

A new perspective on the foraging ecology of apex predators in the California Current: results from a fully coupled ecosystem model.

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Results from a fully coupled ecosystem model for the California Current Large Marine Ecosystem are used to describe the impact of environmental variability on the foraging ecology of its most abundant apex predator, California sea lions. The ecosystem model consists of a biogeochemical submodel embedded in a regional ocean circulation submodel, and both coupled with a multi-species individual-based submodel for forage fish (sardine and anchovy) and California sea lions. Sardine and anchovy are specifically included in the model as they represent important prey sources for California sea lions and exhibit significant interannual and decadal variability in population abundances. Output from a 20-year run (1989-2008) of the model demonstrates how different physical and biological processes control habitat utilization and foraging success of California sea lions on interannual time scales, with the dominant modes of variability linked to sardine abundance and coastal upwelling intensity. The results also illustrate how variability in environmental conditions, forage fish distribution, and prey assemblage affect sea lions feeding success. While specifically focusing on the foraging ecology of sea lions, the modeling framework has the ability to provide new and unique perspectives on trophic interactions in the California Current, or other regions where similar end-to-end ecosystem models may be implemented.

Keywords: Ecosystem model, Foraging ecology, California Current, Marine predators