Models for understanding and management of marine populations

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We formulate and analyze population models, and use them with physical and biological data to understand variability in marine resource and to support their management.

I. Environmental Influences on Marine Populations

Current Students: Lewis Barnett, Lauren Yamane, Allison Dedrick
Current post doc: Jason Whittington, University of Oslo
Research at the individual level indicates climate or OA can change reproduction vs. age

Diminished growth moves to older age

Increased mortality skews to younger ages

Increased fecundity increases at all ages
This changes the sensitivity of populations to different frequencies in the environment. For example, reduced survival.

![Population Sensitivity Graph](image)

- **Normal survival**
- **Lower survival**
- **Lowest survival**

**ENSO frequencies**
Potential Collaboration: we can help by scaling up changes in vital rates to their population and ecosystem consequences,
II. Population responses to marine protected areas
Prediction of the effects on biomass and yield of implementing proposed MPAs in California

Few small MPAs
Add larger MPAs

Greater biomass, fishery yield?
Modeling for implementation of California’s new MPAs
Potential collaboration: help with sampling and adaptive management of California’s MPAs

Moffit, et al. (2013)
Larval Connectivity

Potential (global) collaboration: What to measure?

Right (connectivity)

Wrong (not connectivity)

Local retention or self-recruitment?

Burgess, et al. 2014