

**Operational Plan: Afognak Lake Sockeye Salmon  
Monitoring Project**

by

**Steven E. Thomsen**

and

**Jodi Estrada**

March 2014



## Symbols and Abbreviations

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<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient (multiple)	R
milliliter	mL	west	W	correlation coefficient (simple)	r
millimeter	mm	copyright	©	covariance	cov
		corporate suffixes:		degree (angular)	$^\circ$
<b>Weights and measures (English)</b>		Company	Co.	degrees of freedom	df
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	expected value	$E$
foot	ft	Incorporated	Inc.	greater than	>
gallon	gal	Limited	Ltd.	greater than or equal to	≥
inch	in	District of Columbia	D.C.	harvest per unit effort	HPUE
mile	mi	et alii (and others)	et al.	less than	<
nautical mile	nmi	et cetera (and so forth)	etc.	less than or equal to	≤
ounce	oz	exempli gratia (for example)	e.g.	logarithm (natural)	ln
pound	lb	Federal Information Code	FIC	logarithm (base 10)	log
quart	qt	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
yard	yd	latitude or longitude	lat. or long.	minute (angular)	'
		monetary symbols (U.S.)	\$, ¢	not significant	NS
<b>Time and temperature</b>		months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	$H_0$
day	d	registered trademark	®	percent	%
degrees Celsius	°C	trademark	™	probability	P
degrees Fahrenheit	°F	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
degrees kelvin	K	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
hour	h	U.S.C.	United States Code	second (angular)	"
minute	min	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
second	s			standard error	SE
				variance	
<b>Physics and chemistry</b>				population sample	Var var
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				

***REGIONAL OPERATIONAL PLAN CF.4K.2014.03***

**OPERATIONAL PLAN: AFOGNAK LAKE SOCKEYE SALMON  
MONITORING PROJECT**

by

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Alaska Department of Fish and Game  
Division of Commercial Fisheries

March 2014

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## SIGNATURE PAGE

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Monitoring Project

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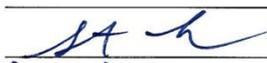
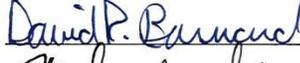
Period Covered April 2014 through September 2016

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## PURPOSE

Concerns expressed by local subsistence users over declines in Afognak Lake sockeye salmon *Oncorhynchus nerka* prompted the Alaska Department of Fish and Game to investigate Afognak Lake's rearing environment. After a one-year smolt abundance and mark-recapture feasibility study was successfully conducted in 2003, subsequent studies (2004–2006, 2007–2009, and 2010–2013) were funded to further evaluate smolt abundance and assess rearing and spawning habitats of Afognak Lake. Funding of the adult escapement weir has come from various sources but will be funded by a grant from the Alaska Sustainable Salmon Fund through 2015. Funding of the sockeye salmon smolt outmigration and limnological studies will be funded through the U.S. Fish and Wildlife Service Office of Subsistence Management through 2017. This operational plan provides the instruction and procedures to properly conduct the Afognak Lake smolt outmigration study and for operation of the adult escapement weir.

## BACKGROUND

The Afognak Lake drainage is located on the southeast side of Afognak Island, approximately 50 km northwest of the city of Kodiak (Figure 1). Afognak Lake (58°07' N latitude, 152°55' W longitude) lies about 21 m above sea level, is 8.8 km long, up to 0.8 km wide, and has a surface area of 5.3 m<sup>2</sup> (Thomsen and Richardson 2013; Figure 2). Runoff from Afognak Lake flows in an easterly direction via the 3.2 km Afognak River, emptying into Afognak Bay. The Afognak Lake system was the most productive sockeye salmon *Oncorhynchus nerka* system on Afognak Island in the 1990s (Honnold and Schrof 2004). Total estimated sockeye salmon runs from the Afognak Lake system averaged 130,630 fish from 1990 through 1999 peaking at 219,126 in 1996 (Honnold and Schrof 2004).

Sockeye salmon escapements during the 1990s ranged from 66,869 (1998) to 132,050 (1997) fish and averaged 90,464 fish, well above the upper range of the Sustainable Escapement Goal (SEG; Honnold and Schrof 2004). In 2000, the sockeye salmon escapement of 54,064 was below the previous 10-year average but still fell within the SEG range of 40,000 to 60,000 fish. Lower escapement levels continued into the 2001 season resulting in commercial salmon fishing closures in the Afognak area until July and season long sockeye salmon sport fishery restrictions. Despite these restrictions, the total sockeye salmon escapement was 24,271 in 2001, far below the lower end of the SEG (40,000; Nelson and Lloyd 2001). Sockeye salmon escapements into the Afognak River failed to reach the lower end of the SEG from 2002 to 2004. During the same three-year time period, the commercial salmon fishery in Afognak Bay was closed and sport fishing for sockeye salmon was also restricted. The Alaska Department of Fish and Game (ADF&G) and U.S. Fish and Wildlife Service jointly closed much of Afognak Bay to subsistence fishing for sockeye salmon in 2002, 2003, and 2004.

In January 2005, ADF&G changed the Afognak Lake SEG of 40,000–60,000 sockeye salmon to a Biological Escapement Goal (BEG) of 20,000–50,000 (Nelson et al. 2005). The escapement goal was changed from an SEG to a BEG based on more thorough spawner-recruit data and was reduced because recent escapement trends were more reflective of sustainable production. After sockeye salmon runs continued to be weak in 2005, a five-day commercial fishery opening occurred and 356 fish were harvested. The sockeye salmon commercial fishery was closed in 2006 and 2007. The sport fishery was open through the 2005 and 2006 seasons but closed in 2007. The subsistence fishery was open throughout the 2005 and 2006 seasons with minimal harvests while a closure occurred in 2007 through the month of July.

Prior to 2003, sockeye salmon production had been assessed by adult escapement and harvest estimates; juvenile (smolt) production estimates of the Afognak Lake sockeye salmon stock had not been reliably assessed. In 2003, a sockeye salmon smolt project was initiated at Afognak Lake outlet to estimate the number, age, size, and condition of the smolt emigration. From 2004 through 2013, the smolt project was continued and the rearing environment (limnology) was monitored. A four year smolt assessment study along with a bioenergetics analysis of rearing juveniles was conducted at Afognak Lake from 2010 through 2013. These data are essential in determining future Afognak Lake sockeye salmon stock production, as well as the future outlook for subsistence, commercial, and sport harvesters. Smolt abundance and limnology data will assist in the development of appropriate strategies to improve returns. In addition to smolt and limnology data, the operation of an adult weir will enable accurate escapement counts to be obtained as well as adult age, sex and length (ASL) data.

## **OBJECTIVES**

The project objectives are to operate the adult counting weir, monitoring adult returns, and to operate the smolt trap, assessing the magnitude and health of the sockeye salmon smolt outmigration. Fulfillment of these objectives supports the development of in-season and long-term management strategies to maximize the production of Afognak Lake's sockeye salmon stock.

### **CREW OBJECTIVES**

1. Estimate the abundance (N), age composition, and average size and weight of outmigrating sockeye salmon smolt. Methods are designed to estimate the parameters within 25% (relative error) of the true value with 95% confidence.
2. Enumerate adult salmon escapement through the weir and estimate salmon build-up below the weir, in the river, lagoon and bay.
3. Estimate the average age, sex, and length (ASL) from the sockeye salmon escapements into Afognak Lake. Methods are designed to estimate the parameters within  $d=0.07$  of the true proportion (for each age group within each stratum) with 95% confidence.
4. Install temperature data loggers in Afognak Lake to monitor temperature.
5. Conduct hands on capacity building exercises and youth training with local native groups.

### **LIMNOLOGY SAMPLING OBJECTIVES**

Limnology sampling and analysis will be conducted by Kodiak Island Laboratory (KIL) staff following methods described in Ruhl (2013 and 2014).

6. Evaluate water chemistry, nutrients, zooplankton, phytoplankton, temperature, and solar input in Afognak Lake.
7. Re-map Afognak Lake bathymetry using an AUV (once in 2014 by Kodiak Island Laboratory staff).

## **TASKS**

### **General**

1. Set up camp. Target date: 5 May.
2. Install temperature data loggers in Afognak Lake at limnology station 2 (Figure 2). Target Date: 5 May.

3. Collect physical data daily: air temperature, water temperature, water level, cloud coverage, wind direction and velocity, and precipitation.
4. Collect water and zooplankton samples at station 1 and zooplankton samples at station 2 approximately every four weeks from May to September at Afognak Lake. This will be conducted by KIL staff.
5. Re-map Afognak Lake bathymetry using an AUV. This one-time sampling event will be conducted by KIL staff in 2014.
6. Collaborate with Afognak Native Village and Natives of Afognak to conduct educational field seminars for youth groups attending the Dig Afognak Summer camp. Target date: July.

### **Smolt Monitoring**

7. Install and operate a smolt trap (downstream) to capture a target goal of 15% of the total sockeye salmon smolt emigrants. Target date: 7 May until the end of the smolt emigration (approximately 3 July).
8. Enumerate the daily smolt trap catch of fish by species.
9. Install and operate a second smolt trap (upstream) to capture 650 sockeye salmon smolt weekly for mark-recapture and mortality testing. Target date: 8 May through the smolt outmigration,
10. Conduct weekly mark-recapture and mortality testing to estimate the total smolt emigration. Retain 50 undyed sockeye salmon smolt for holding mortality testing. Dye 650 sockeye salmon smolt using Bismarck Brown Y (BBY) dye and retain 50 smolt for delayed mortality testing. Release 550 dyed smolt for mark-recapture testing.
11. Collect AWL data from 2% of the sockeye salmon smolt counted per day throughout the outmigration. This will be done using a systematic sampling protocol where every 50<sup>th</sup> sockeye salmon smolt is collected.

### **Adult Monitoring**

12. Install, operate, and maintain an adult counting weir. Target dates: approximately 15 May–31 August.
13. Install, operate, and maintain an upstream steelhead trap to enumerate and pass steelhead downstream of weir. Target dates: (approximately 15 May–31 August).
14. Enumerate adult salmon escapement through the weir by species and provide accurate daily escapement reports. Record the number of net-marked and “jack” (400 mm or less) sockeye salmon escaping through the fish pass.
15. Collect representative scales (for age determination), length, and sex from 2% of the sockeye salmon escaping to Afognak Lake. Note: Moore (2014) lists the minimum of number of samples as 600. Ensure representative samples are collected weekly throughout the season.

## **METHODS**

### **SOCKEYE SALMON SMOLT MONITORING**

#### **Study Design**

A two-site mark-recapture technique using inclined-plane traps will be utilized to estimate smolt outmigration abundance (Carlson et al. 1998). The upstream site is used for marking and releasing smolt. The downstream site is used for capturing smolt to assess abundance, capture rates, and collect biological samples. The two sites are located far enough apart to allow mixing

of marked (dyed) and unmarked smolt. The upstream trap will be operated only to capture smolt for mark-recapture tests. The upstream trap site is also the release site and is located approximately 1.2 km upstream from the location of the Afognak River weir.

Mark-recapture trials will be conducted weekly to estimate trap efficiency and estimate trap catch proportions (Carlson et al. 1998). The proportions derived from these trials will be used to estimate the total number of sockeye salmon smolt that outmigrated from Afognak Lake

The smolt season will be divided into nine strata of equal duration. Trap efficiency estimates will be conducted at the start of each stratum. However, strata may be combined if smolt numbers are insufficient to capture a representative sample and additional strata may be added to account for changes in estimation methods. Smolt trapping will be concluded when the number of captured smolt drops to less than 100 smolt per day for 3 consecutive days. Conclusion of trapping must be confirmed with the supervisor.

Stratum	Date Range
Stratum 1	May 1-7
Stratum 2	May 8-14
Stratum 3	May 15-21
Stratum 4	May 22-28
Stratum 5	May 29-June 4
Stratum 6	June 5-11
Stratum 7	June 12-18
Stratum 8	June 19-25
Stratum 9	June 26-July 2

Trap efficiency will be estimated within each stratum by conducting dye release trials using BBY® dye. The proportion derived from these trials is used to estimate the total number of sockeye salmon smolt that outmigrated from Afognak Lake. The proportion of recaptured marked (dyed) smolt to unmarked smolt will be used to estimate trap efficiency.

To conduct trap efficiency trials, a total of 650 sockeye salmon smolt will be captured using the upstream trap (at release site). If insufficient numbers of smolt are captured at the release site, the crew will attempt to capture additional smolt at the lower trap. If necessary, trials may be conducted with fewer dyed smolt with supervisor approval (minimum release of 330 dyed smolt). Details are covered in the Mark-Recapture Instructions section.

Trap efficiency will be adjusted to account for any mortality associated with holding smolt for the experiment. Delayed mortality and holding mortality trials will be conducted during each stratum to determine if adjustments to trap efficiency are needed. Details are covered in the Delayed and Holding Mortality Experiments section.

Of the 650 smolt captured, 600 will be dyed using BBY dye. The remaining 50 will not be dyed and will be held to estimate holding mortality. Fifty of the marked (dyed) sockeye salmon smolt will be held to estimate delayed mortality caused by the dye procedure

Delayed mortality and holding mortality tests will be conducted during each trial to adjust trap efficiency estimates. For mortality testing, sub-samples of the sockeye smolt captured in the upper trap are held in separate live boxes.

Estimates of population abundance will be calculated using a modification of the stratified Peterson estimator (Carlson et al. 1998). Trap efficiency  $E_h$  for stratum  $h$  is calculated as

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

where

$M_h$  = number of marked smolt released in stratum  $h$  ( $M_h$  will be adjusted to reflect any holding mortality. i.e.  $M_h$  will be reduced using the proportion of mortality of undyed to dyed smolt that occurs during the delayed mortality and holding mortality trials for each stratum)

$m_h$  = number of marked smolt recaptured in stratum  $h$

A modification of the stratified Petersen estimator (Carlson et al. 1998) is used to estimate the number of unmarked smolt  $N_h$  emigrating within each stratum  $h$  as

$$\hat{N}_h = \frac{(n_h + 1)(M_h + 1)}{m_h + 1}, \quad (2)$$

where

$n_h$  = number of unmarked smolt recaptured in stratum  $h$ .

Variance of the smolt abundance estimate is estimated as

$$\hat{\text{var}}(N_h) = \frac{(M_h + 1)(n_h + 1)(M_h - m_h)(n_h - m_h)}{(m_h + 1)^2(m_h + 2)}. \quad (3)$$

Total abundance of  $N$  of unmarked smolt over all strata is estimated by

$$\hat{N} = \sum_{h=1}^L \hat{N}_h, \quad (4)$$

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

$$\hat{\text{var}}(\hat{N}) = \sum_{h=1}^L \hat{\text{var}}(\hat{N}_h), \quad (5)$$

and 95% confidence intervals are estimated using

$$\hat{N} \pm 1.96 \sqrt{\hat{\text{var}}(\hat{N})}, \quad (6)$$

which assumes that  $N$  is approximately normally distributed.

Within each stratum  $h$ , the total population size by age class  $j$  is estimated as,

$$\hat{N}_{jh} = \hat{N}_h \hat{\theta}_{jh}, \quad (7)$$

where  $\hat{\theta}_{jh}$  is the observed proportion of age class  $j$  in stratum  $h$ . Variance of  $\hat{\theta}_{jh}$  is estimated using the standard variance estimate of a population proportion (Thompson 1987). The variance of  $\hat{N}_{jh}$  is then estimated by

$$\text{var}\left(\hat{N}_{jh}\right) = \hat{N}_h^2 v\left(\hat{\theta}_{jh}\right) + \hat{N}_h v\left(\hat{\theta}_{jh}\right)^2. \quad (8)$$

The total number of outmigrating smolt within each age class is estimated by summing the individual strata estimates, and its variance are likewise estimated by summation over the individual strata estimates.

Statistical assumptions were taken from (Carlson et al. 1998).

1. The population was unchanging (i.e., a closed population with no immigration or outmigration).
2. All smolt had the same probability of being marked (i.e., trap is not selective and strata are consistent).
3. All smolt had the same probability of capture (i.e., marking fish does not affect their behavior).
4. All marked smolt released can be recovered (i.e., marking mortality was minimal accurate).
5. All marked smolt were identifiable (i.e., crew well trained and strata are discrete).
6. Marks were not lost after marking (i.e., effectively dyed).

### **Smolt Trap Installation Procedures**

The downstream trap (Figure 3) will be operated from approximately 7 May through 3 July, approximately 5 m upstream from the location of the Afognak River weir and 32 m upstream from the terminus of Afognak Bay. The upstream trap will be installed on approximately 8 May, 1.2 km upstream from the adult weir site. The upstream trap will only be used to capture fish for mark-recapture testing and will be raised to eliminate fishing the remainder of the time.

Both traps will be positioned towards the thalweg at each location, where water velocity is great enough to make it difficult for smolt to avoid capture and to capture a representative portion of the outmigrating smolt. A live box (1.2 m x 1.2 m x 0.5 m) will be attached to the outlet of each trap, and both trapping devices will be connected to cables attached to hand-powered cable come-along winches fixed to each stream bank. Both traps will be secured to an aluminum pipe frame, which will allow the back end of the trap and live box to be adjusted vertically in response to water level fluctuations.

#### ***Installation of the Downstream Smolt Trap***

1. Install the downstream inclined-plane trap in Afognak River 5 m upstream of the weir.
2. Anchor the trap with cables and turnbuckles to positions on the stream bank.
3. Use 3.0 m (10') sections of 5.1 cm (2") diameter pipe joined by NU-RAIL® fittings as a frame to secure and support the trap.

4. Use a come-a-long, secured to the overhead steel pipe cross member, to elevate the downstream end of the trap.
5. Install a catch box to the cod end of the trap for smolt capture.
6. Install a board walk and work platform leading from the bank to the catch box. Build the board walk using rack master supports and planking (2"x12" boards).

### ***Installation of Downstream Smolt Trap Wings***

The instructions below describe methods to increase the capture of outmigrating smolt. The length and extent of the wings will depend on the weekly mark-recapture rate and should be adjusted to target a 15% capture rate.

1. Construct wings upstream of the trap in a "V" configuration using a frame made from 1.6 m (5') legs, and 2.8 m (8') cross members, 5.1 cm (2") diameter pipe and NU-RAIL® fittings.
2. Attach 1.3 by 2.5 m (4' x 8') sheets of aluminum perforated plate to the frame starting at the trap and working upstream. The first sheet of perforated plate is secured to the side of the trap with screws where the plate and the side of the trap are joined. The trap and perforated plate should rest on the streambed; continue placing sheets of perforated plate on the frame with each upstream piece overlapping the previous downstream piece by approximately six inches and securing the plates together with bailing wire.
3. Place Lortex (black plastic screen) over the seams of the perforated plate and any other areas with protruding edges that may be hazardous to smolt.
4. Line the inside walls and bottom of the trap with a blue tarp and/or Lortex as needed to minimize smolt pinning against the perforated plate and increase water velocity.

### ***Installation of the Upstream Smolt Trap***

1. Install the upstream inclined-plane trap in Afognak River 1.2 km upstream of the weir.
2. Anchor the trap to the stream bank with cables and come-a-longs.
3. Use 3.0 m (10') sections of 5.1 cm (2") diameter pipe joined by NU-RAIL® fittings as a frame to secure and support the trap.
4. Use a come-a-long, secured to the overhead steel pipe cross member, to elevate the downstream end of the trap.
5. Install a catch box to the cod end of the trap for smolt capture.

Wings and a boardwalk are not installed for the upstream trap.

### **Downstream Smolt Trap Operation**

The downstream trap is used for capturing smolt to assess abundance, estimate capture rates, and collect biological samples (Figure 3). The trap will be operated continuously (24-hours a day) for the duration of the smolt outmigration. To ensure safe and efficient operation, monitor the trap frequently.

All fish captured in the trap will be identified by species and enumerated daily. Proper identification of sockeye salmon smolt is crucial. Smolt enumeration data (including mortality) will be recorded on the *Daily Smolt Trap Catch Reporting Form* (Figure 4) and the *Sockeye Salmon Smolt Summary Form* (Figure 5). If conducting a mark-recapture test, all smolt must be

visually inspected for marks (dye) and counted. A helpful source for juvenile salmonid identification is the 'Field Identification of Coastal Salmonids' by Pollard et al. (1997). It is the responsibility of the crew leader to ensure species are properly identified. If in doubt, freeze a sample for later verification or send a digital photograph to the Kodiak office. Only sockeye salmon smolt will be sampled for AWL. Specific procedures for sampling and recording smolt AWL data are provided in Appendix A.

Smolt primarily migrate at night. A single trapping or sampling day will be the 24-hour period from noon of the first day to noon the following day and the date recorded will correspond with the calendar day associated with the first noon. Smolt needed for sampling will be held in a live-box until sampled. Keep the traps and wings free of debris to maintain consistent trap efficiency and minimize smolt mortality.

1. Monitor the trap frequently when it is fishing. The trap should be checked every 3–4 hours during the day and every 1–2 hours at night.
2. The downstream trap will be fished continuously for the duration of the smolt emigration (~7 May until ~3 July) and attention to changes in migration patterns will be monitored and recorded (e.g., rain may trigger a large emigration).
3. Modify or pull wings from the water to allow smolt to pass safely if unforeseen conditions occur and smolt trapping must temporarily cease. If possible, any modifications to the trapping system will be discussed with the project biologist before implementation. If immediate modifications are necessary to avoid major mortality or loss of equipment, the project biologist will be notified as soon as possible.
4. Plastic sheeting may need to be added to the perforated plates to reduce pinning or increase flow into the trap.
5. Smolt will be handled with care, as sockeye salmon smolt are very sensitive to any stress, and mortality can occur through the loss of just a few scales.
6. Use a dip net to remove and release the fish as they are counted.
7. A handheld tally denominator (counter) will be used to enumerate the smolt to ensure an accurate count.

### **Age, Weight, Length (AWL) Sampling**

To ensure proportional abundance sampling, approximately 2% of the daily sockeye salmon smolt catch will be sampled to obtain age, weight, and length (AWL; Appendices A1 and 2) data. For every 100 sockeye salmon smolt counted out of the trap, the field crew will retain two smolt for AWL sampling. Smolt will be collected throughout the night and held in the instream live box. The following morning, all smolt from the live box will be anesthetized using tricaine methanesulfonate (MS-222) prior to being sampled. After being sampled, all smolt will be held in aerated buckets of water until they recover from the anesthetic, and subsequently released downstream from the trap.

Fork length will be recorded to the nearest 1 mm and weight to the nearest 0.1 g. Scales will be removed from the preferred area of each fish following procedures outlined by the International North Pacific Fisheries Commission (INPFC 1963; Appendix A2) and mounted on a microscope slide for age determination. AWL data will be recorded on a *Sockeye Salmon Smolt Summary Form* (Figure 5) and in a Rite in the Rain log book, both of which are to be kept in a binder at

camp until the end of the season. These data will also be entered into a Rugged Digital Assistant (RDA; Appendix A2) and electronic data will be sent bi-weekly to the ADF&G Kodiak office. Dyed smolt will not be included in AWL sampling.

Age will be estimated in town from scales viewed with a microfiche reader at 60X magnification and recorded in European notation (Koo 1962) following the criteria established by Mosher (1968). In addition, the overall health or condition factor of each sampled smolt will be assessed by calculating its body condition factor  $K$  (Bagenal and Tesch 1978) as

$$K = \frac{W}{L^3} 10^5 \quad (9)$$

where

W = weight (g) and L = length (mm).

### Mark-Recapture Instructions

The dyeing process can be very stressful to smolt, so every effort should be made to minimize and avoid unnecessary handling (netting) of the smolt during the process. Excessive handling, increased water temperatures, transport, insufficient or excessive dissolved oxygen (DO), and exposure to the dye are the primary stresses. Individually, these can induce mortality.

Count all dyed smolt recaptured at the downstream trap and assign to the appropriate strata. Strata will begin on the day dyed smolt are released and will end before the next release (approximately 1 week). Identifying and counting all recaptured (marked) smolt is critical to properly estimate trap efficiency. To ensure safe and efficient operation, monitor the trap and live-box frequently when in use.

As in previous years at Afognak Lake, an effort will be made to achieve trap efficiencies from 15 to 20% (Thomsen and Richardson 2013). To estimate total smolt abundance of each strata with a 5% probability of exceeding a relative error ( $r$ ) of 25%, 550 marked smolt will be released for each mark-recapture test (Carlson et al. 1998). To estimate mortality associated with the marking, holding, and transport process, 50 marked and 50 unmarked fish will be retained and monitored for four days. Release information will be reported on the *Smolt Dye Release Form* (Figure 6).

Marked smolt held for mortality testing will be observed daily to monitor mark retention and assist in proper identification. Mortality data will be reported on the *Smolt Dye Release Form* (Figure 6).

**The preferred method is to capture all smolt utilized for mark-recapture testing in the upstream trap.** Capturing smolt at the release site avoids unnecessary transportation and reduces smolt mortality. **Smolt captured at the upstream trap require no transportation, eliminating the need for steps 1-2.** Smolt captured at the downstream trap require treatment prior to transportation to the release site and should be avoided to reduce mortality (steps 1-2). If transport from the downstream trap is needed to meet sample size requirements smolt will be transported in a trailer pulled by an all-terrain vehicle to the release site. The following methods will be used for marking and releasing smolt:

1. Collected smolt will be placed in a 26-gallon lidded cooler, filled with river water and a 0.25% sodium bicarbonate solution to maintain a stable pH. Non-iodized salt will be added to

the transport water to achieve a 0.75% solution to replicate physiological levels and reduce metabolic stress and electrolyte depletion that can cause post-transport mortality. Using the oxygen tank and regulator stored under the cabin, the transport cooler will be continuously supplied with supplemental oxygen at a level of 9 mg/l and within an 80–100% saturation range to maintain conditions similar to ambient river water from which the smolt were collected. DO must be monitored throughout the dying process.

2. Following transport to the release site, count and place transported smolt in the upper trap live box and allow them to rest for 30 minutes before beginning the dying process. An accurate count of transported fish is required so they are not counted in the lower trap twice.
3. Prior to adding the dye, 50 smolt (undyed) will be randomly selected and placed in a separate holding box for four days to estimate holding mortality.
4. Fill the 26-gallon cooler with river water and a 0.25% sodium bicarbonate and BBY dye (30mg/L) solution.
5. Place 600 smolt into the 26-gallon lidded cooler containing the dye solution for 30 minutes, and continuously oxygenate. Dyed smolt that display unusual behavior (labored respiration, flared gills, side swimming, etc.) will be removed from the experiment and released downstream of the recapture site.
6. After 30 minutes replace the dye solution with river water and hold the smolt for another 30 minutes before release.
7. Roughly 550 of the dyed smolt will be randomly selected from the holding box and placed in two to three 5-gallon buckets for release. Timing of the dyeing process will be started so dyed smolt will be released across the width of the stream between 2100 and 2300 hours,
8. The remaining dyed smolt (50) will be counted and left in the holding box for four days to estimate delayed mortality resulting from the capture and marking process.

### **Delayed Marking and Holding Mortality Experiments**

Delayed marking and holding mortality experiments are used to estimate the baseline mortality of released smolt during mark-recapture. This experiment is comprised of two parts. Fifty marked smolt will be placed in a live box near the upstream trap. An additional fifty unmarked smolt will be placed separately in the live box (in the same live box with a divider). The mortality of both smolt groups and retention of dye for the marked group will be monitored daily for a four-day period. Smolt used for these experiments will be handled the same way as the smolt being released, except they will not be released.

The proportion of marked to unmarked smolt mortality will be used to adjust the actual number of marked smolt available for recapture in the experiment ( $M_h$ ). The number of unmarked smolt that died will be subtracted from the number of marked smolt that died. This number will be divided by the number of marked smolt held (50) and the resulting ratio will be used to adjust  $M_h$ , the number of dyed smolt released.

### **ADULT SOCKEYE SALMON MONITORING**

A 27 m weir will be installed near the terminus of the Afognak River to enumerate adult salmon escapement. The weir will be constructed perpendicular to the stream flow and consist of 10 wooden tripods (each tripod consisting of three 4" x 6" x 8' spruce timbers and 2" x 6" x 6' horizontal cat-walk supports), ten cat-walk boards (2" x 12"), 33 aluminum pipes (2" x 10'), 44 picketed aluminum panels (1" aluminum pipe with 1" spacing totaling 30" x 6'), and 2 framed

panel gates (Figure 7). All materials will be secured with sand bags and lashed together to create a fish tight structure that conforms to the stream substrate.

Two counting gates will be placed between panels in the two deepest channels of the river enabling fish to be counted as they pass through the weir. A white flash panel will be placed on the substrate beneath each gate to enhance visibility and aid in speciation. Fish will be counted by field technicians using handheld tally denominators as fish migrate upstream through the gates. The counting gates will remain closed until field technicians are present to count fish through the weir for escapement enumeration or when fish are being collected in the live trap for ASL sampling.

Fish passing up or down through the weir will be visually identified and enumerated by field technicians using handheld tally denominators and recorded daily on the *Weekly Weir Camp Reporting Form* (Figure 8). Technicians will be trained while in the field on how to properly identify salmonids and how to collect ASL data. Crew members should minimize delaying salmon passage through the weir.

### **Installing the Weir**

Weir installation generally occurs on approximately 15 May.

1. Move tripods from their staged location on the far bank into the river and evenly space them across the river. The back legs of each tripod will lean against the next tripod. Place a few large rocks or sandbags (2 to 4 depending on stream height) on each tripod platform to weigh them down.
2. Place the two outer tripods (nearest the stream banks) slightly upstream from the rest of the tripods and string a taught line (use seine twine) across the river. Move the remaining tripods upstream until they touch the line. Square the tripods perpendicular to the upstream river flow.
3. Fine tune tripod spacing and leveling. Level each tripod by digging under the highest rear leg to level it out. Leveled tripods make it easier to install and level the boardwalk. Place as many sandbags and boulders as will fit on each tripod platform.
4. Install the entire boardwalk shiplap (overlapping) on the posterior portion of the tripod arms; do not attach it until it is leveled. Starting at one end of the weir, place a 2”x 12” x 12’ board across the first set of tripod arms ensuring it rests on the next consecutive tripod arm. Continue laying out the boardwalk the length of the weir.
5. Level the boardwalk with spacers or leveling blocks nailed to the tripod arm and fine tune the straightness of the boardwalk. Screw the boardwalk boards to the tripod arms and each other. Make sure the end of each individual board rests on a tripod arm.
6. Lay upper and lower aluminum stringers in an alternating pattern across all tripods. At both stream banks, insert the upper and lower stringers into the Nu-Rail fittings installed into the stream bank for stability.
7. Begin installing weir panels from the near bank. Lay each panel flat against the stringers with the base of the panel up off the riverbed approximately 10 inches. Rake and dig a channel in the river bottom to accept each panel. Once a channel is dug, set the panel into the channel and make sure it is straight and level. Next, backfill the channel with stream gravel and rock to ensure it is fish tight. The first (and last) panel may require minute bank modifications and

sandbags to fill gaps. Continue setting weir panels the length of the weir. Sand bags may need to be placed at the base of the panels to maintain a “fish tight” weir.

8. Install two counting gate frames along with the weir panels. These will be counting gates and one will also have the “Scott trap” upstream of it. Install them where water flow is greater and depth is adequate for fish passage.
9. Tie weir panels to each other and to the upper and lower stringers with seine twine or zip-ties.
10. Place white flash panels upstream in front of and against each counting gate (gates one and two) on the river bottom and weigh down the corners with large rocks or sandbags.
11. Install “keep off weir” sign, stream gauge, and counting seats.
12. Inspect the weir for gaps. Walk along the front of the weir backfilling the base of panels where necessary to ensure the weir is fish tight. Use an aqua-scope to improve underwater visibility).
13. Install the “Scott trap” upstream at the near bank gate (Figure 7). Use two 10 foot panels and two 4 foot panels (entrance deflectors), to form a “W” coming out from the gate frame and resting on either side of the frame. Use two 6 foot panels (must be the ones with the smaller pipes) as the upstream 45° angle and interlock them with each other and the 10 foot panels. Use seine twine or zip-ties to affix all panels together. Use the pre-cut triangle panels to shore the trap to the sides of the gate frame, affix them to the weir and the trap. Place loose panels on the lead edges of the trap so that fish can’t jump out of the trap, and one panel across the very rear of the trap on the deflectors so fish can’t jump out the back. Backfill gravel at the bottom of all panels and surround the outside, underwater side of the trap with sandbags to ensure the trap is fish tight.

### **Operating the Weir**

1. Monitor the weir throughout the day and pass fish as soon as build up. Mornings and evenings are typically the best times for fish passage. The crew leader will organize a schedule.
2. The project leader, supervisor, or designee will train personnel to visually recognize the different salmon species and their swimming patterns. When fish have accumulated behind the weir take time to visually study them and note differences as they pass through the weir.
3. Count fish by opening a gate and enumerating them as they pass through with handheld tally denominators, one for each species. Regulate the gate opening by using a wedge to lock the gate into position. Opening the gate too far will enable fish to pass too quickly and make it difficult to accurately count and identify them. Monitor the quality of passing fish, including the numbers of net-marked and “jack” (< 400 mm) sockeye salmon. To assist in identification of jacks place a 400 mm line on the flash panels.
4. If a counting gate will not open, it is probably locked up by gravel or a rock wedged into the framework. Do not attempt to force the gate, or the entire framework may pull out of place along with the flash panel. Free up the gate by inspecting for wedged rock or gravel and removing it with your fingers or a fish pew.

5. When counting fish and conducting surveys, wear polarized glasses for greater visual recognition.
6. Periodically check your handheld tally denominator to ensure they are working properly.
7. When finished counting make sure the counting gate is closed completely.

### **Maintaining the Weir**

1. The weir must be cleaned and inspected daily. Debris build up on the weir may cause poor water flow, leading to scouring at the base of weir panels and weir washout during periods of high water.
2. Cleaning the weir includes getting into the river to remove sticks, logs, leaves, grass, gravel, fish carcasses, and garbage.
3. Throw all debris (except garbage) over the weir, allowing it to flow down river.
4. Frequently inspect the weir to ensure it is fish tight; look for scouring, panels out of place, gaps between panels (greater than a fingers width), sandbags that have been pushed off of tripods by bears, and unsecured flash. Make repairs as needed. Use the Aqua scope to enhance visibility.
5. Make sure the framework of the weir is sound and secure. If any of the boardwalks are loose, or any section or parts of the weir broken or unsafe, repair it immediately.
6. If the water level increases to the point where the bottom of the sandbags on the tripod platform are submerged, weir panels and the trap will need to be pulled to avoid a weir wash out. If a weir wash out is possible, closely monitor fish build-up below the weir for fish pass estimation. If pulling the weir is needed, pull the trap and the two gates. If the visibility allows, count fish passing through the gates. If the water level continues to rise, pull panels from the center of the weir or where the current is the greatest.
7. Keep bears away and off of the weir as much as possible to minimize damage. Try to maintain a perimeter around the camp that is a No-Bear-Zone. Only scare (haze) bears if the crew is comfortable doing so and it is not a dangerous situation.

### **Age, Sex, Length (ASL) Sampling**

Details and procedures for adult ASL sampling and entering RDA data are outlined in the Kodiak Management Area sockeye salmon catch and escapement sampling operational plan, 2014 (Moore 2014).

To ensure proportional ASL sampling, approximately 2% (one sample for every 50 adults) of the daily adult sockeye salmon passing through the weir will be sampled (a minimum of 600) as described by the International North Pacific Fish Commission (1963) and Moore (2014). Sex will be determined by observation of external morphological characteristics (example: form of skull) and length will be determined by measuring the distance from mid-eye to tail fork using a metric ruler, to the nearest millimeter.

All scales, when possible, will be collected from the preferred area of each fish (Moore 2014; INPFC 1963). Scales will be mounted on scale “gum” cards and returned to the Kodiak ADF&G office where impressions will be made on cellulose acetate (Clutter and Whitesel 1956).

ASL data will be recorded in a log book, which will be kept in a binder at camp until the end of the season. This data will also be entered into a Rugged Digital Assistant (RDA) and electronic data will be sent bi-weekly to the ADF&G Kodiak office.

Fish ages will be determined in town by examining scale impressions for annual growth increments using a microfiche reader fitted with a 60X lens following designation criteria established by Mosher (1968). Ages will be recorded using European notation (Koo 1962), where a decimal separates the number of winters spent in fresh water (after emergence) from the number of winters spent in salt water (e.g., 2.3). The total age of the fish includes an additional year representing the time between egg deposition and emergence of fry.

## **ADDITIONAL GUIDELINES AND PROCEDURES**

### **COMMUNICATION**

During the smolt season (May and June) required data will be relayed to the project biologist each day at 1:15 PM by satellite phone or Single Side Band (SSB; Appendix B1) radio. During the adult season (July and August) required data will be relayed first to ADF&G management daily at 8:10 AM by SSB radio or satellite phone, then to the project biologist each day at 8:45 AM by satellite phone or SSB radio.

The morning radio communication is an important tool which provides the most recent escapement data to fishery managers who utilize this information to make daily management decisions and provides local air charter pilots with current weather conditions. The Commercial Fishery Management section also maintains an afternoon radio schedule for their management weirs at 1630 hr (4:30 PM) which is an optional radio communication. If contact to the Kodiak office is necessary at other times, information can be transmitted via the satellite telephone, with the satellite dispatch service, or with the SSB radio.

### **DATA REPORTING REQUIREMENTS**

The crew leader will ensure all field camp reporting requirements are met. Hard copies of data forms and the camp journal will be completed on a daily basis. "Rite in the Rain" logbooks will be used for ASL and AWL sampling. After completing a sampling event and upon returning to the cabin, the data will be transferred to the corresponding data forms and entered into the RDA. In preparation for the resupply flights, the activity report and the adult and juvenile scale samples will be properly packaged and clearly labeled with *ADF&G Attn: Steven Thomsen 486-1872*. **MAKE SURE TO DOUBLE CHECK DATA BEFORE PASSING THEM ON TO TOWN.**

Data reporting requirements can be categorized into three groups:

1. Provide daily: daily smolt and adult counts, mark-recapture and mortality testing results, and daily weather observations,
2. Provide biweekly: timesheets (Appendix D), biweekly crew leader report (Appendix C), smolt scale slides, adult scale cards, smolt AWL and adult ASL data on jump drive provided,
3. Provide seasonally: *Daily Smolt Trap Catch Reporting Form* (Figure 4), the *Sockeye Salmon Smolt Summary Form* (Figure 5), *Smolt Dye Release Form* (Figure 6), *Daily Physical Observation Form* (Figure 9), *Weekly Weir Camp Reporting Form* (Figure 8), completed daily camp activity log book, smolt AWL and adult ASL data log books, and an end of season crew leader report.

Collect climate data at noon each day. These data will include water and air temperatures (°C), stream height (cm), estimated percent cloud cover, and wind direction and velocity (km/hr). Measure stream height with a stream gauge located in the same spot each year.

## **CAMP OPENING**

The crew leader will ensure all items necessary for camp opening are in working order and refer to last year's end of season crew leader report to make sure project needs and repairs can be accommodated. The camp keys are labeled and located in the finfish research office.

### **Camp Equipment Check Out and Check In**

Items with state identification stickers need to be inventoried yearly. To make this process accurate and prompt requires cooperation from camp personnel. Stickered items remaining at camp must be listed on the closing inventory placed in the camp binder each year (i.e. outboards, ATVs, refrigerators). Stickered items stored in town must be checked in and out for the season and returned to their proper location (i.e. radios, guns, EPIRBs, rafts).

## **ORDERING FOOD AND SUPPLIES**

Field crews will purchase the first round of groceries and commodities prior to leaving Kodiak. Resupply items (e.g., groceries, fuel, mail, etc.) will be sent via chartered float plane or by boat on a biweekly basis, near the 1<sup>st</sup> and 15<sup>th</sup> of each month. Completed timesheets, crew leader reports, scale gum cards, and electronic data should be put on the resupply flights and addressed to the project leader.

All air charter flights will be set up through the Kodiak office. Appropriate information regarding flight logistics and times will be relayed via the daily radio communications. Small lists can be relayed over the SSB radio or satellite phone; however, these lists should be limited to just a few items. Blank grocery lists will be available in the field so the crew can place orders 2 weeks in advance for preparation of the next supply flight. It should also be remembered that the grocery budget allocates \$30/day/person and this allocation will not be exceeded. If it becomes apparent that the grocery budget is being surpassed, the project leader will notify staff so appropriate reductions can be made.

When planning for the resupply flights it is important to prepare back-haul items and maximize the use of the chartered aircraft. Items to send back to town include empty fuel containers, non-burnable trash, biological data, and reports. When backhauling items it is important to notify office personnel of the expected items.

Alcoholic beverages, personal grooming supplies, newspapers, magazines, and tobacco must be purchased with personal funds. Please purchase as many of these personal items as possible prior to leaving for the field and be sure to set up a slush fund for incidentals before departure.

## **CAMP CLOSURE**

The crew leader will ensure the camp is winterized and all items left at camp are inventoried. Make sure all stickered items are brought back to town and checked in or inventoried. Items to return include all radios (SSB, satellite phone, and VHF's), EPIRB, defibrillator, and the shotgun. Items to include on the inventory list (with state ID #) include the lake skiff and outboard, refrigerator, and the ATV. Include the inventory and a list of project needs and repairs in the crew leader's report so they can be accommodated the next year.

## **CAMP POLICIES**

- Alcoholic beverages are not to be stored or consumed in areas open to public view. If alcohol is consumed at a camp, the employee must be 21 years of age or older and it must be consumed after work hours. Under no circumstances shall he or she engage in the operation of any State equipment, nor shall he or she return to duty status under the influence of alcohol. The abuse of alcoholic beverages will be grounds for immediate dismissal.
- All employees will be required to act in a professional manner at all times and be especially courteous to the public.
- Injuries must be reported to the project supervisor within 24 hours.
- Loss or damage of equipment must be reported to the project supervisor within 24 hours.

## **VISITORS/PUBLIC INTERACTION**

The weir site will get many visitors. Visitors come by the camp to watch fish passing through the weir and ask about fish passage. Keep the camp clean and be courteous and helpful to visitors, but also inform them of the boundaries. The general public is not allowed to access the weir. Make sure the “keep off weir” sign is posted in a visible location. Remember, your primary role is to operate and maintain the weir and accomplish the associated responsibilities of the project. Under no circumstance should any employee accept gratuities or payment.

### **Violations**

If a violation is observed try to record the incident by photo or video and write down any pertinent details. Approach the situation with caution, introduce yourself, and be courteous. If the situation escalates, leave. If the situation seems unsafe, do not approach. Inform your supervisor and the management team by radio or satellite phone either at the next schedule or ASAP, depending on the level of the violation (examples snagging is low level and commercial vessels fishing inside the markers is high level).

The use of the five Ws can aid in obtaining sufficient information pertaining to a violation.

1. What is the violation?
2. When did the violation take place?
3. Where did the violation occur?
4. Who is in violation and who are the witnesses?
5. Why was the violation committed?

### **SAFETY**

State of Alaska safety regulations and Standard Operating Procedures (SOPs) must be followed at all times. On-site personnel will exercise extreme caution when considering safety issues. Employees not following state safety regulations may be subject to disciplinary action, including termination. Employees are expected to review, understand and sign the following SOPs before field deployment. Sections of the SOP that are required reading for field personnel include:

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 required to hold a current American Red Cross First Aid/CPR certification. First Aid/CPR classes will be held in Kodiak prior to the field deployment. An approved personal flotation device will be worn at all times while boating. A survival kit including matches, VHF radio, flare gun, EPIRB, spare motor parts, and a first aid kit will also be in the boat at all times.

## **Emergencies**

Follow the emergency response flow chart provided in the camp binder and on the USB flash drive provided to the crew leader with additional emergency information.

In the event of a medical emergency, administer first aid to stabilize the situation. If an injury is life threatening and occurs on the water, immediately notify the US Coast Guard at **800-478-5555** on the satellite phone. If an injury is life threatening and occurs on land, immediately notify the Alaska State Troopers at **907-486-4121** on the satellite phone. If in doubt notify the US Coast Guard first. The US Coast Guard can also be reached on SSB radio frequency 4.125 MHz or on VHF channel 16. See appendix B for details on how to use satellite phones. A zip drive has been provided to the crew leader with additional emergency information.

When contacting the U.S. Coast Guard or troopers, have the following information ready to pass along:

The Afognak Lake Cabin is located at **58°4.5' N latitude and 152°49.3' W longitude**.

1. Name and phone number of supervisor,
2. General nature of medical emergency,
3. Number of patients,
4. Specific information regarding the patient (name, age, primary complaint, and vital signs),
5. Your assessment and treatment,
6. Wind and weather conditions, and
7. Other information pertinent to a possible medical evacuation.

## **First Aid and Fire Safety**

All crew members not already certified will take a mandatory CPR and First Aid training course prior to going in the field. The crew leader will ensure that a fully stocked first aid kit and fully charged, operable fire extinguishers are in camp and that all personnel know where they are located and how to use them. Make sure smoke and carbon monoxide alarms are installed and operational.

In the event of a fire use the emergency response flow chart and try to contain the fire with water pumps. The camp has a small water pump and a larger one is located in the Afognak Native Corporation's conex van; keys are on the camp key ring.

## **Firearms**

All field camp employees must be able to safely use a shot gun. A shot gun will be provided for camp use. Training on safe handling and shooting of shot guns will be conducted for all

personnel. Loaded guns (with a round in the chamber of the gun) are prohibited inside camp facilities. **Anyone handling a firearm should always treat it as if it is loaded.** Clean guns frequently and make certain that firearms are completely unloaded while doing so. Firearms will be stored on site, unloaded, and in a location out of sight from the public. Any misuse of firearms will not be tolerated and may be cause for immediate dismissal. Always unload a firearm of all ammunition before boarding a vehicle, vessel, or aircraft.

## **Garbage**

Completely burn garbage to prevent attracting bears. Do not burn during windy or dry weather conditions. Never start fires with fuel. To prevent grass fires, keep grass and brush trimmed to at least fifteen inches away from the burn pit. It is best to burn trash early in the morning or late in the evening when the wind is minimal and humidity is high. Never leave a fire unattended. Tin cans should be burned with burnable garbage to eliminate residual food and odors that attract bears. Send in burnt cans and non-burnable items on supply flights. All garbage that is sent to town must be double bagged.

Biodegradable garbage should be placed into a slop bucket (food scraps, etc.) and dumped away from camp in the river downstream of the weir. Don't compost biodegradable food because it attracts bears.

## **Drinking Water**

Stream and lake water may be contaminated with bacteria or harmful parasites. A "Micron" water filter is provided in the camp to filter all drinking water. If filter cartridges are damaged, replace them immediately. If filters are not available, boil your drinking water for at least 1 minute. Be sure to read the instruction manual with each filter for cleaning and care information.

## **ALL-TERRAIN VEHICLES**

Afognak field camp is furnished with an All-Terrain Vehicle (ATV; 4-wheeler). The ATV has been provided to transport materials, supplies, and equipment between the camp and supply planes or skiff. It may be used for transportation to and from sites of assigned field duties, such as surveys. It is not intended for personal use or recreational purposes. The ATV may be accessed and operated only by trained personnel and will be secured when not in use. Be safety conscious at all times; do not speed or drive recklessly and always wear an ATV helmet.

Unauthorized use of the ATV will result in a notation on your evaluation or dismissal from employment.

## **MAINTENANCE**

Facility maintenance is an important aspect of camp life; the cabins and weir must be kept structurally sound and safe. Refer to last year's end of season crew leader report for a list of needed projects and repairs. Provide a list of materials needed to accomplish the projects and repairs to your project leader. Repairs and maintenance should be scheduled on days when fish passage is slow to keep this work within normal work periods. A USB flash drive has been provided to the crew leader with equipment manuals and maintenance information.

The generator, outboard motors, and ATV must be kept in good operating condition and require regular maintenance. At the end of each season, equipment should be winterized and tagged with a description of the equipment's condition on the tag.

## COMPLIANCE WITH ADF&G REGULATIONS

All employees are responsible for complying with local subsistence, sport fishing, and hunting regulations. Copies of State and Federal regulations will be available to all field camp personnel and kept in camp. Any violation will be recorded on your evaluation and may be cause for immediate dismissal.

## SCHEDULE AND DELIVERABLES

The annual schedule of activities for the 2014 – 2016 seasons is as follows:

Date:	Activity:
May 8 – July 3	Smolt trap installed and operating; 2% AWL samples are collected weekly.
May 10 – August 15	Weir installed and operating. Daily escapement data are reported to ADF&G Kodiak and are posted online and hung at the office.
Daily	Crew lead records daily weather observations and participates in morning radio by SSB at 8:10am with the ADF&G Kodiak office, and as assigned by the project biologist. Fish are passed through the weir as needed during daylight hours. Crew lead makes journal entry in camp log.
Weekly (adults)	2% ASL samples are collected weekly.
Every two weeks	Send in scale samples and accompanying data to ADF&G Kodiak on resupply flights or by skiff.
Post-season	Crew lead authors a 1 – 2 page end of season report summarizing happenings, escapement data, and jack percentages. Crew lead also makes a field inventory and town inventory for future use. Scale data analyzed, escapement information entered into ADF&G Kodiak management reports.

## RESPONSIBILITIES

Fisheries Biologist II:	Off-site supervisor responsible for data quality management, logistics, maintaining communication with the field camp, and ensuring the field crew is trained correctly. Supervises project, runs logistics, trains crew, assists in field as necessary, and writes annual and final reports.
Fish and Wildlife Technician III:	On-site crew lead; performs duties as assigned by FB II. Field crew; assists with enumeration, data collection, and camp chores.

Fish and Wildlife Technician II:

Field crew member; assists with enumeration and data collection, duties assigned by crew lead, and camp chores.

## **SPECIAL PROJECTS**

ADF&G in collaboration with Afognak Native Corporation (ANC) and Afognak Native Village (ANV) will work together on an annual educational project. The collaborative effort is designed to cross train and educate student interns in fisheries management and research practices and educate ADF&G staff about subsistence harvesting methods and traditional ways of life.

1. Afognak Native Corporation will bring up to four high school or college interns to the Afognak Lake monitoring station for up to 2 days during each season. During their trip, the students will work side by side with the biologists learning about the importance of monitoring fish stocks. Afognak Native Corporation will cover the transportation, food and housing required for the interns.
2. Native Village of Afognak will bring Dig Afognak participants at the Traditional Harvesting Camp to the ADF&G monitoring station for half a day each season. ADF&G staff will teach the students about how and why fish stocks are monitored and how this activity relates to subsistence fishing. ADF&G will have the students help them count and sample fish. Native Village of Afognak will provide the transportation to and from the monitoring station.
3. ADF&G will send their Afognak Lake site staff to Dig Afognak for half a day during the traditional harvesting camp so they can learn hands-on from Elders and other subsistence gatherers about why subsistence foods are important to the Alutiiq people. Ideally, they will not only participate in some subsistence activities but also listen to stories from Elders about the importance of our food.
4. In a communal effort, all three groups will participate in a subsistence fishery, sharing in all aspects from net sewing and mending, to fishing, processing, drying and smoking.

The collaboration and consultations described above will help develop partnerships and build the capacity of individuals, agencies, and organizations to meaningfully participate in traditional harvests, and for the management of federal subsistence fisheries. Additionally, ADF&G will give preference to local residents, including qualified residents of the Villages of Port Lions and Ouzinkie, when hiring field crews. Local employees will be trained in various biological data collection techniques and will be educated in research applications that assist with salmon management. The study site is located in an area of high recreational use, and frequent interaction with the public will occur. Employees will be encouraged to provide accurate information to the public regarding the goals and objectives of the project, which will promote increased interaction among subsistence users, organizations, the community, and agencies. This will encourage information gathering and information sharing, which will help capacity building.

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## **FIGURES**

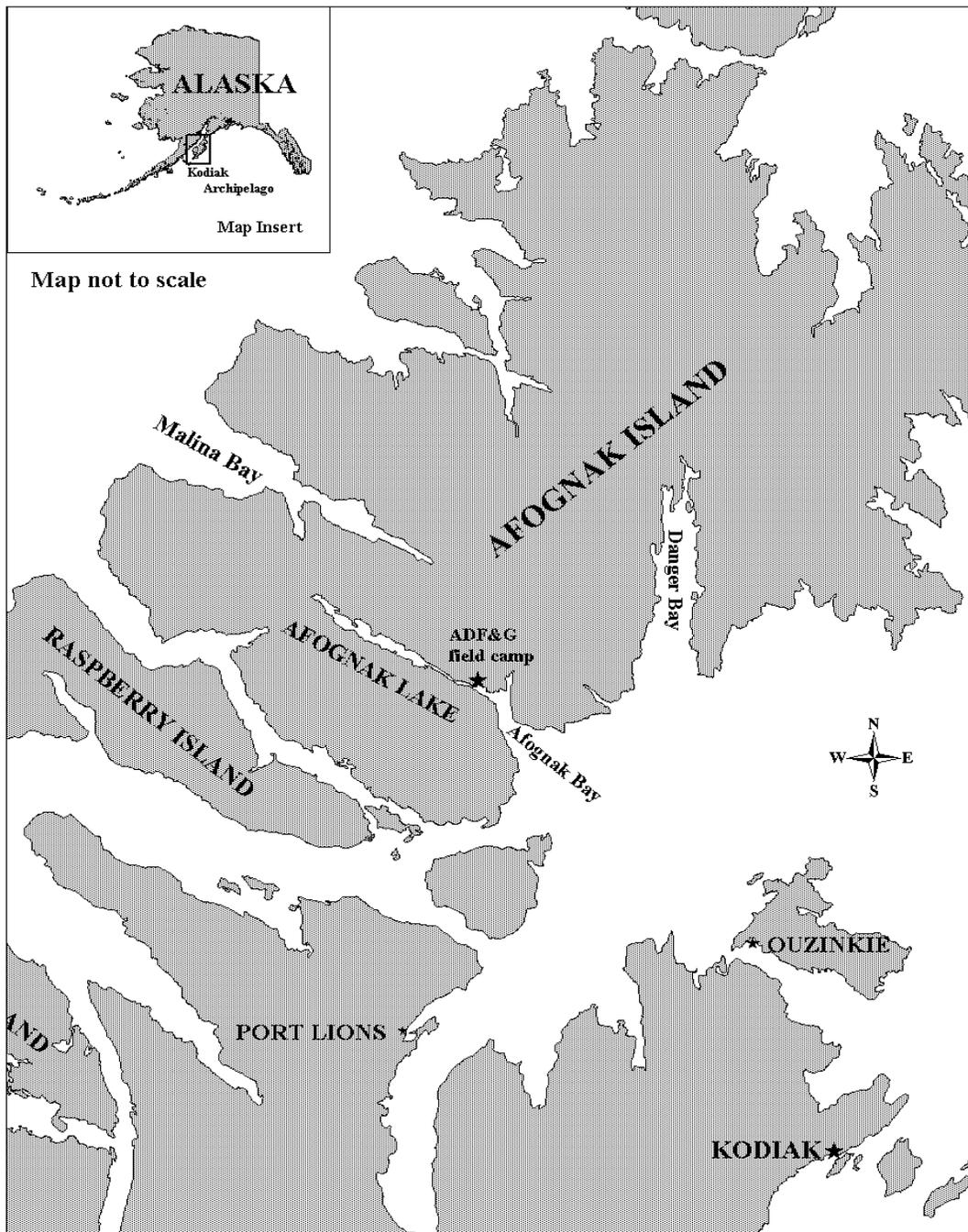


Figure 1.—Location of the ADF&G camp along the Afognak River and Afognak Lake on Afognak Island.

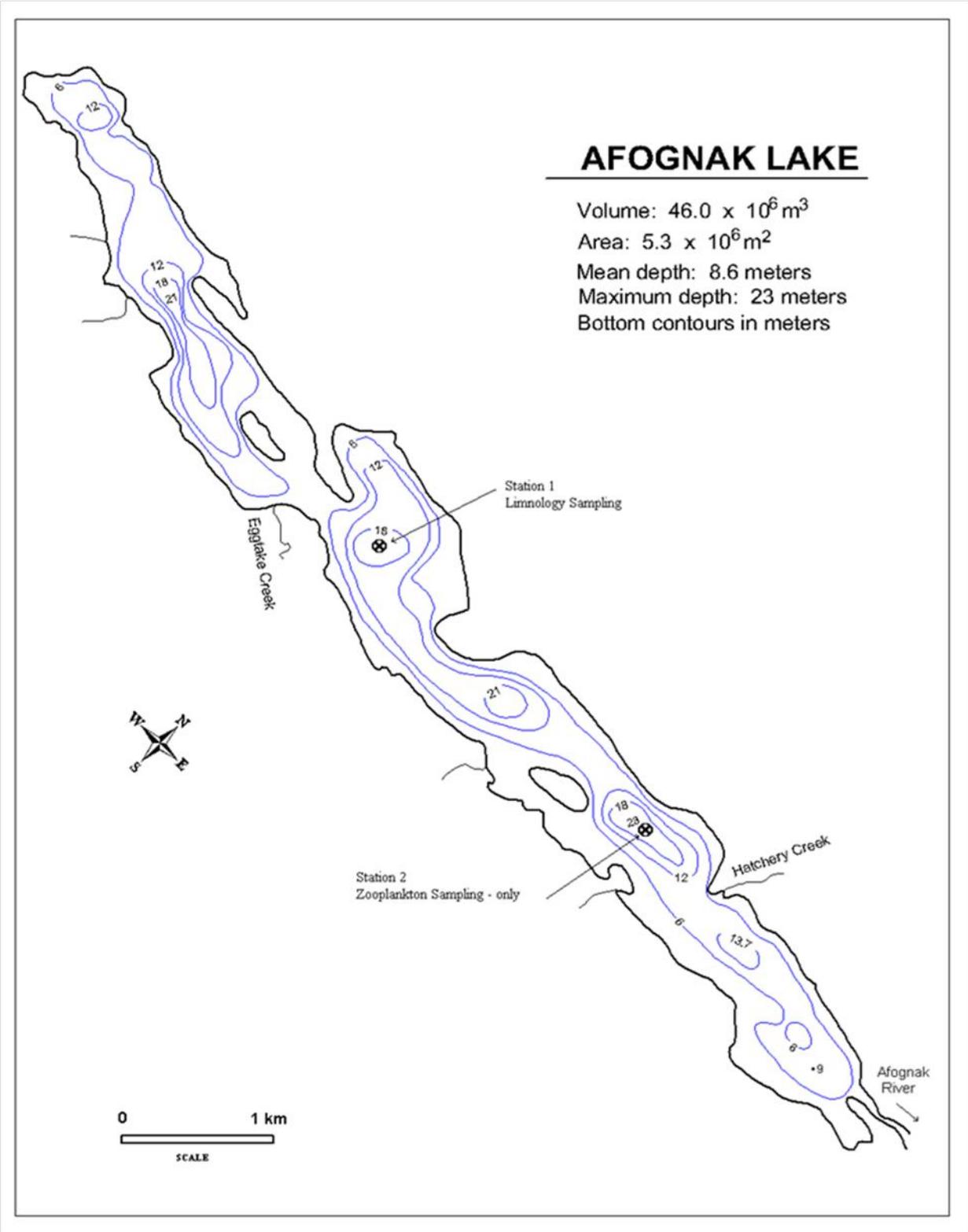


Figure 2.–Bathymetric map of Afognak Lake depicting limnology stations.



Figure 3.–Downstream view of the juvenile sockeye salmon trapping system.





## SMOLT DYE RELEASE FORM

DATE: \_\_\_\_\_

CREW NAMES: \_\_\_\_\_

PROJECT LOCATION: **Afognak** \_\_\_\_\_

NUMBER OF FISH COLLECTED: \_\_\_\_\_  
(from live box)

	COLLECTION LIVE BOX	TRANSPORT CONTAINER	DYE TUB	RECOVERY CONTAINER	STREAM RELEASE
START TIME (military)					
START TEMP (degree celsius)					
END MORTALITY (number of fish)					
OXYGEN SUPPLEMENT O <sub>2</sub> or aerator					

DYE SOLUTION (mixture 3.5g DYE (grams); 25 WATER (gallons))

TOTAL NUMBER OF MORTALITES (NOT RELEASED OR TESTED): \_\_\_\_\_

TOTAL NUMBER OF DYED FISH RELEASED: \_\_\_\_\_

COMMENTS:

### MORTALITY TESTING

DELA YED (DYED) MORTALITY

# Fish Tested: \_\_\_\_\_  
Total Morts: \_\_\_\_\_  
% Mortality: \_\_\_\_\_

HOLDING (UNDYED) MORTALITY

# Fish Tested: \_\_\_\_\_  
Total Morts: \_\_\_\_\_  
% Mortality: \_\_\_\_\_

Date	Morts

Date	Morts

Figure 6.—Smolt dye release form.



Figure 7.—View of the adult salmon enumeration weir in Afognak River, 2013

WEEKLY WEIR CAMP REPORTING FORM

Location:		Personnel:					Weekly Report no:					For Week Ending Saturday:							
Date	Daily Total Salmon Escapement						Daily Totals	Steelhead		Jack No.	Jack % Sockeye	Net Mark Sockeye	Reds Sampled	Dollies up	H <sub>2</sub> O Level	H <sub>2</sub> O Temp.	Weather		
	Sockeye	L. Sockeye	Chinook	Pink	Coho	Chum		Down	Up								Ceiling	Vis.	Wind Dir/Sp
Sun. D																			
C																			
Mon. D																			
C																			
Tue. D																			
C																			
Wed. D																			
C																			
Thur. D																			
C																			
Fri. D																			
C																			
Sat. D																			
C																			
Total for week																			

Additional Comments: Bear and people problems, smolt migration, weir problems, estimated escapements, cabin repair, etc.

Figure taken from Caldentey (2007)

Figure 8.—Weekly weir camp reporting form.



## **APPENDIX A. SMOLT SAMPLING**

Appendix A1.–Statistical (sampling) weeks and associated calendar dates.

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

## Sampling Procedures

### Slides

The left portion of each slide should be labeled prior to sampling using a fine point permanent marker with the slide number, species, area sampled, sample date, and fish numbers of the sample (Figure 1).

#### Slide number

Write the number of the slide.

#### Species

Write out completely (e.g., Sockeye).

#### Area sampled

Write the area where the fish were collected.

#### Sample date

The sampling day is the 24-hour period from noon of the first day to noon the following day, and is identified by the calendar date corresponding to noon on the first day.

#### Fish numbers

Fish should be sequentially numbered, beginning with 1 each time fish are sampled (sampling event). By starting with 1 each sampling event, it is possible to track how many fish have been sampled during each sampling event. Five fish are placed on each slide.

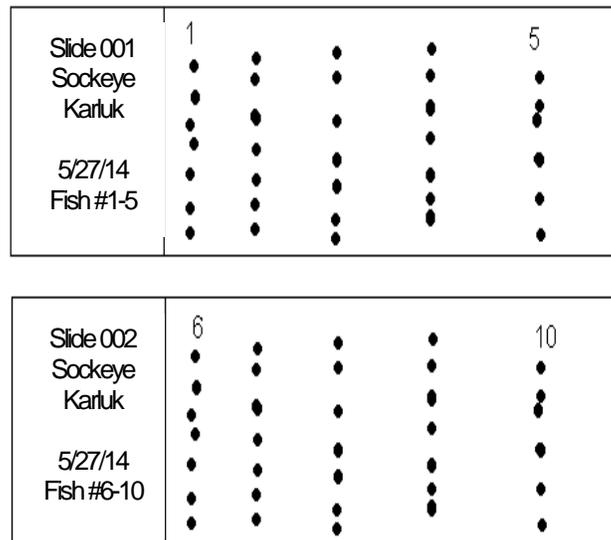


Figure 1.–Properly labeled smolt slide.

## **Sample ASAP**

Sample smolt as soon as possible after they are captured.

## **Mix anesthetizing solution**

Wearing latex gloves and goggles to prevent direct exposure to the anesthetic, dissolve a small amount (approximately of 1 g) of FINQUEL<sup>®</sup> (MS-222; Material Safety Data Sheet is in Appendix A3) and baking soda in about 2 L of cold water in a dish pan. The amount of anesthetic needed will vary slightly depending on the water temperature, freshness of the chemical, and size of the smolt. If 1 g of FINQUEL<sup>®</sup> is not anesthetizing the smolt, additional anesthetic should be added in very small increments. The concentration of the solution should be such that it immobilizes the fish in 2–3 minutes.

## **Set up recovery bucket**

Set up an additional bucket of water to be used as a recovery bucket. This bucket should be filled with fresh water, aerated, and covered to avoid stress on the fish.

## **Transport smolt to sampling area**

Transport smolt, using clean 5-gallon buckets, to the sampling area. Buckets containing smolt should be filled with fresh water, aerated, and covered to avoid stress on the fish. Fish can be placed into the bucket using a dip net, or by dipping the bucket into the live box.

## **Anesthetize smolt**

Place 1–3 smolt in the anesthetic solution until they become subdued to a point where they have decreased responsiveness, but can still ventilate their gills. They will often experience a loss of equilibrium.

## **Lightly dry**

Immediately after the fish is anesthetized, carefully remove it from the dish pan and gently pat dry with a paper towel.

## **Sample smolt**

Place the fish flat on its right side to sample the left side. Quickly and carefully take length (on a smolt sampling board, in millimeters) and weight measurements (on a calibrated scale, to the tenth of a gram), and remove 5–10 scales from the preferred area of the smolt using a scalpel (Figure 2). The preferred scales are located on a line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin, slightly above the lateral line (Figure 2). 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.

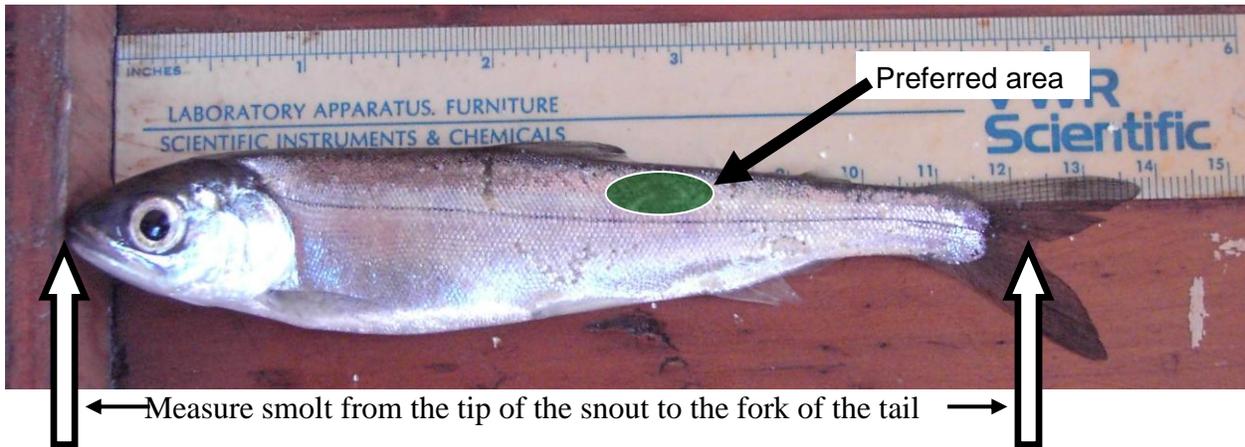


Figure 2.–Smolt with proper length measurement and preferred area highlighted.

### **Move smolt to recovery bucket**

Transfer sampled smolt from the sampling station to the recovery bucket. It is important to sample as quickly as possible and immediately place smolt into the recovery bucket to prevent mortality.

### **Align scales on slide**

Using a dissecting probe, line up and spread out the scales on the slide **under the correct fish number** (Figure 1).

### **Clean sampling supplies**

Wipe off the scalpel and dissecting probe to remove scales and slime before another smolt is sampled.

### **Continue sampling**

Continue sampling smolt until sampling goals are met, or all available smolt have been sampled. The water in all buckets (holding, recovery, and anesthetizing) may need to be refreshed if sampling is taking a long time, and the fish seem more distressed than before, or are not recovering.

### **Release smolt**

Once the sampled fish have recovered and are swimming normally in the recovery bucket, they should be released downstream of the trapping location. If there is any mortality during sampling, this must be recorded on the appropriate sampling forms.

-continued-

## Data Entry/Management

Data obtained while sampling is recorded using a Meazura Rugged Digital Assistant (RDA). The RDA is a waterproof device used to digitally record sampling data. Sample information is transferred from the device to a netbook after each sample. A USB flash drive is used to save and transfer data from the netbooks located in field camps, to the office, throughout the season. An RDA is shown in Figure 3.

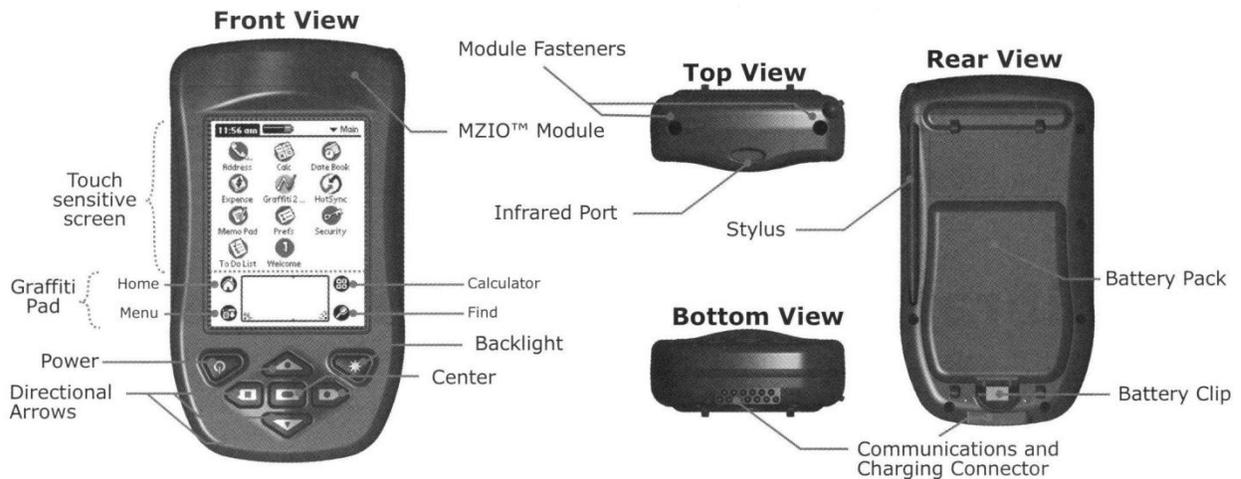


Figure 3.–Rugged Digital Assistant (RDA).

## Entering Data Into the RDA

To begin using the RDA, turn it on by pressing the power button (Figure 3; Table 1). Using the stylus, tap the home icon in the bottom portion of the screen to bring up the main menu. It may be necessary to press the home icon several times to bring up the entire main menu. Next, tap the Forms 5.1 icon. Pendragon Forms (Forms 5.1) is the program that you will use to enter all of the sample data. After the icon is selected, the Pendragon Forms screen will appear. If a form was left open by a previous user, it may be necessary to hit the Quit or Done button to get to the main list of forms. Highlight the appropriate sampling form (Smolt\_2014.XX) and select New, which is found in the lower left corner of the screen. The four main buttons of the form will now be visible: Enter Background Info, Sample Next Fish, Review, and Quit.

-continued-

Image	Description
	Power Button - Button you will press on the RDA itself
	Home Icon - Use the stylus to navigate to the home screens
 Forms 5.1	Forms 5.1 Icon - Use the stylus to open Pendragon Forms 5.1
	This is an example of a button within Pendragon Forms. Use the stylus to select these buttons.

Table 1.–Buttons and icons addressed in the text.

## Enter Background Info

Background information must be entered at the start of each sampling event. A new day always constitutes a new sampling event, so it will be necessary to enter new background information typically once per sampling day. It is important to edit background information when any change in sampling information occurs. The following topics constitute sampling information. If information in one of the following categories changes, it is necessary to change the background information.

### Species

Select the appropriate species from the drop down list on the RDA.

### Management Area

Choose the relevant management area from the dropdown list. Samples collected from Kodiak Island statistical areas must have Kodiak selected as the proper management area.

### Area Sampled

Select the area that best represents where the fish were sampled, such as Ayakulik River, from the dropdown list.

### Location ID (N/A for some areas)

Enter the site where the fish being sampled are from. Talk to the project biologist if you have questions about the Location ID.

### Location Type

Indicate the type of area in which the fish were captured.

-continued-

### **Gear Type**

Select the type of gear in which the smolt were caught.

### **Date of Sample**

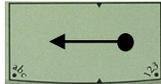
For smolt, the sampling day is the 24-hour period from noon of the first day to noon the following day, and is identified by the calendar date corresponding to noon on the first day. This should match the date written on the slide.

### **Sampler Initials**

Enter the initials of the sampling crew (up to 3 persons). This can be done by writing in the box on the bottom of the screen, or by using the pop up keyboard (see note below).

### **Notes**

1. When entering text, you may tap on the dot by the abc icon to bring up a keyboard. 
2. To delete a character, place the stylus in the text box and draw a small straight line from right to left.



### **Sample Next Fish:**

After entering background information, the RDA is ready to collect individual fish data. The Sample Next Fish button is used to enter the details of each fish sampled. It is not necessary to click on the Sample Next Fish button when entering the first fish of a new sample. After entering the background information, the form automatically knows to go to the sample next fish section of the form. As you continue to sample, simply tap Sample Next Fish or Next to enter individual fish data. This option is used when continuing to the next fish of a sample where no background information has changed. Fish data that is entered here is associated with the current background information logged. The following constitute fish data and should be entered for each fish.

#### **Scale Slide (Card) Number**

Slides are numbered sequentially by date throughout the season starting with 1. A separate numbering sequence will be used for each species or major location change. Consult your crew leader for the current slide number. It is crucial to make sure the number written on the slide matches the slide (card) number entered into the RDA. The slide number will automatically advance to next number after five fish have been sampled. Slides should not have the same number.

#### **Fish Number**

The fish number is a sequential numbering system that begins with the number 1 for each sampling event. This allows samplers to keep track of the number of fish sampled each day (or since the background was changed). By default, the fish number in the RDA will automatically advance after each fish is sampled. It will also go back to 1 whenever the background information is changed.

### **Length in mm**

Enter the length of the smolt from tip of snout to tail fork in millimeters (Figure 2). If for some reason you do not collect a length measurement, enter 999.

### **Fin Clip and Genetics**

Select the Skip Fin Clip and Genetics button if appropriate. If sampling involves fin clips or genetics you can enter the optional fin clip and genetics information.

### **Sample Next Fish**

Select Sample Next Fish to continue sampling.

## **Review/Edit**

The review button can be a very useful tool during sampling. It can be used to ensure data being entered is accurate, or it can be used for editing fish data during a sample. The review portion of the form displays slide number, fish number, length, and weight. The most recently sampled fish appear first. To enter the review screen, tap on the Review button on the main screen of the form. After the data has been reviewed and edited, tap the Done button on the bottom right of the screen to return to the main screen of the form. If Sample Next Fish is selected after leaving the review screen, the auto-increment will continue as if the review screen was never entered.

### **Reviewing Data**

To review the last data entered, tap the Review button on the main screen of the form. Use the scroll bar on the right side of the screen to look at the fish that have been entered.

### **Editing Data**

There are a few options for editing data. Data can be edited on the RDA itself, in the net book after a HotSync, or by the Kodiak office staff. It is very important to pay careful attention when editing data, so additional mistakes are not made. It is recommended that unless you are comfortable with the RDA and its' associated programs that a note explaining the error and what needs to be changed is sent in for someone in the Kodiak office to fix.

For editing data in the RDA use the Review button. If fish data needs to be edited, tap on the line that needs to be edited using the stylus. Tap on the Sample Next Fish button to go through the fish data that was previously entered for that fish. Changes can be made as needed. Buttons chosen prior to the review are highlighted with asterisks. After a fish has been edited, the main review screen appears. If a fish is accidentally selected from the main review screen, click the button that has slide#-fish# to return to the main review screen without going through the fish data. As mentioned above, tap Done to exit the review portion of the form and return to the main screen.

## **Quit**

When sampling is complete, tap Quit to exit the form.

## Data Management

After sampling is done for the day, the data must be backed up on the RDA itself and then transferred (by HotSync) to the netbook.

### Backing up data

After each sample event the RDA should be backed up so that data is stored on both of the compact flash drives located inside the RDA. Turn the RDA on, and tap the home icon in the bottom portion of the screen to bring up the main menu. Tap the CardBkup icon if it is present, and then the Backup Now button at the top left of the screen. The data will now be on both flash drives. If the RDA does not have a CardBkup icon, it will back up automatically.

### Downloading Data to Netbook

Connect the communications cable into the RDA and a USB port on the netbook. Press the power button to turn on the RDA and begin a HotSync by tapping the home icon, and then the HotSync icon found on the main menu. Tapping the large icon in the center of the screen will start the HotSync operation (Figure 4). Please make sure the RDA is dry before downloading any data to the netbook.

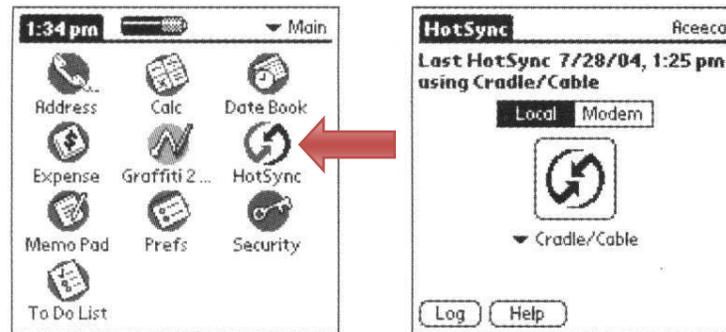


Figure 4.–HotSync Screens Found on RDA.

### Editing, Naming, and Saving Data

To view data, HotSync the RDA and open Pendragon Forms Manager (a shortcut should be located to the right of the start menu) on the netbook. Select the form (Smolt\_2014.XX), and click Edit/View under Data Functions on the right side of the window. All data will now be visible. Minor changes can be made here by navigating to the correct columns and changing the numbers. Exiting out of the window saves the changes on the netbook. It is important to correct the numbers under the proper column. A HotSync must be performed after any changes are made on the netbook to update the RDA. As mentioned before, if a mistake is caught during a sample event it is often easiest to document the mistake and send the correction in with the USB flash drive for the Kodiak office to fix.

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After data has been edited and verified, a copy of the database will need to be exported from the Pendragon software and saved on the netbook. After saving, a window will pop up stating the file has been created. Each .csv file will contain all of the data that has been collected up to that point in the season. Do not edit or save the .csv file as an excel file or it will be difficult or impossible to upload the data into the database. To save a file, follow these instructions:

1. In Pendragon Forms Manager (under Data Functions on the right side of the window) click **To ASCII**.
2. Navigate to the folder in which the data is being saved.
3. Type in the file name. The file name should follow this format:  
Area\_Sampled\_Smolt\_YYYYMMDD.csv (e.g., Afognak\_River\_Smolt\_20140614.csv).
4. Click Save

## **Transferring Data from Netbook onto USB Flash Drive**

Up to date data should be sent into the main office as often as possible (e.g., with the grocery plane). Data should be sent in on a USB flash drive. To move the saved file on the USB flash drive, follow these instructions:

1. Insert a USB flash drive into an appropriate port on the netbook.
2. Double click on MyComputer, which is found on the desktop of the netbook.
3. Navigate to the folder where your data is saved and highlight the most recent file (determined by the date) by single clicking.
4. With the file highlighted, click on edit at the top of the window and then copy.
5. Open up MyComputer and double click on the USB flash drive (often called “Removable Disk”) found under the heading “Devices with Removable Storage.”
6. Click on edit at the top of the window, and then paste. The .csv file that was copied earlier will appear in the window indicating it was copied to the flash drive.
7. Exit out of all windows
8. Single click on the safely remove hardware button on the bottom right corner of the desktop in the quick start menu.
9. Click on “Safely remove USB Mass Storage Device.” A pop-up will verify that it is now safe to remove the flash drive from the system.

## **Powering the Netbook and RDA**

1. The RDA can be charged with either the AC or DC powering options. It is the crew leaders responsibility to keep it charged
2. The netbook can only be charged with the AC power adaptor, therefore plan accordingly for generator use. The charging light on the netbook is red when charging, and green when fully charged.
3. If there are powering problems, please contact the office immediately.

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-continued-

## Some Notes and Reminders

1. Connect the AC adaptor to the bottom of the communications cable to charge the RDA batteries. If using the DC charger, connect the charger into the communications port.
2. If a mistake is noticed before moving onto the next fish, the previous button can be used to make changes in the RDA without having to go to the review screen or alter the data on the netbook.
3. Each length, weight, and scale must correspond to a single fish! It is the responsibility of the crew leader to be sure the data has been entered correctly.
4. Never put data from different dates onto one slide, and always enter new background information for each sampling day. Even if only one fish is sampled that day, enter new background information and begin with a new slide the next day.
5. Responsibility for accuracy lies first with the primary data collector(s) and finally with the crew leader. Sloppy or incomplete data or slides will be returned to individual collectors for correction.
6. Ensure that all equipment is well kept. Electronics should be stored in a clean safe place. The RDA must be completely dry before transferring data to the netbook. RDA batteries must be charged to make certain sampling is not hampered. It is the responsibility of the crew leader to make sure that all data is carefully examined before returning it to their supervisor.

## Troubleshooting

### Resetting the RDA

If problems are encountered with the RDA, a soft reset can be done without losing data. To perform a soft reset hold the power and backlight button down together, and release at the same time. If a soft reset does not work, the office should be contacted about other options for resetting.



Press and release Power and Backlight button together

### HotSync Error Message

HotSync message "Exceeded user storage space limit of 500KB in form 'Smolt\_2014.XX'

1. Open Pendragon Forms Manager
2. Under Form Function click on "Properties"
3. Click on "Advanced Properties"
4. Click on the "Synchronization Tab"
5. Change the Storage Limit (KB) to 5000 instead of 500.
6. Click "OK"
7. Under Form Functions Click on "Distribute"

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-continued-

## **Other Problems**

For other problems with the RDA or the netbook that cannot be figured out by the crew or project leader, contact Michelle Moore at (907) 486-1855 or [michelle.moore@alaska.gov](mailto:michelle.moore@alaska.gov).

**ARGENT** Chemical  
Laboratories



8702 - 152<sup>ND</sup> Avenue Northeast  
Redmond, WA. 98052-3506  
TEL: (425) 885-3777  
FAX: (425) 885-2112  
www.argent-labs.com  
email@argent-labs.com

Primary Manufacturing Chemists

**NFPA Ratings** Flammability



## MATERIAL SAFETY DATA SHEET

**FINQUEL**<sup>®</sup>  
(MS-222)

### SECTION I - PRODUCT IDENTIFICATION

DATE: April 21, 2009

PRODUCT NAME AND SYNONYMS: Finquel, 3-aminobenzoic acid ethyl ester methanesulfonate, Ethyl M-aminobenzoate, methanesulfonic acid salt, MS-222, Tricaine

CAS NO. AND NAME: CAS # 886-86-2, Tricaine Methane Sulfonate

CHEMICAL FAMILY: Anesthetic

CHEMICAL FORMULA: C<sub>10</sub>H<sub>13</sub>NO<sub>3</sub>S

MANUFACTURER'S NAME AND ADDRESS: ARGENT CHEMICAL LABORATORIES  
8702 - 152<sup>ND</sup> Ave. NE  
Redmond, WA. 98052  
(425) 885-3777

EMERGENCY TELEPHONE NUMBER: (800) 451-8346 USA ONLY  
(760) 602-8700 OUTSIDE USA

### SECTION II - HAZARDOUS COMPONENTS

COMPONENTS: Tricaine Methane Sulfonate

CAS #: 886-86-2

% BY WEIGHT: Not established

ACGIH TLV<sup>®</sup>: Not established

OSHA PEL: Not established

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### **SECTION III - PHYSICAL PROPERTIES**

APPEARANCE AND ODOR: White powder with slight to no odor

MOLECULAR WEIGHT: 261.31

BOILING POINT (degrees Fahrenheit): Not applicable

MELTING POINT (degrees Fahrenheit): 300° - 302° (149° - 150° C)

VAPOR PRESSURE (mm of Mercury): Not available

SPECIFIC GRAVITY (water = 1): Not available

VAPOR DEBSITY (air = 1): Not available

PERCENT VOLATILE (by weight): Not available

pH: Not available

SOLUBILITY IN WATER: 1g/0.8 ml at 20° C

EVAPORATION RATE (Butyl Acetate = 1): Not available

### **SECTION IV - FIRE AND EXPLOSION DATA**

FLASH POINT (degrees Fahrenheit, Setflash ASTM D3278-78): N/A

FIRE EXTINGUISHING MEDIA: Use water spray, carbon dioxide, dry chemical powder alcohol or polymer foam.

FLAMMABLE LIMITS (percent by volume): N/A

LOWER: N/A

UPPER: N/A

SPECIAL FIRE FIGHTING PROCEDURES AND EQUIPMENT: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Emits oxides, sulfur oxides, carbon monoxide and carbon dioxide.

### **SECTION V - REACTIVITY DATA**

STABILITY: UNSTABLE: ( ) STABLE: ( **X** )

CONDITIONS TO AVOID: None

INCOMPATIBILITY (material to avoid): Acids, acid chlorides, acid anhydrides, chloroformates, strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic fumes of nitrogen oxides, sulfur oxides, carbon monoxide and carbon dioxide.

HAZARDOUS POLYMERIZATON: WILL OCCUR: ( ) WILL NOT OCCUR: ( **X** )

CONDITIONS TO AVOID: None

## **SECTION VI - HEALTH HAZARD INFORMATION**

**EXPOSURE FROM ROUTINE USE:** May be harmful by inhalation, ingestion, or skin absorption. Causes eye and skin irritation. Material is irritating to mucous membranes and upper respiratory tract.

**EFFECTS OF OVEREXPOSURE:** Not known

**PROBABLE ROUTE OF EXPOSURE:** Inhalation, skin, eyes, and ingestion.

**EYE CONTACT:** Flush eyes with copious amounts of water for 15 minutes. Seek medical attention.

**SKIN CONTACT:** Remove contaminated clothing, wash affected area with soap and water. If irritation occurs, seek medical attention. Launder clothing before reuse.

**INHALATION:** Remove to fresh air, if not breathing give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention.

**INGESTION:** Wash out mouth with water provided person is conscious. Call a physician.

## **SECTION VII - TOXICITY DATA**

**ORAL:** Not available

**DERMAL:** Not available

**INTRAVENOUSLY:** Frog: LDLo 250 mg/kg  
Mouse: LD50 180 mg/kg

**CARCINOGENICITY:** To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

**OTHER PERTINENT DATA:** None

## **SECTION VIII - SPECIAL PROTECTION INFORMATION**

### **PERSONAL PROTECTION EQUIPMENT**

**PROTECTIVE GLOVES:** Chemical resistant rubber or neoprene.

**EYE PROTECTION:** Chemical safety goggles.

**RESPIRATORY PROTECTION (specific type):** Self contained breathing apparatus or NIOSH / OSHA approved respirator.

**OTHER PROTECTIVE EQUIPMENT:** Impervious clothing to minimize prolonged or repeated contact.

### **VENTILATION**

**LOCAL EXHAUST:** Not applicable

**MECHANICAL (general):** Required

**SPECIAL:** None

## **SECTION IX - SPILL, LEAK AND DISPOSAL PROCEDURES**

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Wear self contained breathing apparatus or NIOSH / OSHA approved respirator, rubber boots and chemical resistant gloves. Sweep up spilled materials and hold for waste disposal in appropriate container. Avoid raising dust. Ventilate spill area and wash after pick-up is complete.

WASTE DISPOSAL METHODS: Dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an after-burner and scrubber. Observe all Federal, State and Local laws.

CLEAN WATER ACT REQUIREMENTS: None

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REQUIREMENTS: None

## **SECTION X - REGULATORY INFORMATION**

TSCA: This product is registered on the inventory.

DOT: Not DOT regulated.

PROPER SHIPPING NAME: N/A

HAZARD CLASS: N/A

LABEL REQUIRED: N/A

IDENTIFICATION NUMBER: N/A

OTHER PERTINENT INFORMATION: N/A

## **SECTION XI - SPECIAL PRECAUTIONS AND COMMENTS**

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

- Wear appropriate NIOSH / OSHA approved respirator.
- Wear neoprene or rubber gloves.
- Wear safety goggles.
- Use with safety shower and eye bath close.
- Avoid breathing dust.
- Avoid contact with eyes, skin and clothing.
- Wash thoroughly after handling.
- Store in a cool, dry and dark place as material is photosensitive.

OTHER PRECAUTIONS: Working with solutions of Finquel according to label directions does not pose any known health hazards, however we advise the use of proper safe guards in any situation where chemicals are handled.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM RATING (HMIS):

Health ( 1 )    Flammability ( 0 )    Reactivity ( 1 )

REGISTRATIONS / CERTIFICATIONS:

IMPORTANT: The information and data herein are believed to be accurate and have been compiled from sources believed to be reliable. It is offered for your consideration, investigation and verification. Buyer assumes all risk of use, storage and handling of the product in compliance with applicable Federal, State and Local laws and regulations. ARGENT MAKES NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, CONCERNING THE ACCURACY OR COMPLETENESS OF THE INFORMATION AND DATA CONTAINED HEREIN. Argent will not be liable for claims relating to any party's use of or reliance on information and data contained herein regardless of whether it is claimed that the information and data are inaccurate, incomplete or otherwise misleading.



**APPENDIX B. SATELLITE TELEPHONE AND DISPATCH  
INSTRUCTIONS**

The following information serves as a Policy Statement regarding the allowable uses of ADF&G satellite phones and Instructions on the proper method to successfully set up and operate the satellite phone system assigned to your camp.

These systems are not like standard telephones or cell phones, nor are they like a single side band or VHF radio. Communication is sent through the transmitter to low level satellites, then is beamed down to ground stations, either directly to another satellite phone system or to a switching station linked to standard telephone lines. As such, there is a much higher cost involved in operation than with standard telephone long distance or cell phone charges.

Under no circumstances may you use this satellite phone system for personal calls, unless a family or personal emergency exists. This does not mean that field crew leaders may grant permission for personal use of this phone. Only the project biologist may give you such permission. **ANY DELIBERATE MISUSE OF THIS SYSTEM, SUCH AS MAKING UNAPPROVED, NON-EMERGENCY, OR PERSONAL CALLS, WILL RESULT IN DISCIPLINARY ACTION, WHICH MAY INCLUDE SUSPENSION OR DISCHARGE.**

The primary purpose for having this satellite phone is for secure, reliable communications between remote field stations and ADF&G offices (Kodiak, Chignik, Cold Bay, Sand Point, or Port Moller), ADF&G research vessels (Resolution or K-Hi-C), Fish and Wildlife Protection vessels and offices, or other field camps that are similarly equipped. The secondary purpose is for your SAFETY. With these phones you are capable of directly dialing emergency services at any time of the day or night. It is essential that these phone systems are maintained in good working order, are fully charged or hooked to sufficient power at all times, and remain free for official or emergency use.

## **INSTRUCTIONS**

The portable sat phone unit must be charged with power. There is an internal battery pack, and a 12-volt adapter is available in order to hook the phone to a larger battery bank, that may in turn be recharged by generator or solar panels.

Turn the unit on using the power switch in the lower left corner. A green light, just above the switch, should come on indicating that the unit is sufficiently powered. If no light or a red light comes on, you will need to charge the unit, or attach it to your 12-volt battery bank via the appropriate connections.

The back, or top, of the briefcase-like unit is the antenna, and it must be oriented correctly in order to access the receiving satellite. The top of the case should be open and pointed in a general east-southeast direction. You must have a fairly clear line-of sight to the horizon in that direction; this unit will NOT work through walls or mountains. The angle of the antenna should be almost vertical; remember to lock the support arm that attaches the lid to the main body of the unit, along the right side.

This system has two means for calling; a telephone-like handset (for dial in or dial out phone calls), and a push-to-talk microphone (for ‘dispatch’, unit to unit, calls). All calls made with the handset are billed per minute of use, at an expensive rate. All calls on the ‘AlaskaNet’ dispatch system, using the microphone, are essentially FREE.

When first turned on, the handset and microphone should become active, with the display panels on the top of the phone handset and microphone lighting up (one LED panel, hopefully the one on the handset, should read SLEEP). The display will show, after a few moments, whether a connection has been established with the satellite, and how strong the signal is (ex. *B05 S 21*). Turn the unit slightly, and raise or lower the lid/antenna slightly until the highest possible signal strength is indicated (normally above 20 but will work down to 8). Lock the lid/antenna in place and do not turn the unit again, until your communications are finished. Once a strong signal is acquired push the “\*” button for 2 seconds. Wait until there is a “beep” and the LCD screen displays ‘00:DN ??’, then dial the number.

### **Alaska Dispatch System**

Because all calls made on the dispatch system are FREE, this is the method of choice for using the satellite phone units. There are several ADF&G offices, many field camps, and two research vessels on the AlaskaNet dispatch system, as well as Fish and Wildlife Protection/State Troopers offices and vessels, plus many canneries, fishing vessels, and tenders. You should have received a 10-12 page directory with your phone.

First, make sure the unit is turned on, and that there is sufficient power. Set the unit up so that the signal strength is at the maximum for your location. You should see the signal strength on the microphone display (ex. *B05 S 21*), and the handset display should read SLEEP. Once a strong signal is acquired push the “\*” button for 2 seconds. Wait until there is a “beep”.

On the microphone display, below the signal strength, there should be a query, ‘00:DN ??’. This is asking you to ‘dial’ in the 4-digit dispatch number that you wish to call. After you have entered the 4-digit dispatch number of the unit you wish to contact, hold in the microphone key and a connection will be made with the satellite, which will then try to connect with the dispatch number you punched in. IF a connection is made you will hear two beeps (“bird chirps”) and the microphone display will read SELF. While continuing to hold in the microphone key, call the station you wish to talk to. USE ALL THE SAME FORMALITIES AS WHEN CALLING ON A SSB RADIO. For example, say “Calling the ADF&G Kodiak Office, Calling the ADF&G Kodiak Office; this is Karluk Weir”. When you release the microphone key, the unit will beep again.

BE PATIENT. It will take some time for the signal to go up to the satellite, down to the number you called. It may take the other party some time to get to the microphone and respond (this is especially true for calls to the ADF&G office; supervisors have to walk down to the radio room to respond). When they respond, their 4-digit dispatch number (DN) will show on the microphone display. This is a private conversation, unlike the previous dispatch service.

Just remember to be patient; wait until the other party stops speaking and you hear the unit beep (indicating that they are finished with this portion of their communication), the display should read SELF, and you may key microphone to talk. Then you must again wait for the other party to respond. If the other party is not there, they simply will not answer. If the satellite connection cannot be made, the display will read ‘Unable to Connect’ or ‘Not Available’.

### **Phone System**

**DO NOT USE THE HANDSET TO PLACE CALLS UNLESS ABSOLUTELY NECESSARY.** All calls made with the handset are billed per minute of use, at an expensive rate. Calls should only be made to supervisors, either when radio or dispatch contact is not possible or when a confidential message needs to be relayed. Calls are made by dialing out, almost like a standard telephone. Punch in the area code and telephone number, then **PRESS SEND** (button located in the upper right corner of the handset). Because there is a satellite relay, there will be a slight delay between when you speak and when the other party hears you, so be patient.

Note EVERY call in a phone logbook. The system will show you the amount of time you’ve used on the call, on the LED panel. Note the number called, the date, approximate time, and the length of the call (minutes and seconds). When the call is completed, you **MUST** push the **END** button (top right corner of handset buttons), otherwise the system will remain active and **YOU** will be billed for the time (at almost a dollar a minute). Remember, **PRESS END**.

If someone calls in to this unit, it will ring, like a standard telephone. Press the **SEND** button to start the conversation, but remember to **PRESS END** to finish the call. ADF&G is billed for all calls made using the handset, both the calls you dial out and any calls dialed in.

### **IN CASE OF EMERGENCY:**

If there is a medical emergency, or a real danger to life or health, **IMMEDIATELY** call the US Coast Guard Rescue Coordination Center at 800-478-5555. Be ready to tell them your name, exact location (latitude and longitude or nearby major landmark), and the exact nature of your emergency. They may question you extensively, so be prepared. There are emergency doctors on-call that can advise you. After the call is completed, immediately call your supervisor, at work or at home, and relay the details of your experience.

If there is an enforcement emergency, use the dispatch microphone to call the Kodiak office or the Alaska State Trooper, Fish and Wildlife Protection (DN 6370).

## **APPENDIX C. WEEKLY REPORT EXAMPLE**

To: Steven Thomsen,  
FB II  
Commercial Fisheries Division  
Region IV- Kodiak

From: Natura Richardson,  
FW technician III, Afognak Crew Leader  
Commercial Fisheries Division  
Region IV- Kodiak

**Subject: Field Report for July 16<sup>th</sup> –July 30<sup>th</sup>, 2013**

### **Adult Weir Counts**

The adult sockeye run was extremely slow this period. For the week ending on July 20th, the weekly total was 285 and the season total was 38,815. During that week we sampled 20 adults for a season cumulative of 830. Through the 30th the cumulative was 38,966. This week we also sampled 20 adults for a season total of 850 adults sampled. No other species were passed during this period.

### **Juvenile Collection and Lake Work**

Mid-Lake trawling was performed on the evening of July 22<sup>nd</sup>. We trawled across the lake at each of the mid-water sites and captured a total 6 juvenile sockeye from sites 9 and 10. Sadly, this is the most we have caught mid-water all season. Beach seining was performed on the evenings of July 23<sup>rd</sup>. Collection was successful and juveniles were captured from all 5 sites for a total of 38 fish.

### **Miscellaneous**

Melony Lechner came out to Litnik to help on July 20<sup>th</sup> and she was able to stay out until the 26<sup>th</sup>. She was a great help with the lake work.

The weather has been extremely warm and with no precipitation. The river temperature has been averaging about 17° and the water level continues to drop approximately 5-10 cm every day. The river reading gauge is placed slightly above the river bottom such that a reading of 0 is possible. The river has been reading at 0 since July 24<sup>th</sup> but the river is approximately 10 cm below that 0 reading.

## **APPENDIX D. TIMESHEET INSTRUCTIONS**

All ADF&G employees must fill out a time sheet 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 time sheets 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 time sheet up to the day you send them in and attempt to project your remaining hours worked.

## EVE TIMESHEET INSTRUCTIONS

**PLEASE MAKE SURE THE FOLLOWING ITEMS ARE CORRECTLY FILLED OUT ON THE  
TIMESHEET.**

1. Pay Period End Date
2. Employee ID Number (NOT Social Security Number)
3. Name
4. Division
5. Enter time as actual hours worked
6. Ensure time calculated equals time worked (Work Hours Total = Daily Start/Stop Times)
7. No less than 37.5 hours need to be met weekly starting Monday and ending Sunday
8. Enter the Appropriate hours for sea duty, standby, or hazard
9. **If working past midnight—write 23:59** on the day worked and **on the next day—write 00:01**. (Ex: On the 24<sup>th</sup> you worked until 01:30 AM, you would put 23:59 as your stop time on the 24<sup>th</sup> and your start time as 00:001 on the 25<sup>th</sup>).
10. Clock out for lunch and back in when you return.
11. Supervisors make sure all leave is entered—be it personal, annual, sick, holiday, flex, etc.
12. Enter the total hours worked **IN EACH COLUMN** for each individual code—1,2,3, or 4
13. **Supervisors make sure the pay code is correct for the time charged** and in the “**Charge To**” box (left center) before you sign.
14. In the “**Comments**” section—please list the following if applicable:
  - a. Departure and return time via boat, EX: 10:00 am dep. Port via F/V Hasta La Pasta, 3:00 am arr. Port.
  - b. Departure and return time of low level aerial survey (for each flight if more than one), and type of plane being used (180, 260, Beaver).
  - c. Hazard pay for aerial surveys is in **4-hr increments** at the time the survey begins—**NOT**—4 hours hazard pay for each survey.
  - d. Explain the reason for hazard pay for each day—**no one hired after July 1, 1996 gets hazard duty pay unless working under the 4-hour increment rule qualifier:**
    - i. DIVING
    - ii. NON-PILOT AERIAL

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- iii. TRANSPORTATION BY HELICOPTOR OR WORKING ON/UNDER IT
  - iv. WORK FROM 25 FT TOWER
  - e. Explain whether you worked or did not work on holidays
  - f. Explain Standby pay (Ex: 1000-1500 standby for boat gate). Must be on standby roster prior to claiming standby pay. **Standby hours cannot be the same as hours worked. The only hours not documented as 15-min increments are 2359/0001. Hours can start/stop on the same hour as shift time (Ex: Start/stop for work—0800-1200, standby hours can be 1200-2359, or 0001-0800).**
  - g. SU Employees—Floating Holiday forms must be faxed in for approval prior to the holiday worked. If at sea, premium pay is more pay than floating the holiday.
  - h. SU Employees—FlexTime agreements must be submitted for approval **prior** to working the hours.
  - i. If using **Comp in Lieu of OT**—write in LARGE LETTERS at the bottom of EACH TIMESHEET it applies to: “COMP IN LIEU OF OT.”
  - j. Explain any other variances from the normal in this area for each day.
  - k. If Flexing the last work week of the pay period, write “Flexing Work Week” on the **last day of the pay period.**
15. Premium Pay—if premium pay is to be charged to a **DIFFERENT** pay code than regular hours worked—log the hours and codes at the bottom right section in **“OVERRIDES.”**
16. Make sure both the employee and supervisor have signed and dated the timesheet. IF the employee is in the field the supervisor may sign for the employee and write “For John Doe.” Fax or scan and e-mail the timesheet WITH signatures as soon as possible. If the hours are different, please write **“Amended”** on it.
17. **MOST IMPORTANTLY—PLEASE WRITE LEGIBLY.** The faxed copies are very hard to decipher—the neater they are written the less time spent on the phone or e-mail confirming hours.
18. **PLEASE DO NOT USE** pencils, pink or red pens (they do not show up well when faxed or scanned).

**\*\*EVEN IF WORK IS STARTED IN THE MIDDLE OF THE PAY PERIOD, ALL DATES NEED TO BE WRITTEN IN FOR THE PAY PERIOD\*\***

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

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Appendix D2.-Example of a completed timesheet.

ALASKA DEPARTMENT OF FISH AND GAME Time and Attendance Report

★ Pay period ending: 4/15/2012 ★ EMPLOYEE # 100001 ★ Name: Giovanni Corleone ★ 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	Start	Stop	Leave Taken	Sea Duty	Standby	Hazard	Code 1	Code 2	Code 3	Code 4	Holiday / Leave	Work Hrs Total
Sun	4/1																						
Mon	4/2													P 7.50									7.50
Tue	4/3	8:00	18:30												SWD		10.50	10.50					10.50
Wed	4/4	8:00	18:30												SWD		10.50	10.50					10.50
Thu	4/5	8:00	16:30												SWD		8.50	8.50					8.50
Fri	4/6	8:00	18:30												SWD		9.50	10.50					10.50
Sat	4/7																						
Sun	4/8																						
Mon	4/9	8:00	18:30														7.50	10.50					10.50
Tue	4/10	8:00	18:30														5.50	10.50					10.50
Wed	4/11	8:00	18:30														8.00	10.50					10.50
Thu	4/12	8:00	16:30												SWD		2.50	8.50					8.50
Fri	4/13	8:00	16:30												SWD		8.50	8.50					8.50
Sat	4/14	8:00	16:30												RDO		8.50	8.50					8.50
Sun	4/15	8:00	12:00	13:00	22:00										RDO		13.00	13.00					13.00
TOTALS																	68.50	40.00	70.00			7.50	110.00

EXAMPLE

\*Must take Personal Leave if going on Sea Duty to fulfill the work week.

\*All dates in the Pay Period need to be included.

\*No Sea Duty Pay unless at sea for 24 hours or more

\*HAZARD DUTY PAY only during hours worked, if eligible.

Charge to:	Notation	CC/LC	%
1	LAS-AGNA	11234567-11234567	33%
2	PASTA	11002234-11002234	58%
3			
4			
Total			91%

Comments	4/9	Comments
4/1	F/V Hasta La Pasta Dep 09:00 Arrived 1630	
4/2	Personal Leave Taken	
4/3	F/V Hasta La Pasta Departed 11:00	
4/4	AT SEA F/V HASTA LA PASTA	
4/5	AT SEA F/V HASTA LA PASTA	
4/6	FV HASTA LA PASTA ARRIVED 1730	
4/7	AT SEA F/V HASTA LA PASTA	
4/8		

★ We certify that the information provided above is true and correct.  
 Employee's Signature: *[Signature]* Date: 3/28/12  
 Supervisor's Signature: *[Signature]* Date: 3/28/12  
 Approving Officer Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**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

Codes	Hours	CC/LC
Leave & Holiday	7.50	11104444-11104444

\*Write in this section if Premium Pay is to be charged to a different code.

\*Handwrite in if USING COMP TIME FOR OT → "COMP IN LIEU OF OT"