



AYK SUSTAINABLE SALMON INITIATIVE

Project Synopsis

YUKON RIVER WATERSHED



(Jeffrey F. Bromaghin)

PROJECT 806

PRINCIPAL INVESTIGATOR

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Wildlife Service*

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*Alaska Department
of Fish and Game*

RESEARCH PERIOD

May 2008 -
March 2009

BUDGET

\$56,653.00

FEWER EGGS FOR YUKON CHINOOK SALMON?

Strategies for investing energy in the development of reproductive tissue, and optimizing the trade-off between total ovarian mass, egg size, and egg number (fecundity) are important determinants of salmon population productivity and individual fitness. A 2005 study found that the fecundity of Tanana River fish declined about 20% since 1989. Whether this reduction reflects a downward trend or a natural level of variability is unknown, though such a large and rapid decline raises concerns.

OUR OBJECTIVES

Initiate the first comprehensive investigation of the fecundity of Yukon River Chinook salmon populations. Specifically, to determine the degree to which fecundity differs among populations within the drainage and verify whether fecundity has decreased from historic levels.

HOW WE DID IT

We sampled 403 fish from the Alaska Department of Fish and Game Test Fishery catches in the lower Yukon River to avoid sacrificing additional fish, and to ensure that all populations would be represented. From each individual, we collected physical measurements, egg skeins, and tissue samples. We used genotype data to obtain separate estimates for different populations. We compared our estimates of egg numbers to those from previous Yukon River watershed studies.

RESEARCH FRAMEWORKS:

SALMON LIFE CYCLE –
PRIORITY #3;

SYNTHESIS &
PREDICTION –
PRIORITY #9

SNAPSHOT

This project looked at numbers of eggs per spawning female (fecundity) for Chinook salmon in the Yukon River.

Estimates were obtained for genetically distinct populations and compared with past studies. No evidence of declining fecundity was found, but researchers did find differences between lower and upper river populations with implications for fishery management.



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WHAT WE DISCOVERED

We found that small fish from the middle and upper portions of the drainage have markedly fewer eggs than small fish from the lower portions, suggesting that fecundity decreases with length of migration. We also found that the productivity of middle- and upper-river populations may be more dependent on the size of reproducing individuals than lower-river populations. Our estimates were considerably greater than those in the 2005 study and consistent with a 1987 study. We were unable to collect meaningful data on egg size and total ovarian mass since such measurements must be taken just prior to spawning. Our collection site on the lower river was too far from spawning areas to obtain this data.

PRODUCTS AND OUTREACH

Presentations were given at several meetings: the American Fisheries Society Alaska Chapter, Alaska Board of Fisheries, and for the AYK SSI. A draft manuscript is currently under review.

WHAT'S NEXT?

Our results suggest that a fish reproducing in the middle and upper reaches of the drainage may contribute less to subsequent generations than a similarly sized fish reproducing in the lower drainage. Fishery managers should be aware of these differences in reproductive potential.

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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