



ORIGINAL ARTICLE

Identification and Prioritizing Important Nesting Sites of Green Turtle in Iranian Beaches of Oman Sea during 2008-2010

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ABSTRACT

*Iranian beaches of Oman Sea from its most eastern place (Govatr bay) to most western point (Strait of Hormuz) were studied during 2008–2010. There are vast areas used by marine turtles especially green turtles (*Chelonia mydas*) with different sizes and ages for nesting and laying egg in this region. Field surveys were performed in all sandy beaches located in studied range from early spring to late autumn. 16 probability nesting sites (including all sandy beaches of the region) have been investigated to recognize important nesting sites. To determine important sites of green turtles' nesting, two- person work groups of local people were formed. Then they received training about observation and recording required data. Each work team patrolled at least two times along sandy beach during night (after sun set to early morning) and recorded required data. Because of vast dispersion in nesting sites and long path of coastline number of laid nests and crawl marks without nesting were counted and to prevent from recording repeated data, previous turtles crawl marks were eliminated. The results obtained from field surveys showed that only in 10 of 16 recognized sites, green turtles' nesting occurred and in those areas 406 nests were recorded. All nesting sites were located in open beaches and near human residences (villages). Easy access to site has harmful effect on green turtle egg laying. In open beaches, because of long distances between nesting sites and lack of enough time to transfer the eggs to hatchery sites, eggs protection in the nest is suggested that is provided by fencing the place. To prevent eggs from being hunted by wild animals as dog, birds and jackal using covered fencing with local materials is suggested. Nesting sites protection of green turtle in this region needs addition managerial and training practices.*

Keywords: Green turtle, Nesting sites, Conservation, Oman sea

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INTRODUCTION

Marine turtles have survived on earth for centuries. Human's actions, in particular in the 19th and 20th centuries, have brought many populations to the brink of extinction. Turtles probably appeared in the late Triassic ca. 200 million years ago [11]. The green turtle is circum-global in distribution and majority of its nesting and feeding grounds lie all through the tropical regions [11, 3] and to a lesser extent in subtropical waters [14&3]. Nesting occurs in more than 80 countries worldwide [8&3]. Their movements within the marine environment are less understood but it is believed that the green turtle inhabits coastal waters of over 140 countries [6&3]. They are categorized as Endangered in the IUCN Red List [9&18]. A long term history of capture of adult turtles and harvesting of turtle eggs has reduced many populations worldwide to precarious levels. Recent conservation efforts have resulted in a trend of increasing nesting numbers for several populations [1,2,15, 10] status of marine turtle populations are often assess by surveys of nesting beaches [13]. Each time a female turtle arises from the water to attempt nesting, (a "nesting activity") it creates a typical set of tracks on the sand: with a track ascending to any aborted digging attempts or successful nest, and a further track descending to the sea. By counting tracks to and from the sea (and dividing by two) it is possible to understand how many nesting activities have occurred [5]. In south coasts of Iran, there are more than 52 main habitats for marine turtles that are their pasture, out breeding and spawning areas [12]. Green and Hawksbill turtles have maximum number of nesting regions and laying egg in Iran. In Iranian beaches of Oman Sea that include Chabahar, Konarak and Jask regions near strait of Hormoz, Green turtles are dominant species of the region but Hawksbill turtles and

sometimes Olive ridley also are observed in this region. Generally Oman Sea includes important food and reproduction areas for Green turtle in different living stages Northern parts of Oman Sea beaches are considered as important sites of Green turtles laying eggs because of sandy beaches similarity to beaches of Baloochestan in Pakistan [4]. Laying eggs season of Green turtle in these beaches depends on climate variation and usually begins from late summer and continues to late autumn. Laying climax in this region occurs in August and November [18]. Reproduction success of marine turtles severely depends on environmental conditions around the nest and choosing proper sites by female turtles [19]. Nests attributed to Green Turtles have been recorded on Hormuz island [16] and on mainland beaches near Chabahar in Iranian Baluchistan, from Paservandan east to the border with Pakistan [17]. It is possible that some Green Turtles nest on other islands near the Straits of Hormuz [6]. Sandy beach of Oman Sea provides a good nesting site for different marine species including green turtle. All nesting sites are located in open coasts with distances from each other in contrast to sites related to the islands (closed coasts). Natural threats as fox, jackal and human threats as picking the egg from the nest, pollution and destruction of the coast because of easy access and locating near coastal villages is much more than the coasts located in the islands. Field monitoring of nesting sites in laying eggs season to perform protective programs about the turtles is hard due to dispersion and distance existing among them compared to closed coasts. Mass local public participation programs regarding green turtles conservation need to be set up along this region.

MATERIALS AND METHODS

In this study, Iranian beaches of Oman Sea from its most eastern place (Govatr bay) to most western point (Strait of Hormuz) were studied during 2008 – 2010. There are vast areas used by marine turtles especially green turtles (*Chelonia mydas*) with different sizes and ages for nesting and laying egg in this region. It was observed that green turtles came to the beaches even the time they did not dig the nest.

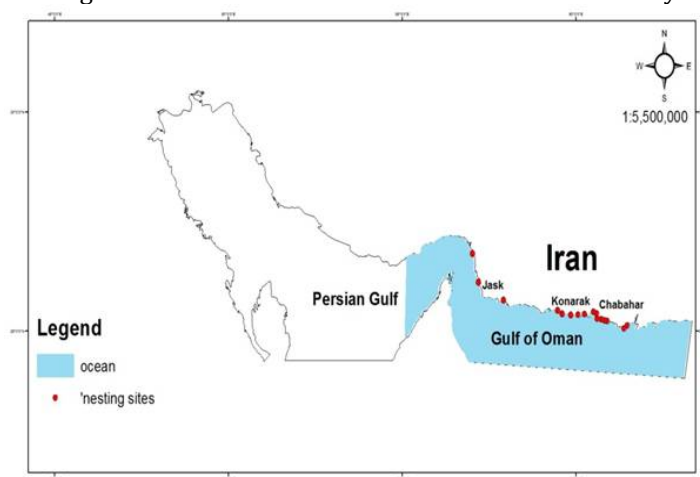


Figure 1: Green turtle nesting sites in Iranian coasts of Oman Sea

Field survey were performed in all sandy beaches located in studied range from early spring to late autumn and information of observed cases were considered for introducing laying sites. In this research to recognize important nesting sites, 16 probability of nesting sites (including all sandy beaches of the region, fig1) have been investigated. After determining study areas, a two- person team as patrol members formed in each region during study period (totally 8 teams) and they have field survey for all determined areas. These people walked along determined sandy beaches during night from sunset to early morning and recorded their observations. In these investigations, there were at least 2 daily surveys along the beach because of lengthy path. Number of laid nests and crawl marks without nesting were counted and to prevent from recording repeated data, previous turtle crawl marks were eliminated. According to distribution of these sandy beaches related to each other and easy access to these ranges and because of having no island state, effect of natural and human factors in these regions was more than beaches located in islands and also monitoring action in the spread and open beaches (longitudinal or linear beaches) was somehow difficult.

Most important factors in this study are as following:

- Direct observation of laid nests and tracks of turtles who have come to Dry land in studied limitation and statistics record of nesting and crawl marks without nesting
- Determining important areas for nesting from all existing sandy beaches
- Collecting existing skeleton in this region and determining them
- Investigating threads status and beach kind

- Using information of local and native people
- Investigation of previous reports about this matter

Information found from provided investigations were collected and classified based on above factors and important nesting sites were determined based on order of utmost nesting.

After determination of nesting sites, providing monitoring plans and performing protective programs in considered beaches for survival of marine turtle generation is so necessary. In this study, two following protective methods have been used for this kind of beaches and according to distance between sites and for effect reduction of natural and human threads on reproduction process of turtles both of which are necessary for performing protective program in this kind of coast and can be so effective.

A) Protection in nesting sites

This method includes laid nests determination during monitoring and protecting of existing eggs in them by covering each nest with a cage or any other proper means without transferring the eggs. Based on dominant climatic condition in the beach (high humidity), it is better for building protective cages to use resistant woods and fences. To increase survival coefficient of turtle's larvae after hatchling in dry environment (to prevent from their hunting by birds) covered cages were used. Using this method in sites that are long and in the case that displacement of eggs to hatchery station is not possible can be very useful. Of course existing eggs in them will be moved to more secure nest immediately after laying eggs. Figure (2) illustrates nesting site protection in the coast of Lipar village in Chabahar city.



Figure 2: Protection in nesting site - the coast of Lipar village in Chabahar city

B) Establishing hatchery sites

This method consists of fencing a part of sandy coast being proper for laying of turtles in reproduction season and transferring the eggs to fenced place immediately after nests determination and end of female turtles' laying eggs and putting them in a handmade nest like main nest dug by female turtle inside of protective station. It is necessary to mention that using this protective method requires regular and continuous monitoring in laying egg season, quick transferring of eggs after end of laying eggs, providing protective equipment and local societies' participation. Figure (3) illustrates established hatchery site near the coast of Kachoo village in Chabahar city.



Figure 3: Established hatchery site near the coast of Kachoo village in Chabahar city

RESULTS AND DISCUSSION

Results obtained from field monitoring of Iranian beaches in northern section of Oman Sea (Gooatr Gulf to strait of Hormuz), showed that in all maximum nesting of marine turtles occurred in Lipar-Coopanser sites in Chabahar city in 101 nests during 2008 – 2010. nesting action was observed in only 10 sites among 16 studied regions in Iranian beaches of Oman Sea and their comparison was made based on number of nesting actions. Ten important nesting sites of Green turtle were recognized and recorded from sixteen determined areas among which Lipar-Coopanser and Teng sites have maximum nesting compared to others and no nesting was observed in Poozam, Tees, Naserabbad, Gooatr, Groom -Ketan and yekbooni sites(Table 1). The greatest nesting site without laying eggs and crawl marks although nesting sites with laying eggs and crawl marks was found in Lipar and coopansar site (diagram1, 2). Of course climatic variations, food diversity and variation of ecosystem status in the region in future will change distribution status and nesting statistics of these sites for example if during one or several laying season referring statistics of female turtles were little or zero, these statistics can change in other seasons based on climatic and environmental condition of the region. Most of these sites are located in coasts of Sistan and Baloochestan Province (Makran beaches of Iran) and all the sites are placed in open coasts in contrast to sites in island regions of Iran and influence of natural and human factors in these coasts relates to easy access and being near the coastal villages and also doing simultaneous monitoring in laying season of turtles in this kind of beaches is somehow difficult because of nesting sites dispersion relative to each other. So according to existing threats in long beaches, necessity of performing protection plans about turtles in these sites is higher than sites located in islands.

Table 1: Nesting and crawl marks without nesting of Green Turtles in Iranian Coasts of Oman Sea during 2008- 2010

	Name of Site	Sum of nesting				Sum of crawl marks without nesting			
		Year				year			
		2008	2009	2010	Sum of 3 years	2008	2009	2010	Sum of 3 years
1	Lipar and coopansar	34	48	19	101	57	63	28	148
2	Teng	27	34	23	84	39	31	28	98
3	Kachoo	16	21	14	51	11	37	21	69
4	Ramin and Ahmadrizeh	11	13	17	41	13	27	14	54
5	Kerati	14	7	12	33	7	21	26	54
6	Shahid Beheshti Port	11	10	11	32	17	14	10	41
7	Goordim	5	9	7	21	7	12	8	27
8	Joord and Darak	3	13	4	20	8	12	7	27
9	Pooshat	6	2	4	12	4	6	9	19
10	Rashedi	3	4	4	11	4	7	8	19
11	Gooatr	5	2	0	3	0	0	0	0
12	Poozam	2	0	1	1	0	0	0	0
13	Tees	1	0	0	1	0	0	0	0
14	Naserabbad	0	0	0	0	0	0	0	0
15	Geroog and ketan	4	1	1	2	0	0	0	0
16	Yekbooni	9	3	2	4	0	0	0	0
Total		577	165	234	178	406	115	161	130

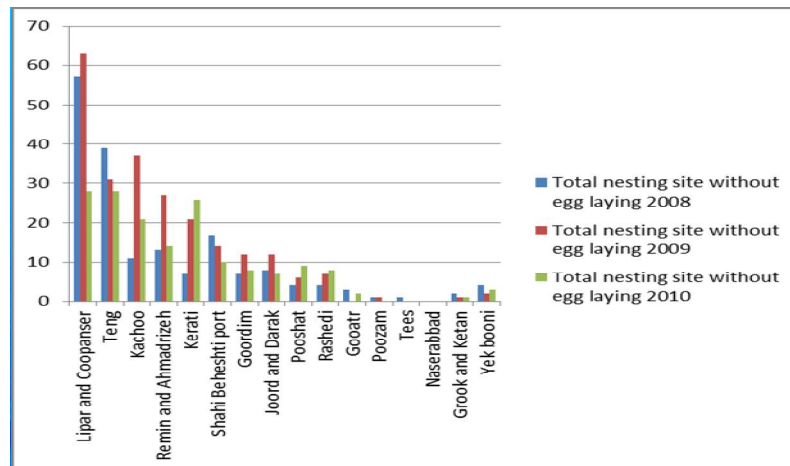


Diagram 1: nesting Sites without laying eggs and crawl marks during 2008-2010

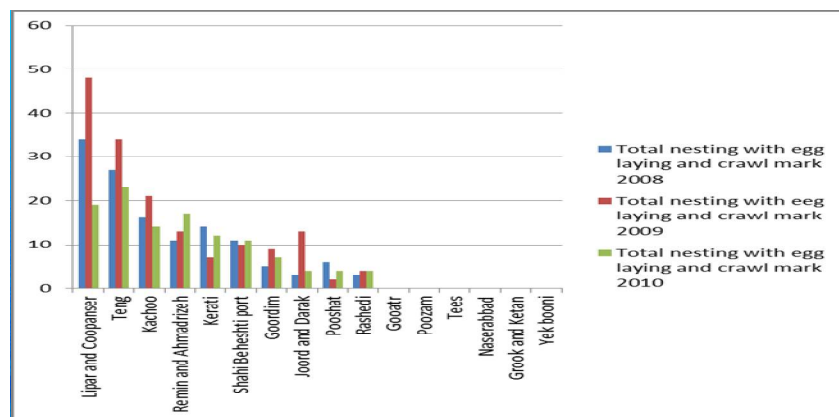


Diagram 2: nesting sites with laying eggs and crawl marks during 2008-2010

CONCLUSION

Investigations showed that marine turtles especially green species spread in all Iranian coasts of Oman Sea and green turtle are dominant of the region though Hawksbill and Olive turtle have been also seen. In this research with aim of recognition and prioritizing important sites, only number of nests chosen by female turtle and crawl marks without nest choosing were counted because of long distances between sites and long coastal line. Totally 406 nests have been observed (Table 1). Simultaneous monitoring of these beaches (long and open beaches) in laying season is more difficult than beaches located in islands and necessity of performing protective plans in these coasts is higher according to adjacency of laying regions and villages and many natural and human threats. using two protective methods including protection in nesting site and establishing hatchery site is suggested for helping survival of Green turtle generation.

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