

Regional Information Report 5J12-16

Western Alaska Salmon Stock Identification Program Technical Document 11: Defining Reporting Groups

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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)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H_A
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, χ^2 , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient (simple)	r
		corporate suffixes:		covariance	cov
Weights and measures (English)		Company	Co.	degree (angular)	$^\circ$
cubic feet per second	ft ³ /s	Corporation	Corp.	degrees of freedom	df
foot	ft	Incorporated	Inc.	expected value	E
gallon	gal	Limited	Ltd.	greater than	>
inch	in	District of Columbia	D.C.	greater than or equal to	\geq
mile	mi	et alii (and others)	et al.	harvest per unit effort	HPUE
nautical mile	nmi	et cetera (and so forth)	etc.	less than	<
ounce	oz	exempli gratia	e.g.	less than or equal to	\leq
pound	lb	(for example)		logarithm (natural)	ln
quart	qt	Federal Information Code	FIC	logarithm (base 10)	log
yard	yd	id est (that is)	i.e.	logarithm (specify base)	log ₂ , etc.
		latitude or longitude	lat. or long.	minute (angular)	'
Time and temperature		monetary symbols (U.S.)	\$, ¢	not significant	NS
day	d	months (tables and figures): first three letters	Jan,...,Dec	null hypothesis	H_0
degrees Celsius	°C	registered trademark	®	percent	%
degrees Fahrenheit	°F	trademark	™	probability	P
degrees kelvin	K	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	α
hour	h	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	β
minute	min	U.S.C.	United States Code	second (angular)	"
second	s	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
				standard error	SE
Physics and chemistry				variance	
all atomic symbols				population sample	Var
alternating current	AC			sample	var
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				

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**WESTERN ALASKA SALMON STOCK IDENTIFICATION PROGRAM
TECHNICAL DOCUMENT 11: DEFINING REPORTING GROUPS**

by

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May 2012

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ABSTRACT

Uncertainty about the magnitude, frequency, location, and timing of the nonlocal harvest of sockeye and chum salmon in Western Alaska fisheries was the impetus for the Western Alaska Salmon Stock Identification Project (WASSIP). The project was designed to use genetic data in mixed stock analysis to reduce this uncertainty. Defining reporting groups for mixed stock analysis provides the framework for reporting fishery stock composition estimates. Reporting groups refer to the groups of populations to which fishery mixtures will be allocated during mixed-stock analyses. The end users of the information (stakeholders) provide a starting point and influence the final determination of reporting groups while biology and statistics provide the constraints for defining reporting groups. Here we present methods to (1) use stakeholder input to establish desired reporting groups, (2) test our ability to identify the desired reporting groups, and (3) arrive at a final set of reporting groups for WASSIP. We also propose a dynamic reporting group strategy for tabulating stock composition information that takes into account the geographic location of the fishery.

Key words: Western Alaska Salmon Stock Identification Project, WASSIP, sockeye salmon, chum salmon, mixed stock analysis, reporting groups

INTRODUCTION

The Western Alaska Salmon Stock Identification Project (WASSIP) was established by 11 organizations (stakeholders) “*to obtain the data and scientific analyses necessary to inform the public policy debate and help Alaskans generate solutions to reduce conflict and assure the sustainability of the stocks and the fisheries upon them*” (ADFG 2006). Understanding the origin of sockeye and chum salmon captured in commercial and subsistence fisheries throughout the Alaska Peninsula, Bristol Bay, and the Arctic-Yukon-Kuskokwim regions was understood to be the key information needed to achieve this goal. However, the WASSIP Memorandum of Understanding (MOU) quoted above does not explicitly define the groups of populations (reporting groups) to which the fishery mixtures will be allocated during mixed-stock analyses (MSA). Defining reporting groups for mixed stock analysis provides the framework for reporting fishery stock composition estimates.

For the purpose of this document, we will define *identifiable unit*, *population*, *reporting group*, and *stock* as follows:

Identifiable unit - the smallest group of populations in a genetic baseline to which portions of a mixture are allocated with acceptable accuracy during mixed stock analyses; constructed based on genetic distinction and statistical resolution only. Identifiable units can include one or more populations and may coincide with stocks.

Population - a group of individuals spawning in close enough proximity that members of the group can potentially mate with any other member.

Reporting group – a group of one or more identifiable units in a genetic baseline to which portions of a mixture are allocated during mixed stock analyses; constructed based on a combination of stakeholder needs, genetic distinction, and statistical resolution. For WASSIP, reporting groups are defined on two scales to achieve two levels of resolution: one for reporting groups proximate to the fishery (subregional) and one for reporting groups distant from the fishery (regional).

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 two or more interbreeding groups, which occur in the same geographic area and is managed as a unit (from 5 AAC 39.222(f)).

Recent laboratory and statistical advances have increased the potential resolution available with MSA, increasing the number of possible reporting groups. Laboratory advances include the availability of genetic data from more individuals and populations over a broader geographic area, and more genetic markers, including markers that were specifically ascertained to differentiate among populations within the WASSIP area (Jasper et al. *In prep b*; Dann et al. 2012a; Dann et al. 2012b; DeCovich et al. *In prep*; Seeb et al. *In prep*). Statistical advances have centered on increasing the sophistication of the statistical framework for MSA (Pella and Masuda 2001; Koljonen et al. 2005; Anderson et al. 2008; Jasper et al. *In prep a*; Jasper and Templin *In prep*).

However, there is a cost to simply using all the identifiable units possible for MSA (i.e. maximum number of reporting groups). Estimates to each identifiable unit will have relatively higher CVs and sampling errors than estimates to reporting groups. Assuming normality, these identifiable unit estimates and confidence intervals can be combined into reporting group estimates and confidence intervals, but the confidence intervals will not be as appropriate as confidence intervals produced from estimates made directly for reporting groups. Rather than providing imprecise estimates for multiple identifiable units, creating reporting groups composed of multiple identifiable units will be more useful to managers and stakeholders because the precision levels would be better defined, CVs would be lower, and sampling error would be reduced (Wood et al. 1987). For example, if 50 identifiable units are discernable based on the genetic data, but only 10 of these units are likely to account for most of the fish captured in a given mixed fishery stratum, and 400 fish were sampled to represent the stratum, many identifiable units are likely to be allocated zero or few fish. More appropriate confidence intervals will be produced by combining identifiable units that are likely to contain small allocations into more comprehensive reporting groups.

Therefore, defining reporting groups should account for both stakeholder interests and biological and statistical constraints. Incorporating societal goals with biological information in identifying conservation/management units is not unique to WASSIP (e.g., Good et al. 2007; Waples 2009). Here we propose a method to construct appropriate reporting groups for WASSIP. The variables to determine appropriate reporting groups are (1) sociological needs including management information gaps (stakeholder needs); (2) genetic population structure which determines the ability to estimate specific reporting groups in MSA; (3) adequacy of the baseline to support reporting groups, which includes number of individuals available within reporting groups and how well the baseline collections represent the genetic variation within potential reporting groups; and (4) expected number of fish from a reporting group potentially within a mixture.

This document is intended to serve two purposes: first, to gather input from the Advisory Panel (AP) to guide the definition of reporting groups; and second, to solicit review from the Technical Committee (TC) on our proposed methods for determining appropriate reporting groups.

VARIABLES FOR REPORTING GROUP DEFINITION

1. Stakeholder needs are required to provide the starting point for defining reporting groups. A consensus of stakeholder needs will dictate which reporting groups are critical to inform public policy and to assure the sustainability of the resource. For example, the Alaska Department of Fish and Game (the department) is one of the stakeholders and is interested in building brood tables incorporating the stock composition estimates from fishery harvests. Therefore, for Bristol Bay, the department needs an estimate of the

number of fish destined for each management unit that are captured in fisheries. Within the Kvichak unit, the department needs the best point estimate with the most appropriate precision estimate for the entire Kvichak drainage. Although the genetic structure allows estimates of stock compositions to a smaller scale (i.e. Lake Clark sockeye are very identifiable), the department does not use this level of discrimination in management and therefore does not require MSA estimates at this level. Because one of the final products of WASSIP is to calculate harvest rates for each reporting group, quality and geographic scale of the escapement information will be critical to determining appropriate reporting groups.

2. Genetic population structure determines the potential of a baseline to estimate specific reporting groups in MSA. Graphic representation of this genetic structure can provide insights into reporting groups that are likely to perform well in MSA. Proof tests and/or escapement tests (defined Dann et al. 2012a) can be used to measure the MSA performance and determine if the performance meets predetermined criteria. Escapement tests provide the most robust measures of baseline performance because they do not assume that the fish in the mixture were from populations in the baseline. Proof tests and escapement tests can produce high concordance in cases where the baseline represents most of the genetic diversity within the reporting group (Dann et al. 2009).
3. Determining the adequacy of the baseline for a given reporting group requires assessing whether the baseline contains an adequate number of individuals within the reporting group and whether the collections within the reporting group adequately represent the genetic diversity within the reporting group (including unsampled populations). For this reason we propose the following guidelines:
 - a. The number of individuals representing a reporting group in the baseline should be at least as large as the mixture. We propose this guideline because mixture individuals are added to the baseline in the Bayesian MSA routine and the allele frequencies are updated. If the MSA routine misallocates fish, updated allele frequencies could drift away from the original frequencies. The updating of population allele frequencies has a larger relative effect on populations when a high proportion of the population is composed of individuals added from the mixture. We observed this phenomenon when we estimated the stock compositions of mixtures of fish that were taken from the escapement of different rivers (Figure 1). We assembled 10 mixtures made up of 240 fish each. Each mixture contained fish in the same proportions (true percentages). We estimated stock proportions using the standard one-mixture-at-a-time method (BAYES Individually) and then by using the information from all ten mixtures simultaneously in the baseline (Simultaneous). The BAYES Individually method performed better than the Simultaneous method in most cases and was most divergent for the Wood and Igushik reporting groups. We think that this occurred because Igushik was underrepresented in the baseline relative to the mixture size (382 individuals from 4 populations in the baseline; 2400 total mixture individuals, of which 400 were of Igushik origin). We believe that allele frequency estimates for the Igushik reporting group were being heavily influenced by misallocations from the Wood River to the Igushik River. These results were presented at the April 2009 WASSIP meeting.

- b. In cases where the baseline poorly represents the genetic variation within desired reporting groups, proximate populations should be grouped to create larger reporting groups. Representation of collections within a reporting group should be proportional to the amount of variation within the group relative to variation between this group and other groups. In other words, reporting groups with high levels of among-population variation need better representation than reporting groups made up of populations with little among-population variation. Without adequate baseline representation of a reporting group, fish in mixtures that originate from populations not represented in the baseline are more likely to allocate to an incorrect reporting group. Because genetic variation is often geographically structured, the misallocation is likely to go to a proximate reporting group. By combining proximate reporting groups that are not well characterized within the baseline, the likelihood of correctly allocating fish from unrepresented populations increases.
4. Reporting group definitions should account for the number of fish expected from the reporting group within a mixture. Even for large sample sizes (>200), Marlowe and Busack (1995) found that a reporting group needed to have an estimated contribution of 5% or greater for a mixture to have a CV less than 50%. We therefore recommend that, when not required to be kept separate for management or other purposes, subregional reporting groups should be combined into regional reporting groups that are expected to have contributions to the mixture of 5% or greater to minimize CVs.

Of course, the number of fish expected from a reporting group will differ greatly among fisheries given the large area (3,000 km shoreline) covered by WASSIP. This is especially true given that many of the fisheries target local stocks. These large changes in stock composition among fisheries add complexity to defining reporting groups that are likely to be represented at contributions of 5% or greater.

PROPOSED METHODS

The methodology for determining reporting groups for WASSIP will be an iterative process that will involve input from stakeholders, an examination of genetic data, and then additional input from stakeholders. The first step is to collect input from stakeholders to provide direction for defining a proposed set of regional and subregional reporting groups. The next step is to determine the ability for genetic information to distinguish the proposed reporting groups. The last step is to finalize the reporting groups by taking into account the stakeholder needs and the genetic constraints.

Here we present a holistic method to integrate all these factors into appropriate reporting group definitions for WASSIP. The proposed method advances the idea of adjusting the reporting groups by area according to the anticipated presence of stocks. Finally, we propose specific reporting groupings for each of these hierarchical levels for both chum salmon and sockeye salmon as a starting point based on input received so far from stakeholders.

Initial input from stakeholders

Tables 1 and 2 and Figures 2–7 outline the regional and subregional reporting groups proposed for WASSIP for sockeye and chum salmon, respectively, based on department staff comments and from comments from the AP at the October 7, 2010 meeting. Tables 3 and 4 provide

collection details summarized by these reporting groups for sockeye and chum salmon, respectively. We are looking for additional comments from AP members to provide guidance on their reporting group needs relative to WASSIP.

Methodology for determining feasibility of reporting groups

We propose the following guidelines for establishing reporting groups.

1. Adequate MSA performance. Performance of the proposed reporting groups will be tested using the escapement sample (where available for sockeye salmon only) and/or proof tests (sockeye and chum salmon) as outlined in Dann et al. (2012a). The department generally seeks to achieve minimum metrics for MSA performance of 90% correct allocation to reporting group. However, much higher performance has been stipulated by the AP in amendment to the MOU, in which the department is to strive to achieve estimates within $\pm 1\%$ of the true value 99% of the time.
2. Adequate numerical representation in the baseline. Numbers of individuals available within reporting groups will be set at a minimum of 400 fish.
3. Adequate representation of within-reporting group genetic variation in the baseline. Variation within reporting groups will be visualized using trees as outlined in Dann et al. (2012a). For cases where escapement samples are available, adequate representation of within-reporting group variation will be examined via the escapement tests. For drainages without escapement samples, verification will be obtained from (1) people who have local knowledge that the abundant spawning aggregates are represented in the baseline, (2) the clustering of spawning aggregates on trees, and (3) the provision of acceptable results from proof tests as a surrogate for escapement tests.
4. Adequate expected number of fish from reporting groups in the mixture. The minimum number of fish from a reporting group expected to occur within the mixture is 5%, or 20 fish (see below for dynamic reporting group strategy).

Reassessment by stakeholders

After determining the feasibility of reporting groups, a final set of reporting groups will be established in consultation with all stakeholders. This final set may result in reporting groups that deviate from the above guidelines. However, reporting groups must provide statistically supportable estimates.

Application of dynamic reporting group strategy

The number of expected fish from a reporting group within a fishery mixture will be highly dependent on where the mixture originates. Generally, reporting groups geographically proximate to the fishery are more likely to be represented in the mixture than reporting groups more distant from the fishery. As a result the tabulation of appropriate reporting groups for fishery mixtures will need modification depending on where the fishery is prosecuted.

We propose a dynamic reporting strategy that would take into account the region in which the fishery is prosecuted. Within the region in which the fishery occurs, reporting groups would include the subregional reporting groups for that region and the regional reporting groups outside of that region. These estimates, along with their 90% credibility intervals, would be tabulated within the final report. All regional and subregional reporting group estimates will be reported in appendices to the final report because they will be required to calculate harvest rates.

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QUESTIONS FOR TECHNICAL COMMITTEE

- 1) Are the variables identified as important for determining reporting groups reasonable? Are there some that seem unnecessary or should other variables be considered?
- 2) Are the proposed methods for determining appropriate reporting groups reasonable? Are there better ways to do this?

QUESTIONS FOR ADVISORY PANEL

- 1) Do the proposed reporting groups (both regional and subregional; Tables 1-4, Figures 2-7) meet the needs of your constituents?
- 2) Are there reporting groups that can be collapsed or further divided?
- 3) Are the delineations between the reporting groups appropriate (Tables 1 and 2)?

RESPONSES FROM THE TC AND AP

Responses to this document from the Technical Committee and Advisory Panel are detailed in the minutes for the WASSIP joint AP/TC meeting in Anchorage, Alaska on March 17, 2011.

Robin Waples, Bruce Weir, and Thomas Quinn represented the TC at the meeting. Below are their comments gleaned from the minutes:

- 1) Are the variables identified as important for determining reporting groups reasonable? Are there some that seem unnecessary or should other variables be considered?
 - Test the baseline (>90% correct allocation proof tests)
 - Robin Waples recommended taking a good look at baseline samples between the Goodnews and Togiak rivers to ensure strays are not contributing to the inability to reach the 90% criterion.
 - Tom Quinn agreed that the 90% criterion was reasonable during a discussion about keeping Nelson River as a separate reporting group.
 - Ensure adequate genetic representation (escapement tests and/or local knowledge)
 - No comments directed toward this criterion.
 - Ensure adequate numerical representation (>400 fish per reporting group)
 - No comments directed toward this criterion.
 - Ensure adequate expected number in mixture (>5%)
 - Robin Waples felt this criterion may be high, but agreed that it is an important variable in determining appropriate reporting groups.
- 2) Are the proposed methods for determining appropriate reporting groups reasonable? Are there better ways to do this?
 - No comments directed toward these questions.

Advisory Panel members representing all MOU signatories were present at the meeting except for representatives for Association of Village Council Presidents and Tanana Chiefs Conference. Below are their comments gleaned from the minutes:

- 1) Do the proposed reporting groups (both regional and subregional; Tables 1-4, Figures 2-7) meet the needs of your constituents? Yes – given the decisions listed below.
- 2) Are there reporting groups that can be collapsed or further divided? Yes – given the decisions listed below.

- 3) Are the delineations between the reporting groups appropriate (Tables 1 and 2)? Yes – given the decisions listed below.

The following decisions were made by Advisory Panel consensus:

- For sockeye salmon reporting groups:
 - Delete Yukon River fish from baseline based on technical concerns.
 - Goodnews will be kept separate from Togiak if 90% criterion is met, otherwise the AP and TC will have a conference call to discuss options.
 - Nelson River will be kept separate if 90% criterion met, the Aleutian Islands will be combined with Northwestern District/Black Hills, and the Aniakchak population will be pooled with East of WASSIP.
 - Cinder and Meshik will be kept separate if 90% criterion is met, otherwise combine.
 - Combine the Bear-early and late runs into one reporting group. Sandy River and Bear River will be kept separate if 90% criterion is met, otherwise combine.
 - Chignik Area will have two reporting groups: Black Lake and Chignik Lake.
 - The East of WASSIP reporting group will not be subdivided.
- For chum salmon reporting groups:
 - First, determine if the 4 major regional reporting groups for chum salmon can be distinguished at the 90% criterion.
 - Second, determine if AYK can be distinguished from Bristol Bay and the Alaska Peninsula.
 - Third, determine if Norton Sound/Port Clarence Area can be distinguished from the Yukon and Kuskokwim areas.
 - Combine Nunivak Island, Lower Kuskokwim River, Kanektok/Goodnews Rivers and Upper Kuskokwim River into one reporting group. Togiak and Nushagak will be kept separate if 90% criterion is met, otherwise pool Togiak and Nushagak but keep them separate from eastern Bristol Bay.
 - Gather local knowledge on the life history of populations from the Norton Sound/Port Clarence and Kotzebue areas and determine what can be distinguished for MSA. Consult with the AP in September to finalize reporting groups.
 - First determine if all 4 Alaska Peninsula sub-regional reporting groups can be distinguished. If not, first combine Northern District and Northwestern District and determine if they can be distinguished from South Peninsula and Chignik. If not, then combine Northern District, Northwestern District and South Peninsula and determine if they can be distinguished from Chignik.

TIMELINE

- 1) Initial input from the AP and the TC by March 7, 2011.
- 2) Final reporting group decisions for sockeye salmon at the March 17, 2011 meeting.
- 3) Final reporting group decisions for chum salmon at the fall, 2011 meeting.

TABLES

Table 1.—Proposed regional and subregional reporting groups for sockeye salmon for WASSIP. Reporting groups are ordered geographically from northwestern Alaska to Cape Suckling. All populations spawning between the start and stop points belong to the reporting group.

Reporting Group		Start Point	Stop Point
Regional	Subregional (if possible)		
North of Kuskokwim R.	Seward Peninsula	Cape Prince of Wales ^a	Point Romanof ^a
	Yukon River (exclude?)	Point Romanof ^a	Naskonat Peninsula ^a
Kuskokwim Bay	Kuskokwim River	Naskonat Peninsula ^a	Warehouse Bluff
	Kanektok	Warehouse Bluff	Jacksmith Bay
	Goodnews	Jacksmith Bay	Cape Newenham
Bristol Bay	Togiak	Cape Newenham	Cape Constantine
	Igushik/Snake	Cape Constantine	Coffee Point
	Wood	Coffee Point	Black Slough
	Nushagak	Black Slough	Etolin Point
	Kvichak	Etolin Point	Pederson Point (excluding Alagnak R.)
	Alagnak	Alagnak River mouth	Alagnak River headwaters
	Naknek	Pederson Point	Cape Chichagof
	Egegik	Cape Chichagof	Cape Greig
	Ugashik	Cape Greig	Cape Menshikof ^a
	North Peninsula	Cinder ^b	Cape Menshikof ^a
Meshik ^b		158° 20.00' W ^a	Stroganof Point ^a
Ilnik (includes Three Hills)		Stroganof Point ^a	Cape Seniavin ^a
Bear early/Sandy ^b		Cape Seniavin ^a	Cape Rozhnof ^a
Bear late		Cape Seniavin ^a	Cape Rozhnof ^a
Nelson River		Cape Rozhnof ^a	Frank's Point ^a
Northwestern District/Black Hills		Frank's Point ^a	Cape Sarichef ^a
Aleutian Islands		Cape Sarichef ^a	Scotch Cap ^a
South Peninsula	South Peninsula	Scotch Cap ^a	Kupreanof Point ^a
Chignik	Black Lake	upstream of Chignik L.	Black Lake headwaters
	Chignik Lake	Kupreanof Point ^a	Cape Kumlik
	Aniakchak Lake (exclude?)	Cape Kumlik	Kilokak Rocks ^a
East of WASSIP	East of WASSIP	Kilokak Rocks ^a	Cape Suckling ^a

^a Stop/start points define fishing district, subdistrict, or section boundaries in Alaska Administrative Code (5 AAC 5.1).

^b Current genetic baseline (45 SNPs) is adequate to allocate to regular font regional and subregional reporting groups and is unable to allocate among reporting group pairs. We anticipate higher resolution with the new 96-SNP baseline.

Table 2.—Proposed regional and subregional reporting groups for chum salmon for WASSIP. Reporting groups are ordered geographically from Japan to the Pacific Northwest. All populations spawning between the start and stop points belong to the reporting group.

Reporting Group		Start Point	Stop Point
Regional	Subregional (if possible)		
Asia	Asia	Western end of species range	US/Russia border
Kotzebue Sound	Kotzebue Sound	Point Hope ^a	Cape Prince of Wales ^a
Norton Sound ^b	Nome/Port Clarence ^c	Cape Prince of Wales ^a	Topkok Head ^a
	Golovin/Elim ^c	Topkok Head ^a	Bald Head ^a
Lower Yukon River ^b	Norton Bay/Shaktoolik/Unalakleet ^c	Bald Head ^a	Point Romanof ^a
	Lower Yukon River (all Summer) ^b	Point Romanof ^a	Naskonat Peninsula ^a
Kuskokwim Bay/River/Nunivak ^b	Nunivak	Naskonat Peninsula ^a	Kipnuk
	Lower Kuskokwim River ^c	Kipnuk	Warehouse Bluff
	Kanektok/Goodnews rivers ^c	Warehouse Bluff	Cape Newenham
	Upper Kuskokwim River (Fall)	Upstream of Takotna River	headwaters of Kuskokwim
Bristol Bay ^b	Togiak ^c	Cape Newenham	Cape Constantine
	Nushagak ^c	Cape Constantine	Etolin Point
	Eastern Bristol Bay ^b	Etolin Point	Cape Menshikof ^a
Middle/Upper Yukon River	Middle (Summer/Fall)	All fall-run populations in Koyukuk River drainage and all populations in Tanana River drainage.	
	Upper (Fall)	All populations upstream of Tozitna River on the mainstem, excluding populations in the Tanana River drainage.	
Alaska Peninsula	Northern District ^b	Cape Menshikof ^a	Moffit Point ^a
	Northwestern District ^b	Moffit Point ^a	Cape Sarichef ^a
	South Peninsula ^b	Scotch Cap ^a	Kupreanof Point ^a
	Chignik ^b	Kupreanof Point ^a	Kilokak Rocks ^a
East of WASSIP	East of WASSIP	Kilokak Rocks ^a	Eastern end of species range

^a Stop/start points in *italics* define fishing district boundaries in Alaska Administrative Code (5 AAC 5.1).

^b Current genetic baseline (53 SNPs) is close to being able to allocate among reporting groups.

^c Current genetic baseline (53 SNPs) is unable to allocate among reporting group sets in. We anticipate higher resolution with the new 96-SNP baseline.

Table 3.—Baseline collection information for sockeye salmon organized geographically by the regional and subregional reporting groups proposed for WASSIP. Each line contains an individual collection with ADF&G collection code, location, collection date (only year is provided for collections where calendar day is not known), and the sample size genotyped for one of the new baseline SNPs. Note that these samples sizes represent the number of individuals genotyped for the new set of 96 SNPs, and may differ from final baseline sample sizes due to the removal of duplicate individuals and individuals with many missing loci.

Reporting Group		ADF&G code	Location	Date	N		
Regional	Subregional						
North of Kuskokwim River	Seward Peninsula	SSALM01	Salmon Lake	8/3/2001	88		
		SGLAC04	Glacial Lake	8/15/2004	190		
		SUNA07	Unalakleet River	8/22/2007	95		
					Seward Peninsula Total	373^a	
	Yukon River	SANDRE05	SANDRE06	SANDRE08	Andreafsky River	7/12/2005	47
					6/28/2006	48	
					7/19/2008	47	
					Yukon River Total	142^a	
					North of Kuskokwim River Total	515	
	Kuskokwim Bay	Kuskokwim River	SNECO06	Necons River	8/1/2006	55	
SNECO07			7/28/2007		95		
STELA03			Telaquana Lake	8/14/2003	96		
STELA05				10/4/2005	95		
SKOGR08			Kogruklu River	8/4/2008	71		
SCHUKO08			Chukowan River	8/7/2008	75		
SHOLI08			Holitna River	8/9/2008	75		
SATSAK09			Atsaksovluk Creek, Aniak Basin	8/6/2009	95		
STULU08			Tuluksak River	7/4/2008	75		
SKWETR06			Kwethluk River	8/8/2006	127		
SKWETR07				8/5/2007	50		
				Kuskokwim River Total	909		
Kanektok			SKAGF09	SPEGF09	SKAGB09	Kagati Lake tributary	8/9/2009
	Pegati Lake tributary	8/8/2009				95	
	Kagati Lake beach	8/9/2009				95	

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Table 3. Page 2 of 17.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SPEGB09	Pegati Lake beach	8/8/2009	95
		SKAGO09	Kagati-Pegati Lake outlet	8/10/2009	95
		SKANE09	Kanektok River mainstem	8/12/2009	95
		SKANE02	Kanektok River	7/16/2002	95
		SKANE07	Kanektok River	7/10/2007	96
				Kanektok Total	761
	Goodnews	SGOODSO10NF	Goodnews R. - N.F. lake tributary	8/12/2010	95
		SGOODB10NF	Goodnews R. - N.F. lake beach	8/12/2010	95
		SGOODO10NF	Goodnews R. - N.F. lake outlet	8/12/2010	95
		SGOODR10NF	Goodnews River - North Fork	8/13/2010	95
		SGOOD02		7/23/2002	95
		SGOOD06		7/20/2006	48
		SGOODSO10MF	Goodnews R. – M.F. lake tributary	8/8/2010	95
		SGOODB10MF	Goodnews R. – M.F. lake beach	8/8/2010	95
		SGOODO10MF	Goodnews R. – M.F. lake outlet	8/8/2010	95
				Goodnews Total	808
				Kuskokwim Bay Total	2,478
Bristol Bay	Togiak	SSLUG10	Slug River	8/8/2010	108
		SOSVIAK10	Osviak River	8/8/2010	75
		STOGL00	Sunday Creek	8/21/2000	95
		STOGT06	Togiak Tower	7/27/2006	95
		SONGI06	Ongivinuk Lake	8/24/2006	95
		SNENE06	Nenevok Lake	8/24/2006	95
		SGECH00	Gechiak Lake	8/21/2000	96
		SKULU06	Kulukak River Lake	8/24/2006	95
				Togiak Total	754
	Igushik	SUALI03	Ualik Lake	8/14/2003	99
		SUALI03f		8/14/2003	30
		SONGU07	Ongoke River - Upper	8/27/2007	95

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Table 3. Page 3 of 17.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SONGL07	Ongoke River - Lower	8/28/2007	95
		SAMAN03	Amanka Lake	8/14/2003	100
		SAMAN03f		8/14/2003	57
		SSNAKLKB10	Snake Lake beach	8/11/2010	89
		SSNAKLKO10	Snake Lake outlet	8/11/2010	83
				Igushik Total	648
	Wood	SLKUL07	Lake Kulik beaches	9/10/2007	95
		SGRANT07	Grant River	8/22/2007	95
		SKULIK01	Lake Kulik	8/1/2001	96
		SMIKCH09	Mikchalk Lake	9/10/2009	95
		SSILVH07	Silver Horn beaches	9/10/2007	95
		SHARDL07	Hardluck Bay beaches	9/10/2007	95
		SMOOSCK09	Moose Creek	8/17/2009	95
		SAGULU01	Agulukpak River	8/21/2001	94
		SANVI06	Anvil Bay Beach	8/20/2006	95
		SSIXCK08	Sixth Creek	2008	95
		SN4BE06	N4 Beach	8/11/2006	95
		SABEA04	A Beach - Little Togiak Lake	8/8/2004	65
		SABEA05		8/10/2005	30
		SLTOG08	Little Togiak River	2008	95
		SPICK01	Pick Creek	8/3/2001	95
		SPICK08		7/22/2008	93
		SLYNXLK09	Lynx Lake	9/9/2009	95
		SLYNX06	Lynx Beach	8/11/2006	95
		SLYNXCKT09	Lynx Creek - Cold Tributary	8/12/2009	81
		SLYNX01	Lynx Creek	8/22/2001	95
		SLYNXCK09		8/21/2009	109
		SAGULO01	Agulowok River	8/22/2001	95
		SICEL07	Ice Creek	8/9/2007	95

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SHAPP01	Happy Creek	7/30/2001	95
		SHANS04	Hansen Creek	8/4/2004	95
		SBEAR01	Bear Creek	8/2/2001	96
		SEAGL07	Eagle Creek	8/12/2007	93
		SYAKOB06	Yako Beach	8/19/2006	95
		SMISS98	Mission Creek	1998	94
		SWOOD09	Wood River	9/5/2009	95
				Wood River Total	2,751
	Nushagak	SFISHT10	Fish Trap Lake	9/4/2010	80
		SMULC01B	Mulchatna River	8/27/2001	65
		SMULC01A		8/27/2001	95
		SKOKT00	Koktuli River	8/13/2000	96
		SSTUY00	Stuyahok River	8/14/2000	96
		SUPNK01	Klutapuk Creek	8/18/2001	95
		SKING01	King Salmon River	8/18/2001	48
		SCHAU01	Chauekuktuli Lakebeach	8/22/2001	96
		SALLE00	Allen River beach	8/17/2000	96
		SALLE01	Allen River	8/22/2001	95
		SNUYL00	Nuyakuk Lake	8/16/2000	95
		SNUYA01	Nuyakuk Lake - south beach	8/23/2001	94
		STIKC01	Tikchik River	8/18/2001	95
		STIKC00	Tikchik Lake	8/18/2000	95
				Nushagak Total	1,241
	Kvichak	STLGF99	Tlikakila River - Glacier Fork	10/6/1999	47
		SUTLIK01	Upper Tlikakila River	9/24/2001	96
		LLCL99	Little Lake Clark	10/9/1999	95
		SKIJI01	Kijik River	9/19/2001	96
		SLKIJ01	Lower Kijik River	9/18/2001	96
		SCHLB99	Chulitna Lodge Beach	10/5/1999	96

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SCHLP99	Chulitna Lodge Ponds	10/1/1999	48
		SSUCK07	Sucker Bay Lake	9/14/2007	95
		STAZI01	Tazimina River	8/29/2001	95
		SNHAL02	Newhalen River	9/3/2002	96
		STOMK00	Tomkok Creek	8/24/2000	95
		STOMK02		8/28/2002	48
		SKNUT00	Knutson Bay	8/27/2000	96
		SKNUT99L		10/16/1999	95
		SPEDR99	Pedro Ponds	1999	47
		SGRAS99L	Pedro Ponds - Grass Pond late	10/15/1999	44
		SCHIN00	Chinkelyes Creek	8/28/2000	96
		SILIA04B	Iliamna River	8/21/2004	95
		SILIA99L	Iliamna River - late	10/17/1999	96
		SFING00	Finger Beach 1	8/24/2000	84
		SPORC99	Porcupine Island - Painted Rock	1999	48
		SFUEL00	Fuel Dump Island	8/28/2000	96
		SWOOD01	Woody Island - West Beach	8/19/2001	96
		STRIA00	Triangle Island 2	8/16/2000	96
		STOMM00	Tommy River	8/24/2000	96
		STOMM02		8/19/2002	48
		SCOPP00	Copper River	8/28/2000	96
		SCOPP99		8/23/1999	47
		SNICK00	Nick N Creek	8/25/2000	96
		SSECK00	Southeast Creek	8/26/2000	96
		SSOUT99	Southeast Creek beach	8/26/1999	95
		SDREA01	Dream Creek	8/22/2001	95
		SGIBR00	Gibraltar River	8/25/2000	90
		SGIBR99		8/23/1999	95
		SDENN00	Dennis Creek	8/23/2000	96

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SBELI00	Belinda Creek	8/25/2000	95
		SUTAL04	Upper Talarik Creek	8/15/2004	95
		SUTAL06		8/10/2006	95
		SLTAL00	Lower Talarik Creek	8/26/2000	95
		SLTAL01		8/23/2001	70
				Kvichak Total	3,392
	Alagnak	SMORA04E	Moraine Creek	8/8/2004	96
		SBATT01	Battle Creek	9/4/2001	96
		SBATL04T	Battle Lake tributary	9/11/2004	96
		SBATL04B	Battle Lake beach	9/11/2004	96
		SNANU04E	Nanuktuk Creek	8/9/2004	96
		SNANU04		9/9/2004	96
		SKULI01	Kulik River	9/5/2001	96
		SKULI04		9/8/2004	96
				Alagnak Total	768
	Naknek	SAMER00	American River	8/22/2000	92
		SAMER01		8/17/2001	96
		SGROS03	Grosvenor Lake	8/12/2003	96
		SHARD03	Hardscrabble Creek	8/12/2003	96
		SMARG01	Margot Creek	8/15/2001	95
		SHEAD01	Headwater Creek	7/22/2001	93
		SBRLK00	Brooks Lake	8/22/2000	96
		SLQTIP06	Lower Q-Tip Lake	9/12/2006	86
		SIDAV00	Idavain Creek	8/23/2000	95
		SIDAV06		8/29/2006	48
		SDUMP306	Dumpling Creek beach	9/17/2006	83
				Naknek Total	976
	Egegik	SCABI00	Cabin Creek	8/15/2000	96
		SSALCR06	Salmon Creek	8/16/2006	95

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SBURL06	Burls Creek	8/16/2006	95
		SCLEO01	Cleo Creek	8/16/2001	48
		SFEAT01	Featherly Creek	8/16/2001	48
		SBECH00	Becharof Creek	8/11/2000	94
		SKEJU00	Upper Kejulik River	8/8/2000	96
		SKEJU01	Kejulik River	8/17/2001	96
		SBECH08NT	Becharof Lake north	8/11/2008	95
		SBECH08SB	Becharof Lake south	8/11/2008	95
				Egegik Total	858
	Ugashik	SUGAS01	Ugashik Creek	7/21/2001	96
		SCROCK05	Crooked Creek	8/24/2005	95
		SDEER01	Deer Creek	7/20/2001	96
		SUGAS00	Ugashik Narrows	8/24/2000	96
		SBLACKU05	Black Creek	8/24/2005	95
		SECRE05	E Creek	8/8/2005	95
		SOUTL00	Outlet Stream	8/26/2000	95
		SFIGU05	Figure 8 Creek	8/22/2005	95
		SOLDH05	Old Ham Creek	8/22/2005	95
				Ugashik Total	858
				Bristol Bay Total	12,246
North Peninsula	Cinder/Meshik	SWIGGC05	Wiggly Creek	7/29/2005	90
		SMAINC05	Mainstem Cinder River	7/29/2005	95
		SLAVA04	Lava Creek	7/23/2004	95
		SMUDA05	Mud Creek A	7/30/2005	95
		SMESLK05	Meshik Lake beach	7/30/2005	95
		SMESLKO05	Meshik Lake outlet	7/30/2005	95
		SMESHL05	L Creek - Meshik River	7/30/2005	95
		SMESH202	Blue Violet Creek - Meshik River	7/29/2002	93
		SMESH102	Landlock Creek - Meshik River	7/29/2002	96

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Reporting Group		ADF&G code	Location	Date	N
Regional		SREDBC05	Red Bluff Creek	7/30/2005	95
				Cinder/Meshik Total	944
	Ilnik	SNPEN01	Willie Creek	8/27/2001	81
		SILNIK07	Ilnik River	7/7/2007	190
		SWILD05	Wildman Lake	7/30/2005	95
		SOCEA01	Ocean River	2001	96
				Ilnik Total	462
	Bear Early/Sandy	SSAND00	Sandy Lake	6/30/2000	95
		SSANDR07	Sandy River	7/8/2007	190
		SBEAR00E	Bear River - early	6/30/2000	95
		SBEARR07		7/7/2007	95
				Bear Early/Sandy Total	475
	Bear Late	SCUB04	Cub Creek	8/15/2004	95
		SREDC04	Red Creek	8/15/2004	95
		SBEARS05	Bear Lake beach	8/29/2005	95
		SBEAR005	Bear Lake outlet	8/29/2005	95
		SBEAR00L	Bear River	8/18/2000	96
				Bear Late Total	476
	Nelson River	SHOOD01	Hoodoo Lake	7/31/2001	95
		SHOOD05	Hoodoo Lake beach	7/31/2005	95
		SNELSR07	Nelson River	2007	47
		SDAVI05	Davids River	7/31/2005	95
				Nelson River Total	332 ^a
	Northwestern	SNCREK07	North Creek	7/25/2007	95
	District/Black Hills	SMOF09	Moffett Creek	8/18/2009	95
		SMOFF02	Paul Hansen tributary	7/30/2002	95
		SOUTE04	Outer Marker Lake	9/9/2004	95
		SBLUE04	Blue Bill Lake	9/7/2004	95
		SSWANL08	Swansons Lagoon	8/25/2008	95

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SPETELA05	Peterson Lagoon	8/2/2005	95
		SWHAL02	Whaleback Mountain Creek	7/30/2002	96
			Northwestern District/Black Hills		761
	Aleutian Islands	SMCLE04	McLees Lake	6/4/2004	143
		SSUMM99	Summer Bay Lake	8/25/1999	96
			Aleutian Islands Total		239^a
			North Peninsula Total		3,689
South Peninsula	South Peninsula	SSANA08	Sanak Island	8/24/2008	86
		SHANLK05	Hansen Lake	8/2/2005	95
		SMIDL04	Middle Lagoon - Morzhovoi Bay	7/28/2004	95
		STHIN05	Thin Point Lagoon	8/1/2005	95
		SMORT04	Mortensen's Lagoon	8/2/2004	95
		SLONGJ05	Long John Lagoon	8/1/2005	95
		SCANBR08	Canoe Bay River	8/26/2008	95
		SARCH05	Archeredin Lake	8/3/2005	95
		SORZI00	Orzinski	7/1/2000	94
			South Peninsula Total		845
Chignik	Black Lake	SBROAD97	Broad Creek	9/1/1997	96
		SBSPR97	Big Spring	1997	95
		SBOUL97	Boulevard Creek	9/1/1997	95
		SFAN97	Fan Creek	1997	95
		SALEC97	Alec River	9/1/1997	96
			Black Lake Total		477
	Chignik Lake	SCHIA08	Chiaktuak Creek	8/29/2008	95
		SCHIA97E		1997	95
		SCHIA97M		9/18/1997	94
		SWESTF08	West Fork Chignik River	8/28/2008	95
		SCUCU08	Cucumber Creek	8/29/2008	95

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SHAT08E	Hatchery Beach	8/29/2008	95
		SHAT96		10/18/1996	95
		SHAT97E		9/15/1997	94
		SCLARK08	Clark River	8/28/2008	94
		SCLARK96		10/19/1996	95
		SCLRK97E		9/16/1997	96
		SCHIG08	Chignik River	8/30/2008	95
		SCHIG98		8/22/1998	95
				Chignik Lake Total	1,233
	Aniakchak River	SSURPL08	Surprise Lake	8/22/2008	95
				Aniakchak River Total	95^a
				Chignik Total	1,805
East of WASSIP		SOCEAB06	Ocean Beach	8/29/2006	95
		SHORS05	Horse Marine Lake	9/2/2005	95
		SPINNM08	Frazer Lake - Pinnell Creek	8/21/2008	78
		SSTUM08	Frazer Lake - Stumble Creek	8/21/2008	95
		SCOUR08	Frazer Lake - Courts Shoreline	8/21/2008	95
		SMIDWM08	Frazer Lake - Midway Creek	8/21/2008	93
		SMIDWS08	Frazer Lake - Midway beach	8/21/2008	95
		SLINDM08	Frazer Lake - Linda Creek	8/22/2008	95
		SHOLFS08	Frazer Lake - Hollow Fox beach	8/22/2008	95
		SVALA08	Frazer Lake - Valarian Creek	8/21/2008	95
		SOUTS08	Frazer Lake - Outlet beach	8/20/2008	95
		SDOGSC08	Frazer Lake - Dog Salmon Creek	8/22/2008	95
		SAKAL05L	Akalura Lagoon	9/2/2005	95
		SUPS00E	Upper Station	6/15/2000	95
		SUPUP93	Upper Station - Upper	9/1/1993	95
		SLUPS93	Upper Station - Lower	1993	95
		SAYAK00	Ayakulik River	7/26/2000	96

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SAYAK08L		8/14/2008	95
		SOMALL99	Karluk Lake - O'Malley River	9/30/1999	95
		SUTHU00E	Karluk Lake - Upper Thumb Lake	7/24/2000	95
		SLTHUM99	Karluk Lake - Lower Thumb River	9/30/1999	95
		SLRIV97	Little River Lake	7/15/1997	96
		SUGAN97	Uganik Lake	7/15/1997	95
		SBUSK05	Buskin Lake	6/26/2005	95
		SBUSKL10		6/13/2010	95
		SLKLOU05	Lake Louise - Buskin River	8/3/2005	95
		SLKLOU10		7/19/2010	95
		SPASA05	Pasagshak Lake	7/15/2005	95
		SLMIA05	Lake Miam	9/2/2005	95
		SSALT94	Saltery Lake	1994	95
		SSALT99		8/26/1999	95
		SAFOG93	Afognak Lake	8/15/1993	79
		SMALI93	Malina	8/15/1993	80
		STHOR06	Thorsheim Lake	8/23/2006	83
		SPORT98	Portage Lake	1998	96
		SLKIT93	Little Kitoi	9/10/1993	95
		SKAFL08	Kaflia Lake	8/27/2008	95
		SWACK09	Wackton Creek - Crescent River	8/13/2009	95
		SPYRAM09	Pyramid Creek - Crescent Lake	8/13/2009	95
		SCRES941	Crescent Lake	1994	48
		SCREE942		1994	47
		SCRESL09	Crescent Lake outlet	8/12/2009	95
		SLJACK06	Little Jack Creek	9/6/2006	95
		SPACK92	Packers Lake	7/1/1992	95
		SSFBIG07	South Fork Big River	8/14/2007	123
		SSFBIGF09	South Fork Big River Falls	7/7/2009	48

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Table 3. Page 12 of 17.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SWOLV93	Wolverine Creek - Big River	7/5/1993	95
		SBLACSC07	Black Sand Creek	8/13/2007	95
		SFARR07	Farro Lake Creek	8/13/2007	95
		SMCCA93	McArthur River	1993	95
		SCHIL92	Chilligan River	1992	48
		SCHIL94		1994	48
		SCHAK08	Chakachatna Slough	8/27/2008	95
		SCOAS09	Coal Creek Spring	8/21/2009	48
		SCOAW09	West Fork Coal Creek	8/21/2009	47
		SMOOSE07	Moose Creek	8/27/2007	95
		SPUNT06	Puntilla Lake	9/6/2006	95
		SREDSA06	Red Salmon Lake	9/7/2006	95
		STRIM107	Trimble River	9/17/2007	61
		STRIM109		9/1/2009	18
		STRIM207		9/17/2007	47
		STRIM209		9/1/2009	48
		SHAYT08	Hayes River tributary	9/2/2008	48
		SHAYT09		8/28/2009	47
		SSKWEN07	Skwentna River	9/20/2007	108
		SCANYC07	Canyon Creek	9/20/2007	65
		SJUDD06	Judd Lake	7/26/2006	94
		SJUDD09		2009	95
		SJUDD93		8/23/1993	96
		STRIN09	Trinity Lake inlet	8/22/2009	95
		STRIN92	Trinity Lake	8/1/1992	48
		SSHEL06	Shell Lake	7/24/2006	95
		SSHEL09		2009	95
		SSHEL93		9/3/1993	48
		SWHISK06	Whiskey Lake outlet	9/2/2006	58

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Table 3. Page 13 of 17.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SWHISK09		9/1/2009	47
		SHEWI06	Hewitt Lake	8/2/2006	65
		SHEWI92		8/1/1992	47
		SJOHNCK09	Johnson Creek	8/28/2009	95
		SKICH107	Kichatna River	8/27/2007	95
		SYENW92	West Fork Yentna River	9/1/1992	96
		SYENW93		9/10/1993	100
		SCHEL06	Chelatna Lake	7/27/2006	95
		SCHEL09		8/7/2009	95
		SCHEL93		8/28/1993	95
		SBYER07	Byers Lake	8/13/2007	95
		SBYER93		1993	48
		SSPINK08	Spink Creek	8/30/2008	95
		SSWALK06	Swan Lake	9/2/2006	95
		SSWALK09		9/8/2009	48
		SSWLK07		8/15/2007	47
		SSUS9511	Susitna River Slough	1995	50
		SSUS9611		9/5/1996	6
		SSUS97		9/5/1997	94
		SSTEP07	Stephan Lake	7/28/2007	95
		SSTEP93		9/2/1993	48
		SLARS06	Larson Lake	7/23/2006	95
		SLARS93		9/1/1993	95
		SMAMA97	Mama and Papa Bear Lakes	9/3/1997	50
		SPAPA07		8/28/2007	54
		STALK97	Talkeetna River Sloughs	9/4/1997	79
		SBIRC07	Birch Creek	8/28/2007	95
		SBIRC93		1993	67
		SSHEEP08	Sheep River	8/30/2008	95

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Table 3. Page 14 of 17.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SNANC10	Nancy Lake	9/3/2010	95
		SNANC93		8/27/1993	95
		SLMEAD09	Little Meadow Creek	8/8/2009	142
		SFISH93	Fish Creek	1993	95
		SFISH94		8/15/1994	94
		SBIGL92	Big Lake	8/1/1992	95
		SCOTT93	Cottonwood Creek	1993	95
		SWASI98	Wasilla Creek	1998	71
		SESKA06	Eska Creek	9/5/2006	95
		SJIM97	Jim Creek	9/2/1997	95
		SBODE06	Bodenburg Creek	8/30/2006	95
		SSIXM08	Sixmile Creek	7/30/2008	95
		SCARMLK10	Carmen Lake	8/23/2010	95
		SWILLIW06	Williwaw Creek	9/7/2006	39
		SWILLIW07		8/23/2007	69
		SCHICK10	Chickaloon River	7/13/2010	95
		SSWAN97	Swanson River	8/21/1997	95
		SBISH93	Bishop Creek	1993	95
		SDANI93	Daniels Lake	1993	95
		SRAIL97	Railroad Creek	8/13/1997	48
		SJOHN97	Johnson Creek	8/12/1997	88
		SMOOK93	Moose Creek	7/27/1993	47
		SMOOK94		1994	95
		SPTAR92	Ptarmigan Creek	8/1/1992	47
		SPTAR93		1993	95
		STERN92	Tern Lake	9/1/1992	48
		STERN93		1993	48
		SQUAR93	Quartz Creek	8/6/1993	94
		SURGOAT09E	Upper Russian Lake - Goat Creek	7/20/2009	95

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Table 3. Page 15 of 17.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SURGOATM09		9/3/2009	95
		SURUS97		8/19/1997	95
		SRBEAR09	Upper Russian Lake - Bear Creek	9/3/2009	95
		SURSHOAL09	Upper Russian Lake beach	9/4/2009	95
		SUPRUS99	Upper Russian Lake South beach	9/16/1999	95
		SURUSA99	Upper Russian Lake outlet	9/17/1999	95
		SUROUT09		9/2/2009	95
		SRUSA92E	Russian River above falls	7/1/1992	96
		SRUSB93	Russian River below falls	8/2/1993	95
		SSKK194L	Kenai River	8/22/1994	47
		SSKK294L		8/22/1994	48
		SSKK494L		8/22/1994	48
		SSKK394E		1994	96
		SSKK394L		8/22/1994	47
		SSKKE93E		8/18/1993	48
		SSKKE93L		9/11/1993	47
		SSKK594L		9/9/1994	95
		SHIDDEN08	Hidden Lake - North shore	9/23/2008	95
		SHIDDEN93	Hidden Creek	7/29/1993	95
		SSKIL95	Skilak Lake	1995	48
		SSKIL92	Skilak Lake - outlet	8/1/1992	96
		SSKIL94E		1994	45
		SSKIL94L		1994	50
		STUST941	Tustumena Lake	1994	48
		STUST942		1994	48
		SSEEP94	Seepage Creek	1994	95
		SGLAC94	Glacier Flats Creek	1994	95
		SMOOT92	Moose Creek	8/1/1992	96
		SBEAR92	Bear Creek	8/1/1992	95

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Table 3. Page 16 of 17.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SNIKO92	Nikolai Creek	7/1/1992	95
		SENG92E	English Bay	6/1/1992	95
		SENG92L		10/1/1992	95
		SBEARLK10	Bear Lake	8/9/2010	190
		SBAIN10	Bainbridge Lake	8/6/2010	95
		SESHA91	Eshamy Lake	10/1/1991	96
		SESHAR08	Eshamy Creek	8/3/2008	95
		SCOG92HL	Coghill Lake tributary	8/27/1992	96
		SCOG92ES		8/27/1992	96
		SCOGH91	Coghill Lake	9/1/1991	96
		SCOGH10		7/7/2010	95
		SMINE09	Miners Lake	7/9/2009	95
		SMINE91		8/9/1991	96
		SEYAK10	Eyak Lake - Hatchery Creek	7/24/2010	95
		SEYAM07	Eyak Lake - Middle Arm	8/2/2007	95
		SEYASB07	Eyak Lake - South beaches	8/22/2007	95
		SMCKI07	McKinley Lake	8/20/2007	95
		SMCKI08		7/29/2008	95
		SMCKI91		7/1/1991	95
		SMCKSC07	McKinley Lake - Salmon Creek	7/25/2007	95
		STANAS09	Tanada Lake beach	9/9/2009	95
		STANAO09	Tanada Lake outlet	9/9/2009	95
		STANA05	Tanada Creek	8/21/2005	95
		SMENT08	Mentasta Lake	7/15/2008	95
		SFISHC08	Fish Creek – E. Fork Gulkana R.	8/1/2008	95
		SGULK08EF	East Fork Gulkana River	8/1/2008	75
		SSWEDE08	Swede Lake	8/13/2008	95
		SPAXSO09	Paxson Lake outlet	8/21/2009	77
		SMEND08	Mendeltna Creek	8/22/2008	95

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		SMEND09		8/12/2009	94
		SBANA08	Banana Lake - Klutina drainage	8/18/2008	82
		SBEARH08	Bear Hole - Klutina tributary	8/14/2008	95
		SKLUTI08	Klutina Lake inlet	8/21/2008	44
		SKLUTI09		8/13/2009	51
		SSANN05	St. Anne Creek	7/15/2005	95
		SSTACR08		7/22/2008	95
		SMAHL08	Mahlo River	7/22/2008	95
		SKLUT08	Klutina River mainstem	8/21/2008	95
		STONSL09	Tonsina Lake	8/8/2009	95
		SLONGLK05	Long Lake	9/7/2005	95
		STEBA08	Tebay Outlet	8/18/2008	94
		SSALMC08	Salmon Creek - Bremner drainage	8/17/2008	95
		SSTEAM08	Steamboat Lake	8/17/2008	95
		SCLEAR07	Clear Creek at 40 Mile	8/24/2007	95
		STOKUN08	Tokun Lake	6/19/2008	95
		STOKUN09		6/25/2009	94
		SMART07	Martin Lake	7/26/2007	95
		SMART08		7/21/2008	95
		SERB91		7/28/1991	96
		SMARTR08	Martin River Slough	7/11/2008	95
		SKUSH07	Kushtaka Lake	8/9/2007	95
		SKUSH08		8/8/2008	95
		SBERI91	Bering Lake	7/10/1991	95
East of WASSIP Total					18,170
Cape Suckling to Cape Prince of Wales Total					39,748

^a These reporting groups that deviate from the 400-fish minimum guideline.

Table 4.—Baseline collection information for chum salmon organized geographically by the regional and subregional reporting groups proposed for WASSIP. Each line contains an individual collection with ADF&G collection code, location, collection date (only year is provided for collections where calendar day is not known), and the sample size genotyped for one of the new baseline SNPs. Note that these samples sizes represent the number of individuals genotyped for the new set of 96 SNPs, and may differ from final baseline sample sizes due to the removal of duplicate individuals and individuals with many missing loci.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
Asia	Asia	CMNAMD05M	Namdae River	2005	95
		CMNAMD05F		2005	95
		CMGAKK03E	Gakko River, early	10/25/2003	80
		CMGAKK03L	Gakko River, late	12/16/2003	80
		CMTSUG99	Tsugaruishi River	12/08/1999	80
		CMSASA90	Sasanai River	11/14/1990	78
		CMYURA97E	Yurappu River, early	09/24/1997	80
		CMYURA97L	Yurappu River, late	11/17/1997	80
		CMSHIN02	Shinzunai River	10/17/2002	80
		CMTOKA02	Tokachi River	10/22/2002	80
		CMKUSH98	Kushiro River	10/22/1998	80
		CMCHIT03E	Chitose River, early	11/07/2003	80
		CMCHIT03L	Chitose River, late	12/05/2003	80
		CMNISH97	Nishibetsu River	10/22/1997	80
		CMSHIB03	Shibetsu River	10/10/2003	80
		CMSHAR01	Shari River	10/11/2001	77
		CMTOKOR05	Tokoro River	10/02/2005	95
		CMTSHIB04	Tokushibetsu River	10/15/2004	80
		CMNAIB95	Naiba	1995	95
		CMTYM95	Tym River	1995	55
		CMBOL97	Bolshaya River	06/01/1997	95
		CMPARA98	Paratunka River	08/17/1998	95
		CMAMU01	Amur River, summer run	07/15/2001	95
		CMAMU97		06/01/1997	60
		CMBIST98	Bistraya River	08/16/1998	70
		CMOZER98	Ozerki Hatchery	08/16/1998	95
		CMPYMT91	Pynta	1991	40
		CMPYMT93		1993	50

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		CMKOL91	Kol River	1991	80
		CMVORO93	Vorovskaya	1993	94
		CMKAM03E	Kamchatka River	2003	50
		CMKAM90		1990	50
		CMTIGIL02	Tigil River	2002	88
		CMPALA98	Palana River	07/24/1998	95
		CMOSS90	Ossora	1990	40
		CMOSS96		1996	50
		CMOLA90	Ola River, Hatchery	1990	79
		CMAPUK02	Apuka River	2002	50
		CMOKLA93	Oklan River	1993	76
		CMANADY00E	Anadyr River, early	2000	31
		CMANADY93		1993	15
		CMKANC91	Kanchalan	1991	80
		CMUTKA02	Utka River	2002	38
		CMUTKA91		1991	40
				Asia Total	3,186
Kotzebue Sound	Kotzebue Sound	CMINMA05	Inmachuk River	08/08/2005	95
		CMKEL91	Kelly Lake, Noatak River	09/01/1991	95
		CMKIAN04	Kiana River	07/13/2004	95
		CMKOB91	Kobuk, Salmon River	09/01/1991	95
		CMNOA91	Noatak River, above hatchery	09/01/1991	95
		CMSEL94	Selby Slough	09/25/1994	95
				Kotzebue Sound Total	570
Norton Sound	Nome/Port Clarence	CMAGIA05	Agiapuk River	07/25/2005	95
		CMAMER04	American River	09/11/2004	95
		CMELDO05	Eldorado River	06/28/2005	95
		CMNOME05	Nome River	07/15/2005	95
		CMPIL94	Pilgrim River	07/15/1994	90
		CMSNA93	Snake River	08/01/1993	35
		CMSNA95		1995	58
		CMSOL95	Solomon River	1995	65
		CMSOL96		09/01/1996	5

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Table 4. Page 3 of 11.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
				Nome/ Port Clarence Total	633
	Golovin/Elim	CMFISH04	Fish River	06/26/2004	95
		CMKWIN04	Kwiniuk River	06/30/2004	95
		CMNIUK04	Niukluk River	07/05/2004	95
		CMTUBU09	Tubutulik River	07/31/2009	95
				Golovin/ Elim Total	380
	Norton Bay/	CMSHAK05	Shaktoolik River	07/23/2005	95
	Shaktoolik/Unalakleet	CMPIKM05	Pikmiktalik River	07/02/2005	95
		CMKOYU05	Koyuk River	07/30/2005	46
		CMUNA92	Unalakleet River	08/01/1992	95
		CMUNAL04		06/21/2004	95
		CMUNGA05	Ungalik River	07/17/2005	54
		CMUNGA10		07/30/2010	95
				Norton Bay/Shaktoolik/Unalakleet Tot	575
				Norton Sound Total	2,158
Lower Yukon River	Lower Yukon River (all Summer)	CMBLAC06	Black River	06/11/2006	95
		CMAND93W	West Fork Andreafsky River	07/01/1993	95
		CMANDR04E	East Fork Andreafsky River	2004	95
		CMCHUL89	Chulinak	1989	95
		CMANV93D	Beaver Creek, Anvik	07/01/1993	95
		CMOTT93	Otter Creek, Anvik	07/01/1993	95
		CMANV92B	Yellow River, Anvik	07/01/1992	95
		CMYUKA93	Innoko River	07/01/1993	88
		CMKALT92	Kaltag River	07/21/1992	95
		CMNUL03	Nulato River	07/08/2003	95
		CMNUL94		07/15/1994	95
		CMGIS04	Gisasa River	06/30/2004	95
		CMMELO03	Melozitna River	06/29/2003	95
		CMCLE02	Clear Creek	2002	95
		CMSFKO96E	S. F. Koyukuk River, Early	07/10/1996	95
		CMHENS04	Henshaw Creek weir	06/23/2004	95
		CMJIM02	Jim River	08/13/2002	95
		CMHUS93	Huslia River	07/01/1993	95

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Table 4. Page 4 of 11.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional	CMTOZI03	Tozitna River	06/27/2003	95
Lower Yukon River (all Summer) Tot.					1,798
Kuskokwim Bay/ River	Lower Kuskokwim River	CMKWE07	Kwethluk River	07/01/2007	95
		CMTUL07	Tuluksak River Weir	07/01/2007	95
		CMKIS94	Kisaralik River	08/05/1994	95
		CMANI92	Aniak River	07/01/1992	95
		CMSALM07	Salmon River	07/05/2007	95
		CMHOL08	Holokuk River	07/31/2008	95
		CMKOG07	Kogruklu River weir	07/09/2007	95
		CMGEO07	George River	06/28/2007	95
		CMSTO94E	Stony River, Early	08/01/1994	95
		CMSTO94L	Stony River, Late	09/25/1994	56
		CMNECO07	Necons River	07/28/2007	95
		CMTATL07	Tatlawiksuk River weir	06/29/2007	95
		CMNUN94	Nunsatuk River	08/02/1994	95
		CMTAK07	Takotna River, near Takotna	06/29/2007	95
		Lower Kuskokwim River Total			
Nunivak		CMMEKO06A	Mekoryuk River, Set A	06/29/2006	93
		CMMEKO06C	Mekoryuk River, Set C	2006	26
Nunivak Total					119 ^a
Kanektok/Goodnews		CMKAN07	Kanektok River weir	07/10/2007	95
		CMGOO91	Goodnews Weir	08/01/1991	95
Kanektok/Goodnews Total					190 ^a
Upper Kuskokwim River (Fall)		CMBIGR08	Big River	09/14/2008	95
		CMSFKU08	South Fork Kuskokwim, fall	09/16/2008	95
		CMWINDF08	Windy Fork	09/15/2008	95
Upper Kuskokwim River (Fall) Total					285 ^a
Kuskokwim Bay/River/Nunivak Total					1,885
Bristol Bay	Togiak	CMOSVIAK10	Osviak River	08/09/2010	95
		CMTOG93	Togiak River	08/01/1993	95
Togiak Total					190 ^a
Nushagak		CMSUNS06	Sunshine Creek	07/25/2006	51
		CMIOW10	Iowithla River	07/26/2010	95

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		CMSNA94	Snake River	07/29/1994	24
		CMSNA96		09/01/1996	25
		CHUNUS92	Upper Nushagak	07/01/1992	53
		CMNUS93		07/01/1993	50
		CMMUL94	Mulchatna River	07/18/1994	95
		CMSTUY92	Stuyahok River	08/01/1992	31
		CMSTUY93		07/01/1993	57
		CMKLUTU10	Klutuspak Creek	08/07/2010	79
				Nushagak Total	560
	Eastern Bristol Bay	CMALAG10	Alagnak River	08/09/2010	95
		CMBRIB93	Big Creek, Naknek	07/01/1993	80
		CMBRIA93	Whale Mountain Ck., Egegik	07/01/1993	95
		CMWHLMT10		08/05/2010	95
		CMPUMIC10	Pumice Creek	07/30/2010	95
		CMWAND10	Wandering Creek, Dog Salmon	08/06/2010	50
				Eastern Bristol Bay Total	510
				Bristol Bay Total	1,260
Middle/Upper Yukon River	Middle (Summer/ Fall)	CMHENS95	Henshaw Creek	09/23/1995	62
		CMSFKO96L	S. Fork Koyukuk River, Late	08/01/1996	95
		CMTAN93	Tanana River Mainstem	11/05/1993	95
		CMTOKA94	Toklat River, Geiger Creek	10/12/1994	95
		CMKAN01	Kantishna River	09/02/2001	95
		CMCHE92	Chena River	07/01/1992	86
		CMCHE94		08/03/1994	95
		CMSAL01	Salcha River	08/18/2001	85
		CMSAL92		07/01/1992	95
		CMDEL94	Delta River	10/31/1994	95
		CMBLU92	Bluff Cabin	1992	95
				Middle (Summer/ Fall) Total	993
	Upper (Fall)	CMBSAL01	Big Salt River	2001	71
		CMCHAN01	Chandalar River	09/19/2001	95
		CMSHE92	Sheenjok River	09/01/1992	95
		CMBLAC95	Black River	1995	95

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Table 4. Page 6 of 11.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		CMOLDC07	Old Crow	2007	95
		CMFBR07	Fishing Branch	2007	95
		CMDON94	Donjek River	10/31/1994	76
		CMKLUA01	Kluane River	10/26/2001	95
		CMPEL93	Pelly River	07/01/1993	84
		CMMINTS89	Minto Slough	1989	95
		CMTATN92	Tatchun Creek	10/24/1992	95
		CMBCK95	Big Creek, Canadian Yukon	10/31/1995	95
		CMTES92	Teslin River	10/22/1992	95
				Upper (Fall) Total	1,181
				Middle/ Upper Yukon River Total	2,174
Alaska Peninsula	Northern District	CMWESC93	Wiggly Creek, Cinder	08/04/1993	95
		CMWIGG09		08/13/2009	95
		CMMES92	Meshik River	08/01/1992	87
		CMWESB93	Plenty Bear Creek, Meshik	08/02/1993	93
		CMPLEN09		08/11/2009	50
		CMMESB09	Meshik Braided	08/11/2009	95
		CMILNIK02	Ilnik River, Three Hills River	07/30/2002	50
		CMNPEN01	North of Cape Seniavin	08/28/2001	55
		CMNCSEN09		08/16/2009	21
		CMNCSEN10		07/31/2010	25
		CMFRANK10	Frank's Lagoon	07/31/2010	95
				Northern District Total	761
	Northwestern District	CMRHMB09	Right Head Moller Bay	08/16/2009	95
		CMNPE98A	Moller Bay	09/02/1998	95
		CMLAW09	Lawrence Valley Creek	08/16/2009	95
		CMLAW92		08/01/1992	95
		CMCOAL08	Coal Valley	08/27/2008	95
		CMDEERV08	Deer Valley	08/27/2008	95
		CMSAP92	Sapsuk River, Nelson Lag.	08/01/1992	80
		CMNELSR08		08/27/2008	95
		CMMOF96	Moffet Creek	09/05/1996	95
		CMJOS09	Joshua Green	08/18/2009	95

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Table 4. Page 7 of 11.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		CMJOS94		08/02/1994	95
		CMFRO92	Frosty Creek	09/01/1992	95
		CMFRO09		08/20/2009	95
		CMALL09	Alligator Hole	08/20/2009	95
		CMALL96		09/04/1996	95
		CMTRA92	Traders Cove	08/01/1992	95
		CMSTC92	St. Catherine Cove	08/01/1992	86
		CMSTC09		08/19/2009	95
		COMPETL09	Peterson Lagoon	08/19/2009	95
		CHPET92		08/01/1992	86
				Northwestern District Total	1,867
	South Peninsula	CHLIJ92	Little John Lagoon	08/01/1992	80
		CMLIJ09		08/19/2009	95
		CMSANC09	Sandy Cove	08/20/2009	95
		CMSANC96		08/26/1996	95
		CMRUS09	Russell Creek	08/20/2009	95
		CMRUS93		08/30/1993	95
		CMDEL96	Delta Creek	08/29/1996	95
		CMBEL92	Belkovski River	08/01/1992	87
		CMVOL96	Volcano Bay	09/01/1996	42
		CMVOL09		08/15/2009	95
		CMVOL92		08/01/1992	64
		CMRUB96	Ruby's Lagoon,	08/31/1996	95
		CMCAN09	Canoe Bay Creek	08/15/2009	95
		CMCAN92		08/01/1992	95
		CMZAC09	Zachary Bay	08/17/2009	13
		CMZAC92		1992	80
		CMFOST09	Foster Creek, Balboa Bay	08/14/2009	95
		CHBAL92		08/20/1992	95
		CMCOL96	Coleman Creek	09/06/1996	95
		CMCHI09	Chichagof Bay	08/17/2009	95
		CMCHI96		08/27/1996	95
		CMSTE92	Stepovak River	08/18/1992	50

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Table 4. Page 8 of 11.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		CMSTE09		08/17/2009	95
		CMSTEPR09		08/17/2009	95
		CMWESM93		08/25/1993	95
				South Peninsula Total	2,126
	Chignik	CMWESL93	Ivanoff River	08/23/1993	94
		CMIVAN09		08/14/2009	95
		CMPORTC08	Portage Creek	08/29/2008	95
		CMWESJ93		08/21/1993	95
		CMKUJUNF09	Kujulik, North Fork	08/12/2009	95
		CMWESK93	North Fork Ck, Kujulik Bay	08/22/1993	72
		CMWESE93	North Fork Ck., Aniakchak	08/03/1993	95
		CMAMBM09	Amber Bay, Main Creek	08/12/2009	85
		CMWESN93		08/26/1993	92
		CMNECR08	Northeast Creek	08/23/2008	95
		CMOCEB08	Ocean Bay	08/23/2008	13
		CMOCEB09		08/13/2009	83
		CMNAKIL08	Nakililock River	08/23/2008	95
		CMWESI93	Chiginagak Bay River	08/20/1993	75
		CMCHIGK09		08/12/2009	73
				Chignik Total	1,252
				Alaska Peninsula Total	6,006
East of WASSIP	East of WASSIP	CMWID93	Wide Bay	08/01/1993	95
		CMWESF93	Kialagvik Creek, Wide Bay	08/11/1993	95
		CMKIAL09		08/25/2009	95
		CMPASS09	Pass Creek, Wide Bay	08/24/2009	95
		CMDRYBR09	Dry Bay River	08/24/2009	71
		CMBEARBC09	Bear Bay Creek	08/19/2009	95
		CMWESD93	E. Bear Bay Creek, Alinchak	08/11/1993	95
		CMWESG93	Alagogshak River	08/12/1993	95
		CMBIGRI09	Big River	09/02/2009	95
		CMWESH93	Big River, Hallo Bay	08/14/1993	95
		CMKARL09	Karluk Lagoon	08/31/2009	84
		CMSTU92	Sturgeon River	07/01/1992	71

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Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		CMSTU08		07/29/2008	6
		CMSTU09		07/10/2009	95
		CMBSUK09	Big Sukhoi	08/07/2009	95
		CMBSU92		08/01/1992	95
		CMDEAD09	Deadman River	08/18/2009	95
		CMSITKI09	Sitkinak Island	08/07/2009	95
		CMPORTNE09	NE Portage, Alitak	08/18/2009	95
		CMBARL09	Barling Bay Creek	08/06/2009	95
		CMWKIL08	West Kiliuda Creek	07/29/2008	4
		CMWKIL09		09/12/2009	86
		CHDOG92	Dog Bay, Kiliuda Bay	08/01/1992	95
		CMCOXC09	Coxcomb Creek	08/17/2009	88
		CMWESP93	Gull Cape Creek	09/14/1993	95
		CMGULLC09		09/23/2009	95
		CMEAGLH09	Eagle Harbor	08/17/2009	95
		CMROUGH09	Rough Creek	09/12/2009	95
		CHAME92	American River	09/01/1992	95
		CMAMER09		08/22/2009	95
		CMRUSSI09	Russian River	08/17/2009	95
		CMRUSSI07		08/17/2007	95
		CMKIZH09	Kizhuyak River	08/19/2009	95
		CHKIZ92		08/01/1992	88
		CMUGAN09	Uganik River	08/20/2009	94
		CHUGA92		08/01/1992	95
		CMSPIRU09	Spiridon River, Upper	08/18/2009	95
		CMZACR09	Zachar River	07/21/2009	68
		CMWESA93	Kitoy Bay Hatchery	07/23/1993	95
		CMKITB09		07/29/2009	95
		CMMCN94	McNeil River	07/18/1994	60
		CMMcN96		1996	49
		CMCHU93	Chunilna River	09/01/1993	87
		CMSUS96	Slough 11, Susitna River	09/05/1996	95
		CMTALK95	Talkeetna River	09/07/1995	50

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Table 4. Page 10 of 11.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		CMLSUS10	Little Susitna River weir	08/11/2010	95
		CMWILL10	Willow Creek	08/25/2010	95
		CMCARMLK10	Carmen Lake	08/23/2010	67
		CMWILLIW10	Williwaw Creek	08/17/2010	95
		CMSIWA06	Siwash	08/08/2006	60
		CMWHN02	Wally Noerenberg Hatchery	07/22/2002	95
		CMWHN06		06/20/2006	95
		CMBEART09	Beartrap Creek	07/28/2009	95
		CMPWS95A	Olsen Creek	07/20/1995	95
		CM24MI06	Chilkat River, mile 24	10/03/2006	95
		CMDIPAC06	DIPAC Hatchery	07/27/2006	95
		CMDRYB06S	Dry Bay Creek	08/02/2006	95
		CMFORD06F	Ford Arm Lake, Fall	2006	95
		CMHFHAT06	Hidden Falls Hatchery	08/03/2006	95
		CMLONG92	Long Bay	08/17/1992	95
		CMMEDV09	Medvejie Hatchery	09/08/2009	95
		CMNAKWA06	Nakwasina River	09/05/2006	95
		CMRALPH06	Ralph's Creek	07/09/2006	95
		CMSANB06S	Sanborn Creek	07/27/2006	95
		CMSAOB06	Saook Bay	07/10/2006	95
		CMSAWM06S	Sawmill Creek, Berners Bay	07/19/2006	95
		CMTAKU06F	Taku River, fall	08/30/2006	95
		CMWCRA06	West Crawfish	09/08/2006	95
		CMWELLB06	Wells Bridge	2006	62
		CMDISA07F	Disappearance Creek, Fall	10/04/2007	95
		CMDISA98		09/25/1998	95
		CMFCHYD06	Fish Creek, Hyder	2006	95
		CMFISH88E	Fish Creek, early	08/08/1988	50
		CMFISH88L	Fish Creek, late	09/24/1988	50
		CMKARTA06	Karta River	2006	56
		CMLAGO07F	Lagoon Creek, Fall	10/04/2007	95
		CMNAKA06S	Nakat Inlet, Summer	2006	95
		CMNARM06S	North Arm Creek	08/04/2006	95

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Table 4. Page 11 of 11.

Reporting Group		ADF&G code	Location	Date	N
Regional	Subregional				
		CMCARR09	Carroll River	08/11/2009	95
		CMNEET06F	Neets Bay, Fall	2006	95
		CMNEET06S	Neets Bay, Summer	2006	95
		CMTRACR06	Traitors Cove Creek	2006	95
		CMSAMPL10	Sample Creek	08/13/2010	95
		CMSWANC10	Swan Cove Creek	08/05/2010	95
		TBA X 20	20 British Columbia sites	TBA	1,600
		CMKITW06	Kitwanga River	2006	95
		CMKITIM06	Kitimat River	2006	95
		TBA X10	10 Washington sites	TBA	800
		CMELWH04	Elwha River	11/04/2004	95
		CMNISQ04	Nisqually River Hatchery	12/21/2004	95
East of WASSIP Total					10,111
Grand Total					29,148

^a These reporting groups that deviate from the 400-fish minimum guideline.

FIGURES

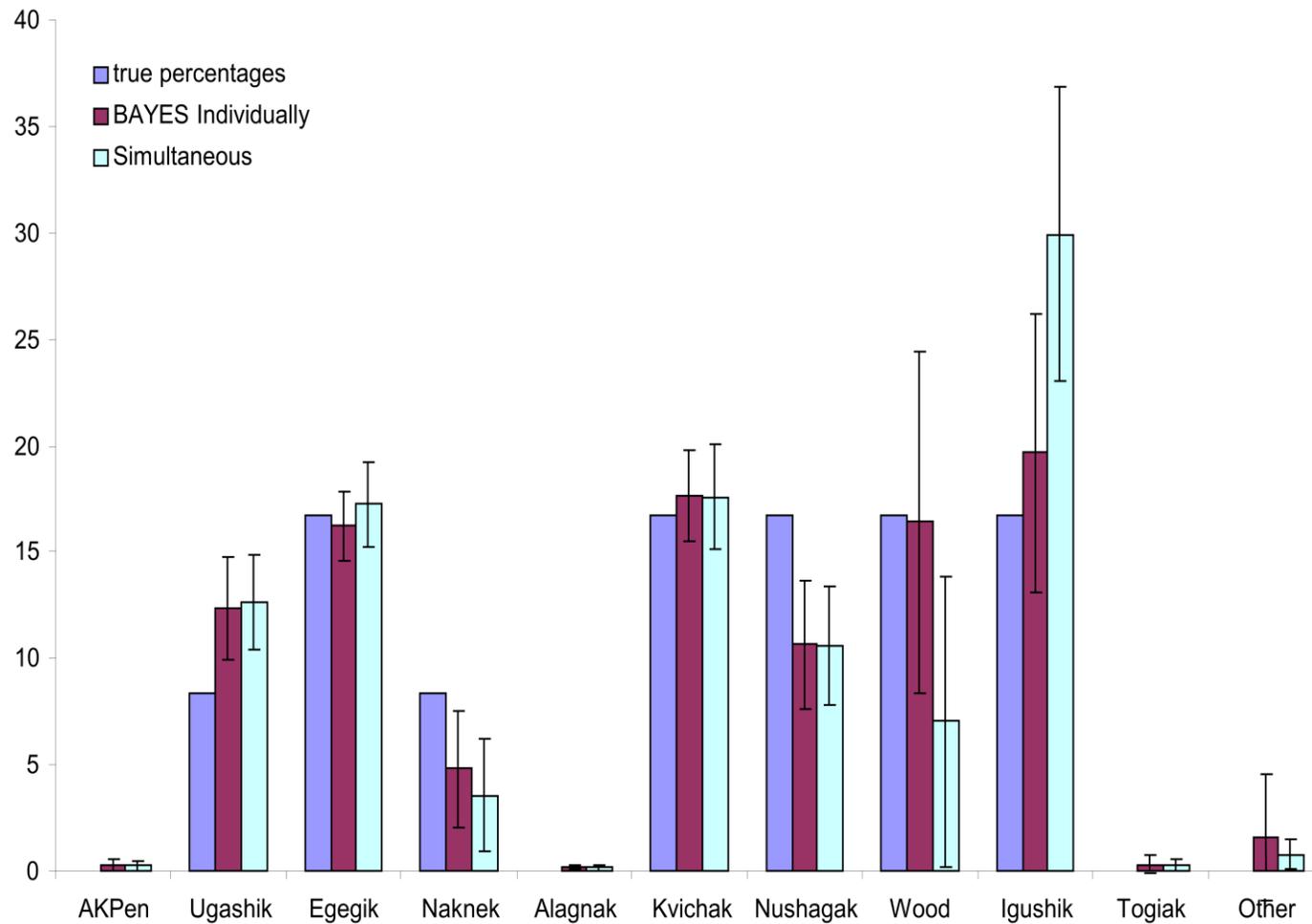


Figure 1.—Stock composition estimates and standard deviations for 10 mixtures made up of 240 sockeye salmon each. Each mixture contained fish taken from the escapement of rivers in the same proportions (true percentages). Two methods for estimating stock proportions were used: 1) the standard one-mixture-at-a-time method (BAYES Individually) and, 2) a method that used the information from all the mixtures simultaneously in the baseline (Simultaneous).

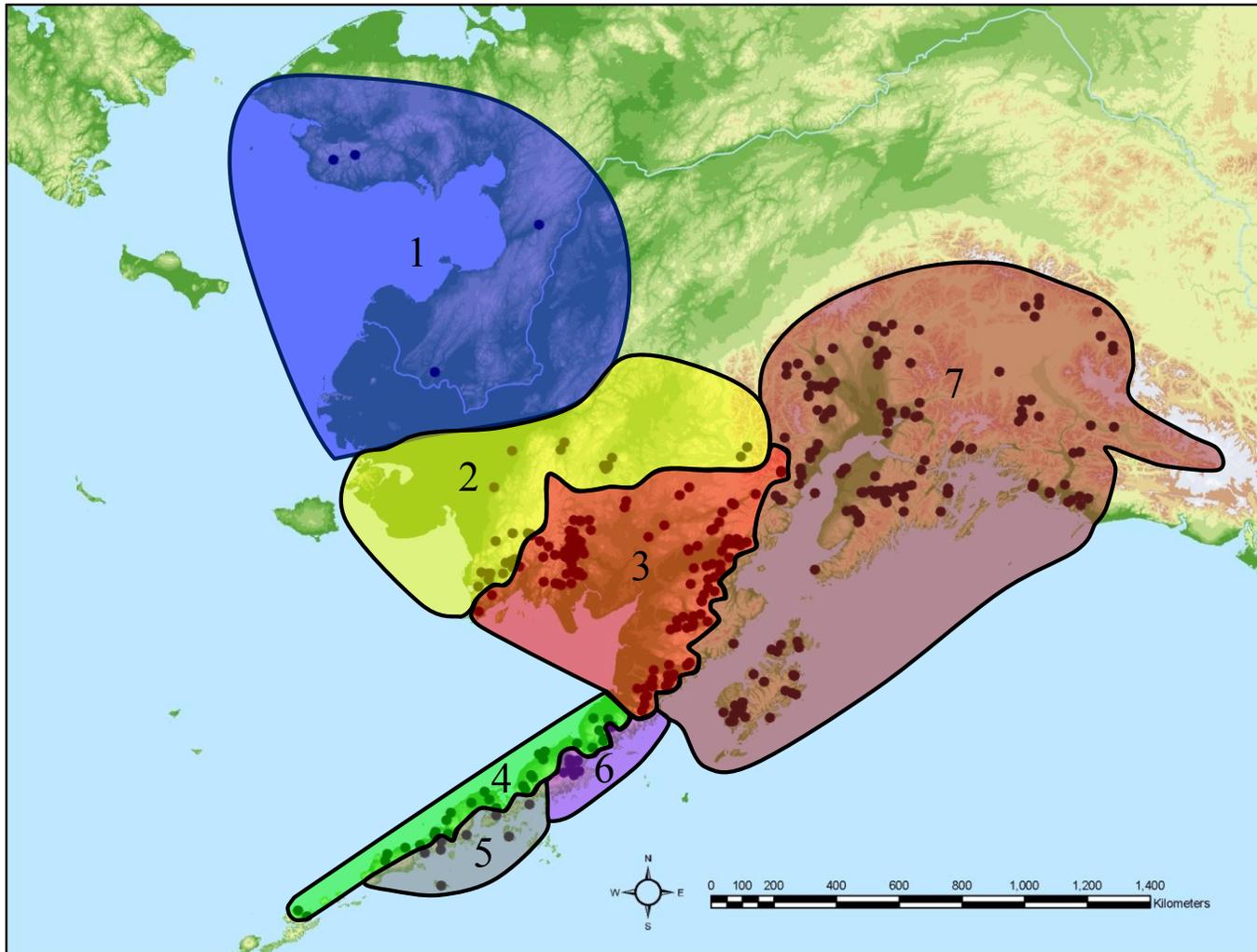


Figure 2.—Sockeye salmon collections (black dots) to be included in the WASSIP baseline, superimposed with the seven regional reporting groups they belong to. These include: 1) North of Kuskokwim River, 2) Kuskokwim Bay, 3) Bristol Bay, 4) North Peninsula, 5) South Peninsula, 6) Chignik, and 7) East of WASSIP.

Note: See Table 1 for details.

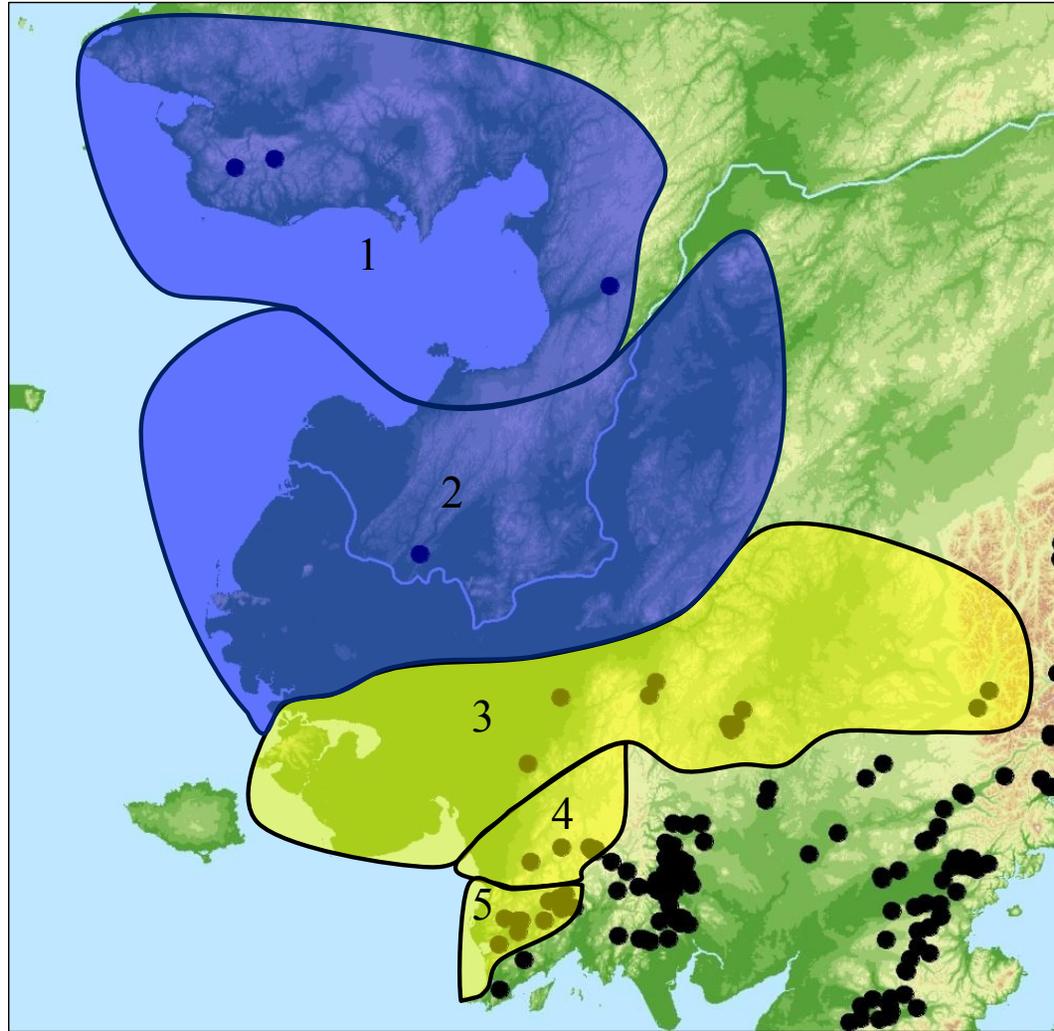


Figure 3.—Sockeye salmon collections (black dots) to be included in the WASSIP baseline, broken into the subregional groups within the North of Kuskokwim River and Kuskokwim Bay regions. These include: 1) Seward Peninsula, 2) Yukon River, 3) Kuskokwim River, 4) Kanektok, and 5) Goodnews.

Note: See Table 1 for details.

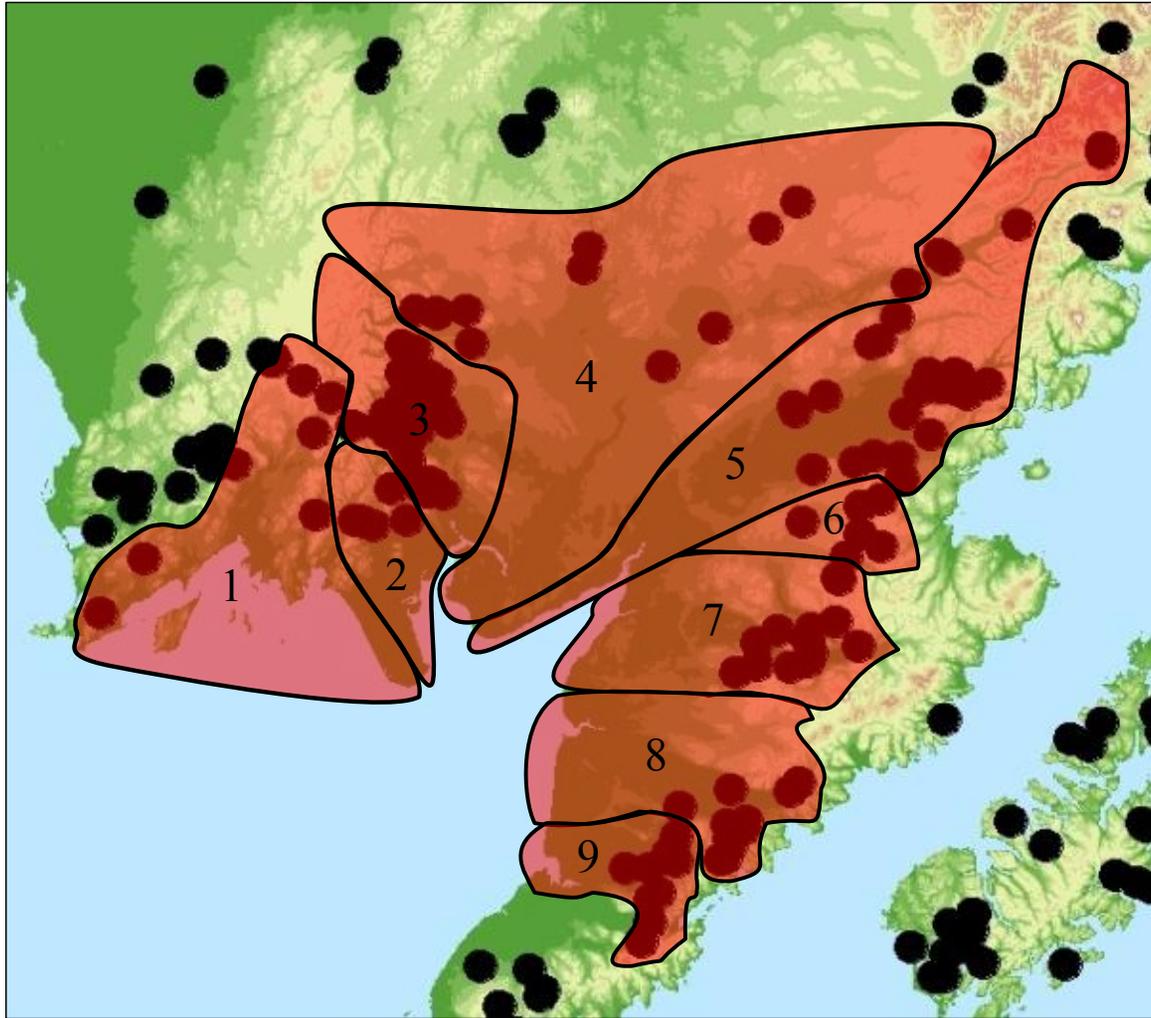


Figure 4.—Sockeye salmon collections (black dots) to be included in the WASSIP baseline, broken into the subregional groups within the Bristol Bay region. These include: 1) Togiak, 2) Igushik/Snake, 3) Wood, 4) Nushagak, 5) Kvichak, 6) Alagnak, 7) Naknek, 8) Egegik, and 9) Ugashik.

Note: See Table 1 for details.

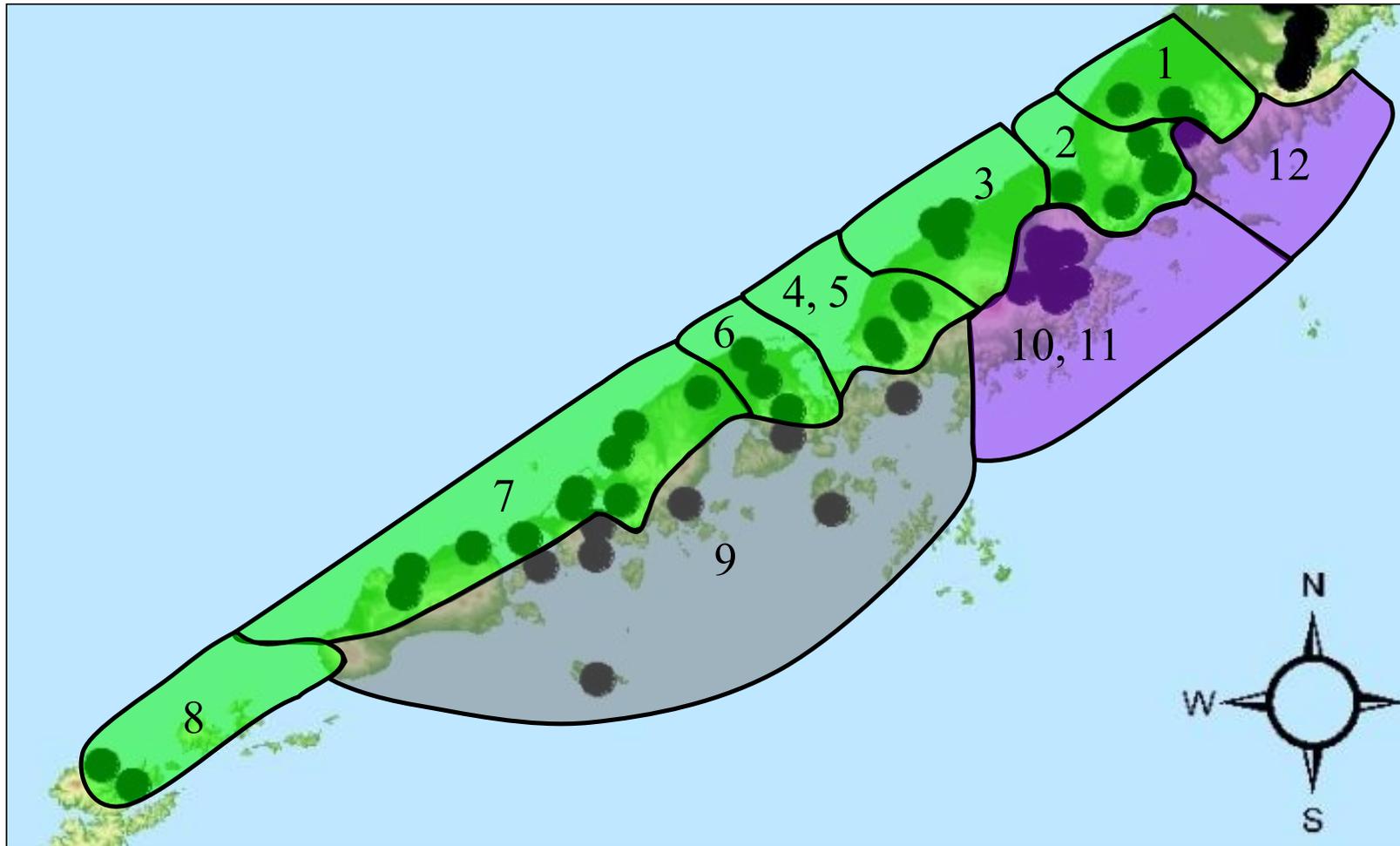


Figure 5.—Sockeye salmon collections (black dots) to be included in the WASSIP baseline, broken into the subregional groups within the North Peninsula, South Peninsula and Chignik regions. These include: 1) Cinder, 2) Meshik, 3) Ilnik, 4) Bear early/Sandy, 5) Bear late, 6) Nelson River, 7) Northwestern District/Black Hills, 8) Aleutian Islands, 9) South Peninsula, 10) Black Lake, 11) Chignik Lake, and 12) Aniakchak Lake.

Note: See Table 1 for details.

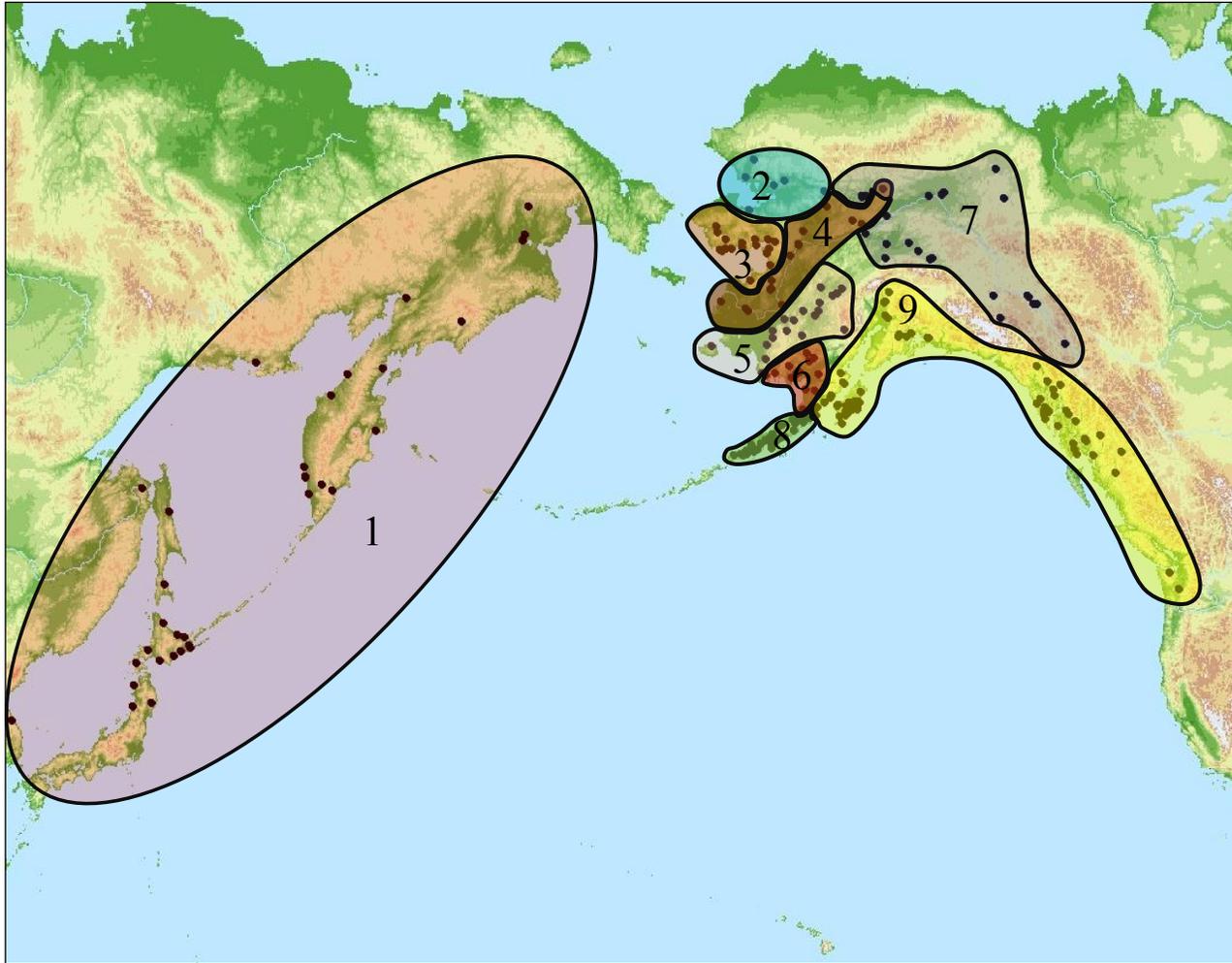


Figure 6.—Chum salmon collections (black dots) to be included in the WASSIP baseline, superimposed with the nine regional reporting groups they belong to. These include: 1) Asia, 2) Kotzebue Sound, 3) Norton Sound, 4) Lower Yukon River, 5) Kuskokwim Bay/River/Nunivak, 6) Bristol Bay, 7) Middle/Upper Yukon River, 8) Alaska Peninsula, and 9) East of WASSIP.

Note: See Table 1 for details.

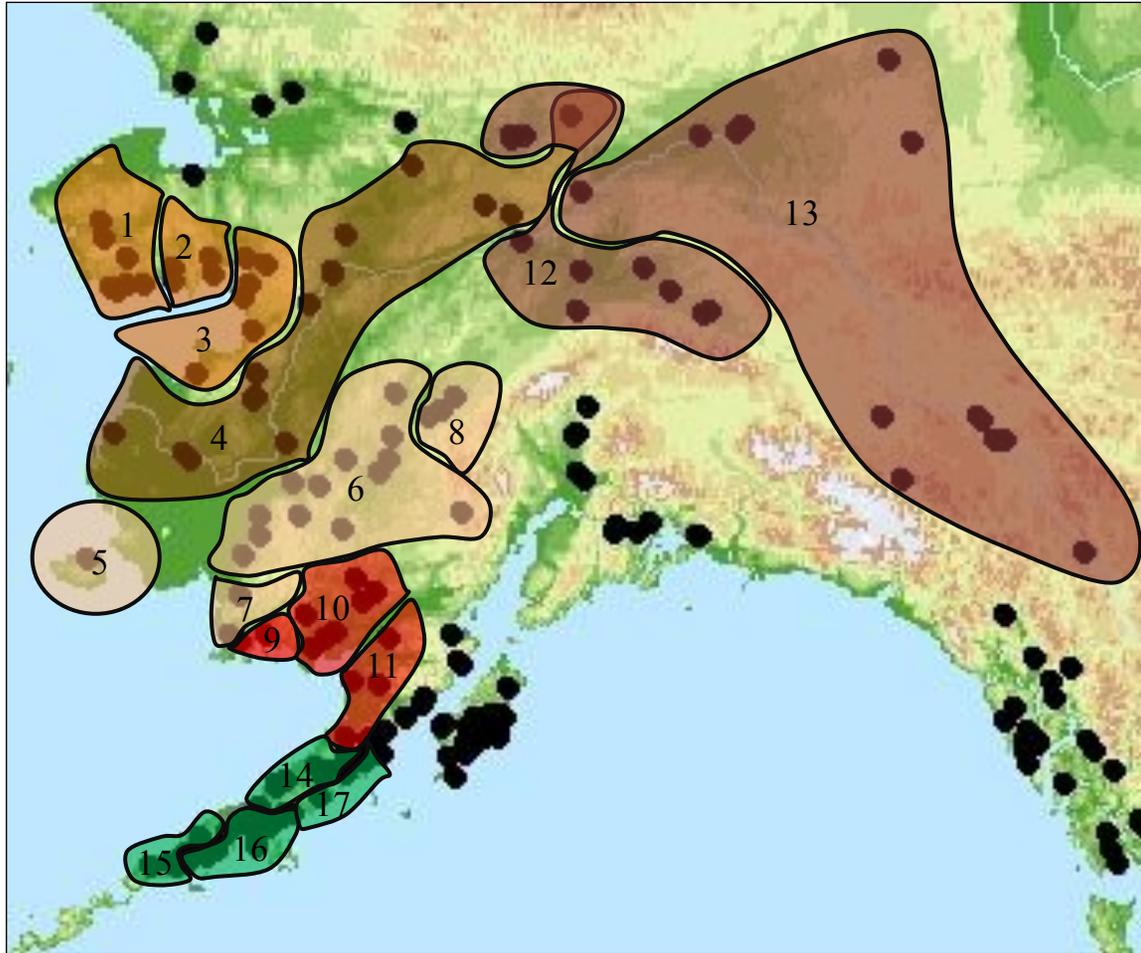


Figure 7.—Chum salmon collections (black dots) to be included in the WASSIP baseline, broken into the subregional groups within the Norton Sound, Lower Yukon River, Kuskokwim Bay/River/Nunivak, Bristol Bay, Middle/Upper Yukon River and Alaska Peninsula regions. These include: 1) Nome/Port Clarence, 2) Golovin/Elim, 3) Norton Bay/Shaktoolik/Unalakleet, 4) Lower Yukon River, 5) Nunivak, 6) Lower Kuskokwim River, 7) Kanektok/Goodnews rivers, 8) Upper Kuskokwim River (Fall), 9) Togiak, 10) Nushagak, 11) Eastern Bristol Bay, 12) Middle Yukon River (Summer/Fall), 13) Upper Yukon River (Fall), 14) Northern District, 15) Northwestern District, 16) South Peninsula, and 17) Chignik.

Note: See Table 2 for details.