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Mixed Stock Analysis of Chinook Salmon Harvested in the Southeast Alaska Commercial Troll Fishery, 1999–2003

by

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

Symbols and Abbreviations

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

FISHERY MANUSCRIPT SERIES NO. 11-03

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The Fishery Manuscript series was established in 1987 by the Division of Sport Fish for the publication of technically oriented results of several years' work undertaken on a project to address common objectives, provide an overview of work undertaken through multiple projects to address specific research or management goal(s), or new and/or highly technical methods, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Manuscripts are intended for fishery and other technical professionals. Fishery Manuscripts are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/ This publication has undergone editorial and peer review.

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ABSTRACT

Chinook salmon from a mixture of stocks are commercially harvested in Southeast Alaska troll fisheries, including salmon originating from Alaska, British Columbia, and the Pacific Northwest. Information used to manage this fishery under the Pacific Salmon Treaty comes 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 in 1998, the Alaska Department of Fish and Game has used mixed stock analysis, based on the coastwide baseline of allozyme data, to estimate the stock composition of Chinook salmon harvests in the Southeast Alaska troll fishery between 1999 and 2003. Results indicate considerable temporal and spatial variation in the composition of troll harvests within years, but consistent patterns of composition across years.

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

INTRODUCTION

Chinook salmon are commercially harvested in troll fisheries in State of Alaska and Federal Exclusive Economic Zone waters east of Cape Suckling and north of Dixon Entrance (Lynch and Skannes 2001). 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). Chinook salmon are harvested throughout the year during three seasonal troll fisheries: (1) winter (October 11–April 30), (2) spring (April 15–June 29), and (3) one or more periods during the summer (July 1–September 20) when Chinook salmon may be retained. The fisheries harvest mixed stocks[1] of Chinook salmon, including fish originating from Alaska, British Columbia, and the Pacific Northwest, and are therefore under the jurisdiction of the Pacific Salmon Treaty. The 1985 treaty provides for cooperative management and research on fisheries harvesting Chinook salmon from populations in Canada and the United States. The winter troll fishery is managed to achieve a harvest of 45,000 Chinook salmon in Southeast Alaska. The spring troll fishery targets Chinook salmon from Southeast Alaska hatcheries, which are not counted against the Pacific Salmon Treaty quotas. Areas open to fishing during this period are found throughout Southeast Alaska with the exception of the SO quadrant. Chinook salmon are harvested in all four quadrants during the summer troll fishery. The fishery is managed by allowing retention of Chinook salmon during two or more periods with the goal of achieving an allowable harvest quota.

A quota system for regulating Chinook salmon harvests in Southeast Alaska was established according to the Pacific Salmon Treaty Annexes and Related Agreements (CTC 2001). The annual quota is specified by the Pacific Salmon Commission (PSC), and the Alaska Board of Fisheries allocates the quota among gear and user groups with the majority allocated to the commercial troll fishery (Lynch and Skannes 2001), e.g. approximately 70% of the PSC quota was available to the troll fleet in the 2001 season. The 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 and Skannes 2001). The model uses catch, escapement, coded wire tag recovery, and recruitment information to forecast relative abundance in treaty fisheries and to provide stock specific catches to which the CTC model output can be compared and calibrated. However, reliance on stock composition estimates from

[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.

coded wire tag data and the Chinook model is problematic because coded wire tags are not applied on all stocks contributing to the fishery and the estimates of escapement or terminal run size are often not available or are poorly determined. Mixed stock analysis (MSA) using genetic data has the potential to reduce uncertainty in the Chinook salmon model by providing accurate information on stocks not represented through coded wire tag data.

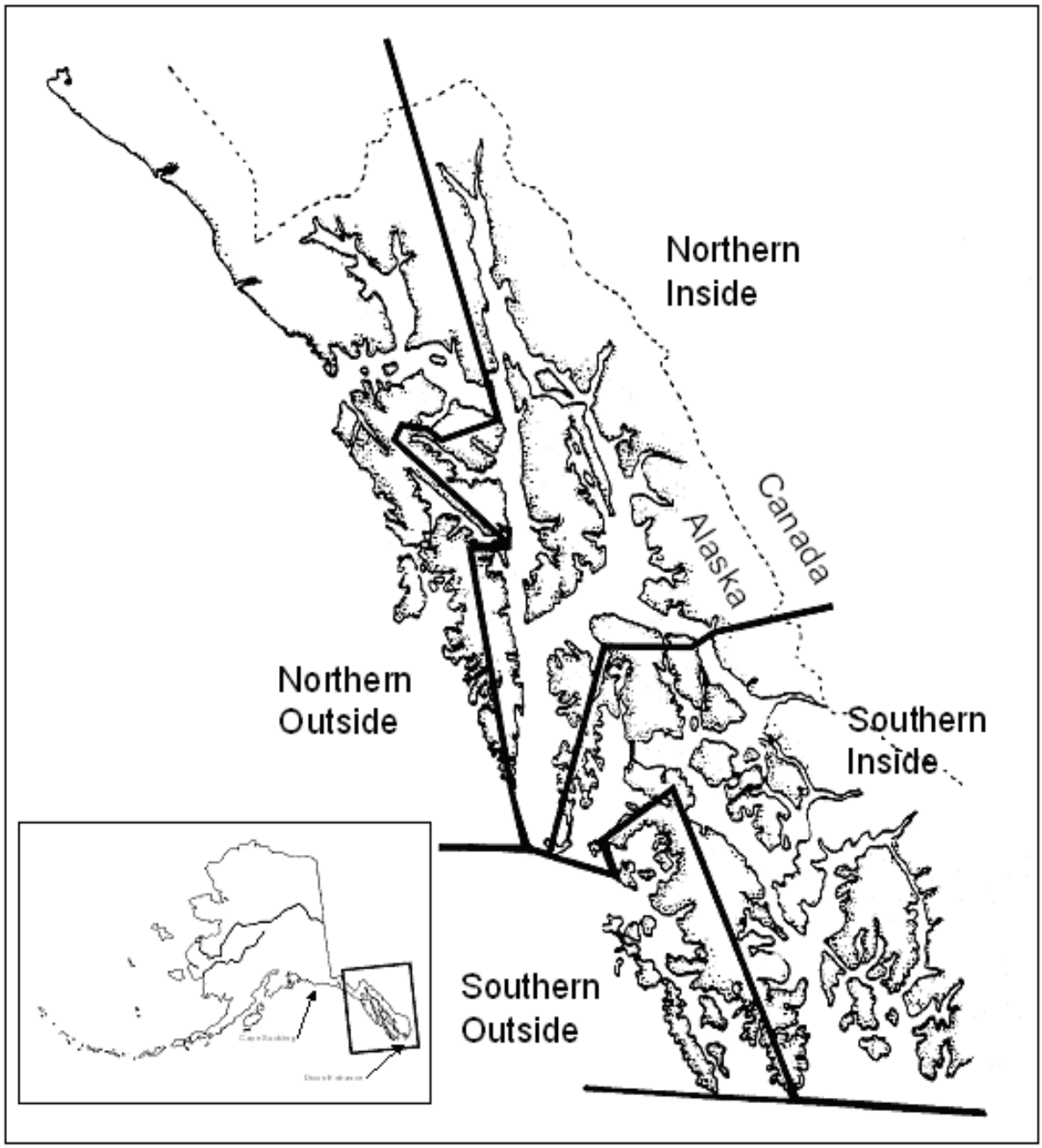

Figure 1.–Location of Southeast Alaska troll fishing quadrants.

MSA has been used extensively to estimate the contribution of genetic aggregates to mixed stock fisheries for Chinook salmon occurring in the Columbia River, coastal Washington, and the Strait of Juan de Fuca (Marshall et al. 1991; Miller et al. 1993). MSA 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. The application of MSA to Chinook salmon fisheries is possible because baseline data for allozyme (protein) loci are available from numerous studies examining the genetic stock structure of Chinook salmon throughout its range (Gharrett et al. 1987; Utter et al. 1989; Bartley et al. 1990; Waples et al. 1993; Seeb et al. 1995; Crane et al. 1996; Marshall et al. 1995; and Teel et al. 2000). Data from 26 of these loci were standardized and combined into a coastwide baseline managed by the Northwest Fisheries Science Center of the National Marine Fisheries Service (NMFS; Teel et al. 1999). Data included in this baseline were collected by NMFS, Washington Department of Fish and Wildlife, University of California, Davis, and Alaska Department of Fish and Game (ADF&G). Simulation studies reported in Teel et al. (1999) showed that contributions from 28 broad-scale groups of populations (reporting groups) could be identified in mixtures with greater than 90% accuracy.

Using this standardized baseline, MSA can be used to estimate the composition of groups of Chinook salmon stocks in important Southeast Alaska fisheries. Previously, ADF&G used this method to estimate the stock composition of Chinook salmon harvested in Southeast Alaska commercial troll fisheries in 1998 and 1999 (Crane et al. 2000). The study reported here continued the use of MSA to provide independent estimates of the stock composition of the Southeast Alaska troll fishery in order to calibrate and test estimates provided by the PSC Chinook salmon model.

OBJECTIVES

The goal of the stock identification effort reported here was to estimate the stock composition of Chinook salmon harvested in the Southeast Alaska commercial troll fisheries between 1999 and 2003 using the available coastwide baseline of allozyme genetic markers. To accomplish this task, the following objectives were to be met each year:

1. Sample Chinook salmon from the Southeast Alaska 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. Survey Chinook salmon sampled from the Southeast Alaska troll fishery for individual genotypes at the 26 allozyme loci in the coastwide baseline (each isolocus pair is considered a single locus).
3. Estimate the relative contribution of 28 broad-scale reporting groups defined by Teel et al. (1999) to:
    a. The early winter (October–December) and late winter (January–April) troll fishery with an area stratum estimate for the NO quadrant for the late winter troll fishery
    b. The spring troll fishery with area strata estimates for NO, NI, and SI quadrants
    c. The summer troll fishery with time strata estimates for the first retention period and subsequent retention periods combined and area strata estimates for the NO quadrant.

METHODS

FISHERY SAMPLING

Chinook salmon were collected from landings at processors in Southeast Alaska. Chinook salmon were selected for sampling without regard to size, sex, presence of an adipose fin, or position in the hold or tote. Eye, muscle, and fin tissue were dissected from sampled Chinook salmon and placed in 2 ml cryovials on wet ice. Troll fishers were interviewed to determine the quadrant (NO, NI, SO, or SI; Figure 1) from which the Chinook salmon were harvested. When an individual could not be traced unambiguously to the quadrant of harvest, it was excluded from further analysis. At the end of the season, samples were shipped to the ADF&G Gene Conservation Laboratory in Anchorage for analysis.

Sampling Design

Target sample sizes were set for each fishing period and port to estimate the stock composition of the harvest at acceptable levels of accuracy and precision given the potential availability and cost of samples. 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 sample size of approximately 400. Under the same assumptions, multinomial proportions can be estimated to within 7% of the true value 90% of the time with a sample size of approximately 200. Sampling goals per port for each fishery are listed in Table 1.

Winter Troll Fishery

Regional stock contribution estimates were provided for two periods during the winter: early winter (October 11–December 31) and late winter (January 1–April 30). During the early winter troll fishery, most of the harvest was taken in the NO quadrant (approximately 70%, from 1990 to 1999). For this reason, sampling of the harvest was limited to this district and the regional estimate was derived from this quadrant only. During the late winter fishery, effort was spread more throughout the region, and sampling was extended to ports in the NI and SI quadrants. The target sample size for the NO quadrant at this time remains sufficient to allow estimation of stock composition of the harvest in this quadrant in addition to the regional estimate. The harvest in the SO quadrant was originally considered insignificant during this period, but in response to increasing harvests in this quadrant, samples were collected from here in 2002 and 2003 although sample sizes were insufficient to be used for estimation of stock composition.

Spring Troll Fishery

Beginning in 2001, the landed catch was sampled in ports in the NI, NO, and SI quadrants. Regional stock contribution estimates were provided for the harvest from the spring fishery. In addition, target sample sizes were set to provide stock contribution estimates for harvests from each of the sampled quadrants independently.

Summer Troll Fishery

Chinook salmon harvested in all quadrants during this fishery were sampled from landed catch in at least eight ports. Stock contribution estimates were provided for the harvest from the entire summer fishery. Estimates were also provided for two periods during the summer: the first opening (early July) and all subsequent openings combined (August–September). In addition, sample sizes in the NO quadrant were set so that stock contributions to the harvest in this quadrant could be estimated for each of these time periods.

LABORATORY AND STATISTICAL ANALYSIS

Tissue samples were assayed for genetic variation at the following allozyme loci: *mAAT-1**; *sAAT-1,2**; *sAAT-3**; *sAH**; *GPI-A**; *GPI-B2**; *GPI-B2a**; *GPIr**; *mIDHP-2**; *sIDHP-1**; *sIDHP-2**; *LDH-B2**; *LDH-C**; *mMDH-2**; *sMDH-A1,2**; *sMDH-B1,2**; *sMEP-1**; *sMEP-2**; *MPI**; *PEPA**; *PEPB-1**; *PGDH**; *PGK-2**; *sSOD-1**; *TPI-3**; and *TPI-4**. Laboratory analyses followed Crane et al. (1996) using the general protocols outlined in Harris and Hopkinson (1976), May et al. (1979), Aebersold et al. (1987) and Van Doornik et al. (1999). Genotypes were scored from observed phenotypes according to coastwide-accepted standards presented in Teel et al. (1999).

When more individual tissue samples were collected than required for a given estimate, individuals were randomly chosen from the entire set to create a sample mixture of the target size. When an estimate was to be provided for the harvest in more than one quadrant (e.g. late winter fishery 2000), individual samples were randomly selected from the entire set proportional to harvests in each quadrant as follows:

1. The number of Chinook salmon harvested in each quadrant for a given troll fishery opening was obtained from the ADF&G Mark, Tag, and Age Laboratory in Juneau. A Commercial Harvest Expansion Report containing the harvest numbers was generated using 10 criteria (Table 2).
2. The relative proportion of the harvest that occurred in each quadrant was calculated for each fishery opening.
3. Individual samples were randomly selected from the entire set of samples 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 final sample size was 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.

The composition of Chinook salmon from each of the 28 reporting groups (Table 3) in each sample was estimated by calculating individual estimates for each of the 252 populations and then summing these estimates across reporting groups. These composition estimates were made using the maximum likelihood methods implemented in SPAM version 3.6 (Debevec et al. 2000). For all regional contribution estimates, 90% confidence intervals were computed from 1000 parametric bootstrap resamples of the baseline frequencies matched with nonparametric resamples of the mixture genotypes. For each resample, contribution estimates were generated for all populations and summed to the regional level. The 1000 estimates for a region were then sorted from lowest to highest with the 51st and 950th values in the sequence taken respectively as the lower and upper bounds of the 90% confidence interval for that region.

Genotypes were removed from the estimation procedure if their probability of occurring was near zero ($P < 1.0\times10^{-45}$). For these cases, the mixture estimates have an "unknown" group containing the portion of the mixture that is removed for this reason. Further, individuals missing data at five or more loci were not included in the analysis. Sample sizes were calculated to reflect the exclusion of individuals.

When an estimate was to be provided for the harvest across multiple periods (e.g. summer fishery from July to September 2000), the stock composition estimates for each period were

combined and weighted by the harvest during that period. The total harvest for each period was obtained from the ADF&G Mark, Tag, and Age Laboratory website as described above.

Following this procedure, each of the 12 sets of stock composition estimates was derived as follows:

1. Early winter fishery (October 11–December 31): 400 individuals from the NO quadrant.
2. Late winter fishery (January 1–April 14)
    a. Northern Outside: Up to 400 individuals randomly sampled from the fishery in this quadrant.
    b. Overall: Up to 400 individuals randomly sampled from each of the NO, NI and SI quadrants in proportion to the relative harvest from each quadrant. Southern Outside was included in 2002 and 2003.
3. Spring fishery (late April–June 30)
    a. Quadrant-specific: Up to 300 individuals from the NO quadrant, and up to 200 individuals from each of the NI and SI quadrants to create three separate mixture samples. If more samples were available than necessary, individuals were randomly chosen to create the mixture sample.
    b. Overall: 400 individuals randomly sampled from each of the NO, NI and SI quadrants in proportion to the relative harvest from each quadrant.
4. Summer fishery (July 1–September 20)
    a. Retention period 1 (early July)
        i. Overall: Up to 400 individuals randomly sampled from each quadrant in proportion to the relative harvest from each quadrant.
        ii. Northern Outside: Up to 400 individuals randomly sampled from the available fishery samples from this quadrant.
    b. Retention period 2 and subsequent periods (late July–September)
        i. Overall: Up to 400 individuals randomly sampled from each quadrant and period in proportion to the relative harvest from each quadrant and period.
        ii. Northern Outside: Up to 400 individuals randomly sampled from the available fishery samples from this quadrant during this time in proportion to the relative harvest from each period.
    c. Overall: Stock composition is estimated as the mean of the estimated contribution estimates from the two retention periods weighted in proportion to the harvest during each period.

RESULTS

PORT SAMPLING

Sampling of the harvest in each port was successfully completed with some exceptions. The only period with chronically low sampling was the early winter period in Sitka, where a combination of personnel turnover and erratic fishing contributed to small sample sizes (Table 4). Sampling in

some of the smaller ports was also occasionally a problem which could lead to undersampling of an entire quadrant. For example, little or no sampling in Hoonah during the spring fishing periods of 2002 and 2003 led to few samples being available from the NI quadrant in these years (Table 5). Additionally, sampling Chinook salmon from loads that contained a mixture of individuals from more than one quadrant occasionally led to smaller than expected sample sizes for each quadrant. For these reasons, the total number of available individuals from port sampling (Table 4) may not equal the number of individuals available for analysis from each quadrant (Table 5).

PST ACCOUNTING YEAR 1999

Fishery Sample Collection

Only the summer fishery was sampled in Accounting Year (AY) 1999. (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 1999 is October 1998 through September 1999.) During the first retention period (July 1–6) of the summer fishery, sampling goals were not met for the NI quadrant (Table 5) due to the exclusion of many samples collected from mixed landings from both the northern quadrants. Sampling goals for the second retention period (August 18–22) were not met in the NI and SI quadrants.

Stock Composition

Based on the MSA estimates, the largest contributor to the summer fishery was the Upper Columbia River (Summer (Su), Fall (F))/Snake River (F) reporting group (21%; Table 6), followed by the Middle/North Oregon Coastal (17%) and Thompson River (16%) reporting groups. Washington Coastal, West Coast Vancouver Island, and Southern Southeast Alaska reporting groups (7–9% each) composed much of the remainder of the harvest. While the relative contribution of the Upper Columbia River (Su, F)/Snake River (F) reporting group was similar between the two retention periods, there was considerable fluctuation in the contributions from the Oregon Coastal and Southern Southeast Alaska reporting groups. The estimated contribution from Southern Southeast Alaska stocks occurred during the first retention period.

PST ACCOUNTING YEAR 2000

Fishery Sample Collection

Sampling of Chinook salmon for AY 2000 began on October 11, 1999 with the early winter fishery. Sampling took place at processors in Sitka at the rate of 1 in every 35 Chinook salmon landed (Table 1). While this was considered a trial attempt to sample this fishery, sufficient samples were collected for estimating stock composition of the harvest. The same sampling rate was continued in Sitka for the late winter fishery, but the rate was increased to 1 in 10 Chinook salmon landed in Petersburg and Ketchikan to achieve the desired sample goals in these ports. Target sample sizes were not met in Sitka or Petersburg and the resulting sample size was limited by the Sitka sample to 265 individuals. The spring fishery was not sampled in 2000.

The sampling of the summer fishery continued similar to 1999. During the first retention period (July 1–5) sampling goals were not met for the NI and SI quadrants (Table 5), but sufficient samples were available from each quadrant to enable a combined sample of 400 individuals. Subsequent Chinook salmon retention periods occurred August 11–12, August 23–30, and September 12–20. A sample of individuals was drawn from these periods weighted by the

contribution made by each quadrant, during each period, to the entire harvest over all three periods. This created a representative mixture sample from an aggregate retention period.

Stock Composition

Based on the MSA estimates, the largest contributor to both winter fisheries was the Upper Columbia River (Su, F)/Snake River (F) reporting group (29% and 23% respectively, Table 7) followed by the Central British Columbia Coastal reporting group (13% and 9%, respectively). In the early winter fishery, Puget Sound was the second largest contributor (14%), but it was replaced by the Strait of Georgia and West Coast Vancouver Island reporting groups during the late winter period (9% and 12%, respectively).

The Upper Columbia River (Su, F)/Snake River (F) reporting group continued as a major contributor to the summer fisheries, especially during the first retention period (20%; Table 8), but the stocks from coastal Washington and Oregon and West Coast Vancouver Island contributed more to the later retention period. The Southern Southeast Alaska reporting group contributed approximately 10% to each fishery, but Skeena, Nass, and Alaska/British Columbia Transboundary reporting groups only contributed significantly (0–8%) during the winter fisheries. Estimates of the stock composition of the summer harvest in the NO quadrant (Table 9) are very similar to estimates based on samples from all four quadrants (Table 8).

PST Accounting Year 2001

Fishery Sample Collection

Sampling of Chinook salmon for AY 2001 began on October 11, 2000 with the early winter fishery. The same sampling procedures were followed as in 2000, but only 168 Chinook salmon were sampled (Table 5) because the first week of sampling was missed and the harvest in November and December was low. During the late winter fishery, target sample sizes were not met for all quadrants and the resulting sample size for estimating stock composition was limited to 307 individuals. The spring fishery was sampled for the first time in AY 2001. Sufficient samples were taken from each quadrant to allow for proposed mixture estimates.

During the first retention period (July 1–6) of the summer fishery, sampling goals were not met for the southern quadrants (Table 5), but only 16% of the entire harvest came from these quadrants; only 3% of the harvest came from the SI quadrant, where no samples were available. It was decided that the SI quadrant would be removed from the estimate, as sufficient samples were available from the SO quadrant to include in the overall composite estimate. All sampling goals were met during the second retention period (August 18–September 6).

Stock Composition

Based on the MSA estimate, the largest contributor to the early winter fishery was the Upper Columbia River (Su, F)/Snake River (F) reporting group (28%; Table 10) followed by the Southern Southeast Alaska, Skeena River, and Strait of Georgia reporting groups (12–15%). In the late winter fishery the Southern Southeast Alaska reporting group predominated (26%), followed by the Skeena River and Strait of Georgia reporting groups (17–19%), with the Upper Columbia River (Su, F)/Snake River (F) reporting group contributing only 10% to the harvest.

The spring fishery primarily harvested Chinook salmon from the Southern Southeast Alaska (59%) and Alaska/British Columbia Transboundary (11%) reporting groups (Table 11).

However, compositions varied between quadrants; harvests from the NO quadrant were comprised of a greater variety of stocks than other quadrants.

Throughout the summer fishery the main contributors to the harvest were the Middle and North Oregon Coast (30%) and the Upper Columbia River (Su, F)/Snake River (F; 12%) reporting groups (Table 12). The Lower Columbia (Sp, F), Thompson, Strait of Georgia and West Coast Vancouver Island reporting groups contributed significantly (8–16%) to the July retention period, but were not as prevalent in the later retention period (1–6%). This later period harvested more of the Washington Coastal (12%) and Puget Sound (7%) reporting groups, which had not contributed appreciably a month earlier. Southern Southeast Alaska stocks were present in every fishery harvest, but stocks from northern British Columbia (Central British Columbia Coast, Skeena, Nass, and Alaska/British Columbia Transboundary) were only found in significant numbers during the winter and spring fisheries.

Estimates of the stock composition of the harvest in the NO quadrant (Table 13) are generally similar to estimates based on samples from all four quadrants (Table 12). However, the relative contribution of West Coast Vancouver Island to the July harvest in the NO quadrant (4%) was lower than estimated for the entire Southeast Alaska harvest at this time (12%; Table 10). Estimated stock composition was also similar between the NO quadrant harvest alone and the regionwide harvest in the late winter fishery (Table 10).

PST ACCOUNTING YEAR 2002

Fishery Sample Collection

Sampling of Chinook salmon during AY 2002 began on October 11, 2001 with the early winter fishery. Sampling during the winter fisheries continued as previously with the exception that the sampling rate was increased to 1 in every 25 Chinook salmon landed at processors in Sitka in an attempt to achieve sampling goals. During the early winter fishery only 249 individuals were sampled, largely due to reduced harvests caused by bad weather and low prices (Table 5). During the late winter period 399 individuals were sampled from the NO quadrant, but sample goals were not met for the NI and SI quadrants. With only 29 samples available from the NI quadrant, the composite sample size was limited to 180 individuals. However, sufficient samples were available for an estimate from the NO quadrant, which accounted for 71% of the harvest during this fishery.

The sample sizes from the 2002 spring fishery were similar to sizes from 2001, with the exception that fewer samples were available from the NI quadrant (N=78). Sample sizes met the goals for the composite estimate and the NO and SI quadrant estimates, but too few samples were available to provide an independent estimate the stock composition of the NI with acceptable accuracy and precision.

During the first retention period (July 12–18) of the summer fishery, the sample goal was not met for the SI quadrant, but more samples were taken from the SO quadrant than intended (Table 1). This change was implemented in response to a shift in the fishing effort to outside waters; during this period, 28% of the harvest came from this quadrant. During the second retention period (August 12–September 2) sufficient samples were available to meet desired levels of precision and accuracy for the stock composition estimates.

Stock Composition

Based on the MSA estimates, with the exception of the spring fishery, Upper Columbia River (Su, F)/Snake River (F) reporting group consistently comprised the largest portion of the estimated stock contributions to the seasonal troll harvests (Table 14). In the early winter fishery, this reporting group accounted for 31% of the harvest, and the Puget Sound (18%), Strait of Georgia (15%), California and South Oregon Coast (7%), and Central British Columbia Coastal (7%) reporting groups comprised most of the remaining harvest. During the late winter fishery, the Upper Columbia River (Su, F)/Snake River (F) reporting group continued to be prevalent (17%), but the Thompson, Strait of Georgia, West Coast Vancouver Island, Central Coast British Columbia, and Southern Southeast Alaska reporting groups all contributed to the harvest (10–14%).

The Southern Southeast Alaska reporting group provided the majority (57%) of the harvest during the spring fishery, in addition to several British Columbia stocks (Table 15). Stock composition varied between quadrants similar to AY 2001.

During the two retention periods in the summer fishery the Middle/North Oregon Coastal, Upper Columbia River (Su, F)/Snake River (F), and Washington Coastal reporting groups accounted for at least half of the harvest (Table 16). The Thompson River reporting group was present in the first retention period (12%), but was absent from the second retention period (0%), replaced by the Puget Sound and Strait of Georgia reporting groups (8% each).

Estimates of the stock composition of the harvest in the NO quadrant (Table 17) are generally similar to estimates based on samples from all four quadrants (Table 16). However, the relative contribution of West Coast Vancouver Island to the July harvest in the NO quadrant (16%) was higher than estimated for the entire Southeast Alaska harvest at this time (5%; Table 16). Estimated stock composition was also similar between the NO quadrant harvest alone and the regionwide harvest in the late winter fishery (Table 14).

PST ACCOUNTING YEAR 2003

Fishery Sample Collection

For the third consecutive year, the sample size obtained from the early winter fishery (N=127) in AY 2003 was well below the target of 400 (Table 5). This was caused by failure to maintain the 1 in 25 sampling rate, which meant that the early portion of the season was not sampled as intensively as necessary. When the quadrant of origin could not be established, the samples were dropped from further analyses. With only 10 samples available from the SO quadrant, the composite sample size was limited to 296 individuals. However, sufficient samples (N=400) were available for an estimate from the NO quadrant, which accounted for 87% of the total harvest during this fishery.

The sample sizes from the spring fishery were similar to sizes from 2001 and 2002, with the exception that fewer samples were available from the NI quadrant (N=63). This was in part due to the inability to sample in Hoonah. Sample sizes met the goals for the NO and SI quadrant estimates, but too few samples were available to provide an independent estimate the stock composition of the NI with acceptable accuracy and precision. With only 63 individuals available from the NI quadrant, the composite sample size was limited to 239 individuals.

The harvest patterns for the summer of 2003 were different from previous summers. Previously the initial retention period was open for less than two weeks due to high harvest rates. However, in 2003 harvest rates were lower and the first retention period was extended for the entire month of July and into the first days of August. For the purpose of this analysis, the first retention period was defined as July 1–31 and the second retention period was August 1–8.

Stock Composition

Based on the MSA estimates, the largest contributor to area troll fisheries during the early winter fishery was the Southern Southeast Alaska reporting group (22%; Table 18), the Upper Columbia River (Su, F)/Snake River (F) reporting group was the second largest (estimated stock contribution of 18%). The Strait of Georgia reporting group (13%) was also a large contributor, while the Willamette, Lower Columbia Spring and Fall, Puget Sound, Thompson, and California and South Oregon Coast reporting groups composed most of the remaining harvest (6–8% each). During the late winter fishery, the Upper Columbia River (Su, F)/Snake River (F) reporting group was prevalent (25%), followed by the Lower Columbia Spring and Fall, Thompson, Strait of Georgia, West Coast Vancouver Island, Central Coast British Columbia, and Skeena River reporting groups (6–10% each).

The Southern Southeast Alaska and Alaska/British Columbia Transboundary reporting groups provided the majority (56%) of the harvest during the spring fishery (Table 19). Several British Columbia stocks were also important, although stock composition varied between quadrants.

During each of the two retention periods in the summer fishery the Middle/North Oregon Coast, Upper Columbia River (Su, F)/Snake River (F), Washington Coast, Thompson River, and West Coast Vancouver Island reporting groups accounted for approximately 70% of the harvest (Table 20).

Estimates of the stock composition of the harvest in the NO quadrant (Table 21) are generally similar to estimates based on samples from all four quadrants (Table 20). Estimated stock composition was also similar between the NO quadrant harvest alone and the region-wide harvest in the late winter fishery (Table 18).

DISCUSSION

MSA based on the extensive allozyme baseline for Chinook salmon was used to estimate the stock composition of the troll fishery harvests in Southeast Alaska from 1999 to 2003. These estimates indicate that the largest contributors to the annual harvest are the Middle/North Oregon Coastal and Upper Columbia River (Su, F)/Snake River (F) reporting groups; for each of the three years that composite estimates were available for the entire the year (2001–2003), these two groups combined accounted for 30–33% of the harvest. Four additional reporting groups, Washington Coastal, Thompson River, West Coast Vancouver Island, and Southern Southeast Alaska, each contributed more than 10% to the annual harvest in at least one of the three years. Estimated stock contributions from the 1999 and 2000 fisheries show a similar pattern. The annual contribution rates are heavily weighted toward the composition of the summer harvest, when the major portion of the harvest occurs.

When each of the seasonal fisheries is considered, the composition of the harvest is much more variable. During the winter fisheries from October to the following April, the prevalence of Columbia River Chinook salmon remains consistently strong, but more of the harvest is composed of stocks from the Strait of Georgia north along the coast to Southeast Alaska. Often

these stocks make up more than half of the harvest, especially during the late winter fishery (January–April). During the spring fishery, when fishing effort is concentrated on harvesting Alaska stocks, stock composition estimates indicate Southern Southeast Alaska stocks compose 47–58% of the harvest and an additional 4–11% of the harvest comes from Alaska/British Columbia Transboundary stocks. Temporal variation in catch composition also occurs on shorter timescales. The retention periods during the summer troll fishery are usually separated by 4–6 weeks and the contribution by some reporting groups can vary widely between these periods. For example, between 1999 and 2003 the Thompson River reporting group contributed 12–19% of the harvest during July and 0–8% of the harvest in August and September. This reduction reflects the general trend for southern reporting groups to replace northern reporting groups between these two time periods.

Stock contribution estimates based on samples from the NO quadrant were similar to estimates based on samples from the entire region. Since composite estimates were weighted by harvest, this is probably a reflection of the high proportion of individuals from this quadrant used in the mixture estimate relative to the other quadrants. Quadrant-specific estimates were available for the spring fishery and variation was consistently found between the reporting group compositions of the harvests in each quadrant. In general, the NO quadrant had the most diverse reporting group composition, while much of the harvest from the SI quadrant came from Southern Southeast and Alaska/British Columbia Transboundary reporting groups.

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

CONCLUSIONS

1. MSA using genetic data can provide important information on reporting group contributions to Chinook salmon fisheries in Southeast Alaska.
2. Stock composition varies between years and between quadrants within years, but consistent important contributors to the Southeast Alaska troll fisheries on an annual basis include: Middle/North Oregon Coastal, Upper Columbia River (Su, F)/Snake River (F), Southern Southeast Alaska, Washington Coastal, Thompson River, Strait of Georgia, and West Coast Vancouver Island reporting groups.
3. The composition of the spring fishery is composed primarily of stocks from southern Southeast Alaska.
4. There is considerable spatial and temporal variation in stock composition within years, but consistent patterns of contribution across years.

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TABLES

Table 1.–Sample goals and sampling rates for collections from landings at processors at ports in Southeast Alaska for MSA of troll-caught Chinook salmon.

Fishery		Ports	Goal	Quadrants Represented[a]	Sample Rate
Winter	Early (Oct 11–Dec 31)				
		Sitka	400	NO	1 in every 25 Chinook salmon offloaded
	Late (Jan 1–Apr 15)				
		Sitka	400	NO	1 in every 25 Chinook salmon offloaded
		Petersburg	50	NI, SI	1 in every 10 Chinook salmon offloaded
		Ketchikan	50	SI	1 in every 10 Chinook salmon offloaded
Spring	April 22–June 30				
		Sitka	300	NO	5+ boats per week, up to 10 fish per boat
		Hoonah	75	NI	1 in every 5 fish offloaded
		Petersburg	75	NI, SI	1 in every 5 fish offloaded
		Wrangell	75	NI, SI	1 in every 5 fish offloaded
		Ketchikan	200	SI	4 boats per week, up to 10 fish per boat
Summer	Retention Period 1 – Early July				
		Yakutat	30	NO	3 boats, 10 fish per boat
		Pelican	30	NO	3 boats, 10 fish per boat
		Elfin Cove	30	NO	3 boats, 10 fish per boat
		Sitka	300	NO	30 boats, 10 fish per boat
		Petersburg	60	NI, SI	6 boats, 10 fish per boat (5 boats from NI)
		Port Alexander	60	NI, SO	6 boats, 10 fish per boat (5 boats from NI)
		Craig	150	SO	15 boats, 10 fish per boat
		Ketchikan	100	SI	10 boats, 10 fish per boat (5 boats from SI, 5 from SO)
	Retention Periods 2+ – August to September				
		Yakutat	30	NO	3 boats, 10 fish per boat
		Pelican	30	NO	3 boats, 10 fish per boat
		Elfin Cove	30	NO	3 boats, 10 fish per boat
		Sitka	300	NO	30 boats, 10 fish per boat
		Petersburg	60	NI, SI	6 boats, 10 fish per boat (5 boats from NI)
		Port Alexander	60	NI, SO	6 boats, 10 fish per boat (5 boats from NI)
		Craig	50	SO	5 boats, 10 fish per boat (5 boats from SO)
		Ketchikan	50	SI	5 boats, 10 fish per boat (5 boats from SI)

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

Table 2.–Selection criteria used to generate the Commercial Harvest Expansion Report.

Criteria	Values
Years	1999, 2000, 2001, 2002, 2003
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

Table 3.–Broad-scale reporting groups for the Chinook salmon coastwide baseline used to report stock composition of Southeast Alaska troll fishery harvests.

	Reporting groups	Population numbers
1	Central Valley	1-6
2	California, Southern Oregon Coastal	7-16, 23-31
3	Klamath River Basin	17-22
4	Mid/North Oregon Coastal	32-49
5	Willamette River	56-62
6	Lower Columbia River	50-55, 63,64
7	Mid/Upper Columbia (Sp) Snake River (Sp, Su)	65-79, 94-109
8	Upper Columbia (Su, F) and Snake (F)	80-93
9	Washington Coastal	110-120
10	Puget Sound	121-143
11	Lower Fraser River	144,145
12	Thompson River	146-159
13	Mid/Upper Fraser River	160-175
14	Strait of Georgia	176-183
15	West Vancouver Island	184-186
16	Central British Columbia Coastal	187-189
17	Skeena River	190-197
18	Nass River	198, 199
19	Alaska/British Columbia Transboundary	200, 207, 210-215
20	Southern Southeast Alaska	201-206, 208, 220-227
21	King Salmon River	209, 228
22	Chilkat River	216, 217, 229
23	Gulf of Alaska	218, 219, 230-233
24	Susitna River	234-237
25	Kodiak Island	238, 239
26	Alaska Peninsula	240, 241
27	Western Alaska	242-250, 252
28	Canadian Yukon	251
29	Russia[a]	253, 254

Source: Adapted from Teel et al. 1999.

Note: Run timing components are abbreviated as Sp (spring), Su (summer), F (fall), and W (winter).

[a] The Russian populations were not included in the analysis. Population numbers are listed in Appendix 1.

Table 4.–Number of Chinook salmon sampled from the troll fishery harvest at ports in Southeast Alaska, 1999–2003.

					Accounting Year[a]				
Fishery	Period	Port	Quadrants Represented	Goal	1999	2000	2001	2002	2003
Winter	Early								
		Sitka	NO	400	–	348	168	249	127
	Late								
		Sitka	NO	400	–	217	300	400	400
		Ketchikan/Craig	SI, SO	50/40	–	99	67	50	68
		Petersburg	NI, SI	50	–	75	50	50	46
			Total	940		739	585	749	641
Spring		Sitka	NO	300	–	–	300	300	300
		Hoonah	NI	75	–	–	75	48	0
		Petersburg	NI, SI	75	–	–	100	87	73
		Wrangell	NI, SI	75	–	–	25	75	75
		Ketchikan	SI	200	–	–	195	159	200
			Total	725			695	669	648
Summer	Retention 1								
		Yakutat	NO	30	24	20	30	30	30
		Pelican	NO	30	54	60	30	60	60
		Elfin Cove	NO	30	10	19	30	30	30
		Sitka	NO	300	198	363	350	300	300
		Excursion Inlet	NI	30	50	29	–	–	–
		Petersburg	NI, SI	60	20	33	60	60	60
		Port Alexander	NI, SO	60	44	60	60	60	60
		Craig	SO	150	99	106	120	150	150
		Ketchikan	SI, SO	100	21	42	50	100	100
			Total	790	520	732	730	790	790
	Retention 2 +								
		Yakutat	NO	30	15	40	10	30	27
		Pelican	NO	30	60	144	130	30	60
		Elfin Cove	NO	30	39	54	30	1	30
		Sitka	NO	300	130	607	253	300	300
		Excursion Inlet	NI	30	25	0	–	–	–
		Petersburg	NI, SI	60	15	79	59	60	10
		Port Alexander	NI, SO	60	25	16	12	50	1
		Craig	SO	50	58	84	62	50	50
		Ketchikan	SI, SO	50	46	89	44	50	50
			Total	640	413	1,113	600	571	528

Note: Strata where no sampling was planned are indicated with a dash (–).

[a] Accounting years begin October 1 of the previous year through September 30 of the indicated year.

Table 5.–Number of Chinook salmon sampled from the troll fishery harvest in Southeast Alaska by quadrant, 1999–2003.

				Accounting Year				
Fishery	Period	Quadrant	Goal	1999	2000	2001	2002	2003
Winter	Early							
		NO	400	–	354	168	249	127
	Late							
		NO	400	–	215	300	399	400
		NI	50	–	39	24	29	41
		SO	--	–	–	–	5	10
		SI	50	–	85	30	40	52
Spring								
		NO	300	–	–	323	343	300
		NI	200	–	–	194	78	63
		SI	200	–	–	276	248	274
Summer	Retention 1							
		NO	400	286	483	440	420	420
		NI	100	23	69	120	100	110
		SO	200	50	109	140	110	150
		SI	50	84	27	0	160	104
	Retention 2 +							
		NO	400	272	720	423	360	417
		NI	50	22	85	64	50	1
		SO	50	46	61	57	50	50
		SI	50	55	98	55	50	66

Note: Numbers may not sum to totals provided in Table 4 because not all individuals could be unambiguously traced to the quadrant of harvest.

Note: Strata where no sampling was planned are indicated with a dash (–).

Table 6.–Estimated contribution of 28 reporting groups to the 1999 Chinook salmon summer troll fishery harvests in Southeast Alaska.

		July–September 1999			July 1999			August–September 1999		
		Harvest = 94523			Harvest = 78126			Harvest = 16397		
		Weighted average			N = 328			N = 286		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.010	0.010	(0.000 - 0.030)	0.008	0.012	(0.000 - 0.034)	0.017	0.014	(0.000 - 0.041)
2	California, S. Oregon Coast	0.005	0.013	(0.000 - 0.040)	0.006	0.016	(0.000 - 0.047)	0.000	0.012	(0.000 - 0.033)
3	Klamath (Sp, F)	0.004	0.009	(0.000 - 0.027)	0.004	0.011	(0.000 - 0.031)	0.006	0.010	(0.000 - 0.027)
4	Mid/N. Oregon Coast	0.167	0.026	(0.116 - 0.202)	0.135	0.030	(0.080 - 0.179)	0.318	0.051	(0.223 - 0.388)
5	Lower Columbia (Sp, F)	0.015	0.011	(0.001 - 0.037)	0.010	0.013	(0.000 - 0.038)	0.037	0.022	(0.000 - 0.071)
6	Willamette	0.003	0.006	(0.001 - 0.020)	0.000	0.007	(0.000 - 0.018)	0.019	0.012	(0.001 - 0.042)
7	Mid/Up Columbia, Snake Sp	0.000	0.002	(0.000 - 0.006)	0.000	0.003	(0.000 - 0.007)	0.000	0.000	(0.000 - 0.000)
8	Up Columbia (Su, F), Snake (F)	0.209	0.032	(0.141 - 0.244)	0.212	0.037	(0.135 - 0.258)	0.193	0.037	(0.125 - 0.250)
9	Washington Coast	0.065	0.029	(0.019 - 0.115)	0.067	0.033	(0.011 - 0.121)	0.059	0.051	(0.004 - 0.175)
10	Puget Sound	0.016	0.025	(0.006 - 0.088)	0.011	0.029	(0.000 - 0.094)	0.044	0.029	(0.004 - 0.099)
11	Lower Fraser	0.000	0.008	(0.000 - 0.020)	0.000	0.010	(0.000 - 0.024)	0.000	0.001	(0.000 - 0.000)
12	Thompson	0.160	0.034	(0.076 - 0.186)	0.186	0.040	(0.085 - 0.217)	0.033	0.021	(0.006 - 0.075)
13	Mid/Up Fraser	0.021	0.018	(0.000 - 0.057)	0.025	0.022	(0.000 - 0.068)	0.003	0.011	(0.000 - 0.030)
14	Strait of Georgia	0.036	0.021	(0.010 - 0.079)	0.029	0.025	(0.000 - 0.081)	0.069	0.027	(0.020 - 0.110)
15	W. Coast Vancouver	0.092	0.042	(0.020 - 0.158)	0.096	0.050	(0.011 - 0.179)	0.071	0.037	(0.010 - 0.132)
16	Central BC Coast	0.053	0.029	(0.018 - 0.113)	0.053	0.035	(0.013 - 0.124)	0.052	0.021	(0.016 - 0.082)
17	Skeena	0.023	0.027	(0.002 - 0.087)	0.024	0.032	(0.000 - 0.099)	0.020	0.019	(0.000 - 0.058)
18	Nass	0.001	0.015	(0.000 - 0.043)	0.000	0.018	(0.000 - 0.050)	0.008	0.013	(0.000 - 0.036)
19	AK/BC Transboundary	0.023	0.013	(0.003 - 0.045)	0.019	0.016	(0.000 - 0.047)	0.040	0.020	(0.000 - 0.064)
20	Southern SE AK	0.077	0.030	(0.011 - 0.111)	0.093	0.037	(0.012 - 0.132)	0.000	0.015	(0.000 - 0.041)
21	King Salmon	0.006	0.006	(0.000 - 0.018)	0.008	0.007	(0.000 - 0.021)	0.000	0.004	(0.000 - 0.010)
22	Chilkat	0.000	0.003	(0.000 - 0.007)	0.000	0.004	(0.000 - 0.008)	0.000	0.002	(0.000 - 0.005)
23	Gulf of Alaska	0.002	0.003	(0.000 - 0.010)	0.000	0.003	(0.000 - 0.009)	0.014	0.010	(0.000 - 0.028)
24-28	Central and Western Alaska	0.014	0.009	(0.001 - 0.029)	0.015	0.011	(0.000 - 0.033)	0.007	0.008	(0.000 - 0.023)
	Unknown[a]	-0.002			0.000			-0.007		

Note: Sample sizes are indicated (N).

[a] The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 7.–Estimated contribution of 28 reporting groups to the AY 2000 winter Chinook salmon troll fishery harvests in Southeast Alaska.

		Oct–Dec 1999 (Early Winter)			Jan–Apr 2000 (Late Winter)		
		Harvest =	16299		Harvest =	18561	
		N =	345		N =	265	
	Region	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.032	0.020	(0.000 - 0.065)	0.015	0.013	(0.000 - 0.038)
2	California, S. Oregon Coast	0.019	0.013	(0.000 - 0.042)	0.025	0.028	(0.000 - 0.084)
3	Klamath (Sp, F)	0.000	0.001	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.000)
4	Mid/N. Oregon Coast	0.000	0.007	(0.000 - 0.019)	0.026	0.025	(0.000 - 0.079)
5	Lower Columbia (Sp, F)	0.047	0.032	(0.000 - 0.104)	0.000	0.011	(0.000 - 0.027)
6	Willamette	0.024	0.022	(0.003 - 0.075)	0.017	0.015	(0.000 - 0.048)
7	Mid/Up Columbia, Snake Sp	0.023	0.017	(0.000 - 0.051)	0.032	0.023	(0.000 - 0.070)
8	Up Columbia (Su, F), Snake (F)	0.294	0.047	(0.217 - 0.372)	0.230	0.049	(0.133 - 0.297)
9	Washington Coast	0.008	0.014	(0.000 - 0.039)	0.000	0.013	(0.000 - 0.037)
10	Puget Sound	0.135	0.043	(0.066 - 0.208)	0.041	0.034	(0.000 - 0.108)
11	Lower Fraser	0.027	0.017	(0.000 - 0.051)	0.000	0.002	(0.000 - 0.000)
12	Thompson	0.014	0.025	(0.000 - 0.082)	0.017	0.018	(0.000 - 0.058)
13	Mid/Up Fraser	0.000	0.013	(0.000 - 0.033)	0.034	0.020	(0.002 - 0.068)
14	Strait of Georgia	0.049	0.025	(0.013 - 0.094)	0.089	0.043	(0.024 - 0.172)
15	W. Coast Vancouver	0.048	0.036	(0.000 - 0.113)	0.116	0.047	(0.028 - 0.181)
16	Central BC Coast	0.129	0.049	(0.029 - 0.188)	0.088	0.055	(0.000 - 0.179)
17	Skeena	0.025	0.031	(0.000 - 0.094)	0.045	0.061	(0.000 - 0.186)
18	Nass	0.062	0.026	(0.000 - 0.089)	0.062	0.042	(0.000 - 0.132)
19	AK/BC Transboundary	0.000	0.007	(0.000 - 0.020)	0.080	0.034	(0.009 - 0.125)
20	Southern SE AK	0.045	0.036	(0.007 - 0.124)	0.083	0.049	(0.009 - 0.171)
21	King Salmon	0.000	0.000	(0.000 - 0.000)	0.000	0.006	(0.000 - 0.016)
22	Chilkat	0.000	0.009	(0.000 - 0.025)	0.000	0.008	(0.000 - 0.022)
23	Gulf of Alaska	0.005	0.006	(0.000 - 0.016)	0.000	0.001	(0.000 - 0.000)
24-28	Central and Western Alaska	0.008	0.008	(0.000 - 0.023)	0.000	0.008	(0.000 - 0.023)
	Unknown [a]	0.007			0.000		

Note: Sample sizes are indicated (N).

[a] The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 8.–Estimated contribution of 28 reporting groups to the 2000 Chinook salmon summer troll fishery harvests in Southeast Alaska.

		July–September 2000			July 2000			August–September 2000		
		Harvest = 93765			Harvest = 50768			Harvest = 42997		
		Weighted average			N = 396			N = 393		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.002	0.003	(0.000 - 0.010)	0.000	0.002	(0.000 - 0.001)	0.004	0.007	(0.000 - 0.020)
2	California, S. Oregon Coast	0.019	0.016	(0.005 - 0.053)	0.032	0.023	(0.000 - 0.075)	0.004	0.021	(0.000 - 0.061)
3	Klamath (Sp, F)	0.006	0.006	(0.000 - 0.017)	0.000	0.003	(0.000 - 0.004)	0.014	0.013	(0.000 - 0.036)
4	Mid/N. Oregon Coast	0.208	0.028	(0.170 - 0.266)	0.165	0.032	(0.115 - 0.219)	0.260	0.048	(0.193 - 0.352)
5	Lower Columbia (Sp, F)	0.023	0.013	(0.003 - 0.046)	0.042	0.021	(0.000 - 0.071)	0.000	0.014	(0.000 - 0.039)
6	Willamette	0.018	0.008	(0.005 - 0.032)	0.011	0.009	(0.000 - 0.027)	0.026	0.013	(0.003 - 0.046)
7	Mid/Up Columbia, Snake Sp	0.008	0.006	(0.002 - 0.020)	0.009	0.009	(0.001 - 0.028)	0.008	0.008	(0.000 - 0.023)
8	Up Columbia (Su, F), Snake (F)	0.167	0.022	(0.124 - 0.197)	0.204	0.033	(0.152 - 0.264)	0.123	0.028	(0.059 - 0.152)
9	Washington Coast	0.119	0.029	(0.067 - 0.162)	0.043	0.027	(0.000 - 0.090)	0.209	0.054	(0.116 - 0.298)
10	Puget Sound	0.023	0.016	(0.006 - 0.059)	0.032	0.026	(0.004 - 0.093)	0.013	0.017	(0.000 - 0.047)
11	Lower Fraser	0.000	0.002	(0.000 - 0.005)	0.000	0.004	(0.000 - 0.008)	0.000	0.001	(0.000 - 0.000)
12	Thompson	0.087	0.019	(0.048 - 0.110)	0.139	0.032	(0.070 - 0.174)	0.025	0.017	(0.002 - 0.059)
13	Mid/Up Fraser	0.028	0.016	(0.008 - 0.062)	0.036	0.026	(0.004 - 0.094)	0.018	0.017	(0.000 - 0.050)
14	Strait of Georgia	0.020	0.013	(0.003 - 0.045)	0.037	0.021	(0.002 - 0.073)	0.000	0.013	(0.000 - 0.036)
15	W. Coast Vancouver	0.073	0.023	(0.035 - 0.112)	0.015	0.026	(0.000 - 0.086)	0.143	0.040	(0.050 - 0.184)
16	Central BC Coast	0.051	0.021	(0.011 - 0.079)	0.072	0.034	(0.007 - 0.121)	0.026	0.021	(0.000 - 0.064)
17	Skeena	0.024	0.014	(0.007 - 0.053)	0.045	0.025	(0.012 - 0.094)	0.000	0.009	(0.000 - 0.023)
18	Nass	0.013	0.012	(0.000 - 0.036)	0.015	0.017	(0.000 - 0.046)	0.010	0.015	(0.000 - 0.045)
19	AK/BC Transboundary	0.000	0.006	(0.000 - 0.017)	0.000	0.008	(0.000 - 0.024)	0.001	0.009	(0.000 - 0.023)
20	Southern SE AK	0.105	0.022	(0.061 - 0.135)	0.100	0.032	(0.048 - 0.152)	0.110	0.032	(0.045 - 0.150)
21	King Salmon	0.000	0.002	(0.000 - 0.003)	0.000	0.003	(0.000 - 0.006)	0.000	0.000	(0.000 - 0.000)
22	Chilkat	0.000	0.005	(0.000 - 0.013)	0.000	0.008	(0.000 - 0.024)	0.000	0.002	(0.000 - 0.006)
23	Gulf of Alaska	0.000	0.001	(0.000 - 0.002)	0.000	0.001	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.004)
24-28	Central and Western Alaska	0.006	0.005	(0.002 - 0.018)	0.004	0.005	(0.000 - 0.014)	0.008	0.009	(0.000 - 0.030)
	Unknown[a]	0.000			0.000			0.000		

Note: Sample sizes are indicated (N).

[a]The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 9.–Estimated contribution of 28 reporting groups to selected 2000 Chinook salmon troll fishery harvests in the Northern Outside quadrant of Southeast Alaska.

		January–April 2000			July 2000			August–September 2000		
		Harvest = 14898			Harvest = 45953			Harvest = 40720		
		N = 216			N = 392			N = 395		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.020	0.016	(0.000 - 0.047)	0.000	0.002	(0.000 - 0.000)	0.005	0.007	(0.000 - 0.022)
2	California, S. Oregon Coast	0.029	0.029	(0.000 - 0.084)	0.039	0.026	(0.000 - 0.086)	0.000	0.020	(0.000 - 0.056)
3	Klamath (Sp, F)	0.000	0.003	(0.000 - 0.000)	0.000	0.005	(0.000 - 0.013)	0.017	0.014	(0.000 - 0.040)
4	Mid/N. Oregon Coast	0.033	0.026	(0.000 - 0.087)	0.166	0.035	(0.116 - 0.231)	0.257	0.048	(0.197 - 0.355)
5	Lower Columbia (Sp, F)	0.000	0.017	(0.000 - 0.048)	0.039	0.022	(0.000 - 0.070)	0.000	0.012	(0.000 - 0.036)
6	Willamette	0.024	0.019	(0.000 - 0.065)	0.007	0.008	(0.000 - 0.022)	0.022	0.013	(0.000 - 0.045)
7	Mid/Up Columbia, Snake Sp	0.023	0.021	(0.000 - 0.069)	0.007	0.009	(0.000 - 0.028)	0.007	0.008	(0.000 - 0.025)
8	Up Columbia (Su, F), Snake (F)	0.212	0.051	(0.106 - 0.274)	0.232	0.036	(0.172 - 0.291)	0.106	0.025	(0.054 - 0.138)
9	Washington Coast	0.000	0.014	(0.000 - 0.039)	0.062	0.032	(0.000 - 0.103)	0.251	0.058	(0.125 - 0.315)
10	Puget Sound	0.043	0.039	(0.000 - 0.118)	0.018	0.024	(0.000 - 0.079)	0.010	0.017	(0.000 - 0.049)
11	Lower Fraser	0.000	0.002	(0.000 - 0.000)	0.000	0.006	(0.000 - 0.015)	0.000	0.002	(0.000 - 0.000)
12	Thompson	0.020	0.025	(0.000 - 0.086)	0.127	0.034	(0.059 - 0.168)	0.002	0.013	(0.000 - 0.037)
13	Mid/Up Fraser	0.053	0.025	(0.008 - 0.089)	0.022	0.023	(0.000 - 0.073)	0.015	0.018	(0.000 - 0.052)
14	Strait of Georgia	0.122	0.046	(0.022 - 0.174)	0.045	0.025	(0.013 - 0.094)	0.008	0.013	(0.000 - 0.039)
15	W. Coast Vancouver	0.114	0.048	(0.026 - 0.180)	0.020	0.025	(0.000 - 0.082)	0.146	0.040	(0.052 - 0.185)
16	Central BC Coast	0.027	0.043	(0.000 - 0.126)	0.078	0.031	(0.010 - 0.110)	0.025	0.021	(0.000 - 0.065)
17	Skeena	0.000	0.053	(0.000 - 0.154)	0.040	0.022	(0.007 - 0.079)	0.000	0.009	(0.000 - 0.025)
18	Nass	0.070	0.043	(0.000 - 0.134)	0.000	0.009	(0.000 - 0.024)	0.012	0.015	(0.000 - 0.043)
19	AK/BC Transboundary	0.093	0.040	(0.012 - 0.145)	0.000	0.009	(0.000 - 0.024)	0.000	0.008	(0.000 - 0.021)
20	Southern SE AK	0.116	0.052	(0.015 - 0.193)	0.091	0.031	(0.042 - 0.144)	0.110	0.034	(0.048 - 0.157)
21	King Salmon	0.000	0.005	(0.000 - 0.014)	0.000	0.002	(0.000 - 0.004)	0.000	0.000	(0.000 - 0.000)
22	Chilkat	0.000	0.011	(0.000 - 0.030)	0.005	0.010	(0.000 - 0.028)	0.000	0.006	(0.000 - 0.015)
23	Gulf of Alaska	0.000	0.000	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.003)
24-28	Central and Western Alaska	0.000	0.006	(0.000 - 0.017)	0.005	0.005	(0.000 - 0.015)	0.008	0.009	(0.000 - 0.031)
	Unknown[a]	0.000			0.000			0.000		

Note: Sample sizes are indicated (N).

[a]The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 10.–Estimated contribution of 28 reporting groups to AY 2001 winter Chinook salmon troll fishery harvests in Southeast Alaska.

		October–December 2000			January–April 2001		
		Harvest =	16299		Harvest =	18561	
		N =	163		N =	307	
	Region	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.000	0.003	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.003)
2	California, S. Oregon Coast	0.000	0.016	(0.000 - 0.043)	0.003	0.007	(0.000 - 0.018)
3	Klamath (Sp, F)	0.000	0.010	(0.000 - 0.026)	0.000	0.009	(0.000 - 0.024)
4	Mid/N. Oregon Coast	0.020	0.015	(0.000 - 0.045)	0.000	0.003	(0.000 - 0.005)
5	Lower Columbia (Sp, F)	0.085	0.034	(0.014 - 0.130)	0.025	0.017	(0.000 - 0.054)
6	Willamette	0.002	0.015	(0.000 - 0.043)	0.000	0.008	(0.000 - 0.024)
7	Mid/Up Columbia, Snake Sp	0.000	0.012	(0.000 - 0.033)	0.005	0.016	(0.000 - 0.047)
8	Up Columbia (Su, F), Snake (F)	0.283	0.058	(0.188 - 0.381)	0.097	0.028	(0.032 - 0.126)
9	Washington Coast	0.000	0.001	(0.000 - 0.000)	0.007	0.011	(0.000 - 0.033)
10	Puget Sound	0.042	0.040	(0.000 - 0.117)	0.072	0.038	(0.023 - 0.147)
11	Lower Fraser	0.000	0.000	(0.000 - 0.000)	0.000	0.009	(0.000 - 0.024)
12	Thompson	0.005	0.022	(0.000 - 0.065)	0.031	0.023	(0.000 - 0.075)
13	Mid/Up Fraser	0.000	0.010	(0.000 - 0.019)	0.006	0.017	(0.000 - 0.052)
14	Strait of Georgia	0.119	0.046	(0.047 - 0.197)	0.165	0.048	(0.063 - 0.223)
15	W. Coast Vancouver	0.076	0.053	(0.009 - 0.185)	0.012	0.027	(0.000 - 0.079)
16	Central BC Coast	0.077	0.044	(0.000 - 0.138)	0.075	0.053	(0.010 - 0.185)
17	Skeena	0.121	0.065	(0.000 - 0.223)	0.192	0.059	(0.094 - 0.286)
18	Nass	0.000	0.029	(0.000 - 0.082)	0.014	0.023	(0.000 - 0.065)
19	AK/BC Transboundary	0.000	0.012	(0.000 - 0.032)	0.015	0.024	(0.000 - 0.069)
20	Southern SE AK	0.146	0.069	(0.007 - 0.237)	0.260	0.072	(0.108 - 0.340)
21	King Salmon	0.005	0.007	(0.000 - 0.018)	0.000	0.000	(0.000 - 0.000)
22	Chilkat	0.006	0.021	(0.000 - 0.058)	0.000	0.009	(0.000 - 0.025)
23	Gulf of Alaska	0.000	0.007	(0.000 - 0.017)	0.011	0.014	(0.000 - 0.039)
24-28	Central and Western Alaska	0.013	0.016	(0.000 - 0.048)	0.010	0.012	(0.000 - 0.040)
	Unknown[a]	0.000			0.000		

Note: Sample sizes are indicated (N).

[a]The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 11.–Estimated contribution of 28 reporting groups to 2001 spring Chinook salmon troll fishery harvests from three quadrants in Southeast Alaska.

	Overall			Northern Outside			Northern Inside			Southern Inside		
	Harvest =28250			Harvest = 13835			Harvest = 7240			Harvest = 7175		
	N = 396			N = 297			N = 193			N = 196		
Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (Sp, F, W)	0.000	0.004	(0.000 - 0.010)	0.000	0.006	(0.000 - 0.016)	0.000	0.000	(0.000 - 0.000)	0.000	0.001	(0.000 - 0.000)
2 California, S. Oregon Coast	0.000	0.003	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.005)	0.000	0.001	(0.000 - 0.000)	0.000	0.006	(0.000 - 0.010)
3 Klamath (Sp, F)	0.000	0.011	(0.000 - 0.033)	0.000	0.006	(0.000 - 0.016)	0.016	0.027	(0.000 - 0.082)	0.000	0.005	(0.000 - 0.008)
4 Mid/N. Oregon Coast	0.005	0.006	(0.000 - 0.018)	0.000	0.002	(0.000 - 0.002)	0.010	0.013	(0.000 - 0.038)	0.000	0.003	(0.000 - 0.001)
5 Low Columbia (Sp, F)	0.003	0.004	(0.000 - 0.011)	0.003	0.008	(0.000 - 0.025)	0.000	0.000	(0.000 - 0.000)	0.000	0.006	(0.000 - 0.018)
6 Willamette	0.000	0.000	(0.000 - 0.000)	0.000	0.001	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)	0.006	0.006	(0.000 - 0.017)
7 Mid/Up Colum, Snake Sp	0.000	0.003	(0.000 - 0.009)	0.000	0.003	(0.000 - 0.006)	0.000	0.003	(0.000 - 0.009)	0.000	0.005	(0.000 - 0.011)
8 Up Colum (Su, F), Snake (F)	0.015	0.011	(0.000 - 0.034)	0.063	0.022	(0.016 - 0.091)	0.000	0.005	(0.000 - 0.012)	0.018	0.010	(0.000 - 0.028)
9 Washington Coast	0.007	0.008	(0.000 - 0.022)	0.007	0.009	(0.000 - 0.025)	0.000	0.005	(0.000 - 0.007)	0.000	0.004	(0.000 - 0.008)
10 Puget Sound	0.029	0.020	(0.004 - 0.070)	0.041	0.024	(0.005 - 0.082)	0.000	0.012	(0.000 - 0.032)	0.000	0.008	(0.000 - 0.021)
11 Lower Fraser	0.000	0.005	(0.000 - 0.013)	0.000	0.003	(0.000 - 0.003)	0.000	0.007	(0.000 - 0.019)	0.000	0.007	(0.000 - 0.012)
12 Thompson	0.034	0.018	(0.009 - 0.065)	0.077	0.026	(0.032 - 0.122)	0.030	0.024	(0.000 - 0.078)	0.010	0.016	(0.000 - 0.046)
13 Mid/Up Fraser	0.026	0.023	(0.000 - 0.071)	0.001	0.010	(0.000 - 0.029)	0.043	0.032	(0.000 - 0.103)	0.016	0.025	(0.000 - 0.075)
14 Strait of Georgia	0.060	0.028	(0.012 - 0.100)	0.030	0.022	(0.005 - 0.074)	0.119	0.039	(0.032 - 0.161)	0.028	0.020	(0.000 - 0.066)
15 W. Coast Vancouver	0.007	0.008	(0.000 - 0.019)	0.010	0.021	(0.000 - 0.061)	0.000	0.001	(0.000 - 0.000)	0.000	0.007	(0.000 - 0.017)
16 Central BC Coast	0.053	0.032	(0.000 - 0.097)	0.034	0.036	(0.000 - 0.114)	0.048	0.030	(0.000 - 0.085)	0.001	0.023	(0.000 - 0.064)
17 Skeena	0.025	0.036	(0.000 - 0.110)	0.049	0.060	(0.000 - 0.196)	0.000	0.047	(0.000 - 0.131)	0.004	0.034	(0.000 - 0.095)
18 Nass	0.011	0.019	(0.000 - 0.051)	0.050	0.034	(0.000 - 0.096)	0.011	0.026	(0.000 - 0.071)	0.000	0.025	(0.000 - 0.073)
19 AK/BC Transboundary	0.108	0.055	(0.008 - 0.186)	0.046	0.051	(0.000 - 0.152)	0.162	0.071	(0.048 - 0.282)	0.161	0.090	(0.000 - 0.306)
20 Southern SE AK	0.585	0.077	(0.456 - 0.712)	0.566	0.084	(0.358 - 0.634)	0.518	0.099	(0.317 - 0.639)	0.750	0.103	(0.511 - 0.852)
21 King Salmon	0.000	0.004	(0.000 - 0.011)	0.005	0.007	(0.000 - 0.019)	0.000	0.001	(0.000 - 0.000)	0.004	0.007	(0.000 - 0.021)
22 Chilkat	0.028	0.022	(0.000 - 0.072)	0.004	0.021	(0.000 - 0.060)	0.029	0.028	(0.000 - 0.084)	0.003	0.017	(0.000 - 0.049)
23 Gulf of Alaska	0.000	0.004	(0.000 - 0.007)	0.012	0.015	(0.000 - 0.040)	0.000	0.009	(0.000 - 0.018)	0.000	0.004	(0.000 - 0.003)
24-28 Central / Western Alaska	0.006	0.007	(0.000 - 0.022)	0.003	0.011	(0.000 - 0.033)	0.014	0.017	(0.000 - 0.050)	0.000	0.010	(0.000 - 0.026)
Unknown[a]	0.000			0.000			0.000			0.000		

Note: Sample sizes are indicated (N).

[a]The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 12.–Estimated contribution of 28 reporting groups to the 2001 summer Chinook salmon troll fishery harvests in Southeast Alaska.

		July–September 2001			July 2001			August–September 2001		
		Harvest = 95363			Harvest = 64584			Harvest = 30509		
		Weighted average			N = 392			N = 346		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.004	0.006	(0.000 - 0.020)	0.006	0.008	(0.000 - 0.022)	0.002	0.011	(0.000 - 0.029)
2	California, S. Oregon Coast	0.008	0.010	(0.001 - 0.034)	0.000	0.012	(0.000 - 0.034)	0.026	0.019	(0.000 - 0.061)
3	Klamath (Sp, F)	0.006	0.008	(0.000 - 0.024)	0.009	0.010	(0.000 - 0.028)	0.000	0.012	(0.000 - 0.031)
4	Mid/N. Oregon Coast	0.300	0.032	(0.238 - 0.346)	0.232	0.039	(0.151 - 0.286)	0.445	0.057	(0.358 - 0.545)
5	Lower Columbia (Sp, F)	0.062	0.023	(0.023 - 0.099)	0.086	0.033	(0.025 - 0.134)	0.012	0.017	(0.000 - 0.050)
6	Willamette	0.009	0.008	(0.000 - 0.023)	0.010	0.011	(0.000 - 0.031)	0.005	0.005	(0.000 - 0.016)
7	Mid/Up Columbia, Snake Sp	0.009	0.010	(0.000 - 0.033)	0.013	0.015	(0.000 - 0.048)	0.002	0.005	(0.000 - 0.014)
8	Up Columbia (Su, F), Snake (F)	0.124	0.023	(0.072 - 0.150)	0.124	0.031	(0.058 - 0.162)	0.126	0.028	(0.071 - 0.165)
9	Washington Coast	0.038	0.031	(0.010 - 0.112)	0.000	0.036	(0.000 - 0.107)	0.119	0.058	(0.011 - 0.201)
10	Puget Sound	0.025	0.018	(0.012 - 0.070)	0.005	0.021	(0.000 - 0.065)	0.069	0.034	(0.016 - 0.129)
11	Lower Fraser	0.000	0.001	(0.000 - 0.002)	0.000	0.002	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.000)
12	Thompson	0.114	0.030	(0.064 - 0.164)	0.161	0.044	(0.084 - 0.227)	0.015	0.020	(0.000 - 0.065)
13	Mid/Up Fraser	0.022	0.015	(0.004 - 0.054)	0.028	0.022	(0.000 - 0.072)	0.010	0.013	(0.000 - 0.040)
14	Strait of Georgia	0.058	0.020	(0.027 - 0.094)	0.076	0.028	(0.031 - 0.123)	0.019	0.021	(0.000 - 0.069)
15	W. Coast Vancouver	0.103	0.032	(0.027 - 0.131)	0.124	0.044	(0.021 - 0.172)	0.057	0.035	(0.000 - 0.107)
16	Central BC Coast	0.014	0.010	(0.000 - 0.032)	0.000	0.009	(0.000 - 0.023)	0.044	0.026	(0.000 - 0.079)
17	Skeena	0.022	0.021	(0.000 - 0.069)	0.032	0.031	(0.000 - 0.101)	0.000	0.009	(0.000 - 0.024)
18	Nass	0.025	0.014	(0.000 - 0.044)	0.037	0.021	(0.000 - 0.065)	0.000	0.001	(0.000 - 0.000)
19	AK/BC Transboundary	0.018	0.013	(0.000 - 0.043)	0.027	0.020	(0.000 - 0.063)	0.000	0.003	(0.000 - 0.007)
20	Southern SE AK	0.029	0.016	(0.008 - 0.063)	0.021	0.022	(0.000 - 0.067)	0.046	0.023	(0.013 - 0.088)
21	King Salmon	0.004	0.005	(0.000 - 0.014)	0.005	0.007	(0.000 - 0.018)	0.000	0.005	(0.000 - 0.013)
22	Chilkat	0.002	0.002	(0.000 - 0.005)	0.000	0.000	(0.000 - 0.000)	0.006	0.006	(0.000 - 0.017)
23	Gulf of Alaska	0.000	0.003	(0.000 - 0.009)	0.001	0.004	(0.000 - 0.013)	0.000	0.002	(0.000 - 0.003)
24-28	Central and Western Alaska	0.004	0.004	(0.000 - 0.013)	0.005	0.006	(0.000 - 0.018)	0.000	0.004	(0.000 - 0.010)
	Unknown[a]	0.000			0.000			0.000		

Note: Sample sizes are indicated (N).

[a]The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 13.– Estimated contribution of 28 reporting groups to selected 2001 Chinook salmon troll fishery harvests in the Northern Outside quadrant of Southeast Alaska.

		January–April 2001			July 2001			August–September 2001		
		Harvest =	9337		Harvest =	54077		Harvest =	28528	
		N =	300		N =	394		N =	384	
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.000	0.003	(0.000 - 0.007)	0.009	0.010	(0.000 - 0.028)	0.000	0.007	(0.000 - 0.018)
2	California, S. Oregon Coast	0.006	0.009	(0.000 - 0.024)	0.006	0.016	(0.000 - 0.047)	0.028	0.020	(0.000 - 0.062)
3	Klamath (Sp, F)	0.000	0.007	(0.000 - 0.021)	0.000	0.000	(0.000 - 0.000)	0.000	0.008	(0.000 - 0.021)
4	Mid/N. Oregon Coast	0.002	0.007	(0.000 - 0.019)	0.252	0.043	(0.162 - 0.308)	0.447	0.053	(0.377 - 0.551)
5	Lower Columbia (Sp, F)	0.019	0.017	(0.000 - 0.052)	0.055	0.029	(0.011 - 0.106)	0.015	0.019	(0.000 - 0.058)
6	Willamette	0.003	0.009	(0.000 - 0.026)	0.014	0.011	(0.000 - 0.031)	0.005	0.006	(0.000 - 0.016)
7	Mid/Up Columbia, Snake Sp	0.001	0.012	(0.000 - 0.036)	0.003	0.007	(0.000 - 0.016)	0.000	0.006	(0.000 - 0.017)
8	Up Columbia (Su, F), Snake (F)	0.110	0.029	(0.044 - 0.143)	0.125	0.029	(0.064 - 0.162)	0.110	0.028	(0.067 - 0.163)
9	Washington Coast	0.008	0.012	(0.000 - 0.035)	0.044	0.047	(0.000 - 0.153)	0.151	0.057	(0.035 - 0.224)
10	Puget Sound	0.062	0.037	(0.017 - 0.137)	0.006	0.017	(0.000 - 0.053)	0.062	0.029	(0.006 - 0.098)
11	Lower Fraser	0.000	0.008	(0.000 - 0.022)	0.000	0.003	(0.000 - 0.003)	0.000	0.002	(0.000 - 0.000)
12	Thompson	0.034	0.024	(0.004 - 0.085)	0.174	0.039	(0.097 - 0.226)	0.017	0.021	(0.000 - 0.067)
13	Mid/Up Fraser	0.008	0.014	(0.000 - 0.041)	0.030	0.022	(0.000 - 0.073)	0.014	0.011	(0.000 - 0.036)
14	Strait of Georgia	0.162	0.044	(0.051 - 0.199)	0.064	0.025	(0.020 - 0.105)	0.020	0.017	(0.000 - 0.053)
15	W. Coast Vancouver	0.001	0.022	(0.000 - 0.061)	0.043	0.031	(0.000 - 0.098)	0.052	0.032	(0.000 - 0.100)
16	Central BC Coast	0.050	0.055	(0.000 - 0.184)	0.001	0.019	(0.000 - 0.053)	0.041	0.022	(0.000 - 0.069)
17	Skeena	0.256	0.066	(0.093 - 0.314)	0.084	0.039	(0.008 - 0.139)	0.000	0.009	(0.000 - 0.022)
18	Nass	0.001	0.020	(0.000 - 0.058)	0.030	0.024	(0.000 - 0.071)	0.002	0.007	(0.000 - 0.020)
19	AK/BC Transboundary	0.029	0.030	(0.000 - 0.087)	0.030	0.020	(0.000 - 0.065)	0.000	0.003	(0.000 - 0.007)
20	Southern SE AK	0.230	0.068	(0.112 - 0.334)	0.017	0.024	(0.000 - 0.073)	0.024	0.018	(0.005 - 0.064)
21	King Salmon	0.000	0.000	(0.000 - 0.000)	0.004	0.007	(0.000 - 0.018)	0.000	0.003	(0.000 - 0.008)
22	Chilkat	0.000	0.011	(0.000 - 0.031)	0.000	0.000	(0.000 - 0.000)	0.007	0.007	(0.000 - 0.019)
23	Gulf of Alaska	0.006	0.012	(0.000 - 0.033)	0.004	0.007	(0.000 - 0.020)	0.000	0.000	(0.000 - 0.000)
24-28	Central and Western Alaska	0.011	0.011	(0.000 - 0.038)	0.000	0.004	(0.000 - 0.010)	0.006	0.006	(0.000 - 0.016)
	Unknown	0.000			0.003			0.000		

Note: Sample sizes are indicated (N).

[a]The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 14.–Estimated contributions of 28 reporting groups to AY 2002 winter Chinook salmon troll fishery harvests in Southeast Alaska.

	October–December 2001			January–April 2002		
	Harvest = 16155 N = 247			Harvest = 11851 N = 179		
Region	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (Sp, F, W)	0.000	0.005	(0.000 - 0.008)	0.003	0.007	(0.000 - 0.019)
2 California, S. Oregon Coast	0.072	0.034	(0.006 - 0.122)	0.010	0.011	(0.000 - 0.034)
3 Klamath (Sp, F)	0.020	0.014	(0.000 - 0.043)	0.003	0.011	(0.000 - 0.031)
4 Mid/N. Oregon Coast	0.030	0.021	(0.000 - 0.069)	0.010	0.012	(0.000 - 0.037)
5 Low Columbia (Sp, F)	0.034	0.030	(0.000 - 0.089)	0.000	0.011	(0.000 - 0.034)
6 Willamette	0.014	0.016	(0.000 - 0.048)	0.022	0.011	(0.003 - 0.040)
7 Mid/Up Colum, Snake Sp	0.019	0.015	(0.000 - 0.049)	0.026	0.016	(0.007 - 0.058)
8 Up Colum (Su, F), Snake (F)	0.306	0.055	(0.200 - 0.382)	0.165	0.029	(0.109 - 0.206)
9 Washington Coast	0.000	0.012	(0.000 - 0.034)	0.025	0.019	(0.000 - 0.056)
10 Puget Sound	0.183	0.060	(0.065 - 0.260)	0.046	0.029	(0.013 - 0.104)
11 Lower Fraser	0.000	0.001	(0.000 - 0.000)	0.024	0.017	(0.000 - 0.057)
12 Thompson	0.022	0.023	(0.000 - 0.075)	0.106	0.034	(0.060 - 0.172)
13 Mid/Up Fraser	0.000	0.011	(0.000 - 0.031)	0.011	0.013	(0.000 - 0.036)
14 Strait of Georgia	0.151	0.050	(0.077 - 0.243)	0.107	0.033	(0.046 - 0.152)
15 W. Coast Vancouver	0.000	0.039	(0.000 - 0.114)	0.140	0.035	(0.077 - 0.194)
16 Central BC Coast	0.071	0.038	(0.000 - 0.115)	0.104	0.031	(0.037 - 0.140)
17 Skeena	0.023	0.021	(0.000 - 0.063)	0.010	0.014	(0.000 - 0.042)
18 Nass	0.000	0.006	(0.000 - 0.014)	0.031	0.018	(0.005 - 0.066)
19 AK/BC Transboundary	0.000	0.013	(0.000 - 0.037)	0.045	0.024	(0.009 - 0.088)
20 Southern SE AK	0.050	0.033	(0.001 - 0.109)	0.102	0.034	(0.035 - 0.149)
21 King Salmon	0.000	0.002	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)
22 Chilkat	0.000	0.001	(0.000 - 0.000)	0.005	0.008	(0.000 - 0.023)
23 Gulf of Alaska	0.000	0.005	(0.000 - 0.014)	0.002	0.007	(0.000 - 0.019)
24-28 Central / Western Alaska	0.002	0.008	(0.000 - 0.023)	0.003	0.010	(0.000 - 0.008)
Unknown[a]	0.004			0.000		

[a]The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 15.–Estimated contributions of 28 reporting groups to the 2002 spring Chinook salmon troll fishery harvests in three quadrants of Southeast Alaska.

	Overall			Northern Outside			Northern Inside			Southern Inside		
	Harvest = 36882			Harvest = 25052			Harvest = 4180			Harvest = 7650		
	N = 398			N = 299			N = 78			N = 198		
Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (Sp, F, W)	0.000	0.000	(0.00 - 0.00)	0.000	0.000	(0.00 - 0.00)				0.000	0.005	(0.00 - 0.01)
2 California, S. Oregon Coast	0.007	0.009	(0.00 - 0.03)	0.020	0.015	(0.00 - 0.05)				0.000	0.004	(0.00 - 0.01)
3 Klamath (Sp, F)	0.000	0.003	(0.00 - 0.01)	0.010	0.019	(0.00 - 0.05)				0.000	0.009	(0.00 - 0.02)
4 Mid/N. Oregon Coast	0.008	0.010	(0.00 - 0.03)	0.036	0.017	(0.00 - 0.06)				0.000	0.012	(0.00 - 0.03)
5 Low Columbia (Sp, F)	0.000	0.005	(0.00 - 0.01)	0.000	0.005	(0.00 - 0.01)				0.000	0.011	(0.00 - 0.03)
6 Willamette	0.000	0.002	(0.00 - 0.00)	0.000	0.000	(0.00 - 0.00)				0.000	0.011	(0.00 - 0.03)
7 Mid/Up Colum, Snake Sp	0.007	0.005	(0.00 - 0.02)	0.000	0.005	(0.00 - 0.01)				0.000	0.009	(0.00 - 0.02)
8 Up Colum (Su, F), Snake (F)	0.037	0.016	(0.01 - 0.07)	0.055	0.020	(0.02 - 0.09)				0.073	0.030	(0.00 - 0.10)
9 Washington Coast	0.009	0.010	(0.00 - 0.03)	0.000	0.014	(0.00 - 0.04)				0.017	0.013	(0.00 - 0.04)
10 Puget Sound	0.021	0.017	(0.00 - 0.06)	0.019	0.016	(0.00 - 0.05)				0.024	0.028	(0.00 - 0.09)
11 Lower Fraser	0.000	0.006	(0.00 - 0.02)	0.000	0.007	(0.00 - 0.02)				0.042	0.028	(0.00 - 0.08)
12 Thompson	0.089	0.026	(0.04 - 0.12)	0.106	0.033	(0.05 - 0.16)				0.022	0.023	(0.00 - 0.07)
13 Mid/Up Fraser	0.002	0.011	(0.00 - 0.03)	0.000	0.003	(0.00 - 0.01)				0.003	0.023	(0.00 - 0.07)
14 Strait of Georgia	0.045	0.022	(0.00 - 0.07)	0.054	0.027	(0.00 - 0.09)				0.005	0.020	(0.00 - 0.06)
15 W. Coast Vancouver	0.075	0.041	(0.01 - 0.15)	0.059	0.042	(0.00 - 0.14)				0.022	0.029	(0.00 - 0.08)
16 Central BC Coast	0.057	0.028	(0.00 - 0.09)	0.008	0.014	(0.00 - 0.04)				0.000	0.023	(0.00 - 0.06)
17 Skeena	0.025	0.025	(0.00 - 0.07)	0.000	0.029	(0.00 - 0.09)				0.035	0.032	(0.00 - 0.09)
18 Nass	0.002	0.021	(0.00 - 0.06)	0.000	0.021	(0.00 - 0.06)				0.034	0.039	(0.00 - 0.11)
19 AK/BC Transboundary	0.040	0.051	(0.00 - 0.16)	0.119	0.061	(0.00 - 0.20)				0.069	0.048	(0.00 - 0.14)
20 Southern SE AK	0.568	0.068	(0.39 - 0.62)	0.483	0.077	(0.32 - 0.57)				0.616	0.082	(0.44 - 0.71)
21 King Salmon	0.000	0.002	(0.00 - 0.00)	0.000	0.002	(0.00 - 0.00)				0.000	0.001	(0.00 - 0.00)
22 Chilkat	0.000	0.010	(0.00 - 0.03)	0.015	0.017	(0.00 - 0.05)				0.000	0.004	(0.00 - 0.00)
23 Gulf of Alaska	0.000	0.010	(0.00 - 0.03)	0.000	0.009	(0.00 - 0.02)				0.005	0.014	(0.00 - 0.04)
24-28 Central / Western Alaska	0.009	0.017	(0.00 - 0.05)	0.019	0.020	(0.00 - 0.06)				0.033	0.021	(0.00 - 0.07)
Unknown[a]	0.000			0.000						0.000		

Note: Sample sizes are indicated (N).

Note: Insufficient samples were available from the Northern Inside quadrant to allow estimation of the stock proportions for this quadrant, however Northern Inside samples are included in the overall sample.

[a] The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 16.–Estimated contributions of 28 reporting groups to the 2002 summer Chinook salmon troll fishery harvest in Southeast Alaska.

		July–September 2002			July 2002			Aug–September 2002		
		Harvest = 252259			Harvest = 186998			Harvest = 65261		
		Weighted average			N = 387			N = 378		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.004	0.004	(0.000 - 0.012)	0.005	0.006	(0.000 - 0.016)	0.000	0.001	(0.000 - 0.000)
2	California, S. Oregon Coast	0.008	0.022	(0.000 - 0.070)	0.007	0.029	(0.000 - 0.087)	0.010	0.024	(0.000 - 0.065)
3	Klamath (Sp, F)	0.000	0.001	(0.000 - 0.003)	0.000	0.001	(0.000 - 0.000)	0.000	0.004	(0.000 - 0.012)
4	Mid/N. Oregon Coast	0.157	0.029	(0.114 - 0.209)	0.116	0.036	(0.067 - 0.184)	0.276	0.043	(0.189 - 0.333)
5	Lower Columbia (Sp, F)	0.052	0.020	(0.020 - 0.085)	0.064	0.025	(0.018 - 0.105)	0.017	0.021	(0.000 - 0.067)
6	Willamette	0.005	0.010	(0.000 - 0.032)	0.005	0.014	(0.000 - 0.041)	0.006	0.007	(0.000 - 0.019)
7	Mid/Up Columbia, Snake Sp	0.046	0.018	(0.012 - 0.072)	0.049	0.024	(0.006 - 0.084)	0.036	0.015	(0.011 - 0.060)
8	Up Columbia (Su, F), Snake (F)	0.215	0.028	(0.170 - 0.265)	0.187	0.036	(0.131 - 0.247)	0.295	0.040	(0.238 - 0.370)
9	Washington Coast	0.187	0.049	(0.067 - 0.228)	0.197	0.064	(0.046 - 0.260)	0.159	0.048	(0.051 - 0.211)
10	Puget Sound	0.040	0.019	(0.013 - 0.074)	0.027	0.023	(0.000 - 0.069)	0.078	0.033	(0.018 - 0.129)
11	Lower Fraser	0.000	0.001	(0.000 - 0.002)	0.000	0.001	(0.000 - 0.000)	0.000	0.004	(0.000 - 0.007)
12	Thompson	0.087	0.025	(0.062 - 0.141)	0.116	0.033	(0.079 - 0.189)	0.003	0.012	(0.000 - 0.034)
13	Mid/Up Fraser	0.012	0.012	(0.001 - 0.038)	0.013	0.016	(0.000 - 0.046)	0.010	0.011	(0.000 - 0.033)
14	Strait of Georgia	0.038	0.018	(0.011 - 0.073)	0.025	0.023	(0.000 - 0.071)	0.075	0.030	(0.020 - 0.120)
15	W. Coast Vancouver	0.037	0.030	(0.001 - 0.102)	0.050	0.040	(0.000 - 0.130)	0.000	0.024	(0.000 - 0.067)
16	Central BC Coast	0.017	0.015	(0.000 - 0.046)	0.024	0.020	(0.000 - 0.061)	0.000	0.005	(0.000 - 0.013)
17	Skeena	0.037	0.018	(0.003 - 0.065)	0.047	0.025	(0.001 - 0.086)	0.007	0.008	(0.000 - 0.023)
18	Nass	0.001	0.006	(0.000 - 0.016)	0.000	0.007	(0.000 - 0.017)	0.003	0.008	(0.000 - 0.022)
19	AK/BC Transboundary	0.003	0.005	(0.000 - 0.012)	0.000	0.006	(0.000 - 0.013)	0.012	0.011	(0.000 - 0.030)
20	Southern SE AK	0.049	0.022	(0.009 - 0.081)	0.062	0.029	(0.007 - 0.102)	0.012	0.013	(0.000 - 0.041)
21	King Salmon	0.000	0.001	(0.000 - 0.001)	0.000	0.000	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.004)
22	Chilkat	0.002	0.004	(0.000 - 0.011)	0.003	0.005	(0.000 - 0.015)	0.000	0.002	(0.000 - 0.001)
23	Gulf of Alaska	0.000	0.003	(0.000 - 0.007)	0.000	0.004	(0.000 - 0.009)	0.000	0.002	(0.000 - 0.000)
24-28	Central and Western Alaska	0.000	0.004	(0.000 - 0.006)	0.003	0.006	(0.000 - 0.017)	0.000	0.002	(0.000 - 0.004)
	Unknown [a]	0.003			0.000			0.003		

Note: Sample sizes are indicated (N).

[a] The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 17.–Estimated contributions of 28 reporting groups to selected 2002 Chinook salmon troll fisheries in the Northern Outside quadrant of Southeast Alaska.

		January–April 2002			July 2002			August–September 2002		
		Harvest = 8378			Harvest = 130083			Harvest = 61390		
		N = 399			N = 394			N = 359		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.000	0.007	(0.000 - 0.020)	0.005	0.005	(0.000 - 0.015)	0.000	0.001	(0.000 - 0.000)
2	California, S. Oregon Coast	0.013	0.014	(0.000 - 0.045)	0.000	0.023	(0.000 - 0.066)	0.008	0.022	(0.000 - 0.061)
3	Klamath (Sp, F)	0.000	0.001	(0.000 - 0.000)	0.000	0.001	(0.000 - 0.000)	0.000	0.004	(0.000 - 0.009)
4	Mid/N. Oregon Coast	0.014	0.013	(0.000 - 0.042)	0.105	0.039	(0.066 - 0.194)	0.289	0.047	(0.195 - 0.350)
5	Lower Columbia (Sp, F)	0.000	0.016	(0.000 - 0.045)	0.023	0.024	(0.000 - 0.074)	0.023	0.023	(0.000 - 0.075)
6	Willamette	0.023	0.013	(0.000 - 0.044)	0.007	0.010	(0.000 - 0.031)	0.006	0.007	(0.000 - 0.020)
7	Mid/Up Columbia, Snake Sp	0.007	0.010	(0.000 - 0.029)	0.067	0.028	(0.011 - 0.100)	0.022	0.012	(0.007 - 0.046)
8	Up Columbia (Su, F), Snake (F)	0.202	0.036	(0.134 - 0.253)	0.124	0.031	(0.083 - 0.186)	0.298	0.041	(0.240 - 0.374)
9	Washington Coast	0.000	0.003	(0.000 - 0.003)	0.260	0.068	(0.088 - 0.321)	0.173	0.052	(0.056 - 0.234)
10	Puget Sound	0.066	0.039	(0.016 - 0.141)	0.012	0.017	(0.000 - 0.052)	0.072	0.033	(0.016 - 0.124)
11	Lower Fraser	0.027	0.021	(0.000 - 0.066)	0.000	0.004	(0.000 - 0.008)	0.000	0.003	(0.000 - 0.006)
12	Thompson	0.079	0.029	(0.038 - 0.137)	0.108	0.027	(0.073 - 0.164)	0.003	0.010	(0.000 - 0.029)
13	Mid/Up Fraser	0.000	0.006	(0.000 - 0.017)	0.007	0.010	(0.000 - 0.028)	0.009	0.010	(0.000 - 0.032)
14	Strait of Georgia	0.096	0.038	(0.033 - 0.158)	0.028	0.025	(0.000 - 0.080)	0.074	0.030	(0.024 - 0.122)
15	W. Coast Vancouver	0.177	0.044	(0.099 - 0.244)	0.157	0.045	(0.059 - 0.210)	0.000	0.021	(0.000 - 0.062)
16	Central BC Coast	0.103	0.039	(0.021 - 0.148)	0.028	0.019	(0.000 - 0.060)	0.000	0.004	(0.000 - 0.006)
17	Skeena	0.015	0.017	(0.000 - 0.050)	0.038	0.020	(0.006 - 0.071)	0.005	0.006	(0.000 - 0.018)
18	Nass	0.033	0.023	(0.000 - 0.078)	0.000	0.007	(0.000 - 0.016)	0.000	0.004	(0.000 - 0.010)
19	AK/BC Transboundary	0.032	0.025	(0.000 - 0.084)	0.000	0.003	(0.000 - 0.004)	0.008	0.008	(0.000 - 0.022)
20	Southern SE AK	0.113	0.042	(0.037 - 0.174)	0.024	0.020	(0.000 - 0.062)	0.009	0.009	(0.000 - 0.026)
21	King Salmon	0.000	0.000	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.000)	0.000	0.003	(0.000 - 0.007)
22	Chilkat	0.000	0.002	(0.000 - 0.000)	0.000	0.000	(0.000 - 0.000)	0.000	0.001	(0.000 - 0.000)
23	Gulf of Alaska	0.000	0.003	(0.000 - 0.007)	0.000	0.004	(0.000 - 0.011)	0.000	0.003	(0.000 - 0.000)
24-28	Central and Western Alaska	0.000	0.005	(0.000 - 0.013)	0.009	0.007	(0.000 - 0.032)	0.000	0.001	(0.000 - 0.001)
	Unknown[a]	0.000			0.000			0.003		

Note: Sample sizes are indicated (N).

[a] The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 18.–Estimated contributions of 28 reporting groups to the AY 2003 winter Chinook salmon troll fishery harvests in Southeast Alaska.

		October–December 2002			January–April 2003		
		Harvest = 18672			Harvest = 32182		
		N = 121			N = 294		
	Region	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.036	0.030	(0.000 - 0.091)	0.000	0.003	(0.000 - 0.002)
2	California, S. Oregon Coast	0.060	0.036	(0.000 - 0.121)	0.039	0.025	(0.001 - 0.088)
3	Klamath (Sp, F)	0.000	0.002	(0.000 - 0.000)	0.000	0.003	(0.000 - 0.002)
4	Mid/N. Oregon Coast	0.000	0.008	(0.000 - 0.016)	0.018	0.017	(0.000 - 0.057)
5	Low Columbia (Sp, F)	0.082	0.045	(0.000 - 0.144)	0.101	0.038	(0.036 - 0.160)
6	Willamette	0.078	0.042	(0.024 - 0.163)	0.050	0.021	(0.024 - 0.092)
7	Mid/Up Colum, Snake Sp	0.015	0.015	(0.000 - 0.044)	0.008	0.013	(0.000 - 0.037)
8	Up Colum (Su, F), Snake (F)	0.178	0.064	(0.075 - 0.283)	0.251	0.046	(0.160 - 0.314)
9	Washington Coast	0.000	0.012	(0.000 - 0.029)	0.008	0.024	(0.000 - 0.070)
10	Puget Sound	0.066	0.047	(0.000 - 0.151)	0.044	0.038	(0.000 - 0.121)
11	Lower Fraser	0.000	0.000	(0.000 - 0.000)	0.030	0.019	(0.000 - 0.062)
12	Thompson	0.056	0.035	(0.000 - 0.111)	0.069	0.029	(0.027 - 0.123)
13	Mid/Up Fraser	0.000	0.010	(0.000 - 0.027)	0.017	0.015	(0.000 - 0.048)
14	Strait of Georgia	0.133	0.050	(0.044 - 0.210)	0.060	0.034	(0.012 - 0.122)
15	W. Coast Vancouver	0.009	0.042	(0.000 - 0.120)	0.092	0.042	(0.005 - 0.144)
16	Central BC Coast	0.000	0.033	(0.000 - 0.097)	0.086	0.032	(0.029 - 0.131)
17	Skeena	0.027	0.034	(0.000 - 0.098)	0.068	0.032	(0.001 - 0.108)
18	Nass	0.000	0.027	(0.000 - 0.075)	0.000	0.007	(0.000 - 0.018)
19	AK/BC Transboundary	0.000	0.049	(0.000 - 0.139)	0.000	0.007	(0.000 - 0.016)
20	Southern SE AK	0.224	0.069	(0.030 - 0.256)	0.039	0.034	(0.011 - 0.118)
21	King Salmon	0.000	0.002	(0.000 - 0.000)	0.000	0.003	(0.000 - 0.009)
22	Chilkat	0.000	0.002	(0.000 - 0.000)	0.000	0.002	(0.000 - 0.000)
23	Gulf of Alaska	0.015	0.022	(0.000 - 0.061)	0.011	0.010	(0.000 - 0.028)
24-28	Central / Western Alaska	0.021	0.019	(0.000 - 0.063)	0.005	0.010	(0.000 - 0.031)
	Unknown [a]	0.000			0.003		

[a] The proportions of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 19.–Estimated contributions of 28 reporting groups of the 2003 spring Chinook salmon troll fishery harvests from three quadrants in Southeast Alaska.

	Overall			Northern Outside			Northern Inside			Southern Inside		
	Harvest = 34877			Harvest = 18833			Harvest = 9262			Harvest = 6782		
	N = 236			N = 299			N = 63			N = 198		
Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1 Central Valley (Sp, F, W)	0.000	0.003	(0.000 - 0.000)	0.010	0.010	(0.000 - 0.028)				0.023	0.016	(0.000 - 0.048)
2 California, S. Oregon Coast	0.005	0.013	(0.000 - 0.039)	0.004	0.018	(0.000 - 0.051)				0.000	0.003	(0.000 - 0.000)
3 Klamath (Sp, F)	0.027	0.024	(0.000 - 0.074)	0.034	0.026	(0.000 - 0.081)				0.000	0.008	(0.000 - 0.021)
4 Mid/N. Oregon Coast	0.028	0.018	(0.000 - 0.059)	0.033	0.017	(0.000 - 0.056)				0.000	0.007	(0.000 - 0.018)
5 Low Columbia (Sp, F)	0.016	0.014	(0.000 - 0.043)	0.006	0.007	(0.000 - 0.021)				0.000	0.008	(0.000 - 0.020)
6 Willamette	0.000	0.004	(0.000 - 0.012)	0.000	0.003	(0.000 - 0.008)				0.000	0.004	(0.000 - 0.009)
7 Mid/Up Colum, Snake Sp	0.008	0.009	(0.000 - 0.028)	0.000	0.003	(0.000 - 0.007)				0.004	0.011	(0.000 - 0.031)
8 Up Colum (Su, F), Snake (F)	0.040	0.021	(0.003 - 0.075)	0.080	0.030	(0.031 - 0.129)				0.016	0.020	(0.000 - 0.059)
9 Washington Coast	0.019	0.016	(0.000 - 0.047)	0.000	0.008	(0.000 - 0.021)				0.000	0.002	(0.000 - 0.000)
10 Puget Sound	0.015	0.020	(0.000 - 0.056)	0.048	0.037	(0.000 - 0.112)				0.026	0.021	(0.000 - 0.064)
11 Lower Fraser	0.000	0.007	(0.000 - 0.013)	0.000	0.004	(0.000 - 0.001)				0.000	0.016	(0.000 - 0.045)
12 Thompson	0.078	0.036	(0.033 - 0.149)	0.077	0.035	(0.015 - 0.130)				0.039	0.024	(0.006 - 0.083)
13 Mid/Up Fraser	0.000	0.026	(0.000 - 0.073)	0.029	0.036	(0.000 - 0.109)				0.003	0.023	(0.000 - 0.064)
14 Strait of Georgia	0.006	0.017	(0.000 - 0.049)	0.037	0.029	(0.004 - 0.096)				0.056	0.031	(0.015 - 0.120)
15 W. Coast Vancouver	0.071	0.042	(0.000 - 0.137)	0.083	0.044	(0.000 - 0.145)				0.000	0.007	(0.000 - 0.000)
16 Central BC Coast	0.106	0.046	(0.014 - 0.169)	0.000	0.018	(0.000 - 0.049)				0.141	0.064	(0.024 - 0.235)
17 Skeena	0.000	0.013	(0.000 - 0.036)	0.015	0.027	(0.000 - 0.080)				0.072	0.057	(0.000 - 0.178)
18 Nass	0.000	0.025	(0.000 - 0.070)	0.070	0.042	(0.000 - 0.143)				0.000	0.024	(0.000 - 0.067)
19 AK/BC Transboundary	0.086	0.057	(0.000 - 0.187)	0.038	0.040	(0.000 - 0.112)				0.084	0.056	(0.000 - 0.171)
20 Southern SE AK	0.474	0.082	(0.278 - 0.552)	0.438	0.073	(0.290 - 0.533)				0.490	0.095	(0.297 - 0.608)
21 King Salmon	0.000	0.001	(0.000 - 0.000)	0.000	0.001	(0.000 - 0.000)				0.000	0.009	(0.000 - 0.027)
22 Chilkat	0.000	0.008	(0.000 - 0.018)	0.000	0.000	(0.000 - 0.000)				0.000	0.024	(0.000 - 0.066)
23 Gulf of Alaska	0.000	0.006	(0.000 - 0.011)	0.000	0.009	(0.000 - 0.025)				0.000	0.004	(0.000 - 0.006)
24-28 Central / Western Alaska	0.022	0.022	(0.000 - 0.072)	0.000	0.014	(0.000 - 0.041)				0.046	0.024	(0.007 - 0.087)
Unknown[a]	0.000			0.000						0.000		

Note: Sample sizes are indicated (N).

Note: Insufficient samples were available from the Northern Inside quadrant to allow estimation of the stock proportions for this quadrant, however Northern Inside samples are included in the overall sample.

[a] The proportion of genotypes not explained by the baseline is indicated by the "Unknown" category.

Table 20.–Estimated contributions of 28 reporting groups to the 2003 summer Chinook salmon troll fishery harvests in Southeast Alaska.

		July–September 2003			July 2003			August–September 2003		
		Harvest = 240573			Harvest = 192612			Harvest = 47961		
		Weighted average			N = 382			N = 310		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.000	0.004	(0.000 - 0.011)	0.000	0.00	(0.000 - 0.013)	0.000	0.010	(0.000 - 0.025)
2	California, S. Oregon Coast	0.015	0.015	(0.001 - 0.047)	0.011	0.02	(0.000 - 0.047)	0.029	0.029	(0.000 - 0.089)
3	Klamath (Sp, F)	0.000	0.001	(0.000 - 0.003)	0.000	0.00	(0.000 - 0.000)	0.000	0.005	(0.000 - 0.013)
4	Mid/N. Oregon Coast	0.141	0.027	(0.091 - 0.179)	0.131	0.03	(0.070 - 0.174)	0.177	0.046	(0.111 - 0.265)
5	Lower Columbia (Sp, F)	0.034	0.018	(0.005 - 0.063)	0.037	0.02	(0.000 - 0.074)	0.023	0.018	(0.000 - 0.060)
6	Willamette	0.003	0.006	(0.000 - 0.016)	0.000	0.01	(0.000 - 0.014)	0.017	0.013	(0.000 - 0.044)
7	Mid/Up Columbia, Snake Sp	0.007	0.011	(0.002 - 0.037)	0.008	0.01	(0.001 - 0.045)	0.003	0.005	(0.000 - 0.015)
8	Up Columbia (Su, F), Snake (F)	0.209	0.029	(0.162 - 0.258)	0.204	0.04	(0.149 - 0.265)	0.231	0.041	(0.157 - 0.294)
9	Washington Coast	0.079	0.031	(0.024 - 0.125)	0.066	0.04	(0.009 - 0.124)	0.135	0.055	(0.032 - 0.214)
10	Puget Sound	0.010	0.023	(0.003 - 0.072)	0.006	0.03	(0.000 - 0.081)	0.025	0.032	(0.000 - 0.102)
11	Lower Fraser	0.010	0.010	(0.000 - 0.027)	0.013	0.01	(0.000 - 0.034)	0.000	0.007	(0.000 - 0.016)
12	Thompson	0.119	0.025	(0.079 - 0.162)	0.128	0.03	(0.080 - 0.179)	0.081	0.035	(0.028 - 0.143)
13	Mid/Up Fraser	0.001	0.003	(0.000 - 0.009)	0.000	0.00	(0.000 - 0.006)	0.005	0.011	(0.000 - 0.032)
14	Strait of Georgia	0.040	0.026	(0.017 - 0.103)	0.046	0.03	(0.014 - 0.115)	0.015	0.032	(0.000 - 0.102)
15	W. Coast Vancouver	0.150	0.043	(0.044 - 0.187)	0.142	0.05	(0.025 - 0.198)	0.181	0.056	(0.040 - 0.230)
16	Central BC Coast	0.058	0.030	(0.008 - 0.110)	0.063	0.04	(0.001 - 0.129)	0.038	0.025	(0.000 - 0.080)
17	Skeena	0.029	0.026	(0.001 - 0.084)	0.032	0.03	(0.000 - 0.100)	0.018	0.019	(0.000 - 0.057)
18	Nass	0.020	0.015	(0.000 - 0.043)	0.025	0.02	(0.000 - 0.054)	0.000	0.002	(0.000 - 0.000)
19	AK/BC Transboundary	0.024	0.017	(0.000 - 0.050)	0.030	0.02	(0.000 - 0.061)	0.000	0.003	(0.000 - 0.004)
20	Southern SE AK	0.038	0.026	(0.003 - 0.088)	0.045	0.03	(0.000 - 0.108)	0.007	0.012	(0.000 - 0.035)
21	King Salmon	0.000	0.003	(0.000 - 0.009)	0.000	0.00	(0.000 - 0.011)	0.000	0.002	(0.000 - 0.005)
22	Chilkat	0.001	0.008	(0.000 - 0.022)	0.002	0.01	(0.000 - 0.027)	0.000	0.002	(0.000 - 0.003)
23	Gulf of Alaska	0.000	0.005	(0.000 - 0.014)	0.000	0.01	(0.000 - 0.017)	0.000	0.001	(0.000 - 0.000)
24-28	Central and Western Alaska	0.006	0.006	(0.000 - 0.013)	0.007	0.01	(0.000 - 0.022)	0.015	0.010	(0.000 - 0.035)
	Unknown [a]	0.007			0.005			0.000		

Note: Sample sizes are indicated (N).

[a] The proportion of genotypes not explained by the baseline are indicated by the "Unknown" category.

Table 21.–Estimated contributions of 28 reporting groups to selected 2003 Chinook salmon troll fishery harvests in the Northern Outside quadrant of Southeast Alaska.

		January–April 2003			July 2003			August–September 2003		
		Harvest = 26879			Harvest = 148670			Harvest = 38503		
		N = 400			N = 397			N = 400		
	Region	Est.	SD	90% CI	Est.	SD	90% CI	Est.	SD	90% CI
1	Central Valley (Sp, F, W)	0.000	0.005	(0.000 - 0.006)	0.000	0.005	(0.000 - 0.014)	0.000	0.009	(0.000 - 0.026)
2	California, S. Oregon Coast	0.042	0.022	(0.006 - 0.077)	0.008	0.016	(0.000 - 0.048)	0.012	0.025	(0.000 - 0.079)
3	Klamath (Sp, F)	0.000	0.003	(0.000 - 0.006)	0.000	0.003	(0.000 - 0.004)	0.000	0.007	(0.000 - 0.020)
4	Mid/N. Oregon Coast	0.015	0.019	(0.001 - 0.064)	0.147	0.035	(0.082 - 0.201)	0.156	0.046	(0.098 - 0.247)
5	Lower Columbia (Sp, F)	0.115	0.040	(0.045 - 0.176)	0.018	0.020	(0.000 - 0.061)	0.052	0.025	(0.013 - 0.092)
6	Willamette	0.083	0.023	(0.052 - 0.126)	0.000	0.004	(0.000 - 0.011)	0.012	0.011	(0.000 - 0.035)
7	Mid/Up Columbia, Snake Sp	0.000	0.011	(0.000 - 0.031)	0.028	0.018	(0.003 - 0.060)	0.002	0.004	(0.000 - 0.012)
8	Up Columbia (Su, F), Snake (F)	0.293	0.042	(0.218 - 0.353)	0.240	0.037	(0.170 - 0.295)	0.239	0.037	(0.172 - 0.291)
9	Washington Coast	0.020	0.023	(0.000 - 0.068)	0.064	0.037	(0.010 - 0.128)	0.208	0.060	(0.077 - 0.273)
10	Puget Sound	0.019	0.024	(0.000 - 0.076)	0.016	0.028	(0.000 - 0.092)	0.000	0.018	(0.000 - 0.048)
11	Lower Fraser	0.026	0.017	(0.000 - 0.053)	0.000	0.003	(0.000 - 0.000)	0.012	0.010	(0.000 - 0.027)
12	Thompson	0.061	0.024	(0.025 - 0.105)	0.143	0.030	(0.087 - 0.187)	0.078	0.031	(0.021 - 0.122)
13	Mid/Up Fraser	0.027	0.016	(0.000 - 0.054)	0.001	0.009	(0.000 - 0.026)	0.014	0.015	(0.000 - 0.046)
14	Strait of Georgia	0.035	0.027	(0.004 - 0.091)	0.037	0.023	(0.013 - 0.088)	0.030	0.019	(0.000 - 0.066)
15	W. Coast Vancouver	0.090	0.043	(0.000 - 0.143)	0.148	0.046	(0.032 - 0.183)	0.135	0.044	(0.055 - 0.199)
16	Central BC Coast	0.055	0.022	(0.018 - 0.092)	0.017	0.024	(0.000 - 0.075)	0.036	0.016	(0.012 - 0.065)
17	Skeena	0.076	0.029	(0.007 - 0.100)	0.011	0.025	(0.000 - 0.078)	0.000	0.005	(0.000 - 0.012)
18	Nass	0.000	0.002	(0.000 - 0.000)	0.037	0.020	(0.000 - 0.060)	0.000	0.001	(0.000 - 0.000)
19	AK/BC Transboundary	0.000	0.013	(0.000 - 0.034)	0.019	0.016	(0.000 - 0.047)	0.000	0.001	(0.000 - 0.000)
20	Southern SE AK	0.025	0.028	(0.007 - 0.096)	0.047	0.031	(0.001 - 0.106)	0.000	0.004	(0.000 - 0.008)
21	King Salmon	0.002	0.005	(0.000 - 0.014)	0.000	0.001	(0.000 - 0.001)	0.000	0.001	(0.000 - 0.000)
22	Chilkat	0.000	0.001	(0.000 - 0.000)	0.007	0.009	(0.000 - 0.025)	0.000	0.000	(0.000 - 0.000)
23	Gulf of Alaska	0.013	0.008	(0.000 - 0.025)	0.004	0.007	(0.000 - 0.019)	0.000	0.002	(0.000 - 0.003)
24-28	Central and Western Alaska	0.012	0.007	(0.000 - 0.022)	0.006	0.007	(0.000 - 0.022)	0.016	0.009	(0.000 - 0.032)
	Unknown [a]	-0.009			0.003			0.000		

Note: Sample sizes are indicated (N).

[a] The proportion of genotypes not explained by the baseline are indicated by the "Unknown" category.

APPENDIX

Appendix 1.–Location and collection details for each population of Chinook salmon included in the coastwide baseline of allozyme data.

Geographic Area	Reporting Group	Pop No.[a]	Source	Run Time	Total N	Brood or Return Years	Sample Years	Age
Sacramento and San Joaquin rivers	Central Valley	1	Mokelumne and Nimbus Hatcheries	fall	350	80, 80, 83, 87	81, 81, 84, 88	J, J, J, J
		2	Merced Hatchery	fall	100	87	88	J
		3	Feather Hatchery	fall	300	80, 83, 87	81, 84, 88	J, J, J
		4	Feather Hatchery	spring	244	80, 83, 88	81, 84, 88	J, J, A
		5	Coleman Hatchery	fall	200	80, 86	81, 87	J, J
		6	Upper Sacramento River	winter	94	86	87	J
California Coast	California, Southern Oregon Coastal	7	Mattole River	fall	150	83, 86	84, 87	J, J
		8	Van Duzen River	fall	100	86	87	J
		9	Salmon Creek	fall	96	86	87	J
		10	Redwood Creek	fall	93	86	87	J
		11	Benbow Creek	fall	99	86	87	J
		12	Hollow Tree Creek	fall	100	86	87	J
		13	Mid Fork Eel River	fall	95	86	87	J
		14	Mad River Hatchery	fall	149	83, 86	84, 87	J, J
		15	North Fork Mad River	fall	61	86	87	J
		16	Redwood Creek	fall	195	86, 86	87, 87	J, J
Klamath River Basin	Klamath River Basin	17	Iron Gate Hatchery	fall	247	80, 83, 86	81, 84, 87	J, J, J
		18	Trinity Hatchery	fall	370	80, 83, 86, 97	81, 84, 87, 98	J, J, J, J
		19	Trinity Hatchery	spring	250	81, 83, 97	82, 84, 98	J, J, J
		20	Salmon and Scott Rivers	fall	198	83, 86	84, 87	J, J
		21	Shasta River and Bogus Creek	fall	259	83, 86, 86	84, 87, 87	J, J, J
		22	South Fork Trinity River	fall	100	86	87	J
South Oregon and North California Coasts	California, Southern Oregon Coastal	23	Rowdy Creek Hatchery	fall	112	83, 86	84, 87	J, J
		24	Mid fork Smith River	fall	99	86	87	J
		25	Winchuck River	fall	170	84, 94	84, 95	A, J
		26	Chetco River	fall	343	80, 83, 87, 95	81, 84, 88, 96	J, J, J, J
		27	Pistol River	fall	200	83, 94	84, 95	J, J
		28	Hunter Creek	fall	100	94	95	J
		29	Cole Rivers Hatchery	spring	263	80, 84, 94	81, 85, 95	J, J, J
		30	Applegate River	fall	181	83, 87	84, 88	J, J
		31	Rogue River at Gold Hill	fall	100	87	88	J

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Geographic Area	Reporting Group	Pop No.[a]	Source	Run Time	Total N	Brood or Return Years	Sample Years	Age
Mid and North	Mid/North Oregon Coastal	32	Euchre Creek	fall	57	95	96	J
Oregon Coast		33	Elk River and Elk River Hatchery	fall	400	80, 84, 87, 94	81, 85, 88, 95	J, J, J, J
		34	Sixes River	fall	268	80, 82, 94	81, 83, 95	J, J, J
		35	South Fork Coquille River	fall	100	87	88	J
		36	Coquille River and Bandon Hatchery	fall	224	80, 82, 94, 95	81, 83, 95, 95	J, J, J, A
		37	Millicoma River	fall	100	87	88	J
		38	Morgan Creek Hatchery	fall	100	87	88	J
		39	Noble Creek Hatchery	fall	100	95	95	A
		40	Rock Creek Hatchery	spring	300	80, 84, 94	81, 85, 95	J, J, J
		41	Rock Creek Hatchery	fall	100	94	95	J
		42	West Fork Smith River (Umpqua Basin)	fall	80	97	98	J
		43	Siuslaw River	fall	160	80, 82, 95	81, 83, 96	J, J, J
		44	Alsea River	fall	181	80, 82, 95	81, 83, 95	J, J, A
		45	Fall Creek Hatchery	fall	300	80, 84, 87	81, 85, 88	J, J, J
		46	Siletz River	fall	184	80, 82, 95, 97	81, 83, 95, 97	J, J, A, A
		47	Trask Hatchery	spring	300	80, 84, 96	81, 85, 97	J, J, J
		48	Trask Hatchery	fall	400	80, 84, 87, 96	81, 85, 87, 97	J, J, A, J
		49	Nehalem River	summer	53	96	96	A
Lower Columbia River	Lower Columbia River	50	Cowlitz Hatchery	spring	152	82, 87	82, 87	A, A
		51	Cowlitz Hatchery	fall	198	81, 81, 88	81, 82, 88	A, J, A
		52	Kalama Hatchery	spring	159	82, 87	82, 87	A, A
		53	Kalama Hatchery	fall	199	81, 88, 89	82, 88, 89	J, A, A
		54	Lewis Hatchery	spring	135	88	88	A
		55	Lewis River	fall	120	90	90	A
Willamette River	Willamette River	56	Mckenzie and Dexter Hatcheries	spring	248	82, 87, 88	82, 87, 88	A, A, A
		57	Mckenzie River	spring	100			
		58	North Santiam River	spring	99	97	98	J
		59	Clackamas Hatchery	spring	100	88	88	A
		60	North Fork Clackamas River	spring	80	96	97	J
		61	Marion Forks Hatchery	spring	100	90	90	A
		62	Sandy River	spring	93	96	97	J
	Lower Columbia River	63	Sandy River	fall	140	90, 91, 92	90, 91, 92	A, A, A
		64	Spring Creek and Big Creek Hatcheries	fall	454	81, 81, 87, 90, 90	82, 82, 87, 90, 90	J, J, A, A, A

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Geographic Area	Reporting Group	Pop No.[a]	Source	Run Time	Total N	Brood or Return Years	Sample Years	Age
Mid and Upper Columbia River spring	Mid/Upper Columbia (Sp) Snake River (Sp,Su)	65	Carson Hatchery	spring	250	82, 89, 89	82, 89, 89	A, A, A
		66	Klickitat River	spring	261	90, 91, 92, 93	90, 91, 92, 93	A, A, A, A
		67	Warm Springs Hatchery and River	spring	210	82, 87, 87	82, 87, 87	A, A, A
		68	Round Butte Hatchery	spring	159	82, 90	82, 90	A, A
		69	North Fork John Day River	spring	85	90, 91, 92	90, 91, 92	A, A, A
		70	Yakima and Cle Elum Rivers	spring	401	86, 89, 89, 90	86, 89, 89, 90	A, A, A, A
		71	American River	spring	226	86, 89, 90	86, 89, 90	A, A, A
		72	Naches, Little Naches, and Bumping Rivers	spring	251	89, 89, 89, 90, 90, 90	89, 89, 89, 90, 90, 90	A, A, A, A, A, A
		73	Leavenworth Hatchery	spring	250	82, 86, 91	82, 86, 91	A, A, A
		74	White River	spring	137	89, 91, 92	89, 91, 92	A, A, A
		75	Nason River	spring	122	89, 92, 93	89, 92, 93	A, A, A
		76	Chiwawa River	spring	247	89, 90,91, 92, 93, 94	89, 90, 91, 92, 93, 94	A, A, A, A, A, A
		77	Methow River	spring	93	93	93	A
		78	Chewack River	spring	151	92, 93	92, 93	A, A
		79	Twisp River	spring	107	92, 93	92, 93	A, A
Mid and Upper Columbia River summer and fall	Upper Columbia (Su, F) and Snake (F)	80	Klickitat River	summer	324	91, 92, 93, 94	91, 92, 93, 94	A, A, A, A
		81	Klickitat River	fall	250	91, 92, 93, 94	91, 92, 93, 94	A, A, A, A
		82	Bonneville Hatchery	fall	200	89, 90	89, 90	J, A
		83	Little White Salmon Hatchery	fall	200	89, 90	89, 90	J, A
		84	Deschutes River	fall	179	82, 84, 90, 91, 92	82, 85, 90, 91, 92	A, J, A, A, A
		85	Yakima River	fall	109	90	90	A
		86	Marion Drain	fall	153	89, 90	89, 90	A, A
		87	Hanford Reach	fall	258	82, 82, 90	82, 82, 90	A, A, A
		88	Priest Rapids Hatchery	fall	400	80, 86, 87, 90	81, 86, 87, 90	J, A, A, A
		89	Wells Hatchery	summer	202	91, 92	91, 92	A, A
		90	Wenatchee River	summer	350	84, 88, 89, 90	85, 88, 89, 90	J, A, A, A
		91	Similkameen River	summer	206	91, 92, 93	91, 92, 93	A, A, A
		92	Methow River	summer	59	92, 93	92, 93	A, A
Snake River	Upper Columbia (Su, F) and Snake (F)	93	Lyons Ferry Hatchery	fall	399	84, 86, 87, 90	85, 86, 87, 90	J, A, A, A
	Mid/Upper Columbia (Sp) Snake River (Sp,Su)	94	Tucannon Hatchery	spring	758	83, 84, 85, 86, 87, 86, 88, 89, 90, 90	85, 86, 87, 86, 87, 88 88, 89, 90, 90	J, J, J, A, A, J, A, A, J, J
		95	Rapid River	spring	293	81, 81, 84, 88	82, 82, 85, 90	J, J, J, J

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Geographic Area	Reporting Group	Pop No.[a]	Source	Run Time	Total N	Brood or Return Years	Sample Years	Age
Snake River (continued)	Mid/Upper Columbia (Sp) Snake River (Sp,Su)	96	Lookingglass Hatchery	spring	100	90	91	J
		97	Minam River	spring	100	89	90	J
		98	Lostine River	spring	297	88, 89, 90	89, 90, 91	J, J, J
		99	Catherine Creek	spring	100	89	90	J
		100	McCall Hatchery	summer	350	81, 88, 89, 90	82, 89, 90, 91	J, J, J, J
		101	Secesh River	summer	254	88, 89, 90	89, 90, 91	J, J, J
		102	Johnson Creek	summer	316	81, 88, 89, 90	82, 89, 90, 91	J, J, J, J
		103	Marsh Creek	spring	259	88, 89, 90	89, 90, 91	J, J, J
		104	Sawtooth Hatchery	spring	350	81, 88, 89, 90	82, 89, 90, 91	J, J, J, J
		105	Valley Creek	spring	279	88, 89, 90	89, 90, 91	J, J, J
		106	Upper Salmon River at Blaine Bridge	spring	60	88	89	J
		107	Upper Salmon River at Frenchman Creek	spring	60	90	91	J
		108	Upper Salmon River at Sawtooth	spring	100	90	91	J
		109	Imnaha River and Hatchery	spring	480	88, 88, 89, 89, 90	89, 90, 90, 91, 91	J, J, J, J, J
Washington Coast	Washington Coastal	110	Naselle Hatchery	fall	448	87, 88, 89, 90	87, 88, 89, 90	A, A, A, A
		111	Wynoochee River and Hatchery	fall	209	90, 93	90, 93	A, A
		112	Wishkah River	fall	96	90, 93	90, 93	A, A
		113	East Fork Satsop River	fall	102	93	93	A
		114	Skookumchuck River	spring	74	90, 91, 92, 93, 94	90, 91, 92, 93, 94	A, A, A, A
		115	Humptulips Hatchery	fall	103	90	90	A
		116	Quinault Hatchery	fall	200	80, 90	81, 90	J, A
		117	Queets River	fall	190	80, 90	81, 90	J, A
		118	Hoh River	fall	176	80, 81, 90	81, 82, 90	J, J, A
		119	Sol Duc	spring	264	87, 88, 90	87, 88, 90	A, A, A
Strait of Juan de Fuca		120	Hoko River	fall	80	93	93	A
Puget Sound	Puget Sound	121	Elwha River	fall	200	88, 90	88, 90	A, A
		122	North Fork Nooksack Hatchery and River	spring	255	85, 88, 93	85, 88, 93	A, A, A
		123	South Fork Nooksack River	spring	51	93	93	A
		124	Skagit Hatchery	spring	92	90	90	A
		125	Skagit River	fall	69	87	87	A
		126	Sauk River	summer	74	86	86	A
		127	Suiattle River	spring	543	85, 86, 87, 88, 89, 90	85, 86, 87, 88, 89, 90	A, A, A, A, A, A
		128	Sauk River	spring	147	86, 94	86, 94	A, A

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Geographic Area	Reporting Group	Pop No.[a]	Source	Run Time	Total N	Brood or Return Years	Sample Years	Age
Puget Sound (continued)		129	Cascade River	spring	84	93, 94	93, 94	A, A
		130	Skagit River	summer	284	86, 94, 95	86, 94, 95	A, A, A
		131	North Fork Stilliguamish River	summer	106	87, 88	87, 88	A, A
		132	Skykomish River	summer	235	87, 88, 89	87, 88, 89	A, A, A
		133	Bridal Veil Creek	summer	87	87, 88	87, 88	A, A
		134	Skykomish Hatchery	fall	106	87	87	A
		135	Wallace River	fall	82	89	89	A
		136	Sultan River	fall	95	87, 88, 89	87, 88, 89	A, A, A
		137	Snoqualmie River	fall	101	88	88	A
		138	Green River Hatchery	fall	398	80, 87, 88, 90	81, 87, 88, 90	J, A, A, A
		139	Puyallup Hatchery	fall	150	92, 93	92, 93	A, A
		140	White River Hatchery	spring	400	92, 93	92, 93	A, A
		141	South Prairie Creek	fall	86	92, 93	92, 93	A, A
		142	Deschutes Hatchery	fall	250	80, 87	80, 87	J, A
		143	Hoodsport Hatchery	fall	248	80, 88	81, 88	J, A
Lower Fraser River	Lower Fraser River	144	Chehalis Hatchery and Harrison River	fall	440	88, 89, 89, 90	88, 89, 89, 90	A, A, A, A
		145	Chilliwack Hatchery	fall	87	89, 90	89, 90	A, A
Lower Thompson River	Thompson River	146	Spius Creek	spring	158	86	87	J
		147	Nicola River	summer	196	86	87	J
		148	Coldwater River	spring	202	82, 86	82, 87	A, J
		149	Bonaparte River	spring	120	86	87	J
		150	Deadman River	spring	120	86	87	J
South Thompson River		151	Adams River	summer	102	87	87	A
		152	Salmon River and Hatchery	summer	500	84, 86, 87	85, 87, 88	J, J, J
		153	Eagle River and Hatchery	summer	460	84, 86, 87	85, 87, 88	J, J, J
		154	Lower Shuswap River	summer	120	86	87	J
		155	Middle Shuswap River	summer	160	86	87	J
North Thompson River	Thompson River	156	Clearwater Hatchery and Horseshoe River	summer	342	82, 84, 86	82, 85, 87	A, J, J
		157	White Horse Bluff	summer	120	86	87	J
		158	Finn Creek	summer	160	86	87	J
		159	North Thompson River	summer	185	86	87	J
Mid Fraser River	Mid/Upper Fraser River	160	Chilcotin River	spring	120	86	88	J
		161	Chilko River	spring	267	82, 86, 88	82, 87, 88	A, J, A
		162	Quesnel Hatchery and River	spring	716	84, 84, 86, 86, 87, 88, 89	85, 85, 87, 87, 88, 88, 89	J, J, J, J, J, A, J

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Geographic Area	Reporting Group	Pop No.[a]	Source	Run Time	Total N	Brood or Return Years	Sample Years	Age
Mid Fraser River (continued)	Mid/Upper Fraser River	163	Lower Cariboo River	spring	160	86	87	J
		164	Upper Cariboo River	spring	180	84, 86	85, 87	J, J
		165	Cottonwood River	spring	220	84, 86	85, 87	J, J
		166	Blackwater River	spring	334	84, 86	85, 87	J, J
		167	Baezaeko River	spring	300	84, 86	85, 87	J, J
Upper Fraser River		168	Willow River	spring	256	84, 86	85, 87	J, J
		169	Bowron River	spring	270	84, 86	85, 87	J, J
		170	Slim Creek	spring	140	86	87	J
		171	Walker Creek	spring	120	86	87	J
		172	Morkill River	spring	120	86	87	J
		173	Horsey River	spring	160	86	87	J
		174	Swift Creek	spring	120	87	87	A
		175	Fraser River at Tete Jaune	spring	137	82, 88	82, 88	A, A
Southern British Columbia	Strait of Georgia	176	Tenderfoot Hatchery	summer	435	84, 88, 91, 92	85, 88, 91, 92	J, A, A, A
		177	Bute Inlet	fall	109	91	91	A
		178	Cowichan Hatchery	fall	484	88, 89, 90	88, 89, 90	A, A, A
		179	Nanaimo Hatchery	fall	241	84, 88, 89, 90	85, 88, 89, 90	J, A, A, A
		180	Nanaimo Lake	summer	104	89, 90	89, 90	A, A
		181	Big Qualicum Hatchery	fall	537	80, 84, 88, 89, 90	81, 85, 88, 89, 90	J, J, A, A, A
		182	Puntledge Hatchery	summer	60	91	91	A
		183	Quinsam Hatchery	fall	643	81, 84, 88, 89, 90	81, 85, 88, 89, 90	A, J, A, A, A
	West Vancouver Island	184	Robertson Creek Hatchery	fall	300	81, 84, 91	81, 85, 91	A, J, A
		185	Kennedy River	fall	150	91, 92	91, 92	A, A
		186	Sucwoa and Conuma Rivers	fall	180	84, 84, 92	85, 85, 92	J, J, A
Central Coast British Columbia	Central British Columbia Coastal	187	Wannock River	fall	180	88, 91	88, 91	A, A
		188	Kitimat river	summer	190	84, 88	85, 88	J, A
		189	Atnarko River	spring	329	84, 90, 91	85, 90, 91	J, A, A
Skeena River	Skeena River	190	Kitsumkalum River	summer	338	88, 89, 91, 91, 95, 96	88, 89, 91, 91, 95, 96	A, A, A, A, A, A
		191	Cedar River	spring	100	91	91	A
		192	Kitwanga River	spring	111	91	91	A
		193	Bulkley River	spring	272	88, 91, 95	89, 91, 95	J, A, A
		194	Morice River	spring	176	91, 95, 96	91, 95, 96	A, A, A
		195	Kispiox River	spring	105	88, 95	89, 95	J, A
		196	Babine River	spring	313	82, 88, 95, 96	82, 88, 95, 96	A, A, A, A
		197	Bear River	spring	243	88, 91, 95	88, 91, 95	A, A, A

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Geographic Area	Reporting Group	Pop No.[a]	Source	Run Time	Total N	Brood or Return Years	Sample Years	Age
Nass River	Nass River	198	Cranberry River	spring	93	88, 89	88, 89	A, A
		199	Damdochax River	spring	75	88	88	A
Southeast Alaska	Alaska/British Columbia Transboundary	200	Little Tahltan River	spring	328	89,90,90,91	89,90,90,91	A,A,A,A
	Southern Southeast Alaska	201	Chickamin River		151	89, 90	89, 90	A
		202	Clear Creek		33	89	89	A
		203	Cripple Creek		121	88	88	A
		204	Gene's Lake Creek		67	89	89	A
		205	Harding River		45	89	89	A
Southeast Alaska	Southern Southeast Alaska	206	North Arm Creek and Andrews Creek		168	89, 89	89, 89	A, A
	Alaska/Briish Columbia Transboundary	207	Shakes Creek		29	93	93	A
	Southern Southeast Alaska	208	Farragut River		186	89, 92, 93, 93	89, 93, 93, 94	A, J, A, J
	King Salmon River	209	King Salmon River		100	88, 89, 90,92	88, 89, 90,92	A, A, A,A
	Alaska/Briish Columbia Transboundary	210	Nakina River		198	89, 90	89, 90	A, A
		211	Kowatua Creek		190	89, 90	89, 90	A, A
		212	Tatsatua Creek		228	89, 90	89, 90	A, A
		213	Dudidontu River		28	90	90	A
		214	Tseta River		81	89	89	A
		215	Upper Nahlin River		129	89, 90	89, 90	A, A
	Chilkat River	216	Big Boulder Creek		73	91, 92, 93	91, 92, 93	A, A, A
		217	Tahini River		162	89, 90, 91,92	89, 90, 91,92	A, A, A,A
	Gulf of Alaska	218	Klukshu River		250	89, 90, 91	89, 90, 91	A, A, A
		219	Situk River		174	90, 91, 92	90, 91, 92	A, A, A
	Southern Southeast Alaska	220	Chickamin River LPW		100	93	93	A
		221	Chickamin River WHL		155	92, 94	92, 94	A, A
		222	Chickamin River		150	94	95	J
		223	Unuk River DMT		153	92, 94	92, 94	A, A
		224	Unuk River LPW		100	93	93	A
		225	Unuk River		150	93	94	J

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Geographic Area	Reporting Group	Pop No.[a]	Source	Run Time	Total N	Brood or Return Years	Sample Years	Age
Southeast Alaska (cont.)	Southern Southeast Alaska	226	Andrew Creek CRL		100	92	92	A
		227	Andrew Creek HFL		210	94, 93	94, 94	A, J
	King Salmon River	228	King Salmon River LPW		100	93	93	A
	Chilkat River	229	Kelsall River		45	92	92	A
Copper River	Gulf of Alaska	230	Klutina River		23	91	91	A
		231	Gulkana River		94	93	94	J
		232	Kasilof River CCR		87	92	92	A
Kenai River		233	Kenai River		150	92	93	J
Susitna River	Susitna River	234	Talachulitna Creek		53	95	95	A
		235	Deception Creek		103	91	91	A
		236	Moose Creek Deshka		51	95	95	A
		237	Prairie Creek		52	95	95	A
Kodiak Island	Kodiak Island	238	Karluk River		67	93	93	A
		239	Ayakulik River		100	93	93	A
South Peninsula	Alaska Peninsula	240	Chignik River		47	95	95	A
North Peninsula		241	Nelson Lagoon		150	94	95	J
Bristol Bay	Western Alaska	242	Naknek River		100	95	95	A
		243	Stuyahok River		87	93, 94	93, 94	A, A
		244	Nushagak River		153	93, 94	93, 94	A, A
		245	Togiak River		163	93, 94	93, 94	A, A
Goodnews River		246	Goodnews River		40	93	93	A
Kanektok River		247	Kanektok River		78	92, 93	92, 93	A, A
Kuskokwim River		248	Tuluksak River		50	93	93	A
		249	Kogrukluk River		100	92, 93	92, 93	A, A
		250	Stony River		100	94	94	A
Yukon River, Canada	Canadian Yukon	251	Stony Creek		185	91	92	J
Norton Sound	Western Alaska	252	Unalakleet River		95	92, 93	92, 93	A, A
Russia	Russia	253	Kamchatka River		121	92, 95	92, 95	A, A
		254	Voroskaia River		55	92, 95	92, 95	A, A

Source: This table is adapted from Teel et al. 1999.

[a] Population numbers given correspond to the population numbers referenced in Table 3.