



AYK SUSTAINABLE SALMON INITIATIVE

Project Synopsis

AYK REGION-WIDE



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(Christian E. Zimmerman)

WORK-IN-PROGRESS FUTURE CLIMATE/HABITAT OF ARCTIC-YUKON-KUSKOKWIM ECOSYSTEMS

PROJECT 714

PRINCIPAL INVESTIGATOR

Nicholas A. Bond
University of Washington

CONTRIBUTING ORGANIZATION

*National Oceanic
and Atmospheric
Administration*

RESEARCH PERIOD

May 2007 -
April 2008

BUDGET

\$143,683.00

PREDICTING SALMON ABUNDANCE

Eastern Bering Sea ecosystems are prone to dramatic changes in the abundance and distribution of shore and marine life including salmon species. This substantial variability occurs on multi-year time scales and much of it can be attributed to fluctuations in climate. The future state of the AYK tributaries and the eastern Bering Sea is clearly an important issue to stakeholders. Important questions such as the continuation of the recent warming trend and northward shift of ecosystems may be addressed using new climate model forecasts. The ability to project future climate states and improved knowledge of the response of the ecosystem and of salmon abundance to changes in climate can reduce the uncertainties facing stakeholders when preparing their contingency plans.

OUR OBJECTIVES

Provide ecosystem forecasts that are important to salmon abundance out to 2030 based on evaluations of climate model results for western Alaska.

Work with communities and other investigators to provide confidence estimates on future salmon abundance potential.

Create a community resource on past and future climate change issues through direct contacts and a website where communities and other investigators can view synthesized results and direct output from global climate model simulations.

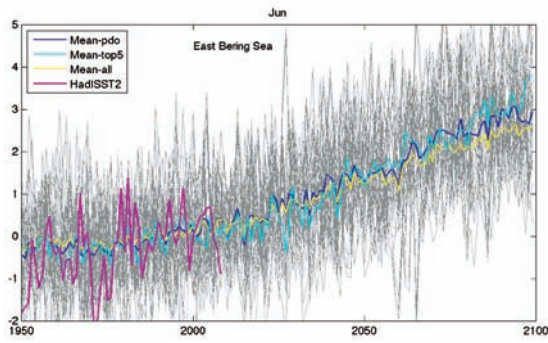
RESEARCH FRAMEWORK:

SYNTHESIS &
PREDICTION –
PRIORITIES #7 AND #8

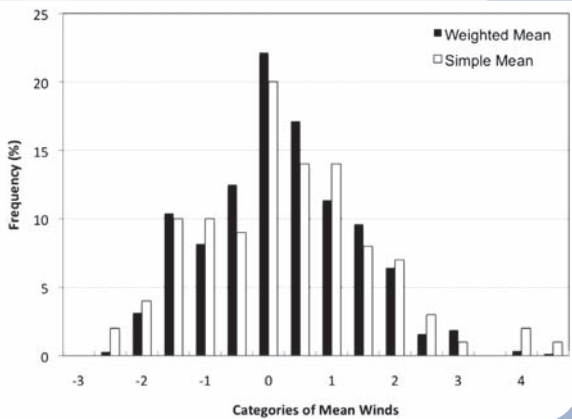
SNAPSHOT

This project will provide forecasts of the eastern Bering Sea ecosystem and salmon abundance from the present to 2030.

Current climate models will be analyzed for accuracy. The most accurate will be used to provide quantitative forecasts that focus on environmental conditions known—or suspected to be—important to Arctic-Yukon-Kuskokwim salmon abundance.



Projected Sea Surface Temperature (SST) anomalies for the eastern Bering Sea during June from ensemble members of 12 IPCC models (gray lines). The colored lines show ensemble means based on different numbers of model projections using the culling strategy. The magenta line indicates the observed value based on Hadley SST2 analysis. (Bond, UW)



Comparison of histograms between simple and weighted ensembles for onshore wind component projections in the southeast Bering Sea using 21 ensemble members and samples from five individual years (2043-2047). There is a shift in mean and a reduction in extremes when the influence of models with poor comparisons to observed winds are given reduced weight. (Bond, UW)

AYK SSI Mission: To collaboratively develop and implement a comprehensive research plan to understand the causes of the declines and recoveries of AYK salmon.

ARCTIC-YUKON-KUSKOKWIM SUSTAINABLE SALMON INITIATIVE

BERING SEA FISHERMEN'S ASSOCIATION
 110 W. 15TH AVENUE
 ANCHORAGE, AK 99501
 (907) 279-6519

HOW WE WILL DO IT

We will assess current models for their ability to successfully represent the present climate and habitat using environmental variables such as changes in precipitation, seasonal timing of runoff, temperatures, winds, and oceanic conditions in the eastern Bering Sea. We will include both human-caused and natural changes in our analysis. We will then use the most accurate models to catalog the mean, variability, and range in variables of known or suspected importance to salmon and the ecosystem from the present to 2030. Finally, we will work with salmon and ecosystem scientists to help build consensus forecasts for the future of the ecosystem and for salmon abundance using our projections of these environmental conditions.

REPORT COMPLETION

September 2010