Ramsar Information Sheet

Published on 31 January 2024

India

Aghanashini Estuary

Designation date	14 February 2023
Site number	2534
Coordinates	14°30'37"N 74°22'59"E
Area	4 801,00 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

Aghanashini Estuary is formed at the confluence of Aghanashini River with Arabian sea. It is located between latitude 14.3910 -14.5850 N and longitude 74.3040 -74.5160 E. The Aghanashini River originates in the Western Ghats and flows westwards for 117 Kilometre before joining the Arabian sea in Kumta Taluk of Karnataka. The brackish water ecosystem of the Estuary extends to 48 square kilometres and provides diverse ecosystem functions and services including flood and erosion risk mitigation, biodiversity conservation and livelihood support. The Site provides livelihood to 6000-7500 families, the valuation of which is estimated to be around 50,05,035 Indian rupees/hectare/year. It supports livelihood activities including fishing, agriculture, collection of edible bivalves and crabs, shrimp aquaculture, traditional fish farming in the estuarine rice fields (locally known as Gazni rice fields), bivalve shell mining and salt production. Additionally, the mangroves help to protect the shores against storms and cyclones.

The Site has a rich biodiversity which includes 84 species of fish, five species of bivalves, and 45 species of mangroves and mangrove associated species. It also supports a population of 117 species of birds. It is home to several threatened taxa which includes one critically endangered and two endangered species of fishes, five vulnerable species (fishes: three, birds: two), and nine near threatened species (fishes: one, birds: eight). The estuary regularly supports more than 66 water bird species (population size: 58,414; 2014 - 2018) and over 1% of the biogeographic population of 9 wetland bird species (Sterna aurantia, Anhinga melanogaster, Ciconia episcopus, Threskiornis melanocephalus, Egretta gularis, Vanellus malabaricus, Egretta garzetta, Vanellus indicus, Hydroprogne caspia).

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Responsible compiler

Institution/agency: Karnataka Forest Department

Postal address: Office of the Deputy Conservator of Forests, Honnavar Division, Honnavar- 581334, Karnataka

National Ramsar Administrative Authority

Institution/agency: Ministry of Environment, Forests and Climate Change, Government of India

Postal address: Ministry of Environment, Forest and Climate Change
Government of India, Indira Paryavaran Bhawan
Jorbagh Road, New Delhi - 110 003
INDIA

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

From year: 1985

To year: 2021

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish): Aghanashini Estuary

2.2 - Site location

2.2.1 - Defining the Site boundaries

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

Former maps: 0

Boundaries description

The spatial extent of the Site is delineated considering its total water spread (permanently flooded area of 4801 hectares,) and encompassing all ecosystem elements such as mangroves, sand, salt and mud flats and sand dunes, and habitat for diverse flora and fauna such as bivalves, fish, diatoms, crabs and birds. It also includes other man-made components such as estuarine rice fields and aquaculture farms. The boundary of the Site matches with the map of the federal government (Government of Karnataka).

2.2.2 - General location

a) In which large administrative region does the site lie? Kumta Taluk, Uttara Kannada District, Karnataka State, India

b) What is the nearest town or population centre? Kumta, Ankola and Karwar

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): 4801

Area, in hectares (ha) as calculated from GIS boundaries: 4804.455

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Marine Ecoregions of the World (MEOW)	Western India Ecoregion (ID 103) - West Coast of South India

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

<no data available>

☑ Criterion 2 : Rare species and threatened ecological communities

Optional text box to provide further information

Aghanashini estuary is home to a large number of birds included in the IUCN Red List and Wild Life Protection Act of India, 1972. This includes two (02) vulnerable waterbird species- Leptoptilos javanicus (Lesser Adjutant Stork) and River tern (Sterna aurantia) and eight (08) Near threatened species- Anhinga melanogaster (Oriental Darter), Threskiornis melanocephalus (Black-headed Ibis), Limosa limosa (Black-tailed Godwit), Limosa lapponica (Bar-tailed Godwit), Numenius arquata (Eurasian Curlew), Calidris ferruginea (Curlew Sandpiper), Woolly- necked Stork (Ciconia episcopus) and Eurasian Oystercatcher (Haematopus ostralegus).

Additionally, in case of fishes, this Site includes one (01) Critically Endangered species (Glaucostegus halavi- Halavi ray), three (03) Vulnerable species (Acentrogobius griseus- Grey gobi, Cynoglossus macrostomus- Malabar Tonguesole, Pampus argenteus- Silver Pomfret), two (02) Endangered species (Eleutheronema tetradactylum- Four-finger threadfin, Pateobatis bleekeri- Bleeker's whipray) and one (01) Near Threatened species (Scomberomorus commerson- Narrow-barred Spanish mackerel) of fishes.

☑ Criterion 3 : Biological diversity

Justification

The Site is rich in biodiversity and comprises threatened species, which contribute to maintain the biodiversity of the entire biogeographic region.

The Site supports 66 water birds, many of which are widely distributed in the Site and the regional landscape. Some of the important species include the Oriental darter (Anhinga melanogaster), black-headed ibis (Threskiornis melanocephalus), bar-tailed godwit (Limosa lapponica) and the Indian river tern (Sterna aurantia).

It is also home to 45 species of mangroves and mangroves associates plants.

There are 84 species of fishes which includes Brownback trevally (Carangoides praeustus), Mackerel (Rastrelliger kanagurta), Banded Pearl spot (Etroplus suratensis), Asian swamp eel (Monopterus albus) and Humpbacked cardinal (Yarica hyalosoma), and 5 species of bivalves which includes Protapes gallus, Meretrix meretrix, M. casta, Villorita cyprinoides, Anadara granosa (Arca granosa) and Geloina expansa. Some species are amphidromous, while others are adapted to specific habitats provided by the Site and use these habitats for foraging and spawning at different stages of their life cycles.

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

Optional text box to provide further information

The Site supports 15 species of birds during breeding cycle or in adverse condition. This includes Little Cormorant (Microcarbo niger), Indian Shag (Phalacrocorax fuscicollis), Oriental Darter (Anhinga melanogaster), Grey Heron (Ardea cinerea), Little Egret (Egretta garzetta), Western Reef Egret (Egretta Gularis), Purple Heron (Ardea purpurea), Black crowned Night-heron (Nycticorax nycticorax), Indian Pond heron (Ardeola grayii), Cattle Egret (Bulbucus ibis), Asian Openbill (Anastomus oscitans), Pheasant tailed Jacana (Hydrophasianus chirurgus) , Bronzewinged Jacana (Metopidius indicus), Purple Swamp-hen (Porphyrio porphyrio), Red Wattled Lapwing (Vanellus Indicus).

This Site supports critical life cycle stages of 7 fish species which include Halavi ray (Glaucostegus halav), Grey gobi (Acentrogobius griseus), Malabar Tonguesole (Cynoglossus macrostomu), Silver Pomfret, (Pampus argenteus), Four-finger threadfin (Eleutheronema tetradactylum), Bleeker's whipray (Himantura bleekeri) and Narrow-barred Spanish mackerel(Scomberomorus commerson) .

☑ Criterion 5 : >20,000 waterbirds

Overall waterbird numbers: 58415

Start year: 2014

End year: 2018

Source of data: Centre for Ecological Sciences, Indian Institute of Science, Bangalore

Optional text box to provide further information

Annual Bird Count:
2014-15: 60247
2015-16: 59769
2016-17: 53572
2017-18: 60072

Reference: Ramachandra TV, Chandran MDS, Prakash Mesta, Sreekanth Naik, Deepthi Hebbala, Saranya G,
Bharath S, Bhat M, Boominathan M, Vishnu D M, Vinay S and Bharath HA, 2018. Aghanashini Estauay, Karnataka, India: Ramsar wetland of International Importance, Sahyadri Conservation Series 87, ENVIS Technical Report 147, CES, Indian Institute of Science, Bangalore 560012.

☑ Criterion 6 : >1% waterbird population

Optional text box to provide further information

The Aghanashini estuary regularly support more than 1% threshold population of 09 water bird species. Based on the available census data from 2014 to 2018 , the Site supported 1820 individuals of Sterna aurantia representing 3.3 % of the biogeographic population; 60 individuals of Anhinga melanogaster representing 1.5% of the biogeographic population; 320 individuals of Ciconia episcopus representing 1.2% of the biogeographic population, 2454 individuals of Threskiornis melanocephalus representing 9.8 % of the biogeographic population, 452 individuals of Egretta gularis representing 1.8 % of the biogeographic population, 180 individuals of Vanellus malabaricus representing 2.5 % of the biogeographic population, 3490 individuals of Egretta garzetta representing 3.5 % of the biogeographic population, 1200 individuals of Vanellus indicus representing 2.4 % of the biogeographic population and 1670 individuals of Hydroprogne caspia representing 2.4 % of the biogeographic population.

☑ Criterion 7 : Significant and representative fish

Justification: A total of 84 fish species are residents of this Site. A majority of fish found in estuaries are euryhaline marine species which enter the estuary in large numbers at certain phases of their life cycles. Of these, seven species are noteworthy. This includes Glaucostegus halavi, Himantura bleekeri, Eleutheronema tetradactylum, Acentrogobius griseus, Pampus argenteus, Cynoglossus macrostomus; and Scomberomorus commerson.

☑ Criterion 8 : Fish spawning grounds, etc.

Justification: Coastal and estuarine systems of this Site are highly productive environments and are essential breeding and nursery grounds for many fish species, especially those associated with the continental shelf. Most of the estuarine fishes are not permanent residents of this Site, but seasonally migrant from marine areas, especially during early stages of their life. In addition to spawning and nursery grounds, the Site provides food for juveniles born in the coast/ sea areas.

The Site serves as feeding and spawning grounds for around 21 species of fishes. They include Ambassis ambassis, Caranx ignobilis, Crossorhombus azureus, Terapon jarbua, Mugil cephalus, Etroplus suratensis, Stolephorus indicus, Secutor insidiator, Secutor ruconius, Liza parsia, Glossogobius sp., Pomadasys maculatus, Hemiramphus far, Scatophagus argus, Lates calcarifer, Lutjanus argentimaculatus, Lutjanus johnii, Sillago sihama, Strongylura leiura, Thryssa mystax and Parastromateus niger.

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

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Plantae								
TRACHEOPHYTA / MAGNOLIOPSIDA	*Acanthus ilicifolius*	☐	☑	☐	LC	☐		Key floral species in Marshy habitats that provides foraging, roosting and nesting ground to wide range of bird species. Can grow in different salinity ranges and support the biodiversity in this Site.
TRACHEOPHYTA / MAGNOLIOPSIDA	*Aegiceras corniculatum*	☐	☑	☐	LC	☐		This true mangrove species grows naturally in medium salinity ranges and supports the biodiversity in this Site.
TRACHEOPHYTA / MAGNOLIOPSIDA	*Kandelia candel*	☐	☑	☐	LC	☐		This dominant mangrove species grows in high to medium salinity zones and provides habitat to several bird species.

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

Phylum	Scientific 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	*Acentrogobius griseus*	☑	☑	☐	☐	☑	☐	☑	☑				VU	☐	☐		Cri 3, 4: The estuarine water provides suitable habitat for survival of this threatened benthic species. Crit. 7, 8: This amphidromous fish regularly migrates between freshwater areas and the sea in this estuary.

Phylum	Scientific 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 / ACTINOPTERYGII	*Ambassis ambassis*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		This Site provides habitats/micro-habitats and feeding ground for this species. The species feeds on benthos, crustaceans and fish. It thrives in estuarine environment but may enter freshwater areas.
CHORDATA / ACTINOPTERYGII	*Caranx ignobilis*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		This Site provides spawning ground in offshore seaweed reefs and banks; juveniles survives in sandy inshore bottoms and estuary. Also provide variable salinity zones for juveniles and subadults.
CHORDATA / ACTINOPTERYGII	*Chelon parsia*	☐	☐	☐	☐	☑	☐	☑	☑					☐	☐		This species migrates to the tidal rivers and feeds on diatoms and filamentous algae, and to the sea for spawning.
CHORDATA / ACTINOPTERYGII	*Crossorhombus azureus*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		This Site supports the survival of juveniles. Adults and larvae are found in coastal areas.
CHORDATA / ACTINOPTERYGII	*Cynoglossus macrostomus*	☑	☑	☐	☐	☑	☐	☑	☐				VU	☐	☐		Crit. 3, 7: This globally threatened species inhabits shallow and sandy bottoms with different salinity zones from low to high. Cri 4: This Site support complete life cycle of this benthopelagic, non-migratory fish species.
CHORDATA / ACTINOPTERYGII	*Eleutheronema tetradactylum*	☑	☑	☐	☐	☑	☐	☑	☐				EN	☐	☐		Crit. 3, 7: This threatened species feeds on shrimps specifically, which are found mainly on the shallow and muddy coastal areas. The Site provides wide salinity ranges, which are important for survival its survival. Crit. 4: Mangroves are nursery areas for juveniles.
CHORDATA / ACTINOPTERYGII	*Etroplus suratensis*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		Crit. 3, 7: Truly estuarine species and representative fin fish of this estuary. Crit. 8: Spawns at sea and juveniles move into the Estuary.
MOLLUSCA / BIVALVIA	*Geloina expansa*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		This Site supports a good population of this bivalve. As the geographic range of this species is uncertain, its prevalence may be important from the biogeographical regional perspective.
CHORDATA / ELASMOBRANCHII	*Glaucostegus halavi*	☑	☑	☐	☐	☑	☐	☑	☐				CR	☐	☐		Crit. 3, 7: This threatened ray fish is found in the mouth of the estuary, which are its feeding grounds. Crit. 4: The mouth of the estuary also supports the survival of juveniles.
CHORDATA / ACTINOPTERYGII	*Glossogobius sparsipapillus*	☐	☐	☐	☐	☑	☐	☑	☑				DD	☐	☐		This Site supports the survival of larvae during juvenile stages of this species.
CHORDATA / ACTINOPTERYGII	*Hemiramphus far*	☐	☐	☐	☐	☑	☐	☑	☑					☐	☐		Juveniles survive in this estuary and occur in marine – estuarine habitat.
CHORDATA / ACTINOPTERYGII	*Lates calcarifer*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		Young individuals move upstream into the river, while adults move downstream for spawning.
CHORDATA / ACTINOPTERYGII	*Lutjanus argentimaculatus*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		Mangroves and shallow coastal areas support juveniles, while the adults are found at a depth of 80 m below the sea.
CHORDATA / ACTINOPTERYGII	*Lutjanus johnii*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		This species occur in marine and estuarine habitats. Mangrove habitats are nursery grounds.
MOLLUSCA / BIVALVIA	*Meretrix casta*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		This estuary provides euryhaline habitat, especially mudflats, which are important for the survival of this species.

Phylum	Scientific 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								
MOLLUSCA / BIVALVIA	*Meretrix meretrix*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		Reproductive cycle of this estuarine bivalve is dependent on the estuary. The species occurs in high to medium salinity conditions.
CHORDATA / ACTINOPTERYGII	*Mugil cephalus*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		Crit. 3, 7: This is an important estuarine fish species under the mullets group. Crit. 3, 8: Adults spawn at sea, while the juveniles migrate into the estuary, which serves as their main nursery area.
CHORDATA / ACTINOPTERYGII	*Pampus argenteus*	☑	☑	☐	☐	☑	☐	☑	☑				VU	☐	☐		When young, this threatened species migrates to the estuaries, especially when the salinity conditions are favourable.
CHORDATA / ACTINOPTERYGII	*Parastromateus niger*	☐	☑	☐	☐	☑	☐	☑	☑				LC	☐	☐		This Site supports migration of this marine fish species and provides refuge during winter.
CHORDATA / ELASMOBRANCHII	*Pateobatis bleekeri*	☑	☐	☐	☐	☑	☐	☑	☐				EN	☐	☐		The Site provides foraging microhabitats to this endangered species on the inshore soft bottom.
CHORDATA / ACTINOPTERYGII	*Pomadasys maculatus*	☐	☐	☐	☐	☑	☐	☑	☐				LC	☐	☐		This Site provides sandy habitat and feeding ground to this fish species.
MOLLUSCA / BIVALVIA	*Protapes gallus*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		This Site provide sandy mud habitat for survival of this species.
CHORDATA / ACTINOPTERYGII	*Scatophagus argus*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		The fish enters the Site mainly for feeding; the mangrove swamps are its preferred habitats.
CHORDATA / ACTINOPTERYGII	*Scomberomorus commerson*	☐	☑	☐	☐	☑	☐	☑	☐				NT	☐	☐		This species migrates into the high-salinity zone of the Site during peak summer. It also uses the lower reaches of the Site as opportunistic feeding grounds when the salinity conditions are within their osmotic tolerance ranges.
CHORDATA / ACTINOPTERYGII	*Secutor insidiator*	☐	☐	☐	☐	☑	☐	☑	☑					☐	☐		This species inhabits shallow coastal waters and enters brackish waters of this estuary. Tolerates considerable variations in salinity and occurs throughout the estuary during all seasons.
CHORDATA / ACTINOPTERYGII	*Secutor ruconius*	☐	☐	☐	☐	☑	☐	☑	☑					☐	☐		Spawns at sea; juveniles require estuaries for survival.
CHORDATA / ACTINOPTERYGII	*Sillago sihama*	☐	☐	☐	☐	☑	☐	☑	☐				LC	☐	☐		This benthic fishes bury themselves in the bottom mud or sand of this estuary and hunt for their food or feed on detritus.
CHORDATA / ACTINOPTERYGII	*Stolephorus indicus*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		This exclusively marine, enters parts of the estuary when the salinity is high.
CHORDATA / ACTINOPTERYGII	*Strongylura leiura*	☐	☐	☐	☐	☑	☐	☑	☑					☐	☐		Larvae and juveniles are found in mangroves. Mainly occurs in inshore and estuarine habitats and is found mostly in this Site during the rainy season due to an abundance of food provided by the mangroves.
MOLLUSCA / BIVALVIA	*Tegillarca granosa*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		Occur in muddy bottoms, mainly with low salinity zone of this estuary. Spawns throughout the year.
CHORDATA / ACTINOPTERYGII	*Terapon jarbua*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		Spawn at sea and juveniles move into the Site for survival.
CHORDATA / ACTINOPTERYGII	*Thryssa mystax*	☐	☐	☐	☐	☑	☐	☑	☑				LC	☐	☐		Juveniles are found in the mangroves. They feed on mysids, sergestids, larvae of shrimps and fish.

Phylum	Scientific 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								
MOLLUSCA / BIVALVIA	*Villorita cyprinoides*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This clam occurs from brackish to nearly freshwater conditions of this Site. It burrow deeps into the soil to escape adverse conditions when the salinity rises during the summer months.
Birds																	
CHORDATA / AVES	*Accipiter badius*	☐	☐	☐	☐	☐	☑	☐	☐	240	2014-2018		LC	☐	☐		
CHORDATA / AVES	*Actitis hypoleucos*	☐	☐	☐	☐	☑	☑	☐	☐	678	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Aegithina tiphia*	☐	☐	☐	☐	☐	☑	☐	☐	421	2014-2018		LC	☐	☐		
CHORDATA / AVES	*Amaurornis akool*	☐	☐	☐	☐	☑	☑	☐	☐	120	2014-208			☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Amaurornis phoenicurus*	☐	☐	☐	☐	☑	☑	☐	☐	230	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Anas acuta*	☐	☐	☐	☐	☑	☑	☐	☐	1109	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Anas clypeata*	☐	☐	☐	☐	☑	☑	☐	☐	378	2014 - 2018			☐	☐		This species is widely distributed across the Site, but is relatively rarer in the biogeographic region. The presence of this species at the Site, thus helps to maintain the biodiversity of the region.
CHORDATA / AVES	*Anas crecca*	☐	☐	☐	☐	☑	☑	☐	☐	810	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Anas querquedula*	☐	☐	☐	☐	☑	☑	☐	☐	666	2014 - 2018			☐	☐		This species is widely distributed across the Site, but is relatively rarer in the biogeographic region. The presence of this species at the Site, thus helps to maintain the biodiversity of the region.
CHORDATA / AVES	*Anas strepera*	☐	☐	☐	☐	☑	☑	☐	☐	92	2014 - 2018			☐	☐		This species is widely distributed across the Site, but is relatively rarer in the biogeographic region. The presence of this species at the Site, thus helps to maintain the biodiversity of the region.
CHORDATA / AVES	*Anastomus oscitans*	☐	☑	☐	☐	☑	☑	☐	☐	652	2014 -2018		LC	☐	☐		The Site provides shallow water and marshy areas which are important foraging habitats for the juveniles and mangrove micro habitat for roosting.
CHORDATA / AVES	*Anhinga melanogaster*	☐	☑	☑	☐	☑	☑	☐	☐	60	2014-2018	1.5	NT	☐	☐		Crit. 6: S Asia (1% threshold = 40). Crit. 3, 4: The Site provides habitat for roosting and nesting.
CHORDATA / AVES	*Anthracoceros coronatus*	☐	☐	☐	☐	☑	☑	☐	☐	240	2014-2018		NT	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Apus affinis*	☐	☐	☐	☐	☑	☑	☐	☐	245	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.

Phylum	Scientific 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	*Ardea cinerea*	☐	☑	☐	☐	☑	☑	☐	☐	890	2014-2018		LC	☐	☐		The Site provides shallow water and marshy areas for foraging and mangrove micro for nesting /roosting.
CHORDATA / AVES	*Ardea purpurea*	☐	☑	☐	☐	☑	☑	☐	☐	189	2014-2018		LC	☐	☐		Crit. 3, 4: The Site provides microhabitats such as reeds, marshes, mudflats and mangroves for foraging, nesting /roosting.
CHORDATA / AVES	*Ardeola grayii*	☐	☑	☐	☐	☑	☑	☐	☐	940	2014-2018		LC	☐	☐		Crit. 3, 4: The Site provides microhabitats such as marshes, shallow water and mangroves for foraging, nesting /roosting.
CHORDATA / AVES	*Arenaria interpres*	☐	☐	☐	☐	☑	☑	☐	☐	666	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Bubulcus ibis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Crit. 3, 4: The Site provides microhabitats such as marshes, shallow water and meadows for foraging, and mangrove for nesting /roosting.
CHORDATA / AVES	*Butorides striata*	☐	☐	☐	☐	☑	☑	☐	☐	780	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Calidris alba*	☐	☐	☐	☐	☑	☑	☐	☐	578	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Calidris alpina*	☐	☐	☐	☐	☑	☑	☐	☐	410	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Calidris ferruginea*	☐	☐	☐	☐	☑	☑	☐	☐	120	2014-2018		NT	☐	☐		Near-threatened species reported from the Site and thus contributes to maintaining the biodiversity of the biogeographic realm.
CHORDATA / AVES	*Calidris minuta*	☐	☐	☐	☐	☑	☑	☐	☐	230	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Caprimulgus asiaticus*	☐	☐	☐	☐	☑	☑	☐	☐	120	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Centropus bengalensis*	☐	☐	☐	☐	☑	☑	☐	☐	614	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Ceryle rudis*	☐	☐	☐	☐	☑	☑	☐	☐	210	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Chalcophaps indica*	☐	☐	☐	☐	☑	☑	☐	☐	178	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Charadrius alexandrinus*	☐	☐	☐	☐	☑	☑	☐	☐	120	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.

Phylum	Scientific 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	*Charadrius dubius*	☐	☐	☐	☐	☑	☑	☐	☐	189	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Charadrius hiaticula*	☐	☐	☐	☐	☑	☑	☐	☐	410	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Charadrius leschenaultii*	☐	☐	☐	☐	☑	☑	☐	☐	614	2014-2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Charadrius mongolus*	☐	☐	☐	☐	☑	☑	☐	☐	720	2014 -2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Chlidonias hybrida*	☐	☐	☐	☐	☑	☑	☐	☐	92	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Chroicocephalus brunnicephalus*	☐	☑	☐	☐	☑	☑	☐	☐	1923	2014 -2018			☐	☐		The Site provides microhabitats like shallow water and mangroves for foraging, nesting /roosting.
CHORDATA / AVES	*Chroicocephalus genei*	☐	☐	☐	☐	☑	☑	☐	☐	245	2014 -2018			☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Chroicocephalus ridibundus*	☐	☐	☐	☐	☑	☑	☐	☐	1002	2014 -2018			☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Ciconia episcopus*	☐	☐	☑	☐	☑	☑	☐	☐	320	2014 -2018	1.2	NT	☐	☐		The Site supports 1.2% of the regional population of this species; S Asia (1% threshold = 250).
CHORDATA / AVES	*Columba livia*	☐	☐	☐	☐	☑	☑	☐	☐	720	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Coracias benghalensis*	☐	☐	☐	☐	☑	☑	☐	☐	210	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Cuculus canorus*	☐	☐	☐	☐	☑	☑	☐	☐	289	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Dendrocitta vagabunda*	☐	☐	☐	☐	☑	☑	☐	☐	390	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Dendrocygna javanica*	☐	☐	☐	☐	☑	☑	☐	☐	912	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Dicrurus macrocercus*	☐	☐	☐	☐	☑	☑	☐	☐	600	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.

Phylum	Scientific 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	*Dicrurus paradiseus*	☐	☐	☐	☐	☑	☑	☐	☐	320	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Dryocopus javensis*	☐	☐	☐	☐	☑	☑	☐	☐	210	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Egretta garzetta*	☐	☑	☑	☐	☑	☑	☐	☐	3490	2014 -2018	3.5	LC	☐	☐		Crit. 6: S Asia (1% threshold = 1000). Crit. 3, 4: The Site provides microhabitats such as shallow water, marshes, meadow, reeds and mangroves for foraging and nesting /roosting.
CHORDATA / AVES	*Egretta gularis*	☐	☑	☑	☐	☑	☑	☐	☐	452	2014 -2018	1.8	LC	☐	☐		Crit. 6: S Asia (1% threshold = 250). Crit. 3, 4: The Site provides microhabitats such as shallow water and mangroves for foraging and nesting /roosting.
CHORDATA / AVES	*Fulica atra*	☐	☐	☐	☐	☑	☑	☐	☐	890	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Gelochelidon nilotica*	☐	☐	☐	☐	☑	☑	☐	☐	1239	2014 -2018		LC	☐	☐		The Site supports 1.2% of the regional population of this species; S Asia (non-bre, 1% threshold = 1000.
CHORDATA / AVES	*Gracula religiosa*	☐	☐	☐	☐	☑	☑	☐	☐	92	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Haematopus ostralegus*	☐	☐	☐	☐	☑	☑	☐	☐	720	2014 -2018		NT	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Haliaeetus leucogaster*	☐	☐	☐	☐	☑	☑	☐	☐	500	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Haliastur indus*	☐	☐	☐	☐	☑	☑	☐	☐	912	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Himantopus himantopus*	☐	☐	☐	☐	☑	☑	☐	☐	870	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Hirundo smithii*	☐	☐	☐	☐	☑	☑	☐	☐	256	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Hydrophasianus chirurgus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Crit. 3, 4: The Site provides microhabitats such as shallow water and reed marshes for foraging, shallow water plants for nesting /roosting.
CHORDATA / AVES	*Hydroprogne caspia*	☐	☐	☑	☐	☑	☑	☐	☐	1670	2014 -2018	2.4	LC	☐	☐		The Site supports 2.4% of the regional population of this species; S Asia (non-bre, 1% threshold = 710).
CHORDATA / AVES	*Larus fuscus*	☐	☐	☐	☐	☑	☑	☐	☐	992	2014 -2018		LC	☐	☐		The Site provides microhabitats such as shallow water and mangroves for foraging.

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		2	4	6	9	3	5	7	8								
CHORDATA / AVES	*Leptocoma zeylonica*	☐	☐	☐	☐	☑	☑	☐	☐	666	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Leptoptilos javanicus*	☑	☐	☐	☐	☑	☐	☐	☐				VU	☐	☐		Vulnerable species reported from the Site and thus contributes to maintaining the biodiversity of the biogeographic realm.
CHORDATA / AVES	*Limosa lapponica*	☐	☐	☐	☐	☑	☑	☐	☐	360	2014 -2018		NT	☐	☐		Near-threatened species reported from the Site and thus contributes to maintaining the biodiversity of the biogeographic realm.
CHORDATA / AVES	*Limosa limosa*	☐	☐	☐	☐	☑	☑	☐	☐	245	2014 -2018		NT	☐	☐		Near-threatened species reported from the Site and thus contributes to maintaining the biodiversity of the biogeographic realm.
CHORDATA / AVES	*Megalaima viridis*	☐	☐	☐	☐	☑	☑	☐	☐	360	2014 - 2018			☐	☐		This species is widely distributed across the Site, but is relatively rarer in the biogeographic region. The presence of this species at the Site, thus helps to maintain the biodiversity of the region.
CHORDATA / AVES	*Merops orientalis*	☐	☐	☐	☐	☑	☑	☐	☐	700	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Metopidius indicus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The Site provides microhabitats such as reed, marshes and shallow water for foraging, and shallow water plants for nesting /roosting.
CHORDATA / AVES	*Microcarbo niger*	☐	☑	☐	☐	☑	☑	☐	☐	600	2014 -2018		LC	☐	☐		Uses the wetland for nesting and foraging. Contributes to more than 20000 waterbird population.
CHORDATA / AVES	*Milvus migrans*	☐	☐	☐	☐	☑	☑	☐	☐	765	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Mirafra assamica*	☐	☐	☐	☐	☑	☑	☐	☐	782	2014 - 2018		LC	☐	☐		This species is widely distributed across the Site, but is relatively rarer in the biogeographic region. The presence of this species at the Site, thus helps to maintain the biodiversity of the region.
CHORDATA / AVES	*Numenius arquata*	☐	☐	☐	☐	☑	☑	☐	☐	421	2014 -2018		NT	☐	☐		Near-threatened species reported from the Site and thus contributes to maintaining the biodiversity of the biogeographic realm.
CHORDATA / AVES	*Numenius phaeopus*	☐	☐	☐	☐	☑	☑	☐	☐	300	2014 -2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Nycticorax nycticorax*	☐	☑	☐	☐	☑	☑	☐	☐	800	2014 -2018		LC	☐	☐		The Site provides microhabitats such as marshes and shallow water for foraging, and mangroves and reed beds for nesting /roosting grounds.
CHORDATA / AVES	*Ocyceros birostris*	☐	☐	☐	☐	☑	☑	☐	☐	520	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.

Phylum	Scientific 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	*Oriolus chinensis*	☐	☐	☐	☐	☑	☑	☐	☐	390	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Oriolus oriolus*	☐	☐	☐	☐	☑	☑	☐	☐	278	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Oriolus xanthornus*	☐	☐	☐	☐	☑	☑	☐	☐	789	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Orthotomus sutorius*	☐	☐	☐	☐	☑	☑	☐	☐	410	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Pelargopsis capensis*	☐	☐	☐	☐	☑	☑	☐	☐	320	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Pericrocotus ethologus*	☐	☐	☐	☐	☑	☑	☐	☐	178	2014 - 2018		LC	☐	☐		This species is widely distributed across the Site, but is relatively rarer in the biogeographic region. The presence of this species at the Site, thus helps to maintain the biodiversity of the region.
CHORDATA / AVES	*Phalacrocorax carbo*	☐	☐	☐	☐	☑	☐	☐	☐	280	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Phalacrocorax fuscicollis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Uses the wetland for nesting and foraging. Contributes to more than 20000 waterbird population.
CHORDATA / AVES	*Philomachus pugnax*	☐	☐	☐	☐	☑	☑	☐	☐	782	2014 - 2018			☐	☐		This species is widely distributed across the Site, but is relatively rarer in the biogeographic region. The presence of this species at the Site, thus helps to maintain the biodiversity of the region.
CHORDATA / AVES	*Pitta brachyura*	☐	☐	☐	☐	☑	☑	☐	☐	120	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Platalea leucorodia*	☐	☐	☐	☐	☑	☑	☐	☐	230	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Plegadis falcinellus*	☐	☐	☐	☐	☑	☐	☐	☐	350	2014 -2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Pluvialis fulva*	☐	☐	☐	☐	☑	☑	☐	☐	578	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Porphyrio porphyrio*	☐	☑	☐	☐	☑	☐	☐	☐	1200	2014-18		LC	☐	☐		The Site provides habitat for foraging, nesting /roosting.
CHORDATA / AVES	*Psittacula krameri*	☐	☐	☐	☐	☑	☑	☐	☐	340	2014 - 2018			☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.

Phylum	Scientific 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	*Pycnonotus cafer*	☐	☐	☐	☐	☑	☑	☐	☐	452	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Recurvirostra avosetta*	☐	☐	☐	☐	☑	☑	☐	☐	614	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Sterna aurantia*	☑	☐	☑	☐	☑	☑	☐	☐	1820	2014 - 2018	3.3	VU	☐	☐		The Site supports 3.3% of the regional population of this species; S Asia (1% threshold = 550).
CHORDATA / AVES	*Sterna hirundo*	☐	☐	☐	☐	☑	☑	☐	☐	1870	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Tachybaptus ruficollis*	☐	☐	☐	☐	☑	☑	☐	☐	178	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Terpsiphone paradisi*	☐	☐	☐	☐	☑	☑	☐	☐	230	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Thalasseus bengalensis*	☐	☐	☐	☐	☑	☑	☐	☐	782	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Threskiornis melanocephalus*	☐	☐	☑	☐	☑	☑	☐	☐	2454	2014 - 2018	9.8	NT	☐	☐		Near-threatened species reported from the Site and thus contributes to maintaining the biodiversity of the biogeographic realm.
CHORDATA / AVES	*Treron phoenicopterus*	☐	☐	☐	☐	☑	☑	☐	☐	578	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Tringa erythropus*	☐	☐	☐	☐	☑	☑	☐	☐	92	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Tringa glareola*	☐	☐	☐	☐	☑	☑	☐	☐	390	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Tringa nebularia*	☐	☐	☐	☐	☑	☑	☐	☐	320	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Tringa ochropus*	☐	☐	☐	☐	☑	☑	☐	☐	178	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Tringa stagnatilis*	☐	☐	☐	☐	☑	☑	☐	☐	378	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Tringa totanus*	☐	☐	☐	☐	☑	☑	☐	☐	620	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.

Phylum	Scientific 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	*Turdoides affinis*	☐	☐	☐	☐	☑	☑	☐	☐	189	2014 - 2018			☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Turdoides striata*	☐	☐	☐	☐	☑	☑	☐	☐	378	2014 - 2018			☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Tyto alba*	☐	☐	☐	☐	☑	☑	☐	☐	120	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Upupa epops*	☐	☐	☐	☐	☑	☑	☐	☐	127	2014 - 2018		LC	☐	☐		Largely distributed across the Site, and spread across the entire regional landscape. The species is typical of the biogeographic region.
CHORDATA / AVES	*Vanellus indicus*	☐	☑	☑	☐	☑	☑	☐	☐	1200	2014 - 2018	2.4	LC	☐	☐		Crit. 3, 4: The Site provides microhabitats such as reed, marshes and shallow water for foraging, and shallow water plants for nesting /roosting ground. Crit. 6: S Asia (1% threshold = 500).
CHORDATA / AVES	*Vanellus malabaricus*	☐	☐	☑	☐	☑	☑	☐	☐	180	2014 - 2018	2.5	LC	☐	☐		Crit. 6: S Asia (1% threshold = 70).

1) Percentage of the total biogeographic population at the site

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

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
Finfish community	☑	It is characterized mainly by Glaucostegus halavi, Pateobatis bleekeri and Eleutheronema tetradactylum that are especially adapted to estuarine habitat. A majority of the species in this community are euryhaline.	Eleutheronema tetradactylum and Pateobatis bleekeri are endangered while Glaucostegus halavi is a critically endangered species in the IUCN Red List.
Stork community	☐	It is mainly composed of Leptoptilos javanicus, Ciconia episcopus and Threskiornis melanocephalus that are especially adapted to the estuarine habitat and occupy critical habitats in the intertidal areas.	

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

4.1 - Ecological character

The Aghanashini River, also known as the Tadri River, originates in the Central-western Ghats of Karnataka. 181 kilometres of the main section of the River passes through the valleys and gorges of a forested mountainous terrain before reaching a narrow coast where the River widens into a sprawling estuary, meeting the Arabian Sea in the Kumta Taluk (a Taluk is a sub-division of a revenue district in India) in Uttara Kannada District. The estuary is located between the famous temple and touristic town of Gokarna in the north and Kumta town in the south. It is about 48 square kilometres in area and about 13 kilometres long with a narrow brackish water zone extending into the inland.

The estuary and mangrove areas have high quantities of organic carbon stored in the soil (1000 tons/ hectare), which play an important role in mitigating climatic change effects. Water circulation and movement created due to inland freshwater and Arabian Sea tidal influxes help in oxygenation and distribution of nutrients in these areas. During the rainy season, the River has a higher discharge and transport large quantities of organic matter from the tropical forests to the Sea, which helps in creating a very dynamic, unique, highly biodiverse and productive coastal ecosystem. The estuary supports 84 fish taxa of which 13 are marine and migrate to the high salinity zones. It is also home to 117 bird species including both estuary and estuary-dependent birds. The mangrove swamp helps in protecting the shoreline and provides food and protective nursery areas for many marine fishes and prawns to spawn. Besides supporting biodiversity, the Site also helps in reducing contaminants transported from the river to the sea as estuaries act as sinks of suspended particles. Biodegradation and volatilization are some estuarine processes involved in removing such organic micropollutants.

The Site comprises some representative, rare, or unique examples of natural or near-natural wetland type and supports diverse biota and livelihood of 6500 to 7000 families. Fishing is a major activity for about 6000 native fishermen from different communities such as Ambigas, Harikantras and Daljis. Local villages have been cultivating a salt-tolerant rice called Kagga in the estuarine rice fields for generations. Other local livelihood occupations include salt making, water transport, sand and shell mining, mat and basket weaving, boat making, etc. Eco-tourism is also an emerging source of livelihood in some villages. The total economic value (TEV: provisioning, regulating, supporting and information services) of the Site is 50,05,035 Indian rupees/hectare/year. The provisioning services alone amount to about 11,35,847 India rupees/hectare/year.

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

Marine or coastal wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
A: Permanent shallow marine waters	Sea water	0	48	
D: Rocky marine shores	Kallu Pradesha	4	79	
E: Sand, shingle or pebble shores	pebble shores	3	135	
F: Estuarine waters	Aghanashini estuary	1	3923	
G: Intertidal mud, sand or salt flats	Mud flats	2	616	

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/POLYPODIOPSIDA	*Acrostichum aureum*	Mangrove species supporting habitat for water birds and ecological functioning of the estuary. Found in the intermediate estuarine zone in the high intertidal region. It is used as fodder for animals, and also for thatching.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Avicennia marina*	This is a colonizing species found from downstream to intermediate estuarine zones in all intertidal regions. It is a hardy species with high tolerance to hypersaline conditions and regenerates quickly from coppices, both as individuals and as a species.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Avicennia marina marina*	Mangrove species supporting habitat for water birds and ecological functioning of the estuary.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Excoecaria agallocha*	This is a mangrove species which exploits open areas. Large shrubs or small trees occurring along the edges of swamps, on bunds and on wet soils. This species is used for furniture and ornaments.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Rhizophora apiculata*	This species is found in the intermediate estuarine zone in the mid-intertidal region. It is a hardy species, and fast-growing. This is a valuable fuelwood species. It is commonly planted in for use in commercial logging activities.

Invasive alien plant species

Phylum	Scientific name	Impacts
TRACHEOPHYTA/MAGNOLIOPSIDA	*Eupatorium perfoliatum*	Actual (major impacts)

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	% occurrence	Position in range /endemism/other
CHORDATA/ACTINOPTERYGII	*Carangoides praeustus*				Widespread. Juveniles reported to enter the mangrove habitat during monsoon.
CHORDATA/ACTINOPTERYGII	*Monopterus albus*				Estuarine/ freshwater species not encountered commonly. Feeds upon smaller fishes and form an integral part of the estuarine ecosystem.
CHORDATA/ACTINOPTERYGII	*Rastrelliger kanagurta*				Marine species generally inhabiting highly saline areas near the sea front. It is prey of sharks and other marine mammals. Part of local fisheries.
CHORDATA/ACTINOPTERYGII	*Yarica hyalosoma*				Highly adaptive fish that is able to survive marine, brackish and freshwater conditions. Feeds on benthos crabs and prawns.

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
A: Tropical humid climate	Am: Tropical monsoonal (Short dry season; heavy monsoonal rains in other months)

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres): 0

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

- 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.

Aghanashini 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 soils are alluvial at the coast and lateritic in the rest of the catchment. Soil Organic Carbon (SOC) in soil (top 1 m) is about 245-350 mg/ha

4.4.4 - Water regime

Water permanence

Presence?	
Usually permanent water present	No change

Source of water that maintains character of the site

Presence?	Predominant water source	
Marine water	☑	No change

Water destination

Presence?	
Marine	No change

Stability of water regime

Presence?	
Water levels fluctuating (including tidal)	No change

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 ☐

(ECD) Water turbidity and colour	31-93 NTU
(ECD) Light - reaching wetland	>0.5 m
(ECD) Water temperature	The minimum water temperature during January (28 oC) and maximum water temperature of 34 oC during April. The mean water

4.4.6 - Water pH

Acid (pH<5.5) ☐

Circumneutral (pH: 5.5-7.4) ☐

Alkaline (pH>7.4) ☑

Unknown ☐

Please provide further information on pH (optional):

pH between 8.0 – 8.77

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 ☐

(ECD) Dissolved gases in water

Dissolved oxygen ranges from 4.07 mg/l to 7.64 mg/l

4.4.8 - Dissolved or suspended nutrients in water

Eutrophic ☐

Mesotrophic ☐

Oligotrophic ☐

Dystrophic ☐

Unknown ☑

(ECD) Dissolved organic carbon	DOC varies at a broad range, from 82 to 262 µM

(ECD) Redox potential of water and sediments	280–426 mV
(ECD) Water conductivity	24.80- 41.29mS/ cms

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:

The surrounding area of the Site is predominantly agricultural. Paddy crops are the dominant crop-types in these fields. The surrounding area has a high density of human population as there are many villages surrounding the Site. The area within the Site and the surrounding area are also subjected to sand-mining which has impacts on the biodiversity.

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

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	High
Hazard reduction	Coastal shoreline and river bank stabilization and storm protection	High

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Water sports and activities	Medium
Spiritual and inspirational	Cultural heritage (historical and archaeological)	Medium
Scientific and educational	Educational activities and opportunities	Medium

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
Nutrient cycling	Storage, recycling, processing and acquisition of nutrients	Medium
Pollination	Support for pollinators	Low

Within the site:	100,000
Outside the site:	1 million

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):

Valuation of Aghanashini Estuarine Ecosystem Goods and Services, November 2019, Journal of Biodiversity 10(1-2), DOI: 10.31901/24566543.2019/10.1-2.093. Economic valuation is a tool to aid and improve wise use and management of natural resources by providing a means for measuring and comparing the various benefits of those resources. The present study is based on the valuation of ecosystem goods and services from the Aghanashini estuary in Uttara Kannada district, Karnataka. The provisioning services provided by this estuary is about 11,35,847 Rs/hectare/year, which highlights the significance of an estuarine ecosystem in sustaining livelihood of 6000 - 7500 families. The total economic value (provisioning, regulating, supporting and information services) of Aghanashini is 50,05,035 Rs/hectare/year. This highlights the contributions by estuarine ecosystems in sustaining the economy of the district while providing jobs to thousands of ecosystem people in the region. Quantification of all benefits associated with coastal ecosystem goods and services, would help in arriving at an appropriate policy and managerial decisions. In absence of such valuations, decisions are skewed in favour of environmentally degrading practices by neglecting the diffuse social interests that benefit from the use and non-use values and benefits of fragile ecosystems. Available at : https://www.researchgate.net/publication/338193800_Valuation_of_Aghanashini_Estuarine_Ecosystem_Good s_and_Services

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 ☐

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

Description if applicable

Traditional management of estuarine rice fields: The estuary of Aghanashini had an old rice farming system, which didn't not need manure or pesticides and required very little soil maintenance. Earthen embankments were made to protect the rice fields from tidal waters. Mangroves were planted alongside for protecting the mud walls from getting washed away in rains and floods. Salt tolerant Kagga rice were planted after the start of the monsoon, before which the fields were drained and dried of the salt water through sluice gates. The salt diluted as the rain water collected in the Gazni rice fields. After this, the paddy's seeds were planted. The crop was harvested in November. Thereafter, the sluice gates were opened permitting tidal waters to enter the Gazni fields through natural estuarine channels, which were also known as the Kodis. Fishing families traditionally shared the Kodis inside the Gaznis for fishing. The Gaznis of Aghanashini estuarine belt ranged in different sizes, from few hectares to few hundred hectares, and each field was managed by a group of farmers co-operatively. Fishing by farmers was limited to their family consumption and not for sale. Hundreds of women and children of all castes throughout the estuary gathered food bivalves.

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 ☐

4.6 - Ecological processes

(ECD) Primary production	The mean annual primary production ranges from 1100- 1350 g/m2 of dry matter, which is higher than the values of 125, 360, 400 and 650 g/m2 of open oceans, continental shelves, lakes and cultivated land, respectively.
(ECD) Nutrient cycling	Aghanshini River is a free flowing river with a natural flow regime which carry nutrient rich sediment from the inland tropical forests.
(ECD) Carbon cycling	Newly fallen mangrove litter in Aghanashini loose about 20–40 % of organic carbon when submerged in seawater for 10–14 days from decay, which leaches significant amount of soluble organic substances.
(ECD) Animal reproductive productivity	Due to good mangrove coverage, the Site is becoming a big producer of edible mangrove-associated mud crabs. The most important of these crabs are Scylla serrata and S. olivacea.
(ECD) Vegetational productivity, pollination, regeneration processes, succession, role of fire, etc.	Natural regeneration is plentiful, especially in shallow places with low tidal effects. Sonneratia caseolaris consists of trees up to 12 m height. Soft corky pneumatophores longer than that of S. alba, reaching up to 1 m are found here.
(ECD) Notable species interactions, including grazing, predation, competition, diseases and pathogens	The mangroves that flourish in the estuary also provide ideal habitats for fish breeding and confer on the fish relative safety from predators and humans.
(ECD) Notable aspects concerning animal and plant dispersal	Several taxa spawned in the estuary, but their early stages were transported seaward by tides whereas later zoae and megalopae were recruited back into the estuary. For some species, larvae were retained in the mangrove areas and not exported.
(ECD) Notable aspects concerning migration	Many winter migrant populations of shorebirds feed almost exclusively on intertidal benthic invertebrates of estuarine mudflats at low tide.

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
Provincial/region/state government	☑	☑

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Cooperative/collective (e.g., farmers cooperative)	☐	☑
Other types of private/individual owner(s)	☐	☑

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

The Site is under the jurisdiction of the Karnataka Forest Department, Government of Karnataka

5.1.2 - Management authority

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

Provide the name and/or title of the person or people with responsibility for the wetland: Principle Chief Conservator of Forests, Government of Karnataka

Postal address: 4th Floor, Aranya Bhavan, 18th Cross, Malleshwaram, Bengaluru – 560003, Karnataka

E-mail address: pccfkar@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
Unspecified development	Medium impact	Medium impact	☑	☑

Water regulation

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Canalisation and river regulation	Low impact	High impact	☐	☑

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Marine and freshwater aquaculture	Low impact	Medium impact	☑	☐

Transportation and service corridors

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Shipping lanes	High impact	High impact	☑	☐

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Fishing and harvesting aquatic resources	High impact	High impact	☑	☐

Human intrusions and disturbance

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Recreational and tourism activities	High impact	High impact	☑	☑

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Unspecified/others	Medium impact	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
Habitat shifting and alteration	Low impact	Medium impact	☑	☑

5.2.2 - Legal conservation status

<no data available>

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 ☐

<no data available>

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Proposed

Habitat

Measures	Status
Habitat manipulation/enhancement	Partially implemented

Species

Measures	Status
Threatened/rare species management programmes	Proposed

Human Activities

Measures	Status
Fisheries management/regulation	Implemented

5.2.5 - Management planning

Is there a site-specific management plan for the site? No

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 ◉

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
Soil quality	Implemented
Water quality	Implemented
Water regime monitoring	Implemented

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

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5. Ramachandra, T.V., Kiran R and Ahalya N. 2002, Status, Conservation and Management of Wetlands, Allied Publishers Pvt Ltd, Bangalore.
6. Ramachandra T.V., Bharath S. (2021) Carbon Footprint of Karnataka: Accounting of Sources and Sinks. In: Muthu S.S. (eds) Carbon Footprint Case Studies. Environmental Footprints and Eco-design of Products and Processes. Springer, Singapore. https://doi.org/10.1007/978-981-15-9577-6_3
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14. Ramachandra T V, Saranya Gunasekaran, 2020. Sustainable biofuel production from estuarine diatoms,Green Chemistry & Technology Letters, eISSN: 2455-3611, Vol 6, No 2, 2020, pp 01-17, https://doi.org/10.18510/gctl.2020.621
15. G. Saranya, T.V. Ramachandra, 2021. Scope for biodiesel and bioactive compounds production in the diatom Nitzschia punctata, Fuel, Volume 300, 120985, ISSN 0016-2361, https://doi.org/10.1016/j.fuel.2021.120985.

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)
<2 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
<no file available>

vi. other published literature
<1 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

Sanikatta salt pans of Aghanashini (*CES, IISC, Bangalore, 08-08-2022*)

Aghanashini estuary fringed with mangroves blending with the foothills of the Western ghats (*CES, IISC, Bangalore, 08-08-2018*)

Aghanashini Estuary (*CES, IISC, Bangalore, 07-08-2018*)

6.1.4 - Designation letter and related data

Designation letter
<1 file(s) uploaded>

Date of Designation: 2023-02-14