



AYK SUSTAINABLE SALMON INITIATIVE

Project Synopsis

KUSKOKWIM RIVER WATERSHED



(Christian E. Zimmerman)

PROJECT 619

PRINCIPAL INVESTIGATOR

James E. Finn
United States
Geological Survey

CONTRIBUTING ORGANIZATION

United States Fish and
Wildlife Service

RESEARCH PERIOD

May 2006 -
April 2009

BUDGET

\$269,989.00

SURVIVING FROM EGG TO SMOLT

Declines in salmon returns to western Alaska rivers in the late 1990s and early 2000s resulted in restrictions to commercial and subsistence fisheries. The reasons for these declines are unknown and difficult to identify due to a general lack of knowledge concerning salmon populations and their habitats within this region. Determining the relative importance of mortality in freshwater, estuarine, or marine habitats on spawning recruitment will aid fisheries managers in responding to declining salmon returns.

OUR OBJECTIVES

Estimate the population size and calculate egg-to-smolt survival of migrating juvenile chum salmon on the Kwethluk River.

Test our methods, which have not previously been used in the AYK region.

Determine the timing of migration and relative abundance of Chinook, coho, sockeye, and pink salmon.

HOW WE DID IT

In 2007 and 2008, we used floating, inclined-plane traps to catch migrating smolts. All caught fish were counted, and every third day, a subsample of 100 fish were also measured. We used mark-recapture methods to estimate the number of migrants passing the traps. We used these estimates along with estimates of potential egg deposition

**RESEARCH
FRAMEWORK:**
SALMON LIFE CYCLE –
PRIORITY #2

SNAPSHOT

The first study of this type in the AYK region, this project produced a method to calculate the egg-to-smolt survival of juvenile chum salmon on the Kwethluk River, a tributary of the Kuskokwim River.

Researchers also estimated the juvenile chum salmon population size, and relative abundance and migration timing of other salmon species.



(Christian E. Zimmerman)



(Christian E. Zimmerman)

to calculate the percent survival of juvenile chum salmon. We also monitored water depth and temperature at the trap site.

WHAT WE DISCOVERED

We estimated a 4.6% egg-to-smolt survival of migrating chum salmon smolts in 2007, and 5.2% survival in 2008. Fluctuations in water depth appeared to be the largest factor influencing the initiation of juvenile chum salmon migration. Similar to other studies, our study found that juvenile abundance for all species increased during high water events, and peak migration timing occurred during early morning. Peak migration occurred from mid-May through mid-June, which coincides with the timing from Yukon River tributaries. We found that our protocols, which we modified to accommodate conditions specific to the Kuskokwim River watershed, worked well. A sampling bias between the traps was identified in 2007 and rectified in 2008.

PRODUCTS AND OUTREACH

In addition to the final report (published as a USGS Open File Report), we are preparing a manuscript that compares survival of chum salmon on the Kwethluk River with survival estimates from a Yukon River tributary and other locations throughout the North Pacific. Outreach efforts include presentations to the Kuskokwim Interagency Fishery Meetings and presentations at scientific meetings.

WHAT'S NEXT?

Our project design may be useful in estimating abundance of other salmon species. Using this method to estimate the abundance of species with multiple age classes is possible if fish rear exclusively upstream of the trapping location. If juveniles migrate downstream to rear in other locations, estimates would need to account for survival in non-natal habitats. In addition, the population size would have to be large enough to provide an adequate number of marks for the abundance estimation.

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