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Status and distribution of coastal birds at Farwa Island, Libya

Statut et répartition des oiseaux côtiers de l'île Farwa, Libye

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Abstract. Wetlands are unique in Libya being less susceptible because of non interference of human activity. Farwa Island is one of the stopover route for migratory waterfowl passing to different habitats in Africa. Consequently, the area is rich in avifauna. Lack of studies in the past or recently on biodiversity of this locality created attention of many ecologists and became one of the important ecosystem. Species like Common Tern *Sterna hirundo*, Little Tern *Sterna albifrons* and Yellow Legged Gull *Larus michahellis* are utilizing this habitat as one of their breeding colonies. Other some important species were observed at the Island such; Shag *Phalacrocorax aristotelis*, Black-tailed Godwit *Limosa limosa*, Audouin's Gull *Larus audouinii* and Lesser Crested Tern *Sterna bengalensis*. These species were mentioned as threatened in the annexes of some international agreements. Moreover, this study recorded the Greater Black-backed Gull *Larus marinus* for first time in Libya. The authors have made extensive survey to the study area during the period from 1998 to 2010.

Keywords : Avifauna, breeding, threatened species, Farwa Island, Libya.

Résumé. En Libye, les zones humides sont les seuls écosystèmes moins perturbés en raison de la non-ingérence de l'activité humaine. L'île Farwa constitue un important habitat d'escale pour de nombreuses espèces de la sauvagine migratrice, vu sa position en plein centre du trajet migratoire emprunté habituellement par les oiseaux avant de se rendre dans les différents habitats en Afrique. Par conséquent, ce site compte parmi les zones humides les plus réputées pour une biodiversité aviaire riche en espèces et en individus. Peu d'études écologiques ont été effectuées jusqu'à nos jours sur la biodiversité de cet habitat humide qui montre d'importants atouts environnementaux. Ainsi, de nombreuses colonies d'espèces utilisent ce site comme un site de reproduction: *Sterna hirundo* (sterne pierregarin), *Sterna albifrons* (sterne naine) et *Larus michahellis* (goéland leucophée). Parmi les espèces remarquables que nous avons observées dernièrement à l'île Farwa : le cormoran huppé (*Phalacrocorax aristotelis*), la barge à queue noire (*Limosa limosa*), le goéland d'Audouin (*Larus audouinii*) et la sterne voyageuse (*Sterna bengalensis*). Ces quatre espèces figurent désormais parmi les oiseaux menacés cités dans les annexes de certains accords internationaux. La présente étude nous a permis l'observation pour la première fois en Libye, du goéland marin (*Larus marinus*). Les résultats de cette étude sont la synthèse des observations et d'investigations menées par les auteurs dans cette zone humide durant la période 1998-2010.

Mots-clés : Avifaune, élevage, espèces menacées, Île Farwa, Libye.

INTRODUCTION

Farwa is one of the most described Libyan wetlands in the recent literature (Defos *et al.* 2001), it is situated 150 km west of Tripoli city at 33°. 05 N latitude and 11°. 40 E longitude. The island is about 12 Km in length with maximum width of about 3 km, and the total area is about 31 Km². The island is connected to the sea on the west with an opening of 10 m wide (Keramburn 1986). The area is composed of sandy to clayey loam in southern region towards the mainland, sandy in eastern region and western region is dominated by marshes, water logged puddles and elevated *Posidonia* crust near to the sea. The quite vast lagoon which is almost rather a deep bay, its maximum depth varies between 0.5-2.5 m. The lagoon is surrounded by many sebkhas which extend East up to the town of Zuwarah and include the protected Park of Zulton (Fig. 1). Some or all of these supratidal sebkhas, vegetated with *Arthrocnemum sp.*, flooded in winter and have occasional water exchanges with Farwah lagoon. Furthermore, the lagoon bottoms are almost occupied by three vegetal assemblages. These formations are, in decreasing order of importance, *Cymodocea nodosa* seagrass beds, *Caulerpa prolifera* meadows and isolated patches of *Posidonia*

oceanica. These different species are found either forming monospecific assemblages or in mixed populations. The presence of dead *Posidonia oceanica* leaves should also be noted, which at times form veritable emergent islands within the channels leading to the open sea (Pergent *et al.* 2002). The whole complex might therefore provide a suitable range of habitats for wintering birds (Defos *et al.* 2001, Smart *et al.* 2006). Species like *Sterna hirundo*, *Sterna albifrons* and *Larus michahellis* are utilizing this habitat as one of their breeding colonies. Other some important species were observed at the Island such; European Shag *Phalacrocorax aristotelis*, Black-tailed Godwit *Limosa limosa*, Audouin's Gull *Larus audouinii* and Lesser Crested Tern *Sterna bengalensis*. These species were mentioned as threatened in the annexes of some international agreements (Annex II, SPA Protocol; Jensen *et al.* 2008). However, the importance of the area as a stopover for avifauna species and qualified to be protected has been reported by Etayeb & Essghaier (2012). The authors have made extensive survey to the study area during the period from 1998 to 2010 as a part to show the ornithological importance of the area and its crucial role to provide a good shelter and foraging habitat for resident and migratory water birds.

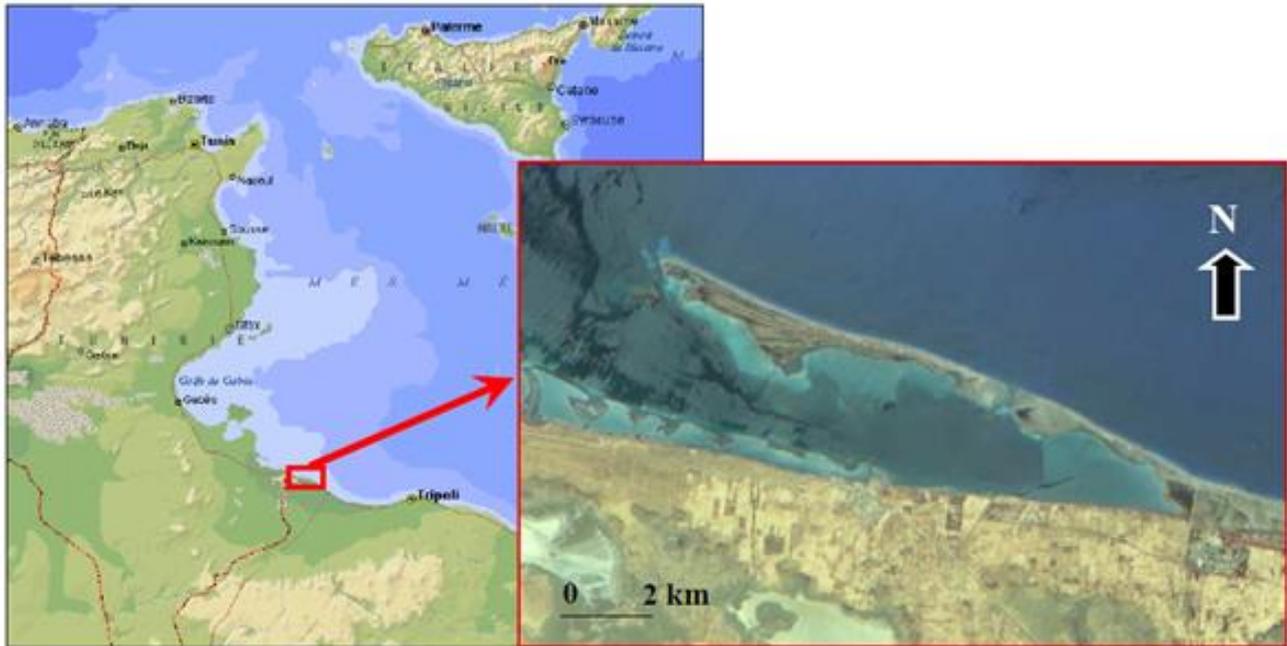


Figure 1. Map of Farwa (Pergent *et al.* 2002)

METHODS

All the observations (July to December 1998 and winter census of waterbirds 2001 and 2005 to 2010) were made by foot and also we covered around the island by boat. The surveys were conducted on waterfowl in the island, the immediate adjacent shore line and water logged puddles on the island was continued from dawn to dusk by using binoculars (Sigma lunar vision 10 x 50 and Optolyth telescope). The birds were identified by using books Hollom *et al.* (1988), Johnson (1996) and Heinzal *et al.* (1998).

For each species, the statuses are assigned to their frequency of occurrence. The categories used are as follows (adapted from James *et al.* 1976) : Local migrant (**LM**), Migrant (**M**), Winter visitor (**WV**), Resident breeder (**RB**) Possible breeder (**PB**) and **Rare** for species recorded once or twice. The objective of the present study is to document the status and distribution of waterfowl at Farwa.

RESULTS & DISCUSSION

Great Crested Grebe *Podiceps cristatus* (WV & M)

Three adult birds were recorded at early hours of the day (19 October 1998) fishing in deep waters south of the island. According to locals, this bird is regularly seen in winter with a maximum flock of 223 individuals in 2010 (Tab. 1).

Black-necked Grebe *Podiceps nigricollis* (WV & M)

No evidence of breeding, but seen regularly along the west coast. Three adults were sighted near the main land at late evening with full winter plumage in October 1998. The largest number (218 birds) was observed in Jan. 2006.

Cory's Shearwater *Calonectris diomedea* (WV & M)

A solitary bird has been sighted early hours of the day

on 1 July 1998 scanning the exposed mud during low tide. **Cory's Shearwater** is a regular winter visitor along the coast but the number varies. A maximum of thirty individuals were sighted near Tripoli in January (Waters, 1963).

European Shag *Phalacrocorax aristotelis* (RB)

This species is one of the most common breeders in eastern Libya (Meininger *et al.* 1996). A total of 25 individuals were sighted in early part of October 1998 resting on the elevated posedonia crust at the western corner of the island which is covered during high tide and exposed during low tide along with Lesser crested terns and Lesser black-backed gulls.

Great Cormorant *Phalacrocorax carbo* (WV & M)

Found regularly in coastal waters during July - Nov 1998. A single solitary bird was sighted on 30 September 1998 fishing along with Yellow legged gull and Caspian tern in the shallow water. On 19 October of the same year a flock of twenty three individuals were resting along with terns on the western corner of the posedonia. The number was fluctuated from 178 to 1410 during the study years (Tab. 1)

Grey Heron *Ardea cinerea* (PB & LM)

As per our record and personnel observation, Grey heron is seen in Libya throughout the year. But, there are sporadic reports that it has been breeding in South of Jebel-Akhdar (Bundy 1976). Still breeding site has not been confirmed. It has been recorded in small numbers wading in shallow water during high tide and actively feeding at low tide. The number varies 13 – 38 during the study period.

Little Egret *Egretta garzetta* (PB & LM)

It has seen regularly along the coast throughout the year. During our visit to Tawerga spring on 8 March 1998, we have noticed breeding nuptial plume on the nape in a small flock of twenty two individuals feeding on wet margin. It gives us an indication that due to abiotic factors these birds develop nuptial plume for a successful breeding cycle (Joel *et al.* 1994; Tab. 1).

Eurasian Spoonbill *Platalea leucorodia* (R & M)

Four birds of this species which is considered globally rare were sighted at the marginal waters feeding along with Flamingo in October 1998. Similarly, three more individuals were sighted in El-heesha on 17 Dec 1997 (Personal observation). The last record in Libya was in 1965 (Bundy, 1976). The number has increased through the years up to 106 (Tab. 1).

Greater Flamingo *Phoenicopterus ruber* (WV & M)

In October 1998 eleven individuals were seen, seven adults and four sub-adults wading in shallow water. The peak was in 2005 where 25 individuals were observed. According to fishermen the flock size increases to hundred or more during winter season and. However, Bundy (1976) mentioned that this species is irregular and scarce.

Eurasian Oystercatcher *Haematopus ostralegus* (WV & M)

During our first visit on 30 September 1998, four individuals are sighted feeding in the shallow water along with other waders. However, the number was fluctuated from 4 to 26 during the study years.

Ringed Plover *Charadrius hiaticula* (WV & M)

It is regular winter visitor along the coast, valleys and sebkhas (Bundy 1976, Etayeb 2002). During our visit on 1 July 1998 six individuals were recorded feeding along with Common Redshank. On 30 September of the same year a flock of more than fifty were sighted and showed winter plumage with black bill and still pale orange color legs. The number has been decreased through the years of study.

Kentish Plover *Charadrius alexandrinus* (RB)

Breed along the coast from east to west (Bundy 1976). On 30 September 1998 a total of 126 individuals were feeding actively during low tide on small invertebrates. In 2006 the number reached 400 (Tab. 1). Small breeding colonies have been recorded in El-Heesha, east of Tripoli and in Bengazi at the eastern part of Libya (unpublished data).

Golden Plover *Pluvialis apricaria* (WV & M)

It is common along the coast sebkhas and wadis. Four individuals were seen in a small patch of water in the western region of the island in October 1998. The second observation was only in 2009 where 41 individuals were sighted.

Grey Plover *Pluvialis squatarola* (R & M)

Two individuals with winter plumage were recorded in the western corner of the island in 1998. The numbers were increased and fluctuated during the next years. However, according to Bundy (1976) this species is more numerous in April-May.

Sanderling *Calidris alba* (WV & M)

On 30 September 1998 a flock of 21 individuals were sighted at the eastern corner of the island and the number seen in the next years is more or less equal (Tab. 1).

Little Stint *Calidris minuta* (WV & M)

It has regularly seen on the coast and sebkhas (Bundy 1976, Smart *et al.* 2006). During the study period the number varies 1-125 actively probing in wet mud during low tide.

Dunlin *Calidris alpina* (WV & M)

Nine individuals were sighted in 1998 at the eastern corner of the island with full fledged winter plumage. The numbers seen during the next study period are more where the maximum was 950 in 2008. This species is most common in the wetlands along the coastline (Smart *et al.* 2006).

Jack Snipe *Lymnocyptes minimus* (R & M)

Scarce, it is usually seen along the coast (Bundy 1976). A small flock of six individuals only in 1998 were chased by Lesser kestrel in the water logged puddles on the island with no success.

Black-tailed Godwit *Limosa limosa* (R & M)

A single solitary bird was sighted on October 1998 at the eastern corner of the island with full fledged winter plumage, upward curved beak, brownish upper parts, and whitish below and with terminal black band in the tail. 10 individuals were sighted in 2008 as a maximum number during the study period.

Common Curlew *Numenius arquata* (WV & M)

It is one of the common winter migrant species on western coast of Farwa. On 1 July 1998 two individuals were sighted and gradually population increased to eleven in October of the same year. However, they are often seen solitary, or in small parties with a total of more than hundred at the marginal waters probing in soft mud for food during the next years (Tab. 1).

Common Redshank *Tringa totanus* (WV & M)

At present, the Redshank has increased in frequency of occurrence and abundance since 1970's. It was described as scarce and single records (Bundy 1976). Our studies reveal that this species is regular and the number varies from 1 – 118.

Marsh Sandpiper *Tringa stagnatilis* (WV & M)

It is scarce, but seen regularly in coastal zone. On

September 1998 four individuals were sighted for the first time during our studies. Another only sighting for one individual was in 2007.

Common Greenshank *Tringa nebularia* (WV & M)

This species is regular along the coast but scarce towards end of the winter. A maximum of 25 individuals were sighted in 2007 during low tide.

Green Sandpiper *Tringa ochropus* (WV & M)

On 30 September 1998, eight individuals were sighted in the eastern corner of the island and the number has increased to twelve in October of the same year. No more records during the next years of study period.

Wood Sandpiper *Tringa glareola* (WV & M)

Seen in small numbers in the island. A maximum of five individuals were seen in 1998 along with other waders near the marginal waters during early hours of the day in September. Another sighting of this species was in 2009 where 14 individuals were foraging at the western corner of the area.

Common Sandpiper *Tringa hypoleucos* (WV & M)

It is a Common migrant species, seen regularly along the coast, wadis and sebkhas. The number varies from 2 – 21.

Ruddy Turnstone *Arenaria interpres* (WV & M)

Seen regularly along the coast (Etayeb 2002). A small flock of fourteen individuals has been recorded in western corner of the Island on 19 October 1998, feeding at the exposed mud along with Sanderlings and Ringed plovers. In 2007 the observed number was 80 as the max during the study period. Bundy (1976) suggested that a maximum of four individuals were sighted between Benghazi – Tobruk in April–May.

Mediterranean Gull *Larus melanocephalus* (WV & M)

The species is abundant along the western coast. Seven individuals were sighted in early September 1998, since then the number has sharply increased to 344 and 811 in 2009 and 2010 respectively.

Slender-billed Gull *Larus genei* (WV & M)

They were seen regularly throughout the studies and the number varies from 26 to 3993. It is not known to breed.

Audouin's Gull *Larus audouinii* (WV & M)

It is a conservation dependent species. Three records during our visit. The number varies 4 - 150 (all in winter plumage).

Lesser Black-backed Gull *Larus fuscus* (WV & PB)

Present locally along the coast. Fifty two individuals including juveniles were sighted in the eastern sandbar in 1998. The number has increased throughout the years of study (Tab. 1); still, no evidence of breeding.

Yellow-legged Gull *Larus michahellis* (RB)

In 1993, four breeding sites were located in eastern Libya (Meininger *et al.* 1996). In July 1998, we found five pairs were breeding in the western corner of the island along with Common Tern and Little Tern. A maximum of fifty one individuals were sighted in the same year. Then the number has increased during the years of study.

Greater Black-backed Gull *Larus marinus* (R & M)

A single solitary bird was sighted on 30 September 1998 in the eastern corner of the island feeding along with Common Tern, Caspian Tern and Slender-billed Gull. This is the first record in Libya. On 19 October, two more individuals were stopped along with Yellow-legged Gull and Lesser Black-backed Gull in the western corner of the island.

We were able to observe this species at a distance of 50-75m for about 30 minutes. It was feeding in the tidal influx and was constantly mobbed by Common Tern and Caspian Tern. The bird was in winter plumage with blackish brown upper parts, the primaries are black and pale under parts. Bill was yellow with black tip and legs color was slaty to pinkish (Sun reflection). The size was a medium size eagle. The wing span was much larger and strongly built than Lesser Black-backed Gull.

Gull-billed Tern *Sterna nilotica* (WV & M)

Four adults and two juveniles of this species were recorded in 1998, scooping and diving in the tidal waters. However, the number was very small during the period of study. No evidence of breeding.

Caspian Tern *Sterna caspia* (WV & M)

It has been seen regularly along the western coast of the study area. The individuals have increased from two in September to twenty three in mid October 1998. Etayeb & Essghaier (2007) reported the breeding of this species at Farwa. The population peaked in 2009 with a total of 90 individuals were recorded; they were always scanning the water and flicking the prey during tidal variations.

Lesser Crested Tern *Sterna bengalensis* (RB)

Regular breeder in some islands at the eastern part of Libyan coast (Meininger *et al.* 1994). A flock of 28 individuals with winter plumage were observed in 1998 resting along with shag in the western corner of the posedonia. The other sightings were in small numbers (4, 2) during 2007 and 2008 respectively.

Sandwich Tern *Sterna sandvicensis* (WV & M)

Ten individuals were sighted in the eastern corner of the island during the first year of the study. They were fishing along with gulls and other species of tern during early part of the high tide in September 1998. The numbers were increased and fluctuated from 28 to 203 throughout the years of study (Tab. 1).

Common Tern *Sterna hirundo* (RB & M)

During our visit in July 1998, on the western corner of

the island, we found eleven active nests, the egg ranges from 1-2 per nest. According to fishermen, it is a regular breeder during early spring. No records have been taken for this species throughout the other years of study because of the visits were during winter. However, future studies will reveal interesting features on breeding biology.

Little Tern *Sterna albifrons* (RB)

This species is one of the common breeders along the eastern coast of Libya (Meiningner *et al.* 1996). A small breeding colony was sighted on the western corner of the island with eight active nests in 1998.

Whiskered Tern *Chlidonias hybrida* (R & M)

A solitary bird was sighted in the main island during early hours in September 1998.

Little Blue King Fisher *Alcedo atthis* (WV & M)

A solitary bird was seen on 30 September 1998, plunging into water for the prey. Two more sightings were recorded (3, 2) during 2005 and 2009 respectively.

Distribution of birds at Farwa

This study found a unique distribution of bird groups at Farwa Island (Fig. 2). The populations of Gulls and Terns were more abundant at the both ends of the island. The eastern and western ends of the island are suitable nesting grounds for the terns such as Common Tern and Little Tern (Etayeb 2002; Sheeta 2008). The Gulls utilized the accumulation of sea grass at the western end of the island for roosting, while the eastern part was for foraging. During day time, Cormorants using the lagoon for feeding, whilst, the roosting is take place on the accumulating of sea grass at the western part and near to the middle of southern coast of the island where the existence of many rods of old bridge. Flamingos and Spoonbills usually existed at difficult access site away from hunting and other disturbing activities.

The largest number of waders was observed in the middle of the southern coast of the island where a vast area of tidal zone with richness of invertebrates for feeding (Etayeb 2002).

There were monthly variations in numbers of species and individuals during the period from July to December 1998. The largest numbers of species were in September and October (Fig. 3). Moreover, the peak of individuals was in September with a total of 193 individuals from different species and the lowest number was in December with a total of five individuals (Fig. 4).

However, during the study period, the population of bird tends to be considerably low due to the following factors; noise pollution-erection of signal posts from the mainland to the sea, removing of silt from the bottom by dredging, vigorous fishing activity, tourist resort, hunting, perdition by stray dogs and raptors. These would result some effects on the living forms of the ecosystem, associated with these changes it could have an influence in the re-distribution and population sizes of the waterfowl in the island.

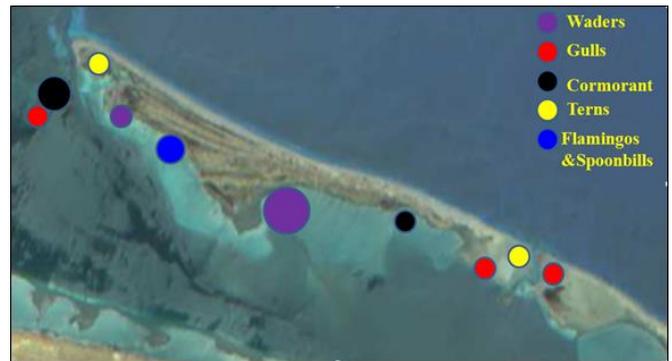


Figure 2. Distribution of waterbirds at Farwa Island.

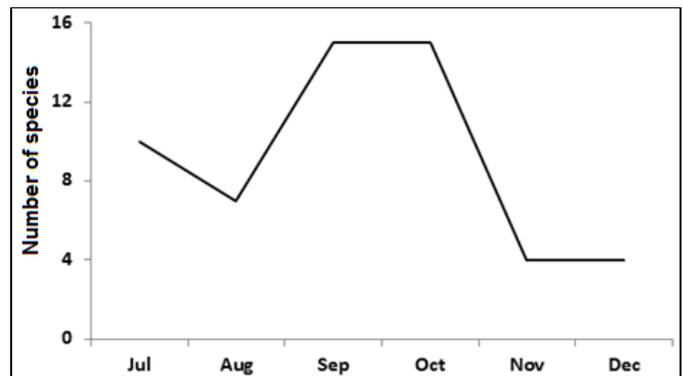


Figure 3. Monthly variation in species numbers at the study area in the year 1998.

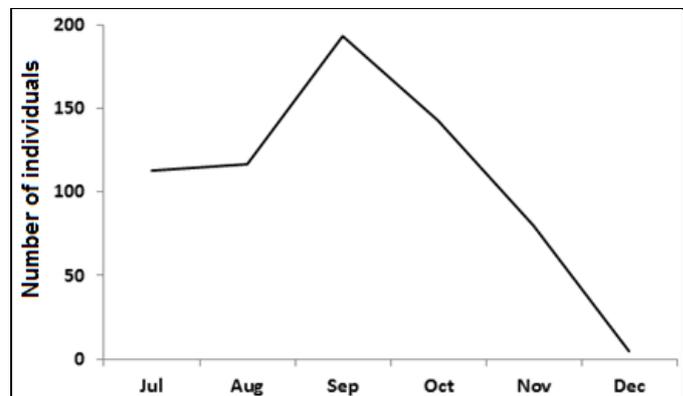


Figure 4. Monthly variation in individuals numbers at the study area in the year 1998.

CONCLUSION

A total of forty-one species were recorded. Species like Great Black-back gull *Larus marinus* is a new sighting; some are globally threatened and vulnerable. Common Tern *Sterna hirundo*, Little Tern *Sterna albifrons* and Yellow-legged Gull *Larus michahelis* are utilizing this habitat as one of their breeding colony. Farwa Island is an excellent example of a tidal area (a rare wetland type in the Mediterranean), and met the numerical criteria, in terms of bird numbers, for designation as a wetland of international importance under the Ramsar Convention.

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Table 1. Number of observed species and individuals during the years of study period.

Species	1998	2001	2005	2006	2007	2008	2009	2010
Great Crested Grebe <i>Podiceps cristatus</i>	3	-	200	210	48	150	85	223
Black-necked Grebe <i>Podiceps nigricollis</i>	3	-	75	218	95	55	13	39
Cory's Shearwater <i>Calonectris diomedea</i>	1	1	-	-	-	-	-	-
European Shag <i>Phalacrocorax aristotelis</i>	25	-	-	-	-	-	-	-
Great Cormorant <i>Phalacrocorax carbo</i>	24	-	484	250	1410	400	178	1320
Grey Heron <i>Ardea cinerea</i>	38	4	14	22	13	20	26	32
Little Egret <i>Egretta garzetta</i>	22	6	9	15	25	10	11	25
Eurasian Spoonbill <i>Platalea leucorodia</i>	4	15	60	48	24	106	74	36
Greater Flamingo <i>Phoenicopterus ruber</i>	11	11	25	6	9	-	-	9
Eurasian Oystercatcher <i>Haematopus ostralegus</i>	4	8	20	5	12	26	12	15
Ringed Plover <i>Charadrius hiaticula</i>	56	-	33	16	23	10	-	12
Kentish Plover <i>Charadrius alexandrinus</i>	126	22	44	400	130	85	-	73
Golden Plover <i>Pluvialis apricaria</i>	4	-	-	-	-	-	41	-
Grey Plover <i>Pluvialis squatarola</i>	2	3	31	150	66	75	24	76
Sanderling <i>Calidris alba</i>	21	15	22	-	18	15	-	13
Little Stint <i>Calidris minuta</i>	56	5	10	125	115	-	1	5
Dunlin <i>Calidris alpina</i>	9	17	80	95	580	950	9	658
Jack Snipe <i>Lymnocyptes minimus</i>	6	-	-	-	-	-	-	-
Black-tailed Godwit <i>Limosa limosa</i>	1	-	3	5	-	10	-	-
Common Curlew <i>Numenius arquata</i>	11	16	190	210	130	238	127	169
Common Redshank <i>Tringa totanus</i>	1	10	35	105	118	40	1	45
Marsh Sandpiper <i>Tringa stagnatilis</i>	4	-	-	-	1	-	-	-
Common Greenshank <i>Tringa nebularia</i>	7	1	5	25	5	8	8	6
Green Sandpiper <i>Tringa ochropus</i>	12	-	-	-	-	-	-	-
Wood Sandpiper <i>Tringa glareola</i>	5	3	-	-	-	-	14	-
Common Sandpiper <i>Tringa hypoleucos</i>	21	1	2	5	2	4	3	1
Ruddy Turnstone <i>Arenaria interpres</i>	14	13	15	40	80	12	7	7
Mediterranean Gull <i>Larus melanocephalus</i>	7	-	200	35	20	320	344	811
Slender-billed Gull <i>Larus genei</i>	26	3	850	750	2800	1640	753	3993
Audouin's Gull <i>Larus audouinii</i>	4	3	150	50	78	8	-	2
Lesser Black-backed Gull <i>Larus fuscus</i>	52	1	700	300	420	230	1285	1050
Yellow-legged Gull <i>Larus michahellis</i>	61	29	70	105	45	100	293	98
Greater Black-backed Gull <i>Larus marinus</i>	3	-	-	-	-	-	-	-
Gull-billed Tern <i>Sterna nilotica</i>	4	-	3	-	2	-	-	-
Caspian Tern <i>Sterna caspia</i>	23	8	35	29	52	35	90	55
Lesser Crested Tern <i>Sterna bengalensis</i>	28	-	-	-	4	2	-	-
Sandwich Tern <i>Sterna sandvicensis</i>	10	-	32	40	82	50	28	203
Common Tern <i>Sterna hirundo</i>	22	7	-	-	-	-	-	-
Little Tern <i>Sterna albifrons</i>	16	10	-	-	-	-	-	-
Whiskered Tern <i>Chlidonias hybrida</i>	1	-	-	-	-	-	-	-
Little Blue King Fisher <i>Alcedo atthis</i>	1	-	3	-	-	-	2	1