Pacific Salmon Commission, Northern Fund Final Report

Northern & Transboundary Sockeye Salmon Matched Scale-Tissue Sampling – Final Report for Northern Fund, COOP-14-143; NF-2014-I-7

By

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and

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July 2015

Alaska Department of Fish and Game **Division of Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, Special Publications and the Division of Commercial Fisheries Regional Reports. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

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

PACIFIC SALMON COMMISSION, NORTHERN FUND FINAL REPORT

NORTHERN & TRANSBOUNDARY SOCKEYE SALMON MATCHED SCALE-TISSUE SAMPLING YEAR 7

(COOP-14-143; NF-2014-I-7)

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July 2015

This investigation was financed by the Pacific Salmon Commission Northern Fund.

The Regional Information Report Series was established in 1987 and was redefined in 2007 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.sf.adfg.ak.us/statewide/divreprots/htlm/intersearch.cfm.

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This document should be cited as:
Buettner, A.R, and Reynolds, Anne M., 2015. Northern & Transboundary Sockeye Salmon Matched Scale-Tissue Sampling – final report for COOP-14-143; NF-2014-I-7. Alaska Department of Fish and Game, Pacific Salmon Commission, Northern Fund Final Report

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ABSTRACT

Correct estimates of the Nass, Skeena, Stikine, and Taku River sockeye salmon contribution to the commercial catch in Southeast Alaska must be calculated to fulfill Pacific Salmon Treaty harvest-sharing agreements. Matched sockeye salmon scale and tissue samples for stock identification analyses were collected from the weekly catches in the 2014 and early 2015 Southeast Alaska drift gillnet fishing districts 101, 106, 108, and 111. Matched samples were also collected from sockeye harvested in the Southeast Alaska purse seine fisheries in districts 101, 102, 103, and 104. A total of 18,441 matched samples were collected from July 1–August 23, 2014 and1,872 matched samples were collected from June 1–June 30, 2015. These matched samples will be used to determine the age composition (scales), hatchery contribution (otoliths), and stock composition proportions (DNA) of the sockeye caught in commercial net fisheries in Southeast Alaska.

Key words: sockeye salmon, *Oncorhynchus nerka*, matched biological sampling, scale pattern analysis, Southeast Alaska, Canada, Northern Boundary Area, Transboundary Area

INTRODUCTION

Provisions of the 2009 Pacific Salmon Treaty (PST) specify abundance-based harvest sharing agreements for Canadian Nass and Skeena River and Transboundary Stikine River and Taku River sockeye salmon in selected Southeast Alaska fisheries. In these fisheries the United States is allowed to harvest a fixed percentage of the return of Nass, Skeena, Stikine, and Taku sockeye stocks. Accurate estimates of the catch of these stocks of sockeye salmon in all United States and Canadian commercial fisheries is required, along with escapement estimates, to calculate their total return, and the percentage of that return caught in treaty-limited fisheries.

In the District 101 gillnet fishery the United States is allowed to harvest 13.8% of the Annual Allowable Harvest (AAH) of Nass River sockeye stocks. In the District 104 purse seine fishery, prior to statistical week 31 (late July), the United States is allowed to harvest 2.45% of the combined AAH of Nass and Skeena River sockeye salmon returns. In the Southeast Alaska fishing Districts 106 and 108 the United States is allowed to harvest 50% of the Total Allowable Catch (TAC) of Stikine River sockeye salmon each week as determined by the pre-season forecast and in-season model. In Southeast Alaska fishing District 111 the PST specifies that the United States and Canada will manage the return of Taku River sockeye to ensure that each country obtains catches equivalent to their share of wild sockeye and a 50% share of enhanced sockeye. The relative strength of the wild and enhanced returns of sockeye salmon need to be assessed in season by inspecting otoliths for thermal marks to avoid over-harvest of wild stocks.

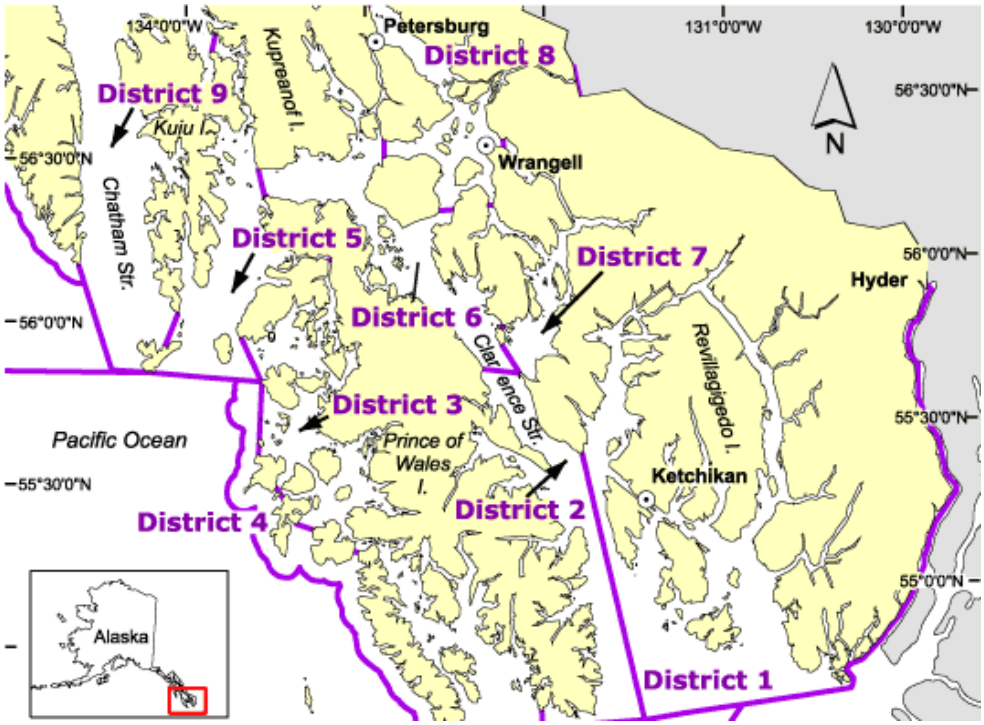

Figure 1. – Geographic location of ADF&G commercial fishing districts 101-109. Map obtained from the ADF&G web page (http://www.cf.adfg.state.ak.us/region1/finfish/salmon/maps).

In the District 106, 108 and 111 gillnet fisheries the United States is allowed to harvest 50% of the annual Total Allowable Catch (TAC) of Stikine River wild and enhanced sockeye salmon (Figure 1 and Figure 2). Significant numbers of enhanced sockeye propagated under treaty agreement are caught in the District 106, 108 and 111 gillnet fisheries and the relative strength of the wild and enhanced returns need to be assessed in season by inspecting otoliths for thermal marks to avoid over-harvest of wild stocks.

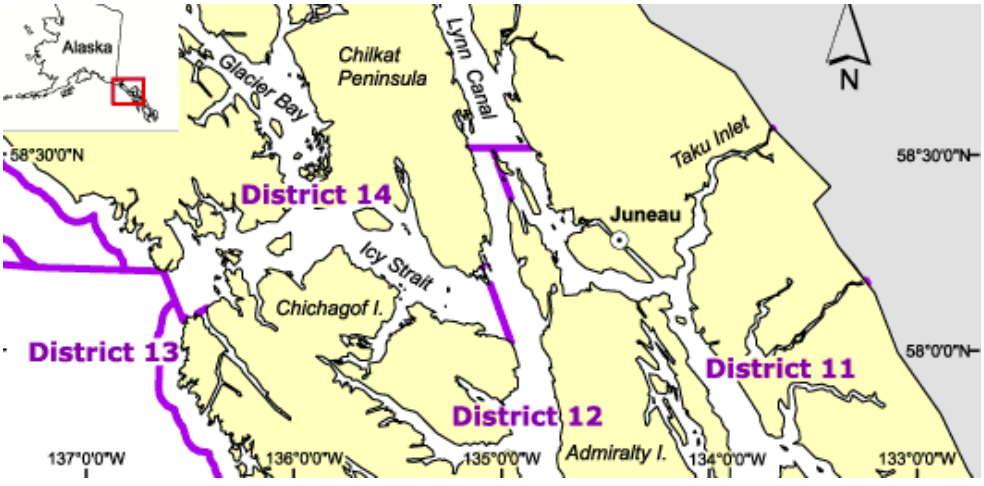

Figure 2. – Geographic location of ADF&G commercial fishing district 111 (labeled District 11). Map obtained from the ADF&G web page (http://www.cf.adfg.state.ak.us/region1/finfish/salmon/maps).

In 1982 the Alaska Department of Fish and Game conducted a study to determine if scale pattern analysis (SPA) of sockeye salmon scales was useful in discriminating stocks harvested in Southeast Alaska (Marshall, 1984). Results of this study showed that SPA could accurately distinguish sockeye scales. From 1982–2010 the catch of Canadian Nass and Skeena sockeye salmon in the District 101, 106, and 108 gillnet fisheries and the Districts 101-104 purse seine fisheries has been estimated using scale pattern analysis (SPA). SPA has also been used from 1982–2011 to estimate the catch of Transboundary Stikine River sockeye salmon in the District 106 and 108 gillnet fisheries and the catch of Transboundary Taku River sockeye salmon in the District 111 gillnet fishery.

Scale pattern stock identification analysis of sockeye salmon, primarily based on patterns of freshwater rearing growth, can only identify relatively large groups of stocks; e.g. Alaska, Nass, Skeena, and Stikine. Scale analysis is not cost effective, is labor intensive, time consuming and requires yearly sampling of escapements to form an annual baseline which precludes its use in-season. These and other problems in accurately estimating stock-specific catches and total returns of sockeye salmon resulted in an extensive investigation by the Northern Boundary Technical Committee (NBTC) of the run reconstruction modeling process currently used. The NBTC concluded that improved stock identification techniques capable of accurately estimating specific groups of stocks are needed to accurately evaluate effectiveness of and improve, if possible, existing run reconstruction methods.

Genetic Stock Identification (GSI) analyses are a powerful and well documented technology. Various types of genetic stock identification techniques, including mitochondrial (mDNA) and single nucleotide polymorphism (SNP) analyses, have demonstrated accuracy in estimating the contribution of specific sockeye salmon stocks to mixed stock fisheries in Southeast Alaska and northern British Columbia. Fisheries and Oceans Canada (DFO) started using mixed stock analysis (MSA) based on genetic markers as a marine stock identification tool in 1996. This method has been used along with SPA for stock separation of Canadian Nass and Skeena in-river fisheries and DFO has a long-term plan to use MSA solely in their analysis.

Matched scale-tissue samples have allowed side-by-side comparison of GSI and SPA based stock identification estimates in Southeast Alaska fisheries. This will be useful in indexing the new GSI estimates to the SPA estimates which go back to 1982 and were used in calculating the current harvest sharing agreements.

OBJECTIVE

The objective of this study was to representatively collect matched scale and tissue samples from sockeye that were commercially harvested each statistical week from the Districts 101, 106, 108 and 111 gillnet fisheries, the District 182-30 set gillnet fishery, and the Districts 101, 102, 103, and 104 purse seine fisheries. Matched samples are required for several PST related stock identification projects including: 1) Boundary Area Alaska-Nass-Skeena run reconstruction, 2) McDonald Lake run reconstruction, 3) Stikine River run reconstruction, and 4) Taku-Snettisham run reconstruction. Scales were used for age composition and DNA tissues were used for stock identification. Otoliths are used in-season to estimate the relative strength of wild and enhanced McDonald, Taku, Snettisham, and Stikine sockeye returns.

This report covers only matched sampling collection as performed by the Alaska Fish and Game Commercial Fisheries Port Sampling Project. GSI and otolith analysis are separate projects.

METHODS

ADF&G commercial port samplers were stationed onboard tenders buying fish on the fishing grounds and in port during dockside deliveries in Ketchikan, Petersburg, Wrangell, and Juneau. Port samplers determined where a specific boat was fishing or from what fishing districts a tender bought fish and collected up to 40 sockeye from each boat or up to 200 from a tender. Port samplers also collected biological data from each fish, including scale samples, sex, and an axillary fin clip. A measurement (nearest 5mm mid-eye to fork) was collected for a sub-set of fish that were sampled. Scale samples were collected from the left side of the fish; two rows above the lateral line on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. Scales were mounted on gum cards with forceps. Scale samples were sent to the ADF&G Region 1 Scale Aging Laboratory in Douglas weekly for age processing. Impressions of the scales were made in cellulose acetate. Scale impressions were then examined under moderate (70x) magnification to determine age. Criteria used to assign ages were similar to those of Mosher (1968), and ages were reported in European notation (Koo 1962).

For those sockeye sampled from fishing Districts 106, 108, and 111 port samplers applied a uniquely numbered six digit coordination tag to the fish head so it could later be collected in a processing plant. The six digit coordination tag number was recorded in the right margin of the ADF&G Commercial Fisheries Age-Sex-Length (ASL) form and on the back of the form for upload into the ADF&G Southeast Region database. Tagged heads were recovered at processing plants and shipped to the ADF&G Thermal Mark Laboratory in Juneau for otolith extraction and processing. The coordination tag number linked the otolith tray and specimen numbers to the scale and DNA specimens.

Approximately 0.5-1 inch of the axillary process or “spine” located above the pelvic fin was collected for DNA from each sockeye using clippers. Each axillary process was placed in a uniquely numbered 2ml cryovial filled with ethanol to preserve the tissue. The vial number was recorded next to the corresponding coordination tag number on the ADF&G Matched Sample Form. The DNA vial number was entered into the ADF&G Region database by technicians working in the Douglas Scale Aging Laboratory on a weekly basis.

The DNA tissue samples were processed and analyzed by the ADF&G Gene Conservation Laboratory and the Auke Bay Laboratories/Ted Stevens Marine Research Institute.

RESULTS

A total of 20,319 matched scale-tissue samples were collected from July 1, 2014- June 30, 2015 (Tables 1-9). Weekly sampling goals were sometimes not achieved due to low catches or catches from different fisheries being mixed onboard fish tenders before being delivered to processors. Sub district specific purse seine samples are particularly difficult to obtain since numerous areas are open at the same time and seiners move between areas frequently seeking concentrations of fish resulting in mixed sub-area deliveries in port.

DISCUSSION

Pacific Salmon Treaty based harvest sharing agreements were renewed in 2009 for the Northern Boundary area fisheries -Alaska District 104 purse seine, Alaska District 101 drift gillnet, Canadian Area 3 net, and Canadian Area 1 troll. The agreements are "abundance based" where the allowable harvest is a percentage of the Annual Allowable Harvest (AAH).

In Alaska's District 104 purse seine fishery, the Nass and Skeena sockeye salmon run size determines the AAH of these stocks prior to Statistical Week 31. In the District 104 purse seine fishery the agreement specifies a harvest, from the beginning of the season through Statistical Week 30, of 2.45% of the combined AAH of both the Nass and Skeena River runs. The fishery in 104 opens the first Sunday in July; in 2014 the initial opening was July 6 (Week 28). The 2014 pre-Week 31 fishing plan for District 104 was based on returns of local Alaskan stocks as well as the Canadian Department of Fisheries and Oceans (DFO) preseason forecast returns of approximately 642 thousand Nass River sockeye salmon and 2.3 million Skeena River sockeye salmon. The preseason forecasts resulted in a total projected return of 2.942 million Nass and Skeena sockeye salmon which, minus an escapement goal of 1.10 million, produced an AAH of approximately 1.842 million fish. Using this forecast, the 2014 pre-week 31 AAH was approximately 45,129 Nass and Skeena sockeye salmon in the District 104 purse seine fishery. (2014 Northern Boundary Technical Committee Bilateral Report).

In the District 101 (Tree Point) drift gillnet fishery, the AAH is calculated as the total run of Nass sockeye salmon minus either the escapement requirement of 200,000 or the actual in-river escapement, whichever is less. The agreement specifies a harvest of 13.8 percent of the AAH of the Nass River sockeye salmon run. The return of Nass sockeye salmon was forecast at 642,000 in 2014 which, minus an escapement goal of 200,000, would result in an AAH of about 442,000. Using this forecast, the 2014 allowable harvest in the District 101 drift gillnet fishery was approximately 60,996 Nass River sockeye salmon (2013 Northern Boundary Technical Committee Bilateral Report).

In 2014 and June 2015 progress in achieving sampling goals, sample quality control, and the quality of record keeping necessary to match stock composition estimates, were monitored on a daily basis by port sampling supervisors in Juneau, Ketchikan and Petersburg and on a weekly basis by the regional data coordinator and project supervisor in Juneau. Representative sampling of the landed catch was assured by: 1) sampling landings in Petersburg, Wrangell, Ketchikan, Juneau, and Yakutat; 2) collecting no more than 40 samples from individual fishing boat deliveries or 200 from individual tender deliveries; 3) placing samplers onboard vessels purchasing fish on the grounds to obtain unmixed sub district specific samples; 4) sampling throughout the duration of each weekly opening; and 5) interviewing vessel personnel and checking fish tickets to assure that all fish onboard were caught in the targeted fishery.

Replacement of SPA with an accurate, genetically based, stock identification techniques has facilitated: 1) reduced sampling costs since the annual baseline escapement samples needed for scale analysis will no longer be needed; 2) much finer resolution of individual stocks allowing stock specific migratory routing and timing studies; 3) the potential for in season stock identification analyses which cannot be done with scale analysis because the baseline samples required cannot be collected until early fall; 4) stock specific spawner-recruit analyses; and 5) providing managers with the ability to shift time and area openings to access surplus stocks or avoid weak stocks.

The negotiated percentages of the annual allowable harvest of Nass and Skeena sockeye that can be taken in Alaska's District 101 gillnet and 104 purse seine fisheries are based on average interception rates in these fisheries estimated by scale pattern analyses between 1985 and 1997. Having matched scale-tissue samples has allowed direct comparison of the two techniques which will allow researchers to determine if any apparent changes in interception rates are real or are due to differences in estimates produced by the two techniques. At this time the comparison of both scale patterns analysis and DNA for years 2004-2008 is complete and digitizing of sockeye scales collected in Southeast Alaska Districts 101-104 will no longer be conducted following the 2009 collection year. Comparative analysis of Districts 106, 108 and 111 Gillnet is on-going.

ACKNOWLEDGMENTS

We would like to particularly thank Jeffrey Rice and Anna Buettner who coordinated the collection of samples from the ports of Petersburg and Ketchikan. We would also like to thank all the ADF&G Port Samplers and staff who assisted in sample collection throughout the region.

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Table 1.–Weekly matched scale-tissue samples collected for stock identification analysis from Alaska's District 101 gillnet fishery July 1, 2014–June 30, 2015.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
July 5, 2014	27	10,614	260
July 12, 2014	28	6,442	260
July 19, 2014	29	5,716	260
July 26, 2014	30	4,398	260
August 7, 2014	31	3,479	260
August 9, 2014	32	3,666	260
August 16, 2014	33	3,584	160
August 23, 2014	34	3,018	249
June 27, 2015	26	3,463	100
Total		44,380	2,069

Table 2.–Weekly matched scale-tissue samples collected for stock identification analysis from Alaska's District 106 gillnet fishery July 1, 2014–June 30, 2015.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
July 5, 2014	27	5,218	590
July 12, 2014	28	10,664	600
July 19, 2014	29	8,158	600
July 26, 2014	30	9,296	600
August 7, 2014	31	3,545	600
August 9, 2014	32	6,924	600
August 16, 2014	33	1,791	600
August 23, 2014	34	4,880	540
June 20, 2015	25	1,686	400
June 27, 2015	26	7,279	600
Total		59,441	5,730

Table 3.–Weekly matched scale-tissue samples collected for stock identification analysis from Alaska's District 108 gillnet fishery July 1, 2014–June 30, 2015.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
July 5, 2014	27	5,965	460

July 12, 2014	28	2,687	357
July 19, 2014	29	2,217	470
July 26, 2014	30	2,632	467
August 7, 2014	31	776	132
August 9, 2014	32	828	228
August 16, 2014	33	146	66
August 23, 2014	34	124	56
June 20, 2015	25	133	37
June 27, 2015	26	1,293	360
Total		16,801	2,633

Table 4.–Weekly matched scale-tissue samples collected for stock identification analysis from Alaska's District 111 gillnet fishery July 1, 2013–June 30, 2014.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
July 5, 2014	27	5,847	615
July 12, 2014	28	13,059	651
July 19, 2014	29	9,839	619
July 26, 2014	30	16,541	775
August 7, 2014	31	9,413	890
August 9, 2014	32	16,301	520
August 16, 2014	33	15,106	0
August 23, 2014	34	13,724	160
June 27, 2015	26	949	337
Total		100,779	4,567

Table 5.–Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 101 purse seine fishery July 1, 2014–August 25, 2014.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
July 12, 2014	28	2,974	200
July 19, 2014	29	7,477	260
July 26, 2014	30	10,528	270
August 7, 2014	31	24,198	260
August 9, 2014	32	6,328	260
August 16, 2014	33	10,712	260
August 23, 2014	34	10,632	260
Total		72,849	1,770

Table 6.-Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 102 purse seine fishery July 1, 2014 - June 30, 2015.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
July 5, 2014	27	3,441	260
July 12, 2014	28	4,005	166
July 19, 2014	29	4,684	260
July 26, 2014	30	5,386	200
August 7, 2014	31	6,607	80
August 9, 2014	32	6,765	160
August 16, 2014	33	4,615	64
August 23, 2014	34	4,422	63
June 27, 2015	26	622	38
Total		40,547	1,291

Table 7.–Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 103 purse seine fishery July–August, 2014.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
August 7, 2014	31	6,159	130
August 9, 2014	32	6,364	40
August 16, 2014	33	8,046	15
August 23, 2014	34	8,741	205
Total		29,310	390

Table 8.–Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 104 purse seine fishery July–August, 2014.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
July 12, 2014	28	21,410	170
July 19, 2014	29	31,860	270
July 26, 2014	30	6,1105	260
August 7, 2014	31	13,7734	196
August 9, 2014	32	208,272	210
August 16, 2014	33	106,425	260
August 23, 2014	34	87,533	170
Total		654,339	1,536

Table 9.–Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 182-30 set gillnet fishery July 1, 2014–June 30, 2015.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
July 5, 2014	27	6,076	81
July 19, 2014	29	1,157	80
July 26, 2014	30	6,967	80
August 2, 2014	31	4,145	80
August 9, 2014	32	2,41	12
June 13, 2015	24	3,81	0
June 20, 2015	25	820	0
June 27, 2015	26	2,378	0
Total		21,543	333

Table 10.–Age composition of sockeye salmon scale samples collected from July 1, 2014–August 25, 2014 in Southeast Alaska net fisheries (ages for late June 2015 samples are pending).

		Age Class													
Gear	District	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.2	3.3	4.2
Seine	101	1	2		9	859	290		21	255	46	1	1		
	102	2	3		5	503	289		8	153	49			1	
	103	1			6	214	74		4	34	11		1		
	104	1	3		5	975	156		5	120	45	2	1		
	107	4	1		16	307	250		34	270	59		1	1	
Gillnet	101	1	2	1	1	628	411		1	388	247		1	2	
	106	4	4		1	1693	1621	1	2	610	272	1	17	6	3
	108	18	11	1	1	598	818	4	4	179	92		27	3	4
	111	139	317	1	4	1584	1481	18		18	73	2		1	
Set net	182	27	131	4		145	201	1		22	15		1		

BUDGET SUMMARY

The budget allocation for this project was as follows:

Salary for ADF&G port sampling personnel:		$144,645
Travel; to/from Juneau, Ketchikan, Petersburg, Wrangell		$3,000
Contractual; pay to tenders for onboard samplers, cell phone charges, shipping, etc.		$8,050
Supplies; vials, forms, tags, gloves, etc.		$2,526
Subtotal Direct	$158,221	
ADF&G Overhead: $158,221 x 21%		$23,161
TOTAL		$188,596

Actual direct expenditures for this project were as follows:

Line 100, salaries and benefits		$144,645.00
Line 200, travel		$2,901.67
Line 300 Contractual		$7,949.55
Line 400 Commodities		$1,381.13
Subtotal Direct	$156,877.35	

Total direct project expenditures by Alaska Fish and Game totaled $156,877.35. Project expenditures differed from the project proposal due to vacancy factor in another available fund. All project expenditures by Alaska Fish and Game were for personnel, travel, contractual and commodities related to matched sample collection in Ketchikan, Petersburg, Wrangell, and Juneau as well as project supervision from Juneau. ADF&G personnel coded to this project included: 1) Tessa Minicucci, Brandi Adams, and Norm Miller; Juneau port sampling 2) Lezlie Rice and Susan Kasinger; Wrangell port sampling; 3) Jason McGinley; Ketchikan port sampling, 4) Vera Goudima and Tyler Lantiegne; Petersburg port sampling.