ABOUT THESE MAPS

Maps a, b and c show the combined density (birds/km^2) of 76 species of marine birds in the Upwelling, Oceanic, and Davidson Current seasons, displayed in 5' latitude by 5' longitude cells. Map d shows density for all seasons and years combined. Densities are based on combined data 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. Cells that were surveyed but in which no birds 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.

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

Overall marine bird density in the study area is dominated by two abundant marine bird species: Common Murre and Sooty Shearwater.

Based on visual inspection of the maps, density was highest, with cells of highest values most widespread as well, during the Upwelling Season. Except for a few highest-density hotspots (see Tables 3.5 and 3.6), marine birds were distributed relatively evenly at high density (>10 individuals per km^2) over the shelf and slope, from north to south in the study area. Particular hot spots were: inshore Monterey Bay, Farallon Ridge and Cordell Bank. The pattern during of the Upwelling Season map generally matched the pattern on the all seasons map. This is because upwelling dominates the processes that contribute to the trophic richness in this system.

During the Oceanic Season, highest density areas increased in prevalence inshore. This was because more feeding habitats occurred inshore, where in shallower depths, more microhabitats were available. In this season, hot spots were the San Francisco Bay tidal plume, inshore near Año Nuevo, innermost Monterey Bay and San Luis Obispo Bay.

Bird density shifted more to mid-shelf during the Davidson Current Season. The California Counter Current altered the oceanography sufficiently to bring more feeding opportunities offshore.