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Genetic Mixed Stock Analysis of Sockeye Salmon Harvests in Selected Northern Chatham Strait Commercial Fisheries, Southeast Alaska, 2012–2014

by

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

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Weights and measures (metric)	
centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

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

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

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

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

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

FISHERY DATA SERIES NO. 15-03

GENETIC MIXED STOCK ANALYSIS OF SOCKEYE SALMON HARVESTS IN SELECTED NORTHERN CHATHAM STRAIT COMMERCIAL FISHERIES, SOUTHEAST ALASKA, 2012–2014

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ABSTRACT

This study provides precise stock-specific estimates of harvest compositions of sockeye salmon (*Oncorhynchus nerka*) caught in commercial purse seine fisheries in northern Chatham Strait, Southeast Alaska. Samples were collected from sockeye salmon harvested in statistical areas 112-14/114-27 and 112-16 during the 2012–2014 seasons. We used genetic mixed stock analysis to estimate annual contributions of 9 broad-scale reporting groups (*Chilkoot*, *Chilkat*, *Chatham Large*, *Chatham Small*, *Speel*, *Northern Southeast Alaska*, *Taku Lakes*, *Taku/Stikine Mainstem*, and *Other*). In addition, contributions of *Kanalku*, *Hasselborg*, and *Pavlof* were assessed independently as fine-scale reporting groups in 2013. Results indicated interannual variability in stock compositions due to changes in relative abundances of stocks, prosecution of fisheries, and migratory behavior, although some consistent patterns were observed. Over all years in the statistical area 112-14/114-27 fisheries, the *Chatham Large* reporting group tended to be present earlier in the season followed by a large component of the *Speel* group. Proportions of the *Chatham Large* reporting group tended to be much larger in the statistical area 112-14/114-27 fisheries than in the 112-16 fishery. In the statistical area 112-16 fishery, a larger variety of reporting groups were present earlier in the season, and the proportion of the *Chilkat* reporting group increased later in the season. The high abundance of pink salmon (*O. gorbuscha*) in 2013 led to increases in both time and area available for these fisheries, resulting in different stock compositions compared to years 2012 and 2014. Notably, there were larger proportions of fish from the *Chatham Small* reporting group in both area fisheries in 2013, whereas this group made up smaller proportions (< 6% in each stratum) of the 2012 and 2014 fisheries. Fine-scale analysis of the 2013 fisheries indicated that *Hasselborg* was the greatest contributor within the *Chatham Small* group in both area fisheries, whereas *Kanalku* and *Pavlof* contributed < 1%.

Key words: Southeast Alaska, sockeye salmon, *Oncorhynchus nerka*, mixed stock analysis, genetic baseline, Kanalku Lake, Pavlof Lake, Hasselborg River, Kook Lake, Sitkoh Lake, Icy Strait, Chatham Strait, purse seine fishery

INTRODUCTION

The status of northern Chatham Strait sockeye salmon (*Oncorhynchus nerka*) stocks important to subsistence users in northern Southeast Alaska has been an ongoing concern since at least the late 1990s (Geiger et al. 2007; Bednarski et al. 2013). Reported subsistence harvests in Kanalku Bay (the preferred subsistence salmon fishery for the community of Angoon) increased substantially in the late 1990s, and abundance appeared to decline at the same time. In 2001, the Alaska Department of Fish and Game (ADF&G), USDA Forest Service, and the Angoon Community Association implemented cooperative studies to estimate escapements at 3 sockeye-producing systems traditionally important to the community of Angoon: Kanalku Lake, Sitkoh Lake, and Kook Lake (Conitz and Cartwright 2005). An estimated escapement of only 250 fish at Kanalku Lake in 2001 prompted the development of a voluntary moratorium of harvest by Angoon community members at Kanalku Bay from 2002 through 2005 in order to improve escapements to the lake and rebuild the run to levels that can sustain consistent harvests (Bednarski et al. 2013). In 2010, Kootznoowoo, Inc. filed a petition with the secretaries of the U.S. departments of Interior and Agriculture requesting the federal government exert extraterritorial jurisdiction over state waters to manage or close commercial fisheries in order to address concerns about subsistence fisheries important to the community of Angoon. Final action on the petition was deferred until 2015 to allow stakeholder discussions that would promote locally developed solutions to the perceived problem: that commercial purse seine fisheries in portions of Icy and Chatham straits interfere with the ability of Angoon residents to meet their subsistence needs for salmon.

Perhaps the greatest uncertainty surrounding this issue is the lack of information concerning the contribution of Kanalku and other northern Chatham Strait sockeye salmon stocks to the commercial purse seine harvest. A portion of all sockeye salmon stocks returning to natal streams in the inside waters of northern Southeast Alaska migrate east through Icy Strait (District 114; Figure 1) and turn south into Chatham Strait (District 112) or north into Lynn Canal (Rich 1926; Rich and Suomela 1927; Rich and Morton 1929). These fish are harvested incidentally in commercial mixed stock purse seine fisheries in Districts 112 and 114, which are managed to harvest pink salmon (*O. gorbuscha*; Ingledue 1989). It has been assumed that sockeye salmon harvests in those fisheries are dominated by very large north-migrating runs (e.g., Chilkat, Chilkoot, Taku, and Snettisham Hatchery) and include contributions from many smaller runs from scattered locations throughout northern Southeast Alaska (e.g., Eggers et al. 2010). However, no comprehensive study of stock compositions for these fisheries has been conducted, aside from a scale pattern-analysis study conducted in 1989 that was limited to identifying Chilkat and Chilkoot lake sockeye salmon (estimated to account for 43% of the District 112 harvest in that year; Ingledue 1989).

Commercial purse seine fisheries in Districts 112 and 114 can occur within approximately 1,000 square miles of state-managed marine waters extending from Port Frederick in Icy Strait, east and south to Point Gardner at the southern tip of Admiralty Island in Chatham Strait, including the waters of Tenakee Inlet (Figure 1). These fisheries initially open in mid- to late June and can continue through August with the harvest apportioned into 20 statistical areas (to track the spatial extent of the harvest), and are further apportioned through time by statistical week. The largest harvests of sockeye salmon in these fisheries occur in statistical areas 112-16 and 114-27. The initial purse seine openings occur each year in statistical area 112-14 along a 1-mile stretch of the Chatham Strait shoreline on the northeast corner of Chichagof Island, in an area known as the Point Augusta Index Area (Figure 1). This small area has been opened annually since 1992 to monitor incoming pink salmon run strength into northern Chatham Strait. As the season progresses, additional areas are opened incrementally based on the overall strength of the pink salmon run and development of salmon escapements in streams in or near specific fishing areas. In years of high pink salmon abundance, the harvest of fish from the Point Augusta Index Area is often mixed with harvests from the rest of statistical area 112-14 when it is opened to fishing, as well as the Whitestone Shoreline harvests in adjacent statistical area 114-27.

Purse seine openings in statistical area 112-16 can occur along the northwestern shore of Admiralty Island, from Point Hepburn north to the latitude of Point Couverden (Figure 1). Since 1985, fisheries in this statistical area accounted for 65% of all sockeye salmon harvested in District 112 (Bednarski et al. 2013). The portion of this area north of Point Marsden is known as the Hawk Inlet shoreline. The purse seine fishery in this area is limited by regulation to a cumulative harvest of 15,000 wild sockeye salmon in the month of July to conserve northbound stocks in accordance with the *Northern Southeast Seine Fishery Management Plan* (5 AAC 33.366). Several tools are used to assess the run strength of northbound pink salmon, including a weekly test fishery conducted annually along the Hawk Inlet shoreline from late June to early July (Ingledue 1989). In this test fishery, a chartered purse seiner makes 4 sets each week, one at each of the locations indicated in Figure 1, and the results are compared with historical data to inform fishery management decisions. In years of high pink salmon abundance, July openings in 112-16 generally consist of 8-, 10-, or 15-hour fishing periods once or twice per week.

In recent seasons, annual pink salmon abundance in northern Southeast Alaska inside waters has varied dramatically, with good to strong returns in odd years and very weak returns in even years. As a result, purse seine opportunity has also varied. Extensive area and time opportunities are allowed in odd years, whereas even-year fisheries are constrained to the Point Augusta Index Area and the Hawk Inlet test fishery in northern District 112, and to terminal hatchery chum salmon (*O. keta*) fisheries in the Hidden Falls Hatchery terminal harvest area in southern District 112.

In order to better understand the contribution, run timing, and distribution of northern Chatham Strait sockeye salmon harvested in the commercial purse seine fisheries in Districts 112 and 114, ADF&G initiated a 3-year genetic mixed stock analysis study in 2012 to estimate stock compositions of sockeye salmon harvests in these fisheries. Samples were collected from sockeye salmon harvested in statistical areas 112-14/114-27 and 112-16 during the 2012–2014 seasons. Genetic mixed stock analysis was conducted to determine the contribution of 9 broad-scale reporting groups: 1) *Chilkoot*, 2) *Chilkat*, 3) *Chatham Large* (Kook Lake, Sitkoh Lake, and Lake Eva, grouped together based on known sockeye salmon escapements in the 5,000–10,000-fish range), 4) *Chatham Small* (Pavlof Lake, Hasselborg River, and Kanalku Lake, grouped together based on known or suspected smaller-sized escapements), 5) *Speel* (including both wild and hatchery fish of Speel Lake origin), 6) Northern Southeast Alaska (*NSEAK*; a conglomeration of several stocks in the northern Southeast area), 7) *Taku Lakes*, 8) *Taku/Stikine Mainstem*, and 9) *Other* (all other baseline populations). In addition, the contribution of *Kanalku*, *Hasselborg*, and *Pavlof* were assessed independently as fine-scale reporting groups when the proportion of mixtures allocated to the *Chatham Small* reporting group exceeded 5%. All genetic analyses were performed by the ADF&G Gene Conservation Lab.

OBJECTIVES

The overall goal of this project was to provide genetic-based stock composition estimates of sockeye salmon harvested in Chatham Strait and Icy Strait purse seine fisheries. Specifically, objectives were to

1. Increase the representation of Chatham Strait sockeye salmon populations in the existing genetic baseline.
2. Define reporting groups for genetic stock identification based on genetics, geography, and management/stakeholder input.
3. Collect and analyze samples from mixed stock fisheries to estimate the harvest of Chatham Strait and Lynn Canal sockeye salmon stocks.

This report addresses Objective 2 and the Chatham Strait portion of Objective 3. Objective 1 is addressed in Rogers Olive et al. *In prep*, which describes the Southeast Alaska sockeye baseline, and the Lynn Canal portion of Objective 3 will be addressed in an upcoming report.

DEFINITIONS

To reduce confusion associated with the methods, results, and interpretation of this study, basic definitions of commonly used genetic and salmon management terms are offered here.

District. A portion of a body of water, areas of which may be open to commercial salmon fishing. Districts are subdivided into statistical areas and used to document the spatial origin of fishery harvests.

F-statistics. Measures used to partition genetic diversity within and among populations in a hierarchical fashion. Common measures include F_{IS}, which is the average departure of genotype frequencies from Hardy–Weinberg expectations within populations; F_{ST}, which is the proportion of the variation due to allele frequency differences among populations; and F_{IT}, which is the departure of genotype frequencies from Hardy–Weinberg expectations relative to the entire population. In this common hierarchy, the subscripts refer to comparisons between levels in the hierarchy: $_{IS}$ refers to individuals within populations, $_{ST}$ to subpopulations within the total population, and $_{IT}$ to individuals within the total population. Hierarchies and subscript notation can be extended to any level to accommodate different study designs.

Genetic Marker. A known DNA sequence that can be identified by a simple assay.

Genotype. The set of alleles for one or more loci for an individual.

Harvest. The number of salmon or weight of salmon taken from a run of a specific stock.

Locus (plural: loci). A fixed position or region on a chromosome that may contain more than one genetic marker.

Mixed Stock Analysis. Method using allele frequencies from populations and genotypes from mixture samples to estimate stock compositions of mixtures of individuals in a fishery sample.

Polymerase Chain Reaction (PCR). Method that amplifies a single or a few copies of a locus across several orders of magnitude, generating millions of copies of the DNA.

Reporting Group. A group of populations in a genetic baseline to which portions of a mixture are allocated during mixed stock analyses; constructed based on a combination of stakeholder needs and genetic distinction.

Run. The total number of salmon in a stock surviving to adulthood and returning to the vicinity of the natal stream in any calendar year, composed of both the harvest of adult salmon plus the escapement; the annual run in any calendar year. With the exception of pink salmon, the run is composed of several age classes of mature fish from the stock, derived from the spawning of a number of previous brood years. See 5 AAC 39.222(f).

Salmon Stock. A locally interbreeding group of salmon that is distinguished by a distinct combination of genetic, phenotypic, life history, and habitat characteristics, or an aggregation of 2 or more interbreeding groups that occur in the same geographic area and are managed as a unit. See 5 AAC 39.222(f).

Single nucleotide polymorphism (SNP). DNA sequence variation occurring when a single nucleotide (A, T, C, or G) differs among individuals or within an individual between paired chromosomes.

METHODS

PURSE SEINE HARVEST SAMPLING

Traditionally, sample sizes for the estimation of stock composition have been set at 400 individuals per stratum for fishery samples from highly mixed locations where many stocks contribute to the harvest (e.g., Seeb et al. 2000). According to sampling theory, under the worst-case scenario (3 stocks contributing equal proportions) a sample of this size should provide estimates of relative proportions within 5% of the true value 90% of the time (Thompson 1987) when stocks are genetically identifiable. The same theory states that under worst-case conditions a sample of 200 will be within approximately 7% of the true value 90% of the time. Thus, given these levels of precision and accuracy and the need to balance costs of fisheries sampling, sample sizes were set to 300–400 per week. Sampling was conducted at Excursion Inlet and Sitka, with extra efforts expended to ensure that a representative sample was obtained and no samples were collected from mixed-district deliveries. All samples were selected randomly without regard to size, sex, or position in the hold.

Tissue samples were collected from sockeye salmon by removing the left axillary process using a pair of dog toenail clippers and inserting the sampled tissue into individually labeled 2.0 ml sample vials. Ethanol was added to each vial within 20 minutes of sampling. As part of the regular catch sampling program, one scale sample was also collected from each fish along with the identification of sex and the measurement of length from mid eye to tail fork (METF) to the nearest 5 mm.

Commercial fishery sampling and analysis was stratified by *statistical week*, which began each Sunday at 12:01 a.m. and ended at midnight the following Saturday. Statistical weeks were numbered sequentially starting from the beginning of the calendar year (Appendix A1).

LABORATORY ANALYSIS

Assaying genotypes

We extracted genomic DNA from tissue samples using a DNeasy 96 Tissue Kit by QIAGEN (Valencia, CA). We screened 96 SNP markers using Fluidigm 96.96 Dynamic Arrays (http://www.fluidigm.com; Table 1). Each reaction was a mixture of 4µl of assay mix (1×DA Assay Loading Buffer [Fluidigm], 10×TaqMan SNP Genotyping Assay [Applied Biosystems], and 2.5×ROX [Invitrogen]) and 5µl of sample mix (1×TaqMan Universal Buffer [Applied Biosystems], 0.05×AmpliTaq Gold DNA Polymerase [Applied Biosystems], 1×GT Sample Loading Reagent [Fluidigm] and 60–400ng/µl DNA) combined in a 7.2nL chamber. Thermal cycling was performed on an Eppendorf IFC Thermal Cycler as follows: 70°C for 30 min for Hot-Mix step and initial denaturation of 10 min at 96°C followed by 40 cycles of 96°C for 15 s and 60°C for 1 min. The Dynamic Arrays were read on a Fluidigm EP1 System or BioMark System after amplification and scored using Fluidigm SNP Genotyping Analysis software. Assays that failed to amplify on the Fluidigm system were reanalyzed on the Applied Biosystems platform. Each reaction on this platform was performed in 384-well reaction plates in a 5µL volume consisting of 5–40ng/µl of template DNA, 1×TaqMan Universal PCR Master Mix (Applied Biosystems), and 1×TaqMan SNP Genotyping Assay (Applied Biosystems). Thermal cycling was performed on a Dual 384-Well GeneAmp PCR System 9700 (Applied Biosystems) as follows: an initial denaturation of 10 min at 95°C followed by 50 cycles of 92°C for 1 s and annealing/extension temperature for 1 min. The plates were scanned on an Applied Biosystems Prism 7900HT Sequence Detection System after amplification and scored using Applied Biosystems' Sequence Detection Software version 2.2. Genotypes produced on both platforms were imported and archived in the Gene Conservation Lab Oracle database, LOKI.

Quality control

Quality control methods consisted of re-extracting 8% of project fish and genotyping them for the same SNPs assayed in the original extraction. Discrepancy rates were calculated as the number of conflicting genotypes, divided by the total number of genotypes examined. These rates describe the difference between original project data and quality control data for all SNPs and are capable of identifying extraction, assay plate, and genotyping errors. This quality control method is the best representation of the error rate of our current genotype production.

Error rates for the original genotyping can be estimated as half the rate of discrepancy by assuming that the discrepancies among analyses were due equally to errors during the original genotyping and to errors during quality control, and by assuming that at least one of these assays produced the correct genotype.

STATISTICAL ANALYSIS

Data retrieval

We retrieved genotypes from the LOKI database and imported them into the program *R*.[1] All subsequent analyses were performed in program *R* unless otherwise noted. Prior to statistical analysis, we performed 2 analyses to confirm the quality of the data used: 1) removed individuals with substantial missing genotypic data, and 2) removed individuals with identical genotypes, unless we have evidence that identical genotypes are likely the result of highly inbred population(s).

We used the 80% rule (Dann et al. 2009) to exclude individuals missing genotypes for 20% or more of loci because these individuals probably had poor-quality DNA. The inclusion of individuals with poor-quality DNA may introduce genotyping errors and reduce the accuracy of mixed stock analyses.

We removed individuals with identical genotypes if we suspected these samples represented duplicate-sampled individuals. If duplication was suspected, we identified the sample with the most missing genotypic data from each identical pair and removed it from further analyses. If both samples had the same amount of genotypic data, the first sample was removed. Identical genotypes can occur as a result of sampling or extracting the same individual twice, and are defined as pairs of individuals sharing the same alleles in 95% of screened loci. Identical genotypes can also occur between different individuals from the same family or a population with greatly reduced genetic variability.

Reporting group selection

Reporting groups were selected, taking into consideration the following: 1) sociological and management needs, 2) the number of fish expected from the reporting group within a mixture, with a 5% minimum contribution, and 3) genetic distinction. Based on these factors, 9 broad-scale reporting groups were selected: 1) *Chilkoot*, 2) *Chilkat*, 3) *Chatham Large*, 4) *Chatham Small*, 5) *Speel*, 6) *NSEAK*, 7) *Taku Lakes*, 8) *Taku/Stikine Mainstem*, and 9) *Other* (Table 2; Figures 2, 3).

The *Chatham Small* broad-scale reporting group included baseline populations of Kanalku Lake, Hasselborg Lake, and Pavlof Lake (Table 2; Figures 2, 3). When the allocation to this reporting group exceeded 5% in a mixture, we estimated the contribution of the fine-scale reporting groups consisting of each of these 3 populations, resulting in 11 fine-scale reporting groups: 1) *Chilkoot*, 2) *Chilkat*, 3) *Chatham Large*, 4) *Kanalku*, 5) *Hasselborg*, 6) *Pavlof*, 7) *Speel*, 8) *NSEAK*, 9) *Taku Lakes*, 10) *Taku/Stikine Mainstem*, and 11) *Other.*

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[1] *R* Development Core Team. 2014. *R*: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. http://www.R-project.org/.

Proof tests

We evaluated the utility of each of the 9 broad-scale and 3 additional fine-scale reporting groups for mixed stock analysis by performing repeated proof tests. Proof tests were made by sampling 200 individuals from the baseline (when the total reporting group size was at least 400 individuals) without replacement and analyzing them as a mixture against the remaining, reduced baseline. If the reporting group size was less than 400 fish, then half of the total size was used for the mixture. These tests provided an indication of the power of the baseline for mixed stock analysis under the assumption that all the populations from a reporting group were represented in the baseline. A critical level of 90% correct allocation was used to determine whether the reporting group was acceptably identifiable (Seeb et al. 2000).

We used the Bayesian mixed stock analysis method implemented in *BAYES* (Pella and Masuda 2001) to evaluate the stock compositions of these test mixtures. The Bayesian model implemented by *BAYES* uses a Dirichlet distribution as the prior distribution for the stock proportions, and the parameters for this distribution must be specified. We defined prior parameters for each reporting group to be equal (i.e., a *flat* prior), with the prior for each reporting group subsequently divided equally to populations within that reporting group. We set the sum of all prior parameters to 1 (prior weight), which is equivalent to adding one fish to each mixture (Pella and Masuda 2001). We ran 3 independent Markov Chain Monte Carlo (MCMC) chains of 20,000 iterations with different starting values and discarded the first 10,000 iterations to remove the influences of the initial start values. We combined the second half of each chain to form the posterior distribution and tabulated mean estimates and 90% credibility intervals from a total of 30,000 iterations. We also assessed the among-chain convergence of these estimates using the Gelman–Rubin shrink factor, which compares variation within a chain to the total variation among chains (Gelman and Rubin 1992). Shrink factors greater than 1.2 indicate that the mixture would need to be reanalyzed with more chains; in this case we would have doubled the iterations. Each proof test was repeated 10 times for each reporting group to account for variability within reporting groups (causing variability within randomly drawn mixtures). We visualized these results using the *gplots* package.[2]

Mixed stock analysis

Mixed stock analysis was performed using the program *BAYES*. Prior parameters for the early time stratum for each statistical area were defined to be equal (i.e., a *flat* prior). For subsequent time strata within the same statistical area in the same year, the priors were the posterior means (i.e., the stock composition estimates) of the previous time strata (Appendices C1, C2). For all mixtures, the prior for a reporting group was divided equally to populations within that reporting group for population prior parameters. We ran 5 independent MCMC chains of 40,000 iterations with different starting values and discarded the first 20,000 iterations to remove the influence of initial start values. Estimates and 90% credibility intervals were calculated from the second half of the 5 chains. To ensure that the *BAYES* output was an acceptable approximation of the stationary posterior distribution and that the stock composition estimates were valid, we assessed the 5 independent MCMC chains for convergence among chains using the Gelman–Rubin shrink factor computed within *BAYES*. If a shrink factor for any stock group in a mixture was greater than 1.2, then we analyzed the *BAYES* trace plots. Investigating these plots allowed us to assess

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[2] Warnes, G. R. 2011. *Gplots: Various R programming tools for plotting data*. http://cran.r-project.org/web/packages/gplots/index.html (accessed January 27, 2014)

whether the burn-in amount was large enough to fully remove the influence of the start values, whether convergence occurred in the second half of each chain, and which chain(s) caused the nonconvergence. When burn-in and late chain convergence was sufficient, we combined the agreeing chains (when at least 3 of the 5 chains agreed), and discarded the first half of each as burn-in, to form the posterior distribution. All chains that caused nonconvergence were dropped.

We employed a stratified design when estimating the stock contributions of the *Chatham Small* fine-scale groups (Jasper et al. 2012). Strata within a given year were combined into yearly estimates and weighted by their respective harvests. This method helps to ensure precision and accuracy of the estimates because there is a cost associated with using populations as individual reporting groups when stock contributions are low (Habicht et al. 2012a).

Stock proportion estimates and the 90% credibility intervals for each strata were calculated by taking the mean and 5% and 95% quantiles of the combined posterior distribution from the 5 MCMC chains (Gelman et al. 2000). In addition, we report the probability that an estimate for a particular reporting group and strata is in fact zero ($P = 0$; Habicht et al. 2012b). Harvest estimates and 90% credibility intervals for each week were calculated by multiplying the number of fish harvested that week by the unrounded estimate of the reporting-group stock proportion, and by the upper and lower bounds.

RESULTS

PURSE SEINE HARVEST SAMPLING

Due to poor pink salmon returns, purse seine openings were very limited in District 112 and District 114 during the 2012 and 2014 seasons; however, overall sampling goals were met for both the Hawk Inlet test fishery in statistical area 112-16 and the Point Augusta Index Area in statistical area 112-14 in those years (Table 3). A much stronger pink salmon return in 2013 allowed for more purse seine openings; samples were collected from both the Hawk Inlet test and common property fisheries in statistical area 112-16, the Point Augusta Index Area and common property fisheries in statistical area 112-14, and the Whitestone Shoreline in statistical area 114-27. It was not possible, however, to sample statistical areas 112-14 and 114-27 separately, so samples from those areas were combined. The sampling goal of 300–400 fish per week was met in 2013 in 2 of 8 weeks in statistical area 112-16, and in 6 of 10 weeks in the combined statistical areas of 112-14 and 114-27. When this goal was not met in a single week within in any year, it was combined with neighboring weeks until the combined sample size was approximately 200. Each week or combination of weeks was then used as a stratum for mixed stock analysis. By dropping the weekly sample size to 200, we were able to analyze more time strata and therefore capture more trends in mixture proportions over the course of a season.

Not all harvest was sampled in all years. Unsampled strata represented 18% (2012), 27% (2013), and 12% (2014) of the total sockeye salmon harvests in districts 112 and 114 (Table 4). The unsampled harvests included 1,740 (2012) and 501 (2014) sockeye salmon within the Hidden Falls Hatchery terminal harvest area in fisheries targeting enhanced chum salmon in southern District 112. An additional 284 sockeye salmon were harvested in 2014 in early September openings targeting wild Excursion River fall chum salmon on the northern shore of Icy Strait in District 114. In 2013, the majority of unsampled sockeye salmon harvests occurred along the shorelines of Baranof (6,416 fish) and Chichagof islands (7,839 fish), and along the Admiralty Island shoreline (944 fish) predominately south of Angoon. The unsampled sockeye salmon harvest on the Admiralty shoreline north of Angoon totaled 17 fish (included in 112-Admiralty in Table 4).

LABORATORY ANALYSIS

Quality control

Quality control demonstrated a low overall genotypic discrepancy rate of 0.19% for samples collected in statistical areas 112-16 and 112-14/114-27. All discrepancies (*n* = 15) were between heterozygous and homozygous genotypes. This resulted in an estimated overall laboratory error rate of 0.10%.

STATISTICAL ANALYSIS

Data retrieval

A total of 55 fish were removed based upon the 80% rule over all years (0.8% of samples genotyped), with the majority (64%) of these coming from statistical areas 112-14/114-27 in 2013 (*n* = 35).

We did not remove individuals with identical genotypes because we knew from the baseline analysis that one of the populations (Kanalku Lake) is highly inbred (Rogers Olive et al. *In prep*). This inbreeding has resulted in a high incidence of fish with identical genotypes within the population. To avoid erroneously removing Kanalku-bound fish from the mixtures sampled for this study, we chose not to perform this portion of the data confirmation analysis. There was a single pair of duplicate fish (sharing identical alleles at 95% of screened loci) in each of the 2012 and 2014 samples, and there were 5 pairs in samples from the 2013 fisheries.

Proof tests

All broad-scale reporting groups met the minimum critical level of 90% correct allocation in the repeated proof tests with correct allocations ranging from 99.6% to 93.8% (Appendices B1–B9). The following broad-scale reporting groups had a minimum correct allocation of 98% or above in all 10 tests: *Chilkat*, *Chilkoot*, *Chatham Large*, *Speel*, and *Taku Lakes*. The *NSEAK* group had the lowest correct allocation within a single test of 93.7%, with 4.2% misallocation to *Taku/Stikine Mainstem* and 1.4% to *Other*. However, the other 9 *NSEAK* tests ranged from 96.4% to 98.9% correct allocation. Correct allocation in the *Taku/Stikine Mainstem* group ranged from 96.3% to 99.2% with most misallocation belonging to the *Other* group. Correct allocation in testing the *Other* group ranged from 95.2% to 98.4%. This group had misallocation greater than 1% to at least one other reporting group in 7 of 10 tests. The *Chatham Small* group had correct allocation ranging from 97.6% to 99.6%. Misallocation of at least 1% in the *Chatham Small* group occurred in 3 of 10 tests and ranged from 1.0% to 1.5% to the *Chatham Large* group.

The 3 fine-scale reporting groups also met the 90% critical level of correct allocation with the *Kanalku* reporting group performing the best with at least a 99% correct allocation over all 10 tests (Appendices B10–B12). Correct allocation in tests of *Hasselborg* ranged from 97.3% to 99.1% with misallocations ranging from 1.1% to 1.8% to any single reporting group. The *Pavlof* reporting group tested the lowest in the fine-scale repeated proof tests with correct allocation ranging between 92.1% and 96.8%. When fish were misallocated in the *Pavlof* proof tests, between 2.3% and 6.9% were allocated to the *Chatham Large* group.

Mixed stock analysis

2012

The sockeye salmon harvest in statistical area 112-16 was combined into one stratum (statistical weeks 26–29; 1,826 fish). The harvest was composed mostly of sockeye salmon from the *Taku/Stikine Mainstem* (22.6%) reporting group, followed by the *Chilkoot* (17.7%), *Chilkat* (17.5%), *Speel* (15.8%), *Taku Lakes* (13.0%), and *NSEAK* (10.2%) reporting groups (Figure 4; Appendix C1). Proportions of less than 5% were estimated for the *Other* (2.1%), *Chatham Small* (0.5%), and *Chatham Large* (0.5%) reporting groups.

The sockeye salmon harvest in statistical area 112-14 was combined into 3 strata: statistical weeks 26–28 (1,372 fish), statistical weeks 29–30 (4,061 fish), and statistical weeks 31–32 (544 fish). The harvest in the first stratum was composed mostly of sockeye salmon from the *Other* (32.5%) reporting group, followed by the *Chatham Large* (26.1%), *Taku Lakes* (10.5%), *Taku/Stikine Mainstem* (9.9%), and *NSEAK* (7.8%) reporting groups (Figure 5; Appendix C2). All remaining reporting groups contributed less than 5% of the harvest. Composition of the harvest shifted later in the season, and proportions of the *Speel* and *Taku/Stikine Mainstem* reporting groups increased to a combined 55% and 63% of the harvest in the last 2 strata.

When estimated proportions were applied to the 2012 harvest, the *Taku/Stikine Mainstem* reporting group contributed the greatest number of sockeye salmon to the statistical area 112-16 fishery and the *Speel* reporting group contributed the greatest number of sockeye salmon to the statistical area 112-14 fishery (Figures 6, 7; Appendices C3, C4). Estimated harvests of *Chatham Large* and *Chatham Small* reporting groups were small, with the largest number of *Chatham Large* fish harvested in statistical weeks 26–28 in the 112-14 fishery (358 fish) and the largest number of *Chatham Small* fish harvested in statistical weeks 29–30 in the 112-14 fishery (106 fish).

2013

The sockeye salmon harvest in statistical area 112-16 was combined into 5 strata: statistical weeks 27–28 (696 fish), statistical weeks 29–31 (14,576 fish), statistical week 32 (3,240 fish), statistical week 33 (3,715 fish), and statistical weeks 34–35 (2,643 fish). The harvest in the first stratum was composed mostly of sockeye salmon from the *Speel* (23.8%) reporting group, followed by the *Taku Lakes* (18.1%), *Taku/Stikine Mainstem* (18.0%), and *NSEAK* (12.6%) reporting groups; however, proportions of each of these groups declined throughout the season (Figure 4; Appendix C1). The proportion of the *Chilkat* reporting group in the first stratum was 15.0% but steadily increased throughout the season to 68.4% in the last stratum (statistical weeks 34–35). The proportion of the *Chilkoot* reporting group decreased from 10.9% to 3.6% throughout the season, whereas proportions of the *Chatham Large* and *Chatham Small* groups both increased slightly in the second stratum. In statistical weeks 29–31 *Chatham Large* increased to 3.6% and *Chatham Small* increased to 10.8%, then both proportions steadily decreased through the rest of the season.

The sockeye salmon harvest in statistical areas 112-14 and 114-27 (combined) was combined into 8 strata: statistical weeks 25–26 (1,143 fish), statistical week 27 (1,814 fish), statistical week 28 (3,005 fish), statistical week 29 (3,214 fish), statistical week 30 (3,358 fish), statistical week 31 (1,674 fish), statistical week 32 (818 fish), and statistical weeks 33–34 (1,024 fish). The *Chatham Large* reporting group contributed the most to the mixture in the first (statistical weeks

25–26, 24.0%) and second (statistical week 27, 26.0%) strata, then steadily decreased to 3.9% in the last stratum (statistical weeks 33–34; Figure 5; Appendix C2). The reporting groups with the next highest proportions in the first stratum were *Taku Lakes* (16.8%), *Taku/Stikine Mainstem* (15.9%), and *NSEAK* (14.1%). Proportions of all 3 of these groups generally declined throughout the season, although the proportion of *Taku/Stikine Mainstem* increased to 21.6% in the second stratum before declining, and the proportion of *NSEAK* increased from 2.4% in statistical week 31 to 19.6% in statistical week 32 before declining to 0.3% in the last stratum. The proportion of the *Chatham Small* reporting group increased from 8.1% in the first stratum to 23.4% in statistical week 28, when it was the largest contributor, then decreased over the rest of the season. The proportion of the *Other* reporting group also increased from 13.1% in the first stratum to 16.7% in statistical week 27, and to 17.9% in statistical week 28, before becoming absent in the last stratum. The proportion of the *Speel* reporting group increased from 0.2% in the first stratum to 36.9% in statistical week 30, then slowly declined to 10.0% by the last stratum. The *Chilkat* reporting group exhibited the most dramatic increase in proportion, from 6.0% in the first stratum to 66.4% in the last stratum. The highest proportion of the *Chilkoot* reporting group occurred in week 30 (7.0%), and proportions varied between 0% and 3.0% in other weeks.

Because the *Chatham Small* reporting group contributed at least 5% to the mixtures in both statistical area 112-16 and statistical areas 112-14/114-27 in 2013, we estimated allocations to fine-scale reporting groups. To estimate the proportions of the fine-scale *Chatham Small* reporting groups (*Pavlof*, *Hasselborg*, and *Kanalku*), we combined all strata for each reporting group within 2013 and weighted them by their respective harvests, resulting in full season estimates. We have provided estimates for both the broad- and fine-scale reporting groups in 2013 for each statistical area (Figures 4–11; Appendices C1–C8).

The full season estimates for the *Chatham Small* fine-scale reporting groups in the statistical area 112-16 fishery indicated *Hasselborg* was the largest contributor (8.5%) to the mixture, and *Pavlof* (0%) and *Kanalku* (0.5%) accounted for much smaller proportions (Figure 8; Appendix C5). Full season estimates for the *Chatham Small* fine-scale reporting groups within statistical area 112-14/114-27 fisheries were similarly dominated by *Hasselborg* (10.1%), followed by *Pavlof* (0.9%) and *Kanalku* (0.7%; Figure 9; Appendix C6).

When estimated proportions were applied to the 2013 harvest, the *Chilkat* reporting group contributed the greatest number of sockeye salmon to the statistical area 112-16 fishery, and the *Speel* reporting group contributed the greatest number of sockeye salmon to the statistical area 112-14/114-27 fisheries (Figures 6, 7, 10, 11; Appendices C3, C4, C7, C8). The *Chatham Large* reporting group contributed an estimated 749 sockeye salmon to the statistical area 112-16 fishery and 1,751 sockeye salmon to the District 112-14/114-27 fisheries. Within the fine-scale reporting groups, the largest contributor of the *Chatham Small* stocks was *Hasselborg* with 2,115 fish in the 112-16 fishery and 1,626 fish in the 112-14/114-27 fishery. The estimated contribution of *Kanalku* fish to both fisheries was small: 125 fish in the 112-16 fishery and 111 fish in the 112-14/114-27 fisheries.

2014

The sockeye salmon harvest in statistical area 112-16 was combined into 2 strata: statistical weeks 26–27 (1,444 fish) and statistical weeks 28–29 (607 fish). The harvest in the first stratum was composed mostly of sockeye salmon from the *Chilkat* (27.6%) reporting group, followed by the *Taku/Stikine Mainstem* (16.9%), *NSEAK* (15.5%), *Chilkoot* (12.6%), *Taku Lakes* (11.3%), and *Speel* (11.1%) reporting groups (Figure 4; Appendix C1). Proportions of less than 5% were estimated for the *Other* (3.7%), *Chatham Small* (1.2%), and *Chatham Large* (0.1%) reporting groups. The harvest in the second stratum was composed mostly of sockeye salmon from the *Speel* (28.7%) reporting group, followed by the *Chilkoot* (19.6%), *Other* (17.0%), *Chilkat* (13.2%), and *Taku/Stikine Mainstem* (13.0%) reporting groups. Proportions of less than 5% were estimated for the *Taku Lakes* (3.7%), *Chatham Large* (2.3%), *Chatham Small* (1.8%), and *NSEAK* (0.6%) reporting groups.

Estimates of the *Other* reporting group contribution to the statistical area 112-16 mixture in weeks 28–29 did not converge at 40,000 iterations (Gelman–Rubin shrink factor estimate = 1.2). The trace plot output from *BAYES* indicated that discarding the first 20,000 iterations of each chain was sufficient for removing any noise created by the starting values, and that the last half of each chain met convergence criteria. For these reasons we chose to combine the chains that were in agreement. Four of the 5 chains agreed based on the trace plot output from *BAYES*, so we dropped the single chain that did not agree and combined the 4 matching chains to obtain the estimate. After dropping the single chain, the Gelman–Rubin shrink factor estimate indicated among-chain convergence (1.0).

The sockeye salmon harvest in statistical area 112-14 was combined into 3 strata: statistical weeks 26–27 (527 fish), statistical weeks 28–30 (2,436 fish), and statistical weeks 31–32 (641 fish). The harvest in the first stratum was composed mostly of sockeye salmon from the *Other* (44.5%) reporting group, followed by the *Chatham Large* (21.8%), and *NSEAK* (11.7%) reporting groups (Figure 5; Appendix C2). The *Other* group declined drastically in the following 2 strata to contributions of 9.2% and 5.3%, whereas *Chatham Large* and *NSEAK* underwent a steadier decline: *Chatham Large* declined to 10.4% and *NSEAK* declined to 1.2% in the final stratum. The proportion of the *Chatham Small* reporting group decreased from 4.3% in the first stratum to 3.3% in the second stratum, then increased to 9.8% in the third stratum. The proportion of the *Speel* reporting group underwent the largest increase over the course of the season, from 3.0% in the first stratum, to 31.9% in the second stratum, and then to 51.4% in the third stratum.

When estimated proportions were applied to the 2014 harvest, the *Chilkat* reporting group contributed the greatest number of sockeye salmon to the statistical area 112-16 fishery and the *Speel* reporting group contributed the greatest number of sockeye salmon to the statistical area 112-14 fishery (Figures 6, 7; Appendices C3, C4). Estimated harvests of *Chatham Large* and *Chatham Small* reporting groups were small, with the largest number of *Chatham Large* fish harvested in statistical weeks 28–30 in the 112-14 fishery (358 fish) and the largest number of *Chatham Small* fish harvested in statistical weeks 28–30 in the 112-14 fishery (80 fish).

DISCUSSION

This is the first study to provide precise stock-specific estimates of harvest compositions of sockeye salmon caught in purse seine fisheries in Icy Strait and northern Chatham Strait. These estimates can improve the understanding of stock productivity, run timing, and harvest patterns of Chatham area sockeye salmon stocks, and can provide useful information to assess management of purse seine fisheries in this area.

While there is interannual variability in stock compositions due to changes in relative abundances of stocks, prosecution of fisheries, and migratory behavior due to environmental conditions, some consistent patterns were observed between years and fisheries. For example, in statistical area 112-14/114-27 fisheries, the *Chatham Large* reporting group tended to be present early in the season (statistical weeks 25–28), whereas a large component of the *Speel* reporting group was present later in the season (statistical weeks 29–32). The proportions of the *Chatham Large* reporting group also tended to be much larger in the statistical area 112-14/114-27 fisheries than in the statistical area 112-16 fishery over comparable strata. In the statistical area 112-16 fisheries, a larger variety of reporting groups was present earlier in the season (statistical weeks 26–29), with no single group dominant. Both areas showed an increase in fish from the *Chilkat* reporting group later in the season (statistical weeks 32–35) in 2013.

In 2013, the high abundance of pink salmon led to increases in both time and area available for the Icy Strait/northern Chatham Strait purse seine fisheries, resulting in different stock compositions compared to the low pink salmon abundance years of 2012 and 2014. In the 112-14/114-27 fisheries, the open area was extended beyond the Point Augusta Index Area within statistical area 112-14 and included adjacent statistical area 114-27. The fishery was also extended later into the season (to statistical week 35) than in 2012 and 2014. In statistical area 112-16, in addition to the Hawk Inlet test fisheries, common property fishing occurred in the portion of statistical area 112-16 south of Point Marsden, and included the Hawk Inlet shoreline north of Point Marsden beginning in late July. This fishery was also extended later in the season in 2013 (to statistical week 35) than in 2012 and 2014 when only the test fisheries were conducted (in statistical weeks 26–29). Additional areas throughout northern Chatham Strait were also opened to purse seine fishing in the 2013 season. Given these differences, there is much more information available by statistical week for that year, and it is not surprising that there are some stock composition differences compared to 2012 and 2014. For example, there was a larger proportion of fish from the *Chilkat* reporting group in 2013 for both fisheries, while this group made up a small proportion of the 2012 and 2014 fisheries. This is expected; Chilkat Lake sockeye salmon exhibit later run timing compared to other major northern Southeast stocks (McPherson 1990) and fisheries were extended later into the season when maximum numbers of this stock would likely be present. In addition, there were higher proportions of the *Chatham Small* reporting group in both fisheries in 2013 than were observed in 2012 and 2014.

The higher proportion of the *Chatham Small* reporting group in 2013 allowed for more detailed analysis of the harvest contribution by the 3 populations within that group. A fine-scale analysis of the 2013 fisheries was only possible because 1) the *Chatham Small* reporting group was present at greater than 5% of the total season harvest, 2) large sample sizes were available throughout the season, and 3) the 3 populations are highly identifiable in the baseline. Within the *Chatham Small* group, *Hasselborg* was the greatest contributor in both the 112-14/114-27 (8.5%) and 112-16 (10.1%) fisheries in 2013, whereas *Kanalku* and *Pavlof* contributed < 1.0% to those fisheries.

The large numbers of *Hasselborg* sockeye salmon present in the 2013 harvest was unexpected, although relatively little is known about the characteristics or magnitude of the sockeye salmon run to Hasselborg River, the outlet to a large lake in the interior of Admiralty Island. Hasselborg River flows into the Salt Lake estuary at the extreme east end of Mitchell Bay. Two waterfalls prevent sockeye salmon from reaching the Hasselborg Lake, and the Salt Lake estuary is separated from the rest of Mitchell Bay by a tidal falls. Sockeye salmon spawn in the Hasselborg River, along with pink, chum, and one of the largest coho salmon (*O. kisutch*) runs on Admiralty Island. Escapement information is limited to survey counts conducted in various years by boat, airplane, and helicopter and on foot, and are not considered a reliable estimate of total escapement (Bednarski et al. 2013), which would be much greater than a one-day survey count. Maximum annual survey counts ranged from 2 to 9,000 sockeye salmon and there were numerous counts of 2,000 or more fish (Conitz and Cartwright 2002), although surveyors often noted difficulty in distinguishing sockeye and coho salmon in the system. It is likely that the Hasselborg sockeye salmon run is larger than previously believed and much larger than the Kanalku run.

In 2013, the proportions of *Kanalku* sockeye salmon present in the fisheries were very small compared to other stock groups, which is not surprising given the relatively small escapements to this system. The total escapement (i.e., fish that entered the system and were counted at a weir below the Kanalku falls) ranged from 1,938 to 2,289 fish over the 3 years of this study (Bednarski et al. *In prep*). The spawning escapement (i.e., fish counted at a weir above the Kanalku falls) has averaged 1,201 fish annually since 2001, with a range of 250 to 2,970 fish. Although we were not able to track the weekly timing of Kanalku sockeye salmon through the fisheries, the run timing of Kanalku fish may be earlier than some other stocks. From 1985 to 2013, reported annual subsistence harvests in Kanalku Bay were 80% complete by 20 July (Bednarski et al. *In prep*), when an average of approximately 28% of the total purse seine harvest of sockeye salmon in Districts 112 and 114 had occurred.

Although this project provided highly precise stock-specific estimates of sockeye salmon harvested in purse seine fisheries in Icy Strait and northern Chatham Strait, some aspects of these results should be interpreted cautiously. It is important to note some precision and accuracy considerations, including 1) the size and representativeness of the harvest samples, 2) the representation of contributing populations in the baseline, and 3) the ability of the statistical method to estimate stock composition.

First, not all of the harvest was sampled in all years (Table 4). However, the size, timing, and location of these harvests suggest the *Chatham Small* stock group would be present in low proportions in some of those unsampled fisheries. In 2012 and 2014, the unsampled harvests occurred almost entirely within the Hidden Falls Hatchery terminal harvest area in fisheries targeting enhanced chum salmon in southern District 112. Hidden Falls is located on the Baranof Island shore farther south than where the northern Chatham stocks are located. There was additional unsampled harvest in September 2014 targeting wild Excursion River fall chum salmon on the northern shore of Icy Strait in District 114. The Excursion Inlet fisheries occur in late August and early September when escapements to the northern Chatham systems are largely completed. In 2013 the majority of unsampled harvests occurred along the shorelines of Baranof and Chichagof islands, and the Admiralty Island shoreline south of Angoon. Although harvests from these fisheries likely contain Chatham Strait sockeye stocks, proportions of the *Chatham Small* reporting group may be low due to their locations on the western side of Chatham Strait (Baranof and Chichagof island shorelines), and/or being south of the sockeye systems important to Angoon (Baranof and southern Admiralty island shorelines). In 2013, additional unsampled sockeye salmon were harvested in the far western portion of District 114 in a fishery directed at Port Althorp pink salmon, and in late August openings targeted wild Excursion River fall chum salmon. The number of northern Chatham sockeye salmon in these harvests is probably very low due to the small size of the harvest in Port Althorp, and the timing of the Excursion Inlet fisheries when escapements to the northern Chatham systems are largely completed.

Second, although the baseline contains samples from all major contributing stocks and most minor stocks, it is likely that some very small stocks are not represented in the baseline. This could lead to some misallocation of fish to the incorrect reporting group during analysis, although this effect is probably small given the overall representation of stocks in the baseline (Rogers Olive et al. *In prep*).

Finally, the accuracy of the statistical method is influenced by biases in the allocation of contributions to populations in the baseline, and the precision of the estimates is driven by a combination of sample size and genetic distinction among reporting groups. Fortunately, reporting groups have been shown to be highly identifiable, and biases for each reporting group are characterized by proof tests (Rogers Olive et al. *In prep*). In addition, the precision of the estimates is well characterized by the posterior distribution of the estimate and summarized in the results with 90% credibility intervals and standard deviations. All of these considerations should guide the interpretation of the estimates reported herein.

Although the information provided in this report could be considered in future management decisions, additional years of sampling and analysis would certainly increase confidence in application of the results. Additional studies would be extremely helpful, particularly during odd-year, high-abundance pink salmon runs, and future studies would be greatly improved through sampling of fisheries along the eastern Chichagof Island shoreline, closer to the origin of several of the sockeye salmon stocks important to the community of Angoon. This study does provide a good picture of the commercial harvest in 2013 and, combined with the results from the more restricted fisheries in 2012 and 2014, suggests some general patterns regarding stock presence, run timing, and contribution of Chatham Strait sockeye salmon stocks to harvests in northern Chatham Strait commercial fisheries.

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This report represents a tremendous amount of work accomplished by many dedicated people. We thank the following members of the Gene Conservation Laboratory team: Heather Hoyt, Zac Grauvogel, Paul Kuriscak, Heather Liller, Hans Thompson, April Rochford, Christina Cupp, Zach Pechacek, Erica Chenoweth, and Judy Berger. We would like to thank members of our port sampling team, especially Anne Reynolds, Antonio Florendo, Jacob Ross, Mackenzie Oliver, Tessa Minicucci, Rhea Ehresmann, Ricky Riddle, Brandi Adams, and Iris Frank, and many other Alaska Department of Fish and Game employees for their assistance with the collection and analysis of fishery samples.

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TABLES AND FIGURES

Table 1.–Source and assay name for the 96 single nucleotide polymorphisms (SNPs) used in the Southeast Alaska sockeye baseline and in the analysis of samples from the seine fishery harvests in Districts 112 and 114 in 2012–2014. Linked loci that were combined as haplotypes and loci that were dropped are noted.

Assay	Source[a]	Assay	Source[a]	Assay	Source[a]
One_ACBP-79	A	*One_Ots208-234*	C	*One_U1101*	B
One_agt-132	B	*One_Ots213-181*	A	*One_U1103*	B
One_aldB-152	C	*One_p53-534*	A	*One_U1105*	B
One_apoe-83	B	*One_pax7-248*	C	*One_U1201-492*	B
One_c3-98[b]	B	*One_PIP*	D	*One_U1202-1052*	B
One_CD9-269	B	*One_Prl2*	A	*One_U1203-175*	B
One_cetn1-167	B	*One_rab1a-76*	B	*One_U1204-53*	B
One_CFP1	D	*One_RAG1-103*	A	*One_U1205-57*	B
One_cin-177	C	*One_RAG3-93*	A	*One_U1206-108*	B
One_CO1[c]	A	*One_redd1-414*	C	*One_U1208-67*	B
One_ctgf-301	A	*One_RFC2-102*[c]	A	*One_U1209-111*	B
One_Cytb_17[c]	A	*One_RFC2-285*	A	*One_U1210-173*	B
One_Cytb_26[c]	A	*One_rpo2j-261*	C	*One_U1212-106*	B
One_E2-65	A	*One_sast-211*	C	*One_U1214-107*	B
One_gdh-212	C	*One_spf30-207*	C	*One_U1216-230*	B
One_GHII-2165	A	*One_srp09-127*	C	*One_U301-92*	A
One_ghsR-66	C	*One_ssrd-135*	C	*One_U401-224*	A
One_GPDH-20	A	*One_STC-410*	A	*One_U404-229*	A
One_GPDH2-187[d]	A	*One_STR07*	A	*One_U502-167*	A
One_GPH-414	A	*One_SUMO1-6*	C	*One_U503-170*	A
One_HGFA-49	A	*One_sys1-230*	C	*One_U504-141*	A
One_HpaI-71	A	*One_taf12-248*	C	*One_vamp5-255*	C
One_HpaI-99	A	*One_Tf_ex11-750*	A	*One_vatf-214*	C
One_hsc71-220	A	*One_Tf_in3-182*	A	*One_VIM-569*	A
One_Hsp47	D	*One_tshB-92*	C	*One_ZNF-61*	A
One_IL8r-362	A	*One_txnip-401*	C	*One_Zp3b-49*	A
One_KCT1-453	B	*One_U1003-75*	B	*One_CO1_Cytb17_26*[c]	
One_KPNA-422	A	*One_U1004-183*	B		
One_LEI-87	A	*One_U1009-91*	B		
One_lpp1-44	B	*One_U1010-81*	B		
One_metA-253	C	*One_U1012-68*	B		
One_MHC2_190	A	*One_U1013-108*	B		
One_MHC2_251[d]	A	*One_U1014-74*	B		
One_Mkpro-129	C	*One_U1016-115*	B		
One_ODC1-196	B	*One_U1024-197*	B		

[a] A = Gene Conservation Laboratory of the Alaska Department of Fish and Game; B = International Program for Salmon Ecological Genetics at the University of Washington; C = Hagerman Genetics Laboratory of the Columbia River Inter-Tribal Fish Commission; and D = Molecular Genetics Laboratory at the Canadian Department of Fisheries and Oceans.

[b] These SNPs were dropped due to nonconformance to Hardy-Weinberg expectations.

[c] These SNPs were combined into haplotypes and treated together as a single locus, *One_CO1_Cytb17_26*.

[d] These SNPs were dropped due to linkage.

Table 2.–Tissue collections of sockeye salmon used for the genetic baseline, including the reporting group (broad-scale and fine-scale) and population location.

Population No.	Reporting Group Broad-scale	Fine-scale	Collection Location
1	*Other*	*Other*	Bainbridge Lake
2			Coghill Lake
3			Eshamy Lake
4			Main Bay
5			Miners Lake
6			Bering Lake
7			Clear Creek at 40 Mile
			Eyak Lake
8			Hatchery Creek
9			Middle Arm
10			South beaches
			Gulkana River
11			Fish Creek
12			East Fork
13			Klutina Lake Inlet
			Klutina River
14			Mainstem
15			Banana Lake
16			Bear Hole
17			Kushtaka Lake
18			Long Lake weir
19			Mahlo River
20			Martin Lake
21			Martin River Slough
22			McKinley Lake (2007)
23			McKinley Lake (2008)
24			Salmon Creek
25			Salmon Creek - Bremner
26			Mendeltna Creek
27			Mentasta Lake
28			Paxson Lake Outlet
29			St. Anne Creek
30			Steamboat Lake - Bremner
31			Swede Lake
32			Tanada Creek weir
			Tanada Lake
33			lower outlet
34			shore
35			Tebay River - Outlet
36			Tokun Lake
37			Tonsina Lake
38	*NSEAK*	*NSEAK*	Ahrnklin River
39			Akwe River
40			Dangerous River
41			East Alsek River
42			Lost/Tahwah Rivers
43			Old Situk River
44			Mountain Stream
45			Situk Lake

-continued-

Table 2.–Page 2 of 4.

Population	Reporting Group		
No.	Broad-scale	Fine-scale	Collection Location
46	*NSEAK* (cont)	*NSEAK* (cont)	Blanchard River
47			Border Slough
48			Klukshu River
49			Upper Tatshenshini River
50			Tatshenshini - Kwatini River
51			Neskataheen Lake
52			Tweedsmuir River
53			Vern Ritchie
54	*Chilkat*	*Chilkat*	Chilkat Lake
			Chilkat River
55			Mosquito Lake
56			Bear Flats
57			Mule Meadows
	Chilkoot	*Chilkoot*	Chilkoot Lake
58			Beaches
59			Bear Creek
60			Chilkoot River
61	*NSEAK* (cont)	*NSEAK* (cont)	Berners Bay
62			Lace River
63			Steep Creek
64			Windfall Lake
65			Lake Creek - Auke Creek Weir
66			Crescent Lake
67	*Speel*	*Speel*	Speel Lake
68			Snettisham Hatchery
69	*NSEAK* (cont)	*NSEAK* (cont)	Vivid Lake
70			Bartlett River
71			North Berg Bay Inlet
72			Neva Lake
73	*Chatham Large*	*Chatham Large*	Sitkoh Lake
74			Lake Eva
75			Kook Lake
76	*Chatham Small*	*Pavlof*	Pavlof Lake
77		*Hasselborg*	Hasselborg Lake
78		*Kanalku*	Kanalku Lake
79	*NSEAK* (cont)	*NSEAK* (cont)	Kutlaku Lake
80			Hoktaheen Lake
81			Falls Lake
82			Ford Arm Creek
83			Klag Bay
84			Redfish Lake
85			Salmon Lake weir
86			Redoubt Lake
87			Benzeman Lake
88	*Taku Lakes*	*Taku Lakes*	King Salmon Lake
89			Little Tatsamenie
90			Little Trapper Lake
91			Kuthai Lake
92			Tatsamenie Lake

-continued-

Table 2.–Page 3 of 4.

Population	Reporting Group		
No.	Broad-scale	Fine-scale	Collection Location
93	*Taku/Stikine Mainstem*	*Taku/Stikine Mainstem*	Hackett River
94			Nahlin River
95			Tulsequah River
96			Yellow Bluff Slough
97			Sustahine Slough
98			Taku River
99			Takwahoni/Sinwa Creek
100			Tuskwa/Chunk Slough
101			Fish Creek
102			Yehring Creek
103			Shakes Slough
104			Iskut River
105			Verrett River
106			Scud River
107			Andy Smith Slough
108			Devil's Elbow
109			Chutine River
110			Chutine Lake
111			Christina Lake
112	*Other* (cont)	*Other* (cont)	Tahltan Lake (1990)
113			Tahltan Lake (2006)
114			Hugh Smith Lake
115			McDonald Lake
116			Hatchery Creek – Sweetwater Lake
117			Kah Sheets Lake
118			Kunk Lake
119			Luck Lake
120			Big Lake
121			Mill Creek Weir
122			Petersburg Lake
123			Red Bay Lake
124			Salmon Bay Lake
125			Shipley Lake
126			Thoms Lake
127			Sarkar Lakes
128			Heckman Lake
129			Helm Lake
130			Karta River
131			Kegan Lake
132			Mahoney Creek
133			Unuk River
134			Fillmore Lake
135			Klakas Lake
136			Bar Creek - Essowah Lake
137			Eek Creek
138			Middle run
139			Early run
140			Hetta Lake
141			Klawock River
142			Bowser Lake

-continued-

Table 2.–Page 4 of 4.

Population No.	Reporting Group: Broad-scale	Reporting Group: Fine-scale	Collection Location
143	*Other* (cont)	*Other* (cont)	Damdochax Creek
144			Meziadin Lake
145			Tintina Creek
146			Alastair Lake
147			Four Mile Creek
148			Fulton River
149			Kitsumkalum Lake
150			Lower Tahlo River
151			McDonell Lake
152			Nangeese River
153			Nanika River
154			Slamgeesh River
155			Sustut River - Johanson Lake
156			Swan Lake
157			Upper Babine River
158			Naden River
159			Kitlope Lake
160			Baker Lake
161			Issaquah Creek
162			Cedar River
163			Adams River
164			Birkenhead River
165			Chilko Lake
166			Gates Creek
167			Harrison River
168			Horsefly River
169			Raft River
170			Stellako River
171			Weaver Creek

Note: Collection details are available in Rogers Olive et al. *In prep*.

Table 3.–Fishery type and location of sockeye salmon mixed fishery samples from 2012–2014 including statistical area, project sample goal, and total number of samples collected.

				Number Collected		
Fishery	Location	Statistical Area	Sample Goal	2012	2013	2014
Purse Seine	Hawk Inlet	112-16	2,400	376[a]	1,815[b]	347[a]
Purse Seine	Augusta/Whitestone	112-14/114-27	3,000	1,180/None	2,358[c]	636/None
Total			5,400	1,556	4,173	983

[a] Samples taken were from the test fishery; no common property fishery took place.

[b] Samples taken were from both the test fishery and common property fisheries.

[c] Samples were from Districts 112-14 and 114-27 combined; it was not possible to sample these separately.

Table 4.–Harvest of sockeye salmon by statistical week in northern Chatham Strait purse seine fisheries, 2012–2014. Fishery areas include statistical areas 112-14 traditional fisheries; 112-16 test fishery only; 112-16 traditional fishery; traditional fisheries in District 112 on the Chichagof, Baranof, and Admiralty shorelines; 112-22 Hidden Falls terminal hatchery harvest; 114-27 traditional; and traditional fisheries in all other areas in District 114 combined. Numbers in bold were sampled and thus represented in genetic mixed stock analyses.

		Fishery Area								
Year	Statistical Week	112-14	112-16 Test	112-16	112-Chichagof	112-Baranof	112-Admiralty	112-22 Hidden Falls	114-27	114-Other
2012	25	0						5		
	26	**651**	**196**					133		
	27	**288**	**147**					217		
	28	**433**	**601**					365		
	29	**2,065**	**882**					307		
	30	**1,996**						427		
	31	**509**						79		
	32	**35**						207		
	33									
	34									
	35						2			
	36									
	Total Harvest	5,977	1,826	0	0	0	2	1,740	0	0
2013	25	**369**			3			810		
	26	**774**	515		84			985		
	27	**1,814**	**216**		810	190		1,498		
	28	**650**	**480**		1,586	455		310	**2,355**	
	29	**388**	**694**	**765**	860	308		460	**2,826**	
	30	**206**		**5,257**	3,895	278		167	**3,152**	
	31	**435**		**7,860**	578	700	14	58	**1,239**	
	32	**161**		**3,240**	23	106	595	6	**657**	114
	33	**0**		**3,715**	0	19	203		**680**	
	34	**286**		**2,592**	0	3	116	0	58	0
	35	0		**51**	0	51	16	8	0	345
	36					4	0	0		0
	Total Harvest	5,083	1,905	23,480	7,839	2,114	944	4,302	10,967	459
2014	25	0						64		
	26	**123**	**944**					81		
	27	**404**	**500**					336		
	28	**1,049**	**195**							
	29	**271**	**412**							
	30	**1,116**						20		
	31	**406**						0		
	32	**235**						0		
	33									
	34									
	35									
	36									284
	Total Harvest	3,604	2,051	0	0	0	0	501	0	284

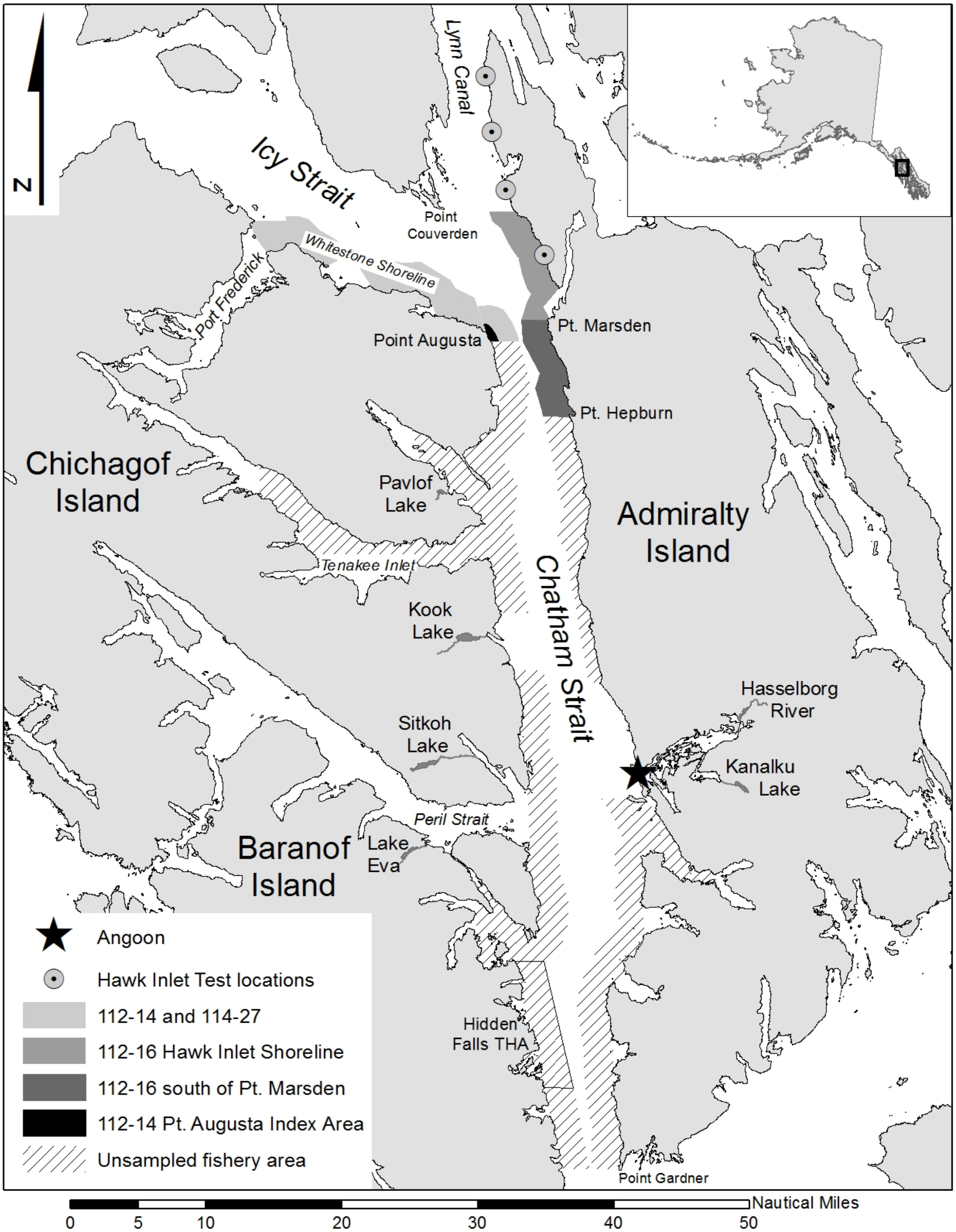

Figure 1.–Map showing the Districts 112 and 114 purse seine fishery locations in northern Southeast Alaska.

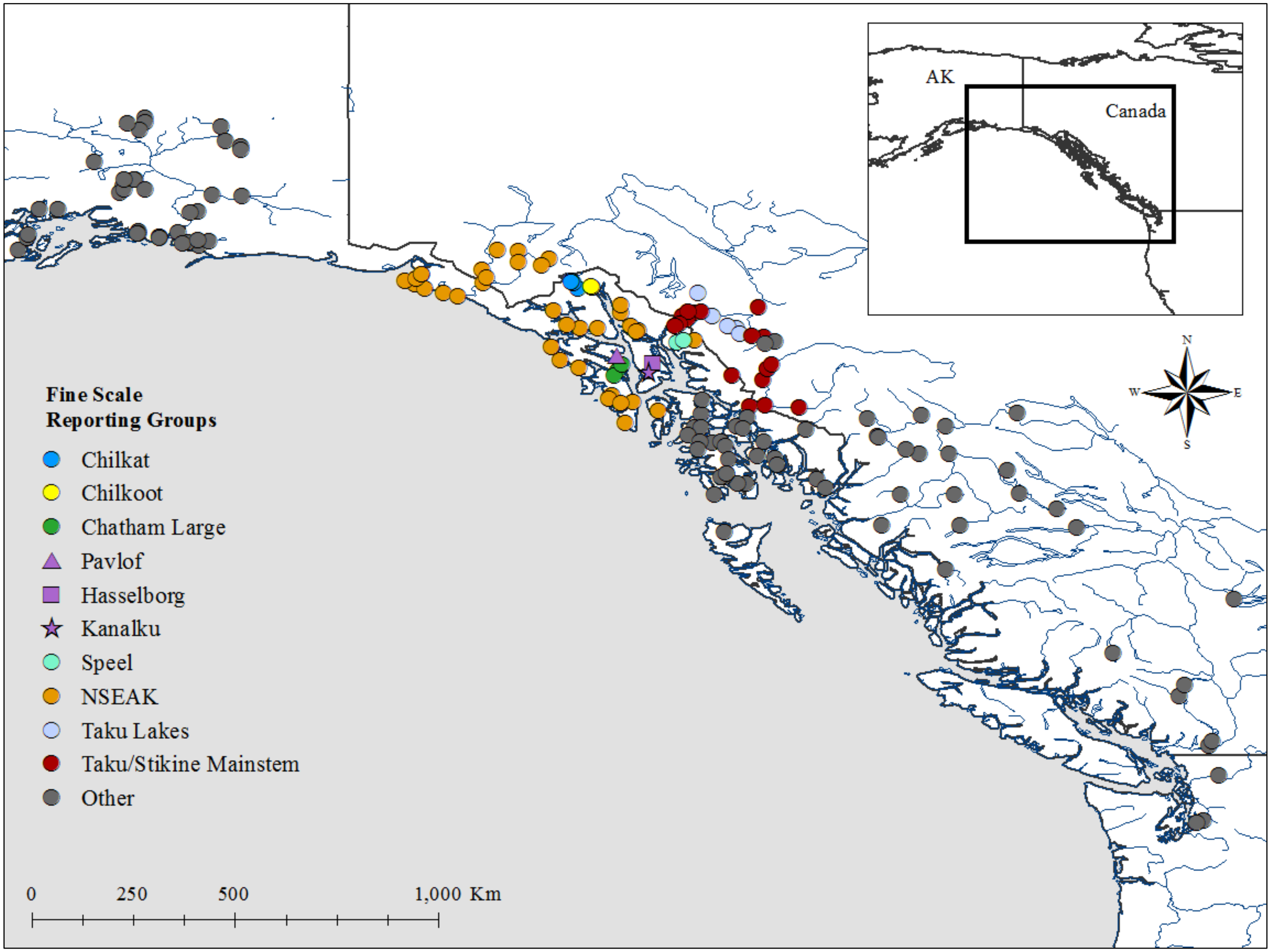

Figure 2.–The location and fine-scale reporting group affiliation of populations of sockeye salmon included in the Chatham Strait fishery analysis. The *Chatham Small* broad-scale reporting group is represented in purple, with each individual fine-scale group represented as a unique shape.

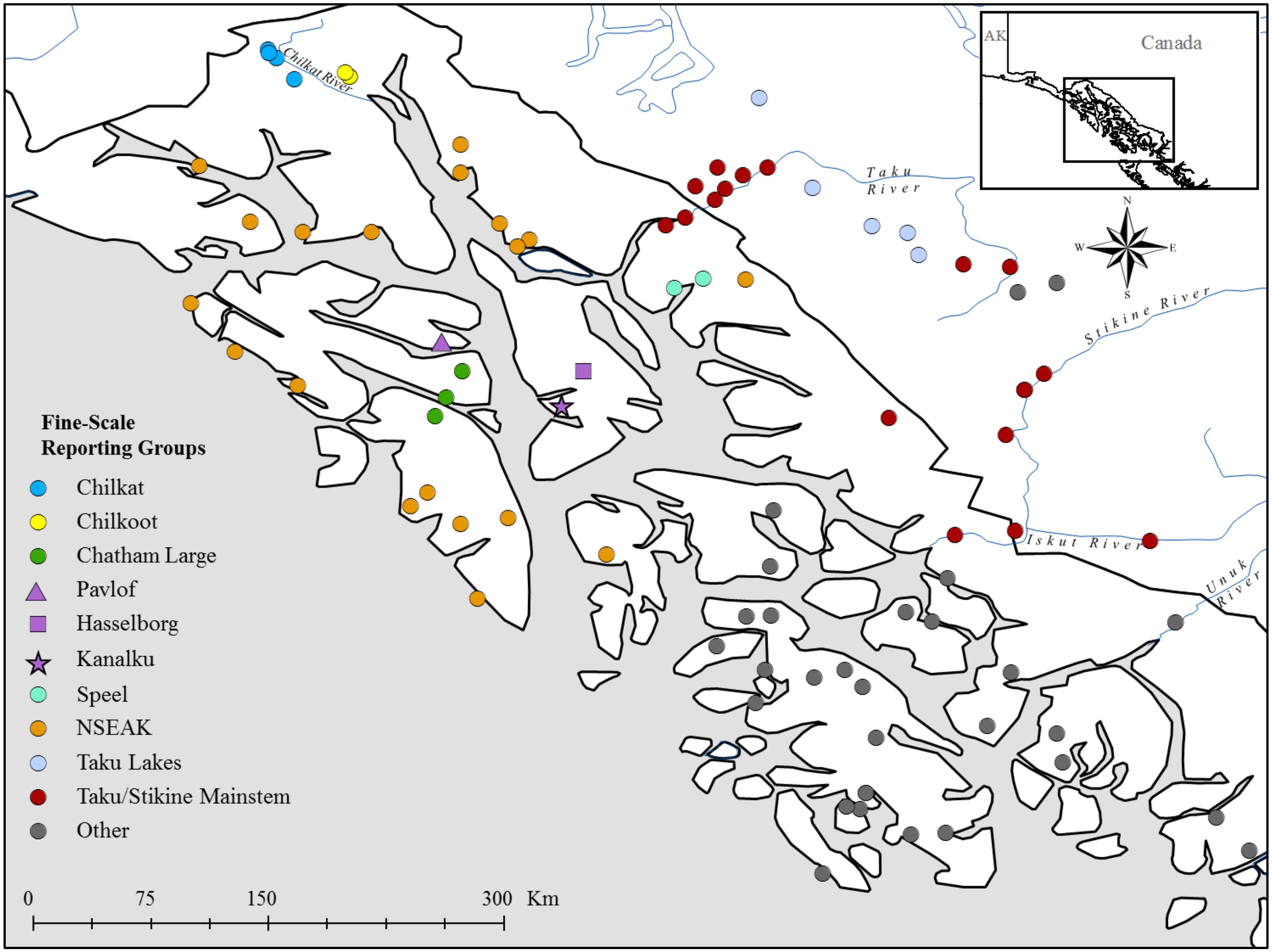

Figure 3.–The location and fine-scale reporting group affiliation of southeast Alaska sockeye salmon included in the Chatham Strait fishery analysis. The *Chatham Small* broad-scale reporting group is represented in purple, with each individual fine-scale group represented as a unique shape.

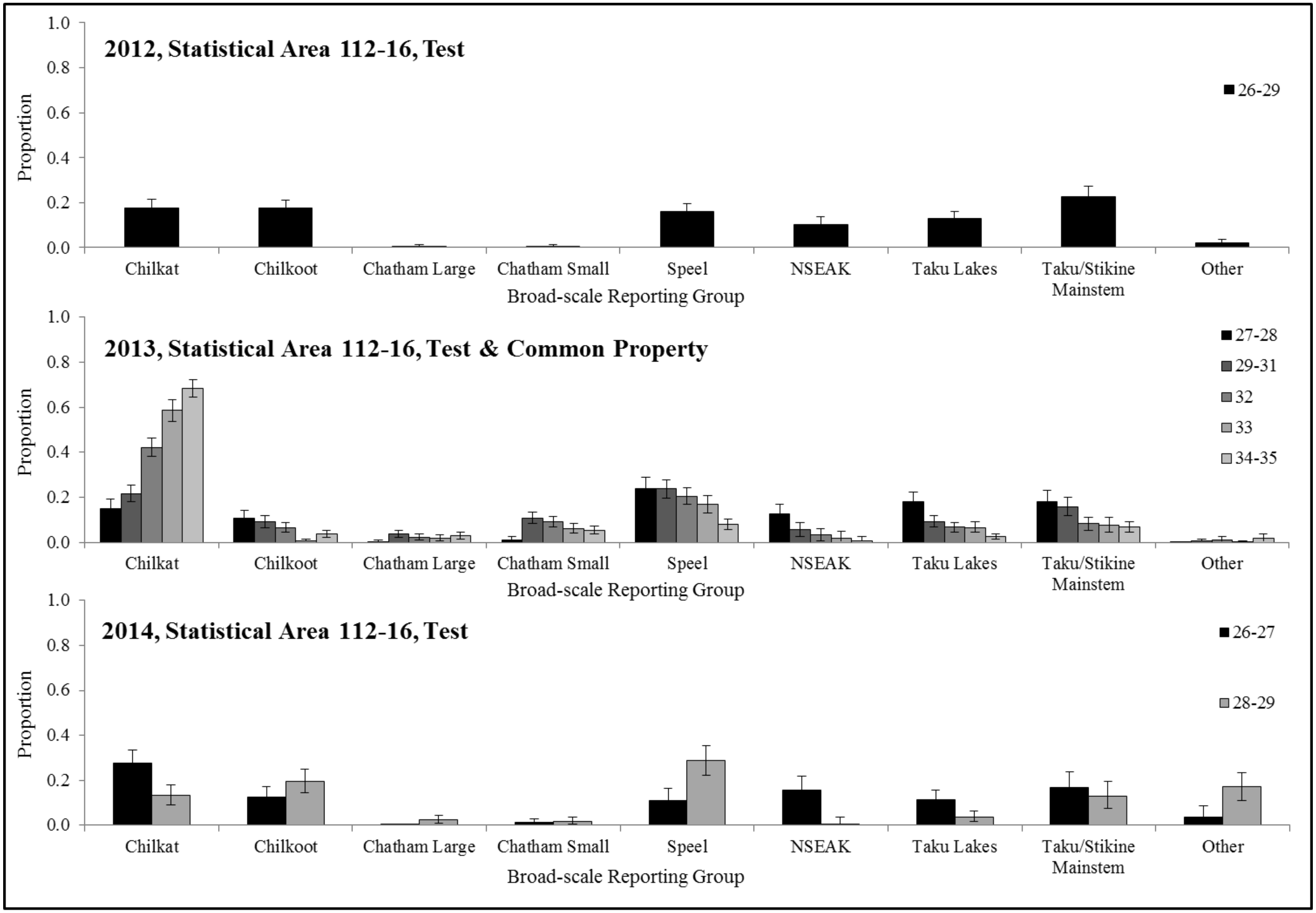

Figure 4.–Proportional stock composition estimates (and 90% credibility intervals) of sockeye salmon harvested in statistical area 112-16 test and common property commercial purse seine fisheries, by statistical week (noted in legends) for 2012–2014.

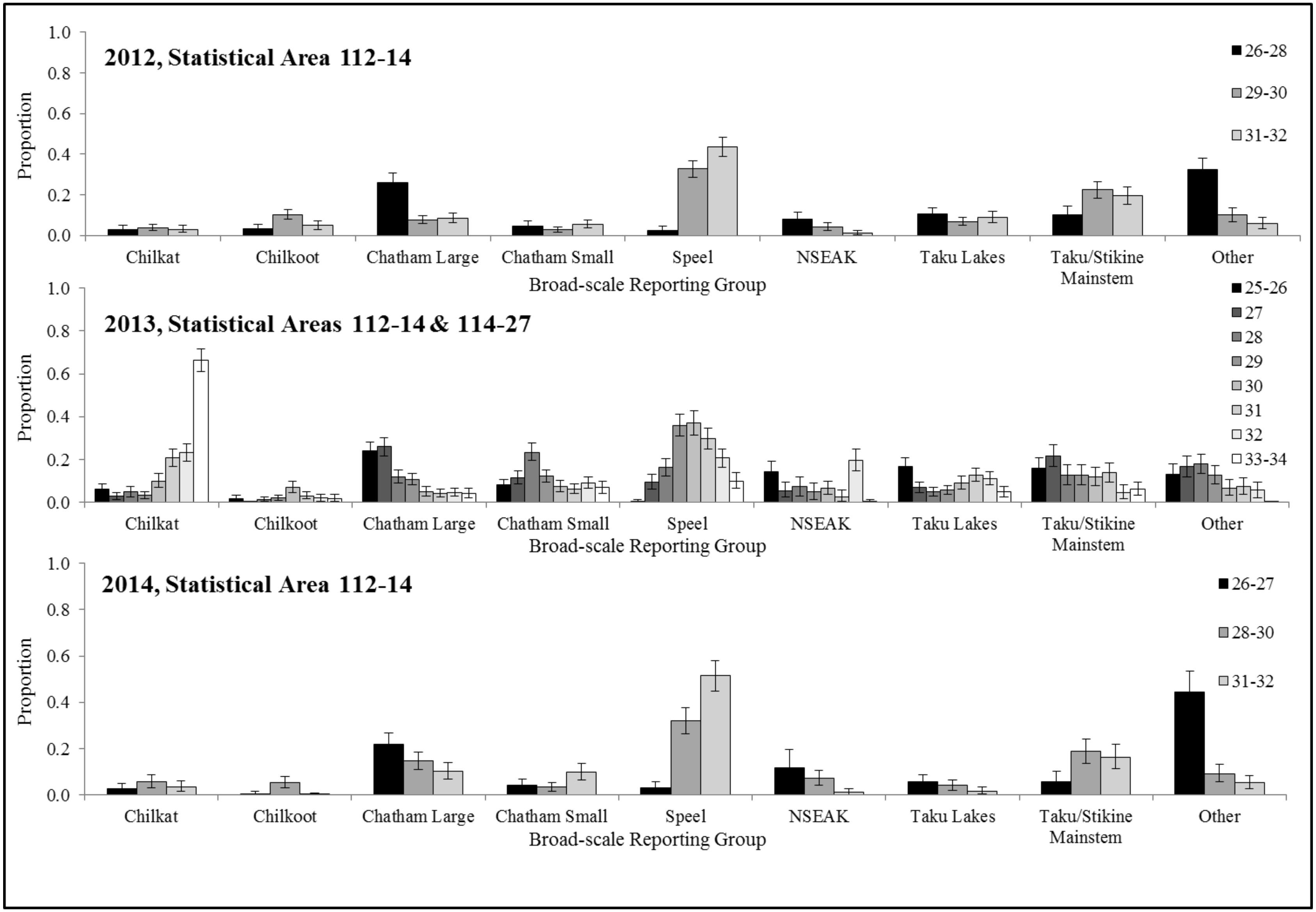

Figure 5.–Proportional stock composition estimates (and 90% credibility intervals) of sockeye salmon harvested in statistical areas 112-14, and 112-14 and 114-27 commercial purse seine fisheries, by statistical week (noted in legend) for 2012–2014.

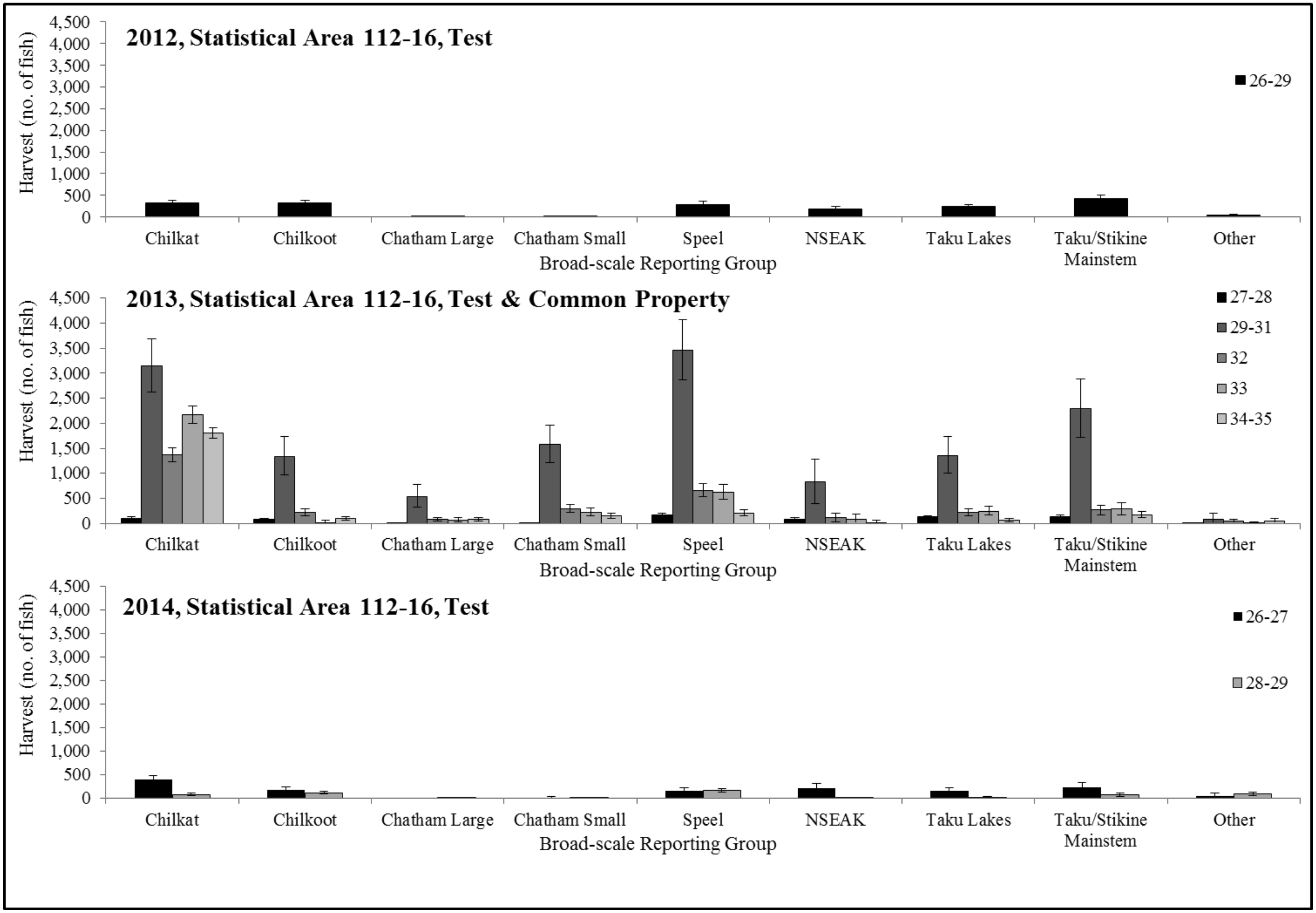

Figure 6.–Stock composition estimates applied to harvest (and 90% credibility intervals) of sockeye salmon harvested in statistical area 112-16 by statistical week (noted in legend) for 2012–2014.

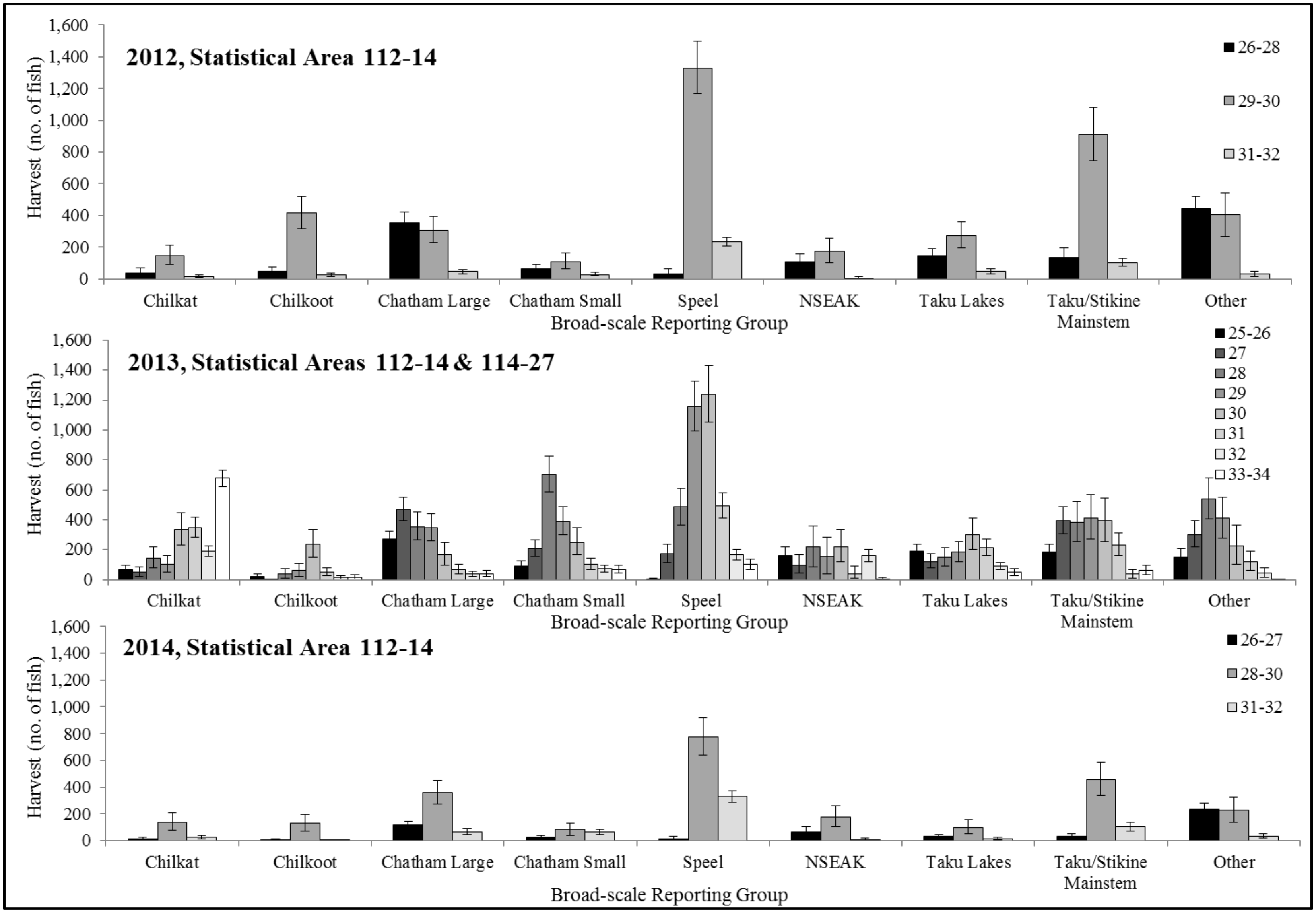

Figure 7.–Stock composition estimates applied to harvest (and 90% credibility intervals) of sockeye salmon harvested in statistical area 112-14, and combined 112-14 and 114-27 by statistical week (noted in legend) for 2012–2014.

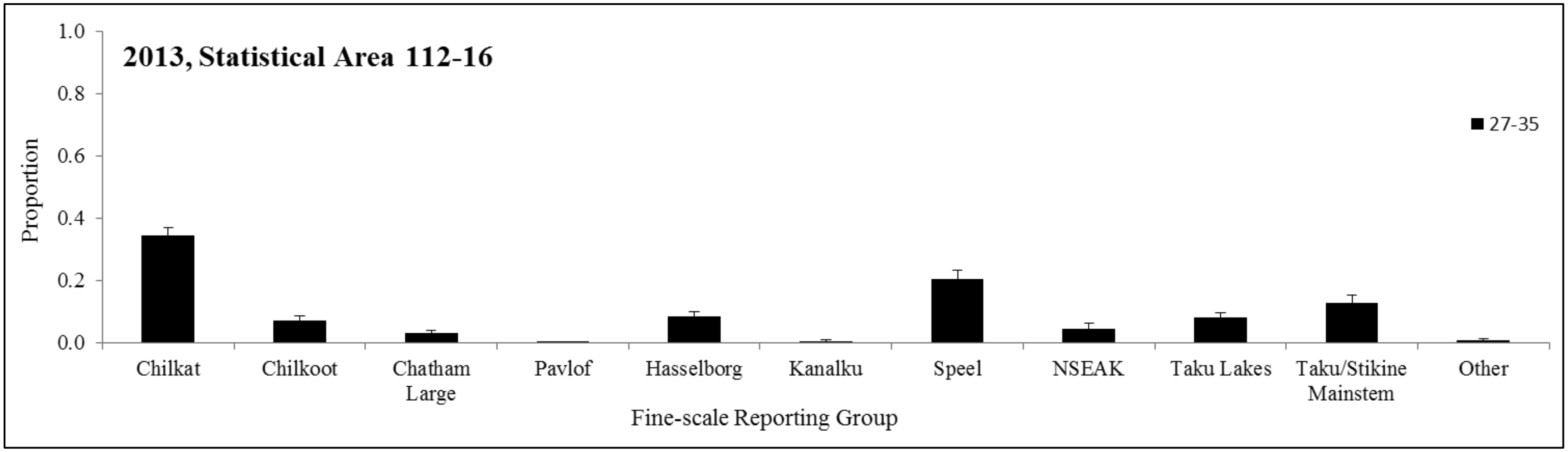

Figure 8.–Fine-scale reporting group proportional stock composition estimates (and 90% credibility intervals) of sockeye salmon harvested in in statistical area 112-16 test and common property commercial purse seine fisheries for the 2013 season (all statistical weeks combined).

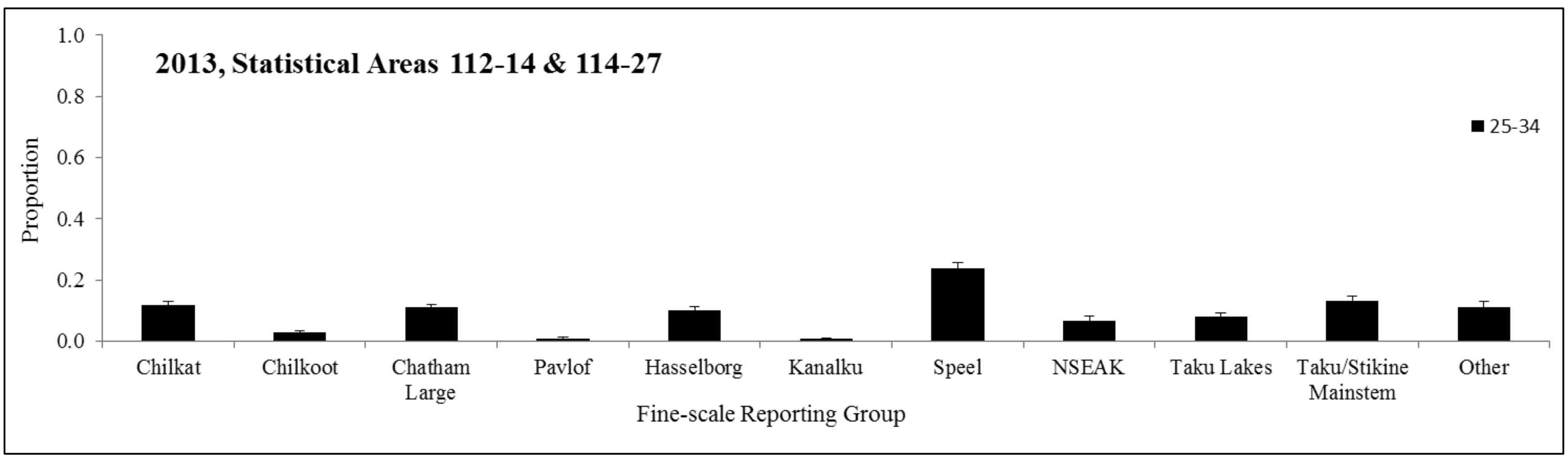

Figure 9.–Fine-scale reporting group proportional stock composition estimates (and 90% credibility intervals) of sockeye salmon harvested in statistical areas 112-14 and 114-27 commercial purse seine fisheries for the 2013 season (all statistical weeks combined).

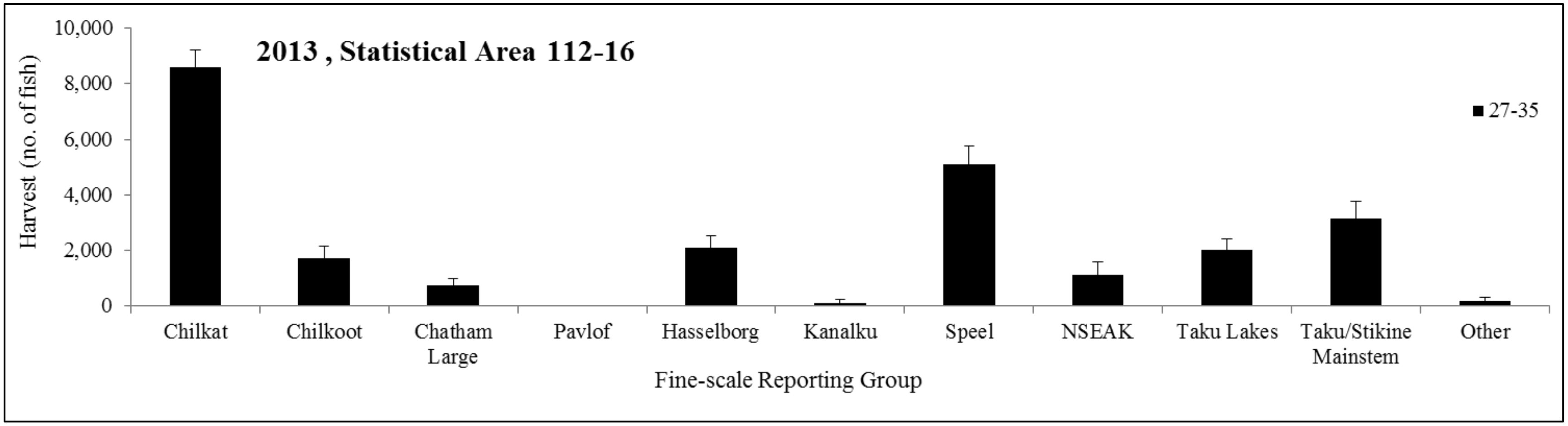

Figure 10.–Estimated harvest of sockeye salmon from fine-scale reporting groups (and 90% credibility intervals) in statistical area 112-16 test and common property commercial purse seine fisheries for the 2013 season (all statistical weeks combined).

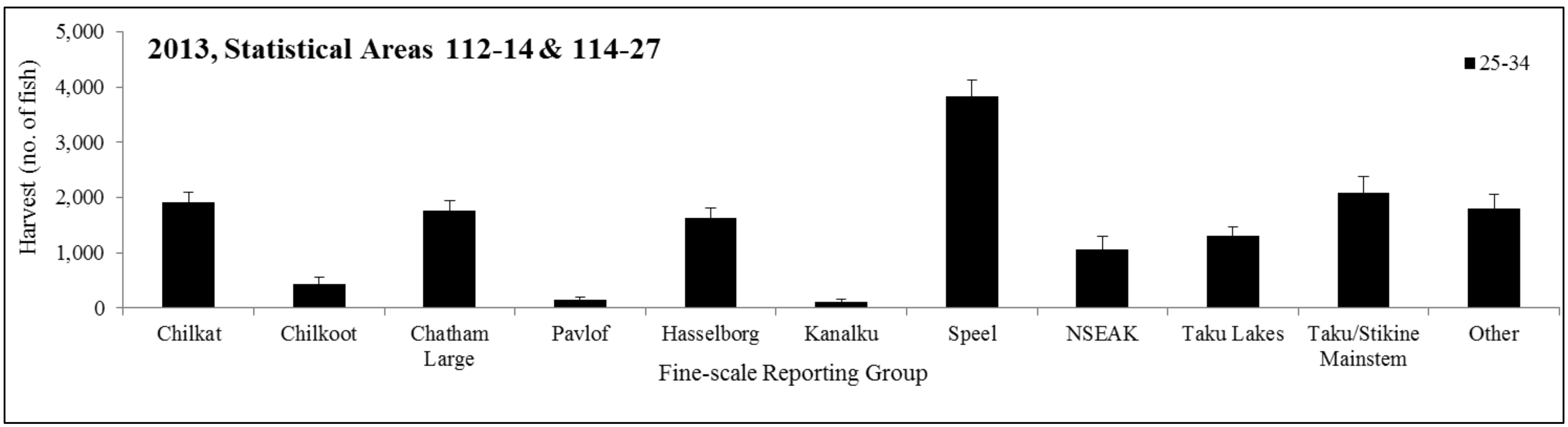

Figure 11.–Estimated harvest of sockeye salmon from fine-scale reporting groups (and 90% credibility intervals) in statistical areas 112-14 and 114-27 for the 2013 season (all statistical weeks combined).

APPENDIX A: STATISTICAL WEEKS

Appendix A1.–Statistical weeks defined for ADF&G commercial fishery sampling and analysis for the 2012, 2013, and 2014 fisheries.

	2012		2013		2014	
Statistical week	Start Date	End Date	Start Date	End Date	Start Date	End Date
25	17-Jun	23-Jun	16-Jun	22-Jun	15-Jun	21-Jun
26	24-Jun	30-Jun	23-Jun	29-Jun	22-Jun	28-Jun
27	1-Jul	7-Jul	30-Jun	6-Jul	29-Jun	5-Jul
28	8-Jul	14-Jul	7-Jul	13-Jul	6-Jul	12-Jul
29	15-Jul	21-Jul	14-Jul	20-Jul	13-Jul	19-Jul
30	22-Jul	28-Jul	21-Jul	27-Jul	20-Jul	26-Jul
31	29-Jul	4-Aug	28-Jul	3-Aug	27-Jul	2-Aug
32	5-Aug	11-Aug	4-Aug	10-Aug	3-Aug	9-Aug
33	12-Aug	18-Aug	11-Aug	17-Aug	10-Aug	16-Aug
34	19-Aug	25-Aug	18-Aug	24-Aug	17-Aug	23-Aug
35	26-Aug	1-Sep	25-Aug	31-Aug	24-Aug	30-Aug
36	2-Sep	8-Sep	1-Sep	7-Sep	31-Aug	6-Sep

APPENDIX B: REPEATED PROOF TEST RESULTS

Appendix B1.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Chilkat* broad-scale reporting group (i.e., 100% proof tests).

	Chilkat Test 1				Chilkat Test 2				Chilkat Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	**0.995**	**0.986**	**1.000**	**0.005**	**0.995**	**0.985**	**1.000**	**0.005**	**0.995**	**0.985**	**1.000**	**0.005**
Chilkoot	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
NSEAK	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002

	Chilkat Test 4				Chilkat Test 5				Chilkat Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	**0.995**	0.986	1.000	0.005	**0.995**	0.985	1.000	0.005	**0.995**	0.985	1.000	0.005
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002
NSEAK	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002

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Reporting Group	Chilkat Test 7 Proportion	Lower	Upper	SD	Chilkat Test 8 Proportion	Lower	Upper	SD	Chilkat Test 9 Proportion	Lower	Upper	SD
Chilkat	**0.995**	0.986	1.000	0.005	**0.995**	0.985	1.000	0.005	**0.995**	0.985	1.000	0.005
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
NSEAK	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002

Reporting Group	Chilkat Test 10 Proportion	Lower	Upper	SD
Chilkat	**0.995**	0.985	1.000	0.005
Chilkoot	0.000	0.000	0.003	0.001
Chatham Large	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.007	0.003
Speel	0.001	0.000	0.003	0.002
NSEAK	0.000	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.000	0.000	0.003	0.002
Other	0.000	0.000	0.003	0.002

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B2.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Chilkoot* broad-scale reporting group (i.e., 100% proof tests).

	Chilkoot Test 1				Chilkoot Test 2				Chilkoot Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chilkoot	**0.995**	0.985	1.000	0.005	**0.995**	0.985	1.000	0.005	**0.995**	0.985	1.000	0.005
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
NSEAK	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002

	Chilkoot Test 4				Chilkoot Test 5				Chilkoot Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chilkoot	**0.995**	0.986	1.000	0.005	**0.994**	0.983	1.000	0.006	**0.995**	0.985	1.000	0.005
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.003	0.002	0.001	0.000	0.007	0.003	0.000	0.000	0.003	0.001
NSEAK	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.000	0.000	0.003	0.001	0.001	0.000	0.004	0.002	0.001	0.000	0.003	0.002
Other	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002

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	Chilkoot Test 7				Chilkoot Test 8				Chilkoot Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Chilkoot	**0.995**	0.986	1.000	0.005	**0.995**	0.986	1.000	0.005	**0.995**	0.985	1.000	0.005
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.005	0.002
NSEAK	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001

	Chilkoot Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002
Chilkoot	**0.995**	0.986	1.000	0.005
Chatham Large	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.001
NSEAK	0.000	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.000	0.000	0.003	0.001
Other	0.000	0.000	0.003	0.001

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B3.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Chatham Large* broad-scale reporting group (i.e., 100% proof tests).

	Chatham Large Test 1				Chatham Large Test 2				Chatham Large Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Chatham Large	**0.995**	0.986	1.000	0.005	**0.995**	0.986	1.000	0.005	**0.995**	0.986	1.000	0.005
Chatham Small	0.001	0.000	0.007	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
NSEAK	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Other	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001

	Chatham Large Test 4				Chatham Large Test 5				Chatham Large Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.002	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Chatham Large	**0.996**	0.986	1.000	0.005	**0.995**	0.986	1.000	0.005	**0.991**	0.977	0.999	0.007
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
NSEAK	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.001	0.000	0.006	0.003
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.001	0.000	0.003	0.002
Other	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.005	0.000	0.015	0.005

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	Chatham Large Test 7				Chatham Large Test 8				Chatham Large Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Large	**0.991**	0.978	0.999	0.007	**0.995**	0.986	1.000	0.005	**0.991**	0.977	0.999	0.007
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.007	0.003
Speel	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.003	0.000	0.012	0.004
NSEAK	0.001	0.000	0.007	0.003	0.000	0.000	0.003	0.002	0.002	0.000	0.010	0.004
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.004	0.002
Other	0.005	0.000	0.015	0.005	0.000	0.000	0.003	0.002	0.001	0.000	0.007	0.003

	Chatham Large Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.001
Chilkoot	0.000	0.000	0.003	0.001
Chatham Large	**0.995**	0.986	1.000	0.005
Chatham Small	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.001
NSEAK	0.000	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.000	0.000	0.003	0.001
Other	0.000	0.000	0.003	0.002

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B4.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Chatham Small* broad-scale reporting group (i.e., 100% proof tests).

	Chatham Small Test 1				Chatham Small Test 2				Chatham Small Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.003	0.000	0.016	0.006
Chilkoot	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Large	0.010	0.002	0.024	0.007	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Small	**0.986**	0.970	0.996	0.008	**0.996**	0.986	1.000	0.005	**0.985**	0.969	0.996	0.008
Speel	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
NSEAK	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.002	0.000	0.012	0.005
Taku Lakes	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.006	0.000	0.020	0.007
Other	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.004	0.002

	Chatham Small Test 4				Chatham Small Test 5				Chatham Small Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002	0.001	0.000	0.005	0.002	0.007	0.000	0.023	0.008
Chilkoot	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Large	0.010	0.002	0.024	0.007	0.003	0.000	0.012	0.005	0.009	0.001	0.023	0.007
Chatham Small	**0.986**	0.969	0.996	0.009	**0.987**	0.972	0.998	0.008	**0.976**	0.956	0.991	0.011
Speel	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
NSEAK	0.001	0.000	0.004	0.002	0.002	0.000	0.011	0.004	0.002	0.000	0.011	0.004
Taku Lakes	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.004	0.000	0.015	0.005	0.003	0.000	0.015	0.006
Other	0.001	0.000	0.003	0.002	0.001	0.000	0.004	0.002	0.001	0.000	0.005	0.002

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	Chatham Small Test 7				Chatham Small Test 8				Chatham Small Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.008	0.003	0.002	0.000	0.011	0.004	0.002	0.000	0.012	0.005
Chilkoot	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Large	0.015	0.004	0.032	0.009	0.003	0.000	0.013	0.005	0.010	0.001	0.024	0.007
Chatham Small	**0.976**	0.956	0.990	0.011	**0.988**	0.972	0.998	0.008	**0.976**	0.955	0.990	0.011
Speel	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
NSEAK	0.001	0.000	0.006	0.003	0.003	0.000	0.014	0.005	0.004	0.000	0.016	0.006
Taku Lakes	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.004	0.000	0.014	0.005	0.001	0.000	0.007	0.003	0.005	0.000	0.019	0.007
Other	0.001	0.000	0.005	0.002	0.001	0.000	0.005	0.003	0.002	0.000	0.009	0.004

	Chatham Small Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.002	0.000	0.011	0.004
Chilkoot	0.001	0.000	0.003	0.002
Chatham Large	0.005	0.000	0.016	0.005
Chatham Small	**0.981**	0.962	0.993	0.010
Speel	0.001	0.000	0.003	0.002
NSEAK	0.004	0.000	0.015	0.006
Taku Lakes	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.005	0.000	0.018	0.006
Other	0.001	0.000	0.008	0.003

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B5.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Speel* broad-scale reporting group (i.e., 100% proof tests).

	Speel Test 1				Speel Test 2				Speel Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.003	0.002	0.001	0.000	0.006	0.003	0.001	0.000	0.008	0.004
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	**0.994**	0.979	1.000	0.007	**0.989**	0.969	0.999	0.010	**0.993**	0.978	1.000	0.007
NSEAK	0.001	0.000	0.003	0.002	0.001	0.000	0.004	0.002	0.001	0.000	0.004	0.002
Taku Lakes	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.002	0.000	0.012	0.005	0.007	0.000	0.024	0.009	0.002	0.000	0.010	0.004
Other	0.001	0.000	0.004	0.002	0.001	0.000	0.004	0.002	0.001	0.000	0.003	0.002

	Speel Test 4				Speel Test 5				Speel Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.007	0.003	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	**0.989**	0.969	1.000	0.010	**0.980**	0.958	0.998	0.012	**0.990**	0.970	1.000	0.010
NSEAK	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.006	0.000	0.023	0.008	0.015	0.000	0.036	0.011	0.006	0.000	0.024	0.008
Other	0.001	0.000	0.004	0.003	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002

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	Speel Test 7				Speel Test 8				Speel Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.003	0.002	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	**0.995**	0.984	1.000	0.006	**0.982**	0.959	0.999	0.013	**0.993**	0.980	1.000	0.007
NSEAK	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.001	0.000	0.005	0.003	0.013	0.000	0.034	0.012	0.002	0.000	0.010	0.004
Other	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002

	Speel Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.007	0.003
Chatham Large	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.007	0.003
Speel	**0.994**	0.980	1.000	0.007
NSEAK	0.001	0.000	0.004	0.002
Taku Lakes	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.001	0.000	0.006	0.003
Other	0.001	0.000	0.004	0.003

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B6.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *NSEAK* broad-scale reporting group (i.e., 100% proof tests).

	NSEAK Test 1				NSEAK Test 2				NSEAK Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.004	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Chatham Large	0.001	0.000	0.008	0.003	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.007	0.003
Speel	0.002	0.000	0.014	0.006	0.001	0.000	0.005	0.020	0.001	0.000	0.003	0.002
NSEAK	**0.974**	0.943	0.996	0.017	**0.975**	0.938	0.999	0.002	**0.989**	0.973	0.998	0.008
Taku Lakes	0.000	0.000	0.003	0.001	0.001	0.000	0.003	0.017	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.013	0.000	0.040	0.014	0.017	0.000	0.049	0.012	0.001	0.000	0.005	0.003
Other	0.006	0.000	0.018	0.006	0.004	0.000	0.030	0.003	0.006	0.000	0.018	0.006

	NSEAK Test 4				NSEAK Test 5				NSEAK Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.003	0.002	0.001	0.000	0.009	0.004	0.001	0.000	0.005	0.003
NSEAK	**0.973**	0.944	0.996	0.016	**0.982**	0.944	0.999	0.018	**0.965**	0.921	0.997	0.024
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.021	0.000	0.047	0.014	0.009	0.000	0.042	0.015	0.004	0.000	0.027	0.010
Other	0.002	0.000	0.012	0.005	0.005	0.000	0.018	0.006	0.027	0.000	0.067	0.021

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Reporting Group	NSEAK Test 7				NSEAK Test 8				NSEAK Test 9			
	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.002	0.001	0.000	0.004	0.002	0.001	0.000	0.004	0.002
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.002	0.000	0.013	0.005	0.004	0.000	0.019	0.007	0.001	0.000	0.006	0.003
NSEAK	**0.987**	0.966	0.998	0.011	**0.937**	0.884	0.986	0.031	**0.964**	0.924	0.994	0.022
Taku Lakes	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Taku/Stikine Mainstem	0.001	0.000	0.007	0.004	0.042	0.000	0.092	0.030	0.007	0.000	0.031	0.011
Other	0.007	0.000	0.022	0.008	0.014	0.002	0.040	0.013	0.024	0.001	0.057	0.018

Reporting Group	NSEAK Test 10			
	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.006	0.003
Chatham Large	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.009	0.004
NSEAK	**0.967**	0.925	0.992	0.021
Taku Lakes	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.012	0.000	0.039	0.014
Other	0.016	0.002	0.050	0.016

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B7.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Taku Lakes* broad-scale reporting group (i.e., 100% proof tests).

	Taku Lakes Test 1				Taku Lakes Test 2				Taku Lakes Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
NSEAK	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.004	0.000	0.014	0.005
Taku Lakes	**0.995**	0.985	1.000	0.005	**0.995**	0.986	1.000	0.005	**0.990**	0.977	0.998	0.007
Taku/Stikine Mainstem	0.001	0.000	0.004	0.003	0.001	0.000	0.003	0.002	0.001	0.000	0.006	0.003
Other	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.001	0.000	0.007	0.003

	Taku Lakes Test 4				Taku Lakes Test 5				Taku Lakes Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.007	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
NSEAK	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Taku Lakes	**0.995**	0.984	1.000	0.005	**0.995**	0.986	1.000	0.005	**0.995**	0.986	1.000	0.005
Taku/Stikine Mainstem	0.001	0.000	0.004	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001

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	Taku Lakes Test 7				Taku Lakes Test 8				Taku Lakes Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.002	0.001	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
NSEAK	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Taku Lakes	**0.995**	0.985	1.000	0.005	**0.989**	0.973	0.998	0.008	**0.995**	0.984	1.000	0.005
Taku/Stikine Mainstem	0.001	0.000	0.004	0.003	0.007	0.000	0.021	0.007	0.001	0.000	0.005	0.003
Other	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002

	Taku Lakes Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.001
Chilkoot	0.000	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003
Speel	0.000	0.000	0.003	0.002
NSEAK	0.001	0.000	0.003	0.002
Taku Lakes	**0.990**	0.976	0.999	0.007
Taku/Stikine Mainstem	0.001	0.000	0.005	0.002
Other	0.005	0.000	0.016	0.005

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B8.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Taku/Stikine Mainstem* broad-scale reporting group (i.e., 100% proof tests).

	Taku/Stikine Mainstem Test 1				Taku/Stikine Mainstem Test 2				Taku/Stikine Mainstem Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.004	0.002	0.001	0.000	0.005	0.003	0.002	0.000	0.014	0.006
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.007	0.003	0.005	0.000	0.023	0.008	0.002	0.000	0.012	0.005
NSEAK	0.001	0.000	0.004	0.002	0.006	0.000	0.025	0.009	0.004	0.000	0.021	0.009
Taku Lakes	0.007	0.000	0.020	0.007	0.011	0.001	0.026	0.008	0.001	0.000	0.008	0.004
Taku/Stikine Mainstem	**0.983**	0.964	0.995	0.010	**0.963**	0.930	0.987	0.018	**0.984**	0.958	0.998	0.014
Other	0.005	0.000	0.016	0.005	0.012	0.002	0.029	0.010	0.004	0.000	0.015	0.005

	Taku/Stikine Mainstem Test 4				Taku/Stikine Mainstem Test 5				Taku/Stikine Mainstem Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.005	0.000	0.016	0.005	0.001	0.000	0.004	0.002	0.002	0.000	0.011	0.004
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Large	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.011	0.000	0.035	0.012	0.001	0.000	0.003	0.002	0.001	0.000	0.004	0.002
NSEAK	0.001	0.000	0.006	0.004	0.006	0.000	0.033	0.012	0.002	0.000	0.014	0.006
Taku Lakes	0.001	0.000	0.004	0.002	0.001	0.000	0.003	0.002	0.007	0.000	0.021	0.007
Taku/Stikine Mainstem	**0.964**	0.932	0.987	0.017	**0.989**	0.961	1.000	0.013	**0.975**	0.951	0.992	0.013
Other	0.016	0.004	0.035	0.010	0.001	0.000	0.004	0.002	0.011	0.002	0.025	0.007

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	Taku/Stikine Mainstem Test 7				Taku/Stikine Mainstem Test 8				Taku/Stikine Mainstem Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.002	0.000	0.012	0.005	0.001	0.000	0.006	0.003	0.002	0.000	0.010	0.005
NSEAK	0.001	0.000	0.007	0.004	0.002	0.000	0.013	0.005	0.001	0.000	0.009	0.004
Taku Lakes	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.006	0.000	0.016	0.005
Taku/Stikine Mainstem	**0.992**	0.973	1.000	0.009	**0.989**	0.973	0.998	0.008	**0.981**	0.959	0.995	0.012
Other	0.001	0.000	0.008	0.005	0.004	0.000	0.015	0.005	0.008	0.000	0.022	0.007

	Taku/Stikine Mainstem Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.005	0.003
Chatham Large	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003
Speel	0.009	0.000	0.036	0.013
NSEAK	0.001	0.000	0.009	0.005
Taku Lakes	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	**0.981**	0.951	0.998	0.015
Other	0.005	0.000	0.016	0.005

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B9.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Other* broad-scale reporting group (i.e., 100% proof tests).

	Other Test 1				Other Test 2				Other Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.004	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.001	0.000	0.004	0.002
Chatham Large	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.007	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.004	0.002	0.004	0.000	0.015	0.006	0.001	0.000	0.007	0.003
NSEAK	0.015	0.000	0.044	0.015	0.002	0.000	0.011	0.006	0.008	0.000	0.036	0.015
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.003	0.000	0.015	0.006	0.020	0.003	0.043	0.013	0.003	0.000	0.021	0.008
Other	**0.978**	0.946	0.999	0.017	**0.971**	0.944	0.991	0.015	**0.984**	0.953	0.999	0.017

	Other Test 4				Other Test 5				Other Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.002	0.000	0.009	0.004
Chilkoot	0.002	0.000	0.010	0.004	0.000	0.000	0.003	0.001	0.001	0.000	0.003	0.002
Chatham Large	0.001	0.000	0.003	0.002	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.008	0.004	0.001	0.000	0.004	0.002	0.001	0.000	0.007	0.003
NSEAK	0.002	0.000	0.010	0.006	0.006	0.000	0.024	0.009	0.002	0.000	0.013	0.005
Taku Lakes	0.001	0.000	0.008	0.003	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.010	0.000	0.035	0.012	0.008	0.000	0.026	0.009	0.040	0.007	0.078	0.022
Other	**0.981**	0.951	0.999	0.016	**0.983**	0.958	0.998	0.013	**0.952**	0.913	0.986	0.022

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	Other Test 7				Other Test 8				Other Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.000	0.000	0.003	0.001	0.002	0.000	0.011	0.004	0.001	0.000	0.003	0.002
Chilkoot	0.000	0.000	0.003	0.002	0.001	0.000	0.008	0.004	0.000	0.000	0.003	0.001
Chatham Large	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.001
Chatham Small	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.006	0.003	0.002	0.000	0.013	0.006	0.000	0.000	0.003	0.002
NSEAK	0.013	0.000	0.058	0.020	0.024	0.000	0.093	0.033	0.042	0.000	0.102	0.033
Taku Lakes	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.026	0.001	0.058	0.017	0.002	0.000	0.011	0.005	0.001	0.000	0.006	0.003
Other	**0.957**	0.904	0.992	0.027	**0.966**	0.896	0.999	0.034	**0.953**	0.893	0.998	0.033

	Other Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002
Chilkoot	0.003	0.000	0.012	0.004
Chatham Large	0.000	0.000	0.003	0.002
Chatham Small	0.001	0.000	0.006	0.003
Speel	0.002	0.000	0.013	0.005
NSEAK	0.005	0.000	0.025	0.009
Taku Lakes	0.000	0.000	0.003	0.002
Taku/Stikine Mainstem	0.009	0.000	0.036	0.013
Other	**0.979**	0.947	0.999	0.017

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B10.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Pavlof* fine-scale reporting group (i.e., 100% proof tests).

	Pavlof Test 1				Pavlof Test 2				Pavlof Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.002	0.000	0.013	0.006	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.004
Chilkoot	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Chatham Large	0.046	0.016	0.088	0.023	0.023	0.003	0.054	0.016	0.057	0.023	0.102	0.025
Pavlof Lake	**0.932**	0.884	0.970	0.027	**0.968**	0.932	0.993	0.019	**0.933**	0.885	0.971	0.026
Hasselborg Lake	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Kanalku Lake	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.007	0.004
NSEAK	0.008	0.000	0.031	0.011	0.001	0.000	0.007	0.004	0.001	0.000	0.009	0.005
Taku Lakes	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Taku/Stikine Mainstem	0.002	0.000	0.010	0.005	0.001	0.000	0.006	0.003	0.001	0.000	0.007	0.004
Other	0.004	0.000	0.023	0.009	0.001	0.000	0.006	0.003	0.001	0.000	0.007	0.004

	Pavlof Test 4				Pavlof Test 5				Pavlof Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.002	0.000	0.012	0.006	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Chilkoot	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Chatham Large	0.045	0.015	0.086	0.022	0.069	0.031	0.118	0.027	0.058	0.024	0.104	0.025
Pavlof Lake	**0.929**	0.879	0.969	0.028	**0.921**	0.870	0.962	0.029	**0.933**	0.884	0.970	0.027
Hasselborg Lake	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.004	0.001	0.000	0.006	0.003
Kanalku Lake	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.007	0.004	0.001	0.000	0.006	0.004	0.001	0.000	0.006	0.003
NSEAK	0.010	0.000	0.041	0.015	0.002	0.000	0.010	0.005	0.001	0.000	0.006	0.003
Taku Lakes	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Taku/Stikine Mainstem	0.002	0.000	0.010	0.005	0.001	0.000	0.006	0.004	0.001	0.000	0.006	0.003
Other	0.006	0.000	0.032	0.012	0.001	0.000	0.007	0.004	0.001	0.000	0.006	0.004

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	Pavlof Test 7				Pavlof Test 8				Pavlof Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.002	0.000	0.012	0.006	0.001	0.000	0.006	0.003	0.002	0.000	0.011	0.005
Chilkoot	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Chatham Large	0.045	0.015	0.088	0.023	0.032	0.007	0.069	0.019	0.045	0.015	0.086	0.022
Pavlof Lake	**0.929**	0.878	0.968	0.028	**0.958**	0.918	0.987	0.022	**0.929**	0.878	0.968	0.028
Hasselborg Lake	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.004	0.001	0.000	0.006	0.003
Kanalku Lake	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.004
Speel	0.001	0.000	0.006	0.004	0.001	0.000	0.006	0.003	0.001	0.000	0.007	0.004
NSEAK	0.010	0.000	0.040	0.014	0.001	0.000	0.007	0.004	0.011	0.000	0.043	0.015
Taku Lakes	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003	0.001	0.000	0.006	0.003
Taku/Stikine Mainstem	0.002	0.000	0.010	0.005	0.001	0.000	0.007	0.003	0.002	0.000	0.011	0.005
Other	0.006	0.000	0.032	0.012	0.001	0.000	0.006	0.004	0.007	0.000	0.033	0.012

	Pavlof Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.006	0.003
Chilkoot	0.001	0.000	0.006	0.003
Chatham Large	0.058	0.023	0.104	0.025
Pavlof Lake	**0.933**	0.884	0.970	0.027
Hasselborg Lake	0.001	0.000	0.006	0.003
Kanalku Lake	0.001	0.000	0.006	0.003
Speel	0.001	0.000	0.007	0.003
NSEAK	0.001	0.000	0.008	0.004
Taku Lakes	0.001	0.000	0.006	0.003
Taku/Stikine Mainstem	0.001	0.000	0.006	0.004
Other	0.001	0.000	0.006	0.004

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B11.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Hasselborg* fine-scale reporting group (i.e., 100% proof tests).

	Hasselborg Test 1				Hasselborg Test 2				Hasselborg Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.007	0.000	0.031	0.011	0.002	0.000	0.014	0.006	0.007	0.000	0.031	0.011
Chilkoot	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Chatham Large	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Pavlof Lake	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Hasselborg Lake	**0.973**	0.942	0.993	0.016	**0.982**	0.957	0.997	0.013	**0.973**	0.943	0.993	0.016
Kanalku Lake	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Speel	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
NSEAK	0.003	0.000	0.017	0.007	0.002	0.000	0.009	0.005	0.003	0.000	0.019	0.008
Taku Lakes	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Taku/Stikine Mainstem	0.012	0.000	0.038	0.013	0.007	0.000	0.027	0.009	0.011	0.000	0.037	0.013
Other	0.001	0.000	0.006	0.004	0.002	0.000	0.009	0.005	0.001	0.000	0.006	0.003

	Hasselborg Test 4				Hasselborg Test 5				Hasselborg Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.009	0.004	0.002	0.000	0.014	0.006	0.002	0.000	0.010	0.004
Chilkoot	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Chatham Large	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Pavlof Lake	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Hasselborg Lake	**0.982**	0.957	0.997	0.013	**0.982**	0.957	0.997	0.013	**0.982**	0.958	0.997	0.013
Kanalku Lake	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Speel	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
NSEAK	0.003	0.000	0.018	0.007	0.002	0.000	0.010	0.005	0.003	0.000	0.016	0.006
Taku Lakes	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Taku/Stikine Mainstem	0.007	0.000	0.026	0.009	0.007	0.000	0.026	0.009	0.008	0.000	0.027	0.009
Other	0.001	0.000	0.005	0.003	0.002	0.000	0.009	0.004	0.001	0.000	0.005	0.003

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Reporting Group	Hasselborg Test 7 Proportion	Lower	Upper	SD	Hasselborg Test 8 Proportion	Lower	Upper	SD	Hasselborg Test 9 Proportion	Lower	Upper	SD
Chilkat	0.003	0.000	0.015	0.006	0.001	0.000	0.008	0.005	0.001	0.000	0.005	0.003
Chilkoot	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Chatham Large	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Pavlof Lake	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Hasselborg Lake	**0.982**	0.957	0.997	0.013	**0.973**	0.942	0.993	0.016	**0.991**	0.974	1.000	0.009
Kanalku Lake	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Speel	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
NSEAK	0.002	0.000	0.010	0.005	0.002	0.000	0.015	0.007	0.001	0.000	0.005	0.003
Taku Lakes	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003
Taku/Stikine Mainstem	0.007	0.000	0.026	0.009	0.018	0.000	0.045	0.014	0.001	0.000	0.005	0.003
Other	0.001	0.000	0.009	0.004	0.001	0.000	0.005	0.003	0.001	0.000	0.005	0.003

Reporting Group	Hasselborg Test 10 Proportion	Lower	Upper	SD
Chilkat	0.013	0.000	0.040	0.014
Chilkoot	0.001	0.000	0.005	0.003
Chatham Large	0.001	0.000	0.005	0.003
Pavlof Lake	0.001	0.000	0.005	0.003
Hasselborg Lake	**0.973**	0.943	0.993	0.016
Kanalku Lake	0.001	0.000	0.005	0.003
Speel	0.001	0.000	0.005	0.003
NSEAK	0.003	0.000	0.020	0.008
Taku Lakes	0.001	0.000	0.005	0.003
Taku/Stikine Mainstem	0.005	0.000	0.026	0.010
Other	0.001	0.000	0.006	0.004

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

Appendix B12.–Estimates of stock composition, upper and lower bounds of the 90% credibility intervals, and standard deviations (SD) for mixtures of known-origin fish removed from the Southeast Alaska sockeye baseline that make up the *Kanalku* fine-scale reporting group (i.e., 100% proof tests).

	Kanalku Test 1				Kanalku Test 2				Kanalku Test 3			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Large	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Pavlof Lake	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Hasselborg Lake	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Kanalku Lake	**0.994**	0.982	1.000	0.006	**0.994**	0.983	1.000	0.006	**0.994**	0.983	1.000	0.006
Speel	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
NSEAK	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku Lakes	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002

	Kanalku Test 4				Kanalku Test 5				Kanalku Test 6			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Large	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Pavlof Lake	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Hasselborg Lake	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Kanalku Lake	**0.994**	0.983	1.000	0.006	**0.994**	0.982	1.000	0.006	**0.994**	0.983	1.000	0.006
Speel	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
NSEAK	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku Lakes	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002

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	Kanalku Lake Test 7				Kanalku Lake Test 8				Kanalku Lake Test 9			
Reporting Group	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Chatham Large	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Pavlof Lake	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Hasselborg Lake	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Kanalku Lake	**0.994**	0.983	1.000	0.006	**0.994**	0.983	1.000	0.006	**0.994**	0.983	1.000	0.006
Speel	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
NSEAK	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku Lakes	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002
Other	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002	0.001	0.000	0.003	0.002

	Kanalku Test 10			
Reporting Group	Proportion	Lower	Upper	SD
Chilkat	0.001	0.000	0.003	0.002
Chilkoot	0.001	0.000	0.003	0.002
Chatham Large	0.001	0.000	0.003	0.002
Pavlof Lake	0.001	0.000	0.003	0.002
Hasselborg Lake	0.001	0.000	0.003	0.002
Kanalku Lake	**0.994**	0.982	1.000	0.006
Speel	0.001	0.000	0.003	0.002
NSEAK	0.001	0.000	0.003	0.002
Taku Lakes	0.001	0.000	0.003	0.002
Taku/Stikine Mainstem	0.001	0.000	0.003	0.002
Other	0.001	0.000	0.003	0.002

Note: Proportions for a given mixture may not sum to 1 due to rounding error.
Note: Correct allocations are in bold.

APPENDIX C: STOCK CONTRIBUTION ESTIMATES

Appendix C1.–Estimated stock composition of 9 broad-scale reporting groups in statistical area 112-16 commercial purse seine fisheries from 2012–2014. Standard deviation (SD), 90% lower and upper credibility interval bounds, and the probability that the estimate is equal to zero ($P = 0$) are provided.

			Broad-scale Reporting Groups								
Year	Statistical Week (sample size)		Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
2012	26–29[a]	**Estimate**	**0.175**	**0.177**	**0.005**	**0.005**	**0.158**	**0.102**	**0.130**	**0.226**	**0.021**
	(374)	SD	0.023	0.021	0.004	0.004	0.022	0.020	0.018	0.028	0.008
		Lower	0.138	0.144	0.001	0.001	0.123	0.071	0.102	0.182	0.010
		Upper	0.213	0.212	0.013	0.013	0.196	0.138	0.160	0.273	0.035
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013[c]	27–28[a]	**Estimate**	**0.150**	**0.109**	**0.004**	**0.012**	**0.238**	**0.126**	**0.181**	**0.180**	**0.001**
	(264)	SD	0.024	0.020	0.004	0.007	0.030	0.025	0.024	0.030	0.002
		Lower	0.113	0.078	0.000	0.003	0.191	0.087	0.143	0.133	0.000
		Upper	0.191	0.143	0.012	0.024	0.289	0.168	0.222	0.231	0.004
		P = 0	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.341
	29–31[b]	**Estimate**	**0.216**	**0.091**	**0.036**	**0.108**	**0.237**	**0.057**	**0.093**	**0.157**	**0.006**
	(388)	SD	0.022	0.016	0.009	0.016	0.025	0.018	0.015	0.024	0.005
		Lower	0.180	0.066	0.022	0.084	0.197	0.027	0.069	0.118	0.001
		Upper	0.253	0.119	0.053	0.135	0.279	0.088	0.119	0.198	0.013
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.028
	32[b]	**Estimate**	**0.423**	**0.066**	**0.023**	**0.090**	**0.205**	**0.034**	**0.066**	**0.082**	**0.012**
	(400)	SD	0.025	0.013	0.007	0.014	0.023	0.016	0.013	0.018	0.007
		Lower	0.381	0.046	0.012	0.068	0.167	0.008	0.047	0.054	0.004
		Upper	0.464	0.089	0.036	0.114	0.244	0.062	0.088	0.113	0.025
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	33[b]	**Estimate**	**0.585**	**0.005**	**0.019**	**0.060**	**0.167**	**0.020**	**0.066**	**0.076**	**0.002**
	(320)	SD	0.028	0.005	0.008	0.013	0.024	0.015	0.014	0.019	0.003
		Lower	0.539	0.000	0.008	0.040	0.130	0.000	0.044	0.047	0.000
		Upper	0.632	0.015	0.033	0.083	0.207	0.048	0.091	0.110	0.008
		P = 0	0.000	0.141	0.000	0.000	0.000	0.068	0.000	0.000	0.466
	34–35[b]	**Estimate**	**0.684**	**0.036**	**0.029**	**0.054**	**0.078**	**0.007**	**0.025**	**0.067**	**0.020**
	(405)	SD	0.023	0.010	0.009	0.011	0.014	0.008	0.008	0.014	0.010
		Lower	0.645	0.021	0.016	0.037	0.056	0.000	0.014	0.045	0.000
		Upper	0.722	0.053	0.044	0.074	0.103	0.024	0.039	0.090	0.036
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053

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Year	Statistical Week (sample size)		Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
			Broad-scale Reporting Groups								
2014	26–27[a]	**Estimate**	**0.276**	**0.126**	**0.001**	**0.012**	**0.111**	**0.155**	**0.113**	**0.169**	**0.037**
	(175)	SD	0.035	0.026	0.002	0.008	0.030	0.036	0.025	0.041	0.026
		Lower	0.220	0.086	0.000	0.002	0.066	0.101	0.075	0.104	0.002
		Upper	0.335	0.172	0.005	0.028	0.163	0.217	0.158	0.239	0.085
		$P = 0$	0.000	0.000	0.360	0.000	0.000	0.000	0.000	0.000	0.000
	28–29[b]	**Estimate**	**0.132**	**0.196**	**0.023**	**0.018**	**0.287**	**0.006**	**0.037**	**0.130**	**0.170**
	(170)	SD	0.028	0.032	0.012	0.010	0.040	0.013	0.015	0.038	0.037
		Lower	0.089	0.146	0.008	0.005	0.223	0.000	0.016	0.073	0.111
		Upper	0.180	0.251	0.045	0.037	0.355	0.036	0.063	0.197	0.233
		$P = 0$	0.000	0.000	0.000	0.000	0.000	0.189	0.000	0.000	0.000

[a] A flat prior was used to estimate stock compositions for this mixture.

[b] Estimated stock proportions from the previous stratum were used as the prior for these mixtures.

[c] Samples collected from both the test and common property fishery.

Appendix C2.–Estimated stock compositions of 9 broad-scale reporting groups in statistical areas 112-14 and 114-27 commercial purse seine fisheries from 2012–2014. Standard deviation (SD), 90% lower and upper credibility interval bounds, and the probability that the estimate is equal to zero (*P* = 0) are provided.

			Broad-scale Reporting Groups								
Year	Statistical Week (sample size)		Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
2012	26–28[a]	**Estimate**	**0.029**	**0.034**	**0.261**	**0.047**	**0.023**	**0.078**	**0.105**	**0.099**	**0.325**
	(279)	SD	0.012	0.011	0.027	0.013	0.014	0.022	0.018	0.026	0.032
		Lower	0.012	0.018	0.218	0.028	0.001	0.044	0.077	0.059	0.272
		Upper	0.050	0.055	0.306	0.069	0.047	0.116	0.137	0.144	0.378
		P = 0	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000
	29–30[b]	**Estimate**	**0.036**	**0.102**	**0.076**	**0.026**	**0.327**	**0.042**	**0.068**	**0.224**	**0.099**
	(459)	SD	0.009	0.015	0.012	0.007	0.025	0.012	0.012	0.025	0.020
		Lower	0.022	0.078	0.057	0.015	0.287	0.025	0.049	0.184	0.066
		Upper	0.053	0.128	0.097	0.040	0.368	0.063	0.088	0.266	0.134
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	31–32[b]	**Estimate**	**0.030**	**0.048**	**0.085**	**0.053**	**0.435**	**0.009**	**0.089**	**0.193**	**0.058**
	(338)	SD	0.010	0.012	0.015	0.012	0.030	0.007	0.016	0.026	0.018
		Lower	0.016	0.029	0.061	0.035	0.386	0.001	0.063	0.151	0.032
		Upper	0.048	0.070	0.112	0.075	0.484	0.024	0.117	0.237	0.089
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013[c]	25–26[a]	**Estimate**	**0.060**	**0.018**	**0.240**	**0.081**	**0.002**	**0.141**	**0.168**	**0.159**	**0.131**
	(297)	SD	0.015	0.008	0.025	0.016	0.004	0.030	0.022	0.029	0.029
		Lower	0.038	0.007	0.200	0.057	0.000	0.095	0.133	0.114	0.085
		Upper	0.086	0.032	0.282	0.108	0.011	0.193	0.206	0.210	0.181
		P = 0	0.000	0.000	0.000	0.000	0.268	0.000	0.000	0.000	0.000
	27[b]	**Estimate**	**0.027**	**0.000**	**0.260**	**0.114**	**0.095**	**0.053**	**0.068**	**0.216**	**0.167**
	(291)	SD	0.010	0.001	0.026	0.019	0.021	0.021	0.015	0.030	0.029
		Lower	0.013	0.000	0.217	0.085	0.063	0.024	0.045	0.168	0.120
		Upper	0.046	0.001	0.304	0.146	0.131	0.093	0.094	0.267	0.216
		P = 0	0.000	0.839	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	28[b]	**Estimate**	**0.048**	**0.012**	**0.117**	**0.234**	**0.161**	**0.073**	**0.049**	**0.127**	**0.179**
	(299)	SD	0.014	0.007	0.019	0.024	0.025	0.028	0.013	0.028	0.028
		Lower	0.026	0.003	0.088	0.195	0.122	0.028	0.030	0.084	0.134
		Upper	0.073	0.025	0.150	0.275	0.203	0.119	0.071	0.174	0.226
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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Year	Statistical Week (sample size)		Broad-scale Reporting Groups								
			Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
2013[c]	29 [b]	**Estimate**	**0.032**	**0.019**	**0.107**	**0.121**	**0.360**	**0.048**	**0.057**	**0.127**	**0.128**
	(339)	SD	0.010	0.008	0.017	0.018	0.031	0.023	0.013	0.028	0.026
		Lower	0.016	0.007	0.080	0.093	0.309	0.011	0.037	0.084	0.087
		Upper	0.051	0.034	0.136	0.152	0.412	0.088	0.080	0.176	0.172
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	30 [b]	**Estimate**	**0.099**	**0.070**	**0.049**	**0.075**	**0.369**	**0.065**	**0.090**	**0.117**	**0.066**
	(255)	SD	0.020	0.017	0.014	0.016	0.034	0.020	0.019	0.027	0.024
		Lower	0.069	0.044	0.029	0.050	0.313	0.035	0.060	0.076	0.031
		Upper	0.133	0.100	0.074	0.103	0.426	0.100	0.123	0.163	0.108
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	31 [b]	**Estimate**	**0.207**	**0.030**	**0.041**	**0.063**	**0.296**	**0.024**	**0.128**	**0.139**	**0.073**
	(298)	SD	0.024	0.010	0.012	0.014	0.030	0.016	0.019	0.027	0.023
		Lower	0.168	0.015	0.024	0.041	0.247	0.005	0.097	0.096	0.039
		Upper	0.248	0.049	0.062	0.087	0.346	0.056	0.161	0.185	0.115
		P = 0	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000
	32 [b]	**Estimate**	**0.231**	**0.019**	**0.045**	**0.090**	**0.206**	**0.196**	**0.110**	**0.046**	**0.058**
	(299)	SD	0.025	0.009	0.012	0.017	0.026	0.031	0.018	0.021	0.022
		Lower	0.190	0.006	0.027	0.064	0.164	0.146	0.081	0.015	0.022
		Upper	0.274	0.036	0.067	0.118	0.250	0.248	0.141	0.083	0.096
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	33–34 [b]	**Estimate**	**0.664**	**0.017**	**0.039**	**0.067**	**0.100**	**0.003**	**0.048**	**0.062**	**0.000**
	(222)	SD	0.032	0.010	0.013	0.017	0.022	0.005	0.014	0.018	0.001
		Lower	0.609	0.005	0.020	0.042	0.066	0.000	0.027	0.035	0.000
		Upper	0.716	0.036	0.064	0.097	0.138	0.013	0.074	0.094	0.002
		P = 0	0.000	0.000	0.000	0.000	0.000	0.144	0.000	0.000	0.600
2014	26–27 [a]	**Estimate**	**0.027**	**0.006**	**0.218**	**0.043**	**0.030**	**0.117**	**0.057**	**0.057**	**0.445**
	(194)	SD	0.013	0.006	0.030	0.015	0.015	0.046	0.017	0.025	0.056
		Lower	0.010	0.000	0.171	0.022	0.009	0.052	0.033	0.022	0.354
		Upper	0.051	0.018	0.269	0.069	0.058	0.198	0.087	0.101	0.535
		P = 0	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	28–30 [b]	**Estimate**	**0.057**	**0.053**	**0.147**	**0.033**	**0.319**	**0.073**	**0.041**	**0.187**	**0.092**
	(246)	SD	0.016	0.016	0.022	0.011	0.034	0.020	0.013	0.031	0.024
		Lower	0.032	0.029	0.111	0.017	0.263	0.043	0.022	0.138	0.056
		Upper	0.086	0.080	0.185	0.054	0.376	0.107	0.064	0.240	0.133
		P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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Year	Statistical Week (sample size)		Broad-scale Reporting Groups								
			Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
2014	31–32 [b]	**Estimate**	**0.037**	**0.001**	**0.104**	**0.098**	**0.514**	**0.012**	**0.017**	**0.164**	**0.053**
	(193)	SD	0.014	0.004	0.022	0.021	0.040	0.009	0.010	0.031	0.017
		Lower	0.017	0.000	0.070	0.066	0.449	0.002	0.005	0.114	0.028
		Upper	0.061	0.010	0.142	0.136	0.579	0.028	0.036	0.218	0.083
		$P = 0$	0.000	0.551	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[a] A flat prior was used to estimate stock compositions for this mixture.

[b] Estimated stock proportions from the previous stratum were used as the prior for these mixtures.

[c] Samples collected from statistical areas 112-14 and 114-27.

Appendix C3.–Estimated stock compositions of 9 broad-scale reporting groups applied to harvest in statistical areas 112-16 commercial purse seine fisheries from 2012–2014. Standard deviation (SD), 90% lower and upper credibility interval bounds, and the probability that the estimate is equal to zero (P = 0) are provided.

			Broad-scale Reporting Groups								
Year	Statistical Week (sample size)		Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
2012	26–29[a]	**Estimate**	**320**	**323**	**9**	**9**	**289**	**186**	**237**	**413**	**38**
	(374)	SD	42	38	7	7	40	37	33	51	15
		Lower	252	263	2	2	225	130	186	332	18
		Upper	389	387	24	24	358	252	292	498	64
2013[c]	27–28[a]	**Estimate**	**104**	**76**	**3**	**8**	**166**	**88**	**126**	**125**	**1**
	(264)	SD	17	14	3	5	21	17	17	21	1
		Lower	79	54	0	2	133	61	100	93	0
		Upper	133	100	8	17	201	117	155	161	3
	29–31[b]	**Estimate**	**3,148**	**1,326**	**525**	**1,574**	**3,455**	**831**	**1,356**	**2,288**	**87**
	(388)	SD	321	233	131	233	364	262	219	350	73
		Lower	2,624	962	321	1,224	2,871	394	1,006	1,720	15
		Upper	3,688	1,735	773	1,968	4,067	1,283	1,735	2,886	189
	32[b]	**Estimate**	**1,371**	**214**	**75**	**292**	**664**	**110**	**214**	**266**	**39**
	(400)	SD	81	42	23	45	75	52	42	58	23
		Lower	1,234	149	39	220	541	26	152	175	13
		Upper	1,503	288	117	369	791	201	285	366	81
	33[b]	**Estimate**	**2,173**	**19**	**71**	**223**	**620**	**74**	**245**	**282**	**7**
	(320)	SD	104	19	30	48	89	56	52	71	11
		Lower	2,002	0	30	149	483	0	163	175	0
		Upper	2,348	56	123	308	769	178	338	409	30
	34–35[b]	**Estimate**	**1,808**	**95**	**77**	**143**	**206**	**19**	**66**	**177**	**53**
	(405)	SD	61	26	24	29	37	21	21	37	26
		Lower	1,705	56	42	98	148	0	37	119	0
		Upper	1,908	140	116	196	272	63	103	238	95
2014	26–27[a]	**Estimate**	**399**	**182**	**1**	**17**	**160**	**224**	**163**	**244**	**53**
	(175)	SD	51	38	3	12	43	52	36	59	38
		Lower	318	124	0	3	95	146	108	150	3
		Upper	484	248	7	40	235	313	228	345	123

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Year	Statistical Week (sample size)		Broad-scale Reporting Groups								
			Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
2014	28–29[b]	**Estimate**	**80**	**119**	**14**	**11**	**174**	**4**	**22**	**79**	**103**
	(170)	SD	17	19	7	6	24	8	9	23	22
		Lower	54	89	5	3	135	0	10	44	67
		Upper	109	152	27	22	215	22	38	120	141

[a] A flat prior was used to estimate stock compositions for this mixture.

[b] Estimated stock proportions from the previous stratum were used as the prior for these mixtures.

[c] Samples collected from both the test and common property fishery.

Appendix C4.–Estimated stock compositions of 9 broad-scale reporting groups applied to harvest in statistical areas 112-14 and 114-27 commercial purse seine fisheries from 2012–2014. Standard deviation (SD), 90% lower and upper credibility interval bounds, and the probability that the estimate is equal to zero ($P = 0$) are provided.

			Broad-scale Reporting Groups								
Year	Statistical Week (sample size)		Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
2012	26–28[a]	**Estimate**	**40**	**47**	**358**	**64**	**32**	**107**	**144**	**136**	**446**
	(279)	SD	16	15	37	18	19	30	25	36	44
		Lower	16	25	299	38	1	60	106	81	373
		Upper	69	75	420	95	64	159	188	198	519
	29–30[b]	**Estimate**	**146**	**414**	**309**	**106**	**1,328**	**171**	**276**	**910**	**402**
	(459)	SD	37	61	49	28	102	49	49	102	81
		Lower	89	317	231	61	1166	102	199	747	268
		Upper	215	520	394	162	1494	256	357	1080	544
	31–32[b]	**Estimate**	**16**	**26**	**46**	**29**	**237**	**5**	**48**	**105**	**32**
	(338)	SD	5	7	8	7	16	4	9	14	10
		Lower	9	16	33	19	210	1	34	82	17
		Upper	26	38	61	41	263	13	64	129	48
2013[c]	25–26[a]	**Estimate**	**69**	**21**	**274**	**93**	**2**	**161**	**192**	**182**	**150**
	(297)	SD	17	9	29	18	5	34	25	33	33
		Lower	43	8	229	65	0	109	152	130	97
		Upper	98	37	322	123	13	221	235	240	207
	27[b]	**Estimate**	**49**	**0**	**472**	**207**	**172**	**96**	**123**	**392**	**303**
	(291)	SD	18	2	47	34	38	38	27	54	53
		Lower	24	0	394	154	114	44	82	305	218
		Upper	83	2	551	265	238	169	171	484	392
	28[b]	**Estimate**	**144**	**36**	**352**	**703**	**484**	**219**	**147**	**382**	**538**
	(299)	SD	42	21	57	72	75	84	39	84	84
		Lower	78	9	264	586	367	84	90	252	403
		Upper	219	75	451	826	610	358	213	523	679
	29[b]	**Estimate**	**103**	**61**	**344**	**389**	**1,157**	**154**	**183**	**408**	**411**
	(339)	SD	32	26	55	58	100	74	42	90	84
		Lower	51	22	257	299	993	35	119	270	280
		Upper	164	109	437	489	1324	283	257	566	553
	30[b]	**Estimate**	**332**	**235**	**165**	**252**	**1,239**	**218**	**302**	**393**	**222**
	(255)	SD	67	57	47	54	114	67	64	91	81
		Lower	232	148	97	168	1051	118	201	255	104
		Upper	447	336	248	346	1431	336	413	547	363

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Year	Statistical Week (sample size)		Broad-scale Reporting Groups								
			Chilkat	Chilkoot	Chatham Large	Chatham Small	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
2013	31 [b]	**Estimate**	**347**	**50**	**69**	**105**	**496**	**40**	**214**	**233**	**122**
	(298)	SD	40	17	20	23	50	27	32	45	39
		Lower	281	25	40	69	413	8	162	161	65
		Upper	415	82	104	146	579	94	270	310	193
	32 [b]	**Estimate**	**189**	**16**	**37**	**74**	**169**	**160**	**90**	**38**	**47**
	(299)	SD	20	7	10	14	21	25	15	17	18
		Lower	155	5	22	52	134	119	66	12	18
		Upper	224	29	55	97	205	203	115	68	79
	33–34 [b]	**Estimate**	**680**	**17**	**40**	**69**	**102**	**3**	**49**	**63**	**0**
	(222)	SD	33	10	13	17	23	5	14	18	1
		Lower	624	5	20	43	68	0	28	36	0
		Upper	733	37	66	99	141	13	76	96	2
2014	26–27 [a]	**Estimate**	**14**	**3**	**115**	**23**	**16**	**62**	**30**	**30**	**235**
	(194)	SD	7	3	16	8	8	24	9	13	30
		Lower	5	0	90	12	5	27	17	12	187
		Upper	27	9	142	36	31	104	46	53	282
	28–30 [b]	**Estimate**	**139**	**129**	**358**	**80**	**777**	**178**	**100**	**456**	**224**
	(246)	SD	39	39	54	27	83	49	32	76	58
		Lower	78	71	270	41	641	105	54	336	136
		Upper	209	195	451	132	916	261	156	585	324
	31–32 [b]	**Estimate**	**24**	**1**	**67**	**63**	**329**	**8**	**11**	**105**	**34**
	(193)	SD	9	3	14	13	26	6	6	20	11
		Lower	11	0	45	42	288	1	3	73	18
		Upper	39	6	91	87	371	18	23	140	53

[a] A flat prior was used to estimate stock compositions for this mixture.

[b] Estimated stock proportions from the previous stratum were used as the prior for these mixtures.

[c] Samples collected from statistical areas 112-14 and 114-27.

Appendix C5.–Stratified stock composition estimates for the 2013 season of sockeye salmon in 11 fine-scale reporting groups in statistical area 112-16 test and common property commercial purse seine fisheries. Standard deviation (SD), 90% lower and upper credibility interval bounds, and the probability that the estimate is equal to zero (*P* = 0) are provided.

	Fine-scale Reporting Groups										
	Chilkat	Chilkoot	Chatham Large	Pavlof	Hasselborg	Kanalku	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
Estimate	**0.346**	**0.070**	**0.030**	**0.000**	**0.085**	**0.005**	**0.206**	**0.044**	**0.081**	**0.126**	**0.007**
SD	0.014	0.010	0.006	0.000	0.009	0.002	0.015	0.012	0.009	0.015	0.004
Lower	0.323	0.054	0.021	0.000	0.070	0.002	0.181	0.026	0.066	0.103	0.003
Upper	0.370	0.086	0.040	0.000	0.101	0.009	0.232	0.064	0.097	0.152	0.013
P = 0	0.000	0.000	0.000	0.631	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Appendix C6.–Stratified stock composition estimates for the 2013 season of sockeye salmon in 11 fine-scale reporting groups in statistical areas 112-14 and 114-27 commercial purse seine fisheries. Standard deviation (SD), 90% lower and upper credibility interval bounds, and the probability that the estimate is equal to zero (*P* = 0) are provided.

	Fine-scale Reporting Groups										
	Chilkat	Chilkoot	Chatham Large	Pavlof	Hasselborg	Kanalku	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
Estimate	**0.119**	**0.027**	**0.109**	**0.009**	**0.101**	**0.007**	**0.238**	**0.066**	**0.081**	**0.130**	**0.112**
SD	0.007	0.004	0.007	0.002	0.007	0.002	0.011	0.009	0.006	0.011	0.010
Lower	0.109	0.020	0.098	0.007	0.090	0.004	0.219	0.051	0.071	0.113	0.095
Upper	0.130	0.035	0.121	0.013	0.113	0.010	0.257	0.081	0.092	0.148	0.129
P = 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Appendix C7.–Stratified stock composition estimates for the 2013 season of sockeye salmon applied to harvest for 11 fine-scale reporting groups in statistical area 112-16 test and common property commercial purse seine fisheries. Standard deviation (SD), 90% lower and upper credibility interval bounds, and the probability that the estimate is equal to zero (*P* = 0) are provided.

	Fine-scale Reporting Groups										
	Chilkat	Chilkoot	Chatham Large	Pavlof Lake	Hasselborg Lake	Kanalku Lake	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
Estimate	**8,601**	**1,731**	**747**	**1**	**2,115**	**125**	**5,115**	**1,106**	**2,005**	**3,143**	**181**
SD	354	241	145	3	235	57	383	291	231	372	96
Lower	8,029	1,354	529	0	1,744	51	4,498	637	1,644	2,554	79
Upper	9,195	2,145	1,002	3	2,516	233	5,759	1,597	2,400	3,775	320

Appendix C8.–Stratified stock composition estimates for the 2013 season of sockeye salmon applied to harvest for 11 fine-scale reporting groups in statistical areas 112-14 and 114-27 commercial purse seine fisheries. Standard deviation (SD), 90% lower and upper credibility interval bounds, and the probability that the estimate is equal to zero (*P* = 0) are provided.

	Fine-scale Reporting Groups										
	Chilkat	Chilkoot	Chatham Large	Pavlof Lake	Hasselborg Lake	Kanalku Lake	Speel	NSEAK	Taku Lakes	Taku/Stikine Mainstem	Other
Estimate	**1,913**	**436**	**1,754**	**152**	**1,626**	**111**	**3,820**	**1,055**	**1,298**	**2,091**	**1,793**
SD	105	71	110	29	114	30	184	143	101	173	162
Lower	1,745	327	1,578	108	1,443	67	3,518	826	1,135	1,814	1,532
Upper	2,090	558	1,939	204	1,816	165	4,125	1,297	1,469	2,382	2,065