

Western Ecological Research Center

Publication Brief for Resource Managers

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Diversity of Terrestrial Avifauna in Response to Distance from the Shoreline of the Salton Sea

Large aquatic bodies influence surrounding terrestrial ecosystems by providing water and nutrients. In arid landscapes, the increased primary productivity that results may greatly enhance vertebrate biodiversity. The Salton Sea, a large saline lake in the Colorado Desert of southern California, provides nutrients in the form of hundreds of thousands of dead fish carcasses, brine flies, and chemical compounds through windborne salt sea spray. The Salton Basin has become a critical habitat for aquatic and terrestrial fauna, especially migrating, breeding, and wintering birds, perhaps largely because California has lost approximately 90% of its original wetlands. According to a study authored by USGS scientists Mark Mendelsohn, Dr. William Boarman, Dr. Robert Fisher, and Stacie Hathaway and published in the *Journal of Arid Environments*, spatial patterns in landbird and shorebird diversity (numbers of species and numbers per species) may depend on proximity to the shoreline of the Sea.

The authors performed point counts for landbirds and shorebirds monthly or every other month between March 2001 and February 2002 across a sampling grid of 35 points along the southwest edge of the Salton Sea. Avian diversity was at a maximum nearest the shore, and was significantly lower away from the Sea's edge, at all surveyed distances up to 1 km from the shore. Patterns of vegetation cover by the dominant plant species at the study area were also related to proximity to the Sea's edge. However, the data did not support a correlation between the avian diversity and vegetation cover.

Despite a lacking direct relationship between avian diversity and vegetation cover, both patterns may be responding to bottom-up causes if they are sensitive to allochthonous inputs of water and nutrients from the Sea. Water availability is concentrated closest to the

Management Implications:

- Landbird and shorebird diversity is at a maximum nearest the shoreline of the Salton Sea, relative to distances of up to 1 km over land from the Sea's edge. The authors encourage more studies investigating the relationship between elevated avian diversity and the physical environment near the shore.
- Avian diversity patterns in the region may be affected at the local, if not landscape (the entire shoreline around the Sea) level, if effects on the land-shore interface from the inevitable inflow reductions are not mitigated.
- Unknown threats from a reduced Salton Sea extend to non-avian organisms as well, including humans in surrounding areas who could be exposed to dust storms similar to the ones Owens Valley residents in Central California have experienced since 1913.

shore at the study area. The authors suspect that this greater soil moisture may allow for elevated levels of primary productivity (particularly in halophytic plants), and in turn more food and habitat structure for birds. A reduction of source water to the Salton Sea, which is now known to be inevitable, given the future management options, will lower the Sea's surface and have potentially serious effects on the structure and composition of the surrounding vegetation. The results of this study suggest that any resulting effects to the land and vegetation near the shore be mitigated to safeguard the terrestrial avifauna of this unique ecosystem.

Mendelsohn, M. B., W. I. Boarman, R. N. Fisher, and S. A. Hathaway. 2007. Diversity of terrestrial avifauna in response to distance from the shoreline of the Salton Sea. Journal of Arid Environments 68:574-587. <http://dx.doi.org/10.1016/j.jaridenv.2006.07.012>.