Regional Operational Plan CF.4K.2015.12

Chignik River System Smolt Enumeration and Limnology Projects Operational Plan, 2015

by

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and

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April 2015

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

Symbols and Abbreviations

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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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Project Leader(s):	Nyssa Baechler, Fishery Biologist I Mary Loewen, Fishery Biologist II
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Plan Type:	Category I

Approval

Title	Name	Signature	Date
Project Leader	Mary Loewen		4.21.15
Section Supervisor	Kevin Schaberg		4/14/15

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF APPENDICES

PURPOSE

This operational plan describes the procedures of the sockeye salmon *Oncorhynchus nerka* smolt monitoring and enumeration project conducted by the Alaska Department of Fish and Game (ADF&G) in the Chignik River system. The project goal is to evaluate and document production trends of sockeye salmon smolt in the Chignik River system and collect limnology data to understand rearing capacity and habitat use. The research is designed to estimate smolt population size and age structure, assess fish body condition, describe limnetic habitat conditions and forage base, collect samples for genetic stock identification, and provide data for the Chignik River preseason adult sockeye salmon forecast. The abundance of sockeye salmon smolt will be estimated using a rotary screw trap array and mark-recapture techniques. Age structure of the population will be estimated from scales of sockeye salmon smolt collected at the traps. Limnology surveys will be conducted in Chignik and Black lakes each month from May to September to describe physical characteristics, nutrient availability, primary production, and zooplankton forage available to rearing juvenile sockeye salmon. Juvenile salmon habitat use will be examined by beach seining in the upper Chignik River system and near-shore marine environment. Findings from this project are vital for understanding effects of the commercial fishery and environmental changes occurring in the Chignik River system on the sockeye salmon population.

Key words: Sockeye salmon, smolt, *Oncorhynchus nerka*, Chignik River, limnology, mark-recapture, zooplankton

BACKGROUND

Sockeye salmon *Oncorhynchus nerka* are the most important commercial salmon species in the Chignik Management Area (CMA). The Chignik River system is the primary sockeye salmon producer in the CMA (Figure 1). Over the last 15 years, annual runs to the Chignik River have ranged from 1.2 to 4.5 million adult sockeye salmon (Wilburn et al. 2015 *in prep*). There are two rearing lakes in the Chignik system and a sockeye salmon run distinct to each lake. Sockeye salmon that spawn in Black Lake and its tributaries return from May through July, and those that spawn in Chignik Lake and its tributaries return from approximately early July through September (Creelman et al. 2011). Smolt population abundance data, by age, has been collected annually since 1994. This project provides information on the Chignik River juvenile (smolt and fry) sockeye salmon population size and dynamics and the physical health of the smolt. Limnology data used for habitat assessment will also be collected as part of this project. Smolt population and limnology data will be used for evaluating current escapement goals, forecasting future adult returns, and estimating ocean survival.

OBJECTIVES

1. Estimate the total number of emigrating sockeye salmon smolt, by age class, from the Chignik River.
2. Describe sockeye salmon smolt emigration timing and growth characteristics (length, weight, and condition factor), by age class and stock.
3. Document juvenile salmon habitat use by beach seining Black Lake and Chignik Lagoon.
4. Collect genetic samples from emigrating sockeye salmon smolt and fry caught in the trap and in Chignik Lagoon beach seine hauls for use in a stock separation study.
5. Describe the physical characteristics of Black and Chignik lakes, including temperature, dissolved oxygen, and light penetration profiles on a monthly basis throughout the sampling season.
6. Describe the nutrient availability and primary productivity of Black and Chignik lakes on a monthly basis throughout the sampling season.

7. Describe the zooplankton forage base available to juvenile sockeye salmon in Black and Chignik lakes on a monthly basis throughout the sampling season.
8. Publish a project summary report by January 15, 2016.

TASKS

1. Install, operate, and maintain a rotary screw trap array to capture a portion of the sockeye salmon smolt outmigration.

   Target dates: April 15 through June 22.
2. Enumerate the daily smolt trap catch by species.
3. Collect weekly samples of 200 sockeye salmon smolt from the rotary screw trap array (40 smolt per day for five consecutive days) for age, weight, and length (AWL) as well as genetic stock-of-origin data.
5. Perform weekly mark-recapture experiments by dyeing and releasing 3,000 (1,000 minimum) sockeye salmon to estimate trap efficiency and the total smolt outmigration. In conjunction with each mark-recapture experiment, conduct a mark-retention/delayed mortality experiment.
6. Collect physical data daily: air temperature, water temperature, relative water depth, cloud cover, trap revolutions per minute, and wind direction and velocity.
7. Collect limnology data monthly from each lake including physical parameters: water chemistry, clarity, temperature, dissolved oxygen, solar illuminance depth profiles, and water samples for biological parameters: nutrients, phytoplankton, and zooplankton.
8. Beach seine in Chignik Lagoon and Black Lake monthly to obtain sockeye salmon juveniles for AWL and genetics.
9. Inventory and store equipment. Target date: June 22.
10. Publish the 2015 smolt project findings in an annual report. Final report due date: January 15, 2016.

METHODS

SMOLT SAMPLING

Trap Installation

The traps will be constructed and installed following the guidelines in Appendix A1. Two rotary screw traps (1.5-m and 2.4-m cone diameters) will be positioned in the Chignik River at the same location as in previous years (56.257259º N Lat 158.730213º W Long; Figure 2). The traps will be operated in tandem perpendicular to the stream flow and anchored to shore. The water velocity should be approximately 5 ft/s (~1.5 m/s) at the trap location to provide a trap operating speed of about 5-8 revolutions per minute (rpm). To reduce smolt avoidance, each trap will be relocated laterally (as the river flow fluctuates), to fish as far offshore as possible without jeopardizing safety or equipment. The traps will be marked with a safety light for boat traffic.

Smolt Trapping and Enumeration

The screw traps will operate continuously throughout the season. A trapping day will be defined as a 24-hour period from noon to noon, with the date corresponding to the calendar date of the

first 12-hour period. Time will be recorded in military (24-hour) format. During periods of high outmigration, high river discharge, or high debris movement, the traps will be checked every two to three hours from dusk to dawn and approximately every six hours during the day to avoid excessive mortality. This may require the crew to remain overnight at the smolt traps. Regardless of outmigration intensity, the traps will be checked, cleaned, and emptied daily at noon. During periods of decreased outmigration intensity, a general rule is to check the traps at noon, 1800, 2200, and between 0600 and 0800 hrs. It is extremely important to monitor the traps closely because smolt migration rates are variable and unpredictable: excessive mortality can occur quickly if smolt are crowded in the trap. The traps will be kept clear of debris, as increased flows and detritus may cause death or injury to captured smolt.

Each time the traps are checked, all species will be identified and counted. Various identification keys (e.g., Pollard et al. 1997; Appendix B1) will be available and care will be taken to ensure proper identification. If identification by external characters proves difficult, a small number of fish will be sacrificed and internal characters will be examined. All fish of each species will be counted using a hand counter to facilitate accuracy. Each time the trap is checked, all counts, including mortalities, will be recorded on the DAILY SMOLT CATCH REPORTING FORM (Figure 3). If it becomes necessary to count continuously because of high fish abundance, the tally will end for each species at the end of each hour. The data will be recorded, and a new tally will begin for the next hour. All counts will be summarized in the SOCKEYE SALMON SMOLT REPORTING FORM (Figure 4) and in two spreadsheets, 2015_appendices and 2015_inseason, on the project laptop on a daily basis.

If direct counting becomes impossible because of high smolt catches, it will be necessary to estimate the trap catch using the catch-weight method. The crew will be prepared to estimate the catch using this method well before large migrations begin because there is no preparation time when catch numbers become large. It may not be necessary to use the catch-weight method on both traps simultaneously; it is desirable to count individual fish when possible. It is also desirable to keep an individual tally for each trap during catch-weight enumeration. The methods for the catch-weight estimation technique are

1. A sample of approximately 300 fish will be dip netted from the trap, and enumerated, by species, into a bucket; any marked fish will be noted. This sample should be representative of the fish in the trap.
2. Wet and tare the empty catch-weight net. Add the enumerated sample to the net. This weight will be the reference weight for the next samples. The data will be recorded in a field notebook and the fish will then be released downstream of the traps.
3. Subsequent samples will be taken from the trap(s). The weight of these samples will be measured and recorded, and the fish will be released.
4. A new reference weight will be taken every 10^{th} sample or earlier if size or species compositions obviously change.
5. These data will be transferred to the CATCH-WEIGHT WORKSHEET (Figure 5) when passage rates slow down.

Any data generated by this method will be clearly marked on the data sheets.

Smolt Age, Weight, and Length Sampling

A sample of 40 sockeye salmon smolt will be collected daily for five consecutive days per statistical week and sampled for AWL data and entered into the Rugged Digital Assistant (RDA). Detailed procedures for sampling adult and smolt sockeye salmon can be found in the Kodiak Management Area salmon catch and escapement sampling operation plan (Wattum *In prep*). All smolt sampling data will reflect the sampling day in which the fish were captured, and samples will not be mixed between days. For example, smolt collected on Friday night and Saturday morning will be counted as Friday's fish, even though sample processing may occur on Saturday afternoon. Additionally, it is important to stay aware of the outmigration magnitude in order to opportunistically sample for AWL proportionally to periods of high outmigration. For example, if large nights of outmigration take place during a night not scheduled for sampling, crew should retain smolt for additional samples that night in order to accurately reflect patterns of outmigration and age composition throughout the season. .

If less than 40 sockeye salmon smolt are captured in a day, all available smolt will be sampled for AWL data. If more than 40 smolt are captured, a sample of smolt will be collected at each check throughout the 24-hr sampling day and held in an instream live box. The number of fish held for sampling at each check will be proportional to the migration strength. At the end of the sampling day, 40 smolt will be randomly collected from the live box and sampled. The remaining smolt will be released. Ideally, only fish 45mm or larger are considered smolt and should be sampled. In years where the average size of outmigrating fish is small, more than 40 smolt should be retained for sampling in order to meet daily sampling goals. If fewer than 40 smolt of 45mm length or greater are caught in a night, all large fish should be sampled, and the remaining fish required to meet the daily sampling goal taken from the remaining smaller fish.

It is important that the smolt sample be representative of the entire night's migration. These data are used to reconstruct the age class components of the emigration, and smolt of different sizes and ages may travel in separate schools throughout the night. The age of the sampled smolt will be estimated post-season by interpreting the growth patterns on their scales following the methods and notation of Koo (1962). The AWL data stored on the RDA will be uploaded to the project laptop weekly and e-mailed to the Kodiak office monthly for entry into the database, or as determined by the Project Biologist.

Genetic Sampling

All AWL-sampled sockeye salmon smolt will have tissue samples taken for paired (AWL and genetics) DNA analysis. The methods for sample collection are outlined in Appendix C1-C2. The sample procedures in Appendix C1 are written for the non-lethal and lethal sampling of smolt; both are used.

Sockeye fry will also be collected for genetic sampling. Twenty five sockeye fry (<45 mm in length) will be collected for five consecutive days per statistical week. If there are less than twenty five fry captured in a single night, all fry should be retained. The collected sample will be lethally dosed with MS-222 and transferred to a 125 mL poly bottle containing ethanol. Record the date, number of fish in the sample, and collector(s) initials on the label. Replace ethanol in the bulk sample fry bottles after 24 hrs.

Genetic samples should not exceed one third of the volume of the containers, and will be refreshed once after the initial 24 hours of storage. Record the number of smolt and fry collected

per day into a spreadsheet and submit it to the project biologist upon completion of the sampling season. It is important to keep an accurate and detailed inventory of all genetics samples throughout the season; mistakes are often difficult to correct after the fact. The samples will be shipped to the ADF&G Gene Conservation Laboratory in Anchorage for processing at the end of the season.

Mark-Recapture Experiments

The Chignik River sockeye salmon smolt population size will be estimated using methods described in Carlson et al. (1998). Trap efficiency estimates will be made a minimum of once per week to estimate the number of sockeye salmon smolt emigrating from the Chignik River, or more frequently if the trap is moved, water levels change, or changes in outmigration intensity, size classes, or species composition are noticed

The trap efficiency E is calculated by

$$E_h = \frac{m_h + 1}{(M_h + 1)}, \tag{1}$$

where

h = stratum or time period index (release event paired with a recovery period),

M_h = the total number of marked releases in stratum h,

and

m_h = the total number of marked recaptures in stratum h.

The approximately unbiased estimator of the total population within each stratum ($\hat{U}_h$) is calculated by

$$\hat{U}_h = \frac{u_h(M_h + 1)}{m_h + 1}, \tag{2}$$

where

u_h = the number of unmarked smolts captured in stratum.

Variance is estimated by

$$v(\hat{U}_h) = \frac{(M_h + 1)(u_h + m_h + 1)(M_h - m_h)u_h}{(m_h + 1)^2 (m_h + 2)}. \tag{3}$$

The estimate of $\hat{U}$ for all strata combined is estimated by

$$\hat{U} = \sum_{h=1}^{L} \hat{U}_h, \tag{4}$$

where L is the number of strata. Variance of $\hat{U}$ is estimated by

$$v\left(\hat{U}\right) = \sum_{h=1}^{L} v\left(\hat{U}_h\right), \tag{5}$$

and 95% confidence intervals are estimated from

$$\hat{U} \pm 1.96\sqrt{v\left(\hat{U}\right)}, \tag{6}$$

which assumes that $\hat{U}$ is asymptotically normally distributed.

Bismarck Brown Y dye will be used to mark a sample of fish. The marked fish will be transported 1.3 km upstream of the trap to the release site (Figure 2). The release site is a cross-section of river aligned with a small creek entering on the north side of the river.

All smolt caught in the trap will be examined for marks, unless high catch volumes require the use of the catch-weight method. The proportion of recaptured fish will be used to estimate the proportion of the total emigration that is captured in the trap. The assumptions for mark-recapture experiments are:

1. Mortality rates are equal between marked and unmarked fish,
2. All recaptured fish are recognized as such,
3. All marked fish do not lose their marks, and
4. Marked and unmarked fish behave similarly (Carlson et al. 1998).

Every effort will be made to conform to these assumptions. The marking process can be very stressful for smolt, and care will be taken to avoid stressing the marked fish. The primary causes of mortality are excessive handling, high water temperatures, low levels of dissolved oxygen, and over-exposure to dye. The marked smolt will be released into the river at a point far enough upstream to ensure mixing with the unmarked population at a time when the migration for the evening is imminent.

Mark-recapture events will occur at least once per stat week (Appendix G1). If the overall workload and scheduling allow, and enough smolt can be captured, trap efficiency estimates will be made every five days.

The following methods will be used for marking and releasing smolt:

1. All data will be recorded on the SMOLT DYE RELEASE FORM (Figure 6).
2. Every five to seven days, a sample of approximately 1,000 to 3,000 sockeye salmon smolt will be collected for marking. If run strength is not sufficient to capture all the smolt in one day, smolt will be held in an instream live box for up to three days and a running count will be kept on a dry erase board in the weatherport. After the third evening, all smolt collected will be marked. Marked fish will not be sampled for AWL information.
3. 100 smolt will be placed into a holding box before the dyeing process for delayed mortality experiments.

4. The fish will be transferred from the instream live box to two lidded 24-gallon marking containers. A water pump will be used to gently exchange the water in the containers. The smolt will be allowed to rest in the container for 30 minutes.

5. The circulation pumps will be turned off, and pump hoses removed from the containers to prevent siphoning and subsequent draining. Three aerator units will be placed in the marking containers to operate continuously during the dyeing process. A solution of 4.6 g of Bismarck Brown Y dye will be dissolved in each container. Depending on the number and size of smolt in the marking containers, the amount of Bismarck Brown may need to be adjusted for each individual test.

6. After 15 minutes, the hoses will be replaced, the pumps will be restarted and the containers flushed with fresh water for 90 minutes. Smolt displaying abnormal behavior will be removed from the experiment and released downstream of the traps.

7. After 90 minutes, smolt showing normal behavior will be dip netted from the recovery containers, 100 smolt transferred to a holding box, and the remaining smolt (final count noted) transferred to six 5-gallon buckets equipped with aerators and transported upstream to the release site (Figure 2). Care should be taken to avoid sloshing and stressing fish during transport in the buckets. At the release site, the smolt will be evenly distributed across the stream by slowly pouring the smolt out of the 5-gallon buckets. The boat should be operated in reverse and smolt released from the bow to prevent propeller-wash mortality or injury. The dye treatment and recovery process should be timed so that the release takes place at approximately 2300 hours.

8. The smolt trap will be closely monitored for recaptured marked fish beginning the day of release and continue through the next marking event. The number of marked fish will be observed and recorded on the DAILY SMOLT CATCH REPORTING FORM (Figure 3), the SOCKEYE SALMON SMOLT REPORTING FORM (Figure 4), and the in_season spreadsheet. The number of smolt examined will equal the number of marked smolt plus the number of unmarked smolt caught each day. The daily smolt catch will not include marked smolt, since these fish have been previously counted when they were collected to be marked.

9. In the event that it is necessary to use the catch-weight method to count smolt during a dye test period, the number of fish examined for marks will be the number of fish counted in the reference weight samples only. The total number of marked fish recovered will be extrapolated from the catch-weight method. Data generated from the catch-weight method will be clearly labeled and recorded on the CATCH-WEIGHT WORKSHEET (Figure 5).

Trapping conditions will be held constant between marking events. Modifications to the trap, including adjustments in lighting and trap location, will be made immediately before a marking event. If major changes in river flow rates or smolt migration patterns are noticed, a new marking event will follow as soon as possible. The Project Biologist will be consulted before any trap modifications are made unless immediate modifications are necessary to prevent loss of equipment or to prevent major smolt mortality. Any changes will be clearly documented in the daily log and in the comments section of the data forms.

Mark Retention/Delayed Mortality Experiments

A random subsample of 200 sockeye salmon smolt will be taken from the fish retained for marking for use in a combined mark retention and delayed mortality experiment. This experiment will be performed in conjunction with every dye test unless otherwise advised by the Project Biologist.

Before marking fish, 100 of the sockeye salmon smolt will be removed from the marking container and placed into a labeled, covered, and aerated 5-gal bucket. After the marking and recovery period, an additional 100 marked smolt will be placed in another labeled, covered, and aerated 5-gal bucket. These two groups of fish will be handled the same as the fish that are marked and released, except they will not be released. The two buckets will be transported to the release site but retained. Be certain not to release these delayed mortality experiment fish. After releasing the marked-release group, return to the trap site and gently pour the two delayed mortality groups into their respective in-river live boxes (perforated totes). These smolt will be examined daily for mortalities. The number of mortalities from each group will be recorded on the DELAYED MORTALITY / MARK-RETENTION FORM (Figure 7). These smolt will be released at the beginning of a new mark-recapture test or after five days, whichever is first.

Mark identification trials will occur each day of the mark-recapture stratum. The purpose of this test to evaluate the mark-recapture assumptions that all marks are retained and recognized. One crewmember will dip net approximately five smolt from both marked and unmarked live boxes and combine them in a bucket. This crew member will present a mixed sample of approximately five marked and unmarked smolt from this bucket to the examiner for one second. The examiner will determine how many smolt are marked and unmarked. The presenter will then carefully count the sample into another bucket and record whether the examiner was correct. Once the true count is verified, the marked and unmarked fish will be separated and returned to their live boxes. Crewmembers will switch roles as presenter or examiner on a daily basis. It is desirable to mimic actual counting conditions as much as possible when conducting these trials; they should be performed under low light conditions. Results of this experiment will be recorded on the DELAYED MORTALITY / MARK-RETENTION FORM (Figure 7).

If less than 1,000 smolt are captured over three days to perform mark-recapture experiments, then the sample-sizes used for delayed mortality and mark retention experiments may be reduced. The project biologist will be consulted prior to making this adjustment to the experimental design.

Physical Data

Air and water temperature, cloud cover, wind direction and velocity, trap rpm, and relative stream height will be observed and measured once daily at noon throughout the season. This information will be recorded on the DAILY PHYSICAL DATA OBSERVATION FORM (Figure 8).

BEACH SEINING

Black Lake

To assess habitat use by juvenile sockeye salmon and collect AWL data, four sites will be sampled with beach seines monthly (May-August) in Black Lake (Figure 10; Appendix D1). A 3 mm mesh, 10 m long, 1 m deep seine will be used. A single haul will be made at each location. Each end of the net will be retrieved simultaneously and the lead line will remain in contact with

the bottom. Care will be taken to set the gear in a similar manner at all sites and for all sampling events at the same site.

All fish species caught will be identified (Appendix B1) and counted. If captured, a total of 45 juvenile (fry and smolt combined) sockeye, 20 coho *O. kisutch*, 20 Chinook *O. tshawytscha* salmon, and 20 other salmon species (pink and/or chum) will either be retained for AWL or randomly sampled from the catch and measured for fork length (FL) to the nearest millimeter (mm) at each site. The first 25 juvenile sockeye salmon of any size will be retained for AWL sampling and stored in a labeled zip lock bag containing enough MS-222 to induce mortality. Up to 20 additional juvenile sockeye will be measured for FL. The label on the zip lock bag of retained fish should include the area, site number, and date. These fish will be transported to the Chignik field lab for AWL sampling. If a specific fish is too small (<45 mm) for scale sampling, it will be assigned a scale number and assumed to be an age-0 fish. All FL and catch data will be collected and recorded on a BEACH SEINE DATA FORM (Figure 13); juvenile sockeye salmon AWL data will be entered into the RDA.

Chignik Lagoon

Juveniles rearing in Chignik Lagoon will also be captured monthly (May-August) by beach seine at four sites (Figure 11; Appendix D1) to assess habitat use, collect AWL data, and tissue for genetic stock identification. Samples should not be mixed between sites. The first haul will be treated in the same manner as the Black Lake sets to produce a quantified sample. However, in the Lagoon, up to two additional sets at each location (3 total) may be conducted to retain the desired sample size of 25 juvenile sockeye salmon for AWL sampling.

Data from each set will be recorded on a separate BEACH SEINE DATA FORM (Figure 13). If no juvenile salmon are present in any of the three sets, all sets can be included on one form, but detailed notes must be maintained to describe what other species, if any, were caught in each set and that three sets were made. If any juvenile salmon are present in a haul, each one must be measured (up to 20 for each species) and recorded on a separate form for that haul.

Chignik Lagoon juvenile sockeye salmon will be sampled for paired AWL and genetics tissue within 24 hrs of capture and data entered into the field notebook and netbook (Wattum 2015 *in prep*). Retained smolt >45 mm will be sampled individually for AWL and genetics; fry (<45 mm) will be treated in the same manner as fry collected at the smolt traps and be placed in a separate polybottle for each sampling site. Polybottles should be labeled with area, site number, method of capture, date, number of samples, and initials of collectors.

Smolt scale slides for Black Lake and Chignik Lagoon beach seining will be numbered differently for each location. Scale slides for Chignik Lagoon will begin with slide 001 and continue numerically throughout the season (002, 003, etc.), whereas scale slides for Black Lake will begin with slide number 1001 and continue in the same manner (1002, 1003, etc). This numbering system allows for seamless data entry post-season.

LIMNOLOGY SAMPLING

Typically, limnology samples have been collected mid-month in Chignik Lake. For interannual consistency, it is desirable to maintain this approximate schedule. However, adjustments in schedule will certainly occur. As much as is possible, try to collect limnology samples from each lake approximately one month apart. Each month, Chignik and Black lakes are sampled via skiff,

while Bear Lake is sampled in collaboration with ADF&G pilots and North Peninsula staff. Detailed information for Bear Lake sampling is contained in Appendix D3.

Station Placement and Sample Collection

Four limnology stations will be established in Chignik Lake (Figure 9), and one station will be sampled in Black Lake (Figure 10). The exact latitudes and longitudes of these stations were determined using a global positioning system (GPS) in prior years (Appendix D1). No buoyed station will be established in Black Lake, so a GPS must be used to ensure correct sampling location each month. The sampling stations in Chignik Lake will be marked with a buoy before or during the first sampling period. Each buoy will be secured to a line and weighted down by two or more sand bags at each station. The line at each station will be long enough to secure to the boat while sampling and to keep the buoy from submerging during periods of rough weather. Lengths of line will differ between stations. At the end of the season, each line should be marked with the corresponding station. If the lines were not marked from the previous season or are missing, the length of the line can be estimated by using maximum depth information from each station A GPS will be used during buoy deployment and to verify the buoy positions at each sampling event. In the event that a buoy moves between sampling periods, it should be repositioned to the correct GPS coordinates before sampling occurs for that month.

Sampling at Chignik and Black lakes will take place at monthly intervals (Appendix D2). Personnel experienced in running the Black River delta or a contracted guide from Chignik Lake Village will transport staff to Black Lake for monthly sampling. The skiff will be held in place at each sampling site in Chignik Lake by wrapping the buoy line around a cleat on the skiff. An anchor will be used to hold the skiff in place at the sampling site in Black Lake; however, it may be necessary to keep the motor running to assist with keeping the skiff in place.

Temperature, dissolved oxygen, water clarity, and light penetration parameters will be measured at all stations. Water samples will be collected from depths of 1 m and 29 m at stations two and four on Chignik Lake. Water samples will be collected from 1 m at the single station on Black Lake. Zooplankton samples will be taken from all stations.

The Chignik smolt crew will also plan to travel to Bear Lake monthly from May-August to conduct limnology sampling; flights to Bear Lake will be arranged directly with the pilot in Chignik. More information on Bear Lake limnology sampling can be found in Appendix D3.

Water Sampling

Water sample and zooplankton bottles should be pre-labeled with as much information as possible prior to sampling. A Van Dorn sampler will be prepared and lowered to the desired sampling depth on a metered line. Collections will be taken from 1 m and 29 m except for in Black Lake where only 1 m samples will be collected. A messenger attached to the line and held at surface will be released to trip the mechanism that will close the Van Dorn bottle at depth. The Van Dorn bottle will be pulled up to the surface and the contents emptied into a pre-cleaned, labeled, plastic carboy container. Each container will be rinsed with a small portion of sample water, which will be discarded prior to pouring the sample water into the carboy. This procedure will be repeated (without rinsing) until the carboy is 2/3 to 3/4 full (usually two deployments of the Van Dorn). Any samples that contain sediment will be discarded and another sample will be collected. The carboys will be stored in a closed tote after sampling and during transport back to the lab. The sampling depths, stations, and other additional comments will be recorded on the

DETAILED LAKE SURVEY FORM (Figure 12). Phytoplantkon samples will be collected during water processing in the lab from samples taken at specified stations and depths.

Zooplankton Sampling

A 0.2-m diameter, 153-micron mesh, conical net will be used to collect all zooplankton samples with vertical tows. Prior to sampling, the bottom depth of each station will be determined by lowering a weighted, metered line. The collection basin and townet will be cleaned of any debris by rinsing with filtered deionized (DI) water. The plankton townet will be lowered at a steady rate, ensuring the weighted cod-end stays below the opening of the net, until the cod-end is approximately 1 m from the lake bottom or to the end of the towline (60 m). The net will be manually retrieved at a constant rate of ~0.5 m/second, stopping when the rim of the net is just above the water's surface. Contents of the net will be flushed with surface water into the collection cup while maintaining the rim above the water line. The townet will then be removed from the water and any remaining visible plankton will be washed into the cup with a DI water wash bottle. The cup will be removed from the net and all sample contents will be emptied into a labeled, 125-mL sample bottle filled with 12.5 mL buffered formalin (to yield a 10% buffered solution by volume). DI water will be used to rinse the collection cup and completely fill the sample bottle. The station number will be written in permanent marker on the cap of each zooplankton bottle in addition to being written on the label. The sample bottle will be capped and sealed with electrical tape to prevent the contents from leaking. Record the exact zooplankton tow depth on the DETAILED LAKE SURVEY FORM (Figure 12).

The sample bottles will be stored at room temperature in a labeled tote in the Chignik field lab. Samples will be sent to Kodiak in a small cooler separate from the water samples to prevent freezing the zooplankton samples. A CHAIN OF CUSTODY form (see Appendix E1 for an example and instructions on how to fill out form) will be filled out by the crew leader and included with the shipped samples. Zooplankton taxa will be identified and enumerated by the crew leader at the ADF&G Kodiak Island Limnology Laboratory post-season following established protocols (Koenings et al. 1987; Ruhl 2013).

Light Measurement

Light levels will be measured from the bright side of the boat using a Li-Cor electronic photometer. The meter will be calibrated according to the manufacturer's instructions prior to use. Light readings, recorded in µmol photons m^{-2} s^{-1}, will begin just above the lake's surface (incidence). Measurements will then be taken just below the water's surface and at 0.5-m intervals, down to 5 m (i.e., 0.5, 1, 1.5,…5); then every meter (5, 6, 7, etc.) thereafter until the light level reaches 0 µmol or the end of the cable is reached (30 m). Data will be recorded on the DETAILED LAKE SURVEY FORM (Figure 12).

Temperature, Dissolved Oxygen, and Water Clarity

Water temperature (°C) and dissolved oxygen (DO; mg/l) levels will be measured at each station with a YSI ProODO meter. A handheld thermometer will be used to measure the air and surface water temperature to ensure the meter is working properly. The meter will be calibrated at the beginning of the season and examined each sampling day, according to the manufacturer's instructions. The probe will be lowered into the water and a reading will be taken at the water's surface. Allow the meter to equilibrate before proceeding to the next depth. Subsequent measurements will be taken at 0.5-m intervals until the probe reaches 5 m. Readings will be

taken every meter thereafter until the probe reaches 25 m, after which, measurements will be taken in 5-m increments. Temperature and DO readings will be recorded on the DETAILED LAKE SURVEY FORM (Figure 12). Measurements will be taken until the probe is 1 m off the lake bottom or the depth exceeds the cord length (50 m).

Water clarity will be measured at each limnology station with a Secchi disk. Secchi depth will be measured on the shaded side of the boat. Polarized glasses will be removed to ensure consistency between sample sites. The Secchi disk will be lowered into the water on a metered line until it disappears from view, then pulled up until it reappears. The depth of the disk when it disappeared, the depth it reappeared, and the average of the two readings will be recorded. Limnology measurements will be recorded on the DETAILED LAKE SURVEY FORM (Figure 12).

Lab Setup

All necessary sample bottles will be acid washed in Kodiak and rinsed three times with DI before sending them to the field. Prior to setting up the lab in Chignik, and before each sampling event, filtration equipment (filter towers and flasks), graduated cylinders, burettes, pipettes, and carboys will be washed with phosphate-free soap and tap water in the labeled phosphate-free side of the sink. All equipment will then be rinsed three times with DI water. Prior to storage, all equipment should be washed, and when stored, all containers will be covered with parafilm to keep dust out. The wastewater flasks do not need to be washed.

Before collecting any samples, reagents and necessary equipment required for filtration will be prepared and configured. A vacuum pump and filter apparatus will be set at 15-psi pump suction. Prior to use, the oil level of the vacuum pump will also be checked. Reagent preparation is outlined in Koenings et al. (1987) and Ruhl (2013). The pump and manifold for filtered particulate should be set up with two sample cups and one hose attached to the erlynmeyer flask, in order to process one sample site and depth completely at once.

Water Sample Processing

Water samples will be kept refrigerated and in the dark if processing cannot occur immediately after collection. Processing should occur immediately after collection (same day if possible), and will be completed no later than within 24 hrs of field collection. Processing directions are posted on the wall in the Chignik Field laboratory.

Before processing begins, all bottles, foil, and filter holders should be pre-labeled with contents, and station identification number to alleviate the potential for errors during processing. Each sample will be processed separately. Poly bottles and graduated cylinders will be rinsed with a small portion of the water sample before filling to the desired amount. The water samples will be processed into the following subsamples:

1. ***Alkalinity and pH:*** Water samples will be measured for pH using an Oakton 30 pH meter. Alkalinity will be assessed by acid titration. Measure 100 mL of the unfiltered refrigerated water sample into a 250 mL beaker. Place a stir bar into the 250 mL beaker and place the beaker on a magnetic stirrer. Place the pH meter probe into the beaker with the water sample and let the probe reading stabilize. Record the pH. Fill the 10 mL buret with 0.02 N sulfuric acid (titrant) (for ease in calculations fill the burette to a round number, 5.0 mL, for example, not 5.22 mL). Slowly add titrant to the water sample, stirring to mix the sample. Allow the sample to stabilize after additions, while monitoring

the pH. Add titrant until a pH of 4.5 is reached and record the volume (mL) of titrant used and multiply this volume by 10 for total alkalinity. See Koenings et al. (1987) and Ruhl (2013) for more details. Measurements will be recorded on the DETAILED LAKE SURVEY FORM (Figure 12).

2. ***Unfiltered frozen water nutrient content:*** Two 250-mL poly bottles will be filled with sample water from each site and depth and labeled 1 of 2 and 2 of 2 (8 total for Chignik Lake: 2 water sampling sites × 2 depths × 2 bottles per water sample). Space will be left to allow expansion due to freezing. The bottles will be appropriately labeled, sealed with electrical tape, and frozen for storage.

3. ***Phytoplankton***: A 100 mL sample of water sample from Chignik Lake stations 2 and 4 (1 m and 29 m) and Black Lake station 1 (1 m) will be poured into a labeled brown 125-mL poly bottle (5 samples total each month). Two mL of Lugol's acetate will be added to the sample and the solution will be mixed gently. The bottle will be appropriately labeled, sealed with electrical tape, and stored in the dark at room temperature.

4. ***Filtered water samples:*** The pump and manifold for filtered particulate should be set up with two sample cups and one hose attached to the erlynmeyer flask, in order to process one sample site and depth completely at once.

   Particulates**:** Two particulate samples per site, per depth are necessary: 1 for particulate carbon, and 1 for chlorophyll a and phaeophytin a. Sample volumes will be determined by the sample's turbidity. In most cases when the water is fairly clear we will filter 1000mL. As water turbidity changes, it may be necessary to reduce the filtrate volume from 1,000 to 500 or even 250 mL (for chl-a); this is common with samples from Black Lake. Filtrate volumes must be recorded on the sample petri dish's label.

   a. Chl-a*:* The vacuum pump will be run at 4 psi, and should NOT EXCEED 5 PSI. Pressure from the vacuum pump or from excessive turbidity in excess of 5 psi can cause cells to lyse, releasing their pigment content, thus altering chlorophyll retention on the filter. Using sterile forceps, a sterile glass microfibre filter will be placed on two of the filter apparatus (filter cups). One cup will be used for the shallow water sample, the other for the water sample from depth.

   One hundred mL of deionized water will be used to rinse the tower and moisten the filter. A portion of sample water will be poured from the graduated cylinder(s) into the filter tower(s). As the sample passes through the filter, more sample water will be added from the graduated cylinder until it has all been filtered. As the last 50 mL is being filtered, 5 mL of $MgCO_3$ solution will be added to the tower. The pump will be turned off when all towers are empty. The filter will be removed with forceps from the filter apparatus, placed in appropriately labeled petri dishes, wrapped in foil, and frozen until shipment to the ADF&G Kodiak Island Limnology Lab for final processing.

   b. Carbon*:* Using sterile forceps, a sterile glass microfibre filter will be placed on the filter apparatus attached to the Erlenmeyer filtration flask set up, which is attached by hose to the manifold containing the chl- a filter cups. One hundred mL of deionized water will be used to rinse the filter cup and to moisten the filter. The rinse water will be discarded from the flask after being drawn through the filter. A 1000mL graduated cylinder will be rinsed with the sample, and then filled to 1000mL. The sample will be poured from the graduated cylinder into the filtration cup until it has all been filtered. Filters will be removed with forceps from the filter apparatus, placed in appropriately

labeled petri dishes, wrapped in foil, and frozen until shipment to the ADF&G Kodiak Island Limnology Lab for final processing.

5. ***Filtered frozen water nutrient content:*** The filtered nutrient sample will be collected from the water retained in the Erlenmeyer flask during the filtration of the particulate carbon sample. We will rinse the 500mL polypropylene nutrient bottle with a small amount of filtrate from the flask. Approximately 450mL of the filtrate will be poured into the polypropylene bottle, leaving space to allow for expansion due to freezing. The bottle will be appropriately labeled, frozen, then sealed with electrical tape.

Processed samples will be shipped to the ADF&G Kodiak Island Limnology Laboratory in a sealed cooler after the samples have completely frozen. It is preferable to send a large cooler once a month with many samples rather than several small shipments throughout the season, unless personnel is traveling with the samples and can deliver the shipment to the lab personally.

A CHAIN OF CUSTODY FORM (see Appendix E1 for an example and instructions on how to fill out form) will be filled out by the crew leader and included with the shipped samples. The crew leader will also email a digital copy of the form or an email containing date samples were relinquished, sample descriptions and quantities, and any other relevant information to the ADF&G Kodiak Island Limnology Laboratory Manager and Project Biologist. The samples will be shipped via ADF&G pilots or commercial air carrier (Lake Clark Air 278-2054 and Grant Aviation 888-359-4726). Zooplankton and phytoplankton samples will be placed in a separate non-frozen transport box lined with a plastic bag and vermiculite and shipped. Before shipping, lab personnel (486-1929 or 486-1817) and the project biologist (486-1805) will be contacted to inform them of arrival time. Original DETAILED LAKE SURVEY FORM (Figure 12) will be shipped to the Kodiak Island Limnology Laboratory and a copy will be retained at Chignik.

Immediately upon return to Kodiak after the field season, the crew leader will go through all field data forms and samples with the Laboratory Manager.

REPORTING

The crew leader will compile a daily log that includes, but is not limited to: issues encountered while conducting assigned duties, suggestions for how to improve current sampling procedures, events that affect normal sampling duties, and daily activities performed and hours worked by smolt crew personnel. This log will be submitted to the project biologist at the end of the field season. The crew leader will contact the project biologist daily at 1300 hours by telephone (486-1805) unless otherwise predetermined. An in-season population worksheet will be completed daily and emailed to the project biologist. The crew leader will record daily smolt outmigration counts, water level, water temperature, and trap rpm in the management office after the noon check. The crew leader is also responsible for co-authoring a season summary report and for completing a comprehensive equipment inventory at the end of the season.

It is desirable for the field crews to photograph all aspects of the fieldwork. Photographs will be taken with a digital camera and downloaded to the research field computer for editing and storage.

TIMESHEETS

The crew leader is responsible for scheduling daily tasks and managing crew hours. Tasks will be scheduled to minimize overtime. Overtime is limited to 20 hours/month (5 hours/week) per

person, unless otherwise pre-authorized, and is not guaranteed each week or month. A proposed work schedule is described in Appendix F1. The crew leader will document, as part of the daily log, all tasks that are performed and the actual hours worked to complete those tasks. Timesheets will be completed and faxed or emailed to Kodiak on the 15th and the last day of each month if possible. If timesheets must be sent in early, amended timesheets can be sent to the Kodiak office if the hours actually worked differ from the hours submitted on the original timesheet. Explicit directions for completing timesheets are located in Appendix F1-F3.

SAFETY

Safety is the highest priority of this project. State safety regulations and Standard Operating Procedures (SOP) will be followed at all times. All staff are personally responsible for assessing unsafe situations and will exercise caution when weighing safety issues. Employees may be subject to disciplinary action without warning, including termination, for noncompliance to state safety regulations.

Employees will be provided the following SOPs and are expected to review them before beginning work:

111-700 Safety Policies and Standards

111-710 Office/Warehouse Safety

111-720 Field Camp Safety

111-730 Aircraft Safety for Passengers

111-740 Boating Safety

111-750 Vehicle Safety

111-760 Laboratory Safety

111-780 Firearm/Bear Safety

In addition, all employees are expected to hold a current American Red Cross First Aid/CPR certification. The department will hold First Aid/CPR classes in Kodiak prior to the field season; if the employee is unable to attend the classes in Kodiak, obtaining the proper instruction will be the employee's responsibility.

A U.S. Coast Guard approved personal flotation device will be worn at all times while boating and while working on the smolt traps. Staff should maintain a full spare gas tank in the skiff at all times. A hand-held VHF radio, a flare gun, a tool kit, spare motor parts, and oars will also be in the boat at all times. A satellite phone will be carried when going out of radio range.

SCHEDULE AND DELIVERABLES

Date	Activity
April 6–14	Prepare for field season
April 15–April 22	Open Chignik Field Office, install smolt traps, training
April 18–June 22	Run smolt traps, take monthly limnology and beach seine samples
June 25–October 15	Return to Kodiak, age scales, process limnology samples, enter data, complete draft annual report
October–February	Publish report, present findings at CRAA meeting in Anchorage

RESPONSIBILITIES

Project Biologist, Mary Loewen – Fishery Biologist II (PCN 11-1273)

Crew Lead, Nyssa Baechler – Fishery Biologist I (PCN 11-1426)

Crewmember, Sarah Ashcraft – Fish and Wildlife Technician II (PCN 11-1836)

Crewmember, Vacant – College Intern II (PCN 11-IN1510)

The project biologist will oversee all aspects of the study, and provide logistical and technical support inseason, as well as be responsible for dissemination of inseason numbers, final reporting and presentations post-season, budget operations, and staffing. The crew leader will schedule daily tasks and will oversee and participate in all field operations regarding the smolt project, as well as prepare preseason logistics, age scales during or post-season, prepare manuscript drafts, and assist with other project duties as assigned. The crewmembers will assist the crew leader in all assigned tasks and field operations. All project members will work as a team to complete the project's goals and will work cooperatively with management staff and the public. Technical or policy questions will be directed to the project biologist. The Chignik Area Management Biologist oversees and is responsible for all Alaska Department of Fish and Game (ADF&G) operations at Chignik.

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FIGURES

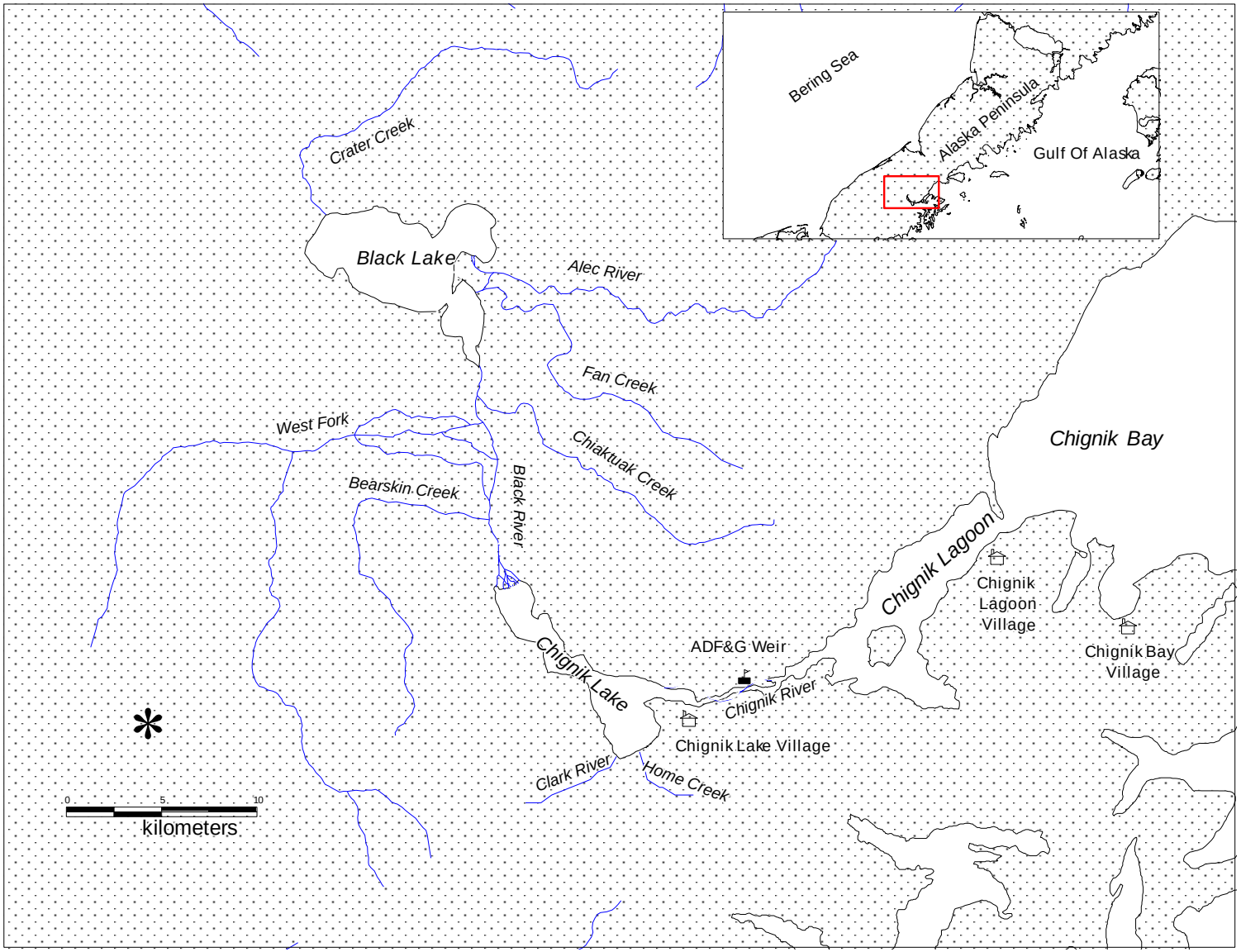

Figure 1.–Map of the Chignik River system.

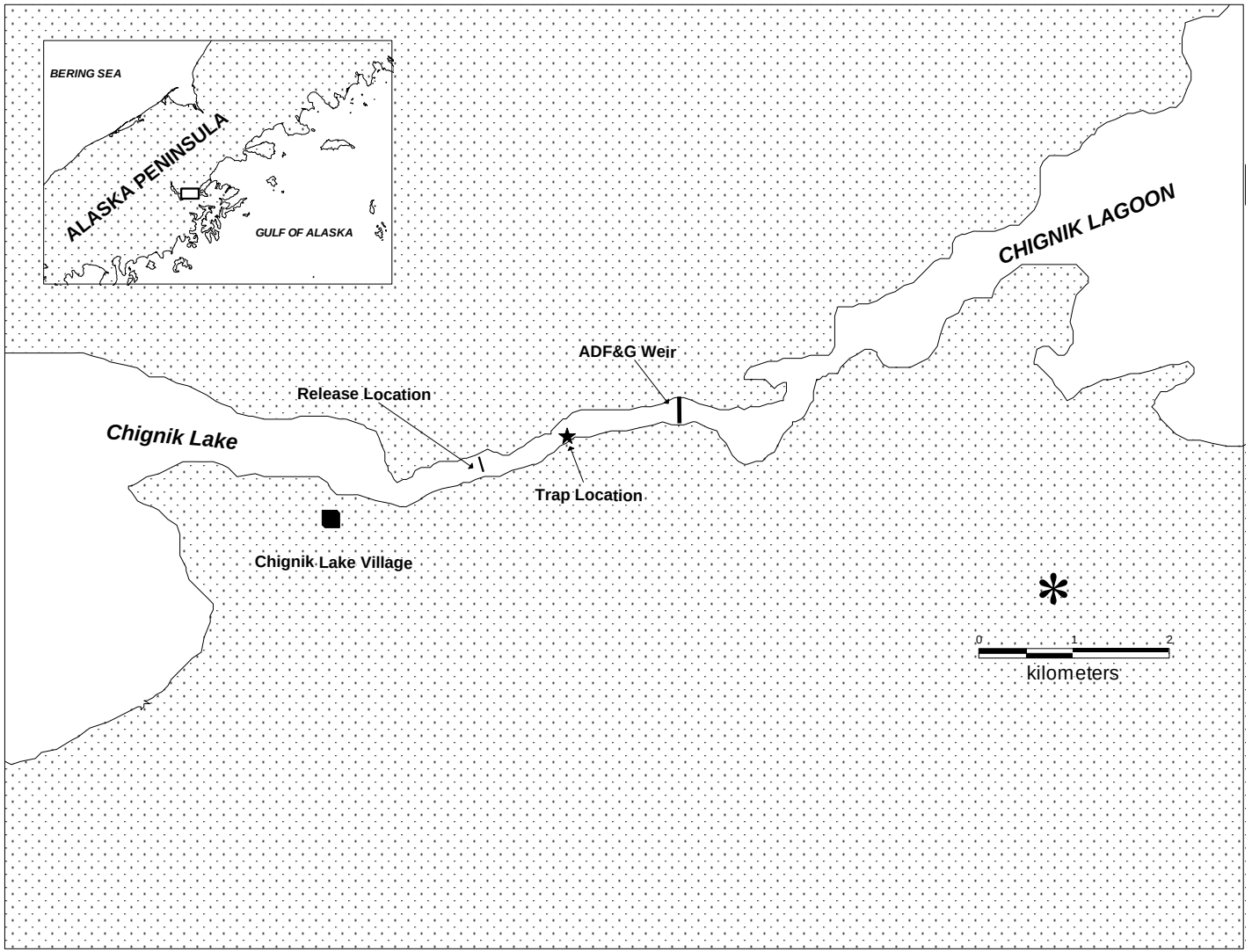

Figure 2.–Location of the traps and release site of marked fish on the Chignik River, Alaska.

Daily Smolt Catch Reporting Form

Trap: _____

Project: Chignik Smolt Smolt date: _____ Page ____of ____

Time (military)	Sockeye Smolt			Incidental Catch[a]													
	Catch[1]	Trap Mortality	Marked Rec[2]	Sockeye Fry	Coho	Coho Fry	Pink	Chnk	Chum	DV	SB	SC	SF	PS	PW	ISO	Comments[3]
Daily Total:																	

[1] All catch is to be examined for marks; catch includes all trap mortalities but not marked fish.

[2] Marked Recovery fish may contain mortalities but are only recorded as a marked recovery.

[3] Include trap conditions, counts of species not included in columns (ex. Alaskan blackfish or hooligan), and any other significant information.

[a] DV = Dolly Varden, SB = stickleback, SC = sculpin, SF = starry flounder, PS = pond smelt, PW = pygmy whitefish, and ISO = isopod.

Figure 3.–Daily Smolt Catch Reporting Form.

Sockeye Salmon Smolt Reporting Form

Project:_____ Year:_____ Page ____of ____

Smolt Date	Catch (both traps combined)			AWL Sample		Mark-Recapture[2]				Comments
	Daily	Cumulative	Mortalities[1]	Daily	Cumulative	# Released	Daily Recaptures	Cumulative Recaptures	%[3]	

[1] Included in daily count.

[2] Cumulative and % begin over with each release.

[3] Calculated by: % = (cumulative recaptured / #released) * 100

Figure 4.–Sockeye Salmon Smolt Reporting Form.

Catch-Weight Worksheet

Smolt Date_____ Page____of ____

Time	Weight	Number of Fish[a]					
		Sockeye	Sockeye Fry	DV	Stick	Coho	Sockeye Recaps[b]
	Total:						

[a] Number of fish in reference sample is from actual counts. Number of fish in subsequent samples is calculated by: $S_c = (S_r * W_s) / W_r$

Where: S_c = Calculated number of fish of each species.

S_r = Number of fish of each species in the reference sample.

W_s = Weight of subsequent sample.

W_r = Weight of reference sample.

[b] Recapture numbers are not included in the number of sockeye column.

Figure 5.–Catch-Weight Worksheet.

Smolt Dye Release Form

Smolt Day:_____ Grams Dye:_____
Tote Volume:_____

	Time (military)	H_2O Temp.	Comments
Fish into Container			
Begin recovery water exchange			
Addition of dye			
Begin water exchange			
Begin transport			
Release			

Number into container:_____

Number non-dyed held for mark retention experiments:_____

Number dyed held for mark retention experiments:_____

Number mortalities removed:_____

Final number dyed released:_____

Comments (include comments on fish vigor, areas of mortality, how well marked the fish were, etc.):

Personnel:

Figure 6.–Smolt Dye Release Form.

Delayed Mortality/Mark-Retention Form

Date/time fish were marked:_____ Grams dye:_____

Water temp. when fish were marked:_____ Water volume:_____

No. marked fish retained:_____ No. unmarked fish retained:_____

Delayed Mortality

Date	Time	H_2O Temp.	# of mortalities	
			Marked	Unmarked
		Total:		

Mark-Retention

Date	Time	Observer	# Correctly Identified	
			Marked	Unmarked

Comments:

Figure 7.–Delayed Mortality/Mark Retention Form.

Daily Physical Data Observation Form

PROJECT Chignik Smolt

YEAR 2013 LOCATION Smolt Traps

DATE[a]	TIME	TEMPERATURE (C)		CLOUD[b]	WIND[b]		Trap RPM		GAUGE	
		Air	Water	COVER (%)	DIRECTION	VEL (kts)	Small	Large	HEIGHT (cm)	COMMENTS (i.e., rain, drizzle, etc...)

[a] Actual calendar dates.

[b] Based on observer estimates.

Figure 8.–Daily Physical Condition Observation Form.

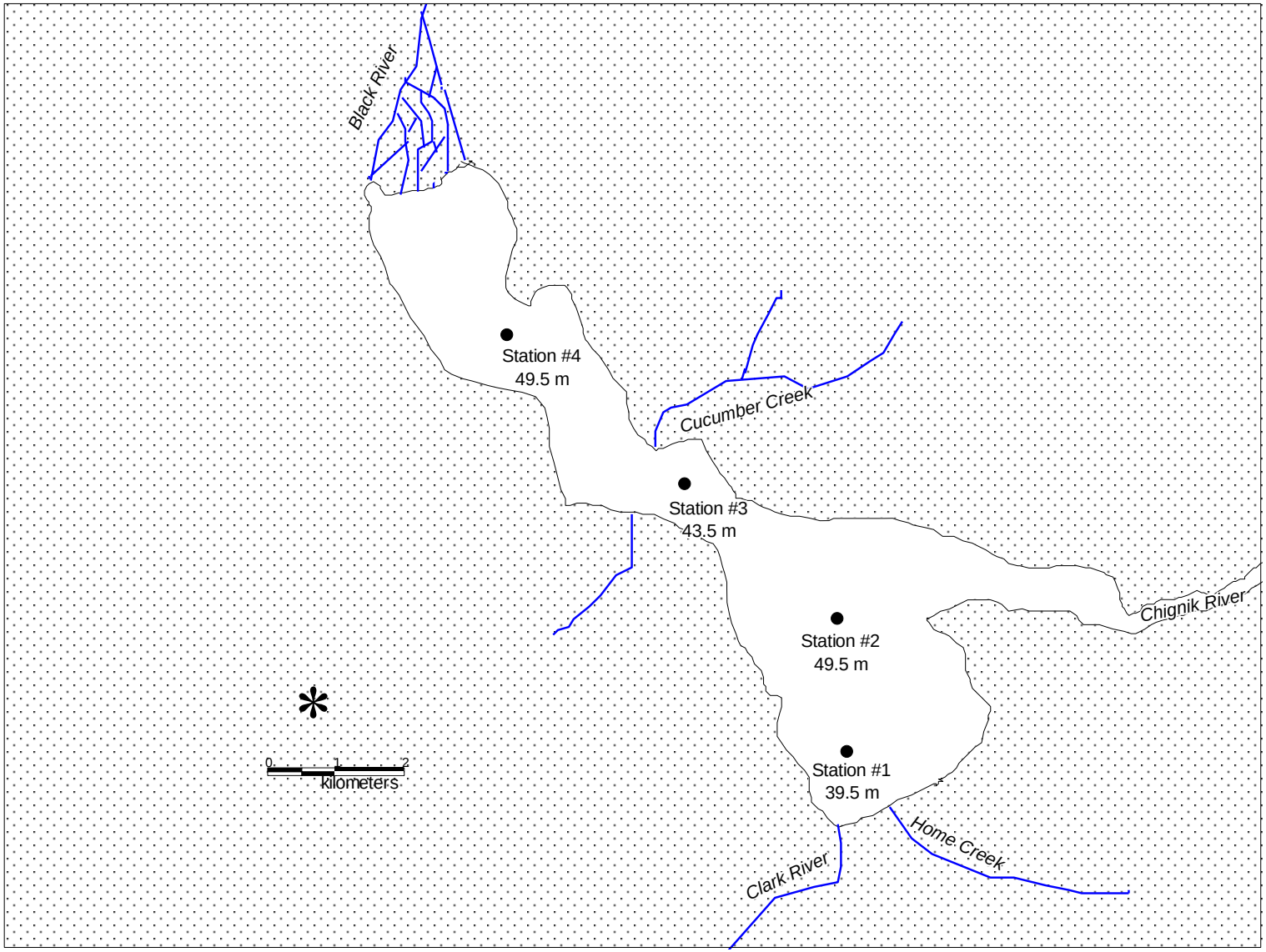

Figure 9.–Locations of the Chignik Lake limnology sampling stations.

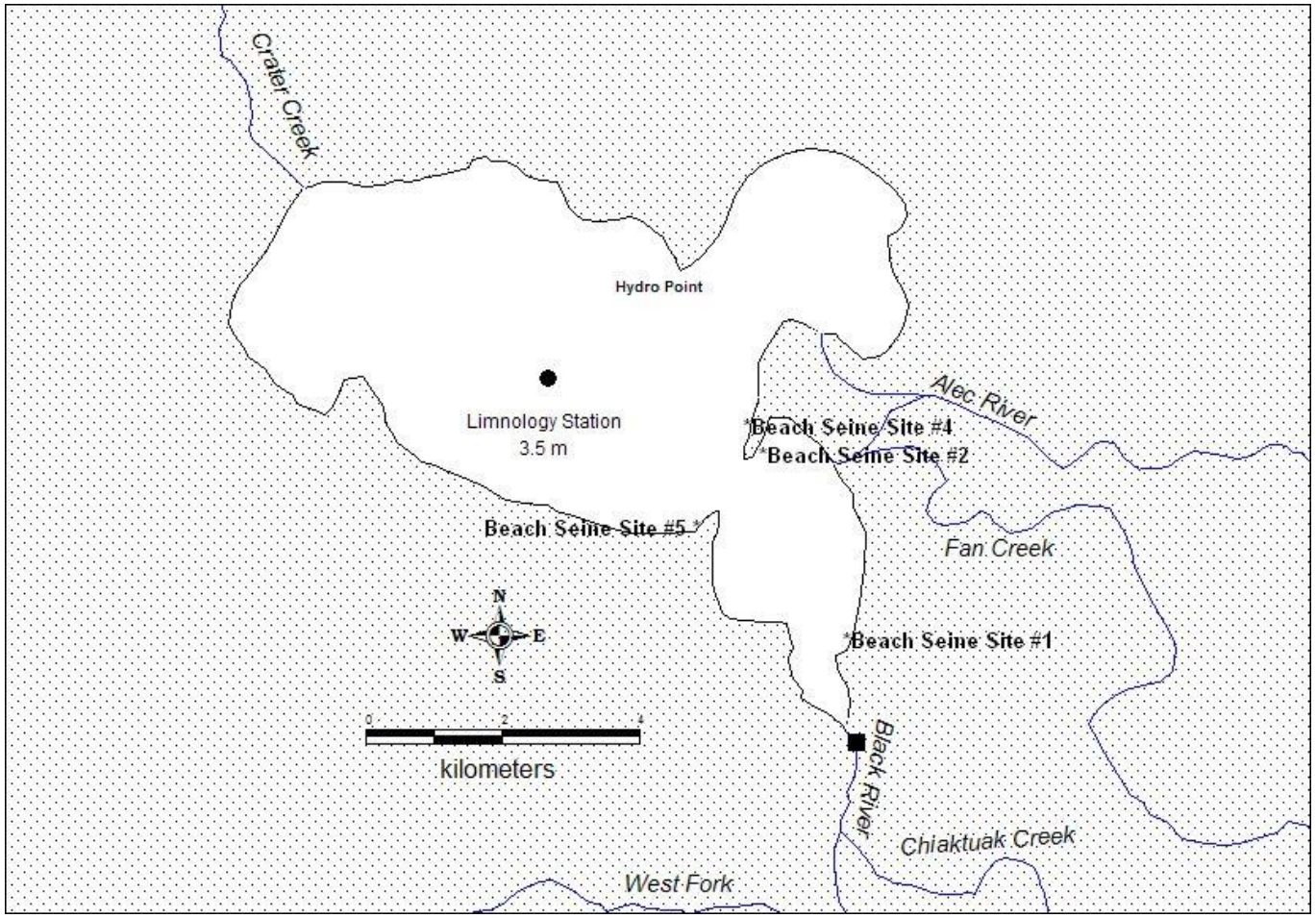

Figure 10.–Location of the Black Lake limnology sampling station and the approximate beach seine sites.

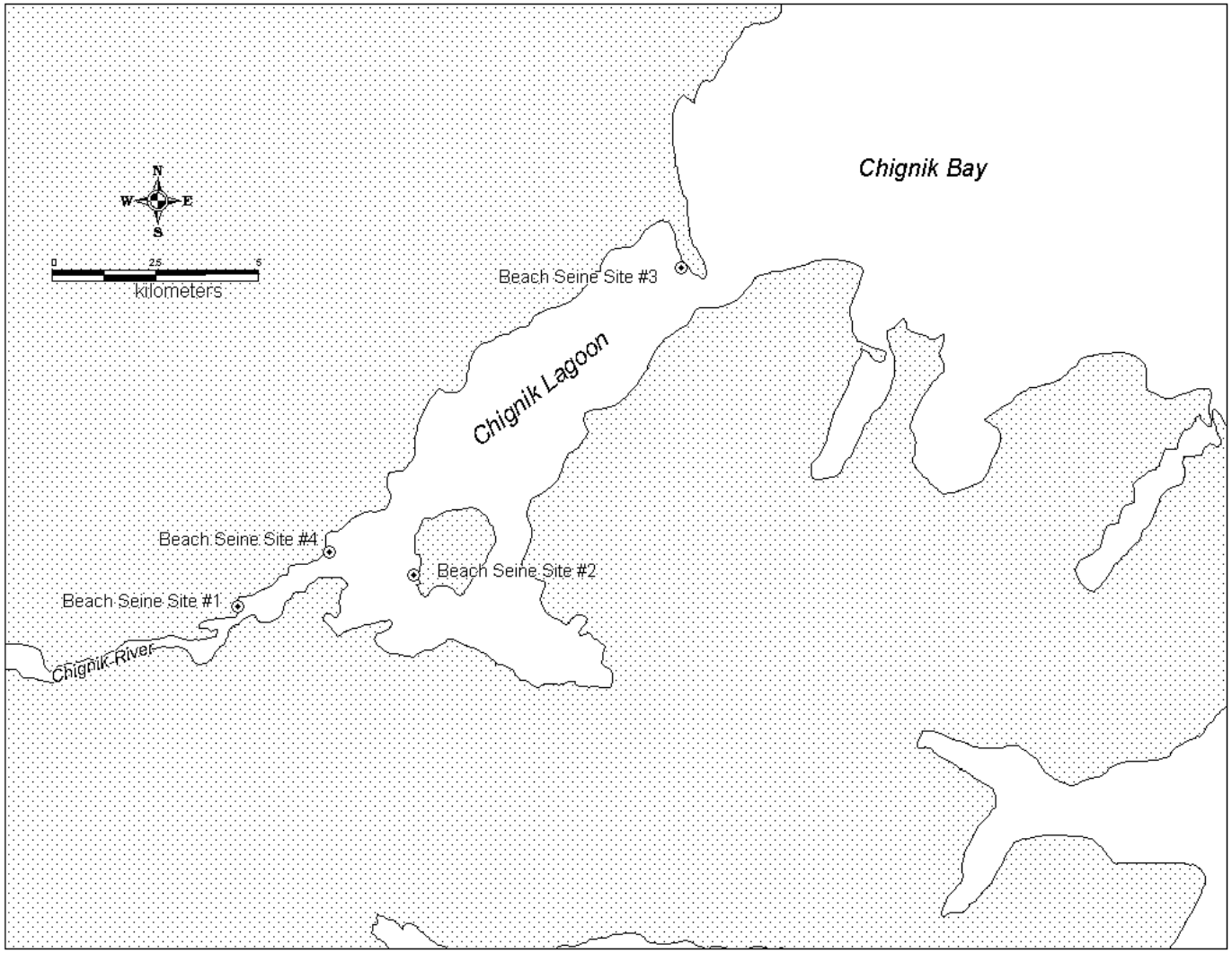

Figure 11.–Map of Chignik Lagoon showing the approximate locations of the beach seine sites.

Detailed Lake Survey Field Form - Division of Commercial Fisheries, Limnology Section

Lake Station Bottom depth (m)

Weather and lake surface conditions

Date Name (s) of sampling personnel Time

Physical Parameters

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/l)	Depth (m)	Solar Illuminance (PAR - micromoles) Sensor Up
Surface			Surface	
0.5			0.5	
1.0			1.0	
1.5			1.5	
2.0			2.0	
2.5			2.5	
3.0			3.0	
3.5			3.5	
4.0			4.0	
4.5			4.5	
5.0			5.0	
6.0			6.0	
7.0			7.0	
8.0			8.0	
9.0			9.0	
10.0			10.0	
11.0			11.0	
12.0			12.0	
13.0			13.0	
14.0			14.0	
15.0			15.0	
16.0			16.0	
17.0			17.0	
18.0			18.0	
19.0			19.0	
20.0			20.0	
21.0			21.0	
22.0			22.0	
23.0			23.0	
24.0			24.0	
25.0			25.0	
30.0			26.0	
35.0			27.0	
40.0			28.0	
45.0			29.0	
50.0			30.0	

Hand Held Temp. Water: Air:

Comments:

Water samples:

Samples were / were not collected

Depths of samples collected:

1m		29m	
5m		30m	
10m		35m	
15m		40m	
20m		45m	
25m		50m	

Zooplankton:

Zooplankton tow depth: (m)

Secchi disk:

Disappeared: (m)

Reappeared: (m)

Mean disk reading: (m)

pH & Alkalinity:

1 m pH:
titration end:
volume (mL), start:
difference: *10 = Alkalinity

29 m pH:
titration end:
volume (mL), start:
difference: *10 = Alkalinity

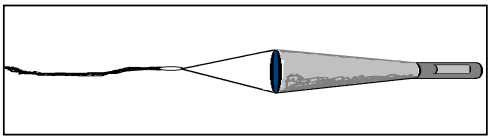

Figure 12.–Detailed Lake Survey Form.

Chignik Smolt Beach Seine Data Form

Pg__of__

The first 25 juvenile sockeye salmon randomly selected will be collected per station for AWL (& Chignik Lagoon genetics) and enter into the RDA. If available, record an additional 20 SOX smolt fork lengths (FL).

#	Additional SOX Smolt FL (mm)	Chinook FL (mm)	Coho FL (mm)	Other: FL (mm)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Comments:

Date: _____

Location: _____

Site #: _____

Personnel: _____

Time of Set: _____

Air Temp (°C): _____

Water Temp (°C _____

Weather: _____

_____

Total Catch	
Sockeye smolt	_____
Sockeye fry	_____
Chinook	_____
Coho	_____
Coho fry	_____
Pink	_____
Dolly	_____
Sculpin	_____
Pond Smelt	_____
Stickleback	_____
Flounder	_____
Other	_____

Figure 13.–Beach Seine Data Form.

APPENDIX A. SMOLT TRAP CONSTRUCTION, PLACEMENT, AND DISASSEMBLY

The procedures for setting up the Chignik smolt traps are divided into two distinct components, trap installation and weatherport placement. The first priority upon arrival to Chignik is the assembly and installation of the traps. The assembly and installation of the weatherport storage station is of secondary importance: it can be constructed after the traps are installed and monitoring has been initiated. Additional instructions for assembly of the traps and weatherport are available at the Chignik lab.

SCREW TRAP ASSEMBLY

Three rotary screw traps were stored near the outlet of Chignik Lake at the Fisheries Research Institute camp at the end of the field season. There are two small traps of equal size and one large trap. The two small traps can be easily differentiated. One small trap has a live box with an extended holding compartment and no skimming wheel. The other small trap has a skimming wheel and has been modified to be used as a live box. This apparatus has an aluminum plate bolted to the cone entrance. Each trap consists of a rotary screw, two pontoons, a dual beamed live box, a front spindle support beam with associated plastic bushing, a front structural beam, and a bipod hoisting structure. Each trap and its component parts are stacked together. All hardware including winches, pulleys, pulley harnesses, and bolts are appropriately labeled and located in a large tote in the smolt cave.

The following photographs (Figures 1-7) illustrate the smolt trap components and some of their features.

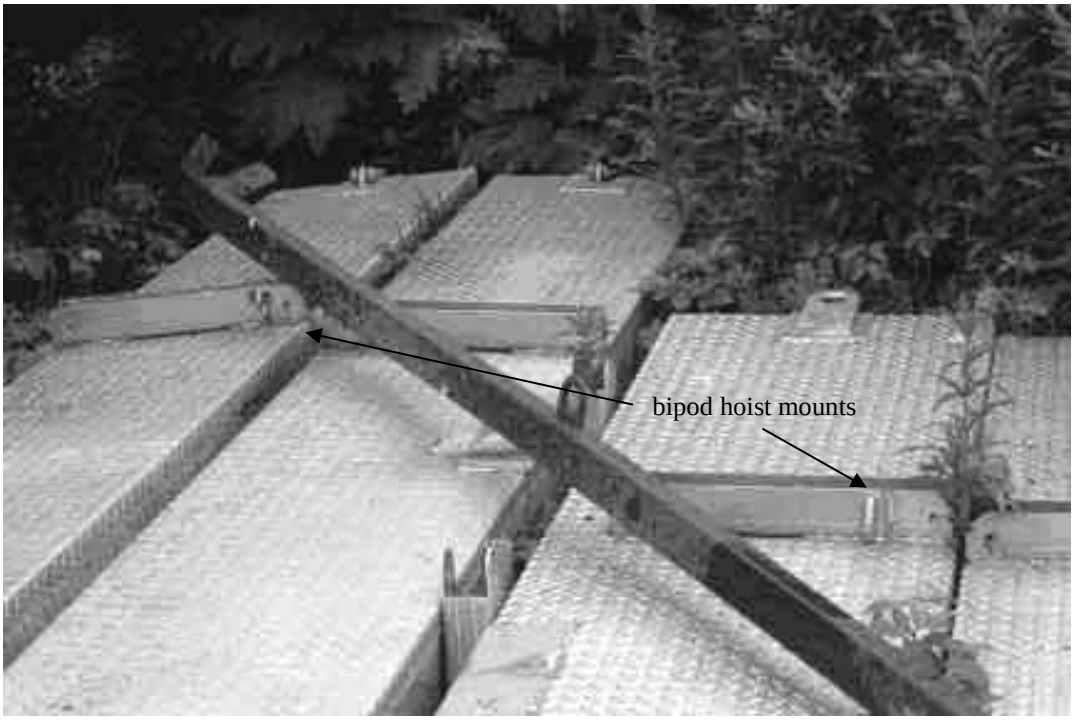

Figure 1.–The photo shows the bow end of two sets of trap pontoons and a single front structural beam. The front beam sleeves, harness eyes, and bipod hoist mounts are also visible from this angle.

-continued-

Figure 2.–The photo illustrates the dual beamed live box for the large trap. The winch mount on the starboard pontoon is also visible from this angle.

Figure 3.–The photo illustrates how the pintle ring fits over a stern beam sleeve. This photo does not show the live box beams inside the sleeve.

-continued-

Figure 4.–The photo illustrates the large rotary screw drum.

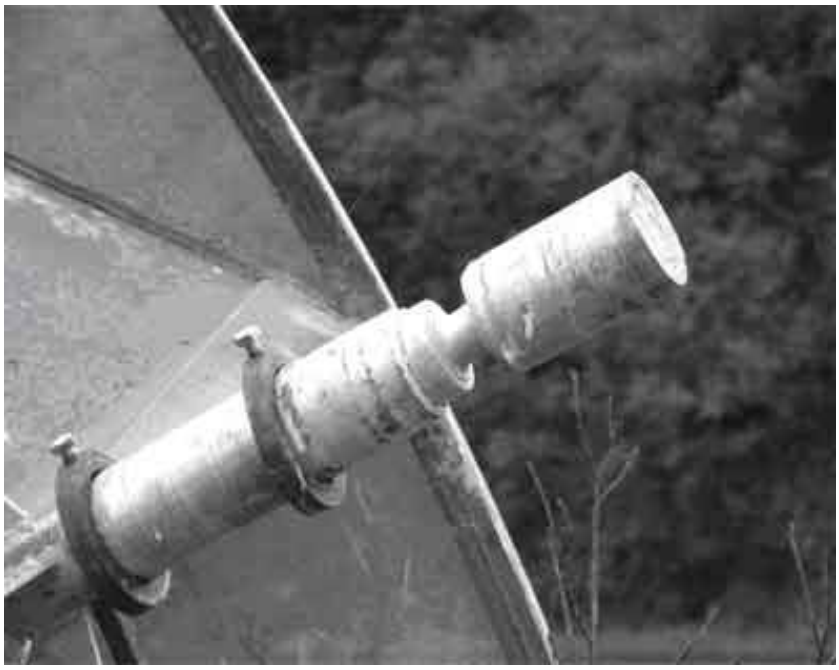

Figure 5.–The photo illustrates the large trap cone spindle and O-rings. Excessive wear on the spindle can occur due to improper placement of the bipod hoist structure. Care should be taken so that the bipod hoist structure does not contact the rotating spindle. The small trap cone has a sleeve attachment.

-continued-

Figure 6.–The picture shows the entrance to the live box and the rear spindle mount and plastic bushing. Check for excessive bushing-wear frequently throughout the season and report to project manager.

Figure 7.–This photo illustrates the bipod hoist structure with the sliding plastic spindle bushing. Check for excessive bushing-wear frequently throughout the season and report to project manager.

-continued-

The small trap that has been modified for use as a live box will be assembled first. The pontoons will be moved down to the beach placing them in the correct orientation with regards to starboard and port labels at the bow end. A 20-25 foot section of crab line will be tied to the eyes at the bow end of each and then a line will be tied from a large willow on the beach to this loop anchoring the apparatus to the shore.

The dual-beamed live box will be moved down to the beach. The live box will be bolted to the stern end of the pontoons while it is in the water so that the beams fit correctly in the sleeves. In order to accomplish this, the stern end of both pontoons will be pushed out in the river to get enough clearance to attach the live box. The starboard side will be bolted first. This will take at least two people to manipulate the live box and pontoon to align the bolt holes. Have a crow bar, rubber mallet, and needle nose pliers available to aid with the adjustments. The live box will be attached to the port pontoon by sliding a pintle ring sleeve over the front beam and beam sleeve and securing them with bolts long enough to pass through all three components.

The front structural beam will be seated in the beam sleeves and bolted to the starboard pontoon while a pintle ring sleeve will be fastened to the port pontoon. This will complete the assembly of the live box. The large and small screw traps will be constructed in the same fashion except pintle rings will not be attached to the large trap and bipod hoist structures will be bolted to the pontoons behind the front structural beams of both traps. Be sure that the flat A-frame surface is facing the stern end (Figure 12).

The partially constructed traps will be pushed out into the stream so that the live boxes are afloat, and the rotary screw will be rolled down to the edge of the river and positioned with the cone entrance behind the front structure beam. An O-ring will be attached to the rear spindle and the spindle inserted into the live box spindle mount.

The front of the screw spindle will be inserted through the sleeve on the front spindle support beam. Two O-rings will be attached to the front of the spindle to hold it in the sleeve. The small cone sleeves contain predrilled screw wholes for holding the O-rings in place. The winch will be bolted to the winch mount on the starboard pontoon. The pulley system will be attached so that the rotary screw can be raised. The first pulley will be attached to the starboard side of the front beam with a chain link. The second pulley will be affixed to the eye in the middle of the front beam with a chain link. The third and final pulley will be bolted to the peak of the bipod hoist structure. The cable will be then threaded through all three pulleys and attached to the rotary screw support beam with the appropriate fastener. The rotary screw will be raised out of the water and an aluminum I-beam will be placed on the pontoons beneath it to act as a chock for transit to the trapping site. The assembly procedures for the large trap will be the same as the small trap.

-continued-

TRAP PLACEMENT

Once the live box and traps are assembled, it is time to begin towing preparations. Two anchor lines and towing harnesses are located in labeled totes in the smolt cave and are tagged for the appropriate trap. Tie the anchor lines prior to towing. The alders to be used for anchors are marked with flagging. The anchor line labeled for use with the small trap will be tied to the flagged alder that is furthest downstream and the large trap line will be tied to the upstream alder. Use a clove hitch to tie off the line and connect the end to a backup alder. A towing yolk to be connected to the back of the skiff is hanging in the smolt cave.

The small trap and the legs will be transported to the trapping site first. The trap will be carefully worked into shore at the trapping site. The anchor line can be clipped to the pulley harness and the tow line detached. (Figure 8).

Now the trap legs can be attached to the port-side pintle rings (Figures 9 and 10). The leg supports will be placed on the shore as high as possible while still allowing the legs to extend out far enough in the stream. Sand bags are necessary to weigh down the trap legs to prevent shifting from water traffic and weather conditions. Sand bags and rocks will be used as a base for the leg supports. The live box platform can then be attached to the stern of the small trap, anchored to shore, and its legs secured between the shore and its pontoons.

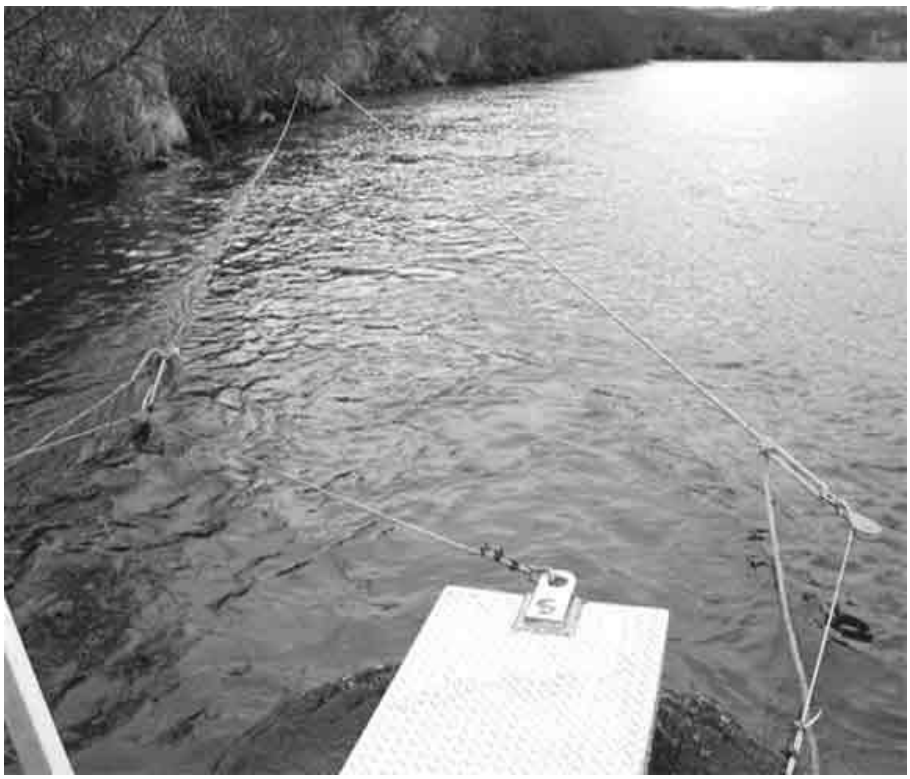

Figure 8.–Pulley harnesses attached to anchor lines.

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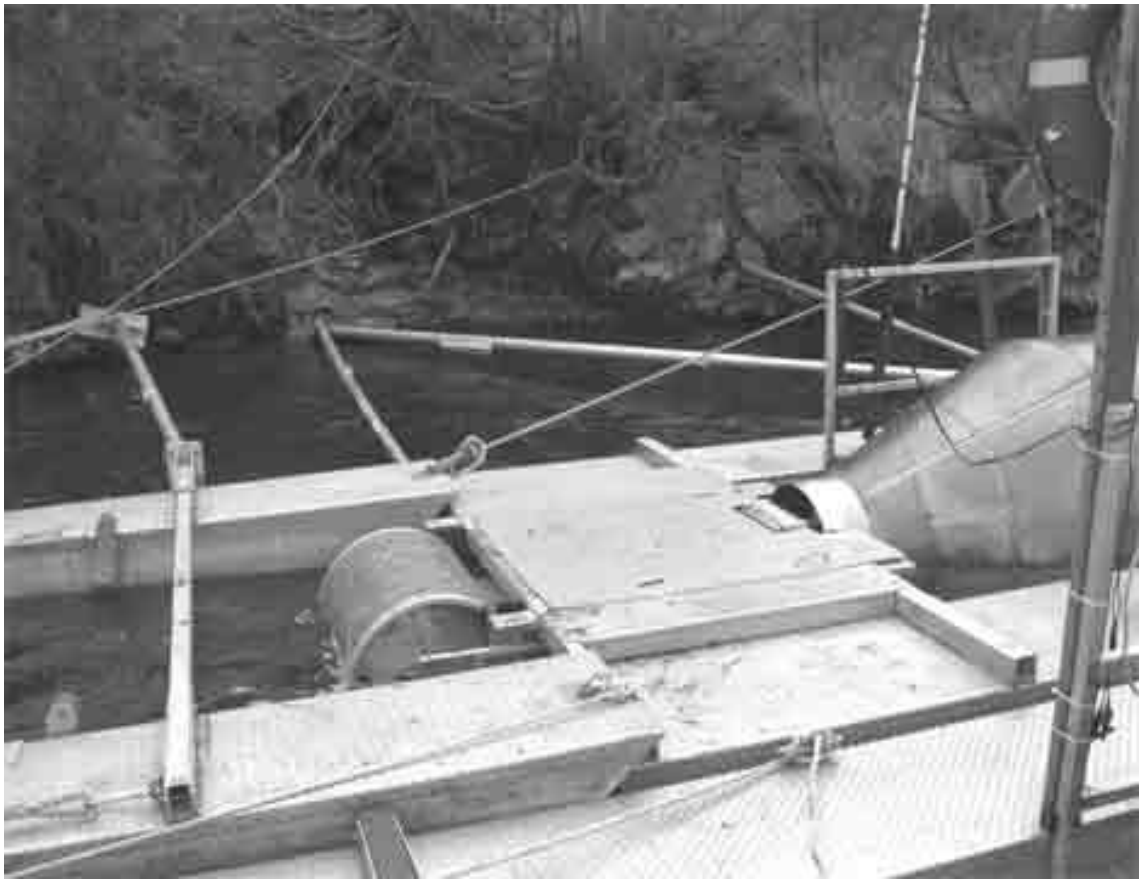

Figure 9.–This photo illustrates the position of the trap legs on shore and how the pontoons of the small trap and live box work area align. The traps should be as far into the river current as is safely possible.

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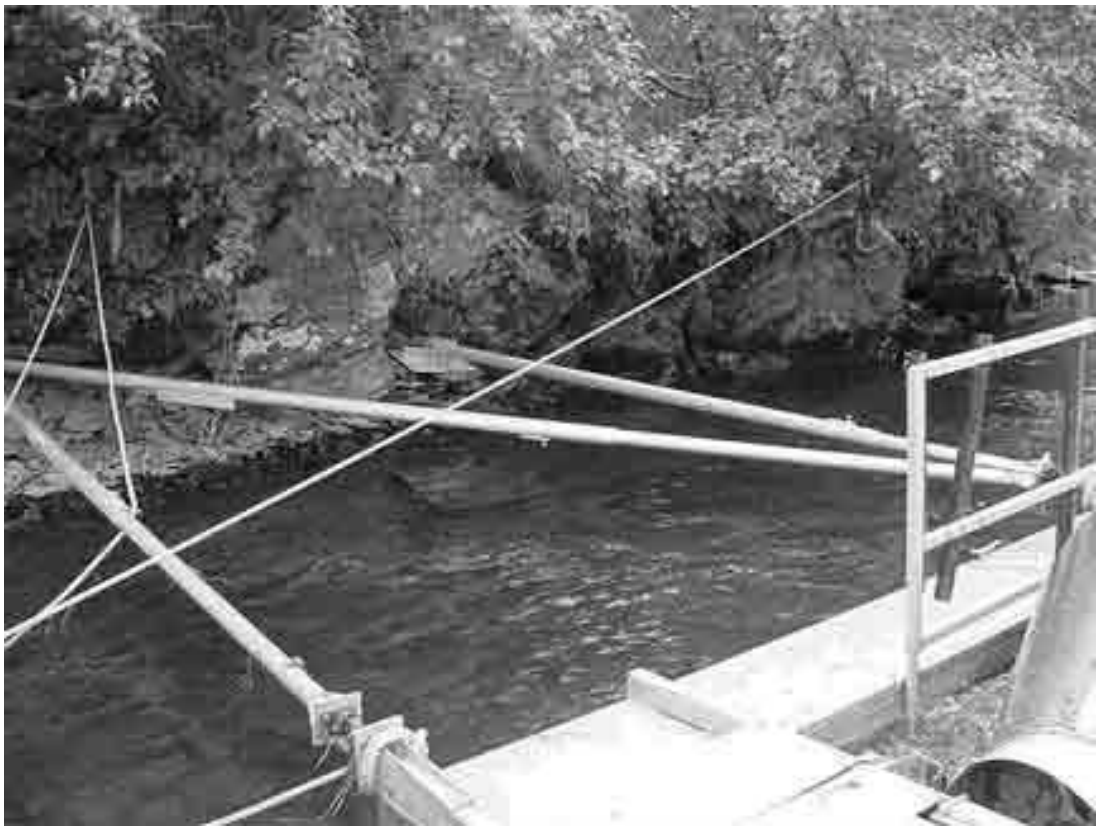

Figure 10.–The photo illustrates the trap leg system, anchor lines, and pintle ring sleeves.

After the trap has been pushed out the rotary screw should be lowered and allowed to operate under flow. After testing the trap, some adjustments might be necessary to the trap legs or to the anchor line. Upon completion of setting the small trap and legs, the large trap can be placed. One person will ride on the trap while the other person will operate the skiff. The large trap will be towed upstream so that it slides slowly up against the side of the small trap. The anchor line can then be clipped to the trap harness and the tow line unclipped. It might take some effort to get the anchor line the right length so that when the rotary screw is lowered into the water the entrances into both rotary screws are in parallel alignment (Figures 12 and 15). To tighten the anchor lines, attach crabline to the anchor line using a prusik knot. Pull the prusik from a separate anchor with a come-along. Take up the slack in the main line by adjusting the clove hitches.

-continued-

Figure 11.–The assembled large trap fishing. Note that the front spindle support beam is resting on the pontoons. The spindle should be turning with little resistance inside the bushing and minimal play between the O-rings. This prevents excessive wearing of the bushing.

-continued-

Figure 12.–Traps fishing. Note the alignment of the cones.

-continued-

FLOATING WEATHERPORT PLATFORM

The floating weatherport platform is composed of the floats and a weatherport platform (Figure 13 and 14). The float frame consists of nine dock floats and three nose cones that remain assembled between field seasons (Figure 13 and 14). The platform is stored on the bulkhead over winter. The weatherport will be assembled on shore at the lower end of the bulkhead so that it can easily be slid into the water upon completion. A section of rope will be threaded through the eyeholes to create a towing harness and anchor line for securing the weather port to shore during construction (Figure 13).

Figure 13.–The photo illustrates the platform, pontoon frame, harness/anchor line attachment, and weatherport construction.

-continued-

THE WEATHERPORT

The weatherport tent frame, fabric, door, and poles are located in the smolt cave. All bolts and pole joints are located in a labeled tote in the smolt cave .The weatherport frame will be arranged and bolted on the platform floor so the door is oriented to the bow end of the floats. A curved tent pole will be inserted onto each post on the frame and connected to the other curved poles with the three way joints. The curved poles which make up the middle hoop will be fitted with the four way joints. After putting the hoops together, the door and rear wall will be attached by hooking the tensioning cord to the cord hooks on the frame. Tighten the cords to make the fabric fit snuggly on the poles and tie them off to cleats on the weatherport frame. The three hoops will now be connected to each other at the joints with the straight poles. The top fabric will be pulled and centered over the tent framework. The top fabric will be tensioned over both walls and down to the frame in the same manner as the walls. It will be necessary for one person to stand in the inside of the tent and feed loose fabric to gain maximum tension on the fabric. Once the weatherport has been set up for a few days and stretched, the fabric and cords will need to be retightened. The flaps at the bottom of the fabric can then be stapled to the platform frame to seal the tent from wind.

Prior to deployment, the weatherport will be loaded with all sampling equipment including dipnets, depth gauge, dye test totes, buckets, weather port tote, shelf, chairs, table, and the kerosene heater. All items should be placed toward the stern end to ensure easier towing. The weatherport will then be clipped to the tow harness with the anchor line and towed upstream to the trap. If possible, towing should occur at high tide to allow for minimal current at Devil's nose. The skiff will be parked and tied off to the large trap. The weather port will then be pulled upstream by hand behind the live box work area and the anchor line can be unclipped from the tow harness and tied off to a cleat on the live box platform (Figures 14-16). A line will be tied to a cleat on the starboard side of the small trap and first fed through the eye on the starboard-side of the weatherport platform. The same line will be fed through the middle and port eyes on the weather port platform and anchored to shore (Figure 16). Additionally, a safety line will be tied from the port pontoon nose cone to an upstream alder.

-continued-

Figure 14.–Position and attachment of the weatherport behind the live box work area. The traps should be as far out into the river as safely possible at all times.

-continued-

After the traps are properly oriented, a wooden mast will be attached to the portside handrail on the large trap using zip ties. This will be used to hold a safety floatation ring, to mount a 12-V work light, and to support the catch-weight apparatus. Photosensitive flashing lights will also be mounted on the large trap starboard hand rail to serve as a warning to boat traffic during nighttime hours.

Figure 15.–The photo shows the correct orientation of both traps and the weatherport.

-continued-

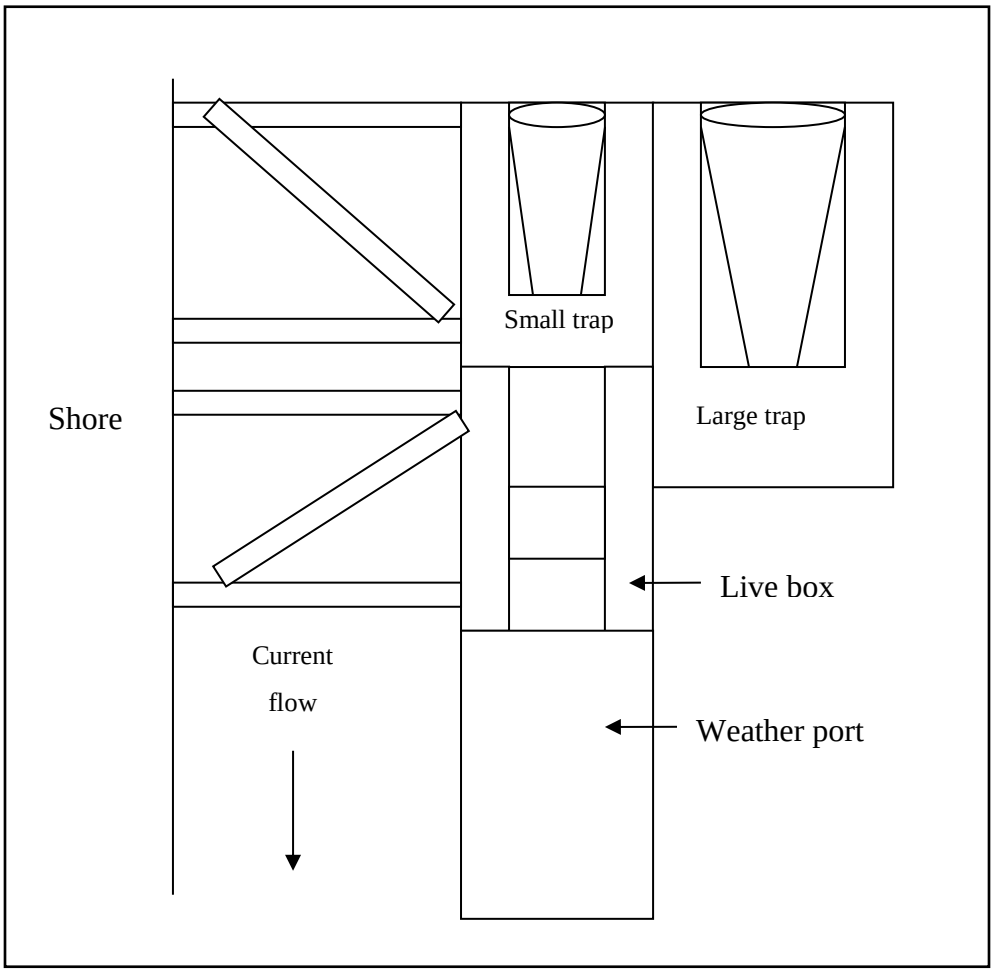

Figure 16.–The diagram shows the correct orientation of both traps and the weatherport.

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TRAP AND WEATHERPORT DISASSEMBLY

1) WEATHERPORT

- Trap disassembly should take approximately 6 hours with 2-3 people.
- Lift both traps out of the water, preferably at end of a smolt day (1200 hrs), and secure with winches.
- Transfer dip nets, strobe light, depth gauge, wooden mast, thermometer, live totes, and live box decking into weatherport.
- Attach weather port anchor line to tow harness on stern of smolt skiff and carefully tow to the weir facility.
- Secure weatherport with anchor lines to shore, upstream of upper dock, for later disassembly.

2) LIVE BOX

- Remove live box legs (3) from pintle rings with 3/4" ratchet. Place legs in the smolt skiff.
- Disassemble the live box at the trap site. The live box creates too much drag to be towed upstream. Lash the pontoons together and place the live box on top of them. Carefully tow this assembly up river to the storage site with one person on the pontoons holding the livebox.
- Untie lines securing rear live box to large/small trap assembly. Allow live box to drift safely behind smolt skiff, paying attention to any possible hang ups.
- Transport live box and legs upstream to FRI site and secure to shore in front of winter storage site for later disassembly.

3) LARGE TRAP

- Motor upstream to large trap anchor line and secure skiff to shore. Untie large trap anchor line from alder and attach it to tow harness on smolt skiff with approximately 10 m of line for towing.
- One person will be positioned on the large trap. When the skiff operator has the tow line under tension and ready for transport, the person on the large trap will untie the lines securing the large trap to the small trap. The person on the large trap will remain on the trap during transport and skiff operator will take proper precautions to ensure safe towing speeds/conditions.
- Transport large trap upstream to FRI site and secure to shore near rear of live box for later disassembly.

-continued-

4) SMALL TRAP

- Remove small trap legs (3) from pintle rings with 3/4" ratchet. The trap will swing into shore gently and the anchor lines will become slack. Place trap legs in the smolt skiff.
- Procedures for small trap transport mirror large trap transport.

5) TRAP DISASSEMBLY AT FRI SITE

- Tools needed for disassembly include: pry bar, rubber mallet, smolt tool box, 9/16" ratchet/wrench (2 each), 3/4" ratchet/wrench (2 each), 1 medium tote labeled for trap equipment, 1 labeled 1-gallon zip-loc bags per structure (3 total) for hardware, permanent marker, rite-in-the-rain notebook, pencil, and duct tape.
- Inspect all trap equipment during disassembly process for damage and note any parts that need replacement.
- Disassemble each trap individually and store nuts and bolts in pre-labeled zip-loc bags. Pintle rings, winches, pulleys, labeled pulley harnesses, and nuts and bolts will be labeled by trap and stored in a medium tote. The above mentioned equipment will be inspected for wear, dried, and cleaned before winter storage in the smolt cave.
- Trap legs, pontoons, rotary screw drums, trap hand rails, bipod hoists, front spindle support beams, structural beams, and live boxes will be neatly stored at the FRI site. Pontoons will be secured to alders with line to prevent them from floating away in a winter flood.

6) WEATHERPORT DISASSEMBLY

- Weatherport disassembly should occur the day after trap disassembly and take approximately 3-4 hours.
- Disassembly of weatherport will take place on shore above the upper dock at ADF&G weir site.
- Inspect all weatherport equipment during disassembly process for damage, separate, and note any parts that need replacement.
- The weatherport tent frame, fabric, door, and poles will be disassembled and removed from the platform. Each will be individually cleaned, dried, folded, duct taped, and labeled before storage in the smolt cave. Bolts securing tent frame will be stored in a labeled 1-gallon zip-loc bag.
- The weatherport platform will be left intact and secured to shore upstream of the bulkhead. The platform deck should be weatherized with polyurethane before winter storage if needed.
- The DIDSON crew will store the weatherport platform on the bulkhead at the end of the season.

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7) STORAGE

- It is recommended that all trap and weather port equipment be stored in the smolt cave over the winter. All tools will be cleaned, dried, sprayed with corrosion resistant spray, and stored in the smolt cave as well. Be sure all tools are accounted for. All equipment will be dried before winter storage.
- At the end of the season the smolt skiff will be prepped for winter storage on the bulkhead. The smolt skiff will be cleaned, gas tanks removed, toolbox removed, hand bilge removed, and all related gear stored in the smolt cave. The motor will be removed, gasoline drained, oil filled, and positioned on a dolly in the dive shop in an easily accessible spot for retrieval at the beginning of next season.

APPENDIX B. JUVENILE SALMON IDENTIFICATION

Figure 1.–Juvenile sockeye salmon.

Figure 2.–Juvenile coho salmon (smolt and fry use adipose fin as reference to distinguish coho from king salmon).

-continued-

Figure 3.–Juvenile king salmon

Figure 4.–Juvenile pink salmon.

-continued-

Figure 5.–Dolly Varden.

Figure 6.–Pygmy whitefish.

-continued-

Figure 7.–Coast range sculpin.

Figure 8.–Pond smelt.

-continued-

Figure 9.–Stickleback.

APPENDIX C. JUVENILE AND SMOLT FINFISH TISSUE SAMPLING FOR DNA ANALYSIS

ADFG Gene Conservation Lab, Anchorage

I. GENERAL INFORMATION

We use fin tissues as a source of DNA to genotype fish. Genotyped fish are used to determine the genetic characteristics of fish stocks or to determine stock compositions of fishery mixtures. The most important thing to remember in collecting samples is that **only quality tissue samples give quality results**. If sampling from carcasses: tissues need to be as "fresh" and as cold as possible.

Preservative used: Silica desiccant bead packet dries and preserves tissues for later DNA extraction. Quality DNA preservation requires 1) **Fast drying** – under 5 hours at 65°F; 2) **Cool drying** – the warmer, the faster it needs to dry - 90°F max; 3) **Dry storage** – with desiccant packs.

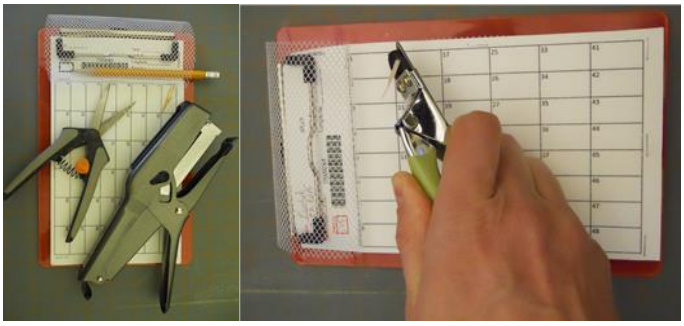
II. SAMPLING METHOD

(> 100mm)

(65-100mm)

(< 65mm)

Select fish size



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III. SAMPLING INSTRUCTIONS

- **Night before:** Every night before sampling, oven-dry 3 desiccant packs @ **160^0 F** for 12 hours. **(NOT SAMPLES)!**
- **Prior to sampling**: Set up work space, fill out required **red** collection information (upper left hand corner only) and place Whatman paper 48 grid on clipboard; ready to sample.
- **Sampling:**
  - Wipe fin prior to sampling.
  - Briefly wipe or rinse scissors with water between samples to avoid cross contaminating.
  - Based on fish size sampled (see left) cut fin along dotted line.
  - Place one clipped fin tissue onto appropriate grid space. Follow sampling order printed on card - do not deviate. If large tissue sample, center tissue on grid space
  - **Only one fin clip per fish into each numbered grid space**.
  - Staple each sample to Whatman card (see photo).
- **Loading the Pelican Case:**
  - First card: Remove blotter papers and desiccant packs from Pelican Case. Place first card in Pelican Case with tissues facing up. Next, place blotter paper directly over card and place desiccant packs on top. Close and secure lid so drying begins.
  - Up to 4 cards can be added per case. Add them so that the tissue samples always face the desiccant pack through blotter paper: 2^{nd} card facing down between desiccant packs; 3^{rd} card facing up between desiccant packs; and 4^{th} card facing down on top of third desiccant pack. Close and secure box after inserting each card.
- **Post-sampling storage:** Store dried tissues in watertight file box at room temperature or cooler. Two desiccant packs are allocated to the file box: rotate 1 pack through the oven every night when drying the 2 packs for the Pelican Case **(@ 160^0 F).**
- **Shipping at end of the season:** Pack 2 dried cards in plastic photo page (2/page), slide in manila envelope; pack inside priority mailing box. Tape box shut and tape return address on box.

IV. SUPPLIES INCLUDED IN SAMPLING KIT:

1. Scissors - for cutting a portion of selected fin.
2. Whatman paper grid – holds 48 fish/sheet.
3. Pelican Case - 1^{st} stage of drying and holding card samples.
4. Silica packs – desiccant removes moisture from samples.
5. Pre-cut blotter paper – covers complete 48 grid samples for drying.
6. Watertight file box – dry storage prior to return shipment.
7. Plastic photo page – 2 cards per page for return shipment.
8. Manila envelope – pack dried cards in manila envelope.
9. Shipping box – put sealed manila envelope inside box.
10. Clipboard – holds Whatman paper grid while sampling.
11. Stapler – extra protection, secure sample to numbered grid.
12. Staples – only use staples provided, specific for stapler.
13. Laminated "return address" labels.
14. Sampling instructions.
15. Pencil

-continued-

V. SHIPPING

Address the sealed mailer box for return shipment to ADFG Genetics lab.

Ship samples to:

ADFG – Genetics
333 Raspberry Road
Anchorage, Alaska 99518

Lab staff: 1-907-267-2247
Judy Berger: 1-907-267-2175

-continued-

Juvenile and Smolt Finfish Sampling with Whatman Paper

Oven-dry 3 rotating desiccant packs **@ 160^0 F** for 12 hours every night in toaster oven.

Set up work space

Using clippers, clip off axillary process (**1/2 -1" max**) to fit into grid.

Whatman card half filled with axillary clips (**1/2 -1" max**) to fit into grid and each axillary stapled to card.

Loading Pelican Case; 1st card facing up on foam insert.

Next, place blotter paper and desiccant pack on top.

Building "sandwich" layers up to 4 cards per case.

Watertight file box with 2 desiccant packs for storage until samples packed/shipped.

APPENDIX D. LIMNOLOGY AND BEACH SEINE SAMPLING COORDINATES, TENTATIVE SAMPLING SCHEDULE, AND BEAR LAKE LIMNOLOGY SAMPLING PROCEDURES

Appendix D1.–Location of limnology and beach seine sites in Black and Chignik lakes.

Area	Description	Site/station	Latitude (N)[a]	longitude (W)[a]
Chignik Lake	Limnology	1	56°14.366'	158°48.834'
		2	56°15.344'	158°49.483'
		3	56°16.122'	158°50.612'
		4	56°17.316'	158°53.386'
Chignik Lagoon	Beach Seine	1	56°16.275'	158°40.459'
		2	56°17.187'	158°36.277'
		3	56°20.396'	158°29.506'
		4	56°16.730'	158°38.649'
Black Lake	Limnology	1	56°27.207'	158°59.701'
	Beach Seine	1	56°27.207'	158°57.618'
		2	56°26.852'	158°57.618'
		4	56°27.138'	158°57.198'
		5	56°26.200'	158°58.217'
Bear Lake	Limnology	4	55°59.092'	160°12.092'
		2	56°00.901'	160°14.310'

Note: Coordinates are in degrees and decimals. All coordinates in datum WGS-84.

Appendix D2.–Chignik smolt season schedule guide for sampling.

April		May		June		July		August
Start of Week		Start of Week		Start of Week		Start of Week		Start of Week	
		3-May	help with resolution offload if needed	1-Jun	BS: Lagoon		BS: Lagoon		BS: Lagoon
12-Apr	arrive install traps	10-May		7-Jun	LS: Bear	opportunistically as staff available in field	LS: Bear	Bear lake camp out on Aug 25; try to sample before Aug 20	LS: Bear
19-Apr	set bouys (end of week) LS: Chignik Lake	17-May	LS: Chignik Lake	14-Jun	LS: Chignik Lake		LS: Chignik Lake		LS: Chignik Lake LS, BS: Black Lake
26-Apr	BS: Lagoon (end of week, also May 1 or 2)	24-May	LS, BS: Black Lake	21-Jun	LS, BS: Black Lake		LS, BS: Black Lake		

Notes: Abbreviations: BS-Beach Seine; LS-Limnology Sample

Appendix D3.–Bear Lake Limnology sampling procedures.

The Chignik smolt crew will travel to Bear Lake monthly (May-August), if possible, to conduct limnology sampling. The map of Bear Lake (Figure 1) indicates four sampling stations, but sampling is only conducted at stations 2 and 4. All sampling mimics Chignik Lake sampling protocols for Chignik Lake stations 2 and 4, with physical parameters and water collected at both stations, and water processed at the Chignik Laboratory.

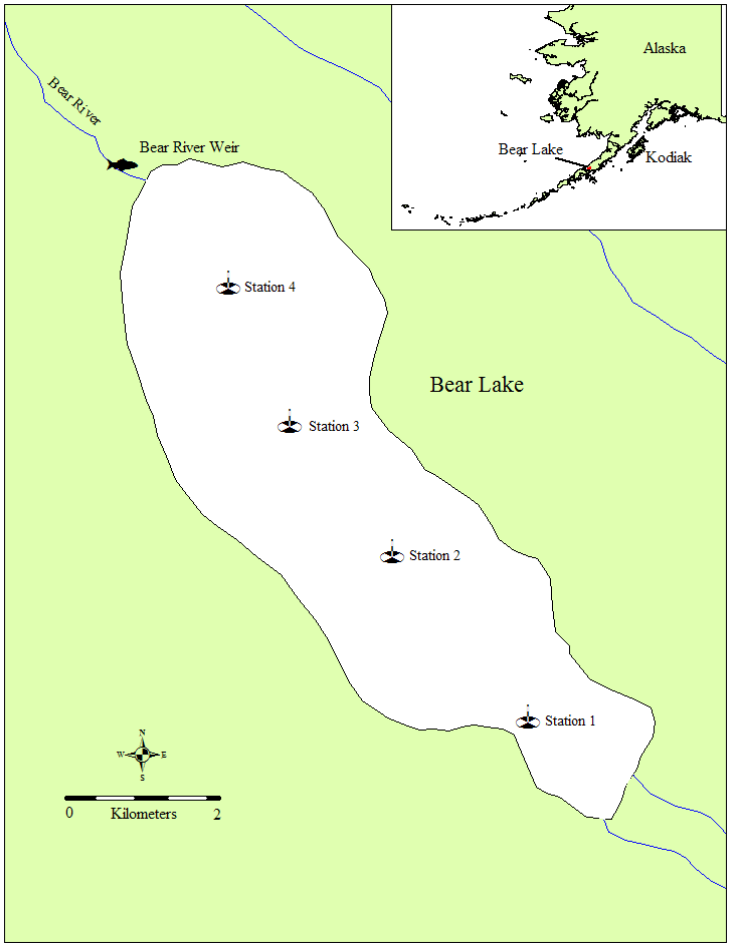

Figure 1.–Map of Bear Lake

Travel to and from Bear Lake will be arranged directly with the pilot in Chignik. As weather is a determining factor for both travel and sampling conditions, it is important to plan ahead and be flexible when making arrangements to travel to Bear Lake. Be sure to notify the weir crew at Bear River of sampling plans by either calling the Port Moller Commercial Salmon Management office (907-375-2716) and having them relay a message, or contacting the crew directly using the SSB. The Chignik Smolt crew uses the ADF&G skiff at the Bear River weir to conduct limnology sampling at the lake.

Safety is of utmost importance, and sampling will not be conducted if lake conditions are unsafe or there is a strong indication that they will become unsafe while sampling.

APPENDIX E. CHAIN OF CUSTODY FORM FOR SHIPPING LIMNOLOGY SAMPLES

A Chain of Custody Form must be filled out by the crew leader in Chignik every time water and zooplankton samples are relinquished and shipped to ADF&G Kodiak Island Limnology Laboratory in Kodiak. Samples will be shipped in a designated large cooler after they have completely frozen. Water samples and filters as well as zooplankton and phytoplankton samples from each location and sampling date will not be separated and must be shipped in the same cooler (water and plankton samples separate) at the same time, and all samples included in the shipment must be listed separately on the Chain of Custody Form. The form is two-sided; the back side of the form provides more space to list all included samples. An example Chain of Custody form is filled out in Figure 1.

Sample Type: Type of sample (i.e. zoop, UFF, FF, Chla, etc.)

Sample Date: Date sampling occurred

Site and Station: Sample location and station number

Depth: Sample depth

Bottle #: Note either 1 of 1, 1 of 2, or 2 of 2 (especially important for UFF samples)

Shipping Container: Describe shipping container in which the sample is contained, i.e. large blue cooler

Other Sample Information: Include any other important comments about the sample

Relinquished by: Name of crew leader

Date: Date samples are relinquished to ADF&G pilot or commercial airlines

Time: Time samples are relinquished from crew leader

Received by: Name of ADF&G employee in Kodiak who receives samples. ** Name of ADF&G or commercial pilot not included in the Chain of Custody. Name of pilot/airline is included in the *Comments* section at the bottom of the form.

Date: Date samples received by ADF&G employee in Kodiak

Time: Time samples are received by ADF&G employee in Kodiak

Comments: Include descriptions of all coolers being shipped, number of coolers being shipped, name of pilot or airline, and any other relevant comments.

-continued-

Page 1 of 2

Chain of Custody

Alaska Department of Fish & Game
Kodiak Island Laboratory
351 Research Ct
Kodiak, AK 99615
P:907-486-1817 F:907-486-1847
Email: alyssa.hopkins@alaska.gov

Client Information	Invoice Information
Client Name: Chignik Limn	Invoice To:
Address: 351 Research Ct.	Address:
City: Kodiak State: AK Zip: 99615	City: State: Zip:
Contact: Mary Loewen	Contact:
Phone Number: 907-486-1805	Phone Number:
Email:	Email:

Project Name: Chignik Limnology
Project Number:
Special Instructions: transport from Chignik weir to Kodiak office

Sample Type	Sample Date	Site and Station	Depth	Bottle #	Shipping Container	Other Sample Information
ZOOP	5-8-15	Chignik 1	42m	1 of 1	Red cooler	
	↓	Chignik 2	46 m	1 of 1	↓	
		Chignik 3	41 m	1 of 1		
ZOOP	↓	Chignik 4	43m	1 of 1	↓	
UFF	5-8-15	Chignik 2	1m	1 of 2	Blue cooler	
↓	↓	Chignik 2	1m	2 of 2	↓	
		Chignik 2	29m	1 of 2		
UFF	↓	Chignik 2	29m	2 of 2		
FF	5-8-15	Chignik 4	1m	1 of 1		
FF	5-8-15	Chignik 4	29m	1 of 1		
Chla	5-8-15	Chignik 2	1m	1 of 1		
	5-8-15	Chignik 2	29m	1 of 1		
					↓	see other side

Relinquished by:	Date:	Time:	Received By:	Date:	Time:
Alyssa Baechler	6-10-15	9:00 am			
Relinquished by:	Date:	Time:	Received By	Date:	Time:

Comments: more samples on other side
2 coolers: blue cooler w/ water, red cooler w/ plankton
sent to Kodiak with Paul Ham, notified Kodiak Lab of arrival time

APPENDIX F. PROPOSED CREW WORK SCHEDULE AND TIMESHEET INSTRUCTIONS

Appendix F1.–Proposed crew work schedule for the Chignik Smolt Enumeration Project.

Employee	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
FB I	0015 - 0415 2200 - 2300	0015 - 0415 1200 - 1400 2200 - 2300	0015 - 0415 1200 - 1400 2100 - 2300	0015 - 0415 1200 - 1400	0015 - 0415 1200 - 1400 2200 - 2300	0015 - 0415 1200 - 1400	0015 - 0415 1200 - 1300
	5	**7**	**8**	**6**	**7**	**6**	**5**
FWT II	0015 - 0415 1200 - 1300	0015 - 0415 1200 - 1400	0015 - 0415 1200 - 1400 2100 - 2300	0015 - 0415 1200 - 1400 2200 - 2300	0015 - 0415 1200 - 1400	0015 - 0415 1200 - 1400 2200 - 2300	0015 - 0415 2200 - 2300
	5	**6**	**8**	**7**	**6**	**7**	**5**
Activities	Trap Check *BS/Limno	Sample	Sample Dye Test	Sample	Sample	Sample	Trap Check

This schedule is provided as an example of work hours during peak emigration. Actual work hours will vary depending on emigration needs.

Employee	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
FB I	0800 - 0900 1200 - 1300 2200 - 2300	0800 - 0900 1200 - 1400 2200 - 2300	0800 - 0900 1200 - 1400 2100 - 2300	0800 - 0900 1200 - 1400	0800 - 0900 1200 - 1400 2200 - 2300	0800 - 0900 1200 - 1400	
	3	**4**	**5**	**3**	**4**	**3**	**0**
FWT II		0800 - 0900 1200 - 1400	0800 - 0900 1200 - 1400 2100 - 2300	0800 - 0900 1200 - 1400 2200 - 2300	0800 - 0900 1200 - 1400	0800 - 0900 1200 - 1400 2200 - 2300	0800 - 0900 1200 - 1300 2200 - 2300
	0	**3**	**5**	**4**	**3**	**4**	**3**
Activities	Trap Check *BS/Limno	Sample	Sample Dye Test	Sample	Sample	Sample	Trap Check

This schedule is provided as an example of work hours during non-peak emigration. Work week hours should even out between peak and off peak periods.

*Beach Seine (includes AWL sampling) and limnology with water processing days are flexible based on weather. The work hours contribute an additional 5-10 hours/week. When possible, schedule with days off from sccrew trap sampling.

Appendix F2.–Instructions for filling out a timesheet.

All ADF&G employees must fill out a timesheet twice per month and these timesheets must be turned in to the Administrative staff in Kodiak in a timely manner. Please follow these instructions when filling out your timesheets to avoid payroll problems. Timesheets will be either emailed or faxed to the project biologist. Fill in the timesheet up to the day you send them in and attempt to project your remaining hours worked.

Fill out each of the following on the top of the timesheet:

Pay period: pay periods start on the 1st or 16th of each month and end on the 15th or end of the month (example: June 1-15 or June 16-30).

EIN: Employee Identification Number

Name: full name

Division: Commercial Fish

In the actual timesheet table fill in the following items:

Day: Monday, Tuesday, etc.

Date: 6/16, 6/17, etc.

Hours worked box: start and stop time in military time.

Code 1: fill in the number of hours worked for that day (see example in Appendix G2).

Work hours and Code 1 Totals should both equal the sum of daily hours worked. If your timesheet is sent in before the end of the pay period, project your time for the remaining days so you can total your columns.

Charge to Table located on the bottom left-hand side of the timesheet should be left blank unless otherwise instructed by your project supervisor.

Comments Table located on the bottom right-hand side of the timesheet should be left blank unless otherwise instructed by your project supervisor.

Employee's signature and date: Be sure to sign and date your timesheet.

Crew leaders are responsible for reviewing each crew member's timesheet before sending them to town to ensure that they are properly filled out.

Appendix F3.–Example of a completed timesheet.

ALASKA DEPARTMENT OF FISH AND GAME Time and Attendance Report

Pay period ending: 6/15/2003 SSN: 191-11-1111 Name: Joe Shmo Division Commercial Fisheries

Record times in military format. Example: 6:00 p.m. = 18:00. If you work past midnight, stop at 23:59 and resume at 00:01 the next day.

Day	Date	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Leave Taken	Sea Duty	Standby	Hazard	Code 1	Code 2	Code 3	Code 4	Holiday / Leave	Work Hrs Total
Sun	6/1	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Mon	6/2	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Tue	6/3	8:00	12:30	14:00	18:00											8.50				0.00	8.50
Wed	6/4	8:00	12:00	13:00	16:30	17:00	19:00									9.50				0.00	9.50
Thu	6/5	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Fri	6/6	8:00	12:00	16:00	19:00											7.00				0.00	7.00
Sat	6/7	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Sun	6/8																			0.00	0.00
Mon	6/9	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Tue	6/10	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Wed	6/11	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Thu	6/12	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Fri	6/13																			0.00	0.00
Sat	6/14																			0.00	0.00
Sun	6/15	8:00	12:00	13:00	16:30	17:00	18:30									9.00				0.00	9.00
																				0.00	0.00
TOTALS														0.00	0.00	94.00	0.00	0.00	0.00	0.00	94.00

EXAMPLE

	Charge to:		
	Notation	CC/LC	%
1			100%
2			
3			
4			
		Total	100%

	Comments		Comments
6/1		6/9	
6/2		6/10	
6/3		6/11	
6/4		6/12	
6/5		6/13	
6/6		6/14	
6/7		6/15	
6/8			

We certify that the information provided above is true and correct.

Joe Shmo Date: 6/15/03
Employee's Signature

Date:
Supervisor's Signature

Date:
Approving Officer Signature

Leave Use Codes

H=Holiday	X=Comp Ann
S=Sick	Y=Comp Pers
A=Annual	C=Court
P=Personal	L=LWOP

**** Premium Pay Codes (PPC)**

110 - Sea Duty	250 - Straight Time
206 - Hazard	251 - Overtime
211 - Standby	

Holiday, Leave, Overtime and Premium Pay Overrides

**Codes	Hours	CC/LC
Leave & Holiday	0.00	No code needed for Leave & Holiday

Ver. 1.9.4
Revised 2/20/99

-continued-

NOTE: every day must be accounted for, even days off. Just leave those days blank for hours.

*If worked Standby Duty (e.g. Boat gate duty) put an "x" into Standby column; in comments section write "Standby Duty" and the hours worked as standby for each day worked.

*Each budget code should have 8 digits, no more, no less.

*If splitting codes for regular pay and overtime, write the overtime in the bottom right box for Holiday, Leave, Overtime and Premium Pay Overrides. Otherwise your overtime will be coded to your regular pay budget.

*make sure your Code 1 hours (and if applicable Code 2 and Code 3) sum matches the Work Hrs Total sum.

APPENDIX G. 2015 STAT WEEKS

Appendix G1.–2015 Stat weeks.

Week	Calendar Dates	Week	Calendar Dates
10	1-Mar – 7-Mar	28	5-Jul – 11-Jul
11	8-Mar – 14-Mar	29	12-Jul – 18-Jul
12	15-Mar – 21-Mar	30	19-Jul – 25-Jul
13	22-Mar – 28-Mar	31	26-Jul – 1-Aug
14	29-Mar – 4-Apr	32	2-Aug – 8-Aug
15	5-Apr – 11-Apr	33	9-Aug – 15-Aug
16	12-Apr – 18-Apr	34	16-Aug – 22-Aug
17	19-Apr – 25-Apr	35	23-Aug – 29-Aug
18	26-Apr – 2-May	36	30-Aug – 5-Sep
19	3-May – 9-May	37	6-Sep – 12-Sep
20	10-May – 16-May	38	13-Sep – 19-Sep
21	17-May – 23-May	39	20-Sep – 26-Sep
22	24-May – 30-May	40	27-Sep – 3-Oct
23	31-May – 6-Jun	41	4-Oct – 10-Oct
24	7-Jun – 13-Jun	42	11-Oct – 17-Oct
25	14-Jun – 20-Jun	43	18-Oct – 24-Oct
26	21-Jun – 27-Jun	44	25-Oct – 31-Oct
27	28-Jun – 4-Jul	45	1-Nov – 7-Nov