Fishery Data Series No. 18-31

Spawning Abundance of Chinook Salmon in the Taku River from 2008 to 2010

by

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and

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December 2018

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries

Symbols and Abbreviations

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Weights and measures (metric)	
centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)	
cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature	
day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry	
all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General	
Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics	
all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$log_{2,}$ etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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by

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ABSTRACT

A cooperative study involving the Alaska Department of Fish and Game, Department of Fisheries and Oceans Canada, and the Taku River Tlingit First Nation was conducted to estimate the number of spawning Chinook salmon *Oncorhynchus tshawytscha* in the Taku River from 2008 to 2010 using mark–recapture methodology. Fish were captured annually near Canyon Island in the lower Taku River using fish wheels and set gillnets from late April through early August and were tagged using back-sewn, individually numbered, solid-core spaghetti tags. Two secondary marks, a left operculum punch and a left axillary finclip, were applied in case the primary spaghetti tag was lost between tagging and recapture. Sampling in the lower river assessment and Canadian commercial fisheries, and on the spawning grounds was used to estimate the fraction of the population that had been marked. Spawning abundance of large-sized Chinook salmon (≥660 mm mid-eye to fork of tail) was estimated at 26,645 (SE = 3,010) in 2008, 22,761 (SE = 2,871) in 2009, and 28,769 (SE = 2,546) in 2010. Spawning abundance of medium-sized Chinook salmon (401–659 mm mid-eye to fork of tail) was estimated at 12,889 (SE = 2,559) in 2008, 10,231 (SE = 1,788) in 2009, and 7,310 (SE = 935) in 2010.

Key words: Chinook salmon, *Oncorhynchus tshawytscha*, Taku River, spawning abundance, mark–recapture, fish wheels, set gillnets, spaghetti tags, secondary marks, British Columbia, Southeast Alaska

INTRODUCTION

The Taku River produces the largest population of Chinook salmon *Oncorhynchus tshawytscha* in Southeast Alaska (Pahlke and Bernard 1996; McPherson et al. 1997; Pahlke 2009) as well as in British Columbia north of the Skeena River. Prior to the mid-1970s, these fish were exploited in directed commercial and recreational fisheries, with annual commercial harvests estimated to have reached approximately 15,000 or more fish (Kissner 1976). As part of a program to rebuild stocks of Chinook salmon in northern British Columbia and Southeast Alaska, various restrictions were placed on all intercepting fisheries (troll, gillnet, and recreational) beginning in 1976. This rebuilding effort has been combined with a coastwide rebuilding program for Chinook salmon in conjunction with the Pacific Salmon Treaty since 1985.

Presently, migrating Chinook salmon from the Taku River are caught incidentally in commercial gillnet and troll fisheries located in U.S. waters near the river and in an inriver Canadian gillnet fishery (Figure 1). Chinook salmon from the Taku River also constitute a large component of the spring catch in the recreational fishery in marine waters near Juneau and are caught in recreational fisheries in Canadian reaches of the drainage. Exploitation of this population is jointly managed by the U.S. and Canada through a subcommittee of the Pacific Salmon Commission (PSC).

Since 1973, escapements to the Taku River have been assessed by counting Chinook salmon on the spawning grounds in five clearwater tributaries from helicopters (Pahlke 2009). Only "large" Chinook salmon (typically 3-ocean age [age-.3] and older, or approximately larger than 659 mm mid-eye to fork of tail [MEF]) are counted in these surveys. Fish age-.1 and age-.2 (1- and 2-ocean age) are not counted because of the difficulty of distinguishing these fish from other species. In addition, the Chinook salmon escapement goal in the Taku River—as is the case for most escapement goals in Southeast Alaska—is established only for large-sized Chinook salmon (the exception being the goal in the Alsek River which includes 2-ocean age Chinook). Aerial and foot observer counts are the most basic form of escapement data gathered in Southeast Alaska and observers count large-sized Chinook salmon which are known to consistently comprise the bulk of the female spawning population.

Survey counts of large-sized Chinook salmon have been expanded to account for fish not present or observed during surveys, and for fish present in unsurveyed tributaries (Mecum and Kissner 1989; PSC 1993). Prior to 2000, factors used in the expansion have been based mostly on professional opinions of the ability to see fish during surveys, and the distribution of spawners in the watershed.

Expansions were established in 1981 and were revised in 1991. In 1988, a study demonstrated that it was possible to mark and recapture sufficient large-sized Chinook salmon in the Taku River to estimate escapement (McGregor and Clark 1989). Information from tagging and radiotelemetry studies in 1989 and 1990 by the Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries (DCF), the Department of Fisheries and Oceans Canada (DFO), and the U.S. National Marine Fisheries Service (NMFS) was used to provide the first estimates with confidence for the abundance of large-sized Chinook salmon in the Taku River in 1989 and 1990 (Pahlke and Bernard 1996; Eiler 1990). Chinook salmon were captured in fish wheels at Canyon Island, well below the upriver spawning grounds where fish were subsequently inspected for marks.

Subsequent mark–recapture (M–R) experiments (McPherson et al. 1996–1998) in conjunction with survey counts provided sufficient data to calculate an empirically based expansion factor. Based on experiments conducted in 1989, 1990, and 1995 to 1997, an expansion factor of 5.2 was estimated by McPherson et al. (2000). Future experiments will allow for the refinement of this estimate. Aerial surveys continue to occur each year and with an expansion factor applied, provide the ability to estimate spawning escapement in the event the M–R experiment fails.

The Taku River stock of Chinook salmon are "spring run" with most returning adults present in the terminal marine area from late April through early July and a few present into August. Spawning occurs from late July through the middle of September and nearly all juveniles spend one year inriver prior to heading into the marine environment, offshore and outside of Southeast Alaska (Kissner and Hubartt 1986). Returning adults spend 1 to 5 years at sea and younger fish (1- and 2-ocean age) are nearly all males, and older fish (ages-.3, -.4 and -.5) are a mix, but dominated by females. Chinook salmon that are 2-, 3-, and 4-ocean age (i.e., 4, 5, and 6-year olds) dominate the annual spawning population, while 5-ocean age Chinook salmon are rare in the Taku River run (McPherson et al. 2010).

OBJECTIVES

The primary objectives of this study were to estimate abundance of large-sized (≥660 mm MEF) Chinook salmon spawning in the Taku River in 2008 to 2010 and to estimate the age and sex composition of these fish. Secondary objectives were to estimate abundance and age and sex composition of medium-sized (401–659 mm MEF) and small-sized (≤401 mm MEF) Chinook salmon.

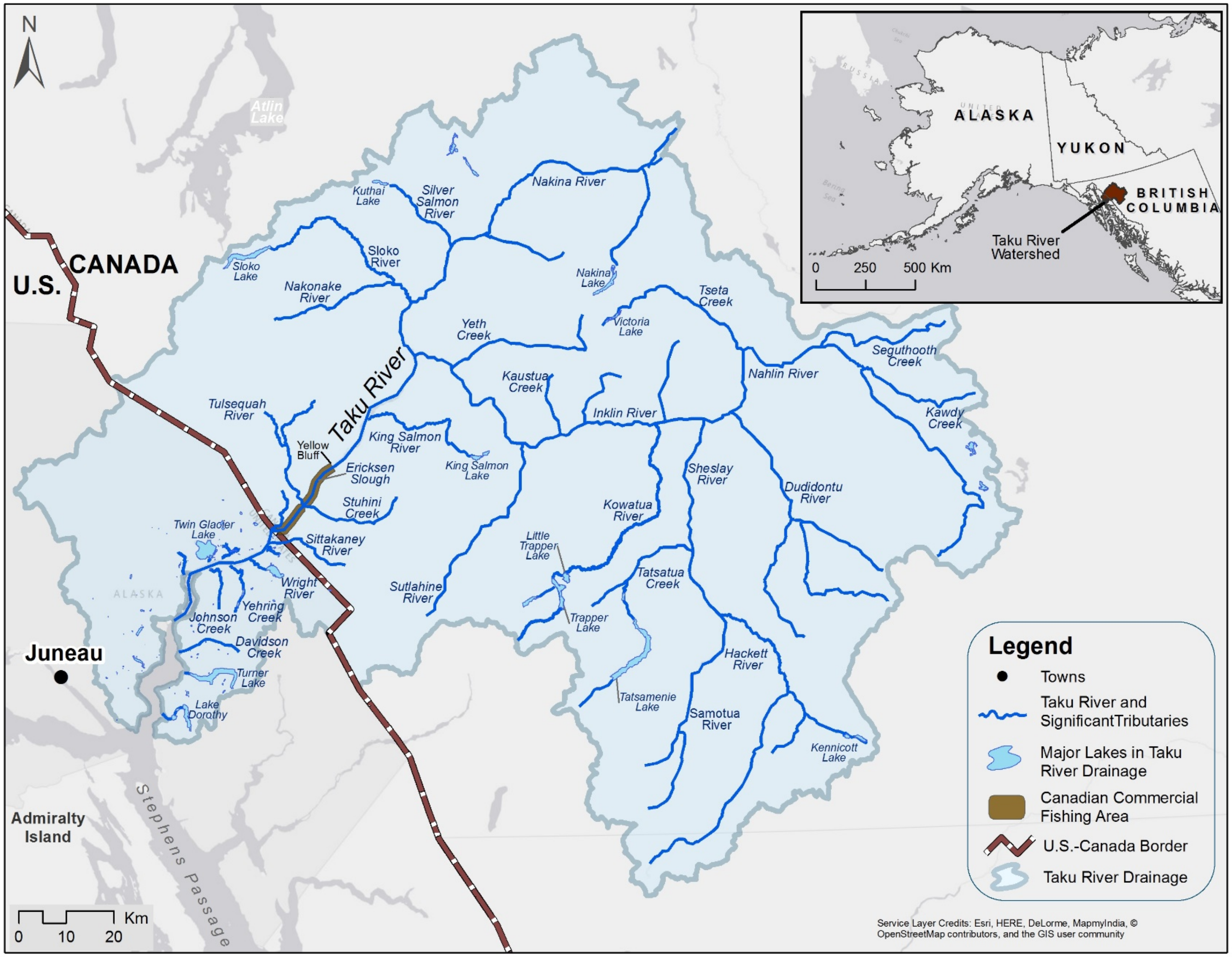

Figure 1.–Taku Inlet and the Taku River drainage of northwestern British Columbia and Southeast Alaska.

METHODS

STUDY AREA

The Taku River originates on the Stikine Plateau of northwestern British Columbia, Canada (Figure 1) and flows into the Taku Inlet which is located about 30 km northeast of Juneau, Alaska. The Taku River drains approximately 17,094 km^2 of land (Bigelow et al. 1995) and there are two main tributaries, the Inklin and the Nakina Rivers, which merge about 80 km up from saltwater to form the main body of the lower Taku River. Discharge past Canyon Island, located about 25 km upriver from Taku Inlet (Figure 1), increases from an average of 60 m^3/sec in February to 1,097 m^3/sec in June (Bigelow et al. 1995). The mainstem is turbid and glacial; however, the tributaries where most known Chinook salmon spawning occurs (i.e., the Nahlin, Nakina, Tatsamenie, Dudidontu, and Hackett Rivers, and Kowatua and Tseta Creeks) are relatively small clearwater systems.

Two-event M–R experiments for a closed population (Seber 1982) were conducted on the Taku River in 2008, 2009, and 2010. Fish wheels and set gillnets were used in the first (capture) event of the experiment in the lower river. The second (recapture) event sample consisted of upriver sampling on or near the spawning grounds and sampling of catches in the lower river assessment, commercial, and Aboriginal fisheries that take place just upstream from the first event capture site. Previous studies have shown this to be an effective means for estimating spawning population parameters for Chinook salmon in the Taku River (McPherson et al. 1996–1999; Boyce et al. 2006; Jones et al. 2010).

EVENT ONE (MARK–CAPTURE): CANYON ISLAND

Adult Chinook salmon were captured using 2 fish wheels located at Canyon Island, approximately 4 km downstream from the international border (Figure 1). The 2 fish wheels were approximately 350 m apart on opposite banks. These fish wheel sites have been in use since 1984. Fish wheel configurations and fish wheel operations are discussed in detail in Kelley and Milligan (1999).

The Taku River narrows significantly at Canyon Island, and much of the river, under low to medium water levels, is forced within a deep channel with bedrock control on both banks, making it an ideal location for fish wheel operation. The initial date of fish wheel operations varied annually during 2008–2010, dependent mostly on water conditions, but usually the fish wheels were operational by the middle of May each year. Fish wheels were operated continuously from start-up in May through early October for sampling Chinook, sockeye (*O. nerka*), and coho (*O. kisutch*) salmon, except during extreme high or low water levels and during maintenance or sampling (Appendices A2 [2008], B2 [2009], C2 [2010]).

To supplement fish wheel catches, a 5⅜-inch or 7¼-inch mesh gillnet was set in an eddy just downstream of the lower fish wheel site. The first days of gillnetting varied each year but normally fishing occurred by the third week of April. The gillnet was fished up to 6 hours per day when fish wheels were not operational due to low water or maintenance, or when fish wheel catches were low (Appendices A1 [2008], B1 [2009], C1 [2010]).

Beginning in 2010, additional net effort was implemented near Flannigan Slough located approximately 4 km upstream from the Canyon Island fish wheels, which are just below the international border. This extra effort was established to increase the number of Chinook salmon tagged in event 1 and to bolster the M–R program, which was being hindered by a period of poor

Chinook salmon production. In 2010, the Flannigan Slough set gillnet (5⅜-inch or 7¼-inch mesh) was fished 6 days a week for 6 hours a day beginning on May 1, and the last effort was on June 22.

During all capture and marking efforts, fish were carefully removed from gillnets or dipnetted from the fish wheel live boxes and transferred to a tote or trough partially filled with river water where they were processed. Fish were handled with bare hands to prevent injury to the fish. While one person held the fish, another took samples and measurements, and a third recorded data. Length was measured to the nearest mm MEF, and gender was determined from inspection of external characteristics. Five scales from every fish handled were taken from the "preferred area" consistent with procedures described by Welander (1940). Scales were mounted onto gummed cards that held scales from 10 fish. The age of each fish was determined later from annual growth patterns of circuli (Olsen 1992) on images of scales impressed onto acetate magnified 70× (Clutter and Whitesel 1956). In cooperation with another project, the presence or absence of an adipose fin (denoting the presence of a coded wire tag) was noted for each fish sampled.

All captured Chinook salmon judged uninjured were tagged and marked for the first event. Each fish was tagged with a "solid-core" spaghetti tag, which consisted of a 2¼-inch section of laminated plastic tubing shrunk onto a 15-inch piece of 80-lb test monofilament fishing line; we felt this was an improved design over that used on the Chilkat River in 1991 (Johnson et al. 1992). The monofilament was back-sewn just behind the dorsal fin and secured by crimping both ends of the monofilament in a line crimp, trimming the excess. Each tag had an individual number and stamp with a contact phone number. Secondary marks were also applied to each fish in the form of a $^{5}/_{16}$-inch hole punched in the upper one-third of the left operculum (LUOP) and by excision of the left axillary appendage (LAA). Fish tagged at Flannigan Slough were given a double upper-left operculum (DLUOP) to distinguish them from fish tagged at Canyon Island, along with excision of the LAA. All recaptures in the fish wheels and from the Flannigan Slough tagging effort were recorded and placed back in the river without additional marking.

EVENT TWO (RECAPTURE): SAMPLING INRIVER FISHERIES

Chinook salmon were also sampled from gillnet fisheries operated just above the international border. These fisheries included an assessment fishery, a commercial fishery, and an Aboriginal food, social, and ceremonial (FSC) fishery. The Chinook salmon assessment fishery began in early May in 2008 and a Chinook salmon commercial fishery began in early May in 2009 and 2010. These fisheries operated until the third Sunday in June when the traditional sockeye salmon commercial fishery began. The Chinook salmon assessment fishery used 7¼-inch mesh gillnets and the Chinook salmon commercial used gillnets that could not exceed 8-inch mesh. The traditional sockeye salmon fishery used gillnets with a maximum mesh size of 5⅞ inches. The FSC fishery operated opportunistically from mid-May to early June, annually.

EVENT TWO (RECAPTURE): SAMPLING ON THE SPAWNING GROUNDS

In 2008, 2009, and 2010, Chinook salmon were sampled from the Nahlin, Dudidontu, Nakina, and Tatsamenie Rivers and in Tseta, Yeth, and Kowatua Creeks. In addition to efforts on these tributaries, the King Salmon River was sampled in 2008 and 2010, and the Hackett River was sampled in 2008. All together, these stocks represented early, mid-, and late season migrants (Alaska Department of Fisheries 1951; Pahlke and Bernard 1996; Eiler 1990). Carcass weirs were operated on the Nakina and Tatsamenie Rivers and Kowatua Creek, and additional rod and reel, spear, and carcass sampling was used in the Nahlin, Dudidontu, and Tatsamenie Rivers and at Tseta, Yeth and Kowatua Creeks. All inspected fish were closely examined for the presence of the primary tag, the secondary marks, and the absence of the adipose fin and each fish was then measured to the nearest mm MEF. Scale samples were taken from all inspected fish from each tributary according to procedures described above for Canyon Island. Sampled fish were marked with a lower left operculum punch (LLOP) to prevent repeat sampling.

SAMPLING FOR CODED WIRE TAGS

In the lower Taku River near Canyon Island from April to June, emigrating Chinook salmon smolt were captured and injected with coded wire tags (CWTs). This information is gathered in a companion project that marks both Chinook and coho salmon smolt. These wild smolt are captured with baited minnow traps and seine nets by 6 staff members attending 3 trap lines, consisting of about 200 traps in aggregate. Rotary screw traps were used from 1991 to 1994 exclusively to capture smolt, and then in combination with minnow traps in 1995 and 1996. Beginning in 1997, minnow traps and seine nets were used for all smolt capture. Captured fish were transported carefully to a central processing station and then adipose finclipped, tagged, tested for overnight mortality and tag retention, and released back into the river near Canyon Island. Strict protocols are followed to promote health of the fish and long-term tag retention, which are detailed in operational plans and onsite training provided preseason. Long-term tag retention has averaged consistently near 94% (McPherson et al. 2010). After spending 1 to 5 years at sea, Chinook salmon then return to the Taku River and are randomly sampled for the presence of CWTs. From these samples, CWTs are used to assign marked fish to their specific brood year, and unmarked fish are allocated using scale age analyses allowing for estimates of the marked fraction by brood year.

ABUNDANCE BY SIZE

These experiments were designed to estimate abundance of Chinook salmon on the spawning grounds with Chapman's modification of the Petersen estimator (Chapman 1951). Abundance and sex-age composition parameters for small-sized, medium-sized and large-sized Chinook salmon were estimated separately. Estimated abundance ($\hat{N}_i$) of small-sized, medium-sized and large-sized fish on the spawning grounds was calculated using the following modification to Chapman's model (Seber 1982):

$$\hat{N}_i = \hat{N}_i^+ - Q_i = \left(\frac{(\hat{M}_i + 1)(C_i + 1)}{(R_i + 1)} - 1 \right) - Q_i \qquad (1)$$

where $\hat{M}_i$ is the estimated number of marked fish not censored from the experiment of size i, C_i is the number of fish of size i inspected for marks during second event sampling, R_i is the number of these inspected fish with marks, and Q_i is the total number of fish of size i that were included in the Chapman model ($\hat{N}_i^+$), but were harvested prior to spawning. In this case, Q_i are known as all of the harvest is sampled for size and classified by size group. The estimated number of marked fish on the spawning grounds was $\hat{M}_i = T_i - \hat{H}_i$, where T_i is the number of tagged fish released at Canyon Island and $\hat{H}_i$ is the estimated number of tagged fish removed by fishing (censored from the experiment). The sources of data for the statistics C_i, R_i, Q_i, T_i, and $\hat{H}_i$ varied annually as a result of sampling success and evaluation of diagnostic tests (described below).

Conditions that must be met for use of Chapman's modification of the Petersen estimator (Seber 1982) include the following:

(a) every fish had an equal probability of being marked in the first sample, or that every fish had an equal probability of being captured in the second sample, or that marked fish mixed completely with unmarked fish; and
(b) recruitment and mortality did not occur between samples; and
(c) marking did not affect the catchability of a fish during the second sampling event; and
(d) fish did not lose their marks in the time between the 2 samples; and
(e) all marks were reported on recovery in the second sample; and
(f) repeat sampling did not occur.

Condition (a) may be violated if size-selective sampling occurs. The population was divided into size groups because fish wheels are selective for smaller fish (Meehan 1961; Pahlke and Bernard 1996). Kolmogorov-Smirnov (K-S) 2-sample tests (Conover 1980) were used to test the hypothesis that fish of different lengths within size strata were captured with equal probability during second event sampling. Length distributions of small-sized, medium-sized and large-sized fish tagged and released at Canyon Island were compared with the length distributions of small-sized, medium-sized, and large-sized fish recaptured in all tributaries. Tests for gender bias were not conducted because sex could not be accurately determined for all fish sampled at Canyon Island during the marking event.

Three consistency tests described by Seber (1982) were used to test for temporal and/or spatial violations of condition (a). Failure to reject at least 1 of these 3 hypothesis tests was sufficient to conclude that at least 1 of the conditions in (a) was satisfied, and a Petersen-type model was appropriate to estimate abundance. The fraction of samples composed of recaptured fish (R_i / C_i) was compared across tributaries and other second event sampling sites to determine if the estimator was consistent.

The experiments were assumed closed to recruitment (condition b) because first event sampling spanned the entire immigration each year. Two methods were employed to account for losses (mortality) during the experiment. Censoring of estimated numbers of tagged fish harvested downstream of the capture site was used to alleviate the potential bias that could result from fish moving downstream after passing the tagging site and being intercepted in commercial and recreational fisheries in adjacent marine waters. When appropriate, tagged fish from fisheries upstream of the tagging site were also censored. In cases where tagged fish from upstream fisheries were not censored, the total catch from these fisheries was subtracted from the abundance estimate to arrive at an estimate of the total number of spawning fish.

The use of multiple marks during the first event, careful inspection of all fish captured during second event sampling, and additional marking of all fish inspected helped to ensure that conditions (d), (e), and (f) were met. Sampling rates were 100% in the assessment fishery. A reward of $5 (CDN) was offered for each returned tag from the inriver Canadian gillnet fishery in the efforts to identify removals.

We accepted the possibility that marking fish had an effect on future behavior or catchability of some released fish during second event sampling (condition c). While only healthy fish were tagged and released, the handling of fish during the marking event may have, in some cases, affected the behavior of marked fish immediately following handling. This may have made marked fish more vulnerable than unmarked fish to capture in the assessment, Canadian commercial, and Aboriginal fisheries that occur a short distance upstream of the marking site, as well as in commercial fisheries occurring downstream of the marking site at Canyon Island. Censoring of estimated numbers of tagged fish harvested downstream of the capture site, as described above, was also useful to alleviate the potential bias that could result from marked fish moving downstream and holding after tagging, which could result in an increased probability of capture in downstream fisheries. When the marked-unmarked ratio of salmon sampled in assessment, Canadian commercial, and/or Aboriginal fisheries was significantly higher than the ratio observed during spawning ground sampling (see consistency test described above), it was assumed to have resulted from greater vulnerability of marked fish immediately following marking, and these fish were censored from the experiment. We were able to assume no difference in probability of capture between marked and unmarked fish during spawning ground surveys because handling effects due to marking, if they occurred, were of short duration and did not persist after marked fish resumed upstream migration to spawning areas.

Estimated numbers of tagged small-sized, medium-sized, and large-sized fish censored from the experiment ($\hat{H}_i$) always included tallies of returned tags and expanded samples from fisheries downstream of Canyon Island. The number of tagged Chinook salmon recovered through sampling by DCF of catches from the Alaska gillnet fishery in Taku Inlet/Stephens Passage was expanded by the fraction of the catch of Chinook salmon sampled in that year. Also, tags recovered from creel surveys of the U.S. recreational fishery near Juneau (approximately 20% of the harvest was sampled in all years) were expanded and censored. However, when no tags were recovered during creel surveys or no creel surveys took place, any voluntarily returned tags were censored. All tags voluntarily returned from the inriver recreational fishery in Canada were censored. Presumably, some unknown number of tagged fish left the river and died, while avoiding commercial or recreational harvest. The radiotelemetry studies performed in 1989 and 1990 (Pahlke and Bernard 1996; Eiler 1990) suggest the incidence of marked fish leaving the river to be negligible, yet any number introduces a source of bias to the experiment.

When sufficient numbers of large-sized marked fish were recovered during spawning grounds surveys, the preferred model for estimating spawning abundance used only those data from spawning ground surveys for second event sampling data. Samples gathered on the spawning grounds are preferred as a variety of methods were used to capture fish and this has been shown to produce unbiased estimates of age, sex, and length composition (McPherson et al. 1997). Marked fish recovered in the inriver assessment and Canadian commercial and Aboriginal fisheries were censored from the experiment (part of $\hat{H}_i$) and Q_i was zero (see equation 1). Consistency test were only applied to those spawning ground observations used to estimate abundance.

In years when small numbers of marked fish were recovered during spawning grounds surveys, sampling results from the inriver assessment and Canadian commercial and Aboriginal fisheries were considered for inclusion as second event sampling data. These data are considered based on the results of consistency tests. If the marked-unmarked ratio from any of these fisheries were significantly greater than the ratio observed during spawning ground surveys, data (recovered marks) from that fishery were censored, as described above. When data from 1 or more of these fisheries did not need to be censored, the data were pooled with spawning ground data, and the total harvest from fisheries was included in Q_i (see equation 1).

Within each year that a M–R experiment was conducted, data from the same sources were used to estimate abundance for all size strata, when sufficient data were available within each stratum for estimates to be calculated. These data sources are described, by year, in the RESULTS section.

Variance, bias, and confidence intervals for $\hat{N}_i$ were estimated with modifications of bootstrap procedures described in Buckland and Garthwaite (1991). Small-sized, medium-sized, and large-sized Chinook salmon passing by Canyon Island were divided into 7 capture histories (Table 1).

Table 1.–Capture histories for small-sized, medium-sized and large-sized Chinook salmon in the population spawning in the Taku River.

Capture history	Source of Statistics
Marked, but censored in recreational fisheries	Returned
Marked, but censored in the U.S. marine commercial fishery	Observed/sampling rate
Marked, but censored in the Canadian inriver commercial, assessment, and Aboriginal fisheries	Returned
Marked and not sampled in tributaries	$\hat{M}_i - R_i$
Marked and recaptured in tributaries	R_i
Not marked, but captured in tributaries	$C_i - R_i$
Not marked and not sampled in tributaries	$\hat{N}_i - \hat{M}_i - C_i + R_i$
Effective population for simulations	$\hat{N}_i^+$

A bootstrap sample was built by drawing with replacement a sample of size $\hat{N}_i^+$ from the empirical distribution defined by the capture histories. A new set of statistics from each bootstrap sample $\{\hat{M}_i^*, C_i^*, R_i^*, \hat{H}_i^*, T_i^*\}$ was generated, along with a new estimate $\hat{N}_i^*$ for abundance on the spawning grounds, and a large number (≥1,000) of such bootstrap samples were drawn creating the empirical distribution $\hat{F}(\hat{N}_i^*)$, which is an estimate of $F(\hat{N}_i)$. The difference between the average $\overline{\hat{N}}_i^*$ of bootstrap estimates and $\hat{N}_i^+$ is an estimate of statistical bias in the latter statistic (Efron and Tibshirani 1993, Section 10.2). Confidence intervals were estimated from $\hat{F}(\hat{N}_i^*)$ with the percentile method (Efron and Tibshirani 1993, Section 13.3).

Variance was estimated as

$$v(\hat{N}_i^*) = (B-1)^{-1}\sum_{b=1}^{B}(\hat{N}_{i(b)}^* - \overline{\hat{N}}_i^*)^2 \qquad (2)$$

where B is the number of bootstrap samples.

Abundance of all spawning Chinook salmon was estimated as $\hat{N} = \hat{N}_{ss} + \hat{N}_{ms} + \hat{N}_{ls}$, and confidence intervals for $\hat{N}$ and $v(\hat{N})$ were estimated as described above.

AGE AND SEX COMPOSITION

The proportion of the spawning population composed of a given age or sex for small-sized, medium-sized or large-sized fish was estimated as a binomial variable from fish sampled on the spawning grounds:

$$\hat{p}_{ij} = \frac{n_{ij}}{n_i} \qquad (3)$$

where $\hat{p}_{ij}$ is the estimated proportion of the population of age or sex *j* in size group *i*, n_{ij} is the number of Chinook salmon of age or sex *j* of size group *i*, and n_i is the number of Chinook salmon in the sample *n* of size group *i* taken on the spawning grounds. Information taken at Canyon Island was not used to estimate age or sex composition of the spawning population, because fish wheels have been shown to selectively capture smaller salmon (Meehan 1961; Pahlke and Bernard 1996), and because of difficulty in accurately sexing fish (most were ocean-bright and did not have secondary maturation characteristics).

Spawning ground samples were pooled, because investigations showed sampling on the spawning grounds had not been size-selective within a size group (McPherson et al. 1997). Sampling variance was calculated as:

$$v(\hat{p}_{ij}) = \frac{\hat{p}_{ij}(1-\hat{p}_{ij})}{n_i - 1} \qquad (4)$$

Numbers of spawning fish by age or sex were estimated as the summation of products of estimated age composition and estimated abundance within a size category:

$$\hat{N}_j = \sum_i \left(\hat{p}_{ij} \hat{N}_i \right) \qquad (5)$$

with a sample variance calculated according to procedures in Goodman (1960):

$$v(\hat{N}_j) = \sum_i \begin{pmatrix} v(\hat{p}_{ij})\hat{N}_i^{\,2} + v(\hat{N}_i)\hat{p}_{ij}^2 \\ - v(\hat{p}_{ij})v(\hat{N}_i) \end{pmatrix} \qquad (6)$$

The proportion of the spawning population composed of a given age or sex was estimated as the summed totals across size categories:

$$\hat{p}_j = \frac{\hat{N}_j}{\hat{N}} \qquad (7)$$

with a variance approximated according to procedures in Seber (1982, p. 8–9):

$$v(\hat{p}_j) = \frac{\sum_i \left(v(\hat{p}_{ij})\hat{N}_i^2 + v(\hat{N}_i)(\hat{p}_{ij} - \hat{p}_j)^2 \right)}{\hat{N}^2} \qquad (8)$$

Sex composition and age-sex composition for the entire spawning population and its associated variances were also estimated with the equations above by first redefining the binomial variables in samples to produce estimated proportions by sex $\hat{p}_k$, where *k* denotes gender (male or female), such that $\sum_k \hat{p}_k = 1$, and by age-sex $\hat{p}_{jk}$, such that $\sum_{jk} \hat{p}_{jk} = 1$. Sex composition was estimated after combining spawning ground samples.

RESULTS

TAGGING, RECOVERY, AND ABUNDANCE IN 2008

Medium-sized and large-sized Chinook salmon abundances in 2008 were estimated using M–R data consisting of event 1 releases at Canyon Island and event 2 samples gathered on the spawning grounds and in the lower river fisheries.

A total of 1,295 Chinook salmon of known size were caught at Canyon Island, of which 1,242 were tagged and released (Table 2). Of the total caught, 139 were small-sized, 466 were medium-sized and 690 were large-sized Chinook salmon. Gillnets were used to catch 507 fish, and fish wheels used to catch 788 fish; all of these fish were caught between 23 April and 5 August.

Of the 690 large-sized Chinook salmon caught at Canyon Island, 668 were tagged and released (Table 2). Of these, 335 were captured in gillnets (Appendix A1), and 333 were caught in fish wheels (Appendix A2). Of the 466 medium-sized Chinook salmon caught at Canyon Island, 454 were tagged and released (Table 2). Of these, 154 were captured in gillnets (Appendix A1), and 300 were caught in fish wheels (Appendix A2). One hundred and twenty small-sized Chinook salmon caught at Canyon Island were tagged and released and all were captured using fish wheels (Appendices A2).

All 1,295 Chinook salmon that were caught at Canyon Island were inspected for adipose fins; of these, 20 fish were missing adipose fins and all had valid CWTs confirmed to be natal to the spring smolt tagging operations on the Taku River (Appendices A1 and A2).

In 2008, water levels were relatively low from late April to early May (i.e., 0–3 ft), followed by steady increase to a peak level seen during Chinook salmon season on 29 May (i.e., 11 ft). Thereafter, water levels slowly dropped to well below average summer levels (i.e., 3–7 ft).

Inriver abundance past Canyon Island was estimated by tagging fish at Canyon Island and sampling for marked and unmarked fish farther upstream in the assessment fishery, the Canadian inriver commercial fishery and at various tributaries. Spawning abundance was estimated by subtracting inriver harvests from inriver abundance.

Table 2.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2008 by size group.

		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
EVENT 1: FISH MARKED WITH SPAGHETTI TAGS AT CANYON ISLAND					
Total Initially Tagged		120	455	668	1,243
Captured using Fish Wheels and Tagged		120	301	333	754
Captured using Set Gillnets and Tagged		0	154	335	489
Total Tag Removals by:		0	3	3	6
All U.S. fisheries		0	3	3	6
Commercial gillnet[a]		0	3	3	6
Sport fishery		0	0	0	0
Inriver assessment fishery		0	0	0	0
All Canadian fisheries		0	0	0	0
Commercial fishery		0	0	0	0
Sport fishery		0	0	0	0
Final Total Tagged in Event 1 ($\hat{M}_i$)		120	**452**[b]	**665**[b]	1,237
EVENT 2: FISH INSPECTED FOR SPAGHETTI TAGS – Captured and Recaptured					
Upper river spawning areas	Inspected	108	**505**[b]	**1,440**[b]	2,053
	Marked	5	**9**[b]	**21**[b]	35
	Marked/Inspected	0.046	0.018	0.015	0.017
Lower River fisheries	Inspected	3	**467**[b]	**2,312**[b]	2,782
(Assessment, Commercial, and Food)	Marked	0	**23**[b]	**64**[b]	87
	Marked/Inspected	0.000	0.049	0.028	0.031

[a] All recoveries in the U.S. gillnet fishery in District 111 (Taku Inlet/Stephens Passage) were select without expansion.

[b] Information in bold was used in the mark–recapture estimate.

Cumulative proportions of combined large- and medium-sized Chinook salmon marked at Canyon Island that survived past all marine fisheries were marginally different to those recaptured in combined samples from the inriver test fishery, Canadian commercial fishery, and the spawning grounds in 2008 (P = 0.14; Figure 2). Few small-sized fish were tagged or examined and were excluded from all subsequent analyses. Because a separate estimate of large-sized fish was desired, differences in marked fractions amongst sampling locations for large-sized and medium-sized fish were separated. Separate comparisons of length distributions for medium-sized and large-sized Chinook salmon indicated size-selective sampling was not significant within each size group (P = 0.99 and P = 0.74; Figures 3 and 4). The recovery samples for medium-sized and large-sized fish included the combined samples from the inriver assessment fishery, Canadian commercial fishery, and the spawning grounds. Any removals that occurred downriver of the marking site (6 total) had known length and were censored from the analyses as they were not available to be sampled during the M–R study.

The estimated inriver run of medium-sized Chinook salmon in 2008 was 13,356 (SE = 2,559). This is based on 972 fish inspected for marks (C_m) in the assessment fishery, Canadian commercial fishery, and on the spawning grounds. Of these, 32 were recaptured fish (R_m) having previously been tagged at Canyon Island (Table 2). Accounting for the inriver harvest (assessment fishery =

140; Canadian commercial fishery = 327) results in a spawning abundance ($=\hat{N}_m$) of 12,889 (SE = 2,559). There were 3 tagged medium-sized fish removed in terminal marine fisheries (all U.S. commercial gillnet fishery). In total, 452 medium-sized fish were released ($=\hat{M}_m$) with tags and available for sampling in 2008.

For medium-sized fish, samples were gathered at 9 spawning areas (Appendix A1). Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in 3 of the spawning areas. For the 6 spawning areas having recoveries, the marked fractions did not differ significantly ($\chi^2 = 7.4$, df = 5, P = 0.19). However, the marked fractions from the pooled spawning grounds sample, the combined assessment fishery, and the Canadian commercial fishery (Table 2) were significantly different ($\chi^2 = 7.0$, df = 1, P = 0.01), notably with a lower marked fraction seen on the spawning grounds. Still, this model is believed to be reasonable from past experience, although failure of the consistency tests indicates potential for bias in the Chapman estimator. The estimated abundance of medium-sized fish has a 95% confidence interval of 10,248 to 20,379, and an estimated relative statistical bias of 6.13% when comparing Chapman's estimate with the bootstrap result. The true degree of bias due to failure of the consistency test is unknown.

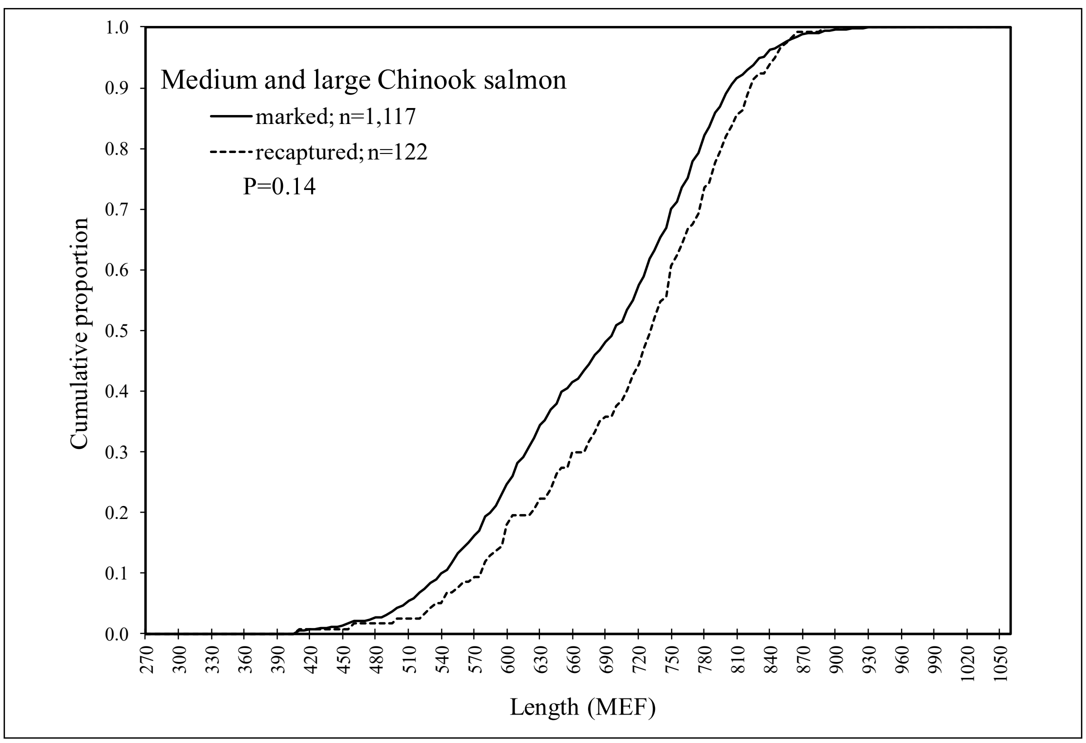

Figure 2.–Cumulative proportions of medium-sized and large-sized Chinook salmon marked at Canyon Island versus those recaptured on the spawning grounds and in lower river fisheries in 2008.

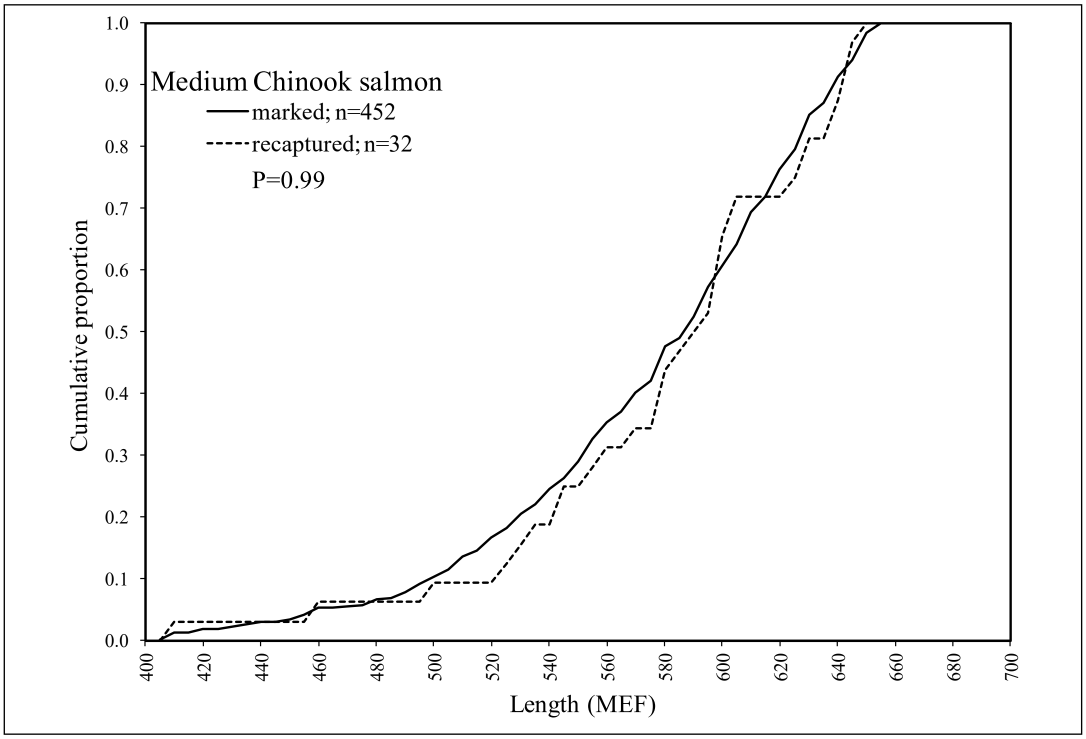

Figure 3.–Cumulative proportions of medium-sized Chinook salmon marked at Canyon Island (minus 6 marine fishery removals) versus those recaptured on the spawning grounds and in lower river fisheries in 2008.

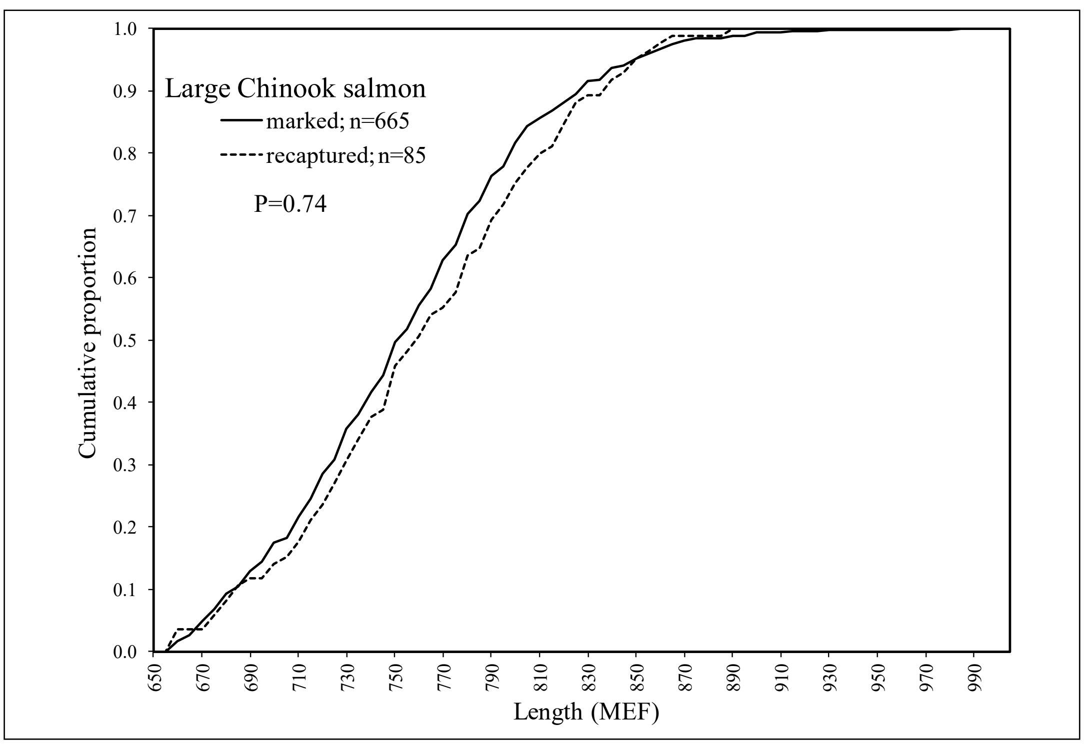

Figure 4.–Cumulative proportions of large-sized Chinook salmon marked at Canyon Island versus those recaptured on the spawning grounds and in lower river fisheries in 2008.

The estimated inriver run of large-sized Chinook salmon in 2008 was 29,063 (SE = 3,010). This is based on 3,752 fish inspected ($=C_m$) for marks in the assessment fishery, Canadian commercial fishery and on the spawning grounds. Of these, 85 were recaptured ($=R_m$) fish having previously been tagged at Canyon Island (Table 2). Accounting for the inriver harvest (test fishery = 1,399; Canadian commercial fishery = 913; Canadian Aboriginal fishery = 1; and assumed Canadian sport fishery = 105) results in a spawning abundance ($=\hat{N}_m$) of 26,645 (SE = 3,010). There were 3 tagged large-sized fish removed in marine fisheries (all U.S. commercial gillnet fishery). In total, 665 large-sized fish were released ($=\hat{M}_m$) with tags and available for sampling in 2008.

For large-sized fish, samples were gathered at 9 spawning areas (Appendix A1). Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in 2 of the spawning areas. For the 7 spawning areas having recoveries, the marked fractions did differ significantly ($\chi^2 = 16.9$, df = 6, P = 0.01). The marked fractions from the pooled spawning grounds sample compared to the combined samples from the assessment fishery and the Canadian commercial fishery (Table 2) were significantly different ($\chi^2 = 6.9$, df = 1, P = 0.01), notably with a lower marked fraction seen on the spawning grounds. Although failure of the consistency tests indicates potential for bias in the Chapman estimator, from past experience this model is believed to be reasonable and the M–R estimate of 26,645 is similar to the expanded peak observer survey count of 27,633, a relative statistical bias of 3.7%. The estimated abundance of large-sized fish has a 95% confidence interval of 23,982 to 35,971, and an estimated relative statistical bias of 1.09% when comparing Chapman's estimate with the bootstrap result. The true degree of bias due to failure of the consistency test is unknown.

The estimated escapement abundance of medium-sized and large-sized Chinook salmon ($\hat{N} = \hat{N}_m + \hat{N}_l$) on the spawning grounds for 2008 was 39,534 (SE = 3,951), and a 95% confidence interval of 31,790 to 47,277.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2008

Age-1.3 fish were the most abundant age class of Chinook salmon on the spawning grounds of the Taku River in 2008. They represented 56.8% (SE = 3.5%) of the estimated escapement of medium-sized and large-sized fish (Table 3). Age-1.2 fish represented 31.4% (SE = 3.8%) of the estimated escapement, and age-1.4 fish represented 8.9% (SE = 1.0%) (Appendix A3).

The sex composition of the estimated escapement was 60.6% (SE = 2.7%) male (Table 3). Males accounted for 92.6% of the medium-sized Chinook salmon and 80.3% of the medium-sized fish were age 1.2. More than half (54.9%) of large-sized Chinook salmon were female and 78.2% of the large-sized fish were age 1.3.

Of the large-sized fish sampled at Canyon Island, 82.9% were age 1.3, and 11.8% were age 1.4. Amongst medium-sized Chinook salmon sampled, 86.3% were age 1.2. Within size groups, the age compositions from samples taken at Canyon Island are similar (P > 0.99) to those from the combined tributary samples.

Length compositions were similar (P = 0.75) between samples gathered on the spawning grounds and at Canyon Island (Table 4).

Table 3.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2008.

		Brood year and age class									
		2005	2004	2004	2003	2003	2002	2002	2001	2001	
		1.1[a]	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
PANEL A: AGE AND SEX COMPOSITION OF MEDIUM CHINOOK SALMON											
Males	*n*	20	1	270	2	31	0	1	0	0	325
	%	5.7%	0.3%	76.9%	0.6%	8.8%	–	0.3%	–	–	92.6%
	SE of %	1.2%	0.3%	2.3%	0.4%	1.5%	–	0.3%	–	–	1.4%
	Escapement	734	37	9,914	73	1,138	–	37	–	–	11,934
	SE of esc.	214	37	1,989	53	296	–	37	–	–	2,897
Females	*n*	0	0	12	0	13	0	1	0	0	26
	%	–	–	3.4%	–	3.7%	–	0.3%	–	–	7.4%
	SE of %	–	–	1.0%	–	1.0%	–	0.3%	–	–	1.4%
	Escapement	–	–	441	–	477	–	37	–	–	955
	SE of esc.	–	–	151	–	159	–	37	–	–	819
Sexes Combined	*n*	20	1	282	2	44	0	2	0	0	351
	%	5.7%	0.3%	80.3%	0.6%	12.5%	–	0.6%	–	–	100.0%
	SE of %	1.2%	0.3%	2.1%	0.4%	1.8%	–	0.4%	–	–	0.0%
	Escapement	734	37	10,355	73	1,616	–	73	–	–	12,889
	SE of esc.	214	37	2,073	53	391	–	53	–	–	2,559
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	*n*	0	0	64	0	324	2	44	0	0	434
	%	–	–	6.7%	–	33.7%	0.2%	4.6%	–	–	45.1%
	SE of %	–	–	0.8%	–	1.5%	0.1%	0.7%	–	–	1.6%
	Escapement	–	–	1,773	–	8,974	55	1,219	–	–	12,021
	SE of esc.	–	–	292	–	1,091	39	225	–	–	2,022
Females	*n*	1	0	10	2	428	5	81	0	1	528
	%	0.1%	–	1.0%	0.2%	44.5%	0.5%	8.4%	–	0.1%	54.9%
	SE of %	0.1%	–	0.3%	0.1%	1.6%	0.2%	0.9%	–	0.1%	1.6%
	Escapement	28	–	277	55	11,855	138	2,243	–	28	14,624
	SE of esc.	28	–	92	39	1,405	63	347	–	28	2,230
Sexes Combined	*n*	1	0	74	2	752	7	125	0	1	962
	%	0.1%	–	7.7%	0.2%	78.2%	0.7%	13.0%	–	0.1%	100.0%
	SE of %	0.1%	–	0.9%	0.1%	1.3%	0.3%	1.1%	–	0.1%	0.0%
	Escapement	28	–	2,050	55	20,828	194	3,462	–	28	26,645
	SE of Esc.	28	–	325	39	2,380	76	485	–	28	3,010
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	*n*	20	1	334	2	355	2	45	0	0	759
	%	1.9%	0.1%	29.6%	0.2%	25.6%	0.1%	3.2%	–	–	60.6%
	SE of %	0.5%	0.1%	3.6%	0.1%	1.7%	0.1%	0.5%	–	–	2.7%
	Escapement	734	37	11,687	73	10,112	55	1,255	–	–	23,955
	SE of esc.	214	37	2,010	53	1,131	39	228	–	–	3,533
Females	*n*	1	0	22	2	441	5	82	0	1	554
	%	0.1%	–	1.8%	0.1%	31.2%	0.4%	5.8%	–	0.1%	39.4%
	SE of %	0.1%	–	0.4%	0.1%	2.3%	0.2%	0.7%	–	0.1%	2.7%
	Escapement	28	–	718	55	12,332	138	2,280	–	28	15,579
	SE of esc.	28	–	177	39	1,414	63	349	–	28	2,376
Sexes Combined	*n*	21	1	356	4	796	7	127	0	1	1,313
	%	1.9%	0.1%	31.4%	0.3%	56.8%	0.5%	8.9%	–	0.1%	100.0%
	SE of %	0.5%	0.1%	3.8%	0.2%	3.5%	0.2%	1.0%	–	0.1%	0.0%
	Escapement	762	37	12,405	129	22,444	194	3,536	–	28	39,534
	SE of esc.	216	37	2,098	66	2,411	76	488	–	28	3,951

[a] No estimate was made for small-sized Chinook salmon and the number of age-1.1 fish above is biased low and germane to medium-sized and large-sized Chinook salmon only and not representative of the total Chinook salmon spawning abundance.

Table 4.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2008.

		Brood Year and age class									
		2005	2004	2004	2003	2003	2002	2002	2001	2001	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	*n*	92	3	335	2	355	2	46	0	0	835
	Average	376	377	603	593	758	810	834	–	–	656
	SD	65	26	73	53	76	7	125	–	–	149
	SE	7	15	4	38	4	5	18	–	–	5
Females	*n*	1	0	22	2	441	5	82	0	1	554
	Average	770	–	666	765	762	785	818	–	805	767
	SD	–	–	76	64	50	44	46	–	–	58
	SE	–	–	16	45	2	20	5	–	–	2
Sexes Combined	*n*	93	3	357	4	796	7	128	0	1	1,389
	Average	380	377	607	679	760	792	823	–	805	700
	SD	77	26	74	110	63	38	83	–	–	133
	SE	8	15	4	55	2	14	7	–	–	4

TAGGING, RECOVERY AND ABUNDANCE IN 2009

Medium-sized and large-sized Chinook salmon abundance in 2009 was estimated using M–R data consisting of event 1 releases at Canyon Island and event 2 samples gathered in tributaries and the lower river fisheries.

A total of 688 Chinook salmon of known size were caught at Canyon Island, of which 637 were tagged and released (Table 5). Of the total caught, 84 were small-sized, 270 were medium-sized, and 334 were large-sized Chinook salmon. Gillnets were used to catch 371 fish and fish wheels were used to catch 317 fish; all of these fish were caught between 29 April and 25 July.

Of the 334 large-sized Chinook salmon caught at Canyon Island, 312 were tagged and released (Table 5). Of these, 193 were captured in gillnets (Appendix B1), and 119 were caught in fish wheels (Appendix B2). Of the 270 medium-sized Chinook salmon caught at Canyon Island, 264 were tagged and released (Table 5). Of these, 159 were captured in gillnets (Appendix B1), and 105 were caught in fish wheels (Appendix B2). Sixty-one small-sized Chinook salmon caught at Canyon Island were tagged and released and all were captured using fish wheels (Appendices B2).

All 688 Chinook salmon that were caught at Canyon Island were inspected for adipose fins; of these, 8 fish were missing adipose fins (Appendices B1 and B2). Later dissection and processing indicated that 5 contained valid CWTs, confirmed natal to the spring smolt tagging operations on the Taku River (Appendices C1 and C2).

In 2009, water levels were relatively low through late April (i.e., -3–3 ft), followed by steady increase to a peak level seen during Chinook salmon season on 9 June (i.e., 12.8 ft). Thereafter, water levels slowly dropped while maintaining above average summer levels (i.e., 3–7 ft).

Inriver abundance past Canyon Island was estimated by tagging fish at Canyon Island and sampling for marked and unmarked fish farther upstream in the Canadian inriver commercial fishery and at various tributaries. Spawning abundance was estimated by subtracting inriver harvest from inriver abundance.

Table 5.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2009 by size group.

		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
EVENT 1: FISH MARKED WITH SPAGHETTI TAGS AT CANYON ISLAND					
Total Initially Tagged		61	264	312	637
Captured using Fish Wheels and Tagged		61	105	119	285
Captured using Set Gillnets and Tagged		0	159	193	352
Total Tag Removals by:		0	2	6	8
All U.S. fisheries[a]		0	2	6	8
Commercial gillnet		0	2	5	7
Commercial troll		0	0	1	1
Sport fishery		0	0	0	0
Inriver assessment fishery (no assessment fishery in 2009)		0	0	0	0
All Canadian fisheries		0	0	0	0
Commercial fishery		0	0	0	0
Sport fishery		0	0	0	0
Final Total Tagged in Event 1 ($\hat{M}_i$)		61	**262**[b]	**306**[b]	1,237
EVENT 2: FISH INSPECTED FOR SPAGHETTI TAGS – Captured and Recaptured					
Upper river spawning areas	Inspected	416	**553**[b]	**1,102**[b]	2,071
	Marked	5	**12**[b]	**4**[b]	21
	Marked/Inspected	0.012	0.022	0.004	0.010
Lower River Fisheries	Inspected	1	**1,136**[b]	**6,759**[b]	7,896
(Commercial)	Marked	1	**26**[b]	**76**[b]	103
	Marked/Inspected	1.000	0.023	0.011	0.013

[a] All recoveries in U.S. marine fisheries were select without expansion.

[b] Information in bold was used in the mark–recapture experiment.

Cumulative proportions of combined large-sized and medium-sized Chinook salmon marked at Canyon Island that survived past all marine fisheries were marginally different to those recaptured in combined samples from the Canadian commercial fishery and the spawning grounds in 2009 (P = 0.19; Figure 5). Few small-sized fish were tagged or examined and were excluded from all subsequent analyses. Because a separate estimate of large-sized fish was desired, differences in marked fractions amongst sampling locations for large-sized and medium-sized fish were separated. Separate comparisons of length distributions for medium-sized and large-sized Chinook salmon indicated size-selective sampling was not significant within each size group (P = 0.90 and P = 0.38; Figures 6 and 7). The recovery samples for medium-sized and large-sized fish included the combined samples from the Canadian commercial fishery and the spawning grounds. Any removals that occurred downriver of the marking site (8 total) had known length and were censored from the analyses as they were not available to be sampled during the M–R study.

The estimated inriver run of medium-sized Chinook salmon in 2009 was 11,397 (SE = 1,788). This is based on 1,689 fish inspected ($= C_m$) for marks in the Canadian commercial fishery and on the spawning grounds. Of these, 38 were recaptured ($=R_m$) fish having previously been tagged at Canyon Island (Table 5). Accounting for the inriver harvest (Canadian Aboriginal fishery = 30; Canadian commercial fishery = 1,136) results in a spawning abundance ($=\hat{N}_m$) of 10,231 (SE = 1,788). There were 2 tagged medium-sized fish removed in terminal marine fisheries (all U.S. commercial gillnet fishery). In total, 262 medium-sized fish were released ($=\hat{M}_m$) with tags and available for sampling in 2009.

For medium-sized fish, samples were gathered at 7 spawning areas (Appendix B1). Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in 3 of the spawning areas. For the 4 spawning areas having recoveries, the marked fractions were significantly different ($\chi^2 = 8.4$, df = 3, P = 0.04). However, the marked fractions from the pooled spawning grounds sample and the Canadian commercial fishery (Table 5) were not significantly different ($\chi^2 = 0.02$, df = 1, P = 0.88). This model is believed to be reasonable from past experience and the estimated abundance of medium-sized fish has a 95% confidence interval of 8,809 to 15,803, and an estimated relative statistical bias of 2.12% when comparing Chapman's estimate with the bootstrap result.

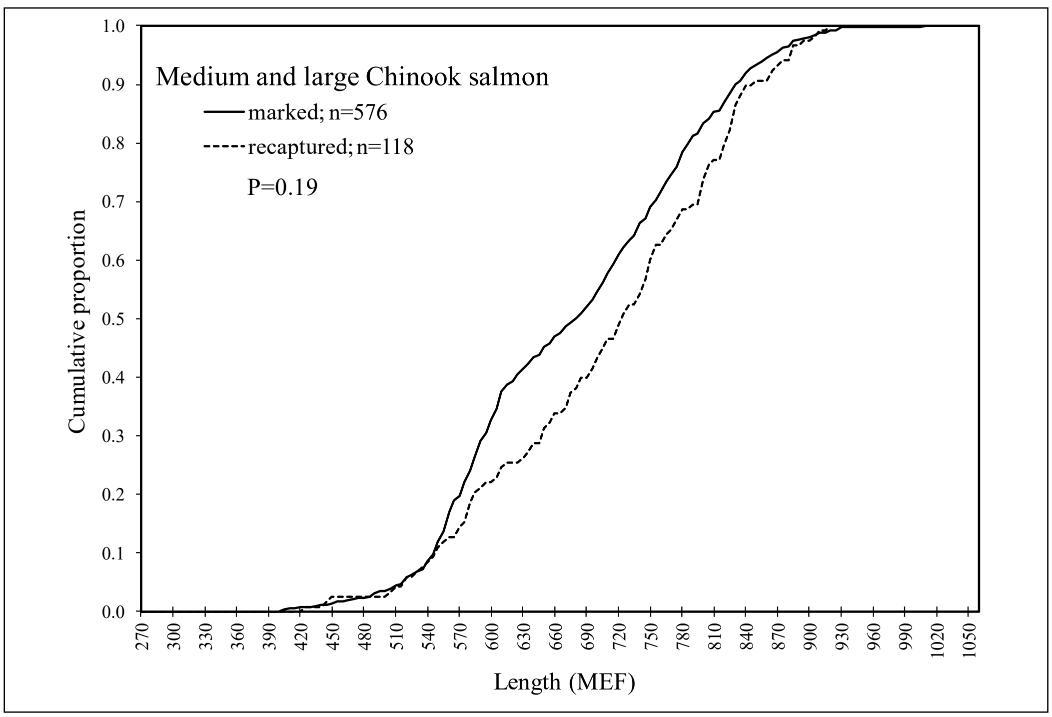

Figure 5.–Cumulative proportions of medium-sized and large-sized Chinook salmon marked at Canyon Island versus those recaptured on the spawning grounds and in lower river fisheries in 2009.

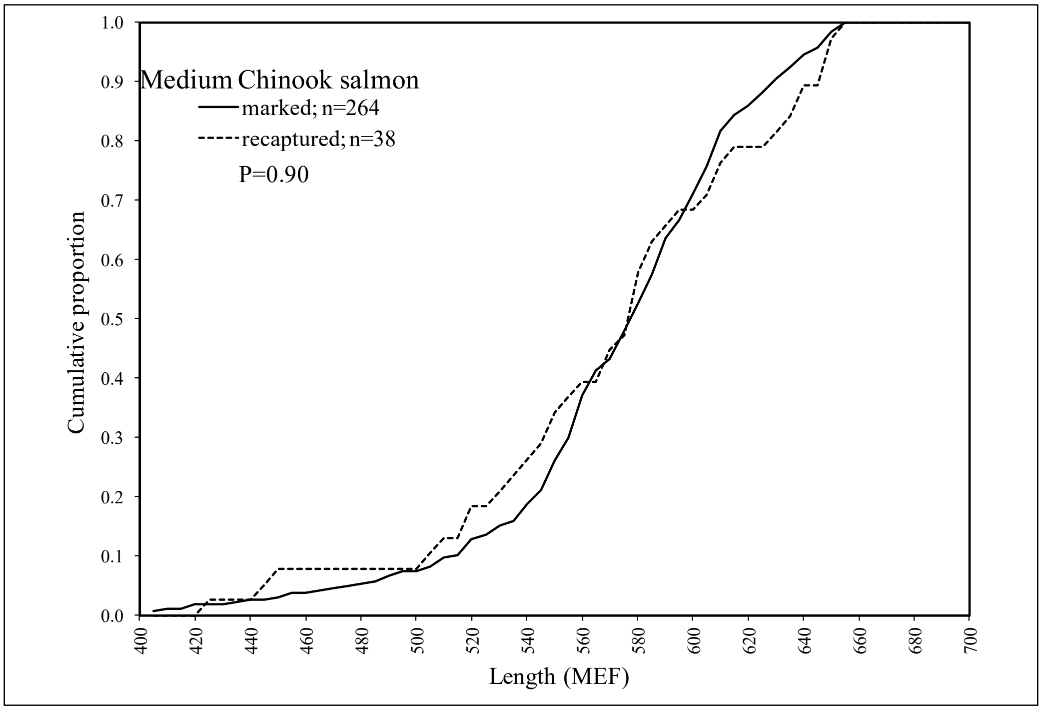

Figure 6.–Cumulative proportions of medium-sized Chinook salmon marked at Canyon Island (minus 6 marine fishery removals) versus those recaptured on the spawning grounds and in lower river fisheries in 2009.

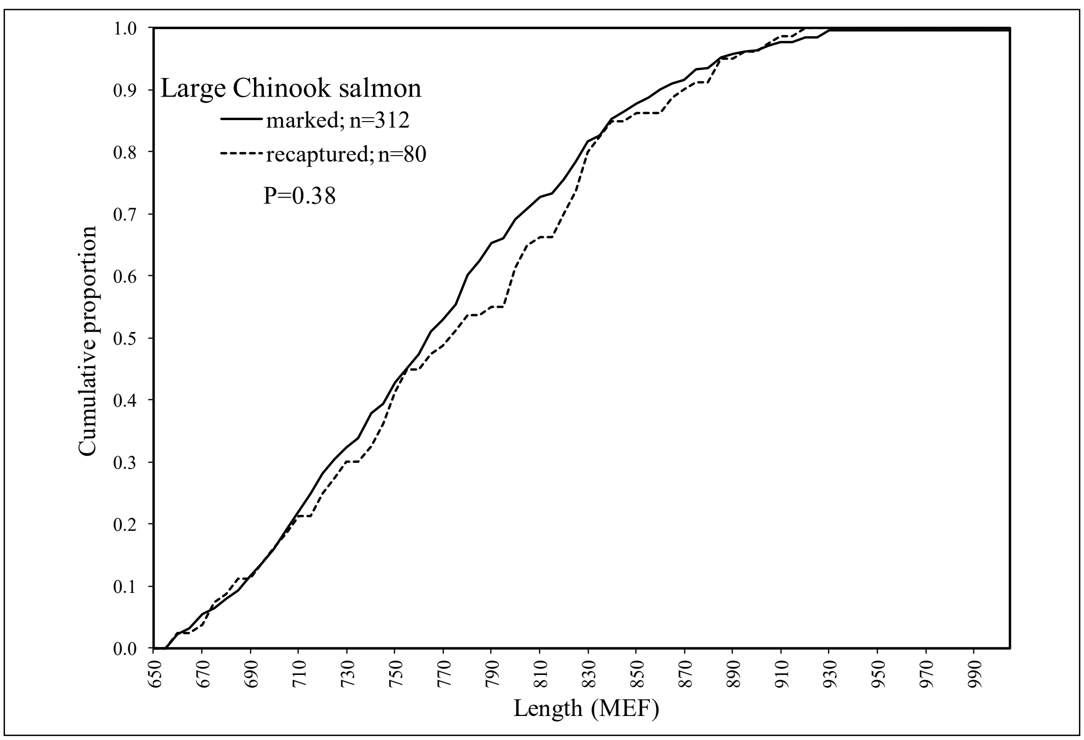

Figure 7.–Cumulative proportions of large-sized Chinook salmon marked at Canyon Island versus those recaptured on the spawning grounds and in lower river fisheries in 2009.

The estimated inriver run of large-sized Chinook salmon in 2009 was 29,797 (SE = 2,871). This is based on 7,861 fish inspected ($=C_m$) for marks in the Canadian commercial fishery and on the spawning grounds. Of these, 80 were recaptured ($=R_m$) fish having previously been tagged at Canyon Island (Table 5). Accounting for the inriver harvest (Canadian commercial fishery = 6,759; Canadian Aboriginal fishery = 172; and assumed Canadian sport fishery = 105) results in a spawning abundance ($=\hat{N}_m$) of 22,761 (SE = 2,871). There were 6 tagged large-sized fish removed in marine fisheries (U.S. commercial gillnet fishery = 5; U.S. commercial troll fishery = 1). In total, 306 large-sized fish were released ($=\hat{M}_m$) with tags and available for sampling in 2009.

For large-sized fish, samples were gathered at 7 spawning areas (Appendix B1). Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in all but 1 of the spawning areas and no consistency test was performed as a result. The marked fractions from the pooled spawning grounds sample compared to the sample from the Canadian commercial fishery (Table 5) were marginally significantly different ($\chi^2 = 5.4$, df = 1, P = 0.02), notably with a lower marked fraction seen on the spawning grounds. Although failure of the consistency tests indicates potential for bias in the Chapman estimator, from past experience this model is believed to be reasonable and the M–R estimate of 22,761 is similar to the expanded peak observer survey count of 21,783, a relative statistical bias of 4.3%. The estimated abundance of large-sized fish has a 95% confidence interval of 25,224 to 36,217, and an estimated relative statistical bias of 0.67% when comparing Chapman's estimate with the bootstrap result. The true degree of bias due to failure of the consistency test is unknown.

The estimated abundance of medium-sized and large-sized Chinook salmon ($\hat{N} = \hat{N}_m + \hat{N}_l$) on the spawning grounds for 2009 was 32,992 (SE = 3,382), and a 95% confidence interval of 26,363 to 39,621.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2009

Age-1.3 fish were the most abundant age class of Chinook salmon on the spawning grounds of the Taku River in 2009. They represented 52.0% (SE = 3.1%) of the estimated escapement of medium-sized and large-sized fish (Table 6). Age-1.2 fish represented 29.0% (SE = 3.6%) of the estimated escapement, and age-1.4 fish represented 15.9% (SE = 1.6%) (Appendix B3).

The sex composition of the estimated escapement was 64.8% (SE = 2.6%) male (Table 6). Males accounted for 96.2% of medium-sized Chinook salmon, and 81.5% of the medium-sized fish were age 1.2. Sex composition of the large-sized Chinook salmon was nearly equal (male = 50.7%), and of 70.4% of the large-sized fish were age 1.3.

Of the large-sized fish sampled at Canyon Island, 66.8% were age 1.3, and 31.8% were age 1.4. Among the medium-sized Chinook salmon sampled, 84.1% were age 1.2. Within size groups, the age compositions from samples taken at Canyon Island are similar (P > 0.98) to those from the combined tributary samples.

Length compositions were similar (P = 0.96) between samples gathered on the spawning grounds and at Canyon Island (Table 7).

Table 6.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2009.

		Brood year and age class									
		2006	2005	2005	2004	2004	2003	2003	2002	2002	
		1.1[a]	2.1	1.2	2.2	1.3	2.3	0.4	1.4	2.4	Total
PANEL A: AGE AND SEX COMPOSITION OF MEDIUM CHINOOK SALMON											
Males	*n*	8	1	229	9	27	1	0	1	0	276
	%	2.8%	0.3%	79.8%	3.1%	9.4%	0.3%	–	0.3%	–	96.2%
	SE of %	1.0%	0.3%	2.4%	1.0%	1.7%	0.3%	–	0.3%	–	1.1%
	Escapement	285	36	8,163	321	962	36	–	36	–	9,839
	SE of esc.	110	36	1,447	118	242	36	–	36	–	2,815
Females	*n*	1	0	5	0	5	0	0	0	0	11
	%	0.3%	–	1.7%	–	1.7%	–	–	–	–	3.8%
	SE of %	0.3%	–	0.8%	–	0.8%	–	–	–	–	1.1%
	Escapement	36	–	178	–	178	–	–	–	–	392
	SE of esc.	36	–	84	–	84	–	–	–	–	562
Sexes Combined	*n*	9	1	234	9	32	1	0	1	0	287
	%	3.1%	0.3%	81.5%	3.1%	11.1%	0.3%	–	0.3%	–	100.0%
	SE of %	1.0%	0.3%	2.3%	1.0%	1.9%	0.3%	–	0.3%	–	0.0%
	Escapement	321	36	8,342	321	1,141	36	–	36	–	10,231
	SE of esc.	118	36	1,476	118	274	36	–	36	–	1,788
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	*n*	0	0	27	0	223	2	0	48	1	301
	%	–	–	4.5%	–	37.5%	0.3%	–	8.1%	0.2%	50.7%
	SE of %	–	–	0.9%	–	2.0%	0.2%	–	1.1%	0.2%	2.1%
	Escapement	–	–	1,035	–	8,545	77	–	1,839	38	11,534
	SE of esc.	–	–	233	–	1,168	55	–	343	38	2,044
Females	*n*	0	0	5	0	195	3	1	88	1	293
	%	–	–	0.8%	–	32.8%	0.5%	0.2%	14.8%	0.2%	49.3%
	SE of %	–	–	0.4%	–	1.9%	0.3%	0.2%	1.5%	0.2%	2.1%
	Escapement	–	–	192	–	7,472	115	38	3,372	38	11,227
	SE of esc.	–	–	88	–	1,038	67	38	538	38	2,016
Sexes Combined	*n*	0	0	32	0	418	5	1	136	2	594
	%	–	–	5.4%	–	70.4%	0.8%	0.2%	22.9%	0.3%	100.0%
	SE of %	–	–	0.9%	–	1.9%	0.4%	0.2%	1.7%	0.2%	0.0%
	Escapement	–	–	1,226	–	16,017	192	38	5,211	77	22,761
	SE of Esc.	–	–	260	–	2,064	88	38	764	55	2,871
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	*n*	8	1	256	9	250	3	0	49	1	577
	%	0.9%	0.1%	27.9%	1.0%	28.8%	0.3%	–	5.7%	0.1%	64.8%
	SE of %	0.3%	0.1%	3.6%	0.4%	2.0%	0.2%	–	0.9%	0.1%	2.6%
	Escapement	285	36	9,198	321	9,507	112	–	1,875	38	21,373
	SE of esc.	110	36	1,465	118	1,192	65	–	345	38	3,479
Females	*n*	1	0	10	0	200	3	1	88	1	304
	%	0.1%	–	1.1%	–	23.2%	0.3%	0.1%	10.2%	0.1%	35.2%
	SE of %	0.1%	–	0.4%	–	2.0%	0.2%	0.1%	1.2%	0.1%	2.6%
	Escapement	36	–	370	–	7,650	115	38	3,372	38	11,619
	SE of esc.	36	–	122	–	1,042	67	38	538	38	2,093
Sexes Combined	*n*	9	1	266	9	450	6	1	137	2	881
	%	1.0%	0.1%	29.0%	1.0%	52.0%	0.7%	0.1%	15.9%	0.2%	100.0%
	SE of %	0.4%	0.1%	3.6%	0.4%	3.1%	0.3%	0.1%	1.6%	0.2%	0.0%
	Escapement	321	36	9,568	321	17,158	227	38	5,247	77	32,992
	SE of esc.	118	36	1,499	118	2,082	95	38	765	55	3,382

[a] No estimate was made for small-sized Chinook salmon and the number of age-1.1 fish above is biased low and germane to medium-sized Chinook salmon only and not representative of the total Chinook salmon spawning abundance.

Table 7.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2009.

		Brood Year and age class									
		2006	2005	2005	2004	2004	2003	2003	2002	2002	
		1.1	2.1	1.2	2.2	1.3	2.3	0.4	1.4	2.4	Total
Males	*n*	219	2	263	9	248	3	–	49	1	794
	Average	341	383	571	594	743	768	–	870	885	581
	SD	37	46	77	53	67	212	–	81	–	184
	SE	2	33	5	18	4	122	–	12	–	7
Females	*n*	1	–	9	–	199	3	1	88	1	302
	Average	595	–	629	–	761	752	770	825	845	776
	SD	–	–	85	–	51	45	–	46	–	65
	SE	–	–	28	–	4	26	–	5	–	4
Sexes Combined	*n*	220	2	272	9	447	6	1	137	2	1,096
	Average	342	383	573	594	751	760	770	842	865	634
	SD	41	46	78	53	61	137	–	64	28	183
	SE	3	33	5	18	3	56	–	6	20	6

TAGGING, RECOVERY AND ABUNDANCE IN 2010

Medium-sized and large-sized Chinook salmon abundance in 2010 was estimated using M–R data consisting of event 1 releases at Canyon Island and event 2 samples gathered in tributaries and the lower river fisheries.

A total of 1,311 Chinook salmon of known size were caught at Canyon Island and Flannigan Slough, of which 1,271 were tagged and released (Table 8). Of the total caught, 111 were small-sized, 433 were medium-sized and 767 were large-sized Chinook salmon. Gillnets were used to catch 963 fish and fish wheels were used to catch 348 fish; all of these fish were caught between 24 April and 13 July.

Of the 767 large-sized Chinook salmon caught at Canyon Island and Flannigan Slough, 746 were tagged and released (Table 8). Of these, 606 were captured in gillnets (Appendices C1 and C2) and 140 were caught in fish wheels (Appendix C3). Of the 433 medium-sized Chinook salmon caught at Canyon Island and Flannigan Slough, 418 were tagged and released (Table 8). Of these, 320 were captured in gillnets (Appendices C1 and C2), and 98 were caught in fish wheels (Appendix C3). Of the 111 small-sized Chinook salmon caught at Canyon Island, 107 were tagged and released (Table 8). Of these, seven were captured in gillnets at Canyon Island (Appendix C1), and 100 were caught in fish wheels (Appendix C3).

All 1,311 Chinook salmon that were caught at Canyon Island and Flannigan Slough were inspected for adipose fins; 14 of these fish were missing adipose fins (Appendices C1, C2 and C2). Later dissection and processing indicated that 10 contained valid CWTs confirmed natal to the spring smolt tagging operations on the Taku River (Appendices C1, C2 and C2).

In 2010, water levels were relatively normal from late April to early June. Thereafter, water levels slowly dropped to well below average summer levels (i.e., 3–7 ft) for the remainder of the Chinook run except for a few brief peaks in flow.

Inriver abundance past Canyon Island was estimated by tagging fish at Canyon Island and Flannigan Slough and sampling for marked and unmarked fish farther upstream in the Canadian inriver commercial fishery and at various tributaries. Spawning abundance was estimated by subtracting inriver harvest from inriver abundance.

Table 8.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2010 by size group. Information in bold was used in the mark–recapture estimate.

		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
EVENT 1: FISH MARKED WITH SPAGHETTI TAGS AT CANYON ISLAND					
Total Initially Tagged		107	418	746	1,271
Captured using Fish Wheels and Tagged		100	98	140	338
Captured using Set Gillnets and Tagged		7	138	271	416
Captured at Flannigan using Set Gillnets and Tagged		0	182	335	517
Total Tag Removals by:		0	2	3	5
All U.S. fisheries		0	2	3	5
Commercial gillnet[a]		0	2	1	3
Sport fishery		0	0	2	2
Inriver assessment fishery (no assessment fishery in 2010)		0	0	0	0
All Canadian fisheries		0	0	0	0
Commercial fishery		0	0	0	0
Sport fishery		0	0	0	0
Final Total Tagged in Event 1 ($\hat{M}_i$)		107	**416**[b]	**743**[b]	1,266
EVENT 2: FISH INSPECTED FOR SPAGHETTI TAGS – Captured and Recaptured					
Upper river spawning areas	Inspected	292	**455**[b]	**1,434**[b]	2,181
	Marked	4	**23**[b]	**26**[b]	53
	Marked/Inspected	0.014	0.051	0.018	0.024
Lower River Fisheries	Inspected	3	**700**[b]	**5,238**[b]	5,941
(Commercial)	Marked	3	**36**[b]	**118**[b]	157
	Marked/Inspected	1.000	0.051	0.023	0.026

[a] All recoveries in U.S. marine fisheries were select without expansion.

[b] Information in bold was used in the mark–recapture estimate.

Cumulative proportions of combined large-sized and medium-sized Chinook salmon marked at Canyon Island that survived past all marine fisheries were different to those recaptured in combined samples from the Canadian commercial fishery and the spawning grounds in 2010 (P = 0.05; Figure 8). Few small-sized fish were tagged or examined and were excluded from all subsequent analyses. Because a separate estimate of large-sized fish was desired, differences in marked fractions amongst sampling locations for large-sized and medium-sized fish were separated. Separate comparisons of length distributions for medium-sized and large-sized Chinook salmon indicated size-selective sampling was not significant within each size group (P = 0.31 and P = 0.99; Figures 9 and 10). The recovery samples for medium-sized and large-sized fish included the combined samples from the Canadian commercial fishery and the spawning grounds. Any removals that occurred downriver of the marking site (5 total) had known length and were censored from the analyses as they were not available to be sampled during the M–R study.

The estimated inriver run of medium-sized Chinook salmon in 2010 was 8,033 (SE = 935). This is based on 1,155 fish inspected ($= C_m$) for marks in the Canadian commercial fishery and on the spawning grounds. Of these, 59 were recaptured ($=R_m$) fish having previously been tagged at Canyon Island (Table 8). Accounting for the inriver harvest (Canadian Aboriginal fishery = 23; Canadian commercial fishery = 700) results in a spawning abundance ($=\hat{N}_m$) of 7,310 (SE = 935). There were 2 tagged medium-sized fish removed in terminal marine fisheries (all U.S. commercial gillnet fishery). In total, 416 medium-sized fish were released ($=\hat{M}_m$) with tags and available for sampling in 2010.

For medium-sized fish, samples were gathered at 8 spawning areas (Appendix C1). Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in 1 of the spawning areas. For the 7 spawning areas having recoveries, the marked fractions were significantly different ($\chi^2 = 23.1$, df = 6, $P < 0.001$). However, the marked fractions from the pooled spawning grounds sample and the Canadian commercial fishery (Table 8) were not significantly different ($\chi^2 = 0.004$, df = 1, P = 0.95). This model is believed to be reasonable from past experience and the estimated abundance of medium-sized fish has a 95% confidence interval of 6,357 to 10,035, and an estimated relative statistical bias of -0.38% when comparing Chapman's estimate with the bootstrap result.

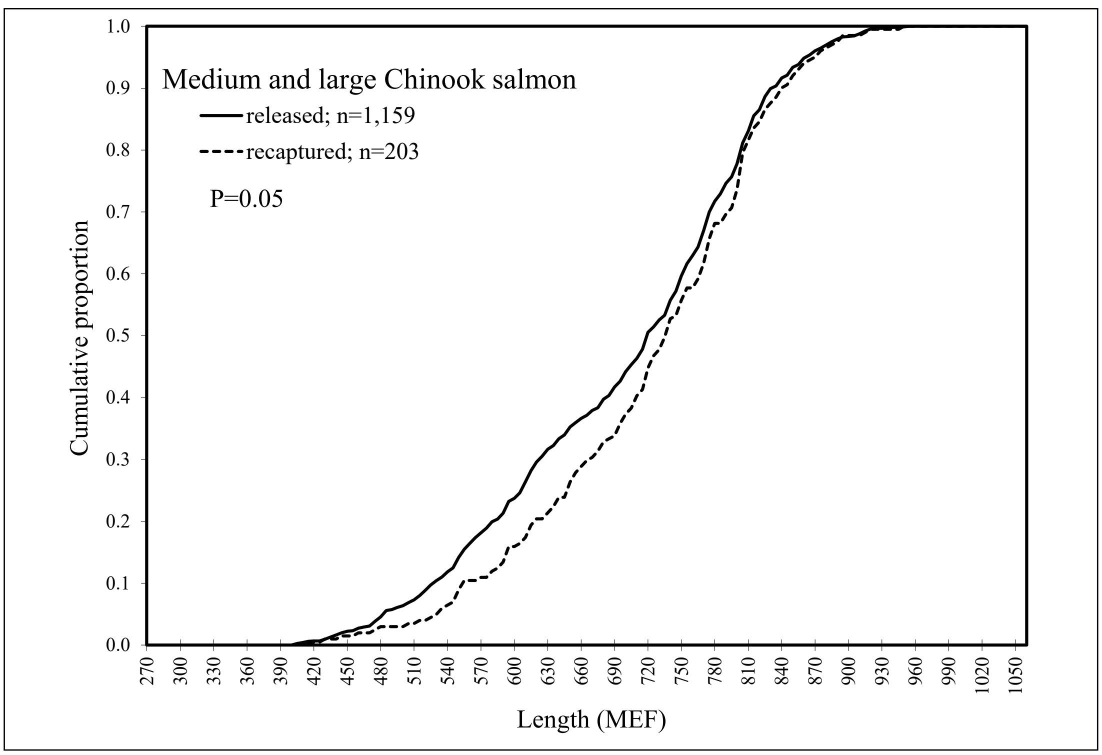

Figure 8.–Cumulative proportions of medium-sized and large-sized Chinook salmon marked at Canyon Island versus those recaptured on the spawning grounds and in lower river fisheries in 2010.

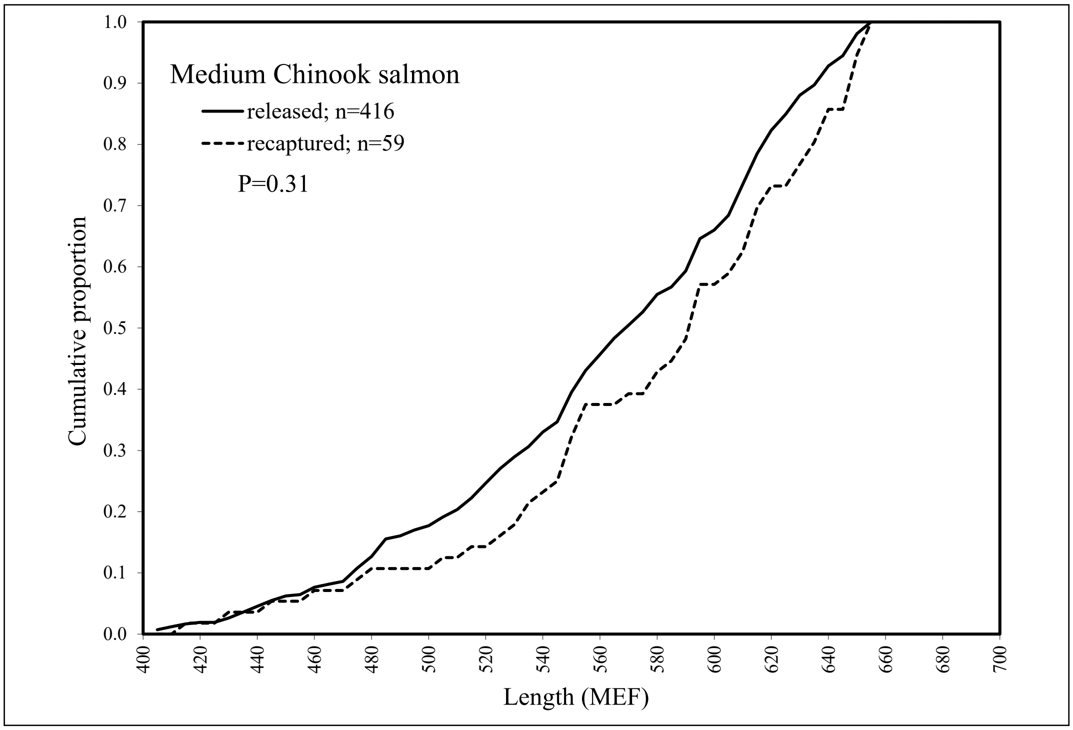

Figure 9.–Cumulative proportions of medium-sized Chinook salmon marked at Canyon Island (minus 6 marine fishery removals) versus those recaptured on the spawning grounds and in lower river fisheries in 2010.

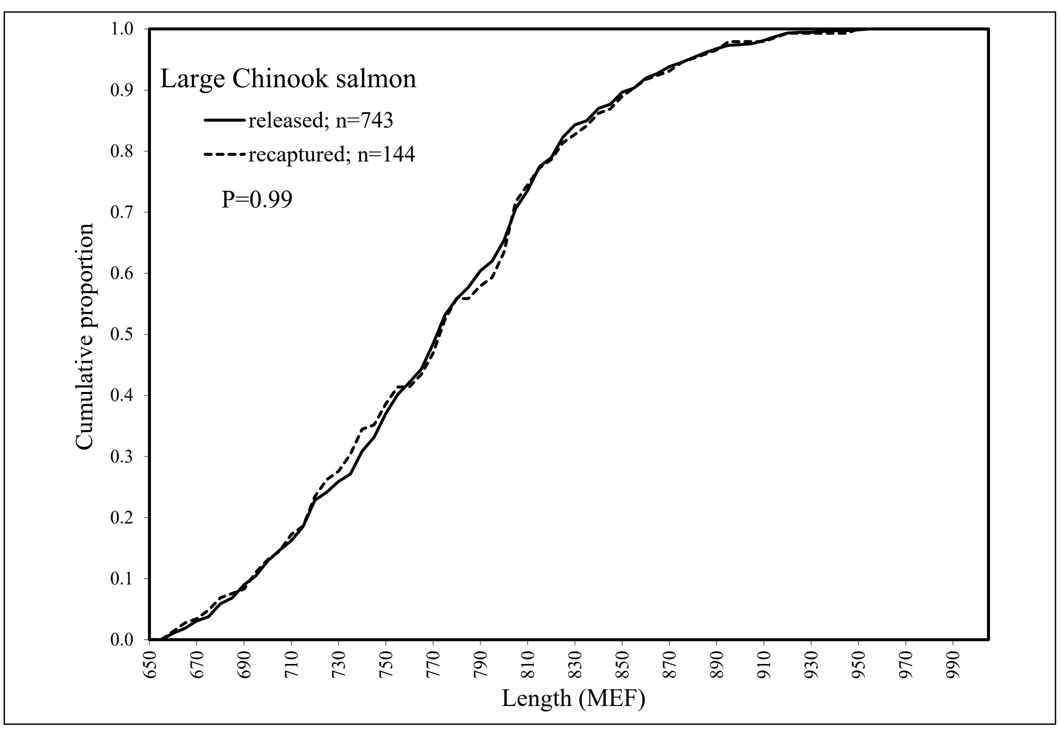

Figure 10.–Cumulative proportions of large-sized Chinook salmon marked at Canyon Island versus those recaptured on the spawning grounds and in lower river fisheries in 2010.

The estimated inriver run of large-sized Chinook salmon in 2010 was 34,238 (SE = 2,546). This is based on 6,672 fish inspected ($=C_m$) for marks in the Canadian commercial fishery and on the spawning grounds. Of these, 144 were recaptured ($=R_m$) fish having previously been tagged at Canyon Island (Table 8). Accounting for the inriver harvest (Canadian commercial fishery = 5,238; Canadian Aboriginal fishery = 126; and assumed Canadian sport fishery = 105) results in a spawning abundance ($=\hat{N}_m$) of 28,769 (SE = 2,546). There were 3 tagged large-sized fish removed in marine fisheries (U.S. commercial gillnet fishery = 1; U.S. sport fishery = 2). In total, 743 large-sized fish were released ($=\hat{M}_m$) with tags and available for sampling in 2010.

For large-sized fish, samples were gathered at 8 spawning areas (Appendix C1). Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in 2 of the spawning areas. For the 6 spawning areas having recoveries, the marked fractions did not differ significantly ($\chi^2 = 7.3$, df = 5, P = 0.20). The marked fractions from the pooled spawning grounds sample compared to the sample from the Canadian commercial fishery (Table 8) were not significantly different ($\chi^2 = 0.99$, df = 1, P = 0.32). Thus, the Chapman model is considered to be a reasonable estimate of abundance. The estimate (28,769) is also similar to the expanded peak observer survey count of 24,710, a relative statistical bias of 14.1%. The estimated abundance of large-sized fish has a 95% confidence interval of 30,140 to 39,647, and an estimated relative statistical bias of 0.54% when comparing Chapman's estimate with the bootstrap result.

The estimated abundance of medium-sized and large-sized Chinook salmon ($\hat{N} = \hat{N}_m + \hat{N}_l$) on the spawning grounds for 2010 was 36,080 (SE = 2,712), and a 95% confidence interval of 36,956 to 47,587.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2010

Age-1.3 fish were the most abundant age class of Chinook salmon on the spawning grounds of the Taku River in 2010. They represented 66.0% (SE = 2.2%) of the estimated escapement of medium-sized and large-sized fish (Table 9). Age-1.2 fish represented 18.8% (SE = 2.0%) of the estimated escapement, and age-1.4 fish represented 10.8% (SE = 1.1%) (Table 9).

The sex composition of the estimated escapement was 57.3% (SE = 1.9%) males (Table 9) and these fish accounted for 97.7% of medium-sized Chinook salmon which were mostly age-1.2 fish (76.0%). Sex composition of the large-sized Chinook salmon was 47.0% (SE = 1.8%) male (Table 9) which were mostly age-1.3 (80.3%).

Of the large-sized fish sampled at Canyon Island, 73.4% were age-1.3 and 23.5% were age-1.4 (Appendix C3). Among the medium-sized Chinook salmon sampled, 91.0% were age-1.2 (Appendix C3). Within size groups, the age compositions from samples taken at Canyon Island are similar (P > 0.99) to those from the combined tributary samples.

For age-1.2, -1.3 and -1.4 fish, length compositions were similar (P = 0.99) between samples gathered on the spawning grounds and at Canyon Island (Table 10).

Table 9.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2010.

		Brood year and age class									
		2007	2006	2006	2005	2005	2004	2005	2004	2003	
		1.1[a]	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
PANEL A: AGE AND SEX COMPOSITION OF MEDIUM CHINOOK SALMON											
Males	*n*	28	1	166	2	19	0	0	0	0	216
	%	12.7%	0.5%	75.1%	0.9%	8.6%	–	–	–	–	97.7%
	SE of %	2.2%	0.5%	2.9%	0.6%	1.9%	–	–	–	–	1.0%
	Escapement	926	33	5,491	66	628	–	–	–	–	7,145
	SE of esc.	201	33	733	47	159	–	–	–	–	2,517
Females	*n*	0	0	2	0	3	0	0	0	0	5
	%	–	–	0.9%	–	1.4%	–	–	–	–	2.3%
	SE of %	–	–	0.6%	–	0.8%	–	–	–	–	1.0%
	Escapement	–	–	66	–	99	–	–	–	–	165
	SE of esc.	–	–	47	–	58	–	–	–	–	383
Sexes Combined	*n*	28	1	168	2	22	0	0	0	0	221
	%	12.7%	0.5%	76.0%	0.9%	10.0%	–	–	–	–	100.0%
	SE of %	2.2%	0.5%	2.9%	0.6%	2.0%	–	–	–	–	0.0%
	Escapement	926	33	5,557	66	728	–	–	–	–	7,310
	SE of esc.	201	33	741	47	173	–	–	–	–	935
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	*n*	0	0	28	1	279	5	37	0	0	350
	%	–	–	3.8%	0.1%	37.4%	0.7%	5.0%	–	–	47.0%
	SE of %	–	–	0.7%	0.1%	1.8%	0.3%	0.8%	–	–	1.8%
	Escapement	–	–	1,081	39	10,774	193	1,429	–	–	13,516
	SE of esc.	–	–	222	39	1,081	87	261	–	–	1,745
Females	*n*	0	0	4	0	319	8	64	0	0	395
	%	–	–	0.5%	–	42.8%	1.1%	8.6%	–	–	53.0%
	SE of %	–	–	0.3%	–	1.8%	0.4%	1.0%	–	–	1.8%
	Escapement	–	–	154	–	12,319	309	2,471	–	–	15,254
	SE of esc.	–	–	78	–	1,208	112	367	–	–	1,854
Sexes Combined	*n*	0	0	32	1	598	13	101	0	0	745
	%	–	–	4.3%	0.1%	80.3%	1.7%	13.6%	–	–	100.0%
	SE of %	–	–	0.7%	0.1%	1.5%	0.5%	1.3%	–	–	0.0%
	Escapement	–	–	1,236	39	23,093	502	3,900	–	–	28,769
	SE of Esc.	–	–	239	39	2,086	145	498	–	–	2,546
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	*n*	28	1	194	3	298	5	37	0	0	565
6	%	2.6%	0.1%	18.2%	0.3%	31.6%	0.5%	4.0%	–	–	57.3%
	SE of %	0.6%	0.1%	2.0%	0.2%	1.6%	0.2%	0.6%	–	–	1.9%
	Escapement	926	33	6,572	105	11,403	193	1,429	–	–	20,661
	SE of esc.	201	33	766	61	1,092	87	261	–	–	3,063
Females	*n*	0	0	6	0	322	0	64	0	0	392
	%	–	–	0.6%	–	34.4%	–	6.9%	–	–	42.7%
	SE of %	–	–	0.2%	–	1.8%	–	0.8%	–	–	1.9%
	Escapement	–	–	221	–	12,418	–	2,471	–	–	15,419
	SE of esc.	–	–	91	–	1,209	–	367	–	–	1,893
Sexes Combined	*n*	28	1	200	3	620	13	101	0	0	966
	%	2.6%	0.01%	18.8%	0.3%	66.0%	1.4%	10.8%	–	–	100.0%
	SE of %	0.6%	0.01%	2.0%	0.2%	2.2%	0.4%	1.1%	–	–	0.0%
	Escapement	926	33	6,793	105	23,820	502	3,900	–	–	36,080
	SE of esc.	201	33	779	61	2,093	145	498	–	–	2,712

[a] No estimate was made for small-sized Chinook salmon and the number of age-1.1 fish above is biased low and germane to medium-sized Chinook salmon only and not representative of the total Chinook salmon spawning abundance.

Table 10.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2010.

		Brood Year and age class									
		2007	2006	2006	2005	2005	2004	2005	2004	2003	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	*n*	168	5	199	3	298	5	37	0	1	716
	Average	365	378	572	568	776	830	855	–	765	624
	SD	54	28	81	139	69	39	72	–	–	186
	SE	5	12	6	80	4	17	12	–	–	7
Females	*n*	0	0	6	0	322	8	64	0	0	400
	Average	–	–	700	–	769	761	807	–	–	774
	SD	–	–	55	–	43	16	37	–	–	45
	SE	–	–	22	–	3	6	5	–	–	3
Sexes Combined	*n*	168	5	205	3	620	13	101	0	1	1,116
	Average	365	378	576	568	772	788	825	–	765	678
	SD	54	28	83	139	57	43	57	–	–	167
	SE	5	12	6	80	3	12	6	–	–	5

DISCUSSION

We have used the M–R project to estimate the spawning abundance of Chinook salmon in the Taku River since 1995. A detailed operational plan was developed each year that described the use of an unstratified, closed population estimator; however, provisions were made to use a stratified estimator in the event that assumptions of the unstratified estimator were not met. In all years since 1995 we were able to use the unstratified estimator because diagnostic tests showed it was the appropriate estimator.

Several conditions had to be met each year, including meeting one of the following three: 1) all fish must have an equal probability of being marked during event 1; 2) all fish must have an equal probability of being captured during event 2; or 3) that marked and unmarked fish mix completely between sampling. Each year, crew members made every effort to follow sampling design methodology to satisfy the condition of equal probability of capture. Fish were captured throughout the duration of the Chinook salmon run at Canyon Island either using fish wheels or set gillnets as part of event 1 of the 2-event M–R experiment. A broad spectrum of locations, known to represent all run timing components, were sampled during event 2 using a multitude of gear types, which promotes equal probability of capture and produces unbiased estimates of age, sex, and size composition. Almost without exception, marked rates within size groups were statistically similar in sampled fish across the tributaries far upstream, indicating that each fish had a near equal probability of being marked at Canyon Island and that significant mixing occurred.

In addition to the 3-part first condition above, a second required condition was that recruitment and mortality did not occur between event 1 and event 2. In this case, we assumed closed recruitment since the marking event spanned the entire immigration. Marked fish harvested downstream of the capture site were censored from the study and, when appropriate, tagged fish from fisheries upstream of the tagging site were also removed from the effective marked population. In cases where tagged fish from upstream fisheries were not censored, the total catch from these fisheries was subtracted from inriver abundance to estimate spawning abundance.

Other required conditions were that marking could not affect the behavior of fish, tag loss could not occur, all tagged fish had to be detected in event 2, and fish were not sampled more than once in event 2. While only healthy fish were marked and released, handling may have, in some cases, affected the behavior of these fish, making them more vulnerable than unmarked fish to capture in the lower river fisheries late in the season. In this study, multiple marks were applied during event 1 (the uniquely numbered spaghetti tag, the left operculum punch and excision of the axillary appendage), sampling for marks applied in event 1 during event 2 was thorough, and different marks were applied to fish sampled in event 2 to prevent repeat sampling. The back-sewn spaghetti tag with 80 lb monofilament was very durable and resistant to tag loss (Johnson et al. 1992). This was especially important considering the time spent and long distances covered between the marking and spawning grounds sampling locations. In some cases, Chinook salmon spent over 4 months in the river and traveled over 300 km between marking at Canyon Island and resampling the spawning grounds. All these measures helped satisfy the conditions necessary for using an unstratified estimator in a closed population, and the sample design has proven robust enough to work well on the Taku River.

Observed differences in marked fractions among the various sampling locations may be from varying timing of inriver fisheries and sulking behavior of tagged Chinook salmon. Such behavior has been reported elsewhere (Bendock and Alexandersdottir 1993; Bernard et al. 1999) and has been observed in this project in previous years (McPherson et al. 1998). Handled Chinook salmon, particularly early migrants, have a tendency to delay their upstream migration. Consequently, the assessment fishery that typically runs May through mid-June when operable, exhibited a lower marked fraction than observed during the traditional sockeye salmon fishery that begins the third Sunday in June annually. Peak numbers of tagged fish coincide with the peak of the run that typically occurs near the end of May through the first week of June (which is dominated by the Nakina River run). Early in the season, untagged fish proceed upriver through the assessment fishery mixed with fish tagged during the weeks prior to the peak. During this time, sulking behavior lowers the marked fraction. However, the opposite effect takes place during the inriver commercial fishery starting in late June. The increased marked fraction can remove tagged fish representing the middle and late segments of the run (potentially affecting part of the fish destined for the Nakina River and most members destined for the Tatsamenie and Kowatua Rivers. However, this affect has not been significant enough to require a stratified postseason estimate. Sulking can seriously affect the inseason estimates and projections as a result, and final estimates are most appropriately derived using the thoroughly mixed sample gathered on the spawning grounds.

Recoveries of uniquely-numbered spaghetti tags on the spawning grounds from 1995 to 2007 were used to pinpoint when those fish passed the tagging site at Canyon Island (Figure 11). Average run timing was 23 May for Nahlin River, 30 May for the Dudidontu and Hackett Rivers and Tseta and Yeth Creeks combined, 2 June for Nakina River, 14 June for Kowatua River, 23 June for Tatsamenie Lake, and 30 May for the total fish seen passing Canyon Island from 1995 to 2007. This information validates prior assumptions that, in general, early run fish are mostly Nahlin River stock, the uppermost spawning tributary; middle run fish are mostly Nakina River stock, the largest producer in the Taku River; and late run fish are mostly Tatsamenie Lake and Kowatua River stocks.

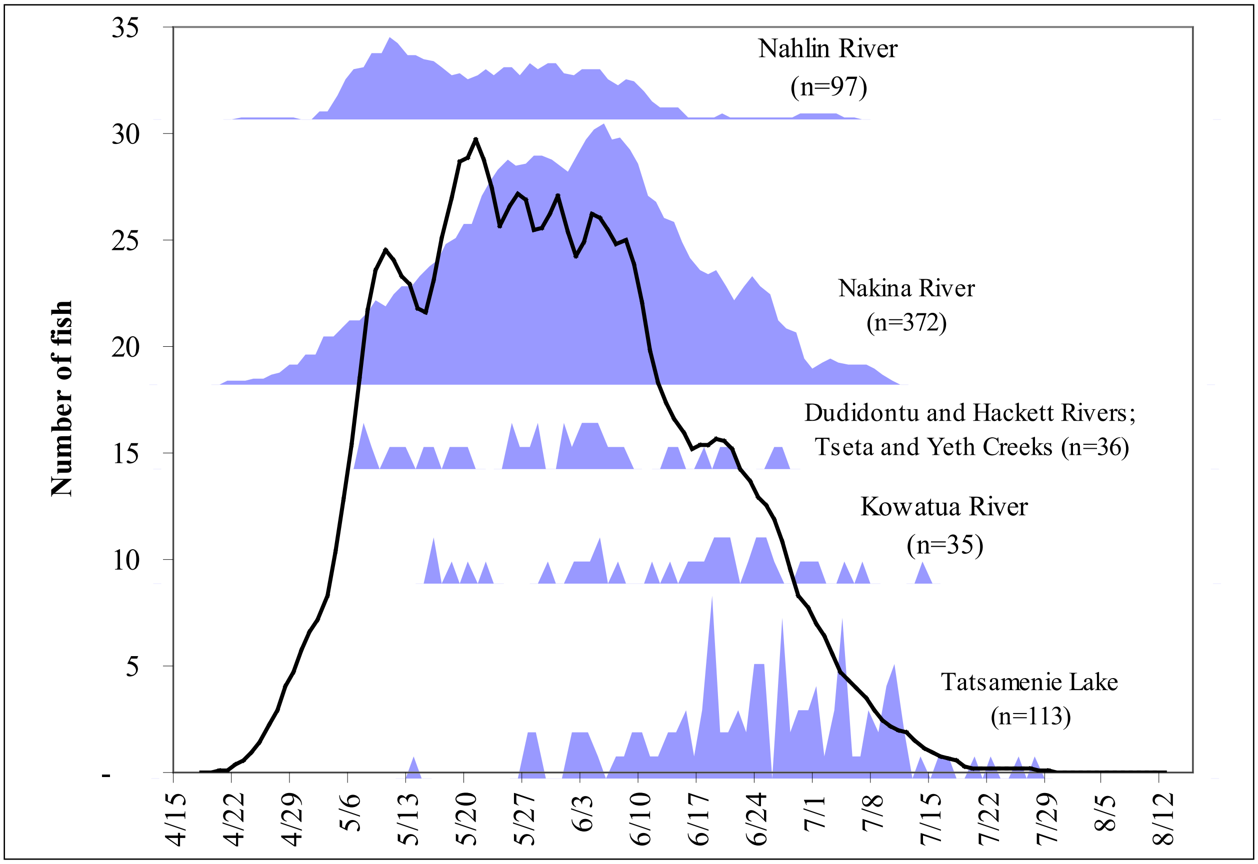

Figure 11.–Chinook salmon run timing as seen at Canyon Island in the lower Taku River (solid line) and the timing of major sub-stocks as they passed Canyon Island based on total spawning ground tag recoveries (blue areas), 1995 to 2007.

With the exception of some marine troll and sport harvests, the Nahlin and Nakina River stocks and other early and middle-run stocks were mostly unexploited since the U.S. spring gillnet season closed in 1976 and until directed Chinook salmon fisheries were implemented in 2005. Most Chinook salmon harvested during this time were taken incidentally during the traditional sockeye fishery that began the third Sunday in June and consisted of fish from Tatsamenie Lake, the Kowatua River, and other late run stocks, as well as the tail end of the Nakina River run.

Since 1973, aerial surveys of Chinook salmon spawning abundance using helicopters have been performed in Taku River. Only large Chinook salmon, mostly 3-ocean (age-1.3) and older fish are counted during these surveys using consistent schedules and protocols annually (Pahlke 2009). Age-1.2 and younger fish are not counted because they are difficult to see and distinguish from other species. In general, large Chinook salmon can be distinguished from smaller fish as there is little overlap in length distributions (Figure 12). Within years, counts were highly correlated, indicating the relative year class strengths (Table 11). As a result, peak counts from 5 index tributaries (i.e., the Nakina, Nahlin, Kowatua, and Dudidontu Rivers, and Tatsamenie Lake) were summed to produce a single peak count representing the entire abundance of large Chinook salmon. Counts from Tseta Creek were not included in the peak survey total (Table 11) as radiotelemetry data showed Tseta Creek was similar to Nakina and Nahlin River stocks in timing and not a significant proportion of the annual spawning abundance, and surveys did not begin on Tseta Creek until 1981 (Pahlke and Bernard 1996; Eiler 1990). An expansion factor of 5.2 was developed in 2000 that expanded the sum of the peak survey counts to an estimate of the spawning abundance of large Chinook salmon (McPherson et al. 2000). This expansion factor used survey counts and M–R estimates in 1989, 1990, and 1995 to 1997. However, since that time, the relationship between the peak survey total and the M–R estimate of the large Chinook salmon spawning abundance has changed and across all years has ranged between 4.2 and 14.6 and averaged 6.9 (Table 11).

The first M–R estimates of large-sized Chinook salmon spawning abundance in the Taku River were conducted in 1989 and 1990. The program was discontinued due to lack of funding but resumed in 1995. Since that time, successful estimates of medium-sized Chinook salmon were attained in all years. Estimates of large-sized Chinook salmon were produced in all but 2 years, 1995 and 1998, when low tagging and recovery rates yielded invalid estimates; however, the 1995 estimate for large fish was made by expanding the M–R estimate of medium-sized fish using the ratio of large- to medium-sized fish seen in samples (1,100 fish) at the Nakina River weir. In 3 years, 2002 to 2004, valid M–R estimates of small-sized Chinook salmon were made (Table 12). Estimates for small-sized Chinook salmon are rarely attained due to low tagging and recovery rates. Low tagging rates for small-sized fish may be due to lower abundance than larger fish since fish wheels are more selective towards smaller fish. The low tagging rates reduces the chance of sampling adequate recoveries to generate an unbiased estimate. The addition of new directed fisheries in 2005 and 2006 nearly tripled event 2's average sample size and nearly doubled the average number of recaptures seen during all years of successful large Chinook salmon M–R. As a result, estimates in directed fishing years were more precise than in other years, on average (Table 12).

In estimating abundance, and age, sex, and length composition for the watershed, we presumed that our combined tributary sample within each size group was representative of the total population. Any differences could be attributed to different methods of capturing Chinook salmon employed in different tributaries. Males tend to drift downstream after spawning, whereas females tend to die near their redds (Kissner and Hubartt 1986), and as a result, estimates of age, sex, and length composition for fish sampled at carcass weirs tend to be biased towards males and smaller Chinook salmon. In contrast, estimates from carcass-only surveys or areas near the actual spawning grounds where males have already expired tend to be biased towards females, which are larger fish, as females guard their redds until death. Chinook salmon sampled from upstream-migrating fish at weirs are more likely to represent the true age, sex, and length composition of the population, as opposed to spawning ground samples collected with gear designed to capture live fish as well as carcasses. In summary, using a variety of sampling gear, or sampling live fish moving upstream through a weir will produce the most unbiased estimates of age, sex, and length structure (McPherson et al. 1996).

Table 11.–Peak aerial counts, escapement, and terminal run of large Chinook salmon in the Taku River, 1973 to 2010.

	Peak Aerial Count									
Year	Nakina River	Nahlin River	Kowatua River	Tatsamenie Lake	Dudidontu River	Tseta Creek	5 tributary total[a]	Escapement[b]	Prop. surveyed (exp. factor)	Terminal run[c]
1973	2,000	300	100	200	200	4	2,800	14,564	–	22,753
1974	1,800	900	235	120	24	4	3,079	16,015	–	18,600
1975	1,800	274	–	–	15	–	2,089	12,920	–	14,964
1976	3,000	725	341	620	40	–	4,726	24,582	–	25,291
1977	3,850	650	580	573	18	–	5,671	29,497	–	29,999
1978	1,620	624	490	550	–	21	3,284	17,124	–	17,252
1979	2,110	857	430	750	9	–	4,156	21,617	–	23,729
1980	4,500	1,531	450	905	158	–	7,544	39,239	–	43,061
1981	5,110	2,945	560	839	74	258	9,528	49,559	–	52,254
1982	2,533	1,246	289	387	130	228	4,585	23,848	–	26,303
1983	968	391	171	236	117	179	1,883	9,794	–	11,097
1984	1,887	951	279	616	–	176	3,733	20,778	–	22,548
1985	2,647	2,236	699	848	475	303	6,905	35,916	–	38,865
1986	3,868	1,612	548	886	413	193	7,327	38,111	–	40,010
1987	2,906	1,122	570	678	287	180	5,563	28,935	–	30,588
1988	4,500	1,535	1,010	1,272	243	66	8,560	44,524	–	45,918
1989	5,141	1,812	601	1,228	204	494	8,986	**40,329**	0.22 (4.5)	43,667
1990	7,917	1,658	614	1,068	820	172	12,077	**52,142**	0.23 (4.3)	56,341
1991	5,610	1,781	570	1,164	804	224	9,929	51,645	–	57,577
1992	5,750	1,821	782	1,624	768	313	10,745	55,889	–	60,742
1993	6,490	2,128	1,584	1,491	1,020	491	12,713	66,125	–	75,542
1994	4,792	2,418	410	1,106	573	614	9,299	48,368	–	54,138
1995[d]	3,943	2,069	550	678	731	786	7,971	33,805	0.24 (4.2)	39,420
1996	7,720	5,415	1,620	2,011	1,810	1,20	18,576	**79,019**	0.24 (4.3)	90,291
1997	6,095	3,655	1,360	1,148	943	648	13,201	**114,938**	0.11 (8.7)	125,623
1998	2,720	1,294	473	675	807	360	5,969	31,039	–	33,737
1999	1,900	532	561	431	527	221	3,951	**16,786**	0.24 (4.2)	18,930
2000	2,907	728	702	953	482	160	5,772	**34,997**	0.16 (6.1)	39,480
2001	1,552	935	1,050	1,024	479	202	5,040	**46,544**	0.11 (9.3)	50,952
2002	4,066	1,099	945	1,145	834	192	8,089	**55,044**	0.15 (6.8)	60,227
2003	2,126	861	850	1,000	644	436	5,481	**36,435**	0.15 (6.7)	41,084
2004	4,091	1,787	828	1,396	1,036	906	9,138	**75,032**	0.12 (8.2)	78,049
2005	1,213	471	833	1,146	318	215	3,981	**38,599**	0.10 (9.7)	67,016
2006	1,900	955	1,180	908	395	199	5,338	**42,191**	0.13 (7.9)	61,388
2007	77	277	262	390	4	–	1,010	**14,749**	0.07 (14.6)	18,489
2008	1,437	1,185	632	1,083	480	497	4,817	**26,645**	0.18 (5.5)	31,223
2009	1,698	1,033	408	633	272	145	4,044	**22,761**	0.18 (5.6)	33,951
2010	1,636	1,018	716	821	561	128	4,752	**28,769**	0.17 (6.1)	33,875
Averages										
1973–1979	2,311	619	363	469	51	10	3,686	19,474	–	21,798
1980–1989	3,406	1,538	518	790	233	231	6,461	33,103	0.22 (4.5)	35,431
1990–1999	5,294	2,277	852	1,140	880	503	10,443	54,976	0.19 (5.2)	61,234
2000-2010	2,064	941	764	954	500	308	5,224	38,342	0.14(7.9)	46,885
All years										
1973–2010	3,313	1,390	656	881	459	319	6,647	37,868	0.17 (6.9)	43,026

-continued-

Table 11.–Page 2 of 2.

[a] Counts from Tseta Creek were not included in the peak survey totals.

[b] Large Chinook salmon spawning abundance was estimated using M–R in bold years. In all other years, aerial counts were expanded using a 5.2 mean expansion factor, the average expansion seen between the M–R estimate of escapement and the summed peak aerial count from 5 tributaries: the Nakina, Nahlin, Kowatua, and Dudidontu Rivers, and Tatsamenie Lake in 1989, 1990, 1995–1997.

[c] Terminal run includes all large Chinook salmon returning to the Taku River and also caught in nearby District 111 in the Juneau area sport and commercial fisheries.

[d] In 1995, because of low tagging and recovery rates in the M–R study, large Chinook salmon spawning abundance was derived by expanding the estimate of medium-sized Chinook salmon by size composition data gathered on the spawning grounds.

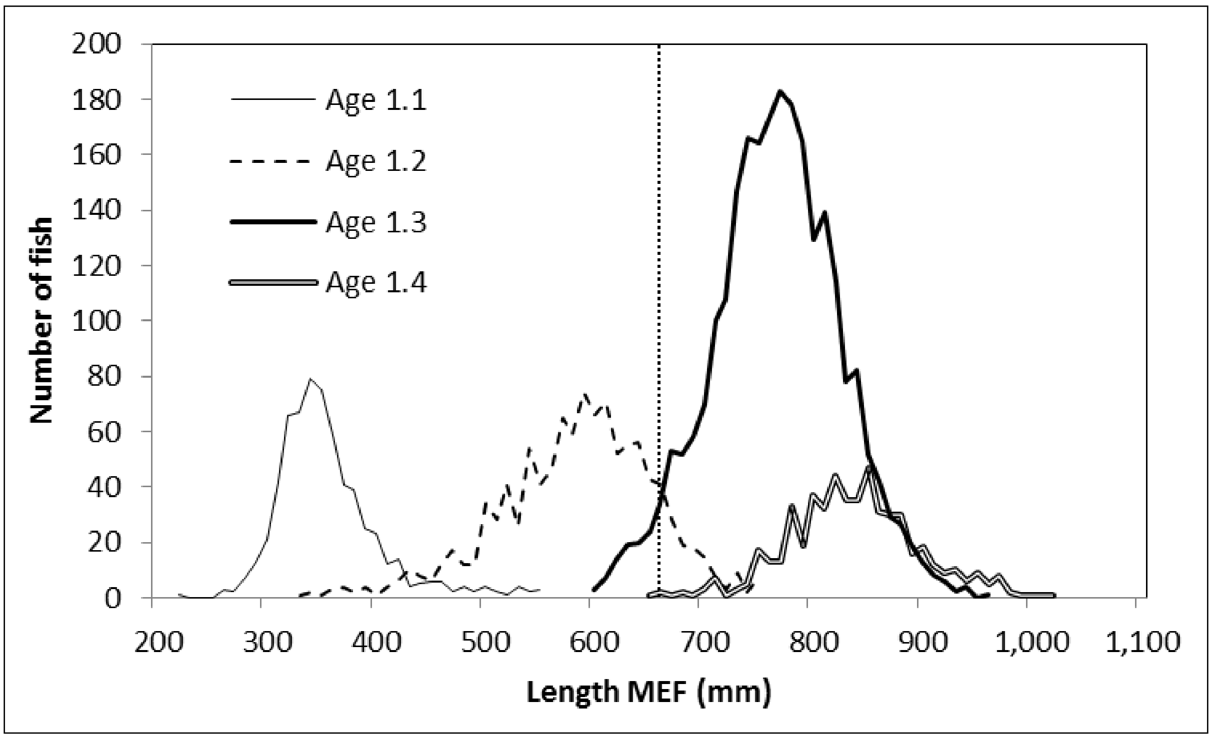

Figure 12.–Length-frequency distributions of age groups of Chinook salmon sampled on the spawning grounds in the Taku River, 2008–2010. The dashed vertical line represents the boundary segregating large-sized Chinook salmon (≥660 mm MEF) from medium-sized and small-sized fish.

Table 12.–Mark–recapture (M–R) estimates, standard errors, and statistics for Chinook salmon in the Taku River in 1989, 1990, 1995 to 1997, and 1999 to 2010.

PANEL A: MARK–RECAPTURE ESTIMATES AND STANDARD ERRORS

Year	$\hat{N}$ Small	SE Small	$\hat{N}$ Medium	SE Medium	$\hat{N}$ Large	SE Large
1989	–	–	10,569[a]	1,589[a]	40,329[a]	5,646[a]
1990	–	–	7,095[a]	1,338[a]	52,142[a]	9,326[a]
1991–1994[b]						
1995	–	–	32,246[c]	3,751[c]	33,805[c]	5,060[c]
1996	–	–	10,402	1,553	79,019	9,048
1997	–	–	2,543	926	114,938	17,888
1998	[d]	[d]	11,775[d]	3,237[d]	31,039[d]	10,604[d]
1999	–	–	8,960	1,462	16,786	3,171
2000	–	–	8,551	1,928	34,997	5,403
2001	–	–	4,971	1,125	46,544	6,766
2002	6,058	2,436	5,944	1,242	55,044	11,087
2003	3,489	1,052	16,780	2,274	36,435	6,705
2004	3,141	1,189	22,023	2,422	75,032	10,280
2005	–	–	5,508	1,024	38,725	4,908
2006	–	–	2,430	618	42,191	4,988
2007	–	–	7,246	2,628	14,749	4,383
2008	–	–	12,889	2,559	26,645	3,010
2009	–	–	10,231	1,788	22,761	2,871
2010	–	–	7,310	935	28,769	2,546

PANEL B: MARK–RECAPTURE STATISTICS

	Small			Medium			Large		
Year	*Mi*	*Ci*	*Ri*	*Mi*	*Ci*	*Ri*	*Mi*	*Ci*	*Ri*
1989	–	–	–	[a]	[a]	[a]	328[a]	5,270[a]	42[a]
1990	–	–	–	[a]	[a]	[a]	270[a]	5,194[a]	26[a]
1991–1994[b]									
1995	–	–	–	798[c]	2,582[c]	63[c]	[c]	[c]	[c]
1996	–	–	–	438	1,018	42	1,113	5,319	74
1997	–	–	–	105	263	10	915	6,022	47
1998	–	–	–	469	450	17	[d]	[d]	[d]
1999	–	–	–	919	396	37	333	1,658	30
2000	–	–	–	340	622	23	656	2,636	47
2001	–	–	–	216	526	22	829	2,859	50
2002	203	296	9	466	330	25	821	1,874	27
2003	56	795	12	539	1,646	52	490	2,151	28
2004	101	307	9	740	2,139	71	919	4,240	51
2005	–	–	–	130	1,502	30	368	10,166	80
2006	–	–	–	101	440	16	333	9,832	64
2007	–	–	–	181	921	20	180	2,674	27
2008	–	–	–	452	972	32	665	3.752	85
2009	–	–	–	262	1,689	38	306	7,861	80
2010	–	–	–	416	1,155	59	743	6,672	144

Notes: En dashes indicate no estimates were made for small fish in those years. $\hat{N}$ = estimated abundance, SE = standard error, *Mi* = estimated number of marked fish, *Ci* = number of fish of size *i* inspected for marks during second sampling event, *Ri* = number of inspected fish with marks.

[a] In 1989 and 1990, medium-sized escapement was estimated by expanding the estimate for large-sized Chinook salmon by the proportion of age-1.2 fish seen on the spawning grounds.

[b] From 1991 to 1994, large-sized escapement was estimated by expanding aerial survey counts because no mark–recapture studies took place.

[c] In 1995, because of low tagging and recovery rates in the mark–recapture study, spawning abundance of large-sized Chinook salmon was derived by expanding the estimate for medium-sized Chinook salmon by size composition data gathered on the spawning grounds.

[d] In 1998, because of low tagging and recovery rates in the mark–recapture study, spawning abundance of large-sized Chinook salmon was estimated by expanding aerial survey counts. The estimate shown for medium-sized fish also includes small-sized fish.

CONCLUSION AND RECOMMENDATIONS

This project is an ongoing, long-term cooperative effort between the U.S. and Canada, and in future work we recommend that efforts continue to maximize both event 1 tagging and event 2 sampling to improve the precision of M–R estimates, both for inseason management and long-term stock assessment. To this end, fish wheel and gillnet gear should continue to be used for capturing and tagging Chinook salmon. Net gear is successfully used to capture and tag Chinook salmon for M–R purposes in the Chilkat, Unuk, Chickamin, Alsek, and Stikine Rivers in Southeast Alaska, and in many other systems in central and western Alaska, in Canada, and the southern U.S.

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APPENDIX A

Appendix A1.–Number of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2008 by size group. Information in bold was used in the mark–recapture estimate.

		Small	Medium	Large		
		0–400 mm	401–659 mm	≥660 mm	Total	Large + medium
EVENT 1: Fish marked with spaghetti tags at Canyon Island						
Total Initially Tagged		120	455	668	1,243	1,123
Captured using Fishwheels and Tagged		120	301	333	754	634
Captured using Set Gillnets and Tagged		0	154	335	489	489
Total Tag Removals by:		0	3	3	6	6
All U.S. fisheries		0	3	3	6	6
Commercial gillnet		0	0	0	0	0
Sport fishery		0	3	3	6	6
Inriver assessment fishery		0	0	0	0	0
All Canadian fisheries		0	0	0	0	0
Commercial fishery		0	0	0	0	0
Sport fishery		0	0	0	0	0
Final Total Tagged in Event 1 (M)		120	**452**	**665**	1,237	1,117
EVENT 2: Fish inspected for spaghetti tags – captured and recaptured						
Upper river spawning areas	Inspected	108	**505**	**1,440**	2,053	1,945
	Marked	5	**9**	**21**	35	30
	Marked/Inspected	0.046	0.018	0.015	0.017	0.015
Nahlin River	Inspected	2	47	281	330	328
	Marked	0	1	4	5	5
	Marked/Inspected	–	0.021	0.014	0.015	0.015
Dudidontu River	Inspected	0	25	173	198	198
	Marked	0	0	2	2	2
	Marked/Inspected	–	–	0.012	0.010	0.010
Tseta Creek	Inspected	0	15	65	80	80
	Marked	0	1	1	2	2
	Marked/Inspected	–	0.067	0.015	0.025	0.025
King Salmon River	Inspected	1	2	10	13	12
	Marked	0	0	0	0	0
	Marked/Inspected	–	–	–	–	–

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		Small	Medium	Large		Large + medium
		0–400 mm	401–659 mm	≥660 mm	Total	
Yeth Creek	Inspected	0	4	37	41	41
	Marked	0	0	2	2	2
	Marked/Inspected	–	–	0.054	0.049	0.049
Nakina River	Inspected	29	110	180	319	290
	Marked	2	2	0	4	2
	Marked/Inspected	0.069	0.018	–	0.013	0.007
Hackett	Inspected	2	29	128	159	157
	Marked	0	2	7	9	9
	Marked/Inspected	–	0.069	0.055	0.057	0.057
Kowatua Creek	Inspected	0	34	183	217	217
	Marked	0	1	2	3	3
	Marked/Inspected	–	0.029	0.011	0.014	0.014
Tatsamenie drainage	Inspected	74	239	383	696	622
(Little and Big Tatsamenie lakes)	Marked	3	2	3	8	5
	Marked/Inspected	0.041	0.008	0.008	0.011	0.008
Lower River Canadian fisheries	Inspected	3	**467**	**2,312**	2,782	2,779
(Test, Commercial and Food)	Marked	0	**23**	**64**	87	87
	Marked/Inspected	0.000	0.049	0.028	0.031	0.031
Assessment fishery	Inspected	0	140	1,399	1,539	1,539
	Marked	0	7	39	46	46
	Marked/Inspected	–	0.050	0.028	0.030	0.030
Commercial fishery	Inspected	3	327	913	1,243	1,240
	Marked	0	16	25	41	41
	Marked/Inspected	0.000	0.049	0.027	0.033	0.033
TRT food fishery	Inspected	0	0	0	0	0
	Marked	0	0	0	0	0
	Marked/Inspected	–	–	–	–	–

Appendix A2.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2008.

			TAGGED								CAUGHT								
		Water	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
	Hours	level																	
Date	fished	(cm)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
4/23	6.0	–	0	0	0	0	4	4	4	4	4	4	0.67	0.67	0.01	0.01	0	–	0
4/24	6.0	–	0	0	0	0	0	4	0	4	0	4	0.00	0.67	0.00	0.01	0	–	0
4/25	6.0	–	0	0	0	0	8	12	8	12	9	13	1.50	2.17	0.02	0.03	0	–	0
4/26	6.0	-76	0	0	0	0	2	14	2	14	2	15	0.33	2.50	0.00	0.03	0	–	0
4/27	6.0	-61	0	0	0	0	9	23	9	23	9	24	1.50	4.00	0.02	0.05	0	–	0
4/28	4.0	-61	0	0	1	1	3	26	4	27	4	28	1.00	5.00	0.01	0.06	0	–	0
4/29	6.0	-46	0	0	3	4	8	34	11	38	11	39	1.83	6.83	0.02	0.08	0	–	0
4/30	6.0	-46	0	0	3	7	11	45	14	52	14	53	2.33	9.17	0.03	0.10	0	–	0
5/1	6.0	-30	0	0	0	7	16	61	16	68	16	69	2.67	11.83	0.03	0.14	0	–	0
5/2	6.0	-30	0	0	2	9	24	85	26	94	27	96	4.50	16.33	0.05	0.19	1	41022	1
5/3	0.0	-15	0	0	0	9	0	85	0	94	0	96	0.00	16.33	0.00	0.19	0	–	1
5/4	6.0	-8	0	0	7	16	14	99	21	115	21	117	3.50	19.83	0.04	0.23	0	–	1
5/5	6.0	0	0	0	1	17	12	111	13	128	13	130	2.17	22.00	0.03	0.26	0	–	1
5/6	6.0	0	0	0	5	22	9	120	14	142	14	144	2.33	24.33	0.03	0.28	0	–	1
5/7	6.0	9	0	0	7	29	15	135	22	164	22	166	3.67	28.00	0.04	0.33	0	–	1
5/8	6.0	15	0	0	13	42	25	160	38	202	38	204	6.33	34.33	0.07	0.40	0	–	1
5/9	6.0	18	0	0	11	53	25	185	36	238	36	240	6.00	40.33	0.07	0.47	0	–	1
5/10	6.0	27	0	0	20	73	19	204	39	277	40	280	6.67	47.00	0.08	0.55	1	41022	2
5/11	6.0	34	0	0	7	80	20	224	27	304	28	308	4.67	51.67	0.06	0.61	1	41153	3
5/12	6.0	52	0	0	8	88	8	232	16	320	16	324	2.67	54.33	0.03	0.64	0	–	3
5/13	6.0	67	0	0	6	94	15	247	21	341	21	345	3.50	57.83	0.04	0.68	0	–	3
5/14	4.0	58	0	0	7	101	6	253	13	354	14	359	3.50	61.33	0.03	0.71	1	41009	4
5/15	6.0	79	0	0	12	113	11	264	23	377	27	386	4.50	65.83	0.05	0.76	4	41154, 41153, 41153, 41009	8
5/16	6.0	94	0	0	8	121	18	282	26	403	26	412	4.33	70.17	0.05	0.81	0	–	8
5/17	0.0	119	0	0	0	121	0	282	0	403	0	412	0.00	70.17	0.00	0.81	0	–	8
5/18	6.0	140	0	0	7	128	8	290	15	418	15	427	2.50	72.67	0.03	0.84	0	–	8
5/19	4.0	134	0	0	6	134	12	302	18	436	18	445	4.50	77.17	0.04	0.88	0	–	8
5/20	4.0	137	0	0	9	143	7	309	16	452	16	461	4.00	81.17	0.03	0.91	1	41153	9
6/10	1.5	183	0	0	2	145	1	310	3	455	3	464	2.00	83.17	0.01	0.92	0	–	9
6/13	4.0	229	0	0	2	147	10	320	12	467	12	476	3.00	86.17	0.02	0.94	0	–	9
6/14	4.0	229	0	0	3	150	6	326	9	476	12	488	3.00	89.17	0.02	0.96	0	–	9
6/15	4.0	244	0	0	4	154	9	335	13	489	19	507	4.75	93.92	0.04	1.00	1	41153	10
Total	161.5	–	0	–	154	–	335	–	489	–	507	–	–	–	–	–	10	10	–

[a] Column total count is the number of adipose-finclipped Chinook salmon possessing valid coded wire.

Appendix A3.–Fish wheel effort for Chinook salmon including water level in 2008.

	Fish wheel #1		Fish wheel #2		Water
Date	Hours fished	RPM	Hours fished	RPM	level (cm)
5/16	0.0	0.0	14.0	2.1	94
5/17	8.0	2.2	23.9	2.4	119
5/18	23.8	2.2	23.9	2.4	140
5/19	23.8	2.3	23.9	2.5	134
5/20	23.5	2.5	23.5	2.4	137
5/21	23.0	2.5	23.0	2.5	152
5/22	23.5	2.3	23.8	2.3	177
5/23	23.4	2.5	23.6	2.9	183
5/24	23.5	2.5	23.8	2.8	210
5/25	23.7	3.0	23.7	3.1	244
5/26	23.9	2.5	23.9	2.5	287
5/27	23.9	2.5	23.8	2.3	299
5/28	23.4	2.7	23.8	2.5	323
5/29	23.8	2.8	23.9	2.4	335
5/30	23.7	2.7	23.8	2.0	320
5/31	23.7	2.7	23.8	2.0	296
6/1	23.4	2.2	23.0	2.5	268
6/2	23.4	2.6	22.8	2.3	250
6/3	23.7	3.0	22.8	2.6	262
6/4	23.8	2.3	23.2	2.2	256
6/5	22.5	2.3	21.4	2.0	219
6/6	23.1	2.2	22.3	1.9	192
6/7	22.2	2.0	22.6	2.0	174
6/8	22.8	2.0	22.7	2.0	162
6/9	22.9	2.0	23.3	2.0	143
6/10	23.1	2.0	23.5	2.0	128
6/11	23.6	2.0	23.7	2.0	113
6/12	23.6	2.1	23.6	2.0	113
6/13	23.6	2.2	23.8	2.0	125
6/14	23.6	2.5	23.7	2.3	137
6/15	23.1	2.4	23.6	2.3	152
6/16	23.2	2.4	23.4	2.1	152
6/17	22.0	2.2	23.4	2.2	155
6/18	23.2	2.4	23.3	2.3	162
6/19	23.1	2.5	23.4	2.3	168
6/20	23.1	2.5	23.3	2.3	162
6/21	23.2	2.5	23.5	2.3	165
6/22	22.6	2.5	23.3	2.4	177
6/23	22.4	2.3	22.9	2.3	171
6/24	22.9	2.1	23.1	1.9	155
6/25	23.3	2.3	23.2	2.0	152
6/26	23.3	2.2	23.8	2.1	155
6/27	23.6	2.0	23.8	1.8	149
6/28	23.6	2.2	23.7	2.1	158
6/29	22.9	2.3	22.9	2.2	183
6/30	23.2	2.1	23.6	2.0	168
7/1	23.5	2.2	23.7	2.1	152
7/2	23.4	2.6	23.6	2.5	180
7/3	23.3	2.6	23.5	2.6	210
7/4	23.4	2.4	23.7	2.3	232
7/5	23.6	2.6	23.8	2.4	256
7/6	22.3	2.3	22.4	2.3	253
7/7	23.6	2.3	23.7	2.3	268
7/8	23.7	2.3	23.6	2.3	235

-continued-

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Date	Fish wheel #1 Hours fished	Fish wheel #1 RPM	Fish wheel #2 Hours fished	Fish wheel #2 RPM	Water level (cm)
7/9	22.9	2.5	22.8	2.1	201
7/10	23.5	2.4	23.6	2.1	180
7/11	23.1	2.0	23.8	2.1	165
7/12	23.1	2.0	23.6	2.0	162
7/13	23.8	1.9	23.6	2.2	155
7/14	23.4	2.2	23.6	1.9	155
7/15	23.6	2.3	23.7	2.1	162
7/16	23.4	2.3	23.7	2.0	162
7/17	23.3	2.4	23.6	2.1	168
7/18	23.1	2.5	23.0	2.2	177
7/19	23.1	2.4	23.7	2.6	198
7/20	23.3	2.1	23.1	2.4	204
7/21	23.1	2.0	23.1	2.0	162
7/22	23.4	2.0	23.3	2.0	146
7/23	22.8	2.0	23.4	2.0	128
7/24	23.5	2.1	23.3	2.0	116
7/25	22.8	2.3	23.6	2.3	107
7/26	21.4	2.5	23.5	2.4	122
7/27	22.3	2.2	23.3	2.6	140
7/28	22.5	2.1	21.9	2.4	137
7/29	22.8	2.6	22.9	2.4	128
7/30	22.8	2.2	23.0	2.4	134
7/31	23.0	2.0	23.1	2.4	146
8/1	22.9	1.8	22.8	2.3	143
8/2	23.1	2.4	23.1	2.2	134
8/3	22.8	2.2	23.4	2.2	134
8/4	23.4	2.1	23.4	2.3	137
8/5	22.6	2.5	22.4	2.2	134
Total	1,863.9	–	1,905.7	–	–

Appendix A4.–Fish wheel Chinook salmon daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2008.

	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
5/16	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	–	0
5/17	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	–	0
5/18	0	0	2	2	2	2	4	4	4	4	0.1	0.1	0.0	0.0	0	–	0
5/19	0	0	2	4	2	4	4	8	4	8	0.1	0.2	0.0	0.0	0	–	0
5/20	1	1	6	10	9	13	16	24	18	26	0.4	0.6	0.0	0.0	1	41153	1
5/21	1	2	12	22	9	22	22	46	22	48	0.5	1.0	0.0	0.1	0	–	1
5/22	0	2	9	31	8	30	17	63	17	65	0.4	1.4	0.0	0.1	0	–	1
5/23	2	4	11	42	9	39	22	85	22	87	0.5	1.9	0.0	0.1	0	–	1
5/24	1	5	3	45	2	41	6	91	6	93	0.1	2.0	0.0	0.1	0	–	1
5/25	0	5	3	48	4	45	7	98	7	100	0.1	2.1	0.0	0.1	0	–	1
5/26	0	5	0	48		45	0	98	0	100	0.0	2.1	0.0	0.1	0	–	1
5/27	0	5	0	48	2	47	2	100	2	102	0.0	2.2	0.0	0.1	0	–	1
5/28	0	5	3	51	7	54	10	110	10	112	0.2	2.4	0.0	0.1	0	–	1
5/29	0	5	1	52	3	57	4	114	4	116	0.1	2.5	0.0	0.1	0	–	1
5/30	0	5	2	54	4	61	6	120	6	122	0.1	2.6	0.0	0.2	0	–	1
5/31	0	5	1	55	9	70	10	130	11	133	0.2	2.8	0.0	0.2	0	–	1
6/1	1	6	19	74	22	92	42	172	45	178	1.0	3.8	0.1	0.2	1	41153	2
6/2	2	8	17	91	13	105	32	204	34	212	0.7	4.5	0.0	0.3	0	–	2
6/3	1	9	22	113	16	121	39	243	41	253	0.9	5.4	0.1	0.3	2	41022, 41218	4
6/4	2	11	20	133	10	131	32	275	35	288	0.7	6.2	0.0	0.4	2	41218, 41153	6
6/5	0	11	29	162	39	170	68	343	70	358	1.6	7.8	0.1	0.5	2	41009, 41153	8
6/6	4	15	23	185	21	191	48	391	51	409	1.1	8.9	0.1	0.5	0	–	8
6/7	0	15	25	210	34	225	59	450	62	471	1.4	10.3	0.1	0.6	1	41153	9
6/8	2	17	10	220	18	243	30	480	35	506	0.8	11.0	0.0	0.6	0	–	9
6/9	6	23	6	226	3	246	15	495	16	522	0.3	11.4	0.0	0.7	0	–	9
6/10	5	28	6	232	4	250	15	510	15	537	0.3	11.7	0.0	0.7	0	–	9
6/11	5	33	2	234	2	252	9	519	9	546	0.2	11.9	0.0	0.7	0	–	9
6/12	3	36	0	234	2	254	5	524	5	551	0.1	12.0	0.0	0.7	0	–	9
6/13	0	36	1	235	1	255	2	526	2	553	0.0	12.0	0.0	0.7	0	–	9
6/14	1	37	2	237	1	256	4	530	4	557	0.1	12.1	0.0	0.7	0	–	9
6/15	1	38	1	238	2	258	4	534	5	562	0.1	12.2	0.0	0.7	0	–	9
6/16	7	45	6	244	5	263	18	552	18	580	0.4	12.6	0.0	0.7	0	–	9
6/17	5	50	6	250	3	266	14	566	14	594	0.3	12.9	0.0	0.8	0	–	9
6/18	3	53	7	257	5	271	15	581	16	610	0.3	13.3	0.0	0.8	0	–	9
6/19	12	65	7	264	4	275	23	604	24	634	0.5	13.8	0.0	0.8	0	–	9
6/20	15	80	5	269	6	281	26	630	27	661	0.6	14.4	0.0	0.8	1	41218	10

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	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
6/21	1	81	2	271	4	285	7	637	7	668	0.1	14.5	0.0	0.8	0	–	10
6/22	4	85	3	274	6	291	13	650	13	681	0.3	14.8	0.0	0.9	0	–	10
6/23	4	89	4	278	7	298	15	665	16	697	0.4	15.2	0.0	0.9	0	–	10
6/24	6	95	2	280	7	305	15	680	15	712	0.3	15.5	0.0	0.9	0	–	10
6/25	4	99	2	282	5	310	11	691	11	723	0.2	15.7	0.0	0.9	0	–	10
6/26	3	102	1	283	3	313	7	698	7	730	0.1	15.9	0.0	0.9	0	–	10
6/27	1	103	1	284	3	316	5	703	5	735	0.1	16.0	0.0	0.9	0	–	10
6/28	1	104	2	286	3	319	6	709	7	742	0.1	16.1	0.0	0.9	0	–	10
6/29	5	109	3	289	4	323	12	721	12	754	0.3	16.4	0.0	1.0	0	–	10
6/30	3	112	3	292	1	324	7	728	7	761	0.1	16.5	0.0	1.0	0	–	10
7/1	1	113	0	292	0	324	1	729	1	762	0.0	16.6	0.0	1.0	0	–	10
7/2	1	114	1	293	1	325	3	732	3	765	0.1	16.6	0.0	1.0	0	–	10
7/3	2	116	3	296	2	327	7	739	7	772	0.1	16.8	0.0	1.0	0	–	10
7/4	0	116	1	297	1	328	2	741	2	774	0.0	16.8	0.0	1.0	0	–	10
7/5	1	117	0	297	0	328	1	742	1	775	0.0	16.8	0.0	1.0	0	–	10
7/6	0	117	0	297	0	328	0	742	0	775	0.0	16.8	0.0	1.0	0	–	10
7/7	0	117	1	298	1	329	2	744	2	777	0.0	16.9	0.0	1.0	0	–	10
7/8	1	118	0	298	0	329	1	745	1	778	0.0	16.9	0.0	1.0	0	–	10
7/9	1	119	2	300	0	329	3	748	3	781	0.1	17.0	0.0	1.0	0	–	10
7/10	0	119	0	300	0	329	0	748	0	781	0.0	17.0	0.0	1.0	0	–	10
7/11	0	119	1	301	0	329	1	749	1	782	0.0	17.0	0.0	1.0	0	–	10
7/12	1	120	0	301	0	329	1	750	1	783	0.0	17.0	0.0	1.0	0	–	10
7/13	0	120	0	301	0	329	0	750	0	783	0.0	17.0	0.0	1.0	0	–	10
7/14	0	120	0	301	0	329	0	750	0	783	0.0	17.0	0.0	1.0	0	–	10
7/15	0	120	0	301	0	329	0	750	0	783	0.0	17.0	0.0	1.0	0	–	10
7/16	0	120	0	301	0	329	0	750	0	783	0.0	17.0	0.0	1.0	0	–	10
7/17	0	120	0	301	0	329	0	750	0	783	0.0	17.0	0.0	1.0	0	–	10
7/18	0	120	0	301	0	329	0	750	0	783	0.0	17.0	0.0	1.0	0	–	10
7/19	0	120	0	301	0	329	0	750	1	784	0.0	17.0	0.0	1.0	0	–	10
7/20	0	120	0	301	0	329	0	750	0	784	0.0	17.0	0.0	1.0	0	–	10
7/21	0	120	0	301	0	329	0	750	0	784	0.0	17.0	0.0	1.0	0	–	10
7/22	0	120	0	301	0	329	0	750	1	785	0.0	17.0	0.0	1.0	0	–	10
7/23	0	120	0	301	1	330	1	751	1	786	0.0	17.1	0.0	1.0	0	–	10
7/24	0	120	0	301	0	330	0	751	0	786	0.0	17.1	0.0	1.0	0	–	10
7/25	0	120	0	301	0	330	0	751	0	786	0.0	17.1	0.0	1.0	0	–	10
7/26	0	120	0	301	0	330	0	751	0	786	0.0	17.1	0.0	1.0	0	–	10
7/27	0	120	0	301	0	330	0	751	0	786	0.0	17.1	0.0	1.0	0	–	10

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	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
7/28	0	120	0	301	0	330	0	751	0	786	0.0	17.1	0.0	1.0	0	–	10
7/29	0	120	0	301	0	330	0	751	0	786	0.0	17.1	0.0	1.0	0	–	10
7/30	0	120	0	301	1	331	1	752	1	787	0.0	17.1	0.0	1.0	0	–	10
7/31	0	120	0	301	0	331	0	752	0	787	0.0	17.1	0.0	1.0	0	–	10
8/1	0	120	0	301	0	331	0	752	0	787	0.0	17.1	0.0	1.0	0	–	10
8/2	0	120	0	301	0	331	0	752	0	787	0.0	17.1	0.0	1.0	0	–	10
8/3	0	120	0	301	0	331	0	752	0	787	0.0	17.1	0.0	1.0	0	–	10
8/4	0	120	0	301	0	331	0	752	0	787	0.0	17.1	0.0	1.0	0	–	10
8/5	0	120	0	301	1	332	1	753	1	788	0.0	17.1	0.0	1.0	0	–	10
Total	120	–	301	–	332	–	753	–	788	–	–	–	–	–	10	10	–

[a] Column total count is the number of adipose-finclipped Chinook salmon possessing valid coded wire.

Appendix A5.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2008 by size group and location.

			Brood year and age class									
			2005	2004	2004	2003	2003	2002	2002	2001	2001	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nahlin	Male	*n*	0	0	12	0	80	0	4	0	0	96
Large fish		%	0.0%	0.0%	12.5%	0.0%	83.3%	0.0%	4.2%	0.0%	0.0%	39.7%
	Female	*n*	0	0	4	0	129	0	13	0	0	146
		%	0.0%	0.0%	2.7%	0.0%	88.4%	0.0%	8.9%	0.0%	0.0%	60.3%
	Total	*n*	0	0	16	0	209	0	17	0	0	242
		%	0.0%	0.0%	6.6%	0.0%	86.4%	0.0%	7.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	34	0	2	0	0	0	0	36
Medium fish		%	0.0%	0.0%	94.4%	0.0%	5.6%	0.0%	0.0%	0.0%	0.0%	85.7%
	Female	*n*	0	0	1	0	5	0	0	0	0	6
		%	0.0%	0.0%	16.7%	0.0%	83.3%	0.0%	0.0%	0.0%	0.0%	14.3%
	Total	*n*	0	0	35	0	7	0	0	0	0	42
		%	0.0%	0.0%	83.3%	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	1	0	0	0	0	0	0	0	0	1
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	1	0	0	0	0	0	0	0	0	1
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	1	0	46	0	82	0	4	0	0	133
All fish		%	0.8%	0.0%	34.6%	0.0%	61.7%	0.0%	3.0%	0.0%	0.0%	46.7%
	Female	*n*	0	0	5	0	134	0	13	0	0	152
		%	0.0%	0.0%	3.3%	0.0%	88.2%	0.0%	8.6%	0.0%	0.0%	53.3%
	Total	*n*	1	0	51	0	216	0	17	0	0	285
		%	0.4%	0.0%	17.9%	0.0%	75.8%	0.0%	6.0%	0.0%	0.0%	100.0%
Upper Dudidontu	Male	*n*	–	–	1	–	16	–	–	–	–	17
Large fish		%	0.0%	0.0%	5.9%	0.0%	94.1%	0.0%	0.0%	0.0%	0.0%	26.6%
	Female	*n*	–	–	–	–	43	–	4	–	–	47
		%	0.0%	0.0%	0.0%	0.0%	91.5%	0.0%	8.5%	0.0%	0.0%	73.4%
	Total	*n*	–	–	1	–	59	–	4	–	–	64
		%	0.0%	0.0%	1.6%	0.0%	92.2%	0.0%	6.3%	0.0%	0.0%	100.0%
	Male	*n*	–	–	3	–	1	–	–	–	–	4
Medium fish		%	0.0%	0.0%	75.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	57.1%
	Female	*n*	–	–	2	–	1	–	–	–	–	3
		%	0.0%	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	42.9%
	Total	*n*	–	–	5	–	2	–	–	–	–	7
		%	0.0%	0.0%	71.4%	0.0%	28.6%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	4	0	17	0	0	0	0	21
All Chinook		%	0.0%	0.0%	19.0%	0.0%	81.0%	0.0%	0.0%	0.0%	0.0%	29.6%
	Female	*n*	0	0	2	0	44	0	4	0	0	50
		%	0.0%	0.0%	4.0%	0.0%	88.0%	0.0%	8.0%	0.0%	0.0%	70.4%
	Total	*n*	0	0	6	0	61	0	4	0	0	71
		%	0.0%	0.0%	8.5%	0.0%	85.9%	0.0%	5.6%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2005	2004	2004	2003	2003	2002	2002	2001	2001	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Lower Dudidontu	Male	*n*	0	0	3	0	22	0	7	0	0	32
Large fish		%	0.0%	0.0%	9.4%	0.0%	68.8%	0.0%	21.9%	0.0%	0.0%	45.1%
	Female	*n*	0	0	0	1	27	1	10	0	0	39
		%	0.0%	0.0%	0.0%	2.6%	69.2%	2.6%	25.6%	0.0%	0.0%	54.9%
	Total	*n*	0	0	3	1	49	1	17	0	0	71
		%	0.0%	0.0%	4.2%	1.4%	69.0%	1.4%	23.9%	0.0%	0.0%	100.0%
	Male	*n*	0	0	11	1	1	0	0	0	0	13
Medium fish		%	0.0%	0.0%	84.6%	7.7%	7.7%	0.0%	0.0%	0.0%	0.0%	92.9%
	Female	*n*	0	0	0	0	1	0	0	0	0	1
		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	7.1%
	Total	*n*	0	0	11	1	2	0	0	0	0	14
		%	0.0%	0.0%	78.6%	7.1%	14.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	–	–	14	1	23	–	7	–	–	45
All Chinook		%	0.0%	0.0%	31.1%	2.2%	51.1%	0.0%	15.6%	0.0%	0.0%	52.9%
	Female	*n*	–	–	–	1	28	1	10	–	–	40
		%	0.0%	0.0%	0.0%	2.5%	70.0%	2.5%	25.0%	0.0%	0.0%	47.1%
	Total	*n*	–	–	14	2	51	1	17	–	–	85
		%	0.0%	0.0%	16.5%	2.4%	60.0%	1.2%	20.0%	0.0%	0.0%	100.0%
Tseta Creek	Male	*n*	0	0	1	0	18	1	3	0	0	23
Large fish		%	0.0%	0.0%	4.3%	0.0%	78.3%	4.3%	13.0%	0.0%	0.0%	63.9%
	Female	*n*	0	0	0	0	11	1	1	0	0	13
		%	0.0%	0.0%	0.0%	0.0%	84.6%	7.7%	7.7%	0.0%	0.0%	36.1%
	Total	*n*	0	0	1	0	29	2	4	0	0	36
		%	0.0%	0.0%	2.8%	0.0%	80.6%	5.6%	11.1%	0.0%	0.0%	100.0%
	Male	*n*	0	0	8	0	1	0	1	0	0	10
Medium fish		%	0.0%	0.0%	80.0%	0.0%	10.0%	0.0%	10.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	–	–	8	–	1	–	1	–	–	10
		%	0.0%	0.0%	80.0%	0.0%	10.0%	0.0%	10.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	9	0	19	1	4	0	0	33
All Chinook		%	0.0%	0.0%	27.3%	0.0%	57.6%	3.0%	12.1%	0.0%	0.0%	71.7%
	Female	*n*	0	0	0	0	11	1	1	0	0	13
		%	0.0%	0.0%	0.0%	0.0%	84.6%	7.7%	7.7%	0.0%	0.0%	28.3%
	Total	*n*	0	0	9	0	30	2	5	0	0	46
		%	0.0%	0.0%	19.6%	0.0%	65.2%	4.3%	10.9%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2005	2004	2004	2003	2003	2002	2002	2001	2001	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
King Salmon River	Male	*n*	0	0	0	0	2	0	0	0	0	2
Large fish		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	40.0%
	Female	*n*	0	0	0	0	0	0	3	0	0	3
		%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	60.0%
	Total	*n*	0	0	0	0	2	0	3	0	0	5
		%	0.0%	0.0%	0.0%	0.0%	40.0%	0.0%	60.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	1	1	0	0	0	0	0	2
Medium fish		%	0.0%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	1	1	0	0	0	0	0	2
		%	0.0%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	1	1	2	0	0	0	0	4
All Chinook		%	0.0%	0.0%	25.0%	25.0%	50.0%	0.0%	0.0%	0.0%	0.0%	57.1%
	Female	*n*	0	0	0	0	0	0	3	0	0	3
		%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	42.9%
	Total	*n*	0	0	1	1	2	0	3	0	0	7
		%	0.0%	0.0%	14.3%	14.3%	28.6%	0.0%	42.9%	0.0%	0.0%	100.0%
Yeth Creek	Male	*n*	0	0	1	0	8	0	3	0	0	12
Large fish		%	0.0%	0.0%	8.3%	0.0%	66.7%	0.0%	25.0%	0.0%	0.0%	54.5%
	Female	*n*	0	0	0	0	7	0	2	0	1	10
		%	0.0%	0.0%	0.0%	0.0%	70.0%	0.0%	20.0%	0.0%	10.0%	45.5%
	Total	*n*	0	0	1	0	15	0	5	0	1	22
		%	0.0%	0.0%	4.5%	0.0%	68.2%	0.0%	22.7%	0.0%	4.5%	100.0%
	Male	*n*	0	0	1	0	0	0	0	0	0	1
Medium fish		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	1	0	0	0	0	0	0	1
		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	2	0	8	0	3	0	0	13
All Chinook		%	0.0%	0.0%	15.4%	0.0%	61.5%	0.0%	23.1%	0.0%	0.0%	56.5%
	Female	*n*	0	0	0	0	7	0	2	0	1	10
		%	0.0%	0.0%	0.0%	0.0%	70.0%	0.0%	20.0%	0.0%	10.0%	100.0%
	Total	*n*	0	0	2	0	15	0	5	0	1	23
		%	0.0%	0.0%	8.7%	0.0%	65.2%	0.0%	21.7%	0.0%	4.3%	100.0%

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			Brood year and age class									
			2005	2004	2004	2003	2003	2002	2002	2001	2001	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina	Male	*n*	0	0	6	0	19	1	7	0	0	33
Large fish		%	0.0%	0.0%	18.2%	0.0%	57.6%	3.0%	21.2%	0.0%	0.0%	48.5%
	Female	*n*	0	0	2	0	22	0	11	0	0	35
		%	0.0%	0.0%	5.7%	0.0%	62.9%	0.0%	31.4%	0.0%	0.0%	51.5%
	Total	*n*	0	0	8	0	41	1	18	0	0	68
		%	0.0%	0.0%	11.8%	0.0%	60.3%	1.5%	26.5%	0.0%	0.0%	100.0%
	Male	*n*	1	0	61	0	10	0	0	0	0	72
Medium fish		%	1.4%	0.0%	84.7%	0.0%	13.9%	0.0%	0.0%	0.0%	0.0%	97.3%
	Female	*n*	0	0	2	0	0	0	0	0	0	2
		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%
	Total	*n*	1	0	63	0	10	0	0	0	0	74
		%	1.4%	0.0%	85.1%	0.0%	13.5%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	21	0	0	0	0	0	0	0	0	21
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	21	0	0	0	0	0	0	0	0	21
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	22	0	67	0	29	1	7	0	0	126
All fish		%	17.5%	0.0%	53.2%	0.0%	23.0%	0.8%	5.6%	0.0%	0.0%	77.3%
	Female	*n*	0	0	4	0	22	0	11	0	0	37
		%	0.0%	0.0%	10.8%	0.0%	59.5%	0.0%	29.7%	0.0%	0.0%	22.7%
	Total	*n*	22	0	71	0	51	1	18	0	0	163
		%	13.5%	0.0%	43.6%	0.0%	31.3%	0.6%	11.0%	0.0%	0.0%	100.0%
Hackett River	Male	*n*	0	0	3	0	32	0	4	0	0	39
Large fish		%	0.0%	0.0%	7.7%	0.0%	82.1%	0.0%	10.3%	0.0%	0.0%	47.6%
	Female	*n*	1	0	2	1	32	0	7	0	0	43
		%	2.3%	0.0%	4.7%	2.3%	74.4%	0.0%	16.3%	0.0%	0.0%	52.4%
	Total	*n*	1	0	5	1	64	0	11	0	0	82
		%	1.2%	0.0%	6.1%	1.2%	78.0%	0.0%	13.4%	0.0%	0.0%	100.0%
	Male	*n*	0	0	6	0	3	0	0	0	0	9
Medium fish		%	0.0%	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	60.0%
	Female	*n*	0	0	2	0	3	0	1	0	0	6
		%	0.0%	0.0%	33.3%	0.0%	50.0%	0.0%	16.7%	0.0%	0.0%	40.0%
	Total	*n*	0	0	8	0	6	0	1	0	0	15
		%	0.0%	0.0%	53.3%	0.0%	40.0%	0.0%	6.7%	0.0%	0.0%	100.0%
	Male	*n*	2	0	0	0	0	0	0	0	0	2
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	2	0	0	0	0	0	0	0	0	2
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	2	0	9	0	35	0	4	0	0	50
All Chinook		%	4.0%	0.0%	18.0%	0.0%	70.0%	0.0%	8.0%	0.0%	0.0%	50.5%
	Female	*n*	1	0	4	1	35	0	8	0	0	49
		%	2.0%	0.0%	8.2%	2.0%	71.4%	0.0%	16.3%	0.0%	0.0%	49.5%
	Total	*n*	3	0	13	1	70	0	12	0	0	99
		%	3.0%	0.0%	13.1%	1.0%	70.7%	0.0%	12.1%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2005	2004	2004	2003	2003	2002	2002	2001	2001	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Kowatua	Male	*n*	0	0	6	0	27	0	6	0	0	39
Large fish		%	0.0%	0.0%	15.4%	0.0%	69.2%	0.0%	15.4%	0.0%	0.0%	32.5%
	Female	*n*	0	0	1	0	59	3	18	0	0	81
		%	0.0%	0.0%	1.2%	0.0%	72.8%	3.7%	22.2%	0.0%	0.0%	67.5%
	Total	*n*	0	0	7	0	86	3	24	0	0	120
		%	0.0%	0.0%	5.8%	0.0%	71.7%	2.5%	20.0%	0.0%	0.0%	100.0%
	Male	*n*	2	0	18	0	1	0	0	0	0	21
Medium fish		%	9.5%	0.0%	85.7%	0.0%	4.8%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	2	0	18	0	1	0	0	0	0	21
		%	9.5%	0.0%	85.7%	0.0%	4.8%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	2	0	24	0	28	0	6	0	0	60
All fish		%	3.3%	0.0%	40.0%	0.0%	46.7%	0.0%	10.0%	0.0%	0.0%	42.6%
	Female	*n*	0	0	1	0	59	3	18	0	0	81
		%	0.0%	0.0%	1.2%	0.0%	72.8%	3.7%	22.2%	0.0%	0.0%	57.4%
	Total	*n*	2	0	25	0	87	3	24	0	0	141
		%	1.4%	0.0%	17.7%	0.0%	61.7%	2.1%	17.0%	0.0%	0.0%	100.0%
Upper Tatsamenie	Male	*n*	0	0	1	0	4	0	0	0	0	5
Large fish		%	0.0%	0.0%	20.0%	0.0%	80.0%	0.0%	0.0%	0.0%	0.0%	55.6%
	Female	*n*	0	0	0	0	4	0	0	0	0	4
		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	44.4%
	Total	*n*	0	0	1	0	8	0	0	0	0	9
		%	0.0%	0.0%	11.1%	0.0%	88.9%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	14	0	0	0	0	0	0	14
Medium fish		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	93.3%
	Female	*n*	0	0	1	0	0	0	0	0	0	1
		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.7%
	Total	*n*	0	0	15	0	0	0	0	0	0	15
		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	3	0	1	0	0	0	0	0	0	4
Small fish		%	75.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	3	0	1	0	0	0	0	0	0	4
		%	75.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	3	0	16	0	4	0	0	0	0	23
All fish		%	13.0%	0.0%	69.6%	0.0%	17.4%	0.0%	0.0%	0.0%	0.0%	82.1%
	Female	*n*	0	0	1	0	4	0	0	0	0	5
		%	0.0%	0.0%	20.0%	0.0%	80.0%	0.0%	0.0%	0.0%	0.0%	17.9%
	Total	*n*	3	0	17	0	8	0	0	0	0	28
		%	10.7%	0.0%	60.7%	0.0%	28.6%	0.0%	0.0%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2005	2004	2004	2003	2003	2002	2002	2001	2001	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Lower Tatsamenie	Male	*n*	0	0	30	0	96	0	10	0	0	136
Large fish		%	0.0%	0.0%	22.1%	0.0%	70.6%	0.0%	7.4%	0.0%	0.0%	56.0%
	Female	*n*	0	0	1	0	94	0	12	0	0	107
		%	0.0%	0.0%	0.9%	0.0%	87.9%	0.0%	11.2%	0.0%	0.0%	44.0%
	Total	*n*	0	0	31	0	190	0	22	0	0	243
		%	0.0%	0.0%	12.8%	0.0%	78.2%	0.0%	9.1%	0.0%	0.0%	100.0%
	Male	*n*	17	1	113	0	12	0	0	0	0	143
Medium fish		%	11.9%	0.7%	79.0%	0.0%	8.4%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	4	0	3	0	0	0	0	7
		%	0.0%	0.0%	57.1%	0.0%	42.9%	0.0%	0.0%	0.0%	0.0%	4.7%
	Total	*n*	17	1	117	0	15	0	0	0	0	150
		%	11.3%	0.7%	78.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	46	0	0	0	0	0	0	0	0	46
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	46	0	0	0	0	0	0	0	0	46
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	63	1	143	0	108	0	10	0	0	325
All fish		%	19.4%	0.3%	44.0%	0.0%	33.2%	0.0%	3.1%	0.0%	0.0%	74.0%
	Female	*n*	0	0	5	0	97	0	12	0	0	114
		%	0.0%	0.0%	4.4%	0.0%	85.1%	0.0%	10.5%	0.0%	0.0%	26.0%
	Total	*n*	63	1	148	0	205	0	22	0	0	439
		%	14.4%	0.2%	33.7%	0.0%	46.7%	0.0%	5.0%	0.0%	0.0%	100.0%
All tributaries	Male	*n*	0	0	64	0	324	2	44	0	0	434
Large fish		%	0.0%	0.0%	14.7%	0.0%	74.7%	0.5%	10.1%	0.0%	0.0%	45.1%
	Female	*n*	1	0	10	2	428	5	81	0	1	528
		%	0.2%	0.0%	1.9%	0.4%	81.1%	0.9%	15.3%	0.0%	0.2%	54.9%
	Total	*n*	1	0	74	2	752	7	125	0	1	962
		%	0.1%	0.0%	7.7%	0.2%	78.2%	0.7%	13.0%	0.0%	0.1%	100.0%
	Male	*n*	20	1	270	2	31	0	1	0	0	325
Medium fish		%	6.2%	0.3%	83.1%	0.6%	9.5%	0.0%	0.3%	0.0%	0.0%	92.6%
	Female	*n*	0	0	12	0	13	0	1	0	0	26
		%	0.0%	0.0%	46.2%	0.0%	50.0%	0.0%	3.8%	0.0%	0.0%	7.4%
	Total	*n*	20	1	282	2	44	0	2	0	0	351
		%	5.7%	0.3%	80.3%	0.6%	12.5%	0.0%	0.6%	0.0%	0.0%	100.0%
	Male	*n*	73	0	1	0	0	0	0	0	0	74
Small fish		%	98.6%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	73	0	1	0	0	0	0	0	0	74
		%	98.6%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	93	1	335	2	355	2	45	0	0	833
All fish		%	11.2%	0.1%	40.2%	0.2%	42.6%	0.2%	5.4%	0.0%	0.0%	60.1%
	Female	*n*	1	0	22	2	441	5	82	0	1	554
		%	0.2%	0.0%	4.0%	0.4%	79.6%	0.9%	14.8%	0.0%	0.2%	39.9%
	Total	*n*	94	1	357	4	796	7	127	0	1	1,387
		%	6.8%	0.1%	25.7%	0.3%	57.4%	0.5%	9.2%	0.0%	0.1%	100.0%

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			Brood year and age class									
			2005	2004	2004	2003	2003	2002	2002	2001	2001	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Canyon Island	Male	*n*	0	0	17	1	190	0	20	0	0	228
Large fish		%	0.0%	0.0%	7.5%	0.4%	83.3%	0.0%	8.8%	0.0%	0.0%	34.0%
	Female	*n*	0	0	10	0	366	8	59	0	0	443
		%	0.0%	0.0%	2.3%	0.0%	82.6%	1.8%	13.3%	0.0%	0.0%	66.0%
	Total	*n*	0	0	27	1	556	8	79	0	0	671
		%	0.0%	0.0%	4.0%	0.1%	82.9%	1.2%	11.8%	0.0%	0.0%	100.0%
	Male	*n*	8	0	383	2	51	0	0	0	0	444
Medium fish		%	1.8%	0.0%	86.3%	0.5%	11.5%	0.0%	0.0%	0.0%	0.0%	98.4%
	Female	*n*	0	0	6	0	1	0	0	0	0	7
		%	0.0%	0.0%	85.7%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	1.6%
	Total	*n*	8	0	389	2	52	0	0	0	0	451
		%	1.8%	0.0%	86.3%	0.4%	11.5%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	123	2	2	0	0	0	0	0	0	127
Small fish		%	96.9%	1.6%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	123	2	2	0	0	0	0	0	0	127
		%	96.9%	1.6%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	131	2	402	3	241	0	20	0	0	799
All fish		%	16.4%	0.3%	50.3%	0.4%	30.2%	0.0%	2.5%	0.0%	0.0%	64.0%
	Female	*n*	0	0	16	0	367	8	59	0	0	450
		%	0.0%	0.0%	3.6%	0.0%	81.6%	1.8%	13.1%	0.0%	0.0%	36.0%
	Total	*n*	131	2	418	3	608	8	79	0	0	1,249
		%	10.5%	0.2%	33.5%	0.2%	48.7%	0.6%	6.3%	0.0%	0.0%	100.0%
Test fishery												
Large fish		*n*	0	0	20	0	711	22	214	1	2	970
		%	0.0%	0.0%	2.1%	0.0%	73.3%	2.3%	22.1%	0.1%	0.2%	90.5%
Medium fish		*n*	1	0	64	1	36	0	0		0	102
		%	1.0%	0.0%	62.7%	1.0%	35.3%	0.0%	0.0%	0.0%	0.0%	9.5%
All fish		*n*	1	0	84	1	747	22	214	1	2	1072
		%	0.1%	0.0%	7.8%	0.1%	69.7%	2.1%	20.0%	0.1%	0.2%	100.0%
Canadian Commercial Fishery												
Large fish		*n*	1	0	7	0	160	5	40	0	0	213
		%	0.5%	0.0%	3.3%	0.0%	75.1%	2.3%	18.8%	0.0%	0.0%	64.2%
Medium fish		*n*	5	1	92	2	18	0	0	0	0	118
		%	4.2%	0.8%	78.0%	1.7%	15.3%	0.0%	0.0%	0.0%	0.0%	35.5%
Small fish		*n*	1	0	0	0	0	0	0	0	0	1
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%
All fish		*n*	7	1	99	2	178	5	40	0	0	332
		%	2.1%	0.3%	29.8%	0.6%	53.6%	1.5%	12.0%	0.0%	0.0%	100.0%

APPENDIX B

Appendix B1.–Number of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2009 by size group. Information in bold was used in the mark–recapture estimate.

		Small 0–400 mm	Medium 401–659 mm	Large ≥660 mm	Total	Large + Medium
EVENT 1: Fish marked with spaghetti tags at Canyon Island						
Total Initially Tagged		61	264	312	1,243	1,123
Captured using Fishwheels and Tagged		61	105	119	754	634
Captured using Set Gillnets and Tagged		0	159	193	489	489
Total Tag Removals by:		0	2	6	8	8
All U.S. fisheries		0	2	6	8	8
Commercial gillnet		0	2	5	7	7
Sport fishery		0	0	0	0	0
Troll fishery		0	0	1	1	1
Inriver assessment fishery		0	0	0	0	0
All Canadian fisheries		0	0	0	0	0
Commercial fishery		0	0	0	0	0
Sport fishery		0	0	0	0	0
Final Total Tagged in Event 1 (M)		61	**262**	**306**	629	568
EVENT 2 - Fish inspected for spaghetti tags - captured and recaptured						
Upper river spawning areas	Inspected	416	553	1,102	2,071	1,655
	Marked	5	12	4	21	16
	Marked/Inspected	0.012	0.022	0.004	0.010	0.010
Nahlin River	Inspected	1	20	82	103	102
	Marked	0	0	0	0	0
	Marked/Inspected	–	–	–	–	–
Dudidontu	Inspected	0	69	147	216	216
	Marked	0	0	0	0	0
	Marked/Inspected	–	–	–	–	–
Tseta Creek	Inspected	1	3	74	78	77
	Marked	0	1	0	1	1
	Marked/Inspected	–	0.067	0.015	0.013	0.0130
Yeth Creek	Inspected	0	0	6	6	6
	Marked	0	0	0	0	0
	Marked/Inspected	–	–	–	–	–

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		Small 0-400 mm	Medium 401-659 mm	Large ≥660 mm	Total	Large + Medium
Nakina River	Inspected	276	226	155	657	381
	Marked	4	6	0	10	6
	Marked/Inspected	0.014	0.027	–	0.015	0.016
Kowatua Creek	Inspected	0	40	180	458	220
	Marked	0	1	0	4	1
	Marked/Inspected	–	0.025	–	0.009	0.005
Tatsamenie drainage	Inspected	138	195	458	791	653
(Little and Big Tatsamenie lakes)	Marked	1	4	4	9	8
	Marked/Inspected	0.007	0.021	0.009	0.011	0.012
Lower River Canadian fisheries	Inspected	1	1,166	6,931	2,782	2,779
(Test, Commercial and Food)	Marked	1	26	77	87	87
	Marked/Inspected	0.000	0.049	0.028	0.031	0.0313
Assessment fishery	Inspected	0	0	0	0	0
	Marked	0	0	0	0	0
	Marked/Inspected	–	–	–	–	–
Commercial fishery	Inspected	1	**1,136**	**6,759**	7,896	7,895
	Marked	1	**26**	**76**	103	102
	Marked/Inspected	1.000	0.023	0.011	0.013	0.013
TRT food fishery	Inspected	0	30	172	202	202
	Marked	0	0	1	1	1
	Marked/Inspected	–	–	0.006	0.005	0.005

Appendix B2.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2009.

			TAGGED								CAUGHT									
			Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips			
Date	Hours fished	Water level (cm)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
4/24/09	6.0	-91	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0	–	0
4/25/09	6.0	-76	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0	–	0
4/26/09	4.0	-76	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0	–	0
4/27/09	6.0	-70	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0	–	0
4/28/09	6.0	-58	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0	–	0
4/29/09	6.0	-30	0	0	0	0	0	0	0	0	1	1	0.17	0.17	0.00	0.00	1	41218	1
4/30/09	6.0	0	0	0	0	0	1	1	1	1	1	2	0.17	0.33	0.00	0.00	0	–	1
5/1/09	6.0	30	0	0	0	0	3	4	3	4	3	5	0.50	0.83	0.01	0.01	0	–	1
5/2/09	6.0	58	0	0	0	0	0	4	0	4	0	5	0.00	0.83	0.00	0.01	0	–	1
5/3/09	4.0	85	0	0	0	0	0	4	0	4	0	5	0.00	0.83	0.00	0.01	0	–	1
5/4/09	6.0	122	0	0	2	2	2	6	4	8	4	9	0.67	1.50	0.01	0.02	0	–	1
5/5/09	6.0	122	0	0	0	2	5	11	5	13	5	14	0.83	2.33	0.01	0.03	0	–	1
5/6/09	6.0	128	0	0	2	4	12	23	14	27	17	31	2.83	5.17	0.03	0.06	0	–	1
5/7/09	6.0	143	0	0	7	11	11	34	18	45	19	50	3.17	8.33	0.04	0.10	0	–	1
5/8/09	6.0	149	0	0	4	15	8	42	12	57	12	62	2.00	10.33	0.02	0.13	0	–	1
5/9/09	6.0	146	0	0	9	24	14	56	23	80	25	87	4.17	14.50	0.05	0.18	0	–	1
5/10/09	4.0	140	0	0	8	32	8	64	16	96	16	103	4.00	18.50	0.05	0.23	0	–	1
5/11/09	6.0	137	0	0	9	41	12	76	21	117	21	124	3.50	22.00	0.04	0.27	0	–	1
5/12/09	6.0	140	0	0	13	54	13	89	26	143	28	152	4.67	26.67	0.06	0.33	1	41306	2
5/13/09	4.0	134	0	0	4	58	10	99	14	157	14	166	3.50	30.17	0.04	0.37	0	–	2
5/14/09	4.0	128	0	0	14	72	9	108	23	180	25	191	6.25	36.42	0.08	0.45	0	–	2
5/15/09	4.0	122	0	0	8	80	15	123	23	203	23	214	5.75	42.17	0.07	0.52	0	–	2
5/16/09	4.0	125	0	0	10	90	9	132	19	222	19	233	4.75	46.92	0.06	0.58	0	–	2
5/17/09	4.0	128	0	0	8	98	16	148	24	246	26	259	6.50	53.42	0.08	0.66	1	41153	3
5/18/09	4.0	119	0	0	6	104	9	157	15	261	16	275	4.00	57.42	0.05	0.71	0	–	3
5/19/09	4.0	113	0	0	14	118	15	172	29	290	32	307	8.00	65.42	0.10	0.80	0	–	3
5/20/09	4.0	116	0	0	9	127	7	179	16	306	17	324	4.25	69.67	0.05	0.86	0	–	3
5/21/09	4.0	134	0	0	18	145	8	187	26	332	27	351	6.75	76.42	0.08	0.94	1	41218	4
5/22/09	4.0	165	0	0	14	159	6	193	20	352	20	371	5.00	81.42	0.06	1.00	0	–	4
Total	148	–	0	–	159	–	193	–	352	–	371	–	–	–	–	–	4	4	–

[a] Column total count is the number of adipose-finclipped Chinook salmon possessing valid coded wire.

Appendix B3.–Fish wheel effort for Chinook salmon including water level in 2009.

	Fish wheel #1		Fish wheel #2		Water
Date	Hours fished	RPM	Hours fished	RPM	level (cm)
5/12	0.0	0.0	6.0	2.3	140
5/13	9.0	2.0	23.9	2.1	134
5/14	23.9	2.1	21.2	2.1	128
5/15	23.8	1.8	23.5	2.0	122
5/16	23.9	1.8	23.8	2.1	125
5/17	23.9	1.5	23.8	1.9	128
5/18	23.8	1.5	23.8	2.0	119
5/19	23.9	1.0	23.8	2.1	113
5/20	23.8	1.7	23.6	2.0	116
5/21	23.8	2.0	23.8	2.3	134
5/22	23.8	2.2	23.8	2.3	165
5/23	23.7	2.7	23.8	2.3	177
5/24	23.5	2.4	23.6	2.5	195
5/25	23.9	2.5	23.9	2.7	219
5/26	23.8	2.6	21.5	2.5	244
5/27	23.8	2.9	23.8	2.9	271
5/28	23.9	2.7	23.8	2.4	274
5/29	23.8	2.5	23.6	2.2	250
5/30	23.4	2.5	23.6	2.2	226
5/31	23.4	2.5	23.0	2.5	207
6/1	23.1	2.3	23.6	2.6	198
6/2	23.7	2.3	23.4	2.4	213
6/3	23.8	2.6	23.9	2.2	262
6/4	23.9	2.8	23.9	2.4	296
6/5	23.9	2.8	23.9	2.4	326
6/6	23.9	2.9	23.9	2.5	344
6/7	23.3	3.0	23.9	2.5	363
6/8	23.9	3.1	23.9	2.4	372
6/9	23.8	2.6	23.8	2.3	390
6/10	23.8	3.0	23.9	2.3	381
6/11	23.9	3.0	22.9	2.1	381
6/12	23.8	3.0	23.8	2.0	369
6/13	23.8	3.0	23.4	2.5	347
6/14	23.8	2.8	23.8	2.3	311
6/15	23.8	2.5	23.4	2.4	280
6/16	23.7	2.5	23.8	2.6	268
6/17	23.8	2.5	23.8	2.2	268
6/18	23.5	2.2	23.7	2.3	253
6/19	23.3	2.2	23.1	2.4	247
6/20	23.6	2.3	23.7	2.4	232
6/21	23.9	2.2	23.8	2.1	219
6/22	21.8	2.4	23.3	2.1	207
6/23	23.5	2.3	22.3	2.1	192
6/24	23.4	2.0	21.9	2.0	189
6/25	23.5	2.3	21.8	2.0	192

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Date	Fish wheel #1		Fish wheel #2		Water level (cm)
	Hours fished	RPM	Hours fished	RPM	
6/26	23.8	2.3	21.2	2.1	183
6/27	23.5	2.2	23.2	2.0	171
6/28	23.3	2.0	23.1	1.8	165
6/29	23.1	2.0	23.0	1.8	158
6/30	23.2	1.9	22.8	2.2	155
7/1	23.3	2.1	23.7	2.2	152
7/2	23.3	2.3	23.3	2.2	177
7/3	23.4	2.7	22.8	2.3	195
7/4	23.3	2.7	23.2	2.1	216
7/5	15.7	2.4	23.5	2.5	235
7/6	15.7	2.4	22.5	2.5	247
7/7	23.6	2.2	22.8	2.5	250
7/8	23.6	2.6	22.8	2.5	250
7/9	23.6	2.4	22.4	2.3	247
7/10	16.9	2.4	23.0	2.3	262
7/11	23.4	2.6	23.1	2.5	271
7/12	23.4	2.6	21.9	2.3	262
7/13	23.3	2.4	20.9	2.3	259
7/14	22.8	2.5	21.2	2.3	262
7/15	23.3	2.4	22.3	2.2	250
7/16	23.2	2.5	21.3	2.3	250
7/17	23.0	2.3	22.3	2.2	219
7/18	23.2	2.6	21.8	2.6	207
7/19	23.2	2.5	22.9	2.3	207
7/20	23.3	2.6	23.0	2.6	210
7/21	7.5	2.5	23.1	2.4	210
7/22	0.0	0.0	23.2	2.6	238
7/23	0.0	0.0	10.5	2.7	381
7/24	0.0	0.0	14.0	2.5	305
7/25	9.0	2.6	22.7	2.5	216
Total	1,604.8	–	1,695.3	–	–

Appendix B4.–Fish wheel Chinook salmon daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2009.

	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
5/12	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	–	0
5/13	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	–	0
5/14	0	0	1	1	1	1	2	2	2	2	0.0	0.0	0.0	0.0	0	–	0
5/15	4	4	2	3	5	6	11	13	12	14	0.3	0.3	0.0	0.0	0	–	0
5/16	1	5	1	4	2	8	4	17	4	18	0.1	0.4	0.0	0.1	0	–	0
5/17	3	8	3	7	6	14	12	29	12	30	0.3	0.6	0.0	0.1	0	–	0
5/18	1	9	1	8	3	17	5	34	7	37	0.1	0.8	0.0	0.1	1	41153	1
5/19	0	9	4	12	6	23	10	44	10	47	0.2	1.0	0.0	0.1	0	–	1
5/20	1	10	3	15	3	26	7	51	9	56	0.2	1.2	0.0	0.2	0	–	1
5/21	1	11	1	16	2	28	4	55	6	62	0.1	1.3	0.0	0.2	2	head lost, no tag	3
5/22	2	13	6	22	3	31	11	66	12	74	0.3	1.6	0.0	0.2	0	–	3
5/23	1	14	5	27	2	33	8	74	9	83	0.2	1.7	0.0	0.3	0	–	3
5/24	0	14	1	28	3	36	4	78	4	87	0.1	1.8	0.0	0.3	0	–	3
5/25	0	14	0	28	1	37	1	79	1	88	0.0	1.9	0.0	0.3	0	–	3
5/26	0	14	0	28	0	37	0	79	0	88	0.0	1.9	0.0	0.3	0	–	3
5/27	0	14	1	29	1	38	2	81	2	90	0.0	1.9	0.0	0.3	0	–	3
5/28	0	14	0	29	0	38	0	81	0	90	0.0	1.9	0.0	0.3	0	–	3
5/29	0	14	2	31	3	41	5	86	5	95	0.1	2.0	0.0	0.3	0	–	3
5/30	1	15	2	33	5	46	8	94	10	105	0.2	2.2	0.0	0.3	0	–	3
5/31	1	16	6	39	3	49	10	104	10	115	0.2	2.4	0.0	0.4	0	–	3
6/1	2	18	5	44	7	56	14	118	18	133	0.4	2.8	0.1	0.4	0	–	3
6/2	4	22	2	46	2	58	8	126	8	141	0.2	3.0	0.0	0.4	0	–	3
6/3	0	22	2	48	4	62	6	132	6	147	0.1	3.1	0.0	0.5	0	–	3
6/4	0	22	0	48	0	62	0	132	0	147	0.0	3.1	0.0	0.5	0	–	3
6/5	0	22	0	48	0	62	0	132	0	147	0.0	3.1	0.0	0.5	0	–	3
6/6	0	22	0	48	0	62	0	132	0	147	0.0	3.1	0.0	0.5	0	–	3
6/7	0	22	0	48	0	62	0	132	0	147	0.0	3.1	0.0	0.5	0	–	3
6/8	0	22	1	49	0	62	1	133	1	148	0.0	3.1	0.0	0.5	0	–	3
6/9	0	22	2	51	2	64	4	137	4	152	0.1	3.2	0.0	0.5	0	–	3
6/10	0	22	1	52	1	65	2	139	2	154	0.0	3.3	0.0	0.5	0	–	3
6/11	0	22	1	53	0	65	1	140	1	155	0.0	3.3	0.0	0.5	0	–	3

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	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
6/12	0	22	0	53	4	69	4	144	4	159	0.1	3.4	0.0	0.5	0	–	3
6/13	0	22	0	53	0	69	0	144	0	159	0.0	3.4	0.0	0.5	0	–	3
6/14	0	22	0	53	1	70	1	145	1	160	0.0	3.4	0.0	0.5	0	–	3
6/15	1	23	1	54	1	71	3	148	3	163	0.1	3.4	0.0	0.5	0	–	3
6/16	0	23	1	55	3	74	4	152	5	168	0.1	3.6	0.0	0.5	0	–	3
6/17	0	23	0	55	3	77	3	155	3	171	0.1	3.6	0.0	0.5	0	–	3
6/18	2	25	2	57	2	79	6	161	6	177	0.1	3.7	0.0	0.5	0	–	3
6/19	1	26	3	60	3	82	7	168	7	184	0.2	3.9	0.0	0.6	0	–	3
6/20	0	26	1	61	2	84	3	171	3	187	0.1	4.0	0.0	0.6	0	–	3
6/21	0	26	0	61	1	85	1	172	1	188	0.0	4.0	0.0	0.6	0	–	3
6/22	1	27	1	62	1	86	3	175	3	191	0.1	4.0	0.0	0.6	0	–	3
6/23	0	27	3	65	1	87	4	179	5	196	0.1	4.2	0.0	0.6	0	–	3
6/24	6	33	8	73	8	95	22	201	26	222	0.6	4.7	0.1	0.7	0	–	3
6/25	4	37	6	79	2	97	12	213	15	237	0.3	5.1	0.0	0.7	0	–	3
6/26	5	42	4	83	0	97	9	222	10	247	0.2	5.3	0.0	0.8	0	–	3
6/27	5	47	2	85	0	97	7	229	8	255	0.2	5.5	0.0	0.8	0	–	3
6/28	6	53	2	87	4	101	12	241	14	269	0.3	5.8	0.0	0.8	0	–	3
6/29	2	55	3	90	1	102	6	247	6	275	0.1	5.9	0.0	0.9	0	–	3
6/30	2	57	3	93	0	102	5	252	5	280	0.1	6.0	0.0	0.9	0	–	3
7/1	2	59	2	95	1	103	5	257	5	285	0.1	6.1	0.0	0.9	0	–	3
7/2	0	59	0	95	1	104	1	258	1	286	0.0	6.1	0.0	0.9	0	–	3
7/3	0	59	2	97	2	106	4	262	4	290	0.1	6.2	0.0	0.9	0	–	3
7/4	0	59	0	97	3	109	3	265	3	293	0.1	6.3	0.0	0.9	0	–	3
7/5	0	59	3	100	1	110	4	269	4	297	0.1	6.4	0.0	0.9	0	–	3
7/6	0	59	0	100	1	111	1	270	3	300	0.1	6.5	0.0	0.9	0	–	3
7/7	1	60	1	101	0	111	2	272	2	302	0.0	6.5	0.0	0.9	0	–	3
7/8	0	60	0	101	1	112	1	273	1	303	0.0	6.5	0.0	1.0	0	–	3
7/9	1	61	1	102	0	112	2	275	2	305	0.0	6.6	0.0	1.0	0	–	3
7/10	0	61	1	103	2	114	3	278	3	308	0.1	6.6	0.0	1.0	0	–	3
7/11	0	61	0	103	0	114	0	278	0	308	0.0	6.6	0.0	1.0	0	–	3

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	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
7/12	0	61	0	103	0	114	0	278	0	308	0.0	6.6	0.0	1.0	0	–	3
7/13	0	61	1	104	2	116	3	281	3	311	0.1	6.7	0.0	1.0	0	–	3
7/14	0	61	0	104	1	117	1	282	2	313	0.0	6.8	0.0	1.0	0	–	3
7/15	0	61	0	104	0	117	0	282	0	313	0.0	6.8	0.0	1.0	0	–	3
7/16	0	61	1	105	0	117	1	283	1	314	0.0	6.8	0.0	1.0	0	–	3
7/17	0	61	0	105	0	117	0	283	0	314	0.0	6.8	0.0	1.0	0	–	3
7/18	0	61	1	106	1	118	2	285	2	316	0.0	6.8	0.0	1.0	0	–	3
7/19	0	61	0	106	0	118	0	285	0	316	0.0	6.8	0.0	1.0	0	–	3
7/20	0	61	0	106	0	118	0	285	0	316	0.0	6.8	0.0	1.0	0	–	3
7/21	0	61	0	106	0	118	0	285	0	316	0.0	6.8	0.0	1.0	0	–	3
7/22	0	61	0	106	0	118	0	285	0	316	0.0	6.8	0.0	1.0	0	–	3
7/23	0	61	0	106	0	118	0	285	0	316	0.0	6.8	0.0	1.0	0	–	3
7/24	0	61	0	106	0	118	0	285	0	316	0.0	6.8	0.0	1.0	0	–	3
7/25	0	61	0	106	1	119	1	286	1	317	0.0	6.8	0.0	1.0	0	–	3
Total	61	–	106	–	119	–	286	–	317	–	–	–	–	–	3	1	–

[a] Column total count is the number of adipose-finclipped Chinook salmon possessing valid coded wire.

Appendix B5.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2009 by size group and location.

			Brood year and age class									
			2006	2005	2005	2004	2004	2003	2003	2002	2002	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nahlin	Male	*n*	0	0	1	0	11	0	1	0	0	13
Large fish		%	0.0%	0.0%	7.7%	0.0%	84.6%	0.0%	7.7%	0.0%	0.0%	40.6%
		n										
	Female	%	0	0	0	0	11	0	8	0	0	19
		n	0.0%	0.0%	0.0%	0.0%	57.9%	0.0%	42.1%	0.0%	0.0%	59.4%
	Total	%	0	0	1	0	22	0	9	0	0	32
		n	0.0%	0.0%	3.1%	0.0%	68.8%	0.0%	28.1%	0.0%	0.0%	100.0%
	Male	*n*	0	0	4	0	2	0	0	0	0	6
Medium fish		%	0.0%	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	4	0	2	0	0	0	0	6
		%	0.0%	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	1	0	0	0	0	0	0	0	0	1
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	1	0	0	0	0	0	0	0	0	1
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	1	0	5	0	13	0	1	0	0	20
All fish		%	5.0%	0.0%	25.0%	0.0%	65.0%	0.0%	5.0%	0.0%	0.0%	51.3%
	Female	*n*	0	0	0	0	11	0	8	0	0	19
		%	0.0%	0.0%	0.0%	0.0%	57.9%	0.0%	42.1%	0.0%	0.0%	48.7%
	Total	*n*	1	0	5	0	24	0	9	0	0	39
		%	2.6%	0.0%	12.8%	0.0%	61.5%	0.0%	23.1%	0.0%	0.0%	100.0%
Upper Dudidontu	Male	*n*	0	0	1	0	9	0	5	0	0	15
Large fish		%	0.0%	0.0%	6.7%	0.0%	60.0%	0.0%	33.3%	0.0%	0.0%	40.5%
	Female	*n*	0	0	0	0	14	1	7	0	0	22
		%	0.0%	0.0%	0.0%	0.0%	63.6%	4.5%	31.8%	0.0%	0.0%	59.5%
	Total	*n*	0	0	1	0	23	1	12	0	0	37
		%	0.0%	0.0%	2.7%	0.0%	62.2%	2.7%	32.4%	0.0%	0.0%	59.5%
	Male	*n*	0	0	23	1	2	0	0	0	0	26
Medium fish		%	0.0%	0.0%	88.5%	3.8%	7.7%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	23	1	2	0	0	0	0	26
		%	0.0%	0.0%	88.5%	3.8%	7.7%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	24	1	11	0	5	0	0	41
All fish		%	0.0%	0.0%	58.5%	2.4%	26.8%	0.0%	12.2%	0.0%	0.0%	65.1%
	Female	*n*	0	0	0	0	14	1	7	0	0	22
		%	0.0%	0.0%	0.0%	0.0%	63.6%	4.5%	31.8%	0.0%	0.0%	34.9%
	Total	*n*	0	0	24	1	25	1	12	0	0	63
		%	0.0%	0.0%	38.1%	1.6%	39.7%	1.6%	19.0%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2006	2005	2005	2004	2004	2003	2003	2002	2002	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Lower Dudidontu	Male	*n*	0	0	2	0	10	0	3	0	0	15
Large fish		%	0.0%	0.0%	13.3%	0.0%	66.7%	0.0%	20.0%	0.0%	0.0%	50.0%
	Female	*n*	0	0	0	0	13	0	2	0	0	15
		%	0.0%	0.0%	0.0%	0.0%	86.7%	0.0%	13.3%	0.0%	0.0%	50.0%
	Total	*n*	0	0	2	0	23	0	5	0	0	30
		%	0.0%	0.0%	6.7%	0.0%	76.7%	0.0%	16.7%	0.0%	0.0%	100.0%
	Male	*n*	1	0	4	1	1	0	0	0	0	7
Medium fish		%	14.3%	0.0%	57.1%	14.3%	14.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	1	0	4	1	1	0	0	0	0	7
		%	14.3%	0.0%	57.1%	14.3%	14.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	1	0	6	1	11	0	3	0	0	22
All fish		%	4.5%	0.0%	27.3%	4.5%	50.0%	0.0%	13.6%	0.0%	0.0%	59.5%
	Female	*n*	0	0	0	0	13	0	2	0	0	15
		%	0.0%	0.0%	0.0%	0.0%	86.7%	0.0%	13.3%	0.0%	0.0%	40.5%
	Total	*n*	1	0	6	1	24	0	5	0	0	37
		%	2.7%	0.0%	16.2%	2.7%	64.9%	0.0%	13.5%	0.0%	0.0%	100.0%
Tseta Creek	Male	*n*	0	0	0	0	10	0	1	0	0	11
Large fish		%	0.0%	0.0%	0.0%	0.0%	90.9%	0.0%	9.1%	0.0%	0.0%	30.6%
	Female	*n*	0	0	0	0	16	0	9	0	0	25
		%	0.0%	0.0%	0.0%	0.0%	64.0%	0.0%	36.0%	0.0%	0.0%	69.4%
	Total	*n*	0	0	0	0	26	0	10	0	0	36
		%	0.0%	0.0%	0.0%	0.0%	72.2%	0.0%	27.8%	0.0%	0.0%	100.0%
	Male	*n*	0	0	2	0	0	0	0	0	0	2
Medium fish		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	2	0	0	0	0	0	0	2
		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	1	0	0	0	0	0	0	0	0	1
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	1	0	0	0	0	0	0	0	0	1
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	1	0	2	0	10	0	1	0	0	14
All fish		%	7.1%	0.0%	14.3%	0.0%	71.4%	0.0%	7.1%	0.0%	0.0%	35.9%
	Female	*n*	0	0	0	0	16	0	9	0	0	25
		%	0.0%	0.0%	0.0%	0.0%	64.0%	0.0%	36.0%	0.0%	0.0%	64.1%
	Total	*n*	1	0	2	0	26	0	10	0	0	39
		%	2.6%	0.0%	5.1%	0.0%	66.7%	0.0%	25.6%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2006	2005	2005	2004	2004	2003	2003	2002	2002	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Yeth River	Male	*n*	0	0	0	0	1	0	1	0	0	2
Large fish		%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	1	0	1	0	0	2
		%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Medium fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	0	0	1	0	1	0	0	2
All fish		%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	1	0	1	0	0	2
		%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	100.0%
Nakina	Male	*n*	0	0	2	0	43	0	5	0	0	50
Large fish		%	0.0%	0.0%	4.0%	0.0%	86.0%	0.0%	10.0%	0.0%	0.0%	64.1%
	Female	*n*	0	0	1	0	13	2	11	1	0	28
		%	0.0%	0.0%	3.6%	0.0%	46.4%	7.1%	39.3%	3.6%	0.0%	35.9%
	Total	*n*	0	0	3	0	56	2	16	1	0	78
		%	0.0%	0.0%	3.8%	0.0%	71.8%	2.6%	20.5%	1.3%	0.0%	100.0%
	Male	*n*	3	1	111	2	10	1	1	0	0	129
Medium fish		%	2.3%	0.8%	86.0%	1.6%	7.8%	0.8%	0.8%	0.0%	0.0%	99.2%
	Female	*n*	0	0	0	0	1	0	0	0	0	1
		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.8%
	Total	*n*	3	1	111	2	11	1	1	0	0	130
		%	2.3%	0.8%	85.4%	1.5%	8.5%	0.8%	0.8%	0.0%	0.0%	100.0%
	Male	*n*	138	0	9	0	0	0	0	0	0	147
Small fish		%	93.9%	0.0%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	138	0	9	0	0	0	0	0	0	147
		%	93.9%	0.0%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	141	1	122	2	53	1	6	0	0	326
All fish		%	43.3%	0.3%	37.4%	0.6%	16.3%	0.3%	1.8%	0.0%	0.0%	91.8%
	Female	*n*	0	0	1	0	14	2	11	1	0	29
		%	0.0%	0.0%	3.4%	0.0%	48.3%	6.9%	37.9%	3.4%	0.0%	8.2%
	Total	*n*	141	1	123	2	67	3	17	1	0	355
		%	39.7%	0.3%	34.6%	0.6%	18.9%	0.8%	4.8%	0.3%	0.0%	100.0%

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			Brood year and age class									
			2006	2005	2005	2004	2004	2003	2003	2002	2002	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Kowatua	Male	*n*	0	0	3	0	38	2	11	1	0	55
Large fish		%	0.0%	0.0%	5.5%	0.0%	69.1%	3.6%	20.0%	1.8%	0.0%	51.9%
	Female	*n*	0	0	0	0	32	0	19	0	0	51
		%	0.0%	0.0%	0.0%	0.0%	62.7%	0.0%	37.3%	0.0%	0.0%	48.1%
	Total	*n*	0	0	3	0	70	2	30	1	0	106
		%	0.0%	0.0%	2.8%	0.0%	66.0%	1.9%	28.3%	0.9%	0.0%	100.0%
	Male	*n*	1	0	14	4	2	0	0	0	0	21
Medium fish		%	4.8%	0.0%	66.7%	19.0%	9.5%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	1	0	14	4	2	0	0	0	0	21
		%	4.8%	0.0%	66.7%	19.0%	9.5%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	1	0	17	4	40	2	11	1	0	76
All fish		%	1.3%	0.0%	22.4%	5.3%	52.6%	2.6%	14.5%	1.3%	0.0%	59.8%
	Female	*n*	0	0	0	0	32	0	19	0	0	51
		%	0.0%	0.0%	0.0%	0.0%	62.7%	0.0%	37.3%	0.0%	0.0%	40.2%
	Total	*n*	1	0	17	4	72	2	30	1	0	127
		%	0.8%	0.0%	13.4%	3.1%	56.7%	1.6%	23.6%	0.8%	0.0%	100.0%
Upper Tatsamenie	Male	*n*	0	0	0	0	10	0	0	0	0	10
Large fish		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	40.0%
	Female	*n*	0	0	0	0	15	0	0	0	0	15
		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	60.0%
	Total	*n*	0	0	0	0	25	0	0	0	0	25
		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	3	0	22	0	0	0	0	0	0	25
Medium fish		%	12.0%	0.0%	88.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	96.2%
	Female	*n*	0	1	0	0	0	0	0	0	0	1
		%	0	1	0	0	0	0	0	0	0	3.8%
	Total	*n*	3	1	22	0	0	0	0	0	0	26
		%	11.5%	3.8%	84.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	7	0	0	0	0	0	0	0	0	7
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	7	0	0	0	0	0	0	0	0	7
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	10	0	22	0	10	0	0	0	0	42
All fish		%	23.8%	0.0%	52.4%	0.0%	23.8%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	1	0	0	15	0	0	0	0	16
		%	0.0%	6.3%	0.0%	0.0%	93.8%	0.0%	0.0%	0.0%	0.0%	27.6%
	Total	*n*	10	1	22	0	25	0	0	0	0	58
		%	17.2%	1.7%	37.9%	0.0%	43.1%	0.0%	0.0%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2006	2005	2005	2004	2004	2003	2003	2002	2002	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Lower Tatsamenie	Male	*n*	0	0	18	0	101	0	21	0	0	140
Large fish		%	0.0%	0.0%	12.9%	0.0%	72.1%	0.0%	15.0%	0.0%	0.0%	51.5%
	Female	*n*	0	0	4	0	96	0	32	0	0	132
		%	0.0%	0.0%	3.0%	0.0%	72.7%	0.0%	24.2%	0.0%	0.0%	48.5%
	Total	*n*	0	0	22	0	197	0	53	0	0	272
		%	0.0%	0.0%	8.1%	0.0%	72.4%	0.0%	19.5%	0.0%	0.0%	100.0%
	Male	*n*	3	0	71	1	10	0	0	0	0	85
Medium fish		%	3.5%	0.0%	83.5%	1.2%	11.8%	0.0%	0.0%	0.0%	0.0%	89.5%
	Female	*n*	1	0	5	0	4	0	0	0	0	10
		%	10.0%	0.0%	50.0%	0.0%	40.0%	0.0%	0.0%	0.0%	0.0%	10.5%
	Total	*n*	4	0	76	1	14	0	0	0	0	95
		%	4.2%	0.0%	80.0%	1.1%	14.7%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	78	1	0	0	0	0	0	0	0	79
Small fish		%	98.7%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	78	1	0	0	0	0	0	0	0	79
		%	98.7%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	81	1	89	1	111	0	21	0	0	304
All fish		%	26.6%	0.3%	29.3%	0.3%	36.5%	0.0%	6.9%	0.0%	0.0%	68.2%
	Female	*n*	1	0	9	0	100	0	32	0	0	142
		%	0.7%	0.0%	6.3%	0.0%	70.4%	0.0%	22.5%	0.0%	0.0%	31.8%
	Total	*n*	82	1	98	1	211	0	53	0	0	446
		%	18.4%	0.2%	22.0%	0.2%	47.3%	0.0%	11.9%	0.0%	0.0%	100.0%
All tributaries	Male	*n*	0	0	27	0	233	2	48	1	0	311
Large fish		%	0.0%	0.0%	8.7%	0.0%	74.9%	0.6%	15.4%	0.3%	0.0%	50.3%
	Female	*n*	0	0	5	0	210	3	88	1	0	307
		%	0.0%	0.0%	1.6%	0.0%	68.4%	1.0%	28.7%	0.3%	0.0%	49.7%
	Total	*n*	0	0	32	0	443	5	136	2	0	618
		%	0.0%	0.0%	5.2%	0.0%	71.7%	0.8%	22.0%	0.3%	0.0%	100.0%
	Male	*n*	11	1	251	9	27	1	1	0	0	301
Medium fish		%	3.7%	0.3%	83.4%	3.0%	9.0%	0.3%	0.3%	0.0%	0.0%	96.2%
	Female	*n*	1	1	5	0	5	0	0	0	0	12
		%	8.3%	8.3%	41.7%	0.0%	41.7%	0.0%	0.0%	0.0%	0.0%	3.8%
	Total	*n*	12	2	256	9	32	1	1	0	0	313
		%	3.8%	0.6%	81.8%	2.9%	10.2%	0.3%	0.3%	0.0%	0.0%	100.0%
	Male	*n*	225	1	9	0	0	0	0	0	0	235
Small fish		%	95.7%	0.4%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	225	1	9	0	0	0	0	0	0	235
		%	95.7%	0.4%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	236	2	287	9	260	3	49	1	0	847
All fish		%	27.9%	0.2%	33.9%	1.1%	30.7%	0.4%	5.8%	0.1%	0.0%	72.6%
	Female	*n*	1	1	10	0	215	3	88	1	0	319
		%	0.3%	0.3%	3.1%	0.0%	67.4%	0.9%	27.6%	0.3%	0.0%	27.4%
	Total	*n*	237	3	297	9	475	6	137	2	0	1,166
		%	20.3%	0.3%	25.5%	0.8%	40.7%	0.5%	11.7%	0.2%	0.0%	100.0%

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			Brood year and age class									
			2006	2005	2005	2004	2004	2003	2003	2002	2002	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Canyon Island	Male	*n*	0	0	1	0	65	0	39	0	0	105
Large fish		%	0.0%	0.0%	1.0%	0.0%	61.9%	0.0%	37.1%	0.0%	0.0%	39.0%
	Female	*n*	0	0	2	0	115	0	47	0	0	164
		%	0.0%	0.0%	1.2%	0.0%	70.1%	0.0%	28.7%	0.0%	0.0%	61.0%
	Total	*n*	0	0	3	0	180	0	86	0	0	269
		%	0.0%	0.0%	1.1%	0.0%	66.9%	0.0%	32.0%	0.0%	0.0%	100.0%
	Male	*n*	3	1	181	3	26	0	1	0	0	215
Medium fish		%	1.4%	0.5%	84.2%	1.4%	12.1%	0.0%	0.5%	0.0%	0.0%	93.1%
	Female	*n*	0	0	13	0	3	0	0	0	0	16
		%	0.0%	0.0%	81.3%	0.0%	18.8%	0.0%	0.0%	0.0%	0.0%	6.9%
	Total	*n*	3	1	194	3	29	0	1	0	0	231
		%	1.3%	0.4%	84.0%	1.3%	12.6%	0.0%	0.4%	0.0%	0.0%	100.0%
	Male	*n*	52	0	0	0	0	0	0	0	0	52
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	52	0	0	0	0	0	0	0	0	52
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	55	1	182	3	91	0	40	0	0	372
All fish		%	14.8%	0.3%	48.9%	0.8%	24.5%	0.0%	10.8%	0.0%	0.0%	67.4%
	Female	*n*	0	0	15	0	118	0	47	0	0	180
		%	0.0%	0.0%	8.3%	0.0%	65.6%	0.0%	26.1%	0.0%	0.0%	32.6%
	Total	*n*	55	1	197	3	209	0	87	0	0	552
		%	10.0%	0.2%	35.7%	0.5%	37.9%	0.0%	15.8%	0.0%	0.0%	100.0%
Canadian Commercial Fishery												
Large fish		*n*	0	0	6	1	362	5	275	2	1	652
		%	0.0%	0.0%	0.9%	0.2%	55.5%	0.8%	42.2%	0.3%	0.2%	83.2%
Medium fish		*n*	0	0	90	7	33	0	2	0	0	132
		%	0.0%	0.0%	68.2%	5.3%	25.0%	0.0%	1.5%	0.0%	0.0%	16.8%
All fish		*n*	0	0	96	8	395	5	277	2	1	784
		%	0.0%	0.0%	12.2%	1.0%	50.4%	0.6%	35.3%	0.3%	0.1%	100.0%

APPENDIX C

Appendix C1.–Number of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2010 by size group. Information in bold was used in the mark–recapture estimate.

		Small	Medium	Large		Large +
		0–400 mm	401–659 mm	≥660 mm	Total	Medium
EVENT 1: Fish marked with spaghetti tags at Canyon Island						
Total Initially Tagged		107	418	746	1,271	1,164
Captured using Fish wheels and Tagged		100	98	140	338	238
Captured at CYI using Set Gillnets and Tagged		7	138	271	416	409
Captured by Flannigan using Set Gillnets and Tagged		0	182	335	517	517
Total Tag Removals:		0	2	3	5	5
All U.S. fisheries		0	2	3	5	5
Commercial gillnet		0	2	1	3	3
Sport fishery		0	0	2	2	2
Troll fishery		0	0	0	0	0
Inriver assessment fishery		0	0	0	0	0
All Canadian fisheries		0	0	0	0	0
Commercial fishery		0	0	0	0	0
Sport fishery		0	0	0	0	0
Final Total Tagged in Event 1 (M)		107	**416**	**743**	1,266	1,159
EVENT 2: Fish inspected for spaghetti tags - captured and recaptured						
Upper River	Inspected	292	**455**	**1,434**	2,181	1,889
(All Spawning Grounds)	Marked	4	**23**	**26**	53	49
	Marked/Inspected	0.014	0.051	0.018	0.024	0.026
Nahlin River	Inspected	0	38	182	220	220
	Marked	0	4	7	11	11
	Marked/Inspected	–	0.105	0.038	0.050	0.050
Dudidontu	Inspected	1	11	156	168	167
	Marked	0	1	2	3	3
	Marked/Inspected	–	0.091	0.013	0.018	0.018
Tseta Creek	Inspected	1	17	164	182	181
	Marked	0	4	5	9	9
	Marked/Inspected	–	0.235	0.030	0.049	0.050

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Appendix C1.–Page 2 of 2.

		Small 0–400 mm	Medium 401–659 mm	Large ≥660 mm	Total	Large + Medium
King Salmon River	Inspected	0	1	1	2	2
	Marked	0	1	0	1	1
	Marked/Inspected	–	1.000	0.000	0.500	0.500
Yeth Creek	Inspected	0	2	7	9	9
	Marked	0	0	0	0	0
	Marked/Inspected	–	0.000	0.000	0.000	0.000
Nakina River	Inspected	176	168	181	525	349
	Marked	3	7	3	13	10
	Marked/Inspected	0.017	0.042	0.017	0.025	0.029
Kowatua Creek	Inspected	4	22	257	283	279
	Marked	0	1	4	5	5
	Marked/Inspected	–	0.045	0.016	0.018	0.018
Tatsamenie drainage	Inspected	110	196	486	792	682
(Little and Big Tatsamenie lakes)	Marked	1	5	5	11	10
	Marked/Inspected	0.009	0.026	0.010	0.014	0.015
Lower River Canadian Fisheries	Inspected	3	723	5,364	6,090	6,087
(Test, Commercial and Food)	Marked	3	36	118	157	154
	Marked/Inspected	1.000	0.050	0.022	0.026	0.025
Assessment Fishery	Inspected	0	0	0	0	0
	Marked	0	0	0	0	0
	Marked/Inspected	–	–	–	–	–
Commercial Fishery	Inspected	3	**700**	**5,238**	5,941	5,938
	Marked	3	**36**	**118**	157	154
	Marked/Inspected	1.000	0.051	0.023	0.026	0.026
TRT Food Fishery	Inspected	0	23	126	149	149
	Marked	0	0	0	0	0
	Marked/Inspected	–	–	–	–	–

Appendix C2.–Canyon Island gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2010.

			TAGGED								CAUGHT								
		Water	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Hours fished	level (cm)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
4/24	6.0	0	0	0	0	0	3	3	3	3	3	3	0.50	0.50	0.01	0.01	0	–	0
4/25	6.0	3	0	0	1	1	0	3	1	4	2	5	0.33	0.83	0.00	0.01	0	–	0
4/26	6.0	3	0	0	0	1	4	7	4	8	4	9	0.67	1.50	0.01	0.02	0	–	0
4/27	6.0	6	0	0	0	1	1	8	1	9	1	10	0.17	1.67	0.00	0.02	0	–	0
4/28	4.5	15	0	0	0	1	0	8	0	9	0	10	0.00	1.67	0.00	0.02	0	–	0
4/29	6.0	49	0	0	0	1	0	8	0	9	0	10	0.00	1.67	0.00	0.02	0	–	0
4/30	4.5	55	0	0	1	2	4	12	5	14	5	15	1.11	2.78	0.01	0.03	0	–	0
5/1	6.0	52	0	0	0	2	0	12	0	14	0	15	0.00	2.78	0.00	0.03	0	–	0
5/2	6.0	52	0	0	2	4	9	21	11	25	11	26	1.83	4.61	0.02	0.05	0	–	0
5/3	6.0	43	0	0	1	5	7	28	8	33	8	34	1.33	5.94	0.01	0.06	0	–	0
5/4	6.0	40	0	0	0	5	8	36	8	41	10	44	1.67	7.61	0.02	0.08	0	–	0
5/5	6.0	40	0	0	2	7	10	46	12	53	12	56	2.00	9.61	0.02	0.10	0	–	0
5/6	6.0	46	0	0	4	11	8	54	12	65	12	68	2.00	11.61	0.02	0.12	0	–	0
5/7	3.0	46	0	0	1	12	1	55	2	67	2	70	0.67	12.28	0.01	0.13	0	–	0
5/8	3.0	55	0	0	2	14	4	59	6	73	6	76	2.00	14.28	0.02	0.15	0	–	0
5/9	3.0	55	0	0	4	18	1	60	5	78	5	81	1.67	15.94	0.02	0.16	0	–	0
5/10	6.0	55	0	0	6	24	15	75	21	99	22	103	3.67	19.61	0.04	0.20	1	no tag	1
5/11	3.0	58	0	0	0	24	5	80	5	104	5	108	1.67	21.28	0.02	0.22	0	–	1
5/12	6.0	61	0	0	6	30	8	88	14	118	14	122	2.33	23.61	0.02	0.24	0	–	1
5/13	6.0	58	0	0	4	34	6	94	10	128	10	132	1.67	25.28	0.02	0.26	0	–	1
5/14	6.0	61	0	0	11	45	11	105	22	150	23	155	3.83	29.11	0.04	0.30	0	–	1
5/15	6.0	58	0	0	7	52	10	115	17	167	17	172	2.83	31.94	0.03	0.33	0	–	1
5/16	4.0	64	0	0	10	62	9	124	19	186	20	192	5.00	36.94	0.05	0.38	1	041218	2
5/17	6.0	70	0	0	5	67	6	130	11	197	12	204	2.00	38.94	0.02	0.40	0	–	2
5/18	6.0	76	0	0	9	76	10	140	19	216	21	225	3.50	42.44	0.04	0.43	0	–	2
5/19	1.5	107	0	0	3	79	2	142	5	221	5	230	3.33	45.78	0.03	0.47	0	–	2
5/20	0.0	162	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/21	0.0	186	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/22	0.0	183	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/23	0.0	186	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/24	0.0	201	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2

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			TAGGED								CAUGHT								
		Water	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
	Hours	level																Tag	
Date	fished	(cm)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	code[a]	Cum
5/25	0.0	207	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/26	0.0	207	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/27	0.0	223	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/28	0.0	244	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/29	0.0	256	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/30	0.0	262	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
5/31	0.0	256	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
6/1	0.0	247	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	-2
6/2	0.0	235	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
6/3	0.0	238	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
6/4	0.0	216	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
6/5	0.0	189	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
6/6	0.0	174	0	0	0	79	0	142	0	221	0	230	0.00	45.78	0.00	0.47	0	–	2
6/7	3.5	168	0	0	8	87	5	147	13	234	13	243	3.71	49.49	0.04	0.51	0	–	2
6/8	0.0	168	0	0	0	87	0	147	0	234	0	243	0.00	49.49	0.00	0.51	0	–	2
6/9	4.0	168	2	2	11	98	12	159	25	259	25	268	6.25	55.74	0.06	0.57	0	–	2
6/10	0.0	195	0	2	0	98	0	159	0	259	0	268	0.00	55.74	0.00	0.57	0	–	2
6/11	0.0	247	0	2	0	98	0	159	0	259	0	268	0.00	55.74	0.00	0.57	0	–	2
6/12	0.0	198	0	2	0	98	0	159	0	259	0	268	0.00	55.74	0.00	0.57	0	–	2
6/13	0.0	183	0	2	0	98	0	159	0	259	0	268	0.00	55.74	0.00	0.57	0	–	2
6/14	4.0	143	0	2	5	103	12	171	17	276	17	285	4.25	59.99	0.04	0.61	0	–	2
6/15	3.0	125	0	2	5	108	6	177	11	287	11	296	3.67	63.66	0.04	0.65	0	–	2
6/16	4.0	119	0	2	5	113	11	188	16	303	17	313	4.25	67.91	0.04	0.70	0	–	2
6/17	4.0	113	1	3	6	119	18	206	25	328	27	340	6.75	74.66	0.07	0.77	0	–	2
6/18	4.0	113	2	5	1	120	14	220	17	345	17	357	4.25	78.91	0.04	0.81	0	–	2
6/19	4.0	119	1	6	2	122	11	231	14	359	15	372	3.75	82.66	0.04	0.85	0	–	2
6/20	4.0	131	0	6	2	124	16	247	18	377	18	390	4.50	87.16	0.05	0.89	0	–	2
6/21	4.0	143	1	7	6	130	10	257	17	394	17	407	4.25	91.41	0.04	0.94	0	–	2
6/22	4.0	152	0	7	3	133	7	264	10	404	10	417	2.50	93.91	0.03	0.96	0	–	2
6/23	0.0	162	0	7	0	133	0	264	0	404	0	417	0.00	93.91	0.00	0.96	0	–	2
6/24	0.0	189	0	7	0	133	0	264	0	404	0	417	0.00	93.91	0.00	0.96	0	–	2
6/25	0.0	189	0	7	0	133	0	264	0	404	0	417	0.00	93.91	0.00	0.96	0	–	2
6/26	0.0	183	0	7	0	133	0	264	0	404	0	417	0.00	93.91	0.00	0.96	0	–	2
6/27	4.0	168	0	7	2	135	6	270	8	412	8	425	2.00	95.91	0.02	0.98	0	–	2
6/28	3.0	152	0	7	1	136	0	270	1	413	1	426	0.33	96.24	0.00	0.99	0	–	2

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			TAGGED								CAUGHT								
			Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Hours fished	Water level (cm)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
6/29	0.0	140	0	7	0	136	0	270	0	413	0	426	0.00	96.24	0.00	0.99	0	–	2
6/30	0.0	134	0	7	0	136	0	270	0	413	0	426	0.00	96.24	0.00	0.99	0	–	2
7/1	0.0	125	0	7	0	136	0	270	0	413	0	426	0.00	96.24	0.00	0.99	0	–	2
7/2	0.0	113	0	7	0	136	0	270	0	413	0	426	0.00	96.24	0.00	0.99	0	–	2
7/3	2.0	104	0	7	1	137	0	270	1	414	1	427	0.50	96.74	0.01	0.99	0	–	2
7/4	2.0	107	0	7	1	138	0	270	1	415	1	428	0.50	97.24	0.01	1.00	0	–	2
7/5	3.0	113	0	7	0	138	1	271	1	416	1	429	0.33	97.58	0.00	1.00	0	–	2
7/6	3.0	113	0	7	0	138	0	271	0	416	0	429	0.00	97.58	0.00	1.00	0	–	2
7/7	3.0	140	0	7		138	0	271	0	416	0	429	0.00	97.58	0.00	1.00	0	–	2
Total	197	–	7	–	138	–	271	–	416	–	429	–	–	–	–	–	2	1	–

[a] Column total count is the number of adipose-finclipped Chinook salmon possessing valid coded wire.

Appendix C3.–Flannigan Slough gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2010.

			TAGGED								CAUGHT				
			Small		Medium		Large		Total		Total		Adipose finclips		
Date	Hours fished[a]	Water level (cm)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[b]	Cum
5/1	–	52	0	0	1	1	0	0	1	1	1	1	0	–	0
5/2	–	52	0	0	0	1	0	0	0	1	0	1	0	–	0
5/3	–	43	0	0	2	3	3	3	5	6	5	6	0	–	0
5/4	–	40	0	0	0	3	1	4	1	7	1	7	0	–	0
5/5	–	40	0	0	0	3	1	5	1	8	1	8	0	–	0
5/6	–	46	0	0	1	4	1	6	2	10	2	10	0	–	0
5/7	–	46	0	0	3	7	15	21	18	28	18	28	0	–	0
5/8	–	55	0	0	5	12	12	33	17	45	18	46	1	041306	1
5/9	–	55	0	0	3	15	14	47	17	62	18	64	1	041396	2
5/10	–	55	0	0	9	24	11	58	20	82	21	85	1	041396	3
5/11	–	58	0	0	11	35	21	79	32	114	33	118	0	–	3
5/12	–	61	0	0	9	44	21	100	30	144	31	149	1	041396	4
5/13	–	58	0	0	17	61	15	115	32	176	34	183	1	041306	5
5/14	–	61	0	0	10	71	21	136	31	207	32	215	1	to tag	6
5/15	–	58	0	0	9	80	28	164	37	244	37	252	0	–	6
5/16	–	64	0	0	7	87	12	176	19	263	20	272	1	no tag	7
5/17	–	70	0	0	13	100	16	192	29	292	30	302	1	041218	8
5/18	–	76	0	0	8	108	16	208	24	316	24	326	0	–	8
5/19	–	107	0	0	0	108	0	208	0	316	0	326	0	–	8
5/20	–	162	0	0	0	108	0	208	0	316	0	326	0	–	8
5/21	–	186	0	0	1	109	0	208	1	317	1	327	0	–	8
5/22	–	183	0	0	1	110	0	208	1	318	1	328	0	–	8
5/23	–	186	0	0	1	111	3	211	4	322	4	332	0	–	8
5/24	–	201	0	0	1	112	4	215	5	327	5	337	0	–	8
5/25	–	207	0	0	0	112	3	218	3	330	4	341	0	–	8
5/26	–	207	0	0	8	120	8	226	16	346	16	357	0	–	8
5/27	–	223	0	0	3	123	2	228	5	351	5	362	0	–	8
5/28	–	244	0	0	0	123	0	228	0	351	0	362	0	–	8
5/29	–	256	0	0	0	123	2	230	2	353	2	364	0	–	8
5/30	–	262	0	0	1	124	0	230	1	354	1	365	0	–	8
5/31	–	256	0	0	6	130	5	235	11	365	11	376	0	–	8

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			TAGGED								CAUGHT				
			Small		Medium		Large		Total		Total		Adipose finclips		
Date	Hours fished[a]	Water level (cm)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[b]	Cum
6/1	–	247	0	0	2	132	5	240	7	372	7	383	0	–	8
6/2	–	235	0	0	3	135	2	242	5	377	6	389	0	–	8
6/3	–	238	0	0	2	137	3	245	5	382	5	394	0	–	8
6/4	–	216	0	0	0	137	0	245	0	382	2	396	0	–	8
6/5	–	189	0	0	1	138	1	246	2	384	2	398	0	–	8
6/6	–	174	0	0	1	139	1	247	2	386	2	400	0	–	8
6/7	–	168	0	0	0	139	4	251	4	390	4	404	0	–	8
6/8	–	168	0	0	16	155	10	261	26	416	27	431	1	041398	9
6/9	–	168	0	0	1	156	4	265	5	421	5	436	0	–	9
6/10	–	195	0	0	2	158	0	265	2	423	2	438	0	–	9
6/11	–	247	0	0	0	158	0	265	0	423	0	438	0	–	9
6/12	–	198	0	0	7	165	4	269	11	434	11	449	0	–	9
6/13	–	183	0	0	3	168	8	277	11	445	11	460	0	–	9
6/14	–	143	0	0	1	169	4	281	5	450	5	465	0	–	9
6/15	–	125	0	0	1	170	1	282	2	452	2	467	0	–	9
6/16	–	119	0	0	0	170	1	283	1	453	1	468	0	–	9
6/17	–	113	0	0	1	171	1	284	2	455	2	470	0	–	9
6/18	–	113	0	0	0	171	0	284	0	455	0	470	0	–	9
6/19	–	119	0	0	3	174	18	302	21	476	23	493	1	041306	10
6/20	–	131	0	0	6	180	26	328	32	508	32	525	0	–	10
6/21	–	143	0	0	0	180	0	328	0	508	0	525	0	–	10
6/22	–	152	0	0	2	182	7	335	9	517	9	534	0	–	10
Total	–	–	0	–	182	–	335	–	517	–	534	–	10	8	–

[a] Fishing time was not recorded for the Flannigan Slough gillnet effort; 6 hrs/day, 6 days/week per operational plan.

[b] Column total count is the number of adipose-finclipped Chinook salmon possessing valid coded wire.

Appendix C4.–Fish wheel effort for Chinook salmon including water level in 2009.

	Fish wheel #1		Fish wheel #2		
Date	Hours fished	RPM	Hours fished	RPM	Water level (cm)
5/9	–	–	7.0	1.0	55
5/10	–	–	23.9	1.0	55
5/11	–	–	–	–	58
5/12	–	–	–	–	61
5/13	–	–	–	–	58
5/14	–	–	–	–	61
5/15	–	–	–	–	58
5/16	–	–	–	–	64
5/17	–	–	–	–	70
5/18	–	–	–	–	76
5/19	23.8	2.1	23.8	2.5	107
5/20	23.8	2.4	23.8	2.4	162
5/21	23.8	2.6	23.8	2.4	186
5/22	23.7	2.7	23.9	2.6	183
5/23	23.8	2.6	23.9	2.6	186
5/24	23.8	2.8	23.5	2.8	201
5/25	23.8	2.4	23.8	2.7	207
5/26	23.6	2.2	23.8	2.6	207
5/27	23.8	2.2	23.8	2.6	223
5/28	23.7	3.0	23.8	3.0	244
5/29	23.9	2.7	23.9	2.5	256
5/30	23.8	2.4	23.8	2.6	262
5/31	23.8	2.4	23.7	2.4	256
6/1	23.8	2.3	23.7	2.6	247
6/2	23.8	2.2	23.8	2.7	235
6/3	23.9	2.3	23.9	2.7	238
6/4	23.0	2.4	23.8	2.6	216
6/5	23.7	2.2	23.9	2.5	189
6/6	23.0	2.0	23.2	2.3	174
6/7	23.3	2.1	23.8	2.4	168
6/8	23.7	2.1	23.8	2.3	168
6/9	23.5	2.0	23.8	2.1	168
6/10	23.6	2.2	23.7	2.2	195
6/11	23.7	2.2	23.8	2.1	247
6/12	23.5	2.5	23.6	2.1	198
6/13	23.7	2.0	23.4	2.3	183
6/14	23.2	2.3	23.8	2.0	143
6/15	23.7	2.1	23.3	2.1	125
6/16	23.3	2.2	23.6	2.2	119
6/17	23.8	2.2	23.7	2.3	113
6/18	23.6	1.8	23.8	2.2	113
6/19	23.7	2.4	23.3	2.2	119
6/20	23.4	2.5	23.2	2.7	131
6/21	23.5	2.6	23.4	2.6	143
6/22	22.0	2.5	23.4	2.4	152
6/23	23.5	2.3	23.8	2.1	162
6/24	23.4	2.8	23.9	2.7	189

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	Fish wheel #1		Fish wheel #2		
Date	Hours fished	RPM	Hours fished	RPM	Water level (cm)
6/25	23.4	2.8	23.9	2.7	189
6/26	23.5	2.4	23.7	2.2	183
6/27	23.6	2.1	23.6	2.3	168
6/28	23.4	2.1	23.5	2.5	152
6/29	23.2	2.1	23.5	2.6	140
6/30	23.3	2.4	23.5	2.7	134
7/1	23.4	2.3	23.6	2.5	125
7/2	23.5	2.2	23.5	2.2	113
7/3	23.6	1.7	23.1	2.1	104
7/4	23.6	1.9	23.3	2.4	107
7/5	23.7	2.0	22.2	2.5	113
7/6	23.8	2.0	22.5	2.1	113
7/7	23.5	2.6	23.1	2.4	140
7/8	22.6	2.5	23.1	2.5	158
7/9	23.5	2.5	23.8	2.3	174
7/10	23.3	2.7	23.0	2.1	180
7/11	23.1	2.8	23.8	2.5	201
7/12	22.5	2.3	23.4	1.9	192
7/13	23.3	2.2	23.1	2.2	155
Total	1,315.3	–	1,350.4	–	–

Appendix C5.–Fish wheel Chinook salmon daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2010.

	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips		
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
5/9	0	0	0	0	0	0	0	0	–	0	0	0	0	0	0	–	0
5/10	0	0	0	0	0	0	0	0	–	0	0	0	0	0	0	–	0
5/11	–	–	–	–	–	–	0	0	–	0	–	0	0	0	–	–	0
5/12	–	–	–	–	–	–	0	0	–	0	–	0	0	0	–	–	0
5/13	–	–	–	–	–	–	0	0	–	0	–	0	0	0	–	–	0
5/14	–	–	–	–	–	–	0	0	–	0	–	0	0	0	–	–	0
5/15	–	–	–	–	–	–	0	0	–	0	–	0	0	0	–	–	0
5/16	–	–	–	–	–	–	0	0	–	0	–	0	0	0	–	–	0
5/17	–	–	–	–	–	–	0	0	–	0	–	0	0	0	–	–	0
5/18	–	–	–	–	–	–	0	0	–	0	–	0	0	0	–	–	0
5/19	0	0	0	0	4	4	4	4	5	5	0.11	0.11	0.01	0.01	–	–	0
5/20	2	2	2	2	3	7	7	11	8	13	0.17	0.27	0.02	0.04	–	–	0
5/21	1	3	1	3	2	9	4	15	4	17	0.08	0.36	0.01	0.05	–	–	0
5/22	0	3	2	5	2	11	4	19	4	21	0.08	0.44	0.01	0.06	–	–	0
5/23	3	6	0	5	0	11	3	22	4	25	0.08	0.53	0.01	0.07	–	–	0
5/24	3	9	3	8	2	13	8	30	9	34	0.19	0.72	0.03	0.10	–	–	0
5/25	2	11	4	12	4	17	10	40	10	44	0.21	0.93	0.03	0.13	–	–	0
5/26	0	11	2	14	11	28	13	53	14	58	0.30	1.22	0.04	0.17	1	41306	1
5/27	3	14	3	17	6	34	12	65	12	70	0.25	1.47	0.03	0.20	–	–	1
5/28	2	16	3	20	2	36	7	72	7	77	0.15	1.62	0.02	0.22	–	–	1
5/29	0	16	1	21	0	36	1	73	1	78	0.02	1.64	0.00	0.22	–	–	1
5/30	0	16	1	22	3	39	4	77	4	82	0.08	1.73	0.01	0.23	–	–	1
5/31	3	19	2	24	3	42	8	85	8	90	0.17	1.90	0.02	0.26	–	–	1
6/1	3	22	4	28	7	49	14	99	14	104	0.30	2.19	0.04	0.30	–	–	1

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	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)									
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips			
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
6/2	2	24	4	32	3	52	9	108	9	113	0.19	2.38	0.03	0.32	–	–	1
6/3	1	25	2	34	2	54	5	113	5	118	0.10	2.48	0.01	0.34	–	–	1
6/4	0	25	0	34	1	55	1	114	2	120	0.04	2.53	0.01	0.34	–	–	1
6/5	2	27	3	37	2	57	7	121	7	127	0.15	2.67	0.02	0.36	–	–	1
6/6	5	32	5	42	10	67	20	141	21	148	0.45	3.13	0.06	0.42	1	no tag	2
6/7	5	37	6	48	9	76	20	161	20	168	0.42	3.55	0.06	0.48	–	–	2
6/8	3	40	4	52	7	83	14	175	14	182	0.30	3.85	0.04	0.52	–	–	2
6/9	0	40	3	55	9	92	12	187	12	194	0.25	4.10	0.03	0.56	–	–	2
6/10	4	44	4	59	3	95	11	198	11	205	0.23	4.34	0.03	0.59	–	–	2
6/11	1	45	3	62	4	99	8	206	8	213	0.17	4.50	0.02	0.61	–	–	2
6/12	0	45	1	63	2	101	3	209	3	216	0.06	4.57	0.01	0.62	–	–	2
6/13	7	52	1	64	0	101	8	217	8	224	0.17	4.74	0.02	0.64	–	–	2
6/14	9	61	2	66	4	105	15	232	15	239	0.32	5.06	0.04	0.68	–	–	2
6/15	8	69	7	73	7	112	22	254	22	261	0.47	5.53	0.06	0.75	–	–	2
6/16	6	75	7	80	3	115	16	270	17	278	0.36	5.89	0.05	0.80	–	–	2
6/17	3	78	1	81	1	116	5	275	5	283	0.11	5.99	0.01	0.81	–	–	2
6/18	2	80	1	82	4	120	7	282	7	290	0.15	6.14	0.02	0.83	–	–	2
6/19	0	80	1	83	1	121	2	284	2	292	0.04	6.18	0.01	0.84	–	–	2
6/20	1	81	4	87	0	121	5	289	5	297	0.11	6.29	0.01	0.85	–	–	2
6/21	3	84	2	89	1	122	6	295	7	304	0.15	6.44	0.02	0.87	–	–	2
6/22	4	88	2	91	1	123	7	302	7	311	0.15	6.60	0.02	0.89	–	–	2
6/23	5	93	0	91	1	124	6	308	6	317	0.13	6.72	0.02	0.91	–	–	2
6/24	2	95	0	91	1	125	3	311	3	320	0.06	6.79	0.01	0.92	–	–	2
6/25	1	96	0	91	0	125	1	312	1	321	0.02	6.81	0.00	0.92	–	–	2

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	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)									
	Small		Medium		Large		Total		Total		CPUE		Proportions		Adipose finclips			
Date	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum
6/26	1	97	0	91	1	126	2	314	2	323	0.04	6.85	0.01	0.93	–	–	2
6/27	0	97	0	91	1	127	1	315	2	325	0.04	6.89	0.01	0.93	–	–	2
6/28	1	98	0	91	2	129	3	318	3	328	0.06	6.96	0.01	0.94	–	–	2
6/29	2	100	1	92	3	132	6	324	6	334	0.13	7.08	0.02	0.96	–	–	2
6/30	0	100	1	93	0	132	1	325	1	335	0.02	7.11	0.00	0.96	–	–	2
7/1	0	100	1	94	1	133	2	327	2	337	0.04	7.15	0.01	0.97	–	–	2
7/2	0	100	0	94	1	134	1	328	1	338	0.02	7.17	0.00	0.97	–	–	2
7/3	0	100	0	94	1	135	1	329	1	339	0.02	7.19	0.00	0.97	–	–	2
7/4	0	100	0	94	2	137	2	331	2	341	0.04	7.23	0.01	0.98	–	–	2
7/5	0	100	1	95	0	137	1	332	1	342	0.02	7.25	0.00	0.98	–	–	2
7/6	0	100	0	95	1	138	1	333	1	343	0.02	7.28	0.00	0.99	–	–	2
7/7	0	100	3	98	0	138	3	336	3	346	0.06	7.34	0.01	0.99	–	–	2
7/8	0	100	0	98	0	138	0	336	0	346	0.00	7.34	0.00	0.99	–	–	2
7/9	0	100	0	98	0	138	0	336	0	346	0.00	7.34	0.00	0.99	–	–	2
7/10	0	100	0	98	1	139	1	337	1	347	0.02	7.36	0.00	1.00	–	–	2
7/11	0	100	0	98	0	139	0	337	0	347	0.00	7.36	0.00	1.00	–	–	2
7/12	0	100	0	98	0	139	0	337	0	347	0.00	7.36	0.00	1.00	–	–	2
7/13	0	100	0	98	1	140	1	338	1	348	0.02	7.38	0.00	1.00	–	–	2
Total	100	–	98	–	140	–	338	–	348	–	–	–	–	–	2	1	–

Appendix C6.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2010 by size group and location.

			Brood year and age class									
			2007	2006	2006	2005	2005	2004	2004	2003	2003	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nahlin	Male	*n*	0	0	1	0	40	1	5	0	0	47
Large fish		%	0.0%	0.0%	2.1%	0.0%	85.1%	2.1%	10.6%	0.0%	0.0%	34.1%
	Female	*n*	0	0	0	0	77	0	14	0	0	91
		%	0.0%	0.0%	0.0%	0.0%	84.6%	0.0%	15.4%	0.0%	0.0%	65.9%
	Total	*n*	0	0	1	0	117	1	19	0	0	138
		%	0.0%	0.0%	0.7%	0.0%	84.8%	0.7%	13.8%	0.0%	0.0%	100.0%
	Male	*n*	0	0	27	0	1	0	0	0	0	28
Medium fish		%	0.0%	0.0%	96.4%	0.0%	3.6%	0.0%	0.0%	0.0%	0.0%	93.3%
	Female	*n*	0	0	2	0	0	0	0	0	0	2
		%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.7%
	Total	*n*	0	0	29	0	1	0	0	0	0	30
		%	0.0%	0.0%	96.7%	0.0%	3.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	28	0	41	1	5	0	0	75
All fish		%	0.0%	0.0%	37.3%	0.0%	54.7%	1.3%	6.7%	0.0%	0.0%	44.6%
	Female	*n*	0	0	2	0	77	0	14	0	0	93
		%	0.0%	0.0%	2.2%	0.0%	82.8%	0.0%	15.1%	0.0%	0.0%	55.4%
	Total	*n*	0	0	30	0	118	1	19	0	0	168
		%	0.0%	0.0%	17.9%	0.0%	70.2%	0.6%	11.3%	0.0%	0.0%	100.0%
Lower Dudidontu	Male	*n*	0	0	2	0	17	0	5	0	0	24
Large fish		%	0.0%	0.0%	8.3%	0.0%	70.8%	0.0%	20.8%	0.0%	0.0%	36.4%
	Female	*n*	0	0	0	0	39	0	3	0	0	42
		%	0.0%	0.0%	0.0%	0.0%	92.9%	0.0%	7.1%	0.0%	0.0%	63.6%
	Total	*n*	0	0	2	0	56	0	8	0	0	66
		%	0.0%	0.0%	3.0%	0.0%	84.8%	0.0%	12.1%	0.0%	0.0%	100.0%
	Male	*n*	0	0	4	0	2	0	0	0	0	6
Medium fish		%	0.0%	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	4	0	2	0	0	0	0	6
		%	0.0%	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	6	0	19	0	5	0	0	30
All fish		%	0.0%	0.0%	20.0%	0.0%	63.3%	0.0%	16.7%	0.0%	0.0%	41.7%
	Female	*n*	0	0	0	0	39	0	3	0	0	42
		%	0.0%	0.0%	0.0%	0.0%	92.9%	0.0%	7.1%	0.0%	0.0%	58.3%
	Total	*n*	0	0	6	0	58	0	8	0	0	72
		%	0.0%	0.0%	8.3%	0.0%	80.6%	0.0%	11.1%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2007	2006	2006	2005	2005	2004	2004	2003	2003	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Tseta Creek	Male	*n*	0	0	4	0	39	1	7	0	0	51
Large fish		%	0.0%	0.0%	7.8%	0.0%	76.5%	2.0%	13.7%	0.0%	0.0%	37.0%
	Female	*n*	0	0	1	0	71	3	12	0	0	87
		%	0.0%	0.0%	1.1%	0.0%	81.6%	3.4%	13.8%	0.0%	0.0%	63.0%
	Total	*n*	0	0	5	0	110	4	19	0	0	138
		%	0.0%	0.0%	3.6%	0.0%	79.7%	2.9%	13.8%	0.0%	0.0%	100.0%
	Male	*n*	0	0	13	1	1	0	0	0	0	15
Medium fish		%	0.0%	0.0%	86.7%	6.7%	6.7%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	13	1	1	0	0	0	0	15
		%	0.0%	0.0%	86.7%	6.7%	6.7%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	–	1	–	–	–	–	–	–	–	1
Small fish		%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	1	0	0	0	0	0	0	0	1
		%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	0	1	17	1	40	1	7	0	0	67
All fish		%	0.0%	1.5%	25.4%	1.5%	59.7%	1.5%	10.4%	0.0%	0.0%	43.5%
	Female	*n*	0	0	1	0	71	3	12	0	0	87
		%	0.0%	0.0%	1.1%	0.0%	81.6%	3.4%	13.8%	0.0%	0.0%	56.5%
	Total	*n*	–	1	18	1	111	4	19	–	–	154
		%	0.0%	0.6%	11.7%	0.6%	72.1%	2.6%	12.3%	0.0%	0.0%	100.0%
Yeth River	Male	*n*	0	0	0	0	2	0	0	0	0	2
Large fish		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	40.0%
	Female	*n*	0	0	0	0	2	0	1	0	0	3
		%	0.0%	0.0%	0.0%	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	60.0%
	Total	*n*	0	0	0	0	4	0	1	0	0	5
		%	0.0%	0.0%	0.0%	0.0%	80.0%	0.0%	20.0%	0.0%	0.0%	100.0%
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Medium fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	0	0	0	0	0	0	0	0
Small fish		%	–	–	–	–	–	–	–	–	–	–
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Male	*n*	0	0	0	0	2	0	0	0	0	2
All fish		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	40.0%
	Female	*n*	0	0	0	0	2	0	1	0	0	3
		%	0.0%	0.0%	0.0%	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	60.0%
	Total	*n*	0	0	0	0	4	0	1	0	0	5
		%	0.0%	0.0%	0.0%	0.0%	80.0%	0.0%	20.0%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2007	2006	2006	2005	2005	2004	2004	2003	2003	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina River	Male	*n*	0	0	4	0	35	0	6	0	0	45
Large fish		%	0.0%	0.0%	8.9%	0.0%	77.8%	0.0%	13.3%	0.0%	0.0%	53.6%
	Female	*n*	0	0	1	0	27	0	11	0	0	39
		%	0.0%	0.0%	2.6%	0.0%	69.2%	0.0%	28.2%	0.0%	0.0%	46.4%
	Total	*n*	0	0	5	0	62	0	17	0	0	84
		%	0.0%	0.0%	6.0%	0.0%	73.8%	0.0%	20.2%	0.0%	0.0%	100.0%
	Male	*n*	7	0	61	0	7	0	0	0	0	75
Medium fish		%	9.3%	0.0%	81.3%	0.0%	9.3%	0.0%	0.0%	0.0%	0.0%	98.7%
	Female	*n*	0	0	0	0	1	0	0	0	0	1
		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	1.3%
	Total	*n*	7	0	61	0	8	0	0	0	0	76
		%	9.2%	0.0%	80.3%	0.0%	10.5%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	83	0	4	0	0	0	0	0	0	87
Small fish		%	95.4%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	83	0	4	0	0	0	0	0	0	87
		%	95.4%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	90	0	69	0	42	0	6	0	0	207
All fish		%	43.5%	0.0%	33.3%	0.0%	20.3%	0.0%	2.9%	0.0%	0.0%	83.8%
	Female	*n*	0	0	1	0	28	0	11	0	0	40
		%	0.0%	0.0%	2.5%	0.0%	70.0%	0.0%	27.5%	0.0%	0.0%	16.2%
	Total	*n*	90	0	70	0	70	0	17	0	0	247
		%	36.4%	0.0%	28.3%	0.0%	28.3%	0.0%	6.9%	0.0%	0.0%	100.0%
Lower Tatsamenie	Male	*n*	0	0	20	1	127	3	13	0	0	164
Large fish		%	0.0%	0.0%	12.2%	0.6%	77.4%	1.8%	7.9%	0.0%	0.0%	62.4%
	Female	*n*	0	0	2	0	78	5	14	0	0	99
		%	0.0%	0.0%	2.0%	0.0%	78.8%	5.1%	14.1%	0.0%	0.0%	37.6%
	Total	*n*	0	0	22	1	205	8	27	0	0	263
		%	0.0%	0.0%	8.4%	0.4%	77.9%	3.0%	10.3%	0.0%	0.0%	100.0%
	Male	*n*	21	1	58	1	7	0	0	0	0	88
Medium fish		%	23.9%	1.1%	65.9%	1.1%	8.0%	0.0%	0.0%	0.0%	0.0%	98.9%
	Female	*n*	0	0	0	0	1	0	0	0	0	1
		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	1.1%
	Total	*n*	21	1	58	1	8	0	0	0	0	89
		%	23.6%	1.1%	65.2%	1.1%	9.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	58	3	1	0	0	0	0	0	0	62
Small fish		%	93.5%	4.8%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	58	3	1	0	0	0	0	0	0	62
		%	93.5%	4.8%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	79	4	79	2	134	3	13	0	0	314
All fish		%	25.2%	1.3%	25.2%	0.6%	42.7%	1.0%	4.1%	0.0%	0.0%	75.8%
	Female	*n*	0	0	2	0	79	5	14	0	0	100
		%	0.0%	0.0%	2.0%	0.0%	79.0%	5.0%	14.0%	0.0%	0.0%	24.2%
	Total	*n*	79	4	81	2	213	8	27	0	0	414
		%	19.1%	1.0%	19.6%	0.5%	51.4%	1.9%	6.5%	0.0%	0.0%	100.0%

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			Brood year and age class									
			2007	2006	2006	2005	2005	2004	2004	2003	2003	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
All Tributaries	Male	*n*	0	0	31	1	260	5	36	0	0	333
Large fish		%	0.0%	0.0%	9.3%	0.3%	78.1%	1.5%	10.8%	0.0%	0.0%	48.0%
	Female	*n*	0	0	4	0	294	8	55	0	0	361
		%	0.0%	0.0%	1.1%	0.0%	81.4%	2.2%	15.2%	0.0%	0.0%	52.0%
	Total	*n*	0	0	35	1	554	13	91	0	0	694
		%	0.0%	0.0%	5.0%	0.1%	79.8%	1.9%	13.1%	0.0%	0.0%	100.0%
	Male	*n*	28	1	163	2	18	0	0	0	0	212
Medium fish		%	13.2%	0.5%	76.9%	0.9%	8.5%	0.0%	0.0%	0.0%	0.0%	98.1%
	Female	*n*	0	0	2	0	2	0	0	0	0	4
		%	0.0%	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	1.9%
	Total	*n*	28	1	165	2	20	0	0	0	0	216
		%	13.0%	0.5%	76.4%	0.9%	9.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	141	4	5	0	0	0	0	0	0	150
Small fish		%	94.0%	2.7%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	141	4	5	0	0	0	0	0	0	150
		%	94.0%	2.7%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	169	5	199	3	278	5	36	0	0	695
All fish		%	24.3%	0.7%	28.6%	0.4%	40.0%	0.7%	5.2%	0.0%	0.0%	65.6%
	Female	*n*	0	0	6	0	296	8	55	0	0	365
		%	0.0%	0.0%	1.6%	0.0%	81.1%	2.2%	15.1%	0.0%	0.0%	34.4%
	Total	*n*	169	5	205	3	574	13	91	0	0	1060
		%	15.9%	0.5%	19.3%	0.3%	54.2%	1.2%	8.6%	0.0%	0.0%	100.0%
Canyon Island	Male	*n*	–	–	5	–	94	–	20	–	–	119
Large fish		%	0.0%	0.0%	4.2%	0.0%	79.0%	0.0%	16.8%	0.0%	0.0%	33.3%
	Female	*n*	–	–	2	–	168	2	64	1	1	238
		%	0.0%	0.0%	0.8%	0.0%	70.6%	0.8%	26.9%	0.4%	0.4%	66.7%
	Total	*n*	–	–	7	–	262	2	84	1	1	357
		%	0.0%	0.0%	2.0%	0.0%	73.4%	0.6%	23.5%	0.3%	0.3%	100.0%
	Male	*n*	1	3	179	2	11	–	1	–	–	197
Medium fish		%	0.5%	1.5%	90.9%	1.0%	5.6%	0.0%	0.5%	0.0%	0.0%	93.4%
	Female	*n*	–	–	13	1	–	–	–	–	–	14
		%	0.0%	0.0%	92.9%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	6.6%
	Total	*n*	1	3	192	3	11	–	1	–	–	211
		%	0.5%	1.4%	91.0%	1.4%	5.2%	0.0%	0.5%	0.0%	0.0%	100.0%
	Male	*n*	86	7	3	–	–	–	–	–	–	96
Small fish		%	89.6%	7.3%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	86	7	3	–	–	–	–	–	–	96
		%	89.6%	7.3%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	87	10	187	2	105	–	21	–	–	412
All fish		%	21.1%	2.4%	45.4%	0.5%	25.5%	0.0%	5.1%	0.0%	0.0%	62.0%
	Female	*n*	–	–	15	1	168	2	64	1	1	252
		%	0.0%	0.0%	6.0%	0.4%	66.7%	0.8%	25.4%	0.4%	0.4%	38.0%
	Total	*n*	87	10	202	3	273	2	85	1	1	664
		%	13.1%	1.5%	30.4%	0.5%	41.1%	0.3%	12.8%	0.2%	0.2%	100.0%

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			Brood year and age class									
			2007	2006	2006	2005	2005	2004	2004	2003	2003	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Flannigan - Lower River	Male	*n*	–	–	4	–	55	1	19	–	–	79
Large fish		%	0.0%	0.0%	5.1%	0.0%	69.6%	1.3%	24.1%	0.0%	0.0%	26.2%
	Female	*n*	–	–	1	–	143	4	73	–	1	222
		%	0.0%	0.0%	0.5%	0.0%	64.4%	1.8%	32.9%	0.0%	0.5%	73.8%
	Total	*n*	–	–	5	–	198	5	92	–	1	301
		%	0.0%	0.0%	1.7%	0.0%	65.8%	1.7%	30.6%	0.0%	0.3%	100.0%
	Male	*n*	5	1	141	1	10	–	1	–	–	159
Medium fish		%	3.1%	0.6%	88.7%	0.6%	6.3%	0.0%	0.6%	0.0%	0.0%	99.4%
	Female	*n*	–	–	–	–	1	–	–	–	–	1
		%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.6%
	Total	*n*	5	1	141	1	11	–	1	–	–	160
		%	3.1%	0.6%	88.1%	0.6%	6.9%	0.0%	0.6%	0.0%	0.0%	100.0%
	Male	*n*	1	–	–	–	–	–	–	–	–	1
Small fish		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Female	*n*	0	0	0	0	0	0	0	0	0	0
		%	–	–	–	–	–	–	–	–	–	–
	Total	*n*	1	–	–	–	–	–	–	–	–	1
		%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Male	*n*	6	1	145	1	65	1	20	–	–	239
All fish		%	2.5%	0.4%	60.7%	0.4%	27.2%	0.4%	8.4%	0.0%	0.0%	51.7%
	Female	*n*	–	–	1	–	144	4	73	–	1	223
		%	0.0%	0.0%	0.4%	0.0%	64.6%	1.8%	32.7%	0.0%	0.4%	48.3%
	Total	*n*	6	1	146	1	209	5	93	–	1	462
		%	1.3%	0.2%	31.6%	0.2%	45.2%	1.1%	20.1%	0.0%	0.2%	100.0%
Canadian Commercial	Total	*n*	13	0	637	33	3106	159	1938	13	13	5,913
Fishery		%	0.2%	0.0%	10.8%	0.6%	52.5%	2.7%	32.8%	0.2%	0.2%	100.0%

APPENDIX D

Appendix D1.–Computer files used to estimate the spawning abundance of Chinook salmon in the Taku River from 2008 to 2010.

File name	Description
08Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2008.
08Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2008.
09Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2009.
09Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2009.
10Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2010.
10Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2010.