Species diversity and distribution pattern of marine mammals of the Persian Gulf and Gulf of Oman - Iranian Waters

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Abstract

A total of 98 marine mammal records from Iranian coastal waters of the Persian Gulf and Gulf of Oman were compiled of which 66 are previously unpublished new records. Seventy-nine were from the Persian Gulf and 16 from the Gulf of Oman coast. The largest numbers of records were from Qeshm Island and Bushehr Provinces. Records of finless porpoise (*Neophocaena phocaenoides*), Indo-pacific humpback dolphin (*Sousa chinensis*) and Indo-pacific bottlenose dolphin (*Tursiops aduncus)* were by far the most numerous probably reflecting their inshore distribution and local abundance. Other species recorded are common dolphin (*Delphinus capensis tropicalis)*, rough-toothed dolphin (*Steno bredanensis)*, Risso's dolphin *(Grampus griseus)*, false killer whale (*Pseudorca crassidens)*, and dugong (*Dugong dugon).* Evidence of 22 Mysticetes were obtained eight of which were tentatively identified as Bryde's whales (*Balaenoptera edeni*), three as fin whales (*Balaenoptera physalus*) and three as Humpback whales (*Megaptera novaeangliae)*. The largest threat to marine mammals in Iran is likely to be incidental capture in fishing gear. Six by caught finless porpoises were recorded and this species may be particularly vulnerable to incidental mortality in gillnets. Recommended marine mammal research, conservation and management small projects in Iran are described.

Keywords: Marine mammals, Species diversity, Distribution patterns, Persian Gulf, Gulf of Oman.

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Introduction

The southern coast of the Islamic Republic of Iran is approximately 3800km in length (Owfi *et al*., 2008), bordered in the east by Pakistan and the west by Iraq. The marine environment is comprised of two very different habitats, in the west for approximately 1050km Iran borders the Persian Gulf, a warm, hyper-saline, shallow and enclosed sea, while the eastern coastline (430km) forms the northern margin of the Gulf of Oman, a relatively exposed and deep component of the Arabian Sea in the Indian Ocean. The Persian Gulf is connected to the Gulf of Oman by the Hormoz Strait, a channel approximately 50km wide and 100m deep at its narrowest point. Qeshm Island, 120 km long and up to 30 km wide, is the largest island in the Persian Gulf and is separated from the Iranian coast by the narrow Khuran Strait.

Management of the marine environment

Regional cooperation in conservation of the Persian Gulf began when the Kuwait Convention came into force in 1979. This convention, signed by all Border States included the Action Plan for the Protection and Development of the Marine Environment and Coastal Areas, the Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution and the Protocol concerning Regional Cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency (Owfi and Rabbaniha, 2001). Pursuant to the convention the Regional Organisation for the Protection of the Marine Environment (ROPME) was established to provide technical coordination, and to assist with implementation of projects associated with the convention. This organisation has been very active undertaking regional surveys and monitoring of most aspects of the marine environment, but has not yet addressed marine mammals (ROPME, 2003). Environmental management and conservation in Iran is the responsibility of the Department of Environment (DoE) and fisheries management is under the jurisdiction of the Iranian Fisheries Science Research Institute (IFSRI). DoE have traditionally had a terrestrial focus and IFSRI have targeted management of marine and freshwater fisheries. Conservation of the marine environment including marine mammals has received comparatively little attention from either organisation. (Owfi, 2014).

There are 12 marine or coastal protected areas along the southern coast of Iran, all of them established in delta and mangrove ecosystems or to protect coral reefs. From east to west by Province these are: Khuzestan: 1. Shadegan marshland and lagoon, 2. Al Amaya mudflats and creek, and 3. Khor-e-Musa, jointly a Ramsar site. Bushehr: 4. Khark and Kharku Islands. Hormozgan: 5. Nayband Bay. 6. Shidvar Island, a Ramsar site, 7 and 8. Khuran Straits and Laft & Khamir mangrove creeks, jointly the Hara Protected Area, a Ramsar site and Biosphere Reserve, 9. Shur, Shirin and Mindab River deltas, a Ramsar site, 10. Gaz and Hara River deltas, a Ramsar site. Sistan-e-Baluchistan: 11 and 12. Govater Bay and Bahu Kalat creek, jointly a Ramsar site (World Conservation Monitoring Center,

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1991;Owfi, 2005). The Hara Protected Area is probably of greatest significance to marine mammals as finless porpoise, humpback dolphins and dugong have been sighted in the channels within the mangroves. The site is also an important site for water birds and is the largest stand of mangroves in the Persian Gulf. Management of the reserve is relatively weak and cutting of mangroves and gillnet fishing still occur (Owfi, 2005).

Threats to marine mammals in Iran

Marine mammal surveys conducted off the coast of the United Arab Emirates (UAE) in the Persian Gulf recorded a dramatic 71% decline in cetacean abundance between 1986 and 1999 (Preen, 2004). Two major mortality events occurred between the two surveys. In 1986, 520 cetaceans died, most located in Qatar and Saudi Arabia (including 6 from Bushehr, Iran). Cause of death was tentatively linked to a red tide event (ROPME, 1986; Subba-Rao and Al-Yamani, 1998; Baldwin *et al*., 1999). In 1991 the death of 71 cetaceans coincided with The Persian Gulf war oil spill, however the dead animals were located 120 – 250 km south of the spill and the cause of death was not identified (Robineau, 1998; Preen, 2004).

In Iran the continual input of oil into the marine environment from natural seepage and human activities causes pollution that could have a chronic affect on marine mammals. 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). The Shadegan Marshes Ramsar site in Khuzestan Province at the head of the Persian Gulf has been placed on the Montreux Record due to chemical pollution from the Iran-Iraq war. Finless porpoise and humpback dolphins have been sighted near to this area and populations of these animals were likely impacted by the war and may be affected by the chemical pollution. The effect of pollution in the Persian Gulf is compounded by its enclosed nature and low flushing rate. Harmful algal blooms occur frequently in the Persian Gulf and Gulf of Oman and have been associated with mass mortality of fish, marine mammals and other marine organisms (ROPME, 1986; Anon., 1994; Subba-Rao and Al-Yamani, 1998;Anon., 2003a; Anon., 2003b).

At present the coastal regions of Iran are less developed than those of southern part of the Persian Gulf states, however several resort islands such as Kish are extremely popular and 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 and negative impacts on marine mammals. The largest threat to cetaceans in Iran is likely to be incidental capture in fishing gear (Robineau, 1998; De Boer *et al*., 2003). The country has the largest fishing fleet in the region and uses techniques such fixed and drift gillnets and purse-seining for tuna known to cause mortality of cetaceans elsewhere in the world (Jefferson and

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Curry, 1994; Perrin *et al.*, 1994 ; Gosliner, 1999; FAO, 2005). All seven records of marine mammal incidental mortality in fishing gear in Iran are of finless porpoises and this near-shore species may be declining in Iranian waters due to bycatch. Other porpoise species such as the Vaquita (*Phocoena sinus*) and Harbour porpoise (*Phocoena phocoena*) are especially vulnerable to entanglement in gillnets and as a result have suffered large-scale population declines (Read and Gaskin, 1988; D'agrosa *et al*., 2000; Biack and Sutinen, 2006; Rojas-Bracho *et al.*, 2006).

Records were compiled from cited references in english and english translations of references in farsi. Relevant references include general texts on the marine ecology of the Persian Gulf and Arabian Sea (ROPME, 2003), guides to the mammals of Iran which include comments on cetaceans (Firoz, 1976; Harrington Jr., 1977; Etemad, 1984; Ziaie, 1996; Firouz, 2005), specific texts describing cetacean distribution and occurrence in adjacent waters, especially those from the Sultanate of Oman, UAE and Saudi Arabia (Baldwin and Cockroft, 1997 ;Baldwin *et al.*, 1999; Baldwin *et al*., 2001; Baldwin *et al*., 2004; Minton, 2004; Preen, 2004; Collins *et al*., 2005;) and records of marine mammal sightings or strandings published inside Iran (Anon., 1995a; Anon., 1995b; Anon., 1998; Anon., 2003c). Evidence of stranded marine mammal specimens and live sightings were compiled, but they were only included in this paper if there were accompanying photographs of sufficient quality that a positive identification could be made. Cetacean skeletal remains were examined and photographed and identification was made based on tooth counts and/or basic morphology.

Discussion

A total of 98 marine mammal records were compiled from Iranian coastal waters of the Persian Gulf and Gulf of Oman of which 66 are previously unpublished new records. Seventy-nine were from the Persian Gulf and 16 from the Gulf of Oman coast. The largest numbers of records were from Qeshm Island (36) and Bushehr Provinces (25). Records of finless porpoise (*Neophocaena phocaenoides*), Indo-pacific humpback dolphin (*Sousa chinensis*) and Indo-pacific bottlenose dolphin (*Tursiops aduncus)* were by far the most numerous probably reflecting their inshore distribution and local abundance. Other species recorded are common dolphin (*Delphinus capensis tropicalis)*, rough-toothed dolphin (*Steno bredanensis)*, Risso's dolphin *(Grampus griseus)*, false killer whale (*Pseudorca crassidens)*, and dugong (*Dugong dugon)*. Evidence of 22 Mysticetes were obtained eight of which were tentatively identified as Bryde's whales (*Balaenoptera edeni*), three as Fin whales (*Balaenoptera physalus*) and three as Humpback whales (*Megaptera novaeangliae)*. A description of marine mammal records in Iran by species and region follows.

Odontocetes

Indo-Pacific bottlenose dolphin (Tursiops aduncus)

The taxonomy of the globally distributed *Tursiops* sp. is unresolved. The Indo-pacific bottlenose dolphin *Tursiops*

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aduncus is believed to occur throughout the Indian Ocean including the Persian Gulf and Gulf of Oman where it may be sympatric with *Tursiops truncatus*. Genetic analysis of *Tursiops* from Oman indicated that they were *T. truncatus* (Ballance and Pitman, 1998), however skulls in the Persian Gulf showed the convex premaxillaries in lateral view and other skeletal and morphologic characteristics ascribed to *T. aduncus* (Ross, 1977;Robineau and Fiquet, 1996; Ross, 1984;Robineau, 1998; Wang *et al.*, 2000). For the purposes of this review we follow the conclusions of previous authors in the region and refer to all Bottlenose dolphin records as *Tursiops aduncus* (Robineau and Fiquet, 1996; Robineau, 1998; Preen, 2004). Nineteen records of *Tursiops* were compiled from Iranian coastal waters; four strandings, six sightings and the skeletal remains of nine animals stored in museums. One record was from the Gulf of Oman and of the remaining 18 records in the Persian Gulf; seven were from Bushehr, one from Hormozgan, one from offshore waters of the Hormoz Strait and nine from the vicinity of Qeshm Island.

Indo-pacific humpbacked dolphin (*Sousa chinensis*)

The taxonomy of the Genus *Sousa* is unresolved despite several recent morphological and molecular genetic studies (Rosenbaum *et al*., 2002; Jefferson and Van Waerebeek, 2004). The IWC and IUCN, conservatively recognise two species *S. teuszii*, the Atlantic humpback dolphin and *S. chinensis*, the Indo-Pacific humpback dolphin until further studies resolve the taxonomy (IWC., 2001.; Reeves *et al*., 2003). Humpback dolphins in Iran are primarily grey-coloured with very large dorsal humps and morphologically conform to the description of *S. plumbea* (Ross *et al*., 1994), however for clarity, until the taxonomic status of *S. plumbea* is resolved, all records of *Sousa* spp. and *Sotalia* spp. in Iran will be treated as *S. chinensis*. Indo-Pacific humpback dolphins occur in shallow, near shore waters, generally less than 20m deep and often near large river mouths. Water depth is probably the main factor limiting their offshore distribution (Jefferson and Karczmarski, 2001). We compiled 20 records of humpback dolphins in Iranian waters, 18 were live sightings and there are two skeletal records. The bulk of the records (16) are from Qeshm and Hormozgan Provinces, and there is one record from Khuzestan, two from Bushehr and one of unknown specific location in Iranian waters of the Persian Gulf (northwest part).

Finless porpoise (*Neophocaena phocaenoides*)

Pilleri and Gihr (1972) showed the probable global geographic distribution of *Neophocaena phocaenoides* to include the entire coastline of Iran including both the Persian Gulf and Gulf of Oman, however until this present study there has been no data to substantiate this suggestion. Finless porpoises in Iranian waters are the Indian Ocean subspecies *Neophocaena phocaenoides phocaenoides* (Reeves *et al*., 1997). Throughout their range finless porpoises inhabit shallow coastal waters,

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and inshore partially enclosed water bodies (Reeves *et al*., 1997). 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).

We compiled 21 records of Finless porpoise from the coast of southern Iran. These comprised evidence of nine strandings, 11 live sightings and the skeletal remains of one individual. Finless porpoises have been recorded in all coastal provinces but records are most numerous from Bushehr (8 records) and north of Qeshm Island (7 records). There is just a single record from Sistan-e-Baluchistan recorded in Chabahar by T.J. Roberts (1977).

Common dolphin (Delphinus spp.)

Delphinus delphis, D. capensis and *D. tropicalis* have been reported in the region, however the taxonomy of these species, especially the *tropicalis* form is unclarified (Perrin, 2002). Most recent authors have attributed all *Delphinus* records in the Gulf of Oman and Persian Gulf to the very long-beaked form *Delphinus capensis cf. tropicalis* and it is possible to clearly differentiate *Delphinus cf. tropicalis* in the field (Robineau and Fiquet, 1996;Ballance and Pitman, 1998; Robineau, 1998). All skulls examined in Iran were identified as *Delphinus cf. tropicalis* based on tooth counts. The common dolphin is the cetacean species most frequently cited as occurring in Iranian waters, however many of the records refer to mis-identified sightings or skeletal remains (Harrington Jr., 1977; Humphrey and Kharom, 1995; Ziaie, 1996; Firouz, 2005). Despite this confusion, *Delphinus* spp. is undoubtedly found in Iran. There are six positive records, two from the Persian Gulf, three from the Gulf of Oman and one skull of unknown origin that is stored at the University of Tehran, Faculty of Sciences Zoological Museum. Photos of an additional three stranded dolphins, one on Qeshm Island and two near Chabahar could not be identified to species and were classified as *Stenella longirostris/ Delphinus* sp.

Spinner dolphin (*Stenella longirostris*)

It was concluded by Van Waerebeek *et al*. (1999) that Spinner dolphins off the coast of Oman should be treated as a discrete population morphologically distinct from all other known Spinner subspecies. Spinners in Oman have cranial morphometrics similar to *Stenella longirostris asiaorientalis* from the east Pacific, but external features quite different from these. Two colour morphs have been described. A common tripartite pan tropical form, and another small, atypical form which was less common. Spinner dolphins are known to occur in both the Persian Gulf and Gulf of Oman, and while it is likely they do enter Iranian waters there are at present no definite records.

Rough-toothed dolphin (*Steno bredanensis*)

A complete skull of a mature Rough-toothed dolphin, dated 22nd June 1975 is stored in the small museum at the Iranian Fisheries Sciences Research Institute

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(IFSRI) office in Chabahar. This is the first, and only, record of this species in Iran. This specimen is the first evidence that Rough-toothed dolphins occur anywhere in the north of the Gulf of Oman or Arabian Sea, it has not been recorded in Pakistan and the only previous records from the Gulf of Oman are of two sightings in the south of the outer Gulf of Oman near the Oman coast in 1995 (Ballance and Pitman, 1998). Several comprehensive reviews of cetaceans in the Persian Gulf did not find any evidence of Rough-toothed dolphin occurrence and it is unlikely that this is suitable habitat for this deep water species (Robineau, 1998).

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 and Arabian Sea (Kruse *et al*., 1991;Baldwin *et al*., 1998). The shallow water of the Persian Gulf is unlikely to be suitable habitat for *Grampus*, there is one published sighting near to Bahrain in the Persian Gulf (Kruse *et al*., 1991) but the original source could not be traced by Baldwin *et al*. (1998) and its presence is considered unconfirmed and unlikely in the Persian Gulf. Most Iranian authors list *Grampus* as present in Iran (Darrehshori *et al*., 1996; Ziaie, 1996;Firouz, 2005) however, there are no published records to substantiate this claim. There are numerous records of Risso's dolphins from the Omani coast of the Gulf of Oman (Gallagher, 1991a; Kruse *et al*., 1991; Baldwin *et al.*, 1998; Ballance and Pitman, 1998) and it is therefore expected that *Grampus* is also relatively common in Iranian waters of the Gulf of Oman. There is only one Iranian record of this species which was a stranding near Chabahar.

Melon-headed whale (Peponocephala electra)

The knowledge of this species in the north-west Indian Ocean is very limited and there are no confirmed sightings in the Persian Gulf or Gulf of Oman (Baldwin *et al*., 1999; Baldwin *et al.*, 2001). A sighting of Melon-headed whales in the Gulf of Oman reported by Leatherwood *et al*. (1991) was treated as unconfirmed by Van Waerebeek *et al.* (1999) due to lack of supporting evidence and the ease of confusing this with other species. It is suggested that reports of sighted and stranded melon-headed whales along the Makran Coast and Indus Delta Pakistan (Roberts, 1997) be treated as unconfirmed for the same reason. Melon-headed whales have not been recorded in Iran.

False killer whale (Pseudorca crassidens)

False killer whales have been reported as present but not common in the Persian Gulf and Gulf of Oman, and are listed by most Iranian authors as occurring in Iran (Etemad, 1984; Ziaie, 1996; Baldwin *et al*., 1999; De Boer *et al*., 2003; Firouz, 2005;). This species is believed to be relatively abundant in pelagic equatorial regions of the Indian Ocean (Leatherwood *et al*., 1991) but would be expected to occur at lower densities in the shallow enclosed water of the Persian Gulf.

Killer whale (Orcinus orca)

A sighting of six Killer whales in the Persian Gulf was published by

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Leatherwood *et al*. (1991), however the position given is approximately 38km inland close to Bandar Abbas in Iran and this record and the occurrence of this species in the Persian Gulf is therefore unsubstantiated. There have been at least seven sightings and one stranding in Oman (Baldwin *et al*., 2001) 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 off the coast of Oman and UAE in the Gulf of Oman and they are believed to be resident in this area (Alling, 1986; Gallagher, 1991b; Ballance and Pitman, 1998; Baldwin *et al*., 1999; Baldwin *et al*., 2001; Watts *et al*., 2002). Sperm whales have not been recorded in Iran but it is very likely that they do occur in deep water of the Iranian Gulf of Oman.

Other Odontocetes

Two species that are rare in Omani waters of the Gulf of Oman, are striped dolphins *Stenella coeruleoalba* and Pan-tropical spotted dolphins (*Stenella attenuata*) (Gallagher, 1991a; Baldwin *et al*., 2001) these species have not been recorded in Iran but it is possible they may be uncommon visitors. Other Odontocetes known from very few records in the region and that may occur in Iranian waters are the Pygmy Killer Whale (*Feresa attenuata*) (Harwood, 1980;Alling, 1986), Dwarf Sperm Whale (*Kogia simus*)(Gallagher, 1991a; Ballance and Pitman, 1998;Baldwin *et al*., 2001), and Pilot Whale (*Globicephala macrocephalus*) (Baldwin *et al*., 2001).

Mysticetes

Blue whale (Balaenoptera musculus)

Blue whales have been reported to occur in Iranian waters (Harrington Jr., 1977; Humphrey and Kharom, 1995; Ziaie, 1996), the only evidence for this is a suggestion that whales near Bandar Abbas and Qeshm Island are blue and fin whales (Etemad, 1984). The presence of Blue whales anywhere in the Persian Gulf is unconfirmed and given that this is a deep water species the shallow Gulf is unlikely to be a highly frequented area. The only Blue whale record in the Persian Gulf was an animal stranded in Kuwait on 6 June 1963 (al-Robbae, 1971b), however, the species identification needs to be confirmed (Robineau, 1998). Blue whales have been sighted on several occasions in Omani waters of the Gulf of Oman (Baldwin *et al*., 1999; Baldwin *et al*., 2001) and it is possible that they also occasionally occur in Iranian waters, however this species is yet to be confirmed anywhere in Iran.

Fin whale (Balaenoptera physalus)

Fin whales are typically included in checklists of mammals occurring in Iran (Harrington Jr., 1977; Etemad, 1984; Ziaie, 1996; Firouz, 2005). There are three Iranian records of this species, all from the Persian Gulf, however they all require identification confirmation. A fin whale measuring 19m in length was stranded near Sorou, 30 km south of Bandar Abbas, Iran in April 1971. The skeleton is now

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stored in the Zoological Museum of the University of Tehran (Baloutch, 1972). A skeleton in an aquarium shop in Bushehr town and another at the Museum of Natural History in Tehran were tentatively identified as fin whales. Firoz (2005) reported that fin whales are occasionally seen near Bandar Abbas and Qeshm Island but this requires confirmation. Fin whales are known to occur elsewhere in the Persian Gulf. Two skeletons are displayed at the Zoological Museum, King Saud University, Riyadh, Saudi Arabia and probably stranded around 1970 (de Silva, 1987), a 13.5m Fin whale stranded in the UAE in 1978, the skeleton is now exhibited at the Natural History Museum, UAE University (al-Robbae, 1982; Robineau, 1998) and two Fin whales stranded on islands off the UAE in 1995 (Baldwin *et al*., 1999). Baldwin *et al*. (1999) reported several unconfirmed sightings in the Persian Gulf, however large pods of as many as 100 fin whales reported by Humphrey and Kharom (1995) from Iranian waters, seem unlikely. There are several unconfirmed Fin whale sightings in the Gulf of Oman (Baldwin *et al*., 1999; Baldwin *et al.*, 2001), but none from Iranian waters.

Bryde's whale (Balaenoptera edeni)

Bryde's whales are known to occur in Iranian waters, many *Balaenoptera edeni* remains have been wrongly identified as *Megaptera novaeangliae*, and it is probable that Bryde's whales are relatively common in Iran (Ziaie, 1996; Firouz, 2005).

Eight records were compiled, seven skeletal remains and two strandings (Record #44 includes both a stranding and the subsequently preserved skeleton). Three records are from Bushehr Province, three from Qeshm Island, and one from Hormoz Island in the Persian Gulf (Hormoz Strait). There is a single record from the Iranian waters of the Gulf of Oman. The identification of the skeletal remains should be treated as tentative, pending a more detailed evaluation.

Sei whale (Balaenoptera borealis)

The occurrence of Sei whales in the Arabian region is uncertain, there are unconfirmed sightings in the Gulf of Oman (Baldwin *et al*., 1999) but there is no evidence of Sei Whale occurrence in Iran.

Minke whale (Balaenoptera acutorostrata)

Minke Whales have been observed on several occasions in Omani waters of the Gulf of Oman (Baldwin *et al*., 2001). There is no evidence of their occurrence in Iranian waters and the Persian Gulf.

Humpback whale (Megaptera novaeangliae)

Humpback whales are listed as occurring in Iran in almost all national mammal reviews and checklists (Firoz, 1976; Harrington Jr., 1977; Etemad, 1984;Humphrey and Kharom, 1995; Ziaie, 1996; Firouz, 2005), but these records appear to be based on many *Balaenoptera* sp. skeletons that have been mis-identified as humpbacks. We compiled three definite records of Humpback whales; two strandings and one sighting all in Sistan-Baluchistan Province.

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Sirenia

Dugong (Dugong dugon)

Dugong occur along the southern margins of the Persian Gulf in coastal waters of Bahrain, UAE, Qatar and Saudi Arabia (Marsh *et al*., 2002). Density is highest in the protected shallow waters between Bahrain and Qatar and around Murawah Island in the UAE. The largest dugong aggregation ever recorded, numbering 674 animals, was found between Bahrain and Qatar in the winter of 1985-86. Dugong abundance in the Gulf was estimated as 5840 ± 903 which is the world's second largest population and the most important area in the west of the species range (Preen, 2004). Iran has generally not been listed as a dugong range state and Preen (2004) suggested that dugong distribution in the north and west of the Gulf was limited by cold winter water temperatures. As dugong typically inhabit shallow tropical and subtropical waters with a mean sea surface temperature of 23^{o}C or greater and apparently avoid prolonged exposure to water temperatures of less than 18^{o}C, it was suggested that the temperature regime and bathymetry in Iran (except for north Qeshm Island) would be unsuitable to support significant numbers of this species (Marsh *et al*., 2002; Preen, 2004). There are unconfirmed sightings of dugong in Gwatar near the Pakistan border (Firouz, 2005). Firouz (2005) reported a sighting of two dugong in the Mond River estuary (approximately 100km south of Bushehr), however this report is also unconfirmed. There are, however two confirmed sightings of dugong in the Hara Protected Area, mangrove forests in north of Qeshm Island (KhoranStrait). 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 29th January 2000. It surfaced about 5m from the boat and then dived. When it surfaced near the boat 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 protected area on 1st November 2000. These records show that dugong have occurred in Iran, but it is unclear whether these individuals indicate the presence of a separate population in Iranian waters or whether they were vagrants that dispersed from the southern part of the Persian Gulf population. In Australia dugongs regularly move distances of 40 - 100 km and some individuals have been shown to undertake long distance movements of at least 600 km across deep oceanic so dispersal 300 km across the relatively shallow Persian Gulf is quite feasible (Marsh *et al*., 2002).

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