ABOUT THIS MAP

Figure 4.14 contains a map of pinniped haulout and rookery sites in the north/central California study area and was developed to summarize pinniped coastal habitat use for important life cycle functions (breeding, pupping, and resting). Different subareas of a site are typically used by each species, but estimated numbers of pinnipeds using each haulout or rookery site have been combined to present a composite count for this display. The number of species using each site and the number of species producing pups at that site are indicated by the color and border of the symbols. Together with the summary bird colony map (Figure 3.42), this summary pinniped map demonstrates the importance of key coastal habitat to more than 20 marine bird and mammal species. Data for the following pinniped species are included: California sea lion, Pacific harbor seal, Steller sea lion, northern fur seal, and northern elephant seal. See also Figure 4.15, a map of estimated species richness for pinnipeds at sea.

DATA SOURCES AND METHODS

Pinniped haulout and pupping activities are monitored by a variety of sources; providers of the data used in this map are as follows: Mark Lowry of NOAA/NMFS' Southwest Fisheries Science Center provided pup and haulout data for California sea lion (2003-2004), Steller sea lion (2003-2004), and for the overview map for Pacific harbor seal (2004); Sarah Allen of Point Reyes National Seashore, National Park Service provided 2006 data for harbor seals at Pt. Reyes. William Sydeman of PRBO Conservation Science, and Joelle Buffa of the Farallon Islands National Wildlife Refuge, FWS provided information from 2004 on the northern fur seal rookery at Southeast Farallon Island; and haulout and pup data on northern elephant seals were provided by: Brian Hatfield, USGS; Joelle Buffa, FWS; Bill Sydeman, PRBO; Pat Morris, University of California, Santa Cruz; and Richard Condit, Smithsonian Institution.

Data from 2003-2004 were combined for each site from available pinniped haulout/rookery data. Counts from aerial surveys were used for Pacific harbor seal, California sea lion, and Steller sea lion. Harbor seal counts were from 2004; for both sea lion species the higher of the 2003 or 2004 counts was used. For northern elephant seal, the midpoint of the range of estimated total 2004 attendance was used, and northern fur seal numbers were also estimated. Species-specific counts were summed for each site; these totals were used to assign the various sites to generalized size classes in order to create an overall map that reflects the abundance and distribution of pinnipeds on shore.

RESULTS AND DISCUSSION

Although pinnipeds spend much of their lives in the water, they come ashore to breed, pup, and molt and rest. This map summarizes terrestrial habitat use of these marine mammals, still tied to the land, and clearly indicates how much of the central California coastline and offshore islands and islets are well used by the five species of pinnipeds in the study area.

The central California coast is characterized by a great diversity of shoreline habitat types, including boulder/rocky beaches, a variety of sandy beaches, sand spits, sand bars, estuaries, sloughs and mudflats. Some of these areas are exposed rocky shorelines where others are more protected from storms and high surf action. Besides habitat type, a variety of factors influence the choice of site selection that pinnipeds make for haulouts and rookeries, e.g., presence of marine predators, disturbance, currents, undersea topography, tidal height, and the proximity of the sites to regions of high ocean productivity (food). For example, in a study on haulout use and rookery characteristics of Steller sea lions, Ban and Trites (2007) reported site selection likely involves either an optimization or compromise of two factors: the nearness to favorable foraging areas, and the degree of difficulty in entering or exiting the water during different tidal heights. For all pinnipeds in the study area, availability and accessibility to suitable, undisturbed habitat for breeding and, most importantly, parturition (birthing), are crucial for long-term survival of pinniped populations. In addition to the great diversity of natural habitats, man-made structures (e.g., docks and piers used by California sea lions, and sometimes Steller sea lions), provide additional terrestrial habitat. Although all species prefer isolated and undisturbed areas, some species, such as the California sea lion and harbor seals, may habituate to human presence.

The timing ashore at the breeding and rookery/pupping sites varies among species. Four of the

five pinnipeds in the study area (California sea lion, Steller sea lion, harbor seal, northern fur seal) use terrestrial habitats for breeding in spring and early summer; whereas the northern elephant seal breeds December through March. The patterns revealed in this summary map reflect both the year-round and seasonal use; year-round use (e.g., harbor seals and California sea lions) is more widespread, whereas seasonal use (e.g., elephant seals) is more concentrated. Except for northern elephant seals that fast during breeding, pupping and lactation, one of the most important criteria for habitat selection for the pinnipeds in the study area is likely proximity to productive foraging areas in the waters off central California.

Based on this analysis and set of data (2003-2004), pupping for all five pinniped species occurs on the Southeast Farallon Islands, and is reported for four species on Año Nuevo Island and Mainland, and three species at Point Reyes.

Spatial patterns of occupancy among species varied between widespread use throughout the year (most of the one-species sites presented on the map are harbor seals) and more concentrated seasonal use, e.g., the elephant seal during winter breeding season. Note also that the relatively high animal counts at Año Nuevo Island and mainland, Point Piedras Blancas, Southeast Farallon Island, and Point Reyes are driven by: 1) the occupancy of elephant seals during their winter breeding/pupping season; 2) California sea lions after their breeding/pupping season and before their next breeding/pupping season (fall-winter-early spring); and 3) relatively large numbers of harbor seals that are present year round at Point Reyes. The pattern of high species richness and relatively greater numbers of individuals at these four locations highlights the importance of these areas for the four species discussed above, and also highlights the importance of Southeast Farallon Islands for the northern fur seal that recently (1996) started breeding/pupping at these islands.

In summary, the shoreline along the north/central California study area is intensely used by five pinnipeds for haulouts, pupping, molting and resting. The amount of use at each site varies annually and is determined by a variety of conditions (e.g., disturbance, accessibility, prey availability). In the study area, harbor seals use islands, remote mainland coasts, bays, estuaries, and sloughs; their terrestrial distribution was widespread along the full extent of the coast in the study area. California sea lions use islands, remote mainland beaches, and piers, and their distribution was also relatively widespread. In contrast, distribution is more concentrated for species that use specific islands and mainlands for breeding/pupping. For example, Steller sea lions use islands and rocky islets, elephant seals use islands and remote mainland beaches, and northern fur seals use islands.