

A Survey of Summer Breeding Seabirds on Elba National Park Islands, the Red Sea, Egypt

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ARTICLE INFO

Article History:

Received: Feb. 8, 2022

Accepted: June 30, 2022

Online: July 29, 2022

Keywords:

Seabirds,
Elba National Park
Islands,
Seabird breeding season,
Terns,
Gulls,
Plovers

ABSTRACT

The present work aimed to survey breeding seabird populations on six islands of the Elba National Park, Egypt; Um Qushayyat and Abu Madfa, Marya, Big Syal, Middle Syal, and Small Syal during the summer seasons of 2017 to 2019, inclusive. Seven nesting seabird species; Lesser crested tern *Thalasseus bengalensis*, Crested tern *Thalasseus bergii*, White-cheeked tern *Sterna repressa*, Bridled tern *Onychoprion anaethetus*, Crab plover *Dromas ardeola*, White-eyed gull *Larus leucophthalmus*, Sooty gull *Larus hemprichii*, were observed. The estimated numbers of seabirds observed on these islands were 5097, 3697 and 6145 breeding pairs in summer seasons of 2017, 2018 and 2019, respectively. These results confirm the importance of the Elba National Park for seabirds since it provides suitable and protected breeding sites for such bird species.

INTRODUCTION

The Red Sea is one of the most important repositories of marine biodiversity on a global scale since it includes a wide range of important coastal habitats (PERSGA, 2003). It was shaped by the northerly extension of the African Rift Valley system, which is about 2,000 km long. The Red Sea coastline and islands, including Elba islands, are among the most important habitats for the breeding of seabirds (Semere *et al.*, 2008).

The Elba National Park is the largest protectorate in Egypt (Al-Gohary, 2007; Attum *et al.*, 2009), which is located in the southeast corner of Egypt on the Red Sea coastline, extending between latitudes 22°00'-23°50', and longitudes 35°00'-37°00', and is considered the northeastern limit of the Afrotropical region (Abdelhafez *et al.*, 2016, 2020). Kassas (1993) referred to the high scientific interest in that region and to the potential value of its genetic resources.

Seabird populations face many threats that include human disturbance, overexploitation, introduced predators, habitat destruction (especially from urban expansion), pollution, and overfishing (Shobrak and Aloufi, 2014; Abdelhafez *et al.*, 2020). The islands of the Red Sea, including the twelve islands of Elba National Park, provide safe shelters for birds throughout the year, especially during the nesting season. Seabirds from all over the Red Sea, the Gulf of Aden, and the northern Indian Ocean resort to the Red Sea islands for nesting (PERSGA, 2003; Semere *et al.*, 2008). The study of nesting birds in Egyptian protectorates is, however, very limited, especially for the Red Sea birds. This is due to many difficulties associated with long distances to be travelled, transportation and accommodation facilities, and the very high cost of field trips.

The present work aims to estimate the number of breeding seabirds on six of the Elba National Park islands during the summer seasons of 2017 to 2019.

MATERIALS AND METHODS

The present study was carried out in Elba National Park, Egypt. Six of the twelve islands of Elba were selected for this study (Fig. 1). Two of these islands were coastal ones; Um Qushayyat and Abu Madfa, while the rest were offshore islands; Marya, Big Syal, Middle Syal and Small Syal. A survey of breeding seabirds inhabiting these islands were carried out during the summer seasons of 2017 to 2019. The islands were surveyed on foot from the outer coast according to Bibby *et al.* (2000). Nikon (10×50) Binocular, Poshnel (43X) telescope was used to survey and species identification according to Svensson *et al.* (2010) populations and nests count on investigated islands. Microsoft Excel (Office 2010) was used to summarize and present the recorded data. We followed scientific names in Collins Bird Guide (Svensson *et al.*, 2010) and IUCN red list 2022.

Description of study islands

1. Geography and physiography

The selected islands of the Red Sea showed different habitat characteristics. The following is a brief description of these islands:

- a. Um Qushayyat Island: It is located in the coastal area in front of El-Adaltd delta, and has a total area of about 42,995.82 m². The island is characterized by its muddy sediments with some spots covered with sand and/or broken shells. The plant cover consists of salty plants such as the subshrubs of *Arthrocnemum macrosotachyum*, *Atriplex farinose* and *Zygophyllum* spp

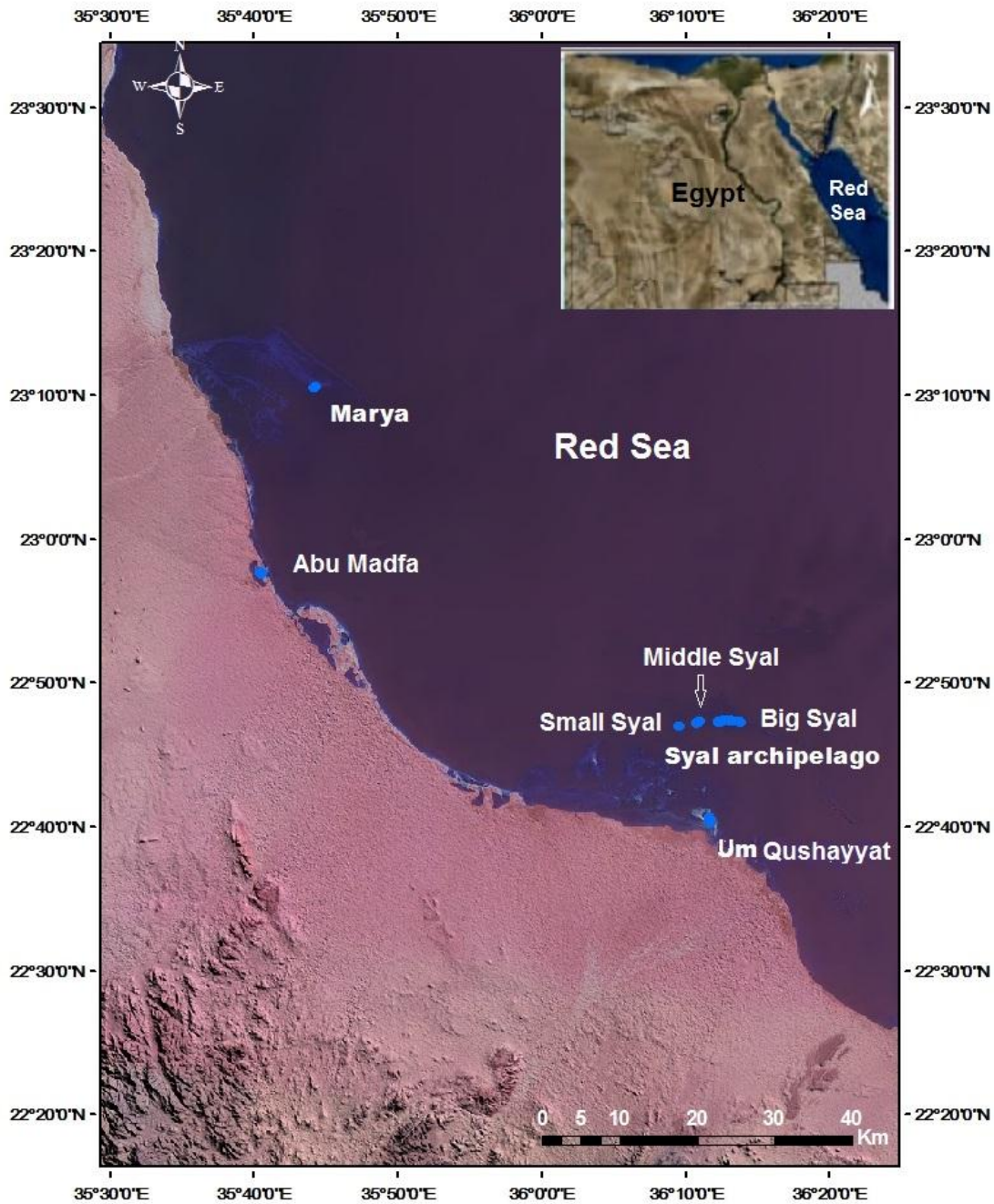


Figure 1. A satellite map showing the six study islands of Elba National Park, Red Sea, Egypt.

- b. Abu Madfa Island: It is a coastal island which is rarely connected to the mainland, and has a total area of about 92,022.6 m². It is bolted by a dense growth of a mangrove, *Avisenia marina*, stand, and has a substrate of mixed mud and rocks.

- c. Marya Island: It is a small island of about 14,269.54 m² that is located within the Shalateen Basin. It has a completely sandy substrate without rocks or plant cover.
- d. Big Syal Island: It is an offshore island. It forms together with the Middle Syal and Small Syal Islands what is known as the Syal Archipelago. The island is the largest island of the Archipelago since it has a total area of about 173,737.22 m² with a sandy substrate. It is mostly used by nesting green turtles and gulls. It has several types of salty plants such as *Arthrocnemum macrosotachyum* and *Atriplex farinose*, and it is the only island that has the shrubs of *Saueda monica*.
- e. Middle Syal Island: It has a total area of about 29,799.42 m², and has a substrate of mixed sand, rock, and mud with scattered salty vegetation like *Atriplex farinose*, *Arthrocnemum macrosotachyum* and *Zygophyllum albiun*.
- f. Small Syal islands: it has a total area of about 3,892.38 m², and is very similar to Marya Island since it has a sandy substrate and is devoid of vegetation.

2. Climate

The climatic conditions of this protected area are characterized by a hyperarid climate with hot rainless summers and mild winters. Precipitation falls mainly in the autumn and winter months. The monthly air temperature of Elba ranged between 24– 38 °C in the summer and 12– 26 °C in the winter (Attum et al., 2009). Table (1) shows the monthly averages of air temperature, wind velocity and humidity during the period of study (Marsa Alam station) (web site: <https://www.wunderground.com/>).

Table 1: Monthly averages of temperature, wind velocity, and humidity, during the period of observations in Southeast Egypt.

Years	Average Temperature	Average Wind Velocity	Average Humidity
2017	33.04 °C	24.54 km/h	30.52 %
2018	32.20 °C	21.34 km/h	35.70 %
2019	32.44 °C	19.52 km/h	35.46 %

RESULTS AND DISCUSSION

Seven seabird species populations were observed on the study islands. These are the Lesser crested tern *Thalasseus bengalensis*, Crested tern *Thalasseus bergii*, White cheek tern *Sterna repressa*, Bridled tern *Onychoprion anaethetus*, Crab plover *Dromas ardeola*, White eyed gull *Larus leucophthalmus*, and Sooty gull *Larus hemprichii*. They nest in varying numbers during the summer seasons on the study islands (Table 3). The total number of breeding birds differ from one island to another and from one year to another

(Fig. 2). Middle Syal showed the highest number of breeding birds in 2017 and 2019 while in 2018 the highest number was recorded on Big Syal Island.

In comparison between investigated islands, Middle Syal island shows the highest number and diversity of nesting of seabirds. This may be due to its location which is far from the coast; away from the usual threats to seabirds. Another suggested reason is the presence of a large feeding area for terns and gulls (Syal Basin fish nesting area where egg and fry of fishes are rich) close to it. It is supposed that Big Syal island would accommodate most of nesting birds, but this is not true due to the heavy presence of mice that were introduced by fishermen boats. While, birds usually rest on Small Syal island, and breed on other close islands with suitable breeding conditions.

Numbers of breeding birds also differ on species and yearly bases (Table 3 and Fig. 3). The following is a detailed consideration of the breeding activities of different bird species of the present work:

Table 2: The measurements of structural diversity of the study sites

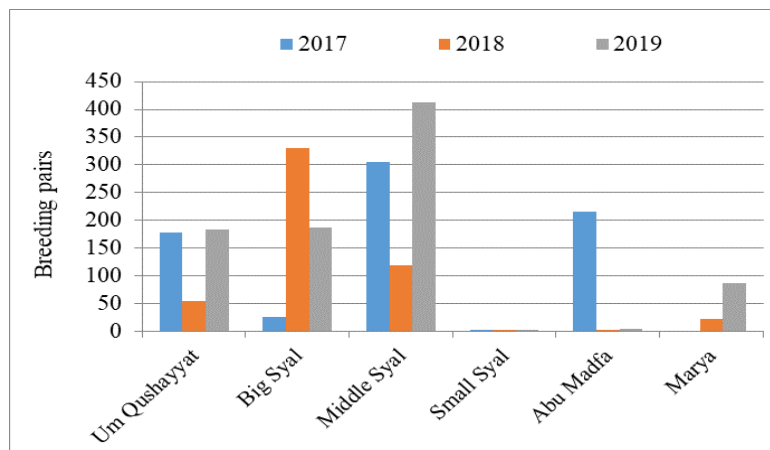
	Um Qushayyat	Small Syal	Middle Syal	Big Syal	Abu Madfa	Marya
Sand	+	+	+	+	+	+
Mud	+				+	
Rocks			+		+	
Herbs	+		+	+	+	
Trees				+		
Mangrove					+	
Shells	+		+		+	
Totals	4	1	4	3	6	1

1- Lesser crested tern, *Thalasseus bengalensis* (Lesson, 1831)

According to IUCN red list lesser crested tern was categorized as Least Concern (LC). The nests of this bird species were the most abundant ones compared with those of other bird species on these survey. Similar results were found on the Saudi Arabian Red Sea coast (Ormond *et al.*, 1984; Shobrak and Aloufi, 2014). This bird is found in dense colonies on four of the six study islands which have a sandy and flat substrate (Table 2). It was reported that this bird species breed along the coasts of the Red Sea and the Gulf of Aden, and in sandy islands (Al-Saghier, 2002; Baha El Din *et al.*, 2003; Shobrak, 2001; Shobrak *et al.*, 2002a and 2002b). The highest density of the lesser crested tern was generally recorded in Middle Syal Island which provided the most suitable habitat for nesting represented by a flat sandy bank and the absence of human and animal disturbances.

Table 3. Estimated numbers of breeding pairs of different seabird species on different study islands of Elba National Park during summers of the study period.

Years	Birds	Um Qushayyat	Big Syal	Middle Syal	Small Syal	Abu Madfa	Marya	Total
2017	Lesser crested tern	-	8	1750	13	6	-	1777
	Crested tern	-	-	75	-	-	-	75
	White cheeked tern	-	1	120	-	1500	-	1621
	Bridled tern	750	-	175	-	-	-	925
	Crab plover	400	2	-	-	8	-	410
	White eyed gull	100	169	9	-	-	-	278
	Sooty gull	2	6	3	-	-	-	11
2018	Lesser crested tern	100	1850	575	4	9	150	2688
	Crested tern	-	-	8	-	4	-	12
	White cheeked tern	-	-	160	3	-	-	163
	Bridled tern	125	-	75	-	-	-	200
	Crab plover	100	-	-	-	4	-	104
	White eyed gull	58	460	9	-	-	-	527
	Sooty gull	1	1	1	-	-	-	3
2019	Lesser crested tern	500	1250	2500	8	3	600	4861
	Crested tern	1	6	9	-	-	2	18
	White cheeked tern	-	-	225	-	-	-	225
	Bridled tern	750	-	150	-	1	1	902
	Crab plover	25	-	-	-	32	-	57
	White eyed gull	10	50	8	-	-	10	78
	Sooty gull	3	-	1	-	-	-	4

**Figure 2.** Estimated total number of breeding pairs of seabirds on different study islands of Elba National Park in summer seasons of the study period.

The number of breeding pairs had been increasing from 2017 to 2019. The estimates of the survey recorded 1,777, 2688, and 4816 breeding pairs for 2017, 2018, and 2019 respectively (Fig. 3). This gradual increase in the number of breeding pairs was clearly correlated with the Egyptian Government declaration that summer was a closed season for fishing. This led to an increase in the availability of fish food for birds and a decrease in the disturbance of fishermen. **PERSGA/GEF (2003)** recorded that the total number of lesser crested tern breeding pairs in the Red Sea is estimated at 13,000–15,000, by ignoring Eritrea. In Eritrea, the largest single colony was observed at Anfile Bay, Seil Island, with 8,500 breeding pairs (**Semere et al., 2008**).

2- Crested tern, *Thalasseus bergii* (Lichtenstein, MHC, 1823)

According to IUCN red list Crested tern was categorized as (LC). As far as we are aware, this is the first time to observe the nests of crested tern in the Egyptian Red Sea islands. **Baha El Din et al. (2003)**, however, reported that this species might breed in the Red Sea islands. The species nests in small numbers associated with lesser crested tern colonies especially at Middle Syal Island (Table 3). **Semere et al. (2008)** recorded 2,200 breeding pairs on 26 islands in Eritrea. During the study period, the numbers of breeding pairs decreased from 75 in 2017 to 18 pairs in 2019 (Fig. 3), although they were recorded on other investigated islands. Crested terns might move to other islands to avoid food inter-competition with other bird species.

3- White-cheeked tern, *Sterna repressa* Hartert, 1916

According to IUCN red list White-cheeked tern was categorized as (LC) nests of this species were noticed in Middle Syal and Abu Madfa islands (Fig. 2). A substrate of mixed mud and rocks on Abu Madfa Island which is ideal for the nesting of the white-cheeked tern, *Sterna repressa*. The footprints of humans, dogs, and mice were occasionally observed on this island. In 2017, it was observed in relatively big numbers of about 1500 breeding pairs in Abu Madfa Island, then they left the island. This might be the result of human disturbances on this onshore island the numbers of breeding pairs of this bird species. On the other hand, steadily increased from 160 breeding pairs in 2017 to 225 breeding pairs in 2019 in Middle Syal Island (Table 3). This was similar to the nesting behavior of the lesser crested tern described before. White-cheeked terns were noticed to nest near both the lesser crested and crested terns. In the Egyptian Red Sea, white-cheeked terns were recorded breeding on the northern and southern islands (**Jennings et al., 1985; Baha El Din et al., 2003**). For this species, **PERSGA (2003)** estimated the total number of breeding pairs in the Red Sea was 27,000-30,000 pairs. While, **Semere et al. (2008)** recorded 18,000 breeding pairs on 69 Eritrean Red Sea islands. Compared to the current findings, it can be concluded that white-cheeked terns are more frequent in the southern Red Sea islands.

4- Bridled tern, *Onychoprion anaethetus* (Scopoli, 1786)

According to IUCN red list Bridled tern was categorized as (LC). Breeding colonies of bridled tern was observed in Umm Qushayyat and Middle Syal islands (Fig. 2) which are Sandy Islands characterized by the presence of vegetation and low human disturbance (Table 2). The plant cover of these spots allow the bridled tern, *Onychoprion anaethetus*, to nest under their branches. Bridled terns were recorded on all sandy islands with vegetation (Shobrak and Aloufi, 2014) where they nested in crevices, under vegetation, or rock overhangs (Shobrak *et al.*, 2002b; Baha El Din *et al.*, 2003). It was indicated that this species is more abundant in the eastern Red Sea 130,000 breeding pairs were recorded (Newton & Al Suhaibany, 1996; Alsaghier, 2002b; PERSGA/GEF, 2003).

5- Crab plover, *Dromas ardeola* Paykull, 1805

Crab plover, *Dromas ardeola*, nesting colony was recorded for the first time in Egypt on Umm Qushayyat Island (Abdelhafez *et al.*, 2020). Umm Qushayyat Island is located in the middle of a mudflat, which is almost exposed to low tide that allows the crab plover to feed, and some shallow lagoons that allow terns and gulls to catch small fishes. According to IUCN red list Crab plover was categorized as (LC). In this study, 100, 150, and 50 nests were observed in 2017, 2018, and 2019, respectively on Umm Qushayyat Island. Possible nesting areas were also observed at Abu Madfa Island. The numbers of nests increased in the first two years then declined to 50 nests in 2019. It was observed that the bird frequently dug the new nests close to the area used before for the same purpose. Abdelhfez *et al* (2020) indicated that the numbers of the crab plover population in Egypt increased from 130 to 1200 birds. The same authors indicated that 50 nests of *D. ardeola* was observed for the first time at Umm Qushayyat Island in 2016. Therefore, they concluded that there were more colonies not recorded yet. *Dromas ardeola* is known to dig underground nests (Von Heuglin 1861). Semere *et al.* (2008) recorded 21 colonies established on 21 Eritrean islands with a total number of 8,661 fresh burrows. It is probably considered to be the highest number of crab plover nests on a world wide scale.

6- White-eyed gull, *Larus leucophthalmus* Temminck, 1825

According to IUCN red list White-eyed gull was categorized as (LC). *Larus leucophthalmus* is endemic to the Red Sea and Gulf of Aden (BirdLife International 2022). In the present study, breeding white-eyed gulls were observed mainly at Big Syal Island. They were also noticed at Umm Qushayyat, Middle Syal and Marya Islands (Table 3). They built nests near dense bushes, shrubs, and halophytes on open ground, and the nests were usually exposed to sunlight. Breeding habitats were selected in the same way described in Eritrea (Semere *et al.*, 2008) and in Saudi Arabian Red Sea area (Shobrak and Aloufi, 2014).

During the study period, the estimated breeding pairs were 278, 527, and 78 pairs in 2017, 2018, and 2019, respectively (Fig. 3). These numbers were relatively low compared with the numbers of breeding white-eyed gulls in the northern Red Sea islands (**Baha El Din *et al.*, 2003, Grieve & Millington 1999**). This may be due to that species depending on the wastes of human and other hunter organisms as food items, it is known that the northern Red sea islands have more human and hunting cavities than southern ones. **Grieve & Millington (1999)** mentioned that the majority of white-eyed gull breeding colonies were found in the Hurghada islands at Northern Egyptian Red Sea, with at least 3,000 breeding pairs.

7-Sooty gull, *Larus hemprichii* Bruch, 1853

According to IUCN red list Sooty gull was categorized as (LC). Low numbers of breeding pairs were observed solitarily on three of the six visited islands (Table 3). They built nests near dense bushes, shrubs, and halophytes on open ground, and the nests were usually exposed to sunlight similar to those chosen by the white-eyed gull. The sooty gull population in the northern Egyptian Red Sea islands, however, recorded higher numbers (**Grieve & Millington, 1999**). Breeding of *L. hemprichii* were also recorded in Wadi El Gemal Island; southern Egyptian Red Sea island (**Grieve & Millington, 1999; Baha El Din *et al.*, 2003**). In the Saudi Arabia Red Sea islands, **Shobrak and Aloufi (2014)** observed this species on all islands in their survey.

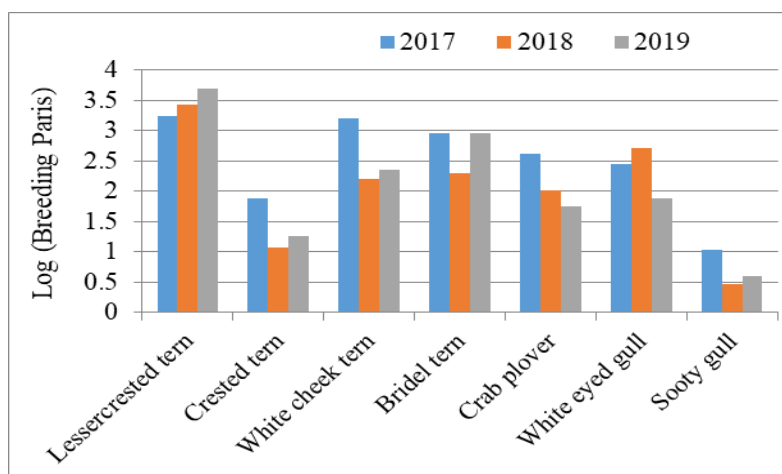


Figure 3. Estimated total numbers of breeding pairs of different seabirds in summer seasons of the study period (Data of breeding pairs were transformed to Log values).

CONCLUSION

The results of the present study confirms the importance of Elba National Park islands for the breeding of several sea bird species since they provide suitable and protected breeding sites for such birds.

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