

Progress and Prospects for Connecting the Climate and Marine Ecosystem Communities: Predictions, Applications, and Decision-Making

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Marine ecosystems are strongly influenced by the physical environment including temperature, salinity, and mixed layer depth. Climate variability and change impact marine organisms directly through these physical variables and indirectly by influencing the location of nutrients such as nitrogen. Thus, marine biologists, fisherman, the seafood industry, and managers have a very strong interest in the climate system. NOAA's National Marine Fisheries Service (NMFS) is responsible for the stewardship of the nation's ocean resources and their habitat. NMFS manages fisheries and works to recover protected marine species under the Marine Mammal Protection Act and the Endangered Species Act.

There are several potential areas in which CLIVAR and the climate community can interact with NMFS, fishery scientists and the marine ecosystem community in general. These include:

- Integrated ecosystem assessment (IEA) as part of ecosystem based management (EBM). Managers are moving from managing single species based on their population toward a more holistic approach including the physical system and how it will change over time.
- Climate change is already impact marine ecosystems, e.g. many fish species are moving north or to deeper depths along the US east coast, and will likely have a large impact going forward. Observational analyses, and simulations with climate models and earth system models can provide useful information for the fishery community.
- Climate forecasts from sub-seasonal to decadal time scales.

I will discuss some of the opportunities and challenges of these research themes. Fishery scientists are eager to work with climate scientists but some of the challenges include: the knowledge base, or lack thereof, of each other fields; differences in the spatial scale the two communities are working at (e.g. "we have lobster data by county"); uncertainty in climate projections; and obtaining ecosystem relevant variables such as ocean bottom temperature.