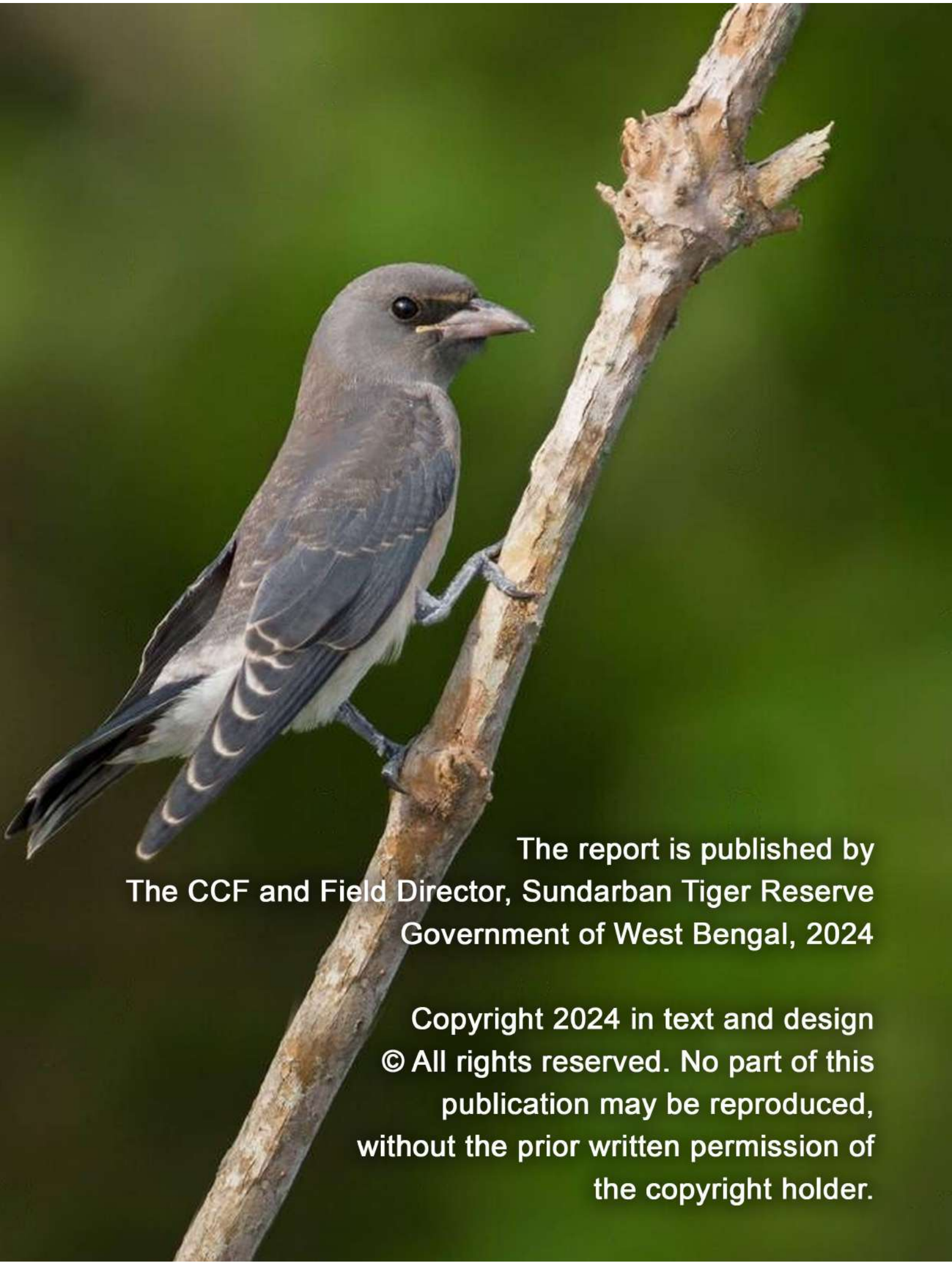
2ND SUNDARBAN BIRD FESTIVAL

Conservation of Avifauna

2024



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Contents

Executive Summary

Sundarban Tiger Reserve (STR) and South 24 Parganas Division under the guidance of Wildlife Wing of the West Bengal Forest Department has organized the 2nd Sundarban Bird Festival (SBF) on 17th to 20th January, 2024 with the objective of bringing in awareness about the conservation of Avifauna in Sundarbans.

2nd Bird Festival was inaugurated in the gracious presence of Shri Debal Ray IFS, PCCF(Wildlife) & Chief Wildlife Warden along with Shri.Nilanjan Mallick IFS, APCCF & Director Sundarban Biosphere Reserve (SBR), CCF & Field Director, STR, Deputy Field Director, Assistant Field Directors, staff of Sundarban Tiger Reserve on 17th January, 2024.

Post the inaugural session, the orientation and training session continued. Short informative sessions were held on the topics like Evolutionary aspect of ornithology, Training and identification of waders, Bird migration all with specific focus to Sundarbans followed by a photography orientation session by renowned wildlife photographer Dhritiman Mukherjee. A thorough orientation on the Data collection protocol, roles of different persons in the team, and the expected outcome of the exercise was completed.

Six resource persons along with twenty four (24) participants and other field staff were then divided into 6 different teams each with the responsibility to cover the specific routes within a 2 day period. Each team was led by the Resourse person as the knowledge head and the staff member as the Team head.

The weather condition on the selected dates unfortunately was unfavourable for birding as there were untimely rains and cloudy weather throughout the exercise. Despite that, **145** bird species were recorded. A total of approximately **8776** numbers of birds were sighted in the 2 day exercise.

National Park West (NPW) team recorded the most number of species sightings - 75, followed by Basirhat (70); Sajnekhali (69); National Park East (66); Kalas (47) and Matla (42) team, some of the birds species are common between different range areas. 7 out of 9 species of Kingfishers were recorded in the 2nd Sundarban Bird Festival.

34 species of mudflat birds; 11 raptors; 84 forest birds and 6 waterfowls were found in their respective microhabitats. Seeing the numbers through the lens of the Protection Regime, 79 species were observed in the core area; 74 in the buffer and 42 species beyond the protected area.

Out of all the threatened species of birds as per the State of Indian Birds Report (SoIB) 2023, 14 species were recorded during the bird trails. The panel discussion on 20th January with the Resource Persons and the participants, existing and emergent issues related to the conservation of avifauna were discussed in detail and deliberated for determining the future course of action.

STR owes their deep gratitude to the officials of the South 24 Pgs forest division, the resource persons, the participants and the frontline staff for their support and encouragement that made the 2nd Sundarban Bird Festival a resounding success.

SUNDARBAN BIRD FESTIVAL

at a Glance

145
Bird Species sighted

8776
Total Number of Bird Sighted

14
Threatened Bird Species Sighted

7
Number of Species of Kingfisher Sighted

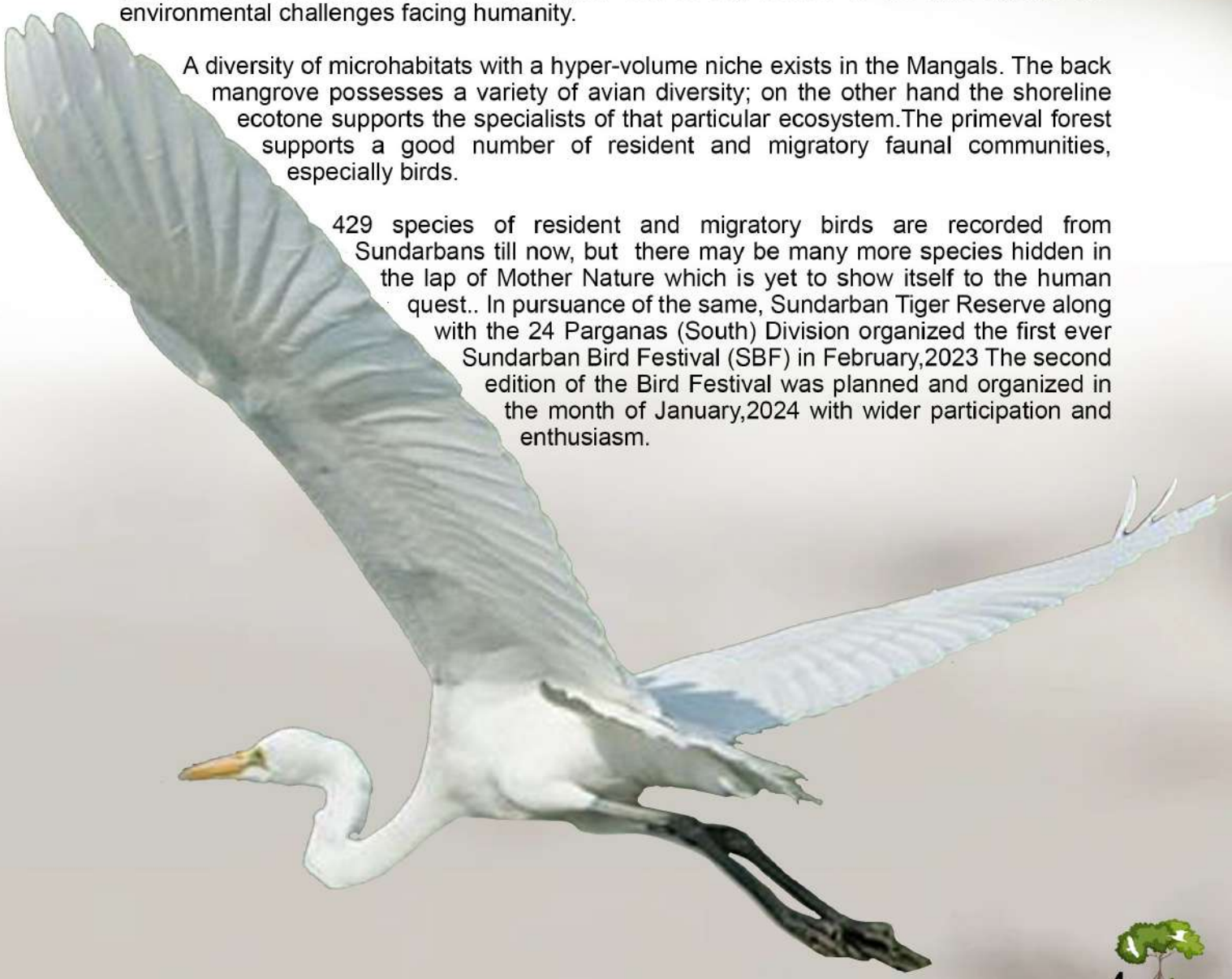
Bird's eye view of the Festival

The Sundarban – the only mangrove tiger-land, is composed of innumerous islands interspersed in a maze of rivers, rivulets, and creeks. The Dampier-Hodges line separates the Sundarbans from the rest of West Bengal. On the eastern boundary, neighbouring country Bangladesh is separated by the rivers like- Kalindi, Raimangal and Harinbhanga. On the western boundary lies the territorial division of 24-Parganas (South) and towards the south lies the Bay of Bengal. As we know this pristine forest has several diamonds on its crown, being designated as part of the Man and Biosphere Reserve Programme, a UNESCO World Heritage Site, the Ramsar Site of international importance and the CATS accredited land of Mangals.

Daily inundation of the landscape by high tides and low tides and silt deposition makes the mangrove delta a haven for natural coastal barrier- the 'Mysterious Mangrove'. Some of the areas are inaccessible throughout the year, due to natural constraints. Tiger reserves are not only the land of tigers, it also possesses a lot of co-predators, avian biodiversity, invertebrates, insects and some unknown natural wonders. It is our duty to create awareness among the people about the biodiversity of the region and its importance in the fight against the environmental challenges facing humanity.

A diversity of microhabitats with a hyper-volume niche exists in the Mangals. The back mangrove possesses a variety of avian diversity; on the other hand the shoreline ecotone supports the specialists of that particular ecosystem.The primeval forest supports a good number of resident and migratory faunal communities, especially birds.

429 species of resident and migratory birds are recorded from Sundarbans till now, but there may be many more species hidden in the lap of Mother Nature which is yet to show itself to the human quest.. In pursuance of the same, Sundarban Tiger Reserve along with the 24 Parganas (South) Division organized the first ever Sundarban Bird Festival (SBF) in February,2023 The second edition of the Bird Festival was planned and organized in the month of January,2024 with wider participation and enthusiasm.



Registration:

Registration was done through online mode and was widely publised by Sundarban Tiger Reserve and Wildlife Wing under Directorate of Forests in their respective websites and through media channels from January 2024. Enthusiastic Birders from all over India and even from the USA had registered and participated in the exercise. The overwhelming registration numbers meant that a selection process was done to select the participants.

Inaugural Ceremony & Orientation Program:

Second Edition of the Bird Festival Program was timed as per the Neap tide phase of the moon from 17th to 20th January,2024. The inauguration and orientation program was done from 2.00pm on 17th January followed by team selection and travel by teams to their respective Bird trial regions.

Team Composition:

6 Birding Teams

Each Team comprising - A Resource Person - as Knowledge Head, A Staff Member - as Team Head, 4 Participants and Boat crew.

Equipment and Materials

Necessary Gears for birding - Binoculars, Cameras, Birds of Sundarbans book
Data sheet for collection of Sighting data along with Excel sheet
Fooding and lodging arrangements for the next 3 Days

Birding Trails:

6 Trails covering the Maximum area of Indian Sundarbans

National Park East, National Park West, Basirhat, Sajnekhali Wildlife Sanctuary, Kalas, Matla.

The teams covered the trails within the 2 Day period recording the occurrence of bird species, their numbers and other habitat related aspects of the sightings.

The route maps of the first Sundarban Bird Festival 2023 are attached in Annexure 2.

Data Collection and Submission:

Data was collected as per the protocol established. The format for Data Collection is attached as Annexure 3.

On 20th January, 2024 the teams submitted the data to the Research Assistant of Sundarban Tiger Reserve for further compilation and analysis of the report.

Detailed Result & Analysis

During the whole exercise, despite the unfavourable weather conditions of rains and cloudy weather. 145 different species of birds were sighted and 8776 (approximately) number of birds were counted in total. The details of the species, number of sightings and other details are attached as Annexure 1.

Bird sightings with respect to Habitats and Ecotones

Upon further analysis of the bird species with respect to the major habitat they occupy the following detail emerges.

Habitat	Number of species
• Mudflat, Waders & Shore birds	**34**
• Raptors	**11**
• Forest birds	**84**
• Waterfowl	**6**

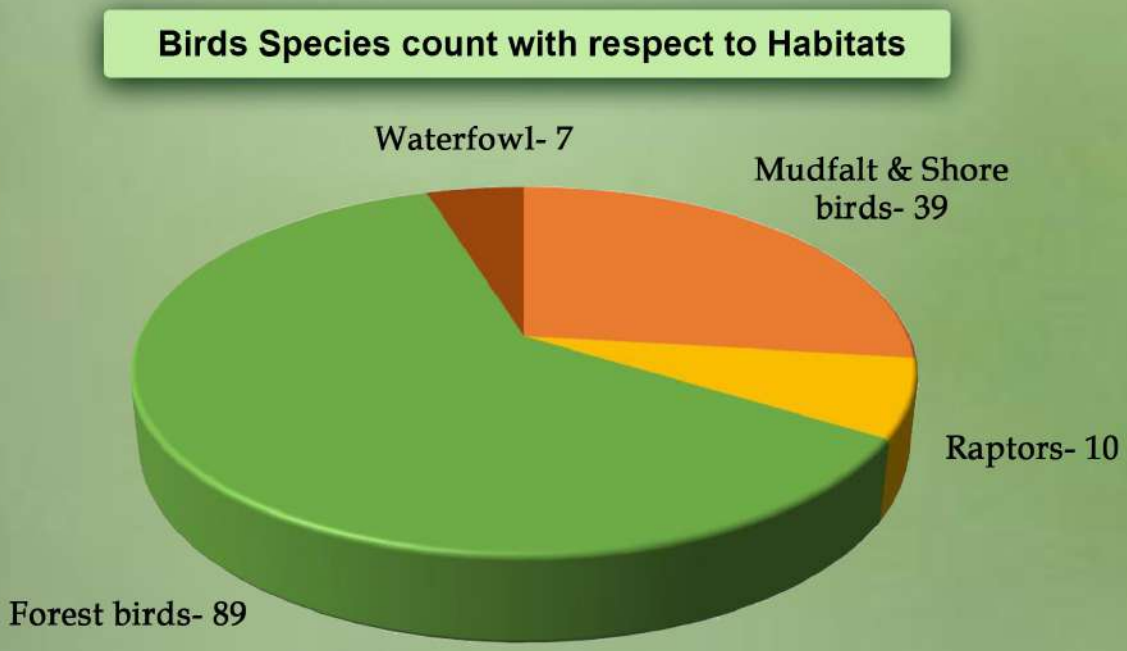


Fig. 1 Avian species count with respect to Habitat, based on SBF 2024.

The mangrove forests in Sundarbans covers almost 70% of the total area of Sundarbans remaining of which is covered by the major rivers and tidal mudflats. The numbers of species recorded is in line with the habitat area as forest birds dominate in the number of species sighted. But the numbers are merely the birds sighted along the river banks and creeks. The actual numbers are still much greater but due to the dangers in accessing the interiors of the forest it is difficult to take it as part of the exercise.

Secondly, it is clearly seen that the wetland ecosystem of the Sundarbans dominates the Avian landscape in comparison to the other microhabitats found in Sundarbans. The shallow depth in most of the mudflat zones - shore regions and the influx -replenishment of the nutrients in every tide cycle clearly provides a richer habitat and niche for many waders and shore birds in Sundarbans.

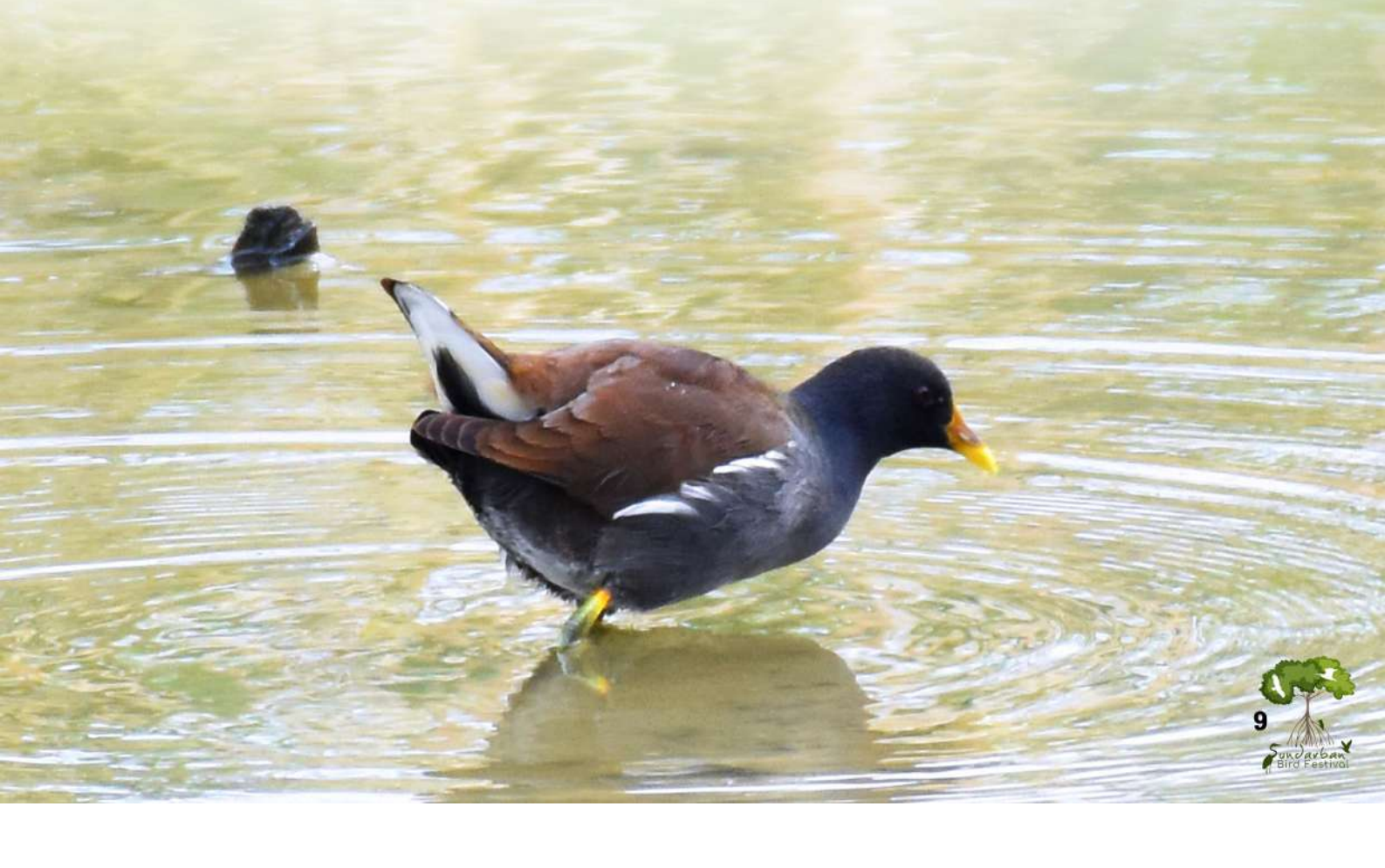
The mudflats and the shoreline are the most significant zone of natural nutrient cycling in Sundarbans and is the ecotone of land and aquatic ecosystems as it is the zone of mixing of the brackish waters with the mudflat or the sandy beaches. The natural nutrient cycling by the mudflat species (fiddler crabs, mudskippers etc.) enriched with natural leaf litter boost the dynamic ecotone. Several species depend exclusively on the mudflats, like Sand Plovers, Eurasian Curlew, Whimbrel etc. The mudflat specialists are one of the bio-indicators of the mangrove ecotone. It depicts that the mudflats and shorelines are the most important habitats for birds, especially the birds under watch according to the Central Asian Flyway list. These mudflats are distributed among both the forest areas and inhabited islands in which the largest areas fall under the Human inhabited islands. Many migratory birds come every year in Sundarbans. So, conservation of long-distance migrants requires identifying and maintaining the health of critical habitats including intertidal mudflats, mangroves, grasslands, open wetlands, paddyfields, and reedbeds. This ensures that they are able to feed and build up resources for their arduous migration journeys.

Shoreline Ecotone
Mudflat ecotone and Sandy beaches e.g. Whimbrel, Eurasian Curlew etc. are found.

Canopy
Mostly Raptors are observed, e.g. White breasted Sea Eagle, Brahminy Kite etc. are found.

Typical Mangrove Forest Floor
Highest mixing of organic matters, leaf litter with nutrients, e.g. Red Jungle Fowl, Ruddy-breasted Crake etc. are found.

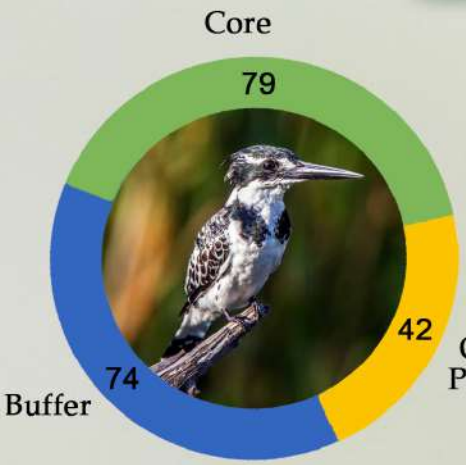
Mangrove Branches and hollow deadwoods
Birds do nesting in seasons, Pied Kingfisher, Various Owls and Parakeets are found in this habitat.



Avifaunal distribution and occurrence with respect to degree of Protection

Bird Trial	Species sighted	Number of Birds sighted
National Park West Range (Core Area of Tiger Reserve)	Mudflat, Waders & Shore birds - 24	376
	Raptors - 04	19
	Forest birds - 44	288
	Waterfowl - 03	109
	No. of species sighted in NPW= 75	**No. of birds sighted in NPW= 792**
National Park East Range (Core Area of Tiger Reserve)	Mudflat, Waders & Shore birds - 30	359
	Raptors - 05	25
	Forest birds - 28	161
	Waterfowl - 03	71
	No. of species sighted in NPE= 66	**No. of birds sighted in NPE= 616**
Basirhat	Mudflat, Waders & Shore birds -23	303
	Raptors - 06	08
	Forest birds - 39	158
	Waterfowl - 02	03
	No. of species sighted in Basirhat = 70	**No. of birds sighted in Basirhat = 472**
Sajnekhali Wildlife Sanctuary	Mudflat, Waders & Shore birds - 24	314
	Raptors - 02	02
	Forest birds - 41	217
	Waterfowl - 02	216
	No. of species sighted in SWLS = 69	**No. of birds sighted in SWLS = 749**
Kalas	Mudflat, Waders & Shore birds - 27	469
	Raptors - 01	07
	Forest birds - 17	44
	Waterfowl - 02	26
	No. of species sighted in Kalas = 47	**No. of birds sighted in Kalas= 546**
Matla	Mudflat, Waders & Shore birds -28	2267
	Raptors - 03	03
	Forest birds - 06	17
	Waterfowl - 05	3314
	No. of species sighted in Matla = 42	**No. of birds sighted in Matla= 5601**

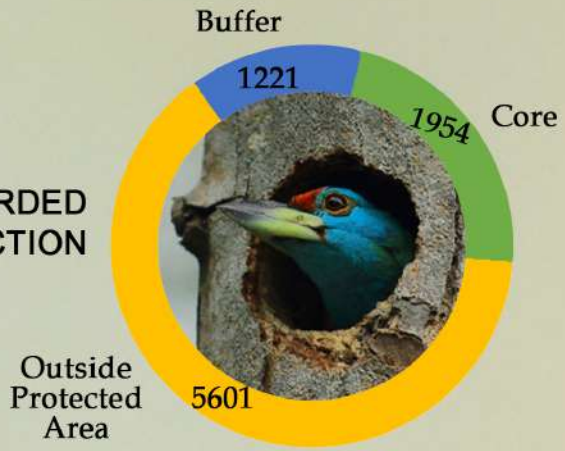
Species Recorded from different Areas



NUMBER OF SPECIES WITH RESPECT TO DEGREE OF PROTECTION

Number of Birds Recorded from Different Areas

NUMBER OF INDIVIDUAL BIRDS RECORDED WITH RESPECT TO DEGREE OF PROTECTION



The above numbers clearly shows certain trends, the greater the protection and lesser the disturbance due to human presence, both the resident and migratory species prefer such locations. Core and Buffer areas has the maximum number of species sighted.

Interestingly, the number of birds sighted in Non protected areas in Matla route is much higher than the number of birds sighted in protected areas. This clearly shows that for certain species of birds the habitats found in non protected areas are more suitable that they congregate in those locations in greater numbers. This shows there needs to be a considerable degree of protection and habitat conservation in those hotspots.

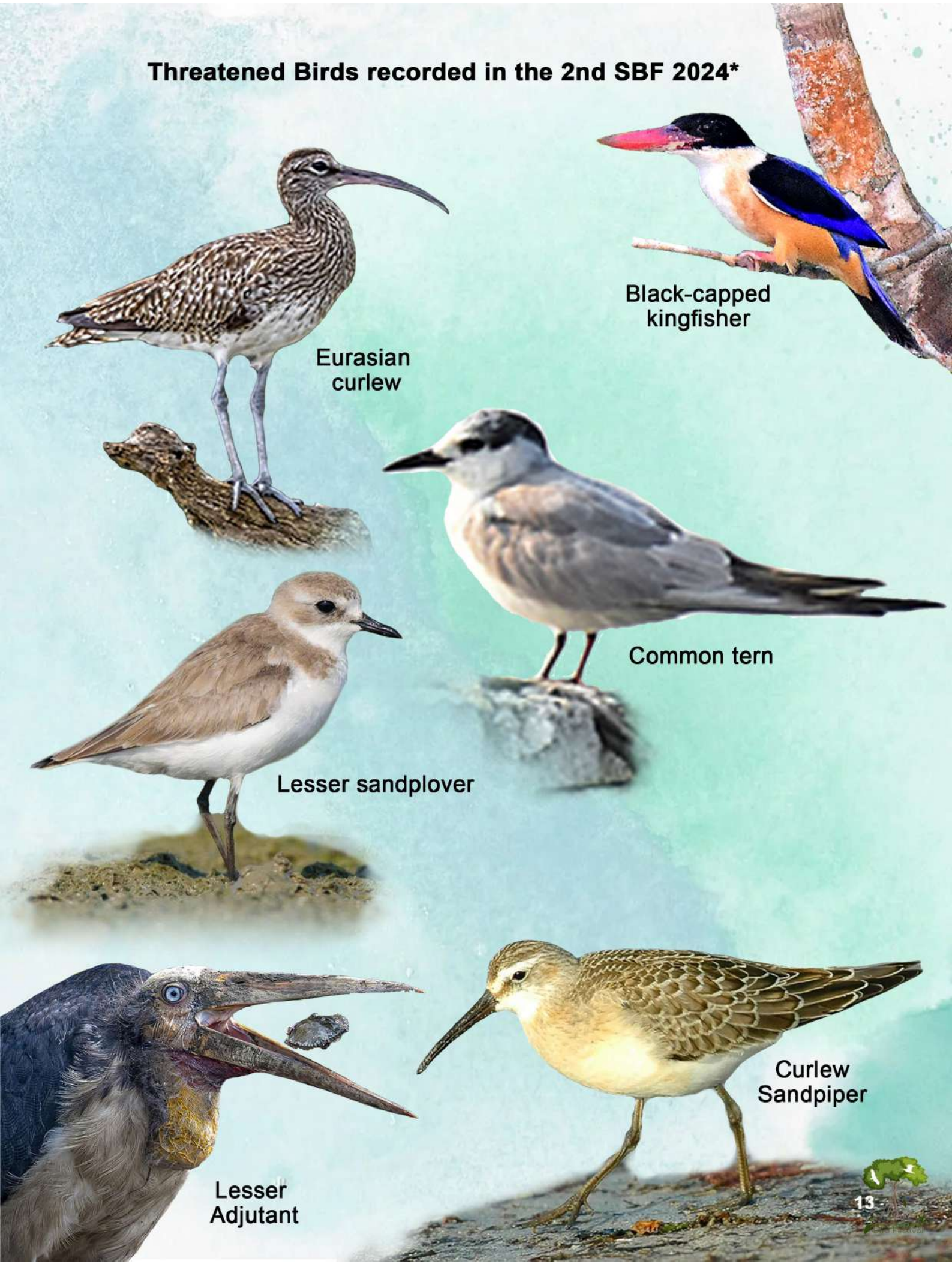
Sundarban's importance in the migratory pathway of threatened birds:

The Sundarbans is a very dynamic ecosystem, which has various types of avian habitats and it is in the overlapping zone of two of the important Bird flyways in the world namely the Central Asian Flyway and East Asian- Eurasian Flyway. Hence an important question to answer is which habitats are most important in connection with the Central Asian Flyway and East Asian- Australasian Flyway and the status of those habitats to ensure conservation of the habitats in the long run.

Based on the State of Indian Birds Report (SoIB) 2023, 14 species of threatened birds were recorded in the two days bird trail. Among the 14 threatened species, three species are considered as the highest priority species of West Bengal, namely: Brown- winged Kingfisher, Black- capped Kingfisher and Lesser Adjutant.

The list of the Bird species along with the status of population as per the SoIB 2023 is attached as Annexure 4.

Studying the threats to the habitats and the conservation of these threatened species wil invariably protect the habitats of all the other species as they include birds from all the habitat ecotypes mentioned in the previous discussion. And hence the threats and measures to be taken to protect the species is discussed in detail.


Threatened Birds recorded in the 2nd SBF 2024*
Black-capped kingfisher
Eurasian curlew
Common tern
Lesser sandplover
Curlew Sandpiper
Lesser Adjutant
13

*According to the State of Indian Birds Report 2023

Threats to the Conservation of Avifauna in Sundarbans:

The threats of the avifauna of Sundarbans can be broadly categorized into two sections-

Drastic habitat loss due to natural and Climate Change related events-

Sundarban Landscape Dynamism: Geologically, Sundarbans being a very active and young estuary the landscape is being sculpted by the influence of the tidal forces and the energy in the system. This has resulted in accretion and erosion in various regions resulting in creation and destruction of habitats like the mudflats, low slope banks, grass dominated flats etc.

With the current trends, more of such land is being eroded in the southern coastline which is relatively much protected as they fall under the protected areas. While new lands and chors are formed along the northern sides along the habited islands which are relatively less protected and subject to much human disturbances like fishing, netting etc.

This is an important aspect to look for as the habitats that are vital for the migratory routes of the birds are now widely prevalent in the habited areas and hence the conservation policy and interventions should focus beyond the protected areas and involve local community and administration in the picture.

Increasing frequency and intensity of Cyclones: Frequent cyclones have destroyed tall trees and mangroves especially along the shorelines and southern region of the Sundarbans. This has resulted in the marked decrease in the sighting of Raptor species in the Sundarbans which prefer highly elevated trees for nesting. Though the Sundarbans falls under the subtropical climatic zone, cyclones in the Bay of Bengal are very common in summer seasons. These catastrophic events push the habitat destruction to a certain level, and thereby the habitats preferred by the residents and the migratory species are destroyed. The raptors mostly prefer tree canopy layers, which are destroyed after severe cyclones.

Anthropogenic disturbances-

Fishing activities and related destruction of Habitats: Destructive fishing nets (Trawling nets, Khalpata, Chorpata, Benti Jal) and fishing practices especially along the shorelines and mudflats regions in the habited areas is the biggest threat to conservation of the bird migratory and residential bird species. This destroys the most active and replenishing habitat of the Mangrove ecotone which is the prime niche and foraging habitat for many waders, water fowls and most of the forest birds.

Poaching and Disturbances for nesting, roosting: Since most of the prime habitats like the mudflats, chores are found in the unprotected areas dominated by human habitations, the threats related to poaching of the birds is high. This disturbs the birds and their behaviour to a great extent. There have been cases of locals disturbing the nests of the roosting herons and some migratory birds which is a grave threat to the conservation of the species.

Pollution & Waste Disposal: Though STR has banned single- use plastic in the entire Tiger Reserve area, but it is not restricted throughout the lower Gangetic basin. Entire pollutants, specifically the plastics carried out through the Hooghly- Matla river system and mixed with the Bay of Bengal. As the daily twice tidal influx, these plastics and microplastics penetrate into the mudflats, sandy shores and other mangrove entities. These should be checked for the good health of the habitat of the mudflat birds as well as waders.

Vessel movements and related disturbances: Huge barges moving along the river channels in Sundarbans has destroyed the natural accretion cycles due to the huge propellers. Oil spillages and Fly Ash mixing in the habitat is another big threat to conservation of the fragile habitats found in Sundarbans.

The vibration created by the propellers of the fishing trawlers, mechanized boats may restrict the breeding and normal behaviour of birds and other associated fauna which is a threat to the conservation.

Indiscriminate Plantation activities: Mangrove plantation has become the buzzword for coastal protection and indiscriminate plantation activities by NGOs, govt agencies, and local population on ecotones like mudflats, grasslands has resulted in destruction of the niches of many waders and shore birds.

Interventions to ensure sustainable Conservation of avifauna in Sundarbans:

Sundarbans is one of the large wintering sites for a whole host of trans-boundary migrants and is critical to the future of many globally threatened species. The following interventions are proposed for the conservation of birds in Sundarbans.

- **Detailed Habitat Study throughout the landscape:** Mapping the important habitats for birds both in protected areas and in non protected areas to create the base line map to ensure that the conservation measures are more focussed. The maps should be updated on a yearly basis as the delta and the landscape is very dynamic and the protection measure shall be focussed with respect to the changes. Habitat study may contain the following categorisation of Habitats
  - Critical Habitat: Habitats like the mudflats, grasslands and shores that are critical for the migration, foraging, breeding of the migratory and residential birds need to be demarcated.
  - Buffer Habitat: The resting and occasionally visited areas and the wetland areas adjoining the critical habitats are to be demarcated as the Buffer habitat.
  - Potential Habitats:The study should also include the potential habitats - i.e. emerging mudflats, shorelines so that efforts in the future can be concentrated in those areas.
  - Breeding and Roosting Sites: To demarcate out the remote breeding and nesting habitats of migratory species through bird survey and local knowledge base.
- **Critical and Buffer Habitat Plans:** Separate plans for protection and conservation of the critical habitats and buffer habitats which are demarcated in the detailed habitat study. Specific focus should be placed on involving the local communities wherever these habitats are falling in the human dominated areas.
- **Creation of Small Protected areas** (i.e. conservation reserve) in Non-Forest areas which are critical for Bird breeding, foraging and Migration. No disturbance zone (Silence Zone) may be declared in such Conservation reserve/ Community Reserve.
- **Access & Benefit Sharing among Stakeholders:** Benefit sharing mechanism from Tourism, Bird watching for the locals to ensure sustainable protection of the habitats and the birds.
  - Pakhimitras for every such habitat may be engaged who will pioneer the cause of conservation of the birds in the areas.
- **Communication with Line Departments:** Constant communication with line departments like P&RD, Irrigation department so as to ensure minimum disturbance to the habitats due to earthworks, construction of embankments etc.
- **Pollution Prevention Measures:** Plastic and other pollution prevention measuers should be planned and integrated for the whole Sundarban Biosphere Reserve and all the upstream rivers.
- **Monitoring of Migration Patterns:** GPS- based rings, tags and other advanced methods and coordination with the other countries for monitoring the migration patterns and better understanding the importance of Sundarbans as migratory route is to be taken up.

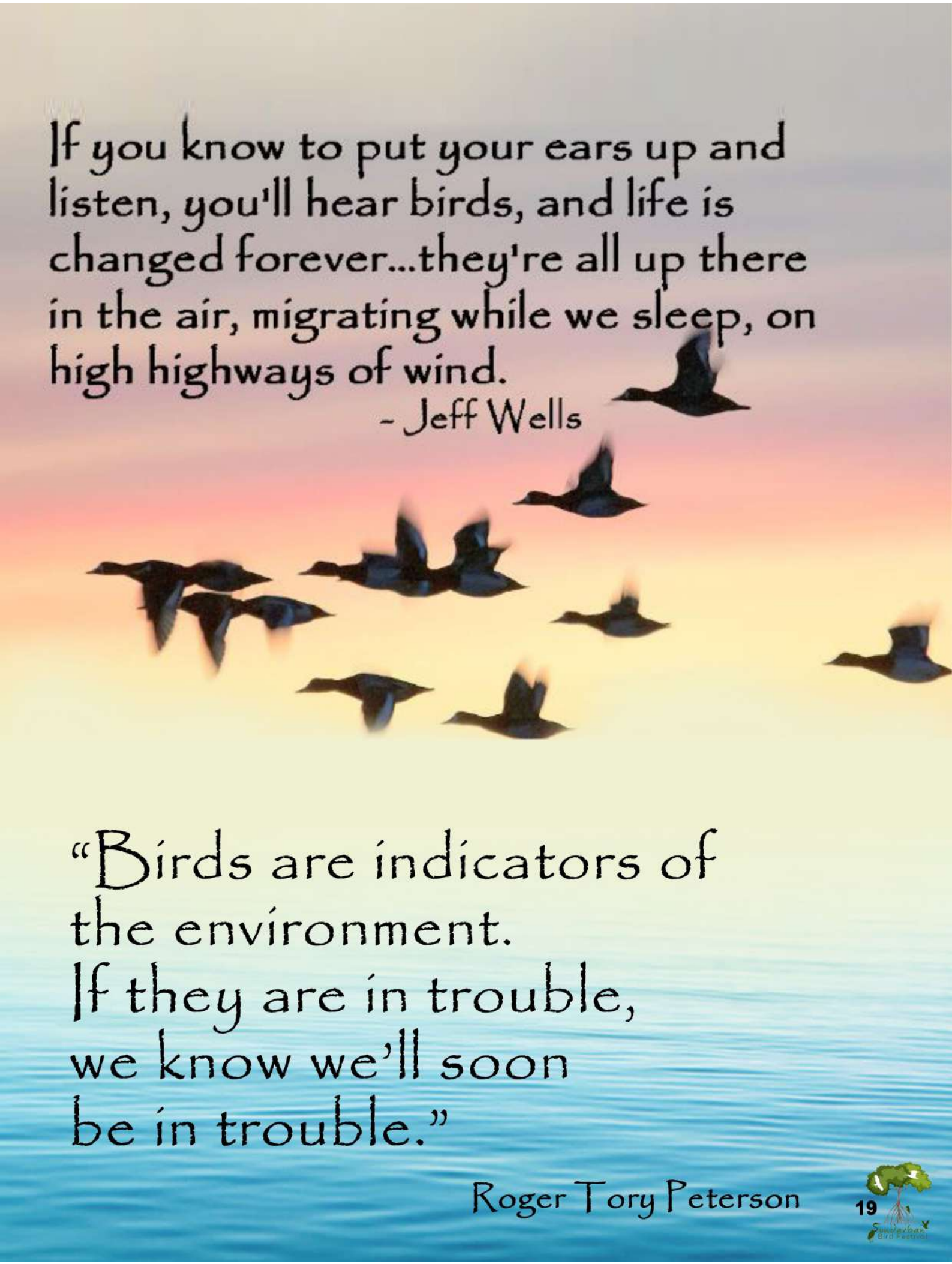
SBF- Way Forward:

- Yearly Survey and Regular Update

  Yearly surveys should be carried out for habitat conservation; thereby a master plan can be prepared in which the Bird festival can play an important role. The trends in the bird sighting can be done from next year with respect to the species sighted and the numbers of such sighting. This can be utilised to make a plan for conservation in the longer run.

- Method of Survey for the future exercises
  - Each team is provided with a Spotting scope for bird identification.
  - The exercise can be extended by one more day.

- Ethological Study-
  - Recording of daily tidal fluctuation with respect to the birds behaviour with their specific habitat by training staff.
  - Regular update in an e-based platform by the staff during their normal patrolling duties (e.g. e-bird handle of Sundarban).
  - An intensive monitoring and conservation effort should be given to two species, namely, Goliath heron and Buffy Fish Owl.


If you know to put your ears up and listen, you'll hear birds, and life is changed forever...they're all up there in the air, migrating while we sleep, on high highways of wind.
- Jeff Wells
"Birds are indicators of the environment. If they are in trouble, we know we'll soon be in trouble."
Roger Tory Peterson

Annexure 1 (Checklist of Birds)

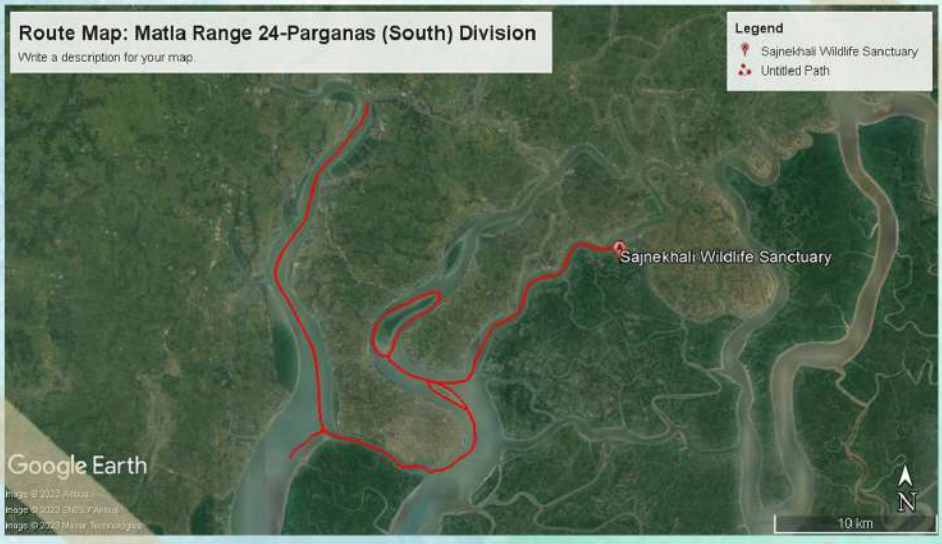
Sl.	Order	Family	Common Name	Scientific Name
1	Galliformes	Phasianidae	Red Junglefowl	*Gallus gallus*
2	Anseriformes	Anatidae	Lesser Whistling-duck	*Dendrocygna javanica*
3			Common Shelduck	*Tadorna tadorna*
4			Gadwall	*Anas strepera*
5			Eurasian Wigeon	*Anas penelope*
6			Northern Pintail	
7			Northern Shoveler	*Anas clypeata*
8	Piciformes	Picidae	Rufous Woodpecker	*Micropternus brachyurus*
9			Brown- capped Pygmy Woodpecker	Yungipicus nanus
10			Grey- capped Pygmy Woodpecker	Yungipicus canicapillus
11			Black-rumped Flameback/ Lesser golden backed woodpecker	*Dinopium benghalense*
12			Greater Flameback/ Greater goldenback	*Chrysocolaptes guttacristatus*
13	Bucerotiformes	Upupidae	EurasianHoopoe	*Upupa epops*
14	Coraciiformes	Alcedinidae	Common Kingfisher	*Alcedo atthis*
15		Halcyonidae	Brown-winged Kingfisher	*Halcyon amauroptera*
16			Stork-billed Kingfisher	*Halcyon capensis*
17			White Breasted Kingfisher / White-throated Kingfisher	*Halcyon smyrnensis*
18			Black-capped Kingfisher	*Halcyon pileata*
19			Collared Kingfisher	*Todiramphus chloris*
20		Cerylidae	Pied Kingfisher	*Ceryle rudis*
21		Meropidae	Asian Green Bee-eater	*Merops orientalis*
22	Cuculiformes	Cuculidae	Common Hawk Cuckoo	*Hierococcyx varius*
23			Asian Koel	*Eudynamys scolopacea*
24			Green-billed Malkoha	*Phaenicophaeus tristis*
25			Greater Coucal	*Centropus sinensis*
26	Psittaciformes	Psittaculidae	Rose-ringed Parakeet	*Psittacula krameri*
27	Apodiformes	Apodidae	Asian Palm Swift	*Cypsiurus balasiensis*
28	Strigiformes	Tytonidae	Barn Owl	*Tyto alba*
29		Strigidae	Oriental Scops Owl	*Otus sunia*
30			Buffy Fish Owl	*Ketupa ketupu*
31	Caprimulgiformes	Caprimulgidae	Large-tailed Nightjar	*Caprimulgus macrurus*
32	Columbiformes	Columbidae	Orange-breasted Green Pigeon	*Treron bicinctus*
33			Spotted Dove	*Streptopelia chinensis*
34			Eurasian Collared Dove	*Streptopelia decaocto*
35			Yellow-footed Green Pigeon	*Treron phoenicoptera*
36	Gruiformes	Rallidae	White-breasted Waterhen	*Amaurornis phoenicurus*

37			Ruddy-breasted Crake	*Porzana fusca*
38	Charadriiformes	Scolopacidae	Eurasian Whimbrel	*Numenius phaeopus*
39			Eurasian Curlew	*Numenius arquata*
40			Common Redshank	*Tringa tetanus*
41			Common Greenshank	*Tringa nebularia*
42			Terek Sandpiper	*Xenus cinereus*
43			Common Sandpiper	*Actitishypoleucos*
44		Charadriidae	Tibetan Sandplover	
45			Pacific Golden Plover	*Pluvialis fulva*
46			Grey Plover	*Pluvialis squatarola*
47			Little Ringed Plover	*Charadrius dubius*
48			Lesser Sand Plover	*Charadrius mongolus*
49			Greater Sand Plover	*Charadrius leschenaultii*
50			Grey-headed Lapwing	*Vanellus cinereus*
51			Red-wattled Lapwing	*Vanellus indicus*
52	Laridae		Pallas's Gull	*Larus ichthyaetus*
53			Brown-headed Gull	*Larus brunnicephalus*
54			Black-headed Gull	*Larus ridibundus*
55			Caspian Tern	*Sterna caspia*
56			Greater Creasted Tern	*Thalasseus bergii*
57			Common Tern	*Sterna hirundo*
58			Little Tern	*Sterna albifrons*
59			Whiskered Tern	*Chlidonia shybridus*
60	Accipitriformes	Pandionidae	Osprey	*Pandion haliaetus*
61		Accipitridae	Brahminy Kite	*Halias turindus*
62			Black Kite	
63			White-bellied Sea Eagle	*Haliaeetus leucogaster*
64			Crested Serpent Eagle	*Spilornis cheela*
65			Grey- headed Fish Eagle	*Icthyophaga ichthyaetus*
66			Shikra	*Accipiter badius*
67			Common Buzzard	*Buteo buteo*
68			Oriental Honey-Buzzard	*Pernis ptilorhyncus*
69			Changeable Hawk Eagle	*Spizaetus cirrhatus*
70			Booted Eagle	*Aquila pennata/Hieraaetus pennatus*
71		Phalacrocoracidae	Little Cormorant	*Phalacrocorax niger*
72	Pelecaniformes	Ardeidae	Little Egret	*Egretta garzetta*
73			Great Egret	*Casmerodius albus*
74			Intermediate Egret	*Mesophoyx intermedia*

75			Cattle Egret	*Bubulcus ibis*
76			Indian Pond Heron	*Ardeola grayii*
77			Grey Heron	*Ardea cinerea*
78			Striated Heron	*Butorides striata*
79			Little Heron	*Butorides striatus*
80	Pelecaniformes	Threskiornithidae	Black-headed Ibis	*Threskiorni melanocephalus*
81	Ciconiiformes	Ciconiidae	Asian Openbill	*Anastomus oscitans*
82			Lesser Adjutant	*Leptoptilos javanicus*
83	Passeriformes	Laniidae	Brown Shrike	*Lanius cristatus*
84		Corvidae	Rufous Treepie	*Dendrocitta vagabunda*
85			House Crow	*Corvus splendens*
86			Large-billed Crow	*Corvus macrorhynchos*
87			Eastern Jungle Crow	Corvus levaillantii
88		Artamidae	Ashy Woodswallow	*Artamus fuscus*
89		Oriolidae	Black-hooded Oriole	*Oriolus xanthornus*
90			Eurasian Golden Oriole/ Common Golden Oriole	*Oriolus oriolus*
91		Coracidae	Large Cuckooshrike	*Coracina macei*
92			Black-winged cuckooshrike	*Coracina melaschistos*
93		Campephagidae	Small Minivet	*Pericrocotus cinnamomeus*
94			Black-headed cuckooshrike	*Lalage melanoptera*
95			Black-winged cuckooshrike/ Lesser grey cuckooshrike / Dark grey cuckooshrike	*Lalage melaschistos*
96			Large cuckooshrike	*Coracina macei*
97		Vangidae	Common woodshrike	*Tephrodornis pondicerianus*
98		Rhipiduridae	White-throated Fantail	*Rhipidura albicollis*
99		Dicruridae	Black Drongo	*Dicrurus macrocercus*
100			Bronzed Drongo	*Dicrurus aeneus*
101			Ashy Drongo	*Dicrurus leucophaeus*
102		Aegithinidae	Common Iora	*Aegithina tiphia*
103		Turdidae	Tickell's Thrush	*Turdus unicolor*
104		Muscicapidae	Red-breasted Flycatcher	*Ficedula parva*
105			Verditer Flycatcher	*Eumyias thalassina*
106			Taiga Flycatcher/ Red-throated flycatcher	*Ficedula albicilla*
107			Oriental Magpie Robin	*Copsychus saularis*
108			Black Redstart	*Phoenicurus ochruros*
109		Monarchidae	Black-naped Monarch/ Black-naped blue flycatcher	Hypothymis azurea
110		Sturnidae	Common Myna/ Indian myna	*Acridotheres tristis*
111			Asian Pied Starling	*Sturnus contra*

112			Chestnut-tailed starling/ Grey-headed starling / Grey-headed myna	*Sturnia malabarica*
113			Jungle Myna	*Acridotheres fuscus*
114		Sittidae	Chestnut-bellied Nuthatch	*Sittacas tanea*
115		Paridae	Great Tit	*Parus major*
116			Cinereous tit	*Parus cinereus*
117		Hirundinidae	Barn swallow	*Hirundo rustica*
118			Striated swallow	*Cecropis striolata*
119			Streak-throated swallow/ Indian cliff swallow	*Petrochelidon fluvicola*
120			Grey-throated martin / Asian plain martin	*Riparia chinensis*
121		Pycnonotidae	Red-whiskered Bulbul	*Pycnonotus jocosus*
122			Red-vented Bulbul	*Pycnonotus cafer*
123		Zosteropidae	Oriental White-eye	*Zosterops palpebrosus*
124		Acrocephalidae	Blyth's Reed warbler	*Acrocephalus dumetorum*
125			Oriental reed warbler	*Acrocephalus orientalis*
126		Cisticolidae	Common tailorbird	*Orthotomus sutorius*
127		Phylloscopidae	Dusky warbler	*Phylloscopus fuscatus*
128			Hume's warbler/ Hume's warbler	*Phylloscopus humei*
129			Greenish warbler	*Phylloscopus trochiloides*
130			Green-crowned warbler	*Phylloscopus burkii*
131		Pellorneidae	Puff-throated babbler	*Pellorneum ruficeps*
132		Leiothrichidae	Jungle babbler	*Argya striata*
133		Timaliidae	White-browed Scimitar Babbler	*Pomatorhinus schisticeps*
134			Pin-striped tit-babbler/ Yellow-breasted babbler	Mixornis gularis
135			Pin-striped babbler	Macronus gularis
136		Dicaeidae	Thick-billed flowerpecker	*Dicaeum agile*
137			Pale-billed flowerpecker	*Dicaeum erythrorynchos*
138			Scarlet-backed flowerpecker	*Dicaeum cruentatum*
139		Nectariniidae	Purple-rumped Sunbird	*Leptocoma zeylonica*
140			Purple Sunbird	*Cinnyris asiaticus*
141		Motacidae	Eastern yellow wagtail	*Motacilla tschutschensis*
142			Forest Wagtail	*Dendronanthus indicus*
143			White Wagtail	*Motacilla alba*
144			Citrine Wagtail	*Motacilla citreola*
145		Fringillidae	Common rosefinch/ Scarlet rosefinch	*Carpodacu erythrinus*

Annexure 2 (Route Maps)



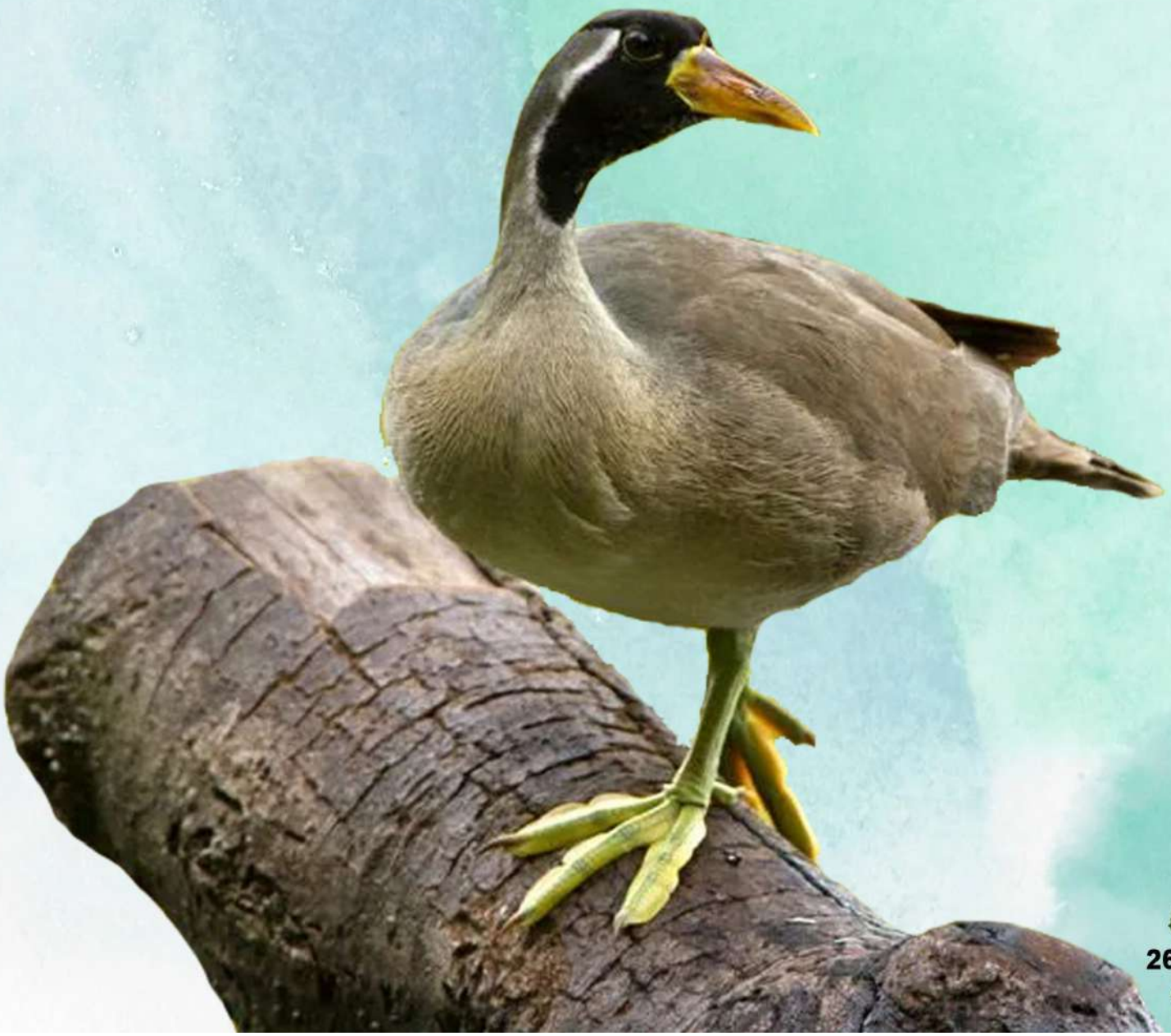
Route Map: National Park West Range
Sundarban Tiger Reserve

Route Map: National Park East Range
Sundarban Tiger Reserve

Route Map: Bashirhat Range
Sundarban Tiger Reserve

Annexure 3

Status of Avifauna in Sundarbans Biosphere Reserve									
Bird Transect Data Sheet									
Observer			Date		Start Time		End Time		
Location									
Transect Distance		Start Lat		Start Long		End Lat		End Long	
Sampling Code		Tide		Sun		Wind		Rain	
1	2		3	4a	4b	4c	5	6	7
Obs'n No.	Speices		Time	No.	Sex	Ad/Juv	Microhabitat	Activity	Dis. In Mtr.
1									
2									
3									



Annexure 4 (Checklist of threatened birds of Sundarbans as per SoIB 2023 Report)

Sl.	Name of the Species	Long term Trend	Current Trend	IUCN Red List	WPA Schedule
1	Eurasian Curlew	Rapid Decline	Rapid Decline	NT	II
2	Brown winged Kingfisher			NT	II
3	Black- Capped Kingfisher	Rapid Decline	Rapid Decline	VU	II
4	Grey Plover	Rapid Decline	Decline	LC	II
5	Lesser Sand Plover	Rapid Decline	Decline	LC	II
6	Curlew Sandpiper	Rapid Decline	Decline	NT	II
7	Terek Sandpiper	Rapid Decline	Rapid Decline	LC	II
8	Common Redshank	Rapid Decline	Decline	LC	II
9	Brown Headed Gull	Rapid Decline	Decline	LC	II
10	Black Headed Gull	Rapid Decline	Decline	LC	II
11	Caspian Tern	Rapid Decline	Decline	LC	II
12	Common Tern	Rapid Decline	Rapid Decline	LC	II
13	Lesser Adjutant			NT	I
14	Osprey	Rapid Decline	Rapid Decline	LC	I

List of Threatened birds found in the 2nd SBF, as per SoIB report, 2023. (abbreviations: IUCN- International Union for conservation of Nature, NT- Near Threatened, VU- Vulnerable, LC- Least Concerned, WPA -Wildlife Protection Act, 1972, Govt. of India)

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