

Regional Operational Plan SF.2A.2014.11

**Coho Salmon Escapement Monitoring, North Gulf
Coast Management Area, 2014**

by

Jay A. Baumer

and

Sarah J. H. Power

March 2015

Alaska Department of Fish and Game

Divisions of Sport Fish and 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, and Special Publications. 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)		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	≥
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	≤
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
Physics and chemistry				standard error	SE
all atomic symbols				variance	
alternating current	AC			population sample	Var
ampere	A			sample	var
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				

REGIONAL OPERATIONAL PLAN SF.2A.2014.11

**COHO SALMON ESCAPEMENT MONITORING, NORTH GULF COAST
MANAGEMENT AREA 2014**

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March 2015

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SIGNATURE PAGE

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Project leader(s): Jay Baumer

Division, Region, and Area: Sport Fish, Region II, North Gulf Coast Management Area

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Period Covered: 2014

Field Dates: October-November 2014

Plan Type: Category II

Approval

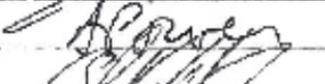
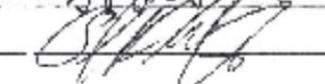
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Biometrics	Sarah Power		11-26-14
Research Coordinator	Timothy McKinley		12/9/14

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ABSTRACT

Ground surveys will be conducted to develop annual abundance indices for coho salmon. Index counts via foot surveys will be conducted in selected Resurrection Bay streams in the North Gulf coast Management area during the fall of 2014. Collected information can be used to: 1) assess run strength for a single year, 2) detect escapement trends over several years, and 3) develop future management strategies by detecting a surplus or identifying problems related to escapement.

Key words: coho salmon, *Oncorhynchus Kisutch*, foot surveys, ground surveys, abundance, Resurrection Bay, North Gulf Coast Management Area

BACKGROUND

Ground stream surveys were performed in selected Resurrection Bay streams on coho salmon (*O. kisutch*) starting in 1960 (Dunn 1961) and were discontinued after 1989 (Carlson 1990) due to budget constraints. Stream surveys were performed in 2013 and surveys in 2014 will add to the 29 years of historical data (Logan 1962-1968; McHenry 1970-1986; Sonnichsen 1987; Vincent-Lang 1988) to help provide a relative abundance index for streams in Resurrection Bay.

The Resurrection Bay area supports extensive and diverse recreational fisheries for wild and enhanced coho salmon, including one of the largest marine coho salmon sport fisheries in Alaska. The recreational coho salmon fishery has grown substantially since the 1990s and is one of the most popular sport fisheries in North Gulf Management Area. This fishery starts in late June to early July as anglers target wild and hatchery coho salmon feeding just outside of Resurrection Bay. This fishery culminates with the Seward Silver Salmon Derby, held each August since 1956, and a shoreline fishery over Labor Day weekend. Enhancement of coho salmon is done annually by Cook Inlet Aquaculture Association and by the Department.

Without stream assessment surveys, biologists have limited resources available to assess run strength, detect escapement trends, and identify surplus or identify problems related to escapement. This operational plan details the quantitative evaluation of coho salmon stocks in selected drainages. There are currently no coho salmon escapement goals for any of the creeks in the North Gulf Coast.

OBJECTIVES

1. Count the number of visible coho salmon in the Seward area by conducting at least one survey of each selected stream between October and November.
2. Create an abundance index to better gauge the health and condition of coho salmon spawning streams that feed Resurrection Bay.

METHODS

The ground-based, stream surveys will be conducted by Department staff and will be timed to coincide with peak spawning periods as determined through a combination of the timing of past escapement surveys, inseason reports of spawning activity, and also take into consideration inseason water levels and viewing conditions to support an optimal count. Surveys are done with at least two people as a safety measure. The two surveyors will walk together, with the lead counter either in front or beside the secondary counter. At least one crew member will carry a gun as a safety measure against aggressive bears. Both individuals may count and the survey count will be the maximum of the two counts.

Observers will wear polarized sunglasses if it aids to enhance visibility into the water during a survey. In addition, each surveyor will carry two handheld counters. One of these handheld counters will be used to record all live salmon encountered and the other counter will be used to record all dead coho salmon encountered. At the conclusion of each survey or survey section the observers will record the counts into a shared sampling form (appendix A) that are printed on write-in-the-rain notebook paper. Observers will then check and remind each other to zero their counters before beginning to survey the next stream segment. Additional data to be recorded on the sampling form during each survey will include the following:

1. Stream name and the corresponding reach surveyed (including all tributaries). Survey reaches will be identified using easily identified landmarks and GPS coordinates .
2. Date and time of day
3. Type of survey.
4. Weather conditions.
5. NOAA Stream level if available (NOAA website, http://aprfc.arh.noaa.gov/index_rivs.php).
6. Water visibility (clear, occluded, poor).
7. Observer comments on noted factors or variables that may have affected survey results.
8. Names of surveyors

The crew leader will be responsible for collecting completed data sheets and providing that information to the project leader with any additional comments about the survey.

Independent counts by each surveyor for this type of survey are difficult at best. Surveyors are within sight of each other for safety reasons. Because of this, body language from one surveyor may tip the other surveyor off as to where fish may be seen, thus counts would not be independent. Even if surveyors were not within sight of each other, which is not protocol for safety reasons, the surveyor walking in front may prompt fish to take cover in areas where the second surveyor would not see them, and hence counts would not be independent.

Acceptable counting conditions can vary significantly from stream to stream and are based on the professional judgment of the crew leader. Conditions that are taken into consideration include sunlight (direct, indirect, presence of shadows), wind conditions, precipitation sufficient to obscure visibility, water clarity and depth (sufficient to observe all underwater structures in the deepest pools). Streams will be skipped if conditions are not acceptable due to limited resources.

Streams in the Resurrection Bay area that have been historically surveyed for coho salmon are: Airport Creek, Box Canyon Creek, Clear Creek, Grouse Creek, Jap Creek, Mayor Creek, Salmon Creek, and the Seward Lagoon Complex which includes Dairy Creek, Shelfler Creek, and the 2nd Ave drainage ditch. Since these streams are subject to frequent flash flooding and dramatic channel migration over time, surveyors will also include details about acceptable water levels and viewing conditions.

Information about stream survey reach was not detailed in previous survey reports (Dunn 1961, Logan 1962-1969, McHenry 1970-1986). Historical stream survey reach information was relayed from personal communications (2013) between Dan Bosch, Area Management coordinator and Tom Prochazka, who was a Fish and Wildlife Tech. III in Seward from 1981-1991. GPS waypoints from GoogleEarth have been estimated for each stream reach from Mr. Prochazka's memory (Table 1).

The count from each stream survey will be interpreted as a minimum number of spawning salmon escaping to that stream and will therefore be viewed only as an index of total escapement. Trends of usable indices over years will therefore be assumed to reflect trends in actual escapements. Caution should be used when interpreting these data. The counts may be influenced by run timing, individual sighting efficiency, as well as weather and water conditions. It should be understood that not all fish that escape to spawn are present for counting at any one time. Ground survey indices can be good indicators of general trends in fish distribution and abundance, but not for developing actual abundance estimates.

DATA REDUCTION

Survey data recorded on sampling forms will be provided to the project leader. The final minimum escapement information, which will be the maximum of the two counts from the survey will be transferred to an annual Resurrection Bay coho salmon escapement index streams spreadsheet. Summarized index counts will be presented in tables in the Area Management Report for the Recreational Fisheries in the North Gulf Coast Area Regulatory Area, including historical survey data. Final edited copies of the MS Excel spreadsheets along with a data map describing the data files will be archived on the Division of Sport Fish intranet site at <http://docushare.sf.adfg.state.ak.us/>.

Caution should be used when interpreting these data. Ground survey indices can be good indicators of general trends in fish distribution and abundance, but not for developing actual abundance estimates.

SCHEDULE AND DELIVERABLES

- October – November 2014: Conduct stream surveys and collect data.
- December 2014: Organize data and develop tables.
- Report results in the 2016 ADF&G Area Management Report for Recreational Fisheries in Resurrection Bay

RESPONSIBILITIES

Jay A. Baumer, Assistant Area Management Biologist, Project Leader, ADF&G.

Duties: Oversees project. Coauthors operational plan; Collects survey index data. Co-author Area Management report.

Jason Graham, GIS Analyst II, ADF&G.

Duties: Creates and updates maps for operational plan and reports.

Sarah J.H. Power, Biometrician II, ADF&G.

Duties: Coauthors operational plan; provide statistical support for study design and data analysis.

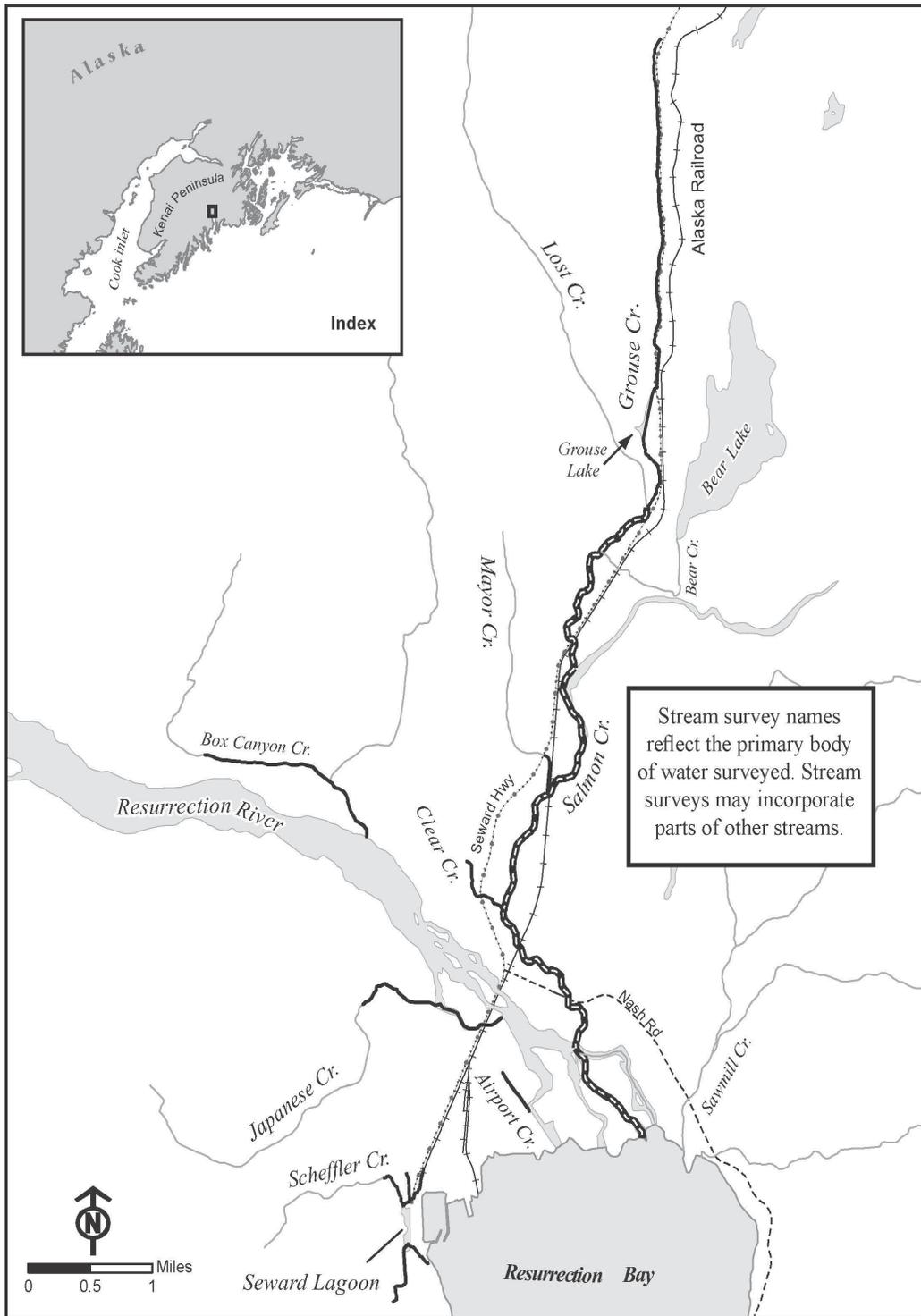
REFERENCE CITED

- Dunn, J.R. 1961. Silver salmon studies in the Resurrection Bay Area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1960-60, Project F-5-R-2(2)Job-6. Juneau.
- Logan, S.M. 1962. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1961-62, Project F-5-R-3(3)7-B-1. Juneau.
- Logan, S.M. 1963. Silver salmon studies in the Resurrection Bay Area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1962-63, Project F-5-R-4(4)7-B-1. Juneau.
- Logan, S.M. 1964. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1963-64, Project F-5-R-5(5)7-B-1. Juneau.
- Logan, S.M. 1965. Silver salmon studies in the Resurrection Bay Area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1964-65, Project F-5-R-6(6)7-B-1. Juneau.
- Logan, S.M. 1966. Silver salmon studies in the Resurrection Bay Area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1965-66, Project F-5-R-7(7)7-B-1, Juneau.
- Logan, S.M. 1967. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1966-67, Project F-5-R-8(8)7-B-1, Juneau.
- Logan, S.M. 1968. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1967-68, Project F-5-R-9(9)7-B-1, Juneau.
- Logan, S.M. 1969. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1968-69, Project F-9-1(10)7-B-1, Juneau.
- McHenry, E.T. 1970. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1969-70, Project F-9-2(11)7-B-1, Juneau.
- McHenry, E. T. 1971. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report, 1970-1971, Project F-9-3(12)G-II-A, Juneau.
- McHenry, E.T. 1972. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report, 1971-1972, Project F-9-4(13)G-II-A, Juneau.
- McHenry, E. T. 1973. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report, 1972-1973, Project F-9-5(14)G-II-A, Juneau.
- McHenry, E. T. 1974. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual report of performance, 1973-1974, Project F-9-6(15)G-II-A, Juneau.
- McHenry, E. T. 1975. Coho salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1974-1975, Project F-9-7(16)G-II-A Juneau.
- McHenry, E. T. 1976. Silver salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1975-1976, Project F-9-8(17)G-II-A, Juneau.
- McHenry, E. T. 1977. Coho salmon studies in the Resurrection Bay Area. Alaska Department of Fish and Game, Sport Fish Division, Federal Aid in Sport Fish Restoration, Annual Performance Report 1976-1977, Project F-9-9(18)G-II-A, Juneau.
- McHenry, E. T. 1978. Coho salmon studies in the Resurrection Bay Area. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report, 1977-1978, Project F-9-10(19)G-II-A, Juneau.
- McHenry, E. T. 1979. Coho salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1978-1979, Project F-9-11, 20 (G-II-A), Juneau.
- McHenry, E. T. 1980. Coho salmon studies in the Resurrection Bay Area. Alaska Department of Fish and Game, Sport Fish Division. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-12(21)G-II-A, Juneau.

- McHenry, E. T. 1981. Coho salmon studies in the Resurrection Bay Area. Alaska Department of Fish and Game, Sport Fish Division. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13(22)G-II-A, Juneau.
- McHenry, E. T. 1982. Coho salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1981-1982, Project F-9-14, 23 (G-II-A), Juneau.
- McHenry, E. T. 1983. Coho salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24 (G-II-A), Juneau.
- McHenry, E. T. 1984. Coho salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, 25 (G-II-A), Juneau.
- McHenry, E. T. 1985. Coho salmon studies in the Resurrection Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration. Annual Performance Report, 1984-1985, Project F-9-17(26)G-II-A, Juneau.
- McHenry, E. T. 1986. Resurrection Bay coho enhancement. Alaska Department of Fish and Game, Annual Performance Report, 1985-1986, Project F-10-1(27)S-31-2.
- Sonnichsen, S., R. H. Conrad, E. T. McHenry, and D. S. Vincent-Lang. 1987. Evaluation of coho salmon (*Oncorhynchus kisutch*) enhancement in Resurrection Bay, Alaska during 1986. Alaska Department of Fish and Game, Fishery Data Series No. 5, Juneau, Alaska, USA
- Vincent-Lang, D., S. Conrad, R. H. McHenry, and T. Edward. 1988. Migrations and age, sex, and length compositions of coho *Oncorhynchus kisutch* and sockeye *O. nerka* salmon in Resurrection Bay, Alaska during 1987. Alaska Department of Fish and Game, Fishery Data Series No. 40, Juneau, Alaska, USA.
- Carlson, J. A. and D. Vincent-Lang. 1989. Stockings, migrations, and age, sex, and length compositions of coho, sockeye, and chinook salmon in Resurrection Bay, Alaska, during 1988. Alaska Department of Fish and Game, Fishery Data Series No. 82, Juneau, Alaska, USA.
- Carlson, J. A. and D. Vincent-Lang. 1990. Stockings, migrations, and age, sex, and length compositions of coho, sockeye, and chinook salmon in Resurrection Bay, Alaska, during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-14, Anchorage, Alaska, USA.

FIGURE

Figure 1.—Map of streams surveyed in the Seward Area for adult coho salmon, 2014.



TABLES

Table 1.–Coho salmon survey streams, North Gulf Coast Management Area.

Resurrection Bay Stream Sites:	Range (Start)		Range (End)	
Airport Creek	60.13119	-149.41562	60.13366	-149.41881
Box Canyon Creek	60.16196	-149.44969	60.16822	-149.47655
Clear Creek	60.15543	-149.42895	60.15192	-149.42011
Lagoon Complex (Dairy Creek, etc)				
Dairy Creek 1	60.12187	-149.44498	60.11959	-149.44384
Dairy Creek 2	60.1215	-149.44184	60.12016	-149.44198
Dairy Creek 3	60.12517	-149.43618	60.11987	-149.44295
First Lake	60.11262	-149.44596	60.11479	-149.44347
Scheffler Creek	60.11519	-149.44165	60.11347	-149.43787
Grouse Creek	60.23603	-149.36714	60.19193	-149.37593
Jap Creek	60.14428	-149.44708	60.13896	-149.41816
Mayor Creek	60.16499	-149.40489	60.15242	-149.41941
Salmon Creek	60.19305	-149.37648	60.12701	-149.38940

Table 2.--Historical Resurrection Bay Coho salmon escapement index streams from Ted McHenry Reports.

Historical Resurrection Bay Coho salmon escapement index																																	
Stream Name/Year	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Ave		
Airport Creek	381	162	39	42	52	50	127	55	67	36	26	13	15	4	23	2	24	7	14	1	9		0	0	0	0					46		
Box Canyon Creek										54	19	56	59	36	28	8	45	45	28	121	32		248	154	144	112	119	1,158	36	171	134		
Clear Creek	267	96	78	40	217	56	171	227	364	59	91	93	55	37	60	15	89	37	59	42	88		241	62	140	190	115		121	88	114		
Lagoon Complex (Dairy Creek, Pasture Crek, Railroad Creek, and First Lake, etc)		249	603	188	245	48	30	99	98	115	44	46	49	63	114	32	17	134	146	68	122		108	64	251	168	225	602	228	685	173		
Grouse Creek	105	24	63	76	294	106	236	174	378	182	132	150	42	34	64	12	27	187	360	14	108		307	408	396	336	977		158	113	195		
Jap Creek	127	91	92	81	152	86	228	172	229	78	79	79	68	40	77	31	94	62	51	61	49		328	85	121	120	131		229	310	120		
Mayor Creek		21	30	15	95	16	135	66	41	64	38	19	22	4	51	5	46	42	50	30	94		145	69	138	98	537		72	109	76		
Salmon Creek		90	242	175	79	174	234	329	1,037	19	105																				248		
Total	880	733	1,147	617	1,134	536	1,161	1,122	2,214	607	534	456	310	218	417	105	342	514	708	337	502		1,377	842	1,190	1,024	2,175				815		
All data was collected from Coho Salmon studies in the Resurrection Bay Area report from the corresponding year.																																	
(Dunn 1961)																																	
(Logan 1962-1969)																																	
(Mchenry 1970-1986)																																	
(Sonnichsen 1987)																																	
(Vincent-Lang 1988)																																	
(Carlton 1989-1990)																																	

Table 3.–Seward Area Coho Salmon Surveys, 2013.

Creek Name	Alive Count	Mort Count	Comments
Box Canyon Creek	168	8	
Clear Creek	135	22	
Japanese Creek	N/A	N/A	Water too high and muddy to count. Walked up from dump road and did not see any fish in shallow waters
Mayors Creek	133	95	
Salmon Creek	N/A	N/A	Water too high and muddy to count. Did see 8 Coho near Seward Hwy Bridge before high water
Grouse Creek	35	13	
Airport Creek	N/A	N/A	
Seward Town Creeks			
1- Dairy Creek S. Fork	6	1	
2- Middle Fork	36	3	16 of 36 alive fish were jacks
3- North Fork	18	148	37 of 148 morts were jacks
Second Ave	15	0	10 of 15 alive were jacks
Mouth Entrance	1	0	Deep water and overcast skies made for poor visibility

Notes

*To count all creeks takes about 3 full days.

*Salmon Creek can start from Timber In. Access point to Seward Hwy Bridge

*Mayor creek starts at new Fire Station along the Seward Hwy

Stream Surveys performed 10/11/13 - 10/13/13

