

## STUDY OF AVIAN DIVERSITY, THREATS AND CONSERVATION OF BALLALESHWAR (VADALE) LAKE, PANVEL. DIST. RAIGAD (MAHARASHTRA)

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**Abstract:** The Balleshwar (Vadale) lake provides a vital role for present Avian fauna with a great place to eat, rest and breed. Lakes are part of the environment and ecosystem. In Panvel, the Urban area's numerous natural ecosystems are changing due to human activities. Population numbers fluctuated as a result of ecological shifts. Numerous species are experiencing sharp declines as a result of this connection. Birds are a great way to monitor the environment. Their sensitivity to their environment is high. They can detect changes in their environment with ease. Bird population changes often represent the first sign of environmental issues. For the protection of species, it's important to understand their life cycles, habitats, and ecosystems. The study indicates that Ballaleshwar Lake Panvel has bird biodiversity. We observed 25 families of bird species during our study period.

**Keywords:** Balleshwar Lake, Panvel, Avian Fauna, Urban ecosystem conservation.

### Introduction:

The Balleshwar (Vadale) lake is Panvel's oldest lake built by the Peshwas, and it was spread over several acres but now it's shrunk due to heavy urbanization in the city. Recent studies have identified freshwater biodiversity as the most vulnerable among various types of diversity, with wetlands emerging as particularly crucial sites, harboring a significant portion of the prevailing avifauna. These investigations indicate that freshwater wetlands, in isolation, contribute substantially, supporting approximately 20% of the recognized biodiversity range in India.

Avian diversity in India faces multifaceted threats, primarily stemming from habitat loss, pollution, climate change, and poaching (Ali, 2002; Rahmani, 2012). Rapid urbanization and agricultural expansion contribute significantly to habitat degradation, impacting numerous bird species (Prakash et al., 2004). Pollution, both air and water, further jeopardizes avian populations, affecting breeding success and overall health (Gupta et al., 2017). Climate change-induced alterations in ecosystems pose additional challenges, disrupting migratory patterns and availability of suitable habitats (Nagendra & Gadgil, 1999).

Conservation efforts are crucial to mitigate these threats. Protected areas, such as national parks and sanctuaries, play a pivotal role in safeguarding avian habitats (Rahmani, 2012). Community-based initiatives, like the Amur Falcon conservation in Nagaland, demonstrate the positive impact of involving local communities (Ramakrishnan et al., 2019). Integrating sustainable practices in agriculture and promoting eco-friendly urban planning are essential steps toward long-term avian conservation (Gadgil et al., 1993).

### Study Area:



**Fig.1 Ballaleshwar Lake Panvel**



**Figure 2: Map Of Study Area: Ballaleshwar (Vadale) Lake, Panvel**

The authors conducted a study on the avian population of Ballaleshwar Lake in Panvel spanning from January 2023 to January 2024. Situated along the Gadhi River, Panvel claims the title of the largest and most notable city in the Raigad district. Surrounded by significant MIDC-managed areas, Panvel is swiftly evolving into a bustling urban hub and holds the distinction of being the most densely populated city in the Raigad district within the Navi Mumbai region. With its central location, Panvel offers access to essential amenities and is conveniently close to Navi Mumbai International Airport (NMIA), industrial zones like Taloja MIDC, Patalganga MIDC, Kamothe Industrial Area, Uran Port area, and Khopoli. (Narwade et.al, 2013). Ballaleshwar Lake, situated to the north of Panvel, spans an area of 1.74 sq Km with an average depth of around 4 meters. The lake maintains an annual water temperature ranging from 17 to 27 degrees Celsius, and its salinity fluctuates between 3 to 4 parts per million (ppm). Notably, the lake serves as a conducive habitat for various aquatic and semi-aquatic bird species, providing an excellent environment for feeding and roosting.

**Material And Method :**

The Ballaleshwar (Vadale) lake is one of the water-bodies located in an area of Panvel in the Raigad district between 18° 59' 38"N and 73° 6' 42"E (Fig.1). The study was carried out for one year (from January 2023 to January 2024) at Ballaleshwar (Vadale) Lake, Panvel. Locations were surveyed twice a month and birds were observed and photographed with the help of Nikon Acculon 8 X 42 binocular and Nikon Coolpix P1000 Camera. The birds were identified up to species using field guides (Ali, S. (2002). The book of Indian birds. Oxford University Press.; Ali,

S. and Ripley, D.S. (1983), Handbook of the Birds of India and Pakistan. Oxford University Press. Oxford; Grimmitte and Inskipp, 2013;). Photographs were taken wherever possible to identify the bird accurately to species level. Birds in flight were also recorded during the survey. The Point count and Line transect method were adopted for sampling.

### Results and Discussion :

Sr. No	Name	Scientific Name	Family	IUCN Status	Migratory Status
1	Black Kite	<i>Milvus migrans</i>	Accipitridae	LC	R
2	Western Marsh-harrier	<i>Circus aeruginosus</i>	Accipitridae	LC	M
3	Brahminy Kite	<i>Haliastur indus</i>	Accipitridae	LC	R
4	Common Kingfisher	<i>Alcedo atthis</i>	Alcedinidae	LC	R
5	White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae	LC	R
6	Northern Shoveller	<i>Spatula clypeata</i>	Anatidae	LC	M
7	Common Teal	<i>Anas crecca</i>	Anatidae	LC	M
8	Garganey	<i>Spatula querquedula</i>	Anatidae	LC	M
9	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Anatidae	LC	R
10	Eurasian Wigeon	<i>Mareca penelope</i>	Anatidae	LC	M
11	Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	Anatidae	LC	M
12	Lesser Whistling-duck	<i>Dendrocygna javanica</i>	Anatidae	LC	R
13	Intermediate Egret	<i>Ardea intermedia</i>	Ardeidae	LC	R
14	Grey Heron	<i>Ardea cinerea</i>	Ardeidae	LC	R
15	Great White Egret	<i>Ardea alba</i>	Ardeidae	LC	R
16	Little Egret	<i>Egretta garzetta</i>	Ardeidae	LC	R
17	Purple Heron	<i>Ardea purpurea</i>	Ardeidae	LC	R
18	Indian Pond heron	<i>Ardeola grayii</i>	Ardeidae	LC	R
19	Black-crowned Night-heron	<i>Nycticorax</i>	Ardeidae	LC	R
20	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	LC	R
21	Red-wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae	LC	R
22	Asian Openbill	<i>Anastomus oscitans</i>	Ciconiidae	LC	M
23	Rock Dove	<i>Columba livia</i>	Columbidae	LC	R
24	Western Spotted Dove	<i>Spilopelia suratensis</i>	Columbidae	LC	R

25	Large-billed Crow / Jungle Crow	<i>Corvus macrorhynchos</i>	Corvidae	LC	R
26	House Crow	<i>Corvus splendens</i>	Corvidae	LC	R
27	Greater Coucal	<i>Centropus sinensis</i>	Cuculidae	LC	R
28	Asian Koel	<i>Eudynamis scolopaceus</i>	Cuculidae	LC	R
29	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	LC	R
30	Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae	LC	M
31	Wire-tailed Swallow	<i>Hirundo smithii</i>	Hirundinidae	LC	R
32	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Jacanidae	LC	R
33	Bronze-winged Jacana	<i>Metopidius indicus</i>	Jacanidae	LC	R
34	Long-tailed Shrike	<i>Lanius schach</i>	Laniidae	LC	M
35	Asian Green Bee-eater	<i>Merops orientalis</i>	Meropidae	LC	M
36	House Sparrow	<i>Passer domesticus</i>	Passeridae	LC	R
37	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Phalacrocorac idae	LC	R
38	Little Cormorant	<i>Microcarbo niger</i>	Phalacrocorac idae	LC	R
39	Little Grebe	<i>Tachybaptus ruficollis</i>	Podicipedidae	LC	R
40	Rose-ringed Parakeet	<i>Alexandrinus krameri</i>	Psittacidae	LC	R
41	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	LC	R
42	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Pycnonotidae	LC	R
43	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Rallidae	LC	R
44	Grey-headed Swamphe	<i>Porphyrio porphyrio</i>	Rallidae	LC	R
45	Eurasian Coot	<i>Fulica atra</i>	Rallidae	LC	R
46	Black-winged Stilt	<i>Himantopus himantopus</i>	Recurvirostrid ae	LC	R
47	Greater Painted-snipe	<i>Rostratula benghalensis</i>	Rostratulidae	LC	M
48	Common Sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae	LC	M
49	Wood Sandpiper	<i>Tringa glareola</i>	Scolopacidae	LC	M
50	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	LC	R
51	Asian Pied Starling	<i>Gracupica contra</i>	Sturnidae	LC	R
52	Glossy Ibis	<i>Plegadis falcinellus</i>	Threskiornithi dae	LC	M
53	Painted Stork	<i>Mycteria leucocephala</i>	Ciconiidae	NT	R
54	Alexandrine Parakeet	<i>Palaeornis eupatria</i>	Psittacidae	NT	R

55	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Threskiornithidae	NT	R
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**Abbreviations:** R- Resident, M- Migratory, NT- Near Threatened, LC- Least Concern

**Threats to Birds:**

1. Unrestricted habitat loss and the deterioration of aquatic ecosystems as a result of human activity are among the primary challenges impacting bird populations.
2. Urban sprawl is causing wetlands in suburban and urban regions to be drained and filled with dirt.
3. Waterfowl's long-term existence is most at risk from habitat deterioration and loss.
4. The ongoing, irreversible depletion of water bodies persists at a troubling pace. Additionally, the reduction in water surface area, salinity levels, and fishery resources, along with the rampant spread of invasive freshwater aquatic weeds, pose significant dangers to the lake ecosystem. This overall decline in biodiversity, coupled with decreased productivity, has adverse effects on the Avifauna of Lake.

**Conservation Strategies:**

1. Preserving wetlands is essential for the survival of both resident and migratory birds, as they offer specialized microhabitats and diverse food sources.
2. Erecting fences to protect the lake area and limiting access for people to designated areas only is recommended.
3. Effective control measures must be implemented to manage aquatic weeds.
4. Measures should be taken to halt human exploitation of the environment.
5. Increasing the number of islands available for bird roosting is advised.
6. Encouraging the planting of indigenous trees can attract birds for roosting purposes.
7. Strict prohibition of domestic sewage inlets is necessary to maintain water quality.
8. Protecting bird habitats and species, providing economic incentives to discourage bird poaching among local populations, and conducting educational and environmental awareness programs are essential for fostering multidisciplinary development efforts.
9. Panvel Municipal Corporation should take proactive measures to adopt conservation and management actions to safeguard the lake ecosystem and its genetic diversity.

## Conclusion :

The preservation of Ballaleshwar (Vadale) Lake is crucial for the survival of both resident and migratory birds because it provides the birds with specialized microhabitats and different kinds of food sources. Loss of habitat is threatening the life support system because of large-scale habitat destruction. Bird conservation practices like presentation or reduction in habitat loss, habitat deterioration and habitat fragmentation need to focus on the small details like shielding bird nests, protecting migratory and resident birds and providing an eco-friendly environment to better appreciate the large spectrum of life. It is in our power to protect and nurture some of these extraordinary life forms. We need to walk through this world and leave an eco-friendly footprint that protects the interests of both, Humans and birds.

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