Canadian Journal of Pure and Applied Sciences
Vol. 19, No. 1, 2, 3, pp. 5903-5916, Feb, June, Oct 2025
Online ISSN: 1920-3853; Print ISSN: 1715-9997
Available online at www.cjpas.org

DISTRIBUTION, SPECIES DIVERSITY AND CONSERVATION STATUS OF COASTAL BIRDS IN BALOCHISTAN AND SINDH: A REVIEW

*Ubaid Ullah[1], Saima Siddiqui[2], Ghazala Yasmeen[1], Iqbal Saeed Khan[1], M Asif Iqbal[1], Uzma Manzoor[1], Amtyaz Safi[1], Naseem Samreen[1], Uzma Imdad[1], Fozia Tabbassum[1], Sehrish Khan[1] and Tahira A Lateef[1]
[1]Department of Zoology, University of Karachi, Karachi-75270
[2]Department of Zoology, Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan

ABSTRACT

The coastal belt of Pakistan supports diverse bird communities across its wetlands, mangroves, tidal creeks, mudflats, beaches, rocky shores, lagoons, estuaries, and nearshore marine habitats. However, information on the coastal birds of Sindh and Balochistan remains scattered across various sources. This review compiles available records to assess bird diversity, distribution, habitat associations, and conservation status along both provincial coasts. Major sites—including the Indus Delta, Karachi's beaches, mangroves, and creeks, as well as Hingol National Park, Astola Island, Miani Hor, Sonmiani Bay, Jiwani, Gwadar, Ormara, and Pasni—were evaluated. A total of 200 bird species belonging to 17 orders and 54 families were documented. Among these, 144 species (72.0%) were shared by both provinces, while 30 (15.0%) occurred exclusively in Balochistan and 26 (13.0%) only in Sindh. Overall, 174 species were recorded in Balochistan and 170 in Sindh. The review identified 26 species of conservation concern, including 6 Endangered, 7 Vulnerable, and 13 Near Threatened species under the IUCN (2024) categories. The high proportion of shared species highlights the ecological connectivity between the two coasts and underscores the need for coordinated conservation efforts. Protecting interconnected mangroves, mudflats, lagoons, tidal creeks, beaches, and shallow coastal waters is essential for sustaining Pakistan's coastal avifauna.

Keywords: Sindh, Balochistan, migratory birds, mangroves, Indus Delta.

INTRODUCTION

The coastline of Pakistan extends 1,050 km (650 mi), 250 km falling in Sindh province and 800 km in Balochistan (Kazmi, 2013). Pakistan's coastline extends across the provinces of Sindh and Balochistan and encompasses a wide range of coastal and marine ecosystems. These environments include mangrove forests, tidal creeks, lagoons, mudflats, sandy beaches, rocky shores, estuaries, intertidal areas, and nearshore marine waters. The ecological diversity of these habitats provides important feeding, breeding, nesting, and refuge areas for resident and migratory birds, marine fauna, and other coastal organisms. The major biodiversity sites of Sindh and Balochistan are described below.

Coastal Biodiversity of Balochistan

The Balochistan coastline presents a contrasting but equally diverse landscape, where extensive arid terrain meets the Arabian Sea. Important coastal and marine biodiversity areas include Hingol National Park, Astola Island Marine Protected Area, Miani Hor, Sonmiani Bay, Ormara, Pasni, Gwadar Bay, Jiwani Coastal Wetland, Churna Island, Kund Malir, Buzi Pass, Damb, Gadani, Daran, and Pishukan. These sites encompass rocky coastlines, sandy beaches, tidal flats, mangrove wetlands, estuarine environments, lagoons, intertidal habitats, reef-associated areas, and offshore marine ecosystems. Hingol National Park is particularly distinctive because its coastal environment is associated with the Hingol River, rocky terrain, sandy beaches, estuarine areas, and adjoining arid landscapes, creating a transition zone between terrestrial, freshwater, and marine ecosystems. Astola Island Marine Protected Area (MPA), the country's largest offshore island, contains rocky shores, sandy beaches, and surrounding marine waters that provide habitat for seabirds and marine species, including sea turtles.

The wetland complexes of Miani Hor and Sonmiani Bay are characterized by mangroves, tidal channels, mudflats, and shallow coastal waters. These habitats provide productive nursery and feeding areas for fish and invertebrates and offer important resources for coastal and migratory birds.

*Corresponding author e-mail: ubaidzwf@gmail.com

The coast around Ormara and Pasni contains extensive sandy and rocky intertidal environments connected to productive nearshore waters, while Gwadar Bay includes a mixture of sandy shores, rocky habitats, tidal areas, and shallow marine environments. The Jiwani Coastal Wetland is particularly important for its mangrove vegetation, tidal channels, mudflats, and associated bird habitats. In contrast, Churna Island and surrounding rocky marine environments provide hard substrates that support reef-associated organisms and contribute to nearshore marine diversity.

Other locations, including Kund Malir, Buzi Pass, Damb, Gadani, Daran, and Pishukan, contain combinations of sandy beaches, rocky shores, intertidal habitats, and nearshore waters that support a variety of coastal organisms.

Coastal Biodiversity of Sindh

The Sindh coast contains numerous wetlands and coastal habitats of considerable ecological importance. Major sites include Badin, Bundal Island, Buddo Island, Buleji, Cape Monze, Clifton Beach, Dhabiji, DHA Karachi, Gharo Creek, Ghizri Creek, Hawksbay, Hub River, the Indus Delta, Jubho Lagoon, Karachi Coast, Karachi Mangrove Forest, Karachi Urban Forest, Keti Bunder North, Keti Bunder South, Korangi Creek, Malir River area, Manora, Nurri Lagoon, Phitti Creek, Port Qasim area, Rehri Creek, Sandspit, Seaview, Shah Bunder, Sujawal, and the Western Backwater Mangrove Area of Karachi. Collectively, these locations encompass mangrove wetlands, tidal creeks, coastal lagoons, mudflats, sandy and rocky beaches, riverine environments, and intertidal habitats.

The Indus Delta and associated creek systems provide extensive wetland environments that serve as important feeding and resting grounds for waterbirds and migratory species. Mangrove-dominated areas such as the Karachi Mangrove Forest, Rehri Creek, Korangi Creek, Gharo Creek, and the Western Backwater provide sheltered conditions for fish, crustaceans, mollusks, and other organisms while also supporting diverse bird communities (Khan *et al*., 2018; Iqbal *et al*., 2023). Sandy and intertidal habitats along Hawksbay, Sandspit, Clifton, Seaview, Buleji, and Cape Monze further contribute to coastal biodiversity by providing feeding and nesting environments for a range of marine and terrestrial species. The combination of deltaic wetlands, mangroves, creeks, beaches, and intertidal zones makes the Sindh coastline an important ecological region for both resident birds and seasonal migrants.

Overall Ecological Significance

The coastal biodiversity of Sindh and Balochistan represents a mosaic of interconnected habitats rather than isolated ecological units. Sindh is particularly characterized by its extensive Indus Delta, mangrove forests, tidal creeks, lagoons, and coastal wetlands, whereas Balochistan is distinguished by its rocky shores, sandy beaches, offshore islands, estuarine wetlands, mangrove systems, and Important Bird and Biodiversity Areas (IBAs) (Table 1). Together, these ecosystems provide essential ecological functions, including shoreline stabilization, nutrient cycling, carbon storage, nursery habitat for marine organisms, and feeding and breeding grounds for birds and other wildlife. The diversity of habitats along both provincial coastlines makes the coastal belt of Pakistan a significant region for biodiversity conservation and provides an important foundation for ecological, marine, and ornithological research.

Desk Study/Literature Search

Pakistan's coastal belt, particularly the Makran coast of Balochistan and the Sindh coast, provides a range of habitats that are important for both resident and migratory birds. These habitats include mangrove forests, tidal creeks, mudflats, coastal wetlands, islands, and shallow marine areas. Because of their availability of food and suitable resting and roosting sites, coastal areas serve as important habitats for many waterbirds and other bird groups. Early work by Khanum and Ahmed (1988) documented resident and migratory birds along the Karachi coast, while Ahmad *et al*. (1992) provided information on waterfowl occurring along the Makran coast. These early studies established the importance of Pakistan's coastal areas for bird populations and provided a foundation for subsequent research.

Table 1. Species Richness, Conservation Designations, and Key Features of Major Coastal Bird Sites in Sindh and Balochistan.

Site	Province	Habitat Type	Species Richness	Key Bird Groups	Conservation Status	Key Threats/Notes
Indus Delta / Keti Bunder	Sindh	Delta, Mangroves, Creeks	68	Waterbirds, Waders, Raptors, Storks	Ramsar Site, Wildlife Sanctuary	Decline from >50,000 migrants. Land reclamation
Nurri-ri Lagoon	Sindh	Brackish Lagoon, Mudflats	Not specified	Waterbirds, Shorebirds	Ramsar Site	Shallow, barren mudflats
Jubho/Kur	Sindh	Brackish Lagoon, Mudflats	28	Pelicans, Flamingos, Cranes, Waders	Ramsar Site	Outfall drains. Important for wintering birds
Kharro Chann	Sindh	Marshes, Agricultural, Creek	Not specified	Painted Stork, Oystercatcher, Crab Plover	IBA	Part of deltaic ecosystem
Gizri Creek	Sindh	Tidal Creek, Mudflats	Not specified	Plovers, Sandpipers, Terns, Egrets	None	Urban pressure, Karachi
Buleji Beach & Cape Monze	Sindh	Rocky Coast, Sandy Beach	Not specified	Gulls, Terns, Storm Petrels	None	Degraded mangroves
Sandspit / Hawksbay	Sindh	Mangroves, Estuaries, Saltpans	104	Shorebirds, Terns, Gulls	IBA	Mangrove forest and sandy beach
Miani Hor	Balochistan	Estuary, Mangroves, Mudflats	70	Oystercatcher, Cranes, Pelicans, Flamingos	Ramsar Site, WWF Ecoregion	Breeding Greater Flamingo recorded
Sonmiani Bay	Balochistan	Bay, Lagoon	Not specified	Waterbirds	Ramsar Site	Dominated by Miani Hor
Jiwani Wetland Complex	Balochistan	Coastal Wetland, Bays	125	Pelicans, Flamingos, Waders, Raptors	Ramsar Site, IBA	81 waterbird species. Falcon trapping
Ormara	Balochistan	Sandy Beach, Bays	Part of 122	Shorebirds, Gulls	Ramsar Site, Turtle Beach	Ras Ormara headland
Pasni / Pasni Hor	Balochistan	Sandy-Rocky Coast, Lagoons	Part of 122	Waterbirds, Waders	None	Mudflats at Shadi Kaur mouth
Pishukan & Ganz	Balochistan	Cliffs, Sandy Beaches	Not specified	Coastal birds	None	45 km stretch
Hingol National Park	Balochistan	Arid Coast, River	Not specified	Raptors, Sandgrouse, Pelicans	IBA, National Park	Winter visitors
Astola Island	Balochistan	Offshore Island	Not specified	Terns, Seabirds	Ramsar Site, (MPA), IBA	Uninhabited

The Makran Coastal Wetland Complex has attracted particular attention because of its ecological significance and rich biological resources. Arshad *et al*. (2002), through a preliminary biological assessment, highlighted the diversity and conservation importance of the wetland complex. Similarly, Hasan and Khan (2009) reported considerable bird diversity from the Makran Coastal Wetland Complex, demonstrating that the area provides suitable habitat for a variety of coastal and migratory birds. The findings of these studies suggest that the Makran coast is not only important for individual bird species but also functions as an interconnected wetland system supporting different groups of wildlife.

Mangrove habitats along the Balochistan coast are another important component of the region's coastal biodiversity. Ghalib and Hasnain (1997) documented a diverse avifauna associated with the mangroves of the Balochistan coast and emphasized the role of these forests in supporting wildlife. The Jiwani Wetland Complex is particularly noteworthy in this regard. Pandrani *et al*. (2005) recorded 81 species of waterbirds in Jiwani Wetland Complex and demonstrated the importance of the wetland as a habitat for water-associated birds. At a broader provincial level, Ghalib *et al*. (2004) assessed the population status of birds in Balochistan, providing useful information about their distribution and conservation status. More recent

observations by Ghalib *et al*. (2019b) further indicate that Balochistan continues to support a diverse wildlife community, although changes in land use and increasing human activities may influence the distribution and abundance of several species.

The coastal ecosystems of Sindh are equally significant for avian diversity. Mangrove forests, creeks, mudflats, and associated wetlands provide feeding and resting areas for numerous bird species. Damhoureyeh and Ghalib (2014) reviewed the condition and distribution of mangrove forests in Sindh and discussed their importance for associated wildlife. Earlier, Ghalib *et al*. (2002) presented an assessment of the status of birds in Sindh, while Ghalib *et al*. (2017) specifically examined coastal bird populations and their distribution. Their work indicates that the Sindh coast supports a considerable variety of coastal birds and that the condition of coastal habitats is closely linked with the persistence of these populations. Ghalib *et al*. (2018a) further reviewed the distribution, status, and conservation of wildlife in Sindh and emphasized the importance of protecting natural habitats in the face of increasing human pressure.

A few investigations have focused on the Karachi coastline and its surrounding tidal creek systems. Khan *et al*. (2014) studied the distribution and conservation of birds in Karachi and reported considerable avian diversity despite the extensive urban and industrial development of the city. The Korangi and Phitti Creek systems also support a variety of vertebrate species. Khan *et al*. (2018) documented the vertebrate biodiversity of these creeks and demonstrated their ecological value within the Karachi coastal environment. Similarly, Ubaid Ullah *et al*. (2021) investigated biodiversity in the Bin Qasim Industrial Zone of Malir, 67 species of bird recorded which showed that wildlife continues to utilize habitats within and around highly developed areas. These studies collectively indicate that even fragmented and human-influenced coastal habitats can retain considerable ecological importance. At the same time, they draw attention to the potential effects of industrial activities, habitat disturbance, pollution, and changes in land use.

The coastal areas of Thatta, particularly Gharo Creek and the Gharo Wind Corridor, have also been studied in relation to bird diversity. Ghalib *et al*. (2018b) examined birds occurring within the Gharo Wind Power Project area and provided information on the avifauna of a coastal landscape undergoing energy development. More recently, Khan *et al*. (2024) investigated avian diversity and associated threats in Gharo Creek, District Thatta and 112 species of birds recorded from the area. Their findings demonstrate that the creek continues to provide important habitat for birds but is also exposed to a few pressures. The available evidence highlights the need to balance development activities, including energy and industrial projects, with measures aimed at maintaining important bird habitats.

Waterbirds form one of the most visible and ecologically important components of the coastal bird communities of Sindh. Khan *et al*. (2016) reviewed the wetlands and waterbirds of Sindh and emphasized the importance of the province's diverse wetland network for resident and migratory species. The conservation significance of these habitats is further supported by recent work on species of conservation concern. Iqbal *et al*. (2023) documented the status and distribution of threatened and near-threatened birds in Sindh, showing that the province continues to support species requiring conservation attention. Such studies are valuable because they provide information that can be used to identify important habitats and guide future monitoring and conservation programs.

Although waterbirds receive considerable attention in coastal studies, other bird groups also contribute to the ecological functioning of these environments. Raptors, for example, may use coastal landscapes for hunting, nesting, or movement between different habitats. Ghalib *et al*. (2019a) reviewed the distribution and status of raptors in Sindh and documented their presence across different habitat types. When considered alongside the broader wildlife assessment of Sindh by Ghalib *et al*. (2018a), these findings demonstrate that coastal biodiversity assessments should encompass a wide range of bird groups rather than focusing exclusively on waterbirds.

The conservation value of Pakistan's coastal habitats is also reflected in national and international conservation initiatives. Kanwal *et al*. (2018) discussed Astola Island, recognized as Pakistan's first marine protected area, 41 bids species recorded and highlighted its importance for its exclusive biodiversity conservation. At the national and international levels, BirdLife International (2024) provides information on Pakistan's avifauna and its conservation significance. These sources provide a broader framework for understanding the significance of locally recorded bird populations and for identifying species and habitats that may require greater conservation attention.

Overall, the literature shows that the coastal regions of Balochistan and Sindh are important areas for bird conservation in Pakistan. Research conducted over several decades has consistently documented diverse bird communities in the Makran wetlands, Jiwani, Karachi, Korangi and Phitti Creeks, Gharo Creek, and other coastal habitats (Ahmad *et al*., 1992; Pandrani *et al*., 2005; Khan *et al*., 2014; Ghalib *et al*., 2009, 2017; Khan *et al*., 2024). Ghalib *et al*. (2000) studied shorebirds of important sites of Pakistan, and 57 shore bird's species were recorded. Other work on coastal birds of Pakistan done previously by Groombridge, (1989); Scott, (1989); Hasan (1994); Siddiqui *et al*. (2001); Arshad *et al*. (2002); Javed and

Hasan (2004, 2005); Hasan and Khan (2005); Pandrani *et al*. (2005); Grimmett *et al*., 2008; Durrani and Hasnain (2008); Rasool and Hasnain (2008) Rasool and Hasnain, (2009); Hasnain and Khan (2009). The studies also demonstrate that these ecosystems are under increasing pressure from urban growth, industrial development, infrastructure projects, habitat modification, and other human activities. Therefore, continued field surveys and long-term monitoring are necessary to determine changes in bird abundance, distribution, and conservation status. Protecting important feeding and roosting sites, maintaining mangrove and wetland habitats, and incorporating biodiversity considerations into coastal development plans will be essential for sustaining Pakistan's coastal bird diversity in the future.

RESULTS AND DISCUSSION

Balochistan's coast represents a diverse ecological landscape comprising rocky shores, sandy beaches, mangroves, mudflats, tidal wetlands, estuaries, and nearshore waters. Hingol National Park supports a wide range of coastal and terrestrial wildlife, while Astola Island, Pakistan's largest offshore island, provides important nesting habitat for sea turtles and seabirds. Miani Hor and Sonmiani Bay are ecologically important wetland systems where mangroves, tidal creeks, and shallow waters serve as feeding and nursery grounds for fish, crustaceans, mollusks, and migratory birds. The coastal areas of Ormara, Pasni, and Gwadar Bay also support diverse marine fauna and provide suitable habitats for sea turtles and other coastal species. Jiwani Coastal Wetland is particularly important for mangroves and waterbirds. Meanwhile, Churna Island, Buzi Pass, Damb, Gadani, Daran, and Pishukan comprise rocky and sandy coastal habitats that support a wide variety of marine organisms. Collectively, these sites form an interconnected coastal ecosystem that sustains the rich biodiversity and ecological productivity of the Balochistan coast.

The coastal areas of Sindh comprise a diverse range of wetlands and other important sites that provide suitable habitats for coastal and migratory birds. Important coastal bird areas include Badin, Bundal Island, Buleji, Cape Monze, Clifton Beach, DHA Karachi, Gharo Creek, Ghizri Creek, Hawksbay, Mubarak Village, Indus Delta and its creeks, Jubho Lagoon, Karachi Mangrove Forest, Kharro Chann, Keti Bunder North, Keti Bunder South, Korangi Creek, Malir River, Manora, Nurri Lagoon, Phitti Creek, Port Qasim Area, Rehri Creek, Sandspit, Seaview, Shah Bunder, and the Western Backwater Mangrove Area of Karachi. Collectively, these sites represent a variety of coastal habitats, including mangrove forests, tidal creeks, lagoons, mudflats, beaches, riverine areas, and intertidal zones, which support a wide range of resident and migratory bird species.

A total of 200 bird species belonging to 17 orders and 54 families were recorded from the coastal areas of Balochistan and Sindh based on the compiled checklist (Table 2). This diverse avifauna reflects the variety of coastal habitats and associated ecosystems present along the coast, which support resident, migratory, and wintering bird species.

The distribution shows that the majority of the recorded coastal bird species were common to both provinces. Of the 200 species listed, 144 species (72.0%) occurred in the coastal areas of both Balochistan and Sindh. In comparison, 30 species (15.0%) were recorded only from the Balochistan coast, whereas 26 species (13.0%) were restricted to the Sindh coast (Table 3). Overall, the greater proportion of shared species indicates considerable similarity in the coastal avifauna of the two provinces.

A total of 200 bird species were documented in the coastal areas of Balochistan and Sindh based on the compiled checklist. Of these, 144 species (72.0%) were recorded in both provinces, indicating substantial overlap in coastal bird composition. Thirty species (15.0%) were recorded exclusively in Balochistan, whereas 26 species (13.0%) were recorded exclusively in Sindh. Overall, 174 species were recorded in Balochistan, compared with 170 species in Sindh. The high proportion of species shared between the two provinces suggests a considerable similarity in their coastal avifaunal composition, despite differences in the species occurring exclusively in each province.

Threatened and Near-Threatened Coastal Birds

The coastal regions of Sindh and Balochistan provide important habitats for several bird species of conservation concern. Previous studies conducted in Sindh have documented a considerable number of threatened and near-threatened bird species, highlighting the importance of conserving coastal and wetland habitats (Iqbal *et al*., 2023).

Among the species of conservation concern are the Greater Spotted Eagle, Common Pochard, Eurasian Curlew, Black-tailed Godwit, Bar-tailed Godwit, Curlew Sandpiper, and Eurasian Oystercatcher**,** all of which are associated with wetland and coastal environments. Their occurrence emphasizes the importance of maintaining undisturbed feeding, breeding, and roosting habitats along the coasts of Sindh and Balochistan. Overall, 13 threatened and 13 near-threatened bird species have been identified in the coastal areas of Balochistan and Sindh (Table 4).

Table 2. Checklist of Coastal Bird Species Recorded in the Coastal Areas of Balochistan and Sindh.

S.No.	Order	Family	Scientific Name	Common Name	Status	Balochistan	Sindh
1	Procellariiformes	Procellaridae	*Oceanites oceanicus*	Wilson's Storm Petrel	YRV	+	+
2	Procellariiformes	Phaethontidae	*Phaethon aethereus*	Redbilled Tropic Bird	WV	+	+
3	Podicipediformes	Podicipedidae	*Podiceps cristatus*	Great Crested Grebe	WV	+	+
4	Podicipediformes	Podicipedidae	*Podiceps nigricollis*	Black Necked Grebe	WV	+	+
5	Podicipediformes	Podicipedidae	*Tachybaptus ruficollis*	Little Grebe or Dabchick	R	+	+
6	Pelecaniformes	Pelecanidae	*Pelecanus onocrotalus*	White or Rosy Pelican	WV	+	+
7	Pelecaniformes	Pelecanidae	*Pelecanus crispus*	Dalmatian Pelican	WV	+	+
8	Pelecaniformes	Phalacrocoracidae	*Phalacrocorax carbo*	Large Cormorant	WV	+	+
9	Pelecaniformes	Phalacrocoracidae	*Phalacrocorax fuscicollis*	Indian Cormorant	R	+	+
10	Pelecaniformes	Phalacrocoracidae	*Phalacrocorax niger*	Little cormorant	R	+	+
11	Pelecaniformes	Anhingidae	*Anhinga melanogaster*	Oriental Darter	R	-	+
12	Ciconiiformes	Ardeidae	*Ardea cinerea*	Grey Heron	WV	+	+
13	Ciconiiformes	Ardeidae	*Ardea purpurea*	Purple Heron	R	-	+
14	Ciconiiformes	Ardeidae	*Butorides striatus*	Little Green Heron	R	+	+
15	Ciconiiformes	Ardeidae	*Ardeola grayii*	Indian Pond Heron	R	+	+
16	Ciconiiformes	Ardeidae	*Bubulcus ibis*	Cattle Egret	R	+	+
17	Ciconiiformes	Ardeidae	*Egretta alba*	Great Egret	V	+	+
18	Ciconiiformes	Ardeidae	*Egretta intermedia*	Intermediate Egret	R	-	+
19	Ciconiiformes	Ardeidae	*Egretta garzetta*	Little Egret	R	+	+
20	Ciconiiformes	Ardeidae	*Egretta gularis*	Indian Reef Heron	R	+	+
21	Ciconiiformes	Ardeidae	*Nycticorax nycticorax*	Night Heron	R	+	+
22	Ciconiiformes	Ciconiidae	*Mycteria leucocephalus*	Painted Stork	R	-	+
23	Ciconiiformes	Ciconiidae	*Ciconia nigra*	Black Stork	WV	-	+
24	Ciconiiformes	Threskiornithidae	*Threskiornis melanocephalus*	Black headed Ibis	WV	+	+
25	Ciconiiformes	Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	WV	+	+
26	Ciconiiformes	Threskiornithidae	*Platalea leucorodia*	Eurasian Spoonbill	WV	+	+
27	Ciconiiformes	Phoenicopteridae	*Phoenicopterus roseus*	Greater Flamingo	NBR	+	+
28	Ciconiiformes	Phoenicopteridae	*Phoenicopterus minor*	Lesser Flamingo	WV/ NBR	-	+
29	Anseriformes	Anatidae	*Tadorna tadorna*	Common Shelduck	WV	-	+
30	Anseriformes	Anatidae	*Anas acuta*	Pintail	WV	+	+
31	Anseriformes	Anatidae	*Anas crecca*	Common Teal	WV	+	+
32	Anseriformes	Anatidae	*Anas platyrhynchos*	Mallard	WV	+	+
33	Anseriformes	Anatidae	*Anas strepera*	Gadwall	WV	+	+
34	Anseriformes	Anatidae	*Anas Penelope*	Wigeon	WV	+	+
35	Anseriformes	Anatidae	*Anas querquedula*	Garganey	PM	-	+
36	Anseriformes	Anatidae	*Anas cylpeata*	Shoveller	WV	+	+
37	Anseriformes	Anatidae	*Aythya ferina*	Common Pochard	WV	+	+
38	Anseriformes	Anatidae	*Aythya fuligula*	Tufted Duck	WV	+	+
39	Anseriformes	Anatidae	*Mergus serrator*	Red Breasted Merganser	V	-	+
40	Anseriformes	Anatidae	*Marmaronetta angustirostris*	Marbled Teal	V	-	+
41	Gruiformes	Rallidae	*Gallinula chloropus*	Common Moorhen	R	+	+
42	Gruiformes	Rallidae	*Fulica atra*	Eurasian Coot	WV	+	+

43	Gruiformes	Rallidae	*Grus grus*	Common Crane	PM	-	+
44	Accipitriformes	Accipitridae	*Pernis ptilorhynchus*	Crested Honey Buzzard	M	+	+
45	Accipitriformes	Accipitridae	*Buteo buteo*	Common Buzzard	WV	+	+
46	Accipitriformes	Accipitridae	*Buteo rufinus*	Longlegged Buzzard	WV	+	-
47	Accipitriformes	Accipitridae	*Milvus migrans*	Black Kite	R	+	+
48	Accipitriformes	Accipitridae	*Haliastur indus*	Brahminy Kite	R	+	+
49	Accipitriformes	Accipitridae	*Accipiter badius*	Shikra	R	-	+
50	Accipitriformes	Accipitridae	*Haliaeetus leucoryphus*	Pallas's fish eagle	WV	+	-
51	Accipitriformes	Accipitridae	*Aquila chrysaetos*	Golden Eagle	WV	+	+
52	Accipitriformes	Accipitridae	*Aquila heliaca*	Imperial Eagle	WV	+	+
53	Accipitriformes	Accipitridae	*Aquila rapax*	Tawny Eagle	R	+	+
54	Accipitriformes	Accipitridae	*Aquila nipalensis*	Steppe Eagle	WV	+	+
55	Accipitriformes	Accipitridae	*Aquila clanga*	Greater Spotted Eagle	WV	-	+
56	Accipitriformes	Accipitridae	*Gyps fulvus*	Indian Griffon Vulture	R	-	+
57	Accipitriformes	Accipitridae	*Neophron percnopterus*	Egyptian Vulture	R	+	+
58	Accipitriformes	Accipitridae	*Aegypius monachus*	Cinereous Vulture	WV	+	-
59	Accipitriformes	Accipitridae	*Circus aeruginosus*	Marsh Harrier	WV	+	+
60	Falconiformes	Falconidae	*Falco cherrug*	Saker Falcon	WV	+	-
61	Falconiformes	Falconidae	*Falco tinnunculus*	Kestrel	WV	+	+
62	Falconiformes	Falconidae	*Falco naumanni*	Lesser Kestrel	V	+	-
63	Falconiformes	Falconidae	*Falco peregrinus*	Peregrine Falcon	WV	+	+
64	Falconiformes	Falconidae	*Falco subbuteo*	Eurasian Hobby	PM	+	+
65	Falconiformes	Pandionidae	*Pandion haliaetus*	Osprey	WV	+	+
66	Strigiformes	Strigidae	*Athene brama*	Spotted Owlet	R	-	+
67	Strigiformes	Strigidae	*Asio flammeus*	Short-eared Owl	WV	+	-
68	Galliformes	Phasianidae	*Contumix cotumix*	Grey Quail	M/PM	-	+
69	Galliformes	Phasianidae	*Francolinus pondicerianus*	Grey Partridge	R	+	+
70	Galliformes	Phasianidae	*Francolinus francolinus*	Black Partridge	R	-	+
71	Charadriiformes	Haematopodidae	*Haematopus ostralegus*	Oyster catcher	WV	+	+
72	Charadriiformes	Charadriidae	*Vanellus leucurus*	White-tailed Lapwing	WV	-	+
73	Charadriiformes	Charadriidae	*Vanellus vanellus*	Northern Lapwing	WV	-	+
74	Charadriiformes	Charadriidae	*Vanellus indicus*	Red-wattled Lapwing	R	+	+
75	Charadriiformes	Charadriidae	*Vanellus malabaricus*	Yellow-wattled Lapwing	SBV	+	+
76	Charadriiformes	Charadriidae	*Pluvialis squatarola*	Grey Plover	WV	+	+
77	Charadriiformes	Charadriidae	*Pluvialis apricaria*	Golden Plover	V	+	-
78	Charadriiformes	Charadriidae	*Charadrius leschenaultia*	Large Sand Plover	WV	+	+
79	Charadriiformes	Charadriidae	*Charadrius hiaticula*	Ringed Plover	WV	+	+
80	Charadriiformes	Charadriidae	*Charadrius dubius*	Little Ringed Plover	WV	+	+
81	Charadriiformes	Charadriidae	*Charadrius alexandrinus*	Kentish Plover	SBV/WV	+	+
82	Charadriiformes	Charadriidae	*Charadrius mongolus*	Lesser Sand Plover	WV	+	+
83	Charadriiformes	Scolopacidae	*Calidris tenuirostris*	Great Knot	WV	+	+
84	Charadriiformes	Scolopacidae	*Numenius phaeopus*	Whimbrel	WV	+	+
85	Charadriiformes	Scolopacidae	*Numenius arquata*	Eurasian Curlew	WV	+	+
86	Charadriiformes	Scolopacidae	*Limosa limosa*	Black tailed Godwit	WV	+	+
87	Charadriiformes	Scolopacidae	*Limosa lapponica*	Bartailed Godwit	WV	+	+

88	Charadriiformes	Scolopacidae	*Tringa erythropus*	Spotted or Dusky Redshank	WV	-	+
89	Charadriiformes	Scolopacidae	*Tringa tetanus*	Common Redshank	WV	+	+
90	Charadriiformes	Scolopacidae	*Tringa stagnatilis*	Marsh Sandpiper	WV	+	+
91	Charadriiformes	Scolopacidae	*Tringa nebularia*	Greenshank	WV	+	+
92	Charadriiformes	Scolopacidae	*Tringa ochropus*	Green Sandpiper	WV	-	+
93	Charadriiformes	Scolopacidae	*Tringa glareola*	Wood Sandpiper	WV	-	+
94	Charadriiformes	Scolopacidae	*Tringa terek*	Terek Sandpiper	WV	+	+
95	Charadriiformes	Scolopacidae	*Tringa hypoleucos*	Common Sandpiper	WV	+	+
96	Charadriiformes	Scolopacidae	*Arenaria interpres*	Ruddy Turnstone	WV	+	+
97	Charadriiformes	Scolopacidae	*Gallinago gallinago*	Common or Fantail Snipe	WV	+	+
98	Charadriiformes	Scolopacidae	*Calidris alba*	Sanderling	WV	+	+
99	Charadriiformes	Scolopacidae	*Calidris minutus*	Little Stint	WV	+	+
100	Charadriiformes	Scolopacidae	*Calidris temminckii*	Temminck's Stint	WV	-	+
101	Charadriiformes	Scolopacidae	*Calidris alpinus*	Dunlin	WV	+	+
102	Charadriiformes	Scolopacidae	*Calidris ferruginea*	Curlew-Sandpiper	WV	+	+
103	Charadriiformes	Scolopacidae	*Calidris pugnax*	Ruff	WV	+	+
104	Charadriiformes	Scolopacidae	*Limicola falcinellus*	Broadbilled Sandpiper	WV	-	+
105	Charadriiformes	Scolopacidae	*Phalaropus lobatus*	Rednecked Phalarope	WV	+	+
106	Charadriiformes	Rostratulidae	*Rostratula benghalensis*	Painted Snipe	R	+	+
107	Charadriiformes	Stercorariidae	*Stercorarius pomarinus*	Pomarine Skua	WV	+	+
108	Charadriiformes	Stercorariidae	*Stercorarius parasiticus*	Arctic Skua	WV	+	+
109	Charadriiformes	Recurvirostridae	*Himantopus himantopus*	Indian Black-winged Stilt	R	+	+
110	Charadriiformes	Recurvirostridae	*Recurvirostra avosetta*	Avocet	WV	+	+
111	Charadriiformes	Dromadidae	*Dromas ardeola*	Crab Plover	M	+	+
112	Charadriiformes	Burhinidae	*Esacus magnirostris*	Great Stone Plover	R	-	+
113	Charadriiformes	Burhinidae	*Esacus recurvirostris*	Great Thick-Knee	R	+	+
114	Charadriiformes	Laridae	*Anous stolidus*	Common Noddy	R	-	+
115	Charadriiformes	Laridae	*Larus hemprichii*	Sooty Gull	SV	+	+
116	Charadriiformes	Laridae	*Larus argentatus*	Herring Gull	WV	+	+
117	Charadriiformes	Laridae	*Larus fuscus*	Lesser Black backed Gull	WV	-	+
118	Charadriiformes	Laridae	*Larus ichthyaetus*	Great Black headed Gull	WV	+	+
119	Charadriiformes	Laridae	*Larus brunnicephalus*	Brown headed Gull	WV	+	+
120	Charadriiformes	Laridae	*Larus ridibundus*	Black headed Gull	WV	+	+
121	Charadriiformes	Laridae	*Larus genei*	Slender-billed Gull	R	+	+
122	Charadriiformes	Sternidae	*Chlidonias hybrida*	Indian Whiskered Tern	M	+	+
123	Charadriiformes	Sternidae	*Chlidonias leucopterus*	White-winged Black Tern	PM	+	+
124	Charadriiformes	Sternidae	*Gelochelidon nilotica*	Gullbilled Tern	WV	+	+
125	Charadriiformes	Sternidae	*Hydroprogne caspia*	Caspian Tern	M	+	+
126	Charadriiformes	Sternidae	*Sterna hirundo*	Common Tern	SV	+	+
127	Charadriiformes	Sternidae	*Sterna repressa*	White Checked Tern	R	+	+
128	Charadriiformes	Sternidae	*Sterna albifrons*	Little Tern	R	+	+
129	Charadriiformes	Sternidae	*Sterna saundersi*	Black Shafted Ternlet	R	+	+
130	Charadriiformes	Sternidae	*Sterna bergii*	Swift Tern	M	+	+

131	Charadriiformes	Sternidae	*Sterna bengalensis*	Indian Lesser Creseted Tern	R	+	+
132	Charadriiformes	Sternidae	*Sterna sandvicensis*	Sandwich Tern	M	+	+
133	Charadriiformes	Sternidae	*Sterna acuticauda*	Black-bellied Tern	M	-	+
134	Charadriiformes	Sternidae	*Sterna anaethetus*	Bridled Tern	SV	+	-
135	Charadriiformes	Cuculidae	*Eudynamys scolopocea*	Indian Koel	R	-	+
136	Columbiformes	Columbidae	*Columba livia*	Blue Rock Pigeon	R	+	+
137	Columbiformes	Columbidae	*Streptopelia senegalensis*	Little Brown Dove	R	+	+
138	Columbiformes	Pteroclididae	*Pterocles alchata*	Pintail Sandgrouse	WV	+	-
139	Caprimulgiformes	Caprimulgidae	*Caprimulgus europaeus*	Hume's European Nightjar	SBV/ WV	+	+
140	Apodiformes	Apodidae	*Apus affinis*	House Swift	R	+	+
141	Coraciiformes	Coraciidae	*Coracias benghalensis*	Indian Roller	R	+	+
142	Coraciiformes	Alcedinidae	*Ceryle rudis*	Indian Pied Kingfisher	R	+	+
143	Coraciiformes	Alcedinidae	*Alcedo atthis*	Indian Small Blue Kingfisher	R	+	+
144	Coraciiformes	Alcedinidae	*Halcyon smyrnensis*	Whitebreasted Kingfisher	R	+	+
145	Coraciiformes	Meropidae	*Merops supeciliosus*	Blue cheeked Bee-eater	SBV/ PM	-	+
146	Coraciiformes	Meropidae	*Merops orientalis*	Sind Small Green Bee-eater	R	+	+
147	Coraciiformes	Upupidae	*Upupa epops*	Hoopoe	WV	+	+
148	Piciformes	Picidae	*Jynx torquilla*	European Wryneck	PM	-	+
149	Passeriformes	Alaudidae	*Calandrella acutirostris*	Humes Short Toed Lark	WV	+	+
150	Passeriformes	Alaudidae	*Ammomanes deserti*	Desert Finch Lark	R	+	-
151	Passeriformes	Alaudidae	*Ammomanes cincturus*	Bar-tailed Lark	R	+	-
152	Passeriformes	Alaudidae	*Alauda gulgula*	Small Sky Lark	R	+	+
153	Passeriformes	Alaudidae	*Galerida cristata*	Crested Lark	R	+	+
154	Passeriformes	Alaudidae	*Alaemon alaudipes*	Greater Hoopoe lark	R	+	-
155	Passeriformes	Alaudidae	*Calandrella raytal*	Indus Sand lark	R	-	+
156	Passeriformes	Hirundinidae	*Ptyonoprogne obsolete*	Pale crag Martin	R	+	+
157	Passeriformes	Hirundinidae	*Raparia paludicola*	Indus Sand Martin	R	+	-
158	Passeriformes	Hirundinidae	*Riparia diluta*	Pale Martin	WV	+	+
159	Passeriformes	Hirundinidae	*Hirundo rustica*	Common Swallow	WV	+	+
160	Passeriformes	Hirundinidae	*Hirundo daurica*	Red-rumped Swallow	WV	-	+
161	Passeriformes	Lanidae	*Lanius vitatus*	Baybacked Shrike	R	+	+
162	Passeriformes	Lanidae	*Lanius isabellinus*	Rufous-tailed Shrike	R	+	-
163	Passeriformes	Lanidae	*Lanius excubitor*	Great Grey Shrike	R	+	+
164	Passeriformes	Sturnidae	*Acridotheres ginginianus*	Bank Myna	R	+	+
165	Passeriformes	Sturnidae	*Acridotheres tristis*	Indian Myna	R	+	+
166	Passeriformes	Sturnidae	*Sturnus vulgaris*	Common Starling	R	+	+
167	Passeriformes	Timalidae	*Turdoides caudatus*	Afghan Babbler	R	+	+
168	Passeriformes	Timalidae	*Turdoides terdoides*	Jungle Babbler	R	-	+
169	Passeriformes	Corvidae	*Corvus splendens*	Sind House Crow	R	+	+
170	Passeriformes	Corvidae	*Corvus ruficollis*	Brown-necked Raven	R	+	-
171	Passeriformes	Pyconotidae	*Pycnonotus leucogenys*	White-eared Bulbul	R	+	+

172	Passeriformes	Pyconotidae	*Pycnonotus cafer*	Red-vented Bulbul	R	+	+
173	Passeriformes	Sylviidae	*Prinia bunchanani*	Rufousfronted Wren- warbler	R	+	+
174	Passeriformes	Sylviidae	*Orthotomus sutorius*	Tailor Bird	R	-	+
175	Passeriformes	Sylviidae	*Sylvia nana*	Desert Warbler	WV	+	-
176	Passeriformes	Turdidae	*Erithacus svecicus*	Bluethroat	WV	-	+
177	Passeriformes	Turdidae	*Phoenicurus ochruros*	Black Redstart	WV	+	+
178	Passeriformes	Turdidae	*Prinia gracilis*	Streaked long-tail Warbler	R	+	-
179	Passeriformes	Turdidae	*Prinia burnesii*	Long tailed Grass Warbler	R	+	+
180	Passeriformes	Turdidae	*Oenanthe picata*	Pied Chat/Pied Wheatear	WV	+	+
181	Passeriformes	Turdidae	*Oenanthe isabellina*	Isabelline Wheatear	WV	+	+
182	Passeriformes	Turdidae	*Oenanthe deserti*	Desert Wheatear	WV	+	-
183	Passeriformes	Turdidae	*Oenanthe monacha*	Hooded Wheatear	R	+	-
184	Passeriformes	Turdidae	*Saxicoloides fulicata*	Indian Robin	R	+	-
185	Passeriformes	Turdidae	*Saxicola caprata*	Pied Bushchat	WV	+	+
186	Passeriformes	Timaliidae	*Turdoides caudatus*	Common Babbler	R	+	+
187	Passeriformes	Dicruridae	*Dicrurus macrocercus*	Black Drongo	R	+	+
188	Passeriformes	Motacillidae	*Anthus campestris*	Tawny Pipit	WV	+	+
189	Passeriformes	Motacillidae	*Anthus similis*	Long-billed Pipit	R	+	+
190	Passeriformes	Motacillidae	*Moticilla cinerea*	Grey Wagtail	WV	+	+
191	Passeriformes	Motacillidae	*Motacilla flava*	Yellow Wagtail	PM	+	+
192	Passeriformes	Motacillidae	*Motacilla citreola*	Yellow-headed Wagtail	WV	+	+
193	Passeriformes	Motacillidae	*Motacilla alba*	White or Pied Wagtail	WV	+	+
194	Passeriformes	Nectariniidae	*Nectarinia asiatica*	Purple Sunbird	R	+	+
195	Passeriformes	Ploceidae	*Ploceus manyar*	Indian Baya	R	-	+
196	Passeriformes	Ploceidae	*Ploceus philippinus*	Baya Weaver	R	-	+
197	Passeriformes	Passeridae	*Passer domesticus*	House Sparrow	R	+	+
198	Passeriformes	Passeridae	*Ploceus ananyar*	Streaked Weaver	R	-	+
199	Passeriformes	Emberizidae	*Emberiza striolata*	House Bunting	R	+	+
200	Passeriformes	Zosteropidae	*Zosterops palpebrosus*	White Eye	R	+	+

Legand: M= Migratory, PM= Passage Migrant, R= Resident, SBV= Summer Breeding Visitor, SV= Summer Visitor, V= Vagrant, WV= Winter Visitor, YRV= Year-Round Visitor
"+" denotes that a species was recorded in the respective area, whereas "–" denotes that the species was not recorded.

Table 3. Distribution of Coastal Bird Species in Sindh and Balochistan.

Category	**Number of Species**	**Percentage (%)**
Recorded in both Balochistan and Sindh	144	72.0%
Recorded only in Balochistan	30	15.0%
Recorded only in Sindh	26	13.0%
Total Species	**200**	**100.0%**

Percentages were calculated based on the total number of species (n = 200) included in the checklist.

Distribution of the 26 coastal bird species classified as Endangered (EN), Vulnerable (VU), or Near Threatened (NT) (Table 5). Of these, 17 species were recorded from the coastal areas of both Balochistan and Sindh, while 3 species Pallas's Fish Eagle, Saker Falcon, and Cinereous Vulture were recorded only along the Balochistan coast and 6 species Black-bellied Tern, Greater Spotted Eagle, Broad-billed Sandpiper, Lesser Flamingo, Marbled Teal, and Northern Lapwing were recorded only along the Sindh coast. The distribution of these species highlights the extent to which birds of conservation concern are shared between the coastal areas of Balochistan and Sindh, as well as those occurring only in one province. Such differences in species occurrence may be influenced by variations in coastal habitats, availability of wetlands and feeding grounds, food resources, and the seasonal movements of birds along the coast.

Table 4. Threatened and near-threatened coastal bird species recorded from the coastal areas of Balochistan and Sindh, with their respective conservation status.

S.No.	Order	Family	Scientific Name	Common Name	IUCN Status 2024
1	Accipitriformes	Accipitridae	*Haliaeetus leucoryphus*	Pallas's fish eagle	EN
2	Accipitriformes	Accipitridae	*Aquila nipalensis*	Steppe Eagle	EN
3	Accipitriformes	Accipitridae	*Neophron percnopterus*	Egyptian Vulture	EN
4	Falconiformes	Falconidae	*Falco cherrug*	Saker Falcon	EN
5	Charadriiformes	Scolopacidae	*Calidris tenuirostris*	Great Knot	EN
6	Charadriiformes	Sternidae	*Sterna acuticauda*	Black-bellied Tern	EN
7	Anseriformes	Anatidae	*Aythya ferina*	Common Pochard	VU
8	Accipitriformes	Accipitridae	*Aquila clanga*	Greater Spotted Eagle	VU
9	Accipitriformes	Accipitridae	*Aquila heliaca*	Imperial Eagle	VU
10	Accipitriformes	Accipitridae	*Aquila rapax*	Tawny Eagle	VU
11	Charadriiformes	Charadriidae	*Pluvialis squatarola*	Grey Plover	VU
12	Charadriiformes	Scolopacidae	*Calidris ferruginea*	Curlew-Sandpiper	VU
13	Charadriiformes	Scolopacidae	*Limicola falcinellus*	Broadbilled Sandpiper	VU
14	Pelecaniformes	Pelecanidae	*Pelecanus crispus*	Dalmatian Pelican	NT
15	Ciconiiformes	Threskiornithidae	*Threskiornis melanocephalus*	Black headed Ibis	NT
16	Ciconiiformes	Phoenicopteridae	*Phoenicopterus minor*	Lesser Flamingo	NT
17	Anseriformes	Anatidae	*Marmaronetta angustirostris*	Marbled Teal	NT
18	Accipitriformes	Accipitridae	*Aegypius monachus*	Cinereous Vulture	NT
19	Charadriiformes	Haematopodidae	*Haematopus ostralegus*	Oyster catcher	NT
20	Charadriiformes	Charadriidae	*Vanellus vanellus*	Northern Lapwing	NT
21	Charadriiformes	Scolopacidae	*Numenius arquata*	Eurasian Curlew	NT
22	Charadriiformes	Scolopacidae	*Limosa limosa*	Black tailed Godwit	NT
23	Charadriiformes	Scolopacidae	*Limosa lapponica*	Bartailed Godwit	NT
24	Charadriiformes	Scolopacidae	*Arenaria interpres*	Ruddy Turnstone	NT
25	Charadriiformes	Burhinidae	*Esacus recurvirostris*	Great Thick-Knee	NT
26	Charadriiformes	Scolopacidae	*Calidris alpinus*	Dunlin	NT

Legends: EN= Endangered, VU= Vulnerable, NT= Near threatened.

Table 5. Distribution of Threatened and Near Threatened Species in Balochistan and Sindh.

IUCN Category	Total Species	Both Balochistan & Sindh	Balochistan only	Sindh only
Endangered (EN)	6	3	2	1
Vulnerable (VU)	7	5	0	2
Near Threatened (NT)	13	9	1	3
Total	**26**	**17**	**03**	**6**

In the coastal areas of Balochistan**,** three species Pallas's Fish Eagle, Saker Falcon, and Cinereous Vulture were recorded only from Balochistan and were not reported from the coastal areas of Sindh. In comparison, six species Black-bellied Tern, Greater Spotted Eagle, Broad-billed Sandpiper, Lesser Flamingo, Marbled Teal, and Northern Lapwing were recorded only from the coastal areas of Sindh. This difference in species occurrence may be related to variations in coastal habitats, wetland availability, food resources, and the seasonal movements of birds between the two provinces.

Threats Facing Coastal Birds of Balochistan and Sindh

1. Habitat Loss and Degradation

The loss and deterioration of natural coastal habitats is one of the major threats to birds in Sindh and Balochistan. Mangroves, mudflats, tidal creeks, lagoons, beaches, and estuarine areas are increasingly affected by urban expansion, land reclamation, industrial development, and infrastructure projects. In Sindh, particularly around Karachi and the Indus Delta, human activities have placed considerable pressure on important bird habitats. Along the Balochistan coast, development around Gwadar, Pasni, Ormara, and other coastal settlements may similarly disturb relatively natural areas used by resident and migratory birds.

2. Pollution and Waste

Pollution from industrial discharge, untreated wastewater, plastics, oil, and solid waste is a serious concern for coastal birds. Polluted water can reduce the availability of fish, crabs, mollusks, and other organisms that birds depend on for food. Plastic waste can also cause direct harm when birds ingest it or become entangled in discarded materials.

The continued accumulation of waste around beaches, creeks, and wetlands can gradually reduce the quality of important feeding and resting areas.

3. Human Disturbance

Frequent human activity around coastal wetlands can disturb birds, particularly at important feeding, roosting, and nesting sites. Fishing, boating, tourism, recreational activities, vehicle movement, and increasing settlement can cause birds to leave suitable habitats or reduce the time they spend feeding. Repeated disturbance may be particularly harmful to migratory birds that need to build energy reserves during their seasonal movements.

4. Unsustainable Fishing and Resource Use

Intensive fishing and the excessive use of coastal resources can alter the food base on which many coastal birds depend. Damage to mangroves and disturbance of intertidal areas can also reduce the productivity of coastal ecosystems. When fish and other marine organisms become less abundant, birds may have difficulty finding sufficient food, especially during migration and wintering seasons.

5. Hunting, Trapping, and Illegal Capture

Hunting and trapping remain potential threats to several coastal bird species. Migratory birds and birds of prey may be particularly vulnerable in areas where illegal capture or hunting occurs. Such activities can directly reduce bird populations and may be especially damaging when they affect species that are already classified as Threatened or Near Threatened.

6. Coastal Development and Infrastructure

Ports, roads, industrial areas, energy projects, solar and wind power projects, unsustainable tourism, and expanding settlements are changing parts of the coastal landscape. Poorly planned development can remove important habitats, divide previously connected areas, and increase disturbance. Infrastructure projects may also interfere with bird movement and migration routes if important ecological areas are not considered during environmental planning.

7. Climate Change and Coastal Erosion

Climate change is an emerging long-term threat to coastal birds. Rising temperatures, sea-level changes, coastal erosion, changing rainfall patterns, and fluctuations in freshwater availability can alter mangrove cover, wetlands and other coastal habitats. Changes in the timing and availability of food may also affect migratory birds that depend on specific coastal sites during different stages of their annual cycle.

8. Lack of Long-Term Monitoring

A lack of continuous and standardized monitoring makes it difficult to determine how coastal bird populations are changing over time. Although several studies have documented birds at individual sites, information on long-term population trends, breeding success, seasonal movements, and habitat use remains limited for some species. Regular and collaborative surveys across both provinces are therefore needed to identify population declines and emerging threats at an early stage.

9. Fragmentation and Loss of Habitat Connectivity

Many coastal birds move between different wetlands, mudflats, mangroves, beaches, and tidal areas according to food availability and seasonal requirements. When these habitats become isolated by development or other human activities, birds may lose access to important feeding and resting sites. Maintaining connectivity between coastal habitats is therefore particularly important for migratory and wide-ranging species that use both Sindh and Balochistan during their movements.

10. Cumulative Human Pressure

The greatest challenge may not come from a single threat but from the combined effect of several pressures. Habitat loss, pollution, disturbance, resource exploitation, development, human settalments and climate-related changes can interact and place additional stress on bird populations. For this reason, conservation of coastal birds requires an integrated approach that protects habitats while also promoting responsible development and sustainable use of coastal land and its resources.

CONCLUSION

The coastal regions of Sindh and Balochistan support a remarkably diverse bird community, with the present review documenting 200 species belonging to 17 orders and 54 families. The high proportion of species shared between the two provinces demonstrates that the coast of Pakistan functions as an interconnected ecological system. The occurrence of 26 threatened and near-threatened species further underlines its national and international conservation importance. The future of these bird populations depends largely on the condition of their habitats. Protecting mangrove forests, mudflats, lagoons, tidal creeks, beaches, estuaries, and shallow coastal waters should therefore remain a conservation priority. At the same time, development, tourism, fisheries, industry, and other human activities need to be managed in sustainable ways that reduce disturbance and habitat loss. Regular bird surveys, protection of important feeding and roosting sites, control of pollution, prevention of illegal hunting and trapping, and stronger cooperation between Sindh and Balochistan will be essential. Ultimately, conserving coastal birds means conserving the wider coastal ecosystem on which both wildlife and coastal communities depend.

REFERENCES

Ahmad, MF, Ghalib, SA. and Hasnain, SA. 1992. The waterfowl of Makran coast. In: Proceedings of National Conference on Problems and Resources of Makran Coast and Plan of Action for its Developments. Pakistan Council for Science and Technology, Islamabad. pp. 113-l23.

Arshad, M., Ali, Z., Mahmood, H. and Muzaffar, M. 2002. Makran coastal wetlands complex - A preliminary biological assessment (Unpublished Report). WWF - Pakistan. pp. 60.

BirdLife International. 2024. Country profile: Pakistan. Available from http://www.birdlife.org/datazone/country/pakistan.

Damhoureyeh, SA. and Ghalib, SA. 2014. An overview of the status and distribution of the mangrove forests and their wildlife in Sindh. Canadian journal of Pure and Applied Sciences. 8(3):3051-3055.

Durranee, J., Hasnain, SA. and Ahmad, E. 2008. Observation on the Birds of Sandspit/ Hawksbay Coastal Wetland Complex, Karachi Coast. Pakistan J. Zool. 40(4):229-237.

Ghalib, SA. and Hasnain, SA. 1997. Avifauna of the Mangroves of Balochistan Coast. In: Biodiversity of Pakistan (Eds. Mufti, SA., Woods, CA. and Hassan, SA. Pakistan Museum of Natural History, Islamabad & Florida Museum of Natural History, Gainesville, USA. 423-428.

Ghalib, SA., Hasnain, SA., Perveen, S. and Khan, AR. 2002. Status of the Birds of Sindh. J. Nat. Hist. Wild.1:37-57.

Ghalib, SA., Khan, MZ., Zehra, A. and Khan, AR. 2004. Current population status of the birds of Balochistan, Pakistan. J. nat. hist. wildl. 3:51-62.

Ghalib, SA., Rais, M., Abbas, D., Tabassum, F., Begum, A. and Jabeen, T. 2009. An overview of the status of shorebirds and internationally important sites in Pakistan. Pakistan Journal of Zoology. 41(3):165-172. http://zsp.com.pk/pdf1/165-172%20(1).pdf.

Ghalib, SA., Kanwal, R., Begum, A., Zehra, A., Yasmeen, G. and Manzoor, U. 2017. Population Distribution of Coastal birds of Sindh. Canadian Journal of Pure and Applied Sciences: 11(2):4223- 4231.

Ghalib, SA., Kanwal, R., Hussain, B., Zehra, A., Siddiqui, S., Yasmeen, G., Ullah, U., Manzoor, U., Raza N. and Begum, A. 2018[a]. Review of the distribution, Status and Conservation of the Wildlife of Sindh. Canadian Journal of Pure and Applied Sciences. 12 (2):4519-4533.

Ghalib, SA., Hussain, B., Zehra, A., Yasmeen, G., Kanwal, R., Siddiqui, S., Ullah, U., Iqbal, MA., Ahmed, F. and Khan, A. R. 2018[b]. Status of the birds recorded from the Wind Power Project Area in coastal Gharo Wind Corridor, District Thatta, Sindh. Canadian Journal of Pure and Applied Sciences. 12 (3):4609-4420.

Ghalib, SA., Ullah, U. and R. Kanwal. 2019[a]. Current distribution and status of Raptors of Sindh. Canadian Journal of Pure and Applied Sciences. 13(1):4719-4732.

Ghalib, SA., Khan, MZ., Ullah, U., Kanwal, R., Zehra, A., Siddiqui, S., Abbas, D., Yasmeen, G., Hussain, B. and Khan, AR. 2019[b]. Recent observation on the distribution and status of wildlife of Balochistan. Canadian Journal of Pure and Applied Sciences. 13 (2):4813-4846.

Grimmett, R., Roberts, TJ. And Inskipp, T. 2008. Birds of Pakistan, Yale University Press.

Groombridge, B. 1989. Marine Turtles in Balochistan: Report on serial survey, 9-11 September 1988 with notes on wetlands sites and a proposed Marine Turtle Conservation Project. World Conservation Monitoring Centre. Cambridge, England.

Hasan, A. 1994. The birds of Sindh Mangroves. Rec. Zool. Surv. Pak. 12:98-105.

Hasan, A. and Khan, SA. 2005. Some observations on the Vertebrate Fauna of Jiwani Wetland Complex. Rec. Zool. Surv. Pak. 16:12-25.

Hasan, A. and Khan, A. 2009. Birds' diversity at Makran Coastal Wetland Complex. Proceedings Seminar on Transboundary Coastal and Marine Protected Areas with Special Priorities for Spawning Grounds. Zoological Survey Department, Government of Pakistan. pp. 42-48.

Iqbal, MA., Ullah, U., Khan, MZ., Ghalib, SA., Zehra, A., Khan AR. and Beg MN. 2023. Recent observation on the status and distribution of Threatened and Near threatened birds of Sindh, Pakistan. International Journal of Biology and Biotechnology. 20(2):277-292.

IUCN 2024. The IUCN Red List of Threatened Species. Available at www.iucnredlist.org.

Javed, H.I. and Hasan, A. 2004. Some observations on the status of birds and fishes in the Nurri-ri-Wetland, Badin, Sindh. Rec. Zool. Surv. Pak. 15:16-21.

Javed, HI. and Hasan, A. 2005. On the status of Jubho Wetland, Badin, Sindh. Rec. Zool. Surv. Pak. 16:6-11.

Kanwal, R., Ullah, U., Hussain, B., Yasmeen, G., Zehra, A., Siddiqui, S., Manzoor, U., Raza, N., Imdad, U., Hussain, SE., Khan, AR. and Ghalib, SA. 2018. First marine protected area of Pakistan: Astola Island. Canadian Journal of Pure and Applied Sciences. 12 (1):4423-4432.

Kazmi, Q. 2013. Marine biodiversity of Pakistan. Conference: Zoological Congress of Pakistan. pp. 1-20.

Khan, MZ., F. Tabbassum., Ghalib, SA., Zehrsa, A., Hussain, B., Siddiqui, S., Yasmeen, G., Gabol, K., Mahmood, N., Khan, IS, Khan, AR., Abbas, D., Jabeen, T. Samreen, N. and Iqbal, MA. 2014. Distribution and conservation of the birds in Karachi, Sindh, Pakistan. Canadian Journal of Pure and Applied Sciences. 8(1):2697-2713.

Khan, MZ. Ghalib, SA. and Kanwal, R. 2016. Wetlands and Waterbirds of Sindh. Lambert Academic Publishing, Germany.

Khan, MZ., Ullah, U., Kanwal, R., Zehra, A and Zubair, S. 2018. Distribution and Status of the Vertebrate Biodiversity of Korangi and Phitti Creeks, Karachi coast, Sindh, Pakistan. International Journal of Biology and Biotechnology. 15 (4):751-764.

Khan, RU., Gabol, K., Khan, A., Sadam, A. Panhwar, WA., Ullah, H., Ali, M., Khan, GB. and Hassan, HU. 2024. Avian diversity and its associated threats in Gharo Creek, District Thatta, Sindh, Pakistan. Pakistan J. Zool. 56(2):725-732.

Khanum, Z. and Ahmed, M. 1988. Resident and Migratory Birds of the Karachi Coast Proceeding of the International Conference- Marine Science of the Arabian Sea-1986. American Institute of Biological Sciences, Washington, DC, USA. 467-469.

Pandrani, A., Hasnain, SA., Ghalib, SA. and Ahmed, E. 2005. Observation of water birds of Jiwani Wetland Complex, Makran Coast (Balochistan). Pakistan Journal of Zoology. 37(4):301-306.

Rasool, F. and Hasnain, SA. 2008. Observations on the avifauna of Miani Hor, Balochistan. Pakistan Journal of Marine Science. 17(2):99-106.

Rasool, F. and Hasnain, SA. 2009. Gwatar Bay: A Potential Site for Transboundary Marine Protected Area between Iran and Pakistan. Proceedings of Seminar on Transboundary Coastal and Marine Protected Areas with Special Priorities for Spawning Grounds. Zoological Survey Department, Government of Pakistan, Islamabad. pp.14-27.

Scott, DA. (Ed.) 1989. A Directory of Asian Wetlands, Pakistan Section, 295-365. IUCN, Gland, Switzerland. pp.1181.

Siddiqui, PA., Saqib, T. and Kazmi, MA. 2001. Birds Population in Different Coastal Areas of Karachi Sind. Pak. J. Marine Sciences. 10(1):49-60.

Ubaid Ullah., Umer, HM., Iqnbal, MA., Yaseen, G., Kanwal, R., Lateef, TA., Ghalib, SA., Khan, MZ. and Beg, MN. 2021. Study of Ecology, distribution and status of biodiversity of Bin Qasim Industrial Zone Malir, Karachi, Pakistan. Canadian Journal of Pure and Applied Sciences. 15 (1):5179-5192.

Received: June 21, 2025; Revised: Aug 25, 2025;
Accepted: Sept 16, 2025