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STATUS AND DIVERSITY OF COASTAL AVIAN FAUNA IN GWADAR PENINSULA, BALOCHISTAN

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ABSTRACT: The 1050 km long coastline of Pakistan, extends from Sir Creek in the southeast of Indus delta to Gwadar Bay in the west. This article is based on diversity, habitat, status and distribution of different species of coastal birds present in the Gwadar coast. Observation of birds was done during winter season at four different sites. The habitat is important for different coastal birds like terns, gulls, pelicans and waders including resident and migratory species. A total of 55 species were recorded from the entire area. The species richness was higher at two sites. The birds were seen in higher numbers at uninhabited points compared to those near the populated area or the port. Shannon diversity index for bird community was calculated for four sites namely Shabi Estuary, Gwadar East Bay, Gwadar West Bay and Gurab, where the diversity was found to be 2.82, 2.27, 2.33 and 2.40 respectively.
Birds of Common Sandpiper (*Actitishy poleucos*), Common Teal (*Anas crecca)*, Wigeon (*Anas Penelope*), Shoveller (*Anas clypeata*), Pochard (*Aythya ferina*), Common Coot (*Fulica atra*), Grey Plover (*Pluvialis squatarola)*, Kentish Plover (*Charadrius alexandriunus*), Dusk Red Shank (*Tringa erythropus*) and Great White Pelicans (*Pelecanus onocrotalus*) have been recorded in large numbers during the study period. Some vulnerable species for *e.g.* Pochard (*Aythya ferina*) and endangered species for *e.g.* Great Knot (*Calidris tenuirostris*), Egyptian Vulture (*Neophron percnopterus*), and two near threatened species Oyster catcher (*Haematus ostralegus*) and Dalmation Pelican (*Pelecanus crispus*) were also recorded. The major threats to the ecosystem are habitat degradation due to port construction, urbanization, hunting, poaching and other anthropogenic activities.

KEYWORDS: Avian fauna, Census, Gwadar East Bay, Shabi Estuary, Kallag, Gurab.

INTRODUCTION

Pakistan coastline is 1050 Km long, stretching from Sir Creek in the southeast, to Jiwani near Iranian border in the southwest and is spread over the provinces of Sindh and Balochistan. The Balochistan coast is a good habitat for different species of aquatic birds (Ghalib and Hasnain, 1997), the coast is almost pollution free and holds a healthy environment. The coastline of Balochistan is classified (IUCN, 2005) into Embeyed coast, Khalifa coast, Gawder East and Gwadar West bay. Tidal lagoons and estuaries Sonmiani Bay and Kalmat Khor and mount of seasonal rivers which includes Hub, Porali, Basol, Hingal, Shadikaur and Dhast River (Fig. 1).

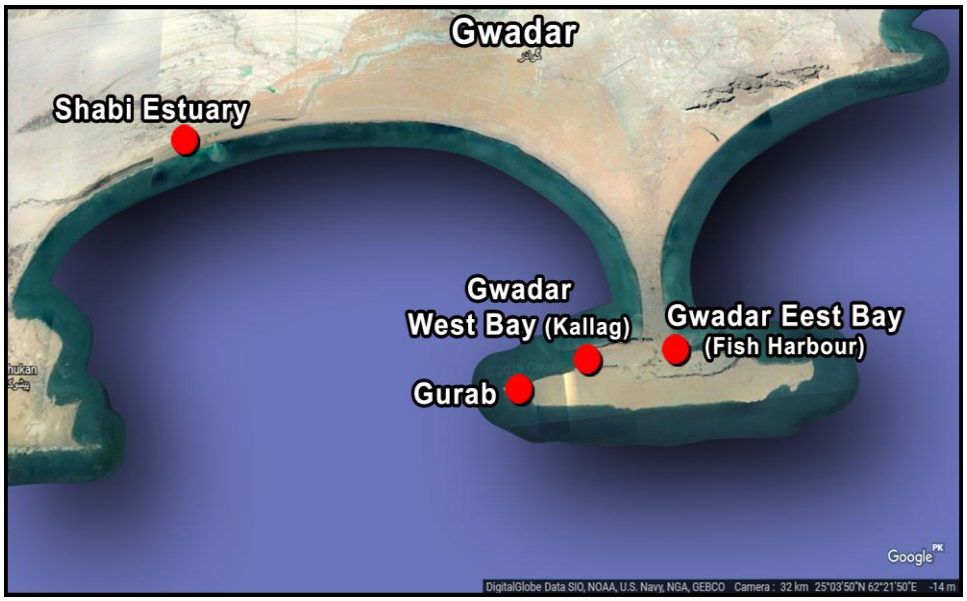

Fig. 1. Map of the study area showing the sites A to D.

Gwadar peninsula is located in a region having subtropical arid climate. The summers are warm and dry whereas the winters are mild and moist. Maximum summer temperatures rise upto 35^{o}C and winters having as low as 13^{o}C. The rainy season is mostly in the winters with an average annual precipitation of 20 mm whereas inmonsoon (July and August), the rain is unusual (Kaleem, 2015).

The mangrove forest of Baluchistan coast is located in Sonmiani Bay, Kalmat Khor and Gawder Bay, which holds a natural population of *Avicennia marina, Rhizophora* and *Ceriopstagal* and is a vital habitat for the coastal bird species. The highest numbers of bird are present in these mangroves forest (Ghalib and Hasnain, 1997; Hasan 1994; Javed and Hasan, 2004; and Gabol and Rahim, 2006; Saifullah and Rasool, 2002; Khurshid *et al*., 1995; Henizel, 1972; Harms *et al*., 1984; Roberts, 1991; Roberts, 1992; Saifullah and Rasool, 2002). The area is also an attraction for the migratory birds coming from Siberia. Birds of the Balochistan coast have been studied earlier, but most of them are simple lists of birds (Pandrani *et al*., 2005).

Due to ever increasing urbanization, industrialization, agriculture and other forms of anthropogenic development, the natural ecosystems and particularly the habitat of birds is under threat. The coastal area of Balochistan which, until recently, was relatively undisturbed, is now subject to massive human development particularly the coastal habitat in Gwadar is changing with developmental activities. Since the start of China Pakistan Economic Corridor (CPEC) project and rapid development activities in and around the Gwadar Port might lead to changes in the dynamics of the habitat. The present study was conducted to find the status and populations of the coastal birds and their trends. The surveys were conducted during winter season of 2017-18.

MATERIALS AND METHOD

Study sites

Coast of Gwadar was surveyed as per the sites shown in the map in Fig. 1. The study was conducted during November 2017 to February 2018. Following observation sites were selected:

A:	Shabi Estuary	(25°13'09"N, 62°12'20"E)
B:	Gwader East Bay (Fish Harbor)	(25°06'48"N, 62°19'52"E)
C:	Gwadar West Bay (Kallag)	(25°06'54"N, 62°17'29"E)
D:	Gurab	(25°06'13"N, 62°16'55"E)

The bay area mostly contains sandy or rocky beaches. The port and harbor area is developed and is under influence of anthropogenic activities. Whereas the other areas are largely natural and undisturbed. The Shabi estuary is an intertidal mudflat and contains mangrove swamps in some parts.

Direct counts

It is one of the most widely used methods for studying the birds. Birds were counted randomly at selected points with the help of binoculars and spotting scope (15x60) and binoculars (7x60). Species identification was made through the field guides developed by Grimmett (1998), Sonobe and Usui (1993), Ali *et al.*, (1983), Heinzelet *et al.*, (1972), Perrins and Attenborugh (1987) and Roberts (1991) and Breckenridge (1935), Deshmukh, (1986). Species diversity of the birds of four different sites was measured separately by Shannon-Weiner Index (Shannon, 1948). The index is calculated by using the following equation:

$$H' = \Sigma\, i\, Pi \log (Pi)$$

Where H is the diversity and the P_i is the relative abundance (Shannon, 1948).

RESULTS AND DISCUSSION

The study areas have been found to be highly important for shore birds and waterfowls particularly flamingos, pelicans, gulls and terns. Altogether 55 species of aquatic birds have been identified in 23 families and 38 genera during the study period (Table 1). Ali *et al.,* (2011) has reported 109 species in 16 orders and 38 families in an adjacent area *i.e.*, Jiwani Wetland Complex Whereas 31 species were recorded from Gwater bay (Gabol and Rahim, 2006).

Seasonal and conservation status of different species is shown in Table 1. During the survey some endangered, vulnerable and near threatened species were spotted. For *e.g.* vulnerable species Pochard (*Aythya ferina*) and endangered species for *e.g.* Great Knot (*Calidris tenuirostris*), Egyptian Vulture (*Neophron percnopterus*) and two near threatened species Oyster catcher *(Haematpus ostralegus*) and Dalmation Pelican (*Pelecanus crispus*) were also recorded which shows the habitat is highly important.

Table 1. Avian fauna observed during study period with conservation and seasonal status.

Family	Species	COMMON NAME	Conservation Status (IUCN)	Seasonal Status
Accipitridae	*Neophron percnopterus*	Egyptian vulture	EN	R
Alauididae	*Alaemon alaudipes*	Desert finch Lark	LC	R
	Galeria cristata	Indian crested Lark	LC	R
	Alauda gulgula	Small sky Lark	LC	R
Anatidae	*Anas crecca*	Common Teal	LC	WV
	Anas Penelope	Wigeon	LC	WV
	Anas clypeata	Shoveller	LC	WV
	Aythya ferina	Pochard	VU	WV
	Anas querquedula	Garganey	LC	WV
Ardeidae	*Egretta Gularis*	Reef heron	LC	R
Charadriidae	*Pluvialis squatarola*	Grey Plover	LC	R
	Charadrius alexandriunus	Kentish Plover	LC	R
	Charadrius leschenaultia	Great sand Plover	LC	WV
Columbidae	*Sptreptopeli senegalensis*	Laughing Dove	LC	R
Corvidae	*Corvus splendens*	House crow	LC	R
	Corvus ficollis	Black naked Raven	LC	R
Dicruridae	*Dicrurus macrocercus*	Black Drongo	LC	R

Continued……..

Emberizidae	*Emberiza sahari*	House Bunting	LC	R
Haematopodidae	*Haematopus ostralegus*	Eurasian Oystercatcher	NT	WV
	Himantopus himantopus	Black winged stilt	LC	R
Hirundinidae	*Riparia paludicola*	Indian sand martin	LC	WV
	Ptyonoprogne fuligula	Rock martin	LC	W
	Hirundo rustica	Common Swallow	LC	WV
Laridae	*Larus genei*	Slender bill gull	LC	WV
	Anousst olidus	Common noddy	LC	WV/R
	Larus hemprichii	Sooty Gull	LC	WV
	Larus argentatus	Herring Gull	LC	WV
	Larus fuscus	Lesser Black headed Gull	LC	WV
	Larus ichthyaetus	Greater black headed Gull	LC	WV
	Larus ridibundus	Black headed Gull	LC	WV
	Gelochelidon nilotica	Gull bill Tern	LC	WV
	Sterna caspia	Caspian Tern	LC	WV
	Sterna hirundo	Common tern	LC	WV
	Sterna sandvicensis	Sandwich Tern	LC	WV
	Sterna albifrons	Litter Tern	LC	WV
Passeridae	*Passer domesticus*	House Sparrow	LC	WV
Pelecanidae	*Pelecanus onocrotalus*	Great White Pelican	LC	WV
	Pelecanus crispus	Dalmatian Pelican	NT	WV

Continued……

Phalacrocoracidae	*Phalacrocorax carbo*	Great cormorant	LC	WV
Phasianidae	*Ammoperdix griseogularis*	See-see partridge	LC	WV
	Cotumix cotumix	Common Quail	LC	WV
Phoenicopteridae	*Phoenicopterus roseus*	Greater Flamingo	LC	WV
Ploceidae	*Ploceus philippinus*	Indian Baya	LC	WV
Podicipedidae	*Tachybaptus ruficollis*	Little grebe	LC	WV
Rallidae	*Fulica atra*	Common Coot	LC	WV
Scolopacidae	*Numenius arquata*	Eurasian Curlew	LC	WV
	Tringa erythropus	Dusk red shank	LC	WV
	Tringa nebularia	Green shank	LC	WV
	Tringa tetanus	Common Red Shank	LC	WV
	Actitis hypoleucos	Common sandpiper	LC	WV
	Gallinago gallinago	Common Fantail Snipe	LC	WV
	Calidris tenuirostris	Great Knot	EN	WV
	Calidris alba	Sanderling	LC	PM
Sturnidae	*Acridothere stristis*	Indian common Mynah	LC	M/PM
Threskiornithidae	*Platalea leucorodia*	Spoon bill	LC	M

Key: R = Resident, M = Migratory, PM = Passive migratory, WV = Winter visitor.
LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered

The composition of the birds in terms of their seasonal status is shown in Fig. 2, according to which 31% were resident, 1% passage visitor and 68% winter visitors were observed during the study period. Ali *et al.,* (2011) compared the avian fauna diversity between Jiwani coastal wetland and Taunsa barrage and found out the highest number of avian fauna in Jiwani coastal wetland with 70% winter migratory bird species. The coast of Gwadar is one of the best habitats for migratory birds because the area is pollution-free

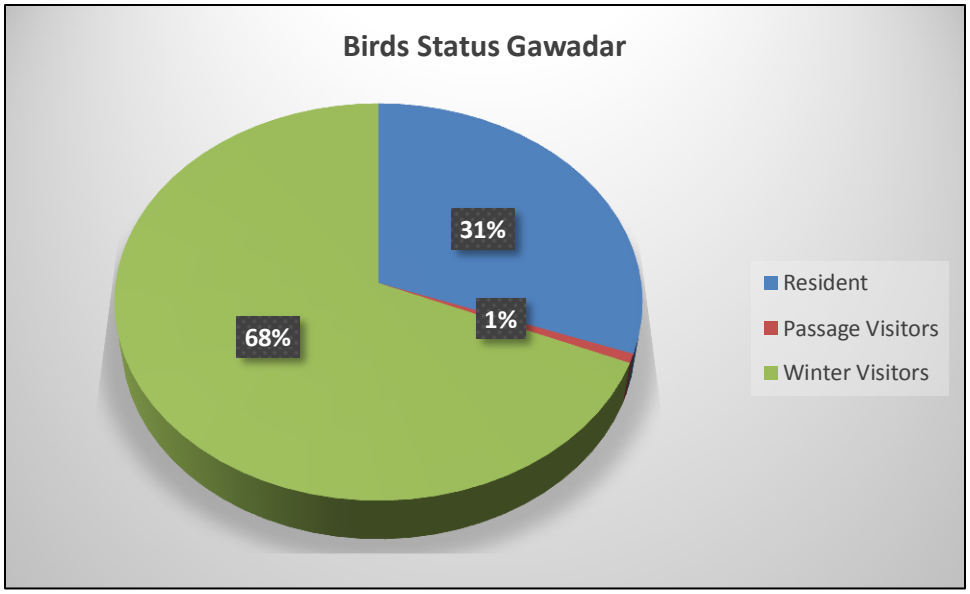

Fig. 2. Composition of status of bird species in study area.

compared to Karachi coast. Another study in Sandspit / Hawkesbay Wetland Complex, Durrani *et al.*, (2008) reported 114 species of birds out of which 70 were migratory.

The highest number of resident birds observed was *Phalacro corax carb, Tachybaptus rufficollis, Ripariapa ludicula* during study period. Whereas among the winter visitors *Fulica atra, Hematopus ostralegus, Larus argentatus, Larus fusus* and *Larus ridibundus* were prominent. Fig. 3 showed some birds as observed in the area.

There is a significant decline in the numbers of water birds visiting the coastal area due to hunting, loss of habitat and habitat degradation. Hunting and poaching of the birds are common in the winter season; as captured in the camera during one of the visits (Fig. 4). The site A, Shabi estuary show highest number of Spoon Bill, Greater Flamingo, Wigeon, Shoveller, Porchard, Black Winged Still, Kentish Plover, Green Shank, Red Shank, Great Knot, Sanderling, Gull Bill Tern, Sand Plover, Dalmatian Pelican and Great White Pelican.

The site B Gwadar East Bay was found more populated with Common Teal, Spoon Bill, Great White Pelican, Dalmatian Pelican, Shoveller compared with study area A. Whereas, Kallag (Gwadar West Bay) showed the highest numbers of Red shank, Great white pelican, Dalmatian pelican, Black headed gull, Gull bill tern, Sandwich tern. On the other hand, Gurab contained a greater population of waders specially Plover, Kentish Plover, Grey Knot, Black Wing Stilt, Green Shank, Red Shank, Greater Flamingo and Spoon Bill.

Ali *et al.*, (2016) studied winter birds and show the highest numbers of waders in the area of Ketibunder in the district Thatta Sindh. Pandrani *et al.*, 2005 reported some important migratory birds especially Dalmatian pelican and white pelican in the area of

Fig. 3. Observed birds in the study area.

Jiwani Wetland complex at Makran coast. Ghalib *et al.,* (2009) recorded the some important shore birds in important site of wetlands of Pakistan.

Family-wise composition of the birds is shown in Fig. 5. The family Rallidae was the most abundant family followed by families Laridae and Phalacrocoracidae.

Ali *et al.,* (2003) reported 125 bird species from Makran Coastal Wetland Complex (an adjacent area) and calculated Shannon index in the mangroves and in the open coastline as 2.2 and 2.61 respectively. Another winter study of coastal birds in Ketibunder (Ali *et al.,* 2016) found the same index as 3.23. The present study revealed similar results. The diversity of birds in the mangrove forest of Shabi estuary was highest as compared to that of the coastline (Fig. 6). The study suggests moderate diversity of avian fauna in the coastal habitat.

Fig. 4. Locals capture the terns as a food source (Photo by corresponding author).

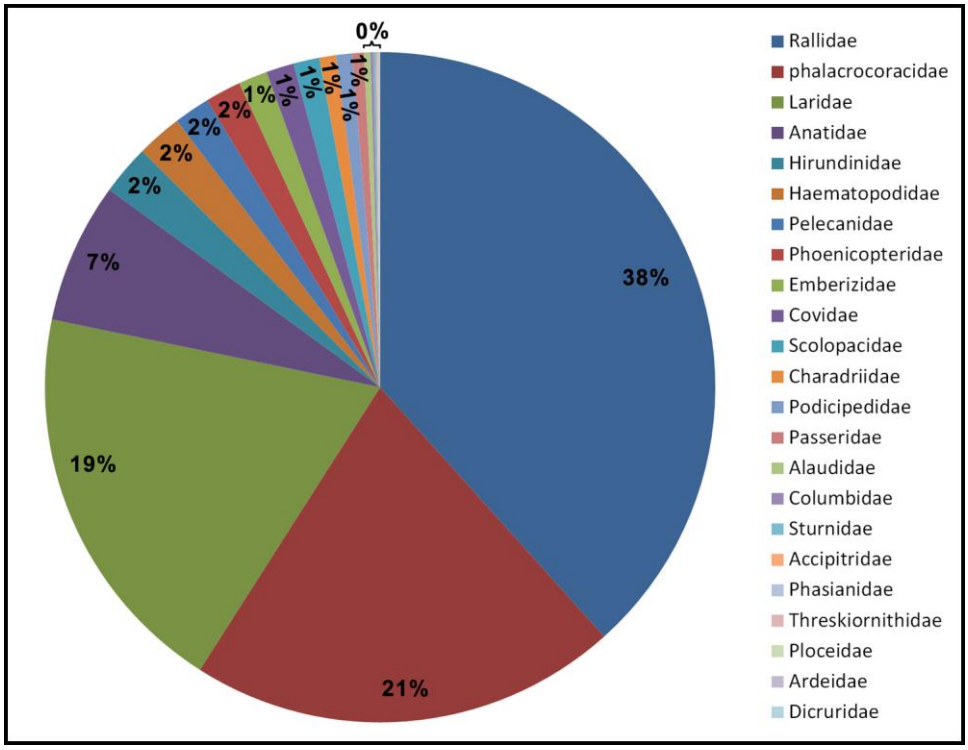

Fig. 5. Comparative abundance of observed bird families in the study area.

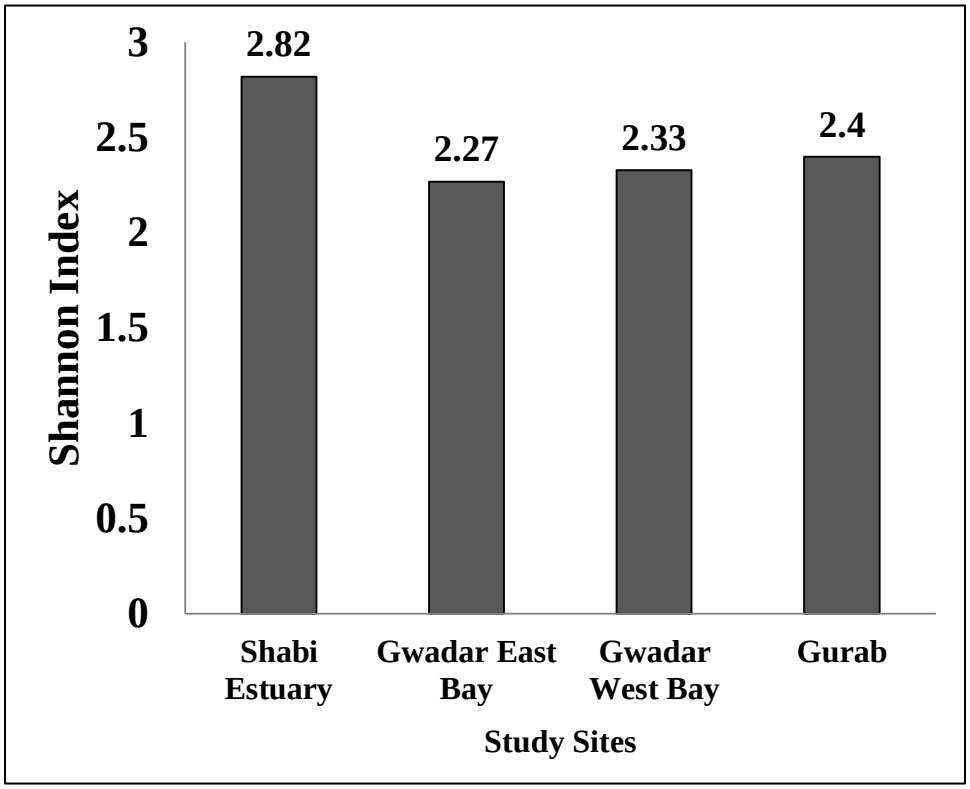

Fig. 6. Shannon-Weiner Index for bird diversity in Gwadar.

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