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Spawning Abundance of Chinook Salmon in the Taku River from 1999 to 2007

by

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and

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Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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

FISHERY DATA SERIES NO. 10-70

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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 1999 to 2007 using mark-recapture methodology. Fish captured near Canyon Island in the lower Taku River using fish wheels and set gillnets from late April through early August were tagged using back-sewn, individually-numbered, solid-core spaghetti tags. Two secondary marks, an 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 test 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 Chinook salmon (≥660 mm mid-eye to fork of tail [MEF]) was estimated at 16,786 (SE = 3,171) in 1999, 34,997 (SE = 5,403) in 2000, 46,544 (SE = 6,766) in 2001, 55,044 (SE = 11,087) in 2002, 36,435 (SE = 6,705) in 2003, 75,032 (SE = 10,280) in 2004, 38,725 (SE = 4,908) in 2005, 42,296 (SE = 5,535) in 2006, and 14,854 (SE = 3,277) in 2007. Spawning abundance of medium Chinook salmon (401–659 mm MEF) was estimated from 1999 to 2007, and small Chinook salmon (< 401 mm MEF) spawning abundance was estimated from 2002 to 2004.

Key words: cooperative, Chinook salmon, *Oncorhynchus tshawytscha*, Taku River, spawning abundance, mark-recapture, fish wheels, set gillnets, spaghetti tags, secondary marks.

INTRODUCTION

The Taku River produces the largest population of Chinook salmon *Oncorhynchus tshawytscha* in British Columbia north of the Skeena River, and in Southeast Alaska (Pahlke and Bernard 1996; McPherson et al. 1997; Pahlke 2009). 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 a commercial gillnet fishery 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 6 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. Survey counts of large Chinook salmon have been expanded to account for fish not present or observed during surveys, and for 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 Chinook salmon in the Taku River to estimate escapement (McGregor and Clark 1989). Information from tagging and radio telemetry

studies in 1989 and 1990 by the 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 estimate the abundance of large Chinook salmon in the Taku River: 40,329 (SE = 5,646) in 1989 and 52,142 (SE = 9,326) in 1990 (Pahlke and Bernard 1996; Eiler 1990). Chinook salmon were captured in fish wheels at Canyon Island, well below the upriver spawning grounds where Chinook salmon were inspected for marks.

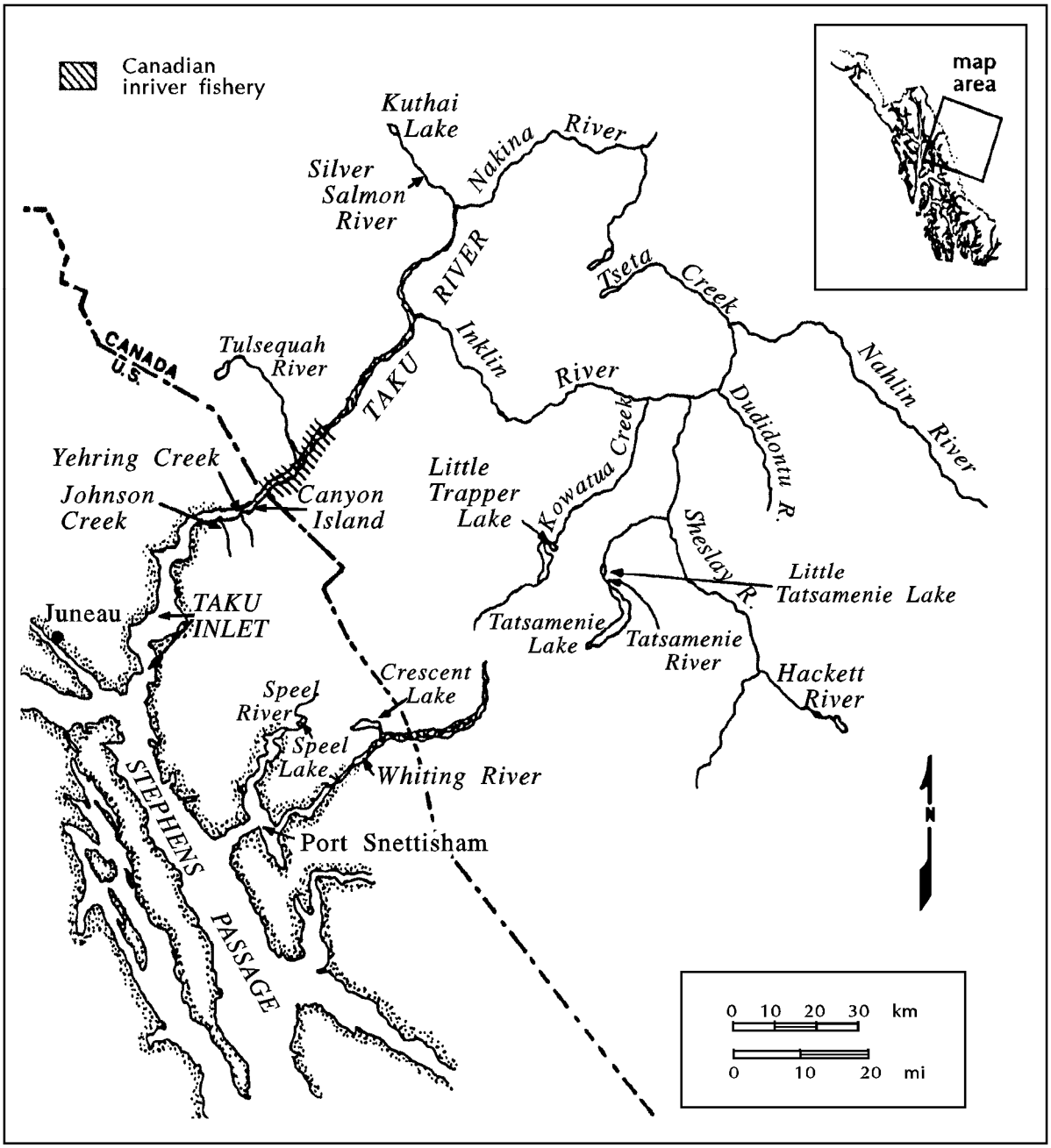

Figure 1.–Taku Inlet and the Taku River drainage.

Subsequent mark-recapture (M-R) experiments (McPherson et al. 1996–1998) provided sufficient data to calculate an empirically based expansion factor. Based on experiments conducted in 1989, 1990, and 1995-1997, 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 occur each year and serve as a fail-safe in the event the M-R experiment fails.

Chinook salmon from the Taku River are "spring run". Most returning adults are present in terminal marine areas from late April through early July, with a few present into August. Spawning occurs from late July to late September. Nearly all juveniles rear for 1 year in fresh water after emergence, smolt at age 1 (Kissner and Hubartt 1986), then rear in offshore waters where they are not subjected to exploitation by fisheries in Southeast Alaska. Returning adults spend 1–5 years at sea, younger fish (age-.1 and -.2) are mostly males, and older fish (ages-.3, -.4 and -.5) are both sexes. Ages-.2, -.3, and -.4 dominate the annual spawning population; age-.5 fish are uncommon (<5% of the run).

The primary objectives of this study were to estimate abundance of large (≥660 mm MEF) Chinook salmon spawning in the Taku River in 1999–2007, and to estimate the age and sex composition of these fish. The Chinook salmon escapement goal in the Taku River, as is the case for all Chinook salmon escapement goals in Southeast Alaska, is for large Chinook salmon. Observer counts are the most basic form of escapement data gathered in Southeast Alaska and observers count large Chinook salmon which comprise the bulk of the female spawning population and are considered adults. Secondary objectives were to estimate abundance and age and sex composition of medium (401–659 mm MEF) and small (≤401 mm MEF) Chinook salmon in these years when sufficient data were collected concurrent with satisfying primary objectives.

METHODS

Two-event M-R experiments for a closed population (Seber 1982) were conducted on the Taku River annually during 1999–2007. Methods of sampling for the first (capture) event of the experiment in the lower river were fish wheel and gillnet. Methods of sampling for the second (recapture) event included upriver sampling on or near spawning grounds, and sampling (virtually 100%) of catches in the lower river test, commercial, and aboriginal subsistence fisheries upstream from the first event sampling site. Previous studies showed 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).

STUDY AREA

The Taku River originates in the Stikine Plateau of northwestern British Columbia, Canada (Figure 1), and flows nearly 300 km downstream, emptying into the Taku Inlet about 30 km east of Juneau, Alaska. The Taku River drains approximately 17,094 km^2 of land (Bigelow et al. 1995). Two principal tributaries, the Inklin and the Nakina rivers, merge at about 55 km above the U.S./Canada border to form the main body of the lower river. Discharge past Canyon Island (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 glacially turbid; however, the tributaries where most Chinook salmon spawn are relatively clear waters, notably the Nahlin, Nakina, Tatsamenie, Dudidontu, and Hackett rivers, and Kowatua and Tseta creeks.

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 200m 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 on both banks, making it an ideal location for fish wheel operation. The initial date of fish wheel operations varied annually, dependent on logistic and water conditions. The earliest start-up was May 6 in 2005, and the latest was May 28 in 2003. 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, B2, C2, D2, E2, F2, G2, H2, and I2).

To supplement fish wheel catches, a 5 3/8" or 7 ¼" mesh gillnet was set in an eddy just downstream of the lower fish wheel site. The first days of gillnetting for Chinook salmon varied annually from April 20 in 2003 to May 8 in 1999. 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, B1, C1, D1, E1, F1, G1, H1, and I1).

Individual 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. 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 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 which 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 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 2 1/4″ section of laminated plastic tubing shrunk onto a 15″ piece of 80-lb-test monofilament fishing line, 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 - each fish was marked with a 5/16″ hole punched in the upper one-third of the left operculum (UOP), and by excision of the left axillary appendage (LAA).

SAMPLING ON THE SPAWNING GROUNDS

Chinook salmon were sampled from the Nakina and Tatsatua (Tatsamenie) rivers (1999–2007), Kowatua Creek (1999–2007), the Nahlin River (2000–2006), the Dudidontu River (2002–2006), Tseta Creek (2003), and the Hackett River (2007) as representative stocks of early-, mid-, and

late-season migrants (ADF 1951; Pahlke and Bernard 1996; Eiler 1990). A carcass weir obtained samples on the Nakina River from 1 August to 21 August. With angling, we obtained samples from 28 July to 31 July on the Nahlin River, on 3 August on Tseta Creek, from 3 August to 6 August on the Dudidontu River, and from 30 August to 18 September on the upper Tatsamenie River (Tatsatua system). Carcass weirs were used on the lower Tatsamenie River and Kowatua Creek from 27 August to 8 September and 19 August to 10 September, respectively. On the lower Tatsamenie River, additional samples were obtained through angling; on Kowatua Creek, additional samples (postspawn) were obtained using spears.

All inspected fish were closely examined for the presence of the primary tag, the UOP and the LAA (secondary marks), for the absence of the adipose fin, then were measured to the nearest millimeter 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 operculum punch to prevent repeat sampling.

SAMPLING INRIVER FISHERIES

Chinook salmon were also sampled in up to 3 gillnet fisheries located upstream of Canyon Island and the international border. These were: a scientific or "test" fishery designed to provide inseason estimates of Chinook salmon abundance; an Aboriginal Food, Social and Ceremonial (FSC) fishery; and, a directed commercial fishery for sockeye salmon. In 2005 and 2006, directed Chinook salmon inriver commercial fishing began in early May and continued until the start of the traditional sockeye fishery that began each year on the third Sunday in June, and normally continued through early September. In all other years, a test fishery began approximately at the end of April or early May, and proceeded until the traditional sockeye salmon fishery commenced. The test fishery used 7 1/4" mesh gillnets, and the directed Chinook salmon inriver fishery used gillnets that could not exceed 8" mesh. The Aboriginal fishery took place from approximately mid-May to early June, annually. Both the Aboriginal and traditional sockeye salmon inriver commercial fisheries deployed gillnets with a maximum mesh size of 5 7/8".

SAMPLING FOR CODED WIRE TAGS

Each spring from April to June, emigrating Chinook salmon smolt are captured near Canyon Island and coded-wire-tagged (CWTd). 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 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 were used for all smolt capture. Captured fish are transported carefully to a central processing station and are 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 preseason operational plans and onsite training. Long-term tag retention has averaged about 94% (McPherson et al. 2010). After spending 1 to 5 years at sea, Chinook salmon return to the Taku River and are sampled to estimate the marked fraction for each brood year, as it is different for each brood due to variations in trapping conditions, weather and climate, and smolt abundance. Scales are taken from all or most adults that are sampled to accurately determine brood year assignments. Scales taken on fish missing adipose fins are used to validate age analyses and to assign fish that are missing CWTs to their respective 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, medium and large Chinook salmon were estimated separately. Estimated abundance ($\hat{N}_i$) of small, medium and large 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:

(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, medium and large fish tagged and released at Canyon Island were compared with the length distributions of small, medium and large 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. 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 test fishery as well as in the component of the aboriginal fishery associated with this study. Because of a reward (CDN$5) for each tag returned from the inriver Canadian gillnet fishery, the number of tags recovered probably represented all marked fish caught in this fishery.

Marking was not necessarily assumed to have little effect on behavior or catchability of 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 test, 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 ratios of salmon sampled in test, Canadian commercial, and/or aboriginal fisheries was significantly higher than the ratios 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, medium and large 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. Any tags voluntarily returned from the inriver recreational fishery in Canada were always censored. Presumably some unknown number of tagged fish left the river and died. The radio telemetry 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 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. According to Robson and Regier, (1964) bias in the abundance estimate will be negligible if 7 or more recaptures are obtained. 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 test 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 test 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, medium and large Chinook salmon passing by Canyon Island were divided into 7 capture histories (Table 1).

Table 1.–Capture histories for small, medium and large 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, test 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

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

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, medium or large fish was estimated as a binomial variable from fish sampled on the spawning grounds:

$$\hat{p}_{ij} = \frac{n_{ij}}{n_i} \tag{3}$$

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:

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

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:

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

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

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

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

$$\hat{p}_j = \frac{\hat{N}_j}{\hat{N}} \tag{7}$$

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

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

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 1999

Medium and large-sized Chinook salmon abundances in 1999 were 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 812 Chinook salmon of known size were caught at Canyon Island, of which 782 were tagged and released (Table 2). Of the total caught, 49 were small-sized, 421 were medium-sized and 342 were large-sized Chinook salmon. Gillnets were used to catch 383 fish and fish wheels used to catch 429 fish; all of these fish were caught between 26 April and 26 July.

Of the 342 large-sized Chinook salmon caught at Canyon Island, 333 were tagged and released (Table 2). Of these, 179 were captured in gillnets (Appendix A1) and 154 were caught in fish wheels (Appendix A2). Of the 421 medium-sized Chinook salmon caught at Canyon Island, 402 were tagged and released (Table 2). Of these, 186 were captured in gillnets (Appendix A1) and 216 were caught in fish wheels (Appendix A2). Forty-seven of the small-sized Chinook salmon caught at Canyon Island were tagged and released and all but 4 were captured using fish wheels (Appendices A1 and A2).

A total of 799 Chinook salmon were inspected from gillnet or fish wheel captures and 18 of them were missing adipose fins (Appendices A1 and A2). Later dissection and processing indicated that 17 contained valid CWTs natal to the spring smolt tagging operations on the Taku River (Appendices A1 and A2).

In 1999, water levels were relatively low from late April to June 9, followed by relatively high water levels between 8 ft and 11 ft from June 10–20. Thereafter through late July, water levels were at or slightly below average summer levels of 5–7 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 test 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 1999 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					
A. Total initially tagged		47	402	333	782
1. Captured using fish wheels		43	216	154	413
2. Captured using set gillnets		4	186	179	369
B. Total removals by**:**			6		6
1. Total U.S. fisheries			4		4
Sport fisheries					
Commercial gillnet [a]			4		4
Commercial troll					
Personal use					
3. Total Canadian fisheries			2		2
Test fishery					
Aboriginal fishery					
Commercial fishery					
Sport fishery [b]			2		2
4. Recaptured as mortality at Canyon Island FW/GN					
C. Final total tagged in event 1 ($\hat{M}_i$)		47	**396**	**333**	776
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected	22	268	391	681
(All spawning grounds)	Marked		17	5	22
	Marked/inspected		0.063	0.013	0.032
1. Nakina River	Inspected	16	92	71	179
	Marked		6	2	8
	Marked/inspected		0.065	0.028	0.045
2. Lower Tatsamenie (Tatsatua River)	Inspected	3	128	265	396
	Marked		7	2	9
	Marked/inspected		0.055	0.008	0.023
3. Kowatua Creek	Inspected	3	48	55	106
	Marked		4	1	5
	Marked/inspected		0.083	0.018	0.047
B. Lower river Canadian fisheries	Inspected	5	651	1,267	1,923
(Test, aboriginal and commercial)	Marked	1	20	25	46
	Marked/inspected	0.200	0.031	0.020	0.024
1. Test fishery	Inspected [c]	2	267	489	758
	Marked	1	11	13	25
	Marked/inspected	0.500	0.041	0.027	0.033
2. Commercial fishery	Inspected	3	384	778	1,165
	Marked		9	12	21
	Marked/inspected		0.023	0.015	0.018

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

[b] Includes 2 medium-sized fish in the Canadian recreational fishery.

[c] Of the 489 large fish inspected for marks, 180 (presumably females) were released.

Cumulative proportions of combined large and medium-sized Chinook salmon marked at Canyon Island that survived past all marine fisheries were similar to those recaptured in samples from the inriver test and commercial fisheries aggregated with those from the spawning grounds in 1999 (P = 0.58; Figure 2). Few small fish were tagged or examined and were excluded from all subsequent analyses. Because a separate estimate of large fish was desired, differences in marked fractions amongst sampling locations for large and medium-sized fish were separated. Separate comparisons of length distributions for medium and large Chinook salmon indicated size-selective sampling was not significant within each size group (P = 0.92 and P = 0.71, Figures 3 and 4). The recovery samples for large fish included all spawning grounds samples and all inriver test and commercial fishery samples, whereas the recovery samples for medium fish included all spawning grounds and test fishery samples. All removals (6 medium-sized fish) had known length and were censored from the analyses. Note that for both released and recaptured fish, only known lengths were used in the length frequency analyses, resulting in differences between the numbers shown in the figures and those reported in the released and recapture totals used during abundance calculations.

The estimated inriver run of medium-sized Chinook salmon in 1999 was 9,611 (SE = 1,462). This is based on 919 fish inspected for marks ($=C_{ms}$) at 3 tributaries and in the lower river test and commercial fisheries, 37 of which were recaptured fish ($=R_{ms}$; Table 2). The inriver fisheries harvested an estimated total of 651 medium-sized fish in the test (267) and commercial fisheries (384) resulting in a spawning abundance ($=\hat{N}_{ms}$) of 8,960 (SE = 1,462). One of the medium-sized fish inspected at the Nakina carcass weir had lost its primary tag. U.S. marine fisheries removed an estimated 4 tagged fish, and the Canadian sport fishery took another 2 fish ($=\hat{H}_{ms}$); the estimated number of medium-tagged fish was 396 ($=\hat{M}_{ms}$).

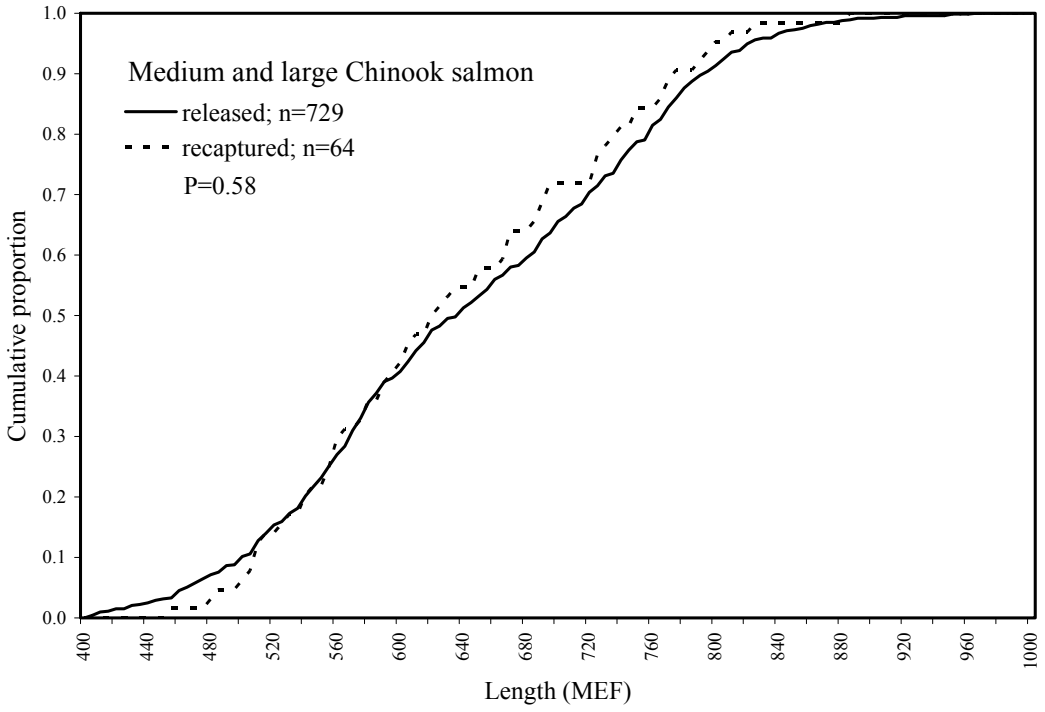

Figure 2.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries and the lower river fisheries in 1999.

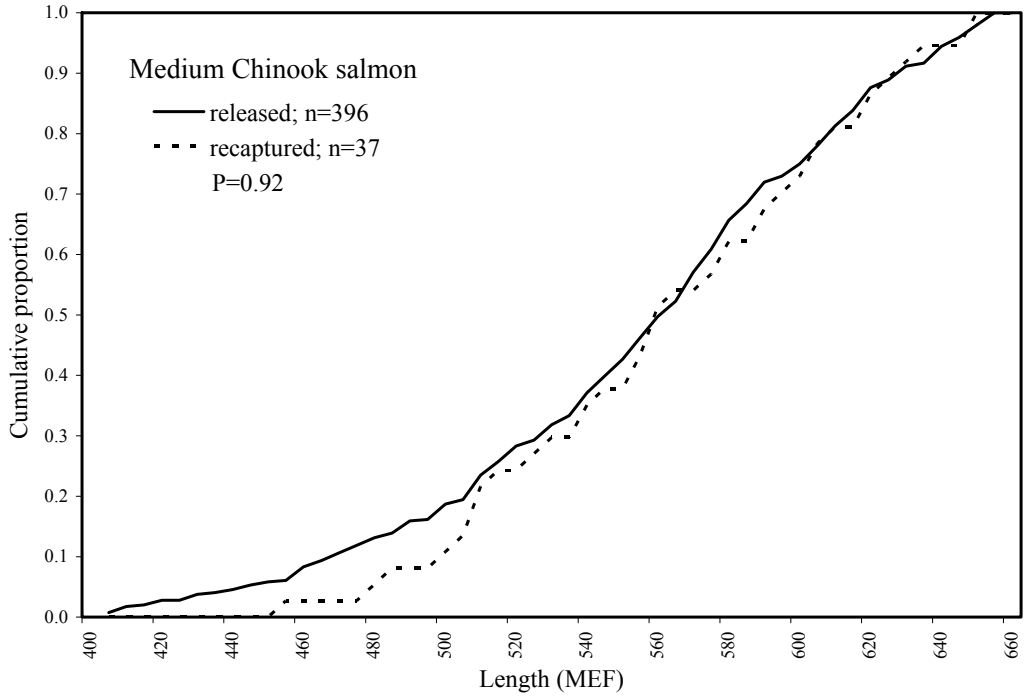

Figure 3.–Cumulative proportions of medium Chinook salmon marked at Canyon Island (minus 6 marine fishery removals) versus those recaptured in tributaries and the lower river fisheries in 1999.

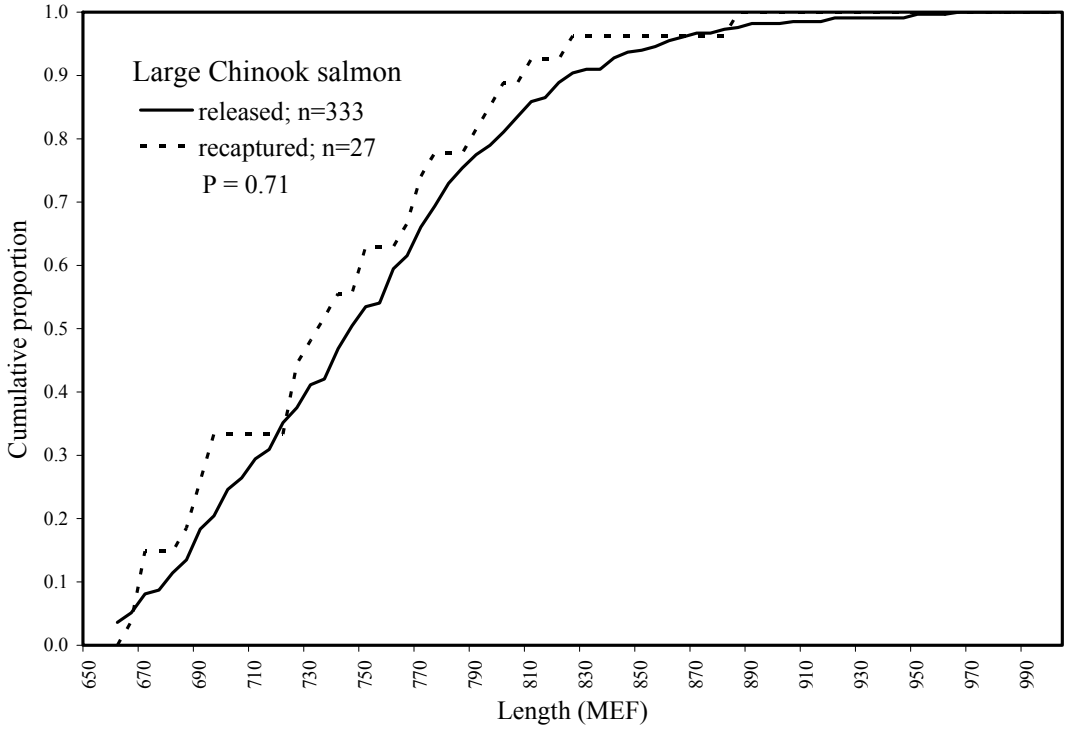

Figure 4.–Cumulative proportions of large Chinook salmon marked at Canyon Island versus those recaptured in tributaries and the lower river fisheries in 1999.

Note that the inriver fishery harvests were apportioned to size (length) categories based on lengths sampled from each harvest; 100% of the landed harvest (309 fish kept) in the test fishery was sampled for lengths (180 large fish, presumably all females, were sampled for marks and released), while 29.4% (343 fish) of the 1,165 commercially caught fish were sampled for length. The fractions of marked fish across the upper river spawning grounds (Table 2) did not differ significantly ($\chi^2 = 0.5$, df = 2, P = 0.78). However, the fractions of the pooled spawning grounds, the test fishery, and commercial fishery (Table 2) did differ significantly ($\chi^2 = 6.5$, df = 2, P = 0.04), notably with a lower fraction in the commercial fishery. Because of the low tagging and sampling numbers, combining the data from the spawning grounds, test, and commercial fisheries was the only feasible approach to estimating abundance in 1999 with any degree of certainty. Estimated abundance of medium-sized fish has a 95% confidence interval of 6,698 to 12,065, and an estimated relative statistical bias of 2.1%.

The estimated inriver run of large-sized Chinook salmon in 1999 was 17,873 (SE = 3,171). This is based on 1,658 fish inspected for marks ($=C_{ls}$) at 3 tributaries and in the lower test and commercial fisheries, 30 of which were recaptured fish ($=R_{ls}$; Table 2). The inriver fisheries harvested an estimated total of 1,267 large-sized fish in the test (489) and commercial fisheries (778) resulting in a spawning abundance ($=\hat{N}_{ls}$) of 16,786 (SE = 3,171). One (3.7%) of the 30 recaptured large fish had lost its primary tag (sampled in the Nakina River), but was detected as a tagged fish from its secondary marks. No tagged large fish were removed by the U.S. marine or Canadian fisheries ($\hat{H}_{ls} = 0$), and the estimated number of large tagged fish in the estimate was 333 ($=\hat{M}_{ls}$). The marked fractions among fish inspected in the 3 spawning areas were similar ($\chi^2 = 2.0$, df = 2, P = 0.36), and similarities between the pooled spawning areas, the test fishery and the commercial fishery indicate that the Petersen estimator based on data pooled is a consistent estimator for the M-R experiment ($\chi^2 = 2.9$, df = 2, P = 0.23). Estimated spawning abundance of large fish has a 95% confidence interval of 12,286 to 24,339 and an estimated relative bias of 2.5%.

The estimated abundance of medium and large Chinook salmon ($\hat{N} = \hat{N}_{ms} + \hat{N}_{ls}$) on the spawning grounds for 1999 was 25,746 (SE = 3,492), and a 95% confidence interval of 20,629 to 34,516.

ESTIMATES OF AGE AND SEX COMPOSITION IN 1999

Age-1.3 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 1999. They constituted 45.0% (SE = 4.2%) of the estimated escapement of medium and large fish (Table 3). Age-1.2 fish constituted 40.4% (SE = 5.0%) of the estimated escapement, and age-1.4 fish constituted 12.4% (SE = 1.8%) (Appendix A3).

The sex composition of the estimated escapement was 72.7% (SE = 2.9%) male (Table 3). Males accounted for 99.1% of medium fish, 95.6% of which were age 1.2. More than half (58.6%) of large fish were male, and age1.3 accounted for 68.3% of large fish.

Of the large fish sampled at Canyon Island, 68.5% were age 1.3, and 22.0% were age 1.4. Amongst medium fish sampled, 92.9% were age 1.2. Within size groups, the age compositions from samples taken at Canyon Island are similar to those from the combined tributary samples.

Length compositions were similar 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 1999.

		Brood year and age class									
		1996	1995	1995	1994	1994	1993	1993	1992	1992	
		1.1	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	6		218	1	2					227
	%	2.6%		95.2%	0.4%	0.9%					99.1%
	SE of %	1.1%		1.4%	0.4%	0.6%					0.6%
	Escapement	235		8,530	39	78					8,882
	SE of esc.	101		1,398	39	56					1,451
Females	n			1		1					2
	%			0.4%		0.4%					0.9%
	SE of %			0.4%		0.4%					0.6%
	Escapement			39		39					78
	SE of esc.			39		39					56
Sexes Combined	n	6		219	1	3					229
	%	2.6%		95.6%	0.4%	1.3%					100.0%
	SE of %	1.1%		1.4%	0.4%	0.8%					
	Escapement	235		8,569	39	117					8,960
	SE of esc.	101		1,404	39	69					1,462
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n			34	1	133	1	25			194
	%			10.3%	0.3%	40.2%	0.3%	7.6%			58.6%
	SE of %			1.7%	0.3%	2.7%	0.3%	1.5%			2.7%
	Escapement			1,724	51	6,745	51	1,268			9,838
	SE of esc.			427	51	1,350	51	339			1,912
Females	n			2		93		38	1	3	137
	%			0.6%		28.1%		11.5%	0.3%	0.9%	41.4%
	SE of %			0.4%		2.5%		1.8%	0.3%	0.5%	2.7%
	Escapement			101		4,716		1,927	51	152	6,948
	SE of esc.			73		980		465	51	91	1,386
Sexes Combined	n			36	1	226	1	63	1	3	331
	%			10.9%	0.3%	68.3%	0.3%	19.0%	0.3%	0.9%	100.0%
	SE of %			1.7%	0.3%	2.6%	0.3%	2.2%	0.3%	0.5%	
	Escapement			1,826	51	11,461	51	3,195	51	152	16,786
	SE of Esc.			446	51	2,206	51	701	51	91	3,171
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	6		252	2	135	1	25			421
	%	0.9%		39.8%	0.3%	26.5%	0.2%	4.9%			72.7%
	SE of %	0.4%		5.0%	0.2%	2.8%	0.2%	1.0%			2.9%
	Escapement	235		10,254	90	6,823	51	1,268			18,720
	SE of esc.	101		1,461	64	1,351	51	339			2,400
Females	n			3		94		38	1	3	139
	%			0.5%		18.5%		7.5%	0.2%	0.6%	27.3%
	SE of %			0.3%		2.3%		1.3%	0.2%	0.3%	2.9%
	Escapement			141		4,755		1,927	51	152	7,026
	SE of esc.			83		981		465	51	91	1,388
Sexes Combined	n	6		255	2	229	1	63	1	3	560
	%	0.9%		40.4%	0.3%	45.0%	0.2%	12.4%	0.2%	0.6%	100.0%
	SE of %	0.4%		5.0%	0.2%	4.2%	0.2%	1.8%	0.2%	0.3%	
	Escapement	235		10,394	90	11,579	51	3,195	51	152	25,746
	SE of esc.	101		1,473	64	2,207	51	701	51	91	3,492

Table 4.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 1999.

		Brood Year and age class									
		1996	1995	1995	1994	1994	1993	1993	1992	1992	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	24		253	2	135	1	25			440
	Average	365		590	660	766	680	875			
	SD	50		67	28	61		70			
	SE	10		4	20	5		14			
Females	n			3		94		38	1	3	139
	Average			667		753		817	800	862	
	SD			28		38		56		33	
	SE			16		4		9		19	
Sexes Combined	n	24		256	2	229	1	63	1	3	579
	Average	365		591	660	761	680	840	800	862	
	SD	50		67	28	53		67		33	
	SE	10		4	20	4		8		19	

TAGGING, RECOVERY AND ABUNDANCE IN 2000

Medium and large-sized Chinook salmon abundances in 2000 were estimated using M-R data consisting of event 1 releases at Canyon Island and event 2 samples gathered in tributaries and the inriver test fishery. Information from the inriver commercial fishery was not used in medium and large Chinook abundance calculations because fractions of marked fish from this fishery were significantly different from the fractions seen on the spawning grounds, in the test fishery, or from spawning grounds and the test fishery combined in all cases.

A total of 1,196 Chinook salmon of known size were caught at Canyon Island, of which 1,152 were tagged and released (Table 5). Of the total caught, 57 were small-sized, 395 were medium-sized and 744 were large-sized Chinook salmon. Of the total tagged fish, gillnets caught 631 fish, fish wheels caught 521 fish; all of these fish were caught between 24 April and 19 July.

Of the 744 large-sized Chinook salmon caught at Canyon Island, 712 were tagged and released (Table 5). Of these, 426 were captured in gillnets (Appendix B1) and 286 were caught in fish wheels (Appendix B2). Of the 395 medium-sized Chinook salmon caught at Canyon Island, 383 were tagged and released (Table 5). Of these, 205 were captured in gillnets (Appendix B1) and 178 (Table 5) were caught in fish wheels (Appendix B2). Fifty-seven of the small-sized Chinook salmon caught at Canyon Island were tagged and released and all were captured using fish wheels (Appendix B2).

A total of 1,199 Chinook salmon were inspected from gillnet or fish wheel captures and 31 of them were missing adipose fins (Appendices B1 and B2). Later dissection and processing indicated that 30 contained valid CWTs natal to the spring smolt tagging operations on the Taku River (Appendices B1 and B2).

In 2000, water levels were low in late April and through 2 June (<5.0 ft), ranging between 6 and 9 ft through July.

Cumulative proportions of combined large and medium-sized Chinook salmon marked at Canyon Island that survived past all marine fisheries were similar to those recaptured in samples from the inriver test fishery aggregated with those from the spawning grounds in 2000 ($P = 0.99$; Figure 5). Few small fish were tagged or examined and were excluded from all subsequent

analyses. Because a separate estimate of large fish was desired, differences in marked fractions amongst sampling locations for large and medium-sized fish were separated. Separate comparisons of length distributions for medium and large Chinook salmon indicated size-selective sampling was not significant within each size group (P = 0.82 and P = 0.98, Figures 6 and 7). The recovery samples for both sizes of fish included all spawning grounds samples and the lower river test fishery samples. Seven medium-sized fish had known length and were censored from the analyses. Exact length measurements were not taken on some recaptured fish, thus they were precluded in these analyses; differences occur between sample sizes used in the length frequency analyses and those used during abundance calculations.

The estimated inriver run of medium-sized Chinook salmon in 2000 was 8,851 (SE = 1,928). This is based on 622 fish inspected for marks ($=C_{ms}$) at 5 tributaries and in the lower river test fishery, 23 of which were recaptured fish ($=R_{ms}$) (Table 5). The inriver test fishery harvested 300 medium-sized fish, resulting in a spawning abundance ($=\hat{N}_{ms}$) of 8,551 (SE = 1,928). All medium-sized fish recovered had retained the primary tag. The inriver Aboriginal and commercial fisheries harvested 1 and 42 tagged fish, respectively, for a total of 43 ($=\hat{H}_{ms}$), and the estimated number of medium tagged fish in the estimate was 340 ($=\hat{M}_{ms}$). Note that both inriver fishery harvests were apportioned to size (length) categories based on lengths sampled from each harvest; 99.6% of the landed harvest (1,394 of 1,399 fish kept) in the test fishery was sampled for lengths (493 large fish, presumably all females, were sampled for marks and released), while 19.9% (331 fish) of the 1,663 commercially caught fish were sampled for length.

The fractions of marked fish across the spawning areas (Table 5) did not differ ($\chi^2 = 7.5$, df = 4, P = 0.11), and the spawning areas summed against the test fishery did not differ ($\chi^2 = 0.7$, df = 1, P = 0.42), indicating that the Petersen estimator based on data pooled across tributaries and the test fishery is a consistent estimator for the M-R experiment. Estimated spawning abundance of medium-sized fish has a 95% confidence interval of 6,063 to 13,550, and an estimated relative statistical bias of 4.4%.

The estimated inriver run of large-sized Chinook salmon in 2000 was 36,093 (SE = 5,403). This estimate is based on 2,636 fish inspected for marks ($=C_{ls}$) in 5 tributaries and the inriver test fishery, 47 of which were recaptured fish ($=R_{ls}$) (Table 5). The inriver test fishery harvested 1,096 large-sized fish (1,589 caught and 493 released), resulting in a spawning abundance ($=\hat{N}_{ls}$) of 34,997 (SE = 5,403). None of the 47 recaptured large fish had lost its primary tag. An estimated 6 large fish were removed by U.S. fisheries (4 in the marine gillnet and 2 in the inriver personal use fishery), and 50 in the Canadian inriver commercial fishery for a total of 56 ($=\hat{H}_{ls}$); the estimated number of large tagged fish in the estimate was 656 ($=\hat{M}_{ls}$). The fractions of marked fish across the 5 spawning areas (Table 5) did not differ ($\chi^2 = 7.6$, df = 4, P = 0.11), and the spawning areas summed did not differ from the test fishery ($\chi^2 = 2.0$, df = 1, P = 0.16), indicating that the Petersen estimator based on data pooled across tributaries and the test fishery is a consistent estimator for the M-R experiment. Similarities in the marked fractions among fish inspected in the 4 tributaries where tags were recovered (in all except the Nahlin River) and the test fishery indicate that the Petersen estimator based on data pooled is a consistent estimator for the M-R experiment ($\chi^2 = 2.8$, df = 4, P = 0.59). Estimated spawning abundance of large fish has a 95% confidence interval of 27,850 to 48,305, and an estimated relative bias of 1.9%.

Table 5.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2000 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					
A. Total initially tagged		57	383	712	1,152
1. Captured using fish wheels		57	178	286	521
2. Captured using set gillnets			205	426	631
B. Total removals by:			43	56	99
1. Total U.S. fisheries				6	6
Sport fisheries					
Commercial gillnet [a]				4	4
Commercial troll					
Personal use				2	2
3. Total Canadian fisheries			43	50	93
Test fishery					
Aboriginal fishery			1		1
Commercial fishery			42	50	92
Sport fishery					
4. Recaptured as mortality at Canyon Island FW/GN					
C. Final total tagged in event 1 ($\hat{M}_i$)		57	**340**	**656**	1,053
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected	67	**322**	**1,047**	1,436
(All spawning grounds)	Marked	5	**10**	**14**	29
	Marked/Inspected	0.075	0.031	0.017	0.027
1. Nakina River	Inspected	51	172	435	658
	Marked	5	6	7	18
	Marked/Inspected	0.098	0.035	0.016	0.027
2. Lower Tatsamenie (Tatsatua River)	Inspected	15	76	371	462
	Marked		1	3	4
	Marked/Inspected		0.013	0.008	0.009
3. Upper Tatsamenie (Tatsatua River)	Inspected	1	35	28	64
	Marked		2	1	3
	Marked/Inspected		0.057	0.036	0.047
4. Nahlin River	Inspected		5	28	33
	Marked		1		1
	Marked/Inspected		0.200		0.030
5. Kowatua Creek	Inspected		34	185	219
	Marked			7	7
	Marked/Inspected			0.038	0.032
B. Lower river Canadian fisheries	Inspected	3	622	2,930	3,555
(Test and commercial)	Marked		55	83	138
	Marked/Inspected[b]		0.088	0.028	0.039

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Table 5.–Page 2 of 2.

		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
1. Test fishery	Inspected [c]	3	**300**	**1,589**	1,892
	Marked		**13**	**33**	46
	Marked/Inspected[b]		0.043	0.021	0.024
2. Commercial fishery	Inspected		322	1,341	1,663
	Marked		42	50	92
	Marked/Inspected[b]		0.130	0.373	0.055

[a] Three recoveries in the U.S. gillnet fishery District 111 (Taku Inlet/Stephens Passage) were select and one was recovered from random sampling 25% of the total harvest.

[b] In the inriver test and Canadian commercial fisheries, length sampling from both fisheries was used to apportion the total harvest into size groups.

[c] Of the 1,589 large fish inspected for marks, 493 (presumably all females) were released.

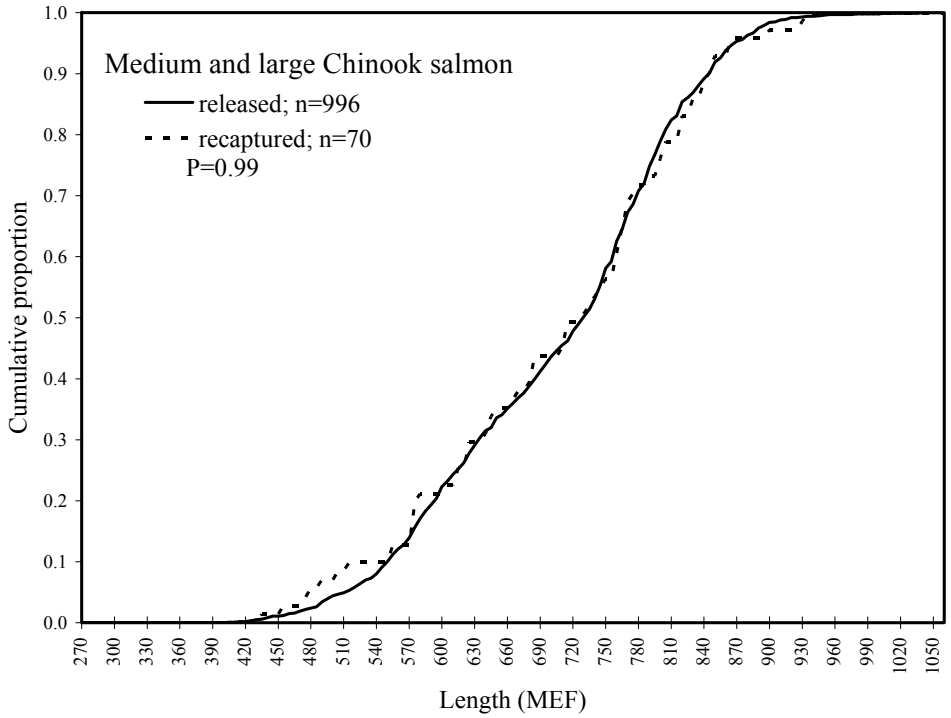

Figure 5.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries and the inriver test fishery in 2000.

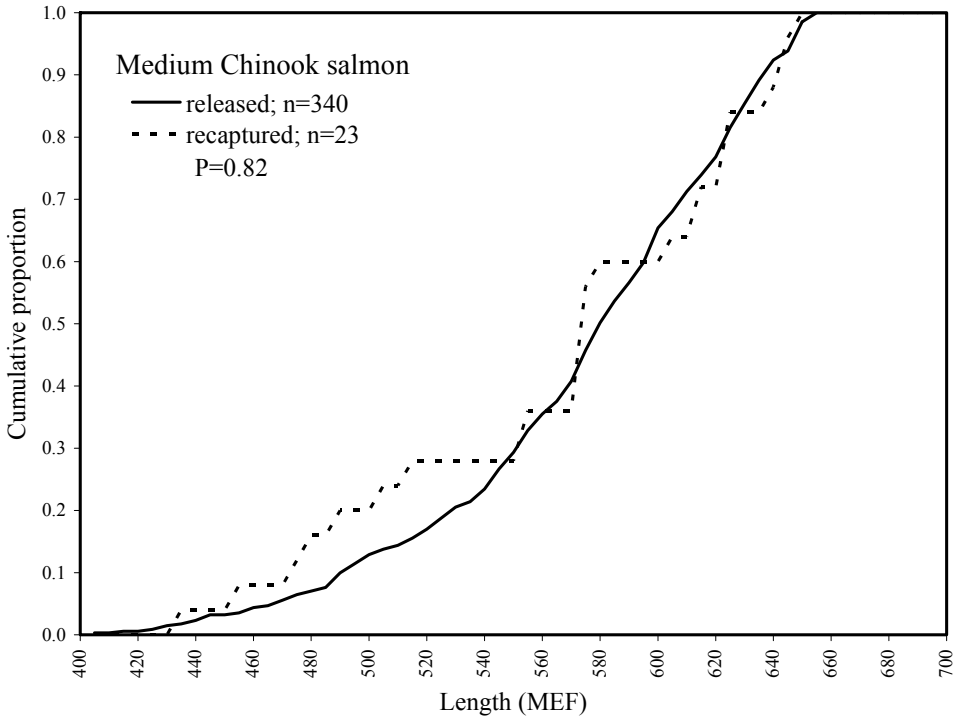

Figure 6.–Cumulative proportions of medium Chinook salmon marked at Canyon Island (minus 42 inriver commercial and 1 Aboriginal removal) versus those recaptured in tributaries and the inriver test fishery in 2000.

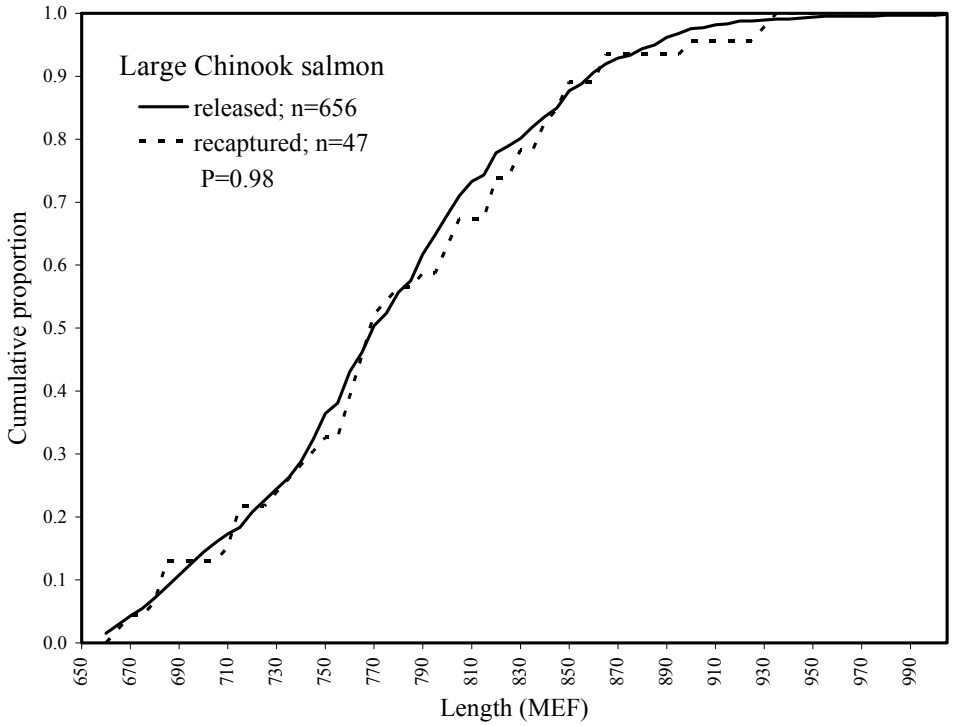

Figure 7.–Cumulative proportions of large Chinook salmon marked at Canyon Island (minus 6 marine and 50 inriver commercial fishery removals) versus those recaptured in tributaries and the inriver test fishery in 2000.

The estimated abundance of medium and large Chinook salmon ($\hat{N} = \hat{N}_{ms} + \hat{N}_{ls}$) on the spawning grounds in 2000 was 43,548 (SE = 5,737), with a 95% confidence interval of 35,348 to 56,861.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2000

Age-1.3 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 2000, comprising 56.8% (SE = 2.9%) of the estimated escapement (Table 6). Age-1.2 fish accounted for 21.7% (SE = 3.7%) and age-1.4 fish 20.6% (SE = 1.7%) of the estimated escapement (Appendix B3).

The sex composition of the estimated escapement was 55.4% (SE = 2.7%) male (Table 6). Males accounted for 97.4% of medium fish, 88.9% of which were age 1.2. More than half (54.9%) of large fish were females, and age 1.3 accounted for 68.4% of large fish.

Of the large fish sampled at Canyon Island, 67.4% were age 1.3 and 26.2% were age 1.4. Amongst medium fish sampled, 92.2% were age 1.2. Within size groups, the age compositions from samples taken at Canyon Island are similar to those from the combined tributary samples.

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

TAGGING, RECOVERY AND ABUNDANCE IN 2001

Medium and large-sized Chinook salmon abundances in 2001 were estimated using M-R data consisting of event 1 releases at Canyon Island and event 2 samples gathered in tributaries. For both medium and large Chinook salmon the marked fractions were not significantly different between samples gathered on the spawning grounds and those from the test and inriver commercial fishery combined; however, the fractions were significantly different between the test and inriver commercial fishery samples. In addition, sample sizes gathered on the spawning grounds were more than adequate to produce valid abundance estimates for both size groups, and thus, the lower river fishery samples were not used in abundance calculations.

A total of 1,249 Chinook salmon of known size were caught at Canyon Island, of which 1,203 were tagged and released (Table 8). Of the total caught, 49 were small-sized, 249 were medium-sized, and 944 were large-sized Chinook salmon. Gillnets caught 874 fish, and fish wheels caught 375 fish; all of these fish were caught between 28 April and 17 July.

Of the 944 large-sized Chinook salmon caught at Canyon Island, 908 were tagged and released (Table 8). Of these, 680 were captured in gillnets (Appendix C1) and 228 were caught in fish wheels (Appendix C2). Of the 256 medium-sized Chinook salmon caught at Canyon Island, 249 were tagged and released (Table 8). Of these, 160 were captured in gillnets (Appendix C1) and 89 were caught in fish wheels (Appendix C2). Forty-six of the small-sized (≤400 mm MEF) Chinook caught at Canyon Island were tagged and released and all but 2 were captured using fish wheels (Appendices C1 and C2).

Table 6.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2000.

		Brood year and age class									
		1997	1996	1996	1995	1995	1994	1994	1993	1993	
		1.1	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	4		237	1	21					263
	%	1.5%		87.8%	0.4%	7.8%					97.4%
	SE of %	0.7%		2.0%	0.4%	1.6%					1.0%
	Escapement	127		7,506	32	665					8,329
	SE of esc.	68		1,701	32	202					1,880
Females	n			3		4					7
	%			1.1%		1.5%					2.6%
	SE of %			0.6%		0.7%					1.0%
	Escapement			95		127					222
	SE of esc.			57		68					95
Sexes Combined	n	4		240	1	25					270
	%	1.5%		88.9%	0.4%	9.3%					100.0%
	SE of %	0.7%		1.9%	0.4%	1.8%					
	Escapement	127		7,601	32	792					8,551
	SE of esc.	68		1,721	32	231					1,928
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n			40		248	2	77			367
	%			4.9%		30.5%	0.2%	9.5%			45.1%
	SE of %			0.8%		1.6%	0.2%	1.0%			1.7%
	Escapement			1,722		10,676	86	3,315			15,798
	SE of esc.			374		1,740	62	623			2,513
Females	n			3	1	308	1	131	1	1	446
	%			0.4%	0.1%	37.9%	0.1%	16.1%	0.1%	0.1%	54.9%
	SE of %			0.2%	0.1%	1.7%	0.1%	1.3%	0.1%	0.1%	1.7%
	Escapement			129	43	13,258	43	5,639	43	43	19,199
	SE of esc.			76	43	2,130	43	978	43	43	3,025
Sexes Combined	n			43	1	556	3	208	1	1	813
	%			5.3%	0.1%	68.4%	0.4%	25.6%	0.1%	0.1%	100.0%
	SE of %			0.8%	0.1%	1.6%	0.2%	1.5%	0.1%	0.1%	
	Escapement			1,851	43	23,934	129	8,954	43	43	34,997
	SE of esc.			394	43	3,738	76	1,480	43	43	5,403
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	4		277	1	269	2	77			630
	%	0.3%		21.2%	0.1%	26.0%	0.2%	7.6%			55.4%
	SE of %	0.2%		3.6%	0.1%	1.7%	0.1%	0.9%			2.7%
	Escapement	127		9,228	32	11,341	86	3,315			24,127
	SE of esc.	68		1,741	32	1,752	62	623			3,138
Females	n			6	1	312	1	131	1	1	453
	%			0.5%	0.1%	30.7%	0.1%	12.9%	0.1%	0.1%	44.6%
	SE of %			0.2%	0.1%	2.1%	0.1%	1.2%	0.1%	0.1%	2.7%
	Escapement			224	43	13,385	43	5,639	43	43	19,421
	SE of esc.			95	43	2,131	43	978	43	43	3,026
Sexes Combined	n	4		283	2	581	3	208	1	1	1,083
	%	0.3%		21.7%	0.2%	56.8%	0.3%	20.6%	0.1%	0.1%	100.0%
	SE of %	0.2%		3.7%	0.1%	2.9%	0.2%	1.7%	0.1%	0.1%	
	Escapement	127		9,452	75	24,726	129	8,954	43	43	43,548
	SE of esc.	68		1,766	53	3,745	76	1,480	43	43	5,737

Table 7.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2000.

		Brood Year and age class									
		1997	1996	1996	1995	1995	1994	1994	1993	1993	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	56		278	1	269	2	77			683
	Average	349		584	615	754	833	876			
	SD	85		72		66	4	56			
	SE	11		4		4	3	6			
Females	n			6	1	312	1	131	1	1	453
	Average			657	680	773	800	826	875	895	
	SD			70		46		42			
	SE			29		3		4			
Sexes Combined	n	56		284	2	581	3	208	1	1	1,136
	Average	349		586	648	764	822	845	875	895	
	SD	85		72	46	57	19	54			
	SE	11		4	33	2	11	4			

Table 8.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2001 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					
A. Total initially tagged		46	249	908	1,203
1. Captured using fish wheels		44	89	228	361
2. Captured using set gillnets		2	160	680	842
B. Total removals by:		1	33	79	113
1. Total U.S. fisheries			3	8	11
Sport fisheries				1	1
Commercial gillnet [a]			3	7	10
Commercial troll					
Personal use					
3. Total Canadian fisheries		1	30	71	102
Test fishery			5	23	28
Aboriginal fishery					
Commercial fishery		1	25	48	74
Sport fishery					
4. Recaptured as mortality at Canyon Island FW/GN					
C. Final total tagged in event 1 ($\hat{M}_i$)		45	**216**	**829**	1,090
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected	295	**526**	**2,859**	3,680
(All spawning grounds)	Marked	2	**22**	**50**	74
	Marked/Inspected	0.007	0.041	0.018	0.020

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Table 8.–Page 2 of 2.

		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
1. Nakina River	Inspected	248	369	1,298	1,915
	Marked	2	16	24	41
	Marked/Inspected	0.008	0.046	0.017	0.016
2. Lower Tatsamenie (Tatsatua River)	Inspected	39	64	571	674
	Marked		1	10	11
	Marked/Inspected		0.016	0.018	0.016
3. Upper Tatsamenie (Tatsatua River)	Inspected	3	44	126	173
	Marked		3		3
	Marked/Inspected		0.068		0.017
4. Nahlin River	Inspected		20	396	416
	Marked		1	11	12
	Marked/Inspected		0.050	0.028	0.028
5. Kowatua Creek	Inspected	5	29	468	497
	Marked			7	7
	Marked/Inspected			0.015	0.014
B. Lower river Canadian fisheries	Inspected		481	3,370	3,851
(Test and commercial)	Marked	1	30	78	109
	Marked/Inspected[b]		0.062	0.023	0.028
1. Test fishery	Inspected [c]		229	2,046	2,275
	Marked		5	30	35
	Marked/Inspected[b]		0.022	0.015	0.015
2. Commercial fishery	Inspected		252	1,324	1,576
	Marked	1	25	48	74
	Marked/Inspected[b]		0.009	0.036	0.047

[a] All but one of the recoveries in the U.S. gillnet fishery District 111 (Taku Inlet/Stephens Passage) were select recoveries and we considered all recoveries returned.

[b] In the inriver test and Canadian commercial fisheries, length sampling from both fisheries was used to apportion the total harvest into size groups. Other small fish than the one tagged fish reported may have been caught.

[c] Of the 2,046 large fish inspected for marks, 871 (presumably all females) were released.

A total of 1,250 Chinook salmon were inspected from gillnet or fish wheel captures, and 22 of them were missing adipose fins (Appendices C1 and C2). Later dissection and processing indicated that 18 contained valid CWTs natal to the spring smolt tagging operations on the Taku River (Appendices C1 and C2).

In 2001, water levels were below average through May and about average through July. As a result, set gillnets were used to capture Chinook salmon through May 26.

Cumulative proportions of combined large and medium-sized Chinook salmon marked at Canyon Island that survived past all marine fisheries were similar compared to those recaptured in samples from the spawning grounds in 2001($P = 0.11$; Figure 8). Few small fish were tagged or examined and were excluded from all subsequent analyses. Because a separate estimate of large fish was desired, differences in marked fractions amongst sampling locations for medium fish, large and medium-sized fish were separated. Separate comparisons of length distributions for medium and large Chinook salmon indicated size-selective sampling were not significant within each size group ($P = 0.67$ and $P = 0.70$, Figures 9 and 10). The recovery samples for both sizes of fish included all spawning grounds samples. All removals had known length and were censored from the analyses.

The estimated spawning abundance of medium-sized Chinook salmon ($=\hat{N}_{ms}$) in 2001 was 4,971 (SE = 1,125). This is based on 526 fish inspected for marks ($=C_{ms}$) at 5 tributaries, 22 of which were recaptured fish ($=R_{ms}$; Table 8). All but 2 (9%) medium-sized fish recovered had retained the primary tag. The U.S. gillnet fishery censored 3 tagged fish and the inriver test and commercial fisheries censored 30 tagged fish, for a total of 33 ($=\hat{H}_{ms}$), and the estimated number of medium tagged fish in the estimate was 216 ($=\hat{M}_{ms}$). The fractions of marked fish across the spawning areas (Table 8) did not differ significantly ($\chi^2 = 3.27$ df = 4, P = 0.51), indicating that the Petersen estimator based on data pooled across tributaries is a consistent estimator for the M-R experiment. Estimated spawning abundance of medium-sized fish has a 95% confidence interval of 3,566 to 8,145, and an estimated relative statistical bias of 4.3%.

The estimated spawning abundance of large Chinook salmon ($=\hat{N}_{ls}$) in 2001 was 46,544 (SE = 6,766). This estimate is based on 2,859 fish inspected for marks ($=C_{ls}$) in 5 tributaries, 50 of which were recaptured fish ($=R_{ls}$) (Table 8). None of the 50 recaptured large fish had lost its primary tag. An estimated 1 large fish was removed by the U.S. marine recreational fishery, 7 by the U.S. marine gillnet fishery, and 71 in the test and commercial fisheries inriver, totaling 79 ($=\hat{H}_{ls}$), and the estimated number of large tagged fish in the estimate was 829 ($=\hat{M}_{ls}$). Similarities in the marked fractions among fish inspected in the 5 spawning areas ($\chi^2 = 4.67$, df = 4, P = 0.32) indicate that the Petersen estimator based on data pooled is a consistent estimator for the M-R experiment. Estimated spawning abundance of large fish has a 95% confidence interval of 36,590 to 62,469, and an estimated relative bias of 1.2%.

The estimated abundance of medium and large Chinook salmon ($\hat{N} = \hat{N}_{ms} + \hat{N}_{ls}$) on the spawning grounds in 2001 was 51,515 (SE = 6,859), with a 95% confidence interval of 41,323 to 67,532.

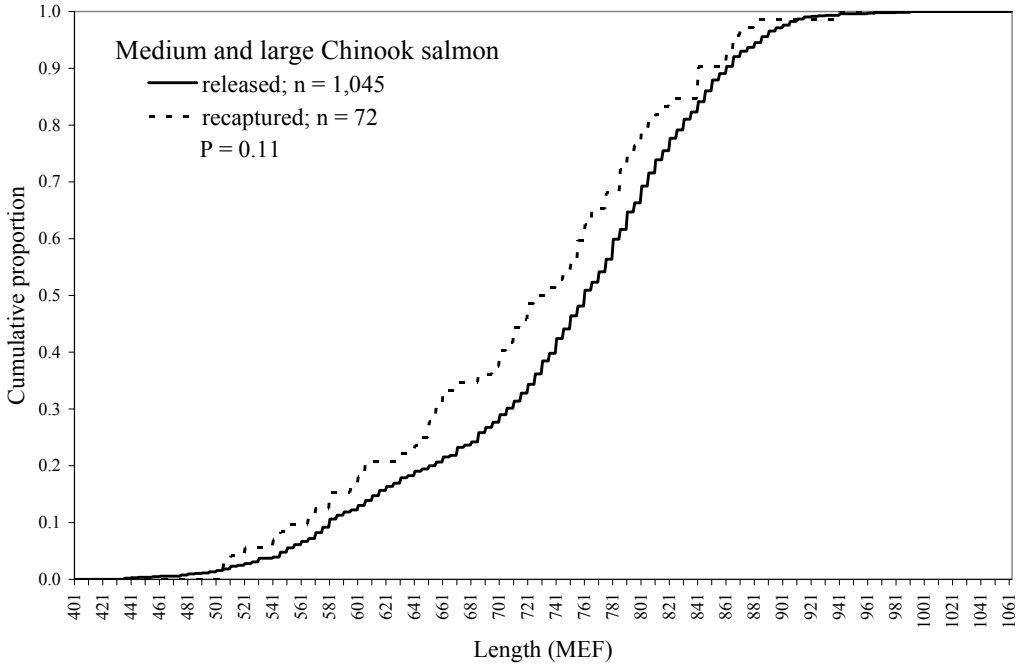

Figure 8.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries in 2001.

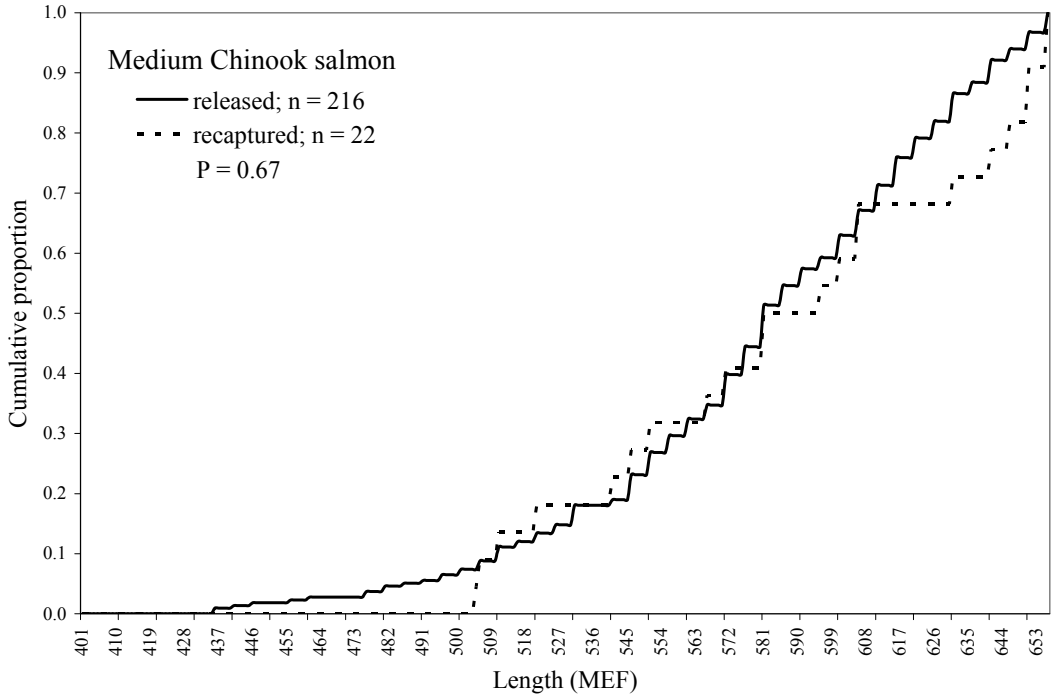

Figure 9.–Cumulative proportions of medium Chinook salmon marked at Canyon Island (minus 3 marine and 30 inriver fishery removals) versus those recaptured in tributaries in 2001.

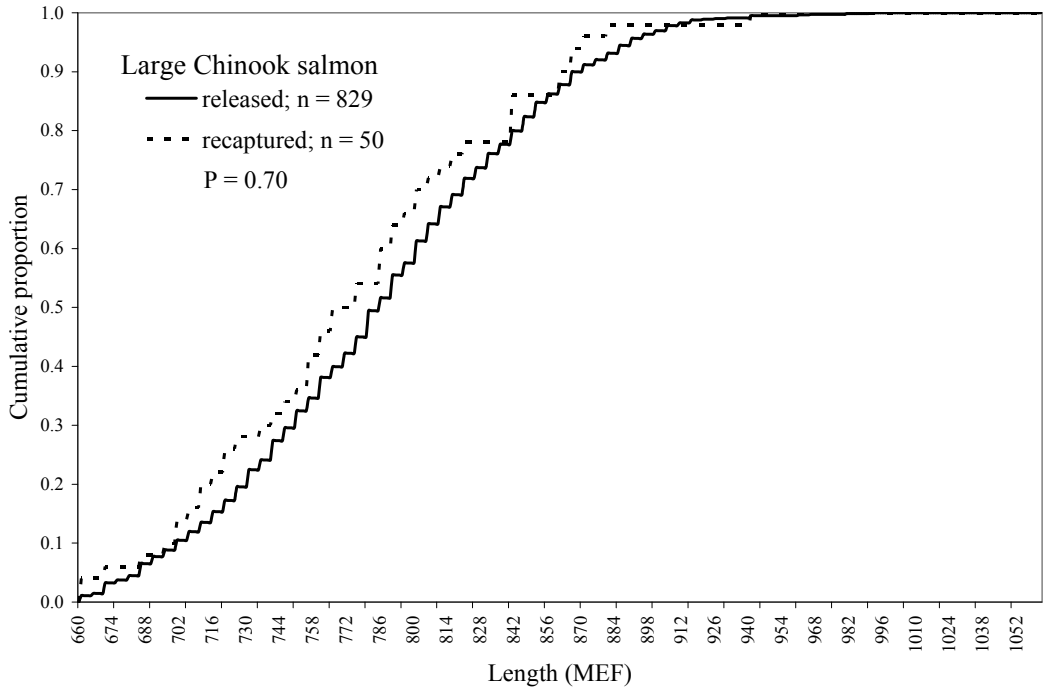

Figure 10.–Cumulative proportions of large Chinook salmon marked at Canyon Island (minus 8 marine and 71 inriver fishery removals) versus those recaptured in tributaries in 2001.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2001

Age-1.3 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 2001, comprising 70.8% (SE = 1.6%) of the estimated escapement (Table 9). Age-1.4 fish accounted for 18.4% (SE = 1.0%) and age-1.2 fish 9.9% (SE = 1.8%) of the estimated escapement (Appendix C3).

The sex composition of the estimated escapement was 54.7% (SE = 1.5%) male (Table 9). Males accounted for 95.8% of medium fish, 76.5% of which were age 1.2. About one-half (50.3%) of large fish were males, and age 1.3 accounted for 76.3% of large fish.

Of the large fish sampled at Canyon Island, 75.1% were age 1.3 and 22.2% were age 1.4. Amongst medium fish sampled, 88.3% were age 1.2. Within size groups, the age compositions from samples taken at Canyon Island are similar to those from the combined tributary samples.

Length compositions were similar between samples gathered on the spawning grounds and at Canyon Island (Table 10).

TAGGING, RECOVERY AND ABUNDANCE IN 2002

Small, medium and large-sized Chinook salmon abundances in 2002 were estimated using M-R data consisting of event 1 releases at Canyon Island and event 2 samples gathered in tributaries. For both medium and large Chinook salmon the marked fractions were not significantly different between samples gathered on the spawning grounds and those from the test and inriver commercial fisheries combined; however, the fractions were significantly different between the test and inriver commercial fishery samples. In addition, sample sizes gathered on the spawning grounds were more than adequate to produce valid abundance estimates for both size groups, and thus, the lower river fishery samples were not used in abundance calculations.

A total of 1,547 Chinook salmon of known size were caught at Canyon Island, of which 1,498 were tagged and released (Table 11). Of the total caught, 227 were small-sized, 397 were medium-sized, and 923 were large-sized Chinook salmon, all of which were caught between 26 April and 20 July.

For the large-sized Chinook salmon caught at Canyon Island, 901 were tagged and released (Table 11). Of these, 463 were captured in gillnets (Appendix D1) and 438 were caught in fish wheels (Appendix D2). For the 397 medium-sized Chinook salmon caught at Canyon Island, 386 were tagged and released (Table 11). Of these, 111 were captured in gillnets (Appendix D1) and 275 were caught in fish wheels (Appendix D2). Two hundred and eleven of the small-sized Chinook salmon caught at Canyon Island were tagged and released, and all but one were captured using fish wheels (Appendices D1 and D2).

A total of 576 Chinook salmon were captured using gillnets operated at Canyon Island and sampled for adipose finclips. Six of these fish were missing their adipose fin, 5 of which possessed valid coded wire placed in smolt in prior years (Appendix D1). A total of 964 Chinook salmon were captured using fish wheels operated near Canyon Island and sampled for adipose finclips. Twenty were missing their adipose fin, 17 of which possessed valid coded wire placed in smolt in prior years (Appendix D2).

In 2002, water levels were below the long-term average for the first half of May, but then quickly rose and remained at or above average throughout June. The only major fluctuation was observed during the initial rise when the river rose more than 10 ft in just 2 weeks.

Table 9.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2001.

		Brood year and age class									
		1998	1997	1997	1996	1996	1995	1995	1994	1994	
		1.1	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	8		197	2	44		2			253
	%	3.0%		74.6%	0.8%	16.7%		0.8%			95.8%
	SE of %	1.1%		2.7%	0.5%	2.3%		0.5%			1.2%
	Escapement	151		3,709	38	829		38			4,764
	SE of esc.	61		850	27	218		27			1,080
Females	n			5		6		0			11
	%			1.9%		2.3%		0.0%			4.2%
	SE of %			0.8%		0.9%		0.0%			1.2%
	Escapement			94		113		0			207
	SE of esc.			46		51		0			76
Sexes Combined	n	8		202	2	50		2			264
	%	3.0%		76.5%	0.8%	18.9%		0.8%			100.0%
	SE of %	1.1%		2.6%	0.5%	2.4%		0.5%			
	Escapement	151		3,804	38	941		38			4,971
	SE of esc.										1,125
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n			40		791	2	106		1	940
	%			2.1%		42.4%	0.1%	5.7%		0.1%	50.3%
	SE of %			0.3%		1.1%	0.1%	0.5%		0.1%	1.2%
	Escapement			997		19,719	50	2,643		25	23,434
	SE of esc.			212		2,915	36	457		25	3,448
Females	n			11		634	9	273		0	927
	%			0.6%		34.0%	0.5%	14.6%		0.0%	49.7%
	SE of %			0.2%		1.1%	0.2%	0.8%		0.0%	1.2%
	Escapement			274		15,806	224	6,806		0	23,110
	SE of esc.			91		2,353	81	1,059		0	3,402
Sexes Combined	n			51		1,425	11	379		1	1,867
	%			2.7%		76.3%	0.6%	20.3%		0.1%	100.0%
	SE of %			0.4%		1.0%	0.2%	0.9%		0.1%	
	Escapement			1,271		35,525	274	9,448		25	46,544
	SE of esc.			254		5,184	91	1,439		25	6,766
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	8		237	2	835	2	108		1	1,193
	%	0.3%		9.1%	0.1%	39.9%	0.1%	5.2%		0.0%	54.7%
	SE of %	0.1%		1.7%	0.1%	1.2%	0.1%	0.5%		0.0%	1.5%
	Escapement	151		4,707	38	20,548	50	2,680		25	28,198
	SE of esc.	61		876	27	2,923	36	457		25	3,613
Females	n			16		640	9	273			938
	%			0.7%		30.9%	0.4%	13.2%			45.3%
	SE of %			0.2%		1.2%	0.1%	0.8%			1.5%
	Escapement			368		15,918	224	6,806			23,317
	SE of esc.			102		2,353	81	1,059			3,403
Sexes Combined	n	8		253	2	1,475	11	381		1	2,131
	%	0.3%		9.9%	0.1%	70.8%	0.5%	18.4%		0.0%	100.0%
	SE of %	0.1%		1.8%	0.1%	1.6%	0.2%	1.0%		0.0%	
	Escapement	151		5,075	38	36,466	274	9,486		25	51,515
	SE of esc.	61		906	27	5,190	91	1,439		25	6,859

Table 10.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2001.

		Brood Year and age class									
		1998	1997	1997	1996	1996	1995	1995	1994	1994	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	147		237	2	835	2	108		1	1,332
	Average	344		596	615	766	833	871		950	
	SD	34		77	22	65	4	77			
	SE	3		5	16	2	3	7			
Females	n			16		640	9	273			938
	Average			708		774	807	844			
	SD			88		42	40	43			
	SE			22		2	13	3			
Sexes Combined	n	147		253	2	1,455	11	381		1	2,250
	Average	344		603	615	769	794	851		950	
	SD	34		82	22	56	50	56			
	SE	3		5	16	1	15	3			

Cumulative proportions of combined large and medium-sized Chinook salmon marked at Canyon Island that survived past all lower river fisheries were different than those recaptured at tributaries in 2002 (P = 0.02; Figure 11). This is a result of the large number of samples from the carcass weir on the Nakina River that tends to capture younger and smaller fish versus those captured at Canyon Island. Separate comparisons of length distributions for medium and large Chinook salmon indicated size-selective sampling was not significant (P = 0.07 and P = 0.27, Figures 12 and 13). All removals had known length and were censored from the analyses. Comparison of small-sized fish marked at Canyon Island that survived past all lower river fisheries were similar to those recaptured in the tributaries in 2002 (P = 0.17). However, the sample size was small for recaptured fish, which decreased the power of this test.

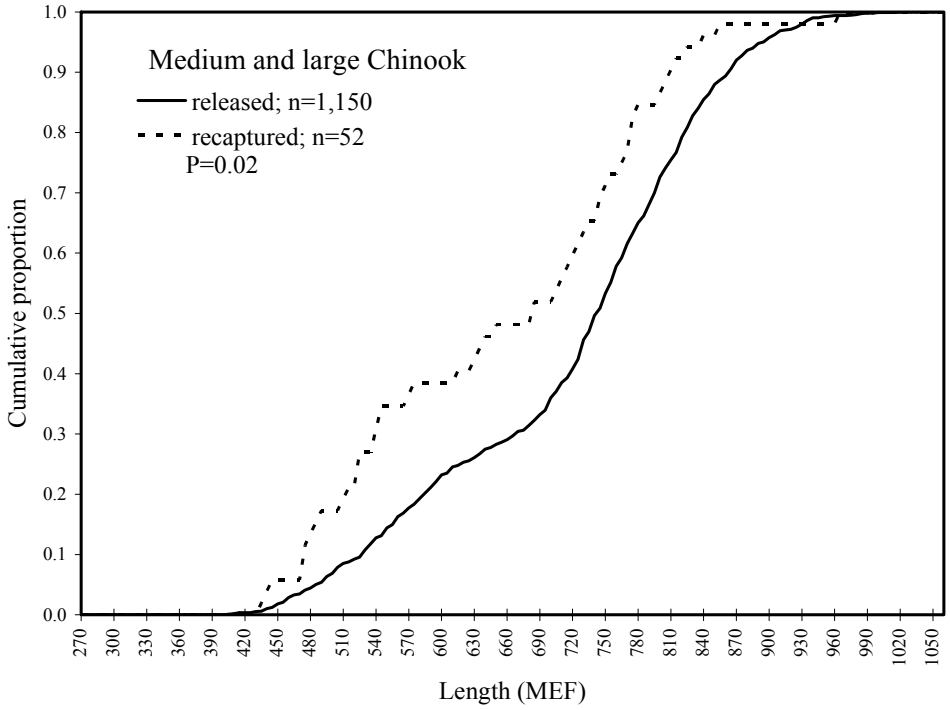

Figure 11.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries in 2002.

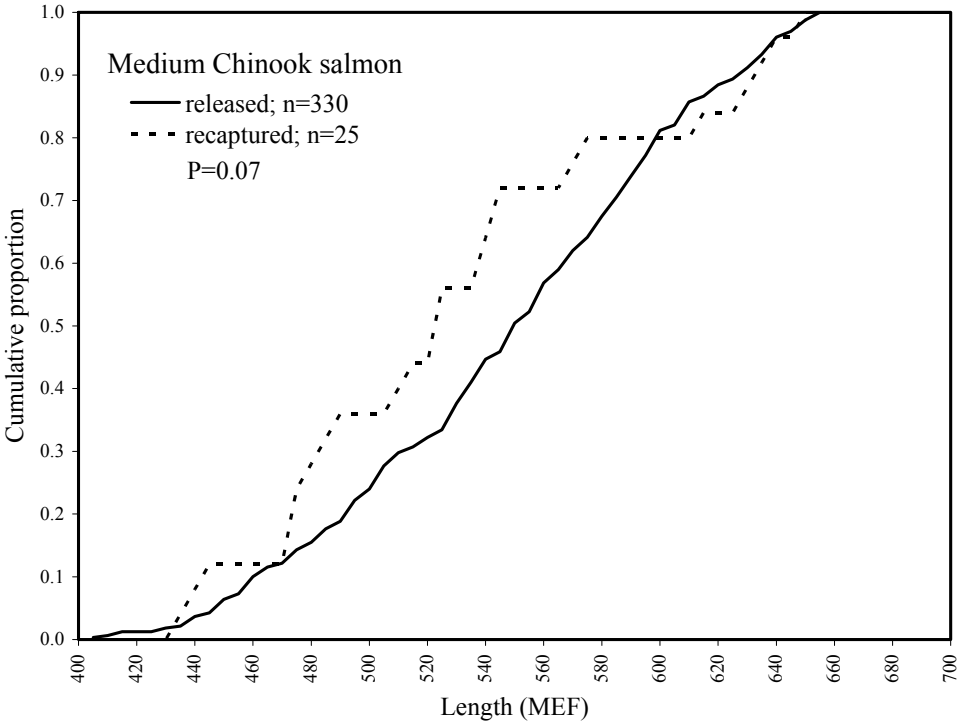

Figure 12.–Cumulative proportions of medium Chinook salmon marked at Canyon Island (minus 2 marine and 54 inriver fishery removals) versus those recaptured in tributaries in 2002.

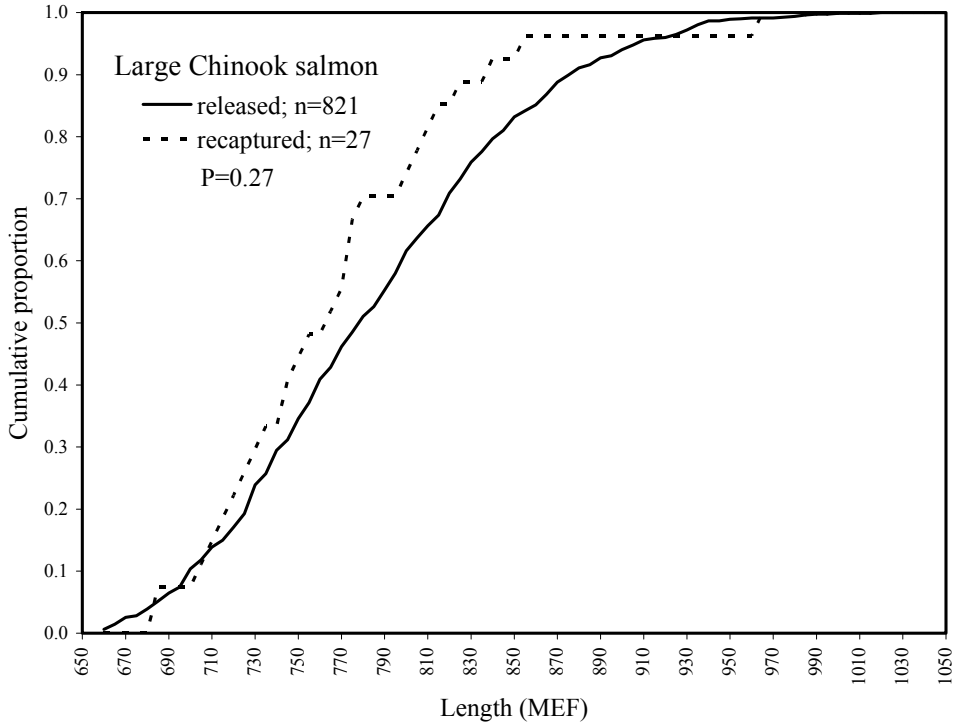

Figure 13.–Cumulative proportions of large Chinook salmon marked at Canyon Island (minus 8 marine and 71 inriver fishery removals) versus those recaptured in tributaries in 2002.

The estimated spawning abundance of small-sized Chinook salmon ($=\hat{N}_{ss}$) in 2002 was 6,058 (SE = 2,436). This is based on 296 fish inspected for marks ($=C_{ss}$) at 5 tributaries, 9 of which were recaptured fish ($=R_{ss}$) (Table 11). One (8.3%) of the small-sized fish recaptured had lost its primary tag. Fisheries removed an estimated 8 (3.8%) tagged fish ($=\hat{H}_{ss}$), reducing the estimated number of small-sized tagged fish that survived to spawn to 203 ($=\hat{M}_{ss}$). The fractions of marked fish across the different tributaries (Table 12) did not differ significantly (Nakina River versus all others pooled; $\chi^2 = 0.7$, df = 1, P = 0.40), indicating that the Petersen estimator based on data pooled across tributaries is a consistent estimator for the M-R experiment. Estimated abundance of small-sized fish has a 95% confidence interval of 3,815 to 12,354, and an estimated relative bias of 10.6%.

The estimated spawning abundance of medium-sized Chinook salmon ($=\hat{N}_{ms}$) in 2002 was 5,944 (SE = 1,242). This is based on 466 fish inspected for marks ($=C_{ms}$) at 6 tributaries, 25 of which were recaptured fish ($=R_{ms}$) (Table 11). None of the medium-sized fish inspected had lost its primary tag. Fisheries removed an estimated 56 (14.5%) tagged fish ($=\hat{H}_{ms}$), and the estimated number of medium tagged fish in the estimate was 330 ($=\hat{M}_{ms}$). The fractions of marked fish across the different tributaries (Table 11) did not differ significantly ($\chi^2 = 1.8$, df = 3, P = 0.62), indicating that the Petersen estimator based on data pooled across tributaries is a consistent estimator for the M-R experiment. Estimated abundance of medium-sized fish has a 95% confidence interval of 4,515 to 9,177, and an estimated relative bias of 7.5%.

Estimated spawning abundance of large Chinook salmon ($=\hat{N}_{ls}$) in 2002 was 55,044 (SE = 11,087). This estimate is based on 1,874 fish inspected for marks ($=C_{ls}$) in 6 tributaries, 27 of which were recaptured fish ($=R_{ls}$; Table 11). One (3.7%) of the 27 recaptured large fish had lost its primary tag (sampled in the Nahlin River), but was detected as a tagged fish from its secondary marks. Fisheries removed an estimated 79 (8.8%) tagged fish ($=\hat{H}_{ls}$), and the estimated number of large tagged fish in the estimate was 821 ($=\hat{M}_{ls}$). Similarities in the marked fractions among fish inspected in the different tributaries ($\chi^2 = 5.1$, df = 5, P = 0.40) indicate that the Petersen estimator based on data pooled across tributaries is a consistent estimator for the M-R experiment. Estimated abundance of large fish has a 95% confidence interval of 40,386 to 82,232, and an estimated relative bias of 3.4%.

The estimated abundance of medium and large-sized Chinook salmon ($\hat{N} = \hat{N}_{ms} + \hat{N}_{ls}$) on the spawning grounds in 2002 was 60,988 (SE = 11,156), with a 95% confidence interval of 39,122 to 82,855. Including small-sized Chinook salmon into this estimate results in an estimated abundance of all Chinook salmon of 67,046 (SE = 11,419).

ESTIMATES OF AGE AND SEX COMPOSITION IN 2002

Age-1.3 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 2002. They constituted 53.6% (SE = 1.7%) of the estimated escapement (Table 12). Age-1.4 fish constituted 34.3% (SE = 1.4%) of the estimated escapement and age-1.2 fish constituted 10.7% (SE = 2.2%)(Appendix D3).

The sex composition of the estimated escapement was 48.0% (SE = 1.8%) male (Table 12). All small fish were male, and 97.4% were age 1.1. Males accounted for 97.4% of medium fish, 85.6% of which were age 1.2. More than half (57.3%) of large fish were female, and age 1.3 accounted for 58.5% of large fish.

Table 11.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2002 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					
A. Total initially tagged		211	386	901	1,498
1. Captured using fish wheels		210	275	438	923
2. Captured using set gillnets		1	111	463	575
B. Total removals by:		8	56	79	143
1. Total U.S. fisheries			2	8	10
Sport fisheries [a]				1	1
Commercial gillnet [b]			2	7	9
Commercial troll					
Personal use					
3. Total Canadian fisheries		8	54	71	133
Test fishery		1	16	22	39
Aboriginal fishery					
Commercial fishery		7	35	47	89
Sport fishery			3	2	5
4. Recaptured as mortality [c] at Canyon Island FW/GN				1	1
C. Final total tagged in event 1 ($\hat{M}_i$)		**203**	**330**	**821**	1,354
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected	**296**	**466**	**1,874**	1,958
(All spawning grounds)	Marked	**9**	**25**	**27**	54
	Marked/Inspected	0.030	0.054	0.014	0.028
1. Nakina River	Inspected	275	382	826	1,483
	Marked	9	22	12	43
	Marked/Inspected	0.033	0.058	0.015	0.029
2. Lower Tatsamenie (Tatsatua River)	Inspected	16	31	200	247
	Marked		2		2
	Marked/Inspected		0.065		0.008
3. Upper Tatsamenie (Tatsatua River)	Inspected	1	12	68	81
	Marked			1	1
	Marked/Inspected			0.015	0.012
4. Dudidontu River	Inspected		10	178	188
	Marked			2	2
	Marked/Inspected			0.011	0.011
5. Nahlin River	Inspected	2	28	445	475
	Marked		1	10	11
	Marked/Inspected		0.036	0.022	0.023
6. Kowatua Creek	Inspected	2	3	157	162
	Marked			2	2
	Marked/Inspected			0.013	0.012

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Table 11.–Page 2 of 2.

		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
B. Lower river Canadian fisheries	Inspected		760	3,938	4,661
(Test, aboriginal and commercial)	Marked	8	51	90	149
	Marked/Inspected[d]		0.067	0.02	0.03
1. Test fishery	Inspected		352	2,457	2,809
	Marked	1	16	43	60
	Marked/Inspected[d]		0.045	0.018	0.021
2. Aboriginal fishery	Inspected			37	37
	Marked				
	Marked/Inspected				
3. Commercial fishery	Inspected		408	1,444	1,852
	Marked	7	35	47	89
	Marked/Inspected[d]		0.086	0.033	0.048

[a] One recovery was from the U.S. sport fishery in Taku Inlet.

[b] All recoveries in the U.S. gillnet fishery District 111 (Taku Inlet/Stephens Passage) were select and no expansion was used.

[c] Includes 1 large fish recaptured at Canyon Island in poor condition and deemed unlikely to reach the spawning grounds.

[d] In the inriver test and Canadian commercial fisheries, small-sized Chinook salmon are often misclassified as medium-sized fish. In 2002, no small-sized fish were reported as being sampled from these fisheries; however, size information from recovered tags indicated that 8 small-sized fish were at least sampled, thus the marked/inspected ratio is erroneous.

Table 12.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2002.

		Brood year and age class									
		1999	1998	1998	1997	1997	1996	1996	1995	1995	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
PANEL B: AGE AND SEX COMPOSITION OF MEDIUM CHINOOK SALMON											
Males	n	10		265	3	22		5			305
	%	3.2%		84.7%	1.0%	7.0%		1.6%			97.4%
	SE of %	1.0%		2.0%	0.6%	1.4%		0.7%			0.9%
	Escapement	190		5,033	57	418		95			5,792
	SE of esc.	70		1,058	34	121		46			1,226
Females	n			3		3		2			8
	%			1.0%		1.0%		0.6%			2.6%
	SE of %			0.6%		0.6%		0.5%			0.9%
	Escapement			57		57		38			152
	SE of esc.			34		34		27			199
Sexes Combined	n	10		268	3	25		7			313
	%	3.2%		85.6%	1.0%	8.0%		2.2%			100.0%
	SE of %	1.0%		2.0%	0.6%	1.5%		0.8%			
	Escapement	190		5,090	57	475		133			5,944
	SE of esc.	70		1,069	34	133		56			1,242
PANEL A: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n			27		450	4	193	1		675
	%			1.7%		28.4%	0.3%	12.2%	0.1%		42.7%
	SE of %			0.3%		1.1%	0.1%	0.8%	0.1%		1.2%
	Escapement			939		15,657	139	6,715	35		23,486
	SE of esc.			258		3,212	74	1,424	35		7,242

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Table 12.–Page 2 of 2.

		Brood year and age class									
		1999	1998	1998	1997	1997	1996	1996	1995	1995	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Females	n			15	1	476	7	405	1	2	907
	%			0.9%	0.1%	30.1%	0.4%	25.6%	0.1%	0.1%	57.3%
	SE of %			0.2%	0.1%	1.2%	0.2%	1.1%	0.1%	0.1%	1.2%
	Escapement			522	35	16,562	244	14,091	35	70	31,558
	SE of esc.			168	35	3,393	102	2,899	35	50	8,395
Sexes Combined	n			42	1	926	11	598	2	2	1,582
	%			2.7%	0.1%	58.5%	0.7%	37.8%	0.1%	0.1%	100.0%
	SE of %			0.4%	0.1%	1.2%	0.2%	1.2%	0.1%	0.1%	
	Escapement			1,461	35	32,219	383	20,807	70	70	55,044
	SE of esc.			366	35	6,524	137	4,242	50	50	11,087
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	10	0	292	3	472	4	198	1	0	980
	%	0.3%	0.0%	9.8%	0.1%	26.4%	0.2%	11.2%	0.1%	0.0%	48.0%
	SE of %	0.1%	0.0%	2.1%	0.1%	1.2%	0.1%	0.8%	0.1%	0.0%	1.8%
	Escapement	190	0	5,972	57	16,075	139	6,810	35	0	29,278
	SE of esc.	70	0	1,089	34	3,215	74	1,424	35	0	13,123
Females	n	0	0	18	1	479	7	407	1	2	915
	%	0.0%	0.0%	0.9%	0.1%	27.2%	0.4%	23.2%	0.1%	0.1%	52.0%
	SE of %	0.0%	0.0%	0.2%	0.1%	1.3%	0.2%	1.2%	0.1%	0.1%	1.8%
	Escapement	0	0	579	35	16,619	244	14,129	35	70	31,710
	SE of esc.	0	0	172	35	3,394	102	2,899	35	50	8,580
Sexes Combined	n	10	0	310	4	951	11	605	2	2	1,895
	%	0.3%	0.0%	10.7%	0.2%	53.6%	0.6%	34.3%	0.1%	0.1%	100.0%
	SE of %	0.1%	0.0%	2.2%	0.1%	1.7%	0.2%	1.4%	0.1%	0.1%	
	Escapement	190	0	6,551	92	32,694	383	20,940	70	70	60,988
	SE of esc.	70	0	1,130	49	6,525	137	4,243	50	50	11,156

Of the large fish sampled at Canyon Island, 67.8% were age 1.3 and 29.6% were age 1.4. Amongst medium fish sampled, 87.0% were age 1.2 and 10.5% were age 1.3. Within size groups, the age compositions from samples taken at Canyon Island are similar to those from the combined tributary samples.

Length compositions were similar between samples gathered on the spawning grounds and at Canyon Island (Table 13).

Table 13.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2002.

		Brood Year and age class									
		1999	1998	1998	1997	1997	1996	1996	1995	1995	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	161	1	298	3	453	4	184	1		1,105
	Average	343	315	565	530	766	828	867	870		
	SD	47		69	50	68	13	77			
	SE	4		4	29	3	6	6			
Females	n			15	1	496	7	418	1	2	940
	Average			722	745	767	749	827	840	868	
	SD			97		47	37	49		124	
	SE			25		2	14	2		88	
Sexes Combined	n	161	1	313	4	949	11	602	2	2	2,045
	Average	343	315	573	584	767	777	839	855	868	
	SD	47		78	684	58	49	62	21	124	
	SE	4		4	342	2	15	3	15	88	

TAGGING, RECOVERY AND ABUNDANCE IN 2003

Results from 2003 are contained in Boyce et al. (2006) and are shown below for comparison.

Small, medium and large-sized Chinook salmon abundances in 2003 were estimated using M-R data consisting of event 1 releases at Canyon Island and event 2 samples gathered in tributaries.

A total of 1,330 Chinook salmon of known size were caught at Canyon Island. Of these, 63 were small, 678 were medium-sized, and 589 were large. Ninety-five percent (95%) of catches occurred between 24 April and 29 June.

Of the 589 large Chinook salmon caught at Canyon Island, 568 were tagged and released (Table 14). Of these, gillnets caught 442 (Appendix E1) and fish wheels caught 126 (Appendix E2). One fish was released during gillnetting and 25 days later was recaptured in the fish wheels in poor condition. This fish was deemed unlikely to reach the spawning grounds and removed from the study. Of the 678 medium Chinook salmon caught at Canyon Island, 618 were tagged and released (Table 14). Of these, 388 were captured in gillnets (Appendix E1) and 230 were caught in fish wheels (Appendix E2). One fish released from a gillnet was recaptured in poor condition 12 days later. This fish was removed from the study. Fifty-seven of the 63 small Chinook salmon caught were also tagged; all but 2 of the tagged fish were captured in fish wheels (Appendices E1 and E2).

Table 14.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2003 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				
A. Total initially tagged	57	618	568	1,243
1. Captured using set gillnets	2	388	442	832
2. Captured using fish wheels	55	230	126	411
B. Total removals by:	1	79	78	158
1. Total U.S. fisheries		4	17	21
Sport fisheries [a]			1	1
Commercial gillnet [b]		4	16	20
Commercial troll				
Personal use				
3. Total Canadian fisheries	1	74	60	135
Test fishery		7	15	22
Aboriginal fishery		6	3	9
Commercial fishery		60	41	101
Sport fishery [c]	1	1	1	3
4. Recaptured as mortality [d] at Canyon Island FW/GN		1	1	2
C. Final total tagged in event 1 ($\hat{M}_i$)	**56**	**539**	**490**	1,085

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Table 14.–Page 2 of 2.

		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected	**795**	**1,646**	**2,151**	4,592
(All spawning grounds)	Marked	**12**	**52**	**28**	92
	Marked/Inspected	0.015	0.032	0.013	0.020
1. Nakina River	Inspected	620	1,152	906	2,678
	Marked	9	37	14	60
	Marked/Inspected	0.015	0.032	0.015	0.022
2. Lower Tatsamenie (Tatsatua River)	Inspected	170	339	515	1,024
	Marked	3	7	7	17
	Marked/Inspected	0.012	0.021	0.014	0.016
3. Upper Tatsamenie (Tatsatua River)	Inspected	3	15	8	26
	Marked				
	Marked/Inspected				
4. Dudidontu River	Inspected		20	234	254
	Marked		2	1	3
	Marked/Inspected		0.100	0.004	0.012
5. Nahlin River	Inspected	1	54	228	283
	Marked		4	3	7
	Marked/Inspected		0.074	0.013	0.025
6. Kowatua Creek	Inspected	1	55	214	270
	Marked		1	1	2
	Marked/Inspected		0.018	0.005	0.007
7. Tseta Creek	Inspected		11	46	57
	Marked		1	2	3
	Marked/Inspected		0.091	0.043	0.053
B. Lower river Canadian fisheries	Inspected	11	1,785	3,010	4,806
(Test, aboriginal and commercial)	Marked		75	59	134
	Marked/Inspected		0.044	0.019	0.029
1. Test fishery	Inspected	3	395	1,401	1,799
	Marked		7	15	22
	Marked/Inspected		0.018	0.011	0.012
2. Aboriginal fishery	Inspected		218	259	477
	Marked		6	3	9
	Marked/Inspected		0.028	0.008	0.017
3. Commercial fishery	Inspected	8	1,172	1,350	2,522
	Marked		60	41	103
	Marked/Inspected		0.056	0.031	0.042

[a] One Chinook salmon was from the U.S. sport fishery in Taku Inlet.

[b] Estimated by expanding random recoveries in the U.S. gillnet fishery District 111 (Taku Inlet/Stephens Passage); approximately 25% of Chinook salmon harvested in this fishery were sampled, yielding 4 large and 1 medium tagged Chinook salmon.

[c] Includes 3 Chinook salmon caught in the Nakina and Nahlin River sport fishery.

[d] Includes 1 medium and 1 large fish recaptured at Canyon Island in poor condition and deemed unlikely to reach the spawning grounds.

In 2003, water levels and flows at Canyon Island generally remained lower than average. A strongly increasing trend was observed throughout May; a weaker, decreasing trend was observed throughout June. Major fluctuations were observed throughout the study.

Cumulative density functions for both censored and uncensored marked fish were significantly larger than the corresponding function for fish recaptured on the spawning grounds (P = 0.003; Figure 14). This is a result of the large number of samples from the carcass weir on the Nakina River, which is biased towards capturing younger, smaller fish. Because the Nakina River represents a considerable amount of the production in the Taku River, estimates of abundance were stratified by size class to retain samples from the Nakina River in the analyses. Separate comparisons of length distributions for medium and large Chinook salmon showed that size-selective sampling was not significant for medium and large-sized fish (P = 0.16 and P = 0.16, Figures 15 and 16). All lower river removals had known length and were censored from the analyses. Removals in the U.S. gillnet fishery were estimated through expansion of random recoveries. All of the random recoveries had known lengths and were subsequently discounted from the analyses, yet lengths were unknown for the estimated expansions, resulting in differences between the numbers shown in the length frequency figures and M-R statistics. Comparison of small-sized fish marked at Canyon Island that survived past all lower river fisheries were similar to those recaptured in the tributaries in 2003 (P = 0.64).

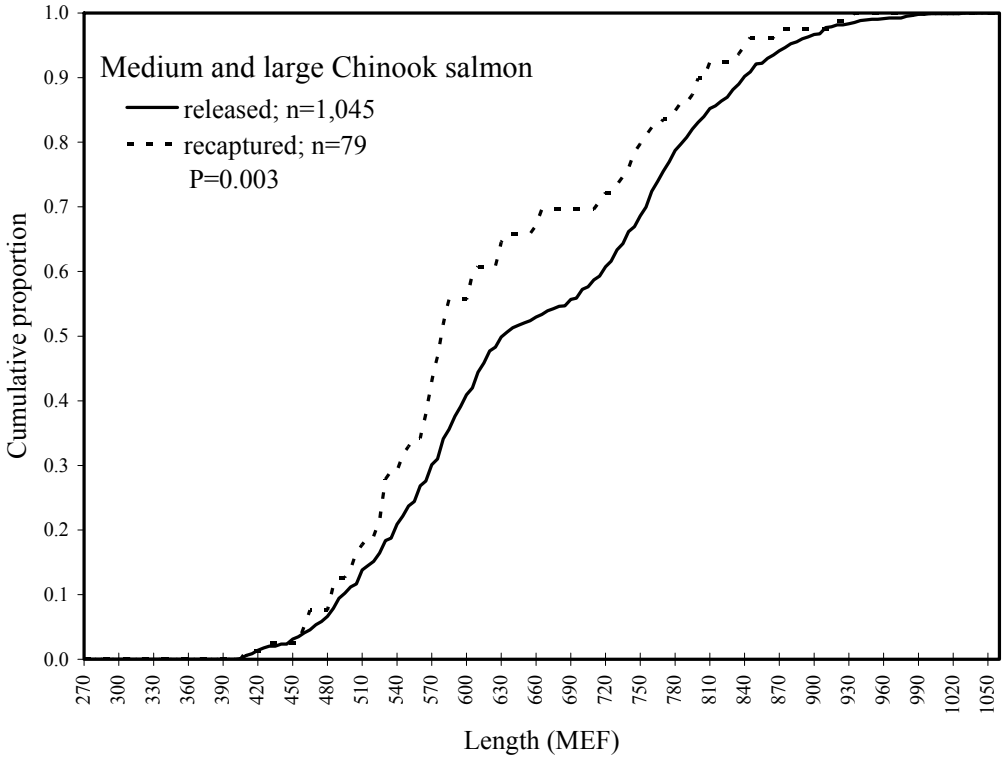

Figure 14.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries in 2003.

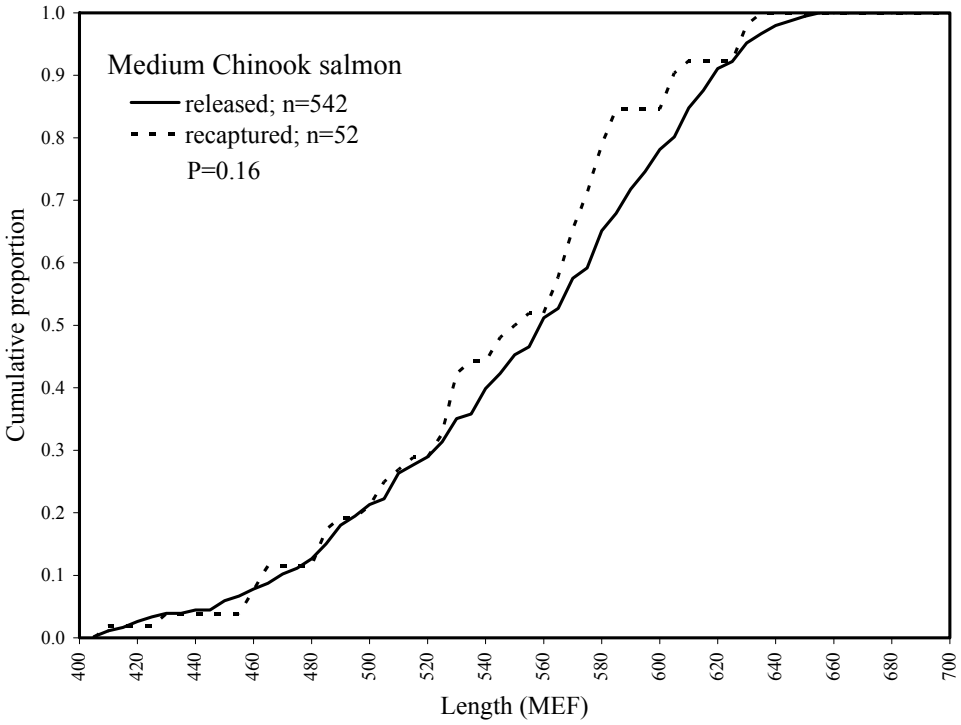

Figure 15.–Cumulative proportions of medium Chinook salmon marked at Canyon Island (minus 1 mortality, 4 marine, and 74 inriver fishery removals) versus those recaptured in tributaries in 2003.

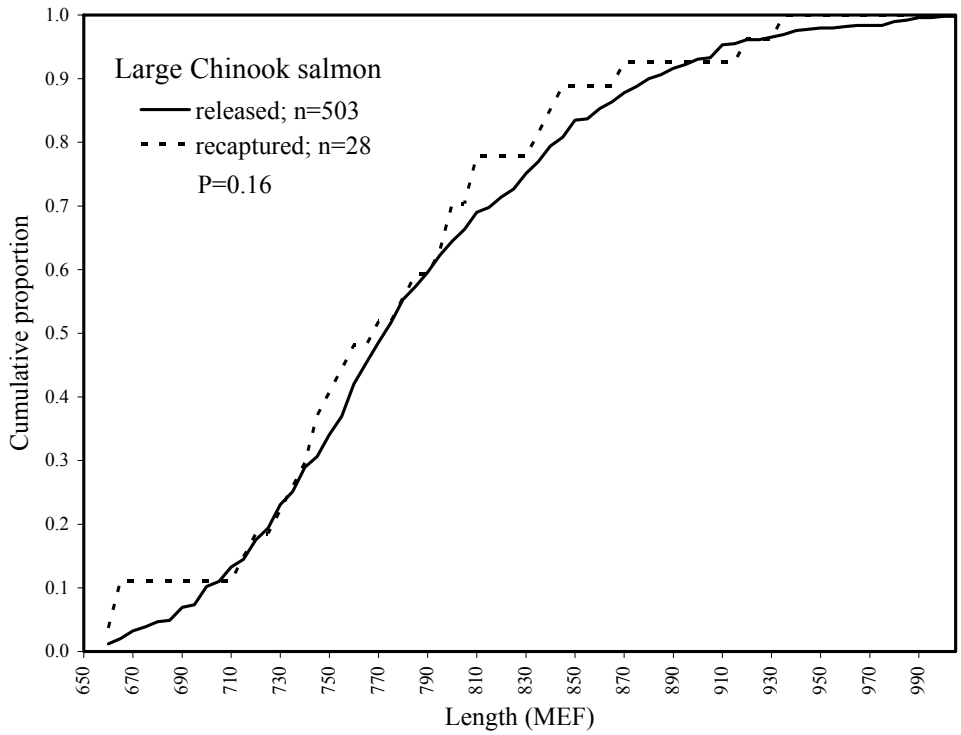

Figure 16.–Cumulative proportions of large Chinook salmon marked at Canyon Island (minus 1 mortality, 17 marine, and 60 inriver fishery removals) versus those recaptured in tributaries in 2003.

The estimated spawning abundance of small-sized Chinook salmon ($=\hat{N}_{ss}$) in 2003 was 3,489 (SE = 1,052). This is based on 795 fish inspected for marks ($=C_{ss}$) at 5 tributaries, 12 of which were recaptured fish ($=R_{ss}$) (Table 14). One (8.3%) of the small-sized fish recaptured had lost its primary tag. Fisheries removed an estimated 1 (1.8%) tagged fish ($=\hat{H}_{ss}$), reducing the estimated number of small-sized tagged fish that survived to spawn to 56 ($=\hat{M}_{ss}$). The fractions of marked fish across the different tributaries (Table 14) did not differ significantly ($\chi^2 = 0.2$, df = 2, P = 0.92), indicating that the Petersen estimator based on data pooled across tributaries is a consistent estimator for the M-R experiment. Estimated abundance of small-sized fish has a 95% confidence interval of 2,387 to 6,161, and an estimated relative bias of 7.3%.

The estimated spawning abundance of medium-sized Chinook salmon ($=\hat{N}_{ms}$) in 2003 was 16,780 (SE = 2,274). This is based on 1,646 fish inspected for marks ($=C_{ms}$) at 7 tributaries, 52 of which were recaptured fish ($=R_{ms}$) (Table 14). None of the medium-sized fish inspected had lost its primary tag. Fisheries removed an estimated 79 (12.8%) tagged fish ($=\hat{H}_{ms}$), and the estimated number of medium tagged fish in our estimate is 539 ($=\hat{M}_{ms}$). The fractions of marked fish across the different tributaries (Table 14) did not differ significantly ($\chi 2 = 9.7$, df = 6, P = 0.14), indicating that the Petersen estimator based on data pooled across tributaries is a consistent estimator for the M-R experiment. Estimated abundance of medium-sized fish has a 95% confidence interval of 13,118 to 22,297, and an estimated relative bias of 0.4%.

Estimated spawning abundance of large-sized Chinook salmon ($=\hat{N}_{ls}$) in 2003 was 36,435 (SE = 6,705). This estimate is based on 2,151 fish inspected for marks ($=C_{ls}$) in 7 tributaries, 28 of which were recaptured fish ($=R_{ls}$; Table 14). One (3.6%) of the 28 recaptured large fish had lost its primary tag (this was observed at the Nakina carcass weir), but was detected as a tagged fish from its secondary marks. Fisheries removed an estimated 78 (13.7%) tagged fish ($=\hat{H}_{ls}$), and the estimated number of large tagged fish in the estimate was 490 ($=\hat{M}_{ls}$). Similarities in the marked fractions among fish inspected in the different tributaries ($\chi^2 = 6.4$, df = 6, P = 0.38) indicate that the Petersen estimator based on data pooled across tributaries is a consistent estimator for the M-R experiment. Estimated abundance of large fish has a 95% confidence interval of 25,627 to 50,849, and an estimated relative bias of 2.0%.

The estimated abundance of medium and large-sized Chinook salmon ($\hat{N} = \hat{N}_{ms} + \hat{N}_{ls}$) on the spawning grounds in 2003 was 53,215 (SE = 7,080), with a 95% confidence interval of 39,338 to 67,092. Including small-sized Chinook salmon into this estimate results in an estimated abundance of all Chinook salmon of 56,704 (SE = 7,158).

ESTIMATES OF AGE AND SEX COMPOSITION IN 2003

Age-1.3 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 2003. They constituted 42.7% (SE = 2.7%) of the estimated escapement (Table 15). Age-1.2 fish constituted 30.5% (SE = 4.0%) of the estimated escapement and age-1.4 fish constituted 23.9% (SE = 1.9%)(Appendix E3).

Table 15.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2003.

		Brood year and age class									
		2000	1999	1999	1998	1998	1997	1997	1996	1996	
		1.1	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	48		596	1	53		5			703
	%	6.8%		84.3%	0.1%	7.5%		0.7%			99.4%
	SE of %	0.9%		1.4%	0.1%	1.0%		0.3%			0.3%
	Escapement	1,139		14,145	24	1,258		119			16,685
	SE of esc.	220		1,930	24	237		55			2,268
Females	n			4							4
	%			0.6%							0.6%
	SE of %			0.3%							0.3%
	Escapement			95							95
	SE of esc.			49							171
Sexes Combined	n	48		600	1	53		5			707
	%	6.8%		85.0%	0.1%	7.5%		0.7%			100.0%
	SE of %	0.9%		1.3%	0.1%	1.0%		0.3%			
	Escapement	1,141		14,260	24	1,258		119			16,780
	SE of esc.	221		1,945	24	237		55			2,274
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n			63	2	392	6	194			657
	%			4.6%	0.1%	28.4%	0.4%	14.1%			47.6%
	SE of %			0.6%	0.1%	1.2%	0.2%	0.9%			1.3%
	Escapement			1,663	53	10,350	158	5,122			17,346
	SE of esc.			366	38	1,954	70	1,000			3,228
Females	n			12	1	420	3	283	2	2	723
	%			0.9%	0.1%	30.4%	0.2%	20.5%	0.1%	0.1%	52.4%
	SE of %			0.3%	0.1%	1.2%	0.1%	1.1%	0.1%	0.1%	1.3%
	Escapement			317	26	11,089	79	7,472	53	53	19,089
	SE of esc.			107	26	2,088	47	1,429	38	38	4,853
Sexes Combined	n			75	3	812	9	477	2	2	1,380
	%			5.4%	0.2%	58.8%	0.7%	34.6%	0.1%	0.1%	100.0%
	SE of %			0.6%	0.1%	1.3%	0.2%	1.3%	0.1%	0.1%	
	Escapement			1,980	79	21,438	238	12,594	53	53	36,435
	SE of esc.			425	47	3,974	89	2,363	38	38	6,705
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	48		659	3	445	6	199			1,360
	%	2.1%		29.7%	0.1%	21.8%	0.3%	9.8%			64.0%
	SE of %	0.4%		4.0%	0.1%	1.4%	0.1%	0.9%			2.7%
	Escapement	1,139		15,809	77	11,607	158	5,241			34,031
	SE of esc.	220		1,965	45	1,968	70	1,002			3,945
Females	n			16	1	420	3	283	2	2	727
	%			0.8%	0.0%	20.8%	0.1%	14.0%	0.1%	0.1%	36.0%
	SE of %			0.2%	0.0%	1.7%	0.1%	1.3%	0.1%	0.1%	2.7%
	Escapement			412	26	11,089	79	7,472	53	53	19,183
	SE of esc.			117	26	2,088	47	1,429	38	38	4,856
Sexes Combined	n	48		675	4	865	9	482	2	2	2,087
	%	2.1%		30.5%	0.2%	42.7%	0.4%	23.9%	0.1%	0.1%	100.0%
	SE of %	0.4%		4.0%	0.1%	2.7%	0.2%	1.9%	0.1%	0.1%	
	Escapement	1,139		16,220	103	22,696	238	12,712	53	53	53,214
	SE of esc.	220		1,989	53	3,981	89	2,363	38	38	7,080

[a] Totals may not sum due to rounding.

The sex composition of the estimated escapement was 64.0% (SE = 2.7%) male (Table 15). All small fish were male, and 96.1% were age 1.1. Males accounted for more than 99% of medium fish, 84.3% of which were age 1.2. Slightly more than half (52.4%) of large fish were female, and age 1.3 accounted for 58.8% of large fish.

Of the large fish sampled at Canyon Island, 60.6% were age 1.3 and 34.1% were age 1.4. Amongst medium fish sampled, 90.5% were age 1.2 and 5.0% were age 1.3. Within size groups, the age compositions from Canyon Island are similar to those from the combined tributary samples. Length compositions were similar between samples gathered on the spawning grounds and at Canyon Island (Table 16).

Table 16.–The estimated average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2003.

		Brood Year and age class									
		2000	1999	1999	1998	1998	1997	1997	1996	1996	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	262	1	617	2	423	6	177	1		1,489
	Average	375	375	580	670	746	802	879	795		
	SD	56		68	148	82	52	62			
	SE	3		3	105	4	21	5			
Females	n			20	2	399	3	273		2	699
	Average			723	783	770	753	821		858	
	SD			64	32	45	23	43		74	
	SE			14	23	2	13	3		53	
Sexes Combined	n	262	1	637	4	822	9	450	1	2	2,188
	Average	375	375	585	726	758	785	844	795	858	
	SD	56		72	109	68	49	59		74	
	SE	3		3	55	2	16	3		53	

TAGGING, RECOVERY AND ABUNDANCE IN 2004

Small, medium and large-sized Chinook salmon abundances in 2004 were estimated using M-R data consisting of event 1 releases at Canyon Island and event 2 samples gathered in tributaries.

A total of 2,047 Chinook salmon of known size were caught at Canyon Island, of which 1,917 were tagged and released (Table 17). Of the total caught, 106 were small-sized, 851 were medium-sized, and 1,090 were large-sized Chinook salmon, and all of these fish were caught between 30 April and 20 July.

For the large-sized Chinook salmon caught at Canyon Island, 1,012 were tagged and released (Table 17). Of these, gillnets caught 73 (Appendix F1) and fish wheels caught 939 (Appendix F2). For the medium-sized Chinook salmon caught at Canyon Island, 803 were tagged and released (Table 17). Of these, 52 were captured in gillnets (Appendix F1) and 751 were caught in fish wheels (Appendix F2). One hundred and two small-sized Chinook salmon caught at Canyon Island were tagged and released, all of which were captured using fish wheels (Appendices F1 and F2).

A total of 134 Chinook salmon were captured using gillnets operated at Canyon Island and sampled for adipose finclips. Six of these fish were missing their adipose fin and all possessed valid coded wire (Appendix F1). A total of 1,913 Chinook salmon were captured using fish wheels operated near Canyon Island and sampled for adipose finclips. Forty were missing their adipose fin, all but one of which possessed a valid coded wire (Appendix F2).

In 2004, with the exception of 4 days in early June, water levels were above the long term average for the entire Chinook salmon run.

Cumulative proportions of combined medium and large-sized Chinook salmon marked and released at Canyon Island that survived past all lower river fisheries were significantly larger than fish recaptured on the spawning grounds in 2004 ($P = 0.001$; Figure 17). This is a result of

the large number of samples from the carcass weir on the Nakina River that tends to capture younger and smaller fish versus those captured at Canyon Island. Estimates of abundance stratified by size class as separate comparisons of length distributions for medium and large Chinook salmon indicated size-selective sampling was not significant within each size groups (P = 0.07 and P = 0.09, Figures 18 and 19). All removals had known length and were censored from the analyses.

The estimated spawning abundance of small-sized Chinook salmon ($=\hat{N}_{ss}$) in 2004 was 3,141 (SE = 1,189). This is based on 307 fish inspected for marks ($=C_{ss}$) at 3 tributaries, 9 of which were recaptured fish ($=R_{ss}$; Table 17). Fisheries removed one (1.0%) tagged fish ($=\hat{H}_{ss}$), reducing the estimated number of small-sized tagged fish that survived to spawn to 101 ($=\hat{M}_{ss}$). The fractions of marked fish across the different tributaries (Table 17) differed significantly ($\chi^2 =$ 33.7, df = 2, P < 0.00). However, this is due to the extremely small sample sizes gathered in 2 of the tributaries. All but 2 recoveries occurred in the Nakina River and the single small fish inspected in the Nahlin River was marked. Estimated abundance of small-sized fish has a 95% confidence interval of 1,962 to 6,312, and an estimated relative bias of 10.7%.

Table 17.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2004 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					
A. Total initially tagged		102	803	1,012	1,917
1. Captured using set gillnets			52	73	125
2. Captured using fish wheels		102	751	939	1,792
B. Total removals by:		1	63	93	157
1. Total U.S. fisheries			2	3	5
Sport fisheries [a]			1		1
Commercial gillnet [b]			1	2	3
Commercial troll					
Personal use				1	1
3. Total Canadian fisheries		1	61	90	152
Test fishery			3	22	25
Aboriginal fishery			3	9	12
Commercial fishery			52	58	110
Sport fishery [c]		1	3	1	5
4. Recaptured as mortality at Canyon Island FW/GN					
C. Final total tagged in event 1 ($\hat{M}_i$)		**101**	**740**	**919**	1,760
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected	**307**	**2,139**	**4,240**	4,553
(All spawning grounds)	Marked	**9**	**71**	**51**	97
	Marked/Inspected	0.029	0.033	0.012	0.021

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		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
1. Nakina River	Inspected	234	1,529	2,351	4,114
	Marked	7	47	27	81
	Marked/Inspected	0.030	0.031	0.011	0.020
2. Lower Tatsamenie (Tatsatua River)	Inspected	72	277	918	1,267
	Marked	1	10	10	21
	Marked/Inspected	0.014	0.036	0.011	0.017
3. Upper Tatsamenie (Tatsatua River)	Inspected		66	85	151
	Marked		2	1	3
	Marked/Inspected		0.030	0.012	0.020
4. Dudidontu River	Inspected		94	245	339
	Marked		4	1	5
	Marked/Inspected		0.043	0.004	0.015
5. Nahlin River	Inspected	1	88	350	439
	Marked	1	8	7	16
	Marked/Inspected	1.000	0.091	0.020	0.036
6. Kowatua Creek	Inspected		85	291	376
	Marked			5	5
	Marked/Inspected			0.017	0.013
B. Lower river Canadian fisheries (Test, aboriginal and commercial)	Inspected		1,029	3,464	4,100
	Marked		58	89	135
	Marked/Inspected		0.056	0.026	0.033
1. Test fishery	Inspected		282	1,410	1,692
	Marked		3	22	25
	Marked/Inspected		0.011	0.016	0.015
2. Aboriginal fishery	Inspected		116	277	393
	Marked		3	9	12
	Marked/Inspected		0.026	0.033	0.030
3. Commercial fishery	Inspected		631	1,777	2,408
	Marked		52	58	110
	Marked/Inspected		0.082	0.033	0.046

[a] One Chinook salmon was from the U.S. sport fishery in Taku Inlet.

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

[c] Includes 4 Chinook salmon caught in the Nakina River sport fishery.

The estimated spawning abundance of medium-sized Chinook salmon ($=\hat{N}_{ms}$) in 2004 was 22,023 (SE = 2,422). This is based on 2,139 fish inspected for marks ($=C_{ms}$) at 6 tributaries, 71 of which were recaptured fish ($=R_{ms}$) (Table 17). Three of the recaptured fish had lost the primary tag (2 from the Nakina River and 1 from the Dudidontu River), but were detected as tagged fish from secondary marks.

Fisheries removed an estimated 63 (7.8%) tagged fish ($=\hat{H}_{ms}$), and the estimated number of medium tagged fish in the estimate was 740 ($=\hat{M}_{ms}$). The fractions of marked fish (Table 17)

were significantly different ($\chi^2 = 12.7$, df = 5, P = 0.03). The significant test statistic was due to no recoveries in Kowatua Creek of 85 medium salmon inspected and a high rate of recovery (8 of 88 inspected) in the Nahlin River. Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in Kowatua Creek. The ratios in the other spawning areas were not different ($\chi^2 = 12.7$, df = 5, P = 0.03). Estimated abundance of medium-sized fish has a 95% confidence interval of 17,956 to 27,220, and an estimated relative bias of 0.06% based on the Chapman model. The true degree of bias due to failure of the consistency test is unknown.

The estimated spawning abundance of large-sized Chinook salmon ($=\hat{N}_{ls}$) in 2004 was 75,032 (SE = 10,280). This estimate is based on 4,240 fish inspected for marks ($=C_{ls}$) in 6 tributaries, 51 of which were recaptured fish ($=R_{ls}$) (Table 17). Fisheries removed an estimated 93 (9.0%) tagged fish ($=\hat{H}_{ls}$), and the estimated number of large tagged fish in our estimate is 919 ($=\hat{M}_{ls}$). Similarities in the marked fractions among fish inspected in the different tributaries indicate that the Petersen estimator based on data pooled across tributaries ($\chi^2 = 4.0$, df = 5, P = 0.55) is a consistent estimator for the M-R experiment. Estimated abundance of large fish has a 95% confidence interval of 59,757 to 99,221, and an estimated relative bias of 1.86%.

The estimated abundance of medium and large-sized Chinook salmon ($\hat{N} = \hat{N}_{ms} + \hat{N}_{ls}$) on the spawning grounds in 2004 was 97,055 (SE = 10,562), with a 95% confidence interval of 76,355 to 117,756. Including small-sized Chinook salmon into this estimate results in an estimated abundance of all Chinook salmon of 100,196 (SE = 10,628).

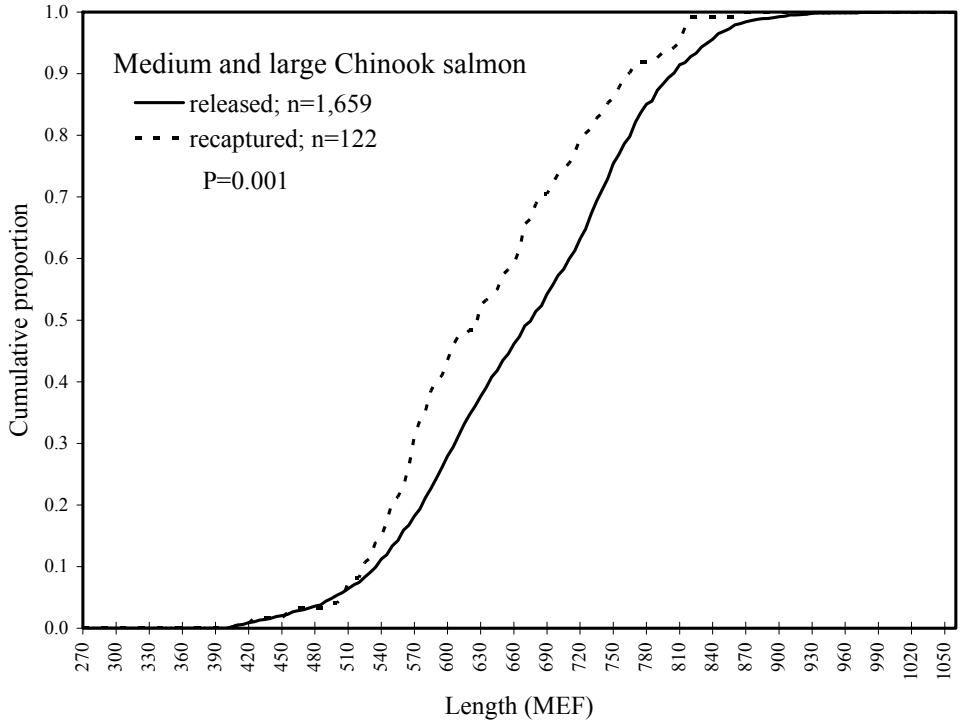

Figure 17.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries in 2004.

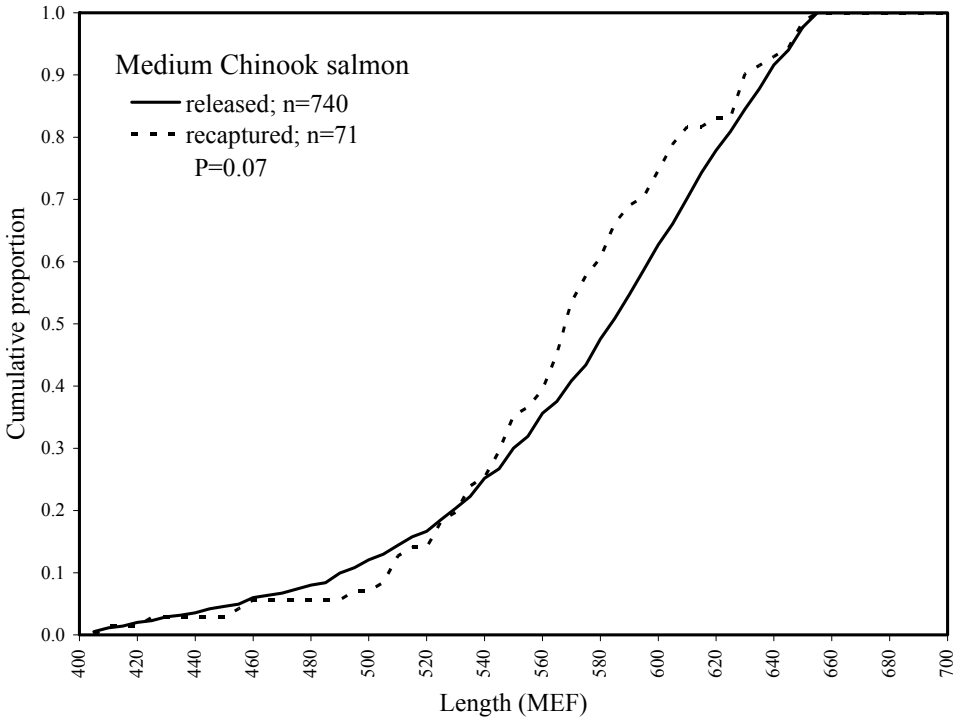

Figure 18.–Cumulative proportions of medium Chinook salmon marked at Canyon Island (minus 2 marine and 61 inriver fishery removals) versus those recaptured in tributaries in 2004.

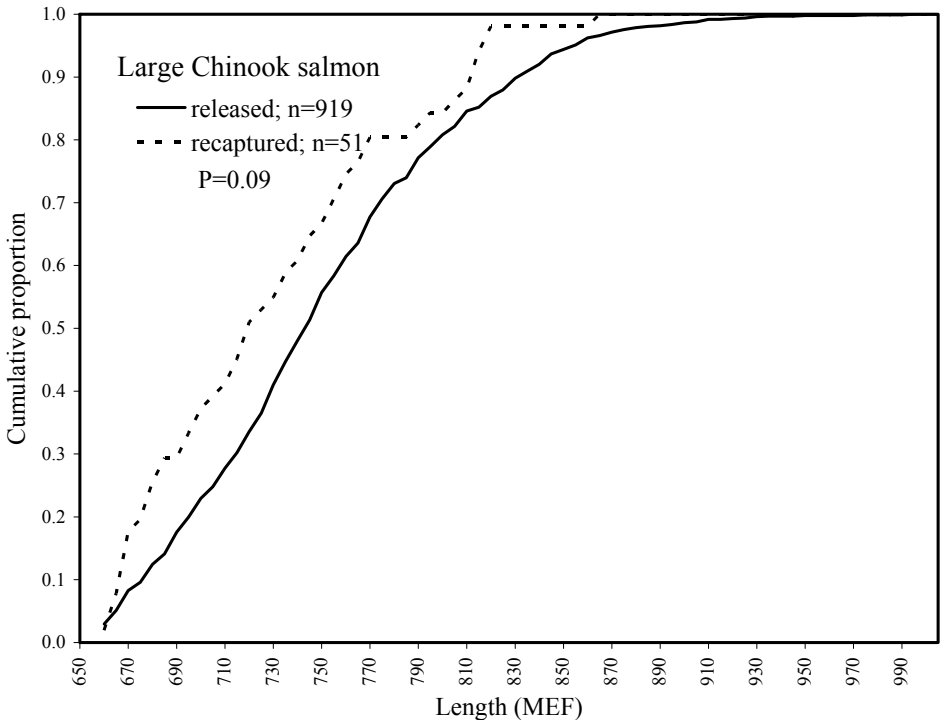

Figure 19.–Cumulative proportions of large Chinook salmon marked at Canyon Island (minus 3 marine and 90 inriver fishery removals) versus those recaptured in tributaries in 2004.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2004

Age-1.3 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 2004. They constituted 58.2% (SE = 2.1%) of the estimated escapement (Table 18). Age-1.4 fish constituted 14.0% (SE = 0.9%) of the estimated escapement and age 1.2 constituted 26.4% (SE = 2.3%). Age data from specific locations are presented in Appendix F3.

The sex composition of the estimated escapement was 61.0% (SE = 1.8%) male (Table 18). All small fish were male, and 88.0% were age 1.1. Males accounted for 98.2% of medium fish, 81.7% of which were age 1.2. Half of the large fish were male, and age 1.3 accounted for 71.3% of large fish.

Table 18.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2004.

		Brood year and age class									
		2001	2000	2000	1999	1999	1998	1998	1997	1997	
		1.1	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	18	1	483	7	72		4			585
	%	3.0%	0.2%	81.0%	1.2%	12.1%		0.7%			98.2%
	SE of %	0.7%	0.2%	1.6%	0.4%	1.3%		0.3%			0.6%
	Escapement	665	37	17,848	259	2,661		148			21,617
	SE of esc.	170	37	1,994	101	414		75			10,184
Females	n			4		6		1			11
	%			0.7%		1.0%		0.2%			1.8%
	SE of %			0.3%		0.4%		0.2%			0.6%
	Escapement			148		222		37			406
	SE of esc.			75		93		37			1,397
Sexes Combined	n	18	1	487	7	78		5			596
	%	3.0%	0.2%	81.7%	1.2%	13.1%		0.8%			100.0%
	SE of %	0.7%	0.2%	1.6%	0.4%	1.4%		0.4%			
	Escapement	665	37	17,995	259	2,882		185			22,023
	SE of esc.	170	37	2,010	101	438		84			2,422
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n	1		141	3	614	1	102	1		863
	%	0.1%		8.2%	0.2%	35.6%	0.1%	5.9%	0.1%		50.1%
	SE of %	0.1%		0.7%	0.1%	1.2%	0.1%	0.6%	0.1%		1.2%
	Escapement	44		6,137	131	26,723	44	4,439	44		37,560
	SE of esc.	44		973	77	3,760	44	741	44		7,273
Females	n			28		616	6	206	3	2	861
	%			1.6%		35.7%	0.3%	11.9%	0.2%	0.1%	49.9%
	SE of %			0.3%		1.2%	0.1%	0.8%	0.1%	0.1%	1.2%
	Escapement			1,219		26,810	261	8,966	131	87	37,473
	SE of esc.			281		3,772	111	1,359	77	62	7,265
Sexes Combined	n	1		169	3	1,230	7	308	4	2	1,724
	%	0.1%		9.8%	0.2%	71.3%	0.4%	17.9%	0.2%	0.1%	100.0%
	SE of %	0.1%		0.7%	0.1%	1.1%	0.2%	0.9%	0.1%	0.1%	
	Escapement	44		7,355	131	53,532	305	13,405	174	87	75,032
	SE of esc.	44		1,140	77	7,379	121	1,960	89	62	10,280
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	19	1	624	10	686	1	106	1		1,448
	%	3.6%	0.1%	25.0%	0.4%	30.3%	0.0%	4.7%	0.0%		61.0%
	SE of %	1.1%	0.1%	2.4%	0.1%	1.2%	0.0%	0.5%	0.0%		1.8%
	Escapement	3,472	100	24,235	389	29,446	44	4,587	44		59,176
	SE of esc.	1,070	73	2,224	127	3,783	44	744	44		12,515
Females	n			32		622	6	207	3	2	872
	%			1.4%		27.9%	0.3%	9.3%	0.1%	0.1%	39.0%
	SE of %			0.2%		1.4%	0.1%	0.7%	0.1%	0.1%	1.8%
	Escapement			1,366		27,031	261	9,003	131	87	37,879
	SE of esc.			291		3,773	111	1,359	77	62	7,398

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Table 18.–Page 2 of 2.

		Brood year and age class									
		2001	2000	2000	1999	1999	1998	1998	1997	1997	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Sexes Combined	n	19	1	656	10	1,308	7	313	4	2	2,320
	%	3.6%	0.1%	26.4%	0.4%	58.2%	0.3%	14.0%	0.2%	0.1%	100.0%
	SE of %	1.1%	0.1%	2.3%	0.1%	2.1%	0.1%	0.9%	0.1%	0.1%	0.0%
	Escapement	3,472	100	25,602	389	56,477	305	13,590	174	87	97,055
	SE of esc.	1,070	73	2,315	127	7,392	121	1,962	89	62	10,561

Of the large fish sampled at Canyon Island, 72.3% were age 1.3 and 19.5% were age 1.4. For medium fish, 86.5% were age 1.2 and 10.2% were age 1.3. Within size groups, the age compositions from samples taken at Canyon Island are similar to those from the combined tributary samples.

Average length by age of fish sampled on the spawning grounds is presented in Table 19. Length compositions were similar between samples gathered on the spawning grounds and at Canyon Island.

Table 19.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2004.

		Brood Year and age class									
		2001	2000	2000	1999	1999	1998	1998	1997	1997	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	63	2	627	10	687	1	106	1		1,497
	Average	398	458	610	598	736	745	827	825		
	SD	93	145	71	78	74		91			
	SE	12	103	3	25	3		9			
Females	n			32		620	6	207	3	2	870
	Average			731		754	741	813	783	780	
	SD			64		45	36	45	12	71	
	SE			11		2	15	3	7	50	
Sexes Combined	n	63	2	659	10	1,307	7	313	4	2	2,367
	Average	398	458	616	598	744	741	818	794	780	
	SD	93	145	75	78	62	33	64	23	71	
	SE	12	103	3	25	2	12	4	11	50	

TAGGING, RECOVERY AND ABUNDANCE IN 2005

Medium and large-sized Chinook salmon abundances in 2005 were 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 561 Chinook salmon of known size were caught at Canyon Island, of which 522 were tagged and released (Table 20). Of the total caught, 20 were small-sized, 144 were medium-sized and 397 were large-sized Chinook salmon, and all of these fish were caught between 25 April and 16 July.

For the large-sized Chinook salmon caught at Canyon Island, 376 were tagged and released (Table 20). Of these, 65 were captured in gillnets (Appendix G1) and 311 were caught in fish wheels (Appendix G2). For the medium-sized Chinook salmon caught at Canyon Island, 131 were tagged and released (Table 20). Of these, 3 were captured in gillnets (Appendix G1) and 128 were caught in fish wheels (Appendix G2). Fifteen small-sized Chinook salmon caught at Canyon Island were tagged and released, all of which were captured using fish wheels (Appendices G1 and G2).

Table 20.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2005 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					
A. Total initially tagged		15	131	376	522
1. Captured using set gillnets			3	65	68
2. Captured using fish wheels		15	128	311	454
B. Total removals by:			17	71	88
1. Total U.S. fisheries [a]			1	7	8
Sport fisheries					
Commercial gillnet					
Commercial troll					
Personal use					
3. Total Canadian fisheries			16	64	80
Test fishery					
Aboriginal fishery					
Commercial fishery			16	63	79
Sport fishery [b]				1	1
4. Recaptured as mortality at Canyon Island FW/GN					
C. Final total tagged in event 1 ($\hat{M}_i$)		15	**130**	**368**	514
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected	173	664	2,754	3,591
(All spawning grounds)	Marked		12	17	29
	Marked/Inspected		0.018	0.006	0.008
1. Nakina River	Inspected	137	501	1,576	2,214
	Marked		10	13	23
	Marked/Inspected		0.020	0.008	0.010
2. Lower Tatsamenie (Tatsatua River)	Inspected	34	103	541	678
	Marked		2	2	4
	Marked/Inspected		0.019	0.004	0.006
3. Upper Tatsamenie (Tatsatua River)	Inspected	2	18	32	52
	Marked				
	Marked/Inspected				
4. Dudidontu River	Inspected		16	222	238
	Marked			2	2
	Marked/Inspected			0.009	0.008
5. Nahlin River	Inspected		9	159	168
	Marked				
	Marked/Inspected				
6. Kowatua Creek	Inspected		17	224	241
	Marked				
	Marked/Inspected				
B. Lower river Canadian fisheries	Inspected		838	7,412	8,220
(aboriginal and commercial) [c]	Marked		18	63	81
	Marked/Inspected		0.021	0.008	0.010

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		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
1. Aboriginal fishery	Inspected		17	13	30
	Marked				
	Marked/Inspected				
2. Commercial fishery	Inspected		821	7,399	8,220
	Marked		18	63	81
	Marked/Inspected		0.022	0.009	0.010
C. Final total sampled in event 2 (upper and lower river)	Inspected	173	**1,502**	**10,166**	11,811
	Marked		**30**	**80**	110
	Marked/Inspected		0.020	0.008	0.009

[a] All recoveries were select without expansion.
[b] Includes 1 large-sized Chinook salmon caught in the Nakina River sport fishery.
[c] There was no test fishery in 2005.

A total of 73 Chinook salmon were captured using gillnets operated at Canyon Island and sampled for adipose finclips. None of these fish were missing their adipose fin (Appendix G1). A total of 488 Chinook salmon were captured using fish wheels operated near Canyon Island and sampled for adipose finclips. Five were missing their adipose fin and all but one possessed valid coded wire (Appendix G2).

In 2005, water levels were well above average from late April through early June then at or above average through mid-July. As a result, the fish wheels were operational in the first week of May, much earlier than normal.

Cumulative proportions of combined medium and large Chinook salmon marked and released at Canyon Island were similar to fish recaptured in the inriver commercial fishery and in various tributaries in 2005 (P = 0.64; Figure 20). Estimates of abundance stratified by size class and separate comparisons of length distributions for medium and large Chinook salmon indicated size-selective sampling was not significant within size group (P = 0.97, P = 0.43; Figures 21 and 22). All removals had known length and were censored from the analyses.

Only 15 small-sized Chinook salmon were tagged at Canyon Island in 2005. Farther upriver, 175 small-sized fish were sampled for tags but none were previously tagged at Canyon Island. Therefore, it was not possible to estimate the abundance of small-sized Chinook salmon $\hat{N}_{ms}$ in 2005.

The estimated inriver run of medium-sized Chinook salmon in 2005 was 6,350 (SE = 1,024). This is based on 1,502 fish inspected for marks ($=C_{ms}$) at 6 tributaries and the lower river fisheries, 30 of which were recaptured fish ($=R_{ms}$; Table 20). The inriver fisheries harvested a total of 838 medium-sized Chinook salmon resulting in a spawning abundance ($=\hat{N}_{ms}$) of 5,508 (SE = 1,024) past all fisheries. The fractions of marked fish (Table 20) were not different among spawning areas (χ^2=1.2, df = 2, P = 0.54), and fractions were not different between samples gathered in the inriver fisheries and the pooled spawning ground data (χ^2=0.22, df = 1, P = 0.64). Fisheries removed an estimated 17 (1 in the marine and 16 in the inriver fisheries) tagged fish ($=\hat{H}_{ms}$), and the estimated number of large tagged fish in our estimate is 130

($=\hat{M}_{ms}$). Estimated abundance of medium-sized fish has a 95% confidence interval of 4,030 to 7,947, and an estimated relative bias of 3.0%.

The estimated inriver run of large-sized Chinook salmon in 2005 was 46,315 (SE = 4,908). This is based on 10,166 fish inspected for marks ($=C_{ls}$) at 6 tributaries and in the lower river fisheries, 80 of which were recaptured fish ($=R_{ls}$; Table 20). The inriver fisheries harvested a total of 7,412 large-sized Chinook salmon resulting in a spawning abundance ($=\hat{N}_{ls}$) of 38,725 (SE = 4,908). The fractions of marked fish (Table 20) were not different among spawning areas (χ^2=4.5, df = 3, P = 0.21), and fractions were not different between samples gathered in the inriver fisheries and on the spawning grounds (χ^2=1.4, df = 1, P = 0.24). Fisheries removed an estimated 71 (7 in the marine and 64 in the inriver fisheries) tagged fish ($=\hat{H}_{ls}$), and the estimated number of large tagged fish in the estimate was 368 ($=\hat{M}_{ls}$). Estimated spawning abundance of large-sized fish has a 95% confidence interval of 31,035 to 50,103, and an estimated relative bias of 1.3%.

The estimated abundance of medium and large-sized Chinook salmon ($\hat{N}=\hat{N}_{ms}+\hat{N}_{ls}$) on the spawning grounds in 2005 was 44,233 (SE = 5,013), with a 95% confidence interval of 36,461 to 56,316.

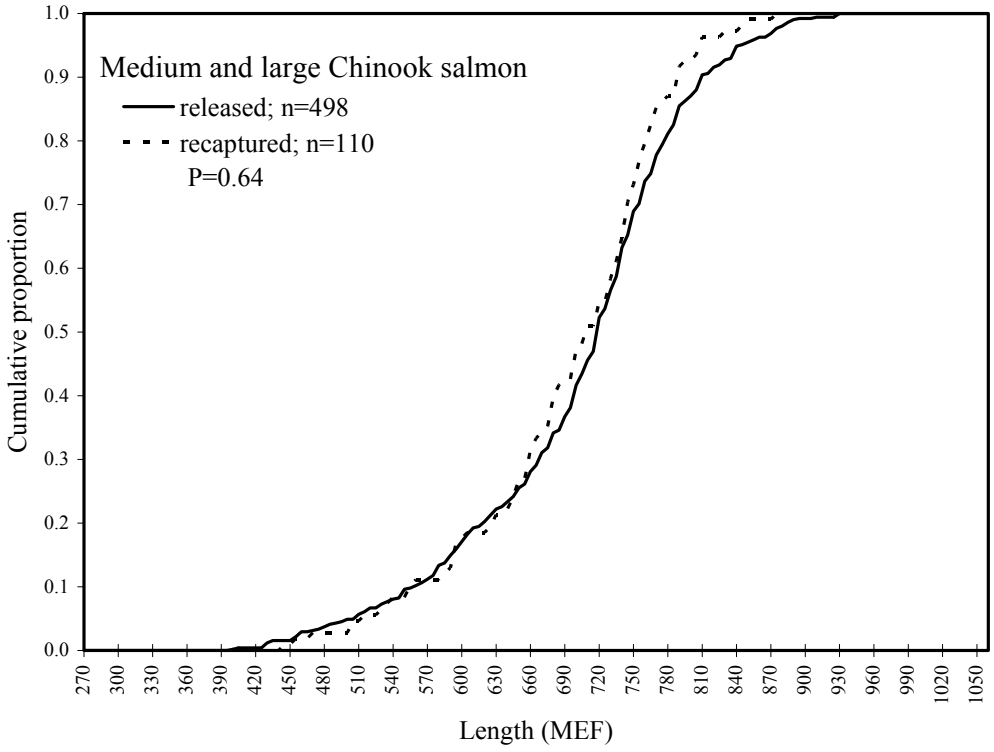

Figure 20.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries and the lower river fisheries in 2005.

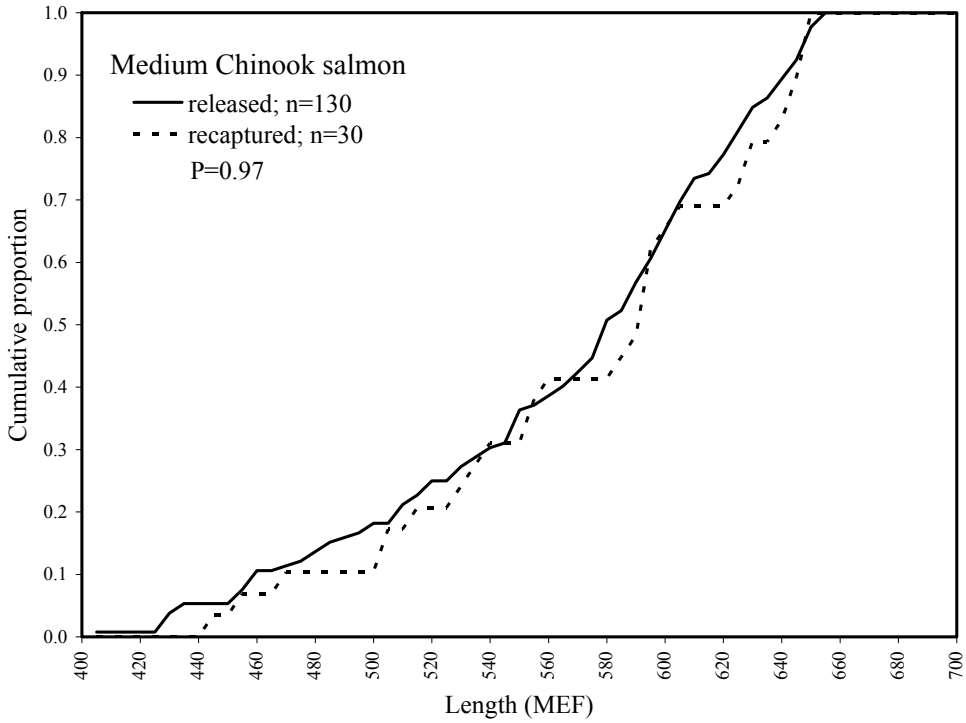

Figure 21.–Cumulative proportions of medium Chinook salmon marked at Canyon Island (minus 1 marine and 16 inriver fishery removals) versus those recaptured in tributaries and the lower river fisheries in 2005.

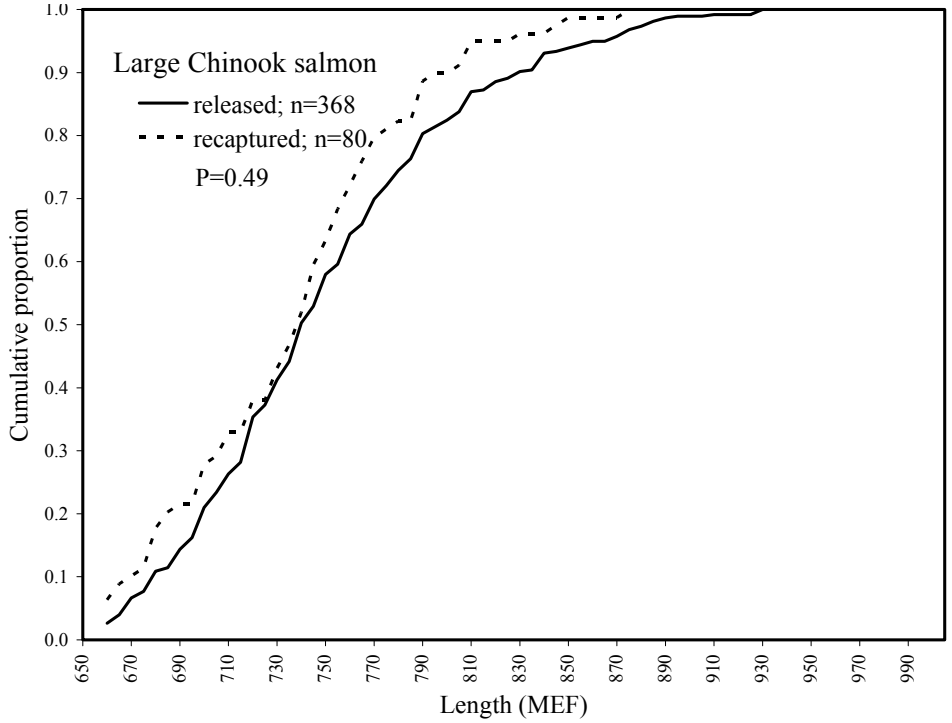

Figure 22.–Cumulative proportions of large Chinook salmon marked at Canyon Island (minus 7 marine and 64 inriver fishery removals) versus those recaptured in tributaries and the lower river fisheries in 2005.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2005

Age-1.3 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 2005. Medium and large-sized Chinook salmon composed 62.2% (SE = 1.4%) of the estimated escapement; age-1.4 fish 21.0% (SE = 1.1%) and age-1.2 fish 14.8% (SE = 1.4%; Table 21)(Appendix F3).

Of medium and large-sized Chinook salmon, males composed 55.6% (SE = 1.6%) of the estimated escapement (Table 21). Males accounted for 97.7% of medium fish, 58.5% of which were age 1.2. About one-half of the large fish were female (50.4%), and age 1.3 accounted for 66.8% of large fish.

Of the large fish sampled at Canyon Island, 72.3% were age 1.3 and 19.5% were age 1.4. For medium fish, 86.5% were age 1.2 and 10.2% were age 1.3. Within size groups, the age compositions from samples taken at Canyon Island are similar to those from the combined tributary samples.

Length compositions were similar between samples gathered on the spawning grounds and at Canyon Island (Table 22).

Table 21.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2005.

		Brood year and age class									
		2002	2001	2001	2000	2000	1999	1999	1998	1998	
		1.1	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	29	1	181	3	86		4			304
	%	9.3%	0.3%	58.2%	1.0%	27.7%		1.3%			97.7%
	SE of %	1.7%	0.3%	2.8%	0.6%	2.5%		0.6%			0.8%
	Escapement	514	18	3,206	53	1,523		71			5,384
	SE of esc.	131	18	615	32	315		37			1,002
Females	n			1		6		0			7
	%			0.3%		1.9%		0.0%			2.3%
	SE of %			0.3%		0.8%		0.0%			0.8%
	Escapement			18		106		0			124
	SE of esc.			18		47		0			51
Sexes Combined	n	29	1	182	3	92		4			311
	%	9.3%	0.3%	58.5%	1.0%	29.6%		1.3%			100.0%
	SE of %	1.7%	0.3%	2.8%	0.6%	2.6%		0.6%			0.0%
	Escapement	514	18	3,223	53	1,629		71			5,508
	SE of esc.	131	18	618	32	334		37			1,024
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n	3		103	1	565	5	140	1		818
	%	0.2%		6.2%	0.1%	34.2%	0.3%	8.5%	0.1%		49.6%
	SE of %	0.1%		0.6%	0.1%	1.2%	0.1%	0.7%	0.1%		1.2%
	Escapement	70		2,417	23	13,260	117	3,286	23		19,198
	SE of esc.	41		382	23	1,739	54	493	23		2,479
Females	n			39		537	3	252	1		832
	%			2.4%		32.5%	0.2%	15.3%	0.1%		50.4%
	SE of %			0.4%		1.2%	0.1%	0.9%	0.1%		1.2%
	Escapement			915		12,603	70	5,914	23		19,527
	SE of esc.			185		1,658	41	823	23		2,519
Sexes Combined	n	3		142	1	1,102	8	392	2		1,650
	%	0.2%		8.6%	0.1%	66.8%	0.5%	23.8%	0.1%		100.0%
	SE of %	0.1%		0.7%	0.1%	1.2%	0.2%	1.0%	0.1%		0.0%
	Escapement	70		3,333	23	25,864	188	9,200	47		38,725
	SE of esc.	41		499	23	3,308	70	1,234	33		4,908

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		Brood year and age class									
		2002	2001	2001	2000	2000	1999	1999	1998	1998	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	32	1	284	4	651	5	144		1	1,122
	%	1.3%	0.0%	12.7%	0.2%	33.4%	0.3%	7.6%		0.1%	55.6%
	SE of %	0.3%	0.0%	1.4%	0.1%	1.1%	0.1%	0.6%		0.1%	1.6%
	Escapement	584	18	5,623	77	14,783	117	3,357		23	24,582
	SE of esc.	137	18	724	39	1,768	54	494		23	2,673
Females	n			40		543	3	252		1	839
	%			2.1%		28.7%	0.2%	13.4%		0.1%	44.4%
	SE of %			0.3%		1.3%	0.1%	0.9%		0.1%	1.6%
	Escapement			933		12,709	70	5,914		23	19,651
	SE of esc.			186		1,658	41	823		23	2,520
Sexes Combined	n	32	1	324	4	1,194	8	396		2	1,961
	%	1.3%	0.0%	14.8%	0.2%	62.2%	0.4%	21.0%		0.1%	100.0%
	SE of %	0.3%	0.0%	1.4%	0.1%	1.4%	0.2%	1.1%		0.1%	0.0%
	Escapement	584	18	6,556	77	27,493	188	9,271		47	44,233
	SE of esc.	137	18	794	39	3,325	70	1,234		33	5,013

Table 22.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2005.

		Brood Year and age class									
		2002	2001	2001	2000	2000	1999	1999	1998	1998	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	94	1	283	4	651	5	144		1	1,183
	Average	405	590	614	614	744	780	838		900	
	SD	105		98	37	78	37	76			
	SE	11		6	19	3	17	6			
Females	n			40		542	3	251		1	837
	Average			746		757	773	807		860	
	SD			40		44	13	46			
	SE			6		2	7	3			
Sexes Combined	n	94	1	323	4	1,193	8	395		2	2,020
	Average	405	590	630	614	750	778	818		880	
	SD	105		102	710	65	29	61		28	
	SE	11		6	19	2	10	3		20	

TAGGING, RECOVERY AND ABUNDANCE IN 2006

Medium and large-sized Chinook salmon abundances in 2006 were 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 539 Chinook salmon of known size were caught at Canyon Island, of which 492 were tagged and released (Table 23). Of the total caught, 63 were small-sized, 111 were medium-sized, and 366 were large-sized Chinook salmon, all of which were caught between 27 April and 17 July.

Table 23.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2006 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
EVENT 1 - FISH MARKED WITH SPAGHETTI TAGS AT CANYON ISLAND					
A. Total initially tagged		52	102	338	492
1. Captured using set gillnets		1	27	128	156
2. Captured using fish wheels		51	75	210	336
B. Total removals by:		0	9	61	71
1. Total U.S. fisheries[a]			1	5	6
Sport fisheries				1	1
Commercial gillnet			1	4	5
Commercial troll					
Personal use					
3. Total Canadian fisheries		1	8	57	66
Test fishery			1	3	4
Aboriginal fishery					
Commercial fishery		1	7	53	61
Sport fishery [b]				1	1
4. Recaptured as mortality at Canyon Island FW/GN					
C. Final total tagged in event 1 ($\hat{M}_i$)		52	**101**	**333**	486
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected	189	225	1,603	2,017
(All spawning grounds)	Marked	4	8	8	20
	Marked/Inspected	0.021	0.036	0.005	0.010
1. Nakina River	Inspected	143	122	732	997
	Marked	2	5	7	14
	Marked/Inspected	0.014	0.041	0.010	0.014
2. Lower Tatsamenie (Tatsatua River)	Inspected	43	68	455	566
	Marked	2	1		3
	Marked/Inspected	0.047	0.015		0.005
3. Upper Tatsamenie (Tatsatua River)	Inspected	2	6	26	34
	Marked				
	Marked/Inspected				
4. Dudidontu River	Inspected		13	212	225
	Marked			1	1
	Marked/Inspected			0.005	0.004
5. Nahlin River	Inspected	1	13	158	172
	Marked		1		1
	Marked/Inspected		0.077		0.006
6. Kowatua Creek	Inspected		3	20	23
	Marked		1		1
	Marked/Inspected		0.333		0.043
B. Lower river Canadian fisheries	Inspected	1	215	8,229	8,445
(Test, aboriginal and commercial)	Marked	1	8	56	65
	Marked/Inspected	1.000	0.037	0.007	0.008

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Table 23.–Page 2 of 2.

		Small 0–400 mm	Medium 401–659 mm	Large >660 mm	Total
1. Test fishery	Inspected		9	630	639
	Marked		1	3	4
	Marked/Inspected		0.111	0.005	0.006
2. Aboriginal fishery	Inspected			222	222
	Marked				
	Marked/Inspected				
3. Commercial fishery	Inspected	1	206	7,377	7,584
	Marked	1	7	53	61
	Marked/Inspected	1.000	0.034	0.007	0.008
C. Final total sampled in event 2 (upper and lower river)	Inspected	190	**440**	**9,832**	10,462
	Marked	5	**16**	**64**	85
	Marked/Inspected	0.026	0.036	0.007	0.008

[a] All recoveries were select without expansion.

[b] Includes 1 large-sized Chinook salmon caught in the Nakina River sport fishery.

For the large-sized Chinook salmon caught at Canyon Island, 338 were tagged and released (Table 23). Of these, 128 were captured in gillnets (Appendix H1) and 210 were caught in fish wheels (Appendix H2). For the medium-sized Chinook salmon caught at Canyon Island, 102 were tagged and released (Table 23). Of these, 27 were captured in gillnets (Appendix H1) and 75 were caught in fish wheels (Appendix H2). Fifty-two small-sized (≤400 mm MEF) Chinook salmon caught at Canyon Island were tagged and released, all but one of which were captured using fish wheels (Appendices H1 and H2).

A total of 156 Chinook salmon were captured using gillnets operated at Canyon Island and sampled for adipose finclips. Six of these fish were missing their adipose fin (Appendix H1), 4 of which had valid coded wire, one missing valid wire, and one whose head was lost during shipment. A total of 336 Chinook salmon were captured using fish wheels operated near Canyon Island and sampled for adipose finclips. Four of these fish were missing their adipose fin, all of which possessed valid coded wire (Appendix H2).

In 2006, water levels were below average for the first 3 weeks of the Chinook salmon run and as a result the fish wheels were not operational until 21 May, much earlier than normal. Thus, set gillnets were used to capture fish for about the first third of the Chinook salmon run.

Cumulative proportions of combined medium and large Chinook salmon marked and released at Canyon Island were similar to fish recaptured in the inriver commercial fishery and in various tributaries in 2006 ($P = 0.62$; Figure 23). Estimates of abundance stratified by size class and separate comparisons of length distributions for medium and large Chinook salmon indicated size-selective sampling was not significant within size groups ($P = 0.71$, $P = 0.69$; Figures 24 and 25). All removals had known length and were censored from the analyses.

Only 52 small-sized Chinook salmon were tagged at Canyon Island in 2006. Farther upriver, 190 small-sized fish were sampled for tags, but only 5 were previously tagged at Canyon Island. Therefore, the spawning abundance of small-sized Chinook salmon in 2006 was not estimated.

The estimated inriver run of medium-sized Chinook salmon in 2006 was 2,645 (SE = 679). This is based on 440 fish inspected for marks ($=C_{ms}$) at 6 tributaries and in the lower river fisheries, 16 of which were recaptured fish ($=R_{ms}$; Table 23). The inriver fisheries harvested 215 medium-sized fish resulting in a spawning abundance ($=\hat{N}_{ms}$) of 2,430 (SE = 679). The fractions of marked fish were significantly different between spawning areas (χ^2=10.1, df = 5, P = 0.07), however the significant difference was due to one recovery from the 3 medium fish inspected at Kowatua Creek. Fractions of marked fish were similar among the other spawning areas (χ^2=2.4, df = 4, P = 0.66). The fractions of marked fish (Table 23) were not different between samples gathered in the test fishery, the Canadian commercial fishery, and the pooled spawning grounds samples (χ^2=1.5, df = 2, P = 0.48). Fisheries removed an estimated 9 (1 in the marine and 8 in the inriver fisheries) tagged fish ($=\hat{H}_{ms}$), and the estimated number of medium-tagged fish in the estimate was 101 ($=\hat{M}_{ms}$). Estimated abundance of medium-sized fish has a 95% confidence interval of 1,627 to 4,164, and an estimated relative bias of 6.1%.

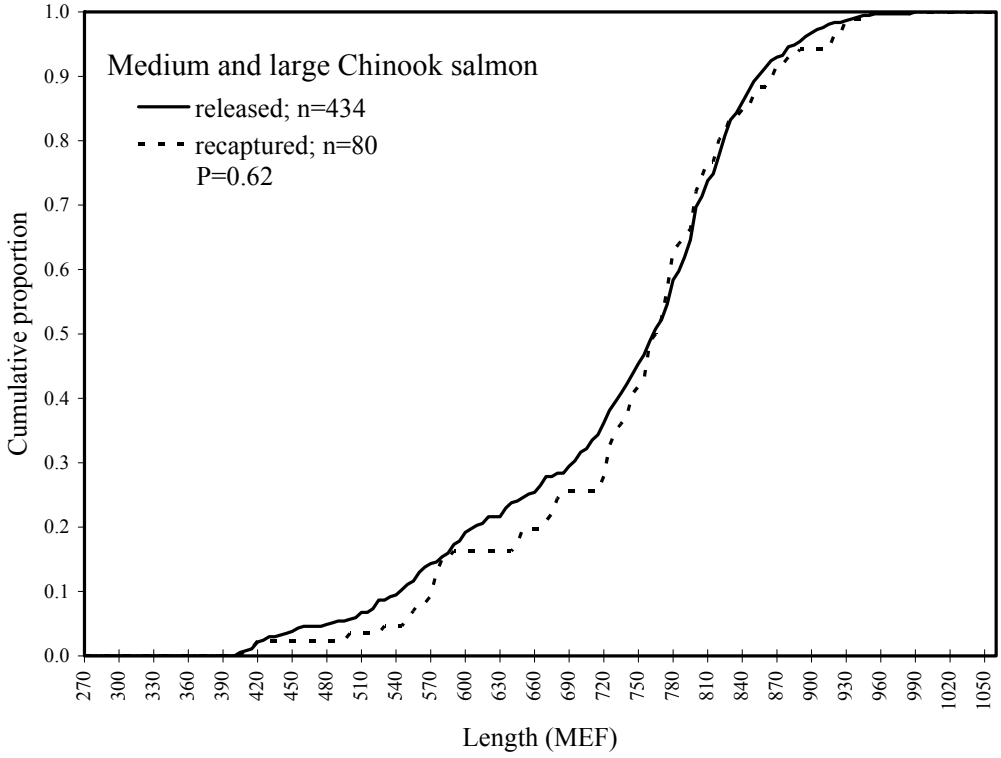

Figure 23.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries and the lower river fisheries in 2006.

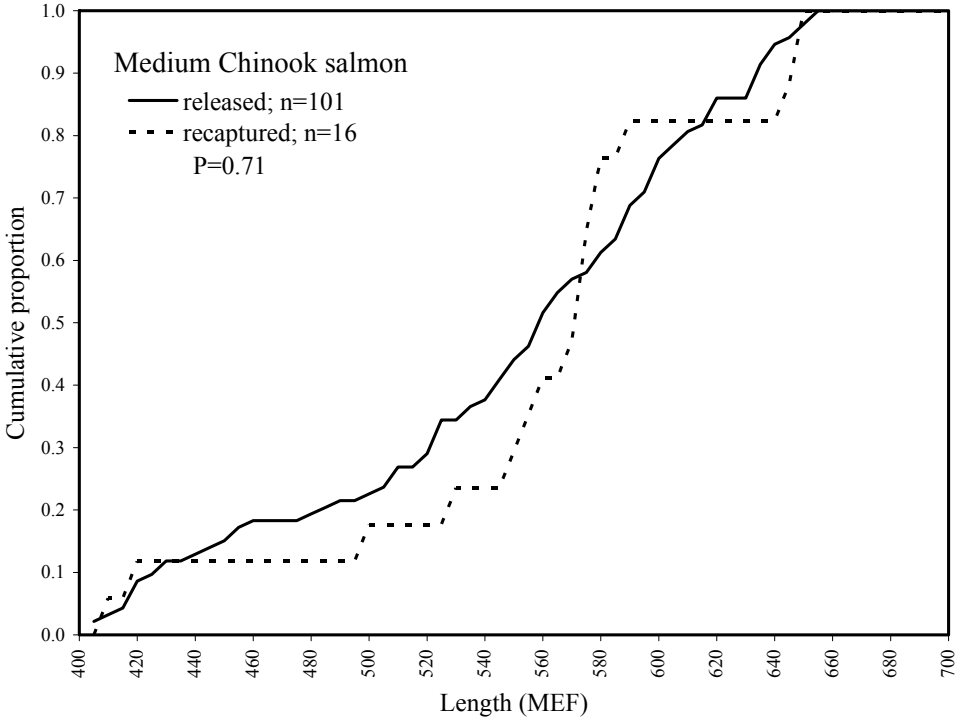

Figure 24.–Cumulative proportions of medium Chinook salmon marked at Canyon Island (minus 1 marine and 8 inriver fishery removals) versus those recaptured in tributaries and the lower river fisheries in 2006.

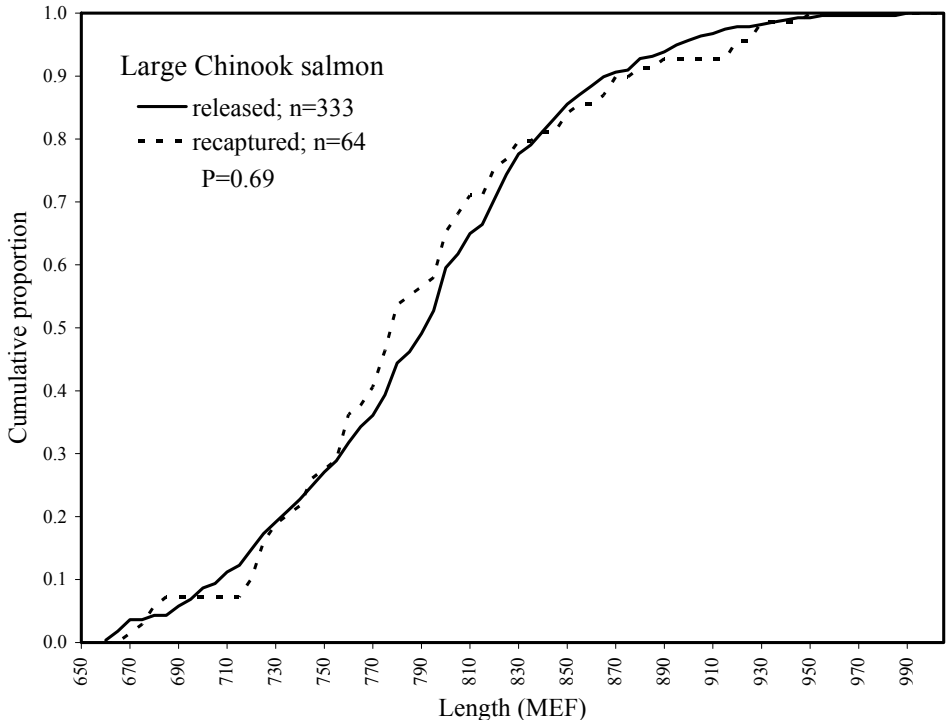

Figure 25.–Cumulative proportions of large Chinook salmon marked at Canyon Island (minus 4 marine and 57 inriver fishery removals) versus those recaptured in tributaries and the lower river fisheries in 2006.

The estimated inriver run of large-sized Chinook salmon in 2006 was 50,525 (SE = 5,535). This is based on 9,832 fish inspected for marks ($=C_{ls}$) at 6 tributaries and in the lower river fisheries, 64 of which were recaptured fish ($=R_{ls}$; Table 23). The inriver fisheries harvested 8,229 (630 test, 7,377 commercial, and 222 Aboriginal) large-sized Chinook salmon resulting in a spawning abundance ($=\hat{N}_{ls}$) of 42,296 (SE = 5,535). The fractions of marked fish were significantly different between spawning areas when the 4 areas with no recoveries were pooled (χ^2=6.4, df = 2, P = 0.04). Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in 4 of 6 spawning areas. The fractions of marked fish (Table 23) were not different between samples gathered in the test fishery, the Canadian commercial fishery, the aboriginal fishery, and the pooled spawning grounds samples (χ^2=2.8, df = 3, P = 0.42). Fisheries removed an estimated 61 (4 in the marine and 57 in the inriver fisheries) tagged fish ($=\hat{H}_{ls}$), and the estimated number of large tagged fish in the estimate was 333 ($=\hat{M}_{ls}$). Estimated abundance of large-sized fish has a 95% confidence interval of 33,980 to 55,483, and an estimated relative bias of 1.2% based on the Chapman model. The true degree of bias due to failure of the consistency test is unknown.

The estimated abundance of medium and large-sized Chinook salmon ($\hat{N}=\hat{N}_{ms}+\hat{N}_{ls}$) on the spawning grounds in 2006 was 44,726 (SE = 5,597), with a 95% confidence interval of 36,504 to 58,247.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2006

Age-1.3 and age-1.4 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 2006. Amongst medium and large-sized Chinook salmon, age 1.4 constituted 46.2% (SE = 1.4%) of the estimated escapement; age-1.3 fish 45.6% (SE = 1.3%) and age-1.2 fish 6.4% (SE = 1.1%; Table 24)(Appendix H3).

Amongst medium and large-sized Chinook salmon, males composed 51.8% (SE = 1.4%) of the estimated escapement (Table 24). Males accounted for 98.0% of medium fish, 62.8% of which were age 1.2. Females were an estimated 50.8% (21,506 fish; SE = 2,875) of the large fish, and age 1.4 accounted for 48.6% of large fish. All small-sized Chinook salmon were male and 94.6% were age 1.1.

Of the large fish sampled at Canyon Island, 46.9% were age 1.3 fish and 49.4% were age 1.4. For medium fish, 67.6% were age 1.2, 15.7% were age 1.3, and 11.8% were age 1.1. Within size groups, the age compositions from samples taken at Canyon Island are similar to those from the combined tributary samples.

Length compositions were similar between samples gathered on the spawning grounds and at Canyon Island (Table 25).

Table 24.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2006.

		Brood year and age class									
		2003	2002	2002	2001	2001	2000	2000	1999	1999	
		1.1	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		121	1	42		8			192
	%	10.2%		61.7%	0.5%	21.4%		4.1%			98.0%
	SE of %	2.2%		3.5%	0.5%	2.9%		1.4%			1.0%
	Escapement	248		1,500	12	521		99			2,380
	SE of esc.	86		427	12	161		43			665
Females	n			2		1		1			4
	%			1.0%	0.0%	0.5%		0.5%			2.0%
	SE of %			0.7%	0.0%	0.5%		0.5%			1.0%
	Escapement			25	0	12		12			50
	SE of esc.			18	0	12		12			27
Sexes Combined	n	20		123	1	43		9			196
	%	10.2%		62.8%	0.5%	21.9%		4.6%			100.0%
	SE of %	2.2%		3.5%	0.5%	3.0%		1.5%			0.0%
	Escapement	248		1,525	12	533		112			2,430
	SE of esc.	86		433	12	164		47			679
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n			40	2	403	4	305		1	755
	%			2.6%	0.1%	26.2%	0.3%	19.9%		0.1%	49.2%
	SE of %			0.4%	0.1%	1.1%	0.1%	1.0%		0.1%	1.3%
	Escapement			1,101	55	11,097	110	8,399		28	20,790
	SE of esc.			224	39	1,532	56	1,183		28	2,783
Females	n			9		318	6	441	3	4	781
	%			0.6%		20.7%	0.4%	28.7%	0.2%	0.3%	50.8%
	SE of %			0.2%		1.0%	0.2%	1.2%	0.1%	0.1%	1.3%
	Escapement			248		8,757	165	12,144	83	110	21,506
	SE of esc.			88		1,229	70	1,667	48	56	2,875
Sexes Combined	n			49	2	721	10	746	3	5	1,536
	%			3.2%	0.1%	46.9%	0.7%	48.6%	0.2%	0.3%	100.0%
	SE of %			0.4%	0.1%	1.3%	0.2%	1.3%	0.1%	0.1%	0.0%
	Escapement			1,349	55	19,854	275	20,542	83	138	42,296
	SE of esc.			258	39	2,662	93	2,751	48	64	5,535
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	20		161	3	445	4	313		1	947
	%	0.6%		5.8%	0.2%	26.0%	0.2%	19.0%		0.1%	51.8%
	SE of %	0.2%		1.0%	0.1%	1.1%	0.1%	1.0%		0.1%	1.4%
	Escapement	248		2,602	67	11,618	110	8,498		28	23,170
	SE of esc.	86		482	41	1,540	56	1,184		28	2,861
Females	n			11		319	6	442	3	4	785
	%			0.6%		19.6%	0.4%	27.2%	0.2%	0.2%	48.2%
	SE of %			0.2%		1.0%	0.2%	1.2%	0.1%	0.1%	1.4%
	Escapement			273		8,769	165	12,156	83	110	21,556
	SE of esc.			90		1,229	70	1,667	48	56	2,875
Sexes Combined	n	20		172	3	764	10	755	3	5	1,732
	%	0.6%		6.4%	0.2%	45.6%	0.6%	46.2%	0.2%	0.3%	100.0%
	SE of %	0.2%		1.1%	0.1%	1.3%	0.2%	1.4%	0.1%	0.1%	0.0%
	escapement	248		2,874	67	20,387	275	20,654	83	138	44,726
	SE of Esc.	86		505	41	2,667	93	2,751	48	64	5,597

Table 25.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2006.

		Brood Year and age class									
		2003	2002	2002	2001	2001	2000	2000	1999	1999	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	184	1	168	3	445	4	313		1	1,119
	Average	363	365	587	698	759	760	828		890	
	SD	54		97	55	77	44	68			
	SE	4		8	32	4	22	4			
Females	n			11		319	6	442	3	4	785
	Average			718		766	799	811	815	858	
	SD			69		45	33	40	40	43	
	SE			21		3	14	2	23	22	
Sexes Combined	n	184	1	179	3	764	10	755	3	5	1,904
	Average	363	365	595	698	762	784	818	815	864	
	SD	54		101	857	65	41	54	40	40	
	SE	4		8	32	2	13	2	23	18	

TAGGING, RECOVERY AND ABUNDANCE IN 2007

Medium and large-sized Chinook salmon abundances in 2007 were 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 429 Chinook salmon of known size were caught at Canyon Island of which 406 were tagged and released (Table 26). Of the total caught, 50 were small-sized, 191 were medium-sized, and 188 were large-sized Chinook salmon, and all of these fish were caught between 27 April and 19 August.

For the large-sized Chinook salmon caught at Canyon Island, 182 were tagged and released (Table 26). Of these, gillnets caught 34 (Appendix I1) and fish wheels caught 148 (Appendix I2). For the medium-sized Chinook salmon caught at Canyon Island, 181 were tagged and released (Table 26). Of these, 54 were captured in gillnets (Appendix I1) and 127 were caught in fish wheels (Appendix I2). Forty-three small-sized (≤400 mm MEF) Chinook salmon caught at Canyon Island were tagged and released, all of which were captured using fish wheels (Appendices I1 and I2).

A total of 96 Chinook salmon were captured using gillnets operated at Canyon Island and sampled for adipose finclips, none of which were missing their adipose fin (Appendix I1). A total of 334 Chinook salmon were captured using fish wheels operated near Canyon Island and sampled for adipose finclips. Five of these fish were missing their adipose fin, all of which possessed valid coded wire (Appendix I2).

Table 26.–Numbers of Chinook salmon marked at Canyon Island, removed by fisheries and inspected for marks in tributaries and fisheries in 2007 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					
A. Total initially tagged		43	181	182	406
1. Captured using set gillnets			54	34	88
2. Captured using fish wheels		43	127	148	318
B. Total removals by:				2	2
1. Total U.S. fisheries[a]				2	2
Sport fisheries					
Commercial gillnet				2	2
Commercial troll					
Personal use					
3. Total Canadian fisheries					
Test fishery					
Aboriginal fishery					
Commercial fishery					
Sport fishery					
4. Recaptured as mortality at Canyon Island FW/GN					
C. Final total tagged in event 1 ($\hat{M}_i$)		43	**181**	**180**	404
EVENT 2 - FISH INSPECTED FOR SPAGHETTI TAGS					
A. Upper river	Inspected		177	237	414
(All spawning grounds)	Marked		6	6	12
	Marked/Inspected		0.034	0.025	0.029
1. Nakina River	Inspected		5	12	17
	Marked				
	Marked/Inspected				
2. Lower Tatsamenie (Tatsatua River)	Inspected		101	136	237
	Marked		3	6	9
	Marked/Inspected		0.030	0.044	0.038
3. Upper Tatsamenie (Tatsatua River)	Inspected		24	6	30
	Marked				
	Marked/Inspected				
4. Nahlin River	Inspected		11	23	34
	Marked				
	Marked/Inspected				
6. Kowatua River	Inspected		14	47	61
	Marked				
	Marked/Inspected				
7. Hackett River	Inspected		22	13	35
	Marked		3		3
	Marked/Inspected		0.136		0.086

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Table 26.–Page 2 of 2.

		Small	Medium	Large	
		0–400 mm	401–659 mm	≥660 mm	Total
B. Lower river Canadian fisheries	Inspected	2	744	2,437	3,183
(Test, aboriginal and commercial)	Marked		14	21	35
	Marked/Inspected		0.019	0.009	0.011
1. Test fishery	Inspected		302	1,396	1,698
	Marked		3	10	13
	Marked/Inspected		0.010	0.007	0.008
2. Aboriginal fishery	Inspected		16	167	183
	Marked				
	Marked/Inspected				
3. Commercial fishery	Inspected	2	426	874	1,302
	Marked		11	11	22
	Marked/Inspected		0.026	0.013	0.017
C. Final total sampled in event 2	Inspected	2	**921**	**2,674**	3,597
(upper and lower river)	Marked		**20**	**27**	47
	Marked/Inspected		0.022	0.010	0.013

[a] All recoveries were select without expansion.

In 2007, the weather was unseasonably cool well into May. This resulted in a late spring thaw and below average water levels through mid-May. However, due to an above-average to record-level snow pack throughout the Taku River drainage, the water levels quickly rose to above-average flows that persisted throughout the summer into late August. As a result, gillnets were used to capture fish through 17 May, after which fish wheels were used exclusively. The unusually high water levels adversely affected the catch rates in fish wheels and the success of the spawning grounds work. Very few fish were sampled at any of the traditional spawning grounds locations with the exception of Little Tatsamenie Lake, a late run stock of fish that is normally sampled from late August through mid-September, a period of average water level in 2007.

The poor tagging and spawning grounds samples led us to the same approach used to estimate abundance in 1999, 2005 and 2006. Inriver abundance past Canyon Island was estimated using all sampling data and escapement was estimated by subtracting inriver harvest from inriver abundance. From past experience, we believe this approach produces the least biased estimates in 2007.

Cumulative proportions of combined medium and large Chinook salmon marked and released at Canyon Island were marginally similar to fish recaptured in the inriver commercial fishery and in various tributaries in 2007 ($P = 0.12$; Figure 26). Estimates of abundance stratified by size class and separate comparisons of length distributions for medium and large Chinook salmon indicated size-selective sampling was not significant within size groups ($P = 0.99$, $P = 0.18$; Figures 27 and 28). Exact length measurements were not taken on some recaptured fish, thus they were precluded in these analyses.

Only 43 small-sized Chinook salmon were tagged at Canyon Island in 2007. No small-sized fish were sampled on the spawning grounds and only 2 were caught in the lower river fisheries. Therefore, it was not possible to estimate the spawning abundance of small-sized Chinook salmon in 2007.

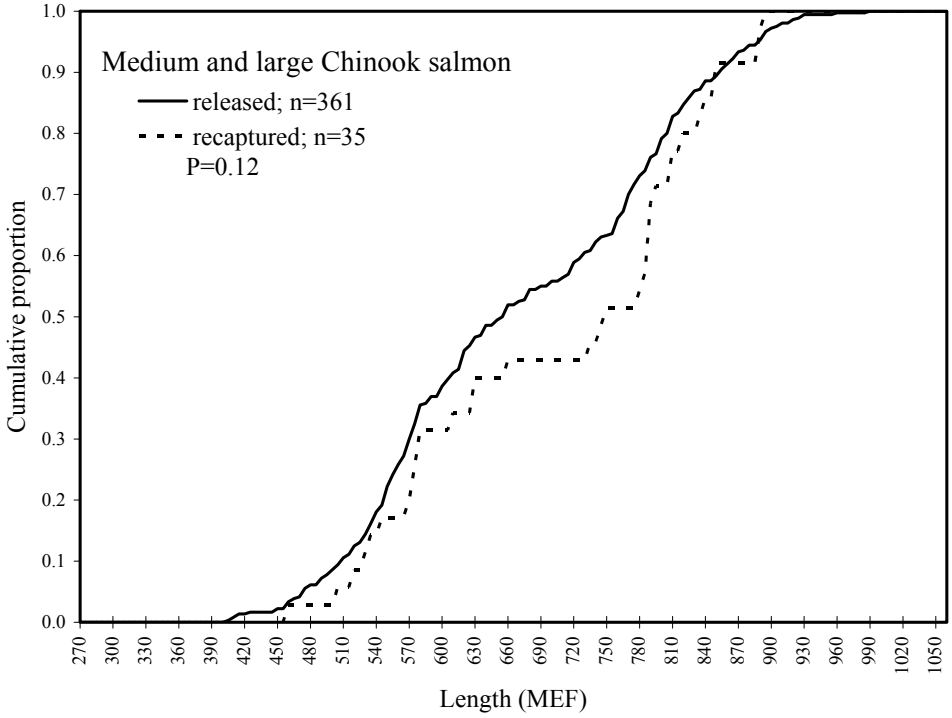

Figure 26.–Cumulative proportions of medium and large Chinook salmon marked at Canyon Island versus those recaptured in tributaries and the lower river fisheries in 2007.

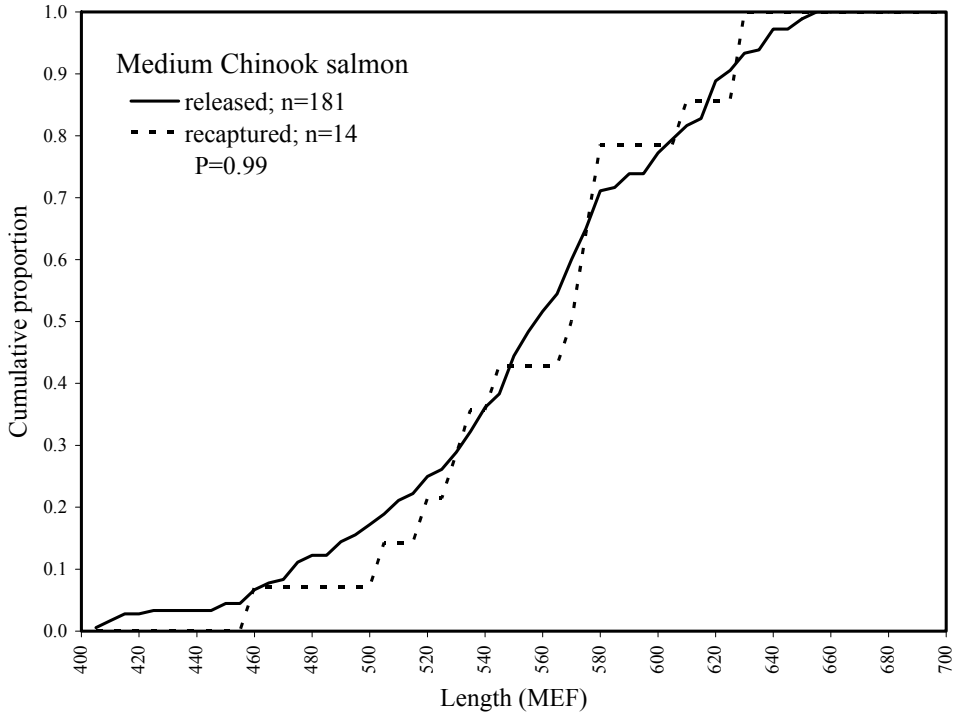

Figure 27.–Cumulative proportions of medium Chinook salmon marked at Canyon Island versus those recaptured in tributaries and the lower river fisheries in 2007.

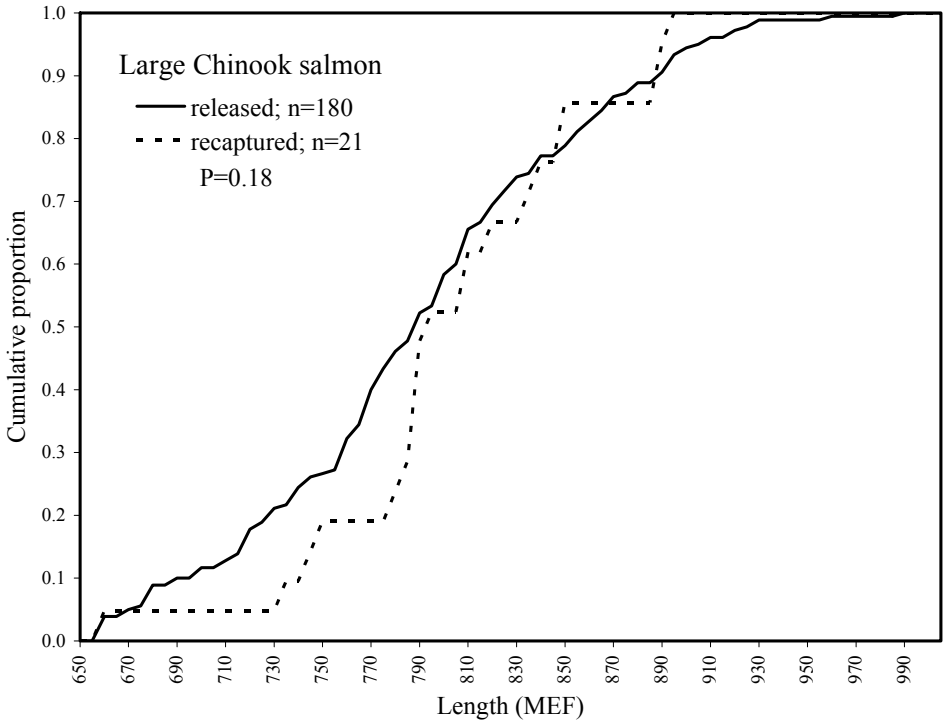

Figure 28.–Cumulative proportions of large Chinook salmon marked at Canyon Island (minus 2 marine fishery removals) versus those recaptured in tributaries and the lower river fisheries in 2007.

The estimated inriver run of medium-sized Chinook salmon in 2007 was 7,990 (SE = 1,814). This is based on 921 fish inspected for marks ($=C_{ms}$) in tributaries and the lower river fisheries, 20 of which were recaptured fish ($=R_{ms}$; Table 26). Inriver fisheries harvested 744 medium-sized fish resulting in a spawning abundance ($=\hat{N}_{ms}$) of 7,246 (SE = 1,814). No censured medium-sized fish were reported in the marine fishery and the estimated number of medium tagged fish in the estimate was 181 ($=\hat{M}_{ms}$). The fractions of marked fish were significantly different between spawning areas when the 4 areas with no recoveries were pooled (χ^2=9.0, df = 2, P = 0.01). Consideration of a spatially stratified estimator (Darroch 1961) in lieu of the Chapman model was precluded by no recoveries in 4 of 6 spawning areas. The fractions of marked fish (Table 26) were not different between samples gathered in the test fishery, the Canadian commercial fishery, the aboriginal fishery, and the pooled spawning grounds samples (χ^2=3.9, df = 3, P = 0.27). The estimated abundance of medium-sized fish has a 95% confidence interval of 4,963 to 11,998, and an estimated relative bias of 4.0% based on the Chapman model. The true degree of bias due to failure of the consistency test is unknown.

The estimated inriver run of large-sized Chinook salmon ($=\hat{N}_{ls}$) in 2007 was 17,291 (SE = 3,277). This is based on 2,674 fish inspected for marks ($=C_{ms}$) in tributaries and the lower river fisheries, 27 of which were recaptured fish ($=R_{ms}$; Table 26). The inriver fisheries harvested 2,437 (1,396 test, 874 commercial, and 167 Aboriginal) large-sized fish, resulting in a spawning abundance of 14,854 (SE = 3,277). The marine fishery removed 2 tagged fish ($=\hat{H}_{ms}$), and the estimated number of large tagged fish in our estimate is 180 ($=\hat{M}_{ms}$). The fractions of marked fish were significantly different between spawning areas when the 5 areas with no recoveries are pooled (χ^2=4.6, df = 1, P = 0.03). Consideration of a spatially stratified estimator (Darroch 1961)

in lieu of the Chapman model was precluded by no recoveries in 5 of 6 spawning areas. The fractions of marked fish (Table 26) were significantly different between samples gathered in the test fishery, the Canadian commercial fishery, the aboriginal fishery, and the pooled spawning grounds samples (χ^2=8.9, df = 3, P = 0.03). The difference was due to the marked fraction from spawning ground samples being greater than fractions observed in the fisheries. As stated earlier, this model is believed to be reasonable from past experience, although failure of the consistency tests indicates potential for bias in the Chapman estimator. Regardless of the model or data set(s) used, the spawning estimate of large fish in 2007 was less than 17,600 individuals. The estimated abundance of large-sized fish has a 95% confidence interval of 10,578 to 23,255, with an estimated relative bias of 3.3%% based on the Chapman model. The true degree of bias due to failure of the consistency test is unknown.

The estimated abundance of medium and large-sized Chinook salmon ($\hat{N} = \hat{N}_{ms} + \hat{N}_{ls}$) on the spawning grounds in 2007 was 22,100 (SE = 3,745), with a 95% confidence interval of 17,260 to 31,700.

ESTIMATES OF AGE AND SEX COMPOSITION IN 2007

Age-1.2 and age-1.3 fish were the most abundant Chinook salmon on the spawning grounds of the Taku River in 2007. For medium and large-sized Chinook salmon escapement, age-1.3 fish constituted 38.3% (SE = 3.8%) of the escapement; age-1.2 fish 31.4% (SE = 5.3%) and age-1.4 fish 25.8% (SE = 3.5%; Table 27; Appendix I3).

For medium and large-sized Chinook salmon, the sex composition of the estimated escapement was 69.3% (SE = 3.5%) male (Table 27). Males accounted for 93.3% of medium fish, 77.4% of which were age 1.2. Of the large fish, 57.7% were male, and age 1.3 fish accounted for 51.4% of the total. There were an estimated 6,290 (SE = 1,469) large female spawners in 2007. All small-sized Chinook salmon were male and age 1.1.

Of the large fish sampled at Canyon Island, 52.4% were age 1.3 and 41.1% were age 1.4. For medium fish, 97.3% were age 1.2. Within size groups, the age compositions from samples taken at Canyon Island are similar to those from the combined tributary samples.

Length compositions were similar between samples gathered on the spawning grounds and at Canyon Island (Table 28).

Table 27.–Estimated abundance and composition by age, sex, and length class of the spawning population of Chinook salmon in the Taku River in 2007.

		Brood year and age class									
		2004	2003	2003	2002	2002	2001	2001	2000	2000	
		1.1	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	14		124		13		2			153
	%	8.5%		75.6%		7.9%		1.2%			93.3%
	SE of %	2.2%		3.4%		2.1%		0.9%			2.0%
	Escapement	619		5,479		574		88			6,760
	SE of esc.	218		1,392		207		64			1,698
Females	n			3	2	6					11
	%			1.8%	1.2%	3.7%					6.7%
	SE of %			1.0%	0.9%	1.5%					2.0%
	Escapement			133	88	265					486
	SE of esc.			81	64	123					184

-continued-

Table 27.–Page 2 of 2.

		Brood year and age class									
		2004	2003	2003	2002	2002	2001	2001	2000	2000	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Sexes Combined	n	14		127	2	19		2			164
	%	8.5%		77.4%	1.2%	11.6%		1.2%			100.0%
	SE of %	2.2%		3.3%	0.9%	2.5%		0.9%			0.0%
	Escapement	619		5,611	88	839		88			7,246
	SE of esc.	218		1,423	64	274		64			1,814
PANEL B: AGE AND SEX COMPOSITION OF LARGE CHINOOK SALMON											
Males	n			19		64	1	42	1	1	128
	%			8.6%		28.8%	0.5%	18.9%	0.5%	0.5%	57.7%
	SE of %			1.9%		3.0%	0.5%	2.6%	0.5%	0.5%	3.3%
	Escapement			1,271		4,282	67	2,810	67	67	8,564
	SE of esc.			391		1,043	67	728	67	67	1,950
Females	n			1		50		42		1	94
	%			0.5%		22.5%		18.9%		0.5%	42.3%
	SE of %			0.5%		2.8%		2.6%		0.5%	3.3%
	Escapement			67		3,345		2,810		67	6,290
	SE of esc.			67		843		728		67	1,469
Sexes Combined	n			20		114	1	84	1	2	222
	%			9.0%		51.4%	0.5%	37.8%	0.5%	0.9%	100.0%
	SE of %			1.9%		3.4%	0.5%	3.3%	0.5%	0.6%	0.0%
	Escapement			1,338		7,628	67	5,620	67	134	14,854
	SE of esc.			406		1,752	67	1,327	67	97	3,277
PANEL C: AGE AND SEX COMPOSITION OF MEDIUM AND LARGE CHINOOK SALMON											
Males	n	14		143		77	1	44	1	1	281
	%	2.8%		30.5%		22.0%	0.3%	13.1%	0.3%	0.3%	69.3%
	SE of %	1.0%		5.2%		2.7%	0.3%	2.2%	0.3%	0.3%	3.5%
	Escapement	619		6,750		4,857	67	2,899	67	67	15,324
	SE of esc.	218		1,445		1,063	67	731	67	67	2,585
Females	n			4	2	56		42		1	105
	%			0.9%	0.4%	16.3%		12.7%		0.3%	30.7%
	SE of %			0.5%	0.3%	2.4%		2.3%		0.3%	3.5%
	Escapement			199	88	3,611		2,810		67	6,776
	SE of esc.			105	64	852		728		67	1,480
Sexes Combined	n	14		147	2	133	1	86	1	2	386
	%	2.8%		31.4%	0.4%	38.3%	0.3%	25.8%	0.3%	0.6%	100.0%
	SE of %	1.0%		5.3%	0.3%	3.8%	0.3%	3.5%	0.3%	0.4%	0.0%
	Escapement	619		6,949	88	8,467	67	5,709	67	134	22,100
	SE of esc.	218		1,480	64	1,773	67	1,328	67	97	3,745

Table 28.–The average length by age of Chinook salmon sampled on the spawning grounds in the Taku River in 2007.

		Brood Year and age class									
		2004	2003	2003	2002	2002	2001	2001	2000	2000	
		1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Males	n	55		143		77	1	44	1	1	322
	Average	391		595		738	700	844	810	985	
	SD	71		59		88		77			
	SE	10		5		10		12			
Females	n			6	1	54		43		1	105
	Average			588	580	763		806		875	
	SD			81		54		44			
	SE			33		7		7			
Sexes Combined	n	55		149	1	131	1	87	1	2	427
	Average	391		595	580	748	700	826	810	930	
	SD	71		60		77		66		78	
	SE	10		5		7		7		55	

DISCUSSION

We have used the M-R project to estimate the spawning abundance of Chinook salmon since 1995. A detailed operational plan was developed each year that planned on using 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 1 of the following 3: all fish must have an equal probability of being marked during event 1 or captured during event 2, or that marked and unmarked fish mix completely between sampling. Each year, crew members made every effort to follow sample design 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 also 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. In addition, radiotelemetry studies in 1989 and 1990 showed that about 95% of marked fish survived the 200 to 400 km migration upstream to the spawning grounds.

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, and the batch marks—left operculum punch and excision of the axillary appendage), sampling during event 2 was meticulous, 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 400 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 test fishery that typically runs May through mid-June when operable, had a lower marked fraction than 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 run). Early in the season, untagged fish proceed upriver through the test 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 29). 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.

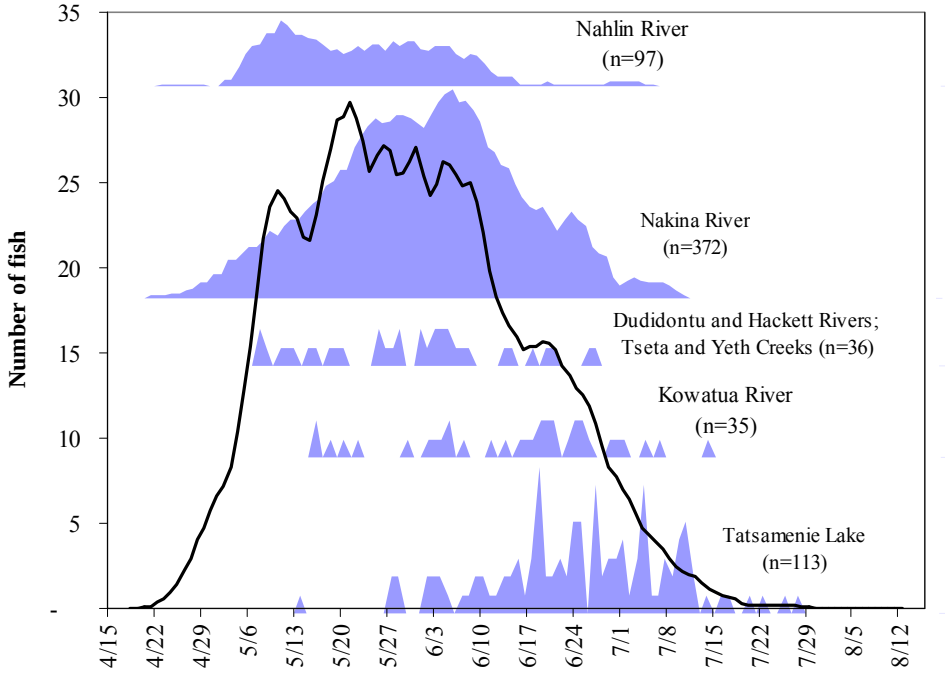

Figure 29.–Chinook salmon run timing as seen at Canyon Island in the lower Taku River (solid line) and the timing of major sub-stocks as they passed Canyon Island based on total spawning ground tag recoveries (gray areas), 1995 to 2007.

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 30). Within years, counts were highly correlated, indicating the relative year class strengths (Table 29). 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 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 peak survey total 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 apparently changed. The average expansion factors from 2000 to 2004 and 2005 to 2007 are 7.4 and 10.8, respectively (Table 29). The most plausible explanation for this change is a shift in spawning distribution, as the change occurred before the advent of recently directed commercial fisheries in 2005.

Comparison of aerial counts and total terminal runs of large Chinook salmon during the 2 directed fishing years and the 2 periods of non-directed fishing years suggest that the early-run stocks (i.e., the Nahlin River and to some extent Dudidontu River and Tseta Creek stocks) experienced decreased escapements because of directed fishing (Table 29). The estimated terminal runs during 2 time periods of non-directed fishing (1990–1999 and 2000–2004) were comparable to the runs during directed fishing (2005–2006).

However, the average peak aerial counts of escapement were not necessarily comparable for the Nahlin River (2,277 and 1,082 versus 713), the Dudidontu River (880 and 695 versus 357), and Tseta Creek (503 and 379 versus 277). A similar result is seen for the middle-run Nakina stock (5,294 and 2,948 versus 1,557). However, for late-run stocks, which in theory had similar management regimes throughout these 3 time periods, the average peak aerial counts were comparable for the Kowatua River (852 and 875 versus 1,007) and Tatsamenie Lake (1,140 and 1,104 versus 1,027; Table 29). These results suggest the exploitation rate has remained fairly consistent for the late-run stocks, but have increased for early-run stocks since directed fisheries began. Changes in productivity and related spawning distribution may also be a factor.

Table 29.–Peak aerial counts, escapement, and terminal run of large Chinook salmon in the Taku River, 1973 to 2007.

Year	Nakina River	Nahlin River	Kowatua River	Tatsamenie Lake	Dudidontu River	Tseta Creek	5 tributary total	Escapement[a]	Proportion surveyed (expansion factor)	Terminal run[b]
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[c]	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	1,201	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	**38,725**	0.10 (9.7)	66,858
2006	1,900	955	1,180	908	395	199	5,338	**42,296**	0.13 (7.9)	61,485
2007	77	277	262	390	4		1,010	**14,854**	0.07 (14.7)	18,558
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	0.21 (5.2)	61,234
2000–2004	2,948	1,082	875	1,104	695	379	6,704	49,630	0.14 (7.4)	53,959
2005–2007	1,063	568	758	815	239	207	3,443	31,958	0.10 (10.8)	48,967
All years										
1973–2007	3,460	1,417	663	884	467	326	6,820	38,890	0.16 (7.1)	43,884

[a] 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.

[b] 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.

[c] 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.

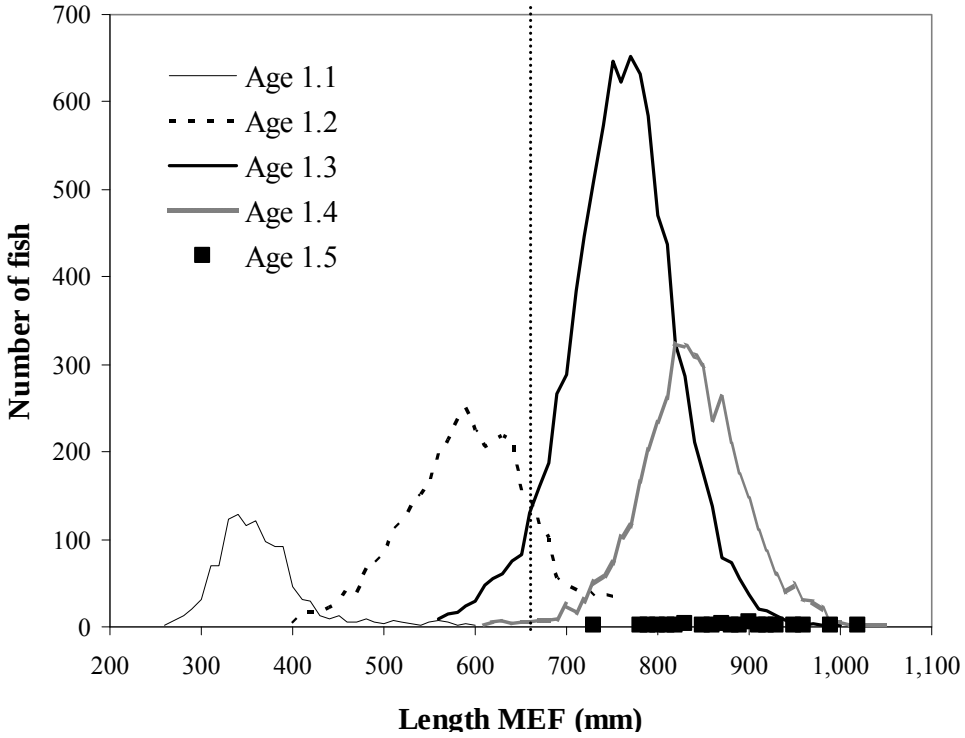

Figure 30.–Length-frequency distributions of age groups of Chinook salmon sampled on the spawning grounds in the Taku River, 1999–2007. The dashed vertical line represents the boundary segregating large Chinook salmon (≥660 mm MEF) from medium and small fish.

The average size of age-1.3 and age-1.4 fish sampled at Canyon Island between 1999 and 2007 was compared to the average lengths of 3-ocean and 4-ocean age Chinook salmon gathered in the Southeast Alaska troll fishery (Figure 31). Regardless of length-type sampling differences between the 2 samples, visual inspection suggests both samples cycle together and considering that 95% of the troll sample consists of hatchery fish that are released at fairly consistent lengths each year, marine factors, not freshwater factors, are most responsible for fluctuations in average length.

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 and began again in 1995. Since that time, successful estimates of medium-sized Chinook salmon have occurred in all years. Estimates of large-sized Chinook salmon were successful in all but 2 years, 1995 and 1998, when low tagging and recovery rates yielded invalid estimates; however, an estimate for large fish was estimated in 1995 from the M-R estimate of medium fish and the proportion of large fish seen in samples (1,100 fish) at the Nakina live weir. In 3 years, 2002 to 2004, M-R estimates of small Chinook salmon spawning abundance were valid (Table 30). The addition of new directed fisheries in 2005 and 2006 nearly tripled the average event 2 sample size and nearly doubled the average number of recaptures seen during all years of successful large Chinook salmon M-R (Table 30). As a result, estimates in directed fishing years were more precise than in other years, on average.

Table 30.–M-R estimates, standard errors, and statistics for Chinook salmon in the Taku River in 1989, 1990, 1995 to 1997, and 1999 to 2007.

	Small		Medium		Large	
PANEL A: MARK-RECAPTURE ESTIMATES AND STANDARD ERRORS						
Year	$\hat{N}$	SE	$\hat{N}$	SE	$\hat{N}$	SE
1989[a]	No mark-recapture		*10,569*	*1,589*	40,329	5,646
1990[a]	No mark-recapture		*7,095*	*1,338*	52,142	9,326
1991–1994[b]	No mark-recapture		No mark-recapture		No mark-recapture	
1995[c]	No mark-recapture		32,246	3,751	*33,805*	*5,060*
1996	No mark-recapture		10,402	1,553	79,019	9,048
1997	No mark-recapture		2,543	926	114,938	17,888
1998[d]			11,775	3,237	*31,039*	*10,604*
1999	No mark-recapture		8,960	1,462	16,786	3,171
2000	No mark-recapture		8,551	1,928	34,997	5,403
2001	No mark-recapture		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	No mark-recapture		5,508	1,024	38,725	4,908
2006	No mark-recapture		2,430	679	42,296	5,535
2007	No mark-recapture		7,246	1,814	14,854	3,277

PANEL B: MARK-RECAPTURE STATISTICS									
Year	n_1	n_2	m_2	n_1	n_2	m_2	n_1	n_2	m_2
1989	No mark-recapture			No mark-recapture		328		5,270	42
1990	No mark-recapture			No mark-recapture		270		5,194	26
1991–1994	No mark-recapture			No mark-recapture			No mark-recapture		
1995	No mark-recapture			798	2,582	63	No mark-recapture		
1996	No mark-recapture			438	1,018	42	1,113	5,319	74
1997	No mark-recapture			105	263	10	915	6,022	47
1998	No mark-recapture			469	450	17	No mark-recapture		
1999	No mark-recapture			919	396	37	333	1,658	30
2000	No mark-recapture			340	622	23	656	2,636	47
2001	No mark-recapture			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	No mark-recapture			130	1,502	30	368	10,166	80
2006	No mark-recapture			101	440	16	333	9,832	64
2007	No mark-recapture			181	921	20	180	2,674	27

[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.

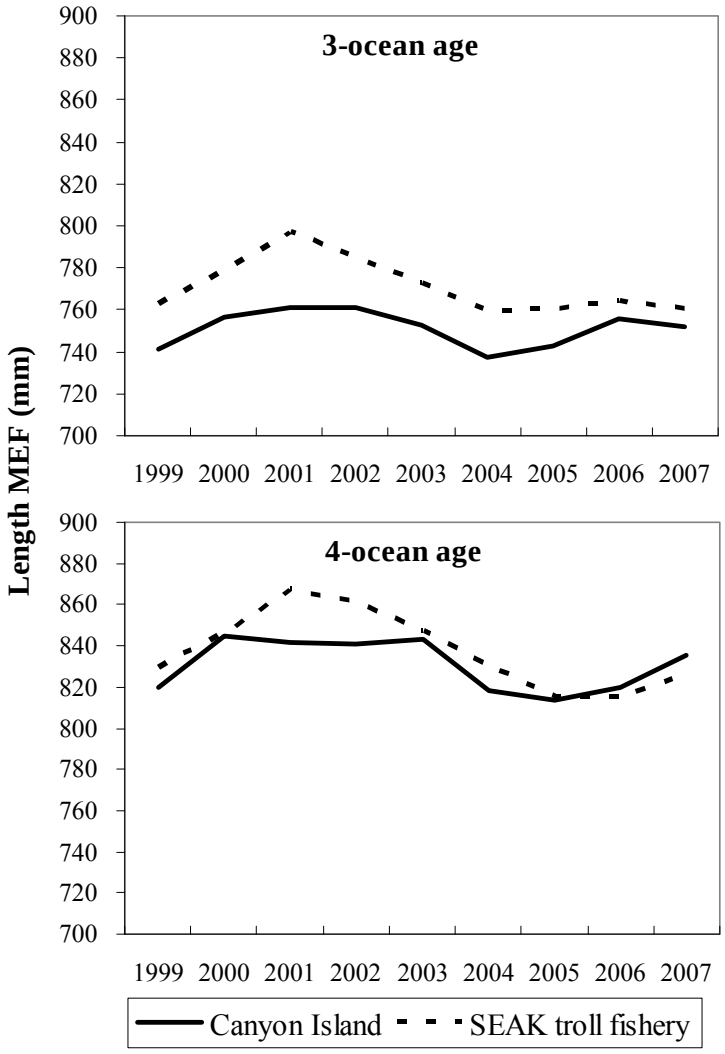

Figure 31.–Average length (MEF) of 3-ocean and 4-ocean age Chinook salmon measured at Canyon Island and in the Southeast Alaska troll fishery from 1999 to 2007. The troll fishery sample consists of coded wire tag recoveries germane to hatchery and wild stocks released in Alaska.

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 unbiased estimates of age, sex and length structure (McPherson et al. 1996).

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 River in Southeast Alaska, and many other systems in central and western Alaska, in Canada and the southern U.S.

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REFERENCES CITED

Alaska Department of Fisheries. 1951. Annual report for 1951. Report No. 3, Juneau.

Bendock, T. N., and M. Alexandersdottir. 1993. Hooking mortality of Chinook salmon released in the Kenai River, Alaska. North American Journal of Fisheries Management 13:540-549.

Bernard, D. R., J. J. Hasbrouck, and S. J. Fleischman. 1999. Handling-induced delay and downstream movement of adult Chinook salmon in rivers. Fisheries 44:37-46.

Bigelow, B. B., B. J. Bailey, M. M. Hiner, M. F. Schellekens, and K. R. Linn. 1995. Water resources data Alaska water year 1994. U. S. Geological Survey Water Data Report AK-94-1, Anchorage.

Boyce, I. M., S. A. McPherson, D. R. Bernard, and E. L. J. III. 2006. Spawning abundance of Chinook salmon in the Taku River in 2003. Alaska Department of Fish and Game, Fishery Data Series No. 06-16, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds06-16.pdf

Buckland, S. T., and P. H. Garthwaite. 1991. Quantifying precision of mark-recapture estimates using the bootstrap and related methods. Biometrics 47:255-268.

Chapman, D. G. 1951. Some properties of the hypergeometric distribution with applications to zoological censuses. University of California Publications in Statistics 1:131-160.

REFERENCES CITED (Continued)

Clutter, R., and L. Whitesel. 1956. Collection and interpretation of sockeye salmon scales. International Pacific Salmon Commission, Bulletin 9. Westminster, British Columbia.

Conover, W. J. 1980. Practical nonparametric statistics, 2nd edition. John Wiley and Sons, New York.

Darroch, J. N. 1961. The two-sample capture-recapture census when tagging and sampling are stratified. Biometrika 48:241-260.

Efron, B., and R. J. Tibshirani. 1993. 1st edition. An introduction to the bootstrap. Chapman and Hall, New York.

Eiler, J. H. 1990. Radio transmitters used to study salmon in glacial rivers. pp 364-369 [*In*] N. C. Parker et al., *editors*. Symposium 7: Proceedings from the International Symposium and Educational Workshop on Fish-Marking Techniques, held in Seattle, Washington, June 1988. American Fisheries Society, Bethesda, Md.

Goodman, L. A. 1960. On the exact variance of products. Journal of the American Statistical Association 55:708-713.

Johnson, R. E., R. P. Marshall, and S. T. Elliott. 1992. Chilkat River Chinook salmon studies, 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-49, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds92-49.pdf

Kelley, M. S., and P. A. Milligan. 1999. Mark-recapture studies of Taku River adult salmon stocks in 1998. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 1J99-21, Douglas.

Kissner, P. D. 1976. Status of important native Chinook salmon stocks in Southeastern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1976-1977, Project F-9-8(17) AFS 41-4b, Juneau. http://www.sf.adfg.state.ak.us/FedAidpdfs/FREDF-9-8(17)AFS-41-4b.pdf

Kissner, P. D., and D. J. Hubartt. 1986. Status of important native Chinook salmon stocks in Southeast Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1985-1986, Project F-10-1, 27 (AFS-41-13), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/FREDf-10-1(27)AFS-41-13.pdf

McGregor, A. J., and J. E. Clark. 1989. Migratory timing and escapement of Taku River salmon stocks in 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J89-40, Juneau. http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.1J.1989.40.pdf

McPherson, S. A., D. R. Bernard, and J. H. Clark. 2000. Optimal production of Chinook salmon from the Taku River. Alaska Department of Fish and Game, Fishery Manuscript No. 00-2, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fms00-02.pdf

McPherson, S. A., E. L. Jones III, S. J. Fleischman and I. M. Boyce. 2010 Optimal Production of Chinook salmon from the Taku River through the 2001 year class. Alaska Department of Fish and Game, Fishery Manuscript No.10-03, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/Sp10-03.pdf

McPherson, S. A., D. R. Bernard, M. S. Kelley, P. A. Milligan, and P. Timpany. 1996. Spawning abundance of Chinook salmon in the Taku River in 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-36, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds96-36.pdf

McPherson, S. A., D. R. Bernard, M. S. Kelley, P. A. Milligan, and P. Timpany. 1997. Spawning abundance of Chinook salmon in the Taku River in 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-14, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds97-14.pdf

McPherson, S. A., D. R. Bernard, M. S. Kelley, P. A. Milligan, and P. Timpany. 1998. Spawning abundance of Chinook salmon in the Taku River in 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-41, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds98-41.pdf

McPherson, S. A., D. R. Bernard, R. J. Yanusz, P. A. Milligan, and P. Timpany. 1999. Spawning abundance of Chinook salmon in the Taku River in 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-26, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds99-26.pdf

REFERENCES CITED (Continued)

Mecum, R. D., and P. D. Kissner. 1989. A study of Chinook salmon in southeast Alaska. Alaska Department of Fish and Game, Fishery Data Series No. 117, Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds-117.pdf

Meehan, W. R. 1961. Use of a fish wheel in salmon research and management. Transactions of the American Fisheries Society 90(4):490-494.

Olsen, M. A. 1992. Abundance, age, sex, and size of Chinook salmon catches and escapements in Southeast Alaska in 1987. Alaska Department of Fish and Game, Technical Fishery Report No. 92-07, Juneau. http://www.sf.adfg.state.ak.us/FedAidpdfs/tfr.92.07.pdf

Pahlke, K. A. 2009. Escapements of Chinook salmon in Southeast Alaska and transboundary rivers in 2007. Alaska Department of Fish and Game, Fishery Data Series No. 09-08, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds09-08.pdf

Pahlke, K. A., and D. R. Bernard. 1996. Abundance of the Chinook salmon escapement in the Taku River, 1989 to 1990. Alaska Fishery Research Bulletin 3(1):8-19, Juneau.

Pahlke, K. A., and D. R. Bernard. 1996. Abundance of the Chinook salmon escapement into the Taku River, 1989-1990., Alaska Fisheries Research Bulletin 3:9-20.

PSC (Pacific Salmon Commission). 1993. Transboundary river salmon production, harvest, and escapement estimates. 1992 Transboundary Technical Committee Report (93-1).

Robson, D. S. and H. A. Regier. 1964. Sample size in Peterson mark-recapture experiments. Transactions of the American Fisheries Society 93: 215-226.

Seber, G. A. F. 1982. On the estimation of animal abundance and related parameters, 2nd edition. Griffin and Company, Ltd. London.

Welander, A. D. 1940. A study of the development of the scale of Chinook salmon *Oncorhynchus tshawytscha*. Master's thesis. University of Washington, Seattle.

APPENDIX A

Appendix A1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 1999.

			TAGGED								CAUGHT								
		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/8/1999	4	-8			3		2		5		5					1.25	1.25	0.01	0.01
5/9/1999	4	-7		0		3	1	3	1	6	1	6				0.25	1.50	0.00	0.02
5/10/1999	4	-6		0	4	7	11	14	15	21	15	21				3.75	5.25	0.04	0.05
5/11/1999	4	-4		0	16	23	26	40	42	63	42	63				10.50	15.75	0.11	0.16
5/12/1999	4	-3		0	20	43	14	54	34	97	35	98				8.75	24.50	0.09	0.26
5/13/1999	4	1	1	1	7	50	9	63	17	114	17	115				4.25	28.75	0.04	0.30
5/14/1999	4	11		1	1	51	1	64	2	116	2	117				0.50	29.25	0.01	0.31
5/15/1999	4	22		1		51	1	65	1	117	1	118				0.25	29.50	0.00	0.31
5/16/1999	4	27		1	3	54	2	67	5	122	6	124	1	44234	1	1.50	31.00	0.02	0.32
5/17/1999	4	29	1	2	1	55	6	73	8	130	8	132			1	2.00	33.00	0.02	0.34
5/18/1999	4	35		2	1	56		73	1	131	1	133			1	0.25	33.25	0.00	0.35
5/19/1999	4	37	2	4	1	57	3	76	6	137	6	139			1	1.50	34.75	0.02	0.36
5/20/1999	4	36		4	8	65	6	82	14	151	14	153			1	3.50	38.25	0.04	0.40
5/21/1999	4	36		4	9	74	7	89	16	167	16	169			1	4.00	42.25	0.04	0.44
5/22/1999	4	35		4	7	81	13	102	20	187	22	191			1	5.50	47.75	0.06	0.50
5/23/1999	4	35		4	4	85	2	104	6	193	6	197			1	1.50	49.25	0.02	0.51
5/24/1999	4	38		4	19	104	12	116	31	224	32	229			1	8.00	57.25	0.08	0.60
5/25/1999	4	50		4	1	105		116	1	225	1	230			1	0.25	57.50	0.00	0.60
5/26/1999	4	48		4	9	114	7	123	16	241	17	247	1	44632	2	4.25	61.75	0.04	0.64
5/27/1999	4	40		4	5	119	2	125	7	248	7	254			2	1.75	63.50	0.02	0.66
5/28/1999	4	35		4	5	124	2	127	7	255	9	263	2	44636 44635	4	2.25	65.75	0.02	0.69
5/29/1999	4	32		4	14	138	20	147	34	289	35	298	1	44633	5	8.75	74.50	0.09	0.78
5/30/1999	4	29		4	10	148	3	150	13	302	13	311			5	3.25	77.75	0.03	0.81
5/31/1999	4	29		4	7	155	7	157	14	316	15	326	1	No tag	6	3.75	81.50	0.04	0.85
6/1/1999	4	30		4	13	168	12	169	25	341	26	352	1	44632	7	6.50	88.00	0.07	0.92
6/2/1999	4	39		4	14	182	7	176	21	362	24	376	2	44634 44634	9	6.00	94.00	0.06	0.98
6/3/1999	4	46		4		182		176	0	362		376			9		94.00		0.98
6/4/1999	4	44		4		182		176	0	362		376			9		94.00		0.98
6/5/1999	4	41		4	4	186	3	179	7	369	7	383			9	1.75	95.75	0.02	1.00
Total	116		4		186		179		369		383		9	8					

[a] Exact gillnet hours fished per day were not available; however, the operational plan specified that gillnets would be fished 4 hours per day.

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

Appendix A2.–Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 1999.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)									
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/14/1999			13.0	1.7	11		0	1	1		0	1	1	1	1			0	13	13	0.00	0.00
5/15/1999	12.9	1.0	22.6	1.8	22		0	4	5		0	4	5	4	5			0	9	22	0.01	0.01
5/16/1999	24.0	1.4	23.0	2.0	27	1	1		5	1	1	2	7	2	7			0	24	45	0.00	0.02
5/17/1999	23.8	2.2	23.6	2.3	29	1	2	4	9	1	2	6	13	6	13			0	8	53	0.01	0.03
5/18/1999	23.9	2.3	23.6	2.3	35		2	2	11	2	4	4	17	4	17			0	12	65	0.01	0.04
5/19/1999	24.0	2.4	23.4	2.4	37	1	3	2	13	3	7	6	23	6	23			0	8	73	0.01	0.05
5/20/1999	24.0	2.1	23.5	2.2	36		3	3	16	2	9	5	28	5	28			0	10	83	0.01	0.06
5/21/1999	24.0	2.3	23.7	2.4	36		3	2	18	2	11	4	32	4	32			0	12	94	0.01	0.07
5/22/1999	23.9	2.1	23.7	2.4	35		3	4	22		11	4	36	4	36			0	12	106	0.01	0.08
5/23/1999	23.8	2.1	23.7	2.4	35		3	3	25	2	13	5	41	5	41			0	10	116	0.01	0.09
5/24/1999	23.8	2.3	23.5	2.7	38	1	4	2	27	6	19	9	50	9	50			0	5	121	0.02	0.12
5/25/1999	23.3	2.3	23.2	2.8	50	1	5	5	32	6	25	12	62	13	63	1	44632	1	4	125	0.03	0.15
5/26/1999	23.5	2.5	23.6	2.7	48		5	9	41	5	30	14	76	16	79	2	44636 44239	3	3	128	0.04	0.18
5/27/1999	23.5	2.2	23.6	2.1	40	3	8	10	51	4	34	17	93	17	96			3	3	130	0.04	0.22
5/28/1999	22.9	2.6	23.8	2.0	35	2	10	6	57	4	38	12	105	12	108			3	4	134	0.03	0.25
5/29/1999	23.8	2.1	23.7	1.9	32	1	11	2	59		38	3	108	3	111			3	16	150	0.01	0.26
5/30/1999	23.8	2.1	23.8	1.7	29		11	3	62		38	3	111	4	115	1	44637	4	12	162	0.01	0.26
5/31/1999	23.7	1.9	23.7	1.6	29		11		62		38	0	111		115			4		162		0.26
6/1/1999	23.7	1.6	23.8	1.6	30	1	12	1	63		38	2	113	2	117			4	24	186	0.00	0.27
6/2/1999	23.7	2.7	23.3	2.4	39		12	9	72	3	41	12	125	12	129			4	4	190	0.03	0.30
6/3/1999	23.4	2.5	23.4	2.5	46	1	13	5	77	3	44	9	134	10	139	1	44633	5	5	194	0.02	0.32
6/4/1999	23.7	1.8	23.3	2.5	44	3	16	13	90	3	47	19	153	21	160			5	2	197	0.05	0.37
6/5/1999	23.5	1.8	23.6	2.0	41	3	19	1	91	3	50	7	160	8	168	1	44634	6	6	202	0.02	0.39
6/6/1999	23.6	2.1	4.0	-	49		19	4	95	1	51	5	165	5	173			6	6	208	0.01	0.40
6/7/1999	22.1	2.6	11.1	2.1	59	2	21	13	108	15	66	30	195	32	205			6	1	209	0.07	0.47
6/8/1999	23.6	2.4	23.3	2.6	72	1	22	7	115	7	73	15	210	15	220			6	3	212	0.03	0.51
6/9/1999	23.2	3.0	23.8	3.0	98		22	3	118	1	74	4	214	4	224			6	12	224	0.01	0.52
6/10/1999	23.6	3.2	23.5	3.2	103	1	23	8	126	7	81	16	230	18	242			6	3	226	0.04	0.56
6/11/1999	23.5	3.2	23.3	2.9	101	1	24	7	133	10	91	18	248	18	260			6	3	229	0.04	0.60
6/12/1999	23.4	3.0	23.1	2.8	98	2	26	6	139	7	98	15	263	16	276			6	3	232	0.04	0.64
6/13/1999	23.4	3.2	23.2	2.7	99		26	7	146	10	108	17	280	17	293			6	3	235	0.04	0.68
6/14/1999	23.6	3.4	23.3	2.5	108		26	7	153	2	110	9	289	9	302			6	5	240	0.02	0.70
6/15/1999	18.8	3.3	23.1	2.5	113		26	9	162	4	114	13	302	15	317	1	44634	7	3	243	0.03	0.73
6/16/1999	8.3	3.6	8.7	3.0	126		26	7	169	4	118	11	313	13	330	1	44632	8	1	244	0.03	0.76

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
						Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/17/1999	-		-		132		26		169		118	0	313		330			8		244		0.76
6/18/1999	13.3	3.2	10.3	2.3	125		26		169	2	120	2	315	2	332			8	12	256	0.00	0.76
6/19/1999	23.3	3.3	22.8	2.4	122		26	3	172	2	122	5	320	5	337			8	9	265	0.01	0.78
6/20/1999	23.7	3.3	15.3	2.7	125		26		172		122	0	320		337			8		265		0.78
6/21/1999	17.8	3.3	17.8	2.6	118		26	3	175	3	125	6	326	6	343			8	6	271	0.01	0.79
6/22/1999	10.4	3.1	10.2	2.6	133		26		175		125	0	326		343			8		271		0.79
6/23/1999	23.1	2.3	22.2	1.5	83	2	28	7	182	1	126	10	336	11	354			8	4	275	0.03	0.82
6/24/1999	22.8	2.3	22.9	2.6	78	3	31	3	185	4	130	10	346	10	364			8	5	280	0.02	0.84
6/25/1999	23.4	2.6	23.5	2.5	84	1	32	1	186	1	131	3	349	3	367			8	16	295	0.01	0.85
6/26/1999	23.3	2.6	22.9	2.7	90	2	34	2	188	2	133	6	355	6	373			8	8	303	0.01	0.86
6/27/1999	23.0	2.4	22.2	2.6	85	2	36	2	190	4	137	8	363	9	382	1	44632	9	5	308	0.02	0.88
6/28/1999	23.2	2.4	22.2	2.3	79		36	3	193	1	138	4	367	4	386			9	11	319	0.01	0.89
6/29/1999	22.4	2.4	23.2	2.1	71		36	4	197	1	139	5	372	5	391			9	9	328	0.01	0.90
6/30/1999	23.1	2.2	22.8	2.0	66	1	37	1	198	2	141	4	376	4	395			9	11	340	0.01	0.91
7/1/1999	23.2	2.1	22.8	2.2	63	1	38	3	201	2	143	6	382	6	401			9	8	348	0.01	0.92
7/2/1999	22.8	2.3	22.3	2.5	64		38	1	202	2	145	3	385	3	404			9	15	363	0.01	0.93
7/3/1999	21.4	2.5	21.4	2.6	74		38	4	206	2	147	6	391	6	410			9	7	370	0.01	0.94
7/4/1999	22.6	2.3	20.6	2.5	80	2	40	2	208		147	4	395	4	414			9	11	380	0.01	0.95
7/5/1999	22.7	2.4	20.9	2.5	85	1	41	2	210	1	148	4	399	4	418			9	11	391	0.01	0.96
7/6/1999	22.2	2.5	22.1	2.5	80		41	1	211		148	1	400	1	419			9	44	436	0.00	0.97
7/7/1999	22.0	2.7	21.5	2.2	77		41		211	1	149	1	401	1	420			9	44	479	0.00	0.97
7/8/1999	22.3	2.5	23.1	2.3	71		41	1	212	2	151	3	404	3	423			9	15	494	0.01	0.97
7/9/1999	23.3	2.6	22.3	2.3	69		41	1	213		151	1	405	1	424			9	46	540	0.00	0.98
7/10/1999	23.5	2.4	23.6	2.6	70		41		213		151	0	405		424			9		540		0.98
7/11/1999	23.3	2.7	23.3	2.6	73		41		213		151	0	405		424			9		540		0.98
7/12/1999	23.0	2.6	23.2	2.5	72		41		213		151	0	405		424			9		540		0.98
7/13/1999	23.4	2.4	22.6	2.3	68	2	43		213		151	2	407	3	427			9	15	555	0.01	0.98
7/14/1999	22.9	2.4	22.8	2.6	65		43		213	1	152	1	408	1	428			9	46	601	0.00	0.99
7/15/1999	22.8	2.8	22.6	2.7	77		43		213		152	0	408		428			9		601		0.99
7/16/1999	22.8	3.0	22.8	2.6	81		43		213		152	0	408		428			9		601		0.99
7/17/1999	22.3	2.8	22.2	2.4	81		43		213		152	0	408	1	429			9	44	645	0.00	0.99
7/18/1999	22.1	2.4	21.4	2.4	81		43		213		152	0	408		429			9		645		0.99
7/19/1999	22.2	2.6	21.9	2.4	77		43		213		152	0	408		429			9		645		0.99
7/20/1999	22.5	2.6	22.7	2.2	73		43	1	214		152	1	409	1	430			9	45	690	0.00	0.99
7/21/1999	22.9	2.6	23.3	2.4	72		43	1	215		152	1	410	1	431			9	46	737	0.00	0.99

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
						Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a] Cum	Daily	Cum	Daily	Cum
7/22/1999	23.1	2.9	23.3	2.7	81		43		215	1	153	1	411	1	432		9	46	783	0.00	1.00
7/23/1999	21.9	2.4	22.9	2.1	74		43		215		153	0	411		432		9		783		1.00
7/24/1999	22.7	2.5	22.8	2.0	63		43		215	1	154	1	412	1	433		9	45	828	0.00	1.00
7/25/1999	23.0	2.1	22.9	2.0	56		43		215		154	0	412		433		9		828		1.00
7/26/1999	21.9	2.0	21.9	2.1	51		43	1	216		154	1	413	1	434		9	44	872	0.00	1.00
Total	1,609		1,581			43		216		154		413		434		9	9				

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

Appendix A3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 1999 by size group and location.

			Brood year and age class									
			1996	1995	1995	1994	1994	1993	1993	1992	1992	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina	Male	n			6	1	26		5			38
Large fish		%			15.8%		68.4%		13.2%			60.3%
	Female	n					8		15	1	1	25
		%					32.0%		60.0%	4.0%	4.0%	39.7%
	Total	n			6	1	34		20	1	1	63
		%			9.5%	1.6%	54.0%		31.7%	1.6%	1.6%	
	Male	n	1		77		1					79
Medium fish		%	1.3%		97.5%		1.3%					100.0%
	Female	n										0
		%										0.0%
	Total	n	1		77		1					79
		%	1.3%		97.5%		1.3%					
	Male	n	13									13
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	13									13
		%	100.0%									
	Male	n	14		83	1	27		5			130
All fish		%	10.8%		63.8%	0.8%	20.8%		3.8%			83.9%
	Female	n					8		15	1	1	25
		%					32.0%		60.0%	4.0%	4.0%	16.1%
	Total	n	14		83	1	35		20	1	1	155
		%	9.0%		53.5%	0.6%	22.6%		12.9%	0.6%	0.6%	
Lower Tats.	Male	n			26		93	1	18			138
Large fish		%			18.8%		67.4%	0.7%	13.0%			58.7%
	Female	n			2		74		19		2	97
		%			2.1%		76.3%		19.6%		2.1%	41.3%
	Total	n			28		167	1	37		2	235
		%			11.9%		71.1%	0.4%	15.7%		0.9%	
	Male	n	5		112	1						118
Medium fish		%	4.2%		94.9%	0.8%						99.2%
	Female	n					1					1
		%					100.0%					0.8%
	Total	n	5		112	1	1					119
		%	4.2%		94.1%	0.8%	0.8%					
	Male	n	3									3
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	3									3
		%	100.0%									
	Male	n	8		138	1	93	1	18			259
All fish		%	3.1%		53.3%	0.4%	35.9%	0.4%	6.9%			72.5%
	Female	n			2		75		19		2	98
		%			2.0%		76.5%		19.4%		2.0%	27.5%
	Total	n	8		140	1	168	1	37		2	357
		%	2.2%		39.2%	0.3%	47.1%	0.3%	10.4%		0.6%	

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			Brood year and age class									
			1996	1995	1995	1994	1994	1993	1993	1992	1992	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Kowatua	Male	n			2		14		2			18
Large fish		%			11.1%		77.8%		11.1%			54.5%
	Female	n					11		4			15
		%					73.3%		26.7%			45.5%
	Total	n			2		25		6			33
		%			6.1%		75.8%		18.2%			
	Male	n			29		1					30
Medium fish		%			96.7%		3.3%					96.8%
	Female	n			1							1
		%			100.0%							3.2%
	Total	n			30		1					31
		%			96.8%		3.2%					
	Male	n	2		1							3
Small fish		%	66.7%		33.3%							
	Female	n										
		%										
	Total	n	2		1							3
		%	66.7%		33.3%							
	Male	n	2		32		15		2			51
All fish		%	3.9%		62.7%		29.4%		3.9%			76.1%
	Female	n			1		11		4			16
		%			6.3%		68.8%		25.0%			23.9%
	Total	n	2		33		26		6			67
		%	3.0%		49.3%		38.8%		9.0%			
All tributaries	Male	n			34	1	133	1	25			194
Large fish		%			17.5%	0.5%	68.6%	0.5%	12.9%			58.6%
	Female	n			2		93		38	1	3	137
		%			1.5%		67.9%		27.7%	0.7%	2.2%	41.4%
	Total	n			36	1	226	1	63	1	3	331
		%			10.9%	0.3%	68.3%	0.3%	19.0%	0.3%	0.9%	
	Male	n	6		218	1	2					227
Medium fish		%	2.6%		96.0%	0.4%	0.9%					99.1%
	Female	n			1		1					2
		%			50.0%		50.0%					0.9%
	Total	n	6		219	1	3					229
		%	2.6%		95.6%	0.4%	1.3%					
	Male	n	18		1							19
Small fish		%	94.7%		5.3%							
	Female	n										
		%										
	Total	n	18		1							19
		%	94.7%		5.3%							
	Male	n	24		253	2	135	1	25			440
All fish		%	5.5%		57.5%	0.5%	30.7%	0.2%	5.7%			76.0%
	Female	n			3		94		38	1	3	139
		%			2.2%		67.6%		27.3%	0.7%	2.2%	24.0%
	Total	n	24		256	2	229	1	63	1	3	579
		%	4.1%		44.2%	0.3%	39.6%	0.2%	10.9%	0.2%	0.5%	

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			Brood year and age class									
			1996	1995	1995	1994	1994	1993	1993	1992	1992	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Canyon Island	Male	n			19	2	115		31	1		168
Large fish		%			11.3%	1.2%	68.5%		18.5%	0.6%		56.9%
	Female	n			1		87	1	34	2	2	127
		%			0.8%		68.5%	0.8%	26.8%	1.6%	1.6%	43.1%
	Total	n			20	2	202	1	65	3	2	295
		%			6.8%	0.7%	68.5%	0.3%	22.0%	1.0%	0.7%	
	Male	n	2	2	340	4	15		2			365
Medium fish		%	0.5%	0.5%	93.2%	1.1%	4.1%		0.5%			99.5%
	Female	n			1		1					2
		%			50.0%		50.0%					0.5%
	Total	n	2	2	341	4	16		2			367
		%	0.5%	0.5%	92.9%	1.1%	4.4%		0.5%			
	Male	n	41	2	3							46
Small fish		%	89.1%	4.3%	6.5%							
	Female	n										
		%										
	Total	n	41	2	3							46
		%	89.1%	4.3%	6.5%							
	Male	n	43	4	362	6	130		33	1		579
All fish		%	7.4%	0.7%	62.5%	1.0%	22.5%		5.7%	0.2%		81.8%
	Female	n			2		88	1	34	2	2	129
		%			1.6%		68.2%	0.8%	26.4%	1.6%	1.6%	18.2%
	Total	n	43	4	364	6	218	1	67	3	2	708
		%	6.1%	0.6%	51.4%	0.8%	30.8%	0.1%	9.5%	0.4%	0.3%	
Test fishery	Male	n			5	0	148	2	52	0	2	209
Large fish		%			2.4%		70.8%	1.0%	24.9%	0.0%	1.0%	49.6%
	Female	n					120	4	78	4	7	212
		%					56.7%	1.7%	36.7%	1.7%	3.3%	50.4%
	Total	n			5		268	6	130	4	9	421
		%			1.2%		63.7%	1.3%	30.8%	0.8%	2.2%	
	Male	n		1	211	2	17					231
Medium fish		%		0.4%	91.3%	0.9%	7.4%					99.6%
	Female	n					1					1
		%					100.0%					0.4%
	Total	n		1	211	2	18					232
		%		0.4%	90.9%	0.9%	7.8%					
	Male	n	2									2
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	2	1	216	2	165	2	52		2	442
All fish		%	0.5%	0.2%	48.9%	0.5%	37.3%	0.5%	11.8%		0.5%	67.5%
	Female	n					121	4	78	4	7	213
		%					56.9%	1.7%	36.5%	1.7%	3.3%	32.5%
	Total	n	2	1	216	2	286	6	130	4	9	655
		%	0.3%	0.2%	33.0%	0.3%	43.7%	0.8%	19.8%	0.5%	1.4%	

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			Brood year and age class									
			1996	1995	1995	1994	1994	1993	1993	1992	1992	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Can. gillnet	Male	n			4		21	1	7			33
Large fish		%			12.1%		63.6%	3.0%	21.2%			32.4%
	Female	n			2		46	2	17		2	69
		%			2.9%		66.7%		24.6%		2.9%	67.6%
	Total	n			8		127	4	47		4	190
		%			4.2%		66.8%	2.1%	24.7%		2.1%	
	Male	n			18		3					21
Medium fish		%			85.7%		14.3%					53.8%
	Female	n			17	1						18
		%			94.4%	5.6%						46.2%
	Total	n	2		83	1	6					92
		%	2.2%		90.2%	1.1%	6.5%					
	Male	n	1									1
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	1									1
		%	100.0%									
	Male	n	1		22		24	1	7			55
All fish		%	1.8%		40.0%		43.6%	1.8%	12.7%			38.7%
	Female	n			19	1	46	2	17		2	87
		%			21.8%	1.1%	52.9%	2.3%	19.5%		2.3%	61.3%
	Total	n	3		91	1	133	4	47		4	283
		%	1.1%		32.2%	0.4%	47.0%	1.4%	16.6%		1.4%	

APPENDIX B

Appendix B1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2000.

			TAGGED								CAUGHT								
			Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	Water level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
4/24/2000	4						1				1				0	4.00	4.0	0.00	0.00
4/25/2000				0		0		1	0	0					0		4.0		0.00
4/26/2000				0		0		1	0	0					0		4.0		0.00
4/27/2000	4			0		0	4	5	4	4	5	6	1	44633	1	0.80	4.8	0.01	0.01
4/28/2000				0		0		5	0	4		6			1		4.8		0.01
4/29/2000	4			0	3	3	9	14	12	16	13	19			1	0.31	5.1	0.02	0.03
4/30/2000				0		3		14	0	16		19			1		5.1		0.03
5/1/2000	4			0	2	5	7	21	9	25	9	28			1	0.44	5.6	0.01	0.04
5/2/2000	5			0	2	7	2	23	4	29	5	33	1	44632	2	1.00	6.6	0.01	0.05
5/3/2000	5			0	3	10	7	30	10	39	12	45	1	44234	3	0.42	7.0	0.02	0.07
5/4/2000	6			0	5	15	15	45	20	59	20	65			3	0.30	7.3	0.03	0.10
5/5/2000	6			0	7	22	8	53	15	74	15	80			3	0.40	7.7	0.02	0.12
5/6/2000	6			0	4	26	20	73	24	98	24	104			3	0.25	7.9	0.04	0.16
5/7/2000	6			0	6	32	12	85	18	116	18	122			3	0.33	8.3	0.03	0.19
5/8/2000	6			0	7	39	9	94	16	132	16	138			3	0.38	8.6	0.02	0.21
5/9/2000	6			0	3	42	6	100	9	141	9	147			3	0.67	9.3	0.01	0.22
5/10/2000	6	18		0	7	49	12	112	19	160	19	166			3	0.32	9.6	0.03	0.25
5/11/2000	4	22		0	5	54	11	123	16	176	17	183	1	44634	4	0.24	9.8	0.03	0.28
5/12/2000	6	29		0	7	61	4	127	11	187	11	194			4	0.55	10.4	0.02	0.30
5/13/2000	5	29		0	6	67	3	130	9	196	10	204	1	No tag	5	0.50	10.9	0.02	0.31
5/14/2000	4	32		0	3	70	2	132	5	201	6	210			5	0.67	11.6	0.01	0.32
5/15/2000	6	30		0	7	77	2	134	9	210	10	220	1	44234	6	0.60	12.2	0.02	0.34
5/16/2000	4	29		0	2	79	8	142	10	220	10	230			6	0.40	12.6	0.02	0.35
5/17/2000	6	28		0	9	88	16	158	25	245	25	255			6	0.22	12.8	0.04	0.39
5/18/2000	6	32		0	6	94	9	167	15	260	15	270			6	0.40	13.2	0.02	0.41
5/19/2000	5	41		0	1	95	2	169	3	263	3	273			6	1.67	14.8	0.00	0.42
5/20/2000	6	41		0	4	99	10	179	14	277	15	288			6	0.40	15.2	0.02	0.44
5/21/2000	4	36		0	8	107	9	188	17	294	18	306	1	44633	7	0.22	15.5	0.03	0.47
5/22/2000	5	32		0	8	115	20	208	28	322	28	334			7	0.18	15.6	0.04	0.51
5/23/2000	1	34		0	2	117	2	210	4	326	5	339			7	0.25	15.9	0.01	0.52
5/24/2000	5	31		0	9	126	12	222	21	347	24	363	3	44633,44633 44633	10	0.21	16.1	0.04	0.55
5/25/2000	5	28		0	14	140	21	243	35	382	37	400	2	44633,44633	12	0.14	16.2	0.06	0.61
5/26/2000	5	24		0	3	143	30	273	33	415	33	433			12	0.15	16.4	0.05	0.66
5/27/2000		24		0		143		273	0	415		433			12		16.4		0.66
5/28/2000	5	31		0	9	152	17	290	26	441	26	459			12	0.19	16.6	0.04	0.70
5/29/2000	5	37		0	3	155	17	307	20	461	21	480	1	44637	13	0.24	16.8	0.03	0.73
5/30/2000	5	43		0	5	160	8	315	13	474	13	493			13	0.38	17.2	0.02	0.75
5/31/2000	4	43		0	6	166	9	324	15	489	17	510	2	44634,44632	15	0.24	17.4	0.03	0.78

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			TAGGED								CAUGHT								
		Water	Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions		
Date	Hrs fished	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/1/2000	5	48		0	6	172	10	334	16	505	17	527	1	44632	16	0.29	17.7	0.03	0.80
6/2/2000	2	56		0	1	173	7	341	8	513	8	535			16	0.25	18.0	0.01	0.82
6/3/2000		68		0		173		341	0	513		535			16		18.0		0.82
6/4/2000		73		0		173		341	0	513		535			16		18.0		0.82
6/5/2000		74		0		173		341	0	513		535			16		18.0		0.82
6/6/2000		85		0		173		341	0	513		535			16		18.0		0.82
6/7/2000		88		0		173		341	0	513		535			16		18.0		0.82
6/8/2000	4	91		0	5	178	9	350	14	527	15	550	1	44636	17	0.27	18.3	0.02	0.84
6/9/2000		91		0	3	181	7	357	10	537	10	560			17		18.3	0.02	0.85
6/10/2000		91		0		181		357	0	537		560			17		18.3		0.85
6/11/2000		102		0		181		357	0	537		560			17		18.3		0.85
6/12/2000		113		0		181		357	0	537		560			17		18.3		0.85
6/13/2000		115		0		181		357	0	537		560			17		18.3		0.85
6/14/2000		118		0		181		357	0	537		560			17		18.3		0.85
6/15/2000		134		0		181		357	0	537		560			17		18.3		0.85
6/16/2000		101		0		181		357	0	537		560			17		18.3		0.85
6/17/2000	4	89		0	3	184	12	369	15	552	16	576			17	0.25	18.5	0.02	0.88
6/18/2000	5	86		0	10	194	22	391	32	584	32	608			17	0.16	18.7	0.05	0.93
6/19/2000	4	82		0	3	197	8	399	11	595	12	620	1	44632	18	0.33	19.0	0.02	0.95
6/20/2000	4	77		0	1	198	7	406	8	603	8	628			18	0.50	19.5	0.01	0.96
6/21/2000	4	78		0	1	199	8	414	9	612	9	637			18	0.44	19.9	0.01	0.97
6/22/2000	4	70		0	4	203	6	420	10	622	10	647			18	0.40	20.3	0.02	0.99
6/23/2000	4	62		0	2	205	6	426	8	630	8	655			18	0.50	20.8	0.01	1.00
Total	204				205		426		630		655		18	17					

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

Appendix B2.– Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2000.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/15/2000	23.8	1.1	23.5	2.4	30		0	1	1		0	1	1	1	1			0	47	47	0.00	0.00
5/16/2000	23.8	1.7	23.6	2.4	29		0	1	2	3	3	4	5	5	6			0	9	57	0.01	0.01
5/17/2000	23.8	2.2	23.8	2.4	28		0	2	4	1	4	3	8	3	9			0	16	73	0.01	0.02
5/18/2000	23.8	2.4	23.7	2.4	32		0	2	6	2	6	4	12	6	15	2	44634,44632	2	8	81	0.01	0.03
5/19/2000	23.6	2.7	23.7	2.6	41	1	1	3	9	8	14	12	24	12	27			2	4	84	0.02	0.05
5/20/2000	23.3	2.4	23.5	2.6	41	1	2	5	14	9	23	15	39	15	42			2	3	88	0.03	0.08
5/21/2000	23.6	2.0	23.6	2.4	36	1	3	4	18	6	29	11	50	11	53			2	4	92	0.02	0.10
5/22/2000	23.8	2.0	23.8	2.3	32	2	5	3	21	5	34	10	60	10	63			2	5	97	0.02	0.12
5/23/2000	18.5	2.0	17.3	2.5	34		5	4	25	4	38	8	68	8	71			2	4	101	0.01	0.13
5/24/2000	23.8	2.1	23.7	2.3	31	2	7	6	31	4	42	12	80	12	83			2	4	105	0.02	0.15
5/25/2000	23.8	1.2	23.8	2.3	28		7	2	33	1	43	3	83	3	86			2	16	121	0.01	0.16
5/26/2000	23.9	1.2	23.8	2.3	24	1	8	2	35	3	46	6	89	7	93	1	44632	3	7	128	0.01	0.17
5/27/2000	23.8	1.0	23.7	2.3	24	1	9		35	2	48	3	92	3	96			3	16	144	0.01	0.18
5/28/2000	23.8	2.1	23.8	2.6	31	1	10	1	36	3	51	5	97	5	101			3	10	153	0.01	0.19
5/29/2000	23.8	2.2	23.8	2.7	37		10	3	39	4	55	7	104	7	108			3	7	160	0.01	0.20
5/30/2000	23.8	0.3	23.1	2.2	43	2	12	5	44	9	64	16	120	16	124			3	3	163	0.03	0.23
5/31/2000	23.8	2.4	23.8	2.0	43		12	3	47	2	66	5	125	5	129			3	10	172	0.01	0.24
6/1/2000	23.5	2.6	23.7	2.3	48		12	1	48	11	77	12	137	12	141			3	4	176	0.02	0.26
6/2/2000	22.8	2.6	23.9	2.6	56		12	7	55	6	83	13	150	15	156	2	44633,44634	5	3	179	0.03	0.29
6/3/2000	23.3	2.9	23.7	2.6	68	1	13	4	59	13	96	18	168	18	174			5	3	182	0.03	0.32
6/4/2000	23.8	2.9	23.8	2.6	73		13	1	60	3	99	4	172	5	179	1	44634	6	10	192	0.01	0.33
6/5/2000	23.3	2.8	23.4	2.6	74		13	7	67	7	106	14	186	16	195	2	44644,44636	8	3	194	0.03	0.36
6/6/2000	23.4	2.7	23.5	2.6	85	2	15	11	78	15	121	28	214	29	224	1	44636	9	2	196	0.05	0.41
6/7/2000	23.7	2.6	23.4	2.5	88	1	16	8	86	5	126	14	228	14	238			9	3	199	0.03	0.44
6/8/2000	23.1	2.7	23.5	2.6	91	2	18	5	91	10	136	17	245	17	255			9	3	202	0.03	0.47
6/9/2000	23.1	2.8	23.2	2.4	91	2	20	4	95	7	143	13	258	14	269			9	3	205	0.03	0.49
6/10/2000	22.5	2.9	22.8	2.6	91	5	25	10	105	20	163	35	293	36	305			9	1	207	0.07	0.56
6/11/2000	22.5	3.1	22.8	2.6	102	6	31	9	114	16	179	31	324	32	337	1	44637	10	1	208	0.06	0.62
6/12/2000	23.3	3.4	23.2	2.7	113		31	6	120	11	190	17	341	17	354			10	3	211	0.03	0.65
6/13/2000	22.9	3.4	23.5	2.7	115		31	4	124	4	194	8	349	8	362			10	6	217	0.01	0.67
6/14/2000	23.3	3.3	23.1	2.7	118		31	3	127	6	200	9	358	9	371			10	5	222	0.02	0.68
6/15/2000	11.7	3.8	15.0	3.0	134		31	2	129	7	207	9	367	10	381			10	3	224	0.02	0.70
6/16/2000	23.5	2.4	23.3	2.7	101	1	32	1	130	5	212	7	374	7	388			10	7	231	0.01	0.71
6/17/2000	23.2	2.5	23.7	2.4	89		32	2	132	3	215	5	379	5	393			10	9	241	0.01	0.72
6/18/2000	22.4	2.4	23.1	2.6	86	1	33	5	137	9	224	15	394	18	411	2	44644,44235	12	3	243	0.03	0.76
6/19/2000	22.6	2.5	23.3	2.5	82	2	35	12	149	7	231	21	415	21	432			12	2	245	0.04	0.79
6/20/2000	22.3	2.7	23.1	2.5	77	2	37	4	153	2	233	8	423	8	440			12	6	251	0.01	0.81
6/21/2000	21.3	2.3	23.1	2.3	78	1	38	4	157	4	237	9	432	9	449			12	5	256	0.02	0.83

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
						Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/22/2000	22.6	.8	23.5	2.3	70	6	44	4	161	6	243	16	448	16	465			12	3	259	0.03	0.85
6/23/2000	21.8	.5	23.4	2.3	62	2	46	4	165	3	246	9	457	9	474			12	5	264	0.02	0.87
6/24/2000	22.1	.8	22.6	2.2	61	2	48	2	167	7	253	11	468	11	485			12	4	268	0.02	0.89
6/25/2000	20.8	.5	23.1	2.5	71	1	49	2	169	3	256	6	474	7	492	1	44644	13	6	274	0.01	0.90
6/25/2000	20.8	.5	23.1	2.5	71	1	49	2	169	3	256	6	474	7	492	1	44644	13	6	274	0.01	0.90
6/26/2000	21.5	.7	22.8	2.5	82	3	52	1	170	4	260	8	482	8	500			13	6	280	0.01	0.92
6/27/2000	21.8	.0	22.8	2.8	95	1	53	3	173	4	264	8	490	8	508			13	6	285	0.01	0.93
6/28/2000	22.2	.2	23.0	2.4	104		53		173	1	265	1	491	1	509			13	45	330	0.00	0.94
6/29/2000	22.9	.2	23.3	2.3	113		53		173	4	269	4	495	4	513			13	12	342	0.01	0.94
6/30/2000	22.9	.0	23.3	2.3	107	1	54	1	174	2	271	4	499	5	518			13	9	351	0.01	0.95
7/1/2000	23.0	.4	23.7	2.3	86	1	55		174		271	1	500	1	519			13	47	398	0.00	0.95
7/2/2000	22.5	.6	23.6	2.5	77		55	1	175	2	273	3	503	5	524			13	9	407	0.01	0.96
7/3/2000	23.0	.7	23.1	2.3	76	1	56		175	3	276	4	507	4	528			13	12	419	0.01	0.97
7/4/2000	22.6	.8	23.1	2.3	77		56	1	176		276	1	508	1	529			13	46	464	0.00	0.97
7/5/2000	22.6	.8	23.6	2.6	89		56		176		276	0	508	1	530			13	46	510	0.00	0.97
7/6/2000	22.0	.8	23.1	2.9	101		56	1	177	2	278	3	511	3	533			13	15	525	0.01	0.98
7/7/2000	23.0	.8	23.0	2.3	102		56		177	2	280	2	513	2	535			13	23	548	0.00	0.98
7/8/2000	22.6	.7	22.9	2.1	97		56	1	178	1	281	2	515	2	537			13	23	571	0.00	0.99
7/9/2000	22.7	.7	23.7	2.3	97		56	1	179	2	283	3	518	3	540			13	15	587	0.01	0.99
7/10/2000	22.2	.8	22.7	2.6	98		56		179		283	0	518		540			13		587		0.99
7/11/2000	22.8	.8	23.3	2.7	92		56		179	1	284	1	519	1	541			13	46	633	0.00	0.99
7/12/2000	23.0	.6	23.1	2.6	83	1	57		179	1	285	2	521	2	543			13	23	656	0.00	1.00
7/13/2000	22.5	.5	23.0	2.5	76		57		179		285	0	521		543			13		656		1.00
7/14/2000	23.1	.4	23.1	2.4	70		57		179		285	0	521		543			13		656		1.00
7/15/2000	23.2	.5	23.1	2.4	67		57		179		285	0	521		543			13		656		1.00
7/16/2000	22.9	.5	23.4	2.6	70		57		179		285	0	521		543			13		656		1.00
7/17/2000	22.6	.5	23.1	2.5	71		57		179		285	0	521		543			13		656		1.00
7/18/2000	22.8	.9	22.8	2.8	76		57		179		285	0	521		543			13		656		1.00
7/19/2000	22.9	.8	22.9	2.7	83		57		179	1	286	1	522	1	544			13	46	702	0.00	1.00
Total	1,500		1,526			57		179		286		522		544		13	13					

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

Appendix B3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2000 by size group and location.

			Brood year and age class									
			1997	1996	1996	1995	1995	1994	1994	1993	1993	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina	Male	n			10		115	1	35			161
Large fish		%			6.2%		71.4%	0.6%	21.7%			48.6%
	Female	n					99		69	1	1	170
		%					58.2%		40.6%	0.6%	0.6%	51.4%
	Total	n			10		214	1	104	1	1	331
		%			3.0%		64.7%	0.3%	31.4%	0.3%	0.3%	
	Male	n	1		130		16					147
Medium fish		%	0.7%		88.4%		10.9%					96.7%
	Female	n			1		4					5
		%			20.0%		80.0%					3.3%
	Total	n	1		131		20					152
		%	0.7%		86.2%		13.2%					
	Male	n	38		1							39
Small fish		%	97.4%		2.6%							
	Female	n										
		%										
	Total	n	38		1							39
		%	97.4%		2.6%							
	Male	n	39		141		131	1	35			347
All fish		%	11.2%		40.6%		37.8%	0.3%	10.1%			66.5%
	Female	n			1		103		69	1	1	175
		%			0.6%		58.9%		39.4%	0.6%	0.6%	33.5%
	Total	n	39		142		234	1	104	1	1	522
		%	7.5%		27.2%		44.8%	0.2%	19.9%	0.2%	0.2%	
Lower Tats.	Male	n			21		99		26			146
Large fish		%			14.4%		67.8%		17.8%			45.6%
	Female	n			1		143		30			174
		%			0.6%		82.2%		17.2%			54.4%
	Total	n			22		242	0	56			320
		%			6.9%		75.6%	0.0%	17.5%			
	Male	n	3		62		1					66
Medium fish		%	4.5%		93.9%		1.5%					97.1%
	Female	n			2							2
		%			100.0%							2.9%
	Total	n	3		64	0	1					68
		%	4.4%		94.1%	0.0%	1.5%					
	Male	n	13									13
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	13									13
		%	100.0%									
	Male	n	16		83		100		26			225
All fish		%	7.1%		36.9%		44.4%		11.6%			56.1%
	Female	n			3		143		30			176
		%			1.7%		81.3%		17.0%			43.9%
	Total	n	16		86		243		56			401
		%	4.0%		21.4%		60.6%		14.0%			

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			Brood year and age class									
			1997	1996	1996	1995	1995	1994	1994	1993	1993	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Upper Tats.	Male	n			7		3					10
Large fish		%			70.0%		30.0%					55.6%
	Female	n			2		4		2			8
		%			25.0%		50.0%		25.0%			44.4%
	Total	n			9		7		2			18
		%			50.0%		38.9%		11.1%			
	Male	n			23		1					24
Medium fish		%			95.8%		4.2%					100.0%
	Female	n										0
		%										0.0%
	Total	n			23		1					24
		%			95.8%		4.2%					
	Male	n	1									1
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	1									1
		%	100.0%									
	Male	n	1		30		4					35
All fish		%	2.9%		85.7%		11.4%					81.4%
	Female	n			2		4		2			8
		%			25.0%		50.0%		25.0%			18.6%
	Total	n	1		32		8		2			43
		%	2.3%		74.4%		18.6%		4.7%			
Nahlin	Male	n			0		8		0			8
Large fish		%			0.0%		100.0%		0.0%			36.4%
	Female	n					12		2			14
		%					85.7%		14.3%			63.6%
	Total	n			0		20		2			22
		%			0.0%		90.9%		9.1%			
	Male	n			5							5
Medium fish		%			100.0%							100.0%
	Female	n										0
		%										0.0%
	Total	n			5							5
		%			100.0%							
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			5		8					13
All fish		%			38.5%		61.5%					48.1%
	Female	n					12		2			14
		%					85.7%		14.3%			51.9%
	Total	n			5		20		2			27
		%			18.5%		74.1%		7.4%			

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			Brood year and age class									
			1997	1996	1996	1995	1995	1994	1994	1993	1993	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Kowatua	Male	n			2		23	1	16			42
Large fish		%			4.8%		54.8%	2.4%	38.1%			34.4%
	Female	n				1	50	1	28			80
		%				1.3%	62.5%	1.3%	35.0%			65.6%
	Total	n			2	1	73	2	44			122
		%			1.6%	0.8%	59.8%	1.6%	36.1%			
	Male	n			17	1	3					21
Medium fish		%			81.0%		14.3%					100.0%
	Female	n										0
		%										0.0%
	Total	n			17	1	3					21
		%			81.0%	4.8%	14.3%					
	Male	n	2		1							3
Small fish		%	66.7%		33.3%							
	Female	n										
		%										
	Total	n	2		1							3
		%	66.7%		33.3%							
	Male	n	2		20		26		16			64
All fish		%	3.1%		31.3%		40.6%		25.0%			45.1%
	Female	n			0		50		28			78
		%			0.0%		64.1%		35.9%			54.9%
	Total	n	2		20		76		44			142
		%	1.4%		14.1%		53.5%		31.0%			
All tributaries	Male	n			40	0	248	2	77	0	0	367
Large fish		%			10.9%	0.0%	67.6%	0.5%	21.0%			45.1%
	Female	n			3	1	308	1	131	1	1	446
		%			0.0%		0.7%		69.1%	0.2%	29.4%	54.9%
	Total	n			43	1	556	3	208	1	1	813
		%			5.3%	0.1%	68.4%	0.4%	25.6%	0.1%	0.1%	
	Male	n	4	0	237	1	21	0	0	0	0	263
Medium fish		%	1.5%		90.1%	0.4%	8.0%					97.4%
	Female	n			3		4					7
		%			42.9%		57.1%					2.6%
	Total	n	4		240	1	25					270
		%	1.5%		88.9%	0.4%	9.3%					
	Male	n	54		2							56
Small fish		%	96.4%		3.6%							
	Female	n										
		%										
	Total	n	54		2							56
		%	96.4%		3.6%							
	Male	n	58		279	1	269	2	77			686
All fish		%	8.5%		40.7%	0.1%	39.2%	0.3%	11.2%			60.4%
	Female	n			3		7		308	1	131	450
		%			0.7%		1.6%		68.4%	0.2%	29.1%	39.6%
	Total	n	58		282	1	276	2	385	1	131	1,136
		%	5.1%		24.8%	0.1%	24.3%	0.2%	33.9%	0.1%	11.5%	

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			Brood year and age class									
			1997	1996	1996	1995	1995	1994	1994	1993	1993	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Canyon Island	Male	n			19		191	2	63		3	278
Large fish		%			6.8%		68.7%	0.7%	22.7%		1.1%	44.7%
	Female	n			6		228	7	100	1	2	344
		%			1.7%		66.3%	2.0%	29.1%	0.3%	0.6%	55.3%
	Total	n			25	0	419	9	163	1	5	622
		%			4.0%	0.0%	67.4%	1.4%	26.2%	0.2%	0.8%	
	Male	n			317	3	23		1			344
Medium fish		%			92.2%	0.9%	6.7%		0.3%			99.4%
	Female	n			2							2
		%			100.0%							0.6%
	Total	n			319	3	23		1			346
		%			92.2%	0.9%	6.6%		0.3%			
	Male	n	45		1							46
Small fish		%	97.8%		2.2%							
	Female	n										
		%										
	Total	n	45		1							46
		%	97.8%		2.2%							
	Male	n	45		337	3	214	2	64		3	668
All fish		%	6.7%		50.4%	0.4%	32.0%	0.3%	9.6%		0.4%	65.9%
	Female	n			8		228	7	100	1	2	346
		%			2.3%		65.9%	2.0%	28.9%	0.3%	0.6%	34.1%
	Total	n	45		345	3	442	9	164	1	5	1,014
		%	4.4%		34.0%	0.3%	43.6%	0.9%	16.2%	0.1%	0.5%	
Test fishery	Male	n			22	2	321	1	212		3	561
Large fish		%			3.9%	0.4%	57.2%	0.2%	37.8%		0.5%	63.8%
	Female	n			1		195	7	113		2	318
		%			0.3%		61.3%	2.2%	35.5%		0.6%	36.2%
	Total	n			23	2	516	8	325		5	879
		%			2.6%	0.2%	58.7%	0.9%	37.0%		0.6%	
	Male	n			210	4	36					250
Medium fish		%			84.0%	1.6%	14.4%					98.8%
	Female	n			1		2					3
		%			33.3%		66.7%					1.2%
	Total	n			211	4	38					253
		%			83.4%	1.6%	15.0%					
	Male	n	2									2
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	2		232	6	357	1	212		3	813
All fish		%	0.2%		28.5%	0.7%	43.9%	0.1%	26.1%		0.4%	71.8%
	Female	n					197	7	113		2	319
		%					61.8%	2.2%	35.4%		0.6%	28.2%
	Total	n	2		232	6	554	8	325		5	1,132
		%	0.2%		20.5%	0.5%	48.9%	0.7%	28.7%		0.4%	

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			Brood year and age class									
			1997	1996	1996	1995	1995	1994	1994	1993	1993	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Can. gillnet	Male	n			5		60		20			85
Large fish		%			5.9%		70.6%		23.5%			57.8%
	Female	n			3		40	1	17		1	62
		%			4.8%		64.5%		27.4%		1.6%	42.2%
	Total	n			11		125	3	49		1	189
		%			5.8%		66.1%	1.6%	25.9%		0.5%	
	Male	n			23		1					24
Medium fish		%			95.8%		4.2%					63.2%
	Female	n			12		1		1			14
		%			85.7%		7.1%		7.1%			36.8%
	Total	n			43	1	5		1			50
		%			86.0%	2.0%	10.0%		2.0%			
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			28		61	0	20			109
All fish		%			25.7%		56.0%	0.0%	18.3%			58.9%
	Female	n			15	0	41	1	18		1	76
		%			19.7%	0.0%	53.9%	1.3%	23.7%		1.3%	41.1%
	Total	n			54	1	130	3	50		1	239
		%			22.6%	0.4%	54.4%	1.3%	20.9%		0.4%	

APPENDIX C

Appendix C1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2001.

			TAGGED								CAUGHT								
		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
4/28/2001	3	-12					4				4				0	0.75	0.8	0.00	0.00
4/29/2001	3	-12		0		0	5	9	5	5	6	10	1	44632	1	0.50	1.3	0.01	0.01
4/30/2001				0		0		9	0	5		10			1		1.3		0.01
5/1/2001	3			0	1	1	13	22	14	19	15	25			1	0.20	1.5	0.02	0.03
5/2/2001				0		1		22	0	19		25			1		1.5		0.03
5/3/2001	3			0	4	5	8	30	12	31	12	37			1	0.25	1.7	0.01	0.04
5/4/2001	3	-60		0		5	8	38	8	39	8	45			1	0.38	2.1	0.01	0.05
5/5/2001	3	-84		0	3	8	5	43	8	47	9	54			1	0.33	2.4	0.01	0.06
5/6/2001	3	-12		0		8	13	56	13	60	13	67			1	0.23	2.6	0.01	0.08
5/7/2001	3	-12		0	5	13	27	83	32	92	32	99			1	0.09	2.7	0.04	0.11
5/8/2001	5	-12		0	6	19	31	114	37	129	37	136			1	0.14	2.9	0.04	0.16
5/9/2001	5	-12		0	9	28	35	149	44	173	44	180			1	0.11	3.0	0.05	0.21
5/10/2001	5	-72		0	2	30	49	198	51	224	52	232	1	44643[b]	2	0.10	3.1	0.06	0.27
5/11/2001	5	-72		0	6	36	46	244	52	276	52	284			2	0.10	3.2	0.06	0.32
5/12/2001		-48		0		36		244	0	276		284			2		3.2		0.32
5/13/2001	3	-24		0	7	43	16	260	23	299	24	308			2	0.13	3.3	0.03	0.35
5/14/2001	5	2		0	3	46	13	273	16	315	17	325	1	44637	3	0.29	3.6	0.02	0.37
5/15/2001	5	5		0	7	53	17	290	24	339	25	350			3	0.20	3.8	0.03	0.40
5/16/2001		7		0		53		290	0	339		350			3		3.8		0.40
5/17/2001		8		0		53		290	0	339		350			3		3.8		0.40
5/18/2001	3	8	1	1	6	59	33	323	40	379	42	392	1	No tag	4	0.07	3.9	0.05	0.45
5/19/2001	3	7		1	7	66	27	350	34	413	35	427	1	44644	5	0.09	4.0	0.04	0.49
5/20/2001	5	8		1	4	70	43	393	47	460	50	477			5	0.10	4.1	0.06	0.55
5/21/2001	5	10		1	5	75	32	425	37	497	39	516	1	44634	6	0.13	4.2	0.04	0.59
5/22/2001	5	12		1	10	85	37	462	47	544	48	564	1	No tag	7	0.10	4.3	0.05	0.65
5/23/2001	5	17		1	6	91	19	481	25	569	28	592	1	44636	8	0.18	4.5	0.03	0.68
5/24/2001	5	18		1	7	98	14	495	21	590	23	615	2	44636,44633	10	0.22	4.7	0.03	0.70
5/25/2001		17		1	5	103	19	514	24	614	26	641			10		4.7	0.03	0.73
5/26/2001		14		1		103		514	0	614		641			10		4.7		0.73
5/27/2001	5	19		1	14	117	28	542	42	656	46	687	2	44644, No tag	12	0.11	4.8	0.05	0.79
5/28/2001	5	36		1	3	120	7	549	10	666	10	697			12	0.50	5.3	0.01	0.80
5/29/2001		52		1		120		549	0	666		697			12		5.3		0.80
5/30/2001		59		1		120		549	0	666		697			12		5.3		0.80
5/31/2001		61		1		120		549	0	666		697			12		5.3		0.80
6/1/2001		73		1		120		549	0	666		697			12		5.3		0.80
6/2/2001		86		1		120		549	0	666		697			12		5.3		0.80
6/3/2001	5	90		1	2	122	11	560	13	679	13	710			12	0.38	5.7	0.01	0.81
6/4/2001	5	85		1	3	125	15	575	18	697	18	728			12	0.28	5.9	0.02	0.83

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			TAGGED								CAUGHT								
		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/5/2001	5	79		1	3	128	22	597	25	722	25	753			12	0.20	6.1	0.03	0.86
6/6/2001	5	86		1	12	140	22	619	34	756	34	787			12	0.15	6.3	0.04	0.90
6/7/2001	5	82	1	2	6	146	14	633	21	777	22	809	1	44637	13	0.23	6.5	0.03	0.93
6/8/2001		82		2		146		633	0	777		809			13		6.5		0.93
6/9/2001	3	84		2	6	152	12	645	18	795	19	828	1	No tag	14	0.16	6.7	0.02	0.95
6/10/2001	4	95		2	2	154	12	657	14	809	16	844			14	0.23	6.9	0.02	0.97
6/11/2001	5	101		2	4	158	8	665	12	821	12	856			14	0.42	7.3	0.01	0.98
6/12/2001		109		2		158		665	0	821		856			14		7.3		0.98
6/13/2001		118		2		158		665	0	821		856			14		7.3		0.98
6/14/2001		113		2		158		665	0	821		856			14		7.3		0.98
6/15/2001		101		2		158		665	0	821		856			14		7.3		0.98
6/16/2001	3	91		2	1	159	5	670	6	827	7	863			14	0.43	7.8	0.01	0.99
6/17/2001	3	97		2	1	160	10	680	11	838	11	874			14	0.27	8.0	0.01	1.00
Total	141		2		160		680		838		874		14	9					

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

[b] tag code listed for 10 May was classified as a coho salmon smolt during coded wire tagging yet was found to be a Chinook salmon during adult sampling.

Appendix C2.– Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2001.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/28/2001	23.5	2.2	23.0	3.0	36	1	1	2	2	5	5	8	8	8	8			0	6	6	0.02	0.02
5/29/2001	23.3	2.4	23.1	2.9	52	1	2	9	11	9	14	19	27	19	27			0	2	8	0.05	0.07
5/30/2001	23.3	2.6	23.7	3.0	59	4	6	4	15	6	20	14	41	16	43			0	3	11	0.04	0.11
5/31/2001	23.8	2.7	24.0	3.0	61		6		15	2	22	2	43	2	45			0	24	35	0.01	0.12
6/1/2001	23.3	3.1	23.4	2.5	73	1	7	5	20	7	29	13	56	13	58			0	4	39	0.03	0.15
6/2/2001	23.6	2.8	23.8	2.7	86	1	8	1	21	4	33	6	62	6	64			0	8	47	0.02	0.17
6/3/2001	23.8	2.7	23.8	2.7	90	1	9	1	22	5	38	7	69	7	71			0	7	53	0.02	0.19
6/4/2001	23.3	2.8	23.4	2.9	85		9	2	24	2	40	4	73	4	75			0	12	65	0.01	0.20
6/5/2001	23.5	2.9	23.5	3.0	79	2	11	6	30	5	45	13	86	14	89			0	3	68	0.04	0.24
6/6/2001	22.6	2.9	21.8	2.8	86	3	14	8	38	14	59	25	111	26	115			0	2	70	0.07	0.31
6/7/2001	23.2	2.4	23.5	2.6	82	1	15	3	41	9	68	13	124	13	128			0	4	74	0.03	0.34
6/8/2001	23.0	2.7	23.6	3.0	82	1	16	3	44	9	77	13	137	16	144	2	644,No tag	2	3	77	0.04	0.38
6/9/2001	22.9	3.1	23.6	3.3	84	4	20	7	51	9	86	20	157	21	165	1	40141	3	2	79	0.06	0.44
6/10/2001	23.2	3.3	23.5	3.5	95	1	21		51	3	89	4	161	4	169			3	12	90	0.01	0.45
6/11/2001	23.1	3.2	23.4	2.9	101	2	23	5	56	9	98	16	177	16	185			3	3	93	0.04	0.49
6/12/2001	23.4	3.2	23.6	3.2	109		23	1	57	7	105	8	185	8	193			3	6	99	0.02	0.51
6/13/2001	23.7	3.2	22.6	3.0	118	1	24	2	59	1	106	4	189	5	198	1	44633	4	9	109	0.01	0.53
6/14/2001	23.5	3.1	23.3	2.7	113		24		59	14	120	14	203	14	212			4	3	112	0.04	0.56
6/15/2001	23.3	2.8	23.3	2.4	101		24	4	63	12	132	16	219	16	228			4	3	115	0.04	0.61
6/16/2001	23.5	2.5	23.3	2.3	91	1	25	1	64	7	139	9	228	10	238			4	5	119	0.03	0.63
6/17/2001	23.0	2.8	23.3	2.7	97	1	26	2	66	7	146	10	238	11	249	1	44637	5	4	124	0.03	0.66
6/18/2001	23.3	2.8	23.5	2.4	102		26	3	69	10	156	13	251	14	263	1	44637	6	3	127	0.04	0.70
6/19/2001	22.9	3.0	22.8	2.7	103	2	28	2	71	8	164	12	263	12	275			6	4	131	0.03	0.73
6/20/2001	23.1	2.8	23.3	3.0	100	3	31		71	9	173	12	275	12	287			6	4	135	0.03	0.76
6/21/2001	23.6	3.0	23.2	3.5	108		31		71	6	179	6	281	7	294	1	40353	7	7	141	0.02	0.78
6/22/2001	23.9	3.3	23.7	2.9	136		31		71		179	0	281		294			7		141		0.78
6/23/2001	23.4	2.8	20.8	2.7	98	1	32	3	74	4	183	8	289	9	303			7	5	146	0.02	0.81
6/24/2001	22.6	2.6	23.0	2.7	94	2	34	2	76	7	190	11	300	11	314			7	4	150	0.03	0.84
6/25/2001	22.3	2.5	23.2	2.7	83	3	37		76	3	193	6	306	6	320			7	8	158	0.02	0.85
6/26/2001	21.9	2.4	22.8	2.4	68	1	38	3	79	6	199	10	316	10	330			7	4	162	0.03	0.88
6/27/2001	21.8	2.6	23.2	2.1	68	3	41		79	7	206	10	326	11	341	1	40141	8	4	167	0.03	0.91
6/28/2001	23.2	3.1	23.8	2.7	80	2	43		79	2	208	4	330	4	345			8	12	178	0.01	0.92
6/29/2001	22.8	3.3	23.6	3.1	88		43		79	2	210	2	332	2	347			8	23	201	0.01	0.92
6/30/2001	22.6	3.0	22.6	3.1	91		43	1	80	3	213	4	336	4	351			8	11	213	0.01	0.93
7/1/2001	21.6	2.9	23.1	2.8	86		43		80	1	214	1	337	1	352			8	45	257	0.00	0.94
7/2/2001	22.3	3.0	22.8	3.0	94		43	1	81	3	217	4	341	4	356			8	11	269	0.01	0.95
7/3/2001	22.6	2.8	23.0	2.8	86		43	1	82	2	219	3	344	3	359			8	15	284	0.01	0.95
7/4/2001	22.3	2.8	23.2	2.7	83		43		82	5	224	5	349	5	364			8	9	293	0.01	0.97

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
						Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
7/5/2001	23.0	3.1	23.3	2.8	85		43	2	84	1	225	3	352	3	367			8	15	308	0.01	0.98
7/6/2001	23.0	3.1	23.2	2.8	82		43	1	85		225	1	353	1	368			8	46	355	0.00	0.98
7/7/2001	23.3	2.6	23.5	2.6	76		43		85		225	0	353		368			8		355		0.98
7/8/2001	22.9	2.6	22.9	2.5	72	1	44		85	2	227	3	356	3	371			8	15	370	0.01	0.99
7/9/2001	22.8	2.1	22.9	2.2	66		44		85		227	0	356		371			8		370		0.99
7/10/2001	23.0	2.2	23.5	2.3	65		44		85		227	0	356		371			8		370		0.99
7/11/2001	23.1	2.2	23.4	2.2	62		44		85		227	0	356		371			8		370		0.99
7/12/2001	23.0	2.3	23.4	2.0	59		44	1	86		227	1	357	1	372			8	46	416	0.00	0.99
7/13/2001	23.2	2.4	23.4	2.0	56		44		86		227	0	357		372			8		416		0.99
7/14/2001	22.5	2.3	23.2	2.2	58		44		86		227	0	357		372			8		416		0.99
7/15/2001	22.3	2.5	22.7	2.5	62		44		86		227	0	357		372			8		416		0.99
7/16/2001	22.2	2.8	23.1	2.7	66		44	2	88	1	228	3	360	3	375			8	15	431	0.01	1.00
7/17/2001	21.4	3.0	23.3	2.7	70		44	1	89		228	1	361	1	376			8	45	476	0.00	1.00
Total	1,171		1,183			44		89		228		361		376		8	7					

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

Appendix C3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2001 by size group and location.

			Brood year and age class									
			1998	1997	1997	1996	1996	1995	1995	1994	1994	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina	Male	n			11		236	1	48			296
Large fish		%			3.7%		79.7%	0.3%	16.2%			50.8%
	Female	n			1		140	2	144			287
		%			0.3%		48.8%	0.7%	50.2%			49.2%
	Total	n			12		376	3	192			583
		%			2.1%		64.5%	0.5%	32.9%			
	Male	n	3		100	1	27		2			133
Medium fish		%	2.3%		75.2%	0.8%	20.3%		1.5%			100.0%
	Female	n										0
		%										0.0%
	Total	n	3		100	1	27		2			133
		%	2.3%		75.2%	0.8%	20.3%		1.5%			
	Male	n	94									94
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	94									94
		%	100.0%									
	Male	n	97		111	1	263	1	50			523
All fish		%	18.5%		21.2%	0.2%	50.3%	0.2%	9.6%			64.6%
	Female	n			1		140	2	144			287
		%			0.3%		48.8%	0.7%	50.2%			35.4%
	Total	n	97		112	1	403	3	194			810
		%	12.0%		13.8%	0.1%	49.8%	0.4%	24.0%			
Lower Tats.	Male	n			12		245		23		1	281
Large fish		%			4.3%		87.2%		8.2%		0.4%	55.1%
	Female	n			3		173		53			229
		%			1.3%		75.5%		23.1%			44.9%
	Total	n			15		418		76		1	510
		%			2.9%		82.0%		14.9%		0.2%	
	Male	n	3		47		5					55
Medium fish		%	5.5%		85.5%		9.1%					91.7%
	Female	n			4		1					5
		%			80.0%		20.0%					8.3%
	Total	n	3		51		6					60
		%	5.0%		85.0%		10.0%					
	Male	n	39									39
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	39									39
		%	100.0%									
	Male	n	42		59		250		23		1	375
All fish		%	11.2%		15.7%		66.7%		6.1%		0.3%	61.6%
	Female	n			7		174		53			234
		%			3.0%		74.4%		22.6%			38.4%
	Total	n	42		66		424		76		1	609
		%	6.9%		10.8%		69.6%		12.5%		0.2%	

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			Brood year and age class									
			1998	1997	1997	1996	1996	1995	1995	1994	1994	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Upper Tats.	Male	n			12		35		4			51
Large fish		%			23.5%		68.6%		7.8%			54.3%
	Female	n			2		39		2			43
		%			4.7%		90.7%		4.7%			45.7%
	Total	n			14		74	0	6			94
		%			14.9%		78.7%	0.0%	6.4%			
	Male	n	1		28		2					31
Medium fish		%	3.2%		90.3%		6.5%					96.9%
	Female	n					1					1
		%					100.0%					3.1%
	Total	n	1		28		3					32
		%	3.1%		87.5%		9.4%					
	Male	n	3									3
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	3									3
		%	100.0%									
	Male	n	4		40		37		4			85
All fish		%	4.7%		47.1%		43.5%		4.7%			65.9%
	Female	n			2		40		2			44
		%			4.5%		90.9%		4.5%			34.1%
	Total	n	4		42		77		6			129
		%	3.1%		32.6%		59.7%		4.7%			
Nahlin	Male	n			2		155	1	9			167
Large fish		%			1.2%		92.8%	0.6%	5.4%			46.6%
	Female	n					161	2	28			191
		%					84.3%	1.0%	14.7%			53.4%
	Total	n			2		316	3	37			358
		%			0.6%		88.3%	0.8%	10.3%			
	Male	n			11		4					15
Medium fish		%			73.3%		26.7%					78.9%
	Female	n			1		3					4
		%			25.0%		75.0%					21.1%
	Total	n			12		7					19
		%			63.2%		36.8%					
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			13		159	1	9			182
All fish		%			7.1%		87.4%	0.5%	4.9%			48.3%
	Female	n			1		164	2	28			195
		%			0.5%		84.1%	1.0%	14.4%			51.7%
	Total	n			14		323	3	37			377
		%			3.7%		85.7%	0.8%	9.8%			

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			Brood year and age class									
			1998	1997	1997	1996	1996	1995	1995	1994	1994	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Kowatua	Male	n			3		120		22			145
Large fish		%			2.1%		82.8%		15.2%			45.0%
	Female	n			5		121	5	46			177
		%			2.8%		68.4%	2.8%	26.0%			55.0%
	Total	n			8		241	5	68			322
		%			2.5%		74.8%	1.6%	21.1%			
	Male	n	1		11	1	6					19
Medium fish		%	5.3%		57.9%	5.3%	31.6%					95.0%
	Female	n					1					1
		%					100.0%					5.0%
	Total	n	1		11	1	7					20
		%	5.0%		55.0%	5.0%	35.0%					
	Male	n	3									3
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	3									3
		%	100.0%									
	Male	n	4		14	1	126		22			167
All fish		%	2.4%		8.4%	0.6%	75.4%		13.2%			48.4%
	Female	n			5		122	5	46			178
		%			2.8%		68.5%	2.8%	25.8%			51.6%
	Total	n	4		19	1	248	5	68			345
		%	1.2%		5.5%	0.3%	71.9%	1.4%	19.7%			
All tributaries	Male	n			40		791	2	106		1	940
Large fish		%			4.3%		84.1%	0.2%	11.3%		0.1%	50.3%
	Female	n			11		634	9	273			927
		%			1.2%		68.4%	1.0%	29.4%			49.7%
	Total	n			51		1425	11	379		1	1867
		%			2.7%		76.3%	0.6%	20.3%		0.1%	
	Male	n	8		197	2	44		2			253
Medium fish		%	3.2%		77.9%	0.8%	17.4%		0.8%			95.8%
	Female	n			5		6					11
		%			45.5%		54.5%					4.2%
	Total	n	8		202	2	50		2			264
		%	3.0%		76.5%	0.8%	18.9%		0.8%			
	Male	n	139									139
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	139									139
		%	100.0%									
	Male	n	147		237	2	835	2	108		1	1,332
All fish		%	11.0%		17.8%	0.2%	62.7%	0.2%	8.1%		0.1%	58.7%
	Female	n			16		640	9	273			938
		%			1.7%		68.2%	1.0%	29.1%			41.3%
	Total	n	147		253	2	1,475	11	381		1	2,270
		%	6.5%		11.1%	0.1%	65.0%	0.5%	16.8%		0.0%	

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			Brood year and age class									
			1998	1997	1997	1996	1996	1995	1995	1994	1994	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Canyon Island	Male	n			12	1	330	5	49	1		398
Large fish		%			3.0%	0.3%	82.9%		12.3%	0.3%		52.9%
	Female	n					235		118		1	354
		%					66.4%		33.3%		0.3%	47.1%
	Total	n			12	1	565	5	167	1	1	752
		%			1.6%	0.1%	75.1%	0.7%	22.2%	0.1%	0.1%	
	Male	n	2		188	2	19					211
Medium fish		%	0.9%		89.1%	0.9%	9.0%					99.1%
	Female	n					2					2
		%					100.0%					0.9%
	Total	n	2		188	2	21					213
		%	0.9%		88.3%	0.9%	9.9%					
	Male	n	43									43
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	43									43
		%	100.0%									
	Male	n	45		200	3	349	5	49	1		652
All fish		%	6.9%		30.7%	0.5%	53.5%	0.8%	7.5%	0.2%		64.7%
	Female	n					237		118		1	356
		%					66.6%		33.1%		0.3%	35.3%
	Total	n	45		200	3	586	5	167	1	1	1,008
		%	4.5%		19.8%	0.3%	58.1%	0.5%	16.6%	0.1%	0.1%	
Test fishery	Total	n			108	10	359	11	107	3		598
All fish		%			18.1%	1.7%	60.0%	1.8%	17.9%	0.5%		
Can. gillnet	Total	n			14	1	32	1	13			61
All fish		%			23.0%	1.6%	52.5%	1.6%	21.3%			

APPENDIX D

Appendix D1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2002.

			TAGGED								CAUGHT								
			Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	Water level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
4/24/2002	4																		
4/25/2002	4																		
4/26/2002	5			0		0	3	3	3	3	3	3			0	1.67	1.67	0.01	0.01
4/27/2008	4			0		0		3	0	3	0	3			0		1.67	-	0.01
4/28/2002	6			0		0	2	5	2	5	2	5			0	3.00	4.67	0.00	0.01
4/29/2002	5			0	1	1	11	16	12	17	12	17			0	0.42	5.08	0.02	0.03
4/30/2002	5			0		1	9	25	9	26	8	25	1	No tag	1	0.63	5.71	0.01	0.04
5/1/2002		-5		0		1		25	0	26	0	25			1		5.71	-	0.04
5/2/2002	5	7		0		1	4	29	4	30	4	29			1	1.25	6.96	0.01	0.05
5/3/2002	5	4		0	1	2	7	36	8	38	8	37			1	0.63	7.58	0.01	0.06
5/4/2002	5	-2		0		2	7	43	7	45	7	44			1	0.71	8.30	0.01	0.08
5/5/2002		-7		0		2		43	0	45	0	44			1		8.30	-	0.08
5/6/2002	5	-11		0	2	4	6	49	8	53	8	52			1	0.63	8.92	0.01	0.09
5/7/2002	5	-13		0	2	6	4	53	6	59	6	58			1	0.83	9.76	0.01	0.10
5/8/2002	5	-17		0	2	8	33	86	35	94	34	92	1	44636	2	0.15	9.90	0.06	0.16
5/9/2002	5	-14		0	6	14	49	135	55	149	55	147			2	0.09	9.99	0.10	0.26
5/10/2002	5	-13		0	6	20	65	200	71	220	70	217	1	44636	3	0.07	10.07	0.12	0.38
5/11/2002	5	-8		0	7	27	53	253	60	280	60	277			3	0.08	10.15	0.10	0.48
5/12/2002		-6		0		27		253	0	280	0	277			3		10.15	-	0.48
5/13/2002	5	-4		0	9	36	23	276	32	312	32	309			3	0.16	10.30	0.06	0.54
5/14/2002	5	7		0	19	55	27	303	46	358	46	355			3	0.11	10.41	0.08	0.62
5/15/2002	5	16		0	12	67	27	330	39	397	39	394			3	0.13	10.54	0.07	0.68
5/16/2002	5	18		0	9	76	24	354	33	430	33	427			3	0.15	10.69	0.06	0.74
5/17/2002	4	23		0	6	82	13	367	19	449	16	443	2	40353 44644	5	0.25	10.94	0.03	0.77
5/18/2002		32		0		82		367	0	449	0	443			5		10.94	-	0.77
5/19/2002		44		0		82		367	0	449	0	443			5		10.94	-	0.77
5/20/2002	5	59		0	5	87	7	374	12	461	12	455			5	0.42	11.36	0.02	0.79
5/21/2002	5	74		0	2	89	7	381	9	470	9	464			5	0.56	11.92	0.02	0.81
5/22/2002		80		0		89		381	0	470	0	464			5		11.92	-	0.81
5/23/2002	5	78		0	5	94	24	405	29	499	29	493			5	0.17	12.09	0.05	0.86
5/24/2002	3	77		0	3	97	14	419	17	516	17	510			5	0.18	12.26	0.03	0.89
5/25/2002		82		0		97		419	0	516	0	510			5		12.26	-	0.89
5/26/2002		92		0		97		419	0	516	0	510			5		12.26	-	0.89
5/27/2002		101		0		97		419	0	516	0	510			5		12.26	-	0.89
5/28/2002		103		0		97		419	0	516	0	510			5		12.26	-	0.89
5/29/2002		107		0		97		419	0	516	0	510			5		12.26	-	0.89
5/30/2002		110		0		97		419	0	516	0	510			5		12.26	-	0.89

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			TAGGED								CAUGHT								
			Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	Water level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/31/2002		96		0		97		419	0	516	0	510			5		12.26	-	0.89
6/1/2002		80		0		97		419	0	516	0	510			5		12.26	-	0.89
6/2/2002		72		0		97		419	0	516	0	510			5		12.26	-	0.89
6/3/2002		71		0		97		419	0	516	0	510			5		12.26	-	0.89
6/4/2002	3	72		0	6	103	8	427	14	530	14	524			5	0.21	12.48	0.02	0.91
6/4/2002	3	72		0	6	103	8	427	14	530	14	524			5	0.21	12.48	0.02	0.91
6/5/2002	3	80		0	5	108	25	452	30	560	29	553			5	0.10	12.58	0.05	0.96
6/6/2002		77		0		108		452	0	560	0	553			5		12.58	-	0.96
6/7/2002	3	67		0	4	112	14	466	18	578	18	571	1	40354	6	0.17	12.75	0.03	0.99
6/8/2002	2	65	1	1	1	113	3	469	5	583	5	576			6	0.40	13.15	0.01	1.00
Total	123		1		113		469		583		576		6	5					

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

Appendix D2.– Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2002.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)									
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/19/2002	4.3	2.5			44																	
5/20/2002	21.3	2.8			59			3	3	6	6	9	9	9	9				2	2	0.01	0.01
5/21/2002	23.3	2.9	5.8	2.6	74			2	5	7	13	9	18	10	19				3	5	0.01	0.02
5/22/2002	23.2	2.8	23.3	2.4	80			6	11	7	20	13	31	13	32				4	9	0.01	0.03
5/23/2002	23.3	2.7	23.6	2.6	78	1	1	2	13	10	30	13	44	13	45				4	12	0.01	0.05
5/24/2002	22.6	2.7	23.8	2.4	77	2	3	13	26	12	42	27	71	29	74	1	40353	1	2	14	0.03	0.08
5/25/2002	23.3	3.1	23.9	2.9	82	3	6	1	27	14	56	18	89	18	92			1	3	17	0.02	0.10
5/26/2002	23.6	3.0	23.5	2.8	92	1	7	2	29	14	70	17	106	17	109			1	3	19	0.02	0.11
5/27/2002	23.3	3.0	23.8	2.9	101		7	9	38	7	77	16	122	16	125			1	3	22	0.02	0.13
5/28/2002	23.3	3.2	22.8	3.0	103		7	9	47	10	87	19	141	19	144			1	2	25	0.02	0.15
5/29/2002	23.5	3.2	23.6	3.0	107		7	5	52	12	99	17	158	17	161			1	3	28	0.02	0.17
5/30/2002	23.6	3.3	23.6	2.9	110	1	8	4	56	11	110	16	174	16	177			1	3	31	0.02	0.18
5/31/2002	23.3	2.9	23.6	2.2	96	1	9	9	65	19	129	29	203	30	207	1	44644	2	2	32	0.03	0.21
6/1/2002	22.0	3.0	22.7	2.6	80	4	13	19	84	19	148	42	245	42	249			2	1	33	0.04	0.26
6/2/2002	22.0	2.9	22.8	2.6	72	4	17	15	99	30	178	49	294	52	301	2	44644 40354	4	1	34	0.05	0.31
6/3/2002	23.0	2.6	23.0	2.7	71	7	24	11	110	27	205	45	339	46	347			4	1	35	0.05	0.36
6/4/2002	23.0	3.0	23.6	2.8	72	8	32	6	116	13	218	27	366	27	374			4	2	37	0.03	0.39
6/5/2002	23.2	2.7	23.3	2.5	80	5	37	4	120	10	228	19	385	20	394			4	2	39	0.02	0.41
6/6/2002	23.2	2.5	23.2	2.8	77	3	40	10	130	17	245	30	415	34	428	4	40373 40141 40353 40354	8	1	40	0.04	0.44
6/7/2002	23.5	1.9	22.6	2.4	67	10	50	8	138	9	254	27	442	27	455			8	2	42	0.03	0.47
6/8/2002	23.3	2.4	23.3	2.5	65	5	55	11	149	14	268	30	472	30	485			8	2	44	0.03	0.50
6/9/2002	22.7	3.1	23.3	3.1	80	2	57	5	154	20	288	27	499	28	513	1	40141	9	2	45	0.03	0.53
6/10/2002	23.0	3.0	23.3	3.0	88	4	61	11	165	12	300	27	526	27	540			9	2	47	0.03	0.56
6/11/2002	22.2	2.6	22.3	3.0	89	7	68	9	174	19	319	35	561	36	576	1	44644	10	1	48	0.04	0.60
6/12/2002	23.2	2.3	22.4	2.5	80	3	71	10	184	19	338	32	593	34	610	2	40373 44637	12	1	50	0.04	0.63
6/13/2002	23.3	2.5	23.2	2.6	74	1	72	2	186	5	343	8	601	8	618			12	6	55	0.01	0.64
6/14/2002	22.8	2.9	22.8	2.7	77	5	77	5	191	7	350	17	618	18	636	1	44636	13	3	58	0.02	0.66
6/15/2002	22.7	3.0	23.0	2.8	97		77	6	197	5	355	11	629	11	647			13	4	62	0.01	0.67
6/16/2002	23.7	2.8	22.9	3.1	120	2	79	1	198	4	359	7	636	7	654			13	7	69	0.01	0.68
6/17/2002	23.6	3.4	23.3	3.5	121	1	80	4	202	4	363	9	645	9	663			13	5	74	0.01	0.69
6/18/2002	22.8	2.9	23.0	2.6	101	1	81	5	207	6	369	12	657	14	677	2	40354 No tag	15	3	77	0.01	0.70
6/19/2002	23.2	2.7	23.4	2.5	92	4	85	1	208	1	370	6	663	6	683			15	8	85	0.01	0.71

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
						Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/20/2002	23.3	2.3	23.4	2.5	82	4	89	2	210	1	371	7	670	7	690			15	7	92	0.01	0.72
6/21/2002	23.0	2.5	23.3	2.4	73	5	94	2	212	6	377	13	683	13	703			15	4	95	0.01	0.73
6/22/2002	23.3	2.4	22.9	2.6	67	1	95	6	218	1	378	8	691	8	711			15	6	101	0.01	0.74
6/24/2002	22.3	3.0	23.0	2.9	70	8	106	9	229	8	392	25	727	26	750			15	2	106	0.03	0.78
6/25/2002	22.3	3.1	22.3	2.9	74	26	132	11	240	11	403	48	775	51	801	1	40373	16	1	107	0.05	0.83
6/26/2002	22.3	2.9	22.8	2.8	73	16	148	4	244	4	407	24	799	26	827			16	2	109	0.03	0.86
6/27/2002	22.8	2.8	23.0	2.9	72	11	159	3	247	4	411	18	817	18	845			16	3	111	0.02	0.88
6/28/2002	23.0	2.4	22.9	2.4	66	11	170	2	249	5	416	18	835	22	867	2	40373 40373	18	2	114	0.02	0.90
6/29/2002	22.7	2.5	23.3	2.5	65	7	177	3	252	2	418	12	847	13	880			18	4	117	0.01	0.91
6/30/2002	22.6	2.9	22.4	2.9	66	6	183		252	4	422	10	857	10	890			18	5	122	0.01	0.92
7/1/2002	22.8	2.7	22.4	2.7	66	8	191	3	255	3	425	14	871	15	905	1	No tag	19	3	125	0.02	0.94
7/2/2002	22.9	3.0	23.3	2.9	70	7	198	2	257		425	9	880	11	916			19	4	129	0.01	0.95
7/3/2002	22.8	3.0	22.9	2.9	70	3	201	2	259		425	5	885	6	922			19	8	136	0.01	0.96
7/4/2002	23.2	2.7	23.4	2.7	66	2	203	1	260	1	426	4	889	4	926			19	12	148	0.00	0.96
7/5/2002	22.6	2.7	22.9	2.7	64	2	205	3	263		426	5	894	5	931			19	9	157	0.01	0.97
7/6/2002	23.3	2.4	23.4	2.6	59	2	207		263	2	428	4	898	5	936			19	9	166	0.01	0.97
7/7/2002	22.4	2.5	23.0	2.6	56	1	208	1	264		428	2	900	2	938			19	23	189	0.00	0.97
7/8/2002	22.8	2.8	22.8	2.7	60		208	2	266		428	2	902	2	940			19	23	212	0.00	0.98
7/9/2002	21.3	3.2	23.1	2.9	67	1	209	3	269		428	4	906	4	944			19	11	223	0.00	0.98
7/10/2002	21.6	2.8	22.2	2.8	70	1	210	2	271	3	431	6	912	6	950			19	7	230	0.01	0.99
7/11/2002	22.3	2.3	22.8	2.7	62		210		271	2	433	2	914	4	954	1	No tag	20	11	242	0.00	0.99
7/12/2002	22.7	2.6	23.3	2.6	59		210	1	272	2	435	3	917	3	957			20	15	257	0.00	0.99
7/13/2002	23.3	2.6	23.6	2.7	58		210	2	274		435	2	919	2	959			20	23	280	0.00	0.99
7/14/2002	21.1	2.8	23.3	2.9	65		210	1	275	1	436	2	921	2	961			20	22	303	0.00	1.00
7/15/2002	21.9	3.2	20.8	2.9	71		210		275	1	437	1	922	1	962			20	43	345	0.00	1.00
7/16/2002	22.3	2.8	22.3	2.8	68		210		275	1	438	1	923	1	963			20	45	390	0.00	1.00
7/17/2002	22.5	2.8	22.7	2.9	65		210		275		438	0	923	0	963			20		390	-	1.00
7/18/2002	23.2	3.2	22.1	2.9	74		210		275		438	0	923	0	963			20		390	-	1.00
7/19/2002	22.7	3.0	22.3	2.8	74		210		275		438	0	923	0	963			20		390	-	1.00
7/20/2002	22.9	2.9	22.7	2.7	71		210		275		438	0	923	1	964			20	46	435	0.00	1.00
Total	1418		1386			210		275		438		923		964		20	17					

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

Appendix D3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2002 by size group and location.

			Brood year and age class									
			1999	1998	1998	1997	1997	1996	1996	1995	1995	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina	Male	n			10		166	2	111	1		290
Large fish		%			3.4%		57.2%	0.7%	38.3%	0.3%		47.9%
	Female	n			3		91	1	220			315
		%			1.0%		28.9%	0.3%	69.8%			52.1%
	Total	n			13		257	3	331	1		605
		%			2.1%		42.5%	0.5%	54.7%	0.2%		
	Male	n	8		200	2	12		5			227
Medium fish		%	3.5%		88.1%	0.9%	5.3%		2.2%			99.1%
	Female	n					1		1			2
		%					50.0%		50.0%			0.9%
	Total	n	8		200	2	13		6			229
		%	3.5%		87.3%	0.9%	5.7%		2.6%			
	Male	n	129	1	3							133
Small fish		%	97.0%	0.8%	2.3%							
	Female	n										
		%										
	Total	n	129	1	3							133
		%	97.0%	0.8%	2.3%							
	Male	n	137	1	213	2	178	2	116	1		650
All fish		%	21.1%	0.2%	32.8%	0.3%	27.4%	0.3%	17.8%	0.2%		67.2%
	Female	n			3		92	1	221			317
		%			0.9%		29.0%	0.3%	69.7%			32.8%
	Total	n	137	1	216	2	270	3	337	1		967
		%	14.2%	0.1%	22.3%	0.2%	27.9%	0.3%	34.9%	0.1%		
Lower Tats.	Male	n					86		25			111
Large fish		%					77.5%		22.5%			57.2%
	Female	n			3		67		13			83
		%			3.6%		80.7%		15.7%			42.8%
	Total	n			3		153		38			194
		%			1.5%		78.9%		19.6%			
	Male	n	1		28							29
Medium fish		%	3.4%		96.6%		0.0%					100.0%
	Female	n										-
		%										0.0%
	Total	n	1		28							29
		%	3.4%		96.6%							
	Male	n	16									16
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	16									16
		%	100.0%									
	Male	n	17		28		86		25			156
All fish		%	10.9%		17.9%		55.1%		16.0%			65.3%
	Female	n			3		67		13			83
		%			3.6%		80.7%		15.7%			34.7%
	Total	n	17		31		153		38			239
		%	7.1%		13.0%		64.0%		15.9%			

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			Brood year and age class									
			1999	1998	1998	1997	1997	1996	1996	1995	1995	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Upper Tats.	Male	n			3		21		1			25
Large fish		%			12.0%		84.0%		4.0%			36.8%
	Female	n			5		28		10			43
		%			11.6%		65.1%		23.3%			63.2%
	Total	n			8		49		11			68
		%			11.8%		72.1%		16.2%			
	Male	n	1		11		2					14
Medium fish		%	7.1%		78.6%		14.3%					93.3%
	Female	n			1							1
		%			100.0%							6.7%
	Total	n	1		12		2					15
		%	6.7%		80.0%		13.3%					
	Male	n	2									2
Small fish		%	100.0%									100.0%
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	3		14		23		1			41
All fish		%	7.3%		34.1%		56.1%		2.4%			48.2%
	Female	n			6		28		10			44
		%			13.6%		63.6%		22.7%			51.8%
	Total	n	3		20		51		11			85
		%	3.5%		23.5%		60.0%		12.9%			
Dudidontu	Male	n			1		48		11			60
Large fish		%			1.7%		80.0%		18.3%			36.4%
	Female	n			4		70		31			105
		%			3.8%		66.7%		29.5%			63.6%
	Total	n			5		118		42			165
		%			3.0%		71.5%		25.5%			
	Male	n			1	1	6					8
Medium fish		%			12.5%	12.5%	75.0%					80.0%
	Female	n					1		1			2
		%					50.0%		50.0%			20.0%
	Total	n			1	1	7		1			10
		%			10.0%	10.0%	70.0%		10.0%			
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			2	1	54		11			68
All fish		%			2.9%	1.5%	79.4%		16.2%			38.9%
	Female	n			4		71		32			107
		%			3.7%		66.4%		29.9%			61.1%
	Total	n			6	1	125		43			175
		%			3.4%	0.6%	71.4%		24.6%			

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			Brood year and age class									
			1999	1998	1998	1997	1997	1996	1996	1995	1995	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nahlin	Male	n			13		109	1	34			157
Large fish		%			8.3%		69.4%	0.6%	21.7%			36.6%
	Female	n				1	173	2	94	1	1	272
		%				0.4%	63.6%	0.7%	34.6%	0.4%	0.4%	63.4%
	Total	n			13	1	282	3	128	1	1	429
		%			3.0%	0.2%	65.7%	0.7%	29.8%	0.2%	0.2%	
	Male	n			23		2					25
Medium fish		%			92.0%		8.0%					92.6%
	Female	n			1		1					2
		%			50.0%		50.0%					7.4%
	Total	n			24		3					27
		%			88.9%		11.1%					
	Male	n	2									2
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	2		36		111	1	34			184
All fish		%	1.1%		19.6%		60.3%	0.5%	18.5%			40.2%
	Female	n			1	1	174	2	94	1	1	274
		%			0.4%	0.4%	63.5%	0.7%	34.3%	0.4%	0.4%	59.8%
	Total	n	2		37	1	285	3	128	1	1	458
		%	0.4%		8.1%	0.2%	62.2%	0.7%	27.9%	0.2%	0.2%	
Kowatua	Male	n					20	1	11			32
Large fish		%					62.5%	3.1%	34.4%			26.4%
	Female	n					47	4	37		1	89
		%					52.8%	4.5%	41.6%		1.1%	73.6%
	Total	n					67	5	48		1	121
		%					55.4%	4.1%	39.7%		0.8%	
	Male	n			2							2
Medium fish		%			100.0%							66.7%
	Female	n			1							1
		%			100.0%							33.3%
	Total	n			3							3
		%			100.0%							
	Male	n	2									2
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	2		2		20	1	11			36
All fish		%	5.6%		5.6%		55.6%	2.8%	30.6%			28.6%
	Female	n			1		47	4	37		1	90
		%			1.1%		52.2%	4.4%	41.1%		1.1%	71.4%
	Total	n	2		3		67	5	48		1	126
		%	1.6%		2.4%		53.2%	4.0%	38.1%		0.8%	

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			Brood year and age class									
			1999	1998	1998	1997	1997	1996	1996	1995	1995	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
All tributaries	Male	n			27		450	4	193	1		675
Large fish		%			4.0%		66.7%	0.6%	28.6%	0.1%		42.7%
	Female	n			15	1	476	7	405	1	2	907
		%			1.7%	0.1%	52.5%	0.8%	44.7%	0.1%	0.2%	57.3%
	Total	n			42	1	926	11	598	2	2	1,582
		%			2.7%	0.1%	58.5%	0.7%	37.8%	0.1%	0.1%	
	Male	n	10		265	3	22		5			305
Medium fish		%	3.3%		86.9%	1.0%	7.2%		1.6%			97.4%
	Female	n			3		3		2			8
		%			37.5%		37.5%		25.0%			2.6%
	Total	n	10		268	3	25		7			313
		%	3.2%		85.6%	1.0%	8.0%		2.2%			
	Male	n	151	1	3							155
Small fish		%	97.4%	0.6%	1.9%							100.0%
	Female	n										
		%										
	Total	n	151	1	3							155
		%	97.4%	0.6%	1.9%							
	Male	n	161	1	295	3	472	4	198	1		1,135
All fish		%	14.2%	0.1%	26.0%	0.3%	41.6%	0.4%	17.4%	0.1%		55.4%
	Female	n			18	1	479	7	407	1	2	915
		%			2.0%	0.1%	52.3%	0.8%	44.5%	0.1%	0.2%	44.6%
	Total	n	161	1	313	4	951	11	605	2	2	2,050
		%	7.9%	0.0%	15.3%	0.2%	46.4%	0.5%	29.5%	0.1%	0.1%	
Canyon Island	Male	n			2		255	6	87			350
Large fish		%			0.6%		72.9%	1.7%	24.9%			39.5%
	Female	n			1		346	12	175	2		536
		%			0.2%		64.6%	2.2%	32.6%	0.4%		60.5%
	Total	n			3		601	18	262	2		886
		%			0.3%		67.8%	2.0%	29.6%	0.2%		
	Male	n	7		337	3	38					385
Medium fish		%	1.8%		87.5%	0.8%	9.9%					98.5%
	Female	n			3		3					6
		%			50.0%		50.0%					1.5%
	Total	n	7		340	3	41					391
		%	1.8%		87.0%	0.8%	10.5%					
	Male	n	204	2	4							210
Small fish		%	97.1%	1.0%	1.9%							
	Female	n										
		%										
	Total	n	204	2	4							210
		%	97.1%	1.0%	1.9%							
	Male	n	211	2	343	3	293	6	87			945
All fish		%	22.3%	0.2%	36.3%	0.3%	31.0%	0.6%	9.2%			63.6%
	Female	n			4		349	12	175	2		542
		%			0.7%		64.4%	2.2%	32.3%	0.4%		36.4%
	Total	n	211	2	347	3	642	18	262	2		1,487
		%	14.2%	0.1%	23.3%	0.2%	43.2%	1.2%	17.6%	0.1%		

APPENDIX E

Appendix E1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2003.

			TAGGED								CAUGHT								
			Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	Water level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
4/20/2003	2																		
4/21/2003																			
4/22/2003																			
4/23/2003																			
4/24/2003	6						1	1	1	1	1	1				6.00	6	0.00	0.00
4/25/2003	5.4						5	6	5	6	5	6				1.08	7	0.01	0.01
4/26/2003	6	17					2	8	2	8	2	8				3.00	10	0.00	0.01
4/27/2003	6	26					6	14	6	14	6	14				1.00	11	0.01	0.02
4/28/2003	6	32			1	1	8	22	9	23	9	23				0.67	12	0.01	0.03
4/29/2003	6	32			1	2	8	30	9	32	12	35				0.50	12	0.01	0.04
4/30/2003	6	37			5	7	6	36	11	43	11	46				0.55	13	0.01	0.05
5/1/2003	6	44			3	10	6	42	9	52	10	56				0.60	13	0.01	0.06
5/2/2003	6	46			2	12	8	50	10	62	11	67	1	40354	1	0.55	14	0.01	0.08
5/3/2003	6	36			5	17	12	62	17	79	17	84			1	0.35	14	0.02	0.09
5/4/2003	6	25			4	21	5	67	9	88	9	93			1	0.67	15	0.01	0.10
5/5/2003	4	18			3	24	7	74	10	98	11	104			1	0.36	15	0.01	0.12
5/6/2003	6	12			8	32	17	91	25	123	26	130	1	40353	2	0.23	16	0.03	0.15
5/7/2003	6	10			16	48	27	118	43	166	43	173			2	0.14	16	0.05	0.19
5/8/2003	6	7			7	55	27	145	34	200	34	207			2	0.18	16	0.04	0.23
5/9/2003		10				55		145	0	200		207			2		16		0.23
5/10/2003	3	14			3	58	8	153	11	211	11	218			3	0.16	16	0.02	0.27
5/11/2003	3	22			8	66	9	162	17	228	19	237	1	40354	3	0.25	17	0.02	0.28
5/12/2003	4	30			7	73	8	170	15	243	16	253			4	0.18	17	0.04	0.32
5/13/2003	6	34			19	92	11	181	30	273	33	286	1	40354	4	0.44	17	0.01	0.33
5/14/2003	4	30			3	95	6	187	9	282	9	295			4		17		0.33
5/15/2003		23				95		187		282		295			4	0.11	17	0.04	0.37
5/16/2003	4	23			23	118	15	202	38	320	38	333			4		17		0.37
5/17/2003		16				118		202		320		333			4	0.10	17	0.07	0.44
5/18/2003	6	14			35	153	27	229	62	382	63	396			6	0.12	17	0.06	0.50
5/19/2003	6	16			27	180	22	251	49	431	52	448	2	40354,40354	6	0.15	18	0.05	0.55
5/20/2003	6	18			24	204	14	265	38	469	41	489			8	0.15	18	0.04	0.59
5/21/2003	5	22			16	220	10	275	26	495	34	523	2	40373,40354	8	0.12	18	0.03	0.62
5/22/2003	3	26			17	237	8	283	25	520	26	549			8		18		0.62
5/23/2003		40				237		283		520		549			8		18		0.62
5/24/2003		42				237		283		520		549			9	0.14	18	0.03	0.65
5/25/2003	4	54			14	251	11	294	25	545	28	577	1	40353	9	0.09	18	0.05	0.70
5/26/2003	4	54	1	1	26	277	14	308	41	586	44	621			9		18		0.70
5/27/2003		48		1		277		308		586		621			9	0.08	18	0.05	0.74

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Appendix E1.–Page 2 of 2.

			TAGGED								CAUGHT								
		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/28/2003	3.5	46		1	18	295	22	330	40	626	42	663			9	0.09	18	0.03	0.78
5/29/2003	2.5	48		1	10	305	13	343	23	649	28	691			9	0.16	18	0.01	0.79
5/30/2003	1.45	54		1	4	309	3	346	-7	656	9	700			3	0.16	16	0.02	0.27
5/31/2003		67		1		309		346		656		700			9		18		0.79
6/1/2003		97		1		309		346		656		700			9		18		0.79
6/2/2003		70		1		309		346		656		700			9		18		0.79
6/3/2003	4	56		1	19	328	15	361	34	690	39	739	1	40373	10	0.10	19	0.04	0.83
6/4/2003	4.5	50	1	2	12	340	30	391	43	733	47	786	1	40373	11	0.10	19	0.05	0.88
6/5/2003	1.5	50		2	9	349	11	402	20	753	22	808	2	40141, No tag	13	0.07	19	0.02	0.91
6/6/2003		62		2		349		402		753		808			13		19		0.91
6/7/2003		88		2		349		402		753		808			13		19		0.91
6/8/2003		83		2		349		402		753		808			13		19		0.91
6/9/2003	3.5	77		2	11	360	2	404	13	766	13	821			13	0.27	19	0.01	0.92
6/10/2003	6	76		2	8	368	12	416	20	786	22	843	2	40141	15	0.27	19	0.02	0.95
6/11/2003	6	82		2	13	381	9	425	22	808	23	866		No tag	15	0.26	20	0.03	0.97
6/12/2003	6	83		2	7	388	17	442	24	832	24	890			15	0.25	20	0.03	1.00
Total	186		2		388		442		832		890		15	13					

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

Appendix E2.–Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2003.

	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
						Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/22/2003			23.6	2.3	26	1	1	3	3	2	2	6	6	7	7				3	3	0.02	0.02
5/23/2003			19.7	2.5	40		1	1	4	1	3	2	8	3	10				7	10	0.01	0.02
5/24/2003			23.3	2.5	42		1	5	9	2	5	7	15	8	18				3	13	0.02	0.04
5/25/2003			22.8	2.5	54		1	1	10	2	7	3	18	3	21				8	20	0.01	0.05
5/26/2003			23.6	2.4	54	1	2	1	11	2	9	4	22	4	25				6	26	0.01	0.06
5/27/2003			23.3	2.1	48	3	5	6	17	2	11	11	33	12	37				2	28	0.03	0.08
5/28/2003			23.2	2.1	46		5	7	24	2	13	9	42	9	46				3	31	0.02	0.10
5/29/2003			23.4	2.0	48	2	7	4	28	6	19	12	54	13	59	1	40373	1	2	33	0.03	0.13
5/30/2003			23.5	2.5	54		7	2	30	3	22	5	59	5	64			1	5	37	0.01	0.14
5/31/2003			23.3	3.0	67		7		30		22	0	59	1	65			1	23	61	0.00	0.15
6/1/2003			23.8	3.5	97		7		30	2	24	2	61	2	67			1	12	73	0.00	0.15
6/2/2003			23.6	2.7	70		7	2	32	2	26	4	65	5	72			1	5	77	0.01	0.16
6/3/2003			23.4	2.2	56	1	8	6	38	3	29	10	75	10	82			1	2	80	0.02	0.18
6/4/2003			22.8	2.0	50	1	9	5	43	1	30	7	82	8	90			1	3	82	0.02	0.20
6/5/2003			23.9	2.3	50	1	10	12	55	5	35	18	100	19	109	1	40354	2	1	84	0.04	0.24
6/6/2003	4.0	.3	22.9	2.8	62	4	14	9	64	3	38	16	116	20	129	2	)354,No tag	4	1	85	0.04	0.29
6/7/2003	22.9	.8	23.4	2.8	88	1	15	15	79	8	46	24	140	26	155	1	40373	5	2	87	0.06	0.35
6/8/2003	23.0	.5	23.5	2.6	83		15	14	93	6	52	20	160	24	179			5	2	89	0.05	0.40
6/9/2003	22.9	.3	22.6	2.5	77	9	24	17	110	3	55	29	189	30	209			5	2	90	0.07	0.47
6/10/2003	22.9	.5	23.5	2.2	76	1	25	7	117	3	58	11	200	15	224			5	3	93	0.03	0.50
6/11/2003	23.5	.3	23.2	2.5	82	2	27	4	121	8	66	14	214	14	238			5	3	97	0.03	0.53
6/12/2003	21.9	.8	23.2	2.8	83		27	5	126	4	70	9	223	9	247			5	5	102	0.02	0.56
6/13/2003	23.6	.8	23.7	2.6	82		27	3	129	1	71	4	227	5	252			5	9	111	0.01	0.57
6/14/2003	23.4	.8	23.5	2.8	82	3	30	1	130	1	72	5	232	6	258			5	8	119	0.01	0.58
6/15/2003	22.6	.3	22.3	2.3	73		30		130	5	77	5	237	5	263			5	9	128	0.01	0.59
6/16/2003	22.9	.5	22.7	2.7	67	2	32	15	145	3	80	20	257	21	284			5	2	130	0.05	0.64
6/17/2003	23.2	.2	22.9	2.5	62	5	37	4	149	5	85	14	271	14	298			5	3	133	0.03	0.67
6/18/2003	23.3	.6	23.3	2.6	66	4	41	6	155	2	87	12	283	14	312	1	40354	6	3	137	0.03	0.70
6/19/2003	23.7	.6	23.5	2.6	68	3	44	2	157	1	88	6	289	6	318			6	8	145	0.01	0.71
6/20/2003	23.6	.4	23.4	2.4	60	1	45	3	160	1	89	5	294	5	323			6	9	154	0.01	0.73
6/21/2003	22.4	.5	23.0	1.8	53	4	49	4	164		89	8	302	8	331			6	6	160	0.02	0.74
6/22/2003	23.1	.0	23.0	2.0	50	2	51	4	168	1	90	7	309	8	339			6	6	166	0.02	0.76
6/23/2003	23.3	.2	23.2	2.1	52	1	52	5	173		90	6	315	6	345			6	8	173	0.01	0.78
6/24/2003	23.2	.1	23.3	2.0	50		52	2	175		90	2	317	2	347			6	23	196	0.00	0.78
6/25/2003	23.9	.0	22.9	2.3	50	1	53		175	1	91	2	319	4	351	1	40541	7	12	208	0.01	0.79
6/26/2003	23.1	.5	23.6	2.8	56		53	3	178		91	3	322	3	354			7	16	224	0.01	0.80
6/27/2003	23.0	.3	23.4	2.8	56		53	4	182	4	95	8	330	8	362			7	6	230	0.02	0.81
6/28/2003	23.0	.8	22.6	2.4	52		53	9	191	2	97	11	341	11	373			7	4	234	0.02	0.84

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Appendix E2.–Page 2 of 2.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/29/2003	22.8	.8	21.9	2.5	53		53	6	197	6	103	12	353	13	386			7	3	237	0.03	0.87
6/30/2003	22.4	.7	22.2	2.8	56	1	54	7	204	2	105	10	363	10	396			7	4	242	0.02	0.89
7/1/2003	22.1	2.3	21.9	2.9	64		54	3	207	4	109	7	370	7	403			7	6	248	0.02	0.91
7/2/2003	21.6	3.0	2.8	3.3	76		54	2	209	2	111	4	374	4	407			7	6	254	0.01	0.91
7/3/2003	22.4	3.0	21.9	3.3	82	1	55	1	210		111	2	376	2	409			7	22	276	0.00	0.92
7/4/2003	23.3	3.0	22.7	3.0	86		55	3	213	2	113	5	381	5	414			7	9	285	0.01	0.93
7/5/2003	22.8	3.0	22.4	3.0	80		55	6	219		113	6	387	7	421	1	40354	8	6	292	0.02	0.95
7/6/2003	22.0	3.0	19.3	3.1	78		55	4	223	4	117	8	395	8	429			8	5	297	0.02	0.96
7/7/2003	21.8	2.5	21.3	2.5	74		55	3	226	4	121	7	402	7	436			8	6	303	0.02	0.98
7/8/2003	21.9	2.5	21.4	2.5	74		55	2	228		121	2	404	2	438			8	22	325	0.00	0.98
7/9/2003	21.8	3.0	21.2	2.5	74		55	1	229	4	125	5	409	5	443			8	9	333	0.01	1.00
7/10/2003	22.7	3.1	22.3	2.5	88		55	1	230	1	126	2	411	2	445			8	23	356	0.00	1.00
Total	780		1,121			55		230		126		411		445		8	7					

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

Appendix E3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2003 by size group and location.

			Brood year and age class									
			2000	1999	1999	1998	1998	1997	1997	1996	1996	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina	Male	n			10		149	2	71			232
Large fish		%			2.5%		36.5%	0.5%	17.4%			56.9%
	Female	n			1		96		77	1	1	176
		%			0.2%		23.5%		18.9%	0.2%	0.2%	43.1%
	Total	n			11		245	2	148	1	1	408
		%			2.7%		60.0%	0.5%	36.3%	0.2%	0.2%	
	Male	n	17		270	1	25		1			314
Medium fish		%	5.4%		86.0%	0.3%	8.0%		0.3%			100.0%
	Female	n										
		%										
	Total	n	17		270	1	25		1			314
		%	5.4%		86.0%	0.3%	8.0%		0.3%			
	Male	n	86	1	6							93
Small fish		%	92.5%	1.1%	6.5%							100.0%
	Female	n										
		%										
	Total	n	86	1	6							93
		%	92.5%	1.1%	6.5%							
	Male	n	103	1	286	1	174	2	72			639
All fish		%	12.6%	0.1%	35.1%	0.1%	21.3%	0.2%	8.8%			78.4%
	Female	n			1		96		77	1	1	176
		%			0.6%		11.8%		9.4%	0.1%	0.1%	21.6%
	Total	n	103	1	287	1	270	2	149	1	1	815
		%	12.6%	0.1%	35.2%	0.1%	33.1%	0.2%	18.3%	0.1%	0.1%	
Lower Tats.	Male	n			41	1	112	1	47			202
Large fish		%			10.0%	0.2%	27.5%	0.2%	11.5%			49.5%
	Female	n			1	1	123	2	78		1	206
		%			0.2%	0.2%	30.1%	0.5%	19.1%		0.5%	50.5%
	Total	n			42	2	235	3	125		1	408
		%			10.3%	0.5%	57.6%	0.7%	30.6%		0.2%	
	Male	n	30		221		17		1			269
Medium fish		%	11.1%		81.5%		6.3%		0.4%			99.3%
	Female	n			2							2
		%			0.7%							0.7%
	Total	n	30		223		17		1			271
		%	11.1%		82.3%		6.3%		0.4%			
	Male	n	131		2							133
Small fish		%	98.5%		1.5%							100.0%
	Female	n										
		%										
	Total	n	131		2							133
		%	98.5%		1.5%							
	Male	n	161		264	1	129	1	48			604
All fish		%	19.8%		32.5%	0.1%	15.9%	0.1%	5.9%			74.4%
	Female	n			3	1	123	2	78		1	208
		%			0.4%	0.1%	15.1%	0.2%	9.6%		0.1%	25.6%
	Total	n	161		267	2	252	3	126		1	812
		%	19.8%		32.9%	0.2%	31.0%	0.4%	15.5%		0.1%	

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			Brood year and age class									
			2000	1999	1999	1998	1998	1997	1997	1996	1996	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Upper Tats.	Male	n			1				1			2
Large fish		%			12.5%				12.5%			25.0%
	Female	n			1		5					6
		%			12.5%		62.5%					75.0%
	Total	n			2		5		1			8
		%			25.0%		62.5%		12.5%			
	Male	n	1		13							14
Medium fish		%	7.1%		92.9%							100.0%
	Female	n										
		%										
	Total	n	1		13							14
		%	7.1%		92.9%							
	Male	n	2									2
Small fish		%	100.0%									100.0%
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	1		14				1			16
All fish		%	4.5%		63.6%				4.5%			72.7%
	Female	n			1		5					6
		%			4.5%		22.7%					27.3%
	Total	n	1		15		5		1			22
		%	4.5%		68.2%		22.7%		4.5%			
Dudidontu	Male	n			2		53	2	42			99
Large fish		%			1.0%		25.4%	1.0%	20.1%			47.4%
	Female	n			1		63		47	1		112
		%			0.5%		30.1%		22.5%	0.5%		53.6%
	Total	n			3		116		89	1		209
		%			1.4%		55.5%		42.6%	0.5%		
	Male	n			19							19
Medium fish		%			95.0%							95.0%
	Female	n			1							1
		%			5.0%							5.0%
	Total	n			20							20
		%			100.0%							
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			21		53	2	42			118
All fish		%			9.1%		22.9%	0.9%	18.2%			51.1%
	Female	n			2		63		47	1		113
		%			0.9%		27.3%		20.3%	0.4%		48.9%
	Total	n			23		116	2	89	1		231
		%			10.0%		50.2%	0.9%	38.5%	0.4%		

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			Brood year and age class									
			2000	1999	1999	1998	1998	1997	1997	1996	1996	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nahlin	Male	n			4	1	45		18			68
Large fish		%			2.5%	0.6%	28.7%		11.5%			43.3%
	Female	n			6		60		23			89
		%			3.8%		38.2%		14.6%			56.7%
	Total	n			10	1	105		41			157
		%			6.4%	0.6%	66.9%		26.1%			
	Male	n			24		10		3			37
Medium fish		%			64.9%		27.0%		8.1%			108.8%
	Female	n										
		%										
	Total	n			24		10		3			34
		%			64.9%		27.0%		8.1%			
	Male	n	1									1
Small fish		%	00.0%									100.0%
	Female	n										
		%										
	Total	n	1									1
		%	00.0%									
	Male	n	1		28	1	55		21			106
All fish		%	0.5%		14.4%	0.5%	28.2%		10.8%			54.4%
	Female	n			6		60		23			89
		%			3.1%		30.8%		11.8%			45.6%
	Total	n	1		34	1	115		44			195
		%	0.5%		17.4%	0.5%	59.0%		22.6%			
Kowatua	Male	n			4		24	1	11			40
Large fish		%			2.8%		16.6%	0.7%	7.6%			28.8%
	Female	n			2		53	1	49			105
		%			1.4%		36.6%	0.7%	33.8%			75.5%
	Total	n			6		77	2	60			139
		%			4.1%		53.1%	1.4%	41.4%			
	Male	n			40		1					41
Medium fish		%			97.6%		2.4%					102.5%
	Female	n										
		%										
	Total	n			40		1					40
		%			97.6%		2.4%					
	Male	n	1									1
Small fish		%	00.0%									100.0%
	Female	n										
		%										
	Total	n	1									1
		%	00.0%									
	Male	n	1		44		25	1	11			82
All fish		%	0.5%		23.5%		13.4%	0.5%	5.9%			43.9%
	Female	n			2		53	1	49			105
		%			1.1%		28.3%	0.5%	26.2%			56.1%
	Total	n	1		46		78	2	60			187
		%	0.5%		24.6%		41.7%	1.1%	32.1%			

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			Brood year and age class									
			2000	1999	1999	1998	1998	1997	1997	1996	1996	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Tseta	Male	n			1		9		4			14
Large fish		%			2.4%		21.4%		9.5%			33.3%
	Female	n					20		9			29
		%					47.6%		21.4%			69.0%
	Total	n					29		13			42
		%					69.0%		31.0%			
	Male	n			9							9
Medium fish		%			90.0%							90.0%
	Female	n			1							1
		%			10.0%							10.0%
	Total	n			10							10
		%			100.0%							
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			10		9		4			23
All fish		%			18.9%		17.0%		7.5%			43.4%
	Female	n			1		20		9			30
		%			1.9%		37.7%		17.0%			56.6%
	Total	n			11		29		13			53
		%			20.8%		54.7%		24.5%			
All tributaries	Male	n			63	2	392	6	194			657
Large fish		%			4.6%	0.1%	28.4%	0.4%	14.1%			47.6%
	Female	n			12	1	420	3	283	2	2	723
		%			0.9%	0.1%	30.4%	0.2%	20.5%	0.1%	0.1%	52.4%
	Total	n			75	3	812	9	477	2	2	1380
		%			5.4%	0.2%	58.8%	0.7%	34.6%	0.1%	0.1%	
	Male	n	48		596	1	53		5			703
Medium fish		%	6.8%		84.3%	0.1%	7.5%		0.7%			99.4%
	Female	n			4							4
		%			0.6%							0.6%
	Total	n	48		600	1	53		5			707
		%	6.8%		84.9%	0.1%	7.5%		0.7%			
	Male	n	221	1	8							230
Small fish		%	96.1%	0.4%	3.5%							100.0%
	Female	n										
		%										
	Total	n	221	1	8							230
		%	96.1%	0.4%	3.5%							
	Male	n	269	1	667	3	445	6	199			1590
All fish		%	11.6%	0.0%	28.8%	0.1%	19.2%	0.3%	8.6%			68.6%
	Female	n			16	1	420	3	283	2	2	727
		%			0.7%	0.0%	18.1%	0.1%	12.2%	0.1%	0.1%	31.4%
	Total	n	269	1	683	4	865	9	482	2	2	2317
		%	11.6%	0.0%	29.5%	0.2%	37.3%	0.4%	20.8%	0.1%	0.1%	

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			Brood year and age class									
			2000	1999	1999	1998	1998	1997	1997	1996	1996	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Canyon Island	Male	n			6	1	104	3	49	1		164
Large fish		%			1.2%	0.2%	21.0%	0.6%	9.9%	0.2%		33.1%
	Female	n			6	1	196	5	120	3		331
		%			1.2%	0.2%	39.6%	1.0%	24.2%	0.6%		66.9%
	Total	n			12	2	300	8	169	4		495
		%			2.4%	0.4%	60.6%	1.6%	34.1%	0.8%		
	Male	n	20		470	4	26					520
Medium fish		%	3.8%		89.7%	0.8%	5.0%					99.2%
	Female	n			4							4
		%			0.8%							0.8%
	Total	n	20		474	4	26					524
		%	3.8%		90.5%	0.8%	5.0%					
	Male	n	50		3							53
Small fish		%	94.3%		5.7%							100.0%
	Female	n										
		%										
	Total	n	50		3							53
		%	94.3%		5.7%							
	Male	n	70		479	5	130	3	49	1		737
All fish		%	6.5%		44.7%	0.5%	12.1%	0.3%	4.6%	0.1%		68.8%
	Female	n			10	1	196	5	120	3		335
		%			3.0%	0.3%	58.5%	1.5%	35.8%	0.9%		31.3%
	Total	n	70		489	6	326	8	169	4		1072
		%	6.5%		45.6%	0.6%	30.4%	0.7%	15.8%	0.4%		

APPENDIX F

Appendix F1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2004.

			TAGGED								CAUGHT								
			Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	Water level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
4/28/2004																			
4/29/2004		10		0		0		0	0	0		0							-
4/30/2004	3	14		0	1	1	0	0	1	1	2	2	1	40373	1	1.50	1.50	0.01	0.01
5/1/2004	3	23		0	1	2	1	1	2	3	2	4			1	1.50	3.00	0.01	0.03
5/2/2004	3	34		0	3	5	3	4	6	9	6	10			1	0.50	3.50	0.04	0.07
5/3/2004	3	38		0	1	6	3	7	4	13	4	14			1	0.75	4.25	0.03	0.10
5/4/2004	3	46		0	1	7	4	11	5	18	5	19			1	0.60	4.85	0.04	0.14
5/5/2004	4	48		0	3	10	3	14	6	24	9	28	2	40354	3	0.44	5.29	0.07	0.21
														40353					0.21
5/6/2004	4	41		0	6	16	9	23	15	39	15	43			3	0.27	5.56	0.11	0.32
5/7/2004	3	41		0	4	20	14	37	18	57	19	62	1	40354	4	0.16	5.72	0.14	0.46
5/8/2004	3	46		0	3	23	5	42	8	65	9	71			4	0.33	6.05	0.07	0.53
5/9/2004		53		0		23		42	0	65		71			4		6.05		0.53
5/10/2004		54		0		23		42	0	65		71			4		6.05		0.53
5/11/2004	2	50		0	5	28	8	50	13	78	13	84			4	0.15	6.21	0.10	0.63
5/12/2004	4	50		0	16	44	20	70	36	114	39	123	2	40353	6	0.10	6.31	0.29	0.92
														40373					0.92
5/13/2004	3	58		0	8	52	3	73	11	125	11	134			6	0.27	6.58	0.08	1.00
5/14/2004		67		0		52		73	0	125		134			6		6.58		1.00
5/15/2004		77		0		52		73	0	125		134			6		6.58		1.00
6/5/2004		73		0		52		73		125		134			6		6.58		1.00
Total	38		0		52		73		125		134		6	6					

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

Appendix F2.–Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2004.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)									
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/11/2004					50																	
5/12/2004	23.2	2.2			50	0	0	1	1	7	7	8	8	8	8			0	3	2.90	0.00	0.00
5/13/2004	23.3	2.2			58	0	0	1	2	5	12	6	14	6	14			0	4	6.77	0.00	0.01
5/14/2004	23.3	2.8			67	0	0	6	8	6	18	12	26	13	27			0	2	8.56	0.01	0.01
5/15/2004	23.2	2.8	10.7	2.1	77	0	0	6	14	5	23	11	37	12	39			0	3	11.38	0.01	0.02
5/16/2004	22.2	2.9	22.2	2.9	80	2	2	21	35	27	50	50	87	52	91	1	40541	1	1	12.23	0.03	0.05
5/17/2004	21.4	2.9	22.1	2.8	82	0	2	17	52	39	89	56	143	62	153	2	40354 40373	3	1	12.93	0.03	0.08
5/18/2004	22.2	2.6	22.3	2.8	83	2	4	37	89	39	128	78	221	85	238	5	40354 40354 40373 40373 40354	8	1	13.46	0.04	0.12
5/19/2004	20.1	2.8	22.7	2.8	84	2	6	23	112	52	180	77	298	79	317	1	40373	9	1	14.00	0.04	0.17
5/20/2004	14.5	3.2	17.0	2.7	96	3	9	21	133	38	218	62	360	63	380			9	1	14.50	0.03	0.20
5/21/2004	18.8	3.1	23.5	2.1	104	0	9	11	144	16	234	27	387	29	409	1	40354	10	1	15.95	0.02	0.21
5/22/2004	23.0	3.2	23.5	2.3	104	0	9	8	152	7	241	15	402	18	427	2	40549 40354	12	3	18.54	0.01	0.22
5/23/2004	22.3	3.0	22.8	2.4	97	3	12	18	170	26	267	47	449	53	480	2	40354 40353	14	1	19.39	0.03	0.25
5/24/2004	17.1	2.9	22.8	2.4	100	1	13	18	188	41	308	60	509	65	545	2	40373 40354	16	1	20.00	0.03	0.28
5/25/2004	22.9	3.3	22.4	2.9	104	1	14	26	214	36	344	63	572	66	611			16	1	20.69	0.03	0.32
5/26/2004	23.3	3.6	22.5	2.6	114	2	16	15	229	25	369	42	614	45	656	2	40353 No tag	18	1	21.70	0.02	0.34
5/27/2004	22.8	3.2	21.9	2.5	109	3	19	15	244	43	412	61	675	63	719			18	1	22.41	0.03	0.38
5/28/2004	22.2	3.1	21.1	2.4	97	5	24	60	304	66	478	131	806	138	857	2	40354 40354	20	0	22.73	0.07	0.45
5/29/2004	21.6	3.1	18.8	2.4	92	9	33	69	373	53	531	131	937	138	995	4	40549 40354 40841 40549	24	0	23.02	0.07	0.52
5/30/2004	23.0	3.0	23.0	2.6	97	1	34	11	384	19	550	31	968	31	1026			24	1	24.50	0.02	0.54
5/31/2004	23.3	2.8	22.6	1.9	82	3	37	20	404	20	570	43	1011	48	1074			24	1	25.46	0.03	0.56
6/1/2004[b]	21.3	2.5	20.7	2.2	76		37		404		570	0	1011		1074	2	40354 40549	26		25.46	-	0.56
6/2/2004	22.9	2.3	23.3	2.1	71	0	37	21	425	19	589	40	1051	42	1116			26	1	26.56	0.02	0.58
6/3/2004	23.0	2.0	23.0	2.1	65	2	39	25	450	19	608	46	1097	46	1162			26	1	27.56	0.02	0.61

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
						Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/4/2004	22.8	2.3	23.3	2.1	65	3	42	9	459	15	623	27	124	28	190			26	2	29.20	0.01	0.62
6/5/2004	23.4	3.0	23.6	3.0	73	2	44	7	466	4	627	13	137	14	204			26	3	32.56	0.01	0.63
6/6/2004	23.3	3.5	23.0	2.9	90	3	47	15	481	13	640	31	168	32	236			26	1	34.00	0.02	0.65
6/7/2004	6.0	3.5	23.3	3.1	115	2	49	1	482	5	645	8	176	8	244			26	4	37.67	0.00	0.65
6/8/2004			18.2	3.1	128	1	50	9	491	12	657	22	198	23	267			26	1	38.46	0.01	0.66
6/9/2004			22.8	2.3	132	0	50	5	496	13	670	18	216	19	286			26	1	39.66	0.01	0.67
6/10/2004	9.1	3.3	22.7	2.4	119	0	50	5	501	10	680	15	231	17	303	1	40549	27	2	41.53	0.01	0.68
6/11/2004	22.3	2.8	22.2	2.4	98	3	53	27	528	19	699	49	280	54	357	2	40354 40354	29	1	42.35	0.03	0.71
6/12/2004	21.8	2.4	22.8	2.2	95	4	57	24	552	22	721	50	330	55	412	1	40549	30	1	43.16	0.03	0.74
6/13/2004	22.8	2.3	23.0	2.1	79	6	63	16	568	24	745	46	376	51	463	2	40541 40549	32	1	44.06	0.03	0.76
6/14/2004	22.8	2.7	23.3	2.6	89	0	63	13	581	5	750	18	394	19	482			32	2	46.49	0.01	0.77
6/15/2004	23.0	2.8	22.5	2.4	92	2	65	7	588	3	753	12	406	13	495			32	4	49.99	0.01	0.78
6/16/2004	21.4	2.7	21.8	2.2	88	5	70	21	609	13	766	39	445	44	539	2	40549 40549	34	1	50.97	0.02	0.80
6/17/2004	22.4	2.6	21.3	2.2	88	9	79	24	633	23	789	56	501	58	597			34	1	51.73	0.03	0.83
6/18/2004	21.7	2.8	19.7	2.4	92	10	89	31	664	20	809	61	562	63	660	1	40541	35	1	52.38	0.03	0.87
6/19/2004	23.2	3.2	21.2	2.8	108	2	91	10	674	8	817	20	582	22	682			35	2	54.40	0.01	0.88
6/20/2004	22.8	3.5	20.0	2.5	115	1	92	16	690	18	835	35	617	36	718			35	1	55.59	0.02	0.90
6/21/2004	23.3	3.3	21.8	2.6	120	0	92	8	698	10	845	18	635	19	737			35	2	57.96	0.01	0.91
6/22/2004	22.5	3.3	22.0	2.6	116	1	93	13	711	16	861	30	665	32	769	1	40373	36	1	59.35	0.02	0.92
6/23/2004	23.2	3.4	21.4	2.4	115	3	96	9	720	16	877	28	693	28	797			36	2	60.94	0.01	0.94
6/24/2004	12.0	3.5	11.8	2.4	130	0	96	3	723	4	881	7	700	8	805			36	3	63.92	0.00	0.94
6/25/2004	No fishing due to flood	156			96	723		881	0	700			805		36		63.92	-	0.94			
6/26/2004	No fishing due to flood	0			96	723		881	0	700			805		36		63.92	-	0.94			
6/27/2004	No fishing due to flood	132			96	723		881	0	700			805		36		63.92	-	0.94			
6/28/2004			9.3	2.5	118	0	96	0	723	3	884	3	703	3	808			36	3	67.01	0.00	0.95
6/29/2004			21.8	1.9	115	0	96	2	725	4	888	6	709	6	814			36	4	70.63	0.00	0.95
6/30/2004			21.6	2.2	120	0	96	4	729	6	894	10	719	11	825			36	2	72.59	0.01	0.95
7/1/2004			23.2	2.6	122	1	97	0	729	2	896	3	722	4	829	1	40354	37	6	78.38	0.00	0.96
7/2/2004	3.8	3.0	22.8	2.7	118	1	98	3	732	4	900	8	730	9	838			37	3	81.34	0.00	0.96
7/3/2004	23.1	2.7	20.8	2.3	115	0	98	4	736	7	907	11	741	14	852	1	40373	38	3	84.47	0.01	0.97
7/4/2004	22.8	3.0	22.7	2.2	113	0	98	5	741	5	912	10	751	13	865	1	40549	39	3	87.96	0.01	0.97
7/5/2004	23.3	2.9	22.3	2.6	106	2	100	2	743	7	919	11	762	11	876			39	4	92.11	0.01	0.98
7/6/2004	22.7	2.5	20.7	2.4	101	0	100	2	745	2	921	4	766	6	882	1	40373	40	7	99.33	0.00	0.98
7/7/2004	23.4	2.7	23.3	2.5	101		100		745		921	0	766		882			40		99.33	-	0.98

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)							
						Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
7/8/2004	23.0	2.6	22.7	2.2	95	2	102	0	745	3	924	5	1771	5	887			40	9	108.46	0.00	0.99
7/9/2004	23.5	3.0	23.1	2.4	96	0	102	0	745	2	926	2	1773	2	889			40	23	131.75	0.00	0.99
7/10/2004	23.3	3.0	16.9	2.2	95		102		745		926	0	1773		889			40		131.75	-	0.99
7/11/2004	22.2	2.8	22.1	2.1	95	0	102	3	748	4	930	7	1780	7	896			40	6	138.07	0.00	0.99
7/12/2004	23.0	2.7	20.1	2.2	91	0	102	0	748	1	931	1	1781	4	900			40	11	148.84	0.00	0.99
7/13/2004	22.8	2.9	21.2	2.6	98	0	102	0	748	2	933	2	1783	2	902			40	22	170.84	0.00	0.99
7/14/2004	23.7	3.0	22.6	3.2	121	0	102	0	748	1	934	1	1784	1	903			40	46	217.09	0.00	0.99
7/15/2004	23.1	2.7	21.5	2.6	101	0	102	2	750	4	938	6	1790	6	909			40	7	224.52	0.00	1.00
7/16/2004	22.5	2.6	21.7	2.2	94	0	102	0	750	1	939	1	1791	1	910			40	44	268.69	0.00	1.00
7/17/2004	22.4	2.9	21.7	2.5	92	0	102	1	751	0	939	1	1792	1	911			40	44	312.78	0.00	1.00
7/18/2004	21.9	2.8	20.5	2.4	90		102		751		939	0	1792		911			40		312.78	-	1.00
7/19/2004	22.0	2.6	21.2	2.3	86	0	102	0	751	0	939	0	1792	1	912			40	43	355.94	0.00	1.00
7/20/2004	22.1	2.5	22.3	2.4	86	0	102	0	751	0	939	0	1792	1	913			40	44	400.35	0.00	1.00
7/21/2004	22.3	2.7	22.0	2.4	86		102		751		939	0	1792		913			40		400.35	-	1.00
Total	1327		1388			102		751		939		1792		,913		40	39					

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

[b] Information regarding sex, length, and tag number was lost when dropped into the river on this day.

Appendix F3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2004 by size group and location.

			Brood year and age class									
			2001	2000	2000	1999	1999	1998	1998	1997	1997	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina	Male	n			25	1	190		62	1		279
Large fish		%			9.0%	0.4%	68.1%		22.2%	0.4%		56.0%
	Female	n			14		110		94	1		219
		%			6.4%		50.2%		42.9%	0.5%		44.0%
	Total	n			39	1	300		156	2		498
		%			7.8%	0.2%	60.2%		31.3%	0.4%		
	Male	n	3		154	2	45		4			208
Medium fish		%	1.4%		74.0%	1.0%	21.6%		1.9%			98.6%
	Female	n			1		1		1			3
		%			33.3%		33.3%		33.3%			1.4%
	Total	n	3		155	2	46		5			211
		%	1.4%		73.5%	0.9%	21.8%		2.4%			
	Male	n	8	1	1		1					11
Small fish		%	72.7%	9.1%	9.1%		9.1%					
	Female	n										
		%										
	Total	n	8	1	1		1					11
		%	72.7%	9.1%	9.1%		9.1%					
	Male	n	11	1	180	3	236		66	1		498
All fish		%	2.2%	0.2%	36.1%	0.6%	47.4%		13.3%	0.2%		69.2%
	Female	n			15		111		95	1		222
		%			6.8%		50.0%		42.8%	0.5%		30.8%
	Total	n	11	1	195	3	347		161	2		720
		%	1.5%	0.1%	27.1%	0.4%	48.2%		22.4%	0.3%		
Lower Tats.	Male	n	1		49	1	152		22			225
Large fish		%	0.4%		21.8%	0.4%	67.6%		9.8%			53.1%
	Female	n			3		145	1	50			199
		%			1.5%		72.9%	0.5%	25.1%			46.9%
	Total	n	1		52	1	297	1	72			424
		%	0.2%		12.3%	0.2%	70.0%	0.2%	17.0%			
	Male	n	6	1	113		8					128
Medium fish		%	4.7%	0.8%	88.3%		6.3%					100.0%
	Female	n										0
		%										0.0%
	Total	n	6	1	113		8					128
		%	4.7%	0.8%	88.3%		6.3%					
	Male	n	32		3							35
Small fish		%	91.4%		8.6%							
	Female	n										
		%										
	Total	n	32		3							35
		%	91.4%		8.6%							
	Male	n	39	1	165	1	160		22			388
All fish		%	10.1%	0.3%	42.5%	0.3%	41.2%		5.7%			66.1%
	Female	n			3		145	1	50			199
		%			1.5%		72.9%	0.5%	25.1%			33.9%
	Total	n	39	1	168	1	305	1	72			587
		%	6.6%	0.2%	28.6%	0.2%	52.0%	0.2%	12.3%			

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			Brood year and age class									
			2001	2000	2000	1999	1999	1998	1998	1997	1997	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Upper Tats.	Male	n			9		10		1			20
Large fish		%			45.0%		50.0%		5.0%			40.8%
	Female	n					24		5			29
		%					82.8%		17.2%			59.2%
	Total	n			9		34		6			49
		%			18.4%		69.4%		12.2%			
	Male	n	4		27		1					32
Medium fish		%	12.5%		84.4%		3.1%					97.0%
	Female	n					1					1
		%					100.0%					3.0%
	Total	n	4		27		2					33
		%	12.1%		81.8%		6.1%					
	Male	n	2									2
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	6		36		11		1			54
All fish		%	11.1%		66.7%		20.4%		1.9%			64.3%
	Female	n					25		5			30
		%					83.3%		16.7%			35.7%
	Total	n	6		36		36		6			84
		%	7.1%		42.9%		42.9%		7.1%			
Dudidontu	Male	n			25		93		2			120
Large fish		%			20.8%		77.5%		1.7%			50.4%
	Female	n			2		103	1	12			118
		%			1.7%		87.3%	0.8%	10.2%			49.6%
	Total	n			27		196	1	14			238
		%			11.3%		82.4%	0.4%	5.9%			
	Male	n	1		84	1	4					90
Medium fish		%	1.1%		93.3%	1.1%	4.4%					98.9%
	Female	n					1					1
		%					100.0%					1.1%
	Total	n	1		84	1	5					91
		%	1.1%		92.3%	1.1%	5.5%					
	Male	n										0
Small fish		%										
	Female	n										
		%										
	Total	n										0
		%										
	Male	n	1		109	1	97		2			210
All fish		%	0.5%		51.9%	0.5%	46.2%		1.0%			63.8%
	Female	n			2		104	1	12			119
		%			1.7%		87.4%	0.8%	10.1%			36.2%
	Total	n	1		111	1	201	1	14			329
		%	0.3%		33.7%	0.3%	61.1%	0.3%	4.3%			

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			Brood year and age class									
			2001	2000	2000	1999	1999	1998	1998	1997	1997	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nahlin	Male	n			26		98		7			131
Large fish		%			19.8%		74.8%		5.3%			45.8%
	Female	n			6		128		20		1	155
		%			3.9%		82.6%		12.9%		0.6%	54.2%
	Total	n			32		226		27		1	286
		%			11.2%		79.0%		9.4%		0.3%	
	Male	n			65	2	8					75
Medium fish		%			86.7%	2.7%	10.7%					98.7%
	Female	n			1							1
		%			100.0%							1.3%
	Total	n			66	2	8					76
		%			86.8%	2.6%	10.5%					
	Male	n	1									1
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	1									1
		%	100.0%									
	Male	n	1		91	2	106		7			207
All fish		%	0.5%		44.0%	1.0%	51.2%		3.4%			57.0%
	Female	n			7		128		20		1	156
		%			4.5%		82.1%		12.8%		0.6%	43.0%
	Total	n	1		98	2	234		27		1	363
		%	0.3%		27.0%	0.6%	64.5%		7.4%		0.3%	
Kowatua	Male	n			7	1	71	1	8			88
Large fish		%			8.0%	1.1%	80.7%	1.1%	9.1%			38.4%
	Female	n			3		106	4	25	2	1	141
		%			2.1%		75.2%	2.8%	17.7%	1.4%	0.7%	61.6%
	Total	n			10	1	177	5	33	2	1	229
		%			4.4%	0.4%	77.3%	2.2%	14.4%	0.9%	0.4%	
	Male	n	4		40	2	6					52
Medium fish		%	7.7%		76.9%	3.8%	11.5%					91.2%
	Female	n			2		3					5
		%			40.0%		60.0%					8.8%
	Total	n	4		42	2	9					57
		%	7.0%		73.7%	3.5%	15.8%					
	Male	n	1									1
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	1									1
		%	100.0%									
	Male	n	5		47	3	77	1	8			141
All fish		%	3.5%		33.3%	2.1%	54.6%	0.7%	5.7%			49.1%
	Female	n			5		109	4	25	2	1	146
		%			3.4%		74.7%	2.7%	17.1%	1.4%	0.7%	50.9%
	Total	n	5		52	3	186	5	33	2	1	287
		%	1.7%		18.1%	1.0%	64.8%	1.7%	11.5%	0.7%	0.3%	

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			Brood year and age class									
			2001	2000	2000	1999	1999	1998	1998	1997	1997	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
All tributaries	Male	n	1		141	3	614	1	102	1		863
Large fish		%	0.1%		16.3%	0.3%	71.1%	0.1%	11.8%	0.1%		50.1%
	Female	n			28		616	6	206	3	2	861
		%			3.3%		71.5%	0.7%	23.9%	0.3%	0.2%	49.9%
	Total	n	1		169	3	1,230	7	308	4	2	1,724
		%	0.1%		9.8%	0.2%	71.3%	0.4%	17.9%	0.2%	0.1%	
	Male	n	18	1	483	7	72		4			585
Medium fish		%	3.1%	0.2%	82.6%	1.2%	12.3%		0.7%			98.2%
	Female	n			4		6		1			11
		%			36.4%		54.5%		9.1%			1.8%
	Total	n	18	1	487	7	78		5			596
		%	3.0%	0.2%	81.7%	1.2%	13.1%		0.8%			
	Male	n	44	1	4		1					50
Small fish		%	88.0%	2.0%	8.0%		2.0%					100.0%
	Female	n										
		%										
	Total	n	44	1	4		1					50
		%	88.0%	2.0%	8.0%		2.0%					
	Male	n	63	2	628	10	687	1	106	1		1,498
All fish		%	4.2%	0.1%	41.9%	0.7%	45.9%	0.1%	7.1%	0.1%		63.2%
	Female	n			32		622	6	207	3	2	872
		%			3.7%		71.3%	0.7%	23.7%	0.3%	0.2%	36.8%
	Total	n	63	2	660	10	1,309	7	313	4	2	2,370
		%	2.7%	0.1%	27.8%	0.4%	55.2%	0.3%	13.2%	0.2%	0.1%	
Canyon Island	Male	n			67		436	2	70	1	1	577
Large fish		%			11.6%		75.6%	0.3%	12.1%	0.2%	0.2%	54.3%
	Female	n			9	1	332	2	137	1	3	485
		%			1.9%	0.2%	68.5%	0.4%	28.2%	0.2%	0.6%	45.7%
	Total	n			76	1	768	4	207	2	4	1,062
		%			7.2%	0.1%	72.3%	0.4%	19.5%	0.2%	0.4%	
	Male	n	15	1	719	7	82	2	2			828
Medium fish		%	1.8%	0.1%	86.8%	0.8%	9.9%	0.2%	0.2%			98.9%
	Female	n			5		3		1			9
		%			55.6%		33.3%		11.1%			1.1%
	Total	n	15	1	724	7	85	2	3			837
		%	1.8%	0.1%	86.5%	0.8%	10.2%	0.2%	0.4%			
	Male	n	92	2	2							96
Small fish		%	95.8%	2.1%	2.1%							
	Female	n										
		%										
	Total	n	92	2	2							96
		%	95.8%	2.1%	2.1%							
	Male	n	107	3	788	7	518	4	72	1	1	1,501
All fish		%	7.1%	0.2%	52.5%	0.5%	34.5%	0.3%	4.8%	0.1%	0.1%	75.2%
	Female	n			14	1	335	2	138	1	3	494
		%			2.8%	0.2%	67.8%	0.4%	27.9%	0.2%	0.6%	24.8%
	Total	n	107	3	802	8	853	6	210	2	4	1,995
		%	5.4%	0.2%	40.2%	0.4%	42.8%	0.3%	10.5%	0.1%	0.2%	

APPENDIX G

Appendix G1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2005.

			TAGGED								CAUGHT						
		Water	Small		Medium		Large		Total		Total		Adipose finclips	CPUE		Proportions	
Date	Hrs fished	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Daily	Cum	Daily	Cum
4/24/2005		26															
4/25/2005	5	35		0	0	0	4	4	4	4	4	4					
4/26/2005	5	46		0	1	1	4	8	5	9	5	9		1.00	1	0.07	0.07
4/27/2005	5	56		0	0	1	5	13	5	14	5	14		1.00	2	0.07	0.14
4/28/2005	6	64		0	1	2	4	17	5	19	5	19		1.20	3	0.07	0.21
4/29/2005	6	67		0	0	2	1	18	1	20	1	20		6.00	9	0.01	0.22
4/30/2005	6	64		0	0	2	5	23	5	25	5	25		1.20	10	0.07	0.29
5/1/2005	5	55		0	1	3	8	31	9	34	9	34		0.56	11	0.12	0.41
5/2/2005	6	49		0	0	3	10	41	10	44	12	46		0.50	11	0.16	0.58
5/3/2005	6	49		0	0	3	8	49	8	52	9	55		0.67	12	0.12	0.70
5/4/2005	2	50		0	0	3	1	50	1	53	1	56		2.00	14	0.01	0.71
5/5/2005		53		0		3		50	0	53		56			14		0.71
5/6/2005	5	53		0	0	3	8	58	8	61	10	66		0.50	15	0.14	0.85
5/7/2005	3	56		0	0	3	7	65	7	68	7	73		0.43	15	0.10	0.95
5/8/2005		64		0				65	0	68		73			15		0.95
Total	60				3		65		68		73						

Appendix G2.–Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2005.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/6/2005			23.8	2.1	53																	
5/7/2005	6.5	2.1	23.8	2.3	56	0	0	0	0	1	1	1	1	1	1			0	30	30	0.00	0.00
5/8/2005	23.4	2.2	23.6	2.2	64	0	0	4	4	10	11	14	15	15	16			0	3	33	0.03	0.03
5/9/2005	23.2	2.7	23.7	2.5	72	0	0	2	6	5	16	7	22	7	23			0	7	40	0.01	0.05
5/10/2005	23.5	2.8	23.6	2.7	82	0	0	2	8	4	20	6	28	6	29			0	8	48	0.01	0.06
5/11/2005	23.2	2.7	23.4	2.8	91	0	0	4	12	4	24	8	36	8	37			0	6	54	0.02	0.08
5/12/2005	23.8	3.0	23.8	2.8	103	0	0	0	12	3	27	3	39	3	40			0	16	70	0.01	0.08
5/13/2005	23.8	2.9	23.8	2.5	104	0	0	0	12	1	28	1	40	1	41			0	48	117	0.00	0.08
5/14/2005	23.9	2.7	23.8	2.5	112		0		12		28	0	40		41			0		117		0.08
5/15/2005	21.8	3.1	23.8	2.6	118		0		12		28	0	40		41			0		117		0.08
5/16/2005	23.9	3.0	23.9	2.3	121		0		12		28	0	40		41			0		117		0.08
5/17/2005	23.3	3.0	23.9	2.3	121	0	0	1	13	6	34	7	47	8	49			0	6	123	0.02	0.10
5/18/2005	23.3	2.8	23.6	2.1	110	0	0	2	15	6	40	8	55	11	60			0	4	127	0.02	0.12
5/19/2005	23.6	2.8	23.8	1.9	106	0	0	2	17	7	47	9	64	9	69			0	5	133	0.02	0.14
5/20/2005	23.8	2.7	23.7	2.3	104	0	0	1	18	2	49	3	67	4	73			0	12	144	0.01	0.15
5/21/2005	23.7	2.7	23.3	2.3	103	1	1	3	21	11	60	15	82	16	89	1	40549	1	3	147	0.03	0.18
5/22/2005	23.5	2.6	23.3	2.1	97	0	1	1	22	14	74	15	97	16	105	1	40373	2	3	150	0.03	0.22
5/23/2005	23.4	2.6	23.6	2.3	97	0	1	4	26	8	82	12	109	14	119			2	3	154	0.03	0.24
5/24/2005	21.8	2.7	23.7	2.6	102	1	2	5	31	6	88	12	121	12	131			2	4	158	0.02	0.27
5/25/2005	23.8	2.8	23.8	2.7	108	0	2	3	34	3	91	6	127	8	139			2	6	163	0.02	0.28
5/26/2005	24.0	2.7	23.8	3.1	124	0	2	3	37	1	92	4	131	4	143			2	12	175	0.01	0.29
5/27/2005	23.7	2.6	22.8	2.5	116	1	3	8	45	17	109	26	157	27	170			2	2	177	0.06	0.35
5/28/2005	23.4	2.8	23.4	2.5	119	2	5	4	49	17	126	23	180	24	194			2	2	179	0.05	0.40
5/29/2005	23.6	2.7	23.4	2.4	106	0	5	2	51	9	135	11	191	12	206			2	4	183	0.02	0.42
5/30/2005	23.6	2.7	23.7	2.6	106	0	5	4	55	8	143	12	203	13	219			2	4	187	0.03	0.45
5/31/2005	23.3	2.6	23.6	2.6	106	1	6	2	57	8	151	11	214	11	230			2	4	191	0.02	0.47
6/1/2005	22.7	2.5	23.3	2.5	101	1	7	6	63	9	160	16	230	18	248			2	3	193	0.04	0.51
6/2/2005	23.7	2.3	23.6	2.4	96	1	8	5	68	10	170	16	246	16	264			2	3	196	0.03	0.54
6/3/2005	23.3	2.4	23.6	2.2	91	0	8	1	69	8	178	9	255	9	273			2	5	202	0.02	0.56
6/4/2005	23.3	2.2	23.7	2.1	89	0	8	3	72	5	183	8	263	10	283	1	41022	3	5	206	0.02	0.58
6/5/2005	23.1	2.2	23.3	2.1	90	0	8	1	73	2	185	3	266	3	286			3	15	222	0.01	0.59
6/6/2005	23.3	2.4	23.5	2.4	88	0	8	5	78	4	189	9	275	9	295			3	5	227	0.02	0.60
6/7/2005	23.8	2.7	23.7	2.7	91	0	8	2	80	9	198	11	286	12	307			3	4	231	0.02	0.63
6/8/2005	22.8	2.7	23.8	2.7	94	0	8	1	81	3	201	4	290	4	311			3	12	243	0.01	0.64
6/9/2005	22.7	2.6	23.9	2.6	96	0	8	1	82	1	202	2	292	2	313			3	23	266	0.00	0.64
6/10/2005	23.8	2.7	23.7	2.8	95	0	8	1	83	1	203	2	294	2	315			3	24	290	0.00	0.65
6/11/2005	23.7	2.6	23.8	2.6	89	0	8	0	83	2	205	2	296	4	319			3	12	301	0.01	0.65

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)									
						Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions		
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/12/2005	23.6	2.4	23.6	2.6	85	0	8	2	85	3	208	5	301	5	324			3	9	311	0.01	0.66
6/13/2005	23.3	2.5	23.6	2.7	84	0	8	3	88	9	217	12	313	12	336			3	4	315	0.02	0.69
6/14/2005	23.3	3.0	23.4	2.6	91	0	8	4	92	3	220	7	320	7	343			3	7	321	0.01	0.70
6/15/2005	23.5	2.5	22.6	2.4	88	4	12	3	95	5	225	12	332	13	356			3	4	325	0.03	0.73
6/16/2005	23.3	2.5	23.2	2.5	85	1	13	1	96	8	233	10	342	10	366			3	5	330	0.02	0.75
6/17/2005	15.8	2.4	22.4	2.5	85	0	13	2	98	4	237	6	348	8	374	1	41022	4	5	334	0.02	0.77
6/18/2005	23.4	2.8	23.3	2.7	91	0	13	3	101	2	239	5	353	6	380			4	8	342	0.01	0.78
6/19/2005	23.5	3.0	23.2	2.7	101	0	13	1	102	3	242	4	357	4	384			4	12	354	0.01	0.79
6/20/2005	23.5	2.7	23.2	2.8	100	1	14	6	108	6	248	13	370	16	400	1	No tag	5	3	357	0.03	0.82
6/21/2005	23.3	2.5	22.8	2.7	96	0	14	0	108	6	254	6	376	6	406			5	8	364	0.01	0.83
6/22/2005	17.2	2.3	23.0	2.2	83	0	14	2	110	6	260	8	384	8	414			5	5	369	0.02	0.85
6/23/2005	23.0	2.2	23.3	2.1	74	0	14	0	110	1	261	1	385	1	415			5	46	416	0.00	0.85
6/24/2005	23.3	2.3	23.5	2.2	70	0	14	0	110	1	262	1	386	2	417			5	23	439	0.00	0.85
6/25/2005	23.4	2.2	23.7	2.2	70	1	15	2	112	2	264	5	391	5	422			5	9	449	0.01	0.86
6/26/2005	23.5	2.3	23.8	2.5	77	0	15	0	112	4	268	4	395	4	426			5	12	460	0.01	0.87
6/27/2005	23.3	2.5	23.6	2.8	82	0	15	1	113	0	268	1	396	1	427			5	47	507	0.00	0.88
6/28/2005	23.1	2.8	23.4	2.9	90		15		113		268	0	396		427			5		507		0.88
6/29/2005	16.5	3.1	23.3	3.1	108	0	15	1	114	8	276	9	405	10	437			5	4	511	0.02	0.90
6/30/2005			23.9	2.5	157		15		114		276	0	405		437			5		511		0.90
7/1/2005	13.3	2.9	23.2	1.7	115	0	15	0	114	2	278	2	407	2	439			5	18	529	0.00	0.90
7/2/2005	22.8	2.6	22.3	2.5	95	0	15	2	116	7	285	9	416	9	448			5	5	534	0.02	0.92
7/3/2005	22.8	2.5	23.0	2.4	90	0	15	1	117	0	285	1	417	1	449			5	46	580	0.00	0.92
7/4/2005	23.5	2.4	23.3	2.5	86	0	15	0	117	1	286	1	418	1	450			5	47	627	0.00	0.92
7/5/2005	22.3	2.2	23.2	2.2	83	0	15	2	119	2	288	4	422	6	456			5	8	635	0.01	0.93
7/6/2005	22.8	2.7	23.6	2.5	80		15		119		288	0	422		456			5		635		0.93
7/7/2005	22.9	2.4	19.6	2.5	79	0	15	2	121	1	289	3	425	3	459			5	14	649	0.01	0.94
7/8/2005	23.2	2.3	22.8	2.4	74	0	15	0	121	2	291	2	427	2	461			5	23	672	0.00	0.94
7/9/2005	23.5	2.3	23.8	2.1	74	0	15	2	123	4	295	6	433	6	467			5	8	680	0.01	0.96
7/10/2005	23.2	2.6	22.9	2.5	77	0	15	1	124	2	297	3	436	3	470			5	15	695	0.01	0.96
7/11/2005	23.3	2.8	22.6	2.7	86	0	15	2	126	0	297	2	438	2	472			5	23	718	0.00	0.97
7/12/2005	22.8	2.7	23.0	2.6	86	0	15	0	126	3	300	3	441	3	475			5	15	733	0.01	0.97
7/13/2005	22.3	2.6	21.4	2.5	82	0	15	0	126	3	303	3	444	3	478			5	15	748	0.01	0.98
7/14/2005	22.5	2.4	21.8	2.3	80	0	15	2	128	2	305	4	448	4	482			5	11	759	0.01	0.99
7/15/2005	22.8	2.3	21.7	2.3	74	0	15	0	128	6	311	6	454	6	488					759	0.01	1.00
7/16/2005	23.3	2.4	23.7	2.2	76		15		128		311	0	454		488			5		759		1.00
Total	1,581		1,678			15		128		311		454		488		5	4					

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

Appendix G3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2005 by size group and location.

			Brood year and age class									
			2002 1.1	2001 2.1	2001 1.2	2000 2.2	2000 1.3	1999 2.3	1999 1.4	1998 2.4	1998 1.5	Total
Nakina	Male	n	1		44		286	2	96			429
Large fish		%	0.2%		10.3%		66.7%	0.5%	22.4%			56.6%
	Female	n			8		174	3	144			329
		%			2.4%		52.9%	0.9%	43.8%			43.4%
	Total	n	1		52		460	5	240			758
		%	0.1%		6.9%		60.7%	0.7%	31.7%			
	Male	n	15		96	2	61		3			177
Medium fish		%	8.5%		54.2%	1.1%	34.5%		1.7%			98.3%
	Female	n					3					3
		%					100.0%		0.0%			1.7%
	Total	n	15		96	2	64		3			180
		%	8.3%		53.3%	1.1%	35.6%		1.7%			
	Male	n	25									25
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	25									25
		%	100.0%									
	Male	n	41		140	2	347	2	99			631
All fish		%	6.5%		22.2%	0.3%	55.0%	0.3%	15.7%			65.5%
	Female	n			8		177	3	144			332
		%			2.4%		53.3%	0.9%	43.4%			34.5%
	Total	n	41		148	2	524	5	243			963
		%	4.3%		15.4%	0.2%	54.4%	0.5%	25.2%			
Lower Tats.	Male	n	1		27		188	1	21		1	239
Large fish		%	0.4%		11.3%		78.7%	0.4%	8.8%		0.4%	47.6%
	Female	n			10		196		56		1	263
		%			3.8%		74.5%		21.3%		0.4%	52.4%
	Total	n	1		37		384	1	77		2	502
		%	0.2%		7.4%		76.5%	0.2%	15.3%		0.4%	
	Male	n	8	1	66		18					93
Medium fish		%	8.6%	1.1%	71.0%		19.4%					98.9%
	Female	n					1					1
		%					100.0%					1.1%
	Total	n	8	1	66		19					94
		%	8.5%	1.1%	70.2%		20.2%					
	Male	n	36									36
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	36									36
		%	100.0%									
	Male	n	45	1	93		206	1	21		1	368
All fish		%	12.2%	0.3%	25.3%		56.0%	0.3%	5.7%		0.3%	58.2%
	Female	n			10		197		56		1	264
		%			3.8%		74.6%		21.2%		0.4%	41.8%
	Total	n	45	1	103		403	1	77		2	632
		%	7.1%	0.2%	16.3%		63.8%	0.2%	12.2%		0.3%	

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			Brood year and age class									
			2002 1.1	2001 2.1	2001 1.2	2000 2.2	2000 1.3	1999 2.3	1999 1.4	1998 2.4	1998 1.5	Total
Upper Tats. Large fish	Male	n	1		5		9		1			16
		%	6.3%		31.3%		56.3%		6.3%			50.0%
	Female	n			1		11		4			16
		%			6.3%		68.8%		25.0%			50.0%
	Total	n	1		6		20		5			32
		%	3.1%		18.8%		62.5%		15.6%			
Medium fish	Male	n	5		6		3					14
		%	35.7%		42.9%		21.4%					93.3%
	Female	n			1							1
		%			100.0%							6.7%
	Total	n	5		7		3					15
		%	33.3%		46.7%		20.0%					
Small fish	Male	n	2									2
		%	100.0%									
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
All fish	Male	n	8		11		12		1			32
		%	25.0%		34.4%		37.5%		3.1%			65.3%
	Female	n			2		11		4			17
		%			11.8%		64.7%		23.5%			34.7%
	Total	n	8		13		23		5			49
		%	16.3%		26.5%		46.9%		10.2%			
Dudidontu Large fish	Male	n			8	1	53	1	15			78
		%			10.3%	1.3%	67.9%	1.3%	19.2%			37.5%
	Female	n			6		100		24			130
		%			4.6%		76.9%		18.5%			62.5%
	Total	n			14	1	153	1	39			208
		%			6.7%	0.5%	73.6%	0.5%	18.8%			
Medium fish	Male	n	1		8	1	2		1			13
		%	7.7%		61.5%	7.7%	15.4%		7.7%			92.9%
	Female	n					1					1
		%					100.0%					7.1%
	Total	n	1		8	1	3		1			14
		%	7.1%		57.1%	7.1%	21.4%		7.1%			
Small fish	Male	n										
		%										
	Female	n										
		%										
	Total	n										
		%										
All fish	Male	n	1		16	2	55	1	16			91
		%	1.1%		17.6%	2.2%	60.4%	1.1%	17.6%			41.0%
	Female	n			6		101		24			131
		%			4.6%		77.1%		18.3%			59.0%
	Total	n	1		22	2	156	1	40			222
		%	0.5%		9.9%	0.9%	70.3%	0.5%	18.0%			

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			Brood year and age class									
			2002 1.1	2001 2.1	2001 1.2	2000 2.2	2000 1.3	1999 2.3	1999 1.4	1998 2.4	1998 1.5	Total
Nahlin	Male	n			19		29	1	7			56
Large fish		%			33.9%		51.8%	1.8%	12.5%			37.3%
	Female	n			14		56		24			94
		%			14.9%		59.6%	0.0%	25.5%			62.7%
	Total	n			33		85	1	31			150
		%			22.0%		56.7%	0.7%	20.7%			
	Male	n			5		2					7
Medium fish		%			71.4%		28.6%					87.5%
	Female	n					1					1
		%					100.0%					12.5%
	Total	n			5		3					8
		%			62.5%		37.5%					
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			24		31	1	7			63
All fish		%			38.1%		49.2%	1.6%	11.1%			39.9%
	Female	n			14		57		24			95
		%			14.7%		60.0%		25.3%			60.1%
	Total	n			38		88	1	31			158
		%			24.1%		55.7%	0.6%	19.6%			
All tributaries	Male	n	3		103	1	565	5	140		1	818
Large fish		%	0.4%		12.6%	0.1%	69.1%	0.6%	17.1%		0.1%	49.6%
	Female	n			39		537	3	252		1	832
		%			4.7%		64.5%	0.4%	30.3%		0.1%	50.4%
	Total	n	3		142	1	1,102	8	392		2	1,650
		%	0.2%		8.6%	0.1%	66.8%	0.5%	23.8%		0.1%	
	Male	n	29	1	181	3	86		4			304
Medium fish		%	9.5%	0.3%	59.5%	1.0%	28.3%		1.3%			97.7%
	Female	n			1		6					7
		%			14.3%		85.7%					2.3%
	Total	n	29	1	182	3	92		4			311
		%	9.3%	0.3%	58.5%	1.0%	29.6%		1.3%			
	Male	n	63									63
Small fish		%	100.0%									100.0%
	Female	n										
		%										
	Total	n	63									63
		%	100.0%									
	Male	n	95	1	284	4	651	5	144		1	1,185
All fish		%	8.0%	0.1%	24.0%	0.3%	54.9%	0.4%	12.2%		0.1%	58.5%
	Female	n			40		543	3	252		1	839
		%			4.8%		64.7%	0.4%	30.0%		0.1%	41.5%
	Total	n	95	1	324	4	1,194	8	396		2	2,024
		%	4.7%	0.0%	16.0%	0.2%	59.0%	0.4%	19.6%		0.1%	

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			Brood year and age class									
			2002 1.1	2001 2.1	2001 1.2	2000 2.2	2000 1.3	1999 2.3	1999 1.4	1998 2.4	1998 1.5	Total
Canyon Island Large fish	Male	n			1	138		42	4			185
		%			0.5%	74.6%		22.7%	2.2%			47.3%
	Female	n			2	138		60	5		1	206
		%			1.0%	67.0%		29.1%	2.4%		0.5%	52.7%
	Total	n			3	276		102	9		1	391
		%			0.8%	70.6%		26.1%	2.3%		0.3%	
Medium fish	Male	n	4		81	44	4					133
		%	3.0%		60.9%	33.1%	3.0%					96.4%
	Female	n			2	3						5
		%			40.0%	60.0%						3.6%
	Total	n	4		83	47	4					138
		%	2.9%		60.1%	34.1%	2.9%					
Small fish	Male	n	19		1							20
		%	95.0%		5.0%							
	Female	n										
		%										
	Total	n	19		1							20
		%	95.0%		5.0%							
All fish	Male	n	23		83	182	4	42	4			338
		%	6.8%		24.6%	53.8%	1.2%	12.4%	1.2%			61.6%
	Female	n			4	141		60	5		1	211
		%			1.9%	66.8%		28.4%	2.4%		0.5%	38.4%
	Total	n	23		87	323	4	102	9		1	549
		%	4.2%		15.8%	58.8%	0.7%	18.6%	1.6%		0.2%	

APPENDIX H

Appendix H1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2006.

			TAGGED								CAUGHT							
	Hrs	Water level	Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	fished	(in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Daily	Cum	Daily	Cum
4/27/2006	4	-18																4/27/2006
4/28/2006	4	-18		0		0		0	0	0		0			-		-	4/28/2006
4/29/2006	4	-12		0		0	4	4	4	4	4	4		1.00	1	0.03	0.03	4/29/2006
4/30/2006	4	-12		0		0	2	6	2	6	2	6		2.00	3	0.01	0.04	4/30/2006
5/1/2006	4	-12		0		0	3	9	3	9	3	9		1.33	4	0.02	0.06	5/1/2006
5/2/2006	4	-12		0		0	1	10	1	10	1	10	1	4.00	8	0.01	0.07	5/2/2006
5/3/2006	4	-12		0	1	1	9	19	10	20	1	11		4.00	12	0.01	0.07	5/3/2006
5/4/2006	3	-6		0		1	1	20	1	21	1	12		3.00	15	0.01	0.08	5/4/2006
5/5/2006	4	14		0		1	2	22	2	23	2	14		2.00	17	0.01	0.10	5/5/2006
5/6/2006	4	6		0		1		22	0	23		14			17	-	0.10	5/6/2006
5/7/2006	4	6		0		1	2	24	2	25	2	16		2.00	19	0.01	0.11	5/7/2006
5/8/2006	4	6		0	3	4	8	32	11	36	11	27		0.36	20	0.07	0.18	5/8/2006
5/9/2006	6	4		0	8	12	25	57	33	69	33	60	1	0.18	20	0.22	0.41	5/9/2006
5/10/2006	6	2	1	1	1	13	11	68	13	82	13	73	1	0.46	20	0.09	0.50	5/10/2006
5/11/2006	2	2		1		13	3	71	3	85	3	76		0.50	21	0.02	0.52	5/11/2006
5/12/2006	4	0		1	1	14	6	77	7	92	7	83	1	0.57	21	0.05	0.56	5/12/2006
5/13/2006	5	-1		1	1	15	7	84	8	100	8	91		0.63	22	0.05	0.62	5/13/2006
5/14/2006		1		1		15		84	0	100		91			22		0.62	5/14/2006
5/15/2006	4	2		1	4	19	8	92	12	112	12	103		0.33	22	0.08	0.70	5/15/2006
5/16/2006		2		1		19		92	0	112		103			22		0.70	5/16/2006
5/17/2006	6	10		1	1	20	22	114	23	135	23	126	1	0.26	23	0.16	0.86	5/17/2006
5/18/2006	6	18	1	2	4	24	2	116	7	142	6	132		1.00	24	0.04	0.90	5/18/2006
5/19/2006	6	26		2	1	25	4	120	5	147	5	137		1.20	25	0.03	0.93	5/19/2006
5/20/2006	4	34		2	1	26	2	122	3	150	3	140		1.33	26	0.02	0.95	5/20/2006
5/21/2006		42		2		26		122	0	150		140			26		0.95	5/21/2006
5/22/2006	4	44		2	1	27	6	128	7	157	7	147	1	0.57	27	0.05	1.00	5/22/2006
5/23/2006	2	55		2		27		128	0	157		147			27	-	1.00	5/23/2006
Total	102		2		27		128		157		156		6	4				

[a] Column total count is the number of adipose-finclipped-Chinook salmon possessing valid coded wire; one head was lost during shipping.

Appendix H2.– Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2006.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/21/2006	23.6	2.2			44					4	4	4	4	4	4							
5/22/2006	23.3	2.3			55	1	1	3	3	7	11	11	15	22	26	1	41153	1	1	1	0.06	0.06
5/23/2006	23.5	2.4			70		1	1	4	8	19	9	24	9	35			1	3	4	0.02	0.08
5/24/2006	23.6	2.5			78		1	2	6	3	22	5	29	5	40			1	5	8	0.01	0.10
5/25/2006	23.8	2.7			96		1		6	3	25	3	32	3	43			1	8	16	0.01	0.10
5/26/2006	23.6	2.8			102		1	1	7	1	26	2	34	2	45			1	12	28	0.01	0.11
5/27/2006	23.9	2.7	10.0	2.6	102		1	1	8	0	26	1	35	1	46			1	34	62	0.00	0.11
5/28/2006	23.8	2.7	23.8	2.6	112	1	2		8	3	29	4	39	4	50			1	12	74	0.01	0.12
5/29/2006	23.9	2.9	23.8	2.5	103		2	1	9	2	31	3	42	3	53			1	16	90	0.01	0.13
5/30/2006	23.5	3.0	22.7	2.5	100	4	6	6	15	18	49	28	70	30	83			1	2	91	0.08	0.21
5/31/2006	23.6	2.8	23.6	2.6	103	3	9	1	16	10	59	14	84	15	98			1	3	95	0.04	0.25
6/1/2006	23.7	2.9	23.8	2.6	112	3	12	6	22	7	66	16	100	16	114			1	3	98	0.04	0.30
6/2/2006	23.8	3.0	23.6	2.6	127		12	1	23	6	72	7	107	7	121			1	7	104	0.02	0.31
6/3/2006	19.8	3.0	19.7	2.9	152		12	1	24	3	75	4	111	5	126			1	8	112	0.01	0.33
6/4/2006					148		12		24		75	0	111		126			1		112		0.33
6/5/2006	12.0	3.0	12.0	2.8	127		12		24		75	0	111		126			1		112		0.33
6/6/2006	23.9	3.0	23.9	2.6	119		12	1	25	1	76	2	113	2	128			1	24	136	0.01	0.33
6/7/2006	23.8	3.0	23.7	2.6	109		12	2	27	4	80	6	119	7	135			1	7	143	0.02	0.35
6/8/2006	23.1	3.0	23.6	2.3	103	3	15	3	30	17	97	23	142	27	162			1	2	145	0.07	0.42
6/9/2006	23.7	2.7	23.3	2.5	106	2	17	8	38	7	104	17	159	18	180			1	3	147	0.05	0.47
6/10/2006	23.0	2.5	23.7	2.7	119	4	21	5	43	20	124	29	188	32	212			1	1	149	0.09	0.56
6/11/2006	23.8	2.8	23.6	2.9	130		21		43	5	129	5	193	7	219			1	7	155	0.02	0.58
6/12/2006	23.9	2.7	23.9	3.0	143		21		43	1	130	1	194	1	220			1	48	203	0.00	0.58
6/13/2006	23.7	2.9	23.8	2.9	144		21		43	6	136	6	200	6	226			1	8	211	0.02	0.60
6/14/2006	22.8	3.0	23.9	2.5	144		21	1	44	2	138	3	203	3	229			1	16	227	0.01	0.60
6/15/2006	23.8	3.1	23.8	2.7	150		21		44	2	140	2	205	2	231			1	24	251	0.01	0.61
6/16/2006	10.2	3.1	23.7	2.8	144		21		44	4	144	4	209	4	235			1	8	259	0.01	0.62
6/17/2006	23.7	3.0	23.7	2.8	132		21		44	3	147	3	212	4	239	1	40841	2	12	271	0.01	0.63
6/18/2006	23.8	2.8	23.9	2.7	120		21		44	3	150	3	215	3	242			2	16	287	0.01	0.64
6/19/2006	23.8	2.8	23.6	2.6	126	1	22	1	45	4	154	6	221	7	249			2	7	294	0.02	0.66
6/20/2006	22.3	3.0	23.6	2.6	102		22	2	47	4	158	6	227	8	257			2	6	299	0.02	0.68

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						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips		CPUE			Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/21/2006	23.9	2.7	23.8	2.5	103		22		47	4	162	4	231	5	262	1	41153	3	10	309	0.01	0.69
6/22/2006	23.8	2.4	23.5	2.2	79	3	25	3	50	2	164	8	239	9	271			3	5	314	0.02	0.72
6/23/2006	23.2	2.0	23.7	2.0	71	3	28	5	55	5	169	13	252	14	285			3	3	317	0.04	0.76
6/24/2006	22.3	2.2	20.9	2.2	68	6	34	2	57	6	175	14	266	14	299			3	3	321	0.04	0.79
6/25/2006	23.2	2.3	23.3	2.3	74	6	40	8	65	6	181	20	286	20	319			3	2	323	0.05	0.85
6/26/2006	23.6	2.2	23.6	2.3	78	3	43	1	66	3	184	7	293	8	327			3	6	329	0.02	0.87
6/27/2006	23.4	2.4	23.5	2.7	74	2	45	1	67	1	185	4	297	5	332	1	40541	4	9	338	0.01	0.88
6/28/2006	23.7	2.2	23.7	2.4	72		45		67	2	187	2	299	2	334			4	24	362	0.01	0.89
6/29/2006	23.8	2.2	23.7	2.5	78	1	46		67	1	188	2	301	2	336			4	24	386	0.01	0.89
6/30/2006	23.4	2.3	23.8	2.7	100	4	50	2	69	2	190	8	309	8	344			4	6	391	0.02	0.91
7/1/2006	23.8	2.9	23.7	2.8	140		50	1	70	2	192	3	312	3	347			4	16	407	0.01	0.92
7/2/2006	12.0	2.6	23.8	2.7	89		50	1	71	1	193	2	314	2	349			4	18	425	0.01	0.93
7/3/2006	23.8	2.2	23.7	2.5	78		50	1	72	3	196	4	318	4	353			4	12	437	0.01	0.94
7/4/2006	23.2	2.4	23.8	2.3	82		50		72	4	200	4	322	4	357			4	12	449	0.01	0.95
7/5/2006	23.6	2.6	23.7	2.4	80		50		72	1	201	1	323	1	358			4	47	496	0.00	0.95
7/6/2006	23.3	2.6	23.6	2.2	77	1	51	1	73	2	203	4	327	4	362			4	12	508	0.01	0.96
7/7/2006	23.3	2.4	23.4	2.4	78		51		73		203	0	327		362			4		508	-	0.96
7/8/2006	23.5	2.4	23.4	2.5	74		51		73		203	0	327		362			4		508	-	0.96
7/9/2006	23.4	2.5	23.5	2.3	76		51		73	3	206	3	330	3	365			4	16	523	0.01	0.97
7/10/2006	23.2	2.1	23.1	2.1	72		51	1	74	2	208	3	333	3	368			4	15	539	0.01	0.98
7/11/2006	22.9	2.0	23.4	2.3	72		51		74		208	0	333		368			4		539	-	0.98
7/12/2006	22.9	2.3	23.17.	2.4	78		51	1	75	0	208	1	334	1	369			4		539	0.00	0.98
7/13/2006	23.0	2.8	23.1	2.6	77		51		75		208	0	334		369			4		539		0.98
7/14/2006	23.2	2.6	23.3	2.5	71		51		75		208	0	334		369			4		539	-	0.98
7/15/2006	23.0	2.3	23.3	2.4	68		51		75		208	0	334		369			4		539		0.98
7/16/2006	23.2	2.5	23.4	2.3	70		51		75	1	209	1	335	1	370			4	47	585	0.00	0.98
7/17/2006	22.8	2.6	23.3	2.4	66		51		75	1	210	1	336	2	372			4	23	608		0.98
Total	1,297		1,170			51		75		210		336		316		4	4					

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

Appendix H3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2006 by size group and location.

			Brood year and age class									
			2003 1.1	2002 2.1	2002 1.2	2001 2.2	2001 1.3	2000 2.3	2000 1.4	1999 2.4	1999 1.5	Total
Nakina	Male	n			15	1	184	3	187			390
Large fish		%			3.8%	0.3%	47.2%	0.8%	47.9%			54.3%
	Female	n			3		83	2	240			328
		%			0.9%		25.3%	0.6%	73.2%			45.7%
	Total	n			18	1	267	5	427			718
		%			2.5%	0.1%	37.2%	0.7%	59.5%			
	Male	n	5		71		30		4			110
Medium fish		%	4.5%		64.5%		27.3%		3.6%			100.0%
	Female	n										
		%										
	Total	n	5		71		30		4			110
		%	4.5%		64.5%		27.3%		3.6%			
	Male	n	122	1	6							129
Small fish		%	94.6%	0.8%	4.7%							
	Female	n										
		%										
	Total	n	122	1	6							129
		%	94.6%	0.8%	4.7%							
	Male	n	127	1	92	1	214	3	191			629
All fish		%	20.2%	0.2%	14.6%	0.2%	34.0%	0.5%	30.4%			65.7%
	Female	n			3		83	2	240			328
		%			0.9%		25.3%	0.6%	73.2%			34.3%
	Total	n	127	1	95	1	297	5	431			957
		%	13.3%	0.1%	9.9%	0.1%	31.0%	0.5%	45.0%			
Lower Tats.	Male	n			13		113	1	65		1	193
Large fish		%			6.7%		58.5%	0.5%	33.7%		0.5%	46.4%
	Female	n			3		100	3	113	1	3	223
		%			1.3%		44.8%	1.3%	50.7%	0.4%	1.3%	53.6%
	Total	n			16		213	4	178	1	4	416
		%			3.8%		51.2%	1.0%	42.8%	0.2%	1.0%	
	Male	n	12		28		8		2			50
Medium fish		%	24.0%		56.0%		16.0%		4.0%			96.2%
	Female	n			1				1			2
		%			50.0%				50.0%			3.8%
	Total	n	12		29		8		3			52
		%	23.1%		55.8%		15.4%		5.8%			
	Male	n	39		1							40
Small fish		%	97.5%		2.5%							
	Female	n										
		%										
	Total	n	39		1							40
		%	97.5%		2.5%							
	Male	n	51		42		121	1	67		1	283
All fish		%	18.0%		14.8%		42.8%	0.4%	23.7%		0.4%	55.7%
	Female	n			4		100	3	114	1	3	225
		%			1.8%		44.4%	1.3%	50.7%	0.4%	1.3%	44.3%
	Total	n	51		46		221	4	181	1	4	508
		%	10.0%		9.1%		43.5%	0.8%	35.6%	0.2%	0.8%	

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			Brood year and age class									
			2003 1.1	2002 2.1	2002 1.2	2001 2.2	2001 1.3	2000 2.3	2000 1.4	1999 2.4	1999 1.5	Total
Upper Tats. Large fish	Male	n			4		3		4			11
		%			36.4%		27.3%		36.4%			45.8%
	Female	n					11		2			13
		%					84.6%		15.4%			54.2%
	Total	n			4		14		6			24
		%			16.7%		58.3%		25.0%			
Medium fish	Male	n	2		4							6
		%	33.3%		66.7%							100.0%
	Female	n										
		%										
	Total	n	2		4							6
		%	33.3%		66.7%							
Small fish	Male	n	2									2
		%	100.0%									
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
All fish	Male	n	4		8		3		4			19
		%	21.1%		42.1%		15.8%		21.1%			59.4%
	Female	n					11		2			13
		%					84.6%		15.4%			40.6%
	Total	n	4		8		14		6			32
		%	12.5%		25.0%		43.8%		18.8%			
Dudidontu Large fish	Male	n			4	1	59		27			91
		%			4.4%	1.1%	64.8%		29.7%			44.6%
	Female	n			1		69		42		1	113
		%			0.9%		61.1%		37.2%		0.9%	55.4%
	Total	n			5	1	128		69		1	204
		%			2.5%	0.5%	62.7%		33.8%		0.5%	
Medium fish	Male	n	1		11		1					13
		%	7.7%		84.6%		7.7%					100.0%
	Female	n										
		%										
	Total	n	1		11		1					13
		%	7.7%		84.6%		7.7%					
Small fish	Male	n										
		%										
	Female	n										
		%										
	Total	n										
		%										
All fish	Male	n	1		15	1	60		27			104
		%	1.0%		14.4%	1.0%	57.7%		26.0%			47.9%
	Female	n			1		69		42		1	113
		%			0.9%		61.1%		37.2%		0.9%	52.1%
	Total	n	1		16	1	129		69		1	217
		%	0.5%		7.4%	0.5%	59.4%		31.8%		0.5%	

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			Brood year and age class									
			2003 1.1	2002 2.1	2002 1.2	2001 2.2	2001 1.3	2000 2.3	2000 1.4	1999 2.4	1999 1.5	Total
Nahlin	Male	n			4		37		19			60
Large fish		%			6.7%		61.7%		31.7%			38.7%
	Female	n			2		51	1	39	2		95
		%			2.1%		53.7%	1.1%	41.1%	2.1%		61.3%
	Total	n			6		88	1	58	2		155
		%			3.9%		56.8%	0.6%	37.4%	1.3%		
	Male	n			6	1	3					10
Medium fish		%			60.0%	10.0%	30.0%					83.3%
	Female	n			1		1					2
		%			50.0%		50.0%					16.7%
	Total	n			7	1	4					12
		%			58.3%	8.3%	33.3%					
	Male	n	1									1
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	1									1
		%	100.0%									
	Male	n	1		10	1	40		19			71
All fish		%	1.4%		14.1%	1.4%	56.3%		26.8%			42.3%
	Female	n			3		52	1	39	2		97
		%			3.1%		53.6%	1.0%	40.2%	2.1%		57.7%
	Total	n	1		13	1	92	1	58	2		168
		%	0.6%		7.7%	0.6%	54.8%	0.6%	34.5%	1.2%		
Kowatua	Male	n					7		3			10
Large fish		%					70.0%		30.0%			52.6%
	Female	n					4		5			9
		%					44.4%		55.6%			47.4%
	Total	n					11		8			19
		%					57.9%		42.1%			
	Male	n			1				2			3
Medium fish		%			33.3%				66.7%			100.0%
	Female	n										
		%										
	Total	n			1				2			3
		%			33.3%				66.7%			
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			1		7		5			13
All fish		%			7.7%		53.8%		38.5%			59.1%
	Female	n					4		5			9
		%					44.4%		55.6%			40.9%
	Total	n			1		11		10			22
		%			4.5%		50.0%		45.5%			

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Appendix H3.–Page 4 of 4.

			Brood year and age class									
			2003 1.1	2002 2.1	2002 1.2	2001 2.2	2001 1.3	2000 2.3	2000 1.4	1999 2.4	1999 1.5	Total
All tributaries	Male	n			40	2	403	4	305		1	755
Large fish		%			5.3%	0.3%	53.4%	0.5%	40.4%		0.1%	49.2%
	Female	n			9		318	6	441	3	4	781
		%			1.2%		40.7%	0.8%	56.5%	0.4%	0.5%	50.8%
	Total	n			49	2	721	10	746	3	5	1,536
		%			3.2%	0.1%	46.9%	0.7%	48.6%	0.2%	0.3%	
	Male	n	20		121	1	42		8			192
Medium fish		%	10.4%		63.0%	0.5%	21.9%		4.2%			98.0%
	Female	n			2		1		1			4
		%			50.0%		25.0%		25.0%			2.0%
	Total	n	20		123	1	43		9			196
		%	10.2%		62.8%	0.5%	21.9%		4.6%			
	Male	n	164	1	7							172
Small fish		%	95.3%	0.6%	4.1%							100.0%
	Female	n										
		%										
	Total	n	164	1	7							172
		%	95.3%	0.6%	4.1%							
	Male	n	184	1	168	3	445	4	313		1	1,119
All fish		%	16.4%	0.1%	15.0%	0.3%	39.8%	0.4%	28.0%		0.1%	58.8%
	Female	n			11		319	6	442	3	4	785
		%			1.4%		40.6%	0.8%	56.3%	0.4%	0.5%	41.2%
	Total	n	184	1	179	3	764	10	755	3	5	1,904
		%	9.7%	0.1%	9.4%	0.2%	40.1%	0.5%	39.7%	0.2%	0.3%	
Canyon Island	Male	n			3	1	65		66			135
Large fish		%			2.2%	0.7%	48.1%		48.9%			38.1%
	Female	n			1		101	6	109	1	1	219
		%			0.5%		46.1%	2.7%	49.8%	0.5%	0.5%	61.9%
	Total	n			4	1	166	6	175	1	1	354
		%			1.1%	0.3%	46.9%	1.7%	49.4%	0.3%	0.3%	
	Male	n	12		68	3	14		2			99
Medium fish		%	12.1%		68.7%	3.0%	14.1%		2.0%			97.1%
	Female	n			1		2					3
		%			33.3%		66.7%					2.9%
	Total	n	12		69	3	16		2			102
		%	11.8%		67.6%	2.9%	15.7%		2.0%			
	Male	n	57	2								59
Small fish		%	96.6%	3.4%								
	Female	n										
		%										
	Total	n	57	2								59
		%	96.6%	3.4%								
	Male	n	69	2	71	4	79		68			293
All fish		%	23.5%	0.7%	24.2%	1.4%	27.0%		23.2%			56.9%
	Female	n			2		103	6	109	1	1	222
		%			0.9%		46.4%	2.7%	49.1%	0.5%	0.5%	43.1%
	Total	n	69	2	73	4	182	6	177	1	1	515
		%	13.4%	0.4%	14.2%	0.8%	35.3%	1.2%	34.4%	0.2%	0.2%	

APPENDIX I

Appendix I1.–Gillnet effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2007.

			TAGGED								CAUGHT							
		Water	Small		Medium		Large		Total		Total		Adipose finclips		CPUE		Proportions	
Date	Hrs fished	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Daily	Cum	Daily	Cum
4/27/2006	1	-24																
4/28/2006	1.5	-18		0		0		0	0	0								
4/29/2006	3	-12		0		0		0	0	0								
4/30/2006	2.5	-12		0		0	1	1	1	1	1	1			2.50	3	0.01	0.01
5/1/2006	3	0		0		0		1	0	1		1				3		0.01
5/2/2006	4.5	0		0		0		1	0	1		1				3		0.01
5/3/2006	3	6		0		0	1	2	1	2	1	2			3.00	6	0.01	0.02
5/4/2006	4	8.4		0		0		2	0	2		2				6		0.02
5/5/2006	2	16.8		0		0		2	0	2		2				6		0.02
5/6/2006		19.2		0		0		2	0	2		2				6		0.02
5/7/2006	4	21.6		0	1	1	2	4	3	5	4	6			1.00	7	0.04	0.06
5/8/2006	4	24		0	1	2		4	1	6	1	7			4.00	11	0.01	0.07
5/9/2006	4	22.8		0	4	6	4	8	8	14	8	15			0.50	11	0.08	0.16
5/10/2006	4	24		0	10	16	5	13	15	29	18	33			0.22	11	0.19	0.34
5/11/2006	4	24		0	6	22	3	16	9	38	10	43			0.40	12	0.10	0.45
5/12/2006	4	25.2		0	11	33	6	22	17	55	18	61			0.22	12	0.19	0.64
5/13/2006	4	28.8		0	4	37	4	26	8	63	9	70			0.44	12	0.09	0.73
5/14/2006	3	30		0	8	45	1	27	9	72	9	79				12		0.73
5/15/2006	4	33.6		0	5	50	3	30	8	80	9	88			0.44	13	0.09	0.82
5/16/2006		45.6		0		50		30	0	80		88				13		0.82
5/17/2006	3.5	50.4		0	4	54	4	34	8	88	8	96				13	0.08	0.91
Total	63		0		54		34		88		96		0					

Appendix I2.–Fish wheel effort for Chinook salmon including water level and daily and cumulative catches, numbers tagged, adipose finclips seen, CPUE, and proportions in 2007.

						TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
	Fish wheel #1		Fish wheel #2		Water	Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
5/18/2007	5.5	.7			49							0										
5/19/2007	24.0	.9	7.5	2.2	50		0		0		0	0	0		0			0				
5/20/2007	22.6	.7	23.8	2.2	53		0	8	8	11	11	19	19	20	20			0	2	2	0.06	0.06
5/21/2007	23.3	2.3	23.7	2.2	58		0	13	21	9	20	22	41	24	44			0	2	4	0.07	0.13
5/22/2007	23.3	2.3	23.8	2.3	64		0	13	34	5	25	18	59	18	62			0	3	7	0.05	0.19
5/23/2007	11.3	3.2	23.8	2.5	77		0	4	38	7	32	11	70	11	73			0	3	10	0.03	0.22
5/24/2007			23.8	2.5	84		0	2	40		32	2	72	2	75			0	12	22	0.01	0.22
5/25/2007	12.0	2.5	23.8	2.5	100		0	1	41	1	33	2	74	2	77			0	18	40	0.01	0.23
5/26/2007	23.9	2.9	23.9	2.1	113		0	1	42		33	1	75	1	78			0	48	88	0.00	0.23
5/27/2007	23.9	2.9	23.9	2.1	125		0	1	43	2	35	3	78	3	81			0	16	104	0.01	0.24
5/28/2007	23.9	2.8	23.9	2.1	119		0		43		35	0	78		81			0		104		0.24
5/29/2007	23.8	2.6	23.3	2.0	108		0	7	50	9	44	16	94	16	97			0	3	107	0.05	0.29
5/30/2007	23.7	2.5	22.8	2.5	103		0	4	54	8	52	12	106	12	109			0	4	111	0.04	0.33
5/31/2007	23.9	3.1	23.9	2.9	119		0	1	55	1	53	2	108	2	111			0	24	134	0.01	0.33
6/1/2007	23.8	2.6	23.7	2.6	118		0	3	58	5	58	8	116	8	119			0	6	140		0.33
6/2/2007	23.8	3.0	23.8	2.7	119		0	3	61	3	61	6	122	6	125			0	8	148		0.33
6/3/2007	23.8	2.3	23.8	2.3	119		0	1	62	1	62	2	124	2	127			0	24	172	0.01	0.34
6/4/2007	20.4	2.9	20.5	2.7	136		0		62		62	0	124		127			0		172		0.34
6/5/2007					154		0		62		62	0	124		127			0		172		0.34
6/6/2007					174		0		62		62	0	124		127			0		172		0.34
6/7/2007					174		0		62		62	0	124		127			0		172		0.34
6/8/2007			14.8	2.1	158		0		62		62	0	124		127			0		172		0.34
6/9/2007	13.8	3.0	23.8	2.1	145	1	1		62	1	63	2	126	2	129			0	19	191	0.01	0.34
6/10/2007	18.8	3.0	23.8	2.1	133		1	3	65		63	3	129	3	132			0	14	205	0.01	0.35
6/11/2007	10.4	3.1	16.3	2.2	148		1	1	66	1	64	2	131	3	135			0	9	214	0.01	0.36
6/12/2007			8.8	2.2	158		1		66		64	0	131		135			0		214		0.36
6/13/2007	14.8	3.1	14.9	2.2	152		1		66		64	0	131	1	136	1	41153	1	30	244	0.00	0.37
6/14/2007	9.2	2.7	9.3	2.2	144		1		66	1	65	1	132	1	137			1	19	262	0.00	0.37
6/15/2007	13.7	2.7	15.3	2.2	144	1	2	1	67	1	66	3	135	3	140			1	10	272	0.01	0.38
6/16/2007	23.8	2.7	23.7	2.3	136	1	3		67	1	67	2	137	2	142			1	24	296	0.01	0.38
6/17/2007	23.8	2.7	23.8	2.4	142	1	4		67	1	68	2	139	3	145			1	16	311	0.01	0.39
6/18/2007	23.8	2.7	23.8	1.6	140		4	1	68	2	70	3	142	3	148			1	16	327	0.01	0.40
6/19/2007	23.8	2.5	23.4	2.0	136		4		68	1	71	1	143	1	149			1	47	375	0.00	0.40
6/20/2007	21.1	2.6	19.2	2.2	127	1	5	2	70	5	76	8	151	10	159			1	4	379	0.03	0.43
6/21/2007	23.7	2.6	23.3	2.7	126	1	6	2	72	8	84	11	162	12	171			1	4	382	0.04	0.47
6/22/2007	23.4	2.6	22.7	2.2	121	3	9	7	79	6	90	16	178	16	187			1	3	385	0.05	0.52
6/23/2007	23.6	2.6	22.2	2.0	116	2	11	10	89	7	97	19	197	19	206			1	2	388	0.06	0.57
6/24/2007	22.8	2.2	23.5	2.3	109	2	13	2	91	3	100	7	204	8	214			1	6	394	0.02	0.60

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	Fish wheel #1		Fish wheel #2		Water	TAGGED (fish wheels combined)								CAUGHT (fish wheels combined)								
						Small		Medium		Large		Total		Total		Adipose finclips			CPUE		Proportions	
Date	Hrs fished	RPM	Hrs fished	RPM	level (in)	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Tag code[a]	Cum	Daily	Cum	Daily	Cum
6/25/2007	23.6	2.7	22.1	2.2	102	4	17	5	96	2	102	11	215	12	226			1	4	397	0.04	0.63
6/26/2007	23.7	2.2	22.8	2.1	97	3	20	4	100	2	104	9	224	9	235			1	5	402	0.03	0.66
6/27/2007	20.4	2.0	22.5	1.9	95	8	28	8	108	7	111	23	247	24	259	1	41153	2	2	404	0.07	0.73
6/28/2007	23.5	2.3	22.8	2.4	97	4	32	2	110	6	117	12	259	12	271			2	4	408	0.04	0.77
6/29/2007	23.1	2.4	23.4	2.4	97	3	35	3	113	3	120	9	268	9	280			2	5	413	0.03	0.80
6/30/2007	23.1	2.7	22.1	2.7	114	3	38		113	5	125	8	276	8	288			2	6	419	0.02	0.82
7/1/2007	23.7	2.3	23.0	2.5	112		38		113	3	128	3	279	3	291			2	16	435	0.01	0.83
7/2/2007	23.8	2.4	23.5	2.6	108		38	2	115	4	132	6	285	6	297			2	8	442	0.02	0.85
7/3/2007	23.8	2.4	21.8	2.2	102	1	39	3	118	2	134	6	291	6	303			2	8	450	0.02	0.87
7/4/2007	23.4	22.8	22.8	2.0	102	4	43		118	2	136	6	297	6	309			2	8	458	0.02	0.88
7/5/2007	8.5	2.0	22.7	2.2	97		43	2	120	1	137	3	300	3	312			2	10	468	0.01	0.89
7/6/2007	13.5	2.0	23.1	2.0	92		43		120		137	0	300		312			2		468		0.89
7/7/2007	23.0	1.9	21.9	2.3	90		43	1	121	1	138	2	302	2	314			2	22	491	0.01	0.90
7/8/2007	23.2	2.1	23.3	2.6	89		43		121	1	139	1	303	1	315			2	46	537	0.00	0.90
7/9/2007	22.8	1.9	23.1	2.4	86		43		121	1	140	1	304	1	316			2	46	583	0.00	0.90
7/10/2007	23.3	2.3	23.0	2.4	85		43	3	124	1	141	4	308	4	320			2	12	594	0.01	0.92
7/11/2007	23.4	2.6	23.5	2.5	96		43		124		141	0	308		320			2		594		0.92
7/12/2007	23.6	3.0	23.6	2.7	114		43		124	1	142	1	309	1	321			2	47	642	0.00	0.92
7/13/2007	23.3	2.8	23.8	3.0	136		43		124		142	0	309		321			2		642		0.92
7/14/2007	23.7	2.8	23.5	2.7	134		43		124		142	0	309		321			2		642		0.92
7/15/2007	23.4	2.7	23.3	2.4	132		43		124	1	143	1	310	1	322			2	47	688	0.00	0.92
7/16/2007	23.4	2.6	23.6	2.6	137		43		124		143	0	310		322			2		688		0.92
7/17/2007	14.1	2.6	23.7	2.5	149		43		124		143	0	310		322			2		688		0.92
7/18/2007	23.6	2.7	23.1	2.6	132		43		124		143	0	310		322			2		688		0.92
7/19/2007	23.4	2.5	22.0	2.6	127		43		124		143	0	310		322			2		688		0.92
7/20/2007	14.9	2.7	14.0	2.5	138		43		124		143	0	310		322			2		688		0.92
7/21/2007					180		43		124		143	0	310		322			2		688		0.92
7/22/2007					168		43		124		143	0	310		322			2		688		0.92
7/23/2007	15.8	2.3	15.3	2.3	115		43		124		143	0	310		322			2		688		0.92
7/24/2007	23.1	2.7	20.0	2.6	113		43		124	3	146	3	313	3	325			2	14	703	0.01	0.93
7/25/2007	22.9	2.5	20.8	2.5	106		43		124	1	147	1	314	1	326			2	44	746	0.00	0.93
7/26/2007	22.7	2.3	21.8	2.5	100		43	2	126		147	2	316	2	328			2	22	768	0.01	0.94
8/1/2007	21.6	2.5	16.9	2.5	115		43	1	127		147	1	317	1	329			2	39	807	0.00	0.94
8/2/2007	22.6	2.4	16.8	2.6	104		43		127		147	0	317	1	330	1	40937	3	39	846	0.00	0.95
8/7/2007	22.5	2.5	21.8	2.6	91		43		127		147	0	317	1	331	1	30123[b]	4	44	891	0.00	0.95
8/13/2008	22.3	2.0	21.5	2.0	76		43		127		147	0	317	1	332			4	44	934	0.00	0.95
8/18/2007	23.3	2.6	23.3	2.6	84		43		127	1	148	1	318	1	333			4	47	981	0.00	0.96
8/19/2007	23.2	2.3	23.1	2.2	80		43		127		148	0	318	1	334	1	41218	5	46	1,027	0.00	0.96
Total	1,430		1,505			43		127		148		318		334		5	5					

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

[b] This valid wire from the fish sampled on 7 Aug indicated the fish was originally released at Little Port Walter hatchery located on southern Baranof Island.

Appendix I3.–Age composition by sex and age from samples aged from Chinook salmon in the Taku River in 2007 by size group and location.

			Brood year and age class									
			2004	2003	2003	2002	2002	2001	2001	2000	2000	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Nakina	Male	n					3		4			7
Large fish		%					42.9%		57.1%			58.3%
	Female	n					2		3			5
		%					40.0%		60.0%			41.7%
	Total	n					5		7			12
		%					41.7%		58.3%			
	Male	n			4		1					5
Medium fish		%			80.0%		20.0%					100.0%
	Female	n										
		%										
	Total	n			4		1					5
		%			80.0%		20.0%					
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			4		4		4			12
All fish		%			33.3%		33.3%		33.3%			70.6%
	Female	n					2		3			5
		%					40.0%		60.0%			29.4%
	Total	n			4		6		7			17
		%			23.5%		35.3%		41.2%			
Lower Tats.	Male	n			16		42		28			86
Large fish		%			18.6%		48.8%		32.6%			65.6%
	Female	n			1		28		16			45
		%			2.2%		62.2%		35.6%			34.4%
	Total	n			17		70		44			131
		%			13.0%		53.4%		33.6%			
	Male	n	13		74		4		2			93
Medium fish		%	14.0%		79.6%		4.3%		2.2%			95.9%
	Female	n			3		1					4
		%			75.0%		25.0%					4.1%
	Total	n	13		77		5		2			97
		%	13.4%		79.4%		5.2%		2.1%			
	Male	n	34									34
Small fish		%	100.0%									
	Female	n										
		%										
	Total	n	34									34
		%	100.0%									
	Male	n	47		90		46		30			213
All fish		%	22.1%		42.3%		21.6%		14.1%			81.3%
	Female	n			4		29		16			49
		%			8.2%		59.2%		32.7%			18.7%
	Total	n	47		94		75		46			262
		%	17.9%		35.9%		28.6%		17.6%			

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			Brood year and age class									
			2004	2003	2003	2002	2002	2001	2001	2000	2000	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Upper Tats.	Male	n					2		1			3
Large fish		%					66.7%		33.3%			50.0%
	Female	n					3					3
		%					100.0%					50.0%
	Total	n					5		1			6
		%					83.3%		16.7%			
	Male	n			19		2					21
Medium fish		%			90.5%		9.5%					95.5%
	Female	n					1					1
		%					100.0%					4.5%
	Total	n			19		3					22
		%			86.4%		13.6%					
	Male	n	2									2
Small fish		%	100.0%									100.0%
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	2		19		4		1			26
All fish		%	7.7%		73.1%		15.4%		3.8%			86.7%
	Female	n					4		0			4
		%					100.0%		0.0%			13.3%
	Total	n	2		19		8		1			30
		%	6.7%		63.3%		26.7%		3.3%			
Nahlin	Male	n			3		8		2		1	14
Large fish		%			21.4%		57.1%		14.3%		7.1%	60.9%
	Female	n					4		5			9
		%					44.4%		55.6%			39.1%
	Total	n			3		12		7		1	23
		%			13.0%		52.2%		30.4%		4.3%	
	Male	n			8							8
Medium fish		%			100.0%							72.7%
	Female	n				1	2					3
		%				33.3%	66.7%					27.3%
	Total	n			8	1	2					11
		%			72.7%	9.1%	18.2%					
	Male	n										
Small fish		%										
	Female	n										
		%										
	Total	n										
		%										
	Male	n			11		8		2		1	22
All fish		%			50.0%		36.4%		9.1%		4.5%	64.7%
	Female	n				1	6		5			12
		%				8.3%	50.0%		41.7%			35.3%
	Total	n			11	1	14		7		1	34
		%			32.4%	2.9%	41.2%		20.6%		2.9%	

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			Brood year and age class									
			2004	2003	2003	2002	2002	2001	2001	2000	2000	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Kowatua	Male	n					7	1	6	1		15
Large fish		%					46.7%	6.7%	40.0%	6.7%		35.7%
	Female	n					10		16		1	27
		%					37.0%		59.3%		3.7%	64.3%
	Total	n					17	1	22	1	1	42
		%					40.5%	2.4%	52.4%	2.4%	2.4%	
	Male	n			8		2					10
Medium fish		%			80.0%		20.0%					76.9%
	Female	n				1	2					3
		%				33.3%	66.7%					23.1%
	Total	n			8	1	4					13
		%			61.5%	7.7%	30.8%					
	Male	n	3									3
Small fish		%	100.0%									100.0%
	Female	n										
		%										
	Total	n	3									3
		%	100.0%									
	Male	n	3		8		9	1	6	1		28
All fish		%	10.7%		28.6%		32.1%	3.6%	21.4%	3.6%		48.3%
	Female	n				1	12		16		1	30
		%				3.3%	40.0%		53.3%		3.3%	51.7%
	Total	n	3		8	1	21	1	22	1	1	58
		%	5.2%		13.8%	1.7%	36.2%	1.7%	37.9%	1.7%	1.7%	
Hackett	Male	n					2		1			3
Large fish		%					66.7%		33.3%			37.5%
	Female	n					3		2			5
		%					60.0%		40.0%			62.5%
	Total	n					5		3			8
		%					62.5%		37.5%			
	Male	n	1		11		4					16
Medium fish		%	6.3%		68.8%		25.0%					100.0%
	Female	n										
		%										
	Total	n	1		11		4					16
		%	6.3%		68.8%		25.0%					
	Male	n	2									2
Small fish		%	100.0%									100.0%
	Female	n										
		%										
	Total	n	2									2
		%	100.0%									
	Male	n	3		11		6		1			21
All fish		%	14.3%		52.4%		28.6%		4.8%			80.8%
	Female	n					3		2			5
		%					60.0%		40.0%			19.2%
	Total	n	3		11		9		3			26
		%	11.5%		42.3%		34.6%		11.5%			

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			Brood year and age class									
			2004	2003	2003	2002	2002	2001	2001	2000	2000	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
All tributaries	Male	n			19		64	1	42	1	1	128
Large fish		%			14.8%		50.0%	0.8%	32.8%		0.8%	57.7%
	Female	n			1		50		42		1	94
		%			1.1%		53.2%		44.7%		1.1%	42.3%
	Total	n			20		114	1	84	1	2	222
		%			9.0%		51.4%	0.5%	37.8%	0.5%	0.9%	
	Male	n	14		124		13		2			153
Medium fish		%	9.2%		81.0%		8.5%		1.3%			93.3%
	Female	n			3	2	6		0			11
		%			27.3%	18.2%	54.5%		0.0%			6.7%
	Total	n	14		127	2	19		2			164
		%	8.5%		77.4%	1.2%	11.6%		1.2%			
	Male	n	41									41
Small fish		%	100.0%									100.0%
	Female	n										
		%										
	Total	n										
		%										
	Male	n	55		143		77	1	44	1	1	322
All fish		%	17.1%		44.4%		23.9%	0.3%	13.7%		0.3%	75.4%
	Female	n			4	2	56		42		1	105
		%			3.8%		53.3%		40.0%		1.0%	24.6%
	Total	n	55		147	2	133	1	86	1	2	427
		%	12.9%		34.4%	0.5%	31.1%	0.2%	20.1%	0.2%	0.5%	
Canyon Island	Male	n			5	1	43		25			74
Large fish		%			6.8%	1.4%	58.1%		33.8%			40.0%
	Female	n			2		54	2	51	1	1	111
		%			1.8%		48.6%	1.8%	45.9%	0.9%	0.9%	60.0%
	Total	n			7	1	97	2	76	1	1	185
		%			3.8%	0.5%	52.4%	1.1%	41.1%	0.5%	0.5%	
	Male	n	3		161	1	1					166
Medium fish		%	1.8%		97.0%	0.6%	0.6%					91.2%
	Female	n			16							16
		%			100.0%							8.8%
	Total	n	3		177	1	1					182
		%	1.6%		97.3%	0.5%	0.5%					
	Male	n	43									43
Small fish		%	100.0%									100.0%
	Female	n										
		%										
	Total	n	43									43
		%	100.0%									
	Male	n	46		166	2	44		25			283
All fish		%	16.3%		58.7%	0.7%	15.5%		8.8%			69.0%
	Female	n			18		54	2	51	1	1	127
		%			14.2%		42.5%	1.6%	40.2%	0.8%	0.8%	31.0%
	Total	n	46		184	2	98	2	76	1	1	410
		%	11.2%		44.9%	0.5%	23.9%	0.5%	18.5%	0.2%	0.2%	

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			Brood year and age class									
			2004	2003	2003	2002	2002	2001	2001	2000	2000	
			1.1	2.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5	Total
Test fishery	Total	n	1		98	1	596	8	674	3	20	1,401
Large fish		%	0.1%		7.0%	0.1%	42.5%	0.6%	48.1%	0.2%	1.4%	
	Total	n			209	2	56	1	28		1	297
Medium fish		%			70.4%	0.7%	18.9%	0.3%	9.4%		0.3%	
Can. gillnet	Total	n			35		437		321	4	15	813
Large fish		%			4.3%		53.8%		39.5%	0.5%	1.9%	
	Total	n	4		439		40			4		487
Medium fish		%	0.8%		90.1%		8.2%			0.8%		

APPENDIX J

Appendix J1.–Computer files used to estimate the spawning abundance of Chinook salmon in the Taku River from 1999 to 2007.

File name	Description
99Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 1999.
99Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 1999.
00Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2000.
00Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2000.
01Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2001.
01Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2001.
02Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2002.
02Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2002.
03Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2003.
03Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2003.
04Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2004.
04Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2004.
05Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2005.
05Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2005.
06Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2006.
06Taku41_KS.xls	File with Kolmogorov-Smirnov test results in 2007.
07Taku41.xls	File with primary mark and recovery data. Age, sex, and length composition tables, abundance calculations, and bootstrap results in 2007.
07Taku41_KS.xls	2007 data file for all Kolmogorov-Smirnov test results.