

factors may be affecting the distributions of seabirds. Ainley et al. (1994, 1996) demonstrated an inverse relationship between seabird reproductive success and ocean temperature at the Farallon Islands. However, locally breeding seabirds are tied to feeding in SCB waters due to their breeding colony locations on the Channel Islands, Coronado Islands, and along the mainland coast from Cambria to Point Conception (Sowls et al. 1980, H. Carter, unpubl. data). Thus, it is not possible for these birds to shift their feeding areas to a great degree, unless they also change breeding colonies which does not occur frequently. Recent increases in local breeding populations, even during warm periods, indicate that the SCB may be able to buffer changes in ocean temperature and the associated effects.

Three severe El Niño events (1982–1983, 1992–1993, and 1997–1998) occurred between the 1975–1978 and 1999–2002 survey periods. Severe El Niño events cause poor reproduction and high adult mortality of certain locally-breeding seabirds (and greater mortality for some visiting species) while others are not affected. Our surveys began in May 1999, 2 yr after the 1997–1998 El Niño event. The 1999–2002 period featured a series of cold water La Niña events which led some researchers to postulate that the CCS had undergone a fundamental climate shift, on the scale of those documented in the 1920s, mid 1940s, and mid 1970s (Schwing et al. 2002). While La Niñas often follow El Niños (Ainley and Boekelheide 1990), these La Niña events have corresponded with generally stronger than normal upwelling in the CCS and have generated the greatest 4-yr mean upwelling index value on record (Schwing et al. 2002). Briggs et al. (1987) conducted 1975–1978 surveys during another climate shift leading to increased temperatures throughout the CCS (Mantua et al. 1997). They surveyed north of Point Conception in 1980–1983 after a transition to warmer water had occurred in the California Current, when negative effects of the warmer water on seabird abundances might have occurred. Still, overall numbers were greater, indicating that ocean temperatures are not entirely responsible for trends in seabird abundances.

Recently, the health of coastal oceans has been highlighted as a major issue of concern

(U.S. Commission on Ocean Policy 2004). In addition to continuing impacts from DDT and PCB contamination and oil pollution, increased urbanization in southern California may be threatening the health of the SCB through runoff and increased use of marine resources. Since the 1975–1983 aerial surveys, the human population has increased by >10 million in California and >25% in the Los Angeles region (CensusScope 2005). Seabirds are sensitive indicators of change in the marine environment due to both natural and anthropogenic factors (Bost and Le Maho 1993, Ainley et al. 1996, Jones et al. 2002). Changes in seabird populations may be warning signs for environmental degradation caused by coastal development, as well as for larger forces that alter marine systems such as climate change. Thus, periodic at-sea surveys of seabirds, with direct comparison to past studies, may provide an effective indication of how well, or how poorly, we are managing and conserving our coastal marine resources.

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