TATLAWIKSUK RIVER WEIR SALMON STUDIES, 2002

By

John C. Linderman Jr.

David J. Cannon

and

Douglas B. Molyneaux

Regional Information Report[1] No. 3A03-16

Alaska Department of Fish and Game
Commercial Fisheries Division
Arctic-Yukon-Kuskokwim Region
333 Raspberry Road, Anchorage, Alaska 99518

June 2003

[1] The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse and ad hoc informational purposes or archive basic uninterrupted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

AUTHORS

John C. Linderman Jr. is a Fishery Biologist for the Alaska Department of Fish and Game, Commercial Fisheries Division, 333 Raspberry Road, Anchorage, AK 99518-1599; e-mail, *john_linderman@fishgame.state.ak.us*.

David J. Cannon is the Partners Fisheries Biologist for the Kuskokwim Native Association, P.O. Box 127, Aniak, AK 99557; e-mail, *dcannon4kna@aol.com*

Douglas B. Molyneaux is the Kuskokwim Area Research Biologist for the Alaska Department of Fish and Game, Commercial Fisheries Division, 333 Raspberry Road, Anchorage, AK 99518-1599; e-mail, *doug_molyneaux@fishgame.state.ak.us*.

OEO/ADA STATEMENT

REPORT SUMMARY PAGE

Title: Tatlawiksuk River Weir Salmon Studies, 2002

Study Number(s): FIS 00-007

Investigator(s)/Affiliation(s): Dave Cannon, Kuskokwim Native Association; John C. Linderman, Jr. and Douglas B. Molyneaux, Alaska Department of Fish and Game, Commercial Fisheries Division.

Management Region: Kuskokwim River

Information Type: Stock Status and Trends

Issue(s) Addressed:

1. Distribution, Abundance, and Life History of Fish Species
   - ∉ Determine the distribution and abundance of salmon and other fishes in the Kuskokwim River.
   - ∉ Identify spawning salmon populations and their run sizes in the Kuskokwim River watershed
2. Fisheries Monitoring
   - ∉ Assess impact of regulation changes (e.g., mesh size restrictions and subsistence fishing schedule) on size and sex of harvested fish and overall quality of escapement.

Study Cost: $30,000 annually to Kuskokwim Native Association under FIS #00-007; additional operational funds and in-kind services are provided through the Alaska Department of Fish and Game, the National Oceanic and Atmospheric Administration (Alaska Fishery Disaster Relief Program, # NA 96FW0196), the Bering Sea Fishermen's Association, and FIS #00-117.

Study Duration: long-term

Key Words: chinook salmon, *Oncorhynchus tshawytscha*, chum salmon, *O. keta*, coho salmon, *O. kisutch*, escapement, age-sex-length, Tatlawiksuk River, Kuskokwim River, resistance board weir, longnose suckers, *Catostomus catostomus*

Citation: Linderman, J.C., Jr., D.J. Cannon, and D.B. Molyneaux. 2003. Tatlawiksuk River weir salmon studies, 2002. Alaska Department of Fish and Game, Commercial Fisheries Division, Arctic-Yukon-Kuskokwim Region. Regional Information Report No. 3A03-16, Anchorage.

ACKNOWLEDGMENTS

Tatlawiksuk River, salmon escapement monitor program is a cooperative project operated jointly by the Kuskokwim Native Association (KNA) and the Commercial Fisheries Division of the Alaska Department of Fish and Game (ADF&G). Since inception of the project in 1998, operational funds have been provided to KNA from a number of sources including grants from the National Fish and Wildlife Foundation (# 1998-0241), the Federal Office of Subsistence Management (# FIS 00-007) and a grant from the U.S. Bureau of Indian Affairs that is administered by the Bering Sea Fishermen's Association (BIA# E004401023). In addition, other groups such as Kuskokwim Corporation and Sport Fish Division of ADF&G provided in-kind support to the project in the form of land-use authorization for the camp, and facilities for weir fabrication and welding services. Support from ADF&G included assistance from staff biologists, a technician crew leader and a share of other operational costs.

Funding for ADF&G was through a combination of state general funds, a grant from the Western Alaska Fishery Disaster Relief Program (NA 96FW0196) under National Oceanic and Atmospheric Administration (NOAA) and a grant from the Federal Office of Subsistence Management (FIS 01-117).

Over the years, many individuals have contributed to the development and operation of the Tatlawiksuk River Weir. A special thanks goes to Rob Stewart for directing the design and construction of the weir and for his periodic technical assistance, and to all others who contributed to project design and construction. Samantha John, Wayne Morgan, Tamara Kvamme and Rhiannon Wheeler of KNA assisted with administrative needs and logistical coordination in support of the 2002 season.

Our greatest appreciation for the success of the 2002 field season goes to lead crew person Russell Corona (ADF&G) and crewmember Michael Middlemist (KNA).

The authors would also like to thank the numerous high school students who contributed to the project through KNA student internship program. Finally, we would like to thank the Gregory family of Senka's Landing for providing winter storage facilities and many hours of Alaskan hospitality.

FOREWORD

Part of the mission of this project is to promote local involvement and to develop KNA's ability to be more involved and effective in salmon resource management. Since inception, the project's crew has consisted of one locally hired KNA technician and one ADF&G technician. The project serves as a platform to host several student interns from surrounding communities to offer "hands-on" work experience at the weir (funded under FIS 01-088).

Oversight of field operations is shared between the KNA and ADF&G. Both organizations make use of the weir data during inseason salmon management deliberations. ADF&G has historically taken the lead in data management, data analysis and reporting; however, these responsibilities are expected to shift more to the KNA fishery biologist position funded through the newly established Partners Fisheries Program (USFWS #701812J479).

Tatlawiksuk River weir has developed into a useful tool for salmon management. Ideally, the project will continue to operate as a cooperative project, with active participation by KNA and ADF&G staff, but the outlook for future funding is unstable. Future funding from BSFA is tenuous because of instability in their grant program. Funding for ADF&G involvement has included the Western Alaska Disaster grant and state general funds, but the Western Alaska Disaster grant ended June 2003 and general funds were cut by 10% for ADF&G fiscal year 2003 and beyond. New funding sources will need to be identified for both KNA and ADF&G if the Tatlawiksuk River weir is to continue operation into the future.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES (Continued)

Figure **Page**

LIST OF APPENDICIES

LIST OF APPENDICIES (Continued)

ABSTRACT

Tatlawiksuk River salmon escapements were monitored in 2002 using a resistance board weir. The target operational period for the project is 15 June through 20 September. Total annual escapement for the target operational period included 2,237 chinook salmon 24,542 chum salmon 11,363coho salmon 1 sockeye salmon and 1 pink salmon. The chinook, chum and coho escapements were all the highest yet observed for Tatlawiksuk River. A total of 1,155 longnose suckers *Catostomus catostomus* were counted passing the weir.

The Alaska Board of Fisheries classified Kuskokwim River chinook and chum salmon as "stocks of concern" in 2000, inclusive of the Tatlawiksuk River populations. Total annual escapements of chinook and chum salmon in 2002 were similar to 2001 when comparable conservation measures were implemented in the fisheries. Escapements in 2001 and 2002 were substantially greater than those observed in 1999 or 2000 when conservation measures were less stringent. Still, the adequacy of the chinook, chum and coho salmon escapements is unclear because the data set for the Tatlawiksuk River spans so few years.

Coho salmon have not been classified as a stock of concern, but annual run abundance appears on the decline since 1997 as evidenced by the reduced commercial harvests and variable escapement levels. Total annual escapement of coho salmon in 2002 was similar to 2001, but much higher than observed in 1999 or 2000. Assessments of coho escapements to Tatlawiksuk River have been difficult because of persistent high water conditions in late summer especially prominent in the Tatlawiksuk River drainage.

KEY WORDS: chinook salmon, *Oncorhynchus tshawytscha*, chum salmon, *O. keta*, coho salmon, *O. kisutch*, escapement, age-sex-length, Tatlawiksuk River, Kuskokwim River, resistance board weir, longnose suckers, *Catostomus catostomus*

INTRODUCTION

Kuskokwim River drains an area approximately 50,000 square miles, or 11 percent of the total area of Alaska (Figure 1; Brown 1983). Each year mature salmon *Oncorhynchus spp.* return to the river and support intensive subsistence and commercial fisheries that have annually harvested about a million salmon between 1980 and 1997 (Burkey et al. 2002). The subsistence fishery is a vital cultural component for most Kuskokwim Area residents, and subsistence salmon harvest contributes substantially to the regional food base (Coffing 1991, Coffing 1997a, Coffing 1997b, Coffing et al. 2000). The commercial salmon fishery in the Kuskokwim Area, though modest in value compared to other areas of Alaska, has been an important component of the market economy of lower river communities (Buklis 1999, Burkey et al. 2002).

Salmon that contribute to these fisheries spawn and rear in nearly every tributary of the Kuskokwim River basin; however, few spawning streams receive rigorous salmon escapement monitoring. Salmon act as ecological process vectors by transporting energy and nutrients between the ocean, estuaries and freshwater environment. The flow of nutrients into freshwater systems plays a significant role in determining the overall productivity of salmon runs; therefore, adequate salmon escapement is crucial for maintaining sustainable salmon harvests (Cederholm et al. 1999, Cederholm et al. 2000). The limited escapement data available for the Kuskokwim River inhibits the ability of management authorities to assess the adequacy of escapements and the effectiveness of management decisions. Tatlawiksuk River weir is one of several initiatives begun in the late 1990s to help address this data gap. The need to address this data gap became even more evident in September 2000, when the Alaska Board of Fisheries (BOF) classified both Kuskokwim River chinook *Oncorhynchus tshawytscha* and chum salmon *O. keta* as “stocks of concern” because of the chronic inability of managers to maintain expected harvest levels (5 AAC 39.222; Burkey et al. 2000a, Burkey et al. 2000b).

Historically, only two long-term ground-based escapement-monitoring projects have been operated in the Kuskokwim River basin; these were Kogrukluk River weir (1976 to present, Clark and Molyneaux 2003a), and Aniak River Sonar (1980 to present, Sandall 2003). These tributaries constitute a modest fraction of the total Kuskokwim River basin, and salmon populations in these tributaries are incomplete in their representation of the diversity of salmon populations that contribute to subsistence, commercial and sport harvests, and to overall ecosystem function in the Kuskokwim River. For years, most fish passing the Aniak River sonar site were assumed to be chum salmon because reliable apportionment of the species composition was not possible; however, recent netting studies have shown this assumption untrue for at least some segments of the annual operational period. Other ground-based escapement monitoring projects have been developed within the Kuskokwim River basin, but until recent years, these initiatives were short-lived (Burkey et al. 2002). Fixed-wing aircraft periodically conduct aerial stream surveys on many tributaries, but these surveys serve as indices of abundance because they are flown only once each season (Appendix A.1; Burkey et al. 2002). The distribution of survey streams is geographically skewed toward the lower Kuskokwim River basin and coastal streams because aerial surveys are restricted to clear water streams or lakes. Tributaries in the middle and upper Kuskokwim River are oftentimes stained from organics or clouded by glacier silt, which hinder fish visibility. Escapement assessment through aerial surveys is subject to a high degree of variability dependent on viewing conditions and the persons doing the surveys (Burkey et al. 2002).

The goal of salmon management to provide for long-term sustainable fisheries is achieved in part by ensuring adequate numbers of salmon escape onto the spawning grounds each year. Since 1960, management of the Kuskokwim River subsistence, commercial and sport fisheries has been the responsibility of the Alaska Department of Fish and Game (ADF&G). Management authority for the subsistence fishery was broadened in October 1999 to include the federal government under Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA), the U.S. Fish and Wildlife Service (USFWS) is the federal agency most involved in the Kuskokwim Area. In addition, Tribal groups such as Kuskokwim Native Association (KNA) are charged by their constituency to actively promote a healthy and sustainable subsistence salmon fishery. These and other groups have combined their resources to develop several new projects, including the Tatlawiksuk River weir, to better achieve their common goal of providing for long-term sustainability of salmon fisheries in Kuskokwim River.

Sustainable salmon fisheries require more than just adequate escapement numbers. Escapement projects, such as Tatlawiksuk River weir, commonly serve as platforms for collecting other types of information useful for management and research. Knowledge of age-sex-length (ASL) compositions of salmon populations can provide insights into understanding fluctuations in salmon abundance and for developing spawner-recruit relationships used in formulating escapement goals (DuBois and Molyneaux 2000). Collection of ASL data is typically included in most escapement monitoring projects (e.g., Gates and Harper 2002, Tobin and Harper 1998, Estensen 2002, Clark and Molyneaux 2003b). In addition, water temperature, water chemistry and stream discharge are fundamental variables of the stream environment that directly and indirectly influence salmon productivity (Hauer and Lambert 1996). These variables can be affected by human activities (i.e., mining, timber harvesting, man-made impoundments, etc.; NRC 1996); or climatic changes (for example, El Nino and La Nina events), which can in turn affect stream productivity and timing of salmon migrations (Kruse 1998). The operational plan for Tatlawiksuk River weir includes collecting ASL data and environmental information.

Objectives

1. Determine daily and total annual escapements of chinook, chum and coho salmon from 15 June through 20 September.

2. Estimate ASL composition of total chinook, chum and coho salmon escapements from a minimum of three pulse samples, one collected from each third of the run, such that 95 percent simultaneous confidence intervals for the age composition in each pulse are no wider than 0.20 (Ŭ= 0.05 and d = 0.10).

3. Profile habitat variables including daily water temperature, water level, and water chemistry (conductivity, pH, alkalinity, turbidity, color, calcium, magnesium and iron) of

the Tatlawiksuk River.

4. Recover tag numbers and associated information from chum, sockeye and coho salmon in support of the mark-recapture study conducted on mainstem Kuskokwim River.

5. Serve as a monitoring site for chinook salmon equipped with radio telemetry transmitters deployed as part of a mark-recapture study conducted on mainstem Kuskokwim River.

METHODS

Study Site

Tatlawiksuk River is a tributary of the middle Kuskokwim River basin and provides spawning and rearing habitat for chinook, chum and coho salmon (ADF&G 1998). Small numbers of sockeye *O. nerka* and pink *O. gorbuscha* salmon also occur in the river. Tatlawiksuk River originates in the foothills of the Alaska Range (Figure 2; Brown 1983), where it flows southwesterly for 70 miles, draining an area of approximately 813 square miles, before joining Kuskokwim River at river mile (rm) 383 (river kilometer (rkm) 616). Throughout most of the river's course, it meanders across wide, flat valleys vegetated with white spruce and scattered birch or aspen. Black spruce is more characteristic in poorly drained areas of the basin. Dense stands of willow and alder occur on sand and gravel bars. Extensive bog flats and swampy lowlands in the lower reaches of the basin are drained by unnamed streams that join the Tatlawiksuk River from the southeast and northeast, contributing to the dark brown water. The channel gradient of the lower fifty miles is approximately eight feet per mile.

Local residents report Athabaskan groups once harvested salmon from Tatlawiksuk River using fish fences and traps (Andrew Gusty Sr., Stony River, personal communication) into the mid 1900s. Since 1968, biologists from ADF&G periodically observed salmon escapements in the mainstem Tatlawiksuk River by means of aerial surveys coincidental with peak chinook and chum salmon spawning activity (Appendix A.2; Schneiderhan 1983, Burkey and Salomone 1999).

Senka's Landing is the nearest settlement to the weir site. Located on the mainstem of the Kuskokwim River, approximately 7 miles downstream from the mouth of Tatlawiksuk River, Senka's Landing is the homestead of the Gregory family. Five permanent residents live at the homestead. The Gregorys periodically sell gasoline for retail and allowed some camp equipment used at the weir project to be stored at their homestead over winter. Senka's Landing does not have telephone service, but the Gregorys can be contacted through the bush message service offered by KSKO radio in McGrath.

Approximately nine miles farther downstream, tucked among several islands, is the community of Stony River, population 43 (Williams 2000). This town does not have a grocery store. Gasoline can be purchased, but availability is limited and unreliable. Several small air taxi carriers service Stony River from Aniak and schedule stops six days a week.

Weir Design and Maintenance

Weir Design

A weir has been used to enumerate salmon escapements in Tatlawiksuk River since 1998 (Linderman et al. 2002). The original fixed weir design was replaced with a resistance board weir in 1999. The weir used in 2002 spanned the 220 ft wide channel, except for ten feet on either side where fixed-panel sections were used. The width of the resistance board panels was 36-in and picket spacing was 1¼-in (gap between pickets). Narrow picket spacing allowed for complete census of all but the smallest returning salmon while small resident species were able to pass between pickets. Linderman et al. (2002) and Stewart (2002) described modifications in weir design implemented since 1998.

Facilitating Upstream Fish Passage

Two types of passage areas were incorporated into the weir. The passage area used most commonly incorporated a passage chute to a holding pen or fish trap. The fish trap served as a platform the crew used to hold fish for biological sampling or tag recovery, or could solely pass fish. Details of the passage chute and holding pen are described in Linderman et al. (2002).

The second passage area, incorporated in 2002, consisted of a 3-in x 3/16-in aluminum angle framed enclosed passage chute identical in length and width to a weir panel (Figure 3). Spaces on either side of the chute were filled with sealed 1-in schedule 40 PVC electrical conduit spaced 2-5/8-in apart on centers (1-5/16-in between pickets). A ¾-in thick piece of plywood attached to the top of the frame as a counting platform for the observer. Vinyl coated wire mesh fencing attached to the remainder of the frame's top prevented fish from jumping out of the chute. A plywood resistance board attached to the downstream end of the chute provided lift. Additional buoyancy was provided by two boat bumpers (10 inch by 27 inch) tied onto the frame in front of the resistance board. A movable gate, constructed from a modified fixed-panel, attached to the upstream opening to regulate fish passage. The enclosed passage chute, designed for installation like a weir panel, was relocated to optimize fish passage sites as needed.

Facilitating Downstream Fish Passage

Fish sometimes migrated downstream and required a means to safely pass below the weir. This behavior was especially prevalent among longnose suckers *Catostomus catostomus* that migrated out of the Tatlawiksuk River in late summer. To accommodate these fish, several panels were modified to allow downstream passage. By laying one or two of the resistance boards flat, force of the water caused the panel's distal end to dip close to, or just below the water surface. Sometimes a sandbag was placed on the panel for additional effect. Although fish do not typically pass upstream over these modified panels, they were set only during periods of active downstream fish migration. Diligence was required by crewmembers watching for salmon traveling upstream over these panels; if such behavior was observed, the panels were immediately adjusted to preclude upstream passage. As a precautionary measure, downstream passage chutes were not used during periods of strong upstream salmon passage.

Facilitating Boat Passage

Boats passed over the Tatlawiksuk River weir at a designated 'boat gate' located near the channel thalweg. The boat gate consisted of modified resistance board panels (Linderman et al. 2002). The weight of a passing boat submerged the weir panels to, resurface after the boat cleared the gate.

During average water level conditions, most of the traffic consisted of boats with jet-drive engines. These boats could pass over the boat gate by reducing their speed; however, operators of boats with propeller-drive engines had to use a towrope when passing upstream, and turn off their engines and tilt their motors when passing downstream (Linderman et al. 2002).

Weir Cleaning and Inspection

Cleaning was performed each day before 1000 hours. Cleaning consisted of walking across the weir to partially submerge each panel, the current washed debris downstream. A rake was sometimes used to push larger debris loads off the weir. The cleaning operation repeated as needed throughout the day. Each time technicians cleaned the weir, they made a visual inspection for breaches along the panels, substrate rail, fish trap and fixed-panel sections. If conditions did not allow for adequate visual inspection, technicians used snorkel gear to assess the weir's integrity.

Fish Passage

The target operational period for counting fish was 15 June through 20 September, which spans most of the salmon runs. The phrase "total annual escapement" used in this report refers to the cumulative escapement of a given species during the target operational period. Total annual escapement may consist of observed passage and estimated passage, the later applied to days when the weir was partially or totally inoperable. Inoperable periods may have been the result of interruptions in operations, a delayed start date or premature end date. Counts of non-salmon species were only reported as observed passage.

Observed Fish Passage

All fish observed passing upstream of the weir were enumerated by species. Daily enumeration typically began by 0800 hours and ended by 1200 hours, depending on abundance. When counting, the technician was positioned above the exit gate and enumerated passage with a multiple tally counter. Counting continued for a minimum of one hour, or until passage waned to near zero, then the exit gate was closed. The technician immediately recorded the fish passage in a designated notebook and zeroed the tally counter for the next count. This procedure was repeated several times each day, even when passage was minimal. At the end of each day, counts recorded in the notebook were copied to the logbook form entitled *"Hourly Fish Passage"* (Appendix B.1). Daily counts were tallied and recorded on the logbook form entitled "*Daily Fish Passage*" (Appendix B.2).

Estimated Fish Passage

Upstream salmon passage was estimated for days when the weir was inoperable. Estimates were assumed to be zero if the inoperable period occurred when passage for the species in question was considered negligible. Otherwise, daily passage estimates for inoperable periods lasting two or more days were determined using linear extrapolation in 2002.

Daily passage estimates determined by linear extrapolation were based on the average passage from two days before and two days after the inoperable period. The result was a linear increase or decrease in daily passage estimates over duration of the inoperable period. Daily estimates from this method were calculated using the following formula:

$$\hat{n}_{d_i} = \zeta + \eta\,(i) - n'_{d_i} \qquad (1)$$

$$\zeta = \frac{n_{d_1-1} + n_{d_1-2}}{2}$$

$$\eta = \frac{(n_{d_I+1} + n_{d_I+2}) - (n_{d_1-1} + n_{d_1-2})}{2(I+1)}$$

for (day-1, day-2,…, day-*i*,…*I*)

where:

$\hat{n}_{d_i}$ = passage estimate for the i^{th} day (day-1, day-2,.., day-*i*,...*I*) of a multiple day inoperable period;

n'_{d_i} = observed passage (if any) from a given day of the inoperable period;

n_{d_I+1} = observed passage the first day after the inoperable period (d_I);

n_{d_I+2} = observed passage the second day after the inoperable period;

n_{d_1-1} = observed passage one day before the inoperable period;

$n_{d_1 4 2}$ | observed passage two days before the inoperable period;

I | number of days the inoperable period lasted

Carcass Counts

Spawned out salmon and carcasses of dead salmon (both hereafter referred to as carcasses) washed up on the weir were counted by species and sexed, and passed downstream. The carcass count was recorded in the passage notebook and transferred to the "*Hourly Carcass Count*" forms in the logbook at the end of each counting day (Appendix B.3). Final carcass counts for the day were tallied by species and sex, and recorded on the "*Daily Carcass Count*" form in the logbook (Appendix B.4).

ASL Composition

ASL compositions of the total annual chinook, chum and coho salmon escapements were estimated by sampling a fraction of fish passage and applying the ASL composition of those samples to total escapement as described in DuBois and Molyneaux (2000).

Sample Collection

The fish trap was used to collect fish for ASL sampling. For each species, a pulse sampling design was used where intensive sampling was conducted for one to three days followed by a few days without sampling. The goal of each pulse was to collect samples from 210 chinook, 200 chum and 170 coho salmon. These sample sizes were selected for simultaneous 95% confidence interval of age-sex composition estimates no wider than 0.20 (Bromaghin 1993). The minimum acceptable number of pulse samples for the season was three per species, one from each third of the run. Active sampling was required to achieve adequate sample sizes for chinook salmon (Linderman et al. 2002).

Standard sampling procedures were followed to remove scales from the preferred area of the fish (DuBois and Molyneaux 2000, INPFC 1963). A minimum of three scales were taken from each fish and mounted on labeled gum cards and each card identified with a unique card number. Sex was determined by visually examining external morphology, keying on the development of the kype, roundness of the belly and the presence or absence of an ovipositor. Length was measured to the nearest millimeter from mid-eye to tail fork.

After each fish was sampled, it was released into a recovery area upstream of the weir and the sex and length information was recorded on ASL field forms (Appendix B.5). Data were eventually transferred from ASL forms to computer mark-sense forms. The completed gum cards and data forms were sent to Bethel and Anchorage ADF&G offices for processing. Original ASL gum cards, acetates and mark-sense forms were archived at the ADF&G office in Anchorage with resulting computer files.

Estimating ASL Composition

ADF&G staff in Bethel and Anchorage aged scales, processed the ASL data and generated data summaries (DuBois and Molyneaux 2000). These procedures generated two types of summary tables for each species; one described the age and sex composition and the other described length statistics. These summaries account for changes in the ASL composition throughout the season by first partitioning the season into temporal strata based on pulse sample dates, applying ASL composition of individual pulse samples to the corresponding temporal strata, and finally summing the strata to generate the estimated ASL composition for the season. This procedure ensured the ASL composition of the total annual escapement was weighted by abundance of fish in the escapement rather than the abundance of fish in the samples. Likewise, the estimated mean length composition for the total annual escapement was calculated by weighting the mean lengths in each stratum by the escapement of chum salmon pass the weir during that stratum.

Ages are reported using the European notation system. This system denotes the fish's age with two numerals separated by a decimal, the first numeral indicates the number of winters the juvenile fish has spent in fresh water and the second numeral indicates the number of winters spent in the ocean (Groot and Margolis 1991). Total age of the fish is equal to the sum of these two numerals, plus one to account for winter when the egg was incubating in gravel. For example, a chinook salmon described as an age-1.4 fish is actually 6 years old.

Mark-Recapture Tag Recovery

Tatlawiksuk River weir was integrated into two mark/recapture tagging studies conducted in the mainstem Kuskokwim River in 2002. In one study, spaghetti tags were inserted into chum, sockeye and coho salmon (Kerkvliet and Hamazaki *in progress*). Fish were tagged near Kalskag and Aniak, and Tatlawiksuk River weir served as one of the tag recovery locations. The weir crew gathered three sets of data in association with this study. The first data set was a list of tag recoveries the crew captured in the fish trap, and recorded the date of capture, species, tag number, tag color, presence of secondary marks, and the general condition of the fish. The tagged fish were captured in a manner comparable to the active sampling technique described for the ASL sampling of chinook salmon. Captured tagged fish were released upstream of the weir with the tag attached. Captured tagged fish data was recorded on the form entitled "*Tag Recovery Data Entry Form"* (Appendix B.6).

The second dataset was a daily summary of observed tagged salmon and observed fish passage. This data set was inclusive of tag recoveries described above, but included information for tagged fish that could not be captured as they passed upstream through a weir. This data was recorded on the form entitled "*Tagged and Untagged Salmon Counted at the Weir Site*" (Appendix B.7).

The third dataset focused on determining any incidence of tag loss by examining fish for a secondary mark. Fish that received spaghetti tags also had their adipose fin clipped as a secondary mark, the weir crew examined fish caught in the fish trap for these secondary marks. The secondary mark sample population included a daily goal of 80 fish depending on abundance, inclusive of any ASL sampled fish. Secondary mark sampling data were recorded on the form entitled "*Salmon Examined for Adipose Hole Punches*" (Appendix B.8).

The second tagging study involving Tatlawiksuk River weir was a radio telemetry project intended to estimate the total abundance of chinook salmon in the Kuskokwim River in 2002 (Stuby *in draft*). Radio transmitters were inserted into chinook salmon caught near Aniak and one of several radio receiver stations was placed at the mouth of the George River to monitor the movement of tagged chinook salmon. The known chinook salmon passage at the weir, coupled with data collected from the receiver station, and similar data collected at other weir projects were used to develop estimates of the total chinook salmon abundance upstream from the tagging site.

Habitat Profiling

Stream Temperature

Temperature was measured with a thermometer scaled in increments of 0.1°C. Thermometers were calibrated before the season against a precision thermometer certified by the National Institute of Standards and Technology. Stream temperature was measured from a station on the south shore, approximately 75-yds downstream of the weir. Measurements were made at least once each day at 0730 or 1030 hours. From shore, a crewmember submerged the thermometer a few centimeters below the water surface, allowed the thermometer to stand undisturbed for one or two minutes, then recorded the resulting temperature in the "*Climatology*" section of the camp logbook (Appendix B.9).

Stream Discharge and River Stage

The discharge of Tatlawiksuk River was periodically estimated using methods described by the U. S. Geological Survey (Rantz 1982). Velocities were measured using a Price AA current-meter with a top-setting wading rod. Stream discharge was calculated using the conventional current-meter method. The information collected for calculating discharge was recorded in the "*Stream Discharge*" section of the camp logbook (Appendix B.10).

Daily operations included monitoring fluctuations in water level with a standardized staff gage. The staff gage consisted of a metal rod incremented in centimeters and secured to a stake driven into the stream channel near camp. Height of the water surface as measured against the staff gage represented the "stage" of water level in the river. River stage was measured to the nearest 0.5 cm at least once each morning and recorded in the "*Climatology*" section of the camp logbook (Appendix B.9). Measurements were recorded more frequently when river stage was changing rapidly. For purposes of this report, a river stage in excess of 100 cm was considered a high water event.

Staff gage was calibrated against semi-permanent benchmarks needed for consistent stage measurements between years (Appendix C). These benchmarks consisted of sections of aluminum pipe, each several feet in length, driven into the gravel with only a few inches showing above the gravel surface. The exposed tip of each pipe corresponded to specific height above an arbitrary datum plane. Multiple benchmarks were established to allow some verification and as safeguards to loss or damage.

Water Chemistry

The objective was to collect water samples to provide a profile of water chemistry under low, intermediate and high flow conditions. Sampling was done early in the week and timed for transport to the ADF&G limnology lab in Soldotna within 24-hours of the sampling event. Water samples were collected upstream of the weir at a point approximately mid-channel. Water was collected from just under the surface using a 500-ml polyethylene bottle thoroughly pre-rinsed with water from the same location. The sample bottle was capped under water to avoid inclusion of air. Date, time, location of the sample collection, collector, and ADF&G contact information were externally labeled. The sample was stored in a cool and dark location until transport to the lab for analysis. Personnel at the laboratory were notified once the sample was in transit to ensure time for preparation before sample arrival. Details of parameters measured and methods used to analyze the water sample are described in Linderman et al. (2002).

RESULTS

Operations

The weir was operated from 17 June through 22 September in 2002. Operations were interrupted by one high water event for nine days from 12 through 20 September. High water level at the end of the season prevented removal of the substrate rail.

Fish Passage

Chinook Salmon

Total annual chinook salmon escapement in 2002 was 2,237 fish (Table 1). The first chinook salmon was observed on 21 June, therefore chinook salmon passage during the 15 through 17 June inoperable period was assumed zero. Peak daily passage of 517 fish occurred on 27 June. The median passage date was 3 July, and the central fifty-percent of the run occurred between 27

June and 7 July. The last chinook salmon was observed on 21 August.

Chum Salmon

Total annual chum salmon escapement was 24,542 fish, including three fish (< 1.0%) estimated passed upstream during the 15 through 17 June inoperable period (Table 2). Estimated passage was derived by linear extrapolation, the passage two days before 17 June assumed to be zero.

The first chum salmon was observed on 17 June, the first day of operation. Peak daily passage of 1,762 fish occurred on 6 July. The median passage date was 10 July, and the central fifty-percent of the run occurred between 4 and 17 July. The last chum salmon was observed on 5 September.

Coho Salmon

Total annual coho salmon escapement was 11,363 fish, including 231 fish (2.0%) estimated passed upstream during the 12 through 20 September inoperable period (Table 3). The estimated passage was derived by linear extrapolation.

The first coho salmon was observed on 27 July, and the peak daily passage of 1,199 fish occurred on 21 August. Median passage date was 23 August, and the central fifty-percent of the run occurred between 18 and 27 August. Coho salmon were still passing upstream in small numbers when the weir was dismantled on 22 September.

Other Species

The 2002 passage included 1 sockeye salmon, 1 pink salmon, 58 Arctic grayling, 2 northern pike, 21 whitefish and 1,155 longnose suckers (Appendix D.1 and D.2). Ninety percent of the longnose suckers passed upstream by 11 July, the twenty-fifth day of operation. Small numbers of suckers migrated back downstream throughout the summer, most of the downstream passage occurring in late July and August.

Carcass Counts

Salmon carcass counts included 10 chinook salmon, 2 sockeye salmon, 1,304 chum salmon and 4 coho salmon (Appendix E). Females accounted for 20.0%, 39.6% and 25.0% of the chinook, chum and coho carcass counts respectively. The first chinook carcass was found on 30 June. The first chum salmon carcass was found on 24 June, and a peaked count of 74 carcasses occurred on 24 July. The first coho carcass was found on 5 August.

ASL Composition

Chinook Salmon

Scale samples, sex and length information were collected from 305 chinook salmon (Table 4 and 5). Samples were collected from four pulses with sample sizes ranging from 58 to 86 fish per pulse, and escapement partitioned into four temporal strata based on dates when samples were collected. As applied to total annual escapement, the most abundant age class was age-1.4 chinook salmon (52.9%), followed by age-1.2 (23.2%), age-1.3 (19.7%) and age-1.5 (3.6%) fish. Sex composition was estimated to include 1,412 males (63.2%) and 823 females (36.8%). One age-1.2 fish in the sample was identified as a female. Average length for male age-1.2, -1.3, -1.4 and -1.5 chinook salmon was 566 mm, 691 mm, 754 mm and 825 mm, respectively. Average length for female age-1.2, -1.3, -1.4 and -1.5 chinook salmon was 587 mm, 695 mm, 790 mm, and 887 mm, respectively. Overall, male lengths ranged from 453 to 846 mm, while female lengths ranged from 587 to 1,015 mm.

Chum Salmon

Scale samples, and sex and length information were collected from 1,407 chum salmon (Table 6 and 7). Samples were collected from seven pulses with sample sizes ranging from 157 to 220 fish per pulse, and escapement was partitioned into seven temporal strata based on dates when samples were collected. As applied to total annual escapement, the most abundant age class was age-0.3 chum salmon (58.6%), followed by age-0.4 (33.2%), age-0.2 (6.7%) and age-0.5 (1.5%) fish. Sex composition was estimated to include 12,346 females (50.3%) and 12,196 males (49.7%). Average length for male age-0.2, -0.3, -0.4 and -0.5 chum salmon was 540 mm, 585 mm, 603 mm and 605 mm, respectively. Average length for female age-0.2, -0.3, -0.4 and -0.5 chum salmon was 520 mm, 548 mm, 566 mm and 584 mm, respectively. Overall, male chum salmon lengths ranged from 481 to 685 mm and female lengths ranged from 411 to 691 mm.

Coho Salmon

Scale samples, and sex and length information were collected from 640 coho salmon (Tables 8 and 9). Samples were collected from four pulses with sample sizes ranging from 113 to 166 fish per pulse, and escapement was partitioned into four temporal strata based on dates when samples were collected. Age was determined for 596 of the 640 sampled (93%). As applied to total annual escapement, the most abundant age class was age-2.1 coho salmon (89.3%), followed by age-3.1 (9.5%) and age-1.1 (1.2%) fish. Sex composition was estimated to include 4,373 females (38.5%) and 6,972 males (61.5%). Average length for male age-1.1, -2.1 and -3.1 coho salmon was 520 mm, 565 mm and 565 mm, respectively. Average length for female age-1.1, -2.1 and -3.1 coho salmon was 509 mm, 565 mm and 576 mm, respectively. Overall, male coho salmon lengths ranged from 401 to 676 mm and female lengths ranged from 432 to 625 mm.

Mark-Recapture Tag Recovery

A total of 124 spaghetti tagged chum salmon were observed passing upstream through the weir in 2002, of which 99 (79.8%) were captured and their tag numbers recorded (Table 10). Of 3,507 chum salmon examined for secondary marks, 12 fish had spaghetti tags and no untagged fish had a secondary mark.

No spaghetti tagged sockeye salmon were observed passing upstream through the weir in 2002.

A total of 151 spaghetti tagged coho salmon were observed passing upstream through the weir in 2002, of which 103 (68.2%) were captured and their tag numbers recorded (Table 10). Of 1,853 coho salmon examined for secondary marks, 39 fish had spaghetti tags and no untagged fish had a secondary mark.

Two radio tagged chinook salmon were observed passing upstream through the weir in 2002. Results from the radio telemetry study will be reported separately.

Habitat Profile

Water temperature, air temperature and water level were generally measured every morning from 15 June through 20 September in 2002 (Appendix F.1). Water temperature ranged from 4.0∀C to 17.0∀C, and air temperature ranged from -2.0∀C to 33.0∀C.

Stage measurements of daily water levels ranged from 54 cm to 151 cm. A high water event began on 12 September, the highest recorded stage measurement occurred on 14 September.

Measurements were taken on 3 September to estimate stream discharge at the weir site. The discharge was estimated to be 31.8 m^3/s at a river stage of 78.0 cm (Appendix F.2).

A water sample was collected on July 18 for chemical analysis and results are described in Appendix F.3.

DISCUSSION

Operations

The weir was operational throughout most of the 15 June through 20 September targeted operational period in 2002. The only inoperable period was nine days from 12 through 20

September caused by a high water event, during which passage gates remained open to pass fish freely upstream. Low water level for much of the season was an important element contributing to successful operation in 2002, but credit also goes to the design modification incorporated into the weir over the past few years (Linderman et al. 2002). Following the high water event of mid-September, operations resumed and no appreciable damage was incurred.

Persistent high water following 20 September did preclude removal of the substrate rail. One hundred feet of spare rail will be available for use at the start of the 2003 season should any damage to the existing rail be found.

The enclosed passage chute was installed in 2002, but remained unused because fish passage through the trap was sufficient. Unfortunately, the enclosed chute was heavy, cumbersome to install and difficult to remove. The intention was to design a movable passage chute to be relocated as water level changed, but the weight precluded changing location. An enclosed passage chute of the same design was used successfully to pass fish at George River, but the crew reported the weight a problem (Linderman et al. *in press*). The enclosed chute built for use on Takotna River was not installed (Clark and Molyneaux 2003b). The enclosed passage chute will continue to be deployed. The chute should be placed in a location ready to use under either exceptionally high or low water conditions. Future designs modifications should incorporate a lighter frame.

When the weir was inoperable because of high water conditions, the passage gates remained open to freely pass fish. If it appeared that the fish were experiencing considerable stress for any reason, counting was continued throughout the day or night, even at the expense of collecting ASL data. It is imperative that project leaders and weir personnel remain vigilant regarding impacts on the fish, recognize conditions that may threaten their well being, and take actions to ensure minimal impact.

Fish Passage

Chinook Salmon

The 2,237 total annual chinook salmon escapement at Tatlawiksuk River weir in 2002 was higher than any other year on record for the project (Figures 4 and 5). Escapement in 2002 was slightly above the escapement of 2,010 fish reported in 2001, and well above the 817 fish passed in 2000 and the 1,490 fish in 1999.

Currently no formal escapement goal exists for Tatlawiksuk River chinook salmon to serve as a benchmark for assessing the adequacy of escapements; therefore, we are left with making an assessment by comparison with other escapement indicators, particularly those few tributaries with escapement goals (Figures 6 and 7). Kuskokwim River chinook salmon escapements were generally considered adequate in 2002 and most of the available information showed a continued trend toward improvement over especially low escapements of 1999 and 2000. Escapements in 1999 and 2000 were generally half to a third of escapement goals at Kogrukluk River and aerial survey index streams, which contributed to Kuskokwim River chinook salmon identified as a stock of concern (Burkey et al 2000a). Tatlawiksuk River chinook salmon escapements have followed a similar trend with lower overall escapements in 1999 and 2000 followed by increasing escapements in 2001 and 2002. George and Takotna Rivers have been exceptions to this trend; chinook salmon escapements in these rivers have shown little or no increase from the low escapements of 1999 and 2000 (Linderman et al. *in press*, Clark and Molyneaux 2003b).

The 2002 run timing of chinook salmon to Tatlawiksuk River was the earliest of the four years of available data (Table 1, Figure 8). The mid-point of the weir passage was two to four days earlier than 2000 and 2001, and 14 days earlier than 1999. A similar between-year pattern in run timing was report at the Kwethluk (Roettiger et al. 2003), Tuluksak (Gates and Harper 2002), George (Linderman et al. *in press*), Kogrukluk (Clark and Molyneaux 2003a) and Takotna Rivers (Clark and Molyneaux 2003b).

Chum Salmon

As with chinook salmon, the 24,542 total annual chum salmon escapement at Tatlawiksuk River weir in 2002 was higher than any other year on record for the project (Figure 4 and 9). Again, escapement in 2002 was slightly above the escapement of 23,718 fish reported in 2001, and well above the escapements of 7,044 and 9,599 fish in 2000 and 1999.

Currently no formal escapement goal exists for Tatlawiksuk River chum salmon to serve as a benchmark for assessing the adequacy of escapements; therefore, we are left with making an assessment by comparison with other escapement indicators, particularly those few tributary streams with escapement goals (Figure 10). Kuskokwim River chum salmon escapements in 2002 were generally considered adequate and most available information showed a continued trend toward improvement over the especially low escapements of 1999 an 2000. Escapements in 1999 and 2000 were below goal for the Kogrukluk and Aniak Rivers, which contributed to Kuskokwim River chum salmon being identified as a stock of concern (Burkey et al 2000b). Tatlawiksuk River chum salmon escapements have followed a similar trend with lower overall escapements in 1999 and 2000 followed by increasing escapements in 2001 and 2002. In comparison to other tributaries that lack chum salmon escapement goals, the passage of chum salmon at Kwethluk River was the highest on record (Roettiger et al. 2003), and Takotna River was the second highest (Clark and Molyneaux 2003b). Chum salmon escapements at the George and Tuluksak Rivers were lower than 2001 (Linderman et al.2003, Gates and Harper 2002).

The 2002 run timing of chum salmon to Tatlawiksuk River was the earliest of the four years of available data (Table 2, Figure 8). The mid-point of passage at the weir was on 10 July, which was five days earlier than 2001, two days earlier than 2000, and nine days earlier than 1999. A similar between-year pattern in run timing was reported at Kwethluk (Roettiger et al. 2003), Tuluksak (Gates and Harper 2002), Aniak (Sandall *in press*), George (Linderman et al. *in press*), Kogrukluk (Clark and Molyneaux 2003a) and Takotna Rivers (Clark and Molyneaux 2003b).

Coho Salmon

The 11,363 total annual coho salmon escapement at Tatlawiksuk River weir in 2002 was a modest increase over the escapement of 10,539 fish in 2001, and well above the 3,455 fish passage in 1999 (Figure 4 and 11). Coho salmon escapement may have been higher in 1998, but weir operations were incomplete that year (Linderman et al. 2002); otherwise, the 2002 escapement was the highest on record for the weir project.

The 2002 season was the most complete record to date for the Tatlawiksuk River coho salmon, less than 2% of total annual escapement was estimated. In 1999 and 2001, 14.1% and 46.0% of the coho passage was estimated, respectively.

As is the case with chinook and chum salmon, no formal escapement goal exists for Tatlawiksuk River coho salmon; therefore, we assess Tatlawiksuk River escapement by comparing it to other escapement indicators, particularly Kogrukluk River, the only tributary in the Kuskokwim Area with an escapement goal for coho salmon (Burkey et al. 2002). Overall, Kuskokwim River coho salmon escapements in 2002 were variable (Figure 12). Escapement to Kogrukluk River in 2002 was 14,198 coho salmon, almost half the escapement goal of 25,000 fish and a decrease from the 19,387 escapement in 2001 (Clark and Molyneaux 2003a). Coho salmon escapement at Kwethluk and Takotna Rivers increased compared to 2001 (Roettiger et al. 2003, Clark and Molyneaux 2003b), but escapement to George and Tuluksak Rivers decreased by about half (Linderman et al. *in press*, Gates and Harper 2002).

The 2002 run timing of coho salmon to Tatlawiksuk River appeared to be a few days later than 2001, and a week or more earlier than 1999 (Table 3, Figure 8), but comparison of run timing between years is questionable because of large estimate percentages in 2001 and 1999. Run timing of coho salmon at other Kuskokwim River weir projects was later in 2002 than in 2001, but the difference in mid-points varied from 2 days at Tuluksak River (Gates and Harper 2003b), to 16 days at George River (Linderman et al. *in press*). Later run timing of the George River coho salmon run may have been influenced by lower water level conditions in August and September than occurred at other projects. The only exception was Takotna River weir in 2002, which was two days earlier than 2001. Comparing 2002 to 1999, Tatlawiksuk River coho salmon were 10 days earlier in 2002 and at Kogrukluk River they were 7 days later (Clark and Molyneaux 2003a); whereas, at George and Kwethluk Rivers the coho salmon returned 2 days earlier in 1999 (Linderman et al. *in press*, Roettiger et al. 2003).

Other Species

Other salmon species observed in the Tatlawiksuk River include small numbers of sockeye and pink salmon (Appendix D.1). The highest observed passage of sockeye salmon was 445 fish in 1997, but in other years, passage was fewer than 100. Highest observed passages of pink salmon were 644 fish in 1996 and 630 fish in 2002, but in other years passage was less than 100 fish. Low escapements reported for sockeye and pink salmon are not thought to be unusual because Tatlawiksuk River is not a primary spawning tributary for those species.

Longnose suckers are the most abundant non-salmon species counted through the Tatlawiksuk River weir. The highest recorded passage of this species was 15,840 fish in 2001 (Appendix D.2). However, abundance estimates are incomplete because upstream migration of this species starts before the beginning of weir operations. In late July and Early August, longnose suckers migrated downstream at the end of their spawning period. Most of the suckers were small enough to pass through the spaces between weir panel pickets, but some fish were not. Passage chutes were incorporated into the weir to accommodate downstream sucker migration. Additionally, the timing of downstream sucker migration often coincided with periods of high water, and the complete submergence of weir panels during high water events facilitated downstream sucker migration. Longnose suckers were reported as common in the Aniak, Tatlawiksuk and Takotna Rivers, but appear to be uncommon or absent from the Kwethluk, Tuluksak and Kogrukluk Rivers.

Small numbers of whitefish were observed passing upstream through the weir in some years. Passage estimates of whitefish, however, are incomplete because most species of whitefish can freely pass through the weir.

Small numbers of northern pike and Arctic Grayling were observed passing upstream through the weir in some years. These fish were believed to be resident species in the river. Most of these fish, especially Arctic Grayling, were small enough to pass through the weir panel pickets.

Carcass Counts

Carcass counts were used in the past to estimate the temporal period fish reside in the river, generally termed "stream life". Stream life for chinook salmon and chum salmon has been estimated by determining the number of days between the median upstream fish passage date, and the median downstream fish carcass date, however this analysis is misleading for many reasons, and does not accurately represent salmon stream life (Figures 13 and 14). Reasons behind this assessment include the small proportion of carcasses to escapements, annual variability of carcass to escapement proportions, and potential biases in sex ratios between carcasses and escapement. The small proportion of carcasses at the weir has positive ramifications for aerial stream surveys because it suggests most observable spawning salmon and their carcasses reside upstream of the river's first four miles during late July when surveys are typically flown. Another positive ramification is the protracted retention of carcasses on the spawning grounds enhances the retention of marine derived nutrients within the Tatlawiksuk River (Cederholm et al. 1999, Cederholm et al. 2000).

ASL Composition of Escapement

For the purposes of this report, the authors will focus on describing trends seen within the Tatlawiksuk River dataset coupled with broad reference to the generalized historical trends described in DuBois and Molyneaux (2000) and unpublished Kuskokwim River ASL data for the years 2000 through 2002 (L. DuBois, ADF&G, Anchorage, personal communication). Probably the greatest value in collecting ASL information is for future application toward developing spawner-recruit models used for establishing escapement goals (e.g., Clark and Sandone 2001). This information can be used for forecasting future runs, and to illustrate long-term trends in ASL composition (e.g., Bigler et al. 1996)

Chinook Salmon

Sample Collection. Chinook salmon samples were adequate for generating ASL composition estimates 2002 for the first time since the projects inception (Table 4 and 5). Obtaining an adequate number of chinook salmon samples was problematic in past years (Linderman et al. 2002). The technique of active sampling was implemented in 2001 and helped to increase the number of chinook salmon samples, but they remained inadequate for estimating ASL composition. Active sampling was successfully used in 2002 when over 300 fish were sampled.

ASL Composition. The dominant chinook salmon age class at the Tatlawiksuk River in 2002 (Table 4) was age-1.4 fish (52.9%), followed by age-1.2 (23.2%), age-1.3 (19.7%), age-1.5 (3.6%) and age-2.2 fish (0.4%). Although ASL composition of chinook salmon escapement was not determined from 1998 through 2001, a similar trend of age-1.4 dominance was seen in the 1999 through 2001 chinook salmon samples. A similar trend was not seen in the 1998 samples, most fish were age-1.3. Based on historical ASL data from other Kuskokwim River escapement projects, a dissimilar trend was seen in other Kuskokwim River chinook salmon populations. Additionally, most other Kuskokwim River chinook salmon populations consistently showed more overall age classes than the Tatlawiksuk River populations.

Male chinook salmon were the dominant sex in 2002, and the percentage of females increased as the runs progressed at the Tatlawiksuk River (Table 4, Figure 15). The percentage of male fish was 63.2%; the percentage of female fish was 36.8%. Additionally, the percentage of female fish increased from 37.2% to 50.0% as the run progressed. Although ASL composition of chinook salmon escapement was not determined from 1998 through 2001, the trend of male dominance can be inferred from chinook salmon samples collected in these years. Although ASL composition of chinook salmon escapement was not determined in 2001, the trend of increasing female proportion can be inferred from samples collected. Based on historical ASL data from other Kuskokwim River escapement projects, similar trends were seen in other Kuskokwim River chinook salmon populations. Male chinook salmon have consistently been the dominant sex in these populations, male chinook salmon percentages fluctuate between 60% and 70%, and female chinook salmon percentages fluctuate between 30% and 40%. In general, the trend of female percentages increasing as the runs progress occurs in other Kuskokwim River chinook salmon populations.

In 2002, Tatlawiksuk River chinook salmon exhibited length partitioning by age class (Figure 16). Average length of age-1.3, -1.4 and -1.5 female fish was 695 mm, 790 mm and 887 mm respectively; the average length of age-1.2, -1.3, -1.4 and -1.5 male fish was 556 mm, 691 mm, 754 mm and 825 mm respectively. Although ASL composition of chinook salmon escapement was not determined in 2001, a similar trend was seen in chinook salmon samples collected in this year. Based on historical ASL data from other Kuskokwim River escapement projects, a similar trend in length composition exists in other Kuskokwim River chinook salmon populations. Length partitioning by age class is evident in these populations, even in those with more chinook salmon age classes than the Tatlawiksuk River.

Chum Salmon

ASL Composition. In 2002, the percentages of younger aged chum salmon remained relatively constant in contrast with chum salmon age compositions from previous years (Figure 17). This difference may be explained by a higher than average percentage of age-0.2 fish which increased from 0.6% to 24.8 as the run progressed, and a run total of 6.7%. Historically, age-0.2 chum salmon did not exceed 2.0%, and had an average percentage from 1999 through 2001 of 0.83%.

In 2002, the percentage of female fish increased as the runs progressed in the Tatlawiksuk River, the average percentage of female fish increasing from 25.8% to 62.4% (Figure 15). A similar trend was seen in the historical Tatlawiksuk River chum salmon sex compositions, and in sex compositions from elsewhere in the Kuskokwim River drainage. One exception to this trend was at Kogrukluk River, which has consistently exhibited chum salmon sex composition dissimilar to Kuskokwim River trends.

In 2002, age-0.3 and -0.4 fish exhibited length partitioning, and male chum salmon tended to be larger than females in the Tatlawiksuk River (Figure 18). The average length of age-0.3 and -0.4 female fish was 520 mm and 548 mm respectively; the average length of age-0.3 and -0.4 male fish was 540 mm and 585 mm respectively. The overall average length of female fish was 554 mm; the overall average length of male fish was 583 mm. Similar trends were seen in historical chum salmon length compositions at Tatlawiksuk River and elsewhere in the Kuskokwim River drainage.

Coho Salmon

ASL Composition. In 2002, age-2.1 coho salmon was the dominant age class in the Tatlawiksuk River at 89.3% (Table 8, Figure 17). A similar trend was seen in historical chum salmon age compositions at Tatlawiksuk River, and elsewhere in the Kuskokwim River drainage. Additionally, the percentage of age-2.1 fish remained relatively constant for the years that ASL composition of coho salmon escapement was determined, and ranged from a low of 79.1% to a high of 91.2% in 2001.

In 2001, the percentages of male to female coho salmon remained close to a 50%-50% split in the Tatlawiksuk River, females comprising 52.1% and males comprising 47.9% of the escapement (Figure 15). Additionally, the percentage of females increased as the runs progressed from 36.3% to 60.4%. The trend of similar male and female percentages was consistent with historical sex composition trends at the Tatlawiksuk River, and elsewhere in the Kuskokwim River drainage. The trend of increasing female percentages as the run progressed was not consistent with historical sex composition trends at the Tatlawiksuk River. Female percentages typically remained relatively constant as the runs progressed.

In 2002, male and female coho salmon lengths remained relatively constant as the runs progressed and male coho salmon mean length ranges were similar to female mean length ranges (Table 9, Figure 19). Male mean lengths ranged from 520 mm to 565 mm, and female mean lengths ranged from 509 to 576. Similar trends were seen in historical chum salmon length compositions at the Tatlawiksuk River, and elsewhere in the Kuskokwim River drainage.

Mark-recapture Tag Recovery

Findings of the 2002 salmon mark/recapture tagging and radio-telemetry projects will be discussed in detail by Kerkvliet and Hamazaki (*in progress*) and Stuby (*in draft*). This report summarizes findings pertinent to Tatlawiksuk River in 2002.

Chum Salmon

The daily observed and recovered tags at the weir were similar to each other, were well distributed throughout most of the chum salmon run, and the run timing of tagged fish was slightly later than the overall chum salmon passage (Figure 20 and 21). The distribution and similar run timing of recovered tags indicates they were representative of the total number of chum salmon observed returning to Tatlawiksuk River; however the slight delay in run timing through the 75% passage point suggests the earlier portion of the Tatlawiksuk River chum salmon run had a lower likelihood of being tagged at the Kalskag-Aniak tagging site, and the later portion had a higher likelihood of being tagged.

Recovery of the numbered spaghetti tags provided an opportunity to examine the distribution of tagged Tatlawiksuk River chum salmon relative to the total chum salmon catch at the Kalskag-Aniak tagging site, and allowed for an examination of transit time and swimming speed of these fish between the tagging site and weir. Chum salmon tags recovered at Tatlawiksuk River were weighted toward the first half of the total chum salmon catch at the Kalskag-Aniak tagging site, indicating chum salmon migrating to Tatlawiksuk River had a higher likelihood of being captured during the first half of the total catch (Figure 22). Transit time for these fish from the tagging site to the weir ranged from 6 to 14 days with a mean transit time of 8 days (Table 11). Migration speed ranged from 20 to 52 km per day and had a mean migration speed of 37 km per day.

Recovery of the numbered chum salmon spaghetti tags provided some preliminary information about run timing of specific spawning populations passing the Kalskag-Aniak tagging site. Tag recoveries from five tributary escapement projects including Aniak River sonar, and the Tatlawiksuk, Kogrukluk and Takotna River weirs suggest a distinct difference in run timing between the spawning populations of these tributaries as they passed the Kalskag-Aniak tagging site. Run timings were progressively earlier the farther upstream these spawning tributaries were located (Figure 23). The general progression, from earliest to latest, was Takotna River, Kogrukluk River, Tatlawiksuk River, and Aniak River. Median passage dates between the Takotna and Aniak Rivers spanned 24 days. Knowledge of the difference in run timing between spawning populations is a fundamental insight necessary for sustainable management of Kuskokwim River chum salmon fisheries.

The ratio of observed tagged chum salmon to total annual chum salmon escapement was lower at Tatlawiksuk River weir when compared to a similar ratio at George River weir (C. Kerkvliet, ADF&G Anchorage, personal communication). This weir is located in a tributary farther downstream from the Tatlawiksuk River. The lower chum salmon tag ratio in Tatlawiksuk River indicates this spawning population had a lower probability of capture at the tagging site than did chum salmon bound for tributaries farther up the Kuskokwim River.

The difference in tag ratios between tributaries does not appear to be a result of tag loss. Of the 2,141 chum salmon examined for secondary marks at the Tatlawiksuk River, no untagged fish were found with a secondary mark indicating that any tag loss was minimal. Similar findings were reported at other tributary escapement projects (C. Kerkvliet, ADF&G, Anchorage, personal communication).

Coho Salmon

Daily recovered and observed coho salmon tags were dissimilar to each other during the central portion of overall coho run, and run timing of recovered and observed tags was delayed compared to the overall coho run (Figure 20 and 21). Higher river stages and water turbidity created difficulties in tagged fish recovery during four days in the central portion of the total coho run. Most un-recovered observed tags passed through the weir during this time, indicating the recovered tags were not representative of observed tags during this portion of the overall coho run. Fortunately, most observed tags were recovered throughout the coho run, indicating the recovered tags are representative of most tagged coho salmon returning to the Tatlawiksuk River. The delayed run timing of the recovered and observed tags suggests either: the earlier portion of the Tatlawiksuk River coho salmon run had a lower likelihood of being tagged at the Kalskag-Aniak tagging site, and the later portion had a high likelihood of being tagged; or upstream migration of tagged fish was delayed relative to untagged fish.

Similar to chum salmon, recovery of numbered spaghetti tags provided an opportunity to examine distribution of tagged Tatlawiksuk River coho salmon relative to the total chum salmon catch at the Kalskag-Aniak tagging site, and allowed for an examination of transit time and swimming speed of these fish between the tagging site and weir. The coho salmon tags recovered at the Tatlawiksuk River were well distributed over the total chum salmon catch at the Kalskag-Aniak tagging site (Figure 22). This finding indicates coho salmon migrating to the Tatlawiksuk River were well represented by the tagging project, and also indicates recovered tags may represent coho passage at the weir better than the recovered tags to weir passage comparison. The transit time for these fish from tagging site to weir ranged from 7 to 29 days and had a mean transit time of 14 days (Table 12). Migration speed ranged from 10 to 45 km per day and had a mean migration speed of 24 km per day.

Recovery of numbered coho salmon spaghetti tags provided some preliminary information about run timing of specific spawning populations passing the Kalskag-Aniak tagging site. Tag recoveries from four tributary escapement projects including the George, Tatlawiksuk, Kogrukluk and Takotna River weirs suggest a distinct difference in run timing between spawning populations of these tributaries as they passed the Kalskag-Aniak tagging site (Figure

23). The general progression, from earliest to latest, was Takotna River, Tatlawiksuk River, Kogrukluk River and Tatlawiksuk River. Run timings were not progressively earlier the farther upstream these spawning tributaries were located. The Kogrukluk River is farther upstream from the tagging sites than the Tatlawiksuk River is, but tagged coho salmon run timing for Kogrukluk River fish was later than Tatlawiksuk River fish.

The ratio of observed tagged coho salmon to total annual coho salmon escapement was similar between the Tatlawiksuk Kogrukluk, Tatlawiksuk and Takotna River weirs (C. Kerkvliet, ADF&G Anchorage, personal communication). The similarity between coho salmon tag ratios at these projects indicates spawning populations in these tributaries had a relatively equal probability of capture at the tagging sites.

Of the 359 coho salmon examined for secondary marks at the Tatlawiksuk River, no untagged fish were found to have a secondary mark indicating tag loss was minimal. Similar findings were reported at other tributary escapement projects (C. Kerkvliet, ADF&G, Anchorage, personal communication).

Habitat Profiling

In 2002, water temperatures fluctuated between 3 °C and 19 °C, and air temperature fluctuated between -2 °C and 26 °C (Appendix F). These results were similar to temperature ranges seen in previous years. Apparently, air temperature had no effect on fish in any given year.

In 2002, observed river stage fluctuated between 54 cm to 151 cm (Appendix F). These results were similar to river stage ranges seen in previous years, however observed river stage remained lower throughout August in 2002 when compared to previous years (Figure 5, 9 and 11). Consistent river stage contributed to uninterrupted operations throughout most of August in 2002, which, in turn, resulted in the most accurate total annual coho salmon escapement. Note, in some years, river stage measurements were not recorded for the entire targeted operational period because of late start-up, early take-out and premature termination of project operations. Additionally, some moderate to large increases in daily chinook, chum and coho salmon passage do coincide with increasing river stage.

Of the four, river stage benchmarks established at the Tatlawiksuk River, benchmark three and four still remain (Appendix C). These benchmarks are not permanent structures. Their heights above the datum plane should be linked to a permanent structure along the stream bank, but construction has not been instigated because the instability of the bank along the camp side of the river prevents the possibility of a permanent link to the benchmarks. These benchmarks must be evaluated and maintained on an annual basis to ensure their success.

The estimated discharge made near the weir site in 2002 was 31.8 m^3/s at a river stage of 78 cm (Appendix F). Discharge was estimated in 1999 and 2000, and the highest estimated discharge was 58.2 m^3/s on 4 August in 2000, at 82.0 cm. The lowest recorded discharge was estimated in 2002.

The investigators intended to estimate discharge a minimum of three times each season, however, limited availability of equipment and trained staff precluded meeting this objective.

CONCLUSIONS

1) **The evolution of the weir and modification of operational procedures since inception of the Tatlawiksuk River weir project has continued to:**
   a) increase the reliability of the weir to span the targeted operational period, and
   b) increase the overall effectiveness of the weir regarding accomplishment of project objectives.

2) **Total annual escapements of chinook, chum and coho salmon at the Tatlawiksuk River weir project have:**
   a) indicated chinook salmon escapements increased again in 2002 when compared to low escapements seen in 1999 and 2000, and this trend was similar to chinook salmon escapements trends seen throughout most of the Kuskokwim River drainage,
   b) indicated chum salmon escapements increased again in 2002 when compared to the low escapements seen in 1999 and 2000, and this trend was similar to chinook salmon escapements trends seen throughout most of the Kuskokwim River drainage, and
   c) indicated coho salmon escapement in 2002 was similar to 2001, and was considered an improvement when compared to variability of increases and decreases in coho salmon escapements seen throughout the Kuskokwim River drainage in 2002

3) **The ASL data collected at the Tatlawiksuk River weir project in 2002 has:**
   a) indicated trends similar to existing ASL data of Kuskokwim River salmon stocks.

4) **The mark-recapture tag data collected at the Tatlawiksuk River weir in 2002 has:**
   a) indicated travel time and travel speed of chum and coho salmon from the tagging sites in 2002, and
   b) indicated run timing separations between chum and coho salmon spawning populations based on spawning tributary location within the Kuskokwim River drainage.

5) **The habitat profile data collected at the George River weir project has:**
   a) allowed comparison of water levels between years and enabled better assessment of weir performance.

RECOMMENDATIONS

Operations

∉ **Incorporate a videography system to allow for continuous fish passage opportunity**. One means of addressing adequate fish passage concerns is incorporation of a videography system to enumerate fish passage. Limitations to this approach include: adequate funding for equipment costs; logistical difficulties in generating adequate power in a remote location; and the added likelihood fish passage data will be lost because of equipment failure, human error or other unforeseeable complications.

Fish Passage

∉ **The Tatlawiksuk River weir project has been a valuable addition to the array of well-distributed escapement monitoring projects throughout the Kuskokwim River drainage, and its annual operation should continue uninterrupted indefinitely.** Adequate monitoring of Kuskokwim River salmon escapements is one of many requirements needed for long term, sustainable management of Kuskokwim River salmon stocks. Discontinuation of the Tatlawiksuk River, or any other escapement monitoring project, would be a step backward from progress made in recent years toward collecting salmon stock assessment and information needs in the Kuskokwim River drainage.

∉ **Establish escapement goals for Tatlawiksuk River chinook, chum and coho salmon.** State managers continue seeking to establish biological escapement goals (BEG) to produce maximum sustainable yield (MSY) for these species at the Tatlawiksuk River, and in other Kuskokwim River spawning tributaries; however, determining MSY requires a rigorous level of stock specific spawner-recruit information still lacking. Alternatively, sustainable escapement goals (SEG) can be established, but require a 5- to 10- year data series of reliable escapement estimates that demonstrate sustainable yields. Adequate salmon stock information needed for establishing escapement goals not yet available at the Tatlawiksuk River, heightens the need for uninterrupted continuation of the project.

ASL Data

∉ **Sample size objectives for ASL sampling should be re-evaluated for chinook salmon more appropriate to the actual run sizes encountered in the Tatlawiksuk River.** Under current methods, the crew is expected to annually collect 630 chinook salmon; i.e., three pulses each consisting of 210 fish. The total annual chinook run in the Tatlawiksuk River, however, has only ranged from 817 to 2,237 fish. The current ASL sampling size objectives are designed for larger populations, therefore may not be appropriate for the chinook salmon population found in Tatlawiksuk River. Sampling objectives need to be reviewed in context with the low abundance of chinook salmon.

Project Management

∉ **The Tatlawiksuk River weir should continue to be operated jointly by KNA and ADF&G.** The partnership developed between KNA and ADF&G in the operation of fisheries projects, including the Tatlawiksuk River weir, has proven to be a successful strategy. Each organization compliments the partnership by providing an element the other cannot.

KNA provides a communication link that helps its constituents be more informed and less prone to the distrust and misinformation that can result when local organizations and their constituents are not directly involved. Active involvement of KNA adds an element of trust and acceptance toward both the projects and ADF&G non-existent if ADF&G operated these projects alone. KNA is more effective at hiring technicians for these projects from the local area, and makes these jobs more acceptable and accessible for potential applicants. Additionally, the proximity of KNA facilities to these cooperatively managed projects provides logistical benefits for staging and for responding to various inseason project needs. In this respect, KNA functions much like a satellite office of ADF&G.

Despite these attributes, KNA would have a difficult time managing the Tatlawiksuk River weir and other jointly operated fisheries projects without ADF&G involvement. The fisheries staff of ADF&G has a greater depth of experience in fisheries project management; both in terms of on-site field experience, and broader aspects such as planning, data management and analysis, and report writing. The addition of a Partners Fisheries Biologist to the KNA staff has shifted some of these responsibilities to KNA, evident with the inclusion of David Cannon as a co-author of this report. However, addition of one fisheries biologist to the KNA staff has not replaced all ADF&G personnel involved, and the many years of fisheries management experience, scientific expertise and understanding they contribute. Additionally, KNA's fisheries biologist has a myriad of other responsibilities, and is involved with multiple projects and with multiple cooperative partners. This time limit reduces the amount direct attention KNA's biologist can contribute to individual project requirements. For example, the timely completion of this report would have been impossible without direct involvement of ADF&G staff.

The partnership between KNA and ADF&G has been a major contributing factor to success of the many fisheries projects for which these organizations are responsible. Discontinuation of this partnership would result in a detrimental loss of continuity and support to both inseason and postseason project requirements, and increases the possibility of misunderstanding and lack of trust between ADF&G, KNA and the public. Continued joint operation will help to ensure the success of these projects in the future.

LITERATURE CITED

Alaska Department of Fish and Game (ADF&G), Habitat Division. 1998. An atlas to the catalog of water important for spawning, rearing or migration of anadromous fishes. Region VI: Interior region resource management. Alaska Department of Fish & Game, Anchorage, Alaska. Revised periodically.

Bigler, B.S., D.W. Welch, and J.H. Helle. 1996. A review of size trends among North Pacific salmon (*Oncorhynchus* spp.). Canadian Journal of Fisheries and Aquatic Sciences. 53:455-465.

Bromaghin, J.F. 1993. Sample size determination for interval estimation of multinomial probabilities. The American Statistician. 47(3): 203-206.

Brown, C.M. 1983 (draft). Alaska's Kuskokwim River region: a history. Bureau of Land Management, Anchorage.

Buklis, L.S. 1999. A description of economic changes in commercial salmon fisheries in a region of mixed subsistence and market economies. Arctic. 52 (1): 40-48.

Burkey, C., Jr. and P. Salomone. 1999. Kuskokwim Area Salmon Escapement Observation Catalog, 1984 -1998. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A99-11, Anchorage.

Burkey, C. Jr., M. Coffing, D. B. Molyneaux and P. Salomone. 2000a. Kuskokwim River chinook salmon stock status and development of management / action plan options, report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report 3A00-40, Anchorage.

Burkey, C. Jr., M. Coffing, D. B. Molyneaux and P. Salomone. 2000b. Kuskokwim River chum salmon stock status and development of management / action plan options, report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report 3A00-41, Anchorage.

Burkey, C. Jr., M. Coffing, J. Estensen, R. L. Fisher, and D. B. Molyneaux. 2002. Annual management report for the subsistence and commercial fisheries of the Kuskokwim Area, 2001. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Regional Information Report 3A02-53, Anchorage.

Cederholm, C.J., D.H. Johnson, R.E. Bilby, L.G. Dominguez, A.M. Garrett, W.H. Graeber, E.L. Greda, M.D. Kunze, B.G. Marcot, J.F. Palmisano, W.G. Pearcy, C.A. Simenstad, and P.C. Trotter. 2000. Pacific salmon and wildlife – ecological contexts, relationships, and implications for management. Special Edition Technical Report, Prepared for D.H. Johnson and T.A. O'Neil (Mang. Dirs.). Wildlife-Habitat Relationships in Oregon and Washington. Washington Department of Fish and Wildlife, Olympia.

Cederholm, C.J., M.D. Kunze, T. Murota and A. Sibatani. 1999. Pacific salmon carcasses: essential contributions of nutrients and energy for aquatic and terrestrial ecosystems. Fisheries 24(10): 6-15.

Clark, J.H. and G.J. Sandone. 2001. Biological escapement goal for Anvik River chum salmon. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A01-06, Anchorage.

Clark, K.J. and D.B. Molyneaux. 2003a. Kogrukluk River weir salmon studies, 2002. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A03-11, Anchorage.

Clark, K.J. and D.B. Molyneaux. 2003b. Takotna River salmon studies and upper Kuskokwim River aerial surveys, 2002. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A03-10, Anchorage.

Coffing, M. 1991. Kwethluk subsistence: contemporary land use patterns, wild resource harvest and use, and the subsistence economy of a lower Kuskokwim River area community. Alaska Department of Fish and Game, Subsistence Division, Technical Paper No. 157, Juneau.

Coffing, M. 1997a. Kuskokwim area subsistence salmon harvest summary, 1996; prepared for the Alaska Board of Fisheries, Fairbanks, Alaska, December 2, 1997. Alaska Department of Fish and Game, Subsistence Division, (Region III unpublished report), Bethel.

Coffing, M. 1997b. Kuskokwim area subsistence salmon fishery; prepared for the Alaska Board of Fisheries, Fairbanks, Alaska, December 2, 1997. Alaska Department of Fish and Game, Subsistence Division, (Region III unpublished report), Bethel.

Coffing, M., L. Brown, G. Jennings and C. Utermohle. 2000. The subsistence harvest and use of wild resources in Akiachak, Alaska, 1998. Final Project Report to U.S. Fish and Wildlife Service, Office of Subsistence Management, FIS 00-009, Juneau.

DuBois, L. and D.B. Molyneaux. 2000. Salmon age, sex and length catalog for the Kuskokwim Area, 1999 Progress Report. Regional Information Report No. 3A00-18. Alaska Department of Fish and Game, Division of Commercial Fisheries, AYK Region, Anchorage.

Estensen, J.L. 2002. Middle Fork Goodnews River Fisheries Studies, 2000 - 2001. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Regional Information Report No. 3A02-31, Anchorage.

Gates, K.S., and K.C. Harper 2002. Abundance and run timing of adult Pacific salmon in the Tuluksak River, Yukon Delta National Wildlife Refuge, Alaska, 2002. U.S. Fish and Wildlife Service, Kenai Fishery Resource Office, Alaska Fisheries Data Series Number 2003-1.

Groot, C. and L. Margolis (Eds.). 1991. Pacific Salmon Life Histories. Department of Fisheries and Oceans, Biological Sciences Branch, Canada. UBC Press, Vancouver, British Columbia.

Hauer, F. R. and W. R. Hill. 1996. Temperature, light and oxygen. Pages 93-106 in F. R. Hauer and G. A. Lambert (Eds.) Methods in Stream Ecology. Academic Press, San Diego, CA.

INPFC (International North Pacific Fisheries Commission). 1963. Annual report, 1961. Vancouver, British Columbia.

Kerkvliet, C. M. and T. Hamazaki. *In progress*. A mark-recapture experiment to estimate the abundance of Kuskokwim River chum, sockeye and coho salmon, 2002. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Regional Information Report No. TBA. Anchorage.

Kruse, G.H. 1998. Salmon run failures in 1997-1998: a link to anomalous ocean conditions? Alaska Fishery Research Bulletin 5 (1): 55-63.

Linderman, J.C. Jr., D.B. Molyneaux, L. DuBois and W. Morgan. 2002. Tatlawiksuk River Weir salmon studies, 1998 – 2001. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Regional Information Report No. 3A02-11. Anchorage.

Linderman, J.C. Jr., D.B. Molyneaux, L. DuBois and D.J. Cannon. *In Press*. George River Salmon Studies, 1996 to 2002. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Regional Information Report No. 3A03-TBA. Anchorage.

NRC (National Research Council). 1996. Upstream: salmon and society in the Pacific Northwest, Committee on the Protection and Management of Pacific Northwest Salmonids. National Academy Press, Washington, D.C.

Rantz, S. E., and others 1982. Measurement and computation of streamflow: volume 1, measurement of stage and discharge. U.S. Geological Survey. Geological Survey Water-supply Paper 2175. Washington, D.C.: U.S. Government Printing Office.

Roettiger T.G., K.C. Harper, and D. Nolfi 2003. Abundance and run timing of adult salmon in the Kwethluk River, Yukon Delta National Wildlife Refuge, Alaska, 2002. U.S. Fish and Wildlife Service, Kenai Fishery Resource Office, In Press.

Sandall, H.D. 2003. Estimation of Aniak River chum salmon passage in 2002 using hydroacoustic methodologies. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A03-(*in press*), Anchorage.

Schneiderhan, D.J. 1983. Kuskokwim stream catalog, 1954-1983. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, unpublished, Anchorage.

Stewart, R. 2002. Resistance board weir panel construction manual, 2002. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region. Regional Information Report No. 3A02-21. Anchorage.

Stuby, L. *In draft.* Inriver abundance of chinook salmon in the Kuskokwim River, 2002. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Data Series No. 03-TBA. Fairbanks.

Tobin, J. H. and K.C. Harper. 1998. Abundance and run timing of adult salmon in the East Fork Andreafsky River, Yukon Delta National Wildlife Refuge, Alaska, 1997. U.S. Fish and Wildlife Service, Kenai Fishery Resource Office, Alaska Fisheries Data Series Number 98-2, Kenai, Alaska

Williams, J. G. 2000. Alaska population overview, 1999 estimates. Alaska Department of Labor and Workforce Development, Research and Analysis Section, pgs. 146 - 149.

TABLES

Table 1. Historical chinook salmon passage at the Tatlawiksuk River weir, 1998 - 2002.

Date	Daily Passage					Cumulative Passage					Percent Passage			
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1999	2000	2001	2002
6/15	0 b	0	0	0 b	0 b	0	0	0	0	0	0	0	0	0
6/16	0 b	0	0	0 b	0 b	0	0	0	0	0	0	0	0	0
6/17	0 b	0	0	0 b	0 e	0	0	0	0	0	0	0	0	0
6/18	0	0	2	0 b	0	0	0	2	0	0	0	0	0	0
6/19	0	0	2	0 b	0	0	0	4	0	0	0	0	0	0
6/20	1	0	0	0	0	1	0	4	0	0	0	0	0	0
6/21	0	0	0	1	1	1	0	4	1	1	0	0	0	0
6/22	0	0	1	2	19	1	0	5	3	20	0	1	0	1
6/23	8	4	0	1	67	9	4	5	4	87	0	1	0	4
6/24	12	2	10	3	3	21	6	15	7	90	0	2	0	4
6/25	7	2	0	5	2	28	8	15	12	92	1	2	1	4
6/26	12	6	20	71	8	40	14	35	83	100	1	4	4	4
6/27	37	4	2	18	517	77	18	37	101	617	1	5	5	28
6/28	31	14	5	38	21	108	32	42	139	638	2	5	7	29
6/29	23	5	2	15	195	131	37	44	154	833	2	5	8	37
6/30	5	2	22	105	25	136	39	66	259	858	3	8	13	38
7/01	99	16	26	364	15	235	55	92	623	873	4	11	31	39
7/02	182	5	149	24	84	417	60	241	647	957	4	29	32	43
7/03	171	13	47	27	108	588	73	288	674	1,065	5	35	34	48
7/04	224	26	30	13	135	812	99	318	687	1,200	7	39	34	54
7/05	74	14	42	111	338	886	113	360	798	1,538	8	44	40	69
7/06	62	15	17	428	64	948	128	377	1,226	1,602	9	46	61	72
7/07	22 d	14	18	170	145	970	142	395	1,396	1,747	10	48	69	78
7/08	c	13	13	21	10		155	408	1,417	1,757	10	50	70	79
7/09	c	21	73	29	24		176	481	1,446	1,781	12	59	72	80
7/10	c	40	51	29	27		216	532	1,475	1,808	14	65	73	81
7/11	c	79 a	45	14	48		295	577	1,489	1,856	20	71	74	83
7/12	c	118	50	48	19		413	627	1,537	1,875	28	77	76	84
7/13	c	54	9	150	20		467	636	1,687	1,895	31	78	84	85
7/14	c	64	0	48	21		531	636	1,735	1,916	36	78	86	86
7/15	c	24	8	47	103		555	644	1,782	2,019	37	79	89	90
7/16	c	65	20	12	10		620	664	1,794	2,029	41	81	89	91
7/17	c	6	47	19	15		626	711	1,813	2,044	42	87	90	91
7/18	c	146	5	31	3		772	716	1,844	2,047	52	88	92	92
7/19	c	20	8	36	15		792	724	1,880	2,062	53	89	93	92
7/20	c	381	10	17	8		1,173	734	1,897	2,070	79	90	94	93
7/21	c	18	2	8	14		1,191	736	1,905	2,084	80	90	95	93
7/22	c	9	16	21	29		1,200	752	1,926	2,113	80	92	96	94
7/23	c	86	7	11	13		1,286	759	1,937	2,126	86	93	96	95
7/24	c	46	5	13 b	7		1,332	764	1,950	2,133	89	93	97	95
7/25	c	33	8	9 b	18		1,365	772	1,959	2,151	91	94	97	96
7/26	c	18	2	6	4		1,383	774	1,965	2,155	93	95	98	96
7/27	c	14 a	3	5 b	24		1,397	777	1,970	2,179	94	95	98	97
7/28	c	10	1	2	20		1,407	778	1,972	2,199	94	95	98	98
7/29	c	22	1	8	10		1,429	779	1,980	2,209	96	95	98	99
7/30	c	15	6	3	5		1,444	785	1,983	2,214	97	96	99	99
7/31	c	6	1	5 b	6		1,450	786	1,988	2,220	97	96	99	99
8/01	c	6	2	4 b	1		1,456	788	1,992	2,221	97	96	99	99
8/02	c	1	3 b	3 b	5		1,457	791	1,995	2,226	98	97	99	100
8/03	c	4	8	2 b	0		1,461	799	1,997	2,226	98	98	99	100
8/04	c	3	2	2	1		1,464	801	1,999	2,227	98	98	99	100
8/05	c	5	0	1	0		1,469	801	2,000	2,227	98	98	99	100
8/06	c	3	1	1	0		1,472	802	2,001	2,227	99	98	100	100
8/07	c	2	1	2	1		1,474	803	2,003	2,228	99	98	100	100
8/08	c	4	3	2	0		1,478	806	2,005	2,228	99	99	100	100
8/09	c	0	1	0	1		1,478	807	2,005	2,229	99	99	100	100
8/10	c	1 b	1	1	0		1,479	808	2,006	2,229	99	99	100	100
8/11	c	1 b	1	0	0		1,480	809	2,006	2,229	99	99	100	100
8/12	c	1 b	0	2	1		1,481	809	2,008	2,230	99	99	100	100
8/13	c	1 b	1	1	0		1,482	810	2,009	2,230	99	99	100	100
8/14	c	1 b	2 b	0	0		1,483	812	2,009	2,230	100	99	100	100
8/15	c	1 b	1 b	0	2		1,484	814	2,009	2,232	100	100	100	100
8/16	c	1 b	1 b	0	0		1,485	814	2,009	2,232	100	100	100	100
8/17	c	1 b	0 b	0 b	0		1,486	814	2,009	2,232	100	100	100	100
8/18	c	1 b	0 b	0 b	0		1,487	815	2,009	2,232	100	100	100	100
8/19	c	1 b	1 b	0 b	1		1,488	815	2,009	2,233	100	100	100	100

-Continued-

Table 1. (page 2 of 2)

Date	Daily Passage					Cumulative Passage					Percent Passage			
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1999	2000	2001	2002
8/20	c	0 b	0 b	0 b	0		1,488	815	2,009	2,233	100	100	100	100
8/21	c	0 b	0 b	0 b	1		1,488	815	2,009	2,234	100	100	100	100
8/22	c	0 b	0 b	0 b	0		1,488	816	2,009	2,234	100	100	100	100
8/23	c	0 b	1 b	0 b	0		1,488	816	2,009	2,234	100	100	100	100
8/24	c	0	0 b	0 b	0		1,488	816	2,009	2,234	100	100	100	100
8/25	c	1	0 b	0 b	0		1,489	816	2,009	2,234	100	100	100	100
8/26	c	0 a	1 b	0 b	0		1,489	817	2,009	2,234	100	100	100	100
8/27	c	0	0 b	2 b	0		1,489	817	2,011	2,234	100	100	100	100
8/28	c	0	0 b	0	0		1,489	817	2,011	2,234	100	100	100	100
8/29	c	0	0 b	0	0		1,489	817	2,011	2,234	100	100	100	100
8/30	c	0	0 b	0	0		1,489	817	2,011	2,234	100	100	100	100
8/31	c	0	0 b	0	0		1,489	817	2,011	2,234	100	100	100	100
9/01	c	0	0 b	0	0		1,489	817	2,011	2,234	100	100	100	100
9/02	c	1	0 b	0	0		1,490	817	2,011	2,234	100	100	100	100
9/03	c	0	0 b	0	1		1,490	817	2,011	2,235	100	100	100	100
9/04	c	0	0 b	0	0		1,490	817	2,011	2,235	100	100	100	100
9/05	c	0	0 b	0	0		1,490	817	2,011	2,235	100	100	100	100
9/06	c	0	0 b	0	0		1,490	817	2,011	2,235	100	100	100	100
9/07	c	0	0 b	0	1		1,490	817	2,011	2,236	100	100	100	100
9/08	c	0	0 b	0	0		1,490	817	2,011	2,236	100	100	100	100
9/09	c	0	0 b	0	1		1,490	817	2,011	2,237	100	100	100	100
9/10	c	0	0 b	0	0		1,490	817	2,011	2,237	100	100	100	100
9/11	c	0	0 b	0	0		1,490	817	2,011	2,237	100	100	100	100
9/12	c	0	0 b	0	0 e		1,490	817	2,011	2,237	100	100	100	100
9/13	c	0	0 b	0	0 b		1,490	817	2,011	2,237	100	100	100	100
9/14	c	0	0 b	0	0 b		1,490	817	2,011	2,237	100	100	100	100
9/15	c	0	0 b	0	0 b		1,490	817	2,011	2,237	100	100	100	100
9/16	c	0	0 b	0 b	0 b		1,490	817	2,011	2,237	100	100	100	100
9/17	c	0	0 b	0 b	0 b		1,490	817	2,011	2,237	100	100	100	100
9/18	c	0	0 b	0 b	0 b		1,490	817	2,011	2,237	100	100	100	100
9/19	c	0	0 b	0 b	0 b		1,490	817	2,011	2,237	100	100	100	100
9/20	c	0	0 b	0 b	0 e		1,490	817	2,011	2,237	100	100	100	100
Total	970	1,490	817	2,011	2,237									
Obs.	970	1,413	807	1,973	2,237									
Est. (%)	0	5.2	1.3	1.9	0									

a = Daily passage was estimated due to the occurance of a hole in the weir.
b = The weir was not operational; daily passage was estimated.
c = The weir was not operational; daily passage was not estimated
d = Partial day count, passage was not estimated.
e = Partial day count, passage was estimated.

Table 2. Historical chum salmon passage at the Tatlawiksuk River weir, 1998 - 2002.

Date	Daily Passage					Cumulative Passage					Percent Passage			
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1999	2000	2001	2002
6/15	0 b	0	1	0 b	1 b	0	0	1	0	1	0	0	0	0
6/16	0 b	0	1	0 b	2 b	0	0	2	0	3	0	0	0	0
6/17	0 b	0	0	0 b	4 e	0	0	2	0	7	0	0	0	0
6/18	0	0	2	0 b	2	0	0	4	0	9	0	0	0	0
6/19	0	0	0	0 b	6	0	0	4	0	15	0	0	0	0
6/20	0	0	0	0	3	0	0	4	0	18	0	0	0	0
6/21	5	0	2	3	42	5	0	6	3	60	0	0	0	0
6/22	4	0	7	4	168	9	0	13	7	228	0	0	0	1
6/23	12	0	1	30	262	21	0	14	37	490	0	0	0	2
6/24	25	18	18	22	28	46	18	32	59	518	0	0	0	2
6/25	26	7	30	61	103	72	25	62	120	621	0	1	1	3
6/26	65	18	97	131	483	137	43	159	251	1,104	0	2	1	4
6/27	197	25	7	69	392	334	68	166	320	1,496	1	2	1	6
6/28	275	67	10	143	574	609	135	176	463	2,070	1	2	2	8
6/29	195	67	3	133	834	804	202	179	596	2,904	2	3	3	12
6/30	146	58	88	368	634	950	260	267	964	3,538	3	4	4	14
7/01	464	91	176	440	424	1,414	351	443	1,404	3,962	4	6	6	16
7/02	529	86	492	143	1037	1,943	437	935	1,547	4,999	5	13	7	20
7/03	556	101	280	171	501	2,499	538	1,215	1,718	5,500	6	17	7	22
7/04	1,005	110	147	162	759	3,504	648	1,362	1,880	6,259	7	19	8	26
7/05	1,011	94	325	488	1278	4,515	742	1,687	2,368	7,537	8	24	10	31
7/06	757	141	155	618	1762	5,272	883	1,842	2,986	9,299	9	26	13	38
7/07	454	171	175	778	809	5,726	1,054	2,017	3,764	10,108	11	29	16	41
7/08	c	158	109	900	666		1,212	2,126	4,664	10,774	13	30	20	44
7/09	c	324	462	1,061	840		1,536	2,588	5,725	11,614	16	37	24	47
7/10	c	391	247	1,399	828		1,927	2,835	7,124	12,442	20	40	30	51
7/11	c	404 a	391	596	1238		2,331	3,226	7,720	13,680	24	46	33	56
7/12	c	416	611	1,179	869		2,747	3,837	8,899	14,549	28	54	38	59
7/13	c	280	169	1,199	702		3,027	4,006	10,098	15,251	31	57	43	62
7/14	c	361	33	1,301	707		3,388	4,039	11,399	15,958	35	57	48	65
7/15	c	268	266	1,330	1123		3,656	4,305	12,729	17,081	38	61	54	70
7/16	c	377	367	1,092	677		4,033	4,672	13,821	17,758	42	66	58	72
7/17	c	339	257	1,201	959		4,372	4,929	15,022	18,717	45	70	63	76
7/18	c	404	183	1,607	880		4,776	5,112	16,629	19,597	49	73	70	80
7/19	c	160	144	859	707		4,936	5,256	17,488	20,304	51	75	74	83
7/20	c	663	88	699	468		5,599	5,344	18,187	20,772	58	76	77	85
7/21	c	306	176	761	504		5,905	5,520	18,948	21,276	61	78	80	87
7/22	c	275	238	650	515		6,180	5,758	19,598	21,791	64	82	83	89
7/23	c	628	158	614	409		6,808	5,916	20,212	22,200	71	84	85	90
7/24	c	322	152	511 b	251		7,130	6,068	20,723	22,451	74	86	87	91
7/25	c	338	114	391 b	206		7,468	6,182	21,114	22,657	77	88	89	92
7/26	c	205	85	270	195		7,673	6,267	21,384	22,852	79	89	90	93
7/27	c	214 a	122	206 b	301		7,886	6,389	21,590	23,153	82	91	91	94
7/28	c	222	93	169	224		8,108	6,482	21,759	23,377	84	92	92	95
7/29	c	130	94	178	159		8,238	6,576	21,937	23,536	85	93	92	96
7/30	c	285	141	230	144		8,523	6,717	22,167	23,680	88	95	93	96
7/31	c	141	72	190 b	119		8,664	6,789	22,357	23,799	90	96	94	97
8/01	c	171	41	176 b	99		8,835	6,830	22,533	23,898	91	97	95	97
8/02	c	125	37 b	163 b	59		8,960	6,867	22,696	23,957	93	97	96	98
8/03	c	141	18	149 b	54		9,101	6,885	22,845	24,011	94	98	96	98
8/04	c	60	15	131	64		9,161	6,900	22,976	24,075	95	98	97	98
8/05	c	57	8	139	98		9,218	6,908	23,115	24,173	95	98	97	98
8/06	c	35	9	96	44		9,253	6,917	23,211	24,217	96	98	98	99
8/07	c	43	12	95	55		9,296	6,929	23,306	24,272	97	98	98	99
8/08	c	24	5	62	72		9,320	6,934	23,368	24,344	97	98	99	99
8/09	c	42	2	69	30		9,362	6,936	23,437	24,374	98	98	99	99
8/10	c	30 b	5	36	37		9,392	6,941	23,473	24,411	98	99	99	99
8/11	c	28 b	7	38	22		9,420	6,948	23,511	24,433	98	99	99	100
8/12	c	26 b	8	38	25		9,446	6,956	23,549	24,458	98	99	99	100
8/13	c	24 b	9	27	13		9,470	6,965	23,576	24,471	99	99	99	100
8/14	c	22 b	10 b	19	5		9,492	6,975	23,595	24,476	99	99	99	100
8/15	c	20 b	4 b	23	13		9,512	6,979	23,618	24,489	99	99	100	100
8/16	c	17 b	4 b	8	8		9,529	6,983	23,626	24,497	99	99	100	100
8/17	c	15 b	4 b	14 b	8		9,544	6,987	23,640	24,505	99	99	100	100
8/18	c	13 b	2 b	13 b	15		9,557	6,989	23,653	24,520	100	99	100	100
8/19	c	11 b	6 b	12 b	1		9,568	6,995	23,665	24,521	100	99	100	100
8/20	c	9 b	14 b	11 b	2		9,577	7,009	23,675	24,523	100	100	100	100
8/21	c	7 b	8 b	9 b	1		9,584	7,017	23,684	24,524	100	100	100	100
8/22	c	4 b	0 b	8 b	2		9,588	7,017	23,692	24,526	100	100	100	100
8/23	c	1 b	2 b	7 b	0		9,589	7,019	23,699	24,526	100	100	100	100

-Continued-

Table 2. (page 2 of 2)

Date	Daily Passage					Cumulative Passage					Percent Passage			
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1999	2000	2001	2002
8/24	c	1	0 b	6 b	2		9,590	7,019	23,705	24,528	100	100	100	100
8/25	c	0	6 b	4 b	2		9,590	7,025	23,709	24,530	100	100	100	100
8/26	c	2 a	2 b	3 b	2		9,592	7,027	23,712	24,532	100	100	100	100
8/27	c	2	2 b	2 b	0		9,594	7,029	23,714	24,532	100	100	100	100
8/28	c	0	2 b	1	0		9,594	7,031	23,715	24,532	100	100	100	100
8/29	c	0	2 b	0	2		9,594	7,033	23,715	24,534	100	100	100	100
8/30	c	0	2 b	0	1		9,594	7,035	23,715	24,535	100	100	100	100
8/31	c	1	0 b	0	2		9,595	7,035	23,715	24,537	100	100	100	100
9/01	c	0	4 b	0	2		9,595	7,039	23,715	24,539	100	100	100	100
9/02	c	1	0 b	2	1		9,596	7,039	23,717	24,540	100	100	100	100
9/03	c	0	2 b	1	0		9,596	7,041	23,718	24,540	100	100	100	100
9/04	c	0	0 b	0	0		9,596	7,041	23,718	24,540	100	100	100	100
9/05	c	1	2 b	0	1		9,597	7,044	23,718	24,541	100	100	100	100
9/06	c	2	0 b	0	0		9,599	7,044	23,718	24,541	100	100	100	100
9/07	c	0	0 b	0	0		9,599	7,044	23,718	24,541	100	100	100	100
9/08	c	0	0 b	0	0		9,599	7,044	23,718	24,541	100	100	100	100
9/09	c	0	0 b	0	0		9,599	7,044	23,718	24,541	100	100	100	100
9/10	c	0	0 b	0	0		9,599	7,044	23,718	24,541	100	100	100	100
9/11	c	0	0 b	0	0		9,599	7,044	23,718	24,541	100	100	100	100
9/12	c	0	0 b	0	1 e		9,599	7,044	23,718	24,542	100	100	100	100
9/13	c	0	0 b	0	0 b		9,599	7,044	23,718	24,542	100	100	100	100
9/14	c	0	0 b	0	0 b		9,599	7,044	23,718	24,542	100	100	100	100
9/15	c	0	0 b	0	0 b		9,599	7,044	23,718	24,542	100	100	100	100
9/16	c	0	0 b	0 b	0 b		9,599	7,044	23,718	24,542	100	100	100	100
9/17	c	0	0 b	0 b	0 b		9,599	7,044	23,718	24,542	100	100	100	100
9/18	c	0	0 b	0 b	0 b		9,599	7,044	23,718	24,542	100	100	100	100
9/19	c	0	0 b	0 b	0 b		9,599	7,044	23,718	24,542	100	100	100	100
9/20	c	0	0 b	0 b	0 e		9,599	7,044	23,718	24,542	100	100	100	100
Total	5,726	9,599	7,044	23,718	24,542									
Obs.	5,726	9,147	6,928	22,109	24,539									
Est. (%)	0.0	4.7	1.6	6.8	0.0									

a = Daily passage was estimated due to the occurance of a hole in the weir.
b = The weir was not operational; daily passage was estimated.
c = The weir was not operational; daily passage was not estimated
d = Partial day count, passage was not estimated.
e = Partial day count, passage was estimated.

Table 3. Historical coho salmon passage at the Tatlawiksuk River weir, 1999 - 2002.

Date	Daily Passage				Cumulative Passage				Percent Passage		
	1999	2000	2001	2002	1999	2000	2001	2002	1999	2001	2002
6/15	0	0	0	0 b	0	0	0	0	0	0	0
6/16	0	0	0	0 b	0	0	0	0	0	0	0
6/17	0	0	0	0 e	0	0	0	0	0	0	0
6/18	0	0	0	0	0	0	0	0	0	0	0
6/19	0	0	0	0	0	0	0	0	0	0	0
6/20	0	0	0	0	0	0	0	0	0	0	0
6/21	0	0	0	0	0	0	0	0	0	0	0
6/22	0	0	0	0	0	0	0	0	0	0	0
6/23	0	0	0	0	0	0	0	0	0	0	0
6/24	0	0	0	0	0	0	0	0	0	0	0
6/25	0	0	0	0	0	0	0	0	0	0	0
6/26	0	0	0	0	0	0	0	0	0	0	0
6/27	0	0	0	0	0	0	0	0	0	0	0
6/28	0	0	0	0	0	0	0	0	0	0	0
6/29	0	0	0	0	0	0	0	0	0	0	0
6/30	0	0	0	0	0	0	0	0	0	0	0
7/01	0	0	0	0	0	0	0	0	0	0	0
7/02	0	0	0	0	0	0	0	0	0	0	0
7/03	0	0	0	0	0	0	0	0	0	0	0
7/04	0	0	0	0	0	0	0	0	0	0	0
7/05	0	0	0	0	0	0	0	0	0	0	0
7/06	0	0	0	0	0	0	0	0	0	0	0
7/07	0	0	0	0	0	0	0	0	0	0	0
7/08	0	0	0	0	0	0	0	0	0	0	0
7/09	0	0	0	0	0	0	0	0	0	0	0
7/10	0	0	0	0	0	0	0	0	0	0	0
7/11	0 a	0	0	0	0	0	0	0	0	0	0
7/12	0	0	0	0	0	0	0	0	0	0	0
7/13	0	0	0	0	0	0	0	0	0	0	0
7/14	0	0	0	0	0	0	0	0	0	0	0
7/15	0	0	0	0	0	0	0	0	0	0	0
7/16	0	0	0	0	0	0	0	0	0	0	0
7/17	0	0	0	0	0	0	0	0	0	0	0
7/18	0	0	0	0	0	0	0	0	0	0	0
7/19	0	2	0	0	0	2	0	0	0	0	0
7/20	0	0	0	0	0	2	0	0	0	0	0
7/21	0	1	0	0	0	3	0	0	0	0	0
7/22	0	0	0	0	0	3	0	0	0	0	0
7/23	0	0	0	0	0	3	0	0	0	0	0
7/24	0	1	0 b	0	0	4	0	0	0	0	0
7/25	1	0	0 b	0	1	4	0	0	0	0	0
7/26	0	0	0	0	1	4	0	0	0	0	0
7/27	1 a	0	0 b	3	2	4	0	3	0	0	0
7/28	2	3	1	3	4	7	1	6	0	0	0
7/29	9	2	0	3	13	9	1	9	0	0	0
7/30	1	25	8	8	14	34	9	17	0	0	0
7/31	1	11	18 b	3	15	45	27	20	0	0	0
8/01	0	40	42 b	5	15	85	69	25	0	1	0
8/02	0	110 b	29 b	11	15	195	98	36	0	1	0
8/03	0	172	17 b	16	15	367	114	52	0	1	0
8/04	0	215	42	4	15	582	156	56	0	1	0
8/05	2	173	91	33	17	755	247	89	0	2	1
8/06	0	129	47	23	17	884	294	112	0	3	1
8/07	5	277	74	46	22	1,161	368	158	1	4	1

-Continued-

Table 3. (page 2 of 2)

Date	Daily Passage				Cumulative Passage				Percent Passage		
	1999	2000	2001	2002	1999	2000	2001	2002	1999	2001	2002
8/08	1	108	135	43	23	1,269	503	201	1	5	2
8/09	1	267	130	79	24	1,536	633	280	1	6	2
8/10	3 b	619	264	73	27	2,155	897	353	1	9	3
8/11	5 b	730	212	63	32	2,885	1,109	416	1	11	4
8/12	2 b	1,123	306	437	33	4,008	1,415	853	1	13	8
8/13	9 b	1,429	314	787	42	5,437	1,729	1,640	1	16	14
8/14	12 b	319 d	864	240	54	5,756	2,593	1,880	2	25	17
8/15	13 b	c	530	220	67		3,123	2,100	2	30	18
8/16	27 b	c	860	345	94		3,983	2,445	3	38	22
8/17	37 b	c	652 b	53	129		4,635	2,498	4	44	22
8/18	45 b	c	610 b	349	173		5,245	2,847	5	50	25
8/19	26 b	c	567 b	27	199		5,812	2,874	6	55	25
8/20	72 b	c	525 b	28	270		6,337	2,902	8	60	26
8/21	75 b	c	482 b	1199	343		6,819	4,101	10	65	36
8/22	33 b	c	439 b	420	375		7,258	4,521	11	69	40
8/23	57 b	c	397 b	1347	446		7,655	5,868	13	73	52
8/24	103	c	354 b	1027	549		8,009	6,895	16	76	61
8/25	88	c	311 b	542	637		8,320	7,437	18	79	65
8/26	93 a	c	269 b	750	730		8,589	8,187	21	82	72
8/27	97	c	226 b	354	827		8,815	8,541	24	84	75
8/28	181	c	185	345	1,008		9,000	8,886	29	86	78
8/29	171	c	182	106	1,179		9,182	8,992	34	87	79
8/30	93	c	204	52	1,272		9,386	9,044	37	89	80
8/31	184	c	176	368	1,456		9,562	9,412	42	91	83
9/01	239	c	64	409	1,695		9,626	9,821	49	92	86
9/02	170	c	87	225	1,865		9,713	10,046	54	92	88
9/03	140	c	107	92	2,005		9,820	10,138	58	94	89
9/04	190	c	88	182	2,195		9,908	10,320	64	94	91
9/05	193	c	80	201	2,388		9,988	10,521	69	95	93
9/06	103	c	33	79	2,491		10,021	10,600	72	95	93
9/07	30	c	43	253	2,521		10,064	10,853	73	96	96
9/08	35	c	55	40	2,556		10,119	10,893	74	96	96
9/09	53	c	38	62	2,609		10,157	10,955	76	97	96
9/10	303	c	13	54	2,912		10,170	11,009	84	97	97
9/11	81	c	61	53	2,993		10,231	11,062	87	97	97
9/12	81	c	29	51 e	3,074		10,260	11,113	89	98	98
9/13	99	c	30	45 b	3,173		10,290	11,158	92	98	98
9/14	82	c	38	40 b	3,255		10,328	11,198	94	98	99
9/15	51	c	56	36 b	3,306		10,384	11,234	96	99	99
9/16	26	c	39 b	31 b	3,332		10,423	11,265	96	99	99
9/17	32	c	31 b	27 b	3,364		10,454	11,292	97	100	99
9/18	18	c	24 b	22 b	3,382		10,478	11,314	98	100	100
9/19	56	c	16 b	18 b	3,438		10,493	11,332	100	100	100
9/20	17	c	8 b	13 e	3,455		10,501	11,345	100	100	100
Total	3,455	5,756	10,501	11,345							
Obs.	2,967	5,646	5,669	11,132							
Est. (%)	14.1	1.9	46.0	2.0							

a = Daily passage was estimated due to the occurance of a hole in the weir.
b = The weir was not operational; daily passage was estimated.
c = The weir was not operational; daily passage was not estimated.
d = Partial day count, passage was not estimated.
e = Partial day count, passage was estimated.

Table 4. Age and sex of chinook salmon at the Tatlawiksuk River weir based on escapement samples collected with a fish trap, 1998-2002.[ab]

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 1.2 Esc.	1.2 %	1.3 Esc.	1.3 %	2.2 Esc.	2.2 %	1.4 Esc.	1.4 %	1.5 Esc.	1.5 %	Total Esc.	Total %
1998[c]	7/1, 7	15	M		0.0		66.7		0.0		6.7		0.0		73.3
			F		0.0		20.0		0.0		6.6		0.0		26.7
			Total		0.0		86.7		0.0		13.3		0.0		100.0
1999[d]	Entire Run	7	M		0.0		14.3		0.0		42.9		0.0		57.1
			F		0.0		0.0		0.0		42.8		0.0		42.9
			Total		0.0		14.3		0.0		85.7		0.0	1,490	100.0
2000[d]	7/6, 13, 16, 21	7	M		14.3		14.3		0.0		42.8		0.0		57.1
			F		0.0		0.0		0.0		28.6		0.0		42.9
			Total		14.3		14.3		0.0		71.4		0.0	817	100.0
2001[d]	6/30, 7/2-3, 5, 8	34	M		14.7		55.9		0.0		8.8		0.0		79.4
			F		0.0		2.9		0.0		17.7		0.0		20.6
			Subtotal		14.7		14.3		0.0		26.5		0.0		100.0
	7/11-14, 16, 19	40	M		10.0		20.0		0.0		15.0		0.0		45.0
			F		0.0		2.5		0.0		45.0		7.5		55.0
			Subtotal		10.0		14.3		0.0		60.0		0.0		100.0
	Season	74	M		12.2		36.5		0.0		12.2		0.0		60.8
			F		0.0		2.7		0.0		32.4		4.1		39.2
			Total		12.2		39.2		0.0		44.6		4.1	2,011	100.0
2002	6/26 - 30	86	M	200	23.3	90	10.5	10	1.2	230	26.7	10	1.2	539	62.8
	(6/15 - 30)		F	0	0.0	20	2.3	0	0.0	269	31.4	30	3.5	319	37.2
			Subtotal	200	23.3	110	12.8	10	1.2	499	58.1	40	4.7	858	100.0
	7/1 - 4	73	M	224	30.1	163	21.9	0	0.0	153	20.5	10	1.4	550	74.0
	(7/1 - 6)		F	0	0.0	0	0.0	0	0.0	183	24.7	10	1.3	194	26.0
			Subtotal	224	30.1	163	21.9	0	0.0	336	45.2	20	2.7	744	100.0
	7/8 - 14	62	M	60	14.5	81	19.4	0	0.0	74	17.7	0	0.0	215	51.6
	(7/7 - 15)		F	7	1.6	27	6.4	0	0.0	155	37.1	13	3.2	202	48.4
			Subtotal	67	16.1	108	25.8	0	0.0	229	54.8	13	3.2	417	100.0
	7/16 - 21, 23 - 25,	58	M	26	12.1	41	19.0	0	0.0	37	17.3	0	0.0	108	50.0
	30, 8/1		F	0	0.0	19	8.6	0	0.0	82	37.9	7	3.4	108	50.0
	(7/16 - 9/22)		Subtotal	26	12.1	60	27.6	0	0.0	119	55.2	7	3.4	216	100.0
	Season	279	M	510	22.8	375	16.8	10	0.4	494	22.1	20	0.9	1,412	63.2
			F	7	0.3	65	2.9	0	0.0	689	30.8	61	2.7	823	36.8
			Total	518	23.2	441	19.7	10	0.4	1,183	52.9	81	3.6	2,235	100.0

[a] The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies in sums are attributed to rounding errors.
[b] The number of fish in "Season" summaries are the strata sums; "Season" percentages are derived from the sums.
[c] ASL composition of escapement was not estimated because of the premature termination of the project.
[d] Sample dates and sample sizes do not meet criteria for estimating escapement percentages for some or all of the strata.

Table 5. Mean length (mm) of chinook salmon at the Tatlawiksuk River weir based on escapement samples collected with a fish trap, 1998-2002.[a]

Year	Sample Dates	Sex		Age Class 1.2	1.3	2.2	1.4	1.5
1998[b]	7/1, 7	M	Mean Length		728		789	
			Std. Error		33		-	
			Range		575- 879		789- 789	
			Sample Size	0	10	0	1	0
		F	Mean Length		705		697	
			Std. Error		13		-	
			Range		681- 725		697- 697	
			Sample Size	0	3	0	1	0
1999[c]	Entire Season	M	Mean Length		690		863	
			Std. Error		-		45	
			Range		690-690		775-925	
			Sample Size	0	1	0	3	0
		F	Mean Length				894	
			Std. Error				6	
			Range				885-905	
			Sample Size	0	0	0	3	0
2000[c]	7/6, 13, 16, 21	M	Mean Length	540	795		740	
			Std. Error	-	-		20	
			Range	540- 540	795-795		715- 780	
			Sample Size	1	1	0	3	0
		F	Mean Length				730	
			Std. Error				40	
			Range				690- 770	
			Sample Size	0	0	0	2	0
2001[c]	6/30, 7/2-3, 5, 8	M	Mean Length	530	675		800	
			Std. Error	24	13		8	
			Range	455-605	580-760		790- 815	
			Sample Size	5	19	0	3	0
		F	Mean Length		818		830	
			Std. Error		-		35	
			Range		818- 818		744- 936	
			Sample Size	0	1	0	6	0
	7/11-14, 16, 19	M	Mean Length	525	686		772	
			Std. Error	7	19		23	
			Range	515-546	602- 767		699- 860	
			Sample Size	4	8	0	6	0

-Continued-

Table 5. (page 2 of 3)

Year	Sample Dates	Sex		Age Class 1.2	1.3	2.2	1.4	1.5
2001[c] (cont.)		F	Mean Length		752		819	955
			Std. Error		-		16	48
			Range		752- 752		740- 935	859- 1010
			Sample Size	0	1	0	18	3
	Season	M	Mean Length	528	678		781	
			Std. Error	14	11		16	
			Range	455-605	580- 767		699- 860	
			Sample Size	9	27	0	9	0
		F	Mean Length		785		821	955
			Std. Error		-		15	48
			Range		752- 818		740- 936	859- 1010
			Sample Size	0	2	0	24	3
2002	6/26 - 30 (6/15 - 30)	M	Mean Length	578	693	532	751	804
			Std Error	8	15		17	-
			Range	536-674	622-777	532-532	657-972	804-804
			Sample Size	20	9	1	23	1
		F	Mean Length		638		780	881
			Std Error		16		14	71
			Range		622-653		687-915	742-970
			Sample Size	0	2	0	27	3
	7/1 - 4 (7/1 - 6)	M	Mean Length	557	694		753	846
			Std Error	6	15		20	-
			Range	510-651	596-802		677-908	846-846
			Sample Size	22	16	0	15	1
		F	Mean Length				788	836
			Std Error				17	-
			Range				658-925	836-836
			Sample Size	0	0	0	18	1
	7/8 - 14 (7/7 - 15)	M	Mean Length	555	691		739	
			Std Error	23	20		22	
			Range	453-661	543-764		673 940	
			Sample Size	9	12	0	11	0
		F	Mean Length	587	691		784	934
			Std Error	-	25		12	81
			Range	587-587	625-735		689-874	853-1015
			Sample Size	1	4	0	23	2

-Continued-

Table 5. (page 2 of 3)

Year	Sample Dates	Sex		Age Class 1.2	1.3	2.2	1.4	1.5
2002	7/16 - 21, 23 - 25,	M	Mean Length	566	673		812	
(cont.)	30, 8/1		Std Error	16	18		34	
	(7/16 - 9/22)		Range	509-611	557-747		566-964	
			Sample Size	7	11	0	10	0
		F	Mean Length		762		837	893
			Std Error		29		15	57
			Range		717-876		689-930	836-950
			Sample Size	0	5	0	22	2
	Season	M	Mean Length	566	691	532	754	825
			Range	453-674	543-802	532-532	566-972	804-846
			Sample Size	58	48	1	59	2
		F	Mean Length	587	695		790	887
			Range	587-587	622-876		658-930	742-1015
			Sample Size	1	11	0	90	8

[a] "Season" mean lengths are weighted by the escapement passage in each stratum.

[b] ASL composition of escapement was not estimated because of the premature termination of the project.

[c] Sample dates and sample sizes do not meet criteria for estimating escapement percentages for some or all of the strata.

Table 6. Age and sex of chum salmon at the Tatlawiksuk River weir based on escapement samples collected with a fish trap, 1998-2002.[ab]

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	0.2 Esc.	0.2 %	0.3 Esc.	0.3 %	0.4 Esc.	0.4 %	0.5 Esc.	0.5 %	Total Esc.	Total %
1998 [c]	6/29 - 7/1	166	M		0.0		50.0		13.3		0.6		63.9
			F		0.0		30.7		5.4		0.0		36.1
			Subtotal		0.0		80.7		18.7		0.6		100.0
	7/6 - 7	164	M		0.0		48.8		11.0		0.0		59.8
			F		0.0		39.0		1.2		0.0		40.2
			Subtotal		0.0		87.8		12.2		0.0		100.0
1999	7/9 - 11 (6/24 - 7/13)	193	M	0	0.0	1,004	33.2	659	21.8	16	0.5	1,678	55.4
			F	0	0.0	800	26.4	549	18.1	0	0.0	1,349	44.6
			Subtotal	0	0.0	1,804	59.6	1,208	39.9	16	0.5	3,027	100.0
	7/16 - 17 (7/14 - 19)	194	M	0	0.0	738	38.6	374	19.6	0	0.0	1,112	58.2
			F	10	0.5	630	33.0	157	8.2	0	0.0	797	41.8
			Subtotal	10	0.5	1,368	71.6	531	27.8	0	0.0	1,909	100.0
	7/21 - 22 (7/20 - 24)	195	M	0	0.0	551	25.1	236	10.8	0	0.0	788	35.9
			F	0	0.0	1,125	51.3	282	12.8	0	0.0	1,406	64.1
			Subtotal	0	0.0	1,676	76.4	518	23.6	0	0.0	2,194	100.0
	7/26 - 28 (7/25 - 31)	119	M	0	0.0	529	34.4	103	6.7	13	0.8	645	42.0
			F	0	0.0	696	45.4	194	12.6	0	0.0	890	58.0
			Subtotal	0	0.0	1,225	79.8	297	19.3	13	0.8	1,535	100.0
	8/3 - 8/4 (8/1 - 6)	117	M	0	0.0	176	29.9	51	8.5	0	0.0	227	38.5
			F	0	0.0	327	55.6	35	6.0	0	0.0	362	61.5
			Subtotal	0	0.0	503	85.5	86	14.5	0	0.0	589	100.0
	8/9 (8/7 - 9/6)	38	M	0	0.0	99	28.9	10	2.7	0	0.0	99	31.6
			F	0	0.0	229	65.8	8	2.6	0	0.0	247	68.4
			Subtotal	0	0.0	328	94.7	18	5.3	0	0.0	346	100.0
	Season	856	M	0	0.0	3,097	32.3	1,433	14.8	29	0.3	4,549	47.4
			F	10	0.1	3,807	29.8	1,225	12.7	0	0.0	5,051	52.6
			Total	10	0.1	6,904	72.1	2,658	27.5	29	0.3	9,600	100.0
2000	6/25 - 26 (6/15 - 30)	41	M	0	0.0	39	14.7	143	53.6	0	0.0	182	68.3
			F	0	0.0	20	7.3	65	24.4	0	0.0	85	31.7
			Subtotal	0	0.0	59	22.0	208	78.0	0	0.0	267	100.0
	7/6, 10, 12- 13 (7/1 - 13)	133	M	28	0.8	1,040	27.8	1,012	27.1	0	0.0	2,080	55.6
			F	0	0.0	872	23.3	759	20.3	28	0.8	1,659	44.4
			Subtotal	28	0.8	1,912	51.1	1,771	47.4	28	0.8	3,739	100.0
	7/15 - 16 (7/14-18)	156	M	21	1.9	305	27.6	128	11.5	0	0.0	454	41.0
			F	0	0.0	468	42.3	184	16.7	0	0.0	652	59.0
			Subtotal	21	1.9	773	69.9	312	28.2	0	0.0	1,106	100.0
	7/21-22, 24 (7/19 - 25)	180	M	24	2.2	374	35.0	190	17.8	0	0.0	589	55.0
			F	6	0.6	339	31.7	131	12.2	6	0.6	481	45.0
			Subtotal	30	2.8	713	66.7	321	30.0	6	0.6	1,070	100.0
	7/28 - 30 (7/26- 8/13)	195	M	40	5.1	224	26.2	75	7.2	0	0.0	301	38.5
			F	20	2.6	369	44.6	133	14.3	0	0.0	482	61.5
			Subtotal	60	7.7	593	70.8	208	21.5	0	0.0	783	100.0

-Continued-

Table 6. (page 2 of 3)

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	0.2 Esc.	0.2 %	0.3 Esc.	0.3 %	0.4 Esc.	0.4 %	0.5 Esc.	0.5 %	Total Esc.	Total %
2000	Season	705	M	113	1.6	1,983	28.2	1,549	21.9	0	0.0	3,645	51.8
(cont.)			F	26	0.4	2,067	29.4	1,271	18.0	34	0.5	3,398	48.2
			Total	139	2.0	4,050	57.6	2,820	39.9	34	0.5	7,043	100.0
2001	6/29 - 30	62	M	0	0.0	140	14.5	389	40.3	0	0.0	529	54.8
	(6/20 - 30)		F	0	0.0	171	17.8	264	27.4	0	0.0	435	45.2
			Subtotal	0	0.0	311	32.3	653	67.7	0	0.0	964	100.0
	7/2 - 4	92	M	0	0.0	286	14.1	1,033	51.1	0	0.0	1,319	65.2
	(7/1 - 6)		F	0	0.0	220	10.9	484	23.9	0	0.0	703	34.8
			Subtotal	0	0.0	506	25.0	1,517	75.0	0	0.0	2,022	100.0
	7/9 - 11	138	M	0	0.0	1,855	26.1	1,031	14.5	52	0.7	2,938	41.3
	(7/7 - 13)		F	0	0.0	2,062	29.0	2,113	29.7	0	0.0	4,174	58.7
			Subtotal	0	0.0	3,917	55.1	3,144	44.2	52	0.7	7,112	100.0
	7/16 - 17	194	M	0	0.0	3,461	42.8	876	10.8	42	0.5	4,378	54.1
	(7/14 - 20)		F	0	0.0	2,752	34.0	959	11.9	0	0.0	3,711	45.9
			Subtotal	0	0.0	6,213	76.8	1,835	22.7	42	0.5	8,089	100.0
	7/23	64	M	50	1.6	1,249	39.1	250	7.8	0	0.0	1,549	48.4
	(7/21 - 26)		F	0	0.0	1,349	42.2	299	9.4	0	0.0	1,648	51.6
			Subtotal	50	1.6	2,598	81.3	549	17.2	0	0.0	3,197	100.0
	7/30	66	M	0	0.0	383	33.3	70	6.0	0	0.0	453	39.4
	(7/27-8/1)		F	35	3.0	575	50.0	87	7.6	0	0.0	696	60.6
			Subtotal	35	3.0	958	83.3	157	13.6	0	0.0	1,149	100.0
	8/4-8, 13-15	231	M	10	0.9	389	32.9	46	3.9	0	0.0	446	37.7
	(8/2 - 9/15)		F	5	0.4	692	58.4	41	3.5	0	0.0	738	62.3
			Subtotal	15	1.3	1,081	91.3	87	7.4	0	0.0	1,184	100.0
	Season	847	M	60	0.2	7,763	32.7	3,693	15.6	93	0.4	11,610	49.0
			F	40	0.2	7,819	33.0	4,248	17.9	0	0.0	12,107	51.0
			Total	100	0.4	15,582	65.7	7,941	33.5	93	0.4	23,717	100.0
2002	6/24 - 27	178	M	0	0.0	1,012	34.9	979	33.7	163	5.6	2,154	74.2
	(6/15-29)		F	16	0.6	375	12.9	294	10.1	65	2.3	750	25.8
			Subtotal	16	0.6	1,387	47.8	1,273	43.8	228	7.9	2,904	100.0
	7/2 - 4	199	M	0	0.0	1,960	30.7	1,093	17.1	32	0.5	3,085	48.2
	(6/30-7/6)		F	129	2.0	1,928	30.1	1,221	19.1	32	0.5	3,310	51.8
			Subtotal	129	2.0	3,888	60.8	2,314	36.2	64	1.0	6,395	100.0
	7/9 - 11	192	M	31	0.5	1,457	24.5	1,333	22.4	31	0.5	2,852	47.9
	(7/7-13)		F	217	3.7	1,922	32.3	961	16.1	0	0.0	3,100	52.1
			Subtotal	248	4.2	3,379	56.8	2,294	38.5	31	0.5	5,952	100.0
	7/16 - 18	220	M	151	2.7	1,456	26.4	828	15.0	0	0.0	2,434	44.1
	(7/14-20)		F	251	4.6	2,183	39.5	628	11.4	25	0.5	3,087	55.9
			Subtotal	402	7.3	3,639	65.9	1,456	26.4	25	0.5	5,521	100.0
	7/23 - 26	212	M	221	8.5	651	25.0	344	13.2	12	0.5	1,229	47.2
	(7/21-28)		F	234	9.0	824	31.6	320	12.3	0	0.0	1,376	52.8
			Subtotal	455	17.5	1,475	56.6	664	25.5	12	0.5	2,605	100.0

-Continued-

Table 6. (page 3 of 3)

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 0.2 Esc.	0.2 %	0.3 Esc.	0.3 %	0.4 Esc.	0.4 %	0.5 Esc.	0.5 %	Total Esc.	Total %
2002 (cont.)	7/30 - 8/1 (7/29-8/3)	188	M	67	10.6	145	22.9	31	4.8	0	0.0	243	38.3
			F	105	16.5	236	37.2	47	7.4	3	0.5	391	61.7
			Subtotal	172	27.1	381	60.1	78	12.2	3	0.5	634	100.0
	8/5 - 8 (8/4-9/20)	157	M	88	16.6	81	15.3	30	5.7	0	0.0	200	37.6
			F	132	24.8	149	28.0	51	9.6	0	0.0	331	62.4
			Subtotal	220	41.4	230	43.3	81	15.3	0	0.0	531	100.0
	Season	1,346	M	558	2.3	6,762	27.6	4,637	18.9	238	1.0	12,196	49.7
			F	1,083	4.4	7,617	31.0	3,521	14.3	126	0.5	12,346	50.3
			Total	1,641	6.7	14,379	58.6	8,158	33.2	364	1.5	24,542	100.0
	Grand Total [d]	3,754	M	731	1.1	19,604	30.2	11,292	17.4	360	0.6	31,988	49.3
			F	1,159	1.8	21,327	32.9	10,248	15.8	160	0.2	32,893	50.7
			Total	1,890	2.9	40,931	63.1	21,540	33.2	520	0.8	64,881	100.0

[a] The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies in sums are attributed to rounding errors.

[b] The number of fish in "Season" summaries are the strata sums; "Season" percentages are derived from the sums.

[c] ASL composition of escapement was not estimated because of the premature termination of the project; results are excluded from the "Grand Total".

[d] The number of fish in the "Grand total" are the sums of the "Season" totals; percentages are derived from those sums.

Table 7. Mean length (mm) of chum salmon at the Tatlawiksuk River weir based on escapement samples collected with a fish trap, 1998-2002.[a]

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
1998[b]	6/29 - 7/1	M	Mean Length		594	610	608
			Std. Error		3	9	-
			Range		517- 661	534- 691	608- 608
			Sample Size	0	83	22	1
		F	Mean Length		562	588	
			Std. Error		3	8	
			Range		511- 606	551- 635	
			Sample Size	0	51	9	0
	7/6 - 7	M	Mean Length		588	614	
			Std. Error		3	5	
			Range		518- 679	585- 668	
			Sample Size	0	80	18	0
		F	Mean Length		555	571	
			Std. Error		2	12	
			Range		509- 595	559- 582	
			Sample Size	0	64	2	0
1999	7/9 - 11 (6/24 - 7/13)	M	Mean Length		588	608	581
			Std. Error		4	4	-
			Range		530- 660	540- 655	581- 581
			Sample Size	0	64	42	1
		F	Mean Length		556	565	
			Std. Error		4	6	
			Range		479- 614	510- 668	
			Sample Size	0	51	35	0
	7/16 - 17 (7/14 - 19)	M	Mean Length		588	604	
			Std. Error		4	5	
			Range		423- 697	530- 683	
			Sample Size	0	75	38	0
		F	Mean Length	530	565	583	
			Std. Error	-	4	6	
			Range	530- 530	500- 680	542- 620	
			Sample Size	1	64	16	0
	7/21 - 22 (7/20 - 24)	M	Mean Length		582	603	
			Std. Error		4	6	
			Range		520- 634	537- 660	
			Sample Size	0	49	21	0

-Continued-

Table 7. (page 2 of 7)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
1999	7/21 - 22	F	Mean Length		554	570	
(cont.)	(7/20 - 24)		Std. Error		2	6	
	(cont.)		Range		500- 625	520- 633	
			Sample Size	0	100	25	0
	7/26 - 28	M	Mean Length		583	609	625
	(7/25 - 31)		Std. Error		4	9	-
			Range		545- 640	570- 640	625- 625
			Sample Size	0	41	8	1
		F	Mean Length		563	575	
			Std. Error		4	5	
			Range		500- 620	540- 618	
			Sample Size	0	54	15	0
	8/3 - 8/4	M	Mean Length		593	600	
	(8/1 - 6)		Std. Error		5	9	
			Range		535- 669	551- 634	
			Sample Size	0	35	10	0
		F	Mean Length		548	557	
			Std. Error		3	14	
			Range		496- 592	500- 610	
			Sample Size	0	65	7	0
	8/9	M	Mean Length		579	635	
	(8/8 - 9/6)		Std. Error		9	-	
			Range		535- 630	635- 635	
			Sample Size	0	11	1	0
		F	Mean Length		549	555	
			Std. Error		5	-	
			Range		480- 595	555- 555	
			Sample Size	0	25	1	0
	Season	M	Mean Length		586	606	601
			Range		423- 697	530- 683	581- 625
			Sample Size	0	275	120	2
		F	Mean Length	530	557	570	
			Range	530- 530	479- 680	500- 668	
			Sample Size	1	359	99	0
2000	6/25 - 26	M	Mean Length		598	627	
	(6/15 - 30)		Std. Error		12	5	
			Range		580- 655	590- 680	
			Sample Size	0	6	22	0

-Continued-

Table 7. (page 3 of 7)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2000 (cont.)	6/25 - 26 (6/15 - 30) (cont.)	F	Mean Length		577	588	
			Std. Error		3	6	
			Range		570- 580	565- 625	
			Sample Size	0	3	10	0
	7/6, 10, 12- 13 (7/1 - 13)	M	Mean Length	560	586	613	
			Std. Error	-	4	5	
			Range	560- 560	535- 650	540- 660	
			Sample Size	1	37	36	0
		F	Mean Length		562	580	590
			Std. Error		7	8	-
			Range		455- 620	500- 675	590- 590
			Sample Size	0	31	27	1
	7/15 - 16 (7/14-18)	M	Mean Length	568	590	613	
			Std. Error	15	5	8	
			Range	540- 590	535- 680	550- 675	
			Sample Size	3	43	18	0
		F	Mean Length		552	571	
			Std. Error		4	4	
			Range		500- 670	530- 600	
			Sample Size	0	66	26	0
	7/21-22, 24 (7/19 - 25)	M	Mean Length	574	590	605	
			Std. Error	2	4	5	
			Range	570- 580	520- 680	550- 670	
			Sample Size	4	63	32	0
		F	Mean Length	520	557	562	590
			Std. Error	-	3	4	-
			Range	520- 520	490- 620	540- 600	590- 590
			Sample Size	1	57	22	1
	7/28 - 30 (7/26- 8/13)	M	Mean Length	539	584	598	
			Std. Error	9	4	11	
			Range	490- 590	500- 655	540- 670	
			Sample Size	10	51	14	0
		F	Mean Length	531	542	567	
			Std. Error	8	3	7	
			Range	515- 560	480- 610	480- 640	
			Sample Size	5	87	28	0
	Season	M	Mean Length	557	587	613	
			Range	490- 590	500- 680	540- 680	
			Sample Size	18	200	122	0

-Continued-

Table 7. (page 4 of 7)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2000 (cont.)	Season (cont.)	F	Mean Length	528	555	576	590
			Range	515- 560	455- 670	480- 675	590- 590
			Sample Size	6	244	113	2
2001	6/29 - 30 (6/20 - 30)	M	Mean Length		599	608	
			Std. Error		10	7	
			Range		560- 645	520- 680	
			Sample Size	0	9	25	0
		F	Mean Length		556	588	
			Std. Error		7	5	
			Range		505- 590	550- 625	
			Sample Size	0	11	17	0
	7/2 - 4 (7/1 - 6)	M	Mean Length		589	594	
			Std. Error		7	4	
			Range		556- 632	522- 687	
			Sample Size	0	13	47	0
		F	Mean Length		553	568	
			Std. Error		7	5	
			Range		512- 576	536- 615	
			Sample Size	0	10	22	0
	7/9 - 11 (7/7 - 13)	M	Mean Length		588	611	676
			Std. Error		5	6	-
			Range		540- 637	564- 657	676- 676
			Sample Size	0	36	20	1
		F	Mean Length		566	581	
			Std. Error		3	4	
			Range		529- 613	534- 626	
			Sample Size	0	40	41	0
	7/16 - 17 (7/14 - 20)	M	Mean Length		581	600	624
			Std. Error		3	8	-
			Range		489- 667	513- 656	624- 624
			Sample Size	0	83	21	1
		F	Mean Length		550	565	
			Std. Error		3	5	
			Range		488- 624	528- 611	
			Sample Size	0	66	23	0
	7/23 (7/21 - 26)	M	Mean Length	518	575	574	
			Std. Error	-	7	5	
			Range	518- 518	526- 646	558- 586	
			Sample Size	1	25	5	0

-Continued-

Table 7. (page 5 of 7)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2001	7/23	F	Mean Length		536	561	
(cont.)	(7/21 - 26)		Std. Error		5	8	
	(cont.)		Range		485- 587	544- 598	
			Sample Size	0	27	6	0
	7/30	M	Mean Length		573	551	
	(7/27-8/1)		Std. Error		5	7	
			Range		527- 614	533- 566	
			Sample Size	0	22	4	0
		F	Mean Length	507	540	528	
			Std. Error	3	4	13	
			Range	504- 509	483- 588	494- 565	
			Sample Size	2	33	5	0
	8/4-8, 13-15	M	Mean Length	543	565	582	
	(8/2 - 9/15)		Std. Error	13	4	12	
			Range	530- 556	458- 641	537- 626	
			Sample Size	2	76	9	0
		F	Mean Length	492	533	550	
			Std. Error	-	2	7	
			Range	492- 492	454- 654	516- 573	
			Sample Size	1	135	8	0
	Season	M	Mean Length	522	581	599	653
			Range	518- 556	458- 667	513- 687	624- 676
			Sample Size	3	264	131	2
		F	Mean Length	505	550	574	
			Range	492- 509	454- 654	494- 626	
			Sample Size	3	322	122	0
2002	6/24 - 27	M	Mean Length		594	612	603
	(6/15-29)		Std. Error		3	3	9
			Range		528- 665	536- 661	549- 645
			Sample Size	0	62	60	10
		F	Mean Length	527	580	597	592
			Std. Error	-	6	5	11
			Range	527- 527	520- 644	563- 658	566- 616
			Sample Size	1	23	18	4
	7/2 - 4	M	Mean Length		584	595	633
	(6/30-7/6)		Std. Error		4	7	-
			Range		525- 661	521- 685	633- 633
			Sample Size	0	61	34	1

-Continued-

Table 7. (page 6 of 7)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2002	7/2 - 4	F	Mean Length	549	554	568	578
(cont.)	(6/30-7/6)		Std. Error	11	4	4	-
	(cont.)		Range	521- 571	499- 654	530- 623	578- 578
			Sample Size	4	60	38	1
	7/9 - 11	M	Mean Length	582	586	605	594
	(7/7-13)		Std. Error	-	5	6	-
			Range	582- 582	522- 677	502- 673	594- 594
			Sample Size	1	47	43	1
		F	Mean Length	528	545	563	
			Std. Error	7	4	5	
			Range	495- 547	448- 610	516- 607	
			Sample Size	7	62	31	0
	7/16 - 18	M	Mean Length	548	587	605	
	(7/14-20)		Std. Error	9	4	7	
			Range	526- 578	497- 685	524- 677	
			Sample Size	6	58	33	0
		F	Mean Length	530	551	565	583
			Std. Error	11	3	5	-
			Range	466- 578	470- 605	508- 604	583- 583
			Sample Size	10	87	25	1
	7/23 - 26	M	Mean Length	536	573	594	594
	(7/21-28)		Std. Error	5	6	11	-
			Range	500- 591	402- 671	448- 684	594- 594
			Sample Size	18	53	28	1
		F	Mean Length	501	532	548	
			Std. Error	6	3	4	
			Range	449- 555	480- 614	505- 584	
			Sample Size	19	67	26	0
	7/30 - 8/1	M	Mean Length	537	559	569	
	(7/29-8/3)		Std. Error	6	4	9	
			Range	500- 592	507- 617	537- 616	
			Sample Size	20	43	9	0
		F	Mean Length	512	526	526	473
			Std. Error	4	4	6	-
			Range	452- 547	440- 691	480- 559	473- 473
			Sample Size	31	70	14	1
	8/5 - 8	M	Mean Length	526	553	564	
	(8/4-9/20)		Std. Error	5	5	15	
			Range	481- 562	501- 605	473- 618	
			Sample Size	26	24	9	0

-Continued-

Table 7. (page 7 of 7)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2002	8/5 - 8	F	Mean Length	499	517	548	
(cont.)	(8/4-9/20)		Std. Error	4	5	8	
	(cont.)		Range	411- 555	448- 606	497- 594	
			Sample Size	39	44	15	0
	Season	M	Mean Length	540	585	603	605
			Range	481- 592	402- 685	448- 685	549- 645
			Sample Size	71	348	216	13
		F	Mean Length	520	548	566	584
			Range	411- 578	440- 691	480- 658	473- 616
			Sample Size	111	413	167	7
	Grand Total [c]	M	Mean Length	540	585	605	620
			Range	490- 590	423- 697	513- 687	581- 676
			Sample size	92	1087	589	17
		F	Mean Length	521	553	572	587
			Range	492- 560	454- 680	480- 675	590- 590
			Sample size	121	1338	501	9

[a] "Season" mean lengths are weighted by the escapement passage in each stratum.

[b] ASL composition of escapement was not estimated because of the premature termination of the project; results are excluded from the "Grand Total".

[c] "Grand Total" mean lengths are simple averages of the "Season" mean lengths.

Table 8. Age and sex of coho salmon at the Tatlawiksuk River weir based on escapement samples collected with a fish trap, 1998-2002.[ab]

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 1.1 Esc.	1.1 %	2.1 Esc.	2.1 %	3.1 Esc.	3.1 %	Total Esc.	Total %
1998	The weir was not operated through coho season in 1998.										
1999	8/26- 28	87	M	89	6.9	598	47.1	74	5.7	761	59.8
	(7/25 - 8/30)		F	44	3.4	408	32.2	59	4.6	511	40.2
			Subtotal	133	10.3	1,006	79.3	133	10.3	1,272	100.0
	9/1- 2	136	M	34	3.7	380	41.2	75	8.1	489	52.9
	(8/31 - 9/4)		F	14	1.4	360	38.9	61	6.6	434	47.1
			Subtotal	48	5.1	740	80.1	136	14.7	923	100.0
	9/7, 9	64	M	59	4.7	551	43.7	98	7.8	709	56.3
	(9/5 - 9/20)		F	39	3.1	433	34.4	79	6.3	551	43.7
			Subtotal	98	7.8	984	78.1	177	14.1	1,260	100.0
	Season	287	M	181	5.2	1,529	44.3	246	7.1	1,956	56.7
			F	97	2.8	1,201	34.8	199	5.8	1,493	43.3
			Total	278	8.0	2,730	79.1	445	12.9	3,455	100.0
2000[c]	8/4, 8/8-8/10, 8/14	188	M		0.0		60.1		0.0		60.1
	(7/19-8/14)		F		0.0		39.9		0.0		39.9
			Subtotal		0.0		100.0		0.0		100.0
2001	8/6 - 9	147	M	8	0.7	483	43.5	30	2.7	521	46.9
	(7/28 - 8/11)		F	7	0.7	498	44.9	83	7.5	588	53.1
			Subtotal	15	1.4	981	88.4	113	10.2	1,109	100.0
	8/13 - 15	139	M	89	1.5	2,699	43.9	265	4.3	3,052	49.6
	(8/12 - 22)		F	88	1.4	2,831	46.0	177	2.9	3,097	50.4
			Subtotal	177	2.9	5,530	89.9	442	7.2	6,149	100.0
	8/30 - 9/2	145	M	39	1.4	1,200	42.8	38	1.4	1,277	45.5
	(8/23 - 9/7)		F	0	0.0	1,432	51.0	97	3.4	1,529	54.5
			Subtotal	39	1.4	2,632	93.8	135	4.8	2,806	100.0
	9/13 - 15	87	M	0	0.0	181	41.4	0	0.0	181	41.4
	(9/8 - 15)		F	0	0.0	257	58.6	0	0.0	257	58.6
			Subtotal	0	0.0	438	100.0	0	0.0	438	100.0
	Season	518	M	135	1.3	4,562	43.4	334	3.2	5,031	47.9
			F	96	0.9	5,018	47.8	357	3.4	5,471	52.1
			Total	231	2.2	9,580	91.2	691	6.6	10,502	100.0
2002	7/30 - 8/1, 5 - 8	113	M	4	0.9	236	56.6	26	6.2	265	63.7
	(6/15 - 8/11)		F	0	0	132	31.9	18	4.4	151	36.3
			Subtotal	4	0.9	368	88.5	44	10.6	416	100.0

-Continued-

Table 8. (page 2 of 2)

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 1.1 Esc.	1.1 %	2.1 Esc.	2.1 %	3.1 Esc.	3.1 %	Total Esc.	Total %
2002	8/14, 22 - 24	166	M	0	0	4,868	62.7	421	5.4	5,290	68.1
(cont.)	(8/12 - 8/26)		F	94	1.2	2,060	26.5	328	4.2	2,481	31.9
			Subtotal	94	1.2	6,928	89.2	749	9.6	7,771	100.0
	8/29 - 9/1	158	M	25	1.3	839	43.1	74	3.8	938	48.1
	(8/27 - 9/3)		F	12	0.6	877	44.9	124	6.3	1,013	51.9
			Subtotal	37	1.9	1,716	88.0	198	10.1	1,951	100.0
	9/6 - 8	159	M	0	0.0	433	35.9	46	3.8	478	39.6
	(9/4 - 9/22)		F	0	0.0	683	56.6	45	3.7	729	60.4
			Subtotal	0	0.0	1,116	92.5	91	7.5	1,207	100.0
	Season	596	M	28	0.3	6,377	56.2	567	5.0	6,972	61.5
			F	106	0.9	3,752	33.1	515	4.5	4,373	38.5
			Total	134	1.2	10,129	89.3	1,082	9.5	11,345	100.0
	Grand	1,401	M	344	1.4	12,468	49.3	1,147	4.5	13,959	55.2
	Total [d]		F	299	1.2	9,971	39.4	1,071	4.2	11,337	44.8
			Total	643	2.5	22,439	88.7	2,218	8.8	25,296	100.0

[a] The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies in sums are attributed to rounding errors.

[b] The number of fish in "Season" summaries are the strata sums; "Season" percentages are derived from the sums.

[c] ASL composition of escapement was not estimated because of the premature termination of the project; results are excluded from the "Grand Total".

[d] The number of fish in the "Grand total" are the sums of the "Season" totals; percentages are derived from those sums.

Table 9. Mean length (mm) of coho salmon at the Tatlawiksuk River weir based on escapement samples collected with a fish trap, 1998 - 2002. [a]

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
1998	The weir was not operated through coho season in 1998.					
1999	8/26- 28 (7/25 - 8/30)	M	Mean Length	508	538	548
			Std. Error	17	8	14
			Range	450- 542	420- 600	522- 595
			Sample Size	6	40	5
		F	Mean Length	511	547	562
			Std. Error	26	6	17
			Range	462- 550	448- 580	522- 600
			Sample Size	3	28	4
	9/1- 2 (8/31 - 9/4)	M	Mean Length	492	552	572
			Std. Error	11	8	10
			Range	460- 530	440- 675	500- 610
			Sample Size	5	56	11
		F	Mean Length	563	554	546
			Std. Error	3	5	17
			Range	560- 565	430- 615	465- 610
			Sample Size	2	53	9
	9/7, 9 (9/5 - 9/20)	M	Mean Length	495	565	561
			Std. Error	28	8	10
			Range	445- 540	415- 620	530- 590
			Sample Size	3	28	5
		F	Mean Length	445	564	581
			Std. Error	30	5	14
			Range	415- 475	520- 610	540- 605
			Sample Size	2	22	4
	Season	M	Mean Length	501	551	560
			Std. Error	12	5	7
			Range	445- 542	415- 675	500- 610
			Sample Size	14	124	21
		F	Mean Length	491	555	565
			Std. Error	17	3	9
			Range	415- 565	430- 615	465- 610
			Sample Size	7	103	17

-Continued-

Table 9. (page 2 of 4)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
2000[b]	8/4, 8/8 - 8/10, 8/14	M	Mean Length	0	569	0
	(7/19 - 8/14)		Std. Error	0	3	0
			Range	0 - 0	430 - 640	0 - 0
			Sample Size	0	113	0
		F	Mean Length	0	556	0
			Std. Error	0	3	0
			Range	0 - 0	470 - 600	0 - 0
			Sample Size	0	75	0
2001	8/6 - 9	M	Mean Length	580	559	583
	(7/28 - 8/11)		Std. Error	0	6	8
			Range	580 - 580	410 - 669	567 - 600
			Sample Size	1	64	4
		F	Mean Length	547	557	549
			Std. Error	0	3	5
			Range	547 - 547	468 - 600	514 - 570
			Sample Size	1	66	11
	8/13 - 15	M	Mean Length	534	562	585
	(8/12 - 22)		Std. Error	14	5	11
			Range	520 - 548	481 - 628	563 - 640
			Sample Size	2	61	6
		F	Mean Length	555	567	569
			Std. Error	13	3	14
			Range	542 - 568	456 - 623	539 - 604
			Sample Size	2	64	4
	8/30 - 9/2	M	Mean Length	540	590	600
	(8/23 - 9/7)		Std. Error	25	6	4
			Range	515 - 564	434 - 668	596 - 603
			Sample Size	2	62	2
		F	Mean Length	0	587	594
			Std. Error	0	3	7
			Range	0 - 0	530 - 632	576 - 617
			Sample Size	0	74	5
	9/13 - 15	M	Mean Length	0	577	0
	(9/8 - 15)		Std. Error	0	7	0
			Range	0 - 0	488 - 647	0 - 0
			Sample Size	0	36	0

-Continued-

Table 9. (page 3 of 4)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
2001 (cont.)	9/13 - 15 (9/8 - 15) (cont.)	F	Mean Length	0	577	0
			Std. Error	0	4	0
			Range	0 - 0	483 - 620	0 - 0
			Sample Size	0	51	0
	Season	M	Mean Length	538	569	587
			Std. Error	12	3	9
			Range	515 - 580	410 - 669	563 - 640
			Sample Size	5	223	12
		F	Mean Length	554	572	571
			Std. Error	13	2	7
			Range	542 - 568	456 - 632	514 - 617
			Sample Size	3	255	20
2002	7/30 - 8/1, 5 - 8 (6/15 - 8/11)	M	Mean Length	586	547	576
			Std. Error	-	5	6
			Range	586- 586	440- 622	550- 603
			Sample Size	1	64	7
		F	Mean Length		557	571
			Std. Error		5	14
			Range		449- 607	546- 625
			Sample Size	0	36	5
	8/14, 22 - 24 (8/12 - 8/26)	M	Mean Length		568	555
			Std. Error		4	26
			Range		425- 630	401- 643
			Sample Size	0	104	9
		F	Mean Length	506	569	582
			Std. Error	25	5	12
			Range	481- 530	505- 617	533- 618
			Sample Size	2	44	7
	8/29 - 9/1 (8/27 - 9/3)	M	Mean Length	510	559	608
			Std. Error	4	7	11
			Range	506- 514	407- 676	573- 641
			Sample Size	2	68	6
		F	Mean Length	534	559	557
			Std. Error	-	4	9
			Range	534- 534	437- 615	522- 599
			Sample Size	1	71	10

-Continued-

Table 9. (page 4 of 4)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
2002 (cont.)	9/6 - 8 (9/4 - 9/22)	M	Mean Length		560	584
			Std. Error		7	11
			Range		422- 657	547- 613
			Sample Size	0	57	6
		F	Mean Length		560	581
			Std. Error		4	14
			Range		432- 620	515- 608
			Sample Size	0	90	6
	Season	M	Mean Length	520	565	565
			Range	506- 586	407- 676	401- 643
			Sample Size	3	293	28
		F	Mean Length	509	565	576
			Range	481- 534	432- 620	515- 625
			Sample Size	3	241	28
	Grand Total [c]	M	Mean Length	520	564	571
			Range	515- 580	410- 669	417- 640
			Sample Size	22	753	61
		F	Mean Length	532	564	574
			Range	542- 568	456- 632	514- 617
			Sample size	6	571	48

[a] "Season" mean lengths are weighted by the escapement passage in each stratum.

[b] ASL composition of escapement was not estimated because of the premature termination of the project; results are excluded from the "Grand Total".

[c] "Grand Total" mean lengths are simple averages of the "Season" mean lengths.

Table 10. Daily, cumulative and percentage of chum and coho salmon tags recovered and observed at the Tatlawiksuk River weir, and tagged at Kalskag-Aniak, 2002.

	Daily Tags						Cumulative Tags						Percent Tags					
	Chum			Coho			Chum			Coho			Chum			Coho		
Date	Recovered	Observed	Tagged	Recovered	Observed	Tagged	Recovered	Observed	Tagged	Recovered	Observed	Tagged	Recovered	Observed	Tagged	Recovered	Observed	Tagged
6/14			0			0			0			0	0	0	0	0	0	0
6/15	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
6/16	0	0	1	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0
6/17	0	0	1	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0
6/18	0	0	1	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0
6/19	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0
6/20	0	0	1	0	0	0	0	0	5	0	0	0	0	0	5	0	0	0
6/21	0	0	2	0	0	0	0	0	7	0	0	0	0	0	7	0	0	0
6/22	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	0	0	0
6/23	0	0	4	0	0	0	0	0	11	0	0	0	0	0	11	0	0	0
6/24	0	0	1	0	0	0	0	0	12	0	0	0	0	0	12	0	0	0
6/25	0	0	3	0	0	0	0	0	15	0	0	0	0	0	15	0	0	0
6/26	0	0	2	0	0	0	0	0	17	0	0	0	0	0	17	0	0	0
6/27	1	3	2	0	0	0	1	3	19	0	0	0	1	2	19	0	0	0
6/28	1	1	2	0	0	0	2	4	21	0	0	0	2	3	21	0	0	0
6/29	3	3	0	0	0	0	5	7	21	0	0	0	5	6	21	0	0	0
6/30	1	2	2	0	0	0	6	9	23	0	0	0	6	7	23	0	0	0
7/1	2	3	3	0	0	0	8	12	26	0	0	0	8	10	26	0	0	0
7/2	2	3	8	0	0	0	10	15	34	0	0	0	10	12	34	0	0	0
7/3	2	4	3	0	0	0	12	19	37	0	0	0	12	15	37	0	0	0
7/4	1	4	4	0	0	0	13	23	41	0	0	0	13	19	41	0	0	0
7/5	3	3	9	0	0	0	16	26	50	0	0	0	16	21	51	0	0	0
7/6	2	2	11	0	0	0	18	28	61	0	0	0	18	23	62	0	0	0
7/7	1	2	1	0	0	0	19	30	62	0	0	0	19	24	63	0	0	0
7/8	5	5	4	0	0	0	24	35	66	0	0	0	24	28	67	0	0	0
7/9	6	6	9	0	0	0	30	41	75	0	0	0	30	33	76	0	0	0
7/10	3	5	3	0	0	0	33	46	78	0	0	0	33	37	79	0	0	0
7/11	3	6	1	0	0	0	36	52	79	0	0	0	36	42	80	0	0	0
7/12	6	7	2	0	0	0	42	59	81	0	0	0	42	48	82	0	0	0
7/13	7	8	2	0	0	0	49	67	83	0	0	0	49	54	84	0	0	0
7/14	4	5	3	0	0	0	53	72	86	0	0	0	54	58	87	0	0	0
7/15	9	9	2	0	0	0	62	81	88	0	0	0	63	65	89	0	0	0
7/16	4	5	1	0	0	0	66	86	89	0	0	0	67	69	90	0	0	0
7/17	8	8	1	0	0	0	74	94	90	0	0	0	75	76	91	0	0	0
7/18	0	0	1	0	0	0	74	94	91	0	0	0	75	76	92	0	0	0
7/19	7	9	3	0	0	0	81	103	94	0	0	0	82	83	95	0	0	0
7/20	1	1	0	0	0	2	82	104	94	0	0	2	83	84	95	0	0	2
7/21	1	2	0	0	0	0	83	106	94	0	0	2	84	85	95	0	0	2
7/22	3	4	0	0	0	1	86	110	94	0	0	3	87	89	95	0	0	3
7/23	3	3	0	0	0	0	89	113	94	0	0	3	90	91	95	0	0	3
7/24	0	0	1	0	0	0	89	113	95	0	0	3	90	91	96	0	0	3
7/25	3	3	0	0	0	1	92	116	95	0	0	4	93	94	96	0	0	4
7/26	0	0	0	0	0	1	92	116	95	0	0	5	93	94	96	0	0	5
7/27	0	0	2	0	0	1	92	116	97	0	0	6	93	94	98	0	0	6
7/28	1	1	1	0	0	1	93	117	98	0	0	7	94	94	99	0	0	7
7/29	1	1	0	0	0	4	94	118	98	0	0	11	95	95	99	0	0	11
7/30	0	1	0	1	1	2	94	119	98	1	1	13	95	96	99	1	1	13
7/31	0	0	1	0	0	1	94	119	99	1	1	14	95	96	100	1	1	14
8/1	1	1	0	0	0	2	95	120	99	1	1	16	96	97	100	1	1	16
8/2	0	0	0	0	0	2	95	120	99	1	1	18	96	97	100	1	1	17
8/3	1	1	0	0	0	0	96	121	99	1	1	18	97	98	100	1	1	17
8/4	0	0	0	0	0	1	96	121	99	1	1	19	97	98	100	1	1	18
8/5	1	1	0	0	0	4	97	122	99	1	1	23	98	98	100	1	1	22
8/6	1	1	0	0	0	2	98	123	99	1	1	25	99	99	100	1	1	24

-Continued-

Table 10. (page 2 of 2)

	Daily Tags						Cumulative Tags						Percent Tags					
	Chum			Coho			Chum			Coho			Chum			Coho		
Date	Recovered	Observed	Tagged	Recovered	Observed	Tagged	Recovered	Observed	Tagged	Recovered	Observed	Tagged	Recovered	Observed	Tagged	Recovered	Observed	Tagged
8/7	0	0	0	0	0	2	98	123	99	1	1	27	99	99	100	1	1	26
8/8	0	0	0	0	0	2	98	123	99	1	1	29	99	99	100	1	1	28
8/9	1	1	0	0	0	3	99	124	99	1	1	32	100	100	100	1	1	31
8/10	0	0	0	1	1	1	99	124	99	2	2	33	100	100	100	2	1	32
8/11	0	0	0	1	1	2	99	124	99	3	3	35	100	100	100	3	2	34
8/12	0	0	0	1	1	2	99	124	99	4	4	37	100	100	100	4	3	36
8/13	0	0	0	4	5	1	99	124	99	8	9	38	100	100	100	8	6	37
8/14	0	0	0	2	2	3	99	124	99	10	11	41	100	100	100	10	7	40
8/15	0	0	0	3	3	1	99	124	99	13	14	42	100	100	100	13	9	41
8/16	0	0	0	0	1	2	99	124	99	13	15	44	100	100	100	13	10	43
8/17	0	0	0	0	0	2	99	124	99	13	15	46	100	100	100	13	10	45
8/18	0	0	0	0	0	1	99	124	99	13	15	47	100	100	100	13	10	46
8/19	0	0	0	0	0	5	99	124	99	13	15	52	100	100	100	13	10	50
8/20	0	0	0	0	0	8	99	124	99	13	15	60	100	100	100	13	10	58
8/21	0	0	0	7	7	3	99	124	99	20	22	63	100	100	100	19	15	61
8/22	0	0	0	1	1	7	99	124	99	21	23	70	100	100	100	20	15	68
8/23	0	0	0	9	14	6	99	124	99	30	37	76	100	100	100	29	25	74
8/24	0	0	0	0	9	4	99	124	99	30	46	80	100	100	100	29	30	78
8/25	0	0	0	0	6	6	99	124	99	30	52	86	100	100	100	29	34	83
8/26	0	0	0	0	19	1	99	124	99	30	71	87	100	100	100	29	47	84
8/27	0	0	0	0	2	3	99	124	99	30	73	90	100	100	100	29	48	87
8/28	0	0	0	7	7	1	99	124	99	37	80	91	100	100	100	36	53	88
8/29	0	0	0	1	1	1	99	124	99	38	81	92	100	100	100	37	54	89
8/30	0	0	0	0	0	3	99	124	99	38	81	95	100	100	100	37	54	92
8/31	0	0	0	12	12	3	99	124	99	50	93	98	100	100	100	49	62	95
9/1	0	0	0	11	13	2	99	124	99	61	106	100	100	100	100	59	70	97
9/2	0	0	0	5	6	1	99	124	99	66	112	101	100	100	100	64	74	98
9/3	0	0	0	0	2	0	99	124	99	66	114	101	100	100	100	64	75	98
9/4	0	0	0	4	4	1	99	124	99	70	118	102	100	100	100	68	78	99
9/5	0	0	0	10	10	0	99	124	99	80	128	102	100	100	100	78	85	99
9/6	0	0	0	3	3	0	99	124	99	83	131	102	100	100	100	81	87	99
9/7	0	0	0	6	6	0	99	124	99	89	137	102	100	100	100	86	91	99
9/8	0	0	0	2	2	1	99	124	99	91	139	103	100	100	100	88	92	100
9/9	0	0	0	2	2	0	99	124	99	93	141	103	100	100	100	90	93	100
9/10	0	0	0	5	5	0	99	124	99	98	146	103	100	100	100	95	97	100
9/11	0	0	0	3	3	0	99	124	99	101	149	103	100	100	100	98	99	100
9/12	0	0	0	1	1	0	99	124	99	102	150	103	100	100	100	99	99	100
9/13	0	0	0	0	0	0	99	124	99	102	150	103	100	100	100	99	99	100
9/14	0	0	0	0	0	0	99	124	99	102	150	103	100	100	100	99	99	100
9/15	0	0	0	0	0	0	99	124	99	102	150	103	100	100	100	99	99	100
9/16	0	0	0	0	0	0	99	124	99	102	150	103	100	100	100	99	99	100
9/17	0	0	0	0	0	0	99	124	99	102	150	103	100	100	100	99	99	100
9/18	0	0	0	0	0	0	99	124	99	102	150	103	100	100	100	99	99	100
9/19	0	0	0	0	0	0	99	124	99	102	150	103	100	100	100	99	99	100
9/20	0	0	0	0	0	0	99	124	99	102	150	103	100	100	100	99	99	100
9/21	0	0	0	1	1	0	99	124	99	103	151	103	100	100	100	100	100	100
9/22	0	0	0	0	0	0	99	124	99	103	151	103	100	100	100	100	100	100
TOTAL	99	124	99	103	151	103												

Table 11. Spaghetti tagged chum salmon captured at the Tatlawiksuk River weir, 2002.

Tagging Location	Date Tagged	Date Recaptured	Tag Number	Tag Identification	Adipose Punch	Travel Time (days)	Travel Speed (km/d)
Aniak	6/15	6/29	15013	ADF&G-02-green	y	14	20
Aniak	6/16	6/28	15060	ADF&G-02-green	y	12	24
Aniak	6/17	6/29	15112	ADF&G-02-green	y	12	24
Aniak	6/18	6/27	15166	ADF&G-02-green	y	9	32
Aniak	6/20	6/29	15291	ADF&G-02-green	y	9	32
Aniak	6/21	7/1	15328	ADF&G-02-green	y	10	29
Aniak	6/21	7/2	15324	ADF&G-02-green	y	11	26
Aniak	6/23	6/30	15494	ADF&G-02-green	y	7	41
Kalskag	6/23	7/1	9094	ADF&G-02-pink	y	8	39
Kalskag	6/23	7/2	9113	ADF&G-02-pink	y	9	35
Kalskag	6/23	7/3	9085	ADF&G-02-pink	y	10	31
Aniak	6/24	7/3	15600	ADF&G-02-green	y	9	32
Kalskag	6/25	7/5	9232	ADF&G-02-pink	y	10	31
Aniak	6/25	7/6	15875	ADF&G-02-green	y	11	26
Aniak	6/25	7/8	15952	ADF&G-02-green	y	13	22
Aniak	6/26	7/5	15973	ADF&G-02-green	y	9	32
Aniak	6/26	7/7	15972	ADF&G-02-green	y	11	26
Aniak	6/27	7/4	16185	ADF&G-02-green	y	7	41
Kalskag	6/27	7/5	9363	ADF&G-02-pink	y	8	39
Aniak	6/28	7/6	16462	ADF&G-02-green	y	8	36
Kalskag	6/28	7/8	9400	ADF&G-02-pink	y	10	31
Aniak	6/30	7/9	17289	ADF&G-02-green	y	9	32
Kalskag	6/30	7/9	9610	ADF&G-02-pink	y	9	35
Aniak	7/1	7/8	17601	ADF&G-02-green	y	7	41
Aniak	7/1	7/9	17494	ADF&G-02-green	y	8	36
Aniak	7/1	7/9	17623	ADF&G-02-green	y	8	36
Aniak	7/2	7/8	17775	ADF&G-02-green	y	6	48
Kalskag	7/2	7/8	9783	ADF&G-02-pink	y	6	52
Aniak	7/2	7/9	17889	ADF&G-02-green	y	7	41
Aniak	7/2	7/10	17898	ADF&G-02-green	y	8	36
Kalskag	7/2	7/10	9761	ADF&G-02-pink	y	8	39
Kalskag	7/2	7/10	9879	ADF&G-02-pink	y	8	39
Kalskag	7/2	7/11	9816	ADF&G-02-pink	y	9	35
Kalskag	7/2	7/13	9759	ADF&G-02-pink	y	11	29
Aniak	7/3	7/9	18238	ADF&G-02-green	y	6	48
Kalskag	7/3	7/12	9923	ADF&G-02-pink	y	9	35
Kalskag	7/3	7/12	10044	ADF&G-02-pink	y	9	35
Kalskag	7/4	7/11	10148	ADF&G-02-pink	y	7	45
Kalskag	7/4	7/12	10143	ADF&G-02-pink	na	8	39
Kalskag	7/4	7/12	10190	ADF&G-02-pink	y	8	39
Aniak	7/4	7/16	18598	ADF&G-02-green	y	12	24
Kalskag	7/5	7/11	10506	ADF&G-02-pink	y	6	52
Aniak	7/5	7/12	18933	ADF&G-02-green	y	7	41
Kalskag	7/5	7/12	10418	ADF&G-02-pink	y	7	45
Aniak	7/5	7/13	13179	ADF&G-02-white	y	8	36
Aniak	7/5	7/13	13188	ADF&G-02-white	y	8	36
Aniak	7/5	7/13	13327	ADF&G-02-white	y	8	36
Kalskag	7/5	7/14	10429	ADF&G-02-pink	y	9	35
Kalskag	7/5	7/14	10528	ADF&G-02-pink	y	9	35
Aniak	7/5	7/15	13170	ADF&G-02-white	y	10	29

-Continued-

Table 11. (page 2 of 2)

Tagging Location	Date Tagged	Date Recaptured	Tag Number	Tag Identification	Adipose Punch	Travel Time (days)	Travel Speed (km/d)
Aniak	7/6	7/13	13514	ADF&G-02-white	y	7	41
Aniak	7/6	7/13	13667	ADF&G-02-white	y	7	41
Aniak	7/6	7/14	13735	ADF&G-02-white	y	8	36
Aniak	7/6	7/14	13751	ADF&G-02-white	y	8	36
Aniak	7/6	7/15	13414	ADF&G-02-white	y	9	32
Aniak	7/6	7/15	13790	ADF&G-02-white	y	9	32
Kalskag	7/6	7/15	10931	ADF&G-02-pink	no	9	35
Kalskag	7/6	7/15	11011	ADF&G-02-pink	no	9	35
Kalskag	7/6	7/15	11029	ADF&G-02-pink	y	9	35
Kalskag	7/6	7/15	11075	ADF&G-02-pink	no	9	35
Kalskag	7/6	7/15	11132	ADF&G-02-pink	y	9	35
Kalskag	7/7	7/13	10651	ADF&G-02-pink	y	6	52
Aniak	7/8	7/17	14550	ADF&G-02-white	y	9	32
Aniak	7/8	7/17	14679	ADF&G-02-white	y	9	32
Kalskag	7/8	7/17	11444	ADF&G-02-pink	n	9	35
Kalskag	7/8	7/17	11589	ADF&G-02-pink	n	9	35
Aniak	7/9	7/15	14767	ADF&G-02-white	y	6	48
Aniak	7/9	7/16	14769	ADF&G-02-white	y	7	41
Aniak	7/9	7/16	14886	ADF&G-02-white	y	7	41
Aniak	7/9	7/16	14985	ADF&G-02-white	y	7	41
Kalskag	7/9	7/17	11673	ADF&G-02-pink	y	8	39
Kalskag	7/9	7/17	11749	ADF&G-02-pink	y	8	39
Kalskag	7/9	7/17	11846	ADF&G-02-pink	n	8	39
Aniak	7/9	7/19	14952	ADF&G-02-white	y	10	29
Aniak	7/9	7/21	14804	ADF&G-02-white	y	12	24
Aniak	7/10	7/17	5569	ADF&G-01-green	y	7	41
Aniak	7/10	7/19	5572	ADF&G-02-green	y	9	32
Kalskag	7/10	7/19	12017	ADF&G-02-pink	y	9	35
Kalskag	7/11	7/19	12393	ADF&G-02-pink	y	8	39
Kalskag	7/12	7/19	4445	ADF&G-01-green	y	7	45
Kalskag	7/12	7/19	12772	ADF&G-02-pink	y	7	45
Aniak	7/13	7/19	6285	ADF&G-01-white	y	6	48
Kalskag	7/13	7/23	12934	ADF&G-02-pink	y	10	31
Kalskag	7/14	7/20	551	ADF&G-01-pink	y	6	52
Kalskag	7/14	7/22	2638	ADF&G-01-pink	y	8	39
Kalskag	7/14	7/22	2685	ADF&G-01-pink	y	8	39
Kalskag	7/15	7/22	785	ADF&G-01-pink	y	7	45
Kalskag	7/15	7/23	783	ADF&G-01-pink	y	8	39
Kalskag	7/16	7/23	1140	ADF&G-01-pink	y	7	45
Kalskag	7/17	7/25	1319	ADF&G-01-pink	y	8	39
Aniak	7/18	7/25	22143	ADF&G-02-green	y	7	41
Aniak	7/19	7/25	22444	ADF&G-02-green	y	6	48
Kalskag	7/19	7/28	2454	ADF&G-01-pink	n	9	35
Kalskag	7/19	7/29	2322	ADF&G-01-pink	n	10	31
Kalskag	7/24	8/1	4774	FWS-02-Fl-orange	y	8	39
Kalskag	7/27	8/3	19335	ADF&G-02-blue	y	7	45
Kalskag	7/27	8/6	19302	ADF&G-02-blue	y	10	31
Kalskag	7/28	8/5	19413	ADF&G-02-blue	y	8	39
Kalskag	7/31	8/9	29091	ADF&G-02-pink	y	9	35
Total			99				
Range						6 - 14	20 - 52
Mean						8	37

Table 12. Spaghetti tagged coho salmon captured at the Tatlawiksuk River weir, 2002.

Tagging Location	Date Tagged	Date Recaptured	Tag Number	Tag Identification	Adipose Punch	Travel Time (days)	Travel Speed (km/d)
Kalskag	7/20	8/12	2760	ADF&G-01-pink	y	23	14
Kalskag	7/20	7/30	2775	ADF&G-01-pink	y	10	31
Aniak	7/22	8/14	22608	ADF&G-02-green	y	23	12
Aniak	7/25	8/22	22640	ADF&G-02-green	y	28	10
Aniak	7/26	8/23	36002	ADF&G-02-white	y	28	10
Aniak	7/27	8/14	2909	ADF&G-01-pink	y	18	16
Aniak	7/28	8/23	23227	ADF&G-02-green	y	26	11
Aniak	7/29	8/13	23367	ADF&G-02-green	y	15	19
Aniak	7/29	8/13	23465	ADF&G-02-green	y	15	19
Kalskag	7/29	8/13	19643	ADF&G-02-blue	y	15	21
Aniak	7/29	8/10	23577	ADF&G-02-green	y	12	24
Aniak	7/30	8/15	23826	ADF&G-02-green	y	16	18
Kalskag	7/30	8/11	19814	ADF&G-02-blue	y	12	26
Aniak	7/31	8/13	23856	ADF&G-02-green	y	13	22
Kalskag	8/1	8/23	29310	ADF&G-02-pink	y	22	14
Aniak	8/1	8/21	36033	ADF&G-02-white	y	20	14
Kalskag	8/2	8/21	19985	ADF&G-02-blue	y	19	17
Aniak	8/2	8/15	24508	ADF&G-02-green	y	13	22
Aniak	8/4	8/15	24801	ADF&G-02-green	y	11	26
Aniak	8/5	9/1	24939	ADF&G-02-green	y	27	11
Aniak	8/5	8/21	24882	ADF&G-02-green	y	16	18
Aniak	8/5	8/21	24941	ADF&G-02-green	y	16	18
Aniak	8/5	8/21	25050	ADF&G-02-green	y	16	18
Kalskag	8/6	8/29	29684	ADF&G-02-pink	y	23	14
Kalskag	8/6	8/23	29230	ADF&G-02-pink	y	17	18
Aniak	8/7	9/5	25384	ADF&G-02-green	y	29	10
Aniak	8/7	8/23	25457	ADF&G-02-green	y	16	18
Kalskag	8/8	8/21	29716	ADF&G-02-pink	y	13	24
Kalskag	8/8	8/21	29813	ADF&G-02-pink	y	13	24
Kalskag	8/9	8/28	20131	ADF&G-02-blue	y	19	17
Kalskag	8/9	8/23	29860	ADF&G-02-pink	y	14	22
Kalskag	8/9	8/23	29874	ADF&G-02-pink	y	14	22
Kalskag	8/10	8/28	20057	ADF&G-02-blue	y	18	17
Aniak	8/11	8/23	25919	ADF&G-02-green	y	12	24
Aniak	8/11	8/23	25933	ADF&G-02-green	y	12	24
Aniak	8/12	9/2	26017	ADF&G-02-green	y	21	14
Aniak	8/12	8/28	26086	ADF&G-02-green	y	16	18
Aniak	8/13	8/28	26113	ADF&G-02-green	y	15	19
Aniak	8/14	8/31	36282	ADF&G-02-white	y	17	17
Kalskag	8/14	8/28	20210	ADF&G-02-blue	y	14	22
Kalskag	8/14	8/28	20215	ADF&G-02-blue	y	14	22
Kalskag	8/15	8/31	20231	ADF&G-02-blue	y	16	20
Aniak	8/16	8/31	36371	ADF&G-02-white	y	15	19
Kalskag	8/16	8/28	31134	ADF&G-02-pink	y	12	26
Aniak	8/17	9/1	36396	ADF&G-02-white	n	15	19
Kalskag	8/17	8/31	20305	ADF&G-02-blue	y	14	22
Aniak	8/18	9/7	26679	ADF&G-02-green	y	20	14
Aniak	8/19	9/5	36442	ADF&G-02-white	y	17	17
Aniak	8/19	9/1	26825	ADF&G-02-green	y	13	22
Aniak	8/19	8/31	36456	ADF&G-02-white	y	12	24
Kalskag	8/19	9/1	20340	ADF&G-02-blue	y	13	24
Kalskag	8/19	9/1	31254	ADF&G-02-pink	y	13	24
Kalskag	8/20	9/7	20358	ADF&G-02-blue	y	18	17

-Continued-

Table 12. (page 2 of 2)

Tagging Location	Date Tagged	Date Recaptured	Tag Number	Tag Identification	Adipose Punch	Travel Time (days)	Travel Speed (km/d)
Aniak	8/20	9/2	35004	ADF&G-02-white	y	13	22
Aniak	8/20	9/1	26972	ADF&G-02-green	y	12	24
Aniak	8/20	9/1	36487	ADF&G-02-white	n	12	24
Aniak	8/20	8/31	26921	ADF&G-02-green	y	11	26
Aniak	8/20	8/31	26922	ADF&G-02-green	n	11	26
Kalskag	8/20	9/1	31326	ADF&G-02-pink	y	12	26
Kalskag	8/20	8/31	20348	ADF&G-02-blue	y	11	29
Aniak	8/21	9/2	27079	ADF&G-02-green	y	12	24
Aniak	8/21	9/1	35074	ADF&G-02-white	y	11	26
Kalskag	8/21	8/31	31342	ADF&G-02-pink	y	10	31
Kalskag	8/22	9/10	31486	ADF&G-02-pink	y	19	17
Kalskag	8/22	9/7	31519	ADF&G-02-pink	y	16	20
Aniak	8/22	9/2	35149	ADF&G-02-white	y	11	26
Kalskag	8/22	9/1	31536	ADF&G-02-pink	y	10	31
Kalskag	8/22	8/31	31425	ADF&G-02-pink	y	9	35
Kalskag	8/22	8/31	31507	ADF&G-02-pink	y	9	35
Kalskag	8/22	8/31	31523	ADF&G-02-pink	y	9	35
Kalskag	8/23	9/11	31626	ADF&G-02-pink	y	19	17
Aniak	8/23	9/7	35236	ADF&G-02-white	y	15	19
Aniak	8/23	9/5	35230	ADF&G-02-white	y	13	22
Aniak	8/23	9/4	27202	ADF&G-02-green	y	12	24
Aniak	8/23	9/4	35234	ADF&G-02-white	y	12	24
Aniak	8/23	9/1	35213	ADF&G-02-white	n	9	32
Aniak	8/24	9/5	27232	ADF&G-02-green	y	12	24
Aniak	8/24	9/5	27258	ADF&G-02-green	n	12	24
Kalskag	8/24	9/6	38017	ADF&G-02-blue	y	13	24
Kalskag	8/24	9/5	31695	ADF&G-02-pink	y	12	26
Aniak	8/25	9/12	35315	ADF&G-02-white	y	18	16
Aniak	8/25	9/5	35297	ADF&G-02-white	y	11	26
Kalskag	8/25	9/5	31839	ADF&G-02-pink	y	11	29
Kalskag	8/25	9/5	31869	ADF&G-02-pink	y	11	29
Aniak	8/25	9/4	27314	ADF&G-02-green	y	10	29
Kalskag	8/25	9/2	31804	ADF&G-02-pink	y	8	39
Aniak	8/26	9/4	27353	ADF&G-02-green	n	9	32
Kalskag	8/27	9/8	30103	ADF&G-02-pink	y	12	26
Aniak	8/27	9/6	35363	ADF&G-02-white	n	10	29
Kalskag	8/27	9/5	30116	ADF&G-02-pink	y	9	35
Aniak	8/28	9/10	35378	ADF&G-02-white	n	13	22
Kalskag	8/29	9/6	30177	ADF&G-02-pink	y	8	39
Aniak	8/30	9/11	27544	ADF&G-02-green	y	12	24
Kalskag	8/30	9/10	30245	ADF&G-02-pink	y	11	29
Aniak	8/30	9/7	27550	ADF&G-02-green	y	8	36
Aniak	8/31	9/9	27600	ADF&G-02-green	y	9	32
Aniak	8/31	9/8	27662	ADF&G-02-green	y	8	36
Aniak	8/31	9/7	27658	ADF&G-02-green	y	7	41
Kalskag	9/1	9/10	30337	ADF&G-02-pink	y	9	35
Kalskag	9/1	9/10	30352	ADF&G-02-pink	y	9	35
Kalskag	9/2	9/9	30391	ADF&G-02-pink	y	7	45
Aniak	9/4	9/11	27922	ADF&G-02-green	n	7	41
Aniak	9/8	9/21	28173	ADF&G-02-green	n	13	22
Total			103				
Range						7 - 29	10 - 45
Mean						14	24

FIGURES

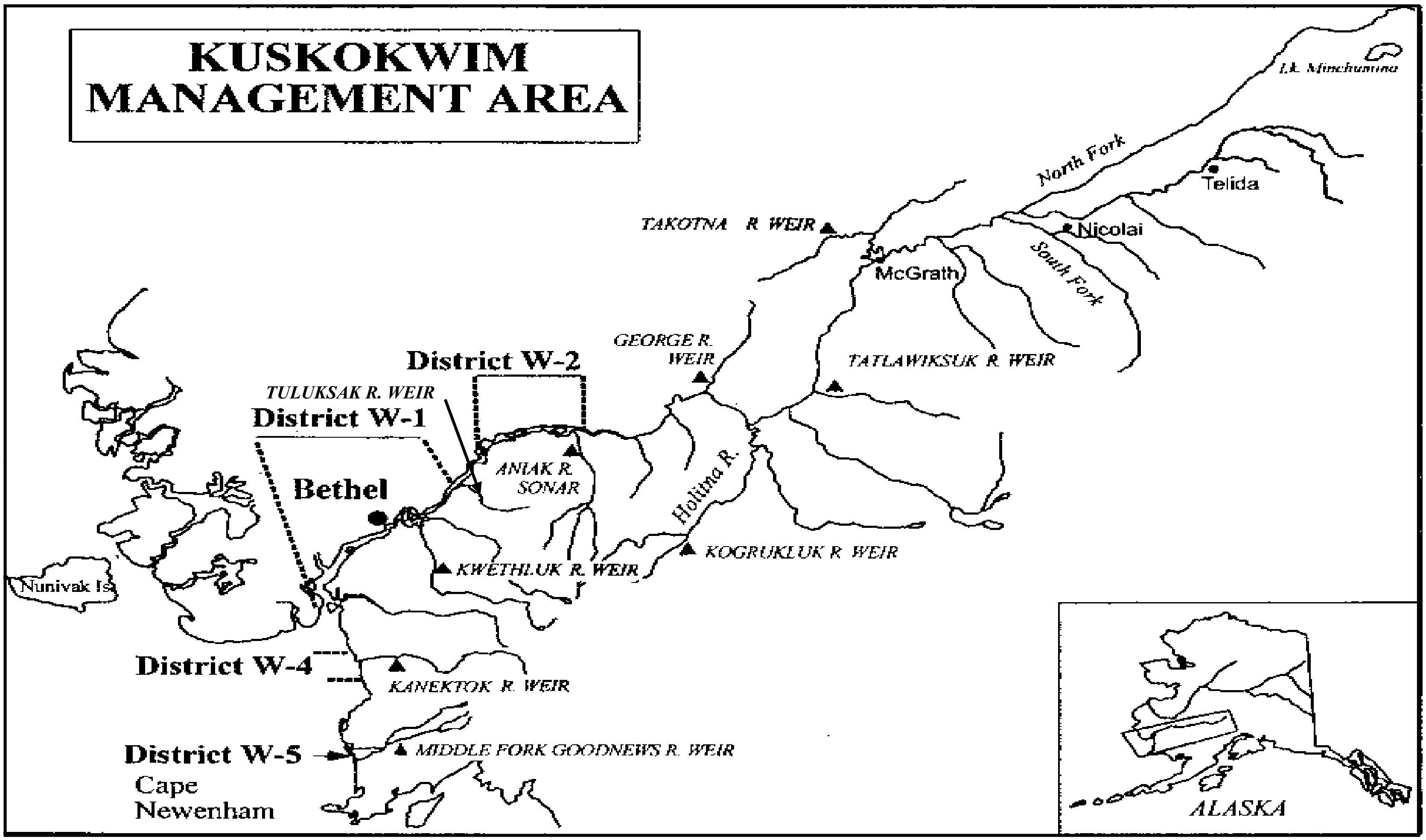


Figure 1. Kuskokwim Area salmon management districts and escapement monitoring projects.

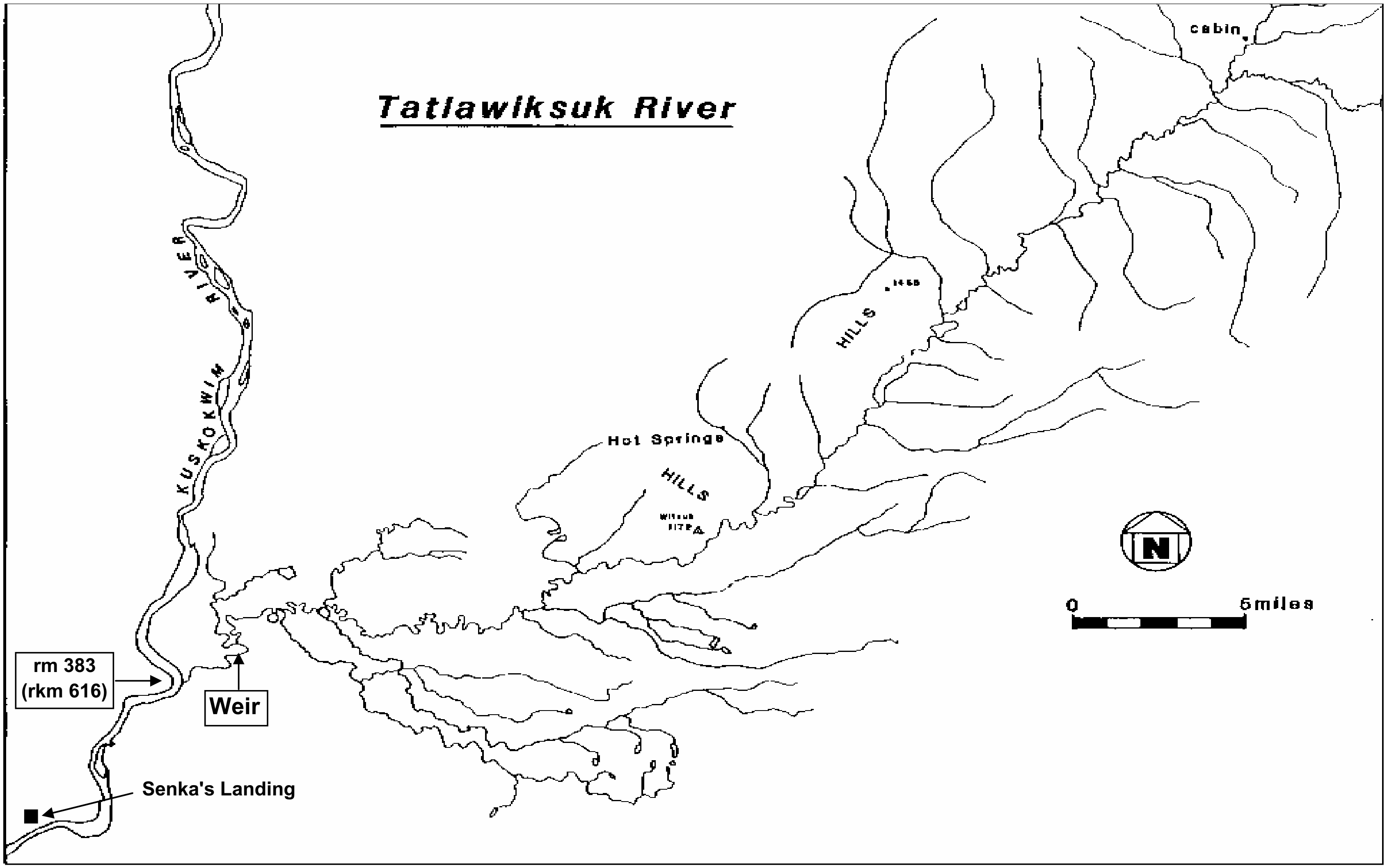
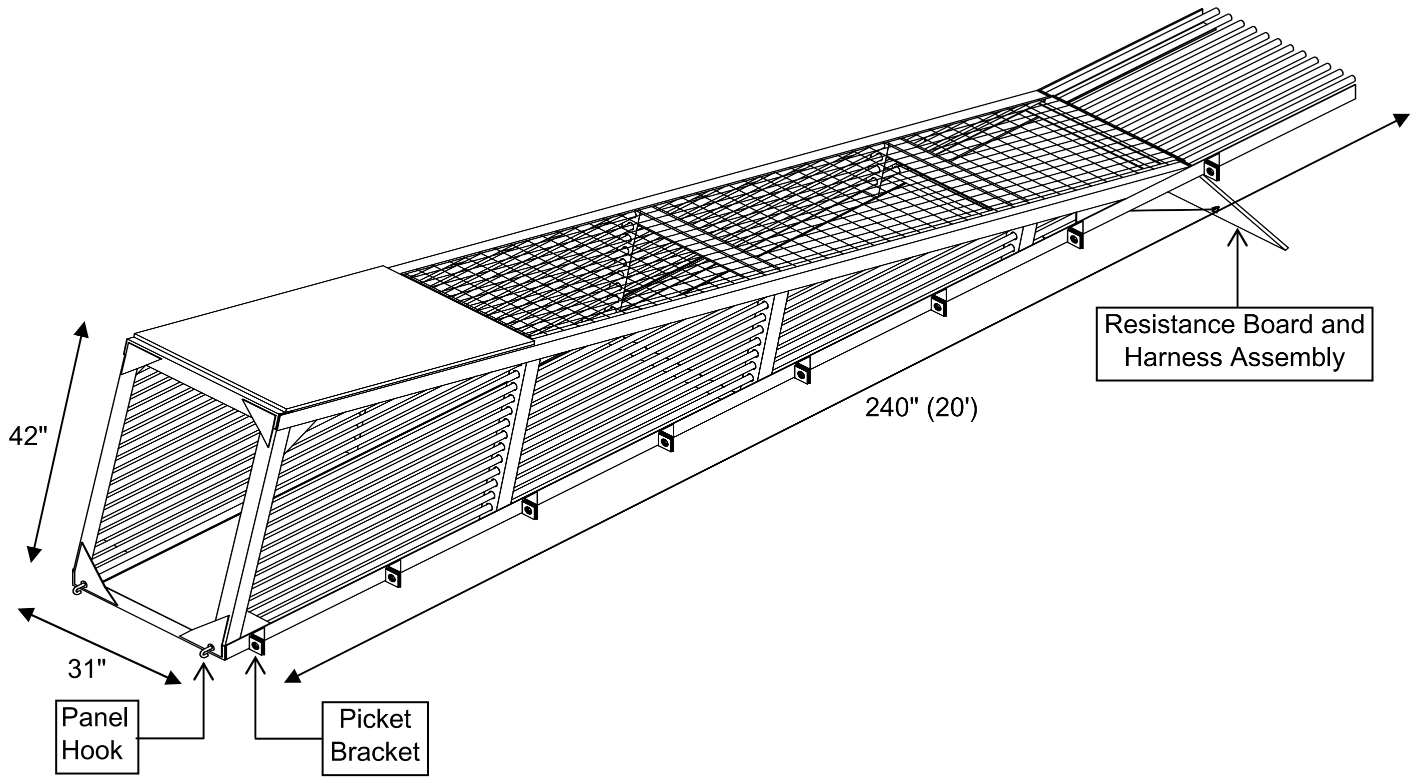


Figure 2. Tatlawiksuk River, middle Kuskokwim River basin.



General Materials:

Frame - 3" x 3/16" aluminum angle
Sidewalls - 1" schedule 40 PVC electrical conduit
Top Cover(s) - 48" x 31" x3/4" plywood, 3" vinyl coated wire mesh cut to size
Picket Bracket - 3" x 3" x 1/2" UHMW plate riveted to a 3" - 3" x 3/16" piece of aluminum angle, both drilled to accept a 1" schedue 40 connector picket

Note: refer to Stewart (2002) for details of resistnace board and harness assembly, and panel hooks.

Figure 3. Enclosed passage chute used in the Tatlawiksuk River weir, 2002.

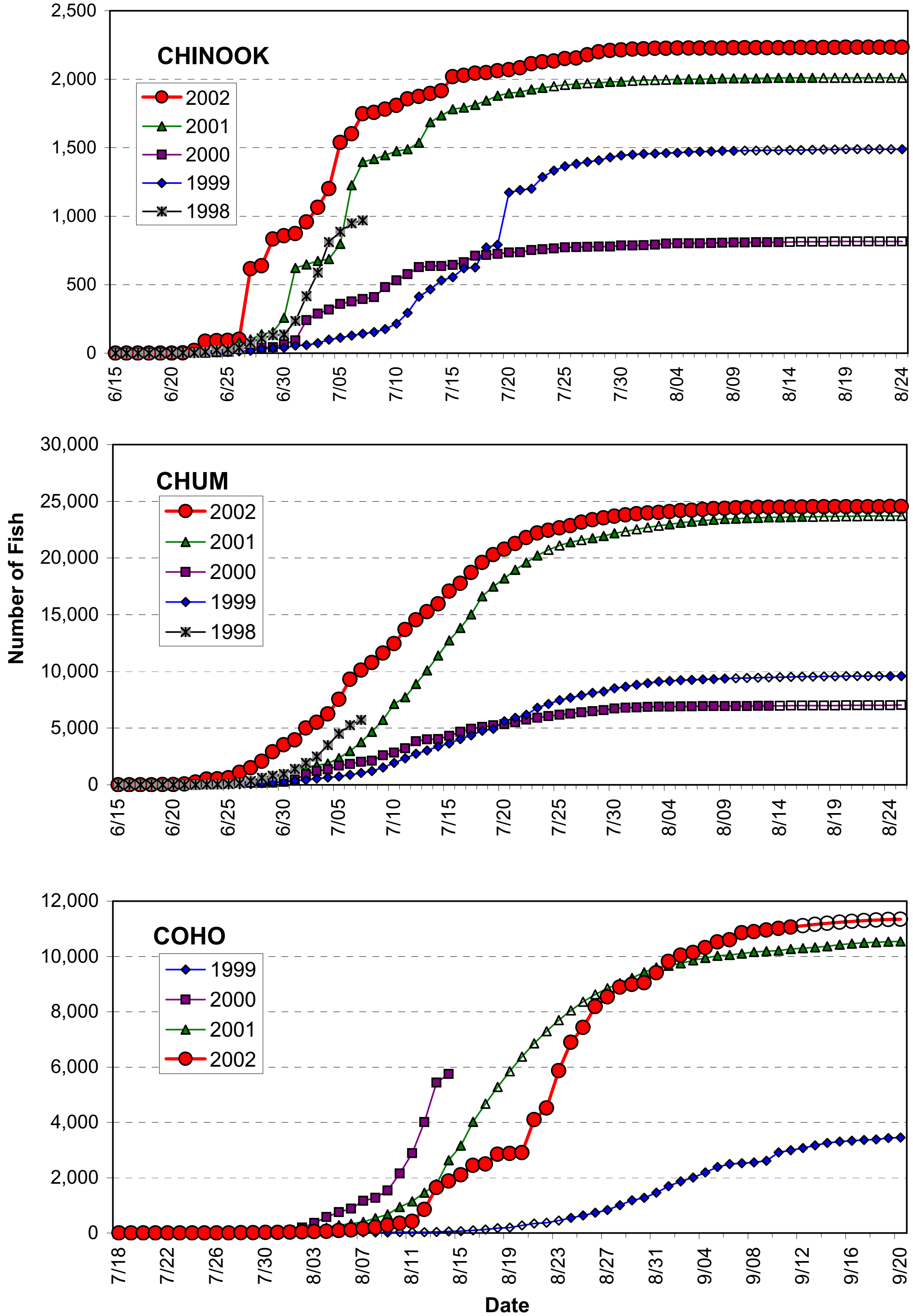


Figure 4. Historical cumulative passage of chinook, chum and coho salmon at the Tatlawiksuk River weir (Solid data points represent observed passage, open data points represent estimated passage).

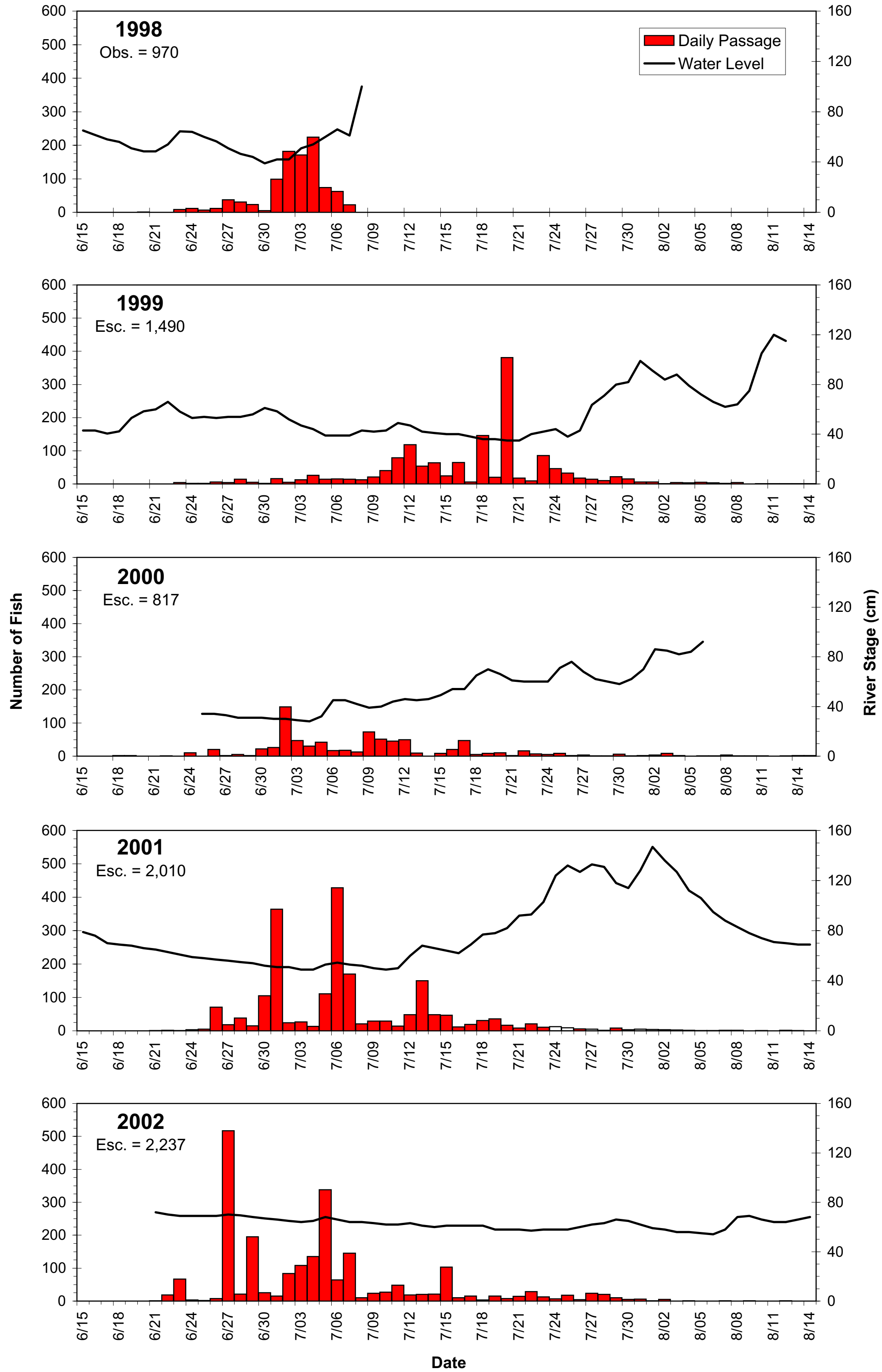


Figure 5. Daily chinook salmon passage relative to daily river stage at the Tatlawiksuk River weir, 1998 - 2002. (Solid bars represent observed passage, open bars represent estimated passage.)

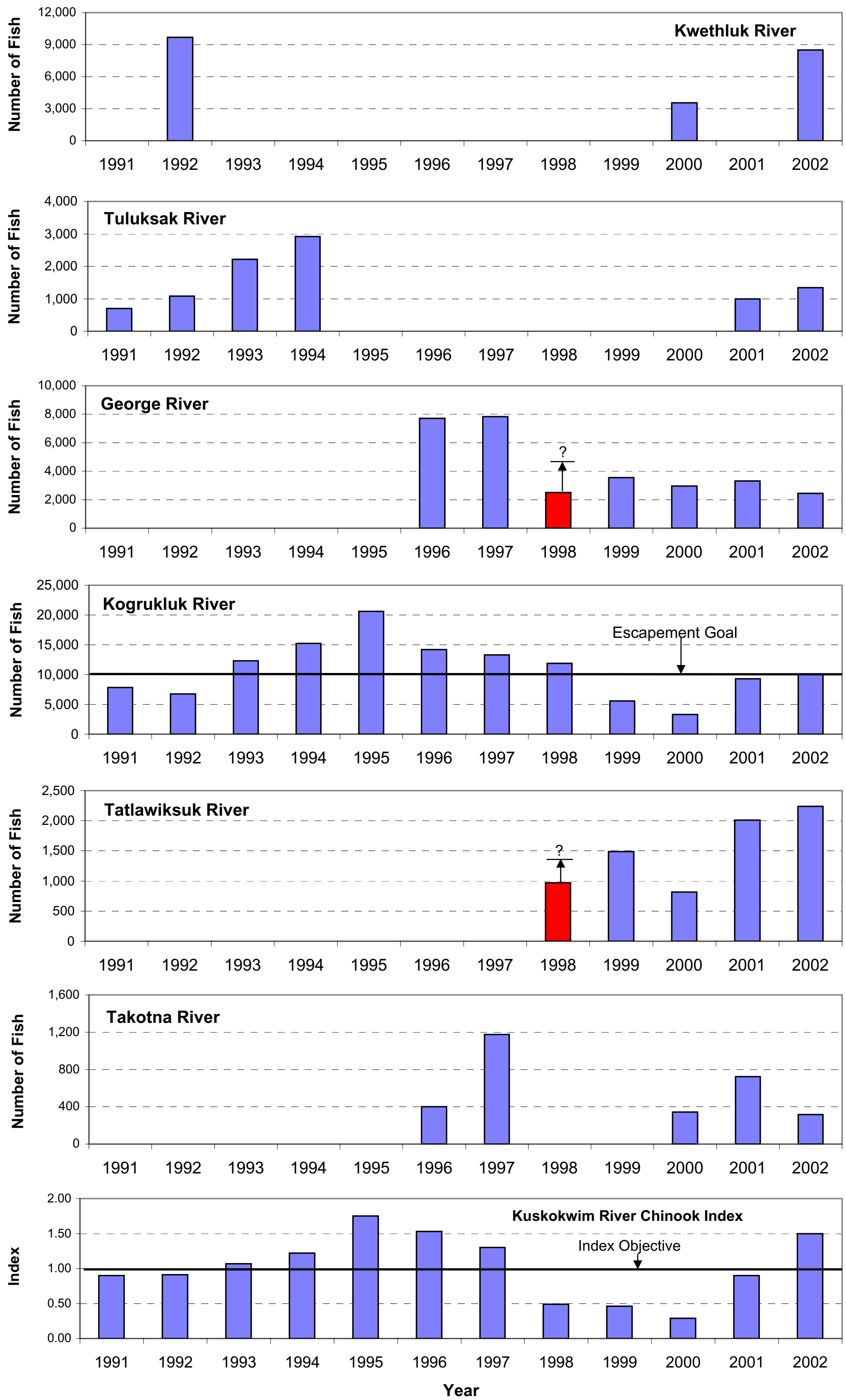


Figure 6. Chinook salmon escapement into six Kuskokwim River tributaries, and Kuskokwim River chinook salmon aerial survey indices, 1991-2002.

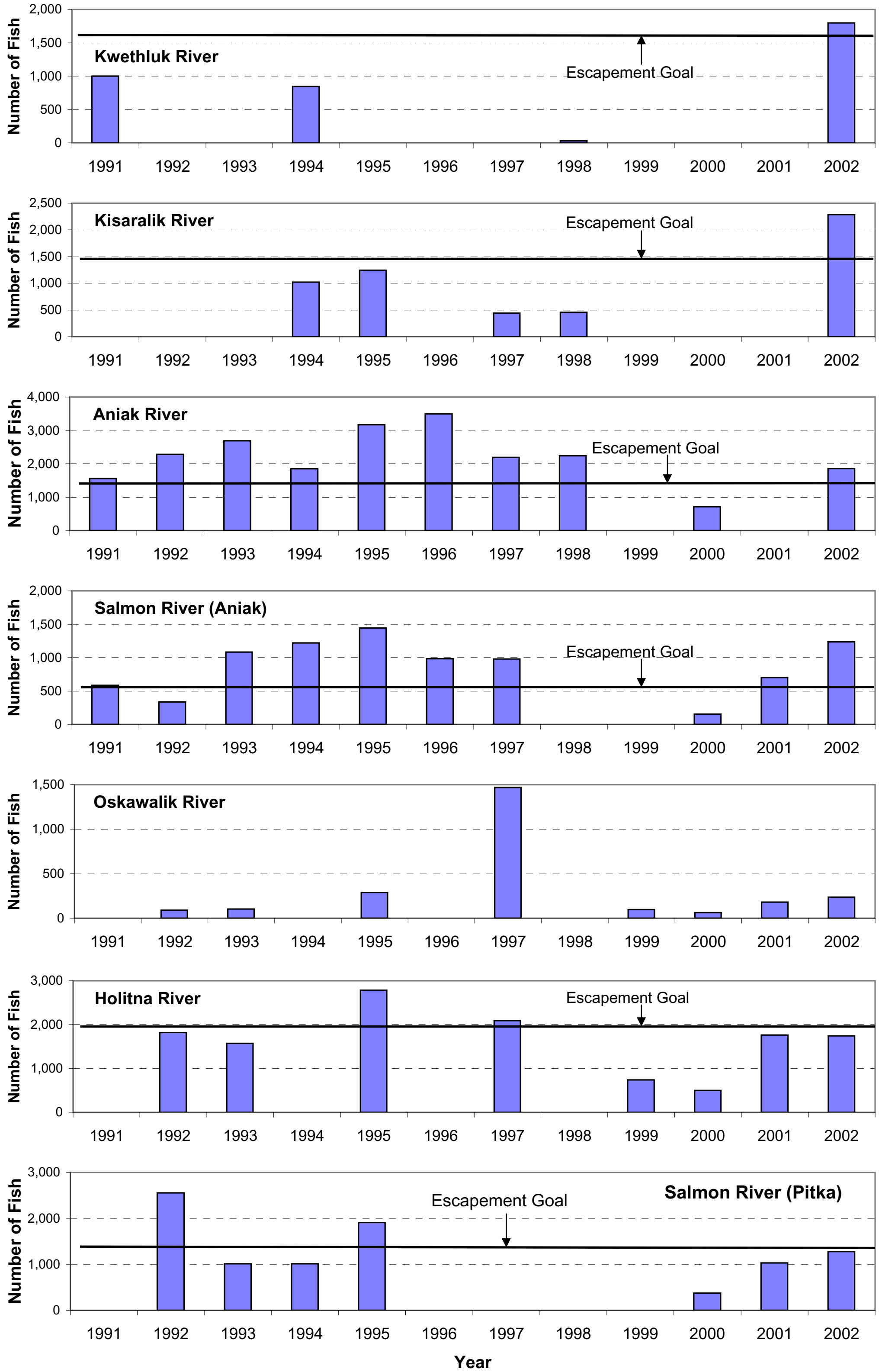


Figure 7. Aerial survey counts of chinook salmon in seven Kuskokwim River tributaries, 1991 - 2002.

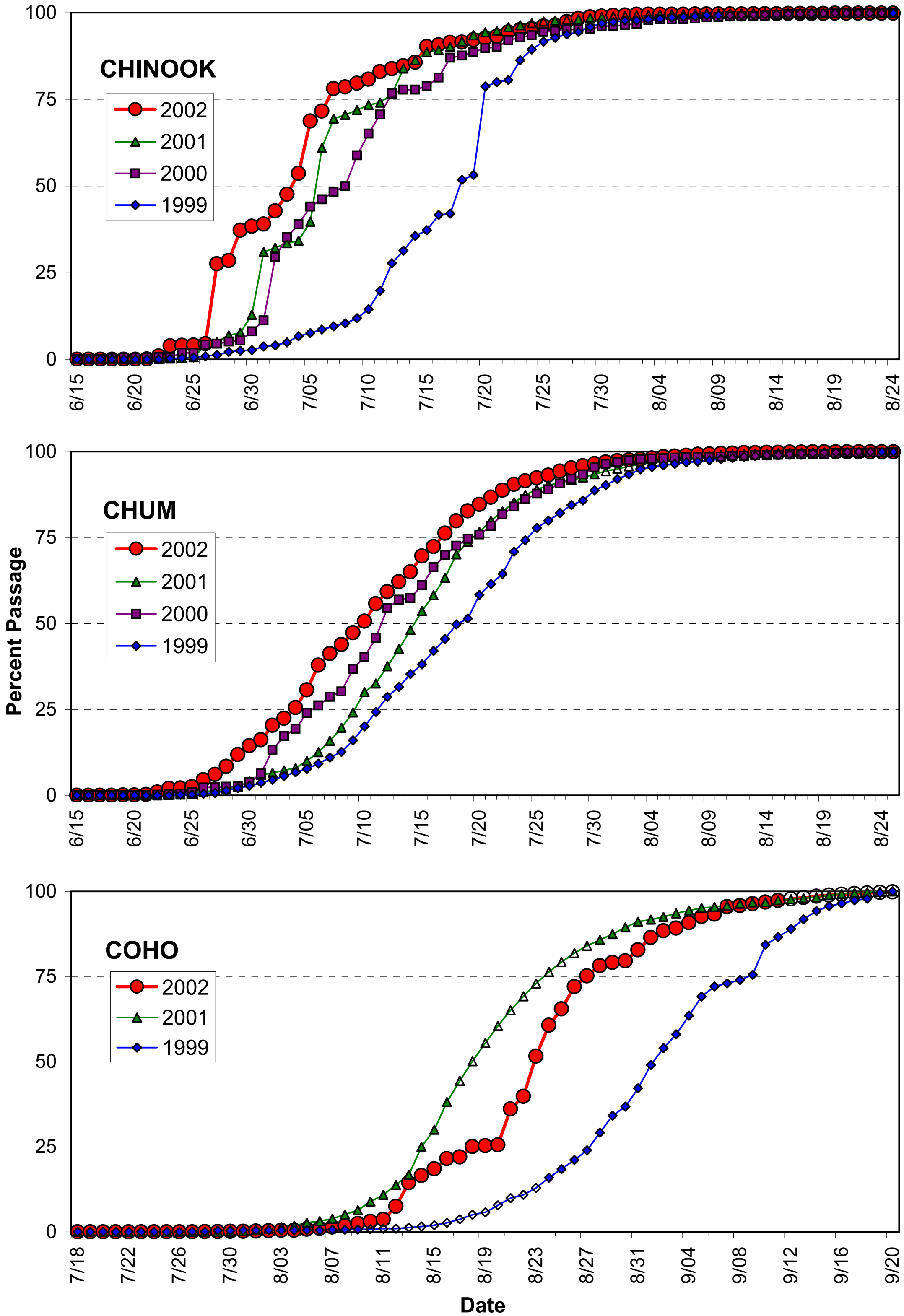


Figure 8. Historical percent passage of chinook, chum and coho salmon at the Tatlawiksuk River weir (Solid data points represent observed passage, open data points represent estimated passage).

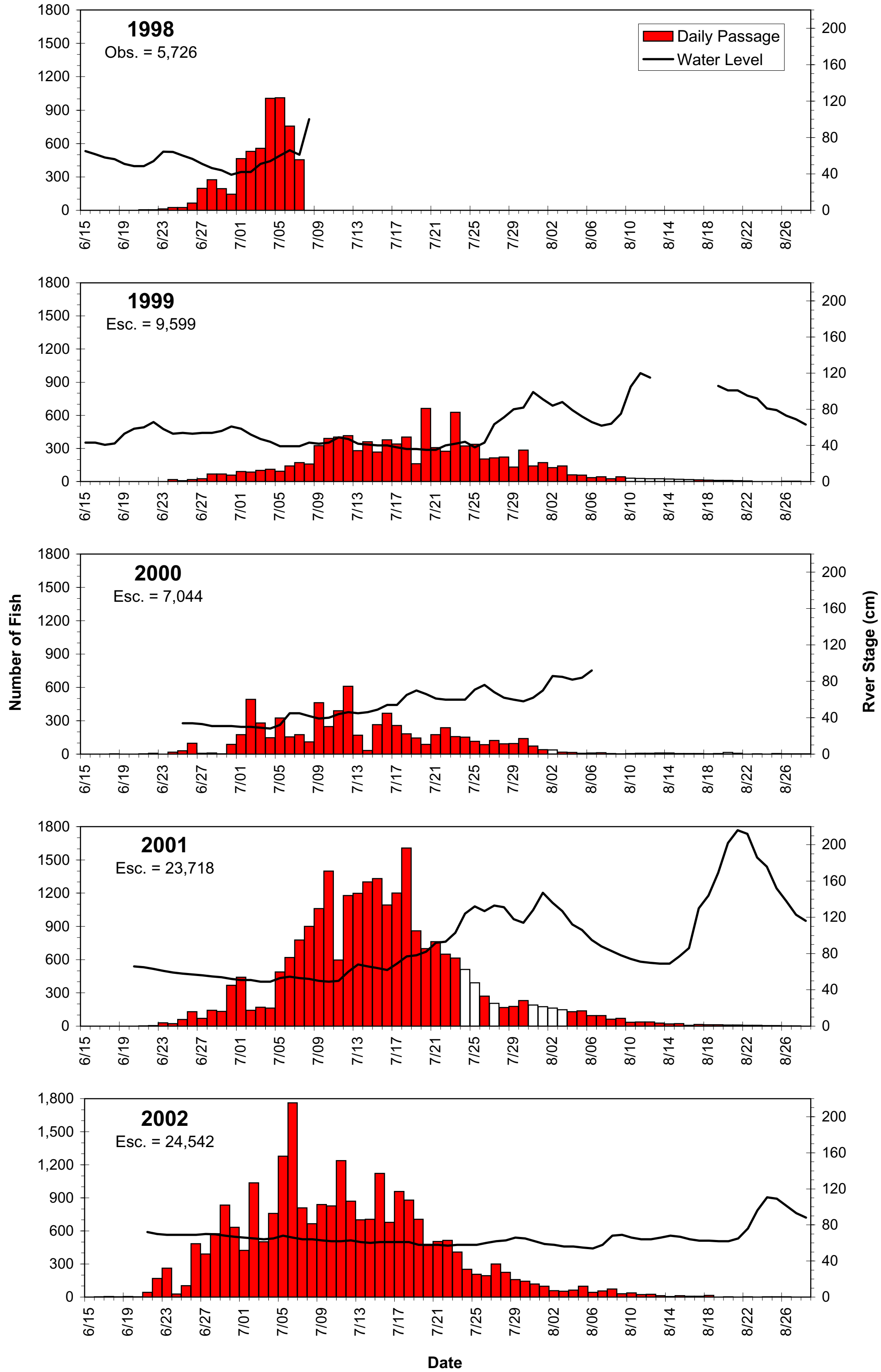


Figure 9. Daily chum salmon passage relative to daily river stage at the Tatlawiksuk River weir, 1998 - 2002 (Solid bars represent observed passage, open bars represent estimated passage).

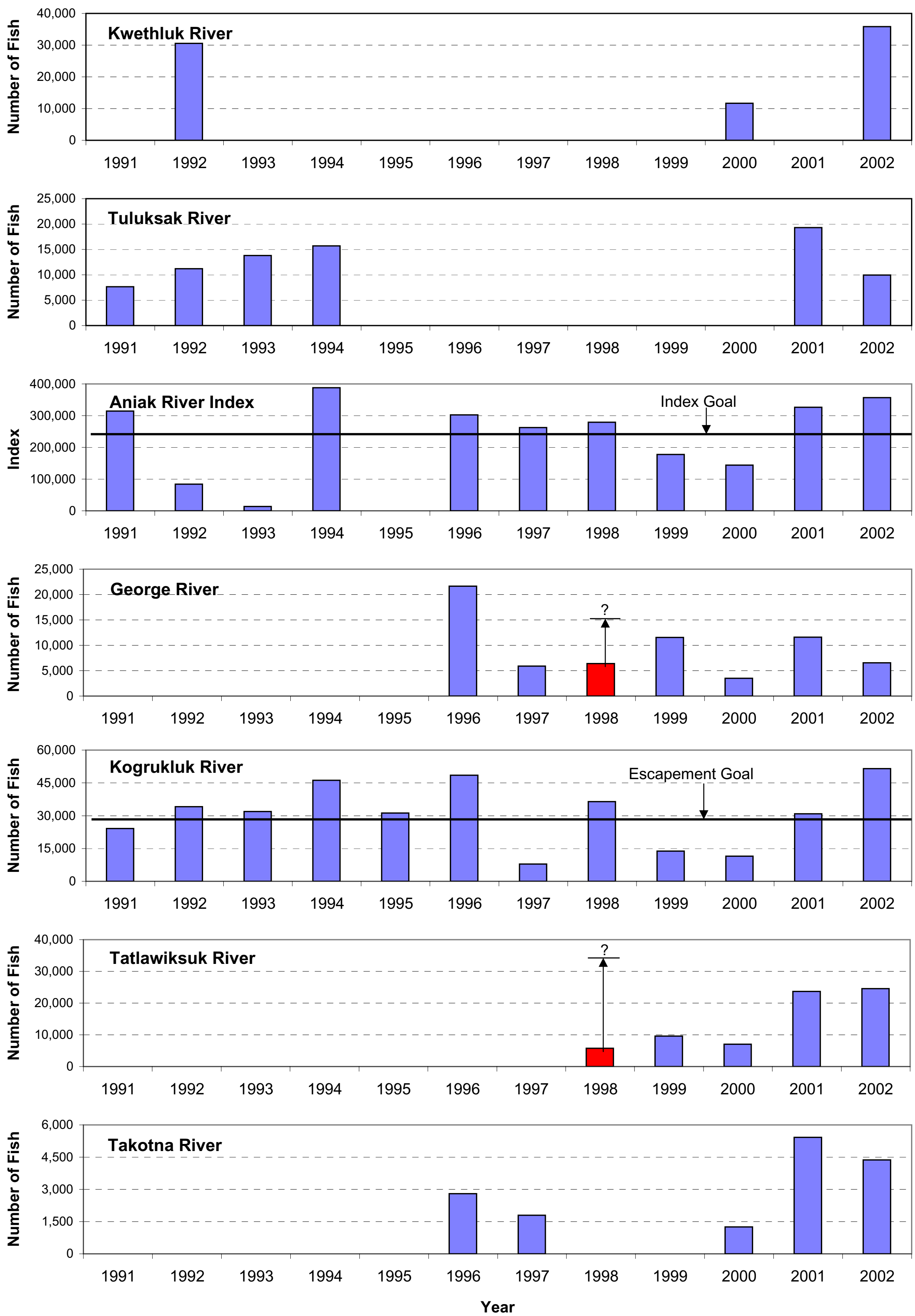


Figure 10. Chum salmon escapement into seven Kuskokwim River tributaries, 1991-2002.

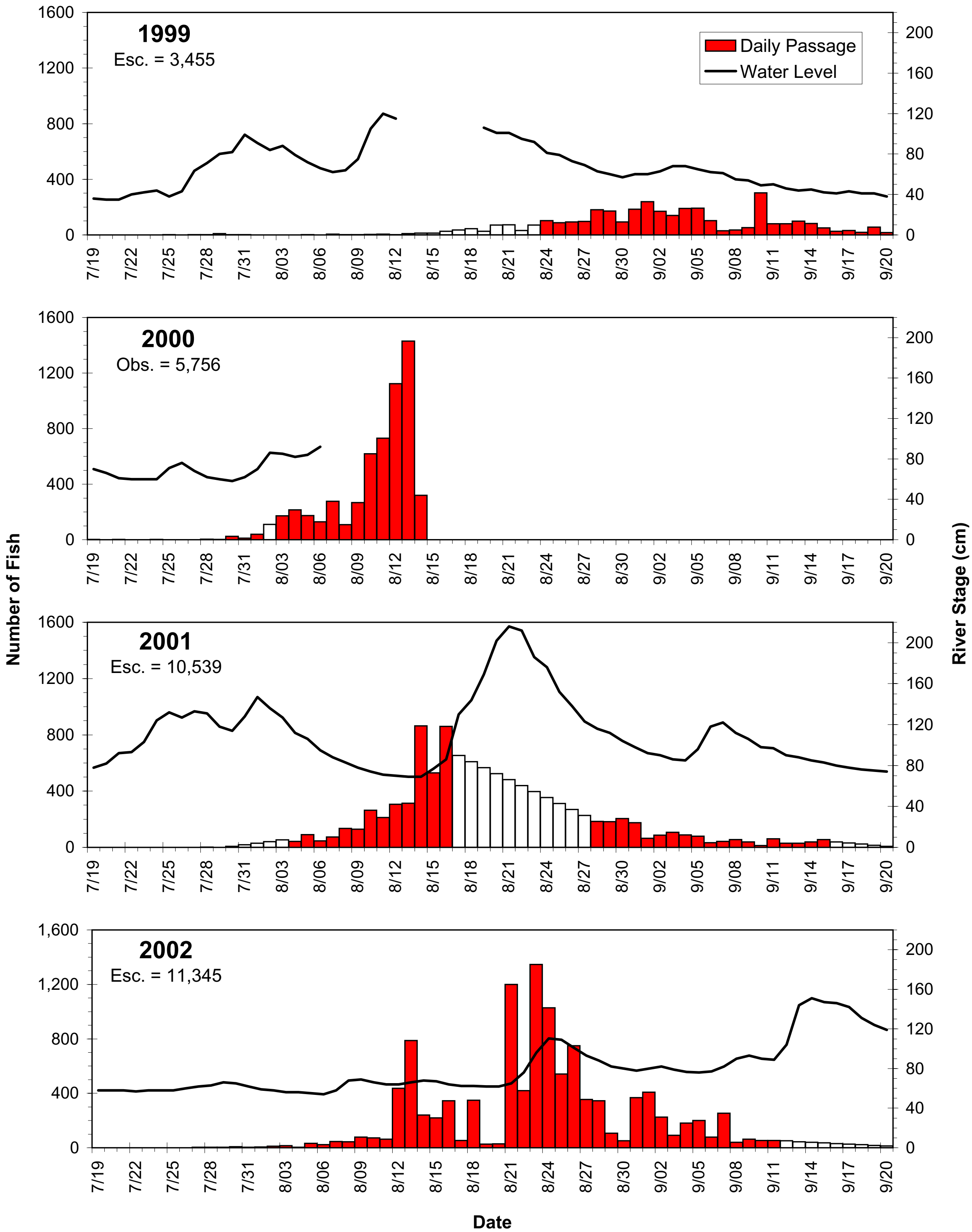


Figure 11. Daily coho salmon passage relative to daily river stage at the Tatlawiksuk River weir, 1999 - 2002 (Solid bars represent observed passage, open bars represent estimated passage).

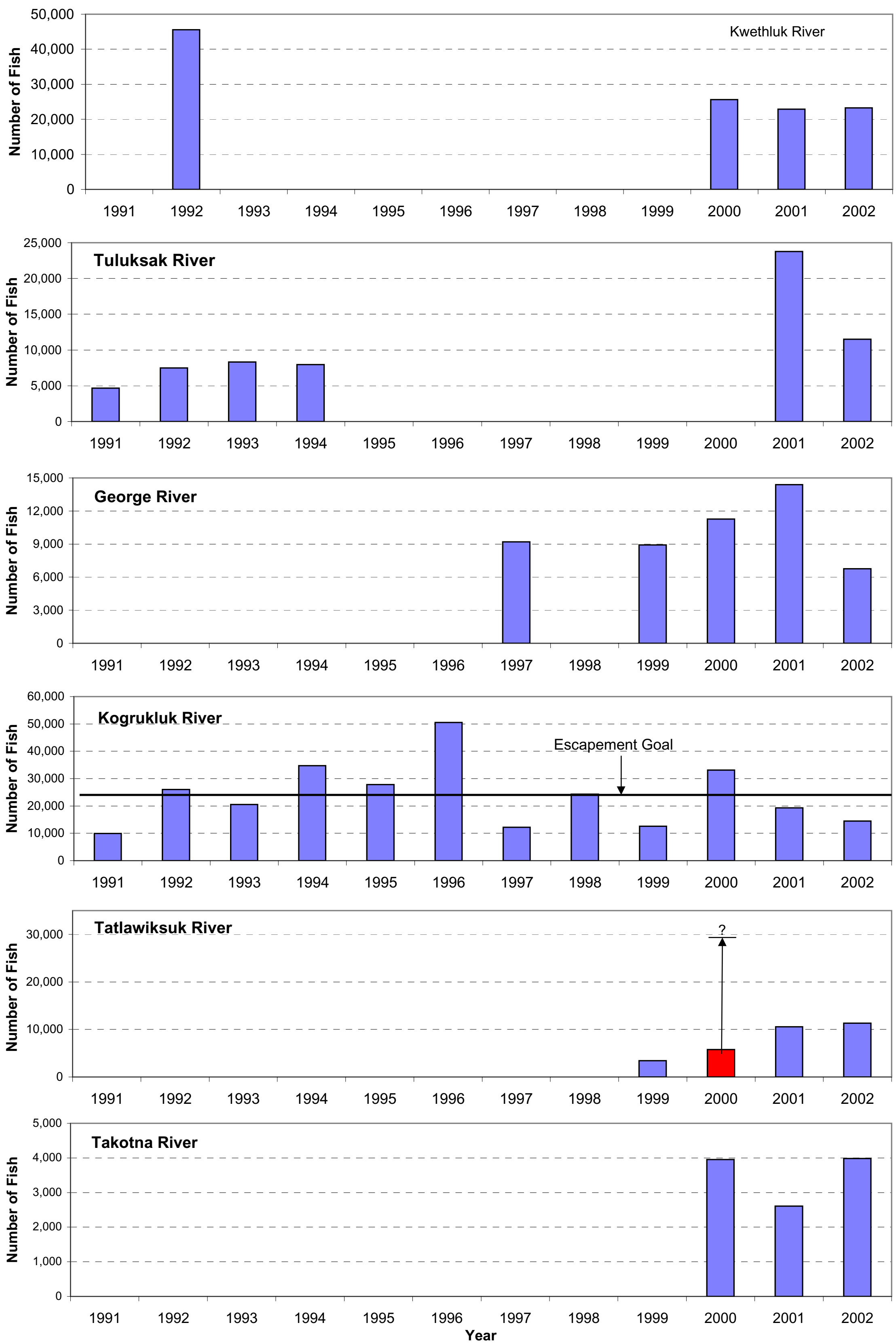


Figure 12. Coho salmon escapement into six Kuskokwim River tributaries, 1991-2002.

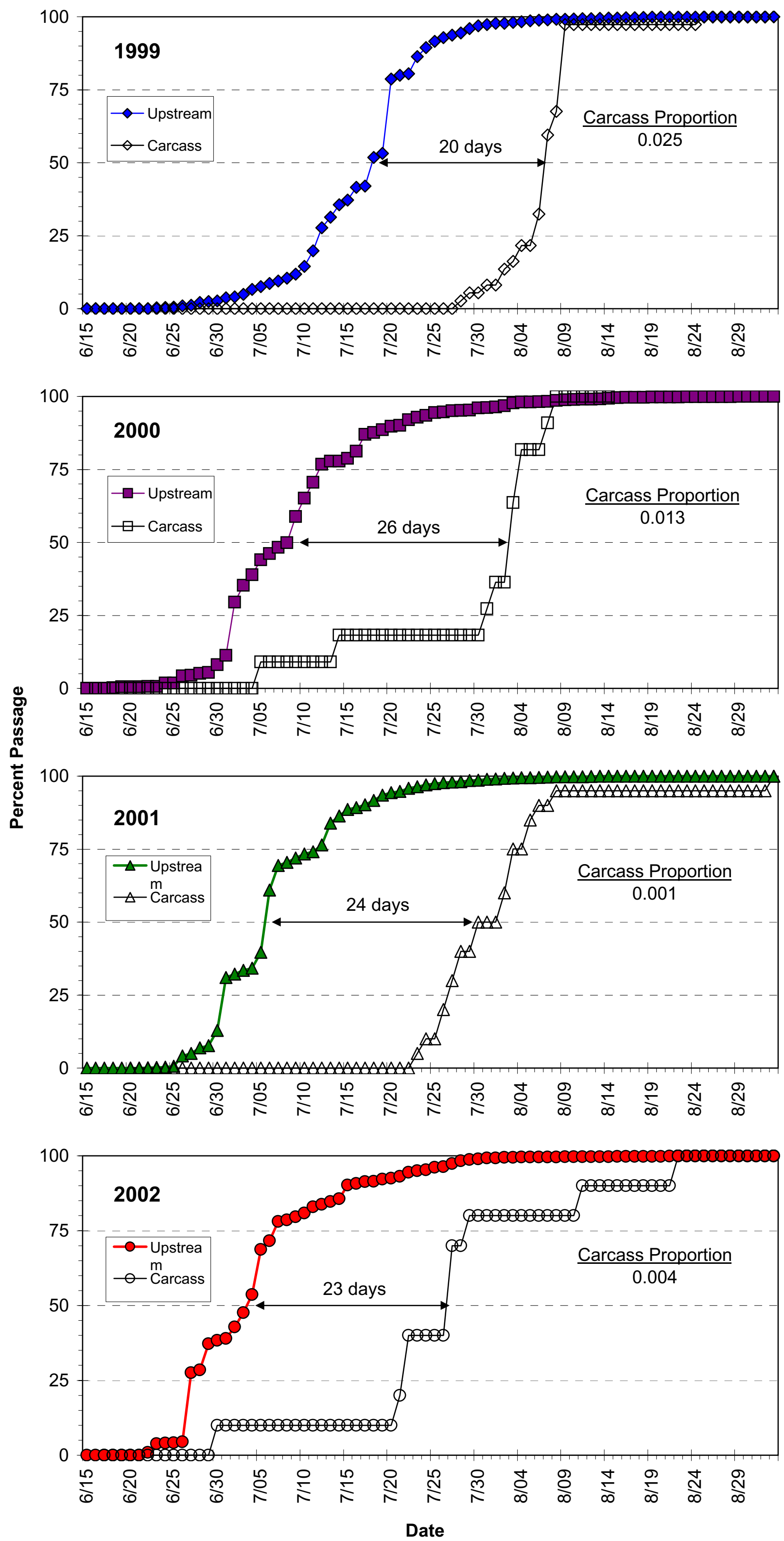


Figure 13. Comparison of percent upstream chinook salmon passage and percent downstream chinook carcass passage at the Tatlawiksuk River weir, 1999 - 2002.

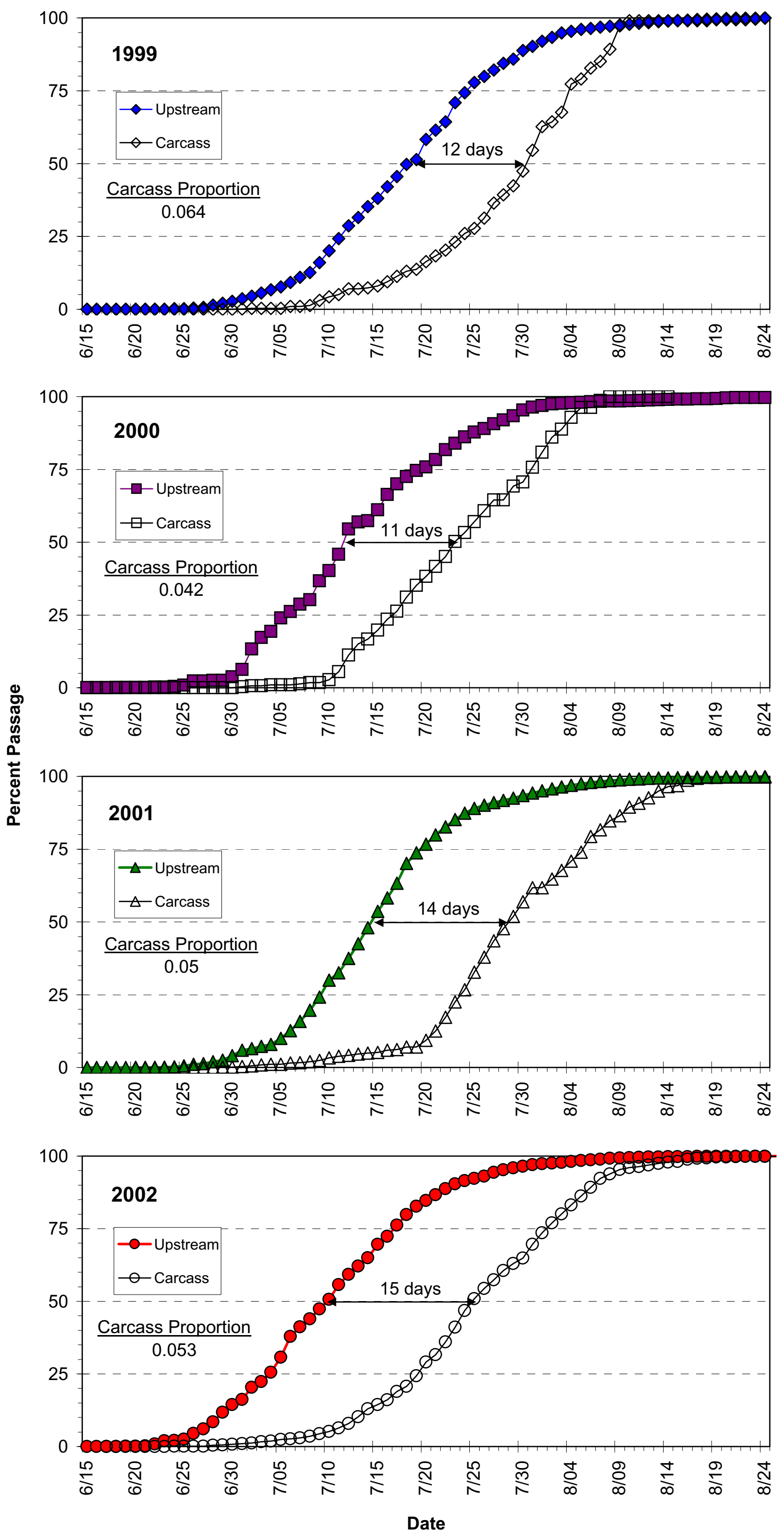


Figure 14. Comparison of percent upstream chum salmon passage and percent downstream chum carcass passage at the Tatlawiksuk River weir, 1999 - 2001.

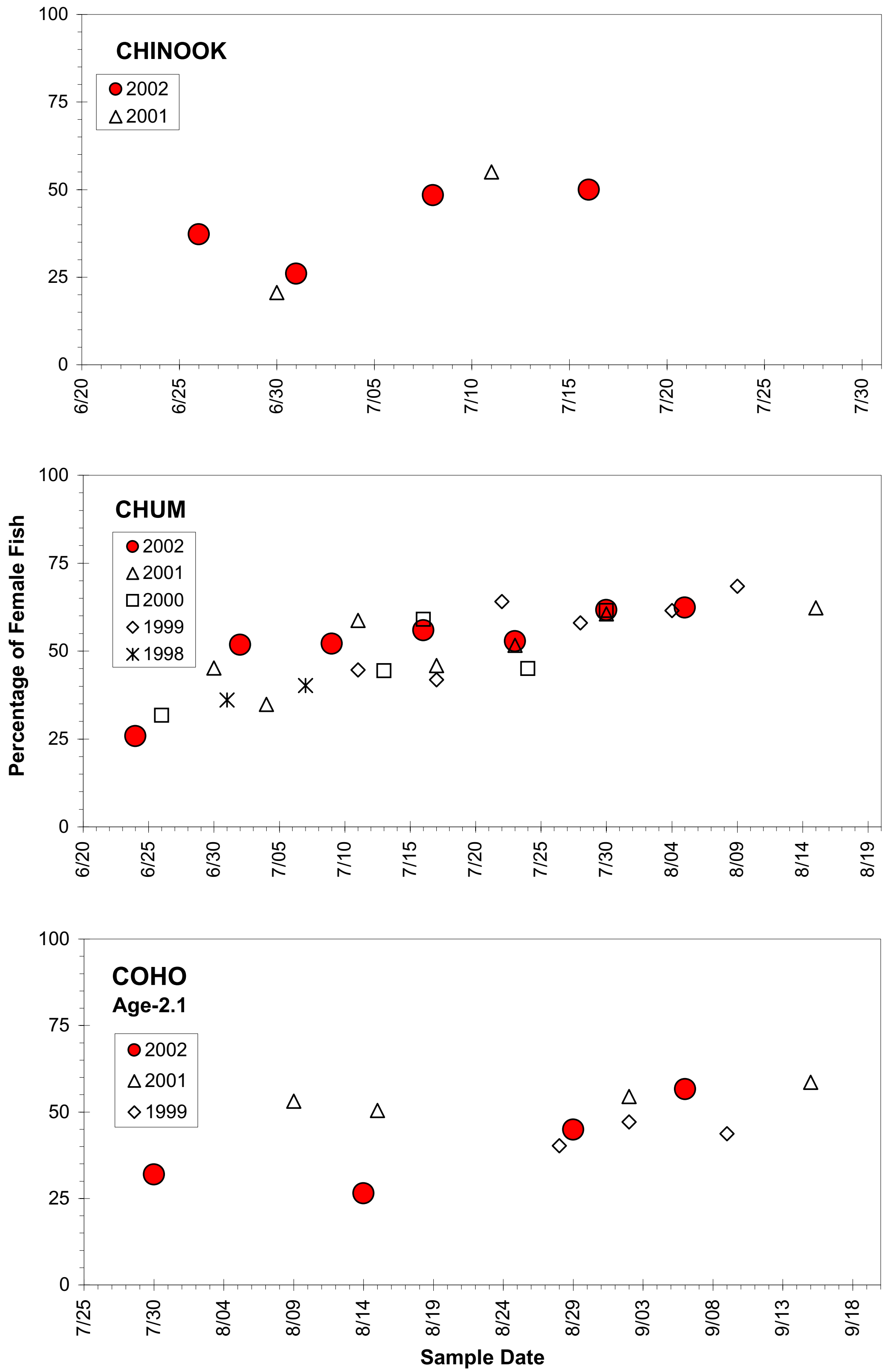


Figure 15. Percentage of female chinook, chum and coho salmon by sample date at the Tatlawiksuk River weir, 1998 - 2002.

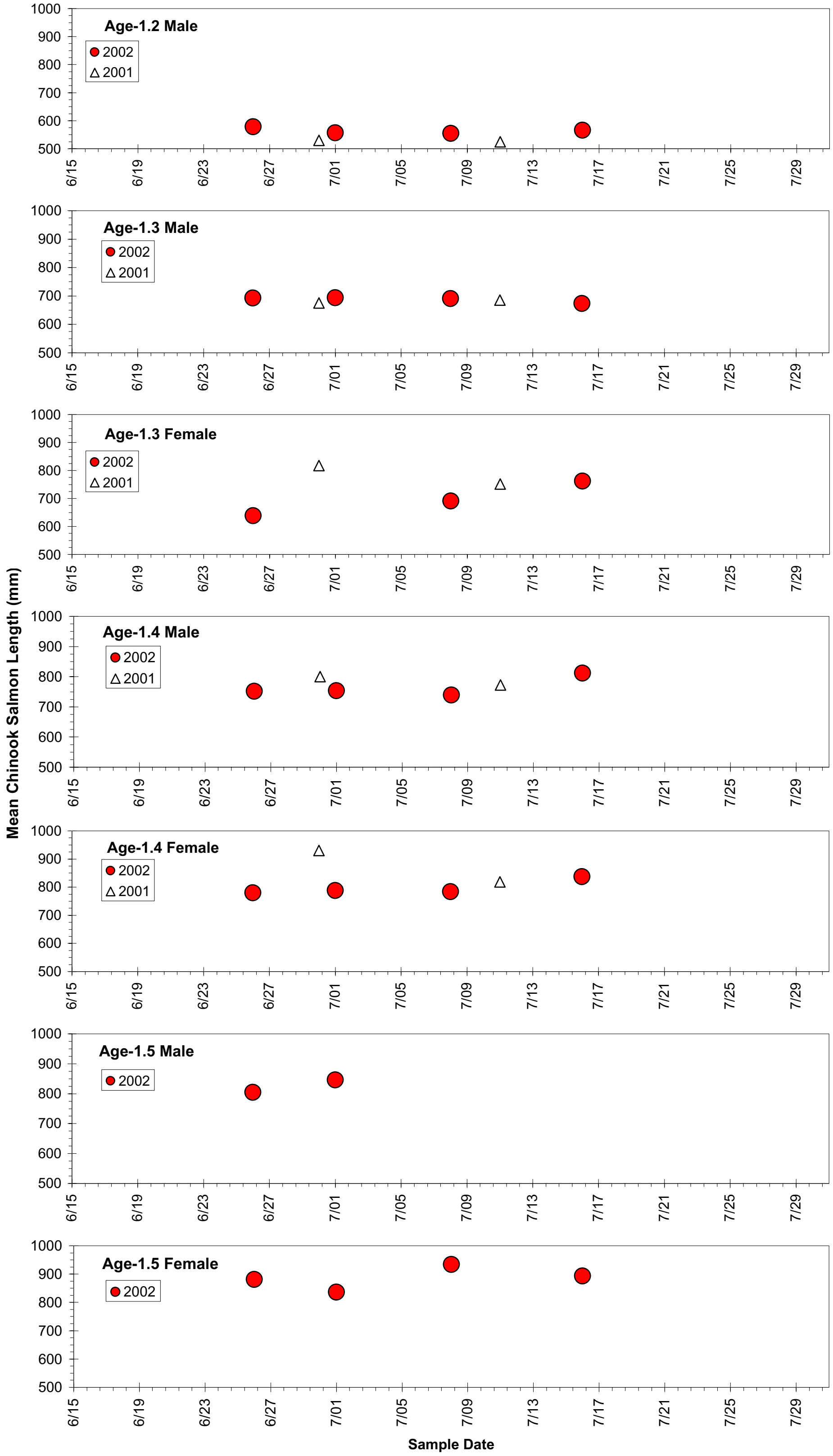


Figure 16. Mean length (mm) at age of chinook salmon by sample date at the Tatlawiksuk River weir, 2001 and 2002.

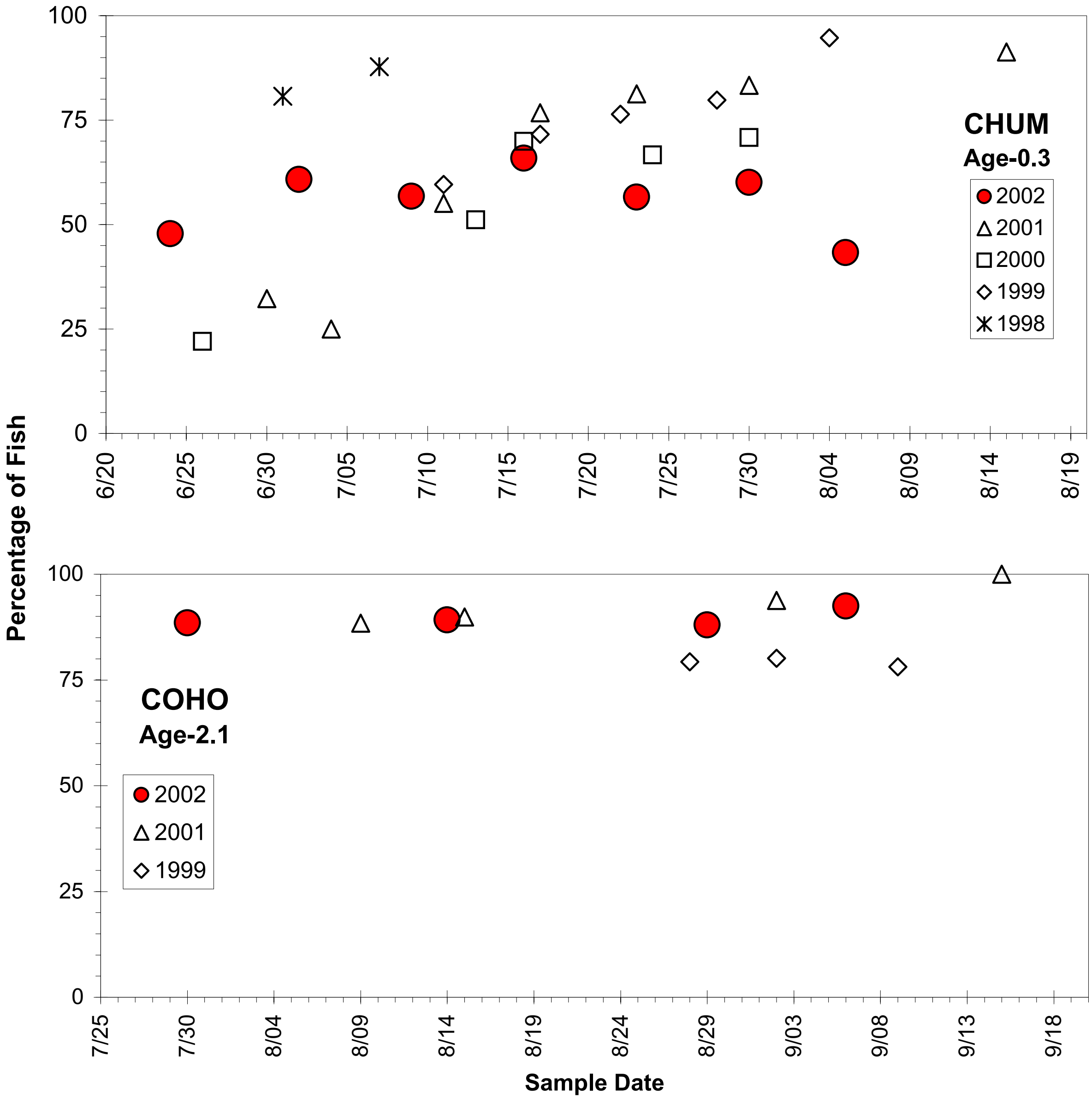


Figure 17. Percentage at age of chum and coho salmon by sample date at the Tatlawiksuk River weir, 1998 - 2002.

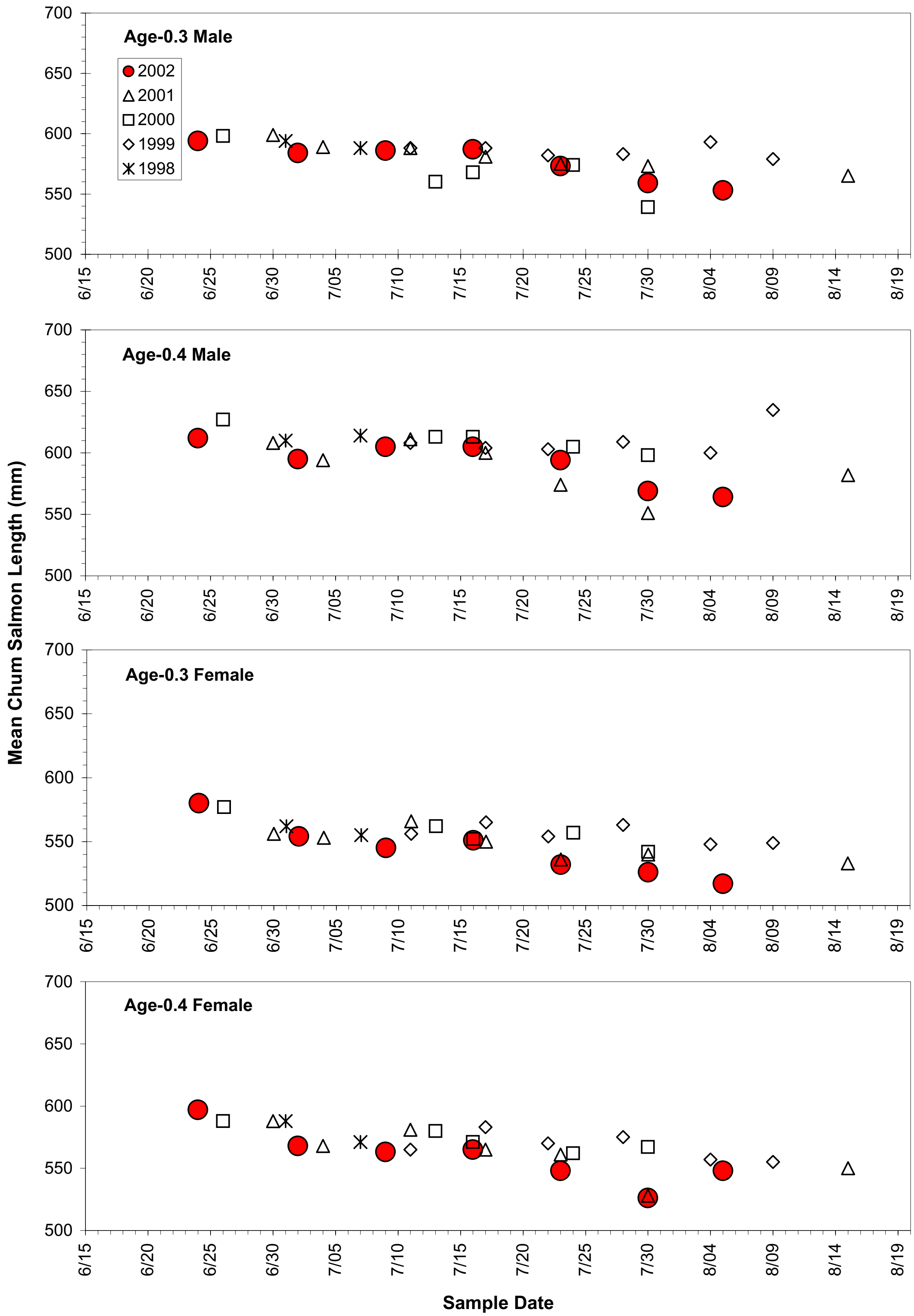


Figure 18. Average length (mm) at age of chum salmon by sample date at the Tatlawiksuk River weir, 1998 - 2002.

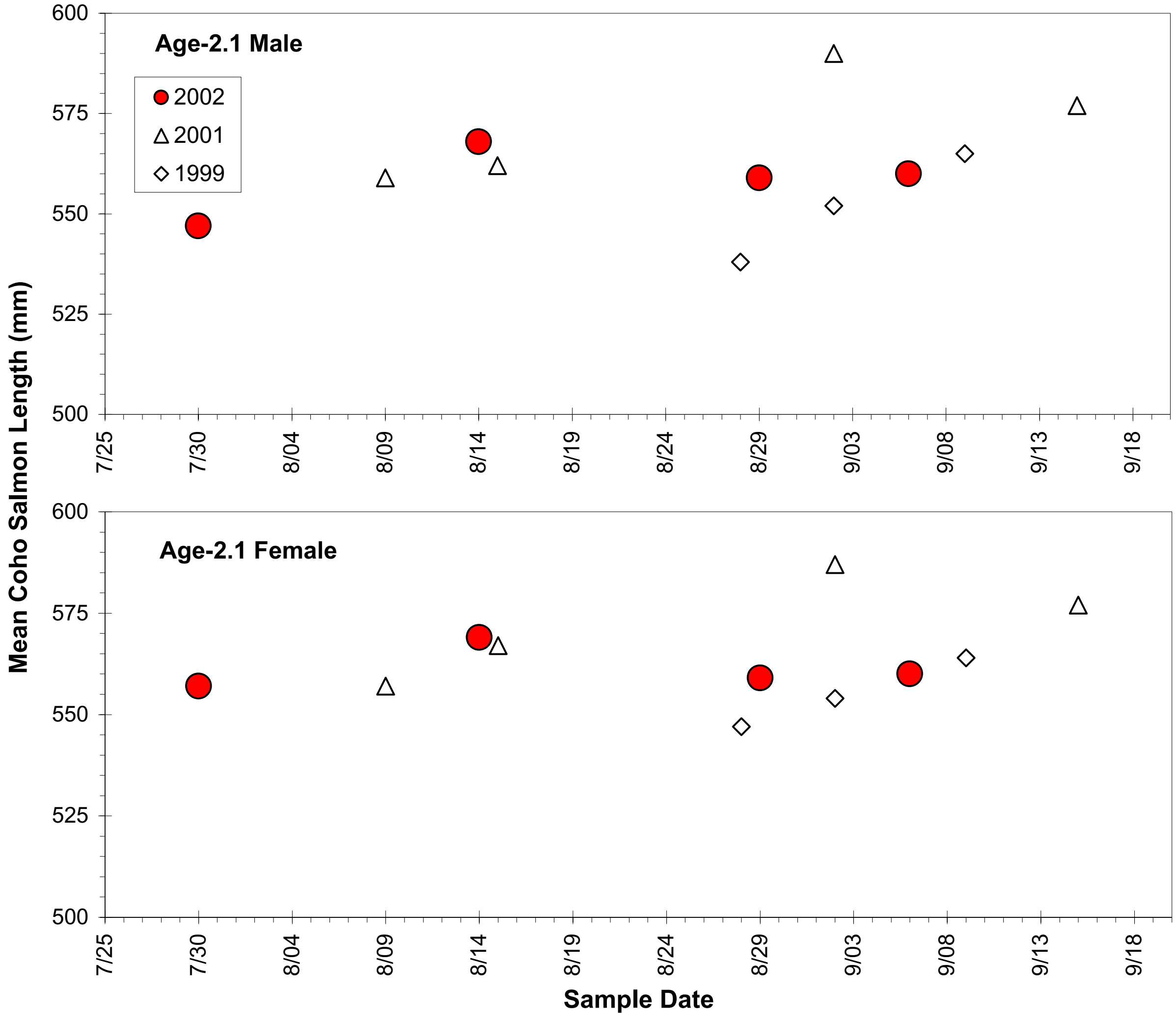


Figure 19. Mean length (mm) of age-2.1 coho salmon by sample date at the Tatlawiksuk River weir, 1999 - 2002.

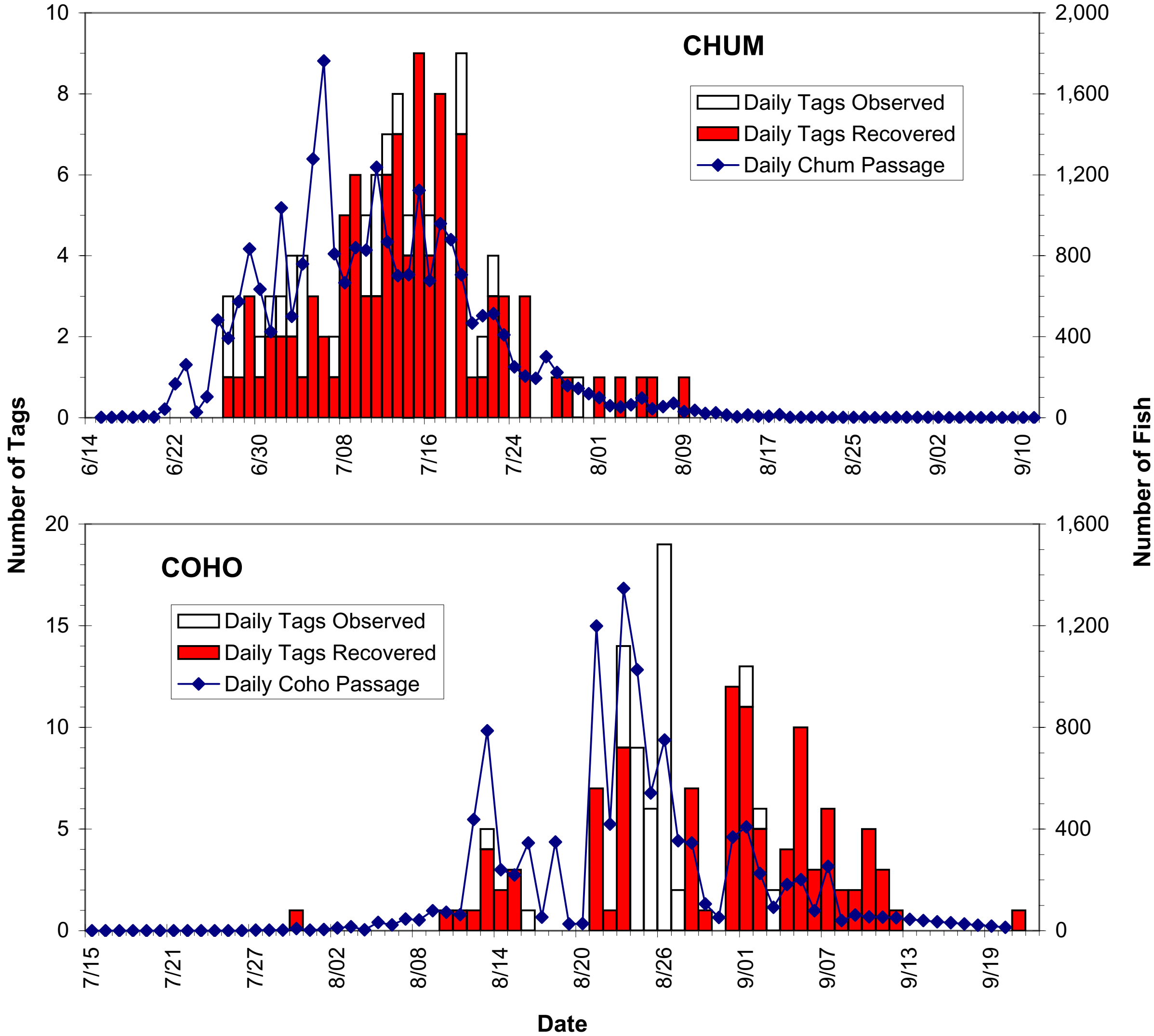


Figure 20. Daily number of observed and recovered chum and coho salmon tags, and daily passage of chum and coho salmon at the Tatlawiksuk River, 2002.

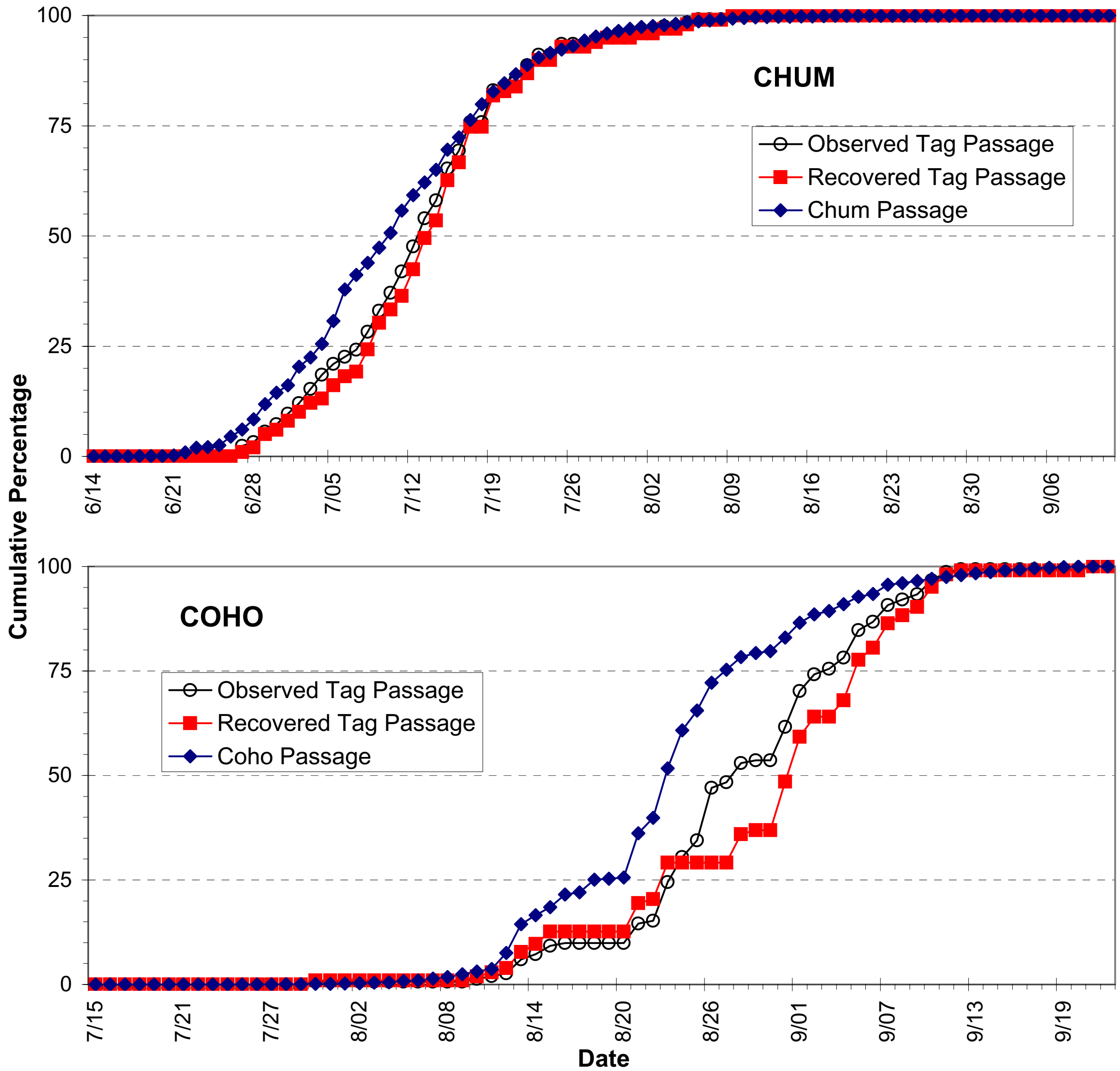


Figure 21. Cumulative percentage of observed and recovered chum and coho salmon tags, and daily passage of chum and coho salmon at the Tatlawiksuk River, 2002.

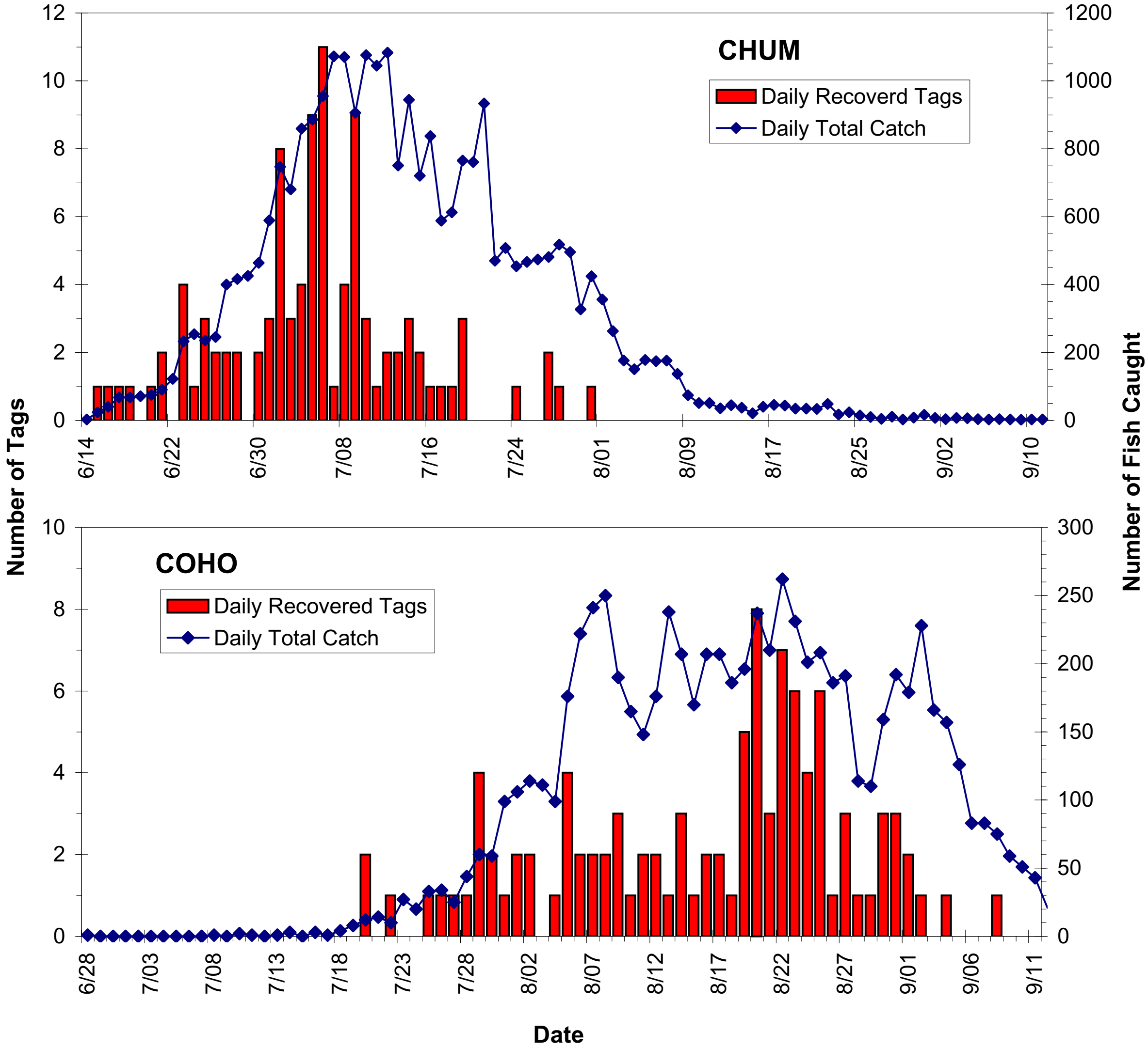


Figure 22. Daily number of Tatlawiksuk River chum and coho salmon tagged at Kalskag-Aniak, and daily catch of chum and coho salmon at Kalskag-Aniak, 2002.

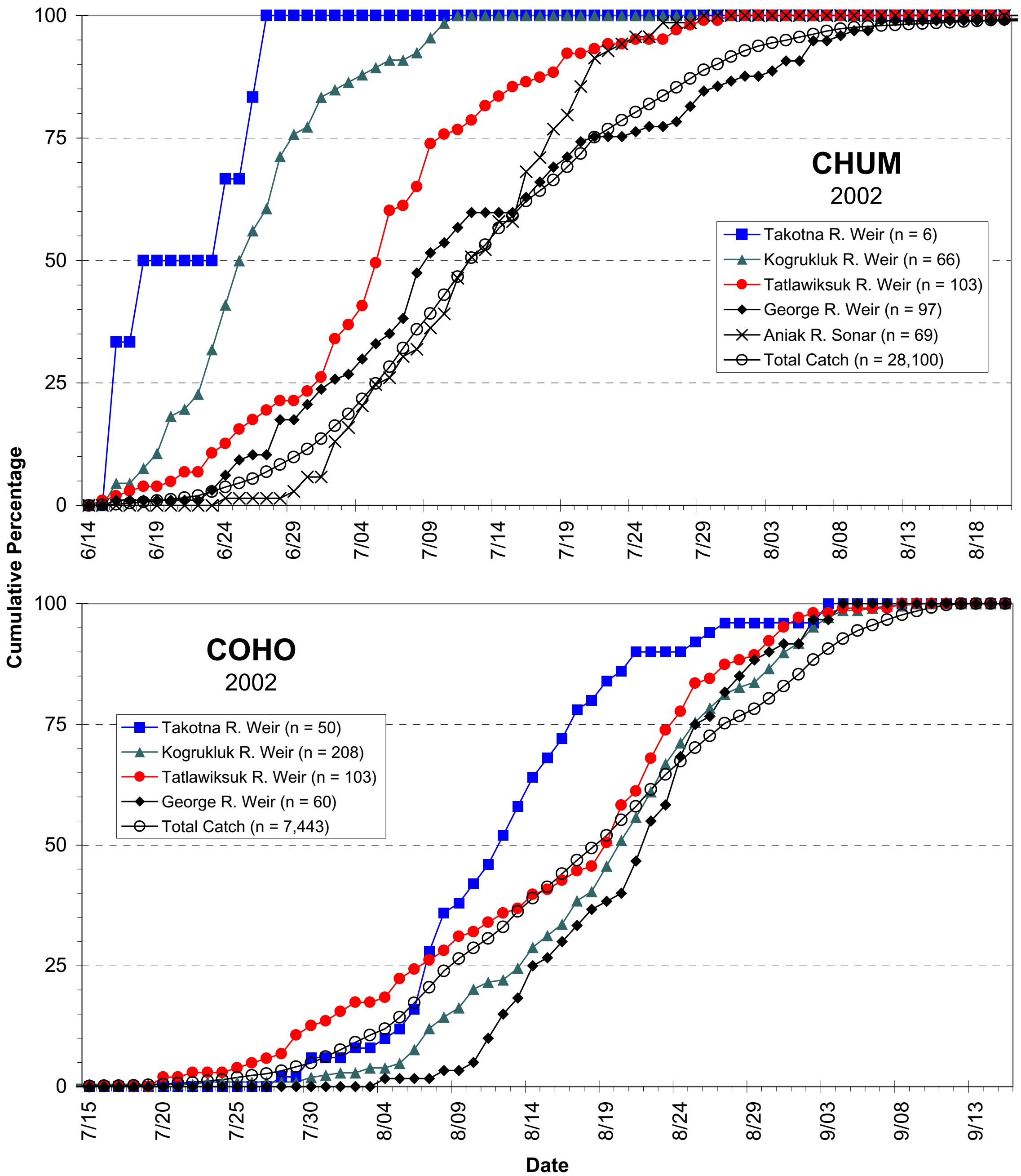


Figure 23. Cumulative percentage by date tagged of chum and coho salmon tags recovered at the Takotna, Kogrukluk, Tatlawiksuk, George and Aniak Rivers, plus cumulative percentage of the total coho salmon catch from the Kalskag - Aniak tagging site, 2002.

APPENDICIES

APPENDIX A:
AERIAL SPAWNING GROUND SURVEY DATA
FROM KUSKOKWIM RIVER TRIBUTARIES

Appendix A.1. Peak aerial survey counts of chinook salmon in indexed Kuskokwim River spawning tributaries, 1975 - 2002a.

Year	Eek	Kwethluk Canyon C.	Kisaralik	Tuluksak	Aniak	Kipchuk (Aniak)	Salmon (Aniak)	Holokuk	Oskawalik	Holitna	Kogrukluk Weir	Cheeneetnuk	Salmon Pitka
1975			118			94		17	71	1,114			
1976				139		177		126	204	2,571	5,579	1,197	1,146
1977		2,290		291			562	60	276			1,399	1,978
1978	1,613	1,732	2,417	403			289			2,766	13,667	267	1,127
1979		911						113			11,338		699
1980	2,378			725			1,186	250	123				1,177
1981		1,783	672		9,074		894				16,655		1,474
1982	230				2,645		185	42	120	521	10,993		419
1983	188	471	731	129	1,909		231	33	52	1,069		243	586
1984		273	157	93	1,409					299	4,926	1,177	577
1985	1,118	629		135				135	61		4,619	1,002	625
1986					909		336	100		850	5,038	381	
1987	1,739	975		60		193	516	208	193	813		317	
1988	2,255	766	840	188	945		244	57	80		8,506		501
1989	1,042	1,157	152		1,880	994	631				11,940		446
1990	1,983	1,295	631	166	1,255	537	596	143	113		10,218		
1991	1,312	1,002		342	1,564	885	583				7,850		
1992					2,284	670	335	64	91	1,822	6,755	1,050	2,555
1993					2,687	1,248	1,082	114	103	1,573	12,332	678	1,012
1994		848	1,021		1,848	1,520	1,218				15,227	1,206	1,010
1995			1,243		3,174	1,215	1,442	181	289	2,787	20,630	1,565	1,911
1996					3,496		983	85			14,199		
1997			439	173	2,187	855	980	165	1,470	2,093	13,280	345	
1998		27	457		2,239	353							
1999								18	98	741	5,570		
2000					714	182	152	42	62	501	3,181		374
2001							703	51	186	1,760	9,294		1,029
2002													
BEG[b]		1,200	1,000	400	1,500		600			2,000	10,000		1,300
Median[c]	1,460					670		107	108			1,002	

[a] Estimates are from "peak" aerial surveys conducted between 20 and 31 July under fair, good, or excellent viewing conditions.

[b] From Buklis (1993).

[c] Median of years 1975 through 1994.

Appendix A.2. History of aerial spawning ground surveys of the Tatlawiksuk River drainage with surveyor comments (Burkey and Salomone 1999).

Date of Survey	Observer	Survey Conditions	Species			Comments
			Chinook	Chum	Coho	
25-Jul-02	John Linderman	Fair	328	2,730	0	Overcast and tannic water obscured deeper pools in lower 10 mi. of survey
30 July 1997	Tom Cappiello	Poor	415	1,896	0	
28 July 1995	Charlie Burkey	Fair	249	976	0	15 miles along the middle river; water very brown, deep pools obscured. Chum count is low, could only survey top 4 miles of 101 due to dark water. Dark water and cloud cover hampered survey.
31 July 1994	Charlie Burkey	Fair	424	5,219	0	25 miles of middle and lower river; dark brown river bottom and water color. Overcast for part of survey. All decrease ability to see fish. Carcass count is a low estimate. 20-30 king redds without fish on them. Stopped survey 5 air miles from mouth due to dark water color.
28 July 1992	Charlie Burkey	Fair	235	2,400	0	30 miles of middle and lower river; water very dark with tannic acid; not a good river for aerial survey due to dark water
26 July 1987	Dan Scheiderhan	Poor	0	0	0	3 miles; too stained and turbid for survey; suveyed five miles in upper valley. North tributary about five miles from mouth is in similar condition
27 July 1982	Dan Scheiderhan	Poor				water high and muddy
07 August 1981	Dan Scheiderhan	Poor	35	48		40 miles of middle and lower river; foothills to 1,465 foot peak
20 July 1980	Rae Baxter					too stained; thousands of chum in tributary creek on south river
29 July 1978	Dan Scheiderhan	Poor	86	38	0	35 miles of middle and lower river; foothills to 1,465 foot peak; water with high dissolved organic material; dark coffee color makes visibility low
22 July 1977	Gary Schaefer	Poor	191	6,430	0	35 miles of middle and lower river; foothills to 1,465 foot peak lower 5 miles too turbid to survey; difficult to survey - very twisted and brown stained; counts minimal.
30 September 1976	Gary Schaefer	Fair	0	0	31	80 miles; Pete Shepards cabin to mouth
24 July 1976	Gary Schaefer	Fair	212	5,600	31	80 miles; Pete Shepards cabin to mouth
24 July 1968	Rae Baxter	Poor	58	3,000	0	35 miles; little good gravel

Appendix B.1. Hourly fish passage form used for the Tatlawiksuk River weir project.

TATLAWIKSUK RIVER WEIR

Year ________ Hourly Upstream Fish Passage

DATE: ____________________

Hour	Observer Initials	Chinook	Sockeye	Chum	Pink	Coho	Sucker	Other
0000								
0100								
0200								
0300								
0400								
0500								
0600								
0700								
0800								
0900								
1000								
1100								
1200								
1300								
1400								
1500								
1600								
1700								
1800								
1900								
2000								
2100								
2200								
2300								
Daily Total								

Initials of Archiever:

Appendix B.2. Daily fish passage form used for the Tatlawiksuk River weir project.

TATLAWIKSUK RIVER WEIR

Year __________ Daily and Cumulative Passage

Date	Archiever	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	Initials	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative

Appendix B.3. Hourly fish carcass count form used for the Tatlawiksuk River weir project.

TATLAWIKSUK RIVER WEIR

Year __________ Hourly Fish Carcass Count

DATE: ____________________

Hour	Observer Initials	Chinook		Sockeye		Chum		Pink		Coho		Sucker	Other
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female		
0000													
0100													
0200													
0300													
0400													
0500													
0600													
0700													
0800													
0900													
1000													
1100													
1200													
1300													
1400													
1500													
1600													
1700													
1800													
1900													
2000													
2100													
2200													
2300													
Daily Total													

Initials of Archiever:

Appendix B.4. Daily fish carcass count form used for the Tatlawiksuk River weir project.

TATLAWIKSUK RIVER WEIR

Year ________ Weir Carcass Counts

Date	Archiever	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	Initials	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative

APPENDIX B:
DATA FORMS USED FOR THE TATLAWIKSUK RIVER WEIR PROJECT

Appendix B.5. ASL Sampling form used for the Tatlawiksuk River weir project.

ASL Sampling Field Form

Location: Species: Date:

Crew: Trap Opened/Closed:

No.	Card No.	Letter A, B…	Sex M F	Length (mm)	Tag No.	Tag Color	AD Punch	Fish Color	Comments

Appendix B.6. Tag recovery form used for the Tatlawiksuk River weir project.

Tag Recovery Data Entry Form

Page ____ of _____ **Weir Location:** ______________________________

Crew: ______________________________

Date (MMDD)	Species	Tag Information				Sample Type	Comments
		Tag No.	Tag Color	Adipose Punch	Fish Color		

Appendix B.7. Tagged to untagged fish form used for the Tatlawiksuk River weir project.

Daily Summary of Tagged and Untagged Salmon Counted Past Weir

Page _____ of _____ **Weir Location:** ______________________

Species: **Crew:** ______________________

Date (MMDD)	Total Number of Tags Recovered by Tag Color							No. of Tags Pass Weir	No. Untagged Fish Pass Weir	Total Fish Passed	Comments
	Pink	Green	White	Blue	Green Mono.	Fl. Yellow	Fl. Orange				

Appendix B.8. Secondary mark sampling form used for the Tatlawiksuk River weir project.

Daily Summary Form for Salmon Examined for Adipose Hole Punches

Page _____ of _____ **Weir Location:** ______________________________

Species: **Crew:**

Week	Date (MMDD)	Tag Colors							Total No. of Fish with Tags	No. of Fish Adipose Punch and No Tag	Total No. of Fish Examined	Sample Type	Comments
		Pink	Green	White	Blue	Green Mono.	Fl. Yellow	Fl. Orange					

Appendix B.9. Climatology form used for the Tatlawiksuk River weir project.

Weather and Stream Observations

Report Observations A Minimum Of Two Times Each Day - Preferably 7 a.m. and 5 p.m.

Location _________________________ Year _________ Page ____________

Date	Time Observed	Sky	Precipitation Code	Precipitation Amount (mm)	Wind	Temperature Air	Temperature Water	Water Level (cm)	Water Clarity	Settleable Solids	Comments

CODES: SKY
- 0 = no observation
- 1 = clear or mostly clear (<10% cloud cover)
- 2 = cloud cover not more that 50% of sky
- 3 = cloud cover more that 50% sky
- 4 = complete overcast
- 5 = thick fog

PRECIPITATION
- A = intermittent rain
- B = continuous rain
- C = snow
- D = snow and rain
- E = hail
- F = thunderstorms w/ or w/out rain

Report Water Level More Frequently When Levels Are Changing Rapidly

Report Settleable Solids Only Once Per Day

Report Water Color At Noon under Sunny Conditions When Using Colorimeter

Appendix B.10. Discharge form used for the Tatlawiksuk River weir project.

File No. ____________ Page ______ of ______
Crew __________________ Date ____________
Habitat Sampling River Meter
Location __________________ Site __________________ Mile ______ Type ______ No. ______
HUC __________________ Gage Number ______ Height ______
Description

Weather

Distance from Head Pin (m) LB RB	Angle	Angle Coef.	Vel Depth (m)	Stream-bed Elev.	Obs. Depth %	No. Revo-lutions	Time (sec)	Velocity mps			Mean Cell Depth (m)	Cell Width (m)	Cell Area (m^2)	Flow (m^3/s)
								Point	Mean Vertical	Mean Cell				

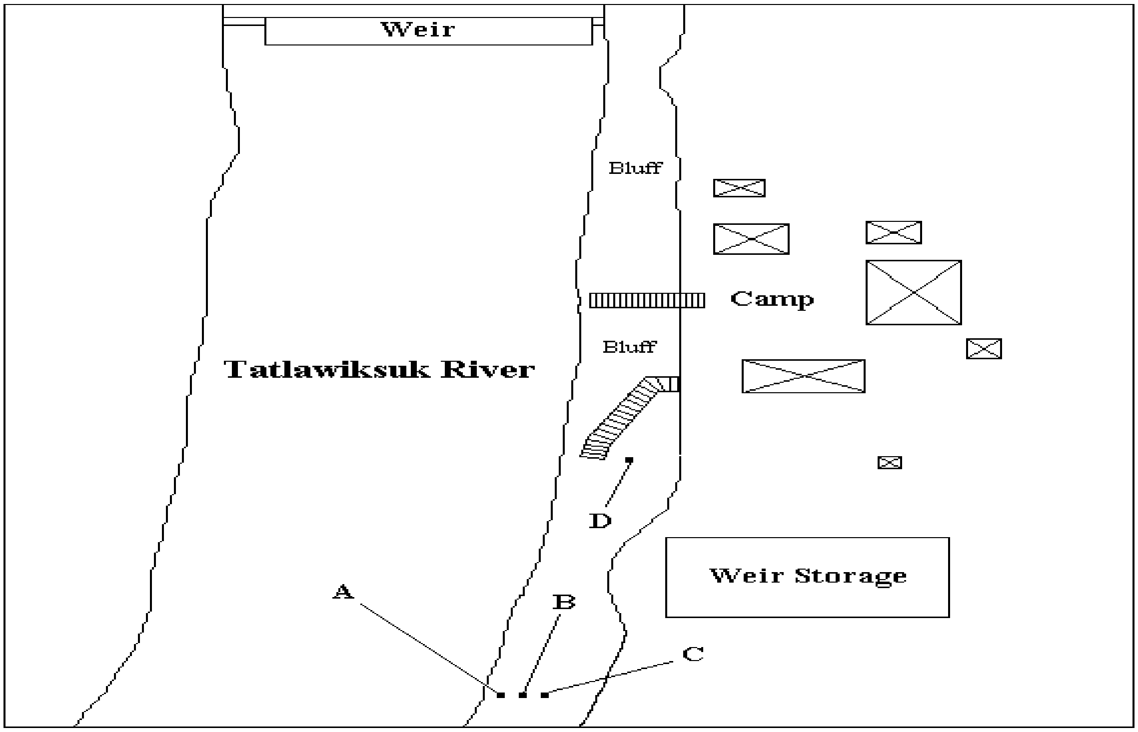
Depth
Average m
Maximum m

Velocity
Average m/sec
Maximum m/sec

River Total

Notes:

APPENDIX C: TATLAWIKSUK RIVER WATER LEVEL BENCHMARK LOCATIONS AND DESCRIPTIONS



A: Benchmark 1 – Set in 1999, representing a River stage of 70 cm. This benchmark was washed out as of September of 2000.

B: Benchmark 2 – Set in 1999, representing a river stage of 115 cm. This benchmark was washed out as of September 2000.

C: Benchmark 3 – Set in 1999, representing a river stage of 170 cm. This benchmark was still in place as of September 2001. The benchmark consists of two four foot long sections of ¾-in aluminum pipe, with the top three to four inches exposed above the gravel. One of the pipes was driven into the gravel horizontally, and one was driven vertically. This benchmark is located approximately 50-ft downstream of the weir storage area, and approximately 15-ft up the bank. Yellow or orange flagging tape was tied to the exposed portions of the pipe each year to aid in identification.

D: Benchmark 4 – Set in September 2001, representing a river stage of 204 cm. The benchmark consists of a five foot long section of 4-in aluminum pipe driven into the gravel with the top five inches exposed. A mark was scribed into the exposed portion of the pipe with a saw to denote the exact location of the river stage measurement. This benchmark is located approximately 10-ft downstream of the first set of stairs (cut into the bluff), and approximately 10-ft up the bank. Six sandbags were placed on top of the pipe to aid in identification, and for extra protection against damage.

APPENDIX D:
PASSAGE OF OTHER FISH SPECIES OBSERVED AT THE TATLAWIKSUK RIVER WEIR PROJECT, 1998 - 2001

Appendix D.1. Historical daily sockeye and pink salmon passage at the Tatlawiksuk River weir, 1998 - 2002.

	Sockeye					Pink				
Date	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
6/15	c	0	0	c	c	c	0	0	c	c
6/16	c	0	0	c	c	c	0	0	c	c
6/17	c	0	0	c	0 e	c	0	0	c	0 e
6/18	0	0	0	c	0	0	0	0	c	0
6/19	0	0	0	c	0	0	0	0	c	0
6/20	0	0	0	0	0	0	0	0	0	0
6/21	0	0	0	1	0	0	0	0	0	0
6/22	0	0	0	0	0	0	0	0	0	0
6/23	0	0	0	0	0	0	0	0	0	0
6/24	0	0	0	0	0	0	0	0	0	0
6/25	0	0	0	0	0	0	0	0	0	0
6/26	0	0	0	0	0	0	0	0	0	0
6/27	0	0	0	0	0	0	0	0	0	0
6/28	0	0	0	0	0	0	0	0	1	0
6/29	0	0	0	0	0	0	0	0	0	0
6/30	0	0	0	0	0	0	0	0	0	0
7/01	0	0	0	0	0	0	0	0	0	0
7/02	0	0	0	0	0	0	0	0	0	0
7/03	0	0	0	0	0	0	0	0	0	0
7/04	0	0	0	0	0	0	0	0	0	0
7/05	0	0	0	0	0	0	0	0	0	0
7/06	0	0	0	0	0	0	0	0	0	1
7/07	0	0	0	0	0	0	0	0	0	0
7/08	c	0	0	0	0	c	0	0	0	0
7/09	c	0	0	0	0	c	0	0	0	0
7/10	c	0	0	0	0	c	0	0	0	0
7/11	c	0 a	0	0	0	c	0 a	0	0	0
7/12	c	0	0	0	0	c	0	0	0	0
7/13	c	0	0	1	0	c	0	0	0	0
7/14	c	0	0	1	0	c	0	0	0	0
7/15	c	0	0	0	0	c	0	0	0	0
7/16	c	0	0	0	0	c	0	0	0	0
7/17	c	0	0	0	0	c	0	0	0	0
7/18	c	0	0	0	0	c	0	0	0	0
7/19	c	0	0	0	0	c	0	0	0	0
7/20	c	0	0	0	0	c	0	0	0	0
7/21	c	0	0	0	0	c	0	0	0	0
7/22	c	0	0	0	0	c	0	0	0	0
7/23	c	0	0	0	0	c	0	0	0	0
7/24	c	0	0	0 b	0	c	0	0	0 b	0
7/25	c	0	0	0 b	0	c	0	0	0 b	0
7/26	c	0	0	0	0	c	0	0	0	0
7/27	c	1 a	0	0 b	0	c	0 a	0	0 b	0
7/28	c	2	0	0	0	c	0	0	0	0
7/29	c	0	0	0	0	c	0	0	0	0
7/30	c	0	0	0	0	c	0	0	0	0
7/31	c	0	0	0 b	0	c	0	0	0 b	0
8/01	c	0	0	0 b	0	c	0	0	0 b	0
8/02	c	0	0	0 b	0	c	0	0 b	0 b	0
8/03	c	2	0	0 b	0	c	0	0	0 b	0
8/04	c	0	0	0	0	c	0	0	0	0
8/05	c	0	0	0	0	c	0	0	1	0
8/06	c	0	0	0	0	c	0	0	0	0
8/07	c	0	0	0	0	c	0	0	0	0
8/08	c	0	0	0	0	c	0	0	0	0
8/09	c	0	0	0	0	c	1	0	0	0

-Continued-

Appendix D.1. (page 2 of 2)

	Sockeye					Pink				
Date	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
8/10	c	0 b	0	0	0	c	0 b	0	0	0
8/11	c	0 b	0	0	0	c	0 b	0	0	0
8/12	c	0 b	0	0	0	c	0 b	0	0	0
8/13	c	0 b	0	0	0	c	0 b	0	0	0
8/14	c	0 b	0 d	0	0	c	0 b	0 d	0	0
8/15	c	0 b	c	0	0	c	0 b	c	0	0
8/16	c	0 b	c	0	0	c	0 b	c	0	0
8/17	c	0 b	c	0 b	0	c	0 b	c	0 b	0
8/18	c	0 b	c	0 b	0	c	0 b	c	0 b	0
8/19	c	0 b	c	0 b	0	c	0 b	c	0 b	0
8/20	c	0 b	c	0 b	0	c	0 b	c	0 b	0
8/21	c	0 b	c	0 b	0	c	0 b	c	0 b	0
8/22	c	0 b	c	0 b	0	c	0 b	c	0 b	0
8/23	c	0 b	c	0 b	0	c	0 b	c	0 b	0
8/24	c	0	c	0 b	0	c	0	c	0 b	0
8/25	c	0	c	0 b	0	c	0	c	0 b	0
8/26	c	0 a	c	0 b	0	c	0 a	c	0 b	0
8/27	c	0	c	0 b	0	c	0	c	0 b	0
8/28	c	0	c	0	0	c	0	c	0	0
8/29	c	0	c	0	1	c	0	c	0	0
8/30	c	0	c	0	0	c	0	c	0	0
8/31	c	0	c	0	0	c	0	c	0	0
9/01	c	0	c	0	0	c	0	c	0	0
9/02	c	1	c	0	0	c	0	c	0	0
9/03	c	0	c	0	0	c	0	c	0	0
9/04	c	0	c	0	0	c	0	c	0	0
9/05	c	0	c	0	0	c	0	c	0	0
9/06	c	0	c	0	0	c	0	c	0	0
9/07	c	0	c	0	0	c	0	c	0	0
9/08	c	0	c	0	0	c	0	c	0	0
9/09	c	0	c	0	0	c	0	c	0	0
9/10	c	0	c	0	0	c	0	c	0	0
9/11	c	0	c	0	0	c	0	c	0	0
9/12	c	0	c	0	0 e	c	0	c	0	0 e
9/13	c	0	c	0	0 b	c	0	c	0	0 b
9/14	c	0	c	0	0 b	c	0	c	0	0 b
9/15	c	0	c	0	0 b	c	0	c	0	0 b
9/16	c	0	c	c	0 b	c	0	c	c	0 b
9/17	c	0	c	c	0 b	c	0	c	c	0 b
9/18	c	0	c	c	0 b	c	0	c	c	0 b
9/19	c	0	c	c	0 b	c	0	c	c	0 b
9/20	c	0	c	c	0 e	c	0	c	c	0 e
Total	0	6	0	3	1	0	1	0	3	1
Obs.	0	5	0	3	1	0	1	0	3	1
Est. (%)	0.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

a = Daily passage was estimated due to the occurance of a hole in the weir.
b = The weir was not operational; daily passage was estimated.
c = The weir was not operational; daily passage was not estimated
d = Partial day count, passage was not estimated.
e = Partial day count, passage was estimated.

Appendix D.2. Historical longnose sucker passage at the Tatlawiksuk River weir, 1998 - 2002.

Date	Daily					Cumulative					Percent Passage			
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1999	2000	2001	2002
6/15	c	1,380	3	c	c		1,380	3			27	0		
6/16	c	757	1	c	c		2,137	4			42	0		
6/17	c	277	122	c	84 d		2,414	126		84	47	12		7
6/18	67	291	35	c	59	67	2,705	161		143	53	15		12
6/19	151	263	36	c	41	218	2,968	197		184	58	19		16
6/20	43	101	3	302	9	261	3,069	200	302	193	60	19	11	17
6/21	24	71	12	253	49	285	3,140	212	555	242	62	20	21	21
6/22	23	5	159	164	122	308	3,145	371	719	364	62	35	27	32
6/23	327	325	154	392	194	635	3,470	525	1,111	558	68	50	41	48
6/24	108	500	198	439	21	743	3,970	723	1,550	579	78	69	57	50
6/25	215	115	51	194	32	958	4,085	774	1,744	611	80	74	65	53
6/26	290	183	55	116	3	1,248	4,268	829	1,860	614	84	79	69	53
6/27	517	124	12	63	3	1,765	4,392	841	1,923	617	86	80	71	53
6/28	359	93	18	17	2	2,124	4,485	859	1,940	619	88	82	72	54
6/29	245	82	0	25	20	2,369	4,567	859	1,965	639	90	82	73	55
6/30	133	86	0	76	0	2,502	4,653	859	2,041	639	91	82	76	55
7/01	61	159	5	64	17	2,563	4,812	864	2,105	656	94	82	78	57
7/02	130	25	19	21	48	2,693	4,837	883	2,126	704	95	84	79	61
7/03	215	28	116	24	24	2,908	4,865	999	2,150	728	96	95	80	63
7/04	155	12	36	7	51	3,063	4,877	1,035	2,157	779	96	98	80	67
7/05	127	53	0	3	43	3,190	4,930	1,035	2,160	822	97	98	80	71
7/06	55	56	1	4	84	3,245	4,986	1,036	2,164	906	98	98	80	78
7/07	1 d	14	0	7	36	3,246	5,000	1,036	2,171	942	98	98	80	82
7/08	c	19	0	4	21		5,019	1,036	2,175	963	99	98	81	83
7/09	c	11	2	30	21		5,030	1,038	2,205	984	99	99	82	85
7/10	c	6	0	12	49		5,036	1,038	2,217	1,033	99	99	82	89
7/11	c	17 a	1	4	17		5,053	1,039	2,221	1,050	99	99	82	91
7/12	c	1	9	26	3		5,054	1,048	2,247	1,053	99	100	83	91
7/13	c	2	4	101	4		5,056	1,052	2,348	1,057	99	100	87	92
7/14	c	1	0	49	1		5,057	1,052	2,397	1,058	99	100	89	92
7/15	c	8	0	49	4		5,065	1,052	2,446	1,062	99	100	91	92
7/16	c	16	0	3	18		5,081	1,052	2,449	1,080	100	100	91	94
7/17	c	0	0	7	27		5,081	1,052	2,456	1,107	100	100	91	96
7/18	c	1	0	41	1		5,082	1,052	2,497	1,108	100	100	92	96
7/19	c	3	0	15	0		5,085	1,052	2,512	1,108	100	100	93	96
7/20	c	4	0	27	2		5,089	1,052	2,539	1,110	100	100	94	96
7/21	c	1	0	23	3		5,090	1,052	2,562	1,113	100	100	95	96
7/22	c	0	0	30	0		5,090	1,052	2,592	1,113	100	100	96	96
7/23	c	0	0	33	1		5,090	1,052	2,625	1,114	100	100	97	96
7/24	c	0	0	21 b	1		5,090	1,052	2,646	1,115	100	100	98	97
7/25	c	0	0	11 b	1		5,090	1,052	2,658	1,116	100	100	98	97
7/26	c	0	0	1	1		5,090	1,052	2,659	1,117	100	100	98	97
7/27	c	0 a	0	2 b	0		5,090	1,052	2,661	1,117	100	100	99	97
7/28	c	0	0	4	0		5,090	1,052	2,665	1,117	100	100	99	97
7/29	c	0	0	1	0		5,090	1,052	2,666	1,117	100	100	99	97
7/30	c	0	0	2	1		5,090	1,052	2,668	1,118	100	100	99	97
7/31	c	0	0	9 b	2		5,090	1,052	2,676	1,120	100	100	99	97
8/01	c	0	0	4 b	3		5,090	1,052	2,680	1,123	100	100	99	97
8/02	c	0	0	7 b	6		5,090	1,052	2,687	1,129	100	100	100	98
8/03	c	0	0	6 b	0		5,090	1,052	2,694	1,129	100	100	100	98
8/04	c	0	0	8	0		5,090	1,052	2,702	1,129	100	100	100	98
8/05	c	0	0	3	0		5,090	1,052	2,705	1,129	100	100	100	98
8/06	c	0	0	1	0		5,090	1,052	2,706	1,129	100	100	100	98
8/07	c	0	0	1	0		5,090	1,052	2,707	1,129	100	100	100	98
8/08	c	0	0	2	0		5,090	1,052	2,709	1,129	100	100	100	98
8/09	c	0	0	2	0		5,090	1,052	2,711	1,129	100	100	100	98
8/10	c	0 b	0	1	0		5,090	1,052	2,712	1,129	100	100	100	98
8/11	c	0 b	0	0	0		5,090	1,052	2,712	1,129	100	100	100	98
8/12	c	0 b	0	1	2		5,090	1,052	2,713	1,131	100	100	100	98
8/13	c	0 b	0	5	0		5,090	1,052	2,718	1,131	100	100	100	98
8/14	c	0 b	0 d	2	0		5,090		2,720	1,131	100		100	98
8/15	c	0 b	c	25	0		5,090		2,745	1,131	100		100	98
8/16	c	0 b	c	25	0		5,090		2,770	1,131	100		100	98
8/17	c	0 b	c	23 b	0		5,090		2,792	1,131	100		100	98
8/18	c	0 b	c	21 b	0		5,090		2,813	1,131	100		100	98
8/19	c	0 b	c	19 b	0		5,090		2,832	1,131	100		100	98
8/20	c	0 b	c	17 b	0		5,090		2,849	1,131	100		100	98
8/21	c	0 b	c	15 b	0		5,090		2,864	1,131	100		100	98
8/22	c	0 b	c	13 b	10		5,090		2,877	1,141	100		100	99
8/23	c	0 b	c	11 b	3		5,090		2,887	1,144	100		100	99
8/24	c	0	c	9 b	1		5,090		2,896	1,145	100		100	99

-Continued-

Appendix D.2. (page 2 of 2)

Date	Daily					Cumulative								
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1999	2000	2001	2002
8/25	c	0	c	7 b	0		5,090		2,903	1,145	100		100	99
8/26	c	0 a	c	5 b	1		5,090		2,907	1,146	100		100	99
8/27	c	0	c	3 b	1		5,090		2,910	1,147	100		100	99
8/28	c	0	c	0	3		5,090		2,910	1,150	100		100	100
8/29	c	0	c	1	1		5,090		2,911	1,151	100		100	100
8/30	c	0	c	0	0		5,090		2,911	1,151	100		100	100
8/31	c	0	c	0	0		5,090		2,911	1,151	100		100	100
9/01	c	0	c	1	0		5,090		2,912	1,151	100		100	100
9/02	c	0	c	0	0		5,090		2,912	1,151	100		100	100
9/03	c	0	c	0	0		5,090		2,912	1,151	100		100	100
9/04	c	1	c	0	0		5,091		2,912	1,151	100		100	100
9/05	c	1	c	0	2		5,092		2,912	1,153	100		100	100
9/06	c	1	c	0	1		5,093		2,912	1,154	100		100	100
9/07	c	0	c	0	1		5,093		2,912	1,155	100		100	100
9/08	c	0	c	0	0		5,093		2,912	1,155	100		100	100
9/09	c	0	c	0	0		5,093		2,912	1,155	100		100	100
9/10	c	0	c	0	0		5,093		2,912	1,155	100		100	100
9/11	c	0	c	2	0		5,093		2,914	1,155	100		100	100
9/12	c	0	c	0	0 e		5,093		2,914	1,155	100		100	100
9/13	c	0	c	0	0 b		5,093		2,914	1,155	100		100	100
9/14	c	0	c	0	0 b		5,093		2,914	1,155	100		100	100
9/15	c	0	c	2	0 b		5,093		2,916	1,155	100		100	100
9/16	c	0	c	c	0 b		5,093		2,916	1,155	100		100	100
9/17	c	0	c	c	0 b		5,093		2,916	1,155	100		100	100
9/18	c	0	c	c	0 b		5,093		2,916	1,155	100		100	100
9/19	c	0	c	c	0 b		5,093		2,916	1,155	100		100	100
9/20	c	0	c	c	0 e		5,093		2,916	1,155	100		100	100
Total	3,246	5,093	1,052	2,916	1,155									
Obs.	3,246	5,093	1,052	2,733	1,155									
Est. (%)	0.0	0.0	0.0	6.3	0.0									

a = Daily passage was estimated due to the occurance of a hole in the weir.
b = The weir was not operational; daily passage was estimated.
c = The weir was not operational; daily passage was not estimated
d = Partial day count, passage was not estimated.
e = Partial day count, passage was estimated.

APPENDIX E: DAILY RECORD OF SALMON CARCASSES PASSED DOWNSTREAM OF THE TATLAWIKSUK RIVER WEIR, 1998 - 2002

	Chinook					Sockeye					Chum					Pink					Coho				
Date	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
6/15		0	0				0	0				0	0				0	0				0	0		
6/16		0	0				0	0				0	0				0	0				0	0		
6/17		0	0		0		0	0		0		0	0		0		0	0		0		0	0		0
6/18	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0
6/19	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0
6/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
6/25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
6/26	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/28	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0
6/29	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
6/30	0	0	0	0	1	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0
7/01	0	0	0	0	0	0	0	0	0	0	3	1	1	3	3	0	0	0	0	0	0	0	0	0	0
7/02	0	0	0	0	0	0	0	0	0	0	1	1	1	3	3	0	0	0	0	0	0	0	0	0	0
7/03	0	0	0	0	0	0	0	0	0	0	1	0	0	3	6	0	0	0	0	0	0	0	0	0	0
7/04	0	0	0	0	0	0	0	0	0	0	7	0	1	3	3	0	0	0	0	0	0	0	0	0	0
7/05	0	0	1	0	0	0	0	0	0	0	3	0	0	0	6	0	0	0	0	0	0	0	0	0	0
7/06	0	0	0	0	0	0	0	0	0	0	5	4	0	5	4	0	0	0	0	0	0	0	0	0	0
7/07	0	0	0	0	0	0	0	0	1	0	13	0	1	1	4	0	0	0	0	0	0	0	0	0	0
7/08		0	0	0	0		0	0	0	0		2	1	4	7		0	0	0	0		0	0	0	0
7/09		0	0	0	0		0	0	0	0		11	0	5	11		0	0	0	0		0	0	0	0
7/10		0	0	0	0		0	0	0	0		7	3	11	11		0	0	0	0		0	0	0	0
7/11		0	0	0	0		0	0	0	0		5	8	6	15		0	0	0	0		0	0	0	0
7/12		0	0	0	0		0	0	1	0		12	17	4	20		0	0	0	0		0	0	0	0
7/13		0	0	0	0		0	0	0	0		0	11	5	30		0	0	0	0		0	0	0	0
7/14		0	1	0	0		0	0	0	0		2	5	4	36		0	0	0	0		0	0	0	0
7/15		0	0	0	0		0	0	0	0		4	9	3	19		0	0	0	0		0	0	0	0
7/16		0	0	0	0		0	0	0	0		9	11	9	21		0	0	0	0		0	0	0	0
7/17		0	0	0	0		0	0	0	0		11	8	3	38		0	0	0	0		0	0	0	0
7/18		0	0	0	0		0	0	0	0		11	14	10	23		0	0	0	0		0	0	0	0
7/19		0	0	0	0		0	0	0	0		4	12	0	47		0	0	0	0		0	0	0	0
7/20		0	0	0	0		0	0	0	0		16	9	27	62		0	0	0	0		0	0	0	0
7/21		0	0	0	1		0	0	0	0		12	10	38	33		0	0	0	0		0	0	0	0
7/22		0	0	0	2		0	0	0	0		12	10	55	58		0	0	0	0		0	0	0	0
7/23		0	0	1	0		0	0	0	0		17	15	63	66		0	0	0	0		0	0	0	0
7/24		0	0	1	0		0	0		0		18	9	49	74		0	0		0		0	0		0
7/25		0	0		0		0	0		0		11	11	71	53		0	0		0		0	0		0
7/26		0	0	2	0		0	0	0	0		21	11	62	47		0	0	0	0		0	0	0	0
7/27		0	0	2	3		0	0		0		32	11	65	38		0	0		0		0	0		0
7/28		1	0	2	0		0	0	0	0		17	0	50	42		0	0	0	0		0	0	0	0
7/29		1	0	0	1		0	0	0	0		19	14	49	31		0	0	0	0		0	0	0	0
7/30		0	0	2	0		0	0	0	0		31	4	60	25		0	0	0	0		0	0	0	0
7/31		1	1		0		0	0		0		43	15	57	61		0	0		0		0	0		0
8/01		0	1		0		0	0		0		50	15		53		0	0		0		0	0		0
8/02		2		2	0		0			0		10	15	35	44		0			0		0			0
8/03		1	3	3	0		0	0		0		20	8	35	40		0	0		0		0	0		0
8/04		2	2	0	0		0	0	0	0		59	12	37	40		0	0	0	0		0	0	0	0
8/05		0	0	2	0		0	0	0	0		11	10	37	40		0	0	0	0		0	0	0	1
8/06		4	0	1	0		0	0	0	0		23	0	63	39		0	0	0	1		0	0	0	0
8/07		10	1	0	0		0	0	0	0		14	7	28	40		0	0	0	0		0	0	0	0
8/08		3	1	1	0		0	0	0	0		25	4	36	21		0	0	0	0		0	0	0	0

-Continued-

APPENDIX E: (page 2 of 2)

Date	Chinook 1998	Chinook 1999	Chinook 2000	Chinook 2001	Chinook 2002
8/09		11	0	0	0
8/10			0	0	0
8/11			0	0	1
8/12			0	0	0
8/13			0	0	0
8/14			0	0	0
8/15				0	0
8/16				0	0
8/17					0
8/18					0
8/19					0
8/20					0
8/21					0
8/22					1
8/23					0
8/24		0			0
8/25		1			0
8/26		0			0
8/27		0			0
8/28		0		0	0
8/29		0		0	0
8/30		0		0	0
8/31		0		0	0
9/01		0		0	0
9/02		0		1	0
9/03		0		0	0
9/04		0		0	0
9/05		0		0	0
9/06		0		0	0
9/07		0		0	0
9/08		0		0	0
9/09		0		0	0
9/10		0		0	0
9/11		0		0	0
9/12		0		0	0
9/13		0		0	
9/14		0		0	
9/15		0		0	
9/16		0			
9/17		0			
9/18		0			
9/19		0			
9/20		0			
Carcass Total	0	37	11	20	10
Live Passage	970	1,490	817	2,010	2,237

Date	Sockeye 1998	Sockeye 1999	Sockeye 2000	Sockeye 2001	Sockeye 2002
8/09		0	0	0	0
8/10			0	0	0
8/11			0	0	0
8/12			0	0	0
8/13			0	0	0
8/14			0	0	0
8/15				0	0
8/16				0	0
8/17					0
8/18					0
8/19					0
8/20					0
8/21					0
8/22					0
8/23					0
8/24		0			0
8/25		0			0
8/26		0			0
8/27		0			0
8/28		0		0	0
8/29		0		0	0
8/30		0		0	0
8/31		0		0	0
9/01		0		0	0
9/02		0		0	0
9/03		0		0	0
9/04		0		0	0
9/05		0		0	0
9/06		0		0	0
9/07		0		0	0
9/08		0		0	0
9/09		0		0	0
9/10		0		0	0
9/11		0		0	0
9/12		0		0	0
9/13		0		0	
9/14		0		0	
9/15		0		0	
9/16		0			
9/17		0			
9/18		0			
9/19		0			
9/20		0			
Carcass Total	0	0	0	2	2
Live Passage	0	6	0	3	1

Date	Chum 1998	Chum 1999	Chum 2000	Chum 2001	Chum 2002
8/09		49	0	20	20
8/10		11	0	36	9
8/11			0	15	4
8/12			0	22	7
8/13			0	27	7
8/14			0	18	6
8/15				4	3
8/16				22	9
8/17				8	5
8/18				4	2
8/19		2			4
8/20				1	0
8/21					1
8/22					2
8/23		1			0
8/24		3			0
8/25		0			0
8/26		0			0
8/27		0			0
8/28		0		0	0
8/29		0		1	0
8/30		0		1	0
8/31		0		0	0
9/01		0		0	1
9/02		0		0	0
9/03		0		0	0
9/04		0		0	0
9/05		0		0	0
9/06		0		0	0
9/07		0		1	0
9/08		0		0	0
9/09		0		0	0
9/10		0		0	0
9/11		0		0	0
9/12		0		0	0
9/13		0		0	
9/14		0		0	
9/15		0		0	
9/16		0			
9/17		0			
9/18		0			
9/19		0			
9/20		0			
Carcass Total	36	611	293	1,180	1,304
Live Passage	5,726	9,599	7,044	23,718	24,542

Date	Pink 1998	Pink 1999	Pink 2000	Pink 2001	Pink 2002
8/09		0	0	0	0
8/10			0	0	0
8/11			0	0	0
8/12			0	0	0
8/13			0	0	0
8/14			0	0	0
8/15				0	0
8/16				0	0
8/17					0
8/18					0
8/19					0
8/20					0
8/21					0
8/22					0
8/23					0
8/24		0			0
8/25		0			0
8/26		0			0
8/27		0			0
8/28		0		0	0
8/29		0		0	0
8/30		0		0	0
8/31		0		0	0
9/01		0		0	0
9/02		0		0	0
9/03		0		0	0
9/04		0		0	0
9/05		0		0	0
9/06		0		0	0
9/07		0		0	0
9/08		0		0	0
9/09		0		0	0
9/10		0		0	0
9/11		0		0	0
9/12		0		0	0
9/13		0		0	
9/14		0		0	
9/15		0		0	
9/16		0			
9/17		0			
9/18		0			
9/19		0			
9/20		0			
Carcass Total	0	0	0	0	1
Live Passage	0	1	0	3	1

Date	Coho 1998	Coho 1999	Coho 2000	Coho 2001	Coho 2002
8/09		0	0	0	0
8/10			0	0	0
8/11			0	0	0
8/12			0	0	0
8/13			0	0	0
8/14			0	0	0
8/15				0	0
8/16				0	0
8/17					0
8/18					0
8/19					0
8/20					0
8/21					0
8/22					0
8/23					0
8/24		0			0
8/25		0			0
8/26		0			0
8/27		0			0
8/28		0		0	0
8/29		0		0	0
8/30		1		0	0
8/31		0		1	0
9/01		0		0	0
9/02		0		0	0
9/03		0		0	1
9/04		0		0	0
9/05		0		0	0
9/06		0		0	0
9/07		0		0	0
9/08		0		0	0
9/09		1		0	0
9/10		0		0	0
9/11		0		2	0
9/12		0		0	0
9/13		1		0	
9/14		0		1	
9/15		0		0	
9/16		0			
9/17		0			
9/18		0			
9/19		0			
9/20		0			2
Carcass Total	0	3	0	4	4
Live Passage	0	3,455	5,756	10,539	11,363

[shaded] = Weir was not operational

APPENDIX F:
HABITAT PROFILE DATA COLLECTED AT THE TATALWIKSUK RIVER WEIR, 1998 - 2002

Appendix F.1. Daily water conditions and weather at Tatlawiksuk River weir, 2002.

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Water	Water Level (cm)
6/15	7:00	1	0	E 7	14	12	
6/16	7:00	1	0	0	16	12	
6/17	7:00	1	0	0	13	9	
6/18	7:00	1	0	0	11	12	
6/19	7:00	4	0	NW 0-5	13	12	
6/20	7:30	2	0	0	12	12	
6/21	7:30	2	0	0	10	11	72
6/22	10:30	4	A	S 0-5	16	12	70
6/23	10:30	4	A	S 0-5	16	12	69
6/24	7:30	4	0	0	11	12	69
6/25	7:30	0	0	0			69[c]
6/26	7:30	4	0	0	10	12	69
6/27	7:30	1	0	0	11	13	70
6/28	7:30	1	A	0	11	12	69.5
6/29	10:30	3	0	0	19	13	68
6/30	10:30	2	0	0	24	14	67
7/1	7:30	4	B	0	12	10	66
7/2	7:30	4	0	0	11	12	65
7/3	7:30	3	A	V 0-5	13	11	64
7/4	7:30	1	0	NE 5	9	9	65
7/5	7:30	2	A	0	12	11	68
7/6	10:30	4	0	SW 10-15	11.5	12	66
7/7	10:30	4	0	SW 5-10	12.5	13	64
7/8	7:30	4	0	0	10	12	64
7/9	7:30	4	0	0	9	12	63
7/10	7:30	4	0	0	11	12	62
7/11	7:30	1	0	0	7	13	62
7/12	7:30	4	0	0	11	12	63
7/13	10:30	4	A	0	14	12	61
7/14	10:30	4	A	0	13	10	60
7/15	7:15	4	A	0	10	9	61
7/16	7:15	1	0	0	7	9	61
7/17	7:15	1	0	0	8	12	61
7/18	7:15	1	0	0	10	12	61
7/19	7:15	3	0	0	13	12	58
7/20	10:30	4	0	0	17	12	58
7/21	10:30	4	0	0	19	13	58
7/22	7:15	4	A	0	14	12	57
7/23	7:15	2	A	0	9	10	58
7/24	7:15	4	A	0	14	12	58
7/25	7:15	4	0	0	12	12	58
7/26	7:15	4	A	0	10	12	60
7/27	7:15	4	A	0	11	13	62
7/28	10:30	3	A	W 0-5	15	12	63
7/29	7:15	1	A	0	3	9	66
7/30	7:15	1	0	0	10	12	65

-Continued-

Appendix F.1. (page 2 of 3)

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C)		Water Level (cm)
					Air	Water	
7/31	7:15	1	0	0	12	10	62
8/1	7:15	1	0	0	9	9	59
8/2	7:15	1	0	0	3	10	58
8/3	10:30	1	0	0	23	14	56
8/4	10:30	1	0	0	20	14	56
8/5	10:30	2	0	0	22	14	55
8/6	7:15	4	A	0	17	13	54
8/7	7:15	4	0	NE 0-5	10	13	58
8/8	7:15	4	A	0	8	10	68
8/9	7:15	3	0	W 0-5	9	11	69
8/10	7:15	3	A	0	4	10	66
8/11	7:15	3	A	0	9	11	64
8/12	7:15	4	B	0	10	11	64
8/13	7:15	1	0	0	-1	10	66
8/14	8:00	1	0	0	5	10	68
8/15	7:15	4	A	0	8	11	67
8/16	7:15	4	0	0	11	11	64
8/17	7:15	4	0	0	9	10	62.5
8/18	7:30	4	0	0	10	10	62.5
8/19	7:30	4	0	0	8	10	62
8/20	7:30	4	0	W 0-5	7	9	62
8/21	7:30	4	B	0	9	9	65
8/22	7:30	4	A	0	9	9	76
8/23	7:30	4	A	0	10	10	96
8/24	10:30	2	A	0	15	10	110.5
8/25	10:30	1	0	W 0-5	12	10	109
8/26	7:30	1	0	0	-2	9	101
8/27	7:30	1	0	0	-2	9	93
8/28	7:30	2	0	0	0	9	88
8/29	7:30	4	0	W 0-5	8	10	82
8/30	7:30	4	A	0	7	10	80
8/31	10:30	4	B	0	14	10	78
9/1	10:30	1	0	0	8	9	80
9/2	10:30	1	0	NE 0-5	10	9	82
9/3	10:30	1	0	0	10	8	79
9/4	10:30	4	A	0	15	9	76.5
9/5	10:30	4	A	SW 5-20	15	10	76
9/6	10:30	4	A	0	10	10	77
9/7	10:30	4	A	0	10	10	82
9/8	10:30	4	A	0	9	9	90
9/9	10:30	2	A	0	2	8	93
9/10	10:30	4	0	0	4	7	90
9/11	10:30	4	0	0	9	8	89
9/12	10:30	4	B	NE 10-20	8	8	104
9/13	10:30	4	A	SE 0-5	10	8	144
9/14	10:30	4	A	V 0-5	10	8	151

-Continued-

Appendix F.1. (page 3 of 3)

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Water	Water Level (cm)
9/15	10:30	4	0	N 5-10	8	7	147
9/16	10:30	4	0	0	8	7	146
9/17	10:30	4	A	0	8	8	142
9/18	10:30		0	N 0-5	6	8	131
9/19	10:30	3	0	N 0-5	5	6	124
9/20	10:30	1	A	N 0-5	2	5	119
9/21	10:30	1	0	NW 0-5	3	4	110
9/22	10:30	4	0	N 0-5	4	4	107
9/23	10:30	4	A	0	6	5	104
9/24	10:30	4	B	0	8	5	106
9/25	10:30	4	A	0	8	6	107

[a] Sky condition codes:

0 = no observation
1 = < 1/10 cloud cover
2 = partly cloudy; < 1/2 cloud cover
3 = mostly cloudy; > 1/2 cloud cover
4 = complete overcast
5 = thick fog

[b] Precipitation Codes:

A = intermittaent rain
B = continuous rain
C = snow
D = snow and rain
E = hail
F = thunder

[c] = Estimated water level.

Appendix F.2. Discharge of the Tatlawiksuk River at the weir site in 2002.

DISCHARGE

31.8 m^3/s = 1,123 ft^3/s

Tatlawiksuk River weir

File No. 02 TAT | Page 1 of 1
Crew J. Linderman, R. Corona | Date 9/03/02
Location | Sampling Site Tatlawiksuk Weir | River Mile 2.5 | Meter Type Price AA | No.
HUC | Gage Number 1 | Height 78 cm

Description: Transect was approximately 75 yd. below weir
Left bank was head pin facing downstream.
A CMD 9000 Digimeter was used for velocity measurements.

Weather 100% thin overcast at 5000 ft, Air T 19°c, H_2O T 8°c

Distance from Head Pin (m) LB RB	Angle	Angle Coef.	Vel Depth (m)	Stream-bed Elev.	Obs. Depth %	No. Revo-lutions	Time (sec)	Velocity m/s Point	Velocity m/s Mean Vertical	Velocity m/s Mean Cell	Mean Cell Depth (m)	Cell Width (m)	Cell Area (m^2)	Flow (m^3/s)
0			0.00					0.000						
2		1	0.18					0.487		0.24	0.09	2.0	0.2	0.04
4		1	0.30					0.721		0.60	0.24	2.0	0.5	0.29
6		1	0.36					0.557		0.64	0.33	2.0	0.7	0.42
8		1	0.38					0.975		0.77	0.37	2.0	0.7	0.57
10		1	0.46					1.000		0.99	0.42	2.0	0.8	0.83
12		1	0.48					1.090		1.05	0.47	2.0	0.9	0.98
14		1	0.42					0.982		1.04	0.45	2.0	0.9	0.93
16		1	0.54					0.760		0.87	0.48	2.0	1.0	0.84
18		1	0.54					1.050		0.91	0.54	2.0	1.1	0.98
20		1	0.63					1.010		1.03	0.59	2.0	1.2	1.21
22		1	0.66					1.050		1.03	0.65	2.0	1.3	1.33
24		1	0.70					1.120		1.09	0.68	2.0	1.4	1.48
26		1	0.77					1.260		1.19	0.74	2.0	1.5	1.75
28		1	0.79					1.180		1.22	0.78	2.0	1.6	1.90
30		1	0.74					1.180		1.18	0.77	2.0	1.5	1.81
32		1	0.72					1.270		1.23	0.73	2.0	1.5	1.79
34		1	0.69					1.310		1.29	0.71	2.0	1.4	1.82
36		1	0.74					1.320		1.32	0.72	2.0	1.4	1.88
38		1	0.74					1.160		1.24	0.74	2.0	1.5	1.84
44		1	0.65					1.130		1.15	0.70	6.0	4.2	4.77
46		1	0.58					0.982		1.06	0.62	2.0	1.2	1.30
48		1	0.58					1.010		1.00	0.58	2.0	1.2	1.16
50		1	0.40					0.691		0.85	0.49	2.0	1.0	0.83
52		1	0.34					0.609		0.65	0.37	2.0	0.7	0.48
54		1	0.29					0.418		0.51	0.32	2.0	0.6	0.32
56		1	0.19					0.285		0.35	0.24	2.0	0.5	0.17
58		1	0.16					0.000		0.14	0.18	2.0	0.4	0.05
60			0.08					0.000		0.00	0.12	2.0	0.2	0.00
61.8			0.00					0.000		0.00	0.04	1.8	0.1	0.00

Depth
Average 0.59 m
Maximum 0.79 m

Velocity
Average 1.04 m/sec
Maximum 1.32 m/sec

Tatlawiksuk River Total **31.8 m^3/s**

Appendix F.3. Chemical analysis of water samples collected from Tatlawiksuk River, 1997, 1998, 2000 and 2002.

Parameter	EPA Std. [A]	Lab	Date of Sample					
			8/5/1997	8/7/1998	6/16/2000	8/5/2000	8/15/2000	7/18/2002
Depth			Surface	Surface	Surface	Surface	Surface	Surface
Location			RM 3	RM 3	RM 3	RM 3	RM 3	RM 3
Relative Water Level			V. Low	High	Moderate	Moderate	High	Moderate
Specific Conductance (σmhos/cm)		ADFG [b]	141	58	101	62	53	119
pH	6.5 to 9.0 [d]	ADFG [b]	7.5	6.9	7	6.7	5.9	7.1
Alkalinity (mg/L)		ADFG [b]	73.0	34.0	49.8	27.6	22.3	55.0
Turbidity (NTU)		ADFG [b]	4.5	10.9	6.8	6	29.5	5.0
Color (Pt units)		ADFG [b]	20	65	28	53	62	19
Calcium (mg/L)		ADFG [b]	NA	8.0	15.3	8.9	7.2	17.5
Magnesium (mg/L)		ADFG [b]	NA	2.0	2.9	2.4	2.4	3.5
Iron (σg/L)	1000 [d]	ADFG [b]	NA	847	595	940	2,429	827
Ammonia (σg/L)			NA	NA	NA	NA	NA	47.7
Nitrate+nitrite (σg/L)			NA	NA	NA	NA	NA	11.4
Reactive silicon (σg/L Sil)		ADFG [b]	4,386	3,900	3,802	3,937	3,555	4,640
Arsenic (σg/L)	48 [d]	ER [c]	<0.05	NA	NA	NA	NA	NA
Cadmium (σg/L)	1.1 [d]	ER [c]	<0.002	NA	NA	NA	NA	NA
Calcium (σg/L)		ER [c]	22,900	NA	NA	NA	NA	NA
Chromium (σg/L)		ER [c]	<0.005	NA	NA	NA	NA	NA
Copper (σg/L)	12 [d]	ER [c]	<0.002	NA	NA	NA	NA	NA
Lead (σg/L)	3.2 [d]	ER [c]	<0.02	NA	NA	NA	NA	NA
Magnesium (σg/L)		ER [c]	3700	NA	NA	NA	NA	NA
Zinc (σg/L)	110	ER [c]	<0.004	NA	NA	NA	NA	NA

[a] United States Environmental Protection Agency (EPA 1986).

[b] Alaska Department of Fish and Game, Limnology Unit, Soldotna, AK.

[c] Elemental Reseach Inc., North Vancouver, B.C., Canada.

[d] freshwater chronic criteria

[e] drinking water criteria

Appendix F.4. Daily water conditions and weather data collected at Tatlawiksuk River weir, 1998.

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Water	Water Level (cm)
6/15	7:15	3	0	0	9.0	7.0	65.0 [c]
6/16	7:15	1	0	0	9.0	7.5	61.5 [c]
6/17	7:15	4	0	0	11.0	9.0	58.0
6/18	7:30	1	0	0	10.0	8.5	56.0
6/19	7:30	4	A	0	10.5	9.0	51.0
6/20	7:30	4	0	0	5.0	8.0	48.5
6/21	10:00	3	A	0	7.0	7.5	48.5
6/22	7:30	1	0	0	9.5	8.0	54.0
6/23	7:30	4	A	0	8.0	8.5	64.5
6/24	7:30	4	A	0	8.0	7.0	64.0
6/25	7:30	3	0	0	8.0	8.0	60.0
6/26	7:30	3	0	0	7.5	9.0	56.5
6/27	7:30	3	0	0	13.0	11.5	51.0
6/28	7:30	3	0	0	11.0	12.0	46.5
6/29	7:30	2	0	0	9.5	12.0	44.0
6/30	7:30	2	0	0	15.0	12.5	39.0
7/01	10:00	4	A	0	15.0	10.0	42.0
7/02	7:30	3	0	0	11.5	10.0	42.0
7/03	10:00	4	0	0	15.0	12.5	51.0
7/04	10:00	4	A	0	14.0	12.0	54.0
7/05							60.0 [c]
7/06	7:30	4	0	5	11.0	9.0	66.0
7/07	7:30	4	A	0	9.5	8.0	61.0
7/08	7:30	3	B	0	12.5	9.0	100.0
7/09	9:00	4	B	0			
7/10	7:30	4	A	0			
7/11	10:30	3	0	5			
7/12	10:30	3	0	10			
7/13	17:00	3	0	5	23.0		
7/14	17:00	3	0	0			
7/15	17:00	3	0	5	23.0		
7/16							
7/17	7:30	4	A	0	12.0		
7/18	10:30	4	0	5	15.0		
7/19	10:30	3	A	5	16.0		
7/20	7:30	5	0	0	9.0		
7/21	7:30	3	0	0	9.0		
7/22	7:30	1	0	0	15.0		
7/23	17:00	3	0	10	21.0		

-Continued-

Appendix F.4. (page 2 of 2)

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Temperature (°C) Water	Water Level (cm)
7/24	17:00	4	A	5	15.0		
7/25	10:30	4	0	15	13.0		
7/26	10:30	3	A	5	12.0		
7/27	7:30	4	A	0	10.0		
7/28	7:30	3	A	0	11.0		
7/29	7:30	4	A	0	11.0		
7/30							
7/31	17:00	1	0	0	26.5		
8/01							
8/02	10:30	4	B	10			
8/03	7:30	4	B	10			
8/04	7:30	4	A	10			
8/05	7:30	3	A	0			
8/06	7:30	3	0	5			
8/07	7:30	4	0	10			

a Sky condition codes:

0 = no observation
1 = < 1/10 cloud cover
2 = partly cloudy; < 1/2 cloud cover
3 = mostly cloudy; > 1/2 cloud cover
4 = complete overcast
5 = thick fog

b Precipitation Codes:

A = intermittaent rain
B = continuous rain
C = snow
D = snow and rain
E = hail
F = thunder

c = Estimated water level.

Appendix F.5. Daily water conditions and weather data collected at Tatlawiksuk River weir, 1999.

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Water	Water Level (cm)
6/11	17:00			10			
6/12	7:30	1		10			
6/13	10:30	2	A	5	19.0		
6/14	7:30	4	A	5	15.0		48.0
6/15	7:30	4	0	0	16.0		43.0
6/16	7:30	4	0	0	14.0		43.0
6/17	7:30	2	0	0	15.0		40.5
6/18	7:30	4	0	0	15.0		42.3
6/19	10:30	1	0	0	16.0		53.0
6/20	10:30	4	A	0	11.0		58.5
6/21	7:30	3	0	0	11.0		60.0
6/22	10:00	3	0	0	15.0		66.0
6/23	7:30	3	0	0	10.0		58.3
6/24	7:30	3	0	0	13.0		53.0
6/25	7:30	3	0	0	11.0		54.0
6/26	10:30	3	0	5	15.0	11.0	53.0
6/27	10:30	2					54.0
6/28	7:30	4	0	0	17.0	11.0	54.0
6/29	7:30	4	0	0	12.0	10.5	56.0
6/30	7:30	5	0	0	14.0	11.0	61.0
7/01	7:30	3	0	5	13.0	11.0	58.5
7/02	7:30	4	0	10	14.0	11.0	52.0
7/03	10:30	1	0	5	17.0	11.0	47.0
7/04	10:30	1	0	5	18.0	14.0	44.0
7/05	10:30	1	0	0	18.0		39.0
7/06	7:30	4	0	0	11.0		39.0
7/07	7:30	4	0	0	11.0		39.0
7/08	7:30	3	0	0	9.0	9.0	43.0
7/09	7:30	3	0	0	13.0	10.0	42.0
7/10	10:30	3	0	0	20.0	10.0	43.0
7/11	10:30	3	0	0	16.0	11.0	49.0
7/12	7:30	4	0	0	12.0	11.0	47.0
7/13	10:30	3	0	0	15.0		42.0
7/14	7:30	4	B	0	11.0		41.0
7/15	7:30	4	0	0	11.0	11.0	40.0
7/16	7:30	4	0	0	9.0	11.0	40.0
7/17	10:30	4	0	0	12.0	12.0	38.0
7/18	17:00	4	A	0	19.0	12.0	36.0
7/19	7:30	4	B		11.0	12.0	36.0
7/20	7:30	4	0	20	10.0	10.0	35.0
7/21	7:30	4	0	0	7.0	9.0	35.0
7/22	7:30	3	0	0	1.0	9.0	40.0
7/23	17:00	4	0	0	15.0	9.0	42.0
7/24	10:30	4	A	0	15.0	10.0	44.0
7/25	10:30	4	B		11.0	10.0	38.0

-Continued-

Appendix F.5. (page 2 of 3)

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Water	Water Level (cm)
7/26	7:30	4	A	5	9.0	9.0	43.0
7/27	7:30	4	A	0	7.0		63.5
7/28	7:30	3	0	0	6.0		71.0
7/29	7:30	4	B	0	12.0		80.0
7/30	7:30	4	0	0	10.0		82.0
7/31	10:30	4	0	10	13.0	11.0	99.0
8/01	10:30	4	0	5	13.0	11.0	91.0
8/02	7:30	3	0	0	7.0	10.0	84.0
8/03	7:30	4	A	5	15.0	10.0	88.0
8/04	7:30	4	0	0	12.0	10.0	79.0
8/05	7:30	4	A	0	11.0	11.0	72.0
8/06	10:00	4	A	0	12.0	11.0	66.0
8/07	10:30	4	0	0	14.0	11.0	62.0
8/08	10:30	4	A	0	12.0	11.0	64.0
8/09	7:30	4	0	0	10.0	11.0	75.0
8/10	7:30	4	A	0	10.0	11.0	105.0
8/11	7:00	4	A	0	10.0	10.0	120.0
8/12	7:30	4	B	0	10.0	10.0	115.0
8/13	7:30	4	0	0	9.0	10.0	
8/14	7:30	4	B	0	9.0	10.0	
8/15	10:30	1	0	5	10.0	10.0	
8/16	7:30	1	0	0	8.0	10.0	
8/17	7:30	1	0	0	4.5	9.0	
8/18	7:30	1	0	0	4.0	9.0	
8/19	7:30	3	A	10	12.0	10.0	106.0
8/20	7:30	4	B	0	10.0	10.0	101.0
8/21	10:30	3	0	0	11.0	10.0	101.0
8/22	10:30	5	0	0	10.0	10.0	95.0
8/23	7:30	4	A	0	6.0	11.0	92.0
8/24	7:30	5	0	0	4.0	9.0	81.0
8/25	7:30	3	A	0	7.0	9.0	79.0
8/26	7:30	3	0	0	7.0	9.0	73.0
8/27	7:30	5	0	0	6.0		69.0
8/28	10:30	1	0	10	11.0	9.0	63.0
8/29	10:30	1	0	0	7.0	9.0	60.0
8/30	7:30	4	B	0		9.0	57.0
8/31	7:30	3	0	0	5.0	9.0	60.0
9/01	10:30	3	0	0	10.0	9.0	60.0
9/02	10:30	4	0	0	5.0	9.0	63.0
9/03	10:30	5	0	0	10.0	8.0	68.0
9/04	10:30	4	0	0	10.0	8.0	68.0
9/05	10:30	1	0	0	9.0	8.0	65.0
9/06	10:30	2	0	10	10.0	8.0	62.0
9/07	12:30	2	0	10	10.0	9.0	61.0
9/08	10:30	1	0	10	13.0	9.0	55.0
9/09	10:30	1	0	10	8.0	9.0	54.0

-Continued-

Appendix F.5. (page 3 of 3)

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Temperature (°C) Water	Water Level (cm)
9/10	10:30	1	0	0	15.0	9.0	49.0
9/11	10:30	1	0	0	10.0	9.0	50.0
9/12	10:30	1	0	0	9.0	8.0	46.0
9/13	10:30	4	0	0	10.0	8.0	44.0
9/14	7:30	5	0	0	-3.0	8.0	45.0
9/15	10:30	3	0	10	9.0	8.0	42.0
9/16	10:30	1	0	0	8.0	8.0	41.0
9/17	10:30	4	A	15	8.0	7.0	43.0
9/18	10:30	3	0	0	10.0	7.0	41.0
9/19	10:30	4	0	0	8.0	7.0	41.0
9/20	10:30	1	0	0	8.0	7.0	38.0

a Sky condition codes:

0 = no observation
1 = < 1/10 cloud cover
2 = partly cloudy; < 1/2 cloud cover
3 = mostly cloudy; > 1/2 cloud cover
4 = complete overcast
5 = thick fog

b Precipitation Codes:

A = intermittaent rain
B = continuous rain
C = snow
D = snow and rain
E = hail
F = thunder

c = Estimated water level.

Appendix F.6. Discharge of the Tatlawiksuk River at the weir site in 1999.

DISCHARGE

1167 ft^3/s = 33.0 m^3/s

Tatlawiksuk River weir

DISCHARGE
AH-81-04

File No. 99TAT
Page 1 of 1

Crew L. DuBois, Chris (intern)
Date 6/15/99

Habitat Location S21N38W02CA
Sampling Site Tatlawiksuk Weir
River Mile 2.5
Meter Type Price AA No.

HUC 19030405
Gage Number
Height 42.5 cm

Description GPS coordinates 100' below weir site.

Weather Air 19oC, 1400 hrs, ptly sunny, wind NW @ 5.

Distance from Head Pin (ft.) LB RB	Angle	Angle Coef.	Vel Depth (ft.)	Stream-bed Elev.	Obs. Depth %	No. Revo-lutions	Time (sec)	Velocity fps Point	Velocity fps Mean Vertical	Velocity fps Mean Cell	Mean Cell Depth (ft.)	Cell Width (ft.)	Cell Area (ft.^{2})	Flow (ft^3/s)
0			0.00					0.000						
5		1	0.28					0.250	(est.)	0.12	0.14	5	0.7	0.1
10	15	0.965925826	0.39		0.9	7	46.5	0.348		0.30	0.34	5	1.7	0.5
15		1	0.53		0.9	15	43.5	0.772		0.56	0.46	5	2.3	1.3
20		1	0.68		0.6	20	46	0.968		0.87	0.61	5	3.0	2.6
30		1	1.02		0.6	30	45	1.473		1.22	0.85	10	8.5	10.4
35		1	1.08		0.6	40	51	1.732		1.60	1.05	5	5.3	8.4
40		1	1.18		0.6	45	41.5	2.383		2.06	1.13	5	5.7	11.6
45		1	1.40		0.6	50	41.5	2.644		2.51	1.29	5	6.5	16.2
50		1	1.61		0.6	50	40.5	2.709		2.68	1.51	5	7.5	20.1
55		1	1.72		0.6	60	42	3.130		2.92	1.67	5	8.3	24.3
60		1	1.90		0.6	70	43.5	3.522		3.33	1.81	5	9.1	30.1
65		1	2.08		0.6	60	40	3.285		3.40	1.99	5	10.0	33.9
70		1	2.28		0.6	80	43	4.067		3.68	2.18	5	10.9	40.1
75		1	2.36		0.6	80	47	3.724		3.90	2.32	5	11.6	45.2
80		1	2.41		0.6	70	41.5	3.690		3.71	2.39	5	11.9	44.2
85		1	2.61		0.6	80	42.5	4.115		3.90	2.51	5	12.6	49.0
90		1	2.70		0.6	70	41	3.735		3.92	2.66	5	13.3	52.1
95		1	2.91		0.6	70	40	3.828		3.78	2.81	5	14.0	53.0
100		1	3.02		0.6	80	43.5	4.021		3.92	2.97	5	14.8	58.2
105	10	0.984807753	3.08		0.6	80	43	4.067		4.04	3.05	5	15.3	60.7
110		1	3.25		0.6	70	42	3.647		3.86	3.17	5	15.8	61.0
120		1	3.18		0.6	80	42	4.163		3.91	3.22	10	32.2	125.5
130		1	3.02		0.6	80	43.5	4.021		4.09	3.10	10	31.0	126.9
135		1	2.85		0.6	60	40	3.285		3.65	2.94	5	14.7	53.6
140		1	2.72		0.6	60	45	2.923		3.10	2.79	5	13.9	43.2
145		1	2.42		0.6	60	41.5	3.167		3.05	2.57	5	12.9	39.1
150	5	0.996194698	2.08		0.6	60	44.5	2.956		3.06	2.25	5	11.3	34.3
155		1	2.02		0.6	50	40.5	2.709		2.83	2.05	5	10.3	29.0
165		1	1.95		0.6	40	42	2.097		2.40	1.99	10	19.9	47.7
170		1	1.83		0.6	35	44	1.754		1.93	1.89	5	9.5	18.2
180		1	1.50		0.6	17	45.5	0.835		1.29	1.67	10	16.7	21.6
185		1	1.23		0.6	6	50	0.282		0.56	1.37	5	6.8	3.8
190		1	0.98		0.6	0	40	0.020		0.15	1.11	5	5.5	0.8
195			0.71					0.014	(est.)	0.02	0.85	5	4.2	0.0
200			0.11					0.002	(est.)	0.01	0.41	5	2.1	0.0
201			0.00					0.000	(est.)	0.00	0.06	1	0.1	0.0

Tatlawiksuk River Total **1,167 ft^3/s**

	Depth		Velocity
Average	2.26 ft	Average	3.19 ft/sec
Maximum	3.25 ft	Maximum	4.16 ft/sec

Notes: Average depth and average velocity are calculated using data from 30 ft through 170 ft, which is approximately 70 percent of stream width.
Estimates for a given row apply to point velocity, mean cell velocity, and flow.

Appendix F.7. Daily water conditions and weather data collected at Tatlawiksuk River weir, 2000.

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Temperature (°C) Water	Water Level (cm)
6/25	10:30	3	0	0	18.0	14.0	34.0
6/26	7:30	1	0	0	14.0	16.0	34.0
6/27	7:30	4	0	0	15.0	15.0	33.0
6/28	7:30	2	A	0	12.0	15.0	31.0
6/29	7:30	4	A	0	10.0	14.0	31.0
6/30	7:30	4	A	0	10.0	14.0	31.0
7/01	10:30	2	0	5	21.0	14.0	30.0
7/02	10:30	1	0	0	21.0	14.0	30.0
7/03	7:30	4	0	0	10.0	14.0	29.0
7/04	10:30	4	0	0	18.0	15.0	28.0
7/05	17:00			0	25.0	17.0	32.0
7/06	7:30	1	0	0	9.0	16.0	45.0
7/07	7:30	3	0	0	15.0	16.0	45.0
7/08	10:30	4	0	0	19.0	16.0	42.0
7/09	10:30	4	A	0	15.0	16.0	39.0
7/10	7:30	4	0	0	10.0	16.0	40.0
7/11	7:30	2	A	0	12.0	15.0	44.0
7/12	9:00	1	0	0	24.0	14.0	46.0
7/13	7:30	2	0	0	12.0	14.0	45.0
7/14	7:30	4	A	0	12.0	14.0	46.0
7/15	10:30	4	A	0	11.0	13.0	49.0
7/16	10:30	4	A	0	11.0	13.0	54.0
7/17	7:30	4	A	5	9.0	12.0	54.0
7/18	8:00	4	0	0	9.0	10.0	65.0
7/19	7:30	4	A	0	9.0	10.0	70.0
7/20	7:30	4	A	0	9.0	10.0	66.0
7/21	7:30	4	A	5	8.0	10.0	61.0
7/22	10:00	1	0	10	20.0	11.0	60.0
7/23	10:00	2	A	0	15.0	13.0	60.0
7/24	7:30	4	A	0	10.0	12.0	60.0
7/25	7:30	3	A	0	10.0	12.0	71.0
7/26	7:30	2	0	0	10.0	12.0	76.0
7/27	7:30	4	0	0	9.0	13.0	68.0
7/28	7:30	2	0	0	4.0	11.0	62.0
7/29	10:30	2	0	0	11.0	11.0	60.0
7/30	10:30	2	0	0	11.0	11.0	58.0
7/31	7:30	4	A	0	8.0	11.0	62.0
8/01	7:30	4	B	0	7.0	10.0	70.0
8/02	7:30	4	A	0	10.0	9.0	86.0
8/03	7:30	3	A	10	11.0		85.0
8/04	7:30	4	A	5	10.0	10.0	82.0
8/05	10:30	4	A	0			84.0
8/06	10:30	3	A	0	12.0	9.0	92.0

a Sky condition codes:

0 = no observation
1 = < 1/10 cloud cover
2 = partly cloudy; < 1/2 cloud cover
3 = mostly cloudy; > 1/2 cloud cover
4 = complete overcast
5 = thick fog

b Precipitation Codes:

A = intermittaent rain
B = continuous rain
C = snow
D = snow and rain
E = hail
F = thunder

c = Estimated water level.

Appendix F.8. Discharge of the Tatlawiksuk River at the weir site in 2000.

DISCHARGE

58.2 m^3/s = 2,055 ft^3/s

Tatlawiksuk River weir

File No. 00 TAT Page 1 of 1

Crew L. DuBois, S. Gregory, R. Chamberlin Date 8/04/00

Habitat Location Sampling Site Tatlawiksuk Weir River Mile 2.5 Meter Type Price AA No.

HUC Gage Number 1 Height 82

Description Transect is approximately 30 m below weir.
Left bank is head pin facing downstream.
Distance measurements were recorded in english units then converted to metric units.
A CMD 9000 Digimeter was used for velocity measurements.

Weather Rain, solid overcast.

Distance from Head Pin (m) LB RB	Angle	Angle Coef.	Vel Depth (m)	Stream-bed Elev.	Obs. Depth %	No. Revo-lutions	Time (sec)	Velocity mps Point	Velocity mps Mean Vertical	Velocity mps Mean Cell	Mean Cell Depth (m)	Cell Width (m)	Cell Area (m^2)	Flow (m^3/s)
0			0.00					0.000						
2		1	0.26		0.9			0.608		0.30	0.13	1.5	0.2	0.1
3		1	0.42		0.6			0.557		0.58	0.34	1.5	0.5	0.3
5		1	0.46		0.6			0.664		0.61	0.44	1.5	0.7	0.4
6		1	0.53		0.6			0.808		0.74	0.50	1.5	0.8	0.6
8		1	0.58		0.6			0.891		0.85	0.55	1.5	0.8	0.7
9		1	0.69		0.6			0.973		0.93	0.63	1.5	1.0	0.9
12		1	0.85		0.6			1.150		1.06	0.77	3.1	2.3	2.5
15		1	0.78		0.6			1.140		1.15	0.82	3.1	2.5	2.8
18		1	0.77		0.6			1.130		1.14	0.78	3.1	2.4	2.7
21		1	0.86		0.6			1.120		1.13	0.82	3.1	2.5	2.8
24		1	0.94		0.6			1.330		1.23	0.90	3.1	2.7	3.4
27		1	1.32		0.6			1.130		1.23	1.13	3.1	3.4	4.2
31		1	1.36		0.6			1.370		1.25	1.34	3.1	4.1	5.1
34		1	1.30		0.6			1.380		1.38	1.33	3.1	4.1	5.6
37		1	1.27		0.6			1.220		1.30	1.29	3.1	3.9	5.1
40		1	1.12	(est.)				1.195	(est.)	1.21	1.20	3.1	3.7	4.4
43		1	0.98		0.6			1.170		1.18	1.05	3.1	3.2	3.8
46		1	0.88		0.6			1.120		1.15	0.93	3.1	2.8	3.2
49		1	0.76		0.6			1.000		1.06	0.82	3.1	2.5	2.7
52		1	0.72		0.6			1.040		1.02	0.74	3.1	2.3	2.3
55		1	0.62		0.6			0.891		0.97	0.67	3.1	2.0	2.0
58		1	0.55		0.6			0.802		0.85	0.58	3.1	1.8	1.5
61		1	0.46		0.6			0.509		0.66	0.50	3.1	1.5	1.0
64		1	0.00					0.000		0.25	0.23	3.1	0.7	0.2

	Depth	Velocity
Average	0.83 m	1.03 m/sec
Maximum	1.36 m	1.38 m/sec

Tatlawiksuk River Total **58.2 m^3/s**

Notes: Average depth and average velocity are calculated using data from 3 m through 61 m, which is approximately 90 percent of stream width.
Estimates for a given row apply to depth, point velocity, mean cell velocity, and flow.

Appendix F.9. Daily water conditions and weather data collected at Tatlawiksuk River weir, 2001.

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Water	Water Level (cm)
6/15	7:30	1	0	0			79.0
6/16	10:30	1	0	5	16.0	11.0	76.0
6/17	10:30	1	0	0		13.0	70.0
6/18	7:30	1	0	0	15.0	11.0	69.0
6/19	7:30	4	0	0	15.0	12.0	68.0
6/20	7:30	1	0	0	18.0	13.0	66.0
6/21	7:30	1	0	0	13.0	10.0	65.0
6/22	7:30	1	0	0	16.0	13.0	63.0
6/23	10:30	1	0	0	20.0	14.0	61.0
6/24	10:30	3	0	8	18.0	14.0	59.0
6/25	7:30	2	0	0	11.0	13.0	58.0
6/26	7:30	4	0	7	11.0	14.0	57.0
6/27	7:30	4	0	5	11.0	13.0	56.0
6/28	7:30	1	0	10	10.0	13.0	55.0
6/29	7:30	2	0	0	11.0	13.0	54.0
6/30	7:30	2	0	0	16.0	13.0	52.0
7/01	10:30	4	0	0	14.0	15.0	51.0
7/02	7:30	2	0	0	17.0	15.0	51.0
7/03	7:30	4	0	5	11.0	13.0	49.0
7/04	7:30	4	A	0	8.0	13.0	49.0
7/05	7:15	3	A	5	9.0	10.5	53.0
7/06	7:30	3	0	5	9.0	11.0	54.5
7/07	10:30	3	0	5-10	14.0	11.0	53.0
7/08	10:30	2	0	5-10	15.0	13.0	52.0
7/09	7:30	2	0	0	7.0	13.0	50.0
7/10	7:30	4	B	0	9.0	13.0	49.0
7/11	7:30	4	B	0-5	10.0	14.0	50.0
7/12	7:30	4	B	0	10.0	12.0	60.0
7/13	7:30	3	0	0	10.0	11.0	68.0
7/14	10:30	4	0	0	15.0	10.0	66.0
7/15	10:30	4	0	0-5	15.0	12.0	64.0
7/16	7:30	4	B	0	13.0	12.0	62.0
7/17	7:30	4	A	0-5	11.0	12.0	69.0
7/18	7:30	1	0	0	5.0	11.0	77.0
7/19	7:30	4	B	0	15.0	11.5	78.0
7/20	7:30	4	A	0	13.0	9.0	82.0
7/21	10:30	1	0	0	17.0	10.5	92.0
7/22	10:30	4	B	0	14.0	12.0	93.0
7/23	7:15	4	A	0	14.0	12.0	103.0
7/24	7:30	4	0	0	13.0	12.0	124.0
7/25	7:30	4	0	0	13.0	12.0	132.0
7/26	7:30	4	A	0	13.0	12.0	127.0
7/27	7:30	3	A	0	8.0	10.0	133.0
7/28	10:30	4	0	0	15.0	12.0	131.0
7/29	10:30	3	0	0	16.0	13.0	118.0

-Continued-

Appendix F.9. (page 2 of 3)

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Water	Water Level (cm)
7/30	10:30	4	B	0-5	12.0	11.0	114.0
7/31	7:30	4	A	0	12.0	8.0	128.0
8/01	7:30	3	A	0	4.0	11.0	147.0
8/02	7:30	1	0	0	3.0	10.0	136.0
8/03	7:30	4	A	0-5	7.0	10.0	127.0
8/04	10:30	1	0	0-5	13.0	9.0	112.0
8/05	7:30	1	0	0	1.0	8.0	106.0
8/06	7:30	4	0	0	6.0	7.0	95.0
8/07	7:30	1	0	0	3.0	9.0	88.0
8/08	7:30	2	0	0	12.0	10.0	83.0
8/09	7:30	1	0	0	4.0	10.5	78.0
8/10	7:30	3	0	0	10.0	10.0	74.0
8/11	10:30	4	0	0	15.0	8.5	71.0
8/12	7:30	4	A	0	10.5	10.0	70.0
8/13	7:30	2	0	0	13.0	11.0	69.0
8/14	7:30	4	B	0-5	12.5	11.0	69.0
8/15	7:30	4	A	0-5	15.0	12.0	77.0
8/16	7:30	4	A	0	12.0	11.0	86.0
8/17	7:30	4	A	0	12.0	12.0	130.0
8/18	7:30	4	B	5	11.0	11.0	144.0
8/19	10:30	4	B	0	10.0	10.0	169.0
8/20	7:30	4	A	5	9.5	10.0	202.0
8/21	7:30	3	0	20-30	11.0	10.5	216.0
8/22	7:30	1	0	0	3.0	10.0	212.0
8/23	7:30	5	0	0	2.0	9.0	186.0
8/24	7:30	3	0	5	17.0	10.0	176.0
8/25	10:30	1	0	0	11.0	9.0	152.0
8/26	10:30	1	0	0	15.0	10.0	138.0
8/27	11:00	4	A	0	11.0	9.0	123.0
8/28	10:30	3	0	0	13.0	9.0	116.0
8/29	10:30	4	0	0	6.0	8.0	112.0
8/30	10:30	4	0	0	11.0	8.0	104.0
8/31	10:30	4	0	0	9.0	9.0	98.0
9/01	10:30	4	A	0-5	10.0	8.0	92.0
9/02	10:30	1	0	0	16.0	9.0	90.0
9/03	10:30	4	0	0	9.0	9.0	86.0
9/04	10:30	4	B	15-20	9.0	8.0	85.0
9/05	10:30	4	A	10-15	6.0	8.0	96.0
9/06	10:30	4	A	5-10	6.0	7.0	118.0
9/07	10:30	4	A	0	6.0	7.0	122.0
9/08	10:30	4	A	5-10	8.0	7.0	112.0
9/09	10:30	1	0	0	10.0	6.0	106.0
9/10	10:30	1	0	0	7.0	6.0	98.0
9/11	10:30	1	0	0	5.5	6.0	97.0
9/12	10:30	1	0	0	8.5	5.5	90.0
9/13	10:30	2	0	0	2.0	6.0	88.0

-Continued-

Appendix F.9. (page 3 of 3)

Date	Observation Time	Sky [a] (a.m.)	Precip. [b] (a.m.)	Wind Vel. (knotts)	Temperature (°C) Air	Water	Water Level (cm)
9/14	10:30	3	0	0	10.0	6.0	85.0
9/15	10:30	3	A	0	8.0	5.5	83.0
9/16	10:30	2	0	0	4.0	7.0	80.0
9/17	10:30	2	0	0	7.0	6.5	78.0
9/18	10:30	3	0	0	10.0	7.0	76.0
9/19	10:30	4	A	0	8.0	7.5	75.0
9/20	10:30	2	0	0	10.0	7.0	74.0

a Sky condition codes:

0 = no observation
1 = < 1/10 cloud cover
2 = partly cloudy; < 1/2 cloud cover
3 = mostly cloudy; > 1/2 cloud cover
4 = complete overcast
5 = thick fog

b Precipitation Codes:

A = intermittaent rain
B = continuous rain
C = snow
D = snow and rain
E = hail
F = thunder

c = Estimated water level.