Fishery Data Series No. 03-08

Production of Coho Salmon from Slippery Creek, 2000–2001

by

Dean E. Beers

May 2003

Alaska Department of Fish and Game **Division of Sport Fish**

Symbols and Abbreviations

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Weights and measures (metric)

Centimeter	cm
Deciliter	dL
Gram	g
Hectare	ha
Kilogram	kg
Kilometer	km
Liter	L
Meter	m
metric ton	mt
Milliliter	ml
Millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
Foot	ft
Gallon	gal
Inch	in
Mile	mi
Ounce	oz
Pound	lb
Quart	qt
Yard	yd

Spell out acre and ton.

Time and temperature

Day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
Minute	min
Second	s

Spell out year, month, and week.

Physics and chemistry

all atomic symbols	
alternating current	AC
Ampere	A
Calorie	cal
direct current	DC
Hertz	Hz
Horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
Volts	V
Watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
And	&
At	@
Compass directions:	
East	E
North	N
South	S
West	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	Et al.
et cetera (and so forth)	Etc.
exempli gratia (for example)	e.g.,
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
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
Trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	Use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

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	C.I.
correlation coefficient	R (multiple)
correlation coefficient	R (simple)
covariance	Cov
degree (angular or temperature)	°
degrees of freedom	Df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
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.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	X
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
Standard length	SL
Total length	TL
Variance	Var

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ABSTRACT

Recovery in 2001 of coded wire tags from adult coho salmon tagged as smolts in 2000, and an adult escapement project, were used to estimate smolt abundance, harvest, exploitation rate, and production of coho salmon *Oncorhynchus kisutch* from Slippery Creek, on Kuiu Island in Southeast Alaska. From 15 April through 29 May 2000, a smolt trap was operated below the outlet to Slippery Lake. During this period 12,391 coho salmon smolt ≥70 mm fork length were tagged and released alive with valid tags. In 2001, 250 adult coho salmon bearing coded wire tags of Slippery Creek origin were recovered by sampling marine fisheries, and corresponded to an estimated marine harvest of 2,839 (SE = 183) fish. Of this harvest, the troll fishery took an estimated 76.8%, net fisheries took 20.2%, and recreational fisheries 3.0%. The escapement of adults past the fish pass trap from 15 August to 15 October 2001 was 2,772. Estimated total run (escapement plus harvest) in 2001 for coho salmon originating from Slippery Creek is 5,611 (SE = 183); marine exploitation rate on this run was estimated at 50.6% (SE = 1.6%). Estimated smolt abundance in 2000 from Slippery Creek was 36,057 (SE = 909) and marine survival rate of coho salmon smolt from Slippery Creek was estimated at 15.6% (SE = 0.6%).

Key words: coho salmon, *Oncorhynchus kisutch*, Slippery Creek, fish pass, harvest, troll fishery, drift gillnet fishery, recreational fishery, seine fishery, escapement, migratory timing, production, exploitation rate, marine survival

INTRODUCTION

Slippery Creek produces about 4,000 adult coho salmon *Oncorhynchus kisutch* annually, most of which are caught in commercial troll and seine fisheries in central Southeast Alaska. Assessment of the Slippery Creek stock is part of the Alaska Department of Fish and Game's (ADF&G) effort to gather information on coho salmon regionwide for in-season and post-season management of the mixed-stock and terminal coho salmon fisheries in Southeast Alaska. The Slippery Creek project is the department's only coho salmon stock assessment program for a lake system between Auke Lake in Juneau and Hugh Smith Lake in Ketchikan.

In 1987 the U.S. Forest Service (USFS) constructed an Alaska steeppass (Zeimer 1962) at the lower end of the creek that allowed fish migrations into previously inaccessible habitat upstream (Figure 1). The USFS, ADF&G and Northern Southeast Regional Aquaculture Association (NSRAA) enhanced the system for coho salmon with nearby wild stocks in 1987 (Wright, Bryant and Frenette 1997). The USFS and ADF&G continued to enhance the system with Crystal Lake hatchery brood stock from 1988 to 1990.

Stock assessment began in 1997, when the USFS constructed and operated a smolt trap at a weir below the lake outlet and placed CWTs in 33,077 coho smolts. Beers (1999) counted the 1998 escapement, and estimated the size of the 1997 smolt emigration and other population parameters (Table 1). ADF&G operated the smolt trap in 1999 and continued stock assessment on the 2000 adult return (Table 1) (Beers 2001). In 2000, ADF&G continued to tag coho salmon smolts, enumerated the escapement, and estimated the fraction returning with CWTs in 2001. The project is very cost-effective because the smolt trap, adult fish pass, and crew living quarters are provided by the USFS.

Objectives of this study were to estimate: (1) 2001 escapement; (2) 2001 ocean harvest; (3) 2000 smolt abundance; and (4) age, sex, and length compositions of the 2000 emigrant smolt population and the 2001 escapement.

METHODS

SMOLT CAPTURE AND CODED-WIRE-TAGGING

Salmon smolt emigrating from Slippery Creek were captured using a "Wolf" smolt trap (Wolf 1956) from 15 April to 28 May 2000 (Figure 2). The trap was reconstructed by ADF&G about ½ mile below the lake outlet. Vexar panels having an average mesh diameter of 0.26 inch were used as leads to funnel fish downstream to the heart of

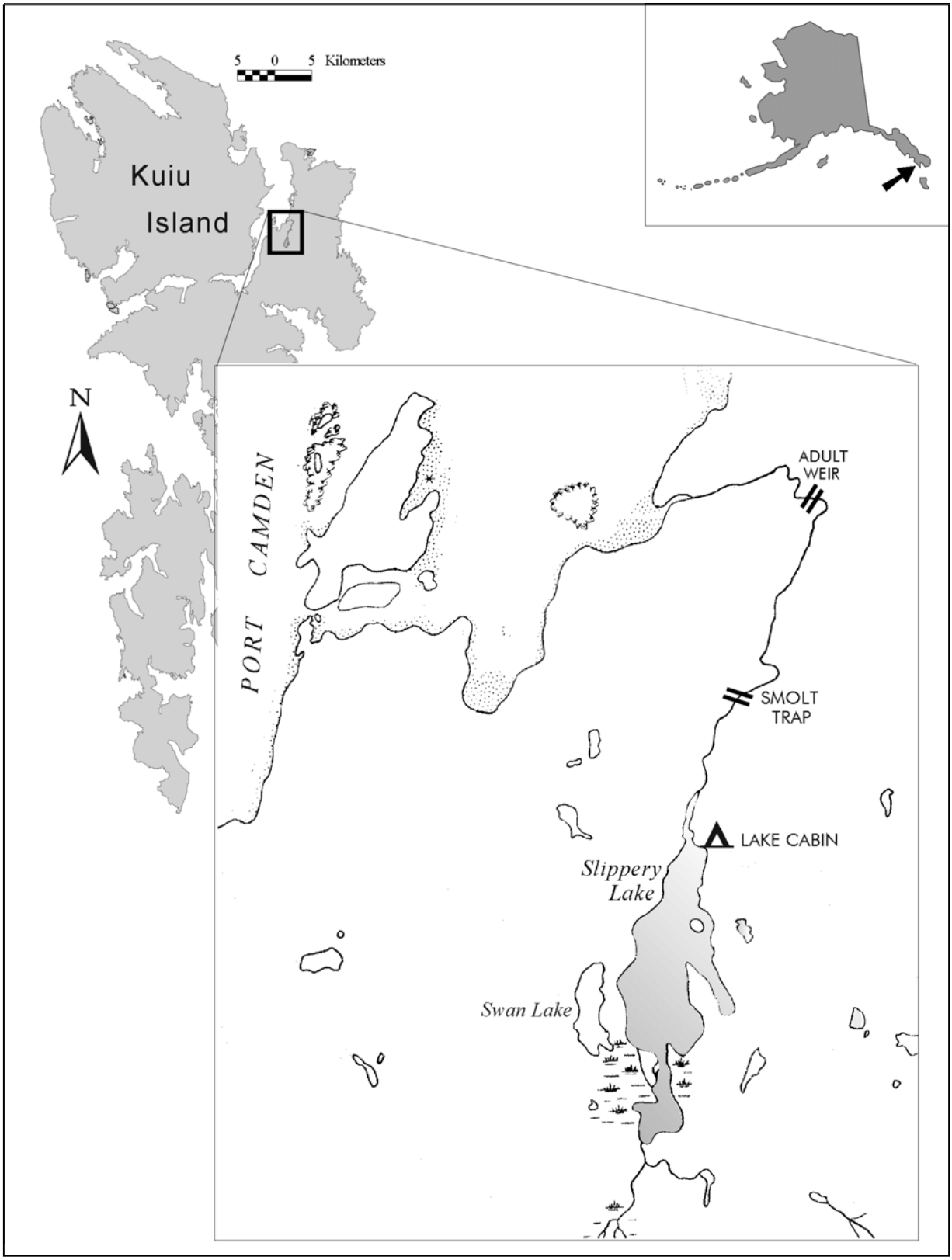

Figure 1.–Slippery Creek drainage on Kuiu Island, Southeast Alaska.

Table 1.–Estimated coho salmon smolt production ($\hat{N}_s$), number of valid CWTs released (n_s), fraction of adults carrying CWTs ($\hat{\theta}_a$), adult harvest ($\hat{H}$) and exploitation rate ($\hat{\mu}$), smolt-to-adult survival ($\hat{S}$), total adult return ($\hat{N}_r$) and escapement(N_e) at Slippery Creek, 1997–98 and 1999–2000.

Smolt/adult year	$\hat{N}_s$	n_s	$\hat{\theta}_a$	$\hat{H}$	$\hat{\mu}$	$\hat{S}$	$\hat{N}_r$	N_e
1997–1998[a]	43,544	33,077	75.9%	2,932	82.3%	8.2%	3,564	632
1999–2000[b]	31,015	12,956	36.3%	2,193	84.2%	8.4%	2,604	411

[a] Beers(2000)

[b] Beers(2001)

the trap, a large perforated aluminum panel dewatering table embedded in the middle of the creek. The tilted table allowed most of the water above it to pass freely through, while directing the remaining water and trapped emigrant smolt to a baffled live box and holding pen below the structure.

Each morning salmonid smolt were removed from the trap, transported to holding pens next to the tagging shed, and processed. Coho smolt were separated by inspection from other species of salmon, trout and Dolly Varden *Salvelinus malma* using a combination of external morphological characteristics (McConnell and Snyder 1972). All live coho salmon smolt ≥70 mm FL were tranquilized in a buffered solution of tricaine-methane sulfonate (MS 222). The solution was buffered with sodium bicarbonate until the pH was neutral. All fish were tagged with a full-length coded wire tag and marked by excision of the adipose fin following methods in Koerner (1977), and held overnight for assessing tag retention and tagging mortality.

The following morning, all mortalities were identified and one hundred live coho salmon smolts were checked for retention of CWTs. The number of fish tagged, number of tagging-related mortalities, and number of fish that had shed their tags were compiled and recorded on *ADF&G CWT Tagging Summary and Release Information Forms* which were submitted to the Commercial Fisheries Division Tag Lab in Juneau when field work ended.

SMOLT ABUNDANCE

The abundance of coho salmon smolt emigrating from Slippery Creek in 2000 was estimated using Chapman's modified Petersen estimator for a closed population (Seber 1982):

$$\hat{N} = \frac{(n_1 + 1)(n_2 + 1)}{(m_2 + 1)} - 1 \qquad (1)$$

$$\text{var}[\hat{N}] = \frac{(n_1 + 1)(n_2 + 1)(n_1 - m_2)(n_2 - m_2)}{(m_2 + 1)^2 (m_2 + 2)} \qquad (2)$$

where n_1 is the number of smolt tagged in 2000, n_2 is the number of returning coho salmon inspected for marks in 2001 at the weir, and m_2 is the number of adults inspected in 2001 at the weir that were missing their adipose fin. In 1999/2000, an age-stratified version of this estimator was used (Beers 2001). However in 2001 we failed to obtain unbiased estimates of age composition for the escapement and were unable to stratify the smolt abundance estimate as a result.

AGE, WEIGHT, AND LENGTH COMPOSITION, AND MEAN LENGTH ESTIMATES FOR SMOLT IN 2000

A systematically drawn sample of 168 coho salmon juveniles was taken to estimate age composition, and mean length and weight at age. Each day, the first smolt handled was sampled, and every 75th smolt after that was sampled. Every

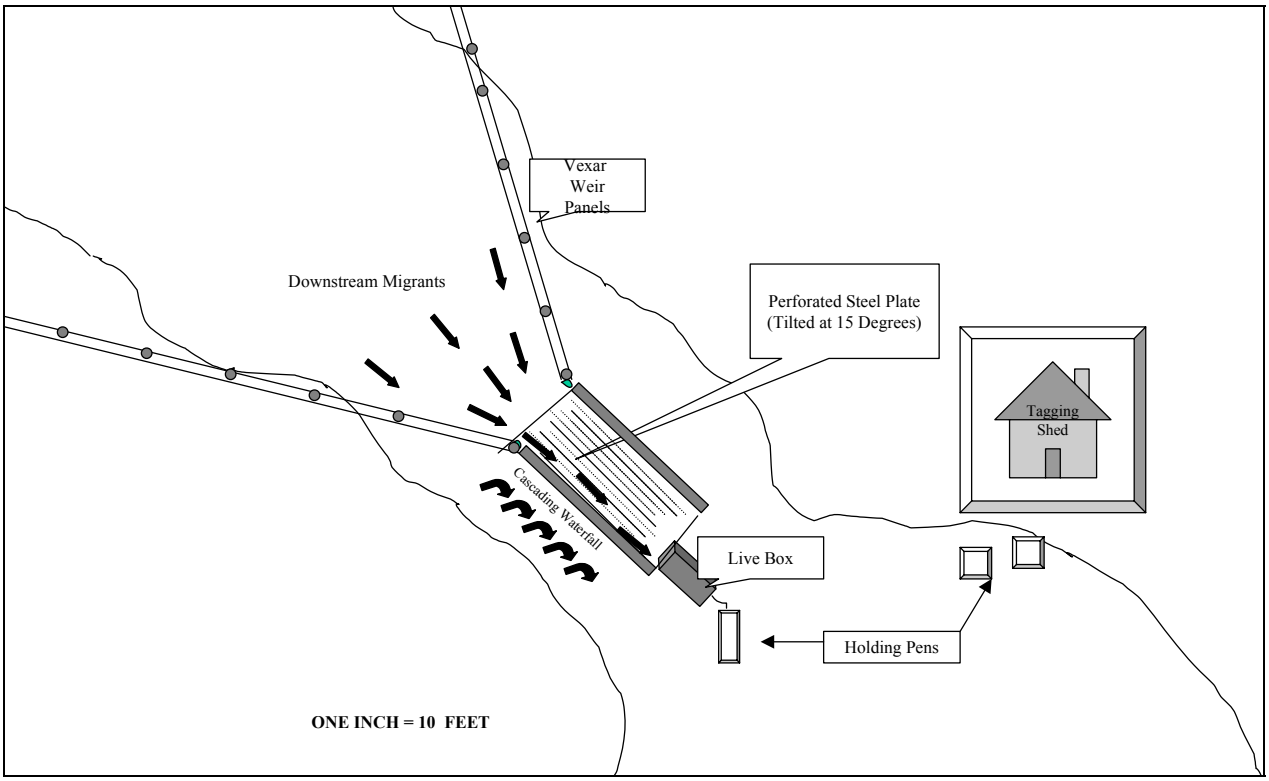

Figure 2.–Design of Slippery Creek smolt trap.

sampled coho salmon smolt was measured for fork length (FL) to the nearest 1mm, sampled for scales and weighed to the nearest 0.1 g. Twelve to 15 scales were removed from the preferred area (Scarnecchia 1979) on the left side of the smolt. Scales were sandwiched between two 1" × 3" microscope slides, and the slides were taped together with frosted scotch tape. Scales were numbered consecutively for each fish, and the number of each fish was written on the frosted portion of the bottom slide in accordance with the position of the scales on the slide along with the location, date, species, and slide number.

Composition of emigrating smolt by age, length, and sex was estimated:

$$\hat{p}_i = \frac{w_i}{w} \tag{3}$$

$$\text{var}[\hat{p}_i] = \left[1 - \frac{w}{\hat{N}}\right] \frac{p_i(1-\hat{p}_i)}{w-1} \tag{4}$$

where w is the number aged, and w_i is the subset of w that belong to age, length, or sex group i. Estimates of mean length at age and its variance were calculated using standard procedures.

HARVEST

Harvest in 2001 of coho salmon originating from Slippery Creek in 2000 was estimated by sampling catches in commercial and recreational fisheries and from the escapement into Slippery Creek. The Southeast Alaska Commercial Fisheries Division Port Sampling program samples landings from commercial drift gillnet, set gillnet, purse seine, and troll fisheries throughout Southeast Alaska and Yakutat. During summer and early fall, samplers are stationed at processors in Ketchikan Craig, Wrangell, Petersburg, Sitka, Pelican, Port Alexander, Elfin Cove, Excursion Inlet and Juneau. The sample goal is to inspect at least 20% of the total catch of chinook and coho salmon for missing adipose fins, indicating the possible presence of a coded wire tag. Heads

from fish missing their adipose fin are sent to the Coded Wire Tag laboratory in Juneau on a weekly basis where the tags are removed, decoded, and the resulting information relayed to fisheries managers.

Because the fisheries exploited coho salmon over several months in 2001, harvest was estimated over several strata, each a combination of time, area, and type of fishery. Statistics from the commercial troll fishery were stratified by fishing period and by fishing quadrant (Figure 3). Statistics from commercial net fisheries were stratified by week and by fishing district. Statistics from the recreational fishery were stratified by fortnight (biweek). Hubartt et al. (1999) present details of sampling the recreational fisheries. The annual Commercial Fisheries Port Sampling manual (unpublished) provides detailed instructions on sampling, logistics and an explanation of the analytical process by which sampling data and tag recoveries are used to estimate exploitation rates in the commercial fisheries.

Estimates of harvest $\hat{r}_i$ were calculated for each stratum, then summed across strata and across fisheries to obtain an estimate of the total harvest $\hat{T}$:

$$\hat{r}_i = \hat{H}_i\left(\frac{m_{ij}}{\lambda_i k_i}\right)\theta^{-1} \tag{5}$$

$$T = \sum_i r_i \tag{6}$$

$$var\left[\hat{T}\right] = \sum_i var\left[\hat{r}_i\right] \tag{7}$$

where $\hat{H}_i$ is the estimated harvest in stratum i, $\hat{\theta}$ is the fraction of the cohort marked with CWTs (from sampling adults at the trap), k_i is the subset of $\hat{H}_i$ examined for missing adipose fins, m_i is the number of decoded CWTs recovered, and $\lambda_i = (a_i' t_i')/(a_i t_i)$ is the decoding rate for CWTs from recovered salmon, which adjusts the sample size of fish collected with missing adipose fins to only those fish that have recoverable tags and which are successfully decoded. See Bernard and Clark (1996) for further details. Variance of $\hat{r}_i$ was estimated using the appropriate large-sample formulations in Bernard and Clark (1996, their Table 1) for a wild stock harvested in recreational and commercial fisheries. Variance of the sum of estimates was estimated as the sum of variances because sampling was independent across strata and fisheries.

ESCAPEMENT

In 2001, from 15 August to 15 October, total immigration of adult coho salmon into Slippery Creek was determined by counting each coho salmon past a four-foot wide picket trap located at the head of a wooden debris deflector at the top of Slippery Creek fish pass. Adults were checked for a missing adipose fin and also checked for the presence of a coded wire tag by use of a magnetometer to estimate tag loss.

We intended to estimate age, sex, and length composition of the escapement in 2001, as in the past. However, the 2001 return was unexpectedly large, and several logistical difficulties prevented us from successfully obtaining and processing the number of scale samples necessary to obtain unbiased estimates.

RUN SIZE, EXPLOITATION RATE, MARINE SURVIVAL

Estimates of total run size (harvest plus escapement of coho salmon returning to Slippery Creek above the trap in 2001) is the sum of the estimated harvest (T) and escapement (N_e):

$$\hat{N}_R = \hat{T} + N_e \tag{8}$$

$$var\left[\hat{N}_R\right] = var\left[\hat{T}\right] \tag{9}$$

where var(N_e) = 0, because N_e was an exact count.

The estimated fishery exploitation rate was calculated:

$$\hat{E} = \frac{\hat{T}}{\hat{N}_R} \tag{10}$$

$$\mathrm{var}\left[\hat{E}\right] \approx \frac{N_e^2}{\hat{N}_R^4}\,\mathrm{var}\left[\hat{T}\right] \qquad (11)$$

This variance (and equation 15 below) is an approximation from the delta method (Seber 1982).

The estimated survival rate of smolts to adults was calculated:

$$\hat{S} = \frac{\hat{N}_R}{\hat{N}_s} \qquad (12)$$

$$\mathrm{var}\left[\hat{S}\right] \approx \hat{S}^2\left[\frac{\mathrm{var}\left[\hat{N}_R\right]}{\hat{N}_R^2} + \frac{\mathrm{var}\left[\hat{N}_S\right]}{\hat{N}_S^2}\right] \qquad (13)$$

RESULTS

SMOLT TAGGING, AGE, LENGTH, AND WEIGHT

Between 15 April and 29 May 2000 at the smolt trap, 12,576 coho salmon smolt ≥70 mm FL were captured (Table 2); 185 died after tagging, leaving a total valid release of 12,391 tagged smolts. Age-1 coho smolt composed 52.7% of sampled smolt and averaged 104.4 mm FL (SD = 13.1) and 10.9 g (SD = 4.3) in weight. Age-2 fish averaged 119.7 mm FL (SD = 16.6) and 16.7 g (SD = 9.5) in weight.

CODED WIRE TAG RECOVERY

During random sampling in 2001 of the sport and commercial fisheries, 250 CWTs placed in coho salmon in Slippery Creek in 2000 were recovered (Appendix A1). The greatest number (122) of tags were recovered from the commercial troll fishery in the Northwest Quadrant on the outside coast (Figure 3). Forty-two (42) CWTs were recovered from purse seine fisheries, the majority (37) from District 109 (Chatham Strait/Frederick Sound); 8 tags were recovered in the marine recreational fishery near Sitka from late June to the end of August, and 2 CWTs were recovered in the gillnet fishery in District 101. Coho salmon bearing Slippery Creek tags were recovered in the troll fishery throughout the season. Tag recovery data indicated this cohort of fish traveled primarily along the outer coast and entered inside waters around the southern tip of Baranof Island and into Chatham Strait before entering Port Camden during their spawning migration (Figure 4).

SMOLT ABUNDANCE IN 2000

The total number of outmigrating coho salmon smolts ≥70mm from Slippery Creek in 2000 was estimated at 36,057 (SE = 909); 952 (34.3%) of the 2,772 adult coho salmon inspected in 2001 were missing adipose fins.

HARVEST, EXPLOITATION AND ESCAPEMENT IN 2001

An estimated 2,839 (SE = 183) coho salmon originating from Slippery Creek were harvested in marine commercial and sport fisheries in 2001. The commercial troll fishery in the Northwest Quadrant took 48.3% of the estimated marine harvest and took 76.8% in all quadrants (Table 3). The seine fisheries in Chatham Strait (Districts 109) took 16.7.5%. Harvests in these fisheries occurred from the end of June through mid-September. The troll harvest was spread over a long period (June to September), and the peak of the seine harvests occurred in August (Figure 4). Estimated harvest in the Sitka marine recreational fishery was 84 fish, using harvest and sampling data from Hubartt et al. (2002, *in prep*.).

A total of 2,772 coho salmon returned to Slippery Creek in 2001 (Appendix A2). The total run (harvest plus escapement) was estimated to be 5,611 (SE = 183) adult coho salmon. The estimated marine survival rate was 15.6% (SE = 0.6%) and the estimated marine fishery exploitation rate was 50.6% (SE = 1.6%).

DISCUSSION

Results of this stock assessment program are assumed to be representative of similar systems in central inside waters of Southeast Alaska (SEAK). Relative recovery rates of CWTs from Slippery Creek are used as an inseason management tool to estimate run strength to the inside waters of SEAK. Because one-half of the

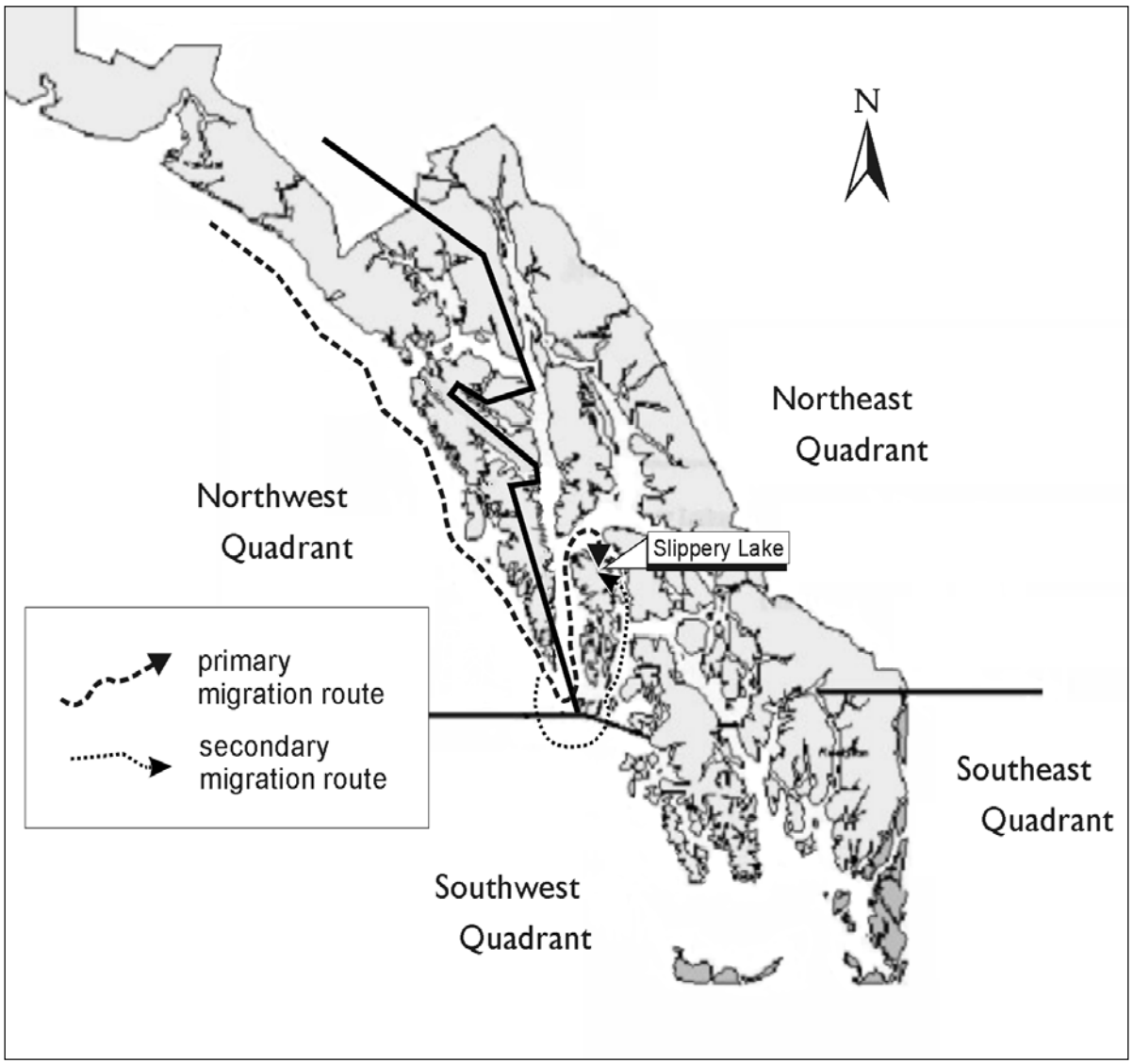

Figure 3.–Migration routes through Southeast Alaska of coho salmon bound for Slippery Creek.

Slippery Creek CWTs are recovered by early August, this stock provides good data for projections needed to meet the regions fishery management goals. Results from other systems (Taku River, Berners River and Auke Lake for northern inside SEAK, the Stikine River for central inside SEAK, Hugh Smith Lake and Unuk River for southern inside SEAK, Ford Arm, Nakwasina River and Salmon Lake for the outside coast) encompass the region's stock assessment program for coho salmon. Past Slippery Creek stock assessments have identified an area (District 109) in which wild coho stocks are exploited at much higher rates than typical inside stocks due to intensive pink and chum salmon seine fisheries in Chatham Strait during August. In 2001, seine fishery removal rates were only 16.2%, compared to 51.3% in 1998 and 54.2% in 2000 (Table 4). This was due to the combination of an above average coho salmon return to Slippery Creek and fish processors putting limits on pink salmon harvests by

Table 2.–Daily counts of coho salmon smolt caught and tagged at the Slippery Creek smolt trap during 2000.

Date	Total tagged	Overnight mortality	Live tagged	Retention rate	Valid tags	Date	Total tagged	Overnight mortality	Live tagged	Retention rate	Valid tags
15-Apr	3	0	3	100%	3	9-May	237	3	234	100%	234
16-Apr	4	1	3	100%	3	10-May	269	0	269	100%	269
17-Apr	5	0	5	100%	5	11-May	397	0	397	100%	397
18-Apr	1	0	1	100%	1	12-May	398	4	394	100%	394
19-Apr	68	4	64	100%	64	13-May	280	0	280	100%	280
20-Apr	36	29	7	100%	7	14-May	237	1	236	100%	236
21-Apr	78	4	74	100%	74	15-May	143	1	142	100%	142
22-Apr	0	0	0	0	0	16-May	221	0	221	100%	221
23-Apr	0	0	0	0	0	17-May	123	0	123	100%	123
24-Apr	0	0	0	0	0	18-May	2,207	38	2,169	100%	2,169
25-Apr	0	0	0	0	0	19-May	575	0	575	100%	575
26-Apr	0	0	0	0	0	19-May	477	15	462	100%	462
27-Apr	160	2	158	100%	158	20-May	774	12	762	100%	762
28-Apr	51	0	51	100%	51	21-May	292	4	288	100%	288
29-Apr	142	0	142	100%	142	22-May	322	4	318	100%	318
30-Apr	320	5	315	100%	315	23-May	303	4	299	100%	299
1-May	1,078	35	1,043	100%	1,043	24-May	170	2	168	100%	168
2-May	815	4	811	100%	811	25-May	135	0	135	100%	135
3-May	522	2	520	100%	520	26-May	80	0	80	100%	80
4-May	357	2	355	100%	355	27-May	29	0	29	100%	29
5-May	321	2	319	100%	319	28-May	46	0	46	100%	46
6-May	480	2	478	100%	478	29-May	45	0	45	100%	45
7-May	185	2	183	100%	183	TOTAL	12,576	185	12,391	100%	12,391
8-May	190	3	187	100%	187						

Table 3.–Estimated marine harvest of adult coho salmon bound for the Slippery Creek in 2001. In fishing periods and fishing quadrants for which no CWT was recovered with the appropriate code, harvest was assumed to be zero. See text for an explanation of the notation.

TROLL FISHERY

Stat. week	Dates	Per.	Quad.	H	var[$\hat{H}$]	k	a	a'	t	t'	m_i	$\hat{r}$	SE[$\hat{r}$]	RP[$\hat{r}$]
19-33	6/29	2	SW	2,329	0	1,032	14	14	14	14	1	7	6	180.5%
19-33	7/2-8/11	3	NW	828,146	0	201,968	3,821	3,801	3,198	3,191	90	1,083	114	20.6%
19-33	7/2-8/11	3	NE	144,658	0	31,008	393	391	327	327	35	477	79	32.4%
19-33	7/2-8/11	3	SE	65,935	0	29,793	448	433	317	316	1	7	6	180.8%
19-33	7/2-8/11	3	SW	198,715	0	114,056	1,456	1,405	1,113	1,108	4	21	10	88.4%
34-38	8/12-9/15	4	NW	432,752	0	144,857	3,368	3,338	2,926	2,923	32	281	48	33.1%
34-38	8/12-9/15	4	NE	73,563	0	24,190	445	443	379	379	33	294	49	32.7%
34-38	8/12-9/15	4	SE	60,314	0	26,651	548	519	421	420	1	7	6	181.4%
34-38	8/12-9/15	4	SW	36,381	0	20,201	313	309	256	256	1	5	5	176.6%
Total troll fishery				1,842,793	0	593,756	10,806	10,653	8,951	8,934	198	2,182	155	13.9%

SPORT FISHERY

Biweek	Dates	Derby	Area	H	var[$\hat{H}$]	k	a	a'	t	t'	m_i	$\hat{r}$	SE[$\hat{r}$]	RP[$\hat{r}$]
13	6/24-6/30	No	Sitka	6,291	1,974,332	1,766	16	16	16	15	1	11	10	186.6%
14	7/01-7/14	No	Sitka	10,816	11,969,993	2,947	43	43	41	38	2	23	15	132.3%
15	7/15-7/28	No	Sitka	21,656	22,447,237	6,344	76	76	75	66	1	11	10	186.8%
16	7/29-8/11	No	Sitka	17,822	10,147,219	6,386	120	120	120	105	2	19	12	130.7%
17	8/12-8/25	No	Sitka	16,680	12,759,327	5,340	90	90	90	81	2	20	13	131.4%
Total sport fishery				73,265	59,298,108	22,783	345	345	342	305	8	84	29	68.1%

SEINE FISHERY

Stat. week	Dates	District	H	var[$\hat{H}$]	k	a	a'	t	t'	m_i	$\hat{r}$	SE[$\hat{r}$]	RP[$\hat{r}$]
29	7/15-7/21	104	13,688	0	3,156	32	30	17	17	1	13	13	188.6%
30	7/22-7/28	109	14,831	0	2,527	25	25	23	23	5	85	37	85.2%
30	7/22-7/28	102	328	0	236	2	2	2	2	1	4	4	170.1%
31	7/29-8/04	109	15,901	0	4,428	67	66	60	60	22	234	48	40.2%
31	7/29-8/04	112	6,555	0	2,124	51	45	38	38	1	10	10	186.1%
32	8/05-8/11	109	9,660	0	2,163	33	33	29	29	6	78	31	77.1%
33	8/12-8/18	109	7,473	0	522	8	8	7	7	1	42	41	193.6%
34	8/19-825	109	6,461	0	1,534	17	17	14	14	3	37	20	108.6%
34	8/19-825	107	4,035	0	333	3	3	3	3	1	35	35	193.2%
35	8/26-9/31	112	5,913	0	4,709	104	104	92	91	1	4	3	167.4%
Total seine fishery			84,845	0	21,732	342	333	285	284	42	542	91	32.8%

GILLNET FISHERY

Stat. week	Dates	District	H	var[$\hat{H}$]	k	a	a'	t	t'	m_i	$\hat{r}$	SE[$\hat{r}$]	RP[$\hat{r}$]
33	8/05-8/11	101	2,800	0	875	11	9	9	9	1	12	11	187.2%
39	9/16-9/22	101	11,385	0	1,727	47	47	42	42	1	19	19	190.8%
Total gillnet fishery			14,185	0	2,602	58	56	51	51	2	31	22	138.6%
TOTAL ALL FISHERIES			2,015,088	59,298,108	640,873	11,551	11,387	9,629	9,574	250	2,839	183	12.7%

[a] = terminal fishery.

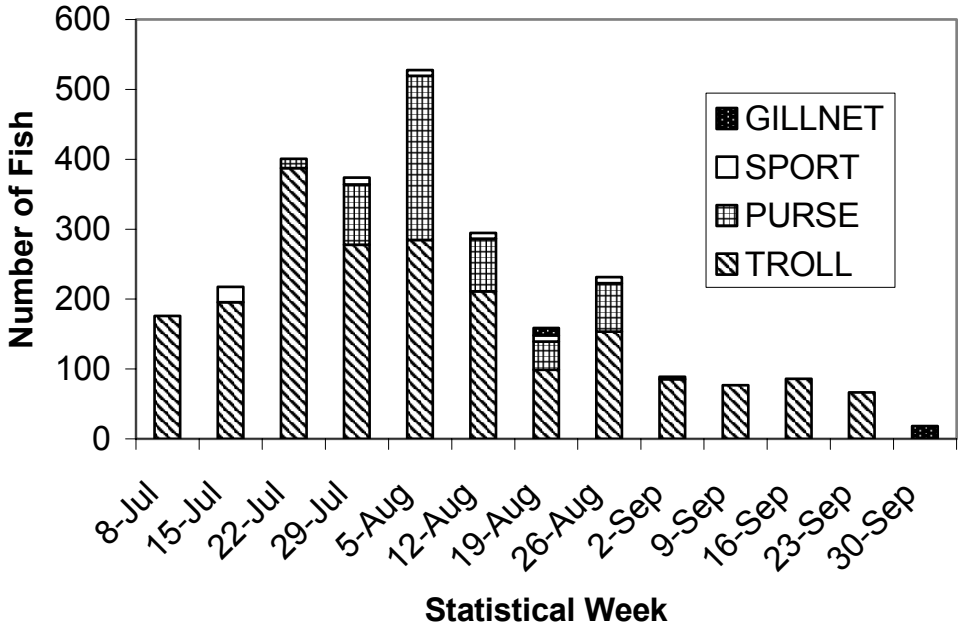

Figure 4.–Estimated harvest of coho salmon bound for Slippery Creek by marine commercial and recreational fisheries in 2001 by statistical week.

individual fishing vessels in August, which greatly reduced wild coho salmon bycatch in Chatham Strait in 2001.

The estimated marine exploitation rate (50.6%) is considered low; average exploitation rates on marked stocks by all fisheries in Southeast from 1990 to 1999 was 62% (Shaul 1998). Amongst the other coho salmon stocks listed above, the exploitation rate in 2001 was generally 50% or less. The 1998 and 2000 exploitation rates on the Slippery Creek stock was much higher at 82.3% (Beers 1999) and 84.7% (Beers 2001). Twenty five percent of the total adult run in 2001 was harvested in outside troll fisheries in the northwest and southwest quadrants before moving into Chatham Strait around the southern tip of Baranof Island; another 10% was harvested by inside seine fisheries in Chatham Strait/ Frederick Sound (Figure 4). Fishery harvest data for other central inside coho systems for the 2001 adult return are not available, but central outside stocks Ford Arm (central outside) and Hugh Smith Lake (southern inside) had exploitation rates of 71.4% and 54.4% respectively in 2000 (L. Shaul *unpublished data*).

Estimated marine survival rate (15.6%) for the 2001 Slippery Creek adult return is higher than in previous years: 8.2% in 1998 and 8.4% in 2000. This is similar to most estimates for other wild stocks in Southeast Alaska for which estimates were obtained for the 2001 adult return. The 2001 marine survival rate at Slippery Creek is considered typical; coho salmon in Southeast Alaska averaged 19.7% marine survival from 1990-1996 (Shaul 1998). Recent marine survival rate averages estimated for other coho salmon in Southeast Alaska (McPherson and Bernard 1996); i.e., Auke Lake averaged 25%, Berners River 21%, Ford Arm 15%, and Hugh Smith Lake 17% for 1991–1994, but 10-year averages were 18% for Auke Lake, 11% for Ford Arm and 13% for Hugh Smith Lake (L. Shaul 1998). Taku River marine survival averaged 16% for the 1993–1995 adult returns.

While the population in this experiment was not closed to losses from mortality, it was closed to recruitment, because salmon return to their natal stream to spawn. The models we used to estimate harvest of coho salmon from Slippery Creek are based on sampling as a random process, yet our

Table 4.–Estimated harvest, exploitation, and total run of Slippery Creek coho salmon in 2001.

Fishery	Area	Estimated harvest	SE	Percent of marine harvest	Percent of total run	Removal rate[a]
U.S. troll fishery	NW Quad	1,370	124	48.3	24.4	
	NE Quad	772	93	27.2	13.8	
	SW Quad	26	11	0.4	0.5	
	SE Quad	14	9	0.3	0.3	
	Subtotal	2,182	155	76.8	38.9	38.9%
Recreational	Sitka	84	29	3.0	1.5	2.5%
Seine fishery	Dist. 109	475	82	16.7	8.5	
	Dist. 107	35	35	12.3	0.6	
	Dist. 104	14	13	0.5	0.3	
	Dist. 112	14	10	0.5	0.3	
	Dist. 102	4	4	1.4	0.1	
	Subtotal	542	91	19.1	9.6	16.2%
Drift gillnet	Dist. 106	31	22	1.1	0.6	1.1%
Total marine harvest		2,839	183	100.0	50.6	
Escapement		2,772	0			
TOTAL RUN		5,611	183		100	

[a] Percent of available population harvested by a fishery.

capture of smolts at Slippery Creek and catch sampling of harvests were not random, but systematic. Fishing effort for smolt was relatively constant, and it is unlikely that much of the migration occurred prior to 15 April. Also, the drawn-out recovery of CWTs indicated considerable mixing of marked and unmarked coho salmon during their 14 to 16 months at sea (Figure 3). Recoveries of CWTs in the troll and District 109 seine fisheries from coho salmon tagged at Slippery Creek were spread throughout this fishery in rough proportion to harvests.

Only valid tags (present and decoded) were used for estimating harvest.

Adult age and length records were not reported due to sampling difficulties in 2001; the unexpected large coho salmon escapement and loss of a crew person due to injury required a reduction in work load so that all adult coho salmon could be counted and inspected for presence of an adipose fin.

Escapement (2,772) and the estimate of total run (5,611) are biased slightly low since a small number of adult fish likely passed by the trap site uncounted before 15 August and/or after 15 October. I believe the number of uncounted fish to be less than 25 and not enough to significantly change any of the results of this report.

CONCLUSIONS AND RECOMMENDATIONS

Results from this project contribute to a long-term regionwide database useful for inseason and postseason assessment of run strength, adult production and developing adequate escapement goals. This investigation indicates that the Slippery Creek coho salmon run does serve as an indicator for run strength in central inside waters. Coho salmon stock assessment also began on the Stikine River in 2000, which should provide additional information on central inside stocks in

the near future. Use of information from Slippery Creek and other stock indicators should be developed in management plans so that highly exploited stocks are properly identified inseason and actions taken to avoid over harvest during periods of low abundance. The large escapement in 2001 should provide useful information to evaluate proper escapement goals for Slippery Creek and similar systems. Since this project is intended to continue annually, we recommend some minor strategies to improve the precision of smolt and adult parameter estimates at minimal cost. It is likely that CWT sampling rates in commercial and sport fisheries will continue to be in the 20–35% range; therefore it is important that all adult coho salmon be inspected for adipose finclips in the fall.

ACKNOWLEDGMENTS

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APPENDIX A

Appendix A1.–Random recoveries of coded wire tagged coho salmon bound for Slippery Creek by date sampled in 2001.

SURVEY SITE	SAMPLE NUM	HEAD	SAMPLE TYPE	GEAR CLASS	DATE	STAT WEEK	PERIOD	QUAD	DISTRICT	TAG CODE
EXCURSION INLET	1100008	14963	R	TROLL	29-Jun-01	26	2	NW		40249
SITKA	1035245	169546	R	SPORT	30-Jun-01	26		NW	113	40249
SITKA	1030422	151242	R	TROLL	3-Jul-01	27	3	NW	113	40249
SITKA	1030413	151222	R	TROLL	3-Jul-01	27	3	NW	113	40249
EXCURSION INLET	1100016	16808	R	TROLL	3-Jul-01	27	3	NW		40250
SITKA	1030447	151274	R	TROLL	4-Jul-01	27	3	NW	113	40249
SITKA	1030474	153914	R	TROLL	5-Jul-01	27	3	NW	113	40249
SITKA	1030458	151349	R	TROLL	5-Jul-01	27	3	NW	113	40249
HOONAH	1110211	190308	R	TROLL	5-Jul-01	27	3	NW	113	40249
HOONAH	1110211	190281	R	TROLL	5-Jul-01	27	3	NW	113	40249
SITKA	1030507	153937	R	TROLL	6-Jul-01	27	3	NW	113	40249
SITKA	1030525	153859	R	TROLL	6-Jul-01	27	3	NW	113	40249
SITKA	1030548	153741	R	TROLL	6-Jul-01	27	3	NW	113	40249
PETERSBURG	1050309	504062	R	TROLL	7-Jul-01	27	3	NE	109	40249
PELICAN	1010086	192042	R	TROLL	7-Jul-01	27	3	NW	113	40249
EXCURSION INLET	1100023	16977	R	TROLL	7-Jul-01	27	3	NW		40249
EXCURSION INLET	1100023	16975	R	TROLL	7-Jul-01	27	3	NW		40250
HOONAH	1110226	190499	R	TROLL	9-Jul-01	28	3	NW	113	40249
PORT ALEXANDER	1080011	167725	R	TROLL	10-Jul-01	28	3	NE	109	40249
PETERSBURG	1050316	503924	R	TROLL	10-Jul-01	28	3	NE	109	40249
SITKA	1030559	153351	R	TROLL	10-Jul-01	28	3	NW	113	40249
SITKA	1030564	153023	R	TROLL	11-Jul-01	28	3	NW	113	40249
SITKA	1030564	153034	R	TROLL	11-Jul-01	28	3	NW	113	40249
SITKA	1030564	153024	R	TROLL	11-Jul-01	28	3	NW	113	40249
HOONAH	1110228	190563	R	TROLL	11-Jul-01	28	3	NW	113	40249
EXCURSION INLET	1100027	9082	R	TROLL	11-Jul-01	28	3	NW		40249
SITKA	1035316	184856	R	SPORT	12-Jul-01	28		NW	113	40249
PORT ALEXANDER	1080018	167733	R	TROLL	13-Jul-01	28	3	NE	109	40249
SITKA	1030584	153085	R	TROLL	13-Jul-01	28	3	NW	113	40249
SITKA	1030585	153102	R	TROLL	13-Jul-01	28	3	NW	113	40249
SITKA	1030582	153396	R	TROLL	13-Jul-01	28	3	NW	113	40249
SITKA	1030580	153389	R	TROLL	13-Jul-01	28	3	NW	113	40250
EXCURSION INLET	1100032	17986	R	TROLL	13-Jul-01	28	3	NW		40250
CRAIG	1070094	27195	R	TROLL	14-Jul-01	28	3	SW	104	40249
SITKA	1030594	153156	R	TROLL	14-Jul-01	28	3	NW	113	40249
SITKA	1035301	184931	R	SPORT	14-Jul-01	28		NW	113	40249
SITKA	1030590	153420	R	TROLL	15-Jul-01	29	3	NW	113	40249
EXCURSION INLET	1100033	4720	R	TROLL	15-Jul-01	29	3	NW		40249
KETCHIKAN	1060201	511481	R	PURSE	16-Jul-01	29		SW	104	40249
CRAIG	1070115	41972	R	TROLL	16-Jul-01	29	3	SW	104	40249
PETERSBURG	1050429	503941	R	TROLL	16-Jul-01	29	3	NE	109	40249
ELFIN COVE	1020069	189722	R	TROLL	16-Jul-01	29	3	NW	114	40249
WRANGELL	1120025	148738	R	TROLL	17-Jul-01	29	3	NE	109	40249
WRANGELL	1120025	148740	R	TROLL	17-Jul-01	29	3	NE	109	40249
PORT ALEXANDER	1080023	167743	R	TROLL	17-Jul-01	29	3	NE	109	40249
PORT ALEXANDER	1080024	167747	R	TROLL	17-Jul-01	29	3	NE	109	40249
HOONAH	1110234	190589	R	TROLL	17-Jul-01	29	3	NW	113	40249
SITKA	1030598	153198	R	TROLL	17-Jul-01	29	3	NW	113	40249
EXCURSION INLET	1100040	4734	R	TROLL	17-Jul-01	29	3	NW		40250
SITKA	1030603	153478	R	TROLL	18-Jul-01	29	3	NW	113	40250
SITKA	1030607	152008	R	TROLL	18-Jul-01	29	3	NW	113	40250
SITKA	1030611	152939	R	TROLL	19-Jul-01	29	3	NW	113	40249
SITKA	1030617	153218	R	TROLL	19-Jul-01	29	3	NW	113	40249
SITKA	1030617	155824	R	TROLL	19-Jul-01	29	3	NW	113	40249
SITKA	1030613	152032	R	TROLL	19-Jul-01	29	3	NW	113	40249
PELICAN	1010119	192275	R	TROLL	19-Jul-01	29	3	NW	113	40249
HOONAH	1110238	190616	R	TROLL	19-Jul-01	29	3	NW	113	40249
SITKA	1030616	155815	R	TROLL	19-Jul-01	29	3	NW	154	40249
EXCURSION INLET	1100045	17941	R	TROLL	19-Jul-01	29	3	NW		40249
EXCURSION INLET	1100045	3815	R	TROLL	19-Jul-01	29	3	NW		40249
SITKA	1030617	153232	R	TROLL	19-Jul-01	29	3	NW	113	40250
SITKA	1030615	152043	R	TROLL	19-Jul-01	29	3	NW	113	40250
EXCURSION INLET	1100045	17943	R	TROLL	19-Jul-01	29	3	NW		40250
PETERSBURG	1050487	504311	R	TROLL	20-Jul-01	29	3	NE	109	40249
PETERSBURG	1050487	504312	R	TROLL	20-Jul-01	29	3	NE	109	40249
HOONAH	1110243	190630	R	TROLL	20-Jul-01	29	3	NW	113	40249
SITKA	1030619	152097	R	TROLL	20-Jul-01	29	3	NW	113	40250
SITKA	1030623	152720	R	TROLL	21-Jul-01	29	3	NW	113	40249
EXCURSION INLET	1100050	7957	R	TROLL	21-Jul-01	29	3	NW		40249
EXCURSION INLET	1100050	7987	R	TROLL	21-Jul-01	29	3	NW		40249
PETERSBURG	1050492	504252	R	PURSE	22-Jul-01	30		NE	109	40249
PETERSBURG	1050492	504255	R	PURSE	22-Jul-01	30		NE	109	40249
PELICAN	1010121	192300	R	TROLL	22-Jul-01	30	3	NW	116	40249
PORT ALEXANDER	1080029	167761	R	TROLL	23-Jul-01	30	3	NE	109	40249
SITKA	1030630	152138	R	TROLL	24-Jul-01	30	3	NW	113	40249
SITKA	1030630	152137	R	TROLL	24-Jul-01	30	3	NW	113	40249
PELICAN	1010130	192393	R	TROLL	24-Jul-01	30	3	NW	113	40249
KETCHIKAN	1060237	508272	R	PURSE	25-Jul-01	30		SE	102	40249
PORT ALEXANDER	1080039	167786	R	TROLL	25-Jul-01	30	3	NE	109	40249
PORT ALEXANDER	1080039	167793	R	TROLL	25-Jul-01	30	3	NE	109	40249
PORT ALEXANDER	1080037	167781	R	TROLL	25-Jul-01	30	3	NE	109	40249
SITKA	1030635	152199	R	TROLL	25-Jul-01	30	3	NW	113	40249
HOONAH	1110252	190740	R	TROLL	25-Jul-01	30	3	NW	113	40249
ELFIN COVE	1020094	189753	R	TROLL	25-Jul-01	30	3	NW	114	40249

-continued-

Appendix A1.–Page 2 of 3.

SURVEY SITE	SAMPLE NUM	HEAD	SAMPLE TYPE	GEAR CLASS	DATE	STAT WEEK	PERIOD	QUAD	DISTRICT	TAG CODE
EXCURSION INLET	1100063	5488	R	TROLL	25-Jul-01	30	3	NW		40249
HOONAH	1110252	190746	R	TROLL	25-Jul-01	30	3	NW	113	40250
PORT ALEXANDER	1080045	167829	R	TROLL	26-Jul-01	30	3	NE	109	40249
SITKA	1030642	186035	R	TROLL	26-Jul-01	30	3	NW	113	40249
PELICAN	1010136	192431	R	TROLL	26-Jul-01	30	3	NW	113	40249
SITKA	1030641	153261	R	TROLL	26-Jul-01	30	3	NW	154	40249
SITKA	1035430	144811	R	SPORT	26-Jul-01	30		NW	113	40249
PETERSBURG	1050582	504224	R	PURSE	27-Jul-01	30		NE	109	40249
PETERSBURG	1050569	504267	R	PURSE	27-Jul-01	30		NE	109	40249
PETERSBURG	1050570	504270	R	PURSE	27-Jul-01	30		NE	109	40250
PORT ALEXANDER	1080046	167845	R	TROLL	27-Jul-01	30	3	NE	109	40249
PORT ALEXANDER	1080046	167839	R	TROLL	27-Jul-01	30	3	NE	109	40249
EXCURSION INLET	1100072	1948	R	TROLL	27-Jul-01	30	3	NW		40249
HOONAH	1110261	190792	R	TROLL	28-Jul-01	30	3	NW	113	40249
HOONAH	1110261	190794	R	TROLL	28-Jul-01	30	3	NW	113	40249
SITKA	1030650	187712	R	TROLL	28-Jul-01	30	3			40249
PETERSBURG	1050605	504343	R	PURSE	29-Jul-01	31		NE	109	40249
PETERSBURG	1050603	504402	R	PURSE	29-Jul-01	31		NE	109	40249
PETERSBURG	1050602	504334	R	PURSE	29-Jul-01	31		NE	109	40250
PETERSBURG	1050602	504333	R	PURSE	29-Jul-01	31		NE	109	40250
PETERSBURG	1050602	504335	R	PURSE	29-Jul-01	31		NE	109	40250
SITKA	1030652	186077	R	TROLL	29-Jul-01	31	3	NW	113	40249
SITKA	1030652	186074	R	TROLL	29-Jul-01	31	3	NW	113	40249
SITKA	1030652	186070	R	TROLL	29-Jul-01	31	3	NW	113	40249
SITKA	1030653	186080	R	TROLL	29-Jul-01	31	3	NW	113	40249
SITKA	1030653	186089	R	TROLL	29-Jul-01	31	3	NW	113	40249
SITKA	1030653	186079	R	TROLL	29-Jul-01	31	3	NW	113	40250
PELICAN	1010140	192469	R	TROLL	29-Jul-01	31	3	NW	113	40250
PORT ALEXANDER	1080054	167890	R	TROLL	30-Jul-01	31	3	NE	109	40249
SITKA	1030654	152208	R	TROLL	30-Jul-01	31	3	NW	113	40249
PORT ALEXANDER	1080050	167865	R	TROLL	30-Jul-01	31	3	NE	109	40250
PETERSBURG	1050618	504373	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050618	504372	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050614	504416	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050616	504369	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050625	504291	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050625	504289	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050626	504294	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050624	504286	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050614	504417	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050622	504282	R	PURSE	31-Jul-01	31		NE	109	40249
PETERSBURG	1050616	504370	R	PURSE	31-Jul-01	31		NE	109	40250
SITKA	1030663	152240	R	TROLL	31-Jul-01	31	3	NW	113	40249
SITKA	1030663	152242	R	TROLL	31-Jul-01	31	3	NW	113	40249
PELICAN	1010149	192516	R	TROLL	31-Jul-01	31	3	NW	113	40249
PELICAN	1010149	192505	R	TROLL	31-Jul-01	31	3	NW	113	40249
EXCURSION INLET	1100080	1859	R	TROLL	31-Jul-01	31	3	NW		40249
PORT ALEXANDER	1080062	167916	R	TROLL	1-Aug-01	31	3	NE	109	40249
PELICAN	1010153	192553	R	TROLL	1-Aug-01	31	3	NW	113	40249
PELICAN	1010153	192555	R	TROLL	1-Aug-01	31	3	NW	113	40249
PETERSBURG	1050677	504440	R	PURSE	2-Aug-01	31		NE	109	40249
PORT ALEXANDER	1080064	167922	R	TROLL	2-Aug-01	31	3			40249
SITKA	1035491	169598	R	SPORT	2-Aug-01	31		NW	113	40249
PORT ALEXANDER	1080068	167935	R	TROLL	3-Aug-01	31	3	NE	109	40249
PORT ALEXANDER	1080073	167949	R	TROLL	3-Aug-01	31	3	NE	109	40250
PETERSBURG	1050680	504442	R	PURSE	4-Aug-01	31		NE	109	40249
PETERSBURG	1050708	504445	R	PURSE	4-Aug-01	31		NE	109	40249
PETERSBURG	1050708	504443	R	PURSE	4-Aug-01	31		NE	109	40249
PETERSBURG	1050709	504441	R	PURSE	4-Aug-01	31		NE	109	40249
PETERSBURG	1050697	504514	R	PURSE	4-Aug-01	31		NE	109	40249
EXCURSION INLET	1100098	9220	R	PURSE	4-Aug-01	31		NE	112	40249
KETCHIKAN	1060287	509413	R	TROLL	4-Aug-01	31	3	SW	104	40249
PETERSBURG	1050681	504396	R	TROLL	4-Aug-01	31	3	NE	109	40249
PETERSBURG	1050681	504397	R	TROLL	4-Aug-01	31	3	NE	109	40250
PETERSBURG	1050715	504560	R	PURSE	6-Aug-01	32		NE	109	40249
PETERSBURG	1050715	504563	R	PURSE	6-Aug-01	32		NE	109	40250
PORT ALEXANDER	1080080	167969	R	TROLL	6-Aug-01	32	3	NE	109	40249
SITKA	1030692	187789	R	TROLL	6-Aug-01	32	3	NW	113	40249
HOONAH	1110283	190955	R	TROLL	6-Aug-01	32	3	NW	113	40249
PETERSBURG	1050719	503575	R	PURSE	7-Aug-01	32		NE	109	40249
PELICAN	1010171	192670	R	TROLL	7-Aug-01	32	3	NW	113	40249
PETERSBURG	1050750	504531	R	PURSE	8-Aug-01	32		NE	109	40249
PETERSBURG	1050722	504451	R	PURSE	8-Aug-01	32		NE	109	40249
PETERSBURG	1050745	504526	R	PURSE	8-Aug-01	32		NE	109	40249
CRAIG	1070330	46699	R	TROLL	8-Aug-01	32	3	SE	105	40249
SITKA	1030698	152404	R	TROLL	8-Aug-01	32	3	NW	113	40249
PELICAN	1010172	192680	R	TROLL	8-Aug-01	32	3	NW		40249
SITKA	1035517	144955	R	SPORT	8-Aug-01	32		NW	113	40249
CRAIG	1070334	46843	R	TROLL	9-Aug-01	32	3	SW	104	40249
SITKA	1030704	152419	R	TROLL	9-Aug-01	32	3	NW	113	40249
PETERSBURG	1050775	504615	R	TROLL	10-Aug-01	32	3	NE	109	40249
PETERSBURG	1050775	504611	R	TROLL	10-Aug-01	32	3	NE	109	40249
PETERSBURG	1050775	504613	R	TROLL	10-Aug-01	32	3	NE	109	40250
PORT ALEXANDER	1080090	169011	R	TROLL	11-Aug-01	32	3	NE	109	40249

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Appendix A1.–Page 3 of 3.

SURVEY SITE	SAMPLE NUM	HEAD	SAMPLE TYPE	GEAR CLASS	DATE	STAT WEEK	PERIOD	QUAD	DISTRICT	TAG CODE
PETERSBURG	1050779	504639	R	TROLL	11-Aug-01	32	3	NE	109	40249
PETERSBURG	1050780	504632	R	TROLL	11-Aug-01	32	3	NE	109	40249
PETERSBURG	1050779	504637	R	TROLL	11-Aug-01	32	3	NE	109	40249
PORT ALEXANDER	1080089	169007	R	TROLL	11-Aug-01	32	3	NE	109	40249
HOONAH	1110302	191084	R	TROLL	11-Aug-01	32	3	NW	114	40249
PETERSBURG	1050786	504540	R	PURSE	12-Aug-01	33		NE	109	40249
PETERSBURG	1050801	504751	R	TROLL	12-Aug-01	33	4	NE	109	40249
ELFIN COVE	1020142	204057	R	TROLL	12-Aug-01	33	4	NW	114	40249
PETERSBURG	1050787	504759	R	TROLL	12-Aug-01	33	4	NE	109	40250
SITKA	1030736	152628	R	TROLL	13-Aug-01	33	4	NE	109	40249
PETERSBURG	1050812	504764	R	TROLL	13-Aug-01	33	4	NE	109	40249
PETERSBURG	1050814	504771	R	TROLL	13-Aug-01	33	4	NE	109	40249
SITKA	1030729	152821	R	TROLL	13-Aug-01	33	4	NW	113	40249
SITKA	1030733	152608	R	TROLL	13-Aug-01	33	4	NW	113	40249
HOONAH	1110313	191123	R	TROLL	13-Aug-01	33	4	NW	114	40249
CRAIG	1070370	29968	R	TROLL	13-Aug-01	33	4	SW	104	40250
PELICAN	1010199	192828	R	TROLL	14-Aug-01	33	4	NW	113	40249
EXCURSION INLET	1100123	1484	R	TROLL	14-Aug-01	33	4	NW		40249
KETCHIKAN	1060372	509770	R	DRIFT	16-Aug-01	33		SE	101	40250
SITKA	1035621	149658	R	SPORT	17-Aug-01	33		NW	113	40249
HOONAH	1110326	191196	R	TROLL	19-Aug-01	34	4	NW	113	40249
PETERSBURG	1050908	504808	R	PURSE	20-Aug-01	34		SE	107	40249
PETERSBURG	1050891	504794	R	PURSE	20-Aug-01	34		NE	109	40249
SITKA	1030759	152868	R	TROLL	20-Aug-01	34	4	NW	113	40249
SITKA	1030758	152859	R	TROLL	20-Aug-01	34	4	NW	113	40249
HOONAH	1110322	191176	R	TROLL	20-Aug-01	34	4	NW	114	40249
PELICAN	1010209	192866	R	TROLL	20-Aug-01	34	4	NW	113	40250
SITKA	1030781	187885	R	TROLL	21-Aug-01	34	4	NW	113	40249
SITKA	1030785	187105	R	TROLL	21-Aug-01	34	4	NW	113	40249
PETERSBURG	1050924	504728	R	PURSE	22-Aug-01	34		NE	109	40249
PETERSBURG	1050917	504813	R	TROLL	22-Aug-01	34	4	NE	109	40249
PETERSBURG	1050917	504814	R	TROLL	22-Aug-01	34	4	NE	109	40249
SITKA	1030790	187893	R	TROLL	22-Aug-01	34	4	NW	113	40249
PETERSBURG	1050959	504861	R	PURSE	23-Aug-01	34		NE	109	40249
PETERSBURG	1050926	504825	R	TROLL	23-Aug-01	34	4	NE	110	40250
PELICAN	1010223	192945	R	TROLL	23-Aug-01	34	4	NW	113	40250
PETERSBURG	1050976	504923	R	TROLL	24-Aug-01	34	4	NE	109	40249
PETERSBURG	1050983	504917	R	TROLL	24-Aug-01	34	4	NE	109	40249
SITKA	1030822	187509	R	TROLL	24-Aug-01	34	4	NW	113	40249
SITKA	1030824	187519	R	TROLL	24-Aug-01	34	4	NW	113	40249
HOONAH	1110352	191269	R	TROLL	24-Aug-01	34	4	NW	113	40249
SITKA	1035630	184998	R	SPORT	24-Aug-01	34		NW	113	40249
PETERSBURG	1050987	504954	R	TROLL	25-Aug-01	34	4	NE	109	40249
EXCURSION INLET	1100148	21621	R	PURSE	27-Aug-01	35		NE	112	40249
KETCHIKAN	1060416	509840	R	TROLL	27-Aug-01	35	4	NE	109	40249
KETCHIKAN	1060416	509843	R	TROLL	27-Aug-01	35	4	NE	109	40249
PETERSBURG	1050997	504967	R	TROLL	27-Aug-01	35	4	NE	109	40249
PORT ALEXANDER	1080095	169030	R	TROLL	27-Aug-01	35	4	NE	109	40249
PORT ALEXANDER	1080098	169038	R	TROLL	28-Aug-01	35	4	NE	109	40249
PORT ALEXANDER	1080097	169034	R	TROLL	28-Aug-01	35	4	NE	109	40249
SITKA	1030850	187030	R	TROLL	31-Aug-01	35	4	NW	113	40249
SITKA	1030852	187538	R	TROLL	31-Aug-01	35	4	NW	113	40249
PELICAN	1010266	193433	R	TROLL	31-Aug-01	35	4	NW	113	40249
SITKA	1030857	187616	R	TROLL	1-Sep-01	35	4	NW	113	40249
PELICAN	1010280	193351	R	TROLL	4-Sep-01	36	4	NW	113	40249
SITKA	1030860	187067	R	TROLL	5-Sep-01	36	4	NW	113	40249
SITKA	1030878	187686	R	TROLL	6-Sep-01	36	4	NE	112	40249
SITKA	1030878	187687	R	TROLL	6-Sep-01	36	4	NE	112	40249
SITKA	1030881	186202	R	TROLL	6-Sep-01	36	4	NW	113	40249
SITKA	1030889	187572	R	TROLL	6-Sep-01	36	4	NW	113	40249
PETERSBURG	1051089	505558	R	TROLL	7-Sep-01	36	4	NE	109	40249
HOONAH	1110424	191589	R	TROLL	7-Sep-01	36	4	NW	113	40249
HOONAH	1110420	191553	R	TROLL	7-Sep-01	36	4	NW	114	40249
PETERSBURG	1051100	504995	R	TROLL	10-Sep-01	37	4	NE	109	40249
PETERSBURG	1051095	505565	R	TROLL	10-Sep-01	37	4	NE	109	40250
PETERSBURG	1051109	505573	R	TROLL	11-Sep-01	37	4	NE	109	40249
PETERSBURG	1051109	505572	R	TROLL	11-Sep-01	37	4	NE	109	40249
PETERSBURG	1051109	505575	R	TROLL	11-Sep-01	37	4	NE	109	40249
PETERSBURG	1051128	505537	R	TROLL	13-Sep-01	37	4	NE	109	40249
PETERSBURG	1051129	505533	R	TROLL	13-Sep-01	37	4	NE	109	40249
PETERSBURG	1051128	505538	R	TROLL	13-Sep-01	37	4	NE	109	40249
SITKA	1030932	186243	R	TROLL	13-Sep-01	37	4	NE	109	40249
SITKA	1030922	152583	R	TROLL	13-Sep-01	37	4	NW	113	40249
SITKA	1030972	152598	R	TROLL	17-Sep-01	38	4	NW	113	40249
PETERSBURG	1051167	505886	R	TROLL	20-Sep-01	38	4	NE	109	40249
PETERSBURG	1051167	505889	R	TROLL	20-Sep-01	38	4	NE	109	40249
PETERSBURG	1051171	505963	R	TROLL	20-Sep-01	38	4	NE	109	40249
SITKA	1030958	186308	R	TROLL	20-Sep-01	38	4	NE	109	40250
KETCHIKAN	1060521	54483	R	TROLL	21-Sep-01	38	4	SE	101	40249
HOONAH	1110500	191919	R	TROLL	21-Sep-01	38	4	NW	114	40249

Appendix A2.–Daily counts of adult coho salmon with and without adipose finclips immigrating past the Slippery Creek adult weir in 2001.

Date	Daily count of large coho [a]	Cumulative count of large coho [a]	Daily adipose finclips	Cumulative adipose finclips	Percent adipose clipped
15-Aug	0	0	0	0	-
16-Aug	0	0	0	0	-
17-Aug	0	0	0	0	-
18-Aug	0	0	0	0	-
19-Aug	0	0	0	0	-
20-Aug	0	0	0	0	-
21-Aug	0	0	0	0	-
22-Aug	3	3	1	1	33
23-Aug	7	10	2	3	30
24-Aug	11	21	6	9	43
25-Aug	32	53	13	22	42
26-Aug	0	53	0	22	42
27-Aug	17	70	8	30	43
28-Aug	50	120	21	51	43
29-Aug	30	150	2	58	39
30-Aug	49	199	15	73	37
31-Aug	26	225	6	79	35
1-Sep	25	250	8	87	35
2-Sep	0	250	0	87	35
3-Sep	18	268	5	92	34
4-Sep	33	301	17	109	36
5-Sep	23	324	8	117	36
6-Sep	14	338	4	121	36
7-Sep	209	547	67	188	34
8-Sep	230	777	72	260	33
9-Sep	78	855	28	288	34
10-Sep	41	896	17	305	34
11-Sep	0	896	0	305	34
12-Sep	92	988	26	331	34
13-Sep	54	1042	25	356	34
14-Sep	0	1042	0	356	34
15-Sep	88	1130	31	387	34
16-Sep	83	1213	32	419	35
17-Sep	72	1285	24	443	34
18-Sep	95	1380	33	476	34
19-Sep	69	1449	28	504	35
20-Sep	62	1511	18	522	35
21-Sep	53	1564	15	537	34
22-Sep	97	1661	30	567	34
23-Sep	31	1692	16	583	34
24-Sep	10	1702	1	584	34
25-Sep	135	1837	64	648	35
26-Sep	55	1892	13	661	35
27-Sep	0	1892	0	661	35
28-Sep	39	1931	15	676	35
29-Sep	19	1950	6	682	35
30-Sep	60	2010	25	707	35
1-Oct	1	2011	1	708	35
2-Oct	0	2011	0	708	35
3-Oct	81	2092	29	737	35
4-Oct	5	2097	2	739	35
5-Oct	0	2097	0	739	35

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Appendix 2.–Page 2 of 2.

Date	Daily count of large coho [a]	Cumulative count of large coho [a]	Daily adipose finclips	Cumulative adipose finclips	Percent adipose clipped
6-Oct	0	2097	0	739	35
7-Oct	328	2425	82	821	34
8-Oct	132	2557	51	872	34
9-Oct	108	2665	43	915	34
10-Oct	17	2682	6	921	34
11-Oct	10	2692	2	923	34
12-Oct	40	2732	12	935	34
13-Oct	17	2749	7	942	34
14-Oct	0	2749	0	942	34
15-Oct	23	2772	10	952	34

[a] >16 inches total length.