



North Pacific Climate Regimes and Ecosystem Productivity



A Project of the NOAA Climate and Ecosystems Program

ISSUE

Alaskan fisheries account for approximately 50% of the US commercial fishery landings with a landed value of approximately \$1 billion each year. Global climate models predict climate change and variability will be most severe at high latitudes and there are many indications that environmental conditions are already changing in these regions. The need for resource management to account for this forcing mechanism is clear as changes in physical forcing in the region may drastically change the structure and functioning of the marine ecosystem and cause profound geographic shifts in species distributions. Predicting the probable consequences of global climate variability and change on Alaskan marine ecosystems and their valuable fishery resources and delivering the knowledge and predictive tools to fisheries managers, thus enabling the incorporation of climate impacts into the management of living marine resources in this region, is essential.



APPROACH

A sound ecosystem approach to management requires understanding how climate fluctuations affect the ecosystem. The North Pacific Climate Regimes and Ecosystem Productivity (NPCREP) study is building this understanding for the eastern Bering Sea and Gulf of Alaska by investigating the physical and biological controls on the ecosystems and how these are affected by climate variability and change. A combination of retrospective, monitoring, process and modeling studies are advancing the understanding of the impacts of climate on the fisheries in the region. NPCREP maintains a monitoring network that utilizes preexisting ecosystem and climate observations and supplements these with measurements critical to the success of the project. These observations are coupled with information from NPCREP retrospective and process studies, thereby generating the necessary foundation for understanding climate-ecosystem relationships. This is enabling the development and testing of indicators of climate impacts on the ecosystems and models to predict the probable consequences of climate change on the region. Researchers at the Alaska Fisheries Science Center and the Pacific Marine Environmental Laboratory, along with academic partners, are conducting the NPCREP study.

ACCOMPLISHMENTS

The NPCREP project was established in 2004. NPCREP is currently:

- Improving stock assessments of Alaskan fisheries by contributing to the development of climate-forced models that are used to improve recruitment predictions by NOAA Fisheries stock assessment scientists.
- Contributing to the development and operational generation of indices and assessment tools that are used by the North Pacific Fishery Management Council and its Plan teams in making recommendations for Total Allowable Catches of Alaskan marine fisheries. NPCREP contributes to 20 of these guidance tools that are used to refine management strategies through their incorporation into the Ecosystems Considerations chapter of the Stock Assessment and Fisheries Evaluation plan.
- Providing environmental and ecosystem data for the eastern Bering Sea via the Internet (www.beringclimate.noaa.gov) and will soon provide data for the northern Gulf of Alaska. This allows: the North Pacific Fishery Management Council to check for trends in the environment and modify management recommendations based on their findings; timely updates to climate and ecosystem indicators and; biological modelers working to improve recruitment predictions and stock assessments to incorporate recent data.



MANAGEMENT AND POLICY IMPLICATIONS

Through the increased understanding being obtained about the impacts of climate variability and change on the fisheries in the eastern Bering Sea and Gulf of Alaska, NPCREP is developing indicators of climate impacts on marine ecosystems and models to predict the probable consequences of global climate change on the eastern Bering Sea and Gulf of Alaska. As these products become available, they are delivered to fisheries managers at the North Pacific Fishery Management Council so that climate variability and change can be incorporated into the management decisions affecting the living marine resources in these regions.

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