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Avifaunal Species Richness and Composition at Masani Barrage, District Rewari, Haryana

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ABSTRACT

Masani barrage act as wintering spot for wide range of migratory as well as residential avian species. Their population estimation is to comprehend group dynamics, niche relationships, habitat preferences, and other behavioral features. An ornithological survey was conducted at Masani barrage, district Rewari, Haryana from April 2022 to March 2023 with the help of scan sampling and point count methodology. A total of 150 bird species belonging to 18 orders and 49 families were recorded, among which 94 species were resident; 47 species were winter migrant and 9 species were summer migrant of the observed feeding guilds, Carnivores were the highly dominated followed by Insectivores (41 species), Omnivores (36 species), Herbivores (9 species) and others. Species such as Ferruginous Pochard, Black-tailed Godwit, Eurasian Curlew, Asian woollyneck, Painted stork, Black-necked Stork, Rufous-vented Grass-babbler, Black-headed Ibis, Lesser Flamingo, Oriental Darter and Alexandrine parakeet fall under near-threatened (NT) category of IUCN Conservation status. Data collected from avifaunal species at the barrage can be utilized as a baseline for analyzing future perspectives and developing appropriate management plans for protection and long-term use.

Keywords Avian species, Feeding guild, Black-headed Gull, IUCN, Sahibi River.

INTRODUCTION

Natural resource composition and richness provide details regarding the availability of resources in each area, their interaction with the ecosystem, along with other ecological variables that have an impact on how species are distributed (Thiollay 2007). Avian population estimation in many ecosystems has become an effective component in the preservation of biodiversity as well as evaluating relevant conservation efforts. Their variety is a crucial environmental indicator for appraising diverse habitats and performing various ecological functions such as pest enforcement, pollination, seed dissemination, wetland restoration, and biomass reuse and recycling (Rajashekara and Venkatesha 2010, Whelan *et al.* 2015, Kumar *et al.* 2016, Rai *et al.* 2017b, Rai *et al.* 2019). India has a wide range of natural bird habitats, including tropical rainforests with hornbills and trogons, meadows with bustards and floricans, rocky hills, deserts, mangroves, and many more natural environments (SoIB 2023).

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Riverine systems, which are susceptible to large-scale habitat changes due to natural and climatic oscillations, necessitate the development of viable indices to assess the wellness of ecosystems (Sinha *et al.* 2019). These are important in the relationships of an extensive variety of species among the river Basin as well as the associated ecosystems (Tilman *et al.* 1996, Daily 2001). The life-forms spanning bacteria, planktons, fishes, amphibians, birds, and mammals that drive the intricate food webs may bloom in river and river-based wetlands (Bunn and Davies 1999, Vasudeva *et al.* 2020). Studies from the Indian subcontinent and other parts have recently achieved important advancements in ornithology in terms of ecology, biology, and other areas (Mahboob and Nisa 2009, Kumar and Rana 2020, Rai and Vanita 2022, Haider *et al.* 2022, Deshmukh and Chavan 2023, Rani *et al.* 2023). The state of Haryana also serves an adequate habitat for resident and migratory species that migrates from other countries, following the migratory flyways (Rai and Vanita 2021, Rai and Yadav 2023). The current study was intended to be carried out at Masani barrage, constructed at Sahibi river, district Rewari, Haryana, a flourishing environment with prominent floral and faunal species. Lacuna of thorough understanding about the avifauna inhabiting this area greatly impedes the development and execution of effective conservation projects. This study is intended to fill knowledge gaps about the avifauna at this barrage and increase public awareness of the ecological value and richness of birds.

MATERIALS AND METHODS

Study area

The perennial wetland of Masani barrage-cum-bridge formed on the Sahibi river in district Rewari, Haryana (28.195" N and 76.737" E). It is known by several names viz. "Sahibi river or Sahibi river dam, Masani barrage or Masani bridge". It was constructed in 1989 in district Rewari, Haryana at National Highway No. 8. It is surrounded by several agricultural fields and Fallowland (Figs. 1 - 2). A water canal carrying sewage from the Rewari districts runs through this site. The wetland is spread over three villages such as Nikhri, Dungerwas and Kharkhara. During winter season, the wetland provides shelter for thousands of migrating avifaunal species. Mulberry (*Morus nigra*), Pine (*Pinus sylvestris*), Kikar (*Artemisia scorporia*), Shisham (*Dalbergia sissoo*), Peepal (*Ficus religiossa*) and Babul (*Acacia arabica*) are some of the prominent trees found around this barrage; whereas some prominent fauna like Nilgai (*Boselaphus tragocamelus*) and Mongoose (*Helogale parvula*) are also observed. An illustration of a wetland area located at the district is represented in Fig. 3.

Methodology

Periodic field visits were accompanied on fortnightly basis at selected study area in different diurnal phases from April, 2022 to March, 2023. Field records were

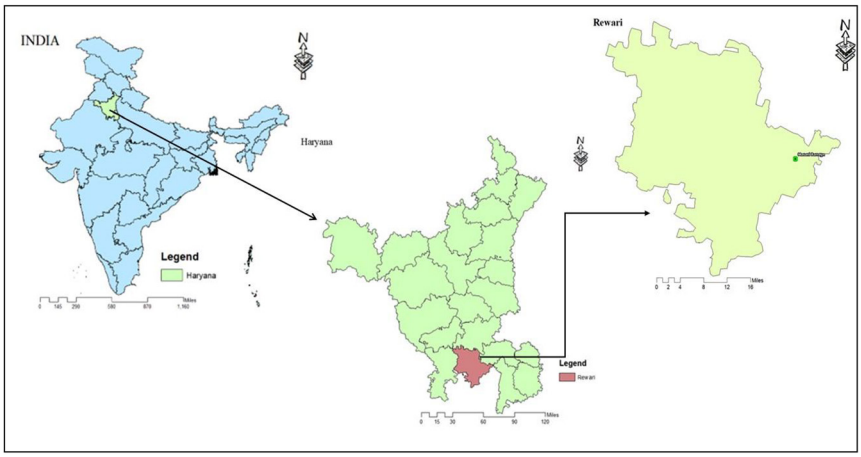

Fig. 1. Map of study area of Masani barrage in district Rewari, Haryana (Arc GIS 10.5).

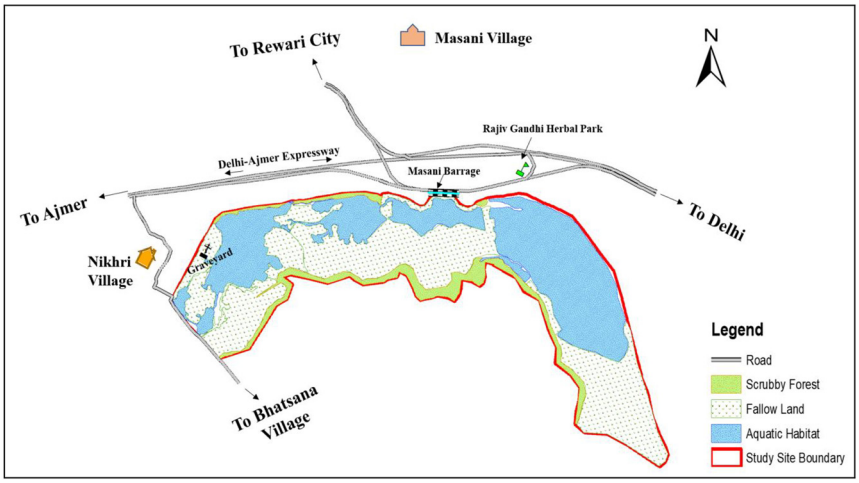

Fig. 2. Locations of different habitats at Masani barrage, district Rewari (Arc GIS 10.5).

made with the help of different techniques such as Scan sampling (Altmann 1974), Point Transect (Gaston 1975, Sutherland *et al.* 2005) with the help of binocular Nikon 10*50 and Canon Power shot SX70HS digital camera. Species were identified with the help of different field guides i.e., Grimmett *et al.* (2016), Grimmett and Inskipp (2019), Kalsi *et al.* (2019), authenticated avian database (IUCN Red list of Threatened Species and Merlin bird ID) and represented in the form of checklist assigning common name, scientific name, alternative name, order, family and genus (Praveen *et al.* 2016, Praveen *et al.* 2019, Praveen and Jayapal 2022 and IUCN 2023). Migratory status was designated based on presence/absence method of avifauna in two selected seasons i.e., Summer (April-September), Winter (October-March) or throughout the year (Grimmett and Inskipp 2003). Feeding guilds were categorized into Carnivore, Insectivore, Omnivore, Herbivore, Frugivore, Grainivore, Insecti/Nectarivore and Piscivore based on direct observation and existing literature (Singh *et al.* 2020). The IWPA (1972), CITES (2012) and IUCN (2023) were used to evaluate the avifauna conservation status and population trends (Increasing ↑, Decreasing ↓, Stable → and Unknown ?). The relative diversity (RDi) value of different families of

Fig. 3. Pictorial representation of wetland habitats at Masani barrage, district Rewari.

the recorded species was computed by using formula Torre-Cuadros *et al.* (2007).

$$RDi = \frac{\text{Number of bird species in a family}}{\text{Total number of bird species}} \times 100$$

RESULTS

During the entire field survey (from April, 2022 to March, 2023), a total of 150 bird species belonging to 18 orders and 49 families were recorded at Masani barrage (Table 1). Order Passeriformes hold maximum number of species (49 species), followed by Charadriformes (25 species), Pelecaniformes (15 species), Anseriformes (14 species) and rest other orders. Family Anatidae hold the highest number of species (14 species) followed by high RDi value (9.33), respectively by Scolopacidae (RDi= 8.00); Ardeidae (RDi= 6.67) and rest others (Table 1). An evaluation of feeding guilds of observed species were done and results shows that Carnivores (48 species) has higher species richness followed by Insectivores (41 species), Omnivores (36 species), Herbivores (9 species), Grainivores (7 species), Frugivores (5 species), Insecti/Nectarivores (3 species) and Pisci-

Table 1. Checklist of avifaunal species recorded at Masani barrage, district Rewari from April, 2022- March, 2023.
(Feeding guild: In- Insectivore, C-Carnivore, O-Omnivore, H-Herbivore, G-Grainivore, P-Piscivore, In/N- Insecti/Nectarivore, F-Frugivore; IUCN Global population trends: ↑ Increasing, ↓ Decreasing, → Stable, ? Unknown; Conservation status: IUCN- International Union for Conservation of Nature and Natural Resources, WPA- Wildlife Protection Act, CITES- Convention on International Trade in Endangered Species of Wild Fauna and Flora; LC-Least Concern, NT-Near-threatened, VU-Vulnerable, I- Schedule I of IWPA (most preferable species), IV- Schedule IV of IWPA (moderately preferable species).

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN (2023)	CITES (2012)	IWPA (1972)	
1	**Accipitriformes (No. of species= 5 and No. of family= 1)**						
1.1.	**Accipitridae (5), RDi=3.33**						
1	Black kite *Milvus migrans* (Boddaert 1783)	C	→	LC	II	I	Pariah kite
2	Brahminy kite *Haliastur indus* (Boddaert 1783)	C	↓	LC	II	I	-
3	Black-winged Kite *Elanus caeruleus* (Desfontaines 1789)	C	→	LC	II	I	Black-shouldered kite
4	Oriental honey buzzard *Pernis ptilorhynchus* (Temminck 1821)	C	↓	LC	II	I	Crested honey buzzard
5	Shikra *Accipiter badius* (J.F. Gmelin 1788)	C	→	LC	II	I	-
2	**Anseriformes (No. of species= 14 and No. of family= 1)**						
2.1.	**Anatidae (14), RDi=9.33**						
6	African comb duck *Sarkidiornis melanotos* (Pennant 1769)	O	↓	LC	II	IV	Knob-billed duck
7	Common pochard *Aythya ferina* (Linnaeus 1758)	O	↓	VU	-	IV	-
8	Eurasian wigeon *Mareca penelope* (Linnaeus 1758)	H	↓	LC	-	IV	-

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
9	Gadwall *Mareca strepera* (Linnaeus 1758)	H	↑	LC	-	IV	-
10	Garganey *Spatula querquedula* (Linnaeus 1758)	H	↓	LC	-	IV	-
11	Common teal *Anas crecca* (Linnaeus 1758)	O	?	LC	-	IV	-
12	Indian spot-billed duck *Anas poecilorhyncha* (J.R. Forster 1781)	H	↓	LC	-	IV	-
13	Lesser Whistling-duck *Dendrocygna javanica* (Horsfield 1821)	O	↓	LC	-	IV	Tree duck
14	Tufted duck *Aythya fuligula* (Linnaeus 1758)	H	→	LC	-	IV	Tufted pochard
15	Northern Pintail *Anas acuta* (Linnaeus 1758)	C	↓	LC	-	IV	-
16	Northern Shoveler *Spatula clypeata* (Linnaeus 1758)	O	↓	LC	-	IV	-
17	Bar-headed goose *Anser indicus* (Latham 1790)	H	↓	LC	-	IV	-
18	Greylag goose *Anser anser* (Linnaeus 1758)	H	↑	LC	-	IV	-
19	Ferruginous pochard *Aythya nyroca* (Güldenstädt 1770)	H	↓	NT	-	IV	-
3	**Bucerotiformes (No. of species= 2 and No. of families= 2)**						
3.1.	**Bucerotidae (1), RDi= 0.67**						
20	Indian grey hornbill *Ocyceros birostris* (Scopoli 1786)	O	→	LC	-	IV	Common grey hornbill
3.2.	**Upupidae (1), RDi=0.67**						
21	Common hoopoe *Upupa epops* (Linnaeus 1758)	In	↓	LC	-	IV	Eurasian hoopoe
4	**Charadriiformes (No. of species= 25 and No. of families= 6)**						
4.1.	**Scolopacidae (12), RDi= 8.00**						
22	Black-tailed godwit *Limosa limosa* (Linnaeus 1758)	In	↓	NT	-	IV	-
23	Common greenshank *Tringa nebularia* (Gunnerus 1767)	C	→	LC	-	IV	Greenshank
24	Common redshank *Tringa totanus* (Linnaeus 1758)	In	?	LC	-	IV	-

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
25	Spotted redshank *Tringa erythropus* (Pallas 1764)	In	→	LC	-	IV	Dusky redshank
26	Ruff *Calidris pugnax* (Linnaeus 1758)	In	↓	LC	-	IV	-
27	Temminck's stint *Calidris temminckii* (Leisler 1812)	In	?	LC	-	IV	-
28	Common sandpiper *Actitis hypoleucos* (Linnaeus 1758)	In	↓	LC	-	IV	-
29	Green sandpiper *Tringa ochropus* (Linnaeus 1758)	In	↑	LC	-	IV	-
30	Wood sandpiper *Tringa glareola* (Linnaeus 1758)	In	→	LC	-	IV	Spotted sandpiper
31	Marsh sandpiper *Tringa stagnatilis* (Bechstein 1803)	In	↓	LC	-	IV	-
32	Common snipe *Gallinago gallinago* (Linnaeus 1758)	C	↓	LC	-	IV	Fantail snipe
33	Greater painted-snipe *Rostratula benghalensis*	O	↓	LC	-	IV	-
4.2.	**Recurvirostridae (2), RDi= 1.33**						
34	Black-winged stilt *Himantopus himantopus* (Linnaeus 1758)	C	↑	LC	-	IV	-
35	Pied avocet *Recurvirostra avosetta* (Linnaeus 1758)	C	?	LC	-	IV	Avocet
4.3.	**Jacanidae (2), RDi= 1.33**						
36	Bronze-winged jacana *Metopidius indicus* (Latham 1790)	C	?	LC	-	IV	-
37	Pheasant-tailed jacana *Hydrophasianus chirurgus* (Scopoli 1786)	O	↓	LC	-	IV	-
4.4.	**Burhinidae (2), RDi= 1.33**						
38	Indian thick-knee *Burhinus indicus* (Salvadori 1865)	O	↓	LC	-	IV	Indian Stone-curlew
39	Eurasian curlew *Numenius arquata* (Linnaeus 1758)	In	↓	NT	-	IV	
4.5.	**Charadriidae (3), RDi= 2.00**						
40	Red-wattled lapwing *Vanellus indicus* (Boddaert 1783)	C	?	LC	-	IV	-

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
41	White-tailed lapwing *Vanellus leucurus* (M.H.C. Lichtenstein 1823)	C	?	LC	-	IV	-
42	Little-ringed Plover *Charadrius dubius* (Scopoli 1786)	C	↓	LC	-	IV	-
4.6.	**Laridae (4), RDi= 2.67**						
43	Whiskered tern *Chlidonias hybrida* (Pallas 1811)	C	→	LC	-	IV	-
44	Black-headed Gull *Larus ridibundus* (Linnaeus 1766)	C	?	LC	-	IV	Common Black-headed gull
45	Pallas's gull *Larus ichthyaetus* (Pallas 1773)	C	↑	LC	-	IV	Great Black-headed gull
46	River tern *Sterna aurantia* (Gray 1831)	C	↓	VU	-	IV	-
5	**Ciconiiformes (No. of species= 4 and No. of family= 1)**						
5.1.	**Ciconiidae (4), RDi= 2.67**						
47	Asian woollyneck *Ciconia episcopus* (Boddaert 1783)	C	↓	NT	-	IV	Woolly-necked stork
48	Painted stork *Mycteria leucocephala* (Pennant 1769)	C	↓	NT	I	IV	-
49	Asian openbill *Anastomus oscitans* (Boddaert 1783)	C	?	LC	-	IV	Open-billed stork
50	Black-necked stork *Ephippiorhynchus asiaticus* (Latham 1790)	C	↓	NT	-	IV	-
6	**Columbiformes (No. of species= 6 and No. of family= 1)**						
6.1.	**Columbidae (6), RDi= 4.00**						
51	Eurasian collared dove *Streptopelia decaocto* (Frivaldszky 1838)	G	↑	LC	-	IV	Indian ring dove
52	Laughing dove *Spilopelia senegalensis* (Linnaeus 1766)	G	→	LC	-	IV	Little brown dove, senegal dove
53	Red turtle-dove *Streptopelia tranquebarica* (Hermann 1804)	G	↓	LC	-	IV	Red-collared dove
54	Spotted dove *Spilopelia chinensis* (Scopoli 1786)	G	↑	LC	-	IV	-
55	Rock dove *Columba livia* (J.F. Gmelin 1789)	G	↓	LC	-	IV	Blue rock pigeon
56	Yellow-footed green- pigeon *Treron phoenicopterus* (Latham,1790)	F	↑	LC	-	IV	Yellow-legged green pigeon

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
7	**Coraciformes (No. of species= 6 and No. of families= 3)**						
7.1.	**Alcedinidae (3), RDi= 2.00**						
57	Pied kingfisher *Ceryle rudis* (Linnaeus 1758)	P	?	LC	-	IV	Lesser pied kingfisher
58	White-breasted kingfisher *Halcyon smyrnensis* (Linnaeus 1758)	C	↑	LC	-	IV	White-throated Kingfisher
59	Common kingfisher *Alcedo atthis* (Linnaeus 1758)	C	?	LC	-	IV	Small blue kingfisher
7.2.	**Meropidae (2), RDi= 1.33**						
60	Green bee-eater *Merops orientalis* (Latham 1801)	In	↑	LC	-	IV	Small green bee-eater, little green bee-eater
61	Blue-cheeked bee-eater *Merops persicus* (Pallas 1773)	In	→	LC	-	IV	-
7.3.	**Coraciidae (1), RDi= 0.67**						
62	Indian roller *Coracias benghalensis* (Linnaeus 1758)	C	↑	LC	-	IV	-
8	**Cuculiformes (No. of species= 4 and No. of family= 1)**						
8.1.	**Cuculidae (4), RDi= 2.67**						
63	Asian koel *Eudynamys scolopaceus* (Linnaeus 1758)	O	→	LC	-	IV	Common koel
64	Common hawk-cuckoo *Hierococcyx varius* (Vahl 1797)	In	→	LC	-	IV	Brain fever bird
65	Greater coucal *Centropus sinensis* (Stephens 1815)	C	→	LC	-	IV	Crow-pheasant
66	Jacobin cuckoo *Clamator jacobinus* (Boddaert 1783)	In	→	LC	-	IV	Pied cuckoo
9	**Galliformes (No. of species= 2 and No. of family=1)**						
9.1.	**Phasianidae (2), RDi= 1.33**						
67	Grey francolin *Francolinus pondicerianus* (J.F. Gmelin 1789)	O	→	LC	-	IV	Grey partridge
68	Indian peafowl *Pavo cristatus* (Linnaeus 1758)	C	→	LC	-	IV	Peafowl
10	**Gruiformes (No. of species=5 and No. of families= 2)**						
10.1.	**Rallidae (4), RDi= 2.67**						
69	Common coot *Fulica atra* (Linnaeus 1758)	H	↑	LC	-	IV	Eurasian coot

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
70	Common moorhen *Gallinula chloropus* (Linnaeus 1758)	O	→	LC	-	IV	Eurasian moorhen
71	Purple swamphen *Porphyrio porphyria* (Linnaeus 1758)	O	?	LC	-	IV	Purple moorhen
72	White-breasted waterhen *Amaurornis phoenicurus* (Pennant 1769)	O	?	LC	-	IV	-
10.2.	**Gruidae (1), RDi= 0.67**						
73	Sarus crane *Grus antigone* (Linnaeus 1758)	O	↓	VU	II	IV	-
11	**Passeriformes (No. of species= 49 and No. of families=20)**						
11.1.	**Cisticolidae (5), RDi= 3.33**						
74	Ashy prinia *Prinia socialis* (Sykes 1832)	In	→	LC	-	IV	Ashy wren warbler
75	Graceful Prinia *Prinia gracilis* (M.H.C. Lichtenstein 1823)	In	→	LC	-	IV	Streaked wren warbler
76	Plain prinia *Prinia inornata* (Sykes 1832)	In	→	LC	-	IV	Plain wren warbler
77	Yellow-bellied prinia *Prinia flaviventris* (Delessert 1840)	In	↓	LC	-	IV	Yellow-bellied wren warbler
78	Common tailorbird *Orthotomus sutorius* (Pennant 1769)	In/N	→	LC	-	IV	-
11.2.	**Corvidae (2), RDi= 1.33**						
79	Rufous treepie *Dendrocitta vagabunda* (Latham 1790)	O	↓	LC	-	IV	Indian treepie
80	House crow *Corvus splendens* (Vieillot 1817)	O	→	LC	-	V	-
11.3.	**Dicruridae (1), RDi= 0.67**						
81	Black drongo *Dicrurus macrocercus* (Vieillot 1817)	In	?	LC	-	IV	-
11.4.	**Estrildidae (2), RDi= 1.33**						
82	Indian silverbill *Euodice malabarica* (Linnaeus 1758)	G	→	LC	-	IV	White-throated munia
83	Scaly-breasted munia *Lonchura punctulata* (Linnaeus 1758)	G	→	LC	-	IV	Spotted munia
11.5.	**Hirundinidae (2), RDi= 1.33**						
84	Streak-throated swallow *Petrochelidon fluvicola* (Blyth 1855)	In	↑	LC	-	IV	Indian Cliff swallow

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
85	Wire-tailed swallow *Hirundo smithii* (Leach 1818)	In	↑	LC	-	IV	-
11.6.	**Laniidae (2), RDi= 1.33**						
86	Long-tailed shrike *Lanius schach* (Linnaeus 1758)	In	?	LC	-	IV	Rufous-backed shrike
87	Bay-backed shrike *Lanius vittatus* (Valenciennes 1826)	In	→	LC	-	IV	-
11.7.	**Leiothrichidae (3), RDi= 2.00**						
88	Jungle babbler *Turdoides striata* (Dumont 1823)	O	→	LC	-	IV	-
89	Striated babbler *Argya earlei* (Blyth 1844)	O	↓	LC	-	IV	-
90	Common babbler *Argya caudata* (Dumont 1823)	O	→	LC	-	IV	Scrub babbler
11.8.	**Motacillidae (5), RDi= 3.33**						
91	Western yellow wagtail *Motacilla flava* (Linnaeus 1758)	In	↓	LC	-	IV	-
92	White wagtail *Motacilla alba* (Linnaeus 1758)	In	→	LC	-	IV	Pied wagtail
93	White-browed wagtail *Motacilla maderaspatensis* (J.F. Gmelin 1789)	In	→	LC	-	IV	Large pied wagtail
94	Citrine wagtail *Motacilla citreola* (Pallas 1776)	In	↑	LC	-	IV	Yellow-headed wagtail
95	Grey wagtail *Motacilla cinerea* (Tunstall 1771)	In	→	LC	-	IV	-
11.9.	**Nectariniidae (1), RDi= 0.67**						
96	Purple sunbird *Cinnyris asiaticus* (Latham 1790)	In/N	→	LC	-	IV	-
11.10.	**Oriolidae (1), RDi= 0.67**						
97	Indian golden oriole *Oriolus kundoo* (Sykes 1832)	O	?	LC	-	IV	-
11.11.	**Passeridae (3), RDi= 2.00**						
98	House sparrow *Passer domesticus* (Linnaeus 1758)	O	↓	LC	-	IV	-
99	Chestnut-shouldered bush-sparrow *Gymnoris xanthocollis* (E. Burton 1838)	O	→	LC	-	IV	Yellow-throated sparrow

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
100	Sind sparrow *Passer pyrrhonotus* (Blyth 1845)	O	→	LC	-	IV	Sind jungle sparrow
11.12.	**Pellorneidae (1), RDi= 0.67**						
101	Rufous-vented grass babbler *Laticilla burnesii* (Blyth 1844)	O	↓	NT	-	IV	Rufous-vented prinia
11.13.	**Phylloscopidae (1), RDi= 0.67**						
102	Common chiffchaff *Phylloscopus collybita* (Vieillot 1817)	In	↑	LC	-	IV	-
11.14.	**Ploceidae (1), RDi= 0.67**						
103	Baya weaver *Ploceus philippinus* (Linnaeus 1766)	O	→	LC	-	IV	Indian baya
11.15.	**Pycnonotidae (2), RDi= 1.33**						
104	Red-vented bulbul *Pycnonotus cafer* (Linnaeus 1766)	O	↑	LC	-	IV	-
105	White-eared bulbul *Pycnonotus leucotis* (Gould 1836)	O	↓	LC	-	IV	-
11.16.	**Sturnidae (6), RDi= 4.00**						
106	Common myna *Acridotheres tristis* (Linnaeus 1766)	O	↑	LC	-	IV	Indian myna
107	Bank myna *Acridotheres ginginianus* (Latham 1790)	C	↑	LC	-	IV	-
108	Asian pied starling *Gracupica contra* (Linnaeus 1758)	O	↑	LC	-	IV	Pied myna
109	Common starling *Sturnus vulgaris* (Linnaeus 1758)	O	↓	LC	-	IV	European tarling
110	Rosy starling *Pastor roseus* (Linnaeus 1758)	O	?	LC	-	IV	Rosy pastor
111	Brahminy starling *Sturnia pagodarum* (J.F. Gmelin 1789)	O	?	LC	-	IV	Black-headed/ Brahminy myna
11.17.	**Sylviidae (1), RDi= 0.67**						
112	Lesser whitethroat *Sylvia curruca* (Linnaeus 1758)	O	→	LC	-	IV	-
11.18.	**Vangidae (1), RDi= 0.67**						
113	Common woodshrike *Tephrodornis pondicerianus* (J.F. Gmelin 1789)	In	→	LC	-	IV	-
11.19.	**Zosteropidae (1), RDi= 0.67**						

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN	CITES	IWPA	
				-2023	-2012	-1972	
114	Indian white-eye *Zosterops palpebrosus* (Temminck 1824)	In/N	↓	LC	-	IV	-
11.20.	**Muscicapidae (8), RDi= 5.33**						
115	Black redstart *Phoenicurus ochruros* (S.G. Gmelin 1774)	In	↑	LC	-	IV	-
116	Bluethroat *Cyanecula svecica* (Linnaeus 1758)	In	→	LC	-	IV	-
117	Red-breasted flycatcher *Ficedula parva* (Bechstein 1792)	In	↑	LC	-	IV	-
118	Indian robin *Saxicoloides fulicatus* (Linnaeus 1766)	In	→	LC	-	IV	Indian black robin
119	Oriental magpie-robin *Copsychus saularis* (Linnaeus 1758)	In	→	LC	-	IV	-
120	Pied bushchat *Saxicola caprata* (Linnaeus 1766)	In	→	LC	-	IV	-
121	Brown rock chat *Oenanthe fusca* (Blyth 1851)	In	→	LC	-	IV	Indian chat
122	Siberian stonechat *Saxicola maurus* (Pallas 1773)	In	→	LC	-	IV	Eastern stonechat
12	**Pelecaniformes (No. of species=15 and No. of families= 3)**						
12.1.	**Ardeidae (10), RDi= 6.67**						
123	Cattle egret *Bubulcus ibis* (Linnaeus 1758)	C	↑	LC	-	IV	-
124	Great white egret *Ardea alba* (Linnaeus 1758)	C	?	LC	-	IV	Large egret
125	Intermediate egret *Ardea intermedia* (Wagler 1829)	C	↓	LC	-	IV	Median egret, smaller egret
126	Little egret *Egretta garzetta* (Linnaeus 1766)	C	↑	LC	-	IV	-
127	Western reef-egret *Egretta gularis* (Bosc 1792)	C	→	LC	-	IV	Western reef heron, Indian reef heron
128	Black-crowned night-heron *Nycticorax nycticorax* (Linnaeus 1758)	C	↓	LC	-	IV	-
129	Indian pond-heron *Ardeola grayii* (Sykes 1832)	C	?	LC	-	IV	Paddybird

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
130	Purple Heron *Ardea purpurea* (Linnaeus 1766)	C	↓	LC	-	IV	-
131	Green-backed heron *Butorides striata* (Linnaeus 1758)	C	↓	LC	-	IV	Little green heron
132	Grey heron *Ardea cinerea* (Linnaeus 1758)	C	?	LC	-	IV	-
12.2.	**Threskiornithidae (4), RDi= 2.67**						
133	Red-naped Ibis *Pseudibis papillosa* (Temminck 1824)	C	↓	LC	-	IV	Indian black ibis
134	Black-headed Ibis *Threskiornis melanocephalus* (Latham 1790)	C	↓	NT	-	IV	White Ibis, Oriental White Ibis
135	Glossy ibis *Plegadis falcinellus* (Linnaeus 1766)	C	↑	LC	-	IV	-
136	Eurasian spoonbill *Platalea leucorodia* (Linnaeus 1758)	C	?	LC	-	I	Spoonbill
12.3.	**Pelecanidae (1), RDi= 0.67**						
137	Great white pelican *Pelecanus onocrotalus* (Linnaeus 1758)	C	?	LC	-	IV	Rosy pelican
13	**Phoenicopteriformes (No. of species= 2 and No. of family= 1)**						
13.1.	**Phoenicopteridae (2), RDi= 1.33**						
138	Greater flamingo *Phoenicopterus roseus* (Pallas 1811)	O	↑	LC	-	IV	-
139	Lesser flamingo *Phoeniconaias minor* (Geoffroy Saint-Hilaire 1798)	O	↓	NT	-	IV	-
14	**Piciformes (No. of species= 4 and No. of families= 2)**						
14.1.	**Megalaimidae (2), RDi= 1.33**						
140	Brown-headed barbet *Psilopogon zeylanicus* (J.F. Gmelin 1788)	F	→	LC	-	IV	Large green barbet
141	Coppersmith barbet *Psilopogon haemacephalus* (Statius Muller 1776)	F	↑	LC	-	IV	Crimson-breasted barbet
14.2.	**Picidae (2), RDi= 1.33**						
142	Black-rumped flameback *Dinopium benghalense* (Linnaeus 1758)	In	→	LC	-	IV	Lesser Golden-backed Woodpecker
143	Eurasian wryneck *Jynx torquilla* (Linnaeus 1758)	In	↓	LC	-	IV	Wryneck, Northern Wryneck
15	**Podicipediformes (No. of species=1 and No. of family= 1)**						

Table 1. continued.

Sr. No.	Order/Family/Common name/Scientific name	Feeding guild	IUCN Global population trends	Conservation status			Alternative names
				IUCN -2023	CITES -2012	IWPA -1972	
15.1.	**Podicipedidae (1), RDi= 0.67**						
144	Little grebe *Tachybaptus ruficollis* (Pallas 1764)	C	↓	LC	-	IV	Dabchick
16	**Psittaciformes (No. of species=2 and No. of family= 1)**						
16.1.	**Psittaculidae (2), RDi= 1.33**						
145	Alexandrine parakeet *Psittacula eupatria* (Linnaeus 1766)	F	↓	NT	II	IV	Large Indian Parakeet
146	Rose-ringed parakeet *Psittacula krameri* (Scopoli 1769)	F	↑	LC	-	IV	-
17	**Strigiformes (No. of species= 1 and No. of family=1)**						
17.1.	**Strigidae (1), RDi= 0.67**						
147	Spotted owlet *Athene brama* (Temminck 1821)	C	→	LC	II	IV	-
18	**Suliformes (No. of species= 3 and No. of family= 1)**						
18.1.	**Phalacrocoracidae (3), RDi= 2.00**						
148	Great cormorant *Phalacrocorax carbo* (Linnaeus 1758)	C	↑	LC	-	IV	Large Cormorant
149	Little cormorant *Microcarbo niger* (Vieillot 1817)	C	?	LC	-	IV	-
150	Oriental darter *Anhinga melanogaster* (Pennant 1769)	C	↓	NT	-	IV	Snake-bird

vores (single species) (Fig. 4). The consolidation of distinct habitats and an assortment of food resources contribute species diversity with multiple feeding guilds in a particular area. An evaluation of IUCN Conservation status revealed that 136 species were Least concern (LC), 11 species (Ferruginous Pochard, Black-tailed Godwit, Eurasian Curlew, Asian woollyneck, Painted stork, Black-necked Stork, Rufous-vented Grass-babbler, Black-headed Ibis, Lesser Flamingo, Oriental Darter and Alexandrine parakeet) were Near-threatened (NT) and 3 species (Common Pochard, River Tern and Sarus Crane) were Vulnerable (VU). According to IWPA (1972) six species (*Milvus migrans, Haliastur indus, Elanus caeruleus, Pernis ptilorhynchus, Accipiter badius, Platalea leucorodia*) fall under schedule-I of Wildlife protection act; 143 species under schedule-IV and single species (*Corvus splendens*) under schedule-V; whereas of total recorded species, nine species fall under Appendix-II and single species under Appendix-I

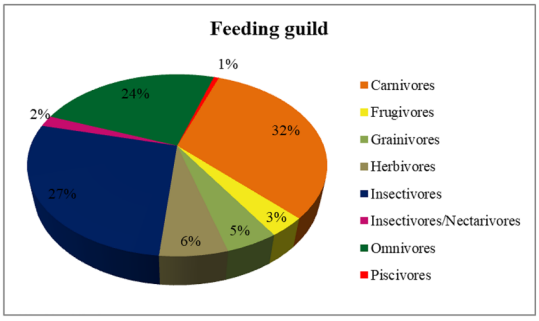

Fig. 4. Feeding guild of reported avian species at Masani barrage, district Rewari, Haryana.

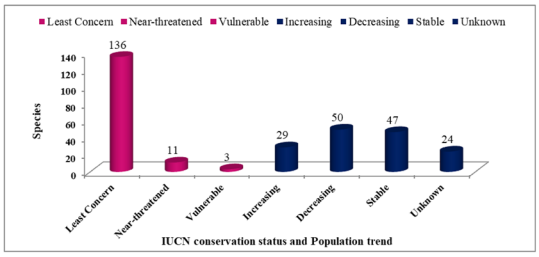

Fig. 5. IUCN conservation status and population trend of recorded species at Masani barrage, district Rewari, Haryana.

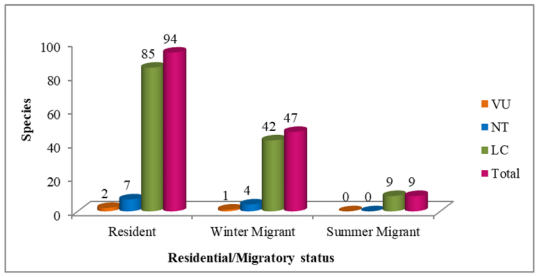

Fig. 6. Relationship between residential/migratory status and IUCN conservation status of observed species at Masani barrage, district Rewari, Haryana.

of CITES (2012). Assessment of global population trend reveals that 29 species shows increasing population trend, 50 species with decreasing population trend, 47 species show stable trend but trend of 24 species are still unknown (Fig. 5). Seasonal fluctuations in avian assemblages happen as a consequence of alterations in weather, supply of food, quality of habitat, and predation danger (Datta 2011). Analysis of residential/migratory status elucidates that of recorded 150 species, 94 species were resident; 47 species were winter migrant and 9 species were summer migrant (Fig. 6). A comparison of residential/migratory status was made with IUCN conservation status of documented species and it results that among 94 residential species: 2 species fall under vulnerable status, 7 species near-threatened, 85 species least concern, whereas of 47 winter migrants: Single species was vulnerable, 4 species near-threatened, 42 species were least concern; among 9 summer migrants: All species come under least concern (Fig. 6).

DISCUSSION

In the present study, 150 bird species comprising 18 orders and 49 families were recorded at Masani barrage, district Rewari, Haryana. Researcher such as Haider *et al.* (2022) recorded 150 avian species belonging 19 orders and 53 families at Taunsa barrage; Brraich and Singh (2022) observed 185 avian species from Shah Nehar Barrage Lake. It was observed that order Passeriformes was the highly dominant among the recorded 18 orders, possessing 49 species (36.64%) in 20 families, because of their capability to use different habitat and varieties of food items among the area (Rai and Vanita 2022). Similar results were also observed by different researchers in several study areas (Rai *et al.* 2017, Wani and Nazir 2020, Singh *et al.* 2021, Rai and Yadav 2023, Rai and Vanita 2023), because of their ability to use wide habitat and food items (Beresford *et al*. 2005). These findings are consistent with previous findings that Passeriformes are the most common avian taxa in Haryana's areas viz., Sultanpur National Park (Chopra *et al.* 2012, Kaushik and Gupta 2016), Bhindawas Bird Sanctuary (Chopra *et al.* 2017), Kalesar National Park (Rai *et al.* 2017b), Man-made sacred ponds, Kurukshetra (Kumar and Sharma 2019). The dominance of Anatidae family revealed that ducks and geese have adequate habitat and food resources, constituted 85% of the population of migratory species as being the numerous and remarkable winter migrants to the Indian subcontinent (Kumar *et al.* 2005). Presence of extensive range of carnivores avian species implies that area provides plentiful food sources for birds in the form of vertebrates and non-vertebrates (Jamwal *et al.* 2017, Kumar and Sharma 2018, Sohil and Sharma 2020). During the entire survey, residential and migratory status depicts that among 150 species, 94 species were resident; 47 species were winter migrant and 9 species were summer migrant. An aggregation of massive winter migrants at a specific location denotes the approach of migratory species from different locations in order to avert adverse environmental conditions (Kumar *et al.* 2016, Arya *et al.* 2019, Joshi *et al*. 2021, Adhurya *et al.* 2023).

CONCLUSION

The present study has shown that the Masani barrage, district Rewari, Haryana has the potential of around 150 species (18 orders, 49 families), where 11 species belong to near-threatened and 3 species under

vulnerable category. Recorded data of 150 avian species at the barrage can be used as baseline data for assessing future perspectives and proper management plans for protection and its sustainable use. Long-term surveillance of avifaunal assemblage in this area would be an important tool for determining the consequences of human impact and implementing conservation strategies at the Masani barrage, district Rewari, Haryana.

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