



RESEARCH ARTICLE

ASSESSMENT OF STATUS AND DIVERSITY OF WETLAND BIRDS OF MELEKOTE LAKE, TUMKUR DISTRICT, KARNATAKA

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Abstract

Wetlands are vital areas rich with biodiversity that provide environment for the survival of many species of plants and animals including man. Wetlands are usually connected with lakes or can exist as isolated features in the landscape. Industrialization, population explosion, habitat destruction, climate change has led to the stressing of wetland ecosystems, disrupting the natural processes which ultimately result in the significant loss of wetland biodiversity. Wetland birds are the sensitive biodiversity indicators of wetland ecosystem. They play a crucial role in maintaining the ecological balance. The present study was an attempt to assess the status and diversity of wetland birds in Melekote lake of Tumkur District., Karnataka. The study was conducted during December 2022 -May 2023. 40 bird species belonging to 11 orders and 23 families were recorded. Order Passeriformes was the most dominant family followed by Pelecaniformes, Charadriiformes, Accipitriformes, Coraciiformes, Suliformes, Columbiformes, Ciconiiformes, Podiciformes, Cuculiformes and Psittaciformes. 37.5% resident, 30% winter migratory, 15% resident migratory, 10% partial migratory and 7.5% summer migratory were also recorded. It was observed that 02 species of Near Threatened (Asian Wolly necked stork and Painted stork) and 01 species of Endangered species (Steppe eagle) were encountered. There is a need to frame the conservation strategies to protect the wet land ecosystem with the rich biodiversity.

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Introduction:-

Wetlands are crucial ecosystems, rich in biodiversity and provide a habitat for a wide variety of plant and animal species, essential for maintaining the sustainability of the ecosystem. They are often regarded as hotspots of environmental significance. They help to combat sudden global warming and reduce pollution by absorbing carbon dioxide (Pournami *et al.*, 2023). The National Wetland Inventory and Assessment reports that wetlands cover 152,600 square kilometres, representing 4.63% of the nation's total geographic area (Space Applications Centre, 2011).

Wetlands provide food and shelter for both migratory and resident birds. Considering the diversity of bird species, wetlands are essential in providing breeding habitats for both native and migratory birds (Kačergytė *et al.*, 2021). Aquatic birds are a vital and essential component of every aquatic ecosystem. Certain species of birds occupy

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different trophic levels, contributing significantly to the sustainability of these ecosystems (Bhoomika *et al.*, 2021). Wetland birds serve as predators, pollinators, and bio-indicators of the aquatic ecosystem, essential in maintaining ecological health (Khatri *et al.*, 2019).

The quality of ecosystems can be evaluated through its avian diversity. Birds are essential in preserving species diversity, regulating populations, and maintaining the ecological balance of an area. The destruction of natural habitats, combined with increasing human intervention and intense activities, has led to the decrease in avifaunal diversity and population (Manjunath and Joshi, 2012). Studies have shown that urbanization has a significant impact on the species richness and abundance of birds (Shahabuddin, 1997). The occurrence, diversity, and population of birds are essential indicators for evaluating the health of an area and assessing changes in its habitat (Kuruvilla and Maria, 2017).

Examining the avian diversity provides valuable insights into the structure and functioning of an ecosystem. It can also serve as a tool to evaluate the degree of pollution in an ecosystem (Ortega-Álvarez and MacGregor-Fors, 2009). The present study was conducted to assess the status and diversity of wetland birds of Melekote lake.

Study Area:

Melekote Lake is situated in the out skirts of Tumkur city near to Bangalore high way ring road. Many residential areas, Engineering college and agricultural areas are located near the lake. The study area lies at 13°20'08.0" N and 77°04'29.4" E. Adjacent to Melekote lake, there is sewage water purifier plant, where the collected drainage water from urban localities is purified. On the underside of the cement bridge of purification plant, series of nests of barn swallows are found. The lake is heavily polluted by garbage discharge from nearby areas and also used for daily activities like washing and other house hold activities by villagers. Most of the water surface is covered by water hyacinth, an aggressive aquatic invader and other water weeds, which forms thick mats blocking sunlight causing oxygen depletion in the water lead to fish death and disrupting the overall ecosystem.



Fig.1:- Satellite view of Melekote Lake.

Materials and Methods:-

The present study was conducted to understand the diversity of avian fauna in Melekote lake. The regular bird survey was conducted from December- 2022 to May-2023 every day in the morning from 6:30 AM to 9 AM. The birds were documented by point count method and All out-search method and viewed using binoculars (Nikon 10x50 mm). The

Birds were identified using field guide and reference books (Ali, 1996 & Grimmett *et al.*, 1999). Birds observed during the survey were grouped into resident and migrant categories based on their migratory patterns. They were further divided into insectivore, nectarivore, omnivore, scavenger, frugivore, carnivore, and granivore categories according to their dietary preferences (Karikar Shraddha *et al.*, 2017). The data for the conservation status was referred from IUCN Red list (IUCN, 2016).

Results and Discussion:-

40 bird species belonging to 11 orders and 23 families were observed during the study period. Order Passeriformes was the most dominant family represented by 10 species comprising 25% of bird species, Pelecaniformes by 09 species with 22.5% of bird species. Charadriiformes, and Accipitriformes, each represented by 05 species with 12.5% of bird species and Coraciiformes, Suliformes, Columbiformes, Ciconiiformes each represented by 02 species, with 5% of bird species, and Podiciformes, Cuculiformes and Psittaciformes each represented by 01 species with 2.5% of the total reported bird species.

37 species of birds identified as Least Concern group, 02 species Near Threatened (Asian Wolly necked stork and Painted stork) and 01 species Endangered (Steppe eagle) as per IUCN Red list. The present result also revealed that 37% of the birds are resident, 30% are winter migratory, 15% are resident migratory, 10% are partial migratory, and 7.5% are summer migratory. Additionally, 18 species are terrestrial, while the remaining 22 species are wetland birds.

Based on the feeding guild, 57.5% carnivorous, 17.5% omnivorous, 15% insectivorous, 7.5% granivorous and 2.5% herbivorous species are encountered.

Avifaunal diversity in Melekote lake, Tumakuru is shown in Table 1, Percentage occurrence of bird's orders in Table 2, and Fig.2, Percentage occurrence of migratory status of birds in Fig.3 and Percentage of feeding guild of bird species in Fig.4.

Table 1:- Avifaunal diversity in Melekote lake, Tumakuru.

Sl. No	Order	Family	Common name	Scientific name	IUCN status	Migratory status	Habitat status	Feeding habit
1	Coraciiformes	Alcedinidae	Small blue kingfisher	Alcedo atthis	LC	R	T	C
2			White-throated kingfisher	Halcyon smyrnensis	LC	RM	W	C
3	Suliformes	Phalacrocoracidae	Little cormorant	Phalacrocorax nigripennis	LC	RM	W	C
4			Indian cormorant	Phalacrocorax fasciatus	LC	RM	W	C
5	Pelecaniformes	Threskiornithidae	Black ibis	Pseudibis papillosa	LC	WM	W	C
6			Glossy ibis	Plegadis fassinellus	LC	RM	W	C
7			Eurasian spoonbill	Platalea leucorodia	LC	PM	W	C
8		Ardeidae	Little egret	Egretta garzetta	LC	WM	W	C
9			Grey heron	Ardea cinerea	LC	WM	W	C

10			Purple heron	Ardeapurplea	LC	WM	W	C
11			Great egret	Ardea alba	LC	PM	W	C
12			Cattle egret	Bubulcus ibis	LC	SM	W	C
13			Indian pond heron	Ardeola grayii	LC	R	W	C
14	Podicipediformes	Podicipedidae	Little grebe	Tachybaptus ruficollis	LC	WM	W	I
15	Charadriiformes	Jacanidae	Bronze winged jacana	Metopidius indicus	LC	WM	W	C
16		Charadriidae	Red wattled lapwing	Vanellus indicus	LC	R	W	O
17		Recurvirostridae	Black winged stilt	Himantopus himantopus	LC	WM	W	C
18		Scolopacidae	Common red shank	Tringa tetanus	LC	WM	W	C
19			Common sand piper	Actitis hypoleucos	LC	WM	W	O
20	Passeriformes	Motacillidae	Large pied wagtail	Motacilla maderaspatensis	LC	R	W	I
21		Ploceida	Baya weaver	Ploceus philippinus	LC	R	T	G
22		Corvidae	House crow	Corvus splendens	LC	R	T	O
23		Muscicapidae	Pied bush chat	Saxicola caprata	LC	R	W	I
24			Oriental magpie robin	Copsychus saularis	LC	R	T	O
25		Acrocephalidae	Blyth's Reed Warbler	Acrocephalus dumetorum	LC	WM	T	I
26		Dicruridae	Ashy drongo	Dicrurus leucophaeus	LC	R	T	O
27		Hirundinidae	Barn swallow	Hirundo rustica	LC	WM	T	I
28		Sturnidae	Common myna	Acridothera tristis	LC	PM	T	O
29		Stenostiridae	Grey headed canary fly catcher	Culicicapaceylonensis	LC	R	T	I
30	Accipitriformes	Accipitridae	Steppe eagle	Aquila nipalensis	EN	R	T	C
31			Black eagle	Ictinaetus malaiensis	LC	R	T	C
32			European Marsh Harrier	Circus aeruginosus	LC	SM	T	C/S
33			Black kite	Milvus migrans	LC	SM	T	C/S
34			Brahminy kite	Haliastur macrocerus	LC	PM	T	C/S
35	Cuculiformes	Cuculidae	Greater Coucal	Centropus sinensis	LC	RM	T	O
36	Columbiformes	Columbidae	Rock pigeon	Columba livia	LC	R	T	G
37			Spotted dove	Spilopelia chinensis	LC	R	T	G

38	Psittaciformes	Psittaculidae	Rose ringed parakeet	<i>Psittacula krameri</i>	LC	R	T	H
39	Ciconiiformes	Ciconiidae	Asian Wolly necked stork	<i>Ciconia episcopus</i>	NT	WM	W	C
40			Painted stork	<i>Mycteria leucocephala</i>	NT	R	W	C

Note: Least Concern (LC), Endangered (EN), Resident (R), Resident Migratory (RM), Winter Migratory (WM), Terrestrial (T), Wetland (W), Carnivorous (C), Omnivorous (O), Granivorous (G), Scavengers (S), Herbivorous (H), Insectivorous (I).

Table 2:- Order wise percentage occurrence of Bird orders.

Sl. No.	Order	Percentage of occurrence
1	Coraciiformes	5
2	Suliformes	5
3	Pelecaniformes	22.5
4	Podicipediformes	2.5
5	Charadriiformes	12.5
6	Passeriformes	22
7	Accipitriformes	12.5
8	Cuculiformes	2.5
9	Columbiformes	5
10	Psittaciformes	2.5
11	Ciconiiformes	5

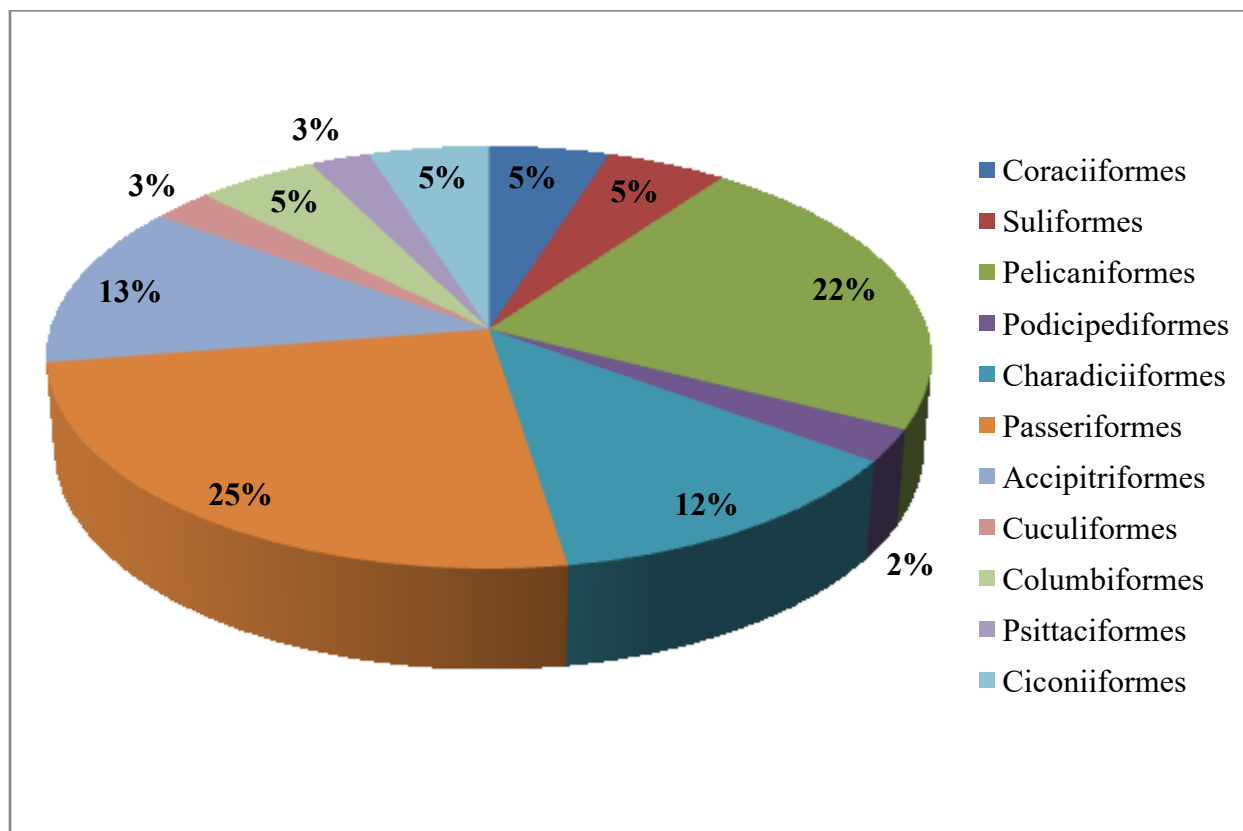


Fig.2:- Percentage occurrence of bird's orders.

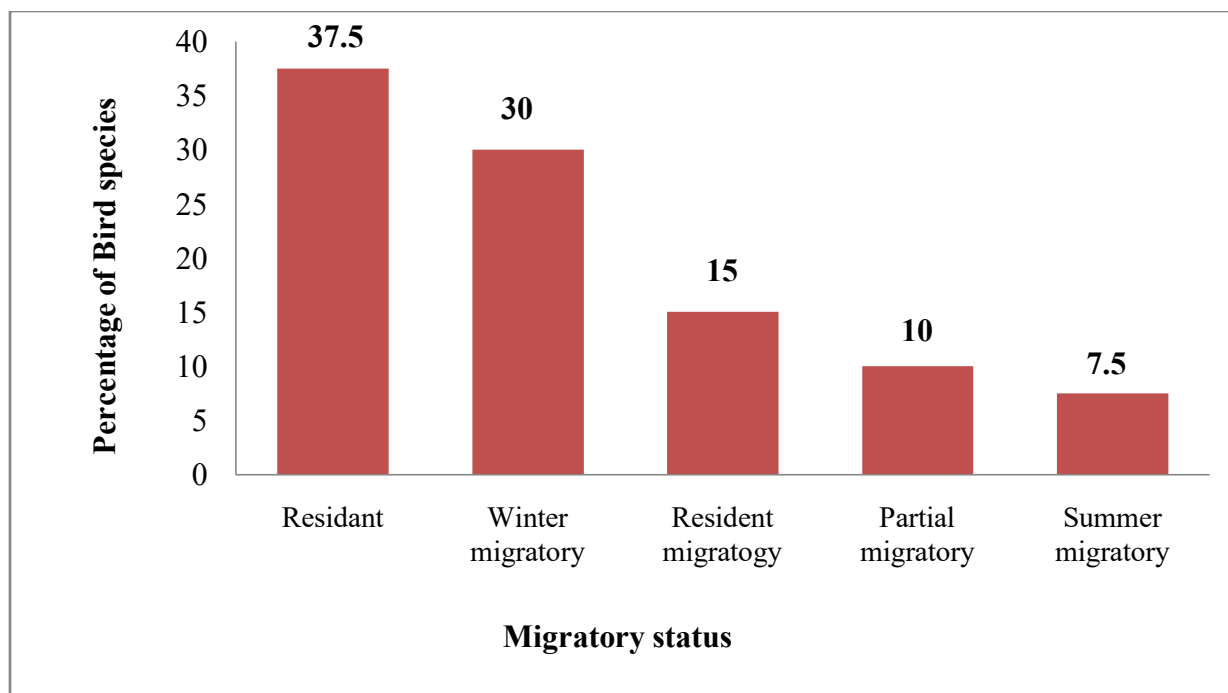


Fig.3:- Percentage occurrence of migratory status of birds.

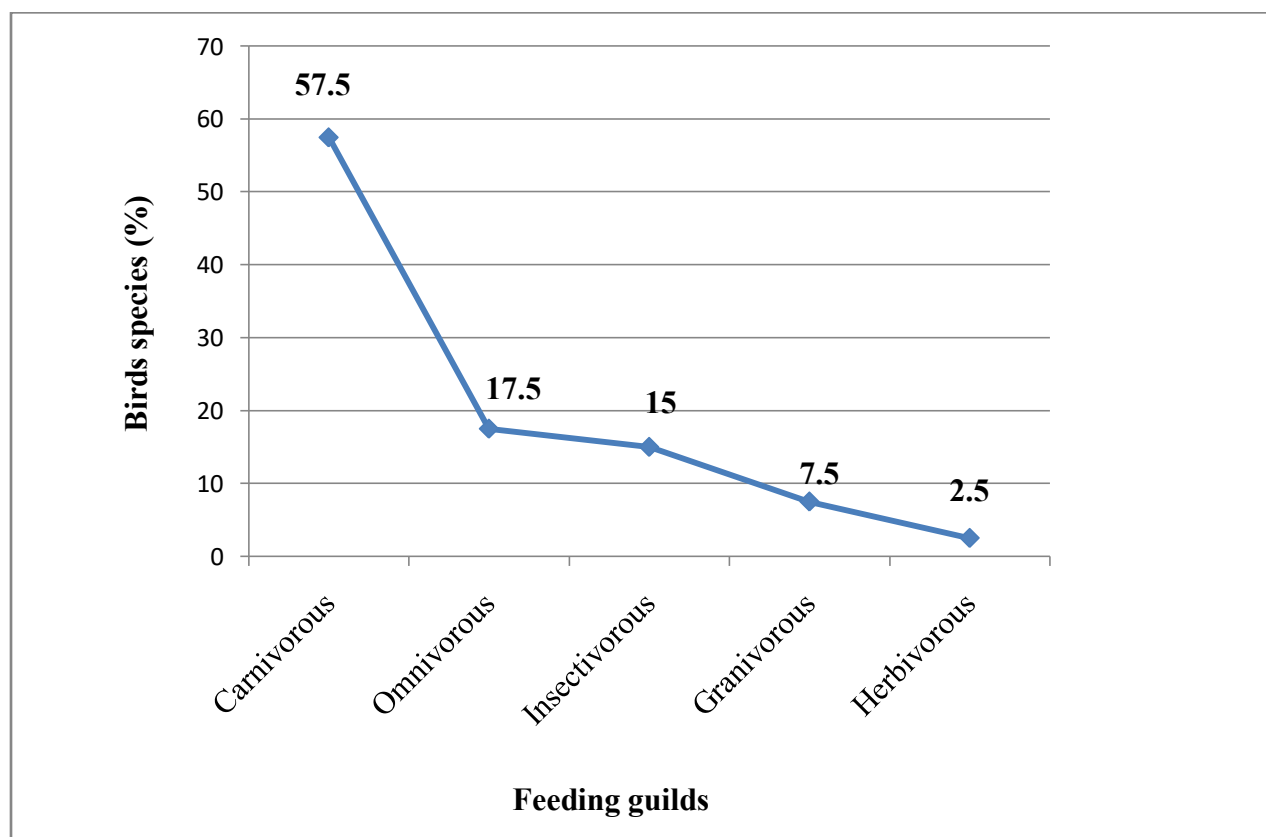


Fig.4:- Percentage of feeding guild of bird species recorded in Melekote lake.

Manohara and Hosetti (2021) studied the density and diversity birds of the Anka Samudra Lake, Ballari District, Karnataka and the results showed that family Sternidae constitutes 51.50%, Ciconidae 20.52%, Phalacrocoracidae

3.84%, Aradeidae 5.85 %, Ploceidae 3.13%, Anatidae 1.97 %, Scolopacidae 1.28%, Threskiornithidae 1.84%, Motacillidae 1.06% and the other families constitute 0.01 to 0.94 %.

Shahnawaz *et al.*, (2023) studied the diversity of birds in Melekote lake and recorded 20 species of birds belonging to 7 orders 12 families. The order Pelecaniformes was found to be dominated by 3 families with 8 species followed by Passeriformes by 4 families with 5 species, Accipitriformes with 3 species, Gruciformes, Coraciiformes, Charadriiformes, Cuculiformes with each species respectively. Out of 20 species, 17 were resident and rest 3 were resident migratory birds.

In Bathi lake of Doddabathi Village, Davanagere District, Harish (2016) observed 47 wetland bird species belonging to 16 families and 8 orders. Among which, 13 species of Charadriiformes, 13 species of Ciconiiformes, 3 species of Pelecaniformes, 5 species of Anseriformes, 5 species of Gruiformes, 3 species of Passeriformes, 3 species of Coraciiformes and 1 species of Podicipediformes. They are of the opinion that the wetland habitat with fishes, crustaceans, invertebrates, water plants and planktons as the primary food source, along with the surrounding agricultural fields may have provided feeding ground for the resident and few migratory wetland birds, thereby contributing to their diversity. In the present study also, similar results were found with bird species belonging to families like Charadriiformes, Coraciiformes, Pelecaniformes and Passeriformes.

Pournami *et al.*, (2023) recorded 33 species of birds belonging to 18 families and 10 orders from the Ashtamudi Lake. The order Charadriiformes and Suliformes each includes 3 species, Pelecaniformes 8 species, Accipitriformes, Coraciiformes and Gruiformes each with 2 species, Cuculiformes, Piciformes and Anseriformes each with 1 species and Passeriformes with 10 species. They have documented two species of birds are under near threatened (NT) category of the International Union for Conservation of Nature (IUCN) and rest of the species comes under the least concern (LC) category. They noticed that the occurrence of 16 species of carnivorous birds was dominant followed by 8 species of insectivorous, 7 species of omnivorous, and frugivorous and mixed guild each with 1 species. Similar results were obtained with the birds showing carnivorous, insectivorous, omnivorous feeding habit. One species of Near threatened species (NT), White necked Stork was documented. They further suggested that the higher number of carnivorous bird species is associated with the abundance of fish in the Ashtamudi wetland. Birds belonging to the families Phalacrocoracidae, Ardeidae, and Ciconiidae primarily feed on fish. In the present study also recorded bird species belonging to families Phalacrocoracidae, Ardeidae, and Ciconiidae which support the result. The presence of insectivorous species suggests the abundance of insects in the study area.

Jan *et al.*, (2016) studied the diversity and abundance of Avifauna in Haigam Wetland, Kashmir and documented 103 species of birds belonging to 78 genera, 45 families and 15 orders. They concluded that the seeds of different aquatic plants, along with fish (carp spp.), attract several bird species like cormorants. Many piscivorous bird species were recorded indicating the abundant fishes in Melekote lake.

Jamkhandi and Kadadevaru (2024) observed 177 species of birds were recorded from selected wetlands in Dharwad district. Of which 168 species belong to the Least concern category (94.9%) among which 74 species show stable population trend, 42 species are under decreasing population trend and 26 species under increasing population trend. The remaining 26 species have no proper documentation on their population patterns. There were 6 species (3.39%) under the Near threatened category with decreasing population trend and 3 species (1.7%) under Vulnerable category with decreasing population trend.

Satheesh *et al.*, (2024) studied the Status, Diversity and Species Composition of Wetland Birds in Vaduvor Bird Sanctuary, Tiruvarur District. A total of 147 bird species belonging to 48 families and 18 orders were recorded. It includes Four Near Threatened species, two Vulnerable species and one Endangered species.

Kumar and Gupta (2009) investigated the Diversity and Abundance of Wetland Birds around Kurukshetra, India. A total of 54 species of wetland birds belonging to 36 genera and 15 families distributed in 5 orders have been recorded. Out of which, 29 were resident and 25 were migrant species. Most of the migratory species were winter visitors and a few were summer visitors.

Joshi *et al.*, (2021) conducted the assessment of water bird species and their composition in the Haiderpur Wetland of Hastinapur Wildlife sanctuary and 66 species belonging to 15 families were encountered. Among them, 04 were Vulnerable, 06 near threatened and 01 Endangered water bird species (as per IUCN records).

Koli (2014) studied diversity and status of avifauna in Todgarh-Raoli Wildlife Sanctuary, Rajasthan and based on the feeding habit, categorised 44 species of omnivorous, 42 species of insectivorous, 35 species of carnivorous, 12 species of granivorous, 4 species of frugivorous, 4 species of insectivorous/nectivorous and 1 species of nectivorous bird species.

Conclusion:-

As the wetlands are under the threats due to urbanization and other human interference, there is a need to create awareness among the local communities and implementation of conservation strategies to protect the habitat with the wetland biodiversity.

Conflict of Interest:

Authors have no conflict of interest.

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