

EVALUATION OF AVIFAUNA DIVERSITY IN HYGAM WETLAND (RAMSAR SITE)

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Abstract: Jammu and Kashmir are rich in natural resources, especially in Wetlands. These Wetlands provide wintering, feeding and breeding grounds for millions of resident (local), and non-resident summer migrants and Migratory birds especially waterfowl (ducks, geese and swans) visiting from different countries. The research studies the status & diversity of various avifauna populations of (Resident, Summer Migrants & Migratory) in Hygam Wetland Reserve a Ramsar Site in Jammu & Kashmir. The study was conducted in 4 seasons (Spring, Summer, Autumn and winter) from January 2022 to December 2023. Visual basis and strip-transit methods were used for the counting of avifaunal populations in the study site. With the help of a expert field guide, monographs and Standard books identification of birds was done. In the study area the Species diversity of the identified birds showed variation between the sites. The highest number & density of avifauna was observed at **1 – site** (emergent & dense vegetation) followed by **2-site** (Radhiam/Akhnoonpora). Out of the total identified avifauna population in winters (winter migratory birds), Mallards were counted highest followed by Northern Pintail and Gadwall. The other species (Residents/Summer migrants) observed were Pond heron, little egret, common coot, Purple swamphen, common teal, Northern Shoveller and goose were also observed in the study area. Out of 42 species of birds recorded from the study area, 19 species were the residents, 11 species found were summer migrants and 12 species represented the winter migrant community. From residential birds, the grey pigeons makes up 70% of the bird diversity followed by the golden finch, blue billed magpie, Streaked laughing thrush, blue whistling thrush & Purple Moorhen. From summer migrants Starlings, dominate the area followed by Tickle's thrush, Indian ring dove, Indian Whiskered tern, European hoopoe etc. The total number of Winter migratory birds that make up 75 to 80% of bird diversity in winter are Mallards, Northern Shoveller, Common Teal, Pin Tail, Geese and common coots.

Keywords: Present status of water birds; Bird diversity; Hygam wetland; Ramsar Site; Migratory birds; Resident and non-resident birds; Threats; Conservatio; Kashmir

1 INTRODUCTION

Wetlands are the most productive and important habitats as they perform a variety of functions and are found throughout the biosphere. Wetlands act as a transition zone between terrestrial and aquatic ecosystems and are highly diverse and productive habitats [1]. Wetlands provide a home for a large diversity of wildlife including birds, mammals, fish, amphibians, insects and plants [2].

Wetlands in India cover an area of 58.2 million hectares [3]. Approximately 23% (310 of 1340) of the bird species found in India [4] are known to be dependent on wetlands [5]. Birds are forestanding species of global biodiversity found in every habitat [6] and key indicators of ecosystem health and stress [7]. Knowledge of the composition of bird communities is crucial to determining the ecology and health of the local ecosystem or regional landscapes[8]. Understanding bird community structure and diversity is therefore essential to recognize the importance of landscapes for avian conservation [9].

Jammu and Kashmir is an avian-rich state [10] with about 28 vital bird areas [11] and is home to 12 threatened bird species and six near-threatened species globally. A high degree of eco-climatic variability and distinctive, varied biogeographical and ecological features are responsible for this spectacular bird diversity [12].

A network of wetlands covering an area of more than 7,000 hectares is located in the Valley of Kashmir. The Valley of Kashmir is renowned for its fully blossomed wetland ecosystems and wide variety of avifauna diversity.

Over 3 lakh migratory waterfowl, including graylag geese, mallards, pochards, Eurasian coot, and gadwall & goose travel to Kashmir's wetlands in the winter seasons for feeding and spawning. All of these birds depend on the wetlands for their survival. It is known that 37 species of waterfowl breed in western Siberia. Ten of these species were seen in Haigam Wetland, while fifteen have been reported from Hokersar Wetland.

In Jammu and Kashmir, eleven out of twenty-one Important Bird Areas meet Ramsar requirements and five wetlands are designated as Ramsar sites two in 2022 like Shalbug & Hygam [13]. Ramsar sites have already been designated for Wular and Hokersar because of their significance for biodiversity. Also, Haigam, and Shallabug, were declared as Ramsar Sites in 2022, and these above wetlands have been documented in the network of Important Bird Areas [13] and [14].

Numerous aquatic and semi-aquatic vegetation may be found in the Hygam wetland, which serves as a suitable home for a range of resident, summer and migratory birds. Since Hygam Wetland supports a larger number of Mallards than other waterbodies in Kashmir, it has earned the nickname "Queen of the Mallards".

Many investigators have studied the diversity, distribution, seasonal migration etc. of birds in various wetlands and lakes of Kashmir [15], [16], [17], [18] but little is known about the birds of Hygam wetland in the recent past. This study aims to determine the current status of avifauna populations (Resident, Summer & Migratory birds in the wetland. Anthropogenic activities have led to growing environmental deterioration in the Kashmir-Himalayan valley, which is well-known for its diversity of wetlands. Overexploitation of resources (e.g., harvesting, fishing, and hunting) of several Kashmir wetlands has caused the decline or the near disappearance of many plant and animal species [19].

Increased siltation, eutrophication (run-off from catchment areas), agricultural conversion, receding open water areas, expanding reed beds, construction of canals, weirs, and over-grazing are the major threats to wetlands of Jammu and Kashmir [20].

During the present study, only a few thousand bird populations (residential, summer migrants and Migratory) were observed & recorded in the study area, due to low water levels as most of the wetland area is walkable by foot and barren due to high siltation and low open water in winters for birds. In near future, we may lose many important avifauna populations and some important winter migratory guests visiting this site if important measures are not taken immediately.

2 STUDY AREA

Haigam wetland or Rakh or Jhil (Ramsar Site) is named after a village Haigam Tehsil Sopore district Baramulla of Jammu & Kashmir. The wetland is ovoid. From Baramulla district in the north, It is located 22 km away and from Srinagar, it is 45 km away. It has an area of about 14 km (1400 hectares) with about 4 km of reed beds but the total area of the wetland has shrunk to 7.25 km due to encroachment, siltation & reed beds. In 1945. The area was notified as a game reserve for duck shooting. The Department of Wildlife Jammu & Kashmir is maintaining the wetland. The wetland is dominated by extensive reed beds [21].

3 GEOGRAPHICAL LOCATION

With a maximum depth of 1.2 meters, the wetland is situated on the flood plains of the Jhelum River. At a height of 1585 meters above sea level, the site's coordinates are $34^{\circ}13'30''$... $34^{\circ}16'4''$ N latitudes and $74^{\circ}30'27''$ - $74^{\circ}32'33''$ E longitudes. The average temperature is between 25 and 30 degrees Celsius. This area receives between 900 and 1000 mm of rain annually. This wetland gets its water from several smaller streams, including Balkul and the flood spill stream of Ningli Nallah. As shown in Figure 1.

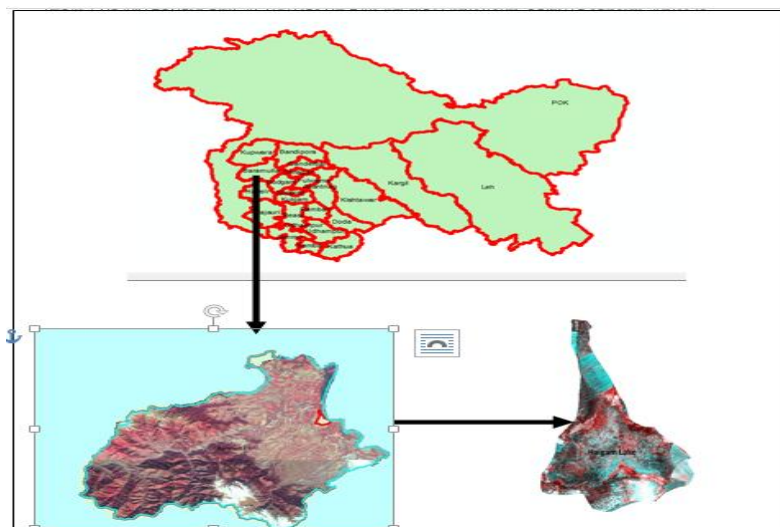


Figure 1 Study Area

4 MATERIAL AND METHODS

A sampling technique was used to examine the current state of birds in the wetland season (January 2022 to December 2023) while considering the size of the study region. The study area has been divided into four sampling sites. Site –I (Scattered Salix trees with dense and emergent vegetation), II- site (Wandakpora/ Aakhanpora & Raidagam side), III-site (Village Hygam side with Salix plantations) and site barren with scattered and dense Salix plantation (Andergam & Lolipora).

Six distinct observation locations were set up in the wetland plantation zones, spaced 50–100 meters apart. Six observation locations were set up in the wetland's interior. The study region was divided into three categories: vegetation type, water depth, and habitat type. Out of the Six study sites, four were aquatic and 2 were terrestrial sites. For the estimation of the avifauna population in in wetland following scientific methods were employed for research:

4.1 Strip Transect Method

The strip transect method was employed for bird counting while travelling in a boat through the narrow water channels. With each transect, a distance of 100 meters was covered to count the number of birds on the left and right sides of the boat.

4.2 Visual Counting Method

For estimation of avian fauna population the visual counting method with the help of Binoculars (10×50X) was employed.

4.3 Point Count Method

Since the majority of the wetland is dried out and most of it was easily accessible on foot, The point count method was employed for counting birds.

By keeping track of the birds that flew into and out of the study plots throughout the research, double counting was avoided. Transect monitoring was done in the early morning and late evening, Since birds are visible and at its peak as done by [22] and [23]. Using a Canon 1300d camera with a 250mm to 400mm zoom lens, photographs of birds were also taken. An expert field guide was also employed for bird identification in order to obtain accurate visuals. Observations were made from 6:00 a.m., when the birds were feeding, to 7:00 p.m., when they leave for their resting places.

5 RESULT AND DISCUSSION

From January 2022 to December 2023 the avifauna populations were observed. The Spring summer, autumn and winter seasons were used to measure variations in the avifauna population. Of the 41 bird species (both Residential, summer migrants and Winter migrants) that were identified from the site—representing residential, summer, and winter migrants —19 species were found to be residents, 11 species were discovered to represent summer migrants, and 11 species represented winter migrants (Table & Figure 2-4). The identified avifauna varied throughout the sites in the study area in terms of species richness and diversity. In site I (which has dense, emergent vegetation and open water surrounding it) has the highest density of migratory birds. Because it has been less affected by human activity, this site serves as a favorable habitat for migratory and other birds to nest, breed, and rest. Site II (Wadakpora/ Akhnoonpora & Radigam side) is where residential and summer migrants are found in large numbers in summer and autumn seasons due to availability of food and space for nesting in the trees and residential houses. The site is towards the residential side of the wetland. In Autumn season the number of summer miratory birds decreases as summer migrants go for migration and no of residential birds incrases as they move towards these residential areas and nearby paddy fields for food and resting.

In this study site it was observed that several bird species (ducks, geese and cormorants) were attracted by the fish species like carp and seeds produced by various aquatic vegetation [24], reported that there is a positive correlation between the avian species diversity and richness with the vegetation cover. Mallards prefer Areas having dense vegetation of emergent macrophytes. Whereas open water was preferred by pochards, coot, gadwall and geese.

From the total number of identified birds, Mallards were the most counted at I-site (200), Northern pintail at (150 species) at II - site. Within the wetland, other species observed included Common Teal (90) at site I and (60) at site II (Graph 2). Graylag geese (100), Gadwall, Eurasian Wigeon, Northern Shoveller, purple moorhen and Swampen were also observed from the study sites. Of all the aquatic bird species found in the area , over 55% were migratory.

Table 1 Residential Birds Diversity Found in the study area (Jan. 2022 to Dec. 2023)

English Name	Scientific name	Total No of species Found
Number of Residential Birds		
1 House crow	Corvus splendns	150
2 Common Myna	Acridotheres tristis	60
3 Sparrow Halk	Accipiter nisus	07
4 White Cheeked Bulbul	Holpestes leucogenys	40
5 Kashmir house sparrow	Passer domestics	100
6 Common pariah kite	Milvus migrans	17
7 Little grebe (Dabchick)	Tachybatus ruficollis	40
8 Grey Heron	Ardea cinerea	40
9 Pond Heron/Paddy bird	Ardeola grayii	80
10 Little Egret	Casmerodius albus	20
11 Green Sandpiper	Tringa ochropus	10
12 Night Heron	Nycticorax nycticorax	15

13	Blue kingfisher	Alcedinidae	30
14	Purple swamphen	Porphyrio porphyrio	150
15	White-breasted Kingfisher	Halcyon smyrnensis	50
16	Grey Wagtail	Motacilla cinerea	20
17	Northern Lapwing	Vanellus vanellus	20
18	common kingfisher	Alecco atthis	20
19	Common Moorhen	Gallinula chloropus	15
20	Fantail snipe	Gallinago gallinago	120
21	Common Sandpiper	Actitis hypoleucos	100
22	Pied Kingfisher	Ceryle rudis	40
23	Kashmiri grey tit	Parus major	40
24	European little ringed plover	Charadrius dubius	30
25	Common eagle	Accipitridae	40
26	Common Pigeon	Columba livia	150
27	Red-Waltted Lapwing	Vanellus indicus	50
28	European goldfinch	Carduelis carduelis	200
29	Streaked laughing thrush	Trochalopteron lineatum	400
30	Red-billed blue magpie	Urocissa erythoryncha	150
31	Blue whistling thrush	Myophonus caeruleus	150
32	Woodpecker	--	50
Total			2404

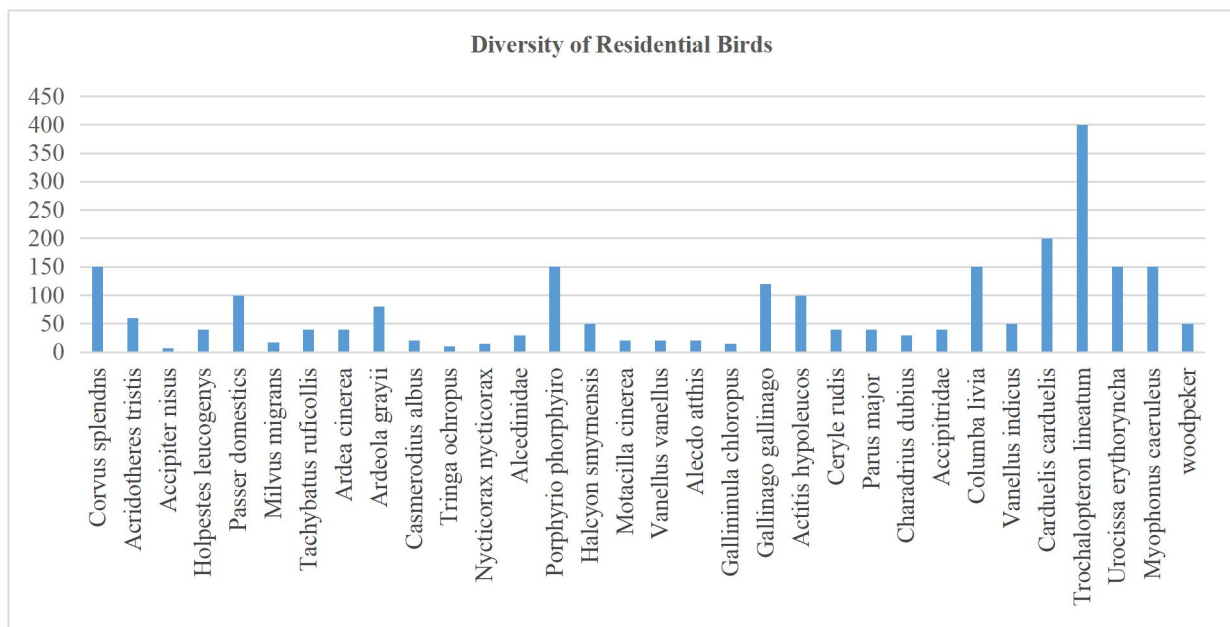


Figure 2 Diversity of Residential Birds (Jan. 2022- Dec. 2023)

Table 2 Summer Migratory Birds Diversity in the study area (Jan. 2022 to Dec. 2023)

S.NO	English Name	Scientific name	Total No of Species Found
Summer Migrants in Hygam			
1	Pheasant tailed jacana	Hydrophasianus chirurgus	2
2	Gold franted finch	Metoponia pusilia	5
3	Slaty headed parakeet	Psittacula himalayana	20
4	Indian Oriole	Oriolus oriolus kundoo	0
5	Owl	Strigiformes	6
6	Rufous backed shrike	Lainius schach erythonotus	10
7	Little bittern	Ixobrychus minutus	0
8	Starlings	sturnidae	100
9	Common swallow	Hirundo rustica	70
10	European hoopoe	Upupa epops	50
11	Indian ring dove	Streptopelia decaota	70
12	Paradise Flycatcher	Terpsiphone paradisi	5
13	Golden blacked woodpecker	Dinopium benghalense	12
14	White-breasted Kingfisher	Halcyon smyrnensis	40
15	Whistling thrush	Myophonus	50

16	Yellow Wagtail	Motacilla flava	30
17	Common swallow	Hirundinidae	40
18	Eurasian lapwing	Upupa epops	20
19	Reed Warbler	Acrocephalus scirpaceus	60
20	Rufous backed Shrik	Lanius schach	50
21	Eastern grey wagtail	Motacilla cinerea	30
22	Tickle’s thrush	Turdus unicolor	60
23	Indian Whiskred tern	Chlidonias hybrida	40
24	Gloden oriole	Oriolus oriolus	20
24	Red shank	Tringa totanus	30
26	Blue tailed bee eater	Merops philippinus	20
Total			1063

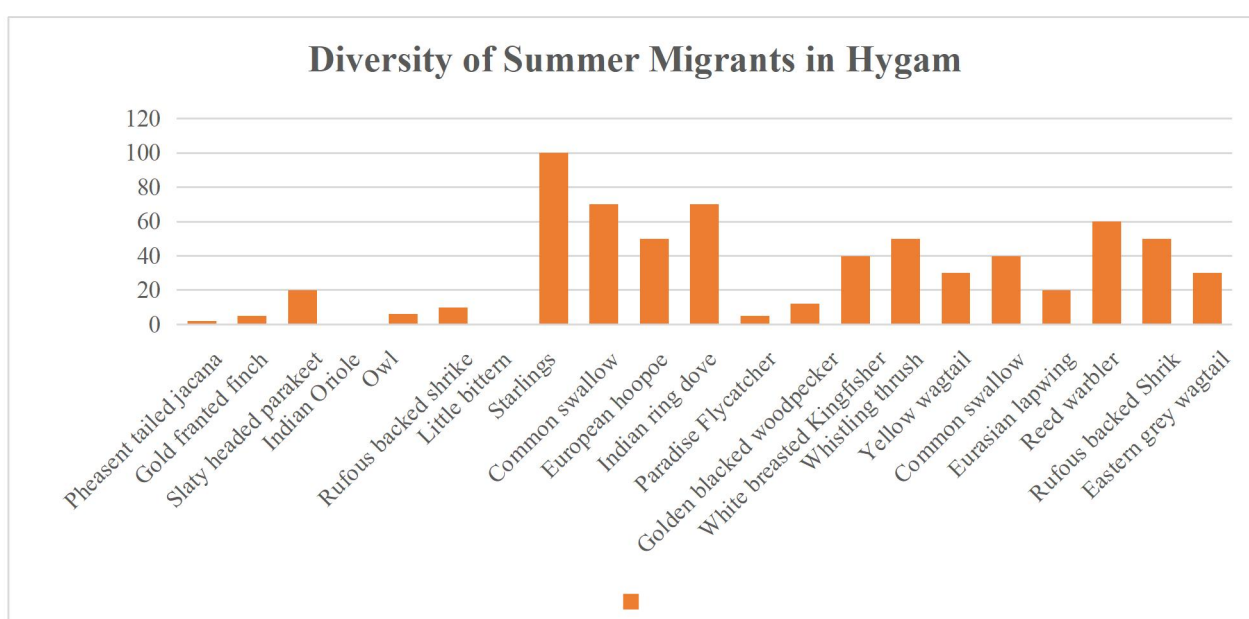


Figure 3 Diversity of summer Migrant Birds Species-wise (Jan. 2022- Dec. 2023)

Table 3 Number of Migratory Birds found in in the study area (Jan. 2022 to Dec. 2023)

S.NO	English Name	Scientific Name	IUCN Conservational Status	Total No of Species Found
Winter migratory Birds visiting Hygam				
1.	Northern Pintail	Anas acuta	Least Concern	5000
2.	Common Teal	Anas crecca	Least Concern	8000
3.	Mallard	Anas platyrhynchos	Least Concern	9500
4.	Gadwall	Anas strepera	Least Concern	6000
5.	Northern Shoveller	Anas clypeata	Least Concern	1500
6.	Common Coot	Fulica arta	Least Concern	2500
7.	Grey leg Goose	Anser anser	Least Concern	10
8.	Red crested Pochard	Rodonnaesa rufina (Pallas)	Least Concern	10
9.	Pallas Fish eagle	Haliaeetus leucoryphus	Endangered	0
10.	Geese	Anser domesticus	Least Concern ---	100
11.	Weigon	Mareca	Least Concern	900
12.	Garganey Teal	Spatula querquedula	Least Concern	150
Total				33670

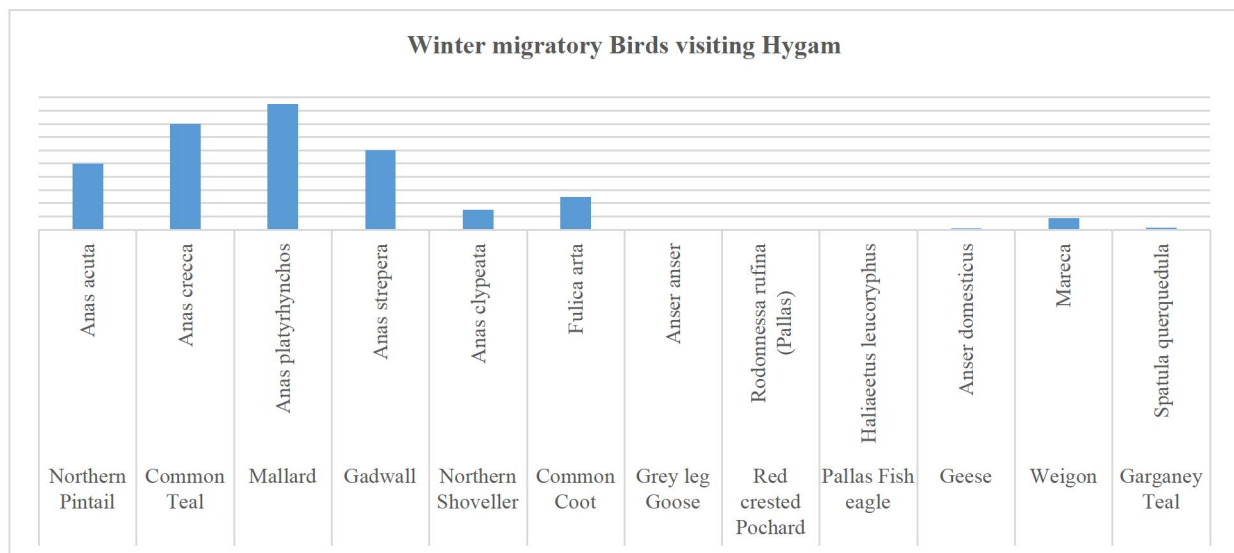


Figure 4 Species-wise number of Migratory Birds (Jan. 2022- Dec. 2023)

6 CONCLUSION AND RECOMMENDATIONS

The research aimed to find out the current status of the avifaunal population in the wetland. There is seasonal variation in the bird population as well as variation among the study sites.

The government have paid less attention to the wetland Reserve, despite its socio-economic and ecological significance. Dense growth of reeds and other emergent vegetation are dominant in the study area. The area of the wetland was about 1400 hectares (14 km) earlier but now the total area of the wetland has shrunk to 725 hectares (7.25 km) [25]. This decline in wetland areas led to the loss of waterbird populations due to habitat destruction and loss of food.

The migratory bird species that were not observed in the current study but were previously discovered in the wetland included the ferruginous duck, red-crested pochard, Palla's fish eagle, and garganey. During the current investigation, no sightings of the Little-bitten, Gold-finned Finch, or Indian Oriole were observed among the summer migrants.

The little grebe, green sandpiper, grey and night Heron & white-breasted kingfisher were found in fewer numbers from residential birds, due to less open water surface and drying of the wetland in the summer season which leads to less food available for these species. Shrinking areas, siltation, eutrophication, pollution, encroachment and people using this wetland as a shooting site in winter are other reasons for dwindling avifauna populations from this wetland.

Another main cause for the decline of the avifauna populations from the study area is the cutting and burning of the reed beds in the summer and autumn seasons by the local people for fodder which destroys the nests of the residential and summer migrants. Due to these reasons, the birds migrate to other areas are their number may remain very low which may be the reason that these birds may not be seen from this reserve.

From past research, it was found that lakhs of water birds were visited in this wetland, but now only a few thousand avifauna diversity visited the site due to the above reasons.

For the maintenance of species diversity and abundance regulation of water levels and creation of open water, areas are important to cater to the requirements of many avifauna species, for feeding to diving ducks and for resting to many other species. Many species that are crucial to the wetland will lost soon if immediate measures are not taken to protect the dying Wetland.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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