Pacific Salmon Commission, Northern Fund Final Report

Northern & Transboundary Sockeye Salmon Matched Scale-Tissue Sampling – Final Report for Northern Fund, COOP-17-003; NF-2017-I-I

By

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and

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July 2017

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 9

(COOP-17-003; NF-2017-I-I)

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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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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 2016 and early 2017 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 18,956 matched samples were collected from July 1–August 31, 2016 and 4,549 matched samples were collected from June 1–June 30, 2017. 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 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 (Figure 1). 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 (Figure 2). 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 (Figure3). 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 (Figure 4). 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.

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. 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.

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 were 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 23,505 matched scale-tissue samples were collected from July 1, 2016- June 30, 2017 (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. 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 the District 104 Purse seine fishery, the Nass and Skeena sockeye salmon run size determines the AAH of these stocks prior to Statistical Week 31. The agreement specifies a harvest in District 104 from the beginning of the season through Statistical Week 30, of 2.45% of the combined AAH of both the Nass and Skeena River sockeye salmon runs. The fishery opens the first Sunday in July and in 2016 the initial opening was July 3 (Week 28). The 2016 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 1,959,000 Nass and Skeena sockeye salmon. The preseason forecasts of Nass and Skeena sockeye salmon minus an escapement goal of 1.10 million produced an AAH of approximately 859,000 fish. Using this forecast, the 2016 pre-week 31 AAH was approximately

21,000 Nass and Skeena sockeye salmon in the District 104 purse seine fishery. (2016 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 679,000 in 2016 which, minus an escapement goal of 200,000, would result in an AAH of about 479,000. Using this forecast, the 2016 allowable harvest in the District 101 drift gillnet fishery was approximately 66,102 Nass River sockeye salmon. A total of 39,912 sockeye salmon were harvested, which was only 33% of the 1985-2015 average of 119,957 fish and was the third lowest harvest since the inception of the Pacific Salmon Treaty. The preliminary estimate of Nass River sockeye salmon harvested in the District 101 drift gillnet fishery in 2016 was 14,388 fish. (2016 Northern Boundary Technical Committee Bilateral Report).

In 2016 and June 2017 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. 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 is no longer conducted following the 2009 collection year.

REFERENCES

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Mosher, K. H. 1968. Photographic atlas of sockeye salmon scales. Fishery Bulletin 67(2):243 279.

Pacific Salmon Commission Bilateral Northern Boundary Technical Committee. 2016. U.S./Canada Northern Boundary Area 2016 Salmon Fisheries Management Report and 2017 Preliminary Expectations. Pacific Salmon Comm. Tech. Rep. No. (17)-1.

Table 1.–Weekly matched scale-tissue samples collected for stock identification analysis from Alaska's District 101 gillnet fishery July 1, 2016–June 30, 2017.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
2-Jul-16	27	4,138	260
9-Jul-16	28	3,286	260
16-Jul-16	29	3,380	241
23-Jul-16	30	3,200	254
30-Jul-16	31	3,945	260
6-Aug-16	32	2,581	260
13-Aug-16	33	7,257	260
20-Aug-16	34	4,199	260
27-Aug-16	35	2,210	233
3-Sep-16	36	810	219
24-Jun-17	25	4,918	261
1-Jul-17	26	1,609	260
	Total	41,533	3,028

Table 2.–Weekly matched scale-tissue samples collected for stock identification analysis from Alaska's District 106 gillnet fishery July 1, 2016–June 30, 2017.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
2-Jul-16	27	9,536	428
9-Jul-16	28	16,025	365
16-Jul-16	29	14,842	510
23-Jul-16	30	16,951	600
30-Jul-16	31	14,196	598
6-Aug-16	32	15,539	602
13-Aug-16	33	5,700	600
20-Aug-16	34	4,039	518
27-Aug-16	35	1,809	265
3-Sep-16	36	592	227
24-Jun-17	25	2,656	351
1-Jul-17	26	4,759	564
	Total	106,644	5,628

Table 3.–Weekly matched scale-tissue samples collected for stock identification analysis from Alaska's District 108 gillnet fishery July 1, 2016–June 30, 2017.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
2-Jul-16	27	22,283	540
9-Jul-16	28	17,655	510
16-Jul-16	29	8,382	520
23-Jul-16	30	5,146	370
30-Jul-16	31	1,654	420
6-Aug-16	32	1,817	460
13-Aug-16	33	587	185
20-Aug-16	34	524	168
27-Aug-16	35	161	26
3-Sep-16	36	62	6
30-June-17	26	1,283	110
	Total	59,554	3,315

Table 4.–Weekly matched scale-tissue samples collected for stock identification analysis from Alaska's District 111 gillnet fishery July 1, 2016–June 30, 2017.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
2-Jul-16	27	3,471	400
9-Jul-16	28	3,963	377
16-Jul-16	29	5,387	560
23-Jul-16	30	23,160	476
30-Jul-16	31	14,382	600
6-Aug-16	32	47,511	400
13-Aug-16	33	27,605	270
20-Aug-16	34	11,362	0
27-Aug-16	35	8,340	53
3-Sep-16	36	1,258	40
24-Jun-17	25	991	219
1-Jul-17	26	859	435
	Total	148,289	3,830

Table 5.–Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 101 purse seine fishery July 1, 2016–August 25, 2017.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
2-Jul-16	27	725	195
9-Jul-16	28	1,590	269
16-Jul-16	29	3,135	177
23-Jul-16	30	8,414	260
30-Jul-16	31	3,574	0
6-Aug-16	32	27,730	280
13-Aug-16	33	7,841	83
	Total	53,009	1,264

Table 6.-Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 102 purse seine fishery July 1, 2016 - June 30, 2017.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
2-Jul-16	27	725	195
9-Jul-16	28	1,590	269
16-Jul-16	29	3,135	177
23-Jul-16	30	8,414	260
30-Jul-16	31	3,574	0
6-Aug-16	32	27,730	280
13-Aug-16	33	7,841	83
24-Jun-17	25	1,520	262
1-Jul-17	26	831	260
	Total	55,360	1,786

Table 7.–Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 103 purse seine fishery July–August, 2016.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
23-Jul-16	30	3,541	80
30-Jul-16	31	780	53
6-Aug-16	32	7,546	117
13-Aug-16	33	4,410	60
20-Aug-16	34	363	22
	Total	16,640	332

Table 8.–Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 104 purse seine fishery July–August, 2016.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
9-Jul-16	28	27,951	260
16-Jul-16	29	71,681	300
23-Jul-16	30	10,714	16
30-Jul-16	31	71,087	264
6-Aug-16	32	177,143	260
13-Aug-16	33	32,687	262
20-Aug-16	34	14,726	290
	Total	405,989	1,652

Table 9.–Weekly matched scale-tissue samples collected for scale pattern analysis from Alaska's District 182-30 set gillnet fishery July 1, 2015–June 30, 2016.

Week Ending	Statistical Week	Sockeye Catch	Matched Scale-Tissue Samples
2-Jul-16	27	6,399	80
9-Jul-16	28	8,979	120
16-Jul-16	29	7,546	80
23-Jul-16	30	3,615	80
30-Jul-16	31	3,771	80
6-Aug-16	32	5,165	40
10-Jun-17	23	269	32
17-Jun-17	24	284	24
24-Jun-17	25	635	40
1-Jul-17	26	905	80
	Total	37,568	656

Table 10.–Age composition of sockeye salmon scale samples collected from July 2016–August 2016 in Southeast Alaska net fisheries (ages for late June 2017 samples are pending).

	District	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3
Drift Gillnet	101	4	31			184	1,168	1		322	292				
	106	7	40			462	2,588	9	1	457	543	2		2	1
	108	7	96	1		186	1,927	2		98	130			6	
	111	20	226	4	3	1,075	1,271	4		26	38				
Purse Seine	101	2	15		5	295	635	1	4	227	136				1
	102	5	13		22	228	430	3	17	168	86				
	103		1		2	122	86			28	20		1	1	
	104	1	6		6	437	679	1	6	135	81			1	
Set Gillnet	182	5	1			43	292	1		3	17				

Figure 1.–Geographic location of the ADF&G commercial purse seine fisheries in district 101-114.

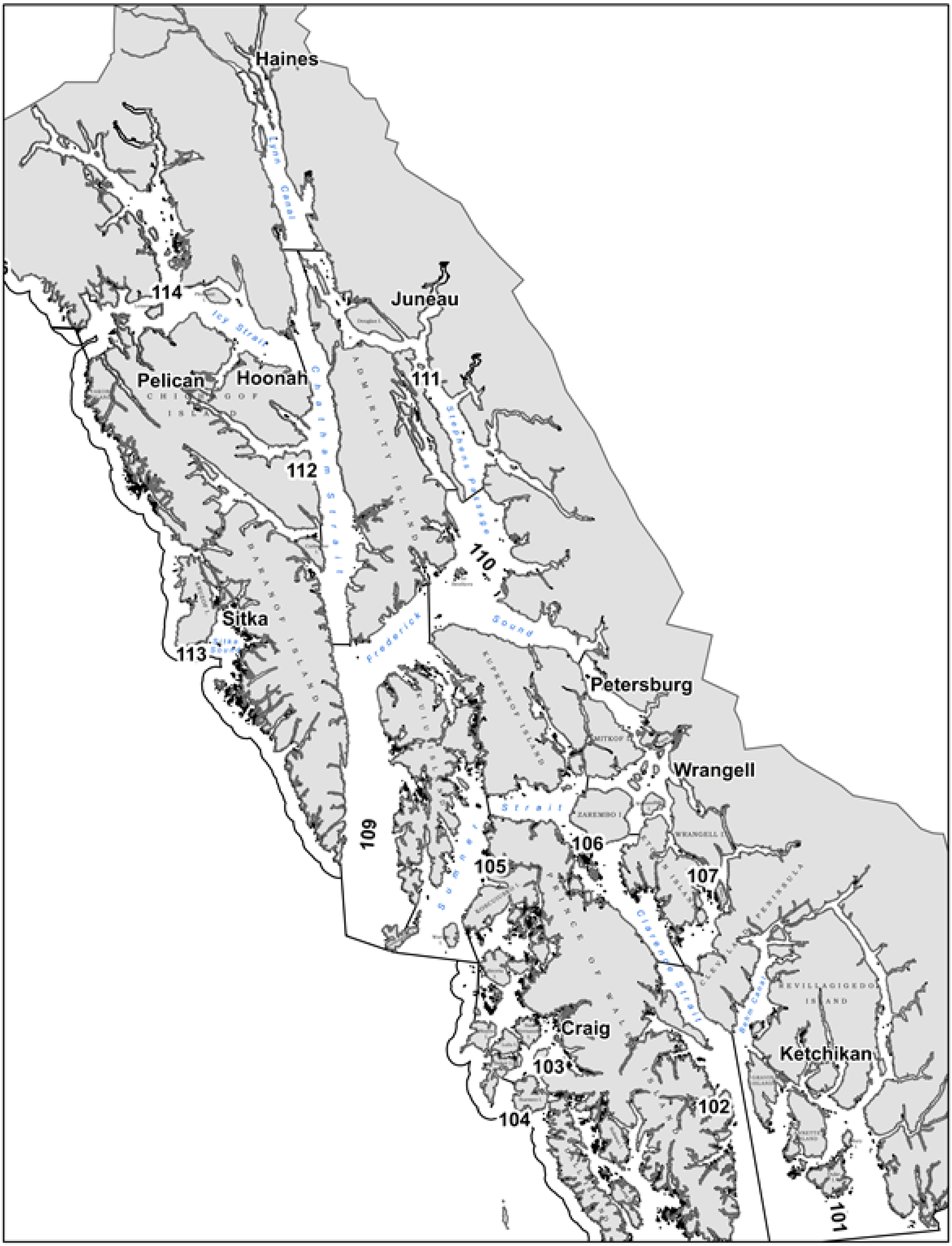


Figure 2.–Geographic location of the ADF&G commercial drift gillnet fishery in district 101-11.

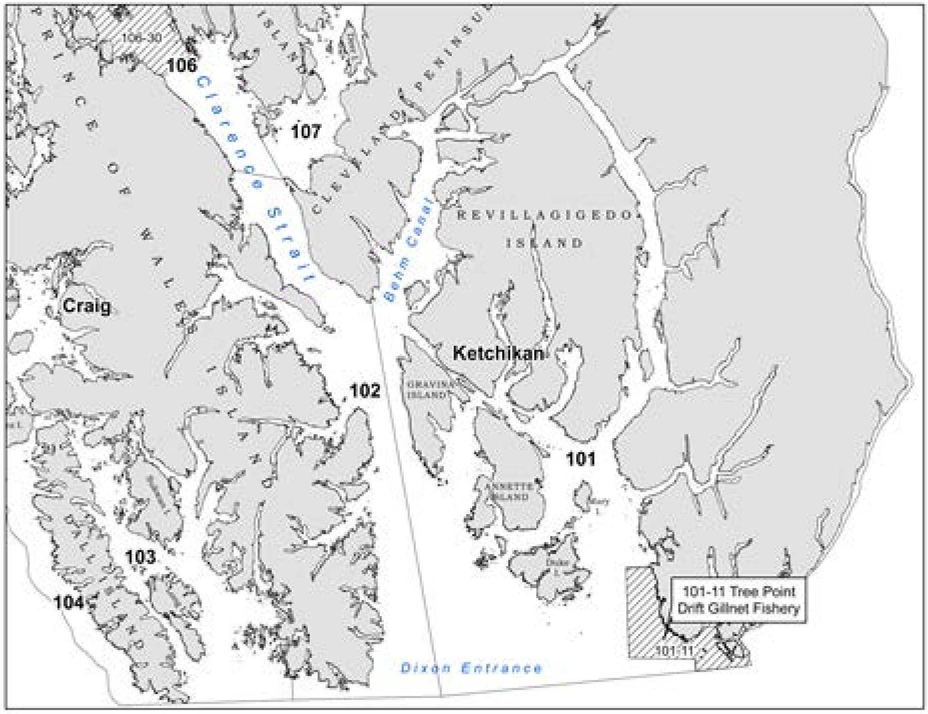


Figure 3.–Geographic location of ADF&G commercial drift gillnet fishery in districts 106 and 108.

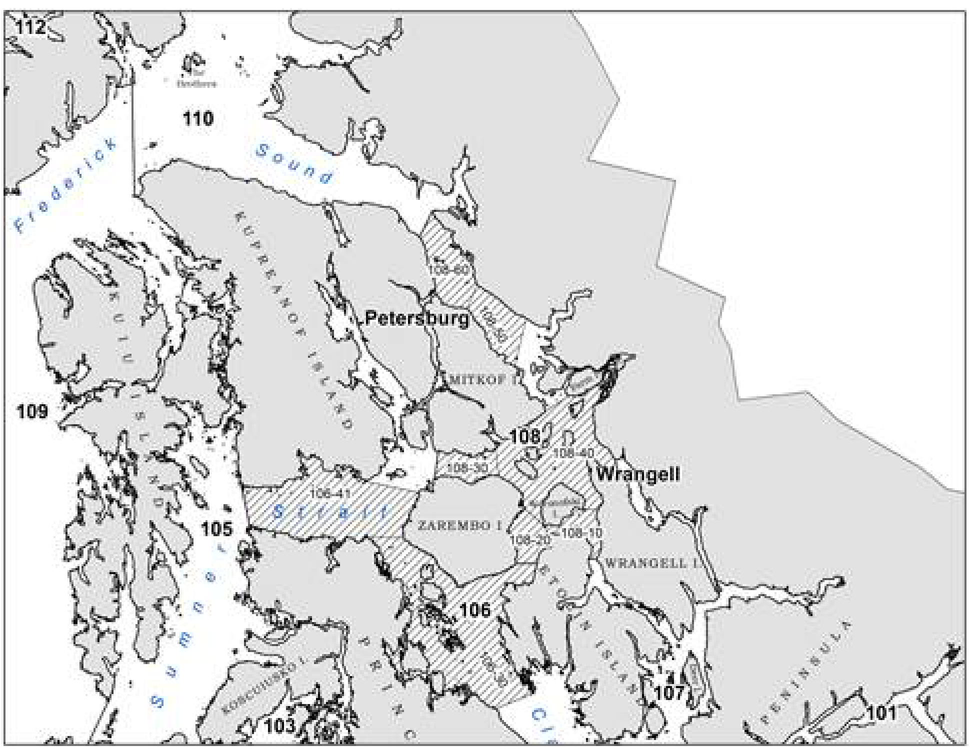
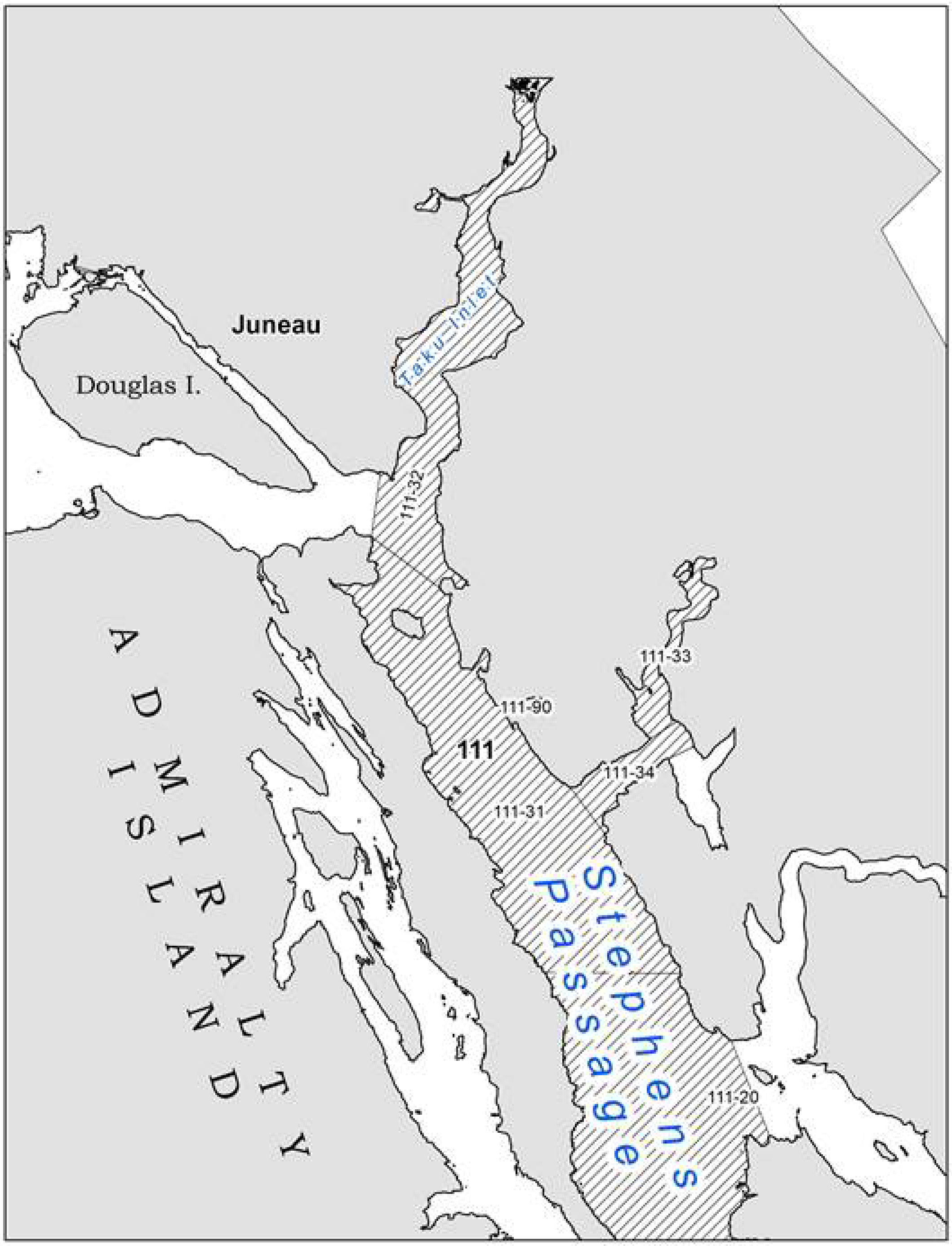


Figure 4.–Geographic location of ADF&G commercial drift gillnet fishery in district 111.



BUDGET SUMMARY

The budget allocation for this project was as follows:

Salary for ADF&G port sampling personnel:		$142,013
Travel; to/from Juneau, Ketchikan, Petersburg, Wrangell		$1,760
Contractual; pay to tenders for onboard samplers, cell phone charges, shipping, etc.		$8,500
Supplies; vials, forms, tags, gloves, etc.		$6,500
Subtotal Direct	$158,800	
ADF&G Overhead: $142,013 x 21%		$29,823
TOTAL		$188,596

Total direct project expenditures by Alaska Fish and Game have not been calculated at the time of this report. 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) Brandi Adams, and Antonio Florendo; Juneau port sampling 2) Lezlie Rice; Wrangell port sampling; 3) Jennifer McGrath and Jill Walker; Ketchikan port sampling, 4) Vera Goudima, Matthew Lenard, Vittoria DeAngelis, and Tyler Lantiegne; Petersburg port sampling.