

The Avian Community of Five Iranian Wetlands, Miankaleh, Fereidoon-Kenar, Bujagh, Anzali and Lavandevil, in the South Caspian Lowlands

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Abstract: Five wetlands in south Caspian lowlands have been selected in order to study their birds, namely Miankaleh, Fereidoon-Kenar, Bujagh, Anzali and Lavandevil. All observations were made using high-quality binoculars and a telescope on twice-monthly visits from spring 2006 to early January 2007. In respect to bird species, in spring Bujagh and Anzali with 82 were the predominant wetlands, whereas in summer it was Bujagh with 87, in autumn Bujagh with 144 and in winter Miankaleh with 148. The peak numbers of birds recorded were: Eurasian Teal *A. crecca* (146,000 in Bujagh, 29,000 in Anzali), Mallard *Anas platyrhynchos* (35,000 in Miankaleh), Greylag Goose *Anser anser* (23,050 in Miankaleh), Eurasian Coot *Fulica atra* (19,940 in Miankaleh and 13,000 in Bujagh) and Caspian Gull *Larus cachinnans* (1142 in Bujagh). The season-to season fluctuations of bird numbers have been estimated. A few suggestions have been made on the improvements to the conservation of the wetlands.

Keywords: Breeding, number, passage migrant, population, waterbirds, wintering, threats.

INTRODUCTION

Iran supports a rich and diverse avifauna of approximately 514 species (Mansoori 2008), a consequence of the diverse range of habitats found across a very broad altitudinal range (from 26 m below sea level to 5600 m) and of Iran's strategic location at the convergence of three major faunal regions (Firouz 2000). Although much of Iran is extremely dry, there are several very extensive wetlands of great importance for a wide variety of waterbird species. The migratory elements are: summer visitors, winter visitors, passage migrants, and internal migrants within Iran (Scott 1989).

The majority of migration through Iran occurs along a north-northeast-south-southwest axis, the main corridor between the Palearctic breeding grounds and the Ethiopian Region wintering grounds (Martins & Hirschfeld 1998). Although there are other important migration axes in Iran, these too cross the southern Caspian lowlands whose wetlands therefore play a very important role in supporting the high diversity of birds found over much of Iran. Over two-thirds of this rich and diverse avifauna occurs here; Miankaleh alone supports more than 288 species yearly

(Evans 1994). The southern Caspian Sea's 700 km of sandy shoreline and its freshwater lakes, marshes and brackish lagoons in central Gilan and the Gorgan Bay region are perhaps the finest of the many areas that together comprise a complex of waterfowl breeding and wintering areas almost unequalled in the Western Palearctic. These wetlands constitute one of the main wintering areas for wildfowl and other species that use the West Siberian-Caspian-Nile Flyway, also known as the Eurasian-East African Flyway (Newton 2008).

During spring and summer, bird diversity and bird populations in these wetlands are very low, mainly being breeding and passage birds. However, during the migrations, large numbers of shorebirds pass through the southern Caspian on their way between breeding grounds in the arctic and wintering grounds in the Persian Gulf or eastern and southern Africa. Some of them, such as egrets, and Collared Pratincole *Glareola pratincola* breed in the southern Caspian (Firouz 2000). This region attracts large wintering populations of pelicans, flamingos, herons, shorebirds and gulls, but the population of ducks, swans, geese, and Eurasian Coot *Fulica atra* is estimated at over two million birds, with perhaps as many birds again

occurring on passage in spring and autumn. This bounty of ducks, geese, and Coot has long supported an annual harvest in the southern Caspian region, but now in some wetlands, long-known as traditional sources for commercial duck-harvesting, increasingly is attracting the attention of those who hunt for 'sport'. However, some rare bird species occur in small numbers in the areas such as White-tailed Eagle *Haliaeetus albicilla*, Pygmy Cormorant *Phalacrocorax pygmeus*, White-headed Duck *Oxyura leucocephala*, Dalmatian Pelican *Pelecanus crispus*, Marbled Teal *Marmaronetta angustirostris*, Ferruginous Duck *Aythya nyroca*, Little Pratincole *Glareola lactea* and Eurasian Dotterel *Eudromias morinellus* (Scott 1995).

STUDY AREAS

According to the survey agreement made with the Department of the Environment, five wetlands were selected namely Miankaleh Wildlife Refuge, the Fereidoon-Kenar Damgahs (fallow ricefields where a kind of trap is constructed to catch mostly ducks), Bujagh National Park, the Anzali Wetlands, and Lavandevl Wildlife Refuge.

Miankaleh Wildlife Refuge (36°50'N, 53°45'E), situated north and east of Behshahr, is about 97,200 ha in size, of which about 68,800 ha are designated as a Ramsar site and biosphere reserve. Miankaleh is a low, sandy peninsula possessing coastal dunes, pomegranate scrub and grassland. Functionally, the essential elements of the Ramsar site's ecology may be described as the meeting of fresh water and brackish Caspian water in a large shallow, sheltered bay linked to the sea, providing conditions for high biological productivity and biodiversity (Scott 1995). Miankaleh Wildlife Refuge has the highest priority for biodiversity conservation in Iran. The Ramsar site boundary encompasses the whole of the Miankaleh Peninsula, Gorgan Bay and the Lapoo-Zaghmarz Ab-bandan, which is a reservoir normally used for irrigation during summer, and comprises a series of long, narrow freshwater lagoons located at the end of the Miankaleh Peninsula, about 10 km west of Gorgan Bay. On the seaward side of Miankaleh

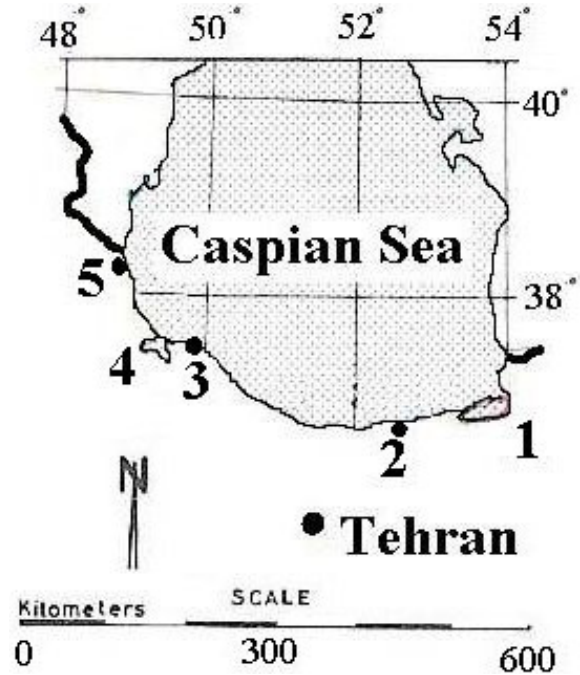


Figure 1. Map of Iran showing 5 study areas in the south Caspian Sea. 1=Miankaleh. 2= Fereidoon-Kenar. 3= Buiagh.

Peninsula, the sandy beach has virtually disappeared and no longer provides easy vehicle access to the fishing village of Ashuradeh at the eastern tip of the Peninsula. Most of the Peninsula is covered with herbs and grasses, and the western part also supports scrub of scattered pomegranate *Punica* spp. and hawthorn *Crataegus* spp, buckthorn *Rhamnus* spp. and bramble *Rubus* spp. There are a few large willow *Salix* sp. planted around some of the houses. Much of the shoreline of the bay is fringed with a broad belt of rush *Juncus* sp and there are some large stands of tamarisk *Tamarix* sp. that had spread extensively as water level fell during the early 1970s but since has begun to die back as the Caspian rises once again (Scott 1995).

Fereidoon-Kenar is a mostly artificial wetland on the southern Caspian coastal plain, 5km south of the town of the same name and 13 km southwest of Babolsar; it is of international importance and was designated a Ramsar site in 2003 (Anonymous 2005). This area contains many damgahs, which serve as an exceptional winter habitat for migratory waterbirds. These fallow ricefields in winter are treated partly as wetland, some being inundated by farmers to attract ducks (mainly Mallard *Anas platyrhynchos*) to be trapped; the conversion of these embanked fields for this purpose is unique

in Iran, the south-central Caspian littoral having provided a winter sanctuary for waterbirds for centuries (including Siberian Crane). In early autumn, farmers carry out repairs to the embankments and build enclosed water-supply ditches from the wetland proper; these fields remain in this condition until it is time to plant the spring crop. By doing this annually, they attract migratory birds to a food source that is safe from shooting. Here the local people practice the traditional skill of the silent hunt – they use trained decoy ducks that the wild birds follow unsuspectingly into traps in the enclosed ditches. Traps are also located within and between stands of trees that may be some distance from the wetland itself. The Fereidoon-Kenar Damgah comprises some 115 small damgahs whose owners work together in small groups of trappers, each group operating their own traps in an area of about 2-10 ha. Usually, the trappers obtain sufficient income each year from this long-established and ecologically sound custom.

In late winter, there comes a day when all the local trappers and hunters meet around the damgahs; one will give the signal, and all begin to shoot at the ducks (Qorouq Shekani). This final hunt causes the ducks and shorebirds to abandon the damgahs, leaving only a very few passerine birds to be found in the area. The damgahs then revert to ricefields for summer cultivation, irrigated by the water that had collected in winter. This is a splendid example of sensitive land-use and the effectiveness of applying appropriate technology. The winter flooding of what effectively is a locally-owned duck-hunting area provides the water and restores the soil for the summer crop.

Bujagh (37°20'N, 49°25'E) covers an area of about 3250 ha and is situated about 35 km east of Bandar Anzali, and 6 km northwest of Kiashahr, in Gilan Province. The wetland lies at the seashore, immediately to the west of the mouth of the Sepid-Rud river (Iran's second largest river). The wetland complex comprises a shallow shoreline, marshy grasslands and sand dune areas on the western bank of Sepid-Rud river, and also the associated fresh to brackish marshes that support some reedbeds (*Phragmites* and *Typha*). Numerous villages to the south dot the landscape, which is heavily cultivated, thus impacting the wetland

adversely. As a consequence, the wetland supports relatively little vegetation. Despite this, about 500 ha of the wetland was designated a Ramsar site in 1975. However, the protected area was increased in 2003 when it was adopted formally as a National Park.

In the southwest Caspian lowlands, the **Anzali** wetland (37°25'N, 49°28'E) is a complex of freshwater lagoons possessing extensive reedbeds, shallow artificial collector ponds (ab-bandan) and seasonal meadows. Its 15,000 hectares lie to the south of the town of the same name, in Gilan province. The wetland is extremely important as spawning and nursery grounds for fish, and as breeding, staging and wintering areas for a wide variety of waterbirds. Parts of the wetland receive particular protection: the Siahkeshim Protected Area, Sorkhankol and the Selkeh Wildlife Refuge, but the entire wetland is designated as a Ramsar site, within which the Anzali Mordab comprises a complex of large, shallow, eutrophic freshwater lagoons, marshes and seasonally flooded grasslands, separated from the Caspian Sea by a sandy barrier, about one km wide, that has open grasslands, pomegranate scrub and sand dune vegetation. The Mordab proper covers about 11,000 ha and comprises a large open lagoon some 26 km long and 2.0–3.5 km wide. It is surrounded by reedbeds that extend the eastern limit by a further seven km. The Mordab complex is fed by several perennial streams, chief of which are the Bahambar, Chakoor, Esfand and Siahdarvishan, emanating in the nearby Talesh Mountains. Siahkeshim (5215 ha) and Sokhankol (1214 ha) Marshes (totally 6429 ha) lie in the partially enclosed basin of the Rude-Esfand in the southwest. The entire marsh and lagoon complex drains into the deep water harbour of Bandar Anzali through several short channels at the northeast end of the main lagoon. Much of the central and eastern portions of the main Mordab support vast stands of tall reeds, while the western portion is mainly open water. Siahkeshim and Sorkhankol marshes are almost entirely overgrown by dense reedbed. The permanent wetland area is surrounded by a broad belt of flood meadows and ab-badans, whose water is extracted for summer crops. Selkeh Wildlife Refuge occupies 366 ha, is situated on the southern edge of the main Mordab (37°24'N,

49°29'E), and comprises shallow freshwater marshes and flood meadows bordered by tall reedbeds to the north and arable land to the south. The wetland is surrounded by a low embankment whose original purpose was to create a reservoir that also could be a duck-hunting area. Selkeh now is protected as a Wildlife Refuge by the Department of the Environment to remain as a haven for waterfowl. The constituent soils are fine-textured alluvial and continuously or intermittently wet hydromorphic. Although Selkeh is a shallow wetland unlike the Siahkeshim and Sorkhankol, from its ability to support birds amongst its other characteristics, it is similar to the Siahkeshim as a whole.

Lavandevil Protected Area (38°20'N, 48°50'E), is situated on the shore of the Caspian Sea about 10 km south of Astara city, Gilan; its 1074 hectares were designated a Ramsar site in 1975. Formerly it was a small area of swampy woodland and freshwater marsh of considerable botanical interest and of some importance for passage and wintering waterfowl including Pygmy Cormorant, but now it is included in the overall DOE Wildlife Refuge. It contains excellent stands of Alder *Alnus* sp woodland, now rare in the South Caspian lowlands outside such protected areas. Despite the Lavandevil area being the only area with official protection in Iran's westernmost Caspian littoral, the unchecked entrance of people into the area and especially the extent of disturbance in summer cause very unsatisfactory conditions for wildlife. Lavandevil's location, at a point where the coastal plain is almost at its nearest, lies under a bird migration flyway, making it an excellent locality for migration studies.

MATERIALS AND METHODS

The observation optics were 10×40 Zeiss binoculars and a 15×60 Bushnell telescope. All observations and related data were collected from spring to late December 2006. Observations were carried out twice a month, usually during the first and last weeks of the month. Each wetland was visited and surveyed either on foot or, in the larger wetlands, by boat. During the assessment of the natural and human-induced impacts on each wetland, I obtained more detailed information about wetland conditions by enquiries to local people, including hunters and even poachers.

RESULTS

Over 160 bird species were identified, but wetlands varied in predominance, dependent on season. In spring, Bujagh and Anzali (82 species) were predominant, in summer Bujagh (87 species) and Lavandevil (64 species), but the highest totals of bird species were recorded in Bujagh (144 species) and Miankaleh (110 species) in autumn while Minakaleh (148 species) had the most recorded in winter followed by Fereidoon-Kenar and Bujagh (each 132 species). The peak counts of waterfowl recorded in relation to seasons were: Eurasian Teal (146,000 in Bujagh in winter and 29,000 in Anzali in autumn 2006), Mallard (35,000 in Minakaleh in winter 2006), Greylag Goose *Anser anser* (23,050 in Minakaleh in winter), Eurasian Coot (19,940 in Miankaleh in winter 2006 and 13,000 in Bujagh in autumn 2006) and Caspian Gull *Larus cachinnans* (1142 in Bujagh in summer 2006).

Table 1. Areas, survey periods and observer details for the surveys of the wetlands of the south Caspian.

Wetland	Miankaleh	Fereidoon-Kenar damgahs	Bujagh	Selke	Anzali Sorkhankol	Siakeshim	Lavandevil
Area (ha)	68,800	400 (c.300ha studied)	3250	366	c.200	c.4000	1074
Spring	Apr-May	May	Apr	May	Apr-May	Apr-May	Apr-May
Summer	Jul-Aug	Aug	Jul	Jul	Jul	Jul	Aug
Autumn	Oct-Nov	Nov	Oct	Nov	Nov	Nov	Oct-Nov
Winter	Dec-Jan	Jan	Jan	Dec-Jan	early Jan	early Jan	early Jan
Observers	M	M	A & M	A & M	A	A	A & M

Key: A = A. Ashoori, M = J. Mansoori

Table 2. Bird observations in five South Caspian wetlands in spring and summer 2006.

English name	Scientific name	Spring				Summer			
		Miankaleh Damgahs	Bujagh	Anzali	Lavandevil	Miankaleh Damgahs	Bujagh	Anzali	Lavandevil
Little Grebe	<i>Tachybaptus ruficollis</i>	21	33	84	131	8	25		
Great Crested Grebe	<i>Podiceps cristatus</i>	3	19	11	13	12			
Horned Grebe	<i>Podiceps auritus</i>	?			2				
Black-necked Grebe	<i>Podiceps nigricollis</i>	4	20	12					
White Pelican	<i>Pelecanus crispus</i>		8						
Pygmy Cormorant	<i>Phalacrocorax pygmeus</i>	10	46	177	37	26	11	11	17
Great Cormorant	<i>Phalacrocorax carbo</i>	39	199	193	83	10	141	44	18
Little Egret	<i>Egretta garzetta</i>	20	22	110	16	5	55	27	351
Grey Heron	<i>Ardea cinerea</i>	47	19	26	46	6	20	9	48
Purple Heron	<i>Ardea purpurea</i>	11	3	16	10	2	27	1	9
Great Egret	<i>Ardea alba</i>	19	77	11	4	1		3	12
Cattle Egret	<i>Bubulcus ibis</i>	44	9	29	24		70		183
Squacco Heron	<i>Ardeola ralloides</i>				51				28
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	23	58	10	97			66	44
Little Bittern	<i>Ixobrychus minutus</i>	3	2						4
Great Bittern	<i>Botaurus stellaris</i>						2		3
Glossy Ibis	<i>Plegadis falcinellus</i>							53	14
Eurasian Spoonbill	<i>Platalea leucorodia</i>			28			20		
Greater Flamingo	<i>Phoenicopterus roseus</i>						18		
White-headed Duck	<i>Oxyura leucocephala</i>			12					
Mute Swan	<i>Cygnus olor</i>			21			5		
Whooper Swan	<i>Cygnus cygnus</i>			47					
Greylag Goose	<i>Anser anser</i>			76					
Ruddy Shelduck	<i>Tadorna ferruginea</i>	2							
Common Shelduck	<i>Tadorna tadorna</i>	31	21						
Eurasian Wigeon	<i>Anas penelope</i>	149	74	54					
Gadwall	<i>Anas strepera</i>	162		70	3				
Eurasian Teal	<i>Anas crecca</i>	2000	700	51	16	39			
Mallard	<i>Anas platyrhynchos</i>	461	1345	9	2				
Northern Pintail	<i>Anas acuta</i>	611	11	34	14				
Garganey	<i>Anas querquedula</i>			655				948	248
Northern Shoveler	<i>Anas clypeata</i>	170	123	90				8	
Red-crested Pochard	<i>Netta rufina</i>		17	2					
Ferruginous Duck	<i>Aythya nyroca</i>		3						
Tufted Duck	<i>Aythya fuligula</i>			44	12				
Osprey	<i>Pandion haliaetus</i>	1		1					
Black Kite	<i>Milvus migrans</i>		19	40					
White-tailed Eagle	<i>Haliaeetus albicilla</i>	1	1	3		12		1	1
Western Marsh Harrier	<i>Circus aeruginosus</i>	4	2	7	4			2	9
Hen Harrier	<i>Circus cyaneus</i>			1		30		12	
Eurasian Sparrowhawk	<i>Accipiter nisus</i>		1	1				1	1
Common Buzzard	<i>Buteo buteo</i>		2	2	2			1	
Long-legged Buzzard	<i>Buteo rufinus</i>							1	
Greater Spotted Eagle	<i>Aquila clanga</i>	1							
Lesser Kestrel	<i>Falco naumanni</i>					3			
Common Kestrel	<i>Falco tinnunculus</i>		2	2	6			4	1
Merlin	<i>Falco columbarius</i>		1			1			
Eurasian Hobby	<i>Falco subbuteo</i>		3	1				3	1
Black Francolin	<i>Francolinus francolinus</i>	3				23			
Common Pheasant	<i>Phasianus colchicus</i>	11				37			
Water Rail	<i>Rallus aquaticus</i>			1	1				3
Purple Gallinule	<i>Porphyrio porphyrio</i>			2				4	17
Common Moorhen	<i>Gallinula chloropus</i>	7	1	3		2	10	1	9
Eurasian Coot	<i>Fulica atra</i>	18	11	1030	104	56	18		20
Little Bustard	<i>Tetrax tetrax</i>						2		

English name	Scientific name	Spring				Summer				
		Miankaleh Damgahs Bujagh Anzali Lavandevil				Miankaleh Damgahs Bujagh Anzali Lavandevil				
Eurasian Oystercatcher	<i>Haematopus ostralegus</i>			2				17		11
Black-winged Stilt	<i>Himantopus himantopus</i>	15		3	6			6		16
Pied Avocet	<i>Recurvirostris avosetta</i>							8	4	4
Eurasian Stone-curlew	<i>Burhinus oediacnemus</i>	1						10		
Collared Pratincole	<i>Glareola pratincola</i>	1		11				22	9	
Black-winged Pratincole	<i>Glareola nordmanni</i>			1						
Eurasian Golden Plover	<i>Pluvialis apricaria</i>							258		
Grey Plover	<i>Pluvialis squatarola</i>			3					21	
Common Ringed Plover	<i>Charadrius hiaticula</i>	3		19				205	120	9
Little Ringed Plover	<i>Charadrius dubius</i>	5		3				100	4	1
Kentish Plover	<i>Charadrius alexandrinus</i>							30	32	
Caspian Plover	<i>Charadrius asiaticus</i>				5					
Northern Lapwing	<i>Vanellus vanellus</i>			1350	306				4	
Eurasian Woodcock	<i>Scolopax rusticola</i>				1					
Great Snipe	<i>Gallinago media</i>				1					
Common Snipe	<i>Gallinago gallinago</i>		1	1	34				1	
Black-tailed Godwit	<i>Limosa limosa</i>			62					88	
Bar-tailed Godwit	<i>Limosa lapponica</i>				44					
Whimbrel	<i>Numenius phaeopus</i>		290		25				10	26
Eurasian Curlew	<i>Numenius arquata</i>				2				2	
Redshank	<i>Tringa totanus</i>			33	19	3			69	5
Marsh Sandpiper	<i>Tringa stagnatilis</i>			1		2				
Common Greenshank	<i>Tringa nebularia</i>			1					22	1
Green Sandpiper	<i>Tringa ochropus</i>			1		3			23	4
Wood Sandpiper	<i>Tringa glareola</i>								40	
Terek Sandpiper	<i>Xenus cinereus</i>								22	12
Common Sandpiper	<i>Actitis hypoleucos</i>								30	3
Ruddy Turnstone	<i>Arenaria interpres</i>						35		5	2
Sanderling	<i>Calidris alba</i>			12					2	1
Little Stint	<i>Calidris minuta</i>				3				196	18
Dunlin	<i>Calidris alpina</i>						50		1	
Ruff	<i>Philomachus pugnax</i>				293					
Red-necked Phalarope	<i>Phalaropus lobatus</i>				30				9	
Common Gull	<i>Larus canus</i>						280			
Caspian Gull	<i>Larus cachinnans</i>			31	54	88	50	1142	3	47
Lesser Black-backed Gull	<i>Larus fuscus</i>			2		2				
Black-headed Gull	<i>Larus ridibundus</i>		9	65	132	23	260	60	1	
Slender-billed Gull	<i>Larus genei</i>	5		23		3	23			
Little Gull	<i>Larus minutus</i>			8	12	12	20	14		
Gull-billed Tern	<i>Sterna nilotica</i>				4					
Caspian Tern	<i>Sterna caspia</i>			11	4	2		5		
Sandwich Tern	<i>Sterna sandvicensis</i>	129	38	67	691	24	66	29		6
Common Tern	<i>Sterna hirundo</i>	20		7	1323		10	232	3	14
Little Tern	<i>Sterna albifrons</i>	2			68		14	2		2
Whiskered Tern	<i>Chlidonias hybrida</i>	2		55	948	30		159	832	8
White-winged Tern	<i>Chlidonias leucopterus</i>	11	10	3	124	21		4	54	33
Rock Dove	<i>Columba livia</i>						14			3
Common Wood Pigeon	<i>Columba palumbus</i>	23		3						
Turtle Dove	<i>Streptopelia turtur</i>		28	5		65	20	31	9	8
Laughing Dove	<i>Streptopelia senegalensis</i>								1	
Eurasian Collared Dove	<i>Streptopelia decaocto</i>						18			
Common Cuckoo	<i>Cuculus canorus</i>						3		6	2
Tawny Owl	<i>Strix aluco</i>		1							
Little Owl	<i>Athene noctua</i>		2	1		1		3		
Short-eared Owl	<i>Asio flammeus</i>		1			1		1		1
Alpine Swift	<i>Tachymarptis melba</i>		Many		17			Many	12	
Common Swift	<i>Apus apus</i>			3						
Common Kingfisher	<i>Alcedo atthis</i>			2	6	1		10	14	3
Blue-cheeked Bee-eater	<i>Merops persicus</i>						480	8		
European Bee-Eater	<i>Merops apiaster</i>		6	11		55	460	11		9
European Roller	<i>Coracias garrulus</i>		1			11	6			3
Eurasian Hoopoe	<i>Upupa epops</i>					1	20	10		12
Bimaculated Lark	<i>Melanocorypha bimaculata</i>					12				
Crested Lark	<i>Galerida cristata</i>	25		3				2		2
Eurasian Skylark	<i>Alauda arvensis</i>					7		39		12
Sand Martin	<i>Riparia riparia</i>							6	3	
Barn Swallow	<i>Hirundo rustica</i>		10		20		260	242	12	27
White Wagtail	<i>Motacilla alba</i>		2	4	11	3	55	40	3	3
Citrine Wagtail	<i>Motacilla citreola</i>						12			
Yellow Wagtail	<i>Motacilla flava</i>		1		2			5	7	

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English name	Scientific name	Spring					Summer				
		Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil	Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil
Grey Wagtail	<i>Motacilla cinerea</i>	2		2	3			23		8	
Meadow Pipit	<i>Anthus pratensis</i>					3					
Water Pipit	<i>Anthus spinoletta</i>	2		1	4	2					
Red-backed Shrike	<i>Lanius collurio</i>							14		3	
Lesser Grey Shrike	<i>Lanius minor</i>					1					
Great/Southern Grey Shrike	<i>Lanius excubitor/meridionalis</i>						4				
Winter Wren	<i>Troglodytes troglodytes</i>							1			
European Robin	<i>Erithacus rubecula</i>		2	3	3			?			
Bluethroat	<i>Luscinia svecica</i>				1						
Finsch's Wheatear	<i>Oenanthe finschii</i>	1	4	1	1						
Isabelline Wheatear	<i>Oenanthe isabellina</i>							2		2	
Eurasian Blackbird	<i>Turdus merula</i>							1			
Redwing	<i>Turdus iliacus</i>			1							
Cetti's Warbler	<i>Cettia cetti</i>				1			5		1	
Common Grasshopper Warbler	<i>Locustella naevia</i>					1					
Savi's Warbler	<i>Locustella luscinioides</i>					3					
Moustached Warbler	<i>Acrocephalus melanopogon</i>							1	3		
European Reed Warbler	<i>Acrocephalus scirpaceus</i>	2	1		3			2	4	1	
Great Reed Warbler	<i>Acrocephalus arundinaceus</i>	1	1					7	14	4	
Icterine Warbler	<i>Hippolais icterina</i>							5		4	
Common Chiffchaff	<i>Phylloscopus collybita</i>	1	2	1	2						
Blackcap	<i>Sylvia atricapilla</i>					1					
Common Whitethroat	<i>Sylvia communis</i>	1						3	8		
Spotted Flycatcher	<i>Muscicapa striata</i>							6		2	
Collared/Semi-collared Flycatcher	<i>Ficedula albicollis/semitorquata</i>	1									
Eurasian Penduline Tit	<i>Remiz pendulinus</i>		3		3			12		6	
Great Tit	<i>Parus major</i>	1	3	3	7	2		9	11	6	
Blue Tit	<i>Parus caeruleus</i>		2		1			2			
Rock Bunting	<i>Emberiza cia</i>	3									
Black-headed Bunting	<i>Emberiza melanocephala</i>			1		2					
Common Reed Bunting	<i>Emberiza schoeniclus</i>		11	7	15			5			
Corn Bunting	<i>Emberiza calandra</i>	2									
Common Chaffinch	<i>Fringilla coelebs</i>		22	8	10	28		2			
European Goldfinch	<i>Carduelis carduelis</i>		16	11	7			4			
House Sparrow	<i>Passer domesticus</i>	Many	Many	40	40+	Many		Many	91	11	
Tree Sparrow	<i>Passer montanus</i>	31	Many	16	20			48	8	19	
Rose-coloured Starling	<i>Sturnus roseus</i>	3	14	6		11	750	12	43	16	
Common Starling	<i>Sturnus vulgaris</i>	22	Many	33	55	Many	200	85	732	19	
Eurasian Golden Oriole	<i>Oriolus oriolus</i>						20				
Eurasian Magpie	<i>Pica pica</i>		6	16	15	44	250	22	10	11	
Rook	<i>Corvus frugilegus</i>		3	51	57	120		16			
Hooded Crow	<i>Corvus corone cornix</i>	4		41	49	4	40	20	38	2	
TOTAL	Species number	58	47	82	82	55	53	32	87	40	64

Table 3. Peak counts of birds observed in five wetlands of the South Caspian, Northern Iran, in autumn and late December 2006 and early January 2007 (mid-winter counts).

English name	Scientific name	Autumn					Winter				
		Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil	Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil
Little Grebe	<i>Tachybaptus ruficollis</i>	36		27	20	9	44	2	19	53	8
Great Crested Grebe	<i>Podiceps cristatus</i>	20		3	3		55		17	51	2
Black-necked Grebe	<i>Podiceps grisegena</i>	11		38	26	5	2		41	14	
Horned Grebe	<i>Podiceps auritus</i>			3	8				3	14	
Dalmatian Pelican	<i>Pelecanus crispus</i>	2			6		13				
White Pelican	<i>Pelecanus onocrotalus</i>	14	3	1	15		38	190	11	54	
Great Cormorant	<i>Phalacrocorax carbo</i>	133	230	153	3760	6	298	560	110	684	41
Pygmy Cormorant	<i>Phalacrocorax pygmeus</i>	10		142	455	4	12	23	190	554	4
Great Egret	<i>Ardea alba</i>	29	38	10	7	3	189	110	26	199	24
Grey Heron	<i>Ardea cinerea</i>	68	50	44	34	4	380	120	40	130	11
Purple Heron	<i>Ardea purpurea</i>	5	3	1	5		121	65	23	45	2
Little Egret	<i>Egretta garzetta</i>	37	5	230	130	13	198	213	333	88	10
Cattle Egret	<i>Bubulcus ibis</i>	10	14	250	154	8	358	25	270	129	27
Squacco Heron	<i>Ardeola ralloides</i>		3	2	11	1	120	44	12	28	3

English name	Scientific name	Autumn					Winter				
		Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil	Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	6	27	24	84		190	450	30	263	2
Little Bittern	<i>Ixobrychus minutus</i>	4		3	6	2	21	1	3	16	2
Great Bittern	<i>Botaurus stellaris</i>			1	1		2	3			
White Stork	<i>Ciconia ciconia</i>			3					2		
Glossy Ibis	<i>Plegadis falcinellus</i>	6		32	35		126	44	20	40	11
Eurasian Spoonbill	<i>Platalea leucorodia</i>	3									
Greater Flamingo	<i>Phoenicopterus roseus</i>	2		13			448	28	11	32	11
White-headed Duck	<i>Oxyura leucocephala</i>	4									
Mute Swan	<i>Cygnus olor</i>	34	8	33			230	267	42	61	130
Whooper Swan	<i>Cygnus cygnus</i>	49	15	24	37		338	29	22	56	100
Red-breasted Goose	<i>Branta ruficollis</i>		2								
Greater White-fronted Goose	<i>Anser albifrons</i>		6	38			10	115	2	24	
Bean Goose	<i>Anser fabalis</i>			1							
Greylag Goose	<i>Anser anser</i>	754	280	362	195		23050	4455	4500	419	14
Ruddy Shelduck	<i>Tadorna ferruginea</i>	9		86			12	3	3		
Common Shelduck	<i>Tadorna tadorna</i>	11	3	5	12	3	230	34	2	18	3
Eurasian Wigeon	<i>Anas penelope</i>	3800	658	183	226		3400	228	190	3622	
Gadwall	<i>Anas strepera</i>	4220	550	425	662	11	3222	4435	400	3901	10
Eurasian Teal	<i>Anas crecca</i>	8440	1220	14000	29000	19	3560	3000	146000	16894	12
Mallard	<i>Anas platyrhynchos</i>	5388	3600	3500	4390	240	12095	35000	4300	12196	230
Northern Pintail	<i>Anas acuta</i>	1850	1290	88	118		4450	4540	780	2781	12
Garganey	<i>Anas querquedula</i>	455	880	760	400		10	8	21		
Northern Shoveler	<i>Anas clypeata</i>	1740	800	243	470		4544	3322	230	7845	2
Red Crested Pochard	<i>Netta rufina</i>	12		38			450	2	10	21	
Common Pochard	<i>Aythya ferina</i>	422	12	120	234		5660	29	123	708	
Ferruginous Duck	<i>Aythya nyroca</i>	2	11	86	24		230	65	76	28	
Tufted Duck	<i>Aythya fuligula</i>	370		24			1900	2	12	259	
Osprey	<i>Pandion haliaetus</i>	1			1		1				1
Black Kite	<i>Milvus migrans</i>	20		18			20	3	30	22	12
White-tailed Eagle	<i>Haliaeetus albicilla</i>	2		2	4		2		3	2	
Hen Harrier	<i>Circus cyaneus</i>			3	1	1	2		2		3
Western Marsh Harrier	<i>Circus aeruginosus</i>	9	3	32	60	2	28	20	21	40	3
Pallid Harrier	<i>Circus macrourus</i>			1		1	2	1	1		1
Eurasian Sparrowhawk	<i>Accipiter nisus</i>	1	1	1			1	1	1		
Common Buzzard	<i>Buteo buteo</i>	2	1	3			3	2	2	1	2
Long-legged Buzzard	<i>Buteo rufinus</i>	2		1			3	1	1		2
Rough-legged Buzzard	<i>Buteo lagopus</i>	1	1	3			3	2	2		1
Lesser Spotted Eagle	<i>Aquila pomarina</i>				9		2	1	1	5	
Greater Spotted Eagle	<i>Aquila clanga</i>			2	9		2			1	2
Steppe Eagle	<i>Aquila nipalensis</i>			1			1		1		
Common Kestrel	<i>Falco tinnunculus</i>	7	3	1			28	21	3	6	3
Merlin	<i>Falco columbarius</i>	1		2			3	1	2		
Eurasian Hobby	<i>Falco subbuteo</i>			1	1			1	1	1	
Saker Falcon	<i>Falco cherrug</i>			1			3	1		4	1
Peregrine Falcon	<i>Falco peregrinus</i>	1		3	1		4	1	2	2	1
Barbary Falcon	<i>Falco pelegrinoides</i>			3	1		1	1	1	1	1
Common Quail	<i>Coturnix coturnix</i>			1	2		3		1	2	23
Black Francolin	<i>Francolinus francolinus</i>	4									
Common Pheasant	<i>Phasianus colchicus persicus</i>	10									
Siberian Crane	<i>Grus leucogeranus</i>		2					2			
Common Crane	<i>Grus grus</i>		2	8			43	2	8		
Water Rail	<i>Rallus aquaticus</i>	3	1	1	23		2	10	3	7	1
Corncrake	<i>Crex crex</i>			1			2	3	2		2
Spotted Crake	<i>Porzana porzana</i>			1	3			1	1	1	
Little Crake	<i>Porzana parva</i>				1			2		1	
Common Moorhen	<i>Gallinula chloropus</i>	5	2	15	100	12	8	60	29	128	2
Purple Gallinule	<i>Porphyrio porphyrio</i>	1		7	135	12	2	2	8	73	2
Eurasian Coot	<i>Fulica atra</i>	2200	65	13000	1630	36	2300	27	12870	19940	28
Little Bustard	<i>Tetrax tetrax</i>	4		3			17	2			
Eurasian Oystercatcher	<i>Haematopus ostralegus</i>	3		18			12	2	2		2
Pied Avocet	<i>Recurvirostris avocetta</i>	3	8	8	45		15	42	60	21	2
Black-winged Stilt	<i>Himantopus himantopus</i>	11	15	4			220	450	21		23
Eurasian Golden Plover	<i>Pluvialis apricaria</i>	1		1600			20	2	200	10	22
Grey Plover	<i>Pluvialis squatarola</i>	7		160			380	2	29	2	21
White-tailed Lapwing	<i>Vanellus leucurus</i>				3		2	1	1	1	1
Lesser Ringed Plover	<i>Charadrius dubius</i>	16									
Common Ringed Plover	<i>Charadrius hiaticula</i>	3		175	26	15	34	3	180	41	120

The avian community of five Iranian wetlands ... – J. Mansoori

English name	Scientific name	Autumn					Winter				
		Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil	Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil
Kentish Plover	<i>Charadrius alexandrinus</i>	12		160	2	3	280		60		10
Eurasian Dotterel	<i>Charadrius morinellus</i>			24				1	4	1	
Northern Lapwing	<i>Vanellus vanellus</i>	155	230	6500	1075	110	4320	230	7000	860	100
Sociable Lapwing	<i>Vanellus gregarius</i>			2			1	2	2		
Eurasian Woodcock	<i>Scolopax rusticola</i>		1	2	8		3	12	1	2	2
Great Snipe	<i>Gallinago media</i>			1			1	5	1		
Common Snipe	<i>Gallinago gallinago</i>			136	90	13	12	2	4	11	5
Little Snipe	<i>Lymnocyptes minutus</i>			2	4		1	1	1	4	
Black-tailed Godwit	<i>Limosa limosa</i>	17	31	255	46				255	46	10
Bar-tailed Godwit	<i>Limosa lapponica</i>	4									
Eurasian Curlew	<i>Numenius arquata</i>			4			126	200	43	41	
Wood Sandpiper	<i>Tringa glareola</i>	2			6		2	2		1	12
Redshank	<i>Tringa totanus</i>	28	4	83	17	3	300	2	230	36	12
Marsh Sandpiper	<i>Tringa stagnatilis</i>	2		25	1		2	3	10	1	1
Common Greenshank	<i>Tringa nebularia</i>	1		23	3		10	3	2	2	1
Green Sandpiper	<i>Tringa ochropus</i>	1	2		1	3	2			1	2
Spotted Redshank	<i>Tringa erythropus</i>			275	76	24	200	2	280	54	10
Terek Sandpiper	<i>Xenus cinereus</i>	2	1								
Common Sandpiper	<i>Actitis hypoleucos</i>	4		3		3	2	1	3		1
Ruddy Turnstone	<i>Arenaria interpres</i>	6									
Great Knot	<i>Calidris canutus</i>						3		2		
Sanderling	<i>Calidris alba</i>	5		35		2	4	23	50	37	54
Little Stint	<i>Calidris minuta</i>	15		210	26	18	43		300	9	12
Dunlin	<i>Calidris alpina</i>	3		180	5	23	2		89	25	21
Curlew Sandpiper	<i>Calidris ferruginea</i>	1									
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	4									
Ruff	<i>Philomachus pugnax</i>	3		330	79		50	12	32	63	3
Red-necked Phalarope	<i>Phalaropus lobatus</i>			84	2			40	21	2	
Arctic Skua	<i>Stercorarius parasiticus</i>			2			11	2	2		
Common Gull	<i>Larus canus</i>	4	3	13			11	26	560	28	51
Yellow-legged Gull	<i>Larus cachinnans</i>	33		960	47	82	1880	19	1700	89	100
Lesser Black-backed Gull	<i>Larus fuscus</i>	20		190	109	960	2330	1200	230	274	1220
Black-headed Gull	<i>Larus ridibundus</i>	41	1	28	15	14	14	2	25	10	14
Slender-billed Gull	<i>Larus genei</i>	66		11		8	310		45	20	21
Little Gull	<i>Larus minutus</i>	4		93	89	235	21	1	14	68	75
Common Tern	<i>Sterna hirundo</i>	9	2	9	3		48		8	23	11
Whiskered Tern	<i>Chlidonias hybrida</i>	78	47	2	14		1208	50	232	744	80
Caspian Tern	<i>Sterna caspia</i>	37		115	16		40		46	6	10
Sandwich Tern	<i>Sterna sandvicensis</i>	11		118			450	2	23	2	12
White-winged Tern	<i>Chlidonias leucopterus</i>	2		18							
Stock Dove	<i>Columba oenas</i>		5		6		10	20		8	7
Rock Dove	<i>Columba livia</i>			3	34		22	30	25	40	20
Turtle Dove	<i>Streptopelia turtur</i>			40	23		150	10	20	40	
Common Cuckoo	<i>Cuculus canorus</i>	1			1		1	1			1
Little Owl	<i>Athene noctua</i>	1	1								
Short-eared Owl	<i>Asio flammeus</i>		1	1			2	1	1		
Common Swift	<i>Apus apus</i>		Many								
Common Kingfisher	<i>Alcedo atthis</i>	5	2	11	10	2	21		20	12	1
Syrian Woodpecker	<i>Dendrocopos syriacus</i>		1								
Calandra Lark	<i>Melanocorypha calandra</i>			18		12	12				20
Lesser Short-toed Lark	<i>Calandrella rufescens</i>			105			10	2			
Crested Lark	<i>Galerida cristata</i>	2									
Eurasian Skylark	<i>Alauda arvensis</i>			250		23	2		50	2	2
Horned Lark	<i>Eremophila alpestris</i>		3								
Sand Martin	<i>Riparia riparia</i>			250	400		100	25	2	52	18
White Wagtail	<i>Motacilla alba</i>	19	4	18	14	20	20	3	12	23	12
Grey Wagtail	<i>Motacilla cinerea</i>	3	2	2		1	4	21	10	7	4
Meadow Pipit	<i>Anthus pratensis</i>		2								
Water Pipit	<i>Anthus spinoletta</i>	23	10	1	1		8	2		3	3
Red-backed Shrike	<i>Lanius collurio</i>			3	3	8	2				
Great Grey Shrike	<i>Lanius excubitor/meridionalis</i>	1									
Winter Wren	<i>Troglodytes troglodytes</i>			2	4	1	1	1		1	2
Dunnock	<i>Prunella modularis</i>			2			1	2			
European Robin	<i>Erithacus rubecula</i>	4	4	4	1	2	12	28	23	14	9
Common Nightingale	<i>Luscinia megarhynchos</i>			1	3		2	10	3	2	
Bluethroat	<i>Luscinia svecica</i>			3			11	2			1

English name	Scientific name	Autumn				Winter					
		Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil	Miankaleh	Damgahs	Bujagh	Anzali	Lavandevil
Common Redstart	<i>Phoenicurus phoenicurus</i>			4	4	14			2	2	2
Whinchat	<i>Saxicola rubetra</i>			2			1	2	2		
Northern Wheatear	<i>Oenanthe oenanthe</i>			17	3	24	2	2		1	
Blue Rock Thrush	<i>Monticola solitarius</i>		1								
Eurasian Blackbird	<i>Turdus merula</i>	1	1	18	4	5	20	7	3	10	2
Song Thrush	<i>Turdus philomelos</i>			2			2	1	1		
Goldcrest	<i>Regulus regulus</i>		1								
Cetti's Warbler	<i>Cettia cetti</i>			2	4			2		1	
Great Reed Warbler	<i>Acrocephalus arundinaceus</i>	2		5	1			8			
Icterine Warbler	<i>Hippolais icterina</i>			3		6	1				
Olivaceous Warbler	<i>Hippolais pallida</i>			1		2	2	2			
Common Chiffchaff	<i>Phylloscopus collybita</i>			2	3	2	3	7	2	8	1
Common Whitethroat	<i>Sylvia communis</i>			3			2	9			
Red-breasted Flycatcher	<i>Ficedula parva</i>			3			1	1			
Long-tailed Tit	<i>Aegithalos caudatus</i>			8	8	3	2	1	4	11	1
Eurasian Penduline Tit	<i>Remiz pendulinus</i>		11								
Great Tit	<i>Parus major</i>	6	4	2	5	2	3	12	3	14	5
Blue Tit	<i>Parus caeruleus</i>	3	2	24		11		3	2		1
Pine Bunting	<i>Emberiza leucocephalos</i>		2				14	8	3		2
Cirl Bunting	<i>Emberiza cirlus</i>			4			2	2			
Common Reed Bunting	<i>Emberiza schoeniclus</i>	7	20	8	26		12	7	3	7	
Common Chaffinch	<i>Fringilla coelebs</i>	31	50	4	2	10	50	45	29	10	40
Brambling	<i>Fringilla montifringilla</i>						21	4	12		3
European Greenfinch	<i>Carduelis chloris</i>			1			2		1		
European Goldfinch	<i>Carduelis carduelis</i>		9	3			6				9
Twite	<i>Carduelis flavirostris</i>						20		32		4
Common Linnet	<i>Carduelis cannabina</i>						28	3	7		4
Hawfinch	<i>Coccothraustes coccothraustes</i>						2	6	2		2
Spanish Sparrow	<i>Passer hispaniolensis</i>			33			500	30	20	30	22
House Sparrow	<i>Passer domesticus</i>	24	10	245	160	46	1000	120	300	270	230
Tree Sparrow	<i>Passer montanus</i>	11	31	9	13	8	120	20	10	30	20
White-winged Snowfinch	<i>Montifringilla nivalis</i>						25	18	8		11
Rose-coloured Starling	<i>Sturnus roseus</i>		15								
Common Starling	<i>Sturnus vulgaris</i>	80	40	300	243	124	1800	27	490	370	190
Eurasian Golden Oriole	<i>Oriolus oriolus</i>				1		2	1		1	1
Eurasian Magpie	<i>Pica pica</i>	40	4	13	15	44	230	48	20	25	12
Rook	<i>Corvus frugilegus</i>	15		75	76	130	250	20	320	150	250
Hooded Crow	<i>Corvus corone cornix</i>	76	30	8	55	9	20	25	12	48	20
TOTAL	Species number	109	75	144	101	61	148	132	132	111	110

Wintering migrants

The Bujagh wetland is very important as a staging and wintering area for a wide variety of migratory waterbirds, notably grebes, Pygmy Cormorant (whose numbers peaked at 300 in mid-winter), ducks, shorebirds, gulls and terns. In Bujagh, Western Marsh Harrier *Circus aeruginosus* and Peregrine Falcon *Falco peregrinus* are regular winter visitors. In the Anzali wetland Eurasian Woodcock *Scolopax rusticola* is a common winter visitor to the surrounding damp woodlands and scrub. Lavandevil supports small numbers of waterbirds in winter, including up to 200 Mute Swan *Cygnus olor*, 100 Whooper Swan *C. cygnus*, 200 Gadwall *A. strepera*, 450 Northern Shoveler *A. clypeata*, 30 Pallas's (Great Black-headed) Gull *L. ichthyaetus* and about 50 Little Gull *L. minutus*, while the adjacent beach occasionally holds substantial numbers of

passage shorebirds for short periods during the autumn migration seasons, e.g. about 180 Sanderling *Calidris alba* and 100 Little Stint *Calidris minuta*. Pygmy Cormorant is a regular winter visitor; there are generally 15–50 birds in the area, but a maximum of 455 and 554 birds was recorded in the Anzali wetland in autumn and winter 2006 respectively (Table 3).

Passage migrants

In Anzali, White Pelican *Pelecanus onocrotalus*, Dalmatian Pelican, Great Bittern *Botaurus stellaris* and Lesser White-fronted Goose *Anser erythropus* are occasional winter visitors in small numbers, while White-headed Duck, Caspian Plover *Charadrius asiaticus*, Sociable Lapwing *Vanellus gregarius*, and Great Snipe *Gallinago media* have been recorded on passage.

Table 4. Breeding birds in (or near) five main wetlands in summer 2006. Key: B = breeding, N = near the area, + = seen but not counted during the study period.

English name	Scientific name	Miankaleh	F-K Damgahs	Bujagh	Anzali	Lavandvil
Little Grebe	<i>Tachybaptus ruficollis</i>	B		B	B	
Great Crested Grebe	<i>Podiceps cristatus</i>	12 pairs				
Great Cormorant	<i>Phalacrocorax carbo</i>	+		B	+	B (N)
Pygmy Cormorant	<i>Phalacrocorax pygmeus</i>			+	B (N)	B
Great Egret	<i>Ardea alba</i>			B?	B (N)	B
Grey Heron	<i>Ardea cinerea</i>	+		B	B (N)	B
Purple Heron	<i>Ardea purpurea</i>	+		+	B (N)	B
Little Egret	<i>Egretta garzetta</i>	+		B	B (N)	B
Cattle Egret	<i>Bubulcus ibis</i>	+			B (N)	B
Squacco Heron	<i>Ardeola ralloides</i>				B	B
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>			+	B (N)	B
Little Bittern	<i>Ixobrychus minutus</i>				B?	B
Eurasian Spoonbill	<i>Platalea leucorodia</i>	20 pairs				
Greater Flamingo	<i>Phoenicopterus roseus</i>	18 pairs				
Mute Swan	<i>Cygnus olor</i>	5 pairs?				
Northern Shoveler	<i>Anas clypeata</i>				B (N)	
White-tailed Eagle	<i>Haliaeetus albicilla</i>	+			B	+
Western Marsh Harrier	<i>Circus aeruginosus</i>			+		B
Hen Harrier	<i>Circus cyaneus</i>	+			B	
Common Buzzard	<i>Buteo buteo</i>				+	
Common Kestrel	<i>Falco tinnunculus</i>			B	+	B
Eurasian Hobby	<i>Falco subbuteo</i>				+	B
Common Pheasant	<i>Phasianus colchicus</i>	B				B
Black Francolin	<i>Francolinus francolinus</i>	B				
Water Rail	<i>Rallus aquaticus</i>					B
Common Moorhen	<i>Gallinula chloropus</i>	+		+	B	B
Purple Gallinule	<i>Porphyrio porphyrio</i>				B (N)	B
Black-winged Stilt	<i>Himantopus himantopus</i>				B	+
Collared Pratincole	<i>Glareola pratincola</i>	B			B	B
Northern Lapwing	<i>Vanellus vanellus</i>				R	
Little Ringed Plover	<i>Charadrius dubius</i>	B			B	+
Kentish Plover	<i>Charadrius alexandrinus</i>	B?				
Little Gull	<i>Larus minutus</i>	B?			+	B
Whiskered Tern	<i>Chlidonias hybrida</i>				B	+
White-winged Tern	<i>Chlidonias leucopterus</i>			B?	+	B
Sandwich Tern	<i>Sterna sandvicensis</i>	B			B	B (N)
Turtle Dove	<i>Streptopelia turtur</i>	+		B	R	B
Little Owl	<i>Athene noctua</i>			B		B
Common Kingfisher	<i>Alcedo atthis</i>				B	B
Blue-cheeked Bee-eater	<i>Merops persicus</i>	+			B	B
Alpine Swift	<i>Tachymarptis melba</i>			B(N)		
Eurasian Hoopoe	<i>Upupa epops</i>	+			B	B
Barn Swallow	<i>Hirundo rustica</i>	+			B	B
Grey Wagtail	<i>Motacilla cinerea</i>				B	8
White Wagtail	<i>Motacilla alba</i>	B			B	B
Icterine Warbler	<i>Hippolais icterina</i>				+	B
Cetti's Warbler	<i>Cettia cetti</i>				B	B
Great Reed Warbler	<i>Acrocephalus arundinaceus</i>				B	B
European Reed Warbler	<i>Acrocephalus scirpaceus</i>			B	+	B
Great Tit	<i>Parus major</i>				B?	B
Blue Tit	<i>Parus caeruleus</i>			B		B
House Sparrow	<i>Passer domesticus</i>			many B	B	B
Tree Sparrow	<i>Passer montanus</i>			B	B	B
Eurasian Golden Oriole	<i>Oriolus oriolus</i>	B?				B
Common Starling	<i>Sturnus vulgaris</i>	B		B	B	B
Eurasian Magpie	<i>Pica pica</i>	B		+	B	B
Rook	<i>Corvus frugilegus</i>			B?		B
Hooded Crow	<i>Corvus corone cornix</i>	+		B	B	B

In Lavandevil, large numbers of herons have been observed overhead and over the Caspian migrating south in autumn (including 350 Squacco Heron *Ardeola ralloides*, 200 Little Egret *Egretta garzetta*, 360 Grey Heron *Ardea cinerea* in a single day in September 1993 (J. Mansoori, pers. obs.).

Other migrants have included up to 100 Great Cormorant *Phalacrocorax carbo*, 60 Glossy Ibis *Plegadis falcinellus*, 3 Spotted Crake *Porzana porzana* and 10 Black Tern *Chlidonias niger*, Eastern Imperial Eagle *Aquila heliaca*, Peregrine Falcon and Short-eared Owl *Asio flammeus* are regular winter visitors in small numbers, and Bearded Reedling (Tit) *Panurus biarmicus* has occurred in some years.

Breeding birds

Although all the surveyed wetlands are important wintering sites for waterbirds, most waterbirds leave the region on northward migration in spring (Scott 1972). Bird populations and their diversity during summer in Bujagh National Park are very low. In Bujagh, the open grassy areas and dunes near the river mouth provide breeding habitat for 10–20 pairs of Collared Pratincole *Glareola pratincola* and a few pairs of Common Tern *Sterna hirundo*. White-tailed Eagle is present year-round and breeds locally (up to five have been observed at one time). The Anzali wetlands support a very large colony of Whiskered Tern *Chlidonias hybrida* (2000–4500 pairs), small colonies of birds such as Grey Heron, Black-crowned Night Heron *Nycticorax nycticorax* and a resident population of Purple Swamphen *Porphyrio porphyrio*. Moustached Warbler *Acrocephalus melanopogon* and Great Reed Warbler *A. arundinaceus* are very common breeding birds in the reedbeds. In Lavandevil, a pair of White-tailed Eagle has bred in the area every year since 1970. Only few species of passerines were found breeding in Fereidoon-Kenar in the early summer.

Rare birds

Damgahs provide some excellent habitats for a high diversity of different species; including the western flock of Siberian Crane *Grus leucogeranus* (although only two wild

individuals have visited the area in winter 2008). The bird listed as critically endangered species in the IUCN Red Data Book. In the Damgahs, the term ‘key species’ covers globally or nationally rare species, endangered or threatened species, or those that occur at high densities. These species are: Ferruginous Duck (NT), Lesser White-fronted Goose (VU), Siberian Crane (CR), Eurasian Spoonbill *Platalea leucorodia*, Red-crested Pochard *Netta rufina*, Mute Swan, Western Marsh Harrier, Eurasian Sparrowhawk *Accipiter nisus*, Pygmy Cormorant and Marbled Teal (VU).

Lesser White-fronted Goose is an occasional winter visitor to Bujagh, the maximum being 10 in January 1973, but the last record was of only two individuals in 2003. Occasional winter visitors or vagrants have included Great Bittern, Red-breasted Goose *Branta ruficollis*, White-headed Duck, Red Phalarope *Phalaropus fulicarius* and a very accidental Black-legged Kittiwake *Rissa tridactyla* in the area on 28 November 1972 (Scott 2008). The Anzali Mordab is the most important wintering area in Iran for Pygmy Cormorant (e.g. more than 300 were observed in mid-winter of 2002 (J. Mansoori, pers. obs.). However Eastern Imperial Eagle, Rough-legged Buzzard *Buteo lagopus*, Saker Falcon *Falco cherrug*, Merlin *F. columbarius* and Short-eared Owl have also been recorded in Bujagh National Park.

The wetlands of the region support within the year a surprising number of bird species at risk in the IUCN categories Critically endangered (Cr), Endangered (En), Vulnerable (Vu) and Near-Threatened (NT) (BirdLife International 2007), namely Dalmatian Pelican (Vu), White-headed Duck (EN), Lesser White-fronted Goose (En), Red-breasted Goose (En), Ferruginous Duck (NT), Pallid Harrier *Circus macrourus* (NT), Greater Spotted Eagle (VU), Lesser Kestrel *Falco naumanni* (VU), Saker Falcon (En), Little Bustard *Tetrax tetrax* (NT), Corncrake *Crex crex* (NT), Black-winged Pratincole *Glareola nordmanni* (NT), Great Snipe (NT) (Tables 2–3), Marbled Teal (Vu), Red Kite *Milvus milvus* (NT), Eastern Imperial Eagle (VU) (Evans 1994) and Slender-billed Curlew (Cr) (Feeny *et al.* 1968). These should be the flagship species for national conservation efforts in this region.

DISCUSSION

Although the survey work has been carried out twice each year, the numbers in Tables 1–2 refer only to proportions of each species' population. It is quite likely that some other species have been missed during the survey. Most migratory birds leave Iran by late winter, only relatively few species such as White-tailed Eagle, some terns, cormorants, herons, egrets, pratincoles, and a few passerines are essentially winter residents, but many of these leave Iran on their return migration. Tables 2–3 show that the populations of birds in the wetlands reach their peak in winter, but quickly decrease in early spring. Noticeable records in January 1992 were 237 Pygmy Cormorant, 12,700 Eurasian Teal, 8650 Eurasian Coot, 1655 Northern Lapwing *Vanellus vanellus*, 25 Common Snipe *Gallinago gallinago* in the Anzali wetland (including Selkeh and Siahkeshim) and 15,000 Great Cormorant, 2750 Greater Flamingo *Phoenicopterus roseus*, 60 Common Goldeneye *Bucephala clangula*, 50,320 Eurasian Coot, 2000 Dunlin *Calidris alpina*, 650 Common Redshank *Tringa totanus* and 560 Pied Avocet *Recurvirostra avosetta* in Lapoo-Zaghmarz and Miankaleh (Scott & Smart 1992). These are not directly comparable with the numbers in the present study, but some species were present in greater numbers in Scott & Smart (1992) whereas some were in greater numbers in the present study. In this study important wintering numbers recorded were 554 Pygmy Cormorant in Anzali, 450 Black-crowned Night Heron in Fereidoon-Kenar, 23,050 Greylag Goose in Miankaleh, 146,000 Eurasian Teal in Bujagh and 29,000 in Anzali, 35,000 Mallard in Fereidoon-Kenar, 7845 Northern Shoveler, 128 Common Moorhen *Gallinula chloropus*, 19,940 Eurasian Coot in Anzali, 1,600 Eurasian Golden Plover *Pluvialis apricaria*, 7,000 Northern Lapwing in Bujagh, 1,880 Yellow-legged Gull, 2,330 Lesser Black-backed Gull *L. fuscus* and 1208 Whiskered Tern in Miankaleh (Table 3).

Threats and conservation measures

The continuous increase in the human population and in development growth has caused adverse impacts on natural landscapes and habitats all over Iran, as the patterns of land use by established industries and development

activities, such as the damage done by agriculture, aquaculture, industrial pollution, pastoral grazing, shell extraction (mining shells from below-ground deposits), over-hunting and fishing. The effects are discussed separately for each site.

Miankaleh Wildlife Refuge is undoubtedly one of the finest bird reserves in the Palearctic. The reserve is extremely important, supporting more than 200,000 waterfowl in winter and large colonies of herons, egrets, terns and pratincoles in summer. It serves as a major staging area for migrants in winter, and for landbirds in spring and autumn (Feeny *et al.* 1968, Rands *et al.* 1982). The reserve and the neighbouring Gomishan wetland also provide one of the most important staging area for many shorebird species in the South Caspian region (Ghaemi 2006). Many small passerines arrive as summer breeders or occur as numerous and common passage migrants. Miankaleh Wildlife Refuge and the Gorgan Peninsula experience heavy bird traffic in autumn.

It is recommended that construction of the proposed road to Ashuradeh, along to the peninsula within Miankaleh Wildlife Refuge should not proceed without an independent environmental impact assessment being undertaken and published (which would be in line with Iran's proud record of Ramsar sites). The risks to habitats and to the bird populations need to be quantified, so that the least harmful option can be determined from knowledge and not from assertion. It is likely that any such road built without these considerations would permit greatly increased disturbance and degradation of the wildlife refuge. For a very long time, a project has been proposed by the Land Bank (Miankaleh project) to convert much of the area to aquaculture and agriculture; however, even the Land Bank's more limited proposal to drain 18,000 ha of land at present under water (the southern Miankaleh area) would do great damage, and is still under consideration. Most land at the southern boundary of the area is under intensive agriculture and is therefore liable to produce run-off pollution from the application of pesticides and fertilizers, a circumstance that world-wide has been found to seriously affect the local ecology, and here is of prime concern.

The impact of aquaculture (especially fish-farm cages) on the ecological character of

wetlands seems to be as great as agriculture; the high fish densities favour the spread and evolution of diseases against which wild stocks have little defence. The settlements on the peninsula (having increased after the Islamic revolution) have led to an extension of grazing cattle, which now include water-buffalo, and subsequent degradation both of natural pomegranate scrub vegetation and the vegetation of the surrounding marshes. On the southern shores of Gorgan Bay and particularly in the temporary wet pastures in the southwest, the amount of traditional grazing mainly by sheep and goats, is considerable and also appears to have increased in recent years. The Shilat organization has constructed a number of fishery installations along the seaward side of the peninsula. It is clear that the increased activities will affect the ecological conditions of this Ramsar site, and will also create conditions for illegal hunting around Miankaleh Wildlife Refuge. These intensive developments have been accompanied by road construction through the northern part near the beach, making the area very crowded and impossible to control illegal hunting and fishing within it. Illegal occupation of land for animal husbandry has also caused great disturbance to the area. Sheep, goats and water buffalos graze heavily over much of the peninsula.

The Fereidoon-Kenar Damgahs are invaluable as wintering ground for migratory waterbirds, but recently a problem arose to interrupt the flooding/cultivation cycle, when the H5N1 bird flu virus was found in early 2006 (Yaghoobzadeh & Ghasempoori 2006). As a consequence, the local people could not harvest or sell any ducks in the 2006/2007 winter. They now had no reason to prepare their land to flood it to attract birds, and so the trappers decided to concentrate on rice cultivation instead of making good the damage to the earth banks. This decision led to a debate between the local trappers and the Department of the Environment. However, during the summer, agreement was reached and the trappers started to inundate their lands and prepare their damgahs to attract waterfowl in winter. The basis of the agreement was that their bird-catching methods are ecologically more sound than the alternatives (such as shooting), and so an NGO (the Mazandaran Crane Conservation Association) and the Department of the

Environment undertook to compensate them for their loss, even if the same restrictions had to apply the next winter.

Towards the end of winter when duck-netting becomes unprofitable, the area is opened up to shooters in a massive ‘shoot-out’, which is a rather indiscriminate method, for large numbers of waterfowl of many species are killed. There is a real danger that Siberian Crane could be amongst the casualties although hunters are protective towards the bird during its winter residence before the traditional duck shoot. After the migrant waterfowl have left, rice cultivation brings with it quite intense human activity as the trappers return to farming. Only a few normally migrant birds remain occasionally through spring and summer. A further, more recent threat to the Damgahs is that presented by the introduction of a second yearly rice crop in early September, when it had been customary for the local farmers start to prepare their lands for winter. This trend towards a second crop has been reinforced by the loss of income from the initial ban on duck-catching, because retrospective compensation from DOE cannot be obtained. The consequence will be a reduction in traditional damgahs, at least until bird flu disappears or mutates to a version harmless to humans.

However one important threat to the areas is pollution from a large number of applied insecticides (*e.g.* Carbaryl, Cartap, Diazinon, Fipronil, Fenitrothion, Lindane, Malathion and Trichlorofon), fungicides (*e.g.* Benomyl, Carboxin-Thiram, Epirodion+Carbendazim, Edifenphos, Propiconazole, Thiophanate-Methyl, Thiram, Tricyclazole, Triflumizol and Fludioxonil) and herbicides (*e.g.* Anilofus+ Etoxisulfuron, Bensulfuron-metyl, Butachlor, Cinosulfuron, Etoxisulfuron, Exadiazon, Molinate, Pertilachlor, Propanil, Piprophos+2.4.D, Thiobencarb and 2.4.D) which are used in the rice fields (Mosalla-Nezhad *et al.* 2003). Illegal net-trapping is the most serious security problem in the area. On a lesser scale, road-building and local house construction with the concomitant traffic during autumn and winter has some adverse effect on the area. Apart from these problems, the restrictions on access imposed by the local land-owners extend even to personnel of the Department of the Environment, which means

in practice that local actions over-rule national DOE policies, and so there is no control over hunting activities.

Bujagh was designated a National Park in 2003 by the DOE, and although disturbance to the area has subsequently diminished, large areas along its southern boundary have converted to rice cultivation; this area experiences uncontrolled recreational activities. The existence in the park of land that is excepted from conservation regulations, is prone to overgrazing and is subject to heavy traffic represents a damaging effect on the park landscape. The DOE should compile and publish a clear management plan for the entire park. It is most important that the Gilan Provincial Office of the DOE is authorised to direct and implement the policies for the park, thus coordinating with local people all the activities are undertaken inside or around the National Park.

The Anzali Wetland and its satellite wetlands such as Selke, Sorkhankol and Siahkeshim Marshes are extremely important for a wide variety of breeding, passage and wintering waterfowl (Ferguson 1972, Scott 1995). New road construction in the north of the wetland inevitably has had a great effect on the ecology of the Mordab. The harbour facilities at Bandar Anzali have been expanded, and an industrial site was developed to the south of the area. In the late 1960s, a 20m-wide drainage canal, two km long, was constructed from the northeast corner of the Mordab to the Caspian Sea to facilitate the reclamation of 5000 ha of reed marsh for agriculture. In recent years, there has been a massive spread of the water fern *Azolla* which had been introduced into the Caspian wetlands in 1970s; it now covers much of the water surface within the reedbeds and in most of the quieter backwaters. The ecological consequences of this invasion by *Azolla* (e.g. Khaleghizadeh 2007) and of the road are now more discussed in the public forum (pers. obs., pers. communications with personnel of Gilan Provincial Office of the DOE). Pollution from a variety of sources such as waste materials, industrial sewage, domestic waste dumping and general litter, when combined with agricultural run-off and livestock manure has caused the whole ecosystem to become critically threatened. Waterfowl populations are subjected to very

high levels of disturbance from road construction, fishing activities, boat traffic and hunting. Hunting pressure on waterfowl population in the Anzali Mordab has increased greatly since the 1970s. The number of licensed hunters in Gilan province has increased from about 6000 in the 1970s to about 50,000 at the time of writing (Gilan Provincial Office of the DOE, unpubl. data). In the traditional hunting methods, hunters use the "net", not firearms, and disorient birds at night by using flares (in front of the boat) and also percussive "laver", a local device; it makes for easy netting in wetlands. This method continues at a high level, probably accounting for at least 100,000 waterfowl per year. However, many others are turning to using shotguns instead, perhaps 5000 at Anzali Mordab alone (Gilan Provincial Office of the DOE, unpubl. data), probably accounting annually for another 100,000 waterfowl. Siahkeshim and Sorkhankol marshes are now dotted with shacks used by the duck-netters. Poaching was reported to have been a very serious problem in the first few years after the revolution, but the situation has improved considerably in recent years, especially at Selkeh Wildlife Refuge where there is a new Game Guard Station and protection is excellent. Bird flu restrictions were imposed thoroughly in 2006, but this reduction in hunting pressure will be only temporary unless existing regulations are enforced once bird flu disappears. Otherwise, there is a high likelihood that within a few years, the once vast flocks of migratory waterfowl will have disappeared completely from all those areas of Anzali Mordab open to hunting for the general public.

Nearly all Iran's wetlands originate from "natural" areas, but human-induced landscape-scale changes inevitably mean that all wetlands have to be managed so that they will continue to function – it does mean, however, that to be effective, such intervention must be based on wide-ranging but thorough studies that have been published, and on any other relevant research undertaken elsewhere. Any activity in these wetlands should be based on sustainable utilisation. Anzali, being a Ramsar site, urgently needs the basic requirement of "management and monitoring" implemented, in order to protect and promote its conservation. The control of all activities in the wetlands should be the responsibility of the reserve

management, but at present there appears to be no single organisation responsible for the overall management of the Anzali wetland. Boats are carrying visitors everywhere, inside the tern colonies and even close to the nest of White-tailed Eagle. Collection of tern eggs and of the flowers of the common water lily *Nympha alba* still continues in places. Pollution from many sources already affects all biota in the wetland – what will happen when the road through the wetland adds to the problems? There is an urgent need for a management plan that promotes, establishes and implements sound environmental policies, so that the area can be properly managed to allow conservation of as much as possible. Because the most important problems in the Selkeh area are poaching, agricultural run-off and disturbance from visitors, it is important that this management plan is developed with the active assistance of the local people.

At present in Lavandevil Wildlife Refuge, almost all the vegetation has disappeared through developments, such as deforestation, a highway, the establishment of many poultry farms, exploitation of shells and their associated factories. Bird populations have decreased drastically due to the destruction of and disturbance to habitats. Pollution comes from domestic garbage that is fly-tipped throughout the area and is seen everywhere. Tourists camp everywhere, scattering litter without control or sanction.

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