Climate change and fisher behavior in the Bering Sea pollock trawl and Pacific cod longline fisheries

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Introduction

The two largest commercial fisheries in the US Bering Sea are the pollock and Pacific cod fisheries. In this paper, we build upon work that independently examined the impact of climate change on the pollock and Pacific cod fisheries. We examine how both fisheries have adjusted to economic and environmental variation since 2000 as well as environmental variation for the previous decade. This poster summarizes key results from this component of the Best-BSIERP Bering Sea Project.

Methods

1. Create a general conceptual framework for explaining the pathways through which climate impacts fisheries.
2. Integrate available data to be able to examine the primary relationships among the factors that affect fishing behavior.
3. Evaluate the fisheries’ responses to observed variation in 1) catch rates, 2) biomass, 3) prices, 4) observed climate variation.
4. Where appropriate, forecast the implications of these observed relationships on the fisheries with predicted future warming of the Bering Sea.


Key Finding # 1

The “march to the north” is not a consistent story.
• Vessels trade off costs and benefits of fishing in different areas. Spatial differences in prices and cold-pool-related catch rates provide mixed evidence of a northward shift in fishing effort.

Key Finding # 2

Vessels have many means by which to adapt to changes in fishing conditions that may be related to climate variation. 
• Location of fishing
• Timing of fishing
• Amount of travel
• Haul/set-level choices (e.g., fishing speed, soak/travel time, number of hooks).

Example, Pacific cod: Frequency of vessel moves in cold versus warm years. Persistence of vessels in a fishing area is lower in warm years. This is an adaptation to lower quality fishing due to a lower concentration of pollock caused by a small cold pool in warm years.

Key Finding # 3

Significant uncertainty remains about how future changes may impact these fisheries.
• The variation in historical data in climate conditions and fish abundance suggests a great deal of uncertainty about what will happen in future warm, low-abundance conditions that are expected to occur with greater frequency.
• Trends may change with management institutions.

Ongoing Research

Research on the relationship between climate, economic factors, the spatial behavior of fisheries, and management institutions in the Bering Sea pollock and BSAI Pacific cod fisheries continues.

Ongoing research includes:
• Refining spatial models of the fisheries and utilizing them as case studies for the Fisheries Spatial Economics Toolbox (FishSET).
• Assessing how the institution of cooperative management in the Pacific cod fishery impacts fishing behavior and metrics of fishery performance.
• Presenting work to other scientists and stakeholders.
• Completing additional manuscripts from the project.

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Project Papers for Further Reference

