# Seminar Announcement

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**Wednesday June 14, 2017**
**12:00 pm**

## *Process studies to quantify ecosystem dynamics in the California Current*

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## ABSTRACT

I review a suite of biophysical factors in the Northeast Pacific Ocean Basin and California Current shelf ecosystem that directly or indirectly relate to forage, Chinook salmon (*Oncorhynchus tshawytscha*), and seabird productivity in central California. The synthesis of our work over the last decade provides a framework for integrating ecosystem process studies with empirical hypothesis testing to benefit fisheries management. Our hypothesis includes seasonality (phenology) as a key element determining forage, Chinook salmon, and seabird productivities. The strength and location of the North Pacific High Pressure System in winter influences shelf ecosystem productivity *via* "bottom-up" mechanisms and retention of key prey (euphausiid crustaceans and juvenile rockfishes, *Sebastes* spp.) in nearshore habitats prior to and during salmon out-migration to sea and seabird chick rearing. Prey retention regionally is associated with increased consumption of krill and juvenile rockfishes by salmon and seabirds and is positively correlated with juvenile salmon ocean survival and fledgling success of seabirds.

As a case study, the effects of ecosystem-level interactions were related to salmon survival. We found, during warmer, fresher, and stratified conditions (i.e., subtropical, less productive) common murres (*Uria aalge*) occur in larger aggregations and forage more inshore, where they forage predominantly on adult northern anchovy (*Engraulis mordax*). While foraging inshore, common murre consumption of juvenile Chinook salmon increases from 0 to 9% of their diet, which relates negatively to the salmon survival rate. Ultimately, we demonstrate through empirical study of ecosystem interactions the significance of top-down impacts on salmon associated with bottom-up dynamics. This information can be used to parameterize ecosystem models and develop benchmarks and trophodynamic thresholds to evaluate likely outcomes of ecosystem management options, including considerations of three fishery resources and recovering seabird populations.