



# AYK SUSTAINABLE SALMON INITIATIVE

*Project Synopsis*

## AYK REGION-WIDE



AYK REGION-WIDE

(Christian E. Zimmerman)

## PROJECT 405

### PRINCIPAL INVESTIGATOR

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*Simon Fraser University*

### CONTRIBUTING ORGANIZATION

*ESSA Technologies, Ltd.*

### RESEARCH PERIOD

May 2004 -  
May 2005

### BUDGET

\$12,690.00

### A REPORT CARD FOR SALMON RESTORATION

The substantial reduction in abundance of salmon in the AYK region of Alaska during the last decade had a large effect on people in this region. Despite the lack of a clear answer about the causes, there have been many suggestions about possible actions to reverse the decline. Similar attempts elsewhere on the North Pacific Rim have produced mixed results. There have been some clear successes, some dismal and expensive failures, and other cases where the outcomes were unclear. Restoration actions should be viewed as experiments, where the intent is to determine, through manipulation of the ecological system and follow-up monitoring, which approaches best achieve management objectives.

### OUR OBJECTIVES

Compile a detailed overview of the principles of experimental design that are directly relevant to restoration efforts in the AYK region.

Combine these principles into a framework that can be used by managers to design projects, and by funding agencies to assess how easily the future effectiveness of proposed restoration activities for salmon can be evaluated.

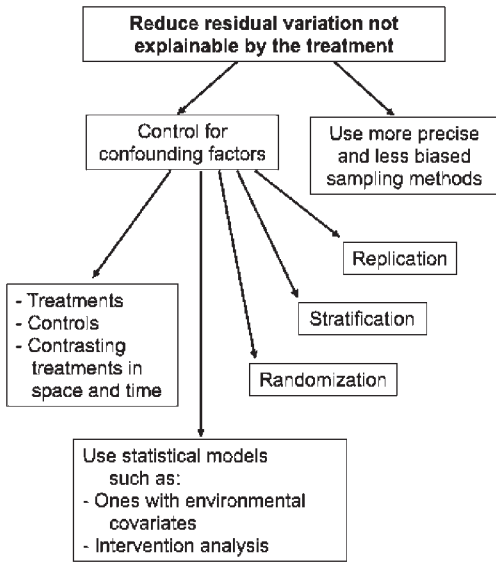
### HOW WE DID IT

We reviewed past experiences and literature.  
We developed our framework with two audiences in

**RESEARCH  
FRAMEWORK:**  
SYNTHESIS &  
PREDICTION –  
PRIORITY #7

### SNAPSHOT

This project reviewed past experiences and literature to develop a framework for the application of experimental design to salmon restoration projects in the AYK region. The framework will allow managers and funding agencies to evaluate the effectiveness of restoration actions and identify unpredicted negative effects.



Methods that could be used to reduce the residual variation that is not explainable by the treatment imposed; in particular, to reduce confounding factors. (Peterman, SFU)

**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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mind: those conducting restoration projects and those choosing which projects to fund.

**WHAT WE DISCOVERED**

All restoration actions should have at least two clearly stated main objectives: achieve results in terms of salmon abundance, and determine which restoration actions work best and which do not. Restoration projects should be coordinated to minimize unintended interactions between projects, and should be part of a larger experimental design using treatments and controls. A carefully designed monitoring and evaluation program including data collection, analysis, and dissemination should be used to determine how well the projects were implemented and whether they had the intended effects. We also found that restoration programs should address habitat-forming processes rather than merely rehabilitating site-specific conditions.

The benefits of applying defined experimental design principles would be substantial, but are challenging.

**PRODUCTS AND OUTREACH**

Our project evaluation framework is available for use by fisheries managers and funding organizations.

**WHAT'S NEXT?**

While implementing our recommendations can be expensive, there can also be enormous costs associated with not taking an experimental approach. For instance, unsuccessful projects may be allowed to continue or even expand. An even worse outcome might arise from counterintuitive negative effects of an action that is allowed to continue, such as diseases unknowingly being spread to wild stocks by supplementation with hatchery juveniles. Without a rigorous framework for evaluating restoration actions, such negative impacts will not be detected, let alone avoided in the future. By collecting data in the near future to test hypotheses about mechanisms causing change in AYK salmon abundance, people in the region will potentially be better able to respond relatively quickly to any future detrimental changes in that abundance.