

## Status and habitat use pattern of birds in Pong Dam Lake Wildlife Sanctuary, Himachal Pradesh

Anuradha<sup>1</sup>, M.L. Thakur<sup>2</sup> and H.S. Banyal<sup>1\*</sup>

<sup>1</sup>Abhilashi University, Chail Chowk, District Mandi (Himachal Pradesh), India.

<sup>1</sup>HP State Biodiversity Board, Paryavaran Bhawan, Shimla-1 (Himachal Pradesh), India.

(Corresponding author: H.S. Banyal\*)

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**ABSTRACT:** A total of 225 species of birds, spread over 150 genera, 54 families and 17 orders have been recorded from the Pong Dam Lake Wildlife Sanctuary. The study further revealed the presence of 71 waterbird species. Maximum number of species i.e., 157 species have been reported from 'Water System' habitat. Another 132 species have been reported from two or more than two habitat types. Analyses of the primary feeding habits revealed the presence of 73 Insectivore birds from the present study area. The study further revealed the presence of 17 threatened species, including two (2) vulture species namely *Gyps bengalensis* and *Sarcogyps calvus* categorized as Critically Endangered.

**Keywords:** Birds, Status, Habitat use pattern, Pong Dam Lake Wildlife Sanctuary.

### INTRODUCTION

Wetlands are crucial for human survival. They are comparable to rain forests and coral reefs, in being the most productive ecosystems in the world. They are the areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. Numerous beneficial services provided by wetlands include protecting and improving water quality and wildlife species, providing suitable habitats, storing floodwaters etc. Network of 75 Indian Ramsar Sites, covering an area of 1,326,677 ha, is known to support 6,873 species of various faunal groups belonging to 3,304 genera and 1,077 families (Chandra *et al.*, 2021).

Sufficient information is available on the fauna, including birds of some important Indian wetlands including Chilka Lake, Keoladeo Ghana National Park, Pulicat Lake etc. Important birds found in these wetlands include pelicans, flamingos, ducks, storks, herons, egrets, gulls, terns and other shore birds. Besides waterbirds and other vertebrates, invertebrate fauna including many annelids, coelenterates, crustaceans, molluscs and echinoderms, is also well documented in a few wetlands of the country. Similarly, many of the mammals, birds, reptiles, amphibians and invertebrates are well documented in some of these important wetlands. However, endemism in wetland fauna is poorly known which include 44 species of waterbirds, one species of Himalayan Newt (*Pleurodeles verrucosus*) and 223 species of fish are endemic in Indian wetlands. Biggest threats needing immediate attention are the degradation of wetland ecosystems and consequent loss of biodiversity in

various wetland types. Assessment of various groups of organisms found in wetland ecosystems, creation of awareness and involvement of local communities are the proposed conservation measures (Chandra *et al.*, 2021).

Status of birds of Kangra, including the Beas River, at present day Pong Wetland, were studied before Independence by Whistler (1926 a&b). Previously some workers have studied the birds of the Pong Dam Wetland. Some of the notable ones include works by Gaston and Pandey (1987) who sighted Red-necked Grebe (*Podiceps grisegena*) on the Pong Dam Lake. Pandey (1989) recorded some 220 species of resident, winter and summer visitor birds from the Pong Dam Wetland, Kangra. Tak *et al.* (2001) observed a huge wintering population of Bar-headed Goose was recorded in Pong Wetland. Moreover, Besten (2004) recorded 555 species of birds from Kangra valley and the Pong Wetland. Thakur *et al.* (2008) reported the presence of 172 species of birds including 53 water birds from Shahnahar Reservoir, situated just downstream the Pong Dam Wetland. However, a comprehensive study on birdlife of the present study area, undertaken with standardised methods, covering all habitat types, spread over all the seasons of the years from July 2021 to January 2023, has been undertaken to have updated information on current information about diversity, status, habitat use pattern etc., of birds of the Pong Dam Lake Wildlife Sanctuary.

### STUDY AREA

Pong Dam Lake, also called Maharana Pratap Sagar, situated at 31° 52' - 32° 10' N and 76° 67' - 76° 14' E, is a manmade reservoir formed in 1975, on Beas River in

Kangra district of Himachal Pradesh. It was declared as a Wildlife Sanctuary in 1983. It is considered as the highest earth fill dam in India. It is a medium sized wetland with catchment area of 12562 sq. km and total geographical area of 207 sq. km. It was designated as a Ramsar site in 2002. Location of the present study site in Shiwalik zone of the Himalayas, almost on northwest edge of the Indian peninsula, where birds migrating along the Central Asian Flyway are known to converge before spreading to other parts of the Country, make it one of the most important sites for study of migratory wetland birds. The wetland is surrounded from almost all sides by agricultural fields and patches of northern dry mixed deciduous forests of acacia and pines. Terrain of area is undulating with uneven ridges cut through by seasonal and perennial streams. There are some marshes, agricultural fields and wasteland areas around the lake.

## METHODOLOGY

Stratified random sampling technique previously employed by Mehta *et al.* (2002) in Ropar Wetland, Thakur *et al.* (2008) in Shahnahar reservoir, Singh and Banyal (2013) in Khajjiar Lake in Chamba and Singh, *et al.* (2014) in Prashar Lake and its Surrounding Area in Mandi District, which is based upon the principle of exploration of a portion of the whole population, was followed for studying the birds of the area. The Pong Dam Lake area was divided into different strata, based upon habitat types and the main habitat types were water system including open waters and shallow margins and marshes, forest patches, agriculture fields and human habitations.

These avifaunal studies were undertaken during the years 2021-2023. No bird was caught or hurt during the observations as these were observed in the field with field binoculars (10 x 42 Nikon) and Field Scope (Fujinon Super 60 S). Standard field guides like Ali and Ripley (1983), Grimmett *et al.* (1999) and Kazmierczak (2000) were used for field identifications.

No direct observations were made on feeding habits and population trends during the study however, feeding habits have been compiled from webportal of Birdlife International just for elucidation of habitat use pattern. Further, IUCN status and global population trends, as available with IUCN (2022) have been collated and compared for each species observed during the present study.

## RESULTS AND DISCUSSION

A total of 225 species of birds, spread over 150 genera, 54 families and 17 orders have been recorded from the Pong Dam Lake Wildlife Sanctuary, during the course of present study, conducted from July 2021 to January 2023. The study further revealed the presence of 71 waterbird species belonging to families namely Podicipedidae, Phalacrocoracidae, Anhingidae, Ardiidae, Ciconiidae, Threskiornithidae, Anatidae, Rallidae, Jacanidae, Charadriidae, Scolopacidae,

Recurvirostridae, Burhinidae, Glareolidae and Laridae (Table 1).

Present study revealed the presence of maximum number of species i.e., 157 species, in 'Water System' habitat, followed by 124 in 'Agriculture', 107 in 'Forest' and 76 in and around 'Human Habitation'. Further, a total of 75 species have been exclusively recorded from 'Water System' habitat, these include some important migratory waterbirds like *Podiceps cristatus*, *Podiceps nigricollis*, *Phalacrocorax carbo*, *Mycteria leucocephala*, *Platalea leucorodia*, *Anser anser*, *Tadorna tadorna*, *Anas platyrhynchos*, *Anas acuta*, *Aythya ferina*, *Circus aeruginosus*, *Pandion haliaetus*, *Amaurornis akool*, *Fulica atra*, *Charadrius alexandrinus*, *Gallinago gallinago*, *Tringa nebularia*, *Tringa glareola*, *Himantopus Himantopus*, *Larus cachinnans*, *Sterna aurantia* etc. Further, 13 species of birds including *Gyps bengalensis*, *Gyps himalayensis*, *Sarcogyps calvus*, *Spilornis cheela*, *Glaucidium cuculoides*, *Dinopium benghalense*, *Monticola solitarius*, *Turdus unicolor*, *Turdus ruficollis*, *Pellorneum ruficeps*, *Turdoides caudatus* etc., have been recorded only from 'Forest' habitat. Moreover, another 5 species including *Butastur teesa*, *Aquila nipalensis*, *Grus antigone*, *Vanellus malabaricus*, and *Galerida cristata* have been reported only from 'Agriculture' habitat. Furthermore, another 132 species having broad habitat requirements, have been reported from two or more than two habitat types (Table 1). Presence of higher number of species in water system and agriculture habitats recorded during the present study is in consonance with the earlier study of Tu *et al.* (2020) who have elucidated that natural and farmland-related habitats have higher bird species richness. Further, Mehta *et al.* (2002) while characterising the avian diversity in relation to habitat in Ropar Wetland of Punjab have reported the presence of maximum diversity in water system.

Analyses of the primary feeding habits of the species recorded during the present study revealed the presence of 73 Insectivore birds, which include species like *Vanellus malabaricus*, *Glareola lactea*, *Caprimulgus macrurus*, *Collocalia brevirostris*, *Apus affinis*, *Merops orientalis*, *Upupa epops*, *Picus xanthopygaeus*, *Riparia paludicola*, *Hirundo smithii*, *Delichon dasypus*, *Anthus rufulus*, *Pericrocotus cinnamomeus*, *Aegithina tiphia*, *Chaimarrornis leucocephalus*, *Rhyacornis fuliginosus*, *Saxicola caprata*, *Pomatorhinus schisticeps*, *Phylloscopus trochiloides*, *Rhipidura hypoxantha* etc. Further, of the remaining, 66 species were primarily Omnivores, 50 Carnivores, 13 Granivores, 9 Frugivores, 7 Piscivores, 5 Herbivores and 2 Nectarivore. Further, categorization of the 74 species confined to 'Water System' habitat, on the basis of feeding habits, revealed the presence of 27 Omnivore, 25 Carnivore, 11 Insectivore, 7 Piscivore and 4 Herbivore birds in Pong Dam Wildlife Sanctuary (Table 1).

**Table 1: Birds recorded in Pong dam lake wildlife sanctuary.**

Sr. No.	Taxon and Common Name	Habitat type	Feeding habits	IUCN status	Global Population trends
<b>Order: Podicipediformes</b>					
<b>Family: Podicipedidae</b>					
1.	<i>Tachybaptus ruficollis</i> Little Grebe	Wt	C	LC	↓
2.	<i>Podiceps cristatus</i> Great Crested Grebe	Wt	C	LC	?
3.	<i>Podiceps nigricollis</i> Black-necked Grebe	Wt	C	LC	?
<b>Order: Pelecaniformes</b>					
<b>Family: Phalacrocoracidae</b>					
4.	<i>Phalacrocorax niger</i> Little Cormorant	Wt	P, C	LC	?
5.	<i>Phalacrocorax carbo</i> Great Cormorant	Wt	P, C	LC	↑
<b>Family: Anhingidae</b>					
6.	<i>Anhinga melanogaster</i> Oriental Darter	Wt	P, C	NT	↓
<b>Order: Ciconiiformes</b>					
<b>Family: Ardeidae</b>					
7.	<i>Egretta garzetta</i> Little Egret	Wt	C	LC	↑
8.	<i>Ardea cinerea</i> Grey Heron	Wt	C	LC	?
9.	<i>Ardea purpurea</i> Purple Heron	Wt	C	LC	↓
10.	<i>Casmerodius albus</i> Large Egret	Wt	C	LC	?
11.	<i>Mesophoyx intermedia</i> Median Egret	Wt	C	LC	↓
12.	<i>Bubulcus ibis</i> Cattle Egret	Wt, Ag, Hh	In	LC	↑
13.	<i>Ardeola grayii</i> Indian Pond-Heron	Wt, Ag	C	LC	?
14.	<i>Nycticorax nycticorax</i> Black-crowned Night-Heron	Wt	C	LC	↓
<b>Family: Ciconiidae</b>					
15.	<i>Mycteria leucocephala</i> Painted Stork	Wt	C	LC	↑
16.	<i>Ciconia episcopus</i> White-necked Stork	Wt, Ag	C	NT	↓
<b>Family: Threskiornithidae</b>					
17.	<i>Platalea leucorodia</i> Eurasian Spoonbill	Wt	C	LC	?
<b>Order: Anseriformes</b>					
<b>Family: Anatidae</b>					
18.	<i>Anser anser</i> Greylag Goose	Wt	H	LC	↑
19.	<i>Anser indicus</i> Bar-headed Goose	Wt, Ag	H, O	LC	↓
20.	<i>Tadorna ferruginea</i> Brahminy/ Ruddy Shelduck	Wt, Ag	O	LC	?
21.	<i>Tadorna tadorna</i> Common Shelduck	Wt	O	LC	↑
22.	<i>Anas strepera</i> Gadwall	Wt	H, O	LC	↑
23.	<i>Anas penelope</i> Eurasian Wigeon	Wt	H	LC	↓
24.	<i>Anas platyrhynchos</i> Mallard	Wt	O	LC	↑
25.	<i>Anas poecilorhyncha</i> Spot-billed Duck	Wt	O	LC	↓
26.	<i>Anas clypeata</i> Northern Shoveller	Wt	O	LC	↓

27.	<i>Anas acuta</i> Northern Pintail	Wt	O	LC	↓
28.	<i>Anas querquedula</i> Garganey	Wt	O	LC	↓
29.	<i>Anas crecca</i> Common Teal	Wt	O	LC	?
30.	<i>Rhodonessa rufina</i> Red-crested Pochard	Wt	H, O	LC	?
31.	<i>Aythya ferina</i> Common Pochard	Wt	O	VU	↓
32.	<i>Aythya nyroca</i> Ferruginous Pochard	Wt	O	NT	↓
33.	<i>Aythya fuligula</i> Tufted Pochard	Wt	O	LC	→
34.	<i>Mergus merganser</i> Common Merganser	Wt	P, C	LC	?
<b>Order: Falconiformes</b>					
<b>Family: Accipitridae</b>					
35.	<i>Elanus caeruleus</i> Black-shouldered Kite	Fo, Ag, Hh	C	LC	→
36.	<i>Milvus migrans</i> Black Kite	Wt, Fo, Ag, Hh	C, O	LC	→
37.	<i>Haliaeetus albicilla</i> White-tailed Sea-Eagle	Wt, Ag	C	LC	↑
38.	<i>Neophron percnopterus</i> Egyptian Vulture	Wt, Fo, Ag	C	EN	↓
39.	<i>Gyps bengalensis</i> Indian White-backed Vulture	Fo	C	CR	↓
40.	<i>Gyps himalayensis</i> Himalayan Griffon	Fo	C	NT	↓
41.	<i>Sarcogyps calvus</i> Red-headed Vulture	Fo	C	CR	↓
42.	<i>Spilornis cheela</i> Crested Serpent-Eagle	Fo	C	LC	→
43.	<i>Circus aeruginosus</i> Western Marsh-Harrier	Wt	C	LC	→
44.	<i>Accipiter badius</i> Shikra	Fo, Ag	C	LC	→
45.	<i>Butastur teesa</i> White-eyed Buzzard	Ag	C	LC	→
46.	<i>Buteo rufinus</i> Long-legged Buzzard	Fo, Ag	C	LC	→
47.	<i>Aquila nipalensis</i> Steppe Eagle	Ag	C	EN	↓
<b>Family: Pandionide</b>					
48.	<i>Pandion haliaeetus</i> Osprey	Wt	P, C	LC	↑
<b>Family: Falconidae</b>					
49.	<i>Falco tinnunculus</i> Common Kestrel	Wt, Fo, Ag	C	LC	↓
50.	<i>Falco peregrinus</i> Peregrine Falcon	Wt, Ag	C	LC	↑
<b>Order: Galliformes</b>					
<b>Family: Phasianidae</b>					
51.	<i>Francolinus francolinus</i> Black Francolin	Fo, Ag	O	LC	→
52.	<i>Francolinus pondicerianus</i> Grey Francolin	Fo, Ag, Hh	O	LC	→
53.	<i>Perdica asiatica</i> Jungle Bush-Quail	Fo, Ag, Hh	O	LC	→
54.	<i>Gallus gallus</i> Red Junglefowl	Fo, Ag	O	LC	↓
55.	<i>Pavo cristatus</i> Indian Peafowl	Fo, Ag, Hh	O	LC	→
<b>Order: Gruiformes</b>					
<b>Family: Gruidae</b>					
56.	<i>Grus antigone</i> Sarus Crane	Ag	O	VU	↓

	<b>Family: Rallidae</b>				
57.	<i>Amaurornis akool</i> Brown Crake	Wt	O	LC	?
58.	<i>Amaurornis phoenicurus</i> White-breasted Waterhen	Wt, Ag	O	LC	?
59.	<i>Porphyrio porphyrio</i> Purple Moorhen	Wt	O	LC	?
60.	<i>Gallinula chloropus</i> Common Moorhen	Wt	O	LC	→
61.	<i>Fulica atra</i> Common Coot	Wt	O	LC	↑
	<b>Order: Charadriiformes</b>				
	<b>Family: Jacanidae</b>				
62.	<i>Hydrophasianus chirurgus</i> Pheasant-tailed Jacana	Wt	O	LC	↓
	<b>Family: Charadriidae</b>				
63.	<i>Charadrius dubius</i> Little Ringed Plover	Wt	In, C	LC	→
64.	<i>Charadrius alexandrinus</i> Kentish Plover	Wt	In, C	LC	↓
65.	<i>Vanellus vanellus</i> Northern Lapwing	Wt, Ag	In, C	NT	↓
66.	<i>Vanellus malabaricus</i> Yellow-wattled Lapwing	Ag	In, C	LC	→
67.	<i>Vanellus duvaucelii</i> River Lapwing	Wt, Ag	In, C	NT	↓
68.	<i>Vanellus indicus</i> Red-wattled Lapwing	Wt, Ag, Hh	In, C	LC	?
	<b>Family: Scolopacidae</b>				
69.	<i>Gallinago gallinago</i> Common Snipe	Wt	O	LC	↓
70.	<i>Numenius arquata</i> Eurasian Curlew	Wt	C	NT	↓
71.	<i>Tringa erythropus</i> Spotted Redshank	Wt	C	LC	→
72.	<i>Tringa totanus</i> Common Redshank	Wt	C	LC	?
73.	<i>Tringa stagnatilis</i> Marsh Sandpiper	Wt	C	LC	↓
74.	<i>Tringa nebularia</i> Common Greenshank	Wt	C	LC	→
75.	<i>Tringa ochropus</i> Green Sandpiper	Wt	C	LC	↑
76.	<i>Tringa glareola</i> Wood Sandpiper	Wt	C	LC	→
77.	<i>Actitis hypoleucos</i> Common Sandpiper	Wt	C	LC	↓
78.	<i>Calidris minuta</i> Little Stint	Wt	O	LC	↑
79.	<i>Calidris temminckii</i> Temminck's Stint	Wt	O	LC	?
80.	<i>Calidris alpina</i> Dunlin	Wt	O	LC	↓
81.	<i>Philomachus pugnax</i> Ruff	Wt	O	LC	↓
	<b>Family: Recurvirostridae</b>				
82.	<i>Himantopus himantopus</i> Black-winged Stilt	Wt, Ag	O	LC	↑
83.	<i>Recurvirostra avosetta</i> Pied Avocet	Wt	O	LC	?
	<b>Family: Burhinidae</b>				
84.	<i>Burhinus oedicephalus</i> Stone-Curlew	Wt, Ag	C	LC	↓
85.	<i>Esacus recurvirostris</i> Great Stone-Plover	Wt	C	NT	↓
	<b>Family: Glareolidae</b>				
86.	<i>Glareola lactea</i> Small Pratincole	Wt	In	LC	?

	<b>Family: Laridae</b>				
87.	<i>Larus cachinnans</i> Yellow-legged Gull	Wt	O	LC	↑
88.	<i>Larus ichthyaetus</i> Pallas's Gull	Wt	O	LC	↑
89.	<i>Larus brunnicephalus</i> Brown-headed Gull	Wt	O	LC	→
90.	<i>Larus ridibundus</i> Black-headed Gull	Wt	O	LC	?
91.	<i>Sterna aurantia</i> River Tern	Wt	C	VU	↓
92.	<i>Sterna acuticauda</i> Black-bellied Tern	Wt	C	EN	↓
93.	<i>Chlidonias hybridus</i> Whiskered Tern	Wt	C	LC	→
	<b>Order: Columbiformes</b>				
	<b>Family: Columbidae</b>				
94.	<i>Columba livia</i> Blue Rock Pigeon	Wt, Fo, Ag, Hh	G, O	LC	↓
95.	<i>Streptopelia orientalis</i> Oriental Turtle-Dove	Wt, Fo, Ag, Hh	G	LC	→
96.	<i>Streptopelia senegalensis</i> Little Brown Dove	Wt, Fo, Ag, Hh	G, O	LC	→
97.	<i>Streptopelia chinensis</i> Spotted Dove	Wt, Fo, Ag, Hh	G, O	LC	↑
98.	<i>Streptopelia tranquebarica</i> Red Collared-Dove	Wt, Fo, Ag, Hh	G	LC	↓
99.	<i>Streptopelia decaocto</i> Eurasian Collared-Dove	Wt, Fo, Ag, Hh	G, O	LC	↑
100.	<i>Treron phoenicoptera</i> Yellow-legged Green-Pigeon	Fo, Hh	F	LC	↑
	<b>Order: Psittaciformes</b>				
	<b>Family: Psittacidae</b>				
101.	<i>Psittacula eupatria</i> Alexandrine Parakeet	Ag, Hh	F	NT	↓
102.	<i>Psittacula krameri</i> Rose-ringed Parakeet	Wt, Fo, Ag, Hh	F, G	LC	↑
103.	<i>Psittacula himalayana</i> Slaty-headed Parakeet	Fo, Ag	F, G	LC	→
104.	<i>Psittacula cyanocephala</i> Plum-headed Parakeet	Fo, Ag	F, G	LC	↓
	<b>Order: Cuculiformes</b>				
	<b>Family: Cuculidae</b>				
105.	<i>Clamator jacobinus</i> Pied Crested Cuckoo	Fo, Ag, Hh	O	LC	→
106.	<i>Hierococcyx varius</i> Brainfever Bird	Fo, Ag, Hh	O	LC	→
107.	<i>Cuculus micropterus</i> Indian Cuckoo	Fo, Ag	O	LC	↓
108.	<i>Cuculus canorus</i> Common Cuckoo	Fo, Ag	C	LC	↓
109.	<i>Eudynamis scolopacea</i> Asian Koel	Wt, Fo, Ag, Hh	O	LC	→
110.	<i>Centropus sinensis</i> Greater Coucal	Wt, Ag	O	LC	→
	<b>Order: Strigiformes</b>				
	<b>Family: Strigidae</b>				
111.	<i>Glaucidium cuculoides</i> Asian Barred Owlet	Fo	C	LC	↑
112.	<i>Glaucidium radiatum</i> Jungle Owlet	Fo	C	LC	→
113.	<i>Athene brama</i> Spotted Owlet	Fo, Ag, Hh	C	LC	→
	<b>Order: Caprimulgiformes</b>				
	<b>Family: Caprimulgidae</b>				
114.	<i>Caprimulgus macrurus</i> Large-tailed Nightjar	Fo, Hh	In	LC	→

	<b>Order: Apodiformes</b>				
	<b>Family: Apodidae</b>				
115.	<i>Collocalia brevirostris</i> Himalayan Swiftlet	Wt, Ag	In	LC	→
116.	<i>Apus affinis</i> House Swift	Wt, Fo, Ag, Hh	In	LC	↑
	<b>Order: Coraciiformes</b>				
	<b>Family: Alcedinidae</b>				
117.	<i>Alcedo atthis</i> Small Blue Kingfisher	Wt	P, C	LC	?
118.	<i>Halcyon smyrnensis</i> White-breasted Kingfisher	Wt, Fo, Ag, Hh	C	LC	↑
119.	<i>Ceryle rudis</i> Lesser Pied Kingfisher	Wt	P, C	LC	?
	<b>Family: Meropidae</b>				
120.	<i>Merops orientalis</i> Small Bee-eater	Wt, Fo, Ag, Hh	In	LC	↑
121.	<i>Merops philippinus</i> Blue-tailed Bee-eater	Wt	In	LC	→
	<b>Family: Coraciidae</b>				
122.	<i>Coracias benghalensis</i> Indian Roller	Ag, Hh	C	LC	↑
	<b>Family: Upupidae</b>				
123.	<i>Upupa epops</i> Common Hoopoe	Wt, Fo, Ag, Hh	In, O	LC	↓
	<b>Family: Bucerotidae</b>				
124.	<i>Ocyrceros birostris</i> Indian Grey Hornbill	Fo, Ag, Hh	O	LC	→
	<b>Order: Piciformes</b>				
	<b>Family: Capitonidae</b>				
125.	<i>Megalaima virens</i> Great Barbet	Fo, Hh	F, In	LC	↓
126.	<i>Megalaima zeylanica</i> Brown-headed Barbet	Fo, Ag, Hh	F, In	LC	→
127.	<i>Megalaima asiatica</i> Blue-throated Barbet	Fo, Hh	F, In	LC	→
128.	<i>Megalaima haemacephala</i> Coppersmith Barbet	Fo, Hh	F, In	LC	↑
	<b>Family: Picidae</b>				
129.	<i>Jynx torquilla</i> Eurasian Wryneck	Fo, Hh	In	LC	↓
130.	<i>Picumnus innominatus</i> Speckled Piculet	Fo, Hh	In	LC	↓
131.	<i>Dendrocopos macei</i> Fulvous-breasted Pied Woodpecker	Fo, Ag	In, F	LC	→
132.	<i>Dendrocopos mahrattensis</i> Yellow-fronted Pied Woodpecker	Fo, Ag	In, F	LC	?
133.	<i>Picus xanthopygaeus</i> Little Scaly-bellied Green Woodpecker	Fo, Ag	In	LC	?
134.	<i>Dinopium benghalense</i> Lesser Golden-backed Woodpecker	Fo	In	LC	→
	<b>Order: Passeriformes</b>				
	<b>Family: Alaudidae</b>				
135.	<i>Calandrella raytal</i> Indian Short-toed Lark	Wt	O	LC	→
136.	<i>Galerida cristata</i> Common Crested Lark	Ag	O	LC	↓
137.	<i>Alauda gulgula</i> Eastern Skylark	Wt, Ag	O	LC	↓
	<b>Family: Hirundinidae</b>				
138.	<i>Riparia paludicola</i> Plain Martin	Wt, Ag	In	LC	↓
139.	<i>Hirundo rupestris</i> Eurasian Crag-Martin	Wt, Ag	In	LC	→
140.	<i>Hirundo rustica</i> Common Swallow	Wt, Fo, Ag, Hh	In	LC	↓
141.	<i>Hirundo smithii</i>	Wt, Ag, Hh	In	LC	↑

	Wire-tailed Swallow				
142.	<i>Hirundo daurica</i> Red-rumped Swallow	Wt, Ag, Hh	In	LC	→
143.	<i>Hirundo fluviicola</i> Streak-throated Swallow	Wt, Fo, Hh	In	LC	↑
144.	<i>Delichon dasypus</i> Asian House-Martin	Wt, Ag	In	LC	↑
<b>Family: Motacillidae</b>					
145.	<i>Motacilla alba</i> White Wagtail	Wt, Fo, Ag	In	LC	→
146.	<i>Motacilla maderaspatensis</i> Large Pied Wagtail	Wt, Ag	In	LC	→
147.	<i>Motacilla flava</i> Yellow Wagtail	Wt	In	LC	↓
148.	<i>Motacilla cinerea</i> Grey Wagtail	Wt	In	LC	→
149.	<i>Anthus rufulus</i> Paddyfield Pipit	Wt, Ag	In	LC	→
<b>Family: Campephagidae</b>					
150.	<i>Pericrocotus cinnamomeus</i> Small Minivet	Fo, Ag	In	LC	→
<b>Family: Pycnonotidae</b>					
151.	<i>Pycnonotus leucogenys</i> Himalayan Bulbul	Wt, Fo, Ag	O	LC	↑
152.	<i>Pycnonotus cafer</i> Red-vented Bulbul	Wt, Fo, Ag, Hh	O	LC	↑
153.	<i>Hypsipetes leucocephalus</i> Black Bulbul	Fo, Ag	O	LC	→
<b>Family: Irenidae</b>					
154.	<i>Aegithina tiphia</i> Common Iora	Wt, Fo, Ag	In	LC	?
<b>Family: Laniidae</b>					
155.	<i>Lanius vittatus</i> Bay-backed Shrike	Wt, Ag	C	LC	→
156.	<i>Lanius schach</i> Rufous-backed Shrike	Wt, Fo, Ag, Hh	C	LC	?
<b>Family: Muscicapidae</b>					
<b>Subfamily: Turdinae</b>					
157.	<i>Monticola solitarius</i> Blue Rock-Thrush	Fo	O	LC	→
158.	<i>Myiophonus caeruleus</i> Blue Whistling-Thrush	Fo, Hh	O	LC	?
159.	<i>Turdus unicolor</i> Tickell's Thrush	Fo	O	LC	?
160.	<i>Turdus ruficollis</i> Dark-throated Thrush	Fo	O	LC	?
161.	<i>Luscinia pectoralis</i> Himalayan Rubythroat	Wt	C	LC	→
162.	<i>Luscinia svecica</i> Bluethroat	Wt	O	LC	→
163.	<i>Copsychus saularis</i> Oriental Magpie-Robin	Wt, Fo, Ag, Hh	In	LC	→
164.	<i>Saxicoloides fulicata</i> Indian Robin	Wt, Fo, Ag, Hh	In, C	LC	→
165.	<i>Phoenicurus ochruros</i> Black Redstart	Wt, Fo, Ag, Hh	In, C	LC	↑
166.	<i>Chaimarrornis leucocephalus</i> White-capped Redstart	Wt	In	LC	→
167.	<i>Rhyacornis fuliginosus</i> Plumbeous Redstart	Wt	In	LC	→
168.	<i>Saxicola torquata</i> Common Stonechat	Wt	In	LC	→
169.	<i>Saxicola caprata</i> Pied Bushchat	Wt, Fo, Ag, Hh	In	LC	→
170.	<i>Saxicola ferrea</i> Grey Bushchat	Wt, Fo, Ag, Hh	In	LC	→

171.	<i>Cercomela fusca</i> Indian Chat	Wt, Hh	In	LC	→
<b>Subfamily: Timaliinae</b>					
172.	<i>Pellorneum ruficeps</i> Spotted Babbler	Fo	In	LC	→
173.	<i>Pomatorhinus erythrogyne</i> Rusty-cheeked Scimitar-Babbler	Wt, Ag	In, O	LC	→
174.	<i>Pomatorhinus schisticeps</i> Hodgson's Scimitar-Babbler	Wt	In, O	LC	↓
175.	<i>Stachyris pyrrhops</i> Black-chinned Babbler	Fo, Ag	In, O	LC	→
176.	<i>Chrysomma sinense</i> Yellow-eyed Babbler	Wt	In, O	LC	→
177.	<i>Turdoides caudatus</i> Common Babbler	Fo	In, O	LC	→
178.	<i>Turdoides earlei</i> Striated Babbler	Wt, Fo	In, O	LC	↓
179.	<i>Turdoides striatus</i> Jungle Babbler	Wt, Fo, Ag, Hh	In, O	LC	→
<b>Subfamily: Sylviinae</b>					
180.	<i>Prinia socialis</i> Ashy Prinia	Wt, Fo, Ag	In	LC	→
181.	<i>Prinia inornata</i> Plain Prinia	Wt, Fo	In	LC	→
182.	<i>Orthotomus sutorius</i> Common Tailorbird	Wt, Fo, Ag, Hh	In	LC	→
183.	<i>Phylloscopus collybita</i> Common Chiffchaff	Wt, Fo, Ag, Hh	In	LC	↑
184.	<i>Phylloscopus chloronotus</i> Lemon-rumped Warbler	Fo, Ag, Hh	In	LC	→
185.	<i>Phylloscopus trochiloides</i> Greenish Leaf-Warbler	Wt, Fo	In	LC	↑
186.	<i>Seicercus xanthoschistos</i> Grey-headed Flycatcher-Warbler	Fo, Ag	In	LC	→
187.	<i>Megalurus palustris</i> Striated Marsh-Warbler	Wt	In	LC	?
188.	<i>Sylvia curruca</i> Common Lesser Whitethroat	Wt, Fo, Ag	In, O	LC	→
<b>Subfamily: Muscipapinae</b>					
189.	<i>Ficedula tricolor</i> Slaty-blue Flycatcher	Fo, Ag	In	LC	→
190.	<i>Eumyias thalassina</i> Verditer Flycatcher	Fo	In	LC	→
191.	<i>Culicicapa ceylonensis</i> Grey-headed Flycatcher	Fo, Ag	In	LC	→
<b>Subfamily: Monarchinae</b>					
192.	<i>Terpsiphone paradisi</i> Asian Paradise-Flycatcher	Fo, Ag	In	LC	→
<b>Subfamily: Rhipidurinae</b>					
193.	<i>Rhipidura hypoxantha</i> Yellow-bellied Fantail-Flycatcher	Fo, Ag, Hh	In	LC	→
194.	<i>Rhipidura albicollis</i> White-throated Fantail-Flycatcher	Wt, Fo, Ag, Hh	In	LC	→
195.	<i>Rhipidura aureola</i> White-browed Fantail-Flycatcher	Wt, Fo, Ag, Hh	In	LC	→
<b>Family: Paridae</b>					
196.	<i>Parus major</i> Great Tit	Wt, Fo, Ag, Hh	In	LC	↑
<b>Family: Sittidae</b>					
197.	<i>Tichodroma muraria</i> Wallcreeper	Wt, Ag, Hh	In	LC	→
<b>Family: Certhiidae</b>					
198.	<i>Certhia himalayana</i> Bar-tailed Tree-Creeper	Fo, Ag	In	LC	↓
<b>Family: Nectariniidae</b>					
199.	<i>Nectarinia asiatica</i> Purple Sunbird	Wt, Fo, Ag, Hh	N, In	LC	→

200.	<i>Aethopyga siparaja</i> Crimson Sunbird	Fo, Ag, Hh	N, In	LC	→
<b>Family: Zosteropidae</b>					
201.	<i>Zosterops palpebrosus</i> Oriental White-eye	Wt, Fo, Ag, Hh	In, N	LC	↓
<b>Family: Emberizidae</b>					
<b>Subfamily: Emberizinae</b>					
202.	<i>Melophus lathami</i> Crested Bunting	Wt, Ag, Hh	G, In	LC	→
203.	<i>Emberiza cia</i> Rock Bunting	Wt, Fo, Ag, Hh	G, In	LC	↑
<b>Family: Fringillidae</b>					
204.	<i>Serinus pusillus</i> Fire-fronted Serin	Fo, Ag	G, In	LC	→
205.	<i>Carduelis spinoides</i> Yellow-breasted Greenfinch	Fo, Ag	G, In	LC	→
206.	<i>Carpodacus erythrinus</i> Common Rosefinch	Fo, Ag	G, In	LC	↓
<b>Family: Estrildidae</b>					
207.	<i>Amandava amandava</i> Red Munia	Wt, Ag	G, In	LC	→
208.	<i>Lonchura punctulata</i> Spotted Munia	Fo, Ag, Hh	G, In	LC	→
<b>Family: Passeridae</b>					
<b>Subfamily: Passerinae</b>					
209.	<i>Passer domesticus</i> House Sparrow	Wt, Ag, Hh	O	LC	↓
210.	<i>Passer rutilans</i> Cinnamon Tree Sparrow	Fo, Ag, Hh	O	LC	→
211.	<i>Petronia xanthocollis</i> Yellow-throated Sparrow	Fo, Ag, Hh	O	LC	→
<b>Subfamily: Ploceinae</b>					
212.	<i>Ploceus philippinus</i> Baya Weaver	Wt, Ag, Hh	O	LC	→
<b>Family: Sturnidae</b>					
213.	<i>Sturnus pagodarum</i> Brahminy Starling	Wt, Ag, Hh	O	LC	?
214.	<i>Sturnus vulgaris</i> Common Starling	Wt, Ag, Hh	O	LC	↓
215.	<i>Sturnus contra</i> Asian Pied Starling	Wt, Ag	O	LC	↑
216.	<i>Acridotheres tristis</i> Common Myna	Wt, Fo, Ag, Hh	O	LC	↑
217.	<i>Acridotheres ginginianus</i> Bank Myna	Wt, Ag, Hh	O	LC	↑
218.	<i>Acridotheres fuscus</i> Jungle Myna	Wt, Ag, Hh	O	LC	↓
<b>Family: Oriolidae</b>					
219.	<i>Oriolus oriolus</i> Eurasian Golden Oriole	Fo, Ag, Hh	O	LC	→
<b>Family: Dicruridae</b>					
220.	<i>Dicrurus macrocercus</i> Black Drongo	Wt, Fo, Ag, Hh	In	LC	?
221.	<i>Dicrurus hottentottus</i> Spangled Drongo	Fo, Ag, Hh	In	LC	↓
<b>Family: Corvidae</b>					
222.	<i>Urocissa erythrorhyncha</i> Red-billed Blue Magpie	Fo, Ag	O	LC	→
223.	<i>Dendrocitta vagabunda</i> Indian Treepie	Wt, Fo, Ag, Hh	O	LC	↓
224.	<i>Corvus splendens</i> House Crow	Wt, Fo, Ag, Hh	O	LC	→
225.	<i>Corvus macrorhynchos</i> Jungle Crow	Wt, Fo, Ag, Hh	O	LC	→

(Feeding Habits: H-Herbivore, O-Omnivore, In-Insectivore, C-Carnivore, G-Granivore, F-Frugivore, P-Piscivore, N- Nectarivore)

Conservation status: LC- Least Concern, NT, Near threatened, VU-Vulnerable; EN- Endangered

Population trends: ↑- Increasing, ↓- Decreasing, →- Stable, ?- Unknown

Habitat types: Wt= Water System, Fo= Forest, Ag=Agriculture, Hh=Human Habitation)

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The insectivorous birds recorded during the present study, by acting as biological pest control agents, would certainly have crucial role in agricultural production in Pong Dam Lake area. Insectivorous birds have been known to provide key ecosystem services, as recently evaluated by Olmos-Moya *et al.* (2022) in vineyards in central Chile, where significantly higher consumption of sentinel prey has been reported using a two-year sentinel prey experimental trial. Effectiveness of birds as effective biocontrol agents has been attributed by Amo and Saavedra (2021) to the capabilities of the insectivorous birds to discriminate between the pheromones of their prey and those of non-prey insects. Piscivore bird species observed from the study area include some of the voracious feeders like *Phalacrocorax niger*, *Phalacrocorax carbo*, *Anhinga melanogaster*, *Mergus merganser* etc., which as reported earlier by Engstrom (2001) in Europe, might have some implications on livelihoods of local stakeholders in Pong Dam Lake Wildlife Sanctuary.

The study further revealed the presence of 17 such species of birds from Pong Wetland which have been categorized as threatened and placed under different threat categories by IUCN (2022). These include two (2) vulture species namely *Gyps bengalensis* and *Sarcogyps calvus* categorized as Critically Endangered, three (3) species namely *Neophron percnopterus*, *Aquila nipalensis* and *Sterna acuticauda* declared as Endangered, three (3) species namely *Aythya ferina*, *Grus antigone* and *Sterna aurantia* included under Vulnerable category and nine (9) species namely *Anhinga melanogaster*, *Ciconia episcopus*, *Aythya nyroca*, *Gyps himalayensis*, *Vanellus vanellus*, *Vanellus duvaucelii*, *Numenius arquata*, *Esacus recurvirostris* and *Psittacula eupatria* declared as Near Threatened by IUCN (2022).

It has been analyzed that of the 225 bird species recorded in Pong Dam Lake Wildlife Sanctuary, 92 species (41%) have stable global population, however, another large proportion of species i.e., 61 species which accounts for 27 % of the species recorded, have decreasing global population trends. In addition, 32 species recorded during the present study have unknown global populations and only 40 species have increasing trends. Further, all the 17 threatened species have decreasing global population trends, therefore conservation of ecosystem of the present study area of Pong Wetland is urgently required for continuous survival of these globally threatened species. Important species showing decreasing population trends worldwide, recorded during the present study include *Anhinga melanogaster*, *Ardea purpurea*, *Mesophoyx intermedia*, *Nycticorax nycticorax*, *Ciconia episcopus*, *Anser indicus*, *Anas Penelope*, *Anas acuta*, *Neophron percnopterus*, *Gyps bengalensis*, *Gyps himalayensis*, *Sarcogyps calvus*, *Aquila nipalensis*, *Falco tinnunculus*, *Gallus gallus*, *Grus antigone*, *Hydrophasianus chirurgus*, *Charadrius alexandrinus*, *Calidris alpina*, *Esacus recurvirostris* etc. BirdLife International (2022), has reported that worldwide, 49% of the bird species have declining populations, therefore, conservation of various habitat types in Pong Dam Lake has very high

relevance, due to the presence of 17 globally threatened species having declining global population trends.

## CONCLUSIONS

The study revealed that Pong Dam Lake, also called Maharana Pratap Sagar, is situated in Shiwalik zone of the Himalayas, almost on northwest edge of the Indian peninsula, where birds migrating along the Central Asian Flyway are known to converge before spreading to other parts of the Country, makes it one of the most important sites for study of migratory wetland birds. The study revealed the presence of 225 species of birds including 71 waterbird species. 'Water System' habitat is one of the most important habitat types in the wetland, supporting 157 species. The study further revealed the presence of 17 threatened species, including two (2) vulture species namely *Gyps bengalensis* and *Sarcogyps calvus* categorized as Critically Endangered. The study further showed that 61 species accounting to 27% of the species recorded, have decreasing global population trends therefore, conservation of various habitat types in Pong Dam Lake has very high relevance, due to the presence of 17 globally threatened species having declining global population trends. Degradation of wetland ecosystem and consequent loss of biodiversity is the biggest threat needing immediate attention. Therefore, interventions on part of various stakeholders are needed to ensure conservation of an enormous range of biological diversity, particularly the avifauna.

## FUTURE SCOPE

Based upon the present study, assessment and long-term monitoring of various groups of organisms, their habitat use pattern, habitat suitability, feeding and breeding sites etc., and creation of awareness and involvement of local communities are recommended for effective conservation of the wetland and its ecosystem.

**Conflicts of Interest.** The authors declare no conflict of interest.

## REFERENCES

- Ali, S. and Ripley, S. D. (1983). *A Pictorial Guide to the Birds of the Indian Subcontinent*. Bombay Natural History Society/Oxford University Press, New Delhi. 177 pp.
- Amo, L. and Saavedra, I. (2021). Attraction to Smelly Food in Birds: Insectivorous Birds Discriminate between the Pheromones of Their Prey and Those of Non-Prey Insects. *Biology*, 10(10), 1010
- Besten, J. W. (2004). *Birds of Kangra*. Moonpeak Publishers, Dharamsala and Mosaic Books, New Delhi. 173 pp.
- BirdLife International (2022). *State of the World's Birds 2022: Insights and solutions for the biodiversity crisis*. BirdLife International, Cambridge, UK.
- Chandra, K., Bharti, D., Kumar, S., Raghunathan, C., Gupta, D., Alfred, J. R. B. and Chowdhury, B. R. (2021). *Faunal Diversity in Ramsar Wetlands of India*. Director, Zoological Survey of India and Wetland Division, Ministry of Environment, Forest and Climate Change, Government of India. 292 pp.
- Engstrom, H. (2001). Effects of Great Cormorant Predation on Fish Populations and Fishery. *Acta Universitatis*

- Upsaliensis*. Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, Uppsala, 670. 39 pp.
- Gaston, A. J. and Pandey, S. (1987). Sighting of Rednecked Grebes (*Podiceps grisegena*) on the Pong Dam Lake, Himachal Pradesh. *J. Bombay Nat. Hist. Soc.* 84(3), 676-677.
- Grimmett, R., Inskipp, C. and Inskipp, T. (1999). *Pocket Guide to the Birds of the Indian Subcontinent*. Oxford University Press, New Delhi. 384 pp.
- IUCN (2022). The IUCN Red List of Threatened Species. Version 2022-2.
- Kazmierczak, K. (2000). *A Field Guide to the Birds of India, Sri Lanka, Pakistan, Nepal, Bhutan, Bangladesh and the Maldives*. Om Book Service, New Delhi. 352 pp.
- Mehta, H. S., Thakur, M. L., Paliwal, R. and Tak, P. C. (2002). Avian diversity of Ropar Wetland, Punjab, India. *Annals of forestry*, 10(2), 307-326.
- Olmos-Moya, N., Díaz-Siefer, P., Pozo, R. A., Fontúrbel, F. E., Lavandero, B., Abades, S. and Celis-Diez, J.L. (2022). The use of cavity-nesting wild birds as agents of biological control in vineyards of Central Chile. *Agriculture, Ecosystems & Environment*, 334, 107975
- Pandey, S. (1989). The birds of Pong Dam Lake Bird Sanctuary. *Tigerpaper*, 16(2), 20-26.
- Singh, J., Thakur, M. L. and Banyal, H. S. (2014). Avifauna of Prashar Lake and its Surrounding Area in Mandi District (Himachal Pradesh), India. *Asian Journal of Biological Sciences*, 7, 47-56.
- Singh, V. and Banyal, H.S. (2013). Avian Fauna of Khajjiar Lake, District Chamba, Himachal Pradesh, India. *Proceedings of the Zoological Society*, 66, 130-136.
- Tak, P. C., Paliwal, R. and Shrama, R. M. (2001). Occurrence of huge wintering population of Bar-headed Goose, *Anser indicus*, at Pong Dam Wetland, Himachal Pradesh. *Bionotes*, 5(4), 88-89.
- Thakur, M. L., Mattu, V. K., Paliwal, R., Mehta, H. S. and Thakur, V. (2008). Birds of Shahnahar Reservoir, Kangra, Himachal Pradesh, India. *Annals of Forestry*, 15(1), 129-151.
- Tu, H. M., Fan, M. W. and Ko, J. C. J. (2020). Different Habitat Types Affect Bird Richness and Evenness. *Sci. Rep.* 10, 1221.
- Whistler, H. (1926 a). The birds of the Kangra District, Punjab, part 1. *Ibis* (12) 2(3), 521-581.
- Whistler, H. (1926 b). The birds of the Kangra District, Punjab, part 2. *Ibis* (12) 2(4), 724-783.

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