**FY 2000 Subsistence Fisheries Project Narrative**
**Project # 43**

**Title:** Klawock Lake Sockeye Salmon Stock Assessment

**Investigator Organization(s):** Alaska Department of Fish and Game
**Geographic Area:** Southeast Alaska
**Information Type:** Stock Status/Trends

**Issue Addressed:** Klawock River (ADF&G stream #103-60-047) sockeye salmon are in a depressed state and escapements have dropped from a historical high of a 63,000 fish return observed in 1936 to 10,000 fish or less during the past 20 years. Since 1985, annual subsistence sockeye salmon harvests have ranged from 1,000 to 7,600 fish, though typically harvests of between 1,700 to 3,000 fish are more common. Discussion at a public meeting February 26, 2000 centered on the terminal harvest of sockeye salmon at the Klawock Bridge, how best to rebuild Klawock sockeye returns, and a consensus reached at the meeting to increase sockeye salmon escapement. There is a long history of salmon enhancement efforts at Klawock dating back to the early-1900s and a recent history of extensive logging in the watershed; both activities likely have had an impact on the natural production of salmon.

**Study Objectives:**

1) Estimate sockeye escapement into Klawock Lake including development of a long-term escapement index using foot surveys of spawning ground escapements.
2) Enumerate sockeye rearing densities using hydroacoustics and mid-water trawling to determine juvenile survival for spawner-recruit assessment.
3) Compare the lake productivity for survivability of current rearing fry populations versus carrying capacity of Klawock Lake.
4) Compare sockeye smolt size and age to size and age optimum for marine survivability.
5) Review historical fish culture operations and practices, fishery harvests, and habitat alterations for possible impacts on the wild sockeye resource.

**Project Description:**
Completion of this project will address all facets of the Klawock sockeye salmon stock that will enable the investigators to suggest possible remedies to return this stock to higher production levels with an end result of allowing for higher subsistence harvest.

*Objective 1:* Field staff will operate the hatchery weir daily from July 1st to September 30th each year. Based on historical weir information from the Klawock weir, over 98% of all sockeye are counted during this time period (ADF&G Alexander database) All sockeye enumerated at the weir will be adipose fin-clipped for recapture assessment on the spawning grounds. Marking fraction may be reduced slightly during periods of high fish volume but all unmarked fish will also be enumerated. Age, weight, length, and sex sampling will also occur daily from a representative sample to assess size and age at return for calculating brood survivals. A recapture of marked fish will be initiated at the mouth of the three spawning streams in mid-August. Beach seining will occur once a week to capture live sockeye holding in these areas prior to spawning. Additional seining may occur near areas where in lake beach spawning occurs. This mark-recapture program will produce a Peterson estimate of total escapement and assess how many fish enter the system uncounted. In addition, a pre-planned series of four or five foot escapement surveys will occur on the spawning grounds to enumerate sockeye salmon. These surveys will be spaced approximately 7 to 10 days apart to cover the expected spawning time.

*Objective 2:* One annual survey to assess the fall rearing population of sockeye salmon in Klawock Lake will be made between August and October using hydroacoustics and mid-water trawling. Standard methods used by ADF&G since 1985 will be employed.

*Objective 3:* Four limnological surveys will be performed during the period May through October at two stations on Klawock Lake that are at the same locations as used from 1987-1989. Final analysis of these samples will be performed by the ADF&G, Commercial Fisheries Limnology Lab in Soldotna, Alaska by methods described in Koenings et al. 1987. Evaluation and consultation of this sub-project will also include limnological modeling to examine the potential carrying capacity of Klawock Lake using the ZB-EZD model (Zadina and Weller, 1999) and a comparison with current rearing populations.

*Objective 4:* Emigrating sockeye smolts will be sub-sampled at the Klawock Hatchery Weir during May each year. A fyke net with an attached floating trap will be operated daily to collect a representative sample for scales, length, and weight as described by Peltz and Haddix (1989). In addition a representative sample of sockeye smolts will be collected for otolith examination

(Zadina and Heinl, 1999). Otoliths will be examined at the ADF&G Coded Wire Tag and Otolith Processing Laboratory in Juneau using the half section technique (R. Berning, personal communication). The Klawock Hatchery is currently using a thermally induced program to identify all hatchery incubated fish. This examination will provide insight into the survival differences between hatchery and wild fish during the freshwater rearing phase.

*Objective* 5: Harvest data from this stock has not been consistently collected but some data are available. There is also a recent history of extensive logging in the watershed. These activities likely have had an impact on the natural production of salmon. Staff will research and review all historical information regarding fish culture and enhancement practices and compile the information in a report. Currently, the US Forest Service, in cooperation with the Tlingit and Haida Central Council, received a grant to begin a watershed council to address watershed issues and to conduct a field-based watershed assessment involving the spawning habitat. This portion of the project is ongoing and will contribute to our understanding of fish habitat conditions in the lake and tributary streams.

**Consultations Completed/Potential for Capacity Development:** Completed and conducting ongoing consultations between the Klawock Cooperative Association (Robert Brown), Craig Cooperative Association (Chrissy Torsey and Karla Yates), Forest Service (Dave Johnson, Mark Lehner, John Hannon), Department of Fish and Game (Bob Chadwick, Tim Zadina, and Dave Barto), Prince of Wales Hatchery Association (John Brunz), University of Alaska Fairbanks (Bruce Finney) and attendees at the most recent Klawock watershed council meeting.

**Deliverables/Products:**

1. An annual progress report will describe project accomplishments and results for the past year and any changes in project design or methodology and be submitted by April 1.
2. A final project report describing the fulfillment of project objectives will be submitted by Dec. 1, 2002.

**Costs:**

| Year | Non-agency | Federal Agency | Federal Local Hire | State Agency | State Local Hire | Total |
|---|---|---|---|---|---|---|
| 2000 | | | $6,000 | $158,000 | | $164,000 |
| 2001 | | | $31,000 | $167,000 | | $198,000 |
| 2002 | | | $31,000 | $167,000 | | $198,000 |
| Total | | | $68,000 | $492,000 | | $560,000 |