(Jeanette Gann)

STOCK-SPECIFIC FORECAST OF ARCTIC-YUKON-KUSKOKWIM CHINOOK SALMON

PROJECT 632

PRINCIPAL INVESTIGATOR

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CONTRIBUTING ORGANIZATION

University of Washington

RESEARCH PERIOD

May 2006 - June 2008

BUDGET

$454,719.00

UNTANGLING SALMON POPULATIONS

Unanticipated poor returns of Chinook and chum salmon to Arctic-Yukon-Kuskokwim drainages have prompted 16 separate disaster declarations by the State of Alaska and federal agencies since 1997. Causes of these poor returns are not known. However, the regional-scale decline of these stocks indicates that the marine environment may play a critical role. In addition, survival rates in the Bering Sea are affected by groundfish trawl fisheries bycatch. Our understanding of marine survival of eastern Bering Sea salmon suffers due to the lack of marine life history information.

OUR OBJECTIVES

Develop a comprehensive baseline for western Alaska Chinook salmon by adding populations to the existing Pacific Rim standardized baseline and identifying a set of genetic markers that provide useful resolution for Bering Sea analyses.

Determine the stock composition of samples from the 2002 to 2007 Bering Aleutian Salmon International Surveys, from the 2005 to 2007 bycatch in the Bering Sea and Aleutian Islands pollock fisheries, and from historic bycatch collections, if usable.

Develop run reconstruction methods to forecast western Alaska Chinook salmon runs based on stock-specific data from juvenile surveys and trawl bycatch.

RESEARCH FRAMEWORK:
SYNTHESIS & PREDICTION – *PRIORITY #10*

SNAPSHOT

This project resulted in the most comprehensive assessment of the genetic structure of Chinook salmon in the state of Alaska.

This baseline was used to estimate the contributions of 15 regional stocks to samples taken from commercial fisheries and research studies in the Bering Sea.

(Lisa Eisner)

(ADF&G Staff)

(ADF&G Staff)

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

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HOW WE DID IT

We conducted analyses on spawning samples from 25 populations from underrepresented regions of western Alaska and used the data to increase the existing database of Chinook salmon genetics to 165 populations from throughout the species range. We analyzed tissues from 4,000 Chinook salmon taken as bycatch in the 2005 to 2007 groundfish fishery, and 1,500 juveniles sampled from the 2002 to 2007 Bering Sea research cruises, in the laboratory using single nucleotide polymorphisms. We used this genetic information to estimate the origins of the Chinook salmon in the fishery, and resource samples to reconstruct the distributions of various Chinook salmon stocks in the Bering Sea.

WHAT WE DISCOVERED

This project provided the first stock-specific information available on the distribution of juvenile Chinook salmon from western Alaska during their initial period of life at sea, indicating that juveniles migrating into the Bering Sea from the Yukon, Kuskokwim, and Nushagak rivers remain segregated during their early marine life. Samples taken from the bycatch in the pollock fishery were not representative of the actual bycatch, but estimates were provided for assessing the impacts of this fishery on western Alaska populations.

PRODUCTS AND OUTREACH

The results of these analyses have been presented to scientific, management, and public groups. One peer-reviewed manuscript has been published and two more are in preparation.

WHAT'S NEXT?

The Alaska Department of Fish and Game, Gene Conservation Laboratory is continuing to build the baseline developed as part of this project. Populations from throughout the species range are being added and a major effort has begun to discover more genetic markers to provide additional resolution. This baseline is being used by the NOAA Auke Bay Laboratories to estimate the stock composition of Chinook salmon incidentally harvested in the ground fish fisheries of the Bering Sea and Gulf of Alaska.