Fishery Data Series No. 13-26

Mixed Stock Analysis of Chinook Salmon Harvested in Southeast Alaska Commercial Troll Fisheries, 2004–2009

by

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June 2013

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

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

FISHERY DATA SERIES NO. 13-26

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June 2013

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This document should be cited as:
Gilk-Baumer, S., W. D. Templin, and L. W. Seeb. 2013. Mixed stock analysis of Chinook salmon harvested in Southeast Alaska commercial troll fisheries, 2004–2009. Alaska Department of Fish and Game, Fishery Data Series No. 13-26, Anchorage.

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ABSTRACT

Chinook salmon originating from Alaska, British Columbia, and the Pacific Northwest are commercially harvested in Southeast Alaska troll fisheries. Information used to manage this fishery under the Pacific Salmon Treaty come from various sources including coded wire tags and escapements. Reliance on stock composition estimates from these data is problematic as coded wire tags are not applied to all stocks contributing to the fishery and estimates of escapement or terminal run size are often not available or are poorly determined. Continuing from a pilot project started in 1998, the Alaska Department of Fish and Game has used mixed stock analysis to estimate the stock composition of Chinook salmon harvests in the Southeast Alaska troll fishery between 2004 and 2009, based on microsatellite loci developed by the Genetic Analysis of Pacific Salmonids group for use in Pacific Salmon Treaty fisheries. Results indicate considerable temporal and spatial variation in the composition of troll harvests within years, but consistent patterns of composition across years. The major contributors to the Southeast Alaska troll fisheries on an annual basis are the Andrew Creek, Southern Southeast Alaska, West Coast Vancouver Island, and Upper Columbia River (Summer/Fall) reporting groups. Other reporting groups, such as North Oregon Coast, Washington Coast, and South Thompson were also important contributors during some of the seasonal fisheries.

Key words: Chinook salmon, Southeast Alaska, troll fishery, mixed stock analysis, microsatellite

INTRODUCTION

Chinook salmon *Oncorhynchus tshawytscha* are commercially harvested in Southeast Alaska (SEAK) and Yakutat troll fisheries in State of Alaska and Federal Exclusive Economic Zone waters east of Cape Suckling and north of Dixon Entrance (Lynch et al. 2010). This area is divided into four quadrants for management purposes: Northern Outside (NO), Northern Inside (NI), Southern Outside (SO), and Southern Inside (SI; Figure 1). The troll fishery harvests mixed stocks[1] of Chinook salmon, including salmon originating from Alaska, British Columbia (BC), and the Pacific Northwest, and is therefore under the jurisdiction of the Pacific Salmon Treaty (PST). The 1985 treaty provides for cooperative management and research on fisheries harvesting Chinook salmon from populations in Canada and the U.S., and a quota system for regulating Chinook salmon harvests in SEAK was established according the PST Annexes and Related Agreements (CTC 2001).

The annual all-gear quota for Chinook salmon in SEAK is specified by the Pacific Salmon Commission (PSC). Since the majority of the quota is allocated to the commercial troll fishery (e.g., the troll fleet harvested approximately 74% of the PST quota in the 2009 season), close management of the troll harvest throughout the seasonal fisheries is essential to achieving and not exceeding the PST quota (ADF&G 2000; Lynch et al. 2010). The winter troll fishery (October 1 through April 30) is managed to not exceed the Guideline Harvest Level of 45,000 Chinook salmon. Until 2003, the winter fishery closed by regulation on April 14. Beginning in 2003, new regulations allowed the fishery to remain open through April 30 or until the Guideline Harvest Level was reached. The spring troll fishery (May 1 or earlier through June 30) targets Chinook salmon from SEAK hatcheries, most of which are not counted against the PST quota. The summer troll fishery (July 1 through September 30) is managed to target the remainder of the treaty quota by allowing retention of Chinook salmon during two or more periods.

The annual quota is dependent on the projected abundance of Chinook salmon forecasted by the Chinook Technical Committee (CTC) of the PSC using the Chinook salmon model (CTC 2001; Lynch et al. 2010). The Chinook salmon model uses catch, escapement, coded wire tag recovery,

[1] In this report, a population refers to a locally interbreeding group of salmon that is distinguished by a distinct combination of genetic, phenotypic, life history, and habitat characteristics, and a stock refers to an aggregation of two or more populations which occur in the same geographic area and are managed as a unit.

and recruitment information to forecast relative abundance in treaty fisheries. Relative stock proportion information is an important component of the Chinook model, and currently coded wire tag data is used for this purpose. However, reliance on stock composition estimates from coded wire tag data and the Chinook model can be problematic as coded wire tags are not applied to all stocks contributing to the fishery and the estimates of escapement and terminal run size of important stocks are often not available or are poorly determined. Genetic mixed stock analysis (MSA) has been suggested as an alternative means to generate stock composition estimates for these fisheries, the results of which could be integrated into a coordinated coastwide management system.

MSA has been used extensively to estimate the contribution of genetic aggregates to mixed-stock fisheries for Chinook salmon occurring in the Columbia River, Yukon River and western and southcentral Alaska (Beacham et al. 2008; Decovich et al. 2010; Templin et al. 2011a). This method uses the genetic stock structure of a species (baseline) to estimate the contribution of each stock to a mixture given the frequency of genetic marks in the mixture. Between 1999 and 2003, the State of Alaska Department of Fish and Game (ADF&G) used mixed stock analysis based on a coastwide allozyme database (Teel et al. 1999) to estimate the composition of the commercial troll fishery harvest (Crane et al. 2000; Templin et al. 2011b).

Since 1999, the CTC has explored the inclusion of MSA estimates of the Alaska commercial harvest as part of the decision-making process. To make this possible, the Genetic Analysis of Pacific Salmonids, a cooperative project among 10 laboratories, was funded to develop a standardized DNA database for stock identification of Chinook salmon. This process began in 2002, and a standardized baseline was available during the summer of 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, plus an additional 10 populations from transboundary rivers for a total of 176 populations (Appendix A1). Initial results indicate that 44 reporting groups can be identified in mixtures with acceptable accuracy and precision (Table 1; Seeb et al. 2007). Expansion of the baseline continues and the next version will include additional populations provided by both ADF&G and the Department of Fisheries and Oceans Canada.

The study reported here continued the use of MSA begun in 1999, but uses the baseline of microsatellites to provide independent estimates of the stock composition of the SEAK troll fishery.

OBJECTIVES

The goal of the MSA effort reported here was to use the available coastwide baseline of microsatellite markers to estimate the stock composition of Chinook salmon harvested in the SEAK commercial troll fisheries during Accounting Years[2] (AY) 2004–2009. Project objectives were to:

1. Sample Chinook salmon from the SEAK troll fishery harvests in a representative manner to provide stock composition estimates of the harvest within 5% of the true value 90% of the time.

[2] The PST accounting year begins with the start of the winter fishery on October 11 of the previous calendar year and ends the following September; e.g., AY 2004 is October 1, 2003 through September 30, 2004.

2. Survey Chinook salmon sampled from the SEAK troll fishery for individual genotypes at the 13 microsatellite loci in the coastwide baseline.
3. Estimate the relative contribution of each reporting group for the following fisheries in AY 2004–2009:
    a. Early winter (October–December) and late winter (January–April) troll fisheries in the NO quadrant, and across all quadrants for the late winter troll fishery;
    b. Spring troll fisheries (May–June) with separate estimates for Chinook salmon harvested in the NO, NI, and SI quadrants;
    c. Summer troll fisheries (July–September) with separate estimates for the first Chinook salmon opening and subsequent openings combined for Chinook salmon harvested across all quadrants and in the NO quadrant alone.

METHODS

FISHERY SAMPLING

Chinook salmon were collected from landings at processors at various ports in SEAK (Table 2; Figure 1). Fish were selected for sampling without regard to size, sex, presence of an adipose fin, or position in the hold or tote, and sampling was conducted in such a manner as to be representative as possible of that week's commercial catch. Axillary processes (the modified and elongated scale found at the anterior base of the pelvic fin) were excised from each fish and placed in a 2 ml cryovial in at least 95% denatured ethanol. Troll fishermen were interviewed to determine the quadrant (NO, NI, SO, or SI) from which the Chinook salmon were harvested. At the end of the season, samples were shipped air cargo back to the ADF&G Gene Conservation Laboratory in Anchorage for analysis. Associated data were archived as part of the age sex length database maintained by ADF&G.

Samples were collected from two periods during the winter: early winter (October through December) and late winter (January through April; Table 2). During the early winter troll fishery, most of the harvest is taken in the NO quadrant (70–75%). For this reason, sampling of the early winter fishery harvests in AY 2004 was limited to this quadrant and the all-quadrant estimate was derived from this quadrant only. In subsequent years sampling was extended to all four quadrants. During the late winter fishery, sampling was extended to ports in the NI and SI quadrants in all years.

During the spring troll fishery, areas open to fishing are found throughout SEAK with the exception of the SO quadrant (Table 2). Samples were collected from six ports, and target sample sizes were set to provide stock contribution estimates for harvests from each of the NO, NI, and SI quadrants independently.

Chinook salmon harvested during the summer troll fisheries were sampled from landed catch in all quadrants and from at least seven ports (Table 2). Samples were collected in order to generate estimates for two periods during the summer: the first opening (July) and all subsequent openings combined (August through September). Sample sizes in the NO quadrant were set so that stock contributions to the harvest in this quadrant could be estimated for each of the time periods in addition to an all-quadrant estimate.

MIXED STOCK ANALYSIS

Laboratory Analysis

Samples were assayed for DNA loci developed by the Genetic Analysis of Pacific Salmonids group for use in Treaty fisheries (Seeb et al. 2007). DNA was extracted from fin and muscle tissue using DNeasy®, 96-tissue kits (QIAGEN® Valencia CA[3]). Polymerase chain reaction (PCR) was carried out in 10 ul reaction volumes (10 mM Tris-HCl, 50 mM 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, $MgCl_2$ concentrations and the corresponding annealing temperature for each primer are available in Seeb et al. 2007. PCR fragment analysis was done on an AB 3730 capillary DNA sequencer. A 96-well reaction plate was loaded with 0.5 ul PCR product along with 0.5 ul of GS500LIZ (AB) internal lane size standard and 9.0 ul 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 CTC.

Genetic data were collected as individual multilocus 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. By the process of sizing the alleles from the holotype specimens, any individual laboratory should be able to convert allele sizes obtained in the laboratory to standardized allele names. Genotype data were stored as GeneMapper (*.fsa) files on a network drive that was backed up nightly. Long-term storage of the data was in an *Oracle* database (*LOKI*) on a network drive maintained by ADF&G computer services.

Several measures were implemented to insure the quality of data produced. First, each individual tissue sample was assigned a unique accession identifier. At the time DNA was extracted or analyzed from each sample, a sample sheet was created that linked each individual sample's code to a specific well number in a uniquely numbered 96-well plate. This sample sheet then followed the sample through all phases of the project, minimizing the risk of misidentification of samples through human-induced errors. Second, genotypes were assigned to individuals using a system in which two individuals score the genotype data independently. Discrepancies between the two sets of scores were then resolved with one of two possible outcomes: (1) one score was accepted and the other rejected, or (2) both scores were rejected and the score was blanked. Lastly, approximately 8% 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.

Statistical Analysis

Mixture Subsampling

Representative mixtures of individuals for MSA were created by subsampling individuals from the collected tissue samples in proportion to harvest by quadrant. The harvest of Chinook salmon in each quadrant for a given troll fishery opening was obtained from the ADF&G Mark, Tag, and

[3] Product names used in this publication are included for completeness but do not constitute an endorsement.

Age Laboratory website (http://tagotoweb.adfg.state.ak.us/CWT/reports/) using the criteria in Table 3. The relative proportion of the total period harvest that was caught in each quadrant was then calculated for each fishery opening.

Individual samples were randomly selected from the entire set of samples available from each quadrant such that the contribution of each quadrant to the sample mixture reflected the composition of the harvest. When sufficient samples were available, the target sample size for each mixture was 400. Thompson (1987) demonstrated that under a worst-case scenario, with no prior information, multinomial proportions could be estimated to within 5% of the true value 90% of the time with a mixture sample size of approximately 400. When the available samples from a given quadrant were fewer than needed to adequately represent the quadrant in a mixture of 400, the total sample size was reduced to the point where each quadrant was represented in the proper proportions. In some cases, the total sample size required from this method could be reduced to a level where the increase in variance due to small sample size might outweigh the presence of bias due to disproportionate representation in the sample. In these cases the decision was made to maintain a larger sample size, with a target sample size of at least 200. Under the same assumptions above, multinomial proportions can be estimated to within 7% of the true value 90% of the time with sample size of approximately 200. In addition, in some cases fewer than 200 individuals were available to generate an estimate. While a sample size below 200 did not meet objectives for precision and accuracy, strata with sample sizes of 100–200 were deemed useful for management information and thus estimates were generated to the four broad-scale reporting groups outlined in Table 1. No estimates were generated for sample sizes less than 100.

Following this procedure, each of the 10 sets of stock composition estimates was derived for each accounting year as follows:

1. Early winter fishery (October–December): Up to 400 individuals from the NO quadrant.
2. Late winter fishery (January–April)
    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 (May–June)
    a. Quadrant specific: Up to 400 individuals from each of the NO, NI, and SI quadrants to create three separate mixture samples.
4. Summer fishery (July–September)
    a. First retention period (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. Second and subsequent retention periods (August–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 in proportion to the relative harvest from each period.

BAYES Analysis

The stock composition of fishery mixtures were estimated using the program BAYES (Pella and Masuda 2001). The Bayesian model implemented by BAYES uses a Dirichlet distribution as the prior distribution for the stock proportions. In this analysis, prior parameters for each of the 44 fine-scale reporting groups were defined to be equal (i.e., a flat prior) with the prior for a reporting group divided equally among populations within that reporting group. The sum of all prior parameters was set to 1 (prior weight), which is equivalent to adding 1 fish to each mixture (Pella and Masuda 2001). We ran three independent Markov Chain Monte Carlo chains of 15,000 iterations with different starting values and discarded the first 7,500 iterations to remove the influence of the initial start values. In order to assess the among-chain convergence, we examined the Gelman-Rubin shrink factors computed for all stock groups in BAYES (Gelman and Rubin 1992). If a shrink factor for any stock group in a mixture was greater than 1.2, we reanalyzed the mixture with 30,000 or 60,000 iterations. No mixture had a shrink factor greater than 1.2 in the reanalysis. Estimates and 90% credibility intervals were tabulated from the combined set of the second half of the three chains. Credibility intervals differ from confidence intervals in that they are a direct statement of probability; i.e., a 90% credibility interval has a 90% chance of containing the true answer (Gelman et al. 2000). The credibility intervals reflect both sampling error and genetic assignment error. We repeated this procedure for each fishery mixture.

For ease of interpretation, the 44 fine-scale reporting groups were condensed into 17 medium-scale reporting groups (Table 1). The 17 reporting groups included 16 individual reporting groups, each of which were estimated to have contributed at least 5% to the harvest in at least one seasonal fishery, and an additional "other" group composed of the remaining 28 reporting groups. The fine-scale reporting groups were also combined into four broad-scale reporting groups for describing trends on a larger scale. When reporting groups were combined, credibility intervals were calculated from the raw BAYES output using the new groupings.

RESULTS

FISHERY SAMPLING

Sampling of Chinook salmon for each accounting year began in October of the preceding year with the early winter fishery, and continued into April with the late winter fishery. While the sample goals for these periods varied, goals were not always met for all ports (Table 2). This was primarily caused by inclement weather reducing the fishing effort in early periods or less intensive harvest sampling during portions of the harvest season. For winter fisheries, only the AY 2004 early winter troll fishery had fewer than 200 samples available; in this case, estimates were generated only to the four broad-scale reporting groups described in Table 1.

Sampling of Chinook salmon during the spring troll fishery occurred between April and June for each year. Similar to winter fisheries, sample goals varied over the years and sample goals were not always met for every port or quadrant (Table 2). This was primarily caused by less intensive harvest sampling or lack of fishing effort in those areas. Sample sizes were between 100 and 200 for the following estimates: in the NI quadrant for AY 2005, 2006, 2008, and 2009; and in the SI

quadrant for AY 2005 and 2006. In these cases, estimates were generated to the four broad-scale reporting groups only (Table 1). Insufficient sample sizes (<100) were available to generate estimates for the following fisheries: AY 2004 and 2007 spring troll in the NI quadrant.

Sampling of Chinook salmon during the first retention period of the summer troll fishery occurred in July of each year, and during the second retention period in August of each year. In AY 2005, a third retention period occurred in September; these samples were combined with the second retention period to generate an overall estimate. Sample goals were not always met for every port or quadrant (Table 2). This was primarily caused by less intensive harvest sampling or lack of fishing effort in those areas. However, sample sizes were sufficient to generate estimates to the fine-scale reporting groups in all years.

MIXED STOCK ANALYSIS

Winter Troll Fishery

Early Winter

In the early winter Chinook troll fishery at the broad-scale reporting groups, there was a trend of decreasing contributions of the California/Oregon/Washington (CA/OR/WA) reporting group from AY 2004–2007 (range: 13–69%) and a slight increase again 2008–2009 (range: 20–23%; Figure 2). The contribution of the Alaska reporting group increased and then declined over the same time periods (range: 8–32%). The Canada reporting group remained prominent over the entire period (range: 34–56%), while the Transboundary group had low contributions (range: <1–3%).

At the medium- and fine-scale reporting groups, the greatest contributor to the early winter fishery in AY 2005 was the Upper Columbia River Summer/Fall (Su/F) reporting group (27%; Figure 3; Appendices B1, B2). Contribution of this reporting group declined after 2005, however, and the 2006–2009 fisheries were comprised primarily of the Southern Southeast Alaska (range: 16–26%) and Central BC Coast (range: 19–27%) reporting groups. The East and West Vancouver Island reporting groups contributed 10–31% combined each year.

Late Winter

At the broad-scale reporting groups for the late winter Chinook troll fishery, the Canada reporting group was the largest contributor (range: 56–66%; Figure 2). The CA/OR/WA reporting group was a larger contributor in early years (range: 11–24%), but declined since AY 2004 while the Alaska reporting group increased to a high of 24% in 2008. The contribution of the Transboundary reporting group remained low (range: 4–9%), but increased slightly over the study period.

When the populations were combined into medium- or fine-scale reporting groups, the late winter fishery was dominated by the West Vancouver Island group in all years (range: 23–44%; Figure 4; Appendices B3, B4). Other larger contributors were the Central BC (range: 6–16%), Upper Columbia River (Su/F) (range: 5–11%), Southern Southeast Alaska (range: 6–13%), and South Thompson (range: 2–10%) reporting groups. The Andrew Creek reporting group contributed 11% in AY 2008. When considering harvest from the NO quadrant only, stock contributions were similar to region-wide estimates although Alaska stocks composed less of the fishery (Figure 5; Appendices B5, B6).

Spring Troll Fishery

At the four broad-scale reporting groups, both the Canada and Alaska reporting groups were large contributors to the spring troll fishery in the NO quadrant for AY 2004–2009, while the Alaska group was the greatest contributor in the NI and SI quadrants (Figure 6). The Alaska reporting group was the highest contributor to harvests in the NO quadrant in AY 2004, 2007, and 2008 (range: 47–54%), but Canadian stocks were more important in AY 2005, 2006 and 2009 (range: 37–49%). Contributions from the Transboundary and CA/OR/WA reporting groups in the NO quadrant remained low (range: 5–15%) across all years except for AY 2006, when the Transboundary reporting group was a larger component of the harvest (31%). In the NI quadrant, the Alaska reporting groups was the highest contributor in all three accounting years where sufficient samples were available (range: 35–72%), followed by the Canada (range: 16–32%), Transboundary (range: 11–25%), and CA/OR/WA (range: 1–9%) groups. In the SI quadrant, the Alaska reporting group was the greatest contributor in all years (range: 48–75%). The Transboundary reporting group was the second largest contributor in AY 2004, 2005, and 2009 (range: 18–29%), but contributed less in 2006–2008 (range: 7–12%). The Canada reporting group contributed 13–22% to the SI quadrant harvest each year, and contributions from the CA/OR/WA group remained low in all years (range: 4–6%).

When populations were combined into medium- and fine-scale reporting groups, the Andrew Creek and Southern Southeast Alaska reporting groups were the largest contributors to the spring troll fishery in most years. Harvests in the NO quadrant were typically dominated by the Andrew Creek reporting group (range: 13–44%) and the West Vancouver Island reporting group (range: 16–34%; Figure 7; Appendices B7, B8). The AY 2006 fishery, however, had a greater variety of stocks represented in the mixture estimates; the Taku River, Upper Stikine River, and Southern Southeast reporting groups contributed 11–17% each. In the SI quadrant, harvests were typically dominated by the Southern Southeast Alaska reporting group (range: 27–56%; Figure 8; Appendices B9, B10). The Upper Stikine River and Andrew Creek reporting groups contributed 7–28% and 6–34% each year, respectively. Insufficient samples were available to generate fine- or medium-scale estimates for harvests from the NI quadrant during the spring troll fisheries.

Summer Troll Fishery

First Retention Period

The stock composition of summer Chinook troll fisheries was more varied than other seasonal fisheries in SEAK, and had greater representation of non-Alaska stocks. At the broad-scale reporting groups during the first retention period, the CA/OR/WA reporting group dominated the stock composition in AY 2004–2006 and 2009 (range: 47–62%), and the Canada group was dominant in 2007 and 2008 (range: 44–50%; Figure 9). The Alaska reporting group contributed 6–14% of the total each year, and contributions of the Transboundary reporting group were low each year (range: <1–3%).

At the medium- and fine-scale, the first retention periods in AY 2004, 2005, and again in 2009 were dominated by the Upper Columbia River (Su/F) reporting group (range: 21–31%; Figure 10; Appendices B11, B12). Though this reporting group still contributed in other years, the predominant reporting group in AY 2006–2008 was South Thompson River (range: 18–27%). The West Vancouver Island reporting group was also an important contributor in all years (range: 7–19%), as were the Washington Coast (range: 9–12%) and North Oregon Coast reporting groups (range: 4–14%). The Mid Oregon Coast reporting group contributed 8–9% in

AY 2004 and 2005; the Southern Southeast Alaska reporting group contributed 6–11% in AY 2005, 2007, and 2009; and the Andrew Creek reporting group was present in all years (range: 1–8%). Stock compositions in the NO quadrant during the first retention period were similar to estimates for the entire area, with harvests dominated by the Upper Columbia River (Su/F) reporting group in most years (range: 13–30%; Figure 11; Appendices B13, B14). Also contributing were the South Thompson (range: 9–21%), West Vancouver Island (range: 7–17%), Washington Coast (range: 11–13%), and North Oregon Coast (range: 3–14%) reporting groups.

Second and Subsequent Retention Periods

In the second and subsequent retention periods at the broad-scale reporting groups, the CA/OR/WA reporting group was the largest contributor in all years (range: 55–76%), followed by the Canada reporting group (range: 15–32%; Figure 9). The Alaska reporting group contributed 5–12% of the total each year, and contributions of the Transboundary reporting group were low (≤1% each year).

At the medium- and fine-scale reporting groups, the largest contributor to the second and subsequent retention periods troll fishery in most years (all but AY 2007) was the Upper Columbia River (Su/F) reporting group (range: 18–37%; Figure 12; Appendices B15, B16). The Washington Coast reporting group was also a larger contributor (range: 10–23%). The West Vancouver Island reporting group contributed 6–14% each year, the North Oregon Coast reporting group contributed 5–13%, the South Thompson River reporting group contributed 3–10%, and the Mid Oregon Coast reporting group contributed 2–17%. The Southern Southeast Alaska reporting group was important in AY 2005–2007 and again in 2009 (range: 5–11%). Stock compositions in the NO quadrant during the second and subsequent retention periods were similar to estimates for the entire area. The largest contributor in most years was the Upper Columbia River (Su/F) reporting group (range: 18–37%; Figure 13; Appendices B17, B18).

DISCUSSION

Genetic mixed stock analysis based on the microsatellite baseline for Chinook salmon was successfully used to estimate the stock composition of the commercial troll fishery harvests in SEAK during AY 2004–2009. These estimates indicate that the composition of the harvest varies annually and by seasonal fishery.

Comparisons between analyses using microsatellite markers (this report) versus those using allozyme markers (Templin et al. 2011b) can be made, but must be interpreted cautiously as both the number of populations and reporting groups changed between the studies. Templin et al. (2011b) included 252 populations with 28 reporting groups while CTC Version 2.1 baseline includes 176 populations and 44 reporting groups. In several cases reporting groups from Templin et al. (2011b) were split into additional reporting groups as a result of the increased discrimination resulting from microsatellites (Mid/North Oregon Coastal to Mid Oregon Coast and North Oregon Coast; Lower Columbia River to Lower Columbia River [Spring] and Lower Columbia River [Fall]; Upper Columbia River [Su/F]/Snake [F] to Upper Columbia River [Su/F] and Snake River [F]; Puget Sound to South Puget Sound and North Puget Sound; Thompson River to Lower Thompson River, South Thompson River and North Thompson River; Skeena River to Lower Skeena River and Upper Skeena River; and Alaska/British Columbia Transboundary to Upper Stikine River, Taku River, and Andrews Creek).

When each of the seasonal fisheries is considered the composition is variable. During the winter fisheries from October to April, the prevalence of the Upper Columbia (Su/F) reporting group decreased from the early winter fishery to the late winter fishery. This group was consistently strong throughout the winters of 1999 to 2003 (Templin et al. 2011b). At the same time, the West Vancouver Island reporting group increased from 3–14% of the harvest in the early winter fishery to 23–44% in the late winter fishery. Similarly, the Strait of Georgia composed large proportions of the winter fishery from 1999 to 2003 (Templin et al. 2011b). Both groups were more prevalent in AY 2004 and 2005 fisheries while more northern stocks became more prevalent in subsequent years. During the spring fishery, when fishing effort is concentrated on harvesting Alaska stocks, stock composition estimates indicate Southern Southeast Alaska and Andrew Creek reporting groups combined comprised 23–50% of the harvest in the NO quadrant and 60–75% in the SI quadrant, and likely a large portion of the NI quadrant harvest. The Southern Southeast Alaska reporting group comprised 47–58% of the spring harvest from 1999–2003 (Templin et al. 2011b). The Transboundary reporting group contributed an additional 5–31% of the harvest in the NO quadrant, 11–25% in the NI quadrant, and 7–29% in the SI quadrant; this is an increase from the 1999 to 2003 contribution of 4–11% (Templin et al. 2011b). The largest contribution that the Transboundary reporting group made during the year was to the spring harvest.

Temporal variation in stock composition also occurs on shorter timescales. The retention periods during the summer troll fishery are usually separated by 4 to 6 weeks and the contribution by some reporting groups can vary widely between these periods. For example, the Washington Coast and Upper Columbia (Su/F) reporting groups combined contributed 22–41% during July and 31–57% in August and September, while the South Thompson, East Vancouver Island, and West Vancouver Island reporting groups combined contributed 22–38% in July and 11–24% in August and September. The North Oregon Coast reporting group had less variability, contributing 4–14% for both summer fisheries. Though there was variability from year to year, in general there was a trend for increasing proportions of southern stocks over time.

In general, stock contribution estimates based on samples from the NO quadrant had the most diverse stock compositions and the highest proportion of southern stocks. For summer fisheries, stock contribution estimates based on samples from the NO quadrant were similar to estimates based on samples from all quadrants. This is likely a reflection of the high proportion of individuals harvested in this quadrant used in the mixture estimate relative to the other quadrants.

These results demonstrate the application of mixed stock analysis to estimate the stock composition of the SEAK troll fishery. Comparison of these results with estimates based on coded wire tags and the PSC Chinook model will require additional analysis, but already detailed information is available on the fishery stock composition of Chinook salmon that were not observable under previous methods.

CONCLUSIONS

1. There is considerable spatial and temporal variation in stock composition within years, but consistent patterns of contribution across years.
2. The reporting groups that contribute the highest proportion of fish to the SEAK troll fisheries on an annual basis are the Andrew Creek, Southern Southeast Alaska, West Coast Vancouver Island, and Upper Columbia River (Su/F) reporting groups. Other reporting groups, such as

North Oregon Coast, Washington Coast, and South Thompson were also important contributors during some of the seasonal fisheries.

3. The spring fishery is mainly composed of stocks from southern SEAK and associated transboundary rivers.

ACKNOWLEDGEMENTS

Laboratory analysis was performed with the assistance of Andy Barclay, Zac Grauvogel, and Beth McLain. We wish to thank Anne Reynolds, Grant Hagerman, Bill Bales, Jeff Rice and many other Alaska Department of Fish and Game employees for their assistance with the collection of troll fishery samples. Funding for these analyses was provided by the Pacific Salmon Commission under U.S. Letter of Agreement Award No. NA06NMF4380179 and Northern Fund Projects No. NF-2006-I-11, NF-2007-I-23, and NF-2008-I-14; NOAA Cooperative Agreement No. IJ05; Sustainable Salmon Fund Projects No. 45335, 45044, 45254, and 45476; and the State of Alaska.

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TABLES AND FIGURES

Table 1.–Reporting groups for the Chinook salmon coastwide baseline used to report stock composition of SEAK troll fishery harvests.

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

Note: Population numbers are listed in Appendix A1. Populations were combined into (1) 44 fine-scale reporting groups, (2) 17 medium-scale reporting groups, and (3) 4 broad-scale reporting groups.

Table 2.–Sampling goals and numbers of fish sampled from troll-caught Chinook salmon landings at processors at ports in SEAK for mixed stock analysis.

Fishery / Port	Quadrants Represented	2004 Goal	2004 Actual	2005 Goal	2005 Actual	2006 Goal	2006 Actual	2007 Goal	2007 Actual	2008 Goal	2008 Actual	2009 Goal	2009 Actual
Winter (October–April)													
Early Winter													
Sitka	NO	400	130	400	400	400	350	350	200	400	154	400	126
Yakutat	NO	30	30	ND	ND	30	17	30	30	30	25	30	30
Juneau	NI, NO	ND	ND	30	30	30	30	30	13	30	30	30	4
Ketchikan	SI, SO	ND	ND	40	6	40	30	40	40	40	31	40	29
Craig	SO, SI	ND	ND	20	20	20	0	20	19	20	5	20	8
Petersburg	NI, SI	ND	ND	25	25	25	25	25	23	25	25	25	25
		430	160	515	481	545	452	495	325	545	270	545	222
Late Winter													
Sitka	NO	400	400	400	460	400	500	350	350	350	350	350	350
Yakutat	NO	30	129	30	46	30	37	30	30	30	30	30	30
Juneau	NI, NO	ND	ND	40	400	40	40	30	30	30	30	30	30
Ketchikan	SI, SO	50	50	50	36	90	90	60	60	60	60	60	60
Craig	SO, SI	ND	ND	40	50	40	40	20	20	20	20	20	20
Petersburg	NI, SI	50	79	50	40	100	62	40	40	40	40	40	40
		530	658	610	1,032	700	769	530	530	530	530	530	530
Spring (May–June)													
Sitka	NO	300	300	300	300	300	300	300	300	300	300	300	300
Hoonah	NO, NI	75	75	75	75	75	75	75	75	75	75	75	75
Petersburg	NI	75	74	75	147	75	45	100	41	100	70	100	100
Wrangell	SI, NI	75	75	75	245	150	420	300	112	300	30	300	86
Ketchikan	SI, NI	200	200	200	278	200	300	200	200	200	200	200	200
Juneau	NI, NO	75	75	75	50	200	131	200	145	200	147	200	200
		800	799	800	1,095	1,000	1,271	1,175	873	1,175	822	1,175	961
Summer (July–September)													
Retention Period 1													
Yakutat	NO	30	30	30	30	30	30	30	30	30	30	30	30
Pelican	NO	30	60	30	30	30	30	60	60	60	80	60	60
Elfin Cove	NO	30	30	30	30	30	30	0	0	0	0	0	0
Sitka	NO	300	300	300	375	300	330	300	300	300	527	300	300
Hoonah	NO, NI	ND	ND	40	27	40	40	40	40	40	40	40	40
Petersburg	NI, SI	60	200	60	64	60	55	60	54	60	50	60	90

-continued-

Table 2.–Page 2 of 2.

Fishery	Port	Quadrants Represented	2004 Goal	2004 Actual	2005 Goal	2005 Actual	2006 Goal	2006 Actual	2007 Goal	2007 Actual	2008 Goal	2008 Actual	2009 Goal	2009 Actual
Summer (cont.)														
Retention Period 1														
	Port Alexander	NI	60	60	60	40	60	50	50	50	50	34	50	50
	Craig	SO	150	130	150	124	150	50	160	160	160	198	160	150
	Ketchikan	SI, SO	100	100	100	0	100	50	100	100	100	73	100	63
			760	910	800	720	800	665	860	794	860	1,032	860	783
Retention Period 2														
	Yakutat	NO	30	4	30	30	30	30	30	30	30	30	30	30
	Pelican	NO	30	30	30	30	30	36	60	60	60	60	60	34
	Elfin Cove	NO	30	15	30	30	30	10	60	0	60	0	60	0
	Sitka	NO	300	300	300	313	300	310	300	300	300	491	300	300
	Hoonah	NO, NI	ND	ND	40	40	40	40	40	40	40	40	40	40
	Petersburg	NI, SI	60	9	60	55	60	60	60	20	60	32	60	22
	Port Alexander	NI	60	18	60	50	60	50	50	50	50	28	50	50
	Craig	SO	50	70	50	53	50	50	60	60	60	137	60	60
	Ketchikan	SI, SO	50	50	50	50	50	50	50	50	50	150	50	50
			610	496	650	651	650	636	710	610	710	968	710	586
Total			3,130	3,023	3,375	3,979	3,695	3,793	3,710	3,132	3,760	3,622	3,760	3,082

Note: Quadrant names are abbreviated as follows: Northern Outside (NO), Northern Inside (NI), Southern Outside (SO), and Southern Inside (SI).

Note: ND indicates that no samples were collected.

Table 3.–Selection criteria used to generate the Commercial Harvest Expansion Report on the ADF&G Mark, Tag, and Age Laboratory website (http://tagotoweb.adfg.state.ak.us/CWT/reports/).

Criteria	Values
Years	2004, 2005, 2006, 2007, 2008, 2009
Species	410
Gear Class Codes	5
Harvest Codes	11, 13
Time Code	P
Time Value Range	1, 54
Area Code	Q- Quadrants
Districts	ALL
Quadrants	NE, NW, SE, SW (correspond to NI, NO, SI, SO respectively)
Stat Area Values	ALL

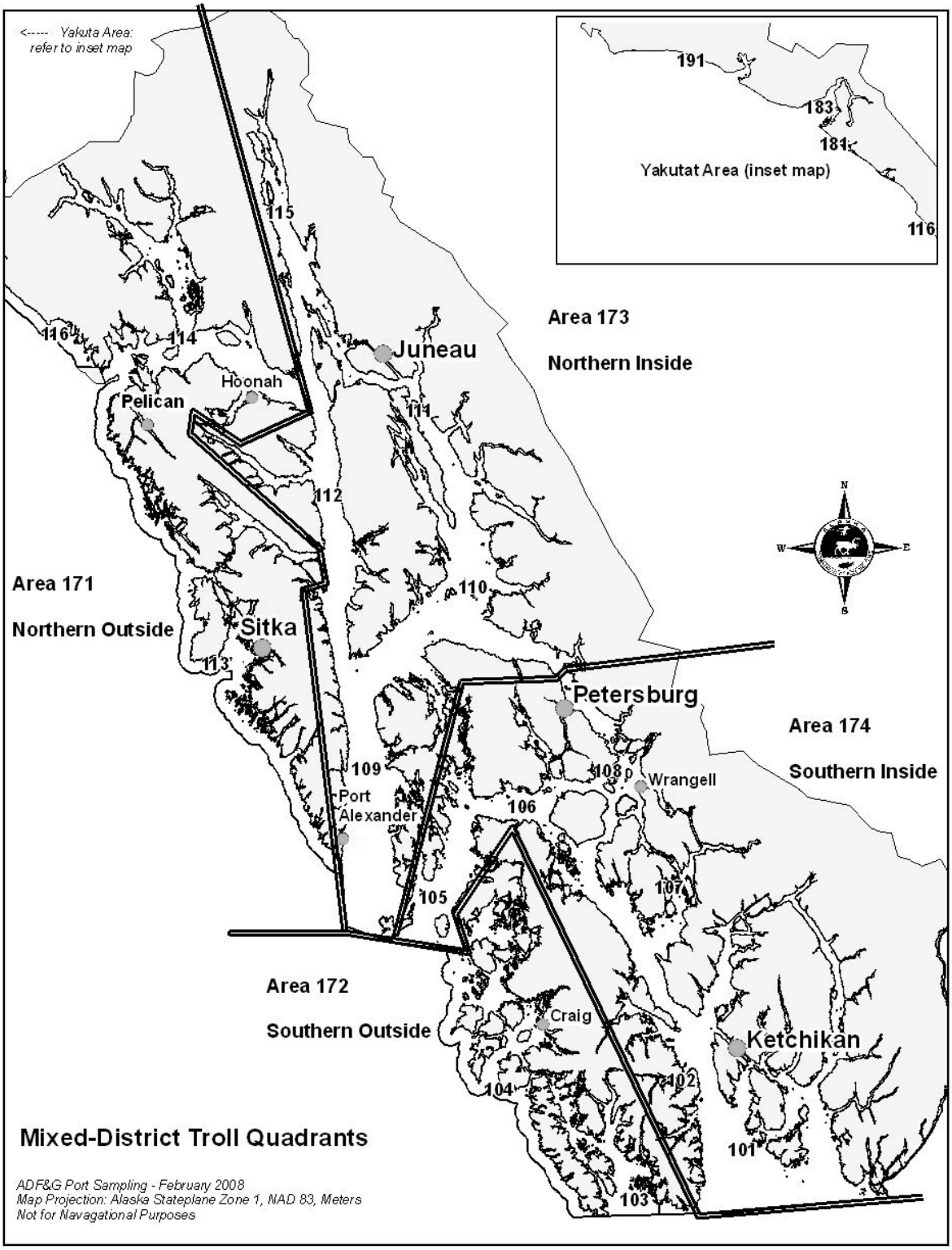

Figure 1.–Location of Southeast Alaska troll fishing quadrants and ports.

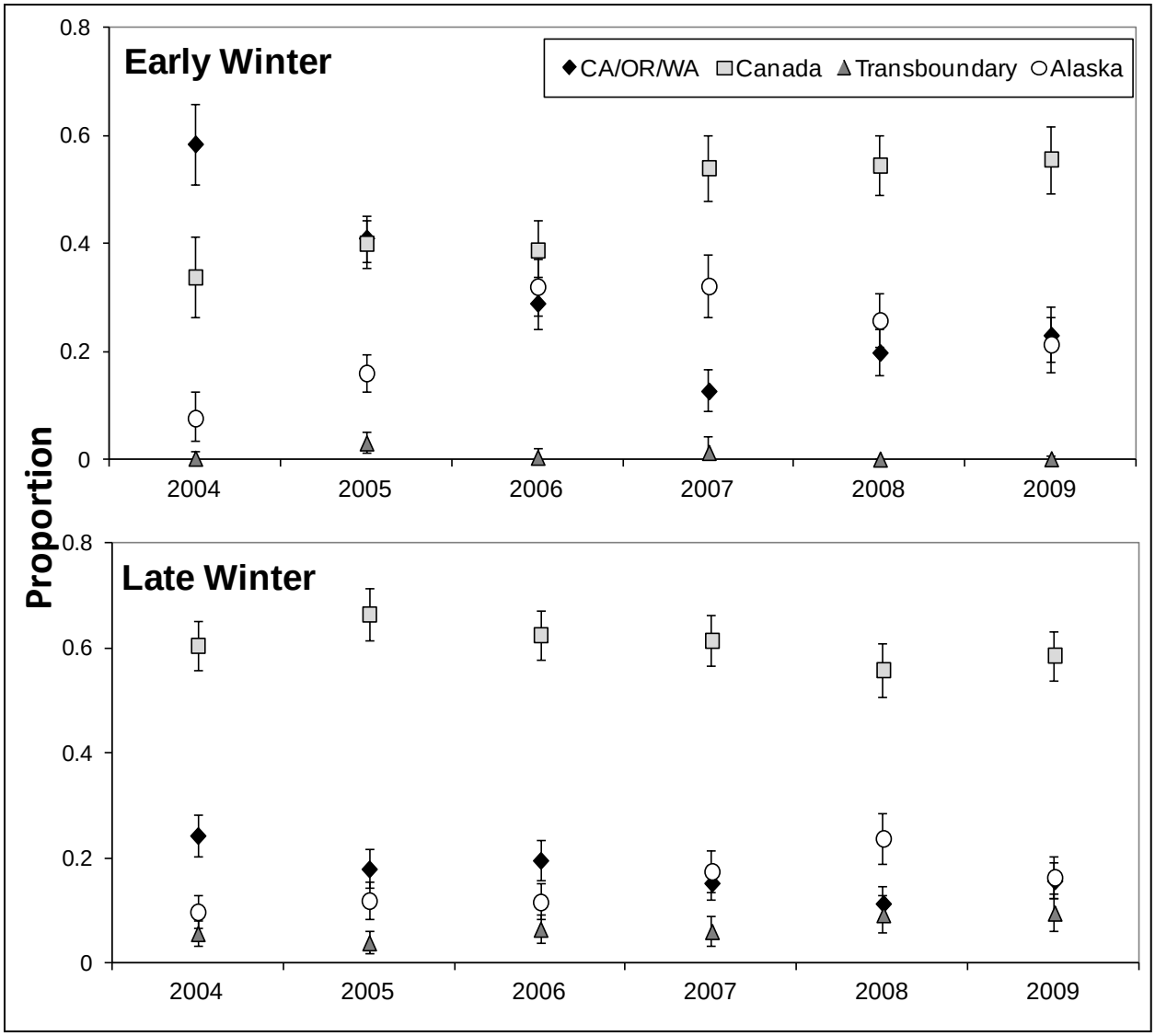

Figure 2.–Estimated contributions and 90% credibility intervals of 4 broad-scale reporting groups of Chinook salmon to the early and late winter troll fishery harvests in SEAK, 2004–2009.

Note: Reporting groups are described in Table 1.

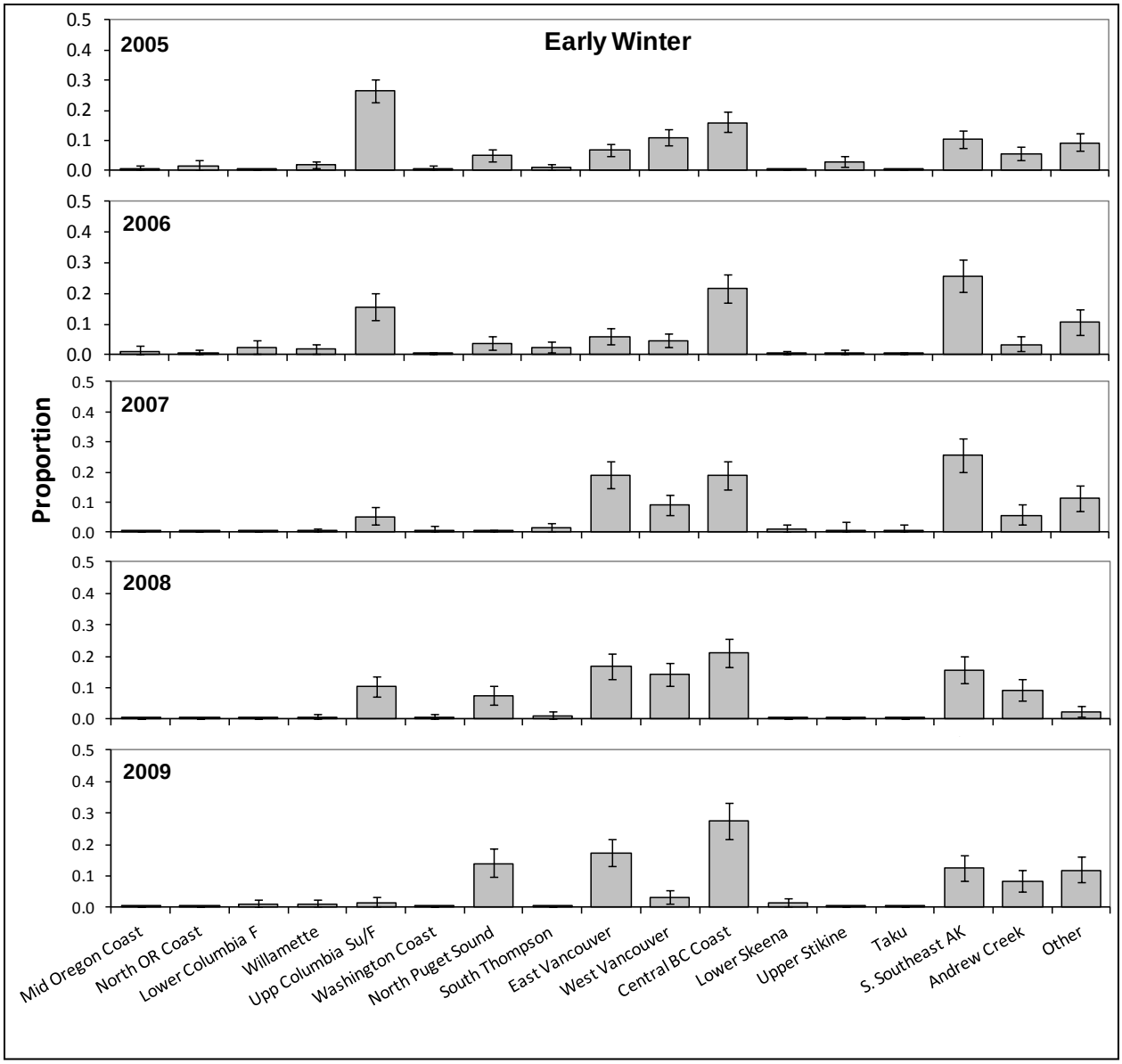

Figure 3.–Estimated contributions and 90% credibility intervals of 17 medium-scale reporting groups of Chinook salmon to the early winter troll fishery harvest in SEAK, 2004–2009.

Note: Reporting groups are described in Table 1. Sample sizes were inadequate for a 2004 estimate.

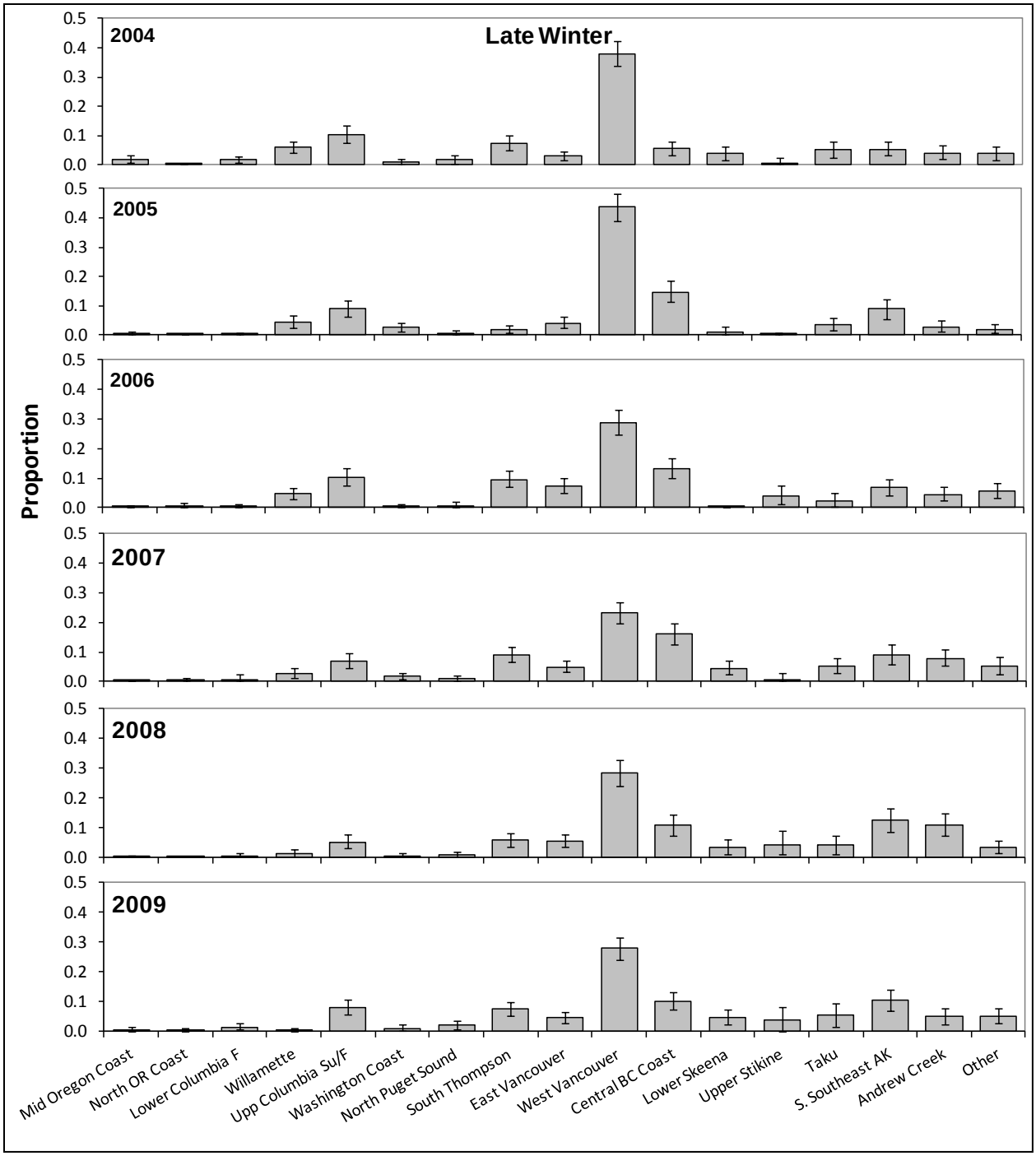

Figure 4.–Estimated contributions and 90% credibility intervals of 17 medium-scale reporting groups of Chinook salmon to the late winter troll fishery harvest in SEAK, 2004–2009.

Note: Reporting groups are described in Table 1.

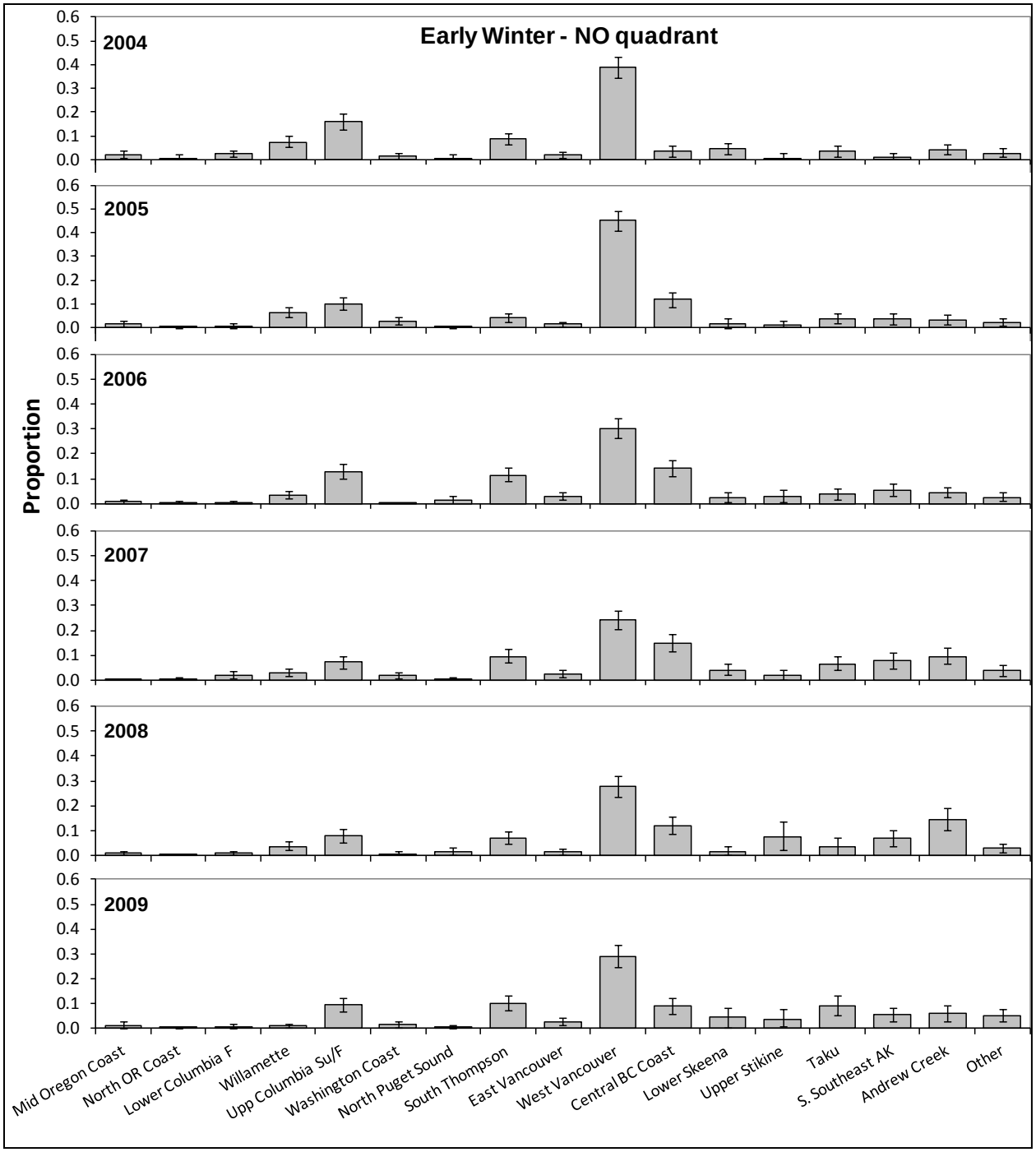

Figure 5.–Estimated contributions and 90% credibility intervals of 17 medium-scale reporting groups of Chinook salmon to the late winter troll fishery harvest in the Northern Outside quadrant in SEAK, 2004–2009.

Note: Reporting groups are described in Table 1.

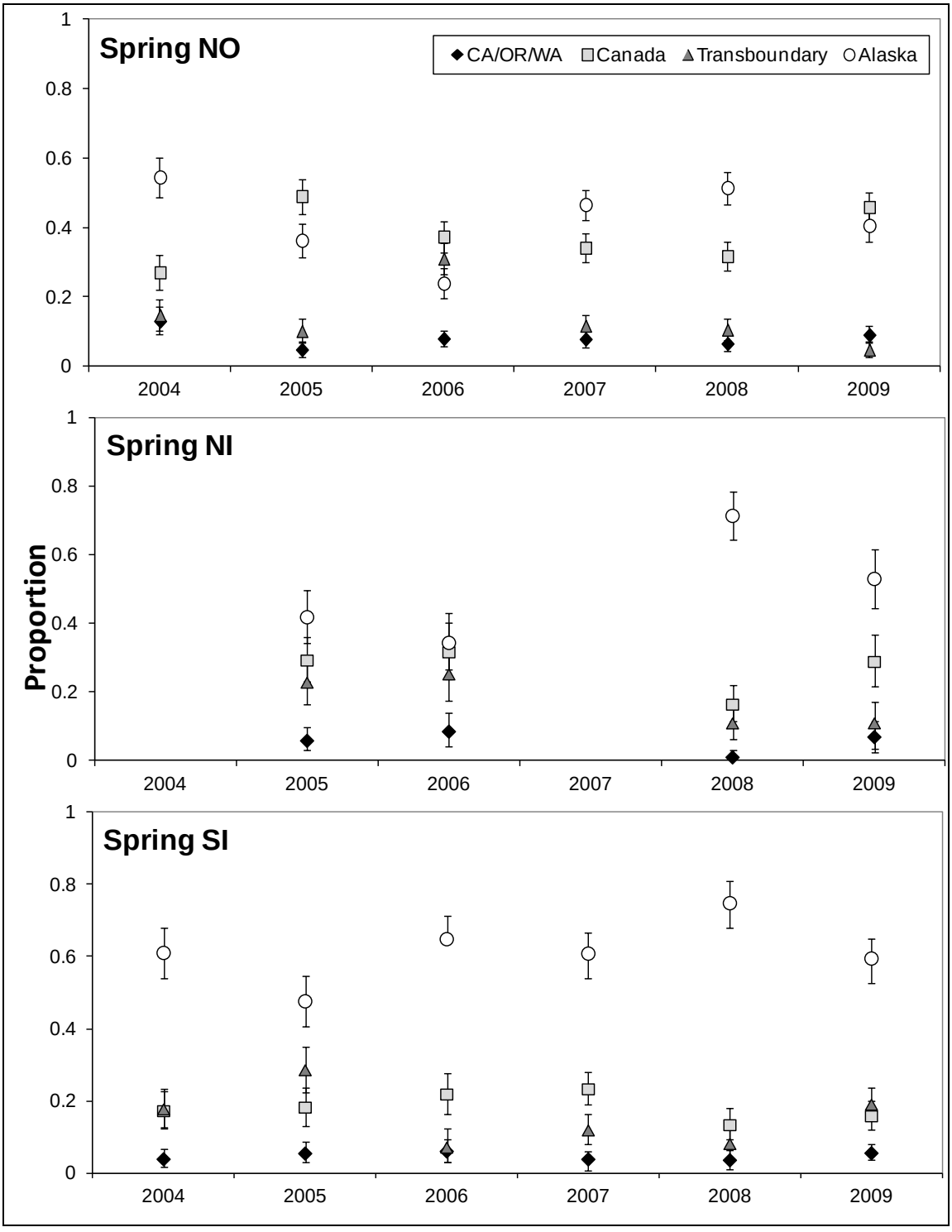

Figure 6.–Estimated contributions and 90% credibility intervals of 4 broad-scale reporting groups of Chinook salmon to the spring troll fishery harvest in the Northern Outside (NO), Northern Inside (NI), and Southern Inside (SI) quadrants in SEAK, 2004–2009.

Note: Reporting groups are described in Table 1.

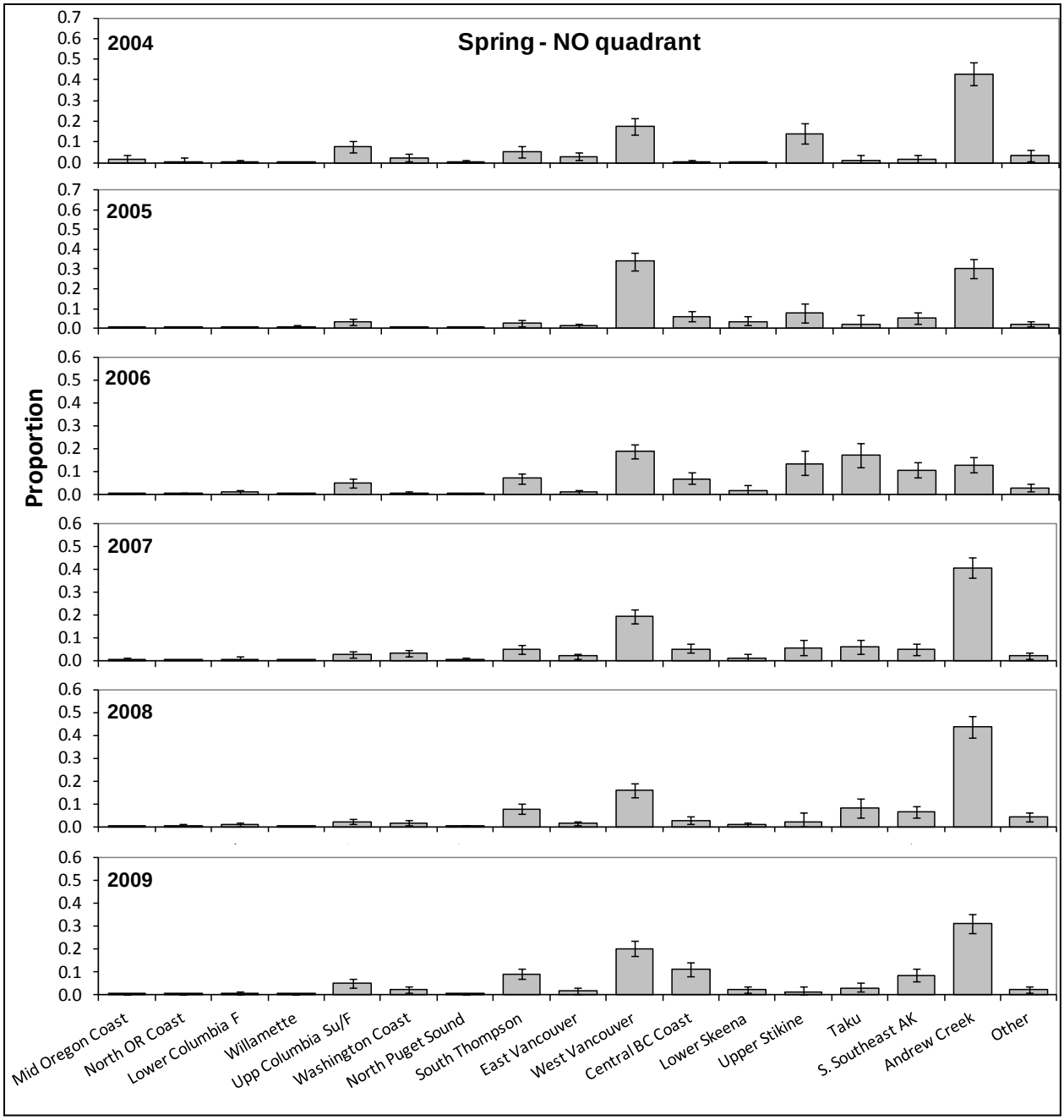

Figure 7.–Estimated contributions and 90% credibility intervals of 17 medium-scale reporting groups of Chinook salmon to the spring troll fishery harvest in the Northern Outside quadrant of SEAK, 2004–2009.

Note: Reporting groups are described in Table 1.

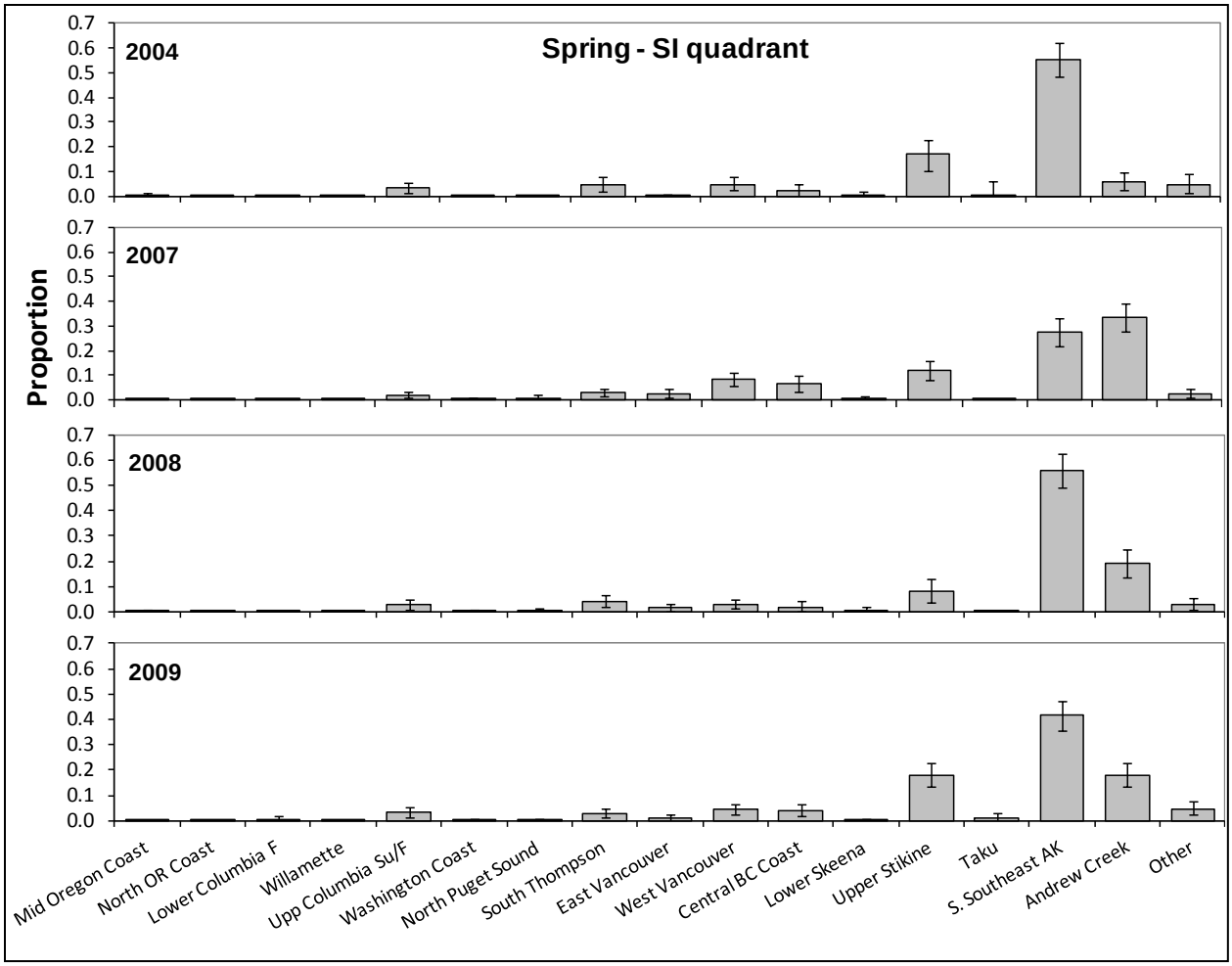

Figure 8.–Estimated contributions and 90% confidence intervals of 17 medium-scale reporting groups of Chinook salmon to the spring troll fishery harvest in the Southern Inside quadrant in SEAK, 2004 and 2007–2009.

Note: Reporting groups are described in Table 1.

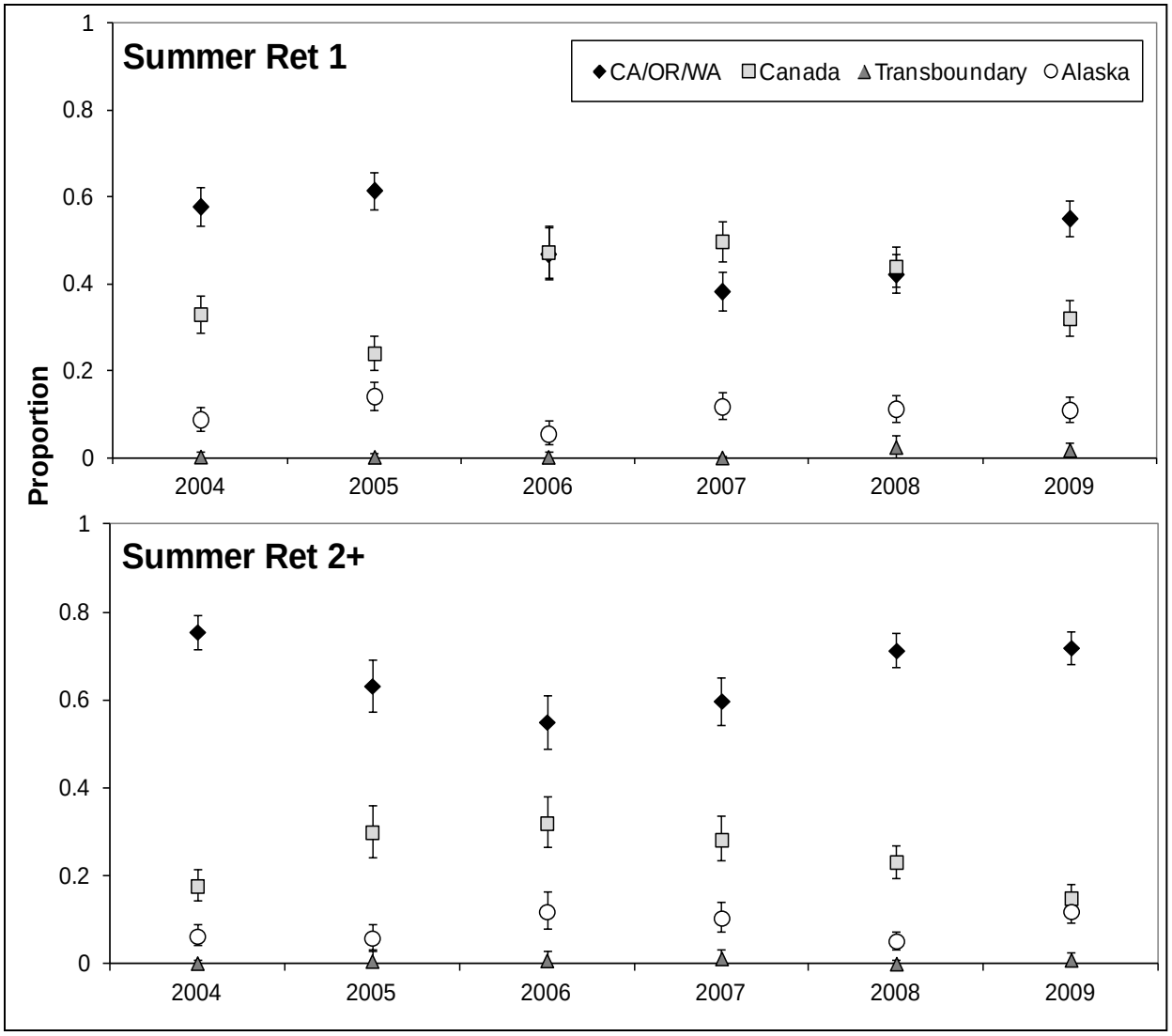

Figure 9.–Estimated contributions and 90% credibility intervals of 4 broad-scale reporting groups of Chinook salmon to the first and following retention periods of the summer troll fishery harvest in SEAK, 2004–2009. The summer troll fisheries take place in one or more openings each year, with the first retention period (ret 1) occurring in July and the second and subsequent periods (ret 2+) occurring in August-September.

Note: Reporting groups are described in Table 1.

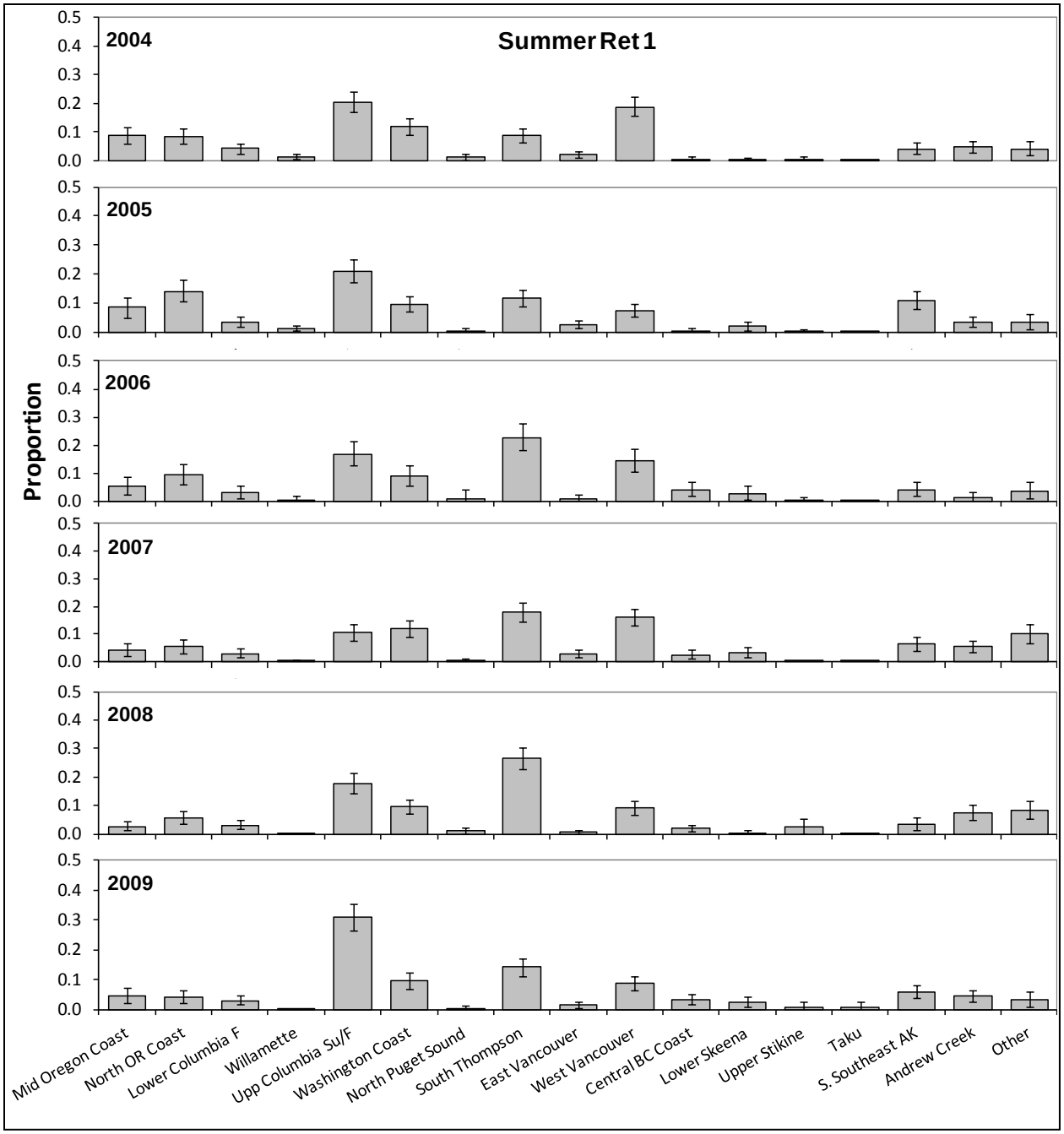

Figure 10.–Estimated contributions and 90% credibility intervals of 17 medium-scale reporting groups of Chinook salmon to the first retention periods of the summer troll fishery harvest in SEAK, 2004–2009. The first retention period (ret 1) of the summer troll fishery occurred in July of each year.

Note: Reporting groups are described in Table 1.

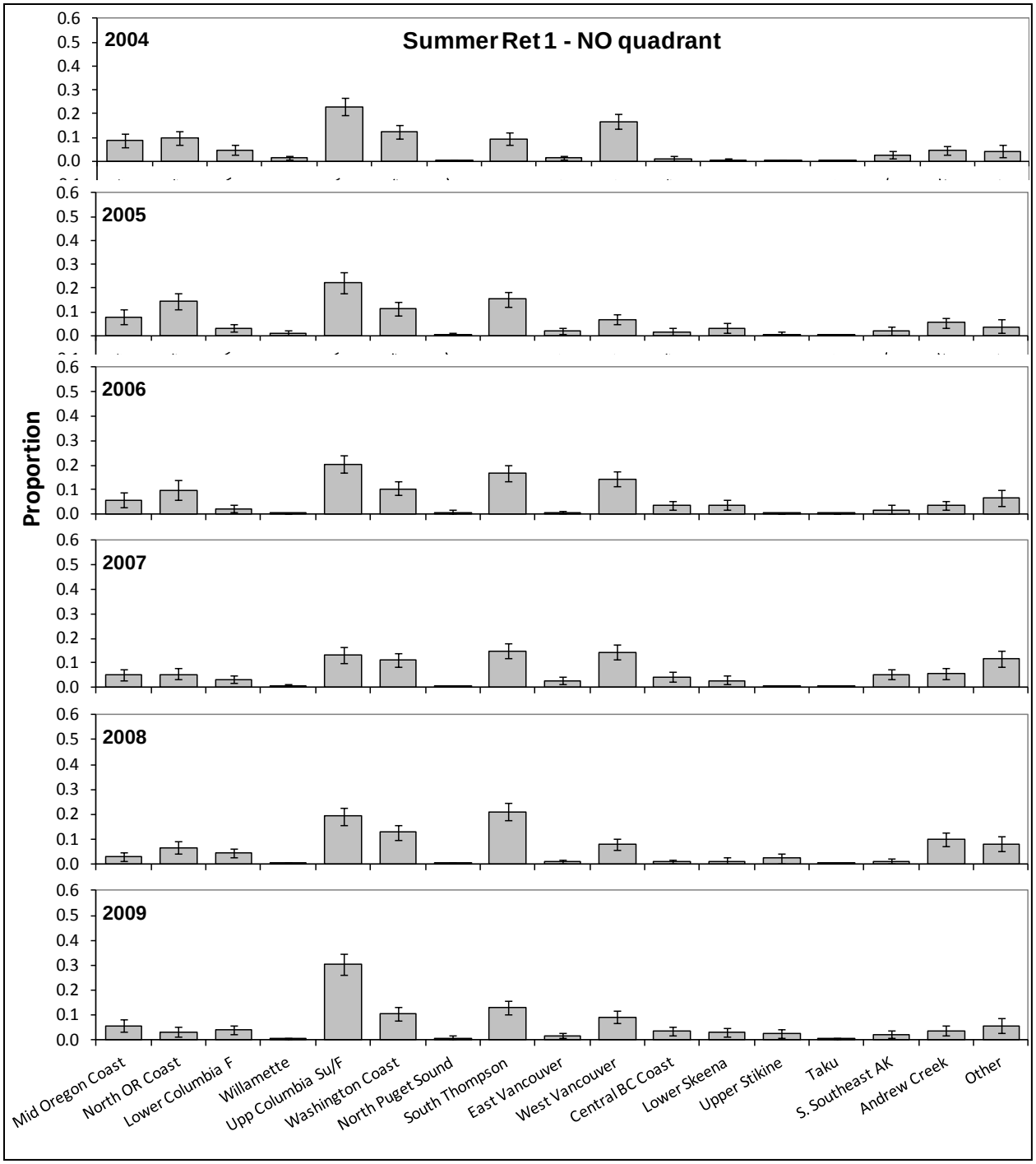

Figure 11.–Estimated contributions and 90% credibility intervals of 17 medium-scale reporting groups of Chinook salmon to the first retention period of the summer troll fishery harvest in the Northern Outside quadrant in SEAK, 2004–2009. The first retention period (ret 1) of the summer troll fishery occurred in July of each year.

Note: Reporting groups are described in Table 1.

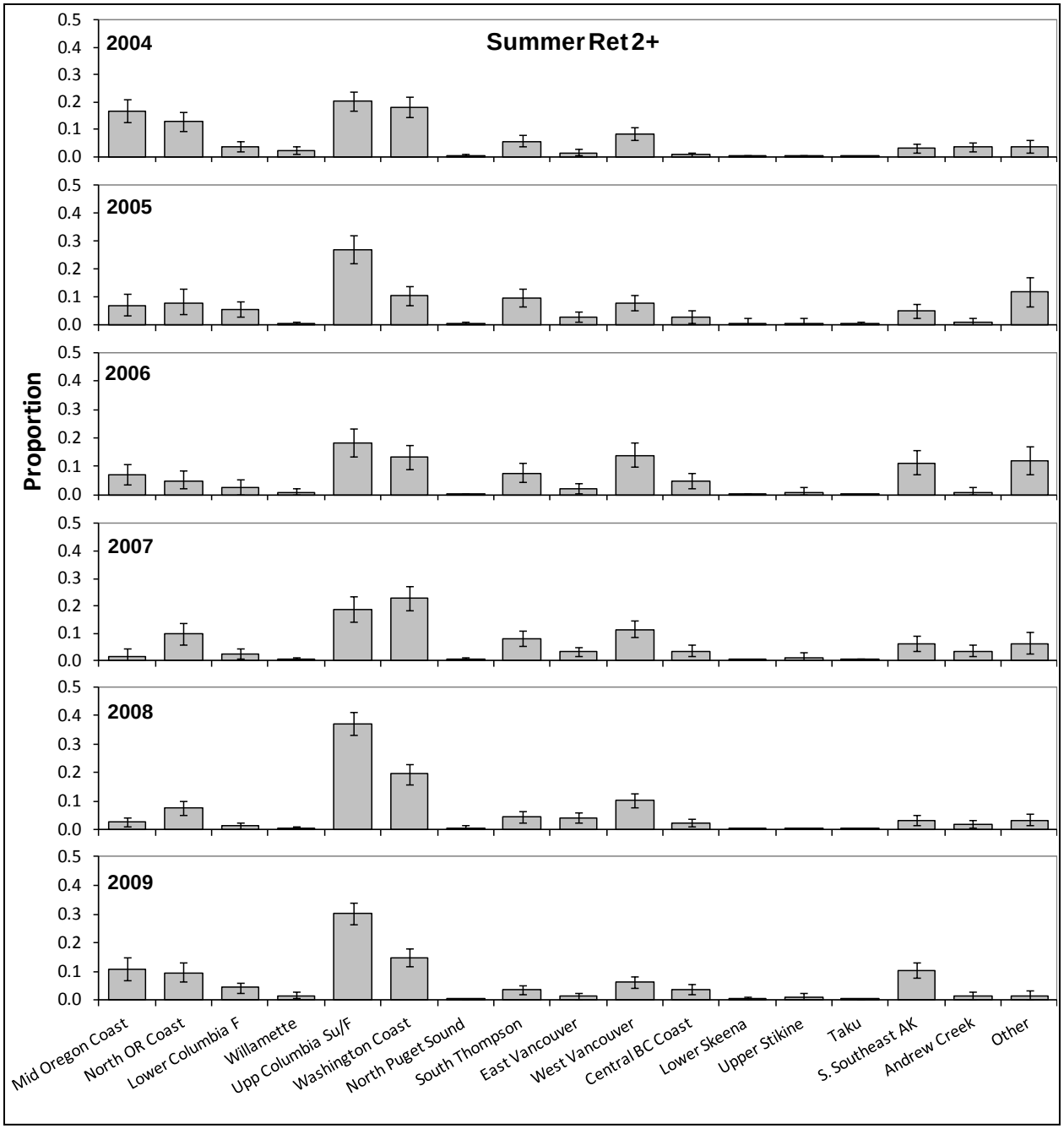

Figure 12.–Estimated contributions and 90% credibility intervals of 17 medium-scale reporting groups of Chinook salmon to the second and subsequent retention periods of the summer troll fishery harvest in SEAK, 2004–2009. The second and subsequent periods of the summer troll fishery (ret 2+) occurred in August-September of each year.

Note: Reporting groups are described in Table 1.

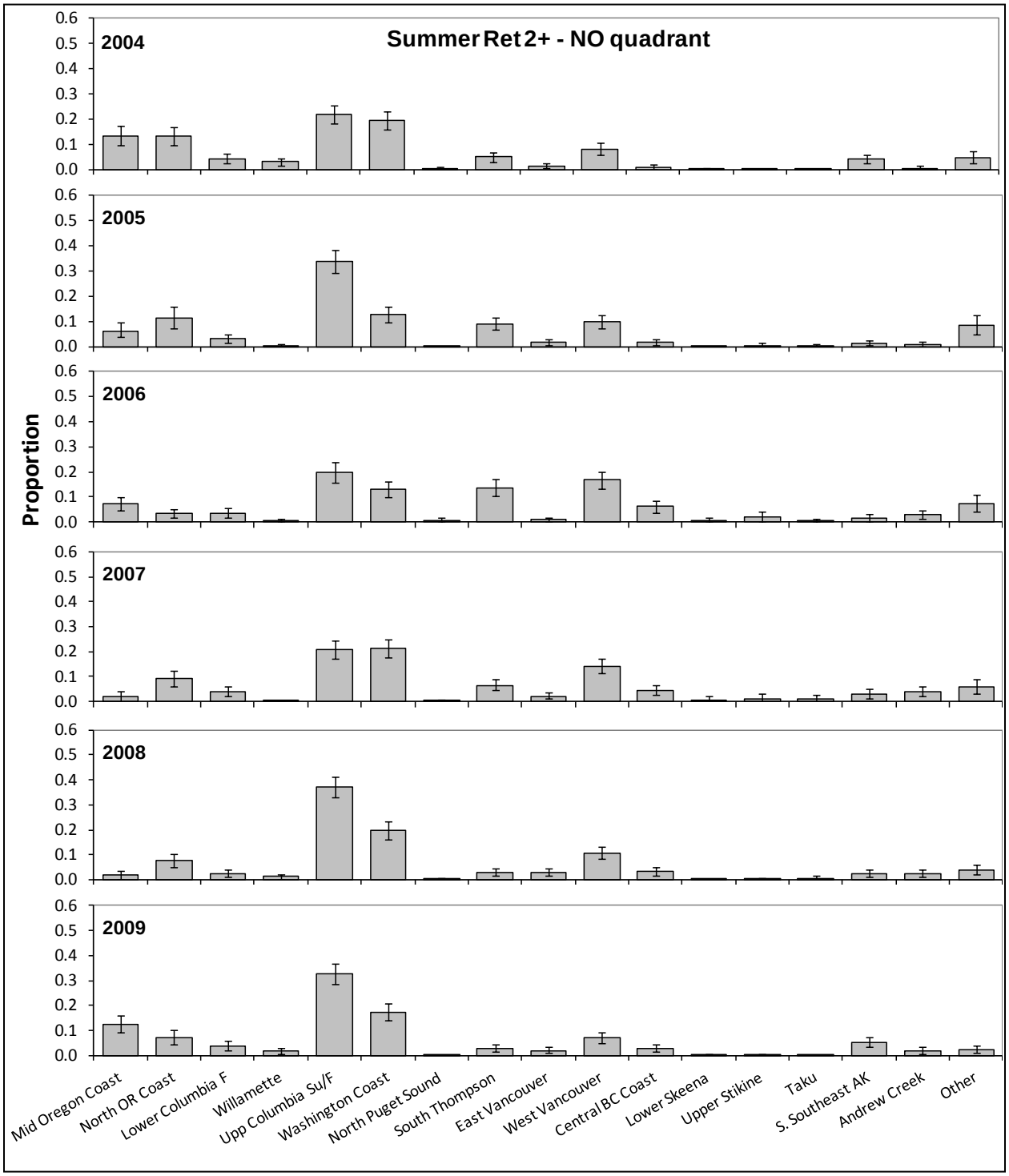

Figure 13.–Estimated contributions and 90% credibility intervals of 17 medium-scale reporting groups of Chinook salmon to the second and subsequent retention periods of the summer troll fishery harvest in the Northern Outside quadrant in SEAK, 2004–2009. The second and subsequent periods of the summer troll fishery (ret 2+) occurred in August-September of each year.

Note: Reporting groups are described in Table 1.

APPENDIX A: BASELINE POPULATIONS

Appendix A1.–Location and collection details for each population of Chinook salmon included in the coastwide baseline of microsatellite data.

Region No.	Reporting Group	Population No.[a]	Population	Run time[b]	Origin[c]	Life Stage	Collection Date
1	Central Valley (F)	1	Battle Creek	F	W	Adult	2002, 2003
		2	Butte Creek	F	W	Adult	2002, 2003
		3	Feather Hatchery (F)	F	H	Adult	2003
		4	Stanislaus River	F	W	Adult	2002
2	Central Valley (Sp)	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 (W)	9	Sacramento River (W)	W	W, H	Adult	1992, 1993, 1994, 1995, 1997, 1998, 2001, 2003, 2004
4	California Coast	10	Eel River	F	W	Adult	2000, 2001
		11	Russian River	F	W	Juvenile	2001
5	Klamath River	12	Klamath River	F	W	Adult	2004
		13	Trinity Hatchery	F	H	Adult	1992
		14	Trinity Hatchery	Sp	H	Adult	1992
6	N California/S Oregon Coast	15	Chetco	F	W	Adult	2004
7	Rogue River	16	Applegate	F	W	Adult	2004
		17	Cole Rivers Hatchery	Sp	H	Adult	2004
8	Mid Oregon Coast	18	Coos Hatchery	F	H	Adult	2005
		19	South Coos	F	W, H	Adult	2000, 2005
		20	Coquille	F	W	Adult	2000
		21	Elk River	F	H	Adult	2004
		22	Millicoma River	F	W	Adult	2000
		23	Sixes River	F	W	Adult	2000, 2005
		24	Siuslaw	F	W	Adult	2001
		25	South Umpqua	F	H,W	Adult	2002

-continued-

Appendix A1.–Page 2 of 7.

Region No.	Reporting Group	Population No.[a]	Population	Run time[b]	Origin[c]	Life Stage	Collection Date
		26	Umpqua	Sp	W	Adult	2004
9	North Oregon Coast	27	Alsea	F	W	Adult	2004
		28	Nehalem	F	W	Adult	2000, 2002-1, 2002-2
		29	Kilchis River	F	Unk	Adult	2000, 2005
		30	Necanicum Hatchery	F	H,W	Adult	2005
		31	Nestucca Hatchery	F	H	Adult	2004, 2005
		32	Salmon River	F	Unk	Adult	2003
		33	Trask River	F	W	Adult	2005
		34	Wilson River	F	W	Adult	2005
		35	Yaquina River	F	W	Adult	2005
		36	Siletz	F	W	Adult	2000
10	Lower Columbia River (Sp)	37	Cowlitz Hatchery (Sp)	Sp	H		2004
		38	Kalama Hatchery (Sp)	Sp	H		2004
		39	Lewis Hatchery (Sp)	Sp	H		2004
11	Lower Columbia River (F)	40	Cowlitz Hatchery (F)	F	H		2004
		41	Lewis (F)	F	W	Adult	2003
		42	Sandy	F	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 River Tule (F)	45	Spring Creek	F	H		2001, 2002
14	Mid and Upper Columbia River (Sp)	46	Carson Hatchery	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

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Appendix A1.–Page 3 of 7.

Region No.	Reporting Group	Population No.[a]	Population	Run time[b]	Origin[c]	Life Stage	Collection Date
15	Deschutes River (F)	52	Upper Deschutes River	Su/F	W	Juvenile	1998, 1999, 2002
		53	Lower Deschutes River	F	W		1999-1, 1999-2, 2001, 2002
16	Upper Columbia River (Su/F)	54	Hanford Reach Creek	Su/F	W	Adult, ?	1999, 2000-1, 2000-2, 2000-3, 2001-1, 2001-2, 2001-3
		55	Methow River summer	Su/F	W		1992, 1993, 1994
		56	Wells Dam	Su/F	H		1993-1, 1993-2
		57	Wenatchee River	Su/F	W	Adult	1993-1, 1993-2
17	Snake River (F)	58	Lyons Ferry	F	W	Adult	2002-1, 2002-2, 2003-1, 2003-2
18	Snake River (Sp/Su)	59	Imnaha River	Sp/Su	W		1998, 2002, 2003
		60	Minam River	Sp/Su	W		1994, 2002, 2003
		61	Newsome Creek	Sp/Su	W	Adult	2001, 2002
		62	Rapid River Hatchery	Sp/Su	H		1997, 1999, 2002
		63	Sesech River	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	F	H	Adult	2005
		68	Hoh River	F	W	Adult	2004, 2005
		69	Humptulips	F	H	Adult	1990
		70	Makah Hatchery	F	H	Adult	2001, 2003
		71	Queets	F	W	Adult	1996, 1997
		72	Quillayute/ Bogachiel	F	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	F	H	Adult	2005
		75	Hamma Hamma River	F	W	Adult	1999, 2000, 2001

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Region No.	Reporting Group	Population No.[a]	Population	Run time[b]	Origin[c]	Life Stage	Collection Date
21	South Puget Sound	76	Clear Creek	F	H	Adult	2005
		77	Hupp Springs Hatchery	Sp	H	Adult	2002
		78	South Prairie Creek	F	W	Adult	1998, 1999, 2002
		79	Soos Creek	F	H	Adult	1998-1, 1998-2, 2004
		80	Voights Hatchery	F	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	F	H	Adult	1998
		88	Skagit (Su)	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	F	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	F	H	Adult	1998, 1999
25	Lower Thompson River	103	Nicola	Sp	H		1998, 1999
		104	Spius River	Sp	H	Adult	1996, 1997, 1998

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Region No.	Reporting Group	Population No.[a]	Population	Run time[b]	Origin[c]	Life Stage	Collection Date
26	South Thompson River	105	Lower Adams	F	H	Adult	1996
		106	Lower Thompson	F	W	Adult	2001
		107	M.Shuswap	F	H	Adult	1997
27	North Thompson River	108	Clearwater	F	W	Adult	1997
		109	Deadman Hatchery	Sp	H	Adult	1996, 1997, 98, 99
		110	Louis River	F	W	Adult	2001
		111	Raft River	Su	W	Adult	2001, 2002
28	Mid Fraser River	112	Chilko	F	W	Adult	1995, 96, 99, 2002
		113	Nechako	F	W	Adult	1996
		114	Quesnel	F	W	Adult	1996
		115	Stuart	F	W	Adult	1996
		116	Upper Chilcotin River	Sp	W	Adult	2001
29	Upper Fraser River	117	Morkill River	F	W	Adult	2001
		118	Salmon River (Fraser)	Sp	W	Adult	1997
		119	Swift	F	W	Adult	1996
		120	Torpy River	F	W	Adult	2001
30	East Vancouver Island	121	Big Qualicum	F	H	Adult	1996
		122	Cowichan Hatchery	F	H	Adult	1999, 2000
		123	Nanaimo Hatchery	F	H	Adult	1998, 2002
		124	Puntledge Hatchery	F	H	Adult	2000, 2001
		125	Quinsam	F	H	Adult	1996, 1998
31	West Vancouver Island	126	Conuma	F	H	Adult	1997, 1998
		127	Marble at NVI	F	H	Adult	1996, 1999, 2000
		128	Nitinat	F	H	Adult	1996
		129	Robertson	F	H	Adult	1996, 2003
		130	Sarita	F	H	Adult	1997, 2001
		131	Tahsis River	F	W	Adult	1996, 2002, 2003
		132	Tranquil River	F	W	Adult	1996, 1999

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Region No.	Reporting Group	Population No.[a]	Population	Run time[b]	Origin[c]	Life Stage	Collection Date
32	S BC Mainland	133	Klinaklini	F	W	Adult	1997
		134	Porteau Cove	F	H	Adult	2003
33	Central BC Coast	135	Atnarko	F	H	Adult	1996
		136	Kitimat	F	H	Adult	1997
		137	Wannock	F	H	Adult	1996
34	Lower Skeena River	138	Ecstall	F	W	Adult	2000, 2001, 2002
		139	Lower Kalum	F	W	Adult	2001
35	Upper Skeena River	140	Babine	F	H	Adult	1996
		141	Bulkley	F	W	Adult	1999
		142	Sustut	F	W	Adult	2001
36	Nass River	143	Damdochax	F	W	Adult	1996
		144	Kincolith	F	W	Adult	1996
		145	Kwinageese	F	W	Adult	1996
		146	Owegee	F	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

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Region No.	Reporting Group	Population No.[a]	Population	Run time[b]	Origin[c]	Life Stage	Collection Date
39	Southern Southeast Alaska (cont.)	161	Clear Creek (Unuk River)		W	Adult	1989, 2003, 2004
		162	Cripple Creek (Unuk River)		W	Adult	1988, 2003
		163	Keta River		W	Adult	1989, 2003
		164	King Creek		W	Adult	2003
40	Andrew Creek	165	Andrew Creek		W	Adult	1989, 2004
		166	Andrew Creek–Crystal		H	Adult	2005
		167	Andrew Creek–MaCaulay		H	Adult	2005
		168	Andrew Creek–Medvejie		H	Adult	2005
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

[a] Population numbers given correspond to the population numbers referenced in Table 1.

[b] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

[c] Origin categories are abbreviated as H (hatchery), and W (wild).

APPENDIX B: ESTIMATED CONTRIBUTION

Appendix B1.–Estimated contributions of 44 reporting groups of Chinook salmon to the harvest during the early winter troll fishery in SEAK, 2005–2007.

	2005			2006			2007		
	n = 397			n = 252			n = 215		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (F)	0.000	0.000	(0.000–0.000)	0.000	0.001	(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	0.002	(0.000–0.004)	0.000	0.001	(0.000–0.000)
3 Central Valley (W)	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	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
5 Kalamath	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 North CA, South OR Coast	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
7 Rogue	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	0.007	0.006	(0.000–0.018)	0.010	0.010	(0.000–0.030)	0.000	0.001	(0.000–0.000)
9 North OR Coast	0.017	0.010	(0.000–0.034)	0.005	0.007	(0.000–0.018)	0.000	0.001	(0.000–0.000)
10 Lower Columbia (Sp)	0.018	0.007	(0.007–0.031)	0.005	0.008	(0.000–0.021)	0.009	0.007	(0.001–0.022)
11 Lower Columbia (F)	0.001	0.003	(0.000–0.006)	0.022	0.014	(0.004–0.048)	0.000	0.002	(0.000–0.002)
12 Willamette	0.019	0.007	(0.009–0.033)	0.018	0.009	(0.005–0.035)	0.005	0.005	(0.000–0.015)
13 Mid Columbia Tule	0.006	0.005	(0.001–0.015)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
14 Mid and Upper 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 (F)	0.002	0.006	(0.000–0.016)	0.012	0.014	(0.000–0.039)	0.000	0.001	(0.000–0.001)
16 Upper Columbia (Su/F)	0.265	0.023	(0.228–0.304)	0.156	0.027	(0.112–0.202)	0.053	0.019	(0.026–0.087)
17 Snake (F)	0.001	0.002	(0.000–0.004)	0.001	0.004	(0.000–0.008)	0.018	0.014	(0.000–0.043)
18 Snake (Sp/Su)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
19 Washington Coast	0.007	0.005	(0.001–0.017)	0.001	0.003	(0.000–0.007)	0.008	0.006	(0.001–0.021)
20 Hood Canal	0.003	0.004	(0.000–0.010)	0.001	0.002	(0.000–0.003)	0.003	0.008	(0.000–0.022)
21 South Puget Sound	0.003	0.004	(0.000–0.012)	0.008	0.006	(0.001–0.020)	0.023	0.013	(0.000–0.046)
22 North Puget Sound	0.050	0.012	(0.031–0.071)	0.037	0.014	(0.017–0.062)	0.001	0.004	(0.000–0.007)
23 Juan de Fuca	0.010	0.005	(0.004–0.020)	0.012	0.007	(0.003–0.026)	0.005	0.005	(0.000–0.015)
24 Lower Fraser	0.014	0.006	(0.005–0.025)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
25 Lower Thompson	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)

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	2005			2006			2007		
	n = 397 Relative Contribution			n = 252 Relative Contribution			n = 215 Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
26 South Thompson	0.011	0.006	(0.003–0.023)	0.024	0.011	(0.009–0.043)	0.015	0.010	(0.003–0.033)
27 North Thompson	0.001	0.002	(0.000–0.005)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
28 Mid Fraser	0.009	0.005	(0.002–0.019)	0.006	0.006	(0.000–0.018)	0.000	0.001	(0.000–0.000)
29 Upper Fraser	0.005	0.006	(0.000–0.016)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
30 East Vancouver	0.068	0.013	(0.048–0.091)	0.059	0.015	(0.036–0.086)	0.192	0.028	(0.149–0.239)
31 West Vancouver	0.110	0.016	(0.085–0.137)	0.044	0.013	(0.025–0.068)	0.090	0.020	(0.060–0.124)
32 South BC Mainland	0.006	0.005	(0.001–0.015)	0.010	0.009	(0.001–0.027)	0.023	0.011	(0.008–0.044)
33 Central BC Coast	0.160	0.021	(0.127–0.195)	0.217	0.028	(0.172–0.265)	0.189	0.029	(0.144–0.239)
34 Lower Skeena	0.000	0.000	(0.000–0.000)	0.005	0.005	(0.000–0.014)	0.010	0.008	(0.002–0.025)
35 Upper Skeena	0.005	0.005	(0.000–0.015)	0.005	0.005	(0.000–0.015)	0.000	0.001	(0.000–0.000)
36 Nass	0.012	0.006	(0.003–0.023)	0.016	0.010	(0.003–0.035)	0.021	0.011	(0.006–0.041)
37 Upper Stikine	0.030	0.012	(0.013–0.050)	0.003	0.007	(0.000–0.019)	0.008	0.013	(0.000–0.037)
38 Taku	0.001	0.003	(0.000–0.006)	0.001	0.004	(0.000–0.009)	0.005	0.009	(0.000–0.026)
39 S. Southeast AK	0.104	0.018	(0.076–0.133)	0.258	0.031	(0.208–0.311)	0.255	0.035	(0.199–0.314)
40 Andrew Creek	0.056	0.014	(0.035–0.081)	0.035	0.015	(0.013–0.061)	0.056	0.021	(0.026–0.093)
41 King Salmon	0.000	0.000	(0.000–0.000)	0.023	0.010	(0.010–0.041)	0.009	0.007	(0.002–0.022)
42 Chilkat	0.000	0.000	(0.000–0.000)	0.004	0.004	(0.000–0.012)	0.000	0.001	(0.000–0.000)
43 Alsek	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	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B2.–Estimated contributions of 44 reporting groups of Chinook salmon to the harvest during the early winter troll fishery in SEAK, 2008–2009.

	2008			2009		
	n = 265			n = 217		
	Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (F)	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 (W)	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 Kalamath	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
6 North CA, South OR Coast	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
7 Rogue	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
8 Mid Oregon Coast	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
9 North OR Coast	0.000	0.001	(0.000–0.000)	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)
11 Lower Columbia (F)	0.000	0.001	(0.000–0.001)	0.012	0.008	(0.002–0.027)
12 Willamette	0.007	0.005	(0.001–0.018)	0.012	0.008	(0.002–0.026)
13 Mid Columbia Tule	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
14 Mid and Upper Columbia	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
15 Deschutes (F)	0.001	0.003	(0.000–0.006)	0.000	0.001	(0.000–0.001)
16 Upper Columbia (Su/F)	0.104	0.020	(0.074–0.138)	0.015	0.009	(0.003–0.033)
17 Snake (F)	0.000	0.001	(0.000–0.001)	0.014	0.009	(0.003–0.030)
18 Snake (Sp/Su)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
19 Washington Coast	0.008	0.006	(0.001–0.018)	0.000	0.001	(0.000–0.001)
20 Hood Canal	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.001)
21 South Puget Sound	0.001	0.002	(0.000–0.003)	0.004	0.007	(0.000–0.018)
22 North Puget Sound	0.076	0.018	(0.048–0.108)	0.141	0.027	(0.099–0.187)
23 Juan de Fuca	0.000	0.001	(0.000–0.001)	0.032	0.012	(0.014–0.054)
24 Lower Fraser	0.007	0.006	(0.001–0.018)	0.000	0.001	(0.000–0.000)
25 Lower Thompson	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
26 South Thompson	0.012	0.008	(0.002–0.027)	0.000	0.001	(0.000–0.001)
27 North Thompson	0.000	0.001	(0.000–0.000)	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	0.000	0.001	(0.000–0.000)	0.007	0.007	(0.000–0.020)
30 East Vancouver	0.167	0.024	(0.130–0.208)	0.173	0.026	(0.131–0.217)
31 West Vancouver	0.143	0.022	(0.109–0.181)	0.032	0.013	(0.013–0.055)
32 South BC Mainland	0.004	0.005	(0.000–0.015)	0.031	0.013	(0.012–0.056)
33 Central BC Coast	0.210	0.028	(0.166–0.257)	0.274	0.034	(0.219–0.332)
34 Lower Skeena	0.000	0.002	(0.000–0.002)	0.015	0.009	(0.004–0.031)
35 Upper Skeena	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
36 Nass	0.001	0.003	(0.000–0.002)	0.023	0.012	(0.006–0.045)
37 Upper Stikine	0.000	0.002	(0.000–0.002)	0.001	0.004	(0.000–0.006)
38 Taku	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
39 S. Southeast AK	0.157	0.026	(0.115–0.201)	0.125	0.025	(0.086–0.169)
40 Andrew Creek	0.093	0.021	(0.060–0.130)	0.082	0.021	(0.049–0.120)
41 King Salmon	0.004	0.004	(0.000–0.011)	0.000	0.001	(0.000–0.000)
42 Chilkat	0.004	0.004	(0.000–0.011)	0.006	0.007	(0.000–0.019)
43 Alsek	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
44 Situk	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B3.–Estimated contributions of 44 reporting groups of Chinook salmon to the harvest during the late winter troll fishery in SEAK, 2004–2006.

	2004			2005			2006		
	n = 347			n = 299			n = 330		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (F)	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 (W)	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	(0.000–0.000)	0.000	0.001	(0.000–0.000)
5 Kalamath	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 North CA, South OR Coast	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
7 Rogue	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	0.018	0.008	(0.006–0.032)	0.005	0.005	(0.000–0.014)	0.003	0.003	(0.000–0.010)
9 North OR Coast	0.001	0.003	(0.000–0.006)	0.000	0.001	(0.000–0.000)	0.006	0.005	(0.001–0.016)
10 Lower Columbia (Sp)	0.001	0.002	(0.000–0.005)	0.000	0.001	(0.000–0.001)	0.001	0.003	(0.000–0.007)
11 Lower Columbia (F)	0.017	0.008	(0.007–0.031)	0.001	0.003	(0.000–0.008)	0.004	0.004	(0.000–0.011)
12 Willamette	0.060	0.013	(0.040–0.082)	0.044	0.012	(0.026–0.066)	0.048	0.012	(0.029–0.069)
13 Mid Columbia Tule	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.003	0.003	(0.000–0.009)
14 Mid and Upper Columbia	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
15 Deschutes (F)	0.000	0.001	(0.000–0.002)	0.000	0.002	(0.000–0.002)	0.002	0.004	(0.000–0.009)
16 Upper Columbia (Su/F)	0.106	0.018	(0.078–0.136)	0.090	0.017	(0.063–0.120)	0.104	0.017	(0.076–0.133)
17 Snake (F)	0.001	0.003	(0.000–0.006)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
18 Snake (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	0.010	0.006	(0.002–0.022)	0.026	0.010	(0.012–0.044)	0.004	0.004	(0.000–0.012)
20 Hood Canal	0.000	0.001	(0.000–0.001)	0.001	0.003	(0.000–0.007)	0.006	0.006	(0.000–0.017)
21 South Puget Sound	0.000	0.001	(0.000–0.000)	0.003	0.005	(0.000–0.014)	0.002	0.004	(0.000–0.011)
22 North Puget Sound	0.017	0.010	(0.003–0.035)	0.004	0.005	(0.000–0.015)	0.008	0.008	(0.000–0.023)
23 Juan de Fuca	0.011	0.006	(0.003–0.023)	0.004	0.004	(0.000–0.011)	0.005	0.005	(0.000–0.014)
24 Lower Fraser	0.000	0.001	(0.000–0.001)	0.004	0.003	(0.000–0.010)	0.000	0.001	(0.000–0.000)
25 Lower Thompson	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
26 South Thompson	0.076	0.015	(0.052–0.103)	0.018	0.008	(0.007–0.034)	0.095	0.017	(0.070–0.124)

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	2004			2005			2006		
	n = 347			n = 299			n = 330		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27 North Thompson	0.001	0.002	(0.000–0.006)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
28 Mid Fraser	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.002	(0.000–0.002)
29 Upper Fraser	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.004	0.006	(0.000–0.015)
30 East Vancouver	0.030	0.009	(0.016–0.047)	0.042	0.012	(0.024–0.063)	0.073	0.015	(0.050–0.099)
31 West Vancouver	0.381	0.026	(0.338–0.424)	0.437	0.029	(0.390–0.485)	0.289	0.025	(0.248–0.331)
32 South BC Mainland	0.011	0.006	(0.003–0.023)	0.007	0.006	(0.001–0.017)	0.017	0.009	(0.004–0.032)
33 Central BC Coast	0.055	0.015	(0.033–0.081)	0.148	0.022	(0.113–0.186)	0.133	0.021	(0.099–0.168)
34 Lower Skeena	0.040	0.014	(0.018–0.065)	0.009	0.010	(0.000–0.028)	0.001	0.003	(0.000–0.002)
35 Upper Skeena	0.006	0.009	(0.000–0.024)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
36 Nass	0.005	0.006	(0.000–0.016)	0.000	0.001	(0.000–0.000)	0.013	0.008	(0.002–0.028)
37 Upper Stikine	0.004	0.009	(0.000–0.024)	0.001	0.004	(0.000–0.009)	0.041	0.019	(0.012–0.075)
38 Taku	0.052	0.016	(0.027–0.079)	0.037	0.013	(0.018–0.059)	0.023	0.014	(0.005–0.049)
39 S. Southeast AK	0.055	0.015	(0.033–0.081)	0.089	0.021	(0.057–0.125)	0.067	0.017	(0.041–0.098)
40 Andrew Creek	0.042	0.014	(0.022–0.067)	0.029	0.012	(0.012–0.051)	0.045	0.014	(0.024–0.071)
41 King Salmon	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
42 Chilkat	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.003	0.003	(0.000–0.009)
43 Alsek	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
44 Situk	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B4.–Estimated contributions of 44 reporting groups of Chinook salmon to the harvest during the late winter troll fishery in SEAK, 2007–2009.

	2007			2008			2009		
	n = 354			n = 299			n = 398		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (F)	0.000	0.001	(0.000–0.001)	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)	0.000	0.001	(0.000–0.000)
3 Central Valley (W)	0.000	0.000	(0.000–0.000)	0.000	0.001	(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	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
5 Kalamath	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
6 North CA, South OR Coast	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
7 Rogue	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
8 Mid Oregon Coast	0.001	0.003	(0.000–0.006)	0.003	0.003	(0.000–0.010)	0.003	0.006	(0.000–0.016)
9 North OR Coast	0.005	0.004	(0.000–0.014)	0.000	0.001	(0.000–0.000)	0.004	0.005	(0.000–0.013)
10 Lower Columbia (Sp)	0.006	0.008	(0.000–0.022)	0.001	0.002	(0.000–0.005)	0.000	0.001	(0.000–0.000)
11 Lower Columbia (F)	0.008	0.008	(0.000–0.024)	0.005	0.005	(0.000–0.015)	0.016	0.007	(0.007–0.029)
12 Willamette	0.028	0.010	(0.015–0.046)	0.016	0.007	(0.006–0.030)	0.005	0.004	(0.001–0.012)
13 Mid Columbia Tule	0.000	0.001	(0.000–0.000)	0.009	0.006	(0.002–0.020)	0.000	0.000	(0.000–0.000)
14 Mid and Upper Columbia	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.003)
15 Deschutes (F)	0.005	0.007	(0.000–0.019)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
16 Upper Columbia (Su/F)	0.069	0.015	(0.046–0.096)	0.053	0.014	(0.033–0.077)	0.083	0.015	(0.060–0.108)
17 Snake (F)	0.000	0.001	(0.000–0.002)	0.000	0.001	(0.000–0.000)	0.002	0.005	(0.000–0.013)
18 Snake (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)
19 Washington Coast	0.018	0.007	(0.007–0.031)	0.007	0.006	(0.001–0.018)	0.011	0.007	(0.002–0.023)
20 Hood Canal	0.000	0.002	(0.000–0.003)	0.000	0.001	(0.000–0.001)	0.006	0.005	(0.000–0.015)
21 South Puget Sound	0.001	0.002	(0.000–0.005)	0.009	0.006	(0.001–0.021)	0.000	0.001	(0.000–0.001)
22 North Puget Sound	0.009	0.006	(0.001–0.020)	0.009	0.007	(0.001–0.022)	0.021	0.009	(0.008–0.038)
23 Juan de Fuca	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.003	0.003	(0.000–0.009)
24 Lower Fraser	0.000	0.001	(0.000–0.000)	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	(0.000–0.000)	0.000	0.001	(0.000–0.002)
26 South Thompson	0.090	0.016	(0.065–0.118)	0.059	0.014	(0.038–0.083)	0.077	0.015	(0.054–0.102)

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	2007			2008			2009		
	n = 354			n = 299			n = 398		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27 North Thompson	0.000	0.001	(0.000–0.000)	0.003	0.004	(0.000–0.011)	0.000	0.001	(0.000–0.001)
28 Mid Fraser	0.008	0.006	(0.001–0.019)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
29 Upper Fraser	0.005	0.005	(0.000–0.014)	0.000	0.001	(0.000–0.000)	0.007	0.006	(0.000–0.019)
30 East Vancouver	0.050	0.012	(0.032–0.071)	0.057	0.014	(0.036–0.081)	0.047	0.011	(0.030–0.066)
31 West Vancouver	0.232	0.023	(0.196–0.271)	0.286	0.026	(0.243–0.330)	0.279	0.023	(0.243–0.318)
32 South BC Mainland	0.006	0.005	(0.001–0.016)	0.007	0.006	(0.001–0.018)	0.008	0.006	(0.000–0.018)
33 Central BC Coast	0.161	0.022	(0.126–0.199)	0.108	0.021	(0.077–0.144)	0.103	0.018	(0.075–0.133)
34 Lower Skeena	0.045	0.015	(0.024–0.071)	0.036	0.015	(0.014–0.063)	0.047	0.015	(0.024–0.074)
35 Upper Skeena	0.016	0.012	(0.000–0.036)	0.001	0.003	(0.000–0.003)	0.001	0.003	(0.000–0.005)
36 Nass	0.000	0.001	(0.000–0.001)	0.002	0.004	(0.000–0.012)	0.018	0.008	(0.007–0.032)
37 Upper Stikine	0.006	0.011	(0.000–0.029)	0.044	0.025	(0.011–0.091)	0.038	0.026	(0.000–0.084)
38 Taku	0.054	0.016	(0.030–0.081)	0.045	0.019	(0.014–0.077)	0.057	0.023	(0.016–0.094)
39 S. Southeast AK	0.091	0.021	(0.058–0.127)	0.125	0.024	(0.088–0.165)	0.105	0.021	(0.073–0.141)
40 Andrew Creek	0.080	0.018	(0.053–0.110)	0.111	0.023	(0.076–0.150)	0.051	0.016	(0.026–0.080)
41 King Salmon	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
42 Chilkat	0.003	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.000)	0.006	0.004	(0.001–0.014)
43 Alsek	0.000	0.001	(0.000–0.001)	0.003	0.003	(0.000–0.010)	0.000	0.000	(0.000–0.000)
44 Situk	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B5.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests from the Northern Outside quadrant during the late winter troll fishery in SEAK, 2004–2006.

	2004			2005			2006		
	n = 361			n = 398			n = 397		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (F)	0.000	0.000	(0.000–0.000)	0.000	0.000	(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	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
3 Central Valley (W)	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)
5 Kalamath	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
6 North CA, South OR Coast	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	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
8 Mid Oregon Coast	0.023	0.010	(0.008–0.040)	0.015	0.008	(0.005–0.029)	0.007	0.005	(0.001–0.016)
9 North OR Coast	0.007	0.007	(0.000–0.022)	0.001	0.002	(0.000–0.006)	0.005	0.004	(0.000–0.012)
10 Lower Columbia (Sp)	0.001	0.004	(0.000–0.010)	0.000	0.002	(0.000–0.003)	0.004	0.005	(0.000–0.014)
11 Lower Columbia (F)	0.024	0.009	(0.011–0.039)	0.007	0.005	(0.001–0.017)	0.004	0.004	(0.000–0.012)
12 Willamette	0.074	0.014	(0.053–0.099)	0.064	0.012	(0.045–0.085)	0.034	0.010	(0.020–0.052)
13 Mid Columbia Tule	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.003	0.003	(0.000–0.010)
14 Mid and Upper Columbia	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
15 Deschutes (F)	0.001	0.002	(0.000–0.003)	0.002	0.004	(0.000–0.011)	0.002	0.003	(0.000–0.008)
16 Upper Columbia (Su/F)	0.160	0.020	(0.129–0.194)	0.101	0.016	(0.076–0.127)	0.130	0.018	(0.102–0.160)
17 Snake (F)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.002	(0.000–0.002)
18 Snake(Sp/Su)	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
19 Washington Coast	0.014	0.007	(0.005–0.027)	0.028	0.009	(0.015–0.044)	0.000	0.001	(0.000–0.000)
20 Hood Canal	0.000	0.001	(0.000–0.002)	0.001	0.003	(0.000–0.006)	0.000	0.002	(0.000–0.003)
21 South Puget Sound	0.002	0.004	(0.000–0.012)	0.000	0.002	(0.000–0.002)	0.000	0.001	(0.000–0.003)
22 North Puget Sound	0.006	0.008	(0.000–0.021)	0.003	0.004	(0.000–0.010)	0.016	0.009	(0.000–0.031)
23 Juan de Fuca	0.005	0.004	(0.000–0.012)	0.003	0.003	(0.000–0.008)	0.000	0.002	(0.000–0.003)
24 Lower Fraser	0.000	0.001	(0.000–0.001)	0.003	0.003	(0.000–0.008)	0.000	0.000	(0.000–0.000)
25 Lower Thompson	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
26 South Thompson	0.087	0.016	(0.062–0.114)	0.040	0.010	(0.025–0.058)	0.115	0.017	(0.089–0.144)

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Reporting Group[a]	2004 n = 361 Relative Contribution Est.	2004 SD	2004 90% CI	2005 n = 398 Relative Contribution Est.	2005 SD	2005 90% CI	2006 n = 397 Relative Contribution Est.	2006 SD	2006 90% CI
27 North Thompson	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
28 Mid Fraser	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.002)	0.005	0.005	(0.000–0.015)
29 Upper Fraser	0.002	0.005	(0.000–0.012)	0.000	0.001	(0.000–0.002)	0.003	0.004	(0.000–0.011)
30 East Vancouver	0.018	0.008	(0.008–0.033)	0.014	0.006	(0.006–0.026)	0.030	0.009	(0.017–0.047)
31 West Vancouver	0.389	0.026	(0.347–0.432)	0.452	0.025	(0.410–0.493)	0.303	0.023	(0.265–0.341)
32 South BC Mainland	0.009	0.006	(0.002–0.019)	0.008	0.006	(0.000–0.019)	0.001	0.003	(0.000–0.008)
33 Central BC Coast	0.037	0.014	(0.014–0.061)	0.118	0.019	(0.089–0.151)	0.143	0.020	(0.112–0.177)
34 Lower Skeena	0.045	0.014	(0.023–0.069)	0.018	0.013	(0.000–0.041)	0.024	0.011	(0.007–0.044)
35 Upper Skeena	0.001	0.003	(0.000–0.003)	0.002	0.005	(0.000–0.013)	0.000	0.001	(0.000–0.003)
36 Nass	0.005	0.005	(0.000–0.015)	0.000	0.002	(0.000–0.003)	0.001	0.002	(0.000–0.006)
37 Upper Stikine	0.004	0.010	(0.000–0.029)	0.013	0.010	(0.002–0.031)	0.030	0.014	(0.008–0.055)
38 Taku	0.035	0.015	(0.011–0.060)	0.037	0.013	(0.018–0.059)	0.038	0.013	(0.018–0.061)
39 S. Southeast AK	0.009	0.009	(0.000–0.028)	0.037	0.014	(0.016–0.061)	0.054	0.014	(0.032–0.079)
40 Andrew Creek	0.043	0.014	(0.023–0.067)	0.033	0.011	(0.016–0.053)	0.043	0.013	(0.024–0.066)
41 King Salmon	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	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.003	0.003	(0.000–0.008)
43 Alsek	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	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B6.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests from the Northern Outside quadrant during the late winter troll fishery in SEAK, 2007–2009.

	2007			2008			2009		
	n = 355			n = 300			n = 300		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (F)	0.000	0.000	(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	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
3 Central Valley (W)	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	(0.000–0.000)	0.000	0.001	(0.000–0.000)
5 Kalamath	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 North CA, South 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	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
8 Mid Oregon Coast	0.000	0.002	(0.000–0.001)	0.008	0.006	(0.001–0.020)	0.012	0.009	(0.000–0.028)
9 North OR Coast	0.005	0.004	(0.000–0.013)	0.000	0.001	(0.000–0.001)	0.001	0.003	(0.000–0.007)
10 Lower Columbia (Sp)	0.000	0.002	(0.000–0.003)	0.001	0.003	(0.000–0.007)	0.000	0.001	(0.000–0.001)
11 Lower Columbia (F)	0.021	0.008	(0.009–0.035)	0.008	0.006	(0.001–0.019)	0.009	0.006	(0.002–0.020)
12 Willamette	0.031	0.010	(0.017–0.047)	0.037	0.011	(0.021–0.056)	0.010	0.006	(0.003–0.021)
13 Mid Columbia Tule	0.000	0.000	(0.000–0.000)	0.000	0.002	(0.000–0.001)	0.000	0.001	(0.000–0.000)
14 Mid and Upper Columbia	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.005)
15 Deschutes (F)	0.004	0.006	(0.000–0.017)	0.000	0.002	(0.000–0.001)	0.000	0.001	(0.000–0.000)
16 Upper Columbia (Su/F)	0.072	0.015	(0.049–0.098)	0.078	0.016	(0.054–0.106)	0.095	0.017	(0.069–0.126)
17 Snake (F)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
18 Snake (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	0.020	0.008	(0.009–0.034)	0.007	0.005	(0.001–0.017)	0.015	0.008	(0.004–0.030)
20 Hood Canal	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
21 South Puget Sound	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.002	(0.000–0.002)
22 North Puget Sound	0.005	0.005	(0.000–0.014)	0.017	0.009	(0.004–0.034)	0.004	0.005	(0.000–0.013)
23 Juan de Fuca	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.004	0.004	(0.000–0.011)
24 Lower Fraser	0.000	0.001	(0.000–0.001)	0.003	0.003	(0.000–0.010)	0.004	0.004	(0.000–0.010)
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	0.096	0.017	(0.070–0.125)	0.070	0.015	(0.047–0.097)	0.102	0.019	(0.072–0.134)

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	2007			2008			2009		
	n = 355			n = 300			n = 300		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27 North Thompson	0.000	0.001	(0.000–0.000)	0.002	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.002)
28 Mid Fraser	0.008	0.006	(0.001–0.020)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
29 Upper Fraser	0.005	0.004	(0.000–0.014)	0.000	0.001	(0.000–0.000)	0.005	0.006	(0.000–0.017)
30 East Vancouver	0.027	0.009	(0.014–0.042)	0.014	0.007	(0.005–0.027)	0.027	0.010	(0.013–0.045)
31 West Vancouver	0.242	0.023	(0.205–0.281)	0.279	0.026	(0.237–0.322)	0.291	0.027	(0.248–0.336)
32 South BC Mainland	0.000	0.001	(0.000–0.002)	0.000	0.001	(0.000–0.000)	0.003	0.006	(0.000–0.015)
33 Central BC Coast	0.149	0.021	(0.116–0.184)	0.119	0.021	(0.086–0.155)	0.091	0.020	(0.060–0.125)
34 Lower Skeena	0.042	0.015	(0.020–0.067)	0.015	0.011	(0.001–0.036)	0.047	0.022	(0.007–0.082)
35 Upper Skeena	0.003	0.008	(0.000–0.021)	0.000	0.001	(0.000–0.002)	0.002	0.006	(0.000–0.013)
36 Nass	0.009	0.006	(0.001–0.021)	0.006	0.007	(0.000–0.020)	0.023	0.010	(0.009–0.041)
37 Upper Stikine	0.018	0.014	(0.000–0.044)	0.074	0.036	(0.023–0.138)	0.038	0.020	(0.012–0.077)
38 Taku	0.065	0.017	(0.040–0.094)	0.033	0.025	(0.000–0.073)	0.092	0.024	(0.054–0.133)
39 S. Southeast AK	0.077	0.019	(0.048–0.110)	0.067	0.019	(0.038–0.100)	0.056	0.017	(0.031–0.085)
40 Andrew Creek	0.095	0.020	(0.064–0.129)	0.145	0.026	(0.103–0.189)	0.060	0.020	(0.030–0.095)
41 King Salmon	0.000	0.000	(0.000–0.000)	0.003	0.003	(0.000–0.010)	0.000	0.001	(0.000–0.000)
42 Chilkat	0.006	0.004	(0.001–0.013)	0.007	0.005	(0.001–0.016)	0.009	0.006	(0.002–0.020)
43 Alsek	0.000	0.001	(0.000–0.001)	0.003	0.003	(0.000–0.010)	0.000	0.001	(0.000–0.000)
44 Situk	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B7.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests from the Northern Outside quadrant during the spring troll fishery in SEAK, 2004–2006.

	2004			2005			2006		
	n = 291			n = 297			n = 392		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (F)	0.000	0.001	(0.000–0.001)	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)	0.000	0.000	(0.000–0.000)
3 Central Valley (W)	0.000	0.001	(0.000–0.000)	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	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
5 Kalamath	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
6 North CA, South OR Coast	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.006)
7 Rogue	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
8 Mid Oregon Coast	0.016	0.010	(0.000–0.035)	0.002	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.000)
9 North OR Coast	0.006	0.008	(0.000–0.022)	0.000	0.001	(0.000–0.000)	0.003	0.004	(0.000–0.012)
10 Lower Columbia (Sp)	0.000	0.002	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
11 Lower Columbia (F)	0.004	0.004	(0.000–0.013)	0.000	0.001	(0.000–0.000)	0.012	0.006	(0.005–0.023)
12 Willamette	0.000	0.001	(0.000–0.001)	0.009	0.006	(0.002–0.020)	0.000	0.000	(0.000–0.000)
13 Mid Columbia Tule	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
14 Mid and Upper Columbia	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
15 Deschutes (F)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
16 Upper Columbia (Su/F)	0.077	0.017	(0.050–0.107)	0.032	0.011	(0.017–0.051)	0.051	0.012	(0.033–0.071)
17 Snake (F)	0.002	0.005	(0.000–0.012)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
18 Snake (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)
19 Washington Coast	0.020	0.012	(0.004–0.042)	0.003	0.004	(0.000–0.010)	0.004	0.005	(0.000–0.013)
20 Hood Canal	0.002	0.004	(0.000–0.010)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
21 South Puget Sound	0.000	0.002	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
22 North Puget Sound	0.002	0.005	(0.000–0.014)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
23 Juan de Fuca	0.000	0.001	(0.000–0.001)	0.000	0.002	(0.000–0.003)	0.006	0.005	(0.001–0.015)
24 Lower Fraser	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.002)
25 Lower Thompson	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)
26 South Thompson	0.050	0.015	(0.027–0.078)	0.027	0.011	(0.011–0.046)	0.072	0.014	(0.051–0.095)

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	2004			2005			2006		
	n = 291			n = 297			n = 392		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27 North Thompson	0.000	0.001	(0.000–0.000)	0.004	0.004	(0.000–0.012)	0.000	0.001	(0.000–0.000)
28 Mid Fraser	0.001	0.003	(0.000–0.007)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
29 Upper Fraser	0.007	0.009	(0.000–0.025)	0.000	0.001	(0.000–0.000)	0.003	0.004	(0.000–0.011)
30 East Vancouver	0.028	0.011	(0.013–0.048)	0.014	0.007	(0.005–0.027)	0.010	0.005	(0.003–0.020)
31 West Vancouver	0.173	0.024	(0.136–0.214)	0.339	0.028	(0.295–0.385)	0.188	0.020	(0.156–0.222)
32 South BC Mainland	0.000	0.002	(0.000–0.002)	0.008	0.006	(0.002–0.019)	0.010	0.006	(0.003–0.020)
33 Central BC Coast	0.002	0.005	(0.000–0.012)	0.061	0.016	(0.037–0.088)	0.070	0.015	(0.047–0.096)
34 Lower Skeena	0.000	0.003	(0.000–0.001)	0.036	0.013	(0.017–0.060)	0.018	0.014	(0.000–0.041)
35 Upper Skeena	0.000	0.002	(0.000–0.002)	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)
36 Nass	0.007	0.011	(0.000–0.030)	0.000	0.002	(0.000–0.001)	0.002	0.004	(0.000–0.010)
37 Upper Stikine	0.139	0.030	(0.090–0.189)	0.082	0.031	(0.030–0.129)	0.137	0.033	(0.086–0.195)
38 Taku	0.007	0.014	(0.000–0.040)	0.019	0.027	(0.000–0.072)	0.173	0.032	(0.122–0.225)
39 S. Southeast AK	0.014	0.011	(0.000–0.035)	0.052	0.017	(0.027–0.082)	0.105	0.020	(0.074–0.140)
40 Andrew Creek	0.430	0.034	(0.374–0.486)	0.303	0.029	(0.257–0.351)	0.128	0.020	(0.096–0.163)
41 King Salmon	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
42 Chilkat	0.009	0.006	(0.002–0.022)	0.007	0.005	(0.001–0.016)	0.005	0.004	(0.001–0.012)
43 Alsek	0.001	0.002	(0.000–0.004)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
44 Situk	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B8.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests from the Northern Outside quadrant during the spring troll fishery in SEAK, 2007–2009.

	2007			2008			2009		
	n = 480			n = 400			n = 400		
	Relative Contribution			Relative Contribution			Relative Contribution		
Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (F)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.001)	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	0.000	(0.000–0.000)
3 Central Valley (W)	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	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
5 Kalamath	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
6 North CA, South OR Coast	0.000	0.000	(0.000–0.000)	0.001	0.002	(0.000–0.004)	0.000	0.000	(0.000–0.000)
7 Rogue	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
8 Mid Oregon Coast	0.004	0.005	(0.000–0.013)	0.000	0.001	(0.000–0.002)	0.000	0.001	(0.000–0.000)
9 North OR Coast	0.001	0.002	(0.000–0.005)	0.005	0.004	(0.000–0.013)	0.000	0.001	(0.000–0.001)
10 Lower Columbia (Sp)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.004)
11 Lower Columbia (F)	0.009	0.005	(0.003–0.018)	0.010	0.005	(0.003–0.020)	0.008	0.005	(0.002–0.016)
12 Willamette	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
13 Mid Columbia Tule	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
14 Mid and Upper Columbia	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.003)	0.000	0.001	(0.000–0.000)
15 Deschutes (F)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.003	0.004	(0.000–0.011)
16 Upper Columbia (Su/F)	0.028	0.008	(0.016–0.043)	0.023	0.008	(0.011–0.037)	0.053	0.012	(0.035–0.074)
17 Snake (F)	0.000	0.001	(0.000–0.001)	0.001	0.002	(0.000–0.006)	0.001	0.002	(0.000–0.004)
18 Snake (Sp/Su)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
19 Washington Coast	0.032	0.009	(0.018–0.048)	0.018	0.007	(0.008–0.031)	0.024	0.008	(0.012–0.038)
20 Hood Canal	0.000	0.001	(0.000–0.003)	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.004)
21 South Puget Sound	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
22 North Puget Sound	0.003	0.004	(0.000–0.012)	0.003	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.001)
23 Juan de Fuca	0.000	0.001	(0.000–0.002)	0.003	0.003	(0.000–0.008)	0.000	0.001	(0.000–0.000)
24 Lower Fraser	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.002)	0.000	0.000	(0.000–0.000)
25 Lower Thompson	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.001)
26 South Thompson	0.050	0.011	(0.034–0.070)	0.078	0.014	(0.056–0.102)	0.093	0.015	(0.070–0.118)

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Reporting Group[a]	2007 n = 480 Relative Contribution Est.	2007 SD	2007 90% CI	2008 n = 400 Relative Contribution Est.	2008 SD	2008 90% CI	2009 n = 400 Relative Contribution Est.	2009 SD	2009 90% CI
27 North Thompson	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.002)
28 Mid Fraser	0.000	0.001	(0.000–0.001)	0.001	0.002	(0.000–0.006)	0.001	0.003	(0.000–0.006)
29 Upper Fraser	0.004	0.005	(0.000–0.014)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
30 East Vancouver	0.021	0.007	(0.010–0.034)	0.016	0.006	(0.007–0.027)	0.018	0.007	(0.008–0.031)
31 West Vancouver	0.194	0.018	(0.165–0.225)	0.161	0.019	(0.131–0.192)	0.203	0.021	(0.170–0.238)
32 South BC Mainland	0.007	0.004	(0.001–0.014)	0.000	0.000	(0.000–0.000)	0.007	0.005	(0.001–0.017)
33 Central BC Coast	0.053	0.012	(0.034–0.075)	0.029	0.009	(0.016–0.046)	0.113	0.017	(0.085–0.142)
34 Lower Skeena	0.010	0.009	(0.001–0.029)	0.008	0.007	(0.001–0.021)	0.023	0.010	(0.009–0.040)
35 Upper Skeena	0.000	0.001	(0.000–0.000)	0.018	0.008	(0.006–0.033)	0.000	0.001	(0.000–0.000)
36 Nass	0.002	0.003	(0.000–0.007)	0.006	0.006	(0.000–0.017)	0.000	0.001	(0.000–0.000)
37 Upper Stikine	0.056	0.021	(0.026–0.094)	0.020	0.023	(0.000–0.064)	0.014	0.012	(0.000–0.037)
38 Taku	0.061	0.019	(0.029–0.092)	0.085	0.025	(0.043–0.124)	0.033	0.012	(0.015–0.054)
39 S. Southeast AK	0.052	0.015	(0.028–0.078)	0.065	0.017	(0.039–0.094)	0.085	0.017	(0.059–0.113)
40 Andrew Creek	0.408	0.026	(0.366–0.451)	0.438	0.028	(0.393–0.484)	0.311	0.026	(0.270–0.354)
41 King Salmon	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	0.006	0.004	(0.001–0.013)	0.011	0.005	(0.004–0.021)	0.009	0.005	(0.002–0.018)
43 Alsek	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
44 Situk	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B9.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests from the Southern Inside quadrant during the spring troll fishery in SEAK, 2004 and 2007–2008.

		2004			2007			2008		
		n = 200			n = 301			n = 200		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
2	Central Valley (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)
3	Central Valley (W)	0.000	0.001	(0.000–0.001)	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)	0.000	0.001	(0.000–0.000)
5	Kalamath	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	North CA, South 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	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
8	Mid Oregon Coast	0.003	0.006	(0.000–0.015)	0.000	0.001	(0.000–0.000)	0.001	0.003	(0.000–0.007)
9	North OR Coast	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
10	Lower Columbia (Sp)	0.000	0.001	(0.000–0.000)	0.002	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.000)
11	Lower Columbia (F)	0.000	0.001	(0.000–0.001)	0.001	0.003	(0.000–0.007)	0.000	0.001	(0.000–0.000)
12	Willamette	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
14	Mid and Upper 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 (F)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.002	(0.000–0.002)
16	Upper Columbia (Su/F)	0.032	0.014	(0.013–0.057)	0.019	0.008	(0.008–0.034)	0.027	0.012	(0.010–0.050)
17	Snake (F)	0.000	0.002	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
18	Snake (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	0.002	(0.000–0.002)	0.004	0.004	(0.000–0.010)	0.002	0.004	(0.000–0.010)
20	Hood Canal	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.001	0.003	(0.000–0.005)
21	South Puget Sound	0.000	0.002	(0.000–0.001)	0.001	0.003	(0.000–0.008)	0.001	0.003	(0.000–0.006)
22	North Puget Sound	0.000	0.001	(0.000–0.001)	0.010	0.007	(0.002–0.024)	0.002	0.005	(0.000–0.012)
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	0.001	0.003	(0.000–0.007)	0.000	0.001	(0.000–0.000)	0.002	0.004	(0.000–0.011)
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	0.048	0.018	(0.022–0.079)	0.029	0.011	(0.014–0.048)	0.042	0.015	(0.021–0.069)

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		2004			2007			2008		
		n = 200			n = 301			n = 200		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North 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)
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	0.010	0.009	(0.001–0.027)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
30	East Vancouver	0.001	0.003	(0.000–0.005)	0.027	0.010	(0.013–0.045)	0.015	0.009	(0.004–0.031)
31	West Vancouver	0.049	0.016	(0.026–0.079)	0.085	0.016	(0.060–0.113)	0.029	0.012	(0.012–0.051)
32	South BC Mainland	0.020	0.014	(0.002–0.045)	0.015	0.008	(0.004–0.030)	0.013	0.009	(0.002–0.029)
33	Central BC Coast	0.023	0.015	(0.004–0.051)	0.065	0.018	(0.037–0.097)	0.019	0.012	(0.003–0.042)
34	Lower Skeena	0.006	0.006	(0.000–0.018)	0.007	0.005	(0.001–0.018)	0.006	0.006	(0.000–0.018)
35	Upper Skeena	0.001	0.004	(0.000–0.006)	0.001	0.002	(0.000–0.003)	0.003	0.006	(0.000–0.015)
36	Nass	0.014	0.015	(0.000–0.041)	0.005	0.007	(0.000–0.020)	0.004	0.007	(0.000–0.018)
37	Upper Stikine	0.171	0.039	(0.102–0.231)	0.119	0.025	(0.079–0.162)	0.081	0.028	(0.037–0.130)
38	Taku	0.007	0.023	(0.000–0.062)	0.000	0.002	(0.000–0.001)	0.001	0.003	(0.000–0.002)
39	S. Southeast AK	0.552	0.042	(0.482–0.621)	0.273	0.033	(0.220–0.330)	0.559	0.042	(0.490–0.627)
40	Andrew Creek	0.059	0.023	(0.025–0.100)	0.336	0.034	(0.281–0.392)	0.190	0.033	(0.139–0.247)
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	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
43	Alsek	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
44	Situk	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B10.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests from the Southern Inside quadrant during the spring troll fishery in SEAK, 2009.

		2009		
		n = 299		
		Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI
1	Central Valley (F)	0.000	0.001	(0.000–0.000)
2	Central Valley (Sp)	0.000	0.001	(0.000–0.000)
3	Central Valley (W)	0.000	0.001	(0.000–0.000)
4	California Coast	0.000	0.001	(0.000–0.000)
5	Kalamath	0.000	0.001	(0.000–0.000)
6	North CA, South OR Coast	0.000	0.001	(0.000–0.000)
7	Rogue	0.000	0.001	(0.000–0.000)
8	Mid Oregon Coast	0.000	0.001	(0.000–0.000)
9	North OR Coast	0.000	0.001	(0.000–0.001)
10	Lower Columbia (Sp)	0.000	0.001	(0.000–0.000)
11	Lower Columbia (F)	0.007	0.006	(0.000–0.020)
12	Willamette	0.000	0.001	(0.000–0.000)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.000)
14	Mid and Upper Columbia	0.000	0.001	(0.000–0.000)
15	Deschutes (F)	0.009	0.009	(0.000–0.026)
16	Upper Columbia (Su/F)	0.032	0.012	(0.015–0.054)
17	Snake (F)	0.000	0.001	(0.000–0.001)
18	Snake (Sp/Su)	0.000	0.001	(0.000–0.000)
19	Washington Coast	0.001	0.003	(0.000–0.007)
20	Hood Canal	0.000	0.001	(0.000–0.001)
21	South Puget Sound	0.003	0.004	(0.000–0.011)
22	North Puget Sound	0.001	0.004	(0.000–0.008)
23	Juan de Fuca	0.000	0.001	(0.000–0.000)
24	Lower Fraser	0.000	0.001	(0.000–0.000)
25	Lower Thompson	0.000	0.001	(0.000–0.000)
26	South Thompson	0.029	0.010	(0.014–0.047)
27	North Thompson	0.000	0.001	(0.000–0.000)
28	Mid Fraser	0.000	0.001	(0.000–0.000)
29	Upper Fraser	0.000	0.001	(0.000–0.000)
30	East Vancouver	0.011	0.006	(0.003–0.023)
31	West Vancouver	0.045	0.012	(0.028–0.067)
32	South BC Mainland	0.000	0.001	(0.000–0.000)
33	Central BC Coast	0.039	0.015	(0.019–0.066)
34	Lower Skeena	0.001	0.003	(0.000–0.006)
35	Upper Skeena	0.001	0.004	(0.000–0.009)
36	Nass	0.032	0.012	(0.014–0.054)
37	Upper Stikine	0.182	0.029	(0.136–0.231)
38	Taku	0.009	0.011	(0.000–0.032)
39	S. Southeast AK	0.415	0.034	(0.359–0.471)
40	Andrew Creek	0.181	0.027	(0.138–0.227)
41	King Salmon	0.000	0.001	(0.000–0.000)
42	Chilkat	0.000	0.001	(0.000–0.000)
43	Alsek	0.000	0.001	(0.000–0.000)
44	Situk	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B11.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests during the first retention period of the summer troll fishery in SEAK, 2004–2006.

		2004			2005			2006		
		n = 395			n = 364			n = 220		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.001	0.002	(0.000–0.006)	0.000	0.000	(0.000–0.000)	0.001	0.003	(0.000–0.006)
2	Central Valley (Sp)	0.000	0.001	(0.000–0.002)	0.000	0.000	(0.000–0.000)	0.000	0.002	(0.000–0.002)
3	Central Valley (W)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
4	California Coast	0.000	0.000	(0.000–0.000)	0.002	0.002	(0.000–0.007)	0.000	0.001	(0.000–0.000)
5	Kalamath	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
6	North CA, South OR Coast	0.001	0.002	(0.000–0.005)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
7	Rogue	0.000	0.001	(0.000–0.002)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
8	Mid Oregon Coast	0.088	0.018	(0.059–0.119)	0.085	0.021	(0.051–0.121)	0.054	0.020	(0.025–0.090)
9	North OR Coast	0.085	0.017	(0.059–0.114)	0.141	0.022	(0.106–0.180)	0.095	0.023	(0.060–0.135)
10	Lower Columbia (Sp)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.002	0.006	(0.000–0.016)
11	Lower Columbia (F)	0.042	0.011	(0.025–0.061)	0.034	0.010	(0.020–0.052)	0.032	0.014	(0.011–0.058)
12	Willamette	0.013	0.006	(0.005–0.023)	0.011	0.006	(0.004–0.021)	0.005	0.006	(0.000–0.018)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
14	Mid and Upper 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 (F)	0.012	0.009	(0.000–0.029)	0.019	0.012	(0.000–0.039)	0.000	0.001	(0.000–0.000)
16	Upper Columbia (Su/F)	0.206	0.022	(0.170–0.244)	0.211	0.025	(0.171–0.253)	0.169	0.027	(0.127–0.215)
17	Snake (F)	0.001	0.003	(0.000–0.004)	0.011	0.010	(0.000–0.030)	0.002	0.005	(0.000–0.013)
18	Snake (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	0.118	0.018	(0.091–0.149)	0.097	0.017	(0.071–0.126)	0.091	0.021	(0.058–0.127)
20	Hood Canal	0.000	0.000	(0.000–0.000)	0.002	0.003	(0.000–0.007)	0.004	0.007	(0.000–0.021)
21	South Puget Sound	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
22	North Puget Sound	0.011	0.007	(0.000–0.024)	0.003	0.005	(0.000–0.015)	0.008	0.015	(0.000–0.041)
23	Juan de Fuca	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.005	0.005	(0.000–0.014)
24	Lower Fraser	0.000	0.000	(0.000–0.000)	0.001	0.002	(0.000–0.006)	0.005	0.005	(0.000–0.014)
25	Lower Thompson	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
26	South Thompson	0.089	0.015	(0.066–0.114)	0.116	0.017	(0.089–0.146)	0.227	0.029	(0.181–0.276)

-continued-

		2004			2005			2006		
		n = 395			n = 364			n = 220		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North Thompson	0.001	0.002	(0.000–0.003)	0.000	0.001	(0.000–0.000)	0.001	0.003	(0.000–0.004)
28	Mid Fraser	0.010	0.006	(0.002–0.021)	0.000	0.001	(0.000–0.000)	0.003	0.004	(0.000–0.011)
29	Upper Fraser	0.005	0.009	(0.000–0.025)	0.000	0.001	(0.000–0.000)	0.000	0.002	(0.000–0.001)
30	East Vancouver	0.021	0.007	(0.011–0.035)	0.027	0.009	(0.014–0.042)	0.010	0.008	(0.001–0.026)
31	West Vancouver	0.188	0.020	(0.156–0.222)	0.075	0.014	(0.053–0.099)	0.145	0.024	(0.107–0.185)
32	South BC Mainland	0.008	0.005	(0.002–0.018)	0.000	0.001	(0.000–0.000)	0.011	0.009	(0.000–0.027)
33	Central BC Coast	0.005	0.005	(0.000–0.015)	0.002	0.005	(0.000–0.012)	0.042	0.016	(0.020–0.071)
34	Lower Skeena	0.003	0.003	(0.000–0.009)	0.019	0.009	(0.007–0.035)	0.028	0.015	(0.007–0.055)
35	Upper Skeena	0.001	0.002	(0.000–0.004)	0.000	0.001	(0.000–0.000)	0.001	0.005	(0.000–0.009)
36	Nass	0.000	0.001	(0.000–0.000)	0.000	0.002	(0.000–0.003)	0.001	0.004	(0.000–0.009)
37	Upper Stikine	0.003	0.005	(0.000–0.014)	0.002	0.004	(0.000–0.011)	0.002	0.007	(0.000–0.015)
38	Taku	0.000	0.001	(0.000–0.001)	0.000	0.002	(0.000–0.002)	0.000	0.001	(0.000–0.000)
39	S. Southeast AK	0.041	0.012	(0.023–0.062)	0.109	0.018	(0.080–0.140)	0.041	0.015	(0.019–0.069)
40	Andrew Creek	0.047	0.012	(0.030–0.068)	0.033	0.011	(0.017–0.052)	0.014	0.010	(0.002–0.034)
41	King Salmon	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
42	Chilkat	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
43	Alsek	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
44	Situk	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B12.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests during the first retention period of the summer troll fishery in SEAK, 2007–2009.

		2007			2008			2009		
		n = 380			n = 394			n = 397		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.000	0.001	(0.000–0.000)	0.000	0.000	(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	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
3	Central Valley (W)	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	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
5	Kalamath	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.001)
6	North CA, South OR Coast	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	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
8	Mid Oregon Coast	0.043	0.013	(0.023–0.066)	0.026	0.010	(0.012–0.043)	0.048	0.015	(0.025–0.073)
9	North OR Coast	0.054	0.015	(0.030–0.080)	0.058	0.014	(0.036–0.083)	0.044	0.013	(0.025–0.068)
10	Lower Columbia (Sp)	0.001	0.002	(0.000–0.006)	0.001	0.002	(0.000–0.005)	0.002	0.004	(0.000–0.010)
11	Lower Columbia (F)	0.030	0.009	(0.016–0.047)	0.031	0.010	(0.016–0.049)	0.031	0.009	(0.018–0.048)
12	Willamette	0.002	0.003	(0.000–0.008)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.002)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
14	Mid and Upper Columbia	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
15	Deschutes (F)	0.001	0.002	(0.000–0.004)	0.009	0.012	(0.000–0.033)	0.006	0.010	(0.000–0.026)
16	Upper Columbia (Su/F)	0.106	0.018	(0.078–0.136)	0.177	0.022	(0.141–0.215)	0.311	0.027	(0.267–0.355)
17	Snake (F)	0.019	0.010	(0.004–0.037)	0.012	0.010	(0.000–0.030)	0.007	0.011	(0.000–0.031)
18	Snake (Sp/Su)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
19	Washington Coast	0.118	0.018	(0.090–0.150)	0.096	0.016	(0.071–0.123)	0.096	0.016	(0.071–0.124)
20	Hood Canal	0.001	0.003	(0.000–0.007)	0.001	0.002	(0.000–0.006)	0.000	0.001	(0.000–0.000)
21	South Puget Sound	0.001	0.002	(0.000–0.006)	0.002	0.003	(0.000–0.008)	0.000	0.001	(0.000–0.001)
22	North Puget Sound	0.002	0.004	(0.000–0.011)	0.010	0.006	(0.002–0.021)	0.005	0.005	(0.000–0.015)
23	Juan de Fuca	0.006	0.004	(0.001–0.013)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
24	Lower Fraser	0.002	0.003	(0.000–0.008)	0.000	0.001	(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	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
26	South Thompson	0.179	0.020	(0.146–0.213)	0.267	0.023	(0.229–0.306)	0.143	0.018	(0.114–0.174)

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		2007			2008			2009		
		n = 380			n = 394			n = 397		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North Thompson	0.000	0.000	(0.000–0.000)	0.008	0.005	(0.002–0.018)	0.010	0.005	(0.004–0.020)
28	Mid Fraser	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.002)
29	Upper Fraser	0.004	0.008	(0.000–0.021)	0.009	0.009	(0.000–0.026)	0.002	0.004	(0.000–0.012)
30	East Vancouver	0.028	0.009	(0.015–0.044)	0.005	0.004	(0.001–0.012)	0.016	0.006	(0.007–0.027)
31	West Vancouver	0.160	0.019	(0.130–0.193)	0.090	0.014	(0.068–0.115)	0.088	0.014	(0.066–0.113)
32	South BC Mainland	0.020	0.008	(0.009–0.034)	0.013	0.006	(0.005–0.024)	0.000	0.000	(0.000–0.000)
33	Central BC Coast	0.026	0.010	(0.012–0.043)	0.019	0.008	(0.008–0.034)	0.036	0.011	(0.020–0.054)
34	Lower Skeena	0.035	0.011	(0.018–0.055)	0.004	0.005	(0.000–0.016)	0.025	0.010	(0.010–0.043)
35	Upper Skeena	0.045	0.012	(0.026–0.066)	0.024	0.010	(0.010–0.042)	0.001	0.004	(0.000–0.010)
36	Nass	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
37	Upper Stikine	0.001	0.002	(0.000–0.003)	0.025	0.015	(0.000–0.052)	0.008	0.010	(0.000–0.027)
38	Taku	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.001)	0.010	0.010	(0.000–0.028)
39	S. Southeast AK	0.064	0.015	(0.041–0.090)	0.034	0.013	(0.013–0.057)	0.062	0.013	(0.041–0.085)
40	Andrew Creek	0.054	0.013	(0.033–0.077)	0.076	0.016	(0.051–0.104)	0.046	0.012	(0.028–0.067)
41	King Salmon	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	0.000	0.000	(0.000–0.000)	0.003	0.003	(0.000–0.008)	0.000	0.000	(0.000–0.000)
43	Alsek	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	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.002	0.003	(0.000–0.007)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B13.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests in the Northern Outside quadrant during the first retention period of the summer troll fishery in SEAK, 2004–2006.

		2004			2005			2006		
		n = 395			n = 370			n = 400		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.001	0.003	(0.000–0.007)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
2	Central Valley (Sp)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
3	Central Valley (W)	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	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
5	Kalamath	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
6	North CA, South OR Coast	0.001	0.002	(0.000–0.004)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
7	Rogue	0.001	0.003	(0.000–0.007)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
8	Mid Oregon Coast	0.086	0.018	(0.058–0.117)	0.079	0.019	(0.048–0.112)	0.059	0.018	(0.030–0.090)
9	North OR Coast	0.099	0.018	(0.071–0.129)	0.143	0.022	(0.109–0.180)	0.099	0.024	(0.062–0.140)
10	Lower Columbia (Sp)	0.003	0.004	(0.000–0.011)	0.000	0.002	(0.000–0.002)	0.005	0.006	(0.000–0.016)
11	Lower Columbia (F)	0.048	0.013	(0.029–0.070)	0.031	0.010	(0.016–0.050)	0.021	0.010	(0.008–0.039)
12	Willamette	0.013	0.006	(0.005–0.023)	0.011	0.005	(0.004–0.021)	0.000	0.001	(0.000–0.000)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
14	Mid and Upper Columbia	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.001)
15	Deschutes (F)	0.007	0.008	(0.000–0.022)	0.019	0.014	(0.001–0.044)	0.009	0.008	(0.000–0.023)
16	Upper Columbia (Su/F)	0.230	0.023	(0.193–0.268)	0.221	0.026	(0.179–0.264)	0.203	0.021	(0.168–0.239)
17	Snake (F)	0.000	0.002	(0.000–0.001)	0.007	0.010	(0.000–0.029)	0.000	0.001	(0.000–0.001)
18	Snake (Sp/Su)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.006)
19	Washington Coast	0.125	0.018	(0.097–0.155)	0.114	0.018	(0.086–0.145)	0.105	0.016	(0.079–0.133)
20	Hood Canal	0.000	0.001	(0.000–0.000)	0.002	0.003	(0.000–0.008)	0.008	0.006	(0.000–0.019)
21	South Puget Sound	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
22	North Puget Sound	0.002	0.004	(0.000–0.009)	0.003	0.004	(0.000–0.012)	0.005	0.007	(0.000–0.021)
23	Juan de Fuca	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)	0.002	0.003	(0.000–0.008)
24	Lower Fraser	0.000	0.000	(0.000–0.000)	0.001	0.002	(0.000–0.006)	0.002	0.003	(0.000–0.007)
25	Lower Thompson	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
26	South Thompson	0.093	0.015	(0.069–0.119)	0.153	0.019	(0.123–0.186)	0.167	0.019	(0.137–0.199)

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		2004			2005			2006		
		n = 395			n = 370			n = 400		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North Thompson	0.001	0.002	(0.000–0.004)	0.000	0.001	(0.000–0.000)	0.004	0.004	(0.000–0.012)
28	Mid Fraser	0.008	0.005	(0.001–0.019)	0.006	0.004	(0.001–0.014)	0.003	0.003	(0.000–0.009)
29	Upper Fraser	0.002	0.005	(0.000–0.015)	0.000	0.001	(0.000–0.000)	0.018	0.016	(0.000–0.045)
30	East Vancouver	0.013	0.006	(0.005–0.024)	0.018	0.007	(0.008–0.031)	0.007	0.005	(0.002–0.016)
31	West Vancouver	0.166	0.019	(0.136–0.198)	0.068	0.013	(0.048–0.091)	0.144	0.018	(0.116–0.174)
32	South BC Mainland	0.011	0.006	(0.004–0.022)	0.000	0.001	(0.000–0.001)	0.013	0.006	(0.005–0.024)
33	Central BC Coast	0.012	0.007	(0.003–0.024)	0.015	0.009	(0.004–0.032)	0.034	0.011	(0.018–0.054)
34	Lower Skeena	0.003	0.004	(0.000–0.012)	0.031	0.012	(0.014–0.052)	0.036	0.012	(0.018–0.058)
35	Upper Skeena	0.005	0.006	(0.000–0.016)	0.001	0.004	(0.000–0.008)	0.001	0.003	(0.000–0.002)
36	Nass	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.004)	0.000	0.001	(0.000–0.002)
37	Upper Stikine	0.001	0.003	(0.000–0.008)	0.003	0.006	(0.000–0.017)	0.000	0.002	(0.000–0.001)
38	Taku	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
39	S. Southeast AK	0.025	0.010	(0.012–0.043)	0.018	0.011	(0.000–0.039)	0.019	0.010	(0.005–0.039)
40	Andrew Creek	0.045	0.011	(0.028–0.063)	0.054	0.013	(0.035–0.076)	0.035	0.011	(0.019–0.055)
41	King Salmon	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	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
43	Alsek	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	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B14.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests in the Northern Outside quadrant during the first retention period of the summer troll fishery in SEAK, 2007–2009.

		2007			2008			2009		
		n = 385			n = 396			n = 399		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.000	0.001	(0.000–0.000)	0.000	0.000	(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	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
3	Central Valley (W)	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	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
5	Kalamath	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
6	North CA, South OR Coast	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	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
8	Mid Oregon Coast	0.050	0.014	(0.030–0.074)	0.029	0.010	(0.014–0.046)	0.058	0.015	(0.036–0.084)
9	North OR Coast	0.054	0.014	(0.032–0.079)	0.066	0.015	(0.042–0.092)	0.034	0.012	(0.016–0.056)
10	Lower Columbia (Sp)	0.000	0.000	(0.000–0.000)	0.001	0.002	(0.000–0.004)	0.003	0.005	(0.000–0.013)
11	Lower Columbia (F)	0.032	0.010	(0.018–0.050)	0.044	0.012	(0.027–0.065)	0.040	0.010	(0.024–0.059)
12	Willamette	0.006	0.004	(0.001–0.013)	0.003	0.003	(0.000–0.008)	0.002	0.003	(0.000–0.008)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.001)	0.001	0.002	(0.000–0.005)	0.002	0.002	(0.000–0.007)
14	Mid and Upper Columbia	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
15	Deschutes (F)	0.001	0.004	(0.000–0.009)	0.000	0.001	(0.000–0.001)	0.021	0.013	(0.000–0.043)
16	Upper Columbia (Su/F)	0.131	0.019	(0.101–0.164)	0.193	0.021	(0.159–0.228)	0.304	0.026	(0.261–0.348)
17	Snake (F)	0.013	0.010	(0.000–0.030)	0.018	0.008	(0.006–0.033)	0.005	0.010	(0.000–0.027)
18	Snake (Sp/Su)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
19	Washington Coast	0.111	0.017	(0.084–0.141)	0.128	0.018	(0.100–0.158)	0.105	0.017	(0.079–0.133)
20	Hood Canal	0.000	0.001	(0.000–0.003)	0.001	0.002	(0.000–0.006)	0.000	0.001	(0.000–0.000)
21	South Puget Sound	0.001	0.002	(0.000–0.004)	0.003	0.003	(0.000–0.010)	0.000	0.001	(0.000–0.000)
22	North Puget Sound	0.000	0.001	(0.000–0.000)	0.002	0.003	(0.000–0.008)	0.009	0.006	(0.001–0.019)
23	Juan de Fuca	0.003	0.003	(0.000–0.008)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
24	Lower Fraser	0.003	0.003	(0.000–0.010)	0.003	0.003	(0.000–0.008)	0.000	0.000	(0.000–0.000)
25	Lower Thompson	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
26	South Thompson	0.149	0.019	(0.120–0.181)	0.211	0.022	(0.176–0.247)	0.129	0.017	(0.102–0.159)

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		2007			2008			2009		
		n = 385			n = 396			n = 399		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North Thompson	0.000	0.000	(0.000–0.000)	0.009	0.005	(0.002–0.019)	0.010	0.005	(0.003–0.020)
28	Mid Fraser	0.000	0.001	(0.000–0.000)	0.008	0.006	(0.001–0.019)	0.000	0.002	(0.000–0.003)
29	Upper Fraser	0.030	0.012	(0.013–0.051)	0.003	0.007	(0.000–0.020)	0.011	0.008	(0.000–0.026)
30	East Vancouver	0.028	0.009	(0.015–0.043)	0.009	0.005	(0.002–0.018)	0.018	0.007	(0.008–0.030)
31	West Vancouver	0.144	0.018	(0.116–0.175)	0.081	0.014	(0.059–0.104)	0.093	0.015	(0.070–0.119)
32	South BC Mainland	0.017	0.007	(0.008–0.030)	0.017	0.007	(0.008–0.029)	0.000	0.000	(0.000–0.000)
33	Central BC Coast	0.043	0.012	(0.025–0.064)	0.009	0.005	(0.002–0.019)	0.035	0.011	(0.019–0.054)
34	Lower Skeena	0.029	0.012	(0.012–0.049)	0.011	0.010	(0.000–0.030)	0.032	0.011	(0.016–0.051)
35	Upper Skeena	0.045	0.012	(0.027–0.067)	0.014	0.010	(0.000–0.031)	0.001	0.004	(0.000–0.010)
36	Nass	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
37	Upper Stikine	0.000	0.002	(0.000–0.001)	0.024	0.012	(0.002–0.045)	0.025	0.010	(0.010–0.043)
38	Taku	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.001	0.004	(0.000–0.008)
39	S. Southeast AK	0.053	0.013	(0.033–0.077)	0.011	0.006	(0.003–0.022)	0.020	0.009	(0.008–0.037)
40	Andrew Creek	0.055	0.013	(0.035–0.078)	0.099	0.017	(0.072–0.128)	0.038	0.012	(0.020–0.059)
41	King Salmon	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	0.000	0.000	(0.000–0.000)	0.005	0.004	(0.001–0.013)	0.000	0.000	(0.000–0.000)
43	Alsek	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	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.003	0.003	(0.000–0.008)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B15.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests during the second and subsequent retention periods of the summer troll fishery in SEAK, 2004–2006.

		2004			2005			2006		
		n = 374			n = 244			n = 204		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.000	0.000	(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 (W)	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	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
5	Kalamath	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	North CA, South 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	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.002	(0.000–0.003)
8	Mid Oregon Coast	0.168	0.025	(0.128–0.210)	0.068	0.024	(0.034–0.111)	0.070	0.021	(0.037–0.107)
9	North OR Coast	0.127	0.022	(0.092–0.163)	0.077	0.028	(0.039–0.130)	0.050	0.020	(0.023–0.086)
10	Lower Columbia (Sp)	0.004	0.005	(0.000–0.014)	0.000	0.001	(0.000–0.001)	0.044	0.016	(0.022–0.072)
11	Lower Columbia (F)	0.036	0.011	(0.019–0.056)	0.055	0.016	(0.031–0.083)	0.026	0.017	(0.000–0.055)
12	Willamette	0.024	0.008	(0.012–0.038)	0.004	0.004	(0.000–0.013)	0.010	0.007	(0.001–0.023)
13	Mid Columbia Tule	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.005	0.008	(0.000–0.023)
14	Mid and Upper 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 (F)	0.000	0.001	(0.000–0.001)	0.001	0.003	(0.000–0.006)	0.026	0.017	(0.000–0.057)
16	Upper Columbia (Su/F)	0.203	0.022	(0.167–0.240)	0.269	0.031	(0.219–0.322)	0.182	0.030	(0.134–0.233)
17	Snake (F)	0.010	0.008	(0.001–0.025)	0.050	0.019	(0.022–0.083)	0.001	0.005	(0.000–0.010)
18	Snake (Sp/Su)	0.000	0.001	(0.000–0.002)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
19	Washington Coast	0.181	0.022	(0.147–0.218)	0.104	0.021	(0.072–0.140)	0.131	0.026	(0.091–0.174)
20	Hood Canal	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.005	0.005	(0.000–0.016)
21	South Puget Sound	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.001)
22	North Puget Sound	0.003	0.003	(0.000–0.010)	0.004	0.005	(0.000–0.013)	0.001	0.003	(0.000–0.005)
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	0.005	0.004	(0.001–0.013)	0.000	0.001	(0.000–0.000)	0.006	0.006	(0.000–0.019)
25	Lower Thompson	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
26	South Thompson	0.056	0.013	(0.036–0.077)	0.095	0.020	(0.065–0.129)	0.076	0.020	(0.045–0.111)

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		2004			2005			2006		
		n = 374			n = 244			n = 204		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North Thompson	0.003	0.003	(0.000–0.008)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
28	Mid Fraser	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
29	Upper Fraser	0.003	0.008	(0.000–0.024)	0.055	0.023	(0.018–0.095)	0.017	0.012	(0.002–0.039)
30	East Vancouver	0.014	0.007	(0.006–0.026)	0.027	0.011	(0.011–0.047)	0.022	0.011	(0.008–0.042)
31	West Vancouver	0.084	0.015	(0.061–0.109)	0.078	0.018	(0.051–0.110)	0.139	0.025	(0.101–0.182)
32	South BC Mainland	0.000	0.001	(0.000–0.001)	0.003	0.004	(0.000–0.011)	0.000	0.001	(0.000–0.000)
33	Central BC Coast	0.006	0.005	(0.001–0.015)	0.029	0.014	(0.007–0.054)	0.047	0.016	(0.023–0.077)
34	Lower Skeena	0.001	0.002	(0.000–0.005)	0.007	0.009	(0.000–0.025)	0.001	0.003	(0.000–0.007)
35	Upper Skeena	0.000	0.002	(0.000–0.001)	0.006	0.009	(0.000–0.025)	0.000	0.001	(0.000–0.000)
36	Nass	0.005	0.005	(0.000–0.015)	0.000	0.001	(0.000–0.000)	0.013	0.009	(0.002–0.030)
37	Upper Stikine	0.001	0.002	(0.000–0.005)	0.005	0.010	(0.000–0.026)	0.008	0.010	(0.000–0.028)
38	Taku	0.000	0.001	(0.000–0.001)	0.002	0.004	(0.000–0.010)	0.000	0.001	(0.000–0.001)
39	S. Southeast AK	0.029	0.011	(0.014–0.048)	0.050	0.015	(0.028–0.077)	0.112	0.026	(0.073–0.157)
40	Andrew Creek	0.034	0.011	(0.018–0.053)	0.009	0.008	(0.000–0.024)	0.007	0.010	(0.000–0.028)
41	King Salmon	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
42	Chilkat	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
43	Alsek	0.002	0.003	(0.000–0.008)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
44	Situk	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B16.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests during the second and following retention periods of the summer troll fishery in SEAK, 2007–2009.

		2007			2008			2009		
		n = 289			n = 394			n = 400		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.000	0.001	(0.000–0.000)	0.000	0.000	(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	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
3	Central Valley (W)	0.000	0.001	(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)	0.001	0.002	(0.000–0.006)	0.000	0.000	(0.000–0.000)
5	Kalamath	0.000	0.001	(0.000–0.000)	0.002	0.002	(0.000–0.007)	0.000	0.000	(0.000–0.000)
6	North CA, South OR Coast	0.001	0.002	(0.000–0.005)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
7	Rogue	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
8	Mid Oregon Coast	0.016	0.015	(0.000–0.047)	0.027	0.010	(0.012–0.045)	0.108	0.024	(0.069–0.149)
9	North OR Coast	0.100	0.024	(0.061–0.140)	0.076	0.015	(0.052–0.102)	0.095	0.020	(0.063–0.130)
10	Lower Columbia (Sp)	0.007	0.006	(0.000–0.018)	0.000	0.001	(0.000–0.001)	0.003	0.004	(0.000–0.011)
11	Lower Columbia (F)	0.027	0.011	(0.010–0.047)	0.015	0.007	(0.005–0.028)	0.043	0.011	(0.026–0.062)
12	Willamette	0.005	0.005	(0.000–0.014)	0.006	0.004	(0.001–0.014)	0.015	0.007	(0.006–0.028)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.000)	0.008	0.005	(0.002–0.018)	0.000	0.000	(0.000–0.000)
14	Mid and Upper Columbia	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.002	0.002	(0.000–0.006)
15	Deschutes (F)	0.006	0.007	(0.000–0.020)	0.003	0.006	(0.000–0.016)	0.003	0.005	(0.000–0.014)
16	Upper Columbia (Su/F)	0.189	0.028	(0.145–0.236)	0.372	0.025	(0.331–0.414)	0.302	0.024	(0.264–0.342)
17	Snake (F)	0.015	0.016	(0.000–0.046)	0.000	0.001	(0.000–0.001)	0.000	0.002	(0.000–0.001)
18	Snake (Sp/Su)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.002)
19	Washington Coast	0.227	0.027	(0.184–0.272)	0.195	0.021	(0.162–0.231)	0.148	0.020	(0.117–0.181)
20	Hood Canal	0.003	0.004	(0.000–0.011)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.001)
21	South Puget Sound	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)	0.001	0.002	(0.000–0.003)
22	North Puget Sound	0.002	0.005	(0.000–0.013)	0.007	0.005	(0.001–0.018)	0.000	0.001	(0.000–0.001)
23	Juan de Fuca	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
24	Lower Fraser	0.003	0.003	(0.000–0.010)	0.003	0.003	(0.000–0.008)	0.000	0.000	(0.000–0.000)
25	Lower Thompson	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
26	South Thompson	0.082	0.016	(0.057–0.110)	0.045	0.011	(0.028–0.064)	0.034	0.010	(0.020–0.052)

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		2007			2008			2009		
		n = 289			n = 394			n = 400		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North Thompson	0.000	0.002	(0.000–0.002)	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.005)
28	Mid Fraser	0.001	0.002	(0.000–0.005)	0.003	0.004	(0.000–0.012)	0.000	0.001	(0.000–0.001)
29	Upper Fraser	0.013	0.016	(0.000–0.046)	0.001	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.001)
30	East Vancouver	0.032	0.011	(0.017–0.052)	0.043	0.010	(0.027–0.062)	0.013	0.007	(0.004–0.026)
31	West Vancouver	0.115	0.019	(0.085–0.148)	0.103	0.015	(0.079–0.129)	0.061	0.012	(0.043–0.082)
32	South BC Mainland	0.000	0.001	(0.000–0.000)	0.005	0.004	(0.000–0.013)	0.002	0.003	(0.000–0.007)
33	Central BC Coast	0.035	0.013	(0.017–0.058)	0.024	0.009	(0.012–0.040)	0.037	0.010	(0.021–0.056)
34	Lower Skeena	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.002	0.004	(0.000–0.012)
35	Upper Skeena	0.001	0.004	(0.000–0.009)	0.003	0.003	(0.000–0.009)	0.000	0.000	(0.000–0.000)
36	Nass	0.000	0.001	(0.000–0.001)	0.003	0.003	(0.000–0.008)	0.000	0.000	(0.000–0.000)
37	Upper Stikine	0.012	0.010	(0.000–0.031)	0.001	0.003	(0.000–0.007)	0.010	0.008	(0.000–0.025)
38	Taku	0.001	0.004	(0.000–0.010)	0.000	0.001	(0.000–0.002)	0.000	0.001	(0.000–0.001)
39	S. Southeast AK	0.062	0.016	(0.038–0.091)	0.033	0.010	(0.019–0.051)	0.103	0.016	(0.078–0.131)
40	Andrew Creek	0.035	0.012	(0.017–0.057)	0.019	0.008	(0.008–0.034)	0.014	0.007	(0.004–0.027)
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)
42	Chilkat	0.007	0.005	(0.001–0.016)	0.000	0.000	(0.000–0.000)	0.002	0.003	(0.000–0.008)
43	Alsek	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
44	Situk	0.000	0.001	(0.000–0.002)	0.000	0.000	(0.000–0.000)	0.001	0.002	(0.000–0.006)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B17.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests in the Northern Outside quadrant during the second and following retention periods of the summer troll fishery in SEAK, 2004–2006.

		2004			2005			2006		
		n = 394			n = 357			n = 341		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.000	0.000	(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	(0.000–0.001)	0.000	0.001	(0.000–0.000)
3	Central Valley (W)	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	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
5	Kalamath	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.001)
6	North CA, South 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	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.002	(0.000–0.002)
8	Mid Oregon Coast	0.133	0.023	(0.097–0.173)	0.062	0.018	(0.037–0.095)	0.073	0.017	(0.047–0.102)
9	North OR Coast	0.133	0.022	(0.098–0.170)	0.114	0.026	(0.072–0.157)	0.033	0.012	(0.017–0.054)
10	Lower Columbia (Sp)	0.002	0.004	(0.000–0.009)	0.000	0.001	(0.000–0.000)	0.018	0.008	(0.007–0.033)
11	Lower Columbia (F)	0.041	0.012	(0.023–0.062)	0.031	0.010	(0.016–0.050)	0.037	0.011	(0.021–0.056)
12	Willamette	0.030	0.009	(0.018–0.046)	0.003	0.003	(0.000–0.010)	0.005	0.005	(0.000–0.014)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.001)
14	Mid and Upper Columbia	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
15	Deschutes (F)	0.000	0.001	(0.000–0.000)	0.004	0.008	(0.000–0.023)	0.017	0.014	(0.000–0.042)
16	Upper Columbia (Su/F)	0.217	0.022	(0.182–0.254)	0.336	0.028	(0.292–0.382)	0.199	0.025	(0.159–0.240)
17	Snake (F)	0.003	0.005	(0.000–0.015)	0.024	0.012	(0.007–0.045)	0.008	0.007	(0.000–0.022)
18	Snake (Sp/Su)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
19	Washington Coast	0.195	0.021	(0.161–0.232)	0.127	0.019	(0.096–0.160)	0.130	0.020	(0.098–0.163)
20	Hood Canal	0.001	0.002	(0.000–0.005)	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.004)
21	South Puget Sound	0.001	0.002	(0.000–0.006)	0.000	0.001	(0.000–0.001)	0.000	0.002	(0.000–0.003)
22	North Puget Sound	0.005	0.004	(0.001–0.013)	0.000	0.001	(0.000–0.001)	0.006	0.005	(0.000–0.017)
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	0.007	0.005	(0.001–0.016)	0.010	0.006	(0.003–0.021)	0.006	0.004	(0.001–0.014)
25	Lower Thompson	0.002	0.002	(0.000–0.006)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
26	South Thompson	0.049	0.012	(0.032–0.070)	0.090	0.016	(0.065–0.117)	0.138	0.020	(0.107–0.171)

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		2004			2005			2006		
		n = 394			n = 357			n = 341		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North Thompson	0.004	0.003	(0.000–0.010)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
28	Mid Fraser	0.000	0.001	(0.000–0.000)	0.003	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.000)
29	Upper Fraser	0.001	0.006	(0.000–0.006)	0.036	0.019	(0.008–0.069)	0.022	0.010	(0.008–0.040)
30	East Vancouver	0.012	0.006	(0.004–0.023)	0.015	0.007	(0.006–0.028)	0.010	0.006	(0.003–0.021)
31	West Vancouver	0.081	0.014	(0.059–0.105)	0.097	0.016	(0.072–0.125)	0.168	0.020	(0.135–0.202)
32	South BC Mainland	0.001	0.002	(0.000–0.004)	0.005	0.005	(0.000–0.014)	0.000	0.000	(0.000–0.000)
33	Central BC Coast	0.009	0.007	(0.001–0.022)	0.016	0.008	(0.006–0.030)	0.062	0.015	(0.040–0.087)
34	Lower Skeena	0.001	0.002	(0.000–0.004)	0.000	0.001	(0.000–0.000)	0.003	0.007	(0.000–0.019)
35	Upper Skeena	0.022	0.008	(0.010–0.036)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)
36	Nass	0.002	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.000)
37	Upper Stikine	0.000	0.001	(0.000–0.002)	0.003	0.005	(0.000–0.014)	0.019	0.012	(0.000–0.040)
38	Taku	0.000	0.001	(0.000–0.000)	0.002	0.003	(0.000–0.008)	0.002	0.004	(0.000–0.012)
39	S. Southeast AK	0.041	0.011	(0.024–0.060)	0.011	0.006	(0.003–0.023)	0.015	0.010	(0.002–0.034)
40	Andrew Creek	0.006	0.005	(0.000–0.016)	0.009	0.005	(0.002–0.020)	0.029	0.011	(0.013–0.049)
41	King Salmon	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	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)
43	Alsek	0.001	0.002	(0.000–0.006)	0.000	0.001	(0.000–0.002)	0.000	0.000	(0.000–0.000)
44	Situk	0.000	0.001	(0.000–0.002)	0.000	0.001	(0.000–0.000)	0.000	0.001	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

Appendix B18.–Estimated contributions of 44 reporting groups of Chinook salmon to harvests in the Northern Outside quadrant during the second and following retention periods of the summer troll fishery in SEAK, 2007–2009.

		2007			2008			2009		
		n = 391			n = 394			n = 400		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (F)	0.000	0.000	(0.000–0.000)	0.000	0.000	(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	0.000	(0.000–0.000)
3	Central Valley (W)	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	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
5	Kalamath	0.000	0.000	(0.000–0.000)	0.002	0.003	(0.000–0.007)	0.000	0.000	(0.000–0.000)
6	North CA, South 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)
7	Rogue	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.003)	0.000	0.001	(0.000–0.000)
8	Mid Oregon Coast	0.018	0.013	(0.000–0.042)	0.019	0.010	(0.005–0.037)	0.126	0.021	(0.093–0.162)
9	North OR Coast	0.092	0.019	(0.062–0.124)	0.077	0.016	(0.052–0.104)	0.072	0.017	(0.045–0.101)
10	Lower Columbia (Sp)	0.002	0.004	(0.000–0.012)	0.000	0.001	(0.000–0.001)	0.003	0.004	(0.000–0.011)
11	Lower Columbia (F)	0.042	0.012	(0.024–0.062)	0.024	0.009	(0.011–0.040)	0.038	0.010	(0.023–0.057)
12	Willamette	0.000	0.001	(0.000–0.002)	0.013	0.006	(0.005–0.024)	0.017	0.007	(0.007–0.030)
13	Mid Columbia Tule	0.000	0.001	(0.000–0.001)	0.003	0.004	(0.000–0.011)	0.000	0.000	(0.000–0.000)
14	Mid and Upper Columbia	0.002	0.003	(0.000–0.007)	0.000	0.001	(0.000–0.000)	0.001	0.002	(0.000–0.006)
15	Deschutes (F)	0.003	0.003	(0.000–0.009)	0.015	0.009	(0.004–0.031)	0.002	0.004	(0.000–0.011)
16	Upper Columbia (Su/F)	0.208	0.023	(0.172–0.246)	0.372	0.026	(0.329–0.414)	0.326	0.024	(0.287–0.366)
17	Snake (F)	0.026	0.012	(0.009–0.047)	0.001	0.003	(0.000–0.005)	0.000	0.002	(0.000–0.001)
18	Snake (Sp/Su)	0.001	0.002	(0.000–0.006)	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.003)
19	Washington Coast	0.214	0.023	(0.177–0.252)	0.198	0.021	(0.164–0.234)	0.173	0.021	(0.140–0.208)
20	Hood Canal	0.002	0.003	(0.000–0.008)	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.001)
21	South Puget Sound	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.001)	0.001	0.003	(0.000–0.009)
22	North Puget Sound	0.001	0.003	(0.000–0.007)	0.001	0.003	(0.000–0.009)	0.000	0.001	(0.000–0.000)
23	Juan de Fuca	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.002	0.002	(0.000–0.007)
24	Lower Fraser	0.008	0.005	(0.002–0.017)	0.008	0.005	(0.002–0.017)	0.005	0.004	(0.001–0.012)
25	Lower Thompson	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)
26	South Thompson	0.066	0.013	(0.046–0.089)	0.031	0.010	(0.017–0.048)	0.029	0.009	(0.015–0.045)

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		2007			2008			2009		
		n = 391			n = 394			n = 400		
		Relative Contribution			Relative Contribution			Relative Contribution		
	Reporting Group[a]	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
27	North Thompson	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)	0.001	0.002	(0.000–0.005)
28	Mid Fraser	0.000	0.001	(0.000–0.001)	0.001	0.003	(0.000–0.007)	0.000	0.001	(0.000–0.001)
29	Upper Fraser	0.006	0.010	(0.000–0.028)	0.002	0.005	(0.000–0.012)	0.001	0.004	(0.000–0.002)
30	East Vancouver	0.022	0.008	(0.011–0.036)	0.031	0.009	(0.018–0.047)	0.021	0.008	(0.009–0.034)
31	West Vancouver	0.141	0.018	(0.113–0.172)	0.107	0.016	(0.083–0.134)	0.071	0.013	(0.051–0.094)
32	South BC Mainland	0.000	0.001	(0.000–0.001)	0.002	0.003	(0.000–0.007)	0.002	0.003	(0.000–0.008)
33	Central BC Coast	0.043	0.012	(0.025–0.064)	0.033	0.010	(0.019–0.051)	0.030	0.010	(0.016–0.047)
34	Lower Skeena	0.008	0.007	(0.000–0.021)	0.000	0.001	(0.000–0.000)	0.001	0.003	(0.000–0.008)
35	Upper Skeena	0.000	0.001	(0.000–0.001)	0.000	0.001	(0.000–0.002)	0.000	0.000	(0.000–0.000)
36	Nass	0.000	0.001	(0.000–0.001)	0.003	0.003	(0.000–0.008)	0.000	0.001	(0.000–0.000)
37	Upper Stikine	0.011	0.011	(0.000–0.032)	0.001	0.004	(0.000–0.010)	0.001	0.002	(0.000–0.004)
38	Taku	0.010	0.011	(0.000–0.030)	0.004	0.005	(0.000–0.015)	0.000	0.001	(0.000–0.000)
39	S. Southeast AK	0.028	0.012	(0.011–0.050)	0.024	0.009	(0.012–0.040)	0.054	0.012	(0.035–0.075)
40	Andrew Creek	0.039	0.013	(0.021–0.062)	0.026	0.009	(0.013–0.042)	0.020	0.009	(0.009–0.036)
41	King Salmon	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	0.005	0.004	(0.001–0.012)	0.000	0.000	(0.000–0.000)	0.003	0.003	(0.000–0.010)
43	Alsek	0.000	0.000	(0.000–0.000)	0.000	0.001	(0.000–0.000)	0.000	0.000	(0.000–0.000)
44	Situk	0.000	0.001	(0.000–0.001)	0.000	0.000	(0.000–0.000)	0.000	0.000	(0.000–0.000)

Note: Sample sizes (n), standard deviation (SD), and 90% credibility intervals are provided.

[a] Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).