Chignik River Smolt Enumeration Project Operational Plan, 2010

by

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and

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April 2010

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

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Measures (fisheries)

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

Mathematics, statistics

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

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INTRODUCTION

Economically, sockeye salmon *Oncorhynchus nerka* are the most important commercial salmon species in the Chignik Management Area (CMA). The Chignik River watershed 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 1.5 to 4.5 million adult sockeye salmon (Stichert et al. 2009). There are two rearing lakes and two distinct sockeye salmon runs in the Chignik River watershed. Sockeye salmon that spawn in Black Lake and its tributaries return from about May through July, and those that spawn in Chignik Lake and its tributaries return from about July through September (Witteveen and Botz 2004). Smolt population abundance data, by age, has been collected annually since 1994. This project provides information on the Chignik River juvenile sockeye salmon population size and dynamics and the physical health of the smolt. The project will also collect rudimentary limnology data to add to the existing Chignik watershed limnology database and allow the modeling of potential juvenile sockeye salmon rearing capacity of the Chignik River watershed. Smolt enumeration and limnology information will be used for evaluating current escapement goals, forecasting future adult returns, and estimating ocean survival, providing valuable insight into run size fluctuations and leading to more accurate forecasting.

GOAL

The project goal is to evaluate and document trends of Chignik River watershed sockeye salmon smolt production, as well as collect watershed limnology in order to gain insight into population health and watershed rearing capacity.

OBJECTIVES

1. Estimate the total number of emigrating sockeye salmon smolt, by age class, from the Chignik River watershed.
2. Describe sockeye salmon smolt emigration timing and growth characteristics (length, weight, and condition factor), by age class and stock, for the Chignik River watershed.
3. Collect data in order to continue building a smolt database to estimate smolt-to-adult survival and to forecast future runs, and describe habitat conditions in both Black and Chignik lakes during the outmigration through limnology data.
4. Summarize the 2010 smolt emigration data in a report.

TASKS

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

   Target date: April 27 through July 10.
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) data.
4. Collect genetic samples from all AWL sampled fish.

5. Perform mark-recapture experiments by dying and releasing 3,000 (1,000 minimum) sockeye salmon smolt once every 5 days, to estimate trap efficiency and the total smolt outmigration. In conjunction with each mark-recapture experiment, a mark-retention/delayed mortality experiment will be conducted.
6. Collect physical data daily: air temperature, water temperature, relative water depth, cloud cover, precipitation, and wind direction and velocity.
7. Collect limnology data monthly from each lake: water temperature, dissolved oxygen, and solar illuminance depth profiles as time and budget allow.
8. Collect monthly water and zooplankton samples from each lake as time and budget allow.
9. Conduct beach seines in Chignik lagoon to obtain sockeye salmon juveniles for AWL and genetic samples.
10. Inventory and store equipment, and close camp.

    Target date: July 15.
11. Write project summary report and deliver a general presentation on the smolt project to Chignik Lake High School students.

    Final report due date: March 15, 2011. School presentation: Before end of semester in May 2010.

SUPERVISION

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

Crew Leader, Jassalyn Bradbury - Fisheries Biologist I (PCN 11-1426)

Crewmember, Vacant – Fish and Wildlife Technician II (PCN 11-5191)

The crew leader will schedule daily tasks and will oversee and participate in all field operations regarding the smolt project. The crewmember will assist the crew leader in all assigned tasks and field operations. The Project Biologist will oversee the study, and provide logistical and technical support. All project members will work as a team to complete the project's goal. 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. The smolt project research staff will work cooperatively with management staff and the public.

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 (Figure 2). The traps will be marked clearly to avoid conflicts with boat traffic. The traps will be operated in tandem (small trap closer to shore) perpendicular to the stream flow and attached to the 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 the trapping equipment. After the traps are installed, a river depth profile at the trapping site (1-m intervals) and a schematic diagram will be completed.

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. The traps will be checked hourly during dark hours, and approximately every six hours during the day. The traps will be checked, cleaned, and emptied daily at noon. 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 5). 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 on the SOCKEYE SALMON SMOLT REPORTING FORM (Figure 6) on a daily basis.

If direct counting is 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 150 fish will be dipnetted from the trap(s) and weighed. This sample should be representative of the fish in the trap. This weight will be the reference weight for the next samples. The weight of the sample will be recorded in a field notebook.
2. The sample will be enumerated, by species, and any marked fish will be noted. These data will be recorded in a field notebook and the fish will then be released.
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 10th sample or earlier if size or species compositions obviously change.
5. These data will be transferred to the CATCH-WEIGHT WORKSHEET (Figure 7) 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 for five consecutive days per statistical week and sampled for AWL data (Appendix C1 through C6). All smolt sampling data will reflect the smolt day in which the fish were captured, and samples will not be mixed between days. 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 hourly throughout the night's migration and held in an instream live box. The number of fish sampled hourly will be proportional to the migration strength. At the end of the smolt day, 40 smolt will be randomly collected from the live box and sampled. The remaining smolt will be released. It is important that the smolt sample represent the entire night's migration. These data are used to reconstruct the age class component of the emigration, and smolt of different sizes and ages may travel in separate schools throughout the night.

The age of the sampled fish will be estimated postseason by interpreting the growth patterns on their scales following the methods and notation of Koo (1962).

Genetic Sampling

All AWL sampled fish will have tissue samples taken for future DNA analysis. The methods for sample collection are outlined in Appendix D1. The sample procedures in Appendix D1 are written for the non-lethal and lethal sampling of smolt. It should be noted that for juvenile sockeye salmon less than 65 mm, it may be necessary to retain the whole fish as a sample. Samples should not exceed one-third of the volume of the sample vial. Labeled samples will be shipped to the ADF&G Gene Conservation Laboratory for storage and processing.

Sockeye fry will be collected for genetic sampling. 25 sockeye fry will be collected each night for five consecutive nights and preserved in ethanol in 125 mL bottles. Ethanol should comprise no less than one third of the bottle volume, and will be refreshed once after the initial 24 hours of storage.

Mark-Recapture Experiments

The Chignik River watershed smolt population size will be estimated using methods described in Carlson et al. (1998). Trap efficiency estimates will be made every five days to estimate the number of sockeye salmon smolt emigrating from the Chignik River, or more frequently if the trap is moved.

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 *h*,

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 for $\hat{U}$ is estimated by

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

and 95% confidence intervals are estimated from

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

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 upstream of the trap to the release site (Figure 2). 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 (Carlson et al. 1998).

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.

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.

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

1. All data will be recorded on the SMOLT DYE RELEASE FORM (Figure 8).
2. Every five days, a sample of approximately 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. After the third evening, all smolt collected will be marked. Marked fish will not be sampled for AWL information.
3. The fish will be transferred from the instream live box to two 24-gallon transport/marking containers. The containers will then be covered. 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 at least 30 minutes.
4. The circulation pumps will be turned off, and a solution of 4.6 g of Bismarck Brown Y dye will be dissolved in each container. Three aerator units will be placed in the marking containers and will operate continuously during the dyeing period. After 15 minutes in the dye, the pump will be restarted and the containers will be flushed with fresh water. The dye solution should be extremely dilute after 20 minutes of flushing.
5. Following the dye treatment, the containers will be flushed with fresh water for a minimum of 90 minutes. Smolt displaying abnormal behavior will not be released.
6. Smolt showing normal behavior will be dipnetted from the recovery containers, counted, transferred to 5-gallon buckets equipped with aerators and transported upstream to the release site (Figure 2). At the release site, the smolt will be evenly distributed across the stream by slowly pouring the smolt out of the 5-gallon buckets. It is imperative that the smolt are released on the downstream side of the boat to reduce the probability of propellor wash mortality or injury. The dye treatment and recovery process should be timed so that the release takes place at approximately 2300 hours.
7. The smolt trap will be 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 5) and the SOCKEYE SALMON SMOLT REPORTING FORM (Figure 6). 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.
8. 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.

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 transport container and placed in one side of a divided instream live box. These fish will be handled the same as the fish that are marked, except they will not be placed in the dye solution. After the marking and recovery period, an additional 100 marked smolt will be placed in the other side of the live box. 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 9). These smolt will be released at the beginning of a new mark-recapture test or after five days, whichever is first. The daily smolt catch will not include these fish because they have already been counted.

Additionally, a sample of five marked and five unmarked smolt will be used to conduct daily marking identification trials. The purpose of this test is not to evaluate field personnel's species identification ability, but to evaluate the mark-recapture assumption that all marks are recognized. One crewmember will examine the smolt and the other will present the smolt. The duties will switch the next day. The examiner will not look at the smolt before the trial. The presenter will, at random, select a smolt from the live box, present it in a dip net to the examiner for approximately one second, and immediately release the fish back to the appropriate side of the live box. The examiner will determine whether the smolt was marked or not; the presenter will record whether the examiner was correct. The presenter will not inform the examiner of the accuracy of his determinations until all 10 fish have been examined. 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 9). When the experiment is finished, the smolt are counted and released, but not included in the daily smolt catch because they have been previously counted.

Physical Data

Air and water temperature, cloud cover, wind direction and velocity, trap rpm, and relative stream height will be measured once daily at noon throughout the season. This information will be recorded on the DAILY PHYSICAL DATA OBSERVATION FORM (Figure 10).

LIMNOLOGY SAMPLING

Station Placement and Sample Collection

Four limnology stations will be established in Chignik Lake (Figure 11), and one station will be established in Black Lake (Figure 12). The exact latitudes and longitudes of these stations were

determined using a global positioning system (GPS) in prior years (Appendix E1). The stations will be set and marked with a buoy at the same locations.

Sampling at Chignik and Black lakes will take place at monthly intervals (Appendix E2). Contracted skiffs from Chignik Village will be scheduled and used for transport to Black Lake for monthly sampling. Temperature, dissolved oxygen, and light penetration parameters will be measured at all stations. Water samples will be collected from a depth of 1 m and 29 m at stations two and four on Chignik Lake. Water samples will be collected from the single station on Black Lake. Zooplankton samples will be taken from all stations.

Water Sampling

A Van Dorn sampler will be prepared and lowered to the desired sampling depth on a metered line by qualified personnel. A messenger will be attached to the line and 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. Any samples that contain sediment will be discarded and another sample will be collected. The carboys will be kept cold and dark in a cooler while in transport. The sampling depths, stations, and other appropriate comments will be recorded on the DETAILED LAKE SURVEY FORM (DLS form; Figure 13).

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 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. 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 washed with filtered water into the collection basin. The basin will be removed from the net and all sample contents will be emptied into a labeled, 125-ml bottle filled with 12.5 ml formalin (to yield a 10% buffered solution by volume). The Chignik smolt crew will provide prepped bottles. Filtered DI water will be used to rinse the collection basin and completely fill the bottle. The bottle will be capped and sealed with electrical tape to prevent the contents from leaking.

The sample bottles will be stored at room temperature. Samples will be sent to Kodiak in a separate container from the water samples to prevent freezing the zooplankton samples. Zooplankton taxa will be identified and enumerated at the ADF&G Near Island Limnology Laboratory following established protocols (Koenings et al. 1987; Thomsen et al. 2002).

Light Measurement

Light levels will be measured from the bright side of the boat using an International Light IL1400A electronic photometer. The meter will be calibrated according to the manufacturer's instructions prior to use. Light readings, recorded in kilolux (Klux), will begin just above the lake's surface (incidence). Measurements will continue to be taken just below the water's surface at 0.5-m intervals, down to 5 m (i.e., 0.5, 1, 1.5,…5), and then every meter (5, 6, 7, etc.)

thereafter until the light level is 1% of the surface reading. Data will be recorded on the DLS form (Figure 13).

Temperature, Dissolved Oxygen, and Water Clarity

Water temperature (^{o}C) and dissolved oxygen (DO; mg/l) levels will be measured at each station with a YSI Y52 dissolved oxygen meter. Prior to use, the meter's probe membrane will be examined for wear (tears, folds, and air bubbles). A handheld thermometer will measure the surface temperature to ensure the meter is working properly. The meter will be calibrated at the start of each sampling day, according to the manufacturer's instructions. An incidence reading will be taken above the water's surface. The probe will then be lowered into the water and another reading will be taken directly below the water's surface. 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 DLS form (Figure 13). Measurements will be taken until the probe is 1 m off the lake bottom or the depth exceeds the cord length.

Water clarity will be measured at each limnology station with a Secchi Disk (SD). SD depth will be measured on the shaded side of the boat. The SD 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. Results will be recorded on the DLS form (Figure 13).

Lab Setup

Filtration equipment (filter towers and flasks), graduated cylinders, burettes, and carboys will be washed with phosphate-free soap in the labeled phosphate-free side of the sink. All equipment will be rinsed with tap water four times and then rinsed four times with filtered water. The wastewater flasks do not need to be washed. All necessary bottles will be washed with phosphate-free soap before sending them to the field.

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 Thomsen et al. (2002).

Water Sample Processing

Water sample processing will be completed directly after field sampling. Water will not be held more than three days before processing. Each sample will be processed separately. Poly bottles and graduated cylinders will be rinsed with a small portion of the water sample. The water samples will be processed into the following subsamples:

1) Alkalinity and pH: Samples of refrigerated water will be measured for pH by using a Corning pH meter. Alkalinity will be assessed by acid titration as described by Koenings et al. (1987) and Thomsen et al. (2002). Measurements will be recorded on the DLS form.

2) Unfiltered frozen water nutrient content: Two 200 ml of sample water will be placed into two 250-ml poly bottles. Space will be left to allow expansion due to freezing. The bottles will be appropriately labeled, frozen, and then sealed with electrical tape.

3) Phytoplankton: 100 ml of sample water will be placed into a labeled 125-ml poly bottle. 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) Particulates: Four graduated cylinders will be filled with 1,000 ml (1 L) each of sample water for each of the two particulate samples (chlorophyll *a*, and C). As water turbidity changes, it may be necessary to reduce the filtrate volume from 1,000 to 500 or even 300 ml to prevent damaging the vacuum pump; this is common with samples from Black Lake. Filtrate volumes will be logged on the sample petri dish's label. Multiple filter towers may be used if the equipment is available. Using sterile forceps, a sterile Whatman GF/F filter will be placed on the filter apparatus. One hundred ml of deionized water will be used to rinse the tower and moisten the filter. The rinse water will be discarded from the flask after being drawn through the filter. A portion of sample water will be poured from the graduated cylinder(s) into the filter tower(s). The vacuum pump should be run at approximately 15 psi; increased sample water turbidity may require increasing the pump's draw to 20 psi. As the sample passes through the filter, more of the sample water will be added from the graduated cylinder until all 1,000 ml are filtered. As the last 50 ml of the chlorophyll-*a* sample is filtered, a mixture of 5 ml of $MgCO_3$ solution and 5 ml of filtered water will be added to the tower. The pump will be turned off when all towers are empty. The particulate nutrient filters will be removed with forceps from the filter apparatus, placed in appropriately labeled petri dishes, and frozen until shipment to the ADF&G Near Island Limnology lab for initial processing.

5) Filtered frozen water nutrient content: A small portion of sample water will be filtered through the apparatus and discarded to rinse the filtration flask. Then approximately 450 ml of filtrate will be retained from the filtrate flask and placed in a rinsed (with filtrate) 500-ml bottle. The bottle will be appropriately labeled, frozen, and then sealed with electrical tape.

Processed samples and frozen ice packs will be shipped to the ADF&G Near Island Limnology Laboratory in a sealed cooler after the frozen samples have hardened. The samples will be shipped via commercial air carrier as soon as possible. Zooplankton and phytoplankton samples will be placed in a Zip-lock bag after being sealed with electrical tape and shipped separately so they will not freeze. Before shipping, lab personnel (481-1901) and the Project Biologist (486-1805 wk) will be contacted to inform them of arrival time. Original DLS forms (Figure 13) will be shipped to the Near Island Limnology Laboratory and a copy will be made and retained at Chignik.

Beach Seining

To assess timing of fry emergence and lagoon use by juvenile sockeye salmon, four beach seine sites will be established in the Chignik Lagoon (Figure 3) and four in Black Lake (Figure 4). A 3 mm mesh, 10 m long, 1 m deep seine will be used. Multiple beach seine sets at each location may be necessary to obtain the desired samples, and up to 4 beach seine sets in each site should be attempted if required. The number of sets conducted at each site should be recorded on the data form. Each end of the net will be retrieved simultaneously and the lead line will remain in contact with the bottom at all times. Care will be taken to set the gear in a similar manner at all sites and for all sampling events at the same site.

After the set is made, all fish species will be identified (Appendix B1) and counted. Large hauls may require estimating the catch abundance. All fish held for age, weight, and fork length (FL) sampling will be kept in an aerated tote. All juvenile sockeye, and 20 each coho *O. kisutch*, and Chinook *O. tshawytscha* salmon will be randomly sampled from the catch and measured for FL to the nearest millimeter (mm). All juvenile sockeye salmon will also be sampled per set for age length, weight and genetics data. A total sample size of 200 juvenile sockeye salmon per sampling event (all locations combined) is desired for AWL and genetics, evenly distributed throughout the catch locations. If a specific fish is too small to obtain scales, the location on the slide will be left blank and the fish will be assumed to be an age-0. fish. Specimens collected for AWL sampling will be placed in a zip lock bag containing water and enough MS-222 to induce mortality. A waterproof paper label that contains the date, the location, AWL number and the method of capture will be placed in the bag with the collected fish. All AWL sample fish will then be transported to the Chignik field lab for AWL processing (Appendix C1). Fish must be processed the same day, otherwise obtaining scale may be difficult or impossible. All information collected (FL and AWL) will be recorded on the *Beach Seine Data Form* (Figure 14).

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	111-740	Boating Safety
111-710	Office/Warehouse Safety	111-750	Vehicle Safety
111-720	Field Camp Safety	111-760	Laboratory Safety
111-730	Aircraft Safety for Passengers	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 survival kit including matches, a hand-held VHF radio, a flare gun, a GPS unit, spare motor parts, and a first aid kit will also be in the boat at all times.

REPORTING

The crew leader will compile a daily log. 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 needed or predetermined. The crew leader will record daily smolt emigration counts, water level, water temperature, and trap rpm in the management

office every morning by 0730 hours. The crew leader is also responsible for co-authoring a season summary, 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. Tasks will be scheduled to minimize overtime. Overtime is limited to 30 hours/month (7.5 hours/week) per person, unless otherwise pre-authorized. 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 to Kodiak before the 15th and the last day of each month as 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 G1 and G2.

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Carlson, S. R., L. G. Coggins Jr., and C. O. Swanton. 1998. A simple stratified design for mark-recapture estimation of salmon smolt abundance. Alaska Fishery Research Bulletin 5(2):88-102.

Koenings, J. P., G. B. Kyle, J. A. Edmundson, and J.M. Edmundson. 1987. Limnology field and laboratory manual: Methods for assessing aquatic production. Alaska Department of Fish and Game, FRED Report No. 71. Juneau, AK 99802.

Koo, T.S.Y. 1962. Age designation in salmon. Univ. Washington Publ. in Fish., New Ser. 1(2):37:48.

Pollard, W. R. G. F. Hartman, C. Groot, and P. Edgell. 1997. Field Identification of Coastal Juvenile Salmonids. Harbour Publishing. British Colombia, Canada.

Stichert, M. A., T. J. Anderson, and T. H. Dann. 2009. Chignik Management Area Salmon and Herring Annual Management Report, 2007. Alaska Department of Fish and Game, Fishery Management Report No. 09-09, Anchorage.

Thomsen, S. E., S. Honnold, S. Schrof, and K. Spalinger. 2002. Kodiak Island lake Assessment/Limnology Project Laboratory Analysis Operational Plan. Alaska Department of Fish and Game, Division of Commercial Fisheries. Kodiak.

Witteveen, M. W. and J. C. Botz. 2004. Chignik Lakes scale pattern analysis, run apportionment, and sockeye salmon catch sampling results, 2003. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division. Regional Information Report 4K04-30. Kodiak.

FIGURES

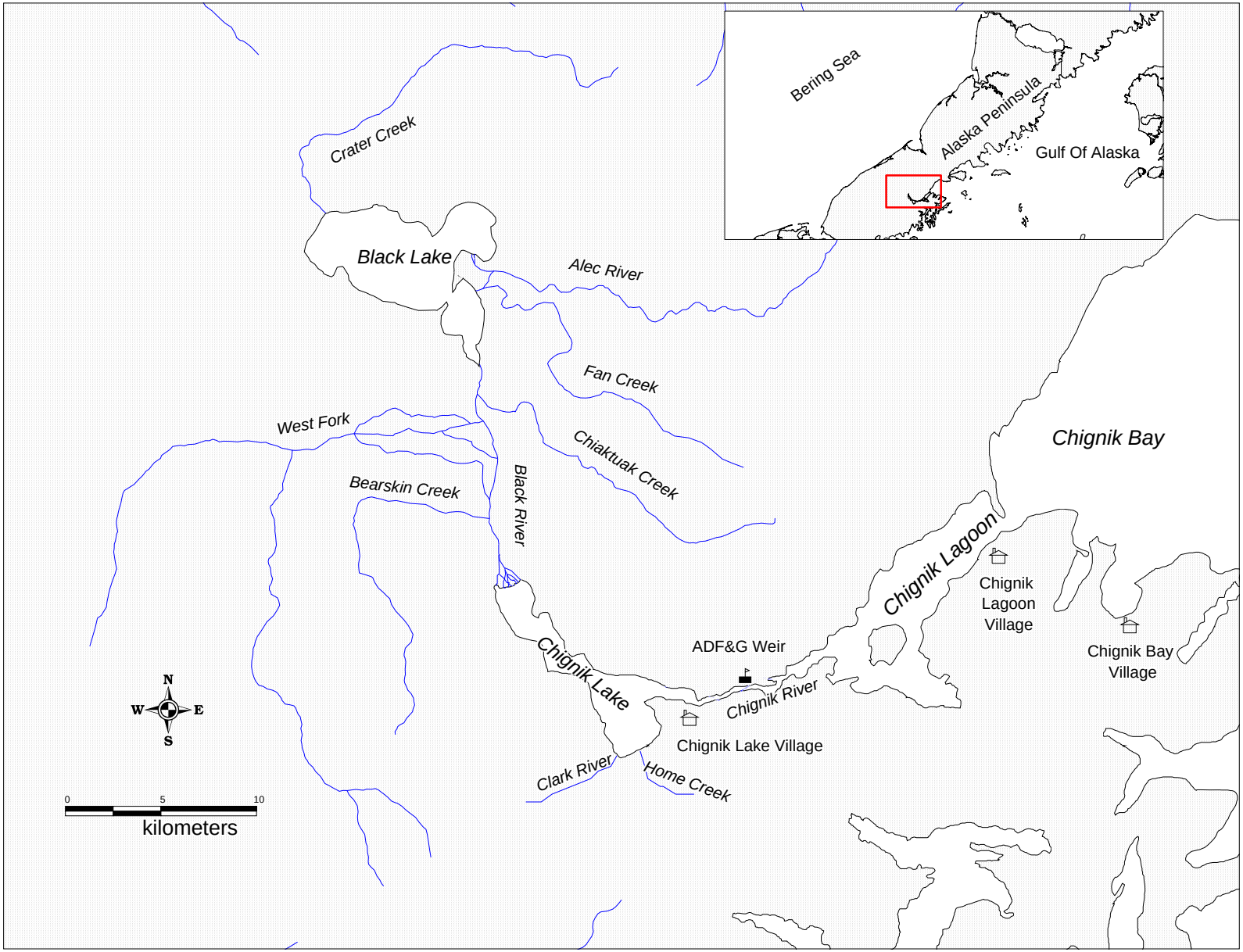

Figure 1.–Map of the Chignik River watershed.

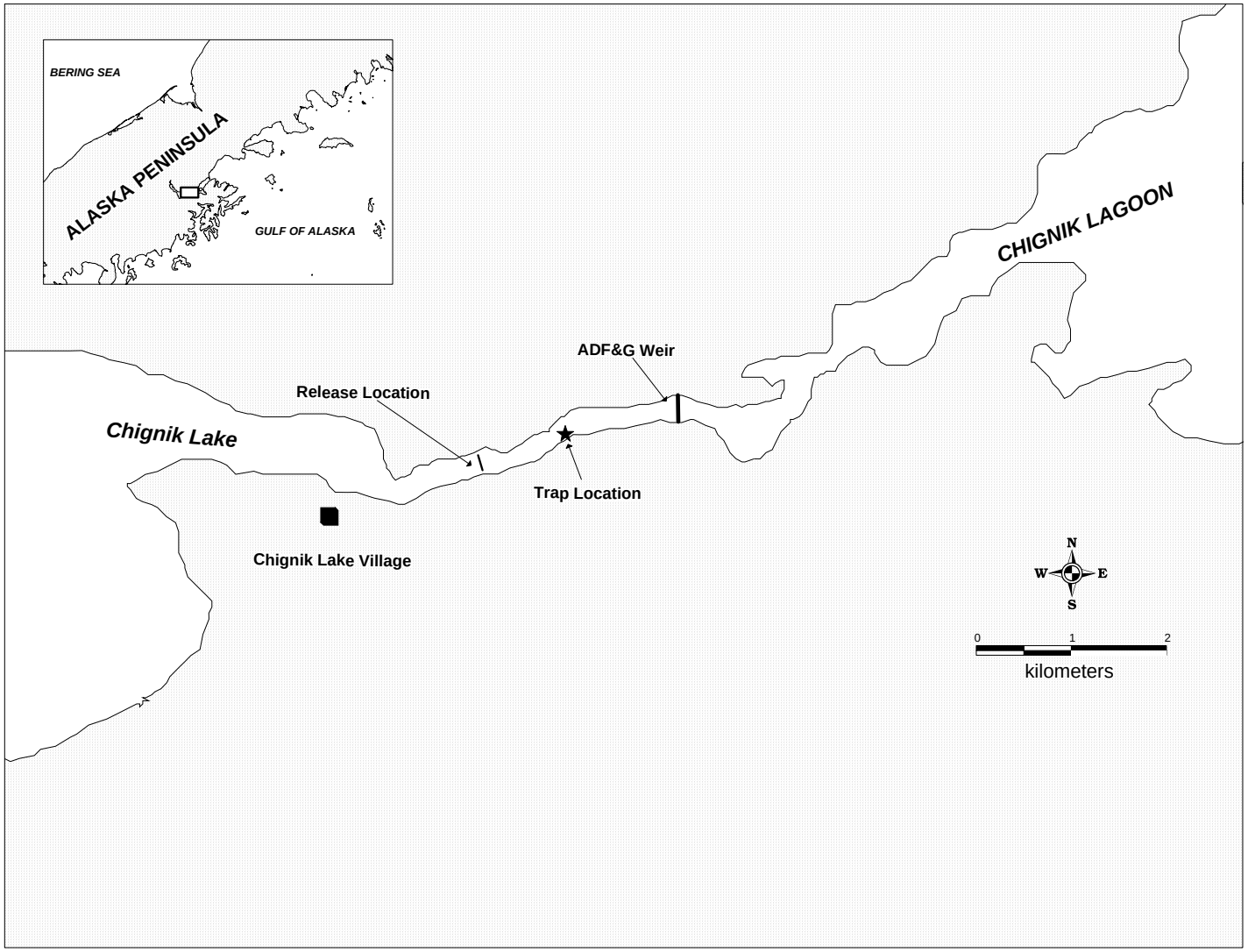

Figure 2.–Location of the traps and release site of marked fish on the Chignik River, Alaska.

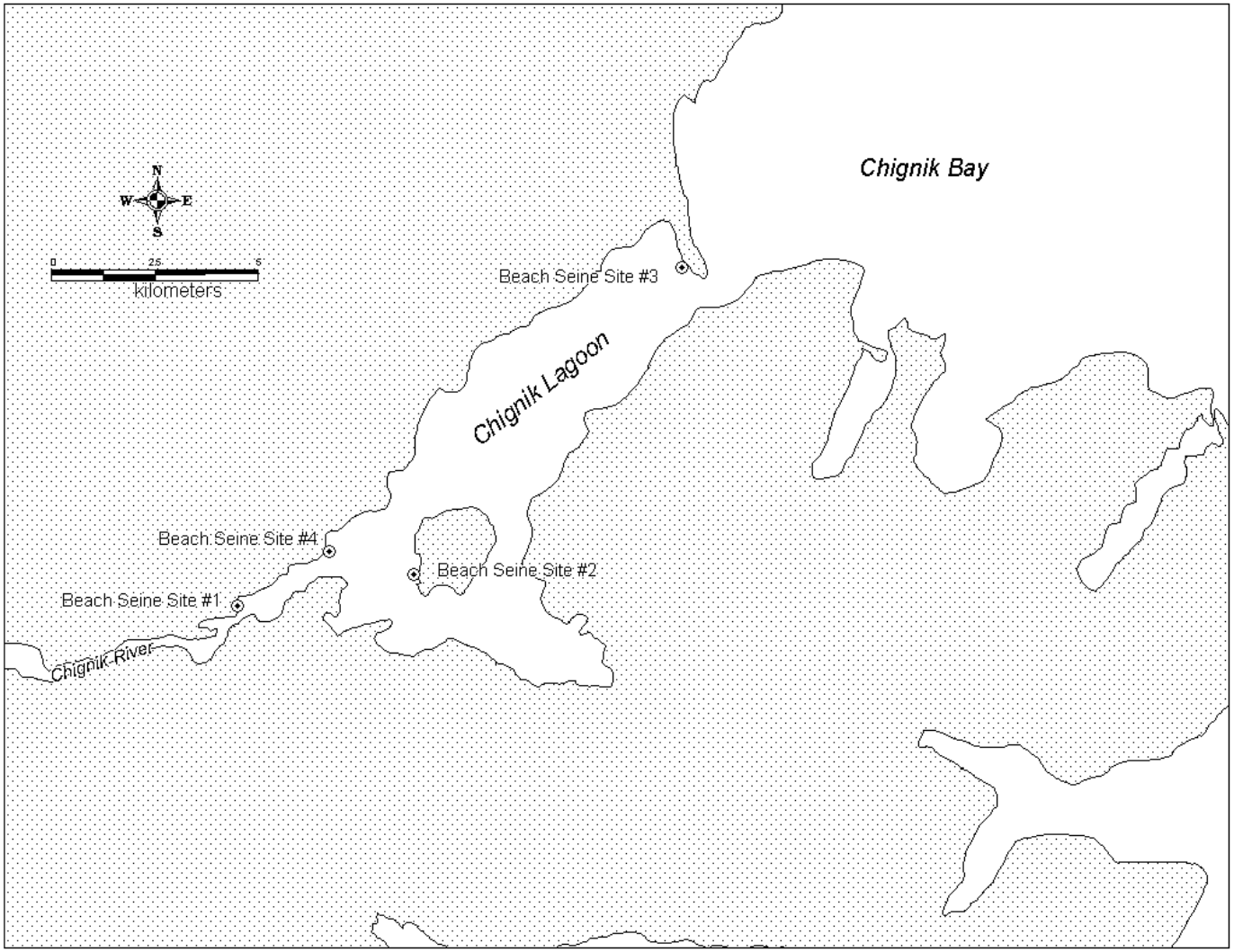

Figure 3.–Map of Chignik Lagoon showing the approximate locations of the beach seine sites.

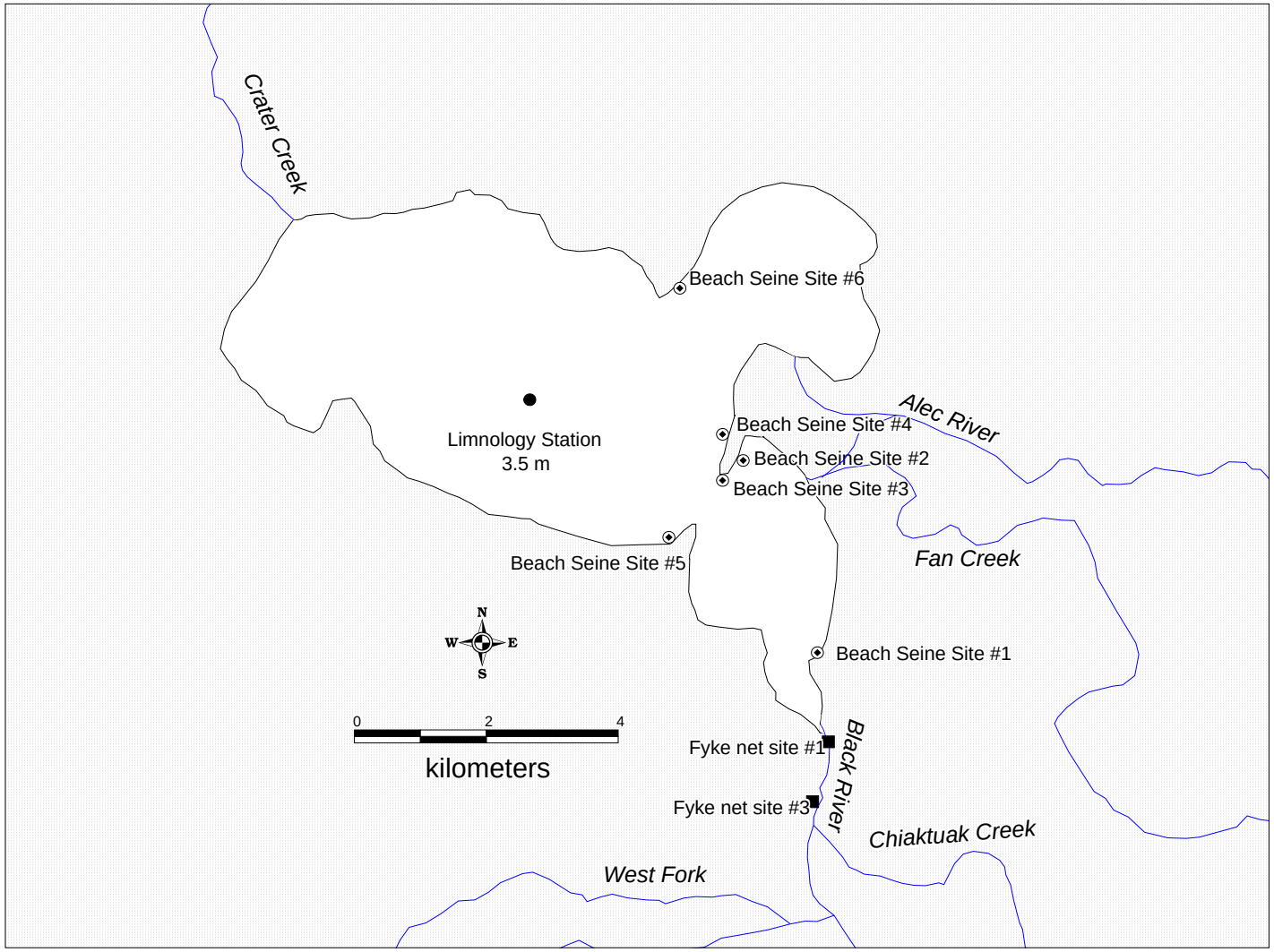

Figure 4.–Map of Black Lake showing the limnology station and the approximate locations of the beach seine sites.

Daily Smolt Catch Reporting Form

Trap: _____

Project:_____ Smolt date: _____ Page ____of ____

Time (military)	Sockeye counts					Other counts					Comments[3]
	Catch[1]	Examined for Marks[2]	Marked Recoveries	Trap Mortality	Sockeye Fry	Coho	Dolly V.	Stickleback	Smelt	Sculpin	
Daily Total:											

[1] Catch includes all trap mortalities, but not marked fish.

[2] This number should equal the catch column unless the catch weight method is used or some other circumstance prevents the examination of all captured smolt.

[3] Include weather changes, water level changes, counts of species not included in columns, and any other significant information.

Figure 5.–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 6.–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 <u>not</u> included in the number of sockeye column.

Figure 7.–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 released:_____

Number held for mark retention experiments:_____

Number of mortalities:_____

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

Personnel:

Figure 8.–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

Mark-Retention

Date	Time	Observer	# Correctly Identified	
			Marked	Unmarked
			5	5
			5	5
			5	5
			5	5
			5	5
			5	5
			5	5

Comments:

Figure 9.–Delayed mortality/mark retention form.

Daily Physical Data Observation Form

PROJECT _____

YEAR _____ LOCATION _____

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

Figure 10.–Daily physical condition observation form.

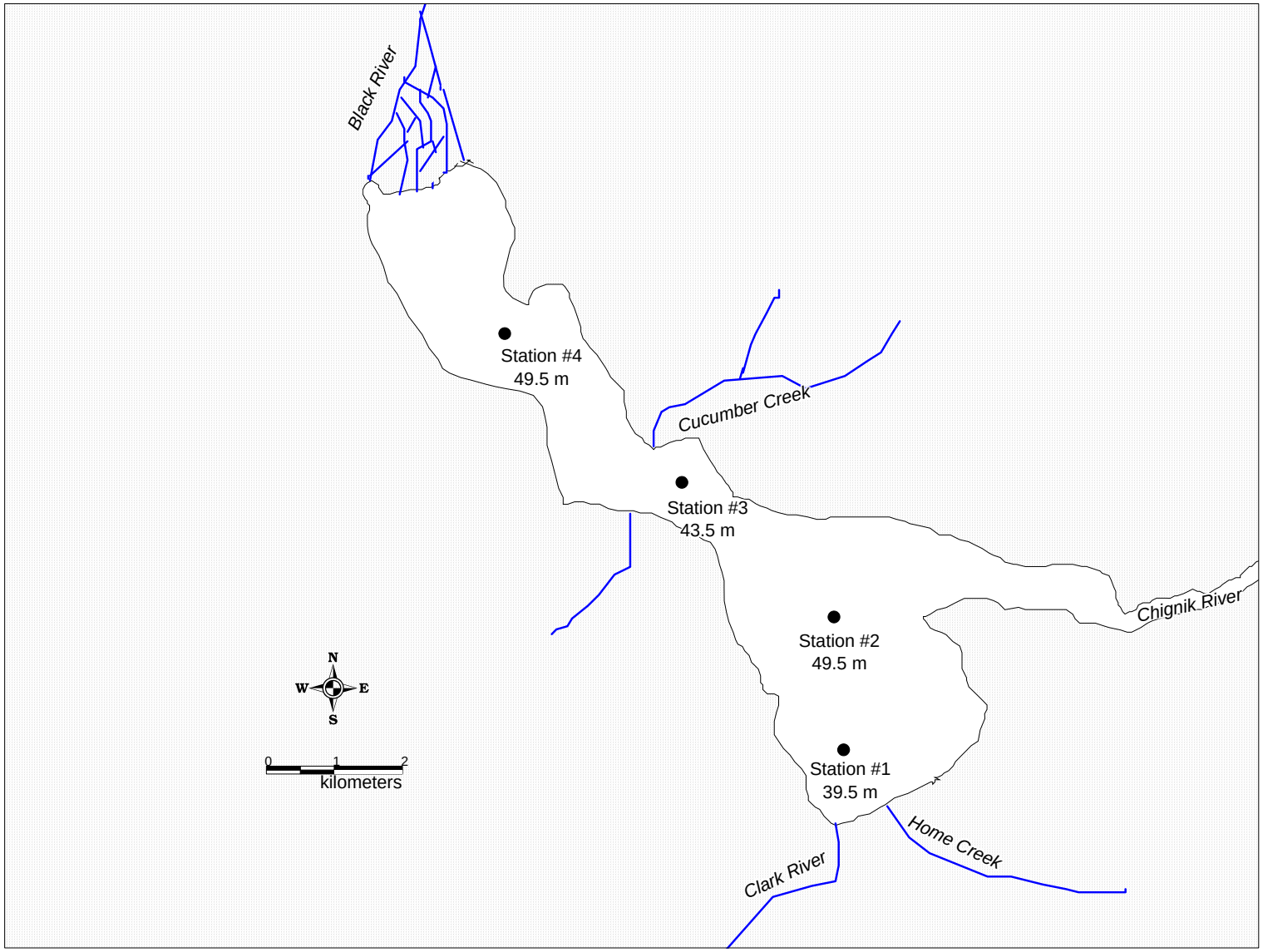

Figure 11.–Locations of the Chignik Lake limnology sampling stations.

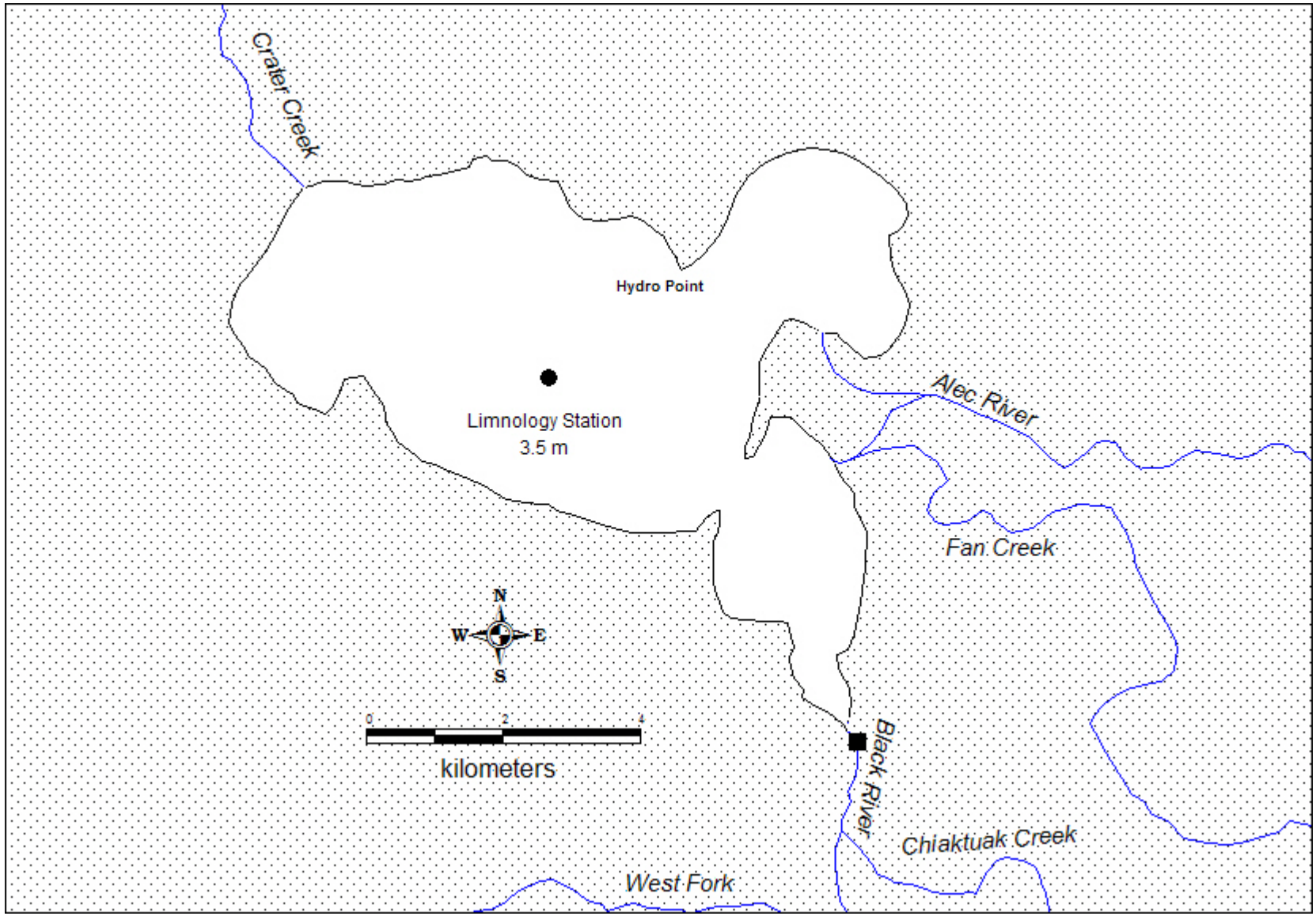

Figure 12.–Location of the Black Lake limnology sampling station.

Detailed Lake Survey Form Comm. Fish Division, 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 (Foot Candles) UP
Incidence			Incidence	
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:

DO Meter Light Meter

Water samples:

were / were not collected for lab analysis.

Depths of samples: (m), (m) and (m)

Samples were filtered in the lab.

Zooplankton:

One Vertical tow was taken at each station.

Station No. Bottom depth _____ (m)

Zooplankton tow depth _____ (m)

Station No. Bottom depth _____ (m)

Zooplankton tow depth _____ (m)

Net size was **20cm x 153u.**

Each tow was preserved separately in 10% Buffered Formalin.

Secchi disk:

disappeared: _____ (m)

reappeared: _____ (m)

Mean disk reading: (m)

Comments:

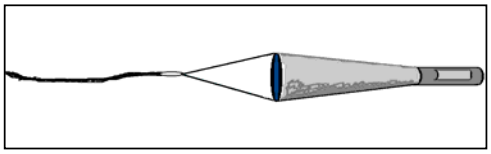

Figure 13.–Detailed Lake Survey form.

Chignik Limnology Beach Seine Data Form

#	Sockeye AWL #	Sockeye FL(mm)	Sockeye Wt (g)	Sockeye Cont. FL(mm)	Chinook FL(mm)	Coho FL(mm)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Comments:

Personnel: _____

Date: _____

Location: _____

Site: _____

Time Set: _____

Air Temp: _____

H20 Temp: _____

WX: _____

Total Catch	
Coho	
Dolly	
Flounder	
Chinook	
Pond Smelt	
Sculpin	
Sockeye > 45 mm	
Sockeye < 45 mm	
Stickleback	

Figure 14.–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 sampling station is of secondary importance: it can be constructed after the traps are installed and monitoring has been initiated.

SCREW TRAP ASSEMBLY

Three rotary screw traps were stored near the lake outlet 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 large live box without a skimming wheel. The other small trap does have 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 rotary screw 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, eyes, 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.

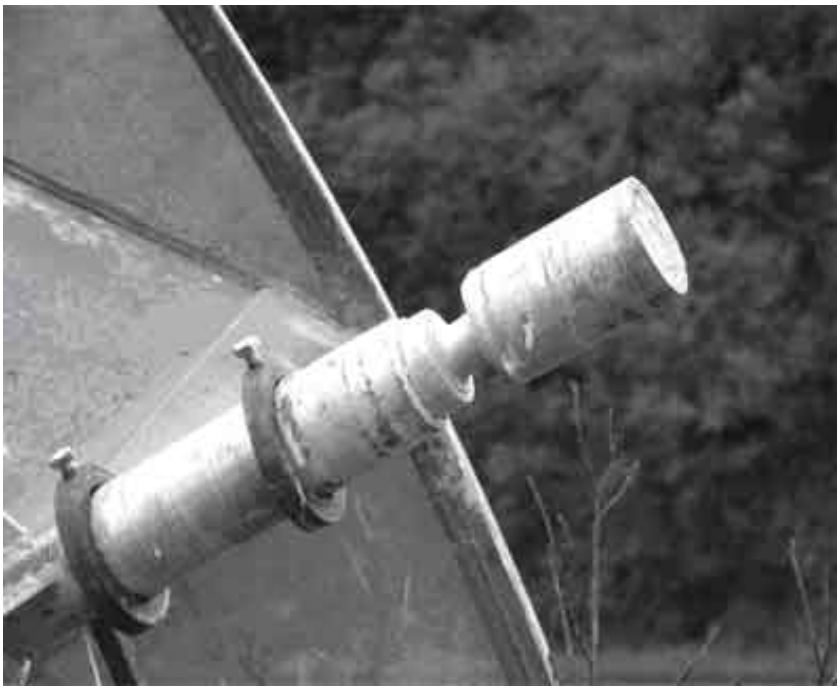

Figure 5. The photo illustrates the trap cone spindle and O-rings. Excessive wear on the spindle occurred due to improper placement of the bipod hoist structure. Care should be taken so that the bipod hoist structure does not contact the rotating spindle.

-continued-

Figure 6. The picture shows the entrance to the live box and the rear spindle mount and plastic bushing.

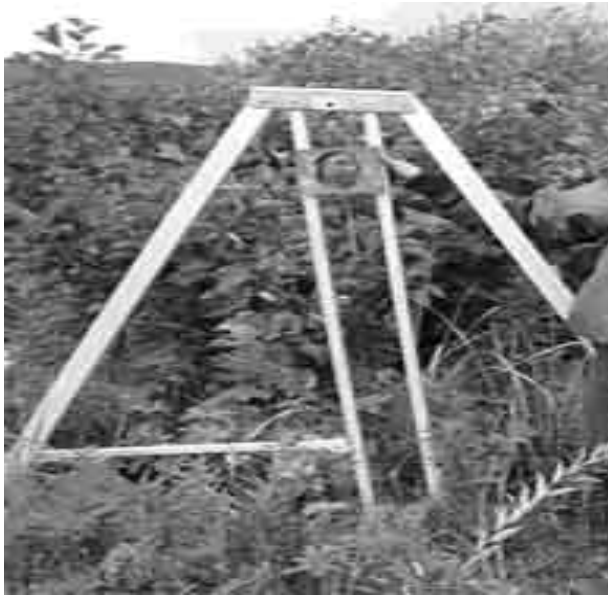

Figure 7. This photo illustrates the bipod hoist structure with the sliding plastic spindle bushing.

-continued-

The first trap to be assembled is the small trap that has been modified for use as a live box. 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. 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 screw traps will be constructed in the same fashion, except that they will be fitted with the rotary screw drums.

The live box – pontoon apparatus will be pushed out into the stream so that it is completely afloat, and the rotary screw will be rolled down to the edge of the river and positioned with the cone entrance towards the water. The pontoons will be pulled ashore so that the cone exit falls near the live box opening. The front structural beam will be attached to the pontoons with a ring sleeve. The rotary screw support beam will be affixed to the front spindle of the rotary screw using the O-rings already in place on the spindle. The rear spindle will be attached to the live box end in a similar manner.

The bipod hoist structure will then be bolted to the pontoons. 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.

TRAP PLACEMENT

Once the live box and traps are assembled the anchors and lines will be prepared upstream of the trapping site. Two anchor lines are located in the bunkhouse and are labeled for the trap they were used with in the 2009 season. The alders to be used for anchors can be easily identified by the orange flagging. The anchor line labeled for use with the small trap will be tied with a bowline to the flagged alder that is furthest downstream. The line labeled for use with the large trap will be anchored in series to two flagged alders immediately upstream.

-continued-

A bowline will be tied to the lower alder leaving a long tag end so that a second bowline can be tied to the upper alder. A third anchor line will have to be sized and anchored for use with the large trap. The anchor lines will then be uncoiled and the terminal ends brought to the trapping site ready to tie to the traps.

The small trap and the legs will be transported to the trapping site first and the small trap platform will be anchored to shore by the designated trapping site. The live box will then be towed to the trapping site. A tow harness equipped with carabiners is located in the same tote as the anchor lines. Using this harness the trap will be clipped to the skiff and untied from the anchor willow. The small trap will be towed downstream to the trapping site. The skiff will be parked immediately upstream of the trapping site and the small trap will be unclipped from the tow harness and clipped to the downstream anchor line via the pulley harness (Figure 8). Now the trap legs will be attached to the port side pintle ring hitches (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. It might be necessary at this point to gather some large rock to weigh down the trap legs to prevent any large movements. The live box platform can then be attached to the stern of the small trap, anchored to shore, and have its legs secured between the shore and its pontoons.

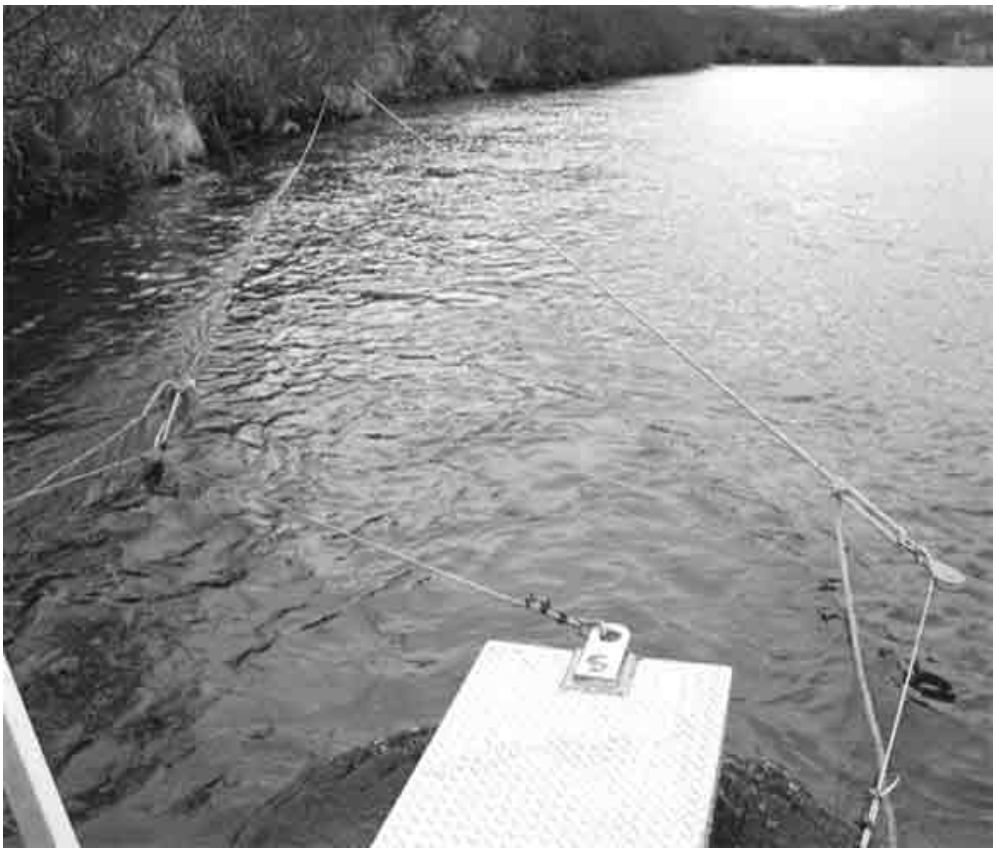

Figure 8. Pulley harnesses attached to anchor lines.

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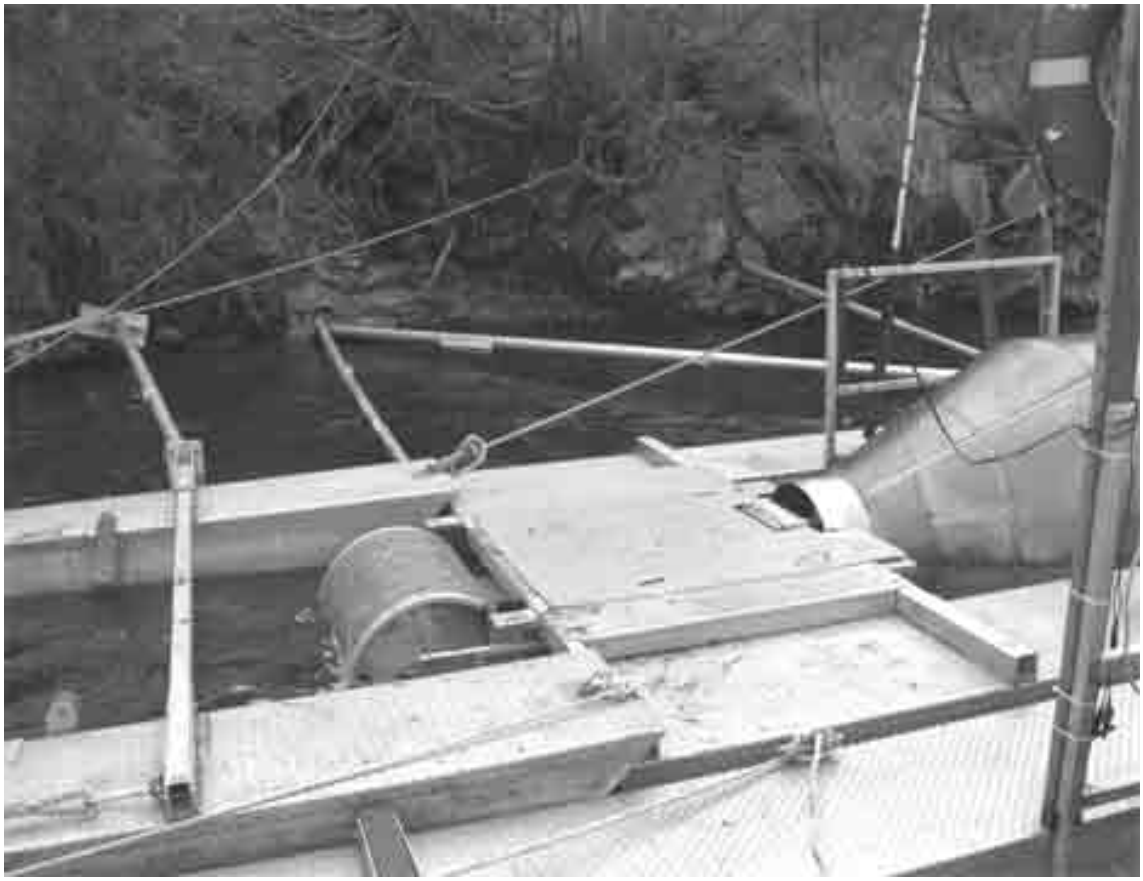

Figure 9. This photo illustrates the position of the trap legs on shore and how the pontoons of the small trap and live box work area align.

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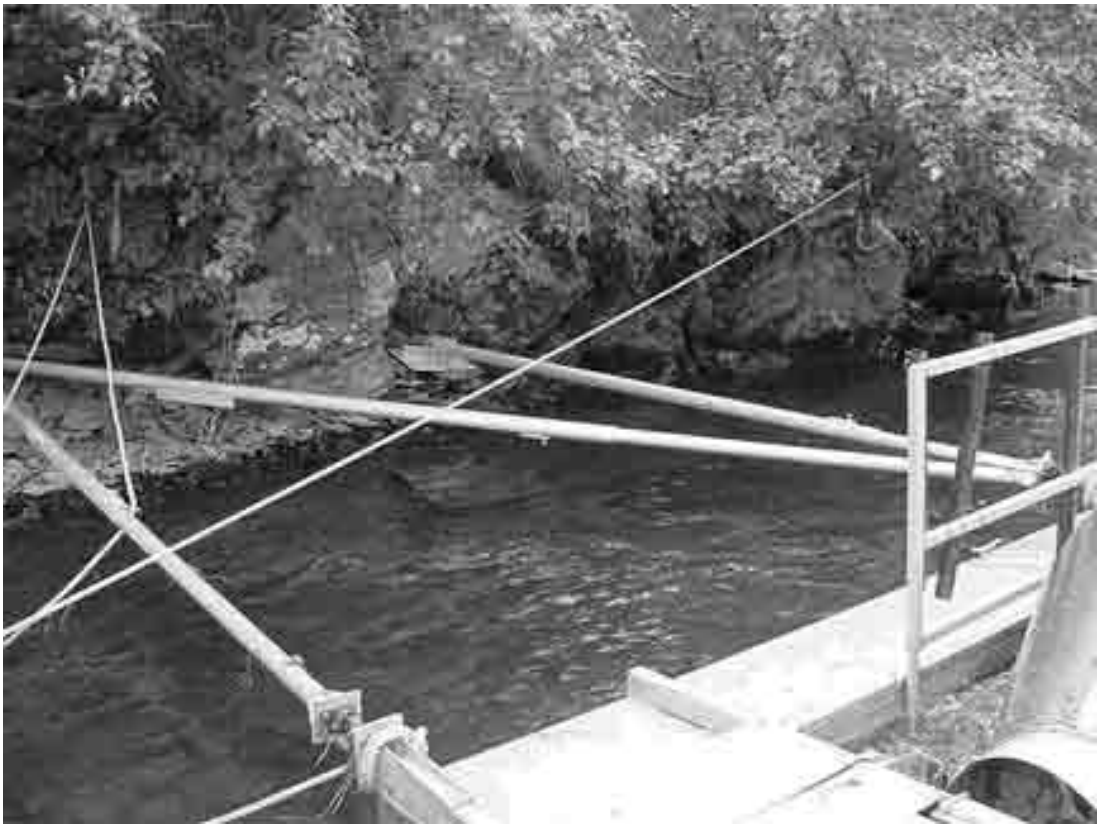

Figure 10. The photo illustrates the trap leg system, anchor lines, and pintle ring sleeves.

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 tie-in point. Upon completion of setting the small trap and legs, the large trap can be placed. The large trap will be towed down well below the small trap in order to turn around and tow it back upstream. At this point one person will ride on the trap while the other person will operate the skiff. The trap will be towed upstream so that it slides slowly up against the side of the small trap and the person riding on the large trap can clip the anchor line into the trap pulley harness. 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 entrance into both rotary screws are in parallel alignment (Figures 11, 12 and 15). This may be accomplished by raising the trap out of the water and using a come-along to winch in the excess anchor line at its point of attachment to shore.

-continued-

Figure 11. The assembled large trap fishing. Note that the bipod hoist is leaning in a direction that will allow the front structural beam to sandwich and apply pressure to the portion of the plastic bushing that extends outside of the metal spindle mount between it and an O-ring. This prevents excessive wear and friction of the spindle against the O-rings.

-continued-

Figure 12. The small trap fishing. Note the position of the plastic bushing.

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FLOATING WEATHER PORT PLATFORM

The floating weatherport platform is composed of the floats and weatherport platform (Figure 13 and 14). The float frame consists of nine dock floats and three nose cones that remain assembled between field seasons.

A 6-8 foot section of crabline will be threaded through the eyehole and tied with a double fisherman's knot to form a permanent loop at the front of each nose cone and an anchor line will be threaded through these loops to secure the pontoons to alders on the shore (Figure 13).

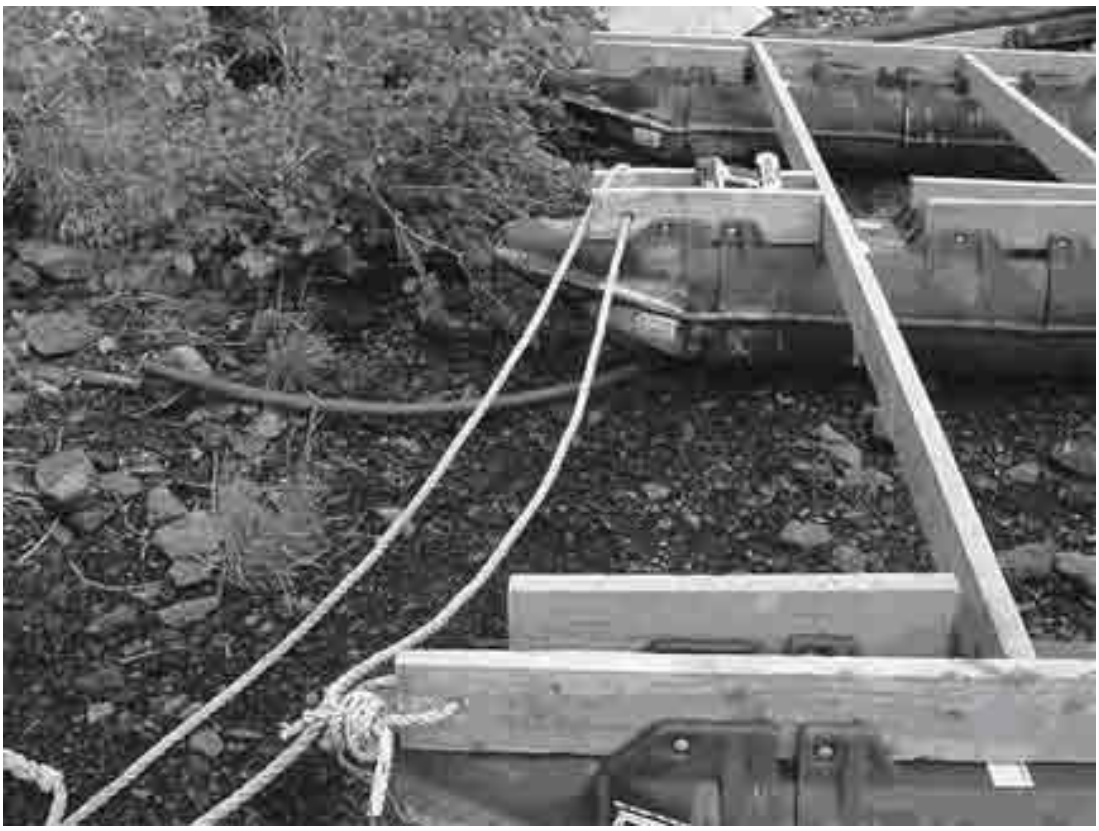

Figure 13. The photo illustrates the nose cones and the permanent loop tied in the frame for anchoring the weather port to the trap. The holes used to connect the gangplank on the middle nose cone are visible from this angle.

-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 curve 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. It will be necessary to weight the tensioning cord with one's foot to gain enough force to make the fabric fit snuggly on the poles. 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. The flaps at the bottom of the fabric will 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 cots, chairs, table, sandbag and the kerosene heater. All items should be placed toward the stern end to ensure easier towing. The weatherport will be untied from the anchor line and pushed out into the river. It will be walked down to the bulkhead and tied it off to a cleat. The weatherport will then be clipped to the tow harness at the permanent loops on both starboard and port nose cones 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 weatherport will then be pulled upstream by hand behind the live box work area and the tow harness can be unclipped from the skiff and tied off to a cleat on the small trap (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 weatherport platform and anchored to shore (Figure 16). The tension on these anchor lines will constantly be affected by changes in streamflow and wind therefore requiring some manipulation over the course of the season. 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.

-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 bipod hoist structure of each trap 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.

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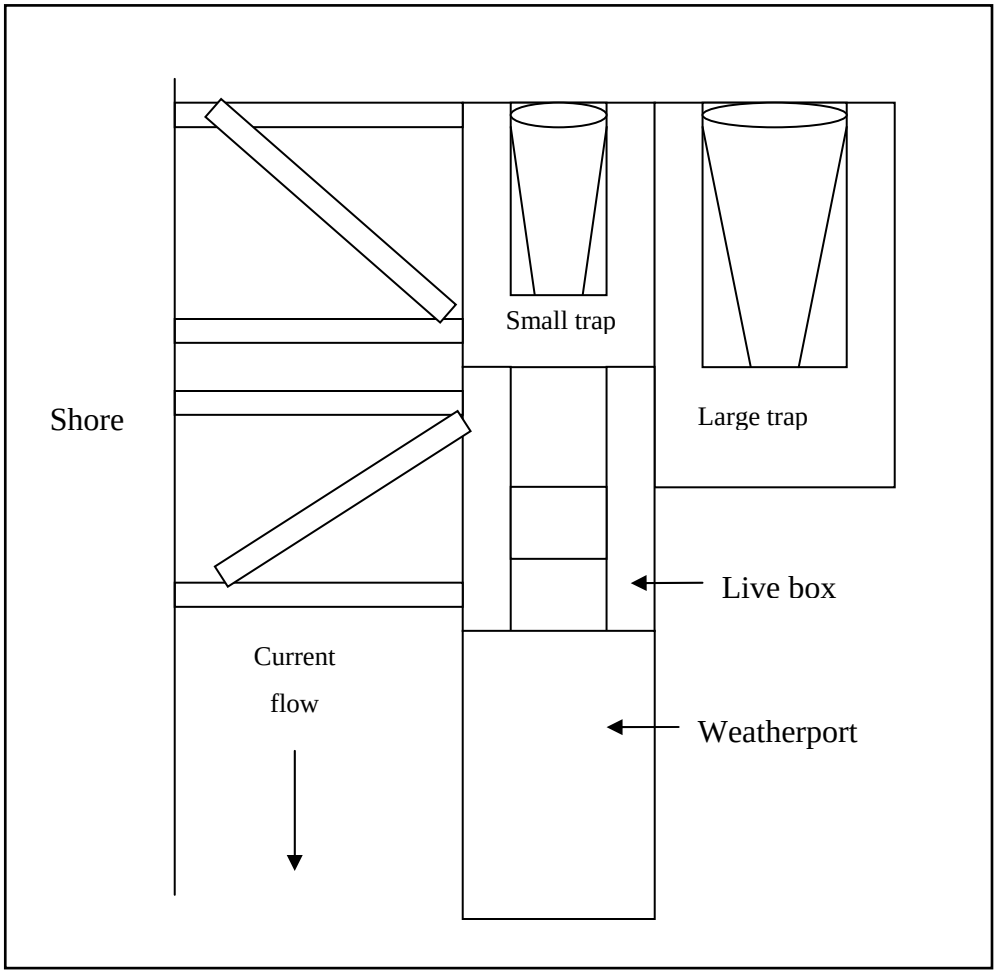

Figure 16. The diagram shows the correct orientation of both traps and the weatherport.

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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 weatherport tow harness to front of weather port. The tow harness consists of ~20-25 feet of crabline that is threaded through the eyeholes in the starboard and port weatherport frame. A caribiner is clipped to the center of the line for attachment to the smolt skiff tow harness. The smolt skiff tow harness consists of ~15 feet of crabline tied to the starboard and port u-bolts on the stern of the skiff. A caribiner is clipped in the center of the crabline to ensure even towing. Attach weather port tow harness to tow harness on stern of moored (starboard rear live box cleat) smolt skiff.
- Loosen and untie weatherport anchor and safety lines and place them in weatherport. Allow weather port to drift safely behind smolt skiff, paying attention to any possible hang ups. Transport weatherport downstream to ADF&G weir site under slow speed.
- 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 moored (starboard large trap cleat) smolt skiff.
- Attach tow harness to bow crossbar of live box. Attach live box tow harness to tow harness on stern of smolt skiff.
- 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

- Remove small trap legs (3) from pintle rings with 3/4” ratchet. The two traps will swing into shore gently and the anchor lines will become slack. Place trap legs in the moored (starboard large trap cleat) smolt skiff.
- 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 w/approx 5-10 m of line for proper towing.

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- 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.

4) SMALL TRAP

- Procedures for small trap transport mirror large trap transport.
- Motor upstream to small trap anchor line and secure skiff to shore. Untie small trap anchor line from alder anchors and attach it to tow harness on smolt skiff w/approx 5-10 m of line for proper towing.
- Again, one person will be positioned on the small trap. When the skiff operator has the tow line under tension and ready for transport the person on small trap will untie safety lines from trap site alders. The skiff operator will take proper precautions to ensure safe towing speeds/conditions while person is aboard trap during transport.
- Transport small trap upstream to F.R.I site and secure to shore near large trap.

5) TRAP DISASSEMBLY AT FRI SITE

- Tools needed for disassembly include: pry bar, sledge hammer, smolt tool box, 9/16” ratchet/wrench (2 each), 3/4” ratchet/wrench (2 each), 1 large tote for anchor lines, 1 medium tote for trap equipment, 3 labeled 1-gallon zip-loc bags, permanent marker, rite-in-the-rain notebook, pencil, and duct tape. Labels on the zip-locs should consist of trap (large, small, and rear live box) and year.
- Inspect all trap equipment during disassembly process for damage, separate, and note any parts that need replacement.
- Disassemble each trap individually and store nuts and bolts in pre-labeled 1-gallon zip-loc bags. Anchor lines, 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 storing in smolt cave.
- Trap legs, pontoons, screw traps, trap hand rails, bipod hoists, rotary screw support beams, and live boxes will be stored and tied to near by alders 10 m from the rivers edge at the FRI site over the winter.

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.

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- The weatherport tent frame, fabric, door, and poles will be disassembled from the weatherport 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.
- Weatherport platform/pontoons will be left intact and secured to the upper dock. The platform deck should be weatherized with stain before winter storage if needed.
- The weir crew will secure the weatherport platform on the bulkhead at the end of the season. Instructions should be communicated to the weir crew to secure the weatherport platform
- 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.
- At the end of the season the smolt skiff will be prepped for winter storage on the bulkhead, which will be accomplished by the weir crew. 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 years season.

APPENDIX B. JUVENILE SALMON IDENTIFICATION

Appendix B1.-Juvenile salmon identification key.

Key to Field Identification of Anadromous Juvenile Salmonids in the Pacific Northwest

By

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ABSTRACT

A key is presented with descriptive illustrations to help in field identification of live, juvenile salmonids in fresh waters of the Pacific Northwest. Other juvenile fish that may be mistakenly identified as salmonids are included.

INTRODUCTION

Species identification of live, anadromous juvenile salmonids is frequently a problem to the field biologist. The purpose of this key is to list and illustrate the external characteristics which will expedite field identification of juvenile salmonids in the Pacific Northwest.

Five species of Pacific salmon (pink, chum, sockeye, chinook, and coho); four species of trout (cutthroat, brown, Dolly Varden, and rainbow or steelhead); and other juvenile and adult fish [1] that may be mistaken for salmon or trout in fresh water are described in this key.

USE OF KEY

The characteristics for identification are listed in a series of alternative statements, some of which are illustrated. To use the key, examine the first statement; if applicable, proceed to the next and continue to successive statements until the species is identified. If a statement is not applicable, pass to the alternative characteristics indicated by numbers in parentheses (numbers on the drawings correspond to numbers of statements in the key). Continue in this manner until the specimen is identified. Some external characteristics are positive separating features (marked with asterisk), whereas others are not. Therefore, two or more statements should be considered before final rejection. If a precise identification cannot be made using the external characteristics —and the fish can be sacrificed, a positive identification can usually be made from internal features (marked with double asterisks). A bibliography of keys that utilize more descriptive internal characteristics is included in this paper.

[1] Especially adult smelt, family Osmeridae.

KEY

1. (47) Adipose fin and scales present. (Fig. 1)
2. (48) Fleshy appendage at base of pelvic fins present.
3. (49) Mouth large, reaching at least to center of eye.

Family Salmonidae

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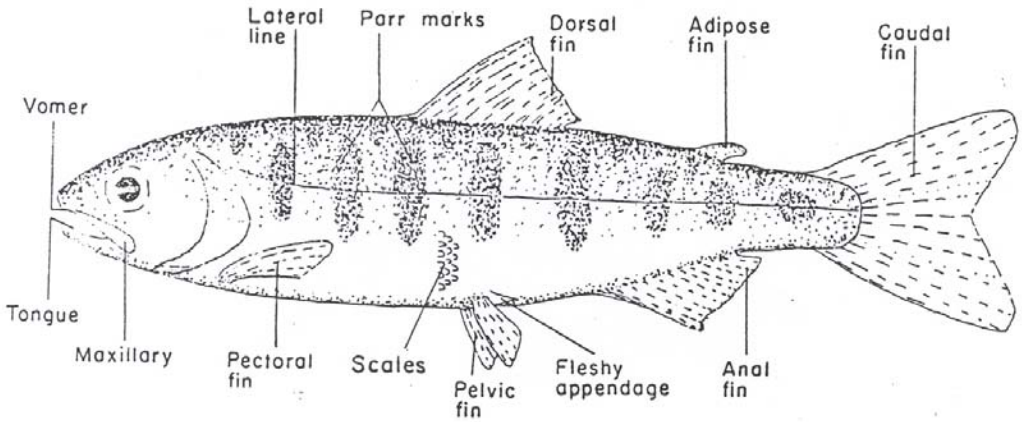

Figure 1.—A hypothetical salmonid showing external characteristics.

4. (17) Anal fin higher than long, with 8 to 12 developed rays (Fig. 2A)
5. (52) *Teeth on head and shaft of vomer. (Fig. 3A)

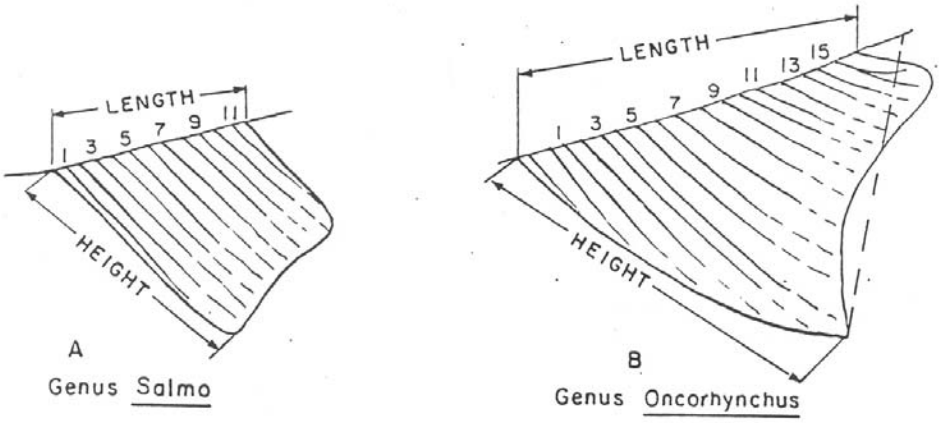

Figure 2.—Anal fins: (A) Trout, genus *Salmo;* (B) Pacific salmon, genus *Oncorhynchus.* The two drawings show differences in structure and fin ray count. (Note that the length of the anal fin is its overall basal length, and its height is that distance from the origin of the fin to the tip of the anterior lobe. In counting fin rays, include only those which originate from the base and terminate at the outer margin of the fin or are half as long as [or greater than] the longest ray.)

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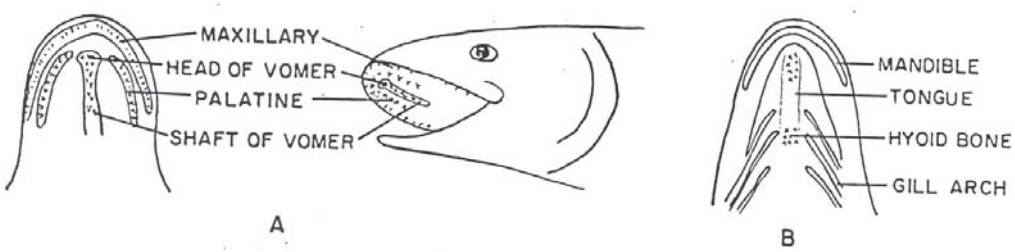
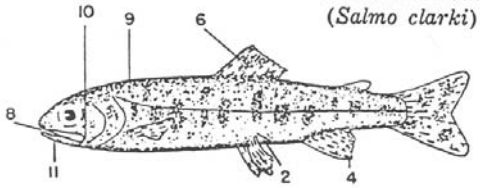


Figure 3.—Location of dentition in (A) the roof and (B) the floor of the mouth of salmonid fishes. (Presence or absence of teeth on the vomer or tongue may be determined by use of the little finger or a blunt instrument. The small hyoid teeth at the base of the tongue are located between the gill arches of the lower jaw and are difficult to find.)

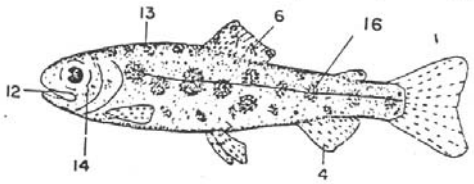
6. (18) Dorsal fin with large dark spots.
Trout
Genus *Salmo*

7. (53) Adipose fin not orange; no row of pale round spots along lateral line.
8. (12) *Small hyoid teeth at base of tongue. (Fig. 3B)
9. (13) Not more than five parr marks on mid-dorsal ahead of dorsal fin.
10. (14) Maxillary reaching past posterior margin of eye.
11. (15) Red or yellowish hyoid mark under lower jaw. Tail usually black spotted.
Cutthroat trout
(*Salmo clarki*)



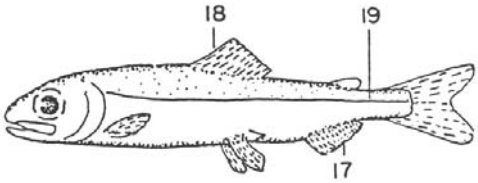
12. (8) *No teeth at base of tongue.
13. (9) Five to 10 parr marks along mid-dorsal ridge ahead of dorsal fin.
14. (10) Maxillary short, not reaching past posterior margin of eye.
15. (11) No hyoid mark under lower jaw. Few or no spots on tail.

16. (20) Parr marks almost round.
Rainbow or steelhead trout
(*Salmo gairdneri*)



17. (4) Anal fin longer than high, with 13 or more developed rays. (Fig. 2B)
18. (6) Dorsal fin without large dark spots, may be black tipped.
Pacific salmon
Genus *Oncorhynchus*

19. (20) No parr marks. Fry leave fresh water while small—approximately 1.75 inches (45 mm) long.
Pink salmon
(*O. gorbuscha*)



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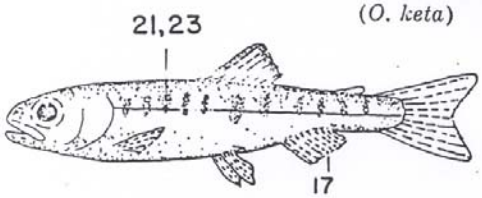
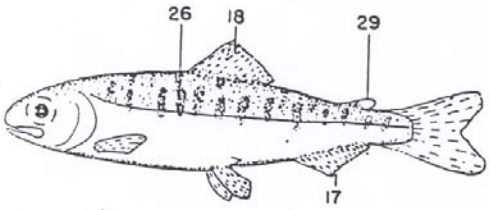
20. (16) Parr marks present as vertical bars or oval spots.
21. (30) Parr marks short, extending little, if any, below lateral line.
22. (25) Gill rakers on first arch, 19 to 26. ** Pyloric caeca, 140 to 186.
23. (26) Parr marks faint. Sides below lateral line iridescent green.
24. (27) Small when migrating from fresh water, approximately 1.5 inches (40 mm) long.

Chum salmon
(*O. keta*)



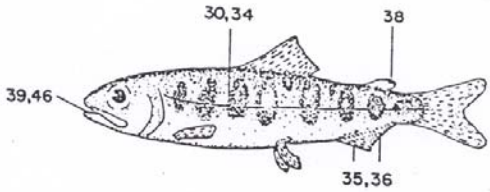
25. (22) Gill rakers on first arch, 30 to 40. **Pyloric caeca 60 to 115.
26. (23) Parr marks usually sharply defined. Sides below lateral line silvery, not iridescent green.
27. (24) Relatively large when migrating from fresh water, approximately 3 to 5 inches (80 to 126 mm) long.
28. (31) Gill rakers long and slender, more than 29 on first arch.
29. (32) Adipose fin clear, not pigmented.

Sockeye salmon
(*O. nerka*)



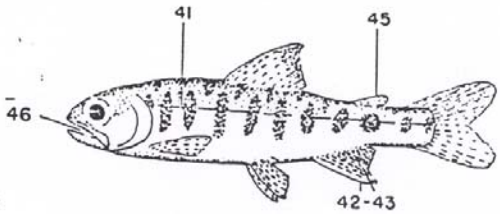
30. (21) Parr marks large, vertical bars centered by lateral line.
31. (28) **Gill rakers short and thick, fewer than 29 on first arch.
32. (29) Adipose fin at least partially pigmented.
33. (40) **Plyloric caeca more than 90.
34. (41) Parr marks broader than interspaces.
35. (42) Anterior rays of anal fin not distinctly longer than rest, not white edged.
36. (43) Anal fin not pigmented.
37. (44) Black spots, when present, on both lobes of caudal fin.
38. (45) Adipose fin not completely mottled, clear area at anterior base of fin.
39. (46) Black gums along base of lower teeth.

Chinook salmon
(*O. tshawytscha*)



40. (33) **Plyloric caeca less than 80.
41. (34) Parr marks narrower than interspaces.
42. (35) Anterior rays of anal fin elongated; when depressed they extend to base of last ray. (Fig. 2B)
43. (36) Anal fin pigmented between rays, resulting in black banding.
44. (37) Black spots, when present, on upper lobe of caudal.
45. (38) Adipose fin completely pigmented.
46. (36) Mouth gray to white.

Coho salmon
(*O. kisutch*)



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47. (1) Adipose fin not present; scales present or lacking.
Not Salmonidae

48. (2) No fleshy appendage at base of pelvic fins.
Smelts
Family Osmeridae

49. (3) Mouth small, not reaching center of eye; teeth weak or absent.

50. (51) Depressed dorsal fin, shorter than head.
Whitefishes
Genus *Coregonus*

51. (50) Depressed dorsal fin, longer than head.
Arctic grayling
(*Thymallus arcticus*)

52. (5) **Teeth on head of vomer only.
Chars
Genus *Salvelinus*
Dolly Varden (*S. malma*)

53. (7) Adipose fin orange; row of distinct pale round spots along lateral line.
Brown trout
(*Salmo trutta*)

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Appendix B2.-Photos of fishes present in the Chignik watershed.

Figure 1. Juvenile Sockeye salmon.

Figure 2. Juvenile coho salmon.

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Figure 3. Stickleback.

Figure 4. Dolly Varden.

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Figure 5. Pygmy whitefish.

Figure 6. Coast range sculpin.

APPENDIX C. SMOLT AGE-WEIGHT-LENGTH (AWL) SAMPLING MATERIALS AND METHODS

Annually, outmigrating salmon smolt are sampled for age (scales), weight, and length, by field crews throughout the Westward Region. These data are essential for sound management of the State's salmon resources.

To be useful, data must be recorded on the age, weight, length (AWL) optical scanning (opscan) forms neatly and accurately. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling juvenile salmon for age, weight, and length.

Complete each section on the left side of the AWL form using a No. 2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the AWL forms, may not recognize partially filled circles. Be sure to transfer the litho code, located in the left margin on the front side of the AWL form to the back side of the form by darkening the appropriate circles (see Appendix C3.).

Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the AWL form. Stray marks and scuffed AWL forms can severely hamper scanning. The AWL forms should be treated carefully; the scanner in the Kodiak office cannot read damaged forms. The forms should not be stapled, bent, paper-clipped or folded. Specific instructions for completing AWL forms are listed in Appendix C2 and an example of an AWL form filled out for smolt sampled can be found in Appendix C3.

All juvenile salmon AWL data will be recorded in a field notebook dedicated to smolt sampling. These data will then be transferred from the field notebook to the AWL forms. Each species will have its own AWL sample number series that runs sequentially throughout the season. Up to 40 individual fish per smolt day may be included in one AWL sample. If more than 40 fish are sampled in a single smolt day, then multiple AWL numbers will be used on that day. For example, if 70 sockeye salmon smolt are sampled in a single day (day 1), the AWL numbers will be AWL #001 (fish 1-40; 8 slides) and AWL #002 (fish 1-30; 6 slides). The next day will start with AWL #003. Each day’s sample will start with a new AWL number.

Smolt will be sampled as soon as possible after they are captured. The smolt will be transported in clean, 5-gallon gallon buckets to the sampling area. An additional bucket of water will be used as a recovery bucket. Buckets containing smolt will be filled with fresh, clean water and aerated. The buckets will be covered when possible to avoid stress on the fish.

Tricaine Methanesulfonate (MS-222) will be used to anesthetize the smolt; latex gloves will be worn to prevent direct exposure to the anesthetic. This chemical will be administered by experienced personnel. A small amount (approximately 1 g) of MS-222 and a small amount of baking soda will be dissolved in approximately 2 L of cold water. The amount of anesthetic used will vary depending on the water temperature, freshness of the chemical, and size of the smolt. A few smolt will be placed in the anesthetic solution until subdued to a point where they can no longer flex their axial musculature but can still ventilate their gills. The concentration of the solution should be such that it immobilizes the fish in 2-3 minutes.

-continued-

After the fish are anesthetized, it is important to sample them quickly and place them in a recovery container to prevent mortality. No more than 80 smolt will be anesthetized with one batch of solution.

After the smolts have been immobilized, excess water will be gently removed from the fish using a paper towel or a wet sponge as a blotter. Place the fish on its right side to sample the left side. Measure smolt length, to the nearest mm, from tip-of-snout to tail fork (Appendix C4). Record length by blackening the appropriate column circles on the front side of the AWL form. When collecting length data, take care to ensure that each length corresponds to the appropriate scale smear mounted on the slide, as length-at-age is evaluated for each sample. Weigh each smolt to the nearest 0.1 g, and record the weight by blackening the appropriate column circles on the back side of the AWL form.

On salmon species, the preferred scale is located where a straight line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin crosses the second scale row dorsal to the lateral line. In smolt, the area directly around this scale is considered the preferred area (Appendix C4). If scales are not present in this area then scales should be taken from the secondary location, which is the same area on the right side of the fish. A scalpel will be used to remove 5-10 scales from the preferred area. These scales will be mounted on a glass slide using a a probe to position the scales. Scales from five fish will be mounted on each slide. The scalpel will be wiped clean of scales and slime between each fish. A diagram of a slide with scales mounted correctly is located in Appendix C5.

The left portion of each slide will be labeled with AWL number, sample location, species, date, and inclusive fish numbers. A diagram of a properly labeled slide is located in Appendix C5. After sampling, fish will be held in a recovery container until they are swimming normally and then released downstream of the trapping location. When the slides are completed, return them to the box in order by AWL # and fish #. Label the slide box on top with the information listed in Appendix C5.

Smolt length and weight will be recorded on AWL forms (Appendix C4.). Using a No. 2 pencil, complete each section of the left side of the AWL form and darken the corresponding blocks.

Fill out each of the following:

Description

Record the following: species, location, year and samplers names (e.g., sockeye smolt, Frazer fish pass, 2003, Sagalkin, Schrof).

Card

The AWL forms and corresponding slides are numbered sequentially by date throughout the season starting with 001. A new, consecutively numbered AWL form is used each day even if the previous AWL form is not full. There may be a minimum of one fish and a maximum of 40 fish (8 slides) per AWL form.

Species

Refer to the reverse side of the AWL form for the correct one digit code (e.g., sockeye = 2).

Day, Month, Year

Use appropriate digits for the date the fish are sampled.

District

List the district in which the fish were sampled. For the Chignik watershed, the district is 271.

Subdistrict (Section)

List the subdistrict in which the fish were sampled. For the Chignik watershed, the subdistrict is 10.

Stream

List the stream in which the fish were sampled. For the Chignik watershed, the stream is 101.

Location

The Chignik River smolt trap is 235.

Period

List the period (sample week) in which the fish were sampled (Appendix C6.).

Project and Gear

Refer to the reverse side of the AWL form for the correct code. Smolt samples collected in the traps will have a project code of 8 and a gear code of 00.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the AWL form for the correct code (e.g., tip of snout to tail fork = 1). Refer to Appendix C1.

-continued-

Number of scales per fish

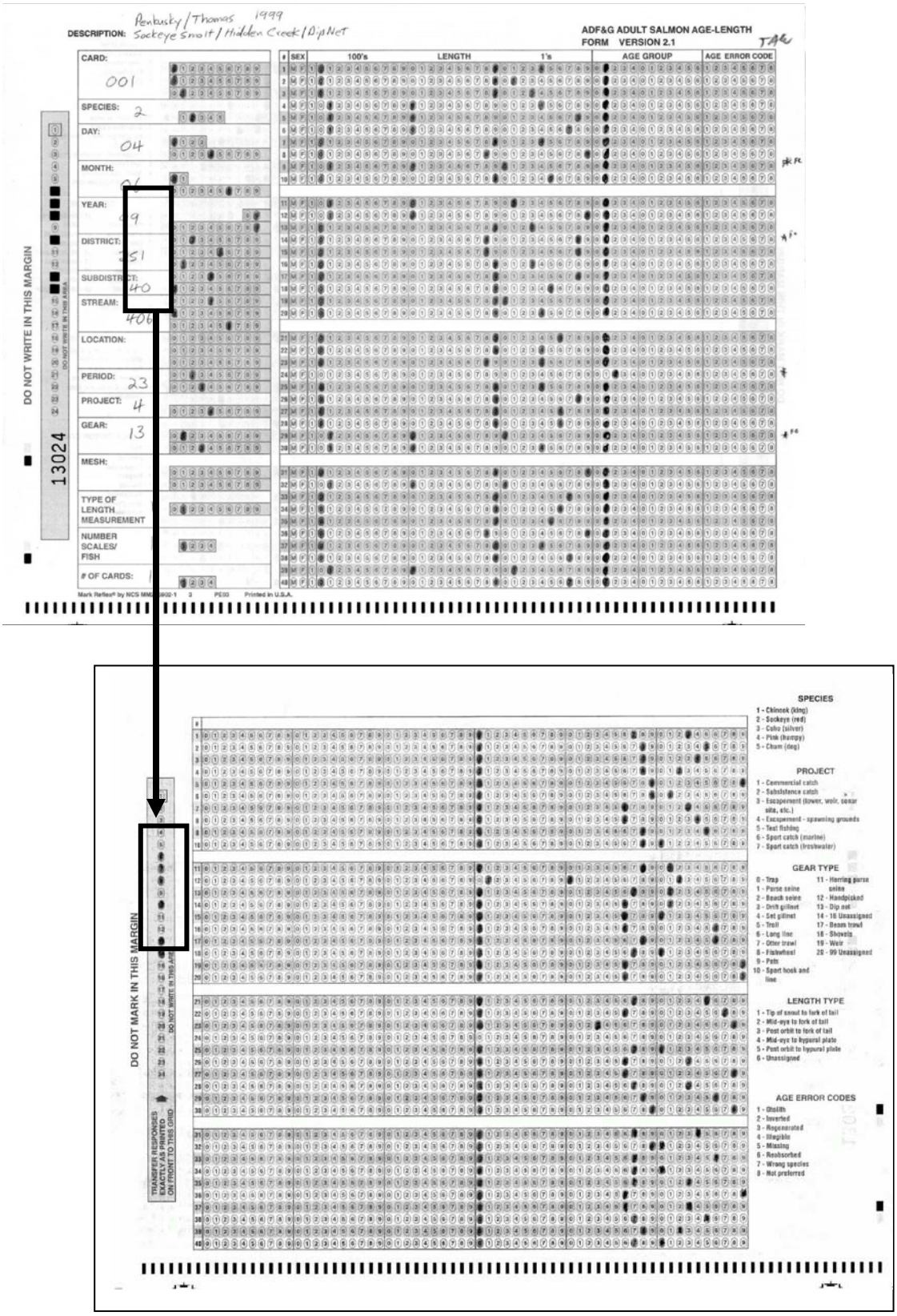
Fill in the number of scales (smears) collected per fish. For smolt, one scale smear per fish is collected.

# of cards

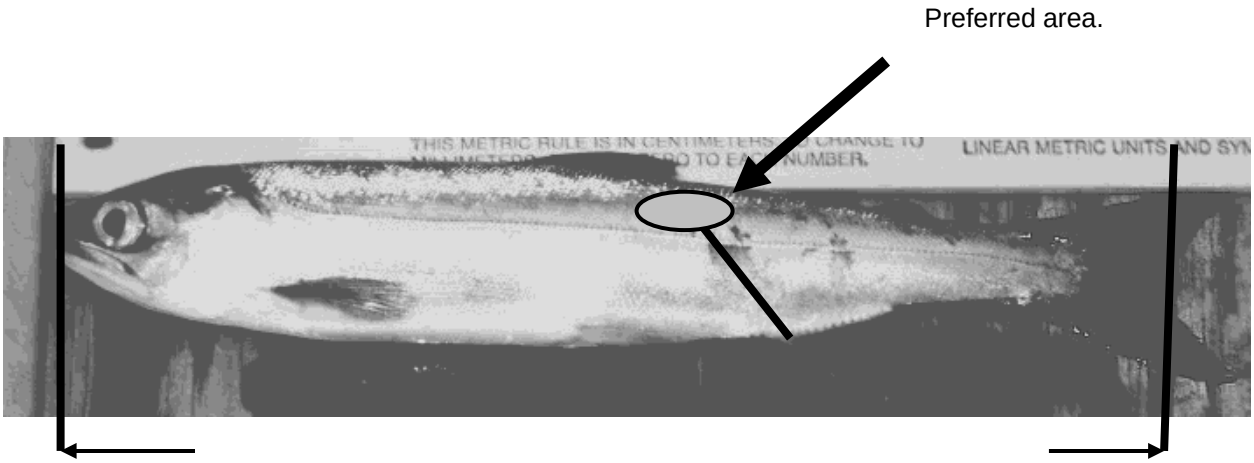
# of cards always = 1 (each AWL form is individually numbered).

If possible, keep the AWL forms in numerical order throughout the season and keep all forms flat, dry, and clean. Remember, when sampling smolt, weight data is recorded on the back side of the AWL form and the litho code, located in the left margin on the front side of the AWL form must be transferred to the back side of the form (see Appendix C3). The litho code is the number unique to each AWL form and copying the litho code from the front to the back of the form indicates weight data was transcribed on the back of the form for the Optical scanning machine to read. Fish slime and water curling may cause data to be misinterpreted by the optical scanning machine. It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.

Appendix C3.–Example of an AWL form filled out for smolt sampled.

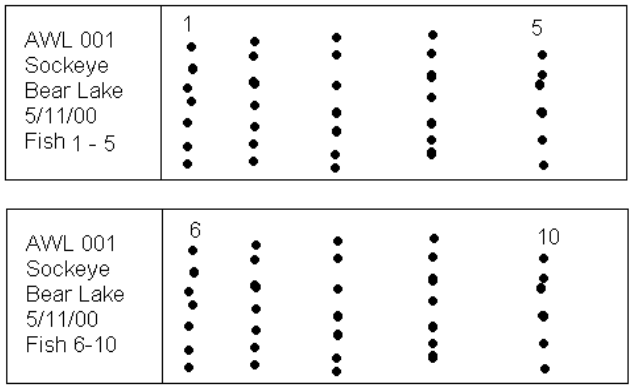


Appendix C4.–Photo of a smolt with the preferred area indicated.



Measure a smolt from the tip of the snout to the fork of the tail. The preferred area lies along a straight line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin, above the lateral line.

Appendix C5.–An example of two correctly labeled smolt slides. This represents fish 1 through 10 from a sample collected on 5/11/00.



It is recommended to number above every vertical row of scales on the slide.

When the slides are completed, return them to the box in order by AWL # and fish #, and label the slide box on top with the following information:

Location: Bear Lake

AWL Number: AWL 001

Beginning and end dates: 5/11-7/13/00

Sockeye Salmon Smolt

Appendix C6.–Sampling weeks and associated calendar dates, 2010.

Week	Calendar Dates	Week	Calendar Dates
10	01-Mar to 07-Mar	28	05-Jul to 11-Jul
11	08-Mar to 14-Mar	29	12-Jul to 18-Jul
12	15-Mar to 21-Mar	30	19-Jul to 25-Jul
13	22-Mar to 28-Mar	31	26-Jul to 01-Aug
14	29-Mar to 04-Apr	32	02-Aug to 08-Aug
15	05-Apr to 11-Apr	33	09-Aug to 15-Aug
16	12-Apr to 18-Apr	34	16-Aug to 22-Aug
17	19-Apr to 25-Apr	35	23-Aug to 29-Aug
18	26-Apr to 02-May	36	30-Aug to 05-Sep
19	03-May to 09-May	37	06-Sep to 12-Sep
20	10-May to 16-May	38	13-Sep to 19-Sep
21	17-May to 23-May	39	20-Sep to 26-Sep
22	24-May to 30-May	40	27-Sep to 03-Oct
23	31-May to 06-Jun	41	04-Oct to 10-Oct
24	07-Jun to 13-Jun	42	11-Oct to 17-Oct
25	14-Jun to 20-Jun	43	18-Oct to 24-Oct
26	21-Jun to 27-Jun	44	25-Oct to 31-Oct
27	28-Jun to 04-Jul	45	01-Nov to 07-Nov

APPENDIX D. FINFISH TISSUE SAMPLING OF SMOLT FOR DNA ANALYSIS

ADF&G Gene Conservation Lab, Anchorage

I. General Information

We use fin clip samples from individual fish to determine the genetic characteristics and profile of a particular run or stock of fish. This is a non-lethal method of collecting tissue samples from smolt-size fish for genetic analysis. The most important thing to remember in collecting samples is that **only quality tissue samples give quality results**. If sampling from recently moribund smolt: tissues need to be as "fresh" and as cold as possible, do not sample from fungal fins.

Sample preservative: Ethanol (ETOH) preserves tissues for later DNA extraction without having to store frozen tissues. Avoid extended contact with skin.

II. Sample procedure:

Tissue type: Fin clip tissue types will be determined and collected based on smolt(s) overall size. **NO adipose fin.**

Non-lethal sampling: pelvic fin clip samples will be taken from smolt **> 100mm** in size.

Only one pelvic fin clip per fish per vial.

Lethal sampling: two size categories **65-100mm** and/or **< 65mm** in size to provide ample tissue/ethanol ratio for quality tissue preservation. Clip ½ caudal fin clip per smolt (65-100mm in size) or clip the entire caudal fin from smolt (< 65mm) in size as shown in diagram provided.

1. Select smolt randomly, without regard to size or position in the rotary fish trap.
2. Prior to sampling, fill the vials half way with ETOH from the squirt bottle. Fill only the vials that you will use for a particular sampling period.
3. To avoid any excess water or fish slime in the vial, wipe the selected fin dry prior to sampling. Using the dog toe nail clipper or scissors, make the fin clip **1/2 -1" max** to fit into the cryovial.
4. Place fin clip into ETOH. The tissue/ethanol ratio should be **slightly less than 1:3** to thoroughly soak the tissue in the buffer.
5. Top up vials with ETOH and screw cap on securely. Invert tube twice to mix ETOH and tissue. Between samples, wipe the dog toe nail clippers or scissor blade so not to cross contaminate samples.
6. Data to record: Record each vial number so individual tissue samples correlate with additional data being collected.
7. Discard or store remaining ethanol from the 500ml bottle before returning samples. **Tissue samples must remain in 2ml ethanol** after sampling. HAZ-MAT paperwork will be required for return shipment. Store vials containing tissues at cool or room temperature, away from heat in the white sample boxes provided. In the field: keep samples out of direct sun, rain and store capped vials in a dry, cool location. Freezing not required.

Supplies included with sampling kit:

1. (1) Nail clipper - used for cutting the fin clip
2. Cryovials - small (2ml) plastic vials; pre-labeled.
3. Caps – with or without gasket to prevent evaporation of ETOH.
4. Cryovial rack- white plastic rack with holes for holding cryovials while sampling
5. Ethanol (ETOH) – in bulk Nalge bottle
6. Squirt bottle – to fill or "top off" each cryovial with ETOH. Squirt bottle not for ethanol storage.
7. Printout of sampling instructions
8. Laminated "return address" label

III. Shipping: HAZMAT paperwork is required for return shipment of these samples and is included in the kit.

Return shipping code: 11340643-11340643

Smolt Stage

Ship samples to:

ADF&G – Genetics
333 Raspberry Road
Anchorage, Alaska 99518

Lab staff: 1-907-267-2247
Judy Berger: 1-907-267-2175
Chris Habicht: 1-907-267-2169

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ADF&G Gene Conservation Laboratory, Anchorage

Non-lethal finfish tissue sampling of sockeye salmon smolt

(>100mm)

Lethal finfish tissue sampling of sockeye salmon smolt

(65-100mm)

(< 65mm)

Smolt Stage

Non-lethal sampling: one category **(> 100mm).** Clip off only **one pelvic** and put fin clip into pre-filled ETOH cryovial (shown above). **Only one fin clip per fish per vial.**

Lethal sampling: two size catagories **(65-100mm)** and/or **(< 65mm)**. Clip off ½ caudal fin or the entire caudal fin (shown above) necessary to maintain 1:3 tissue/ethanol ratio for tissue quality.

Select sockeye smolts for tissue sampling randomly, without regard to size or position in rotary screw fish traps. **NO** adipose fin ("fatty tissue").

APPENDIX E. LIMNOLOGY SAMPLING COORDINATES AND TENTATIVE SAMPLING SCHEDULE

Appendix E1.–Location of limnology sampling stations in Black and Chignik lakes, 2010.

Lake	Station	Latitude (N)	Longitude (W)
Black	1	56.45345	-158.99502
Chignik	1	56.23994	-158.81836
	2	56.25573	-158.82472
	3	56.26870	-158.84353
	4	56.28860	-158.88977

Note: Coordinates are in degrees and decimals.

Appendix E2.–Suggested limnology sampling schedule.

	May	June	July	August
Week 1	Deploy buoys WS, ZP-CL	WS, ZP-CL	WS, ZP-CL	
Week 2	WS, ZP-BL	WS, ZP-BL	WS, ZP-BL Retrieve buoys	
Week 3				
Week 4				

Conventions:
Water sample = WS
Plankton tow = ZP

Chignik Lake = CL
Black Lake = BL

APPENDIX F. PROPOSED CREW WORK SCHEDULE

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

Employee	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
FB I	0000-0400 1200-1300 2130 - 2359 **7.5**	0000-0530 1200-1400 **7.5**	0000-0530 1200-1400 **7.5**	0000-0530 1200-1400 **7.5**	0000-0530 1200-1400 **7.5**	1200-1300 1800-1900 **RDO** **2**	0000-0530 **RDO** **5.5**
FWT II	0000-0400 1700-1800 2130 - 2359 **7.5**	0000-0530 1600-1800 **7.5**	0000-0530 1600-1800 **7.5**	0000-0530 1600-1800 **7.5**	0000-0530 1600-1800 **7.5**	0000-0530 **RDO** **5.5**	1200-1300 1800-1900 **RDO** **2**
Activities	Dye Test Sample	Sample	Sample	Sample	Sample		

APPENDIX G. TIMESHEET INSTRUCTIONS

Appendix G1.–Instructions for filling out a timesheet.

All ADF&G employees must fill out a timesheet biweekly 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. When a flight comes out to drop off groceries, or for any other reason, near the end of a pay period, camp personnel need to send in their timesheets. 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).

SSN: your social security 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 G2.–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