

## THE STATUS AND NESTING SITES OF THE MARINE TURTLES OF PAKISTAN AT KARACHI AND MAKRAN COAST: A LITERATURE REVIEW

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### ABSTRACT

The paper presents the surveys and investigations conducted over many years which provide an insight of the previous researches on status and nesting sites of the five marine turtles (*Chelonia mydas* L., *Eretmochelys imbricate* L., *Lepidochelys olivacea* (Eschscholtz, 1829), *Dermochelys coriacea* (Vandelli, 1761) and *Caretta caretta* L.) that are found in Pakistan on the coast of Karachi and Makran. The analysis of methodologies and results of previous researches have been done to have a better understanding of the presence of selected turtle species. Both quantitative and qualitative studies were brought under consideration.

**Key words:** Hawks Bay, Balochistan coast, turtle eggs, nesting pits, conservation, turtle hatcheries.

### INTRODUCTION

The coastline of Pakistan is around 990 km long, which is divided in two parts, Balochistan coast that is about 720 km and Sindh Coast which is about 270 km (Fig. 1). The coast of Karachi lies between the Hub River to the west and Gharo creek. The length of the coastal belt of Karachi is about 100 km. The coast of Balochistan stretches from the east of the Hub River to the mid of the Gwatar Bay to the west. The Coast of Balochistan is bound geologically by the Makran Coast that extends from west to east till Hala range (Pakistan, M. F. F. 2016). Marine turtles live in warm temperate and tropical waters and are found in world's major oceans. The range of their movement varies from tropical to subtropical regions. (Firdous, 2001). In the Indian Ocean five species of turtle are found i-e. *Chelonia mydas* (green turtle), *Eretmochelys imbricata* (hawksbill turtle), *Lepidochelys olivacea* (olive ridley turtle), *Dermochelys coriacea* (leatherback turtle), *Caretta caretta* (loggerhead turtle) (Khan *et al.* 2010).

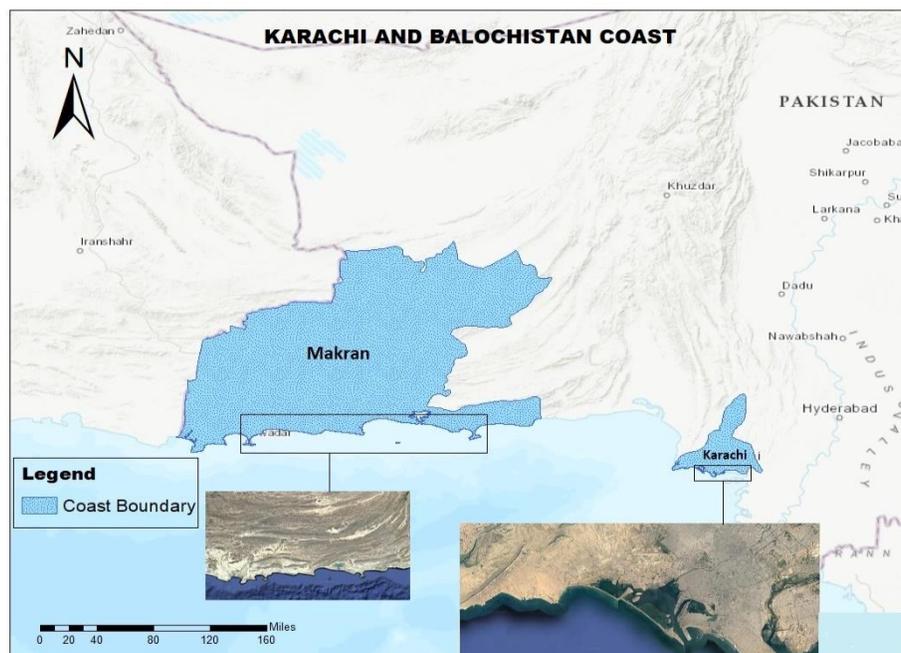


Fig.1. Coasts of Karachi and Balochistan, Pakistan. (Major nesting sites of marine turtles).

The Makran coast in Balochistan, (Province of Pakistan) provide nesting sites to considerable number of marine turtles. As the coast of Balochistan is comprised of almost 95% (>700 km long) desolate and inaccessible beaches that are evidently appropriate for the habitats of marine turtles (Kabraji and Firdous, 1984).

***Chelonia mydas* (green turtle):**

Green Turtle is the most commonly found specie in Pakistan which could weigh 200 kg and it could grow up to 1.5 m. The status of Green turtle is endangered. Key nesting sites of the Green Turtle could be found at Sands pit and Hawks bay along the Karachi coast, and at Balochistan coast it could be observed at Astola Island, Ormara and Jiwani beaches. The eggs laying period is mostly during July to December. The eggs are laid by female turtles in dug close chambers in clutches of 75 - 120 eggs (Pakistan, M. F. F. 2016).

***Lepidochelys olivacea* (olive ridley turtle):**

Along the coast of Pakistan, the Olive ridley turtle was considered the second highest nesting turtle. Its length is about 80 cm. They are bit less bulky and weighs up to 45 Kg. The status of Olive ridley is endangered. It nests at Hawks bay and Sandspit from March to October and the peak nesting time of Olive Ridley was July and September. After the incident of oil spill in 2003 at the Karachi coast the nesting of Olive ridley had reduced and no specie was recorded after 2012 but in the offshore waters a large population has been recorded in the recent studies (Pakistan, M. F. F. 2016).

***Dermochelys coriacea* (leatherback turtle):**

Unlike other turtles the Leatherback turtle had a leathery shell rather than a hard shell and that is how it got its name. Its size could reach up to maximum 180 cm which makes it the largest sea turtle in terms of size, and its weight is around 500 kg. The status of Leatherback turtle is Critically Endangered (Pakistan, M. F. F. 2016).

***Eretmochelys imbricata* (hawksbill turtle):**

The Hawksbill turtle has a narrow pointed beak. Its length is less than 1 m. Its weight is 140 kg. The status of Hawksbill turtle is Critically Endangered (Pakistan, M. F. F. 2016).

***Caretta caretta* (loggerhead turtle):**

Distinctively, the Loggerhead turtle has a large head to support the powerful muscles of the jaws, which are essential for feeding on crustaceans and mollusks with hard shells. The average size of Loggerhead turtle is 92 cm and the weight is about 115 kg. The status of Loggerhead turtle is endangered (Pakistan, M. F. F. 2016).

**Literature review:**

**Status of five marine turtle species in Pakistan**

Murray (1884) was perhaps among the first ones to describe the presence of sea turtles in Pakistan. He identified olive ridley and green turtles in the province of Sindh. He reported nesting of green turtles in Karachi at Gizri and Clifton. During breeding season huge amount of eggs were brought for sale. Shockley (1949) reported that *Chelona mydas* was frequently observed along Jiwani coast close to the Iranian border. Specifically, at "turtle cliff", around a dozen turtles could be observed and in September-November, 1945, a large number of turtle tracks were recorded alongside the beach. Minton (1966) reported that no specimen of *Dermochelys coriacea* (Leatherback turtle) was recorded from the waters of West Pakistan. But in June 1958 a photograph of an adult leatherback specimen was found which was beached at Hawke's Bay Karachi. So he concluded that no other local record was found and the leatherback could be occasionally seen nesting on the islands near the inlets of the Indus. Minton (1966) reported that hawksbill turtles were found at the coasts of Pakistan only as a migrant, and there is no recorded proof of its nesting or breeding at the shores of Pakistan. Minton (1966) did not report any loggerhead turtle, but he confirmed that the specie occurs in Pakistan without any doubt. Ghalib and Zaidi (1976) concluded that the nesting of loggerhead turtle does not occur in Pakistan but they added it in the list of sea turtles of Karachi. Khan and Mirza (1976), Khan and Tasnim (1990) and Khan (2003), reported the occurrence of loggerhead turtle in Pakistan without providing any detail. Ghalib and Zaidi (1976) also incorporates the presence of hawksbill turtle in the list of sea turtles of Karachi. Khan and Mirza (1976), Khan and Tasnim (1990) and Khan (2003, 2006), have also reported hawksbill turtle in Pakistan. Ghalib and Zaidi, (1976) discovers that among other five species of sea turtles *Dermochelys coriacea* (leatherback turtle) have also been recorded on the shores of Pakistan but they did not give any particular record or nesting details anywhere in Pakistan. Coasts of Pakistan has been supporting a large population of *Chelona mydas* (Green Turtles) along with a less number of *Lepidochelys olivacea* (Olive Ridley) population that has been nesting mainly at Sandspit and Hawkes Bay, Karachi, Province of Sindh (Ghalib and Zaidi,

1976; Kabraji and Firdous, 1984). Groombridge (1987, 1989) conducted a survey in the year 1987 along the coast of Makran. A local in Ormara identified the leatherback turtle in a photograph and told them that the specie was caught in fishing nets occasionally, but can't be verified. Firdous (1989, 2000) recorded a dead leatherback turtle on September 5, 1988 stranded on the beach of Sandspit, Karachi. It is ascribed by her that the death of the turtle would be because of the possibility of shark attack. A notable cut was found on the left rear flipper of the turtle on the ventral side. Another dead specimen of leatherback turtle was collected by her on April 25 1989 from Paradise Point, this time a big hole was recorded on the right front flipper at the proximal end. Also the back flippers were damaged giving indication of the shark attack.

As indicated by the Editor, IOSEA Marine Turtle MOU (given in Firdous, 2006) dead leatherback turtles described by Firdous (1989; 2006) were in bad condition and when they were washed aground it was assumed that the wounds credited to shark attack might have happened later these turtles have passed on. Subsequently reason for death can't be connected to shark attack and probability of anthropogenic elements can't be precluded. Baldwin *et al.*, (2003) had confirmed the retrieval of flipper tag from a specimen of *Caretta caretta* (loggerhead turtle) from Pakistan. Mortimer and Donnelly, (2008) states that the hawksbill turtle has been distributed all over the world. It migrates to diversified habitats with a complex movement during their whole lifespan and had been recorded in around 108 countries but the nests are found in around 70 countries. It is also found in Pakistan as a rarest marine turtle species. As stated by Hussain (2009) hawksbill turtle has a distribution from Cape Monz to Hawks bay, Paradise Point, and Manora but the credibility of this distribution is not evident. He also produces a photograph of hawksbill turtle shell but alongside he also mentioned that Mertens (1969) has spotted a small shell of hawksbill turtle at a shop in Karachi which is the only authentic report of the presence of this specie of turtle. Khan *et al.*, (2010) carried out Surveys from September 2004 to December 2007. All known and potential nesting sites of turtles had been identified. During the survey new nesting sites were identified on six beaches, including Gwadar, Mubarak village, Ganz, Pishukan, Hingol National Park and Sonmiani. They also reported habitat degradation at coastal areas near Korangi creeks and Karachi. Khan *et al.*, (2010) carried out a study on the nesting of sea turtles but were unable to find any nest of loggerhead turtle along the coast of Pakistan.

According to Salam (2010) loggerhead turtle, (*Caretta caretta*) was recorded at Daran beach, Pakistan. Khan (2010) confirmed ruined carcasses of loggerhead turtle in February, 2010 at Gwadar (West Bay). Rees *et al.* (2010) told that two loggerhead turtles (female) migrated to the waters of Pakistan. They were satellite tagged in Masirah Island situated in Oman. Waqas *et al.* (2011) carried out studies on conservation of green turtles. *Chelonia mydas* (green turtle) belongs to the family Cheloniidae of class Reptilia and is a large turtle. The sandy beach of Jiwani constitutes important nesting sites for the green turtles. WWF (Pakistan) had monitored the population of green turtles along the coast of Jiwani between 1999- 2008. He further confirmed the protection of total 2,731 nests and from these nests a total of 91,936 hatchlings emerged and they were released into the sea water. Khanum *et al.* (2014) states that Hawkes Bay is one of the foremost favorable nesting sites for (*Chelonia mydas*) green turtles in Pakistan. Many environmental elements affect the nesting patterns of (*Chelonia mydas*) at this beach. The fundamental goal of the research was to assess the significance of habitat monitoring with the assistance of GIS. Seasonal effect on nesting pit density is pretty substantive on high resolution imageries. The result of the study showed the influence of rising temperature on nesting grounds. Manzoor *et al.* (2019) executed a study from 2014 to 2017, regarding the status, distribution and conservation of the marine turtles in the shores of Karachi. During the study only *Chelonia mydas* (Green turtle) has been recorded in the study areas i-e. Hawkes bay, Cape Monze and sandspit. *Lepidochelys olivacea* (Olive ridley) turtle and *Eretmochelys imbricata* (Hawksbill turtle) were not seen at the study sites of coasts of Karachi. In the offshore water of Pakistan *Caretta caretta* (Loggerhead turtle) has been captured in a fishing net by a fisherman. *Dermochelys coriacea* (Leatherback turtle) is a rare species of marine turtles that was recorded dead in Miani Hor lagoon of Baluchistan province. *Dermochelys coriacea* (Leatherback turtle) was also recorded at Khori Great bank entangled in a fishing net which was rescued and released in water. *Eretmochelys imbricata* (Hawksbill turtle) has been found at the Baluchistan coast. Moazzam and Nawaz (2019) affirmed that *Dermochelys coriacea* (leatherback turtle) has been reported from Pakistan but they were found dead on the shores of Sindh and Baluchistan and were 4 in number. They also confirmed the presence of 8 leatherback turtles that were captured in gillnets. A specimen of leatherback turtle was recorded dead in Miani Hor with a possibility of boat strike. All the turtles captured in fish gears were rescued and released except one who died while heaving on the boat. Moazzam and Nawaz (2019) asserted that *Caretta caretta* (Loggerhead turtle) was reported from Gwadar Pakistan. A specimen of Loggerhead turtle was accidentally entangled in a gillnet. There is no valid data of nesting sites of loggerhead recorded in Pakistan. They confirmed that 11 loggerhead turtles were captured in fishing nets and were released safely in water. The records confirmed rare occurrence of loggerhead turtles in Pakistan.

### Threats and conservation status of marine turtles in Pakistan:

Salm, (1975) told that the Government of Sindh under Sindh Wildlife Protection Ordinance reacted to the alarming situation of turtle depletion in Pakistani seas and declared the sea turtles as "Protected". Turtle eggs are normally removed from the nests and buried at a safe location (Stancyk *et al.*, 1980). Groombridge, (1982) explained that the overexploitation of turtles includes destruction of nesting sites and slaughtering. This was the major reason of incorporating the sea turtles of Pakistan among the threatened species in the Red Book of IUCN. Groombridge *et al.* (1988) analyzed the trade statistics and concluded that there was great exploitation of turtles until 1985. According to import figures of Japan, skin of turtles was exported in the following years 1976-1985, except 1983 and 1984. Figures of Pakistan's custom confirmed the export of raw shell of about 1800 kg in the year July 1981 to June 1982 and July 1982 to June 1983 and it was probably *Chelonia mydas*. He further states that the province of Sindh was fully protected under the Sind Wildlife Protection Ordinance (1972). So it could be concluded that all the turtle exploitation occurred in Baluchistan. Furthermore, he confirmed that at Ormara and Jiwani nesting females were commercially harvested for oil extraction purposes. This exploitation practice was observed with great intensity at Ormara. The beach was observed with turtle shells and bones littering all around and they were may be principally for the extraction of oil. It had an unfavorable impact on the population of turtles. According to Firdous (2001) over 1,500,000 eggs have been transplanted to enclosures to guard them from predators from October 1979 to December 1997 and around 450,000 hatchlings were launched to the sea. Education and public attention is a need within side the conservation of endangered species which includes marine turtles, and efforts were made to unfold the message through media. It is assumed that a productive conservation can be carried out through powerful implementation of countrywide and worldwide legislation. Beachfront lighting and loss of habitat are major concerns and a great threat to turtle population throughout South Asia (Islam 2002; Bhupathy and Saravanan 2002).

Jiwani is a main trade point between Pakistan and Iran, and is located at one edge of Gwadar bay. Fishermen use speed boats for the purpose of fishing. Furthermore, transportation of oil and goods between Pakistan and Iran is also performed by speed boats. (WWF Pakistan, 2004). The main reason of decline in population of marine turtles in Pakistan is associated to a number of reasons that includes loss of foraging and nesting sites, habitat degradation, commercial harvesting and marine pollution. (Khan and Ghalib 2006). Large number of turtle population has been observed in Jiwani because it is the hot spot for turtle's mating. But the excess usage of boats for navigation purpose is disturbing the turtle population. There has been history of exploitation of turtle eggs by the native people to cure rheumatism. They are also used as a medicine by local herders to treat sick goats. It has been observed that the community is involving in the conservation of marine turtles by abstaining people from collection of turtle eggs and damaging nests. Foxes, Jackals and dogs are commonly found in Jiwani area. They destroy the nests of turtles and also prey on their eggs. Moreover, predation of hatchlings by ghost crabs is also very common on Daran Beach. Hatchlings face threatening conditions right after their emergence because birds and feral dogs try to grab them while they enter into water. In water, gulls and large fishes serve as their predators. (Waqas *et al.*, (2011). Waqas *et al.* (2011) affirmed that currently, no laws have been made for the protection of marine turtles in Jiwani. All the species are protected under Baluchistan Wildlife Protection Act 1975. A marine turtle survey is conducted by Brian Groombridge of World Conservation Monitoring Centre, Cambridge, U.K., in September 1988. It was suggested in their survey that Jiwani should be declare as a "Wildlife Sanctuary" to protect the remaining population of marine turtles. However, still no laws have been made in this regard. In addition to that WWF-Pakistan also suggested to the Government of Balochistan in 2005 to declare this area as 'protected' but no decision has been made yet. Shahid *et al.* (2015) assessed the extent of marine turtle bycatch, four operators that were trained by WWF observed four tuna gillnet vessels to record marine turtle bycatch for a time period of thirty months from January 2013 to June 2015. As a result, 600 marine turtles' bycatches were reported. The mortality of turtles was recorded about 10% of the total caught turtles. Around 90% of the sea turtles were released back in waters in a good condition. 68.8% captures of *Lepidochelys olivacea* (olive ridley sea turtle) were recorded followed by *Chelonia mydas* i-e 29.6% and *Eretmochelys imbricata*, (hawksbill turtle) accounts for 1.5%. Manzoor *et al.*, (2019) states that marine turtles had been protected by Sindh Wildlife Department. Three marine turtle hatcheries are located at Hawkes bay and Sands pit that are working under (SWD) government of Sindh. Sindh Wildlife Department aims to protect the marine turtle eggs and juveniles of (*Chelonia. mydas*) from crows, dogs and crabs.

### Conclusion

The main conclusion of this article is that there are a lot of threats that these turtles are facing on the shores of Pakistan which includes the feeding of eagles and stray dogs on the eggs of the turtles especially, *Chelonia mydas* and Olive ridley and on the other hand the littering of the coasts by the plastic bags and heaps of trash is destroying the turtle's natural habitat. Monitoring programs should be conducted at regular intervals for the provision of exact

population trends and data about nesting sites. A sufficient management plan is required to eradicate the lack of awareness at public level to reduce the threats to sea turtles of Karachi and Balochistan and to conserve their habitats.

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