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A note on sperm whale (*Physeter macrocephalus*) records from the Sultanate of Oman and United Arab Emirates

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Abstract

Records of sighted ($n = 141$) and stranded ($n = 27$) sperm whales (*Physeter macrocephalus*) in the waters off Oman and the United Arab Emirates (UAE) are documented and summarized. A list of samples and specimens from the region is also provided. Sources include the literature and various databases available to the authors at the time of writing. Records span a time period between 1954 and 2017 and include Soviet and Norwegian whaling catch data and a dataset collated from 19th century American whaling logbooks (Townsend, 1935). Sightings and strandings clearly occur in the region throughout the year. Sperm whale sightings are generally made in deep waters (128 m – 3,450 m), and are frequently associated with the continental shelf. The spatio-temporal pattern of sperm whale sightings generally reflects effort. Sightings are particularly abundant in the region off Dhofar in the south of Oman, which was an important whaling ground for whalers in the 1800s and 1960s. Evidence for mortality related to human activities, such as ship-strike injury and fisheries interaction, is documented. Further research on sperm whales, particularly on their conservation status and taxonomic affinities, and the threats facing putative regional populations is strongly recommended.

Introduction

The occurrence of sperm whales (*Physeter macrocephalus*) off the coast of Oman and United Arab Emirates (UAE) has been previously documented (see Gallagher, 1991; Baldwin, 1998). However, dedicated research on sperm whales in the region is lacking.

Catch data from whaling expeditions (Townsend, 1935; Holt, 1979; Mikhalev, 2000; Wray & Martin, 1981; Smith *et al.* 2012) as well as more recent sightings data from platforms of opportunity (e.g. Ballance & Pitman, 1998), dedicated surveys (e.g. Alling *et al.* 1982; Minton *et al.* 2010) and incidental sightings (e.g. Brown, 1957; Slijper *et al.* 1964), suggest that sperm whales occur year round in the Arabian Sea. Reports of mixed schools of nursing females and young individuals have been reported (Berzin, 1971 in Gallagher, 1991; Gallagher, 1991; Baldwin, 1998) and Soviet catches of reproductively active males, lactating females and females in the early stages of pregnancy (Mikhalev, 2000), show that sperm whales breed in the Arabian Sea. Furthermore, Mikhalev (2000) surmised from patterns in foetal length data that sperm whales had two distinct breeding cycles in the Arabian region, although this pattern could also be explained by the long gestation period in sperm whales (Mikhalev, 2000).

Herein, we review all historic and unpublished records of sperm whale sightings and strandings from Oman and the UAE available to the authors at the time of writing. We also include a collated list of skeletal specimens and tissue samples collected from the region.

Materials and Methods

All sightings and strandings records from Oman and the UAE are summarized below (see Fig. 1 for a map of the region). These records are deposited in the Oman Cetacean Database (OMCD) and Oman Cetacean Stranding Database (OMCSD) and include records from published literature (e.g. Minton *et al.* 2010) and those already reviewed elsewhere (e.g. Gallagher, 1991; Baldwin, 1998). Also included are unpublished data from recent cetacean surveys in Oman and incidental records from the authors or third parties. Further records of sperm whale sightings and strandings from the UAE have been provided by

the UAE Dolphin Project and the Fujairah Whale Research Project. Other unpublished sources of sperm whale records come from marine mammal observers (MMOs) working on oil exploration vessels in the region. Finally, we include catch data from Norwegian and Soviet whaling fleets operating in the Arabian Sea between 1963-67 (IWC Database) and maps showing whaling locations for American whalers during the 19th century (from Townsend, 1935).

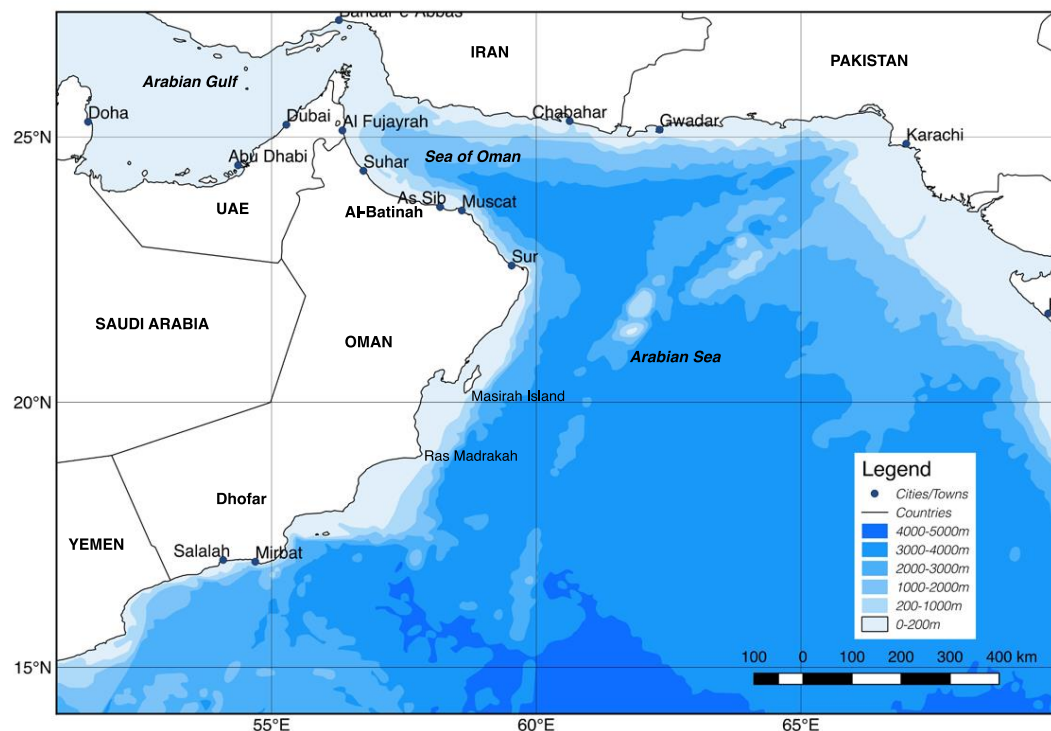


Figure 1. Map of the Arabian Sea region, indicating referenced shore locations.

All sightings were categorised as follows. 1) *Whaling*: sightings from catch data and logbooks. 2) *Platforms of Opportunity*: includes sightings where an observer is carrying out a dedicated marine mammal survey on a platform that does not share the same objective (e.g. Ballance & Pitman, 1998 and MMO sightings). 3) *Dedicated Surveys*: includes sightings and strandings where the principal objective of the survey was to document cetaceans and the observers had full control over where and how to direct search efforts. 4) *Incidental*: includes all reports of sperm whales where searching for marine mammals was not the primary objective at the time of sighting. Here we include records from vessels operating/transiting offshore (e.g. sightings in Brown, 1957; Slijper *et al.* 1964) and other third party reports.

Where records included associated sighting coordinates, these were plotted in QGIS (QGIS Development Team, 2017). A degree of variation exists in the accuracy of positions for any given sighting or stranding record. For sightings obtained during dedicated surveys and platforms of opportunity, the sighting position of the platform is assumed to be accurate. Where a bearing and distance to a sighting was given (sometimes several kilometres away), we calculated the actual position of the sighting. Bearing and distance estimation at the time of sighting are also assumed to be accurate. Where this information was not available, the position of the platform was plotted. In some cases, particularly for incidental sightings from third parties, a position was estimated, either by the observer or author (if there was enough information to do so), using Google Earth. For strandings, if no GPS position was provided, the position of the closest given site (usually a town) was used. American whaling records from the 19th century (Townsend, 1935) were considered separately due to reduced accuracy of position data compared to more recent records (but see Smith *et al.* 2012). As with the Norwegian and Soviet catches, these data show positions where whales were killed (Smith *et al.* 2012).

Only records positively identified as sperm whales are considered in the plots. Positive identification was made by the authors (either first hand or by photographs) or through trusted sources.

Length and sex data, available from Soviet and Norwegian whaling catch records, are also summarised here.

Results

Sightings

Excluding all whaling data, the authors reviewed 109 records of live sperm whales documented from Oman and the UAE between 1954 and 2017 (OMCD). Of these, 93 were positively identified as sperm whales and include sightings made incidentally ($n = 17$), on platforms of opportunity ($n = 38$) or during dedicated marine mammal surveys ($n = 23$). Additional records ($n = 26$) came from Norwegian and Soviet whaling data (IWC Database) (Appendix I.).

A total of 99 sperm whale records include information on group size. Of these, 35 are records of single individuals. Group sizes between two to four individuals were reported on 29 occasions. Groups of five or more individuals are reported less frequently, however, groups as large as 50 or more individuals were reported on three occasions. Recorded depths across sightings ranges between 128 m and 3,450 m.

On three occasions, aggregations of sperm whales were sighted in marguerite formation off Muscat. One of these sightings was made off Sidab on 31st May 2006 (see Ponnampalam, 2016 for a detailed account). On 21st April 2016, an incidental report of sperm whales in marguerite formation off Muscat was obtained from a third party and included video footage of killer whales (*Orcinus orca*). It is assumed that the whales were responding to the presence of the killer whales, although both species are not seen together in any footage. Later the same year, ~31st December 2016, a third party reported 20-25 sperm whales in marguerite formation off Masirah Island. Associated video and photos showed approximately 15 killer whales surrounding the group. Sperm whales were allegedly killed, although there is no evidence of this in the available video or photos.

The distribution of sightings, excluding 19th century whaling data, (Fig. 2) is largely a reflection of effort. Specifically, a large number of sightings were made off the Dhofar coast, the focus of most dedicated marine mammal survey effort in Oman between 2000 and 2017 (e.g. Minton *et al.* 2010, Willson *et al.* 2016a). Between Ras Madrasah and Ras al Hadd, the majority of sightings were made from platforms of opportunity (e.g. during seismic exploration). Off the Sea of Oman coast, records are clustered around Muscat where there has been some dedicated survey for marine mammals and a number of incidental sightings, associated with recreational boating, fishing and whale watching. From these records it is evident that sperm whales occur in the deep waters off Oman and along the continental shelf, with sightings being particularly prolific where the continental shelf is narrow (e.g. off Ras al Hadd, Mirbat and the Muscat coast). These areas presumably facilitate easier detection rather than reflect distribution concentrations, although, they are associated with high productivity. Sightings plotted by month (Fig. 3) largely reflect effort at different times of the year e.g. Soviet/Norwegian whaling in October/November (assumedly to avoid the southwest monsoon). Nonetheless, this plot illustrates the year round occurrence of sperm whales in the region.

Further records of sperm whales from 19th century whaling logbooks ($n = 61$) are considered in a separate plot (Fig. 4), adapted from Townsend (1935). These records show that sperm whales are widespread in the deep waters off Dhofar and that whales were taken at a similar time of year (September - December), and location, to Soviet/Norwegian whaling.

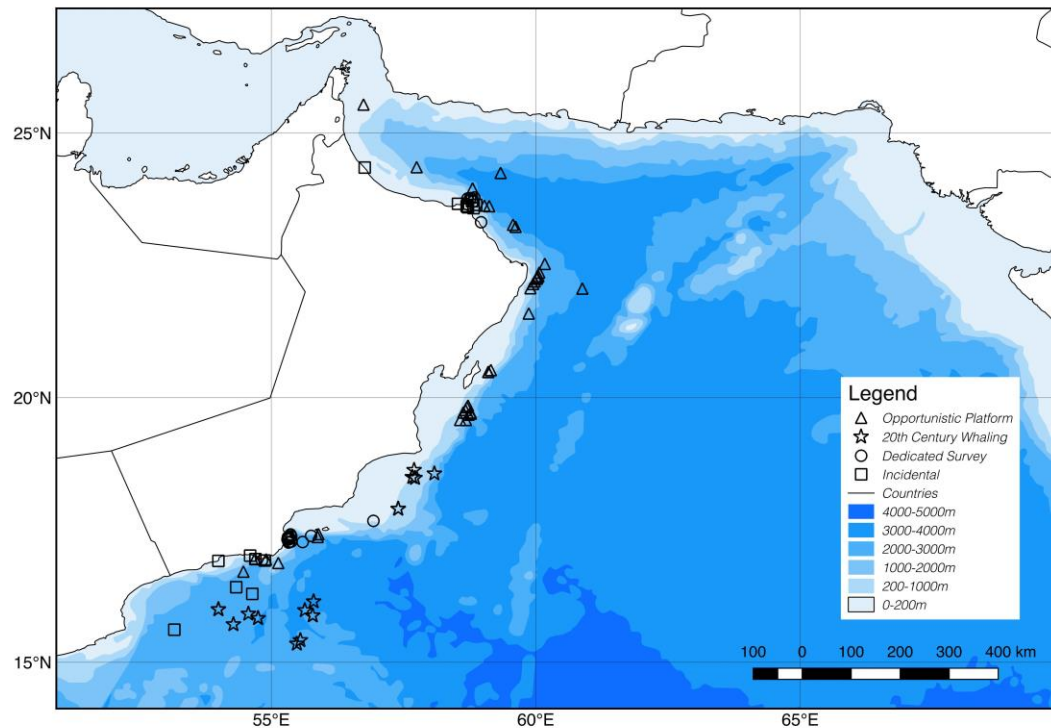


Figure 2. Sightings of sperm whales (*P. macrocephalus*) off Oman and the UAE, by sighting category, plotted in QGIS (QGIS Development Team, 2017). Sightings were categorised based on whether the primary objective at the time of sighting was to find marine mammals and whether there was a directed search effort from the platform to find marine mammals (see text for details). Only Soviet and Norwegian catch data is included in the whaling positions.

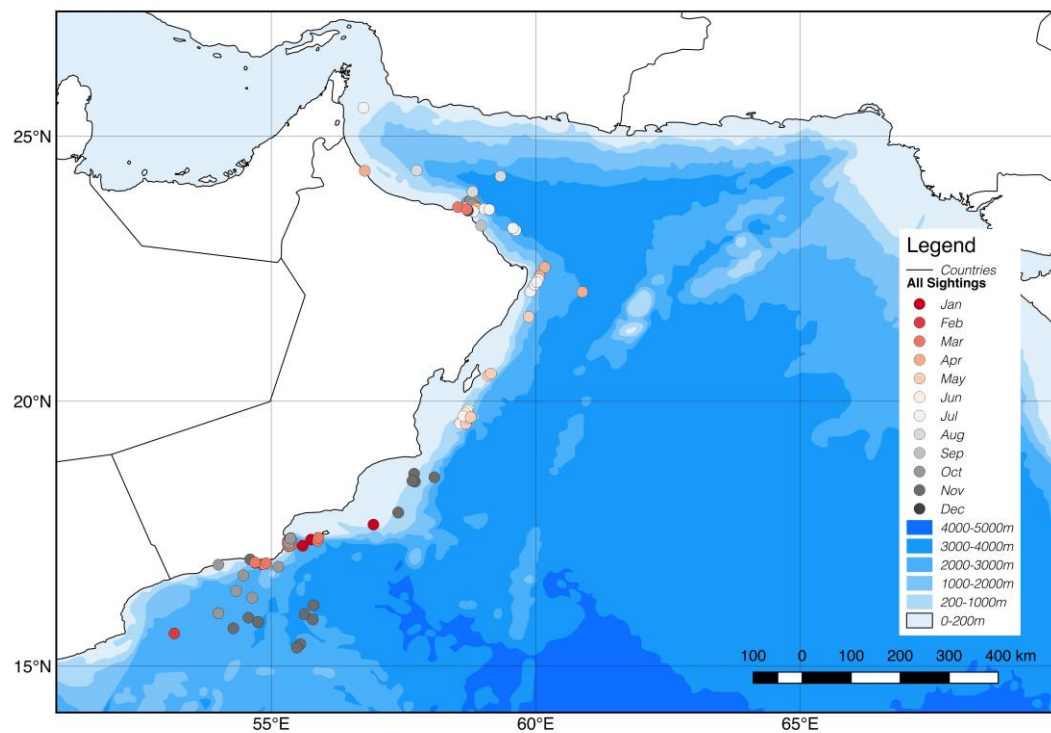


Figure 3. Sightings of sperm whales (*P. macrocephalus*) off Oman and the UAE, by month, plotted in QGIS (QGIS Development Team, 2017).

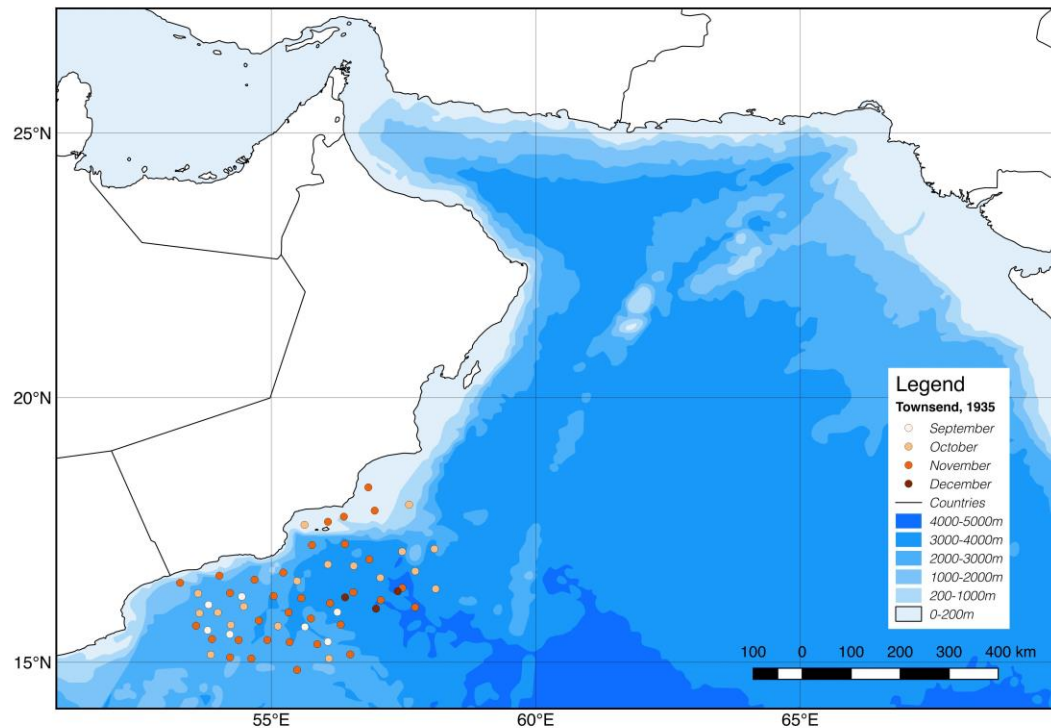


Figure 4. 19th century whaling catches of sperm whales (*P. macrocephalus*) off Oman by month (from Townsend, 1935).

Measurements of Length from Catch Data

Soviet and Norwegian whaling data (IWC database) allow for investigation of length measurements in male and female sperm whales. All females caught were between 8.5-9.7 m in length, whereas males ranged between 9.0 - 15.1 m (Fig. 5). Best *et al.* (2016) showed that the lengths of captured female sperm whales decreased moving from south to north across an ocean basin. Best *et al.* (2016) suggest that differences in foraging strategies with latitude could be a result of this. Female sperm whales from the Arabian Sea and Oman appear to fit this pattern (Fig. 6), however, analyses at this stage are rudimentary and further assessment is required.

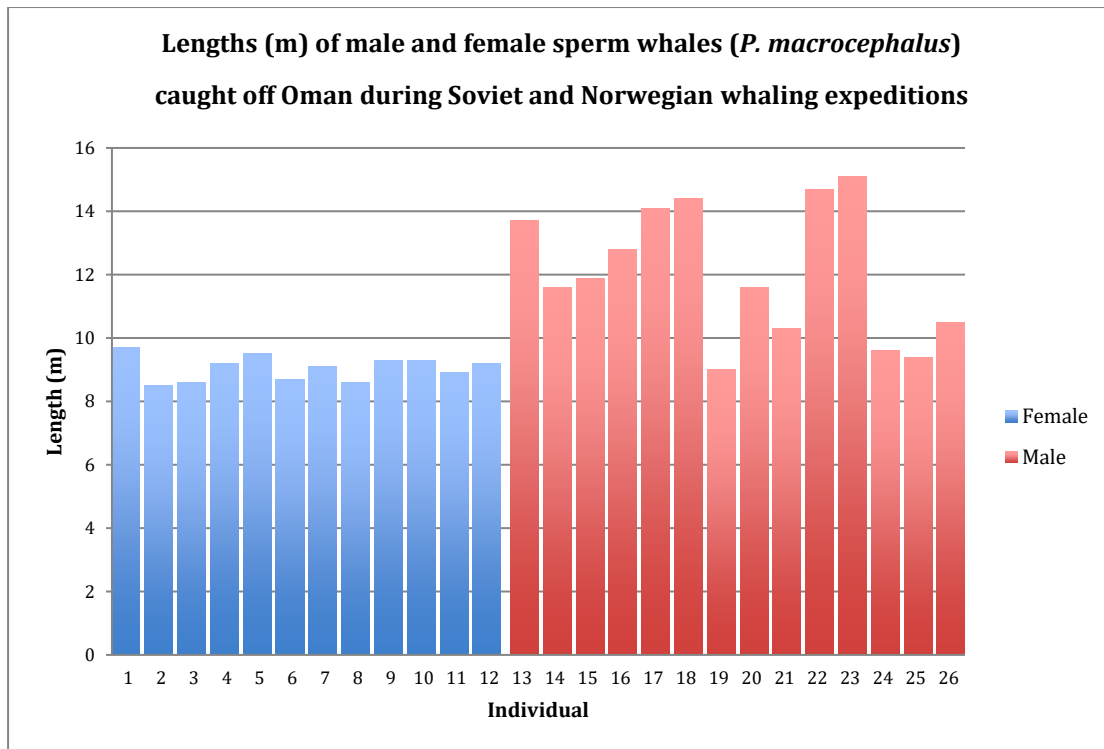


Figure 5. Length measurements (m) of sperm whales caught by Soviet and Norwegian whalers off Oman.

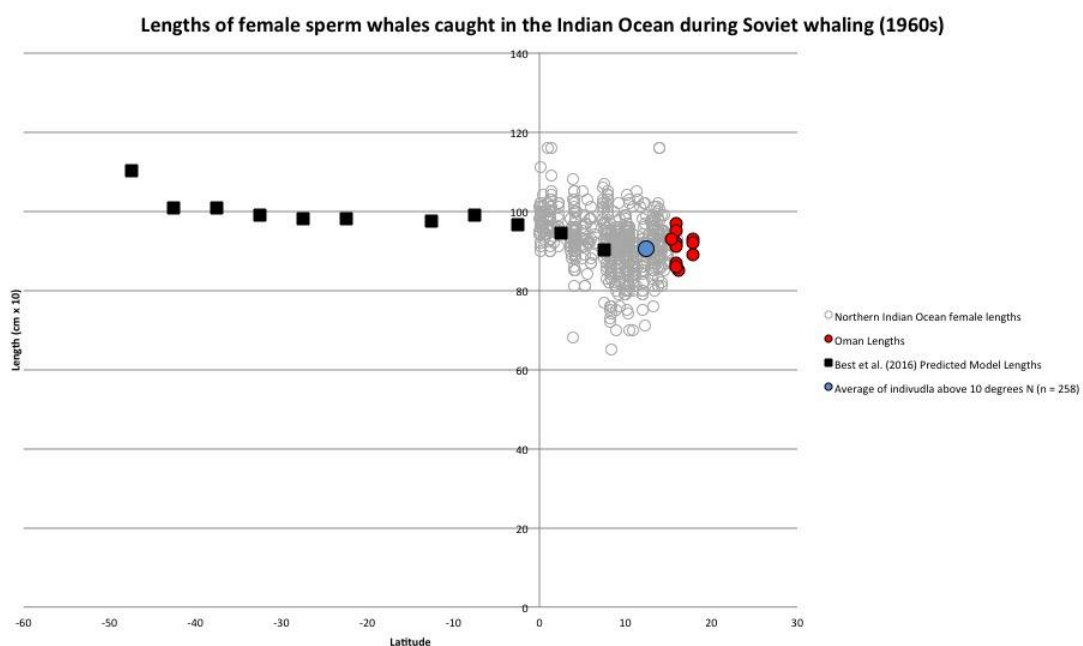


Figure 6. Lengths of female sperm whales caught in the Indian Ocean on Soviet whaling expeditions at different latitudes. Black squares = Best *et al.* (2016) predicted model lengths of females for different latitudes; Grey circles = raw length data from Soviet catches from the northern Indian Ocean; Blue circle = average length of females caught above 10° N ($n = 258$); Red circles = length measurements of female sperm whales caught off Oman.

Strandings

Between ~1977 and 2015, 27 sperm whale strandings were recorded (OMCSD). Of these, 22 were positively identified as sperm whales and are plotted below. Where available ($n = 7$), the distribution of stranded males ($n = 5$) and females ($n = 2$) is given (Fig. 7). Strandings are also plotted by month (Fig. 8) to illustrate strandings occur, and are reported, throughout the year.

The available lengths of individuals identified as 'adult' ($n = 8$) ranged between 900 - 1590 cm. Individuals identified as young ($n = 5$), including 'calves', 'juveniles' and 'sub-adults' ranged between 245 - 900 cm.

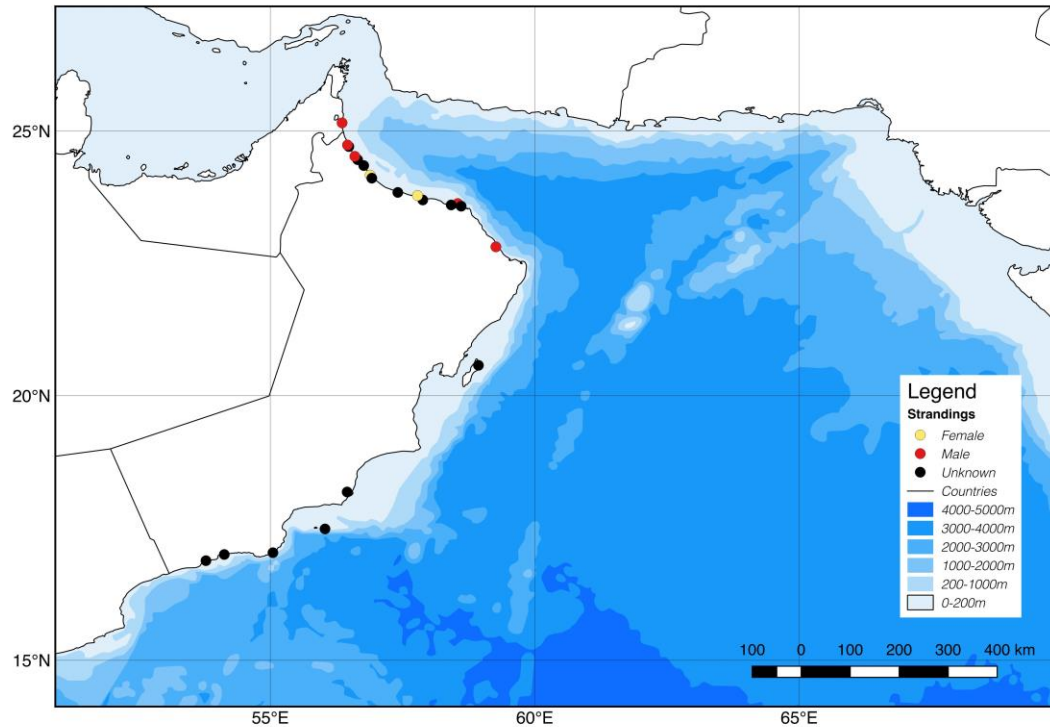


Figure 7. Stranding locations for sperm whales (*P. macrocephalus*) along the coast of Oman and the UAE. Where the data was available, the sex of the individual is indicated by colour.

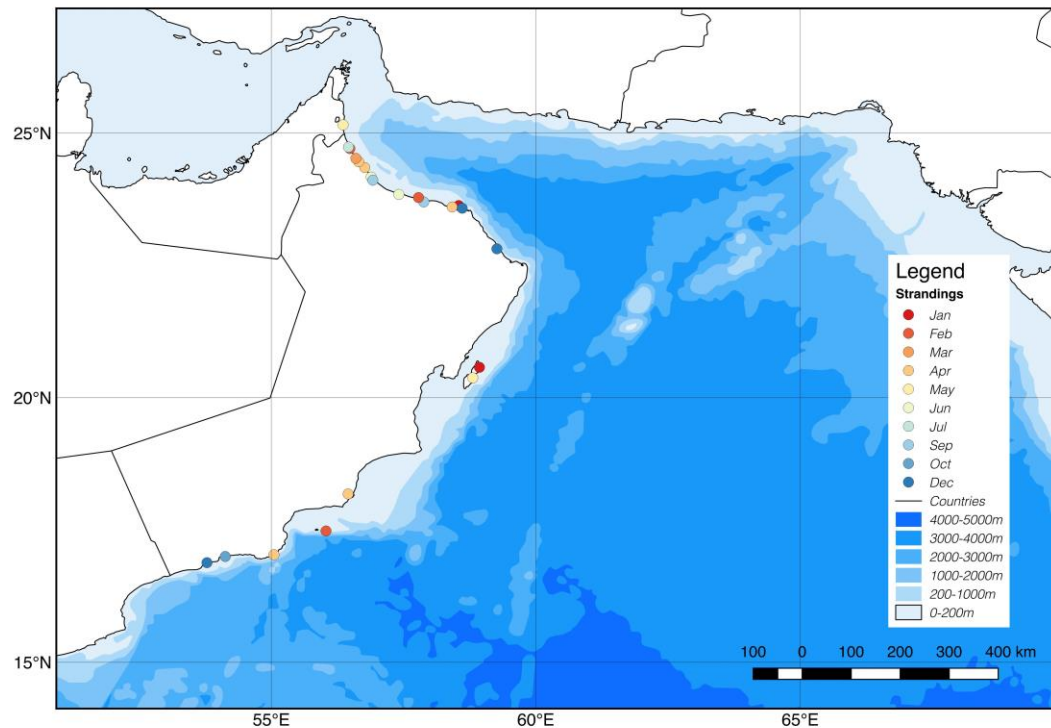


Figure 8. Stranding locations for sperm whales (*P. macrocephalus*) along the coast of Oman and the UAE by month.

Live Strandings

Three sperm whales are reported to have stranded alive along Oman's coast. The first of these is well documented and stranded near Sohar along the al-Batinah coast on 7th April 1981 (see Gallagher, 1991).

On 5th October 2000, a stranded whale was recorded near Salalah. It is reported that initially two whales stranded alive, but one was helped back out to sea. The remaining whale is reported to have died on the 6th October.

On 2nd of June 2012, a female adult was found near Saham along the al-Batinah coast. It was lying on its right side, mostly submerged, in the intertidal zone on a dissipative beach. No other whales were observed offshore. The whale was said to have swum in from the north and initially stranded alive around 22:00-23:00 and remained alive until about 03:00. The municipality buried the carcass on 5th June.

Interaction with Fisheries

On 12th December 2001, a stranded male sperm whale was recorded near Tiwi, Oman. The whale was found dead on a rocky shelf in the intertidal zone. It was still intact, but flesh was disintegrating, intestines were spilling and skin was peeling. Stomach contents were collected and included hundreds of squid beaks and a large ball of fishing twine.

On 13th March 2010, a male sperm whale calf was recorded near Sohar, Oman. A nylon rope was wrapped around the peduncle causing a deep impression. No fishing net was present on the body but there were gill-net impressions in the flesh from the peduncle to the pectoral fin.

Evidence of Ship Strike

On the 20th February 2003, 16th of January 2008 (Gray & Baldwin, 2008), and 11th July 2009, sperm whales were recorded near Sawadi (al-Batinah), Darsait (Muscat), and Shinas (al-Batinah), Oman, respectively, with wounds consistent with ship strike injuries. Whether these were the cause of death or occurred post-mortem at sea is uncertain.



Figure 9. A male sperm whale stranded off the Muscat coast, Oman (Darsait) 16/01/2008 with injuries consistent with ship strike. Whether these were the cause of death or occurred post-mortem is uncertain.

Other strandings of note

The carcasses of stranded sperm whales recorded on the 21st February 2012 and the 8th September 2013 were described as being emaciated. A stranding of a sperm whale at Fujairah, UAE, in May 2014 is the most northerly stranding of a sperm whale in the region recorded to date (slightly north of a stranding off Pakistan, Gore *et al.* 2007). The animal was buried, and the skeleton has been exhumed and is being prepared for educational display.

Samples and Specimens

Two sperm whale skulls (ONHM 29 and ONHM 866) are stored at the ONHM with partial or complete skeletons, including a fully mounted specimen on display. Listed in Collections of skulls and Cetacea: Odontoceti from Bahrain, UAE and Oman, 1969-1990 (M. D. Gallagher). Tissue samples collected from strandings ($n = 25$) and biopsy samples collected from free-ranging individuals ($n = 19$) are curated by ESO in Muscat, Oman with the exception of one curated at Al Maya Sanctuar, Office of the Crown Prince of the Emirate of Fujairah, UAE. For a list of samples and specimens see Appendix III.

Other Available Data

There are a small number of sperm whale acoustic recordings from Oman, which will be analysed in the near future. Photographs, suitable for individual identification, are also held by ESO and await cataloguing and analysis.

Discussion

Surveys to produce absolute population size estimates (DISTANCE sampling), and genetic analyses of samples currently available, would greatly improve our understanding of the conservation status of sperm whale populations off the coast of Oman and the UAE. Mikhalev (2000) suggests that sperm whales in the Arabian Sea form a discreet population, differing from other populations in the Indian Ocean based several 'peculiarities'. These are: 1) the smaller average size of individuals (Fig. 6), 2) the more frequent recovery of ambergris (including single pieces up to 70 kg in weight), and 3) an almost complete absence of pelagic shark wounds.

Little is known about the movements and area of critical habitat for sperm whales in the region. Whaling catch data shows sperm whales in high abundance in the region off Dhofar, but whether this is a reflection of whaling effort or is a region of important sperm whale habitat is not known. Male sperm whales are regularly reported off the Sea of Oman coast. A dedicated satellite telemetry project would provide insight into these areas, particularly when used in conjunction/collaboration with genetic studies.

Threats identified include an expanding fisheries industry. The extent to which sperm whales in the region are affected by this is not known. However, two strandings have been reported with some evidence

of interaction with fisheries (see above). Ship strike could be a greater concern for sperm whales, particularly in the Sea of Oman where there is a large amount of offshore shipping traffic entering/leaving the Gulf. Two records of sperm whales stranded on the Sea of Oman coast have exhibited wounds consistent with vessel collision. Whether these occurred post-mortem or were the cause of death is not known.

A threefold increase in container vessel traffic has been noted from the northern Indian Ocean between 2004 and 2014, with mapping of satellite-derived AIS traffic densities showing a concentration of routes around the periphery of this area, (Willson *et al.* 2016b). The highest densities of traffic were noted off Southern Sri Lanka, the Gulf of Aden and Sea of Oman in approaches to the Straits of Hormuz. With the successful uptake of a whale mitigation project for Arabian Sea humpback whales in the port of Oman (Baldwin *et al.* 2015), a similar project has been launched by Five Oceans Environmental Services LLC (March 2017) in conjunction with the Government and Port of Fujairah, UAE. The first phase of the Fujairah Whale Project is to map cetacean diversity and abundance off Fujairah in an area previously absent of dedicated cetacean fieldwork. A vessel-based visual and acoustic line transect survey approach has been designed to cover waters >500m and up to 80km offshore with the purpose of understanding the seasonality and distribution of deep diving species, including sperm whales, in an area of high shipping traffic density. In addition to vessels transiting in and out of the Straits of Hormuz, over 14,000 vessels visited Fujairah Port in 2014, predominantly for bunkering services (Cpt. Massoud, *pers comm.* March 2017). As such, the port acts as a natural hub to engage greater participation from the shipping industry in awareness of mitigation measures. This model provides potential opportunities for the rest of the region as a means to stimulate research and environmental resource management.

Other potential threats in the region include sound pollution from oil exploration activities (e.g seismic and multi-beam echo sounder surveys), and military sonar (Gordon *et al.* 2003; Degollada *et al.* 2003).

Another, recently identified, threat to sperm whales in the region is tourism. The continental shelf off Oman is particularly narrow in some regions (e.g. off Dhofar and Muscat), allowing tourist operators to venture into deeper waters, and sperm whale habitat, more easily. There have been reports of tourist operators unwittingly harassing sperm whales with the alleged intention of venturing close enough to allow customers a 'swim-with' experience.

Conclusions

Dedicated cetacean research off the coast of Oman from 2000 onwards has focused on the endangered Arabian Sea humpback whale population (Minton *et al.* 2008; Minton *et al.* 2011; Willson *et al.* 2016a). Sperm whales, due to their preference for deeper offshore waters, have been more difficult to systematically study and document. Soviet catch data (Mikhalev, 2000) suggest that sperm whales in the region may also comprise a discreet Northern Indian Ocean population, potentially vulnerable to threats of fishing, shipping, oil and gas exploration and coastal development. Therefore, this species merits more dedicated research in order to design appropriate management and conservation strategies. The recent launch of the Fujairah Whale Research Project is a positive step forward.

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Appendix I. Table of sperm whale (*Physeter macrocephalus*) sightings off Oman and the United Arab Emirates. I = Incidental; W = Whaling; OP = Opportunistic Platform; DS = Dedicated Survey. Location accuracy codes are as follows: * = position calculated using GPS location, bearing and distance estimation; ** = Google Earth position estimate; *** = Vessel/Platform position; **** = position estimated from a figure from the literature by using it as an image overlay in Google Earth; ***** = unknown position accuracy; *****= position estimated from an effort log; ***** = whaling positions for Norwegian and Russian vessels.

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
I	Slijper <i>et al.</i> 1964 (Capt. Morzer Bruins)		Netherlands Whale Research Group T.N.O.	Arabian Sea	23/02/1954	Y		1			***
I	Slijper <i>et al.</i> 1964 (Capt. Morzer Bruins)		Netherlands Whale Research Group T.N.O.	Arabian Sea	20/10/1954	Y		4			***
I	Slijper <i>et al.</i> 1964 (Capt. Morzer Bruins)		Netherlands Whale Research Group T.N.O.	Arabian Sea	22/01/1955	Y		1			***
I	Slijper <i>et al.</i> 1964 (Capt. Morzer Bruins)		Netherlands Whale Research Group T.N.O.	Arabian Sea	24/05/1957	Y		1			***
I	Slijper <i>et al.</i> 1964 (Capt. Morzer Bruins)		Netherlands Whale Research Group T.N.O.	Arabian Sea	28/03/1958	Y		6 + 1 male			***
W	IWC Database	<i>Thorshovdi</i>	Whaling	Arabian Sea	31/10/1962	Y			16.000000	54.000000	*****
W	IWC Database	<i>Thorshovdi</i>	Whaling	Arabian Sea	31/10/1962	Y			16.000000	54.000000	*****
W	IWC Database	<i>Thorshovdi</i>	Whaling	Arabian Sea	31/10/1962	Y			16.000000	54.000000	*****
W	IWC Database	<i>Thorshovdi</i>	Whaling	Arabian Sea	31/10/1962	Y			16.000000	54.000000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraina</i>	Whaling	Arabian Sea	18/11/1965	Y			15.916670	54.566670	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraina</i>	Whaling	Arabian Sea	18/11/1965	Y			16.150000	55.800000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraina</i>	Whaling	Arabian Sea	18/11/1965	Y			15.833330	54.750000	*****

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.833330	54.750000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.833330	54.750000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.833330	54.750000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.883330	55.783330	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.883330	55.783330	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.983330	55.633330	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.883330	55.783330	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.416670	55.550000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	18/11/1965	Y			15.350000	55.483330	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	5/11/1966	Y			15.716670	54.283330	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	6/11/1966	Y			17.900000	57.400000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	7/11/1966	Y			17.900000	57.400000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	7/11/1966	Y			17.900000	57.400000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	7/11/1966	Y			17.900000	57.400000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraine</i>	Whaling	Arabian Sea	7/11/1966	Y			18.483330	57.716670	*****

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraina</i>	Whaling	Arabian Sea	7/11/1966	Y			18.483330	57.716670	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraina</i>	Whaling	Arabian Sea	8/11/1966	Y			18.566670	58.083330	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraina</i>	Whaling	Arabian Sea	8/11/1966	Y			18.633330	57.700000	*****
W	IWC Database; Mikhalev, 2000	<i>Sovetskaya Ukraina</i>	Whaling	Arabian Sea	8/11/1966	Y			18.500000	57.666670	*****
I	OMCD; Gallagher, 1991		Incidental (near miss stranding)	Sohar	07/04/1981	Y		1	24.350000	56.766670	*****
DS	OMCD; Alling <i>et al.</i> 1982	<i>Tulip</i>	Research (WWF Netherlands)	Hallaniyat Islands	14/01/1982	Y			17.273257	55.593044	****
DS	OMCD; Alling <i>et al.</i> 1982	<i>Tulip</i>	Research (WWF Netherlands)	Hallaniyat Islands	16/01/1982	Y			17.390174	55.753021	****
DS	OMCD; Alling <i>et al.</i> 1982	<i>Tulip</i>	Research (WWF Netherlands)	Hallaniyat Islands	18/01/1982	Y			17.672774	56.930954	****
I	OMCD; Gordon, 1982; Gallagher, 1991		WWF/IUCN	Salalah (Yemen border)	14/02/1988	Y		2	15.616670	53.166670	*****
I	OMCD; Gallagher, 1991		Incidental	Mirbat	29/11/1988	Y		4	16.950000	54.700000	*****
I	OMCD; Gallagher, 1991		Incidental	Mirbat	29/11/1988	Y		3	16.950000	54.700000	*****
I	OMCD; Gallagher, 1991		Incidental	Wadi Hinna	29/11/1988	Y		1	17.016670	54.600000	*****
I	OMCD; Baldwin 1998 IWC report		Incidental	Muscat	18/10/1994	Y		50	23.715000	58.795000	*****
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	20/05/1995	Y		1	19.580000	58.680000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	20/05/1995	Y		3	19.680000	58.730000	***

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Gulf of Oman	20/05/1995	Y		2	19.700000	58.770000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	20/05/1995	Y		1	19.720000	58.770000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	20/05/1995	Y		2	19.700000	58.770000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Masirah Island	01/06/1995	Y		1	19.580000	58.570000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	01/06/1995	Y		10	19.850000	58.720000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	01/06/1995	Y		2	19.820000	58.700000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	01/06/1995	Y		1	19.770000	58.670000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	01/06/1995	Y		3	19.720000	58.630000	***
OP	Baldwin 1998 IWC report	<i>DIVA</i>	Oil Spill Emergency Response	Fujairah, UAE	08/07/1995	Y	600-1300	4-6	25.540133	56.743735	**
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Khabbah	19/07/1995	Y		1	22.270000	60.030000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Ras al Hadd	19/07/1995	Y		3	22.300000	60.050000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	19/07/1995	Y		1	22.150000	59.950000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	19/07/1995	Y		2	22.070000	59.900000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	19/07/1995	Y		3	22.200000	59.980000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	19/07/1995	Y		1	22.200000	59.980000	***

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Khabbah	19/07/1995	Y		6	22.250000	60.020000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	23/07/1995	Y		1	23.230000	59.620000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Sifah	23/07/1995	Y		5	23.270000	59.570000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Batinah coast	24/07/1995	Y		1	23.630000	59.030000	***
OP	OMCD; Ballance <i>et al.</i> 1996	<i>Malcolm Baldrige</i>	NOAA Oceanographic Cruise	Offshore	24/07/1995	Y		1	23.620000	59.120000	***
	OMCD			Offshore Arabian Sea	29/09/1995	N		12	9.200000	64.800000	*****
I	OMCD; Baldwin 1998 IWC report		Incidental	Hino Island	01/04/1996	Y		12	16.923630	54.876300	***
I	OMCD; Baldwin 1998 IWC report		Incidental	Bandar al Jissah	23/05/1996	Y		4	23.600000	58.716670	***
I	OMCD; Baldwin 1998 IWC report		Incidental	Bandar al Jissah	30/12/1996	Y		1	23.600000	58.716670	***
I	OMCD; 3rd Party		Incidental	Arabian Gulf	11/01/1997	N		1	26.140000	56.370000	*****
I	OMCD; 3rd Party		Incidental		29/03/1997	N			17.240000	56.480000	*****
I	OMCD; 3rd Party		Incidental	Offshore Arabian Sea	30/03/1997	N		4	11.130000	57.810000	*****
I	OMCD; 3rd Party		Incidental	Red Sea	02/04/1997	N			15.400000	41.570000	*****
I	OMCD; 3rd Party		Incidental	Arabian Gulf	28/07/1997	N		8	26.930000	51.770000	*****
I	OMCD; 3rd Party		Incidental	Somalia	04/08/1997	N		12	0.770000	48.830000	*****

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
I	OMCD; 3rd Party		Incidental	Offshore Arabian Sea	10/10/1997	N		4	18.250000	65.580000	*****
OP	OMCD; Baldwin 1998 IWC report	<i>Calgary</i>	Seismic	Taqah	29/10/1997	Y	1750	20	16.713670	54.472500	***
OP	OMCD; Baldwin 1998 IWC report	<i>Calgary</i>	Seismic	Ras Janjari	29/10/1997	Y	1350	13	16.877330	55.132330	***
I	OMCD; 3rd Party		Incidental	Yemen	16/02/1998	N		3	14.830000	52.290000	*****
I	OMCD; 3rd Party		Incidental	Somalia	24/02/1999	N		1	12.150000	50.730000	*****
I	OMCD; 3rd Party		Incidental	Somalia	24/02/1999	N		1	12.150000	50.730000	*****
I	OMCD; ESO/OWDRG		Incidental	Batinah coast	13/06/1999	N		3	24.299200	58.521630	***
I	OMCD; 3rd Party		Incidental	Bandar al Jissah	01/01/2000	N		3	23.560000	58.640000	*****
I	OMCD; 3rd Party		Incidental	Bandar al Jissah	01/02/2000	N		20	23.550000	58.650000	*****
I	OMCD; 3rd Party		Incidental	Yemen	11/05/2000	N		15	15.190000	52.440000	*****
I	OMCD; 3rd Party		Incidental	Bandar al Jissah	01/01/2001	N		3	23.550000	58.650000	*****
DS	OMCD, Minton <i>et al.</i> 2010		DH-02-01	Mirbat	21/02/2001	Y		25	16.924370	54.824070	***
OP	OMCD, MMO	<i>Geo-Baltic</i>	Seismic	Gulf of Oman	28/04/2002	N	3450	1	23.218630	60.224600	***
I	OMCD; 3rd Party		Incidental	Muscat	08/03/2004	Y	800	1	23.665000	58.530000	*****
OP	OMCD; ESO/OWDRG	<i>Sanjeeda</i>	Sanjeeda Survey	Bandar Qinqari	11/03/2004	Y	320	8	16.945530	54.901740	***

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
OP	OMCD; ESO/OWDRG	<i>Sanjeeda</i>	Sanjeeda Survey	Ras Nuss	16/03/2004	N		3			
OP	OMCD; ESO/OWDRG	<i>Sanjeeda</i>	Sanjeeda Survey	Mirbat	19/03/2004	Y	1000	2	16.959090	54.691950	***
OP	OMCD; ESO/OWDRG	<i>Sanjeeda</i>	Sanjeeda Survey	Hallaniyat Islands	26/03/2004	Y	2414	17	17.368080	55.877290	***
OP	OMCD; ESO/OWDRG	<i>Sanjeeda</i>	Sanjeeda Survey	Hallaniyat Islands	26/03/2004	Y	1900	55	17.422120	55.891300	***
I	OMCD; 3rd Party		Incidental		18/04/2004	N	1000	1	23.793333	58.670000	*****
I	OMCD; 3rd Party		Incidental	Fahal Island	03/02/2005	Y		12			
DS	OMCD; ESO/OWDRG; Ponnampalam, 2009		MCT-SUR-09-05	Ras Abu Daud	13/09/2005	Y	128	2	23.316180	58.967200	***
DS	OMCD; ESO/OWDRG; Ponnampalam, 2009		MCT-10-05	Offshore	01/10/2005	Y	1097	2	23.760280	58.709550	***
DS	OMCD; ESO/OWDRG; Ponnampalam, 2009		MCT-10-05	Offshore	01/10/2005	Y	1097	2	23.765050	58.712760	***
DS	OMCD; ESO/OWDRG; Ponnampalam, 2009		MCT-10-05	Offshore	01/10/2005	Y	1100	1	23.766800	58.757940	***
DS	OMCD; ESO/OWDRG; Ponnampalam, 2009		MCT-10-05	Offshore	01/10/2005	Y	1100	1	23.773070	58.770560	***
DS	OMCD; ESO/OWDRG; Ponnampalam, 2009		MCT-10-05	Offshore	01/10/2005	Y	2000	1	23.783960	58.839010	***
DS	OMCD; ESO/OWDRG; Ponnampalam, 2009		MCT-10-05	Offshore	01/10/2005	Y	1340	2	23.707320	58.820180	***
DS	OMCD; Ponnampalam, 2009; Ponnampalam, 2016		MCT-05-06	Sidab	31/05/2006	Y	499	35	23.662080	58.692900	***
I	OMCD; 3rd Party		Incidental	Muscat	25/04/2008	Y	1000		23.644870	58.875250	*****

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
I	OMCD; 3rd Party		Incidental	Muscat	04/07/2008	Y		15	23.582870	58.823920	*****
I	OMCD; 3rd Party		Incidental	Bandar al Jissah	21/11/2008	N		15			
OP	MMO Report	<i>Blackford Dolphin</i>	Rig	18	07/12/2009	N		3	24.946055	56.907903	*
OP	MMO Report	<i>BOS Atlantic</i>	Seismic	59	15/04/2010	Y	2761	1	22.529279	60.170815	*
OP	MMO Report	<i>BOS Atlantic</i>	Seismic	59	16/04/2010	Y	3032	1	22.063517	60.880953	*
OP	MMO Report	<i>BOS Atlantic</i>	Seismic	59	27/04/2010	Y	1700	1	22.366118	60.067078	*
OP	MMO Report	<i>BOS Atlantic</i>	Seismic	59	19/05/2010	Y	549	1	20.490707	59.104072	*
OP	MMO Report	<i>BOS Atlantic</i>	Seismic	59	19/05/2010	Y	543	2	20.486095	59.100727	*
OP	MMO Report	<i>BOS Atlantic</i>	Seismic	59	19/05/2010	Y	595	1	20.522488	59.151654	*
OP	MMO Report	<i>BOS Atlantic</i>	Seismic	59	28/05/2010	Y	1894	10	21.591258	59.868146	*
OP	MMO Report	<i>BGP Challenger</i>			25/02/2011	Y					
OP	MMO Report	<i>BGP Challenger</i>			25/02/2011	Y					
DS	OMCD; ESO/OWDRG	<i>Mouj al Amal</i>	DOF-MAR-2011	Hasik	27/03/2011	Y		30	17.264320	55.326108	*
DS	OMCD; ESO/OWDRG	<i>ESO1</i>	DOF-FEB-2012	Hasik	22/02/2012	Y	450	7	17.377649	55.333121	*
DS	OMCD; ESO/OWDRG	<i>ESO1</i>	DOF-FEB-2012	Hasik	28/02/2012	Y		10	17.365490	55.314940	***

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
DS	OMCD; ESO/OWDRG	<i>ESOI</i>	DOF-FEB-2012	Hasik	28/02/2012	Y			17.351819	55.328468	*
DS	OMCD; ESO/OWDRG	<i>ESOI</i>	DOF-FEB-2012	Hasik	29/02/2012	Y			17.416690	55.363201	*
DS	OMCD; ESO/OWDRG	<i>ESOI</i>	DOF-FEB-2012	Hasik	01/03/2012	Y	1000		17.322460	55.306515	*
DS	OMCD; ESO/OWDRG	<i>ESOI</i>	DOF-FEB-2012	Hasik	02/03/2012	Y			17.380120	55.376170	***
DS	OMCD; ESO/OWDRG	<i>ESOI</i>	DOF-FEB-2012	Hasik	22/03/2012	Y	1000	1	17.281482	55.377410	*****
DS	OMCD; ESO/OWDRG	<i>ESOI</i>	DOF-FEB-2012	Hasik	22/03/2012	Y		2	17.274378	55.343919	*****
DS	OMCD; ESO/OWDRG	<i>ESOI</i>	DHF-FEB-2012	Hasik	22/10/2012	Y		7	17.323152	55.331437	***
DS	OMCD; ESO/OWDRG	<i>ESOI</i>	DOF-OCT-2012	Hasik	27/10/2012	Y	1000	30	17.410420	55.363313	*
DS	OMCD; ESO/OWDRG	<i>Mouj al Amal</i>	DOF-FEB-2014	Hasik	19/02/2014	N		1	17.211465	55.296850	*
OP	MMO Report	<i>Jupiter</i>	MBES & Coring	41	24/04/2014	N		1	23.691057	58.790600	*
OP	MMO Report	<i>Jupiter</i>	MBES & Coring	41	10/08/2014	Y		10	24.357000	57.748700	*
OP	MMO Report	<i>Jupiter</i>	MBES & Coring	41	20/08/2014	Y	3378	50	24.248183	59.335653	*
OP	MMO Report	<i>Jupiter</i>	MBES & Coring	41	27/08/2014	Y	2680	12	23.955590	58.805654	*
I	UAE Dolphin Project Database; 3rd Party		Incidental		Dec-14	Y		1			
I	3rd Party		Incidental	Sifah	16/01/2015	Y		8			

Sighting Type	Source	Platform	Activity/Survey	Block/Region	Date	Confirmed	Depth	No. of individuals	Latitude	Longitude	Location Accuracy
I	3rd Party		Incidental	Sifah	16/01/2015	Y					
I	UAE Dolphin Project Database; 3rd Party		Incidental		10/02/2016	Y		1			
I	3rd Party		Incidental	Muscat	21/04/2016	Y		7			
I	3rd Party		Incidental	Muscat	20/03/2017	Y		2	23.622220	58.693790	**
I	3rd Party		Incidental	Muscat	06/04/2017	Y		>10			
I	3rd Party		Incidental	Muscat	14/04/2017	Y		~20			
I	Gallagher, 1991		Incidental	Ras Raysut	Autumn	Y			16.916667	54.000000	*****
I	Brown, 1957		National Institute of Oceanography	Arabian Sea	Mar-May/1952-1956	Y			16.292802	54.641163	****
I	3rd Party		Incidental	Masirah Island	31-12-2016	Y		20-25	20.409937	59.17613	**

Appendix II. All sperm whale (*P. macrocephalus*) strandings off Oman and the UAE. I = Incidental; DS = Dedicated Survey; M = male; F = female; UK = unknown; A = Adult; C = calf; J = juvenile; SubA = sub-adult. * = used site location for position estimate. ** = typo in report, so changed position accordingly.

Relevant Database ID	Report Type	Source	Date	Site name	Latitude	Longitude	Confirmed ID	Sex	Age	Length (cm)	Notes
160	I	OMCD; Gallagher 1991	1977-1980	Dawwah, Masirah	20.580000	58.820000	N	UK			
1001	I	OMCD; MECA	07/06/2008	Shinas	24.727252	56.476328	N	UK		1400	*
1041	I	OMCD; 3rd Party	01/03/2011	Salalah, Baleed	17.005910	54.144373	N	UK	UK		*
1062	I	OMCD; MECA	10/07/2009	Wadiyat, Shinas	24.777884	56.461627	N	UK	A	1600	*
1063	I	OMCD; MECA	20/01/2008	Qareem			N	UK	UK	900	
156	I	OMCD; Gallagher, 1991	07/04/1981	Sohar	24.350000	56.766670	Y	UK		1056	
157	I	OMCD; Gallagher, 1991	13/09/1986	Barka	23.700000	57.883333	Y	UK			**
158	I	OMCD; 3rd Party	05/10/2000	Salalah, Dahariz	17.000000	54.130000	Y	UK	A		
159	I	OMCD; Gallagher, 1991; Papastravou & Salm, 1991	19/04/1988	Sadh	17.033330	55.050000	Y	UK			
161	I	OMCD; Gallagher, 1991	06/12/1987	Mughsayl	16.883330	53.783330	Y	UK		1450	
162	DS	OMCD	09/02/2000	Hallaniyat Islands	17.482720	56.035000	Y	UK	J	245	
708	I	OMCD	12/12/2001	Tiwi	22.814310	59.265440	Y	M		1250	
896	I	OMCD	20/02/2003	Sawadi	23.783330	57.783330	Y	F	J	1500	
902	I	OMCD; 3rd Party	23/04/2003	Sohar, Majiz al Khubra	24.461141	56.651569	Y	UK	A		*
940	DS	OMCD	30/01/2006	Masirah Island	20.574960	58.935840	Y	UK			
977	I	OMCD	16/01/2008	Darsayt	23.632440	58.544130	Y	M	A	1590	
1022	I	OMCD; MECA	02/06/2012	Saham	24.168806	56.889055	Y	F	A	1550	*
1031	I	OMCD; MECA	18/04/2012	Lakbi	18.181697	56.452720	Y	UK	A		*
1032	I	OMCD; MECA	21/02/2012	Shinas	24.709028	56.485547	Y	UK	A	1200	*
1057	I	OMCD; MECA	05/06/2010	Mussanah	23.842258	57.411002	Y	UK	C	350	*
1061	I	OMCD	13/03/2010	Sohar	24.523820	56.599019	Y	M	C	4000	*
1105	I	OMCD; 3rd Party	08/09/2013	Saham	24.111577	56.919700	Y	UK	J	960	*
1137	I	OMCD; 3rd Party	25/05/2010	Masirah Island	20.376150	58.809188	Y		UK		*
1157	I	OMCD	23/04/2015	Khuwair	23.605489	58.420312	Y	UK	SubA	920	
995	I	OMCD; MECA	11/07/2009	Shinas	24.737600	56.459780	Y	M	A		*
1030	I	OMCD	05/12/2011	Cat Island	23.581888	58.609609	Y	UK	A	900	*
	I	UAE Dolphin Project Database; 3rd Party	May-12	Fujairah Port, UAE	25.157122	56.357270	Y	M		1300	
	I		May-14	Fujairah, UAE			Y				

Appendix III. Table of sperm whale (*P. macrocephalus*) samples and specimens from Oman. Samples labelled ‘ONHM’ are skeletal specimens curated at the Oman Natural History Museum.

Date Collected	Individual Sample record	Location	Live/ Dead	Type	In ESO Freezer
31/05/2006	31-05-06-??	Sidab	live	biopsy	Yes
31/05/2006	31-05-06-??	Sidab	live	biopsy	Yes
31/05/2006	31-05-06-01	Sidab	live	biopsy	Yes
31/05/2006	31-05-06-04	Sidab	live	biopsy	Yes
31/05/2006	31-05-06-05	Sidab	live	biopsy	Yes
31/05/2006	31-05-06-06	Sidab	live	biopsy	Yes
31/05/2006	31-05-06-07	Sidab	live	biopsy	Yes
17/02/2010	17-02-10-01	Ras al Hadd/Sur	live	biopsy	Yes
17/02/2010	17-02-10-02	Ras al Hadd/Sur	live	biopsy	Yes
17/02/2010	17-02-10-04	Ras al Hadd/Sur	live	biopsy	Yes
17/02/2010	17-02-10-05	Ras al Hadd/Sur	live	biopsy	Yes
17/02/2010	17-02-10-06	Ras al Hadd/Sur	live	biopsy	Yes
28/02/2012	28-02-12-01	Hasik	live	biopsy	Yes
28/02/2012	28-02-12-02	Hasik	live	biopsy	Yes
28/02/2012	28-02-12-03	Hasik	live	biopsy	Yes
01/03/2012	01-03-12-01	Hasik	live	biopsy	Yes
27/10/2012	ESO1-27-10-12-C-01	Hasik	live	biopsy	Yes
28/10/2012	ESO1-27-10-12-C-02	Hasik	live	biopsy	Yes
29/10/2012	ESO1-27-10-12-C-03	Hasik	live	biopsy	Yes
12/12/2001	12-12-01-01	Tiwi	dead	tissue	Yes
20/02/2003	20-02-03-01	Sawadi	dead	tissue	Yes
26/02/2006	26-02-06-01	Masirah Island	dead	tissue	Yes
17/01/2008	17-01-08-01	Darsait	dead	tissue	Yes
29/01/2008	29-01-08-01	Al Batinah?	dead	tissue	Yes
11/07/2009	11-07-09-01	Shinas	dead	tissue	Yes
07/02/2010	07-02-10-01	Musunah	dead	tissue	Yes
13/03/2010	13-03-10-01	Sohar	dead	tissue	Yes
05/06/2010	05-06-10-01	Musunah	dead	tissue	Yes
01/03/2011	01-03-11-01	Salalah	dead	tissue	Yes
03/06/2012	03-06-12-01	Saham	dead	tissue	Yes
??/06/2012	Jun-12	Lakabi	dead	tissue	?
??/06/2012	Jun-12	Lakabi, Near Pink Lagoon	dead	tissue	?
07/06/2008	07-06-08-C-01	Shinas	dead	tissue	?
31/12/2008	31-12-08-C-01	Sorqah	dead	tissue	?
10/07/2009	10-07-09-C-01	Shinas	dead	tissue	?
20/01/2008	20-01-08-C-01	Batinah coast	dead	tissue	?
18/04/2012	18-04-12-C-01	Lakbi	dead	tissue	?
21/02/2012	21-02-12-C-01	Shinas	dead	tissue	?
12/04/2009	12/04/2009	Batinah coast	dead	tissue	?
05/12/2011	05-12-11-C-01	Cat Island	dead	tissue	?
08/09/2013	08-09-13-C-01	Saham	dead	tissue	?
25/05/2010	25-05-10-C-01	Masirah Island	dead	tissue	?
23/04/2015	23-04-15-C-01	Khuwair	dead	tissue	?
07/04/1981	ONHM 29	Sohar	dead	bone	N
13/09/1986	ONHM 866	Barka	dead	bone	N
??/05/2014	tba	Fujairah, UAE	dead	tissue	N