

3RD Sundarban Bird Festival



2025

*Conservation of Avifauna
in Sundarbans*



The report is published by
The CCF and Field Director, Sundarban Tiger Reserve
Government of West Bengal, 2025

Copyright 2025 in text and design
© All rights reserved. No part of this
publication may be reproduced,
without the prior written permission of
the copyright holder.



Contents

Executive Summary.....	1
2nd Sundarban Bird Festival - At a Glance.....	3
Bird's eye View of the Festival.....	4
Detailed Result & Analysis.....	8
Threats to the Conservation of Avifauna in Sundarbans.....	30
Possible Interventions to ensure sustainable Conservation of Avifauna in Sundarbans.....	32
SBF - Way forward.....	34
Annexure 1 (Checklist of Birds- 3 years).....	36
Annexure 2 (Route Maps).....	42
Annexure 3 (Provided Data Sheet Format).....	46
Annexure 4 (Checklist of threatened birds of Sundarbans as per SolB 2023 Report).....	47



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 3rd Sundarban Bird Festival (SBF) on 22nd to 26th January, 2025 with the objective of bringing in awareness about the conservation of Avifauna and provide interesting insights into the world of avifauna in Sundarbans.

The festival was inaugurated with the photography exhibition at Sajnekhali MIC Hall. Post the inaugural session, sessions on orientation of the participants to the objectives of the festival and informative sessions on the topics like Evolutionary aspect of ornithology, Training and identification of waders, Bird migration all with specific focus to Sundarbans were organised. This was followed by a conservation photography session by world

renowned conservationist and photographer Shri Dhritiman Mukherjee. A thorough training 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 3 day period (23 January- 25 January, 2025). Each team was led by the Resource person as the knowledge head and the staff member as the team head.

The weather condition was mostly good but some areas were partly cloudy during the exercise. Despite that, **153 avian species** were recorded. A total of **31927 numbers of birds were sighted in the 3 day exercise**. In the previous bird festivals only 2 days of field exercise was taken up while this year birding days were increased by 1 day with more hotspot area coverage. Hence, the total recorded species and the number of birds sighted also have considerably increased.

Matla team (108) recorded the most number of species sightings, followed by Kalas (95); NP West (81); Basirhat (73); NP East (70) and Sajnekhali WLS team (64), some of the birds species are common between different range areas. 7 species of Kingfishers were recorded in the 3rd Sundarban Bird Festival, 2025. 48 species of mudflat birds; among them 7 waterfowls; 11 raptors; 87 forest birds and 7 kingfishers were recorded in the 3rd SBF, 2025. Seeing the numbers through the lens of the Protection Regime, 100 species were observed in the core area; 90 in the buffer and 129 species beyond the protected areas alongside human habitations.



Out of all the threatened species of birds as per the State of Indian Birds Report (SolB) 2023, 13 species were recorded during the bird trails. The panel discussion on the 26th January, 2025 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, the research range of STR and the frontline staff for their support, dedication and effort that made the 3rd Sundarban Bird Festival a resounding success.



SUNDARBAN BIRD FESTIVAL, 2025 *at a Glance*



153

**Bird Species
sighted**



31927

**Total Number of
Bird Sighted**



13

**Threatened Bird
Species Sighted**



7

**Number of
Species
of Kingfisher
Sighted**

3



BIRD'S EYE VIEW OF THE FESTIVAL

The Sundarban – the only mangrove tiger-land, is composed of numerous 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 is also an abode for a lot of co-predators, avian biodiversity, invertebrates, insects and some unidentified 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 of Sundarbans. The back mangrove possesses a variety of avian diversity; on the other hand the shoreline ecotone supports the specialists of that niche ecosystem. The dense 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 3rd Sundarban Bird Festival (3rd SBF) in January, 2025.





Registration:

Registration was done through online mode and was widely published by Sundarban Tiger Reserve and Wildlife Wing under Directorate of Forests in their respective websites and through media channels from November 2024. Enthusiastic Birders from all over India 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:

Third Edition of the Bird Festival Program was timed as per the neap tide phase of the moon from 23rd- 25th January, 2025. The inauguration and orientation program started from 2.00pm on 22nd January followed by team selection and sending off the teams to their respective Bird trial regions.



Team Composition:



6 Birding Teams

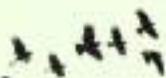
Each Team comprising - A Resource Person - as Knowledge Head, A Staff Member - as Team Head, 4 Participants and Boat crew.

Equipment and Materials



Necessary Gears for birding- Binoculars, Cameras, Birds of Sundarbans field guide 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 3 day period recording the occurrence of bird species, their numbers and other habitat related aspects of the sightings.

The route maps of the third Sundarban Bird Festival 2025 are attached in Annexure 2.



Data Collection and Submission:

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

On 26th January, 2025 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 of 2025, 153 different species of birds were sighted and 31927 numbers of birds were counted in total. The details of the species (SBF 2023-25), number of sightings and other details are attached as Annexure 1.

Bird sightings with respect to their broad Habitats and Ecotones

Upon further analysis of the bird species with respect to broad categories of avian community in the following detail emerges (Fig. 1).

Habitat	Number of species
Mudflat, Waders & Shore birds -	41
Raptors -	08
Forest birds -	99
Waterfowl -	05

Birds Species count with respect to Habitats

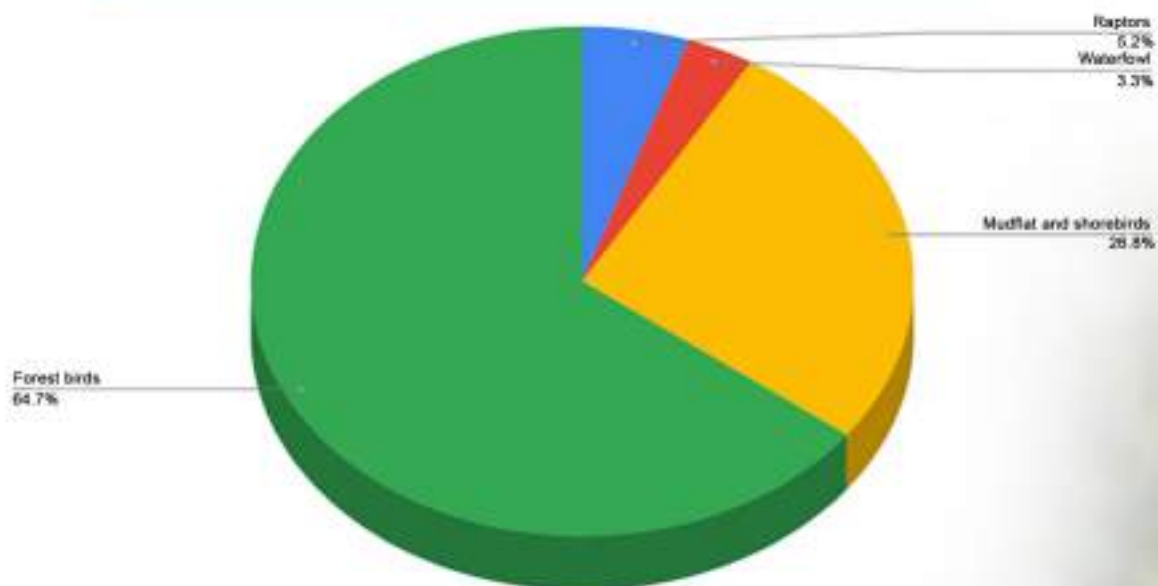


Fig. 1 Avian species count with respect to different avian categories, based on SBF 2025.



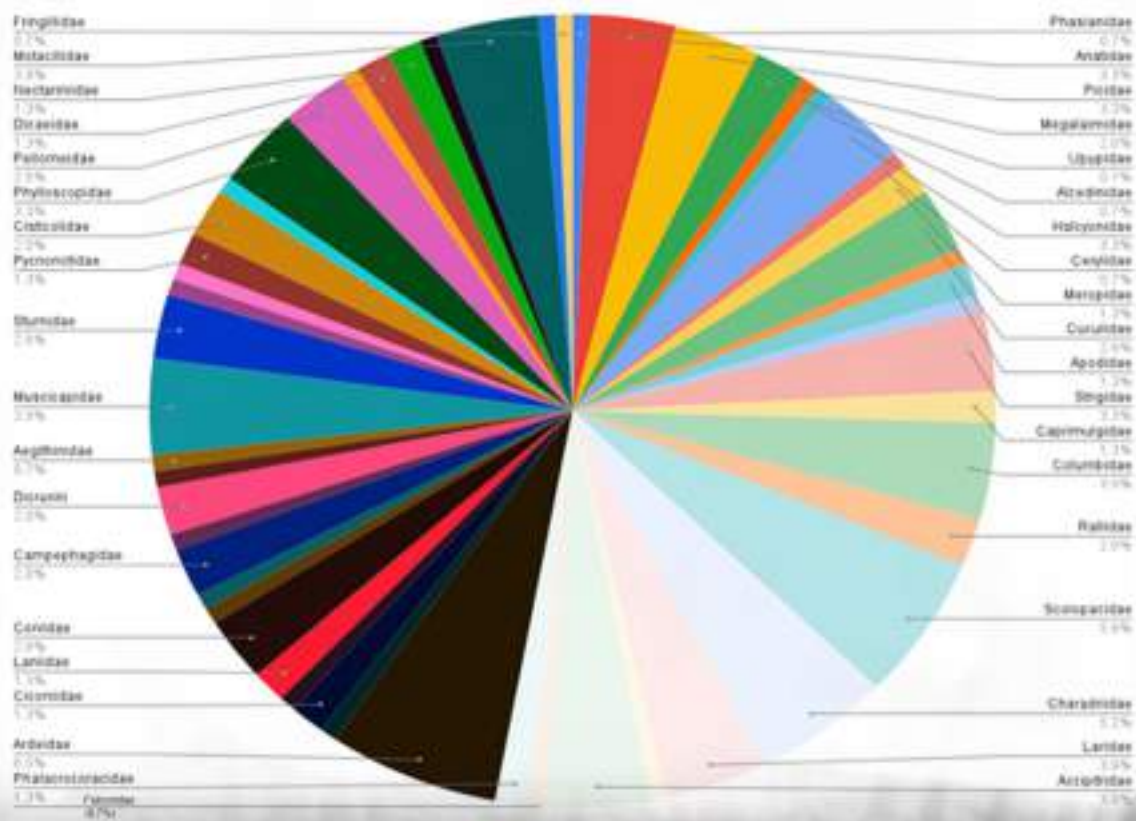
The mangrove forests in Sundarbans covers almost 70% of the total area of Sundarbans remaining of which is covered by the major rivers and tidal mudflats. The numbers of species recorded is in line with the habitat area as forest birds (99 sp., 64.7%) dominate in the number of species sighted. But the 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 habitats of the 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. The Relative Diversity Index (RDi) of different families of the observed birds is shown below.



Avian diversity of SBF 2025 (family wise)



The different microhabitats:

Shoreline Ecotone

Mudflat ecotone and Sandy beaches
e.g. Whimbrel, Eurasian Curlew,
Plovers, Great Knot, River tern etc. are
found.

Canopy

Mostly Raptors are observed along
with a few columbidae birds .
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,
Kingfishers, various Owls and
Parakeets are found in this habitat.



Avifaunal distribution and occurrence with respect to degree of Protection: SBF 2025

Bird Trial	Species sighted	Number of Birds sighted
National Park West Range (Core Area of Tiger Reserve)	Mudflat, Waders & Shore birds - 17	1418
	Raptors -06	42
	Forest birds - 56	441
	Waterfowl - 02	202
	No. of species sighted in NPW= 81	No. of birds sighted in NPW= 2103
National Park East Range (Core Area of Tiger Reserve)	Mudflat, Waders & Shore birds - 21	1143
	Raptors - 4	40
	Forest birds - 45	382
	Waterfowl - 0	0
	No. of species sighted in NPE= 70	No. of birds sighted in NPE= 1565
Basirhat	Mudflat, Waders & Shore birds - 14	172
	Raptors - 04	05
	Forest birds - 54	507
	Waterfowl - 01	170

Bird Trial	Species sighted	Number of Birds sighted
	No. of species sighted in Basirhat = 73	No. of birds sighted in Basirhat = 854
Sajnekhali Wildlife Sanctuary	Mudflat, Waders & Shore birds - 13	952
	Raptors - 06	18
	Forest birds - 44	349
	Waterfowl - 01	287
	No. of species sighted in SWLS = 64	No. of birds sighted in SWLS = 1606
Kalas	Mudflat, Waders & Shore birds - 31	1755
	Raptors - 05	09
	Forest birds - 56	569
	Waterfowl - 2	6063
	No. of species sighted in Kalas = 94	No. of birds sighted in Kalas= 8396
Matla	Mudflat, Waders & Shore birds - 36	1672
	Raptors - 04	04
	Forest birds - 64	579
	Waterfowl - 4	15148
	No. of species sighted in Matla = 108	No. of birds sighted in Matla= 17403



The above numbers clearly show certain trends, the greater the protection and lesser the disturbance due to anthropogenic sources, the resident and migratory species prefer to inhabit such regions. Interestingly, the number of birds sighted in non-protected areas along the 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. New char areas (accreted areas) on the rivers are the potential habitats for birds.

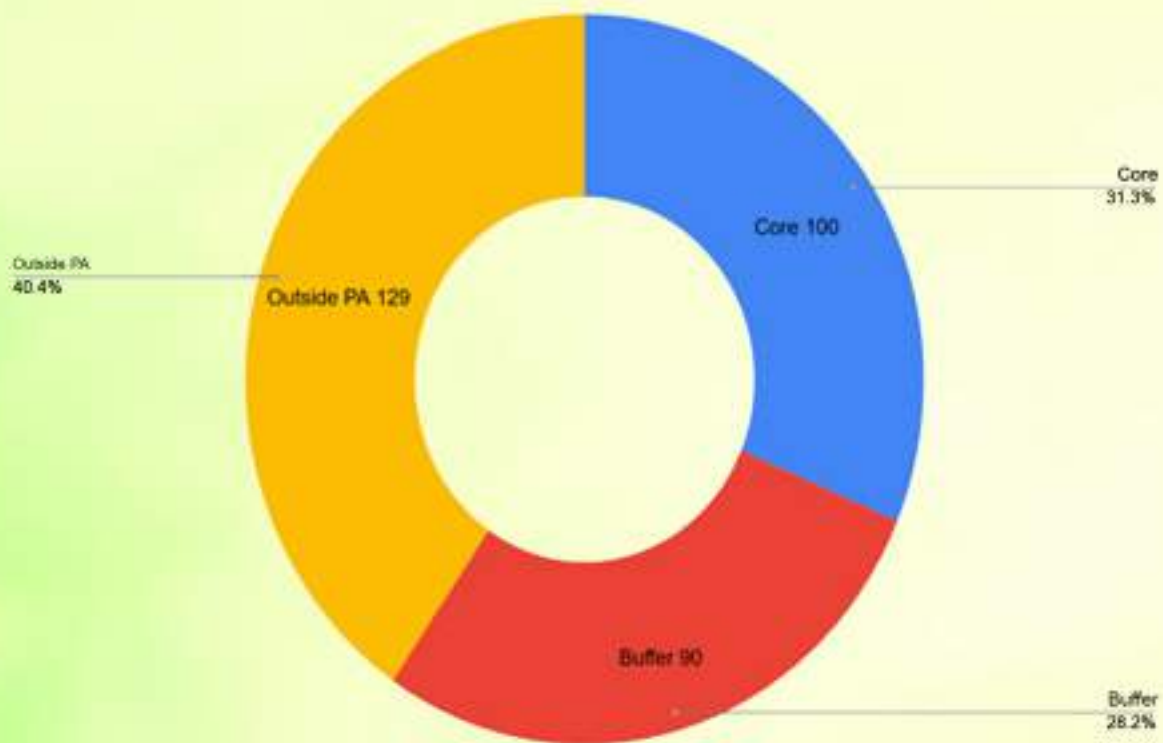


Fig. 2 Avian Species recorded in terms of protected areas of Sundarban Landscape, SBF 2024 (common species also recorded).

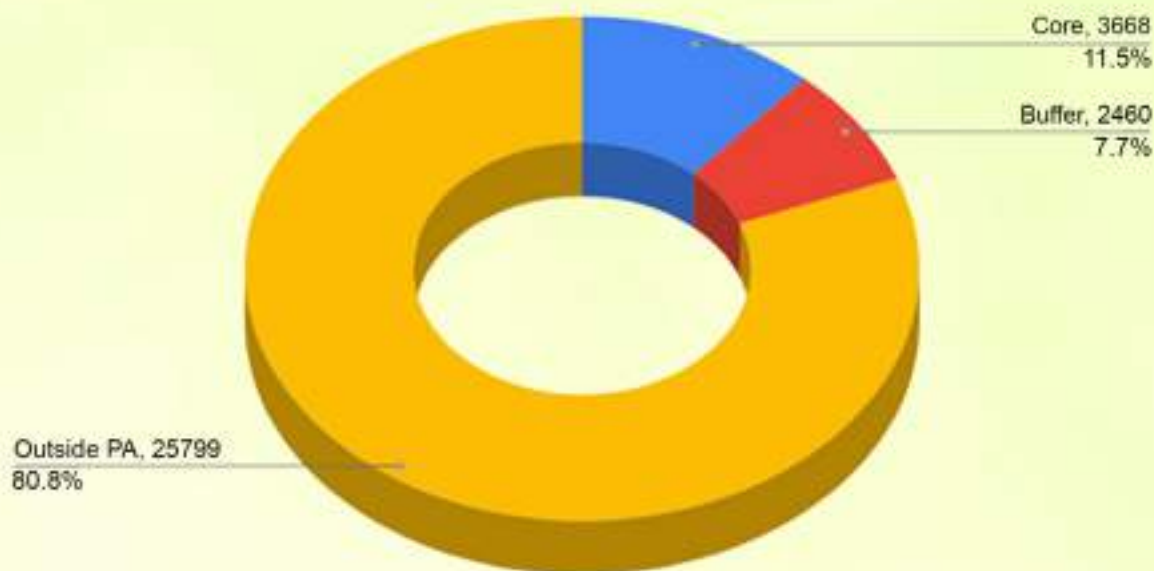


Fig 2a. Number of birds recorded in terms of protected areas of the Sundarban Landscape, SBF 2025.

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.

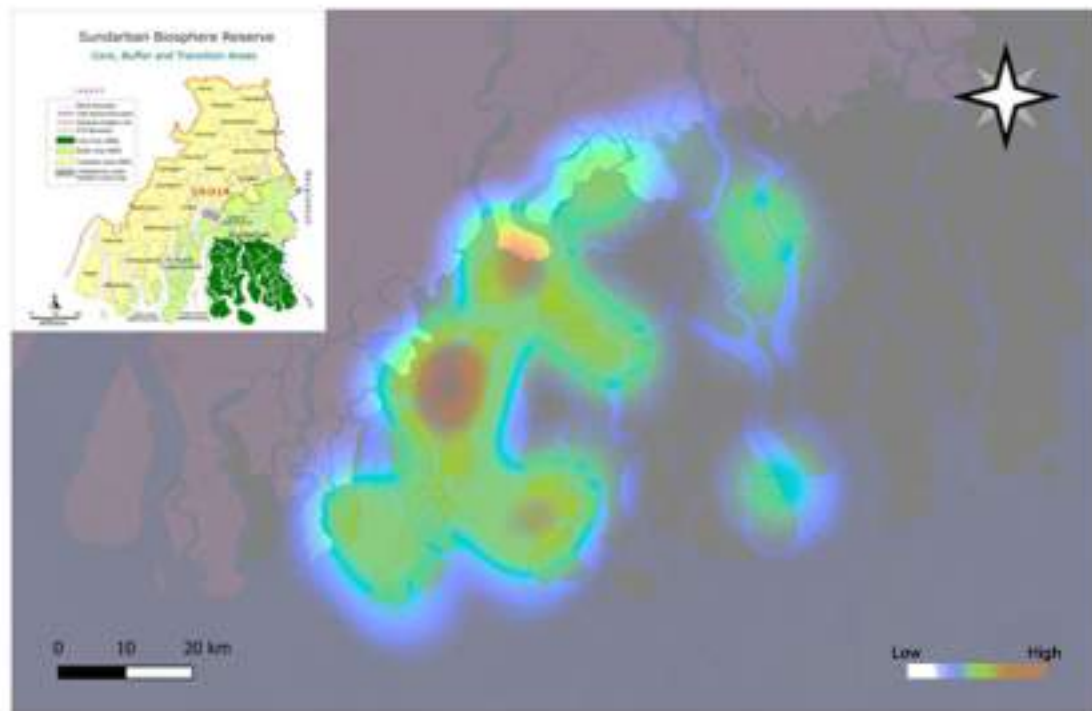
Based on the State of Indian Birds Report (SolB) 2023, 13 species of threatened birds were recorded in the two days bird trail. Among the 13 threatened species, three species are considered as the highest priority species of West Bengal, namely: Brown- winged Kingfisher, Black- capped Kingfisher, Great Knot etc.

The list of the Bird species along with the status of population as per the SolB 2025 is attached as Annexure 4.

Studying the threats to the habitats and the conservation of these threatened species will 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.



Migratory Birds Hotspot of the Sundarbans (SBF 2023-2025):



Plotting the locations of the sightings of the migratory species on the landscape clearly shows that there are specific regions which are preferred and are of greater importance in the migratory pathway in comparison to others. It is also clearly visible that it majorly falls within the 24 Parganas (S) Division and in the shoreline regions of Jambudweep and Bakkhali.





Threatened Birds* recorded in the 3rd SBF 2025



**Black Capped
Kingfisher**



Eurasian Curlew



**Terek
Sandpiper**



**Brown winged
Kingfisher**



Grey Plover



**Lesser Sand
Plover**



Lesser Adjutant



Osprey



Common Tern



Brown Headed Gull



Common Redshank

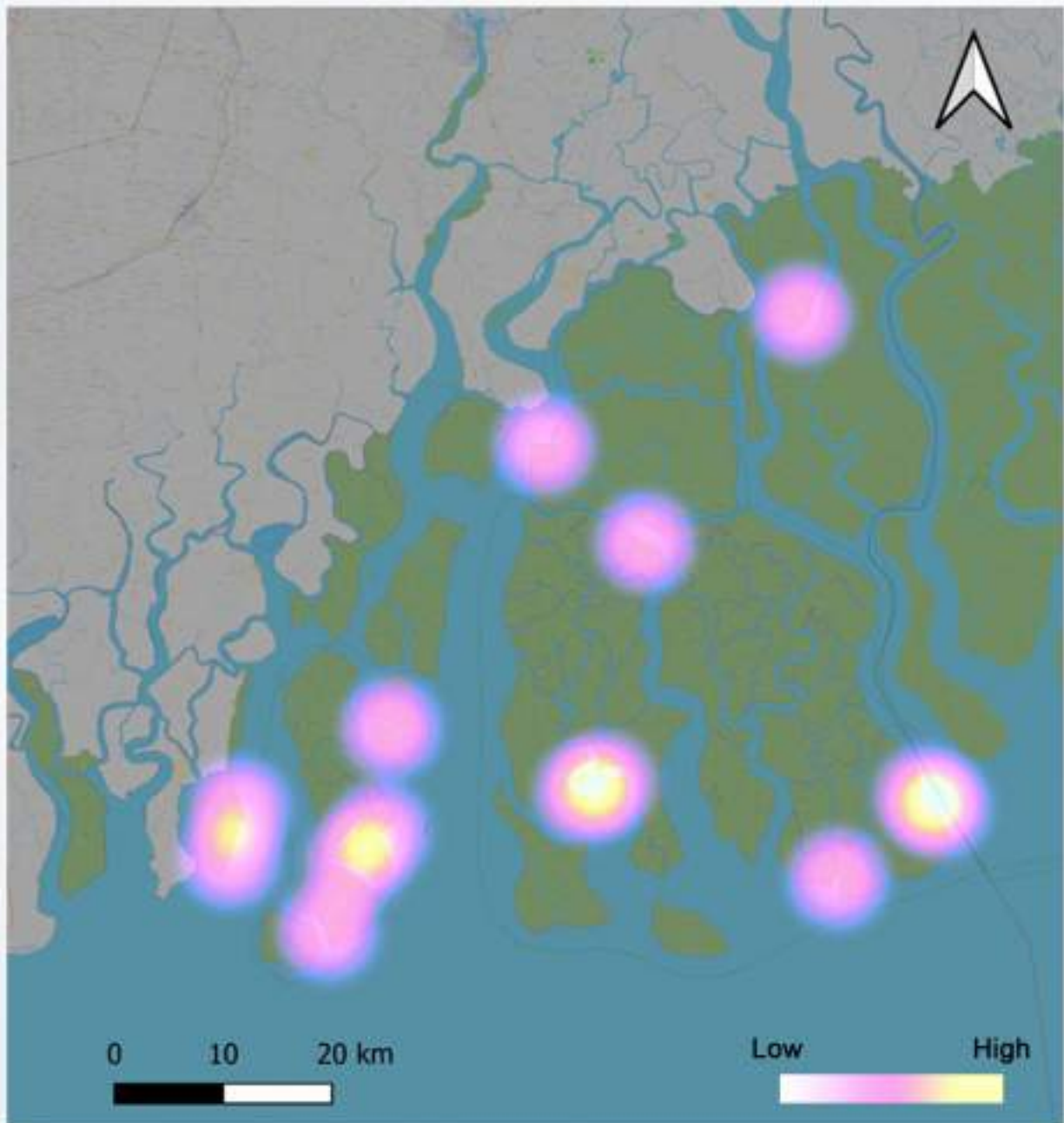


Black Headed Gull



Great Knot

Endangered hotspot



Plotting the locations of sightings of the endangered bird species on the map clearly shows the hotspots which are concentrated on the shore side regions of both STR and 24 Paraganas (S) Division. There is also a clear overlap between the hotspots for the migratory species and endangered species maps and hence these regions are highly critical for the conservation of avifauna in Sundarbans. Focussed and measured efforts need to be put in these regions for understanding the ecology and minimise any anthropogenic, geologic or any other disturbances to these regions in Sundarbans.



Comparative study of avi- faunal diversity from last three Sundarban bird festivals: 2023-2025

Bird diversity and abundance fluctuate annually due to a complex interplay of factors including seasonal changes, weather patterns, habitat quality, and anthropogenic interventions. These variations can impact individual species and entire communities of birds.

Resident and migratory category:

Resident and Migratory Bird species found in SBFs



Diversity Index:

The observers used Shannon- Weiner Index (Equation 1) to calculate the avian biodiversity in the Sundarbans, in the sampled area. Boat transect method was followed up during the Bird Festivals in three consecutive years. Note that, in 2025 the field survey was for 3 days, and in the previous years (2023 and 2024) the festival was for 2 days.

$$\text{Shannon- Weiner Index (H')} = - \sum (p_i * \ln(p_i)) \dots\dots\dots (\text{Equation 1})$$

(where p_i is the proportion of individuals belonging to species i in the total population. $\ln$ represents the natural logarithm).



SBF	Species Richness	Shannon Diversity Index (H')	No. of families recorded during the survey	Remarks
2023	145	3.55	58	Represents higher diversity
2024	144	3.03	51	Represent moderate diversity
2025	153	2.24	53	Represents low to moderate diversity

Species richness was almost unchanged from 2023 to 2024, then rose in 2025 likely due to the extra survey day. The Shannon index declines each year, signaling that fewer species dominate the community (e.g. Lesser Whistling Duck, Brown-headed gull etc.) even as total species count stays high. The steady drop in Shannon diversity despite stable or increasing species counts points to a loss of evenness, a handful of species are becoming abundant while others dwindle. The partial rebound in family richness in 2025 did not prevent further unevenness, implying a real shift in community structure rather than just sampling variation. Such dominance patterns often emerge under habitat stress, where resilient species outcompete more vulnerable ones. Resource shifts (prey availability, nesting sites etc), and climate variability may affect migration and breeding in Sundarbans. The trend shows the differences in sampling coverage and timing across years.

ANOVA test for justification of the studied sample data:

Note that, in 2023, 145 species of birds were observed belonging to 58 different families, in 2024, 144 species of birds were observed belonging to 51 different families which means some of the birds are coming in larger quantities hence diversity is comparatively low in comparison to that of 2023 SBF. In 2025, 153 species of birds were observed belonging to 53 different families which is self explanatory.

Further ANOVA test clarifies the significant difference (ANOVA, $df=3,776$; $F=2.776$; $p<0.05$) between the abundance of birds belonging to different families in different years. This significant difference may be due to sampling efforts, different timeline of the study and anthropogenic intervention in the buffer and outside protected areas of the Sundarbans.

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3028746.077	3	1009582.026	2.776	0.040	2.616
Within Groups	282180268.1	776	363634.3661			
Total	285209014.2	779				



Ecological significance of mudflat and shorebirds in the Sundarbans landscape:

The mudflat and the shoreline are the exclusive ecotone zones of the Sundarbans. Mudflat birds serve as indicators of ecosystem health, reflecting changes in habitat quality and prey populations. This ecotone supports a rich diversity of avian species, many of which are migratory or threatened. Birds contribute to nutrient cycling by transporting nutrients from one location to another through their guano. These shoreline birds play a crucial role in the food web, preying on invertebrates, ichthyofauna, and other small animalcules. Some bird species, like shorebirds, can influence sediment structure, its dynamics and vegetation through their foraging and nesting activities. As discussed earlier about the international migration flyways, Sundarban serve as critical stopover sites for migratory birds, providing essential refueling and resting areas. Mudflat birds are prey for larger predators, viz. raptors (like Peregrine falcons) and reptiles (Monitor lizards), supporting the food chain. Birds help maintain coastal ecosystem balance, which can contribute to shoreline stability. Mudflat birds are an important component of biodiversity, and their conservation is essential for maintaining ecosystem resilience.

The observers want to find out the dominant species of the mudflat and the shoreline ecotone and thereby apply Berger-Parker Index (Equation 2), as follows:

$$\text{Berger-Parker Index (d)} = N_{\max} / N \dots\dots\dots (\text{Equation 2})$$

(Where, $N_{\max}$ = Number of individuals of the most abundant species, and N = Total number of individuals in the community)

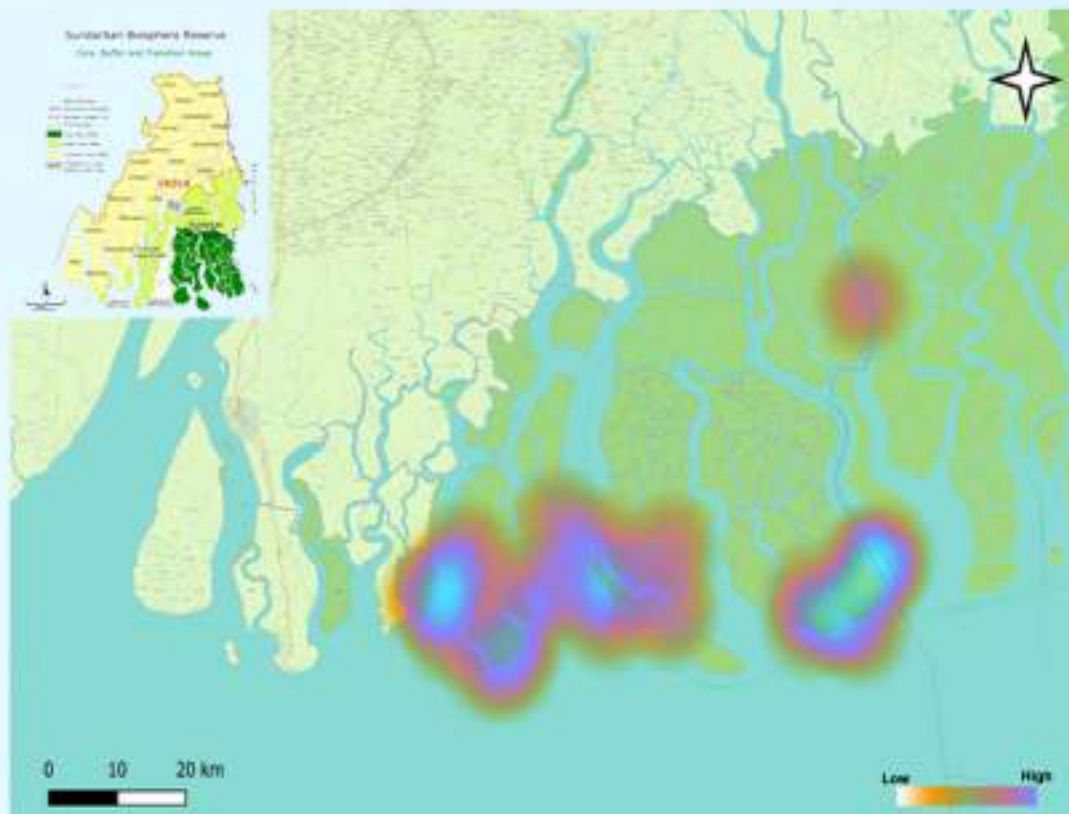
Note that Berger-Parker Index is a measure of species dominance in a community. Here, it is observed that not a single species is completely dominant, rather there is an assemblage of the birds within a given time and space indicating the dynamic nature of the ecosystem of mudflats and the shoreline.

	2023		2024		2025	
Rank	Sp Id	d^{2023}	Sp Id	d^{2024}	Sp Id	d^{2025}
1	Lesser whistling duck	0.352	Lesser whistling duck	0.4	Lesser whistling duck	0.525
2	Brown-headed gull	0.114	Brown-headed gull	0.194	Fulvous whistling duck	0.209
3	Eurasian whimbrel/ Common whimbrel	0.089	Eurasian whimbrel/ Common whimbrel	0.056	Brown-headed gull	0.051
4	Common shelduck	0.065	Eurasian Wigeon	0.042	Eurasian whimbrel/ Common whimbrel	0.037
5	Eurasian curlew	0.048	Gadwall	0.031	Asian Openbill	0.031



From the comparative study, it is observed that Lesser whistling ducks have higher presence throughout the habitat during the three consecutive years and their dominance value is showing an increasing trend over years. Brown-headed gull and whimbrels are two species which show their continuous command over shorelines and mudflats of the Sundarbans.

Shorebird Hotspot of the Sundarbans (SBF 2023-2025):



Trend of Kingfishers from the Kingfisher's Paradise:

Twelve species of kingfishers are predominantly found in India. According to ornithologists, these birds are divided into three categories, based on their particular habitats and hunting skills, namely- tree, water, and river kingfishers. The wide range of foraging skills of these kingfishers in Sundarbans thereby explains the diverse and dynamicity of the mangrove delta. Tree kingfishers (subfamily Halcyoninae) hunt on grounds, while water and river kingfishers rely on the aquatic environments. River kingfishers (subfamily Alcedininae) are typically found near creeks or forest settings, whereas water kingfishers (subfamily Cerylonidae) are mostly piscivorous, known for gracefully hovering and diving into the waters with their agile nature.



Sundarbans is denoted as the Kingfisher's paradise. Seven (7) species of kingfishers were recorded in the Sundarban Bird Festivals (2023-2025). The list is given below.

Sl.	Species (Common Name)	2023	2024	2025	Total Sighted	Mean
1	Common Kingfisher	45	35	79	159	53.0
2	Brown-winged Kingfisher	38	31	28	97	32.3
3	Stork-billed Kingfisher	11	8	1	20	6.7
4	White-throated Kingfisher	34	21	41	96	32.0
5	Black-capped Kingfisher	36	45	207	288	96.0
6	Collared Kingfisher	28	11	75	114	38.0
7	Pied Kingfisher	3	4	20	27	9.0

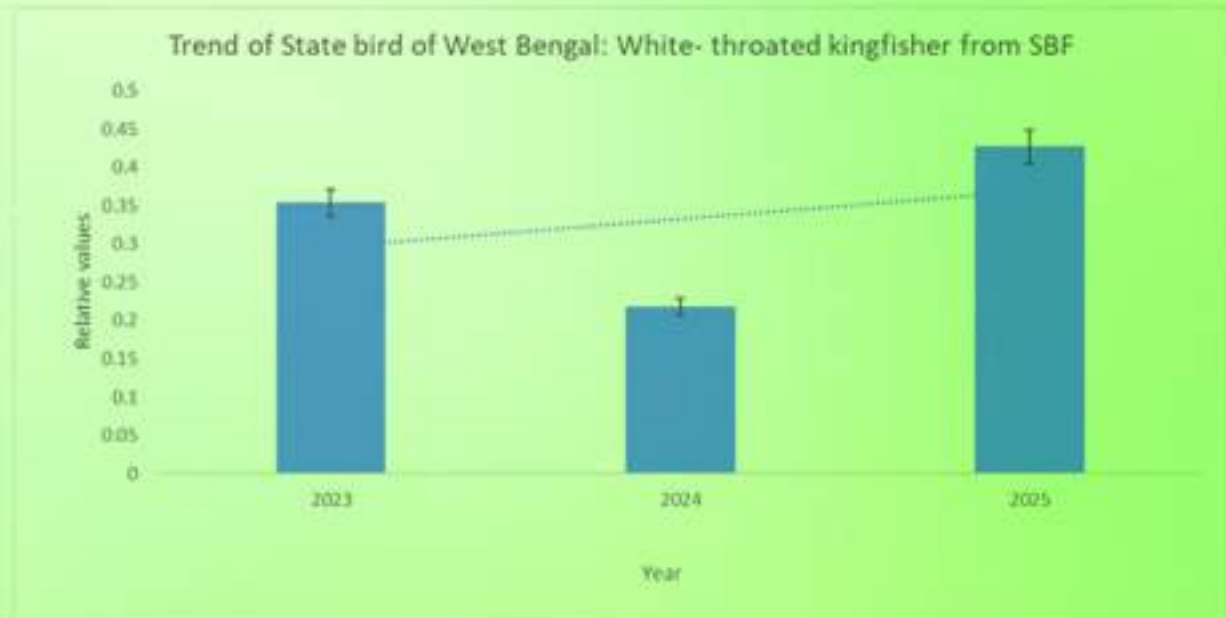
Here the researchers found statistically significant variation ($df= 3,24$; $F= 3.43$; $p<0.05$) between the sample means of kingfishers in three consecutive years, from the Indian Sundarbans.

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	13489.250	3	4496.417	3.439	0.03	3.008787
Within Groups	31375.429	24	1307.310			
Total	44864.679	27				

The Sundarbans stands out as perhaps one of the richest regions in India for kingfisher diversity. Ruddy kingfisher is a monsoon migrant and hence it is not recorded during the winter months when the bird festival is conducted. But a good number of Ruddy Kingfishers are found during the monsoon months. White-throated kingfishers are usually spotted far from the waters; when near aquatic areas, they sometimes dive for fishing but are more often seen hunting frogs, shrimps, squilla, rodents, and insects. In contrast, common kingfishers are found close to waterbodies and beside the forest camp areas of the Sundarbans, feed on small fish or fish fingerlings. Pied Kingfishers fall under the water kingfisher category and are best known for their hovering activity above the waters. These kingfishers are mostly found in the village side of the Sundarbans. The hovering behaviour for their foraging demonstrates the extraordinary control on their flight. The brown-winged kingfisher and black-capped kingfisher are tree kingfishers commonly found in the edges of the mangroves. Last but not the least, collared kingfishers are mostly found in the edges and the top canopy of the mangroves displays several flight patterns in the winters, in Sundarbans. Interestingly, these collared kingfishers nest on the old-used woodpecker holes in the mangroves.

White- throated kingfisher: the State bird of West Bengal

As, White- throated kingfisher (aka. White breasted kingfisher) is the state bird of West Bengal and also found in good numbers in the Sundarbans, hence an attempt to make an account of findings of the species is given here.

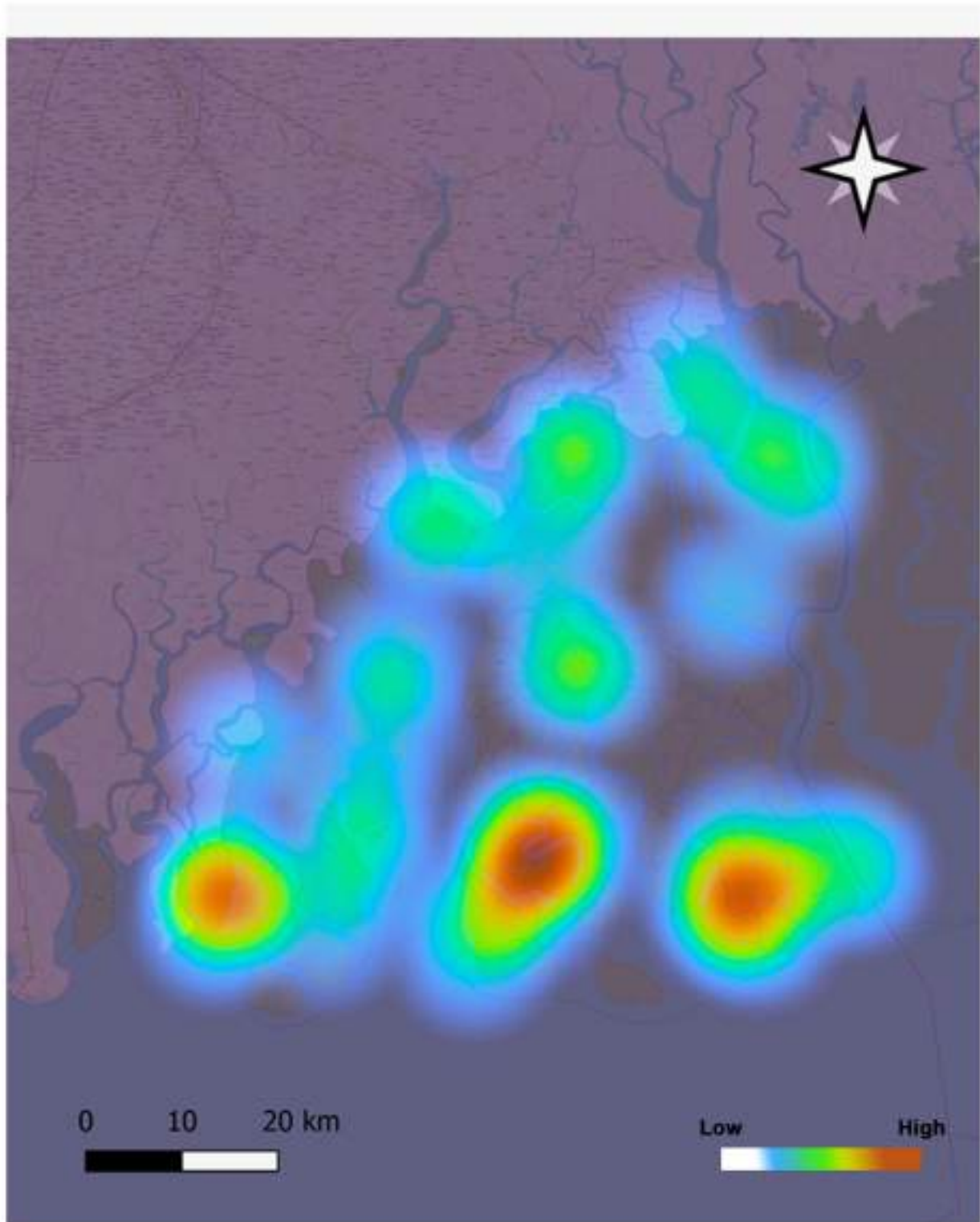


In conclusion, the significant variations in bird diversity and abundance is a natural phenomenon influenced by n-dimensional factors that interact in complex ways. Understanding these factors is crucial for effective conservation efforts and for understanding the health and resilience of ecosystems.

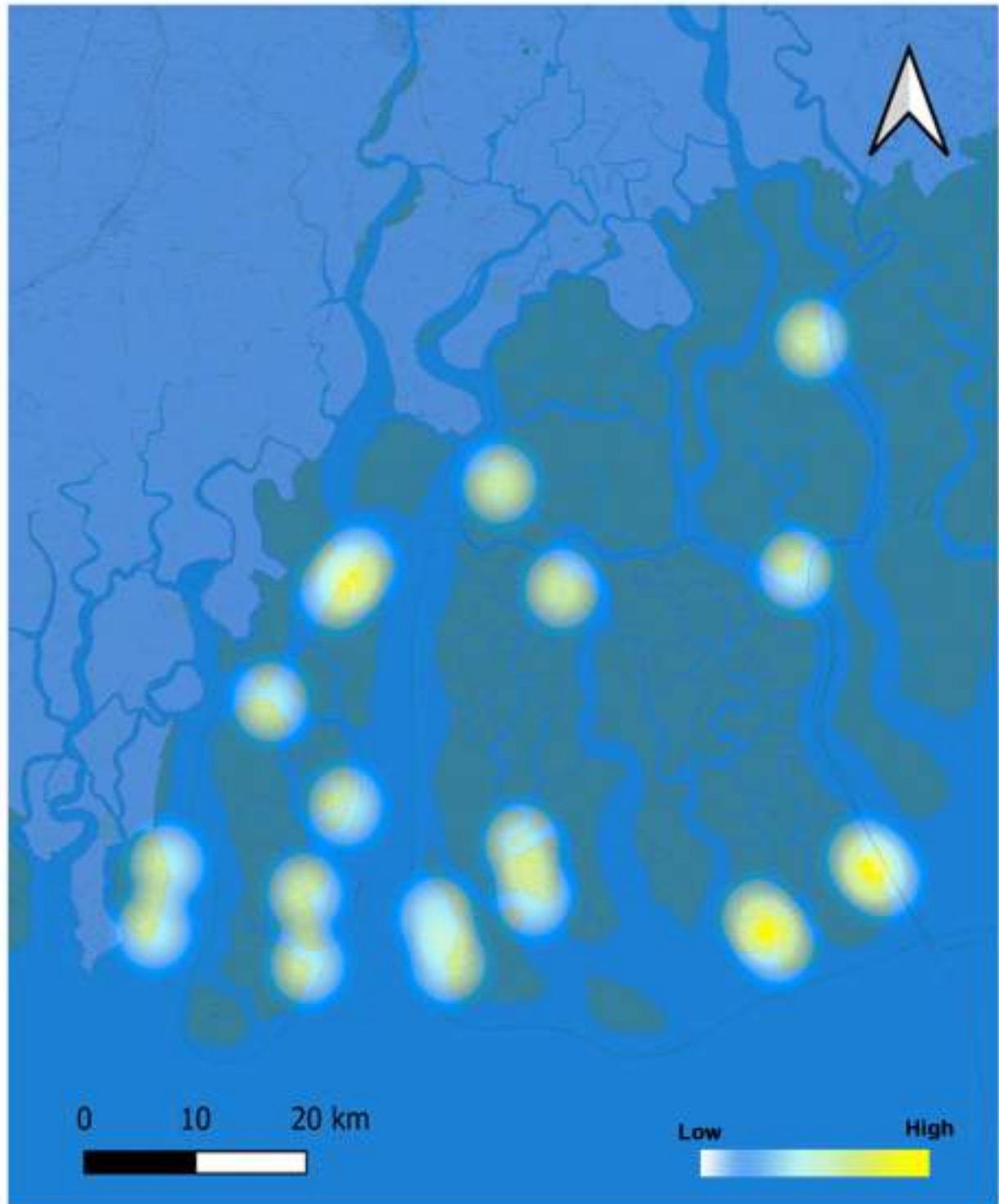




Threatened Birds Hotspot of the Sundarbans (SBF 2023-2025):
Near threatened map



Vulnerable hotspot



THREATS TO THE CONSERVATION OF AVIFAUNA IN SUNDARBANS:

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

a.) 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.

b.) Anthropogenic disturbances-

Fishing activities and related destruction of Habitats: Destructive fishing nets (e.g. Trawling nets, Khal-pata, Chor-pata, 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, waterfowls 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, 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, government agencies, and local population on ecotones like mudflats, grasslands has resulted in destruction of the niches of many waders and shorebirds.

“Birds are indicators of the environment. If they are in trouble, we know we’ll soon be in trouble.”

-Roger Tory Peterson



POSSIBLE 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.

1.) 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.

a.) 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.

b.) Buffer Habitat: The resting and occasionally visited areas and the wetland areas adjoining the critical habitats are to be demarcated as the Buffer habitat.

c.) 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.

d.) Breeding and Roosting Sites: To demarcate out the remote breeding and nesting habitats of migratory species through bird survey and local knowledge base.

2.) 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.

3.) 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.

4.) 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.

a.) Pakhimitras for every such habitat may be engaged who will pioneer the cause of conservation of the birds in the areas.



5.) 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.

6.) Pollution Prevention Measures: Plastic and other pollution prevention measures should be planned and integrated for the whole Sundarban Biosphere Reserve and all the upstream rivers.

7.) 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 a 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 sightings. 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.

- **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





ANNEXURE 1

	Order	Family	Species Common Name	IUCN	Status (Resident/ Migratory)	2023	2024	2025
1	Galliformes	Phasianidae	Red Junglefowl	LC	R	1	5	25
2		Anatidae	Fulvous Whistling Duck	LC	R	0	0	6050
3		Anatidae	Lesser Whistling-duck	LC	R	1331	2984	15216
4		Anatidae	Common Shelduck	LC	M	245	156	483
5		Anatidae	Gadwall	LC	M	159	233	65
6		Anatidae	Eurasian Wigeon	LC	M	63	312	56
7		Anatidae	Northern Pintail	LC	M	38	9	0
8		Anatidae	Northern Shoveler	LC	M	45	23	0
9	Piciformes	Picidae	Rufous Woodpecker	LC	R	0	3	3
10		Picidae	Brown-capped Pygmy Woodpecker	LC	R	0	2	0
11		Picidae	Fulvous-breasted Woodpecker	LC	R	7	0	1
12		Picidae	Lesser Yellownape	LC	R	8	0	0
13		Picidae	Streak-throated Woodpecker	LC	R	6	0	0
14		Picidae	Grey-capped pygmy Woodpecker	LC	R	0	7	3
15		Picidae	Grey-headed Woodpecker	LC	R	5	0	0
16		Picidae	Black-rumped Flameback/ Lesser goldenback	LC	R	9	3	8
17		Picidae	Greater Flameback /Greater goldenback	LC	R	11	5	8
18		Megalaimidae	Lineated Barbet	LC	R	0	0	1
19		Megalaimidae	Blue-throated Barbet	LC	R	0	0	1
20		Megalaimidae	Coppersmith Barbet	LC	R	3	0	4
21	Bucerotiformes	Upupidae	Common/ Eurasian Hoopoe	LC	R	4	5	5
22	Coraciiformes	Alcedinidae	Common Kingfisher	LC	R	45	35	79
23		Halcyonidae	Brown-winged Kingfisher	NT	M	38	31	28
24		Halcyonidae	Stork-billed Kingfisher	LC	R	11	8	1
25		Halcyonidae	White-throated Kingfisher	LC	R	34	21	41
26		Halcyonidae	Black-capped Kingfisher	VU	M	36	45	207
27		Halcyonidae	Collared Kingfisher	LC	M	28	11	75
28		Cerylididae	Pied Kingfisher	LC	R	3	4	20
29		Meropidae	Green Bee-eater / Asian green bee-eater/ Little green bee-eater	LC	R	65	27	49
30		Meropidae	Blue-tailed Bee-eater	LC	R	16	0	8
31	Cuculiformes	Cuculidae	Common Hawk Cuckoo	LC	R	2	8	2
32		Cuculidae	Asian Koel	LC	R	4	6	2
33		Cuculidae	Green-billed Malkoha	LC	R	2	2	2
34		Cuculidae	Greater Coucal / Crow pheasant	LC	R	14	4	27
35		Cuculidae	Lesser Coucal	LC	R	5	0	0
36	Psittaciformes	Psittaculidae	Rose-ringed Parakeet	LC	R	76	89	263
37	Apodiformes	Apodidae	Asian Palm Swift	LC	R	59	20	77
38		Apodidae	House Swift	LC	R	0	0	4
39	Strigiformes	Tytonidae	Barn Owl	LC	R	14	3	1
40		Strigidae	Oriental Scops Owl	LC	R	2	4	13
41		Strigidae	Buffy Fish Owl	LC	R	3	6	4
42		Strigidae	Spotted Owlet	LC	R	2	0	8
43		Strigidae	Brown Fish Owl	LC	R	0	0	1
44		Strigidae	Brown boobook / brown hawk-owl	LC	R	1	0	1
45	Caprimulgiformes	Caprimulgidae	Large-tailed Nightjar	LC	R	4	2	18

	Order	Family	Species Common Name	IUCN	Status (Resident/ Migratory)	2023	2024	2025
46		Caprimulgidae	Indian Nightjar	LC	R	0	0	3
47	Columbiformes	Columbidae	Rock Pigeon/ Common pigeon	LC	R	58	0	6
48		Columbidae	Spotted Dove	LC	R	28	24	122
49		Columbidae	Red Collared Dove	LC	R	0	0	1
50		Columbidae	Eurasian Collared Dove	LC	R	37	28	121
51		Columbidae	Emerald Dove/ Common Emerald dove	LC	R	0	0	29
52		Columbidae	Orange-breasted Green Pigeon	LC	M	0	6	0
53		Columbidae	Yellow-footed Green Pigeon	LC	M	6	11	21
54		Rallidae	White-breasted Waterhen	LC	R	34	13	45
55		Rallidae	Ruddy-breasted Crake	LC	R	1	2	1
56		Rallidae	Common Moorhen	LC	R	2	0	0
57		Rallidae	Common Coot	LC	M	1	0	0
58		Rallidae	Slaty-legged Crake/ Banded crake	LC	R	0	0	1
59	Charadriiformes	Scolopacidae	Eurasian whimbrel/ Common whimbrel	LC	M	335	419	1069
60		Scolopacidae	Eurasian Curlew	NT	M	183	201	210
61		Scolopacidae	Spotted Redshank	LC	M	2	0	0
62		Scolopacidae	Common Redshank	VU	M	24	112	293
63		Scolopacidae	Common Greenshank	LC	M	2	6	51
64		Scolopacidae	Terek Sandpiper	LC	M	4	7	16
65		Scolopacidae	Common Sandpiper	LC	R	61	232	462
66		Scolopacidae	Great Knot	EN	M	0	0	4
67		Scolopacidae	Little Stint	LC	M	0	0	4
68		Scolopacidae	Temminck's Stint	LC	M	0	0	4
69		Burhinidae	Great Thick-knee / Great stone-curlew	NT	R	3	0	0
70		Charadriidae	Pacific Golden Plover	LC	M	28	37	49
71		Charadriidae	Grey Plover	VU	M	1	9	9
72		Charadriidae	Little Ringed Plover	LC	R	11	4	3
73		Charadriidae	Kentish Plover	LC	M	2	6	12
74		Charadriidae	Lesser Sand Plover	EN	M	32	23	717
75		Charadriidae	Greater Sand Plover	LC	M	30	34	30
76		Charadriidae	Tibetan Sandplover	LC	M	0	87	0
77		Charadriidae	Grey-headed Lapwing	LC	M	43	135	46
78		Charadriidae	Red-wattled Lapwing	LC	R	33	13	13
79		Laridae	Heuglin's Gull	LC	M	15	0	0
80		Laridae	Pallas's Gull	LC	M	11	18	4
81		Laridae	Brown-headed Gull	LC	M	430	1443	1479
82		Laridae	Black-headed Gull	LC	M	31	29	191
83		Laridae	Gull-billed Tern	LC	R	0	0	2
84		Laridae	Caspian Tern	LC	M	1	8	0
85		Laridae	River Tern	VU	R	3	1	0
86		Laridae	Common Tern	LC	M	21	43	10
87		Laridae	Little Tern	LC	R	12	47	0
88		Laridae	Whiskered Tern	LC	M	34	50	50
89	Accipitriformes	Pandioninae	Osprey	LC	M	3	14	3
90		Accipitridae	Brahminy Kite	LC	R	28	44	66
91		Accipitridae	White-bellied Sea Eagle	LC	R	17	23	25
92		Accipitridae	Grey-headed Fish Eagle	NT	R	0	7	0
93		Accipitridae	Crested Serpent Eagle	LC	R	3	11	3
94		Accipitridae	Shikra	LC	R	1	7	10
95		Accipitridae	Common buzzard	LC	M	0	1	0
96		Accipitridae	Oriental Honey-Buzzard	LC	R	1	3	2



	Order	Family	Species Common Name	IUCN	Status (Resident/ Migratory)	2023	2024	2025
97		Accipitridae	Booted Eagle	LC	M	0	2	0
98		Accipitridae	Changeable Hawk Eagle	LC	R	2	9	5
99	Falconiformes	Falconidae	Peregrine Falcon	LC	M	2	0	4
100	Podicipediformes	Podicipedidae	Little Grebe	LC	R	3	0	0
101	Suliformes	Anhingidae	Oriental Dater	LC	M	1	0	0
102		Phalacrocoracidae	Little Cormorant	LC	R	51	72	206
103		Phalacrocoracidae	Great Cormorant	LC	M	0	0	2
104		Phalacrocoracidae	Indian Cormorant	LC	M	53	0	0
105	Pelecaniformes	Ardeidae	Little Egret	LC	R	76	95	306
106		Ardeidae	Great Egret	LC	R	26	38	345
107		Ardeidae	Intermediate Egret	LC	R	11	130	56
108		Ardeidae	Cattle Egret	LC	R	32	52	83
109		Ardeidae	Indian Pond Heron	LC	R	121	127	295
110		Ardeidae	Grey Heron	LC	R	43	64	4
111		Ardeidae	Goliath Heron	LC	R	0	0	1
112		Ardeidae	Purple Heron	LC	M	1	0	1
113		Ardeidae	Striated Heron	LC	R	0	8	41
114		Ardeidae	Little Heron	LC	R	36	56	0
115		Ardeidae	Black-crowned Night Heron	LC	R	1	0	5
116		Threskiornithidae	Black-headed Ibis	LC	R	21	61	69
117	Ciconiiformes	Ciconiidae	Asian Openbill	LC	R	23	17	902
118		Ciconiidae	Lesser Adjutant	NT	R	9	21	20
119	Passeriformes	Pittidae	Mangrove Pitta	NT	R	4	0	8
120		Chloropseidae	Golden-fronted Leafbird	LC	R	3	4	0
121		Laniidae	Brown Shrike	LC	R	3	7	12
122		Laniidae	Long-tailed Shrike	LC	R	0	0	5
123		Pachycephalidae	Mangrove Whistler	LC	R	14	0	0
124		Corvidae	Rufous Treepie	LC	R	11	19	12
125		Corvidae	House Crow	LC	R	7	18	78
126		Corvidae	Eastern Jungle Crow	LC	R	0	14	21
127		Corvidae	Large-billed Crow	LC	R	10	11	60
128		Artamidae	Ashy Woodswallow	LC	R	17	21	51
129		Oriolidae	Eurasian Golden Oriole	LC	R	3	12	0
130		Oriolidae	Black-hooded Oriole	LC	R	18	23	8
131		Campephagidae	Large Cuckooshrike	LC	R	16	11	3
132		Campephagidae	Black-winged Cuckooshrike / Lesser grey cuckooshrike / Dark grey cuckooshrike	LC	R	5	7	3
133		Campephagidae	Black-headed Cuckooshrike	LC	R	0	17	0
134		Campephagidae	Small Minivet	LC	R	19	47	144
135		Vangidae	Common woodshrike	LC	M	0	21	0
136		Rhipiduridae	White-throated Fantail	LC	R	4	6	8
137		Dicrurini	Black Drongo	LC	R	7	12	29
138		Dicrurini	Ashy Drongo	LC	R	0	22	7
139		Dicrurini	Bronzed Drongo	LC	R	25	31	189
140		Monarchidae	Black-naped Monarch / black-naped blue flycatcher	LC	M	5	28	2
141		Aegithinidae	Common Iora	LC	R	14	25	11
142		Muscicapidae	Blue Rock Thrush	LC	M	0	0	1
143		Muscicapidae	Orange-headed Thrush	LC	R	0	0	1
144		Muscicapidae	Tickell's Thrush	LC	M	4	18	0



	Order	Family	Species Common Name	IUCN	Status (Resident/ Migratory)	2023	2024	2025
145		Muscicapidae	Red-breasted Flycatcher	LC	M	1	7	0
146		Muscicapidae	Taiga Flycatcher / Red-throated flycatcher	LC	M	1	9	10
147		Muscicapidae	Verditer Flycatcher	LC	M	2	5	0
148		Muscicapidae	Blue-throated Flycatcher	LC	M	6	0	0
149		Muscicapidae	Blue throated blue flycatcher	LC	M	0	0	2
150		Muscicapidae	Oriental Magpie Robin	LC	R	16	31	81
151		Muscicapidae	Black Redstart	LC	M	1	3	2
152		Sturnidae	Chestnut-tailed Starling	LC	R	28	15	13
153		Sturnidae	Common Starling	LC	R	2	0	0
154		Sturnidae	Asian Pied Starling	LC	R	13	11	26
155		Sturnidae	Common Myna	LC	R	12	14	86
156		Sturnidae	Jungle Myna	LC	R	13	21	26
157		Sittidae	Chestnut-bellied Nuthatch	LC	R	14	16	0
158		Paridae	Great Tit	LC	R	14	9	3
159		Paridae	Cinereous Tit	LC	R	0	12	0
160		Hirundinidae	Asian plain Martin/ Grey- throated martin	LC	R	0	3	0
161		Hirundinidae	Barn Swallow	LC	R	44	31	113
162		Hirundinidae	Striated swallow	LC	R	0	5	0
163		Hirundinidae	Streak-throated Swallow	LC	R	0	14	0
164		Pycnonotidae	Red-whiskered Bulbul	LC	R	21	9	78
165		Pycnonotidae	Red-vented Bulbul	LC	R	14	15	80
166		Cisticolidae	Zitting Cisticola	LC	R	0	0	1
167		Cisticolidae	Plain Prinia	LC	R	0	0	1
168		Cisticolidae	Common Tailorbird	LC	R	9	11	14
169		Zosteropidae	Oriental White-eye / Indian White-eye	LC	R	10	16	16
170		Phylloscopidae	Blyth's Reed Warbler	LC	R	11	14	5
171		Phylloscopidae	Large-billed Reed Warbler	LC	R	3	0	0
172		Phylloscopidae	Oriental reed warbler	LC	R	0	6	0
173		Phylloscopidae	Green- crowned warbler	LC	R	0	0	1
174		Phylloscopidae	Dusky Warbler	LC	R	14	17	21
175		Phylloscopidae	Yellow-browed Warbler	LC	R	0	0	4
176		Phylloscopidae	Hume's Warbler	LC	R	2	13	0
177		Phylloscopidae	Greenish Warbler	LC	R	7	14	40
178		Phylloscopidae	Golden-spectacled Warbler / Green - crown warbler	LC	R	0	3	0
179		Pellorneidae	Puff-throated Babbler	LC	R	14	7	9
180		Pellorneidae	White-browed Scimitar Babbler	LC	R	8	6	8
181		Pellorneidae	Striped Tit-Babbler/ Pin-striped babbler/ Yellow-breasted babbler	LC	R	12	11	53
182		Pellorneidae	Jungle Babbler	LC	R	0	11	28
183		Alaudidae	Oriental Skylark	LC	R	0	0	4
184		Dicaeidae	Thick-billed Flowerpecker	LC	R	14	12	2
185		Dicaeidae	Pale-billed Flowerpecker	LC	R	6	3	3
186		Dicaeidae	Scarlet-backed Flowerpecker	LC	R	4	2	0
187		Noctamidae	Purple-rumped Sunbird	LC	R	14	9	12
188		Noctamidae	Purple Sunbird	LC	R	12	5	25
189		Noctamidae	Lozen's Sunbird	LC	R	3	0	0
190		Passeridae	House Sparrow	LC	R	14	3	28
191		Motacillidae	Forest Wagtail	LC	M	17	4	0
192		Motacillidae	White Wagtail	LC	M	3	5	6



	Order	Family	Species Common Name	IUCN	Status (Resident/ Migratory)	2023	2024	2025
193		Motacillidae	Citrine Wagtail	LC	M	0	7	21
194		Motacillidae	Yellow Wagtail	LC	R	0	0	3
195		Motacillidae	Eastern yellow wagtail	LC	R	0	0	18
196		Motacillidae	Grey Wagtail	LC	M	0	0	4
197		Motacillidae	Paddyfield pipit/ Oriental pipit	LC	R			1
198		Estrildidae	Scaly-breasted Munia / Spotted Munia	LC	R	0	0	33
199		Fringillidae	Common Rosefinch	LC	M	14	10	1
					SUM	5065	8776	31927



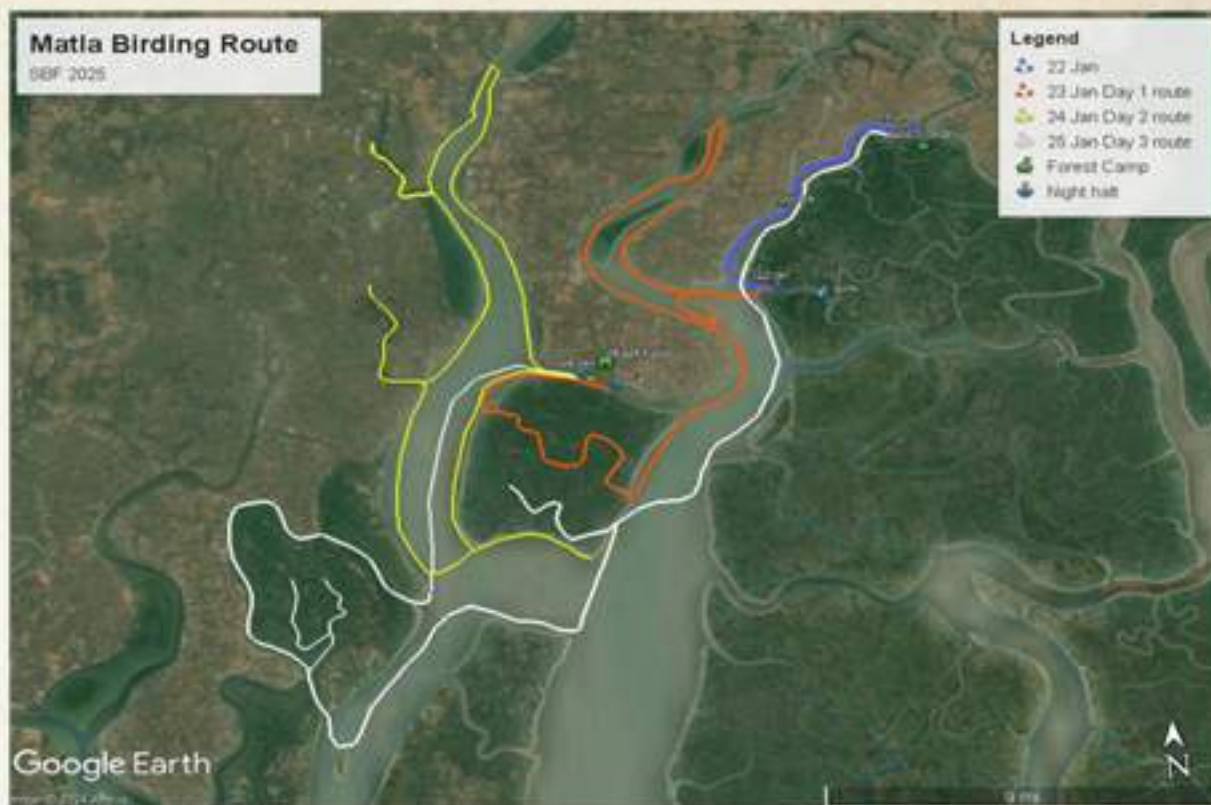


ANNEXURE 2









ANNEXURE 3

Status of Avifauna in Sundarbans Biosphere Reserve										
Bird Transect Data Sheet										
Observer				Date			Start 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.	Species		Time	No.	Sex	Ad/Juv	Microhabitat	Activity	Dis. In Mtr.	



ANNEXURE 4

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	Great Knot	Decline globally		EN	I
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	Common Tern	Rapid Decline	Rapid Decline	LC	II
12	Lesser Adjutant			NT	I
13	Osprey	Rapid Decline	Rapid Decline	LC	I

List of Threatened birds found in the 3rd SBF 2025, as per SolB 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)









Sundarban Tiger Reserve

Canning Town, Dist: 24 Pgs (South), PIN: 743329, West Bengal, India.

sundarbantigerreserve.org, sundarbantigerreserve@gmail.com