



AYK SUSTAINABLE SALMON INITIATIVE

Project Synopsis

YUKON RIVER WATERSHED



(Laura Gutierrez)

PROJECT 702

PRINCIPAL INVESTIGATOR

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CONTRIBUTING ORGANIZATION

*Alaska Department
of Fish and Game*

RESEARCH PERIOD

May 2007 -
March 2011

BUDGET

\$1,292,384.00

WORK-IN-PROGRESS ECOLOGY AND DEMOGRAPHICS OF CHINOOK SALMON

CHINOOK SALMON IN FRESHWATER

Yukon River Chinook salmon have a stream-type life history. Adults spawn in the fall. Fry emerge from the gravel the following spring, overwinter in the river, and migrate to the ocean after spending a full year in fresh water. Research on other species suggests the mortality that regulates Chinook salmon abundance may result from competition for space and/or food during the summer months juveniles spend rearing in freshwater. However, data on Chinook salmon is lacking, probably because they typically rear in large rivers, which makes the necessary fieldwork difficult.

OUR OBJECTIVES

Increase understanding of how ecological processes regulate population size and generate annual variability in the abundance of Chinook salmon in the Chena River. Specifically, to determine whether density-dependent mortality is due to competition among juveniles, the timing of any competitive bottlenecks during the summer rearing season, and whether competition for food is a factor.

Identify the influence of stream flow and other environmental factors on juvenile food availability and understand how they affect growth, condition, and the number of returning adults.

Predict juvenile Chinook salmon density using stream flow patterns and improve management analyses by including the effects of environmental conditions.

RESEARCH FRAMEWORKS:

SALMON LIFE CYCLE –
PRIORITY #2;

SYNTHESIS &
PREDICTION –
PRIORITY #8

SNAPSHOT

This project examines the ecological factors that affect juvenile Chinook salmon in the Chena River, including causes of juvenile mortality in freshwater.

This work will lead to improved stock-recruitment analyses that incorporate environmental processes to better predict optimal escapements and forecast future returns.



(Laura Gutierrez)



(Mark Wipfli)

HOW WE WILL DO IT

We plan to collect data on the abundance of post-emergent fry and fingerlings at four sites along the Chena River, upstream of the flood control dam, where rearing juveniles are most abundant. We will measure the growth and condition of juvenile fish to look for competitive bottlenecks, and record fish foraging behavior in response to food and competitive interactions. We will add food to four sites within the study areas to determine whether competition for food is a factor in growth and abundance. Data loggers will allow us to measure stream depth, temperature, dissolved oxygen, photosynthetically active radiation, and stream metabolism. We will also sample regularly for nutrients (nitrogen and phosphorus), algal and invertebrate biomass on the streambed, drifting invertebrates in the water column, and terrestrial invertebrate infall into the river.

REPORT COMPLETION

May 2011

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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