Fishery Data Series No. 07-87

Chinook Salmon Creel Survey and Inriver Gillnetting Study, Lower Kenai River, Alaska, 2005

by

Anthony Eskelin

December 2007

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)

Measures (fisheries)

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

Mathematics, statistics

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

FISHERY DATA SERIES NO. 07-87

CHINOOK SALMON CREEL SURVEY AND INRIVER GILLNETTING STUDY, LOWER KENAI RIVER, ALASKA, 2005

by

Anthony Eskelin
Division of Sport Fish, Soldotna

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska 99518-1599

December 2007

This investigation was partially financed by the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777K) under project F-10-21, Job No. S-2-5a.

The Division of Sport Fish Fishery Data Series was established in 1987 for the publication of technically oriented results for a single project or group of closely related projects. Since 2004, the Division of Commercial Fisheries has also used the Fishery Data Series. Fishery Data Series reports are intended for fishery and other technical professionals. Fishery Data Series reports are available through the Alaska State Library and on the Internet: http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm This publication has undergone editorial and peer review.

Anthony Eskelin
Alaska Department of Fish and Game, Division of Sport Fish
43961 Kalifornsky Beach Road, Suite B, Soldotna, AK 99669-8367, USA

This document should be cited as:
Eskelin, A. 2007. Chinook salmon creel survey and inriver gillnetting study, lower Kenai River, Alaska, 2005. Alaska Department of Fish and Game, Fishery Data Series No. 07-87, Anchorage.

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

LIST OF TABLES

Table **Page**

LIST OF FIGURES

LIST OF APPENDICES

ABSTRACT

A creel survey to estimate angler effort, catch and harvest of Chinook salmon *Oncorhynchus tshawytscha* was conducted on the Kenai River between the Soldotna Bridge and the Warren Ames Bridge from 16 May to 31 July 2005. For the early run, (16 May through 30 June) angler effort was 79,492 (SE = 3,365) angler-hours and Chinook salmon harvest was 2,876 (SE = 329). Unguided anglers accounted for 41% of the effort and 23% of the harvest versus guided anglers who accounted for 59% of the effort and 77% of the harvest. The early-run harvest was composed of 6.6% (SE = 2.1%) age-1.2 fish, 44.1% (SE = 4.3%) age-1.3 fish, 48.5% (SE = 4.3%) age-1.4 fish, and 0% age-1.5 fish, whereas early-run Chinook salmon passage at the sonar site was composed of 12.4% (SE = 2.0%) age-1.2 fish, 30.2% (SE = 2.7%) age-1.3 fish, 52.8% (SE = 2.9%) age-1.4 fish and 3.5% (SE = 1.1%) age-1.5 fish. For the late run, (1 July through 31 July) angler effort was 230,785 (SE = 8,028) angler-hours and Chinook salmon harvest was 15,313 (SE = 1,161). Unguided anglers accounted for 54% of the effort and 45% of the harvest versus guided anglers who accounted for 46% of the effort and 55% of the harvest. The late-run recreational harvest was composed of 2.5% (SE = 0.7%) age-1.2 fish, 18.3% (SE = 1.9%) age-1.3 fish, 76.1% (SE = 2.1%) age-1.4 fish and 2.7% (SE = 0.8%) age-1.5 fish, whereas the late-run (1 July through 10 August) Chinook salmon passage at the sonar site was composed of 6.9% (SE = 1.2%) age-1.2 fish, 18.5% (SE = 1.7%) age-1.3 fish, 70.5% (SE = 2.0%) age-1.4 fish and 4.2% (SE = 0.9%) age-1.5 fish.

A standardized inriver gillnetting project was conducted near the Chinook salmon sonar site. The gillnetting project ran from 16 May to 10 August 2005. During the early run 497 Chinook salmon and 1,595 sockeye salmon *O. nerka* were captured. During the late run 1,057 Chinook salmon, 755 sockeye salmon, 2 coho salmon *O. kisutch*, and 1 pink salmon *O. gorbuscha* were captured. The ratio of Chinook salmon CPUE to all species CPUE averaged 0.36 in the early run and 0.62 in the late run.

Key words: Kenai River, *Oncorhynchus tshawytscha,* Chinook salmon, creel survey, effort, harvest, gillnet, CPUE, age composition.

INTRODUCTION

The Kenai River (Figure 1) supports the largest freshwater recreational fishery in Alaska. Anglers fish for Chinook salmon *Oncorhynchus tshawytscha*, coho salmon *O. kisutch*, sockeye salmon *O. nerka*, pink salmon *O. gorbuscha*, Dolly Varden *Salvelinus malma*, and rainbow trout *O. mykiss*. The Kenai River Chinook salmon fishery between the Soldotna Bridge and Warren Ames Bridge is the subject of this report.

Chinook salmon return to the Kenai River in two runs: "early" from late April through late June, and "late" from late June through early August. For management purposes the early run is all Chinook salmon entering the river before 1 July and the late run is all fish entering on or after 1 July. Recreational anglers value fish from both runs because of their large size; especially late-run fish which average approximately 18 kg (40 lb) and can exceed 36 kg (80 lb). The world record sport-caught Chinook salmon (44.1 kg) (97 lb, 4 oz) was harvested from the Kenai River in May 1985.

Before 1970, participation in the recreational fishery in the Kenai River was primarily by shorebased anglers targeting sockeye salmon in July and coho salmon in August and September. The Alaska Department of Fish and Game (Department) implemented a creel survey in 1974 in response to an increase in boat anglers targeting Chinook salmon. Angler effort and harvest increased through 1988, then declined during the early 1990s because of low Chinook salmon returns and restrictions to the fishery (Figures 2 and 3). Angler effort and harvest during the early-run fishery has remained below 1988 levels. In the late-run fishery, effort has been relatively stable, whereas harvest has remained near historic highs the past 7 years (Figure 3).

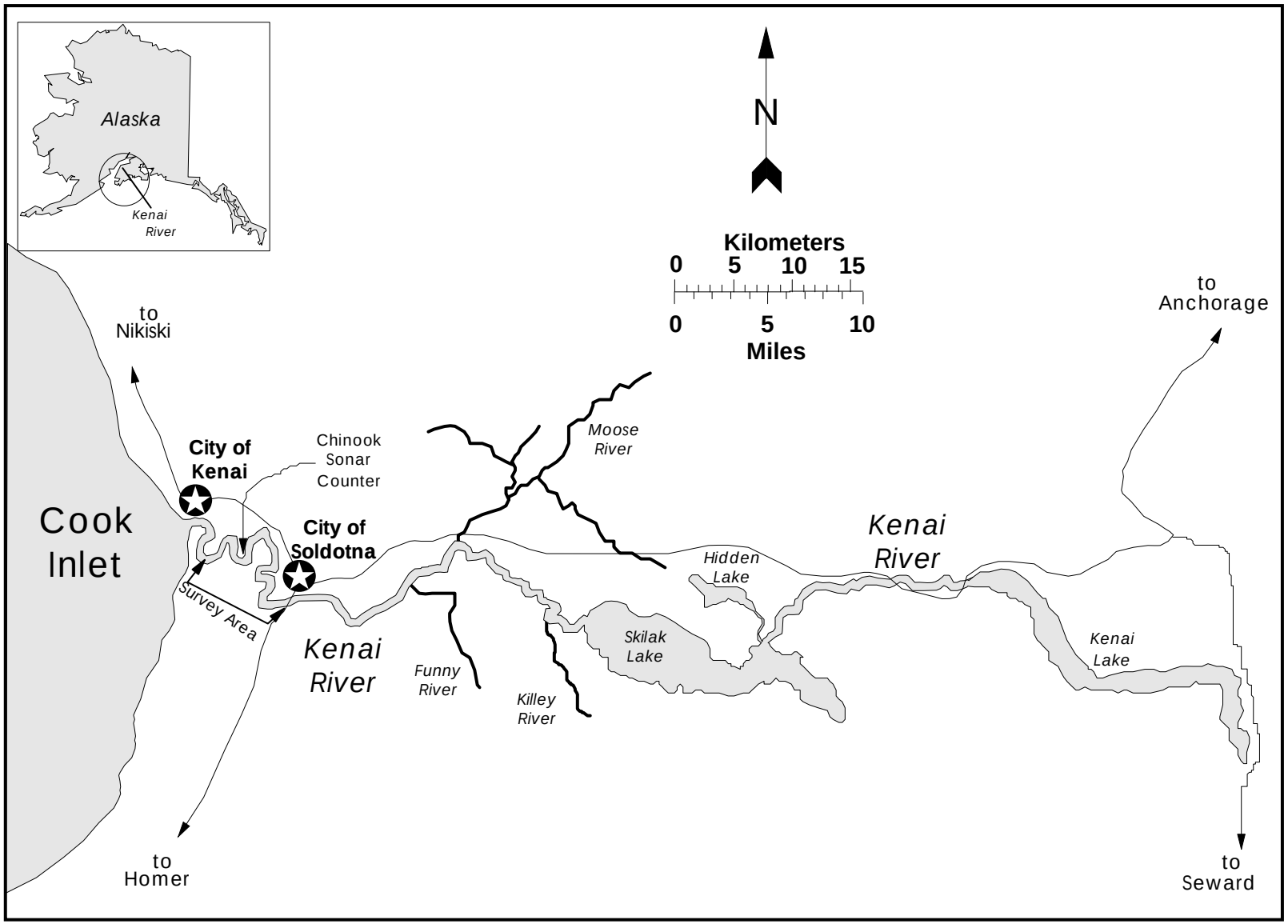


Figure 1.-The Kenai River drainage.

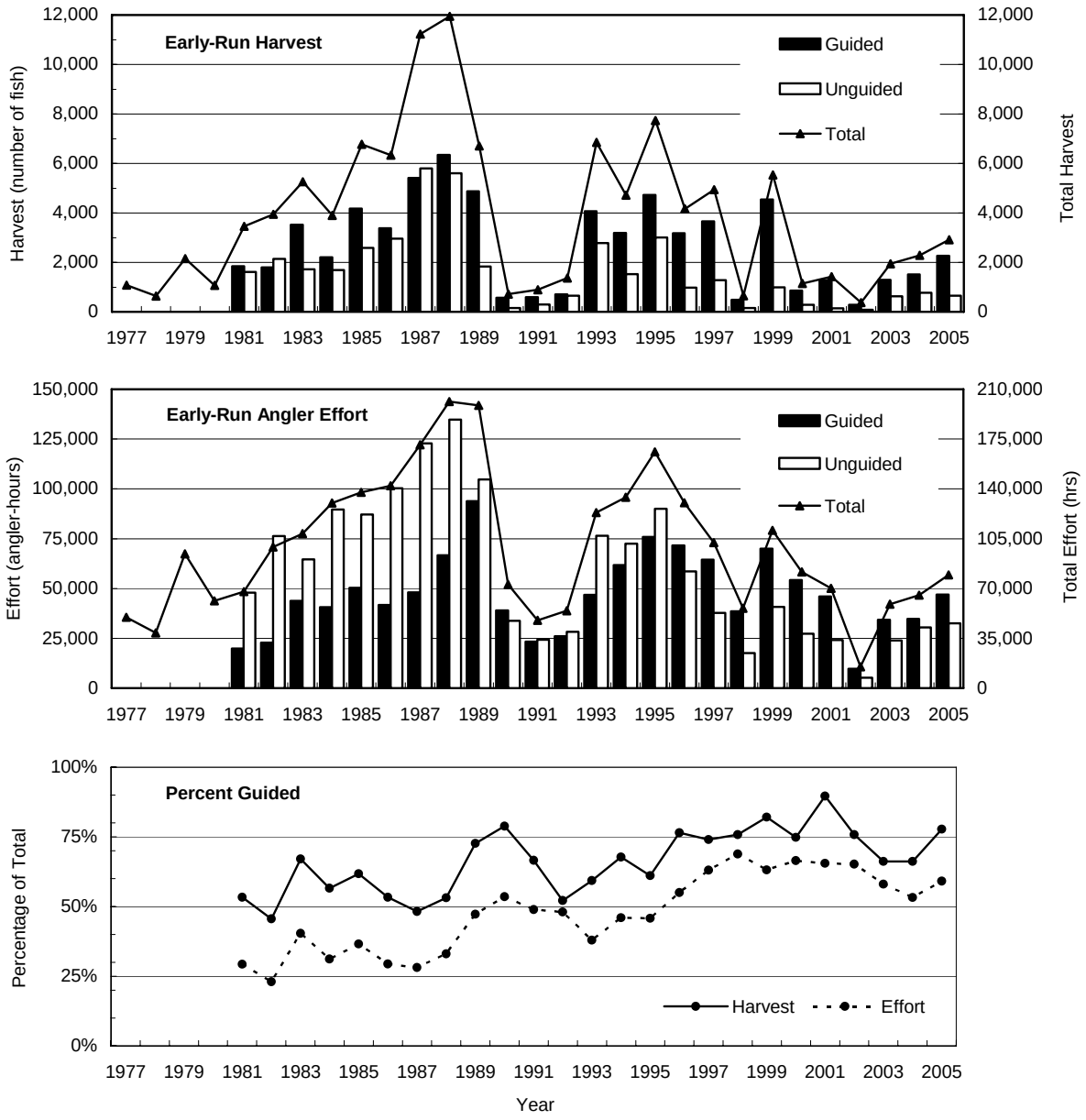


Figure 2.-Historic angler effort and harvest for the early-run Kenai River Chinook salmon fishery between the Soldotna Bridge and the Warren Ames Bridge, 1977-2005.

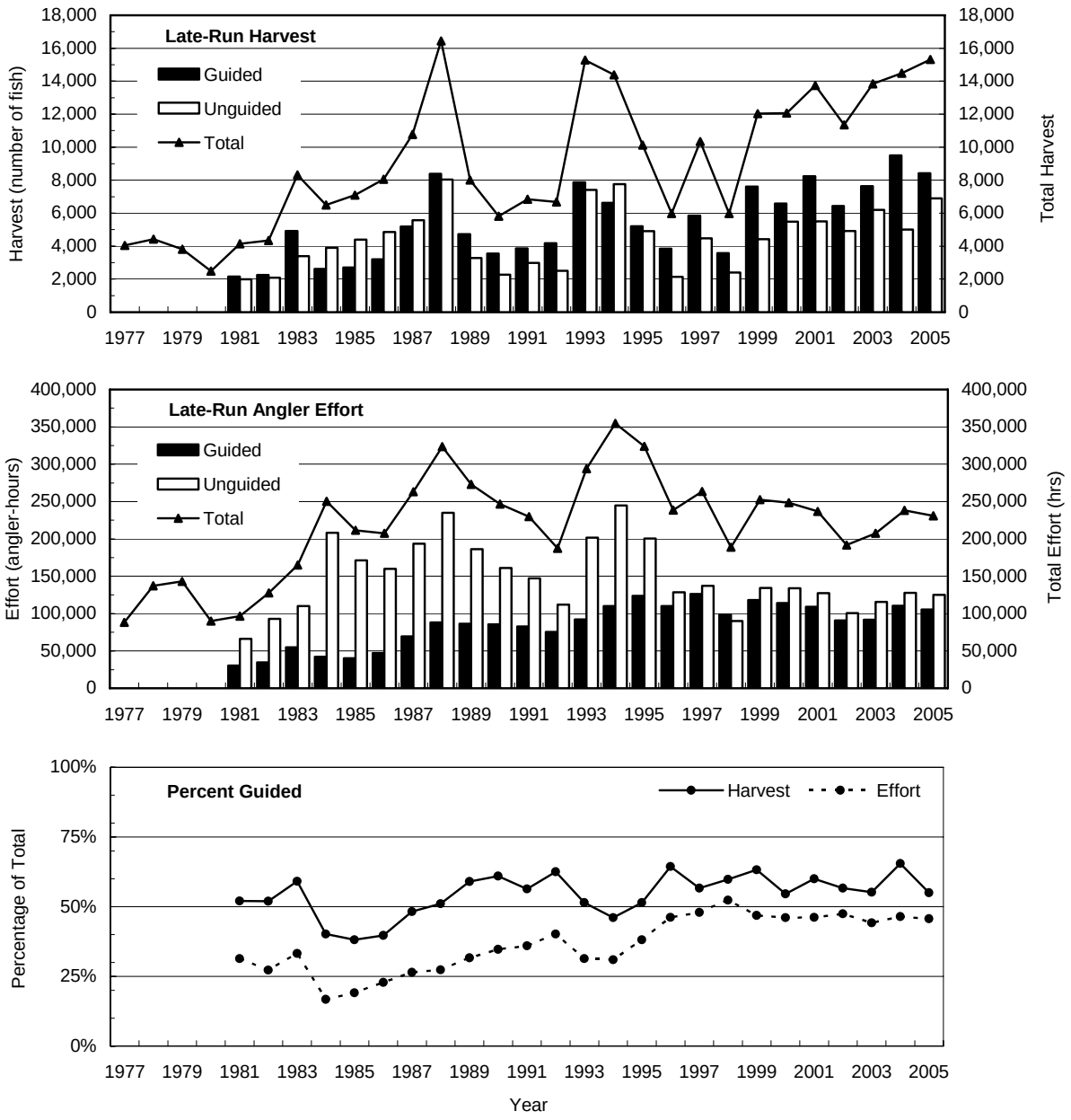


Figure 3.-Historic angler effort and harvest for the late-run Kenai River Chinook salmon fishery between the Soldotna Bridge and the Warren Ames Bridge, 1977-2005.

Since 1981, separate effort and harvest estimates have been produced for guided and unguided anglers (Figures 2 and 3).

MANAGEMENT PLANS

The early- and late-run Kenai River Chinook salmon returns have separate management plans adopted by the Alaska Board of Fisheries (BOF). Management within these plans utilize estimates of inriver return and harvest. Estimates of inriver return are obtained with sonar (Miller et al. 2004) while estimates of harvest are obtained from creel surveys. Previous Kenai River Chinook salmon creel surveys are published in Conrad and Hammarstrom (1987); Hammarstrom (1975-1981, 1988-1994); Hammarstrom et al. (1985); Hammarstrom and Larson (1982-1984, 1986); King (1995-1997); Marsh (1999, 2000); Reimer (2003, 2004a, 2004b); and Reimer et al. (2002).

In January 2005, the BOF modified the Kenai River and Kasilof River Early-Run King Salmon Conservation Management Plan (5 AAC 56.070 updated through register 174, Figure 4) and adopted an optimum escapement goal (OEG) range of 5,300 to 9,000 Chinook salmon. If the spawning escapement is projected to exceed 9,000 fish, the fishery will be liberalized to allow bait. If the spawning escapement is projected to be less than 5,300 fish, the Department will restrict the fishery by prohibiting the harvest of Chinook salmon less than 55 inches TL or by closing the fishery. In March 2003, the BOF introduced a slot limit into the Kenai River and Kasilof River Early-Run King Salmon Conservation Management Plan that prohibits harvest of Chinook salmon between 44 and 54.99 inches TL until 1 July downstream of the Soldotna Bridge and until 15 July upstream of the Soldotna Bridge (Figure 4). This change was implemented to protect early-run Chinook salmon that spend 5 years in salt water.

Management of the late-run Chinook salmon sport fishery is complicated because Chinook salmon are harvested by the commercial sockeye salmon setnet fishery along the east shore of Cook Inlet (McBride et al. 1985). The inriver Chinook salmon sport fishery is managed under the Kenai River Late-Run King Salmon Management Plan (5 AAC 21.359 updated through register 174, Figure 4). The Kenai River Late-Run King Salmon Management Plan mandates the sport fishery be managed to achieve a spawning escapement of 17,800 to 35,700 Chinook salmon. Bait and one single hook are permitted. If the spawning escapement is projected to exceed 35,700 fish the inriver sport fishing season may be extended up to 7 days during the first week of August.

FISHING REGULATIONS

Regulations for the Chinook salmon sport fishery in the Kenai River are among the most restrictive of any water open to Chinook salmon fishing in Alaska. Although fish do not enter the river in appreciable numbers until mid-May, the Chinook salmon season is open 1 January through 31 July. The area open to Chinook salmon fishing extends from the outlet of Skilak Lake to Cook Inlet, with the exception of the confluence areas of Slikok Creek (river mile [rm] 18.9), Funny River (rm 30.4), Moose River (rm 36.4) and the Lower Killey River (rm 44.0) (Figures 1 and 5). The Slikok Creek and Funny River confluence areas are closed from 1 January to 14 July, the Lower Killey River confluence area is closed from 25 June to 14 July, and the Moose River closure is in effect for the entire Chinook salmon fishing season. In addition, the area between Centennial Campground (rm 20.3) and the Soldotna Bridge (rm 21.1) (Figure 5), and the area around Morgan's Hole (approximately rm 31) is closed to fishing from boats for the entire Chinook salmon fishing season.

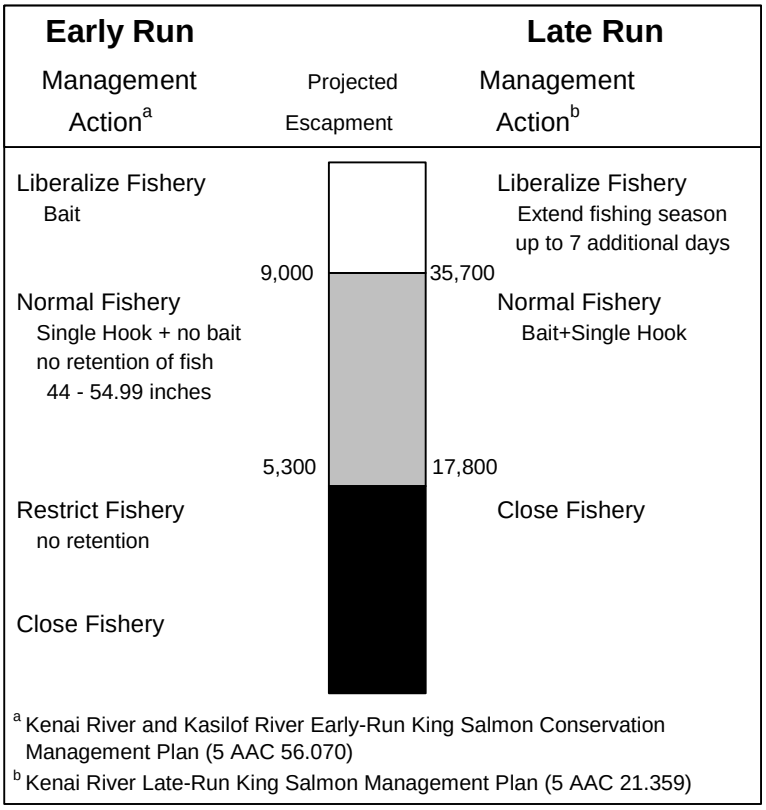


Figure 4.-Escapement levels and inriver management actions for the Kenai River Chinook salmon fisheries.

The daily bag and possession limit is one Chinook salmon per day 20 inches TL or longer; the annual limit is two Chinook salmon 20 inches TL or longer. Fish that are between 44 and 54.99 inches TL may not be retained before 1 July downstream of the Soldotna Bridge or before 15 July upstream of the Soldotna Bridge. A person who retains a Chinook salmon 20 inches TL or longer is prohibited from fishing from a boat in the Kenai River downstream of Skilak Lake for the remainder of that day. The use of multiple hooks and treble hooks is prohibited. During the early-run fishery use of bait is not allowed. Conversely, bait is allowed during the late-run fishery. On Mondays, only unguided fishing is allowed and boat anglers may only fish from non-motorized vessels (those that do not have a motor onboard) downstream of the outlet of Skilak Lake. In addition, all Kenai River Chinook salmon greater than 55 inches TL must be sealed within 3 days of harvest at the Soldotna ADF&G office.

There are further restrictions for fishing guides and guided anglers. Guided anglers are only allowed to fish from 0600 to 1800 hours. Guides are also prohibited from personally fishing while conducting clients and are prohibited from conducting clients on Sundays and Mondays, with the exception of Memorial Day and the last two Sundays in May (for charitable purposes).

The early-run fishery in 2005 was liberalized by emergency order to allow the use of bait beginning June 18 from the mouth of the Kenai River upstream to 100 yards below the

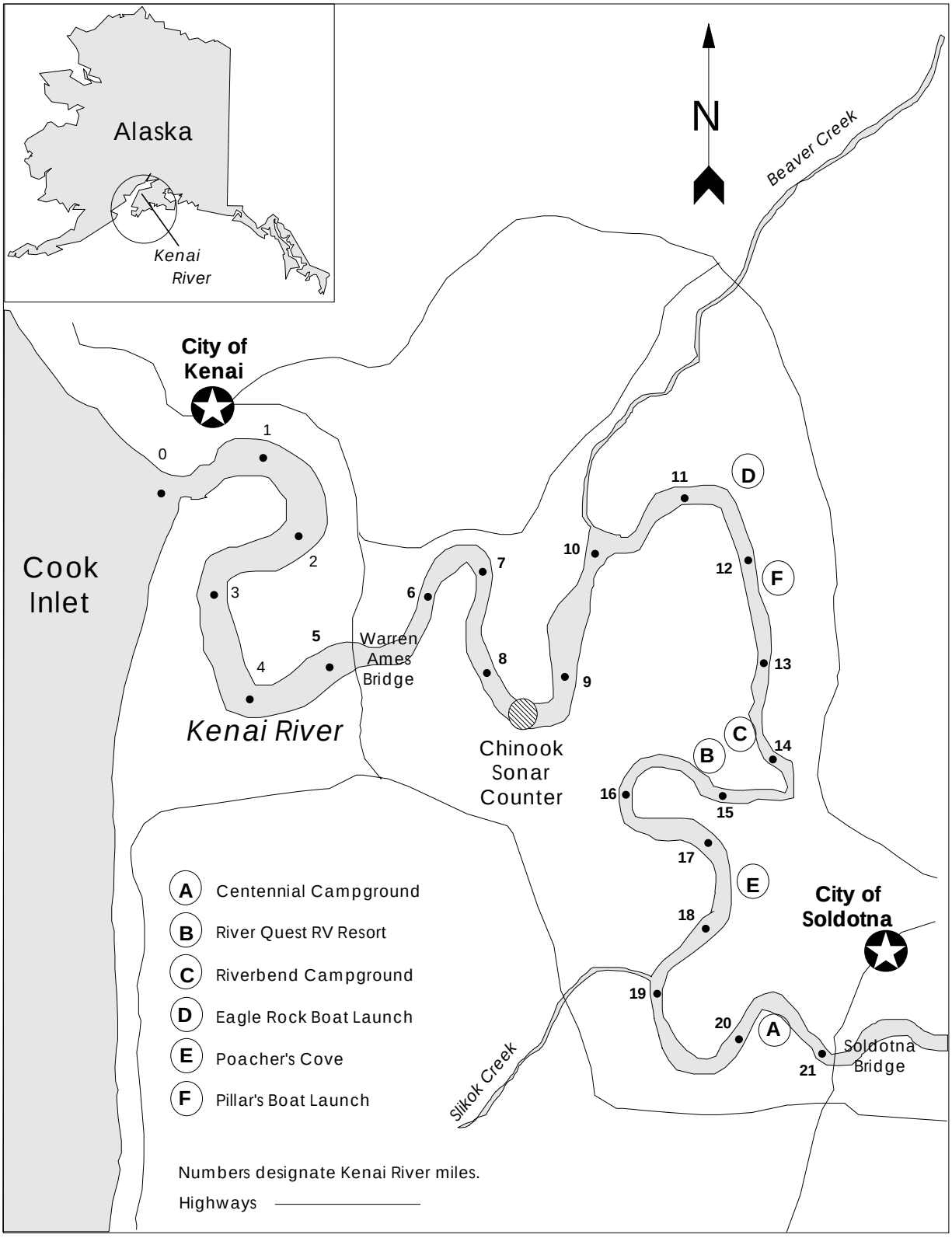


Figure 5.-The Kenai River creel survey study area.

confluence of the Moose River. This management action was taken because the spawning escapement was projected to exceed 9,000 Chinook salmon. No inseason actions were taking during the late-run in 2005.

OBJECTIVES

The objectives for the 2005 study were to estimate:

1. The total catch and harvest[1] by the sport fishery in the mainstem Kenai River between the Warren Ames and the Soldotna Bridges from 16 May through 30 June (early run) and from 1 July through 31 July (late run). Desired relative precision of the estimates for each run is within 20%, or 1,000 fish, of the true values 95% of the time.
2. Angler effort by the sport fishery in the mainstem Kenai River between the Warren Ames and the Soldotna Bridges from 16 May through 30 June (early run) and 1 July through 31 July (late run). Desired relative precision of the estimates for each run is within 10%, or 5,000 angler-hours, of the true values 95% of the time.
3. The proportion, by age and sex, of the Chinook salmon population entering the Kenai River from 16 May through 10 August such that all age-proportion estimates for each run are within 0.075 of the true values 95% of the time[2].
4. The proportion, by age and sex, of Chinook salmon harvested by the sport fishery in the mainstem Kenai River between the Warren Ames and the Soldotna Bridges such that all age-proportion estimates for each run are within 0.10 of the true values 95% of the time, or alternatively, that harvest estimates by age are within 500 fish for all age groups 95% of the time.

In addition, the project was responsible for completing the following tasks:

1. Examine Chinook salmon sampled during the creel survey and inriver drift gillnetting for presence of the adipose fin.
2. Calculate the proportion of fish captured in the inriver drift gillnets that are Chinook salmon.
3. Clip tips of dorsal fins from Kenai River Chinook salmon sampled from inriver drift gillnetting for future genetic analysis.

METHODS

CREEL SURVEY

A stratified, two-stage roving-access creel survey (Bernard et al. 1998a, b) was employed to estimate angler effort, catch, and harvest of Chinook salmon from the Warren Ames Bridge (rm 5.2) to the Soldotna Bridge (rm 21.1) (Figure 5). The creel survey was conducted from 16 May through 31 July 2005. First-stage sampling units were days. The unguided angler-day was assumed to be 20 hours long (0400 to 2400 hours) while the guided angler-day was 12 hours long (0600 to 1800 hours) by regulation. Daily catch and harvest were estimated as the product

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

[2] This objective guideline has been revised for the 2005 season. Formerly, inriver return age proportion estimates were to be within 0.10 of the true value 95% of the time.

of effort (angler-hours) and CPUE or HPUE. Second-stage sampling units were periodic angler counts for estimating angler effort and angler trips for estimating CPUE and HPUE. Angler trips were sampled by conducting completed-trip angler interviews.

Stratified sampling accounted for the geographical, temporal and regulatory factors affecting the fishery. Since substantial harvest downstream of the sonar site would affect inriver return and escapement estimates, angler counts were geographically stratified into two areas: (1) between the Soldotna Bridge and the Chinook salmon sonar site, and (2) between the Chinook salmon sonar site and the Warren Ames Bridge. Angler interviews did not include this level of stratification because past attempts to estimate catch and harvest downstream of the sonar site using geographically stratified angler interviews were ineffective (Marsh 2000). Thus, catch and harvest downstream of the sonar site are based on estimated effort downstream of the sonar site while assuming CPUE and HPUE are constant throughout the study area.

The creel survey was temporally stratified by week and day type (weekday and weekends/holidays) because harvest and catch rates can differ by time (King 1995-1997). Similarly, angler counts and angler interviews were post-stratified by angler type because catch rates between guided and unguided anglers can differ (Reimer 2004b).

Based upon these findings the following strata were used for conducting angler counts and estimating creel statistics:

Stratum	Number of Strata	Description
Geographic:	2 strata	Upstream and downstream of the Chinook salmon sonar site (angler counts only)
Temporal:	7 strata	Early Run: 17-22 May, 24-29 May, 31 May–5 June, 7-12 June, 14-19 June, 21-26 June, 28-30 June
	5 strata	Late Run: 1-3 July, 5-10 July, 12-17 July, 19-24 July, 26-31 July
Day Type:	2 strata	Weekdays and weekends/holidays
Angler Type:	2 strata	Guided and unguided

Two of the four available weekdays and both weekend days were sampled each week. An exception was 25-31 May when 2 days were selected randomly from the 3 weekend/holiday days available. During the last (28-30 June) temporal strata in the early run, only one day-type strata occurred, thus the early run was composed of 26 strata. The late run was composed of 20 strata. Mondays were not sampled even though unguided drift boat anglers were allowed to fish.

Creel survey staff also took Secchi disc measurements twice daily at rm 15.6.

Angler Counts

Four angler counts were conducted during each sampled day. The first count began at the start of a randomly chosen hour (0400, 0500, 0600, 0700, or 0800 hours) with the remaining counts done every 5 hours. This schedule ensured at least two angler counts were conducted while guided anglers were fishing (between 0600 and 1800 hours) each day.

Counts were conducted between the Soldotna Bridge and the Warren Ames Bridge, a distance of 15.9 mi. To maximize interview time, the direction (upstream or downstream) traveled to conduct angler counts was pre-selected to minimize total travel time. Anglers were counted while driving a boat through the survey area. The entire count took approximately 45 minutes and every effort was made to complete the trip in less than 1 hour. Angler counts were instantaneous counts and reflected fishing effort at the time the count began. Anglers were counted if they were fishing or rigging their line when observed during an angler count. Boats were counted as fishing if they contained at least one angler. Ten hand tally counters were used to sum the following categories for both geographic stratum: (1) unguided power boats, (2) unguided drift boats, (3) guided power boats, (4) guided drift boats, (5) unguided anglers in power boats, (6) unguided anglers in drift boats, (7) guided anglers in power boats (excluding the guide), (8) guided anglers in drift boats (excluding the guide), (9) active boats[1], and (10) shore anglers. Only categories 5-8 were required for this project; categories 1-4, and 9-10 were supplementary information for management purposes.

One boat and angler count was completed on Mondays between 0800 and 1400 hours as an index of effort.

Angler Interviews

Anglers who completed fishing were interviewed at the following boat launches (Figure 5):

A) Centennial Campground
B) River Quest RV Resort
C) Riverbend Campground
D) Eagle Rock Boat Launch
E) Poacher's Cove
F) Pillar's Boat Launch

Interviews were conducted only at Pillar's Boat Launch when the creel survey began on 17 May. Other launches were added to the sampling schedule immediately after substantial boat traffic was observed. Centennial Campground was added to the sampling schedule on 27 May, River Quest RV Resort and Riverbend Campground were added on 8 June, and Poacher's Cove was added on 18 June. Interviews were collected at all boat launches for the entire late run (1 July through 31 July).

The first randomly scheduled boat count for each day sampled was completed (between 0500 and 0900 hours) before conducting interviews; therefore, the entire angler-day was not sampled. The chance of introducing length-of-stay bias (Bernard et al. 1998a) is small. In 2001, only 2% of the interviews were conducted from 0400 to 0859 hours and the mean CPUE for that period was similar to the overall mean (Reimer 2003). This is considered typical across years.

There were four time intervals per day during which interviews could be conducted: three intervals between consecutive angler counts, and one interval after the last angler count. During the early run, when there were more interview periods than active boat launches, each launch was sampled once before any launch was repeated in the daily schedule. During the late run, when there were more accessible boat launches than interview periods, access location was

[1] Boats were counted as active if there were no anglers actively fishing from the boat, but the boat was in operation at any time during the day.

chosen without replacement from the locations available. Time and boat launch were paired randomly.

The following information was recorded for each interviewed angler: (1) time of interview, (2) boat or shore angler, (3) guided or unguided angler, (4) number of hours spent fishing downstream of the Soldotna Bridge[1], (5) number of fish harvested downstream of the Soldotna Bridge by species, (6) number of fish released downstream of the Soldotna Bridge by species, and (7) whether released Chinook salmon were less than 44 inches TL, 44-54.99 inches TL, or 55 inches TL or greater.

Age, Sex, and Length of the Sport Harvest

Harvested Chinook salmon were sampled for age, sex, and length (ASL) during angler interviews. Sex was identified from external morphologic characteristics. MEF length was measured to the nearest half-centimeter. Three scales were removed from the right side of the fish approximately two rows above the lateral line along a diagonal line downward from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin and placed on an adhesive coated card (Clutter and Whitesel 1956; Welander 1940). Acetate impressions of the scales were aged using a microfiche reader.

Sport-harvest ASL samples were stratified into two 3-week strata in the early run (16 May-6 June and 7-30 June) and two 2-week strata in the late run (1-17 July and 18-31 July). The sample goal for the late run was 150 fish per stratum, sufficient to achieve the desired relative precision (objective 4) assuming 15% of the scales could not be aged (Thompson 1987). A sample size goal of 150 fish per stratum was unrealistic for the early run, although preseason analysis indicated that objective 4 would be satisfied under the absolute precision objective.

Additionally, harvested fish were inspected for an adipose fin. A missing adipose fin indicates the fish is missing the fin naturally or received a coded wire tag as a juvenile. Presence of a coded wire tag would identify a Chinook salmon of hatchery origin that strayed to the Kenai River. If a fish without an adipose fin was found, and permission was granted from the angler, the fish's head was removed and examined later for a coded wire tag.

INRIVER GILLNETTING

The inriver gillnetting program began in 1979 and has been modified several times to meet the changing needs of the Kenai River Chinook salmon fishery. Because of concerns about net selectivity bias with respect to CPUE, species composition estimates, abundance estimates, as well as drift gillnetting time and drift area considerations, the project was standardized to collect data for ASL estimates of inriver returns, CPUE, and species composition (Reimer 2004b). Before 2002, the project used only 7.5 inch mesh gillnets and the mesh material consisted of dark green 'cable lay' nylon, typical 1960s commercial fishing gear. Since 2002, 5.0 and 7.5 inch mesh size multifiber nets have been fished with equal frequency just downstream of the Chinook salmon sonar site in an area approximately 0.4 m long.

Specifications of the nets used in 2005 are shown below:

1. 5.0 inch (stretched mesh) multifiber, 80 meshes deep, 10 fathoms long, Shade 1 (clear-steel blue), MS73 (14 strand) twine.

[1] Hours fishing were rounded to the nearest 0.5 hour and included when an angler's line was in the water or being rigged, but not travel time or time after an angler had harvested a fish.

2. 7.5 inch (stretched mesh) multifiber, 55 meshes deep, 10 fathoms long, Shade 1, MS93 (18 strand) twine.

Inriver sampling was scheduled daily for 6 hours from 16 May through 10 August. The daily sampling was constrained by the tidal influence at the study site, which makes drifting nets unfeasible during parts of the rising and high tide stages. Therefore, sampling took place from 3 hours before to 3 hours after low tide, excluding hours of darkness (2300-0400 hours). One low tide was sampled each day.

Each drift was positioned to sample fish that would pass through the insonified river channel (approximately 15 m offshore from the right-bank transducer to 10 m offshore from the left-bank transducer). The drift began immediately downstream of the sonar transducers (rm 8.6) and ended 0.4 mi downstream (rm 8.2). Drifts were terminated when either: (1) the crew believed four fish were in the net, (2) the net was drifting off the thalweg, (3) the net became snagged on the bottom or was not fishing properly, or (4) the end of the drift area was reached. Successive drifts always began at the upstream end of the study area. Two drifts (one starting on each bank) were completed with each mesh size before switching to the other mesh size. For each set the mesh size, starting bank, start and stop times, and number of fish caught by species were recorded.

Water level and clarity were recorded at rm 8.6 at the beginning, midpoint, and end of each netting shift. Water level was a relative measure using a staff gauge at the sonar site. Water clarity was measured to the nearest 0.1 m with a Secchi disk near the staff gauge.

Age, Sex, and Length of the Inriver Return

Chinook salmon captured in gillnets were removed and placed in a tagging cradle (Larson 1995) for ASL sampling. ASL sample data were recorded on a Juniper Systems Allegro CE[1] field computer. To prevent resampling, a ¼ inch hole was punched in the dorsal lobe of the caudal fin on every Chinook salmon handled. Each captured Chinook salmon was examined for a hole punch prior to sampling. Chinook salmon were also checked for an adipose fin. If a Chinook salmon adipose fin was missing, the fish was sacrificed and the head was removed and examined later for a coded wire tag. Injuries sustained by Chinook salmon during the capture and handling process were also recorded. Samples were stratified into two 3-week time periods during each run. The goal was to collect 150 fish for each stratum. Strata for the early run were 16 May-6 June and 7-30 June; strata for the late run were 1-20 July and 21 July-10 August.

Captured sockeye salmon were measured for MEF length every other day. Sockeye salmon length distribution was used as one variable in a mixture model to evaluate species composition at the sonar site (Fleischman and Burwen 2003).

Tissue samples (tips of dorsal fins) were collected from returning Chinook salmon captured by the inriver gillnets on days when sockeye salmon lengths were not recorded. The finclips were placed in 2 ml plastic tubes and immersed in an alcohol buffer. Each tube had a unique number and was stored at the ADF&G gene conservation laboratory for future analysis.

For the first time, subsampling of Chinook salmon was instituted in the late run. After June 30, only every other Chinook salmon per drift were sampled for biological data. All other captured

[1] Use of a company's name does not constitute endorsement.

Chinook salmon were given a hole punch on the dorsal lobe of the caudal fin to prevent resampling and then released.

Age, sex, and length composition estimates were generated using the Chinook salmon catches from the 5.0 and 7.5 inch mesh gillnets combined.

DATA ANALYSIS

Angler effort, catch, and harvest were estimated separately for guided and unguided anglers using the following procedures.

Angler Effort

The mean number of anglers on day *i* in stratum *h* was estimated by:

$$\bar{x}_{hi} = \frac{\sum_{g=1}^{r_{hi}} x_{hig}}{r_{hi}}, \quad (1)$$

where:

x_{hig} = the number of anglers observed in the *g*th count of day *i* in stratum *h*, and

r_{hi} = the number of counts on day *i* in stratum *h*.

Angler counts were conducted systematically within each sample day. The variance of the mean angler count was estimated by:

$$\hat{V}(\bar{x}_{hi}) = \frac{\sum_{g=2}^{r_{hi}} \left(x_{hig} - x_{hi(g-1)}\right)^2}{2r_{hi}(r_{hi}-1)}. \quad (2)$$

Effort (angler-hours) during day *i* in stratum *h* was estimated by:

$$\hat{E}_{hi} = L_{hi}\bar{x}_{hi}, \quad (3)$$

where:

L_{hi} = length of the sample day (20 hours for unguided anglers, 12 hours for guided anglers).

The within-day variance of effort was estimated by:

$$\hat{V}(\hat{E}_{hi}) = L_{hi}^2 \hat{V}(\bar{x}_{hi}). \quad (4)$$

The mean effort of stratum *h* was estimated by:

$$\bar{E}_h = \frac{\sum_{i=1}^{d_h} \hat{E}_{hi}}{d_h}, \quad (5)$$

where:

d_h = number of days sampled in stratum *h*.

The sample variance of daily effort for stratum *h* was estimated by:

$$S_1^2(E)_h = \frac{\sum_{i=1}^{d_h}\left(\hat{E}_{hi} - \overline{E}_h\right)^2}{\left(d_h - 1\right)}. \quad (6)$$

Total effort of stratum *h* was estimated by:

$$\hat{E}_h = D_h \overline{E}_h, \quad (7)$$

where:

D_h = total number of days the fishery was open in stratum *h*.

The variance of total effort for each stratum in a two-stage design, omitting the finite population correction factor for the second stage, was estimated by (Cochran 1977):

$$\hat{V}\left(\hat{E}_h\right) = \left(1 - f\right)D_h^2 \frac{S_1^2(E)_h}{d_h} + fD_h^2 \frac{\sum_{i=1}^{d_h}\hat{V}\left(\hat{E}_{hi}\right)}{d_h^2}, \quad (8)$$

where:

f = fraction of days sampled (= d_h / D_h).

Catch and Harvest

Catch and harvest per unit (hour) of effort for day *i* was estimated from angler interviews using the jackknife method to minimize the bias of these ratio estimators (Efron 1982). The jackknife estimate of CPUE (similarly HPUE) for angler *j* was:

$$CPUE^*_{hij} = \frac{\sum_{\substack{a=1 \\ a \neq j}}^{m_{hi}} c_{hia}}{\sum_{\substack{a=1 \\ a \neq j}}^{m_{hi}} e_{hia}}, \quad (9)$$

where:

c_{hia} = catch of angler *a* interviewed on day *i* in stratum *h*,

e_{hia} = effort (hours fished) by angler *a* interviewed on day *i* in stratum *h*, and

m_{hi} = number of anglers interviewed on day *i* in stratum *h*.

The jackknife estimate of mean CPUE for day *i* was the mean of the angler estimates:

$$\overline{CPUE}^{*}_{hi} = \frac{\sum_{j=1}^{m_{hi}} CPUE^{*}_{hij}}{m_{hi}}, \tag{10}$$

and the bias corrected mean was:

$$\overline{CPUE}^{**}_{hi} = m_{hi}\left(\overline{CPUE}_{hi} - \overline{CPUE}^{*}_{hi}\right) + \overline{CPUE}^{*}_{hi}, \tag{11}$$

where:

$$\overline{CPUE}_{hi} = \frac{\sum_{j=1}^{m_{hi}} c_{hij}}{\sum_{j=1}^{m_{hi}} e_{hij}}.$$

The variance of the jackknife estimate of CPUE was estimated by:

$$\hat{V}\left(\overline{CPUE}^{**}_{hi}\right) = \frac{m_{hi}-1}{m_{hi}} \sum_{j=1}^{m_{hi}} \left(CPUE^{*}_{hij} - \overline{CPUE}^{*}_{hi}\right)^2. \tag{12}$$

Catch during each sample day was estimated as the product of effort and CPUE by:

$$\hat{C}_{hi} = \hat{E}_{hi}\overline{CPUE}^{**}_{hi}, \tag{13}$$

and the variance by (Goodman 1960):

$$\hat{V}\left(\hat{C}_{hi}\right) = \hat{V}\left(\hat{E}_{hi}\right)\left(\overline{CPUE}^{**}_{hi}\right)^2 + \hat{V}\left(\overline{CPUE}^{**}_{hi}\right)\hat{E}^2_{hi} - \hat{V}\left(\hat{E}_{hi}\right)\hat{V}\left(\overline{CPUE}^{**}_{hi}\right). \tag{14}$$

HPUE was estimated by substituting angler harvest for angler catch in equations (9) through (12). Harvest during sample day *i* was estimated by substituting the $HPUE_{hi}$ statistics into equations (13) and (14). Total catch and harvest during stratum *h* was estimated using equations (5) through (8), substituting estimated catch ($\hat{C}_{hi}$) and harvest ($\hat{H}_{hi}$) during sample day *i* for the estimated effort ($\hat{E}_{hi}$) during day *i*.

When no interviews from a particular angler type were obtained for a particular day, there were no CPUE and HPUE estimates to pair with angler counts. For these days, pooled estimates of CPUE and HPUE calculated from interviews obtained during the remaining days within the stratum, or similar strata were imputed (substituted). A bootstrap procedure was used to estimate the variance introduced by use of imputed values.

Total effort, catch, and harvest estimates, and their respective variances, were summed across strata within each run. Technically, estimates of catch and harvest by geographic location and angler-type were not statistically independent, because HPUE and CPUE were estimated from the same interviews for both geographic strata, and estimates were post-stratified by angler type.

This lack of independence between strata could underestimate variances; however, the bias in variance estimates is small.

Angler Effort, Catch, and Harvest on Mondays

Since 1999, regulations allow only unguided fishing from drift boats on Mondays. Harvest estimates from the creel survey from 1999 through 2002 indicated that total harvest on Mondays comprised a small percent (<4%) of the total late-run harvest (Reimer 2003). Because of these results and budgetary constraints, the creel survey design was changed in 2003 from interviewing anglers on Mondays to conducting one "index" angler count during the middle of the day (0800 to 1400 hours). Although the resulting estimates could be biased and imprecise, they are statistically robust enough to confirm whether angler effort, harvest, and catch on Mondays are a small or negligible fraction of the total. The following ad hoc procedure was used to estimate effort, catch and harvest on drift boat Mondays:

1. 2001 angler counts were used to estimate the relationship between index counts and mean angler counts on Mondays. The mean angler count was approximately 78% of the "index" count.
2. To estimate angler hours of effort *E*, the estimated mean count was multiplied by the length of the unguided angler day (20 hours).
3. To estimate CPUE and HPUE on Mondays without angler interviews, we exploited the tendency for angler success to exhibit an autocorrelated time trend. We plotted CPUE and HPUE versus time for days sampled with angler interviews, and then subjectively imputed CPUE and HPUE values for each Monday.
4. Catch and harvest were estimated as the product of the imputed values of CPUE and HPUE and the estimate of *E* derived from the index count.

CPUE of Inriver Gillnetting

Drift gillnetting was conducted using 5.0 and 7.5 inch mesh gillnets. Two drifts (one starting on each bank *k*) were completed using one gear-size, and then the sequence repeated using the other gear-size. A repetition *j* consisted of a complete set of four such drifts. Daily CPUE *r* of species *s* in mesh *m* for day *i* was estimated as follows:

$$= \hat{r}_{smi} = \frac{\sum_{j=1}^{J_i} \sum_{k=1}^{2} c_{smijk}}{\sum_{j=1}^{J_i} \sum_{k=1}^{2} e_{mijk}}, \tag{15}$$

$$\hat{V}(\hat{r}_{smi}) = \frac{\sum_{j=1}^{J_i} \left(c_{smij} - \hat{r}_{smi} e_{mij}\right)^2}{\bar{e}_{mi}^{\,2} J_i (J_i - 1)}, \tag{16}$$

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*, e_{mijk} is the effort (soak time in minutes) for that drift, J_i is the number of repetitions completed on day *i*, c_{smij} is the catch of species *i* in mesh *m* summed across drifts on both banks conducted during repetition *j* of day *i*, e_{mij} is the effort for mesh *m* summed across

drifts on both banks conducted during repetition j of day i, and $\bar{e}_{mi}$ is the mean of e_{mij} across all repetitions j for mesh m on day i. The variance follows Cochran (1977:66).

Proportion of Chinook Salmon Captured by Inriver Gillnetting

The proportion of species s passing through the insonified zone of the river channel on day i was estimated as follows:

$$\hat{p}_{si} = \frac{\sum_{j}^{J_i} \hat{r}_{sij}}{\sum_{s}\sum_{j}^{J_i} \hat{r}_{sij}}, \tag{17}$$

$$\hat{V}(\hat{p}_{si}) = \frac{\sum_{j=1}^{J_i} \left(\hat{r}_{sij} - \hat{p}_{si}\hat{r}_{ij}\right)^2}{\bar{r}_i^{\,2} J_i (J_i - 1)}. \tag{18}$$

Where CPUE:

$$\hat{r}_{sij} = \frac{1}{2}\sum_{m=1}^{2} \frac{\sum_{k=1}^{2} c_{smijk}}{\sum_{k=1}^{2} e_{mijk}}, \tag{19}$$

for species s during repetition j of day i is estimated as the mean of the CPUEs, pooled across bank, for each mesh size,

$r_{ij} = \sum_{s} \hat{r}_{sij}$ 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.

Only data from repetitions with at least one drift with each mesh size were used to estimate species proportions.

Age and Sex Composition

Age and sex composition of the Chinook salmon harvest were estimated for each run, by time stratum t. The proportion of Chinook salmon in age/sex group b in time stratum t was estimated as:

$$\hat{p}_{bt} = \frac{n_{bt}}{n_t}, \tag{20}$$

where:

n_{bt} = the number of fish of age/sex group b sampled during stratum t, and

n_t = the number of legible scales read from Chinook salmon sampled during stratum *t*.

The variance of $\hat{p}_{bt}$ was estimated as (Cochran 1977):

$$\hat{V}(\hat{p}_{bt}) = \frac{\hat{p}_{bt}(1-\hat{p}_{bt})}{(n_t - 1)}. \quad (21)$$

Contingency tables and chi-square tests were used to determine if age/sex composition differed significantly ($P < 0.05$) among strata. The proportion of Chinook salmon in age/sex group *b* during an entire run, and its variance, were estimated by pooling data across strata (equations 20-21 without stratum subscripts *t*).

The harvest of each age/sex group by time stratum *t* and geographic stratum *g* (upstream and downstream of the sonar site), was estimated by:

$$\hat{H}_{gbt} = \hat{H}_{gt}\hat{P}bt, \quad (22)$$

with variance (Goodman 1960):

$$\hat{V}\left(\hat{H}_{gbt}\right) = \hat{H}_{gt}^2\hat{V}(\hat{p}_{bt}) + \hat{p}_{bt}^2\hat{V}\left(\hat{H}_{gt}\right) - \hat{V}(\hat{p}_{bt})\hat{V}\left(\hat{H}_{gt}\right), \quad (23)$$

where:

$\hat{H}_{gt}$ and $\hat{V}\left(\hat{H}_{gt}\right)$ = estimated harvest and its variance in geographic stratum *g* during temporal stratum *t*.

If age/sex composition differed ($P < 0.05$) among strata, a weighted proportion was calculated:

$$\hat{p}_{gb} = \frac{\sum_t \hat{H}_{gt}\hat{p}_{bt}}{\sum_t \hat{H}_{gt}}, \quad (24)$$

$$\hat{V}(\hat{p}_{gb}) = \frac{1}{\hat{H}_g^2}\left[\frac{\hat{v}(\hat{H}_{g1})\left[\hat{p}_{b1}\hat{H}_{g2} - \hat{H}_{gb2}\right]^2}{\hat{H}_g^2} + \frac{v(\hat{H}_{g2})\left[\hat{p}_{b2}\hat{H}_{g1} - \hat{H}_{gb1}\right]^2}{\hat{H}_g^2} + \hat{v}(\hat{p}_{b1})\hat{H}_{g1}^2 + \hat{v}(\hat{p}_{b2})\hat{H}_{g2}^2\right]. \quad (25)$$

The number of Chinook salmon passing the sonar *N* was apportioned by age and sex similarly, using equations 20-24, ignoring geographic stratum subscript *g*, substituting *N* for *H*, and using the net-captured Chinook salmon to estimate *p*. The inriver return *R* of age and sex group *b* was estimated as the sum of the age/sex specific sonar passage N_b and harvest below the sonar H_{2b},

$$\hat{R}_b = \hat{N}_b + \hat{H}_{2b}. \quad (26)$$

RESULTS

CREEL SURVEY

Effort, Catch, and Harvest

The creel survey was conducted from 16 May to 31 July. During the early run, the creel survey sampled 20 of the 34 (59%) days the fishery was open to guided anglers and 25 of the 38 (66%)

days the fishery was open to unguided powerboat anglers (Table 1). During the late run, the creel survey sampled 14 of the 22 (64%) days the fishery was open to guided anglers and 19 of the 27 (70%) days the fishery was open to unguided powerboat anglers (Table 2). A total of 3,040 angler interviews were conducted: 1,034 during the early run and 2,006 during the late run (Tables 1 and 2).

During the early run, angler counts ranged from 2 to 179 for unguided anglers and from 5 to 278 for guided anglers (Appendix A1). The largest angler count occurred on 12 June for unguided anglers and on 21 June for guided anglers. The largest count in the early run for guided and unguided anglers combined was 368 anglers on June 18, the first day bait was allowed. During the late run, angler counts ranged from 30 to 589 for unguided anglers and from 186 to 646 for guided anglers (Appendix A2). The largest counts occurred on 24 July for unguided anglers and on 16 July for guided anglers. The largest count in the late run for guided and unguided anglers combined was 1,096 anglers on 16 July.

Effort was 79,492 (SE = 3,365) angler-hours during the early run (Table 1) and 230,785 (SE = 8,028) angler-hours during the late run (Table 2). Guided anglers accounted for 59% of the early-run effort and 46% of the late-run effort. The precision of both the early- (±8.3%) and late- (±6.8%) run effort estimates satisfied the project objectives (within 10% of the true value 95% of the time).

Daily catch rates of Chinook salmon during both runs were generally higher for guided anglers than for unguided anglers. Daily catch rates of early-run Chinook salmon ranged from 0 to 0.114 and averaged 0.037 fish per hour for unguided anglers, and ranged from 0.018 to 0.136 and averaged 0.067 fish per hour for guided anglers (Appendices B1 and B2). Catch rates of early-run Chinook salmon were highest on 21 June for unguided anglers and on 3 June for guided anglers. Similarly, daily catch rates of late-run Chinook salmon ranged from 0.038 to 0.184 and averaged 0.090 fish per hour for unguided anglers, and ranged from 0.061 to 0.284 and averaged 0.128 fish per hour for guided anglers (Appendices B3 and B4). Daily catch rates were highest in the late run on 19 July for unguided anglers and 30 July for guided anglers.

The estimated harvest of Chinook salmon during the early run was 2,876 (SE = 329) (Table 1). Unguided anglers accounted for 23% of the harvest compared to 77% for guided anglers. The estimated catch of early-run Chinook salmon was 4,430 (SE = 735), meaning 35% of the catch was released. Anglers reported releasing 109 Chinook salmon for the 1,034 interviews conducted during the early run. Of the Chinook salmon reportedly released, 71 (65%) were below the slot limit of 44 inches TL and 38 (35%) were within the slot limit (44-54.99 inches TL).

The estimated harvest of Chinook salmon during the late run was 15,313 (SE = 1,161) (Table 2). Unguided anglers accounted for 45% of the harvest compared to 55% for guided anglers. The estimated catch of late-run Chinook salmon was 25,633 (SE = 2,214), meaning 40% of the catch was released. The relative precision for total harvest (±14.9%) and catch (±16.9%) satisfied the project objectives (within 20% of the true value 95% of the time).

Approximately 2.2% of the early-run effort and 13.9% of the late-run effort occurred downstream of the Chinook salmon sonar site (Appendices C1 and C2). These results are similar to 2001-2004. The late-run harvest estimate downstream of the Chinook salmon sonar

Table 1.-Angler effort, catch, and harvest estimates for the early-run Kenai River Chinook salmon fishery between the Soldotna Bridge and the Warren Ames Bridge, 2005.

				Effort		Catch[a]		Harvest[a]	
	N[b]	n[c]	Int.[d]	Est.	SE	Est.	SE	Est.	SE
17-22 May									
Guided weekdays	4	2	4	896	174	45	40	36	22
Guided weekend	2	2	18	624	240	28	22	28	22
Unguided weekdays	4	2	9	660	114	0	0	0	0
Unguided weekends	2	2	12	605	75	40	16	25	14
24-30 May									
Guided weekdays	4	2	9	2,952	790	78	120	26	62
Guided weekend	2	1	12	1,380	235	48	25	48	25
Unguided weekdays	4	2	28	1,360	317	12	12	12	12
Unguided weekends	3	2	55	2,475	637	0	0	0	0
31 May-5 June									
Guided weekdays	4	2	43	2,772	493	331	86	213	81
Guided weekend/holiday	1	1	11	980	201	69	34	34	25
Unguided weekdays	4	2	36	1,710	385	88	58	57	54
Unguided weekends/holiday	2	2	103	2,275	326	152	37	56	21
7-12 June									
Guided weekdays	4	2	36	6,860	819	496	106	235	59
Guided weekend	1	1	5	1,494	678	113	62	75	44
Unguided weekdays	4	2	52	2,540	253	105	25	70	24
Unguided weekends	2	2	78	3,350	787	54	22	34	17
14-19 June									
Guided weekdays	4	2	46	8,308	1,088	502	208	469	226
Guided weekend	1	1	38	1,692	650	194	83	134	61
Unguided weekdays	4	2	61	2,930	396	59	27	42	34
Unguided weekends	2	2	62	4,207	525	112	44	81	34
21-26 June									
Guided weekdays	4	2	105	10,352	1,560	754	177	483	87
Guided weekend	1	1	40	2,228	460	94	36	84	34
Unguided weekdays	4	2	13	3,130	365	256	617	87	47
Unguided weekends	2	2	91	4,040	445	163	42	53	24
28-30 June									
Guided weekdays	3	1	26	6,462	1,590	502	150	360	120
Unguided weekdays	1	1	41	3,210	367	135	51	135	51
Day Type Subtotals									
Guided weekdays	27	13	269	38,602	2,778	2,708	363	1,823	296
Guided weekends/holiday	8	7	124	8,398	1,117	546	120	403	92
Unguided weekdays	25	13	240	15,540	867	655	623	403	97
Unguided weekends/holiday	13	12	401	16,952	1,269	521	76	248	51
Angler Type Subtotals									
Guided	34	20	393	47,000	2,994	3,254	382	2,226	310
% Guided			38%	59%		73%		77%	
Unguided[e]	38	25	641	32,492	1,537	1,176	628	651	110
% Unguided			62%	41%		27%		23%	
Early-run Total[e]			1,034	79,492	3,365	4,430	735	2,876	329

[a] Catch and harvest estimates may not sum to total due to rounding.

[b] Number of days fishery was open to fishing from powerboats.

[c] Number of days sampled.

[d] Number of interviews conducted.

[e] Unguided angler estimates are biased low because drift boat Mondays were not sampled.

Table 2.-Angler effort, catch, and harvest estimates for the late-run Kenai River Chinook salmon fishery between the Soldotna Bridge and the Warren Ames Bridge, 2005.

				Effort		Catch[a]		Harvest[a]	
	N[b]	n[c]	Int.[d]	Est.	SE	Est.	SE	Est.	SE
1-3 July									
Guided weekdays	1	1	41	4,494	1,605	327	132	186	84
Guided weekends	1	1	76	3,546	354	344	55	226	42
Unguided weekdays	1	1	56	2,050	209	79	22	39	16
Unguided weekends	2	2	135	6,965	1,183	531	131	299	80
5-10 July									
Guided weekdays	4	2	64	16,372	2,067	2,007	352	1,363	260
Guided weekends	1	1	49	3,642	1,440	435	179	311	132
Unguided weekdays	4	2	113	11,460	1,345	990	370	423	172
Unguided weekends	2	2	134	10,180	1,898	742	189	369	105
12-17 July									
Guided weekdays	4	2	138	20,152	2,115	2,073	450	1,264	268
Guided weekends	1	1	46	4,864	1,255	887	251	494	160
Unguided weekdays	4	2	145	15,780	1,890	1,271	386	793	316
Unguided weekends	2	2	118	14,155	1,195	1,452	241	875	166
19-24 July									
Guided weekdays	4	2	150	23,364	2,981	3,736	1,432	1,691	516
Guided weekends	1	1	49	4,376	1,198	285	98	255	90
Unguided weekdays	4	2	164	21,240	2,879	2,750	1,108	1,295	426
Unguided weekends	2	2	128	12,415	1,870	1,085	251	780	180
26-31 July									
Guided weekdays	4	2	129	20,460	2,928	2,325	650	1,816	521
Guided weekends	1	1	35	4,280	1,506	998	376	815	303
Unguided weekdays	4	2	141	19,020	1,870	1,846	305	1,136	317
Unguided weekends	2	2	95	11,970	1,026	1,502	231	884	174
Day Type Subtotals									
Guided weekdays	17	9	522	84,842	5,364	10,468	1,678	6,320	827
Guided weekends	5	5	255	20,708	2,735	2,948	499	2,100	381
Unguided weekdays	17	9	619	69,550	4,148	6,935	1,268	3,686	642
Unguided weekends	10	10	610	55,685	3,314	5,312	477	3,207	328
Angler Type Subtotals									
Guided	22	14	777	105,550	6,021	13,416	1,751	8,419	910
% Guided			39%	46%		52%		55%	
Unguided[e]	27	19	1,229	125,235	5,309	12,248	1,355	6,893	721
% Unguided			61%	54%		48%		45%	
Late-run Total[d]			2,006	230,785	8,028	25,663	2,214	15,313	1,161

[a] Catch and harvest estimates may not sum to total due to rounding.

[b] Number of days fishery was open to fishing from powerboats.

[c] Number of days sampled.

[d] Number of interviews conducted.

[e] Unguided angler estimates are biased low because drift boat Mondays were not sampled.

site was 2,287 (SE = 210) (14.9%), whereas 13,026 (SE = 1,142) Chinook salmon were harvested upstream of the sonar site (Appendix C2).

Daily angler counts and interpolated values of HPUE and CPUE used to index effort, harvest, and catch on Mondays during the early run, indicated an effort of approximately 1,810 angler-hours, a harvest of approximately 32 Chinook salmon, and a catch of 56 on Mondays. These values comprise slightly more than 2% of the effort and slightly more than 1% of the total early-run harvest and catch estimates. During the late run, approximately 7,472 hours were expended fishing on Mondays in July with a catch of 684 and a harvest of 420 Chinook salmon (Figure 6). This represented approximately 3% of total late-run effort, catch and harvest. Catch, harvest and effort estimates on Mondays are not included in the seasonal totals.

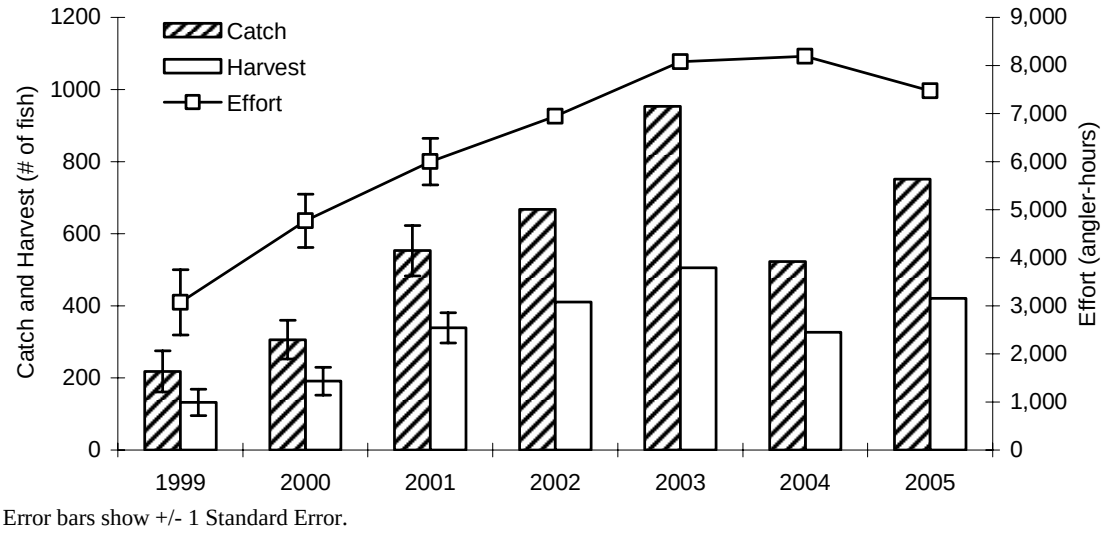


Figure 6.-Monday unguided drift boat catch, harvest and angler effort during the late run, 1999-2005.

INRIVER GILLNETTING

Species Composition of Return

During the early run, 497 Chinook salmon and 1,595 sockeye salmon greater than 400 mm MEF length were captured with gillnets (Appendices D1 and D2). There were 80 other fish less than 400 mm MEF length captured: 77 eulachon *Thaleichthys pacificus*, 2 Dolly Varden, and 1 Chinook salmon. Daily Chinook salmon CPUE ranged from 0.004 to 0.271 and averaged 0.082 fish per minute (Appendix D3). The daily ratio of Chinook salmon to total salmon ranged from 0.09 to 1.00 and averaged 0.36 (Appendix D3). CPUE and Chinook salmon ratios were calculated using only salmonids greater than 400 mm MEF length because this length approximates the lower length limit detectible by the sonar (Debby Burwen, ADF&G, Sport Fish Division, Anchorage, personal communication).

During the late run, 1,057 Chinook salmon, 755 sockeye salmon, 2 coho salmon, and 1 pink salmon greater than 400 mm MEF length were captured in gillnets (Appendices D4 and D5). There were no salmonids less than 400 mm MEF length captured during the late run. Daily Chinook salmon CPUE ranged from 0.072 to 0.903 and averaged 0.337 fish per minute (Appendix D6). The daily ratio of Chinook salmon to total salmon ranged from 0.27 to 0.95 and averaged 0.62 (Appendix D6).

Catch from the 5.0 and 7.5 inch mesh gillnets were compared to assess age, size and/or species selectivity bias. Chinook salmon less than 600 mm MEF length were more abundant in the 5.0 inch mesh gillnets than in 7.5 inch mesh gillnets whereas Chinook salmon greater than 600 mm MEF length were comparable in abundance in both mesh sizes (Figure 7). The length frequency distributions and mean daily length of sockeye salmon caught in each mesh size were similar (Figure 7 and Appendix E).

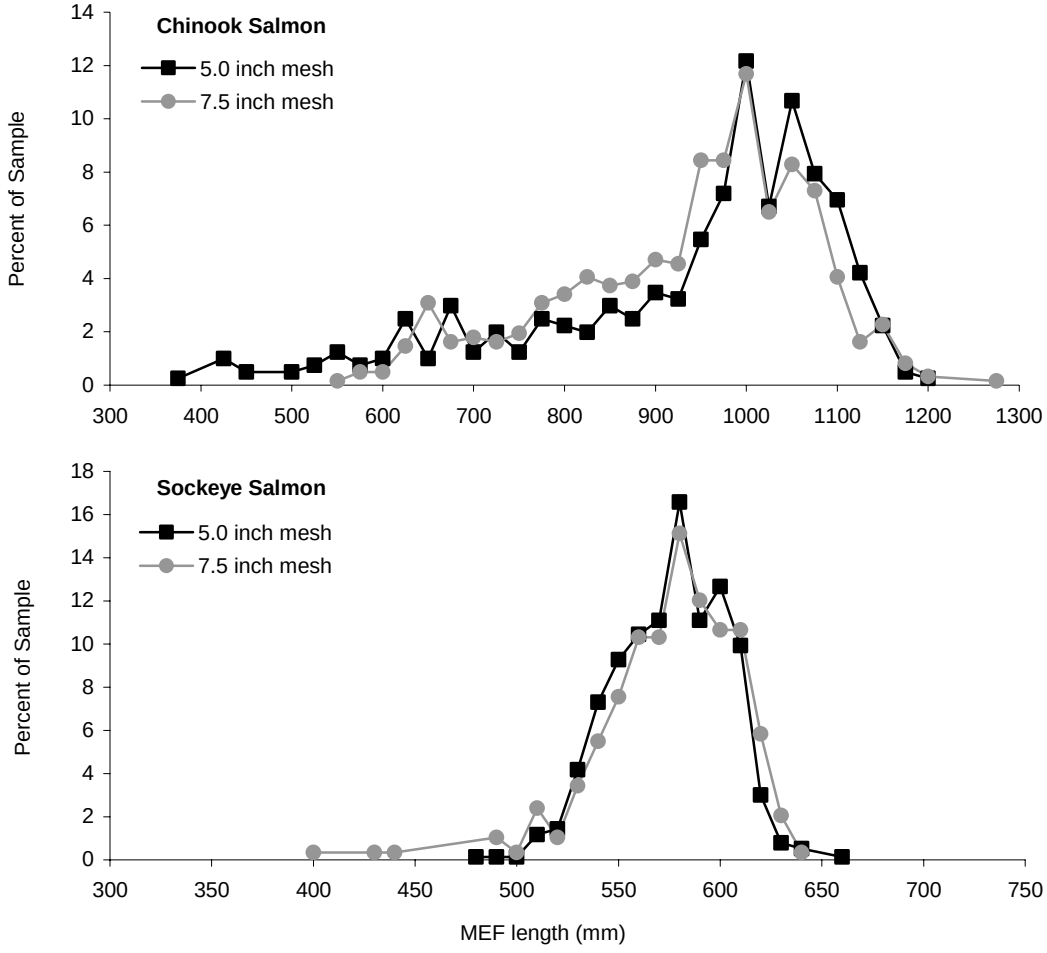


Figure 7.-Length distribution of Kenai River Chinook and sockeye salmon caught with 5.0 and 7.5 inch mesh gillnets, 2005.

The species composition of fish captured in the 5.0 and 7.5 inch mesh gillnets was different in both the early run (χ^2 = 233.5, df = 1, P < 0.0001) and the late run (χ^2 = 268.7, df = 1, P < 0.0001). The 5.0 inch mesh captured more sockeye salmon and fewer Chinook salmon (Appendices D1 and D4) than the 7.5 in mesh, which captured fewer sockeye salmon and more Chinook salmon (Appendices D2 and D5).

AGE, SEX, AND LENGTH

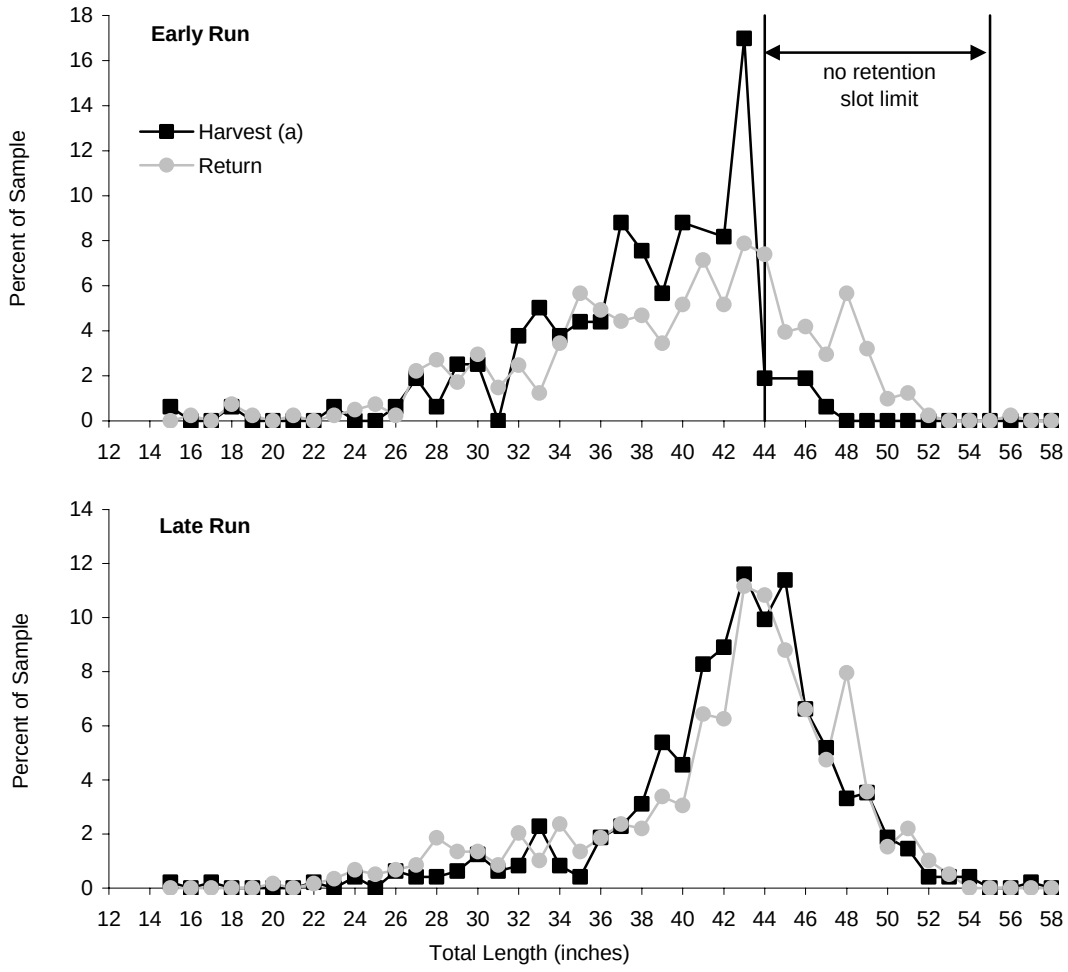
Creel Survey

The early-run harvest was comprised of 1.5% (SE = 1.0%) age-1.1 fish, 6.6% (SE = 2.1%) age-1.2 fish, 44.1% (SE = 4.3%) age-1.3 fish, and 47.8% (SE = 4.3%) age-1.4 fish (Table 3). A higher percentage of age-1.3 males (25.7%) than age-1.3 females (18.4%) were harvested and a lower percentage of age-1.4 males (11.0%) than age-1.4 females (36.8%) were harvested (Table 3). The 44-54.99 inch slot limit truncated the early-run harvest length composition at 44 inches TL, except for three fish that were illegally harvested (Figure 8).

Table 3.-Harvest estimates by age class of early-run Kenai River Chinook salmon in the sport fishery between the Soldotna Bridge and the Warren Ames Bridge, 2005.

	Age				
Parameter	1.1	1.2	1.3	1.4	Total
Early Run, 16 May-30 June					
Female					
Sample size		1	25	50	76
% sample		0.7%	18.4%	36.8%	55.9%
SE % sample		0.7%	3.3%	4.1%	4.3%
Total Harvest		21	529	1,058	1,607
SE Total Harvest		21	113	169	221
Male					
Sample size	2	8	35	15	60
% sample	1.5%	5.9%	25.7%	11.0%	44.1%
SE % sample	1.0%	2.0%	3.8%	2.7%	4.3%
Total Harvest	42	169	740	317	1,269
SE Total Harvest	30	61	137	85	190
Combined					
Sample size	2	9	60	65	136
% sample	1.5%	6.6%	44.1%	47.8%	100.0%
SE % sample	1.0%	2.1%	4.3%	4.3%	0.0%
Total Harvest	42	190	1,269	1,375	2,876
SE Total Harvest	30	65	190	199	329

The age composition of the late-run harvest differed (χ^2 = 9.02, df = 2, P = 0.01) between temporal strata (1–17 July, 18-31 July) with age-1.2, age-1.3, and age-1.4 fish considered (96.3% of the sample). Therefore, late-run age composition estimates were weighted by the harvest in each temporal stratum (Table 4 and Appendix F1). Age-1.4 fish were most abundant, comprising 76.1% (SE = 2.1%) of the total harvest, followed by age-1.3 fish at 18.3% (SE = 1.9%), and age-1.2 fish at 2.5% (SE = 0.7%). Relative precision goals for estimates of age proportions were met.



[a] Length distribution of the early run harvest is truncated at 44 inches TL due to the 44-55 inch slot limit. The non-zero values at 46 and 47 inches represent illegally harvested fish.

Figure 8.-Length distribution of early- and late-run Kenai River Chinook salmon sampled by the creel survey and the inriver netting project, 2005.

Inriver Gillnetting

During the early run, the age composition of the inriver return differed among temporal strata (χ^2 = 16.08, df = 2, P < 0.0003) with age-1.2, age-1.3 and age-1.4 fish considered (96% of the sample). Therefore, age composition estimates for Chinook salmon passing by the sonar site were weighted by the sonar passage estimates in each temporal stratum (Table 5 and Appendix F2). Age-1.4 fish were most abundant, comprising 52.8% (SE = 2.9%) of the total return, followed by age-1.3 fish at 30.2% (SE = 2.7%) and age-1.2 fish at 12.4% (SE = 2.0%). Relative precision goals were met.

Table 4.-Harvest estimates, by age class and location, of late-run Kenai River Chinook salmon in the sport fishery between the Soldotna Bridge and the Warren Ames Bridge, 2005.

	Age					
Parameter	1.1	1.2	1.3	1.4	1.5	Total
Late Run, 1 July-31 July						
Female						
Sample size			26	195	3	224
Downstream Harvest			139	1,047	14	1,199
SE Downstream Harvest			29	111	8	123
Upstream Harvest			790	5,959	79	6,828
SE Upstream Harvest			166	617	46	682
Total Harvest			928	7,006	93	8,027
SE Total Harvest			191	655	54	718
% Total Harvest			6.1%	45.8%	0.6%	52.4%
SE % Total Harvest			1.2%	2.4%	0.3%	2.4%
Male						
Sample size	2	12	54	128	9	205
Downstream Harvest	9	58	279	695	47	1,088
SE Downstream Harvest	6	18	44	82	16	114
Upstream Harvest	53	332	1,592	3,952	269	6,198
SE Upstream Harvest	37	99	242	465	92	623
Total Harvest	62	390	1,870	4,647	317	7,286
SE Total Harvest	44	115	275	503	108	661
% Total Harvest	0.4%	2.5%	12.2%	30.3%	2.1%	47.6%
SE % Total Harvest	0.3%	0.7%	1.6%	2.3%	0.7%	2.4%
Combined						
Sample size	2	12	80	323	12	429
Downstream Harvest	9	58	417	1,742	61	2,287
SE Downstream Harvest	6	18	57	167	18	210
Upstream Harvest	53	332	2,381	9,911	348	13,026
SE Upstream Harvest	37	99	314	932	103	1,142
Total Harvest	62	390	2,799	11,653	409	15,313
SE Total Harvest	44	115	350	960	121	1,161
% Total Harvest	0.4%	2.5%	18.3%	76.1%	2.7%	100.0%
SE % Total Harvest	0.3%	0.7%	1.9%	2.1%	0.8%	0.0%

Note: Downstream is between the Warren Ames Bridge and the Chinook salmon sonar site.

Upstream is between the Chinook salmon sonar site and the Soldotna Bridge. Total harvest is between the Soldotna Bridge and the Warren Ames Bridge.

Angler harvest estimates by date, age class, and location of late-run Kenai River Chinook salmon between the Soldotna Bridge and the Warren Ames Bridge, 2005, are presented in Appendix F1.

Table 5.-Sonar passage estimates by age class of early-run Kenai River Chinook salmon, 2005.

	Age					
Parameter	1.1	1.2	1.3	1.4	1.5	Total
Early Run, 16 May- 30 June						
Female						
Sample size		2	44	122	5	173
Sonar passage estimate		103	2,531	6,765	336	9,734
SE sonar passage estimate		76	356	516	137	556
% sonar passage		0.5%	12.4%	33.1%	1.6%	47.6%
SE % sonar passage		0.4%	1.7%	2.5%	0.7%	2.6%
Male						
Sample size	3	36	57	86	7	189
Sonar passage estimate	233	2,429	3,642	4,025	387	10,716
SE sonar passage estimate	114	350	415	432	147	559
% sonar passage	1.1%	11.9%	17.8%	19.7%	1.9%	52.4%
SE % sonar passage	0.6%	1.7%	2.0%	2.1%	0.7%	2.6%
Combined						
Sample size	3	38	101	208	12	362
Sonar passage estimate	233	2,532	6,173	10,789	723	20,450
SE sonar passage estimate	134	403	555	607	222	295
% sonar passage	1.1%	12.4%	30.2%	52.8%	3.5%	100.0%
SE % sonar passage	0.7%	2.0%	2.7%	2.9%	1.1%	0.0%

Note: Temporally stratified harvest estimates, by age class, for the early-run Kenai River Chinook salmon sport fishery between the Soldotna Bridge and the Warren Ames Bridge, 2005, are presented in Appendix F2.

During the late run, the age composition of the inriver return differed among temporal strata ($\chi^2 = 14.61$, df = 2, $P < 0.0007$) with age-1.2, age-1.3 and age-1.4 fish considered (96% of the sample). Therefore, age composition estimates for Chinook salmon passing by the sonar site were weighted by the sonar passage estimates in each temporal stratum (Table 6 and Appendix F3). Age-1.4 fish were most abundant, comprising 70.5% (SE = 2.0%) of the total return, followed by age-1.3 fish at 18.5% (SE = 1.7%) and age-1.2 fish at 6.9% (SE = 1.2%). Relative precision goals were met.

Age composition by mesh size differed for the late run ($\chi^2 = 10.51$, df = 2, $P = 0.005$), but not for the early run ($\chi^2 = 13.95$, df = 2, $P = 0.936$). Overall, when not stratified by run, age composition by mesh size did not differ ($\chi^2 = 3.975$, df = 2, $P = 0.137$). Age composition estimates derived from 7.5 inch mesh (Appendices G1 and G2) were similar to the age composition estimates derived from the 5.0 and 7.5 inch mesh combined. These estimates are compiled for historical comparison to years (before 2002) when only 7.5 inch mesh gillnets were used to estimate the age composition of the inriver return.

The age composition of the early-run harvest and the early-run drift gillnet catch differed ($\chi^2 = 13.43$, df = 2, $P = 0.001$) with age-1.2, age-1.3, and age-1.4 fish considered (97% of the sample). Anglers harvested a larger percentage of the age-1.3 fish and a smaller percentage of the age-1.2 and age-1.4 fish than were captured by inriver gillnets during the early run (Tables 3 and 5, Figure 9). The age composition of the late-run harvest and the late-run gillnet catch also differed

Table 6.-Sonar passage estimates by age class of late-run Kenai River Chinook salmon, 2005.

Parameter	1.2	1.3	1.4	1.5	Total
	Late Run, 1 July-10 August				
Female					
Sample size	4	22	208	7	241
Sonar passage estimate	349	1,772	17,159	583	19,863
SE sonar passage estimate	126	313	1,045	172	1,112
% sonar passage	0.8%	4.1%	39.7%	1.3%	45.9%
SE % sonar passage	0.5%	1.0%	2.4%	0.6%	2.2%
Male					
Sample size	29	73	161	15	278
Sonar passage estimate	2,631	6,222	13,312	1,213	23,377
SE sonar passage estimate	471	696	990	316	1,173
% sonar passage	6.1%	14.4%	30.8%	2.8%	54.1%
SE % sonar passage	1.1%	1.6%	2.0%	0.7%	2.2%
Combined					
Sample size	33	95	369	22	519
Sonar passage estimate	2,980	7,994	30,470	1,795	43,240
SE sonar passage estimate	499	782	1,358	385	1,370
% sonar passage	6.9%	18.5%	70.5%	4.2%	100.0%
SE % sonar passage	1.2%	1.7%	2.0%	0.9%	0.0%

Note: Temporally stratified sonar passage estimates by age class for late-run Kenai River Chinook salmon, 2005, are presented in Appendix F3.

(χ^2 = 6.73, df = 2, P = 0.035) with age-1.2, age-1.3, and age-1.4 fish considered (96% of the sample). Anglers harvested a smaller percentage of age-1.2 fish, a similar percentage of age-1.3 fish, and a larger percentage of age-1.4 fish than were captured by inriver gillnets during the late run (Tables 4 and 6).

LENGTH AT AGE COMPARISONS

MEF lengths are compiled by age and sex for the early run (Table 7) and the late run (Table 8). A comparison of mean length-at-age across years is shown in Figure 10. The most notable difference is early-run age-1.4 fish sampled in the creel survey and early-run age-1.4 fish sampled from inriver gillnets. Before 2002, mean length-at-age for early-run fish was similar for age-1.4 fish sampled in the creel survey compared to age-1.4 fish sampled from inriver gillnets (F = 0.19 df = 1, P = 0.67). Since 2002, mean length-at-age for age-1.4 fish sampled in the creel survey has been smaller than fish sampled in the inriver gillnets (F = 161.04, df = 1, P = 0.001). In 2005, the shorter length of age-1.4 fish in the early-run harvest is most notable among males (Figure 11). Age-1.4 females (953 mm MEF, SE = 7) averaged 20 mm longer than age-1.4 males (933 mm MEF, SE = 19) in the creel survey, whereas age-1.4 males (1,030 mm MEF, SE = 8) averaged 56 mm longer than age-1.4 females (975 mm MEF, SE = 5) sampled from inriver gillnets (Table 7).

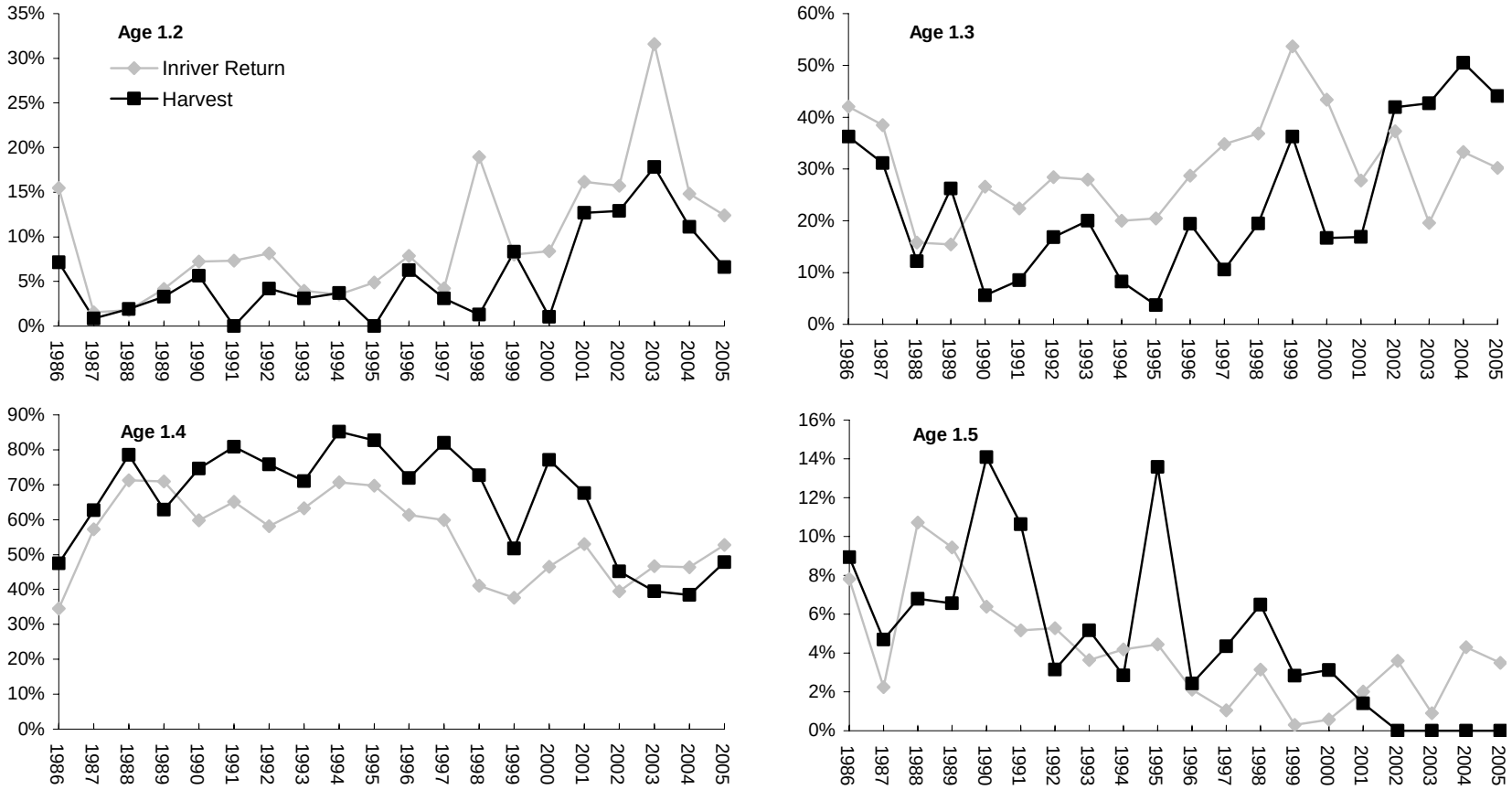


Figure 9.-Age composition of early-run Chinook salmon harvest versus inriver return, 1986-2005.

Table 7.-MEF lengths of early-run Kenai River Chinook salmon sampled from the sport fishery and inriver gillnetting, 2005.

	Age					
Parameter	1.1	1.2	1.3	1.4	1.5	Combined
			Creel Survey			
Females						
Sample size		1	27	48		76
Mean length		735	844	953		911
SE length			13	7		9
Min length		735	725	825		725
Max length		735	990	1,040		1,040
Males						
Sample size	2	8	35	14		59
Mean length	383	632	810	933		800
SE length	33	10	12	19		18
Min length	350	575	665	820		350
Max length	415	660	925	1,040		1,040
Combined						
Sample size	2	9	62	62		135
Mean length	383	643	825	948		863
SE length	33	15	9	7		10
Min length	350	575	665	820		350
Max length	415	735	990	1,040		1,040
			Inriver Gillnetting Survey			
Females						
Sample size		2	44	122	5	173
Mean length		650	826	975	1,069	936
SE length		40	6	5	20	7
Min length		610	745	825	1,040	610
Max length		690	930	1,140	1,150	1,150
Males						
Sample size	3	36	57	86	7	189
Mean length	425	644	786	1,030	1,129	877
SE length	5	7	9	8	25	13
Min length	415	550	625	840	1,080	415
Max length	430	710	940	1,180	1,265	1,265
Combined						
Sample size	3	38	101	208	12	362
Mean length	425	644	803	998	1,104	905
SE length	5	6	6	5	18	8
Min length	415	550	625	825	1,040	415
Max length	430	710	940	1,180	1,265	1,265

Table 8.-MEF lengths of late-run Kenai River Chinook salmon sampled from the sport fishery and inriver gillnetting, 2005.

	Age					
Parameter	1.1	1.2	1.3	1.4	1.5	Combined
			Creel Survey			
Females						
Sample size			26	194	4	224
Mean length			890	987	1,070	977
SE length			11	3	15	4
Min length			765	855	1,040	765
Max length			1,020	1,105	1,100	1,105
Males						
Sample size	2	12	54	127	10	205
Mean length	370	637	825	1,035	1,124	954
SE length	20	10	11	6	24	11
Min length	350	590	665	805	1,015	350
Max length	390	695	965	1,180	1,285	1,285
Combined						
Sample size	2	12	80	321	14	429
Mean length	370	637	846	1,006	1,109	966
SE length	20	10	9	3	19	6
Min length	350	590	665	805	1,015	350
Max length	390	695	1,020	1,180	1,285	1,285
			Inriver Gillnetting Survey			
Females						
Sample size		4	22	208	7	241
Mean length		635	895	1,001	1,082	987
SE length		36	11	4	13	5
Min length		555	805	860	1,025	555
Max length		700	990	1,150	1,125	1,150
Males						
Sample size		29	73	161	15	278
Mean length		625	803	1,046	1,111	942
SE length		9	10	5	11	10
Min length		505	640	865	1,045	505
Max length		735	980	1,200	1,170	1,200
Combined						
Sample size		33	95	369	22	519
Mean length		627	825	1,021	1,102	963
SE length		9	9	3	9	6
Min length		505	640	860	1,025	505
Max length		735	990	1,200	1,170	1,200

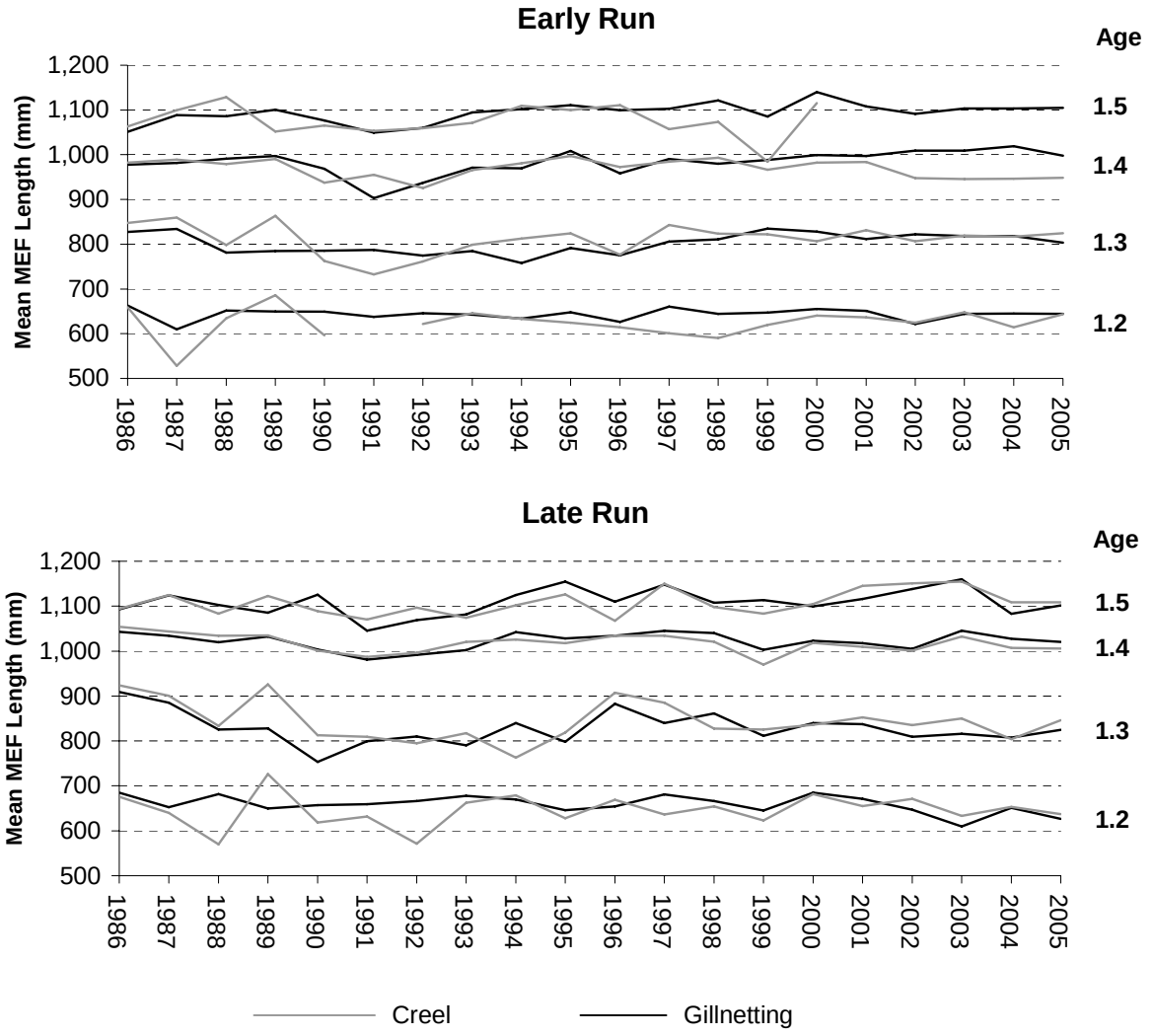


Figure 10.-Mean MEF length-at-age for early- and late-run Kenai River Chinook salmon sampled in the creel survey and inriver gillnetting project, 1986-2005.

OTHER RESULTS

Kenai River Secchi disk measurements of water clarity were average for the early run and above average for most of the late run, while discharge was above average for the early run and average for most of the late run (Figure 12). There were 677 Chinook salmon examined in the sport harvest for the presence of the adipose fin during the creel survey, and none were missing the adipose fin. There were 1,430 Chinook salmon examined for the presence of an adipose fin during drift gillnetting, and two were missing the adipose fin. Heads were collected and sent to the ADF&G Coded Wire Tab Laboratory in Juneau and neither was found to have a coded wire tag. In addition, ADF&G staff sealed 9 fish brought in to the Soldotna office under the greater than 55 inches TL sealing requirement, 1 in the early run and 8 in the late run. Finally, tissue samples (finclips) were taken from 535 Chinook salmon in 2005 for future genetic analysis.

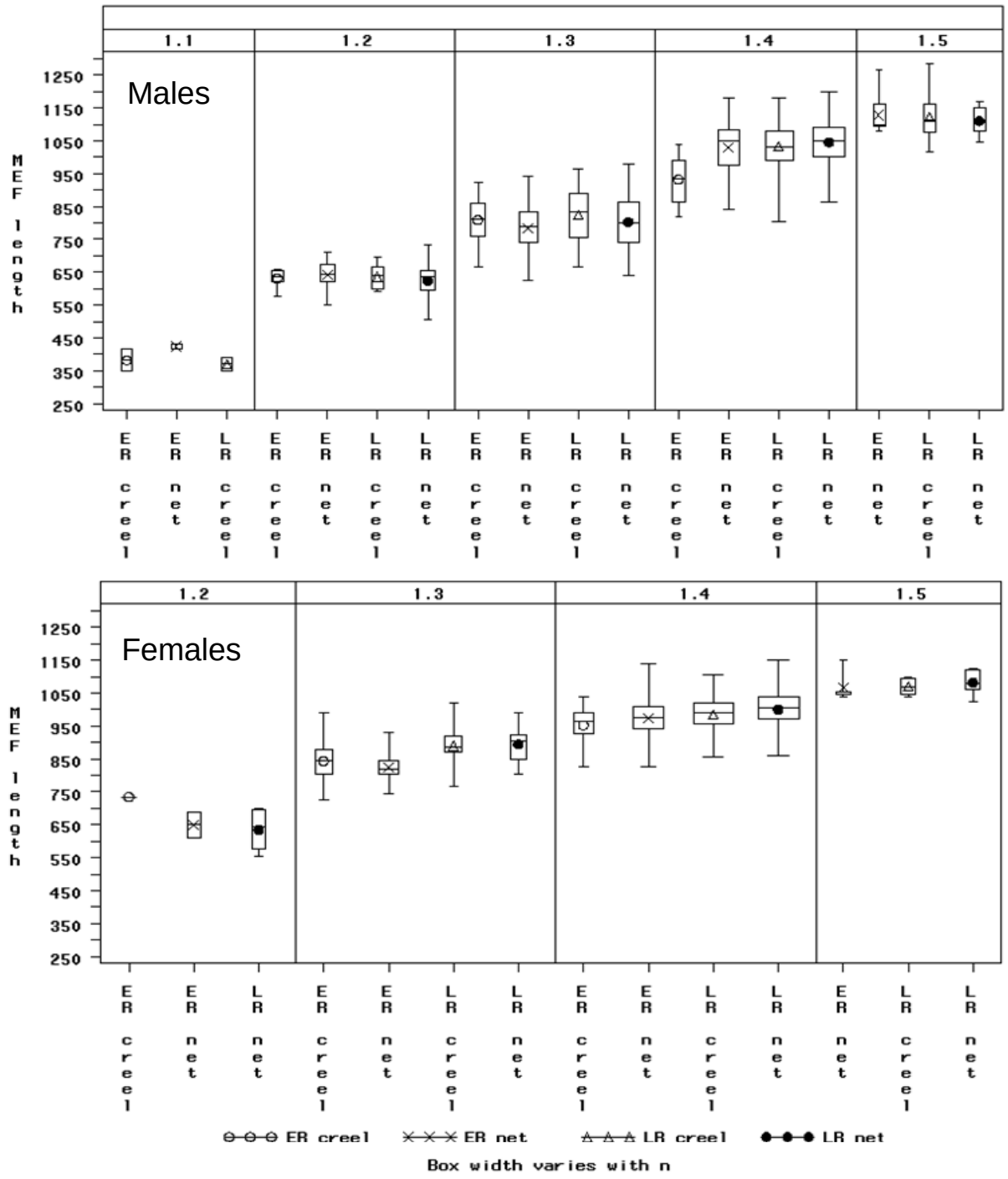
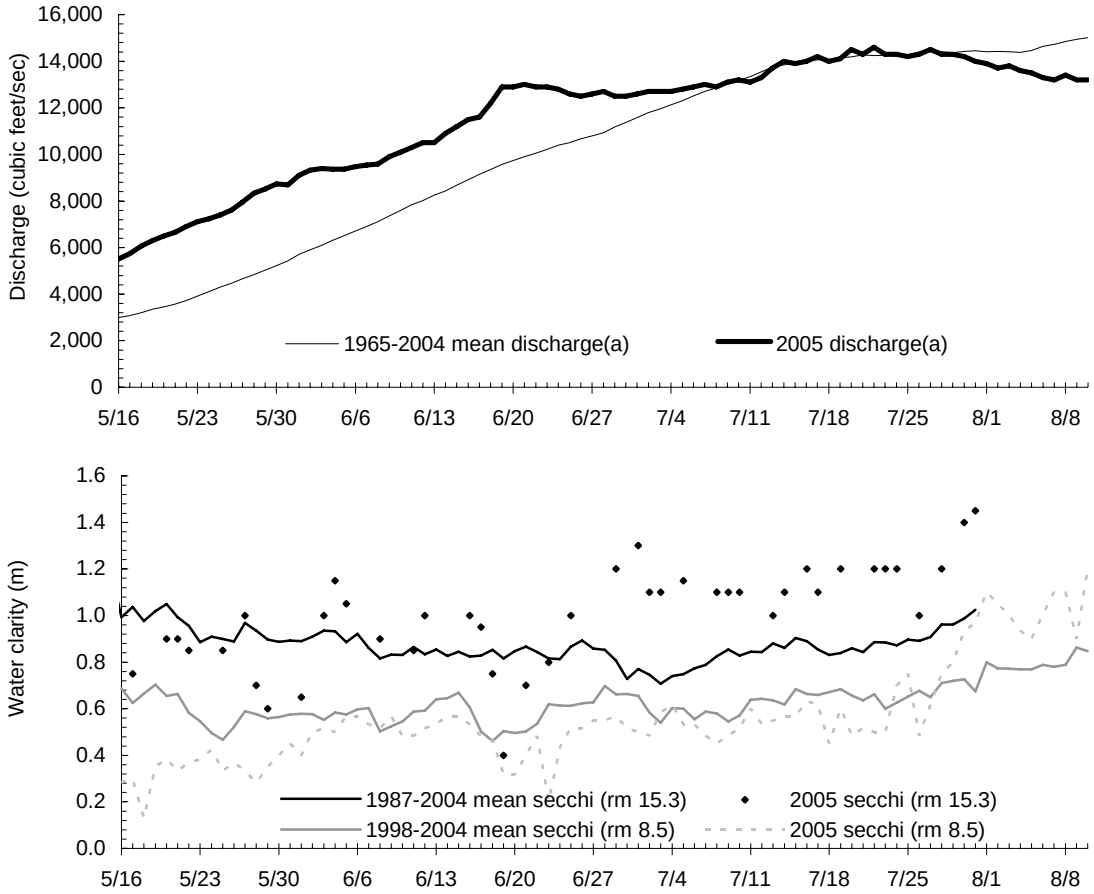


Figure 11.-Length distribution by age of early- and late-run Kenai River Chinook salmon sampled by the creel survey and the inriver gillnetting project, 2005.



(a) discharge data downloaded from USGS 15266300 KENAI RIVER AT SOLDOTNA AK. 2005-10-25 17:23:24 EDT http://waterdata.usgs.gov/ak/nwis/discharge?

Figure 12.-Kenai River discharge and water clarity, 16 May-10 August 2005.

DISCUSSION AND RECOMMENDATIONS

CREEL SURVEY

The 44-54.99 inch slot limit has been effective at protecting 5-ocean-age Chinook salmon during the early-run fishery as there has not been any sampled in the creel survey or brought in to be sealed since its inception in 2003. The slot limit has also reversed anglers' tendency to selectively harvest 4-ocean-age Chinook salmon because larger 4-ocean-age fish are also protected. Among 4-ocean-age fish in 2005, females were harvested at a higher rate than males and accounted for most of the smaller average size of 4-ocean-age fish in the creel survey because 4-ocean-age males were on average larger than 4-ocean-age females, hence more males were protected under the slot limit than were females. Also, 3-ocean-age fish have been selectively harvested in the early run since 2003, due in part to the imposed slot limit.

Low early-run angler effort has challenged the creel survey, which has had difficulty collecting enough samples to meet project objectives in recent years. The slot limit has reduced angler effort and harvest. However, the early-run fishery was liberalized on 18 June 2005 by emergency order to allow the use of bait. This increased both effort and harvest and early-run

project objectives were met for the first time since 2002. Effort and harvest in the early run were similar to the 10-year average (1995-2004). Harvest in the late run was the second highest on record, whereas late-run effort was comparable to historical averages. Anglers in the late-run have become increasingly efficient. In 2005, late-run HPUE was the second highest documented and HPUE in the late run for the years 2001-2005 are the five highest on record. Effort has been relatively stable for the late run, whereas harvest has shown an upward trend.

Unguided anglers have been allowed to fish from drift boats on Mondays in the late run since 1999 and on Mondays during both the early and late runs since 2003. Mondays have never been sampled during the early run and have not been included in the late-run regular creel sampling since 2001, replaced instead by the angler index count. Consequently, 2002-2005 estimates of angler effort, harvest, and catch have not included Mondays, introducing a small (<4%) negative bias. Effort during Mondays in the late run increased from 1999 through 2003, but appears to have stabilized.

INRIVER GILLNETTING

The inriver gillnetting program has undergone major changes since 1998. Changes include: (1) standardizing the netting area directly downstream of the Kenai Chinook salmon sonar site in 1998, (2) adding CPUE and species composition estimates to the project objectives in 2002, (3) alternating gillnets with differing mesh sizes (5.0 and 7.5 inch) rather than using only 7.5 inch mesh gillnets in 2002, (4) changing the mesh material used from traditional cable-lay nylon mesh to a more transparent multifiber mesh material in 2002, and (5) subsampling the Chinook salmon inriver gillnet catch for age, sex, and length in the late run rather than sampling every Chinook salmon captured in 2005.

The use of multifiber mesh gillnets since 2002 has dramatically increased the sampling efficiency of the inriver gillnetting program (Reimer 2004b). As a result, more fish were captured per drift and consequently handling times increased. Before 2005, during the late run there were an increasing number of complaints from anglers as the gillnetting crew drifted through a crowded section of the river as they worked to untangle and sample fish. To reduce angler conflicts with the gillnetting program, subsampling of Chinook salmon was instituted in the late run. After 30 June, every other Chinook salmon captured per drift was sampled. Subsampling helped considerably in 2005, handling times were reduced and there were noticeably fewer complaints from the public with regard to the netting program as compared to past years. Even with this level of subsampling, all late-run precision objectives for age and sex compositions were met for inriver gillnetting. It is recommended that this level of subsampling continue in the late run unless it is projected inseason that late-run precision objectives for age and sex compositions will not be met.

ACKNOWLEDGEMENTS

Thanks are due to those individuals involved with the success of this project. Area research supervisor Tim McKinley oversaw the project. Robert Begich and Adam Reimer provided valuable guidance and insight. Thanks also go to my field crews who did an excellent job in collecting most of the data used in this report. The creel survey crew was Ivan Karic and Stacie Mallette and the netting crew was Amy Breakfield, Matt King, and Nate Lockwood. Jerry Strait aged the scales for all creel and netting samples. Steve Fleischman provided valuable biometric assistance.

REFERENCES CITED

Bernard, D. R., A. E. Bingham, and M. Alexandersdottir. 1998a. The mechanics of onsite creel surveys in Alaska. Alaska Department of Fish and Game, Special Publication No. 98-1, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/sp98-01.pdf

Bernard, D. R., A. E. Bingham, and M. Alexandersdottir. 1998b. Robust harvest estimates from on-site roving access creel surveys. Transactions of the American Fisheries Society 127:481-495.

Clutter, R., and L. Whitesel. 1956. Collection and interpretation of sockeye salmon scales. International Pacific Salmon Commission, Bulletin 9. Westminster, British Columbia, Canada.

Cochran, W. G. 1977. Sampling techniques, *third edition.* John Wiley and Sons, New York.

Conrad, R. H., and S. L. Hammarstrom. 1987. Harvest of Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*O. kisutch*) and angler-effort by the lower Kenai River recreational fisheries, 1986. Alaska Department of Fish and Game, Fishery Data Series No. 6, Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds-006.pdf

Efron, B. 1982. The jackknife, the bootstrap and other resampling plans. Society of Industrial and Applied Mathematics, Philadelphia CBMS-NSF Monograph 38, Philadelphia.

Fleischman, S. J., and D. L. Burwen. 2003. Mixture models for the species apportionment of hydroacoustic data, with echo-envelope length as the discriminatory variable. ICES Journal of Marine Science 60:592-598.

Goodman, L. A. 1960. On the exact variance of products. Journal of the American Statistical Association 55:708-713.

Hammarstrom, S. L. 1975. Inventory and cataloging of Kenai Peninsula, Cook Inlet, Prince William Sound, and fish stocks. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1974-1975, Project F-9-7, 16 (G-I-C), Juneau.

Hammarstrom, S. L. 1976. Inventory and cataloging of Kenai Peninsula, and Cook Inlet drainages and fish stocks. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1975-1976, Project F-9-8, 17 (G-I-C), Juneau.

Hammarstrom, S. L. 1977. Evaluation of Chinook salmon fisheries of the Kenai Peninsula. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1976-1977, Project F-9-9, 18 (G-II-L), Juneau.

Hammarstrom, S. L. 1978. Evaluation of Chinook salmon fisheries of the Kenai Peninsula. Federal Aid in Fish Restoration, Annual Report of Performance, 1977-1978, Project F-9-10, Volume 19 (G-II-L), Juneau, Alaska, USA, Juneau.

Hammarstrom, S. L. 1979. Evaluation of Chinook salmon fisheries of the Kenai Peninsula. Federal Aid in Fish Restoration, Annual Report of Performance, 1978-1979, Project F-9-11, Volume 20 (G-II-L), Juneau, Alaska, USA, Juneau. http://www.sf.adfg.state.ak.us/fedaidpdfs/FREDf-9-11(20)g-ii-l.pdf

Hammarstrom, S. L. 1980. Evaluation of Chinook salmon fisheries of the Kenai Peninsula. Alaska Department of Fish and Game, Sport Fish Division. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-12(21)G-II-L, Juneau. http://www.sf.adfg.state.ak.us/FedAidpdfs/FREDf-9-12(21)G-II-L.pdf

Hammarstrom, S. L. 1981. Evaluation of Chinook salmon fisheries of the Kenai Peninsula. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (G-II-L), Juneau.

Hammarstrom, S. L. 1988. Angler effort and harvest of Chinook salmon *Oncorhynchus tshawytscha* and coho salmon *O. kisutch* by the recreational fisheries in the lower Kenai River, 1987. Alaska Department of Fish and Game, Fishery Data Series No. 50, Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds-050.pdf

REFERENCES CITED (Continued)

Hammarstrom, S. L. 1989. Angler-effort and harvest of Chinook salmon and coho salmon by the recreational fisheries in the lower Kenai River, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 100, Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds-100.pdf

Hammarstrom, S. L. 1990. Angler-effort and harvest of Chinook salmon and coho salmon by the recreational fisheries in the lower Kenai River, 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-22, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds90-22.pdf

Hammarstrom, S. L. 1991. Angler effort and harvest of Chinook salmon and coho salmon by the recreational fisheries in the lower Kenai River, 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-44, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds91-44.pdf

Hammarstrom, S. L. 1992. Angler effort and harvest of Chinook salmon by the recreational fisheries in the Lower Kenai River, 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-25, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds92-25.pdf

Hammarstrom, S. L. 1993. Angler effort and harvest of Chinook salmon by the recreational fisheries in the lower Kenai River, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-40, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds93-40.pdf

Hammarstrom, S. L. 1994. Angler effort and harvest of Chinook salmon by the recreational fisheries in the lower Kenai River, 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-7, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds94-07.pdf

Hammarstrom, S. L., L. Larson, M. Wenger, and J. Carlon. 1985. Kenai Peninsula Chinook and coho salmon studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration. Annual Performance Report, 1984-1985, Project F-9-17, 26 (G-II-L), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/FREDf-9-17(26)G-II-L.pdf

Hammarstrom, S. L., and L. L. Larson. 1982. Evaluation of Chinook salmon fisheries of the Kenai Peninsula. Federal Aid in Fish Restoration, Annual Report of Performance, 1981-1982, Project F-9-14, Volume 23 (G-II-L), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/FREDf-9-14(23)G-II-L.pdf

Hammarstrom, S. L., and L. L. Larson. 1983. Evaluation of Chinook salmon fisheries of the Kenai Peninsula. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24 (G-II-L), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/FREDf-9-15(24)G-II-L.pdf

Hammarstrom, S. L., and L. L. Larson. 1984. Evaluation of Chinook salmon fisheries of the Kenai Peninsula. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, 25 (G-II-L), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/FREDf-9-16(25)G-II-L.pdf

Hammarstrom, S. L., and L. L. Larson. 1986. Kenai River creel census. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1985-1986, Project F-10-1, 27 (S-32-1), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/FREDf-10-1(27)S-32-1,2,4,5.pdf

King, M. A. 1995. Angler effort and harvest of Chinook salmon by the recreational fisheries in the lower Kenai River, 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-12, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds95-12.pdf

King, M. A. 1996. Angler effort and harvest of Chinook salmon by the recreational fisheries in the lower Kenai River, 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-22, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds96-22.pdf

King, M. A. 1997. Angler effort and harvest of Chinook salmon by the recreational fisheries in the lower Kenai River, 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-9, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds97-09.pdf

REFERENCES CITED (Continued)

Larson, L. 1995. A portable restraint cradle for handling large salmonids. North American Journal of Fisheries Management 15:654-656.

Marsh, L. E. 1999. Angler effort and harvest of Chinook salmon by the recreational fisheries in the lower Kenai River, 1997. Alaska Department of Fish and Game, Fishery Data Series No. 99-4, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds99-04.pdf

Marsh, L. E. 2000. Angler effort and harvest of Chinook salmon by the recreational fisheries in the lower Kenai River, 1998. Alaska Department of Fish and Game, Fishery Data Series No. 00-21, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds00-21.pdf

McBride, D. N., R. D. Harding, B. A. Cross, and R. H. Conrad. 1985. Origins of Chinook salmon, *Oncorhynchus tshawytscha* (Walbaum), in the commercial catches from the central district eastside set gill net fishery in Upper Cook Inlet, 1984. Alaska Department of Fish and Game, Commercial Fisheries Division, Informational Leaflet No. 251, Juneau.

Miller, J. D., D. L. Burwen, and S. J. Fleischman. 2004. Estimates of Chinook salmon abundance in the Kenai River using split-beam sonar, 2002. Alaska Department of Fish and Game, Fishery Data Series No. 04-29, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds04-29.pdf

Reimer, A. 2003. Chinook salmon creel survey and inriver gillnetting study, lower Kenai River, Alaska, 2001. Alaska Department of Fish and Game, Fishery Data Series No. 03-01, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds03-01.pdf

Reimer, A. 2004a. Chinook salmon creel survey and inriver gillnetting study, lower Kenai River, Alaska, 2002. Alaska Department of Fish and Game, Fishery Data Series No. 04-28, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds04-28.pdf

Reimer, A. 2004b. Chinook salmon creel survey and inriver gillnetting study, lower Kenai River, Alaska, 2003. Alaska Department of Fish and Game, Fishery Data Series No. 04-32, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds04-32.pdf

Reimer, A. M., W. W. Jones, and L. E. Marsh. 2002. Chinook salmon creel survey and inriver gillnetting study, lower Kenai River, Alaska, 1999 and 2000. Alaska Department of Fish and Game, Fishery Data Series No. 02-25, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds02-25.pdf

Thompson, S. K. 1987. Sample size for estimating multinomial proportions. The American Statistician 41(1):42-46.

Welander, A. D. 1940. A study of the development of the scale of Chinook salmon *Oncorhynchus tshawytscha*. Masters Thesis. University of Washington, Seattle.

APPENDIX A. BOAT AND ANGLER COUNTS DURING THE KENAI RIVER CHINOOK SALMON FISHERY, 2005

Appendix A1.–Guided and unguided boat angler counts by location during the early-run Kenai River Chinook salmon fishery, 2005.

		Downstream[a]								Upstream[a]								Combined Strata							
		Unguided Anglers				Guided Anglers				Unguided Anglers				Guided Anglers				Unguided Anglers				Guided Anglers			
Date	Day Type[b]	A[c]	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
5/17/2005	wd	0	0	0	0	0	0	0		21	8	5	3	29	30	5		21	8	5	3	29	30	5	
5/20/2005	wd	0	0	0	0	0	0	0		2	8	13	6	27	10	11		2	8	13	6	27	10	11	
5/21/2005	we/hol	0	0	0	2	0	0			14	12	15	3	72	32			14	12	15	5	72	32		
5/22/2005	we/hol	0	0	0	0					27	25	12	11					27	25	12	11				
5/25/2005	wd	0	0	0	0	0	0	0		21	10	7	10	66	39	27		21	10	7	10	66	39	27	
5/27/2005	wd	0	0	0	0	0	0	0		28	29	10	21	102	118	17		28	29	10	21	102	118	17	
5/28/2005	we/hol	0	0	5	3		0	6		10	48	31	60		68	41		10	48	36	63		68	47	
5/29/2005	we/hol	0	0	14	5					10	98	24	22					10	98	38	27				
6/1/2005	wd	0	0	0	0		0	0		3	22	21	15		82	35		3	22	21	15		82	35	
6/3/2005	wd	0	0	0	0	0	0			32	31	16	31	74	40			32	31	16	31	74	40		
6/4/2005	we/hol	0	0	0	8	0	0	0		58	61	52	44	121	63	61		58	61	52	52	121	63	61	
6/5/2005	we/hol	0	3	0	0					13	87	76	53					13	90	76	53				
6/8/2005	wd	0	0	0	0		0	0		8	30	42	55		162	107		8	30	42	55		162	107	
6/9/2005	wd	0	0	0	2	0	0	0		37	22	19	39	215	179	60		37	22	19	41	215	179	60	
6/11/2005	we/hol	0	4	0	0		4	0		25	97	93	64		179	66		25	101	93	64		183	66	
6/12/2005	we/hol	0	4	7	23					23	175	102	53					23	179	109	76				
6/16/2005	wd	0	0	0	0		8	0		9	45	42	36		231	112		9	45	42	36		239	112	
6/17/2005	wd	0	2	0	0	0	7	0		33	65	30	31	204	190	111		33	67	30	31	204	197	111	
6/18/2005[d]	we/hol	0	0	0	0	0	0	0		93	40	104	83	275	90	58		93	40	104	83	275	90	58	
6/19/2005	we/hol	0	3	0						132	159	97						132	162	97					
6/21/2005	wd	0	2	0	0	9	0			45	42	43	6	269	196			45	44	43	6	278	196		
6/23/2005	wd	0	4	3	0	0	71	7		52	28	34	54	276	153	76		52	32	37	54	276	224	83	
6/25/2005	we/hol	0	1	9	0	0	4	0		53	115	80	86	257	210	86		53	116	89	86	257	214	86	
6/26/2005	we/hol	2	6	0	0					167	156	88	45					169	162	88	45				
6/29/2005	wd	0	2		0		2	0		24	48	47	93		255	102		24	50		93		257	102	
	Minimum		0				0				2				5				2				5		
	Average		1				3				44				107				46				110		
	Maximum		23				71				175				276				179				278		

[a] Downstream = Warren Ames Bridge to the Chinook salmon sonar site, Upstream = Chinook salmon sonar site to the Soldotna Bridge.

[b] wd = weekday, we/hol = weekend/holiday.

[c] Angler count time frames: A = 0400-0859 hours, B = 0900-1359 hours, C = 1400-1959 hours, D = 2000-2359 hours.

[d] Fishery was liberalized to allow the use of bait, slot limit (44-54.99 inches TL) still in effect.

Appendix A2.–Guided and unguided boat angler counts by location during the late-run Kenai River Chinook salmon sport fishery, 2005.

		Downstream[a]								Upstream[a]								Combined Strata							
	Day	Unguided Anglers				Guided Anglers				Unguided Anglers				Guided Anglers				Unguided Anglers				Guided Anglers			
Date	Type[b]	A[c]	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
7/1/2005	wd	0	11	8	0	32	16			142	111	74	64	484	217			142	122	82	64	516	233		
7/2/2005	we/hol	28	8	7	0	86	33			118	194	125	46	223	249			146	202	132	46	309	282		
7/3/2005	we/hol	0	32	10	19					30	267	299	210					30	299	309	229				
7/5/2005	wd	2	9	11	8	4	79	15		271	87	76	152	510	217	185		273	96	87	160	514	296	200	
7/8/2005	wd	14	17	5	3	91	72			118	111	134	128	316	212			132	128	139	131	407	284		
7/9/2005	we/hol	0	45	34	7		104	109		203	294	136	320		317	77		203	339	170	327		421	186	
7/10/2005	we/hol	0	38	43	0					55	381	204	276					55	419	247	276				
7/13/2005	wd	13	24	15	14	72	78	34		178	178	106	291	480	390	172		191	202	121	305	552	468	206	
7/14/2005	wd	4	45	18	40		92	42		56	255	170	171		463	265		60	300	188	211		555	307	
7/16/2005	we/hol	36	45	15	42	92	80	65		414	223	231	185	554	194	231		450	268	246	227	646	274	296	
7/17/2005	we/hol	76	119	26	69					380	399	375	196					456	518	401	265				
7/19/2005	wd	6	58	12	24		105	33		339	357	122	257		430	296		345	415	134	281		535	329	
7/22/2005	wd	0	48	38	14		55	218		90	320	163	276		515	295		90	368	201	290		570	513	
7/23/2005	we/hol	8	30	14	12	19	67	11		409	150	180	203	533	201	263		417	180	194	215	552	268	274	
7/24/2005	we/hol	0	57	54	0					337	532	225	272					337	589	279	272				
7/26/2005	wd	12	30	13	2		54	75		232	370	131	171		470	310		244	400	144	173		524	385	
7/28/2005	wd	8	26	19	19		77	75		195	289	173	212		458	186		203	315	192	231		535	261	
7/30/2005	we/hol	45	60	33	98	90	126	84		286	142	174	207	548	117	105		331	202	207	305	638	243	189	
7/31/2005	we/hol	32	171	79	75					288	276	255	173					320	447	334	248				
	Minimum		0				4				30				77				30				186		
	Average		27				69				214				318				241				387		
	Maximum		171				218				532				554				589				646		

[a] Downstream = Warren Ames Bridge to the Chinook salmon sonar site, Upstream = Chinook salmon sonar site to the Soldotna Bridge.

[b] wd = weekday, we/hol = weekend/holiday.

[c] Angler count time frames: A = 0400-0859 hours, B = 0900-1359 hours, C = 1400-1959 hours, D = 2000-2359 hours.

APPENDIX B. EFFORT, CATCH, AND HARVEST ESTIMATES BY GEOGRAPHIC STRATA DURING THE KENAI RIVER CHINOOK SALMON FISHERY, 2005

Appendix B1.–Daily unguided boat angler CPUE, HPUE, angler effort, catch and harvest estimates by location during the early-run Kenai River Chinook salmon sport fishery, 2005.

		Angler interview data[a]					Downstream[b]								Upstream[b]							
	Day		Catch		Harvest		Counts		Effort		Catch		Harvest		Counts		Effort		Catch		Harvest	
Date	Type[c]	n[d]	CPUE	SE	HPUE	SE	n	mean	Est.	SE	Est.	SE	Est.	SE	n	mean	Est.	SE	Est.	SE	Est.	SE
5/17/2005	wd	10	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	9	185	55	0	0	0	0
5/20/2005	wd	8	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	7	145	43	0	0	0	0
5/21/2005	we/hol	15	0.090	0.041	0.021	0.023	4	1	10	8	1	1	0	0	4	11	220	51	20	10	5	5
5/22/2005	we/hol	12	0.053	0.032	0.053	0.032	4	0	0	0	0	0	0	0	4	19	375	54	20	12	20	12
5/25/2005	wd	10	0.026	0.024	0.026	0.024	4	0	0	0	0	0	0	0	4	12	240	48	6	6	6	6
5/27/2005	wd	18	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	22	440	90	0	0	0	0
5/28/2005	we/hol	35	0.000	0.000	0.000	0.000	4	2	40	22	0	0	0	0	4	37	745	207	0	0	0	0
5/29/2005	we/hol	20	0.000	0.000	0.000	0.000	4	5	95	68	0	0	0	0	4	39	770	469	0	0	0	0
6/1/2005	wd	4	0.059	0.127	0.037	0.117	4	0	0	0	0	0	0	0	4	15	305	81	18	39	11	36
6/3/2005	wd	32	0.048	0.020	0.032	0.016	4	0	0	0	0	0	0	0	4	28	550	87	26	12	17	9
6/4/2005	we/hol	30	0.068	0.024	0.019	0.014	4	2	40	33	3	2	1	1	4	54	1,075	51	73	26	21	15
6/5/2005	we/hol	73	0.066	0.012	0.030	0.010	4	1	15	17	1	1	0	1	4	57	1,145	320	76	25	34	15
6/8/2005	wd	38	0.039	0.015	0.033	0.015	4	0	0	0	0	0	0	0	4	34	675	115	27	11	22	11
6/9/2005	wd	27	0.043	0.022	0.022	0.016	4	1	10	8	0	0	0	0	4	29	585	103	25	13	13	9
6/11/2005	we/hol	66	0.020	0.009	0.012	0.007	4	1	20	23	0	0	0	0	4	70	1,395	317	27	14	16	10
6/12/2005	we/hol	69	0.013	0.008	0.009	0.006	4	9	170	68	2	2	2	1	4	88	1,765	717	24	17	16	13
6/16/2005	wd	39	0.031	0.016	0.031	0.016	4	0	0	0	0	0	0	0	4	33	660	149	21	12	21	12
6/17/2005	wd	22	0.011	0.011	0.000	0.000	4	1	10	12	0	0	0	0	4	40	795	194	9	9	0	0
6/18/2005[e]	we/hol	42	0.070	0.023	0.051	0.018	4	0	0	0	0	0	0	0	4	80	1,600	350	112	44	81	34
6/19/2005	we/hol	20	0.000	0.000	0.000	0.000	3	1	20	24	0	0	0	0	3	129	2,587	390	0	0	0	0
6/21/2005	wd	1	0.114	0.635	0.029	0.031	4	1	10	12	1	6	0	0	4	34	680	152	78	432	19	21
6/23/2005	wd	12	0.056	0.043	0.027	0.030	4	2	35	21	2	2	1	1	4	42	840	130	47	37	23	26
6/25/2005	we/hol	34	0.036	0.013	0.007	0.007	4	3	50	49	2	2	0	0	4	84	1,670	292	59	24	12	12
6/26/2005	we/hol	57	0.044	0.013	0.017	0.009	4	2	40	29	2	1	1	1	4	114	2,280	332	100	34	40	21
6/29/2005	wd	23	0.042	0.026	0.042	0.026	4	1	10	12	0	1	0	1	4	53	1,060	212	44	29	44	29
Min		1	0.000		0.000		3	0	0		0		0		3	7	145		0		0	
Mean		29	0.037		0.020		4	1	23		1		0		4	46	911		32		17	
Max		73	0.114		0.053		4	9	170		3		2		4	129	2,587		112		81	

[a] Angler counts are stratified by location, angler interviews are not.

[b] Downstream = Warren Ames Bridge to the Chinook salmon sonar site, Upstream = Chinook salmon sonar site to the Soldotna Bridge.

[c] wd = weekday, we/hol = weekend/holiday.

[d] On days with less than 5 angler interviews, pooled estimates of CPUE and HPUE from other days in the stratum were used.

[e] Fishery was liberalized to allow the use of bait, slot limit (44-54.99 inches TL) still in effect.

Appendix B2.–Daily guided boat angler CPUE, HPUE, angler effort, catch and harvest estimates by location during the early-run Kenai River Chinook salmon sport fishery, 2005.

		Angler interview data[a]					Downstream[b]								Upstream[b]							
	Day		Catch		Harvest		Counts		Effort		Catch		Harvest		Counts		Effort		Catch		Harvest	
Date	Type[c]	n[d]	CPUE	SE	HPUE	SE	n	mean	Est.	SE	Est.	SE	Est.	SE	n	mean	Est.	SE	Est.	SE	Est.	SE
5/17/2005	wd	4	0.051	0.092	0.040	0.049	3	0	0	0	0	0	0	0	3	21.3	256	87	13	24	10	13
5/20/2005	wd	0	0.051	0.092	0.040	0.049	3	0	0	0	0	0	0	0	3	16.0	192	59	10	18	8	10
5/21/2005	we/hol	14	0.046	0.030	0.046	0.030	2	0	0	0	0	0	0	0	2	52.0	624	240	28	22	28	22
5/22/2005	we/hol	4	0.051	0.092	0.040	0.049	3	0	0	0	0	0	0	0	3	0.0	0	0	0	0	0	0
5/25/2005	wd	2	0.041	0.159	0.025	0.080	3	0	0	0	0	0	0	0	3	44.0	528	102	22	84	13	42
5/27/2005	wd	7	0.018	0.018	0.000	0.000	3	0	0	0	0	0	0	0	3	79.0	948	354	17	18	0	0
5/28/2005	we/hol	12	0.035	0.025	0.035	0.025	2	3	36	36	1	2	1	2	2	54.5	654	162	23	17	23	17
6/1/2005	wd	29	0.103	0.028	0.051	0.019	2	0	0	0	0	0	0	0	2	58.5	702	282	72	35	36	20
6/3/2005	wd	14	0.136	0.052	0.103	0.052	2	0	0	0	0	0	0	0	2	57.0	684	204	93	45	70	42
6/4/2005	we/hol	11	0.071	0.032	0.035	0.025	3	0	0	0	0	0	0	0	3	81.7	980	201	69	34	34	25
6/8/2005	wd	28	0.090	0.020	0.042	0.016	2	0	0	0	0	0	0	0	2	134.5	1,614	330	145	44	67	30
6/9/2005	wd	36	0.057	0.019	0.028	0.012	3	0	0	0	0	0	0	0	3	151.3	1,816	431	103	43	51	24
6/11/2005	we/hol	24	0.076	0.023	0.050	0.019	2	2	24	24	2	2	1	1	2	122.5	1,470	678	111	62	74	44
6/16/2005	wd	27	0.088	0.026	0.088	0.026	2	4	48	48	4	4	4	4	2	171.5	2,058	714	181	83	181	83
6/17/2005	wd	19	0.032	0.016	0.024	0.014	3	2	28	34	1	1	1	1	3	168.3	2,020	278	65	34	48	30
6/18/2005[e]	we/hol	38	0.115	0.022	0.079	0.019	3	0	0	0	0	0	0	0	3	141.0	1,692	650	194	83	134	61
6/21/2005	wd	62	0.081	0.013	0.044	0.010	2	5	54	54	4	4	2	2	2	232.5	2,790	438	227	52	123	34
6/23/2005	wd	43	0.062	0.016	0.050	0.016	3	26	312	331	19	21	15	17	3	168.3	2,020	503	126	45	100	40
6/25/2005	we/hol	40	0.042	0.014	0.038	0.013	3	1	16	20	1	1	1	1	3	184.3	2,212	459	93	36	83	34
6/29/2005	wd	26	0.078	0.023	0.056	0.022	2	1	12	12	1	1	1	1	2	178.5	2,142	918	166	87	119	70
Min		0	0.018		0.000		2	0.0	0		0		0		2	0.0	0		0		0	
Mean		21	0.067		0.046		3	2.3	28		2		1		3	97.4	1,169		83		56	
Max		62	0.136		0.103		3	26.0	312		19		15		3	232.5	2,790		227		181	

[a] Angler counts are stratified by location, angler interviews are not.

[b] Downstream = Warren Ames Bridge to the Chinook salmon sonar site, Upstream = Chinook salmon sonar site to the Soldotna Bridge.

[c] wd = weekday, we/hol = weekend/holiday.

[d] On days with less than 5 angler interviews, pooled estimates of CPUE and HPUE from other days in the stratum were used.

[e] Fishery was liberalized to allow the use of bait, slot limit (44-54.99 inches TL) still in effect.

Appendix B3.–Daily unguided boat angler CPUE, HPUE, angler effort, catch and harvest estimates by location during the late-run Kenai River Chinook salmon sport fishery, 2005.

		Angler interview data[a]					Downstream[b]								Upstream[b]							
	Day		Catch		Harvest		Counts		Effort		Catch		Harvest		Counts		Effort		Catch		Harvest	
Date	Type[c]	n	CPUE	SE	HPUE	SE	n	mean	Est.	SE	Est.	SE	Est.	SE	n	mean	Est.	SE	Est.	SE	Est.	SE
7/1/2005	wd	56	0.038	0.010	0.019	0.008	4	4.8	95	57	4	2	2	1	4	97.8	1,955	201	75	22	37	16
7/2/2005	we/hol	42	0.045	0.016	0.033	0.014	4	10.8	215	87	10	5	7	4	4	120.8	2,415	529	108	44	81	38
7/3/2005	we/hol	93	0.095	0.018	0.049	0.012	4	15.3	305	163	29	16	15	9	4	201.5	4,030	1,042	384	122	197	70
7/5/2005	wd	54	0.118	0.029	0.052	0.016	4	7.5	150	32	18	6	8	3	4	146.5	2,930	814	346	128	151	62
7/8/2005	wd	59	0.050	0.018	0.020	0.008	4	9.8	195	51	10	4	4	2	4	122.8	2,455	101	122	44	49	21
7/9/2005	we/hol	63	0.067	0.018	0.031	0.011	4	21.5	430	219	29	17	14	8	4	238.3	4,765	1,058	317	111	150	61
7/10/2005	we/hol	71	0.079	0.019	0.041	0.012	4	20.3	405	235	32	20	17	11	4	229.0	4,580	1,543	364	151	189	84
7/13/2005	wd	80	0.108	0.019	0.075	0.015	4	16.5	330	58	36	9	25	6	4	188.3	3,765	810	406	112	282	82
7/14/2005	wd	65	0.051	0.014	0.024	0.009	4	26.8	535	220	27	14	13	7	4	163.0	3,260	883	166	65	77	36
7/16/2005	we/hol	50	0.127	0.027	0.073	0.020	4	34.5	690	169	88	29	50	18	4	263.3	5,265	803	670	177	384	119
7/17/2005	we/hol	68	0.085	0.021	0.054	0.015	4	72.5	1450	454	123	49	78	33	4	337.5	6,750	741	572	153	363	109
7/19/2005	wd	118	0.184	0.029	0.080	0.013	4	25.0	500	288	92	55	40	24	4	268.8	5,375	1,109	990	257	427	114
7/22/2005	wd	46	0.062	0.019	0.038	0.014	4	25.0	500	223	31	17	19	11	4	212.3	4,245	1,227	262	111	161	76
7/23/2005	we/hol	46	0.110	0.034	0.073	0.023	4	16.0	320	111	35	16	23	11	4	235.5	4,710	1,069	519	199	345	133
7/24/2005	we/hol	82	0.072	0.015	0.056	0.012	4	27.8	555	321	40	25	31	19	4	341.5	6,830	1,497	491	150	381	119
7/26/2005	wd	98	0.093	0.018	0.078	0.016	4	14.3	285	111	27	11	22	10	4	226.0	4,520	1,138	422	133	353	115
7/28/2005	wd	43	0.101	0.036	0.041	0.017	4	18.0	360	79	36	15	15	7	4	217.3	4,345	630	438	168	178	76
7/30/2005	we/hol	40	0.138	0.038	0.114	0.032	4	59.0	1180	294	163	61	134	50	4	202.3	4,045	617	559	177	460	146
7/31/2005	we/hol	55	0.116	0.020	0.043	0.014	4	89.3	1785	681	207	86	77	39	4	248.0	4,960	349	574	105	213	71
Min		40	0.038		0.019		4	4.8	95		4		2		4	97.8	1,955		75		37	
Mean		65	0.090		0.053		4	23.6	472		46		29		4	211.8	4,236		401		237	
Max		118	0.184		0.114		4	72.5	1,450		163		134		4	341.5	6,830		990		460	

[a] Angler counts are stratified by location, angler interviews are not.

[b] Downstream = Warren Ames Bridge to the Chinook salmon sonar site, Upstream = Chinook salmon sonar site to the Soldotna Bridge.

[c] wd = weekday, we/hol = weekend/holiday.

Appendix B4.–Daily guided boat angler CPUE, HPUE, angler effort, catch and harvest estimates by location during the late-run Kenai River Chinook salmon sport fishery, 2005.

		Angler interview data[a]					Downstream[b]								Upstream[b]							
	Day		Catch		Harvest		Counts		Effort		Catch		Harvest		Counts		Effort		Catch		Harvest	
Date	Type[c]	n	CPUE	SE	HPUE	SE	n	mean	Est.	SE	Est.	SE	Est.	SE	n	mean	Est.	SE	Est.	SE	Est.	SE
7/1/2005	wd	41	0.0728	0.0147	0.0413	0.0123	2	24.0	288	96	21	8	12	5	2	350.5	4,206	1,602	306	132	174	84
7/2/2005	we/hol	76	0.097	0.0146	0.0637	0.0122	2	59.5	714	318	69	33	45	22	2	236.0	2,832	156	275	44	180	36
7/5/2005	wd	42	0.131	0.0235	0.069	0.0173	3	32.7	392	342	51	46	27	25	3	304.0	3,648	1,021	478	159	252	95
7/8/2005	wd	22	0.1144	0.0336	0.0971	0.0338	2	81.5	978	114	112	35	95	35	2	264.0	3,168	624	362	128	308	123
7/9/2005	we/hol	49	0.1195	0.0189	0.0855	0.0175	2	106.5	1,278	30	153	24	109	22	2	197.0	2,364	1,440	282	178	202	130
7/13/2005	wd	81	0.1356	0.0237	0.0816	0.0151	3	61.3	736	154	100	27	60	17	3	347.3	4,168	817	565	148	340	92
7/14/2005	wd	57	0.0718	0.0169	0.0448	0.0116	2	67.0	804	300	58	25	36	16	2	364.0	4,368	1,188	314	113	196	73
7/16/2005	we/hol	46	0.1823	0.0255	0.1015	0.0241	3	79.0	948	67	173	27	96	24	3	326.3	3,916	1,254	714	249	397	158
7/19/2005	wd	63	0.2839	0.0462	0.1164	0.0215	2	69.0	828	432	235	128	96	53	2	363.0	4,356	804	1,237	304	507	132
7/22/2005	wd	87	0.061	0.0112	0.0373	0.0086	2	136.5	1,638	978	100	62	61	39	2	405.0	4,860	1,320	296	97	181	65
7/23/2005	we/hol	49	0.065	0.0146	0.0582	0.014	3	32.3	388	255	25	18	23	16	3	332.3	3,988	1,170	259	96	232	88
7/26/2005	wd	68	0.1471	0.0228	0.1159	0.0193	2	64.5	774	126	114	26	90	21	2	390.0	4,680	960	689	177	542	143
7/28/2005	wd	61	0.0754	0.0162	0.0578	0.0135	2	76.0	912	12	69	15	53	12	2	322.0	3,864	1,632	291	138	223	108
7/30/2005	we/hol	35	0.2331	0.041	0.190	0.03	3	100.0	1,200	192	280	66	228	51	3	256.7	3,080	1,494	718	370	586	299
Min		22	0.061		0.037		2	24.0	288		21		12		2	197.0	2,364		259		174	
Mean		56	0.128		0.083		2	70.7	848		111		74		2	318.4	3,821		485		309	
Max		87	0.284		0.190		3	136.5	1,638		280		228		3	405.0	4,860		1,237		586	

[a] Angler counts are stratified by location, angler interviews are not.

[b] Downstream = Warren Ames Bridge to the Chinook salmon sonar site, Upstream = Chinook salmon sonar site to the Soldotna Bridge.

[c] wd = weekday, we/hol = weekend/holiday.

APPENDIX C. EFFORT, CATCH AND HARVEST ESTIMATES BY TEMPORAL AND GEOGRAPHIC STRATA DURING THE KENAI RIVER CHINOOK SALMON FISHERY, 2005

Appendix C1.–Angler effort, catch, and harvest estimates by location during the early-run Kenai River Chinook salmon sport fishery, 2005.

	Downstream[a] Creel Estimates						Upstream[a] Creel Estimates								
	Effort		Catch		Harvest		Effort		Catch		Harvest		% Downstream		
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Effort	Catch	Harvest
17-22 May															
Guided weekdays	0	0	0	0	0	0	896	174	45	40	36	22	0.0%	0.0%	0.0%
Guided weekends	0	0	0	0	0	0	624	240	28	22	28	22	0.0%	0.0%	0.0%
Unguided weekdays	0	0	0	0	0	0	660	114	0	0	0	0	0.0%	N/A	N/A
Unguided weekends	10	8	1	1	0	0	595	74	40	16	24	14	1.7%	2.2%	0.9%
24-30 May															
Guided weekdays	0	0	0	0	0	0	2,952	790	78	120	26	62	0.0%	0.0%	0.0%
Guided weekends	72	51	2	2	2	2	1,308	229	45	25	45	25	5.2%	5.2%	5.2%
Unguided weekdays	0	0	0	0	0	0	1,360	317	12	12	12	12	0.0%	0.0%	0.0%
Unguided weekends	203	100	0	0	0	0	2,273	629	0	0	0	0	8.2%	N/A	N/A
31 May-5 June															
Guided weekdays	0	0	0	0	0	0	2,772	493	331	86	213	81	0.0%	0.0%	0.0%
Guided weekends	0	0	0	0	0	0	980	201	69	34	34	25	0.0%	0.0%	0.0%
Unguided weekdays	0	0	0	0	0	0	1,710	385	88	58	57	54	0.0%	0.0%	0.0%
Unguided weekends	55	37	4	3	1	1	2,220	324	149	37	54	21	2.4%	2.4%	2.2%
7-12 June															
Guided weekdays	0	0	0	0	0	0	6,860	819	496	106	235	59	0.0%	0.0%	0.0%
Guided weekends	24	24	2	2	1	1	1,470	678	111	62	74	44	1.6%	1.6%	1.6%
Unguided weekdays	20	18	1	1	0	0	2,520	253	104	25	69	24	0.8%	0.8%	0.6%
Unguided weekends	190	72	3	2	2	1	3,160	784	51	22	32	17	5.7%	5.0%	5.1%
14-19 June															
Guided weekdays	152	88	10	8	10	8	8,156	1,085	492	208	459	226	1.8%	2.0%	2.1%
Guided weekends	0	0	0	0	0	0	1,692	650	194	83	134	61	0.0%	0.0%	0.0%
Unguided weekdays	20	22	0	0	0	0	2,910	395	59	27	42	34	0.7%	0.4%	0.0%
Unguided weekends	20	24	0	0	0	0	4,187	524	112	44	81	34	0.5%	0.0%	0.0%
21-26 June															
Guided weekdays	732	599	48	37	36	31	9,620	1,440	707	173	447	82	7.1%	6.3%	7.4%
Guided weekends	16	20	1	1	1	1	2,212	459	93	36	83	34	0.7%	0.7%	0.7%
Unguided weekdays	90	49	6	10	2	2	3,040	362	250	617	85	47	2.9%	2.4%	2.8%
Unguided weekends	90	57	4	2	1	1	3,950	442	159	42	52	24	2.2%	2.2%	2.0%
28-30 June															
Guided weekdays	36	21	3	2	2	1	6,426	1,590	499	150	358	120	0.6%	0.6%	0.6%
Unguided weekdays	30	20	1	1	1	1	3,180	367	133	51	133	51	0.9%	0.9%	0.9%

-continued-

Appendix C1.–Page 2 of 2.

	Downstream Creel Estimates						Upstream Creel Estimates						% Downstream		
	Effort		Catch		Harvest		Effort		Catch		Harvest				
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Effort	Catch	Harvest
Day Type Subtotals															
Guided weekdays	920	605 0	61	38 0	48	32 0	37,682	2,711 0	2,648	361 0	1,775	294 0	2.4%	2.2%	2.6%
Guided weekends	112	60 0	5	3 0	4	3 0	8,286	1,115 0	541	120 0	399	92 0	1.3%	0.9%	1.1%
Unguided weekdays	160	60 0	9	10 0	4	2 0	15,380	865 0	646	623 0	399	97 0	1.0%	1.3%	1.0%
Unguided weekends	568	143 0	11	4 0	4	2 0	16,384	1,261 0	510	76 0	244	51 0	3.3%	2.1%	1.7%
Angler Type Subtotals															
Guided	1,032	608	66	38	52	32	45,968	2,931	3,189	380	2,174	308	2.2%	2.0%	2.3%
% guided	58.7%		77.3%		86.1%		59.1%		73.4%		77.2%				
Unguided	728	155	19	11	8	3	31,764	1,529	1,157	628	642	110	2.2%	1.6%	1.3%
% unguided	41.3%		22.7%		13.9%		40.9%		26.6%		22.8%				
Early-run Total	1,760	628	85	40	60	32	77,732	3,306	4,345	734	2,816	327	2.2%	1.9%	2.1%

[a] Downstream = Warren Ames Bridge to the Chinook salmon sonar site, Upstream = Chinook salmon sonar site to the Soldotna Bridge.

Appendix C2.–Angler effort, catch, and harvest estimates by location during the late-run Kenai River Chinook salmon sport fishery, 2005.

	Downstream[a] Creel Estimates						Upstream[a] Creel Estimates						% Downstream		
	Effort		Catch		Harvest		Effort		Catch		Harvest				
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Effort	Catch	Harvest
1-3 July															
Guided weekdays	288	96	21	8	12	5	4,206	1,602	306	132	174	84	6.4%	6.4%	6.4%
Guided weekends	714	318	69	33	45	22	2,832	156	275	44	180	36	20.1%	20.1%	20.1%
Unguided weekdays	95	57	4	2	2	1	1,955	201	75	22	37	16	4.6%	4.6%	4.6%
Unguided weekends	520	184	39	17	22	10	6,445	1,168	492	130	277	79	7.5%	7.3%	7.4%
5-10 July															
Guided weekdays	2,740	973	326	118	244	113	13,632	1,823	1,680	332	1,119	233	16.7%	16.3%	17.9%
Guided weekends	1,278	30	153	24	109	22	2,364	1,440	282	178	202	130	35.1%	35.1%	35.1%
Unguided weekdays	690	107	55	15	23	7	10,770	1,340	935	370	400	172	6.0%	5.5%	5.5%
Unguided weekends	835	321	61	26	30	14	9,345	1,870	681	188	338	104	8.2%	8.2%	8.2%
12-17 July															
Guided weekdays	3,080	486	315	79	192	47	17,072	2,059	1,758	443	1,072	263	15.3%	15.2%	15.2%
Guided weekends	948	67	173	27	96	24	3,916	1,254	714	249	397	158	19.5%	19.5%	19.5%
Unguided weekdays	1,730	433	126	26	75	22	14,050	1,840	1,145	386	718	315	11.0%	9.9%	9.4%
Unguided weekends	2,140	484	211	57	128	38	12,015	1,093	1,242	234	747	161	15.1%	14.5%	14.7%
19-24 July															
Guided weekdays	4,932	1,897	670	278	315	106	18,432	2,299	3,066	1,405	1,376	505	21.1%	17.9%	18.6%
Guided weekends	388	255	25	18	23	16	3,988	1,170	259	96	232	88	8.9%	8.9%	8.9%
Unguided weekdays	2,000	515	246	119	118	47	19,240	2,833	2,504	1,102	1,177	423	9.4%	8.9%	9.1%
Unguided weekends	875	340	75	30	54	22	11,540	1,839	1,009	249	726	178	7.0%	6.9%	7.0%
26-31 July															
Guided weekdays	3,372	265	365	76	285	62	17,088	2,916	1,960	646	1,531	517	16.5%	15.7%	15.7%
Guided weekends	1,200	192	280	66	228	51	3,080	1,494	718	370	586	299	28.0%	28.0%	28.0%
Unguided weekdays	1,290	219	126	30	74	20	17,730	1,857	1,720	304	1,062	316	6.8%	6.8%	6.5%
Unguided weekends	2,965	741	369	105	211	63	9,005	709	1,133	206	673	162	24.8%	24.6%	23.9%
Day Type Subtotals															
Guided weekdays	14,412	2,205	1,698	322	1,048	174	70,430	4,890	8,770	1,647	5,272	809	17.0%	16.2%	16.6%
Guided weekends	4,528	457	700	84	502	67	16,180	2,696	2,248	492	1,598	375	21.9%	23.7%	23.9%
Unguided weekdays	5,805	718	556	126	291	56	63,745	4,086	6,379	1,262	3,395	639	8.3%	8.0%	7.9%
Unguided weekends	7,335	1,018	755	127	446	78	48,350	3,153	4,558	460	2,762	318	13.2%	14.2%	13.9%
Angler Type Subtotals															
Guided	18,940	2,251	2,397	333	1,550	186	86,610	5,584	11,019	1,719	6,870	891	17.9%	17.9%	18.4%
% Guided	59.0%		64.7%		67.8%		43.6%		50.2%		52.7%				
Unguided	13,140	1,245	1,311	179	737	97	112,095	5,161	10,937	1,343	6,156	714	10.5%	10.7%	10.7%
% Unguided	41.0%		35.3%		32.2%		56.4%		49.8%		47.3%				
Late-run Total	32,080	2,573	3,708	378	2,287	210	198,705	7,604	21,955	2,182	13,026	1,142	13.9%	14.4%	14.9%

[a] Downstream = Warren Ames Bridge to the Chinook salmon sonar site, Upstream = Chinook salmon sonar site to the Soldotna Bridge.

APPENDIX D. INRIVER GILLNETTING DAILY CATCH, CPUE, AND SPECIES PROPORTION DURING THE KENAI RIVER CHINOOK SALMON FISHERY, 2005

Appendix D1.–Inriver gillnetting catch, CPUE, and proportion of Chinook salmon caught in a 5.0 inch mesh gillnet during the early-run Kenai River Chinook salmon sport fishery, 2005.

			Total	Chinook			Sockeye			Chinook/	
Date	Drifts	Minutes	Catch	#	CPUE	SE	#	CPUE	SE	Total[a]	SE
5/16/2005	12	107	2	2	0.019	0.012	0	0.000	0.000	1.00	0.000
5/17/2005	12	114	2	2	0.018	0.012	0	0.000	0.000	1.00	0.000
5/18/2005	10	109	1	0	0.000	0.000	1	0.009	0.009	0.00	0.000
5/19/2005	11	98	2	0	0.000	0.000	2	0.020	0.014	0.00	0.000
5/20/2005	10	98	4	3	0.031	0.016	1	0.010	0.010	0.75	0.228
5/21/2005	6	56	2	1	0.018	0.018	1	0.018	0.018	0.50	0.000
5/22/2005	12	109	5	2	0.018	0.012	3	0.028	0.014	0.40	0.177
5/23/2005	10	91	3	2	0.022	0.015	1	0.011	0.011	0.67	0.287
5/24/2005	10	88	5	1	0.011	0.011	4	0.046	0.025	0.20	0.198
5/25/2005	10	87	12	2	0.023	0.015	10	0.115	0.034	0.17	0.077
5/26/2005	12	103	10	1	0.010	0.010	9	0.088	0.038	0.10	0.072
5/27/2005	8	61	3	1	0.016	0.016	2	0.033	0.021	0.33	0.291
5/28/2005	9	74	12	6	0.081	0.035	6	0.081	0.028	0.50	0.140
5/29/2005	10	80	11	4	0.050	0.027	7	0.087	0.038	0.36	0.184
5/30/2005	10	82	24	7	0.085	0.031	17	0.206	0.050	0.29	0.096
5/31/2005	11	89	9	6	0.067	0.019	3	0.034	0.017	0.67	0.123
6/1/2005	10	79	23	4	0.051	0.028	19	0.241	0.049	0.17	0.072
6/2/2005	12	92	29	5	0.055	0.025	24	0.262	0.061	0.17	0.064
6/3/2005	10	79	27	2	0.025	0.018	25	0.318	0.093	0.07	0.060
6/4/2005	8	59	12	3	0.051	0.025	9	0.153	0.075	0.25	0.148
6/5/2005	6	48	31	10	0.208	0.059	21	0.436	0.174	0.32	0.109
6/6/2005	10	64	27	5	0.078	0.025	22	0.341	0.134	0.19	0.046
6/7/2005	10	74	66	3	0.041	0.020	62	0.837	0.205	0.05	0.022
6/8/2005	8	61	97	9	0.149	0.030	87	1.436	0.265	0.09	0.030
6/9/2005	10	78	111	8	0.103	0.033	102	1.311	0.301	0.07	0.033
6/10/2005	9	53	55	6	0.114	0.031	49	0.929	0.254	0.11	0.030
6/11/2005	7	44	60	11	0.247	0.066	49	1.102	0.346	0.18	0.075
6/12/2005	10	70	37	2	0.029	0.020	35	0.499	0.132	0.05	0.041
6/13/2005	10	76	28	3	0.040	0.029	25	0.329	0.094	0.11	0.071
6/14/2005	10	76	39	6	0.079	0.022	33	0.436	0.073	0.15	0.046
6/15/2005	8	61	40	12	0.196	0.052	28	0.457	0.091	0.30	0.057
6/16/2005	9	64	50	7	0.109	0.034	42	0.656	0.162	0.14	0.047
6/17/2005	9	65	23	3	0.046	0.023	20	0.307	0.088	0.13	0.060
6/18/2005	8	61	33	2	0.033	0.022	31	0.511	0.169	0.06	0.038
6/19/2005	9	60	42	3	0.050	0.035	39	0.646	0.113	0.07	0.047
6/20/2005	8	50	63	4	0.081	0.045	59	1.188	0.149	0.06	0.030
6/21/2005	11	74	57	3	0.041	0.022	54	0.735	0.090	0.05	0.026
6/22/2005	9	61	53	2	0.033	0.033	51	0.831	0.176	0.04	0.035
6/23/2005	10	67	59	1	0.015	0.015	58	0.861	0.170	0.02	0.017
6/24/2005	10	75	28	0	0.000	0.000	28	0.373	0.096	0.00	0.000
6/25/2005	8	62	39	7	0.113	0.046	32	0.516	0.144	0.18	0.034
6/26/2005	10	67	53	7	0.105	0.040	45	0.673	0.152	0.13	0.053
6/27/2005	8	54	7	4	0.074	0.028	3	0.055	0.039	0.57	0.235
6/28/2005	9	64	33	4	0.063	0.048	29	0.456	0.068	0.12	0.080
6/29/2005	6	45	25	10	0.223	0.044	15	0.335	0.105	0.40	0.094
6/30/2005	6	43	36	2	0.047	0.029	34	0.794	0.114	0.06	0.034
Total	431	3,371	1,390	188	2.963		1,197	18.811			
Min	6	43	1	0	0.000		0	0.000		0.00	
Mean	9	73	30	4	0.064		26	0.409		0.24	
Max	12	114	111	12	0.247		102	1.436		1.00	

[a] Chinook salmon CPUE / all species CPUE.

Appendix D2.–Inriver gillnetting catch, CPUE, and proportion of Chinook salmon caught in a 7.5 inch mesh gillnet during the early-run Kenai River Chinook salmon sport fishery, 2005.

			Total	Chinook			Sockeye			Chinook/	
Date	Drifts	Minutes	Catch	#	CPUE	SE	#	CPUE	SE	Total[a]	SE
5/16/2005	7	79	1	1	0.013	0.013	0	0.000	0.000	1.00	0.00
5/17/2005	12	131	2	2	0.015	0.009	0	0.000	0.000	1.00	0.00
5/18/2005	10	98	2	2	0.021	0.013	0	0.000	0.000	1.00	0.00
5/19/2005	12	112	1	1	0.009	0.009	0	0.000	0.000	1.00	0.00
5/20/2005	10	98	4	4	0.041	0.022	0	0.000	0.000	1.00	0.00
5/21/2005	7	67	1	1	0.015	0.015	0	0.000	0.000	1.00	0.00
5/22/2005	10	95	6	6	0.063	0.017	0	0.000	0.000	1.00	0.00
5/23/2005	12	110	11	9	0.081	0.044	2	0.018	0.018	0.82	0.17
5/24/2005	9	79	5	3	0.038	0.027	2	0.025	0.017	0.60	0.16
5/25/2005	11	96	1	1	0.010	0.010	0	0.000	0.000	1.00	0.00
5/26/2005	12	99	8	1	0.010	0.010	7	0.071	0.036	0.13	0.10
5/27/2005	8	67	4	2	0.030	0.030	2	0.030	0.020	0.50	0.33
5/28/2005	8	65	6	5	0.077	0.048	1	0.015	0.015	0.83	0.18
5/29/2005	12	99	11	5	0.051	0.022	6	0.061	0.025	0.45	0.17
5/30/2005	10	83	17	9	0.109	0.032	8	0.097	0.039	0.53	0.13
5/31/2005	12	99	13	7	0.071	0.041	6	0.060	0.023	0.54	0.11
6/1/2005	10	80	12	7	0.087	0.026	5	0.062	0.027	0.58	0.11
6/2/2005	12	88	9	6	0.068	0.027	3	0.034	0.018	0.67	0.15
6/3/2005	8	66	13	9	0.136	0.036	4	0.061	0.022	0.69	0.09
6/4/2005	8	66	18	12	0.181	0.032	6	0.090	0.039	0.67	0.12
6/5/2005	6	49	12	10	0.203	0.063	2	0.041	0.027	0.83	0.10
6/6/2005	12	93	23	11	0.119	0.037	12	0.129	0.044	0.48	0.11
6/7/2005	10	76	24	9	0.118	0.037	15	0.197	0.087	0.38	0.13
6/8/2005	8	63	58	13	0.207	0.077	45	0.717	0.204	0.22	0.05
6/9/2005	9	70	42	11	0.157	0.050	31	0.443	0.192	0.26	0.07
6/10/2005	10	66	38	7	0.107	0.047	29	0.443	0.166	0.18	0.07
6/11/2005	6	45	14	3	0.067	0.044	11	0.245	0.156	0.21	0.11
6/12/2005	12	88	22	11	0.124	0.020	11	0.124	0.038	0.50	0.08
6/13/2005	10	66	11	6	0.091	0.033	5	0.076	0.050	0.55	0.19
6/14/2005	12	91	31	12	0.132	0.043	19	0.209	0.051	0.39	0.11
6/15/2005	7	53	13	8	0.152	0.059	5	0.095	0.057	0.62	0.17
6/16/2005	10	75	16	8	0.106	0.033	8	0.106	0.065	0.50	0.12
6/17/2005	8	60	16	6	0.099	0.041	10	0.166	0.066	0.38	0.15
6/18/2005	8	59	23	5	0.084	0.043	18	0.303	0.084	0.22	0.10
6/19/2005	8	53	14	6	0.114	0.047	8	0.152	0.057	0.43	0.13
6/20/2005	9	60	22	4	0.067	0.036	18	0.302	0.099	0.18	0.10
6/21/2005	10	70	15	7	0.100	0.048	8	0.115	0.048	0.47	0.17
6/22/2005	10	69	23	5	0.073	0.032	18	0.261	0.087	0.22	0.07
6/23/2005	8	55	13	7	0.126	0.044	6	0.108	0.053	0.54	0.15
6/24/2005	10	69	19	4	0.058	0.023	15	0.217	0.085	0.21	0.08
6/25/2005	6	40	15	8	0.198	0.098	7	0.173	0.091	0.53	0.13
6/26/2005	10	68	26	7	0.102	0.032	19	0.278	0.072	0.27	0.09
6/27/2005	8	56	5	4	0.072	0.038	1	0.018	0.018	0.80	0.20
6/28/2005	10	10	21	12	1.152	6.785	9	0.864	4.965	0.57	0.11
6/29/2005	6	44	19	14	0.318	0.100	5	0.113	0.066	0.74	0.06
6/30/2005	8	60	29	18	0.299	0.071	11	0.183	0.048	0.62	0.05
Total	431	3,388	709	309	5.570		398	6.702			
Min	6	10	1	1	0.009		0	0.000		0.13	
Mean	9	74	15	7	0.121		9	0.146		0.57	
Max	12	131	58	18	1.152		45	0.864		1.00	

[a] Chinook salmon CPUE / all species CPUE.

Appendix D3.–Inriver gillnetting catch, CPUE, and proportion of Chinook salmon caught in 5.0 and 7.5 inch mesh gillnets during the early-run Kenai River Chinook salmon sport fishery, 2005.

				Total	Chinook			Sockeye			Chinook/	
Date	Reps	Drifts	Minutes	Catch	#	CPUE	SE	#	CPUE	SE	Total[a]	SE
5/16/2005	5	19	187	3	3	0.017	0.009	0	0.000	0.000	1.00	0.00
5/17/2005	6	24	245	4	4	0.017	0.008	0	0.000	0.000	1.00	0.00
5/18/2005	5	20	206	3	2	0.011	0.007	1	0.005	0.005	0.69	0.30
5/19/2005	6	23	210	3	1	0.004	0.004	2	0.017	0.012	0.20	0.23
5/20/2005	5	20	196	8	7	0.035	0.015	1	0.005	0.005	0.87	0.09
5/21/2005	3	12	112	3	2	0.019	0.009	1	0.009	0.009	0.67	0.19
5/22/2005	5	20	185	8	7	0.037	0.013	1	0.006	0.006	0.87	0.13
5/23/2005	5	20	181	9	6	0.034	0.010	3	0.016	0.010	0.68	0.15
5/24/2005	5	19	167	10	4	0.023	0.011	6	0.034	0.017	0.40	0.11
5/25/2005	5	20	174	13	3	0.017	0.011	10	0.058	0.024	0.23	0.06
5/26/2005	6	24	201	18	2	0.010	0.006	16	0.084	0.045	0.10	0.04
5/27/2005	4	16	128	7	3	0.023	0.015	4	0.030	0.012	0.43	0.22
5/28/2005	4	16	131	17	11	0.084	0.035	6	0.045	0.019	0.65	0.07
5/29/2005	5	20	157	19	6	0.037	0.018	13	0.084	0.024	0.31	0.15
5/30/2005	5	20	165	41	16	0.094	0.019	25	0.148	0.042	0.39	0.07
5/31/2005	6	23	188	22	13	0.066	0.029	9	0.045	0.017	0.59	0.09
6/1/2005	5	20	159	35	11	0.069	0.015	24	0.148	0.029	0.32	0.04
6/2/2005	6	24	180	38	11	0.062	0.021	27	0.147	0.038	0.30	0.08
6/3/2005	4	16	132	38	10	0.076	0.019	28	0.208	0.076	0.27	0.09
6/4/2005	4	16	125	30	15	0.118	0.034	15	0.118	0.083	0.50	0.22
6/5/2005	3	12	97	43	20	0.204	0.064	23	0.237	0.146	0.46	0.17
6/6/2005	5	20	141	45	13	0.086	0.033	32	0.227	0.115	0.28	0.10
6/7/2005	5	20	150	90	12	0.080	0.018	77	0.521	0.199	0.13	0.05
6/8/2005	4	16	123	155	22	0.179	0.008	132	1.065	0.270	0.14	0.03
6/9/2005	5	19	148	153	19	0.128	0.020	133	0.837	0.343	0.13	0.05
6/10/2005	5	19	118	93	13	0.131	0.047	78	0.761	0.298	0.14	0.04
6/11/2005	3	12	80	62	12	0.152	0.014	50	0.791	0.505	0.16	0.10
6/12/2005	5	20	141	54	11	0.080	0.014	43	0.319	0.086	0.20	0.04
6/13/2005	5	20	142	39	9	0.064	0.013	30	0.201	0.073	0.24	0.08
6/14/2005	5	20	150	66	15	0.101	0.023	51	0.338	0.034	0.23	0.05
6/15/2005	4	15	114	53	20	0.180	0.054	33	0.270	0.076	0.40	0.08
6/16/2005	5	19	139	66	15	0.125	0.036	50	0.373	0.067	0.25	0.07
6/17/2005	4	16	119	36	9	0.075	0.016	27	0.232	0.089	0.24	0.10
6/18/2005	4	16	120	56	7	0.059	0.022	49	0.402	0.107	0.13	0.03
6/19/2005	4	16	106	52	9	0.085	0.035	43	0.404	0.071	0.17	0.05
6/20/2005	4	16	102	85	8	0.077	0.045	77	0.770	0.083	0.09	0.05
6/21/2005	5	20	137	68	9	0.067	0.032	59	0.444	0.079	0.13	0.05
6/22/2005	5	19	130	76	7	0.051	0.019	69	0.513	0.156	0.09	0.03
6/23/2005	4	16	109	69	8	0.073	0.016	61	0.573	0.133	0.11	0.02
6/24/2005	5	20	144	47	4	0.028	0.013	43	0.300	0.093	0.09	0.04
6/25/2005	3	12	86	53	15	0.186	0.101	38	0.435	0.149	0.30	0.05
6/26/2005	5	20	135	79	14	0.105	0.026	64	0.471	0.117	0.18	0.05
6/27/2005	4	16	110	12	8	0.072	0.014	4	0.036	0.025	0.67	0.12
6/28/2005	5	19	74	54	16	0.078	0.038	38	0.270	0.027	0.22	0.08
6/29/2005	3	12	89	44	24	0.271	0.039	20	0.222	0.059	0.55	0.04
6/30/2005	3	12	87	56	15	0.169	0.068	41	0.479	0.084	0.26	0.07
Total	211	834	6,522	2,035	471	3.759		1,557	12.698			
Min	3	12	74	3	1	0.004		0	0.000		0.09	
Mean	5	18	142	44	10	0.082		34	0.276		0.36	
Max	6	24	245	155	24	0.271		133	1.065		1.00	

Note: A complete rep consists of four drifts (two mesh sizes, two banks). Only reps that had at least one drift from each mesh size were used in this table.

[a] Chinook salmon CPUE / all species CPUE.

Appendix D4.–Inriver gillnetting catch, CPUE, and proportion of Chinook salmon caught in a 5.0 inch mesh gillnet during the late-run Kenai River Chinook salmon sport fishery, 2005.

			Total	Chinook			Sockeye			Coho			Pink			Chinook/	
Date	Drifts	Minutes	Catch	#	CPUE	SE	#	CPUE	SE	#	CPUE	SE	#	CPUE	SE	Total[a]	SE
7/1/2005	7	53	45	8	0.151	0.033	37	0.69746	0.1572	0	0.000	0.000	0	0.000	0.000	0.18	0.05
7/2/2005	6	42	32	12	0.288	0.083	20	0.47923	0.1227	0	0.000	0.000	0	0.000	0.000	0.38	0.11
7/3/2005	8	55	30	9	0.162	0.076	21	0.37883	0.1307	0	0.000	0.000	0	0.000	0.000	0.30	0.10
7/4/2005	8	46	11	7	0.152	0.071	4	0.0868	0.0425	0	0.000	0.000	0	0.000	0.000	0.64	0.14
7/5/2005	6	42	42	18	0.425	0.092	24	0.566	0.189	0	0.000	0.000	0	0.000	0.000	0.43	0.09
7/6/2005	6	44	24	10	0.230	0.062	14	0.322	0.147	0	0.000	0.000	0	0.000	0.000	0.42	0.15
7/7/2005	6	38	22	11	0.289	0.079	11	0.289	0.171	0	0.000	0.000	0	0.000	0.000	0.50	0.14
7/8/2005	7	52	35	16	0.306	0.059	19	0.364	0.100	0	0.000	0.000	0	0.000	0.000	0.46	0.07
7/9/2005	6	30	43	14	0.466	0.129	28	0.932	0.353	0	0.000	0.000	1	0.033	0.044	0.33	0.13
7/10/2005	6	44	40	18	0.410	0.085	22	0.502	0.124	0	0.000	0.000	0	0.000	0.000	0.45	0.06
7/11/2005	7	41	38	32	0.784	0.163	6	0.147	0.086	0	0.000	0.000	0	0.000	0.000	0.84	0.07
7/12/2005	7	36	64	22	0.619	0.123	42	1.182	0.445	0	0.000	0.000	0	0.000	0.000	0.34	0.09
7/13/2005	6	30	56	21	0.702	0.120	35	1.170	0.393	0	0.000	0.000	0	0.000	0.000	0.38	0.08
7/14/2005	7	40	29	12	0.297	0.087	17	0.420	0.088	0	0.000	0.000	0	0.000	0.000	0.41	0.08
7/15/2005	6	36	53	17	0.472	0.045	36	1.000	0.204	0	0.000	0.000	0	0.000	0.000	0.32	0.04
7/16/2005	5	32	34	17	0.525	0.054	17	0.525	0.348	0	0.000	0.000	0	0.000	0.000	0.50	0.16
7/17/2005	5	30	23	7	0.236	0.082	16	0.538	0.144	0	0.000	0.000	0	0.000	0.000	0.30	0.12
7/18/2005	7	44	29	9	0.203	0.068	20	0.452	0.105	0	0.000	0.000	0	0.000	0.000	0.31	0.09
7/19/2005	6	40	51	14	0.352	0.076	37	0.932	0.190	0	0.000	0.000	0	0.000	0.000	0.27	0.04
7/20/2005	6	37	22	9	0.246	0.124	13	0.356	0.182	0	0.000	0.000	0	0.000	0.000	0.41	0.11
7/21/2005	6	39	27	10	0.258	0.063	17	0.439	0.267	0	0.000	0.000	0	0.000	0.000	0.37	0.14
7/22/2005	6	32	21	15	0.463	0.113	6	0.185	0.112	0	0.000	0.000	0	0.000	0.000	0.71	0.10
7/23/2005	6	33	42	11	0.336	0.063	31	0.947	0.286	0	0.000	0.000	0	0.000	0.000	0.26	0.08
7/24/2005	6	33	22	8	0.243	0.074	14	0.425	0.212	0	0.000	0.000	0	0.000	0.000	0.36	0.17
7/25/2005	8	53	28	17	0.322	0.059	11	0.208	0.066	0	0.000	0.000	0	0.000	0.000	0.61	0.09
7/26/2005	6	35	24	13	0.370	0.117	11	0.313	0.086	0	0.000	0.000	0	0.000	0.000	0.54	0.09
7/27/2005	8	47	21	10	0.213	0.094	11	0.235	0.058	0	0.000	0.000	0	0.000	0.000	0.48	0.12
7/28/2005	6	41	12	7	0.169	0.029	5	0.121	0.047	0	0.000	0.000	0	0.000	0.000	0.58	0.11
7/29/2005	6	29	32	9	0.311	0.065	22	0.760	0.170	1	0.035	0.035	0	0.000	0.000	0.28	0.07
7/30/2005	6	36	27	11	0.305	0.071	15	0.416	0.105	1	0.028	0.039	0	0.000	0.000	0.41	0.07
7/31/2005	6	33	16	6	0.183	0.088	10	0.305	0.159	0	0.000	0.000	0	0.000	0.000	0.38	0.05
8/1/2005	6	39	5	3	0.076	0.051	2	0.051	0.050	0	0.000	0.000	0	0.000	0.000	0.60	0.25
8/2/2005	6	36	15	12	0.335	0.102	3	0.084	0.036	0	0.000	0.000	0	0.000	0.000	0.80	0.08
8/3/2005	6	22	5	3	0.139	0.059	2	0.093	0.058	0	0.000	0.000	0	0.000	0.000	0.60	0.19
8/4/2005	6	39	12	11	0.280	0.070	1	0.025	0.025	0	0.000	0.000	0	0.000	0.000	0.92	0.07
8/5/2005	6	34	6	3	0.089	0.031	3	0.089	0.045	0	0.000	0.000	0	0.000	0.000	0.50	0.18
8/6/2005	6	41	11	9	0.221	0.064	2	0.049	0.031	0	0.000	0.000	0	0.000	0.000	0.82	0.13
8/7/2005	2	15	5	1	0.065	0.064	4	0.261	0.137	0	0.000	0.000	0	0.000	0.000	0.20	0.24
8/8/2005	8	52	11	7	0.136	0.048	4	0.077	0.041	0	0.000	0.000	0	0.000	0.000	0.64	0.10
8/9/2005	8	57	4	4	0.070	0.026	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
8/10/2005	8	47	4	2	0.043	0.027	2	0.043	0.028	0	0.000	0.000	0	0.000	0.000	0.50	0.27
Total	260	1,605	1,073	455	11.941		615	16.464		2	0.062		1	0.033			
Min	2	15	4	1	0.043		0	0.000		0	0.000		0	0.000		0.18	
Mean	6	39	26	11	0.291		15	0.402		0	0.002		0	0.001		0.48	
Max	8	57	64	32	0.784		42	1.182		1	0.035		1	0.033		1.00	

[a] Chinook salmon CPUE / all species CPUE.

Appendix D5.–Inriver gillnetting catch, CPUE, and proportion of Chinook salmon caught in a 7.5 inch mesh gillnet during the late-run Kenai River Chinook salmon sport fishery, 2005.

			Total	Chinook			Sockeye			Coho			Pink			Chinook/	
Date	Drifts	Minutes	Catch	#	CPUE	SE	#	CPUE	SE	#	CPUE	SE	#	CPUE	SE	Total[a]	SE
7/1/2005	6	45	19	8	0.179	0.061	11	0.246	0.071	0	0.000	0.000	0	0.000	0.000	0.42	0.12
7/2/2005	8	58	31	24	0.416	0.077	7	0.121	0.039	0	0.000	0.000	0	0.000	0.000	0.77	0.07
7/3/2005	6	43	21	12	0.280	0.067	9	0.210	0.107	0	0.000	0.000	0	0.000	0.000	0.57	0.14
7/4/2005	9	65	13	13	0.201	0.056	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
7/5/2005	5	32	19	13	0.401	0.100	6	0.185	0.104	0	0.000	0.000	0	0.000	0.000	0.68	0.17
7/6/2005	7	52	17	14	0.267	0.072	3	0.057	0.030	0	0.000	0.000	0	0.000	0.000	0.82	0.09
7/7/2005	6	46	17	11	0.237	0.065	6	0.129	0.072	0	0.000	0.000	0	0.000	0.000	0.65	0.16
7/8/2005	8	57	19	12	0.210	0.068	7	0.123	0.057	0	0.000	0.000	0	0.000	0.000	0.63	0.13
7/9/2005	6	30	21	20	0.669	0.123	1	0.033	0.031	0	0.000	0.000	0	0.000	0.000	0.95	0.04
7/10/2005	6	35	19	14	0.395	0.105	5	0.141	0.099	0	0.000	0.000	0	0.000	0.000	0.74	0.13
7/11/2005	6	37	12	11	0.299	0.085	1	0.027	0.026	0	0.000	0.000	0	0.000	0.000	0.92	0.07
7/12/2005	8	37	50	42	1.146	0.214	8	0.218	0.117	0	0.000	0.000	0	0.000	0.000	0.84	0.06
7/13/2005	6	30	21	19	0.626	0.223	2	0.066	0.063	0	0.000	0.000	0	0.000	0.000	0.90	0.10
7/14/2005	8	51	24	23	0.451	0.121	1	0.020	0.019	0	0.000	0.000	0	0.000	0.000	0.96	0.04
7/15/2005	5	30	21	14	0.460	0.099	7	0.230	0.147	0	0.000	0.000	0	0.000	0.000	0.67	0.10
7/16/2005	6	34	32	14	0.414	0.147	18	0.533	0.191	0	0.000	0.000	0	0.000	0.000	0.44	0.05
7/17/2005	4	27	22	21	0.790	0.169	1	0.038	0.042	0	0.000	0.000	0	0.000	0.000	0.95	0.04
7/18/2005	8	47	26	22	0.465	0.150	4	0.085	0.085	0	0.000	0.000	0	0.000	0.000	0.85	0.15
7/19/2005	6	38	33	28	0.728	0.087	5	0.130	0.061	0	0.000	0.000	0	0.000	0.000	0.85	0.06
7/20/2005	6	36	29	16	0.439	0.069	13	0.357	0.081	0	0.000	0.000	0	0.000	0.000	0.55	0.07
7/21/2005	6	41	13	12	0.294	0.047	1	0.025	0.024	0	0.000	0.000	0	0.000	0.000	0.92	0.08
7/22/2005	7	41	7	7	0.172	0.074	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
7/23/2005	6	38	22	19	0.505	0.117	3	0.080	0.057	0	0.000	0.000	0	0.000	0.000	0.86	0.07
7/24/2005	6	29	10	10	0.346	0.120	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
7/25/2005	6	38	9	9	0.239	0.092	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
7/26/2005	6	38	24	21	0.548	0.141	3	0.078	0.053	0	0.000	0.000	0	0.000	0.000	0.88	0.09
7/27/2005	8	53	17	17	0.322	0.089	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
7/28/2005	6	40	10	9	0.225	0.086	1	0.025	0.025	0	0.000	0.000	0	0.000	0.000	0.90	0.10
7/29/2005	6	32	16	15	0.463	0.173	1	0.031	0.032	0	0.000	0.000	0	0.000	0.000	0.94	0.07
7/30/2005	6	40	28	22	0.550	0.177	6	0.150	0.060	0	0.000	0.000	0	0.000	0.000	0.79	0.10
7/31/2005	6	37	17	14	0.380	0.084	3	0.081	0.056	0	0.000	0.000	0	0.000	0.000	0.82	0.10
8/1/2005	8	55	23	23	0.415	0.118	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
8/2/2005	6	38	16	16	0.421	0.097	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
8/3/2005	6	26	10	10	0.383	0.119	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
8/4/2005	6	39	8	8	0.207	0.062	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
8/5/2005	6	36	15	14	0.392	0.068	1	0.028	0.027	0	0.000	0.000	0	0.000	0.000	0.93	0.06
8/6/2005	6	39	12	9	0.228	0.113	3	0.076	0.082	0	0.000	0.000	0	0.000	0.000	0.75	0.22
8/7/2005	4	26	5	5	0.194	0.099	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
8/8/2005	6	40	3	2	0.049	0.048	1	0.025	0.025	0	0.000	0.000	0	0.000	0.000	0.67	0.34
8/9/2005	8	50	6	4	0.080	0.030	2	0.040	0.026	0	0.000	0.000	0	0.000	0.000	0.67	0.12
8/10/2005	8	45	5	5	0.110	0.055	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000	1.00	0.00
Total	263	1,653	742	602	15.596		140	3.587		0	0.000		0	0.000			
Min	4	26	3	2	0.049		0	0.000		0	0.000		0	0.000		0.42	
Mean	6	40	18	15	0.380		3	0.087		0	0.000		0	0.000		0.84	
Max	9	65	50	42	1.146		18	0.533		0	0.000		0	0.000		1.00	

[a] Chinook salmon CPUE / all species CPUE.

Appendix D6.–Inriver gillnetting catch, CPUE, and proportion of Chinook salmon caught in 5.0 and 7.5 inch mesh gillnets during the late-run Kenai River Chinook salmon sport fishery, 2005.

				Total	Chinook			Sockeye			Coho			Pink			Chinook/	
Date	Reps	Drifts	Minutes	Catch	#	CPUE	SE	#	CPUE	SE	#	CPUE	SE	#	CPUE	SE	Total[a]	SE
7/1/2005	3	12	90	55	15	0.16676	0.0413	40	0.441	0.126	0	0.000	0.000	0	0.000	0.000	0.27	0.079
7/2/2005	3	12	85	57	30	0.3492	0.0237	27	0.319	0.039	0	0.000	0.000	0	0.000	0.000	0.52	0.018
7/3/2005	3	12	85	45	17	0.19793	0.0684	28	0.329	0.171	0	0.000	0.000	0	0.000	0.000	0.38	0.062
7/4/2005	4	16	102	24	20	0.21703	0.0695	4	0.075	0.051	0	0.000	0.000	0	0.000	0.000	0.74	0.087
7/5/2005	3	11	75	61	31	0.40414	0.0474	30	0.341	0.180	0	0.000	0.000	0	0.000	0.000	0.54	0.141
7/6/2005	3	12	89	40	23	0.258	0.030	17	0.199	0.066	0	0.000	0.000	0	0.000	0.000	0.56	0.056
7/7/2005	3	12	84	39	22	0.267	0.066	17	0.209	0.117	0	0.000	0.000	0	0.000	0.000	0.56	0.093
7/8/2005	4	15	109	54	28	0.251	0.044	26	0.226	0.081	0	0.000	0.000	0	0.000	0.000	0.53	0.075
7/9/2005	3	12	60	64	34	0.586	0.183	29	0.486	0.225	0	0.000	0.000	1	0.012	0.012	0.54	0.175
7/10/2005	3	12	79	59	32	0.407	0.032	27	0.333	0.057	0	0.000	0.000	0	0.000	0.000	0.55	0.03
7/11/2005	3	12	74	45	41	0.569	0.162	4	0.057	0.021	0	0.000	0.000	0	0.000	0.000	0.91	0.019
7/12/2005	4	15	72	114	64	0.903	0.174	50	0.750	0.280	0	0.000	0.000	0	0.000	0.000	0.55	0.085
7/13/2005	3	12	60	77	40	0.689	0.118	37	0.616	0.328	0	0.000	0.000	0	0.000	0.000	0.53	0.168
7/14/2005	4	15	92	53	35	0.378	0.112	18	0.223	0.045	0	0.000	0.000	0	0.000	0.000	0.63	0.046
7/15/2005	3	11	66	74	31	0.494	0.063	43	0.699	0.183	0	0.000	0.000	0	0.000	0.000	0.41	0.059
7/16/2005	3	11	66	66	31	0.480	0.078	35	0.546	0.276	0	0.000	0.000	0	0.000	0.000	0.47	0.09
7/17/2005	2	8	50	38	27	0.519	0.101	11	0.241	0.117	0	0.000	0.000	0	0.000	0.000	0.68	0.15
7/18/2005	4	15	92	55	31	0.335	0.077	24	0.277	0.074	0	0.000	0.000	0	0.000	0.000	0.55	0.11
7/19/2005	3	12	78	84	42	0.537	0.090	42	0.529	0.176	0	0.000	0.000	0	0.000	0.000	0.50	0.08
7/20/2005	3	12	73	51	25	0.345	0.090	26	0.359	0.156	0	0.000	0.000	0	0.000	0.000	0.49	0.06
7/21/2005	3	12	80	40	22	0.275	0.026	18	0.224	0.206	0	0.000	0.000	0	0.000	0.000	0.55	0.22
7/22/2005	3	12	67	28	22	0.339	0.036	6	0.085	0.085	0	0.000	0.000	0	0.000	0.000	0.80	0.15
7/23/2005	3	12	70	64	30	0.410	0.061	34	0.518	0.183	0	0.000	0.000	0	0.000	0.000	0.44	0.07
7/24/2005	3	12	62	32	18	0.287	0.073	14	0.200	0.084	0	0.000	0.000	0	0.000	0.000	0.59	0.05
7/25/2005	3	12	75	29	23	0.305	0.100	6	0.080	0.022	0	0.000	0.000	0	0.000	0.000	0.79	0.01
7/26/2005	3	12	73	48	34	0.460	0.174	14	0.197	0.056	0	0.000	0.000	0	0.000	0.000	0.70	0.11
7/27/2005	4	16	100	38	27	0.277	0.040	11	0.110	0.046	0	0.000	0.000	0	0.000	0.000	0.72	0.06
7/28/2005	3	12	81	22	16	0.202	0.061	6	0.075	0.037	0	0.000	0.000	0	0.000	0.000	0.73	0.08
7/29/2005	3	12	61	48	24	0.360	0.127	23	0.403	0.084	1	0.019	0.019	0	0.000	0.000	0.46	0.06
7/30/2005	3	12	76	55	33	0.406	0.058	21	0.250	0.113	1	0.029	0.029	0	0.000	0.000	0.59	0.08
7/31/2005	3	12	70	33	20	0.270	0.054	13	0.174	0.093	0	0.000	0.000	0	0.000	0.000	0.61	0.09
8/1/2005	3	12	81	23	21	0.247	0.128	2	0.024	0.024	0	0.000	0.000	0	0.000	0.000	0.91	0.06
8/2/2005	3	12	74	31	28	0.393	0.102	3	0.042	0.003	0	0.000	0.000	0	0.000	0.000	0.90	0.02
8/3/2005	3	12	48	15	13	0.239	0.063	2	0.044	0.044	0	0.000	0.000	0	0.000	0.000	0.84	0.15
8/4/2005	3	12	78	20	19	0.240	0.041	1	0.012	0.012	0	0.000	0.000	0	0.000	0.000	0.95	0.05
8/5/2005	3	12	69	21	17	0.227	0.045	4	0.068	0.038	0	0.000	0.000	0	0.000	0.000	0.77	0.08
8/6/2005	3	12	80	23	18	0.224	0.058	5	0.064	0.046	0	0.000	0.000	0	0.000	0.000	0.78	0.15
8/7/2005	1	4	27	6	2	0.074		4	0.131		0	0.000		0	0.000	0.000	0.36	
8/8/2005	3	12	79	10	6	0.075	0.036	4	0.050	0.050	0	0.000	0.000	0	0.000	0.000	0.60	0.13
8/9/2005	4	16	108	10	8	0.073	0.021	2	0.019	0.019	0	0.000	0.000	0	0.000	0.000	0.79	0.17
8/10/2005	4	16	93	9	7	0.072	0.042	2	0.023	0.013	0	0.000	0.000	0	0.000	0.000	0.76	0.16
Total	128	505	3,135	1,760	1027	13.810		730	10.050		2	0.048		1	0.012			
Min	1	4	27	6	2	0.072		1	0.012		0	0.000		0	0.000		0.27	
Mean	3	12	76	43	25	0.337		18	0.245		0	0.001		0	0.000		0.62	
Max	4	16	109	114	64	0.903		50	0.750		1	0.029		1	0.012		0.95	

Note: A complete rep consists of four drifts (two mesh sizes, two banks). Only reps that had at least one drift from each mesh size were used in this table.

[a] Chinook salmon CPUE / all species CPUE.

APPENDIX E. AVERAGE MEF LENGTHS OF SOCKEYE SALMON SAMPLED IN THE INRIVER GILLNETS, 2005

Appendix E1.–Average MEF lengths of sockeye salmon sampled in the inriver gillnets, 2005.

	5.0 inch Mesh					7.5 inch Mesh					5.0 and 7.5 inch Mesh				
Date[a]	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD
5/19/2005	2	495	510	502.5	10.6	0					2	495	510	502.5	10.6
5/21/2005	1	550	550	550.0		0					1	550	550	550.0	
5/23/2005	1	555	555	555.0		2	540	620	580.0	56.6	3	540	620	571.7	42.5
5/25/2005	10	540	620	585.5	25.5	0					10	540	620	585.5	25.5
5/27/2005	2	520	595	557.5	53.0	2	545	560	552.5	10.6	4	520	595	555.0	31.4
5/29/2005	7	545	610	576.4	23.8	6	580	610	597.5	10.8	13	545	610	586.2	21.2
5/31/2005	3	580	600	588.3	10.4	6	560	620	587.5	21.4	9	560	620	587.8	17.7
6/2/2005	23	525	615	587.8	17.9	3	610	620	613.3	5.8	26	525	620	590.8	18.8
6/4/2005	6	560	605	588.3	16.3	6	510	620	580.8	44.4	12	510	620	584.6	32.2
6/6/2005	20	545	625	588.3	21.8	12	540	610	591.7	19.1	32	540	625	589.5	20.6
6/8/2005	61	530	620	584.5	22.2	33	540	620	585.9	20.3	94	530	620	585.0	21.5
6/10/2005	42	530	630	577.4	24.4	26	540	620	585.6	17.3	68	530	630	580.5	22.2
6/12/2005	35	530	620	576.9	25.8	11	535	630	574.1	29.8	46	530	630	576.2	26.5
6/14/2005	33	520	620	574.7	26.4	18	530	630	581.4	21.8	51	520	630	577.1	24.9
6/16/2005	40	505	640	570.0	30.4	8	505	610	563.8	33.5	48	505	640	569.0	30.6
6/18/2005	27	510	640	569.1	32.6	18	510	605	562.0	20.4	45	510	640	566.2	28.3
6/20/2005	57	510	630	574.9	30.3	18	510	620	576.1	34.9	75	510	630	575.2	31.2
6/22/2005	48	520	620	569.4	26.6	18	520	610	562.8	30.0	66	520	620	567.6	27.4
6/24/2005	27	540	625	576.5	22.5	15	425	620	555.0	48.9	42	425	625	568.8	35.3
6/26/2005	43	505	625	566.3	28.0	18	485	650	568.3	37.8	61	485	650	566.9	30.9
6/28/2005	29	480	605	559.1	29.5	9	440	615	547.8	49.8	38	440	615	556.4	34.9
6/30/2005	34	520	610	570.9	26.0	11	540	620	577.7	27.5	45	520	620	572.6	26.2
7/2/2005	20	530	610	565.5	21.0	6	530	605	576.7	25.2	26	530	610	568.1	22.0
7/4/2005	4	540	600	578.8	28.4	0					4	540	600	578.8	28.4
7/6/2005	12	545	640	580.4	23.9	3	550	610	573.3	32.1	15	545	640	579.0	24.6
7/8/2005	19	540	615	564.7	21.3	7	505	620	573.6	37.9	26	505	620	567.1	26.2
7/10/2005	22	545	615	573.6	21.8	5	560	605	580.0	18.4	27	545	615	574.8	21.1
7/12/2005	38	520	660	576.4	29.0	8	550	630	577.5	25.4	46	520	660	576.6	28.1
7/14/2005	17	540	610	573.8	21.3	1	600	600	600.0		18	540	610	575.3	21.5
7/16/2005	15	525	620	578.0	30.8	18	540	630	585.8	29.5	33	525	630	582.3	29.9
7/18/2005	20	550	620	582.0	20.4	4	490	605	556.3	48.2	24	490	620	577.7	27.2
7/20/2005	12	490	600	566.3	33.0	13	500	620	570.0	35.5	25	490	620	568.2	33.7
7/22/2005	6	555	615	580.8	22.7	0					6	555	615	580.8	22.7
7/24/2005	14	540	620	585.4	27.3	0					14	540	620	585.4	27.3
7/26/2005	11	545	620	583.2	23.3	3	605	620	611.7	7.6	14	545	620	589.3	23.9
7/28/2005	5	545	560	556.0	6.5	1	400	400	400.0		6	400	560	530.0	64.0
7/30/2005	15	510	610	564.0	29.3	6	505	610	572.5	39.6	21	505	610	566.4	31.7
8/1/2005	2	530	580	555.0	35.4	0					2	530	580	555.0	35.4
8/3/2005	2	580	600	590.0	14.1	0					2	580	600	590.0	14.1
8/5/2005	3	540	605	581.7	36.2	1	570	570	570.0		4	540	605	578.8	30.1
8/7/2005	4	570	610	590.0	18.3	0					4	570	610	590.0	18.3
8/9/2005	0					2	580	640	610.0	42.4	2	580	640	610.0	42.4

[a] Sockeye salmon lengths were measured on alternate days for both runs.

APPENDIX F. TEMPORALLY STRATIFIED AGE COMPOSITION ESTIMATES FOR THE KENAI RIVER CHINOOK SALMON FISHERY, 2005

Appendix F1.–Temporally stratified harvest estimates, by age class and location, of late-run Kenai River Chinook salmon in the sport harvest between the Soldotna Bridge and the Warren Ames Bridge, 2005.

	Age					
Parameter	1.1	1.2	1.3	1.4	1.5	Total
Late Run, 1 July- 17 July						
Female						
Sample size			13	93	3	109
% sample			6.0%	43.3%	1.4%	50.7%
SE % sample			1.6%	3.4%	0.8%	3.4%
Downstream Harvest			59	424	14	497
SE Downstream Harvest			18	68	8	77
Upstream Harvest			342	2,449	79	2,870
SE Upstream Harvest			98	318	46	355
Total Harvest			402	2,873	93	3,367
SE Total Harvest			114	344	54	381
Male						
Sample size	2	10	33	56	5	106
% sample	0.9%	4.7%	15.3%	26.0%	2.3%	49.3%
SE % sample	0.7%	1.4%	2.5%	3.0%	1.0%	3.4%
Downstream Harvest	9	46	150	255	23	483
SE Downstream Harvest	6	15	32	46	10	75
Upstream Harvest	53	263	869	1,475	132	2,791
SE Upstream Harvest	37	86	166	228	60	348
Total Harvest	62	309	1,019	1,730	154	3,274
SE Total Harvest	44	99	188	253	70	374
Combined						
Sample size	2	10	46	149	8	215
% sample	0.9%	4.7%	21.4%	69.3%	3.7%	100.0%
SE % sample	0.7%	1.4%	2.8%	3.2%	1.3%	0.0%
Downstream Harvest	9	46	210	679	36	979
SE Downstream Harvest	6	15	40	100	14	138
Upstream Harvest	53	263	1,211	3,924	211	5,662
SE Upstream Harvest	37	86	202	445	76	589
Total Harvest	62	309	1,421	4,603	247	6,641
SE Total Harvest	44	99	226	468	88	605

-continued-

Appendix F1.–Page 2 of 2.

Parameter	Age 1.1	1.2	1.3	1.4	1.5	Total
Late Run, 1 July-31 July						
Female						
Sample size			26	195	3	224
Downstream Harvest			139	1,047	14	1,199
SE Downstream Harvest			29	111	8	123
Upstream Harvest			790	5,959	79	6,828
SE Upstream Harvest			166	617	46	682
Total Harvest			928	7,006	93	8,027
SE Total Harvest			191	655	54	718
% Total Harvest			6.1%	45.8%	0.6%	52.4%
SE % Total Harvest			1.2%	2.4%	0.3%	2.4%
Male						
Sample size	2	12	54	128	9	205
Downstream Harvest	9	58	279	695	47	1,088
SE Downstream Harvest	6	18	44	82	16	114
Upstream Harvest	53	332	1,592	3,952	269	6,198
SE Upstream Harvest	37	99	242	465	92	623
Total Harvest	62	390	1,870	4,647	317	7,286
SE Total Harvest	44	115	275	503	108	661
% Total Harvest	0.4%	2.5%	12.2%	30.3%	2.1%	47.6%
SE % Total Harvest	0.3%	0.7%	1.6%	2.3%	0.7%	2.4%
Combined						
Sample size	2	12	80	323	12	429
Downstream Harvest	9	58	417	1,742	61	2,287
SE Downstream Harvest	6	18	57	167	18	210
Upstream Harvest	53	332	2,381	9,911	348	13,026
SE Upstream Harvest	37	99	314	932	103	1,142
Total Harvest	62	390	2,799	11,653	409	15,313
SE Total Harvest	44	115	350	960	121	1,161
% Total Harvest	0.4%	2.5%	18.3%	76.1%	2.7%	100.0%
SE % Total Harvest	0.3%	0.7%	1.9%	2.1%	0.8%	0.0%

Note: Downstream is between the Warren Ames Bridge and the Chinook salmon sonar site. Upstream is between the Chinook salmon sonar site and the Soldotna Bridge. Total harvest is between the Soldotna Bridge and the Warren Ames Bridge.

Harvest estimates, by age class and location, for the late-run Kenai River Chinook salmon sport fishery between the Soldotna Bridge and the Warren Ames Bridge are presented in Table 4.

Appendix F2.–Temporally stratified sonar passage estimates by age class for early-run Kenai River Chinook salmon, 2005.

Parameter	1.1	1.2	1.3	1.4	1.5	Total
Early Run, 16 May- 5 June						
Female						
Sample size	0	1	17	52	1	71
% sample	0.0%	0.7%	11.6%	35.4%	0.7%	48.3%
SE % sample	0.0%	0.6%	2.2%	3.3%	0.6%	4.1%
Sonar passage estimate	0	26	437	1,336	26	1,825
SE sonar passage estimate	0	94	366	553	94	702
Male						
Sample size	0	7	15	51	3	76
% sample	0.0%	4.8%	10.2%	34.7%	2.0%	51.7%
SE % sample	0.0%	1.8%	2.5%	3.9%	1.2%	4.1%
Sonar passage estimate	0	180	386	1,311	77	1,953
SE sonar passage estimate	0	67	95	154	44	167
Combined						
Sample size	0	8	32	103	4	147
% sample	0.0%	5.4%	21.8%	70.1%	2.7%	100.0%
SE % sample	0.0%	1.9%	3.4%	3.8%	1.3%	0.0%
Sonar passage estimate	0	206	822	2,647	103	3,778
SE sonar passage estimate	0	71	131	164	51	115
Early Run, 6 June- 30 June						
Female						
Sample size	0	1	27	70	4	102
% sample	0.0%	0.5%	12.6%	32.6%	1.9%	47.4%
SE % sample	0.0%	0.5%	2.3%	3.2%	0.9%	3.4%
Sonar passage estimate	0	78	2,094	5,428	310	7,910
SE sonar passage estimate	0	78	379	541	154	583
Male						
Sample size	3	29	42	35	4	113
% sample	1.4%	13.5%	19.5%	16.3%	1.9%	52.6%
SE % sample	0.8%	2.3%	2.7%	2.5%	0.9%	3.4%
Sonar passage estimate	233	2,249	3,257	2,714	310	8,762
SE sonar passage estimate	134	391	455	423	154	587
Combined						
Sample size	3	30	69	105	8	215
% sample	1.4%	14.0%	32.1%	48.8%	3.7%	100.0%
SE % sample	0.8%	2.4%	3.2%	3.4%	1.3%	0.0%
Sonar passage estimate	233	2,326	5,351	8,142	620	16,672
SE sonar passage estimate	134	397	539	585	216	271

Note: Sonar passage estimates by age class for early-run Kenai River Chinook salmon, 2005, are presented in Table 5.

Appendix F3.–Temporally stratified sonar passage estimates by age class for late-run Kenai River Chinook salmon, 2005.

Parameter	1.2	1.3	1.4	1.5	Total
Late Run, 1 July-20 July					
Female					
Sample size	3	10	112	4	129
% sample	1.0%	3.4%	37.6%	1.3%	43.3%
SE % sample	0.7%	1.2%	3.3%	0.8%	2.9%
Sonar passage estimate	279	931	10,426	372	12,009
SE sonar passage estimate	105	193	706	121	722
Male					
Sample size	26	48	88	7	169
% sample	8.7%	16.1%	29.5%	2.3%	56.7%
SE % sample	1.6%	2.1%	2.6%	0.9%	2.9%
Sonar passage estimate	2,420	4,468	8,192	652	15,732
SE sonar passage estimate	455	595	743	244	826
Combined					
Sample size	29	58	200	11	298
% sample	9.7%	19.5%	67.1%	3.7%	100.0%
SE % sample	1.7%	2.3%	2.7%	1.1%	0.0%
Sonar passage estimate	2,700	5,399	18,618	1,024	27,741
SE sonar passage estimate	478	642	798	304	381
Late Run, 21 July-10 August					
Female					
Sample size	1	12	96	3	112
% sample	0.5%	5.4%	43.4%	1.4%	50.7%
SE % sample	0.5%	1.5%	3.3%	0.8%	3.4%
Sonar passage estimate	70	842	6,733	210	7,855
SE sonar passage estimate	70	247	770	122	846
Male					
Sample size	3	25	73	8	109
% sample	1.4%	11.3%	33.0%	3.6%	49.3%
SE % sample	0.8%	2.1%	3.2%	1.3%	3.4%
Sonar passage estimate	210	1,753	5,120	561	7,644
SE sonar passage estimate	122	362	655	200	832
Combined					
Sample size	4	37	169	11	221
% sample	1.8%	16.7%	76.5%	5.0%	100.0%
SE % sample	0.9%	2.5%	2.9%	1.5%	0.0%
Sonar passage estimate	281	2,595	11,852	771	15,499
SE sonar passage estimate	141	447	1,099	236	1,316

Note: Age composition and sonar passage by age class for 2005 late-run Kenai River Chinook salmon are presented in Table 6.

APPENDIX G. AGE COMPOSITION ESTIMATES FOR THE KENAI RIVER CHINOOK SALMON INRIVER RETURN USING CATCH FROM 7.5 INCH MESH GILLNET, 2005

Appendix G1.–Sonar passage estimates by age class for early-run Kenai River Chinook salmon estimated from captures in a 7.5 inch mesh gillnet, 2005.

Parameter	1.2	1.3	1.4	1.5	Total
Early Run, 16 May-5 June					
Female					
Sample size	1	10	40	1	52
% sample	1.1%	10.6%	42.6%	1.1%	55.3%
SE % sample	1.1%	3.2%	5.1%	1.1%	5.2%
Sonar passage estimate	40	402	1,608	40	2,090
SE sonar passage estimate	40	121	200	40	205
Male					
Sample size	6	8	27	1	42
% sample	6.4%	8.5%	28.7%	1.1%	44.7%
SE % sample	2.5%	2.9%	4.7%	1.1%	5.2%
Sonar passage estimate	241	322	1,085	40	1,688
SE sonar passage estimate	96	110	180	40	201
Combined					
Sample size	7	18	67	2	94
% sample	7.4%	19.1%	71.3%	2.1%	100.0%
SE % sample	2.7%	4.1%	4.7%	1.5%	0.0%
Sonar passage estimate	281	723	2,693	80	3,778
SE sonar passage estimate	103	156	195	57	115
Early Run, 6-30 June					
Female					
Sample size	1	17	42	2	62
% sample	0.8%	12.8%	31.6%	1.5%	46.6%
SE % sample	0.8%	2.9%	4.0%	1.1%	4.3%
Sonar passage estimate	125	2,131	5,265	251	7,772
SE sonar passage estimate	125	486	680	177	735
Male					
Sample size	17	28	23	3	71
% sample	12.8%	21.1%	17.3%	2.3%	53.4%
SE % sample	2.9%	3.5%	3.3%	1.3%	4.3%
Sonar passage estimate	2,131	3,510	2,883	376	8,900
SE sonar passage estimate	486	594	551	216	738
Combined					
Sample size	18	45	65	5	133
% sample	13.5%	33.8%	48.9%	3.8%	100.0%
SE % sample	3.0%	4.1%	4.4%	2.4%	0.0%
Sonar passage estimate	2,256	5,641	8,148	627	16,672
SE sonar passage estimate	498	693	737	392	271

-continued-

Appendix G1.–Page 2 of 2.

Parameter	1.2	1.3	1.4	1.5	Total
	Early Run, 16 May-30 June				
Female					
Sample size	25	63	132	7	227
Sonar passage estimate	166	2,533	6,873	291	9,862
SE sonar passage estimate	132	501	709	181	763
% sonar passage	0.8%	12.4%	33.6%	1.4%	48.2%
SE % sonar passage	0.6%	2.4%	3.4%	0.9%	3.7%
Male					
Sample size	23	36	50	4	113
Sonar passage estimate	2,372	3,831	3,968	416	10,588
SE sonar passage estimate	495	604	579	219	765
% sonar passage	11.6%	18.7%	19.4%	2.0%	51.8%
SE % sonar passage	2.4%	2.9%	2.8%	1.1%	3.7%
Combined					
Sample size	48	99	182	11	340
Sonar passage estimate	2,538	6,364	10,841	707	20,450
SE sonar passage estimate	508	710	763	396	295
% sonar passage	12.4%	31.1%	53.0%	3.5%	100.0%
SE % sonar passage	2.5%	3.4%	3.7%	1.9%	0.0%

Note: These estimates are shown to allow comparison of inriver return age composition estimates before 2002 when only a 7.5-inch mesh gillnet was used.

.

Appendix G2.–Sonar passage estimates by age class for late-run Kenai River Chinook salmon estimated from captures in a 7.5-inch mesh gillnet, 2005.

	Age					
Parameter	1.1	1.2	1.3	1.4	1.5	Total
Late Run, 1 July-20 July						
Female						
Sample size	0	1	7	67	0	75
% sample	0.0%	0.6%	4.2%	40.4%	0.0%	45.2%
SE % sample	0.0%	0.6%	1.6%	3.8%	0.0%	3.9%
Sonar passage estimate	0	167	1,170	11,197	0	12,534
SE sonar passage estimate	0	167	434	1,071	0	1,088
Male						
Sample size	0	9	35	45	2	91
% sample	0.0%	0.0%	5.4%	21.1%	27.1%	54.8%
SE % sample	0.0%	0.0%	1.8%	3.2%	3.5%	3.9%
Sonar passage estimate	0	0	1,504	5,849	7,520	15,207
SE sonar passage estimate	0	0	489	885	965	1,095
Combined						
Sample size	0	10	42	112	2	166
% sample	0.0%	6.0%	25.3%	67.5%	1.2%	100.0%
SE % sample	0.0%	1.9%	3.4%	3.6%	0.8%	0.0%
Sonar passage estimate	0	1,671	7,019	18,717	334	27,741
SE sonar passage estimate	0	514	944	1,044	236	381
Late Run, 21 July-10 August						
Female						
Sample size	0	0	7	60	2	69
% sample	0.0%	0.0%	5.1%	44.1%	1.5%	50.7%
SE % sample	0.0%	0.0%	1.9%	4.3%	1.0%	4.3%
Sonar passage estimate	0	0	798	6,838	228	7,863
SE sonar passage estimate	0	0	301	879	161	942
Male						
Sample size	0	2	16	44	5	67
% sample	0.0%	1.5%	11.8%	32.4%	3.7%	49.3%
SE % sample	0.0%	1.0%	2.8%	4.0%	1.6%	4.3%
Sonar passage estimate	0	228	1,823	5,014	570	7,636
SE sonar passage estimate	0	161	455	754	255	928
Combined						
Sample size	0	2	23	104	7	136
% sample	0.0%	1.5%	16.9%	76.5%	5.1%	100.0%
SE % sample	0.0%	1.0%	3.2%	3.7%	2.7%	0.0%
Sonar passage estimate	0	228	2,621	11,852	798	15,499
SE sonar passage estimate	0	161	546	1,154	416	1,316

-continued-

Appendix G2.–Page 2 of 2.

Parameter	Age 1.1	1.2	1.3	1.4	1.5	Total
Late Run, 1 July-10 August						
Female						
Sample size	0	1	14	127	2	144
Sonar passage estimate	0	167	1,968	18,034	228	20,397
SE sonar passage estimate	0	167	529	1,385	161	1,439
% sonar passage	0.0%	0.4%	4.6%	41.7%	0.5%	47.2%
SE % sonar passage	0.0%	0.4%	1.2%	2.9%	0.4%	2.9%
Male						
Sample size	0	11	51	89	7	158
Sonar passage estimate	0	228	3,327	10,863	8,090	22,843
SE sonar passage estimate	0	161	668	1,162	998	1,435
% sonar passage	0.0%	0.5%	7.7%	25.1%	18.7%	52.8%
SE % sonar passage	0.0%	0.4%	1.5%	2.5%	2.3%	2.9%
Combined						
Sample size	0	12	65	216	9	302
Sonar passage estimate	0	1,899	9,640	30,569	1,132	43,240
SE sonar passage estimate	0	539	1,090	1,556	478	1,370
% sonar passage	0.0%	4.4%	22.3%	70.7%	2.6%	100.0%
SE % sonar passage	0.0%	1.2%	2.5%	2.7%	1.1%	0.0%

Note: These estimates are shown to allow comparison of inriver return age composition estimates before 2002 when only a 7.5-inch mesh gillnet was used.