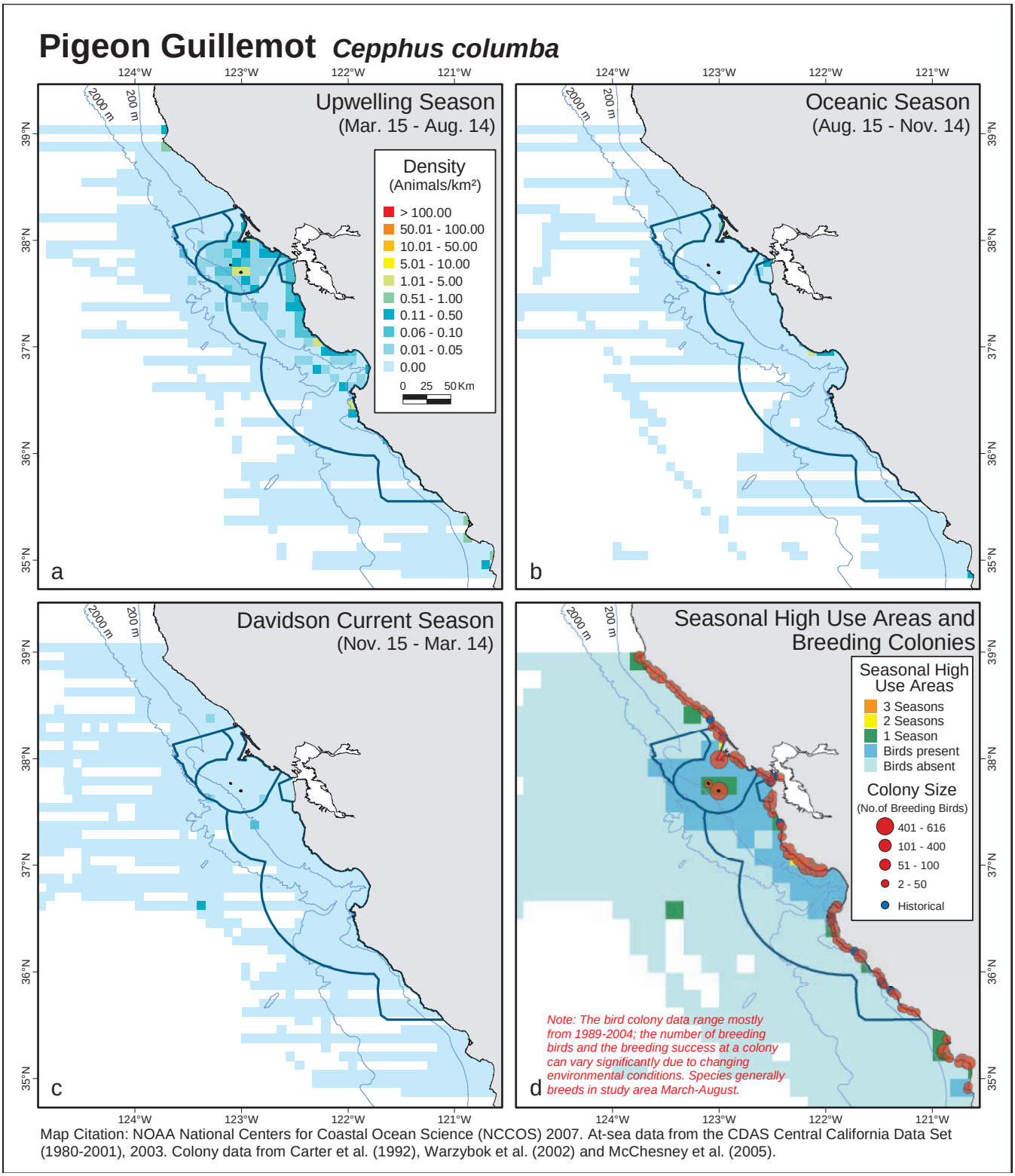

Figure 3.33. Pigeon Guillemot: maps of seasonal density, high use areas, and breeding colonies.

ABOUT THESE MAPS

Maps a, b and c show the at-sea density (birds/km^2) of Pigeon Guillemot (*Cepphus columba*) 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 Pigeon Guillemots 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.

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.

Data on colony sizes were obtained primarily from Carter *et al.,* (1992), with additional updates from Warzybok *et al.,* (2002) for South Farallon Islands and from McChesney *et al.,* (2005) for colonies at San Pedro Rock and Devil's Slide Rock and Mainland. Since Pigeon Guillemots nest in rock crevices and burrows, estimating breeding population size is very difficult. Most colonies are surveyed by counting birds rafting on the water or resting on the ground outside of nest sites. Breeding birds show a distinct diurnal pattern of when they sit at nest-cavity entrances (Ainley and Boekelheide 1990). Carter *et al.,* (1992) estimated breeding population sizes by adjusting bird counts with correction factors based on time of day of the survey. Counts from McChesney *et al.,* (2005) were adjusted using these same correction factors.

RESULTS AND DISCUSSION

The Pigeon Guillemot occurs uncommonly in the study area and mostly during the nesting season, which includes the Upwelling Season and the beginning of Oceanic Season; the species was almost absent in the Davidson Current Season. Surveys in CDAS recorded 467 sightings of 841 individuals. Because there was a relatively low number of at-sea sightings in CDAS, no regression model was attempted. The species frequents waters overlying rocky reefs close to nesting colonies. During the breeding season, this species congregates on the water within a few hundred meters of colonies, and since most at-sea surveys did not cover the nearshore area, densities close to shore are likely underrepresented and breeding colony data are a better representation of distribution (G. McChesney, pers.comm.).

One of the largest colonies anywhere occurs at the South Farallon Islands. Accordingly, a high density "halo" of guillemots extends around those islands (including the Farallon Ridge), with scattered individuals elsewhere. The National Marine Sanctuary boundaries encompass most of the areas where this species occurs in the study area. Important areas outside of the sanctuary boundaries are around Point Buchon, as well as Estero and San Luis Obispo bays.

In the study area, Pigeon Guillemots are one of the most widespread breeding species (see also Appendix 1A, the bird colony data table). In 1989, Pigeon Guillemots were the fifth-most abundant breeding seabird (Carter *et al.,* 1992). Beyond the Gulf of the Farallones, they were the second-most abundant breeder. Largest nesting areas include Fish Rocks, Point Reyes, South Farallon Islands, the southern San Mateo and Santa Cruz county coasts, Point Buchon area, and the Shell Beach area. Little overall trend was evident between 1980 and 1989 surveys (Carter *et al.,* 1992). Current data are inadequate to assess trends since 1989.

Pigeon Guillemots feed on benthic fish, such as juvenile rockfish, blennies and sculpins, and invertebrates, such as grass shrimp and octopus. Pigeon Guillemots mostly forage in rocky substrates. See Tables 3.5, 3.7, 3.10 and 3.11 for related summary information.

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