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Where the wild things are: predicting hotspots of seabird aggregations in the California Current System

PRBO Conservation Science (PRBO) and collaborators conducted analyses to identify marine hotspots and inform Marine Spatial Planning (MSP) in the California Current System (CCS). Results indicated that hotspots are well aligned with currently protected areas (e.g., National Marine Sanctuaries), yet also highlighted a major conservation gap in Northern California/Southern Oregon (from Cape Mendocino to Heceta Bank).

PRBO developed habitat associations for 16 species of seabirds using information from at-sea surveys carried out over a 12-year period (1997-2008). Surveys extended from north of Vancouver Island to the US/Mexico border and out to 600 km from the coast. We related seabird abundance to bathymetric variables, such as proximity of the continental shelf and slope, and satellite oceanographic data including sea-surface temperature, sea-level height and chlorophyll-a. Single-species predictive models were developed using a hierarchical, multivariate statistical procedure (bagged decision trees).

Bathymetric variables were often important predictive variables. Oceanographic variables derived from remotely sensed data were generally less important. Model predictions were applied to the entire California Current for 4 months (February, May, July, October) as a proxy for seasons in each of 11 years. Single-species predictions were combined using three criteria (abundance, importance, and persistence) to identify potential hotspots of multi-species seabird aggregation.

Hotspots occurred over the shelf of the continental U.S. and southern Canada and aligned well with current National Marine Sanctuary boundaries. Our analysis also revealed gaps in protection, especially in broader areas around the Channel Islands beyond the existing Sanctuary and in the coastal area between Cape Mendocino (Northern California) to Heceta Head (Southern Oregon), where there are currently no marine reserves.

Main Points

- Bathymetric variables were more important than oceanographic variables in predicting hotspots.
- Current protected areas include some of the most important hotspots along the West Coast of the U.S.
- There is a conservation gap between Cape Mendocino in northern California and Heceta Bank in southern Oregon that may benefit from additional protection.

Nur, N., J. Jahncke, J. M. Herzog, J. Howar, D. Hyrenbach, J. Zamon, D. Ainley, J. Wiens, K. Morgan, L. Ballance, and D. Stralberg. 2011. Where the Wild Things Are: Predicting Hotspots of Seabird Aggregations in the California Current System. *Ecological Applications*, 21(6), 2011, pp. 2241–2257. PRBO Publication #1748.

Seabird hotspots in the California Current System

(Map shows areas of high abundance of seabirds during spring)

