Marine mammal records from Iran

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ABSTRACT

Iran has 1,700km of coastline that borders the Persian Gulf and the Arabian Sea in the northwest Indian Ocean. Apart from a handful of records, almost nothing is known about which marine mammal species occur in Iranian waters. This review was conducted to fill this information gap. A total of 127 marine mammal records of 14 species were compiled from Iranian coastal waters. Ninety-nine were from the Persian Gulf, 26 from the Gulf of Oman and 2 were of unknown location. Records of finless porpoise (*Neophocaena phocaenoides*) (25), Indo-Pacific humpback dolphin (*Sousa chinensis*) (24) and Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) (22) were by far the most numerous, a probable reflection of their inshore distribution and local abundance. Other species recorded were long-beaked common dolphin (*Delphinus capensis tropicalis*), rough-toothed dolphin (*Steno bredanensis*), striped dolphin (*Stenella coeruleoalba*), spinner dolphin (*Stenella longirostris*), Risso's dolphin (*Grampus griseus*), false killer whale (*Pseudorca crassidens),* sperm whale (*Physeter macrocephalus*) and dugong (*Dugong dugon*). Records of 26 mysticetes were compiled, 10 of which were tentatively identified as Bryde's whales (*Balaenoptera edeni*), 1 possible fin whale (*Balaenoptera physalus*), 3 humpback whales (*Megaptera novaeangliae*) and the remainder were not identified to species. The largest threat to small cetaceans in Iran is likely to be incidental capture in fishing gear. Nine finless porpoises were recorded as bycatch and this and other coastal species may be declining due to unsustainable mortality rates. Some of the world's busiest shipping lanes pass through Iranian waters and ship strikes are likely to be the largest threat to mysticetes in the area.

KEYWORDS: DISTRIBUTION; NORTHERN HEMISPHERE; INDIAN OCEAN; IRAN; SIRENIA; STRANDINGS; CONSERVATION; PERSIAN GULF; FINLESS PORPOISE; INDO-PACIFIC HUMPBACK DOLPHIN; LONG-BEAKED COMMON DOLPHIN; ROUGH-TOOTHED DOLPHIN; STRIPED DOLPHIN; SPINNER DOLPHIN; RISSO'S DOLPHIN; FALSE KILLER WHALE; SPERM WHALE; BRYDE'S WHALES; FIN WHALE; HUMPBACK WHALE.

INTRODUCTION

The southern coast of the Islamic Republic of Iran is 1,700km in length, and is bordered to the east by Pakistan and to the west by Iraq (Fig. 1). There are four coastal provinces, from west to east: Khuzestan, Bushehr, Hormozgan, and Sistan and Baluchistan. The marine environment of Iran includes two very different habitats; the Persian Gulf, a warm, hyper-saline, shallow and enclosed sea and the Gulf of Oman, a relatively more exposed and deep component of the Arabian Sea in the northwest Indian Ocean. The Persian Gulf is connected to the Gulf of Oman by the Straits of Hormoz, a channel approximately 50km wide and 100m deep at its narrowest point (Fig 1). Qeshm Island, 120km long and up to 30km wide, is the largest island in the Gulf and is separated from the Iranian coast by the narrow Khurran Straits. The Hara Protected Area lies on the north coast of Qeshm Island encompassing 100,000ha of mangrove and inter-tidal channels (see Fig. 2b). Established in 1972, it is the largest marine protected area in Iran.

In Iranian waters of the Persian Gulf, extensive shallow areas less than 25m deep exist adjacent to Iraq and around Qeshm Island. Water enters the enclosed Persian Gulf through the Hormoz Straits and a density and wind driven counter-clockwise current flows northwest along the Iranian coast and then southeast along the Arabian coast with a turnover time that ranges from 3 to 5.5 years (Sheppard, 1993). As a consequence of the extreme aridity and high summer temperatures (up to 48ºC) in the region, evaporation exceeds freshwater input tenfold creating extremely high salinity, commonly measured at 40-50ppt and up to 70ppt in shallow, enclosed bays in the southeast (Sheppard, 1993) and highly variable sea surface temperatures between 12ºC and 35ºC (ROPME, 2003). The harsh environment of the Persian Gulf, combined with its recent geologic origin, have created biological communities characterised by low species richness and moderate to low primary productivity compared to the Arabian Sea (Price, 2002; Sheppard, 1993). In contrast, the Gulf of Oman exhibits characteristics typical of pelagic ecosystems having lower and less variable temperature and salinity, greater depth (>2,000m), and higher productivity and species richness (Reynolds, 1993; ROPME, 2003; Subba-Rao and Al-Yamani, 1998).

Important fisheries for *Penaeid* shrimp, grouper, jack fish and Spanish mackerel, exist in the Persian Gulf (Price *et al.*, 1993) and for large pelagics, especially tuna, and small pelagics, such as sardines and anchovies, in the Gulf of Oman (FAO, 2005). Iran has the largest fishing fleet and reports the largest landings in the region, however the fisheries sector contributes only 0.23% to the GDP of this rich nation (FAO, 2005). Purse seine fisheries for tuna in the Indian Ocean have been expanding, and in 2003 Iran landed 11,830t, 12% of western Indian Ocean tuna catches (FAO, 2005).

The Persian Gulf is far from pristine; it is one of the world's busiest shipping lanes, with approximately 25,000-35,000 oil tankers carrying about 60% of the world's oil passing through the Strait of Hormoz each year (UNEP, 1999). It has experienced three major wars: Iran-Iraq (1980-88), Gulf War (1991) and Iraq (2003), the world's largest oil spill (1 million tonnes of crude) in 1991; and multiple other large spills

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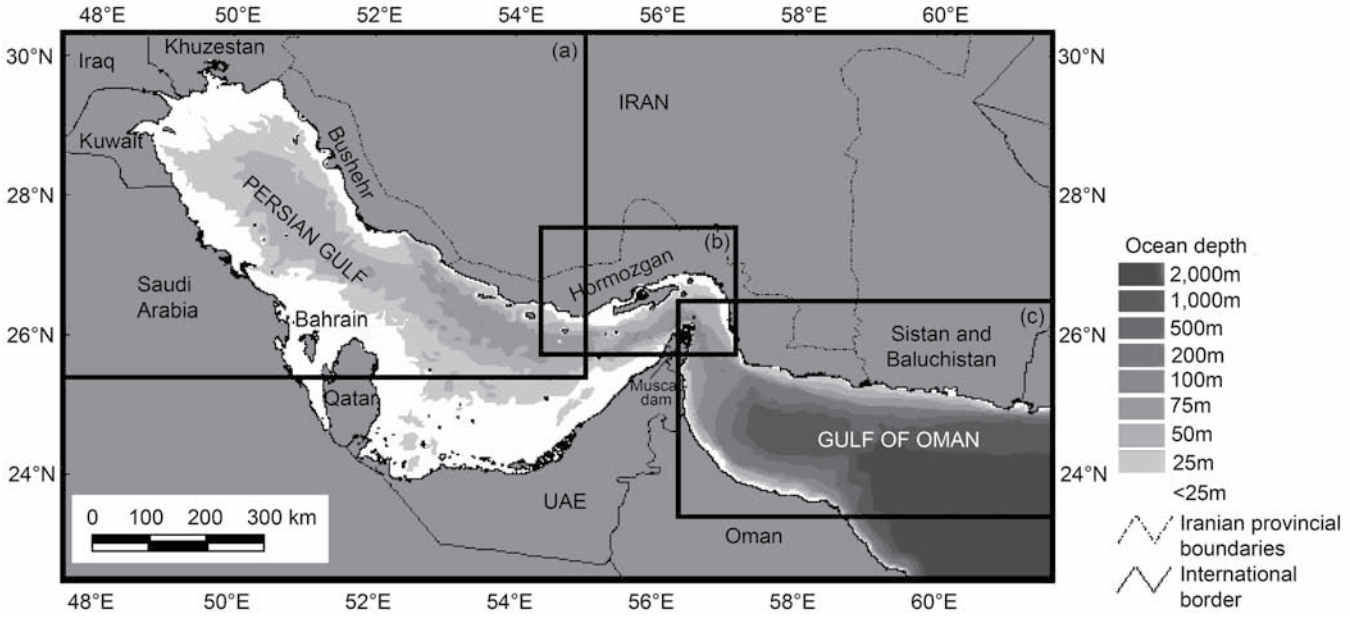

Fig. 1. Iran, the Persian Gulf and Gulf of Oman (English spelling of Farsi names are taken from those used on maps produced by the Gita Shenasi Cartographic and Geographic Institute, Tehran, Iran). For (a), (b) and (c) see Fig. 2

including the Nowruz spill in 1983 (Gerges, 1993; Price *et al.*, 1994; ROPME, 2003). As a result of normal oil extraction and transport it has been estimated that in a ten year period 1.5 million tonnes of oil are released into the Persian Gulf (Michel *et al.*, 1986). The World Conservation Monitoring Centre (WCMC, 1991) suggested that the Persian Gulf is the most oil polluted marine area in the world.

There have been at least two mass mortalities of cetaceans in the southern Persian Gulf: the first, in 1986 involved 520 cetaceans (comprising six from Iran) and was tentatively linked to a red tide event (Baldwin *et al.*, 1999; ROPME, 1986; Subba-Rao and Al-Yamani, 1998), the second, in 1991 around the time of the Gulf War oil spill, involved 71 dolphins and the cause was not determined (Preen, 2004; Robineau, 1998). Between 1986 and 1999, Preen (2004) recorded a 71% decline in cetacean abundance along the coast of the United Arab Emirates (UAE) in the Persian Gulf.

Almost nothing is known about the marine mammal species that inhabit the coastal waters of Iran other than a handful of records published in local journals, and the Iranian coastline is among the least studied marine areas in the world (Price *et al.*, 1994). This review was conducted to fill this information gap with the hope that it will stimulate future studies and conservation of the marine mammal fauna of Iran.

METHODS

From 17 November to 10 December 2005, marine mammal records were compiled during visits to universities, natural history museums, Department of Environment (DoE) offices, Iranian Fisheries Research Organisation (IFRO) centres and various wildlife non-governmental organisations (NGOs) in Tehran, Bushehr city, Kish Island, Bandar Abbas, Qeshm Island and Chabahar city. Security constraints restricted access to Khuzestan Province adjacent to Iraq and to the Pakistan border areas and time constraints limited the number of visits to smaller cities on the coast. Fewer marine mammal records from these areas reflect the lack of 'effort' rather than marine mammal abundance.

Cetacean skeletal remains are stored in a number of natural history museums in Tehran and in towns along the coast. Specimens were photographed and identification was made based on external and cranial morphology and tooth counts. Records were also compiled by the authors from good quality photographs or video recordings of marine mammal sightings and strandings. From January 2006 onwards, an informal stranding network was established and new strandings data were opportunistically collected and systematically collated. Records were compiled from published references in English and English translations of references in Farsi.

RECORDS

A total of 127 marine mammal records of 14 species were compiled from Iranian coastal waters of the Persian Gulf and Gulf of Oman. Ninety-nine were from the Persian Gulf, 26 from the Gulf of Oman and 2 were of unknown location. The largest numbers of records were from Qeshm Island (39) and Bushehr Provinces (32), which is probably because there are active marine biologists working in these locations. Records of finless porpoises, *Neophocaena phocaenoides* (25), Indo-Pacific humpback dolphins, *Sousa chinensis* (24) and Indo-Pacific bottlenose dolphins, *Tursiops aduncus* (22) were by far the most numerous, a probable reflection of their inshore distribution and local abundance. Other species recorded were long-beaked common dolphins (*Delphinus capensis tropicalis)*, rough-toothed dolphins (*Steno bredanensis),* striped dolphins (*Stenella coeruleoalba*), spinner dolphins (*Stenella longirostris*), Risso's dolphins *(Grampus griseus),* false killer whales (*Pseudorca crassidens),* sperm whales *(Physeter macrocephalus)* and dugongs (*Dugong dugon).* Records of 26 mysticetes were compiled, 10 of which were tentatively identified as Bryde's whales (*Balaenoptera edeni*), 1 as a possible fin whale (*Balaenoptera physalus*), 3 as humpback whales (*Megaptera novaeangliae)* and the remainder were not identified to the species level. Some individuals stranded and the skeleton was then collected, these are counted as a single record (see several mysticete records in Table 1). The location of each record has been plotted, using GPS data when available or described locations if they were relatively precise, on Fig. 2a (Southwest Iran coast), Fig. 2b (Qeshm Island and Hormozgan) or Fig. 2c (Gulf of Oman), and records are compiled in Table 1. The following is a description of Iranian marine mammal records by species and location.

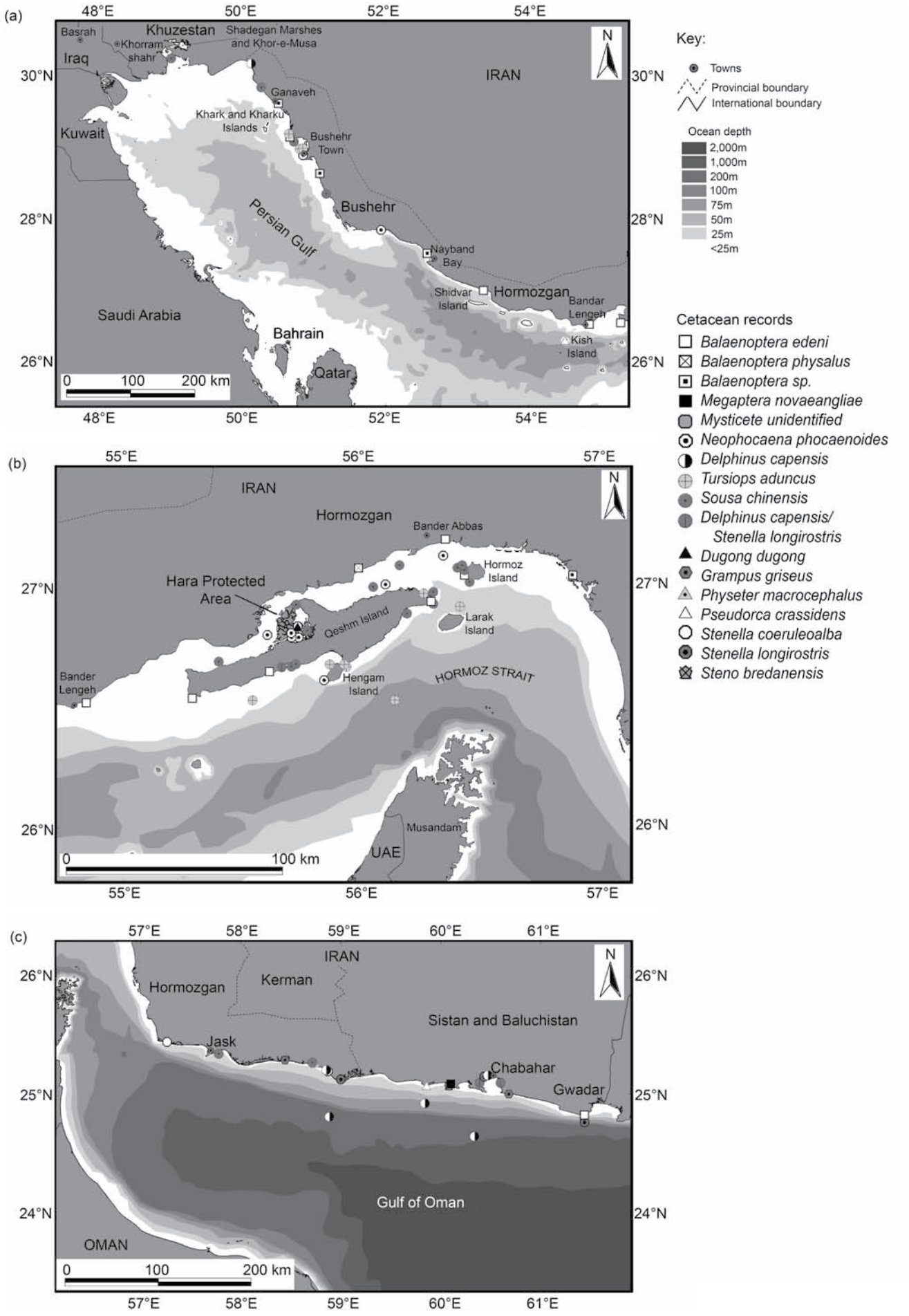

Fig. 2. Location of marine mammal records along: (a) the southwest coast of Iran; (b) in the vicinity of Hormozgan and Qeshm Island; and (c) in the Gulf of Oman, Iran.

Table 1

Records of marine mammals in Iran.

No.	Species	Type	Province	Location	Date	Notes	Source
Odontocetes							
4	*Tursiops aduncus*	Skull	Sistan/Baluchistan	IFRO, Chabahar	17/12/99	-	This paper
6	*Tursiops aduncus*	Skull/skeleton	Bushehr	Museum of Natural History, Tehran	-	-	This paper
14	*Tursiops aduncus*	Skull	Bushehr	IFRO Office, Bushehr city	1995	-	This paper
15	*Tursiops aduncus*	Skull	Bushehr	IFRO Office, Bushehr city	1995	-	This paper
16	*Tursiops aduncus*	Skull	Bushehr	IFRO Office, Bushehr city	1995	-	This paper
31	*Tursiops aduncus*[T]	Stranding	Bushehr	Near Bushehr city	1995	-	This paper
34	*Tursiops aduncus*[T]	Stranding	Bushehr	North of Bushehr city port	1994	-	This paper
42	*Tursiops aduncus*	Stranding	Bushehr	Bushehr city	1997	Animal had been skinned	This paper
43	*Tursiops aduncus*[T]	Sighting	Qeshm	Between Qeshm and Hengam Isl.	2005	Group of 10-20	This paper
48	*Tursiops aduncus*	Skull	Hormozgan	IFRO Office, Bandar Abbas	-	-	This paper
49	*Tursiops aduncus*	Stranding	Qeshm	South coast of Qeshm Island	2003	-	This paper
57	*Tursiops aduncus*	Skull	Qeshm	GeoPark Museum, Qeshm Island	-	-	This paper
58	*Tursiops aduncus*	Skull	Qeshm	GeoPark Museum, Qeshm Island	-	-	This paper
61	*Tursiops aduncus*[T]	Sighting	Qeshm	Between Qeshm and Hengam Isl.	10/02/06	-	This paper
68	*Tursiops aduncus*	Skull/skeleton	Qeshm	Hormuz Island. Stored in the Stuttgart museum	Jan. 1973	-	This paper
92	*Tursiops aduncus*[T]	Sighting	Qeshm	Between Hormoz and Larak Islands	23/01/73	10-12 animals	Pilleri and Gihr (1973-74)
93	*Tursiops aduncus*[T]	Sighting	Qeshm	Between Qeshm and Hengam Isl.	24/01/73	5 animals	As above
94	*Tursiops aduncus*[T]	Sighting	Qeshm	Southeast of Qeshm Island	26/01/73	Small group	As above
95	*Tursiops aduncus*[T]	Sighting	Offshore	10nm south of Qeshm Island, 26°31.9'N; 56°7.8'E	04/08/06	8-12 animals	This paper
104	*Tursiops aduncus*[T]	Stranding	Bushehr	Rood-e-Kolneh Creek, 15km S of Bushehr Port, 29°10.8'N; 50°38.8'E	24/06/07	-	This paper
115	*Tursiops aduncus*	Sighting	Offshore	Strait of Hormoz	08/07/84	Several small groups 75m deep	Weitkowitz (1992)
122	*Tursiops aduncus*[T]	Stranding	Qeshm	N Qeshm Island, 26°58.5'N; 56°15.0'E	01/11/07	-	This paper
7	*Sousa chinensis*	Skull/skeleton	Hormozgan	From Bandar Abbas. Stored at Uni of Tehran Zoological Museum	1974	-	This paper
21	*Sousa chinensis*[T]	Sighting	Hormozgan	East of Jask Port	1995	-	This paper
22	*Sousa chinensis*[T]	Sighting	Bushehr	Behrekan Bay	May 2003	-	This paper
25	*Sousa chinensis*[T]	Sighting	Khuzestan	Musa Creek, 30°14'N; 49°E	Mar. 1995	-	Anon. (1995a)
30	*Sousa chinensis*[T]	Sighting	Bushehr	Close to Bushehr town, 29°4.0'N; 50°43.0'E	29/11/05	1 mature male	This paper
45	*Sousa chinensis*[T]	Sighting	Hormozgan	Near Hormoz Island	-	-	This paper
50	*Sousa chinensis*[T]	Sighting	Qeshm	Salakh, south Qeshm Island	16/01/05	6+ animals	This paper
51	*Sousa chinensis*[T]	Sighting	Qeshm	Berkeh Kalaf, south Qeshm Island	27/07/05	10+ animals	This paper
56	*Sousa chinensis*	Skull	Qeshm	GeoPark Museum, Qeshm Island	-	-	This paper
60	*Sousa chinensis*[T]	Sighting	Qeshm	Zaitoon Park, south of Qeshm town	25/04/06	25 animals	This paper
80	*Sousa chinensis*	Sighting	Khuzestan or Bushehr	Near shore	22-29/09/91	7 individuals photo-id'd	Henningsen and Constantine (1992)
81	*Sousa chinensis*[T]	Sighting	Qeshm	NW of Qeshm Island in Clarence Strait	27/01/73	1 animal	Pilleri and Gihr (1973-74)
82	*Sousa chinensis*[T]	Sighting	Hormozgan	West tip of Hormoz Island	22/01/73	1 animal	As above
83	*Sousa chinensis*[T]	Sighting	Hormozgan	800m SW of Hormoz Island	23/01/73	12-15 animals	As above
84	*Sousa chinensis*[T]	Sighting	Qeshm	1 mile N of Dargahan, N of Qeshm Island	29/01/73	Large group	As above
85	*Sousa chinensis*[T]	Sighting	Qeshm	Near Qeshm town	29/01/73	2 animals	As above
86	*Sousa chinensis*[T]	Sighting	Hormozgan	South of Hormoz Island	30/01/73	16 animals	As above
87	*Sousa chinensis*[T]	Sighting	Qeshm	Hara Protected Area, Qeshm Island, 26°49.1'N; 55°45.9'E	29/01/00	1 animal	Keijl and van der Have (2002)
88	*Sousa chinensis*[T]	Sighting	Qeshm	Hara Protected Area, Qeshm Island, 26°55.6'N; 55°43.3'E	29/01/00	1 animal	As above
89	*Sousa chinensis*[T]	Sighting	Qeshm	Salakh, south Qeshm Island	Jul.2006	-	This paper
103	*Sousa chinensis*[T]	Sighting	Qeshm	Between Bandar Abbas and Qeshm Island	May 2007	-	This paper
106	*Sousa chinensis*[T]	Stranding	Bushehr	Leilatein Creek, north Bushehr coast, 29°49.8'N; 50°15.6'E	Oct. 2003	Neonate	This paper

Cont.

No.	Species	Type	Province	Location	Date	Notes	Source
Odontocetes cont.							
123	*Sousa chinensis*[a]	Stranding	Hormozgan	East of Jask, 25°34.5'N; 58°47.6'E	Dec. 2008	-	This paper
129	*Sousa chinensis*	Sighting	Khuzestan	Khor-e-Musa	11-14/02/54	-	Mörzer-Bruyns (1960)
12	*Neophocaena phocaenoides*	Skull	Bushehr	IFRO office museum, Bushehr	-	-	This paper
18	*N. phocaenoides*	Stranding	Bushehr	Stuffed, displayed in Aquarium shop	-	-	This paper
39	*N. phocaenoides*[b]	Stranding	Bushehr	Bushehr port, 28°52.8'N; 50°50.4'E	27/11/02	115cm	Anon. (2003a)
40	*N. phocaenoides*[a]	Sighting	Qeshm	Hara Protected Area, Qeshm Island, 26°47.2'N; 55°43.0'E	06/12/05	12 animals	This paper
41	*N. phocaenoides*	Stranding	Bushehr	Bushehr town	Mar. 1998	Bycatch, 145cm	Anon. (1998)
46	*N. phocaenoides*[a]	Stranding	Hormozgan	Bandar Abbas near IFRO office	Feb. 1995	Bycatch. 147cm long	Anon. (1995b)
52	*N. phocaenoides*[b]	Stranding	Qeshm	Hara Protected Area, Qeshm Island	27/01/03	Bycatch	This paper
54	*N. phocaenoides*[b]	Sighting	Qeshm	Hara Protected Area, Qeshm Island, 26°48.5'N; 55°41.9'E	06/12/05	4 animals	This paper
62	*N. phocaenoides*	Stranding	Bushehr	Flukes displayed in aquarium shop, Bushehr town	-	Bycatch	This paper
63	*N. phocaenoides*	Stranding	Bushehr	Flukes displayed in aquarium shop, Bushehr town	-	Bycatch	This paper
64	*N. phocaenoides*	Stranding	Bushehr	Flukes displayed in aquarium shop, Bushehr town	-	Bycatch	This paper
70	*N. phocaenoides*[b]	Sighting	Qeshm	Hara Protected Area, Qeshm Island	28/01/73	2 animals	Pilleri and Gihr (1973-74)
71	*N. phocaenoides*[a]	Sighting	Qeshm	N of Qeshm Island, near Dargahan	29/01/73	3 animals	As above
72	*N. phocaenoides*	Sighting	Sistan/Baluchistan	Chabahar	Winter 1971	-	Roberts (1977)
73	*N. phocaenoides*	Sighting	Khuzestan	Khorramshahr	1980s	-	Etemad (1985)
74	*N. phocaenoides*[b]	Sighting	Qeshm	Hara Protected Area, Qeshm Island, 26°50.2'N; 55°43.6'E	24/01/00	2 animals	Keijl and van der Have (2002)
75	*N. phocaenoides*	Sighting	Khuzestan	Khorramshahr	-	-	Anon. (1998)
76	*N. phocaenoides*[a]	Sighting	Bushehr	Bandar Dayer	Mar. 1995	-	Anon. (1995b)
77	*N. phocaenoides*[b]	Stranding	Qeshm	Hara Protected Area, Karwasta, Qeshm Island	20/01/07	Bycatch	This paper
78	*N. phocaenoides*	Sighting	Khuzestan/Bushehr	S Khuzestan/N Bushehr Province	23-29/09/91	4 animals; 1km from shore	Henningsen and Constantine (1992)
79	*N. phocaenoides*	Sighting	Khuzestan/Bushehr	S Khuzestan/N Bushehr Province	23-29/09/91	3 animals; 1km from shore	As above
90	*N. phocaenoides*[b]	Stranding	Bushehr	Near Bushehr City, 28°56.7'N 50°50.5'E	Mar. 2007	3 animals	This paper
91	*N. phocaenoides*[b]	Stranding	Qeshm	South Hengam Island, 26°36.8'N 55°52.2'E	16/03/07	-	This paper
96	*N. phocaenoides*	Sighting	Qeshm	Hara Protected Area, Qeshm Island	21/01/07	Caught in fishing net, released live	This paper
118	*N. phocaenoides*[b]	Stranding	Hormozgan	East of Jask, 25°30.0'N; 58°55.7'E	23/11/07	152cm	This paper
28	*Delphinus cf tropicalis*[a]	Stranding	Sistan/Baluchistan	Near Chabahar harbour	Early 2000s	-	This paper
55	*Delphinus cf tropicalis*	Skull	Qeshm	GeoPark Museum, Qeshm Island	-	-	This paper
97	*Delphinus cf tropicalis*	Sighting	Khuzestan/Bushehr	S Khuzestan/N Bushehr Province	22-30/09/91	12 animals	Henningsen and Constantine (1992)
98	*Delphinus cf tropicalis*[a]	Sighting	Sistan/Baluchistan	Southwest of Chabahar	Early 1970s	-	Pilleri and Gihr (1973-74)
99	*Delphinus cf tropicalis*[b]	Sighting	Sistan/Baluchistan	Southwest of Chabahar	Early 1970s	-	As above
100	*Delphinus cf tropicalis*[b]	Sighting	Sistan/Baluchistan	Southwest of Chabahar	Early 1970s	-	As above
119	*Delphinus cf tropicalis*[b]	Stranding	Hormozgan	East of Jask, 25°30.2'N; 58°55.7'E	23/11/07	147cm.	This paper
125	*Delphinus cf tropicalis*[a]	Stranding	Bushehr	Ameri Port	28/02/08	203cm, M, bycatch	This paper
126	*Delphinus cf tropicalis*[b]	Stranding	Bushehr	Ameri Port	28/02/08	186cm, F, bycatch	This paper
127	*Delphinus cf tropicalis*[b]	Stranding	Bushehr	Near Bushehr city, 28°56.7'N; 50°50.5'E	06/11/07	177cm, bycatch.	This paper
9	*Stenella longirostris*	Skull	Not known	Zoological Museum, Uni. of Tehran	-	-	This paper
20	*Stenella longirostris*[b]	Stranding	Sistan/Baluchistan	Near Chabahar Harbour	Dec. 2005	-	This paper
111	*Stenella longirostris*[a]	Mass stranding	Hormozgan	Kalirak village, east of Jask, 25°24.7'N; 59°4.1'E	20/09/07	79 animals over 13km	This paper
120	*Stenella longirostris*[b]	Sighting	Sistan/Baluchistan	10nm SW of Gwatar	Nov. 2007	27-32 animals	This paper
53	*Stenella longirostris/ Delphinus cf tropicalis*[a]	Stranding	Qeshm	Near Kargah jetty, 26°39.9'N; 55°39.6'E	27/03/03	-	This paper
65	*S. longirostris/ Delphinus cf tropicalis*	Stuffed	Qeshm	GeoPark Museum, Qeshm Island	-	-	This paper
112	*S. longirostris/ Delphinus cf tropicalis*[b]	Stranding	Sistan/Baluchistan	Ramin 10km east of Chabahar	08/10/07	3 animals	This paper

Cont.

No.	Species	Type	Province	Location	Date	Notes	Source
Odontocetes cont.							
113	*S. longirostris/ Delphinus cf tropicalis*[a]	Stranding	Sistan/Baluchistan	5km west of Chabahar	09/10/07	-	This paper
114	*Stenella coeruleoalba*[a]	Mass stranding	Hormozgan	Kangan Bay, 25°46.3'N; 57°23.3'E	24/10/07	73 animals live stranded	This paper
117	*Stenella coeruleoalba*	Skull	Hormozgan	DoE office in Jask	01/09/04	-	This paper
3	*Steno bredanensis*[a]	Skull	Sistan/Baluchistan	Stored at IFRO office Chabahar. Found in Gourdim, SW of Chabahar	11/09/97	-	This paper
26	*Grampus griseus*[a]	Stranding	Sistan/Baluchistan	Chabahar Bay	2002	-	This paper
107	*Grampus griseus*[a]	Stranding	Sistan/Baluchistan	Near Zarabad village, between Jask and Konarak	1991	-	This paper
2	*Pseudorca crassidens*[a]	Skull	Sistan/Baluchistan	Stored at IFRO, Chabahar. Stranded Tang, SW of Chabahar	22/10/93	-	This paper
8	*Pseudorca crassidens*	Skull	Qeshm	Zoological Museum, Uni of Tehran	-	-	This paper
116	*Pseudorca crassidens*[a]	Skull	Hormozgan	Kish Island, stored with local resident	Approx. 1997	-	This paper
109	*Physeter macrocephalus*[a]	Stranding	Hormozgan	Abd coast east of Jask, 25°34.5'N; 58°47.8'E. Stored in GeoPark Museum, Qeshm Island	Jun. 2007	One jaw in Jask DoE office	This paper
Mysticetes							
10	*Balaenoptera physalus*[a]*	Stranding, skull and skeleton	Hormozgan	30km south of Bandar Abbas. Stored in Zoological Museum, Uni of Tehran	Apr. 1971	-	Baloutch (1972)
1	*Balaenoptera edeni*[a]*	Skeleton, skull	Sistan/Baluchistan	Stored IFRO office, Chabahar. Found Pasabandar, 120km E of Chabahar	Pre-1997	-	This paper
29	*Balaenoptera edeni**	Skull	Bushehr	IFRO office, Bushehr	-	Partial skull, possibly other half of No.13	This paper
44	*Balaenoptera edeni*[a]*	Stranding, skull and skeleton	Hormozgan	Found floating near Hormoz Island. Skeleton with EPA on Hormoz Isl.	23/04/04	-	This paper
59	*Balaenoptera edeni*[a]	Skull, skeleton	Qeshm	GeoPark Museum, Qeshm	-	-	This paper
66	*Balaenoptera edeni*[a]	Skull	Qeshm	Found near Salakh, now stored in GeoPark Museum, Qeshm	Spring 2006	Found with skull #67	This paper
69	*Balaenoptera edeni*[a]	Skull, skeleton	Qeshm	South tip Qeshm Island. Atlas and vertebrae in Stuttgart museum	Jan. 1973	-	Pilleri and Gihr (1973-74)
105	*Balaenoptera edeni*[a]*	Stranding	Hormozgan	Bandar Lengeh, 26°31.2'N; 54°51.0'E	04/07/07	13m long, gashes on body	This paper
108	*Balaenoptera edeni*[a]	Stranding	Hormozgan	Bandar Abbas	19/08/07	Gashes on head	This paper
110	*Balaenoptera edeni*[a]*	Live stranding	Qeshm	Qeshm Town, 26°56.4'N; 56°16.8'E	21/09/07	Young animal, 4m long	This paper
121	*Balaenoptera edeni*[a]*	Stranding	Hormozgan	3km W of Mogham Port, 350km W of Bandar Abbas, 26°59.7'N; 53°22.3'E	Late Nov. 07	13.6m	This paper
5	*Balaenoptera* sp.	Skeleton	Not known	Museum of Natural History, Tehran	-	-	This paper
11	*Balaenoptera* sp.[a]	Skeleton	Hormozgan	From Minab Kolahi port. Stored in Uni of Tehran Zoological Museum	1980s	-	This paper
17	*Balaenoptera* sp.	Skeleton	Bushehr	Aquarium shop, Bushehr city	-	-	This paper
32	*Balaenoptera* sp.[a]	Stranding	Bushehr	Nayband Bay	1996	-	This paper
35	*Balaenoptera* sp.[a]	Stranding	Bushehr	Near Ganaveh Port	1999	-	This paper
36	*Balaenoptera* sp.[a]	Skull	Bushehr	Ameri Port	1993	Juvenile	This paper
37	*Balaenoptera* sp.[a]	Stranding	Bushehr	Helle River Estuary, N Bushehr town	2004	-	This paper
38	*Balaenoptera* sp.	Stranding	Bushehr	Not known	-	-	This paper
128	*Balaenoptera* sp.	Stranding	Bushehr	Not known	Mar. 2008	-	This paper
23	*Megaptera novaeangliae*	Sighting	Sistan/Baluchistan	Near Chabahar	Sep. 2004	Mother-calf	This paper
24	*M. novaeangliae*	Stranding	Sistan/Baluchistan	Not Known	Dec. 2003	-	This paper
27	*M. novaeangliae*[a]	Stranding	Sistan/Baluchistan	Pozm, 50km west of Chabahar	Oct. 2004	-	This paper
13	Unidentified mysticete	Skull	Bushehr	IFRO Office, Bushehr	-	Partial skull, possibly other half of No.29	This paper
47	Unidentified mysticete	Skeleton, skull	Hormozgan	EPA Office, Bandar Abbas.	-	-	This paper
67	Unidentified mysticete[a]	Skull	Qeshm	Found near Salakh. Stored in the GeoPark Museum, Qeshm Island	Spring 2006	Possibly very young *B. edeni* found with No.66	This paper
Sirenia							
101	*Dugong dugon*[a]	Sighting	Qeshm	Hara Protected Area, Qeshm Island, 26°50.2'N; 55°43.6'E	29/01/00		Keijl and van der Have (2002)
102	*Dugong dugon*	Sighting	Qeshm	Hara Protected Area, Qeshm Island	01/11/00	3 animals	Green (2000)

*Identification requires confirmation, [a] Location displayed on map.

Odontocetes

Indo-Pacific bottlenose dolphin (Tursiops aduncus)

The Indo-Pacific bottlenose dolphin occurs throughout the Indian Ocean including the Persian Gulf and Gulf of Oman where it is considered sympatric with the common bottlenose dolphin, *T. truncatus*. Genetic analysis of bottlenose dolphins sampled in deep oceanic waters off Oman indicated that they were common bottlenose dolphins (Ballance and Pitman, 1998) but most other authors in the region referred to all bottlenose dolphin records as Indo-Pacific bottlenose dolphins (Preen, 2004; Robineau, 1998; Robineau and Fiquet, 1996). Skulls from the Iranian coast of the Persian Gulf showed the convex pre-maxillaries in lateral view, high tooth counts and distance between the tip of rostrum to the apex of the premaxillary convexity (TPC)/condylobasal length (CBL) ascribed to the Indo-Pacific bottlenose dolphin (Robineau, 1998; Robineau and Fiquet, 1996; Ross, 1977; 1984; Wang *et al.*, 2000). Given this, all bottlenose dolphin records in Iran are referred to here as Indo-Pacific bottlenose dolphins. It is possible that more detailed investigations, especially in the Gulf of Oman, may also reveal the presence of common bottlenose dolphins in Iran.

Twenty-two records of Indo-Pacific bottlenose dolphins were compiled from Iranian coastal waters; 1 record was from the Gulf of Oman, 2 from the Straits of Hormoz and 19 were in the Persian Gulf. There were 6 strandings, 7 sightings and the skeletal remains of 9 animals stored in museums.

PERSIAN GULF

Bottlenose dolphins are widely distributed throughout the Persian Gulf and are the most commonly recorded cetacean (Al-Robaae, 1974; Baldwin *et al.*, 1999; Gallagher, 1991a; Preen, 2004; Robineau, 1998). In the southern Gulf bottlenose dolphins are found in deeper water than Indo-Pacific humpback dolphins; 29% of groups seen by Preen (2004) and almost all of those seen by Henningsen and Constantine (1992) were in water greater than 10m deep. Indo-Pacific bottlenose dolphins are also common and widespread in Iranian waters of the Persian Gulf. Four Indo-Pacific bottlenose dolphins have been recorded stranded near to Bushehr port, the skulls of three individuals are stored in the IFRO office in Bushehr city and a skull and skeleton reportedly from Bushehr is stored at the Museum of Natural History in Tehran. On the 19 January 1973 while taking off from Bandar Lengeh airport Pilleri and Gihr (1973-74) sighted a scattered group of dolphins 200m from the coast that they identified as probably *Tursiops* sp. Given the distant view and possibility of confusion with other dolphin species this sighting should be treated as unconfirmed.

The majority of Indo-Pacific bottlenose dolphin records in Iranian waters occur around Qeshm Island, particularly of small groups in the narrow channel between Hengam Island and Qeshm Island. It is unclear if this is a high density area or if frequent sightings are due to the accessible ocean viewpoint nearby. Indo-Pacific bottlenose dolphins have been sighted near to Larak Island, along the southeast coast of Qeshm Island (Pilleri and Gihr, 1973-74), in the Straits of Hormoz approximately 10 n.miles south of Qeshm in water 70m deep and in the Straits (unknown location) in water approximately 75m deep (Weitkowitz, 1992). Two Indo-Pacific bottlenose dolphin skulls are stored in the GeoPark Museum on Qeshm Island, and a skull from Qeshm is stored in the Stuttgart Natural History Museum, Germany.

GULF OF OMAN

The only record indicating the presence of *Tursiops* sp. in Iranian waters of the Gulf of Oman is a skull stored in the IFRO office in Chabahar (Table 1). *Tursiops* sp. are commonly sighted along the Oman coast of the Gulf of Oman (Ballance and Pitman, 1998; Collins *et al.*, 2002) and it is likely that despite the lack of records they are also common in Iranian waters.

Indo-Pacific humpback dolphin (Sousa chinensis)

The taxonomy of the Genus *Sousa* is unresolved despite several recent morphological and molecular genetic studies (Jefferson and Van Waerebeek, 2004; Rosenbaum *et al.*, 2002). Humpback dolphins in Iran are primarily grey, possess prominent dorsal humps and morphologically conform to the description of *Sousa plumbea* (Ross *et al.*, 1994). To remain in line with current scientific consensus and until the taxonomic status of *S. plumbea* is resolved all records of *Sousa* sp. and *Sotalia* sp. in Iran are treated as *Sousa chinensis*.

Indo-Pacific humpback dolphins occur in shallow, nearshore waters, generally less than 20m deep and in many parts of their worldwide range occur near large river mouths. Water depth is probably the main factor limiting their offshore distribution (Jefferson and Karczmarski, 2001). They have been recorded as a common resident in shallow areas from all countries that border the Persian Gulf (Baldwin *et al.*, 2004; Preen, 2004; Robineau, 1998; Weitkowitz, 1992). The majority of sightings are of one to 20 individuals, although unusually large groups of up to 100 have also been seen (Baldwin *et al.*, 2004).

For this study, 24 records of humpback dolphins in Iranian waters were compiled; 22 from the Persian Gulf and 2 from the Gulf of Oman. These comprised 20 sightings, 2 skeletal records and 2 strandings.

PERSIAN GULF

The majority of Iranian Indo-Pacific humpback dolphin records (18) are from Qeshm Island and Hormozgan Province in the Persian Gulf. There are several records from the Iraqi coast very close to the Iranian border: a group (reported as *Stenella malayana* and *Sotalia lentiginosa*) was seen near Fao (Al-Robaae, 1974); one individual (reported as *S. lentiginosa*) was captured by fishermen in the Khor-Al-Zubair River (Al-Robaae, 1970); they were reported from the Shatt Al-Arab, Iraq (close to the Iranian border) in April 1958 (Mörzer Bruyns, 1960), and in Musa Creek near to Khorramshahr in February 1954 (Mörzer-Bruyns, 1971; Mörzer Bruyns, 1960). Examination of published photographs of a sighting reported as common dolphins (*Delphinus delphis*) in Musa Creek, Khuzestan revealed they were clearly Indo-Pacific humpback dolphins (Anon., 1995a). In 1992 seven individuals were photo-identified in coastal Iranian waters of either Khuzestan or Bushehr Province (Henningsen and Constantine, 1992). A single, large, Indo-Pacific humpback dolphin was sighted near Bushehr city on 1 December 2005 and a neonate was stranded in the same area in October 2003. Further south, a group of Indo-Pacific humpback dolphins was sighted near Bahrekan Bay in May 2003. Etemad (1985) cited a report by Murray, 1884, that humpback dolphins were found at Bandar-Lengeh port in Hormozgan. The original reference could not be traced and the presence of humpback dolphins in this area is unconfirmed.

In January 1973, Pilleri and Gihr circumnavigated Qeshm and Hormoz Islands and reported at least six sightings of Indo-Pacific humpback dolphin, three north of Qeshm Island and three south and west of Hormoz Island (Pilleri and Gihr,

1973-74). Reported group sizes were between 1 and 16 individuals and included sightings of calves and juveniles and observations of acrobatic behaviour. There were two sightings of humpback dolphins within the mangrove channels of Hara Protected Area on 29 January 2000 (Keijl and van der Have, 2002) and there have been recent sightings south of Qeshm Island, south of Qeshm town, between Qeshm and Bandar Abbas and near Hormoz Island (Table 1). The skeleton of a humpback dolphin stranded near Bandar Abbas in 1974 is deposited in the Zoological Museum at the University of Tehran and the skull of a different individual is in the GeoPark Museum on Qeshm Island.

The records show that Indo-Pacific humpback dolphin sightings occur throughout the year and the presence of calves in recorded sightings indicate that there is a breeding resident population in Iranian waters of the Persian Gulf. Given the affinity of this species for shallow estuarine water a relatively large population could be expected in the shallow, low salinity waters near Iraq. There are relatively few Indo-Pacific humpback dolphin records from this area, probably due to the long-term instability and sensitivity of this border region restricting human access for surveys.

GULF OF OMAN

There are two records of Indo-Pacific humpback dolphins in Iranian waters of the Gulf of Oman: a photograph of a single animal taken in 1995 just east of Jask, Hormozgan; and one animal stranded between Jask and Chabahar in December 2008. Humpback dolphins have not been recorded in Omani waters of the Gulf of Oman and there is thought to be an hiatus in distribution between those in the southern Persian Gulf and those in the Arabian Sea (Baldwin *et al.*, 2004). It is not clear from the limited records whether there is a continuous distribution of humpback dolphins along the Iranian coast to Pakistan.

Finless porpoise (Neophocaena phocaenoides)

Pilleri and Gihr (1972) showed the probable global geographic distribution of finless porpoises to include the entire coastline of Iran, however, until this present study there has been insufficient published data to substantiate this. Finless porpoises in Iranian waters are the Indian Ocean subspecies *N. p. phocaenoides* (Reeves *et al.*, 1997). Throughout their range finless porpoises inhabit shallow coastal waters, and inshore, partially enclosed, water bodies (Reeves *et al.*, 1997). For this study, 25 records of finless porpoises were compiled; 23 were from the Persian Gulf and 2 from the Gulf of Oman. These comprised 12 strandings, 12 sightings and the skeletal remains of one individual.

PERSIAN GULF

The finless porpoise has been listed as an uncommon breeding resident in the Persian Gulf (De Boer *et al.*, 2003). In general it appears to be rare but widespread throughout the south and west of the Gulf (Anon., 1995b; Collins *et al.*, 2005; Gallagher, 1991a; Preen, 2004; Robineau and Fiquet, 1996). It has not been recorded further east than Jebel Ali, Dubai in the UAE (Baldwin *et al.*, 1998; Collins *et al.*, 2005).

In contrast, records suggest that finless porpoises are common in Iranian waters of the Persian Gulf. There are several records from the northwest Persian Gulf in estuaries in Khuzestan, Iran and in nearby Iraq; two porpoise groups were sighted near the mouth of the Shatt al-Arab close to the Iraq border (Al-Robaae, 1975) and porpoises have been recorded near Khorramshahr where they sometimes enter the larger rivers and shallow water (Anon., 1998; 2003d; Etemad, 1985). Two groups of porpoises, one of 3 individuals and one of 4, were sighted about 1km from shore in waters less than 10m deep in northern Iran (Henningsen and Constantine, 1992).

The majority of the finless porpoise records in Iran are of stranded or incidentally captured animals from the vicinity of Bushehr city. One porpoise was reported as bycatch in a gillnet near Bushehr in March 1998 (Anon., 1998). A second individual, 115cm in length, was stranded on the western shores of Bushehr port on 27 November 2002 (Anon., 2003d). An aquarium shop in Bushehr city has a stuffed finless porpoise and the tail flukes of three other porpoises on display. These animals were reportedly fisheries bycatch and were purchased from fishermen.

In the Hara Protected Area on Qeshm Island, over a 30 year period there have been repeated sightings of finless porpoise groups in virtually the same location within channels flowing between the mangroves (Table 1; Fig. 2b). In January 1973, Pilleri and Gihr (1973-74) recorded two finless porpoises in the Protected Area. Two individuals were seen on 24 January 2000 (Keijl and van der Have, 2002) and during a survey conducted by two of the authors on 6 December 2005 two groups were sighted, one of 4 individuals and the other a best estimate of 12 (high 16, low 10) was recorded. Despite being a Protected Area, fishing with gillnets still occurs and porpoises with signs of gillnet entanglement were stranded during 2004 and 2007 and a porpoise was captured and released alive in January 2007 (Table 1). Outside of the Protected Area, porpoises have been recorded along the north coast of Qeshm Island (Pilleri and Gihr, 1973-74). One individual was stranded on Hengam Island in March 2007 and an animal measuring 147cm in length was killed in a gillnet between Hormoz Island and Bandar Abbas in 1995 (Anon., 1995b).

There are two areas of apparent porpoise concentration in Iran, one north of Qeshm Island and the other at the head of the Persian Gulf. The only evidence that there may be a continuous distribution between these areas is a report of a sighting (unclear whether stranded or alive) in March 1995 at Bandar-e-Dayer in Bushehr Province (Anon., 1995b).

GULF OF OMAN

There are only two records of finless porpoises from anywhere in the Gulf of Oman (excluding Pakistan) and these are both from the Iranian coast. A stranded porpoise was found on 23 November 2007 east of Jask and there was one 'almost certain' sighting in Chabahar, Iran in the winter of 1971 (Collins *et al.*, 2005; Roberts, 1977). Finless porpoises have been recorded along the coast of Pakistan, including from Gwadar adjacent to the Iranian border (Roberts, 1997) and it seems likely that they are distributed more widely along the Iran-Pakistan coast.

A seasonal movement of animals inshore during the winter and offshore during the summer has been noted in several parts of this species' range including Pakistan (Pilleri and Gihr, 1972; Roberts, 1997) and Hong Kong (Jefferson and Braulik, 1999). It is interesting to note that all records of finless porpoise in Iran, for which a date is available, were made during the winter, between November and March. It is unclear whether this is due to the extreme high summer temperatures limiting fieldwork and speeding decomposition of strandings, or because seasonal inshore movement of populations renders them more prone to bycatch and more accessible for sightings during the winter months.

A large proportion of Iranian finless porpoise records are of stranded or bycaught animals which suggests that incidental mortality in coastal fishing gear may be unsustainable especially if, as the records indicate, the populations are small and localised.

Long-beaked common dolphin (Delphinus capensis tropicalis)

Delphinus delphis, D. capensis and *D.c. tropicalis* have been reported in the region (Jefferson and Van Waerebeek, 2002; Perrin, 2002). Most recent authors have attributed all *Delphinus* sp. records in the Gulf of Oman and Persian Gulf to the very long-beaked form *D.c. tropicalis* and it is possible to clearly differentiate this subspecies in the field (Ballance and Pitman, 1998; Robineau, 1998; Robineau and Fiquet, 1996). All skulls examined in Iran were identified as *D.c. tropicalis* based on very high tooth counts.

The common dolphin is the cetacean species cited most frequently by Iranian authors as occurring in Iranian waters (Anon., 1995a; Firouz, 2005; Harrington, 1977; Humphrey and Kharom, 1995; Ziaie, 1996), however many of the records refer to mis-identified sightings or skeletal remains. There are just 10 positive records: 5 from the Persian Gulf and 5 from the Gulf of Oman.

PERSIAN GULF

Long-beaked common dolphins have been frequently recorded in the south of the Persian Gulf, especially off the coast of Saudi Arabia and UAE. During surveys near Abu Ali Island in Saudi Arabia, common dolphins were the most frequently encountered species accounting for 75% of all individuals sighted (Robineau, 1998; Robineau and Fiquet, 1996). *Delphinus* sp. were not sighted at all during comprehensive aerial surveys of the entire southern Persian Gulf coastline and it was suggested that they may be more abundant closer to the Iranian coast where water is deeper (Preen, 2004).

In Iranian waters of the Persian Gulf, one group of 12 common dolphins were recorded in offshore waters in the northwest (Henningsen and Constantine, 1992). No specific location for this sighting was given, but the survey track indicates that the sighting must have been SSW of either Bushehr city, or Ganaveh. A young bycaught animal stranded near Bushehr city in November 2007, and two animals, a 203cm male (Fig. 3) and 186cm female, were bycaught near Ameri, Bushehr in February 2008 (Table 1). A *D.c. tropicalis* skull is stored at the GeoPark Museum on Qeshm Island.

Fig. 3. Long-beaked common dolphin, *D. c. tropicalis,* stranded near Bushehr. The extremely long rostrum, high tooth count, flipper to jaw stripe and hourglass pattern on the flanks are diagnostic. Photo: courtesy Fatemeh Mohsenizadeh.

GULF OF OMAN

D.c. tropicalis is widely distributed and abundant off the Oman and UAE coast of the Gulf of Oman where they are often seen in mixed groups with spinner dolphins, sometimes in association with yellowfin tuna, *Thunnus albacares* (Baldwin *et al*., 1999). Pilleri and Gihr (1973-74) reported three sightings of common dolphins in deep waters off the Iranian coast and there have been two strandings documented (Table 1).

Spinner dolphin (Stenella longirostris)

Spinner dolphins are known to occur in both the Persian Gulf and Gulf of Oman, and it is likely their range includes deeper waters of Iran. Van Waerebeek *et al*. (1999) concluded that spinner dolphins in the Gulf of Oman should be treated as a discrete population morphologically distinct from other spinner dolphin subspecies. Spinner dolphins in Oman have cranial morphometrics similar to *S.l. orientalis* from the east Pacific, but external features quite different from these. Two colour morphs have been described: a common tripartite pantropical form and another smaller, atypical bipartite form which is less common.

PERSIAN GULF

Spinner dolphins are present, but relatively uncommon, in the Persian Gulf. Records are limited to several skulls found on an island near Abu Dhabi, UAE and reports of sightings near Dubai (Baldwin *et al*., 1998; Preen, 2004; Robineau, 1998). Mörzer Bruyns (1971) observed concentrations of thousands either side of the Straits of Hormoz. It is likely that spinner dolphins occur in deeper waters of the Iranian Persian Gulf although there are no confirmed records at present.

GULF OF OMAN

The spinner dolphin is abundant in Oman, where groups of more than 1,500 have been seen (Van Waerebeek *et al*., 1999). They often occur in mixed groups with *Delphinus* sp., occasionally with pantropical spotted dolphins (*S. attenuata*) and associate with yellowfin tuna (Baldwin *et al*., 1998; Collins *et al*., 2002). A spinner dolphin was stranded 50m from Chabahar fishing port in December 2005 and a group was videoed 10 n.miles southwest of Gwadar on the Pakistan-Iran border. Large groups of small unidentified dolphins are regularly observed off the coast of Sistan and Baluchistan and it is possible that these may be groups of spinner dolphins. On the 20 September 2007, the partially decomposed carcasses of 79 spinner dolphins were stranded along 13km of coast, 125km east of Jask. A retrospective investigation concluded that the most likely cause of death was fishing activities (Braulik *et al*., In press). It is probable that spinner dolphins are common off the Iranian coast of the Gulf of Oman and may be represented by the morphologically distinct Oman form.

Spinner dolphin (Stenella longirostris)/*long-beaked common dolphin* (D.c. tropicalis) *records*

Four dolphin records were identified as either spinner dolphins or long-beaked common dolphins (Table 1) but identification could not be further refined based on available evidence (photographs of badly decomposed animals). There are two records of spinner dolphin/long-beaked common dolphin strandings near to Chabahar, one stranding from the south of Qeshm Island and a stuffed animal in the GeoPark Museum on Qeshm Island (that has not been examined in detail).

Striped dolphins (Stenella coeruleoalba)
Striped dolphins are rare in the Gulf of Oman and have never been recorded in the Persian Gulf (Alling, 1986; Baldwin *et al.*, 1999; Ballance and Pitman, 1998). There was a live mass stranding of 73 striped dolphins on 24 October 2007, 60km west of Jask. The stranded group appeared to have become trapped in an estuarine area with complex sandbanks and shallows. What caused this locally uncommon, pelagic species to enter such atypical habitat could not be determined (Braulik *et al.*, In press). A striped dolphin skull from a different stranding (reported to be in the same vicinity), is in the DoE office in Jask.

Rough-toothed dolphin (Steno bredanensis)
The complete skull of a mature rough-toothed dolphin is stored at the IFRO office in Chabahar (Fig. 4). This is the first, and only, record of this species in Iran. This species has not been recorded in Pakistan but it has been recorded (both sightings and strandings) a hand-ful of times in Omani waters of the Gulf of Oman (Ballance and Pitman, 1998; Van Waerebeek *et al.*, 1999; Oman Whale and Dolphin Research Group, unpublished data). There is no evidence of rough-toothed dolphin occurrence in the Persian Gulf and it is unlikely that this is suitable habitat for this deep water species (Robineau, 1998).

Fig. 4. Skull of rough-toothed dolphin, stored in the IFRO museum in Chabahar. The skull was identified based on the large orbit, number of teeth and the ridge at the ventral side of the frontals.

Risso's dolphin (Grampus griseus)
Risso's dolphin is a pelagic species that is relatively common seaward of the continental shelf in the northern Indian Ocean, including the Gulf of Oman and Arabian Sea (Baldwin *et al.*, 1998; Kruse *et al.*, 1991). Most Iranian authors list Risso's dolphin as present in Iran (Darrehshori *et al.*, 1996; Firouz, 2005; Ziaie, 1996), though no details are provided. Risso's dolphins are common in Omani waters of the Gulf of Oman (Baldwin *et al.*, 1998; Ballance and Pitman, 1998; Gallagher, 1991a; Kruse *et al.*, 1991) and are probably relatively common in Iranian waters. There are two stranding records of this species, one near to Chabahar (see Fig. 5) and one east of Jask (Table 1; Fig. 2c). The shallow water of the Persian Gulf is unlikely to be suitable habitat for Risso's dolphins and its presence there is unconfirmed and considered unlikely.

Melon-headed whale (Peponocephala electra)
Knowledge of this species in the northwest Indian Ocean is very limited and although there is a well documented record from Hallaniyah, Oman, there are no confirmed sightings in the Persian Gulf or Gulf of Oman (Baldwin *et al.*, 1999; Van Waerebeek *et al.*, 1999). The ease of confusion with other

Fig. 5. Stranded Risso's dolphin, close to Chabahar. This species is identified based on the white patch on the chest, white lips, blunt head, dark colouration with white scarring and tall falcate dorsal fin. Photo: courtesy Teymour Aminrad.

species means that reports of sighted melon-headed whales along the Makran Coast and Indus Delta in Pakistan (Roberts, 1997) should be treated as unconfirmed. Melon-headed whales have not been recorded in Iran.

False killer whale (Pseudorca crassidens)
The false killer whale is believed to be relatively abundant in pelagic equatorial regions of the Indian Ocean (Leatherwood *et al.*, 1991) and it is uncommonly reported in waters of both the Persian Gulf and Gulf of Oman (Al-Robaae, 1971b; Baldwin *et al.*, 1998; Baldwin *et al.*, 1999; Mörzer-Bruyns, 1971; Mörzer Bruyns, 1969; Robineau, 1998; Weitkowitz, 1992). The presence of false killer whales in the Persian Gulf of Iran is confirmed by the presence of a skull found on Qeshm Island now stored at the Zoological Museum at the University of Tehran and a skull found on Kish Island stored with a local resident. Mörzer-Bruyns (1971) reported observing immature false killer whales in February in the Persian Gulf in water 36-47m deep.

Records suggest that the false killer whale is a breeding resident in the Gulf of Oman (Baldwin *et al.*, 1999; Leatherwood *et al.*, 1991). A sighting reported by Leatherwood *et al.* (1991) at 25.85ºN 59.85ºE is incorrectly located 30 miles inland in Iran, however the sighting itself may still be valid. One false killer whale skull stored at IFRO in Chabahar (Fig. 6), and collected from the nearby coast, suggest it is present in Iranian waters of the Gulf of Oman.

Fig. 6. Skull of a false killer whale. Nine round tooth sockets arranged along full length of rostrum, wide premaxilla bones and deep antorbital notches aided the identification of this specimen.

Killer whale (Orcinus orca)
The geographic location of six killer whales reportedly seen in the Persian Gulf corresponds to approximately 38km inland of Bandar Abbas, Iran (Leatherwood *et al.*, 1991) and therefore occurrence of this species in Iranian waters of the Persian Gulf is unsubstantiated. There have been numerous killer whale sightings in Oman (Baldwin *et al.*, 1999, Oman Whale and Dolphin Research Group, unpublished data); and in the Persian Gulf off UAE (Baldwin, pers. comm.) and although this species has not been recorded in Iranian waters of the Gulf of Oman it may be an uncommon visitor.

Sperm whale (Physeter macrocephalus)
Sperm whales have not been recorded and are not expected to occur in the Persian Gulf. There are many records of sperm whales in deep water in the Gulf of Oman where they are resident (Alling, 1986; Baldwin *et al.*, 1999; Ballance and Pitman, 1998; Gallagher, 1991b; Gore *et al.*, 2007). The first sperm whale record for Iran was a stranding in June 2007 near to Jask.

Other odontocetes
Other odontocetes that have been recorded in the region and may occur in Iranian waters are the pantropical spotted dolphin (*Stenella attenuata*), pygmy killer whale (*Feresa attenuata*), dwarf sperm whale (*Kogia sima*), pilot whale (*Globicephala macrorynchus*) and Cuvier's beaked whale (*Ziphius cavirostris*) (Alling, 1986; Baldwin *et al.*, 1999; Ballance and Pitman, 1998; Gallagher, 1991b; Harwood, 1980).

Mysticetes
Reports of baleen whale sightings in Iran are rare and there is no quantitative information on their distribution or abundance. It was reported by Daanehkaar (1998) that whales can be observed near to the Iranian coastline at Nayband Bay and Bandar Lengeh harbour where there is deep water close to the land and whales are apparently also infrequently seen in waters off Bandar Abbas and Qeshm Island (Firouz, 2005).

Twenty-six baleen whale records were compiled, 9 from Bushehr Province in the northwest of the Persian Gulf, 12 from Hormozgan and Qeshm Island, 4 from Sistan and Baluchistan and 1 of unknown origin. There are 13 records of skeletal material, 12 strandings and video of one sighting. In some cases it was not possible to obtain a definite species identification from photographs of strandings or from examination of bones. If identification was not possible records have been included as *Balaenoptera* sp. or the identification was treated as tentative (Table 1), pending confirmation using molecular analysis of bone or tissue samples.

Blue whale (Balaenoptera musculus)
Blue whales are reported by Iranian authors to occur in Iran (Etemad, 1985; Harrington, 1977; Humphrey and Kharom, 1995; Ziaie, 1996), however, no supporting data are provided and no evidence for the occurrence of this species in Iran has been found in this study. Given its shallow nature (<100m deep) Iranian waters of the Persian Gulf are unlikely to be frequented by blue whales and there is only one unconfirmed record from elsewhere in the Gulf; a stranding in Kuwait in 1963 (Al-Robaae, 1971a; Robineau, 1998). Blue whales have been sighted on several occasions in the Sultanate of Oman (Baldwin *et al.*, 1999) and it is possible that they also occur in Iranian waters of the Gulf of Oman.

Fin whale (Balaenoptera physalus)
There are several published but unconfirmed fin whale strandings and sightings from the Persian Gulf (Al-Robaae, 1982; Baldwin *et al.*, 1999; de Silva, 1987; Robineau, 1998). Firouz (2005) reported that fin whales are occasionally seen near Bandar Abbas and Qeshm Island in Iran, however large pods of as many as 100 individuals reported in Iranian waters by Humphrey and Kharom (1995) seem unlikely. There is one unconfirmed Iranian record of this species; a fin whale measuring 19m in length was stranded 30km south of Bandar Abbas in April 1971 (Baloutch, 1972). The skeleton is now displayed in the Zoological Museum of the University of Tehran. All the above records are unconfirmed and Baldwin (2003) was unable to find any substantiated evidence of fin whale occurrence in the Arabian region and suggests that they are unlikely to occur.

Bryde's whale (Balaenoptera edeni) *and Omura's whale* (Balaenoptera omurai)
The identity and number of species of Bryde's whales worldwide is currently uncertain (Perrin and Brownell, 2007). A new species, Omura's whale (*B. omurai*) was described in 2003 (Wada *et al.*, 2003) and there is believed to be a smaller inshore form of Bryde's whale from Asia (*B. edeni*) and a 'normal' larger offshore form (*B. brydei*) as well as the possibility of other intermediate forms (Ballance *et al.*, 2001; Perrin *et al.*, 2007; Rice, 1998). Perrin and Brownell (2007) recommended that *B. edeni* be used provisionally for the Bryde's whale complex until the taxonomy of the group is resolved. Bryde's whales are probably relatively common in Iranian waters although it is unclear at present which form or forms are represented.

Ten records of Bryde's whales in Iranian waters were compiled: 5 skeletal remains and 5 strandings. Nine records are from the Persian Gulf and there is a single record from Iranian waters of the Gulf of Oman.

Persian Gulf: There are multiple records of Bryde's whales from the Persian Gulf and this species is the most common mysticete in the area (Al-Robaae, 1969; Baldwin *et al.*, 1999; Robineau, 1998; Robineau and Fiquet, 1996). The remains of a Bryde's whale were found on the southern tip of Qeshm Island in 1973; the atlas and three vertebrae are now stored in the Stuttgart Museum (Pilleri and Gihr, 1973-74). The skull of a young Bryde's whale found on the south coast of Qeshm Island in spring 2006 and a skeleton tentatively identified as a Bryde's whale are both stored at the GeoPark Museum on Qeshm Island. In 2004 a Bryde's whale carcass found floating between Qeshm and Hormoz Islands was towed to Hormoz Island where the skeleton is now preserved by the Environmental Protection Authority. In 2007 there were four Bryde's whale strandings in Iranian waters of the Persian Gulf (Table 1).

Gulf of Oman: A skeleton identified as a Bryde's whale is at the IFRO office in Chabahar. It is believed to have stranded on the nearby coast and confirms the presence of this species in Iranian waters of the Gulf of Oman.

Sei whale (Balaenoptera borealis)
The occurrence of sei whales in the Arabian region is uncertain and their identification may be confused with Bryde's whales. There are unconfirmed sightings in the Gulf of Oman (Baldwin *et al.*, 1999) but a review of records led Baldwin (2003) to conclude that their presence in Arabia be unlikely. There is no evidence of their occurrence in Iran.

Common minke whale (Balaenoptera acutorostrata)
Minke whale sightings in the middle east were reported by Baldwin *et al*. (1999). However a later re-examination of records led to the conclusion there are no confirmed records of this species in the Arabian region (Baldwin, 2003). There is no evidence of their occurrence in Iranian waters.

Humpback whale (Megaptera novaeangliae)
Humpback whales are listed as occurring in Iran in almost all national mammal reviews and checklists (Etemad, 1985; Firouz, 2005; Harrington, 1977; Humphrey and Kharom, 1995; Ziaie, 1996), but these records appear to be based on many *Balaenoptera* sp. skeletons that have been mis-identified as humpback whales. There are no known records of this species from Iranian waters of the Persian Gulf but there are two records from nearby Iraq (Al-Robaae, 1974; Gervais, 1883).

A resident, non-migratory population of humpback whales occurs in the Arabian Sea and Gulf of Oman. Highly productive upwelling along the coast of Oman ensures sufficient food to allow whales to remain in the region throughout the year (Minton *et al*., In press; Papastavrou and Van Waerebeek, 1997; Reeves *et al*., 1991; Whitehead, 1985). The greatest recorded concentrations of animals are from southern Oman, near to Masirah and the Halaniyat Islands, but there are also records, primarily of young animals, from the Gulf of Oman as far west as UAE (Baldwin *et al*., 1999; Mikhalev, 1997; Minton *et al*., In press). In this study three definite records of humpback whales were compiled; two strandings and one sighting, all from the Sistan and Baluchistan coast in the Gulf of Oman. A mother-calf pair was recorded close to the Chabahar coast in September 2004, a humpback whale stranded near Pozm in October 2004 and another stranded near Chabahar in December 2003. These individuals are presumably part of the Arabian Sea population. Surveys to evaluate the seasonal distribution and abundance of humpback whales in Iran and subsequent comparison of identified individuals with those from Oman would be valuable to understanding more about this resident population which is classified by the International Union for Conservation of Nature (IUCN) as 'endangered' (Minton *et al*., 2008).

Sirenia
Dugong (Dugong dugon)
The world's second largest dugong population occurs in the southern margins of the Persian Gulf in the coastal waters of Bahrain, UAE, Qatar and Saudi Arabia (Marsh *et al*., 2002). Abundance was estimated as 5,840 ± 903 and the largest aggregation ever recorded, numbering an estimated 674 animals, was found between Bahrain and Qatar in the winter of 1985/86 (Preen, 2004). Dugong typically inhabit shallow tropical and subtropical waters with a mean sea surface temperature of 23ºC or greater and avoid prolonged exposure to water temperatures of less than 18ºC. It was therefore suggested that the temperature regime and bathymetry in Iran (except for north Qeshm Island) would be unsuitable to support significant numbers of this species and Iran has not been recorded as a dugong range state (Marsh *et al*., 2002; Preen, 2004).

There have been anecdotal reports of dugong sightings in Gwadar near the Pakistan border and a reported, but unconfirmed, sighting of two individuals in the Mond River estuary (approximately 100km south of Bushehr city) (Firouz, 2005). There have been two definite sightings of dugongs in the mangroves of the Hara Protected Area north of Qeshm Island. Keijl and van der Have (2002) reported that 'a single individual was seen briefly in a rather narrow and muddy creek about 15m wide on 29 January 2000. It surfaced about 5m from the boat and then dived. When it surfaced the broad flattened snout was seen, and when it subsequently dived the tailstock and V-shaped flukes were seen very clearly'. Green (2000) also described a sighting of three dugongs in the Hara Protected Area on 1 November 2000.

These records show that dugong have occurred in Iran, but it is unclear whether these individuals indicate the presence of a resident population in Iranian waters or whether they were vagrants that dispersed from the southern Persian Gulf population. In Australia dugongs regularly move distances of 40-100km and some individuals have been shown to undertake long distance movements of at least 600km across deep oceanic water, so dispersal 300km across the relatively shallow Persian Gulf is quite feasible (Marsh *et al*., 2002).

THREATS FACING MARINE MAMMALS IN IRAN

Incidental capture in fishing gear
The largest threat to cetaceans in Iran is likely to be incidental capture in fishing gear. The country has the largest fishing fleet in the region and uses techniques such as fixed and drift gillnets known to cause mortality of cetaceans elsewhere in the world (FAO, 2005; 2007; Gosliner, 1999; Jefferson and Curry, 1994; Perrin *et al*., 1994). There are nine records of finless porpoise and three of common dolphin incidental mortality in fishing gear in Iran. The nearshore distribution of finless porpoise places them in close proximity to intensively fished areas and losses are likely to have a greater impact on small and localised populations which appear to occur along the Iranian coast.

Shipping traffic
The Straits of Hormoz and Bandar Abbas region include major shipping lanes and 30% of the world's oil tankers pass through these areas annually (ROPME, 2003). In 2007, two Bryde's whales were stranded bearing gashes from propellers. Although it is not clear whether these occurred before or after death, cetaceans in the shipping lanes and entrance to the Persian Gulf are undoubtedly at risk of collision with vessels.

Oil pollution
The continual input of oil into the marine environment from natural seepage and routine oil extraction and transportation activities (estimated at 1.2 million barrels/year; ROPME, 2003) could have a chronic effect on marine mammal health. There is also always a risk of new catastrophic oil spills. In most cases cetaceans would be expected to avoid a spill and the greatest impact on them is likely to be indirect effects on prey availability, or the health effects of consuming prey contaminated by petroleum residues (Geraci *et al*., 1999).

Chemical pollution
The Shadegan Marshes Ramsar site located on the Iran-Iraq border at the head of the Persian Gulf has been placed on the Montreux Record since 1993 due to chemical pollution from the Iran-Iraq war (RAMSAR, 2009). Finless porpoise and humpback dolphins have been sighted in this area and populations of these animals may have been impacted (either positively or negatively) by the wars and may also be affected by the chemical pollution.

Harmful algal blooms
Harmful algal blooms (HABs), often associated with seasonal upwelling, occur frequently in the Persian Gulf and Gulf of Oman and have caused mass mortality of fish and

other marine organisms. A HAB was tentatively linked to the mass mortality of at least 520 marine mammals in the Persian Gulf in 1986 (Anon., 1994; 2003a; 2003b; 2003c; ROPME, 1986; Subba-Rao and Al-Yamani, 1998).

Coastal development

In the UAE and other states along the south of the Persian Gulf extensive coastal development including construction of new islands for housing complexes and resorts, causeway construction and dredging have severely degraded the marine environment and caused loss of seagrass beds and fish spawning sites (Jameson *et al.*, 1995). In the UAE, demersal fish stocks have declined dramatically, in some instances to 5% of 1978 levels, due to a combination of overfishing and destruction of demersal fish spawning sites by extensive coastal development (FAO, 2003). At present the coastal regions of Iran are less developed than those of southern Persian Gulf states, however, several resort islands such as Kish (Fig. 2a) are developing rapidly. Unless there are controls placed on coastal development in Iran, it is likely to proceed along similar unsustainable lines as states such as the UAE potentially causing declines in fisheries resources, degradation of marine habitats and negative impacts on marine mammals.

RECOMMENDATIONS

Establishment of a strandings network

Establishment of a network of individuals and organisations to survey the Iranian coastline for strandings and respond to reported strandings is a relatively low-cost but highly effective way to collect information on marine mammal species occurrence and threats. Training for volunteers will be required and a central location designated to store information, to deposit specimens and arrange sample analysis, etc.

Marine mammal bycatch assessment

It is suspected that bycatch of dolphins and porpoises in fishing gear may be one of the largest threats to marine mammals in Iranian waters. To identify ports, fishing gear and fisheries that result in significant marine mammal bycatch and species that are most susceptible, a study of ports, fish landing sites and fish markets, and interviews with fishermen will need to be conducted. Following this more detailed studies, such as observer programmes, could be initiated.

Conduct baseline distribution and abundance surveys

Initiation of marine mammal distribution and abundance surveys is vital as a precursor to targeted conservation efforts. Areas and species that may be prioritised are: (1) coastal cetaceans in Khuzestan which are likely to be threatened by pollution and military activities; (2) marine mammals around Qeshm Island which records suggest is an important area for finless porpoise and humpback dolphins; (3) humpback whales off the coast of Sistan and Baluchistan; and (4) monitoring of pelagic dolphins in the Gulf of Oman where accidental capture in fishing gear may be significant.

Study of marine mammals in the Hara Protected Area

Three marine mammal species have been recorded in the mangroves of the extensive Hara Protected Area on the north coast of Qeshm Island. Regular sightings of finless porpoise indicate that the Protected Area may be important habitat for this species. The only confirmed records of dugong in Iran also occurred here. As this is a high profile national reserve, it is an ideal location to study marine mammal occurrence, distribution and abundance and to monitor and manage potential threats such as illegal fishing with gillnets that cause porpoise mortality.

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Marine mammal records from Iran

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Correction: The single rough-toothed dolphin (*Steno bredanensis*) record (see Table 1, record no.3 on page 54, and the text and Fig. 4 on page 58) is erroneous and should be recorded as Indo-Pacific bottlenose dolphin (*Tursiops aduncus*). Rough-toothed dolphins have not been recorded in Iran, although they are likely to occur. The number of cetacean species recorded in Iran is thus amended from 14 to 13, the number of Indo-Pacific bottlenose dolphin records from 22 to 23, including two from the Gulf of Oman and 10 skeletal specimens.