

RECENT OBSERVATION ON THE STATUS AND DISTRIBUTION OF THREATENED AND NEAR THREATENED BIRDS OF SINDH, PAKISTAN

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ABSTRACT

In the present study 42 Threatened and near Threatened birds species were recorded in Sindh which falling in 11 orders and 19 families. The study was conducted during December 2018 to November 2020 for two years in major wetlands, protected areas, forests and potential sites all over the province. During the whole study 22 birds were recorded as Threatened include 05 Critically Endangered (CR), White-rumped Vulture (*Gyps bengalensis*), Indian Vulture (*Gyps indicus*), Red-headed Vulture (*Sarcogyps calvus*), Great Indian Bustard (*Ardeotis nigriceps*), Sociable Lapwing (*Vanellus gregarius*) 07 Endangered (EN), Steppe Eagle (*Aquila nipalensis*), Pallas's Fish-eagle (*Haliaeetus leucoryphus*), Egyptian Vulture (*Neophron percnopterus*), Lesser Florican (*Sypheotides indicus*), Great Knot (*Calidris tenuirostris*), White-headed Duck (*Oxyura leucocephala*), Black-bellied Tern (*Sterna acuticauda*), 10 Vulnerable (VU) and 20 species were recorded as Near Threatened (NT). Threatened and Near Threatened birds include 03 Passerine species, 14 Raptors species, 22 Aquatic birds species and all the three bustard species were recorded as Threatened. Reasons of increasing the numbers of Threatened and Near Threatened species are mostly anthropogenic activities, habitat destruction, illegal hunting and Climate change. There is need of sustainability in environmental related services and conservation plan for the protection of documented fauna.

Key words: Birds, distribution, critically endangered, endangered, vulnerable, near threatened, threats

INTRODUCTION

Pakistan thirds largest province is Sindh with 30 districts having a diversified types of habitats including important Khirthar Range, Deserts, Coastal Mangrove Forest, Sandy Beaches and stretched network of Indus river system, which comprises of several major canals, permanent lakes, irrigation networks, reservoirs/dams, meadows, swamps, marshes, mud-flats and shallow ponds (Fig.1).



Fig 1. Map of Sindh showing different districts.

These habitats and ecosystems serve as a home of threatened biodiversity including birds. Currently birds in Sindh are struggling for their existence against several threatening factors and severe ecological modifications that have been made by continuing anthropogenic/developmental activities.

During the Initial Environmental Examinations (IEEs), Environmental Impact Assessments (EIAs), and birds monitoring of several wetlands, protected areas and developmental projects in Sindh there were 420 birds species recorded including 42 threatened and near threatened birds species from province of Sindh.

Listing of Threatened species is important to set priority actions for development, exploitation of the resources and provision for species recovery and information to the state of the environment (Possingham *et al.*, 2002). In many countries, threatened species lists directly effects the legislations and lists of threatened species as an important factor to identifying ecosystems facing higher-risk.

The objectives of this study were to conducted field visits to major permanent/seasonal wetlands, canals, protected areas, forest, deserts and coastal areas of Sindh to provide listing and information related the current distribution and status of Threatened and Near Threatened birds species in Sindh. The study helpfully provides baseline of Threatened and Near Threatened avifauna of Sindh. The reason behind this study was to establish updated list of threatened birds of Sindh.

MATERIAL AND METHODS

The occurrence of the species in the province, their feeding grounds, habits, roosting grounds and nomenclature used in this paper is adopted from Roberts (1991; 1992). The International Union for Conservation of Nature (IUCN) red list status of the species for 2020 was followed.

Surveys were conducted from December 2018 to November 2020 at all significant wetlands and other important wildlife areas of Sindh which includes Abasar Talab, Abdul Shah Dhand, Achro Thar Sanghar, Badin, Bhansar Talab, Bundal Island, Cape Monze, Chotiari Reservoir Sanghar (Chotiari Dam), Clifton, Dangewari Lake, Dhabiji, DHA Karachi, Eri Game Reserve, Gadap Town, Gadhro Pithapur, Ghandak Dhoru, Gharo Creek, Ghizri Creek, Ghotki District, Gorakh Hills Dadu, Guddu Barrage, Gulsher Dhand, Hadero Lake, Haleji Lake Wildlife Sanctuary, Hammal Lake, Hawksbay, Hilaya Forest, Hub Dam, Hub River, Hyderabad, Indus Delta, Islamkot, Jageer Dhand, Jamshoro, Jhimpir, Jubho Lagoon, Karachi Coast, Karcahi Mangrove Forest, Karoonjhar Hills, Kathorr, Keenjhar Lake Wildlife Sanctuary, Ketu Bunder North, Ketu Bunder South, Khipro Forest, Khirthar Protected Area Complex (KPAC), Kohistan Area Thatta, Konkar Gadap, Korangi Creek, Kotri Barrage, Lakhat, Larkana, LungLake, Mahal Kohistan Wildlife Sanctuary, Mahrano Wildlife Sanctuary, Malir River, Malji Jo Wandion, Manchar Lake, Mando Dero, Manora, Matiari Forest, Mehboob Shah Lake, Mirpurkhas, Mirpur Sakro, Mithi, Mithi Bypass Area, Mohabat Dero, Nagarparkar, Nara Desert Wildlife Sanctuary (NDWS), Nara Desert Wetland Complex (NDWC), Norang, Northern Bypass Karachi, Nurri Lagoon, Phitti Creek, Phousna Lake, Pie Forest, Port Qasim Area, Pulleli Canal, Qambar Shahdadkot, Rann of Kutch Wildlife Sanctuary, Ranpur Dam, Rehri Creek, Rohri Canal, Saanga Talab, Sakar Talinear Nagarparkar, Sandspit, Sankar Tali, Seaview, Shah Bunder, Shahdad Kot Zero point area, Shaheed Benazirabad (Nawabshah), Shikarpur, Sindh Kohistan, Sujawal, Sukkur Barrage, Sumbak Game Reserve, Surjan Game Reserve, Takkar Wildlife Sanctuary, Tando Allah Yar, Tando Mitha Khan, Tando Muhammad Khan, Thando Dam, Tharparkar, Unarpur Forest, Veera Wah, Wahi Pandi and Western Backwater Mangrove Area Karachi were surveyed in search of Threatened and Near Threatened species of birds.

Sites covered during the surveys included all the above listed. Observations were carried out only for Threatened and Near Threatened birds at each site. In addition, raptors (Eagles, Vultures, Falcons and Harriers) were also covered in all types of their preferring habitats. Location /area wise species of Threatened and Near Threatened birds type was recorded.

Direct field observations were made on different preselected observation points at each habitat type to collect information about distribution Threatened and Near Threatened birds of Sindh.

Line transect technique was frequently used wherever it was feasible to move throughout the habitat and the edges of large wetlands, lakes, coastal area, riverbeds, riverine forests, lagoons, dams and canals areas and observations were written on the predesigned survey sheet. A distance of 25 - 50 meter on both sides of the selected tract was maintained in this method. From the start of the Line transect method initial points were marked with GPS, observed species were recorded and finishing point was also marked with GPS at the end of observation.

For raptors observations from selected vantage points within the potential habitat to detect the soaring species and identification in the suitable habitats. Detecting through direct sighting, with the help of binocular during flying, roosting and feeding. Vultures are mostly recorded at their feeding

grounds near poultry farms at Thatta, Gharo, Khirthar Protected Area Complex (KPAC), Tharparkar areas. Transect survey by vehicle in the open plain areas was also carried out for raptors.

For shore and coastal birds during winter season vantage point and boat survey along the coastline and Indus Delta area was taken out for identifying the threatened bird species with the help of telescope and binocular. Boat survey was also used during riverine, Lakes and Canals for bird habitats searching.

RESULTS

Major points of Bird biodiversity in province of Sindh

Globally, BirdLife International aims to identify, protect and manage network of sites that are significant for long term availability of bird populations and many sites are important for other biodiversity so the conservation of IBAs ensure the conservation of large numbers of animals and plants and their habitats (BirdLife International, 2020). Important Bird and Biodiversity Areas (IBAs) are the areas for critical the protection and conservation of birds and biodiversity. IBAs are the sites of international importance and identified for practical conservation action used for reinforcement in network of existing protected areas. There are 19 IBAs identified in Sindh having diverse ecosystem of desert, freshwater lakes/rivers/canals and coastal habitats. These IBAs are identified for supporting some threatened species of birds and large populations of congregatory birds (Table 1).

Table 1. Important Bird and Biodiversity Areas (IBAs) in Sindh.

S. No.	Site Name	District	Species
1	Deh Akro Wildlife Sanctuary	Shaheed Benazirabad (Nawabshah)	Crocodiles, Hobara Bustard, Partridges and waterbirds
2	Drigh Wildlife Sanctuary	Qambar Shahdadkot	Waterbirds and Birds of prey
3	Haleji Wildlife Sanctuary	Thatta	Smooth coated Otter , Crocodiles, Waterbirds
4	Hammal Katchery Lake	Qambar Shahdadkot	Smooth coated Otter, Waterbirds
5	Indus Dolphin Reserve and Kandhkot wetlands	Sukkur	Fishing Cat, Indus Dolphin and waterbirds
6	Jabho Lagoon (Ramsar Site)	Sujawal	Waterbirds
7	Keenjhar (Kalri) Wildlife Sanctuary	Thatta	Waterbirds, Birds of prey
8	Keti Bundar North Wildlife Sanctuary	Thatta	Waterbirds
9	Khirthar National Park (including Hub Dam)	Karachi/Jamshoro	Sindh Ibex, Urial, Chinkara, Bustrads, Vultures, Eagles, Peafowls and waterbirds
10	Manchar Lake	Dadu	Waterbirds and Raptors
11	Mehboob Shah Lake	Thatta	Waterbirds and Birds of Prey
12	Mehrano Reserve Lake and Rohri canal wetlands	Khairpur	Smooth coated Otter, Deers, Blue bull, Partridges, and Waterbirds
13	Nurri Lagoon (Ramsar Site)	Badin	Waterbirds Eagles, Falcons
14	Nara canal wetlands (including Soonhari, Sadhori and Sanghriaro lakes)	Sanghar	Smooth coated Otter, Crocodiles, Raptors and Waterbirds
15	Nara Desert Wildlife Sanctuary	Sanghar	Bustards, Partridges and Waterbirds
16	Outer Indus delta	Badin	Waterbirds
17	Phoosna Wetlands Complex	Badin	Waterbirds
18	Pugri Lake	Larkana	Waterbiords
19	Rann of Kutch Wildlife Sanctuary	Thatta	Waterbirds and Raptors

Composition of Major Groups of Threatened and Near Threatened birds in Sindh

During the current study 42 birds as 22 Threatened and 20 Near Threatened were recorded, Threatened birds includes 05 Critically Endangered, 07 Endangered and 10 Vulnerable. These include 15 resident and 27 migratory (Table 2, 3; Fig. 2).

Table 2. Numbers of Threatened and Near Threatened birds recorded.

S. No.	IUCN Status		Number of Species
01	Threatened	Critically Endangered (CR)	05
02		Endangered (EN)	07
03		Vulnerable (VU)	10
04	Near Threatened	Near-threatened (NT)	20
Total			42

Table 3. Residential status of Threatened and Near-threatened birds of Sindh.

S. No.	Type	Number of Species
01	Resident	15
02	Migratory	27
Total		42

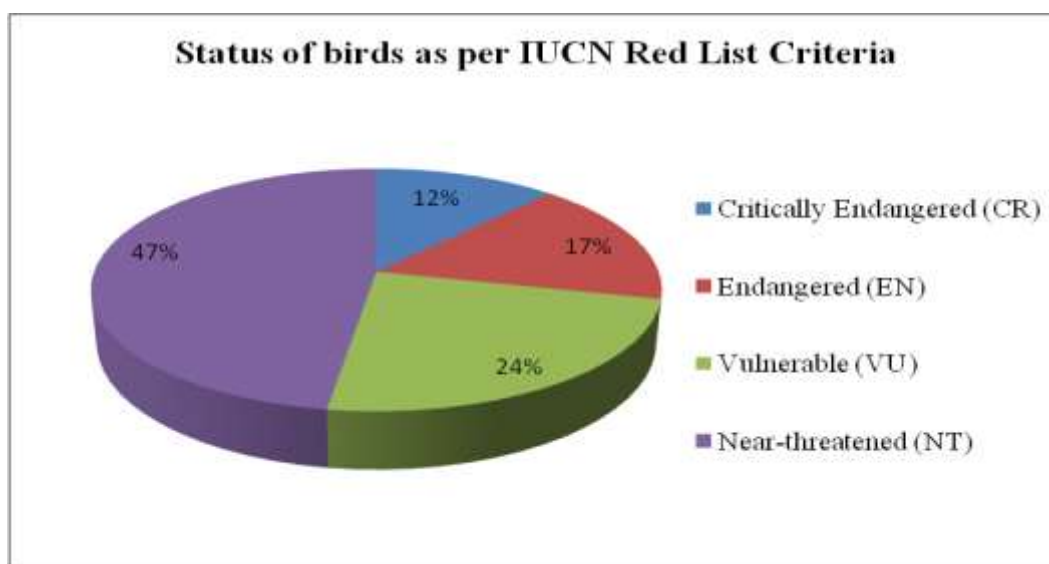


Fig.2. Showing Percentage of Threatened and Near-Threatened birds.

Different groups of Threatened and Near-Threatened Birds recorded

Four major groups and 24 types of Threatened and Near Threatened birds were recorded in Sindh (Table 4).

Table 4. List showing different groups of Threatened and Near-Threatened Birds of Sindh.

Group o Birds	Type	Numbers	Total
Birds of Prey	Eagles	05	14
	Falcons	02	
	Harriers	01	
	Vultures	06	
Passerine	Babblers	01	03
	Pigeons	01	
	Warblers	01	
Bustard	Bustards	02	03
	Floricane	01	
Aquatic	Cranes	01	22
	Curlew	01	
	Ducks	04	
	Flamingos	01	
	Godwits	02	
	Ibises	01	
	Knots	01	
	Lapwings	01	
	Oystercatcher	01	
	Pelicans	01	
	Plovers	01	
	Sandpipers	01	
	Skimmer	01	
	Stork	01	
	Terns	02	
	Darter	01	
Thick-knee	01		
Total			42

Threatened and Near Threatened birds Checklist

Forty two Threatened and Near Threatened species of birds comprises 11 families and 18 orders were recorded in the study (Table 5).

Table 5. Checklist of Threatened and Near Threatened Birds of Sindh with seasonal and IUCN Red List Status

S. No.	Order	Family	Common Name	Scientific Name	Seasonal Status	Global IUCN Red List Category
1	Accipitriformes	Accipitridae	White-rumped Vulture	<i>Gyps bengalensis</i>	R	CR
2	Accipitriformes	Accipitridae	Indian Vulture	<i>Gyps indicus</i>	R	CR
3	Accipitriformes	Accipitridae	Red-headed Vulture	<i>Sarcogyps calvus</i>	WV	CR
4	Charadriiformes	Charadriidae	Sociable Lapwing	<i>Vanellus gregarious</i>	WV	CR
5	Otidiformes	Otididae	Great Indian Bustard	<i>Ardeotis nigriceps</i>	V	CR
6	Accipitriformes	Accipitridae	Steppe Eagle	<i>Aquila nipalensis</i>	WV	EN
7	Accipitriformes	Accipitridae	Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>	R	EN
8	Accipitriformes	Accipitridae	Egyptian Vulture	<i>Neophron percnopterus</i>	R	EN
9	Anseriformes	Anatidae	White-headed Duck	<i>Oxyura leucocephala</i>	V	EN
10	Charadriiformes	Scolopacidae	Great Knot	<i>Calidris tenuirostris</i>	WV	EN
11	Charadriiformes	Laridae	Black-bellied Tern	<i>Sterna acuticauda</i>	R	EN
12	Otidiformes	Otididae	Lesser Florican	<i>Sypheotides indicus</i>	V	EN
13	Accipitriformes	Accipitridae	Eastern Imperial Eagle	<i>Aquila heliaca</i>	WV	VU
14	Accipitriformes	Accipitridae	Tawny Eagle	<i>Aquila rapax</i>	R	VU
15	Accipitriformes	Accipitridae	Greater Spotted Eagle	<i>Clanga clanga</i>	WV	VU
16	Gruiformes	Gruidae	Sarus Crane	<i>Antigone antigone</i>	V	VU
17	Otidiformes	Otididae	Asian Houbara	<i>Chlamydotis macqueeni</i>	WV	VU

18	Passeriformes	paradoxomithidae	Jerdon's Babbler	<i>Chrysomma altirostre</i>	R	VU
19	Anseriformes	Anatidae	Common Pochard	<i>Aythya ferina</i>	WV	VU
20	Anseriformes	Anatidae	Marbled Teal	<i>Marmaronetta angustirostris</i>	WV	VU
21	Columbiformes	Columbidae	Yellow-eyed Pigeon	<i>Columba eversmanni</i>	V	VU
22	Charadriiformes	Laridae	Indian Skimmer	<i>Rynchops albigollis</i>	SBV	VU
23	Accipitriformes	Accipitridae	Cinereous Vulture	<i>Aegypius monachus</i>	R	NT
24	Accipitriformes	Accipitridae	Pallid Harrier	<i>Circus macrourus</i>	WV	NT
25	Accipitriformes	Accipitridae	Bearded Vulture	<i>Gypaetus barbatus</i>	WV	NT
26	Falconiformes	Falconidae	Red-headed Falcon	<i>Falco chicquera</i>	R	NT
27	Falconiformes	Falconidae	Laggar Falcon	<i>Falco jugger</i>	R	NT
28	Anseriformes	Anatidae	Ferruginous Duck	<i>Aythya nyroca</i>	WV	NT
29	Charadriiformes	Laridae	River Tern	<i>Sterna aurantia</i>	R	NT
30	Charadriiformes	Burhinidae	Great Thick-knee	<i>Esacus recurvirostris</i>	R	NT
31	Charadriiformes	Charadriidae	Northern Lapwing	<i>Vanellus vanellus</i>	WV	NT
32	Charadriiformes	Haematopodidae	Eurasian Oystercatcher	<i>Haematopus ostralegus</i>	WV	NT
33	Charadriiformes	Scolopacidae	Bar-tailed Godwit	<i>Limosa lapponica</i>	WV	NT
34	Charadriiformes	Scolopacidae	Black-tailed Godwit	<i>Limosa limosa</i>	WV	NT
35	Charadriiformes	Scolopacidae	Eurasian Curlew	<i>Numenius arquata</i>	WV	NT
36	Charadriiformes	Scolopacidae	Curlew Sandpiper	<i>Calidris ferruginea</i>	WV	NT
37	Passeriformes	Locustellidae	Long-billed Grasshopper-warbler	<i>Locustella major</i>	V	NT
38	Pelecaniformes	Pelecanidae	Dalmatian Pelican	<i>Pelecanus crispus</i>	WV	NT
39	Pelecaniformes	Threskiornithidae	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	R	NT
40	Ciconiiformes	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	R	NT
41	Ciconiiformes	Phoenicopteridae	Lesser Flamingo	<i>Phoeniconaias minor</i>	WV	NT
42	Suliformes	Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>	R	NT

Legend: R= Resident, WV= Winter Visitor, V= Vagrant, SBV= Summer Breeding Visitor, M= Migratory, CR= Critically Endangered, EN= Endangered, VU= Vulnerable, NT= Near-threatened.

Distribution of the Threatened and Near Threatened birds in Sindh

1. White-rumped Vulture (*Gyps bengalensis*) (CR) R

The White-rumped Vulture was very scarce resident in plains, deserts and human habitation in Sindh. It is observed only in scattered localities in Mithi, Islamkot and Nagarparkar areas. Nesting is also recorded in the Malji Jo Wandion area. It is occasional visitor to Khirthar Protected Area Complex. The species is under declining in their potentially distributed areas in Tharparkar District due to use of Diclofenac drugs in domesticated animals and habitat destruction. Due to the rapid decline in their population designated as Critically Endangered (BirdLife, 2020).

2. Long-billed Vulture /Indian Vulture (*Gyps indicus*) (CR) R

Long-billed Vulture is less common resident near human habitations in Sindh. It was sighted in Tharparkar (Nagarparkar area) particularly in the Karoonjhar Hills and surrounding area. A small population of Longbilled Vulture currently survives in Tharparkar in Karoonjhar Hills and Nagarparkar. Rarely once from Khairpur District, Nara Desert Wildlife Sanctuary, Achro, Thar, Sanghar, Badin and rare visitor to the Khirthar Protected Area Complex. Habitat destruction, damage of nesting sites and use of Diclofenac drugs are the main threats to this Vulture.

3. Red-headed Vulture/King Vulture (*Sarcogyps fulvus*) (CR) WV

Scarce resident / winter visitor and recorded in Tharparkar District, Khirthar National Park (Ghalib *et al.*, 2016). Species is rare in its range of distribution in Sindh. During current study very few species were sighted in Mithi and Tharparkar district. Two species were sighted in KPAC. It is facing the threat of destruction of nesting sites and use of diclofenac drugs in domesticated animals. Due to severe decline in their global population, it meets the critically endangered category (IUCN, 2020).

4. Sociable Lapwing (*Vanellus gregarius*) (CR) WV

In the earlier studies Roberts (1991) and Grimmitt *et al.* (2008) observed that Sociable Lapwing is winter visitor mostly in its non-breeding plumage in Pakistan. The species is considered as undergone major and rapid decline in the end of the century due to loss of habitat and falls in the category of Globally Threatened (Critically Endangered) bird species (BirdLife, 2020). During the current study recorded from Qambar Shahdaktot, Larkana. It is very rare in Haleji Lake Wetland Complex, Badin, and occasionally at Karachi Coast.

5. Great Indian Bustard (*Ardeotis nigriceps*) (CR) V

Great Indian Bustard is very rare winter visitor in Sindh. During the current study it was sighted at Tharparkar Desert, Eastern Border region of Sanghar, Khairpur, Nara Desert Wildlife Sanctuary and Sukkur. It is very rare visitor and occasionally recorded in Sindh. Illegal hunting and habitat destruction its population is declining and falls in the critically endangered category (BirdLife, 2020).

6. Steppe Eagle (*Aquila nipalensis*) (EN) WV

Steppe Eagle is common winter visitor to desert plains and open scrub areas of Sindh. During the current study it was commonly observed in Karachi, Dhabiji, Haleji Lake, Keenjhar Lake (Chul-side Area), Jhimpir, Thatta, Hilly area of Gharo, Badin, Sujawal, Kirther Protected Area Complex (KPAC), Jamshoro, Hyderabad and Pie Forest areas.

7. Pallas's Fish-eagle (*Haliaeetus leucoryphus*) (EN) R

Pallas's Fish-eagle is resident to Pakistan and its population is severely declining (Roberts, 1991; Grimmett *et al.*, 2008). During the current study two species were recorded in Haleji Wetland Complex, Jamshoro and Kotri area. Destruction of habitat, cutting of riverine forest, degradation, disturbance of riverine tract and large wetlands directly impacts breeding sites all the way through its range. It qualifies as globally Endangered (BirdLife, 2020).

8. Egyptian Vulture (*Neophron percnopterus*) (EN) R

The most common and resident vulture species found in around human habitations, poultry farms rocky an open plain area, currently recorded in different areas of Sindh. Egyptian Vulture is quite common in Mithi area especially large flocks congregations occur in the Mithi Bypass. During the current study it was recorded from Coastal Area, in hilly area along National Highway, Mahal Kohistan Wildlife Sanctuary, Surjan Game Reserve (KPAC), Nagarparkar, Nara Desert Wildlife Sanctuary Khairpur.

9. White-headed Duck (*Oxyura leucocephala*) (EN) V

A decade ago this is common winter visitor to the wetlands of Sindh. During the current study, rarely recorded at Gharo Creek, Karachi Coast. There is no evidence from other wetlands of Sindh. Previously their distribution in Sindh was recorded. Currently due to degradation of major wetland leads to declining in population and falls in the endangered category (BirdLife, 2020).

10. Great Knot (*Calidris tenuirostris*) (EN) WV

Roberts (1991) and Grimmett *et al.* (2008) recorded that **Great Knot** is rare species and winter visitor to the intertidal zone in Pakistan. BirdLife (2020) reported that due to development of several degraded habitats and passage grounds it is endangered species. In the present study the occurrence were recorded along the Indus Delta (Badin, Keti Bunder, Gharo Creek and Korangi Creek, Port Qasim Area), nearby lakes, mudflats of Haleji wetland complex, Sujawal, Phusna Lake and Chotiari Reservoir Sanghar.

11. Black-bellied Tern (*Sterna acuticauda*) (EN) R

Black-bellied Tern is resident to the wetlands of Sanghar, Sindh. Worldwide this species is vanished in a large part of its range, but all over the Indian subcontinent recorded as common (Roberts, 1991; Grimmett *et al.*, 2008). Its population has decline due to disturbance of nesting sites and juvenile are susceptible to predators qualifying the species as globally Threatened (endangered) (BirdLife, 2020). In the present study one or two individuals were seen at study areas like Guddu, Sukkur, Kotri Barrages, Larkana, Nur-ri Lagoon, Rehri Creek, Korangi Creek, Phitti Creek, Gharo Creek, Malir River, Haleji Lake, Hadero Lake, Hub Dam, Keenjhar Lake, Keti Bunder, Shah Bunder, Badin and Sakar Tali near Nagar Parkar. In winter season large numbers were recorded near Gharo Creek and at Karachi Coast.

12. Lesser Florican (*Sypheotides indicus*) (EN) V

It is very rare and vagrant in Sindh. During the current study its occurrence was confirmed through secondary sources only at Nara Desert Wildlife Sanctuary Khairpur and two species were sighted at Tharparkar district. Habitat destruction and illegal hunting are the real reasons for decline in Sindh. Their population is declining and falls in the category of endangered species (BirdLife, 2020).

13. Imperial Eagle (*Aquila heliaca*) (VU) R

It is year-round resident to open plains and desert tracts areas of Sindh and Balochistan (Grimmett *et al.*, 2008). During the current study it was recorded at Gharo, Jhimpir (Jamshoro/Thatta), Sindh Kohistan, Sujawal, Badin, Mahal Kohistan Wildlife Sanctuary, Surjan Game Reserve, Sumbak Game

Reserve, Khar Center, Gorakh Hills, Dadu, Nara Desert Wildlife Sanctuary Khairpur. Habitat destruction leads to the declining in population.

14. Tawny Eagle (*Aquila rapax*) (VU) R

Tawny Eagle is Less common resident in Pakistan mostly preferring desert tracts and absent from high mountainous areas. It adapted to the irrigated and cultivated grounds and their surroundings in the deserts of Sindh. It is recorded Less Common in Karachi, Gadap, Northern Bypass, Haleji Wetland Complex, Gharo, Badin, Jhimpir, Hub Dam and Mahal Kohistan Wildlife Sanctuary, Surjan, Eri Game Reserves, Shaheed Benazirabad, Tando Muhammad Khan, Tando Allah Yar, Sanghar, Larkana and Dadu.

15. Greater Spotted Eagle (*Clanga clanga*) (VU) WV

The greater spotted Eagle is a common winter visitor to the surrounding area of large canals, River Indus, dams, barrages head ponds and large lakes. During the current study it is recorded in Kohistan area, Thatta, Rocky and hilly areas adjacent to National Highway, Haleji Lake, Hadero Lake, Manchar Lake, Dadu, Kirthar Protected Area Complex, Thaddo Dam, Nara Canal and Nara Desert Wildlife Sanctuary. Their population is declining due to habitat destruction and alteration of their breeding range wooded areas in Sindh.

16. Sarus Crane (*Antigone antigone*) (VU) V

Sarus Crane is resident and its breeding recorded in Pakistan by Roberts (1991). Its population has decline, due to lost habitat and dreadful conditions of wetlands as a result of anthropogenic activities as drainage, extensive cultivation, and use of pesticides, the hunting of adults and collection of eggs, chicks and trade for medicinal purposes. It qualifies as Vulnerable (BirdLife, 2020). Five pairs were seen at Abasar Talab near Nagarparkar town and three individuals were seen at Saanga Talab near Veera Wah. A breeding pair was seen at Bando Goth Talab near Nagarparkar and few breeding pairs were observed at Bhansar Talab near Nagarparkar. This is a passage migrant to Sindh. Due to destruction of habitats and pressure of hunter/poachers it is very scarcely land at different Talabs of Tharparkar.

17. Asian Houbara (*Chlamydotis macqueenii*) (VU) WV

Houbara Bustard is declining in their range of distribution due to overhunting. The practice of hunting of Houbara is become as a sport today and intensively pursued by hundreds of people, including members of ruling families in many Gulf States as well as North Africa, Pakistan and Central Asia (Goriup, 1997). During the current study it is recorded Kohistan area, Thatta, Jhimpir, Badin, Sujawal, Shaheed Benazirabad (Nawabshah), Nara Desert Wildlife Sanctuary, Sukkur, Ghotki and Tharparkar.

18. Jerdon's Babbler (*Chrysomma altiloistre*) (VU) R

Jerdon's Babbler is sedentary in Pakistan and it inhabits in areas of tall grassland, comprising *Phragmites karka* reedbeds and *Saccharum benghalense*, (*Saccharum munja*) reed grass in riverine tracts, floodplains subject to annual monsoon flooding (Robert 1992). Showler and Davidson, (1999) identified habitats three core areas of distribution of Jerdon's Babbler as North-east Sindh, North-central Sindh, Southern-west Punjab and southern Khyber Pakhtunkhwa and recorded from Pakistan. During the current study it is observed South-east Sindh in the Nara Canal, Nara Wetland Complex area, Chotiari Wetland Complex Sanghar and Tharparkar districts. In Northern and central Sindh also recorded from Shikarpur, Sukkur, Larkana, Khairpur, Shaheed Benazirabad, Dadu and Mirpurkhas. It was also seen near Sukkur city and in the town of Shaheed Benazirabad. It was recently recorded from the Rohri canal in south of District Khairpur. Rare Resident at Haleji Lake, Keenjhar Lake and Hub Dam.

19. Common Pochard (*Aythya ferina*) (VU) WV

Common Pochard was very common visitor to the wetlands of Sindh. During the current study it was recorded as rare winter visitor to Karachi Coast, Bundal Island, Haleji Lake, wetlands (Dhands) of Sujawal, Mahrano Wildlife Sanctuary Khairpur, Tando Muhammad Khan, Hammal Lake, Lung Lake and Nara Desert Wildlife Sanctuary. Due to habitat destruction, potential wetlands as a result of extensive anthropogenic activities cause negative effects on their population and distribution in Sindh. Illegal hunting and poaching activities are nowadays major threats to Common Pochard.

20. Marbled Teal (*Marmaronetta angustirostris*) (VU) WV

Marbled Teal is resident species in Sindh, Balochistan and Punjab provinces of Pakistan (Roberts, 1991; Grimmett *et al.*, 1998; Grimmett *et al.*, 2008). Chahudry *et al.* (2019) have studied historic and current distribution data regarding the species and recorded at Mirpur Sakro, Haleji Lake, Lung Lake, Hammal Lake, Drigh Lake, Manchar Lake and Dangewari Lake in district Khairpur.

In the current study its occurrence was very rare and occasionally recorded from Mirpur Sakro, Haleji Lake, Lung Lake, Drigh Lake, Mehboob Shah Lake, Zero point, Sahahdad Kot and Hub Dam Wildlife Sanctuary. It was seen at Nara Desert Wetland Complex, few individuals at Hammal Lake, small seepage lakes of Shaheed Benazirabad and Chotiari Dam of Sanghar district. Population and distribution is declining in Sindh due to chemical and physical alteration of wetland as a result of anthropogenic activities, extensive habitat destruction and illegal hunting/poaching are main threats and qualifies as Vulnerable (BirdLife, 2020).

21. Yellow-eyed Pigeon (*Columba eversmanni*) (VU) V

Currently not recorded in the upper Sindh few individuals were observed in Sindh Kohistan and only once recorded in Konkar Gadap area during the current study. It is vagrant to Sindh. Illegal hunting and lack of awareness are the main causes of declining of this pigeon.

22. Indian Skimmer (*Rynchops albigollis*) (VU) SBV

The species is named due to its specialized feeding mechanism. The upper mandible is shorter than the lower one. The bird usually flies low over water, open the bill and lower mandible skimming through water. In recent study its occurrence is recorded at the edges, sandy beds of Indus River at Sukkur, Larkana, Lung Lake, Dadu, Manchar Lake, Shaheed Benazirabad, Mitiari forest area, Hyderabad and Jamshoro. It was also seen adjacent to lakes Hub Dam, Haleji Wetland Complex, Ghara Creek, Korangi Creek, Hadero Lake, Hammal Lake in non-breeding season. Destruction of functional nests and potential nesting sites due to erosion and other anthropogenic activities are the reasons of declining of the species and qualifies as Vulnerable (BirdLife, 2020).

23. Cinereous Vulture (*Aegyptius monachus*) (NT) R

Cinereous vulture is found in grasslands, mountains, semi-deserts, and occasional at coastal areas. It is common winter visitor to the lower Sindh Ghara near National Highway and parts of Khirthar National Park. The Cinereous Vulture was recorded in Diplo (Ghalib *et al.*, 2013). During the current study was recorded as scarcely winter visitor in Badin, Ghara, Ghotki Districts, near Haleji Lake, Tharparkar, Sukkur, Karachi Coast Khirthar National Park, Dadu, Nagarparkar, Mithi Bypass, Nara Desert Wildlife Sanctuary. Due to use of ban Diclofenac drugs in livestock and poultry is a major cause of declining and qualifying as near threatened (BirdLife, 2020).

24. Pallid Harrier (*Circus macrourus*) (NT) WV

It was found in open country, plains and foothills. Pallid Harrier is common winter visitor in Sindh. During the current study it was recorded from Hub Dam, Haleji Wetland Complex, Nagarparkar, Manchar Lake, Wahi Pandi, Dadu, Khirthar Protected Area Complex.

25. Bearded Vulture (*Gypaetus barbatus*) (NT) WV

Bearded Vulture is mostly found in mountainous areas as winter visitor in Sindh. In current study recorded in Khirthar Prtoected Area Complex (Bhal area and Marri Mungthar Hills), Jamshoro, Mithi and Nagarparkar areas. Due to use of Diclofenac Acids based drugs in the livestock is still one of the major reasons of declining and other threat includes destruction of nesting sites and habitat destruction. Due to drastic decline in their population globally qualifies as near threatened (BirdLife, 2020).

26. Red-headed Falcon (*Falco chicquera*) (NT) R

Red-headed Falcon is rare resident to open ground filed areas. Currently recorded in Hub Dam, Karachi Coast, Thatta, Khirthar Protected Area Complex, Larkana, Nara Desert Wildlife Sanctuary, Nara Desert Wetland Complex. Falconry trading in local market is a threat to this falcon. Illegal trapping is the reason of declining of its population.

27. Laggar Falcon (*Falco jugger*) (NT) R

Laggar Falcon is usually found in open plains area in Sindh. In current study it was seen at Hub Dam, Khirthar Protected Area Complex at (Mahal Kohistan Wildlife Sanctuary, Surjan Game Reserve, Sumbak Game Reserve and Eri Game Reserve), Ghara, Karachi Coast, Haleji Lake, Thatta, Badin, Dadu, Nara Desert Wildlife Sanctuary. Nesting was observed at Karonjhar Hills. During each winter

season trappers are emerges to illegally trap this bird in large quantity for falconry and trade. This is the main cause of globally declining and qualifies as near threatened (BirdLife, 2020).

28. Ferruginous Duck (*Aythya nyroca*) (NT) WV

This species is a winter visitor, common passage migrant and uneven year round visitor in Pakistan (Roberts 1991; Grimmett *et al.*, 2008). During the current study the duck was observed at Haleji Lake Wildlife Sanctuary, Keenjhar Lake, Hawkesbay , Hub Dam, Nar-ri Lagoon, Abdul-Shah Dhandh, Phousna Lake and Ranpur Dam, Dangewari Lake, Gadhro Pithapur, Kathor, Hamal Lake, and Langh Lake. It qualifies as Near Threatened and its population has been decline by the degradation and destruction wetland habitats and illegal hunting (BirdLife, 2020).

29. River Tern (*Sterna aurantia*) (NT) R

River Tern prefers the River beds sandy habitats. During the current study it was recorded from Karachi Coast, Korangi Creek, Phitti Creek, Gharo Creek, Malir River, Sujawal, Keti Bunder, Shah Bunder, Badin, Keenjhar Lake, Hammal Lake, Indus River, near Sukkur Barrage, Nara Canal, Rohri Canal, Pulleli Canal, Karachi Wah, and River Indus near Jamshoro. Erosion of functional nests, damage of eggs and habitat destruction are the main causes of declining of the species and qualifies as near threatened (BirdLife, 2020).

30. Great Thick-knee (*Esacus recurvirostris*) (NT) R

This is very common winter visitor to the wetlands and coast of Sindh. During the current study observed at Indus Delta, Keti Bunder, Shah Bunder, Korangi Creek, Port Qasim area, Gharo Creek, Khaikuddi Creek, Bundal Island, Karachi Western Backwater and Haleji Wetland Complex. Alterations of coastal water quality due to anthropogenic activities are declining their population in its potential range of distribution.

31. Northern Lapwing (*Vanellus vanellus*) (NT) WV

This is Less common to Sindh and common in Punjab. During the current study very few individuals were recorded from Badin wetlands grassy beds, around lagoons of Sujawal and Gharo Creek. Due to destruction of grassy beds near major wetland of Sindh now it is occasionally seen at their distribution range. Due to globally decline in population qualifies as near threatened (BirdLife, 2020).

32. Eurasian Oystercatcher (*Haematopus ostralegus*) (NT) WV

Eurasian Oystercatcher is very frequent winter visitor to the Coastal areas of Sindh and found at both muddy coast and sandy beaches. Mostly found at Indus Delta, Keti Bunder, Gharo Creek, Korangi Creek, Phitti Creek, Sea view, Clifton, Sandspit and Western Backwater mangrove area. It is also recorded from lagoons and peat lands in surroundings of Haleji Wetland Complex and wetland of Sujawal and Badin Districts.

33. Bar-tailed Godwit (*Limosa lapponica*) (NT) WV

They congregate in flocks at coastal areas of Sindh as winter visitors and feeding during the day they disperse in small groups or individually at their feeding grounds. Bar-tailed godwits forage by probing in mangrove mudflats, coastal and seepage marshes using their long sensitive bills mainly feeds on mollusks, insects, crustaceans and sometimes seeds of aquatic plants. In the current study their distribution is recorded at Karachi Coast, Western Back Waters, Sandspit, Manora, DHA Karachi, Sea View, Korangi Creek, Phitti Creek, Port Qasim, Gharo Creek, Keti Bunder, Badin, Indus Delta, Haleji Wetland Complex and marshes of Nara Desert Wetland Complex.

34. Black-tailed Godwit (*Limosa limosa*) (NT) WV

This species is highly gregarious winter visitor in Pakistan mainly confined in Sindh at large inland wetlands (Roberts, 1991; Grimmett *et al.*, 2008). During the current study individuals were seen at various selected sites i.e. Cape Monze, Korangi Creek, Hawkesbay, Rehri Creek, Port Qasim Area, Gharo Creek, Jubbho Lagoon, Keenjhar Lake, Nara Desert Wetland Complex, Narrari Lagoon, Phousna Lake, Ranpur Dam and Veerawah Lake. Its population is declining rapidly in its range of distribution as result of unsettled to changes in agricultural practices and other anthropogenic activities and qualifies as Near Threatened (BirdLife, 2020).

35. Eurasian Curlew (*Numenius arquata*) (NT) WV

This species is common winter visitor, passage migrant and irregular year round visitor in Pakistan (Roberts 1991; Grimmett *et al.*, 2008; Hassan and Ahmad, 2006). In the present study large flocks were

seen at different selected sites i.e. Eastern Karachi Coast Cape Monze, Hawkesbay, Western Karachi Coast, Rehri Creek, Ibrahim Haydri, Bundal Island, Korangi Creek and Port Qasim Area and sparsely distributed less numbers were observed at Keenjhar Lake, Keti Bunder, Shah Bunder, Nur-ri Lagoon, Jubbho Lagoon, Hub Dam, Veerawah Lake and Shahdad Kot Zero point area. Their population is declined in its potential distribution sites at local and a moderately rapid decline at global level qualifies it as Near Threatened (BirdLife, 2020).

36. Curlew Sandpiper (*Calidris ferruginea*) (NT) WV

Curlew Sandpiper is occurs at wetlands mainly along the Sindh Coast most of the tidal link estuaries and sheltered shores near the mangrove mudflats are favorable sites for wintering (Ghalib *et al.*, 2013). Very common winter visitors to Indus Delta, Keti Bunder, Sujawal, Sir Creek, Rann of Kutch Wildlife Sanctuary, Badin, Gharo Creek, Port Qasim area, Korangi Creek, Bundal Island Karachi Coast. It was also seen at Haleji Wetland Complex and inland wetlands and fish farms characterized by muddy edges.

37. Long-billed Grasshopper-warbler (*Locustella major*) (NT) V

Long-billed Grass Warbler is vagrant, occasionally found and scarcely distributed in Sindh. During the current study Long-billed Grasshopper warbler was recorded during the monsoon season from surroundings of Hub Dam, Haleji Lake, Keenjhar Lake, Unarpur Forest, Mitiari Forest, Lung Lake, Tando Allah Yar, Tando Adam, Shaheed Benazirabad and Nara Desert Wildlife Sanctuary.

38. Dalmatian Pelican (*Pelecanus crispus*) (NT) WV

This species is common passage migrant, winter visitor, and irregular year round visitor in Pakistan (Roberts, 1991; Grimmett *et al.*, 2008; Ghalib *et al.*, 2017). Its population has been decreased due to habitat loss, disturbance, industrial pollution, illegal hunting/poaching and collision with high power-lines and coastal wind turbines. It falls in the category of Near Threatened (BirdLife, 2020). During the current study species were observed at few selected sites i.e. Nur-ri Lagoon, Phoosna, Jubbho Lagoon, Nar-ri Lagoon, Sankar Tali near Nagarparkar, Gharo Creek, Port Qasim, Korangi Creek and Hawkesbay.

39. Black-headed Ibis (*Threskiornis melanocephalus*) (NT) R

This species is year-round resident common passage migrant and irregular year round visitor to Pakistan (Roberts, 1991; Grimmett *et al.*, 2008; Ghalib *et al.*, 2002). It faces threats like illegal hunting and disturbance of breeding colonies conversion/diversions of drainage and alteration of foraging habitats into agriculture fields. Its population is declining and falls in the category of globally Near Threatened (BirdLife, 2020). Its distribution is mostly confined to Lower Sindh mostly on tidal creeks along the coast and mangrove area but few individuals were also seen at Veerawah Lake in district Tharparkar. In the current study individuals were recorded from different sites Korangi Creek, Phitti Creek, Gharo Creek, Keti Bunder, Shah Bunder, Haleji Wetland Complex, Nur-ri Lagoon.

40. Painted Stork (*Mycteria leucocephala*) (NT) R

Painted Stork is resident and common winter visitor in Pakistan (Roberts, 1991; Grimmett *et al.*, 2008). There population is severely declined in the past five years due to illegal hunting, drainage of polluted agricultural, domestic and industrial effluents and scarcity of food therefore qualifies as Near Threatened (BirdLife, 2020). Their distribution is limited in Sindh and confined to very limited sites. During the current study Painted Stork was seen at Indus Delta, Keti Bunder, Gharo Creek, Port Qasim Area, Korangi Creek and Phitti Creek near coastal tidal link and mangrove forest.

41. Lesser Flamingo (*Phoeniconaias minor*) (NT) WV

This species is resident and breeding recorded in district Badin and Karachi coast in Pakistan (Roberts, 1991; Grimmett *et al.*, 2008; Khan *et al.*, 2014). Currently breeding was recorded at mud-flats near Port Qasim area. Their population appears to be undergoing in rapid decrease due to destruction of breeding sites, aquatic pollution/industrial effluents and poaching and falls in the category of globally Near Threatened because (BirdLife, 2020). During the current study individuals were recorded at Karachi Coast, Gharo Creek, Ghizri Creek, Western Backwaters Mangroves area, Haleji Lake, Badin, Nar-ri Lagoon and at different water bodies of Nagarparkar area.

42. Oriental Darter (*Anhinga melanogaster*) (NT) R

Oriental Darter is resident species to Pakistan (Roberts, 1991; Grimmett *et al.*, 2008). In winter seasons visits in large numbers to wetlands of Sindh. During the current study in winter season recorded from

Keenjhar Lake, Haleji Lake Wildlife Sanctuary, Nur-ri Lagoon, Jubho Lagoon, phonsa Lake, Coastal areas of Keti Bunder, Shah Bunder and Karachi. Found very few in the summer at the above waterbodies. Fig. (3-17) showed photograph of some Threatened and Near Threatened birds species recorded from Sindh, Pakistan.
















		
Fig 3. <i>Haematopus ostralegus</i> (Eurasian Oystercatcher)	Fig 4. <i>Mycteria leucocephala</i> (Painted Stork)	Fig 5. <i>Falco jugger</i> (Lagger Falcon)
		
Fig 6. <i>Circus macrourus</i> (Pallid harrier)	Fig 7. <i>Sarcogyps calvus</i> (Red headed Vulture)	Fig 8. <i>Aquila nipalensis</i> (Steppe Eagle)
		
Fig 9. <i>Aquila rapax</i> (Tawny Eagle)	Fig 10. <i>Gyps bengalensis</i> (White-rumped Vulture)	Fig 11. <i>Aegypius monachus</i> (Cinereous Vulture)
		
Fig 12. <i>Pelecanus crispus</i> (Dalmatian Pelicans)	Fig 13. <i>Aquila heliaca</i> (Eastern Imperial Eagle)	Fig 14. <i>Neophron percnopterus</i> (Egyptian Vulture)
		
Fig 15. <i>Numenius arquata</i> (Eurasian Curlew)	Fig 16. <i>Phoenicopterus roseus</i> (Greater Flamingos)	Fig 17. <i>Gyps fulvus</i> (Griffon Vulture)

Fig. 3-17. Some photograph of species recorded from Sindh, Pakistan.

DISCUSSION

Comparison of the present study with the previous on threatened and Near Threatened Species of Birds in Sindh

Ghalib *et al.* (2019) have recorded 13 birds of prey as Threatened and Near Threatened from Sindh which include 03 Critically Endangered (CR) Indian White-backed Vulture (*Gyps bengalensis*), Long-billed or Indian Vulture (*Gyps indicus*), Redheaded or King Vulture (*Sarcogyps calvus*), 03 Endangered (EN) Egyptian Vulture, (*Neophron percnopterus*), Pallas's Fishing Eagle (*Haliaeetus leucoryphus*), Steppe Eagle (*Aquila nipalensis*), 02 Vulnerable (VU) Imperial Eagle (*Aquila heliaca*), Greater Spotted Eagle (*Aquila clanga*) 05 Near Threatened (NT) Pale or Pallid Harrier (*Circus macrourus*), Cinereous Vulture (*Aegypius monachus*), Bearded Vulture (*Gypaetus barbatus*), Laggar Falcon (*Falco jugger*) and Red-necked Falcon (*Falco chicquera*). During the current observations we recorded 14 birds of prey as Threatened and Near Threatened from Sindh which include Tawny Eagle (*Aquila rapax*) as Vulnerable.

Ghalib *et al.* (2018) have recorded 18 Threatened and 18 Near Threatened species of birds in Sindh. During the current study 22 Threatened and 19 Near Threatened species of birds recorded in Sindh. It shows that the numbers of Threatened and Near Threatened birds are increasing with time due to anthropogenic activities and misbalancing of the natural ecosystem.

Iqbal *et al.* (2018) have recorded two Threatened and one Near Threatened birds as Egyptian Vulture (Endangered), Imperial Eagle (Vulnerable) and Laggar Falcon (Near Threatened) from Mahal Kohistan Wildlife Sanctuary (KPAC).

Iqbal *et al.* (2023) recorded 54 species of birds in Surjan and Sumbak Game Reserves in KPAC which includes one Threatened species Egyptian Vulture (*Neophron percnopterus*) EN and three near Threatened species Eastern Imperial Eagle (*Aquila heliaca*) VU, Tawny Eagle (*Aquila rapax*) VU and Laggar Falcon (*Falco jugger*) NT.

Jabeen *et al.* (2014) have also recorded Threatened Common Pochard and Near Threatened Black-tailed Godwit, Bar-tailed Godwit, Dalmatian Pelican, Eurasian Oystercatcher, Eurasian Curlew, Gull-billed Tern and River Tern from the Western back water mangrove forest at Karachi. In the current study Lesser Flamingo is also recorded from this area.

Chaudhry *et al.* (2012) have reported sixteen species of birds have been recorded as Threatened and Near Threatened in Pakistan which include 07 Threatened Sociable Lapwing (*Vanellus vanellus*) (CR), White-headed Duck (*Oxyura leucocephala*) (EN), Pallas's Fish Eagle (*Haliaeetus leucoryphus*) (VU), Sarus Crane (*Grus antigone*) (VU), Great Knot (*Calidris tenuirostris*) (VU), Dalmatian Pelican (*Pelecanus crispus*) (VU), Marbled Duck (*Marmaronetta angustirostris*) (VU), 09 Near Threatened (NT) species include Black-bellied Tern (*Sterna acuticauda*) (NT), Black-tailed Godwit (*Limosa limosa*), Black-headed Ibis (*Threskiornis melanocephala*), Black-necked Stork (*Ephippiorhynchus asiaticus*), Eurasian Curlew (*Numenius arquata*), Ferruginous Duck (*Aythya nyroca*), Lesser Flamingo (*Phoenicopterus minor*), Oriental Darter (*Anhinga melanogaster*) and Painted Stork (*Mycteria leucocephala*). All of these species were recorded as Threatened/ Near Threatened from Sind during the current study.

Vultures Status in Sindh

Eight species of vultures are recorded in Pakistan (Roberts 1991; Grimmett *et al.*, 2008; Ahmad, 2013 and Ghalib *et al.*, 2016, 2019). Seven species of vultures recorded in Sindh (Ghalib *et al.*, 2016). Three species White-rumped vulture (*Gyps benghalensis*), Indian/Long-billed vulture (*Gyps indicus*), Red-headed vulture (*Sarcogyps calvus*) are Critically Endangered, one species Egyptian vulture (*Neophron percnopterus*) is Endangered, two species Cinereous Vulture (*Aegypius monachus*) and Lammergeier / Bearded vulture (*Gypaetus barbatus*) are Near-threatened (IUCN, 2020). Of them two species of Gyps vultures White-rumped vulture (*Gyps benghalensis*) and Indian/Long-billed vulture (*G. indicus*) are also endemic to South and Southeast Asia.

Five Eagles species were recorded as Threatened found in the current study in Sindh viz. Steppe Eagle (*Aquila nipalensis*), Pallas's Fish Eagle (*Haliaeetus nipalensis*) as Endangered, Imperial Eagle (*Aquila heliaca*), Tawny Eagle (*Aquila rapax*) and Greater Spotted Eagle (*Clanga clanga*) as Vulnerable.

Threats to the Birds and Ecosystem

The major threats to the biodiversity in the Province are poaching, pollution, habitat degradation and lack of management in the PAs. However, the general threats to the species, ecosystems and the environment have been outlined below:

1) Hunting

Illegal hunting is major threat to most of the threatened birds mostly unregulated hunting activities in the wild habitat especially in the premises of Protected Areas. Such as hunting of Bustard species especially Asian Houbara (*Chalmydotis macqueenii*) is declining due to hunting.

2) Trapping and Poaching

Trapping and poaching is also a threat to the threatened birds species especially to Falcons for falconry. Poaching Ducks is also observed in different areas of Sindh during the migratory season.

3) Habitat loss to developmental activities

Destruction of habitats due urbanization and industrial developments are also a source of the decline of the birds species.

4) Habitat degradation

Destruction of habitats Lakes and water bodies alters the distribution of dependent aquatic waterbirds. Habitat degradation disturb the balance in the ecosystem at local as well as at global level which cause missing species in food chain/web leads to decline in species.

5) Birds Strikes

Birds strike in Wind Farms are very common, mostly Birds of Prey are at high risk to the blades rotating Wind Turbines. There is a need to monitor the mortality rate of birds due to strikes.

6) Deforestation

Cutting of forest due to development activities, agriculture, industrialization and for wood changes in the ecosystem. Cutting of mangrove causing change in the coastal mudflats ecosystem. Cutting riverine forest is threat to restrict range wildlife species.

7) Pollution

Coastal area of Karachi is facing a big problem of Coastal aquatic pollution. Proper Effluent Treatment Plants at Layari River and Malir River are very essential to decrease the load of pollution on the coastal ecosystem.

8) Firewood collection

Aggressive cutting of natural vegetation is reported in some protected areas viz. Nara Desert Wildlife Sanctuary Nara Wetland Complex, Coastal Mangroves at Karachi and Indus Delta region. This is also cause of decreasing the productivity of ecosystem.

9) Drought

Change in the rain fall pattern due to Climate Change cause droughts and sometime increase in rainfall causing floods in the areas. This sudden change also impacts the distribution of birds species.

10) Sea water intrusion in the coastal areas

Coastal erosion and sea intrusion is also recorded in the lower Indus Delta in different areas of Thatta, Sujawal and Badin Districts. Most of the agricultural land at the coastal area is susceptible to coastal erosion.

11) Human population pressure particularly in the PAs

Increase in human populations causing increase in construction and agricultural practices which damaging the ecological balance of the ecosystem.

12) Lack of freshwater flows/ water scarcity

Decrease in the flow of freshwater to the Indus Delta is also a threat to the Deltas ecosystem. Mangroves growth is dependent on the flow of freshwater. Some areas in Sindh is facing the scarcity of water for livelihood.

Recommendations

1. Promote education and rising public awareness related activities regarding Threatened species conservation.
2. Special arrangements to conserve and manage coastal ecosystems including installation of sewage treatment plants on Layari River and Malir River to minimize the risk to coastal habitats.

3. Management of the degraded wetland sites such as Hadero Lake, Manchar Lake.
4. Special studies on Houbara Bustard, Vultures, Eagles, Pelican, Common pochard and Sandpipers.
5. Management of fisheries activities at wetlands of Sindh.
6. Regular conduction of Annual Waterbirds Census (AWC) on the important wetlands of the province particularly on the Ramsar Sites.
7. Development of Management plans for the Protected Areas and the Ramsar sites of Sindh.
8. Mitigation of the impact of different developmental activities on Threatened and Near Threatened birds species.
9. Capacity building and Training of the Sindh Wildlife Department, personnels and local communities.
10. Control on hunting, and Falcon trapping and illicit trade of Threatened birds in the province.
11. Special measures should be taken for Karachi Coastal protection and restoration of polluted sites and degraded mangrove forest.
12. Conservation of Indus Delta and plantations of Mangroves.

Efforts made by Sindh Wildlife Department

Most of the threatened birds species are protected under the Sindh Wildlife Protection Ordinance, 1972 includes all Cranes, Hawaks, Eagles, Vultures, Kites, Buzzards, Flamingos, Pelicans, Storks, Ibises, Spoonbills, Kestrel, Hobbies, Partridges, Peafowls, Bustards, Houbara Bustard, Owls, all members of Genus Anser, Marbled Teal, Common Teal, Ruddy Shelduck, Common Shelduck, Swans, Large painted Sandgrouse, White Headed Duck and Rosy Pastor (SWD, 2008).

Formulation and implementation of a Research Plan to determine the current status of the birds species of special conservation interest including Falcons, Marbled Teal, Common Pochard, Houbara Bustard, Indian Vulture, White-backed Vulture, Indian Peafowl.

Action by the Wildlife Department should encourage captive breeding of commercially important wildlife species particularly Demoiselle Crane, Indian Peafowl, Red Munia, Roseringed Parakeet, Houbara Bustard, Partridges, along with exotic species such as Budgerigars, Java Sparrow, Cockatiels, Lovebirds, Cuckatoos and Pheasants.

Making efforts to restore Lugh lake Wildlife Sanctuary restoration, through providing food continuously to the birds for retrogression.

Restoration of inlets to Haleji Lake Wildlife Sanctuary makes the water quality better and attraction for migratory has been recorded in recent days.

Customs officials seized 75 Falcons and a Houbara Bustard at Karachi Port in anti-smuggling operation.

Sindh Wildlife officials released thousands of Spiny-tailed Lizards to their natural habitat and took legal action against the poachers. Raptors usually feed on these lizards.

Wildlife officials searching birds markets and surroundings of important wetlands and released the trapped birds and legal action has been taken against the trappers.

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