

Sighting of Whales and Dolphins in the Arabian Sea off Oman during 2007-2008

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Abstract

During the fishery survey cruises of *R. V. Al Mustaqila 1* conducted in the Arabian Sea EEZ of Oman between September 2007 and September 2008, three species of whales such as humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*) and killer whale (*Orcinus orca*) and, two species of dolphins, namely the long-beaked common dolphin (*Delphinus delphis*) and spinner dolphin (*Stenella longirostris*) were recorded along with few unidentified whales and dolphins. Most whale sightings (85%) were recorded between Ras al Hadd to Ras Madrakah at depths ranging from 20 m to 200 m during April, May, September—November usually with 1—6 individuals. The seasons of sighting of dolphins were during February and May (17 sightings) and September and November (11 sightings) between Ras al Hadd and Ras Soqarah and 70% of the sightings recorded less than 100 individuals. While the temperature of the water in the survey ranged from 18.4 C to 24.7 C, there was less variation in salinity (35.68, 36.62 ppt) of the water. The current study indicated that the Arabian Sea off Oman is an important site for the distribution of the ceatacean fauna.

Key words : Cetaceans, Arabian Sea, Oman, Whales, Dolphins.

Whales, dolphins and porpoises belong to the mammalian order, Cetacea which can be divided into 14 families, and are represented by as many as 85 species under 40 genera (1). Over 130,000 more whales had been caught from the world oceans than had been officially disclosed and most of them were below the legal size were lactating females or were caught in restricted area and seasons (1, 2). The cetaceans in the Arabian waters (Arabian Gulf, Oman Sea, Arabian Sea and Red Sea) are approximately a quarter of the worlds cetacean species and even few of them be considered subspecies unique to Arabian (1). Five species of baleen whales (Mysticeti) and 18 species of toothed whales, dolphins and porpoises (Odontoceti) occur in waters of the Arabian Peninsula (1, 3—5) (Table 1). Among the baleen whales (brydes whales, humpback whales and blue whales) encountered in Arabian waters, the blue whales are relatively rare (1). However, during November 1963, the erstwhile Soviet whaling fleet hunted 3,339 whales comprising of 1,294 blue whales, 954 sperm whales, 849 bryde whales and 242 humpback whales from the

Arabian Sea (1). Besides, sightings of unidentified beaked whales, including those in northern Indian Ocean waters, hint at the possible occurrence of additional undescribed species (1). The present paper reports the additional information on the sighting of the whales and dolphins in the Arabian Sea off the coast of Oman during the fishery resources survey conducted between September 2007 and September

Table 1. Cetacean species in scas of Arabian Peninsula. Source : Reeves et al. (3), Baldwin and Salm (5), Baldwin et al. (4, 8); Baldwin (1).

Suborder Mysticeti : Baleen whales	
Family Balaenopteridae	
Common name	Species name
Blue whale	<i>Balaenoptera musculua</i>
Fin whale	<i>Balaenoptera physalus</i>
Bryde's whale	<i>Balaenoptera edeni</i>
Minke whale	<i>Balaenoptera acutorostrata</i>
Humpback whale	<i>Megaptera novaeangliae</i>
Suborder Odontoceti : Toothed whales and dolphins	
Family Physeteridae	
Sperm whale	<i>Physeter macrocephalus</i>
Dwarf whale	<i>Kogia simus</i>

Table 1. Continued.

Suborder Mysticeti : Baleen whales	
Family Balaenopteridae	
Common name	Species name
Family : Ziphiidae	
Cuvier's beaked whale	<i>Ziphius cavirostris</i>
Family Delphinidae	
Melon-headed whale	<i>Peponocephala electra</i>
Pygmy killer whale	<i>Feresa attenuata</i>
False killer whale	<i>Pseudorca crassidens</i>
Killer whale	<i>Orcinus orca</i>
Rough-toothed dolphin	<i>Steno bredanensis</i>
Indo-Pacific humpback dolphin	<i>Sousa chinensis</i>
Common dolphin	<i>Delphinus delphis cf tropicalis</i>
Bottlenose dolphin	<i>Tursiops truncatus</i>
Risso's dolphin	<i>Grampus griseus</i>
Spotted dolphin	<i>Stenella attenuata</i>
Striped dolphin	<i>Stenella coeruleoalba</i>
Spinner dolphin	<i>Stenella longirostris</i>

Table 2. Details of surveys of *RV Al Mustaqila 1* in the Arabian Sea.

Number of survey	Season	Period
Survey 1	Late SW monsoon to inter-monsoon	12 Aug 2007 to 27 Sep 2007
Survey 2	NE monsoon period	1 Nov 2007 to 17 Dec 2007
Survey 3	Spring inter-monsoon	27 Jan 2008 to 13 Mar 2008
Survey 4	Pre SW monsoon	20 Apr 2008 to 5 Jun 2008
Survey 5	Late SW monsoon to inter-monsoon period	3 Aug 2008 to 18 Sep 2008

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Methods

The survey area for the sighting of whales and dolphins covered the EEZ of the Sultanate of Oman

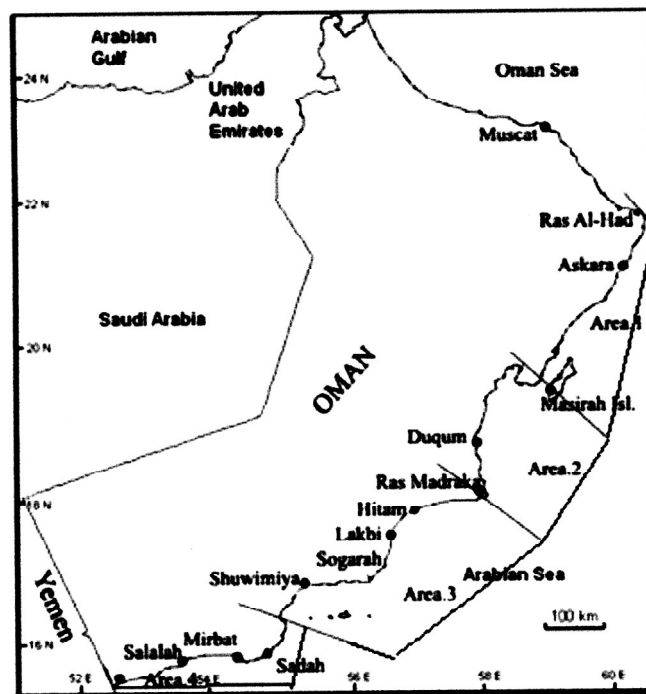


Figure 1. Arabian Sea survey areas from Ras al Hadd in the north to Salalah in the south.

Table 3. Details of sightings of humpback whale.

Date	Time of day (h)	Location Lat (N) Long (E)	Number of individual (s)	Estimated depth (m)	Distance from boat (m)	Weather	Behavior and Notes
23/9/2007	15:00	19° 57.04' 58° 09.44'	2	20-30	400	Calm	In amongst of surface baitfish
13/11/2007	17:30	18° 44.07' 57° 47.07'	1	30	4 km	Calm	Breaching
17/11/2007	08:00	20° 00.16' 58° 04.46'	1	20	8	Fine	Entangled in fishing set net
28/11/2007	11:20	18° 52.05' 57° 56.03'	2	180	200	Wind 15 knots N, 0.5 swell, 0.5 m	Swimming steadily
6/2/2008	16:59	20° 20.43' 58° 14.10'	1	21.6	600	Moderate	Splashing with fin on surfaces, tail and fin slaps
14/03/2008	13:37	19° 18.45' 57° 50.15'	1	32	300	Calm	Dived
25/4/2008	09:40	21° 21.75' 59° 34.34'	1	230	10	Flat	Breaching
25/4/2008	12:40	21° 20.42' 59° 33.40'	1	300	50	Flat, no swell	Breaching, slapping flippers on surface, slapping tail on surface
6/8/2008	05:35	22° 07.7' 59° 47.7'	6	115	100	Sea smooth, no wind	Slow swimming
7/10/2008	12:29	19° 01.33' 57° 59.76'	2	90	500	Calm	Traveling

between Ras al Hadd and the Oman-Yemen border in the depth varying from 20 m in the coastal waters to the continental slope extending to deeper waters up to 100 nm offshore (Fig. 1). The survey covered the main seasons of a year, with an overlap of one season between September 2007 and September 2008. Five seasonal survey cruises were conducted for a total of 238 days with an average of 47 days per cruise (Table 2) by the *RV Al Mustaqila 1* which is 45.2 m long and fitted with 3,206 hp engine (1,225 GT).

Table 4. Humpback whale : comparison between present and previous studies.

Details	Present survey	Previous survey
Population	Could only small population	Few hundred individuals (1) Baldwin
Season of sighting	August to November few in February to April	Greatest number in November, March and May (3, 6, 12)
Depth of sighting	Between 20 and 300 m	Less than 50 m (1)
Number of individuals each sighting	One or two	One or two (1)

The sightings of cetaceans were made during day time between 0600 and 1800 h. During the survey, data on the sighted whales and dolphins such as location (latitude and longitude), date and time, number of individuals, weather condition, behavior, depth, distance from boat, associated animals such as other marine mammals and birds were recorded in the proforma 'Whales and Dolphins Sighting Report Form' used by the Ministry of Fisheries Wealth, Oman. During the survey, the temperature and salinity of the

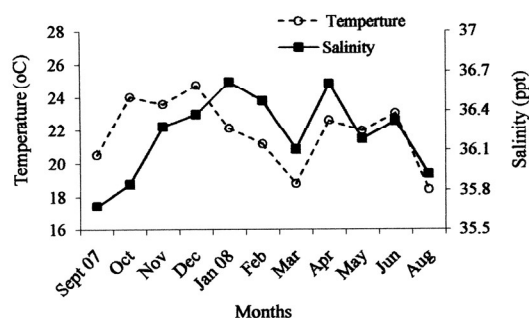
**Figure 2.** Monthly distribution of temperature and salinity of seawater.

Table 5. Details of sightings of sperm whale.

Date	Time of day (h)	Location Lat (N) Long (E)	Number of individuals	Estimated depth (m)	Distance from boat (m)	Weather	Behavior and notes
19/9/2007	13:45	21° 38.26' 59° 38.26'	4	63	200-800	Moderate	Moving, birds above 2 whales
15/5/2008	16:40	20° 41.73' 59° 21.40'	80-100	1000	50-300	Wind 14 knots SW	Swimming beside boat, sticking head out of water looking at boat
8/7/2008	09:45	21° 39.56' 54° 39.50'	2	172	100	Calm	Dive

water in 20–250 m depth range were collected by XR-420 and XR-620 CTDs deployment.

Results and Discussion

Distribution of Temperature and Salinity of Water

During the survey, while monthly average temperature of water in the region ranged between 18.4 C (August) and 24.7 C (December), salinity of water varied from 35.68 ppt (September) and 36.62 ppt (January) (Fig. 2). The temperature distribution of the wa-

ter had bimodal oscillation. The temperature value increased from 20.5 in September 2007 to form the peak in December 2008 and thereafter the values decreased drastically during subsequent months and reached a lower value of 18.8 C in March 2008. The second minor peak was observed during June (23.0 C). There was not much variation in the salinity of the water during various months and the difference between the minimum and maximum values was only 0.94 ppt. However, the monthly trend of salinity distribution was almost identical to that of temperature values.

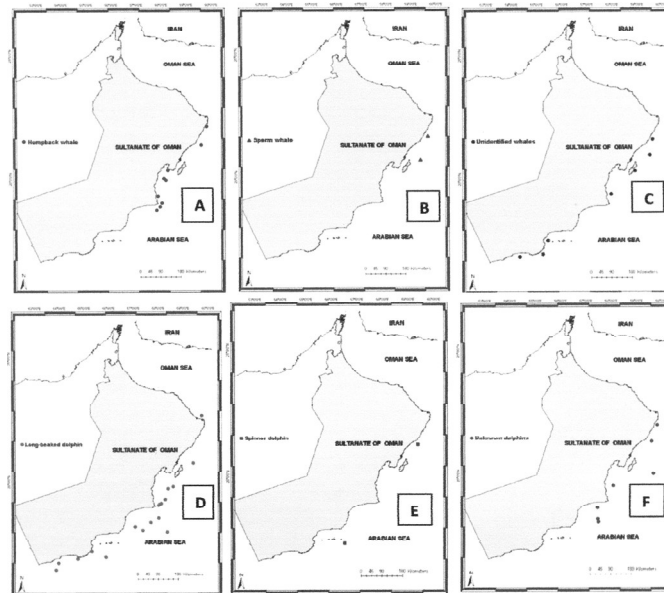


Figure 3. Sightings of whales and dolphins in the Arabian Sea. (A) Humpback whales; (B) Sperm whales; (C) Unidentified whales; (D) Long-beaked dolphins; (E) Spinner dolphins and (F) Unidentified dolphins.

Table 6. Sperm whale : comparison between present and previous studies.

	Present survey	Previous survey
Population	Few, but could find in high population	21 sighting in Omani waters (8)
Season of sighting	May, Jul and Sep	March to July (Baldwin et al. unpublished) All months except February and August
Depth of sighting	63; 172 and 1000m	More than 100m; mostly in depth (500-1750 m) (8, 9)
Number of individuals each sighting	2; 4; 80-100	Common single or two to 6 (could find 20–50) (10–12)

Sighting of Whales

During the survey, three species of whales such as humpback whale *Megaptera novaeangliae*, sperm whale *Physeter macrocephalus* and killer whale (*Orcinus orca*), and two species of dolphins, the long-beaked common dolphin *Delphinus delphis* and spinner dolphin *Stenella longirostris* were recorded. On few occasions, unidentified whales and dolphins were also recorded.

Humpback Whale (*Megaptera novaeangliae*)

The humpback whale was recorded ten times

Table 7. Killer whale : comparison between present and previous studies.

	Present survey	Previous survey
Population	Few	Few (10)
Season of sighting	–	Summer months
Depth of sighting	2,435m	–
Number of individuals each sighting	4	7–8 (10, 14)

during the survey which was the highest species recorded among the whales (Table 3). Most of the sightings were between August and November (60%) and the other sighting records were between February to April (40%). However previous records show a restricted period of sightings during March and May (3, 6).

All humpback whales sightings were between Ras Al Hadd and Ras Madrakah (Fig. 3A) in one or two individuals except one case that found a pack of six individuals at depth of about 115 m (50% at depth less than 100 m). During the survey one humpback whale was found entangled in fishing set net.

The sightings of this species on ten occasions, mostly in one or two individuals indicated the presence of small population in the Arabian Sea of Oman. This is in agreement with the earlier studies in Omani waters (5) in that the population of this species would

Table 8. Details of sightings of unidenfied whales.

Date	Time of day (h)	Location Lat (N) Long (E)	Number of individual(s)	Estimated depth (m)	Distance from boat (m)	Weather	Behavior and notes
7/10/2007		18° 84.04' 57° 55.39'	1	105	1 km	Calm	At surface
15/5/2008	10:47	20° 19.63' 50° 51.98'	2	64	100-200	Flat, wind 13knot SW	Cruising at surface
15/5/2008	18:00	20° 57.80' 59° 27.64'	2	272	600	Calm	Sporting in distance
26/05/2008	09:43	17° 30.99' 55° 25.66'	2	63	1.8km	Sea calm, wind 14 knots SW	Sporting in distance
28/5/2008	07:30	17° 58.92' 56° 24.52'	More than 2	111	200	1 meter SW swell, wind 6 knots	Sporting in distance
30/5/2008	07:59	16° 51.92' 54° 18.24'	3	800	300	Wind 7 knots SW	Sports visible
8/6/2008	08:15	21° 36.12' 59° 34.18'	1	54	200	Wind 6 knots SW	At surface, breaching beside dhow
8/9/208	13:30	16° 57.91' 55° 14.01'	1	1500	1.8 km	Calm	Cruising at surface

Table 9. Details of sightings of long-beaked common dolphin.

Date	Time of day (h)	Location Lat (N) Long (E)	Number of individuals	Estimated depth (m)	Distance from boat (m)	Weather	Behavior and notes
22/09/2007	07:10	20° 46.17' 59° 21.81'	≈15	154	400	Calm, wind 5.5 knots	Appeared to be feeding, some came to boat rode bow wave for a short time
8/10/2007	06:05	19° 05.45' 58° 02.04'	30	94	30	Calm, wind 6 knots N	Came to vessel briefly
3/11/2007	14:45	18° 31.32' 57° 58.67'	≈100	168	5-200	Calm, sunny, 0.5 m swell	Speed, breaching spinning, tail bashing
5/11/2007	08:35	18° 10.33' 57° 02.30'	30 or more	50	100	Flat	Breaching
15/11.2007	16:00	19° 43.39' 58° 21.75'	200-300	96	50-800	Calm, no wind	Traveling in speed
27/11/2007	16:30	19° 07.40' 58° 06.09'	≈150	113	Around the boat	Wind 7 knots, 0.5 swell	Breaching, spinning, tail slapping
28/11.2007	08:10	19° 01.52' 57° 58.46'	250	100	Around the boat	Wind 18knots, 0.5 m swell, 0.5 m wave	Breaching, playing in waves
3/3/2008	15:38	19° 17.49' 58° 15.20'	Several thousand	941	20	Calm, wind 4.9 knots	Over wide area, feeding, show little interest in ship (associated with few small birds)
11/3/2008	14:30	16° 42.07' 53° 55.88'	100-150	250	–	Calm, 8 knots	Traveling, came to ship and jumping
13/3/08	12:05	16° 25.55' 53° 49.41'	100	2000	300	Flat, calm	Traveling and jumping
1/5/2008	13:15	19° 48.00' 58° 34.00'	50	330	100	Calm, sunny	Bow riding, breaching, swimming
11/5/2008	6:44	17° 58.10' 58° 18.89'	200	196	–	10knots SW, 0.2m SW swell	Swimming quickly
14/5/2008	15:50	18° 21.29' 57° 39.41'	50	380	–	Calm, slight swell	Swimming, breaching
16/5/2008	10:22	22° 28.07' 59°43.39'	50	750	100-200	5knots, 78°, sea calm	Traveling at pace, out from beach
28/5/2008	10:00	17° 10.27' 55° 17.11'	200	100	All around the boat	1m SW swell, 5 knots, SW wind	Swimming fast
29/5/2008	11:15	16° 56.46' 51° 51.17'	≈100	603.9	100	8 knots SW	Jumping and traveling
29/5/2008	14:20	16° 53.26' 54° 43.10'	≈100	1500	20-200	10 knots SW, 1 m swell	Jumping
20/8/2008	7:11	18° 02.04' 57° 20.47'	500	200.39	20 and more	Moderate sea	Passing at speed

be with few hundred individuals. Most humpback whales have been seen in water depth of less than 50 m either singly or in pairs (1, 7); however, in this survey the sighting depth ranged from 20 to 300 m (Table 4). Though, mating season in this whale has been reported to be from January to May and calving to peak in early February, during the present survey, no calf accompanying the adult was recorded.

Sperm Whame (*Physeter macrocephalus*)

Sperm whales were sighted between Ras al Hadd

and Masirah Island on three occasions during May, July and September with four, two and 80-100 at the depths of 63 m, 172 m and 1,000 m respectively (Table 5; Fig. 3B). Sperm whales have been recorded in the region during all months of the year except February and August (8). However, the sighting season of sperm whales was slightly different (March to July) in the previous surveys from the Omani waters (8). Similarly, while the depth of occurrence of sighting of sperm whales was in more than 500 m in earlier sur-

Table 10. Long-beaked common dolphin : comparison between present and previous studies.

	Present survey	Previous survey
Population	Most common cetacean	Second common species in Omani water (9)
Season of sighting	Common in May and November	March (9)
Depth of sighting	Common in depth 50-500 m	Common in depth 200-1000
Number of individuals each sighting	Common from 15-200 thousands could reach to several	30-500 with a maximum up to 1800 (4)

veys (8, 9), in this survey two sightings were in depth less than 200 m (Table 6).

Though, this whale occurs in groups of 20-50 individuals, single animal or small pods of 2—6 individuals are common (8—12). During a cetacean survey in the Northern and Southern Indian Ocean during March-July 1995, sperm whales were encountered with 99 sightings, including 21 off Oman (13). The present survey results indicate that the population of sperm whale in Arabian Sea might be in low numbers. The variation in depth, season of occurrence and population between this survey and previous surveys could be due the variation in survey seasons and depths (Table 6).

Killer Whales (*Orcinus orca*)

Four killer whales, one large, one small and two medium sized, were sighted only once in Salalah area at lat. 16°08.81' and long. 53°43.40'. The whales occurred at the depth region of 2,435 m when the water was calm and were swimming at the surface. Earliest record in the region was of a sighting of eight in Janu-

ary 1980 off the Arabian Sea coast of Oman (14). The present survey results indicate that this species has wider distribution in Oman Sea and Arabian Sea, but with a small population (Table 7).

Unidentified Whales

Eight sightings of unidentified whales were recorded from Ras al Hadd to Salalah at depths varied from 50—1500 m (Table 8; Fig. 3C). Most of them were found in one or two individuals. Most of them were found in May and June with one record each during September and October.

Sightings of Dolphins Long-beaked Common Dolphin (*Delphinus delphis*)

Eighteen sightings of long-beaked common dolphins were recorded in the Arabian Sea between Ras al Hadd and Salalah (Table 9); however, most of them were found between Masirah Island and Ras Soqarah (60%). Three sightings were recorded in March, seven in May, five in November and one each in August, September and October. The season of occurrence of long-beaked common dolphin recorded in May and November presently varied from the earlier report (9) that recorded the sightings during March.

This dolphin occurs over continental shelf waters of coastal Arabia in larger groups of up to 1,800 individuals and more commonly in groups of 30—500 individuals (1). The number of individuals in each sighting ranged between 15 and 200, except once the number reached beyond thousand. The depth of sighting varied between 50 m and 2000 m. However, most of sightings were in 94 m to 1000 m depth (Tables 9 and 10; Fig. 3D). In a previous study occurrence of

Table 11. Details of sightings of spinner dolphin.

Date	Time of day (h)	Location Lat (N) Long (E)	Number of individuals	Estimate depth (m)	Distance from boat (m)	Weather	Behavior and Notes
2/11/2007	08:15	21° 13.98' 59° 22.11'	≈50	60	300	Calm, 1 m swell	Swimming, leaping, spinning, breaching
7/9/2008	11:00	17° 20.25' 56° 29.52'	20 adults	2800	50-100	Calm	Feeding

Table 12. Spinner dolphin : comparison between present and previous studies.

	Present Survey	Previous survey
Population	Few hundreds	21,000 in group of 1—800 in Oman Sea (8, 9)
Season of sighting	September and November	February and October (9)
Depth of sighting	60 and 2800m	Deep water (9)
Number of individuals each sighting	20—50	20—700 (9)

this species was found at depths ranged from 200—1,000 m (9).

The species *Delphinus delphis* is the most common cetacean off Oman (8) and is likely to be a subspecies of the long-beaked common dolphin, namely *D. delphis tropicalis* distributed in the Arabian Sea and Gulf of Aden (1).

Spinner Dolphin (*Stenella longirostris*)

Spinner dolphin measuring less than 2 m in length has long slender beak and the habit of leaping up to three metres in the air and spinning like a barrel be-

fore slapping back down into the water gave this dolphin its common name (1). This dolphin is the most common species encountered in deeper waters off Oman (15). About 50 individuals were recorded during November 2007 in the north of Masirah Island at a shallower depth of 60 m and with 20 individuals during September 2009 near Demaniat Island at 2,800 m depth (Tables 11 and 12; Fig. 3E). The school size recorded during the survey was small compared to the earlier studies where the size of the school reached 700 individuals (9) and 1,800 individuals (1). The present survey indicates that this species is occurring both in shallower and in deeper waters.

Unidentified Dolphins

Sightings of dolphins which could not be identified were made in waters between Ras al Hadd and north of Demaniat Island during February (5 sightings) and, during April, May, September and October one sighting each (Table 13). The school size ranged from 1 to 150 individuals and the depth of sights ranged from 20 m to 2,500 m (Table 13; Fig. 3F).

The other odontocete cetaceans like Frasters dolphin (*Lagenodelphis hosei*) and the pygmy sperm whale (*Kogia breviceps*) recorded in the northern Indian Ocean waters (1, 8, 9) have not been sighted

Table 13. Details of sightings of unidentified dolphins.

Date	Time of day (h)	Location Lat (N) Long (E)	Number of individual(s)	Estimated depth (m)	Distance from boat (m)	Weather	Behavior and Notes
6/2/2008	13:18	20° 03.71' 59° 38.23'	150	81	100	Rough	Moving quickly, jumping
9/2/2008	17:50	19° 35.01' 58° 03.00'	1	20	—	NE 13knots, swell 1 m NE	—
17/2/2008	15:40	18° 15.05' 57° 25.74'	50	180	400	Calm	—
21/2/2008	09:10	18° 07.71' 57° 26.78'	50-100	276	500	Calm	In transit, leading dolphin jumping
28/2/2008	13:00	22° 10.83' 60° 13.90'	4-5	1500	200	Calm	Traveling
25/4/2008	09:37	21° 21.85' 59° 34.30'	30	175	50	Calm	Swimming moderate speed
9/5/2008	08:39	18° 42.31' 57° 24.80'	30	61	10	Flat	Jumping out of the water, moving quickly
14/9/2008	11:00	—	2-3	131	—	Calm	Appeared to be communicating with each other
11/10/2008	06:00	22° 01.26' 59° 47.78'	80	74	200	Calm	Feeding

during the period of study. Similarly, the most common bottlenose dolphin recorded in Omani waters (9) was not sighted in this survey.

High levels of prey availability would be the primary factor in determining habitat choice of the cetaceans in the Arabian Sea. However, population estimates of cetaceans in the region are lacking and the status of most species remains unknown. The increased human activity, fishing, pollution, shipping and general habitat degradation and loss to the environmental quality due to coastal and offshore development in the region might be the threats to cetaceans. Also, hydrocarbon pollution and the toxins originating from harmful algal blooms would cause mortality in some cases. Further extensive surveys on the cetaceans in the coastal and offshore waters of Oman are required to obtain more representative seasonal coverage and to include regions that were not accessible during previous surveys.

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