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Operational Plan: Yakutat Salmon Escapement Surveys

by

Nicole L. Zeiser

December 2015

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

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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Division of Commercial Fisheries

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Signature Page

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PURPOSE

The Alaska Department of Fish and Game, Division of Commercial Fisheries, monitors annual spawning escapements of Pacific salmon within the Yakutat Management Area. Aerial and ground surveys are methods used to develop escapement estimates of sockeye *Oncorhynchus nerka*, Chinook *O. Tshawytcha*, coho *O. kisutch*, and pink *O. gorbuscha* salmon. Assessing salmon returns plays an important role in the management of the Yakutat commercial, subsistence, and sport fisheries where harvest adjustments can be made in order to meet escapement goals. This report provides operational guidelines for the locations and methods for conducting systematic surveys for obtaining peak index counts from local salmon stocks.

Key words: escapement index, escapement survey, coho salmon, *Oncorhynchus kisutch*, sockeye salmon, *Oncorhynchus nerka*, Tawah Creek, Sockeye Creek, Situk River, Old Situk River, Awke River, Italio River, East/Doame rivers, Tsiu/Tsivat rivers, Southeast Alaska, Yakutat Management Area

OBJECTIVES

1. Obtain peak survey counts of sockeye and coho salmon escapements in Tawah and Sockeye creeks, and the Situk, Old Situk, Awke, Italio, East/Doame, and Tsiu/Tsivat rivers through systematic aerial and ground surveys.
2. Review, code, and enter survey counts into the ADF&G Southeast Alaska Integrated Fisheries Database (IFDB).

BACKGROUND

Yakutat Area drainages support wild stocks of all five species of Pacific salmon, which in turn support viable commercial, sport, and subsistence fisheries. Sockeye salmon is the primary species followed by coho, Chinook, pink, and finally chum (*O. keta*) salmon. These salmon are harvested in the commercial set gillnet fisheries, which is the only commercial net gear permitted in the Yakutat Management Area. The Yakutat Management Area stretches from Cape Fairweather to Cape Suckling along the gulf coast of Alaska, a distance of approximately 275 miles (Figure 1). Although there are hundreds of different spawning populations in Yakutat Management Area, up to 25 different areas are open to commercial fishing each year. Currently, there are eight streams that are monitored annually for escapement estimates and four of those eight streams have a set biological escapement goal (BEG) or a sustainable escapement goal (SEG). These include: East/Doame, Akwe, Italio, Situk, Old Situk and Tsiu/Tsivat rivers and Tawah and Sockeye creeks. The Yakutat coastal waters also support hand and power troll fisheries targeting mixed stocks of Chinook and coho salmon. Salmon have been commercially harvested in the Yakutat area since the late 1870s (Conrad and Gray 2013) and are economically important for the community of Yakutat. The Yakutat area supports the largest freshwater sport fisheries in the Southeast Alaska Region for sockeye, Chinook, and coho salmon landings (Jennings et al. 2015) and is home to the renowned Situk River which produces the largest steelhead *O. mykiss* run in the State of Alaska (Bain et al. 2003). Subsistence fishers in Yakutat also rely heavily on the salmon resources for personal or family consumption in addition to it being a cultural practice for many residents. Reported annual subsistence harvests are usually around 5,000 salmon and sockeye salmon harvests make up approximately 75% of the total subsistence harvest.

The salmon returns in the Yakutat area are highly variable and, as a result, contribute to shifts in fishing effort. These divergent trends make it difficult for fisheries managers to assess the

effectiveness of stock-specific management strategies. To ensure continued viability of runs, spawning escapement goals have been established for several index streams in the Yakutat Management Area (Table 1). Escapement observations and evaluations have been an effective tool for measuring run strength and for sustainable management. Escapement counts performed inseason become the driving force in establishing openings, closures, and fishing time and area for the various fisheries.

Figure 1.–Map of the Yakutat Management Area showing streams that are surveyed for salmon escapement.

A variety of methods are used to actively manage and monitor local salmon stocks for escapement estimates. Aerial and ground surveys are used to develop peak escapement counts for sockeye, Chinook, coho, and pink salmon for several Yakutat area streams. Aerial surveys are accomplished from small-fixed wing aircraft and ground surveys are conducted by boat or on foot. Finally, escapement counts are also obtained through fish weirs. A resistance board floating panel weir has been operated on the Situk River since 1976 (Zeiser 2013). Weir counts are also conducted on the Klukshu River; a tributary of the Alsek River located in Canada and operated

by Fisheries and Oceans Canada (TTC 2014). Stream surveys have been conducted in the Yakutat area since statehood and are deemed critical to ensure that fish return to their natal streams in adequate numbers. The goal of each survey is to obtain peak index counts of spawning sockeye and coho salmon and to ensure escapement goals are achieved for those systems with goals. Stream surveys are also important for establishing long-term data sets for indexing spawning escapement trends, establishing escapement goals, re-evaluating current escapement goals, and for determining the status of local salmon stocks. Historically, up to 20 different Yakutat area streams had been surveyed sporadically but due to inconsistent counts and escapement data they are no longer surveyed. Conducting consistent and systematic surveys for each index stream is necessary for obtaining a useful dataset and for comparing peak counts from year to year.

Systems mentioned in this manual and noted as index streams are used in managing commercial set gillnet fisheries in the Yakutat and Yakataga Districts. Stream counts do not represent the total escapement due to variability in run timing and factors compromising visibility. At best, surveys provide an index of escapement strength from year to year. This manual was designed to assist and inform future managers and surveyors about each surveyed stream, its location, its characteristics, run timing, what species to look for, and specific survey routes.

Table 1.–Yakutat Area salmon escapement goals.

Species	System	Assessment Method	Goal Type[a]	Escapement Goal	Year Established
Chinook	Klukshu River (Alsek River)	Weir	BEG	800–1,200	2013
	Alsek River (total)	Weir Expansion	BEG	3,500–5,300	2013
	Situk River	Weir	BEG	450–1,050	2003
Sockeye	East Alsek-Doame River	Aerial Survey	BEG	13,000–26,000	2003
	Klukshu River	Weir	BEG	7,500–11,000	2013
	Lost River	Boat Survey	LB SEG	≥1,000	2009
	Situk River	Weir	BEG	30,000–70,000	2003
Coho	Tawah Creek	Boat Survey	SEG	1,400–4,200	2015
	Situk River	Boat Survey	BEG	3,300–9,800	1994
	Tsiu/Tsivat Rivers	Aerial Survey	BEG	10,000–29,000	1994
Pink	Situk River[b]	Weir	LB SEG	≥33,000	2012

[a] Goal types are biological escapement goal (BEG), sustainable escapement goal (SEG), and lower-bound sustainable escapement goal (LB SEG).

[b] The Situk River pink salmon escapement goal is a lower-bound sustainable escapement goal of at least 33,000 pink salmon counted through the weir by 5 August.

METHODS

Aerial and ground surveys are performed weekly from June through October each year. During each foot, boat, or aerial survey, observers will record counts of spawning sockeye and coho salmon within each listed stream (Appendices A–F). All visual counts will be conducted using polarized glasses and mechanical hand tallies for each species. A rite-in-the-rain notebook will

be used to record stream name, stream counts, water conditions (visibility, water level, and tide levels), and approximate survey distance. These counts, along with other survey data, will be transferred to a standardized survey form in a notebook located in the ADF&G office (Appendix G). At the end of the season, assigned staff will enter these data into the Southeast Alaska Integrated Fisheries Database (IFDB). Typically, only one observer conducts aerial surveys, and two observers conduct the ground surveys. Each stream has a designated survey route and should be performed the same way each time. Run timing varies for each stream and surveys should be conducted accordingly. A survey schedule is provided and can be used as a guide (Appendix H).

FOOT SURVEYS

The Yakutat road system provides access to several important index streams that are surveyed annually by foot. Crews of two people will perform foot surveys of major sockeye and coho salmon producing streams. Each stream will be visited once a week during the spawning season until a clear peak or maximum escapement count is obtained. It is very important not to stop conducting surveys once the escapement goal is met. Continue surveying the stream after the goal is met in order to provide a complete accounting of the escapement. Capturing the peak of abundance will ensure that escapement indices and the escapement goals created from index counts accurately reflect trends in salmon abundance. Foot surveys will generally be walked starting at the headwaters of each stream and live fish will be counted while walking downstream to the end of the survey route. Both observers will wear polarized glasses and carry tally whackers to obtain individual counts that can be compared at the end of the survey. It is sometimes necessary to work together when encountering large schools of fish holding in deep pools or spread out in wide sections of the river in order to get a better count. Foot surveys are conducted on Sockeye Creek (upper and lower sections) and Old Situk River (upper and lower sections). Historically, several other streams along the roadside were sporadically surveyed on foot but those surveys have been eliminated because they were not systematically surveyed.

Sockeye Creek

Sockeye Creek is a clear water tributary of the glacially occluded Antlen and Ahrnklin rivers. Both sockeye and coho salmon are counted in this drainage; however, the survey area and run timing is different for each species. The Ahrnklin River flows into the Situk-Ahrnklin Inlet where the most productive commercial set gillnet fishery in the Yakutat area takes place. Sockeye and coho salmon destined for Sockeye Creek are harvested in the Situk-Ahrnklin commercial set gillnet fishery. Although no escapement goal exists for Sockeye Creek, peak survey counts can be useful for managers in terms of what contributions the system makes for the sockeye and coho salmon landings in the commercial set gillnet fishery.

The Sockeye Creek drainage is extremely long, with many braided channels and log jams, therefore the survey area is divided into two sections, upper and lower Sockeye Creek. Sockeye salmon start showing up in Sockeye Creek around the end of June. The run timing can be early or late and a useful method for timing the first survey is to check for fish in the creek from the culverts located at mile 23 on Forest Highway 10. The upper section of Sockeye Creek is accessed by a 3.5 mile trail located at mile 22.1 on Forest Highway 10 (Appendix D). The trail leads to a lake locally known as “Upper Pikes Lake”. The outlet of this lake is where the survey begins for counting sockeye salmon. The survey is conducted by walking downstream and ends at the culverts under the road on Forest Highway 10. The lower section of Sockeye Creek is walked from the same road culverts downstream approximately 1.25 miles. The best method to

survey this system is to walk the upper section first, which takes approximately 5–6 hours. The following day, walk the lower section in order to obtain a complete survey and a total count. Peak counts for sockeye salmon generally occur during the second or third week in July.

The survey route for enumerating coho salmon in Sockeye Creek is conducted differently. Only short sections of the upper and lower areas are surveyed mainly because of late run timing, lack of staff, and common flood events in the fall. Sockeye Creek coho salmon begin entering the system in October and run as late as December. Peak counts generally occur in mid-October. The survey area for counting coho salmon in the upper section of Sockeye Creek starts from the road culverts and extends upstream approximately 1.25 miles (N59°29.63' W139°10.00'), and the lower section extends from the road culvert downstream ~1.25 miles (N59°27.93' W139°10.12'). Ideally, Sockeye Creek should be walked at least two times (before and after the peak of the run), for both species; however, limited staff and weather constraints sometimes prevents this.

Old Situk River

The Old Situk River is a clear-water tributary that flows into what is now the Situk River mainstem. Both sockeye and coho salmon spawn in this channel and escapements are monitored annually. The Old Situk River is located upstream of the Situk River weir. The weir is used to obtain total escapement counts for sockeye salmon; however, the weir is removed before the coho salmon run is complete. Further counts are necessary to obtain a peak coho salmon count from the Situk and Old Situk rivers. Similar to Sockeye Creek, the Old Situk River is divided into two sections, the upper and lower Old Situk River. Approximately two miles of the system is counted on foot for both sockeye and coho salmon. Historically, surveys have been conducted with a canoe, however, geological changes over time have made it difficult to float the system and this method is not recommended. The survey route is the same for both sockeye and coho salmon, the upper section is surveyed first, and the lower section is surveyed the following day. Sockeye salmon arrive in mid-July and surveys should commence around the second week in August. Peak counts are generally obtained around the last week in August. Coho salmon arrive in August, run through November, and peak during the last week of October. The survey route begins at the outlet of Old Situk Lake and ends at the road culverts near the Nine-Mile Bridge on Highway 10 (Appendices C, E and F). Surveyors will walk a flagged trail just off Forest Highway 10, near Mile 14, to get to Old Situk Lake. Both sections of this system should be surveyed at least twice in order to obtain a peak index count for both species.

BOAT SURVEYS

Tawah Creek

Tawah Creek is a small stream located on the road system in Yakutat, Alaska (Appendix A). Portions of the drainage include Ophir Creek, Lost River, and Summit Lake, also locally known as Coast Guard Lake. Often referred to as just the Lost River, for fisheries management purposes, it is actually two systems. Summit Lake, Tawah and Ophir creek are all one system, and are a tributary of the Lost River. Due to the turbidity of the water in the Lost River, fish can rarely be seen in it. Tawah Creek empties into the Lost River about a half mile upstream from the Lost River confluence with the Situk River estuary. Almost all the sockeye salmon entering the system migrate into Tawah Creek, and coho salmon spawn in both the Lost River and the Tawah Creek systems. Sockeye salmon arrive in July and spawn through early September. Tawah Creek

experiences a late run of coho salmon, arriving in September and spawning well into late November. Peak escapement counts for coho salmon can be expected in late September through mid-October. Ophir Creek is a difficult stream to survey: it has multiple channels that must be accessed at different locations in order to conduct a complete survey, it is a difficult stream to walk, and it is virtually impossible to walk in some areas. Foot surveys of Ophir Creek were conducted in past years but recently have been eliminated due to the difficulties of conducting surveys systematically.

The survey route is the same for both sockeye and coho salmon. Surveys are conducted from a canoe. Two surveyors will be dropped off at the head of Summit Lake. Summit Lake is a large body of water that is shallow and clear with thick vegetation. There is not a particular path or method for surveying the lake itself. Occasionally wakes from fish can be seen in the lake that provide guidance as to what direction to paddle in. Ophir Creek drains into the lake approximately 400 yards to the northeast from the starting point. A short section (~100 yards) of the creek or "slough" is also surveyed. Once the slough is surveyed, paddle the canoe across the lake towards the outlet. The lake outlet drains into Tawah Creek. Continue down Tawah Creek to where it joins the Lost River. At the Tawah Creek/Lost River confluence paddle up the Lost River to the Lost River bridge. The bridge is the ending point of the survey. Arrangements should be made for transportation back to town prior to conducting the survey. The survey takes approximately 4–5 hours depending on water levels, current, and the tide. The survey is usually coordinated around high tides to make paddling up the Lost River easier. Escapement surveys for sockeye salmon will begin in early July and counts are conducted weekly thereafter until a peak count is observed. Coho salmon surveys generally begin the first week of September. A lower-bound SEG of 1,000 sockeye salmon and an SEG of 1,200–4,200 coho salmon have been established for Tawah Creek/Lost River.

Situk River

Following the removal of the weir in early August, float counts begin for indexing coho salmon escapement. The Situk River is approximately 22 miles in length with two lake systems, but only the lower 12 miles of the river is monitored. Float counts are usually conducted from a jet-powered river skiff but occasionally a canoe is used depending on water levels. Two surveyors will be dropped off at Nine-Mile bridge on Forest Highway 10 where the start of the survey begins (Appendices B and C) The best technique is for one person to operate the skiff, while the other person counts fish. The survey route ends at what is locally known as the "Lower Landing". Arrangements should be made for a pick up or to have a truck and boat trailer at the lower landing upon arrival. Surveys take approximately five hours and are conducted weekly until a peak escapement count is obtained. The BEG for Situk River coho salmon is 3,300–9,800 fish.

AERIAL SURVEYS

Aerial surveys are conducted to document sockeye and coho salmon escapements in remote streams along the Yakutat Forelands and the Yakataga District. Peak aerial survey counts are obtained in the East Alsek, Doame, Akwe, New Italio, and Tsiu and Tsivat rivers. Aerial surveys provide the only consistent means to index trends in historical escapement in these remote streams, and have provided escapement information critical for inseason management of the commercial set gillnet fisheries since statehood. Aerial escapement surveys for coho salmon

(excluding the Tsiu and Tsivat rivers) have been conducted only intermittently in recent years, mainly due to the lack of late-season air charter availability in Yakutat.

East Alsek-Doame River

The East Alsek River is located about 47 miles southeast of Yakutat (Figure 1). It is a small, shallow stream that extends about nine miles before entering an estuary lagoon and the Gulf of Alaska. Upwelling water from the neighboring glacially-occluded Alsek River feeds clear water through the gravel into the East River. The East Alsek River provides spawning and rearing habitat for sockeye, coho and chum salmon. The Doame River is a tributary of the East Alsek River and also has crystal clear water that supports a relatively small population of sockeye and coho salmon. East Alsek-Doame river salmon are commercially harvested and also support minor subsistence and sport fisheries. An ADF&G regulatory marker is located approximately two miles upstream from the mouth and designates the area open to commercial fishing. This area is counted separately (and noted in comments) but not included in aerial index escapement counts. The East Alsek River is surveyed from the markers upstream to the end of the system, and the Doame River is surveyed from the markers upstream to the lake. Doame Lake is also surveyed. Occasionally fish can be seen in the shallow areas around the perimeter of the lake and near the lake outlet. The East Alsek-Doame River system is considered one drainage, and the counts from each river are added together for a total escapement estimate. The commercial fishery does not open on the East Alsek River until the lower end of the escapement goal is met, so escapement counts are important for fisheries management. The East Alsek-Doame River BEG of 13,000–26,000 sockeye salmon counted on peak aerial surveys has been attained annually over the last 10 years. There is no escapement goal for coho salmon. Aerial surveys begin in the first week of June and are conducted weekly until a peak escapement count is obtained for sockeye salmon.

Italio River

The Italio River is located approximately 19 miles southeast of Yakutat and is glacially influenced. In 1986 the Italio River changed course and broke into the Akwe River lagoon, which is now referred to as the New Italio River. The portion of the river that was cut-off during the geological change is now fed by upwelling ground water and is comprised of two systems, the Old and Middle Italio rivers. The Italio River supports small runs of sockeye and coho salmon but due to depressed stocks, there has been essentially no directed commercial fishery in the Italio since 1987. Aerial surveys are conducted to count spawners. The Italio River is considered the most difficult stream in the Yakutat area to survey from the air. Although the water is clear, the course of the river is convoluted and winds through deep forest, which create shadows throughout most of the system. In 2012, the USFS installed two video camera fish counting systems above the Italio Falls fish pass to count sockeye salmon entering Italio Lake. This project was continued in 2013 and 2014, but discontinued in 2015. Escapement counts indicated sockeye salmon stocks are recovering. Aerial surveys typically begin in the early part of July and are conducted weekly to obtain a peak index count. In 1995 a BEG was established for Italio River sockeye salmon but the goal was dropped due to the decline in productivity and very limited fishing effort (Geiger et al. 2004). There is no formal escapement goal for coho salmon.

Akwe River

The Akwe River is located just east of the Italio River (~35 miles southeast of Yakutat) and the two rivers share a common mouth. The lower seven miles of the Akwe River is wide and shallow and flows parallel to the beach before entering the Gulf of Alaska. The Akwe River is glacially influenced by its other neighboring river, the Ustay River. As a result, water clarity and the ability to observe salmon during aerial-based surveys in the Akwe River are minimal. Spawning fish can occasionally be seen in the lagoon when conditions are ideal and also in the upper stretches below Akwe Lake. Water clarity and visibility has improved in recent years and aerial surveys have become more effective. An ADF&G regulatory marker located approximately 500 yards above the confluence of the rivers and another marker located seven miles up the lagoon designate the area open to commercial fishing. Escapement surveys for sockeye salmon begin in June. Sockeye and coho salmon are counted throughout the whole system when the river is not open to commercial fishing; otherwise, escapement counts are conducted above the upper marker when commercial nets are in the water. Complete surveys are typically conducted in late July and early August when sockeye salmon can be counted near the outlet of Akwe Lake. Successful index counts make for a viable management tool when matched against inseason CPUE figures. A BEG of 600–1,500 sockeye salmon counted on peak aerial surveys was established for the Akwe River in 1995 (Clark et al. 1995), but the BEG was eliminated in 2008 due to the inability to adequately assess escapement. There is no formal goal for coho salmon.

Tsiu-Tsivat River

The Tsiu and Tsivat rivers are located in the Yakataga District, about 125 miles northwest of Yakutat. The Tsiu River is a relatively small and shallow river. The Tsivat River is a tributary of the Tsiu River and is the larger of the two rivers. Both rivers sustain a productive run of coho salmon. Coho salmon escapements have been assessed since the 1970s and the BEG of 10,000–29,000 coho salmon counted on peak aerial surveys has been achieved every year since, with the exception of a few years where surveys were incomplete due to inclement weather. The Tsiu River is a clear water stream with excellent visibility for counting fish. Unlike the Tsiu River, visibility in Tsivat River is a bit occluded making it more difficult to see fish. The two rivers are surveyed together to obtain a total index count. Escapement surveys are conducted weekly and are critical for inseason management of the commercial fishery that takes place in the lower stretch of the Tsiu River. The Tsiu River undergoes major geological changes every year and regulatory markers are moved around to allow for escapement before the commercial fishery is opened. The escapement includes only fish observed above the designated regulatory markers. Surveys typically begin around the third week in August and usually only partial surveys are conducted (i.e., the streams are surveyed until no more fish are visible). As the run builds and fish reach the spawning grounds, complete surveys are conducted to the ends of both systems. Escapement counts are reported to the area biologist via satellite phone immediately after each survey is completed.

DATA REVIEW AND CODING SURVEY COUNTS

Survey data forms will be reviewed for errors and completeness then entered into the Southeast Integrated Fisheries Database (IFDB) at the end of the season. Pertinent comments and usage codes will also be entered. Comments generally pertain to fish observed below regulatory markers, or identify the area surveyed if the survey was incomplete. All surveys will be assigned a usage code by the management biologists who conducted the surveys so that the quality of each

survey, based on visibility, timing, and area surveyed, is identified for future users of the survey data. Usage Code 01 indicates a survey that is not useful for indexing abundance or comparing to other surveys of the same stream; surveys that take place when conditions are poor for counting, or which only cover a small portion of the stream or survey area (i.e., do not include all the fish known to be present), or which are in some other way not useful for comparing to other counts. Usage code 02 indicates a survey that is comparable to other surveys of the same stream and is potentially useful for indexing abundance; surveys that take place under normal conditions and represent a good complete count. Usage Code 03 is used to designate a single survey for each stream as the one and only peak or maximum survey count for the year. It is very important that only one survey for each stream in a given year is designated with a code 03. In the event that no survey in a given year is deemed a good peak count, surveys for that stream will be coded with 02 or 01 and no peak survey should be identified. A good peak survey count may not be obtained every year for every system due to weather, budget constraints, or lack of pilots. After all survey data are entered in IFDB and coding is completed, the entire data set will be reviewed by research biologists to ensure that each stream has only one coded peak and that the selection of peak surveys for each stream makes sense in terms of run timing and the overall set of surveys for each stream. Any errors or recommended coded changes will be reviewed in consultation with the management biologists familiar with the surveys or the area prior to making any modifications to the database.

SCHEDULE AND DELIVERABLES

Surveys will be conducted from early June through late October (see schedule in Appendix H). Data entry will occur from early July through October and coding surveys and editing data will take place in October and November. Information derived from this project will be used to facilitate inseason management of the Yakutat commercial set gillnet fisheries. Additionally, the information obtained from this project will be used in the annual Yakutat Area commercial salmon fisheries management report and the annual Yakutat set gillnet fishery management plan.

RESPONSIBILITIES

The Yakutat Area management biologist and their assistant will be responsible for conducting aerial and ground surveys throughout the season, reviewing and entering data into IFDB, and coding surveys after data entry is complete.

REFERENCES CITED

Bain, C., S. T. Elliot, R. E. Johnson, and G. Woods. 2003. Situk River steelhead: a review of historical data through 1996. Alaska Department of Fish and Game, Fishery Manuscript No. 03-01, Anchorage.

Conrad, S., and D. Gray. 2013. Overview of the 2013 Southeast Alaska and Yakutat commercial, personal use, and subsistence salmon fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fisheries Management Report No. 14-28, Anchorage.

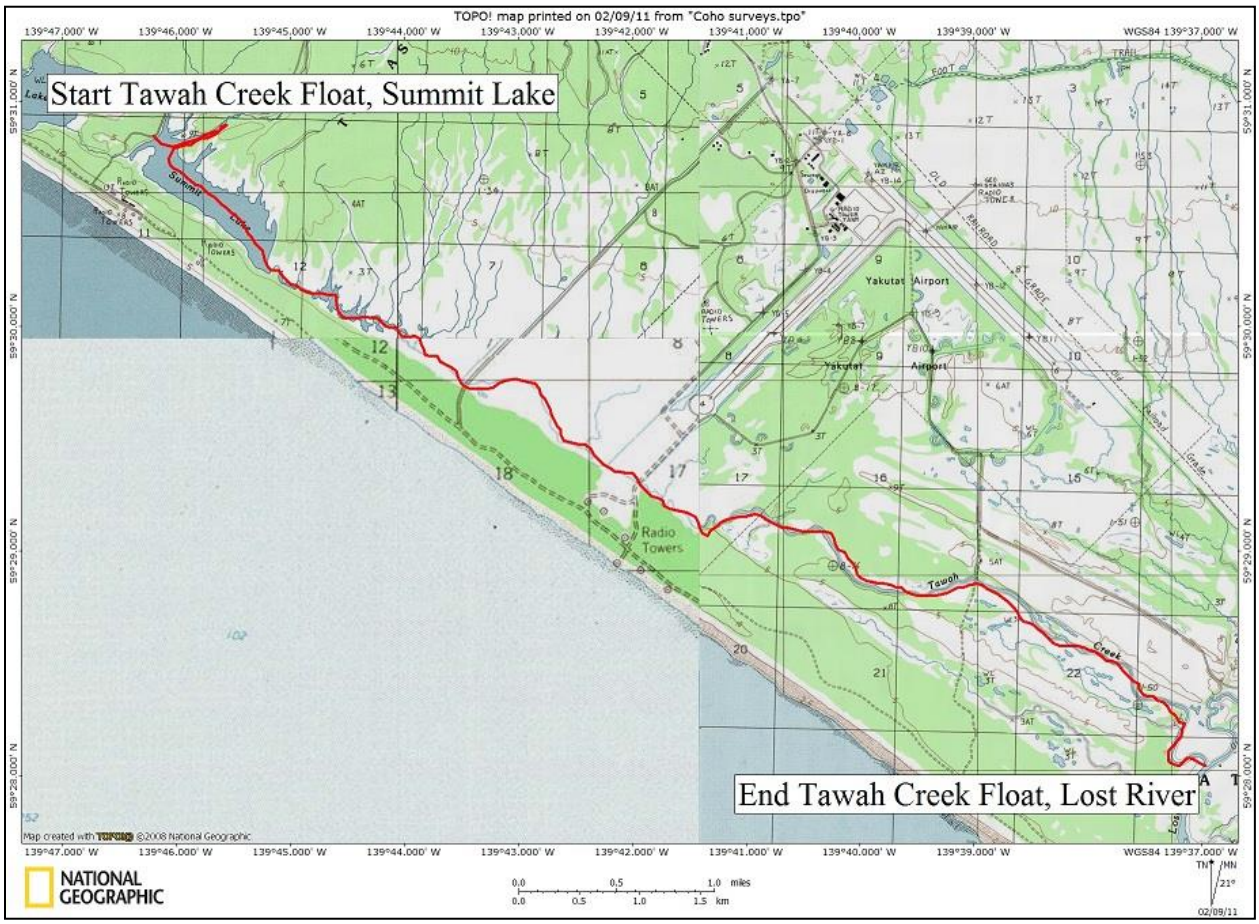
Geiger, H. J., M. A. Cartwright, J. H. Clark, J. Conitz, S. C. Heinl, K. Jensen, B. Lewis, A. J. McGregor, R. Riffe, G. Woods and T. P. Zadina. 2004. Sockeye salmon stock status and escapement goals in Southeast Alaska [*in*] H. J. Geiger, and S. McPherson, editors. Stock status and escapement goals for salmon stocks in Southeast Alaska. Alaska Department of Fish and Game, Special Publication No. 04-02, Anchorage.

Jennings, G. B., K. Sundet, and A. E. Bingham. 2015. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2011. Alaska Department of Fish and Game, Fishery Data Series No. 15-04, Anchorage.

TTC (Transboundary Technical Committee). 2014. Salmon management and enhancement plans for the Stikine, Taku and Alsek rivers, 2013. Pacific Salmon Commission Report TCTR (14)-1, Vancouver.

APPENDICES

Appendix A.–Map of Tawah Creek survey area.



Stream name: Tawah Creek**.**

Stream number: 182-80-030.

Drainage: Lost River/Ophir Creek.

Location/ GPS coordinates: trailhead at N 59°30.889’ W 139°46.120’.

Survey method: boat (canoe).

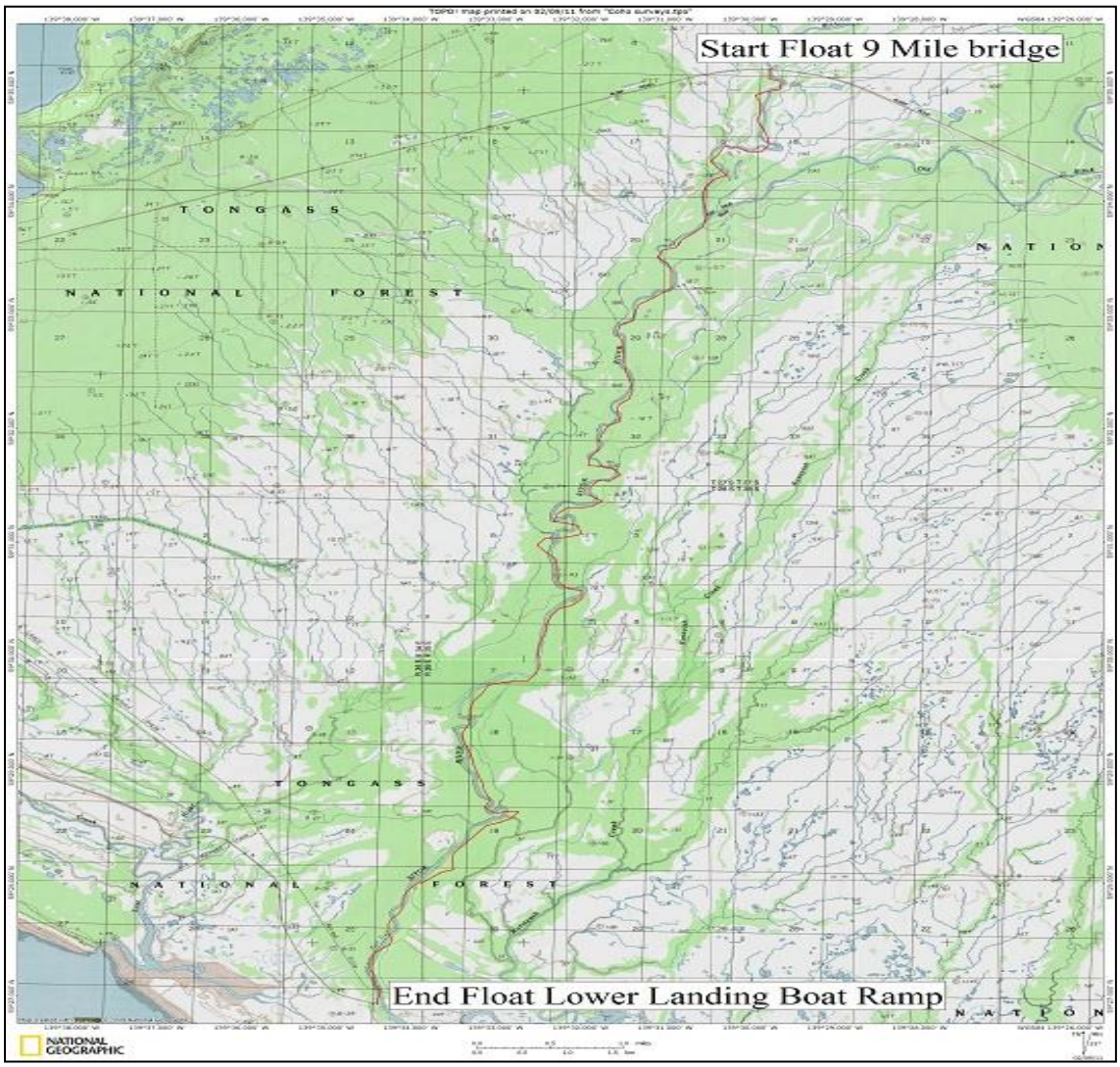
Survey length: ~6 miles.

Survey area: from the head of Summit Lake to the Lost River bridge.

Species counted: sockeye and coho salmon.

Comments: pink salmon are also abundant but not counted; Chinook salmon and steelhead are occasionally observed. Time this survey with a high tide. The survey takes ~4.5–5 hours. You will want to be near the end of the survey route around high tide.

Appendix B.–Map showing Situk River survey area.



Stream name: Situk River.

Stream number: 182-70-010.

Drainage: Situk River.

Location/ GPS coordinates: not needed.

Survey method: boat (river skiff or canoe).

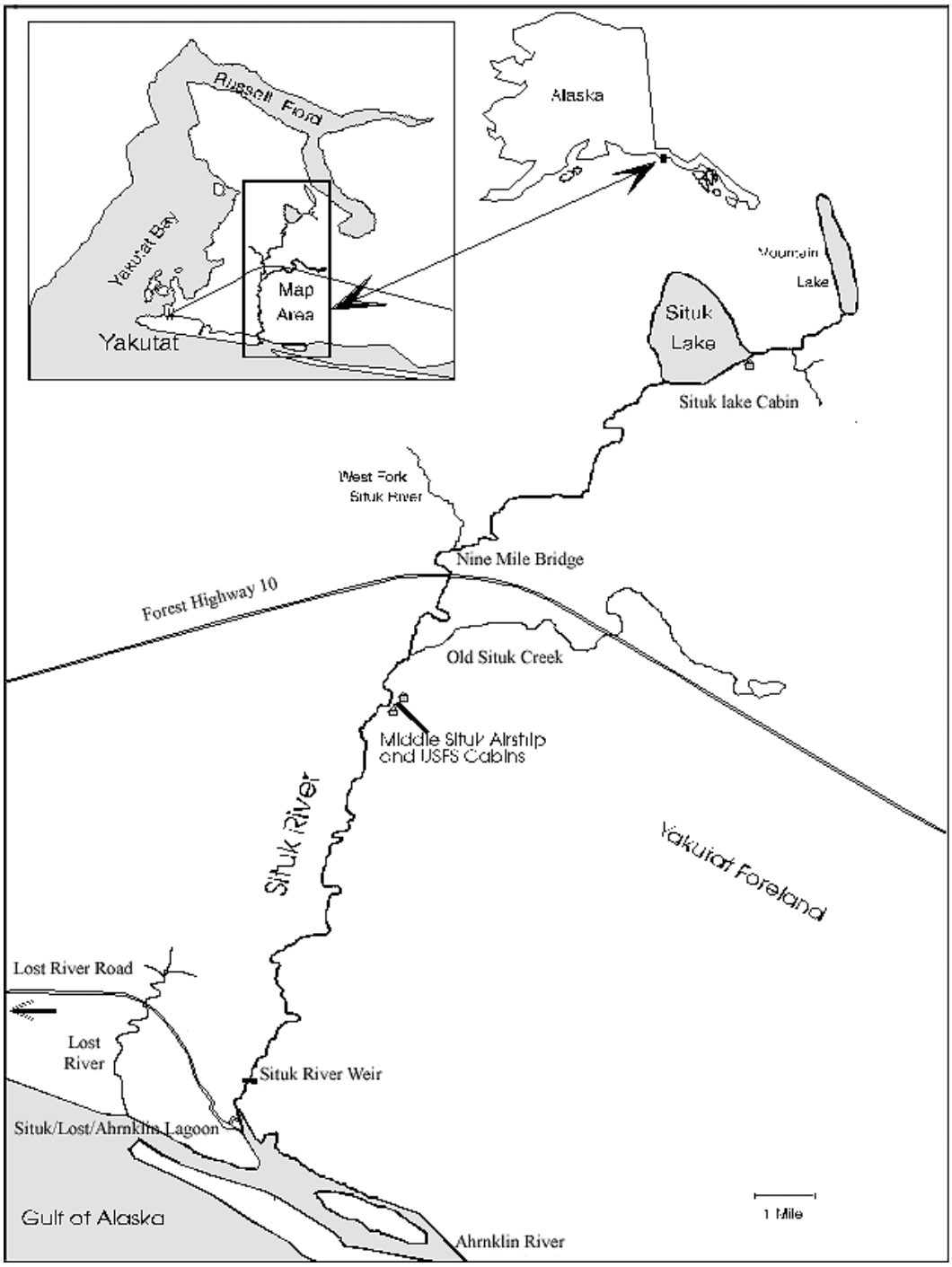
Survey length: 13.5 miles.

Primary species counted: Chinook, sockeye, coho, pink, and chum salmon.

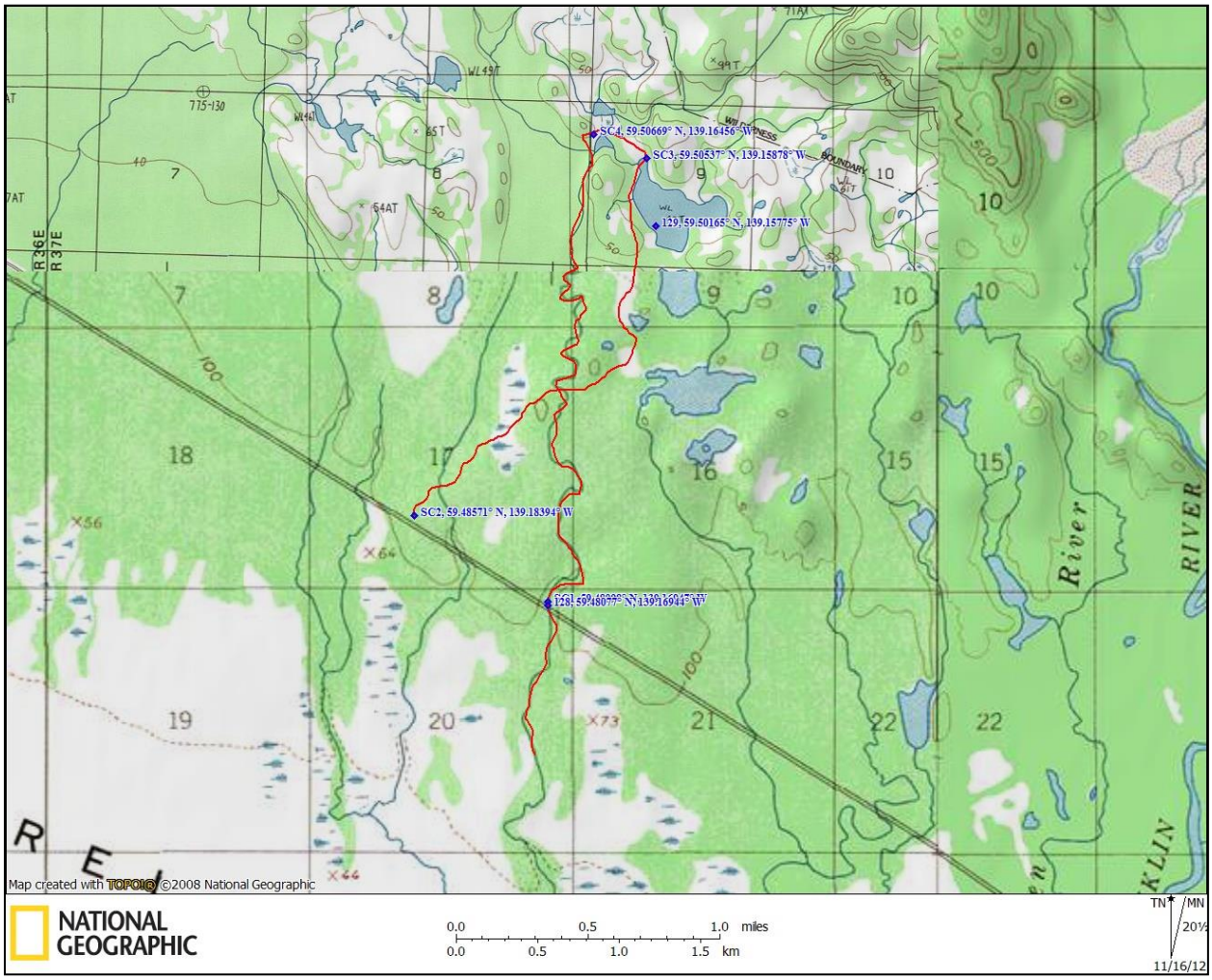
Survey area: from Nine-mile bridge (off Forest Highway 10) to Lower Landing Boat Ramp.

Comments: the survey takes ~5–6 hours. Arrange for someone to meet you at the lower landing with a boat trailer.

Appendix C.–Map showing Situk River drainage survey area (including upper and lower Old Situk River, Situk River weir site, and Forest Highway 10).



Appendix D.–Map showing upper and lower Sockeye Creek survey areas.



Stream name: Sockeye creek (Upper and lower).

Stream number: 182-17-011.

Drainage: Ahrnklin River.

Location/GPS coordinates: trailhead to the lake at N59°28.863’ W139°10.179’; begin survey at Pike Lake outlet at N59°30.096’ W139°09.444’; road culvert at N59°28.853’ W139°10.171’.

Primary species counted: sockeye and coho salmon**.**

Survey area (sockeye salmon): from Pikes Lake outlet to road culvert, and from road culvert downstream 1.25 miles.

Survey area (coho salmon): from road culvert upstream 1.25 miles (N59°29.63’ W139°10.00’) and from road culvert downstream 1.25 miles (N59°27.93’ W139°10.12’).

Survey length: trailhead to lake outlet ~3.5 miles; upper section ~4.5 miles; lower section: ~1.25 miles.

Comments: the entire upper section takes 5–6 hours to survey, so the lower section can be conducted the following day to obtain a total count.

Appendix E.–Map showing “upper” Old Situk River survey area.

Stream name: “Upper” Old Situk River.

Stream number: 182-70-015.

Drainage: Situk River.

Location/GPS coordinates: trailhead at N59°55.25’ W139°38.41’; lake outlet at N59°55.72’ W139°38.29’; road culverts at N59°57.04’ W139°43.77’.

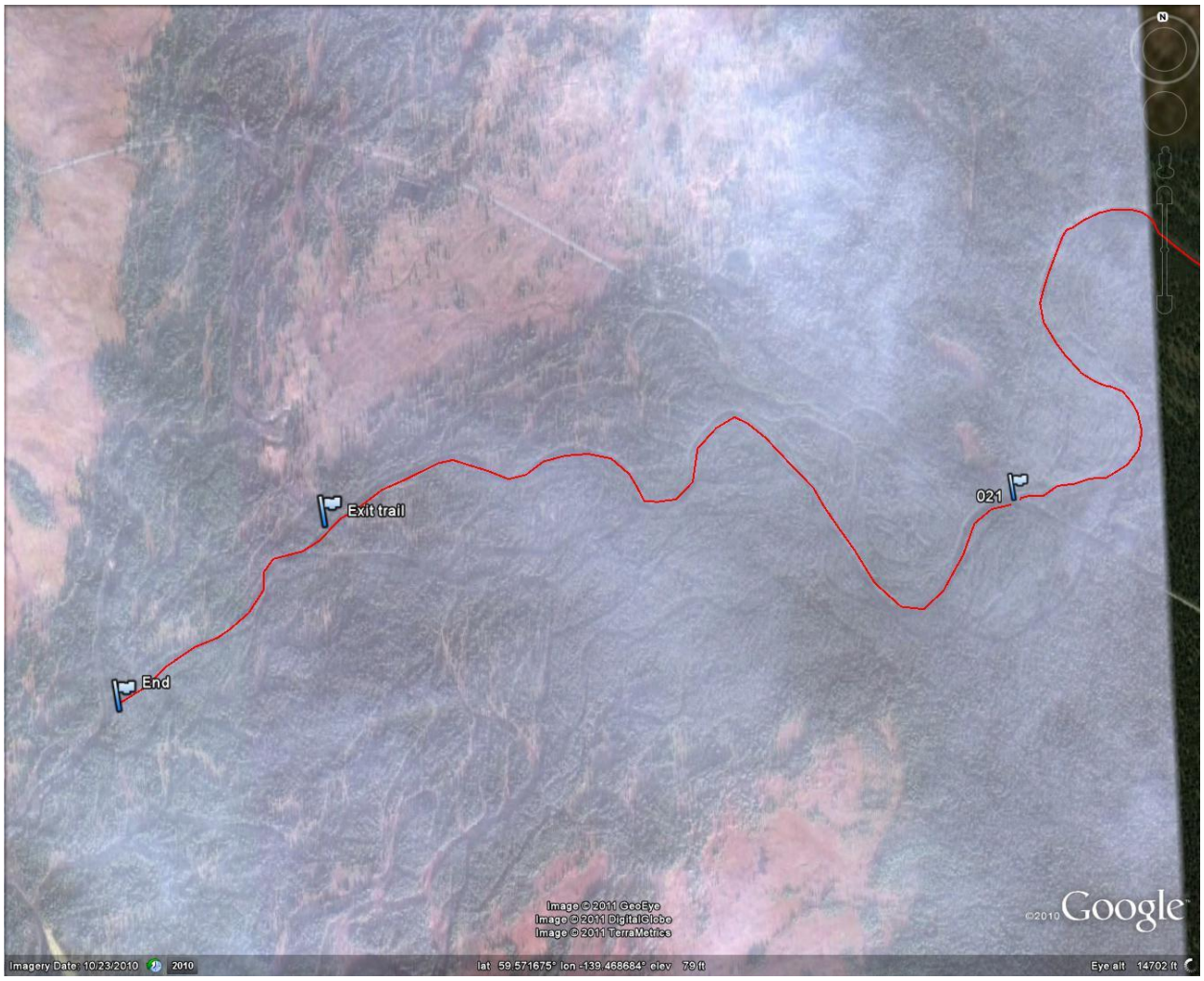
Species counted: sockeye and coho salmon.

Survey area: from Old Situk Lake to road culverts.

Survey length: ~3.8 miles.

Comments: drive Forest Highway 10 to the Old Situk Lake trailhead and walk to the lake. Begin the survey at the outlet of the lake, and survey downstream to the road culverts. The survey takes all day, so start in the morning.

Appendix F.–Map showing “Lower” Old Situk River survey area.



Stream name: “Lower” Old Situk River.

Location/GPS coordinates: Road culverts at N59°57.04’ W139°43.77’; ~0.8 mi above the Situk River confluence at N59°57.10’ W139°48.91’.

Species counted: Sockeye and coho salmon.

Survey area: from road culverts to ~0.8 miles above the Situk River confluence.

Survey length: 2.5mi.

Comments: drive Forest Highway 10 to the road culverts and begin the survey. Count fish downstream until you get just above the Situk River confluence. Walk the 10 mile meadow trailhead to get back to Forest Highway 10.

Appendix G.–Standardized salmon escapement survey form.

ALASKA DEPARTMENT OF FISH AND GAME
SALMON ESCAPEMENT SURVEYS

Document No. ____ **YAKUTAT AREA**

Year ____ start with No. 300

No.	Field 1 Stream Number			2 Stream Name	1/3 Mo/Day	4 Type	5 Area	6 Dist.	6 Mouth	7 Intertidal	8 Stream Live	9 Stream Dead	10 Species	11 Observer	12 Usage Code	13 Coded Remarks	14 Remarks
01																	
02																	
03																	
04																	
05																	
06																	
07																	
08																	
09																	
10																	
11																	
12																	
13																	
14																	

Type:
A = Aerial
F = Foot
B = Boat
H = Helicopter
T = Tower
W= Weir

Area:
P= Partial survey
L = Full (Length) survey

***Dist.**
Miles (tenths)
*if partial survey

Coded Remarks:
21 = Visibility Excellent
22 = Visibility Normal
23 = Visibility Poor
31 = Water High
32 = Water Normal
33 = Water Low
41 = Tide High
42 = Tide Low
43 = Tide Intermediate
51 = Tide Ebb
52 = Tide Flood

Usage Codes:
00 = Not coded yet
01 = Not useful for indexing or estimating escapement of this species.
02 = Potentially useful for indexing or estimating escapement of this species.
03 = Potentially useful as the "peak" survey count for this species.

Species Codes: **410** = Chinook, **420** = Sockeye, **430** = Coho, **440** = Pink, **450** = Chum

Appendix H.–Survey schedule by month, week, stream, and species for the Yakutat Area.

Month	Week 1	Week 2	Week 3	Week 4
June	• East/Doame Rivers (*sockeye)* • Akwe River *(sockeye)*	• East/Doame Rivers *(sockeye)* • Akwe River *(sockeye)*	• East/Doame Rivers *(sockeye)* • Akwe River *(sockeye)*	• East/Doame River *(sockeye)* • Akwe River *(sockeye)*
July	• East/Doame Rivers *(sockeye)* • Akwe River *(sockeye)* • Tawah Creek (*sockeye)* • Sockeye Creek (*sockeye)*	• East/Doame Rivers *(sockeye)* • Akwe River *(sockeye)* • Tawah Creek (*sockeye)*	• East/Doame Rivers *(sockeye)* • Akwe River *(sockeye)* • Tawah Creek (*sockeye)* • Sockeye Creek (*sockeye)* • Italio River (*sockeye)*	• East/Doame River *(sockeye)* • Akwe River *(sockeye)* • Italio River *(sockeye)* • Tawah Creek (*sockeye)*
August	• East/Doame Rivers *(sockeye)* • Akwe River *(sockeye)* • Tawah Creek (*sockeye)*	• East/Doame Rivers *(sockeye)* • Akwe River *(sockeye)* • Tawah Creek (*sockeye)* • Old Situk River (*sockeye)* • Situk River (*coho)*	• East/Doame Rivers *(coho)* • Akwe River *(coho)* • Tawah Creek (*sockeye)* • Situk River (*coho)* • Tsiu/Tsivat Rivers *(coho)*	• East/Doame Rivers *(coho)* • Akwe River *(coho)* • Tawah Creek (*sockeye)* • Situk River (*coho)* • Tsiu/Tsivat Rivers *(coho)*
September	• East/Doame Rivers *(coho)* • Akwe River *(coho)* • Tawah Creek (*coho)* • Situk River (*coho)* • Tsiu/Tsivat Rivers *(coho)*	• East/Doame Rivers *(coho)* • Akwe River *(coho)* • Tawah Creek (*coho)* • Situk River (*coho)* • Tsiu/Tsivat Rivers *(coho)*	• East/Doame Rivers *(coho)* • Akwe River *(coho)* • Tawah Creek (*coho)* • Situk River (*coho)* • Tsiu/Tsivat Rivers *(coho)*	• East/Doame Rivers *(coho)* • Akwe River *(coho)* • Tawah Creek (*coho)* • Situk River (*coho)* • Tsiu/Tsivat Rivers *(coho)*
October	• Tawah Creek (*coho)* • Situk River (*coho)* • Tsiu/Tsivat Rivers *(coho)*	• Tawah Creek (*coho)* • Situk River (*coho)* • Sockeye Creek (*coho)*	**If staff is available:** • Tawah Creek (*coho)* • Situk River (*coho)* • Old Situk (*coho)*	**If staff is available:** • Tawah Creek (*coho)* • Situk River (*coho)*