07-06
Project Title: Impact of freshwater and terrestrial ecosystem conditions on estuarine dependent and anadromous fish

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Goals:
   The primary goal of our project is to develop ecosystem indicators for stock assessment based on cross-ecosystem exchange between terrestrial, freshwater, and marine systems, and to make these indicators available to fisheries researchers in an easy to use, spatiotemporally explicit, web-based database.

Approach:
   Most ecosystem indicators for marine fish stock assessment are generated from physical and biological oceanographic measurements and models that do not capture important terrestrial and freshwater influences on estuarine dependent and anadromous fish life cycles. We developed a comprehensive database of ecosystem indicators for watersheds draining into the coastal ocean of California by spatially synthesizing a wide range of diverse data sets. While many of these data are currently available through various sources, they have not been summarized in a format that is relevant for fisheries research, nor are they standardized and consolidated in a single location.

Work Completed:
   We have developed a working database of terrestrial and freshwater ecosystem indicators for all coastal California watersheds draining into the CCLME. Users can select a basin and generate data summaries for a wide range of variables using a simple interactive menu. Examples of the indices include (summarized by basin): water flow, air temperature, monthly heat index, soil water content, snow cover, gross primary production, percent landcover (by land class), percent impervious surface, percent canopy cover, and toxicity or water quality index. CO-I S. Ralston then used the flow data for the Sacramento-San Joaquin River Delta to extend the starry flounder stock assessment model and develop a long-term reconstruction of abundance.

Applications:
   Our work has the potential to have significant benefit to marine resource management by providing data that was previously unavailable or difficult to obtain at the necessary spatial scales. The indicators that we have developed and summarized are important to estuarine dependent or anadromous life cycles. At the most general level, they will be useful for detecting trends in terrestrial and freshwater ecosystems that might be important for understanding changes in the structure and function of the CCLME.

Publications/Presentations/Webpages:

Ralston et al. A long-term reconstruction of starry flounder abundance by inclusion of estuarine conditions and year-class strength. *In prep.*