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A SURVEY OF AVIFAUNAL DIVERSITY IN WETLANDS AROUND KEOLADEO NATIONAL PARK, BHARATPUR, RAJASTHAN, INDIA¹

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Abstract. Keoladeo National Park, a world heritage site, is famous for its rich avifaunal diversity but is now facing water shortages. Therefore, many species of migratory birds have been moving to nearby wetlands for foraging. In this connection, a survey was carried out during 2009-10 to understand the status of birds and their use of these wetlands. A total of 27 wetlands have been identified within 100 km radius of the Keoladeo National Park, and within them 75 species of water birds were recorded. Of the 27 wetlands, Rediabundh is the most species rich with 44 bird species, while only one species was found in Chicksana wetland. Larger-sized wetlands with more water attracted larger numbers of species, including more individual birds, than the smaller wetlands. A landscape level conservation plan, including these wetlands, is needed for the long term conservation of birds in Keoladeo National Park.

Key words: India, Keoladeo National Park, Rediabundh, Wetland bird populations.

DIVERSIDAD AVIFAUNISTICA EN LOS HUMEDALES ALEDAÑOS AL PARQUE NACIONAL KEOLADEO, BHARATPUR, RAJASTHAN, INDIA

Resumen. El Parque Nacional Keoladeo, sitio patrimonio de la humanidad, es famoso por su rica diversidad de aves pero se enfrenta a cortes de agua. Por eso, muchas especies migratorias se han desplazado a humedales aledaños para alimentarse. En 2009-10 llevamos a cabo conteos para comprender el estado de las aves y su utilización de estos humedales. Un total de 27 humedales han sido identificados dentro de un radio de

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100km entorno al Parque Nacional Keoladeo, y 75 especies de aves acuáticas han sido registradas en ellos. De los 27 humedales, Rediabundh es el más rico en especies con 44, mientras que una sola especie fue encontrada en el humedal Chicksana. Humedales grandes y con más agua atraeron un mayor número de especies e individuos que los humedales pequeños. Un plan de conservación a nivel de paisaje que incluya estos humedales es necesario para la conservación a largo plazo de las aves del Parque Nacional Keoladeo.

Palabras clave: India, Parque Nacional Keoladeo, Rediabundh, poblaciones de aves acuáticas.

INTRODUCTION

Keoladeo National Park (27° 8' to 27° 12'N and 77° 30' to 77° 34' E), 28 km² in area, is located on the extreme western edge of the Gangetic Basin, which was once the confluence of the Gambhir and Banganga rivers in Bharatpur district, State of Rajasthan (Fig. 1).

The park has a unique mosaic of habitats that include wetlands, woodlands, scrub forests, and grasslands that support an amazing diversity of both plant and animal species. The flora consists of over 375 species of angiosperms, of which 90 are those of wetlands. More than 350 species of birds have been recorded, with a high diversity of migratory birds during winter. Indeed, Keoladeo National Park is known as “Birders

Paradise” as the park lies on the Central Asian Flyway of the Asia Pacific Global Migratory Flyway. In that capacity, it is a staging / wintering ground for a large number of migratory waterfowl that breed in the Palearctic region. The park had been the only wintering ground for the central population of the endangered Siberian Crane (*Grus leucogeranus*). Due to its rich avian biodiversity value, the park has been declared as both a Ramsar site and World Heritage Site.

Populations of both migratory and resident water birds have been declining in the region due to prolonged drought and a scarcity of water in the supply reservoirs. Birds known to reside within Keoladeo National Park have been

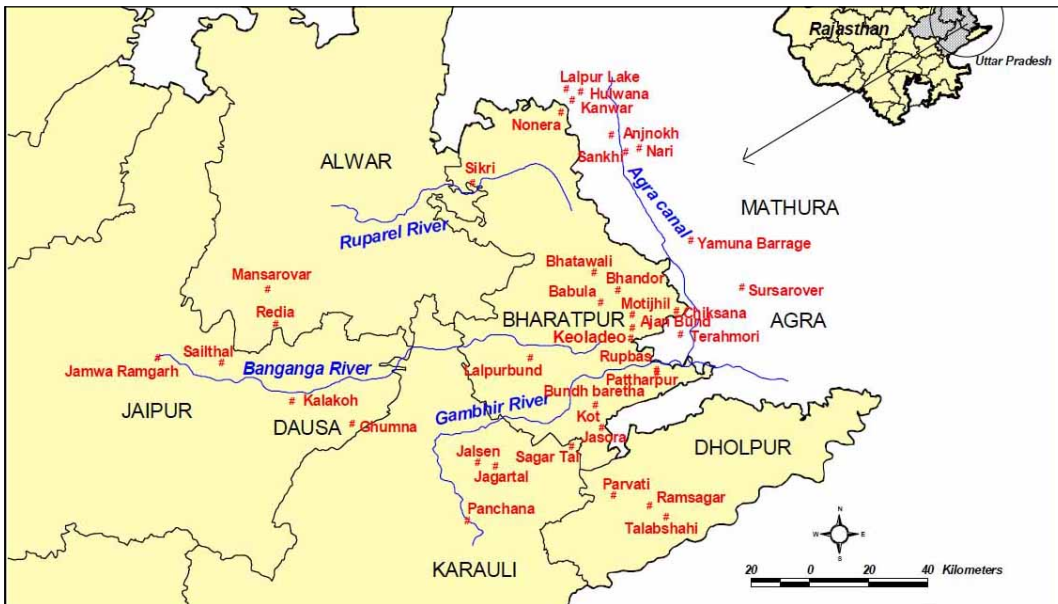


FIGURE 1. Locations of the wetlands surveyed in the vicinity of Keoladeo National Park; inset shows location within the province.

moving to the nearby wetlands as water becomes less available in the park (Mathur et al. 2009). No detailed information is available on bird usage of these wetlands, and therefore it would be difficult to develop a much-needed comprehensive landscape level conservation plan for conserving bird diversity in Keoladeo National Park. Thus, we carried out a rapid survey to assess the species diversity of birds and their use in the wetlands within 100 km of the park.

METHODS

All the wetlands within 100 km radius of Keoladeo National Park were surveyed for water birds during November 2009 to February 2010. A total of 27 wetlands were visited within this area (Fig. 1). During surveys, all water birds were counted according to standard methods (Colin et al. 1992). Birds were identified to

species level by consulting the following works: Ali 1990, 1996, Ali and Ripley (1986), Bhusan et al. (1993), Flemming et al. (2000), Grewal (2000), Inskipp and Inskipp (1999), and Shrestha (2000).

Binoculars and a telescope were used in the counts. During the survey each of the 27 wetlands, on at least two separate days, was visited in both morning and evening to count all the water birds present. Data on populations and species richness was related to wetland area as well as their distance from Keoladeo National Park using non-parametric tests within SPSS and Excel software.

RESULTS AND DISCUSSION

A total of 75 species of wetland birds belonging to 18 families was recorded in these 27 wetlands around the Keoladeo National Park (Table 1). Of the 27 wetlands, the Rediabundh wetland had

TABLE 1. Bird species sighted within the 27 wetlands surveyed within a 100 km radius of the Keoladeo National Park.

	Scientific Name
FAMILY PODICIPEDIDAE (GREBES)	
Little Grebe (Dabchick)	<i>Tachybaptus ruficollis</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
FAMILY PELECANIDAE (PELICANS)	
Great White Pelican (Rosy Pelican)	<i>Pelecanus onocrotalus</i>
Dalmatian Pelican	<i>Pelecanus crispus</i>
FAMILY PHALACROCORACIDAE (CORMORANTS/SHAGS)	
Little Cormorant	<i>Phalacrocorax niger</i>
Indian Cormorant (Indian Shag)	<i>Phalacrocorax fuscicollis</i>
Great Cormorant	<i>Phalacrocorax carbo</i>
FAMILY ANHINGIDAE (DARTERS)	
Darter (Snake-bird)	<i>Anhinga melanogaster</i>
FAMILY ARDEIDAE (HERONS, EGRETS & BITTERNES)	
Little Egret	<i>Egretta garzetta</i>
Grey Heron	<i>Ardea cinerea</i>
Purple Heron	<i>Ardea purpurea</i>
Great Egret (Large Egret)	<i>Casmerodius albus</i>
Intermediate Egret (Median Egret)	<i>Mesophoyx intermedia</i>
Cattle Egret	<i>Bubulcus ibis</i>
Indian Pond-Heron	<i>Ardeola grayii</i>
FAMILY CICONIIDAE (STORKS)	
Painted Stork	<i>Mycteria leucocephala</i>
Asian Openbill (Asian Openbill-Stork)	<i>Anastomus oscitans</i>
White Stork (European White Stork)	<i>Ciconia ciconia</i>
FAMILY THRESKIORNITHIDAE (IBISES & SPOONBILLS)	
Glossy Ibis	<i>Plegadis falcinellus</i>
Black-headed Ibis (Oriental White Ibis)	<i>Threskiornis melanocephalus</i>

TABLE 1. Continued.

	Scientific Name
Black Ibis	<i>Pseudibis papillosa</i>
Eurasian Spoonbill	<i>Platalea leucorodia</i>
FAMILY PHOENICOPTERIDAE (FLAMINGOS)	
Greater Flamingo	<i>Phoenicopterus ruber</i>
FAMILY ANATIDAE (SWANS, GEESE & DUCKS)	
Greylag Goose	<i>Anser anser</i>
Bar-headed Goose	<i>Anser indicus</i>
Ruddy Shelduck (Brahminy Shelduck)	<i>Tadorna ferruginea</i>
Common Shelduck	<i>Tadorna tadorna</i>
Comb Duck	<i>Sarkidiornis melanotos</i>
Cotton Pygmy-Goose (Cotton Teal)	<i>Nettapus coromandelianus</i>
Gadwall	<i>Anas strepera</i>
Eurasian Wigeon	<i>Anas penelope</i>
Mallard	<i>Anas platyrhynchos</i>
Spot-billed Duck	<i>Anas poecilorhyncha</i>
Northern Shoveller	<i>Anas clypeata</i>
Northern Pintail	<i>Anas acuta</i>
Common Teal	<i>Anas crecca</i>
Red-crested Pochard	<i>Rhodonessa rufina</i>
Common Pochard	<i>Aythya ferina</i>
Ferruginous Pochard	<i>Aythya nyroca</i>
Tufted Pochard	<i>Aythya fuligula</i>
FAMILY ACCIPITRIDAE (HAWKS, EAGLES, BUZZARDS, OLD WORLD VULTURES, KITES, HARRIERS)	
Egyptian Vulture	<i>Neophron percnopterus</i>
Eurasian Marsh Harrier	<i>Circus aeruginosus</i>
FAMILY PANDIONIDAE (OSPREY)	
Osprey	<i>Pandion haliaetus</i>
FAMILY GRUIDAE (CRANES)	
Sarus Crane	<i>Grus antigone</i>
Purple Moorhen	<i>Porphyrio porphyrio</i>
Common Moorhen	<i>Gallinula chloropus</i>
Common Coot	<i>Fulica atra</i>
FAMILY JACANIDAE (JACANAS)	
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>
Bronze-winged Jacana	<i>Metopidius indicus</i>
FAMILY CHARADRIIDAE (PLOVERS, DOTTERELS, LAPWINGS)	
Little Ringed Plover	<i>Charadrius dubius</i>
Kentish Plover	<i>Charadrius alexandrinus</i>
River Lapwing	<i>Vanellus duvaucelii</i>
Red-wattled Lapwing	<i>Vanellus indicus</i>
White-tailed Lapwing	<i>Vanellus leucurus</i>
FAMILY SCOLOPACIDAE (SANDPIPERS, STINTS, SNIPES, GODWITS & CURLEWS)	
Common Snipe	<i>Lymnocyptes minimus</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Common Redshank	<i>Tringa totanus</i>
Marsh Sandpiper	<i>Tringa stagnatilis</i>
Common Greenshank	<i>Tringa nebularia</i>
Green Sandpiper	<i>Tringa ochropus</i>
Wood Sandpiper	<i>Tringa glareola</i>
Ruff	<i>Philomachus pugnax</i>
FAMILY RECURVIROSTRIDAE (IBISBILL, AVOCETS & STILTS)	
Black-winged Stilt	<i>Himantopus himantopus</i>
Pied Avocet	<i>Recurvirostra avosetta</i>

TABLE 1. Continued.

	Scientific Name
FAMILY LARIDAE (GULLS, TERNS & NODDIES)	
Herring gull	<i>Larus argentatus</i>
River Tern	<i>Sterna aurantia</i>
Whiskered Tern	<i>Chlidonias hybridus</i>
FAMILY ALCEDINIDAE (KINGFISHERS)	
White-throated Kingfisher (White-breasted Kingfisher)	<i>Halcyon smyrnensis</i>
Pied Kingfisher (Lesser Pied Kingfisher)	<i>Ceryle rudis</i>
FAMILY MOTACILLIDAE (WAGTAILS & PIPITS)	
White-browed Wagtail (Large Pied Wagtail)	<i>Motacilla maderaspatensis</i>
Citrine Wagtail	<i>Motacilla citreola</i>
FAMILY CAMPEPHAGIDAE (CUCKOO-SHRIKES, FLYCATCHER-SHRIKES, TRILLERS, MINIVETS, WOODSHRIKES)	
Southern Grey Shrike	<i>Lanius meridionalis</i>

the highest species richness as well as maximum number of birds. In contrast, the Chicksana wetland contained just one species. A total of 11 wetlands had more than 10 species and eight (former) wetlands had no wetland birds at all

due to lack of water (Table 2).

There was a significant relationship between wetland size and species richness, as well as the number of birds found. However, there was no significant relationship between species richness

TABLE 2. Species richness and number of birds recorded in all wetlands surveyed in the vicinity of Keoladeo National Park.

Name of Wetland	Number Bird Species	Number Individuals
Nonera	13	161
Indroli	2	301
Abua Nagla	16	1852
Bundh Baretha	7	846
Kot	13	41
Jasora	26	275
Tala-E-Shahi	20	3320
Urmila Sagar	33	1104
Roopbaas	3	7
Ramsagar	11	1248
Parvathi	17	769
Bachamdi	7	8
Chicksana	1	1
Girraj Canal	16	430
Jagar Bundh	4	103
Jalsen	0	0
Pachna	0	0
Redia bundh	40	1368
Mansarovar	17	360
Kalakho	0	0
Ghumna	0	0
Saithal	0	0
Bhandor	0	0
Babula	0	0
Motijheel	0	0

and proximity to Keoladeo National Park. It was expected that higher numbers of birds would use wetlands closer to Keoladeo National Park, but this was not true. Wetland size and the availability of water were the factors that determined bird.

During the survey, a rare, white Albino Ibis (*Threskiornis melanocephalus*) was observed in Talab-E-Shahi wetland, which is 80 km away from Keoladeo National Park. Most probably the same bird had been sighted as well in Keoladeo National Park. Therefore, local movements of these and other birds, as well as their habitat use, needs to be assessed so that a comprehensive landscape level conservation plan can be prepared toward conserving avifaunal diversity in the region containing Keoladeo National Park.

The nearest and largest perennial wetland in the vicinity of Keoladeo National Park is Chambal National Park, where more than 200 species of water birds are known (Taigor and Rao 2010). Prolonged drought in and around Keoladeo National Park may be forcing several migratory species to use the Chambal National Park. Therefore, any water-related projects proposed in the Chambal National Park should also consider avifaunal biodiversity and habitat requirements in a regional perspective. Wetlands around the Keoladeo National Park no doubt are playing a crucial role in the conservation of water birds of this region, especially during droughts when some wetlands are not suitable for birds to breed or forage. Current land use patterns of this region could well be posing an added threat to these wetlands. Some of these wetlands should be declared as community or conservation reserves depending on nature educational programs and the subsequent input of local people.

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