Southern California Coastal Ocean Observing System (SCCOOS)

Strategic Advisory Committee Meeting
February 24, 2009
The Ocean Institute, Dana Point, CA

Climate Impacts on Ecosystems
NOTES

The group had a wide-ranging discussion of how managers concerned with marine ecosystems can cope with climate variability and change (years to decades). A number of specific areas of possible SCCOOS involvement but two points made by advisors were overarching:

- Most potential users of SCCOOS products are swamped with their immediate duties. SCCOOS products will, therefore, be more useable when they include enough analysis to support for rapid evaluation and use.

- Users should not be confused by the proliferation of ocean observing efforts (e.g. PaCOOS, CeNCOOS, and SCCOOS). It is, therefore, important that these efforts be coordinated in order to make data available in the most coherent and unified way possible.

Fisheries Management: The group recognized that there are important statistical and causal relations between the climatically varying physical environment and the productivity and abundance of marine biota. They generally support the present SCCOOS ecosystem efforts (nearshore CalCOFI, repeated Underway CTD sections, glider transects, moorings) for slowly providing the time series with which (a) new relationships can be found and old ones improved, (b) stock assessments can be made more accurate by relating ecosystem sampling to the environment, and (c) the algorithms used to set catch limits can be improved by accounting for climatically varying environmental conditions (presently, these affect catch limits of only Sardine and Sablefish).

The nearshore CalCOFI stations recognized as valuable in extending a full suite of physical and plankton sampling into waters not reached previously sampled. Eggs and larvae that are collected are useful in assessments of certain species, but this utility is limited by an inability to readily identify many species in their egg or larval stages. This sampling is potentially valuable in assessing Market Squid, Halibut, Lobster, and Scorpionfish but the work to make use of these samples has not yet been done.

There were suggestions for new observations/analyses to support ecosystem management:

1. Exploitation of environmental factors in management depends on establishing the environmental factors that affect each species. One approach is to relate fish catch data to the conditions at the catch location. The SCCOOS data-assimilating model could reanalyze historical data to describe physical variables over a broad area and over enough years to develop some statistical reliability for relations with fish catch. This same effort would make it easy to extract other physical time series tailored to other climate analyses.

2. Relatively short approximately monthly sections sampling hydrography and plankton have been quite effective in defining the environmental and planktonic conditions that lead to Salmon success off Newport OR. Two similar lines are being planned for Northern California. It is suggested that the feasibility and utility of similar sampling in the Bight be examined and possibly a pilot study begun.

3. Integrated Ecosystem Assessments are a central part of the developing federal fisheries management approach and of the Western Governor's plan on Ocean Health. It is suggested that SCCOOS consider ways in which it could contribute to these comprehensive assessments which cover a large range of physical, biological and social factors along the West Coast.

Marine Protected Areas (MPAs): Dispersal of larvae is a central factor in the scientific basis for MPA siting and SCOOS has examined this dispersal both through models and with HF Radar surface currents. Nevertheless, the MPA siting process has ignored these capabilities. SCCOOS needs to do a better job making the MPA technical committee aware of what has been done and what else could be done quickly. This is an area in which SCCOOS should stay actively involved.

A substantially more complex problem would be to address the conservation effectiveness of protecting fixed areas when climate change may demand migration. While predicting biological responses is beyond present SCCOOS capabilities, efforts should be made to understand how well we might predict the effects of climate change on nearshore and estuarine environments. In a similar way, SCCOOS might partner with biologists to assess which species are most at risk to environmental change and what mitigation is possible.

Climate Change and Land-Use Planning: As a result of NOAA guidance, SCCOOS has narrowed its efforts to the present focus areas. The resulting program is poorly structured to address the nearshore processes that are affected by land-use planning (e.g. inundation, shoreline erosion, ecological consequences of sand transporting, and the effects of desalination or ocean energy projects). There is, however, a critical need to lay the scientific basis for future land-use permitting decisions in these areas. Essential to this is defining the controllable factors forcing ecosystem change and those species/locations that will need protection or restoration action.

SCCOOS developed around ocean physics and chemistry and is not well constituted to deal with the biological sampling and analysis needed, even more so because land-use issues tend to involve benthic or shallow-water species while SCCOOS's focus has been pelagic. SCCOOS is, however, suited to establishing physical baselines needed to define impacts, to predict how climate change might change these baselines, and to anticipate the physical consequences of human activities (sedimentation patterns from sand discharges, shoreline erosion, changes in wave and storm forcing). Specific areas in which effort might be invested include:

- **Sedimentation:** What will be the physical and biological consequences of various activities (like sand transport or storm water discharge) that accelerate the sedimentation rate, possibly of material foreign to the local ecosystem? Are there times or discharge mechanisms that minimize adverse impacts? How much will climate change increase the need for purposeful sand transport?

- **Wetlands:** How will changes in freshwater flows, sea level and storm waves affect different wetlands? What protection, buffer zones, restoration, or adaptation might be used to conserve wetland ecosystems?
- **Shoreline erosion:** Where will the effects of rising sea-level and increasing sea states first become critical and how fast? What land use strategies for these areas will be most effective (banning improvements, fortifying the shoreline, or let-the-builder be wary)?
- **Storm Water:** How might run-off controls or outfall siting reduce the ecosystem impacts of storm-water discharge, which are likely to increase with global change?
- **Harmful Algal Blooms (HABs):** What land uses affect HABs? What controls could be implemented?

It was agreed that this is a critical areas that challenges SCCOOS management to devise a program that provides the basis for future land-use management. There are many unanswered basic-science questions in this area as well as a management need that is growing rapidly.

Partnerships: It was recognized that there are only two realistic ways to grow SCCOOS into new areas: replace existing efforts (no candidates for elimination were identified) or to form partnerships that can win support that is not now available to the partners. Both NOAA and the State Conservancy have made it clear that SCCOOS will be judged on how well it meets users needs. It is a challenge to SCCOOS management to invest its present funds in a way that maximizes the ability to form effective partnerships with agencies and groups that have a demonstrable need for SCCOOS work. It is a challenge to these groups to find enough time to make the partnership effective and to explain to funders what practical needs are being met by the joint enterprise.