HISTORY OF LIMNOLOGICAL AND FISHERIES INVESTIGATIONS AT KLAWOCK LAKE, SOUTHEAST ALASKA

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By

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ABSTRACT

The Klawock River sockeye salmon *Oncorhynchus nerka* harvest monitoring and stock and habitat assessment project (Study Number FIS00-043) was initiated in 2001. The stock assessment project was implemented due to concern over the potentially depressed nature of that stock. This report summarizes all available historic fisheries information and data for the Klawock watershed. This review includes historic information and data on the study site, limnology, hatchery activities, commercial and subsistence harvest history, stock assessment, and watershed assessment. This information will be used to evaluate the current status of the sockeye stock and to identify potential limiting factors in sockeye production. Any limiting factors identified by this project may be further investigated to identify appropriate steps to facilitate stock rehabilitation process.

Key words: sockeye salmon, *Oncorhynchus nerka*, Klawock River, Klawock Lake, Prince of Wales Island, stock assessment, limnology, zooplankton, hatchery, harvest, subsistence, watershed assessment, escapement, hydroacoustics.

INTRODUCTION

The Klawock Lake sockeye salmon stock *(Oncorhynchus nerka)* has been important to all fishers of the area for over 100 years. A number of activities have had an impact on the natural production of sockeye salmon in this system. The well-documented pattern of extensive salmon harvest at the turn of the century probably initiated the decline of salmon stocks in this region. The North Pacific Trading and Packing Company began harvest and cannery operations at Klawock in 1878. Cannery operations recorded significant harvests between 1886 and the late 1920's with a peak take of 62,602 sockeye salmon in 1888. There is also a long history of hatchery operations at Klawock dating back to 1897 when the North Pacific Trading and Packing Company built the first hatchery. The original hatchery operated with a mixed degree of success until 1917 when it was abandoned. Moser (1898) and Roppel (1982) provide an excellent historical review of early harvest and hatchery activities associated with this stock. The State of Alaska, Department of Fish and Game, Fisheries Rehabilitation, Enhancement, and Development Division (ADF&G, FRED) built and operated a hatchery beginning in 1978. It was passed to private non-profit operations in 1996

Additional activities impacting Klawock River sockeye salmon include continued commercial and subsistence fishing, and a recent history of extensive road building and logging in the watershed. Since 1985, annual subsistence harvests have ranged from 1,000 to 7,600 sockeye salmon, with typical harvests of between 1,700 to 3,000 fish. Attempts to quantify the commercial fisheries harvest of Klawock Lake sockeye have met with very limited success. However, available data indicates that the commercial harvest was not a large proportion of the annual sockeye return. The Central Council Tlingit and Haida Tribes of Alaska conducted an assessment of the Klawock Lake watershed in 2000. This project, funded by the U.S. Environmental Protection Agency (EPA), was implemented to quantify the effects of timber harvest, road building, and land development on the watershed and associated anadromous fish habitat. The U.S.D.A. - Forest Service (USFS) provided assistance through an interdisciplinary Watershed Assessment Team on a Proper Functioning Condition (PFC) assessment of the streams and wetlands in the Klawock basin.

A sockeye stock assessment including limnological studies was conducted from 1986 through 1988 with funding from the U.S. Canada Pacific Salmon Treaty. This included lake productivity, juvenile population assessment (hydroacoustics), smolt evaluation that included coded wire tagging for adult survival evaluation, and evaluating adult returns to complete this brood cycle. In addition pre-smolt hydroacoustic surveys were accomplished in 1995 and 2000 as requested by the Klawock Hatchery.

The Alaska Department of Fish and Game (ADFG) participated in a public meeting in Klawock on February 26, 1999. The discussion centered on local public concerns of Klawock Lake sockeye stock depletion and how best to rebuild adult returns. A great deal of the discussion centered on the terminal harvest of sockeye salmon at the Klawock

Bridge, located at the mouth of Klawock River. A general consensus was reached that control of the number of fish taken at the mouth of the river would allow for increased escapement and assist in the rebuilding of the sockeye salmon stock.

Annual Klawock River sockeye salmon escapement estimates have dropped from a historical high of 63,000 fish return observed in 1936 to 10,000 fish or less during the past 20 years. There are currently no detailed stock assessment programs for Klawock Lake sockeye salmon. The current sockeye salmon stock assessment project was implemented to provide a detailed evaluation of the status of this stock. The information provided by the evaluation will be used to address local concern over the potentially depressed state of the sockeye salmon run. Objective 6 of the study is a review of all Klawock River fisheries data. This review examines fishery harvest data, habitat alterations, historical fish culture operations and practices, and their implications on the status of the current sockeye resource.

STUDY SITE

The Klawock River system (Alaska Department of Fish and Game stream number 103-60-047) is located on the southwestern side of the Prince of Wales Island (55° 32' 58" N, 133° 02' 39" W). The lake has a surface area of 1,176 ha, an elevation of 9.1 m, a mean depth of 17.7 m, and a max depth of 49 m (Figure 1). The lake water is organically stained and has a volume of 209 * 10^6 m^3. The mean euphotic zone depth is 4.2 m based on 86-88 data. There are four tributaries to Klawock Lake; Hatchery Creek, Half-mile Creek, Three-mile Creek and an unnamed creek at the head of the lake. The lake empties into Klawock Inlet via the Klawock River. Native fish species include cutthroat trout (*Oncorhynchus clarki* spp.), Dolly Varden (*Salvelinus namaycush*), three spine stickleback (*Gasterosteus aculeatus*), cottids (*Cottus* sp.), steelhead (*O. mykiss*), and pink (*O. gorbushka*), chum (*O. keta*), coho (*O. kisutch*), and sockeye (*O. nerka*) salmon. Historical high salmon escapement estimates by species are presented in Table 1.

PROJECT SPONSORSHIP

Funding for the Klawock Lake sockeye salmon stock assessment and limological program was provided by the United States Forest Service through the Alaska Department of Fish and Game and the Klawock Cooperative Association. This annual report fulfills contract obligations for Sykes Act Contract Number 43-0109-0-0111.

LIMNOLOGY

Limnological evaluation data was collected in 1974 (ADFG 1974), 1986-88 and again in 2000. Limnology samples collected during 1986-88 and 2000 were collected at two stations designated A and B (Figure 1). Parameters were measured as defined by Koenings, et al. 1987 that included temperature, zooplankton species composition, density, and biomass. Water quality parameters included conductivity, pH, alkalinity, turbidity, color, calcium, magnesium, iron, total phosphorous (TP), total filterable phosphorous (TFP), filterable reactive phosphorous (FRP), total kjeldhal nitrogen (TKN), ammonia, nitrate plus nitrite, total nitrogen (TN), reactive silica (RSi), carbon, total particulate phosphorous (TPP), chlorophyll *a*, and phaeophyton *a*. A detailed summary of this limnology data is presented in Appendix 1.

Euphotic zone depth

Measurements of under water light penetration (footcandles) were recorded during the years 1986-88 and 2000 at both stations on Klawock Lake. The seasonal mean euphotic zone depth (EZD) was calculated for each year that light data were collected (Table 2). Measurements were taken at 0.5 m intervals, from the surface to a depth equivalent to one percent of the subsurface light reading, using a Protomatic submarine photometer. Vertical light extinction coefficients (K_d) were calculated as the slope of the light intensity (natural log of percent subsurface) versus depth. The euphotic zone depth (EZD), the depth to which 1% of the subsurface light (phototsynthetically available radiation [400-700 nm]) penetrates the lake surface (Schindler 1971), was calculated from the equation: $EZD = 4.6205 / K_d$ (Kirk 1994). Euphotic volume (EV) is the product of the EZD and lake surface area and represents the volume of water capable of photosynthesis.

Temperature and Dissolved Oxygen

Water temperature and dissolved oxygen vertical profiles were collected in Klawock Lake during the years 1974, 1986-88, and 2000. Profiles for the year 2000 are presented in Figure 2 and 3. Examination of temperature data indicates that Klawock Lake is generally stratified during the summer with a peak recorded epilimnetic temperature of 17 °C. Temperatures may exceed that value with a temperature of 18 °C reported in 1897 at the outlet stream when lake surface water was used in the hatchery near the outlet. Hypolimnetic temperatures varied between 5 and 7 °C at station B, the deeper of the two

sample stations. Isothermal conditions throughout the water column in the spring and fall suggest that the lake is monomictic. Dissolved oxygen levels range between 70% and 90% saturation (6.0 and 11.0 $mg*L^{-1}$) with a low of 42% saturation (5.13 $mg*L^{-1}$) at a depth of 25 m with a temperature of 7.4 °C recorded at Station A on 27 June 2000.

Zooplankton

The zooplankton assemblage of Klawock Lake was sampled in 1973-74, 1986-88, and 2000. The population is dominated by copepods (Cyclopoida) followed by cladocerans (Bosmina sp) (Figure 4 and 5). This species composition held during all years that zooplankton data were collected. Additionally, a species of mysid shrimp (*Neomysis mercedis*) have been confirmed in samples collected in 1973-74 and more recent sample efforts (Zadina, personal communication).

HATCHERY HISTORY

In recognition of the monetary potential of the Klawock River sockeye population, the North Pacific Trading and Packing Company attempted to enhance the sockeye run by building a hatchery in 1897. Early hatchery operations were plagued with problems. The original Klawock hatchery was located at the outlet of Klawock Lake. During the first year of operation problems with the water supply resulted in only 800,000 sockeye fry produced from 2,023,000 eggs. The water was obtained from lake surface waters, which that year averaged 19 °C. In order to correct water supply problems the hatchery was relocated to Three Mile Creek the next year. The hatchery had a capacity of 3,600,000 eggs until 1908 when it was enlarged to a capacity of 8,000,000 eggs. There were ongoing problems with hatchery operations including difficulties with freezing of the water system and eggs. No fry were held until the free-swimming stage nor was there an attempt to feed fry during the first sixteen years of operation. Releases were conducted by dumping buckets of 20,000-25,000 sac-fry into lake margins and shores of islands in depths of three to five feet. The Bureau of Fisheries did not endorse this method and repeated attempts to have fish held longer met with no alteration of hatchery operations. From 1897 to 1916 egg takes averaged 3,000,000 eggs with a maximum of 7,822,000 eggs taken in 1916. This hatchery was abandoned in 1917.

The most recent hatchery efforts began in 1978 when ADF&G, Fisheries Rehabilitation, Enhancement, and Development (FRED) Division built the current hatchery. This hatchery was initially operated as a chum and coho salmon production facility with steelhead trout and sockeye salmon production added in 1980. Administration and

operation of the FRED hatchery was transferred to the Prince of Wales Hatchery Association in 1996.

The first sockeye culture was performed in 1980 when there were 71,930 sockeye salmon eggs collected as part of a wildlife vaccine program. Sockeye not used in that program (18,364 fish) were subsequently released into the lake system. Sockeye salmon production began as an ongoing program in 1987. The sockeye production and stocking history for the Klawock system is presented in Table 3. The current hatchery has produced a total of 11,424,920 sockeye ranging from 200,000 to 2,730,000 annually. A variety of release strategies were employed including emergent unfed-fry, fed fry, pre-smolt, and smolt.

Coho salmon represent the majority of production at the Klawock River Hatchery with over 15,000,000 fish produced to date. Coho are used in a cost recovery program, providing funds for facility management and operations. A variety of release strategies were employed including emergent unfed-fry, fed fry, pre-smolt, and smolt. Net pens have been used to hold and feed fry, pre-smolt and smolt. There was concern that releasing large numbers (greater than 1,000,000) juvenile coho into the lake would negatively impact the juvenile sockeye population. Coho production history is presented in Table 4. A weir has been operated in conjunction with hatchery activities and provides a conservative estimate of fish escapement Table 5. The weir is discussed in greater detail later in this paper.

LAKE REARING MODEL

This report uses the ZB-EZD model (Zadina and Weller 1999) that utilizes zooplankton biomass and euphotic zone depth to estimate the potential sockeye salmon fry rearing capability of the lake.

$$SB = 1.95(ZB) + 15.5(EZD) - 183.0;\ r^2 = 0.94$$

Where SB = total smolt biomass ($kg*km^{-2}$), ZB = zooplankton biomass ($mg*m^{-2}$), and EZD = euphotic zone depth (m). The total potential smolt biomass is estimated by multiplying the calculated SB by the total lake area (km^2). The lake surface area used for Klawock Lake is 11.76 km^2. Maximum smolt production assumes an individual fish size of 2.4 g. Optimum smolt production assumes an individual fish size of 4.0 g. The potential number of smolt produced at Klawock Lake is estimated by total smolt biomass estimate divided by either 2.4 g or 4.0 g, respectively (Table 6).

This model, based on current physical and biological information, allows a comparison of the predicted potential to the actual sockeye salmon fry rearing population (estimated from hydroacoustic sampling). The survival rate from fall rearing fry to smolt is assumed to be 70%. The potential fall fry population (the number of fry the lake can support) is estimated by taking the maximum or optimum smolt production and dividing by 70% (Geiger and Koenings 1991). A

second comparison may be made using the estimated fall biomass and the predicted potential total lake sockeye biomass. Both of these comparisons are presented as percent of total lake capacity (Table 7).

EARLY COMMERCIAL HARVEST HISTORY – PRE-STATEHOOD

The Klawock Lake system has a long history of harvest and hatchery activities. The oldest cannery in Alaska was located at Klawock, operated as a saltery until 1878 when it was purchased by the North Pacific Trading and Packing Company. This company built a cannery that same year, initiating the salmon packing business in Alaska. The principal sources of supply of sockeye were Hetta Lake, the home stream (Klawock River), and Sarkar River. During early operation the cannery packed between 12,000 and 16,000 cases of sockeye salmon per year (with approximately 13 fish per case). Moser (1898) estimated that in the early days of the fishery 80,000 sockeye could be taken annually. During the ten years of active harvest prior to 1898 the mean annual harvest was 41,700 sockeye (Figure 6). In 1896 a second cannery at Hunter Bay began operation and increased harvest pressure on streams on the south end of Prince of Wales Island.

SUBSISTENCE HARVEST

Subsistence salmon permits for Klawock Lake salmon stocks are issued by the ADFG, Commercial Fisheries Division, Ketchikan Area Office. Current records for subsistence harvest have been recorded since 1969. Individual and household possession limits have varied during this period. However, current permit conditions allow for individual and household possession limits of ten and twenty fish, respectively. The current legal subsistence gear in this area includes; hand purse seines, beach seines, and dip nets. The subsistence fishery is open continuously each week starting Monday at 8AM and ending Friday at 5PM. The fishing season begins July 7 and ends July 31, annually. The majority of the harvest (>90%) is taken in the estuary but the entire Klawock Lake drainage is open for subsistence fishing. The reported catch of sockeye salmon and the total number of permits issued have fluctuated annually since 1969. However, the reported catch per unit effort (CPUE; the catch per returned permit) has been stable since 1969 (Figure 7). The subsistence harvest for sockeye and other salmon is further detailed in Table 8.

COMMERCIAL HARVEST – SINCE STATEHOOD

Efforts to estimate the commercial harvest component of Klawock River sockeye salmon using coded wire tags (CWT) have proven problematic. Hatchery reared Klawock Lake sockeye salmon were coded wire tagged as fry, pre-smolts, and/or smolts from 1988-98. During that time there was a total of 215 thousand CWT fish released from the hatchery (Table 9). A total of 11.6 million sockeye were released in conjunction with those tagged fish (Table 3). Select tag recovery was conducted at the hatchery invalidating expansion of tags recovered in the commercial fisheries. Additional problems include low tag recoveries in the commercial fisheries and the majority of commercial caught tagged fish were delivered to remote transfer stations that incorporated fish from multiple districts. A total of 66 tags in the commercial fishery and 87 tags at the weir (Table 10) were recovered out of that 215 thousand fish. These efforts have yielded little useful information. The ADFG does not recommend this method and has discontinued sockeye coded wire tag efforts because of these problems and budgetary constraints.

PATHOLOGY

Pathology tests were performed on Klawock River hatchery fish. The most common fish health problems tested for include; Aeromonas salmonicida, bacterial kidney disease, gas bubble disease, gill hyperplasia, infectious haemopoietic necrosis. Other fish infections and diseases examined and tested for include; Tricophrya piscium, Cytophaga, Pseudomonas, Aeromonas, psychrophila, Micrococcus, Furunculosis, costia, flexibacter, and epizootics. Tests were periodically conducted from 1978 to 97. The results of pathology work performed on sockeye and coho are presented in Table 11 and 12 (Theodore Meyer personal communication).

HISTORICAL STOCK ASSESSMENT AND RESEARCH

Klawock Weir

A weir has been operated intermittently at the Klawock Hatchery from 1977 to 1992 primarily for obtaining hatchery brood stock (Table 5). Species counts for these years represent a minimum escapement because once brood stock collection goals were obtained the weir was removed. That allowed all species of salmon to move freely and uncounted into the lake. The numbers presented for the years 1968-88 are expanded through extrapolation from run timing data (Figure 8, Appendix 2). Occasional flood

events also allowed uncounted fish to pass the weir when it was in operation. The highest estimated sockeye escapement occurred in 1936 with a total escapement of 65,314 fish counted at the weir. The ten-year average escapements estimates from recent weir data of 6,600 sockeye. Pink and chum salmon estimates were generated from foot surveys of the Klawock River below the weir. The majority of pink and chum salmon spawn below the weir. Therefor, weir counts for pink and chum salmon are not representative of the entire population. In some years pink and chum salmon escapements were estimated by foot surveys.

Rearing Juvenile Sockeye Salmon Population assessment

The distribution and abundance of rearing sockeye salmon fry was estimated by hydroacoustics and mid-water trawl sampling conducted in the fall using the same methods described by Zadina and Weller (1999) or Barto and Cook 1995 for earlier surveys. Data for all hydroacoustic and mid-water trawl sampling is summarized Table 11. The mean juvenile sockeye population estimate for nine years that surveys were conducted is 500 thousand.

WATERSHED HABITAT ASSESSMENT

The Central Council Tlingit and Haida Tribes of Alaska with the assistances of the USFS conducted a Proper Functioning Condition (PFC) assessment of the Klawock Lake watershed (2001) in order to identify potential limiting factors in freshwater fisheries habitat. The Klawock watershed is 29,150 acres and composed of approximately 41% wetlands with the rest of the area historically covered by mixed conifer forest. A draft report of the PFC conducted on 9.4 miles of Three-Mile and Half-Mile Creeks discusses the results of that work (Table 13). Half-Mile Creek was rated as Proper Functioning Condition (PFC). Three-Mile Creek was rated as Functional at Risk (FAR) due to several factors. Problems typically identified in this assessment include excessive erosion and/or deposition, lack of channel stability, upland watershed degradation, stream bank and upland harvest, lack of large woody debris (LWD) and LWD recruitment potential, and absence of riparian and wetland plants to protect banks. Inlet and Hatchery creeks were rated as PFC. There are, however, Not Functional (NF) and FAR reaches with in each sub-basin.

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TABLES

Table 1. Klawock Lake system historical high salmon escapement estimates.

Species	Historical High	Year
Pink	1.4 million	1930
Chum	265 thousand	1932
Sockeye	65 thousand	1936
Coho	17 thousand	1959

Table 2. Euphotic zone depth (EZD) by station by month and yearly mean for Klawock Lake, 1986-2000.

Date	Station A	Station B
May-86	6.12	na
Nov-86	3.14	2.67
1986 Mean	4.63	2.67
Apr-87	4.60	5.66
Nov-87	2.79	2.50
1987 Mean	3.69	4.08
Mar-88	2.92	na
Aug-88	Na	3.83
Nov-88	3.03	3.42
1988 Mean	2.97	3.63
May-00	4.72	4.20
Jun-00	5.21	4.82
Aug-00	4.72	4.07
Sep-00	3.62	3.95
2000 Mean	4.57	4.26

Table 3. Summary of recent hatchery sockeye releases by strategy and totals.

Release	Emergent Fry	Fed Fry	Fingerling	Presmolt	Smolt	Unknown	Total
1980		18,364					18,364
1987	809,000					20,693	829,693
1988	592,565					20,609	613,174
1989	2,426,132		44,552				2,470,684
1990	99,652	104,039					203,691
1991			196,846	19,733			216,579
1992	446,766		701,587				1148,353
1993	278,760			197,712			476,472
1994			532,180				532,180
1995	2,616,462	100,000			11,739		2,728,201
1996	300,000	24,000					324,000
1997		245,021					245,021
1998			581,047				581,047
1999	868,025						868,025
2000	6,167	353,264					359,431
Total	844,3529	844,688	2,056,212	217,445	11,739	41,302	11,614,915

Data retrieved from the ADFG tag lab database 15 March 2001.

Table 4. Summary of Klawock hatchery coho releases.

Year Released	Coho
1980	13,319
1981	36,537
1982	66,163
1983	121,768
1984	854,504
1985	1,131,000
1986	855,000
1987	926,000
1988	1,005,000
1989	2,320,521
1990	633,764
1991	1,508,254
1992	640,914
1993	485,941
1996	1,324,704
1997	Na
1998	622,143
1999	1,330,102
2000	435,742
2001	1,596,381
Total	15,907,757

Table 5. Summary of fish passed at the Klawock River weir.

Year	Sockeye	Coho	Pink	Chum
1930	7,044	13,240	1,412,912	15,615
1931	34,184	6,322	535,748	151,543
1932	57,294	7,052	181,734	264,793
1934	16,374	7,341	406,163	16,402
1935	20,028	6,955	425,180	39,924
1936	65,314	9,382	594,692	37,416
1937	33,544	2,578	572,271	13,625
1938	15,368	4,398	357,751	22,209
1968	13,242	5,272	66,836	85,281
1969	1,557	1,135	62,336	66,079
1970	7,213	3,467	100,740	111,111
1971	11,580	2,718	54,543	905
1977	4,771	4,015	39,655	12,670
1982	4,872	3,406	4,654	182
1983	872	4,371	17,765	1,115
1985	1,042	14,547	Na	na
1986	19,636	4,665	1,493	4,599
1987	7,844	11,286	5,591	3,706
1988	6,453	4,970	998	6498
1999	5,310	18,544	289,139	21,831
2000	9,428	13,336	9,271	20,824

Table 6. The predicted optimum and maximum number (in millions) of smolt produced at Klawock Lake as calculated using the ZB-EZD model.

Optimal fall fry population

	Station A	Station B	Mean
1986	1.4	1.3	1.3
1987	1.0	1.0	1.0
1988	1.4	1.4	1.4
2000	4.1	4.1	4.1

Maximum fall fry population

	Station A	Station B	Mean
1986	2.3	2.0	2.2
1987	1.7	1.7	1.7
1988	2.3	2.3	2.3
2000	6.8	6.8	6.8

Table 7. The hydroacoustic population estimates presented with the estimated potential fall fry population (in millions) and the percent of the predicted potential total lake sockeye carrying capacity.

	Hydroacoustic	70% Optimum	70% Maximum	OPT %	MAX %
1986	911,000	1.3	2.2	69	41
1987	465,000	1.0	1.7	45	27
1988	350,000	1.4	2.3	25	15
2000	311,000	4.1	6.8	7	4

Table 8. Summary of Klawock subsistence salmon harvest by species from 1985-2000.

Year	# of permits	Sockeye	Coho	Pink	Chum
1969	40	1,663	Na	na	na
1970	40	998	Na	na	na
1971	55	454	Na	na	na
1972	91	2,278	Na	na	na
1973	104	1,226	Na	na	na
1974	90	2,043	Na	na	na
1975	98	2,287	Na	na	na
1976	109	1,701	Na	na	na
1977	118	2,408	Na	na	na
1978	145	1,695	Na	na	na
1979	151	4,053	Na	na	na
1980	193	4,275	Na	na	na
1981	264	7,265	Na	na	na
1982	419	12,404	Na	na	na
1985	138	2,336	0	10	107
1986	156	2,762	0	196	243
1987	117	2,118	0	150	150
1988	96	1,851	0	10	125
1989	122	3,088	0	139	45
1990	100	2,631	86	286	190
1991	77	1,989	24	298	57
1992	133	4,322	15	121	60
1993	162	5,763	29	260	63
1994	133	4,848	72	220	11
1995	118	3,489	1	111	133
1996	159	5,553	59	13	85
1997	126	4,746	2	173	3
1998	125	4,670	128	144	30
1999	123	3,509	49	99	127
2000	112	3,000	19	99	152

Data retrieved from ADFG ALEX/IFDB 10 October 2001.

Table 9. Summary of sockeye coded wire tagging efforts.

Year	Tag Code	Tagged	Tag Retention
1988	04-29-35	10,093	94.5
1988	04-29-36	9,611	96.8
1987	04-27-03	9,673	94.3
1987	04-27-04	2,700	98.7
1987	04-27-16	7,622	99
1990	04-01-01-09-15	7,782	80
1991	04-01-01-09-14	11,962	95.8
1991	04-01-02-05-05	8,053	96.4
1991	04-33-09	9,255	97.8
1991	04-33-10	10,198	99.3
1992	04-37-56	9,689	93.6
1992	04-37-57	9,129	91.6
1992	04-39-02	10,727	98.1
1992	04-39-03	9,069	97.4
1993	04-01-01-10-04	10,650	93.4
1993	04-01-02-05-06	9,766	88.7
1993	04-01-02-05-07	9,676	98.3
1995	04-39-62	1,195	93.8
1995	04-42-52	10,078	96.3
1997	05-31-24	24,062	96.5
1998	04-01-03-13-12	24,407	98.7
Total		215,397	

Data retrieved from ADFG tag lab database 10 October 2001.

Table 10. Summary of Coded Wire Tag recoveries by District, Gear, and Year.

District	Gear	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Grand Total
101	Drift				1								1
102	Purse								1				1
103	Purse										2		2
	Weir		13	21		2				4	7	3	50
	Sport		1										1
	Escape.				34				1	2			37
	Total		14	21	34	2			1	6	9	3	90
104	Purse	1		6	3		3	7	11	14			45
	Troll							1					1
	Total	1		6	3		3	8	11	14			46
Unknown	Purse		1	2	8		3						14
	Misc.				1								1
	Total		1	2	9		3						15
Grand Total		1	15	29	47	2	6	8	13	20	9	3	153

Data derived from ADFG tag lab database 10 October 2001.

Table 11. Summary of pathology for sockeye salmon at the Klawock Hatchery. A.SAL=Aeromonas salmonicida, BKD= bacterial kidney disease, INHV=infectious haemopoietic necrosis.

Year	Data	A. SAL	BKD	IHNV
1979	Sample Size			24
	# Positive			0
1986	Sample Size			40
	# Positive			37
1987	Sample Size			63
	# Positive			61
1988	Sample Size		178	95
	# Positive		25	1
1989	Sample Size			44
	# Positive			0
1991	Sample Size		5	11
	# Positive		5	0
1992	Sample Size		5	6
	# Positive		0	0
1993	Sample Size	5	1	5
	# Positive	5	0	0
1994	Sample Size			62
	# Positive			13
1995	Sample Size		5	10
	# Positive		0	0
1996	Sample Size			6
	# Positive			6
1997	Sample Size	60	60	68
	# Positive	0	9	63
Total Sample Size		65	254	434
Total # Positive		5	39	181

Table 12. Summary of pathology work conducted on coho at the Klawock hatchery. A.SAL=Aeromonas salmonicida, BKD= bacterial kidney disease, and FLEX=flexibacter.

Year	Data	A. SAL	BKD	Costia	FLEX	Hexamita
1982	Sample Size	10	10			
	# Positive	0	0			
1983	Sample Size	20	20			
	# Positive	0	0			
1984	Sample Size	14	14			4
	# Positive	14	0			1
1987	Sample Size	10		10		
	# Positive	0		5		
1989	Sample Size	7	159			
	# Positive	5	54			
1991	Sample Size					
	# Positive					
1992	Sample Size	6	4			
	# Positive	1	4			
1993	Sample Size	6	5			
	# Positive	5	0			
1994	Sample Size	10	15		10	
	# Positive	10	0		6	
1996	Sample Size	10	5			
	# Positive	5	1			
Total SampleSize		93	232	10	10	4
Total # Positive		40	59	5	6	1

Table 13. Summary of hydroacoustic and mid-water trawl abundance estimates of rearing sockeye salmon fry for Klawock Lake.

Date	Total Population Estimate	Species	Percent of Species	Total No. of Species	Age	Population	Mean Length (mm)	Mean Weight (g)
9/21/86	1,008,500	Sockeye	90.38%	911,529	0	911,529	46.1	1.04
		Stickleback	7.69%	77,577	na	77,577	74.3	6.50
		Sculpin	1.92%	19,394	na	19,394	66.0	3.00
3/24/87	503,000	Sockeye	92.59%	465,741	0	130,407	31.3	0.23
					1	316,704	52.6	1.48
					3	18,630	110.0	14.40
		Stickleback	3.70%	18,630	na	18,630	96.0	10.10
		Coho	3.70%	18,630	2	18,630	130.0	24.00
Smolt 87		Sockeye	100.00%		1	70.52%	79.2	4.27
					2	29.48%	115.9	12.81
Fry Stock	809,000	Sockeye	100.00%	809,000	0	809,000	28.1	0.15
7/08/87	Tow Net	Sockeye	95.65%		0	100.00%	37.0	0.55
	Only	Sculpin	4.35%		na	100.00%	35.0	0.40
10/22/87	311,400	Sockeye	87.50%	272,475	0	272,475	58.1	2.24
		Stickleback	12.50%	38,925	na	38,925	93.0	8.60
4/14/88	350,175	Sockeye	100.00%	350,175	0	112,056	29.5	0.21
					1	224,112	52.6	1.37
					2	14,007	101.0	9.70
Smolt 88	56,028	Sockeye	100.00%	56,028	1	45,852	87.1	6.03
					2	8,444	110.2	10.99
					3	1,732	129.4	17.42
10/26/88	375,000	Sockeye	97.06%	363,971	0	330,882	66.8	3.24
					1	33,088	87.3	7.53
		Stickleback	2.94%	11,029	na	11,029	108.0	12.70
4/20/95	382,791	Sockeye	84.09%	321,892	0	156,596	36.1	0.39
					1	121,797	70.9	3.04
					2	43,499	94.6	7.78
		Stickleback	15.91%	60,899	na	60,899	82.9	5.73
9/7/2000	311,289	Sockeye	100.00%	311,289	0	311,289	48.0	0.84

Table 14. Summary of Proper Functioning Condition assessment results.

PFC Category	Half-mile Cr.	Three-mile Cr.	Total miles
Non Functional	Na	2.7	2.7
Functional at risk w/ downward trend	Na	2.8	2.8
Functional at risk w/ no trend	Na	0.5	0.5
Functional at risk w/ upward trend	Na	1.1	1.1
Proper Functioning Condition	1.6	0.7	2.3

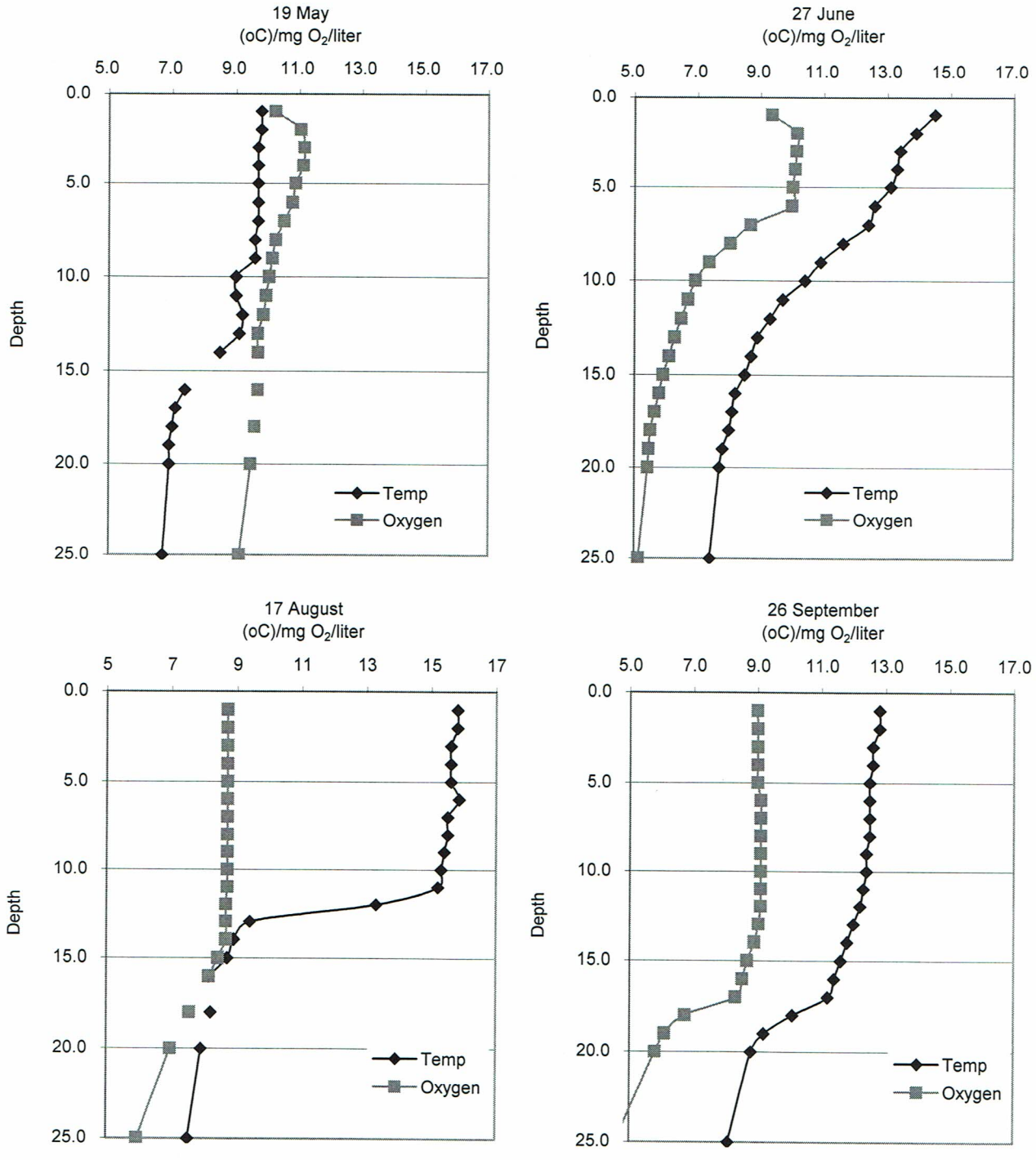
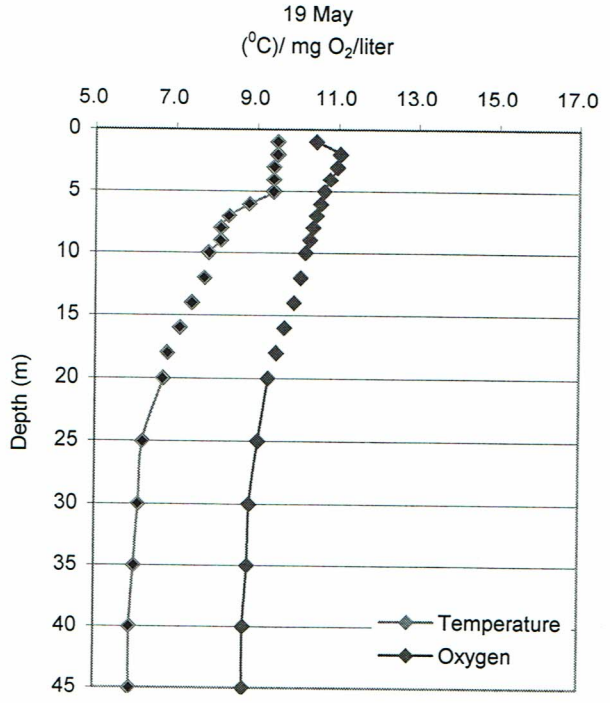
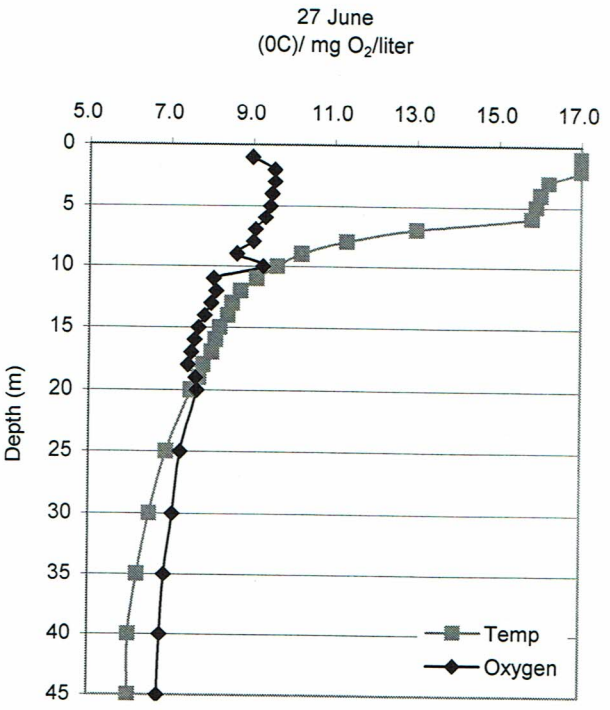
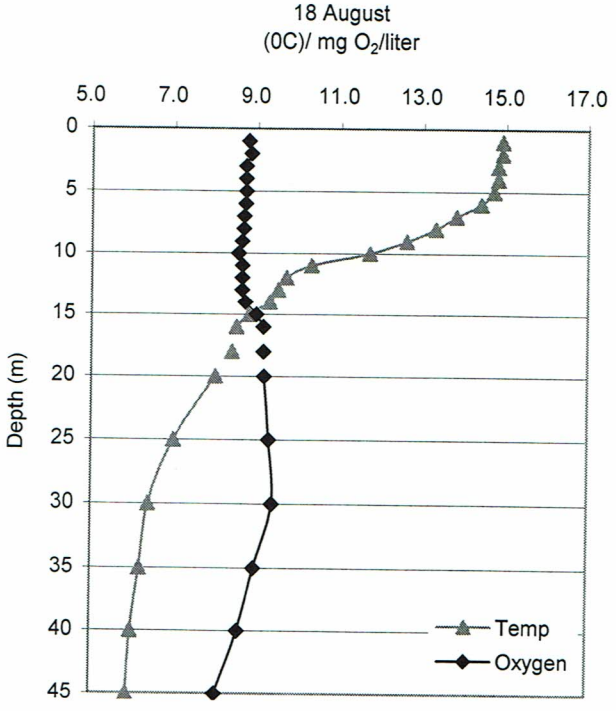


Figure 3. Temperature and dissolved oxygen profiles for Station A on Klawock Lake during 2000.







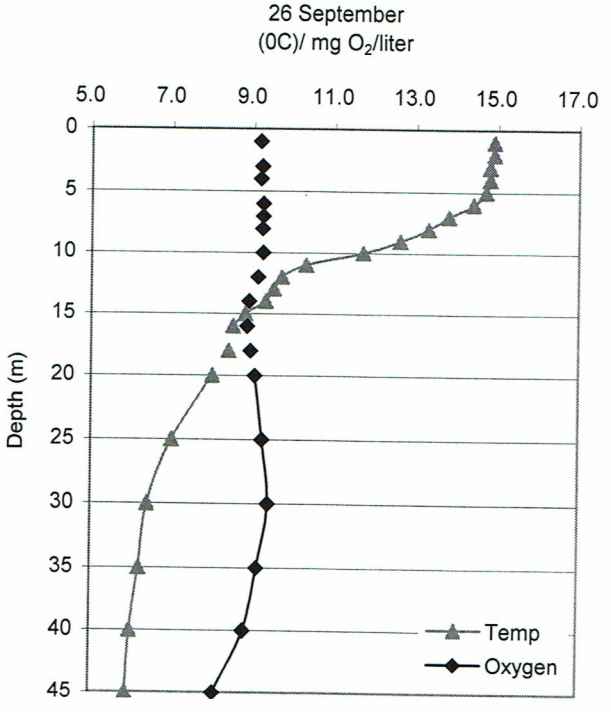


Figure 4. Temperature and dissolved oxygen profiles for Station B on Klawock Lake during 2000.

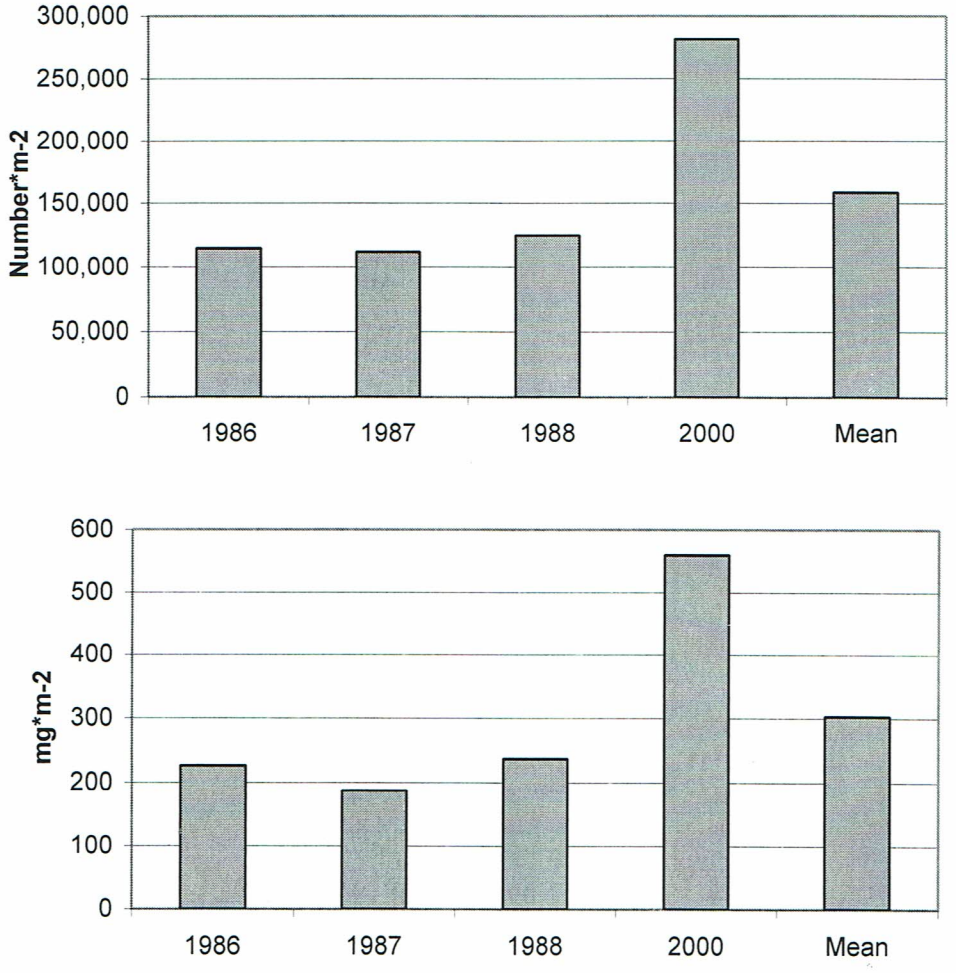


Figure 5. Mean seasonal macrozooplankton density and biomass at Klawock Lake and mean of years sampled.

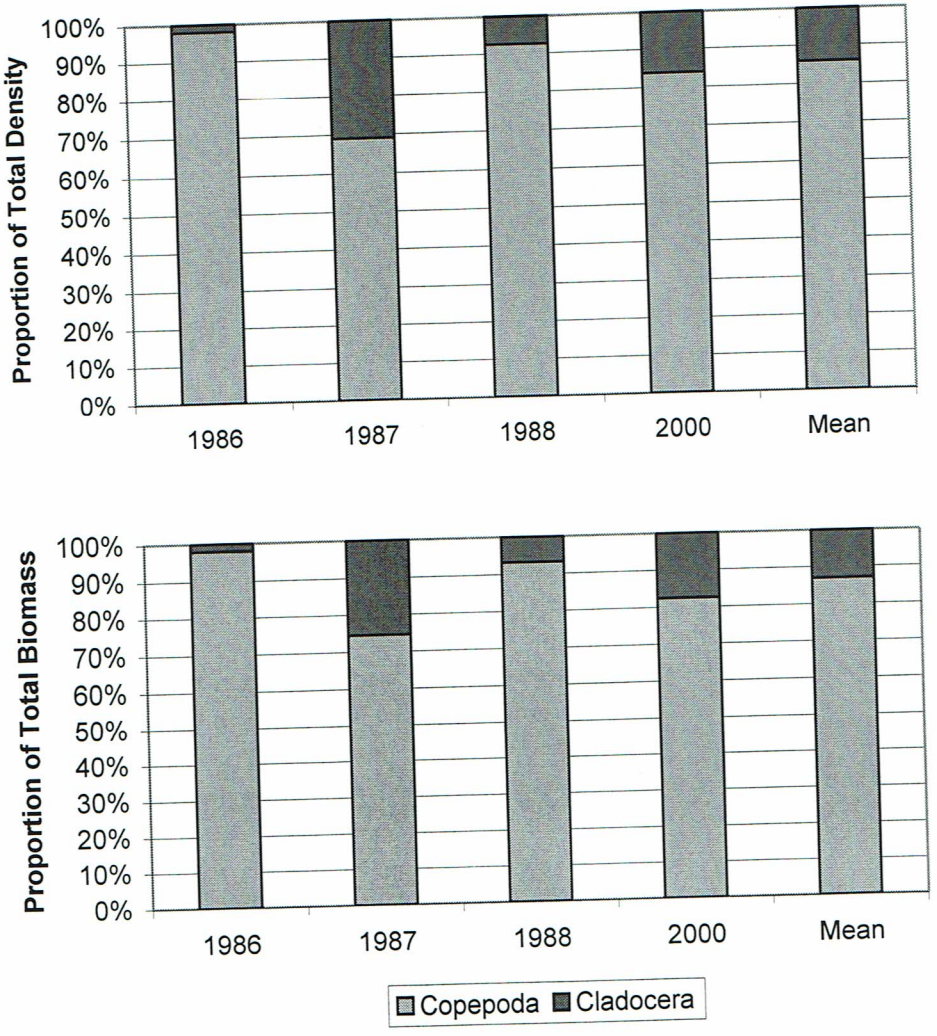


Figure 6. Mean seasonal distribution of macrozooplankton density and weighted biomass by zooplankton order at Klawock Lake and mean of years sampled

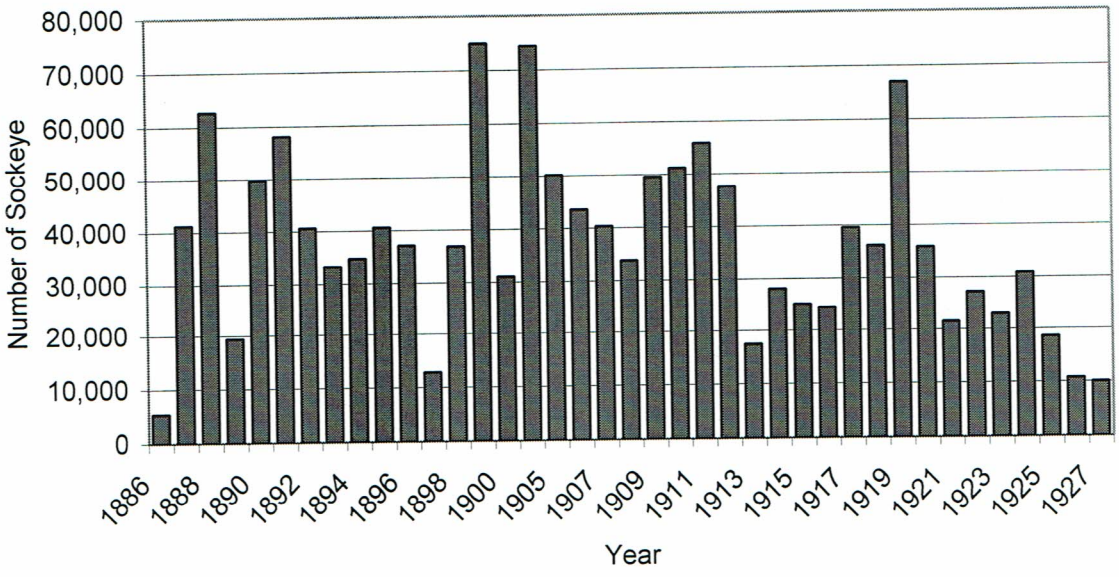


Figure 7. Early sockeye harvest numbers reported for Klawock Inlet.

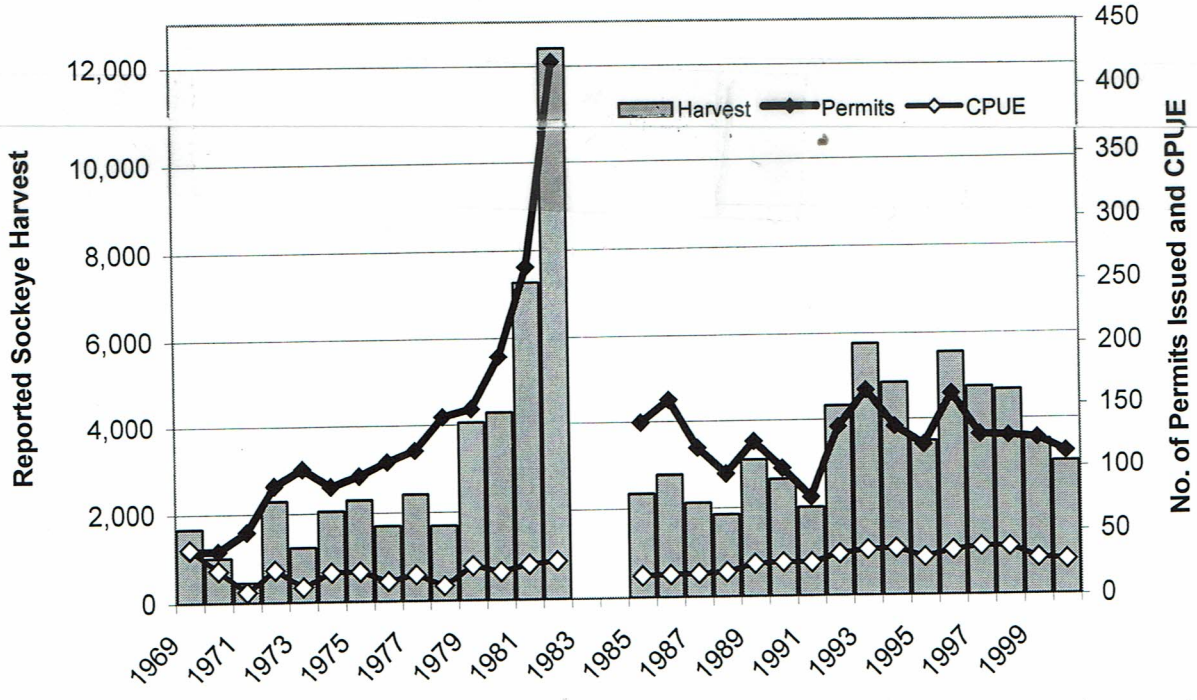


Figure 8. The reported harvest, number of permits, and catch per unit effort (CPUE) for the Klawock River sockeye subsistence fishery, 1969 to 2000.

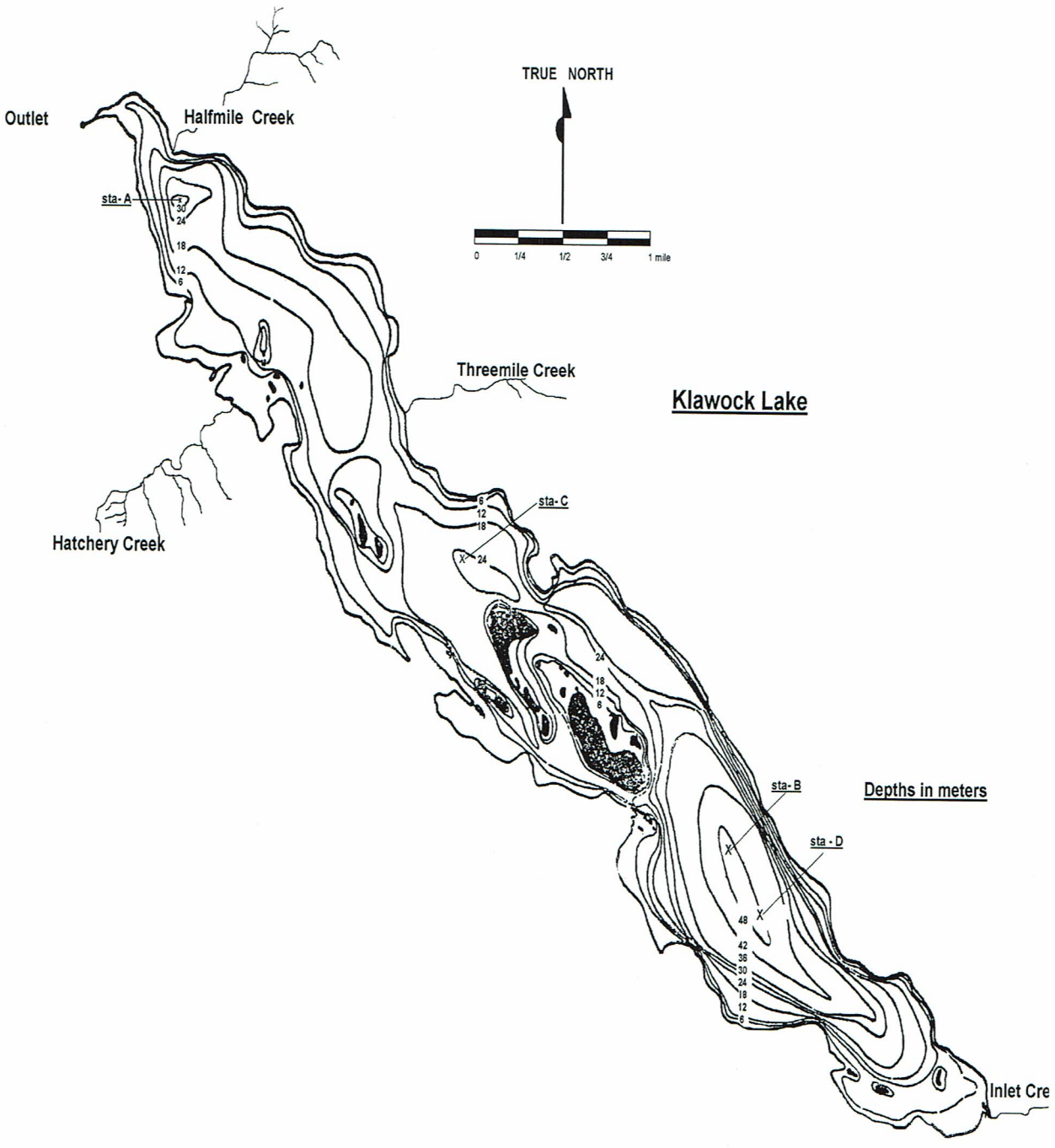


Figure 2. Map of Klawock Lake.

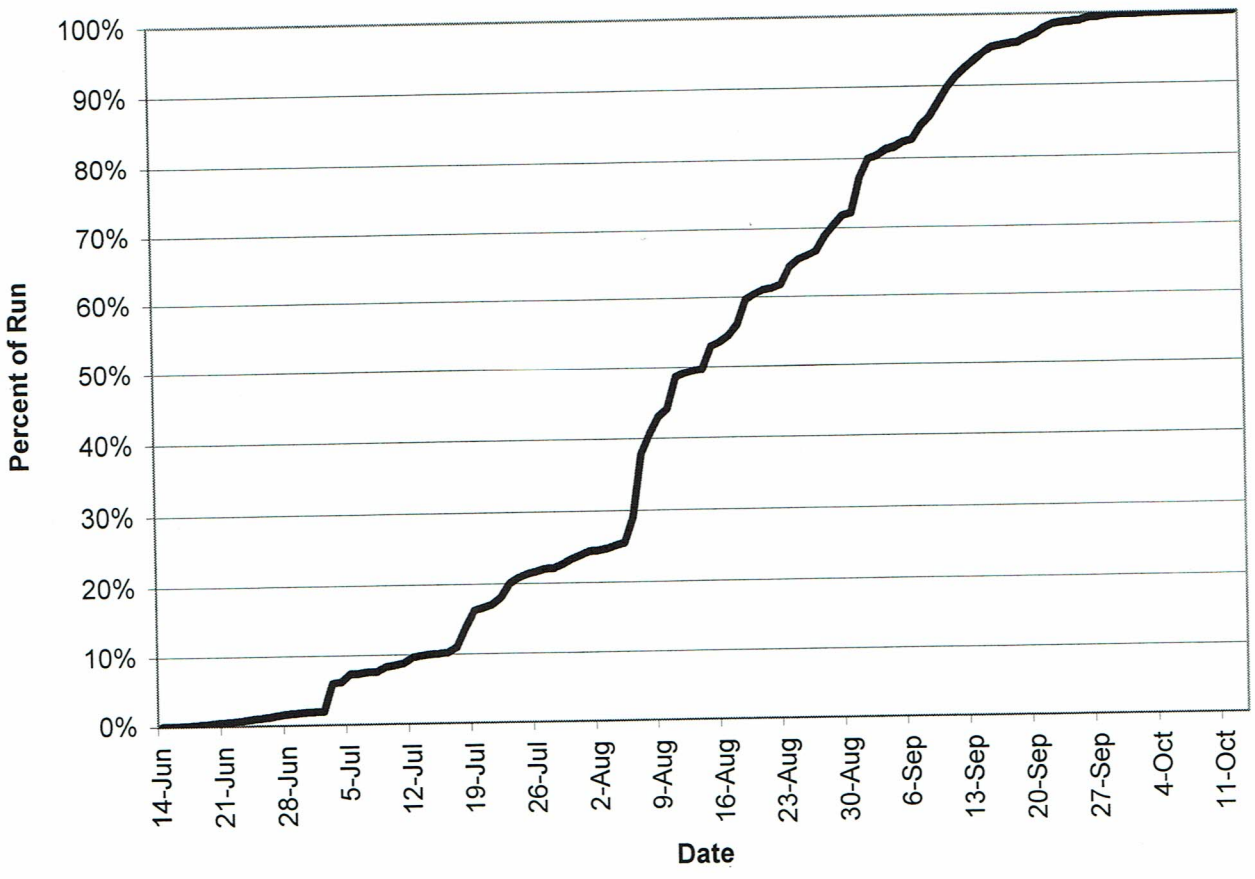


Figure 9. Klawock River Weir Adult Sockeye Salmon Counts ten-year average.

Appendix 1.

Table 1. Klawock Lake water quality data.

DATE	YEAR	STATION	DEPTH (m)	STRATA	CONDUCTIVITY (umhos/cm)	pH	ALKALINITY (mg/l)	TURBIDITY (NTU)	COLOR (Pt units)	CALCIUM (mg/l)	MAGNESIUM (mg/l)	IRON (ug * L^{-1})	TP (ug * L^{-1})	TFP (ug * L^{-1})	FRP (ug * L^{-1})	TKN (ug * L^{-1})	AMMONIA(ug * L^{-1})	NITRATE+NITRITE (ug * L^{-1})	TN (ug * L^{-1})	RSI (ug * L^{-1})	CARBON (ug * L^{-1})	TPP (ug * L^{-1})	CHL A (ug * L^{-1})	PHAEO (ug * L^{-1})
29-Aug	1979	A		Epi	22	6.7	10			3.4	0.2		4.0	3.8	0.8	130.0	4.5	8.4	138.7	844		1.0		
29-Aug	1979	A		Hyp	36	6.8	12			4.4	0.2		5.1	4.7	1.2	108.3	7.3	26.5	134.5	1,127		1.8		
28-May	1981	A	5	Epi	25	6.8	10			4.5	0.2	39	4.4	1.8	0.7	83.5	2.0	3.4	86.9	989	179	2.4	0.48	
28-May	1981	A	5	EZD																			0.19	
28-May	1981	A	30	Hyp	28					3.5	0.7	17	4.6	4.7	1.3	78.3	4.0	20.0	98.3	1,227	60	1.3		
19-May	1986	A	1	Epi	37	6.8	11	0.5	29.0			58	6.3	1.8	0.1	85.8	2.4	22.5	108.3	1,324	58		0.84	0.39
19-May	1986	A	6.5	EZD																			1.26	0.46
19-May	1986	A	19	Hyp	36	6.7	12	0.7	27.8			74	4.6	2.7	1.5	80.8	<1.1	21.0	101.8	1,306	82		0.72	1.25
4-Nov	1986	A	1	Epi	34	6.8	10	0.7	45.9			96		4.1	1.6		3.5	23.9		1,303	124	2.4	0.28	0.27
4-Nov	1986	A	2	EZD																			0.11	0.31
4-Nov	1986	A	15	Hyp	33	6.7	10	0.7	45.9			87	7.8	4.2	2.5	114.4	6.0	21.0	135.4	1,234	91	1.8	0.18	0.26
4-Nov	1986	B	1	Epi	36	6.8	10	0.5	34.6			50	5.4	3.2	1.5	70.2	3.5	28.3	98.5	1,329	55	2.8	0.22	0.30
4-Nov	1986	B	2.5	EZD																			0.20	0.25
4-Nov	1986	B	30	Hyp	38	6.7	10	0.4	27.8			26	3.5	2.6	1.3	64.7	2.7	56.5	121.2	1,364	24	2.2	0.05	0.16
27-Apr	1987	A	1	Epi	33	6.6	10	0.3	30.1			88	4.7	2.9	1.3	100.2	1.1	26.8	127.0	1,279	97		0.42	0.18
27-Apr	1987	A	2.5	MEU																			0.35	0.19
27-Apr	1987	A	5	EZD																			0.26	0.18
27-Apr	1987	A	21	Hyp	35	6.7	10	0.4	32.3			97	4.2	2.1	0.6	102.6	1.1	26.8	129.4	1,244	73		0.29	0.18
27-Apr	1987	B	1	Epi	35	6.7	9	0.2	31.2			57	3.8	2.6	1.6	105.9	1.1	32.6	138.5	1,384	64		0.17	0.17
27-Apr	1987	B	3	MEU																			0.15	0.14
27-Apr	1987	B	6	EZD																			0.15	0.20
27-Apr	1987	B	35	Hyp	35	6.7	9	0.2	30.1			72	3.7	1.8	0.1	100.2	1.1	32.6	132.8	1,428	58		0.16	0.16
9-Jul	1987	A	1	Epi	36	6.6	10	0.3	31.2	4.4	0.5	72	3.7	2.5	6.2	109.9	5.7	10.9	120.8	1,176	91		0.34	0.32

9-Jul	1987	A	2.25	MEU																		0.34	0.31
9-Jul	1987	A	4.5	EZD																		0.33	0.34
9-Jul	1987	A	21	Hyp	37	6.6	10	0.5	29.0	4.4	0.5	11	4.2	2.7	3.4	115.6	6.0	32.6	148.2	1,291	118	0.04	0.27
9-Jul	1987	B	1	Epi	36	6.8	10.5	0.2	25.6	4.4	0.8	59	5.5	2.5	1.1	118.0	6.8	9.4	127.4	1,205	130	0.37	0.30
9-Jul	1987	B	2.25	MEU																		0.40	0.31
9-Jul	1987	B	4.5	EZD																		0.20	0.33
9-Jul	1987	B	27	Hyp	36	6.7	10	0.4	30.1	4.4	0.5	76	4.1	2.2	1.3	106.7	6.8	32.6	139.3	1,262	109	0.04	0.17
20-Nov	1987	A	1	Epi	35	6.5	10	0.9	38.0	4.7	0.7	172	5.5	2.5	2.0	83.7	7.3	13.7	97.4	1,277	151		
20-Nov	1987	A	21	Hyp	34	6.6	10	1.0	34.6	4.7	0.7	160	6.1	2.0	2.0	88.1	2.3	15.2	103.3	1,144	180		
20-Nov	1987	B	1	Epi	38	6.4	10	1.0	30.1	4.7	0.7	96	5.2	2.2	1.7	76.5	3.2	22.6	99.1	1,323	109		
20-Nov	1987	B	34	Hyp	37	6.5	10	0.6	29.0	4.7	0.7	77	5.5	2.2	1.9	71.0	1.3	25.6	96.6	1,350	80		
15-Mar	1988	A	1	Epi	35	6.6	9	0.6	32.3	3.8	0.2	120	5.7	2.8	1.9	23.9	5.5	27.5	51.4	1,124	137		
15-Mar	1988	A	1.75	MEU																			
15-Mar	1988	A	3.5	EZD																			
15-Mar	1988	A	19	Hyp	35	6.6	9	0.6	35.7	4.2	0.4	146	6.0	2.6	2.2	98.1	2.7	28.9	127.0	1,115	83		
11-Aug	1988	B	1	Epi	36	6.6	10	0.5	32.3			78	4.3	2.5	1.6	79.7	3.0	10.2	89.9	1,043	36		
11-Aug	1988	B	2	MEU																			
11-Aug	1988	B	4	EZD																			
11-Aug	1988	B	28	Hyp	36	6.4	10	0.3	26.7			65	4.3	1.7	1.5	77.7	2.7	34.4	112.1	1,106	36		
16-Nov	1988	A	1	Epi	37	6.6	10	2.8	39.1			160	6.4	3.4	1.9	104.7	1.1	23.7	128.4	1,420	89		
16-Nov	1988	A	2	MEU																			
16-Nov	1988	A	4	EZD																			
16-Nov	1988	A	21	Hyp	37	6.6	10	1.8	43.6			163	5.4	5.3	4.6	91.4	1.1	22.7	114.1	1,214	72		
16-Nov	1988	B	1	Epi	38	6.5	9	2.2	34.6			96	5.8	2.5	1.4	85.8	1.1	25.6	111.4	1,193	137		
16-Nov	1988	B	2.25	MEU																			
16-Nov	1988	B	4.5	EZD																			
16-Nov	1988	B	34	Hyp	38	6.5	9	1.4	34.6			104	5.1	2.3	1.8	88.6	1.1	26.5	115.1	1,214	69		
19-May	2000	A		1	35	6.8	11.3	0.5	30	4.9	0.5	70	5.1	2.7	2.3	101.3	9.0	27.7		1180	122	2.84	0.92
19-May	2000	A		EZD																		0.89	0.27
19-May	2000	A		HYP	35	6.8	11.2	0.6	31	4.7	0.5	70	4.8	2.7	2.4	89.5	9.2	30.5		1187	102	0.28	0.09
19-May	2000	A		MEU																		0.88	0.26
19-May	2000	B		1	36	6.9	11.3	1.4	31	5.1	0.4	69	5.4	2.6	2.5	98.3	6.4	20.9		1167	122	0.76	0.22
19-May	2000	B		EZD																		0.95	0.31

19-May 2000	B	HYP	35	6.8	10.5	0.5	31	5.1	0.6	63	4.9	2.7	2.4	86.5	3.0	32.7	1193	104	0.23	0.17
19-May 2000	B	MUE																	1.51	0.79
27-Jun 2000	A	1	35	6.6	12.1	0.7	30	4.8	0.9	60	4.9	3.5	3.0	89.5	12.6	12.4	1071	84	0.46	0.25
27-Jun 2000	A	EZD																	0.49	0.30
27-Jun 2000	A	HYP	36	6.5	12.8	1.1	31	4.5	0.8	68	4.8	2.7	2.0	94.5	15.0	29.9	1116	76	0.11	0.28
27-Jun 2000	A	MEU																	0.43	0.29
27-Jun 2000	B	1	37	6.7	12.3	1.8	33	5.3	0.7	42	8.4	4.5	4.1	123.0	11.8	16.8	1035	87	0.64	0.29
27-Jun 2000	B	EZD																	0.84	0.35
27-Jun 2000	B	HYP	36	6.5	12.1	1.6	32	4.7	0.6	58	12.9	4.2	3.0	120.0	13.4	35.2	1100	84	0.11	0.19
27-Jun 2000	B	MEU																	0.65	0.28
17-Aug 2000	A	1	38	6.5	12.0	0.5	29	5.4	0.9	85	3.8	2.4	2.0	104.2	7.3	16.5	1023	130	1.22	0.43
17-Aug 2000	A	EZD																	1.00	0.38
17-Aug 2000	A	HYP	42	6.4	13.1	0.5	28	5.9	0.8	83	5.2	3.0	2.4	89.5	8.8	31.4	1056	107	0.11	0.25
17-Aug 2000	A	MEU																	1.41	0.42
17-Aug 2000	B	1	38	6.4	11.6	0.5	30	5.1	0.8	76	3.6	2.4	2.2	103.3	7.9	22.0	1041	107	0.83	0.41
17-Aug 2000	B	EZD																	0.72	0.43
17-Aug 2000	B	HYP	37	6.2	10.4	0.5	30	4.7	0.7	69	4.8	2.7	2.2	89.5	3.7	45.8	1081	73	0.10	0.24
17-Aug 2000	B	MEU																	0.70	0.37
26-Sep 2000	A	1	36	6.8	12.4	1.5	38	4.8	0.8	109	6.0	3.8	3.1	124.9	13.7	20.8	1197	131	0.71	0.26
26-Sep 2000	A	EZD																	0.57	0.25
26-Sep 2000	A	HYP	38	6.7	12.8	1.2	38	5.2	0.8	112	5.5	3.3	3.0	114.1	11.5	27.4	1223	113	0.14	0.22
26-Sep 2000	A	MEU																	0.63	0.25
26-Sep 2000	B	1	37	6.7	12.2	1.5	38	5.0	0.8	87	4.9	3.3	1.8	139.4	7.3	11.5	1233	128	1.94	0.05
26-Sep 2000	B	EZD																	1.17	0.31
26-Sep 2000	B	HYP	38	6.5	11.3	0.7	29	4.6	0.7	52	4.2	2.9	1.3	109.2	11.0	43.6	1190	59	0.15	0.18
26-Sep 2000	B	MEU																	1.45	0.22

(EZD)= euphotic zone depth, (MEU)=Mid-euphotic zone depth, (HYP)=hypolimnion, (EPI)=epilimnion, (TP)= total phosphorous, (TFP)=total filterable phosphorous, (FRP)=filterable reactive phosphorous, (TKN)=total kjeldhal nitrogen, ammonia, nitrate minus nitrite, total nitrogen (TN), reactive silica (RSi), carbon, (TPP)=total particulate phosphorous, CHL*a*=chlorophyll *a*, and phaeophyton.

Appendix 2.

Table 1. Daily counts of sockeye salmon at Klawock River weir.

Date	1968	1969	1970	1971	1977	1982	1983	1986	1987	1988	1999	2000
14-Jun		0		0		0	0		0		0	0
15-Jun		0		0		0	0		0		0	0
16-Jun		4		0		0	0		0		0	0
17-Jun		3		0		0	0		0		0	0
18-Jun		3	7	3		0	0		0		0	0
19-Jun		6	12	2		0	0		0		0	0
20-Jun		10	4	7		0	0		0		0	0
21-Jun		2	5	10		0	0		0		0	0
22-Jun		2	6	5		0	0		0		0	0
23-Jun		4	14	8		0	0		0		0	0
24-Jun		3	21	8		0	0		0		0	0
25-Jun		5	15	12		0	0		0		0	0
26-Jun		5	8	12		0	0		0		0	0
27-Jun		16	16	11		0	0		0		0	0
28-Jun		6	23	16		7	0		0		0	0
29-Jun		3	3	14		0	0		0		0	0
30-Jun		1	15	24		0	0		0		0	0
1-Jul	8	1	5	9		0	0		0		0	0
2-Jul	8	1	10	19		0	0		0		0	0
3-Jul	3	1	2001	7		0	0		0		0	0
4-Jul	2	14	36	10		0	0		0		0	0
5-Jul	771	1	15	31		0	0		0		0	50
6-Jul	10	1	4	12		0	0		0		0	1
7-Jul	28	5	38	19		0	0		0		0	15
8-Jul	0	5	18	2		0	0		0		4	38
9-Jul	19	80	8	4		0	0		0		14	40
10-Jul	1	33	5	3		0	0		0		35	44
11-Jul	25	35	3	0		0	0		0		26	26
12-Jul	4	25	245	0		50	0		0		24	15
13-Jul	24	10	13	0		33	0		15		8	3
14-Jul	4	3	72	2		0	0		0		1	25
15-Jul	3	9	5	3		4	0		0			93
16-Jul	8	2	14	11		19	0		0		1	18
17-Jul	38	2	320	52		6	0		0			35
18-Jul	1473	7	5	455		0	0		0		8	39
19-Jul	1624	8	2	43		15	0		0			715
20-Jul	129	10	0	14		9	3		0		8	56
21-Jul	159	3	0	119		14	1		0			15
22-Jul	131	11	359	6		6	0		0		27	11
23-Jul	1039	4	239	2		2	0		0		180	30
24-Jul	110	10	0	0		1	48		0		28	152
25-Jul	220	12	0	1		9	8		0		1	13
26-Jul	26	37	0	1		3	0		0		7	
27-Jul	207	1	2	0		0	6		0		939	1
28-Jul	14	1	9	3		14	1	4	0		795	2
29-Jul	12	0	11	67		7	20	244	0		27	

30-Jul	60	0	0	75		34	1	0	300		1	4
31-Jul	216	0	2	6		62	9	4	0			4
1-Aug	153	0	10	2		146		32	0			8
2-Aug	55	1	1	0		15	0	0	0			39
3-Aug	54		12	3		37	5	0	0		6	916
4-Aug	31	5		2		48	5	221	0			96
5-Aug	35	5		2		114	1	30	0			8
6-Aug	20	1		5		25	1	4217	0			232
7-Aug	11	1061		373		73	3	1247	0		9	259
8-Aug	27		1	1009	36	137		2196	0		280	16
9-Aug	10	2		1891	41	30	18	0	0		130	124
10-Aug	6	6	230	277	115	8	14	0	0		91	90
11-Aug	4		1827	423	62	468	41	62	0	26	152	222
12-Aug	18		92	50	105	0	6	32	0	0	170	52
13-Aug	0		1	22	143	9	2	28	0	0	11	32
14-Aug	3			1	49	15		5	0	0	34	117
15-Aug	3		20	35	93	19	259	0	0	0	219	101
16-Aug	3		20	35	48	112	18	10	0	0	174	1160
17-Aug	17	4		308	48	172	14	0	0	0	696	3526
18-Aug	59	1		569	74	64	3	1456	0	0	487	66
19-Aug	38	1	1	2856	49	3	75	281	0	0	25	7
20-Aug	12	1		388	18	0	32	91	0	0	79	39
21-Aug	65		1	640	5	0	3	9	0	0	21	526
22-Aug	45		3	107	3	0	2	70	0	0	25	13
23-Aug	257			113	48	0	11	0	0	0	23	49
24-Aug	2818		3	80	87	4	16	0	0	0	14	4
25-Aug	226	2		78	76		14	1086	0	0	9	3
26-Aug	61		6	13	90	5	22	24	0	0	20	2
27-Aug	23		28	10	38	52	35	0	0	0		
28-Aug	23	1	88	2	342	340	12	0	400	0	83	4
29-Aug	945	1	21	37	277	53	2	0	0	0	4	4
30-Aug	396		21	44	161	12	4	0	0	375	1	16
31-Aug	261		9	73	47	7		0	0	8	2	11
1-Sep	11		42	34	155	2095	0	0	0	209		15
2-Sep	0		256	19	184	243	0	2196	0	259		13
3-Sep	0		50	15	77	62	1	147	0	0	1	8
4-Sep	0	1	28	1	39	9	2	455	330	0	7	20
5-Sep	0		15		27	109		0	0	0	8	35
6-Sep	0				138	5		0	0	239	9	33
7-Sep	2			2	132	14	0	0	0	0	7	18
8-Sep	0				107	3	3	0	928	371	43	11
9-Sep	0				3	1	2	0	610	270	18	5
10-Sep	0				6			0	1108	354	3	
11-Sep	0				1		1	0	936	399	1	
12-Sep	0				4	5	1	0	659	349	9	8
13-Sep	0				2		3	0	424	67	1	4
14-Sep					1	0	1	0	452	45	2	4
15-Sep					4		11	140	340	37	3	13
16-Sep							12	0	326	65	4	2
17-Sep							9	0	67	0	4	7

18-Sep		4	0	78	28	17	1
19-Sep		1	0	64	0	175	2
20-Sep		24	0	142	31	1	
21-Sep		22	0	53	0	3	
22-Sep		2	194	77	175	4	
23-Sep		3	163	86	40	2	4
24-Sep	0	9	3	37	0	3	3
25-Sep	0		15	32	0		
26-Sep	0	1	15	42	0		
27-Sep	0		35	167	8		
28-Sep		1	0	12	0		1
29-Sep	0		0	36	48		2
30-Sep	0		6	21	0		2
1-Oct	2	0	0	2	0		1
2-Oct			17		0		
3-Oct			31		12		1
4-Oct	1		0	10	0		1
5-Oct			0	7	0		
6-Oct			31	0	0		
7-Oct			0	1	0		
8-Oct		0	0	0	0		
9-Oct			0	0	0	2	
10-Oct			3	0	0		
11-Oct		0	0	0	0		
12-Oct		1	0		11		