

Lineage – Scientific Methodology

Annual distribution of Dusky dolphin

1. Literature sources were searched for distribution information.
 - a. Scientific papers, published texts, unpublished reports and university theses
 - b. BIOSIS Previews (1993–2009)
 - c. Aquatic Sciences and Fisheries Abstracts (1960–2009)
 - d. Fish and Fisheries Worldwide (1971–2009)
 - e. NZ Science (1800–2009)
 - f. Scopus and Science Direct (up to 2009)
 - g. Department of Conservation library databases
2. Other sources.
 - a. Strandings database maintained by the Museum of New Zealand Te Papa Tongarewa, Wellington, for the Department of Conservation. This included 115 records for the years 1944–2008.
 - b. Cetacean sightings database held by Department of Conservation, Wellington. This contained 252 records of sightings of groups of dusky dolphins reported mainly by fisheries observers during 1999–2009. It is assumed that the locations and identifications provided are correct.
3. Summary
 - a. Information was integrated from the literature and expert opinion and distributional zones were hand-drawn on a template map. The timing of sampling effort of the research and the sighting and stranding records used to describe the distribution of bottlenose dolphins may constrain our knowledge of the annual and seasonal distribution because of seasonal bias in the sampling effort in some areas. There is not enough consistent information to map the seasonal distribution.
 - b. A distributional “hotspot” is where the species would be expected to be found in high density relative to its density elsewhere. The 90% distribution is the area in which 90% by number of the species are to be found. The 100% distribution is the full range – the area in which virtually all individuals of the species are to be found.

- c. Dusky dolphins in New Zealand waters are classed as “not threatened” by the DoC Threat Classification system (Hitchmough et al. 2007).
- d. Dusky dolphins are distributed in cold temperate waters around New Zealand (Gaskin 1968). They are also found off South America and western South Africa. These dolphins prefer continental shelf waters less than 2000 m deep (Würsig et al. 1997) and are very rarely seen in waters north of East Cape (about 37° S) (Baker 1999).
- e. The main waters used by dusky dolphins are off Kaikoura, around the Otago Peninsula, the Marlborough Sounds, and, to a lesser extent, Fiordland and the west coast South Island (Würsig et al. 1997, Lusseau & Slooten 2002). Data provided here are from both opportunistic observations and systematic studies based on a season or the full year.
- f. Dusky dolphins are closely associated with the subtropical convergence (Gaskin 1972). They migrate north to warmer waters in winter and then south in summer (Gaskin 1968), with movement between Kaikoura and the Marlborough Sounds, including Admiralty Bay (Markowitz et al. 2004). Some seasonal movement also occurs between Kaikoura and Otago and the west coast South Island. Generally, in winter dusky dolphins are more likely to be sighted in northern South Island waters and southern North Island waters (Würsig et al. 1997). Dolphins are present off Kaikoura in all seasons (Cipriano 1992).
- g. Dolphins in Admiralty Bay and Current Basin show intra-annual differences in feeding behaviour, feeding on mobile prey in deeper water in May–July, with shearwaters in attendance, and in August to November, they fed on small fish schools at the surface, in the presence of shearwaters, gannets, gulls, and occasionally a fur seal (Vaughn et al. 2007).
- h. Pod sizes off Kaikoura generally included less than 200 individuals, though in all seasons except winter, some groups of 200–1000 dolphins were seen (Cipriano 1992).
- i. These dolphins breed during summer and females and calves are closer to shore at this time (Würsig et al. 1997). The composition of groups varies between areas: post-breeding males overwinter in the Marlborough Sounds; most dolphins off Otago and west coast South island in the breeding season are females; off Kaikoura in all seasons there are similar numbers of males and females (Harlin et al. 2003).
- j. The winter population of dusky dolphins in Admiralty Bay is estimated at over 1000 dolphins (with a mean of 220 seen per week) (Markowitz et al. 2004). In this locality dolphins feed on small schooling fish during the day.
- k. Off Kaikoura, dusky dolphins are concentrated between Kaikoura Peninsula and Haumuri Bluffs (Cipriano 1992). In summer and autumn, dusky dolphins off the Kaikoura Canyon move offshore in late afternoon and evening and follow the vertical migration of their prey (myctophids and small squid) at

night from about 125 m to within about 30 m of the surface (Cipriano 1992, Benoit-Bird et al. 2004, Markowitz 2004). During the day, these dolphins rest and socialise (Würsig et al. 1997, Barr & Slooten 1999). In winter and spring, the dolphins remain further from shore throughout the day, usually in larger groups, and make more along-shore movements than in other seasons (Cipriano 1992).

- i. Dusky dolphins off Kaikoura may use different habitats as a result of tourism activities. Dolphins spent more time south of tourist activities and were in larger groups (750 individuals) (Brown 2000).
- m. Off Kaikoura, west coast South Island, and Marlborough Sounds, they are often seen in association with common dolphins (*Delphinus delphis*), Hector's dolphins (*Cephalorhynchus hectori hectori*), southern right whale dolphins (*Lissodelphis peronii*), long-finned pilot whales (*Globicephala malaena*), and bottlenose dolphins (*Tursiops truncatus*) (Markowitz 2004), as well as seabirds (Hawke & Dobinson 2001) and fur seals (*Arctocephalus forsteri*) (McFadden 2003). Off Kaikoura, small groups of mothers and calves preferred shallower waters (with most in waters 20 m or shallower) to deeper areas; whereas other groups appeared to have no preference (Weir et al. 2008).
- n. During summer months, dusky dolphins were present off the west coast of the South Island, with large groups (some with calves) of 100–200 individuals in the fiords and smaller groups off Cape Foulwind and Jackson Head (Bräger & Schneider 1998).
- o. Dusky dolphins were sighted in Doubtful Sound (infrequently), Milford Sound, and Dusky Sound, as well as in open coastal waters Fiordland waters south of Doubtful Sound (Lusseau & Slooten 2002). In summer, dolphins were closer to shore during the day. Larger groups were seen further offshore in winter.
- p. Strandings of dusky dolphins were reported from the west coast of the North Island south of 40° S, around Cook Strait and Wellington Harbour and Cloudy Bay (Warneke 2001), and in Nelson-Marlborough and around Kaikoura (Te Papa Tongarewa strandings database). Most were reported during September to January. Gaskin (1968) reported a stranding of dusky dolphins on the Chatham Islands.
- q. Most reported sightings of dusky dolphins from the DoC cetacean sightings database were from waters south of 40° S: in and around Cook Strait, in waters off the east and west coasts of the South Island and off the Stewart-Snares shelf, Auckland Islands Shelf and east to the Campbell Rise. These sightings included small groups and pods of more than 1000 individuals. One record was for one individual in the Hauraki Gulf, two were of about 10 from off New Plymouth, and another pod of 10 was reported north-east of Mahia Peninsula. Gaskin (1968) provides accounts of sightings in Cook Strait and more southern waters, to at least

around Stewart Island. Webb (1972) sighted dusky dolphins in late summer around Solander Island (west of Stewart Island), west of Hokitika, Kahurangi Point, and Tasman Bay in 15–20 °C waters.

4. References

The following sources provided useful information on the distribution of dusky dolphins in New Zealand waters. Würsig et al. (2007) provide a comprehensive summary of the distribution and movements of dusky dolphins in New Zealand waters. This is not an exhaustive list of all references to dusky dolphins.

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