



Figure 4.18. Maps for Pacific white-sided dolphin: seasonal and overall densities from the CDAS central California data set (1980-2003).

**ABOUT THESE MAPS**

Figure 4.18 a, b and c show the density (animals/km<sup>2</sup>) of Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) in three ocean seasons - Upwelling, Oceanic, and Davidson Current, displayed in cells of

10' latitude by 10' longitude. Figure 4.18 d shows the overall density combining all three seasons. Densities are based on the combined data sets of several studies; see Data Sources below and the Data and

Analyses section of this chapter for more information. The color and mapping intervals were selected to show the most structure and highlight significant areas, while allowing comparisons among species. Cells that were surveyed but in which no Pacific white-sided dolphin were observed have a density of zero. Areas not surveyed appear white; no information is available for these areas. Dark blue lines indicate the boundaries of the National Marine Sanctuaries in the study area: Cordell Bank, Gulf of the Farallones and Monterey Bay. Bathymetric contours for the 200 meter and 2,000 meter isobaths are shown in blue.

### DATA SOURCES AND METHODS

Densities for marine mammals at sea in this assessment are based on the CDAS central California data set (2003), developed using software called 'Marine Mammal and Seabird Computer Data Analysis System' (CDAS), by the R.G. Ford Consulting Co. This data set contains data from eight survey programs (five aerial surveys, three ship surveys) conducted between 1980 and 2003; the data extends from Pt. Arena to Pt. Sal in the study area. See the Data and Analyses section of this chapter for information on the at-sea survey data sets and methods used to estimate density.

### RESULTS AND DISCUSSION

The Pacific white-sided dolphin is an endemic species of the temperate waters of the North Pacific Ocean and is one of the most abundant dolphin species in the eastern North Pacific. Two forms are known to occur off the California coast (Carretta *et al.*, 2004; Walker *et al.*, 1986; Chivers *et al.*, 1993), however, because there are no known differences in color patterns, it is currently not possible to distinguish animals without genetic or morphometric analyses (Carretta *et al.*, 2004). Pacific white-sided dolphins that occur within the U.S. Exclusive Economic Zone are divided into two discrete, non-contiguous areas: 1) Alaskan waters, and 2) waters off Washington, Oregon, and California. In the CDAS central California data set (1980-2003), the Pacific white-sided dolphin was the most abundant of the cetaceans (605 sightings of 41,984 individuals). Pacific white-sided dolphins occurred throughout the study area during all oceanographic seasons, mostly over the outer shelf, slope, canyons, and other deep ocean habitats. Densities were generally greater over the outer shelf and slope habitats and along canyon edges. Highest overall seasonal density in the CDAS data set was in the Oceanic season and lowest in the Upwelling season.

The occurrence of Pacific white-sided dolphins in the study area is highly variable; this species responds to oceanographic conditions on both seasonal and interannual time scales (Forney and Barlow, 1998). In a study in Monterey Bay (Black, 1994), group size and relative abundance of the Pacific white-sided dolphin varied seasonally and were greater during the Oceanic and Davidson Current Seasons than during the Upwelling Season, when relative individual and group abundance was low and group sizes were small (not shown in maps). Also, in habitats over and near shelf-breaks and greater bottom relief, feeding behavior was observed more than other behaviors (Black, 1994). In general, the absence of sightings of Pacific white-sided dolphins in the CDAS data set may reflect the distribution of spatial and temporal survey effort rather than absence from the survey area; the maps shown likely do not reflect the total distribution of the species in the study area.

See an additional map for this species in Figure 4.28, from NOAA's Southwest Fisheries Science Center stock assessment surveys (July-December, 1991, 1993, 1996 and 2001). This map provides additional information on the range of the species off the coasts of California, Oregon and Washington.

There are no known habitat issues of concern for the Pacific white-sided dolphin and it is not listed as "threatened", "endangered", or "depleted". Insufficient data prohibit evaluation of potential trends in abundance (Carretta *et al.*, 2004; Carretta *et al.*, 2006). Due to drift gillnet fisheries for sharks and swordfish, human-related sources of mortality and serious injury may occur off Baja California, Mexico, where drift gillnetting occurs along the entire Mexican coast. (Carretta *et al.*, 2004; Carretta *et al.*, 2006). Off California, Oregon, and Washington, low levels of mortality of the Pacific white-sided dolphin have been documented in the domestic groundfish trawl fisheries; however, the total fishery mortality and serious injury for this stock is considered to be insignificant. (Carretta *et al.*, 2004; Carretta *et al.*, 2006).

Prey of the Pacific white-sided dolphin includes: Pacific whiting, northern anchovy, rockfish, Pacific saury, and market squid (*Loligo opalescens*) (Stroud *et al.*, 1981; Black, 1994).