



# AYK SUSTAINABLE SALMON INITIATIVE

## Project Synopsis

### NORTON SOUND AREA



(Christian E. Zimmerman)

# WORK-IN-PROGRESS NORTON SOUND CHINOOK SALMON GROWTH AND PRODUCTION

## PROJECT 807

### PRINCIPAL INVESTIGATOR

Greg T. Ruggerone  
*Natural Resources  
Consultants, Inc.*

### CONTRIBUTING ORGANIZATION

*Alaska Department  
of Fish and Game*

### RESEARCH PERIOD

May 2008 -  
March 2010

### BUDGET

\$74,187.00

### CHINOOK SALMON SCALES

Growth is a key factor affecting survival and life history characteristics of salmon. Using salmon scales, we will estimate annual growth of Unalakleet River Chinook salmon in freshwater and the ocean from 1981 to 2007. Growth estimates will be compared with ocean-climate shifts, trends in abundance, and age-at-maturation.

We expect that the Unalakleet River Chinook salmon scale data, along with our previous studies of Yukon and Kuskokwim river Chinook salmon scale growth, will improve our understanding of factors that influence abundance and life history traits (growth in relation to gender and age-at-maturation) of Norton Sound Chinook salmon, which are vital to the people of this region.

### OUR OBJECTIVES

Create a database using salmon scale measurements of Unalakleet River Chinook salmon growth during each year in freshwater and the ocean, for years 1981 to 2007.

Compare scale growth with indices of abundance, ocean-climate shifts, and with growth of Yukon and Kuskokwim river Chinook salmon.

Examine relationships between growth and age-at-maturation.

### HOW WE WILL DO IT

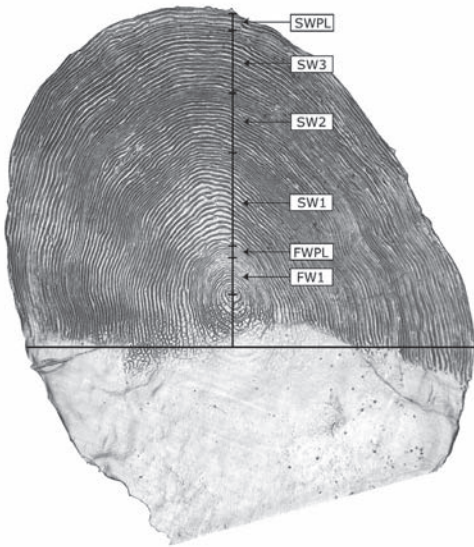
Routinely collected Unalakleet River Chinook salmon

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

### SNAPSHOT

Salmon scales record the annual and seasonal growth history of salmon in freshwater and ocean habitats. This project uses collections of adult Chinook salmon scales from the Unalakleet River as a means to cost-effectively reconstruct past growth of these salmon, which are vital to the people of Norton Sound.

NORTON SOUND



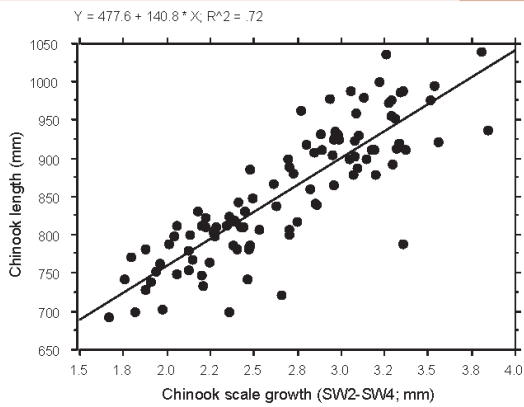
Salmon scale showing circuli and annual growth zones: FW1: first year in freshwater; FWPL: spring growth during smolt migration; SW1, SW2, SW3: growth during the 1st, 2nd, and 3rd years at sea; SWPL: growth during the homeward migration from the open ocean to natal river. Narrowly spaced circuli (black lines or ridges) represent winter transition periods when growth is slower. (Ruggerone, NRC)

scales were obtained from Alaska Department of Fish and Game storage facilities in Nome and Anchorage.

We will scan images of the scales to a computer and measure seasonal (circuli) and annual scale growth from 50 fish per year. These measurements will provide indices of how well these Chinook salmon grew during their single year in freshwater and each of three or four years at sea. These growth measurements will be compared with measurements of Yukon and Kuskokwim river Chinook salmon to identify differences and similarities.

## REPORT COMPLETION

September 2010



In previous work, Chinook salmon length and scale radius measurements taken from Yukon and Kuskokwim river salmon were positively correlated. (Ruggerone, NRC)

**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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