Regional Operational Plan SF.2A.2014.05

Operational Plan: Kenai River Chinook Salmon Creel Survey, Inriver Gillnetting, and Age Composition Study

by

Jeff Perschbacher

June 2014

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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KENAI RIVER CHINOOK SALMON CREEL SURVEY, INRIVER GILLNETTING, AND AGE COMPOSITION STUDY

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Alaska Department of Fish and Game, Division of Sport Fish, Soldotna

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Division of Sport Fish

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SIGNATURE PAGE

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Approval

Title	Name	Signature	Date
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PURPOSE

A creel survey to estimate sport-angler effort, catch, and harvest of Chinook salmon (*Oncorhynchus tshawytscha*) and an inriver gillnetting study to estimate species catch rates and species composition are critical to inseason management, as well as development of management plans and escapement goals for Kenai River Chinook salmon.

BACKGROUND

The Kenai River (Figure 1) supports the largest freshwater sport fishery in Alaska (Jennings et al. 2011). Angler effort is distributed among the Chinook salmon fishery from mid-May through July, the sockeye salmon fishery from June through early August, the coho salmon fishery in August and September, and a rainbow trout and Dolly Varden fishery from mid-June through April. The Kenai River will likely receive substantial angler effort into the foreseeable future due to its proximity to major population centers, relative ease of access, and large-sized Chinook salmon.

Chinook salmon returning to the Kenai River exhibit two distinct run-timing patterns: "early" (late April-late June) and "late" (late June-early August) (Bendock and Alexandersdottir 1992; Burger et al. 1985; Reimer 2013). For management purposes, the early run is composed of all Chinook salmon entering the river before July 1 and the late run is composed of those entering on or after July 1. During the 1988 Alaska Board of Fisheries (BOF) meeting, management policies were adopted to govern management of both runs. These policies, amended many times since, establish escapement goal ranges for both runs and specify the management actions available to achieve those goals. The early-run optimum escapement goal range (OEG) is currently 5,300 to 9,000 Chinook salmon. The late-run sustainable escapement goal range (SEG) is currently 15,000 to 30,000 Chinook salmon. The management plans for each run require timely predictions of escapement for inseason management. Age composition data is used postseason to develop brood tables necessary for stock-recruit analysis.

The Alaska Department of Fish and Game (ADF&G) implemented a creel survey in 1974 in response to an increase in the number of boat anglers targeting Chinook salmon, and to monitor the age, sex, and length (ASL) composition of harvested Chinook salmon. Prior to 1991, anglers were surveyed in the entire area open to Chinook salmon fishing (downstream of Skilak Lake, see. Since 1991 anglers were surveyed only in the downstream section of the Kenai River (between the Warren Ames Bridge (RM 5.1)[1] and the Soldotna Bridge (RM 21.1) (see Figure 2)[2]. Beginning in the mid 1980's, mark-recapture studies using gillnets for the marking phase were used to estimate the inriver run of Chinook salmon. The Division of Sport Fish (SF) began using sonar to estimate the inriver run of Chinook salmon in 1987 while the inriver gillnetting study provided age-sex-length (ASL) compositions of the inriver run. Inriver gillnetting was standardized to include catch rates in 1998 near the sonar site at RM 8.6, and further

[1] Warren Ames Bridge is traditionally the demarcation point between the lower end of the sport fishery and the beginning of the personal use dipnet fishery. We assume negligible catch and harvest in sport fisheries below the Warren Ames Bridge.

[2] Similar estimates are also obtained postseason from the Statewide Harvest Survey, and since 2006 from Freshwater Guide Log Books. However, the creel survey provides estimates inseason which allows for more effective inseason management.

standardized to include species composition in 2002. This operational plan describes the creel survey and inriver gillnetting project design for the 2014 field season.

OBJECTIVES

This project estimates parameters necessary for inseason management and postseason stock-recruit analysis of Kenai River Chinook salmon. These parameters include: 1) catch and harvest of Chinook salmon by the inriver sport fishery (for inseason monitoring of escapement), 2) proportion of Chinook salmon passing the Chinook salmon sonar site at RM 8.6 (used in augmenting the sonar estimate of inriver abundance), and 3) total return of Chinook salmon by brood year (for stock-recruit analysis). Specific primary objectives[3] are as follows:

1. Estimate catch and harvest of Chinook salmon[4] by the sport fishery in the mainstem Kenai River between Warren Ames and Soldotna Bridges[5] from 16 May through 30 June (early run) and from 1 July through 31 July (late run), such that the relative precision of the estimates for each run is within .20, or 1,000 fish, of the true values 95% of the time[6].
2. Estimate daily proportions of fish passing through the insonified zone at RM 8.6 (midriver) that are Chinook salmon, such that the resulting seasonal estimates of Chinook salmon passage, for each run, are within .10 of the true values 90% of the time.
3. Estimate total return for the early- and late-runs, by brood year, such that the estimates are within .10 of the true values 90% of the time. Total return consists of the inriver run as estimated by the sonar at RM 8.6, plus all commercial and/or sport harvest downstream of the sonar. Total return originating from one brood year is the sum of age-specific total runs across several calendar years. Sub-objectives[7] associated with each of the major components of total return are as follows:
    a) Estimate the proportion by age of the Chinook salmon population passing the Chinook salmon sonar site RM 8.6, from May 16 through 15 August such that all age-proportion estimates, for each run, are within 0.10 of the true values 95% of the time.
    b) Estimate the proportion by age of the Chinook salmon harvested by the Central District Upper Subdistrict Eastside set gill net fishery (ESSN, late run only) within 0.10 of the true values 90% of the time[8].
    c) Estimate the proportion by age of Chinook salmon harvested by the sport fishery in the mainstem Kenai River between Warren Ames and Soldotna Bridge[9] such that all age-proportion estimates, for each run, are within 0.20 of the true values 80% of the time.

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[3] Objective 3 related to estimation of total returns by brood year and stock recruit analysis are reported in ADF&G Fishery Data Series (FDS): *Stock Assessment of early- and late-run Chinook salmon in the Kenai River*.

[4] Harvest is the number of fish caught and retained while catch is the total number of fish caught (including those intentionally released).

[5] Catch and harvest upstream of the Soldotna Bridge are not estimated directly by this project. However, preliminary inseason estimates are obtained indirectly, using paired historical estimates above and below the bridge. See Study Design and Data Analysis sections.

[6] High relative precision is neither possible nor necessary when the harvest is small; meeting the absolute precision goal is sufficient in this case.

[7] These sub-objectives lead to sample sizes that, on average, satisfy the precision criterion for historical estimates of total return listed in primary objective 3.

[8] The ESSN commerical fishery sampling design is described in another operational plan (Eskelin FY14/FY15 Operational Plan Upper Cook Inlet Commercial Eastside Set Gillnet Chinook Salmon Harvest Composition Study).

[9] Age proportions from the sport fishery below the Soldotna bridge (RM 21) are used as a proxy for age proportions below the sonar (RM 8.5).

4. Test the null hypothesis that the true proportion of small (<750mm) Chinook salmon is equal for:
    a) fish that are bound for the Funny and Killey river weirs and are vulnerable to capture and radio-tagging by drift gillnets at RM 8.6, versus
    b) fish that actually pass the Funny and Killey weirs.

    such that the test, with Type I error probability = 0.1, has a power of 75% if the true difference between the two proportions is 0.25. A finding of different size composition (H_0 rejected) would be interpreted as evidence that the gillnet sample is not representative of all Chinook salmon passing RM 8.6.

TASKS:

Tasks are of secondary importance and can be accomplished without driving study design or sample size.

1. Estimate total sport angler effort, by run, in angler-hours. Precision of the effort estimates are driven by that of the catch and harvest estimates (Objective 1).
2. Estimate catch per unit effort (CPUE) and harvest per unit effort (HPUE) of sport anglers for days surveyed between Warren Ames and Soldotna Bridges.
3. Estimate daily CPUE of Chinook salmon captured in midriver gillnets at RM 8.6. Precision of CPUE estimates are driven by that of the Chinook salmon proportion estimates (Objective 2).
4. Insert esophageal radio transmitters in Chinook salmon captured in inriver gillnets between May 16 and August 15, in conjunction with *Kenai River King Salmon Abundance and Migratory Timing Study*[10]. Estimate sport angler effort, and harvest, by run, above and below RM 8.6 and RM 13.7.
5. Collect tissue samples from Kenai River Chinook salmon sampled from inriver gillnets and the sport fish harvest for genetic analysis[11].
6. Collect secchi disk and water temperature readings midchannel at RM 15.3 during creel survey sampling days and collect daily secchi disk readings, and tidal conditions at RM 8.6.
7. Examine Chinook salmon sampled from the sport harvest and the inriver drift gillnets for external sexual characteristics, presence or absence of the adipose fin, and presence of a radio tag.
8. Estimate CPUE of Chinook salmon captured in drift gillnets in relation to tide stage at RM 8.6.
9. Determine the age, sex, and length compositions of Chinook salmon captured nearshore in drift gillnets at RM 8.6.
10. During the early run, investigate the feasibility of sampling Chinook salmon with drift gillnets (4.5", 5.0", and 7.5" mesh sizes) at a location upstream of major tidal influence (RM 12).

[10] Reimer FY14/FY15 Operational Plan, *Kenai River Chinook Salmon Abundance and Migratory Timing Study*.

[11] Tips of the dorsal fin will be taken from Chinook salmon sampled in the inriver gillnetting study and tips of the axillary process will be sampled from Chinook salmon sampled in the creel survey.

METHODS

STUDY DESIGN

Creel Survey: Inriver Sport Effort, Catch, and Harvest

A stratified two-stage roving-access creel survey (Bernard et al. 1998) will be used to estimate sport fishing effort, catch, and harvest of Chinook salmon from the Warren Ames Bridge to the Soldotna Bridge [12]. First-stage sampling units will be days. Daily catch and harvest will be estimated as the product of effort (angler hours) and CPUE or HPUE, respectively. Second-stage units for estimating effort will be periodic counts of anglers done from a boat. Second-stage units for estimating CPUE and HPUE will be angler-trips, sampled by interviewing anglers who have completed fishing for the day and are exiting the fishery. Since the 2014 early run preseason forecast is less than the lower end of the optimal escapement goal, closing the fishery is warranted until data from inseason assessment projects indicate that fishing opportunity can be allowed without jeopardizing achievement of the optimal escapement goal[13]. The following methods and schedule for the creel survey are prepared for when the fishery reopens.

A potential problem with the current study design is that the criteria for recording angler effort during angler interviews are not necessarily equivalent to the criteria used during angler counts. For example, an angler as observed during the angler boat count could be defined as inactive (due, for instance, to numerous short trips between fishing holes) for a greater fraction of his/her fishing trip than he/she would recall during an interview. In this particular scenario an angler would report his angling time (hours actively fishing) higher than it actually was, which would result in a lower catch rate and an underestimation of CPUE, HPUE, catch, and harvest. During 2010, 2011, and 2012 total trip length was recorded during angler interviews, but total Chinook salmon angler counts (regardless of line or travel status) were unsuccessful due to time restraints, and the complexity of the Kenai River's mixed stock fisheries. Although discriminating total anglers specifically targeting Chinook salmon were unsuccessful, the proportion of time guided and unguided anglers reported to have fished during the day was different. The proportion of time an angler spent fishing each day was the ratio of time the angler reported to have been fishing to the total time the boat was on the river (launch time to time of interview). Guided anglers reported to be actively fishing 75% of the total time they were on the river, and unguided angler reported to be actively fishing 81% of the total time on the river. Assuming guided anglers are more efficient, and have a better knowledge of the river and fishing holes, a greater proportion of their day would be expected to be spent fishing compared to unguided anglers. These preliminary results may lead credence to the fact that anglers (especially unguided) may be reporting to actively fish longer than in actuality. During 2014, creel survey technicians will stress "actively fishing for Chinook salmon" does not include time spent launching the boat, traveling upstream/downstream, fishing for other species, or other activities that do not include rigging or having a line in the water.

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[12] Predicting inseason estimates of effort, catch, and harvest upstream of Soldotna Bridge are described in Memorandum: *Projected savings in Kenai River Chinook salmon in-river fisheries* (KenaiKSeoSvgs, Tim McKinley), dated 5/7/2012.

[13] Emergency Order No. 2-KS-1-04-14, effective 12:01a.m., Thursday, May 1, 2014.

The creel survey is scheduled from 16 May through July 31 on the Kenai River between the Warren Ames Bridge and the Soldotna Bridge. A fishing day is defined as 0400-2359 hours (20 hours); however, guided anglers are restricted to a 12-hour fishing day (0600-1800) by regulation.

Creel Survey Stratification

Angler counts will be geographically stratified into the following three areas;

1. Between the Warren Ames Bridge and the Chinook salmon sonar site (RM 8.6).
2. Between the lower Chinook salmon sonar site (RM 8.6) and the upper Chinook salmon sonar site (RM 13.7).
3. Between the upper Chinook salmon sonar site (RM 13.7) and the Soldotna Bridge.

The Chinook salmon sonar site at RM 8.6 will be referred to as the lower sonar, while the Chinook salmon sonar site at RM 13.7 will be referred to as the upper sonar hereafter. Counts between the lower sonar site and the upper sonar site will be used for preliminarily estimation of sport angler effort, CPUE, and HPUE within this stratum. Only counts above and below the lower sonar are currently required for this project.

Angler counts and catch and harvest rates have differed significantly between biweekly or weekly time intervals, between weekdays and weekend/holidays, and between guided[14] and unguided user groups (Reimer 2004b). Therefore, the creel survey will be temporally stratified into weekly intervals, by day type (weekdays and weekends/holidays) and will be post-stratified by angler-type to improve precision and to minimize bias. Angler effort will be stratified upstream/downstream of the lower sonar and upstream/downstream of the upper sonar site. Estimates of CPUE and HPUE will be stratified upstream/downstream of the upper sonar site, but not the lower sonar site[15]. Approximately 56% and 62% sport angler effort and harvest occurred between the sonar sites during the 2013 early- and late-runs respectively (Perschbacher *In prep* b). Based on these factors, the following strata will be used for estimating creel statistics:

Stratum	# of strata	Type of strata
Geographic	3	Warren Ames Bridge to lower sonar, lower sonar to upper sonar, upper sonar to Soldotna Bridge
Temporal	13	Weekly
Day type	2	Weekdays, Weekends/Holiday
Angler type	2	Guided and Unguided

During the early run, two of the four available powerboat fishing weekdays will be randomly chosen to sample. Both weekend days will be sampled each week. The two person crew four

[14] Guides register and place a decal on their boat(s), making guide boats easily identifiable on the river.

[15] Past attempts to stratify H/CPUE by location were unsuccessful due to small sample sizes below the lower sonar. Thus, stratified estimates of effort will be multiplied by pooled estimates of HPUE regardless of location, to estimate harvest above and below the lower sonar.

days per week sampling schedule has been in place since 2002 and has not hindered our ability to meet objective precision criteria. An exception to this sampling regime is the week of 20-27 May when two days were selected randomly from the three weekend/holiday days available [Saturday, 24 May; Sunday, 25 May; and Monday, 26 May (Memorial Day)]. Non-holiday Mondays (when only unguided fishing from drift boats is allowed) will not be sampled during the early run because angler effort, catch, and harvest have been observed to be less than 1% of total early-run angler effort, catch, and harvest; however, angler effort will be indexed by conducting one angler count between the hours of 10:00-14:00. Thus, the early run will be composed of the following 28 strata:

Stratum	Time Stratum	Dates	Day Type	Angler Type
1	16 - 18 May	16 May	Weekday	Unguided
2				Guided
3		17, 18 May	Weekend/Holiday	Unguided
4		17 May		Guided
5	20 - 26 May	20, 22 May	Weekday	Unguided
6				Guided
7		24, 25 May	Weekend/Holiday	Unguided
8		24 May		Guided
9	27 May - 1 June	28, 30 May	Weekday	Unguided
10				Guided
11		31 May, 1 June	Weekend/Holiday	Unguided
12		31 May		Guided
13	3 - 8 June	5, 6 June	Weekday	Unguided
14				Guided
15		7, 8 June	Weekend/Holiday	Unguided
16		7 June		Guided
17	10 - 15 June	11, 13 June	Weekday	Unguided
18				Guided
19		14, 15 June	Weekend/Holiday	Unguided
20		14 June		Guided
21	17 - 22 June	19, 20 June	Weekday	Unguided
22				Guided
23		22, 23 June	Weekend/Holiday	Unguided

24		22 June		Guided
25	24 - 29 June	26, 28 June	Weekday	Unguided
26				Guided
27		29, 30 June	Weekend/Holiday	Unguided
28		29 June		Guided

During the late run, the sampling design is the same as the early run with two of the four available powerboat fishing weekdays randomly chosen, with both weekend days sampled. Non-holiday Mondays during the late run will consist of single boat count between 10:00-14:00, to index angler effort on late run, non-holiday Mondays.

Stratum	Time Stratum	Dates	Day Type	Angler Type
1	1-6 July	2, 4 July	Weekday	Unguided
2				Guided
3		5, 6 July	Weekend/Holiday	Unguided
4		5 July		Guided
5	8-13 July	8, 11 July	Weekday	Unguided
6				Guided
7		12, 13 July	Weekend/Holiday	Unguided
8		12 July		Guided
9	15-20 July	16, 18 July	Weekday	Unguided
10				Guided
11		19, 20 July	Weekend/Holiday	Unguided
12		19 July		Guided
13	22-27 July	23, 24 July	Weekday	Unguided
14				Guided
15		26, 27 July	Weekend/Holiday	Unguided
16		26 July		Guided
17	29-31 July	30, 31 July	Weekday	Unguided
18				Guided

During the early run, the creel survey is scheduled to sample 27 of 40 (68%) days if fishing from powerboats is allowed. During the late run, the creel survey will sample 18 of 27 (67%) possible powerboat fishing days. The creel survey could sample up to 44 of 67 (69%) possible powerboat fishing days if the fishery is open from May 16 to July 31.

Creel Survey Sampling

Completed-trip angler interviews will be conducted at access locations between angler counts and will not begin until after the first count of the day has been completed. Analysis of the 2001 data showed that very few interviews will be lost by not interviewing until after the first count of the day and that the mean CPUE and HPUE of anglers interviewed before 0800 was similar to the overall mean (Reimer 2003). Technicians will attempt to interview all anglers exiting the fishery at their interview location.

Anglers will be interviewed at the following five access locations:

1. Centennial Campground (RM 20.3)
2. Poacher's Cove (RM 17.4)
3. River Bend Campground (RM 14.0)
4. Pillars Boat Launch (RM 12.3)
5. Eagle Rock Launch Area (RM 11.4)

Most anglers access the early-run fishery in May at Pillars Boat Launch and Stewart's Landing (Reimer 2003). The department was allowed access to Stewart's Landing (a private boat launch) during the early run in 2012-2013 but was denied access during the early-run of 2014 if the fishery were to reopen. Interviews are scheduled to begin at Pillars Boat Launch on May 16 and more access locations will be added when boat traffic increases at other locations. The draft 2014 schedule, which will likely be revised during the season, commences sampling at Pillars Boat Launch on May 16, Centennial Campground on May 28, River Bend Campground and Poacher's Cove on June 11, and Eagle Rock Boat Launch on July 2.

Angler counts will be conducted from a boat and four counts will be made during each sample day. Time to begin the first count (0400, 0500, 0600, 0700, or 0800) will be chosen at random and all remaining counts in a day will be done systematically every five hours thereafter. This schedule guarantees at least two counts during the guided-angler hours of 0600-1800. Although each angler count may take up to one hour to complete, they are treated as instantaneous counts of the entire study area. Since the study area is 14.8 miles long, it can take up to an hour to drive the boat to and from interview locations before and after angler counts. To maximize interview time, the direction (upstream or downstream) that the technician travels to conduct angler counts will be selected to minimize travel distance and time.

With four equally spaced angler counts per day, three periods for conducting angler interviews are always available between angler counts, plus one possible additional period after the last count. Scheduling of interviews at access locations will proceed as follows. During May to early June (when fewer than 4 access locations are being sampled) each location will be sampled at least once before any are repeated, with time and access location paired randomly. Beginning in mid-June (when there are more available access locations than sampling periods) 3-4 access

locations will be sampled without replacement from the 5 available with time and access location paired randomly. The creel survey sampling schedule is in Appendix A1.

Non-holiday Mondays are excluded from the regular creel study. Results of including Mondays into the creel survey during 2009 and 2010 indicate less than 5% of harvest occurs on non-holiday Mondays during the late run. A shift in angler effort towards mid-day, compared to angler counts conducted in 1999-2001, warranted recalibration of the index (Perschbacher 2012c). During 2014, a single index angler count will be conducted during the middle of the day (1000 to 1400), at a time and in a direction that is convenient to the project biologist.

The current objective criterion[16] for precision of catch and harvest estimates have been met every year except for early-run catches in 2005, and 2007. Early and late-runs were restricted before being closed to fishing for all Chinook salmon during 2012 and 2013. Estimates of catch and harvest, with estimated absolute precision (AP)[17], and estimated relative precision (RP) from 2002-2011 are presented in Table 1.

Table 1.- Estimates of harvest and catch, with estimated absolute precision (AP) and estimated relative precision (RP) for early and late runs of Kenai River Chinook salmon from the Soldotna Bridge to Warren Ames Bridge, 2002-2011 (Reimer 2004a; 2004b; Reimer 2007), (Eskelin 2007; 2009; 2010), (Perschbacher 2012a; 2012b; 2012c; 2012d, In prep. a-b).

		Harvest				Catch			
Run	Year	N	SE	AP	RP	N	SE	AP	RP
Early	2002	376	85	167	0.44	419	84	165	0.39
	2003	1,948	399	782	0.40	2,817	484	949	0.34
	2004	2,285	338	663	0.29	3,534	435	853	0.24
	2005	2,876	329	645	0.22	4,430	735	1,441	0.33
	2006	3,397	412	808	0.24	4,523	441	864	0.19
	2007	2,645	456	894	0.34	3,944	645	1,271	0.32
	2008	2,602	218	427	0.16	3,552	304	596	0.17
	2009	898	143	280	0.31	1,058	151	296	0.28
	2010	837	94	184	0.22	1,203	151	296	0.25
	2011	816	156	306	0.38	1,090	186	365	0.33
	2012	316	93	182	0.58	471	109	214	0.45
	2013	0	0			39	16	31	0.80
Late	2002	11,381	715	1,401	0.12	16,866	1,028	2,015	0.12
	2003	13,837	1,168	2,289	0.17	28,769	1,746	3,422	0.12
	2004	14,493	975	1,911	0.13	22,456	1,462	2,865	0.13
	2005	15,313	1,161	2,276	0.15	25,663	2,214	4,339	0.17
	2006	13,190	905	1,774	0.13	19,788	1,323	2,593	0.13
	2007	9,258	637	1,255	0.14	13,408	815	1,606	0.12
	2008	9,272	726	1,423	0.15	10,929	825	1,618	0.15
	2009	7,378	487	955	0.13	10,352	728	1,427	0.14
	2010	5,375	441	864	0.16	6,039	462	906	0.15
	2011	6,458	525	1,029	0.16	9,580	716	1,403	0.15
	2012	105	52	102	0.97	1,250	160	314	0.25
	2013	1,577	297	582	0.37	2,554	386	757	0.29

[a] Early- and late-run sport fisheries were restricted during 2012 & 2013.

[16] The current objectives are: harvest and catch within .20, or 1000 fish, 95% of the time.

[17] Absolute and relative precision levels were based on 95% C.I.'s.

Inriver Drift Gillnetting: Proportion Chinook Salmon Inriver at RM 8.6

Gillnet Specifications

Gillnets of two mesh sizes (5.0 and 7.5 inches) will be used to estimate species composition within the insonified area at the RM 8.6 Chinook salmon sonar site, and to collect ASL and genetic tissue samples. The nets are constructed of a multi-fiber mesh in colors that closely match Kenai River water. New in 2014, panel nets constructed of the two mesh sizes will be fished with equal frequency both nearshore (behind the sonar transducers) and midriver (within the insonified area). Nets will be constructed of four 15 ft panels alternating between 5.0 inch and 7.5 inch mesh size panels for a total length of 60 ft (10 fathoms). Nearshore nets will be approximately 15 ft deep and midriver nets will be approximately 30 ft deep. Specifications of each mesh type are shown below:

5.0 inch (stretched mesh) multi-fiber, Shade 1 (clear-steel blue), MS73 (14 strand) twine

7.5 inch (stretched mesh) multi-fiber, Shade 1, MS93 (18 strand) twine

Since 2002, gillnets made of one mesh size per net were used and 5.0 inch and 7.5 inch gillnets were alternately deployed. The modification in 2014 to panel nets of different mesh size within each net was needed to reduce the required number of nets in the boat due to crews having to deploy both shallow (15 ft) nearshore nets and deep (30 ft) midriver nets. Without panel nets the number of nets required in a boat would be four, whereas the use of panel nets reduces the required number of nets to two.

Tide Stage and Schedule

Since 2002, the netting schedule has undergone several changes in both length of time netted, and stage of tide netted from 4 hours before to 4 hours after low tide (2002–2003), to 3 hours before to 3 hours after low tide (2004–2006), to 5 hours before low tide to 1 hour after low tide (2007–2013). The change from 8 hours per day in 2003 to 6 hours per day in 2004 was due to budgetary constraints, whereas in 2007, the tidal schedule was changed in an attempt to intercept more fish based on hourly sonar passage estimates by tide stage (Eskelin 2010). However, Chinook salmon and sockeye salmon catch rates related to tidal stage have differed significantly between years (Perschbacher *In prep* b).

In 2014, two netting crews will be scheduled to net in succession from 0700 to 1300 hours (morning crew) and from 1300 to 1900 hours (afternoon crew), regardless of tide stage, with each crew covering both nearshore and midriver areas equally. Since 2004, gillnetting has been conducted for 6 hours each day. The netting effort will be doubled in 2014 to 12 hours each day, and will be divided equally between nearshore and midriver sets. There will be times when gillnetting will be ineffective due to upstream current from incoming tides which occurs for approximately 1 hour to 3.5 hours each flood tide (depending on tide size and river discharge). Due to upstream current, we estimate there will be a reduction in midriver gillnetting of up to 33% under a worst case scenario (large tidal swing, low river discharge), however there should be approximately 5 hours of midriver gillnetting conducted most days. The gillnetting sampling schedule at RM 8.6 is in Appendix A2.

Gillnetting Area

The study area is approximately 0.3 mi in length, located just downstream of the lower Chinook salmon sonar site at RM 8.6, and was chosen because of its location relative to the sport fishery, and is not known as spawning habitat for Chinook salmon (Miller and Burwen 2000). The location of the drifts within the study area is critical to the success of the species apportionment part of the project (Objective 2 and 3a). Midriver sets should capture fish that pass through the insonified area of the river channel while nearshore sets should capture fish that pass outside of the insonified area (behind the sonar transducers). Midriver sets will be drifted within the DIDSON insonified area that extends from a point 3m out from the right-bank transducer to 3m out from the left-bank transducer. Nearshore sets will extend from shoreline to the point where midriver sets begin. Rangefinders will be used to ensure sets are either within or outside of the insonified area. Netting will be conducted downstream from the sonar transducers and will be deployed perpendicular to the river current. Since tide stage will affect the amount of current, a maximum time per drift will be determined inseason to standardize effort among sets (approximately 5-7 min). A drift will be terminated if any of the following occur: 1) the net becomes snagged on the bottom or is not fishing properly, 2) the net is not fishing in the appropriate area (insonified for midriver sets and non-insonified for nearshore sets), 3) the end of the study area is reached, 4) the maximum drift time is reached, or 5) the net is determined to be saturated with sockeye or pink salmon, usually 10+ fish.

Radio Transmitter Deployment

A separate Kenai River Chinook salmon Abundance and Migratory Timing Study will be conducted during 2014 and the inriver gillnetting study at RM 8.6 will perform the marking event. Advanced Telemetry Systems (ATS, Isanti, MN) models F1835B and F1845B radio transmitters [18]will be deployed in Chinook salmon from May 16 through August 15. New in 2014 is radio transmitter model F1835B which is smaller in diameter and length for the purpose of being able to tag smaller Chinook salmon. Chinook salmon measuring 600mm METF or less will receive radio transmitter model F1835B, while those larger than 600mm will receive model F1845B. During May 16 through August 15, all Chinook salmon sampled for ASL (nearshore and midriver) will receive a radio transmitter. During July 1 through August 15, captured Chinook salmon may be subsampled for radio tagging (this will be assessed inseason based on catch rates and available radio tags). Fish with profusely bleeding gills, missing a significant amount of scales, or observed to be lethargic will be released without tagging to minimize potential differences in survival and behavior between tagged and untagged populations.

Inriver Drift Gillnetting: Size Selectivity

As described above, the netting program will be altered in 2014 in an attempt to capture a more representative sample by size and age of the inriver runs. In 2012 and 2013, relatively large numbers of small (<750 mm METF) Chinook salmon were sampled at tributary weirs operated by the U.S. Fish and Wildlife Service (USFWS) (Funny River and Killey River weirs) than the netting program could account for. When multiplying length compositions by weir and sonar passage estimates, more small fish passed the two weirs than were estimated to have passed RM 8.6 during the early run. Further, evidence of size-selective sampling in the late run is found in

[18] Model F1845B used 2010-2013 required a Chinook salmon to measure greater than 550mm METF to reduce mortality.

the ESSN fishery, which in some years captures large numbers of small Chinook salmon that aren't reflected in the netting program. A tendency for small Chinook salmon to travel closer to shore, consistent with wave drag, is a possible explanation (Hughes 2004). Failure to get a representative sample of Chinook with the nets would bias the mixture model estimates of Chinook passage and SSART estimates of abundance. Under-sampling small kings would underestimate the total number of Chinook salmon and the fraction of fish that are small. The amount of bias depends on how different the length distributions are between nearshore and midriver Chinook salmon.

In 2013, we conducted a pilot study of nearshore gillnetting behind the sonar transducers, in addition to the traditional midriver gillnetting. In this pilot study, nearshore gillnetting was conducted for two netting days per week beginning approximately 2 hours before high tide to 4 hours after high tide. All other aspects of nearshore gillnetting were similar to midriver gilletting in regard to data collection and analysis. A significant difference in proportions (0.38, P-value < 0.002) of small (<750 mm) Chinook salmon were captured between nearshore than midriver nets during the early run (Perschbacher *in prep* b). In the early run 71% of Chinook salmon captured nearshore were small, whereas only 33% of Chinook salmon captured midriver were <750 mm. At tributary weirs, 70% of fish were small, whereas only 33% of fish captured midriver in the early run were small.

In 2014 we will test the hypothesis (Objective 4) that the size composition of fish bound for the Funny and Killey river weirs and vulnerable to interception by the modified RM 8.6 gillnetting program is the same as the size composition of fish that actually pass the Funny and Killey weirs. If the expected number (27) of radio-tagged fish pass the Funny and Killey river weirs and the difference between the two proportions is 0.25, the test would have a power of 75% (Table 2). A finding of different size composition would be interpreted as evidence that the gillnet sample is not representative of all Chinook salmon passing RM 8.6.

Table 2.- Probability of rejecting the null hypothesis (at $\alpha = 0.1$) that the proportion of small (<75 cm) salmon is equal for (1) fish that are bound for the Funny and Killey river weirs and are vulnerable to capture and radio-tagging by drift gillnets at RM 8.6, versus (2) fish that actually pass the Funny and Killey weirs.

Above Weirs (n.eff=100)	Above Weirs with Radiotags (n=27)										
	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75
0.25		0.13	0.27	0.46	0.65	0.81	0.91	0.97	0.99	1.00	1.00
0.3	0.13		0.13	0.26	0.43	0.62	0.78	0.89	0.96	0.98	1.00
0.35	0.26	0.12		0.12	0.25	0.41	0.60	0.76	0.88	0.95	0.98
0.4	0.42	0.25	0.12		0.12	0.24	0.40	0.59	0.75	0.87	0.94
0.45	0.59	0.41	0.24	0.12		0.12	0.24	0.40	0.58	0.75	0.87

0.5	0.75	0.58	0.40	0.24	0.12		0.12	0.24	0.40	0.58	0.75
0.55	0.87	0.75	0.58	0.40	0.24	0.12		0.12	0.24	0.41	0.59
0.6	0.94	0.87	0.75	0.59	0.40	0.24	0.12		0.12	0.25	0.42
0.65	0.98	0.95	0.88	0.76	0.60	0.41	0.25	0.12		0.12	0.26
0.7	1.00	0.98	0.96	0.89	0.78	0.62	0.43	0.26	0.13		0.13
0.75	1.00	1.00	0.99	0.97	0.91	0.81	0.65	0.46	0.27	0.13	

RM 12 Feasibility Gillnetting and Mesh Size Investigations

Similar to Objective 4, in 2014 we will be conducting a pilot study to test the difference between proportions of small Chinook salmon (<750mm) that are sampled in inriver drift gillnets (4.5, 5.0, and 7.5 inch mesh sizes) at an upstream location (RM 12) vs. the proportion of small Chinook salmon observed at tributary weirs.

Due to low preseason forecast for early run Kenai River Chinook salmon, the Kenai River Chinook salmon sport fishery is closed to all fishing by Emergency Order (Emergency Order No. 2-KS-1-04-14, effective 12:01a.m., Thursday, May 1, 2014). During the timeframe that the Kenai River sport fishery is closed the displaced creel technicians will conduct a feasibility study of netting at RM 12 (upstream of the major tidal influence). The upstream location between RM's 11and 12 (Figure 2) is a possible location for gillnetting in the early run without major disruption to the sport fishery or jeopardizing crew safety. This is a popular drifting zone in the sport fishery in the late run but not as much in the early run partly due to drifting not being as effective without the use of bait which is seldom allowed (by emergency order) prior to July 1. Currently sport fishing regulations prohibit back trolling with the aid of a motor from RM 11 to RM 12 during 1-31 July (5 AAC 57.121 (3) (G)). It is possible that with an extension of the regulation during May and June that this location could prove to be a better area to gillnet Chinook salmon outside of major tidal influence when upstream current, and low-river discharge is the most prevalent.

The drift gillnetting area at RM 12 will be approximately 0.5 RM from the existing late run sport fishery "Drift Fishing Only" regulatory sign (RM 12.0), downstream to Eagle Rock (~RM11.5). Netting will be conducted up to 5 days per week (Monday–Friday) for approximately 6 hours each day without regard to tide stage (0900–1530 hours, including a 0.5 hr lunch break). Mesh sizes used will be 4.5 inch hung loosely, 5.0 inch, and 7.5 inch. Length of gillnets will be 30ft in length instead of the traditional 60ft gillnets used at RM 8.6 due to a stronger current and the need to be able to maneuver a deployed net around obstacles.

Total Return by Brood Year

Total return by brood year is the sum of age-specific returns across multiple calendar years. For example, the total return from the 1990 brood year consists of 3-year-old fish returning in 1993, 4-year-olds returning in 1994, 5-year-olds returning in 1995, 6-year-olds returning in 1996, and 7-year-olds returning in 1997. In each case, the age specific return is the sum of age-specific inriver run (RM 8.6) as estimated by the sonar, age-specific commercial harvest (marine, late run only), age-specific personal-use harvest below the Warren Ames bridge, and age-specific sport harvest below the sonar at RM 8.6.

Inriver Run by Age

Chinook salmon captured in midriver gillnets within the insonified area (RM 8.6) will constitute the ASL sample for the inriver run. Samples will be stratified temporally, post season, into approximately three-week time intervals[19] (two strata during each run), if found to be significantly different:

1. 16 May - 6 June
2. 7 June - 30 June
3. 1 July - 20 July
4. 21 July - 15 August

Assuming a simple random (not stratified) sample and 15% unreadable scales, a minimum of 149 fish in each run will be required to be within 10 percentage points of the true value 95% of the time (Thompson 1987). This is equivalent to 127 valid ages for each run. Since 2002, the sample size goal has been met for both the early and late runs except for the 2012 and 2013 early runs (Table 3).

Table 3.- Number (n) of Kenai River Chinook salmon with valid ages sampled with gillnets from the inriver run, and relative precision (95% interval; RP95) for ages 1.3 and 1.4, 2002-2012 (Reimer 2004a, 2004b; 2007), (Eskelin 2007; 2009; 2010), (Perschbacher 2012a; 2012b; 2012c; 2012d; *In prep*. a-b).

	Early Run			Late Run		
Year	n	RP95 (1.3)	RP95 (1.4)	n	RP95 (1.3)	RP95 (1.4)
2002	306	5.4%	5.5%	945	2.4%	3.1%
2003	724	2.9%	3.6%	1,114	2.4%	2.9%
2004	351	4.9%	5.2%	933	2.8%	3.2%
2005	362	4.7%	5.2%	519	3.4%	4.0%
2006	251	4.9%	6.1%	703	2.6%	3.7%
2007	213	9.5%	9.1%	437	5.0%	6.3%
2008	163	7.6%	7.6%	496	3.5%	4.3%
2009	128	7.5%	8.6%	338	3.4%	5.3%
2010	137	8.7%	6.6%	221	6.5%	6.5%
2011	204	6.7%	7.2%	327	4.5%	5.7%
2012[a]	82	10.6%	10.3%	232	6.3%	6.4%
2013[a]	41	13.7%	15.4%	149	6.8%	8.0%

[a] Sample size goal of 127 readable scales was not met during the 2012 & 2013 early runs.

[19] Previous experience has shown that age composition changes relatively slowly; thus two strata per run are sufficient to reduce bias.

Commercial Harvest by Age

A separate study will be conducted in 2014 and will estimate the number of Kenai River Chinook salmon harvested in the ESSN fishery and the age composition FY14/15 Eskelin: Upper Cook Inlet Commercial Eastside Set Gillnet Chinook Salmon Sampling Study.

Sport Harvest by Age

The recreational harvest will be sampled for age composition by collecting scale samples from Chinook salmon encountered during creel survey angler interviews. Angler type (guided or unguided), length (METF), and sex will be recorded for each Chinook salmon. Assuming a simple random (not stratified) sample and 15% unreadable scales, 24 fish are required to be within 20 percentage points of the true value 80% of the time (Thompson 1987). This is equivalent to 19 valid ages for each run. Since 2002, the sample size goal has been met for both the early and late runs except for the 2012 late run, and 2013 early run (Table 4).

Table 4.- Number (n) of Kenai River Chinook salmon sampled from the creel survey and relative precision (80% interval, RP80) for ages 1.3 and 1.4 fish during the early and late runs, 2002-2013 (Reimer 2004a; 2004b; 2007), (Eskelin 2007; 2009; 2010), (Perschbacher 2012a; 2012b; 2012c; 2012d, *in prep* a-b). Relative precision RP80 is 1.28 times the coefficient of variation of the estimate.

	Early Run			Late Run		
Year	n	RP80 (1.3)	RP80 (1.4)	n	RP80 (1.3)	RP80 (1.4)
2002	31	11.5%	11.5%	275	3.8%	3.8%
2003	81	9.0%	9.0%	311	2.6%	3.8%
2004	99	6.4%	6.4%	305	3.8%	3.8%
2005	134	5.5%	5.5%	429	2.4%	2.7%
2006	129	3.4%	4.8%	313	2.9%	3.5%
2007	106	6.0%	6.7%	237	3.7%	4.8%
2008	198	7.3%	6.6%	218	6.1%	6.7%
2009	66	12.6%	12.8%	195	5.7%	6.8%
2010	56	14.1%	11.1%	184	7.2%	7.0%
2011	56	12.7%	13.1%	233	5.3%	6.4%
2012	38	8.9%	9.3%	4	-	-
2013	NA	-	-	55	7.8%	8.6%

"NA"= no Chinook salmon harvested.

Brood Year Return Reconstruction

Theoretically, to reconstruct returns by brood year, age composition must be estimated for each component of total return. In practice, only major components need be sampled for age composition, and the estimates need not be overly precise [20]. In previous operational plans, it was demonstrated that individual sample size goals of 149, 119, and 24 for the late-run inriver run, ESSN harvest, and late-run sport harvest result in achieving the overall precision objective for brood year returns. This analysis was based on a sampling error CV of 2.2% for the inriver run, which we now know to be unrealistically low (Miller et al. 2012). Kenai River Chinook salmon run reconstructions are currently in the process of being revised, given recent advances in understanding about historical run sizes.

DATA COLLECTION

Creel Survey of Inriver Sport Fishery

The creel survey crew will be composed of two fishery technicians, with both technicians working each sampling day. The Chinook salmon creel survey is scheduled to be conducted from May 16 through July 31. Each technician is responsible for conducting angler interviews and angler counts during their shift. Each technician will also take a Secchi disk and water temperature reading in the main river channel adjacent to River Quest Resort (RM 15.3) at the beginning of his or her shift to monitor river conditions that affect the sport fishery. Information regarding any other condition that technicians think is unique or might otherwise affect the fishery will be recorded in a field notebook. Finally, technicians will return their data sheets and field computer to the Soldotna office daily to be downloaded into a computer database.

Angler Counts

Angler counts are conducted as the boat is driven through the entire length of the survey area. Upon arrival at the Soldotna Bridge, upper Chinook salmon sonar site, lower Chinook salmon sonar site, or Warren Ames Bridge the technician will record the count data for that river section. A count is usually accomplished in less than one hour.

The total number for each of the following categories is tallied using ten thumb counters:

1. Unguided power boats.
2. Unguided drift boats.
3. Guided power boats.
4. Guided drift boats.
5. Unguided anglers fishing from power boats.
6. Unguided anglers fishing from drift boats.
7. Guided anglers fishing from power boats (excluding the guide).
8. Guided anglers fishing from drift boats (excluding the guide).

[20] Simulation studies show that stock recruit analysis is relatively insensitive to moderate errors in age composition estimates. For example a simple random sample size of less than 100 has been shown to produce sufficiently precise age composition for total run.

9. Shore anglers above and below Sockeye salmon sonar site (RM 19.2) during July.
10. Active power boats (no active anglers on board, but under power at time of count).

Only counts numbered (5-8) are required for this project; numbers (1-4), and (9-10) are collected as auxiliary information for management and historical comparisons. A person is tallied as an angler if he/she is fishing or rigging a rod. If a boat is traveling with no lines in the water, none of the people in that boat are considered to be angling. The count numbered (9) will record boats that are under power but do not contain anglers actively fishing or preparing to fish (i.e. rigging their lines). Upon completion of each angler count for a given location, the values will be recorded electronically using data entry software on a Juniper Systems Inc.™ Allegro CX field computer. If the field computer is not functioning properly, angler count data will be recorded manually on an angler count data form (Appendix B1).

Angler Interviews

Between angler counts, the technician will travel by boat to the scheduled access location and interview anglers who are finished angling for the day (completed-trip interviews). The technician will attempt to interview all anglers leaving the fishery at their location. If more anglers are leaving the fishery than can be interviewed, the technician will select anglers to interview in the order they arrived at the launch. It is critical that the decision to interview an angler is not based on their success (in harvesting or catching fish). During each completed-trip interview, the following information will be recorded from each angler contacted:

1. Time of interview.
2. Boat type (power or drift).
3. Angler type (guided or unguided).
4. If angler fished exclusively upstream, or downstream of upper sonar site (RM 13.7)[21].
5. Number of Chinook salmon harvested downstream of the Soldotna Bridge[22].
6. Number of Chinook salmon released downstream of the Soldotna Bridge.
7. Total hours fished downstream of the Soldotna Bridge, not including travel time or time spent in the boat after the angler has harvested a Chinook salmon, rounded to the nearest 1/4 hour.
8. *Early run only*: for each Chinook salmon released the angler will be asked if the fish was below the lower limit (less than 42 inches), within the protected slot limit (42 – 54.99 inches total length) or above the slot limit (55 inches or greater).
9. If a harvested Chinook salmon has a radio transmitter then the approximate location (RM) of harvest, frequency #, and pulse code # of radio transmitter will be recorded.[23]

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[21] Data collected will be used post season to test for differences in HPUE and CPUE rates between anglers who fished exclusively upstream or downstream of the upper Chinook salmon sonar site. A series of z-tests will be used to test for the differences.

[22] Location of harvested Chinook salmon will be recorded as (1) upstream of upper sonar site, (2) between upper sonar and lower sonar sites, or (3) below lower sonar site. Data collected will be used post season to estimate harvest statistics related to Chinook salmon sonar sites.

[23] This information will be used by the Kenai River King Salmon Abundance and Migratory Timing study described in another operational plan (Reimer FY11/FY12 Operational Plan, Kenai River King Salmon Abundance and Migratory Timing Study).

Data will be recorded electronically on the field computer and if the computer is not working properly, data will be entered on an angler interview data form (Appendix B2).

Chinook salmon[24] will be sampled for METF length, total length during early run slot-limit restriction, gender, and genetics tissue. Scales will be sampled following the procedures described under Objective 3 below. Biological data will be recorded on data forms (Appendix B3).

Inriver Drift Gillnetting

River Mile 8.6

There will be two RM 8.6 gillnetting crews composed of three fishery technicians each, with two technicians working per shift (morning, and afternoon). Sampling will be conducted from an outboard-powered skiff. Primary responsibilities are to capture Chinook salmon in a drift gillnet; sample captured Chinook salmon for ASL data and genetic tissue, count other species of salmon captured , and record data directly into a handheld computer. Each technician will be scheduled 5 days/week for 8 hours per day of which 6 hours will be spent netting (the remainder of time will be for travel to and from the work site, required maintenance, and 0.5 hr lunch breaks). This schedule allows for sampling the inriver netting study every day during the entire season. During the workday, approximately 12 hours will be allocated to gillnetting among the morning and afternoon crews. Panel nets of two different depths (15ft deep for nearshore, and 30ft deep for midriver) will be 60 ft in length and will contain two different mesh sizes (5.0 and 7.5 inches). Since each panel net will have a 5.0 inch mesh panel on one end and a 7.5 inch mesh panel on the other, the crew will have to ensure they alternate sets by mesh size (i.e. to avoid having the 5.0 inch mesh panel always set closest to the shoreline, or sonar transducers). One sampling 'replicate' will then consist of eight drifts; two nearshore drifts alternating the mesh size closest to the North bank, two nearshore drifts alternating the mesh size closest to South bank, two midriver drifts alternating the mesh size closest to the North sonar transducer, and two nearshore drifts alternating the mesh size closest to the South sonar transducer. The mesh size to be drifted first will alternate daily. The start and stop time will be recorded for each drift. The start time is the time the crew begins setting the net. The stop time is the time the crew begins pulling the net.

All Chinook salmon captured in nets will be examined for the presence of an adipose fin during both runs. To avoid re-sampling, a 'hole-punch' will be given to each captured Chinook salmon in the upper lobe of the caudal fin regardless of whether or not it was sampled. The RM 8.6 netting crew will be instructed to inspect captured Chinook salmon for hole punches on both lobes. If a Chinook salmon sampled at RM 8.6 is recaptured at RM 8.6, it will be noted and released without being sampled. If a Chinook salmon sampled at RM 12 is recaptured at RM 8.6, the Chinook salmon will be sampled for ASL and genetics, and will be noted as being previously sampled by the other crew before being released. In addition, crews will be instructed to record a Chinook salmon as an escape if they visually inspected that the fish was a Chinook salmon, but were unable to hole-punch the caudal fin. All other salmon species captured will be counted each day, and sampled for length every third day. Because a higher proportion of

[24] Very rarely, during the peak of the late run, it may become difficult to sample all boats at some exit locations. To the extent that this occurs, sampling for age composition and genetic tissue can be slightly depensatory if data are pooled across time strata.

sockeye salmon migrate nearshore than midriver, lengths of sockeye captured nearshore will be measured in equal numbers as those measured in midriver nets. For other non-salmon species captured, only the species and the number of fish captured will be recorded.

During the early run (May 16 to June 30), and the late run (July 1 to August 15) *every* Chinook salmon captured will be sampled for ASL and genetics. Chinook salmon will be untangled from nets and have cotton "tail ties" placed around the caudal peduncle with the other end affixed to the boat gunwale so the tethered fish remains in the water while other fish are released from the net. In order to track Chinook salmon size by mesh size, tail ties will be marked in a fashion to avoid confusion (for example, red tail tie for Chinook salmon caught in 5.0 inch mesh, blue tail tie for 7.5 inch mesh). The tethered Chinook salmon will be placed in a padded, restraint cradle (Larson 1995) to immobilize the captured fish while biological data are collected. During sampling the cradle will hang from the side of the boat with its base approximately 15 cm below the water line, thus Chinook salmon will not be removed from the water for sampling. The METF (measured to the nearest 5 mm) and sex of each sampled Chinook salmon will be recorded. The METF (measured to the nearest 5 mm) of sockeye salmon will be recorded every third day. Scales samples will be collected, and mesh size where the Chinook salmon was caught will be recorded.

Prior to tagging Chinook salmon, all radio transmitters will be activated by removing a magnet taped to the side of the transmitter (thus closing a magnetic reed switch inside the capsule), and tested to assure proper working condition. Transmitters will be inserted with an applicator made from 2 concentric pipes of polyvinyl chloride. The outer pipe is ¾ in outside diameter with rounded edges and one end split into quarters. The inner pipe fits snugly inside the outer pipe but slides with minimal effort. Likewise, the narrow end of the transmitter fits snugly within the split end of the outer pipe. Each transmitter will be fit with a retention device (e.g., rubber band) around the diameter of the tag to prevent the salmon from regurgitating the transmitter. Transmitters, lubricated with glycerin, will be inserted by gently pressing the tag against the esophageal sphincter until the sphincter relaxes allowing the tag to pass into the stomach. The transmitter will then be dislodged from the applicator using the inner pipe as a plunger.

Radio tags for this project are esophageal implant models F1835B and F1845B fabricated by Advanced Telemetry Systems and broadcasting between 151.200-151.525 MHz. The F1835B bottle shaped radio tags are 17 mm in diameter, 48 mm long and weigh 16 g. The F1845B bottle shaped radio tags are 19 mm in diameter, 56 mm long and weigh 26 g. Given that tag weight should not exceed 2% of the fish weight (Winter 1996), fish as small as 1.5 lbs could be tagged, which is smaller than any age-.2+ Chinook salmon.

Data will be recorded electronically using data entry software on a Juniper Systems Inc.™ Allegro CE field computer. After sampling, the crew will download the data onto a desktop PC. If the field computer is not functioning properly, data will be recorded on data forms (appendix B) and given to their supervisor. In addition, crews will also fill out a field notebook daily to document observations not covered by the electronic data entry system, and will be instructed to contact their supervisor about all complaints or negative contacts they field during the course of their shift which will get forwarded to the Soldotna ADF&G Area Research Biologist, and Area Managers.

River Mile 12

The feasibility netting at RM 12 will be conducted with a crew of 2 people for up to 5 days/week, with 6 hours/day allocated to gillnetting during the early run (May 16 to June 30). The RM 12 crew will collect the same type of data for captured Chinook salmon (genetic and scale samples, sex, and length will be recorded, etc.) as is collected at RM 8.6. All Chinook salmon captured will be sampled for ASL and genetics, but will not receive a radio transmitter. All other non-Chinook species salmon will be counted and recorded each day. No length measurements will be taken from non-Chinook species.

Gillnets will be deployed with alternating deployment locations by bank and mesh size, with each mesh size (4.5, 5.0, and 7.5 inch) fished approximately two hours each day. A sampling replicate will be a total of 12 sets; each of the three mesh sizes will be set four times (two nearshore drifts and two midriver drifts). The mesh size to be drifted first will differ daily. The start and stop time will be recorded for each drift. The start time is the time the crew begins setting the net and the stop time is the time the crew begins pulling the net. The mesh size where Chinook salmon are captured will be recorded. All captured Chinook salmon will be sampled for ASL and genetics before being released. To prevent resampling at RM 12, sampled Chinook salmon will be given a ventral caudal hole punch. If a Chinook salmon sampled at RM 12 is recaptured at RM 12, it will be noted and released without being sampled. If a Chinook salmon sampled at RM 8.6 is recaptured at RM 12, the Chinook salmon will be sampled for ASL and genetics, and will be noted as being previously sampled by the other crew before being released.

Scale Sampling for Inriver Netting and Sport Harvest

For all Chinook salmon sampled from the inriver run (gillnetting at RM 8.6, and RM 12) or the sport harvest (creel survey), three scales will be taken from the left side of the body of each sampled fish, at a point on a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin, two rows above the lateral line (Clutter and Whitesel 1956; Welander 1940), and placed on an adhesive-coated card. An impression is made of the scales on the card using a press under 25,000 PSI and then the scales growth patterns are viewed with a 40x microfiche reader to determine freshwater and marine residence times.

Coded Wire Tag (CWT) Recovery

All Chinook salmon sampled during the course of the creel survey and all fish captured during inriver gillnetting will be examined for an adipose fin clip. Technicians will remove the head of all adipose fin clipped Chinook salmon encountered, provided permission can be obtained from the angler/processor in possession of the fish. A cinch strap will be attached to the head which will be returned to the office for storage in a freezer. All data, including the number of Chinook salmon examined and the number observed missing the adipose fin, will be recorded. The cinch strap number will also be recorded alongside ASL data to enable cross-referencing between datasets. Data collected during the creel survey or the inriver gillnetting survey will be returned to the project leader.

Genetic Sampling

Genetic tissue samples will be taken from every Chinook salmon sampled for ASL in the creel survey, and inriver gillnetting locations. A ½ inch sized piece of tissue from the anterior portion of the dorsal fin will be removed from each fish sampled from the inriver gillnets, placed in a 2ml plastic vial (Nalgene, VWR Cat. # 66008-710) and completely covered with a Sigma

Reagent Grade 95% Alcohol (Sigma Cat. # R 8382) buffered solution such that the liquid/tissue ratio is approximately 3:1. A ½ inch piece from the tip of an axillary process will be taken from Chinook salmon sampled in the creel survey will be stored in the same way as genetic samples taken from Chinook salmon sampled from the inriver gillnets. Each plastic tube will be sequentially numbered and the vial number will be recorded in the field computer. All plastic vials will be stored at the Soldotna office until the end of the season when all tubes will be sent to the Gene Conservation Laboratory for analysis.

Secchi and Temperature

A Secchi disc depth reading will be recorded at the beginning, end, and midpoint of each midriver gillnetting shift to monitor river conditions that affect netting catch rates at RM 8.6. The Secchi reading will be taken at the same location, near the lower sonar site each day. Each creel technician will take a Secchi disk and water temperature (F) reading in the main river channel adjacent to River Quest Resort (RM 15.3) at the beginning of his or her shift to monitor river conditions that affect sport angler catch rates.

Tidal conditions at RM 8.6

The RM 8.6 netting crew will collect the direction of river flow for each midriver and nearshore set. Once the net is deployed, the crew will record the direction the net drifts in relation to the stream bank. Each set will be recorded as either a downstream, slack, or upstream set.

DATA REDUCTION

Creel technicians will return their scale cards and field ASL data forms to the Soldotna office daily and will be responsible for ensuring the data is legible and accurate. Technicians are also responsible for entering most data (except for ASL data) into the field computer and downloading data to the project biologist desktop computer that can output the dataset in fixed width comma separated values (.csv) format for analysis. Netting data will be entered electronically in the field. Paper forms will be available as a backup in the event the field computer fails. Age data are keypunched directly into master electronic data files after age is determined by scale reading. The project biologist will ensure all data are returned, are legible, and are entered correctly. Data maps for all of the information collected in this project are shown in Appendix C.

The project biologist will edit creel, inriver gillnetting, and biological data to ensure values of counts, interview data, age, and length-at-age are within regular bounds. The biologist will also edit the data for obvious coding errors, prepare inseason data summaries daily, conduct postseason data analyses, and write the Division Fishery Data Series report. All creel survey, inriver gillnetting, and biological data will be in computer files and edited by 1 December. A final edited copy of all data files along with a data map will posted to the Alaska Department of Fish and Game Research and Technical Services (RTS) DocuShare[25] website for archiving.

[25] http://docushare.sf.adfg.state.ak.us/dsweb/HomePage

DATA ANALYSIS

Creel Survey: Inriver Effort, Catch, and Harvest

Estimates of angler effort, catch, and harvest of Chinook salmon downstream of Soldotna Bridge will be calculated by following the procedures outlined in (Bernard et al. 1998). Daily estimates of angler effort and their variances will be calculated using equation 2.9 and 2.10 from (Bernard et al. 1998). Estimates of daily catch and harvest rates and their variances will be calculated using equations 2.11a and 2.11b in (Bernard et al. 1998)[26]. Daily estimates of catch and harvest are then calculated by combining the daily estimate of angler effort with the catch and harvest rates as outlined in sections 2.2.3 and 2.2.4 of (Bernard et al. 1998). Angler effort estimates, estimates of catch and harvest rates, and estimates of catch and harvest will be conducted in a post-stratified manner for each angler type. Since the correct angler type can be determined for fishing anglers as they are counted then no prorating of angler counts will be necessary. Additionally, adjustments in the variance estimates for covariances due to post-stratifying by angler type, are expected to be minor and will be ignored (Bernard et al. 1998).

Stratum estimates of angler effort as well as catch and harvest will then be calculated by equation 2.1 of Table 2.1 of (Bernard et al. 1998). The stratum variances for these estimates are calculated following equation 2.5 of Table 2.4 in (Bernard et al. 1998).

During the early run a single angler count, and no interviews will be conducted on non-holiday Mondays in 2014. The following ad hoc estimation procedure will be used to obtain rough estimates of Monday effort, catch, and harvest. These estimates are not intended to conform to the same standard of statistical rigor as those for the remainder of the week.

1. The relationship between index counts and mean count on Mondays for 2009-2010 will be used to estimate the relationship between index counts and mean counts on Mondays for 2014. The mean number of anglers during 2009-2010 was approximately 52% of the number of anglers counted during the "index" period (1000-1400).
2. To estimate angler-hours of effort *E*, the estimated mean count will be multiplied by the length of the unguided angler day (20 hours).
3. To estimate CPUE and HPUE on Mondays without angler interviews, we exploit the tendency for angler success to exhibit an autocorrelated time trend. CPUE and HPUE will be plotted versus time for days sampled with angler interviews, and then we will impute CPUE and HPUE values for each Monday.
4. Catch and harvest will be estimated as the product of the imputed values of CPUE and HPUE and the estimate of *E* derived from the index count.

Creel survey estimates of CPUE and HPUE for non-holiday Mondays, during 2009 and 2010, did not show a significant difference compared to the ad hoc method in step 3 (Perschbacher 2012c). Therefore, the only change to estimate non-holiday Monday effort, catch, and harvest will be using the recalibrated proportion of anglers observed during the index in step 1.

[26] The jackknife estimating procedure as outlined in Appendix D of Bernard et al. (1998b) may be used in lieu of these procedures if sample sizes are deemed to be low (i.e., less than 5 anglers interviewed in a day).

Inriver Drift Gillnetting: Proportion Chinook Salmon at RM 8.6

Drift gillnets with two mesh sizes will be deployed: 5.0 and 7.5 inches. Two nearshore drifts (*l*) will be conducted with one mesh size oriented toward shore, on each side (*k*) of the river; then this sequence will be repeated with the other mesh size oriented towards shore. Two midriver drifts (*l*) will be conducted with one mesh size oriented closest to the sonar transducer, on each side (*k*) of the river; then this sequence will be repeated with the other mesh size oriented closest to the sonar transducer. A repetition (*j*) will consist of a complete set of four nearshore and four midriver drifts. Complete repetitions (four nearshore sets and four midriver sets) will be used for calculation of species proportions for nearshore and midriver, respectively.

The proportion of species *s* passing through the insonified zone of the river channel (midriver) on day *i* will be estimated as follows:

$$\hat{p}_{si} = \frac{\sum_{j}^{J_i} \hat{r}_{sij}}{\sum_{s}\sum_{j}^{J_i} \hat{r}_{sij}}, \tag{1}$$

where J_i is the number of repetitions completed on day *i*, the CPUE *r* for species *s* during repetition *j* of day *i* is estimated as the mean of the CPUEs, pooled across bank, for each mesh size:

$$\hat{r}_{sij} = \frac{1}{2}\sum_{m=1}^{2} \frac{\sum_{k=1}^{2} c_{smijk}}{\sum_{k=1}^{2} e_{mijk}} \tag{2}$$

and where c_{smijk} is the catch of species *s* in mesh *m* during a drift originating from bank *k* during repetition *j* on day *i*, and e_{mijk} is the effort (minutes of soak time) for that drift.

The variance of the species *s* proportion *p* on day *i* will be estimated[27] as (Cochran 1977:66):

$$\hat{\text{var}}\left(\hat{p}_{si}\right) = \frac{\sum_{j=1}^{J_i}\left(\hat{r}_{sij} - \hat{p}_{si}\hat{r}_{ij}\right)^2}{\bar{r}_i^{\,2} J_i (J_i - 1)} \tag{3}$$

where

$\hat{r}_{ij} = \sum_{s} \hat{r}_{sij}$ is the CPUE summed across all species caught during repetition *j* of day *i*, and

$\bar{r}_i$ = the mean CPUE of salmon (all species) caught across all drifts *k* during day *i*.

[27] Schaeffer et al (1990) state that this "is a good estimator only when the sample size is large" ($\geq$20). Sample sizes are small (J<10) in this study, thus there is potential for bias. The direction of the bias is currently unknown.

Daily Chinook proportions $\hat{p}_{Ci}$ will subsequently be multiplied by total daily upstream midriver sonar estimates of fish passage $\hat{x}_i$ (Miller et al 2005) to produce alternative daily estimates of Chinook salmon passage $\hat{y}_i$.

$$\hat{y}_i = \hat{x}_i \hat{p}_{Ci} \tag{4}$$

$$\hat{\text{var}}(\hat{y}_i) = \hat{x}_i^2 \, \hat{\text{var}}(\hat{p}_{Ci}) + \hat{p}_{Ci}^2 \, \hat{\text{var}}(\hat{x}_i) - \hat{\text{var}}(\hat{p}_{Ci}) \hat{\text{var}}(\hat{x}_i) \tag{5}$$

The relative magnitude of the sums of the daily $\hat{y}_i$ and $\hat{\text{var}}(\hat{y}_i)$ form the basis for the Objective 2 precision criterion. Equation 8 follows Goodman (1960).

The proportion of species *s* passing through the nearshore area on day *i* will be estimated using the same equations (1) through (3)

Inriver Drift Gillnetting: Size Selectivity

A two tailed z-test with = 0.10 will be conducted to test the null hypothesis of no difference in size composition (proportion of fish <75 cm) between Chinook salmon (1) that are radio-tagged and successfully migrate above either the Funny or Killey river weir, and (2) that pass either the Funny or Killey river weir (this group will be sampled by the USFWS[28]). Although this comparison is direct and easy to interpret, the power to detect small differences in size composition is low (Table 3). Therefore, additional analyses of weir, netting, and telemetry data will also be conducted to assess the size selectivity of the gillnetting program. These analyses, which have not yet been fully conceived, will be based on the approach used to develop "expanded weir" estimates of 2013 early run abundance by size (Appendix E). Because they will incorporate all relevant data, they will supplement our information about size selectivity above and beyond the simple comparison above.

Total Return by Brood Year

Total return originating from one brood year is the sum of age-specific total returns across five calendar years bracketing 3- through 7-year-old fish.

$$\hat{R}_y = \sum_{a=3}^{7} \hat{R}_{y+a,a} \tag{6}$$

where $\hat{R}_{y+a,a}$ is the sum of the estimates of inriver run I_a at RM 8.6 (estimated by sonar, Miller et al., 2005), plus commercial harvest C (censused from ESSN and upper Cook Inlet Drift gillnet fisheries), the Kenai River personal use harvest P, the late-run marine sport harvest M, and sport harvest S downstream of the sonar (estimated by creel survey), each restricted to the appropriate age a and calendar year $t=y+a$.

[28] We assume an effective sample size of 100 for the USFWS estimate of small Chinook proportion.

$$\hat{R}_{t,a} = \hat{I}_{t,a} + \hat{C}_{t,a} + \hat{P}_{t,a} + \hat{M}_{t,a} + \hat{S}_{t,a} \tag{7}$$

Omitting t for simplicity, age-specific commercial harvest will be estimated as the product of the commercial harvest *C* and an age proportion *p*:

$$\hat{C}_a = C\ \hat{p}_{Ca} \tag{8}$$

$$\mathrm{var}\left(\hat{C}_a\right) = C^2\ \mathrm{var}\left(\hat{p}_{Ca}\right) \tag{9}$$

where

$$\hat{p}_{Ca} = \frac{n_{Ca}}{n_C} \tag{10}$$

$$\mathrm{var}\left(\hat{p}_{Ca}\right) = \frac{\hat{p}_{Ca}\left(1-\hat{p}_{Ca}\right)}{n_C - 1} \tag{11}$$

n_C is the number of valid ages sampled from the commercial harvest, of which n_{Ca} are age *a*.

Similarly, age-specific sport harvest below the sonar will be estimated as:

$$\hat{S}_a = \hat{S}\ \hat{p}_{Sa} \tag{12}$$

$$\mathrm{var}\left(\hat{S}_a\right) = \hat{S}^2\ \mathrm{var}\left(\hat{p}_{Sa}\right) + \hat{p}_{Sa}^2\ \mathrm{var}\left(\hat{S}\right) - \mathrm{var}\left(\hat{p}_{Sa}\right)\mathrm{var}\left(\hat{S}\right) \tag{13}$$

where

$$\hat{p}_{Sa} = \frac{n_{Sa}}{n_S} \tag{14}$$

$$\mathrm{var}\left(\hat{p}_{Sa}\right) = \frac{\hat{p}_{Sa}\left(1-\hat{p}_{Sa}\right)}{n_S - 1} \tag{15}$$

n_S is the number of valid ages sampled from the sport harvest, of which n_{Sa} are age *a*.

Age specific personal use *P* will be estimated using equations 8-11 and substituting *P* for *C*. Age specific marine sport harvest *M* will be estimated using equations 12-15 and substituting *M* for *S*.

Finally, the estimate of age-specific inriver return will be stratified into two 3-week periods (subscript *h*):

$$\hat{I}_a = \sum_{h=1}^{2} \hat{I}_h \hat{p}_{Iha} \tag{16}$$

$$\mathrm{var}\left(\hat{I}_a\right) = \sum_{h=1}^{2}\left[\hat{I}_h^2\ \hat{\mathrm{var}}\left(\hat{p}_{Iha}\right) + \hat{p}_{Iha}^2\ \hat{\mathrm{var}}\left(\hat{I}_h\right) - \hat{\mathrm{var}}\left(\hat{p}_{Iha}\right)\hat{\mathrm{var}}\left(\hat{I}_h\right)\right] \tag{17}$$

where

$$\hat{p}_{Iha} = \frac{n_{Iha}}{n_{Ih}} \tag{18}$$

$$\text{var}(\hat{p}_{Iha}) = \frac{\hat{p}_{Iha}(1-\hat{p}_{Iha})}{n_{Ih}-1} \tag{19}$$

and n_{Ih} is the number of valid ages sampled from the inriver run during stratum *h*, of which n_{Iha} are age *a*. All analyses will be conducted separately for the early and late runs. Variance estimates for species proportions (equations 9, 11, 13, 15, 17, and 19) assume that each fish sampled is an independent observation (i.e., that simple random sampling, SRS, was employed). In reality, the sport harvest is sampled with a multistage design (creel survey), and the inriver return with a cluster design (netting); and technically, the age proportion variances should be estimated in the context of those designs. However age composition changes very slowly over time; and in the past we have assumed that variability between sampling stages and among clusters is negligible. To verify this, we recently re-analyzed the 2006 netting data, calculated the age proportions following equations 1-5 and compared them to the simple random sampling estimators in equations 14 and 15. The point estimates and their standard errors were essentially equivalent. Based on this evidence, we continue to use the SRS equations for convenience.

TECHNICIAN MANUAL

An explanation and background of the projects are detailed in the Technician Manual (Appendix F). The manual also has expectations, responsibilities and general operating procedures for crewmembers to reference and follow. Crews will be required to read this manual and keep it in their clipboard for reference while on duty.

SCHEDULES AND DELIVERABLES

The schedule for conducting angler counts and interviews is in Appendix A, and for the inriver netting program is in Appendix B. A general schedule for completion of tasks is outlined below.

1. Prepare equipment for the field season. ..... April 1 - May 10 (Perschbacher)

2. Field season preparation and preseason training. .....April 1 - May 15 (All Staff)

3. Creel Survey.....May 16 - July 31 (Karic)
   (Vacant)

4. River Mile 8.6 Gillnetting. ..... May 16 - Aug 10 (Johnson)
   (Amend)
   (Collum)

5. River Mile 12 Gillnetting pilot study ..... May 16 – June 30 (Karic)
   (Vacant)

6. Inseason angler effort, harvest, and netting CPUE estimates. .....Daily (Perschbacher)

7. Interview and count data edited. .....Daily (Perschbacher)

8. Interview and count data summarized. .....Daily (Perschbacher)

9. Prepare equipment for winter storage. .....Aug 10 – Aug 20 (Perschbacher)

10. Scales read. .....Oct 15 (Perschbacher)

11. Age composition summary. .....Oct 15 (Perschbacher)

12. Final creel estimates.....Oct 15 (Perschbacher)

13. Chinook salmon stock assessment report ..... March 1 (McKinley)

14. Annual report submitted and data archived. .....November 30 (Perschbacher)

15. 2014 operation plan..... May 1 (Perschbacher)

The results of this project will be presented in an Alaska Department of Fish and Game, Sport Fish Division, Fishery Data Series report. The estimates of catch, harvest, and age will also be presented in separate Fishery Data Series reports describing assessment of each run of Chinook salmon.

RESPONSIBILITIES

PRINCIPAL INVESTIGATORS

Jeff Perschbacher, Project Leader, Fishery Biologist I, April 1 – November 30:

The project leader is responsible for writing the operational plan. This position will serve as the project biologist and will be responsible for removing equipment from winter storage, readying it for use, for hiring and training any new personnel and completion of Monday index counts. The project biologist will be responsible for inseason data reduction and conducting daily data analysis, postseason data analysis, and writing the fishery data series report. This position will be involved in any presentation that may be required at the Board of Fisheries concerning the creel survey, inriver gillnetting project or Kenai Chinook ASL data. This position will also ensure all data is in proper format and archived with RTS at the completion of the field season and will be expected to generate all harvest and effort estimates as well as projections for the inriver run, final escapement for each run, and will post regular summaries of inseason estimates and projections on the intranet.

This position is responsible for ensuring all pressing and aging of Chinook salmon scale samples from the creel survey and inriver gillnets is accomplished and will summarize the age composition data and forward the information to the area research biologist. All data will be entered into a mark sense format file for archiving and scale cards will be archived as well.

It will also be the responsibility of this position to keep the area research biologist informed of any problems with equipment and/or personnel affecting the completion of this project.

Timothy McKinley, Area Research Supervisor, Fishery Biologist III, January 1 – December 31:

This position will serve as the overall supervisor for the project and personnel involved. When necessary, the Area Research Supervisor will assist project personnel with all aspects of this project.

CONSULTING BIOMETRICIAN

Jiaqi Huang, Biometrician III, January 1 – December 31:

Provides guidance on sampling design and data analysis; assists with preparation of operational plan and report.

PROJECT LEADER SUPERVISOR

Tony Eskelin, Fishery Biologist II, January 1 – December 31:

This position will serve as the direct supervisor of the project leader and will assist the project leader when necessary in all aspects of crew supervision, field season preparation and collection of data, data analysis, report writing, and operational planning. This position will also be responsible for data analysis of Chinook salmon <750 METF comparisons between RM 8.6 and RM 12 vs. tributary weirs.

CREEL SURVEY CREW

Vacant, Fish and Wildlife Technician III: May 12 – July 31.

Ivan Karic, Fish and Wildlife Technician III: May 12 – July 31.

Primary responsibilities of these positions when the sport fishery is open include: interviewing and counting sport anglers and boats while adhering to strict sampling schedule; sampling harvested Chinook salmon for ASL and CWT information; recording data accurately; entering data into a computerized database in a timely manner; answering questions from the public on a variety of subjects such as sport fishing regulations and local fishery issues. Primary responsibilities when the sport fishery is closed in 2014 are to conduct inriver gillnetting study at RM 12, and aid in other research projects as needed.

Further duties are to carefully document fishery violations observed during the course of normal duties and forward the information to the project leader and potentially other enforcement agencies and preventative maintenance and/or repair of assigned equipment.

INRIVER GILLNETTING CREW

Kas Johnson, Fish and Wildlife Technician II: May 13 – August 12.

Samantha Collum, Fish and Wildlife Technician II: May 13 – August 12.

Averee Amend, Fish and Wildlife Technician II: May 13 – August 12.

Responsibilities of these positions include; capturing Chinook salmon in gillnets while adhering to strict sampling schedules and protocols, sampling captured Chinook salmon for ASL and

CWT information, recording data accurately and entering data into a computerized database in a timely manner. Further duties are preventative maintenance and/or repair of assigned equipment.

BUDGET SUMMARY

Proposed FY14 and FY15 Costs:

Line Item	Category	FY14 Budget ($K)	FY 15 Budget ($K)
100	Personnel	351.0	361.4
200	Travel	4.5	1.9
300	Contractual	21.1	21.8
400	Commodities	8.5	7.1
500	Equipment	0	0
Total		385.6	392.2

Funded Personnel FY 14:

PCN	Name	Level	Funded Man Months
114023	McKinley, Timothy	Fishery Biologist III	12.0
115244	Eskelin, Anthony	Fishery Biologist II	12.0
114190	Perschbacher, Jeff	Fishery Biologist I	8.0
114133	Vacant	FWT III	2.7
114253	Karic, Ivan	FWT III	2.7
114260	Johnson, Kas	FWT II	3.1
114213	Amend, Averee	FWT II	3.1
115239	Collum, Sam	FWT II	3.1
Total			46.7

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FIGURES

Figure 1.- Map of the Kenai River drainage.

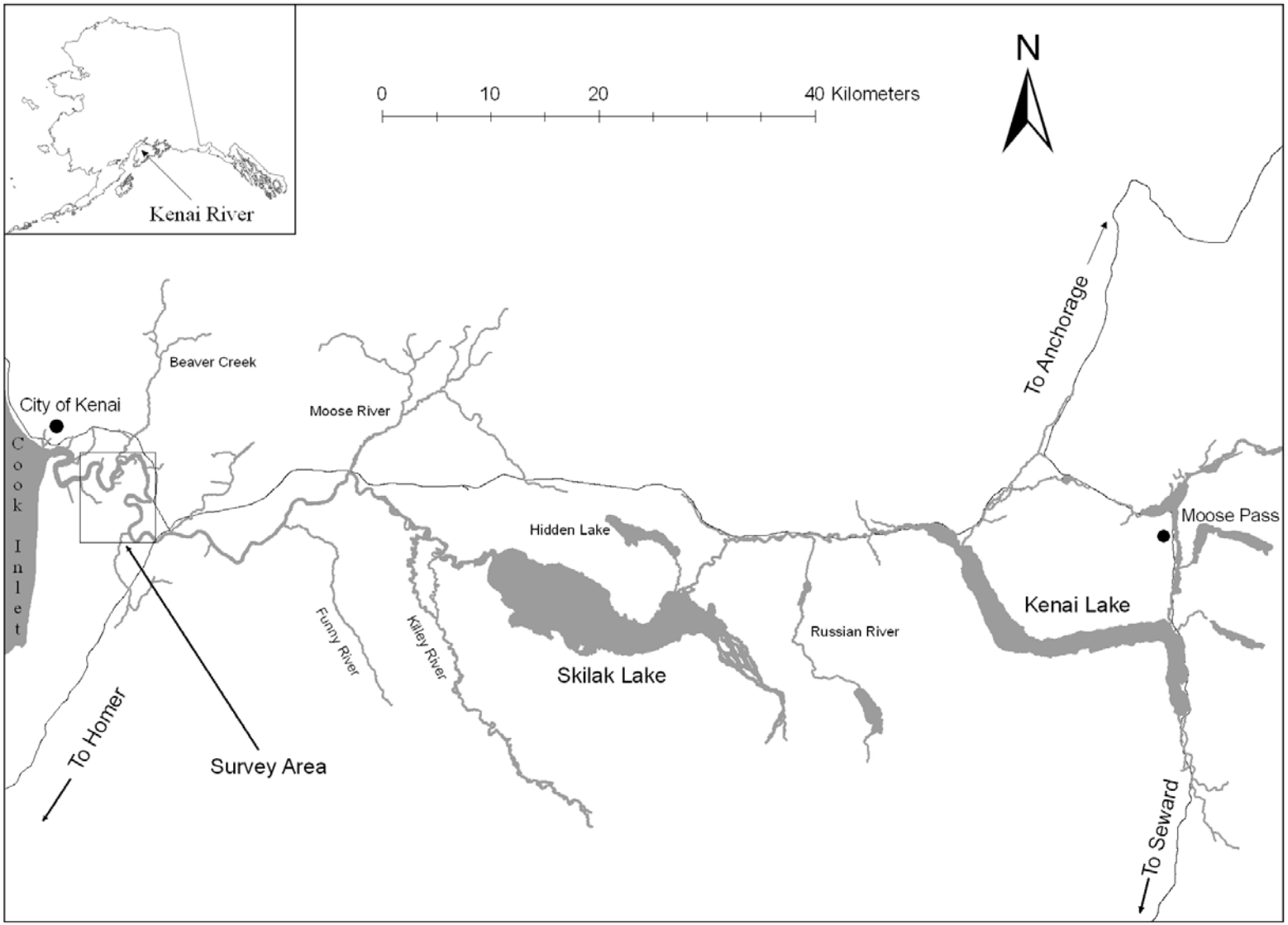
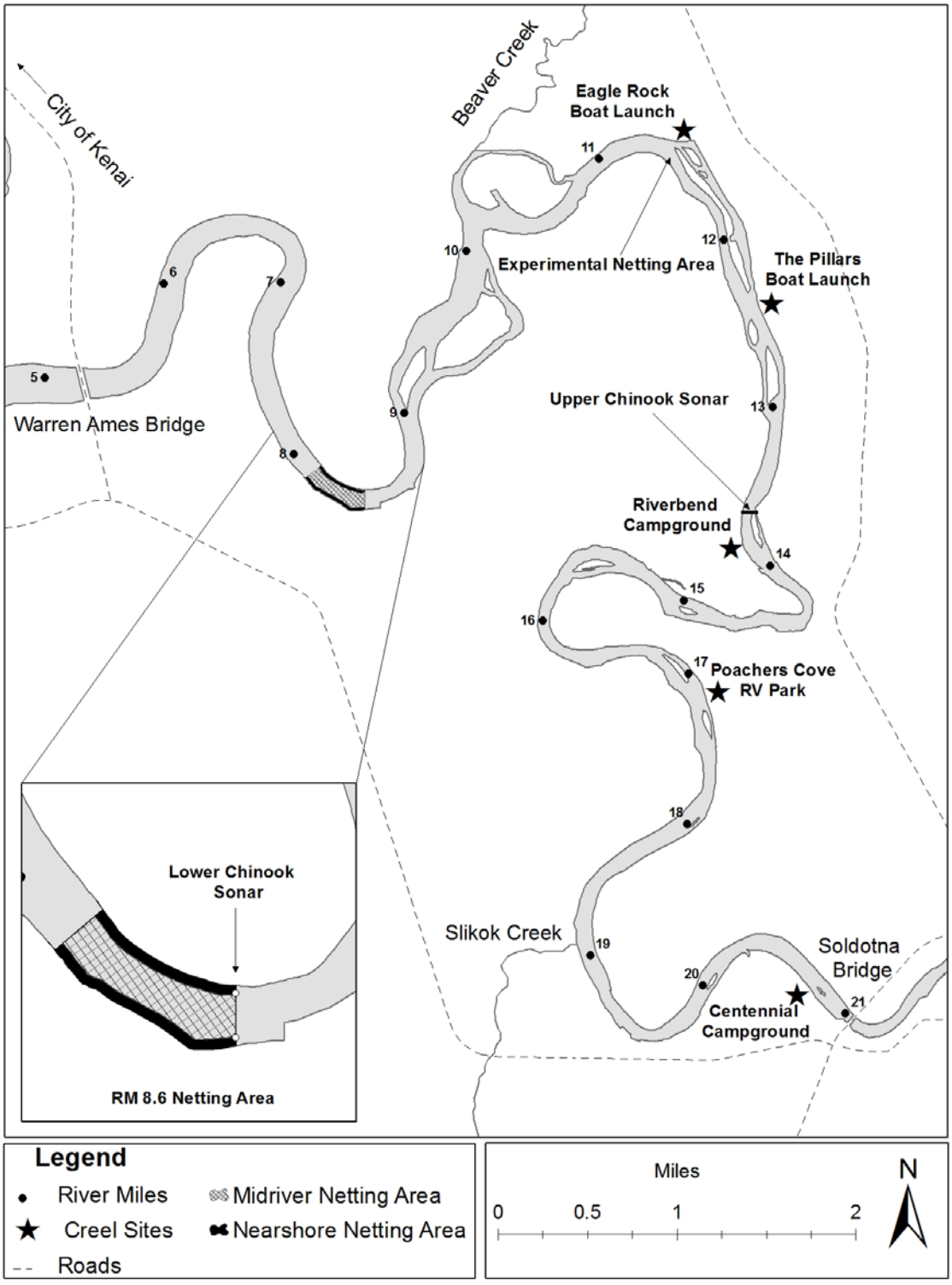


Figure 2.- Map of the Kenai River creel survey and inriver gillnetting study areas.



APPENDIX A. SAMPLING SCHEDULES FOR THE KENAI RIVER CHINOOK SALMON CREEL SURVEY AND INRIVER GILLNETTING STUDY, 2014

Appendix A1.-Sampling schedule for the Kenai River Chinook salmon creel survey.

		Friday May 16, 2014	Saturday May 17, 2014	Sunday May 18, 2014
Week One		*6:15 Morning shift begins*	*3:15 Morning shift begins*	*4:15 Morning shift begins*
		7:00 - 8:00 Count DOWN IK	**4:00 - 5:00 Count DOWN IK**	**5:00 - 6:00 Count DOWN IK**
		8:00 - 12:00 Pillar's IK	**5:00 - 9:00 Pillar's IK**	**6:00 - 10:00 Pillar's IK**
		12:00 - 13:00 Count UP IK	**9:00 - 10:00 Count UP IK**	**10:00 - 11:00 Count UP IK**
		13:00 - 15:15 Pillar's IK	**10:00 - 13:45 Pillar's IK**	**11:00 - 14:15 Pillar's IK**
		15:15 Shift change	*13:45 Shift change*	*14:15 Shift change*
Early Run		**15:15 - 17:00 Pillar's AA**		**14:15 - 15:00 Pillar's AA**
		17:00 - 18:00 Count UP AA	**14:00 - 15:00 Count UP AA**	**15:00 - 16:00 Count UP AA**
		18:00 - 22:00 Pillar's AA	**15:00 - 19:00 Pillar's AA**	**16:00 - 20:00 Pillar's AA**
		22:00 - 23:00 Count UP AA	**19:00 - 20:00 Count UP AA**	**20:00 - 21:00 Count UP AA**
		23:00 - 23:45 Pillar's AA	**20:00 - 23:45 Pillar's AA**	**21:00 - 23:45 Pillar's AA**
		0:45 Evening shift ends	*0:45 Evening shift ends*	*0:45 Evening shift ends*

		Tuesday May 20, 2014	Thursday May 22, 2014	Saturday May 24, 2014	Sunday May 25, 2014
Week Two		*5:15 Morning shift begins*	*4:15 Morning shift begins*	*7:15 Morning shift begins*	*6:15 Morning shift begins*
		6:00 - 7:00 Count DOWN IK	**5:00 - 6:00 Count DOWN IK**	**8:00 - 9:00 Count DOWN IK**	**7:00 - 8:00 Count DOWN IK**
		7:00 - 11:00 Pillar's IK	**6:00 - 10:00 Pillar's IK**	**9:00 - 13:00 Pillar's IK**	**8:00 - 12:00 Pillar's IK**
		11:00 - 12:00 Count UP IK	**10:00 - 11:00 Count UP IK**	**13:00 - 14:00 Count UP IK**	**12:00 - 13:00 Count UP IK**
		12:00 - 14:45 Pillar's IK	**11:00 - 14:15 Pillar's IK**	**14:00 - 15:45 Pillar's IK**	**13:00 - 15:15 Pillar's IK**
		14:45 Shift change	*14:15 Shift change*	*15:45 Shift change*	*15:15 Shift change*
Early Run		**14:45 - 16:00 Pillar's AA**	**14:15 - 15:00 Pillar's AA**	**15:45 - 18:00 Pillar's AA**	**15:15 - 17:00 Pillar's AA**
		16:00 - 17:00 Count UP AA	**15:00 - 16:00 Count UP AA**	**18:00 - 19:00 Count UP AA**	**17:00 - 18:00 Count UP AA**
		17:00 - 21:00 Pillar's AA	**16:00 - 20:00 Pillar's AA**	**19:00 - 23:00 Pillar's AA**	**18:00 - 22:00 Pillar's AA**
		21:00 - 22:00 Count UP AA	**20:00 - 21:00 Count UP AA**	**23:00 - 0:00 Count UP AA**	**22:00 - 23:00 Count UP AA**
		22:00 - 23:45 Pillar's AA	**21:00 - 23:45 Pillar's AA**		**23:00 - 23:45 Pillar's AA**
		0:45 Evening shift ends	*0:45 Evening shift ends*	*0:45 Evening shift ends*	*0:45 Evening shift ends*

Early Run Week Three	Wednesday May 28, 2014	Friday May 30, 2014	Saturday May 31, 2014	Sunday June 1, 2014
	6:15 Morning shift begins	*7:15 Morning shift begins*	*3:15 Morning shift begins*	*7:15 Morning shift begins*
	7:00 - 8:00 Count DOWN IK	8:00 - 9:00 Count DOWN IK	4:00 - 5:00 Count UP IK	8:00 - 9:00 Count DOWN IK
	8:00 - 12:00 Pillar's IK	9:00 - 13:00 Pillar's IK	5:00 - 9:00 Centennial IK	9:00 - 13:00 Pillar's IK
	12:00 - 13:00 Count UP IK	13:00 - 14:00 Count UP IK	9:00 - 10:00 Count DOWN IK	13:00 - 14:00 Count UP IK
	13:00 - 15:15 Centennial IK	14:00 - 15:45 Centennial IK	10:00 - 13:45 Pillar's IK	14:00 - 15:45 Centennial IK
	15:15 Shift change	*15:45 Shift change*	*13:45 Shift change*	*15:45 Shift change*
	15:15 - 17:00 Centennial AA	15:45 - 18:00 Centennial AA		15:45 - 18:00 Centennial AA
	17:00 - 18:00 Count DOWN AA	18:00 - 19:00 Count DOWN AA	14:00 - 15:00 Count UP AA	18:00 - 19:00 Count DOWN AA
	18:00 - 22:00 Pillar's AA	19:00 - 23:00 Pillar's AA	15:00 - 19:00 Centennial AA	19:00 - 23:00 Pillar's AA
	22:00 - 23:00 Count UP AA	23:00 - 0:00 Count UP AA	19:00 - 20:00 Count DOWN AA	23:00 - 0:00 Count UP AA
	23:00 - 23:45 Centennial AA		20:00 - 23:45 Pillar's AA	
	0:45 Evening shift ends	*0:45 Evening shift ends*	*0:45 Evening shift ends*	*0:45 Evening shift ends*

Early Run Week Four	Thursday June 5, 2014	Friday June 6, 2014	Saturday June 7, 2014	Sunday June 8, 2014
	7:15 Morning shift begins	*4:15 Morning shift begins*	*6:15 Morning shift begins*	*7:15 Morning shift begins*
	8:00 - 9:00 Count UP IK	5:00 - 6:00 Count DOWN IK	7:00 - 8:00 Count UP IK	8:00 - 9:00 Count DOWN IK
	9:00 - 13:00 Centennial IK	6:00 - 10:00 Pillar's IK	8:00 - 12:00 Centennial IK	9:00 - 13:00 Pillar's IK
	13:00 - 14:00 Count DOWN IK	10:00 - 11:00 Count UP IK	12:00 - 13:00 Count DOWN IK	13:00 - 14:00 Count UP IK
	14:00 - 15:45 Pillar's IK	11:00 - 14:15 Centennial IK	13:00 - 15:15 Pillar's IK	14:00 - 15:45 Centennial IK
	15:45 Shift change	*14:15 Shift change*	*15:15 Shift change*	*15:45 Shift change*
	15:45 - 18:00 Pillar's AA	14:15 - 15:00 Centennial AA	15:15 - 17:00 Pillar's AA	15:45 - 18:00 Centennial AA
	18:00 - 19:00 Count UP AA	15:00 - 16:00 Count DOWN AA	17:00 - 18:00 Count UP AA	18:00 - 19:00 Count DOWN AA
	19:00 - 23:00 Centennial AA	16:00 - 20:00 Pillar's AA	18:00 - 22:00 Centennial AA	19:00 - 23:00 Pillar's AA
	23:00 - 0:00 Count DOWN AA	20:00 - 21:00 Count UP AA	22:00 - 23:00 Count DOWN AA	23:00 - 0:00 Count UP AA
		21:00 - 23:45 Centennial AA	23:00 - 23:45 Pillar's AA	
	0:45 Evening shift ends	*0:45 Evening shift ends*	*0:45 Evening shift ends*	*0:45 Evening shift ends*

Week Five	Wednesday June 11, 2014	Friday June 13, 2014	Saturday June 14, 2014	Sunday June 15, 2014
	3:15 Morning shift begins	*6:15 Morning shift begins*	*4:15 Morning shift begins*	*7:15 Morning shift begins*
	4:00 - 5:00 Count DOWN IK	7:00 - 8:00 Count DOWN IK	5:00 - 6:00 Count DOWN IK	8:00 - 9:00 Count UP IK
	5:00 - 9:00 River Bend IK	8:00 - 12:00 Pillar's IK	6:00 - 10:00 Pillar's IK	9:00 - 13:00 Centennial IK
	9:00 - 10:00 Count UP IK	12:00 - 13:00 Count UP IK	10:00 - 11:00 Count UP IK	13:00 - 14:00 Count DOWN IK
	10:00 - 13:45 Poacher's IK	13:00 - 15:15 River Bend IK	11:00 - 14:15 Poacher's IK	14:00 - 15:45 Poacher's IK
	13:45 Shift change	*15:15 Shift change*	*14:15 Shift change*	*15:45 Shift change*
Early Run		15:15 - 17:00 River Bend AA	14:15 - 15:00 Poacher's AA	15:45 - 18:00 Poacher's AA
	14:00 - 15:00 Count UP AA	17:00 - 18:00 Count UP AA	15:00 - 16:00 Count UP AA	18:00 - 19:00 Count DOWN AA
	15:00 - 19:00 Centennial AA	18:00 - 22:00 Poacher's AA	16:00 - 20:00 Centennial AA	19:00 - 23:00 River Bend AA
	19:00 - 20:00 Count DOWN AA	22:00 - 23:00 Count UP AA	20:00 - 21:00 Count DOWN AA	23:00 - 0:00 Count UP AA
	20:00 - 23:45 Pillar's AA	23:00 - 23:45 Centennial AA	21:00 - 23:45 River Bend AA	
	0:45 Evening shift ends	*0:45 Evening shift ends*	*0:45 Evening shift ends*	*0:45 Evening shift ends*

Week Six	Tuesday June 17, 2014	Thursday June 19, 2014	Saturday June 21, 2014	Sunday June 22, 2014
	7:15 Morning shift begins	*4:15 Morning shift begins*	*5:15 Morning shift begins*	*5:15 Morning shift begins*
	8:00 - 9:00 Count DOWN IK	5:00 - 6:00 Count DOWN IK	6:00 - 7:00 Count DOWN IK	6:00 - 7:00 Count UP IK
	9:00 - 13:00 River Bend IK	6:00 - 10:00 River Bend IK	7:00 - 11:00 Pillar's IK	7:00 - 11:00 Poacher's IK
	13:00 - 14:00 Count DOWN IK	10:00 - 11:00 Count UP IK	11:00 - 12:00 Count UP IK	11:00 - 12:00 Count DOWN IK
	14:00 - 15:45 Pillar's IK	11:00 - 14:15 Centennial IK	12:00 - 14:45 Centennial IK	12:00 - 14:45 River Bend IK
	15:45 Shift change	*14:15 Shift change*	*14:45 Shift change*	*14:45 Shift change*
Early Run	15:45 - 18:00 Pillar's AA	14:15 - 15:00 Centennial AA	14:45 - 16:00 Centennial AA	14:45 - 16:00 River Bend AA
	18:00 - 19:00 Count UP AA	15:00 - 16:00 Count DOWN AA	16:00 - 17:00 Count DOWN AA	16:00 - 17:00 Count DOWN AA
	19:00 - 23:00 Poacher's AA	16:00 - 20:00 Poacher's AA	17:00 - 21:00 River Bend AA	17:00 - 21:00 Pillar's AA
	23:00 - 0:00 Count DOWN AA	20:00 - 21:00 Count DOWN AA	21:00 - 22:00 Count UP AA	21:00 - 22:00 Count UP AA
		21:00 - 23:45 Pillar's AA	22:00 - 23:45 Poacher's AA	22:00 - 23:45 Centennial AA
	0:45 Evening shift ends	*0:45 Evening shift ends*	*0:45 Evening shift ends*	*0:45 Evening shift ends*

Early Run Seven

Tuesday June 24, 2014				Thursday June 26, 2014				Saturday June 28, 2014				Sunday June 29, 2014			
5:15	*Morning shift begins*			*4:15*	*Morning shift begins*			*5:15*	*Morning shift begins*			*7:15*	*Morning shift begins*		
6:00 -	7:00	Count DOWN	IK	5:00 -	6:00	Count DOWN	IK	6:00 -	7:00	Count DOWN	IK	8:00 -	9:00	Count UP	IK
7:00 -	11:00	Pillar's	IK	6:00 -	10:00	Pillar's	IK	7:00 -	11:00	Pillar's	IK	9:00 -	13:00	Centennial	IK
11:00 -	12:00	Count UP	IK	10:00 -	11:00	Count UP	IK	11:00 -	12:00	Count UP	IK	13:00 -	14:00	Count DOWN	IK
12:00 -	14:45	River Bend	IK	11:00 -	14:15	Centennial	IK	12:00 -	14:45	Centennial	IK	14:00 -	15:45	Poacher's	IK
14:45	*Shift change*			*14:15*	*Shift change*			*14:45*	*Shift change*			*15:45*	*Shift change*		
14:45 -	16:00	River Bend	AA	14:15 -	15:00	Centennial	AA	14:45 -	16:00	Centennial	AA	15:45 -	18:00	Poacher's	AA
16:00 -	17:00	Count UP	AA	15:00 -	16:00	Count DOWN	AA	16:00 -	17:00	Count DOWN	AA	18:00 -	19:00	Count DOWN	AA
17:00 -	21:00	Poacher's	AA	16:00 -	20:00	River Bend	AA	17:00 -	21:00	River Bend	AA	19:00 -	23:00	River Bend	AA
21:00 -	22:00	Count UP	AA	20:00 -	21:00	Count UP	AA	21:00 -	22:00	Count UP	AA	23:00 -	0:00	Count UP	AA
22:00 -	23:45	Centennial	AA	21:00 -	23:45	Poacher's	AA	22:00 -	23:45	Poacher's	AA				
0:45	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*		

Late Run Week One

Wednesday July 2, 2014				Friday July 4, 2014				Saturday July 5, 2014				Sunday July 6, 2014			
7:15	*Morning shift begins*			*5:15*	*Morning shift begins*			*4:15*	*Morning shift begins*			*7:15*	*Morning shift begins*		
8:00 -	9:00	Count DOWN	IK	6:00 -	7:00	Count DOWN	IK	5:00 -	6:00	Count DOWN	IK	8:00 -	9:00	Count UP	IK
9:00 -	13:00	Eagle Rock	IK	7:00 -	11:00	Eagle Rock	IK	6:00 -	10:00	Eagle Rock	IK	9:00 -	13:00	Poacher's	IK
13:00 -	14:00	Count UP	IK	11:00 -	12:00	Count UP	IK	10:00 -	11:00	Count UP	IK	13:00 -	14:00	Count DOWN	IK
14:00 -	15:45	Centennial	IK	12:00 -	14:45	Pillar's	IK	11:00 -	14:15	Centennial	IK	14:00 -	15:45	Pillar's	IK
15:45	*Shift change*			*14:45*	*Shift change*			*14:15*	*Shift change*			*15:45*	*Shift change*		
15:45 -	18:00	Centennial	AA	14:45 -	16:00	Pillar's	AA	14:15 -	15:00	Centennial	AA	15:45 -	18:00	Pillar's	AA
18:00 -	19:00	Count DOWN	AA	16:00 -	17:00	Count UP	AA	15:00 -	16:00	Count DOWN	AA	18:00 -	19:00	Count UP	AA
19:00 -	23:00	River Bend	AA	17:00 -	21:00	Poacher's	AA	16:00 -	20:00	River Bend	AA	19:00 -	23:00	River Bend	AA
23:00 -	0:00	Count UP	AA	21:00 -	22:00	Count UP	AA	20:00 -	21:00	Count UP	AA	23:00 -	0:00	Count UP	AA
				22:00 -	23:45	Centennial	AA	21:00 -	23:45	Poacher's	AA				
0:45	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*		

Late Run Week Two

Tuesday	July 8, 2014			Friday	July 11, 2014			Saturday	July 12, 2014			Sunday	July 13, 2014		
7:15	*Morning shift begins*			*5:15*	*Morning shift begins*			*7:15*	*Morning shift begins*			*3:15*	*Morning shift begins*		
8:00 -	9:00	Count DOWN	IK	6:00 -	7:00	Count UP	IK	8:00 -	9:00	Count DOWN	IK	4:00 -	5:00	Count DOWN	IK
9:00 -	13:00	River Bend	IK	7:00 -	11:00	Poacher's	IK	9:00 -	13:00	Pillar's	IK	5:00 -	9:00	Pillar's	IK
13:00 -	14:00	Count DOWN	IK	11:00 -	12:00	Count DOWN	IK	13:00 -	14:00	Count UP	IK	9:00 -	10:00	Count UP	IK
14:00 -	15:45	Pillar's	IK	12:00 -	14:45	River Bend	IK	14:00 -	15:45	Centennial	IK	10:00 -	13:45	Centennial	IK
15:45	*Shift change*			*14:45*	*Shift change*			*15:45*	*Shift change*			*13:45*	*Shift change*		
15:45 -	18:00	Pillar's	AA	14:45 -	16:00	River Bend	AA	15:45 -	18:00	Centennial	AA				
18:00 -	19:00	Count DOWN	AA	16:00 -	17:00	Count UP	AA	18:00 -	19:00	Count DOWN	AA	14:00 -	15:00	Count DOWN	AA
19:00 -	23:00	Eagle Rock	AA	17:00 -	21:00	Centennial	AA	19:00 -	23:00	River Bend	AA	15:00 -	19:00	Eagle Rock	AA
23:00 -	0:00	Count UP	AA	21:00 -	22:00	Count DOWN	AA	23:00 -	0:00	Count UP	AA	19:00 -	20:00	Count UP	AA
				22:00 -	23:45	Pillar's	AA					20:00 -	23:45	Poacher's	AA
0:45	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*		

Late Run Week three

Wednesday	July 16, 2014			Friday	July 18, 2014			Saturday	July 19, 2014			Sunday	July 20, 2014		
3:15	*Morning shift begins*			*6:15*	*Morning shift begins*			*5:15*	*Morning shift begins*			*6:15*	*Morning shift begins*		
4:00 -	5:00	Count UP	IK	7:00 -	8:00	Count DOWN	IK	6:00 -	7:00	Count UP	IK	7:00 -	8:00	Count DOWN	IK
5:00 -	9:00	Poacher's	IK	8:00 -	12:00	Pillar's	IK	7:00 -	11:00	Poacher's	IK	8:00 -	12:00	Pillar's	IK
9:00 -	10:00	Count UP	IK	12:00 -	13:00	Count UP	IK	11:00 -	12:00	Count DOWN	IK	12:00 -	13:00	Count UP	IK
10:00 -	13:45	Centennial	IK	13:00 -	15:15	River Bend	IK	12:00 -	14:45	Pillar's	IK	13:00 -	15:15	River Bend	IK
13:45	*Shift change*			*15:15*	*Shift change*			*14:45*	*Shift change*			*15:15*	*Shift change*		
				15:15 -	17:00	River Bend	AA	14:45 -	16:00	Pillar's	AA	15:15 -	17:00	River Bend	AA
14:00 -	15:00	Count DOWN	AA	17:00 -	18:00	Count DOWN	AA	16:00 -	17:00	Count UP	AA	17:00 -	18:00	Count DOWN	AA
15:00 -	19:00	River Bend	AA	18:00 -	22:00	Eagle Rock	AA	17:00 -	21:00	River Bend	AA	18:00 -	22:00	Eagle Rock	AA
19:00 -	20:00	Count DOWN	AA	22:00 -	23:00	Count UP	AA	21:00 -	22:00	Count UP	AA	22:00 -	23:00	Count UP	AA
20:00 -	23:45	Pillar's	AA	23:00 -	23:45	Poacher's	AA	22:00 -	23:45	Centennial	AA	23:00 -	23:45	Centennial	AA
0:45	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*		

Late Run Week Four

Wednesday	July 23, 2014			Thursday	July 24, 2014			Saturday	July 26, 2014			Sunday	July 27, 2014		
6:15	*Morning shift begins*			*6:15*	*Morning shift begins*			*4:15*	*Morning shift begins*			*4:15*	*Morning shift begins*		
7:00 -	8:00	Count UP	IK	7:00 -	8:00	Count UP	IK	5:00 -	6:00	Count DOWN	IK	5:00 -	6:00	Count DOWN	IK
8:00 -	12:00	Centennial	IK	8:00 -	12:00	Poacher's	IK	6:00 -	10:00	Pillar's	IK	6:00 -	10:00	River Bend	IK
12:00 -	13:00	Count DOWN	IK	12:00 -	13:00	Count DOWN	IK	10:00 -	11:00	Count UP	IK	10:00 -	11:00	Count DOWN	IK
13:00 -	15:15	River Bend	IK	13:00 -	15:15	River Bend	IK	11:00 -	14:15	Poacher's	IK	11:00 -	14:15	Eagle Rock	IK
15:15	*Shift change*			*15:15*	*Shift change*			*14:15*	*Shift change*			*14:15*	*Shift change*		
15:15 -	17:00	River Bend	AA	15:15 -	17:00	River Bend	AA	14:15 -	15:00	Poacher's	AA	14:15 -	15:00	Eagle Rock	AA
17:00 -	18:00	Count UP	AA	17:00 -	18:00	Count DOWN	AA	15:00 -	16:00	Count UP	AA	15:00 -	16:00	Count UP	AA
18:00 -	22:00	Poacher's	AA	18:00 -	22:00	Eagle Rock	AA	16:00 -	20:00	Centennial	AA	16:00 -	20:00	Pillar's	AA
22:00 -	23:00	Count DOWN	AA	22:00 -	23:00	Count UP	AA	20:00 -	21:00	Count DOWN	AA	20:00 -	21:00	Count UP	AA
23:00 -	23:45	Pillar's	AA	23:00 -	23:45	Centennial	AA	21:00 -	23:45	Eagle Rock	AA	21:00 -	23:45	Centennial	AA
0:45	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*			*0:45*	*Evening shift ends*		

Late Run Week Five

Wednesday	July 30, 2014			Thursday	July 31, 2014		
4:15	*Morning shift begins*			*5:15*	*Morning shift begins*		
5:00 -	6:00	Count DOWN	IK	6:00 -	7:00	Count DOWN	IK
6:00 -	10:00	Eagle Rock	IK	7:00 -	11:00	Pillar's	IK
10:00 -	11:00	Count UP	IK	11:00 -	12:00	Count UP	IK
11:00 -	14:15	Poacher's	IK	12:00 -	14:45	Centennial	IK
14:15	*Shift change*			*14:45*	*Shift change*		
14:15 -	15:00	Poacher's	AA	14:45 -	16:00	Centennial	AA
15:00 -	16:00	Count DOWN	AA	16:00 -	17:00	Count DOWN	AA
16:00 -	20:00	Pillar's	AA	17:00 -	21:00	River Bend	AA
20:00 -	21:00	Count UP	AA	21:00 -	22:00	Count DOWN	AA
21:00 -	23:45	Centennial	AA	22:00 -	23:45	Eagle Rock	AA
0:45	*Evening shift ends*			*0:45*	*Evening shift ends*		

Appendix A2.–Sampling schedule for the Kenai River RM 8.6 netting project.

Week 1	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	12-May	13-May	14-May	15-May	16-May	17-May	18-May
red lengths?					*yes*	*no*	*yes*
First Bank					*Left*	*Left*	*Right*
First location					*Near*	*Mid*	*Near*
First mesh					*5.0*	*5.0*	*5.0*
Morning							
Tech #1	**Prep**	**Prep**			**X**	**X**	**X**
Tech #2	**Prep**	**Prep**	**X**	**X**			**X**
Tech #3	**Prep**	**Prep**	**X**		**X**	**X**	
Afternoon							
Tech #1	**Prep**	**Prep**			**X**	**X**	**X**
Tech #2	**Prep**	**Prep**	**X**	**X**			**X**
Tech #3	**Prep**	**Prep**	**X**		**X**	**X**	
High Tide					5:45	6:30	7:15
Low Tide					14:15	15:00	15:45
High tide2					18:45	19:30	20:15
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs.							
Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.							
Traditional netting schedule (begin 5 hrs before low tide)							
Net in					8:15	9:00	9:45
Net out					14:15	15:00	15:45

Week 2	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	19-May	20-May	21-May	22-May	23-May	24-May	25-May
red lengths?	*yes*	*no*	*yes*	*no*	*yes*	*no*	*yes*
First Bank	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*	*Left*
First location	*Mid*	*Near*	*Mid*	*Near*	*Mid*	*Near*	*Mid*
First mesh	*5.0*	*7.5*	*7.5*	*7.5*	*7.5*	*5.0*	*5.0*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide	8:00	9:00	10:15	11:30	13:00	14:00	15:00
Low Tide	15:30	16:30	17:30	18:45	20:00	21:00	21:30
High tide2	21:15	22:15	23:30	0:00	18:45	1:30	3:00
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs.							
Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.							
Traditional netting schedule comparable to past years (begin 5 hrs before low tide)							
Net in	10:30	11:30	12:30	13:45	15:00	16:00	16:30
Net out	16:30	17:30	18:30	19:45	21:00	22:00	22:30

Week 3	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	26-May	27-May	28-May	29-May	30-May	31-May	1-Jun
red lengths?	*no*	*yes*	*no*	*yes*	*no*	*yes*	*no*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Near*	*Mid*	*Near*	*Mid*	*Near*	*mid*	*Near*
First mesh	*5.0*	*5.0*	*7.5*	*7.5*	*7.5*	*7.5*	*5.0*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	11:00	11:30	12:00	12:30	13:15	13:45	14:30
Low Tide	11:00	11:30	12:00	12:30	13:15	13:45	14:30
High tide2	3:45	4:30	5:00	18:00	18:45	19:15	20:00
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs. **Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.** **Traditional netting schedule comparable to past years (begin 5 hrs before low tide)**							
Net in	6:00	6:30	7:00	7:30	8:15	8:45	9:30
Net out	12:00	12:30	13:00	13:30	14:15	14:45	15:30

Week 4	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun
red lengths?	*yes*	*no*	*yes*	*no*	*yes*	*no*	*yes*
First Bank	*Left*	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*
First location	*Mid*	*Near*	*Mid*	*Near*	*Mid*	*Near*	*Mid*
First mesh	*5.0*	*5.0*	*5.0*	*7.5*	*7.5*	*7.5*	*7.5*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	7:30	8:15	3:45	10:00	11:15	12:30	13:45
Low Tide	15:00	15:45	16:30	17:15	18:15	19:30	20:30
High tide2	20:45	21:30	16:45	23:00	0:00	1:00	1:45
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs.							
Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.							
Traditional netting schedule comparable to past years (begin 5 hrs before low tide)							
Net in	10:00	10:45	11:30	12:15	13:15	14:30	15:30
Net out	16:00	16:45	17:30	18:15	19:15	20:30	21:30

Week 5	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun
red lengths?	*no*	*yes*	*no*	*yes*	*no*	*yes*	*no*
First Bank	*Left*	*Left*	*Right*	*Right*	*Left*	*Left*	*Right*
First location	*Near*	*Mid*	*Near*	*Mid*	*Near*	*mid*	*Near*
First mesh	*5.0*	*5.0*	*5.0*	*5.0*	*7.5*	*7.5*	*7.5*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	14:45	2:45	3:45	4:00	4:45	5:30	6:15
Low Tide	20:30	22:00	11:00	11:30	12:15	13:00	13:45
High tide2	2:30	15:45	16:45	17:45	17:45	18:30	19:15
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs. **Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.** **Traditional netting schedule comparable to past years (begin 5 hrs before low tide)**							
Net in	4:15	5:00	6:00	6:30	7:15	8:00	8:45
Net out	10:15	11:00	12:00	12:30	13:15	14:00	14:45

Week 6	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun
red lengths?	*yes*	*no*	*yes*	*no*	*yes*	*no*	*yes*
First Bank	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*	*Left*
First location	*Mid*	*Near*	*Mid*	*Near*	*Mid*	*Near*	*Mid*
First mesh	*7.5*	*5.0*	*5.0*	*5.0*	*5.0*	*7.5*	*7.5*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	7:00	8:00	9:00	10:00	11:15	12:30	13:45
Low Tide	14:30	15:15	16:00	17:00	18:15	19:15	20:30
High tide2	20:00	21:00	21:45	22:45	23:45	0:45	13:45
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs. **Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.** **Traditional netting schedule comparable to past years (begin 5 hrs before low tide)**							
Net in	9:30	10:15	11:00	12:00	13:15	14:15	15:30
Net out	15:30	16:15	17:00	18:00	19:15	20:15	21:30

Week 7	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	28-Jun	29-Jun
red lengths?	*no*	*yes*	*no*	*yes*	*no*	*yes*	*no*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Near*	*Mid*	*Near*	*Mid*	*Near*	*mid*	*Near*
First mesh	*7.5*	*7.5*	*5.0*	*5.0*	*5.0*	*5.0*	*7.5*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	15:00	15:45	16:30	17:15	4:45	5:30	6:00
Low Tide	21:30	22:00	11:15	11:45	12:30	13:00	13:30
High tide2	2:45	3:30	4:15	4:45	17:45	18:30	19:00
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs. **Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.** **Traditional netting schedule comparable to past years (begin 5 hrs before low tide)**							
Net in	4:30	5:15	6:15	6:45	7:30	8:00	8:30
Net out	10:30	11:15	12:15	12:45	13:30	14:00	14:30

Week 8	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul	5-Jul	6-Jul
red lengths?	*yes*	*no*	*yes*	*no*	*yes*	*no*	*yes*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Mid*	*Near*	*Mid*	*Near*	*Mid*	*Near*	*Mid*
First mesh	*7.5*	*7.5*	*7.5*	*5.0*	*5.0*	*5.0*	*5.0*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	6:45	7:15	8:00	8:30	9:30	10:30	11:45
Low Tide	14:00	14:30	15:00	15:45	16:30	17:15	18:30
High tide2	19:30	20:00	20:45	21:15	22:00	22:45	23:45
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs. **Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.** **Traditional netting schedule comparable to past years (begin 5 hrs before low tide)**							
Net in	9:00	9:30	10:00	10:45	11:30	12:15	13:30
Net out	15:00	15:30	16:00	16:45	17:30	18:15	19:30

Week 9	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul
red lengths?	*no*	*yes*	*no*	*yes*	*no*	*yes*	*no*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Near*	*Mid*	*Near*	*Mid*	*Near*	*mid*	*Near*
First mesh	*7.5*	*7.5*	*7.5*	*7.5*	*5.0*	*5.0*	*5.0*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	13:00	14:15	15:15	16:00	16:45	17:30	5:15
Low Tide	19:30	20:45	21:30	10:30	11:30	12:00	12:45
High tide2	0:45	15:45	16:45	17:45	18:45	19:45	20:45
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs.							
Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.							
Traditional netting schedule comparable to past years (begin 5 hrs before low tide)							
Net in	14:30	15:45	16:30	5:30	6:30	7:00	7:45
Net out	20:30	21:45	22:30	11:30	12:30	13:00	13:45

Week 10	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul
red lengths?	*yes*	*no*	*yes*	*no*	*yes*	*no*	*yes*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Mid*	*Near*	*Mid*	*Near*	*Mid*	*Near*	*Mid*
First mesh	*5*	*7.5*	*7.5*	*7.5*	*7.5*	*5.0*	*5.0*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	6:00	6:45	7:45	8:30	9:30	10:45	12:00
Low Tide	13:30	14:15	15:00	15:45	16:30	17:30	18:45
High tide2	19:00	19:45	20:30	21:15	10:00	23:00	0:15
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs. **Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.** **Traditional netting schedule comparable to past years (begin 5 hrs before low tide)**							
Net in	8:30	9:15	10:00	10:45	11:30	12:30	13:45
Net out	14:30	15:15	16:00	16:45	17:30	18:30	19:45

Week 11	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul
red lengths?	*no*	*yes*	*no*	*yes*	*no*	*yes*	*no*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Near*	*Mid*	*Near*	*Mid*	*Near*	*mid*	*Near*
First mesh	*5*	*5*	*7.5*	*7.5*	*7.5*	*7.5*	*5.0*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	13:30	14:45	15:45	16:15	17:00	17:30	5:15
Low Tide	20:00	21:00	22:00	11:00	11:30	12:00	12:30
High tide2							18:00
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs. **Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.** **Traditional netting schedule comparable to past years (begin 5 hrs before low tide)**							
Net in	15:00	4:15	5:00	6:00	6:30	7:00	7:30
Net out	21:00	10:15	11:00	12:00	12:30	13:00	13:30

Week 12	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	2-Aug	3-Aug
red lengths?	*yes*	*no*	*yes*	*no*	*yes*	*no*	*yes*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Mid*	*Near*	*Mid*	*Near*	*Mid*	*Near*	*Mid*
First mesh	*5*	*5*	*5*	*7.5*	*7.5*	*7.5*	*7.5*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	5:45	6:15	7:00	7:30	8:15	8:45	9:45
Low Tide	14:00	14:30	15:00	15:30	16:15	17:00	17:30
High tide2	18:30	19:00	19:30	20:00	20:30	21:15	22:00
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs.							
Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.							
Traditional netting schedule comparable to past years (begin 5 hrs before low tide)							
Net in	8:00	8:30	9:00	9:30	10:15	11:00	11:30
Net out	14:00	14:30	15:00	15:30	16:15	17:00	17:30

Week 13	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	9-Aug	10-Aug
red lengths?	*no*	*yes*	*no*	*yes*	*no*	*yes*	*no*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Near*	*Mid*	*Near*	*Mid*	*Near*	*mid*	*Near*
First mesh	*5*	*5*	*5*	*5*	*7.5*	*7.5*	*7.5*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	11:00	12:30	13:45	14:45	15:45	16:30	17:15
Low Tide	17:30	19:00	20:00	21:15	22:00	11:00	14:30
High tide2	23:00						
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs.							
Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.							
Traditional netting schedule comparable to past years (begin 5 hrs before low tide)							
Net in	12:30	14:00	15:00	16:15	17:00	6:00	9:30
Net out	18:30	20:00	21:00	22:15	23:00	12:00	15:30

Week 14	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
	11-Aug	12-Aug	13-Aug	14-Aug	15-Aug	16-Aug	17-Aug
red lengths?	*yes*	*no*	*yes*	*no*	*yes*	*no*	*yes*
First Bank	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*	*Left*
First location	*Mid*	*Near*	*Mid*	*Near*	*Mid*	*Near*	*Mid*
First mesh	*7.5*	*5*	*5*	*5*	*5.0*	*7.5*	*7.5*
Morning							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
Afternoon							
Tech #1	**X**			**OFFICE**	**X**	**X**	**X**
Tech #2	**X**	**X**	**X**	**X**			**X**
Tech #3		**X**	**X**	**X**	**X**	**X**	
High Tide1	5:00	6:00	6:45	7:30	8:15	9:15	10:15
Low Tide	15:30	16:00	17:00	18:15	19:30	20:45	22:00
High tide2	17:45	18:30	19:15	20:00	20:45	21:30	20:30
Morning Shift begins at 0600, Netting from 0700 – 1300 hrs.							
Afternoon Shift begins at 1200, Netting from 1300 – 1900 hrs.							
Traditional netting schedule comparable to past years (begin 5 hrs before low tide)							
Net in	7:30	8:15	8:45	9:30	10:15	11:00	12:00
Net out	13:30	14:15	14:45	15:30	15:15	17:00	18:00

Appendix A3.-Sampling schedule for RM 12 feasibility gillnetting.

Week 1	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	12-May	13-May	14-May	15-May	16-May	17-May	18-May
Location	Training	Training	Training	Training	RM 12	OFF	OFF
First Mesh					4.5		
Office	8:00	8:00	8:00	8:00	8:15		
Net In					9:00		
Net Out					15:45		
Week 2	**19-May**	**20-May**	**21-May**	**22-May**	**23-May**	**24-May**	**25-May**
Location	RM12	RM12	RM12	RM12	RM12	OFF	OFF
First Mesh	5.0	7.5	4.5	5.0	7.5		
Office	8:15	8:15	8:15	8:15	8:15		
Net In	9:00	9:00	9:00	9:00	9:00		
Net Out	15:45	15:45	15:45	15:45	15:45		
Week 3	**26-May**	**27-May**	**28-May**	**29-May**	**30-May**	**31-May**	**1-Jun**
Location	RM12	RM12	RM12	RM12	RM12	OFF	OFF
First Mesh	4.5	5.0	7.5	4.5	5.0		
Office	8:15	8:15	8:15	8:15	8:15		
Net In	9:00	9:00	9:00	9:00	9:00		
Net Out	15:45	15:45	15:45	15:45	15:45		
Week 4	**2-Jun**	**3-Jun**	**4-Jun**	**5-Jun**	**6-Jun**	**7-Jun**	**8-Jun**
Location	RM12	RM12	RM12	RM12	RM12	OFF	OFF
First Mesh	7.5	4.5	5.0	7.5	4.5		
Office	8:15	8:15	8:15	8:15	8:15		
Net In ER	9:00	9:00	9:00	9:00	9:00		
Net Out	15:45	15:45	15:45	15:45	15:45		
Week 5	**9-Jun**	**10-Jun**	**11-Jun**	**12-Jun**	**13-Jun**	**14-Jun**	**15-Jun**
Location	RM12	RM12	RM12	RM12	RM12	OFF	OFF
First Mesh	5.0	7.5	4.5	5.0	7.5		
Office	8:15	8:15	8:15	8:15	8:15		
Net In	9:00	9:00	9:00	9:00	9:00		
Net Out	15:45	15:45	15:45	15:45	15:45		
Week 6	**16-Jun**	**17-Jun**	**18-Jun**	**19-Jun**	**20-Jun**	**21-Jun**	**22-Jun**
Location	RM12	RM12	RM12	RM12	RM12	OFF	OFF
First Mesh	4.5	5.0	7.5	4.5	5.0		
Office	8:15	8:15	8:15	8:15	8:15		

Net In ER	9:00	9:00	9:00	9:00	9:00		
Net Out	15:45	15:45	15:45	15:45	15:45		
Week 7	**23-Jun**	**24-Jun**	**25-Jun**	**26-Jun**	**27-Jun**	**28-Jun**	**29-Jun**
Location	**RM12**	**RM12**	**RM12**	**RM12**	**RM12**	OFF	OFF
First Mesh	7.5	4.5	5.0	7.5	4.5		
Office	8:15	8:15	8:15	8:15	8:15		
Net In	9:00	9:00	9:00	9:00	9:00		
Net Out	15:45	15:45	15:45	15:45	15:45		

Daily schedule includes 45 minute travel/launch time on either end and 1/2 hr lunch break

APPENDIX B. KENAI RIVER CHINOOK SALMON CREEL SURVEY FORMS, 2014.

Appendix B1.–Kenai River Chinook creel count form.

KENAI RIVER CHINOOK CREEL COUNT FORM

Date: _____ Secchi one: _____ Secchi two: _____

Time one: _____ Time two: _____

Tech.	Time	River Section *	Non Guided				Guided				active boats	non active boats	Shore Angler
			Power		Drift		Power		Drift				
			Boat	Angler	Boat	Angler	Boat	Angler	Boat	Angler			
Count number one													
		Warren Ames Bridge-Lower sonar site											
		Lower sonar site-Upper sonar site											
		Upper sonar site-Soldotna Bridge											
Count number two													
		Warren Ames Bridge-Lower sonar site											
		Lower sonar site-Upper sonar site											
		Upper sonar site-Soldotna Bridge											
Count number three													
		Warren Ames Bridge-Lower sonar site											
		Lower sonar site-Upper sonar site											
		Upper sonar site-Soldotna Bridge											
Count number four													
		Warren Ames Bridge-Lower sonar site											
		Lower sonar site-Upper sonar site											
		Upper sonar site-Soldotna Bridge											

Tech: Initials **Time:** Military time at start of count **River Section:** reset counters at each section. **Angler:** count a person as an angler **Boats**: count a boat as if it contains at least one angler Active boats: count all boats that are underway, although they have no one is **Non-active boats:** boats not underway with no active anglers but have run their boat during that day.

Appendix B2.–Kenai River Chinook creel interview form.

KENAI RIVER CHINOOK CREEL INTERVIEW FORM Page _____ of _____

Date:_____ Name:_____

							Chinook Salmon							Radio Tag Information			
Time	Site	Boat #	Ang. #	Hours Fished	Fishing Method	Fish Loc.*	Kept	K. Loc.*	scale#	vial#	Ad Clip	Rel.	slot?	Frequency	Pulse #	RM	Comments
														151 .			
														151 .			
														151 .			
														151 .			
														151 .			
														151 .			
														151 .			
														151 .			
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														151 .			
														151 .			

Time: nearest minute **Site:** codes 1=Centennial, 2=Riverquest, 3=Riverbend, 4=Not used, 5= Eagle rock, 6=Pillar's, 7=Poachers Cove. **Boat #**: Start at 1 each day. **Ang. #:** Restarts at 1 with each new boat. **Hours Fished:** time line was in the water to the nearest half hour. **Angler type**: (G)uided or (U)nguided. **Fishing method** Power boat (P) or Drift boat (D) or Shore angler (S)

Chinook Salmon Section **Kept:** # harvested **Scale#:** write card#-fish# (ex. 2-4) and length (to nearest 5mm) and sex in comments, if not sampled write 'NS'. **Vial#:** Record the vial#. **Ad clip:** Check if harvest chinook was ad cliped, write AFC# or 'no head' in comments **Rel:** # released **Slot?:** ask if fish was below/within/above 46"-55" slot limit. **Frequency:** Record frequency # on tag. **Pulse Code:** Record pulse code# (1-26). **RM**: Location Chinook was caught (hole or river mile). * Fish Loc. and K. Loc: "1"= Below Upper sonar site, "2" = Above Upper Sonar site. **Comments:** Relevant notes.

Appendix B3.–Kenai River Chinook creel ASL sampling form.

KENAI RIVER CHINOOK CREEL ASL SAMPLING FORM

Date:

Sampler: Mallette/Karic

Card	Fish #	Angler type	Sex	MEF Length	Total Length	Vial #	Age	CWT#	Radio TAG Information Freq #	Radio TAG Information Pulse #	Comments
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

Card	Fish #	Angler type	Sex	MEF Length	Total Length	Vial #	Age	CWT#	Radio TAG Information Freq #	Radio TAG Information Pulse Code	Comments
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

Card	Fish #	Angler type	Sex	MEF Length	Total Length	Vial #	Age	CWT#	Radio TAG Information Freq #	Radio TAG Information Pulse Code	Comments
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

APPENDIX C. DATA MAPS FOR KENAI RIVER CHINOOK SALMON CREEL SURVEY AND INRIVER GILLNETTING STUDY, 2014.

Appendix C1.–Data maps for files.

Data Map for file:
Kscnt2014.dta

Data Field Name	Start Column	End Column	Comma Column	Codes/ Comments
Month	1	2	3	
Day	4	5	6	
Year	7	10	11	Four digit year
Location	12	12	13	1 = Warren Ames Bridge to Lower salmon sonar site, 2 = Lower Chinook sonar site to Upper sonar site, 3= Upper sonar site to Soldotna Bridge
Count Time	14	17	18	Military time when count began
Unguided Power Boat Count[a]	19	22	23	A boat was counted if it contained at least one angler
Unguided Power Angler Count[a]	24	27	28	Anglers were defined as people who had a line in the water or were rigging a line
Unguided Drift Boat Count[a]	29	32	33	A boat was counted if it contained at least one angler
Unguided Drift Angler Count[a]	34	37	38	Anglers were defined as people who had a line in the water or were rigging a line
Guided Power Boat Count[a]	39	42	43	A boat was counted if it contained at least one angler
Guided Power Angler Count[a]	44	47	48	Anglers were defined as people who had a line in the water or were rigging a line
Guided Drift Boat Count[a]	49	52	53	A boat was counted if it contained at least one angler
Guided Drift Angler Count[a]	54	57	58	Anglers were defined as people who had a line in the water or were rigging a line
Shore Angler Count[a]	59	62	63	Anglers were defined as people who had a line in the water or were rigging a line
Active Boat Count	64	67	68	A boat was counted if it was under power but contained no active anglers
Non Active Boat Count	69	71	End	A boat was counted if it was not under power but was under power at one time that day

a Count fields left *blank* if fishing is closed at that time for that group or a scheduled count was missed.

Data Map for files:

Ksint2014.txt

Data Field Name	Start Column	End Column	Comma Column	Codes/ Comments
Date Code	1	8	9	
Year	1	4		Four digit year
Month	5	6		
Day	7	8		
Interview time	10	11	12	Time of interview (truncated to nearest hour prior to 2005)
(Blank)	13	13	14	
Interviewer	15	16	17	Initials of interviewer
Interview Location	18	19	20	01=Centennial Park, 03=Riverbend, 04=Stewarts Landing, 05=Eagle Rock, 06=Pillars, 07=Poacher's Cove.
(Blank)	21	22	23	
(Blank)	24	25	26	
Survey Area Code	27	28	29	P0 = Kenai Pen.
Site Code	30	32	33	001 = Kenai River, Cook Inlet to Soldotna Bridge
(Blank)	34	35	36	
(Blank)	37	38	39	
Boat Number	40	42	43	Does not reset to 01 at start of each person shift
Angler Number	44	45	46	Angler number starts at 01 for each boat
(Blank)	47	47	48	
Interview Type	49	49	50	always C = Completed trip interview
Boat/Shore	51	51	52	B = Boat, S = Shore
Unguided/Guided	53	53	54	U = Unguided, G = Guided
Fishing Time (Hours)	55	56	57	Hours fished
Fishing Time (Minutes)	58	59	60	Minutes fished (rounded to nearest .25 hour)

-continued-

Data Field Name	Start Column	End Column	Comma Column	Codes/ Comments
Location Fished	61	61	62	1 = Exclusively fished below Upper sonar site, 2 = Exclusively fished above Upper sonar site, 3 = Fished above and below Upper sonar site
Species (Chinook)	63	65	66	410 = Chinook
Harvest	67	67	68	K = Chinook harvested
Number Harvested	69	70	71	Number of Chinook harvested (generally 1 although 2 possible w/ proxy)
Location of harvest	72	72	73	1=Harvested above Upper sonar site, 2=between upper/lower sonar sites, 3= below lower sonar
Species (Chinook)	74	76	77	410 = Chinook
Released	78	78	79	R = Chinook released
Number Released	80	81	82	Number of Chinook released
(Blank)	83	83	84	
Species (sockeye)	85	87	88	420 = sockeye
Harvest/Released	89	89	90	Number of sockeye harvested
Number Harvested/Released	91	92	93	Number of sockeye released
(Blank)	94	94	95	
Species (coho)	96	98	99	430 = coho
Harvest/Released	100	100	101	Number of coho harvested
Number Harvested/Released	102	103	104	Number of coho released
(Blank)	105	105	106	
Species (pink)	107	109	110	440 = pink
Harvest/Released	111	111	112	Number of pink harvested
Number Harvested/Released	113	114	115	Number of pink released
(Blank)	116	116	117	
Species (rainbow)	118	120	121	511 = Rainbow
Harvest/Released	122	122	123	Number of rainbow harvested
Number Harvested/Released	124	125	126	Number of rainbow released
Fishing Location	127	128	129	"Always" set to 1 since 2000

-continued-

Data Field Name	Start Column	End Column	Comma Column	Codes/ Comments
Boat Type	130	131	132	1 = power boat, 2 = drift boat, "blank" = shore
Adipose Finclip	133	134	135	N = no adclip, C = adclip present
Released Chinook <46 in	136	136	137	
Released Chinook 46-54.99 in	138	138	139	
Released Chinook >55 in	140	140	141	column 141=# of released Chinook 55 inches or greater
Vial #	142	145	146	
Frequency #	147	150	151	Four digit Frequency #
Pulse Code #	152	153	154	Two digit Pulse Code #
Location Caught	155	158	159	Location where tagged Chinook was caught (river mile)
Age	160	161	162	
Age err	163	163	END	”R=regenerated, “M”=missing, “I”=inverted, “A”=absorbed

Data Map for files:
ksintage14.txt

Data Field Name	Start Column	End Column	Comma Column	Codes/ Comments
(Blank)	1	1	2	
Date Code	3	8	9	
Year	3	4		Two digit year
Month	5	6		
Day	7	8		
(Blank)	10	13	12,14	
Survey Area Code	15	16	17	P0 = Kenai Pennisula fresh water (not Kenai/Kasilof).
Site Code	18	20	21	001 = Kenai River, Cook Inlet to Soldotna Bridge
(Blank)	22	23	24	
	25	26	27	
Species	28	30	31	410 = chinook
(Blank)	32	44	35,39,43,45	
(Blank)	46	57	47,49,58	
Collector	59	60	61	Initials of sampler
Sex	62	62	63	= M or F
(Blank)	64	64	65	
MEF length	66	69	70	MEFL, millimeters
Total length	71	75	76	TL, inches
Vial	77	80	81	
	82	89	84,87,90	
Angler Type	91	95	96	G = guided, NG = Unguided
Scale Card Number	97	99	100	
Fish Number	101	102	103	Number on scale card (Values 1-10)
Age	104	105	106	column 104=freshwater age, column 105=marine age
Age error	107	108	end	R=regen, M=missing, I=inverted, A=absorbed

Data Map for files:
creelsecchi2014.txt

Data Field Name	Start Column	End Column	Comma Column	Codes/ Comments
Date Code	1	8	9	
Year	1	4		Four digit year
Month	5	6		
Day	7	8		
Time	10	13	14	Military time
Secchi	15	18	19	secchi depth (meters) mid-channel at rm 15.3, #.## format
Water temperature	20	23	end	water temperature (degrees C) midchannel at rm 15.3, ##.# format

Data Map for files:
Ksawl2013.txt

Files are in Tagging Length mark-sense format.

Data Field Name	Start Column	End Column	Comma Column	Codes/ Comments
Crew Number	1	2	3	1,2,3 or 4
Date Code	4	11	12	
Year	4	7		Four digit year
Month	8	9		
Day	10	11		
(Blank)	13	23	15,17,21,24	
Statewide location/stat code	25	28	29	"Always" = 009 (Kenai River)
(Blank)	30	54	32,39,47,51,55	
Length Type	56	57	58	EF=Mid-eye-fork length, TL= Total Length
(Blank)	59	68	62,64,67,69	
Mesh size (inches)	70	70	71	
Drift Start Time (Hour)	72	74	75	Military hours
Drift Start Time (Minutes)	76	78	79	
Drift Start Time (Seconds)	80	82	83	
Drift Stop Time (Hour)	84	86	87	Military hours
Drift Stop Time (Minutes)	88	90	91	
Drift Stop Time (Seconds)	92	94	95	
Scale Card Number	96	98	99	
Fish Number	100	102	103	Number on scale card (Values 1-10)
Age	104	105	106	column 104=Freshwater, column 105=Marine
Age error	107	108	109	R=regen, M=missing, I=inverted, A=absorbed, D=Dirty
Repetition number	110	117	118	Begins at 1 each day and increments by one every four drifts
Drift Number	119	120	121	Begins at 1 each day and increments with every drift
Sex	122	122	123	= M or F
Length	124	127	128	MEFL, millimeters
Genetics vial number	129	133	134	Starts at 1 and increments with each sampled fish

-continued-

Data Field Name	Start Column	End Column	Comma Column	Codes/ Comments
Fin Punch	135	136	137	Not used in 2004-2006
Fate	138	138	139	R=release, E=escape, Y=recap, H=harvested
Bank	140	140	141	N=north, S=south, bank that drift was set on (throw bouy towards)
(Blank)	142	142	143	
Species code	144	146	147	410=Chinook, 420=sockeye, 430=coho, 440=pink, exc.
Number Caught	148	149	150	
Adipose Finclip	151	156	157	Coded Wire Tag #
Frequency #	158	161	162	Four digit Frequency # of radio tagged Chinook
Pulse Code #	163	164	165	Two digit Pulse Code # of radio tagged Chinook
Condition/Injury Status	166	168	end	1=OK, 2=bleeding gills, 3=cut or scraped, 4=lethargic, 5=other

APPENDIX D. TECHNICIAN MANUAL FOR THE KENAI RIVER CHINOOK SALMON CREEL SURVEY AND INRIVER GILLNETTING STUDY, 2014

Appendix D 1.–Technician manual for the Kenai River Chinook salmon creel survey and inriver gillnetting study, 2014.

INTRODUCTION and BACKGROUND

This manual provides the specific procedures for technicians conducting the 2014 Kenai River Chinook Salmon Creel Survey and Inriver Gillnetting Project. These projects are critical to effective inseason and postseason management of Chinook salmon in the Kenai River. The data collected from these projects are highly scrutinized and used daily in projecting returns, assessing run strength, harvest, effort and escapement of Kenai River Chinook salmon.

Creel survey personnel will be counting boats and anglers, interviewing sport anglers, and collecting biological samples from harvested Chinook salmon. The information collected in this survey will be used to estimate the sport harvest of Kenai River Chinook salmon between the Soldotna bridge and Warren Ames bridge. The harvest estimate is used to make both inseason and postseason management decisions regarding the Kenai River Chinook salmon fishery.

The netting crew will be capturing salmon using gill nets to collect species composition information and relative abundance (CPUE) and as well as biological information from captured Chinook salmon (ie. genetics samples, sex, age, length and CWT information) and length and abundance information from other salmon species. This information is used inseason to estimate the age composition of returning Chinook salmon and as an alternative estimate of the species composition of fish passing the Chinook salmon sonar.

DUTIES

Creel Personnel:

- Conduct angler/boat counts and interview anglers on the Kenai River while adhering to a rigid sampling schedule.
- Sample Chinook salmon harvested by sport anglers for ASL and CWT information and record the appropriate information on a handheld computer and sampling forms.
- Download collected data on the Allegro CE handheld computer to the project biologist's personal computer. This is to be done at the end of the day after returning to the office.
- Answer questions from the public on a variety of subjects such as sport fishing regulations and local fishery information.
- Carefully document fishery violations observed during the course of normal duties and forward information to the project leader and other enforcement agencies.

Both Creel and Inriver Netting Personnel:

- Carefully edit all data forms before turning them into the immediate supervisor.
- Maintain and repair state equipment provided such as boats, motors, trailers and state highway vehicles. Only minor maintenance and repair will be done at the discretion of the project biologist. Major maintenance and repair will be forwarded to the maintenance

supervisor for boats, motors and trailers and the State Department of Transportation for highway vehicles.

- Complete time sheets no later than the 15th and 30th/31st of each month.
- Clean and maintain appropriate areas of the ADF&G warehouse and shed.
- Ensure all boats and vehicles are kept clean.
- Report any problems to your immediate supervisor.

SAMPLING, INTERVIEWS and ANGLER COUNTS

Interviews: Interviews are to be conducted at the times and locations in the interview schedule. When conducting interviews always identify yourself as working for the Alaska Department of Fish and Game and only interview boats that are leaving the fishery and anglers that are done fishing for that trip (completed trip anglers). Anglers to be interviewed are randomly selected, i.e., do not target only anglers with fish, but do attempt to interview all anglers exiting the fishery at your selected location. If you cannot interview all anglers, then document the number and type of anglers that you missed.

While completing the interview, record the information into the handheld computer. When sampling harvested Chinook salmon, record the sex, mid-eye tail fork (METF) length and total length on the AWL sampling form in addition to entering all the necessary data into the computer. The METF length measurement, to the nearest 1 mm, is from the mid-eye to the fork of tail. The total length measurement, to the nearest 1 mm, is from the snout to tip of tail measured across the lateral line of the body. Collect three scales on the left side of the fish 3 rows above the lateral line at a 45 degree line posterior of the dorsal fin to the tail, place them concave (curled) side down on the scale card and label each fish with the METF length. Be sure to label the form and card correctly (date, location, sampler, species, etc.). In addition, a genetics sample will be taken from the axillary process of all sampled fish if permission is granted from the angler. Genetics sample numbers will be entered into the computer and samples will be stored in vials filled with ethyl alcohol and stored in the project biologist's office.

Boat and angler counts: Counts are to begin on the whole hour as designated on the schedule and should not take more than one hour to complete. Plan your schedule so that you are at the designated end of the study area at the designated time and location. Direction of travel is labeled in the schedule to minimize travel distance.

Categories of to be tallied during each count include:

a. Guided power boats.
b. Guided power anglers.
c. Guided drift boats.
d. Guided drift anglers.

e. Unguided power boats.

f. Unguided power anglers.

g. Unguided drift boats.

h. Unguided drift anglers.

i. Shore anglers.

j. Active boats (boats not on bank with no active anglers and boat had motor run during the day)

Four individual counts will be conducted during each scheduled count period. These areas include:

a. between the Warren Ames Bridge (RM5.2) and the lower salmon sonar site (RM 8.6),

b. between the lower salmon sonar site (RM 8.6) and upper sonar site (RM 13.7),

c. between upper sonar site (RM 13.7) and the Soldotna Bridge (RM 21.1),

For example, a count will be made from the Soldotna Bridge downstream to upper sonar site then entered into the handheld computer. Thumbcounters will be reset and the next count will be from upper sonar site to the lower sonar site, and so on for each area. During the late run, we will also be stratifying shore angler counts between the Sockeye salmon sonar site (RM 19) and the Soldotna Bridge and from the Sockeye salmon sonar site to the Warren Ames Bridge. Each creel personnel will take a secchi disc reading and water temperature (in degrees F) in front of RiverQuest during their shift and enter it into the computer. If the handheld computer is not functioning properly, data will be entered onto data forms and turned into the project biologist at the end of his/her shift.

Inriver Netting RM 8.6: Each day a crew of two people will be scheduled to net from either 0700 to 1300, or 1300 to 1900 hours. Netting will take place in the 0.3 m section of river downstream of the Chinook salmon sonar. The mesh size and bank from which to set the net will be specified by the handheld computer. It is critical that the net is only drifted in the area that would be either insonified, or non-insonified. This will be stressed to you all season and if you have any questions regarding where the insonified area is do not hesitate to ask the project biologist. The time that each set begins and ends is automated and recorded on the handheld computer as well as all the biological information on sampled Chinook and sockeye salmon. If the computer is functioning properly, the only writing you will have to do for sampling will be to record the length on the scale card and fill out the back of the scale card. The METF length measurement, to the nearest 5 mm, is from the mid eye to the fork of tail on Chinook salmon and is the length that is recorded on the scale card. On each sampled Chinook salmon, collect three scales and place them on the scale card concave side down. Be sure to label the form and card appropriately (date, location, sampler, species, etc.). All Chinook salmon sampled from May 16 to June 30 will receive an esophageal radio transmitter. From July 1 to August 15 all Chinook sampled for ASL will receive an esophageal radio transmitter (although subsampling may occur based on available radio tags). The frequency # and pulse code # for each tagged salmon will be recorded on the handheld computer. Before releasing the fish, mark the fish with a 'hole punch' on the dorsal side of the caudal fin and do not sample a fish that already has a hole punched in that area, record it as a recapture. Also be sure to examine all captured Chinook salmon for the presence of an adipose fin and kill all Chinook salmon without at an adipose fin. Once the fish is

on board, cut the head off and affix a cinch strap to the head. There won't be many Chinook salmon without adipose fins so be sure to examine every one. An escape is a fish that got out of the net without being sampled only if it was positively identified as a Chinook salmon (4 bobbing corks do not count if you did not visually see that it was a Chinook salmon). Each day the netting crew will take both a secchi disc reading and tide staff reading in front of the Chinook salmon sonar at the beginning, midpoint and end of their shift and enter it in the handheld computer.

Each week one crewmember will spend one day mending nets, repairing equipment and various odd tasks such as scale pressing, editing data and potentially working on other projects as time allows. This office day will be alternated so that each crewmember will have an office day every third week.

Radio Transmitter Deployment and retrieval: During 2014 the inriver gillnetting and creel survey crews will be collaborating with a separate study that is estimating Kenai River Chinook salmon abundance. The inriver netting crew will have additional responsibilities of tagging early run Chinook salmon with radio transmitters and recording tag information (frequency #, and pulse code #), as well as collecting genetics samples from all captured Chinook salmon in the early and late runs. The creel survey crews additional responsibilities will be recording information (frequency #, pulse code #, and location caught), for all tagged Chinook salmon sampled during angler interviews.

EQUIPMENT NEEDED

At the start of the season, each crew will be issued and be responsible for a clipboard. At the start of each sampling period you should make sure at a minimum that it contains:

20-30 scale cards and acetates in a ziplock bag

3 sets of tweezers

2 standard pencils

2 cloth measuring tapes

Sampling forms (At least 5 of each)

1 *rite in the rain* logbook

1 pair of sharp scissors

5 statement forms

Laminated Kenai Chinook contact list

Laminated State Parks and ABWE contact list

Sport fish regulation booklet

Copy of State Parks Permit for over-horsepower motors (netting crew)

A copy of this manual

In addition, you will need the handheld Allegro computer, a box of genetics vials, a bottle of ethyl alcohol, and a camera as well as extra hole punches on the boat. Be sure and double check you have what you need before leaving the office area.

The netting crew will have an additional clipboard of radio transmitters to be deployed sequentially, and three radio transmitter deploying devices that will be required every day.

UNIFORMS

Your uniform is your hat. Please try and wear a Fish and Game issued hat during your fieldwork. Fish and Game patches sewn on your PFD will be another form of identification. You will be held to a higher standard than the public, so when on duty, act professional, represent the department well and be aware that you are being watched a lot closer than you may think.

PERSONAL FLOATATION DEVICES (LIFE JACKETS)

Life jackets are to be worn at all times when on the boat, or near water deep enough that you could drown. There will be no exceptions to this rule and crews are instructed to notify the project biologist if there is any noncompliance to this rule. You may take off your PFD to change clothes but must promptly put your life jacket back on.

SAMPLING GEAR

You will be issued a high quality rain coat and bibs, rubber boots, a PDF, both arm length and short rubber coated gloves as well as a dry bag for each crew. You will be instructed to turn in all sampling gear at the end of the field season.

CELL PHONES

The netting crew and creel crew will each be issued a cell phone. At a minimum, all the numbers on the Kenai Chinook contact list should be entered into the phone book. The cell phone is to be on and easily accessible at all times when on duty. Charge the cell phone in the project biologist's office at the end of the workday and bring the phone with you when you start your workday. Limit phone use to state business, however you can use the phone in an emergency. . Please keep track of the phone while on duty and notify the project biologist if the phone is lost or is not functioning properly. The phones are not waterproof, nor do they float so keep them dry and in a zippered or snapped pocket when getting in and out of the boat. Waterproof phone bags will be supplied.

SAFETY

Safety is the utmost priority. Please try and be safe and aware of your surroundings. Do not do anything to jeopardize your or members of your crews' safety. There is no piece of data that is worth jeopardizing safety. If you feel uncomfortable doing a task that could potentially jeopardize your safety, do not do it and contact your supervisor.

TIME SHEETS

Time sheets must be completed twice monthly, one for the 1st through the 15th and one for the 16th through the 30th or 31st. This is your responsibility and you will be reminded when they are due. You will be instructed as to how to properly fill out your timesheet online. Save and review the timesheet with your supervisor, but do not press the submit button. The website address is http://www.tears.adfg.state.ak.us/tears/help/#. Print out both the timesheet and project accounting detail sheet. Don't forget to sign your timesheet. You do not need to sign the project

accounting detail sheet but turn in both to the project biologist. You will be paid for grave and swing shifts if you work during these times along with regular time and will be compensated overtime if you work more than 37.5 hours per week. You need to fill in start/stop times and the number of hours worked each day. Lunch is one-half hour per day and is not compensable. There are two 15-minute compensable breaks per day. The payroll officer will determine how many hours of grave, etc. that you have worked. The netting crew should try and take lunch at different times per day. The creel crew should try and take lunch at a break in sampling.

OVERTIME is any time worked in excess of 37.5 hours per week. The workweek always begins on Monday and ends on Sunday at midnight.

SWING shift pay is any shift that begins between 1200 (noon) and 1959 (7:59 p.m.). Employees working this shift are entitled to an additional 0.0375 times their hourly rate for the hours worked.

GRAVE shift pay is any shift that begins between 2000 (8:00 p.m.) and 0559 (5:59 a.m.). Employees working this shift are entitled to an additional 0.075 times their hourly rate for the hours worked.

PURCHASING and INVOICES

You may be instructed to make purchases at various local stores. You must sign the invoice when you receive the goods. Make sure the invoice or receipt states exactly what you purchased (i.e. sporting goods is not specific enough). You should also print your name below your signature, put Kenai River Chinook somewhere on the invoice and turn it in promptly to the appropriate bin in the project biologist's office. If you need something, let the project biologist know and get what you need to do your job effectively (ie, gloves, boots, sampling equipment, rain gear).

TIMELINESS and TIME OFF

It is very important to show up on time for your scheduled workday, timing is critical and it is important to follow the specified sampling schedule. Please notify the project biologist if for some reason you will not be able to complete your regular workday at the times specified by your schedule. The netting crew will work five consecutive days with two consecutive days off. The creel crew will work four out of seven days per week with no guarantee of two consecutive days off. The creel crew will work all weekend days, two of the four days between Tuesday through Friday and will not work Mondays. If you need time off, contact the project biologist and he will try and find someone to fill in for you. Please try and give some time in advance if you know you need the time off and most of the time it shouldn't be a problem. In an emergency, contact the project biologist.

SPORTFISHING VIOLATIONS

Fish and wildlife law enforcement is not a primary job responsibility of ADF&G employees; however, during the course of your fieldwork you may come across sportfishing violations. If you come across violations, you are instructed to promptly call the project biologist; in the event that you cannot contact him, call either State Parks or the Alaska Division of Wildlife Troopers (DWT). Laminated cell phone lists are provided and should be in the sampling clipboard. You are not to check fishing licenses or do any type of enforcement. The creel crew will be taking total length on fish and may come across harvested fish within the restricted slot limit in the early run. In this situation, promptly notify the project biologist. Carefully note what you

witnessed and take down boat numbers, license plates, physical descriptions and document all witnessed violations in your logbook. Enforcement is not your responsibility, so use discretion and should you come across violations, promptly notify your supervisor. If you come across a Chinook salmon that is larger than 55 inches total length, needing to be sealed, contact the project biologist to make arrangements for the angler to bring the fish to the Fish and Game office to be sealed.

EVALUATION

Data collection and editing are the primary duties of these positions. Each person will be evaluated on the quality, cleanliness, and thoroughness of the data that they turn in as well as dependability and timeliness arriving to work. Also, it is important to act professional and communicate regularly with your supervisor and crewmembers to discuss problems, suggestions, etc.

APPENDIX E: ANALYTICAL METHODS FOR EXPANDED WEIR ESTIMATES, KENAI RIVER EARLY RUN KING SALMON 2013

Appendix E1.–Analytical methods for expanded weir estimates, Kenai River early run king salmon 2013.

Size structured estimates of the 2012 and 2013 inriver runs were generated by fitting a "Abundance and Detectability by Size" (ADS) statistical model to early run Kenai River Chinook salmon data. The ADS model (Appendix E2) assumes that midriver detectability of Kenai River king salmon is a function of fish size class (55-75 cm, 75 –95 cm, and >95 cm mid-eye to fork of tail; MEF). Chinook salmon measuring less than 550 mm METF were not considered in the model. Information about size composition was provided by the RM 8.6 inriver test gillnetting program and ASL sampling at the weirs.

Stock groupings in the model were (1) Funny River–Slikok Creek, (2) Killey River above the weir (including Benjamin Creek), (3) Killey R below the weir, and (4) other stocks. Information about stock composition was provided by radio telemetry and weir counts. Radio transmitters were applied to a subsample of captured fish longer than 550 mm METF at the RM 8.6 inriver test gillnetting site. Genetic stock identification data were not included in this model.

A Bayesian framework was adopted for model fitting, as implemented in OpenBUGS (Lunn et al. 2009). This environment provided the flexibility to combine information from multiple data sources. Model parameters for total abundance, stock composition, and age composition were hierarchical among years. The influence of missing telemetry data was automatically considered.

Appendix E2.–Flow chart of annual quantities (parameters in green, data in blue) from an abundance and detectability by size (ADS) model. By fitting the ADS model to 2012–2013 Kenai River Chinook salmon data, expanded weir estimates of inriver run abundance by stock group and size class were obtained.