INT. J. BIOL. BIOTECH., 16 (2): 495-504, 2019.

DISTRIBUTION AND ABUNDANCE OF LOGGERHEAD TURTLES (*CARETTA CARETTA* L.) FROM PAKISTAN

Muhammad Moazzam* and Rab Nawaz

WWF-Pakistan, 46-K, Block 6, PECHS, Karachi 75400, Pakistan
**Corresponding author:* mmoazzamkhan@gmail.com

ABSTRACT

Loggerhead turtle (*Caretta caretta* Linnaeus, 1785) was previously reported from Pakistan on one occasion which was based on a specimen caught incidentally in gillnet at Gwadar., No authentic nesting of loggerhead turtles is known from Pakistan Present paper reports confirmed occurrence of 11 specimens of loggerhead turtles that were entangled in fishing gears. All specimens entangled in gillnets were safely released. The records of loggerhead turtles from Pakistan coast indicated that this species is widely distributed but are of rare occurrence in Pakistan. No marked seasonality of occurrence was noticed except that more entanglements were made during winter months.

Keywords: Loggerhead turtles, *Caretta caretta*, Pakistan, entanglement, safe release, gillnets.

INTRODUCTION

Caretta caretta (Linnaeus, 1758) commonly known as loggerhead turtle, is previously reported from Daran beach, 11km SE of Jiwani. Pakistan by Salam (2010). Both an adult and hatchlings as well as about 60 nests were recorded for the first time from the area. However, according to Khan (2010) these were green turtle nests and as of today no confirm nesting of loggerhead turtles is known from Pakistan. Khan (2010) also reported the occurrence of washed up carcasses of this species at West Bay, Gwadar in February, 2010 and provided a photograph of a carcass. This carcass surely is of an Olive Ridely turtle (*Lepidochelys olivacea*) rather than a loggerhead turtle, as reported. It is added that the specimen reported from Jiwani by Salam (2010) was actually caught at Gwadar as reported by Khan (2010). Prior to these records Baldwin *et al*. (2003) have reported flipper tag recovery from loggerhead turtle from Pakistan. Rees *et al*. (2010) have reported migration of two female loggerhead turtles into Pakistani water which were satellite tagged in Masirah Island, Oman.

Minton (1966) although has not examined any specimens of loggerhead turtle, however, according to him this species undoubtedly occurs in Pakistan. Ghalib and Zaidi (1976) have included loggerhead turtle in the list of marine turtles of Karachi, Pakistan but that nesting does not occur. Similarly, Khan (2003), Khan and Mirza (1976) and Khan and Tasnim (1990) have included loggerhead turtle in the list of marine turtles of Pakistan but no details of their occurrence is provided. Khan *et al.* (2010) studied nesting of marine turtles along the coast of Pakistan but they did not find any nests of loggerhead turtles.

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

MATERIALS AND METHODS

WWF-Pakistan has initiated a crew-based observers programme on board tuna gillnet vessels (Moazzam and Nawaz, 2017a, 2017b). These observers record the instance of bycatch of megafauna including marine turtles. They are also trained to safely release any entangled turtles and other bycatch. This is the main source of data on loggerhead turtles which is presented in this paper.

RESULTS

There is only one authentic record of loggerhead turtle from Pakistan so far which was made by Salam (2010) and Khan (2010), however, prior to records Baldwin *et al*. (2003) have reported flipper tag recovery from loggerhead turtle from Pakistan. In addition, Rees et *al*. (2010) have reported migration of two female loggerhead turtles into Pakistani water which were satellite tagged in May 2006 in Masirah Island, Oman. The present paper reports eleven additional confirmed cases of occurrence of loggerhead turtle from Pakistan. Fig. 1 shows the map of

Pakistan from where loggerhead turtles were recorded. The details of all sightings of loggerhead turtles from Pakistan are given in Table I.

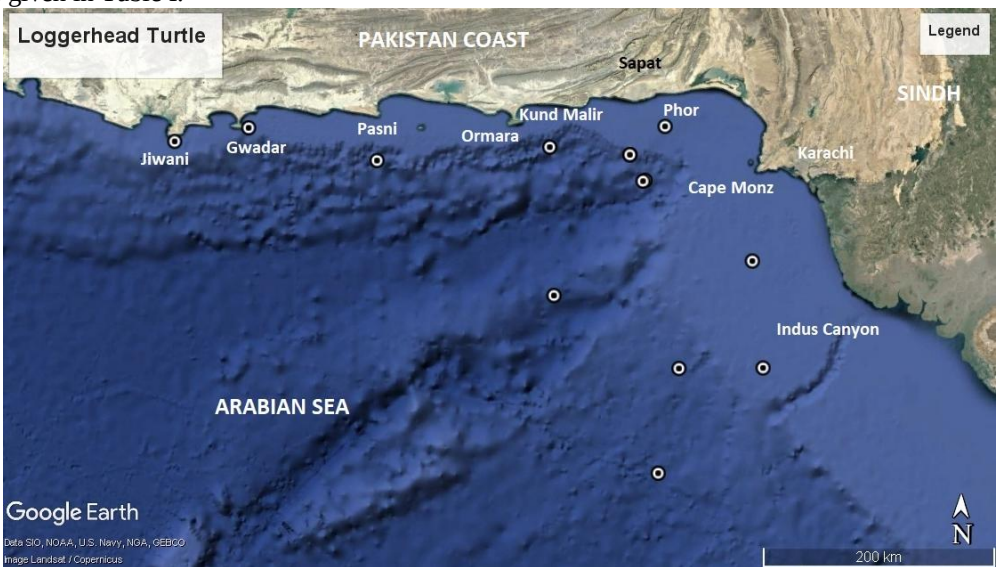

Fig. 1. Map of Pakistan showing the locations from where loggerhead turtles have been recorded.

Records of Loggerhead Turtle from Pakistan

Loggerhead turtle enmeshed on 15 December, 2015 (Fig.2).

A loggerhead turtle was caught by tuna gillnet vessel on 15 December, 2015 about 270 km southwest of Karachi (22°33.200'N; 65°51.500'E). This turtle was weighed to be about 60 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of the turtle was not measured but it is estimated that it has a curved carapace length of 70 cm.

Loggerhead turtle enmeshed on 4 March 2016 (Fig.3).

Another loggerhead turtle was found entangled in the tuna gillnet on 4 March 2016 about 192 km southwest of Karachi (23°20.700'N; 66°01.200'E). This loggerhead turtle weighed about 100 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of the turtle was measured to be 90 cm. The turtle was encrusted with gooseneck barnacle (*Lepas anserifera*). There was a white remora (*Remora albescens*) attached on the ventral side of this turtle.

Loggerhead turtle enmeshed on 12 May 2016 (Fig.4).

A loggerhead turtle got entangled in tuna gillnet on 12 April 2016 about 160 km south of Malan (23°53.100'N; 64°59.070'E). This loggerhead turtle weighed about 70 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of the turtle was not measured but it is estimated that it has a carapace length of 80 cm.

Loggerhead turtle enmeshed on 3 May 2016 (Fig.5).

A fisherman caught a loggerhead turtle in tuna gillnet on 3 May 2016 about 42 km south of Pasni (24°52.500'N; 63°30.100'E). This female loggerhead turtle weighed about 80 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of the turtle was not measured but it is adjudged that it has a carapace length of 92 cm. The turtle was encrusted with gooseneck barnacle (*Lepas anserifera*) and sessile barnacle (*Chelonibia testudinaria*)

Loggerhead turtle enmeshed on 10 September 2016 (Fig.6).

Another loggerhead turtle was found to be enmeshed in tuna gillnet on 10 September 2016 about 31 km southeast of Ormara (25°000.010'N; 64°56.030'E). This loggerhead turtle weighed about 50 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of the turtle was not measured but it is adjudged that it has a carapace length of 60 cm.

Table I. Details of Records of Loggerhead turtles from Pakistan.

Date	Location	Status	Remarks
2003	Pakistan coast (no specific location)	Flipper tagged	Tag recovered from Pakistan coast (Baldwin *et al*., 2003; Rees *et al*., 2010).
2006	Pakistan Coast (no specific location)	Satellite tagged turtle	Female (97 cm) tracked for 3 days in Pakistani waters (Rees *et al*., 2010).
2006	Pakistan Coast (no specific location)	Satellite tagged turtle	Female (108 cm) tracked for 5 days in Pakistani waters (Rees *et al*., 2010)
2010	Gwadar	Caught in gillnet	Salam (2010) indicated its collection from Jiwani, However, Khan (2010) confirmed that it was caught at Gwadar
2010	Gwadar	Hatchling	Salam (2010) provided a photograph of a hatchling which is possibly from Daran, Jiwani but it seems to be a hatchling of green turtle?
December 15, 2015	Southwest of Karachi (22°33.200'N; 65°51.500'E	Caught in gillnet and safely released	Reported by Captain Hasnat Khan (Observer)
March 4, 2016	Southwest of Karachi (23°20.700'N; 66°01.200'E)	Caught in gillnet and safely released	Recorded by Captain Khaista Rehman (Observer)
April 12, 2016	South of Malan (23°53.100'N; 64°59.070'E)	Caught in gillnet and safely released	Recorded by Captain Khaista Rehman (Observer)
May 3, 2016	24°52.500'N; 63°30.100'E	Caught in gillnet and safely released	Recorded by Captain Ikramuddin (Observer)
September 10, 2016	Southeast of Ormara (25°000.010'N; 64°56.030'E)	Caught in gillnet and safely released	Recorded by Captain Hasnat Khan (Observer)
October 26, 2016	South of Sapat (24°57.050'N; 65°36.040'E)	Caught in gillnet and safely released	Recorded by Captain Mehar Gul (Observer)
January 22, 2017	South of Cape Monz (24°09.400'N; 66°37.500'E)	Caught in gillnet and safely released	Recorded by Captain Shah Zamin (Observer)
March 21, 2017	South of Sapat (24°57.050'N; 65°36.040'E)	Caught in gillnet and safely released	Recorded by Captain Umer Zamin (Observer)
April 21, 2017	South of Phor (25°10.100'N; 65°53.600'E)	Caught in gillnet and safely released	Recorded by Captain Nisar Muhammad (Observer)
February 28,2018	South of Karachi (23°21.045'N; 66°43.070'E)	Free swimming	Recorded by Captain Saeed Zaman (Observer)
April 20, 2018	South of Phor (24°45.600'N; 65°43.700'E)	Caught in gillnet and safely released	Recorded by Captain Amir Rahim (Observer)

Fig. 2. Loggerhead caught by Captain Hasnat Khan (observer) 278 km southwest of Karachi on 15 December 2015 (dorso-lateral)

Fig.3. Loggerhead caught by Captain Khaista Reman (Observer) 192 km southwest of Karachi on 4 March 2016 (ventral view)

Loggerhead turtle enmeshed in October 2016 (Fig.7).

Another fisherman caught a loggerhead turtle in tuna gillnet on 26 October 2016 about 53 km south of Sapat (24°57.050'N; 65°36.040'E). This loggerhead turtle weighed about 90 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of the turtle was not measured but it is adjudged that it has a carapace length of 80 cm.

(a) (b)

Fig. 4. Loggerhead caught by Captain Khaista Rehman (observer) 160 km south of Malan on 12 April 2016 (a) dorso-posterior view (b) turtle being safely released.

(a) (b)

Fig 5. Loggerhead caught by Captain Ikramuddin (observer) 42km south of Pasni on 3 May 2016 (a) ventral view showing epizootic barnacles (b) lateral view showing plates of the face and turtle being safely released.

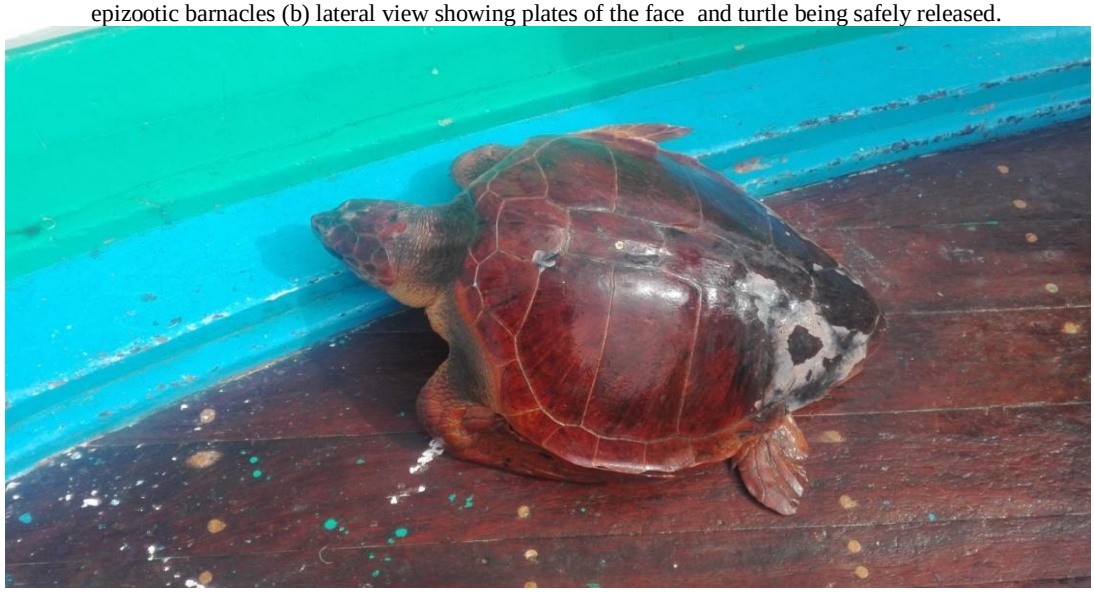

Fig. 6. Loggerhead caught by Captain Hasnat Khan (observer) 31 km southeast of Ormara on 10 September 2016 (dorsal view)

Loggerhead turtle enmeshed on January 2017 (Fig.8-9).

A fisherman caught a loggerhead turtle in tuna gillnet on 22 January 2017 about 50 km south of Cape Monz (24°09.400'N; 66°37.500'E). This turtle weighed about 70 kg and has a curved carapace length of 73 cm. The turtle was heaved and placed in the fishing boats and later on safely released.

Loggerhead turtle enmeshed in March 2017 (Fig.10).

Another fisherman caught a loggerhead turtle in tuna gillnet on 21 March 2017 about 45 km south of Sapat (24°57.050'N; 65°36.040'E). This loggerhead turtle weighed about 90 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of the turtle was not measured but it is adjudged that it has a carapace length of 80 cm.

Fig. 7. Loggerhead caught by Captain Mehar Gul (observer) 53 km south of Sapat on 26 October 2016 (dorso-lateral view)

Fig. 8. Loggerhead caught by Captain Shah Zamin (observer) 74 km south of Cape Monz on 22 January 2017 (dorso-frontal view).

Fig.9. Loggerhead caught by Captain Shah Zamin (observer) 74 km south of Cape Monz on 22 January 2017 (lateral and dorsal view head showing neural plates).

Fig. 10. Loggerhead caught by Captain Umer Zamin (observer) 45 km south of Sapat on21 March 2017 (dorso-posterior view)

Loggerhead turtle enmeshed in April 2017 (Fig.11).

A loggerhead turtle was found to be enmeshed in tuna gillnet on 3 April 2017 about 28 km south of Phor (25°10.100'N; 65°53.600'E). This loggerhead turtle weighed about 85 kg. The turtle was heaved and placed in the fishing boats and later on safely released. The length of the turtle was not measured but it is adjudged that it has a carapace length of 76 cm. Its carapace was observed to be encrusted with some goose neck barnacles (*Lepas anserifera*).

Free swimming loggerhead turtle photographed in February 2018 (Fig.12).

An observer Mr. Saeed Zaman recorded a clip of a free swimming loggerhead turtle about 161 km south of Karachi in the Indus Canyon area on 28 February 2018 (23°21.045'N; 66°43.070'E). Although it was not possible to determine the size and weight of this free swimming turtle but it seems to be a large sized specimen.

Loggerhead turtle enmeshed in April 2018 (Fig.13).

Another fisherman caught a loggerhead turtle in tuna gillnet on 20April 2018 about 71 km south of Phor (24°45.600'N; 65°43.700'E). This loggerhead turtle weighed about 76 kg The turtle was heaved and placed in the

fishing boats and later on safely released. The length of the turtle was not measured but it is adjudged that it has a carapace length of 72 cm.

Fig. 11. Loggerhead caught by Captain Nisar Muhammad (observer) 28 km south of Kund Malir on 21 April 2017 (dorso-posterior view)

Fig. 12. Free swimming loggerhead turtle reported by Captain Saeed Zaman (observer) 161 km south of Karachi on 28 February 2018.

Fig. 13. Loggerhead caught by Captain Amir Rahim (observer) 71 km south of Phor on 20 April 2018 (dorso-frontal view)

DISCUSSIONS

Loggerhead turtle (*Caretta caretta*) is among the rarest of marine turtle found along the cost of Pakistan. Baldwin *et al*. (2003) reported flipper tag recovery from loggerhead turtle from Pakistan. In addition, Rees *et al*. (2010) have reported migration of two female loggerhead turtles into Pakistani water which were satellite tagged in Masirah Island, Oman in 2006.

A specimen collected from Gwadar was reported by Salam (2010) and Khan (2010) whereas present paper reports 11 additional specimens which were recorded during December 2015 and April 2018. This study indicates that there is no marked seasonality of occurrence of loggerhead turtles in Pakistan (Table 1). These turtles were recorded almost throughout the year, however, there are no records during June to August which is because of close season observed by fishermen engaged in tuna fisheries during this period (Moazzam *et al*., 2016). Table 1 indicates that during March and May more specimens of this species was recorded as compared to other months of the years. Further studies will be required to ascertaining seasonality of occurrence of loggerhead turtles in Pakistan.

Loggerhead turtle was observed to be widely distributed along Sindh and Balochistan coast and no specific area of concentration was observed (Fig. 1). The distribution of the loggerhead turtle is of great importance because the Sultanate of Oman is known to host the largest loggerhead turtle rookery in the Indian Ocean and was historically estimated as a third of the global stocks of the species (Tucker *et al*., 2018). The major loggerhead rookery is located

on Masirah Island. The historical track-count surveys conducted in 1977–1979 and 1991 indicated that about 20,000 to 40,000 female annually nest on this island (Baldwin *et al*., 2003; Wallace *et al.*, 2010). Rare occurrence of loggerhead is of great interest because Masirah Island, Oman is not far away from Pakistan coast. The species is of rare occurrence and not nesting along Pakistan coast.

REFERENCES

Baldwin R., G.R. Hughes, and R. I. T. Prince (2003). Loggerhead turtles in the Indian Ocean. Pp. 218– 234 In: *Loggerhead Sea Turtles*. Bolten, A.B., and B.E. Witherington (Eds.). Smithsonian Institution Press, Washington, D.C., USA.

Ghalib, S. A., and S. S. H. Zaidi (1976). Observations on the survey and breeding of marine turtles of Karachi coast. *Agriculture Pakistan* 27: 87-96.

Khan, A. (2010). Records of loggerhead turtles on the Makran Coast, Pakistan. *Indian Ocean Turtle Newsletter* No. 12: 13.

Khan, M. S., (2003). Checkliste und Bestimmungsschlüsselder Schildkröten und Krokodile Pakistans. *Testudo (Sigs)*. 12: 9-22.

Khan, M. S. and M. R. Mirza (1976). An annotated checklist and key to the reptiles of Pakistan. Part I: Chelonia and Crocodilia. *Biologia* 22: 211-219.

Khan, M. S., and R. Tasnim (1990). A field guide to the identification of herps of Pakistan. Part: II Chelonia. – *Biological Society of Pakistan* Monograph No.15: 1-15.

Khan, M. Z., S. A., Ghalib and B. Husain (2010). Status and new nesting sites of sea turtles in Pakistan. *Chelonian Conservation and Biology*, 9: 119–123.

Minton, S.A. (1966). A contribution to the herpetology of West Pakistan. *Bulletin of American Museum of Natural History* 134: 27-184.

Moazzam, M., and R. Nawaz (2017a). *Arabian Humpback and Baleen Whale sightings along the Pakistan Coast: Information Generated through WWF Pakistan's Fishing Crew Observer Programme.* International Whaling Commission. SC/67A/CMP/05: 1-14.

Moazzam, M., and R. Nawaz (2017b) (Issued in January 2019). Occurrence and distribution of leatherback turtle (*Dermochelys coriacea*) in the coastal and offshore waters of Pakistan. *Records Zoological Survey of Pakistan* 23:4-8.

Moazzam, M., R. Nawaz. And S. Ayub (2016). Update on the neritic tuna fisheries of Pakistan. *IOTC–2016–WPNT06*–24. 1-6.

Rees, A. F., S. A. Saady, A. C. Broderick, M. S. Coyne, N. Papathanasopoulou and B. J. Godley (2010). Behavioural polymorphism in one of the world's largest populations of loggerhead sea turtles *Caretta caretta*. *Marine Ecology Progressive Series* 418: 201-212.

Salam, A. (2010). *Nesting of Loggerhead Turtles in Pakistan confirmed by renowned expert Nicolas Pilcher*. (https://www.iucn.org/content/nesting-loggerhead-turtles-pakistan-confirmed-renowned-expert-nicolas-pilcher)/

Tucker, A. D., R. Baldwin, A. Willson, A. Al Kiyumi, S. A. Harthi, B. Schroeder, E. Possardt and B. Witherington (2018) Revised clutch frequency estimates for Masirah Island loggerhead turtles (*Caretta caretta*). Herpetological Conservation and Biology 13:158–166.

Wallace, B.P., A.D. DiMatteo, B.J. Hurley, E.M. Finkbeiner, A.B. Bolten, M.Y. Chaloupka, B.J. Hutchinson, F.A. Abreu-Grobois, D. Amorocho, K.A. Bjorndal, J. Bourjea B. W. Bowen, R. B. Duenas, P. Casale, B. C. Choudhury, A. Costa, P. H. Dutton, A. Fallabrino, A. Girard, M. Girondot, M. H. Godfrey, M. Hamann, M. L. Mendilaharsu, M. A. Marcovaldi, J. A. Mortimer, J. A. Musick, R. Nel, N. J. Pilcher, J. A. Seminoff, S. Troeng, B. Witherington and R. B. Mast (2010). Regional management units for marine turtles: a novel framework for prioritizing conservation and research across multiple scales. *Plos One*, 5: e15465.

(*Accepted for publication February 2019*)