

Effects of Human Activity on the Structure of Coastal Marine Bird Assemblages in Central Chile

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Abstract

In comparison with the effects of the collection of marine intertidal organisms by humans, the effects of human recreational activities on assemblages of marine birds have received scarce attention. We evaluated whether in central Chile the spatial and temporal variation in the composition and abundance of the avian assemblage is affected by the presence of humans on the coast. We studied a 1.5-km stretch of rocky coast, in the center of which is a small marine reserve where no fishing or recreational activities take place. At 15 observation points, we conducted 12 monthly surveys of birds that roost in the supralittoral zone, between the high-tide mark and the terrestrial vegetation, and/or that forage in the intertidal zone. In addition, within the reserve we conducted daily bird surveys over 2 years to evaluate whether abundance or composition changed according to the activity of people outside the reserve. We recorded 19 species of coastal marine birds. Eleven species used the supralittoral zone only for roosting (roosting assemblage), whereas the others foraged on intertidal organisms and roosted in the supralittoral zone (foraging assemblage). Although the largest negative effect of human activity on bird abundance occurred in summer, the period of greatest recreation intensity, the presence of humans negatively affected birds year round, changing both the spatial and temporal distribution of birds along the shore. Bird abundance was higher at observation points inside the marine reserve, although the pattern was stronger for birds roosting on the supralittoral zone than for birds actively foraging in the intertidal zone. Similarly, the number of birds recorded during weekends inside the reserve was higher than during week days. Our results illustrate the important role played by this marine reserve, which offers marine birds safe roosting sites without human interference. Larger marine reserves than the one we studied are needed because the dynamics of birds inside the reserve were strongly influenced by human activities in immediately adjacent areas. Our results emphasize the need to consider human recreational activities along the coast when establishing conservation programs because harvesting refugia or “no-take” zones will not provide protection to coastal bird assemblages unless human access is restricted.