

Breeding Population of Birds on Banifaror Island in the Persian Gulf

Behrouz Behrouzi-Rad*

Khuzestan Science and Research Branch, Islamic Azad University, Ahwaz, Iran

*Corresponding author: Behrouz Behrouzi-Rad, Khuzestan Science and Research Branch, Islamic Azad University, Ahwaz, Iran, Tel: 9121325838; E-mail:

bbehrouzirad@yahoo.com

Received date: January 03, 2013; Accepted date: May 30, 2014; Published date: June 6, 2014

Copyright: ©2014 Behrouzi-Rad B, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

This research was conducted in Banifaror Island (26°06'51"N 54°26'43"E), in Persian Gulf from August 2009 to August 2012. The aim of this study is to provide a complete picture of the Present population of the breeding water birds in Banifaror. Total count method was used to obtain the census of the nests and breeding population of water birds. Forty one species of water birds were identified in this island, of which six species were breeder. Breeding population of Bridled Tern *Sterna anaethetus* was dominant. The maximum population of this species was 32340 pairs in 2009. Other breeder species were Lesser Crested Tern *Sterna bengalensis*, Swift Tern *Sterna bergii*, Caspian Tern *Sterna caspia*, Western Reef Heron *Egretta gularis*, and a small colony of White cheeked Tern *Sterna repressa*. The island has been suggested for to be classified as sensitive habitat for breeding water birds. This is the first record of the status of the breeding population of water birds on Banifaror Island.

Keywords: Breeding population; Banifaror Island; Persian Gulf; Iran

Introduction

The study of the species diversity, changing in breeding and migratory population of the water birds is very important in the wetlands, creeks and islands [1,2]. To monitor a group of birds implies that there is a need for information on the breeding population status or health that can only be met by collecting data, because every species has a range of conditions under which it thrives. By choosing to monitor a set of species that require high quality environments, specialized habitats, or conditions that a manager may want to promote a sense of the region's environmental health can be made. Since environmental or habitat health is often difficult for us to measure directly, due to the many factors (often unknown or ephemeral) that contribute to the conditions, it is often easier to measure the status of the breeding population that require them to develop an assessment [3]. On the other hand, it is widely accepted that the number of terns using a site is a good indicator or that site's biological importance [2], and they are also important indicators of the ecological condition of their habitats. There are 34 islands on northern part of Persian Gulf at Iranian coasts [4,5]. Banifaror (or Farorghan or Faror Kocheh) is one of them. Terns, Herons, Gulls and Waders form important animal group heavily dependent on the islands for their continued existence [4-7]. Banifaror also is an important breeding sites for Terns, five in particular nest in vast number on the island, these are the Lesser Crested Tern *Thalasseus bengalensis*, Swift Tern *Thalasseus bergii*, White Checked Tern, *Sterna repressa*, Caspian Tern *Sterna caspia* and Bridled Tern *Sterna anaethetus* [4,5,7,8]. Besides terns and Western Reef Heron, which breed in summer in Banifaror, several other species of water birds use the Banifaror, at migration time in spring and in summer, such as *Tringa ssp*, *Larus ssp*, *Naumenius spp*, *Caradrius ssp*, *Caldris ssp* and some terrestrial birds such as Crested Lark *Galerida cistata* [8]. The plant and animal population of Banifaror Island is rich and unique,

and are exceptionally beautiful land is interactive as well as being of great scientific interest. Much of the beauty and uniqueness of this site, however, result from the fact that this has so far remained relatively free from human interference. The aim of this study was to provide a complete picture of the present population of the colonial breeding five tern species and Western Reef Heron in Banifaror Island, for identifying the sensitive habitats of breeding of water birds in Persian Gulf islands, for protection these habitats. I identified the breeding species and count breeding population of Terns and Western Reef Heron on Banifaror (or Farorghan) island in 2009-2012.

Materials and Methods

Study area

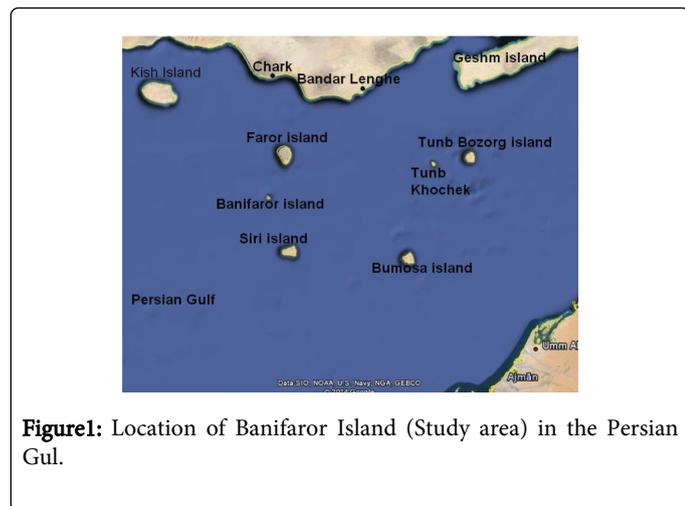
Thirty four islands are located on the northern part of the Persian Gulf. The Banifaror (or Farorghan or Faror Kocheh) Island is one of them and situated at (26°06'51"N 54°26'43"E), 57 km southeast of Kish island, 205 km south west of Bandar Abbas city, 50 km away from Bandar Charak port. The area of the Banifaror is 83 hectares, (Figure1). The interior of the island covered by *Cyperus spp*, *Lysium and Saueda vermiculata* and *Halopyrum mucronatum*, but the perimeter of the island is without any vegetation. There are no springs or surface water in this island. Rainfall is very low, and the summer temperatures frequently exceed 40°C.

Estimation of bird's population

The nests of breeding population of water birds was counted directly on (1-10) August in 2009-2012. The nests of Lesser Crested tern *Sterna bengalensis* and Swift Tern *Sterna bergii* were on sandy place without any vegetation and were counted easily. The nests of Western Reef Heron *Egretta gularis* were on short bushes and were counted easily. The nests of Bridled Tern *Sterna anaethetus* were under the short bushes and were counted by looking under the bushes.

Total count method was used to count the nests of breeding population of White Cheeked Tern *S.repressa*, Caspian Tern *Sterna caspica* and Western Reef Heron in one day [9]. Nest numbers of Bridled Tern, Lesser Crested and Swift Terns were estimated using sampling method by plots (20×20 m for Bridled Tern, ten plot) and 1×1 m for the other two species (ten plot) in one day base down which the breeding population of these species was estimated [10,11]. The plots selected randomly in the breeding place of these three species. The nests with the eggs counted in the each plots.

Area of the island is 83 hectare. We estimated the area of the breeding habitat of the Bridled, Lesser Crested and Swift terns by GPS system. The area of the breeding place for Bridled Tern was 50 hectare and for the other two species was about one hectare (Figure 2). The breeding places of each species marked by GPS and have been shown on Figure 4. The non-breeders counted done on 1-10 August, in 2009-2012 by total count methods (Krebs 2002) at low tide (at low tide the area of the island was about 200 ha.). All species observations around the island were confirmed with binocular (10×40 mm).



Counts were done only once during the breeding season of each year (between 1-10 August 2009-2012). This time was obtained by searching terns breeding colonies on Nakhilo Island since 2004-2008 [11]. The first observation was done on first of August 2009, second on 6th August 2010, third on 9th August 2011 and fourth on 10th August 2012. At this time all breeding species established nests and laid egg.

Result

Bird's population

In total, forty one species of water birds have been identified in this island in 2009-2012 (Table 1), of which six species were breeder (Table 2). The counts of each species are given in (Table 1). Waders (Charadriidae and Scolopacidae) were the dominant families with 29 species (70.73%), but total numbers of Sternidae with six species were 273759 (99.02%) individuals, (Figures 2 and 3 and Table 1). Lesser Crested and Bridled Terns (with 98 percent were the most abundant between the other breeding species (Table 1). The total numbers of birds declined from 71565 (25.88%) in 2009 to 67461 (24.40%) in 2012, (Table 1), reduction was 1.48 percent. Bird's density (individuals/ha.) declined from 357.82 in 2009 to 337.30 in 2012, (Table 1). Density reduction was 20.52 (Table 1).

Five species of terns and Western Reef Heron had been bred on Banifaror Island in 2009-2012, (Table 2). Five tern species, Bridled Tern (maximum 32340 pairs in 2009), small colony of Caspian Tern (maximum 67 pairs in 2009), small colony of White Cheeked Tern (maximum 145 pairs in 2011), Lesser Crested and Swift Terns (maximum 2310 and 145 pairs respectively in 2009) and Western Reef Heron (12-14 pairs) had been bred in Banifaror Island in 2009–2012.

Species	1 st Aug.	6 th Aug.	9 th Aug.	10 th Agu.	%
	2009	2010	2011	2012	
Western Reef Heron <i>Egretta gularis</i>	28	11	9	15	0.02
Little Egret <i>Eretta garzetta</i>	2	3	1	2	0.002
Grey Heron <i>Ardea cinerea</i>	3	12	13	13	0.014
Swift Tern <i>Sterna Bergii</i>	295	262	253	191	0.36
Lesser Crested Tern <i>S.Bengalensis</i>	4731	4391	4121	3921	6.2
Bridled Tern <i>S. anaethetus</i>	65320	63456	63121	61871	91.8
Caspian Tern <i>S.caspia</i>	180	123	143	102	0.21
Gull-billed Tern <i>S.nilotica</i>	2	3	3	0	0.002
White-cheeked Tern <i>S.repressa</i>	320	254	451	245	0.45
Slender-billed Gull <i>Larus genei</i>	343	34	34	245	0.23
Blac -headed Gull <i>Larus.ridibundus</i>	34	23	23	245	0.11
Common Gull <i>L. canus</i>	12	47	34	18	0.004
Lesser Black-backed Gull <i>L.fuscus</i>	12	43	10	285	0.12

Redshank <i>Tringa totanus</i>	12	9	7	15	0.015
Spotted Redshank <i>T. erythropus</i>	11	6	12	4	0.011
Common Sandpiper <i>T. hypolaucus</i>	7	1	1	0	0.003
Green Sandpiper <i>T. ochropus</i>	0	11	4	3	0.006
Marsh Sandpiper <i>T. stagnatilis</i>	6	0	2	9	0.005
Greenshank <i>T. nebolaria</i>	0	1	11	12	0.008
Wood Sandpiper <i>Tringa glareola</i>	2	0	1	2	0.5
Black-tailed Godwit <i>Limosa limosa</i>	28	11	12	15	0.022
Common Snipe <i>Gallinago gallinago</i>	3	12	13	13	0.014
Avocet <i>Ricurvirostra avosetta</i>	5	0	0	6	0.003
Oystercatcher <i>Haematopus ostralegus</i>	3	0	0	2	0.001
Kentish Plover <i>Charadrius alexandrinus</i>	5	0	2	5	0.004
Little Ringed Plover <i>Ch. Dubius</i>	11	9	0	6	0.009
Lesser Sand Plover <i>Ch. mongolus</i>	0	4	3	0	0.002
Ringed Plover <i>Ch. hiaticula</i>	0	0	0	6	0.002
Greater Sand Plover <i>Ch. leschenaultii</i>	2	0	9	0	0.004
Jack Snipe <i>Lymnocyptos minimus</i>	4	12	14	11	0.014
Eurasian Curlew <i>Numenius arquata</i>	8	8	1	16	0.011
Whimbrel <i>N. phaeopus</i>	3	5	2	25	0.012
Ruff <i>Philomachus pugnax</i>	4	21	2	13	0.014
Curlew Sandpiper <i>Caldris ferruginea</i>	23	18	19	12	0.025
Dunlin <i>C. alpine</i>	3	0	0	3	0.002
Temminck's Stint <i>C. temminckii</i>	72	32	65	89	0.095
Little Stint <i>C. minuta</i>	43	34	19	20	0.041
Turnstone <i>Arenaria interpres</i>	4	2	12	0	0.006
Terek Sandpiper <i>Xenus cinereus</i>	2	0	0	0	0.001
Grey Plover <i>Pluvialis squatarola</i>	9	8	10	5	0.011
Broad-billed Sandpiper <i>Limicola falcinellus falcinellus</i>	11	70	50	16	0.053
Total numbers	71565	68936	68487	67461	100
	-25.88%	-24.93%	-24.77%	-24.40%	
waterbird species totals	37	32	35	35	43
Sum of four years			276451		
Waterbird population density (a)	357.82	344.68	342.34	337.3	-

Table 1: Water birds of 41 species recorded at Banifaror Island on August 2009-2012.

Species and population of breeding birds on Banifaror Island:

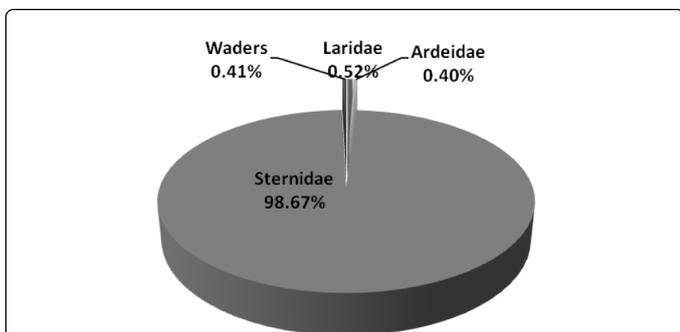


Figure 2: Population percent of dominant water-birds on Banifaror, 2009-2012.

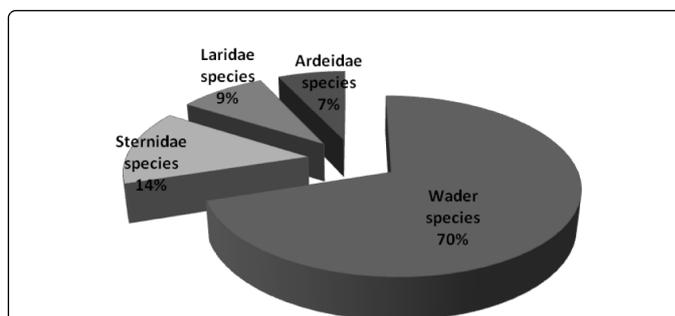


Figure 3: Species percent of dominant water birds on Banifaror, 2009-2012.

The tern’s populations were the most abundant in August (99%, Figure 2). Lesser Crested and Swift Terns breed in huge colonies on bare ground at east of island, the colony of the White-cheeked Tern had been selected the west part of island for breeding and the Bridled Tern had been bred on central part of Banifaror (Figure 4). The selection of sites suitable for establishing colonies is subject to pressure by human disturbance (Fishermen).

Species	2009	2010	2011	2012
White-cheeked Tern <i>Sterna repressa</i>	0	10	245	132
Lesser Crested Tern <i>Thalasseus bengalensis</i>	2310	2101	1987	1876
Bridled Tern <i>Sterna anaethetus</i>	32340	31111	31210	29875
Swift Tern <i>Thalasseus bergii</i>	145	131	125	89
Caspian Tern <i>Sterna caspica</i>	67	25	56	45
Western Reef Heron	13	14	12	13
Total (Pairs)	34875	33056	33534	32028

Table 2: Breeder species of water birds on Banifaror Island in 2009-2012.

Consequently terns tend to confine their nest close to water, e.g. on small estuary isles or even on mudflat. Beside breeding species, the mudflats at around of Banifaror hold many hundreds of shorebirds in summer and winter, including large number of Tringa sp, Charadrius sp, Caldris sp and other waders (Table 1).

White-cheeked tern *Sterna repressa*: Breeds in tropical warm waters of Indian Ocean, mainly coastal and inshore, avoiding inland waters [12]. Nests on sandy islands, sometimes on a bare and exposed sand-flat some 400 m in from sea, or on sand blown or washed into hollows of rock surface [12]. On the Persian Gulf islands favors sparsely vegetated open ground, e.g. sand dunes above high water mark on branches [6,13]. This species had been bred in five islands in 2009-2012 in Persian Gulf, (Nakhilo, Om-Al Gorm, Sheedvar, Ghabre Nakhoda and Banifaror, Table 3). This species had been bred in three areas on Banifaror Island on sandy open ground about 50 meters in from sea (Figure 4).

The number of their counted nests is shown in (Table 3). Nesting place area was about 259-320 m², (259 m² in 2010, 320 m² in 2011 and 2012, Table 3) Other breeding colonies of this species have been reported in 1970s as follows: Kharkou (1500-2500 pairs), Bushehr Bay

(50 pairs), Morghu (Khan) (65 pairs), Um-Al-Karam (Om-Al-Gorm) (300 pairs), Nakhilo (170 pairs), Sheedvar (300,000 pairs in 1972 but only 27000-45000 pairs in 1977, (Table 3) [7]. There is not enough information about breeding status of this species since 1970s till 2009 in Banifaror, but after 2009, breeding population of White Cheeked Tern on the Banifaror Island is shown in Table 3.

Lesser crested tern *Thalasseus Bengalensis*: This species Breeds in lower middle and low latitudes from Mediterranean through subtropical and tropical warm seas, associates commonly with Swift Tern *Thalasseus bergii* sharing nest-sites on flat sandy upper beaches, especially on low-lying islands, among dwarf or stunted and sparse vegetation, and on bare sand-spits, flat rocks or coral reefs [12]. In Persian Gulf breeds in Sheedvar [4,7,11,13], Gabre Nakhoda and Dara [8], Nakhilo, Om-Al-Gorm and Tahmadon [7,8,11], Banifaror [5,8]. Breeding population of this species has been shown on table 4. Scott has reported the breeding of this species in 1970s in Persian Gulf as follows: Kharku island (600 pairs), Nakhilo (1000 pairs) and Sheedvar (10 nest in 1972; 10 nest in 1977) and Om-al-Gorm (15000 pairs, Table 4) Scott has not visited the Banifaror Island during 1970s, thus, the status of breeding population of Lesser Crested Tern is not clear in

Banifaror in 1970s, but the considerable population of this species had bred on the island and average percent of breeding population was 9.56 percent in 2009-2012, (Table 4). Breeding population of Lesser Crested Tern *Thalasseus Bengalensis* declined from 2009 to 2012, but increased from 1970s to 2012, (Table 4).

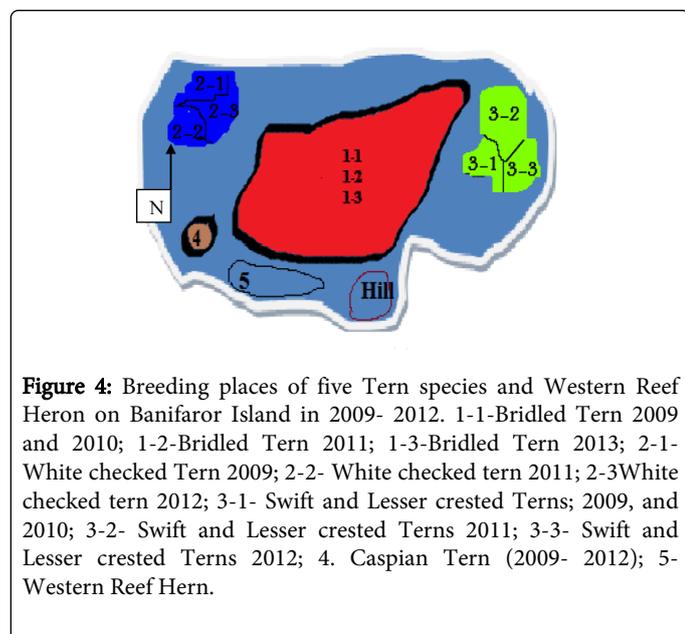


Figure 4: Breeding places of five Tern species and Western Reef Heron on Banifaror Island in 2009- 2012. 1-1-Bridled Tern 2009 and 2010; 1-2-Bridled Tern 2011; 1-3-Bridled Tern 2013; 2-1-White checked Tern 2009; 2-2- White checked tern 2011; 2-3 White checked tern 2012; 3-1- Swift and Lesser crested Terns; 2009, and 2010; 3-2- Swift and Lesser crested Terns 2011; 3-3- Swift and Lesser crested Terns 2012; 4. Caspian Tern (2009- 2012); 5- Western Reef Heron.

Island	1970 [7]	2009	2010	2011	2012
Banifaror	?	0	10(259m ²) (0.38 nest at 10 m ²)	245(320m ²) (7.76 nest at 10 m ²)	132(320m ²) (4.1 nest at 10 m ²)
Nakhilo	170	12	15	14	8
Sheedvar	300000 (27000-45000 in 1977)	950	854	1211	321
Gabre Nakhoda	0	6	0	0	0
Kharkuo	1500-2500	0	0	0	0
Bushehr Bay	50	0	0	0	0
Morghu (Khan)	65	0	0	0	0
Om-Al-Gorm	300	0	0	0	0
Total (a)	300585(?)	1278 0%	879 -1.13%	1470 (16.66%)	461 -28.63%

Table 3: Estimated number of breeding pairs of White-cheeked Tern on Banifaror and other islands of Persian Gulf in 2009-2012. (a)=The numbers in the parentheses are percent of breeding population of White-cheeked Tern in Banifaror.

Islands	1970 [7]	2009	2010	2011	2012
Banifarorr	?	2310	2101	1987	1876
Gabre Nakhoda	0	1500	3127	850	130
Boneh	0	45	0	0	0
Dara	0	142	0	0	0
Nakhilo	1000	21500	18170	15342	14321
Om-Al-Gorm	15000	0	0	0	0
Khan	0	1110	453	654	543
Sheedvar	10	3320	452	321	432
Kharkuo	600	0	0	0	0
Total (a)	16010 (?)	29927 (7.71)	22412 (9.37)	19154 (10.32)	17302 (10.84)

Table 4: Breeding pairs of Lesser Crested Tern on Banifaror and other islands of Persian Gulf, 2009-2012. (a)=The numbers in the parentheses are percent of breeding population of Lesser Crested Tern in Banifaror.

Bridled Tern *Sterna anaethetus*. Bridled Tern breeds on islands and in some areas, on mainland, nesting under bushes on sand and coral islets. In Persian Gulf region, breeds on Dara, Bone, Om-Al-Gorm, Nakhilo, Sheedvar and Khabre Nakhoda Islands [5,7,8]. Maximum 32340 breeding pairs were on Banifaror in 2009 (Table 2). In Kuwait, 2000-3000 pairs breeds on Kubbar Island [12]. Scott has reported the breeding population of this species as follow: Kharku Island (250-300 pairs), Morghu (5500 pairs), Om-Al-Goram (1000 pairs), Nakhilo (15000 pairs), Sheedvar (3000-3500 pairs, Scott, 2007). This species had not bred in Kharku in 2009-2012, (Table 5). Average percent of breeding population of this species was 51.82 on Banifaror, (35.53 in 2009, 50, 95 in 2010, 57.00 in 2011 and 63.83 % in 2012, Table 5).

Islands	1970 [7]	2009	2010	2011	2012
Banifaror	?	32340	31983	31210	29875
Um-Al-Gorm	1000	450	453	312	101
Nakhilo	15000	17320	16543	14320	11231
Sheedvar	3000-3500	15320	12342	8765	5432
Khan	?	135	0	0	0
Boneh	?	150	122	0	0
Ghabre Nakhoda	?	250	1321	1231	946
Dara	?	50	0	0	0
Kharkuo	250-300	0	0	0	0
Khan	5500	0	0	0	0
Total (a)	25300(?)	66015	62764	54750	46803 (63.83%)

	Percent=?	-35.53%	-50.95%	-57.00%	
--	-----------	---------	---------	---------	--

Table 5: Breeding pairs of Bridled Tern in Banifaror and other islands of Persian Gulf, 2009-2012.

Swift Tern *Thalasseus bergii*: In Persian Gulf, Arabian Sea and Bay of Bengal present all year [14], occurring along entire seaboard of Arabia, southern Iran, India subcontinent, and Burma to western Malaya [15,16], but movements in relation to Natta colony unknown in absence of ringing [17]. Nest site is on bare ground or among

scattered bushes [13]. Swift Tern *Thalasseus bergii* breed in colony. This species breeds on Persian Gulf Islands mixed with Lesser Crested Tern. Maximum breeding population of this species was 145 pairs on Banifaror in 2009. At least 40 breeding pairs reported in 1975 on Om-al-Gorm (Um-al-Gorm), 30-40 pairs on Sheedvar [7]. Swift Tern and lesser Crested Tern had been bred in a colony in a mixed manner in Banifaror in three years. Average of breeding population of this species was 10.07 percent in Banifaror (7.48 in 2009, 7.11 in 2010, 10.38 in 2011 and 15.31 in 2012, Table 6).

Islands	1970 [7]	2009	2010	2011	2012
Banifaror	0	145	156	125	89
Om-al-Gorm	40	0	0	0	0
Nakhilo	0	1420	1754	875	435
Sheedvar	30-40	120	123	54	12
Khan	0	135	28	120	45
Boneh	0	8	0	0	0
Ghabre Nakhoda	0	110	132	30	0
Total (a)	30-80(0%)	1938(7.48%)	2193(7.11%)	1204(10.38%)	581(15.31%)

Table 6: Breeding pairs of Swift Tern in Banifaror and other islands of Persian Gulf, 2009-2012. (a)=The numbers in parentheses are percent of breeding population of Swift Tern in Banifaror.

Caspian tern *Sterna Caspica*: The breeding population of the Caspian Terns is low in the Persian Gulf islands. Between 5-10 breeding pairs reported on Om-Al-Gorm and 5-10 pairs on Helleh delta in 1975 (Figure 4 and Table 6) [7]. Status of the breeding population of Caspian Tern is not clear in 1970s and 1980s, so there is not enough information about breeding status of this species before 2009 in Banifaror. Since 2009 a small colony of this species had bred on Banifaror (Table 7).

Western reef heron *Egretta gularis*: This species had bred on 6 islands in 2009-2012 (Table 1). Breeding population of this species were 14-13 pairs in 2009-2012 on Bani-Faro. Maximum were on Nakhilo, 92 nests, in 2012, (Table 8). Breeding population of this species increased from 125 pairs in 2009 to 289 pairs in 2012 in the six islands; it is increased more than twice. There was three breeding colony of Western Reef Heron on Persian Gulf islands in 1970s, 26 pairs on Om-Al-Gorm in June 1975, 20 pairs on Khan in June 1975 and 8-12 pairs on Sheedvar Island in 1972 (Table 8) [7].

Islands	1970 [7]	Pandam (2002)	2009	2010	2011	2012
Banifaror	?	0	67	45	56	45
Gabber Nakhoda	0	120	0	0	0	0
Boneh	0	60	0	0	0	0
Dara	0	30	0	0	0	0
Khan	0	5	0	0	0	0
Om-Al-Gorm	10-May	0	0	0	0	0
Helleh delta	10-May	0	0	0	0	0
Total (a)	10-20(?)	215 (0%)	67 (100%)	45 (100%)	56 (100%)	45 (100%)

Table 7: Breeding pairs of Caspian Tern in Banifaror and Other island of Persian Gulf, 2009-2012. (a)=The numbers in the parentheses are percent of breeding population of Caspian Tern in Banifaror.

Discussion

Terns, waders and gulls form main animal group heavily dependent in the Persian Gulf islands for their continued existence. There are many species of these seabirds on the islands and also on Banifaror, but six species in particular nest in vast number on the islands.

These are the Western Reef Heron *Egretta gularis*, Lesser Crested Tern *Thalasseus bengalensis*, White-checked Tern *Sterna repressa*, Swift Tern *Thalasseus bergii*, Bridled Tern *Sterna anaethetus* and Caspian Tern *sterna caspia*. All six species occur together on Banifaror Island, but each has distinctive nesting habitats, (Figure 2). The Banifaror island is more sensitive habitat during summer, because, 36.69% of five terns species and more the 4.39% of Breeding population of Western Reef Heron (Table 8) of Persian Gulf islands had bred on this island in 2009-2012 (Tables 1-7). The Banifaror Island also was the only island in Persian Gulf that Caspian Tern had bred on it in 2011 and 2012 (Table 7). There is not information about breeding status of these species on Banifaror during 1970s, because none of the ornithologist have been visited this island before 2009. First time, I visited the island in 2009 and continued till 2012 and

count the breeding species of birds. The population of breeding tern's species decreased from 34862 pairs in 2009 to 32017 pairs in 2012 (Table 2). The population of White-checked Tern also declined from 300,000 pairs (1970s) to 132 in 2009 on Sheedvar Island (Table 3). For the reason as mention below, the sensitivity of Banifaror is more than the other islands. Scott reported that the tern's species had bred on Kharg and Kharku islands in 1970s, but in 2009- 2012 none of the tern's species had bred on these islands. There are two main reasons for these changes; the first main reason is the developing of oil industries and occupying all surface of Khark by oil installation and petrochemical industries, and establishment of army in Kharku Island in 1980s. The second one is increasing of the House Crow *Corvus splendens* population in Khark to more than 5500 individuals that finds the eggs and chicks of terns and eats them [8]. May be these reasons caused that all breeding tern species moved from the Khark and Kharku islands to Banifaror in 2009-2012. In fact the Khark and Kharku islands replaced by Banifaror.

Islands	1970s [7]	2009	2010	2011	2012
Banifaror	?	0	14	12	13
Gabber Nakhoda	?	12	13	14	8
Nakhilo	?	34	44	74	92
Sheedvar	12-Aug	21	13	17	12
Khan	20	45	77	67	72
Om-Al-Gorm	26	13	11	54	92
Total (a)	58(?)	125(0%)	172(8.13%)	238(5.04%)	289(4.4%)

Table 8: Breeding pairs of Western Reef Heron on Banifaror and other islands. (a)=The numbers in the parentheses are percent of breeding population of Western Reef Heron in Banifaror.

Fluctuation of breeding population water birds, are biological indicators for environment of island. Moving the breeding population of terns from Khark and Kharku Island confirmed this theory. All of these can be regarded as being of conservation importance equal to that of the avifauna. It is also believed that some colonies of breeding terns have been collapsed in the past due to continuous disturbance of breeding site by fishermen in the Banifaror and cased the breeding population of terns decreased. Besides Fishermen, natural predators, namely the Black Rat *Rattus rattus*, Turnstone *Arenaria interpres* frequently interfere in success of terns [8]. Black Rat is often noted as a predator of Cory's Shearwater chicks [18]. Predation of chicks by Black Rats is noted where their density is high [18]. There is a considerable population of Black Rat in Banifaror [8]. Banifaror Island regularly support huge numbers of breeding water birds, it meet the Ramsar Convention criteria and therefore deserve to be designated as Ramsar Sites and as a sensitive habitat for breeding sites of terns (Tables 2-6). Maximum number of breeding population of terns and Western Reef Heron which have been censuses in 2009-2012 in the Banifaror was 34785 and 14 pairs respectively (Table 2). The fluctuations of the number of breeding population of terns could be due to variation in the local environment of the island. Many components of the environment affect to select the breeding place, but in Banifaror the main factor is vegetation cover and presence of sandy safe place on the island, because some of the fishermen when resting

on the island, they collect the eggs of birds and cut the bushes for burni Tuck ng for food cooking, and when they cutting bushes and walking on the island, they break all the eggs under their foot. The Bridled Tern breeds under the bushes, in mid part of the Banifaror which covered by vegetation, (Figure 2) and sandy part without vegetation is located on North West of island and Lesser Crested and Swift terns breed on this part of island, (Figure 2). There are small part on island which covered by sabulous (pebble) and White Cheeked Tern breeds on it. The Caspian Tern breeds on south west of island on small part of sandy place. Structure of beaches of the island is suitable for anchor of fishermen boats, so when they are going to land and rest or stay a night on the island, they land from all around of beaches of the island, and disturb the breeding population of Bridled tern and other species on the sandy part of island. The general habitat greatly influences the presence or absence of the through the restriction of nesting and breeding areas, nutrition, temperature, security, water pollution, natural resources, fishermen, etc. Decreasing of breeding population of water birds throughout island, and was attributed to the food and security provided during breeding time.

Management and Conservation implications

The island is required to be stopped appropriately to check the fishermen boats anchor to prevent further Population loss of breeding birds. Strengthen enforcement of existing restrictions on the hunting of migratory birds.

To give strict guidelines to the Petro-cemical Companies and oil tankers to stop the west water releasing to the Persian Gulf at least during the migratory seasons of birds.

Measurements of water chemistry should be taken on a regular basis to allow long-term monitoring of Changes in physico-chemical parameters around the island.

Anthropogenic factors are the root causes for wetland degradation and habitat destruction of water birds. Therefore, conservation education and awareness programmers are essential for local people, students, fishing community and visitors to the Island. Publication of factsheets, checklists and pocket guide about biodiversity of Persian Gulf islands will help to widen the local knowledge among conservationists. It is recommended to initiate study of bird diversity and population status immediately with periodic monitoring in all islands for their conservation and management.

Suggestion

Concerning the breeding population of the terns and existence of other water birds during different time of year especially migration and breeding season, registration the Baniofaror Island in Ramsar Convention as a Ramsar sites is suggesting, if this could be achieved, a higher level of management and better degree of protection would be expected for this island. During the breeding season, it is necessary to prevent all kinds of disturbance on the island, e.g. egg-collecting by local people and uncontrolled visits by other people to island where tern's species regularly breed. As an urgent measure, it would be helpful to prepare a series of guidelines for controlling human access to the island and keeping people outside the tern's colonies to avoid the destruction of nests. The development of awareness programs for local people and fishermen would certainly benefit the breeding birds on the Persian Gulf islands.

Acknowledgment

This research project has been financially supported by the Department of the Environment Office of Bandar Abbas Province in 2009. I would like to thank to DOE Staff in Bandar Abbas province for their advice in Particular to the Mr. Khaleghi and Mr. Ghaderi who helped in the counts of the nests and assisted with transportation to island.

References

1. Scott DA (2008) Rare Birds in Iran in the Late 1960s and 1970s. *Podoces* 3: 1-30.
2. Wetland International (2007) The Asian Waterbird Census Development Strategy 2007-2015.
3. Wetland International (2006) Waterbird population estimates. (4 edtn) Netherlands.
4. Behrouzi-Rad B (2008) Dictionary of water birds of Persian Gulf, Published by Department of Environment 165.
5. Behrouzi-Rad B (2013) Breeding Species of Water birds on 10 Islands of Persian Gulf in 2009, *Octa Journal of Environmental Research* 1: 52-64.
6. Scott DA (1995) A Directory of Wetlands in the Middle East. Switzerland 43-221.
7. Scott DA (2007) A Review of the Status of the Breeding Water birds in Iran in the 1970. *Podoces* 2: 1-21.
8. Behrouzi-Rad B (2009) Sensitive Habitat of Water birds of Persian Gulf. Iran 343.
9. Krebs CH (2002) Ecological Methodology.
10. Blaber SJM, Milton DA, Farmer MJ, Smith GC (1998) Sea bird breeding population on the far Northern Great Barrier Reef Australia: Trends and Influences. *Emu* 98: 44-57.
11. Behrouzi-Rad B, Tayfe FH (2008) Nest Counts for Western Reef Heron and Four Sterna Species (*repressa*, *anaethetus*, *bergii*, *bengalensis*) on Nakhilo Island in the Persian Gulf from 2005-2007. *Podoces* 3: 45-52
12. Cramp S (1983) Handbook of the Birds of Europe, the Middle East and North Africa. The Birds of the Western Palearctic. Waders to Gulls Oxford University Press.
13. Cornwallis L (1975) Breeding Terns in Sheedvarand Mond protected Area Internal report Tehran, Iran.
14. Tuck GS (1974) Seabirds of the Persian Gulf (The Gulf) and Gulf of Oman a Survey 1958-1973. *Sea Swallow* 23: 7-21.
15. Ali S, Ripley SD (1969) Handbook of the Birds of India and Pakistan. (3rd edtn) India.
16. Fasola M, Canova L (1991) Colony site selection by eight Species of Gulls and Terns Breeding in Valli di Comacchio. Italy.
17. Moore TJ (1960) *Ibis* 2: *Avis indianbiodiversity*. 105-110.
18. Jean-Pierre B (1989) Status and Distribution of the Gull-billed Tern *Sterna nilotica* in the Western Palearctic, Proceeding of the 2nd Mediterranean Seabird Symposium Calvia.