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Project Title: Chinook salmon stock composition of Southeast Alaska fisheries, 2009

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Abstract:
Since 1999, the Alaska Department of Fish and Game has used genetic stock identification to estimate the stock composition of Chinook salmon harvests in Southeast Alaska commercial and sport fisheries. This project continued the stock identification of these fisheries in 2008 and 2009 by screening 13 microsatellite markers in 7,000 Chinook salmon collected from Southeast Alaska troll, directed net, and sport fisheries. These estimates will provide an independent estimate of the stock composition of the harvests for comparison with estimates provided by coded-wire tag data and the PSC Chinook salmon model.

Introduction:
Since 1999, the Chinook Technical Committee (CTC) of the Pacific Salmon Commission (PSC) has explored the inclusion of genetic stock identification estimates of the Alaska commercial harvest as part of the decision-making process. Between 1999 and 2003, the State of Alaska Department of Fish and Game (ADFG) used genetic stock identification based on a coastwide allozyme database (Teel et al. 1999) to estimate the composition of the commercial troll fishery harvest in Southeast Alaska (Crane et al. 2000; Templin et al. *in revision*). At the same time, samples were collected from sublegal-sized Chinook salmon encountered in the summer troll fishery, providing important information for evaluating assumptions of stock-specific survival rates. Initial estimates demonstrated that the stock composition of the sublegal encounters was substantially different than assumptions used for management purposes (Bloomquist and Carlile 2002).

Advances in genetic methods and technologies using DNA-based markers have increased the potential utility of genetic stock identification for estimating harvest composition over the previous set of allozyme markers. Through a process that began in 2002, a standardized baseline of genetic markers was developed through collaboration between 10 laboratories and it was made available for use during the summer of 2005 (Moran et al. 2005; Seeb et al. 2007). This baseline has continued to be improved through the addition of more genetic markers and more populations. Version 2.1 of the CTC baseline contains allele frequencies from 166 populations contributing to PSC fisheries, ranging from the Situk River in Alaska to the Central Valley of California. Expansion of the baseline continues and the next version will include additional populations provided by both ADFG and the Department of Fisheries and Oceans Canada (DFO). Initial results indicate that 44 regional groups can be identified in mixtures with acceptable accuracy and precision (Moran et al. 2005; Seeb et al. 2007). Results from this and other genetic stock identification analyses could be integrated into a coordinated coast-wide

management system. This was the subject of recent workshops held by the PSC (Pacific Salmon Commission 2008).

Beginning in 2003 genetic stock identification was extended to cover the troll, seine, drift gillnet, and sport fishery harvests of Chinook salmon in Southeast Alaska waters for a period of two years with the intent to use the baseline of DNA-markers. In 2006, coverage of the Chinook salmon harvest was reduced to just the troll and sport fisheries and the directed gillnet fisheries in districts 108 and 111. This project extended genetic stock identification of Chinook salmon harvested or encountered in the commercial troll and sport fisheries in Southeast Alaska until the close of the summer fisheries in September 2009. Stock composition estimates are also provided for the drift gillnet harvests in the District 108 and 111 directed fisheries in 2009.

During the past decade since the signing of the 1999 Pacific Salmon Treaty (PST) agreement, Canada has had conservation concerns for Chinook originating from the West Coast of Vancouver Island (WCVI). Canada has undertaken genetic stock identification studies in Northern British Columbia and the WCVI fisheries and has concluded that WCVI Chinook tend to migrate near-shore (within 1 mile of the coast). These fisheries have been shaped accordingly in order to provide WCVI Chinook with some protection from harvest. A similar genetic stock analysis was attempted in Southeast Alaska outer coast troll and sport fisheries in the summer of 2008 to determine if this same near shore migration of WCVI Chinook is evident in Southeast Alaska.

Objectives:

The goal of this project is to estimate the stock composition of selected 2008 and 2009 Southeast Alaska Chinook salmon fisheries using genetic stock identification. This will be accomplished by meeting the following objectives:

1. Sample Chinook salmon harvested in the following fisheries
    a. Troll fishery –
        i. sample from the 2008 summer troll fishery harvest in districts 104, 113, 152, and 154 (Figure 1).
        ii. sample from the Accounting Year (AY) 2009 seasonal troll fishery harvests (winter – October 2008 to April 2009, spring – April to June 2009, and summer – July to September 2009) beginning October 2008 through September 2009.
    b. Sport fishery –
        i. sample from the 2008 summer sport fishery harvest in districts 104 and 113.
        ii. sample from the AY 2009 sport fishery harvests between April and September 2009.
    c. Directed fisheries – sample from the harvest from the directed fisheries operating in districts 108 and 111 beginning May 2009.
2. Assay 7,000 individual genotypes from sampled Chinook salmon at the loci in the current PSC baseline of genetic markers.
3. Estimate the relative stock composition of the Southeast Alaska fisheries using genetic stock identification such that the estimated stock composition is within 5% of the true value 90% of the time.

Approach:

Fishery sampling

Chinook salmon were collected from commercial troll and gillnet landings at processors in Southeast Alaska. Chinook salmon were sampled in the sport fishery by onboard participants

and by creel census samplers. Sampling goals and actual numbers sampled are listed in Tables 3, 4, and 5.

Chinook salmon were selected for sampling without regard to size, sex, adipose fin-clip, or position in the hold. Axillary process tissue was dissected from sampled fish and placed in alcohol in 2ml cryovials. Along with each individual sampled, basic information was recorded such as size, sex, date, vessel, and age (from scale samples). At the end of the fishery, samples were transported back to the ADFG Gene Conservation Laboratory, Anchorage, for analysis. Associated data is archived as part of the ASL database maintained by ADFG.

Representative tissue collections of individuals for mixture analysis were created by subsampling individuals from the collected samples in proportions weighted by harvest in the ports and quadrants that comprise the mixture composition to be estimated. Where sufficient samples exist, the samples were randomly subsampled proportional to harvests. Target mixture sample sizes were 200, 300, or 400 individuals to achieve acceptable levels of accuracy and precision. However, due to the vagaries of fisheries and fishery sampling, target sample sizes were not available for every time and space stratum. Samples with sizes smaller than the target were analyzed, but strata represented by fewer than 100 individuals were pooled into larger groups for analysis.

In order to investigate spatial patterns in migratory behavior of WCVI stock, we attempted to collect two additional sets of four mixtures from 2008 summer troll fisheries. For each retention period during the summer fishery, additional samples were taken from the Sitka and Craig ports in order to represent "inside" waters (districts 104 and 113) and "outside" waters (districts 152 and 154; Figure 1). The boundary between these districts is approximately three nautical miles from shore and comparison of the harvest in 113 with 154 and 104 with 152 was intended to provide an efficient test of whether WCVI stocks migrate close to shore in SE Alaska. However, due to the nature of the summer troll fishery in 2008, insufficient sample sizes were available from "outside" districts to provide the comparison. Actual numbers of fish sampled from each district is listed in Table 6.

Laboratory analyses

Samples were assayed for DNA loci developed by the Genetic Analysis of Pacific Salmon (GAPS) group funded by the Pacific Salmon Commission for use in Treaty fisheries (Table 1). DNA was extracted from axillary process tissue using DNeasy 96 tissue kits (QIAGEN, Valencia CA). Polymerase chain reaction (PCR) was carried out in 10ul reaction volumes (10mM Tris-HCl, 50mM KCl, 0.2 mM each dNTP, 0.5 units Taq DNA polymerase (Promega, Madison, WI)) using an Applied Biosystems (AB, Foster City CA) thermocycler. Primer concentrations, MgCl concentrations and the corresponding annealing temperature for each primer are available upon request. PCR Fragment analysis was done on an AB 3730 capillary DNA sequencer. 0.5ul PCR product was loaded into a 96 well reaction plate along with 0.5ul of GS500LIZ (AB) internal lane size standard and 9.0ul of Hi-Di (AB). PCR bands were visualized and separated into bin sets using AB GeneMapper software v4.0. All laboratory analyses followed protocols accepted by the Chinook Technical Committee of the Pacific Salmon Commission. The data collected were individual multi-locus genotypes for the 13 microsatellite loci currently included in the CTC standardized baseline. According to the convention implemented by the CTC, at each locus, a standardized allele is one that has a recognized holotype specimen from which the standardized allele can be reproduced using commonly applied fragment analysis techniques. Genotype data are stored in an *Oracle* database (*LOKI*) on a network drive maintained by ADFG computer services.

Error checking and data storage
Several measures were implemented to insure the quality of data produced.

I. Sample sheets which contain information for each plate of extracted DNA (95 individuals per plate) in the lab were created in a standard format. Once DNA is extracted or obtained from an outside source, an *Excel* file was created containing sample information for each well on that plate. This sample sheet follows the plate through all phases of a project, minimizing the risk of misidentification of samples through human error.

II. Genotypes were assigned to individuals using a system in which two observers score the genotype data. Discrepancies between the scores were then resolved with one of three possible outcomes: 1) one score is accepted and the other rejected, 2) both scores are rejected and the score is blanked, or 3) the sample is rerun.

III. Approximately eight percent of the individuals, eight samples from each 96-well DNA extraction plate, were reanalyzed for all loci. This insured that the data were reproducible and any errors created from the processing of individual plates were corrected.

Mixture Analysis
Stock composition estimates for the 44 stock groups identified by the power analysis (Table 2) were generated using the SPAM version 3.7 (Debevec et al. 2000) and BAYES (Pella and Masuda 2001). Depending on the strata, samples were weighted by harvest by quadrant (troll fisheries), commercial statistical week (gillnet fisheries), by sport fishery statistical biweek (sport fisheries), or by port (sport fisheries). For each estimation procedure in SPAM, genotypes were removed from the estimation procedure if their probability of occurring was near zero. For these cases, the mixture estimates have an "unknown" group containing the percent of the mixture that is removed. Individual population or stock estimates were calculated and then summed into reporting regions. Ninety percent confidence intervals for all group contribution estimates were computed from 1,000 bootstrap resamples of the baseline and mixture genotypes. For each resample, contribution estimates were generated for all populations and summed to the group level. The 1,000 estimates for a group were then sorted from lowest to highest with the 51st and 950th values in the sequence taken respectively as the lower and upper bounds of the 90% confidence interval for that group. For BAYES, the estimation was run using three independent MCMC chains of 15,000 iterations with different starting values. Prior parameters for each reporting group were defined to be equal (i.e., a "flat" prior) with the prior for a reporting group divided equally to populations within that reporting group for population prior parameters. The sum of all prior parameters was set to 1.0 (prior weight), which is equivalent to adding one fish to each mixture (Pella and Masuda 2001). Estimates and 90% credibility intervals were tabulated from the combined set of composed of the second half of the three chains.

Following this procedure, stock composition estimates was derived as follows:

1. Early winter fishery (October 11 – December 31) – Up to 400 individuals randomly sampled from each quadrant in proportion to the relative harvest from each quadrant.
2. Late winter fishery (January 1 – April 14)
    a. Northern Outside – Up to 400 individuals randomly sampled from the fishery in this quadrant.

b. Overall – Up to 400 individuals randomly sampled from each quadrant in proportion to the relative harvest from each quadrant.

3. Spring fishery (late April – June 30)
    a. Quadrant-specific – Up to 300 individuals from the Northern Outside quadrant, and up to 300 individuals from each of the Northern Inside and Southern Inside quadrants to create three separate mixture samples. If more samples are available than necessary, individuals were randomly chosen to create the mixture sample.
4. Summer fishery (July 1 – September 20)
    a. Retention period 1 (early July)
        i. Overall – Up to 400 individuals randomly sampled from each quadrant in proportion to the relative harvest from each quadrant.
        ii. Northern Outside – Up to 400 individuals randomly sampled from the available fishery samples from this quadrant.
    b. Retention period 2 and subsequent periods (late July – September)
        i. Overall – Up to 400 individuals randomly sampled from each quadrant and period in proportion to the relative harvest from each quadrant and period.
        ii. Northern Outside – Up to 400 individuals randomly sampled from the available fishery samples from this quadrant during this time in proportion to the relative harvest from each period.
5. Directed fishery (May – July)
    a. District 108 – Up to 400 individuals randomly sampled from each statistical week in proportion to the relative harvest from each week.
    b. District 111 – Up to 400 individuals randomly sampled from each statistical week in proportion to the relative harvest from each week.
6. Sport fishery (April – September)
    a. Outside ports (Yakutat, Sitka, and Craig)
        i. Overall – Up to 400 individuals randomly sampled from each statistical biweek in proportion to the relative harvest from each biweek.
        ii. Biweeks 8 – 13 -- Up to 400 individuals randomly sampled from the first half of the sport fishery season in proportion to the relative harvest from each biweek.
        iii. Biweeks 14 – 19 -- Up to 400 individuals randomly sampled from the second half of the sport fishery season in proportion to the relative harvest from each biweek.
    b. Ketchikan – Up to 400 individuals randomly sampled from each statistical biweek in proportion to the relative harvest from each biweek.
    c. Petersburg and Wrangell – Up to 400 individuals randomly sampled from each port and statistical biweek in proportion to the relative harvest from each port and biweek.
    d. Juneau, Haines, and Skagway – Up to 400 individuals randomly sampled from each port and statistical biweek in proportion to the relative harvest from each port and biweek.

Results/Findings:

Fishery sampling

A total of 3,006 Chinook salmon were sampled in Southeast Alaska troll fisheries during the 2009 PSC Accounting Year (Oct 2008 – Sept 2009; Table 3). A total of 747 Chinook salmon were sampled during the 2009 directed gillnet fisheries in districts 108 and 111 (Table 4). A total of 3,436 Chinook salmon were sampled from the 2009 sport fishery (Table 5). Sample goals

were met for many but not all ports, but sample sizes were deemed sufficient for composition estimates.

A total of 1,281 Chinook salmon were sampled in Northern Outside and Southern Outside quadrants in the 2008 Southeast Alaska summer troll fisheries (July – Aug 2008; Table 6). Sample goals for districts 152 and 154 were not met because fishermen tended not to fish in those districts in 2008 due to fuel costs and weather considerations.

Laboratory analyses
A total of 8,217 samples were analyzed at all 13 markers. During quality control procedures a total of 516 fish were reanalyzed for all 13 markers for a total of 6,708 comparisons. Overall failure rates were <1%. The few inconsistencies found (1.6% across all samples) were due primarily to pipetting errors and DNA quality during quality control procedures.

Mixture analysis
Stock composition estimates generated using BAYES can be found in Tables 7-13. The most commonly occurring stock group across all AY 2009 fisheries was the Andrew Creek stock group. Though more prevalent in fisheries that took place in the Northern Inside and Southern Inside quadrants, the Andrew Creek and Southern Southeast Alaska stock groups were present (> 5%) in nearly every fishery. Fisheries that took place in the Northern Outside and Southern Outside quadrants typically had a greater variety of stock groups present. Summer sport and troll fisheries in these areas had a greater prevalence of non-Alaskan stock groups, especially the Central British Columbia Coast, West Vancouver, South Thompson, Washington Coast, Upper Columbia (Summer, Fall), and Mid Oregon Coast stock groups. The Central British Columbia Coast and Vancouver Island stock groups were present in the winter troll fisheries. As expected, gillnet and directed troll fisheries in Districts 108 and 111 were dominated by the Andrew Creek, Southern Southeast Alaska, Upper Stikine River, and Taku River stock groups.

Stock composition estimates for 2008 summer troll fisheries can be found in Table 14. Because sample goals were not met for districts 152 and 154, mixture estimates to examine spatial patterns in migratory behavior of WCVI stock were not possible. Results are weighted by harvest by port.

Evaluation:
We accomplished the following:

- A total of 7,189 Chinook salmon were sampled during Accounting Year 2009 fisheries. Sample goals were met for many but not all ports, but sample sizes were deemed sufficient for composition estimates.
- A total of 1,281 Chinook salmon were sampled from Northern and Southern Outside quadrants during AY 2008 summer troll fisheries in order to investigate spatial patterns in migratory behavior of WCVI stock. However, sample sizes from "outside" districts 152 and 154 were insufficient to generate estimates.
- A total of 8,217 samples of Chinook salmon were assayed for genotypes for the 13 microsatellite loci in the CTC standardized baseline, and quality control procedures revealed a low rate of inconsistencies.
- Mixture analyses estimated contributions of 44 stock groups of Chinook salmon to 10 troll, 2 directed, and 6 sport fishery strata in Southeast Alaska in 2008-2009.

Project Products:

Results from this project will be presented to ADF&G Commercial Fisheries and Sport Fish management staff and will be presented to the PSC Chinook Technical Committee. Publication in a peer-reviewed journal or agency report is expected in 2011.

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Table 1. Microsatellite loci standardized for Chinook salmon genetic stock identification among laboratories participating in the Genetic Analysis of Pacific Salmon project.

Locus	Primer Sequence (5'→ 3') **F** > Forward, **R** > Reverse	Citation	Curator Agency[1]
Ots201b	F- CAGGGCGTGACAATTATGC R- TGGACATCTGTGCGTTGC	OSU unpublished	ADFG
Ots208b	F- GGATGAACTGCAGCTTGTTATG R- GGCAATCACATACTTCAACTTCC	Greig et al. 2003	CRITFC
Ots211	F - TAGGTTACTGCTTCCGTCAATG R - GAGAGGTGGTAGGATTTGCAG	Greig et al. 2003	ADFG
Ots212	F- TCTTTCCCTGTTCTCGCTTC R- CCGATGAAGAGCAGAAGAGAC	Greig et al. 2003	OSU
Ogo4	F- GTCGTCACTGGCATCAGCTA R- GAGTGGAGATGCAGCCAAAG	Olsen et al. 1998	WDFW
Ogo2	F- ACATCGCACACCATAAGCAT R- GTTTCTTCGACTGTTTCCTCTGTGTTGAG	Olsen et al. 1998	ADFG
Ots3M	F- TGTCACTCACACTCTTTCAGGAG R- GAGAGTGCTGTCCAAAGGTGA	Banks et al. 1999	WDFW
Ots213	F- CCCTACTCATGTCTCTATTTGGTG R- AGCCAAGGCATTTCTAAGTGAC	Greig et al. 2003	OSU
Omm1080	F- GAGACTGACACGGGTATTGA R- GTTATGTTGTCATGCCTAGGG	Rexroad et al. 2001	SWFSC
Ssa408UOS	F- AATGGATTACGGGTACGTTAGACA R- CTCTTGTGCAGGTTCTTCATCTGT	Cairney et al. 2000	NWFSC
Ots9	F- ATCAGGGAAAGCTTTGGAGA R- CCCTCTGTTCACAGCTAGCA	Banks et al. 1999	DFO
OtsG474	F- TTAGCTTTGGACATTTTATCACAC R- CCAGAGCAGGGACCAGAAC	Williamson et al. 2002	CRITFC
Oki100	F- CCAGCACTCTCACTATTT R- CCAGAGTAGTCATCTCTG	DFO unpublished	DFO

[1] Laboratory abbreviations: OSU, Oregon State University; SWFSC, Southwest Fisheries Science Center – National Marine Fisheries Service; DFO, Department of Fisheries and Oceans Canada; NWFSC, Northwest Fisheries Science Center – National Marine Fisheries Service; CRITFC, Columbia River Inter-Tribal Fish Commission; ADFG, Alaska Department of Fish & Game; WDFW, Washington Department of Fish & Wildlife.

Table 2.–Broad-scale reporting regions for the Chinook salmon coastwide baseline (Seeb et al. 2007) used to report stock composition of Southeast Alaska troll fishery harvests. Population numbers are listed in Appendix 1.

	Reporting regions	Population numbers
1	Central Valley fall	1-4
2	Central Valley spring	5-8
3	Central Valley winter	9
4	California Coast	10-11
5	Klamath River	12-14
6	N California/S Oregon Coast	15
7	Rogue River	16-17
8	Mid Oregon Coast	18-26
9	North Oregon Coast	27-36
10	Lower Columbia R. spring	37-39
11	Lower Columbia R. fall	40-42
12	Willamette River	43-44
13	Mid Columbia R. Tule fall	45
14	Mid and Upper Columbia R. spring	46-51
15	Deschutes River fall	52-53
16	Upper Columbia R. summer/fall	54-57
17	Snake River fall	58
18	Snake River spring/summer	59-66
19	Washington Coast	67-73
20	Hood Canal	74-75
21	South Puget Sound	76-81
22	North Puget Sound	82-96
23	Juan de Fuca	97-99
24	Lower Fraser River	100-102
25	Lower Thompson River	103-104
26	South Thompson River	105-107
27	North Thompson River	108-111
28	Mid Fraser River	112-116
29	Upper Fraser River	117-120
30	East Vancouver Island	121-125
31	West Vancouver Island	126-132
32	S BC Mainland	133-134
33	Central BC Coast	135-137
34	Lower Skeena River	138-139
35	Upper Skeena River	140-142
36	Nass River	143-146
37	Upper Stikine River	147-151
38	Taku River	152-158
39	Southern Southeast Alaska	159-164
40	Andrews Creek	165-168
41	N. Southeast Alaska	169
42	Chilkat River	170-171
43	Alsek River	172-175
44	Situk River	176

Table 3.– Number of Chinook salmon sampled from the troll fishery harvest at ports in Southeast Alaska, 2008-2009. Accounting years begin October 1 and end September 30 of the following year. Quadrants are abbreviated as follows: Northern Outside (NO), Northern Inside (NI), Southern Outside (SO), and Southern Inside (SI).

Season	Period	Port	Quadrants Represented	Samples Goal	Samples Actual
Summer	(July 1 – Sept 30, 2008)	Sitka	NO	800	946
	Retention Periods 1 & 2	Craig	SO	800	335
		TOTAL (AY 2008)		1,600	1,281
Winter	Early (Oct 11-Dec 31, 2008)				
		Sitka	NO	400	126
		Yakutat	NO	30	30
		Juneau	NO, NI	30	4
		Ketchikan	SI, SO	40	29
		Craig	SO	20	8
		Petersburg	NI, SI	25	25
		Total		545	222
	Late (Jan 1 - Apr 15, 2009)	Sitka	NO	350	350
		Yakutat	NO	30	30
		Juneau	NO, NI	30	30
		Ketchikan	SI, SO	60	60
		Craig	SO	20	20
		Petersburg	NI, SI	40	40
		Total		530	530
Spring	(April 22 - June 30, 2009)	Sitka	NO	300	300
		Hoonah	NI	75	75
		Petersburg	NI, SI	100	100
		Wrangell	NI, SI	300	86
		Ketchikan	SI	200	200
		Juneau	NO, NI	200	124
		Total		1,175	885
Summer	(July 1 – Sept 30, 2009)				
	Retention Periods 1 & 2	Yakutat	NO	60	60
		Pelican	NO	60	94
		Elfin Cove	NO	60	0
		Sitka	NO	600	600
		Hoonah	NO	80	80
		Petersburg	NI, SI	120	112
		Port Alexander	NO, NI	120	100
		Craig	SO	200	210
		Ketchikan	SI, SO	150	113
		Total		800	1,369
		TOTAL (AY 2009)		3,700	3,006

Table 4.— Sampling goals by port from gillnet harvests in the directed Chinook salmon fisheries in districts 108 and 111 during 2009.

		Samples	
District	Port	Goal	Actual
108	Petersburg	520	94
	Wrangell	1,000	176
	Total	1,520	270
111	Juneau	880	477
	TOTAL	2,400	747

Table 5.— Numbers of Chinook salmon sampled in Southeast Alaska sport fisheries during the spring and summer of 2009.

	Samples	
Port	Goals	Actual
Juneau	600	607
Haines	15	15
Skagway	20	20
Glacier Bay	65	65
Sitka	600	599
Yakutat	75	174
Elfin Cove	50	49
Craig	200	538
Petersburg	450	278
Wrangell	200	108
Ketchikan	600	983
Total	2,875	3,436

Table 6.— Numbers of Chinook salmon sampled in Southern Outside (SO) and Northern Outside (NO) quadrants in 2008 summer troll fisheries to investigate spatial patterns in WCVI stocks. District locations are noted on Figure 1.

		Samples	
Quadrant	Districts	Goals	Actual
NO	113 (inside)	400	714
	154 (outside)	400	20
	Unknown	NA	212
SO	104 (inside)	400	305
	152 (outside)	400	10
	Unknown	NA	20
	Total	1,600	1,281

Table 7.–Estimated contributions of 44 stock groups of legal-sized Chinook salmon to winter troll fishery harvests in Southeast Alaska, 2008-2009. Sample sizes after weighting by quadrant are indicated (N). Run timing components are abbreviated as Sp (spring), Su (summer), Fa (fall), and Wi (winter).

		Early Winter 2008			**Late Winter 2009**		
		N = 217			N = 398		
		Relative Contribution			Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley Fa	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
2	Central Valley Sp	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
3	Central Valley Wi	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
4	California Coast	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
5	Klamath R Basin	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
6	N CA, S OR Coast	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
7	Rogue River	0.000	0.001	(0.000-0.001)	0.000	0.000	(0.000-0.000)
8	Mid Oregon Coast	0.000	0.001	(0.000-0.000)	0.003	0.006	(0.000-0.016)
9	N Oregon Coast	0.000	0.001	(0.000-0.000)	0.004	0.005	(0.000-0.013)
10	Lower Columbia Sp	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
11	Lower Columbia Fa	0.012	0.008	(0.002-0.027)	0.016	0.007	(0.007-0.029)
12	Willamette River	0.012	0.008	(0.002-0.026)	0.005	0.004	(0.001-0.012)
13	Mid Columbia Tule	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
14	Mid and Upp Columbia	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.003)
15	Deschutes R Fa	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
16	Upp Columbia Su Fa	0.015	0.009	(0.003-0.033)	0.083	0.015	(0.060-0.108)
17	Snake R Fa	0.014	0.009	(0.003-0.030)	0.002	0.005	(0.000-0.013)
18	Snake River Sp Su	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
19	Washington Coast	0.000	0.001	(0.000-0.001)	0.011	0.007	(0.002-0.023)
20	Hood Canal	0.000	0.001	(0.000-0.001)	0.006	0.005	(0.000-0.015)
21	South Puget Sound	0.004	0.007	(0.000-0.018)	0.000	0.001	(0.000-0.001)
22	North Puget Sound	0.141	0.027	(0.099-0.187)	0.021	0.009	(0.008-0.038)
23	Juan de Fuca	0.032	0.012	(0.014-0.054)	0.003	0.003	(0.000-0.009)
24	Lower Fraser	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
25	Lower Thompson	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.002)
26	South Thompson	0.000	0.001	(0.000-0.001)	0.077	0.015	(0.054-0.102)
27	North Thompson R	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.001)
28	Mid Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
29	Upper Fraser	0.007	0.007	(0.000-0.020)	0.007	0.006	(0.000-0.019)
30	East Vancouver	0.173	0.026	(0.131-0.217)	0.047	0.011	(0.030-0.066)
31	West Vancouver	0.032	0.013	(0.013-0.055)	0.279	0.023	(0.243-0.318)
32	South BC Mainland	0.031	0.013	(0.012-0.056)	0.008	0.006	(0.000-0.018)
33	Central BC Coast	0.274	0.034	(0.219-0.332)	0.103	0.018	(0.075-0.133)
34	Lower Skeena	0.015	0.009	(0.004-0.031)	0.047	0.015	(0.024-0.074)
35	Upper Skeena	0.000	0.001	(0.000-0.000)	0.001	0.003	(0.000-0.005)
36	Nass River	0.023	0.012	(0.006-0.045)	0.018	0.008	(0.007-0.032)
37	Upper Stikine R	0.001	0.004	(0.000-0.006)	0.038	0.026	(0.000-0.084)
38	Taku River	0.000	0.001	(0.000-0.001)	0.057	0.023	(0.016-0.094)
39	S Southeast AK	0.125	0.025	(0.086-0.169)	0.105	0.021	(0.073-0.141)
40	Andrew Creek	0.082	0.021	(0.049-0.120)	0.051	0.016	(0.026-0.080)
41	King Salmon	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
42	Chilkat R	0.006	0.007	(0.000-0.019)	0.006	0.004	(0.001-0.014)
43	Alsek R	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
44	Situk R	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)

Table 8.–Estimated contributions of 44 stock groups of Chinook salmon to the harvest from the Northern Outside, Northern Inside and Southern Inside quadrants during the spring troll fishery in Southeast Alaska, 2009. Run timing components are abbreviated as Sp (spring), Su (summer), Fa (fall), and Wi (winter). Sample sizes are indicated (N).

		Northern Outside			**Northern Inside**			**Southern Inside**		
		N = 400			**N =** 120			**N =** 299		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley Fa	0.000	0.001	(0.000-0.000)	0.000	0.002	(0.000-0.001)	0.000	0.001	(0.000-0.000)
2	Central Valley Sp	0.000	0.000	(0.000-0.000)	0.001	0.004	(0.000-0.008)	0.000	0.001	(0.000-0.000)
3	Central Valley Wi	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
4	California Coast	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
5	Klamath R Basin	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
6	N CA, S OR Coast	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
7	Rogue River	0.000	0.000	(0.000-0.000)	0.000	0.002	(0.000-0.001)	0.000	0.001	(0.000-0.000)
8	Mid Oregon Coast	0.000	0.001	(0.000-0.000)	0.000	0.002	(0.000-0.001)	0.000	0.001	(0.000-0.000)
9	N Oregon Coast	0.000	0.001	(0.000-0.001)	0.000	0.002	(0.000-0.001)	0.000	0.001	(0.000-0.001)
10	Lower Columbia Sp	0.001	0.002	(0.000-0.004)	0.000	0.002	(0.000-0.001)	0.000	0.001	(0.000-0.000)
11	Lower Columbia Fa	0.008	0.005	(0.002-0.016)	0.012	0.011	(0.001-0.034)	0.007	0.006	(0.000-0.020)
12	Willamette River	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
13	Mid Columbia Tule	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
14	Mid and Upp Columbia	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
15	Deschutes R Fa	0.003	0.004	(0.000-0.011)	0.000	0.002	(0.000-0.001)	0.009	0.009	(0.000-0.026)
16	Upp Columbia Su Fa	0.053	0.012	(0.035-0.074)	0.017	0.012	(0.003-0.039)	0.032	0.012	(0.015-0.054)
17	Snake R Fa	0.001	0.002	(0.000-0.004)	0.000	0.002	(0.000-0.001)	0.000	0.001	(0.000-0.001)
18	Snake River Sp Su	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
19	Washington Coast	0.024	0.008	(0.012-0.038)	0.034	0.017	(0.011-0.065)	0.001	0.003	(0.000-0.007)
20	Hood Canal	0.001	0.002	(0.000-0.004)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.001)
21	South Puget Sound	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.003	0.004	(0.000-0.011)
22	North Puget Sound	0.000	0.001	(0.000-0.001)	0.002	0.007	(0.000-0.013)	0.001	0.004	(0.000-0.008)
23	Juan de Fuca	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
24	Lower Fraser	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
25	Lower Thompson	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
26	South Thompson	0.093	0.015	(0.070-0.118)	0.056	0.022	(0.025-0.096)	0.029	0.010	(0.014-0.047)
27	North Thompson R	0.000	0.001	(0.000-0.002)	0.001	0.003	(0.000-0.002)	0.000	0.001	(0.000-0.000)
28	Mid Fraser	0.001	0.003	(0.000-0.006)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)

		Northern Outside N = 400 Relative Contribution			Northern Inside N = 120 Relative Contribution			Southern Inside N = 299 Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
29	Upper Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
30	East Vancouver	0.018	0.007	(0.008-0.031)	0.011	0.010	(0.000-0.031)	0.011	0.006	(0.003-0.023)
31	West Vancouver	0.203	0.021	(0.170-0.238)	0.058	0.021	(0.028-0.097)	0.045	0.012	(0.028-0.067)
32	South BC Mainland	0.007	0.005	(0.001-0.017)	0.008	0.012	(0.000-0.033)	0.000	0.001	(0.000-0.000)
33	Central BC Coast	0.113	0.017	(0.085-0.142)	0.105	0.031	(0.059-0.159)	0.039	0.015	(0.019-0.066)
34	Lower Skeena	0.023	0.010	(0.009-0.040)	0.048	0.022	(0.018-0.088)	0.001	0.003	(0.000-0.006)
35	Upper Skeena	0.000	0.001	(0.000-0.000)	0.000	0.002	(0.000-0.001)	0.001	0.004	(0.000-0.009)
36	Nass River	0.000	0.001	(0.000-0.000)	0.002	0.007	(0.000-0.011)	0.032	0.012	(0.014-0.054)
37	Upper Stikine R	0.014	0.012	(0.000-0.037)	0.007	0.018	(0.000-0.046)	0.182	0.029	(0.136-0.231)
38	Taku River	0.033	0.012	(0.015-0.054)	0.103	0.035	(0.050-0.164)	0.009	0.011	(0.000-0.032)
39	S Southeast AK	0.085	0.017	(0.059-0.113)	0.269	0.049	(0.190-0.351)	0.415	0.034	(0.359-0.471)
40	Andrew Creek	0.311	0.026	(0.270-0.354)	0.262	0.045	(0.190-0.338)	0.181	0.027	(0.138-0.227)
41	King Salmon	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
42	Chilkat R	0.009	0.005	(0.002-0.018)	0.000	0.002	(0.000-0.001)	0.000	0.001	(0.000-0.000)
43	Alsek R	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
44	Situk R	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)

Table 9.–Estimated contributions of 44 stock groups of legal-sized Chinook salmon encountered during each retention period of the summer troll fishery in Southeast Alaska, 2009. Run timing components are abbreviated as Sp (spring), Su (summer), Fa (fall), and Wi (winter). Sample sizes after weighting by quadrant are indicated (N).

		Retention Period 1			**Retention Period 2**		
		N = 397			**N =** 400		
		Relative Contribution			Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley Fa	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
2	Central Valley Sp	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
3	Central Valley Wi	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
4	California Coast	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
5	Klamath R Basin	0.000	0.001	(0.000-0.001)	0.000	0.000	(0.000-0.000)
6	N CA, S OR Coast	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)
7	Rogue River	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
8	Mid Oregon Coast	0.048	0.015	(0.025-0.073)	0.108	0.024	(0.069-0.149)
9	N Oregon Coast	0.044	0.013	(0.025-0.068)	0.095	0.020	(0.063-0.130)
10	Lower Columbia Sp	0.002	0.004	(0.000-0.010)	0.003	0.004	(0.000-0.011)
11	Lower Columbia Fa	0.031	0.009	(0.018-0.048)	0.043	0.011	(0.026-0.062)
12	Willamette River	0.000	0.000	(0.000-0.000)	0.015	0.007	(0.006-0.028)
13	Mid Columbia Tule	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
14	Mid and Upp Columbia	0.000	0.000	(0.000-0.000)	0.002	0.002	(0.000-0.006)
15	Deschutes R Fa	0.006	0.010	(0.000-0.026)	0.003	0.005	(0.000-0.014)
16	Upp Columbia Su Fa	0.311	0.027	(0.267-0.355)	0.302	0.024	(0.264-0.342)
17	Snake R Fa	0.007	0.011	(0.000-0.031)	0.000	0.002	(0.000-0.001)
18	Snake River Sp Su	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.002)
19	Washington Coast	0.096	0.016	(0.071-0.124)	0.148	0.020	(0.117-0.181)
20	Hood Canal	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
21	South Puget Sound	0.000	0.001	(0.000-0.001)	0.001	0.002	(0.000-0.003)
22	North Puget Sound	0.005	0.005	(0.000-0.015)	0.000	0.001	(0.000-0.001)
23	Juan de Fuca	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
24	Lower Fraser	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
25	Lower Thompson	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
26	South Thompson	0.143	0.018	(0.114-0.174)	0.034	0.010	(0.020-0.052)
27	North Thompson R	0.010	0.005	(0.004-0.020)	0.001	0.002	(0.000-0.005)
28	Mid Fraser	0.000	0.001	(0.000-0.002)	0.000	0.001	(0.000-0.001)
29	Upper Fraser	0.002	0.004	(0.000-0.012)	0.000	0.001	(0.000-0.001)
30	East Vancouver	0.016	0.006	(0.007-0.027)	0.013	0.007	(0.004-0.026)
31	West Vancouver	0.088	0.014	(0.066-0.113)	0.061	0.012	(0.043-0.082)
32	South BC Mainland	0.000	0.000	(0.000-0.000)	0.002	0.003	(0.000-0.007)
33	Central BC Coast	0.036	0.011	(0.020-0.054)	0.037	0.010	(0.021-0.056)
34	Lower Skeena	0.025	0.010	(0.010-0.043)	0.002	0.004	(0.000-0.012)
35	Upper Skeena	0.001	0.004	(0.000-0.010)	0.000	0.000	(0.000-0.000)
36	Nass River	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
37	Upper Stikine R	0.008	0.010	(0.000-0.027)	0.010	0.008	(0.000-0.025)
38	Taku River	0.010	0.010	(0.000-0.028)	0.000	0.001	(0.000-0.001)
39	S Southeast AK	0.062	0.013	(0.041-0.085)	0.103	0.016	(0.078-0.131)
40	Andrew Creek	0.046	0.012	(0.028-0.067)	0.014	0.007	(0.004-0.027)
41	King Salmon	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
42	Chilkat R	0.000	0.000	(0.000-0.000)	0.002	0.003	(0.000-0.008)
43	Alsek R	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
44	Situk R	0.002	0.003	(0.000-0.007)	0.001	0.002	(0.000-0.006)

Table 10.—Estimated contributions of 44 stock groups of Chinook salmon to the harvest from selected fishing periods of the troll fishery in the Northern Outside quadrant of Southeast Alaska, 2009. Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter). Sample sizes are indicated (N).

		Late Winter 2009 N = 300 Relative Contribution			**Spring 2009** N = 400 Relative Contribution			**Summer Ret 1 2009** N = 399 Relative Contribution			**Summer Ret 2 2009** N = 400 Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley Fa	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
2	Central Valley Sp	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
3	Central Valley Wi	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
4	California Coast	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
5	Klamath R Basin	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.000	(0.000-0.000)
6	N CA, S OR Coast	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
7	Rogue River	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
8	Mid Oregon Coast	0.012	0.009	(0.000-0.028)	0.000	0.001	(0.000-0.000)	0.058	0.015	(0.036-0.084)	0.126	0.021	(0.093-0.162)
9	N Oregon Coast	0.001	0.003	(0.000-0.007)	0.000	0.001	(0.000-0.001)	0.034	0.012	(0.016-0.056)	0.072	0.017	(0.045-0.101)
10	Lower Columbia Sp	0.000	0.001	(0.000-0.001)	0.001	0.002	(0.000-0.004)	0.003	0.005	(0.000-0.013)	0.003	0.004	(0.000-0.011)
11	Lower Columbia Fa	0.009	0.006	(0.002-0.020)	0.008	0.005	(0.002-0.016)	0.040	0.010	(0.024-0.059)	0.038	0.010	(0.023-0.057)
12	Willamette River	0.010	0.006	(0.003-0.021)	0.000	0.000	(0.000-0.000)	0.002	0.003	(0.000-0.008)	0.017	0.007	(0.007-0.030)
13	Mid Columbia Tule	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.002	0.002	(0.000-0.007)	0.000	0.000	(0.000-0.000)
14	Mid and Upp Columbia	0.001	0.002	(0.000-0.005)	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.001	0.002	(0.000-0.006)
15	Deschutes R Fa	0.000	0.001	(0.000-0.000)	0.003	0.004	(0.000-0.011)	0.021	0.013	(0.000-0.043)	0.002	0.004	(0.000-0.011)
16	Upp Columbia Su Fa	0.095	0.017	(0.069-0.126)	0.053	0.012	(0.035-0.074)	0.304	0.026	(0.261-0.348)	0.326	0.024	(0.287-0.366)
17	Snake R Fa	0.000	0.001	(0.000-0.000)	0.001	0.002	(0.000-0.004)	0.005	0.010	(0.000-0.027)	0.000	0.002	(0.000-0.001)
18	Snake River Sp Su	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.003)
19	Washington Coast	0.015	0.008	(0.004-0.030)	0.024	0.008	(0.012-0.038)	0.105	0.017	(0.079-0.133)	0.173	0.021	(0.140-0.208)
20	Hood Canal	0.000	0.001	(0.000-0.000)	0.001	0.002	(0.000-0.004)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
21	South Puget Sound	0.000	0.002	(0.000-0.002)	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.001	0.003	(0.000-0.009)
22	North Puget Sound	0.004	0.005	(0.000-0.013)	0.000	0.001	(0.000-0.001)	0.009	0.006	(0.001-0.019)	0.000	0.001	(0.000-0.000)
23	Juan de Fuca	0.004	0.004	(0.000-0.011)	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.002	0.002	(0.000-0.007)
24	Lower Fraser	0.004	0.004	(0.000-0.010)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.005	0.004	(0.001-0.012)
25	Lower Thompson	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.001)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
26	South Thompson	0.102	0.019	(0.072-0.134)	0.093	0.015	(0.070-0.118)	0.129	0.017	(0.102-0.159)	0.029	0.009	(0.015-0.045)
27	North Thompson R	0.000	0.001	(0.000-0.002)	0.000	0.001	(0.000-0.002)	0.010	0.005	(0.003-0.020)	0.001	0.002	(0.000-0.005)
28	Mid Fraser	0.000	0.001	(0.000-0.001)	0.001	0.003	(0.000-0.006)	0.000	0.002	(0.000-0.003)	0.000	0.001	(0.000-0.001)
29	Upper Fraser	0.005	0.006	(0.000-0.017)	0.000	0.001	(0.000-0.000)	0.011	0.008	(0.000-0.026)	0.001	0.004	(0.000-0.002)
30	East Vancouver	0.027	0.010	(0.013-0.045)	0.018	0.007	(0.008-0.031)	0.018	0.007	(0.008-0.030)	0.021	0.008	(0.009-0.034)
31	West Vancouver	0.291	0.027	(0.248-0.336)	0.203	0.021	(0.170-0.238)	0.093	0.015	(0.070-0.119)	0.071	0.013	(0.051-0.094)
32	South BC Mainland	0.003	0.006	(0.000-0.015)	0.007	0.005	(0.001-0.017)	0.000	0.000	(0.000-0.000)	0.002	0.003	(0.000-0.008)
33	Central BC Coast	0.091	0.020	(0.060-0.125)	0.113	0.017	(0.085-0.142)	0.035	0.011	(0.019-0.054)	0.030	0.010	(0.016-0.047)
34	Lower Skeena	0.047	0.022	(0.007-0.082)	0.023	0.010	(0.009-0.040)	0.032	0.011	(0.016-0.051)	0.001	0.003	(0.000-0.008)
35	Upper Skeena	0.002	0.006	(0.000-0.013)	0.000	0.001	(0.000-0.000)	0.001	0.004	(0.000-0.010)	0.000	0.000	(0.000-0.000)
36	Nass River	0.023	0.010	(0.009-0.041)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)

		Late Winter 2009 N = 300 Relative Contribution			Spring 2009 N = 400 Relative Contribution			Summer Ret 1 2009 N = 399 Relative Contribution			Summer Ret 2 2009 N = 400 Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
37	Upper Stikine R	0.038	0.020	(0.012-0.077)	0.014	0.012	(0.000-0.037)	0.025	0.010	(0.010-0.043)	0.001	0.002	(0.000-0.004)
38	Taku River	0.092	0.024	(0.054-0.133)	0.033	0.012	(0.015-0.054)	0.001	0.004	(0.000-0.008)	0.000	0.001	(0.000-0.000)
39	S Southeast AK	0.056	0.017	(0.031-0.085)	0.085	0.017	(0.059-0.113)	0.020	0.009	(0.008-0.037)	0.054	0.012	(0.035-0.075)
40	Andrew Creek	0.060	0.020	(0.030-0.095)	0.311	0.026	(0.270-0.354)	0.038	0.012	(0.020-0.059)	0.020	0.009	(0.009-0.036)
41	King Salmon	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
42	Chilkat R	0.009	0.006	(0.002-0.020)	0.009	0.005	(0.002-0.018)	0.000	0.000	(0.000-0.000)	0.003	0.003	(0.000-0.010)
43	Alsek R	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.000	0.000	(0.000-0.000)
44	Situk R	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)	0.003	0.003	(0.000-0.008)	0.000	0.000	(0.000-0.000)

Table 11.– Estimated contributions of 44 stock groups of Chinook salmon to directed gillnet fishery harvests in Southeast Alaska in 2009. Run timing components are abbreviated as Sp (spring), Su (summer), Fa (fall), and Wi (winter). Sample sizes after weighting by harvest by statistical week are indicated (N).

		Dist. 108 N = 268 Relative Contribution			**Dist. 111** N = 316 Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley Fa	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
2	Central Valley Sp	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
3	Central Valley Wi	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
4	California Coast	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
5	Klamath R Basin	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
6	N CA, S OR Coast	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
7	Rogue River	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
8	Mid Oregon Coast	0.000	0.001	(0.000-0.000)	0.001	0.002	(0.000-0.004)
9	N Oregon Coast	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
10	Lower Columbia Sp	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
11	Lower Columbia Fa	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
12	Willamette River	0.004	0.004	(0.000-0.011)	0.000	0.001	(0.000-0.000)
13	Mid Columbia Tule	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
14	Mid and Upp Columbia	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
15	Deschutes R Fa	0.002	0.004	(0.000-0.009)	0.000	0.001	(0.000-0.000)
16	Upp Columbia Su Fa	0.004	0.005	(0.000-0.015)	0.000	0.001	(0.000-0.000)
17	Snake R Fa	0.000	0.002	(0.000-0.003)	0.000	0.001	(0.000-0.001)
18	Snake River Sp Su	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
19	Washington Coast	0.000	0.001	(0.000-0.002)	0.000	0.001	(0.000-0.000)
20	Hood Canal	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
21	South Puget Sound	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
22	North Puget Sound	0.001	0.002	(0.000-0.004)	0.008	0.006	(0.000-0.019)
23	Juan de Fuca	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
24	Lower Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
25	Lower Thompson	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
26	South Thompson	0.003	0.005	(0.000-0.014)	0.000	0.001	(0.000-0.000)
27	North Thompson R	0.001	0.003	(0.000-0.008)	0.000	0.000	(0.000-0.000)
28	Mid Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
29	Upper Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
30	East Vancouver	0.000	0.001	(0.000-0.000)	0.003	0.003	(0.000-0.009)
31	West Vancouver	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
32	South BC Mainland	0.004	0.004	(0.000-0.013)	0.002	0.003	(0.000-0.008)
33	Central BC Coast	0.003	0.004	(0.000-0.011)	0.000	0.001	(0.000-0.001)
34	Lower Skeena	0.000	0.001	(0.000-0.001)	0.004	0.004	(0.000-0.011)
35	Upper Skeena	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
36	Nass River	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
37	Upper Stikine R	0.088	0.023	(0.054-0.129)	0.089	0.059	(0.000-0.181)
38	Taku River	0.025	0.017	(0.000-0.053)	0.716	0.061	(0.621-0.817)
39	S Southeast AK	0.167	0.029	(0.121-0.217)	0.005	0.011	(0.000-0.029)
40	Andrew Creek	0.690	0.037	(0.627-0.749)	0.162	0.025	(0.124-0.204)
41	King Salmon	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
42	Chilkat R	0.005	0.005	(0.000-0.014)	0.008	0.005	(0.002-0.018)
43	Alsek R	0.000	0.001	(0.000-0.000)	0.000	0.000	(0.000-0.000)
44	Situk R	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)

Table 12.– Estimated contributions of 44 stock groups of Chinook salmon to sport fishery harvests in 1) Ketchikan, 2) Juneau, Haines, and Skagway, and 3) Petersburg and Wrangell, Southeast Alaska, 2009. Run timing components are abbreviated as Sp (spring), Su (summer), Fa (fall), and Wi (winter). Sample sizes after weighting by harvest by port and statistical biweek are indicated (N).

		Ketchikan N = 296 Relative Contribution			**Juneau-Haines-Skagway** N = 277 Relative Contribution			**Petersburg-Wrangell** N = 294 Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley Fa	0.001	0.003	(0.000-0.007)	0.001	0.002	(0.000-0.006)	0.000	0.001	(0.000-0.000)
2	Central Valley Sp	0.000	0.001	(0.000-0.000)	0.001	0.002	(0.000-0.004)	0.000	0.001	(0.000-0.000)
3	Central Valley Wi	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
4	California Coast	0.001	0.002	(0.000-0.003)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
5	Klamath R Basin	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
6	N CA, S OR Coast	0.001	0.002	(0.000-0.004)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
7	Rogue River	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
8	Mid Oregon Coast	0.004	0.006	(0.000-0.016)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
9	N Oregon Coast	0.008	0.006	(0.002-0.019)	0.004	0.004	(0.000-0.011)	0.000	0.001	(0.000-0.000)
10	Lower Columbia Sp	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.001)	0.002	0.004	(0.000-0.010)
11	Lower Columbia Fa	0.003	0.004	(0.000-0.012)	0.001	0.002	(0.000-0.004)	0.000	0.001	(0.000-0.000)
12	Willamette River	0.001	0.003	(0.000-0.006)	0.000	0.001	(0.000-0.000)	0.004	0.005	(0.000-0.013)
13	Mid Columbia Tule	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
14	Mid and Upp Columbia	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
15	Deschutes R Fa	0.007	0.008	(0.000-0.022)	0.009	0.006	(0.002-0.020)	0.000	0.001	(0.000-0.002)
16	Upp Columbia Su Fa	0.024	0.010	(0.009-0.043)	0.004	0.004	(0.000-0.011)	0.007	0.005	(0.001-0.016)
17	Snake R Fa	0.001	0.002	(0.000-0.004)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
18	Snake River Sp Su	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
19	Washington Coast	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
20	Hood Canal	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
21	South Puget Sound	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
22	North Puget Sound	0.007	0.009	(0.000-0.025)	0.000	0.001	(0.000-0.001)	0.045	0.014	(0.025-0.069)
23	Juan de Fuca	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
24	Lower Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.001	0.003	(0.000-0.007)
25	Lower Thompson	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
26	South Thompson	0.019	0.009	(0.007-0.035)	0.000	0.001	(0.000-0.001)	0.006	0.007	(0.000-0.020)
27	North Thompson R	0.000	0.001	(0.000-0.000)	0.004	0.004	(0.000-0.011)	0.000	0.001	(0.000-0.000)
28	Mid Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
29	Upper Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
30	East Vancouver	0.018	0.008	(0.007-0.033)	0.004	0.004	(0.000-0.011)	0.013	0.007	(0.004-0.026)
31	West Vancouver	0.032	0.011	(0.016-0.051)	0.000	0.001	(0.000-0.000)	0.003	0.003	(0.000-0.010)

		Ketchikan **N =** 296 Relative Contribution			**Juneau-Haines-Skagway** **N =** 277 Relative Contribution			**Petersburg-Wrangell** **N =** 294 Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
32	South BC Mainland	0.000	0.001	(0.000-0.000)	0.010	0.006	(0.002-0.022)	0.019	0.009	(0.007-0.037)
33	Central BC Coast	0.036	0.013	(0.017-0.059)	0.008	0.005	(0.001-0.018)	0.057	0.014	(0.035-0.082)
34	Lower Skeena	0.012	0.008	(0.003-0.029)	0.009	0.006	(0.002-0.020)	0.048	0.012	(0.029-0.070)
35	Upper Skeena	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.002)
36	Nass River	0.012	0.007	(0.003-0.026)	0.000	0.001	(0.000-0.001)	0.001	0.002	(0.000-0.003)
37	Upper Stikine R	0.023	0.017	(0.000-0.054)	0.061	0.041	(0.000-0.123)	0.342	0.037	(0.281-0.404)
38	Taku River	0.008	0.010	(0.000-0.027)	0.197	0.044	(0.132-0.276)	0.076	0.024	(0.039-0.117)
39	S Southeast AK	0.774	0.028	(0.726-0.818)	0.020	0.014	(0.002-0.046)	0.099	0.021	(0.067-0.134)
40	Andrew Creek	0.008	0.010	(0.000-0.028)	0.619	0.032	(0.566-0.671)	0.275	0.031	(0.226-0.326)
41	King Salmon	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.002)
42	Chilkat R	0.000	0.001	(0.000-0.000)	0.049	0.013	(0.030-0.072)	0.000	0.001	(0.000-0.000)
43	Alsek R	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
44	Situk R	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)

Table 13.– Estimated contributions of 44 stock groups of Chinook salmon to sport fishery harvests in Sitka, Craig, and Yakutat, Southeast Alaska, 2009. Run timing components are abbreviated as Sp (spring), Su (summer), Fa (fall), and Wi (winter). Sample sizes after weighting by port and statistical biweek are indicated (N).

		All Season N = 352 Relative Contribution			**Biweeks 8 - 13** N = 239 Relative Contribution			**Biweeks 14 - 18** N = 240 Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley Fa	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
2	Central Valley Sp	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
3	Central Valley Wi	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
4	California Coast	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)
5	Klamath R Basin	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
6	N CA, S OR Coast	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
7	Rogue River	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
8	Mid Oregon Coast	0.023	0.010	(0.010-0.040)	0.020	0.010	(0.006-0.039)	0.019	0.012	(0.005-0.042)
9	N Oregon Coast	0.014	0.011	(0.000-0.034)	0.030	0.013	(0.012-0.053)	0.021	0.016	(0.000-0.050)
10	Lower Columbia Sp	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
11	Lower Columbia Fa	0.043	0.011	(0.026-0.063)	0.038	0.013	(0.019-0.061)	0.042	0.013	(0.023-0.065)
12	Willamette River	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.009	0.006	(0.002-0.020)
13	Mid Columbia Tule	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
14	Mid and Upp Columbia	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
15	Deschutes R Fa	0.000	0.001	(0.000-0.001)	0.001	0.003	(0.000-0.004)	0.001	0.003	(0.000-0.003)
16	Upp Columbia Su Fa	0.238	0.024	(0.199-0.278)	0.136	0.023	(0.101-0.176)	0.351	0.035	(0.292-0.409)
17	Snake R Fa	0.003	0.007	(0.000-0.020)	0.001	0.003	(0.000-0.004)	0.016	0.018	(0.000-0.051)
18	Snake River Sp Su	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
19	Washington Coast	0.101	0.017	(0.074-0.130)	0.072	0.018	(0.045-0.103)	0.105	0.021	(0.073-0.141)
20	Hood Canal	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
21	South Puget Sound	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.000)	0.000	0.002	(0.000-0.002)
22	North Puget Sound	0.009	0.009	(0.000-0.025)	0.002	0.005	(0.000-0.011)	0.000	0.002	(0.000-0.002)
23	Juan de Fuca	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
24	Lower Fraser	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.004	0.004	(0.000-0.013)
25	Lower Thompson	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.001)
26	South Thompson	0.093	0.016	(0.068-0.121)	0.122	0.022	(0.087-0.160)	0.066	0.017	(0.041-0.095)
27	North Thompson R	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
28	Mid Fraser	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.001)
29	Upper Fraser	0.007	0.009	(0.000-0.024)	0.000	0.001	(0.000-0.001)	0.018	0.014	(0.000-0.044)
30	East Vancouver	0.031	0.010	(0.016-0.048)	0.018	0.009	(0.006-0.034)	0.024	0.010	(0.010-0.043)
31	West Vancouver	0.181	0.021	(0.149-0.216)	0.153	0.024	(0.117-0.194)	0.190	0.026	(0.149-0.233)
32	South BC Mainland	0.000	0.001	(0.000-0.001)	0.000	0.002	(0.000-0.002)	0.000	0.001	(0.000-0.000)

		All Season N = 352 Relative Contribution			Biweeks 8 - 13 N = 239 Relative Contribution			Biweeks 14 - 18 N = 240 Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
33	Central BC Coast	0.075	0.016	(0.050-0.104)	0.104	0.023	(0.069-0.144)	0.062	0.019	(0.032-0.095)
34	Lower Skeena	0.002	0.006	(0.000-0.015)	0.010	0.018	(0.000-0.051)	0.001	0.003	(0.000-0.003)
35	Upper Skeena	0.013	0.010	(0.000-0.030)	0.028	0.019	(0.000-0.061)	0.000	0.001	(0.000-0.000)
36	Nass River	0.001	0.003	(0.000-0.005)	0.000	0.001	(0.000-0.001)	0.000	0.001	(0.000-0.001)
37	Upper Stikine R	0.000	0.001	(0.000-0.001)	0.002	0.007	(0.000-0.015)	0.003	0.007	(0.000-0.019)
38	Taku River	0.020	0.009	(0.007-0.036)	0.016	0.014	(0.000-0.043)	0.019	0.011	(0.002-0.039)
39	S Southeast AK	0.048	0.015	(0.026-0.074)	0.082	0.022	(0.049-0.121)	0.025	0.014	(0.006-0.052)
40	Andrew Creek	0.097	0.019	(0.068-0.129)	0.165	0.029	(0.119-0.214)	0.021	0.011	(0.007-0.041)
41	King Salmon	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
42	Chilkat R	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.003	0.004	(0.000-0.010)
43	Alsek R	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)
44	Situk R	0.000	0.000	(0.000-0.000)	0.000	0.001	(0.000-0.000)	0.000	0.001	(0.000-0.000)

Table 14.– Estimated contributions of 44 stock groups of legal-sized Chinook salmon encountered during each retention period of the summer troll fishery in Southeast Alaska, 2008. Run timing components are abbreviated as Sp (spring), Su (summer), Fa (fall), and Wi (winter). Sample sizes after weighting by quadrant are indicated (N).

		Retention Period 1			**Retention Period 2**		
		N = 394			**N =** 394		
		Relative Contribution			Relative Contribution		
	Region	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley Fa	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
2	Central Valley Sp	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
3	Central Valley Wi	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
4	California Coast	0.000	0.000	(0.000 - 0.000)	0.001	0.002	(0.000 - 0.006)
5	Klamath R Basin	0.000	0.000	(0.000 - 0.000)	0.002	0.002	(0.000 - 0.007)
6	N CA, S OR Coast	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
7	Rogue River	0.000	0.000	(0.000 - 0.000)	0.000	0.001	(0.000 - 0.001)
8	Mid Oregon Coast	0.026	0.010	(0.012 - 0.043)	0.027	0.010	(0.012 - 0.045)
9	N Oregon Coast	0.058	0.014	(0.036 - 0.083)	0.076	0.015	(0.052 - 0.102)
10	Lower Columbia Sp	0.001	0.002	(0.000 - 0.005)	0.000	0.001	(0.000 - 0.001)
11	Lower Columbia Fa	0.031	0.010	(0.016 - 0.049)	0.015	0.007	(0.005 - 0.028)
12	Willamette River	0.000	0.001	(0.000 - 0.000)	0.006	0.004	(0.001 - 0.014)
13	Mid Columbia Tule	0.000	0.000	(0.000 - 0.000)	0.008	0.005	(0.002 - 0.018)
14	Mid and Upp Columbia	0.000	0.000	(0.000 - 0.000)	0.000	0.001	(0.000 - 0.000)
15	Deschutes R Fa	0.009	0.012	(0.000 - 0.033)	0.003	0.006	(0.000 - 0.016)
16	Upp Columbia Su Fa	0.177	0.022	(0.141 - 0.215)	0.372	0.025	(0.331 - 0.414)
17	Snake R Fa	0.012	0.010	(0.000 - 0.030)	0.000	0.001	(0.000 - 0.001)
18	Snake River Sp Su	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
19	Washington Coast	0.096	0.016	(0.071 - 0.123)	0.195	0.021	(0.162 - 0.231)
20	Hood Canal	0.001	0.002	(0.000 - 0.006)	0.000	0.000	(0.000 - 0.000)
21	South Puget Sound	0.002	0.003	(0.000 - 0.008)	0.000	0.000	(0.000 - 0.000)
22	North Puget Sound	0.010	0.006	(0.002 - 0.021)	0.007	0.005	(0.001 - 0.018)
23	Juan de Fuca	0.000	0.001	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
24	Lower Fraser	0.000	0.001	(0.000 - 0.000)	0.003	0.003	(0.000 - 0.008)
25	Lower Thompson	0.000	0.001	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
26	South Thompson	0.267	0.023	(0.229 - 0.306)	0.045	0.011	(0.028 - 0.064)
27	North Thompson R	0.008	0.005	(0.002 - 0.018)	0.000	0.001	(0.000 - 0.000)
28	Mid Fraser	0.000	0.001	(0.000 - 0.000)	0.003	0.004	(0.000 - 0.012)
29	Upper Fraser	0.009	0.009	(0.000 - 0.026)	0.001	0.003	(0.000 - 0.009)
30	East Vancouver	0.005	0.004	(0.001 - 0.012)	0.043	0.010	(0.027 - 0.062)
31	West Vancouver	0.090	0.014	(0.068 - 0.115)	0.103	0.015	(0.079 - 0.129)
32	South BC Mainland	0.013	0.006	(0.005 - 0.024)	0.005	0.004	(0.000 - 0.013)
33	Central BC Coast	0.019	0.008	(0.008 - 0.034)	0.024	0.009	(0.012 - 0.040)
34	Lower Skeena	0.004	0.005	(0.000 - 0.016)	0.000	0.000	(0.000 - 0.000)
35	Upper Skeena	0.024	0.010	(0.010 - 0.042)	0.003	0.003	(0.000 - 0.009)
36	Nass River	0.000	0.001	(0.000 - 0.000)	0.003	0.003	(0.000 - 0.008)
37	Upper Stikine R	0.025	0.015	(0.000 - 0.052)	0.001	0.003	(0.000 - 0.007)
38	Taku River	0.000	0.001	(0.000 - 0.001)	0.000	0.001	(0.000 - 0.002)
39	S Southeast AK	0.034	0.013	(0.013 - 0.057)	0.033	0.010	(0.019 - 0.051)
40	Andrew Creek	0.076	0.016	(0.051 - 0.104)	0.019	0.008	(0.008 - 0.034)
41	King Salmon	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
42	Chilkat R	0.003	0.003	(0.000 - 0.008)	0.000	0.000	(0.000 - 0.000)
43	Alsek R	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
44	Situk R	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)

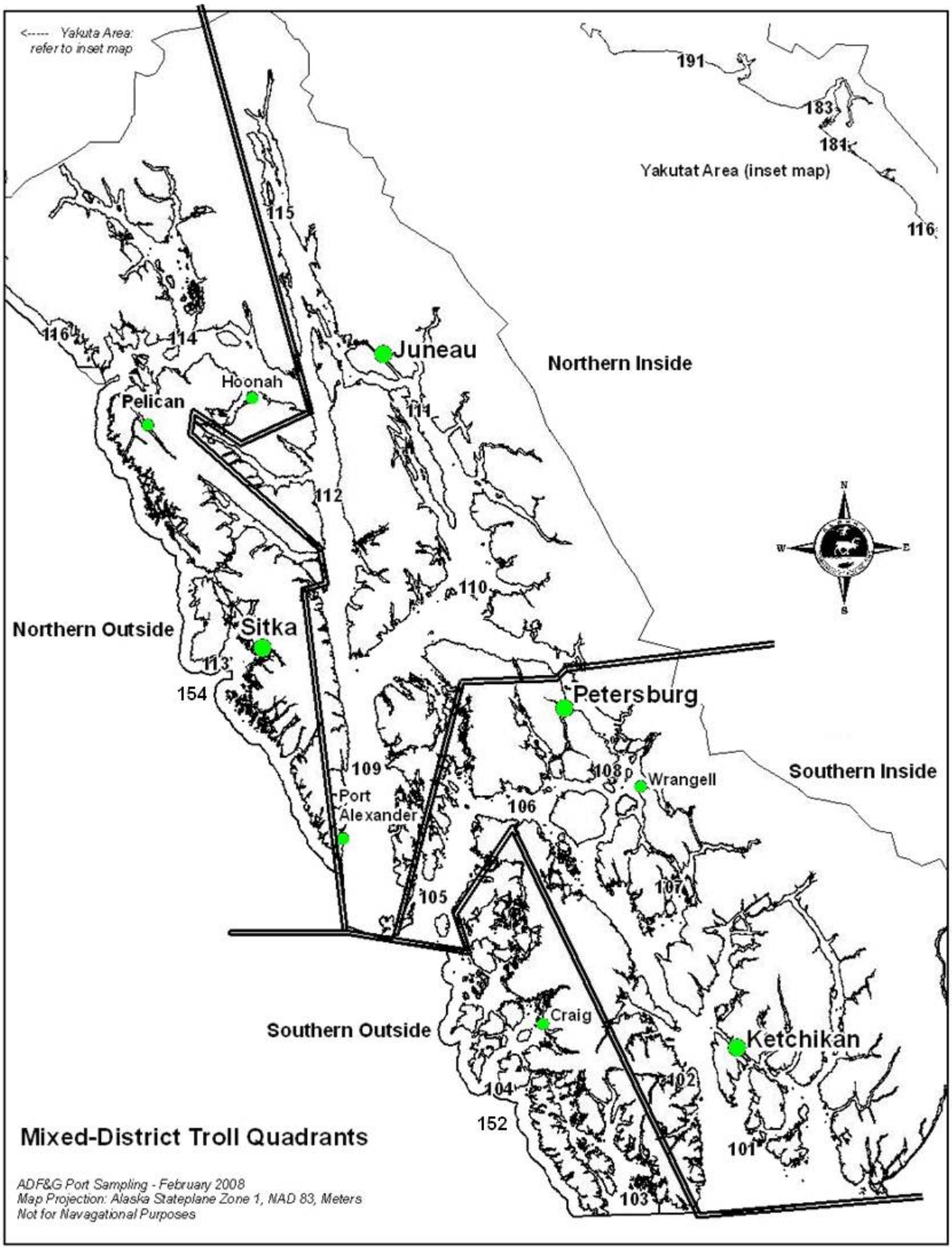

Figure 1. Location of Southeast Alaska ports and commercial fishing quadrants.

Appendix 1.–Location and collection details for each population of Chinook salmon included in the coastwide baseline of microsatellite data. Population numbers given correspond to the population numbers referenced in Table 2.

Region #	Region	Population #	Population	Run time	Origin	Life Stage	Collection Date
1	Central Valley fall	1	Battle Creek	Fa	W	Adult	2002, 2003
		2	Butte Creek	Fa	W	Adult	2002, 2003
		3	Feather Hatchery fall	Fa	H	Adult	2003
		4	Stanislaus River	Fa	W	Adult	2002
2	Central Valley spring	5	Butte Creek	Sp	W	Adult	2002, 2003
		6	Deer Creek	Sp	W	Adult	2002
		7	Feather Hatchery	Sp	H	Adult	2003
		8	Mill Creek	Sp	W	Adult	2002, 2003
3	Central Valley winter	9	Sacramento River winter	Wi	W/H	Adult	1992, 1993, 1994, 1995, 1997, 1998, 2001, 2003, 2004
4	California Coast	10	Eel River	Fa	W	Adult	2000, 2001
		11	Russian River	Fa	W	Juvenile	2001
5	Klamath River	12	Klamath River	Fa	W	Adult	2004
		13	Trinity Hatchery	Fa	H	Adult	1992
		14	Trinity Hatchery	Sp	H	Adult	1992
6	N California/S Oregon Coast	15	Chetco	Fa	W	Adult	2004
7	Rogue River	16	Applegate	Fa	W	Adult	2004
		17	Cole Rivers Hatchery	Sp	H	Adult	2004
8	Mid Oregon Coast	18	Coos Hatchery	Fa	H	Adult	2005
		19	South Coos	Fa	W, H	Adult	2000, 2005
		20	Coquille	Fa	W	Adult	2000
		21	Elk River	Fa	H	Adult	2004
		22	Millicoma River	Fa	W	Adult	2000
		23	Sixes River	Fa	W	Adult	2000, 2005
		24	Siuslaw	Fa	W	Adult	2001
		25	South Umpqua	Fa	H,W	Adult	2002
		26	Umpqua	Sp	W	Adult	2004
9	North Oregon Coast	27	Alsea	Fa	W	Adult	2004
		28	Nehalem	Fa	W	Adult	2000, 2002-1, 2002-2

Region #	Region	Population #	Population	Run time	Origin	Life Stage	Collection Date
		29	Kilchis River	Fa	Unk	Adult	2000, 2005
		30	Necanicum Hatchery	Fa	H,W	Adult	2005
		31	Nestucca Hatchery	Fa	H	Adult	2004, 2005
		32	Salmon River	Fa	Unk	Adult	2003
		33	Trask River	Fa	W	Adult	2005
		34	Wilson River	Fa	W	Adult	2005
		35	Yaquina River	Fa	W	Adult	2005
		36	Siletz	Fa	W	Adult	2000
10	Lower Columbia R. spring	37	Cowlitz H. spring	Sp	H		2004
		38	Kalama H. spring	Sp	H		2004
		39	Lewis H. spring	Sp	H		2004
11	Lower Columbia R. fall	40	Cowlitz H. fall	Fa	H		2004
		41	Lewis fall	Fa	W	Adult	2003
		42	Sandy	Fa	W	Adult	2002, 2004
12	Willamette River	43	McKenzie	Sp	H	Adult	2002, 2004
		44	North Santiam	Sp	H	Adult	2002, 2004-1, 2004-2
13	Mid Columbia R. tule fall	45	Spring Creek	Fa	H		2001, 2002
14	Mid and Upper Columbia R. spring	46	Carson H.	Sp	H		2001, 2004
		47	John Day	Sp	W	Juvenile, Adult	2000-1, 2000-2, 2000-3, 2000-4, 2000-5, 2000-6, 2004
		48	Upper Yakima	Sp	H	Adult, Mixed	1998, 2003
		49	Warm Springs Hatchery	Sp	H		2002, 2003
		50	Wenatchee Hatchery	Sp	H	Adult	1998, 2000
		51	Wenatchee River	Sp	W	Adult	1993, 1998, 2000
15	Deschutes River fall	52	Upper Deschutes River	Su/Fa	W	Juvenile	1998, 1999, 2002

Region #	Region	Population #	Population	Run time	Origin	Life Stage	Collection Date
		53	Lower Deschutes R.	Fa	W		1999-1, 1999-2, 2001, 2002
16	Upper Columbia R. summer/fall	54	Hanford Reach CR	Su/Fa	W	Adult, ?	1999, 2000-1, 2000-2, 2000-3, 2001-1, 2001-2, 2001-3
		55	Methow R. summer	Su/Fa	W		1992, 1993, 1994
		56	Wells Dam	Su/Fa	H		1993-1, 1993-2
		57	Wenatchee River	Su/Fa	W	Adult	1993-1, 1993-2
17	Snake River fall	58	Lyons Ferry	Fa	W	Adult	2002-1, 2002-2, 2003-1, 2003-2
18	Snake River spring/summer	59	Imnaha R.	Sp/Su	W		1998, 2002, 2003
		60	Minam R.	Sp/Su	W		1994, 2002, 2003
		61	Newsome Creek	Sp/Su	W	Adult	2001, 2002
		62	Rapid River H.	Sp/Su	H		1997, 1999, 2002
		63	Sesech R.	Sp/Su	W		2001, 2002, 2003
		64	Tucannon	Sp/Su	W	Adult	2003-1, 2003-2
		65	Tucannon	Sp/Su	H	Adult	2003
		66	West Fork Yankee Fork	Sp/Su	W		2005
19	Washington Coast	67	Forks Creek	Fa	H	Adult	2005
		68	Hoh River	Fa	W	Adult	2004, 2005
		69	Humptulips	Fa	H	Adult	1990
		70	Makah Hatchery	Fa	H	Adult	2001, 2003
		71	Queets	Fa	W	Adult	1996, 1997
		72	Quillayute/ Bogachiel	Fa	W	Adult	1995-1, 1995-2, 1995-3, 1996-1, 1996-2
		73	Sol Duc	Sp	H	Adult	2003
20	Hood Canal	74	George Adams Hatchery	Fa	H	Adult	2005
		75	Hamma Hamma River	Fa	W	Adult	1999, 2000, 2001
21	South Puget Sound	76	Clear Creek	Fa	H	Adult	2005

Region #	Region	Population #	Population	Run time	Origin	Life Stage	Collection Date
		77	Hupp Sp Hatchery	Sp	H	Adult	2002
		78	South Prairie Creek	Fa	W	Adult	1998, 1999, 2002
		79	Soos Creek	Fa	H	Adult	1998-1, 1998-2, 2004
		80	Voights Hatchery	Fa	H	Adult	1998
		81	White River	Sp	H	Adult	1998-1, 1998-2, 2002
22	North Puget Sound	82	L. Sauk River	Su	W		1998
		83	Marblemount Hatchery	Sp	H		1997
		84	Marblemount Hatchery	Su	H		1997
		85	NF Nooksack	Sp	H,W	Adult	1999
		86	NF Stilliguamish	Su	H,W	Adult	1996, 2001-1, 2001-2
		87	Samish Hatchery	Fa	H	Adult	1998
		88	Skagit summer	Su	W	Adult	1994, 1995
		89	Suiattle (Skagit)	Sp	W	Adult	1989, 1998, 1999
		90	Skykomish River		W		2004, 2005
		91	Snoqualmie River		W		2005
		92	Stillaguamish Hatchery	Su	H	Adult	2004
		93	Upper Cascade River	Sp	W		1998
		94	Upper Sauk River	Sp	W		1998
		95	Upper Skagit River	Su	W		1998
		96	Wallace Hatchery	Su	H		2004, 2005
23	Jaun de Fuca	97	Dungeness River		W	Adult	2004-1, 2004-2
		98	Elwha Hatchery	Fa	H	Adult/Juv	1996-1, 1996-2, 2004
		99	Elwha River		W	Adult/Juv	2004-1, 2004-2
24	Lower Fraser River	100	Birkenhead River	Sp	H	Adult	1996, 1997, 1999, 2001, 2002, 2003
		101	Maria Slough	Su	W	Adult	1999, 2000, 2001
		102	West Chilliwack Hatchery	Fa	H	Adult	1998, 1999
25	Lower Thompson River	103	Nicola	Sp	H		1998, 1999
		104	Spius River	Sp	H	Adult	1996, 1997, 1998

Region #	Region	Population #	Population	Run time	Origin	Life Stage	Collection Date
26	South Thompson River	105	Lower Adams	Fa	H	Adult	1996
		106	Lower Thompson	Fa	W	Adult	2001
		107	M.Shuswap	Fa	H	Adult	1997
27	North Thompson River	108	Clearwater	Fa	W	Adult	1997
		109	Deadman Hatchery	Sp	H	Adult	1996, 1997, 1998, 1999
		110	Louis River	Fa	W	Adult	2001
		111	Raft River	Su	W	Adult	2001, 2002
28	Mid Fraser River	112	Chilko	Fa	W	Adult	1995, 1996, 1999, 2002
		113	Nechako	Fa	W	Adult	1996
		114	Quesnel	Fa	W	Adult	1996
		115	Stuart	Fa	W	Adult	1996
		116	Upper Chilcotin River	Sp	W	Adult	2001
29	Upper Fraser River	117	Morkill River	Fa	W	Adult	2001
		118	Salmon River (Fraser)	Sp	W	Adult	1997
		119	Swift	Fa	W	Adult	1996
		120	Torpy River	Fa	W	Adult	2001
30	East Vancouver Island	121	Big Qualicum	Fa	H	Adult	1996
		122	Cowichan Hatchery	Fa	H	Adult	1999, 2000
		123	Nanaimo Hatchery	Fa	H	Adult	1998, 2002
		124	Puntledge Hatchery	Fa	H	Adult	2000, 2001
		125	Quinsam	Fa	H	Adult	1996, 1998
31	West Vancouver Island	126	Conuma	Fa	H	Adult	1997, 1998
		127	Marble at NVI	Fa	H	Adult	1996, 1999, 2000
		128	Nitinat	Fa	H	Adult	1996
		129	Robertson	Fa	H	Adult	1996, 2003
		130	Sarita	Fa	H	Adult	1997, 2001
		131	Tahsis River	Fa	W	Adult	1996, 2002, 2003
		132	Tranquil River	Fa	W	Adult	1996, 1999
32	S BC Mainland	133	Klinaklini	Fa	W	Adult	1997
		134	Porteau Cove	Fa	H	Adult	2003
33	Central BC Coast	135	Atnarko	Fa	H	Adult	1996

Region #	Region	Population #	Population	Run time	Origin	Life Stage	Collection Date
		136	Kitimat	Fa	H	Adult	1997
		137	Wannock	Fa	H	Adult	1996
34	Lower Skeena River	138	Ecstall	Fa	W	Adult	2000, 2001, 2002
		139	Lower Kalum	Fa	W	Adult	2001
35	Upper Skeena River	140	Babine	Fa	H	Adult	1996
		141	Bulkley	Fa	W	Adult	1999
		142	Sustut	Fa	W	Adult	2001
36	Nass River	143	Damdochax	Fa	W	Adult	1996
		144	Kincolith	Fa	W	Adult	1996
		145	Kwinageese	Fa	W	Adult	1996
		146	Owegee	Fa	W	Adult	1996
37	Upper Stikine River	147	Christina		W	Adult	2000, 2001, 2002
		148	Craig River		W	Adult	2001
		149	Little Tahltan River		W	Adult	1989, 1990
		150	Shakes Creek		W	Adult	2000, 2001, 2002
		151	Verrett River		W	Adult	2000, 2002, 2003
38	Taku River	152	Dudidontu		W	Adult	2005, 2006, 2008
		153	Kowatua Creek		W	Adult	1989, 1990
		154	Little Tatsamenie		W	Adult	2007
		155	Little Trapper		W	Adult	1999
		156	Nakina River		W	Adult	1989, 1990
		157	Tatsatua Creek		W	Adult	1989, 1990
		158	Upper Nahlin River		W	Adult	1989, 1990, 2004
39	Southern Southeast Alaska	159	Chickamin River		W	Adult	1990, 1993
		160	Chickamin River – Whitman		H	Adult	2005
		161	Clear Creek (Unuk R.)		W	Adult	1989, 2003, 2004
		162	Cripple Creek (Unuk R.)		W	Adult	1988, 2003
		163	Keta River		W	Adult	1989, 2003
		164	King Creek		W	Adult	2003
40	Andrews Creek	165	Andrews Creek		W	Adult	1989, 2004
		166	Andrews Creek – Crystal		H	Adult	2005
		167	Andrews Creek – MaCaulay		H	Adult	2005
		168	Andrews Creek – Medvejie		H	Adult	2005

Region #	Region	Population #	Population	Run time	Origin	Life Stage	Collection Date
41	Northern Southeast Alaska	169	King Salmon River		W	Adult	1989, 1990, 1993
42	Chilkat River	170	Big Boulder Creek		W	Adult	1992, 1995, 2004
		171	Tahini River		W	Adult	1992, 2004
43	North Gulf Coast, Alsek River	172	Blanchard River		W		2000, 2001, 2002, 2003
		173	Klukshu River		W	Adult	1989, 1990, 1991
		174	Takhanne		W	Adult	2000, 2001, 2002, 2003
		175	Klukshu		W	Adult	1987, 2000, 2001
44	Situk River	176	Situk River		W	Adult	1988, 1990, 1991, 1992