

ABOUT THESE MAPS

Limited sighting data was available in the CDAS data set (1980-2003) for minke whale, fin whale, sperm whale and killer whale. But since these cetacean species occur in the study area, maps of the available sightings in CDAS (Figures 4.24 a, b, c and d) were developed to indicate the presence of these species in the study area and the three central California National Marine Sanctuaries. Due to limited data in the CDAS data set for these species, seasonal or overall density maps were not made and it was difficult to identify spatial and temporal patterns from the existing data.

See additional maps for these species in Figures 4.29-4.31, from NOAA's Southwest Fisheries Science Center stock assessment surveys (July-December, 1991, 1993, 1996 and 2001). These maps provide additional information on the range of the species off the coasts of California, Oregon and Washington.

Minke Whale (*Balaenoptera acutorostrata*)

The minke whale that occurs off central California is from the California/Oregon/Washington stock (one of two stocks found in U.S. North Pacific waters) and is present year round in the study area (Dohl *et al.*, 1983; Forney *et al.*, 1995; Barlow, 1997). The minke whale is not federally listed as threatened or endangered.

See Figure 4.24a; in the CDAS data analyzed in this study, scattered sightings of minke whales occurred in shelf, slope, and offshore waters in all three central California national marine sanctuaries, but most sightings were over the shelf. The pattern of sightings indicated on the map only confirms that minke whales have been sighted in a certain location in the study area and in a specific sanctuary. Rather than a real absence from an area or time period, the absence of sightings of a species may reflect insufficient survey effort.

Fin Whale (*Balaenoptera physalus*)

The fin whale that occurs off central California is from the California/Oregon/Washington stock (one of three stocks found in U.S. waters in the Pacific) and is present year round (Dohl *et al.*, 1983; Forney *et al.*, 1995). The fin whale is federally listed as an endangered species.

See Figure 4.24b; in the CDAS data analyzed in this study, scattered sightings of fin whales occurred in shelf, slope, and offshore waters in all three central California national marine sanctuaries, but most sightings were over the slope. Fin whales also occurred in offshore waters to the north, west, and south of the three sanctuaries. The pattern of sightings indicated on the map only confirms that fin whales have been sighted in a certain region and in a specific sanctuary. Rather than a real absence from a region (or sanctuary), the absence of sightings may reflect insufficient survey effort.

Sperm Whale (*Physeter macrocephalus*)

The sperm whale that occurs off central California is from the California/Oregon/Washington stock (one of three stocks found in U.S. waters in the Pacific) and is federally listed as an endangered species. Sperm whales are widely distributed across the entire North Pacific, and although seasonal movements of sperm whales in the North Pacific are unclear, it is thought that males move north in the summer to feed in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands, while females and young sperm whales usually remain in tropical and temperate waters year-round (Angliss and Outlaw, 2005). Off California, sperm whales occur year-round (Dohl *et al.*, 1983; Forney *et al.*, 1995; Barlow, 1997), with peak abundance from April through mid-June and from end August through mid-November (Rice, 1974).

See Figure 4.24c; in the CDAS data analyzed in this study, sperm whale sightings were widely scattered and occurred along the western boundaries of all three central California national marine sanctuaries and beyond (to the north, west, and south), mostly over the slope and deep ocean habitats. The pattern of sightings indicated on the map only confirms that sperm whales have been sighted in certain areas; rather than a real absence from an area or time period, the absence of sightings of a species may reflect insufficient survey effort.

The California/Oregon/Washington stock of sperm whale is listed as "endangered" under the Endangered Species Act and therefore is considered "strategic" and "depleted" under the Marine Mammal Protection Act. Increasing levels of anthropogenic noise in the oceans may be a habitat

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issue for deep-diving whales that use sound to hunt their prey (Carretta *et al.*, 2007). Sperm whales along the U.S. west coast feed primarily on squid (e.g., jumbo or Humboldt squid, *Dosidicus gigas*), but also some fishes and other invertebrates.

Killer Whale (*Orcinus orca*)

Five stocks, or types, of killer whales are recognized within the U.S. Pacific Exclusive Economic Zone (Carretta *et al.*, 2006); Killer whales that occur off central California occur year-round and are mostly from three recognized stocks: 1) the Eastern North Pacific Offshore stock; 2) the Eastern North Pacific Transient stock; and 2) the Eastern North Pacific Southern Resident stock. A fourth stock, or ecotype has been suggested, the LA pod, and it also occurs in the study area (Black *et al.*, 2002).

The ‘transient’ type is the most frequently sighted type of killer whale off central California (Black *et al.*, 1997); transients has been observed from southern California to Alaska. ‘Transients’ feed on marine mammals, travel in small groups often over long ranges, and are usually vocally quiet (Black *et al.*, 2002). Transients were often found at the edge of Monterey Canyon.

The ‘offshore’ type is not well known but does occur in the study area and has been observed (at least) in Monterey Bay and off Pt. Reyes (S. Allen, pers. comm.); this type is more vocal, travels in larger groups, and feeds on fishes and squid.

The southern ‘resident’ type is primarily sighted in inland marine waters of Washington and southern British Columbia, but it has also been observed once in Monterey Bay; this type preys mostly on fish, lives in close family groups, and is quite vocal.

The “LA pod” type has been observed from the Farallon Islands to the upper Gulf of California (Sea of Cortez) (Black *et al.*, 2002). See the mammal population estimate table and the life history table in this chapter for more information on this species.

Although the killer whale species is not federally listed as threatened or endangered, the Eastern North Pacific Southern Resident stock of killer whales is listed as Federally threatened, under the Marine Mammal Protection Act; this stock is also classified as a “strategic stock”. The stock

was designated as “endangered” by the State of Washington in April 2004. This stock is found primarily in the Pacific Northwest but is occasionally seen off California (NCCOS, 2005).

See Figure 4.24d; in the CDAS central California data set analyzed in this study, scattered sightings of killer whales occurred in all three central California national marine sanctuaries in shelf and slope habitats, the south rim of the Monterey Canyon, and several sightings to the west of Pt. Reyes. The pattern of sightings indicated on the map only confirms that killer whales have been sighted in certain areas and in all three central California sanctuaries. Rather than a real absence from an area or time period, the absence of sightings of a species may reflect insufficient survey effort.

The species occurs year-round in the study area, and killer whales are most frequently sighted in Monterey Bay from January-May and from September through November (Monterey Bay Whale Watch, 2007).

Known prey of the killer whale types, when feeding in Monterey Bay, include the following. For Transient killer whales: gray whale calves, California sea lions, harbor seals, elephant seals, Dall’s porpoise, Pacific white-sided dolphins, long-beaked common dolphin and seabirds; for Offshore killer whales: salmon, small schooling fish and blue shark; and for Resident killer whales: Chinook salmon; (Black *et al.*, 2002). For the LA Pod: great white sharks and likely other prey off Farallon Islands (Pyle *et al.*, 1997).



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