

Climate Impacts on the California Current Ecosystem

The California Current, between Washington and California, is subject to climate variations in various forms including the ENSO, variations associated with the PDO pattern, more regional fluctuations in the timing of the Spring Transition, and longer-term changes of uncertain origin. There are long physical and biological records that show correlations between physical forcing by these climate signals and ecosystem components ranging from plankton to top-predator fish. There are good reasons to believe these correlations. Climate variability modulates nutrient supply to the lowest trophic levels, and ocean temperature, and other physical characteristics, are known to affect animal behavior.

Although the case for strong climate impacts on the ecosystems of the California Current and its nearshore waters is strong, it has been difficult to clarify the mechanisms and predictability of climate variability impacts on ecosystems and for this reason climate variability is explicitly included in the management of only two species: sardines and market squid. In order to use developing predictions of physical climate variability to improve management of marine resources and ecosystems it is necessary that: (1) methods for describing the present physical state of the ocean and predicting future states be improved; (2) predictions of climate impacts on lower trophic levels that can now be made must be tested until their reliability is trusted for management decisions; and, (3) methods of extending predictability of climate impacts on higher trophic levels must be developed.

Today three regional groups are developing proto regional coastal ocean observing systems along the West Coast and the Pacific Coastal Ocean Observing System (PaCOOS) is planning a set of federal backbone observations to supplement the regional observations, carry them into the California Current, and describe marine resources and ecosystems.

The Joint Institute for Marine Observations (JIMO) at Scripps Institution of Oceanography (SIO), the Cooperative Institute for Ocean Satellite Studies at Oregon State University (OSU), and PACOOS are jointly calling a meeting to develop specific plans for carrying forward work on assessing and predicting climate impacts on marine resources and ecosystems along the West Coast of the continental U.S., including both the California Current and inshore waters. The meeting intends to identify the highest priorities, and develop practical plans for the following priorities:

- (1) Modeling ocean physics, nutrients and plankton in the region in order to (a) describe the physical manifestations of the varying climate and relate them to important biological measurements such as krill, (b) test and develop the capability to predict these physical manifestations, (c) test and further develop the capability to describe and predict variations in nutrients, pollutants, and planktonic populations, and (d) eventually develop forecasts for selected fish species under a varying California Current climate;
- (2) Extending the present sustained physical oceanographic and meteorological observations needed to initialize, constrain and test ocean models and to support time series research; and,
- (3) Augmenting the present sustained biological and chemical observations needed to (a) test model descriptions of nutrients, pollutants and plankton populations, and (b) provide impetus to the development of stock assessment and ecosystem models with the objective of predicting climate impacts on the entire ecosystem.

The organizing institutions will seek representation of the West Coast regional associations, the Geophysical Fluid Dynamics Laboratory, NMFS and NOS scientists concerned with climate impacts, and academic scientists involved in modeling or observing the climate variability and biota of the California Current and its neighboring inshore waters.

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