

Lagenodelphis hosei (Fraser, 1956)

English: Fraser's dolphin

German: Borneo-Delphin

Spanish: Delfín de Fraser

French: Dauphin de Fraser

Family Delphinidae

1. Description

The body of Fraser's dolphin is stocky, the beak short but distinct and the dorsal fin small, triangular and slightly falcate. The flippers and flukes are also comparatively small. The striking colouration varies with age and sex: a distinctive black stripe extending from the eye to the anus is absent or faint in juveniles, wider and thicker in adult males and variable in adult females. A similar pattern is observed with the facial stripe or "bridle". The back of *L. hosei* is brownish grey, the lower side cream-coloured and the belly is white or pink. The largest male recorded was 2.7m and the largest female 2.6m long. Large males can weigh up to 210 kg (Dolar, 2009).

The one species in this genus was not recognized until 1956, when it was described from a single skull which had been picked up on a beach in Sarawak in 1895. It remained unknown to science as a living animal until 1971, when the species was "rediscovered". Once its external features became known, it turned out that tuna fishermen in the eastern tropical Pacific were already familiar with it (Rice, 1998). Based on cytochrome *b* mtDNA it is more closely related to *Stenella*, *Tursiops*, *Delphinus*, and *Sousa* than to *Lagenorhynchus*, while skull morphology shows similarities with *D. delphis*, *S. longirostris*, *S. coeruleoalba* and *S. clymene* (Dolar, 2009).

2. Distribution

<http://www.iucnredlist.org/apps/redlist/details/11140/0/rangemap>

Distribution of Lagenodelphis hosei: deep tropical and warm temperate waters of the Pacific, Atlantic and Indian Oceans between 30°S and 30°N (Hammond et al. 2008; © IUCN).

L. hosei is pantropical and ranges north to the Gulf of Mexico, Islas Canarias, West Africa (van Waerebeek et al. 2000) Sri Lanka, Taiwan, southern Honshu, and Jalisco in Mexico and south to Uruguay and Brasil, Natal, Queensland, and Peru (Rice, 1998).

The distribution of this species is poorly known. It appears to be most common near the equator in the eastern tropical Pacific and at the southern end of Bohol Strait in the Philippines. It seems to be relatively scarce in the Atlantic Ocean, where it is known from the Lesser Antilles and the Gulf of Mexico (e.g. Mignucci-Giannoni et al. 1999) and recently from Venezuela (Bolaños and Villarroel-Marín, 2003).

L. hosei may range across the Indian Ocean, with confirmed sightings from the east coast of South Africa, Madagascar, Sri Lanka, and Indonesia. It also occurs away from the equator as far north as Taiwan and Japan and, in small numbers, off Australia (Perrin et al. 1994).

Recently (Weir et al. 2008), the species was identified at sea and from strandings off Angola, Ghana and Nigeria, confirming southern and eastern distribution limits for the species within the Atlantic Ocean. Dolar et al. (1997) reported sightings between the Philippines and Malaysia, which, however, were so infrequent that they did not allow estimation of population density.

Strandings in temperate areas (Britanny in France, Victoria in Australia, and Uruguay) may represent extralimital forays connected with temporary oceanographic anomalies such as the world-wide El Niño phenomenon in 1983-84, during which a mass stranding occurred in France (Perrin et al. 1994). Bones et al. (1998) reported a stranding on the coast of Scotland.

3. Population size

Estimates of abundance are only known for a few areas. They include 289,500 (CV = 0,34) Fraser's dolphins in the eastern tropical Pacific (Wade and Gerodette, 1993). In the Eastern Sulu Sea, Dolar et al. (2006) estimated a total abundance of 13,500 (CV = 0,26). A 2002 shipboard line-transect survey of the entire Hawaiian Islands EEZ resulted in an abundance estimate of 10,226 (CV=1.11) Fraser's dolphins (Barlow 2006). This is currently the best available abundance estimate for this stock (Caretta et al. 2008). Current population size in the US Atlantic is unknown (Waring, 2007).

4. Biology and Behaviour

Habitat: This is typically a high-seas animal; it has not been observed close to shore in shallow water. E.g., off Angola and Nigeria. all records of Fraser's dolphins (Weir et al. 2008) occurred in deep water (>1000 m), and in the Sulu Sea, Philippines, and off the coast of Mexico, sighting rates are also highest at these water depths. However, it may approach very close to shore (100m) of some islands surrounded by deep water, e.g. Lesser Antilles, Indonesia and Philippines (Dolar, 2009).

In the eastern tropical Pacific, in equatorial-southern subtropical surface water and other waters typified by upwelling and generally more variable conditions, it forms part of a cetacean community that also includes *Physeter catodon*, *Globicephala macrorhynchus*, *Delphinus delphis*, *Stenella coeruleoalba* and *Peponocephala electra*. Off South Africa, records are associated with the warm Agulhas Current that moves south in the summer (Perrin et al.1994 and refs. therein).

This community is more or less complementary in occurrence to another group of species, found primarily in so-called tropical surface water, where a stable, shallow mixed layer and thermocline ridging are dominant features, that includes *Stenella attenuata*, *Stenella longirostris* and *Steno bredanensis* (Perrin et al.1994 and refs. therein).

Behaviour: Analysis of prey suggests that Fraser's dolphin is a deep diver, hunting at depths of at least 250-500m (Carwardine, 1995) or more, and myoglobin concentrations in muscle reach 7.1 g Mb / 100 g, similar to values recorded from deep-diving weddell seals (*Leptonychotes weddellii*) and bottlenose whales (*Hyperoodon ampullatus*; Dolar, 2009). In some areas, it is considered shy and difficult to approach; in others it is a bit more approachable. It does not bowride in the eastern tropical Pacific, but it does in most other areas. Running herds create a great deal of white water (Jefferson et al. 1993).

Reproduction: The life history of Fraser's dolphin was examined by Amano et al. (1996) based on 108 specimens from a school captured by the drive fishery in Japan. The sex ratio was approximately 1:1. The annual ovulation rate was 0.49. The estimated neonatal length (110 cm) predicts a gestation period of about 12.5mo. and calving peaks in spring and probably also in fall. The calving interval was estimated to be about 2yr. Life history parameters are similar to those of the striped and pantropical spotted dolphins, but reproductive rate of this species may be lower than that of other pelagic delphinids, if the observed shorter longevity is real.

Schooling: Herds tend to be large, consisting of hundreds or even thousands of dolphins, often mixed with other species, such as melon-headed whales (*Peponocephala electra*), short-finned pilot whales (*Globicephala macrorhynchus*), Risso's dolphins (*Grampus griseus*), spinner dolphins (*Stenella longirostris*) pantropical spotted dolphins (*S. attenuata*), bottlenose dolphins (*Tursiops truncatus*) and sperm whales (Perrin et al. 1994 and refs. therein; Dolar, , 2009). Weir et al. (2008) observed a pod of 150 probable Fraser's dolphins 130 km south of Nigeria off Nigeria and schools of 120 and 60 animals 170 km and 140 km respectively off the coast of Angola.

Food: In the eastern Pacific, Fraser's dolphin feeds on mesopelagic fish, shrimps and squids. It rarely associates there with bird flocks or tuna schools, which correlates well with the absence of surface-dwelling prey from its diet. In other regions, e.g. the southern Indian Ocean and the western Pacific, it may also feed far below the surface. The stomachs of animals stranded in Brittany contained only the remains of fish (4-24cm long; four species) and the cephalopod *Sepia* sp., indicating benthic or mesopelagic feeding preferences (Perrin et al. 1994). Santos and Haimovici (1998) reported on the preference for loliginid squids in the diet of *L. hosei* stranded in southern Brazil.

Dolar et al. (2003) examined the stomach contents of Fraser dolphins in the Sulu Sea and found mesopelagic fishes, particularly myctophids (mainly *Ceratoscopelus warmingi*, *Diaphus* spp. and *Myctophum asperum*), to be equally important as mesopelagic cephalopods (*Abraliopsis*, *Onychoteuthis*, *Histioteuthis*, and *Chiroteuthis*), and crustaceans (*Notostomos elegans*, *Acanthephyra quadrispinosa*, and *Acanthephyra carinata*). Vertical distributions of the prey items summarized from published literature indicate that Fraser's dolphins cover a wide vertical foraging range, from near the surface to probably as deep as 600 m. Watkins et al. (1994) reported on co-operative hunting techniques observed in the Caribbean.

5. Migration

There are no detailed reports on migratory behaviour, although this pelagic species regularly approaches islands where it is captured for human consumption (see below).

6. Threats

Direct catch: Small numbers of Fraser's dolphins are taken in local subsistence harpoon fisheries in the Lesser Antilles, Indonesia, the Philippines and probably elsewhere in the Indopacific. A few are taken in drive fisheries in Taiwan and Japan (Perrin et al. 1994 and refs. therein). Dolar et al. (1994) investigated directed fisheries for marine mammals in central and southern Visayas, northern Mindanao and Palawan, Philippines, from archived reports and visits to sites where such fisheries are conducted. Some of the hunters take only dolphins, for bait or human consumption, and the species taken include Fraser's dolphins. These are

taken by hand harpoons or, increasingly, by togglehead harpoon shafts shot from modified, rubber-powered spear guns. Around 800 cetaceans are taken annually by hunters at the seven sites, mostly during the inter-monsoon period of February-May. Dolphin meat is consumed or sold in local markets and some dolphin skulls are cleaned and sold as curios (Dolar et al. 1994).

Incidental catch: Some are killed incidentally in the tuna purse-seine fishery in the eastern tropical Pacific: 26 were estimated taken during the period 1971-75 (Gerrodette and Wade 1991). A few are also taken in gill nets in Sri Lanka, the Philippines, and likely in other tropical gillnet fisheries as well. Some are killed by anti-shark nets (Perrin et al. 1994 and refs. therein; Dolar et al. 1999; Cockcroft, 1990).

More recently, Weir et al. (2008) monitoring bycatch at six artisanal Ghanaian fishing ports between 1998 and 2000 found four Fraser's dolphins comprising one adult, one juvenile and two calves at two ports. Drift gillnets were identified as the probable cause of mortality for at least two specimens.

Pollution: In an investigation on the global distribution and toxicological impacts of polychlorinated biphenyls (PCBs) on cetaceans, Minh et al. (2000), found residues to be the highest in Fraser's dolphins collected off Kii Peninsula, Japan, reflecting serious marine pollution by PCBs in industrialized Asian countries. Values exceeded the levels associated with immunosuppression in harbour seals.

7. Remarks

Range states (Hammond et al. 2008):

American Samoa; Anguilla; Antigua and Barbuda; Argentina; Aruba; Australia; Bahamas; Bangladesh; Barbados; Belize; Benin; Bermuda; Brazil; Brunei Darussalam; Cambodia; Cameroon; Cayman Islands; China; Colombia; Congo; Congo, The Democratic Republic of the; Cook Islands; Costa Rica; Côte d'Ivoire; Cuba; Djibouti; Dominica; Dominican Republic; Ecuador; El Salvador; Equatorial Guinea; Fiji; French Guiana; French Polynesia; Gabon; Gambia; Ghana; Grenada; Guam; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; Hong Kong; India; Indonesia; Iran, Islamic Republic of; Jamaica; Japan; Kenya; Kiribati; Liberia; Madagascar; Malaysia; Maldives; Marshall Islands; Mauritania; Mexico; Micronesia, Federated States of; Morocco; Mozambique; Myanmar; Namibia; Nauru; Netherlands Antilles; Northern Mariana Islands; Oman; Pakistan; Palau; Panama; Papua New Guinea; Peru; Philippines; Pitcairn; Puerto Rico; Saint Kitts and Nevis; Saint Lucia; Saint Pierre and Miquelon; Saint Vincent and the Grenadines; Samoa; Senegal; Sierra Leone; Singapore; Solomon Islands; Somalia; South Africa; Sri Lanka; Suriname; Tanzania, United Republic of; Thailand; Timor-Leste; Togo; Tonga; Trinidad and Tobago; United States; United States Minor Outlying Islands; Uruguay; Venezuela; Viet Nam; Virgin Islands, British; Virgin Islands, U.S.; Wallis and Futuna; Western Sahara; Yemen

On 16 December 1992 the Department of Agriculture of the Philippines issued Fisheries Administrative Order No. 185, 'banning the taking or catching, selling, purchasing, possessing, transporting and exporting of dolphins'. The order did not stop dolphin and whale hunting but seems to have decreased the sale of dolphin meat openly in the market.

Investigations are encouraged to ensure that these artisanal whale fisheries operate within sustainable limits and do not export products illegally (Dolar et al. 1994). This recommendation can also be extended to other populations of Fraser's dolphins. For South

American stocks, see further recommendations in Hucke-Gaete (2000) in Appendix 1; for Southeast Asian stocks see general recommendations in Perrin et al. (1996) in Appendix 2.

The species is poorly known with respect to its distribution, migratory behaviour and abundance and by-catch rates are poorly documented.

L. hosei is listed as "Least Concern" by the IUCN (Hammond et al. 2008) . The southeast Asian populations are listed in Appendix II of CMS. The species is listed in Appendix II of CITES.

8. Sources

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