Marine Mammals and Sea Turtles of the Arabian Gulf: A Guide to Their Identification

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ABOUT THE COVER

Top image: Long-beaked common dolphin (*Delphinus capensis*). Photo courtesy of T.A. Jefferson, Clymene Enterprises

Bottom image: Green turtle (*Chelonia mydas*). Photo courtesy of A. Bruckner, National Oceanic and Atmospheric Administration (NOAA)

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PURPOSE

The purpose of this guide is to provide a definitive aid for the identification of marine mammals and sea turtles that occur or may occur within the Arabian Gulf. The guide will provide observers and researchers with current information on these species and lists diagnostic characters that may be used to identify sighted animals. The guide includes photographs, a list of identifying characters, and range maps for each species (based on the best available information), as well as separate dichotomous keys for marine mammal and sea turtle species.

The main sections of the guide present marine mammal and sea turtle species that are known to occur in the Arabian Gulf. Most of the photographs included in the guide represent perspective views of marine mammals and sea turtles that an observer in offshore waters is likely to see. There are other identification guides for marine mammals and sea turtles that offer additional views, including drawings that may be helpful to the observer for species identification. Abbreviated descriptions of marine mammal species that are not confirmed in the Gulf are provided in the **Appendix** at the end of the guide. The dichotomous keys and the main sections of the guide can and should be used together for identifying species; however, it must be noted that the species in the main sections of the guide are intended mostly for the identifications of live animals at sea, whereas the dichotomous keys are more appropriate for the identification of beached or dead animals (i.e., those "in hand"). It is suggested that the main sections of the guide be used to work up an initial identification, and then the key should be used to confirm the identification.

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MARINE MAMMALS

Most marine mammal species known to occur within the Arabian Gulf are recognized by The International Union for Conservation of Nature and Natural Resources (IUCN) as species of concern. The IUCN is the world's oldest and largest global environmental network and publishes the IUCN Red List of Threatened Species, which is recognized as the most comprehensive and objective global approach for evaluating the conservation status of plant and animal species (http://www.iucn.org/). A listing of marine mammal species that are known to occur in the Arabian Gulf, along with their relative status in the Gulf and IUCN Red List status, is presented in **Table 1**.

Table 1. Marine mammal species of the Arabian Gulf, along with their relative status in the Gulf and IUCN Red List Status*.

Common Name	Species	Status in Gulf	IUCN Red List Status*
Bryde's whale	*Balaenoptera brydeii/edeni*	Rare	DD
Humpback whale	*Megaptera novaeangliae*	Rare	LC
False killer whale	*Pseudorca crassidens*	Rare	DD
Indo-Pacific bottlenose dolphin	*Tursiops aduncus*	Common	DD
Indo-Pacific humpback dolphin	*Sousa chinensis*	Common	NT
Pantropical spotted dolphin	*Stenella attenuata*	Rare	LC
Spinner dolphin	*Stenella longirostris*	Rare	DD
Long-beaked common dolphin	*Delphinus capensis*	Common	DD
Finless porpoise	*Neophocaena phocaenoides*	Rare?	V
Dugong	*Dugong dugon*	Common	V
Blue whale	*Balaenoptera musculus*	Extralimital	E
Fin whale	*Balaenoptera physalus*	Extralimital	E
Killer whale	*Orcinus orca*	Unconfirmed	DD
Short-finned pilot whale	*Globicephala macrorhynchus*	Unconfirmed	DD
Risso's dolphin	*Grampus griseus*	Unconfirmed	LC
Rough-toothed dolphin	*Steno bredanensis*	Unconfirmed	LC
Striped dolphin	*Stenella coeruleoalba*	Unconfirmed	LC

*IUCN Red List Status Categories:

CRITICALLY ENDANGERED (CE)
A taxon is Critically Endangered when the best available evidence indicates that it is considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (E)
A taxon is Endangered when the best available evidence indicates that it is considered to be facing a very high risk of extinction in the wild.

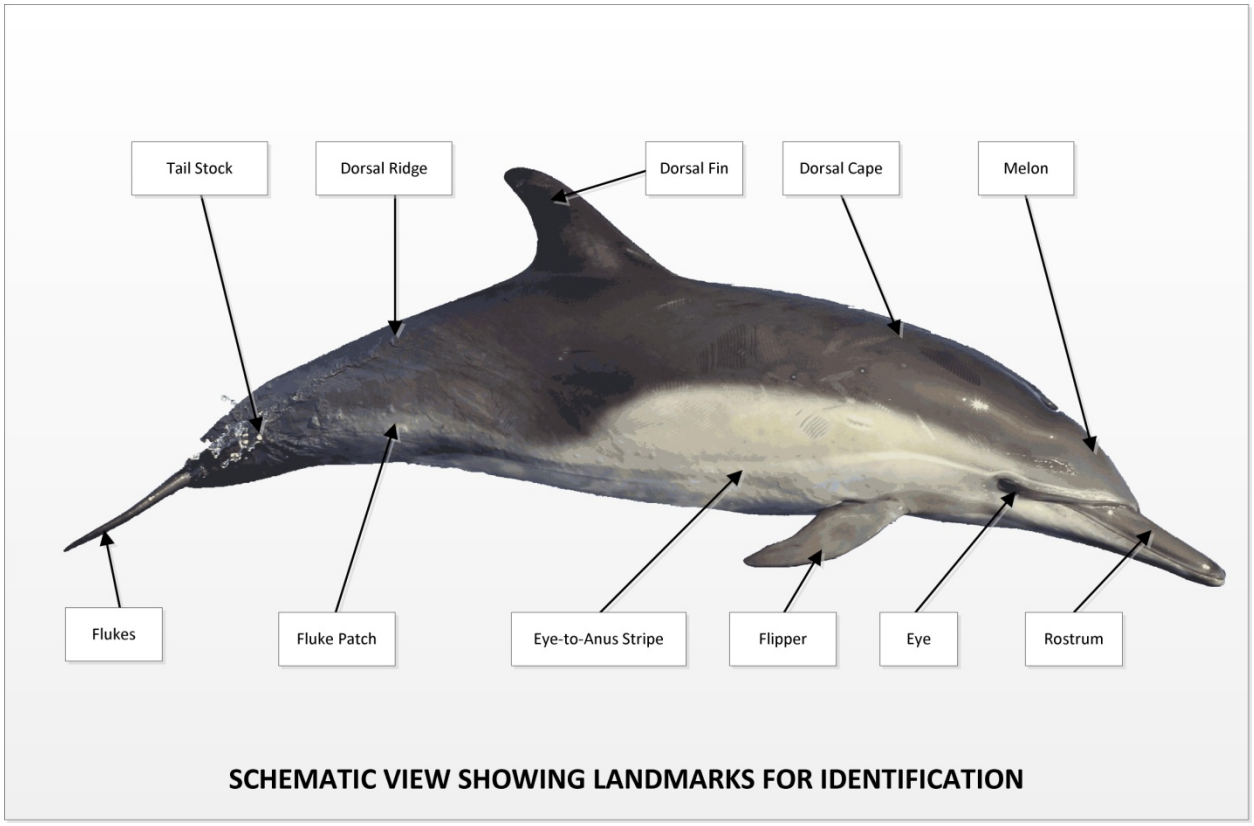
VULNERABLE (V)
A taxon is Vulnerable when the best available evidence indicates that it is considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat.

The following illustration provides a guide to external morphological characters of marine mammals that are diagnostic in the identification of species.



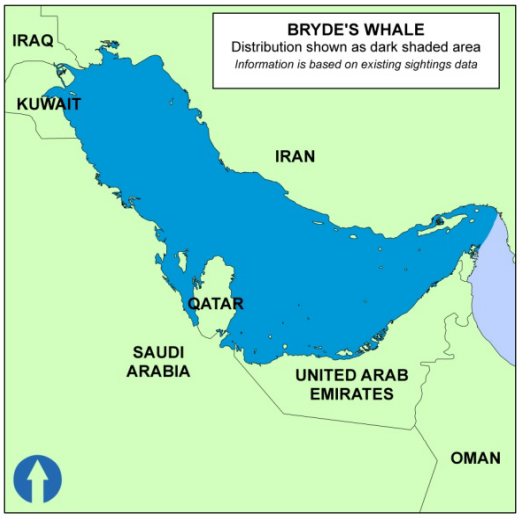
SCHEMATIC VIEW SHOWING LANDMARKS FOR IDENTIFICATION

Bryde's whale (*Balaenoptera edeni/brydei*)

Photo credit: National Oceanic and Atmospheric Administration (NOAA)

Photo credit: T.A. Jefferson

Bryde's whale (*Balaenoptera edeni/brydei*)



Identification

- *Length*: Adults up to 16.5 m
- *Body shape*: Slender and streamlined, with ventral pleats from lower jaw to past navel
- *Head shape*: From above, rounded, with three rostral ridges (central ridge and two accessory ridges, one on either side of upper jaw); from side, shallow and pointed
- *Dorsal fin shape*: Located about 2/3 of way along back; relatively tall and falcate, rising from the back at a steep angle
- *Flipper shape*: Moderately long and slender
- *Body color*: Body mostly dark brownish gray, with lighter color on belly and lower sides; often light scars/mottling on back
- *Baleen*: 250 to 370 pairs of gray baleen plates, with light gray fringes (relatively coarse)
- *Blow*: Usually columnar, but can be bushy; sometimes they blow underwater with no visible blow

Distribution in Gulf

Bryde's whale is known from the Arabian Gulf from four stranding records and a single sighting of two feeding individuals off Saudi Arabia. This species is seen regularly outside the Gulf along the coast of Oman, especially in March and April, when they may be breeding.

Status in Gulf

Bryde's whales must be considered rare in the Arabian Gulf. Since it is regularly seen in nearshore waters off Oman, the existing sightings data may represent an underestimate of densities in the Arabian Gulf.

Behavior and Ecology

Not much is known about the behavior of Bryde's whales. This species is generally seen alone or in pairs, although they can be seen in groups of up to 10 individuals. Bryde's whales do not have a well-defined breeding season in most areas. There is a 2-year reproductive cycle composed of 11 to 12 months gestation, 6 months lactation, and 6 months resting. Bryde's whales are lunge-feeders, feeding on fish and krill. They dive for as long as 20 minutes.

Bryde's whales produce low-frequency tonal and swept calls similar to those of other rorquals. Calls vary regionally, yet all but one of the call types have a fundamental frequency below 60 Hz.

Selected References

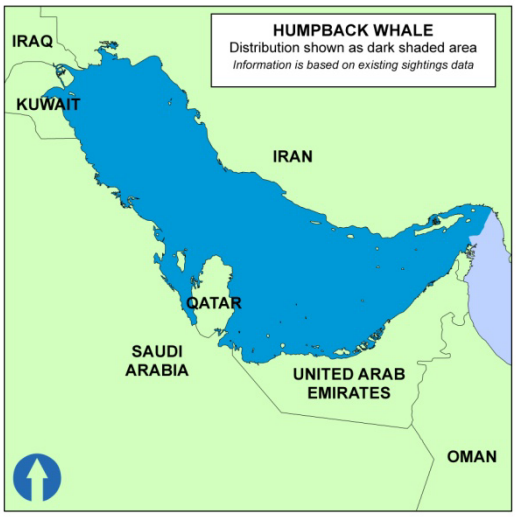
Al-Robaae, 1969; Cummings, 1985; Robineau, 1998; Kato and Perrin, 2009.

Humpback whale (*Megaptera novaeangliae*)

Photo credit: NOAA

Photo credit: T.A. Jefferson

Humpback whale (*Megaptera novaeangliae*)



Identification

- *Length*: Adults from 11-17 m long (females about 1-1.5 m longer than males)
- *Body shape*: Relatively robust, with a series of bumps along the tail stock behind the dorsal fin
- *Head shape*: Broad and rounded from above, with a single median ridge and tubercles along the upper and lower jaws
- *Dorsal fin shape*: Highly variable, but usually "stepped," with a small falcate fin sitting atop a short hump on the back; about 2/3 of the way back
- *Flipper shape*: Extremely long and slender (up to 1/3 of body length), with tubercles along the leading edges
- *Body color*: Back dark gray, belly whitish, with the white extending up the sides to varying degrees, uneven margin between dark and light colors; flippers and underside of tail flukes usually mostly white
- *Baleen*: 270 to 400 black to olive baleen plates on each side
- *Blow*: Usually rather low and bushy, but can appear tall and slender at times; reaching up to 3 m tall

Distribution in Gulf

There is only a single record of the humpback whale from the Arabian Gulf, a skull from the late 1800s from the coast of Iraq. These whales are common outside the Gulf, in the Gulf of Oman and Arabian Sea, where they appear to breed. Arabian Gulf records may be stragglers from this semi-resident population in the Arabian Sea area.

Status in Gulf

Humpback whales must be considered rare in the Arabian Gulf. However, this species often uses shallow nearshore waters, and thus the Gulf may provide good habitat. As humpback whale populations rebound from depletion caused by heavy commercial whaling, we may see increased use of areas such as the Arabian Gulf.

Behavior and Ecology

Humpback whales are arguably the most social of all the baleen whales. Group size can range from single individuals to large groups of up to 20 or more whales. These groups are, however, typically unstable, with the exception of mother/calf pairs. On the feeding grounds, relatively large numbers of humpbacks may be observed within a limited area. On the breeding grounds, small groups of males may occur, competing for access to females.

Humpback whales feed on a wide variety of invertebrates and small schooling fishes. The most common invertebrate prey are krill; the most common fish prey are herring, mackerel, sand lance, sardines, anchovies, and capelin. These whales are lunge feeders, taking in huge batches of prey items as they lunge laterally, diagonally, or vertically through patches. Feeding behavior is highly diverse, and humpbacks employ unusual behaviors, such as bubble netting, to corral prey. This is the only species of baleen whale that shows strong evidence of cooperation when feeding in large groups. Males compete for access to receptive females by aggressive, sometimes violent, interactions, as well as vocal displays.

Humpback whale diving behavior depends on time of year. In summer, most dives last less than 5 minutes; those exceeding 10 minutes are atypical. In winter, dives average 10 to 15 minutes; dives of greater than 30 minutes have been recorded.

Humpback whales are known to produce three classes of vocalizations: (1) "songs" in late fall, winter, and spring by solitary males; (2) social sounds made by calves or within groups on the wintering (calving) grounds; and (3) social sounds made on the feeding grounds.

Selected References

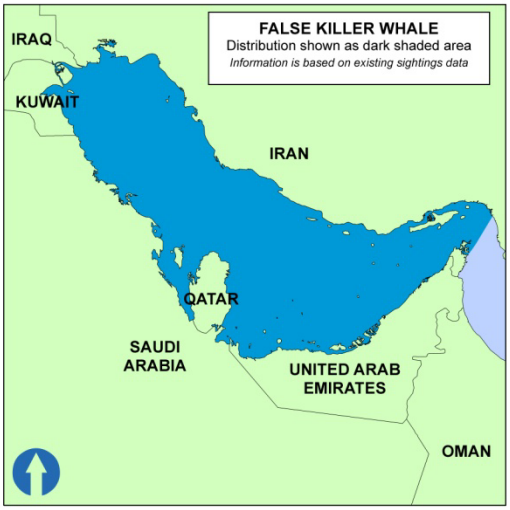
Robineau, 1989, 1998; Clapham and Mead, 1999.

False killer whale (*Pseudorca crassidens*)

Photo credit: R. Baird

Photo credit: R. Pitman

False killer whale (*Pseudorca crassidens*)



Identification

- *Length*: Adults up to 5 m long (males longer than females)
- *Body shape*: Slender and streamlined, with a shallow tail stock
- *Head shape*: Elongated, with a bulbous forehead, but narrow when viewed from above
- *Dorsal fin shape*: Relatively tall and prominent; falcate; usually fairly slender with a rounded tip
- *Flipper shape*: S-shaped (with a unique hump on leading edge)
- *Body color*: Almost entire body is dark gray to black, with only a faint cape; faint lighter patches on chest and sometimes around the mouth
- *Teeth*: Very large and robust; each jaw contains 7 to 12 pairs (round in cross section)

Distribution in Gulf

There are only three records of false killer whales in the Arabian Gulf: one stranding and two sighting records. Two additional sighting records exist for the Straits of Hormuz at the entrance to the Gulf. False killer whales are common in waters of Oman, outside the Arabian Gulf.

Status in Gulf

False killer whales should be considered rare in the Arabian Gulf, although this species does sometimes enter shallow nearshore waters (like those of the Gulf) in other parts of the Indo-Pacific.

Behavior and Ecology

Although smaller groups are more common, this species may also occur in large groups (group sizes as large as 300 have been reported). The known maximum dive depth is about 500 m. No seasonality in reproduction is known for the false killer whale. False killer whales primarily eat deep-sea cephalopods and fish, but they have been known to attack other cetaceans, including dolphins, and baleen whales.

The dominant frequencies of false killer whale whistles are 4 to 9.5 kHz; those of their clicks are 25 to 30 kHz and 95 to 130 kHz.

Selected References

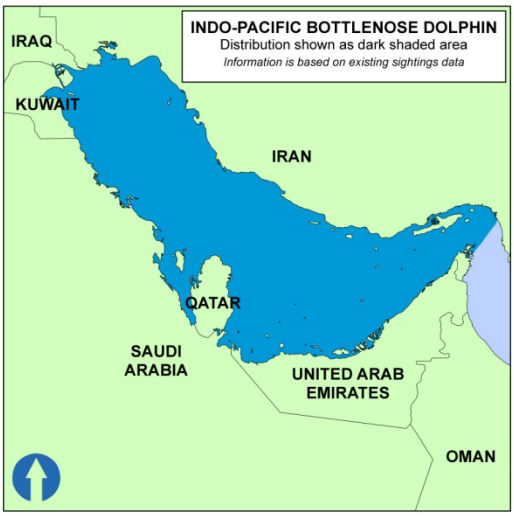
Morzer-Bruyns, 1969; Al-Robaae, 1971; Robineau, 1998; Baird, 2009.

Indo-Pacific bottlenose dolphin (*Tursiops aduncus)*

Photo credit: T.A. Jefferson

Photo credit: T.A. Jefferson

Indo-Pacific bottlenose dolphin (*Tursiops aduncus)*



Identification

- *Length*: Adults up to about 2.7 m
- *Body shape*: Slender and streamlined
- *Head shape*: Typical dolphin shape, with a moderately-long, slender beak and crease between the melon and beak
- *Dorsal fin shape*: Prominent and relatively large; falcate, though tending to be somewhat more wide-based and triangular than in other bottlenose dolphins
- *Flipper shape*: Typical dolphin shape
- *Body color*: Grayish cape, whitish belly, and intermediate sides; cape is relatively distinct, with a prominent spinal blaze under dorsal fin; dark spotting on undersides in all but young animals
- *Teeth*: 21 to 29 pairs of teeth in each jaw; teeth moderately slender

Distribution in Gulf

Many records of the Indo-Pacific bottlenose dolphin exist for the Arabian Gulf, including not just sightings, but also a number of strandings and beachcast material. This species was often observed in sighting surveys off Saudi Arabia, and was the most common species observed in aerial surveys for marine mammals in the western and southern parts of the Arabian Gulf. They appear to be particularly common in the Gulf of Salwa.

Status in Gulf

Indo-Pacific bottlenose dolphins are common in the Arabian Gulf. There are no estimates of abundance specifically for the Indo-Pacific bottlenose dolphin in the Arabian Gulf, although Preen estimated that there were about 480 small cetaceans in the southern and western Arabian Gulf in 1999. This represents mostly bottlenose dolphins, and there were indications of a significant decline in abundance since 1986, so they may have been much more abundant in earlier years.

In fact, it appears that all bottlenose dolphins in the Arabian Gulf are of this species, and the common bottlenose dolphin (*Tursiops truncatus*) may not be present there. Bottlenose dolphins are also common along the coasts of Oman, outside of the Arabian Gulf, but it is possible that at least some of these records may be of the common bottlenose dolphin.

Behavior and Ecology

Most studies of the behavioral ecology of this species have been conducted in South Africa and Australia, and only recently has there been some ecological study of populations in Japanese and Taiwanese waters. Group size tends to be relatively small (compared to oceanic dolphins), generally less than a few dozen individuals, but sometimes it can reach 100 animals or more. As in their better-known congeners, group composition appears to be of a fission-fusion nature, and fluidity in associations is the rule.

Selected References

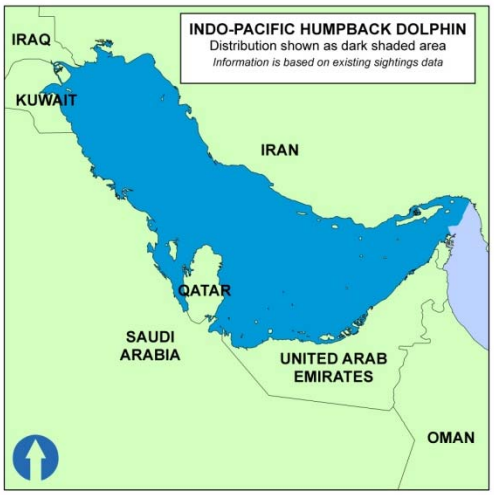
Wells and Scott, 1999; Wang and Yang, 2009.

Indo-Pacific humpback dolphin (*Sousa chinensis*)

Photo credit: T.A. Jefferson

Photo credit: J. Kiszka

Indo-Pacific humpback dolphin (*Sousa chinensis*)



Identification

- *Length*: Adults up to 2.8 m (although probably much smaller in the Arabian Gulf)
- *Body shape*: Moderately robust, with a deepened tail stock (especially in adult males)
- *Head shape*: Long, slender beak, with no crease between beak and melon
- *Dorsal fin shape*: Small, falcate dorsal fin sits atop a hump of connective tissue on back (this feature is most exaggerated in adult males)
- *Flipper shape*: Broader and more paddle-shaped than in oceanic dolphins
- *Body color*: Adults are brownish gray, often with whitish scarring and/or dark flecking on the back and tail stock; calves are lighter gray
- *Teeth*: 29 to 39 pairs of robust teeth in each tooth row; some may have slight wrinkles or be extensively worn

Distribution in Gulf

There are many records of the Indo-Pacific humpback dolphin in the Arabian Gulf. These include a large number of sightings, strandings, and beachcast skeletal specimens. These animals are commonly observed in at least the followings areas: Straits of Hormuz, Saudi Arabian waters, and Kuwait (near the head of the Gulf). They are also commonly observed in Omani waters of the Arabian Sea, though not in the Gulf of Oman. This species is largely restricted to shallow, generally-nearshore waters, and they are mostly seen in waters less than 30 m deep.

Status in Gulf

One of the most-commonly observed cetacean species in the Arabian Gulf, the Indo-Pacific humpback dolphin is probably well known to most coastal dwellers. It was the second most-common species (after the Indo-Pacific bottlenose dolphin) observed during aerial surveys of large sections of the western and southern Arabian Gulf in the 1980s and 1990s. Although they would appear to be rather abundant, sometimes being seen in groups that range up to 100 animals (which is very unusual for this species), there are no abundance estimates for the species in the Gulf.

Humpback dolphins in the Arabian Gulf are currently considered to be part of the species *Sousa chinensis*, which is distributed throughout the Indo-Pacific. However, recent studies using morphology and genetics suggest that the *plumbea*-type humpback dolphins, of which the Arabian Gulf animals are a part, may be a separate species (*Sousa plumbea*). Further taxonomic work is required to determine if this is indeed the case. A hiatus in distribution in the Gulf of Oman suggests that the Arabian Gulf may contain a separate population from the Indian Ocean, and the much-smaller skulls of the Arabian Gulf animals also support this supposition.

Behavior and Ecology

Most groups of Indo-Pacific humpback dolphins are relatively small (<25 individuals); they are most often composed of less than 10 animals. It is not uncommon to see single individuals, but groups of up to 100 have also been sighted. Generally, groups are composed of a variety of different age and sex classes, with adults usually making up one-half to two-thirds of larger groups. In most areas, group structure is highly fluid, resembling the fission/fusion society of bottlenose dolphins.

Feeding habits have only been studied in detail in three areas: southern Africa, Australia, and southern China. These dolphins feed on a wide variety of prey that includes fishes, cephalopods, and crustaceans. Interactions with coastal fishing operations tend to be common, particularly with trawlers.

There is very little information available on diving habits of this species as they have never been tagged with time/depth recording devices. Because of the shallow waters where they generally live, dives deeper than about 20 to 30 m would likely be rare. Some dives may last as long as 4 to 5 minutes, but most surface intervals are much shorter (generally <1 minute). They do not ride bow waves of boats.

Indo-Pacific humpback dolphin vocalizations consist of four different categories: broadband clicks (8 kHz to >22 kHz), barks and quacks (0.6 kHz to >22 kHz), grunts (0.5 ± 2.6 kHz), and whistles (0.9 to 22 kHz). Some Indo-Pacific humpback dolphin clicks have broadband energy of up to at least 200 kHz.

Selected References

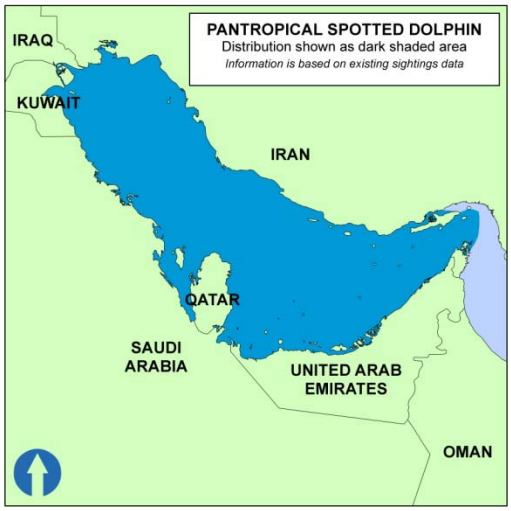
Robineau, 1998; Jefferson and Karczmarski, 2001; Baldwin et al., 2004; Jefferson and Van Waerebeek, 2004.

Pantropical spotted dolphin (*Stenella attenuata*)

Photo credit: T.A. Jefferson

Photo credit: T.A. Jefferson

Pantropical spotted dolphin (*Stenella attenuata*)



Identification

- *Length*: Adults up to 2.6 m
- *Body shape*: Slender and streamlined
- *Head shape*: Slender, with a moderately-long, slim beak; crease between melon and upper jaw
- *Dorsal fin shape*: Falcate, and usually very slender
- *Flipper shape*: Continuously recurved with a pointed or slightly rounded tip
- *Body color*: Two-tone; dark brownish gray on back, with lighter belly and lower sides (the belly can range from white to moderate gray); light spotting on dorsal surface and dark spotting on ventral surface may be present (but not always); dark gape-to-flipper stripe and white on lips and tip of jaws (except on calves)
- *Teeth*: 34 to 48 pairs of small, slender teeth in each jaw

Distribution in Gulf

Only a single record of the pantropical spotted dolphin exists for the Arabian Gulf – a skull found near the entrance to the Gulf. This species also appears to be uncommon in Omani waters outside the Gulf.

Status in Gulf

Pantropical spotted dolphins are rare in the Arabian Gulf. They prefer deeper waters than the Gulf offers.

Behavior and Ecology

Group size for the pantropical spotted dolphin may range from just a few dolphins to several thousand; though a few dozen to hundreds are more common. Observations of dolphin groups caught in tuna purse seines in the eastern tropical Pacific (ETP) show that there are subgroups containing mother-calf pairs, adult males, or juveniles. In the ETP, where this species has been best studied, there are two calving peaks—one in spring and one in fall.

Pantropical spotted dolphins prey on epipelagic fish, squid, and crustaceans, with some ingestion of mesopelagic prey. Results from various tracking and food habits studies suggest that pantropical spotted dolphins in the ETP and off Hawaii feed primarily at night on epipelagic species and on mesopelagic species that rise with the deep scattering layer towards the water's surface after dark. Dives during the day generally are shorter and shallower than dives at night; rates of descent and ascent are higher at night than during the day. This species often rides the bow waves of ships.

Pantropical spotted dolphin whistles have a frequency range of 3.1 to 21.4 kHz. Clicks typically have two frequency peaks (bimodal) at 40 to 60 kHz and 120 to 140 kHz.

Selected References

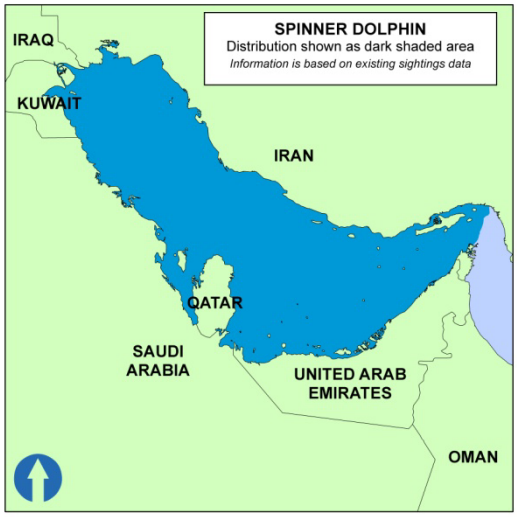
Gallagher, 1991; Perrin and Hohn, 1994; Robineau, 1998; Perrin, 2001.

Spinner dolphin (*Stenella longirostris*)

Photo credit: T.A. Jefferson

Photo credit: NOAA

Spinner dolphin (*Stenella longirostris*)



Identification

- *Length*: Adults up to 2.35 m
- *Body shape*: Very slender and streamlined, on adult males tail stock is deepened and there may be a slight post-anal keel
- *Head shape*: Exceedingly slender, with a very-long slim beak; prominent crease between melon and upper jaw
- *Dorsal fin shape*: Variable, ranging from slightly falcate to triangular
- *Flipper shape*: Continuously recurved with a pointed or slightly rounded tip
- *Body color*: Distinctly three-tone: dark gray back, intermediate sides, white to light gray belly; dark lip patches, dark eye-to-flipper stripe
- *Teeth*: 40 to 62 pairs of extremely small, slender teeth in each jaw

Distribution in Gulf

There is only a single record of the spinner dolphin in the Arabian Gulf, although the species is very common in Omani waters just outside the Gulf. In Oman, it is often seen in schools of several hundred individuals (and occasionally in the thousands).

Status in Gulf

The single record suggests that spinner dolphins are rare in the Arabian Gulf. Although this is a species that frequents shallow nearshore waters in many areas for daytime resting, these areas generally have very deep, oceanic waters nearby, where the animals move to feed at night. The very shallow waters of the Arabian Gulf probably do not provide the required access to feeding habitat for spinner dolphins.

Behavior and Ecology

Spinner dolphin group sizes range from less than 50 to several thousand individuals. Seasonal and geographic variations in-group size has been recorded. A Hawaiian population of spinner dolphins has been studied for more than 35 years. Social groupings in this species are typically very fluid in Hawaiian waters; large groups form, break-up, and re-form with different subgroups throughout the day. In the offshore ETP, there is some segregation by age and sex among dolphin groups.

Spinner dolphins feed primarily on small mesopelagic fishes, squids, and sergestid shrimps and they dive to at least 200 to 300 m. Foraging takes place primarily at night, when the mesopelagic community migrates vertically towards the surface and also horizontally towards the shore at night. Rather than foraging offshore for the entire night, spinner dolphins track the horizontal migration of their prey. This tracking of the prey allows spinner dolphins to maximize their foraging time while foraging on prey at its highest densities. Spinner dolphins often ride bow waves of ships.

Spinner dolphins are well known for their propensity to leap high into the air and spin before landing in the water; the purpose of this behavior is unknown. Several other types of aerial behavior include backslaps, headslaps, noseouts, tailslaps, and a behavior called “motorboating.” Undoubtedly, spinner dolphins are one of the most aerially active of all dolphin species.

Pulses, whistles, and clicks have been recorded from this species. Pulses and whistles have dominant frequency ranges of 5 to 60 kHz and 8 to 12 kHz, respectively. Spinner dolphins consistently produce whistles with frequencies as high as 16.9 to 17.9 kHz. Clicks have a dominant frequency of 60 kHz. The burst pulses are predominantly ultrasonic, often with little or no energy below 20 kHz.

Selected References

Perrin and Gilpatrick, 1994; Perrin, 1998; Robineau, 1998.

Long-beaked common dolphin (*Delphinus capensis*)

Photo credit: T.A. Jefferson

Photo credit: R. Pitman

Long-beaked common dolphin (*Delphinus capensis*)

Identification

- *Length*: Adults up to 2.6 m
- *Body shape*: Very slender and streamlined, there may be a slight post-anal keel
- *Head shape*: Very slender, with an exceedingly-long slim beak; prominent crease between melon and upper jaw
- *Dorsal fin shape*: Prominent, and usually slightly falcate
- *Flipper shape*: Continuously recurved with slightly rounded tip
- *Body color*: Hourglass pattern: dark brownish-gray back, white belly, and figure-8 pattern of light yellowish gray on sides; dark lip patches and eye stripe, dark chin-to-flipper stripe; flippers may be lighter gray in color
- *Teeth*: 52 to 67 pairs of extremely small, slender teeth in each jaw

Distribution in Gulf

There are many records of the long-beaked common dolphin in the Arabian Gulf, from strandings, beachcast skulls, and sightings. This species was the most common cetacean observed in sighting surveys off the coast of Saudi Arabia in the 1990s, mostly in waters 10 to 30 m deep, and in groups of 2 to 60 individuals. However, it was not reported by Preen (2004) from his aerial surveys off the southern and western Arabian Gulf in the 1980s and 1990s. This species is extremely common off the coast of Oman, outside the Arabian Gulf, often occurring in large schools of several hundreds.

Status in Gulf

The long-beaked common dolphin is common in the Arabian Gulf. Although there are no abundance estimates for this species in the Gulf, it appears that their numbers may be in the high hundreds or thousands, and it is unknown if these animals are part of the huge populations that exist outside the Arabian Gulf in the Arabian Sea.

The common dolphins in the Arabian Gulf have extremely long beaks and are well differentiated from other common dolphins in the world. They have generally been considered to be part of a subspecies of the globally-distributed long-beaked common dolphin (*D. capensis tropicalis*). However, recent evidence is accumulating that suggests that the *tropicalis* form of common dolphin may in fact be more closely related to the short-beaked common dolphin (*D. delphis*). Further work is needed to clarify the affinities of the *tropicalis* form.

Behavior and Ecology

Long-beaked common dolphin group size ranges from several dozen to over 10,000. Common dolphins are fast-moving swimmers, active bowriders, and often jump in the air.

Delphinus feeds primarily on organisms in the migrating Deep Scattering Layer (DSL). Diel fluctuations in vocal activity of this species (more vocal activity during late evening and early morning) appear to be linked to feeding on the DSL as it rises during the same time. Long-beaked common dolphins will often approach vessels to ride the bow and quarter waves produced by them as they move through the water.

Recorded *Delphinus* vocalizations include whistles, chirps, barks, and clicks. Clicks and whistles have dominant frequency ranges of 23 to 67 kHz and 0.5 to 18 kHz, respectively.

Selected References

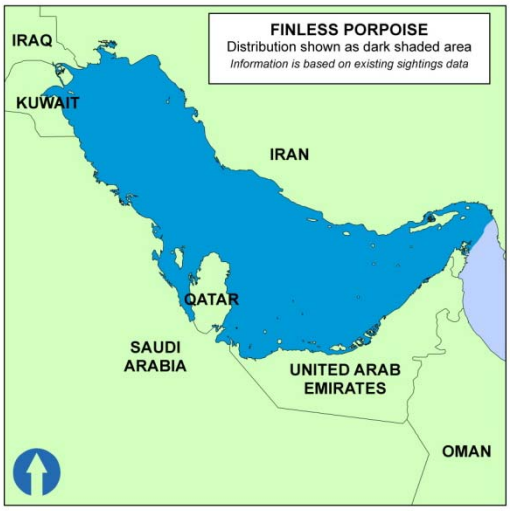
Robineau and Fiquet, 1996; Robineau, 1998; Jefferson and Van Waerebeek, 2002.

Finless porpoise (*Neophocaena phocaenoides*)

Photo credit: T. Webb

Photo credit: T.A. Jefferson

Finless porpoise (*Neophocaena phocaenoides*)



Identification

- *Length*: Adults up to 1.7 m (although those in the Gulf probably much smaller)
- *Body shape*: Moderately slender, and more "mushy" than most other cetaceans
- *Head shape*: Steep, almost vertical forehead, with little or no beak
- *Dorsal fin shape*: No dorsal fin; this is replaced by a low, wide (3.5-12 cm wide) dorsal ridge on the back, which is covered in 10 to 25 rows of small tubercles
- *Flipper shape*: Relatively wide, with rounded tips
- *Body color*: Adults are dark gray in color, often with lighter color around lips and on the throat and belly; calves significantly lighter gray in color
- *Teeth*: 15 to 22 pairs of small spade-shaped teeth in each jaw

Distribution in Gulf

There are a number of records of finless porpoises from the Arabian Gulf, from strandings, beachcast skeletal material, as well as sightings in various locations. They were observed by Swiss biologist Giorgio Pilleri and his colleagues at Clarence Strait (near the Gulf's entrance in the 1970s), and recently Preen (2004) observed the species five times during aerial strip transect surveys of the western and southern waters of the Arabian Gulf.

Status in Gulf

Although the number of sightings would suggest that finless porpoises are rare in the Arabian Gulf, the species may not be as rare as this indicates. Finless porpoises are very difficult to detect and generally are not noticed by people who are not experienced in looking for them. So, they may in fact be more common than the records suggest.

Behavior and Ecology

Most finless porpoise groups are small, less than about a dozen individuals. Larger groups have been documented in various parts of the range, but these usually appear to be opportunistic aggregations that form to take advantage of good feeding opportunities. Little is known of their group structure, as no detailed studies have been conducted of identified individuals, but it is thought that most groups are probably fluid, with only short-lasting associations. Finless porpoises are generally considered shy and cryptic. Aerial behavior tends to be quite rare, compared to other species of small cetaceans. Finless porpoises do not ride bow waves. They tend to be most active when feeding or socializing. Most dives appear to be short, generally less than 30 seconds, but dives of up to 4 minutes duration have been noted. Life history of this species has been relatively well studied, mostly from stranded and incidentally captured individuals. Growth curves have been constructed for various populations in Japanese and Chinese waters. Growth is rapid during the first year, and thereafter begins to level-off. Some animals in southern China appear to live as long as 33 years. Calving is broadly seasonal, with the calving peak varying widely among populations.

Finless porpoises appear to be opportunistic feeders, taking whatever local prey species are most abundant. They feed mostly on various species of shallow-water pelagic and demersal fishes, cephalopods, and crustaceans. Squids often appear to be a very important part of the diet. Not much is known of their feeding behavior.

Finless porpoise acoustic behavior is very specialized. Like all species in the family Phocoenidae, they make very stereotyped clicks that are well above the human hearing range, with fundamental frequencies of around 120 kHz. The apparently do not whistle.

Selected References

Robineau, 1998; Jefferson, 2002; Jefferson and Hung, 2004; Preen, 2004; Jefferson and Wang, 2011.

Dugong (*Dugong dugon*)

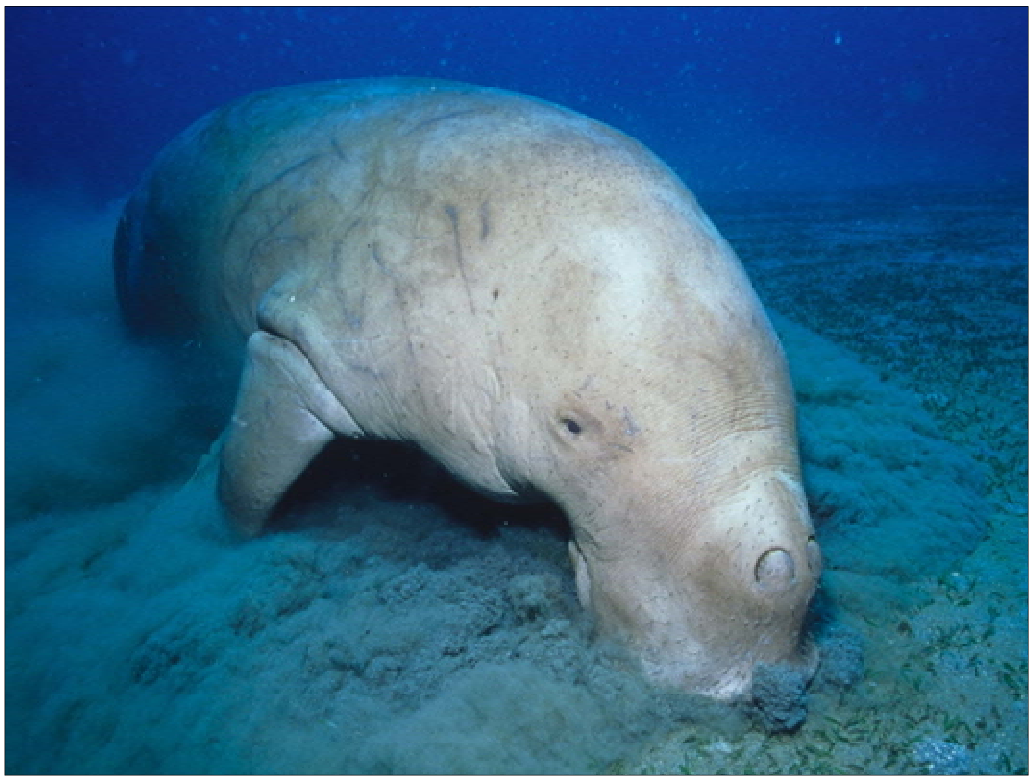


Photo credit: I. Visser

Photo credit: C. Garrigue

Dugong (*Dugong dugon*)

Identification

- *Length*: Adults up to 3.3 m
- *Body shape*: Moderately robust, but still streamlined; skin is basically smooth with small folds and sprinkled with short hairs
- *Head shape*: Stocky, with flattened rostral disk with short, coarse bristles; muzzle deflected downwards; nostrils valve-like; eyes small
- *Dorsal fin shape*: No dorsal fin or ridge
- *Flipper shape*: Paddle-shaped with no nails
- *Body color*: Brownish to slate-gray on the back, fading to a lighter gray (often with a pinkish hue) on the belly; older adults ("scarbacks") may have white areas on back
- *Teeth*: Differentiated teeth, with formula I2/3, C0/1, PM 3/3, M 3/3; outer pair of upper incisors of adult males and some females erupt from gums as "tusks" (though they do not extend outside closed mouth)

Distribution in Gulf

There are numerous records of dugongs in the Arabian Gulf, including many sightings, strandings, and beachcast skeletal specimens. They occur throughout the Gulf, but the most important habitats appear to be: (1) waters of the United Arab Emirates (UAE), (2) between Qatar and Bahrain, (3) between Qatar and the UAE, and (4) Saudi Arabia. These areas contain most of the Gulf's dugongs. They apparently do not normally occur in the waters of Kuwait, Iran, or Iraq. Dugongs mostly feed in shallow, nearshore waters, within seagrass beds.

Status in Gulf

Dugongs are common in the Arabian Gulf, with an estimated population of about 5,800 animals in this enclosed tropical sea. This is the largest population of dugongs outside of Australia, and the second largest in the world. Surveys in the southern and western portion of the Gulf (in waters of Saudi Arabia, Qatar, and the UAE) indicate that this area contains about 3,000 dugongs, and the population there appears to have been relatively stable from at least 1986 to 1999.

A number of threats face dugongs in the Arabian Gulf, a region with rampant development, oil exploration and extraction, and almost constant war in recent decades. As in virtually every part of the species' range, hunting appears to have occurred at some level for several millennia. In addition, die-offs of dugongs have occurred after recent oil spills, the first happening at the end of the first Gulf War in the early 1990s.

Behavior and Ecology

Most dugongs are sighted alone or in groups of a few animals. Large aggregations of up to several hundred animals are regularly seen at some locations, feeding on seagrass meadows. Dugongs are slow-growing mammals, with females only reaching sexual maturity after 6 to 17 years and producing a single calf every 2.5 to 5 years. The estimated gestation period is about 13 months; calves are nursed for at least 13 months. Dugongs start eating seagrasses soon after birth. They are benthic feeding specialists; depending on the species of seagrass being consumed, dugongs target either the leaves alone or uproot the entire plant. Dugongs are known to occasionally supplement their herbivorous diet with macro-invertebrates. The highly specialized dietary requirements of the dugong suggest that only certain seagrass meadows may be suitable as dugong habitat.

Dugongs can undertake long-distance movements. The capacity of dugongs to cross deep ocean trenches (up to 4 km in depth) is supported by recent reports of dugongs at Aldabra Atoll, which is located 425 km from Madagascar; dugongs had not previously been observed at this atoll. These movements are likely habitat-driven, which is further supported by movements of large numbers of dugongs in western Australia, following a tropical cyclone that reduced the availability of prey plants in one area. Maximum recorded dive depth for a tagged dugong is 20.5 m, although as noted earlier, maximum dive depths of up to 33 m are inferred from feeding scars in seagrass meadows. Maximum dive time at depths greater than 1.5 m is 12.3 minutes. Typical mean dive duration for depths less than 3 m from the water's surface is 2.7 minutes.

Dugongs produce complex sounds such as chirp-squeaks, barks, and trills. Chirp-squeaks are in the 3 to 18 kHz range. Trills are within the 3 to 18 kHz frequency band. Barks are broadband signals of 500 to 2,200 Hz. The center frequency of dugong calls ranges from 3 to 6 kHz.

Selected References

Preen, 1991, 2004; Baldwin and Cockcroft, 1997; Marsh et al., 2002.

SEA TURTLES

The seven or eight extant sea turtle species are distributed within two families: Cheloniidae and Dermochelyidae (Marquez, 1990). These species are unevenly distributed through all three tropical oceans with three species having relatively restricted distributions (the flatback, *Natator depressus*, in northern Australia; Kemp's ridley, *Lepidochelys kempi*, in the Gulf of Mexico and northern Atlantic; and the black turtle, *Chelonia agassizii*, in the eastern Pacific [Pritchard, 1997]). Despite the relatively low number of extant sea turtle species, they are not a relict group and have great economic value as well as vulnerability to mankind. Currently all species are listed as species of concern within the IUCN Red List of Threatened Species (http://www.iucn.org/).

Five species of sea turtles are known to occur within the Arabian Gulf. A listing of these species, along with their relative status in the Gulf and their current conservation status according to the IUCN are provided in **Table 2**.

Table 2. Sea turtle species of the Arabian Gulf, along with their relative status in the Gulf and IUCN Red List Status.

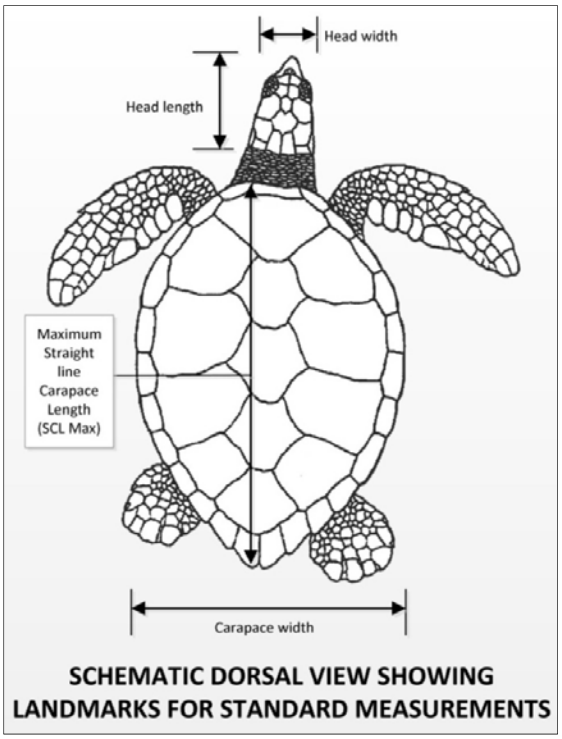
Common Name	Species	Status in Gulf	IUCN Red List Status*
Green Turtle	*Chelonia mydas*	Common	E
Hawksbill turtle	*Eretmochelys imbricata*	Common	E
Loggerhead turtle	*Caretta caretta*	Uncommon	E
Olive ridley turtle	*Lepidochelys olivacea*	Rare	V
Leatherback turtle	*Dermochelys coriacea*	Rare	CE

*IUCN Red List Status Categories:

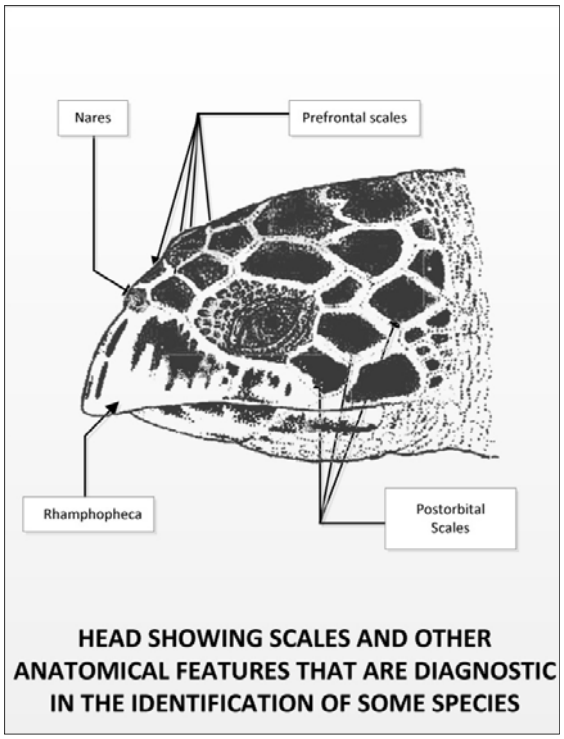
CRITICALLY ENDANGERED (CE)
A taxon is Critically Endangered when the best available evidence indicates that it is considered to be facing an extremely high risk of extinction in the wild.
ENDANGERED (E)
A taxon is Endangered when the best available evidence indicates that it is considered to be facing a very high risk of extinction in the wild.
VULNERABLE (V)
A taxon is Vulnerable when the best available evidence indicates that it is considered to be facing a high risk of extinction in the wild.
NEAR THREATENED (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
LEAST CONCERN (LC)
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened. Widespread and abundant taxa are included in this category.
DATA DEFICIENT (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat.

This guide bases the identification of sea turtle species from the examination of certain external characters, including: (1) the upper shell (carapace) and body size, shape, construction, coloration, markings, and scutes (polygonal horny shields covering the carapace); (2) the head size, shape, and scales (leathery or horny shields covering the head); and (3) limb size, shape, and claws (presence and number).

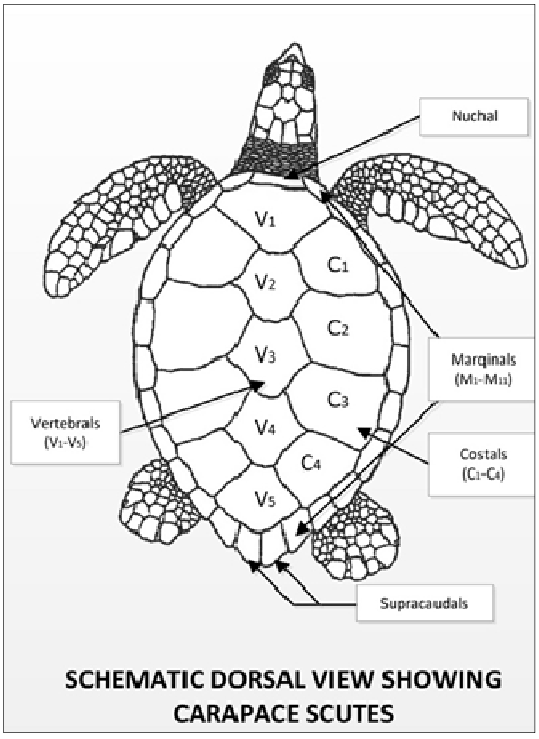
The following illustrations provide a guide to the external morphological characters of sea turtles that are diagnostic in the identification of species.



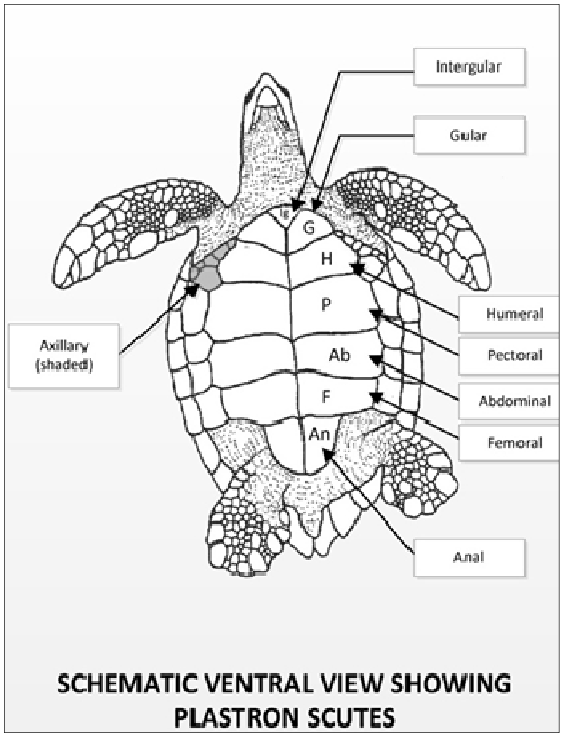
SCHEMATIC DORSAL VIEW SHOWING LANDMARKS FOR STANDARD MEASUREMENTS



HEAD SHOWING SCALES AND OTHER ANATOMICAL FEATURES THAT ARE DIAGNOSTIC IN THE IDENTIFICATION OF SOME SPECIES



SCHEMATIC DORSAL VIEW SHOWING CARAPACE SCUTES



SCHEMATIC VENTRAL VIEW SHOWING PLASTRON SCUTES

The following species accounts provide basic information on the diagnostic morphological characters of adult and hatchling sea turtle species that are known to occur within the Arabian Gulf. Photographs of each species are also provided.

Green turtle (*Chelonia mydas*)

Photo credit: D. Shea

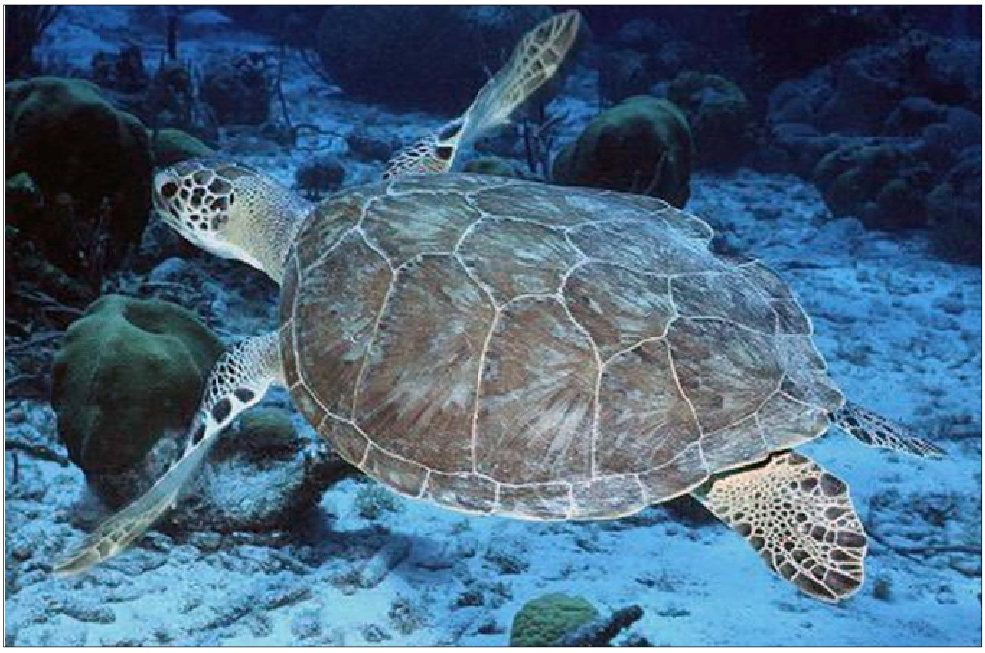


Photo credit: A. Bruckner

Green turtle (*Chelonia mydas*)

Identification

- *Length*: Adults up to about 120 cm (straight carapace length [SCL])
- *Carapace*: Broadly oval, with the outer margin sometimes scalloped; body shape in side view is depressed in adults; five central scutes and four pairs of lateral scutes
- *Head*: Relatively small and rounded anteriorly, with one pair of prefrontal scales and four pairs of postorbital scales
- *Body Color*: Variable; dorsal side ranges from pale to very dark and from monochromatic to brilliant combinations of yellow, brown, and greenish tones forming radiating stripes or blotches.; ventral side ranges from white and dirty white or yellowish white (Atlantic forms), to dark gray or bluish-green (Pacific forms)
- *Limbs*: Single claw on the anterior border of each flipper
- *Hatchling*: Dorsal side dark brown or nearly black dorsally with forelimbs and carapace outlined in white; ventral side pure white; typical SCL ranges from 46 to 57 mm

Distribution in Gulf

The green turtle is the second most common sea turtle species in the Gulf.

Behavior and Ecology

This species is a typical solitary and nektonic animal that occasionally forms feeding aggregations in shallow water areas with abundant seagrasses and macroalgae. It is the only herbivorous sea turtle species. Green turtles migrate between breeding-nesting areas and feeding grounds, which are separated in some case by distances of up to several thousands of kilometers. Usually there is a two-year breeding interval. Reproductive maturity in green turtles is estimated at approximately 6 to 13 years. Egg incubation on sandy beaches extends from 48 to 70 days, depending on local temperature and humidity.

Selected References

Ernst and Barbour, 1989; Marquez, 1990; Al-Merghani et al., 1996; Pritchard and Mortimer, 1999; Pilcher, 2000; Meakins and Al-Mohanna, 2000; Hasbún et al., 2000; Al-Ghais, 2006.

Hawksbill turtle (*Eretmochelys imbricata*)

Photo credit: S. Cohen

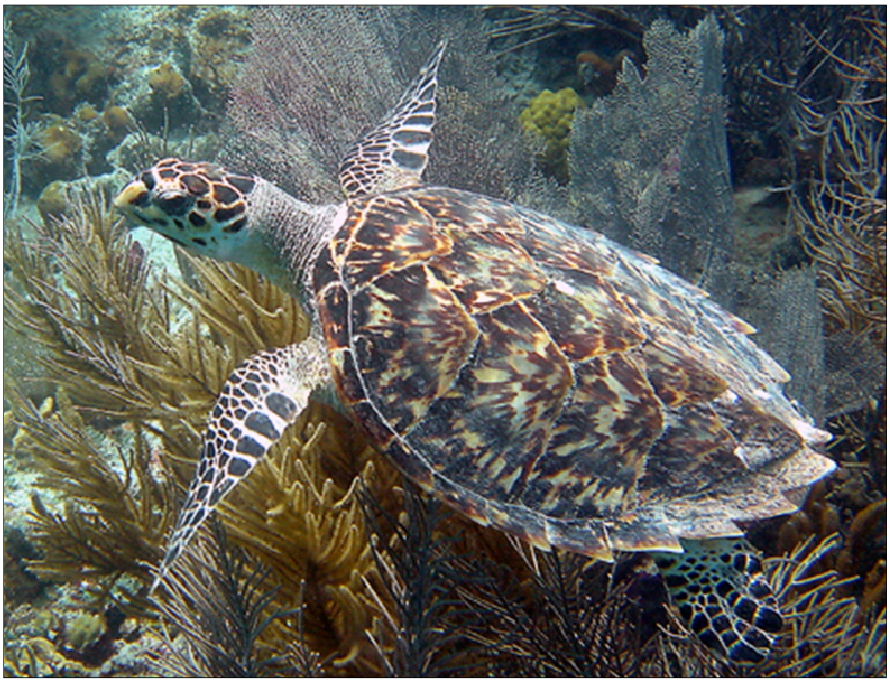
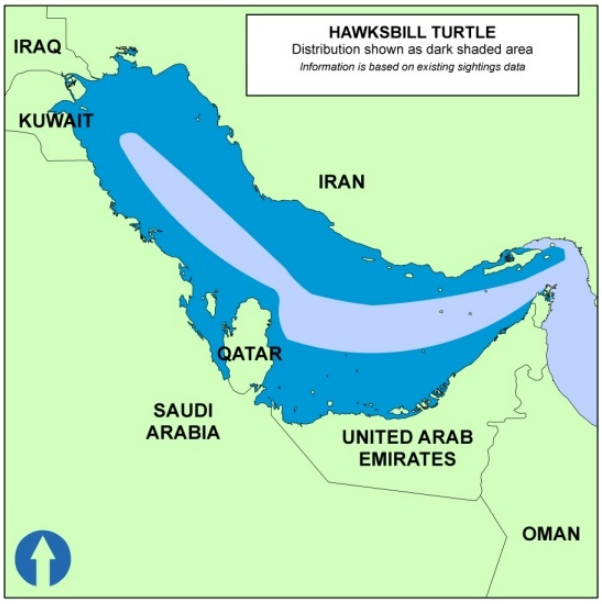


Photo credit: C. Rogers

Hawksbill turtle (*Eretmochelys imbricata*)



Identification

- *Length*: Adults up to about 90 cm SCL
- *Carapace*: Elliptical or oval, with posterior margin strongly serrated; five central scutes and four pairs of lateral scutes that are characteristically imbricated (overlapping); posterior border of lateral scutes "ragged" in appearance
- *Head shape*: Medium-sized, narrow, with a pointed and straight, bird-like beak; two pairs of prefrontal scales and three or four pairs of postorbital scales
- *Limbs*: Two claws on the anterior border of each flipper
- *Body color*: The most colorful of all sea turtle species; dorsal pattern is very variable, generally with amber base color and spots or fans of complementary colors (brown, red, black, and yellow); ventral side generally amber colored or white
- *Hatchling*: Dorsal side mostly dark brown, with paler blotches on the scutes of the rear part of the carapace; ventral side dark with small pale spots on the "tip" of each scute along the two keels of the plastron; typical SCL ranges from 39 to 46 mm

Distribution in Gulf

The hawksbill turtle is the most common sea turtle species in the Gulf.

Behavior and Ecology

The hawksbill turtle is common where coral reef formations are present, although it may also be found in shallow waters with seagrasses and macroalgae. It is a carnivorous species, feeding on a wide variety of food items but appears to prefer sponges growing in reef environments. Frequent sightings of this species in shallow, coastal waters suggest that at least part of the population has residential or non-migratory behavior. Individuals of several year classes may aggregate together on selected feeding grounds. Studies on hawksbill migrations show both short and long-distance movements, at least for parts of the population. Usually there is a 2- to 3-year breeding interval, and females may lay over two clutches per nesting season. Egg incubation on sandy beaches extends from 44 to 90 days, depending on local temperature and humidity.

Selected References

Al-Robaae, 1969; Marquez, 1990; Robineau, 1998; Pilcher, 1999; Pritchard and Mortimer, 1999; Al-Ansi and Al-Khayat, 2008; Tabib et al., 2011.

Loggerhead turtle (*Caretta caretta*)

Photo credit: NOAA

Photo credit: NOAA

Loggerhead turtle (*Caretta caretta*)

Identification

- *Length*: Adults up to about 105 cm SCL
- *Carapace*: Moderately broad; five central scutes and five pairs of lateral scutes that are very rough in texture and generally covered with barnacles
- *Head shape*: Large, broad, and subtriangular in shape; two pairs of prefrontal scales with one inter-prefrontal scale
- *Limbs*: Front limbs relatively short and thick when compared to other species; two claws on the anterior border of each fore flipper and two to three claws on rear flippers
- *Body color*: Adults generally have an unmarked reddish-brown dorsal pattern, becoming orange-creamy on the flanks and yellow-creamy ventrally
- *Hatchling*: Dorsal side dark brown, with the flippers pale brown marginally and underneath; ventral side much paler; typical SCL ranges from 38 to 50 mm

Distribution in Gulf

The loggerhead turtle is considered an occasional visitor to the Gulf.

Behavior and Ecology

This species is primarily an inhabitant of nearshore waters off continental shores in tropical and subtropical seas; however, individuals are also regularly sighted in temperate waters. This species is carnivorous, feeding on a large variety of food items. Loggerhead turtles are typically migratory, often moving great distances between nesting beaches and feeding areas. Nesting occurs in spring and summer, with females laying between two and five times per season. There is a 2- to 3-year breeding interval. Egg incubation on sandy beaches extends from 44 to 90 days, depending on local temperature and humidity.

Selected References

Al-Robaae, 1969; Marquez, 1990; Robineau, 1998; Pritchard and Mortimer, 1999; Al-Ansi and Al-Khayat, 2008.

Olive ridley turtle (*Lepidochelys olivacea*)

Photo credit: R. Pitman

Photo credit: R. Pitman

Olive ridley turtle (*Lepidochelys olivacea*)

Identification

- *Length*: Adults up to about 72 cm SCL
- *Carapace*: Nearly round; five central scutes and five to nine pairs of lateral scutes that are often asymmetrical in configuration
- *Head shape*: Relatively large, broad, and subtriangular in shape; two pairs of prefrontal scales
- *Limbs*: Front limbs with one or two claws on the anterior border, and sometimes another small claw in the distal part; rear flippers with two claws
- *Body color*: Adults are plain olive-gray dorsally and creamy or whitish with pale gray margins ventrally
- *Hatchling*: Nearly black overall with greenish sides; SCL ranges from 38 to 50 mm

Distribution in Gulf

The olive ridley turtle is considered a rare visitor to the Gulf

Behavior and Ecology

The olive ridley turtle usually migrates along continental shelves and feeds in shallow waters; however, reports of olive ridleys diving and feeding in depths of 200 m have been reported. It is a facultative carnivore, feeding on a large variety of food items. In the nesting season, olive ridleys converge at special locations in nearshore waters and crawl ashore in large numbers to nest in events called "arribazon." These females show nest-site fidelity, both within and between nesting seasons. Egg incubation on sandy beaches extends from 45 to 65 days, depending on local temperature and humidity.

Selected References

Al-Robaae, 1969; Marquez, 1990; Kami, 1997; Robineau, 1998; Pritchard and Mortimer, 1999; Al-Ansi and Al-Khayat, 2008; Papathanasopoulou, 2009.

Leatherback turtle (*Dermochelys coriacea*)

Photo credit: K. Dodge

Photo credit: NOAA

Leatherback turtle (*Dermochelys coriacea*)

Identification

- *Length*: Adults up to about 180 cm SCL
- *Carapace*: Elongate and spindle-shaped; leathery and without scutes; seven prominent longitudinal ridges (keels)
- *Head shape*: Broadly triangular and scaleless; two prominent maxillary cusps, covered with unscaled skin
- *Limbs*: Front limbs extremely long and paddle-shaped; length equal to or exceeding half the carapace length; all limbs are clawless
- *Body color*: Dorsal side predominantly black with scattered white blotches that are usually arranged along the dorsal keels, becoming more numerous laterally and very dense ventrally; spots may be bluish or pink on neck and the base of the flippers; ventral side predominantly white
- *Hatchling*: Black with white blotches that are clearly arranged along the dorsal keels; typical SCL ranges from 55 to 63 mm

Distribution in Gulf

The leatherback turtle is considered a rare visitor to pelagic waters of the Gulf.

Behavior and Ecology

The leatherback turtle is a highly pelagic species that approaches coastal waters during the reproductive season and in small numbers within concentrations of jellyfishes and tunicates. It feeds almost exclusively on these pelagic invertebrates, although other pelagic food items are taken on occasion. The leatherback turtle is the most widely distributed of all sea turtles, ranging from feeding areas in temperate to subpolar waters, to nesting grounds in tropical to subtropical areas. Unlike most other sea turtle species, leatherbacks usually nest in autumn and winter, and gather in breeding grounds in large numbers, forming “arribazones.” Usually there is a 2- to 3-year breeding interval, and females may lay between four and five clutches per nesting season. Egg incubation on sandy beaches extends from 50 to 78 days, depending on local temperature and humidity.

Selected References

Al-Robaae, 1969; Marquez, 1990; Frick, 1996; Robineau, 1998; Pritchard and Mortimer, 1999; Al-Ansi and Al-Khayat, 2008.

DICHOTOMOUS IDENTIFICATION KEYS

Marine mammal and sea turtle specimens "in hand" can best be identified by using the dichotomous keys to external features. With such specimens, it may be possible to view the entire body and to measure relative proportions of features. In marine mammals, various features of coloration and morphology are often useful in such considerations. Nonetheless, it can sometimes be very difficult, or impossible, to identify marine mammals to species, whether based on at-sea sightings, "in hand" specimens, or a skull. Great variability in behavior, coloration, body morphology, and bone structure can occur.

The following general rules on the use of the keys below should be kept in mind:

1. Use multiple features to make an identification: don't rely on a single feature.
2. Use the information in the key with more latitude when dealing with young or damaged specimens, or those from a very poorly-studied geographic region.
3. Feel free to jump to any place in the key to begin. For instance, if you are sure that the specimen you are working with is a toothed whale, jump to that part of the key (don't feel the need to go through each step of the key related to baleen whales).
4. Always confirm your final identification by examining photos/illustrations, and comparing to appropriate descriptions in the species accounts.
5. Use geographical information as little as possible. Be aware that these are wide-ranging animals that sometimes wander far outside their normal ranges.

KEY TO IDENTIFICATION OF MARINE MAMMALS OF THE ARABIAN GULF, BASED ON EXTERNAL APPEARANCE

1a. Double blowhole; no teeth present; baleen plates suspended from upper jaw
Mysticete ..... **Go to 2**

1b. Single blowhole; teeth present; no baleen plates
Odontocete ..... **Go to 5**

2a. Flippers 1/4 to 1/3 of body length, with knobs on leading edge; flukes with irregular trailing edge; 14 to 35 broad conspicuous ventral pleats, longest extending at least to navel; top of head covered with knobs, one prominent cluster of knobs at tip of lower jaw; 270 to 400 black to olive brown baleen plates with gray bristles per side, less than 80 cm long; dorsal fin usually atop a hump; maximum body length 17 m ..... **Humpback whale (*Megaptera novaeangliae*)**

2b. Flippers less than 1/5 of body length, lacking knobs; 40 to 100 fine ventral pleats; head lacking knobs
Bryde's, blue, or fin whale ..... **Go to 3**

3a. Three conspicuous ridges on rostrum; 40-70 ventral pleats extending to umbilicus; 250 to 370 slate gray baleen plates per side, with white to light gray fringes; head coloration symmetrical; maximum body length 16.5 m ..... **Bryde's whale (*Balaenoptera edeni/brydei*)**

3b. Only one prominent ridge on rostrum; 55-100 ventral pleats
Blue or fin whale ..... **Go to 4**

4a. Head broad and almost U-shaped from above; dorsal fin very small (about 1% of body length) and set far back on body; 260 to 400 black baleen plates with black bristles per side (all three sides of each plate roughly equal in length); head coloration symmetrical; body mottled gray, with white under flippers; maximum body length 33 m ..... **Blue whale (*Balaenoptera musculus*)**

4b. From above, head V-shaped and pointed at tip; dorsal fin about 2.5% of body length; 260 to 480 gray baleen plates with white streaks per side (front 1/3 of baleen on right side all white); head coloration asymmetrical (left side gray, much of right side white); back dark, with light streaks; belly white; maximum body length 27 m ..... **Fin whale (*Balaenoptera physalus*)**

5a. Body dark gray or black, with lighter belly; no dorsal fin; narrow dorsal ridge; 15 to 22 spade-shaped teeth (not conical) in each tooth row; maximum size to 2.3 m ..... **Indo-Pacific finless porpoise (*Neophocaena phocaenoides*)**

5b. Teeth conical and sharply pointed, unless heavily worn (in cross section, circular or oval)
Delphinidae ..... **Go to 6**

6a. Head blunt with no prominent beak
Blackfish or other species ..... **Go to 7**

6b. Head with prominent beak
Long-beaked dolphins ..... **Go to 10**

7a. 2 to 7 pairs of teeth at front of lower jaw only (rarely 1 to 2 pairs in upper jaw), but teeth may be absent or extensively worn; forehead blunt with vertical crease; dorsal fin tall and dark; body gray to white, covered with scratches and splotches in adults; flippers long and sickle-shaped; maximum body length 4 m ..... **Risso's dolphin (*Grampus griseus*)**

7b. Teeth (7 or more pairs) in both upper and lower jaws; forehead without vertical median crease
Other species ..... **Go to 8**

8a. Flippers large and paddle-shaped; dorsal fin tall and erect (up to 0.9 m in females and 1.8 m in males); striking black and white coloration, with white post-ocular patches, white lower jaw, white ventrolateral field, and light gray saddle patch behind dorsal fin; 10-14 large (to 2.5 cm in diameter) oval teeth in each tooth row; maximum body length 10 m ..... **Killer whale (*Orcinus orca*)**

8b. Dorsal fin not particularly large; body mostly black, with light areas restricted to light gray patches (no distinct white patches on body)
Other species ..... **Go to 9**

9a. Dorsal fin low and broad-based, located on forward third of back; head bulbous; body black to dark gray with light anchor-shaped patch on belly and often light gray saddle behind dorsal fin; often a light streak above and behind each eye; deepened tail stock; long sickle-shaped flippers; 7 to 13 pairs of teeth in front half only of each jaw..... **Short-finned pilot whale (*Globicephala macrorhynchus*)**

9b. Dorsal fin near middle of back; flippers with distinct hump on leading edge; body predominantly black; no beak; 7 to 12 large teeth in each half of both jaws, circular in cross-section; maximum body length 6 m ..... **False killer whale (*Pseudorca crassidens*)**

10a. Head long and conical; beak runs smoothly into forehead, with no crease; body dark gray to black above and white below, with many scratches and splotches; narrow dorsal cape; flippers very large; 19-28 slightly wrinkled teeth in each half of both jaws; maximum body length 2.8 m ..... **Rough-toothed dolphin (*Steno bredanensis*)**

10b. Beak distinct from forehead (however, there may not be a prominent crease between beak and melon) Other species ..... **Go to 11**

11a. Less than 39 teeth per tooth row *Tursiops* or *Sousa* ..... **Go to 12**

11b. Greater than 39 teeth per row *Delphinus or Stenella* ..... **Go to 14**

12a. Moderately robust; 18 to 29 teeth in each half of the jaws (teeth may be extensively worn or missing); body to 3.8 m; moderately long robust snout set off by distinct crease; color dark to light gray dorsally, fading to white or even pink on belly Bottlenose dolphins *(Tursiops* spp.) ..... **Go to 13**

12b. 26 or more teeth in each tooth row; indistinct crease between melon and beak; body gray with lighter belly; base of dorsal fin of adults often expanded to form longitudinal ridge; beak long, crease indistinct; 26 to 39 teeth in each tooth row; maximum size to 2.8 m ..... **Indo-Pacific humpback dolphin (*Sousa chinensis*)**

13a. Beak relatively short and stubby; generally no spotting on belly; no spinal blaze; 18 to 27 pairs of teeth; maximum size up to 3.8 m..... **Common bottlenose dolphin (*Tursiops truncatus*)**

13b. Beak relatively long and slender; generally with black spotting on the belly; often a spinal blaze below the dorsal fin; 21 to 29 pairs of teeth; maximum size 2.7 m ..... **Indo-Pacific bottlenose dolphin (*Tursiops aduncus*)**

14a. Dorsal fin erect to slightly falcate; back dark and belly white; tan to buff thoracic patch and light gray streaked tail stock form an hourglass pattern that crosses below dorsal fin; cape forms a distinctive V below dorsal fin; chin to flipper stripe; maximum size 2.7 m; 40 to 67 teeth in each row; palate with two deep longitudinal grooves ..... **Long-beaked common dolphin (*Delphinus capensis*)**

14b. No hourglass pattern on side; palatal grooves, if present, shallow *Stenella* sp. ..... **Go to 15**

15a. Color pattern black to dark gray on back, white on belly, prominent black stripes from eye to anus and eye to flipper; light gray spinal blaze extending to below dorsal fin (not always present); shallow palatal grooves often present; 40-55 teeth in each row; maximum size 2.6 m ..... **Striped dolphin (*Stenella coeruleoalba*)**

15b. No eye to anus stripe; no spinal blaze Other species ..... **Go to 16**

16a. Light to heavy spotting present on dorsum of adults (on some individuals, spots may appear absent); no palatal grooves; dorsal fin narrow and falcate; dark cape that sweeps to lowest point on side in front of dorsal fin; dark gape to flipper stripe; beak tip and lips white; adults with light to extensive spotting and gray bellies (spotting sometimes absent); 34 to 48 teeth in each half of each jaw; maximum size 2.6 m ..... **Pantropical spotted dolphin (*Stenella attenuata*)**

16b. No spotting on dorsum of adults; cape dips to lowest point at level of dorsal fin; eye-to-flipper stripe; shallow palatal grooves often present; dorsal fin slightly falcate to canted forward; beak exceedingly long and slender; 40 to 62 very fine sharply pointed teeth per tooth row; maximum size 2.4 m ..... **Spinner dolphin (*Stenella longirostris*)**

KEY TO IDENTIFICATION OF SEA TURTLES OF THE ARABIAN GULF, BASED ON EXTERNAL APPEARANCE (MODIFIED FROM PRITCHARD AND MORTIMER, 1999)

1a. Carapace leathery and scuteless, black or dark spotted, pointed posteriorly with prominent longitudinal ridges; carapace length to approximately 180 cm ..... **Leatherback turtle (*Dermochelys coriacea*)**

1b Carapace hard with large polygonal scutes, rounded or elongate; carapace length less than 120 cm ..... **Go to 2**

2a. Carapace wide and almost circular; head width to approximately 15 cm; dorsal color gray to olive green and unmarked; maximum carapace length to approximately 72 cm ..... **Olive ridley turtle (*Lepidochelys olivacea*)**

2b. Carapace more elongate than circular; coloration variable and patterned; maximum carapace length to 120 cm ..... **Go to 3**

3a. Head very large, width to 28 cm; carapace broadest anteriorly, elongate, and narrow posteriorly, noticeable bulge at the fifth vertebral scute, color reddish-brown; maximum carapace length 105 cm ..... **Loggerhead turtle (*Caretta caretta*)**

3b. Head not very large, width from 12 to 15 cm; carapace not broadest anteriorly, lacking bulge at fifth vertebral scute; carapace color variable and often boldly marked, typically with dark brown and black streaks, some plain olive green ..... **Go to 4**

4a. Head small, anteriorly rounded; carapace heart-shaped, smooth and wide with modest incurving above hind legs; carapace coloration variable, usually with radiating streaks or spots; maximum carapace length 120 cm ..... **Green turtle (*Chelonia mydas*)**

4b. Head very narrow and anteriorly pointed with pointed bird-like beak, width to 12 cm; carapace relatively narrow and lacking upturned sides, often well marked, posterior margins of scutes overlapping, posterior margin usually strongly serrated; carapace length to approximately 90 cm ..... **Hawksbill turtle (*Eretmochelys imbricata*)**

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APPENDIX

Unconfirmed or Extralimital Marine Mammals

Blue whale (*Balaenoptera musculus*)

Photo credit: T.A. Jefferson

Photo credit: P. Olson

Identification

- *Length*: Adults up to 25 m
- *Body shape*: Slender and streamlined, with 60 to 88 ventral pleats from lower jaw to past navel
- *Head shape*: From above, broadly rounded like a gothic arch, with a single median rostral ridge; from side, shallow and pointed
- *Dorsal fin shape*: Located about 3/4 of way along back; very small and falcate, sometimes just a nubbin
- *Flipper shape*: Moderately long and slender
- *Body color*: Body mostly light to dark gray, with light to extensive mottling on sides and back; lighter color on belly and lower sides; through water surface, body appears light blue
- *Baleen*: 260 to 400 pairs of black baleen plates, with coarse bristles
- *Blow*: Very tall and columnar (up to 12 m high)

Status in Gulf

There is only a single unconfirmed record of a stranding from 1963 in Kuwait. The species is considered extralimital in the Gulf.

Fin whale (*Balaenoptera physalus*)

Photo credit: T.A. Jefferson

Photo credit: P. Olson

Identification

- *Length*: Adults up to 24 m
- *Body shape*: Slender and streamlined, with 50 to 100 ventral pleats from lower jaw to past navel
- *Head shape*: From above, rounded but tapering toward the tip, with a single median rostral ridge; from side, shallow and pointed
- *Dorsal fin shape*: Located about 3/4 of way along back; relatively prominent and falcate, rising from the back at a shallow angle
- *Flipper shape*: Moderately long and slender
- *Body color*: Body mostly dark gray to black, with light gray to white color on belly and lower sides; lower jaw asymmetrical (right side whitish, left side dark); usually several light streaks and chevrons on back and sides
- *Baleen*: 260 to 480 pairs of dark gray to black baleen plates, with striations and bands of light gray, yellow, and olive color
- *Blow*: Tall and columnar (up to 7 m high)

Status in Gulf

There are two unconfirmed stranding records of this species in the Arabian Gulf, one from Iran and the other from the UAE. The fin whale is considered extralimital in the Gulf.

Killer whale (*Orcinus orca*)

Photo credit: T.A. Jefferson

Photo credit: T.A. Jefferson

Identification

- *Length*: Adult males up to 9.8 m, adult females to 8.5 m
- *Body shape*: Moderately robust
- *Head shape*: Blunt and broad, with very slight, stubby beak
- *Dorsal fin shape*: Tall and prominent (up to 1.8 m in males), ranging from falcate to slightly canted forward
- *Flipper shape*: Broad and paddle-shaped, large (especially in adult males)
- *Body color*: Distinctly black and white, with white patches on lower jaw, above eye, on ventral sides and tail stock; often light gray saddle behind dorsal fin
- *Teeth*: 10 to 14 pairs of large, pointed teeth (oval in cross section)
- *Blow*: Low and bushy, although often not visible in tropical regions

Status in Gulf

There appear to be no confirmed records of killer whales from the Arabian Gulf (one report exists, but the position plots on land and is therefore suspect). However, the species is cosmopolitan in distribution, and it appears likely that they will be found in the Gulf at some point in the future.

Short-finned pilot whale (*Globicephala macrorhynchus*)

Photo credit: T.A. Jefferson

Photo credit: T.A. Jefferson

Identification

- *Length*: Adult males up to 7.2 m, adult females to 5.5 m
- *Body shape*: Moderately robust, with a deepened tail stock
- *Head shape*: Bulbous, with little or no visible beak
- *Dorsal fin shape*: Located on forward third of back; wide-based and low, falcate
- *Flipper shape*: Long and recurved
- *Body color*: Mostly dark gray to black, with light patches on chest and underside; faint light gray saddle behind dorsal fin
- *Teeth*: 7 to 9 pairs of pointed teeth in each tooth row

Status in Gulf

There are no records for the Arabian Gulf, but this species has been sighted in the Hormuz Straits, at the entrance to the Gulf, and thus it seems likely they could visit the Gulf on occasion.

Risso's dolphin (*Grampus griseus*)

Photo credit: T.A. Jefferson

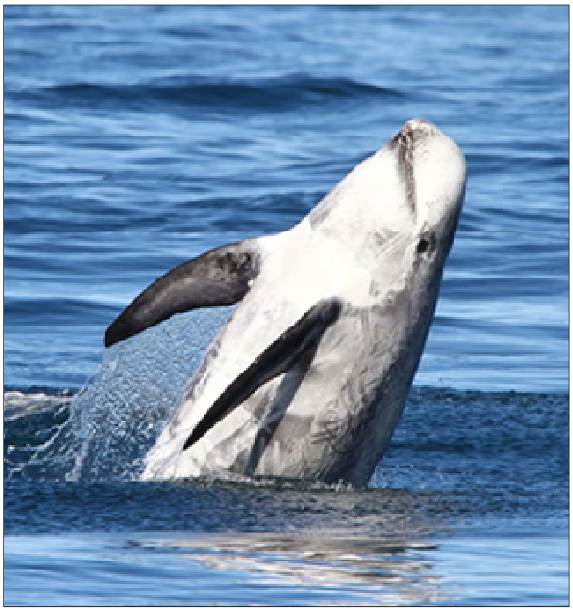

Photo credit: T.A. Jefferson

Identification

- *Length*: Adults up to 3.8 m
- *Body shape*: Moderately robust, with a very shallow tail stock
- *Head shape*: Squarish, with little or no visible beak; there is a vertical cleft on the front of the melon
- *Dorsal fin shape*: Located at mid-back; tall and prominent, falcate
- *Flipper shape*: Fairly long and recurved
- *Body color*: Mostly shades of gray, with light patches on chest and underside; adults are usually covered with white scratches and scars, and some adults may appear completely white
- *Teeth*: 2 to 7 pairs of pointed teeth in lower jaw only (usually none in upper jaw)

Status in Gulf

There are several reported records of this species occurring in the Arabian Gulf. However, these are all undocumented and unconfirmed, and recently it has been suggested that these were in fact erroneous. This species prefers waters much deeper than those of the Arabian Gulf.

Rough-toothed dolphin (*Steno bredanensis*)

Photo credit: T.A. Jefferson

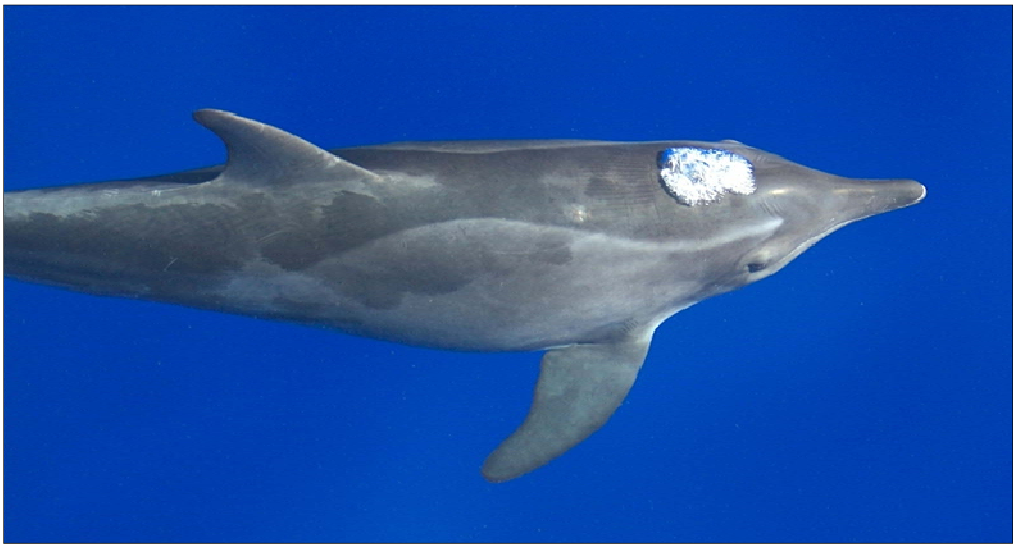

Photo credit: T.A. Jefferson

Identification

- *Length*: Adults up to 2.65 m
- *Body shape*: Moderately slender with shallow tail stock
- *Head shape*: Nearly conical; long beak, sloping smoothly from forehead, with no crease between melon and beak
- *Dorsal fin shape*: Prominent and falcate
- *Flipper shape*: Typical dolphin shape
- *Body color*: Dark gray narrow cape, lighter gray sides and belly, with whitish blotches and spots on belly and around mouth
- *Teeth*: 19 to 28 pairs of stout teeth in each jaw, with vertical wrinkles or ridges

Status in Gulf

There are currently no records of rough-toothed dolphins from the Arabian Gulf, however, this species does occasionally move into shallow waters, so it is possible that they could be found there at some point in the future.

Striped dolphin (*Stenella coeruleoalba*)

Photo credit: T.A. Jefferson

Photo credit: T.A. Jefferson

Identification

- *Length*: Adults up to 2.6 m
- *Body shape*: Moderately slender and streamlined
- *Head shape*: Moderately-long, stout beak; distinct crease between melon and upper jaw
- *Dorsal fin shape*: Falcate and prominent
- *Flipper shape*: Recurved with a pointed or slightly rounded tips
- *Body color*: Dark gray cape, white belly, and intermediate sides; light spinal blaze below dorsal fin; black stripes from eye/face area to flipper and anus
- *Teeth*: 40 to 55 pairs of slender, pointed teeth in each jaw

Status in Gulf

There are no striped dolphin records from the Arabian Gulf, but the species has been recorded in the Gulf of Oman.