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DISTRIBUTION AND ABUNDANCE OF HAWKSBILL TURTLES (*ERETOCHELYS IMBRICATA* RÜPPELL, 1835) FROM PAKISTAN

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ABSTRACT

Eretochelys imbricate (Rüppell, 1835) commonly known as hawksbill turtle was previously reported from Pakistan only once when a small hawksbill turtle shell was seen in a shop in Karachi in 1960's. Present paper reports confirmed occurrence of 9 specimens of hawksbill turtles that were mainly entangled in fishing gears. All these specimens which were enmeshed in the fishing gear were safely released except one which died during disentanglement process. The records of hawksbill turtles from Pakistan coast indicated that this species is widely distributed along the coastal and offshore waters of Pakistan but are of rare occurrence in Pakistan. No marked seasonality of occurrence was noticed except that more entanglements were made during post southwest monsoon period (winter months).

Keywords: Hawksbill turtles, *Eretochelys imbricata* (Rüppell, 1835), Pakistan, entanglement, safe release, gillnets.

INTRODUCTION

The hawksbill turtle has a circumglobal distribution throughout tropical and, to a lesser extent, subtropical waters of the Atlantic Ocean, Indian Ocean, and Pacific Ocean (Mortimer and Donnelly, 2008). It is a migratory species having a complex movement through geographically disparate habitats during their lifetimes and found in about 108 countries but its nesting occurs in at least 70 countries (Mortimer and Donnelly, 2008). It is the rarest sea turtle species found in Pakistan.

Minton (1966) pointed out that hawksbill turtles evidently researches Pakistan coast only as a wanderer, however, there is no evidence of its breeding or nesting here. According to Hussain (2009) hawksbill turtle is distributed from Cape Monz to Paradise Point, Hawks bay and Manora but no credible evidence of this distribution pattern was provided. He also gave a photograph of shell of hawksbill turtle but he mentioned that only authentic record of this species from Pakistan which is made by Mertens (1969) who has seen a small hawksbill turtle shell in a shop in Karachi. Further details of the specimen are not available.

Ghalib and Zaidi (1976) have included hawksbill turtle in the list of marine turtles of Karachi, Pakistan but no details of its occurrence were provided. Similarly Khan (2003, 2006), Khan and Mirza (1976) and Khan and Tasnim (1990) have included hawksbill turtle in the list of marine turtles of Pakistan but no further details were provided.

Khan *et al.* (2010) reported hawksbill turtle nesting at Cape Monz and Mubarak Village during June and July and at Astola Island in July and December. No evidence of their nesting was provided by Khan *et al*. (2010) and also no details of technique used for the identification of the nests were given. The information about their nesting in these areas cannot be independently verified.

Shahid *et al.* (2015) studied population of turtle in the offshore waters and recorded occurrence of 9 specimens of hawksbill turtle during January 2013 and June 2015. They also reported an entanglement rate of 1.5 % of the commercial catch of tuna longline vessels that operate in the offshore waters. This study is based on mere speculation and misidentification of the species. Present authors were spearheading the bycatch studies on which Shahid *et al.*, (2015) based his paper but during the period only two straggler hawksbill turtles were observed (included in the present paper). Thus, the data presented by Shahid *et al.* (2015) is merely based on speculation.

WWF-Pakistan has initiated a study to document presence of turtle species in Pakistan in 2012 (Moazzam and Nawaz, 2017a, 2017b; 2019). Through this study *inter alia* a number of specimens of hawksbill turtles were also reported to occur in the offshore waters of Pakistan. The present paper provides details of the all authentic records of hawksbill turtles from Pakistan.

MATERIAL AND METHODS

WWF-Pakistan has initiated a crew-based observers programme on board tuna gillnet vessels (Moazzam and Nawaz, 2017a, 2017b). These observers are record the instance of bycatch of megafauna including marine turtles. These observers are also trained to safely release any entangled turtles and other bycatch.

RESULTS

There is only one record of hawksbill turtle from Pakistan which is made by Mertens (1969) who has seen a small hawksbill turtle shell in a shop in Karachi, however, no details of the specimen were provided. In addition, Hussain (2009) gave a photograph of shell of hawksbill turtle but no further details were provided.

Present paper reports nine additional confirmed cases of occurrence of hawksbill turtle from Pakistan. Fig. 1 shows the map of Pakistan from where hawksbill turtles were recorded. The details of all records of occurrence of hawksbill turtle from Pakistan are given in Table-I.

Records of Hawksbill Turtle from Pakistan

Hawksbill turtle enmeshed on 11 March 2013 (Fig.2).

A juvenile hawksbill turtle was found entangled in the tuna gillnet on 11 March 2013 at about 52 km south of Ormara (24°42.914'N; 64°34.217'E). This hawksbill turtle weighed about 4 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of this juvenile turtle was measured to be 25 cm. Dorsal surface of this turtles was encrusted with fouling animals including unidentified bryozoan and gooseneck barnacle (*Lepas anserifera*).

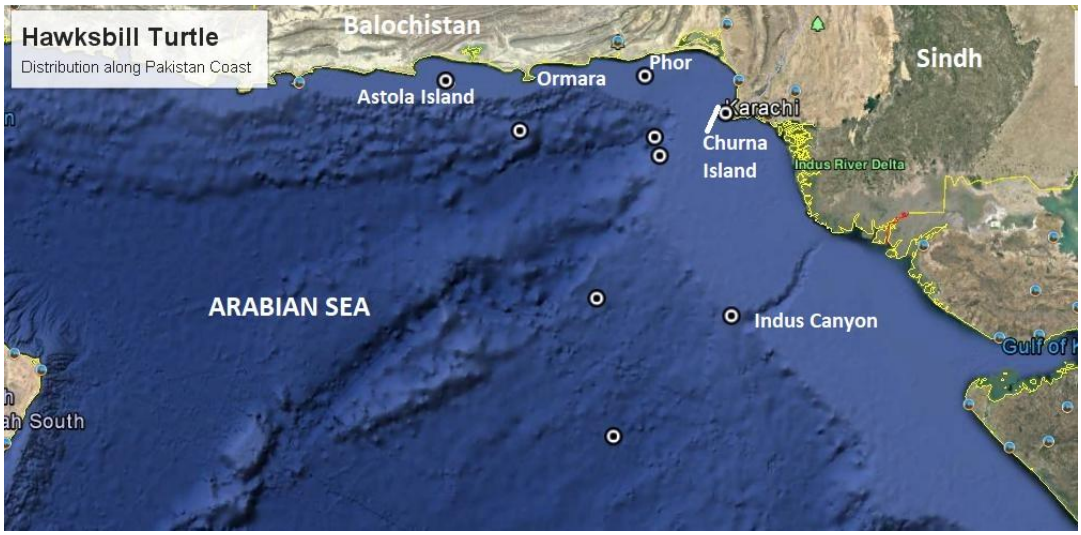

Fig. 1. Map of Pakistan showing the locations from where hawksbill turtles have been recorded.

Hawksbill turtle filmed at Astola Island in 20 August 2013 (Fig.3)

Mazhar (2013) posted a video on YouTube which depicts an adult hawksbill turtle at Astola Island during underwater excursion. The date on the website is 20 August 2013 which may not be correct for this video clip because visibility in the sea is very good whereas in August usually water is too turbid to dive at Astola Island. This is possibly the first live recording of a hawksbill turtle from Pakistan. Because of its large size and shape, it seems to be an adult female. Astola Island is known to be very rich ground of sea turtles especially green turtle (Mertens, 1969). Khan *et al*. (2010) recorded nesting of hawksbill turtles from Astola Island but their observations could not be independently verified.

Hawksbill turtle enmeshed on 21December 2013 (Fig.4).

A hawksbill turtle was found entangled in the tuna gillnet on 21 December 2013 at about 354 km southwest of Karachi (21°59.428'N; 65°30.770'E). This female hawksbill turtle has a length of 64 cm and weigh about 18 kg. The turtle was heaved and placed in the fishing boat for recording observation. It was later on release safely in the sea. Ventral surface of this turtle was encrusted with sessile barnacle (*Chelonibia testudinaria*).

Hawksbill turtle enmeshed on 16 October 2016 (Fig.5).

A hawksbill turtle was found entangled in the tuna gillnet on 16 October 2016 at about 20 km south of Phor (25°13.200'N; 65°48.200'E). This hawksbill turtle was not weighed. The turtle was heaved and placed in the fishing boats and later on safely released. The length of this turtle was measured to be 59 cm. Dorsal surface of this turtles was heavily encrusted with gooseneck barnacle (*Lepas anserifera*).

Table-I. Details of Records of Hawksbill Turtles from Pakistan.

Date	Location	Status	Remarks
1969	Pakistan coast	Shell	A small shell seen in shop in Karachi (Mertens, 1969)
2009	Pakistan Coast	Shell	Photograph of shell but no details provided (Hussain, 2009)
2010	Cape Monz, Mubbarak village	Nest	Khan *et al.* (2010) reported nesting but no details of identification of nest or track provided. Mere speculation.
2013-2015	Offshore waters of Pakistan	9 entanglement in tuna gillnets	Reported by Shahid *et al*. (2015) but based on speculation and possible misidentification.
March 11, 2013	About 52 km south of Ormara (24°42.914'N; 64°34.217'E).Depth 1372 m	Caught in gillnet and safely released	Reported by Captain Shah Zamin (Observer)
August 20, 2013 (Doubtful date)	Astola Island	Underwater photography	Mazhar (2013) provided a clip showing a free swimming hawksbill turtle among coral and rocky structures at Astola Island.
December 21, 2013	About 354 km southwest of Karachi (21°59.428'N; 65°30.770'E). Depth 2691 m.	Caught in gillnet and safely released	Reported by Captain Shah Zamin (Observer)
October 16, 2016	About 20 km south of Phor (25°13.200'N; 65°48.200'E). Depth 68 m	Caught in gillnet and safely released	Reported by Captain Badshah Nawab (Observer)
October 21, 2016	About 93 km southwest of Karachi (24°30.010'N; 65°57.050'E). Depth 389 m.	Caught in gillnet and safely released	Reported by Captain Hussain Ahmad (Observer)
November 11, 2016	About 112 km southwest of Karachi (24°40.040'N; 65°54.070'E). Depth 761 m.	Caught in gillnet, dead, disposed off	Reported by Captain Late Noorul Wahid (Observer)
January 12, 2017	Churna Island	Underwater photographs, dead. Entangled in ghost net	Scuba Adventure-Pakistan (2017)
November 18, 2017	About 207 km south of Karachi at Indus Canyon (23°04.108'N; 66°39.110'E). Depth 529 m.	Caught in gillnet and safely released	Reported by Captain Noor Muhammad (Observer)
December 12, 2018	About 245 km southwest of Karachi (23°13.200'N; 65°20.500'E). Depth 1652 m	Caught in gillnet, has healed scar of shark bite (?) and safely released	Reported by Captain Ghulam Qadir (Observer)

(a) (b)

Fig. 2. Hawksbill turtle caught by Captain Shah Zamin (observer) on 11 March 2013 at about 52 km south of Ormara. (a) dorsal view (b) ventral view.

Fig. 3. Hawksbill turtle recorded from Astola Island in 201.3

(a) (b)

Fig.4. Hawksbill turtle caught by Captain Shah Zamin on 21 December 2013 at about 354 km southwest of Karachi. (a) dorso-frontal view, (b) ventral view.

Fig. 5. Hawksbill turtle caught by Captain Badshah Nawab (observer) on 16 October 2016 at about 20 km south of Phor (dorsal view).

Fig. 6. Hawksbill turtle being released by Captain Hussain Ahmad (observer) at about 93 km southwest of Karachi on 21 October 2016 (dorsal view)

Hawksbill turtle enmeshed on 21 October 2016 (Fig.6).

A hawksbill turtle was found entangled in the tuna gillnet on 21 October, 2016 at about 93 km southwest of Karachi (24°30.010'N; 65°57.050'E). This hawksbill turtle weighed about 15 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of this female turtle was measured to be 55 cm.

Hawksbill turtle enmeshed on 11 November 2016 (Fig.7-8).

A hawksbill turtle was found entangled in the tuna gillnet on 11 November 2016 at about 112 km southwest of Karachi (24°40.040'N; 65°54.070'E). This hawksbill turtle was not weighed. The turtle was already dead when heaved possibly because of prolonged submergence. It was later on thrown back in the sea. The length of this turtle was not measured but adjudged to be about 48 cm.

Fig. 7. Hawksbill turtle placed on gunwale of the boat before dumping in the sea. It was caught by Captain Noorul Wahid (late) on 11 November 2016 at about 112 km southwest of Karachi (lateral view).

Fig. 8. Hawksbill turtle placed in the fishing boat before dumping in the sea. It was caught by Captain Noorul Wahid (late) at about 112 km southwest of Karachi (dorsal view).

Hawksbill turtle filmed at Churna Island on 12 January 2017 (Fig.9)

Scuba Adventure- Pakistan which is a diving group in Pakistan reported a dead hawksbill turtle on January 2017 (Scuba Adventure-Pakistan, 2017). This turtle got killed due to entanglement in a ghost net. This turtle was

encrusted with sessile barnacle (*Chelonibia testudinaria*) on both ventral and dorsal size of the carapace. The size of the specimen could not be determined but it is an adult female which died due to entanglement in the derelict fishing gear.

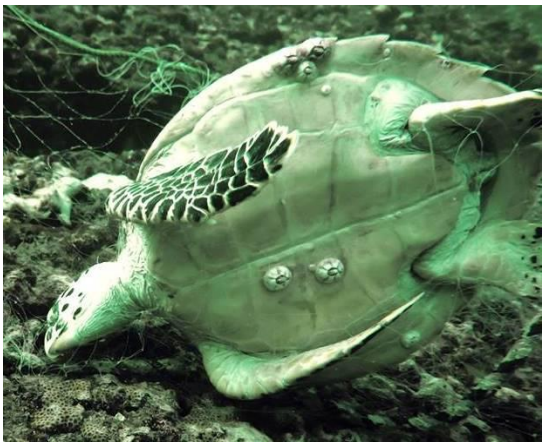

Fig.9. Hawksbill turtle found dead at Churna Island in 12 January 2017 reported by Scuba Adventures-Pakistan (https://www.facebook.com/scubapakistan/photos/ a.1089524274506424/1089525931172925/?type=3&theater)

Fig. 10. Hawksbill turtle caught by Captain Noor Muhammad on 18 November 2017 at about 207 km south of Karachi at Indus Canyon (fronto-dorsal view).

Hawksbill turtle enmeshed on 18 November 2018 (Fig.10).

A hawksbill turtle was found entangled in the tuna gillnet on 18 November 2017 at about 207 km south of Karachi at Indus Canyon (23°04.108'N; 66°39.110'E). This hawksbill turtle has a length of 41 cm and weigh about 12 kg. The turtle was heaved and placed in the fishing boat for recording observation. It was later on release safely in the sea. Dorsal surface of this turtle was encrusted with gooseneck barnacle (*Lepas anserifera*), bryozoans and amphipod (*Podocerus* sp.).

Fig. 11. Hawksbill turtle caught by Captain Ghulam Qadir on 29 December 2018 at about 245 km southwest of Karachi (dorsal view).

Hawksbill turtle enmeshed on 29 December 2018 (Fig.11).

A hawksbill turtle was found entangled in the tuna gillnet on 29 December at about 245 km southwest of Karachi (23°13.200'N; 65°20.500'E).This juvenile hawksbill turtle has a length of 32 cm and weigh about 5 kg. The turtle has damaged carapace possibly bitten by a shark but the wound was healed. The turtle was heaved and placed in the fishing boat for recording observation. It was later on release safely in the sea.

DISCUSSION

Although the hawksbill turtle has a circumglobal distribution throughout tropical and subtropical waters of the Atlantic, Indian, and Pacific Oceans but it is critically endangered species according to IUCN Red List (Mortimer and Donnelly, 2008). This is possibly the rarest of all sea turtles in Pakistan (Moazzam and Nawaz, 2017a, 2017b, 2019).

Hawksbill turtle was observed to be widely distributed along Sindh and Balochistan coast and no specific area of concentration was observed (Fig. 1). This species seems to be found mainly during post southwest monsoon months (between October and March) with exception of one dubious record of August, 2013 from Astola Island made by Mazhar (2013). Clear visibility in the water recorded by Mazhar (2013) indicates that it was recorded in post southwest monsoon. During August the turbidity in the around Astola Island is extremely making it unsuitable for snorkeling of diving.

Shahid *et al.* (2016) while assessing the bycatch of tuna gillnet vessels in Pakistan reported that during January 2013 and June 2015 a total of 526 sea turtles were caught by four tuna gillnet vessels with a CPUE value of 8.44 turtles caught per sq km of net and total of 9 hawksbill turtles(1.5%, capture rate 0.25 per km of net) were caught. If this is taken as correct, then the population of hawksbill turtle would be thousands because there are more than 700 tuna gillnet vessels operate in Pakistan. This report, therefore, seems to be erroneous and possibly based on misidentification of this species. Present authors have analyzed the original data used by Shahid *et al.* (2016) and only 2 specimens of hawksbill were found in the bycatch during this period which are reported in this paper too.

Hawksbill turtles have a 3 month nesting season from April to June, in the Persian Gulf (Chatting *et al*., 2018), Gulf of Oman (Ross, 1981), Bushehr, Hormozgan and Sistan and Baluchistan of Iranian Coast (Khademi, 2014), however, no confirmed nesting is reported from Pakistan coast

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