

## AN OVERVIEW OF OCCURRENCE, DISTRIBUTION AND STATUS OF THE BIRDS OF KHIRTHAR PROTECTED AREA COMPLEX (KPAC), SINDH

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### ABSTRACT

The present field studies were undertaken to collect data on the distribution and status of the birds in the Khirthar Protected Areas Complex (KPAC). These took place for a period of six months from September, 2012 to March, 2013. The data were collected at 50 sites throughout the Complex and compiled. Seven different habitats were identified for the study of the birds of the area. A total of 207 species of birds belonging to 15 Orders and 38 Families alongwith their status were recorded. Among them, 08 species have been listed as threatened and 06 as near threatened as per IUCN Red List. The highest avian biodiversity was found at the wetland sites and at cropland/ villages, and the lowest in mountainous areas. From the conservation view point, highest number of threatened/ Near threatened species of birds were found at the Wetland Sites and next at Riparian/ Sandy/Plain areas.

**Keywords:** Khirthar National Park, protected areas of Sindh, birds of Sindh.

### INTRODUCTION

Wildlife and wildlife habitats are vital to the ecological and biological processes that are essential to the preservation of life. Pakistan's protected areas system represents a significant contribution to the protection of global biodiversity. There are over 235 protected areas in Pakistan. The Khirthar Protected Areas Complex (KPAC) stretches over 4,350km<sup>2</sup>, and comprises of Khirthar National Park (3,087km<sup>2</sup>), Mahal Kohistan Wildlife Sanctuary (705.7 km<sup>2</sup>), Hub Dam Wildlife Sanctuary (272 km<sup>2</sup>), Surjan Game Reserve, Sambak Game Reserve, Eri Game Reserve, and Huthiano Game Reserve (285.3km<sup>2</sup>) (Khan *et al.*, 2013). It is an archeologically rich site and includes the world's largest fort, the Rannikot Fort, tombs in Taung and fossils and petrified forests in the Khirthar Range.

The Khirthar Protected Areas Complex is significant for its sizeable indigenous settlements, rugged terrain, valuable flora, fauna and mineral resources. Important wildlife species that inhabit this area include the Urial (*Ovis vignei*), Sindh Ibex (*Capra aegagrus*), Chinkara (*Gazella bennettii*), Striped Hyaena (*Hyaena hyaena*), Wolf (*Canis lupus*), Caracal (*Felis caracal*), Indian

Pangolin (*Manis crassicaudata*), Ratel (*Mellivora capensis*), Houbara Bustard (*Chlamydotis undulata*), Grey Partridge (*Francolinus pondicerianus*), See-see Partridge (*Ammoperdix griseogularis*), Sandgrouses, Falcons, Vultures, and Marsh Crocodile. It is home to many other residents as well as migratory bird species.

The principal vegetation of the Park comprises of *Acacia senegal*, *Acacia nilotica*, *Zizyphus nummularia*, *Commiphora wightii*, *Capparis decidua*, *Acacia jacquemontii*, *Prosopis cineraria*, *Tecomella undulata*, *Salvadora oleoides*, *Tamarix spp*, *Euphorbia caducifolia*, *Grewia tenax*, *Veronia cinerascens* and *Lycium ruthenicum*. As many as seven habitat types were identified during the previous study (UoM, 2000). These included the Wetland, Riparian Area, Sandy Plains, Stony Ground, Mountain Escarpment, Mountain Ridges and Ravines, Cropland and Villages.

The Hub Dam Area of KPAC is also an Important Bird Area (IBA), and a Ramsar Site. It contains many resident species of birds while a large number of migratory birds visit the area as summer/ winter passage migrants during the season.

During the Baseline Study of Khirthar National Park (KNP) in 2000, 193 species of birds were recorded (UoM, 2000). Later, environmental impact assessments (EIAs)

were carried out for gas exploration activities by Halcrow Pakistan (2002), and Hagler Bailley Pakistan (2001, 2002 a,b,c,d, and 2003) and information was collected about the fauna of the area including the birds but the data is unpublished. Mirza (2002) gives valuable information about species identification and behavior and status of mammals, birds, and reptiles of KNP. As many as 153 species of birds have been described from the area. Other works dealing with the birds of the area include Haleem and Khan (1975), Scott (1989), Lindsey (1991), Roberts (1991, 1992), Ghalib *et al.* (2000, 2002), Mirza (2007), Grimmett *et al.* (2008), Khan *et al.* (2012), Ahmed (2013), and Begum *et al.* (2013).

## MATERIALS AND METHODS

During the present study, attempt was made to survey all seven habitat types, but the emphasis was on the principal bird habitat types such as the wetlands, foothills, stony ground, scrub forest and vicinity of villages. The present study was conducted in KPAC for a period of 6 months from September, 2012 to March, 2013. Extensive surveys were conducted in the area by a team of observers during this period. Following techniques were employed for surveying birds in the area.

**i. Transect Method:** It is the most commonly used field method in bird surveying. There are two types of transects used in survey – line transects and point counts (or point transects).

Line Transects – are used for extensive, open and uniform habitats. These are done by the observers moving on a predetermined fixed route and searching and recording birds they hear or see on either side of the route. In the present study, each sample area was traversed and examined by two observers. Birds were searched on each side of the strip for about 150 meter, so each study strip was about 300 meter wide. Binoculars and spotting scope were used to identify bird species and count or assess bird numbers.

Point count or point transects - are used for highly visible or vocal species, such as passerines, in a wide variety of habitats and are particularly suited to dense vegetation such as forest or scrub. A point count is a count undertaken in a location for a fixed time.

**ii. Counting Flocks:** This technique is used for flocking species, particularly waders and anatids. When the flock is of about a few hundred birds, all can be counted directly from a suitable vantage point through binoculars and spotting scope. This is easy with large birds but becomes progressively difficult with large numbers and smaller birds at greater distances.

For small flocks having fewer than 500 birds, individual birds are counted. With large numbers of birds or with mobile flocks, however, birds are counted in tens, twenties or even greater numbers rather than counting individual birds and the proportion of the flock each represents is counted. Landmarks are used to divide large flocks on the ground into smaller groups.

For accurate counts, close or distant viewing of individuals with binoculars or a telescope is made by counting 1, 2, 3, 4, 5, 6, 7,..... etc.

When there is an uneven distribution of numbers, then by visually dividing the birds into small groups and counting each group individually. Totals from each group are then added to from the final total.

Counting of either evenly or unevenly distributed birds may also be made by counting the flocks in multiple i.e. 3, 6, 9, 12, 15 etc. or 2, 4, 6, 8, 10 etc.

### iii. Plot Searches

Plot searches are made at each site to record as many species of birds as possible from a main central point within a radius of 250m of the sampling point.

### iv. Spot Lighting

Night Surveys are carried out to record the occurrence of nocturnal birds. Each transect approximately 5km long is scanned after dark using a vehicle or by travelling on foot along the main tracks. The same route is followed on the return journey. The species sighted are listed along with the details of the location and habitat type.

### v. Incidental Sighting

This methods includes recording the incidental sighting of the birds alongwith field data.

Sampling sites for the study of birds were randomly selected throughout the present study. However, some sampling was done ensuring that all the major and most important bird habitats types such as wetlands, water spring points, foothills and plains are mostly covered.

## RESULTS AND DISCUSSION

Bird occurrence with numbers was recorded in seven habitats types. A total of 207 species of birds belonging to 17 Orders and 52 Families have been recorded from the KPAC (Table 1). The number of species of birds recorded separately in each component of the KPAC have been shown in table 2, and the seasonal status has been shown in table 3.

Table 1. Consolidated Checklist of the Birds of KPAC.

S. No.	Order	Family	Scientific Name	Common Name	Status
01	Podicipediformes	Podicipedidae	<i>Podiceps cristatus</i>	Great Crested Grebe	WV
02	Podicipediformes	Podicipedidae	<i>Podiceps nigricollis</i>	Black Necked Grebe	WV
03	Podicipediformes	Podicipedidae	<i>Tachybates ruflcollis</i>	Little Grebe or Dabchick	R
04	Pelecaniformes	Pelecanidae	<i>Pelecanus onocrotalus</i>	White or Rosy Pink	WV
05	Pelecaniformes	Pelecanidae	<i>Pelecanus crispus</i>	Dalmatian Pelican	WV
06	Pelecaniformes	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Large Cormorant	WV
07	Pelecaniformes	Phalacrocoracidae	<i>Phalacrocorax niger</i>	Little Cormorant	R
08	Ciconiiformes	Ardeidae	<i>Ardea cinerea</i>	Grey Heron	WV
09	Ciconiiformes	Ardeidae	<i>Ardeola grayii</i>	Indian Pond Heron	R
10	Ciconiiformes	Ardeidae	<i>Bubulcus ibis</i>	Cattle Egret	R
11	Ciconiiformes	Ardeidae	<i>Casmerodius alba</i>	Great Egret	R
12	Ciconiiformes	Ardeidae	<i>Egretta intermedia</i>	Smaller or Median Egret	R
13	Ciconiiformes	Ardeidae	<i>Egretta garzetta</i>	Little Egret	R
14	Ciconiiformes	Ardeidae	<i>Nycticorax nycticorax</i>	Night Heron	R
15	Ciconiiformes	Ardeidae	<i>Ixobrychus minutus</i>	Little Bittern	R
16	Ciconiiformes	Ardeidae	<i>Ixobrychus sinensis</i>	Yellow Bittern	R
17	Ciconiiformes	Threskiornithidae	<i>Platalea leucorodia</i>	Eurasian Spoonbill	WV/r
18	Ciconiiformes	Phoenicopteridae	<i>Phoenicopterus roseus</i>	Greater Flamingo	WV/ YRV
19	Anseriformes	Anatidae	<i>Anas acuta</i>	Pintail	WV
20	Anseriformes	Anatidae	<i>Anas crecca</i>	Common Teal	WV
21	Anseriformes	Anatidae	<i>Anas platyrhynchos</i>	Mallard	WV
22	Anseriformes	Anatidae	<i>Anas strepera</i>	Gadwall	WV
23	Anseriformes	Anatidae	<i>Anas penelope</i>	Wigeon	WV
24	Anseriformes	Anatidae	<i>Anas clypeata</i>	Shoveller	WV
25	Anseriformes	Anatidae	<i>Aythya ferina</i>	Common Pochard	WV
26	Anseriformes	Anatidae	<i>Aythya fuligula</i>	Tufted Duck	WV
27	Falconiformes	Accipitridae	<i>Elanus caeruleus</i>	Black winged Kite	R
28	Falconiformes	Accipitridae	<i>Pernis ptilorhynchus</i>	Oriental Honey Buzzard	WV
29	Falconiformes	Accipitridae	<i>Milvus migrans</i>	Black Kite	R
30	Falconiformes	Accipitridae	<i>Accipiter badius</i>	Shikra	R
31	Falconiformes	Accipitridae	<i>Accipiter nisus</i>	Asiatic Sparrow-Hawk	WV
32	Falconiformes	Accipitridae	<i>Buteo rufinus</i>	Longlegged Buzzard	WV
33	Falconiformes	Accipitridae	<i>Buteo buteo</i>	Common Buzzard	WV
34	Falconiformes	Accipitridae	<i>Butastur teesa</i>	White-eyed Buzzard Eagle	R
35	Falconiformes	Accipitridae	<i>Hieraatus fasciatus</i>	Bonelli's or Slender Hawk Eagle	R
36	Falconiformes	Accipitridae	<i>Hieraatus pennatus</i>	Booted Hawk Eagle	WV
37	Falconiformes	Accipitridae	<i>Aquila chrysaetos</i>	Golden Eagle	WV
38	Falconiformes	Accipitridae	<i>Aquila heliaca</i>	Imperial Eagle	WV
39	Falconiformes	Accipitridae	<i>Aquila rapax</i>	Tawny Eagle	R
40	Falconiformes	Accipitridae	<i>Aquila nipalensis</i>	Steppe Eagle	WV
41	Falconiformes	Accipitridae	<i>Aquila clanga</i>	Greater Spotted Eagle	WV
42	Falconiformes	Accipitridae	<i>Haliaeetus leucoryphus</i>	Pallas's Fishing Eagle	R
43	Falconiformes	Accipitridae	<i>Aegyptius monachus</i>	Cinereous Vulture	R
44	Falconiformes	Accipitridae	<i>Gyps fulvus</i>	Indian Griffon Vulture	R
45	Falconiformes	Accipitridae	<i>Gyps begalensis</i>	Indian Whitebacked Vulture	R

Continued...

Table 1 continue...

S. No.	Order	Family	Scientific Name	Common Name	Status
46	Falconiformes	Accipitridae	<i>Neophron percnopterus</i>	Egyptian Vulture	R
47	Falconiformes	Accipitridae	<i>Circus aeruginosus</i>	Marsh Harrier	WV
48	Falconiformes	Accipitridae	<i>Circaetus gallicus</i>	Short-toed Eagle	R
49	Falconiformes	Pandionidae	<i>Pandion haliaetus</i>	Osprey	WV
50	Falconiformes	Falconidae	<i>Falco jugger</i>	Lagger Falcon	R
51	Falconiformes	Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon	WV
52	Falconiformes	Falconidae	<i>Falco subbuteo</i>	Hobby	WV
53	Falconiformes	Falconidae	<i>Falco columbarius</i>	Pallid Merlin	WV
54	Falconiformes	Falconidae	<i>Falco chicquera</i>	Red Headed Merlin	R
55	Falconiformes	Falconidae	<i>Falco tinnunculus</i>	Common Kestrel	WV/r
56	Galliformes	Phasianidae	<i>Ammoperdix griseularis</i>	See-see Partridge	R
57	Galliformes	Phasianidae	<i>Francolinus francolinus</i>	Black Partridge	R
58	Galliformes	Phasianidae	<i>Francolinus pondicerianus</i>	Grey Partridge	R
59	Galliformes	Phasianidae	<i>Conturnix conturnix</i>	Grey Quail	M/PM
60	Galliformes	Phasianidae	<i>Pavo cristatus</i>	Indian Peafowl	R
61	Gruiformes	Rallidae	<i>Amaurornis phoenicurus</i>	White-breasted Water Hen	R
62	Gruiformes	Rallidae	<i>Gallinula chloropus</i>	Indian Moorhen	R
63	Gruiformes	Rallidae	<i>Fulica atra</i>	Coot	WV
64	Gruiformes	Otididae	<i>Chlamydotis undulate</i>	Houbara Bustard	WV
65	Charadriiformes	Charadriidae	<i>Vanellus leucurus</i>	White-tailed Lapwing	WV
66	Charadriiformes	Charadriidae	<i>Vanellus gregarius</i>	Sociable Lapwing	WV
67	Charadriiformes	Charadriidae	<i>Vanellus indicus</i>	Red Wattled Lapwing	R
68	Charadriiformes	Charadriidae	<i>Vanellus malabaricus</i>	Yellow-wattled Lapwing	SBV
69	Charadriiformes	Charadriidae	<i>Charadrius dubius</i>	European Little Ringed Plover	WV
70	Charadriiformes	Charadriidae	<i>Charadrius alexandrinus</i>	Kentish Plover	WV/r
71	Charadriiformes	Scolopacidae	<i>Limosa limosa</i>	Black tailed Godwit	WV
72	Charadriiformes	Scolopacidae	<i>Tringa totanus</i>	Common Redshank	WV
73	Charadriiformes	Scolopacidae	<i>Tringa nebularia</i>	Greenshank	WV
74	Charadriiformes	Scolopacidae	<i>Tringa ochropus</i>	Green Sandpiper	WV
75	Charadriiformes	Scolopacidae	<i>Tringa hypoleucos</i>	Common Sandpiper	WV
76	Charadriiformes	Scolopacidae	<i>Capella gallinago</i>	Common or Fantail Snipe	WV
77	Charadriiformes	Scolopacidae	<i>Calidris minutus</i>	Little Stint	WV
78	Charadriiformes	Scolopacidae	<i>Calidris temminckii</i>	Temminck's Stint	WV
79	Charadriiformes	Scolopacidae	<i>Calidris testaceus</i>	Curlew-Sandpiper	WV
80	Charadriiformes	Scolopacidae	<i>Philomachus pugnax</i>	Ruff	WV
81	Charadriiformes	Scolopacidae	<i>Phalaropus lobatus</i>	Rednecked Phalarope	WV
82	Charadriiformes	Recurvirostridae	<i>Himantopus himantopus</i>	Blackwinged Stilt	R
83	Charadriiformes	Glareolidae	<i>Cursorius cursor</i>	Cream coloured or Desert Courser	R
84	Charadriiformes	Glareolidae	<i>Cursorius coromandelicus</i>	Indian Courser	R
85	Charadriiformes	Glareolidae	<i>Glareola lactea</i>	Small Pranticole	SBV
86	Charadriiformes	Laridae	<i>Larus argentatus</i>	Herring Gull	WV
87	Charadriiformes	Laridae	<i>Larus ridibundus</i>	Black headed Gull	WV
88	Charadriiformes	Sternidae	<i>Chlidonias hybrida</i>	Whiskered Tern	PM
89	Charadriiformes	Sternidae	<i>Gelochelidon nilotica</i>	Gullbilled Tern	WV

Continued...

Table 1 continue...

S. No.	Order	Family	Scientific Name	Common Name	Status
90	Charadriiformes	Sternidae	<i>Sterna albifrons</i>	Little Tern	R
91	Columbiformes	Pteroclididae	<i>Pterocles exustus</i>	Chestnut-bellied or Common or Indian Sandgrouse	R
92	Columbiformes	Pteroclididae	<i>Pterocles lichtensteini</i>	Close-barred Sandgrouse	R
93	Columbiformes	Columbidae	<i>Columba livia</i>	Blue Rock Pigeon	R
94	Columbiformes	Columbidae	<i>Streptopelia decaocto</i>	Ring Dove	R
95	Columbiformes	Columbidae	<i>Streptopelia tranquebarica</i>	Red Turtle Dove	R
96	Columbiformes	Columbidae	<i>Streptopelia senegalensis</i>	Little Brown or Senegal Dove	R
97	Psittaciformes	Psittacidae	<i>Psittacula krameri</i>	Rose ringed Parakeet	R
98	Cuculiformes	Cuculidae	<i>Cuculus canorus</i>	Eurasian Cuckoo	PM/ SBV
100	Cuculiformes	Cuculidae	<i>Eudynamys scolopacea</i>	Indian Koel	R
101	Cuculiformes	Cuculidae	<i>Centropus sinensis</i>	Common Crow-Pheasant or Coucal	R
102	Strigiformes	Strigidae	<i>Otus brucei</i>	Striated or Pallid Scops Owl	WV
103	Strigiformes	Strigidae	<i>Bubo bubo</i>	Indian Great Horned or Eagle Owl	R
104	Strigiformes	Strigidae	<i>Athene brama</i>	Spotted Owlet	R
105	Strigiformes	Strigidae	<i>Asio otus</i>	Longeared Owl	WV
106	Caprimulgiformes	Caprimulgidae	<i>Caprimulgus europaeus</i>	Eurasian Nightjar	SBV/PM
107	Caprimulgiformes	Caprimulgidae	<i>Caprimulgus mahrattensis</i>	Syke's or Sind Nightjar	R
108	Caprimulgiformes	Caprimulgidae	<i>Caprimulgus asiaticus</i>	Indian Little Nightjar	R
109	Apodiformes	Apodidae	<i>Tachymarptes melba</i>	Alpine Swift	PM
110	Apodiformes	Apodidae	<i>Apus affinis</i>	House Swift	R
111	Coraciiformes	Alcedinidae	<i>Ceryle rudis</i>	Indian Pied Kingfisher	R
112	Coraciiformes	Alcedinidae	<i>Alcedo atthis</i>	Indian Small Blue Kingfisher	R
113	Coraciiformes	Alcedinidae	<i>Halcyon smyrensis</i>	White breasted Kingfisher	R
114	Coraciiformes	Meropidae	<i>Merops superciliosus</i>	Blue cheeked Bee-eater	SBV/PM
115	Coraciiformes	Meropidae	<i>Merops orientalis</i>	Sind Small Green Bee- eater	R
116	Coraciiformes	Coraciidae	<i>Coracias benghalensis</i>	Roller or Blue Jay	R
117	Coraciiformes	Upupidae	<i>Upupa epops</i>	Hoopoe	WV
118	Piciformes	Picidae	<i>Jynx torquilla</i>	Eurasian Wryneck	PM
119	Piciformes	Picidae	<i>Picoides assimilis</i>	Sind Woodpecker	R
120	Passeriformes	Alaudidae	<i>Eremopterix grisea</i>	Ashycrowned Finch-Lark	R
121	Passeriformes	Alaudidae	<i>Eremopterix nigriceps</i>	Blackcrowked Finch-Lark	R
122	Passeriformes	Alaudidae	<i>Ammoman deserti</i>	Indian Desert Finch-Lark	R
123	Passeriformes	Alaudidae	<i>Alaemon alaudipes</i>	Greater Hoopoe Lark	R
124	Passeriformes	Alaudidae	<i>Calandrella rufescens</i>	Lesser Short-toed Lark	WV
125	Passeriformes	Alaudidae	<i>Calandrella brachydactyla</i>	Great Short-toed Lark	WV
126	Passeriformes	Alaudidae	<i>Melanocorypha bimaculata</i>	Calandra Lark	WV

Continued...

Table 1 continue...

S. No.	Order	Family	Scientific Name	Common Name	Status
127	Passeriformes	Alaudidae	<i>Galerida cristata</i>	Crested Lark	R
128	Passeriformes	Alaudidae	<i>Alauda arvensis</i>	Common Skylark	WV
129	Passeriformes	Hirundinidae	<i>Riparia riparia</i>	Pale Martin	WV
130	Passeriformes	Hirundinidae	<i>Mirafra erythroptera</i>	Indian Bush Lark	R
131	Passeriformes	Hirundinidae	<i>Riparia paludicola</i>	Grey throated Indian Sand Martin	R
132	Passeriformes	Hirundinidae	<i>Ptyonoprogne fuligula</i>	Pale Crag Martin	R
133	Passeriformes	Hirundinidae	<i>Hirundo rustica</i>	Common Swallow	WV
134	Passeriformes	Hirundinidae	<i>Hirundo daurica</i>	Redrumped Swallow	WV
135	Passeriformes	Lanidae	<i>Lanius isabellinus</i>	Rufous-tailed or Isabelline Shrike	WV
136	Passeriformes	Lanidae	<i>Lanius excubitor</i>	Grey Shrike	R
137	Passeriformes	Lanidae	<i>Lanius vittatus</i>	Baybacked Shrike	R
138	Passeriformes	Lanidae	<i>Lanius collurio</i>	Redbacked Shrike	PM
139	Passeriformes	Lanidae	<i>Lanius schach</i>	Rufous-backed Shrike	R
140	Passeriformes	Dicruridae	<i>Dicrurus adsimilis</i>	Black Drongo or King Crow	R
141	Passeriformes	Sturnidae	<i>Sturnus roseus</i>	Rosy Starling or Rosy Pastor	DPM
142	Passeriformes	Sturnidae	<i>Acridotheres ginginianus</i>	Bank Myna	R
143	Passeriformes	Sturnidae	<i>Sturnus vulgaris</i>	Common Starling	R
144	Passeriformes	Sturnidae	<i>Acridotheres tristis</i>	Indian Myna	R
145	Passeriformes	Corvidae	<i>Dendrocitta vagabunda</i>	Tree Pie	R
146	Passeriformes	Corvidae	<i>Corvus splendens</i>	Sind House Crow	R
147	Passeriformes	Corvidae	<i>Corvus corax</i>	Common Raven	R
148	Passeriformes	Bombycillidae	<i>Hypocolius ampelinus</i>	Grey Hypocolius	WV
149	Passeriformes	Campephagidae	<i>Tephrodornis pondicerianus</i>	Sind Wood Shrike	R
150	Passeriformes	Campephagidae	<i>Pericrocotus cinnamomeus</i>	Sind Small Minivet	R
151	Passeriformes	Pyconotidae	<i>Pycnonotus leucogenys</i>	White-cheeked Bulbul	R
152	Passeriformes	Pyconotidae	<i>Pycnonotus cafer</i>	Red-vented Bulbul	R
153	Passeriformes	Timaliidae	<i>Chrysomma sinense</i>	Yellow-eyed Babbler	R
154	Passeriformes	Timaliidae	<i>Turdoides caudatus</i>	Common Babbler	R
155	Passeriformes	Timaliidae	<i>Turdoides earlei</i>	Striated Babbler	R
156	Passeriformes	Timaliidae	<i>Turdoides striatus</i>	Sind Jungle Babbler	R
157	Passeriformes	Muscicapidae	<i>Muscicapa striata</i>	Spotted Flycatcher	PM
158	Passeriformes	Muscicapidae	<i>Ficedula parva</i>	Red breasted Flycatcher	WV
159	Passeriformes	Monarchidae	<i>Terpsiphone paradisi</i>	Asian Paradise Flycatcher	PM
160	Passeriformes	Sylviidae	<i>Cettia cetti</i>	Cetti's Warbler	WV
161	Passeriformes	Sylviidae	<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	WV
162	Passeriformes	Sylviidae	<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler	PM
163	Passeriformes	Sylviidae	<i>Prinia buchanani</i>	Rufousfronted Wren-Warbler	R

Continued...

Table 1 continue...

S. No.	Order	Family	Scientific Name	Common Name	Status
164	Passeriformes	Sylviidae	<i>Prinia gracilis</i>	Indian Streaked Wren-Warbler / Long tailed Warbler	R
165	Passeriformes	Sylviidae	<i>Prinia inornata</i>	North Western Plain Wren-Warbler	R
166	Passeriformes	Sylviidae	<i>Prinia burnesii</i>	Long tailed Grass Warbler	R
167	Passeriformes	Sylviidae	<i>Prinia criniger</i>	Brown Hill Warbler	R
168	Passeriformes	Sylviidae	<i>Scotocerca inquieta</i>	Streaked Scrub Warbler	R
169	Passeriformes	Sylviidae	<i>Orthotomus sutorius</i>	Tailor Bird	R
170	Passeriformes	Sylviidae	<i>Hippolais caligata</i>	Booted Tree Warbler	WV
171	Passeriformes	Sylviidae	<i>Sylvia hortensis</i>	Orphaen Warbler	PM/ WV
172	Passeriformes	Sylviidae	<i>Sylvia curruca</i>	Greater White throat	PM
173	Passeriformes	Sylviidae	<i>Sylvia communis</i>	Common White throat	M
174	Passeriformes	Sylviidae	<i>Sylvia nana</i>	Desert Warbler	WV
175	Passeriformes	Sylviidae	<i>Phylloscopus collybita</i>	Chiffchaff	WV
176	Passeriformes	Sylviidae	<i>Phylloscopus neglectus</i>	Plain Leaf Warbler	WV
177	Passeriformes	Sylviidae	<i>Phylloscopus trochiloides</i>	Greenish Warbler	WV/ PM
178	Passeriformes	Turdidae	<i>Cercotrichas galacototes</i>	Rufous Chat or Rufoustailed Scrub Robin	PM
179	Passeriformes	Turdidae	<i>Luscinia svecicus</i>	Bluethroat	WV
180	Passeriformes	Turdidae	<i>Phoenicurus ochruros</i>	Black Redstart	WV
181	Passeriformes	Turdidae	<i>Saxicola torquata</i>	Common Stone Chat	PM/ WV
182	Passeriformes	Turdidae	<i>Saxicola caprata</i>	Pied Bush Chat	R
183	Passeriformes	Turdidae	<i>Oenanthe isabellina</i>	Isabelline Wheatear	WV
184	Passeriformes	Turdidae	<i>Oenanthe xanthopyrna</i>	Redtailed Wheatear	WV
185	Passeriformes	Turdidae	<i>Oenanthe deserti</i>	Desert Chat or Desert Wheatear	WV
186	Passeriformes	Turdidae	<i>Oenanthe picata</i>	Pied Chat/Pied Wheatear	WV
187	Passeriformes	Turdidae	<i>Oenanthe alboniger</i>	Hume's Chat or Wheatear	R
188	Passeriformes	Turdidae	<i>Saxicoloides fulicata</i>	Indian Robin	R
189	Passeriformes	Turdidae	<i>Monticola solitarius</i>	Blue Rock Thrush	WV
190	Passeriformes	Motacillidae	<i>Anthus campestris</i>	Tawny Pipit	WV
191	Passeriformes	Motacillidae	<i>Anthus similis</i>	Long billed Rock Pipit	R
192	Passeriformes	Motacillidae	<i>Motacilla flava</i>	Yellow or Citrine Wagtail	PM
193	Passeriformes	Motacillidae	<i>Motacilla citreola</i>	Yellowheaded Wagtail	WV
194	Passeriformes	Motacillidae	<i>Motacilla alba</i>	White or Pied Wagtail	WV
195	Passeriformes	Nectariniidae	<i>Nectarinia asiatica</i>	Purple Sunbird	R
196	Passeriformes	Passeridae	<i>Passer domesticus</i>	House Sparrow	R
197	Passeriformes	Passeridae	<i>Passer hispaniolensis</i>	Spanish Sparrow	WV
198	Passeriformes	Passeridae	<i>Passer pyrrhonotus</i>	Sind Jungle Sparrow	R
199	Passeriformes	Passeridae	<i>Petronia xanthocollis</i>	Sind Yellow headed Sparrow	R
200	Passeriformes	Ploceidae	<i>Ploceus philippinus</i>	Indian Baya	R
201	Passeriformes	Estrildidae	<i>Estrilda amandava</i>	Red Munia	R
202	Passeriformes	Estrildidae	<i>Lonchura malabarica</i>	White throated Munia	R
203	Passeriformes	Fringillidae	<i>Bucanetes githagineus</i>	Trumpeter Bull Finch	R
204	Passeriformes	Fringillidae	<i>Carpodacus erythrinus</i>	Common Rosefinch	PM

Continued...

Table 1 continue...

S. No.	Order	Family	Scientific Name	Common Name	Status
205	Passeriformes	Emberizidae	<i>Emberiza melanocephala</i>	Blackheaded Bunting	PM
206	Passeriformes	Emberizidae	<i>Emberiza buchanani</i>	Greynecked Bunting	WV
207	Passeriformes	Emberizidae	<i>Emberiza striolata</i>	Striped or House Bunting	R

Legend: R = Resident, WV = Winter Visitor, M = Migratory, PM = Passage Migrant

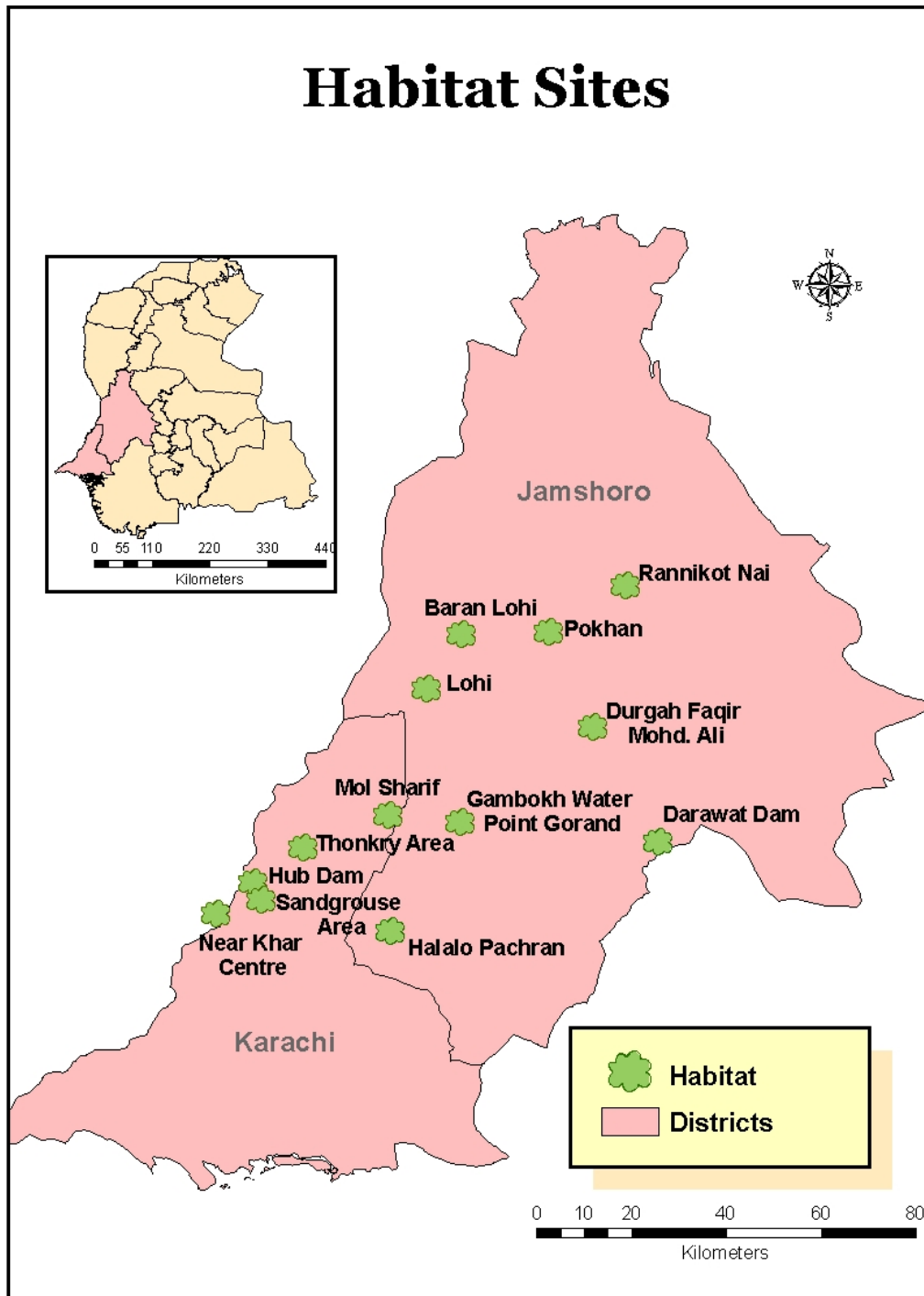


Fig. 1. Map of important sites for birds within KPAC area.



Table 2. Distribution of Bird Species in the different components of the Khirthar Protected Area Complex.

S. No.	Area	Number of Species
1	Hub Dam Wildlife Sanctuary	160
2	Mahal Kohistan Wildlife Sanctuary	33
3	Surjan, Sumbak, Eri and Huthiano Game Reserves	19
4	Khirthar National Park (including Khar Centre area)	90

Table 3. Status of various Species of Birds in the Khirthar Protected Area Complex.

S. No.	Status	Number of Species
1	Resident Species	101
2	Winter visitors	84
3	Passage Migrants	18
4	Summer Breeding Visitors	04

Table 4. List of Ramsar Sites in Pakistan.

S. No.	Wetland	Location	Area
01	Astola (Haft Talar) Island	Balochistan	5,000ha
02	Chashma Barrage	Punjab	34,099 ha
03	Deh Akro	Sindh	20243 ha
04	Drigh Lake	Sindh	164 ha
05	Haleji Lake	Sindh	1,704 ha
06	<b>Hub Dam</b>	<b>Sindh, Balochistan</b>	<b>27,000 ha</b>
07	Indus Delta	Sindh	472,800 ha
08	Indus Dolphin Reserve	Sindh	125,000 ha
09	Jiwani Coastal Wetland	Balochistan	4,600 ha
10	Jabho Lagon	Sindh	706 ha
11	Keenjhar Lake	Sindh	13,468 ha
12	Miani Hor	Balochistan	55,000 ha
13	Nurri Lagoon	Sindh	2,540 ha
14	Ormara Turtle Beaches	Balochistan	2,400 ha
15	Rann of Kutch	Sindh	566,375 ha
16	Tanda Dam,	KPK	405 ha
17	Taunsa Barrage	Punjab	6,756 ha
18	Thanedar Wala,	KPK	40,47 ha
19	Uchhali Complex (including Khabbaki, Uchhali and Jahlar lakes),	Punjab	1,243 ha

Table 5. List of Important Bird Areas in Sindh.

S. No.	Important Bird Areas
1.	Indus Dolphin Reserve
2.	Drigh Lake Wildlife Sanctuary
3.	Hammal Katchery Lake
4.	Pugri Lake
5.	Mehrano Reserve Lake and Rohri Canal wetlands
6.	Nara Desert Wildlife Sanctuary
7.	Nara Canal wetlands and Sadori, Sonehri and Sanghriarho
8.	Deh Akro Wetland Complex and Wildlife Sanctuary
9.	Manchhar Lake
10.	<b>KNP and Hub Dam</b>
11.	Outer Indus Delta
12.	Keenjhar Lake Wildlife Sanctuary
13.	Keti Bunder North Wildlife Sanctuary
14.	Mahboob Shah lake
15.	Haleji Lake Wildlife Sanctuary
16.	Jabho Lagoon
17.	Nurri-ri Lagoon
18.	Phoosna Wetland Complex
19.	Rann of Kutch

Twenty species of birds were recorded to be the common/widespread in the Complex. These are Black Crowned Finch Lark, Blue Rock Pigeon, Crested Lark, Common Myna, Common Babbler, Chestnut-shouldered Petronia, Egyptian Vulture, Grey Partridge, Green Bee-eater, House Sparrow, House Bunting, House Crow, Indian Roller, Indian Silverbill, Jungle Babbler, Little Brown Dove, Purple Sunbird, Redwattled Lapwing, Ring Dove and White-cheeked Bulbul.

The following 50 species of birds have not been recorded in the present study in the area, although previously they were recorded in the Environmental Baseline Study (UoM, 2000):

Wigeon, Eurasian Wryneck, Common Cuckoo, Alpine Swift, Pallid Scops Owl, Longeared Owl, Common Crane, Blacktailed Godwit, Temminck's Stint, Curlew Sandpiper, Rednecked Phalarope, Sociable Lapwing, White tailed Lapwing, Indian Courser, Small Pratincole, Whiskered Tern, Great Crested Grebe, Blacknecked Grebe, Large Egret, Intermediate Egret, Little Bittern, Yellow Bittern, Greater Flamingo, Spoonbill, White Pelican, Dalmatian Pelican, Common Quail, Osprey, Pallas's Fish Eagle, Marsh Harrier, Shikra, Eurasian Sparrow Hawk, Tawny Eagle, Steppe Eagle, Booted Eagle, Red headed Merlin, Lesser Woodshrike, Spotted Flycatcher, Redthroated Flycatcher, Blue throat, Brown Hill Warbler, Graceful Prinia, Cetti's Bush Warbler, Blyth's Reed Warbler, Clamorous Reed

Warbler, Redwinged Bush Lark, Richard's Pipit, Longbilled Pipit, Redthroated Pipit and Common Rose Finch.

Moreover, 16 new records of occurrence of birds have been made, as given below:

Greater Spotted Eagle, Oriental Honey Buzzard, Black Partridge, River Tern, Whitebreasted Waterhen, Black-crowned Night Heron, Bluecheeked Bee-eater, Common Raven, Sind Sparrow, Crow Pheasant/Greater Coucal, Syke's or Sind Nightjar, Blackbellied Sandgrouse, Asian Paradise Flycatcher, Rock Bunting, Black rumped Flameback/Goldenbacked Woodpecker, Dark throated Thrush and Chukar (Hagler Bailly, 2005; Khan *et al.*, 2012; Halcrow Pak., 2002). Thus, the total number of species of birds recorded so far from the KPAC comes to 207 (Table 1).

#### **AVIFAUNAL STUDY IN THE COMPONENTS OF THE KPAC:**

Avifaunal study in each component of the KPAC was made separately. The results are given below:

##### **1. Khirthar National Park**

It is the core wildlife area of the KPAC. The notable avifauna includes Birds of Prey (Bonelli's Eagle, Greater Spotted Eagle, Imperial Eagle, Egyptian Vulture, Cinereous Vulture, Laggar Falcon), Game Birds (Grey Partridge, Seesee Partirdge, Indian Peafowl, Chestnut-bellied Sandgrouse, Lichtenstein Sandgrouse), Buntings (Greynecked Bunting, House Bunting, Blackheaded Bunting), Wheatears (Hume's Wheatear, Desert Wheatear, Variable Wheatear), Shrikes (Baybacked Shrike, Southern Grey Shrike, Rufoustailed Shrike), Sparrows (Jungle Sparrow, Yellow -throated Sparrow), Striated Babbler, Rufouustailed Scrub Robin, Small Minivet, Tawny Pipit and White-throated Munia.

Grimmett *et al.* (2008) have outlined some of the species of birds peculiar to Indus Kohistan/west of Indus. So these may also contribute to the overall distinct avian biodiversity of the Park. These includes: Pallid Scops Owl, Eurasian Nightjar, Indian Nightjar, Spotted Crake, Crowned Sandgrouse, Short-toed Eagle, Merlin, Streaked Scrub Warbler, Blue Rock Thrush, Hooded Wheatear, Rufoustailed Wheatear, Rock Martin, Greater Whitethroat, Lesser Short-toed Lark, Longbilled Pipit, and House Bunting.

##### **❖ Khar Centre Area**

This area is important as it forms the southern part of the KPAC with important hill ranges *viz.* Murri-Munghthar and Luser Hills. There is an information Centre and Rest House, and enclosures where Marsh Crocodile, Blackbuck and Chinkara have been kept as captive

animals for breeding. There is a lot of vegetation around including a Farm House.

The important habitats include the stony/rocky plain area, farmland, marshy areas of the Hub Dam Reservoir, flat plain area, stony areas with water points in the floodplain area, and nearby villages.

The area is important for supporting Grey, Black and Seesee Partridges, Crested Honey Buzzard, Grey Hypocolius, Indian Peafowl, Chestnut and Closebarred Sandgrouses and a variety of waterbirds due to its close proximity to Hub Dam. Sandgrouses breed in the Thonkry area of this component.

The Peafowl which had been once kept in the enclosures have escaped to the nearby farmland area and now they roam in the area adjacent to the Rest House and can be seen sitting on the roof and boundary walls of the buildings near around.

The area, due to the presence of ample vegetation provides a very good habitat to the birds. Due to its closeness to the city and the facilities available there, the area may be developed as a place for public awareness and education.

The area around the Khar Centre is stony, rocky, plain area. The farmland nearby and the marshy and shallow water areas of the Hub Dam support a variety of bird fauna such as Indian Peafowl, Seesee Partridge, Sind Starling, Striated Babbler, Indian Koel, Roseringed Parakeet, Baybacked Shrike, Chestnut and Closebarred Sandgrouses and Rufousfronted Wren Warbler. Waterbirds such as Large Cormorant, Grey Heron, Indian River Tern are also seen due to close vicinity of Hub Dam.

Anoi Cave area is important for supporting species like House Bunting, Rock Bunting, Black Partridge, Grey Partridge, Indian Robin, Common Babbler, Longtailed Bush Warbler, and Silverbill. It represents both the stony habitat as well as the flood plain area.

##### **2. Hub Dam Wildlife Sanctuary**

Hub Dam is situated in the north of Karachi bordering the Khirthar National Park. It is a large water storage reservoir constructed in 1981 on the Hub River, in a region of arid plains and low stony hills. The greater part of the reservoir (in Balochistan) is unprotected; the eastern shore and area south of the Dam (in Sindh) are protected in the Khirthar National Park and as Hub Dam Wildlife Sanctuary respectively. The reservoir formed by the dam covers an area of 32 square miles and is an ideal place for bird watching. In the surrounding area of the reservoir, jackal, foxes, mongoose and numerous birds of the plain area are found.

The reservoir has emerged as an important refuge mainly for migratory waterbirds which include great crested grebe, pelicans, cormorants, cranes, ducks, coot, egrets, waders, gulls and terns. In addition to waterbirds, raptors, coursers, doves, kingfishers and many passerines inhabit the area. The reservoir is also a source of fish production. The area is a very favourite haunt for the anglers. One km area along the saddle embankment has been reserved for the anglers. Even before the creation of the dam, this area was famous among anglers as the habitat of Mahseer, a game fish.

#### ❖ Hub Dam as a Ramsar Site

So far, 19 sites in Pakistan have been designated as Ramsar sites. Out of these, 10 are located in Sindh (Table 4). The Hub Reservoir has been designated as a Ramsar site since 1974. It used to support large concentration of waterbirds as given below:

Year	Total Numbers of Waterbirds Recorded
2000	13128
2001	14431
2002	8374
2003	2476
2004	2638
2010	3447
2011	280
2012	1404

The winter visitors are mainly water birds which migrate to Pakistan along the Central Asian / Indus Flyway during the migratory season ranging from October to April. January is the peak season for these birds. Annual Waterbirds Censuses have been undertaken on Hub Dam from 2000 to 2004 and from 2010 – 2012.

The population of the waterbirds has declined very much during the recent years as compared to earlier records mainly due to disturbance and commercial fishing activities in the reservoir.

Some Near threatened species of waterbirds have been recorded from the site during the Asian Waterbird Census (AWC) such as White-eyed Pochard (32), Blackbellied Tern (08), and Oriental Darter (04) in 2010; Eurasian Curlew (27) and Blackbellied Tern (22) in 2012 (Chaudhary *et al.*, 2012).

#### ❖ Hub Dam as an Important Bird Area (IBA)

Fifty five IBAs have been designated in Pakistan and among them, there are 19 IBAs in Sindh (Table 5).

IBAs are the critical sites meant for the conservation and sustainable management of the world's birds.

The Asian IBA Programme, initiated in 1996, aims to document and promote a region-wise network of

internationally important sites for the conservation of birds and biodiversity.

Using the global criteria, IBAs are selected based on presence of:

1. Globally threatened species;
2. Restricted range bird species;
3. Assemblage of biome-restricted bird species;
4. Globally important congregations of birds.

Khirthar National Park and Hub Dam have been selected as IBAs due to the presence of threatened species, such as Dalmatian Pelican, Pallas's Fishing Eagle, Imperial Eagle, Sociable Lapwing, Indian Skimmer, and Congregatory waterbirds such as Black-necked Grebe, Great White Pelican, Redcrested Pochard and Common Coot. Recently, 160 species of birds have been recorded from the area (Khan *et al.*, 2012).

The threats to the birds include large scale disturbance due to fishing activities in the Dam area as 30-40 boats have been operating in the area for fishing. There is also disturbance due to visitors particularly during the weekends. The Plantation Garden which used to support a variety of birds in the past has ceased to function due to lack of funds for operating the generators for lifting water for plantation. The water level of the dam has gone down to 318 feet now. Patches of dry land have been appearing in the flat area of the dam. There is no restocking of fishes as the hatchery has become non-functional now.

### 3. Mahal Kohistan Wildlife Sanctuary Tehsil Thano Bulla Khan, District Jamshoro

Mahal Kohistan Wildlife Sanctuary is spread over an area of about 110 square Km surrounded by Taluka Jamshoro (North), District Thatta (South), Malir (East), and District Karachi (West) occupying south corner in the province of Sindh. It is situated between 67° 23' to 67° 45' E. latitude and 25° 22' to 25° 36' N. Most of the area of the Sanctuary consists of dry arid land and there are very few water points and these too near the tombs/ villages or graveyards. The common birds find a safe refuge near these tombs and the water points.

As many as 33 species of birds were recorded during the present field survey.

The area is important for supporting Lichtenstein and Chestnut-bellied Sand grouses, Indian Great Horned Owl, Short-toed Eagle, and Bonelli's Eagle. Grey Partridge, House Bunting, Greynecked Bunting, Indian Tree Pie and Indian Silverbill are fairly common in the rocky hills/ nullahs. Other notable species are the Blackcrowned Sparrow Lark, Plain Prinia, Pied Bushchat and Longtailed Bush Warbler.

**Photographs of some important birds of Khirthar Protected Areas Complex.**



Eurasian Hobby



House Bunting



Houbara Bustard (Courtesy by: pakguns.com).



Long tailed Pipit



Rufous tailed Scrub Robin



Seese Partridge

#### 4. Surjan, Sumbak, Eri and Huthiano Game Reserves.

The above mentioned four Game Reserves fall into the Districts of Jamshoro and Thatta. As many as nineteen species of birds were recorded from the area. The notable species included the Desert Lark, Common Stonechat, Desert Wheatear, Common Buzzard, Eurasian Eagle Owl/Horned Owl, Grey Partridge, Red Turtle Dove and

Black Crowned Sparrow Lark. The area is mostly hilly and does not provide suitable habitat for birds hence the avian species are very few in numbers.

#### **MOST IMPORTANT SITES**

The following areas within KPAC have been identified as the most important sites for birds (Fig. 1):



White backed Vulture

### 1. Khirthar National Park including the Hub Dam

The KNP is ecologically very significant being an Important Bird Area (IBA) due to the presence of Dalmatian Pelican, Pallas's Fishing Eagle, Imperial Eagle, Sociable Plover, Indian Skimmer and migratory waterbirds, such as Blacknecked Grebe, White Pelican, Redcrested Pochard and Common Coot.

### 2. Hub Dam

It is extremely important being a Wildlife Sanctuary and a Ramsar Site as well. It has been so designated due to its importance for supporting large concentrations of waterbirds and due to the presence of fish, Mahseer.

### 3. Khar Centre

It is important for supporting Grey, Black and Seesee Partridges, Indian Peafowl, Grey Hypocolius, Indian Whitebacked Vulture, Crested Honey Buzzard, Chestnutbellied and Lichtenstein Sandgrouses.

### 4. Benir

It is important for supporting Bonelli's Eagle, Short-toed Eagle, Laggar Falcon, Peregrine Falcon, Indian Horned Owl, Golden backed and Pied Woodpeckers (Ghalib and Jafri, 2001, unpublished report).

### 5. Mole Naddi and Mole Sharif

These are vital areas for Grey Partridge, Chestnut-bellied Sandgrouse, House Bunting and Jungle Sparrow.

### 6. Baran Nai and Darawat Dam

Darawat Dam has just been commissioned. It may turn out to be a potentially significant area for supporting Waterbirds.

### 7. Thonkry Area near Khar Centre

It is important for Chestnut-bellied Sandgrouse and Egyptian Vulture.

### 8. Gambokh Water Point, Gorand

The area supports Indian Tree Pie, Greynecked Bunting and House Bunting.

### 9. Dargah Faqir Mohd. Ali

It is significant area for supporting large number of forest and garden birds.

### 10. Rannikot Nai

It is vital area for supporting Seesee Partridge, House Bunting and Rock Sparrow.

### 11. Halalo Pachran

It is an important area for Birds of Prey.

### Important Habitats for Avian Diversity:

If the overall avian diversity of the KPAC is taken into account, then wetland sites and cropland and villages come out as the most important areas for supporting waterbirds, birds of Prey and Forest Birds. Hub Dam and Khar area are such important sites.

- ❖ Rocky sites are important for Seese Partridge, Sandgrouses and some Birds of Prey.
- ❖ Wetlands may be regarded as the important sites, supporting the endangered, threatened and vulnerable species such as Sociable Lapwing (Critically Endangered), Greater Spotted Eagle (Vulnerable), Dalmatian Pelican (Vulnerable), Pallas's Fishing Eagle (Vulnerable) alongwith the Near –threatened species such as Indian Darter, Ferruginous Duck and Blackbellied Tern.
- ❖ Riparian areas and sandy plains are important areas for Egyptian Vulture (Endangered), Imperial Eagle (Vulnerable), and Houbara Bustard (Vulnerable).

### Threats and Management Issues

A five year (1973 – 78) park management Plan was prepared by Holloway and Khan (1973) under IUCN funding at about the time the KNP was declared, but it has been only partly implemented. It proposed a park personnel structure, budget and basic infrastructural arrangements associated with a primary objective of conserving the Sind Ibex, the Urial and Chinkara, and facilitating visitor access to the Park. Key wildlife management recommendations included: no extension to the irrigated land area, reduction of livestock grazing, prohibition of felling of trees and cutting of branches for animal fodder, no poaching and no quarrying. However, only a very limited amount of field research was conducted for the project and detailed prescription concerning the distribution, significance, and management of other than a few mammal species could not be provided.

The Sindh Wildlife Department (SWD) has established a pragmatic, day to day management strategy for the park within the financial constraints imposed upon it. Departmental regulations state that a number of activities may not be undertaken within the Park (Cutting or removal of wood and other plant materials, grazing of domestic livestock herds, clearing and tilling of the land, poaching, or disturbance of wildlife by use of firearms), and include a 5 km buffer zone around the Park. At present, most of these regulations are unenforceable. A large number of game watchers, hired mostly from local villages, patrol the mountains and are an effective deterrent to poachers, so enforcing regulations concerning firearms use.

However, the complex issues surrounding the existence of a large human population within the Park (and present prior to park establishment) make Park Management extremely difficult. There is some private ownership and leasing of land within the Park, extensive exploitations of ground water for crop irrigation, human and livestock consumption, livestock grazing, wood and fodder harvesting, and continued land clearing and tilling. Thus, management is largely restricted to the mountains (the

location of Ibex and Urial), while the valleys within the Park constitute a zone of contested space between local land- users and Park Managers (Hagler Bailly Pakistan, 2005).

### Threatened Species of Birds recorded in the KPAC

A total of 15 species of birds recorded from KPAC are listed in IUCN Redlist (Table 6). This includes two species as Critically Endangered, one Endangered, five Vulnerable and seven species of Near-threatened birds.

### Future Action Plan

1. Hub Dam Reservoir area and Khirthar National Park may be recognized and highlighted as important Bird Areas.
2. The significant species such as Waterbirds, Sandgrouses, Partridges, Peafowl, Grey Hypocolius and the 15 species listed as the birds peculiar to the Indus Kohistan/ West of Indus may be studied in particular.
3. The following passage migrants may be particularly studied to record their seasonal movement and status in the migratory season:  
Alpine Swift, Blackheaded Bunting, Blyth's Reed Warbler, Common Cuckoo, Common Quail, Common Rosefinch, Common Stone Chat, Greater Whitethroat, Orphean Warbler, Redthroated Pipit, Rosy Starling, Rufousthroated Scrub Robin, Small Pratincole, Spotted Flycatcher, Whiskered Tern, Yellow Wagtail and Yellow –wattled Lapwing.
4. Some areas could be studied in particular such as Halalo Pachran for Birds of Prey and Mole Sharif area for Houbara Bustard, Sandgrouses and Grey Partridges; Khar and Bhaal area for Whitebacked Vultures and Grey Hypocolius, and Hub Dam for Sociable Lapwing.
5. Proper Management of the HDWS is essential. The overall population of migratory water birds has significantly fallen down. The AWC recorded 3447, 280 and 1404 waterbirds in 2010, 2011 and 2012. The local causative factors responsible for low waterbird population in the peak season need to be determined and rectified.
6. Water point areas may be surveyed and studied in particular, as these are also the preferred sites for birds. A list of such important water points has been provided by Hagler Bailly Pakistan (2005) as given below:
  - Rannikot Dhor
  - Baran Nai
  - Taung Spring
  - Ghaibi Pir
  - Jhenku Spring
  - Batro Karchat Spring
  - Mehrab Jo Kirro (Western Flank)
  - Sattani Bhor (Eastern Flank)
  - Bachhani (Eastern)



- Narrow Valley between Malu and Dumbar (Western)
  - Sajjati (Eastern)
  - NW Face (Benir)
  - Monghthar Hide out (E)
  - Lussar near Piluro (W)
  - Thonkry (W)
7. The fauna of the listed below archaeological sites may also be studied.
- (i) Rannikot Fort
  - (ii) Masoom Ji Boothi, Deh Karchat
  - (iii) Kohtrass Boothi, 8 miles SW of Deh Karchat on road from Thana Bula Khan to Taung.
  - (iv) Othinji Buthi, Deh Karchat on river Baran from Arab Jo Thanu to Wahi Village, NW of Bachani Sandhi, Mahal Kohistan.

Table 6. List of Threatened/ Near- threatened Species of KPAC.

S. No.	Common Name	Scientific Name	Status
1	White rumped Vulture	<i>Gyps bengalensis</i>	CE
2	Sociable Lapwing	<i>Vanellus gregarious</i>	CE
3	Egyptian Vulture	<i>Neophron percnopterus</i>	E
4	Dalmatian Pelican	<i>Pelecanus crispus</i>	V
5	Imperial eagle	<i>Aquila heliaca</i>	V
6	Greater Spotted Eagle	<i>Aquila clanga</i>	V
7	Pallas's Fishing Eagle	<i>Haliaeetus leucoryphus</i>	V
8	Macqueen's or Houbara Bustard	<i>Chlamydotis macqueeni</i>	V
9	Cinereous Vulture	<i>Aegypius monachus</i>	NT
10	Laggar falcon	<i>Falco jugger</i>	NT
11	Pallid Harrier	<i>Circus macrourus</i>	NT
12	Ferruginous Pochard	<i>Aythya nyroca</i>	NT
13	Blackbellied Tern	<i>Sterna acuticauda</i>	NT
14	Rufousvented Prinia	<i>Prinia burnesii</i>	NT
15	Darter	<i>Anhinga melanogaster</i>	NT

**Legend:** CE = Critically Endangered, E = Endangered, V= Vulnerable, NT = Near-threatened

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