SC/67A/CMP/05 Rev1

Arabian Humpback and Baleen Whale sightings along the Pakistan Coast: Information Generated Through WWF Pakistans Fishing Crew Observer Programme

Muhammad Moazzam and Rab Nawaz

INTERNATIONAL
WHALING COMMISSION

Arabian Humpback and Baleen Whale sightings along the Pakistan Coast: Information Generated Through WWF Pakistan's Fishing Crew Observer Programme

Muhammad Moazzam and Rab Nawaz

WWF-Pakistan, 46-K, PECHS, Block 6, Karachi 75400, Pakistan (mmoazzamkhan@gmail.com)

ABSTRACT

Historical records and Soviet whaling data indicate the presence of baleen whales off the coast of Pakistan up to 1965, but since then only a handful of strandings and opportunistic sightings confirm their ongoing presence in the region. Between 2012 and 2016, observations of free-swimming and entangled whales were recorded by fishing vessel crew members trained under a bycatch observer scheme coordinated by WWF Pakistan. The scheme, which started with two observers in 2012, now involves 75 participating vessels. Reported baleen whale observations increased from none in 2012, to 16 in 2015. In 2016, 47 sightings of baleen whales were recorded, including 12 confirmed sightings of Arabian Sea humpback whales, three sightings of Bryde's and 32 sightings of baleen whales that could not be identified to species level due to lack of adequate photographic or video evidence. Sightings reported from 2012 through 2016 are summarized and plotted, providing insight into the current distribution of Arabian Sea humpback whales and other baleen whale species in the region. The authors recommend the continuation of the programme, and suggest that it could serve as a useful model for crew-based reporting schemes in a region where dedicated cetacean surveys are difficult to conduct, but fisheries are widespread and active.

INTRODUCTION

Both baleen and toothed whales have been frequently reported from Pakistani waters. Reports of live sightings of baleen whales along the Pakistan coast were made by Qureshi (1958 - Personal communication), Pilleri and Gihr (1976), Roberts (1997a, 1977b), de Silva (1983), Moazzam (1977-1985 unpublished information) and Leatherwood (1986). In addition, a number of studies have been made on the stranding of baleen whales along Pakistan coast. These include Mathew (1875), Moses (1947), Siddiqui (1968), de Silva (1983), James (1983), Rizvi (1983), Ahmed (1985), and Niazi (personal communication to MM, 1985), Gore *et al.* (2012), Kiani and Siddiqui (2009), Kiani (2015a, 2015b), Mikhalev (1997; 2000), Minton *et al.* (2015) and Kiani (2015a; 2015b).

Confirmed species of baleen whale occurring in Pakistan include blue whales (*Balenoptera musculus*), Bryde's whales (*B. edeni/brydei*) and the Endangered Arabian Sea humpback whale (*Megaptera noveangliae*) (Minton et al., 2008). Reports of other baleen whales are most likely misidentifications although recent work suggests Omura's whales (*Balaenoptera omurai*) may occur in the Arabian Sea (Ranjbar *et al.*, 2016). Prior to this study, knowledge of Arabian Sea humpback whales in Pakistan was limited and based mainly on whaling data and strandings. Confirmed records (summarized in Kiani, 2015(a)) are detailed in Table 1.

With the exception of Gore *et al.* (2012), all previously published studies focus either on strandings or stranded specimens. Mikhalev (1997; 2000) reports on 242 Arabian Sea humpback whales taken by a Soviet whaling fleet in the 1960's, of which 164 were taken off the coast of Pakistan. No dedicated whale surveys have taken place off the coast of Pakistan since that time. Considering the Endangered status of Arabian Sea humpback whales, and the paucity of information on their current distribution and abundance, WWF-Pakistan implemented a programme to train the captains and crews of tuna gillnet vessels act as observers to accurately report both entanglements and live sightings of whales alongside other types of bycatch. Here we report on the baleen whale sightings that have resulted from this programme between 2012 and 2016.

TABLE 1: Records of Arabian Sea humpback whales from the Pakistan coast available prior to the WWF Observer programme (summarized in Kiani 2015a).

Time of observation(s)	Region of Pakistan	Nature of observation	Source of record(s)
1873	Balochistan coast	Stranding	Mathew (1873)
November 1965 and 1966	Sindh Coast near mouth of the River Indus	Hunted by the Soviet Whaling Fleet (242 killed in the Arabian Sea (Oman, India and Pakistan) of which 164 were from the Pakistan coast, mostly off Karachi and the Rann of Kutch)	Mikhalev (1997, 2000)
May, 24, 1984	Off shore waters of Karachi	Entangled in gillnet (9.50 m long carcass)	Ahmed (1985)
July 1973	Off Balochistan (Makran coast)	Entangled in telegraph cable	de Silva (1983)
2004	Do-Darya, Karachi	Stranding (15.5 m.)	Moazzam and Kiani (unpublished information)
2008 (?)	Off Karachi	Fishermen recorded one whale swimming under and around fishing boats	https://www.youtube.com/watch?v=G7JEHbrrTDY
2009	Pasni (Balochistan)	WWF-Pakistan Boat Survey	Moazzam and Kiani (unpublished information)
2012	Ganz (Balochistan)	Entanglement in bottom-set gillnet (released)	(unpublished information)
2009	Ormara (Balochistan)	Humpback calf beached near the naval base which was returned to the sea	Rahim (personal observation), Kiani (2015b)
2005-2009	Balochistan coast	Two sightings	Gore *et al.* (2012)

METHODS: WWF-PAKISTAN'S OBSERVER PROGRAMME

Pakistan has a large tuna gillnet fleet consisting of more than 500 wooden vessels which operate in coastal (territorial waters) and offshore waters (Exclusive Economic Zone) as well as some venturing in the Area Beyond National Jurisdiction (ABNJ). In October 2012, WWF-Pakistan started an observer programme on these vessels in orderto collect information about cetacean mortality in the tuna gillnet fisheries of Pakistan.

Initally, efforts were made to train and place 'external' observers with bachelor degrees in science. However, due to the length of fishing trips (about 35 days on average) and inadequate facilities on board, this approach was abandoned. Instead, one of the crew members (usually the skipper) would be trained and given a monetary incentive to collect data on tuna catches, as well as entanglement of cetaceans and other megafauna (turtles, sunfish, mobulids etc.). Within a short time, these crew-based observers were generating an unexpected volume of useful data about various aspects of tuna gillnet operation and catches of target and non-target species. Following the initial success of the first two crew-based observers in 2012, the number of observers was increased to four. Funds for the first two observers were provided by the Indo-Pacific Cetacean Research and Conservation Foundation (IPCRCF) from the Australian Marine Mammal Centre (AMMC). Additional observers were funded by WWF-Pakistan.

Fig. 1- Pakistan's coast showing some of the areas where WWF crew-based observers are working on fishing vessels and where baleen whales are sighted

In 2015, a FAO/GEF/Common Ocean Project regarding Area Beyond National Jurisdiction was initiated through which the number of observers was gradually increased from 4 to 75 in 2017, increasing the coverage of the monitoring of the tuna fishing fleet (Fig 1), and providing more platforms of opportunity for cetacean observations.

METHODS: Data collection

Fishing operations take place throughout the year except during June and July which is a closed season. In some years fishermen stop their operation in May and restart in August extending the close season for three or three and half months, coinciding with southwest monsoon. During typical operations, a 6 to 8 km long gillnet is set before sunset in the evening and is retrieved the next morning.

Crew-based observers use standardized data sheets to record the quantity and species of fish that are caught. They also record information about bycatch and non-target megafauna. The observers are additionally asked to note the presence of cetaceans and are provided with digital cameras to take photographs and/or movie clips of cetaceans, especially Arabian Sea humpback whales. Observers are also trained to identify other baleen whale species using photographs, posters and illustrations. However final species identification is always confirmed by the authors through the examination of photographic or video evidence. On the completion of each fishing trip, the observers are interviewed and during this debriefing, detailed information about whale sightings are recorded. Fishermen are also asked about their perception of whales.

Finally, these fishermen are trained to safely release all living megafauna (turtles, whale sharks, sunfish, mobulids, pelagic rays, birds, snakes and cetaceans).

RESULTS

Since the start of the crew-based observer programme five years ago, hundreds of turtles, 35 whale sharks, 29 mobulid rays, 14 sunfishes, four birds (brown boobies), 16 sea snakes and three pelagic rays have been safely released. In addition, four dolphins, one Arabian Sea humpback whale and one Longman's beaked whale were also safely released.

At the start of the programme there were very few whale sightings reported, with none in 2012 and only a handful in 2013 and 2014. With the recent increase in observer coverage, training and experience, reports have increased significantly. Table 2 details all of the baleen whale sightings recorded through this programme from 2015 onward.

There were only two confirmed and three unconfirmed records of Arabian Sea humpback whales in 2013, and one confirmed record of Bryde's whale was made from off Karachi waters. In 2014, records included three confirmed observations of Arabian Sea humpback and four records of baleen whales not identified to species level. One of the fishermen was able to take two photographs of a humpback whale about 67 km East of Karachi on 25 October 2014. All other records of baleen whales were made from the Sapat-Malan area along the Balochistan coast during April 2014.

2015 saw a significant increase in the number of records of whales, when the total number of observers was increased to 23, mostly recruited after September 2015. One observation included an Arabian Sea humpback whale 'feeding frenzy' involving a school of *Sardinella longiceps* about 17 km south of Ormara on 22 April 2015. In addition, two Arabian Sea humpback whales were recorded from 47 km south of Ormara on 26 April, 2015.In November and December 2015,

the number of records of baleen whales increased to 14 but most could not be identified to species level, excepting one Bryde's whale recorded off Malan in November, 2015 (Table 2; Fig. 2 and 3).

In 2016, the number of observers increased to 64 and a total of 47 sightings of baleen whales were recorded: including confirmed sightings of 12 Arabian Sea humpback whales and three sightings of Bryde's whales. The remaining 32 sightings of baleen whales could not be identified to species level due to their distance from the boat and/or lack of photographic/video evidence (Table 2, Fig. 2 and 3). It is evident from the data that most of the baleen whales including Arabian Sea humpback whales concentrate in the areas that have dense schools of pelagic shrimps (Fig. 4). During spring (April and May) fishermen reports large school of pelagic shrimps as well as Indian oil sardine (*Sardinella longiceps*) schools in the Malan-Ormara Area. On a number of occasion fishermen also reported baleen whale feeding frenzies in the area.

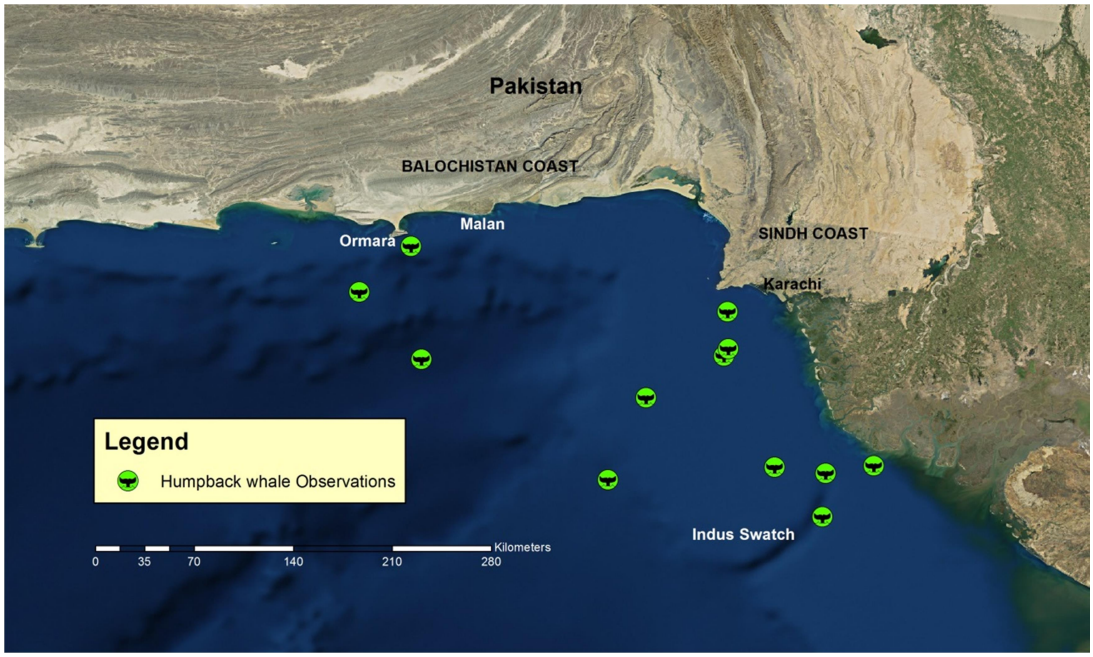

Fig. 2. Distribution of humpback whales observed along the Pakistan coast in 2015 and 2016.

Table 2. Details of Whales Reported from Pakistan Coast during 2015 and 2016.

Date	Whale Species	Latitude	Longitude	Depth (m)	Remarks
22-04-2015	AHBW	25°6.000'N	64°43.000'E	160	Feeding on sardinellas
26-04-2015	AHBW	24°48.600'N	64°23.200'E	1068	
09-11-2015	BW	24°34.066'N	67°17.121'E	71	
09-11-2015	BW	24°47.101'N	66°30.980'E	33	
11-11-2015	BW	24°17.675'N	66°51.580'E	65	
13-11-2015	BW	24°9.606'N	67°06.801'E	64	
17-11-2015	BW	23°39.265'N	67°30.071'E	35	
17-11-2015	BW	23°32.549'N	67°12.601'E	75	
17-11-2015	BW	24°3.270'N	67°14.699'E	57	
19-11-2015	BW	24°9.606'N	67°6.801'E	23	
21-11-2015	BRW	25°14.436'N	65°8.639'E	22	
21-11-2015	BW	24°30.447'N	66°52,021'E	33	
23-11-2015	BW	24°28.186'N	66°51.924'E	38	
29-11-2015	BW	25°17.369'N	65°49.723'E	19	
06-12-2015	BW	24°11.224'N	67°13.791'E	11	
15-12-2015	BW	24°27.364'N	66°55.477'E	35	
13-04-2016	AHBW	23°37.100'N	65°58.100'E	794	
26-04-2016	AHBW	24°23.000'N	64°47.000'E	3029	
12-09-2016	AHBW	24°41.130'N	66°43.747'E	21	6 whales feeding on pelagic shrimp
17-09-2016	BW	23°52.290'N	67°7.918'E	34	
23-09-2016	BW	24°26.782'N	66°53.833'E	54	
23-09-2016	BW	23°31.837'N	66°55,747'E	102	
23-09-2016	BW	24°12.077'N	66°42.997'E	72	
27-09-2016	BW	23°44.981'N	67°31.586'E	12	
01-10-2016	AHBW	23°41.906'N	67°1.724'E	79	
08-10-2016	BRW	24°15.800'N	67°1.000'E	39	
08-10-2016	BW	24°15.872'N	66°49.550'E	37	5 whale feeding on pelagic shrimps.
09-10-2016	BW	23°25.984'N	67°9.960'E	92	
11-10-2016	BW	23°27.245'N	67°30.683'E	45	
18-10-2016	AHBW	23°23.000'N	67°20.000'E	414	
19-10-2016	BW	23°38.727'N	67°32.318'E	16	
24-10-2016	BW	23°36.000'N	67°23.000'E	67	
24-10-2016	BW	23°43.550'N	66°58.790'E	77	
24-10-2016	BW	24°15.869'N	66°29.149'E	68	
24-10-2016	BW	24°34.129'N	65°47.054'E	1159	
26-10-2016	AHBW	23°42.467'N	67°39.544'E	11	
26-10-2016	BW	24°6.019'N	67°7.528'E	26	
27-10-2016	BW	24°7.295'N	67°7.426'E	22	
31-10-2016	BW	23°45.866'N	67°15.130'E	35	

31-10-2016	BW	23°50.588'N	67°18.706'E	19	
01-11-2016	BW	24°34.056'N	66°39.221'E	57	
06-11-2016	AHBW	23°39.522'N	67°21.124'E	74	4 whales feeding on pelagic shrimp
06-11-2016	BW	23°37.660'N	67°13.952'E	64	
06-11-2016	BW	23°28.775'N	67°19.720'E	425	
09-11-2016	BW	23°43.360'N	67°8.079'E	58	
09-11-2016	BW	24°20.381'N	67°10.615'E	12	
09-11-2016	BW	23°53.118'N	66°26.775'E	101	
09-11-2016	AHBW	24°24.235'N	66°42.335'E	73	
11-11-2016	AHBW	24°27.000'N	66°44.000'E	69	
13-11-2016	AHBW	24°8.359'N	66°12.581'E	101	
13-11-2016	BW	23°8.776'N	66°46.453'E	345	
17-11-2016	BW	23°41.437'N	67°28.196'E	60	
17-11-2016	BW	24°44.125'N	65°33.949'E	1335	
17-11-2016	BW	25°8.044'N	65°53.841'E	51	
19-11-2016	BRW	24°39.774'N	66°26.341'E	59	5 whales
19-11-2016	BBW	24°37.765'N	66°50.436'E	29	2 whales
20-11-2016	BW	24°20.223'N	66°54.935'E	65	
20-11-2016	BW	24°0.679'N	66°46.356'E	72	
20-11-2016	BW	24°7.308'N	66°52.421'E	64	
27-11-2016	BW	24°18.232'N	66°11.927'E	82	
30-11-2016	BW	24°54.642'N	66°18.264'E	74	
02-12-2016	BW	24°51.458'N	66°0.758'E	472	
03-12-2016	BW	24°29.979'N	67°0.886'E	35	
03-12-2016	BW	23°57.495'N	66°57.253'E	74	
03-12-2016	BW	24°11.306'N	67°2.204'E	38	
03-12-2016	BW	23°51.075'N	66°49.325'E	83	
13-12-2016	BW	24°4.859'N	66°42.910'E	72	
19-12-2016	BW	24°3.147'N	67°3.080'E	94	

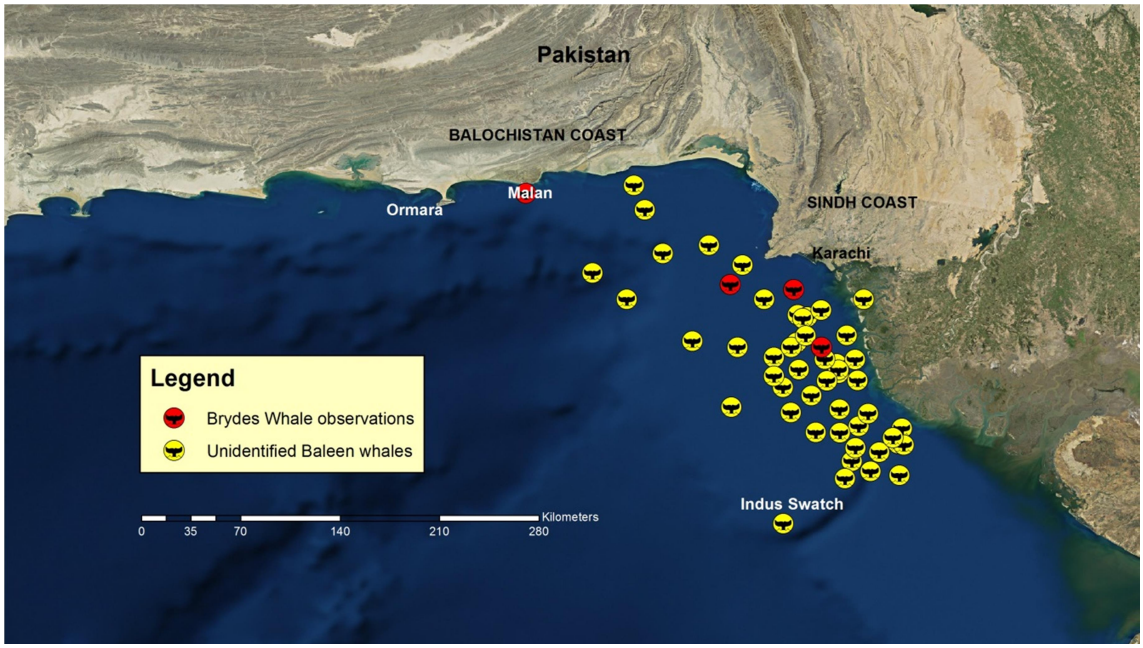

Fig. 3. Distribution of unidentified baleen whales and Bryde's whales observed along the Pakistan coast in 2015 and 2016.

Fig. 4. Dense school of pelagic shrimps that attracts baleen whales-off Khuddi Creek- October, 2016.

FISHERMEN'S PERCEPTION OF WHALES

Almost all fishermen operating in offshore waters are aware of whales and other cetaceans. There is a general consensus among fishermen that baleen whales (locally named *Lear* or *Weaser* for baleen whales) are found in the coastal and offshore waters throughout the year. However, their number increases during October to December with a peak in November, especially along the Sindh coast and in Sonmiani Bay. During this period whales, according to fishermen, feed upon schools of pelagic shrimps. During April and May, whales are found in Malan area between Kund Malir and Ormara. During this period these whales are said to feed on schools of *Sardinellas* and Indian mackerels and also on pelagic shrimp. Fishermen also believe that whales are typically solitary, but at times groups may consist of three to eight individuals.

DISCUSSION

The fishing crew observer programme initiated by WWF-Pakistan has provided an opportunity to record sightings of Arabian humpback whales and other baleen whales from coastal and offshore waters of Pakistan. Figure 4 indicates that (as might be expected) with the increase in the number of observers the frequency of sighting of whales has also increased. The results also indicate that most of the tuna gillnet vessels which are mainly based in the Karachi Fisheries Harbour operate all along the Sindh coast and in the Somniani Bay up to Ormara.

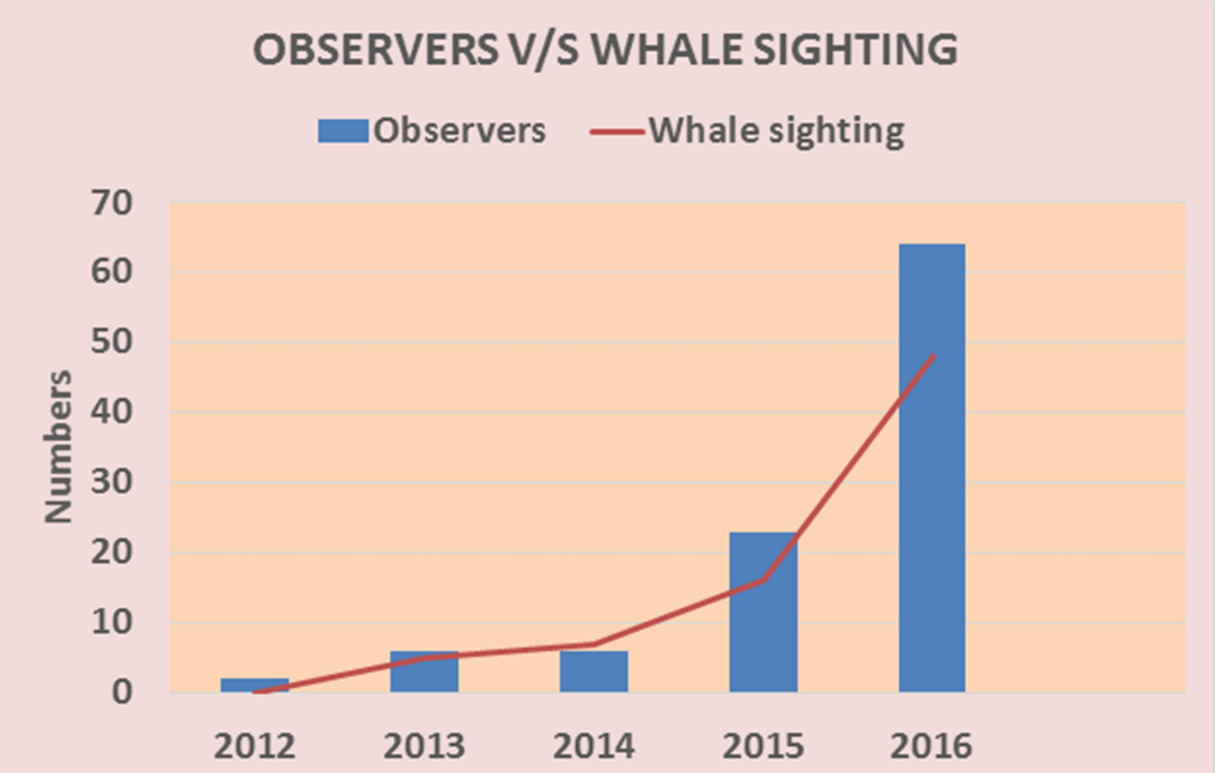

Fig. 5. Relationship between number of observers and baleen whale sightings

The collected data indicates that although baleen whales are found almost throughout the year in Pakistan, their occurrence appears to increase in spring (April and May) along the Balochistan coast (between Kund Malir and Ormara). Fishermen report the presence of large schools of pelagic shrimps in that area. In addition schools of *Sardinellas* are also mainly observed in the Ormara area. Baleen whales, especially Arabian Sea humpback whales, are reported to feed on these schools of pelagic shrimps and *Sardinellas*, which is consistent with the stomach contents reported by Mikhalev (1997, 2000). Pelagic shrimps belonging to *Euphausia*, *Segestes* and *Acetes* are known from the Arabian Sea coast bordering Pakistan. In winter (September to December) a large number of whale sightings are reported from the Sindh coast mainly from the Swatch area (mouth of the Indus River) and in the offshore waters of Karachi. However, very few sightings were recorded from Balochistan coast during summer, mainly due to the seasonal (monsoon) closure of the tuna gillnet fishery.

Fig. 6 Arabian humpback whale sighted near Indus Swatch

Fishermen have reported dense schools of pelagic shrimp in the offshore waters of Karachi and the Indus Swatch (Fig. 6). Interestingly, a pod of 2-7 Arabian Sea humpback whales was observed feeding in the area. More sightings were reported from the creek mouths of the Indus Delta than in offshore Karachi waters. Mikhalev (1997, 2000) reported hunting of Arabian Sea humpback whales from almost the same area extending to the Indian coast (off Gujarat).

Fig. 7 Two Arabian Sea humpback whales sighted near Malan

The sightings data from this project do not clearly indicate any pattern to the depths in which baleen whales are observed, with sighting depths ranging from 10 m to more than 3,000 m. However, in summer whales appear to be concentrated in waters of between 30 to 80 m depth. Whales occurring along the Balochistan coast venture into deeper oceanic waters, which may reflect the narrow continental shelf in this region (Fig. 7). It should be noted that because observers are often engaged in setting or retrieving fishing gear when sightings are made, opportunities for photographic/video confirmation of species and behavior are sometimes missed. The vessels, which are platforms of opportunity, are unable to abandon their fishing operations to follow and/or photograph whales.

Despite this the crew-based observer programme has generated an impressive volume of data on whale occurrence in Pakistan at a relatively low cost. It has increased awareness of whales amongst the participating fishing crews, and has led to the successful release of a number of cetaceans and other megafauna from fishing nets in the region. There is a clear value in continuing this programme, which can serve as a model for similar low-cost opportunistic data collection from fisheries vessels in areas where dedicated whale surveys are not yet possible. It is clearly a useful model for improving the availability of data for the Arabian Sea humpback whale, but also other cetaceans in the region, many of which are subject to bycatch (Anderson, 2014; Moazzam & Nawaz, 2014). WWF Pakistan continues to seek funding to continue and expand this programme.

REFERENCES

Ahmed, M.. Stranding of a Humpback whale (*Megaptera novaengliae* Borowski 1781) on the Sind coast. Records Zool. Survey of Pakistan, 10: 112-113

Anderson, R. C. (2014). Cetaceans and tuna fisheries in the Western and Central Indian Ocean. *International Pole and Line Federation Technical Report, 2*, 133.

DeSilva, P. H. D. H. 1983. Taxonomy of the cetaceans of the Indian Ocean. Paper # SM10/SP31 presented at the symposium on marine mammals of the Indian Ocean. Colombo, 22-25 Feb, 1983 (unpublished manuscript)

Gore, M. A., Kiani, M.S., Ahmad, E., Hussain, B., Ormond, R. F., Siddiqui, J., Waqas, U. and Culloch, R. 2012. Occurrence of whales and dolphins in Pakistan with reference to fishers' knowledge and impacts. J. Cetacean Res. Manage. 12(2): 235–247.

James, P.S. B. R1983. On Stranding of whales along the Indian coast, with special reference to the recent incursions of sperm whales into the coastal waters of India. Paper SP-2 presented at the NARA symposium on marine mammals of the Indian Ocean, Colombo, Sri Lanka, Feb.1983.

Kiani, M. S., 2015a. Status of Humpback Whales and Marine Cetacean Research in Pakistan. In: Minton, G., Reeves, R., Collins, T. and Willson, A. (eds.), Report on the Arabian Sea Humpback Whale Workshop: Developing a collaborative research and conservation strategy. Dubai, 27-29 January 2015. pp. 11-12. WWF, MMC, EWS, WCS.

Kiani, M. S. 2015b. Pakistan. Arabian Sea Whale Network Newsletter October 2015. 4.

Kiani, M.S. and P.J.A. Siddiqui. 2009. Marine cetaceans and transboundary issues: need for regional cooperation. Proc. "Transboundary Coastal and Marine Protected Areas with Special Priorities for Spawning Grounds". Zool. Surv. Dept., Pak. Pp. 35-41.

Leatherwood, S., 1986. whales, dolphins and porpoises of the Indian Ocean Sanctuary – a catalogue of available information. San Diego, Hubbs Marine Research Centre Teach, Rep. 89-179.207 pp.

Mathew, A1873. Stranding of Humpback whale at Baluchistan coast. Jour. Bombay Nat. Hist. Soc. 47: p.732

Mikhalev, Y. A. (1997) Humpback whales, *Megaptera novaeangliae*, in the Arabian Sea. Marine Ecology Progress Series, 149, 13-21.

Mikhalev, Y.A. (2000). Whaling in the Arabian Sea by the whaling fleets Slava and Sovetskaya Ukraina. In Soviet Whaling Data [1949-1979], eds. D. D. Tormosov, Y. A. Mikhalev, B. P.B., V. A. Zemsky, K. Sekiguchi& R. L. Brownell Jr, 141-181. Moscow: Center for Russian Environmental Policy, Marine Mammal Council.

Minton, G., Collins, T. J. Q., Pomilla, C., Findlay, K. P., Rosenbaum, H. C., Baldwin, R., & Brownell Jr, R. L. (2008). *Megaptera novaeangliae*, Arabian Sea subpopulation. *IUCN Red List of Threatened Species,* http://www.iucnredlist.org/details/132835.

Minton, G., Reeves, R., Collins, T. and Willson, A. (eds.), 2015. Report on the Arabian Sea Humpback Whale Workshop: Developing a collaborative research and conservation strategy. Dubai, 27-29 January 2015. WWF, MMC, EWS, WCS. 50p.

Moazzam, M., & Nawaz, R. (2014). By-catch of tuna gillnet fisheries of Pakistan: A serious threat to non-target, endangered and threatened species. *Ecosystem Approaches to the Management and Conservation of Fisheries and Marine Biodiversity in the Asia Region, 56*(1), 85.

Moses, S. T. 1947. Strandings of whales on the coasts of India. J. Bomb. Nat. Hist. Soc., 47 : 377 – 379.

Pilleri, G. and M. Gihr, 1973-74, Contribution to the knowledge of the Cetaceans of southwest and monsoon Asia (Persian Gulf, Indus Delta, Malabar, Andaman Sea and Gulf of Siam). Invest. Cetacea, G. Pilleri ed., 5: 95 – 153

Ranjbar, S., Dakhteh, M.S. and Van Waerebeek, K., 2016. Omura's whale (*Balaenoptera omurai*) stranding on Qeshm Island, Iran: further evidence for a wide (sub) tropical distribution, including the Persian Gulf. bioRxiv, p.042614.

Rizvi, S. N. H. 1983. Whales in Pakistani waters. Technical report NIO TR No., 1 – 20 pp. National Institute of Oceanography, Pakistan.

Roberts, T. J. 1977a. Cetacean records for Pakistan. In: Invest, on Cetacea, G. Pilleri ed., VIII : 93 – 99

Roberts, T. J. 1977b. The mammals of Pakistan. Ernest Benn Ltd. London/Cambridge, 1 – 361 pp.

Siddiqi, M. S. U. 1968. Great Indian Rorqual (Balaenoptera) near Pasni (West Pakistan). Jour. Bombay Nat. Hist. Soc. 65 (3), P. 772.