

ORIGINAL ARTICLE

**PRESENT STATUS OF THE SANTRAGACHII WETLAND THAT WAS ONCE
CONSIDERED AS A GOOD ABODE OF MIGRATORY WATERBIRDS INSIDE
THE URBAN AREA**

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Abstract: *Santragachii wetland in Howrah, West Bengal, India, has been well known for the abode of different migratory waterbirds for last few decades. In recent past it has suffered a serious degradation in quality as a suitable waterbird habitat due to excessive water-hyacinth growth and water pollution. However, a regular strong effort has been put to clear those waterhyacinth covers and monitoring has been done on the water quality from 2018 by different nongovernment bodies that has resulted a partial recovery of the migratory duck population in recent years. Here in this paper the minute changes of the migratory duck populations over the years have been depicted and the effects of habitat restoration on their population trends have been studied.*

Key Words: Wetland, habitat, waterbird, migration, diversity, restoration, population.

Communicated: 7.12.2023

Revised: 15.12.2023

Accepted: 16.12.2023

1. INTRODUCTION

Wetlands provide key essential ecological services to sustain the biological diversity and human welfare over the Globe. It provides a constant source of food, refuge, migration, and reproduction to different life forms [1]. Waterbirds directly depends on the wetlands but also contributes to the proper functioning of wetlands in a deeper sense. In fact, wetlands and waterbirds are so deeply connected that wetland health can be analyzed by the distribution of waterbirds.

In essence, the presence of different waterbirds is a clear indicator of good wetland health. Significantly for the importance of conservation assessment priority of wetlands over the World, Ramsar site criteria 5 and 6 are being followed. However, even if any wetland does not satisfy those strict Ramsar criteria, it still must be monitored with care as most waterbirds including migratory ones majorly distribute

themselves across different wetlands during their winter visit. When migrating they all come in a huge population later settle in local patches in different wetlands suitable for their foraging opportunities. Those interconnected and wetland patches provide a wide range of foraging scope for them [2]. Works on man-made reservoir in different parts of South Bengal has been done earlier [3, 4]. In the present study, investigation was conducted in an urban wetland, supposed to support diverse waterbirds, especially migratory ones as their wintering abode in South Bengal.

In this context, mention may be made that, those wetlands that are not included in the current Ramsar site by no means. However, these are important, as each of them plays a crucial role in maintaining the balance of nature and combating pollution of air and water. One such wetland in which migratory waterbirds reside in winter for last two decades is the Santragachii wetland (lat. 22.580⁰N; long. 88.283⁰E). The wetland extends over an area of 24 ha, of which 18 ha constitute a lake that provides suitable habitat for waterbirds. A sizeable portion of the waterbody remains clogged with water hyacinth (*Eichhornia crassipes*) throughout the year. The lake supports a wide variety of zooplankton, molluscs and fish that cater the waterbirds with required dishes [5]. A detailed description of this wetland is given by Khan *et al.* [6]. Originally it was an open pit, later developed by South-Eastern Railway for their purpose. With time, it became a very attractive place for migratory waterbirds and became a beautiful abode for them inside the busy locality (Figure 1). At first there were hardly one or two permanent houses beside the waterbody mainly surrounded by shrubs and tall vegetation. Later it was invaded by greedy people and promoters, who turned the spot into an association of apartments of different heights. To add to the problem, the housing complexes had poor sewage management system and majority of household liquid and solid wastes were used to be thrown directly into the waterbody. This practice indulged in the addition of excessive ‘Nitrogen’ and ‘Phosphorous’ inputs into the wetland and resulted the increase in pollution level, leading to eutrophication in aquatic ecosystem [7]. It has been a very robust negative impact on the natural habitat of waterbirds. For the past decades this waterbody was found to be endowed with a reasonably great number of migratory waterbirds ranging from a total population from 7000 to 9000 [5 -7].



Figure 1: Condition of Santragachii Wetland fully covered by Water-hyacinth during October 2018.

However, for the last few years, their number dropped drastically. In 2018, the population came down to around 700 [8]. In this period, the full waterbody was thoroughly covered by excessive water-hyacinth and water quality was very poor (Figures 1 -3). For years some of the most common visitors of the wetland were Gadwall (*Mareca strepera*), Northern Pintail (*Anas acuta*), Garganey (*Spatula querquedula*), Common Teal (*Anas crecca*), Northern Shoveler (*Spatula chlypeata*), Wigeon (*Mareca penelope*), Ferruginous Pochard (*Aythya nyroca*), Common Pochard (*Aythya farina*), Lesser Whistling Duck (*Dendrocygna javanica*), Great Cormorant (*Phalacrocorax carbo*), Common Snipe (*Gallinago gallinago*), Swinhoe's Snipe (*Gallinago megala*), Purple Heron (*Ardea purpurea*), Common Moorhen (*Gallinula chloropus*), Bronze-winged Jacana (*Metopidius indicus*), Comb Duck (*Sarkidiornis sylvicola*) etc. Even in a year around 2010-11 Baikal Teal (*Sibirionetta formosa*) was observed there.



Figure 2: Dedicated members of the Nature Mates club and alumni of Narasinha Dutt College, Howrah, cleaning hyacinth chunks by a boat during First week of November 2018.

2. METHODOLOGY

The waterbird counts were made from boat starting from 8 am to 5 pm until the total counts have been made covering major portions of the wetland from 2015 to 2023 in the months of January by the standard methods followed by Wetlands International 2006 [8] and Sinha et al. 2011 [9]. For the counting of waterbirds, a binocular (Olympus 7×21 PS III) was used along with two full frame DSLRs of Nikon and 500mm f4 and 70-200 mm f2.8 telephoto lens was used to take pictures for further clarification in counting and identification. The birds were identified observing the photography [10-13] and recorded for analysis. For the ecological data analysis of communities, “PAST” (Paleontological Statistics) software version 3.22 was used [14]. The important diversity indices were calculated by the software and analyzed accordingly.

TRIM (trends and indices for monitoring data) software was used to analyze the population trends of different waterbird species in this wetland over the nine-year study period [15].



Figure 3: Lesser Whistling Ducks (*Dendrocygna javanica*) sitting on the newly made resting island during 2018.

3. RESULTS

Table 1: List of the species encountered during the study period from 2015 to 2023.

Species	Scientific Name	Residing Status	IUCN Status (2023)
Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
Great Cormorant	<i>Phalacrocorax carbo</i>	Resident	Least Concerned
Little Cormorant	<i>Phalacrocorax niger</i>	Resident	Least Concerned
Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concerned
Great Egret	<i>Casmerodius albus</i>	Resident	Least Concerned
Intermediatory Egret	<i>Egretta intermedia</i>	Resident	Least Concerned
Little Egret	<i>Egretta garzetta</i>	Resident	Least Concerned
Cattle Egret	<i>Bubulcus ibis</i>	Resident	Least Concerned
Grey Heron	<i>Ardea cinerea</i>	Resident	Least Concerned
Purple Heron	<i>Ardea purpurea</i>	Resident	Least Concerned
Pond Heron	<i>Ardeola grayii</i>	Resident	Least Concerned
Lesser Whistling Duck	<i>Dendrocygna javanica</i>	Resident / Local Migrant	Least Concerned
Fulvous Whistling Duck	<i>Dendrocygna bicolor</i>	Resident / Local Migrant	Least Concerned
Comb Duck	<i>Sarkidiornis melanotos</i>	Resident / Local Migrant	Least Concerned
Northern Pintail	<i>Anas acuta</i>	Winter Migrant	Least Concerned

Common Teal	<i>Anas crecca</i>	Winter Migrant	Least Concerned
Gadwall	<i>Anas strepera</i>	Winter Migrant	Least Concerned
Eurasian Wigeon	<i>Anas penelope</i>	Winter Migrant	Least Concerned
Garganey	<i>Anas querquedula</i>	Winter Migrant	Least Concerned
Northern Shoveler	<i>Anas clypeata</i>	Winter Migrant	Least Concerned
Cotton Pygmy Goose	<i>Nettapus coromandelianus</i>	Resident / Local Migrant	Least Concerned
Ferruginous Pochard	<i>Aythya nyroca</i>	Winter Migrant	Near Threatened
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concerned
Common Moorhen	<i>Gallinula chloropus</i>	Resident	Least Concerned
Bronze Winged Jacana	<i>Metopidius indicus</i>	Resident	Least Concerned
Red Wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concerned
Common Sandpiper	<i>Actitis hypoleucos</i>	Winter Migrant	Least Concerned
Wood Sandpiper	<i>Tringa glareola</i>	Winter Migrant	Least Concerned
Common Snipe	<i>Gallinago gallinago</i>	Resident / Local Migrant	Least Concerned
Swinhoe's snipe	<i>Gallinago megala</i>	Winter Migrant	Least Concerned
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concerned
Stork Billed Kingfisher	<i>Halcyon Capnesis</i>	Resident	Least Concerned
Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concerned
Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concerned

Table 2. Year-wise changes in community composition of waterbirds from 2015 to 2023.

Year	Species types	Total numbers	Dominance_D	Shannon_H	Evenness_e^H/S	Brillouin	Margalef
2015	33	5674	0.8402	0.556	0.05284	0.5441	3.702
2016	34	6621	0.8502	0.5246	0.0497	0.5141	3.751
2017	32	5240	0.8396	0.5395	0.0536	0.5277	3.62
2018	24	3094	0.8198	0.571	0.07375	0.5564	2.862
2019	29	3574	0.8024	0.6414	0.06548	0.6258	3.422
2020	32	2310	0.7702	0.7473	0.06598	0.7229	4.003
2021	28	4145	0.8792	0.4236	0.05455	0.4112	3.241
2022	30	5199	0.8856	0.4063	0.05004	0.3955	3.389
2023	30	6327	0.906	0.3425	0.04695	0.3337	3.313

Overall, 34 species of different waterbirds were encountered over the last 9 years out of them 5 species were local migratory while 7 winter migratory ducks and 2 migratory waders (Table 1). The typical winter migratory ducks were Gadwall, Garganey, Common teal, Northern Pintail, Ferruginous Pochard, Wigeon and Northern Shoveler. From 2015 to 2017 a common trend in ecological indices were noted. Shannon Weiner index showed a gradual decline over the years except 2019-2020, indicated loss of species evenness which is reflected by the increase in dominance (D). The Margalef's richness remained lowest in the year 2018 (Table 2).

In general, 2018 was the most affected year by water-hyacinth covering gathering only 24 species in winter. Overall, 34 total types of birds relying on waterbody was recorded and highest of them was seen in 2016 with 34. Mention may be made that during the recent years the general diversity remained quite low as indicated by the Shannon Weiner index ranging from 0.7473 to 0.3425 whereas studies in the previous years 2002 to 2014 on this wetland this index was noted to be between 1.4-1.7 range (not shown here). The total number of species population was very low in

2018 to 2020 with the values 3094, 3574 and 2310 respectively indicating a recovering stage of the wetland health during this period. However, a descend increase in their numbers has been noted in 2022 and 2023 as more than 6000.

Table 3. Trend analysis of some of the important migratory duck populations over the nine years of study period.

Name of the Species	Overall Slope Imputed	Wald test for significance of slope parameter	Comment
Lesser Whistling Duck	0.9892± 0.0654	Wald-Test 0.01, df 1, p 0.9386	Uncertain
Fulvous Whistling duck	0.8222 ± 0.0750	Wald-Test 6.33, df 1, p 0.118	Moderate decline (p<0.05)
Gadwall	0.9002± 0.0386	Wald-Test 8.86, df 1, p 0.0029	Moderate decline (p<0.01)
Garganey	0.9003± 0.0459	Wald-Test 6.42, df 1, p 0.0113	Moderate decline (p<0.05)
Ferruginous Pochard	0.9117± 0.0634	Wald-Test 2.13, df 1, p 0.1440	Uncertain
Common Teal	0.9465± 0.0370	Wald-Test 6.16, df 1, p 0.0130	Uncertain
Northern Pintail	0.8627± 0.0571	Wald-Test 9.44, df 1, p 0.0021	Moderate decline (p<0.05)
Northern Shoveler	0.8627± 0.0571	Wald-Test 5.87, df 1, p 0.0154	Steep decline (p<0.05)
Wigeon	0.8490± 0.0878	Wald-Test 2.47, df 1, p 0.1157	Uncertain
Cotton Pygmy Goose	0.9520± 0.0753	Wald-Test 0.48, df 1, p 0.4883	Uncertain

All the migratory ducks showed a general decline in the study period (Table 3) especially northern Shoveler whereas the most adaptable Lesser Whistling duck remained the least hampered throughout the study period except in 2018. Fulvous whistling duck, Gadwall, Garganey and Northern Shoveler showed significant decline while Ferruginous Pochard and Common Teal remained uncertain in their population trends although their numbers dropped decently in last three to four years.

4. DISCUSSION

Santragachii wetland was well known to support good number of migratory ducks in winter for long time. In this short study period 34 species of waterbird was noted in which 2 belongs to ‘Near threatened’ category in IUCN, 2023. They were Darter and Ferruginous Pochard. A common decline in general bird population was the trends in recent years in this wetland mainly due to water pollution. Direct domestic sewage discharge from the surrounding building and railway plant discharge resulted a thick water hyacinth covering that made some of the key negative impacts responsible for decline in wetland health and waterbird population. A high-water hyacinth cover on a wetland has been found to have a general negative impact on waterbird abundance in communities across the World [16].

For last few years the growing water-hyacinth cover problem started due to the mismanaged practices of the locals residing in the complexes surrounding the waterbody. The draining systems

were directly joined to the waterbody and they throw garbage from their balcony directly to the wetland in spite the properly placed dumping boxes nearby. Railways and Howrah Municipal Corporation were taking the responsibility to clean the waterbody seasonally between October and November just before the winter. However, during 2017-18, due to some misunderstanding between them, the waterbody was not cleaned in due time. Then some collective motivational efforts from the different NGOs and college students made a great effect on waterbirds by cleaning the water hyacinth, building their resting islands in the middle of the waterbody (Figures 2-3). The result was astonishing and an increase in migratory bird's appearance from almost zero to a noticeable amount was observed. In this regard "Nature-Mates and Nature Club" of Kolkata was most effective team that must be mentioned.

However, it has been found that a small-scale water-hyacinth cover also provides some beneficial foraging and resting opportunities to the migratory as well as residential waterbirds [5]. At the same time, with the increasing nutritional input and wetland clogging, water-hyacinth cover might have resulted a severe negative impact on planktonic photosynthesis and dissolved oxygen of the wetland affecting waterbirds negatively. Only the most adaptable and numerous Lesser Whistling ducks were seen in good numbers in last two years after the wetland health recovery. The typical winter migratory ducks were noted to leave this abode in recent past preferring other sites in further southern parts of West Bengal. Interestingly in previous works it was found that wetland complexes are connected by aerial routes for waterbirds and they move in closely located wetlands according to the need of foraging [9].

Mention may be made here that a serious habitat degradation and modification had occurred in Dankuni wetland cluster in recent past for railway factory building. This might have also affected the stability of Santragachii migratory waterbird population as they frequently moved across the wetlands [17]. Recent continuous efforts by different NGOs and colleges managed to save this Santragachii wetland from further damages and these can be observed in the increase in species numbers in 2022-23. However, the population is never achieving close to near as it had been for years from 2000 to 2014 as the condition of the wetland has been drastically affected by the imprudent activities.

2. CONCLUSION

In this short period of time any firm conclusion cannot be achieved for a successful recovery program on wetland health by any ecological modelling analysis. However, this is the first-hand report of an urban wetland habitat restoration program in recent times by monitoring the wetland quality as an avian abode for migratory ducks. We must monitor long and have precautions from all protecting authorities to check the status of the wetland health and waterbird population trends for long run to save the beautiful abode for migratory waterbirds.

3. ACKNOWLEDGEMENT

Author is thankful to Dr. Soma Bandyopadhyay, Principal, Narasinha Dutt College, for her permission and support to the regular field visits, which is a part of this study.

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