

Fishery Data Series No. 10-23

**Stock Assessment Studies of Chilkat River Adult
Sockeye and Chum Salmon Stocks in 2003 and 2004**

by

Randall L. Bachman

April 2010

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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ABSTRACT

The Alaska Department of Fish and Game and the Northern Southeastern Regional Aquaculture Association conducted mark-recapture studies of adult Chilkat River sockeye (*Oncorhynchus nerka*) and chum (*O. keta*) salmon in 2003 and 2004, in order to estimate the escapement of chum and sockeye salmon in the Chilkat River, and sockeye salmon in Chilkat Lake, and to summarize age, sex, and length compositions for these populations. Using two fish wheels in the lower Chilkat River, we captured and marked sockeye and chum salmon with an individually numbered tag and with 2 fin clips. The 2003 total fish wheel catch was 4,551 sockeye salmon and 3,846 chum salmon. Of these, 4,012 sockeye salmon and 3,042 chum salmon were marked. The drainagewide sockeye salmon abundance estimate, at the time of tagging, was 150,000 fish (SE=11,000). We then stratified the sockeye escapement into Chilkat Lake and Chilkat River mainstem sockeye escapements, which were calculated as 113,000 and 36,000 sockeye salmon, respectively. The 2003 drainagewide chum salmon abundance estimate, at the time of tagging, was 166,000 fish. The 2004 total fish wheel catch was 4,366 sockeye salmon and 4,266 chum salmon. Of these, we marked 4,021 sockeye and 4,249 chum salmon. The drainagewide sockeye salmon abundance estimate was 163,000 fish; the Chilkat Lake and Chilkat River mainstem sockeye escapements were 115,000 and 45,000 fish, respectively. The 2004 drainagewide chum salmon abundance estimate was 329,000 fish.

Key words: mark-recapture, stratified population estimate, escapement, scale pattern analysis, Chilkat River, Chilkat Lake, salmon, fish wheel, age, length, sockeye salmon, *Oncorhynchus nerka*, chum salmon, *Oncorhynchus keta*, Southeast Alaska

INTRODUCTION

The Chilkat River drainage is located at the head of Lynn Canal, in northern southeast Alaska (Figure 1). The drainage supports large runs of sockeye (*Oncorhynchus nerka*) and chum (*O. keta*) salmon populations that contribute significantly to commercial and subsistence fisheries in the Haines area (ADF&G 1987, Bachman et al. 1999). The northern and western parts of the basin lie within British Columbia and Yukon Territory, Canada. The Chilkat River is a large glacial system that has its terminus near Haines, Alaska. The mainstem and major tributaries (Tsirku, Klehini, Kelsall, and Tahini rivers) comprise approximately 350 km of river channel, in a watershed covering about 1,600 km². The river system originates from many glaciers and flows through rugged mountainous terrain, converging to a turbid, braided river system. Salmon escapements cannot be monitored by aerial or foot surveys in the turbid areas of the river. Chilkat Lake, the primary destination of Chilkat River sockeye salmon, is a relatively large, clear water lake with a surface area of 9.8 km², mean depth of 32.5 m, a maximum depth of 57 m, and a volume of 0.319 km³. The outlet of the lake is located approximately 30 km northwest of the city of Haines, Alaska (Figure 1).

Based on mark-recapture studies, statistics from the gillnet fishery, and fish wheel collected scale pattern analysis data (in Marshall et al. 1982), it was estimated that 80 to 90% of Chilkat sockeye salmon originated from Chilkat Lake, with the remainder of the fish produced in the Chilkat River mainstem and its tributaries (Bachman 2005, Kelley and Bachman 2000). Important mainstem sockeye salmon spawning locations include Mule meadows, Mosquito Lake, Little Salmon River, and Bear flats. Chilkat River drainage fall chum salmon populations originate from the Klehini River (early run) and Chilkat River mainly along the Tsirku River delta near the village of Klukwan (late run).

These large runs of sockeye and chum salmon contribute significantly to the Lynn Canal (District 15; Figure 2) commercial drift gillnet fishery as well a subsistence fishery in the Haines area (Bachman et al. 1999). Chilkat Lake has produced annual commercial sockeye salmon harvests as high as 168,000 in 1986, with an average harvest of 92,000 fish for the years 1976 to 2004. Annual harvests of “other” sockeye stocks, which include Chilkat River mainstem spawning fish, have

been as high as 33,000 (1992), with an average harvest of 14,400 fish between 1976 and 2004. In addition to the commercial harvest, sockeye salmon originating from Chilkat Lake and the Chilkat River are also taken in the Haines area subsistence fishery. Reported subsistence harvests in Chilkat Inlet and Chilkat River for the period 1990 to 2004 averaged approximately 6,700 sockeye salmon. District 15 commercial drift gillnet catches of fall chum salmon averaged 304,000 fish in the 1980s, including a maximum harvest of 621,000 fish in 1985. Commercial harvests of chum salmon declined in the 1990s and averaged 58,600 fish from 1995 to 2004. As a result, the fall commercial gillnet fishery has been curtailed since 1989 to reduce harvest of this stock. Prior to 1990, the majority of the chum salmon harvested in the Lynn Canal drift gillnet fishery were wild fall chum salmon (Figure 3). Hatchery releases of summer chum salmon in lower Lynn Canal now contribute over 80% of the chum harvest in the district. The majority of the commercial sockeye salmon harvest in the Lynn Canal fishery is comprised of a mixture of stocks from Chilkat Lake, Chilkat River, Chilkoot Lake, and Berners Bay rivers. Scale pattern analysis (SPA) is used inseason to estimate the contribution of these stocks of sockeye salmon in this fishery each season (Marshall et al. 1982; McPherson et al. 1983, 1992; McPherson 1990, McPherson and Marshall 1986; McPherson 1987, 1989; McPherson and Olsen 1992). Scale samples from Chilkat Lake and mainstem Chilkat River sockeye salmon stocks are collected by this project for use as SPA standards.

The Chilkat River fish wheel program was operated experimentally by the Alaska Department of Fish and Game (ADF&G) in 1977, 1978, 1982, 1983, and again in 1990, to assess Chilkat River fall chum and coho (*O. kisutch*) salmon escapements into the river. Beginning in 1991, the fish wheel was also used to assess Chinook salmon (*O. tshawytscha*) escapements (Ericksen 2003a). The Chilkat River fish wheel program has been operated to sample all species of Pacific salmon into the river since 1997 (Table 1). Our goal with this study was to estimate the escapement of sockeye and chum salmon escapement returning to the Chilkat River drainage during 2003 and 2004. This report describes the methods and results of this study.

OBJECTIVES

1. Estimate the escapement of adult sockeye salmon into Chilkat Lake and to the Chilkat River mainstem in 2003 and 2004
2. Estimate the age, sex, and length composition of adult sockeye salmon entering the Chilkat River in 2003 and 2004
3. Estimate the escapement of adult chum salmon to the Chilkat River in 2003 and 2004.
4. Estimate the age, sex, and length composition of adult chum salmon entering the Chilkat River in 2003 and 2004
5. Develop a relationship between fish wheel catch, visual aerial survey counts and mark-recapture escapement estimates of Chilkat River adult chum salmon

METHODS

ABUNDANCE ESTIMATES

Lower River Adult Sampling and Marking (First Event)

Returning adult sockeye and chum salmon were captured in fish wheels operated adjacent to milepost 9 of the Haines highway, on the eastern bank of the Chilkat River where the main

channel is next to the road (Figure 2). Commercial Fisheries Division personnel installed 2 aluminum fish wheels, which had a 3-basket configuration, in early June. One fish wheel was located adjacent to milepost 9, and the other was placed approximately 300 m downstream of the first. While the Chilkat River channel at this location is conducive for fish wheel operation, seasonal fluctuations in water flow velocity required minor changes in fishing location to maintain optimal rpm rate for the fish wheels. Except for infrequent periods of high-flow events, routine maintenance, or equipment failure, the fish wheels were operated continuously from June 6 through October 21 in 2003, and from June 7 through October 19 in 2004. The number of hours each wheel operated was recorded daily. Water depth (cm) and temperature (°C) were recorded each morning near milepost 8 of the Haines highway.

Sockeye Salmon

All sockeye salmon were dip-netted from the fish wheel live boxes and placed into a tagging/marketing trough partially filled with river water. Every healthy and active sockeye salmon was visually examined for sex, and measured to the nearest millimeter from mid-eye-to-fork-of-tail (MEF). All salmon that had serious wounds or that were lethargic in behavior were immediately released and were not marked, tagged, or sampled. Each day, a scale sample was collected from the first 40 sockeye salmon for age determination. All uninjured sockeye salmon > 360 mm MEF were marked by inserting a uniquely numbered T-bar tag just below the dorsal fin, and by removing the adipose fin and a secondary fin; the type of secondary fin removed was based on a marking schedule, and on statistical weeks for the year (Table 2 and Appendix A). The marking schedule corresponded to 2-week blocks of time throughout the season, which allowed us to stratify the marking and recapture data. We did not include sockeye salmon ≤ 360 mm MEF (precocious males or jacks) in the mark-recapture analysis, because fish in this size category do not have equal probability of capture in recovery events at Chilkat Lake.

Chum Salmon

Procedures for sampling chum salmon were similar to that previously discussed for sockeye salmon. Every healthy chum salmon was visually examined for sex, and measured to the nearest mm MEF. A scale sample was collected from every healthy chum salmon captured in the fish wheels for age composition analysis. Every healthy chum salmon captured was marked with a uniquely numbered solid-core spaghetti tag sewn into the posterior end of the dorsal fin through the pterygiophores. The fish was also given a lower left operculum hole punch, and had a fin removed. The type of secondary fin removed was based on a sampling schedule (Table 3). The marking schedule corresponded to 2-week blocks of time throughout the season, which allowed us to stratify the marking and recapture data.

Data Collection

The date of sampling, the tag sequence number used, data on sex and length, as well as information connecting the data to a scale sample, were recorded on OPSCAN ASL forms, according to established protocols (ADF&G 1994). The tagging and sampling procedures took from 30 to 40 seconds per fish to complete. The fish were then immediately returned to the river. Fish wheel catches were sampled in the morning (0800–1200 hrs) and late afternoon (1430–1630 hrs), with more frequent sampling conducted during periods of peak fish movement.

Recovering Tags (Recapture or Second Event)

Sockeye Salmon

In 2003, staff from the Northern Southeast Regional Aquaculture Association (NSRAA) operated the Chilkat Lake weir, from June 26 through October 17. In 2004, ADF&G staff operated the weir, from July 6 through October 13 (Bachman 2005). Fish were captured as they swam through the weir into a fish trap. In addition, beach seines were used to capture adult sockeye salmon milling and holding immediately behind the weir. All sockeye salmon were examined for missing adipose fins, T-bar tags and secondary marks. Double sampling was prevented by punching a hole in the lower edge of the left operculum of all fish sampled during recovery efforts. Approximately 40 fish each day were sampled for length (MEF in mm), sex and scales.

ADF&G staff sampled Chilkat River mainstem sockeye salmon in 2 large spawning tributaries. Sampling efforts were concentrated in known spawning areas in Mosquito Lake, Bear Flats, Little Salmon River and at Mule Meadows (a small tributary just north of the Kellsall River confluence; Figure 2). Chilkat River mainstem sockeye salmon were captured with gillnets, beach seines and bare hands once or twice each week, from July 6 through September 6 in 2003 and from July 24 through September 25 during 2004. Fish were examined and sampled in the same manner as described for Chilkat Lake. Scheduling of recovery sampling efforts at mainstem areas varied based on the percentage of recaptures in a given area to avoid unnecessary handling of fish on the spawning grounds.

Chum Salmon

Two teams of 3 people each sampled chum salmon for marks in 2 spawning areas. The sampling sites were classified into 2 distinct areas based upon a similar study conducted in 1990 (Figure 2; ADF&G unpublished data). The Klehini River (including Herman Creek) area was sampled from September 12 to October 11 in 2003, and from August 25 to October 9 during 2004. The lower Chilkat River area was sampled from September 5 to November 8 in 2003, and from September 19 to November 2 during 2004. All chum salmon were examined for marks and missing adipose fins, measured for length (MEF in mm), and sexed. Double sampling was prevented by punching a hole in the lower edge of the left operculum of all sampled fish during recovery efforts. In addition, chum salmon caught incidentally were sampled by ADF&G Division of Sport Fish personnel in their coho salmon recovery efforts, and by NSRAA personnel while collecting chum salmon brood stock at Herman Creek and Chilkat River spawning grounds near the village of Klukwan.

Data Collection

Mark recovery data were organized into strata by statistical week for analysis. Statistical weeks begin at 00:01 a.m. Sunday and end the following Saturday at midnight, with weeks numbered sequentially beginning with the week encompassing the first Saturday in January (Appendices A1 and A2).

Inriver Abundance (Data Analysis)

Sockeye Salmon

A two-event mark-recapture experiment was used to develop separate estimates of the spawning escapement of sockeye salmon to Chilkat Lake and the Chilkat River mainstem in 2003 and

2004. The number of adult sockeye salmon marked at the fish wheels defined the first sampling event. Sampling of adult sockeye salmon on mainstem spawning grounds and at the Chilkat Lake weir defined the second event. Mark-recapture data were compiled into a matrix divided into mark and recapture time strata, and an estimate of abundance was calculated for sockeye salmon for the entire Chilkat River drainage. The weekly estimates of Chilkat River mainstem and Chilkat Lake sockeye salmon were then determined by multiplying an estimate of the weekly abundance by the proportion of mainstem and Chilkat Lake fish as determined from scale samples.

Sockeye salmon scale samples collected from the fish wheels were analyzed for stock of origin by Commercial Fisheries Division personnel at the ADF&G scale lab in Douglas, Alaska. Scales were projected onto a microfiche reader and aged. Each scale was then assigned to one of the 2 Chilkat River stocks (Chilkat Lake or Chilkat River mainstem) based on scale pattern characteristic analysis (SPA) (McPherson 1989). The proportions of each stock in the fish wheel catch were calculated for each week to provide compositions of each stock group based on fish wheel catch.

Sockeye salmon abundance was estimated using Chapman's modified Petersen estimator for a closed population, with corresponding variance (Seber 1982), as follows:

$$\hat{N}_{es} = \frac{(n_1 + 1)(n_2 + 1)}{(m_2 + 1)} - 1; \text{ and,} \quad (1a)$$

$$\text{var}[\hat{N}_{es}] = \frac{(n_1 + 1)(n_2 + 1)(n_1 - m_2)(n_2 - m_2)}{(m_2 + 1)^2(m_2 + 2)}; \text{ where,} \quad (1b)$$

N_{es} denotes the number of sockeye salmon in the escapement, \hat{N}_{es} denotes the estimate of N_{es} ; n_1 is the number of sockeye salmon marked in the lower Chilkat River fish wheels (first event); n_2 is the number of sockeye salmon captured and examined for marks in the recapture or second-event sampling; and m_2 is the subset of n_2 , which are the number of fish in the second event that had been marked in the first event at the fish wheels.

The general assumptions that must hold for a 2-sample mark-recapture estimate to be consistent were listed by Seber (1982):

- (a) every fish has an equal probability of being marked during event 1, every fish has an equal probability of being captured in event 2, or marked fish mix completely with unmarked fish;
- (b) the population is closed (no recruitment, death, or emigration), so that the population size is constant;
- (c) marking does not affect catchability (or mortality) of the fish;
- (d) fish do not lose marks between sample events; and,
- (e) all recovered marks are reported.

If assumptions of the Petersen model were not met, a model based on Chapman and Junge (1956) or Darroch (1961) was used to form the population estimate, by stratifying the population by sex, age or time of marking or recapture area.

The assumption (b) that the population was closed was true for Chilkat salmon populations in a narrow sense. Each sampling day was a snapshot of the sockeye and chum salmon populations as they moved past the fish wheels. In this situation, the population's location in time would function as if it were a location in space; a salmon population passing the fish wheels in a time stratum could be considered a closed population. If marked and unmarked fish had the same probability of leaving the population prior to the second event (sampling on the spawning grounds), if we were able to distinguish when marked fish were tagged, and if assumptions about equal catchability, tag retention, and mark recognition were met, a closed population estimator would produce a valid estimate of the salmon populations at the time the population passed the fish wheels (see Schwarz and Taylor 1998).

Marking and recovery data were organized into temporal strata and a drainagewide sockeye salmon abundance estimate was determined for the time of marking. Estimates of weekly abundance by stock group were determined by multiplying the proportion of the weekly fish wheel sockeye salmon catch per unit of effort (CPUE) for each weekly period by the total abundance estimate. Fish wheel CPUE was calculated as the number of fish caught per basket hour.

Methods for estimating the abundance of Chilkat River fall chum salmon were identical to that of sockeye salmon. Unlike sockeye salmon, age (scale) samples were not collected from second-event sampling on the spawning grounds. Length, sex, and presence of a tag or mark on each fish were noted. The number of adult chum salmon marked at the fish wheels defined the first sampling event. Sampling adult chum salmon on the spawning grounds defined the second event. Mark-recapture data were compiled into a matrix divided into mark and recapture time strata, and an estimate of abundance was generated for chum salmon for the entire Chilkat River drainage. Chum salmon abundance was estimated using the Chapman's modified Petersen estimator for a closed population.

We chose to pool marking and recovery strata if we could not detect failure of assumption (a) using criteria outlined by Arnason et al. (1996). To test for consistency of capture probabilities in the marking and recapture strata, two chi-square tests are commonly used. A test for equal capture probability in the first sample compares observed and expected numbers of marked and unmarked fish in each recapture stratum. A test for equal capture probability in the second sample, or equivalently, complete mixing, compares observed and expected numbers of those fish marked in the initial (marking) strata which were recaptured or not recaptured. These tests are provided in the Stratified Population Analysis System¹ (SPAS) software that were used to analyze mark-recapture data and are labeled "equal proportions" and "complete mixing," respectively (Arnason et al. 1996). We considered a test statistic with p -value ≤ 0.05 to be "significant." If neither test statistic, or only one test statistic, was significant, we concluded all marking and all recapture strata could be pooled without significant risk of bias and the simple Petersen ("pooled Petersen") estimator could be used. We also used a Kolmogorov-Smirnov ($K-S$) 2-sample test (Conover 1999) to detect if fish of different sizes were captured with equal probability. This test compared the cumulative size distributions of marked fish in the first event with those examined for marks in the second event. If size selective sampling was detected, the abundance estimate was stratified by size.

¹ Product names used in this publication are included for completeness but do not constitute product endorsement.

AGE, SEX AND LENGTH COMPOSITIONS

Length, sex and scale data from adult sockeye salmon were collected at the fish wheels, Chilkat Lake weir site, and on spawning grounds of the Chilkat River mainstem following methods stated in ADF&G (1994). Length, sex and scale data were collected from every chum salmon caught in the fish wheels. Only length and sex data were collected from chum salmon examined on spawning grounds on the Klehini River and the Chilkat River. Sex and length compositions were tabulated separately for fish captured in the fish wheels and in each second-event sampling area. Scale samples were taken from the preferred area of each fish (INPFC 1963) and prepared for analysis as described by Clutter and Whitesel (1956). Age classes were designated following the European aging system where freshwater and saltwater years are separated by a period (e.g., 1.3 denotes a 5-year-old fish with 1 year in freshwater and 3 years in saltwater).

Mean length-at-age and their variances were calculated using standard sample summary statistics (Cochran 1977). Size and sex selectivity was investigated by comparing the numbers of sockeye and chum salmon by size and sex captured in the lower river and spawning ground samples with contingency table analysis ($\alpha = 0.10$). Age or sex composition of the escapement was obtained from pooled samples when no selectivity was found. Proportions in the age or sex compositions and their associated variances were estimated as:

$$\hat{p}_a = \frac{n_a}{n}; \quad (2a)$$

$$\text{var}[\hat{p}_a] = \frac{\hat{p}_a(1 - \hat{p}_a)}{n - 1}, \text{ where} \quad (2b)$$

\hat{p}_a denotes the estimated proportion of fish of age a or sex a within the population, n is the total number of samples (age or sex) and n_a is the subset of n determined to be age or sex a . The abundance of sex s sockeye and chum salmon in the escapement was estimated as follows:

$$\hat{N}_s = \hat{N}\hat{p}_s; \quad (3a)$$

$$\text{var}[\hat{N}_s] = \text{var}[p_s]\hat{N}^2 + \text{var}[\hat{N}]p_s^2 - \text{var}[p_s]\text{var}[\hat{N}], \quad (3b)$$

where \hat{N} is the estimated inriver abundance of sockeye or chum salmon. The abundance of age a sockeye or chum salmon in the escapement \hat{N}_a was estimated by substituting \hat{N}_s and \hat{p}_s for \hat{N}_a and \hat{p}_a in equations 3a and 3b.

Marking and recovery data were organized by temporal strata and a drainagewide sockeye salmon abundance estimate was determined for the time of marking. The estimate was derived for all mark and recovery data combined. Sockeye salmon that were \leq to 360 mm MEF were not included in this estimate, because fish in this size category are not equally sampled in recovery events at Chilkat Lake (Bachman and McGregor 2001).

RESULTS

ABUNDANCE ESTIMATES

Lower River Adult Sampling and Marking (First Event)

2003

In 2003, fish wheels were operated on the Chilkat River from June 6 through October 21 (Table 1). Due to woody debris entanglements that caused damage to the upper fish wheel axle, this wheel was inoperable from July 26 through July 29. From October 19 through the end of the season, the lower fish wheel became inoperable because water levels were below that necessary to operate the fish wheels. Fish wheel effort (hours of operation per day), rpm, and physical river parameters are summarized in Appendices B1 through B3. In 2003, the daily water level was generally lower than the 1994 to 2002 average throughout the sampling season (Figure 4).

2004

In 2004, fish wheels were operated on the Chilkat River from June 7 through October 19 (Table 4). Due to high water events caused by stormy weather, the lower wheel was inoperable from August 8 through August 10. Fish wheel effort (hours of operation per day), rpm, and physical river parameters are summarized in Appendices B4 through B6. In 2004, the daily water level was generally lower than the 1994 to 2003 average throughout the sampling season (Figure 5).

Inriver Abundance

2003 Sockeye Salmon

A total of 4,012 sockeye salmon were marked and released out of 4,551 fish captured in the lower Chilkat River fish wheels (Table 5, Appendices B7 through B9); 233 sockeye salmon were ≤ 360 mm (MEF) length and were released without marks. Also, 75 fish escaped without being marked, 30 were found dead, and 201 were thought to be injured and were released without being sampled.

In 2003, NSRAA personnel operated the Chilkat Lake weir. NSRAA personnel examined 5,948 sockeye salmon for marks at the Chilkat Lake weir site and recovered 124 marked fish. ADF&G staff captured 1,444 sockeye salmon on mainstem area spawning grounds and recovered 68 marked fish for a total of 192 marked fish recovered drainage wide (Table 6).

The cumulative distribution function (CDF) of lengths of sockeye salmon marked in the lower Chilkat River was not significantly different from the CDF of marked sockeye salmon recaptured at Chilkat Lake and Chilkat River mainstem spawning grounds (*K-S* test, $d_{\max} = 0.071$, $P = 0.31$; Figure 6, top). Sockeye salmon marked in the lower Chilkat River were significantly smaller; however, than all of the fish (marked and unmarked combined) sampled on the spawning grounds (*K-S* test, $d_{\max} = 0.104$, $P < 0.05$; Figure 6, bottom). We concluded that sampling in the second event was size selective, relative to the first-event sample. Therefore, the population was stratified into 2 size classes, to reduce bias: small fish (≤ 520 mm MEF) and large fish (>520 mm MEF). The resulting CDFs of lengths of marked fish were not significantly different from CDFs of those recaptured at Chilkat Lake weir or Chilkat River mainstem spawning grounds for small fish (*K-S* test, $d_{\max} = 0.207$, $P = 0.051$; Figure 7, top), and large fish (*K-S* test, $d_{\max} = 0.111$, $P = 0.081$; Figure 7, bottom). Second-event sampling was not uniform over time, as recovery rates were greater for large fish marked later in the immigration (Table 7). Large fish marked during 3

marking periods (June 9–July 12, July 14–August 24, and August 25–October 19) were recaptured at significantly different rates ($X^2 = 6.85$, $df = 2$, $P = 0.033$). In addition, the probability of capturing a large marked sockeye salmon differed significantly among the 2 recovery areas ($X^2 = 33.3$, $df = 1$, $P < 0.001$). Therefore, the Darroch estimator was used to estimate abundance.

Partial pooling of the original strata was necessary, because negative probabilities of capture and stratum estimates were obtained when we applied the Darroch model to the original 9 marking strata and 15 recovery strata. The data for small and large sockeye salmon were pooled into 3 temporal marking strata and 2 recovery areas (Table 8). An estimated 150,000 sockeye salmon immigrated into the Chilkat River drainage in 2003 (Table 9). Of those, 41,000 were small, and 109,000 were large fish. The estimates are germane to the time of marking in the lower river, because subsistence harvests and natural predation occurred between the 2 sampling events.

Scale samples collected from sockeye salmon marked at the fish wheels were assigned to stock of origin through scale pattern analysis, and weekly proportions by stock of the fish wheel catch were developed from the results. The total abundance estimate was multiplied by the weekly stock proportions, to generate the estimated weekly passage of sockeye salmon by stock group through the lower Chilkat River. The estimated abundance of Chilkat Lake sockeye salmon was 113,000 fish (Tables 10 and 11). The estimated abundance of Chilkat River mainstem fish was 36,000 fish (Tables 10 and 12).

2004 Sockeye Salmon

Of 4,366 sockeye salmon captured in the lower Chilkat River fish wheels, 4,021 were marked prior to release (Table 13; Appendices B10 through B12), and 115 were ≤ 360 mm (MEF) length and were released without marks. A total of 88 fish escaped without being marked, 15 were found dead, and 127 fish were thought to be injured and were released without being sampled.

In 2004, ADF&G staff operated the Chilkat Lake weir to provide second-event sampling of Chilkat Lake sockeye salmon. The Chilkat Lake weir was installed in early June; sampling began on July 6 and continued through October 13, 2004 (Appendices B13 and B14). A total of 9,420 fish were examined while enumerating sockeye salmon through the Chilkat Lake weir; 221 tagged fish were recovered. In addition, we examined 1,651 fish on spawning grounds in the Chilkat River drainage for marks, and recovered 49 total marked fish (Table 14).

The cumulative distribution function (CDF) of lengths of sockeye salmon marked in the lower Chilkat River was significantly different from the CDF of marked sockeye salmon recaptured at Chilkat Lake and Chilkat River mainstem spawning grounds (*K-S* test, $d_{\max} = 0.089$, $P = 0.041$; Figure 8, top). In addition, sockeye salmon marked in the lower Chilkat River were significantly smaller than all fish (marked and unmarked combined) sampled on the spawning grounds (*K-S* test, $d_{\max} = 0.187$, $P < 0.001$; Figure 8, bottom). We concluded that sampling in the second event was size selective, relative to the first-event sample. The population was stratified into 2 size classes, to reduce this size bias of both events: small fish (≤ 515 mm MEF), and large fish (>515 mm MEF). The resulting CDFs of lengths of marked fish were not significantly different from CDFs of those recaptured at Chilkat Lake weir or Chilkat River mainstem spawning grounds for small fish (*K-S* test, $d_{\max} = 0.148$, $P = 0.209$; Figure 9, top) and large fish (*K-S* test, $d_{\max} = 0.111$, $P = 0.092$; Figure 9, bottom). Second-event sampling was uniform over time, as recovery rates were greater for large fish marked later in the immigration (Table 15). Large fish marked during 3 marking periods (June 8–July 10, July 11–August 21, and August 22–October 12) were

recaptured at similar rates ($X^2 = 5.53$, $df = 2$, $P = 0.063$). The probability of capturing a large marked sockeye salmon was not significantly different among the 2 recovery areas ($X^2 = 0.29$, $df = 1$, $P = 0.588$). Therefore, we used the pooled-Petersen estimator to estimate population abundance.

The data for small and large sockeye salmon were pooled into 3 temporal marking strata and 2 recovery areas (Table 16). An estimated 163,000 sockeye salmon immigrated to the Chilkat River drainage in 2004 (Table 17). Of those, 32,000 were small fish and 131,000 were large fish. The estimates are germane to the time of marking in the lower river, because subsistence harvests and natural predation occur between the 2 sampling events.

Scale samples collected from sockeye salmon marked at the fish wheels were assigned to stock of origin through scale pattern analysis and weekly proportions by stock of the fish wheel catch were developed. The total abundance estimate was then multiplied by the weekly stock proportions to generate the estimated weekly passage of sockeye salmon by stock group through the lower Chilkat River. The estimated abundance of Chilkat Lake sockeye salmon was 115,000 fish. The estimated abundance of Chilkat River mainstem fish was 45,000 fish (Table 18).

2003 Chum Salmon

Of the total fish wheel catch of 3,846 chum salmon, 3,402 fish were tagged and fin clipped (Table 19), 120 escaped without being marked, and 33 were found dead. An additional 291 fish were intentionally released without marks when large fish wheel catches of both chum and coho salmon resulted in severe overcrowding in the holding boxes.

We examined 4,528 chum salmon on the spawning grounds for marks (Table 20) and recovered 92 marked fish. Of these, 80 had tags and were recaptured 5 to 37 days (mean = 19.5 days) after being marked in the lower river. Twelve recovered fish were missing tags but the secondary fin clip was recognized.

The CDF of lengths of chum salmon marked in the fish wheels was not significantly different from the CDF of marked chum salmon recaptured on the spawning grounds ($K-S$ test, $d_{\max} = 0.032$, $P = 0.213$; Figure 10, top). In addition, the CDF of lengths of chum salmon marked in the fish wheels was not significantly different from the CDF of all fish (marked and unmarked combined) recovered during second-event sampling ($K-S$ test, $d_{\max} = 0.113$, $P = 0.679$; Figure 10, bottom). These results indicate there was no size selectivity during either sampling event. Therefore, we used the pooled-Petersen model to estimate the population abundance of chum salmon. We estimate that 166,000 (SE = 17,000) chum salmon immigrated into the Chilkat River in 2003. This estimate was germane to the time of tagging in the lower river, because an unquantified removal occurs (from natural mortality and subsistence fishery harvest) between the 2 sampling events.

One of the objectives of this study was to develop a relationship between mark-recapture results, fish wheel catch and peak aerial survey counts. We compared the results of the 3 stock assessment methods to determine if a relationship exists among them. If such a relationship exists, we can conclude that fish wheel catch or aerial escapement counts can be a dependable index of the population size.

The sum of the 2003 peak aerial survey was 28% of the mark-recapture estimate (166,000) and 2.3% of the total fish wheel catch (3,846). In 2003, the mark-recapture estimate was 3.5 times the drainagewide peak aerial survey count and 43.1 times the total fish wheel catch. Results for

the first 3 years of this study are presented in Table 21. The average proportion of the population estimate captured in the fish wheels and counted during aerial surveys was 0.02 and 0.26, respectively, for years 2002 to 2004.

2004 Chum Salmon

Of the total fish wheel catch of 4,266 chum salmon, 4,249 fish were tagged and fin clipped (Table 22); 17 chum salmon escaped prior to being marked at the fish wheels.

We examined 18,410 chum salmon on the spawning grounds for marks (Table 23) and recovered 239 marked fish. Of these, 144 had tags and were recaptured 6 to 52 days (mean = 23.8 days) after being marked in the lower river. Of the marked fish, 28 were missing tags but the secondary fin clip was recognized.

The CDF of lengths of chum salmon marked in the fish wheels was not significantly different from the CDF of marked chum salmon recaptured on the spawning grounds (*K-S* test, $d_{max} = 0.036$, $P = 0.052$; Figure 11, top). In addition, the CDF of lengths of chum salmon marked in the fish wheels was not significantly different from the CDF of all fish (marked and unmarked combined) recovered during second-event sampling (*K-S* test, $d_{max} = 0.096$, $P = 0.250$; Figure 11, bottom). Based on this analysis, there was no size-selective sampling for fall chum salmon between both sampling events. Therefore, we used the pooled-Petersen model to estimate the abundance of chum salmon. We estimate that 330,000 (SE = 20,000) chum salmon immigrated into the Chilkat River in 2004. This estimate was germane to the time of tagging in the lower river because an unquantified removal occurs (from natural mortality and subsistence fishery harvest) between the 2 sampling events.

Age and Sex Composition of the Inriver Run Abundance

2003 Sockeye Salmon

We sampled 898 small and 1,834 large sockeye salmon for age (scales), sex and length in the Chilkat River drainage during 2003. A total of 2,732 fish were successfully aged, representing 12 age classes (Table 24). Additionally, 2,586 small and 4,652 large sockeye salmon were sampled for length determination during the first and second sampling events. The proportion of small fish sampled for age in the fish wheels (0.28) was very close to the proportion of small fish in the abundance estimate (0.27). This analysis, along with prior tests that showed the second sampling event was selective for size, suggests the first sampling event may not have been size selective. Therefore, samples from the first event (Table 24) were used to estimate the age-sex-length composition of the sockeye escapement. The majority of the sockeye escapement was fish of ages 2.3 (59,000 fish) and 1.3 (23,000 fish; Table 25).

2004 Sockeye Salmon

We sampled 731 small and 2,493 large sockeye salmon for age (scales), sex and length in the Chilkat River drainage during 2004. A total of 3,224 fish was successfully aged, representing 12 age classes (Table 26). Additionally, 3,645 small and 6,225 large sockeye salmon were sampled for length determination during the first and second sampling events. Similar to results in 2003, the proportion of small fish sampled for age in the fish wheels (0.24) was close to the proportion of small fish in the abundance estimate (0.20). This analysis, along with prior tests that showed the second sampling event was selective for size, suggests that the first sampling event may not have been size selective. Therefore, samples from the first event were used to estimate the age

sex and length composition of the sockeye escapement. The majority of the sockeye escapement was fish of ages 1.3 (estimated 68,000 fish) and 2.2 (estimated 27,000 fish; Table 27).

2003 Chum Salmon

In 2003, we sampled 1,371 male and 1,189 female chum salmon for age (scales), sex determination and length. Of the 2,560 chum salmon sampled, a total of 2,539 were successfully aged, representing 5 age classes (Table 28). The average length for the dominant age class (age-0.3) fish was 609 mm MEF (Table 29). Sex ratios from the 2 distinct second-event areas (Chilkat River and Klehini River) were similar, which supported pooling of all strata for the population estimate ($X^2 = 0.39$, $df = 1$, $P = 0.51$).

Sex ratio comparisons from samples collected from the fish wheels (first event) and on spawning ground recovery trips (second event) were significantly different ($X^2 = 26.2$, $df = 1$, $P < 0.001$). The majority of the chum salmon samples collected on the fish wheels early in the season were predominantly males. Samples taken from the fish wheels late in the season were predominantly females. The fall chum salmon run is very protracted, until late into the fall season, and samples from the spawning grounds tend to include fish that passed the fish wheels earlier in the season. Therefore, age sex and length compositions of the chum escapement were determined from fish wheel samples. The most abundant age class in the chum escapement was age-0.3 (estimated 131,000 fish; Table 30).

2004 Chum Salmon

In 2004, we sampled 1,423 male and 1,252 female chum salmon for age (scales), sex determination and length. A total of 2,600 fish were successfully aged, representing 3 age classes (Table 31). The average length for the dominant age class (age-0.3) fish was 623 mm MEF (Table 32). Sex ratios from the 2 second-event areas (Chilkat River and Klehini River) were not significantly different ($X^2 = 0.41$, $df = 1$, $P = 0.50$), which supported pooling of all strata for the abundance estimate. As in 2002 and 2003, sex ratio comparisons from samples collected from the fish wheels and on spawning ground recovery trips were significantly different ($X^2 = 24.2$, $df = 1$, $P < 0.001$). This result is a function of sex composition changes over time during the migration. Male chum salmon dominate the run earlier in the migration period. The majority of the chum salmon samples collected on the fish wheels early in the season were predominantly males. Samples taken from the fish wheels later in the migration were predominantly females. The fall chum run is very protracted and extends until late into the fall season, and samples from the spawning grounds tend to include fish that passed the fish wheels early in the season. Therefore, age sex and length compositions for the chum escapement were determined from fish wheel samples. The most abundant age class in the escapement was age-0.3 (estimated 256,000 fish; Table 33).

DISCUSSION

The accuracy of mark-recapture studies in providing estimates of abundance was dependent on the degree to which the underlying assumptions, as noted above, were satisfied. The first assumption (a) is that all fish have an equal probability of being captured and marked. During both 2003 and 2004, fish wheels were operated beginning in early June and the first fish were caught one or more days after deployment (Table 4 and Appendix B). Fish wheels were operated 24 hours per day except during equipment breakdowns, debris entanglements or high water events; however, it is known that river conditions affect the fishing efficiencies of both wheels.

Fish wheels were in operation well before the first chum salmon was captured on July 6 (2003) and July 15 (2004); the bulk of the fish wheel catch of chum salmon occurred after August 21. The sockeye catch during the last week of fish wheel operations was minimal for both years. Unlike 2002, we did not observe large numbers of chum salmon moving into the lower river near the end of the fish wheel season. We terminated fish wheel operations after the third week in October, based on the pattern of fish wheel catches observed in 1990; less than 1% of the annual chum salmon catch was captured between October 20 and October 25 of that year (Figure 12). Thus, we assume that we captured and marked fish over essentially the entire sockeye and chum salmon migration in 2003 and 2004.

Adult coho salmon have been known to back out of some rivers after being tagged (Ericksen 2003b). If this phenomena occurred with sockeye and chum salmon, assumption (a), equal mixing and equal probability of marking and recovery, would be violated, if marked fish were caught in fisheries down river from the tagging site (fish wheels), or ultimately spawned in other river systems. Our marking site is located several miles upstream of the intertidal zone. In addition, sockeye salmon that were fixed with radio tags in 2003 and 2004 did not back out of the Chilkat River system, but continued upstream to spawning areas (Brian Elliott, ADF&G Division of Sport Fish, *personal communication*). Thus, we assume this phenomenon did not occur in this study.

We concluded that fish wheels were not size-selective for sockeye salmon, but that recapture methods were size-selective, because length distributions of marked fish in the first event and recaptured fish in the second event were dissimilar for both years of this study. Because probabilities of capture were not equal for fish of all size classes during second-event (recapture) sampling, we stratified the sockeye salmon population by size category. Cumulative length distributions of chum salmon marked in the first event and recaptured in the second event were similar. Probabilities of capture were equal for fish of all size classes sampled during the second event; stratification of the population was therefore not necessary for fall chum salmon. We used the Petersen estimator to calculate the chum salmon population size. The divergent results between both species suggest that within-year differences in the fish wheel catchability exist, perhaps related to gear placement, or changes in stream morphology caused by variations in stream discharge throughout the season.

All fish had an equal probability of being captured in event 2 (assumption a) in our study. We conducted recovery sampling until all Chilkat River mainstem sockeye salmon had completed spawning. We also conducted second-event sampling at the Chilkat Lake weir for Chilkat Lake sockeye salmon until we were certain that the majority of the escapement had passed through the weir. NSRAA and ADF&G crews sampled 45 (2003) and 125 (2004) sockeye salmon during the last week of weir operations, and recovered fish marked during the last stratum sampled at the fish wheels. Historical weir data indicate that approximately 99% of the Chilkat Lake sockeye salmon run passes the weir by October 16 (Figure 13). We sampled chum salmon on the spawning grounds through November 8 in 2003 and November 2 in 2004, and we recovered marked chum salmon that had been tagged during the last marking stratum on the fish wheels in both years.

We believe that non-recognition or non-reporting of marks (assumption e for Petersen estimate) was negligible. All marked sockeye salmon were given primary (adipose fin clip, T-bar tag) and secondary marks (additional fin clips). Since fish examined during second-event sampling were

alive and not in advanced stages of decomposition, marks were not likely to be missed. Sampling crews were trained and aware of all specific marks.

We assumed that mortality of marked fish was negligible (assumption c for Petersen estimate). In a similar project on the Taku River, holding studies of sockeye salmon captured at a fish wheel indicated negligible short-term mortality due to tagging and handling (Kelley et al. 1997). Tagging and marking of sockeye salmon at both the Taku and Chilkat rivers takes only 30 to 50 seconds. Standard protocol for mark-recapture projects on both the Taku and Chilkat rivers is to refrain from marking or tagging salmon that exhibit serious wounds or that are lethargic in behavior. While it was not possible to definitively conclude that mortality of marked fish differed from unmarked fish, we have no information to suggest that mark-induced mortality was an important factor in our study. Results of radio telemetry work conducted during 2003 and 2004 also indicated that handling-induced mortality at the fish wheels was very small (Brian Elliott, ADF&G Division of Sport Fish, personal communication).

Kelley et al. (1997) concluded that tagging and handling procedures could affect fish behavior (assumption c). Their study on the Taku River found that effects could be species-specific. They found that tagged Chinook salmon recaptured in the fish wheels had been delayed for much longer periods (mean of 12.3 days) than either sockeye (mean 3.6 days) or coho salmon (mean of 4.3 days); these results were similar to those observed at the Taku River in 1988 (McGregor and Clark 1989). The authors assumed that marked fish dropped back or held near the vicinity of the capture site before resuming their upstream migration.

The effects of the length of time that fish are held in fish wheel live boxes before being tagged or marked was also examined at the Taku River in 1996 (Kelley et al. 1997). No significant differences in elapsed days from fish wheel release to recovery in the inriver commercial fishery were apparent between groups of fish held for a long time and groups held for a short time for Chinook, sockeye, and coho salmon. Also, no substantial differences in tag recovery rate for a given species for the 2 holding times were discovered, which was similar to observations of McGregor and Clark (1989) for Chinook salmon in 1988.

The removal of an unknown quantity of sockeye salmon between mark and recovery sites occurred in the Chilkat River subsistence gillnet fishery, located between the fish wheels and spawning sites. Subsistence fishing effort typically peaks with the sockeye salmon run in the Chilkat River. Sampling of the subsistence fishery for marks is not conducted. We assumed that removal rates of sockeye salmon in this fishery did not influence our population estimates, as low numbers of fish are harvested in the fishery relative to the total inriver run. We also assumed that removal rates are similar for marked and unmarked sockeye salmon in the subsistence fishery.

In this study, abundance estimates for the Chilkat Lake and Chilkat River mainstem components of the escapement were developed by applying weekly fish wheel CPUE and stock composition data to the drainagewide abundance estimate. It is known that the stock composition of sockeye salmon migrating past the fish wheels changes through time. Error or uncertainty in the stock identification would introduce bias to the total and weekly estimates of abundance for different components of the return. Results of the radio telemetry studies in 2003 and 2004, however, indicated that the stock composition determinations made from scale samples collected at the fish wheels was nearly perfect. During 2003 and 2004, 111 and 203 radio tags were deployed from the Chilkat River fish wheels. All radio-tagged fish that were found in or near a spawning

area had been correctly assigned to stock of origin based on the stock identification of scale samples collected from those fish at the fish wheels (Brian Elliott, ADF&G Division of Sport Fish, *personal communication*).

The Chilkat River mark-recapture program has become an integral part of the department's stock assessment and management program for salmon in upper Lynn Canal. In order to meet escapement goal requirements, ADF&G commercial fishery managers use abundance and stock composition data from this program, together with fishery performance data from the drift gillnet fishery in Lynn Canal, to adjust fishing times, catches and escapements (Bachman et al. 1999). Information from this project is used to determine if escapement goals are being attained, to assess the effects of various management decisions on the escapement levels, and to provide data needed for run reconstruction of Chilkat River drainage sockeye and fall chum salmon stocks. Currently, the fish wheel catch is used as an inseason index of relative abundance, by comparing weekly fish wheel catch with historical averages. Run reconstruction conducted over a number of years has provided a time series useful for the development of spawner-recruit relationships. These documented spawner-recruit relationships are necessary for forecasting of future returns and for refining and developing biological escapement goals that will provide for maximum sustained yield of these stocks.

RECOMMENDATIONS

1. Continue to operate the weir at the outlet of Chilkat Lake as a recovery platform, and as an integral part of the sockeye salmon escapement estimation project for the Chilkat River drainage
2. Examine larger numbers of marked and unmarked fish for length and sex during second-event sampling
3. Continue making necessary safety and fish-handling modifications to the fish wheels

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TABLES AND FIGURES

Table 1.—Chilkat fish wheels, dates of operation, and catches of Chinook, sockeye, coho, pink, and chum salmon, 1977, 1978, 1982, 1983, 1990, 1991, and 1994 to 2004.

Year	Dates of Operation	Chinook	Sockeye	Coho	Pink	Chum	Number, Type, and Basket Configuration of Fish wheels
1977	8/21–10/21	0	108	729	0	604	N/A
1978	8/14–11/9	0	119	369	14	1,586	N/A
1982	10/5–26	0	10	78	0	254	1 wooden 4–basket wheel
1983	8/9–10/3	0	299	190	67	176	1 wooden 4–basket wheel
1990	8/14–10/25	0	2,984	3,686	1,140	3,025	2 wooden 4–basket wheels
1991	6/10–7/20	382	1,385	0	578	8	2 wooden 4–basket wheels
1994	6/18–9/11	214	3,865	140	532	196	2 wooden 4–basket wheels
1995	6/16–9/16	139	3,231	1,353	609	2,288	2 wooden 4–basket wheels
1996	6/22–9/16	68	3,118	546	494	430	2 wooden 4–basket wheels
1997	6/11–10/9	179	5,016	1,057	1,657	1,315	2 aluminum 3–basket wheels
1998	6/8–10/13	138	5,747	1,071	1,738	1,947	2 aluminum 3–basket wheels
1999	6/7–10/8	320	7,735	1,697	15,740	4,250	2 aluminum 3–basket wheels
2000	6/9–10/7	99	3,709	1,495	1,265	4,045	2 aluminum 3–basket wheels
2001	6/6–10/7	172	4,417	2,550	1,971	4,680	2 aluminum 3–basket wheels
2002	6/7–10/19	270	4,219	5,090	1,030	2,895	2 aluminum 3–basket wheels
2003	6/6–10/21	289	4,551	5,306	2,903	3,402	2 aluminum 3–basket wheels
2004	6/7–10/19	185	4,366	1,745	5,821	4,266	2 aluminum 3–basket wheels
Average Catch ^a		188	4,543	2,005 ^b	3,069	2,534 ^b	

^a Average catch taken from the 1994–2004 catch years where dates of operation are comparable.

^b Average calculated from 1990, and 1997 to 2004.

Table 2.–Secondary fin clips applied to sockeye salmon, by date, during 2003 and 2004.

2003 Dates	Statistical Weeks^a	Secondary Mark^b
Start to June 14	Start to 24	Adipose fin clip only
June 15 to June 28	25–26	Right axillary appendage clip
June 29 to July 12	27–28	Left axillary appendage clip
July 13 to July 26	29–30	Right ventral fin clip
July 27 to August 9	31–32	Left ventral fin clip
August 10 to August 23	33–34	Dorsal (last 4 rays) fin clip
August 24 to September 6	35–36	Right pectoral fin clip
September 7 to September 20	37–38	Left pectoral fin clip
September 21 to October 4	39–40	Right axillary appendage clip
October 5 to End	41–End	Left axillary appendage clip

2004 Dates	Statistical weeks^a	Secondary mark^b
Start to June 12	Start-24	Adipose fin clip only
June 13 to June 26	25–26	Right axillary appendage clip
June 27 to July 10	27–28	Left axillary appendage clip
July 11 to July 24	29–30	Right ventral fin clip
July 25 to August 7	31–32	Left ventral fin clip
August 8 to August 21	33–34	Right pectoral fin clip
August 22 to September 4	35–36	Left pectoral fin clip
September 5 to September 18	37–38	Clip last 4 rays of dorsal fin
September 19 to October 2	39–40	Right axillary appendage
October 3 to End	41–End	Left axillary appendage

^a Statistical weeks are defined in Appendix A.

^b All sockeye salmon received an adipose fin clip, numbered T-bar tag and secondary fin clips to designate the statistical week of capture.

Table 3.–Secondary fin clips applied to chum salmon, by date, during 2003 and 2004.

2003 Dates	Statistical Weeks^a	Secondary Mark^b
July 15 to July 26	29–30	Right ventral fin clip
July 27 to August 9	31–32	Left ventral fin clip
August 10 to August 23	33–34	Dorsal (last 4 rays) fin clip
August 24 to September 6	35–36	Right pectoral fin clip
September 7 to September 20	37–38	Left pectoral fin clip
September 21 to October 4	39–40	Right axillary appendage clip
October 5 to October 21	41–End	Left axillary appendage clip

2004 Dates	Statistical Weeks	Secondary Mark
June 27 to July 10	27–28	Left axillary appendage clip
July 11 to July 24	29–30	Right ventral fin clip
July 25 to August 7	31–32	Left ventral fin clip
August 8 to August 21	33–34	Right pectoral fin clip
August 22 to September 4	35–36	Left pectoral fin clip
September 5 to September 18	37–38	Clip last 4 rays of dorsal fin
September 19 to October 2	39–40	Right axillary appendage
October 3 to October 19	41–End	Left axillary appendage

^a Statistical weeks are defined in Appendix A.

^b All chum salmon received an adipose fin clip, numbered spaghetti tag and secondary fin clips to designate the statistical week of capture.

Table 4.—Chilkat Lake weir dates of operation and visual counts of sockeye, coho, pink, and chum salmon, 1967–1995 and 1999–2004.

Year	Dates of Operation	Sockeye	Coho^a	Pink	Chum
1967	6/13–9/02	20,111	n/a	n/a	n/a
1968	6/08–9/12	41,246	168	4 ^a	n/a
1969	6/04–9/16	44,555	n/a	n/a	n/a
1970	5/29–9/17	41,085	n/a	n/a	n/a
1971	5/31–10/28	49,342	1,063	n/a	n/a
1972	6/03–10/12	51,850	518	n/a	n/a
1973	6/11–10/15	50,527	167	n/a	n/a
1974	5/30–9/28	82,811	161	n/a	n/a
1975	6/04–11/06	41,520	644	n/a	n/a
1976	6/03–10/21	69,723	204	n/a	n/a
1977	6/03–9/27	41,044	n/a	n/a	n/a
1978	6/05–11/05	67,520	390	n/a	n/a
1979	6/09–11/11	80,589	965	n/a	n/a
1980	6/15–10/8	87,847	n/a	n/a	n/a
1981	6/11–10/22	82,597	n/a	n/a	n/a
1982	6/24–10/06	80,208	n/a	n/a	n/a
1983	6/22–11/12	134,022	n/a	n/a	n/a
1984	6/09–10/07	115,269	n/a	n/a	n/a
1985	6/23–10/22	57,724	n/a	n/a	n/a
1986	6/16–11/14	23,947	n/a	n/a	n/a
1987	6/19–11/20	48,593	n/a	n/a	n/a
1988	6/18–11/14	27,575	n/a	n/a	n/a
1989	6/05–10/28	140,475	n/a	n/a	n/a
1990	6/06–11/13	53,780	n/a	n/a	n/a
1991	7/10–10/24	47,436	n/a	n/a	n/a
1992	6/08–10/15	94,278	1,052	2	41
1993	6/13–10/14	210,257	595	0	5
1994	5/20–10/05	80,788	797	0	0
1995	6/08–10/09	59,698	797	0	0
1999 ^b	6/30–10/23	129,533	2,785	17	10
2000	6/16–10/18	47,077	872	0	0
2001	6/19–10/13	51,979	978	0	0
2002	6/23–10/18	65,085	4,740	0	1
2003	6/27–10/10	52,417	1,678	0	0
2004	7/6–10/13	75,632	4,989	0	0

Source: Statewide electronic fish tickets, recorded in Alexander, the Integrated Fisheries Database (IFDB). 1st edition. Alaska Department of Fish and Game. 1988 to present.

^a Weir counts do not reflect total escapement as weir was not operated through entire course of coho salmon return.

^b Weir was not operated in years 1996–1998 as sockeye salmon sampling was conducted using beach seines on spawning areas in Chilkat Lake.

Table 5.–Number of sockeye salmon captured in the lower Chilkat River fish wheels, and marked by temporal strata and size class^a, June 12 through October 19, 2003.

Date	Finclip	Number Captured	Number Marked			Proportion Marked
			Small	Large	Total	
6/9–6/14	Adipose fin clip only	6	2	3	5	0.83
6/15–6/28	Right axillary appendage clip	243	93	140	233	0.96
6/29–7/12	Left axillary appendage clip	505	235	265	500	0.99
7/13–7/26	Right ventral fin clip	385	138	205	343	0.89
7/27–8/9	Left ventral fin clip	591	124	410	534	0.90
8/10–8/23	Right pectoral fin clip	1,018	227	763	990	0.97
8/24–9/6	Left pectoral clip	988	180	720	900	0.91
9/7–9/20	Dorsal fin clip	543	85	309	394	0.73
9/21–10/21	Right axillary appendage clip	272	26	87	113	0.42
Total		4,551	1,110	2,902	4,012	0.88

^a Fish were classified by mid-eye-to-fork length (MEF): 360 mm ≤ small ≤ 520 mm MEF; large > 520 mm MEF.

Table 6.–Number of sockeye salmon inspected for marks and number of marked fish recaptured during mark-recovery surveys in the Chilkat River by site, size class^a and sex, 2003.

Site	Dates	Number Inspected				Total	Number Marked				
		Small		Large			Small		Large		Total
		M	F	M	F		M	F	M	F	
Chilkat Lake weir											
	7/3–7/5	55	14	153	168	389	0	0	2	0	2
	7/6–7/12	32	7	50	52	141	0	0	0	0	0
	7/13–7/19	23	7	182	244	455	0	0	2	2	4
	7/20–7/26	32	11	173	253	469	1	0	2	3	6
	7/27–8/2	25	25	200	219	469	0	1	2	3	6
	8/3–8/9	30	30	228	178	464	0	3	0	4	7
	8/10–8/16	9	18	153	239	419	0	0	0	3	3
	8/17–8/23	0	0	0	0	0	0	0	0	0	0
	8/24–8/30	30	14	232	214	489	1	2	5	12	20
	8/31–9/6	11	14	96	64	184	0	0	0	4	4
	9/7–9/13	23	36	155	351	565	0	0	1	9	10
	9/14–9/20	16	32	233	203	483	1	5	6	4	16
	9/21–9/27	9	11	237	200	458	1	1	10	4	16
	9/28–10/4	7	23	244	205	478	0	0	7	6	13
	10/5–10/11	5	18	273	187	483	0	4	5	10	19
	Total	305	260	2,608	2,775	5,948	4	16	41	63	124
Chilkat River Mainstem											
	7/6–7/12	0	0	23	1	24	0	0	0	0	0
	7/13–7/19	59	1	45	38	144	5	0	2	1	8
	7/20–7/26	87	2	38	53	181	3	0	4	7	14
	7/27–8/2	197	24	17	71	308	9	1	1	4	15
	8/3–8/9	119	7	23	20	169	3	0	4	1	8
	8/10–8/16	158	10	12	31	212	3	2	1	2	8
	8/17–8/23	125	5	11	12	154	5	1	1	1	8
	8/24–8/30	142	1	1	6	150	4	0	0	1	5
	8/31–9/6	63	3	2	4	73	1	1	0	0	2
	Total	950	54	173	237	1,414	33	5	13	17	68
	Grand Total	1,255	314	2,780	3,013	7,362	37	21	54	80	192

^a Fish were classified by mid-eye-to-fork length (MEF): 360 mm MEF ≤ small ≤ 520 mm MEF; large > 520 mm MEF.

Table 7.—Number of marked sockeye salmon released into the lower Chilkat River and recaptured by marking period and recovery site, and number examined for marks at each recovery site by size class, 2003.

Marking Stratum (Date)	Number Marked	Fraction Recovered	Chilkat Lake Weir	Chilkat River Mainstem
Small Fish (> 360 mm and ≤ 520 mm mid-eye-to-fork length)				
6/9–6/14	2	0.000	0	0
6/15–6/28	93	0.108	0	10
6/29–7/12	235	0.072	2	15
7/13–7/26	138	0.080	0	11
7/27–8/9	124	0.032	3	1
8/10–8/23	227	0.026	5	1
8/24–9/6	180	0.028	5	0
9/7–9/20	85	0.035	3	0
9/21–10/21	26	0.038	1	0
Examined for marks			565	1,004
Fraction marked			0.034	0.038
Large Fish (>520 mm mid-eye-to-fork length)				
6/9–6/14	3	0.333	1	0
6/15–6/28	140	0.036	1	4
6/29–7/12	265	0.087	10	13
7/13–7/26	205	0.083	8	9
7/27–8/9	410	0.029	10	2
8/10–8/23	763	0.035	27	0
8/24–9/6	720	0.036	26	0
9/7–9/20	309	0.058	18	0
9/21–10/21	87	0.069	6	0
Examined for marks			5,384	411
Fraction marked			0.020	0.068

Table 8.—Pooled number of sockeye salmon marked by stratum, recovered by marking stratum and recovery area, and examined for marks by recovery area and size class in the Chilkat River drainage, 2003.

Marking Stratum (Date)	Number Marked	Fraction Recovered	Chilkat Lake Weir	Chilkat River Mainstem
Small Fish (>360 mm and ≤ 520 mm mid-eye-to-fork length)				
6/9–7/12	330	0.024	8	0
7/14–8/24	489	0.035	3	14
8/25–10/19	291	0.048	2	12
Examined for marks			565	1,004
Fraction marked			0.023	0.026
Large Fish (>520 mm mid-eye-to-fork length)				
6/9–7/12	408	0.081	15	18
7/14–8/24	1,378	0.050	45	24
8/25–10/19	1,116	0.046	51	0
Examined for marks			5,383	410
Fraction marked			0.021	0.102

Table 9.—Estimated abundance of sockeye salmon (mid-eye-to-fork length>360 mm) in the Chilkat River drainage by size class, 2003.

Size category	Abundance	Standard Error
Small Fish (> 360 mm and ≤ 520 mm mid-eye-to-fork length)	40,606	6,601
Large Fish (>520 mm mid-eye-to-fork length)	109,220	8,423
Combined	149,826	10,584

Table 10.—Estimated weekly abundance of Chilkat Lake and Chilkat River mainstem sockeye salmon stocks in the Chilkat River drainage, 2003.

Stat Week	Mid-Week Date	Weekly Proportion	Abundance Estimate	Chilkat Lake	Chilkat mainstem	Chilkat Lake		Chilkat Mainstem	
						Age 1.	Age 2.	Age 0.	Age 1.
24	11-Jun	0.001	187	140	47	0.50	0.25	0.00	0.25
25	18-Jun	0.016	2,390	1,398	992	0.49	0.09	0.23	0.19
26	25-Jun	0.041	6,199	2,148	4,051	0.29	0.06	0.43	0.22
27	2-Jul	0.069	10,382	2,827	7,555	0.24	0.04	0.54	0.18
28	9-Jul	0.049	7,357	1,883	5,474	0.18	0.08	0.59	0.15
29	16-Jul	0.049	7,357	3,027	4,330	0.30	0.11	0.44	0.15
30	23-Jul	0.035	5,228	2,498	2,684	0.32	0.16	0.32	0.19
31	30-Jul	0.037	5,564	2,968	2,597	0.19	0.35	0.24	0.23
32	6-Aug	0.097	14,527	10,872	3,608	0.13	0.61	0.11	0.14
33	13-Aug	0.124	18,560	16,530	1,958	0.10	0.79	0.05	0.05
34	20-Aug	0.118	17,664	16,080	1,505	0.06	0.85	0.03	0.05
35	27-Aug	0.120	18,037	16,637	1,071	0.03	0.89	0.03	0.03
36	3-Sep	0.116	17,328	16,996	249	0.03	0.95	0.00	0.01
37	10-Sep	0.060	9,000	8,805	0	0.02	0.96	0.00	0.00
38	17-Sep	0.038	5,751	5,654	0	0.02	0.97	0.00	0.00
39	24-Sep	0.029	4,295	4,156	0	0.01	0.96	0.00	0.00
Total			149,826	112,618	36,119				

Table 11.—Historical estimated escapements of Chilkat Lake sockeye salmon by week, 1976 to 2004.

Stat. Week	Year														
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
23														62	
24	1		22	6										689	202
25		214	476	44	72	3			302					5,802	639
26	433	305	1,302	698	887		31	368	1,441	7	4	88	59	10,690	3,615
27	944	572	8,622	6,930	1,152	5	532	1,248	5,436	98	2	1,777	2,015	7,845	1,660
28	2,437	773	2,751	2,081	3,560	141	605	11,144	623	1,317	602	2,197	496	2,295	4,353
29	1,140	207	11,816	8,576	4,355	549	461	15,284	3,280	1,141	139	5,601	9	8,126	9,566
30	2,055	542	1,310	4,068	4,575	1,071	2,515	8,935	6,011	334	20	2,542	722	15,810	2,380
31	2,816	711	1,814	1,413	2,100	1,002	1,743	10,750	929	812	24	1	1,969	3,161	1,449
32	310	1,184	40	2,056	2,100	266	3,496	6,865	141	2,029	1	123	1,965	4,340	1,925
33	2,740	725	1,078	5,895	2,100	729	509	4,254	2,971	157	3	1,776	200	11	380
34	9,810	968	1,634	7,288	5,666	1,450	4,073	5,589	1,417	1,555	138	1,875	566	3,207	2,948
35	4,283	1,269	1,246	11,212	6,910	767	5,151	1,433	14,899	4,434	736	6,193	280	7,582	7,167
36	6,799	18,711	5,670	3,639	10,351	4,967	1,575	5,475	18,015	3,271	1,006	1,618	469	8,379	9,647
37	17,483	8,664	6,106	19,464	29,613	18,652	6,091	10,526	18,512	3,372	5,364	27	7,973	15,019	259
38	9,655	144	7,747	12	10,739	1,113	20,378	21,097	21,106	12,639	6,943	259	2,254	34,155	664
39	5,584	5,821	9,469	2,353	7,015	6,134	25,516	9,455	17,510	17,688	3,796	18,033	2,747	2,713	4,465
40	0	234	6,334	1,413	3,374	32,516	7,467	9,398	2,252	5,258	3,762	6,165	4,551	2,936	3,552
41	3,001		91	2,125	778	10,222	78	7,305	424	2,009	831	0	655	3,053	4,456
42	238			1,316		4,502		5,081		1,603	576	318	663	4,600	904
Total	69,729	41,044	67,528	80,589	95,347	84,089	80,221	134,207	115,269	57,724	23,947	48,593	27,593	140,475	60,231
Early stock	17,582	9,437	17,924	30,433	10,253	10,617	9,640	47,885	28,193	7,449	2,536	13,345	7,512	54,090	25,792
Late stock	52,147	31,607	49,604	50,156	85,094	73,472	70,581	86,322	87,076	50,275	21,411	35,248	20,081	86,385	34,439

—continued—

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Week	Year														1976 to 2004	
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean	SE
23	1	–	–	–	–	–	–	–	–	–	–	–	–	–	32	12
24	44	10	–	–	57	–	476	395	270	53	105	683	140	81	202	63
25	305	53	75	–	2,232	–	1,857	2,562	1,140	3,861	392	4,695	1,398	1,150	1,364	451
26	901	1,016	1,745	1,510	5,323	2,720	3,618	6,382	5,737	14,933	4,580	6,169	2,148	2,441	2,827	936
27	1,600	1,653	3,557	3,456	8,471	11,051	11,759	12,307	12,659	13,238	5,014	6,699	2,827	5,757	4,789	1,155
28	1,971	1,762	4,240	8,223	9,674	32,814	5,951	10,495	26,856	10,034	6,595	7,185	1,883	8,046	5,900	2,002
29	503	6,529	3,552	5,125	9,387	28,393	5,713	12,343	16,442	9,594	12,139	6,745	3,027	7,909	6,816	1,682
30	2,812	5,034	7,615	8,025	18,775	28,308	13,187	9,500	20,819	8,399	19,314	9,037	2,498	7,426	7,367	1,923
31	2,234	2,263	5,336	8,184	17,172	26,778	16,044	10,900	14,853	7,176	12,945	11,728	2,968	7,984	6,112	1,761
32	3,724	3,579	6,490	9,375	17,973	42,335	22,138	15,897	17,906	8,886	20,775	15,074	10,872	15,718	8,192	2,572
33	1,821	1,197	14,537	34,085	15,054	22,358	11,283	17,350	21,197	9,347	11,512	14,182	16,530	14,216	7,869	2,349
34	4,295	5,768	6,643	17,559	25,643	17,767	9,617	16,221	20,962	11,167	10,196	10,325	16,080	14,305	8,094	1,844
35	10,732	10,357	23,593	16,367	21,007	21,848	14,521	19,738	20,035	7,145	9,084	10,109	16,637	10,692	9,842	1,889
36	5,380	13,172	19,677	19,346	13,394	13,942	18,044	12,723	9,563	9,647	9,641	13,339	16,996	12,648	9,900	1,593
37	2,260	6,014	1,251	18,274	20,377	14,112	27,518	19,149	10,180	5,595	3,139	7,219	8,805	2,537	10,812	2,171
38	3,264	8,779	61,222	4,012	–	425	42,800	12,857	13,788	6,492	2,813	2,379	5,654	2,455	11,280	3,824
39	1,873	22,150	32,323	–	–	–	9,474	18,121	10,382	3,009	2,519	1,354	4,156	2,095	9,452	2,244
40	1,091	6,171	297	–	–	–	21,328	10,598	10,685	1,742	924	902	–	2,235	5,807	1,943
41	1,427	1,891	2,947	–	–	–	3,475	3,163	2,899	1,003	–	287	–	1,219	2,319	650
42	6,651	342	14,630	–	–	–	–	411	–	–	–	–	–	366	2,813	1,043
Total	52,889	97,740	209,730	153,540	184,541	262,852	238,803	211,114	236,374	131,322	131,687	128,111	112,618	117,696	117,090	17,667
Early stk	15,916	23,096	47,147	43,897	89,065	172,401	80,744	80,782	116,682	96,636	81,859	68,015	27,760	56,512	44,593	10,731
Late stk	36,973	74,644	162,583	109,643	95,476	90,451	158,059	130,331	119,692	34,633	49,828	60,096	84,858	58,949	72,418	10,038

Note: Escapement estimates based on weir counts in 1976 to 1993, and on mark-recapture estimates from fish wheel programs in 1994 to 2004.

Table 12.—Weekly and yearly escapement of Chilkat River mainstem sockeye salmon from 1994 to 2004.

Stat Week	Years											1994 to 2004	
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean	SE
23	—	—	—	—	—	—	—	—	—	—	—	—	—
24	—	27	—	69	65	—	53	51	98	47	81	61	7
25	—	1,410	—	270	1,153	39	309	55	1,745	992	288	696	192
26	137	2,867	585	162	3,820	431	2,222	1,294	4,917	4,051	1,662	2,014	511
27	1,061	3,700	4,428	1,189	2,842	1,565	5,817	2,254	7,001	7,555	4,279	3,790	685
28	3,427	3,529	12,508	1,059	2,893	5,571	8,440	2,261	6,159	5,474	6,541	5,260	972
29	1,434	3,116	10,239	1,433	3,312	2,671	13,472	3,145	5,068	4,330	7,002	5,020	1,146
30	2,242	4,283	11,416	3,277	3,335	5,001	7,805	6,645	3,966	2,684	3,789	4,949	817
31	2,720	3,140	6,615	2,845	4,271	2,607	8,025	2,627	4,884	2,597	5,169	4,136	561
32	3,170	1,588	5,207	2,222	1,252	2,891	4,944	2,330	2,136	3,608	6,670	3,274	509
33	8,431	1,229	1,036	613	1,201	1,724	2,318	964	1,200	1,958	3,905	2,234	677
34	1,882	449	661	371	243	1,083	657	209	996	1,505	2,518	961	223
35	886	740	398	430	481	257	139	34	432	1,071	1,890	614	158
36	691	—	217	140	—	381	65	29	484	249	899	351	89
37	105	—	59	377	90	—	—	26	—	—	104	127	38
38	—	—	—	180	—	133	—	—	—	—	52	122	19
Yearly total ^a	26,186	26,080	53,369	14,638	24,959	24,355	54,266	21,925	39,086	36,119	44,849	33,257	3,985
Weekly mean	2,182	2,173	4,447	976	1,920	1,873	4,174	1,566	3,007	2,778	3,438	2,594	328

^a Based on mark-recapture estimates from apportionment of fish wheel captured sockeye salmon by stock through scale pattern analysis

Table 13.—Number of sockeye salmon captured in the lower Chilkat River fish wheels, and marked by temporal strata and size classa, June 12 through October 19, 2004.

Date	Finclip	Number Captured	Number Marked			Proportion Marked
			Small	Large	Total	
6/8–6/12	Adipose fin clip only	5	0	5	5	1.00
6/13–6/26	Right axillary appendage clip	136	23	101	124	0.91
6/27–7/10	Left axillary appendage clip	659	118	483	601	0.91
7/11–7/24	Right ventral fin clip	701	102	538	640	0.91
7/25–8/7	Left ventral fin clip	940	198	674	872	0.93
8/8–8/21	Right pectoral fin clip	929	246	614	860	0.93
8/22–9/4	Left pectoral clip	689	226	420	646	0.94
9/5–9/18	Dorsal fin clip	155	35	93	128	0.83
9/19–10/12	Right axillary appendage clip	152	35	110	145	0.95
Total		4,366	983	3,038	4,021	0.92

^a Fish were classified by mid-eye-to-fork length (MEF): 360 mm MEF < small ≤ 515 mm MEF; large > 515 mm MEF.

Table 14.—Number of sockeye salmon inspected for marks and number of marked fish recaptured during mark-recovery surveys in the Chilkat River by site, size class, and sex, 2004.

Site	Dates	Number Inspected, by Size and Sex				Total	Number Marked, by Size and Sex				Total
		Small		Large			Small		Large		
		M	F	M	F		M	F	M	F	
Chilkat Lake weir											
	7/9–7/10	7	1	52	60	120	0	0	3	0	3
	7/11–7/17	24	9	211	240	484	1	0	1	7	9
	7/18–7/24	24	16	287	350	678	2	0	2	8	12
	7/25–7/31	11	3	156	158	328	0	0	5	6	11
	8/1–8/7	26	13	276	333	649	0	1	4	4	9
	8/8–8/14	38	10	281	371	700	1	0	3	10	14
	8/15–8/21	24	22	184	253	484	1	1	5	18	25
	8/22–8/28	91	64	265	273	693	1	3	10	9	23
	8/29–9/4	84	70	275	301	731	4	2	5	16	27
	9/5–9/11	69	65	333	267	734	2	1	14	8	25
	9/12–9/18	92	181	567	579	1,419	1	4	13	12	30
	9/19–9/25	53	137	635	571	1,396	3	2	2	6	13
	9/26–10/2	14	48	199	170	431	0	1	3	4	8
	10/3–10/9	27	57	181	191	456	0	1	1	6	8
	10/10–10/11	4	3	59	50	117	0	0	0	1	1
	Total	590	700	3,962	4,168	9,420	16	16	72	117	221
Chilkat River mainstem											
	7/24	19	7	3	9	38	10	1	1	4	16
	7/25–7/31	54	17	87	90	248	7	0	6	3	16
	8/1–8/7	69	21	84	179	353	0	0	0	2	2
	8/8–8/14	1	2	6	3	12	0	1	2	0	3
	8/15–8/21	44	6	26	59	135	0	0	1	0	1
	8/22–8/28	63	19	50	106	238	1	0	0	2	3
	8/29–9/4	49	11	50	109	219	0	0	3	2	5
	9/5–9/11	0	0	0	0	0	0	0	0	0	0
	9/12–9/18	5	5	35	45	90	0	0	1	0	1
	9/19–9/25	204	15	20	79	318	2	0	0	0	2
	Total	508	103	361	679	1,651	20	2	14	13	49
	Grand Total	1,098	803	4,323	4,847	11,071	36	18	86	130	270

^a Fish were classified by mid-eye-to-fork length (MEF): 360 mm MEF < small ≤ 515 mm MEF; large > 515 mm MEF.

Table 15.–Number of marked sockeye salmon released into the lower Chilkat River and recaptured by marking period and recovery site, and number examined for marks at each recovery site by size class, 2004.

Marking Stratum Dates	No. Marked	Fraction Recovered	Chilkat Lake Weir	Chilkat River Mainstem
Small Fish (360 mm < Small Fish ≤ 520 mm mid-eye-to-fork length)				
6/8–6/12	0	0.000	0	0
6/13–6/26	26	0.077	2	0
6/27–7/10	121	0.083	5	5
7/11–7/24	102	0.069	1	6
7/25–8/7	198	0.056	5	6
8/8–8/21	246	0.049	8	4
8/22–9/4	226	0.049	10	1
9/5–9/18	35	0.086	3	0
9/19–10/12	35	0.029	1	0
Examined for marks			1,290	611
Fraction marked			0.027	0.036
Large Fish (>520 mm mid-eye-to-fork length)				
6/8–6/12	5	0.000	0	0
6/13–6/26	101	0.010	0	1
6/27–7/10	487	0.057	19	9
7/11–7/24	538	0.061	24	9
7/25–8/7	674	0.079	50	3
8/8–8/21	618	0.073	40	5
8/22–9/4	420	0.083	35	0
9/5–9/18	93	0.097	9	0
9/19–10/12	110	0.082	9	0
Examined for marks			8,126	1,040
Fraction marked			0.023	0.026

Table 16.–Pooled number of sockeye salmon marked by stratum, recovered by marking stratum and recovery area, and examined for marks by recovery area and size class in the Chilkat River drainage, 2004.

Marking stratum	Number Marked	Fraction Recovered	Chilkat Lake Weir	Chilkat River Mainstem
Small Fish (360 mm < Small Fish ≤ 520 mm mid-eye-to-fork length)				
6/8–7/10	147	0.082	7	5
7/11–8/21	546	0.055	14	16
8/22–10/12	296	0.051	14	1
Examined for marks			1,290	611
Fraction marked			0.027	0.036
Large Fish (>520 mm mid-eye-to-fork length)				
6/8–7/10	593	0.049	19	10
7/11–8/21	1,830	0.072	114	17
8/22–10/12	623	0.085	53	0
Examined for marks			8,126	1,040
Fraction marked			0.023	0.026

Table 17.—Estimated abundance of sockeye salmon (mid-eye-to-fork length>360 mm) in the Chilkat River drainage, by size class, 2004.

Size category	Abundance	Standard Error
Small Fish (≤ 520 mm mid-eye-to-fork length)	32,464	4,038
Large Fish (>520 mm mid-eye-to-fork length)	130,522	8,483
Combined	162,986	9,534

Table 18.—Estimated weekly abundance of Chilkat Lake and Chilkat River mainstem sockeye salmon stocks in the Chilkat River drainage, 2004.

Stat Week	Mid-Date	Weekly Proportion	Weekly Abundance	Chilkat Lake	Chilkat Mainstem	Chilkat Lake Age 1.	Chilkat Lake Age 2.	Chilkat Mainstem Age 0.	Chilkat Mainstem Age 1.
24	9-Jun	0.001	163	81	81	0.50	0.00	0.00	0.50
25	16-Jun	0.009	1,438	1,150	288	0.40	0.40	0.15	0.05
26	23-Jun	0.025	4,104	2,441	1,662	0.56	0.04	0.09	0.32
27	30-Jun	0.062	10,036	5,757	4,279	0.49	0.08	0.32	0.11
28	7-Jul	0.089	14,586	8,046	6,541	0.51	0.04	0.33	0.11
29	14-Jul	0.091	14,912	7,909	7,002	0.49	0.04	0.37	0.10
30	21-Jul	0.069	11,214	7,426	3,789	0.59	0.08	0.27	0.07
31	28-Jul	0.081	13,205	7,984	5,169	0.55	0.06	0.23	0.16
32	4-Aug	0.137	22,388	15,718	6,670	0.50	0.21	0.17	0.13
33	11-Aug	0.111	18,121	14,216	3,905	0.41	0.37	0.11	0.10
34	18-Aug	0.104	16,984	14,305	2,518	0.27	0.57	0.05	0.10
35	25-Aug	0.078	12,636	10,692	1,890	0.17	0.68	0.03	0.12
36	1-Sep	0.084	13,611	12,648	899	0.16	0.77	0.01	0.05
37	8-Sep	0.016	2,641	2,537	104	0.10	0.86	0.02	0.02
38	15-Sep	0.016	2,560	2,455	52	0.04	0.92	0.00	0.02
39	22-Sep	0.013	2,153	2,095	0	0.08	0.89	0.00	0.00
40	29-Sep	0.014	2,235	2,235	0	0.05	0.95	0.00	0.00
41	6-Oct	0.007	1,219	1,219	0	0.06	0.94	0.00	0.00
42	13-Oct	0.002	366	366	0	0.06	0.94	0.00	0.00
Total			162,986	115,462	44,849				

Table 19.—Number of chum salmon captured in the lower Chilkat River, and marked by temporal strata, 2003.

Date	Finclip	Number captured	Number marked	Proportion marked
7/15–7/26	Right ventral fin clip	16	15	0.94
7/27–8/23	Left ventral fin clip	62	61	0.98
8/24–9/6	Right pectoral fin clip	410	404	0.99
9/7–9/20	Left pectoral clip	817	716	0.88
9/21–10/4	Dorsal fin clip	956	744	0.78
10/5–10/18	Right axillary fin clip	742	709	0.96
10/19–10/21	Left axillary fin clip	843	753	0.89
Total		3,846	3,402	0.88

Table 20.–Number of chum salmon inspected for marks and number of marked fish recaptured during recovery surveys in the Chilkat River drainage, 2003.

Dates	Number Inspected	Number Marked	Fraction Marked
9/12–9/13	100	15	0.15
9/14–9/20	136	9	0.07
9/21–9/27	452	17	0.04
9/28–10/4	329	2	0.01
10/5–10/11	716	14	0.02
10/12–10/18	362	3	0.01
10/19–10/25	600	9	0.02
10/26–11/1	1,340	19	0.01
11/2–11/8	493	4	0.01
Total	4,528	92	0.02

Table 21.–Comparisons of peak aerial counts, fish wheel catches and mark-recapture abundance estimates for Chilkat River drainage chum salmon, 2002–2004.

Year	Drainage wide	Total	Drainage wide		Ratios			
	Peak Aerial Count	Fish Wheel Catch	Mark-Recap. (M-R) Estimate	SE	M-R/ Peak Aerial Ct.	M-R/Fish Wheel Ctch.	Peak Aerial Count/M-R	Fish Wheel Catch/M-R
2002	63,566 ^a	4,217	205,779	22,088	3.2	48.8	0.31	0.02
2003	46,910 ^b	3,846	165,721	16,684	3.5	43.1	0.28	0.02
2004	60,606 ^c	4,266	328,577	20,426	5.4	77.0	0.18	0.01
Average	57,027	4,110	233,359	19,733	4.1	56.8	0.26	0.02

^a Peak counting dates were; Chilkat River (November 1), Klehini River (September 25) and Herman Creek (September 17).

^b Peak counting dates were; Chilkat River (October 27), Klehini River (September 25) and Herman Creek (September 30).

^c Peak counting dates were; Chilkat River (October 25), Klehini River (October 12) and Herman Creek (September 20).

Table 22.–Number of chum salmon captured in the lower Chilkat River, and marked by temporal strata, 2004.

Date	Finclip	Number captured	Number marked	Proportion marked
7/8–7/24	Right ventral fin clip	36	35	0.972
7/25–8/7	Left ventral fin clip	127	126	0.992
8/8–8/21	Right pectoral fin clip	536	530	0.989
8/22–9/4	Left pectoral clip	1497	1494	0.998
9/5–9/18	Dorsal fin clip	682	681	0.999
9/19–10/2	Right axillary fin clip	851	847	0.995
10/3–10/19	Left axillary fin clip	537	536	0.998
Total		4,266	4,249	0.996

Table 23.—Number of chum salmon inspected for marks and number of marked fish recaptured during recovery surveys in the Chilkat River drainage, 2004.

Dates	Number Inspected	Number Marked	Fraction Marked
8/25–8/28	80	2	0.025
8/29–9/4	150	8	0.055
9/5–9/11	706	40	0.057
9/12–9/18	254	21	0.081
9/19–9/25	1,112	24	0.022
9/26–10/2	1,810	45	0.025
10/3–10/9	2,215	23	0.010
10/10–10/16	4,361	30	0.007
10/17–10/23	4,347	31	0.007
10/24–10/30	3,375	13	0.004
10/31–11/2	144	2	0.014
Total	18,410	239	0.01

Table 24.—Estimated age composition of sockeye salmon sampled in the Chilkat River drainage in 2003, stratified by size.

	Brood Year and Age Class												Total Aged
	2000		1999			1998			1997			1996	
	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	
Small Fish (>360 mm and ≤520 mm MEF^a)													
Sample size	226	8	27	142	7	0	49	336	1	90	12	0	898
Percent	8.3	0.3	1.0	5.2	0.3	0	1.8	12.3	0.0	3.3	0.4	0	32.9
Percent SE	0.5	0.1	0.2	0.4	0.1	0	0.3	0.6	0.0	0.3	0.1	0	0.9
Large Fish (>520 mm MEF)													
Sample size	13	0	232	30	0	1	374	176	2	995	10	1	1,834
Percent	0.5	0	8.5	1.1	0	0.0	13.7	6.4	0.1	36.4	0.4	67.1	67.1
Percent SE	0.1	0	0.5	0.2	0	0.0	0.7	0.5	0.1	0.9	0.1	0	0.9
Combined													
Sample size	239	8	259	172	7	1	423	512	3	1,085	22	1	2,732
Percent	8.7	0.3	9.5	6.3	0.3	0.0	15.5	18.7	0.1	39.7	0.8	0.0	100.0
Percent SE	0.5	0.1	0.6	0.5	0.1	0.0	0.7	0.7	0.1	0.9	0.2	0.0	0.0

^a MEF is length measured from middle of eye to fork of tail.

Table 25.—Estimated abundance of sockeye salmon in the Chilkat River drainage in 2003, by age and sex, stratified by size.

	Brood Year and Age Class												Est. Total
	2000		1999			1998			1997			1996	
	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	3.3	
Small Fish (>360 mm and ≤520 mm MEF^a)													
Male	10,584	439	603	4,881	384	0	932	4,716	55	1,371	55	0	24,020
Standard Error	1,047	158	186	614	147	0	234	600	55	289	55	0	1,995
Female	1,810	0	877	2,907	0	0	1,755	13,710	0	3,565	603	0	25,227
Standard Error	338	0	227	445	0	0	332	1,272	0	503	186	0	2,079
Total Small	12,394	439	1,481	7,787	384	0	2,687	18,427		4,936	658	0	40,606
Standard Error	1,178	158	302	840	147	0	424	1,605	55	618	195	0	3,729
Large Fish (>520 mm MEF)													
Male	548	0	4,716	768	0	0	7,678	3,565	55	21,278	219	0	38,828
Standard Error	177	0	600	211	0	0	832	503		1,804	110	0	3,016
Female	165	0	8,007	877	0	55	12,833	6,087	55	33,289	329	55	61,696
Standard Error	95	0	857	227	0	55	1,209	710	55	2,635	136	55	4,584
Total Large	713	0	12,723	1,645	0	55	20,511	9,652	110	54,567	548	55	100,524
Standard Error	203	0	1,201	320	0	55	1,751	979	78	4,093	177	0	7,231
Combined													
Male	11,133	439	5,320	5,649	384	0	8,610	8,281	110	22,649	274	0	62,848
Standard Error	1,087	158	649	675	147	0	902	877	78	1,900	124	0	4,659
Female	1,974	0	8,884	3,784	0	55	14,588	19,798	55	36,853	932	55	86,923
Standard Error	355	0	922	522	0	55	1,334	1,701	55	2,880	234	55	6,304
All fish	13,107	439	14,204	9,433	384	55	23,198	28,079	165	59,503	1,205	55	149,771
Standard Error	1,229	158	1,307	963	147	55	1,938	2,276	95	4,430	269	55	10,584

^a MEF is length measured from middle of eye to fork of tail.

Table 26.—Estimated age composition of sockeye salmon sampled in the Chilkat River drainage in 2004, stratified by size.

	Brood Year and Age Class												Total
	2001		2000			1999		1998			1997		
	0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	3.2	2.4	3.3	
Small Fish (>360 mm and ≤515 mm MEF^a)													
Sample	1.3	10.	18	175	11	41	329	0	19	2	0	1	731
Pecent	0.2	0.5	0.6	5.4	0.3	1.3	10.2	0.0	0.6	0.1	0	0.0	22.7
SE	41	32	0.1	0.4	0.1	0.2	0.5	0.0	0.1	0.0	0	0.0	0.7
Large Fish (>515 mm MEF)													
Sample	5	0	412	85	0	1,303	210	3	467	0	2	6	2,493
Pecent	0.2	0.0	12.8	2.6	0.0	40.4	6.5	0.1	14.5	0.0	0.1	0.2	77.3
SE	0.1	0.0	0.6	0.3	0	0.9	0.4	0.1	0.6	0.0	0.0	0.1	0.7
Combined													
Sample	137	3	430	260	11	1,344	539	3	486	2	2	7	3,224
Pecent	4.2	0.1	13.3	8.1	0.3	41.7	16.7	0.1	15.1	0.1	0.1	0.2	100.0
SE	0.4	0.1	0.6	0.5	0.1	0.9	0.7	0.1	0.6	0.0	0.0	0.1	0.0

^a MEF is length measured from middle of eye to fork of tail.

Table 27.—Estimated abundance of sockeye salmon in the Chilkat River drainage in 2004, by age and sex, stratified by size.

	Brood Year and Age Class												Total
	2001		2000			1999		1998			1997		
	0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	3.2	2.4	3.3	
Small Fish (>360 mm and ≤515 mm MEF^a)													
Male	5,66	152	506	4,904	556	910	6,066	0	556	0	101	51	19,463
SE	618	88	162	565	170	220	645	0	170	0	72	51	1,456.9
Female	1,01	0	404	3,943	0	1,163	10,566	0	404	101	0	0	17,593
SE	232	0	144	496	0	250	932	0	144	72	0	0	1,349
All small	6,67	152	910	8,847	556	2,073	16,632	0	961	101	101	51	37,056
SE	686	88	220	826	170	343	1,293	0	226	72	0	51	4,038
Large Fish (>515 mm MEF)													
Male	152	0	7,229	2,022	0	26,339	4,044	101	10,414	0	51	152	50,503
SE	88	0	722	338	0	1,849	503	72	923	0	51	88	3,199
Female	101	0	13,599	2,275	0	39,533	6,572	51	13,195	0	51	152	75,528
SE	5	0	708	118	0	2,058	342	3	687	0	3	8	3,931
All large	253	0	20,828	4,297	0	65,872	10,616	152	23,609	0	101	303	126,031
SE	13	0	1,199	246	0	3,796	611	7	1,360	0	4	16	7,265
Combined													
Male	5,81	152	7,735	6,926	556	27,249	10,111	101	10,970	0	152	202	69,613
SE	628	88	755	703	170	1,900	904	72	957	0	88	102	3,515
Female	1,11	0	14,003	6,218	0	40,696	17,138	51	13,599	101	51	152	93,120
SE	244	0	1,140	656	0	2,655	1,323	51	1,116	72	51	88	4,156
All fish	6,92	152	21,738	13,144	556	67,945	27,249	152	24,569	101	202	354	162,531
SE	703	88	1,587	1,088	170	4,164	1,900	88	1,748	72	102	135	5,443

^a MEF is length measured from middle of eye to fork of tail.

Table 28.—Estimated age composition of chum salmon captured in the Chilkat River fish wheels in 2003, stratified by sex.

	Brood Year and Age Class					Total Aged	Total Sampled
	2000 0.2	1999 0.3	1998 0.4	1997 0.5	1996 0.6		
Male							
Sample size	117	1,055	191	2	1	1,366	1,828
Percent	4.6	41.6	7.5	0.1	0.0	53.8	
Percent Standard Error	0.4	1.0	0.5	0.1	0.0	1.0	
Female							
Sample size	69	948	150	6	0	1,173	1,575
Percent	2.7	37.3	5.9	0.2	0.0	46.2	
Percent Standard Error	0.3	1.0	0.5	0.1	0.0	1.0	
Combined							
Sample size	186	2,003	341	8	1	2,539	3,403
Percent	7.3	78.9	13.4	0.3	0.0	100.0	
Percent Standard Error	0.5	0.8	0.7	0.1	0.0	0.0	

Table 29.—Average length at age for Chilkat River chum salmon sampled from the Chilkat River fish wheels in 2003, stratified by sex.

	Brood year and age class					Total Aged	Total Sampled
	2000 0.2	1999 0.3	1998 0.4	1997 0.5	1996 0.6		
Male							
Sample size	117	1,055	191	2	1	1,366	2,538
Average length	571	619	660	725	750	621	
Standard Deviation	3	1	3	26	0	42	
Female							
Sample size	69	948	150	6	0	1,173	1,175
Average length	565	599	631	623	0	603	
Standard Deviation	68	20	52	255	0	35	
Combined							
Sample size	186	2,003	341	8	1	2,539	3,713
Average length	568	609	646	648	750	611	
Standard Deviation	14	45	18	3	0	55	

Table 30.—Estimated abundance by age of chum salmon in the Chilkat River in 2003, stratified by sex. .

	Brood year and age class					Total
	1999 0.2	1998 0.3	1997 0.4	1996 0.5	1995 0.6	
Male						
	7,637	68,860	12,467	131	65	89,159
Standard Error	1,030	7,118	1,523	93	65	9,117
Female						
	4,504	61,876	9,791	392	0	76,562
Standard Error	683	6,429	1,254	165	0	7,879
Combined						
	12,140	130,736	22,257	522	65	165,721
Standard Error	1,490	13,229	2,503	191	65	16,684

Table 31.—Estimated age composition of chum salmon captured in the Chilkat River fish wheels in 2004, stratified by sex.

	Brood year and age class			Total Aged	Total Sampled
	2001 0.2	2000 0.3	1999 0.4		
Male					
Sample size	39	1,068	276	1,383	2,278
Percent	1.50	41.08	10.62	53.19	
Percent Standard Error	0.24	0.97	0.60	0.98	
Female					
Sample size	20	960	237	1,217	1,970
Percent	0.77	36.92	9.12	46.81	
Percent Standard Error	0.17	0.95	0.57	0.98	
Combined					
Sample size	59	2,028	513	2,600	4,248
Percent	2.27	78.00	19.73	100.00	
Percent Standard Error	0.29	0.81	0.78	0.00	

Table 32.—Average length at age for Chilkat River chum salmon sampled from the Chilkat River fish wheels in 2004, stratified by sex.

	Brood year and age class			Total measured	Total sampled
	2001 0.2	2000 0.3	1999 0.4		
Male					
Sample size	39	1,068	276	1,383	2,278
Average length	610	630	651	634	
Standard Deviation	30	33	37	35	
Female					
Sample size	20	960	237	1,217	1,970
Average length	596	616	635	619	
Standard Deviation	16	31	38	33	
Combined					
Sample size	59	2,028	513	2,600	4,248
Average length	606	623	643	627	
Standard Deviation	27	33	39	35	

Table 33.—Estimated abundance by age of chum salmon in the Chilkat River in 2004, stratified by sex.

	Brood year and age class			Total
	2001 0.2	2000 0.3	1999 0.4	
Male				
Abundance	4,929	134,969	34,880	174,778
Standard Error	840	8,967	2,937	11,329
Female				
Abundance	2,528	121,321	29,951	153,799
Standard Error	584	8,156	2,626	10,085
Combined				
Abundance	7,456	256,290	64,831	328,577
Standard Error	1,064	16,154	4,775	20,426

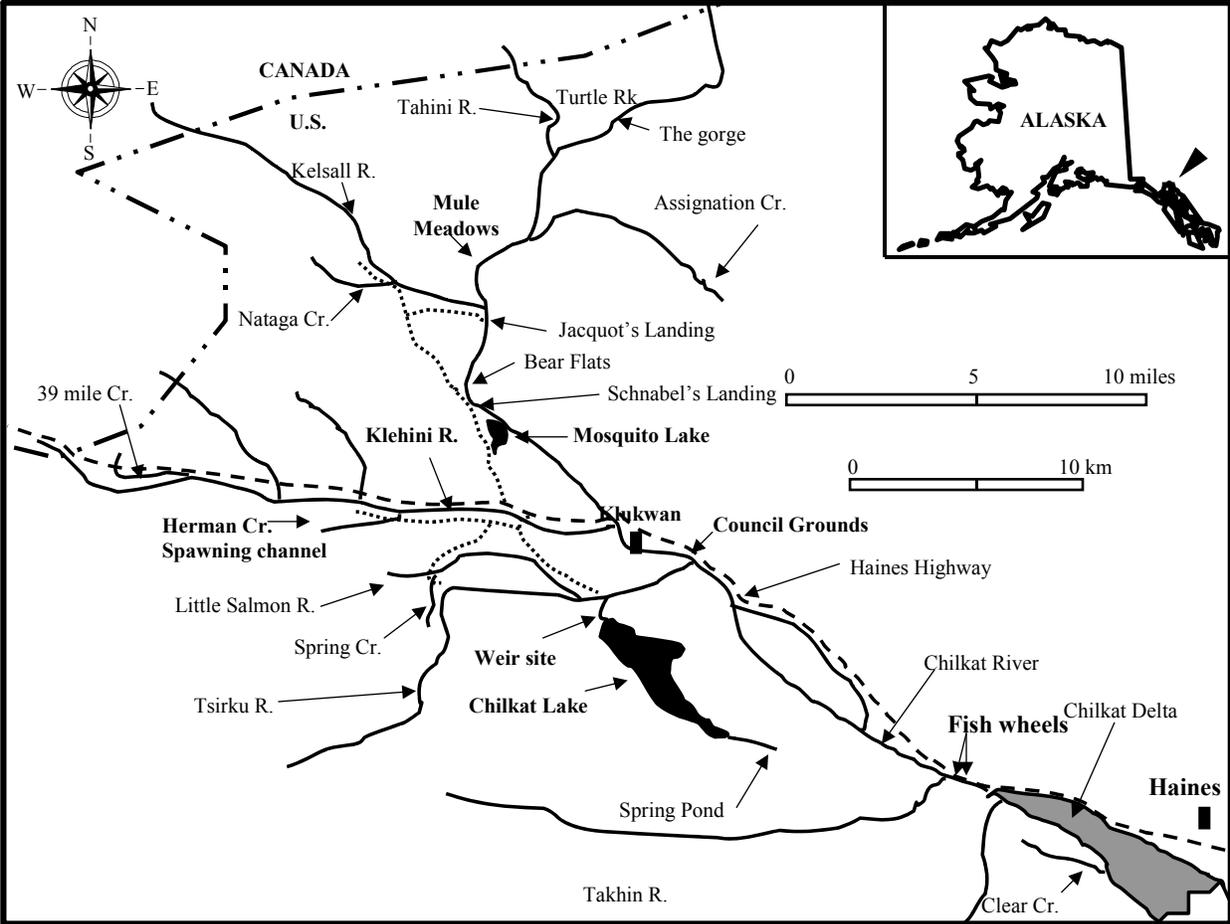


Figure 1.—The Chilkat River drainage, showing location of sampling sites.

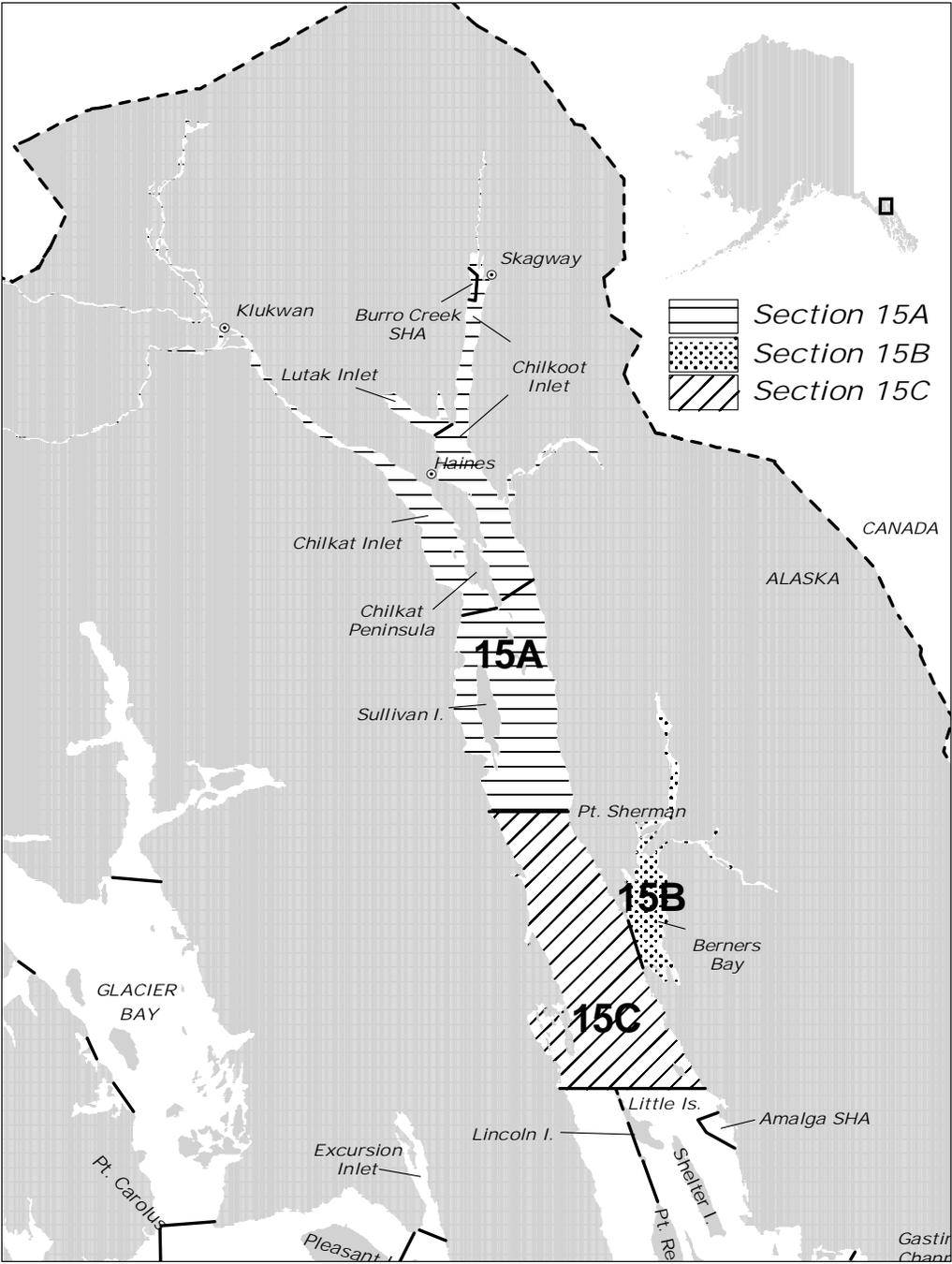


Figure 2.—Sections within District 15 includes all areas north of the latitude of Little Island.

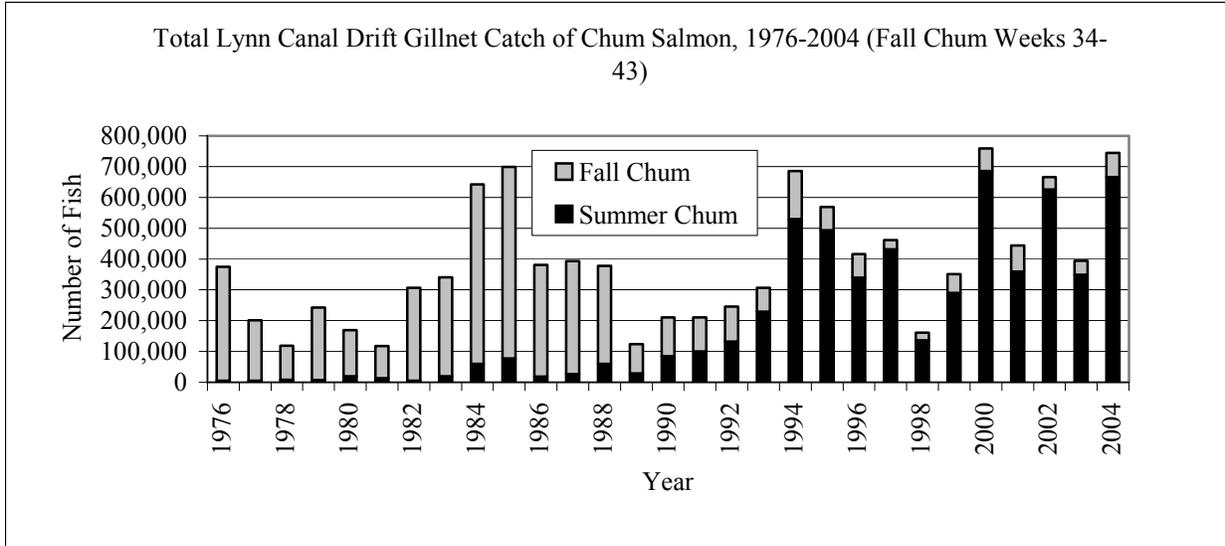


Figure 3.—Summer and fall chum salmon harvests in the Lynn Canal (District 15) drift gillnet fishery, 1976–2004.

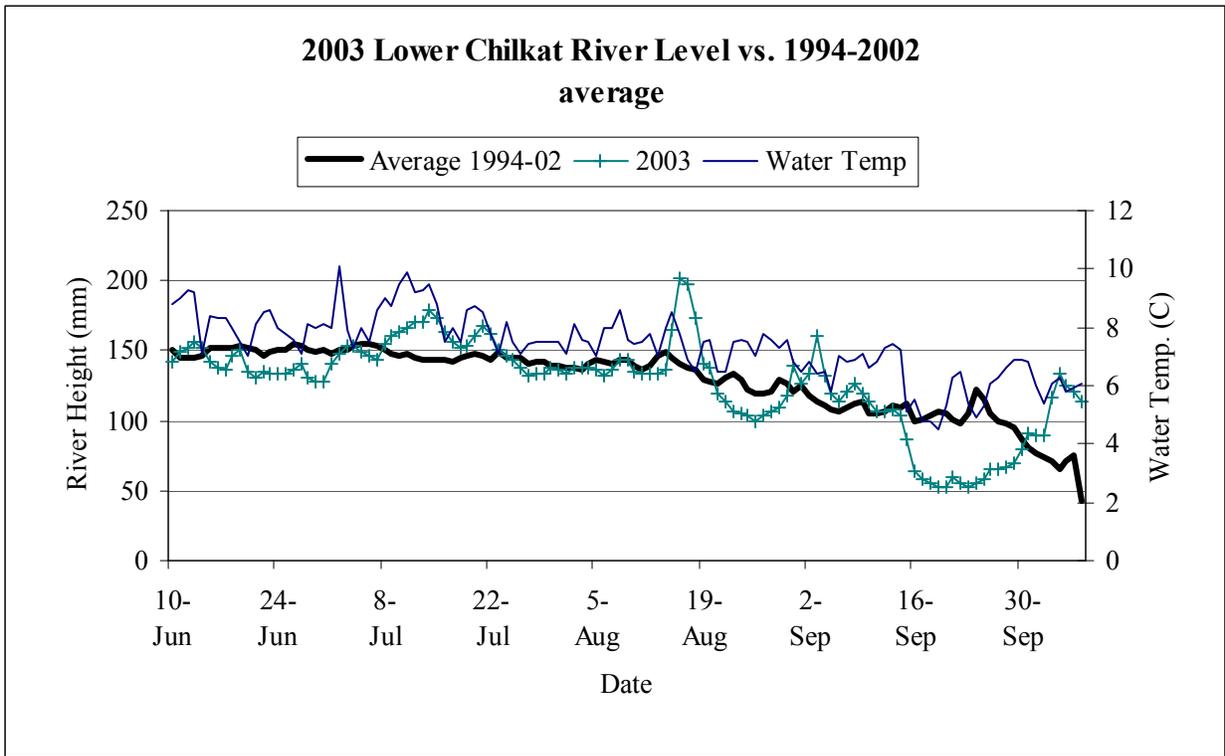


Figure 4.—2003 water level and temperature measurements of the Chilkat River compared to the 1994 to 2002 average water level.

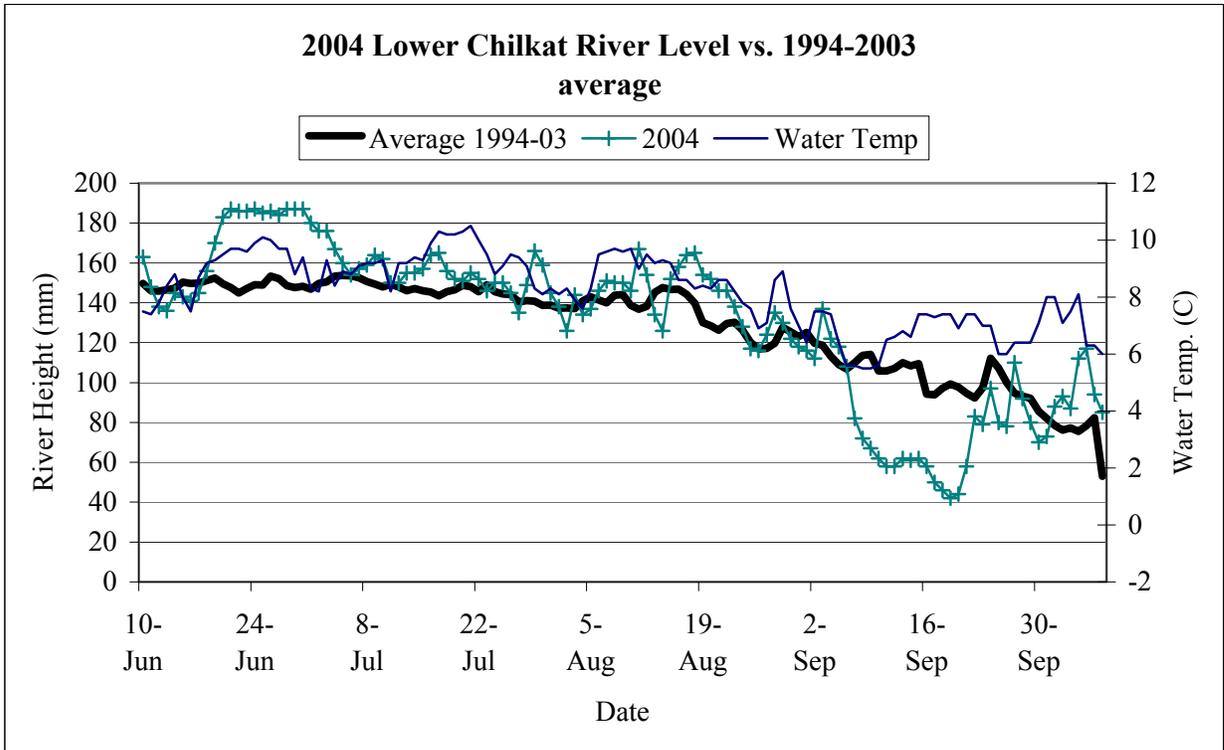


Figure 5.—2004 water level and temperature measurements of the Chilkat River compared to the 1994 to 2003 average water level.

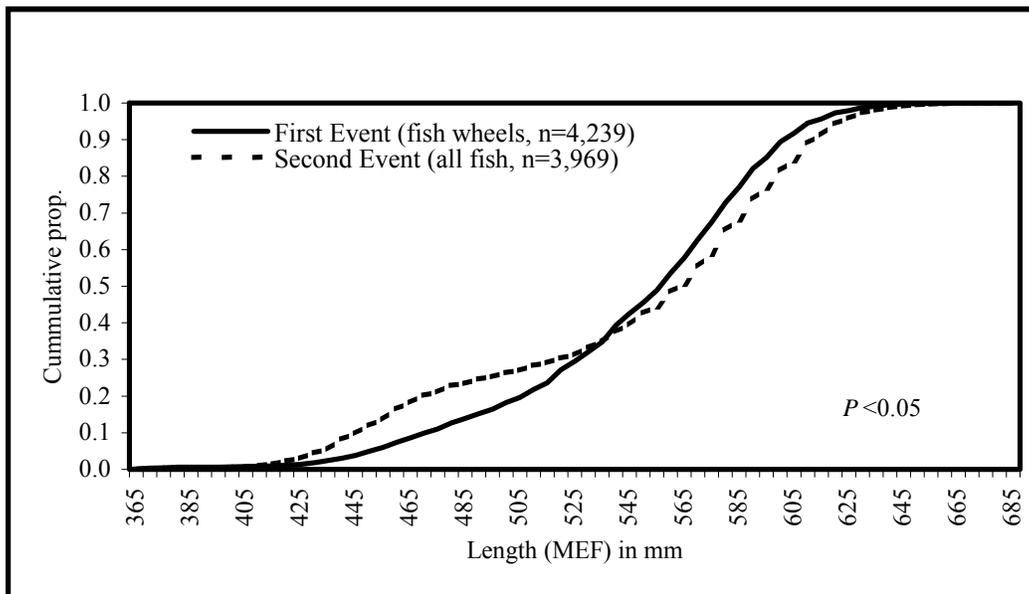
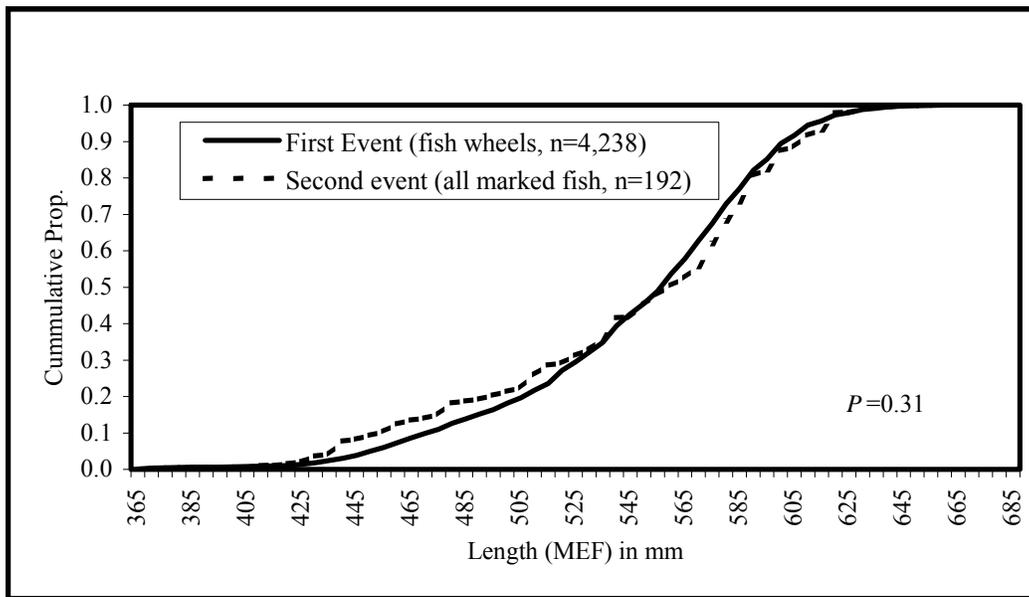


Figure 6.—Cumulative distribution functions of lengths of sockeye salmon marked in the lower Chilkat River, compared to lengths of marked fish recaptured on spawning grounds (top) and compared to lengths of fish examined for marks during recovery events (bottom), 2003.

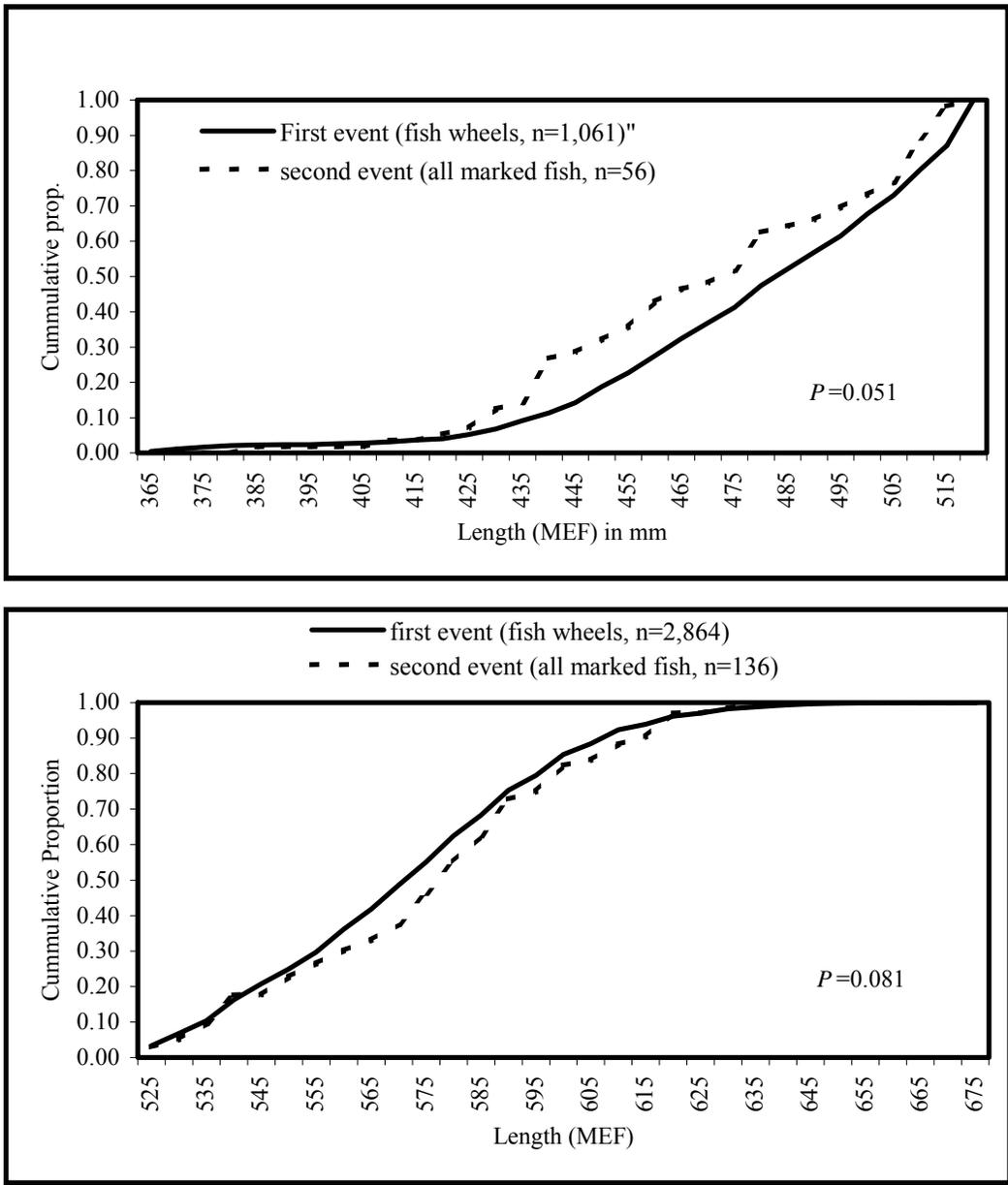


Figure 7.—Cumulative distribution function (CDF) of MEF lengths of small (top) and large (bottom) sockeye salmon marked in the lower Chilkat River versus lengths of marked fish recaptured on the spawning grounds, 2003.

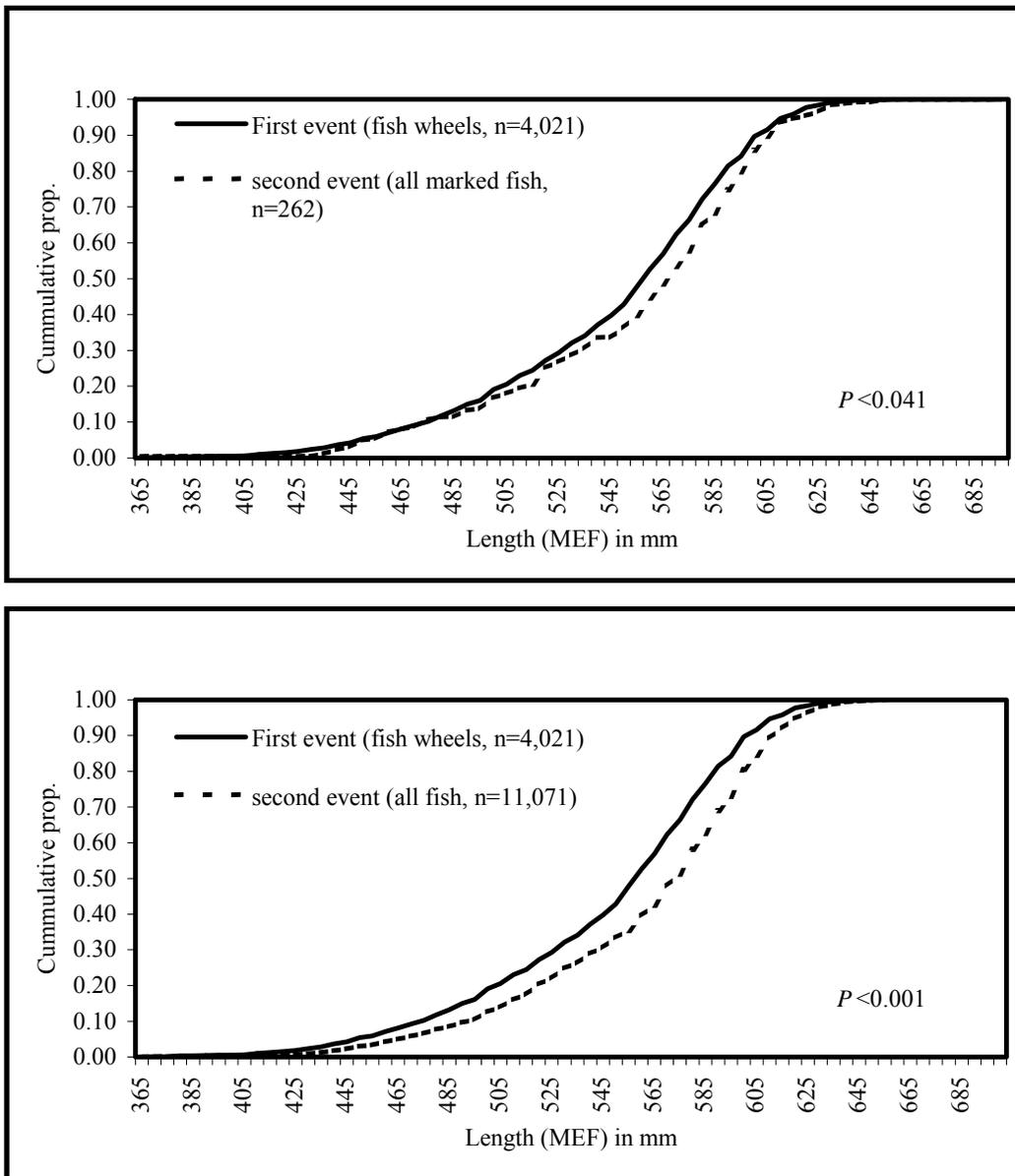


Figure 8.—Cumulative distribution function (CDF) of MEF lengths of sockeye salmon marked in the lower Chilkat River versus lengths of marked fish recaptured on spawning grounds (top) and versus lengths of fish examined for marks during recovery events (bottom), 2004.

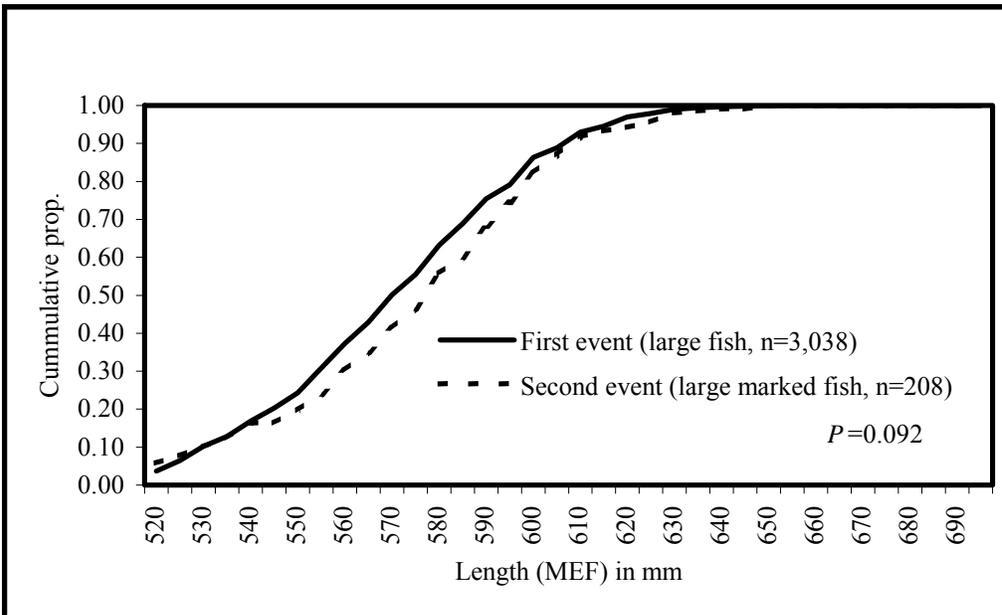
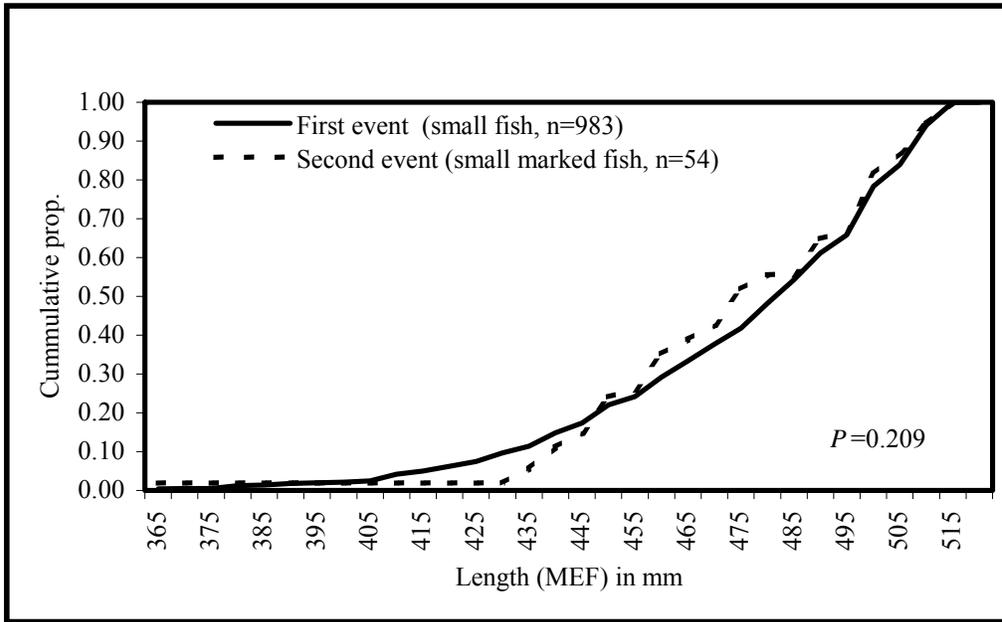


Figure 9.—Cumulative distribution function (CDF) of MEF lengths of small (top) and large (bottom) sockeye salmon marked in the lower Chilkat River versus lengths of marked fish recaptured on the spawning grounds, 2004.

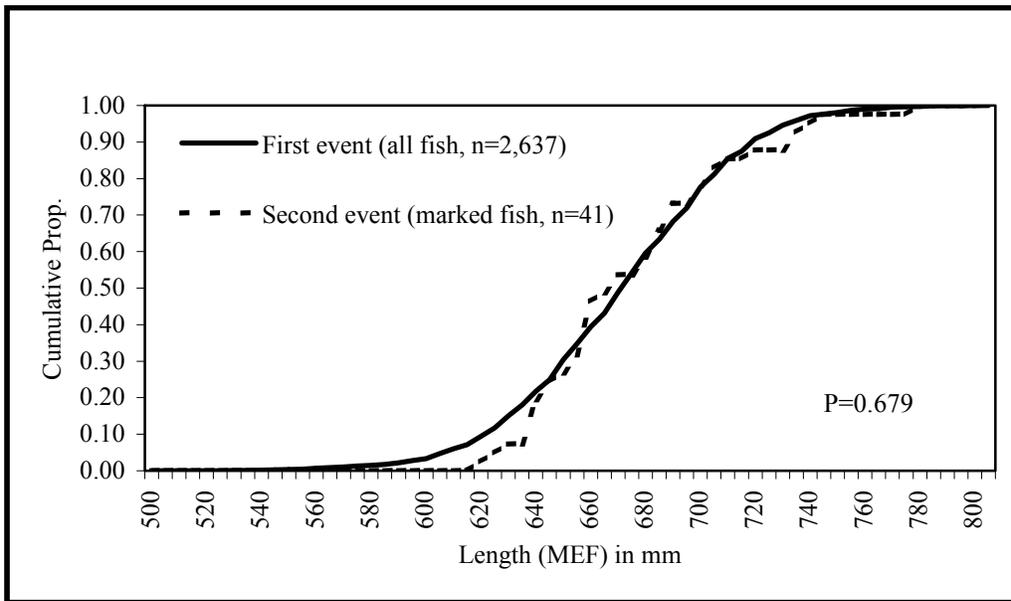
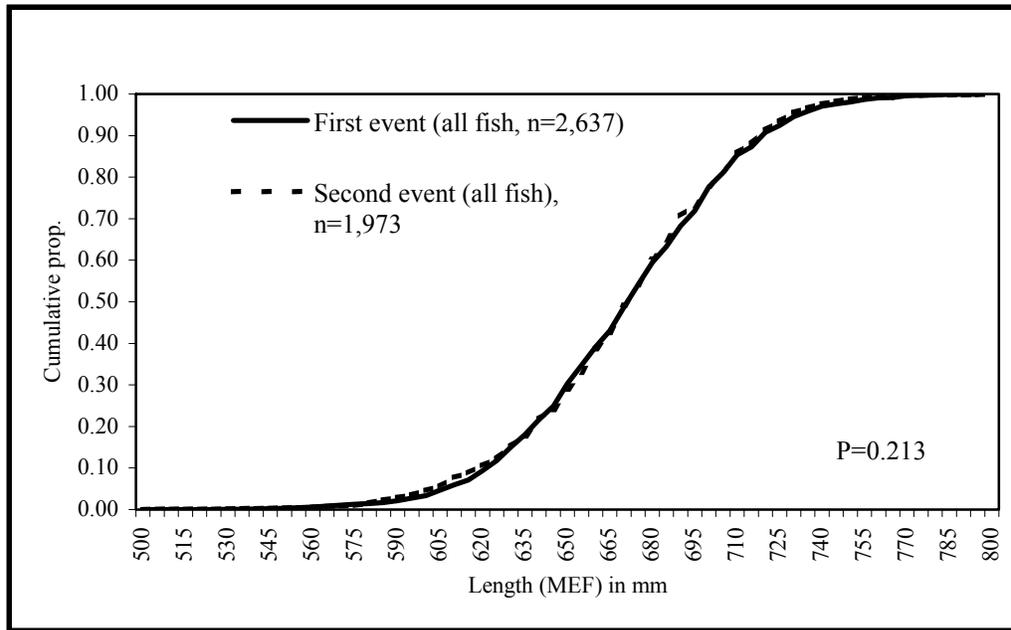


Figure 10.—Cumulative distribution function (CDF) of MEF lengths of chum salmon marked in the lower Chilkat River versus lengths of marked fish recaptured on the spawning grounds (top) and versus lengths of fish examined for marks on the spawning grounds (bottom), 2003.

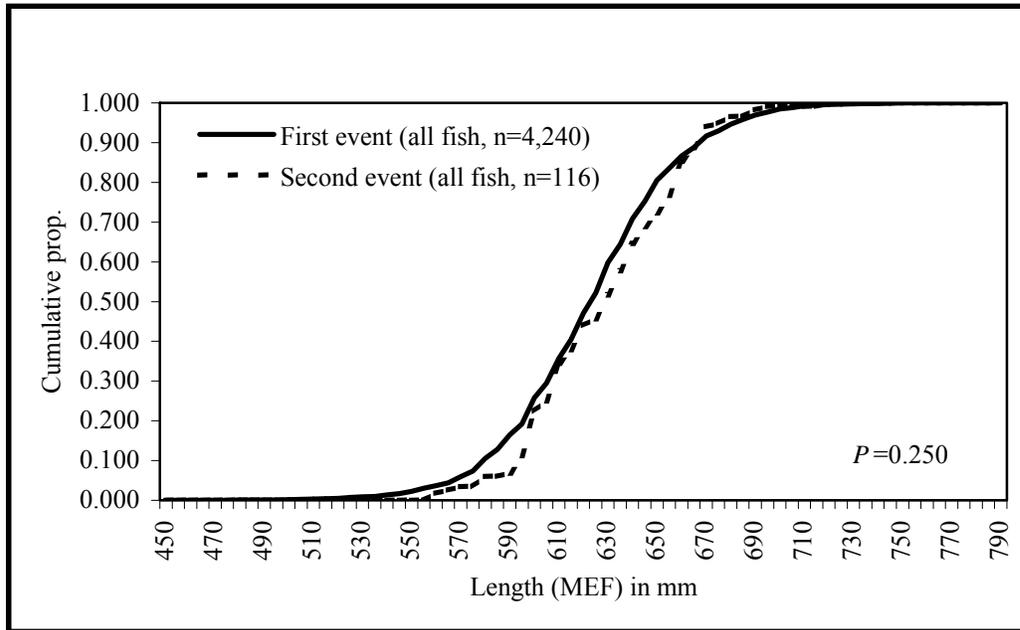
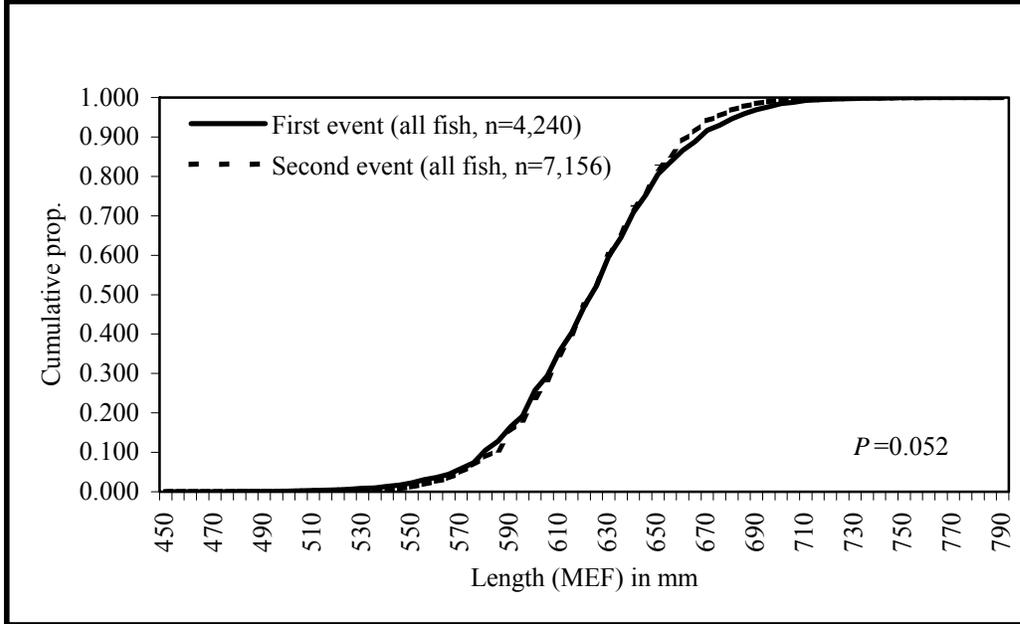


Figure 11.—Cumulative distribution function (CDF) of MEF lengths of chum salmon marked in the lower Chilkat River versus lengths of marked fish recaptured on the spawning grounds (top) and versus lengths of fish examined for marks on the spawning grounds (bottom), 2004.

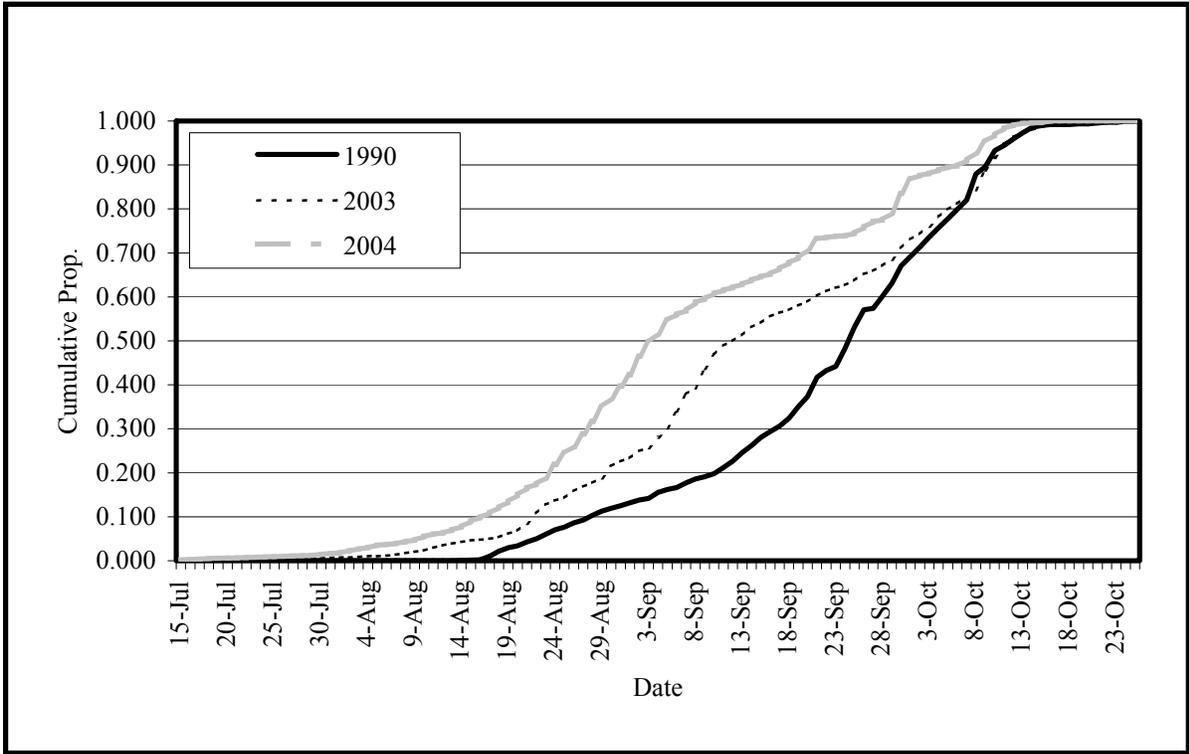


Figure 12.—Cumulative proportion of adult chum salmon captured in the Chilkat River fish wheels during 2003 and 2004, compared to the cumulative proportion of 1990.

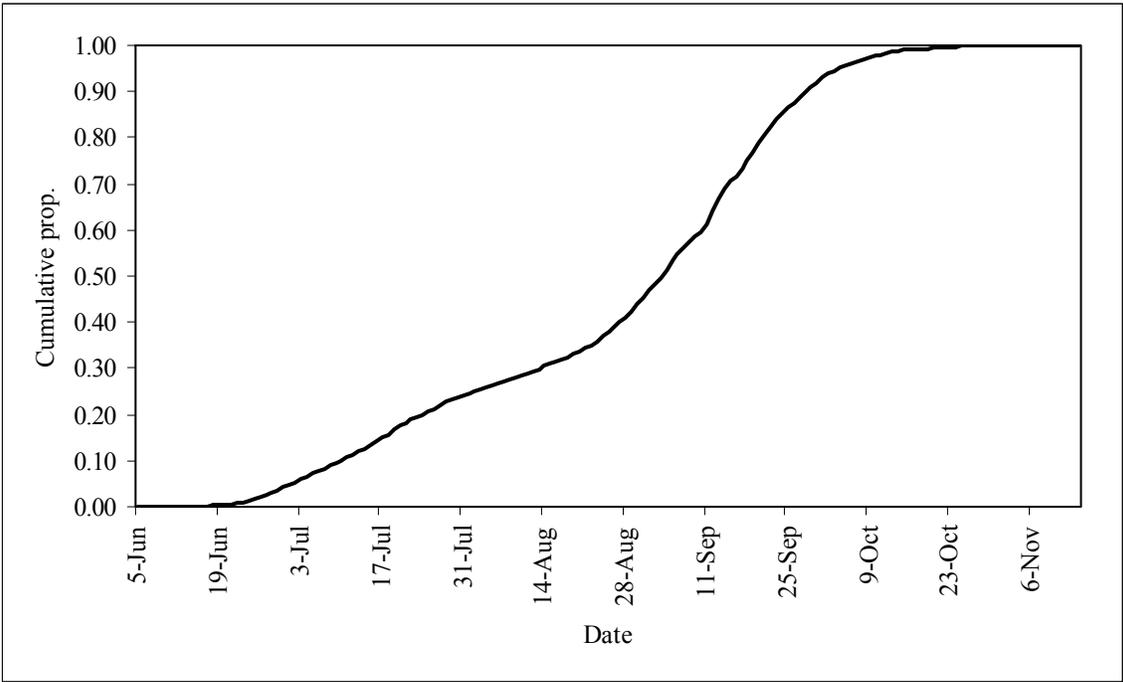


Figure 13.—Average cumulative proportions of Chilkat Lake sockeye salmon weir counts, 1970–1995 and 1999–2004.

APPENDIX A

Appendix A1.–Calendar dates for statistical weeks in 2003.

Statistical Week	From	Through	Statistical Week	From	Through
1	1-Jan	4-Jan	28	6-Jul	12-Jul
2	5-Jan	11-Jan	29	13-Jul	19-Jul
3	12-Jan	18-Jan	30	20-Jul	26-Jul
4	19-Jan	25-Jan	31	27-Jul	2-Aug
5	26-Jan	1-Feb	32	3-Aug	9-Aug
6	2-Feb	8-Feb	33	10-Aug	16-Aug
7	9-Feb	15-Feb	34	17-Aug	23-Aug
8	16-Feb	22-Feb	35	24-Aug	30-Aug
9	23-Feb	1-Mar	36	31-Aug	6-Sep
10	2-Mar	8-Mar	37	7-Sep	13-Sep
11	9-Mar	15-Mar	38	14-Sep	20-Sep
12	16-Mar	22-Mar	39	21-Sep	27-Sep
13	23-Mar	29-Mar	40	28-Sep	4-Oct
14	30-Mar	5-Apr	41	5-Oct	11-Oct
15	6-Apr	12-Apr	42	12-Oct	18-Oct
16	13-Apr	19-Apr	43	19-Oct	25-Oct
17	20-Apr	26-Apr	44	26-Oct	1-Nov
18	27-Apr	3-May	45	2-Nov	8-Nov
19	4-May	10-May	46	9-Nov	15-Nov
20	11-May	17-May	47	16-Nov	22-Nov
21	18-May	24-May	48	23-Nov	29-Nov
22	25-May	31-May	49	30-Nov	6-Dec
23	1-Jun	7-Jun	50	7-Dec	13-Dec
24	8-Jun	14-Jun	51	14-Dec	20-Dec
25	15-Jun	21-Jun	52	21-Dec	27-Dec
26	22-Jun	28-Jun	53	28-Dec	31-Dec
27	29-Jun	5-Jul			

Appendix A2.–Calendar dates for statistical weeks in 2004.

Statistical Week	From	Through	Statistical Week	From	Through
1	1-Jan	3-Jan	28	4-Jul	10-Jul
2	4-Jan	10-Jan	29	11-Jul	17-Jul
3	11-Jan	17-Jan	30	18-Jul	24-Jul
4	18-Jan	24-Jan	31	25-Jul	31-Jul
5	25-Jan	31-Jan	32	1-Aug	7-Aug
6	1-Feb	7-Feb	33	8-Aug	14-Aug
7	8-Feb	14-Feb	34	15-Aug	21-Aug
8	15-Feb	21-Feb	35	22-Aug	28-Aug
9	22-Feb	28-Feb	36	29-Aug	4-Sep
10	29-Feb	6-Mar	37	5-Sep	11-Sep
11	7-Mar	13-Mar	38	12-Sep	18-Sep
12	14-Mar	20-Mar	39	19-Sep	25-Sep
13	21-Mar	27-Mar	40	26-Sep	2-Oct
14	28-Mar	3-Apr	41	3-Oct	9-Oct
15	4-Apr	10-Apr	42	10-Oct	16-Oct
16	11-Apr	17-Apr	43	17-Oct	23-Oct
17	18-Apr	24-Apr	44	24-Oct	30-Oct
18	25-Apr	1-May	45	31-Oct	6-Nov
19	2-May	8-May	46	7-Nov	13-Nov
20	9-May	15-May	47	14-Nov	20-Nov
21	16-May	22-May	48	21-Nov	27-Nov
22	23-May	29-May	49	28-Nov	4-Dec
23	30-May	5-Jun	50	5-Dec	11-Dec
24	6-Jun	12-Jun	51	12-Dec	18-Dec
25	13-Jun	19-Jun	52	19-Dec	25-Dec
26	20-Jun	26-Jun	53	26-Dec	31-Dec
27	27-Jun	3-Jul			

APPENDIX B

Appendix B1.—Chilkat River daily water level, temperature, fish wheel rpm, and fish wheel effort data, June 6 to July 31, 2003. Fish wheel I refers to the fish wheel located farthest upstream.

Date	Statistical Week	Water Level	Water Temp.(C)	Fish Wheel I RPM	Fish Wheel II RPM	Fish Wheel I Effort	Fish Wheel II Effort
6/6	23	120	8.1	3.0	0.0	13.50	0.00
6/7	23	142	8.0	3.5	2.5	23.50	13.25
6/8	24	139	8.1	3.5	2.2	24.00	24.00
6/9	24	138	8.5	3.5	2.3	24.00	24.00
6/10	24	142	8.8	3.6	2.3	24.00	24.00
6/11	24	149	9.0	3.9	2.5	23.70	23.80
6/12	24	152	9.3	3.8	2.1	24.00	24.00
6/13	24	156	9.2	3.8	2.1	24.00	24.00
6/14	24	152	7.1	3.7	2.1	24.00	24.00
6/15	25	142	8.4	3.3	2.2	24.00	24.00
6/16	25	138	8.3	3.0	2.2	24.00	24.00
6/17	25	136	8.3	3.1	2.1	24.00	24.00
6/18	25	146	8.0	3.6	2.6	24.00	24.00
6/19	25	150	7.5	3.7	2.3	24.00	24.00
6/20	25	135	7.0	3.4	2.1	23.75	23.50
6/21	25	130	8.1	3.3	2.1	24.00	24.00
6/22	26	135	8.5	3.1	2.1	24.00	24.00
6/23	26	133	8.6	2.7	2.0	24.00	24.00
6/24	26	133	8.0	2.5	1.8	24.00	24.00
6/25	26	133	7.8	3.1	2.1	24.00	24.00
6/26	26	137	7.6	2.8	2.0	24.00	24.00
6/27	26	140	7.1	2.9	2.5	24.00	23.75
6/28	26	130	8.1	2.7	2.1	24.00	24.00
6/29	27	128	8.0	2.1	1.3	24.00	24.00
6/30	27	128	8.1	2.1	1.5	24.00	24.00
7/1	27	141	8.0	2.3	2.2	24.00	24.00
7/2	27	148	10.1	3.2	2.3	24.00	24.00
7/3	27	154	7.9	3.2	2.2	24.00	24.00
7/4	27	153	7.3	3.0	2.0	24.00	24.00
7/5	27	149	8.0	2.9	2.1	24.00	24.00
7/6	28	146	7.5	2.8	2.0	24.00	24.00
7/7	28	144	8.6	3.5	2.2	16.80	24.00
7/8	28	155	9.0	3.0	2.3	22.50	12.00
7/9	28	161	8.7	3.7	2.5	24.00	24.00
7/10	28	164	9.5	3.3	2.3	24.00	24.00
7/11	28	166	9.9	3.7	2.6	24.00	24.00
7/12	28	171	9.2	3.6	2.7	24.00	24.00
7/13	29	172	9.3	3.8	2.6	24.00	24.00
7/14	29	179	9.5	4.1	2.5	24.00	24.00
7/15	29	173	8.8	4.0	2.7	24.00	24.00
7/16	29	163	7.5	3.9	2.6	24.00	24.00
7/17	29	156	8.0	3.8	2.6	24.00	24.00
7/18	29	152	7.5	3.6	2.5	24.00	24.00
7/19	29	153	8.6	3.1	2.4	24.00	24.00
7/20	30	160	8.7	3.6	2.8	24.00	24.00
7/21	30	168	8.5	3.7	2.9	24.00	24.00
7/22	30	162	7.8	3.6	3.0	24.00	24.00
7/23	30	151	7.1	3.4	2.9	24.00	24.00
7/24	30	146	8.2	3.6	2.4	24.00	24.00
7/25	30	143	7.5	3.5	2.3	12.00	24.00
7/26	30	138	7.1	—	2.1	—	24.00
7/27	31	132	7.4	—	2.0	—	24.00
7/28	31	133	7.5	—	2.1	—	24.00
7/29	31	133	7.5	—	2.4	—	24.00
7/30	31	138	7.5	2.3	2.5	12.00	24.00
7/31	31	137	7.5	2.2	2.2	18.00	24.00

Appendix B2.—Chilkat River daily water level, temperature, fish wheel rpm, and fish wheel effort data, August 1 to September 30, 2003. Fish wheel I refers to the fish wheel located farthest upstream.

Date	Statistical Week	Water Level	Water Temp.(C)	Fish Wheel I RPM	Fish Wheel II RPM	Fish Wheel I Effort	Fish Wheel II Effort
8/1	31	134	7.1	2.3	2.4	24.00	24.00
8/2	31	138	8.1	2.4	2.3	24.00	24.00
8/3	32	138	7.6	2.4	2.3	24.00	24.00
8/4	32	138	7.5	2.3	2.4	24.00	24.00
8/5	32	136	7.0	2.4	2.5	24.00	24.00
8/6	32	132	8.0	2.3	2.4	24.00	24.00
8/7	32	136	8.0	2.4	2.6	24.00	24.00
8/8	32	143	8.6	2.6	2.7	24.00	24.00
8/9	32	144	7.6	2.5	2.6	24.00	24.00
8/10	33	135	7.4	2.6	2.6	24.00	24.00
8/11	33	134	7.5	2.6	2.6	24.00	24.00
8/12	33	134	7.8	2.4	2.6	24.00	24.00
8/13	33	134	7.0	2.0	2.5	24.00	24.00
8/14	33	137	8.0	2.1	2.6	24.00	24.00
8/15	33	165	8.5	3.1	3.4	24.00	24.00
8/16	33	202	7.8	3.1	3.5	24.00	21.50
8/17	34	198	6.9	3.0	3.4	24.00	24.00
8/18	34	173	6.5	2.4	3.0	24.00	24.00
8/19	34	141	7.5	2.1	2.3	24.00	24.00
8/20	34	138	7.6	2.1	2.3	24.00	24.00
8/21	34	119	6.8	2.0	1.8	24.00	24.00
8/22	34	114	6.5	2.2	1.9	24.00	24.00
8/23	34	106	7.5	2.0	1.8	24.00	18.00
8/24	35	105	7.6	2.0	1.8	24.00	24.00
8/25	35	103	7.5	1.9	1.9	24.00	24.00
8/26	35	100	7.0	1.7	1.7	24.00	24.00
8/27	35	103	7.8	1.7	2.1	24.00	24.00
8/28	35	106	7.6	2.0	2.0	24.00	16.00
8/29	35	110	7.3	2.6	2.1	24.00	7.75
8/30	35	118	7.6	2.8	2.3	24.00	24.00
8/31	36	139	6.8	2.8	2.4	24.00	24.00
9/1	36	126	6.5	2.9	2.5	24.00	24.00
9/2	36	134	6.8	3.5	2.1	24.00	24.00
9/3	36	160	6.4	3.2	2.9	24.00	24.00
9/4	36	132	6.5	3.1	2.7	24.00	24.00
9/5	36	120	5.8	1.8	1.7	24.00	9.00
9/6	36	113	7.0	1.9	1.9	24.00	24.00
9/7	37	121	6.8	2.0	2.3	24.00	24.00
9/8	37	126	6.9	2.0	2.2	24.00	24.00
9/9	37	119	7.1	1.9	2.1	24.00	24.00
9/10	37	113	6.6	1.6	0.3	24.00	17.50
9/11	37	106	6.8	1.5	1.3	24.00	24.00
9/12	37	107	7.3	1.6	1.2	24.00	24.00
9/13	37	108	7.4	1.6	1.4	24.00	24.00
9/14	38	104	7.2	1.8	0.5	24.00	15.00
9/15	38	87	5.1	2.8	0.0	15.00	0.00
9/16	38	64	5.5	1.3	2.3	24.00	22.00
9/17	38	58	4.8	1.1	2.1	24.00	24.00
9/18	38	55	4.8	1.5	1.7	24.00	24.00
9/19	38	53	4.5	1.2	1.7	24.00	24.00
9/20	38	52	5.3	1.4	1.5	24.00	24.00
9/21	39	60	6.3	1.5	2.2	24.00	24.00
9/22	39	55	6.5	2.2	2.1	24.00	24.00
9/23	39	52	5.4	1.5	2.2	24.00	24.00
9/24	39	55	4.9	2.2	2.4	24.00	24.00
9/25	39	58	5.3	2.0	2.3	24.00	24.00
9/26	39	66	6.1	2.7	3.0	24.00	24.00
9/27	39	66	6.3	2.7	3.7	24.00	24.00
9/28	40	67	6.6	2.6	3.5	24.00	24.00
9/29	40	70	6.9	3.2	3.3	24.00	24.00
9/30	40	80	6.9	3.6	3.8	24.00	24.00

Appendix B3.—Chilkat River daily water level, temperature, fish wheel rpm, and fish wheel effort data, October 1 to October 21 (end of season), 2003. Fish wheel I refers to the fish wheel located farthest upstream.

Date	Statistical Week	Water Level	Water Temp.(C)	Fish Wheel I RPM	Fish Wheel II RPM	Fish Wheel I Effort	Fish Wheel II Effort
10/1	40	91	6.8	3.7	3.8	21.00	24.00
10/2	40	90	6.0	3.6	3.7	24.00	24.00
10/3	40	90	5.4	3.5	3.6	24.00	24.00
10/4	40	116	6.1	3.7	3.7	24.00	24.00
10/5	41	133	6.3	3.0	3.6	20.00	24.00
10/6	41	125	5.8	2.2	3.5	24.00	24.00
10/7	41	121	5.9	1.7	3.8	24.00	24.00
10/8	41	144	6.1	1.5	3.7	24.00	24.00
10/9	41	99	5.3	1.8	2.1	20.00	24.00
10/10	41	80	5.3	1.8	1.8	22.00	24.00
10/11	41	71	4.9	1.2	1.2	24.00	24.00
10/12	41	63	4.1	2.0	1.6	24.00	24.00
10/13	42	57	3.7	1.5	1.8	24.00	24.00
10/14	42	54	4.0	1.0	1.5	24.00	24.00
10/15	42	51	4.0	1.2	1.5	24.00	24.00
10/16	42	47	1.6	1.0	1.2	24.00	24.00
10/17	42	44	1.9	0.5	1.5	24.00	24.00
10/18	42	44	3.4	0.3	1.2	24.00	9.25
10/19	42	50	5.3	0.3	N/A	24.00	N/A
10/20	43	51	5.9	0.5	N/A	15.00	N/A
10/21	43	45	3.4	1.8	N/A	24.00	N/A

Appendix B4.—Chilkat River daily water level, temperature, fish wheel rpm, and fish wheel effort data, June 7 to July 31, 2004. Fish wheel I refers to the fish wheel located farthest upstream.

Date	Statistical Week	Water Level	Water Temp.(C)	Fish Wheel I RPM	Fish Wheel II RPM	Fish Wheel I Effort	Fish Wheel II Effort
6/7	24	163	8.5	2.9	2.6	14.00	12.50
6/8	24	180	8.4	3.3	2.2	24.00	24.00
6/9	24	187	8.5	2.7	2.1	24.00	15.50
6/10	24	163	7.5	3.0	1.7	24.00	24.00
6/11	24	148	7.4	3.2	2.3	15.00	24.00
6/12	24	138	7.8	2.8	2.0	24.00	24.00
6/13	25	136	8.4	1.5	2.1	24.00	24.00
6/14	25	145	8.8	2.6	2.7	24.00	24.00
6/15	25	143	8.0	2.1	2.6	24.00	24.00
6/16	25	141	7.5	1.7	2.2	24.00	24.00
6/17	25	145	8.7	1.8	2.5	24.00	24.00
6/18	25	156	9.2	1.7	2.7	24.00	24.00
6/19	25	170	9.3	2.4	2.6	24.00	24.00
6/20	26	183	9.5	2.6	2.3	24.00	24.00
6/21	26	187	9.7	2.1	2.5	24.00	24.00
6/22	26	186	9.7	2.3	2.6	24.00	24.00
6/23	26	186	9.6	2.7	2.6	24.00	24.00
6/24	26	187	9.9	2.4	2.5	24.00	24.00
6/25	26	185	10.1	2.3	2.6	24.00	24.00
6/26	26	186	10.0	3.0	2.9	24.00	24.00
6/27	27	184	9.7	2.3	2.7	24.00	24.00
6/28	27	187	9.7	2.8	2.5	23.50	15.00
6/29	27	187	8.8	2.8	2.6	24.00	24.00
6/30	27	187	9.4	3.0	2.9	24.00	24.00
7/1	27	180	8.3	2.9	2.9	22.50	24.00
7/2	27	176	8.2	1.8	2.6	24.00	24.00
7/3	27	176	9.3	2.7	2.9	24.00	24.00
7/4	28	167	8.7	2.9	2.8	24.00	24.00
7/5	28	160	8.9	2.6	2.7	24.00	24.00
7/6	28	154	8.8	2.4	2.7	24.00	24.00
7/7	28	157	9.1	2.2	2.5	24.00	24.00
7/8	28	159	9.2	2.3	2.3	24.00	24.00
7/9	28	164	9.2	2.5	2.5	24.00	24.00
7/10	28	162	9.2	1.9	2.6	24.00	24.00
7/11	29	150	8.2	1.7	2.1	24.00	24.00
7/12	29	150	9.2	2.0	2.2	24.00	24.00
7/13	29	155	9.2	2.2	2.3	24.00	24.00
7/14	29	155	9.4	2.2	2.4	24.00	24.00
7/15	29	157	9.3	2.2	2.2	24.00	24.00
7/16	29	164	9.9	2.5	2.2	24.00	24.00
7/17	29	165	10.3	2.5	2.3	24.00	24.00
7/18	30	156	10.2	2.5	2.1	24.00	24.00
7/19	30	152	10.2	2.0	2.1	24.00	24.00
7/20	30	151	10.3	2.0	2.3	24.00	24.00
7/21	30	155	10.5	2.1	2.4	24.00	24.00
7/22	30	152	10.0	2.3	2.4	24.00	24.00
7/23	30	146	9.5	1.9	2.1	24.00	24.00
7/24	30	150	8.8	2.7	2.1	24.00	24.00
7/25	31	150	9.1	2.8	2.1	24.00	24.00
7/26	31	145	9.5	2.4	2.0	24.00	24.00
7/27	31	135	9.1	2.1	1.9	24.00	24.00
7/28	31	149	9.2	2.3	2.1	24.00	24.00
7/29	31	166	8.3	2.8	2.6	24.00	22.00
7/30	31	159	8.1	2.5	2.2	24.00	24.00
7/31	31	145	8.3	2.7	2.4	24.00	24.00

Appendix B5.—Chilkat River daily water level, temperature, fish wheel rpm, and fish wheel effort data, June 7 to July 31, 2004. Fish wheel I refers to the fish wheel located farthest upstream.

Date	Statistical Week	Water Level	Water Temp.(C)	Fish Wheel I RPM	Fish Wheel II RPM	Fish Wheel I Effort	Fish Wheel II Effort
8/1	32	138	8.1	1.7	2.5	24.00	24.00
8/2	32	126	8.3	1.4	2.3	24.00	24.00
8/3	32	144	7.9	2.1	2.6	24.00	24.00
8/4	32	136	7.6	1.8	2.0	24.00	24.00
8/5	32	137	8.3	1.2	1.7	24.00	24.00
8/6	32	146	9.5	2.1	1.5	24.00	13.50
8/7	32	151	9.6	2.4	1.3	24.00	24.00
8/8	33	150	9.7	1.8	0.0	24.00	0.00
8/9	33	150	9.6	2.0	0.0	24.00	0.00
8/10	33	146	9.7	2.1	0.0	24.00	0.00
8/11	33	167	9.0	2.3	0.0	24.00	8.50
8/12	33	154	9.5	1.9	3.3	24.00	24.00
8/13	33	134	9.2	3.4	1.6	24.00	24.00
8/14	33	126	9.3	3.4	1.6	24.00	24.00
8/15	34	152	9.2	3.3	1.6	24.00	24.00
8/16	34	158	8.6	3.2	1.5	24.00	24.00
8/17	34	164	8.6	3.1	1.7	24.00	24.00
8/18	34	165	8.3	3.4	1.8	24.00	24.00
8/19	34	154	8.4	3.3	1.9	24.00	25.00
8/20	34	152	8.3	3.1	1.9	25.00	24.00
8/21	34	146	8.6	3.3	1.8	24.00	24.00
8/22	35	146	8.7	3.2	1.4	24.00	24.00
8/23	35	138	8.2	2.8	1.5	24.00	17.50
8/24	35	128	7.8	3.0	3.2	24.00	24.00
8/25	35	117	7.3	3.0	3.4	21.00	24.00
8/26	35	116	6.9	2.7	3.4	15.00	24.00
8/27	35	124	7.1	2.9	3.7	24.00	24.00
8/28	35	135	8.6	3.0	3.9	24.00	24.00
8/29	36	130	8.9	2.8	3.7	24.00	24.00
8/30	36	122	7.6	2.9	3.6	24.00	24.00
8/31	36	118	7.0	2.4	2.8	24.00	24.00
9/1	36	116	6.4	2.9	3.1	24.00	24.00
9/2	36	112	7.5	2.9	3.1	24.00	24.00
9/3	36	137	7.5	3.2	3.1	24.00	24.00
9/4	36	122	7.4	3.3	3.6	24.00	24.00
9/5	37	118	6.4	3.2	3.6	24.00	24.00
9/6	37	108	5.6	3.3	3.6	24.00	24.00
9/7	37	82	5.6	3.0	3.0	24.00	24.00
9/8	37	72	5.5	3.0	3.0	24.00	24.00
9/9	37	67	5.5	3.0	3.0	24.00	24.00
9/10	37	62	5.6	2.9	3.0	24.00	24.00
9/11	37	58	6.5	2.9	2.9	24.00	24.00
9/12	38	58	6.6	2.7	2.4	24.00	24.00
9/13	38	62	6.8	2.7	2.5	24.00	24.00
9/14	38	61	6.6	2.6	2.5	24.00	24.00
9/15	38	62	7.4	2.7	2.7	24.00	24.00
9/16	38	58	7.4	2.7	2.8	24.00	24.00
9/17	38	50	7.3	2.7	2.8	24.00	24.00
9/18	38	46	7.4	2.5	2.7	24.00	24.00
9/19	39	42	7.2	2.6	2.7	24.00	24.00
9/20	39	44	6.9	2.8	2.6	24.00	24.00
9/21	39	58	7.4	2.9	2.8	20.00	24.00
9/22	39	83	7.4	2.8	3.1	11.00	24.00
9/23	39	79	7.0	3.1	3.3	24.00	24.00
9/24	39	97	7.0	3.0	3.2	24.00	24.00
9/25	39	80	6.0	2.6	3.0	12.00	24.00
9/26	40	78	6.0	2.6	2.8	24.00	24.00
9/27	40	110	6.4	2.3	2.1	24.00	24.00
9/28	40	92	6.4	2.3	2.3	24.00	24.00
9/29	40	80	6.4	2.6	3.0	24.00	24.00
9/30	40	70	7.1	2.6	3.0	24.00	24.00

Appendix B6.—Chilkat River daily water level, temperature, fish wheel rpm, and fish wheel effort data, October 1 to October 19 (end of season), 2004. Fish wheel I refers to the fish wheel located farthest upstream.

Date	Statistical Week	Water Level	Water Temp.(C)	Fish Wheel I RPM	Fish Wheel II RPM	Fish wheel I Effort	Fish Wheel II Effort
10/1	40	73	8.0	2.0	2.3	24.00	24.00
10/2	40	88	8.0	2.4	3.6	24.00	24.00
10/3	41	93	7.1	2.5	3.5	24.00	24.00
10/4	41	87	7.5	2.7	3.2	24.00	24.00
10/5	41	112	8.1	2.6	3.6	24.00	24.00
10/6	41	117	6.3	2.6	4.1	19.00	24.00
10/7	41	94	6.3	2.2	3.8	24.00	24.00
10/8	41	85	6.0	2.7	3.7	24.00	24.00
10/9	41	79	6.4	2.6	3.8	24.00	24.00
10/10	42	72	6.4	2.7	4.0	24.00	24.00
10/11	42	71	6.4	2.6	3.9	24.00	24.00
10/12	42	45	3.7	2.6	3.9	24.00	24.00
10/13	42	52	3.9	2.5	3.5	24.00	24.00
10/14	42	76	4.4	2.5	3.4	24.00	24.00
10/15	42	79	4.6	2.4	3.3	24.00	24.00
10/16	42	64	3.1	2.7	3.2	24.00	24.00
10/17	43	58	1.9	2.5	2.7	24.00	24.00
10/18	43	58	1.3	1.8	2.5	24.00	24.00
10/19	43	44	-0.1	1.5	2.1	12.00	12.00

Appendix B7.—Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of sockeye salmon captured in the Chilkat River fish wheels, from June 9 to July 31, 2003.

Date	Daily Sockeye Catch	Cumulative Sockeye Catch	Daily Sockeye Marked	Cumulative Sockeye Marked	Daily CPUE	Cumulative Prop. CPUE
6/9	1	1	1	1	0.06	0.00
6/10	0	1	0	1	0.00	0.00
6/11	1	2	0	1	0.06	0.06
6/12	1	3	1	2	0.06	0.13
6/13	2	5	2	4	0.13	0.25
6/14	1	6	1	5	0.06	0.31
6/15	10	16	10	15	0.63	0.94
6/16	10	26	10	25	0.63	1.56
6/17	4	30	4	29	0.25	1.81
6/18	3	33	3	32	0.19	2.00
6/19	6	39	4	36	0.38	2.38
6/20	13	52	10	46	0.83	3.20
6/21	25	77	25	71	1.56	4.76
6/22	28	105	28	99	1.75	6.51
6/23	18	123	13	112	1.13	7.64
6/24	10	133	10	122	0.63	8.26
6/25	26	159	25	147	1.63	9.89
6/26	29	188	28	175	1.81	11.70
6/27	22	210	22	197	1.38	13.08
6/28	39	249	39	236	2.44	15.52
6/29	48	297	48	284	3.00	18.52
6/30	54	351	50	334	3.38	21.90
7/1	64	415	60	394	4.00	25.90
7/2	31	446	30	424	1.94	27.83
7/3	34	480	32	456	2.13	29.96
7/4	27	507	27	483	1.69	31.65
7/5	37	544	34	517	2.31	33.96
7/6	43	587	43	560	2.69	36.65
7/7	50	637	44	604	3.68	40.32
7/8	9	646	9	613	0.78	41.10
7/9	17	663	14	627	1.06	42.17
7/10	40	703	38	665	2.50	44.67
7/11	22	725	20	685	1.38	46.04
7/12	29	754	28	713	1.81	47.85
7/13	46	800	41	754	2.88	50.73
7/14	44	844	38	792	2.75	53.48
7/15	35	879	30	822	2.19	55.67
7/16	20	899	16	838	1.25	56.92
7/17	30	929	25	863	1.88	58.79
7/18	28	957	27	890	1.75	60.54
7/19	23	980	21	911	1.44	61.98
7/20	31	1,011	28	939	1.94	63.92
7/21	18	1,029	14	953	1.13	65.04
7/22	33	1,077	32	997	2.06	68.04
7/23	27	1,104	26	1,023	1.69	69.73
7/24	25	1,129	19	1,042	2.08	71.81
7/25	10	1,139	10	1,052	1.25	73.06
7/26	27	1,166	25	1,077	3.38	76.44
7/27	14	1,180	12	1,089	1.75	78.19
7/28	11	1,191	7	1,096	1.38	79.56
7/29	19	1,210	15	1,111	1.58	81.15
7/30	21	1,231	15	1,126	1.50	82.65

Appendix B8.—Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of sockeye salmon captured in the Chilkat River fish wheels, from August 1 to September 30, 2003.

Date	Daily Sockeye Catch	Cumulative Sockeye Catch	Daily Sockeye Marked	Cumulative Sockeye Marked	Daily CPUE	Cumulative Prop. CPUE
8/1	36	1,267	32	1,158	2.25	84.90
8/2	49	1,316	44	1,202	3.06	87.96
8/3	50	1,366	48	1,250	3.13	91.08
8/4	52	1,418	48	1,298	3.25	94.33
8/5	47	1,465	42	1,340	2.94	97.27
8/6	40	1,505	35	1,375	2.50	99.77
8/7	60	1,565	54	1,429	3.75	103.52
8/8	90	1,655	89	1,518	5.63	109.15
8/9	75	1,730	75	1,593	4.89	114.04
8/10	84	1,814	78	1,671	5.25	119.29
8/11	73	1,887	68	1,739	4.56	123.85
8/12	111	1,998	107	1,846	6.94	130.79
8/13	87	2,085	81	1,927	5.44	136.23
8/14	85	2,170	80	2,007	5.31	141.54
8/15	68	2,238	66	2,073	4.25	145.79
8/16	19	2,257	19	2,092	1.25	147.04
8/17	17	2,274	16	2,108	1.06	148.10
8/18	43	2,317	41	2,149	2.69	150.79
8/19	95	2,412	89	2,238	5.94	156.73
8/20	125	2,537	118	2,356	7.81	164.54
8/21	72	2,609	69	2,425	4.50	169.04
8/22	68	2,677	63	2,488	4.25	173.29
8/23	71	2,748	69	2,557	5.07	178.36
8/24	76	2,824	75	2,632	4.75	183.11
8/25	79	2,903	76	2,708	4.84	187.95
8/26	62	2,965	60	2,768	3.72	191.67
8/27	90	3,055	84	2,852	5.29	196.96
8/28	81	3,136	80	2,932	6.08	203.04
8/29	38	3,174	38	2,970	3.59	206.63
8/30	72	3,246	72	3,042	4.50	211.13
8/31	44	3,290	44	3,086	2.75	213.88
9/1	83	3,373	80	3,166	5.19	219.07
9/2	113	3,486	105	3,271	7.06	226.13
9/3	49	3,535	48	3,319	3.06	229.19
9/4	91	3,626	46	3,365	5.69	234.88
9/5	43	3,669	35	3,400	3.91	238.79
9/6	67	3,736	57	3,457	4.19	242.97
9/7	62	3,798	57	3,514	3.88	246.85
9/8	50	3,848	36	3,550	3.13	249.97
9/9	84	3,932	36	3,586	5.25	255.22
9/10	60	3,992	22	3,608	4.34	259.56
9/11	52	4,044	44	3,652	3.25	262.81
9/12	38	4,082	37	3,689	2.38	265.19
9/13	22	4,104	22	3,711	1.38	266.56
9/14	24	4,128	14	3,725	1.85	268.41
9/15	21	4,149	18	3,743	4.20	272.61
9/16	33	4,182	33	3,776	2.15	274.76
9/17	20	4,202	19	3,795	1.25	276.01
9/18	19	4,221	19	3,814	1.19	277.20
9/19	23	4,244	23	3,837	1.44	278.64
9/20	35	4,279	35	3,872	2.19	280.82
9/21	28	4,307	28	3,900	1.75	282.57
9/22	27	4,334	25	3,925	1.69	284.26
9/23	20	4,354	20	3,945	1.25	285.51
9/24	19	4,373	16	3,961	1.19	286.70
9/25	13	4,386	13	3,974	0.81	287.51
9/26	17	4,403	14	3,988	1.06	288.57
9/27	6	4,409	6	3,994	0.38	288.95
9/28	21	4,430	21	4,015	1.31	290.26
9/29	11	4,441	0	4,015	0.69	290.95
9/30	16	4,457	0	4,015	1.00	291.95

Appendix B9.—Daily catch, daily marked, and CPUE of sockeye salmon captured in the Chilkat River fish wheels, from October 1 to October 21 (end of season), 2003.

Date	Daily Sockeye Catch	Cumulative Sockeye Catch	Daily Sockeye Marked	Cumulative Sockeye Marked	Daily CPUE	Cumulative Prop. CPUE
10/1	11	4,468	0	4,015	0.73	292.68
10/2	8	4,476	0	4,015	0.50	293.18
10/3	10	4,486	0	4,015	0.63	293.81
10/4	3	4,489	0	4,015	0.19	293.99
10/5	2	4,491	0	4,015	0.14	294.13
10/6	6	4,497	0	4,015	0.38	294.51
10/7	1	4,498	0	4,015	0.06	294.57
10/8	5	4,503	0	4,015	0.31	294.88
10/9	10	4,513	0	4,015	0.68	295.56
10/10	5	4,518	0	4,015	0.33	295.89
10/11	10	4,528	0	4,015	0.63	296.51
10/12	3	4,531	0	4,015	0.19	296.70
10/13	4	4,535	0	4,015	0.25	296.95
10/14	7	4,542	0	4,015	0.44	297.39
10/15	2	4,544	2	4,017	0.13	297.51
10/16	2	4,546	0	4,017	0.13	297.64
10/17	0	4,546	0	4,017	0.00	297.64
10/18	0	4,546	0	4,017	0.00	297.64
10/19	3	4,549	0	4,017	0.38	298.01
10/20	1	4,550	0	4,017	0.20	298.21
10/21	1	4,551	0	4,017	0.13	298.34

Appendix B10.—Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of sockeye salmon captured in the Chilkat River fish wheels June 8 to July 31, 2004.

Date	Daily Sockeye Catch	Cumulative Sockeye Catch	Daily Sockeye Marked	Cumulative Sockeye Marked	Daily CPUE	Cumulative Prop. CPUE
6/8	1	1	1	1	0.06	0.06
6/9	0	1	0	1	0.00	0.06
6/10	1	2	0	1	0.06	0.13
6/11	0	2	0	1	0.00	0.13
6/12	2	4	2	3	0.13	0.25
6/13	6	10	6	9	0.38	0.63
6/14	7	17	7	16	0.44	1.06
6/15	2	19	2	18	0.13	1.19
6/16	1	20	1	19	0.06	1.25
6/17	7	27	4	23	0.44	1.69
6/18	2	29	2	25	0.13	1.81
6/19	1	30	1	26	0.06	1.88
6/20	0	30	0	26	0.00	1.88
6/21	13	43	10	36	0.81	2.69
6/22	14	57	14	50	0.88	3.56
6/23	23	80	21	71	1.44	5.00
6/24	15	95	14	85	0.94	5.94
6/25	21	116	18	103	1.31	7.25
6/26	24	140	24	127	1.50	8.75
6/27	42	182	41	168	2.63	11.38
6/28	39	221	38	206	3.04	14.41
6/29	33	254	27	233	2.06	16.48
6/30	30	284	24	257	1.88	18.35
7/1	44	328	44	301	2.84	21.19
7/2	38	366	35	336	2.38	23.57
7/3	38	404	38	374	2.38	25.94
7/4	55	459	53	427	3.44	29.38
7/5	52	511	50	477	3.25	32.63
7/6	51	562	43	520	3.19	35.82
7/7	42	604	30	550	2.63	38.44
7/8	39	643	31	581	2.44	40.88
7/9	70	713	68	649	4.38	45.25
7/10	86	799	84	733	5.38	50.63
7/11	84	883	83	816	5.25	55.88
7/12	99	982	90	906	6.19	62.07
7/13	62	1,044	60	966	3.88	65.94
7/14	30	1,074	25	991	1.88	67.82
7/15	35	1,109	26	1,017	2.19	70.00
7/16	30	1,139	27	1,044	1.88	71.88
7/17	56	1,195	56	1,100	3.50	75.38
7/18	78	1,273	76	1,176	4.88	80.25
7/19	66	1,339	58	1,234	4.13	84.38
7/20	54	1,393	51	1,285	3.38	87.75
7/21	31	1,424	23	1,308	1.94	89.69
7/22	22	1,446	15	1,323	1.38	91.07
7/23	28	1,474	27	1,350	1.75	92.82
7/24	26	1,500	26	1,376	1.63	94.44
7/25	85	1,585	84	1,460	5.31	99.75
7/26	79	1,664	73	1,533	4.94	104.69
7/27	27	1,691	25	1,558	1.69	106.38
7/28	25	1,716	20	1,578	1.56	107.94
7/29	27	1,743	25	1,603	1.76	109.70
7/30	36	1,779	30	1,633	2.25	111.95
7/31	73	1,852	68	1,701	4.56	116.51

Appendix B11.–Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of sockeye salmon captured in the Chilkat River fish wheels August 1 to September 30, 2004.

Date	Daily Sockeye Catch	Cumulative Sockeye Catch	Daily Sockeye Marked	Cumulative Sockeye Marked	Daily CPUE	Cumulative Prop. CPUE
8/1	94	1,946	93	1,794	5.88	122.39
8/2	78	2,024	68	1,862	4.88	127.26
8/3	78	2,102	76	1,938	4.88	132.14
8/4	81	2,183	73	2,011	5.06	137.20
8/5	75	2,258	67	2,078	4.69	141.89
8/6	105	2,363	98	2,176	8.40	150.29
8/7	77	2,440	76	2,252	4.81	155.10
8/8	100	2,540	96	2,348	12.50	167.60
8/9	104	2,644	93	2,441	13.00	180.60
8/10	63	2,707	61	2,502	7.88	188.48
8/11	73	2,780	64	2,566	6.74	195.21
8/12	56	2,836	49	2,615	3.50	198.71
8/13	24	2,860	24	2,639	1.50	200.21
8/14	61	2,921	59	2,698	3.81	204.03
8/15	61	2,982	61	2,759	3.81	207.84
8/16	69	3,051	57	2,816	4.31	212.15
8/17	56	3,107	56	2,872	3.50	215.65
8/18	69	3,176	58	2,930	4.31	219.96
8/19	65	3,241	60	2,990	4.06	224.03
8/20	79	3,320	79	3,069	4.94	228.96
8/21	49	3,369	47	3,116	3.06	232.03
8/22	27	3,396	27	3,143	1.69	233.71
8/23	45	3,441	39	3,182	3.25	236.97
8/24	74	3,515	71	3,253	4.63	241.59
8/25	51	3,566	43	3,296	3.40	244.99
8/26	39	3,605	32	3,328	3.00	247.99
8/27	49	3,654	48	3,376	3.06	251.06
8/28	52	3,706	51	3,427	3.25	254.31
8/29	53	3,759	53	3,480	3.31	257.62
8/30	52	3,811	46	3,526	3.25	260.87
8/31	58	3,869	58	3,584	3.63	264.49
9/1	57	3,926	51	3,635	3.56	268.06
9/2	63	3,989	58	3,693	3.94	271.99
9/3	37	4,026	37	3,730	2.31	274.31
9/4	32	4,058	32	3,762	2.00	276.31
9/5	28	4,086	27	3,789	1.75	278.06
9/6	19	4,105	19	3,808	1.19	279.24
9/7	3	4,108	3	3,811	0.19	279.43
9/8	10	4,118	3	3,814	0.63	280.06
9/9	5	4,123	1	3,815	0.31	280.37
9/10	8	4,131	4	3,819	0.50	280.87
9/11	8	4,139	8	3,827	0.50	281.37
9/12	15	4,154	15	3,842	0.94	282.31
9/13	10	4,164	4	3,846	0.63	282.93
9/14	12	4,176	12	3,858	0.75	283.68
9/15	13	4,189	8	3,866	0.81	284.49
9/16	6	4,195	6	3,872	0.38	284.87
9/17	12	4,207	12	3,884	0.75	285.62
9/18	6	4,213	6	3,890	0.38	285.99
9/19	11	4,224	11	3,901	0.69	286.68
9/20	16	4,240	16	3,917	1.00	287.68
9/21	15	4,255	15	3,932	1.02	288.70
9/22	0	4,255	0	3,932	0.00	288.70
9/23	2	4,257	2	3,934	0.13	288.83
9/24	1	4,258	1	3,935	0.06	288.89
9/25	8	4,266	8	3,943	0.67	289.56
9/26	9	4,275	9	3,952	0.56	290.12
9/27	3	4,278	3	3,955	0.19	290.31
9/28	1	4,279	1	3,956	0.06	290.37
9/29	11	4,290	11	3,967	0.69	291.06
9/30	12	4,302	12	3,979	0.75	291.81

Appendix B12.–Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of sockeye salmon captured in the Chilkat River fish wheels October 1 to October 19 (end of season), 2004.

Date	Daily Sockeye Catch	Cumulative Sockeye Catch	Daily Sockeye Marked	Cumulative Sockeye Marked	Daily CPUE	Cumulative Prop. CPUE
10/1	10	4,312	10	3,989	0.63	292.43
10/2	9	4,321	9	3,998	0.56	292.99
10/3	1	4,322	1	3,999	0.06	293.06
10/4	6	4,328	6	4,005	0.38	293.43
10/5	4	4,332	4	4,009	0.25	293.68
10/6	0	4,332	0	4,009	0.00	293.68
10/7	6	4,338	6	4,015	0.38	294.06
10/8	5	4,343	5	4,020	0.31	294.37
10/9	8	4,351	8	4,028	0.50	294.87
10/10	3	4,354	3	4,031	0.19	295.06
10/11	5	4,359	5	4,036	0.31	295.37
10/12	1	4,360	1	4,037	0.06	295.43
10/13	1	4,361	0	4,037	0.06	295.49
10/14	1	4,362	0	4,037	0.06	295.56
10/15	0	4,362	0	4,037	0.00	295.56
10/16	1	4,363	0	4,037	0.06	295.62
10/17	1	4,364	0	4,037	0.06	295.68
10/18	1	4,365	0	4,037	0.06	295.74
10/19	1	4,366	0	4,037	0.13	295.87

Appendix B13.–Daily sockeye salmon counts, and daily numbers of marked and unmarked sockeye salmon sampled at the Chilkat Lake weir, from July 6 to August 31, 2004.

Date	Daily sockeye Sockeye Count	Cumulative Sockeye count	Daily Sockeye Sampled	Cumulative Sockeye Sampled	Marked Sockeye	Cumulative Marked Sockeye
7/6	58	58	0	0	0	0
7/7	82	140	0	0	0	0
7/8	0	140	0	0	0	0
7/9	30	170	30	30	1	1
7/10	878	1,048	146	176	4	5
7/11	500	1,548	0	176	0	5
7/12	526	2,074	80	256	1	6
7/13	243	2,317	243	499	4	10
7/14	1,918	4,235	0	499	0	10
7/15	188	4,423	188	687	4	14
7/16	128	4,551	128	815	2	16
7/17	1,626	6,177	105	920	2	18
7/18	1,717	7,894	106	1,026	0	18
7/19	1,340	9,234	203	1,229	4	22
7/20	211	9,445	105	1,334	4	26
7/21	2,320	11,765	201	1,535	2	28
7/22	1,463	13,228	148	1,683	0	28
7/23	972	14,200	63	1,746	0	28
7/24	400	14,600	67	1,813	3	31
7/25	1,903	16,503	136	1,949	3	34
7/26	2,165	18,668	136	2,085	2	36
7/27	1,267	19,935	56	2,141	2	38
7/28	1,110	21,045	77	2,218	4	42
7/29	4	21,049	4	2,222	0	42
7/30	0	21,049	0	2,222	0	42
7/31	56	21,105	56	2,278	0	42
8/1	418	21,523	166	2,444	3	45
8/2	378	21,901	0	2,444	0	45
8/3	142	22,043	65	2,509	0	45
8/4	1,150	23,193	95	2,604	0	45
8/5	330	23,523	46	2,650	2	47
8/6	352	23,875	141	2,791	3	50
8/7	84	23,959	84	2,875	1	51
8/8	167	24,126	167	3,042	0	51
8/9	1,963	26,089	149	3,191	1	52
8/10	1,286	27,375	100	3,291	7	59
8/11	638	28,013	87	3,378	2	61
8/12	1,264	29,277	57	3,435	2	63
8/13	304	29,581	15	3,450	1	64
8/14	447	30,028	46	3,496	1	65
8/15	1,548	31,576	153	3,649	9	74
8/16	155	31,731	0	3,649	0	74
8/17	0	31,731	0	3,649	0	74
8/18	0	31,731	0	3,649	0	74
8/19	102	31,833	102	3,751	6	80
8/20	590	32,423	144	3,895	8	88
8/21	85	32,508	63	3,958	3	91
8/22	0	32,508	0	3,958	0	91
8/23	0	32,508	0	3,958	0	91
8/24	1,011	33,519	158	4,116	3	94
8/25	345	33,864	45	4,161	1	95
8/26	578	34,442	179	4,340	8	103
8/27	323	34,765	154	4,494	4	107
8/28	1,471	36,236	103	4,597	6	113
8/29	897	37,133	110	4,707	7	120
8/30	9	37,142	0	4,707	0	120
8/31	98	37,240	65	4,772	4	124

Appendix B14.–Daily sockeye salmon counts, and daily numbers of marked and unmarked sockeye salmon sampled at the Chilkat Lake weir, from September 1 to October 13 (end of season), 2004.

Date	Daily sockeye Sockeye Count	Cumulative Sockeye count	Daily Sockeye Sampled	Cumulative Sockeye Sampled	Marked Sockeye	Cumulative Marked Sockeye
9/1	1,086	38,326	151	4,923	4	128
9/2	1,361	39,687	93	5,016	5	133
9/3	1,346	41,033	96	5,112	4	137
9/4	209	41,242	155	5,267	5	142
9/5	1,297	42,539	101	5,368	1	143
9/6	1,821	44,360	48	5,416	2	145
9/7	622	44,982	124	5,540	9	154
9/8	2,704	47,686	72	5,612	0	154
9/9	1,965	49,651	0	5,612	0	154
9/10	1,426	51,077	209	5,821	5	159
9/11	1,892	52,969	116	5,937	7	166
9/12	1,319	54,288	203	6,140	6	172
9/13	604	54,892	206	6,346	4	176
9/14	2,283	57,175	160	6,506	5	181
9/15	700	57,875	156	6,662	2	183
9/16	1,978	59,853	88	6,750	3	186
9/17	1,303	61,156	339	7,089	4	190
9/18	1,333	62,489	149	7,238	3	193
9/19	1,636	64,125	183	7,421	2	195
9/20	213	64,338	213	7,634	2	197
9/21	1,226	65,564	240	7,874	2	199
9/22	2,147	67,711	351	8,225	3	202
9/23	171	67,882	138	8,363	0	202
9/24	768	68,650	116	8,479	2	204
9/25	919	69,569	33	8,512	0	204
9/26	0	69,569	0	8,512	0	204
9/27	0	69,569	0	8,512	0	204
9/28	0	69,569	0	8,512	0	204
9/29	55	69,624	55	8,567	1	205
9/30	103	69,727	42	8,609	1	206
10/1	458	70,185	210	8,819	3	209
10/2	1,095	71,280	74	8,893	3	212
10/3	930	72,210	71	8,964	0	212
10/4	31	72,241	31	8,995	1	213
10/5	199	72,440	140	9,135	5	218
10/6	809	73,249	92	9,227	2	220
10/7	442	73,691	0	9,227	0	220
10/8	288	73,979	51	9,278	0	220
10/9	146	74,125	32	9,310	0	220
10/10	340	74,465	33	9,343	1	221
10/11	576	75,041	44	9,387	0	221
10/12	261	75,302	33	9,420	0	221
10/13	330	75,632	0	9,420	0	221

Appendix B15.—Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of chum salmon captured in the Chilkat River fish wheels July 15 to August 31, 2003.

Date	Daily Chum Catch	Cumulative Chum Catch	Daily Chum tagged	Cumulative Chum Tagged	Daily CPUE	Cumulative Proportion CPUE
7/15	1	1	1	1	0.06	0.06
7/16	1	2	1	2	0.06	0.13
7/17	0	2	0	2	0.00	0.13
7/18	1	3	1	3	0.06	0.19
7/19	2	5	2	5	0.13	0.31
7/20	0	5	0	5	0.00	0.31
7/21	1	6	1	6	0.06	0.38
7/22	0	6	0	6	0.00	0.38
7/23	4	10	4	10	0.25	0.63
7/24	2	12	1	11	0.13	0.75
7/25	2	14	2	13	0.17	0.92
7/26	2	16	2	15	0.25	1.17
7/27	3	19	3	18	0.38	1.54
7/28	1	20	1	19	0.13	1.67
7/29	0	20	0	19	0.00	1.67
7/30	1	21	1	20	0.08	1.75
7/31	3	24	3	23	0.21	1.96
8/1	3	27	3	26	0.19	2.15
8/2	0	27	0	26	0.00	2.15
8/3	6	33	6	32	0.38	2.53
8/4	7	40	7	39	0.44	2.96
8/5	0	40	0	39	0.00	2.96
8/6	5	45	5	44	0.31	3.28
8/7	7	52	7	51	0.44	3.71
8/8	16	68	16	67	1.00	4.71
8/9	10	78	9	76	0.65	5.37
8/10	11	89	11	87	0.69	6.05
8/11	24	113	24	111	1.50	7.55
8/12	21	134	21	132	1.31	8.87
8/13	17	151	17	149	1.06	9.93
8/14	13	164	13	162	0.81	10.74
8/15	15	179	14	176	0.94	11.68
8/16	5	184	5	181	0.33	12.01
8/17	8	192	8	189	0.50	12.51
8/18	13	205	13	202	0.81	13.32
8/19	32	237	28	230	2.00	15.32
8/20	28	265	28	258	1.75	17.07
8/21	60	325	59	317	3.75	20.82
8/22	90	415	90	407	5.63	26.45
8/23	73	488	73	480	5.21	31.66
8/24	36	524	36	516	2.25	33.91
8/25	27	551	27	543	1.65	35.56
8/26	58	609	57	600	3.48	39.04
8/27	39	648	39	639	2.29	41.34
8/28	32	680	32	671	2.40	43.74
8/29	42	722	42	713	3.97	47.71
8/30	105	827	105	818	6.56	54.27
8/31	39	866	39	857	2.44	56.71

Appendix B16.–Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of chum salmon captured in the Chilkat River fish wheels September 1 to October 21 (end of season), 2003.

Date	Daily Chum Catch	Cumulative Chum Catch	Daily Chum tagged	Cumulative Chum Tagged	Daily CPUE	Cumulative Proportion CPUE
9/1	32	898	32	889	2.00	58.71
9/2	59	957	59	948	3.69	62.39
9/3	29	986	27	975	1.81	64.21
9/4	92	1,078	36	1,011	5.75	69.96
9/5	80	1,158	68	1,079	7.27	77.23
9/6	147	1,305	117	1,196	9.19	86.42
9/7	150	1,455	138	1,334	9.38	95.79
9/8	50	1,505	40	1,374	3.13	98.92
9/9	172	1,677	58	1,432	10.75	109.67
9/10	123	1,800	77	1,509	8.89	118.56
9/11	78	1,878	77	1,586	4.88	123.43
9/12	40	1,918	40	1,626	2.50	125.93
9/13	52	1,970	40	1,666	3.25	129.18
9/14	68	2,038	55	1,721	5.23	134.41
9/15	39	2,077	39	1,760	7.80	142.21
9/16	56	2,133	56	1,816	3.65	145.87
9/17	29	2,162	27	1,843	1.81	147.68
9/18	27	2,189	26	1,869	1.69	149.37
9/19	37	2,226	36	1,905	2.31	151.68
9/20	35	2,261	35	1,940	2.19	153.87
9/21	53	2,314	51	1,991	3.31	157.18
9/22	38	2,352	38	2,029	2.38	159.55
9/23	31	2,383	30	2,059	1.94	161.49
9/24	21	2,404	20	2,079	1.31	162.80
9/25	42	2,446	42	2,121	2.63	165.43
9/26	56	2,502	50	2,171	3.50	168.93
9/27	29	2,531	29	2,200	1.81	170.74
9/28	44	2,575	44	2,244	2.75	173.49
9/29	55	2,630	55	2,299	3.44	176.93
9/30	101	2,731	101	2,400	6.31	183.24
10/1	74	2,805	72	2,472	4.93	188.17
10/2	48	2,853	48	2,520	3.00	191.17
10/3	65	2,918	64	2,584	4.06	195.24
10/4	85	3,003	65	2,649	5.31	200.55
10/5	62	3,065	62	2,711	4.23	204.78
10/6	50	3,115	35	2,746	3.13	207.90
10/7	56	3,171	51	2,797	3.50	211.40
10/8	65	3,236	65	2,862	4.06	215.46
10/9	174	3,410	121	2,983	11.86	227.33
10/10	109	3,519	104	3,087	7.11	234.44
10/11	115	3,634	115	3,202	7.19	241.62
10/12	66	3,700	66	3,268	4.13	245.75
10/13	30	3,730	29	3,297	1.88	247.62
10/14	29	3,759	28	3,325	1.81	249.44
10/15	25	3,784	23	3,348	1.56	251.00
10/16	18	3,802	18	3,366	1.13	252.12
10/17	11	3,813	11	3,377	0.69	252.81
10/18	2	3,815	2	3,379	0.18	252.99
10/19	8	3,823	8	3,387	1.00	253.99
10/20	10	3,833	10	3,397	2.00	255.99
10/21	5	3,838	5	3,402	0.63	256.62

Appendix B17.—Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of chum salmon captured in the Chilkat River fish wheels June 8 to July 31, 2004.

Date	Daily Chum Catch	Cumulative Chum Catch	Daily Chum tagged	Cumulative Chum Tagged	Daily CPUE	Cumulative Prop. CPUE
6/8	1	1	1	1	0.06	0.06
6/9	0	1	0	1	0.00	0.06
6/10	1	2	0	1	0.06	0.13
6/11	0	2	0	1	0.00	0.13
6/12	2	4	2	3	0.13	0.25
6/13	6	10	6	9	0.38	0.63
6/14	7	17	7	16	0.44	1.06
6/15	2	19	2	18	0.13	1.19
6/16	1	20	1	19	0.06	1.25
6/17	7	27	4	23	0.44	1.69
6/18	2	29	2	25	0.13	1.81
6/19	1	30	1	26	0.06	1.88
6/20	0	30	0	26	0.00	1.88
6/21	13	43	10	36	0.81	2.69
6/22	14	57	14	50	0.88	3.56
6/23	23	80	21	71	1.44	5.00
6/24	15	95	14	85	0.94	5.94
6/25	21	116	18	103	1.31	7.25
6/26	24	140	24	127	1.50	8.75
6/27	42	182	41	168	2.63	11.38
6/28	39	221	38	206	3.04	14.41
6/29	33	254	27	233	2.06	16.48
6/30	30	284	24	257	1.88	18.35
7/1	44	328	44	301	2.84	21.19
7/2	38	366	35	336	2.38	23.57
7/3	38	404	38	374	2.38	25.94
7/4	55	459	53	427	3.44	29.38
7/5	52	511	50	477	3.25	32.63
7/6	51	562	43	520	3.19	35.82
7/7	42	604	30	550	2.63	38.44
7/8	1	2	1	2	0.06	0.13
7/9	0	2	0	2	0.00	0.13
7/10	0	2	0	2	0.00	0.13
7/11	1	3	1	3	0.06	0.19
7/12	3	6	3	6	0.19	0.38
7/13	1	7	1	7	0.06	0.44
7/14	1	8	1	8	0.06	0.50
7/15	2	10	2	10	0.13	0.63
7/16	2	12	2	12	0.13	0.75
7/17	4	16	4	16	0.25	1.00
7/18	6	22	6	22	0.38	1.38
7/19	2	24	2	24	0.13	1.50
7/20	0	24	0	24	0.00	1.50
7/21	3	27	3	27	0.19	1.69
7/22	4	31	4	31	0.25	1.94
7/23	2	33	1	32	0.13	2.06
7/24	3	36	3	35	0.19	2.25
7/25	4	40	4	39	0.25	2.50
7/26	4	44	3	42	0.25	2.75
7/27	2	46	2	44	0.13	2.88
7/28	2	48	2	46	0.13	3.00
7/29	3	51	3	49	0.20	3.20
7/30	10	61	10	59	0.63	3.82
7/31	11	72	11	70	0.69	4.51

Appendix B18.—Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of chum salmon captured in the Chilkat River fish wheels August 1 to September 30, 2004.

Date	Daily Chum Catch	Cumulative Chum Catch	Daily Chum tagged	Cumulative Chum Tagged	Daily CPUE	Cumulative Prop. CPUE
8/1	6	78	6	76	0.38	4.88
8/2	18	96	18	94	1.13	6.01
8/3	19	115	19	113	1.19	7.20
8/4	12	127	12	125	0.75	7.95
8/5	23	150	20	145	1.44	9.38
8/6	8	158	8	153	0.64	10.02
8/7	8	166	8	161	0.50	10.52
8/8	20	186	20	181	2.50	13.02
8/9	16	202	16	197	2.00	15.02
8/10	32	234	31	228	4.00	19.02
8/11	25	259	24	252	2.31	21.33
8/12	9	268	9	261	0.56	21.89
8/13	33	301	32	293	2.06	23.96
8/14	29	330	29	322	1.81	25.77
8/15	52	382	52	374	3.25	29.02
8/16	38	420	38	412	2.38	31.39
8/17	44	464	42	454	2.75	34.14
8/18	53	517	53	507	3.31	37.46
8/19	54	571	54	561	3.38	40.83
8/20	68	639	66	627	4.25	45.08
8/21	64	703	64	691	4.00	49.08
8/22	42	745	42	733	2.63	51.71
8/23	61	806	59	792	4.41	56.12
8/24	130	936	130	922	8.13	64.24
8/25	107	1,043	104	1,026	7.13	71.37
8/26	67	1,110	67	1,093	5.15	76.53
8/27	122	1,232	122	1,215	7.63	84.15
8/28	119	1,351	119	1,334	7.44	91.59
8/29	141	1,492	141	1,475	8.81	100.40
8/30	89	1,581	89	1,564	5.56	105.97
8/31	114	1,695	114	1,678	7.13	113.09
9/1	111	1,806	111	1,789	6.94	120.03
9/2	179	1,985	179	1,968	11.19	131.22
9/3	134	2,119	130	2,098	8.38	139.59
9/4	87	2,206	87	2,185	5.44	145.03
9/5	126	2,332	126	2,311	7.88	152.90
9/6	57	2,389	57	2,368	3.56	156.47
9/7	37	2,426	37	2,405	2.31	158.78
9/8	80	2,506	79	2,484	5.00	163.78
9/9	33	2,539	33	2,517	2.06	165.84
9/10	55	2,594	55	2,572	3.44	169.28
9/11	30	2,624	30	2,602	1.88	171.15
9/12	28	2,652	28	2,630	1.75	172.90
9/13	31	2,683	31	2,661	1.94	174.84
9/14	38	2,721	38	2,699	2.38	177.22
9/15	35	2,756	35	2,734	2.19	179.40
9/16	25	2,781	25	2,759	1.56	180.97
9/17	50	2,831	50	2,809	3.13	184.09
9/18	56	2,887	56	2,865	3.50	187.59
9/19	50	2,937	50	2,915	3.13	190.72
9/20	80	3,017	80	2,995	5.00	195.72
9/21	106	3,123	106	3,101	7.23	202.94
9/22	13	3,136	13	3,114	1.11	204.06
9/23	12	3,148	10	3,124	0.75	204.81
9/24	3	3,151	3	3,127	0.19	204.99
9/25	23	3,174	23	3,150	1.92	206.91
9/26	60	3,234	60	3,210	3.75	210.66
9/27	56	3,290	55	3,265	3.50	214.16
9/28	14	3,304	14	3,279	0.88	215.04
9/29	68	3,372	68	3,347	4.25	219.29
9/30	193	3,565	193	3,540	12.06	231.35

Appendix B19.–Daily catch, daily marked, and catch-per-unit-of-effort (CPUE) of chum salmon captured in the Chilkat River fish wheels October 1 to October 19 (end of season), 2004.

Date	Daily Chum Catch	Cumulative Chum Catch	Daily Chum tagged	Cumulative Chum Tagged	Daily CPUE	Cumulative Prop. CPUE
10/1	136	3,701	136	3,676	8.50	239.85
10/2	37	3,738	36	3,712	2.31	242.16
10/3	17	3,755	17	3,729	1.06	243.22
10/4	36	3,791	36	3,765	2.25	245.47
10/5	26	3,817	26	3,791	1.63	247.10
10/6	14	3,831	14	3,805	0.98	248.08
10/7	50	3,881	50	3,855	3.13	251.20
10/8	81	3,962	80	3,935	5.06	256.26
10/9	102	4,064	102	4,037	6.38	262.64
10/10	65	4,129	65	4,102	4.06	266.70
10/11	64	4,193	64	4,166	4.00	270.70
10/12	33	4,226	33	4,199	2.06	272.76
10/13	17	4,243	17	4,216	1.06	273.83
10/14	4	4,247	4	4,220	0.25	274.08
10/15	4	4,251	4	4,224	0.25	274.33
10/16	14	4,265	14	4,238	0.88	275.20
10/17	0	4,265	0	4,238	0.00	275.20
10/18	3	4,268	3	4,241	0.19	275.39
10/19	7	4,275	7	4,248	0.88	276.26