



Figure 3.8. Black-footed Albatross: maps of seasonal density and high use areas.

ABOUT THESE MAPS

Maps a, b and c show the at-sea density (birds/km²) of Black-footed Albatross (*Phoebastria nigripes*) in three ocean seasons – Upwelling, Oceanic, and Davidson Current, displayed in cells

of 5' latitude by 5' longitude. Densities are based on the combined data sets of several studies; see the Data and Analyses section of this chapter. The color and mapping intervals were selected to show

the most structure and highlight significant areas, while allowing comparisons among marine bird species. Cells that were surveyed but in which no Black-footed Albatrosses were observed have a density of zero. Areas not surveyed appear white; no information was available for these areas. 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 m and 2,000 m isobaths are shown in light blue.

In order to provide an integrated look at the patterns of a species' spatial and temporal occurrence and abundance in the study area, map d shows seasonal high-use areas, displayed in cells of 10' latitude by 10' longitude, and also breeding colonies (when available). The seasonal high use map provides a further synthesis of densities presented in maps a, b and c, and portrays the relative importance of various areas to the species. Areas with consistently high use are highlighted. See the Data and Analyses section of this chapter for further explanation of high-use areas. Because the sighting data for this species extends significantly beyond the western extent of the standard map frame used in this project, additional maps are provided for this species in Appendix 3H that include a greater western extent.

DATA SOURCES AND METHODS

The at-sea data set is referred to as the CDAS central California data set (1980-2001) and was developed using software called Marine Mammal and Seabird Computer Data Analysis System (CDAS), by the R.G. Ford Consulting Co. The data set extends from Pt. Arena to Pt. Sal in the study area, and the surveys used were conducted between 1980 and 2001. See the Data and Analyses section of this chapter for more information on the at-sea survey data sets and methods.

RESULTS AND DISCUSSION

The Black-footed Albatross is common off central California although it nests in the Hawaiian Islands. Surveys in CDAS logged 2,584 sightings of 3,570 individuals. A multiple regression model of nine independent variables explained 22.2% of the variation in cell density. Important variables were: a positive relationship to ocean depth, and inverse relationships for distance to land, and for year. Occurring mainly west of the outer shelf, this

albatross was more abundant as depth increased, although it was found in waters over relatively shallower depths during the Upwelling Season (mean depth 955 m) compared to >2,000 m during the remainder of the year. Mean distance from shore was also much closer during the Upwelling Season (28.6 km) compared to >67 km during other seasons. Population size in the study area decreased as the years advanced from 1985 through 2002, although a slight increase occurred during the last few years of cooler water (see discussion of climate shifts toward end of chapter). Eight maps are provided for this species, four of which have a western extent to show the full offshore extent of the data for this species. The species occurred in all three National Marine Sanctuaries in the study area, and in all three ocean seasons.

Areas of highest density, most within the boundaries of the north/central California National Marine Sanctuaries, were Cordell Bank, the outer portions of Fanny Shoal and Farallon Escarpment, as well as these canyons: Pioneer, Ascension and Monterey. These are commercial fishing areas as well, as this species is especially attracted to fish offal and by-catch left by trawlers. This attraction explains the "trail" of albatross (relatively higher cell density) that extends across the Gulf of the Farallones to the Golden Gate, and across inner Monterey Bay to the important fishing port of Moss Landing; these birds were following fishing vessels. Recent fishery closures for demersal fish species along the U.S. west coast has likely affected the occurrence patterns of this species, with a corresponding decrease in numbers or density of albatross visiting these waters, i.e., they would be more dispersed than when the fishing activity was greater.

Albatrosses are generalists that feed on almost anything (any live or dead prey at the surface) of edible size. See Tables 3.5, 3.8, 3.9, 3.10 and 3.11 for related summary information.

