



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
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REGIONAL OFFICE ECOSYSTEM SCIENCE NEEDS – NOTES FOR REVIEWERS
BOB TURNER, NMFS WEST COAST REGIONAL OFFICE, APRIL 19, 2016

The West Coast Regional Office of the National Marine Fisheries Service (NMFS) works closely with the Pacific Fishery Management Council (Council) and views the Council's Fishery Ecosystem Plan (FEP) as our main repository of ecosystem-based management guidance and planning information for West Coast marine species. When considering our ecosystem science needs, we look to the needs of the Council, and to the needs of West Coast states, tribes, and members of the interested public for guidance. We appreciate the work that the Southwest Fisheries Science Center has done to date to develop, guide, and support ecosystem science for the California Current Large Marine Ecosystem. We also support the Center's efforts to continue and encourage research surveys that have a multi-species or ecosystem approach, rather than focusing on just a few species or species groups on their cruises. Looking to the future, we recommend that the Center also consider:

Bringing ecosystem information into fish stock assessments, possibly including

- Influence of climatic and oceanographic conditions,
- Potential development of environmental covariates (e.g. SST, wind stress) and indicators,
- Evaluate the efficacy of incorporating environmental factors within current stock assessment modeling frameworks.

Ecosystem information for fishery management plan (FMP) stocks

- Work that can help answer questions on the effects of harvest on the larger ecosystem, the potential trade-offs of alternate management actions, and the utility of ecosystem indicators for long-term monitoring programs, such as:
 - Continued development of ecosystem-based models that incorporate environmental variation and anthropogenic disturbances to guide harvest policies and enable risk assessment for fishing strategies,
 - Continue examination and development of predictive habitat models to help understand the environmental conditions around catch of target species, non-targets and bycatch, particularly in the highly migratory species fisheries.



Evaluate the influence of climatic/oceanographic conditions on the population dynamics of FMP and non-FMP stocks (specifically bycatch species and protected species)

- Develop indicators to track that influence of these conditions on these stocks (eg. upwelling, sea surface temperatures, Pacific Decadal Oscillation, chl-a, zooplankton),
- Information to help understand short and long-term changes to the populations of these stocks in response to dynamic changes in climate and oceanographic conditions (climate change).

Improve understanding of commercial fishing fleets and of recreational fisheries' importance to coastal economies

- Improved understanding of the effects of shifting climate on income and fisheries participation is needed for the coastal pelagic and highly migratory species fleets;
- Continued evaluation of the role of recreational fisheries in the economies of California coastal communities;
- Continued participation in the development of social well-being indicators for California Current Integrated Ecosystem Assessment.

Improve understanding of how interactions within food webs affect species of commercial and conservation importance

- Current and growing need for predator/prey information that can inform harvest/annual catch limit decisions (i.e. do current/future fishing levels maintain adequate prey availability to meet predator forage needs.
 - Modelling approaches with existing data and diet information that can help understand the role of FMP species in the food web, including analysis of trophic interactions between predators and prey.
 - Improved data collection and improved processing of existing data, including comprehensive analyses of stomach contents data.

RESOURCES:

NMFS West Coast Region homepage and ecosystem-based management page, respectively:

<http://www.westcoast.fisheries.noaa.gov/index.html>

<http://www.westcoast.fisheries.noaa.gov/fisheries/ecosystem/index.html>

Pacific Fishery Management Council's Fishery Ecosystem Plan:

<http://www.pcouncil.org/ecosystem-based-management/fep/>