Fishery Data Series No. 10-63

Chinook Salmon Creel Survey and Inriver Gillnetting Study, Lower Kenai River, Alaska, 2007

REVISED 12/07/2010

Corrections have been made to Table 5 and to Figure 10.

by

Anthony Eskelin

October 2010

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

Symbols and Abbreviations

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

FISHERY DATA SERIES NO. 10-63

CHINOOK SALMON CREEL SURVEY AND INRIVER GILLNETTING STUDY, LOWER KENAI RIVER, ALASKA, 2007

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, 99518-1565

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

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ABSTRACT

A creel survey to estimate angler effort, catch, and harvest of Chinook salmon *Oncorhynchus tshawytscha* was conducted on the Kenai River between Soldotna Bridge and Warren Ames Bridge from 16 May 2007 through 31 July 2007. For the early run, 16 May through 30 June, effort was 70,256 (SE = 3,611) angler-hours and harvest was 2,645 (SE = 456) Chinook salmon. Unguided anglers accounted for 36% of effort and 27% of harvest, versus guided anglers who accounted for 64% of effort and 73% of harvest. The early-run harvest was composed of 20.0% (SE = 3.8%) age-1.2 fish, 57.3% (SE = 4.7%) age-1.3 fish, 21.8% (SE = 4.0%) age-1.4 fish, and 0.9% (SE = 0.9%) age-1.5 fish, whereas early-run Chinook passage at the sonar site was composed of 30.8% (SE = 3.1%) age-1.2 fish, 35.3% (SE = 3.2%) age-1.3 fish, 32.6% (SE = 3.2%) age-1.4 fish and 0.9% (SE = 0.6%) age-1.5 fish. For the late run, 1 July through 31 July, effort was 219,219 (SE = 7,917) angler-hours and harvest was 9,258 (SE = 637) Chinook salmon. Unguided anglers accounted for 51% of effort and 31% of harvest, versus guided anglers who accounted for 49% of effort and 69% of harvest. The late-run sport harvest was composed of 11.5% (SE = 2.0%) age-1.2 fish, 29.9% (SE = 2.9%) age-1.3 fish, 52.0% (SE = 3.2%) age-1.4 fish and 6.6% (SE = 1.6%) age-1.5 fish, whereas the late-run (1 July through 10 August) Chinook passage at the sonar site was composed of 20.4% (SE = 1.9%) age-1.2 fish, 27.4% (SE = 2.1%) age-1.3 fish, 43.0% (SE = 2.4%) age-1.4 fish and 8.8% (SE = 1.4%) age-1.5 fish.

A standardized inriver gillnetting program was conducted near the Chinook salmon sonar site. The netting program ran from 16 May 2007 through 10 August 2007. During the early run, 272 Chinook salmon, 1,210 sockeye salmon *O. nerka*, and 9 Dolly Varden *Salvelinus malma* were captured. During the late run, 794 Chinook salmon, 2,004 sockeye salmon, 42 coho salmon *O. kisutch*, 3 pink salmon *O. gorbuscha*, 13 Dolly Varden, and 1 rainbow trout *O. mykiss* were captured. The ratio of Chinook salmon CPUE to all species CPUE averaged 0.24 in the early run and 0.31 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 sport 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 Warren Ames Bridge (river mile [rm] 5.2) and Soldotna Bridge (rm 21.1) (Figure 2) is the subject of this report.

Chinook salmon returning to the Kenai River exhibit two distinct run timing patterns: "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. Sport 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, weighing 44.1 kg (97 lb 4 oz), was harvested from the Kenai River in May 1985.

The Alaska Department of Fish and Game (ADF&G) implemented a Kenai River Chinook salmon creel survey in 1974 in response to an increase in the number of boat anglers targeting Chinook salmon. Angler effort and harvest continued to increase through 1988 then declined during the early 1990s due to low Chinook salmon returns and restrictions to the fishery (Figures 3 and 4). Effort and harvest during the early-run fishery have been relatively stable since 2003 but remain below historical averages. In the late-run fishery, effort has been relatively stable

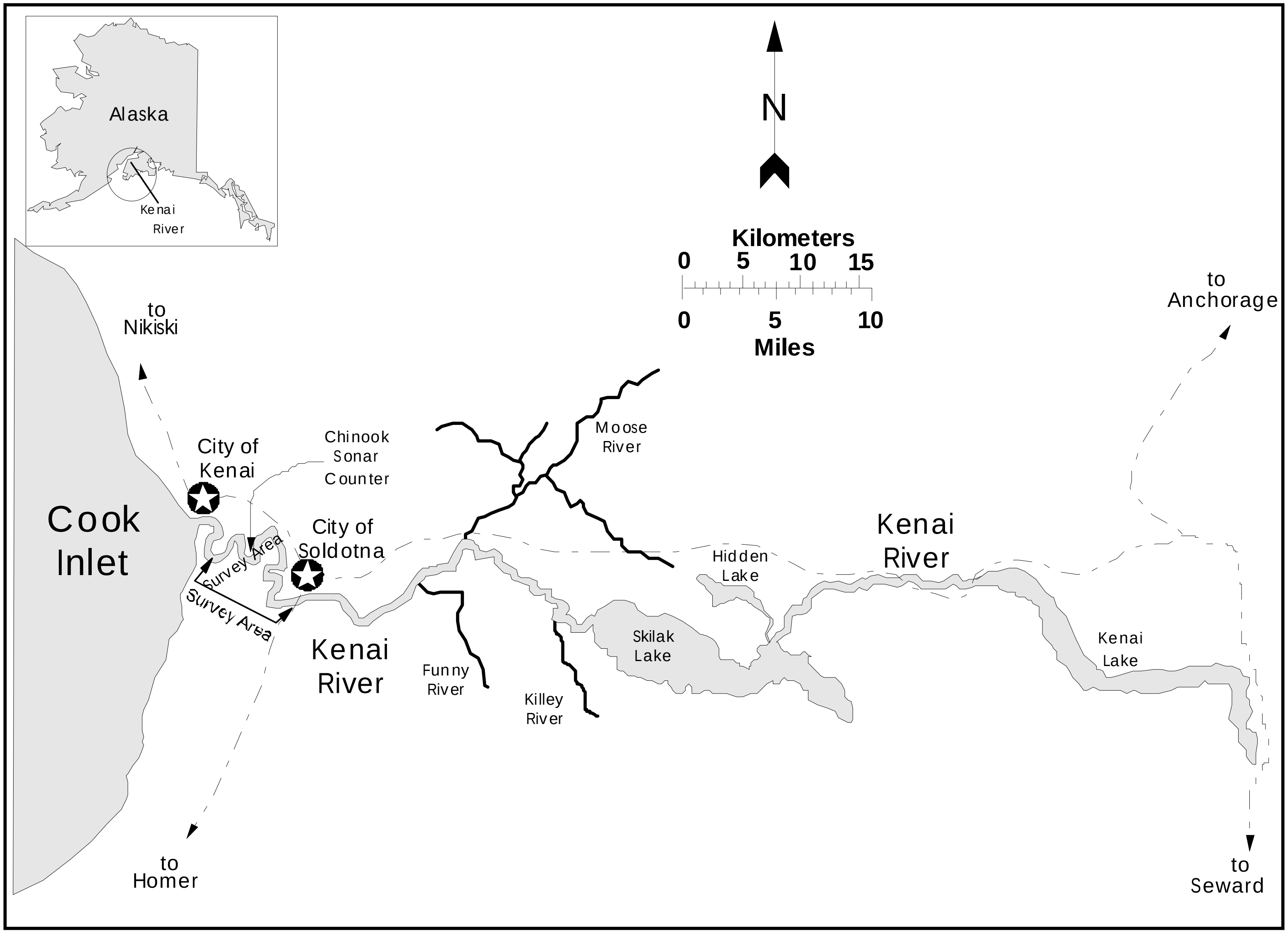


Figure 1.-Kenai River drainage on Kenai Peninsula in Southcentral Alaska.

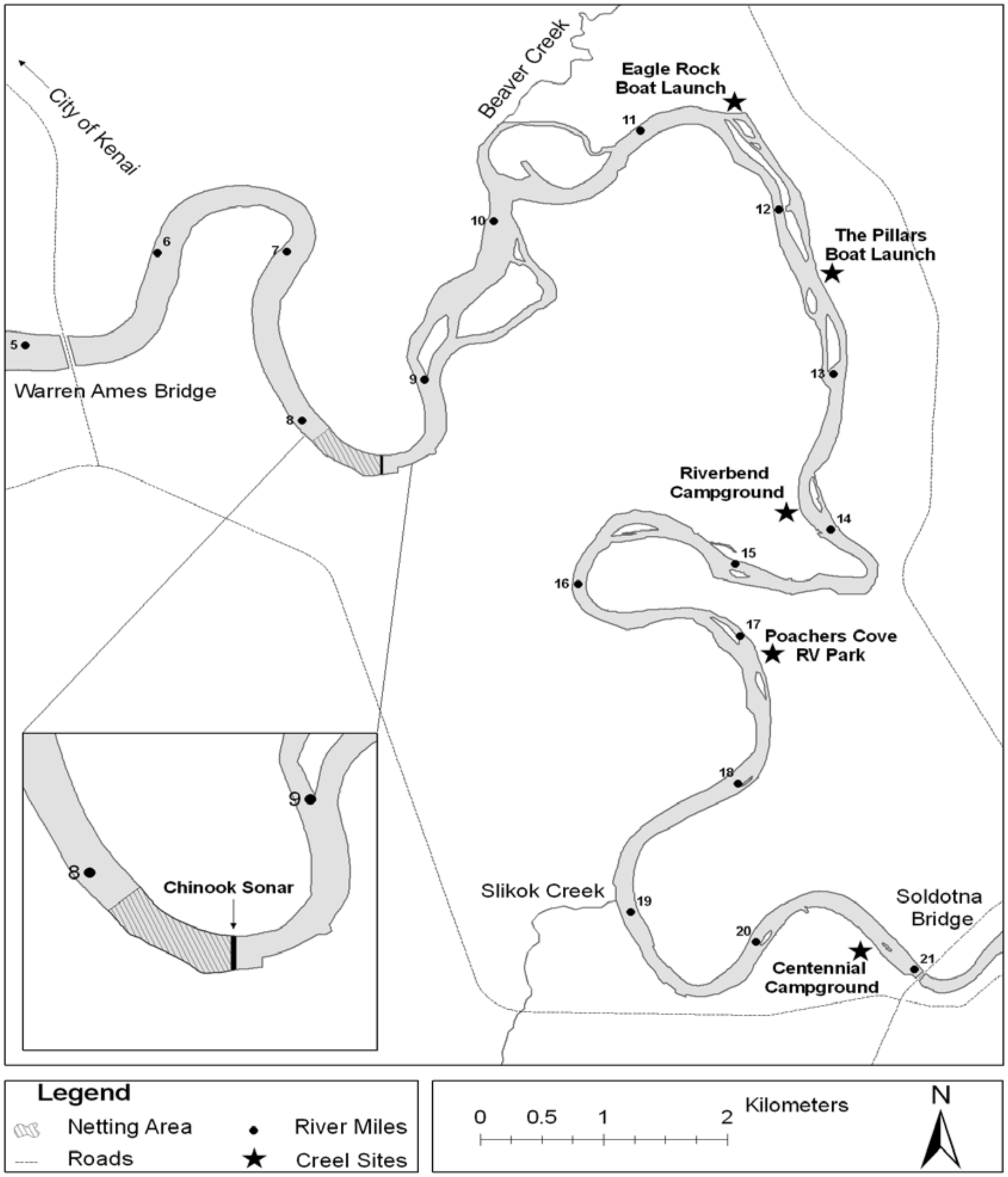
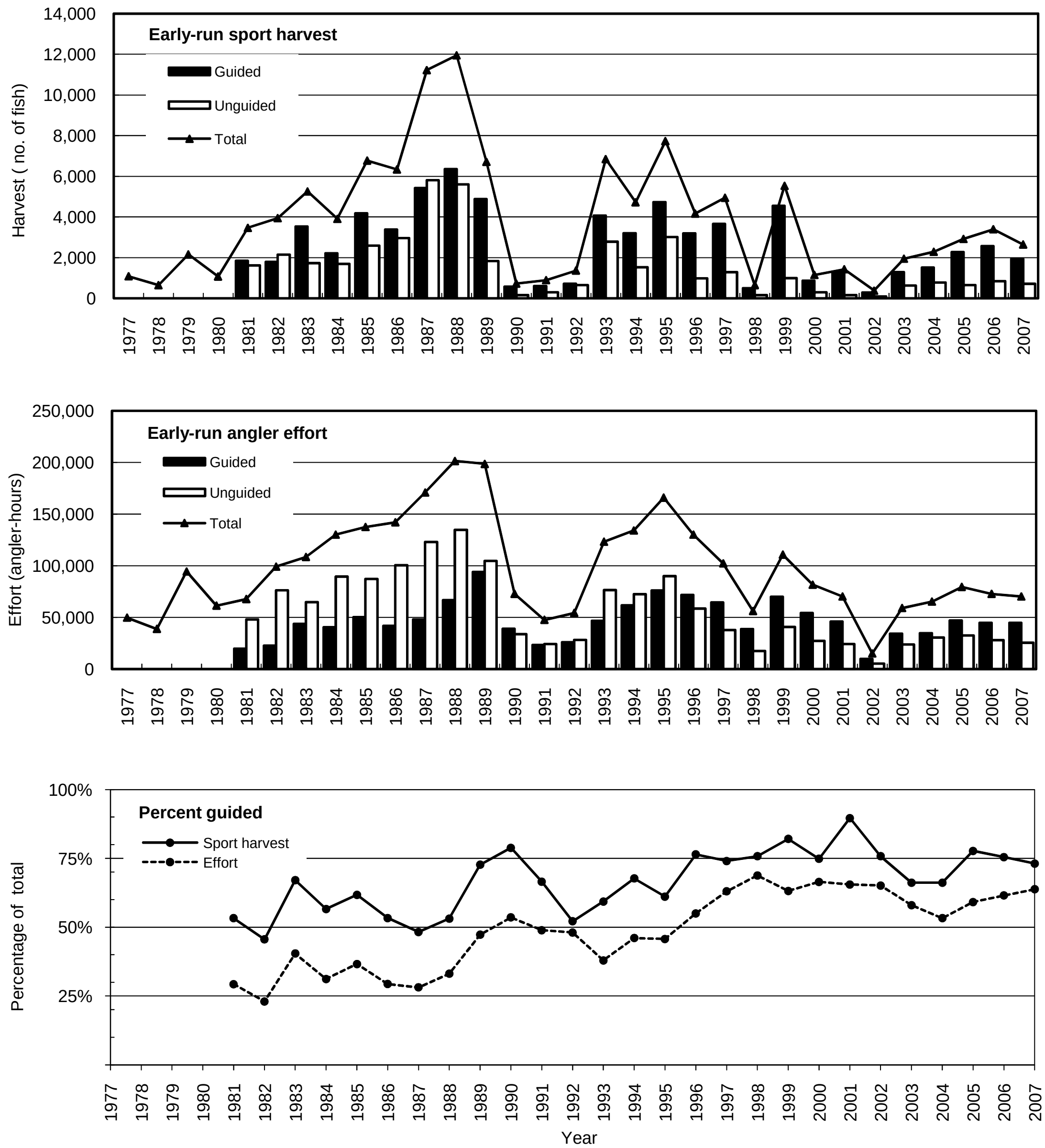


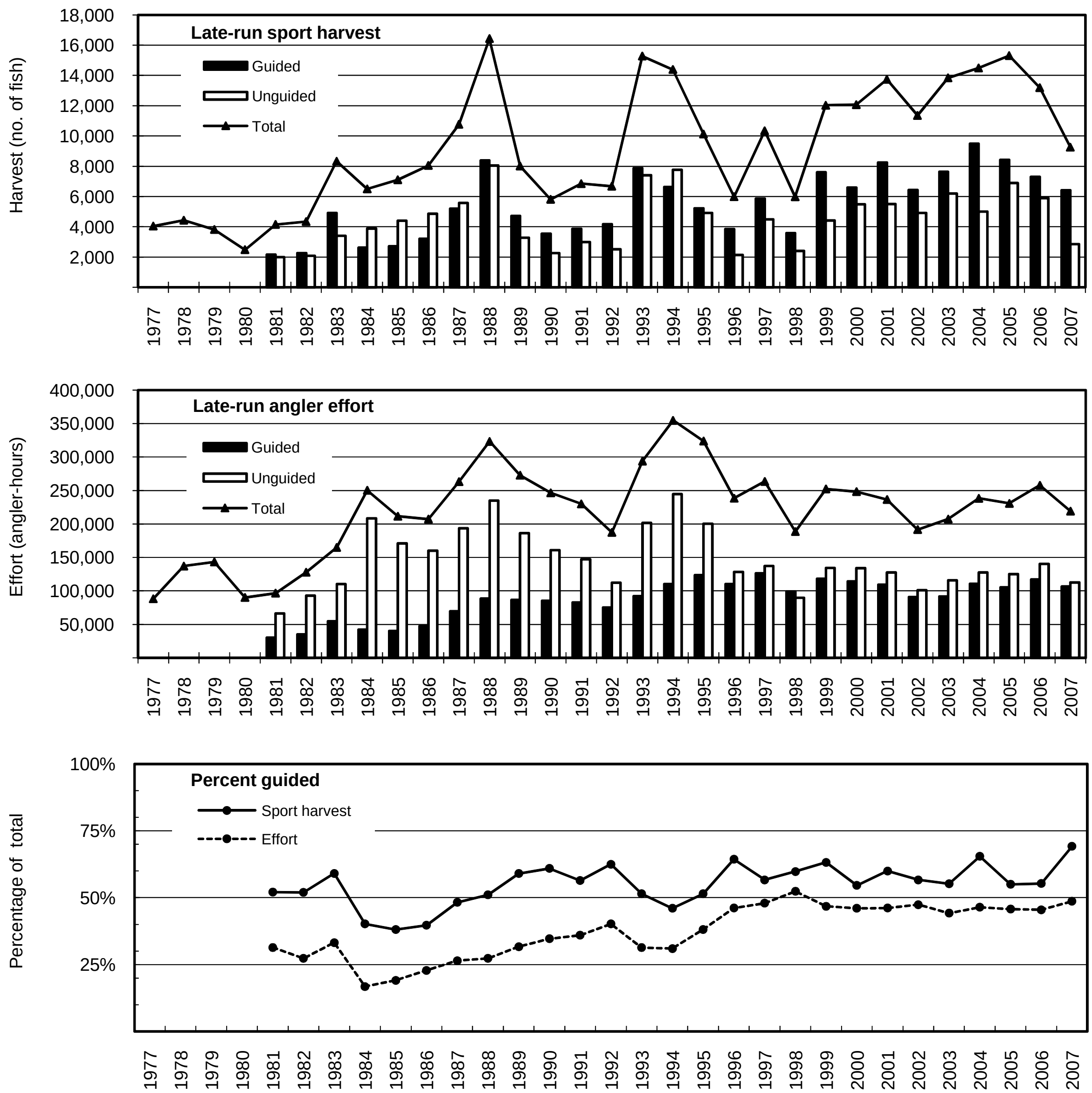
Figure 2.-Lower Kenai River from Warren Ames Bridge (rm 5.2) to Soldotna Bridge (rm 21.1).



Source: Alaska Statewide Harvest Survey (SWHS) reports (Howe et al. 1995, 1996, 2001a-d; Jennings et al. 2004, 2006 a-b, 2007, 2009 a-b, 2010; Mills 1982-1994; Walker et al. 2003).

Note: Prior to 1981, the SWHS did not collect data on guided versus unguided anglers.

Figure 3.-Guided versus unguided sport harvest and angler effort for early-run Kenai River Chinook salmon between Soldotna Bridge and Warren Ames Bridge, 1977–2007.



Source: Alaska Statewide Harvest Survey (SWHS) reports (Howe et al. 1995, 1996, 2001a-d; Mills 1982-1994; Jennings et al. 2004, 2006a-b, 2007, 2009a-b, 2010; Walker et al. 2003).

Note: Prior to 1981, there were no data collected on guided versus unguided anglers.

Figure 4.-Guided versus unguided sport harvest and angler effort for late-run Kenai River Chinook salmon between Soldotna Bridge and Warren Ames Bridge, 1977–2007.

since 1996, whereas harvest has fluctuated and has been above historical averages since 1998 (Figure 4). Since 1981, the Alaska Statewide Harvest Survey (SWHS) has reported separate effort and harvest estimates for guided and unguided anglers (Figures 3 and 4).

In 1979, ADF&G began monitoring the age, sex, and length composition of the Kenai River Chinook salmon return by implementing an inriver gillnetting program. Inriver gillnetting was standardized to include catch rates in 1998 near the Chinook sonar site at rm 8.6 and further standardized to include species composition in 2002. The creel survey and inriver gillnetting programs coupled with the Chinook salmon sonar project are critical to inseason management and the development of escapement goals for Kenai River Chinook salmon.

MANAGEMENT PLANS

The early and late Kenai River Chinook salmon runs 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; Eskelin 2007, 2009; Hammarstrom (1975-1981, 1988-1994); Hammarstrom et al. (1985); Hammarstrom and Larson (1982-1984, 1986); King (1995-1997); Marsh (1999, 2000); Reimer et al. (2002); and Reimer (2003, 2004a, b).

The early run is managed to attain an optimal escapement goal (OEG) of 5,300 to 9,000 Chinook salmon. If the spawning escapement is projected to exceed 9,000 fish, the fishery will be liberalized by emergency order to allow bait. If the spawning escapement is projected to be less than 5,300 fish, the department will restrict the fishery by emergency order by prohibiting harvest of Chinook salmon less than 55 inches (in) total length (TL), or by closing the fishery. In March 2003, the BOF introduced a slot limit in the *Kenai River and Kasilof River Early-Run King Salmon Conservation Management Plan* (5 AAC 57.160) that prohibits harvest of Chinook salmon between 44 in TL and those less than 55 in TL until 1 July below Soldotna Bridge and until 15 July above Soldotna Bridge (Figure 5). 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 more complicated because Chinook salmon are harvested by the commercial sockeye salmon setnet fishery along the east shore of Cook Inlet before they enter the sport fishery. The inriver late-run 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 5), which mandates the sport fishery be managed to achieve a spawning escapement of 17,800 to 35,700 late-run Chinook salmon.

FISHING REGULATIONS

Regulations for the Chinook salmon sport fishery in 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 (rm 18.9), Funny River (rm 30.4), Moose River (rm 36.4) and the Lower Killey River (rm 44.0) (Figure 1). The Slikok

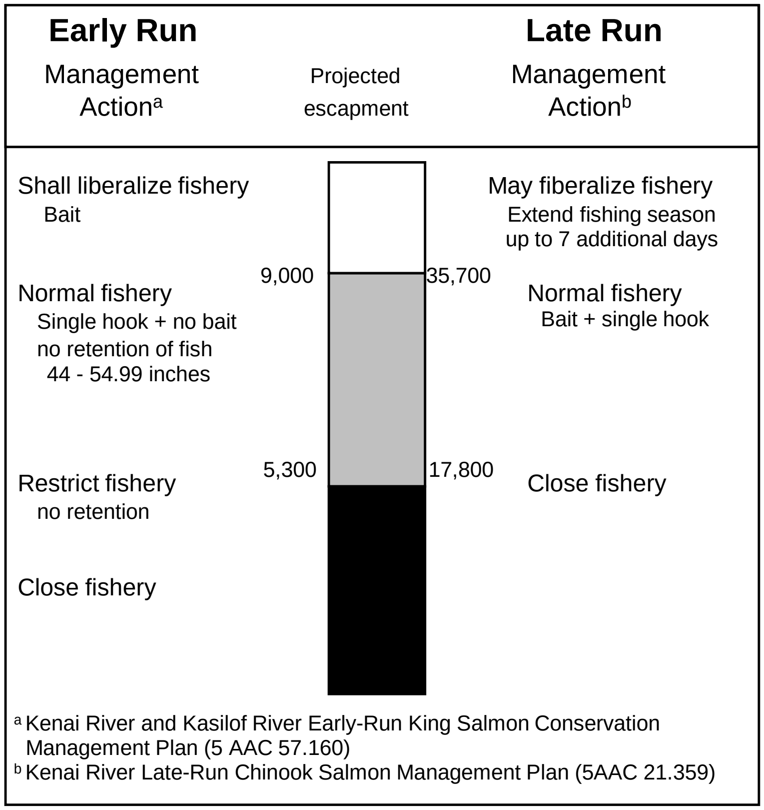


Figure 5.-Escapement levels and sport management actions for Kenai River Chinook salmon fisheries.

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 2), and the area around Morgan's Hole (approximately rm 31) (Figure 1) are closed to fishing from boats for the entire Chinook salmon fishing season.

The daily bag and possession limit is one Chinook salmon per day 20 in TL or longer; the annual limit is two Chinook salmon 20 in TL or longer. Fish that are between 44 and 54.99 in TL may not be retained before 1 July downstream of Soldotna Bridge or before 15 July upstream of Soldotna Bridge. A person who retains a Chinook salmon 20 in 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 in the early- and late-run fisheries. During the early-run fishery use of bait is not allowed, whereas bait is allowed during the late-run fishery. On Sundays and Mondays, only unguided fishing is allowed and on Mondays, unguided 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 55 in TL or longer 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 was liberalized in 2007 by emergency order (No. 2-KS-1-12-07) to allow the use of bait beginning 12 June from the mouth of Kenai River upstream to a point 100 yards below the confluence of Moose River and the Kenai River (Begich and Pawluk 2007). This management action was taken because the spawning escapement was projected to exceed 9,000 Chinook salmon. No inseason actions were taken during the late run in 2007.

OBJECTIVES

Objectives for the 2007 study were to estimate:

1. Catch and harvest[1] of Chinook salmon by the sport fishery in the mainstem Kenai River between the Warren Ames and 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. The proportion by age of the Chinook salmon population passing the Chinook salmon sonar site (rm 8.5) from 16 May through 10 August such that all age-proportion estimates, for each run, are within 10 percentage points of the true values 95% of the time.
3. The proportion by age of Chinook salmon harvested by the sport fishery in the mainstem Kenai River downstream from Soldotna Bridge such that all age-proportion estimates, for each run, are within 20 percentage points of the true values 80% of the time.

In addition to the objectives above, the project was also responsible for completing the following tasks:

1. Estimate total sport angler effort, by run, in angler-hours. Precision of the effort estimates are driven by that of the catch/harvest estimates (Objective 1).
2. Estimate daily catch per unit effort (CPUE) of Kenai River Chinook salmon captured in inriver gillnets at rm 8.5. Precision of the CPUE estimates are driven by that of the Chinook salmon proportion estimates (Objective 2.).
3. Calculate the proportion of fish captured in the inriver gillnets that are Chinook salmon.
4. Examine Chinook salmon sampled during the creel survey and inriver gillnetting for presence of the adipose fin.
5. Collect tissue samples from Kenai River Chinook salmon sampled from inriver gillnets and the sport harvest for future genetic analysis.

[1] "Harvest" is the number of fish kept; "catch" is the number of fish harvested plus fish released.

METHODS

CREEL SURVEY

A stratified, two-stage roving-access creel survey (Bernard et al. 1998) was employed to estimate sport fishing effort, catch, and harvest of Chinook salmon from Warren Ames Bridge (rm 5.2) to Soldotna Bridge (rm 21.1) (Figure 2). The creel survey was conducted from 16 May 2007 through 31 July 2007. First-stage sampling units were days. The unguided angler-day was assumed to be 20 h long (0400 to 2400 hours) while the guided angler-day was 12 h long (0600 to 1800 hours) by regulation. Daily catch and harvest were estimated as the product of effort (angler-hours) and CPUE or harvest per unit effort (HPUE). Second-stage units for estimating angler effort and CPUE or HPUE were periodic angler counts and angler trips. Angler trips were sampled by conducting completed-trip angler interviews.

Stratification accounted for the geographical, temporal, and regulatory factors affecting the fishery. Since significant harvest below the sonar site would affect inriver return and escapement estimates, angler counts were geographically stratified into two areas: (1) between Soldotna Bridge and the Chinook salmon sonar site, and (2) between the Chinook salmon sonar site and 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).

The sampling strata used for conducting Kenai River Chinook salmon angler counts and estimating creel statistics are presented in Table 1.

Two of the four available weekdays and both weekend days were sampled each week. An exception was the week of 29 May–3 June, when 2 days were selected randomly from the 3 weekend/holiday days available. The early run was composed of 28 strata. The late run was composed of 19 strata. Mondays were not sampled even though unguided drift boat anglers were allowed to fish.

Water clarity was measured to the nearest 0.05 m twice daily with a Secchi disk near mid-channel at rm 15.3.

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 (h). The schedule ensured that at least two angler counts were conducted while guided anglers were fishing (between 0600 and 1800 hours) each day.

Counts were conducted from a boat between Soldotna Bridge and Warren Ames Bridge, a distance of 15.9 rm. To maximize interview time, the direction (upstream or downstream)

Table 1.-Sampling strata used for conducting Kenai River Chinook salmon angler counts and estimating creel statistics, 2007.

Sampling strata		
Type	Number	Description
Geographic [a]	2	Warren Ames Bridge (rm 5.1) to downstream of the Chinook salmon sonar site (rm 8.5)
		Upstream of the Chinook salmon sonar site (rm 8.5) to Soldotna Bridge (rm 21.1)
Temporal	7	Early run: 16-20 May, 22-27 May, 29 May -3 June, 5-10 June, 12-17 June, 19-24 June, and 26-30 June
	6	Late run: 1 July, 3-8 July, 10-15 July, 17-22 July, 24-29 July, and 31 July
Day type	2	Weekdays
		Weekends/holidays
Angler type	2	Guided
		Unguided

[a] Used for angler counts only.

traveled to conduct angler counts was pre-selected to minimize total distance traveled and time spent conducting the count. Anglers were counted while driving the boat through the survey area. The entire count required approximately 45 minutes to complete, and most counts were completed in less than 1 h. Angler counts were treated as instantaneous counts hence 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 the boat contained at least one angler. Eleven thumb counters were used to sum the following categories for each 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[2], (10) non-active boats[3], and (11) shore anglers. Only categories 5-8 were required for this project; categories 1-4, and 9-11 were supplementary information for management purposes.

One count was completed each Monday between 0800 and 1400 hours as an index of effort[4].

Angler Interviews

Anglers who completed fishing were interviewed at the following boat launch sites (Figure 2):

2 Boats were counted as active boats if there were no anglers actively fishing from the boat, but the boat and motor were in operation.

3 Boats were counted as non-active boats if there were no anglers actively fishing from the boat, the motor was not in operation, but it was obvious the motor had been run during the day.

4 See page 17 for an explanation of Monday angler counts.

A) Centennial Campground
B) Poacher's Cove
C) Riverbend Campground
D) Pillars Boat Launch
E) Eagle Rock Campground

Interviews were conducted only at Pillar's Boat Launch when the creel survey began on 17 May. Other boat launch sites were added to the sampling schedule immediately after sufficient boat traffic was observed there. Centennial Campground was added to the sampling schedule on 30 May, Riverbend Campground was added on 5 June, Poacher's Cove was added on 6 June and Eagle Rock Boat Launch was added on 17 June. For each day sampled, the first randomly scheduled boat count of the day was completed (between 0500 and 0900 hours) prior to conducting interviews; therefore, the entire angler-day was not sampled. The chance of introducing length-of-stay bias (Bernard et al. 1998) 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 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 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 Soldotna Bridge[5], (5) number of Chinook salmon harvested downstream of Soldotna Bridge, (6) number of Chinook salmon released downstream of Soldotna Bridge, and (7) whether released Chinook salmon were less than 44 in TL, 44-54.99 in TL, or 55 in TL or greater[6].

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. Lengths from mid eye to fork (MEF) were measured to the nearest half-centimeter. Three scales were removed from the preferred area of each fish and placed on an adhesive coated card (Clutter and Whitesel 1956; Welander 1940). Acetate impressions of the scales were aged by trained staff using a microfiche reader.

Additionally, a tissue sample (tip of axillary process) was taken from harvested fish for genetic analysis, and each harvested fish was inspected for an adipose fin. A missing adipose fin indicates the fish is either missing the fin naturally or received a coded wire tag as a juvenile. Presence of a coded wire tag would identify the fish as a stray because juvenile Chinook salmon

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5 Hours fishing were rounded to the nearest 0.5 h 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.

6 Taken during the early run only.

are not tagged in 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 the presence of a coded wire tag at the ADF&G Mark, Tag, and Age Laboratory in Juneau.

INRIVER GILLNETTING

The inriver gillnetting program began in 1979 (Hammarstrom 1980) and has been modified several times to meet the changing needs of the Kenai River Chinook salmon fishery (Marsh 2000; Reimer et al. 2002; Reimer 2004a). Due to concerns of net selectivity bias with respect to CPUE, species composition estimates, abundance estimates, as well as drifting time and area considerations, the drift gillnetting program was standardized to estimate ASL of inriver returns, CPUE, and species composition (Reimer 2004b). Inriver gillnetting was conducted 6 h each day from 16 May through 10 August in an area approximately 0.6 km in length located immediately downstream of the Chinook salmon sonar site at rm 8.5 (Figure 2). Two different mesh sizes were fished with equal frequency. Specifications of the nets used in 2007 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 and,
2. 7.5 inch (stretched mesh) multifiber, 55 meshes deep, 10 fathoms long, Shade 1, MS93 (18 strand) twine.

From 2004 to 2006, sampling was conducted approximately 6 h per day from 3 h before to 3 h after a low tide. An analysis of the number of fish passing the sonar site revealed potentially more fish could be intercepted if sampling began shortly after high tide (Figure 6). Since drifting the net is not feasible during parts of the rising and high tide stages, sampling was scheduled to begin as close to high tide as possible and still fish the net effectively. In 2007, sampling was scheduled for 6 consecutive hours beginning 1 h after high tide. One tide was sampled each day, excluding periods of darkness (2300–0400 hours).

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 area began immediately downstream from the sonar transducers (rm 8.6) and ended approximately 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 within ~30 m of either bank, (3) the net became snagged on the bottom or was not fishing properly, or (4) the end of the drift area was reached. Drifts always began at the upstream end of the study area. Two drifts (one starting on each bank) were completed with one 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 clarity and level were recorded at rm 8.6 at the beginning, midpoint, and end of each netting shift. Water level was recorded from a staff gauge located at the Chinook salmon sonar site. Water clarity was measured to the nearest 0.05 m with a Secchi disk mid-channel near the sonar site.

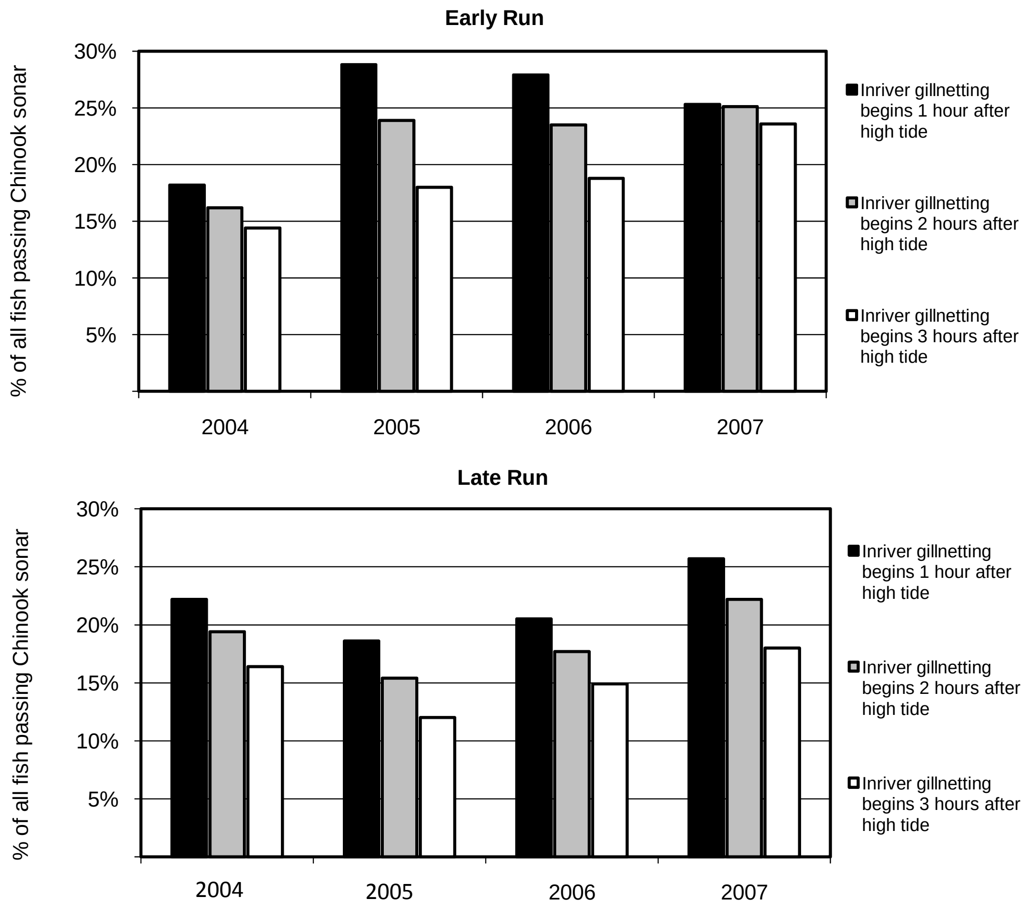

Figure 6.-Percentage of all fish passing Kenai River Chinook Sonar during different tide stages in 6 hour periods for early- and late-run Kenai River Chinook salmon, 2004–2007.

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[7] 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. Samples were stratified into two approximately 3-week strata during each run with a sample-size goal of 149 fish for each stratum. Strata for the early run were 16 May-9 June and 10-30 June; strata for the late run were 1-20 July and 21 July-10 August.

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

The number and species of all fish captured were recorded. In addition, MEF lengths of captured sockeye salmon were measured every other day. Length distribution of captured sockeye salmon was used as one variable in a mixture model to evaluate species composition in the insonified area at rm 8.6 (Miller et al. 2005).

Tissue samples (dorsal fin clips) were collected from returning Chinook salmon captured by the inriver gillnets on days when sockeye salmon lengths were not being recorded. The fin clips 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.

Captured Chinook salmon were subsampled in the late run. After 30 June, only every other Chinook salmon per drift was sampled for biological data. All other captured Chinook salmon were only given a hole punch on the dorsal lobe of the caudal fin to prevent resampling and then released. Estimates of age, sex, and length (ASL) composition of the inriver return were generated using the Chinook salmon catches from 5.0 and 7.5 inch mesh gillnets combined.

DATA ANALYSIS

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:

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

where:

x_{hig} = the number of anglers observed in the gth 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:

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

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

$$\hat{E}_{hi} = L_{hi}\bar{x}_{hi}, \tag{3}$$

where:

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

The within-day variance (effort) was estimated by:

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

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

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

where:

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

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

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

Total effort of stratum *h* was estimated by:

$$\hat{E}_h = D_h \bar{E}_h, \tag{7}$$

where:

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

The variance of total effort of each stratum in a two-stage design, omitting the finite population correction factor for the second stage, was estimated by Bernard et al. (1998):

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

where:

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

Catch and Harvest

Catch and harvest per 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:

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

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 appropriate $HPUE_{hi}$ 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 during 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. 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

By regulation (5 AAC 57.121 3A) only unguided fishing from drift boats or from shore are allowed on Mondays. Since 2002, a creel survey has not been conducted on Mondays (Reimer 2004a); rather one "index" angler count has been conducted each Monday during the middle of the day (0800-1400 hours). For 2007, the index count was used in the following ad hoc procedure to estimate effort, catch and harvest on drift boat Mondays:

1. Angler count data from 2001 were used to estimate the relationship between index counts and mean angler counts on Mondays. The mean number of anglers was approximately 78% of the number counted during the "index" period.
2. To estimate angler hours of effort E, the estimated mean count was multiplied by the length of the unguided angler-day (20 h).
3. To estimate CPUE and HPUE on Mondays without angler interviews, we exploited the tendency for angler success to exhibit an autocorrelated time trend. CPUE and HPUE were plotted versus time for days sampled with angler interviews, and then we 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

Two gillnet mesh sizes were deployed: 5.0 and 7.5 inch. Two drifts were conducted with one mesh size, originating from each side (k) of the river; then the sequence repeated with the other mesh 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:

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

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

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, $c_{smij\cdot}$ is the catch of species i in mesh m summed across drifts on both banks conducted during repetition j of day i, $e_{mij\cdot}$ 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).

Proportion of Chinook Salmon Captured by Inriver Gillnetting

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

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

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

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 were used for estimation of 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 Chinook salmon of age/sex group b sampled during stratum t, and

n_t = the number of successfully aged/sexed Chinook salmon sampled during stratum t.

The variance of $\hat{p}_{bt}$ was approximated[8] as (Cochran 1977):

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

Contingency tables and chi-square tests were used to determine if age/sex composition differed significantly ($P < 0.05$) among strata. If not, 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 (above and below the sonar), was estimated by:

$$\hat{H}_{gbt} = \hat{H}_{gt}\hat{p}_{bt}, \tag{22}$$

with variance (Goodman 1960):

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

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[8] Variance estimates for species proportions assume that each fish sampled is an independent observation (i.e., that simple random sampling was employed). In reality, the sport harvest is sampled with a multistage design (creel survey), and the inriver return with a cluster design (netting); and technically, the age proportion variances should be estimated in the context of those designs. However, age composition changes very slowly over time; and in the past we have assumed that variability between sampling stages and among clusters is negligible. To verify this, we re-analyzed the 2006 netting data, calculated the age proportions following equation 8 and compared them to the simple random sampling estimator in equation 20. The point estimates and their standard errors were essentially equivalent. Based on this evidence, we continue to use the simple random sampling equations for convenience.

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:

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

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

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},

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

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 26 of the 42 (62%) unguided powerboat fishing days were sampled (Table 2). During the late run, the creel survey sampled 13 of the 18 (72%) days the fishery was open to guided anglers and 18 of the 29 (62%) of the unguided powerboat fishing days (Table 3). A total of 3,077 angler interviews were conducted: 1,182 during the early run and 1,895 during the late run (Tables 2 and 3).

During the early run, angler counts ranged from 0 to 153 for unguided anglers and from 0 to 276 for guided anglers (Appendix A1). The largest count occurred on 16/17 June for unguided anglers and on 19 June for guided anglers. The largest count in the early run for guided and unguided anglers combined was 401 anglers on 16 June. During the late run, angler counts ranged from 7 to 603 for unguided anglers and from 152 to 767 for guided anglers (Appendix A2). The largest count occurred on 29 July for unguided anglers and on 19 July for guided anglers. The largest count in the late run for guided and unguided anglers combined was 1,093 anglers on 19 July.

Estimated effort was 70,256 (SE = 3,611) angler-hours during the early run (Table 2) and 219,219 (SE = 7,917) angler-hours during the late run (Table 3). Guided anglers accounted for 64% of the early-run effort and 49% of the late-run effort.

Table 2.-Estimated early-run Kenai River Chinook salmon sport fish effort, catch, and harvest between Soldotna Bridge and Warren Ames Bridge, 16 May to 30 June 2007.

	Sport fishery open to fishing from powerboats (No. of days)	Sampled (Number of days)	Interviews (Number conducted)	Effort: Days fished	Effort: SE	Chinook salmon Catch [a]: Number of fish	Catch [a]: SE	Harvest [b]: Number of fish	Harvest [b]: SE
16-20 May									
Guided weekdays	4	2	10	540	316	0	0	0	0
Guided weekends	1	1	0	28	11	0	0	0	0
Unguided weekdays	4	2	2	280	67	0	0	0	0
Unguided weekends	2	2	32	400	94	0	0	0	0
22-27 May									
Guided weekdays	4	2	33	892	269	34	15	13	8
Guided weekends	2	1	18	924	144	0	0	0	0
Unguided weekdays	4	2	59	650	109	12	5	7	5
Unguided weekends	3	2	69	750	228	0	0	0	0
29 May-3 June									
Guided weekdays	4	2	49	2,804	532	145	38	64	24
Guided weekends	1	1	28	608	140	27	12	27	12
Unguided weekdays	4	2	32	1,270	195	33	30	11	11
Unguided weekends	2	2	81	1,100	161	33	14	15	7
5-10 June									
Guided weekdays	4	1	30	5,936	1,169	85	30	28	15
Guided weekends	1	1	13	948	420	38	28	38	28
Unguided weekdays	4	1	12	660	113	0	0	0	0
Unguided weekends	2	2	48	1,885	550	96	50	64	35
12-17 June									
Guided weekdays	4	2	78	8,400	1,819	1,072	369	582	159
Guided weekends	1	1	29	2,556	835	221	96	84	44
Unguided weekdays	4	2	44	3,120	445	152	51	152	51
Unguided weekends	2	2	122	4,345	531	159	41	122	35
19-24 June									
Guided weekdays	4	2	85	8,696	1,939	821	456	679	378
Guided weekends	1	1	47	1,376	322	28	13	23	11
Unguided weekdays	4	2	48	3,340	675	223	126	181	97
Unguided weekends	2	2	60	2,530	577	132	57	102	46
26-30 June									
Guided weekdays	4	2	46	9,148	1,082	481	173	377	134
Guided weekends	1	1	12	1,940	297	74	36	19	19
Unguided weekdays	4	2	65	3,370	372	35	17	16	15
Unguided weekends	1	1	30	1,760	84	41	23	41	23
Day type subtotals									
Guided weekdays	28	13	331	36,416	3,172	2,638	613	1,743	432
Guided weekends/holiday	8	7	147	8,380	1,052	389	108	191	58
Unguided weekdays	28	13	262	12,690	927	455	140	366	111
Unguided weekends/holiday	14	13	442	12,770	1,005	462	90	344	72
Angler type subtotals									
Guided	34	20	478	44,796	3,342	3,027	623	1,934	436
% Guided			40%	64%		77%		73%	
Unguided [c]	42	26	704	25,460	1,367	917	167	710	132
% Unguided			60%	36%		23%		27%	
Early-run total [c]			1,182	70,256	3,611	3,944	645	2,645	456

[a] "Catch" = fish harvested plus fish released; catch estimates may not sum to total due to rounding.

[b] "Harvest" = fish kept; harvest estimates may not sum to total due to rounding.

[c] Unguided angler estimates biased low because Mondays were not sampled.

Table 3.-Estimated late-run Kenai River Chinook salmon sport fish effort, catch, and harvest between Soldotna Bridge and Warren Ames Bridge, 1 July to 31 July 2007.

	Sport fishery open to fishing from powerboats (No. of days)	Sampled (Number of days)	Interviews (Number conducted)	Effort		Chinook salmon			
						Catch [a]		Harvest [b]	
				Days fished	SE	Number of fish	SE	Number of fish	SE
1 July									
Unguided weekends	2	1	42	1,995	597	92	6	65	37
3-8 July									
Guided weekdays	4	2	136	15,624	3,057	554	172	320	104
Guided weekends	1	1	36	3,336	803	110	48	96	41
Unguided weekdays	4	2	49	8,520	1,033	158	62	63	51
Unguided weekends	2	2	101	7,000	1,219	396	114	286	86
10-15 July									
Guided weekdays	4	2	88	18,476	2,122	1,184	276	1,129	248
Guided weekends	1	1	18	5,348	1,271	298	133	298	133
Unguided weekdays	4	2	88	11,230	1,868	406	141	74	29
Unguided weekends	2	2	182	13,600	1,287	524	101	268	67
17-22 July									
Guided weekdays	4	2	146	26,868	2,964	2,229	326	1,734	343
Guided weekends	1	1	64	4,716	727	416	83	296	65
Unguided weekdays	4	2	163	20,800	3,578	1,025	305	423	184
Unguided weekends	2	2	206	10,725	1,663	1,047	229	596	130
24-29 July									
Guided weekdays	1	2	148	22,228	2,233	2,603	400	1,973	279
Guided weekends	1	1	18	5,100	1,464	348	137	239	113
Unguided weekdays	4	2	86	18,510	1,218	740	142	400	108
Unguided weekends	4	2	185	14,060	1,386	606	110	421	85
31 July									
Guided weekdays	1	1	90	4,948	1,316	394	116	320	95
Unguided weekdays	1	1	49	6,135	1,168	280	90	256	85
Day type subtotals									
Guided weekdays	14	9	608	88,144	5,418	6,964	621	5,476	526
Guided weekends	4	4	136	18,500	2,221	1,171	214	929	191
Unguided weekdays	17	9	435	65,195	4,495	2,609	380	1,216	237
Unguided weekends	12	9	716	47,380	2,861	2,664	296	1,636	193
Angler type subtotals									
Guided	18	13	744	106,644	5,855	8,135	657	6,405	559
% Guided			39%	49%		61%		69%	
Unguided [c]	29	18	1,151	112,575	5,328	5,273	482	2,853	306
% Unguided			61%	51%		39%		31%	
Late-run total [c]			1,895	219,219	7,917	13,408	815	9,258	637

[a] "Catch" = fish harvested plus fish released; catch estimates may not sum to total due to rounding.

[b] "Harvest" = fish kept; harvest estimates may not sum to total due to rounding.

[c] Unguided angler estimates biased low because Mondays were not sampled.

In the early run, daily catch rates (CPUE) varied from 0 to 0.097 and averaged 0.027 fish per hour for unguided anglers, while daily CPUE for guided anglers ranged from 0 to 0.185 and averaged 0.048 fish per hour (Appendices B1 and B2). Daily CPUE in the early-run was highest on 19 June for unguided anglers and on 13 June for guided anglers. In the late run, daily CPUE varied from 0.016 to 0.125 and averaged 0.047 fish per hour for unguided anglers, while daily CPUE for guided anglers ranged from 0.025 to 0.150 and averaged 0.072 fish per hour (Appendices B3 and B4). Daily CPUE was highest in the late run on 22 July for unguided anglers and 25 July for guided anglers.

The estimated harvest of Chinook salmon during the early run was 2,645 (SE = 456) (Table 2). Guided anglers accounted for 73% of the harvest compared to 27% for unguided anglers. The estimated catch of early-run Chinook salmon was 3,944 (SE = 645). The difference between the catch and the harvest is 1,299 Chinook salmon, which is the 33% of the catch that was released. Anglers reported releasing 91 Chinook salmon for the 1,182 interviews conducted during the early run of which 47 were reported to be below the slot limit of 44 in TL, 20 (22%) were reported to be within the slot limit (44 to 54.99 in TL) and 24 were reported as unknown whether above or below the slot limit. The absolute precision for total harvest (±894 fish) satisfied the project objectives (within 20% or 1,000 fish of the true value 95% of the time).

The estimated harvest of Chinook salmon during the late run was 9,258 (SE = 637) (Table 3). Guided anglers accounted for 69% of the harvest compared to 31% for unguided anglers. The estimated catch of late-run Chinook salmon was 13,408 (SE = 815). The difference between the catch and the harvest is the 31% of the catch that was released. The relative precision for total harvest (±13.5%) and catch (±11.9%) satisfied the project objectives (within 20% of the true value 95% of the time).

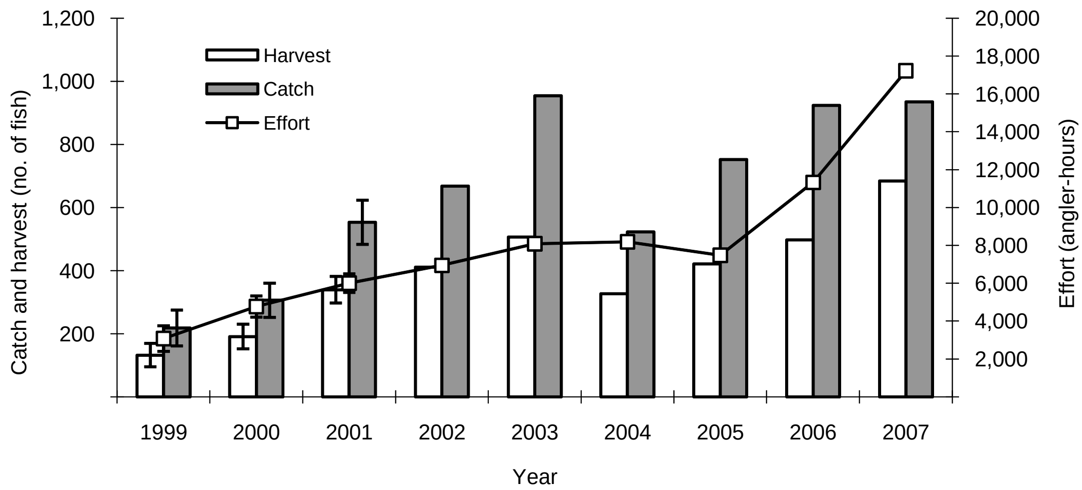
Approximately 4.5% of the early-run effort and 17.2% of the late-run effort occurred downstream of the Chinook salmon sonar site (Appendices C1 and C2). The estimate of late-run harvest below the Chinook salmon sonar site was 1,750 (SE = 213) (18.9%), whereas 7,507 (SE = 600) Chinook salmon were harvested 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 late run, indicated an effort of 17,222 angler-hours, a harvest of approximately 684 Chinook salmon, and a catch of 935 on Mondays (Figure 7). This represented approximately 8% of total late-run effort, and 7% of total catch and harvest. Estimates of catch, harvest, and effort on Mondays are not included in the seasonal totals.

INRIVER GILLNETTING

Species Composition

During the early run, 272 Chinook salmon and 1,210 sockeye salmon were captured with gillnets (Appendices D1 and D2). CPUE and Chinook salmon ratios were calculated using only salmonids greater than or equal to 400 mm MEF length because this length approximates the lower length limit detectable by the sonar (Debby Burwen, ADF&G, Sport Fish Division, Anchorage, personal communication). A total of 33 other fish (less than 400 mm in MEF length) were captured, 5 sockeye salmon and 28 eulachon *Thaleichthys pacificus*. Daily



Note: "Harvest" = fish kept; "catch" = fish harvested plus fish released; error bars show +/- 1 standard error.

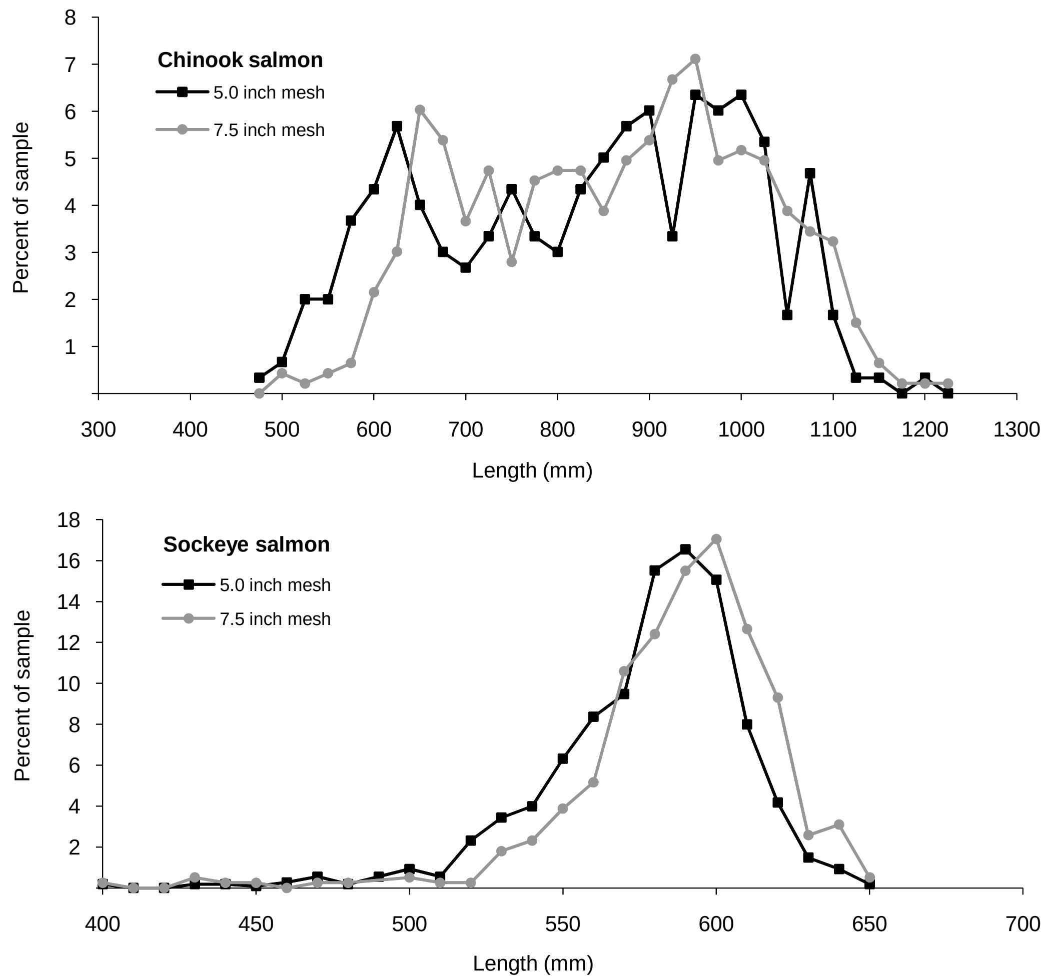
Figure 7.-Monday unguided drift boat sport catch, harvest, and angler effort for late-run Kenai River Chinook salmon, 1999–2007.

Chinook salmon CPUE ranged from 0 to 0.192 and averaged 0.056 (Appendix D3). The daily ratio of Chinook salmon to total salmon captured ranged from 0 to 1.00 and averaged 0.24 (Appendix D3).

During the late run, 794 Chinook salmon, 2,004 sockeye salmon, 42 coho salmon, 3 pink salmon, 13 Dolly Varden greater than 400 mm MEF length were captured (Appendices D4 and D5). In addition, 1 rainbow trout less than 400 mm MEF length was captured in the late run. Daily Chinook salmon CPUE ranged from 0.021 to 0.654 and average 0.254 (Appendix D6). The daily ratio of Chinook salmon to total salmon captured ranged from 0.04 to 0.88 and averaged 0.31 (Appendix D6).

Catch from the 5.0 inch and 7.5 inch mesh gillnets was 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 whereas other length classes were of comparable abundance in each mesh (Figure 8). Length frequency distributions and mean daily length of sockeye salmon caught in each mesh were similar (Figure 8 and Appendix E1).

The species composition of fish captured in the 5.0 inch and 7.5 inch mesh gillnets was significantly different in both the early run (χ^2 = 122.0, df = 2, P < 0.0001) and the late run (χ^2 = 259.4.7, df = 1, P < 0.0001). The 5.0 inch mesh captured a lower proportion of Chinook salmon and higher proportion of sockeye salmon than the 7.5 inch mesh (Appendices D1, D2, D4 and D5).



Note: length measured mid eye to fork.

Figure 8.-Length distributions of Kenai River Chinook and sockeye salmon caught with 5.0 and 7.5 inch mesh gillnets, 2007.

AGE, SEX, AND LENGTH

Creel Survey

The early-run Chinook salmon sport harvest was composed of 20.0% (SE = 3.8%) age-1.2 fish, 57.3% (SE = 4.7%) age-1.3 fish, 21.8% (SE = 4.0%) age-1.4 fish, and 0.9% (SE = 0.9%) age-1.5 fish (Table 4). Age-1.3 males (33.6%, SE = 4.5%) comprised a higher percentage of the total early-run harvest than age-1.3 females (23.6%, SE = 4.1%), whereas age-1.4 males (6.4%, SE = 2.3%) comprised a lower percentage of the total early-run harvest than age-1.4 females (15.5%, SE = 3.5%) (Table 4). The slot limit truncated the early-run harvest length composition at 44 in TL (Figure 9).

Table 4.-Age composition and estimated sport harvest by age class for the early-run Kenai River Chinook salmon between Soldotna Bridge and Warren Ames Bridge, 16 May to 30 June 2007.

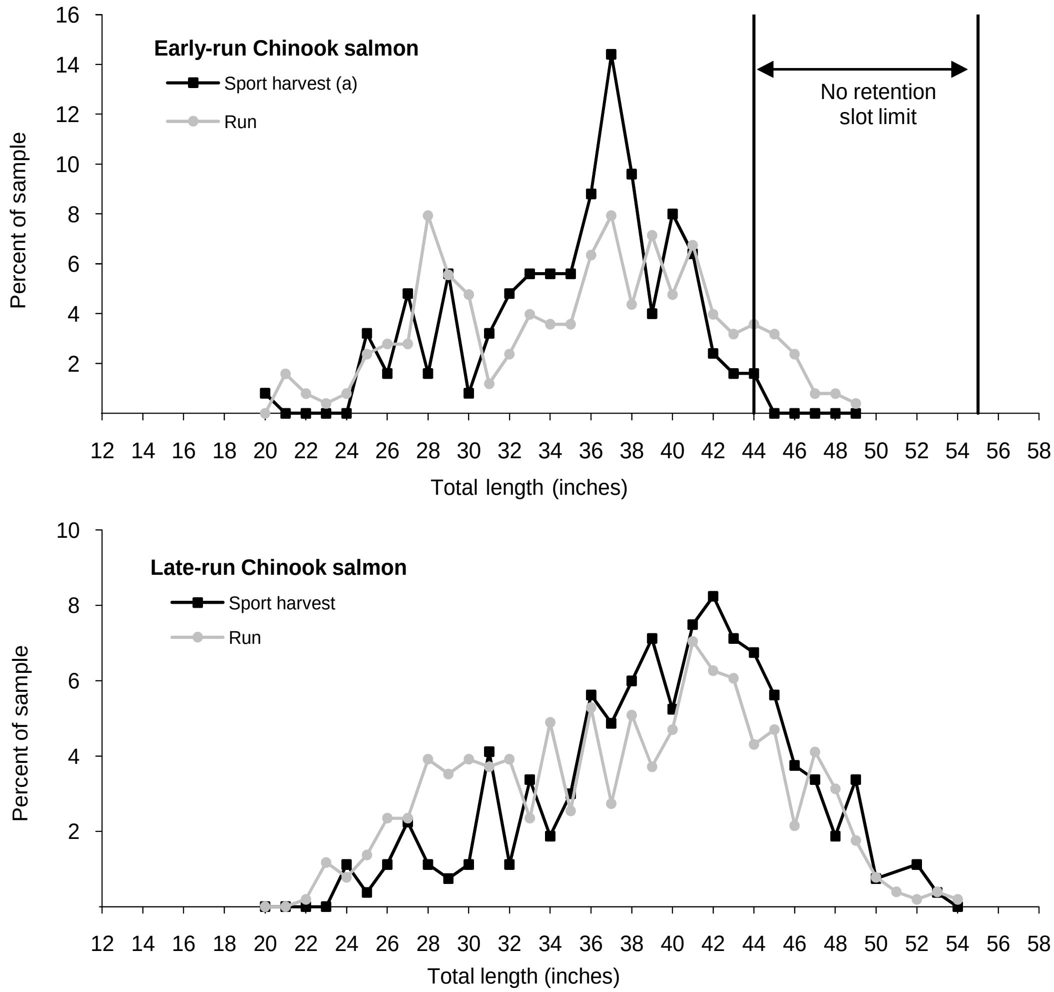
	Age				
Parameter	1.2	1.3	1.4	1.5	Total
Female					
Sample size	3	26	17	1	47
Harvest	72	625	409	24	1130
SE harvest	42	151	114	24	231
% harvest	2.7%	23.6%	15.5%	0.9%	42.7%
SE % harvest	1.6%	4.1%	3.5%	0.9%	4.7%
Male					
Sample size	19	37	7	-	63
Harvest	457	890	168	-	1515
SE harvest	123	193	67	-	289
% harvest	17.3%	33.6%	6.4%	-	57.3%
SE % harvest	3.6%	4.5%	2.3%	-	4.7%
Both sexes combined					
Sample size	22	63	24	1	110
Harvest	529	1,515	577	24	2,645
SE harvest	135	289	143	24	456
% harvest	20.0%	57.3%	21.8%	0.9%	100.0%
SE % harvest	3.8%	4.7%	4.0%	0.9%	0.0%

Notes: Values given by age and sex may not sum to totals due to rounding.

The late-run sport harvest was composed of 11.5% (SE = 2.0%) age-1.2 fish, 29.9% (SE = 2.9%) age-1.3 fish, 52.0% (SE = 3.2%) age-1.4 fish, 6.6% (SE = 1.6%) age-1.5 fish, and 0.4% (SE = 0.4%) age-2.3 fish (Table 5). Age-1.4 females (32.0%, SE = 3.0%) comprised a higher percentage of the total late-run harvest than age-1.4 males (20.1%, SE = 2.6%), whereas age-1.3 females (8.6%, SE = 1.8%) comprised a lower percentage of the total late-run harvest than age-1.3 males (21.3%, SE = 2.6%) (Table 5). Sample size goals and relative precision goals for estimates of age proportions of the harvest were met for each sampling stratum in the late run.

Inriver Gillnetting

During the early run, the age composition of the inriver run did not differ among temporal strata (χ^2 = .4942, df = 2, P = 0.781) with age-1.2, age-1.3 and age-1.4 fish considered (97% of the sample). Age-1.3 fish were most abundant, comprising 35.3% (SE = 3.2%) of the inriver run, followed by age-1.4 fish (32.6%, SE = 3.2%) and age 1.2 fish (30.8%, SE = 3.1%) (Table 6).



[a] Length distribution of early-run harvest is truncated at 44 in TL due to the 44-55 in slot limit.

Figure 9.-Length distributions of early- and late-run Kenai River Chinook salmon creel survey and inriver gillnetting samples, 2007.

During the late run, the age composition of the inriver run differed among temporal strata ($\chi^2 = 7.21$, df = 2, $P < 0.027$), and age composition estimates for Chinook salmon passing by the sonar site (Table 7) were weighted by the sonar passage estimates in each temporal stratum (Appendix F1). Age-1.4 fish were most abundant, comprising 43.0% (SE = 2.4%) of the total return, followed by age-1.3 fish (27.4%, SE = 2.1%) and age-1.2 fish (20.4%, SE = 1.9%).

The age composition of the early run and the late run differed ($\chi^2 = 29.10$, df = 2, $P = 0.0001$). Age-1.4 (43.0%, SE = 2.4%) and age-1.5 (8.8%, SE = 1.4%) fish in the late run were more prevalent than age-1.4 (32.6%, SE = 3.2%) and age-1.5 (0.9%, SE = 0.9%) fish in the early run. Whereas age-1.2 (30.8%, SE = 3.1%) and age-1.3 (35.3, SE = 3.2%) fish in the early run were

Table 5.-Age composition and estimated sport harvest by age class and geographic strata for late-run Kenai River Chinook salmon between Soldotna Bridge and Warren Ames Bridge, 1 July to 31 July 2007.

	Age					
Parameter	1.2	1.3	1.4	1.5	2.3	Total
Female						
Sample size	1	21	78	5		105
% sample	0.4%	8.6%	31.8%	2.0%		42.9%
SE % sample	0.4%	1.8%	3.0%	0.9%		3.2%
Downstream harvest	7	150	557	36		750
SE downstream harvest	7	36	85	16		107
Upstream harvest	31	643	2,390	153		3,217
SE upstream harvest	31	144	294	69		350
Total harvest	38	794	2,947	189		3,968
SE total harvest	38	174	342	85		400
Male						
Sample size	27	52	49	11	1	140
% sample	11.0%	21.2%	20.0%	4.5%	0.4%	57.1%
SE % sample	2.0%	2.6%	2.6%	1.3%	0.4%	3.2%
Downstream harvest	193	372	350	79	7	1,000
SE downstream harvest	42	64	62	25	7	134
Upstream harvest	827	1,593	1,501	337	31	4,290
SE upstream harvest	164	234	226	103	31	417
Total harvest	1,020	1,965	1,852	416	38	5,290
SE total harvest	198	277	269	126	38	467
Both sexes combined						
Sample size	28	73	127	16	1	245
% sample	11.4%	29.8%	51.8%	6.5%	0.4%	100.0%
SE % sample	2.0%	2.9%	3.2%	1.6%	0.4%	0.0%
Downstream harvest	200	522	907	114	7	1,750
SE downstream harvest	43	81	124	31	7	213
Upstream harvest	858	2,237	3,892	490	31	7,507
SE upstream harvest	167	283	393	125	31	600
Total harvest	1,058	2,758	4,799	605	38	9,258
SE total harvest	202	330	443	152	38	637

Notes: Values given by age and sex may not sum to totals due to rounding.
"Downstream" = Kenai River reach between Warren Ames Bridge and the Chinook salmon sonar site.
"Upstream" = Kenai River reach between the Chinook salmon sonar site and Soldotna Bridge.
"Total harvest" = the downstream and upstream reach harvests combine.

Table 6.-Age composition and estimated sonar passage by age class for early-run Kenai River Chinook salmon, 16 May to 30 June 2007.

	Age					
Parameter	1.2	1.3	1.4	1.5	2.2	Total
Female						
Sample size	17	41	44	2	-	104
Sonar passage estimate	1,247	3,009	3,229	147	-	7,632
SE sonar passage estimate	293	431	444	104	-	578
% sonar passage	7.7%	18.6%	19.9%	0.9%	-	47.1%
SE % sonar passage	1.8%	2.6%	2.7%	0.6%	-	3.4%
Male						
Sample size	51	37	28	-	1	117
Sonar passage estimate	3,742	2,715	2,055	-	73	8,585
SE sonar passage estimate	470	414	367	-	73	586
% sonar passage	23.1%	16.7%	12.7%	-	0.5 %	52.9%
SE % sonar passage	2.8%	2.5%	2.2%	-	0.5%	3.4%
Both sexes combined						
Sample size	68	78	72	2	1	221
Sonar passage estimate	4,990	5,724	5,283	147	73	16,217
SE sonar passage estimate	519	541	529	104	73	403
% sonar passage	30.8%	35.3%	32.6%	0.9%	0.5%	100.0%
SE % sonar passage	3.1%	3.2%	3.2%	0.6%	0.5%	0.0%

Note: Values given by age and sex may not sum to totals due to rounding.

Table 7.-Age composition and estimated sonar passage by age class for late-run Kenai River Chinook salmon, 1 July to 10 August 2007.

	Age					
Parameter	1.2	1.3	1.4	1.5	2.2	Total
Female						
Summed sample size	13	28	127	16	-	184
Sonar passage estimate	1,164	2,713	12,324	1,624	-	17,825
SE sonar passage estimate	402	583	1,104	446	-	1,218
% sonar passage	2.7%	6.3%	28.7%	3.8%	-	41.5%
SE % sonar passage	0.8%	1.2%	2.2%	0.9%	-	2.4%
Male						
Summed sample size	80	103	66	23	2	274
Sonar passage estimate	7,607	9,043	6,171	2,145	188	25,154
SE sonar passage estimate	798	819	727	448	136	1,084
% sonar passage	17.7%	21.0%	14.4%	5.0%	0.4%	58.5%
SE % sonar passage	1.8%	1.9%	1.7%	1.0%	0.3%	2.4%
Combined						
Summed sample size	93	131	193	39	2	458
Sonar passage estimate	8,771	11,757	18,495	3,768	188	42,979
SE sonar passage estimate	842	915	1,061	591	136	1,370
% sonar passage	20.4%	27.4%	43.0%	8.8%	0.4%	100.0%
SE % sonar passage	1.9%	2.1%	2.4%	1.4%	0.3%	0.0%

Note: Values given by age and sex may not sum to totals due to rounding.

more prevalent than age-1.2 (20.4%, SE = 1.9%) and age-1.3 (27.4%, SE = 2.1%) fish in the late run.

Age compositions by mesh size did not differ for the early run (χ^2 = 2.652, df = 2, P = 0.266) and for the late run (χ^2 = 0.451, df = 2, P = 0.816). 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 gillnets combined (Tables 6 and 7) and are compiled for historical comparison to years prior to 2002 when only 7.5 inch mesh nets were used to estimate the age composition of the inriver run.

The age composition of the early-run harvest and the early-run differed (χ^2 = 11.939, df = 2, P = 0.0026) among ages 1.2, 1.3, and 1.4. Anglers harvested a larger percentage of age-1.3 fish and a smaller percentage of age-1.2 and age-1.4 fish (Tables 4 and 6, Figure 10). The age composition of the late-run harvest and the late-run inriver run was not significantly different (χ^2 = 13.368, df = 3 P < 0.004) among ages 1.2, 1.3, 1.4, and 1.5. However, anglers did harvest a smaller percentage of age-1.2 and larger percentage of age-1.4 fish (Tables 5 and 7).

LENGTH-AT-AGE COMPARISONS

MEF lengths are compiled by age and sex for the early run (Table 8) and the late run (Table 9). A graphical depiction of length-at-age is shown in Figure 11. Mean length-at-age and sex was similar for the creel survey and inriver gillnets except for age-1.4 fish in the early run. Age-1.4 females (967 mm, SE = 8) sampled from inriver gillnets in the early-run averaged 55 mm longer than age-1.4 females (913 mm, SE = 13) sampled from the creel survey in the early run. Age-1.4 males (989 mm, SE = 12) sampled from inriver gillnets in the early run averaged 56 mm longer than age-1.4 males (934 mm, SE = 18) sampled from the creel survey in the early run.

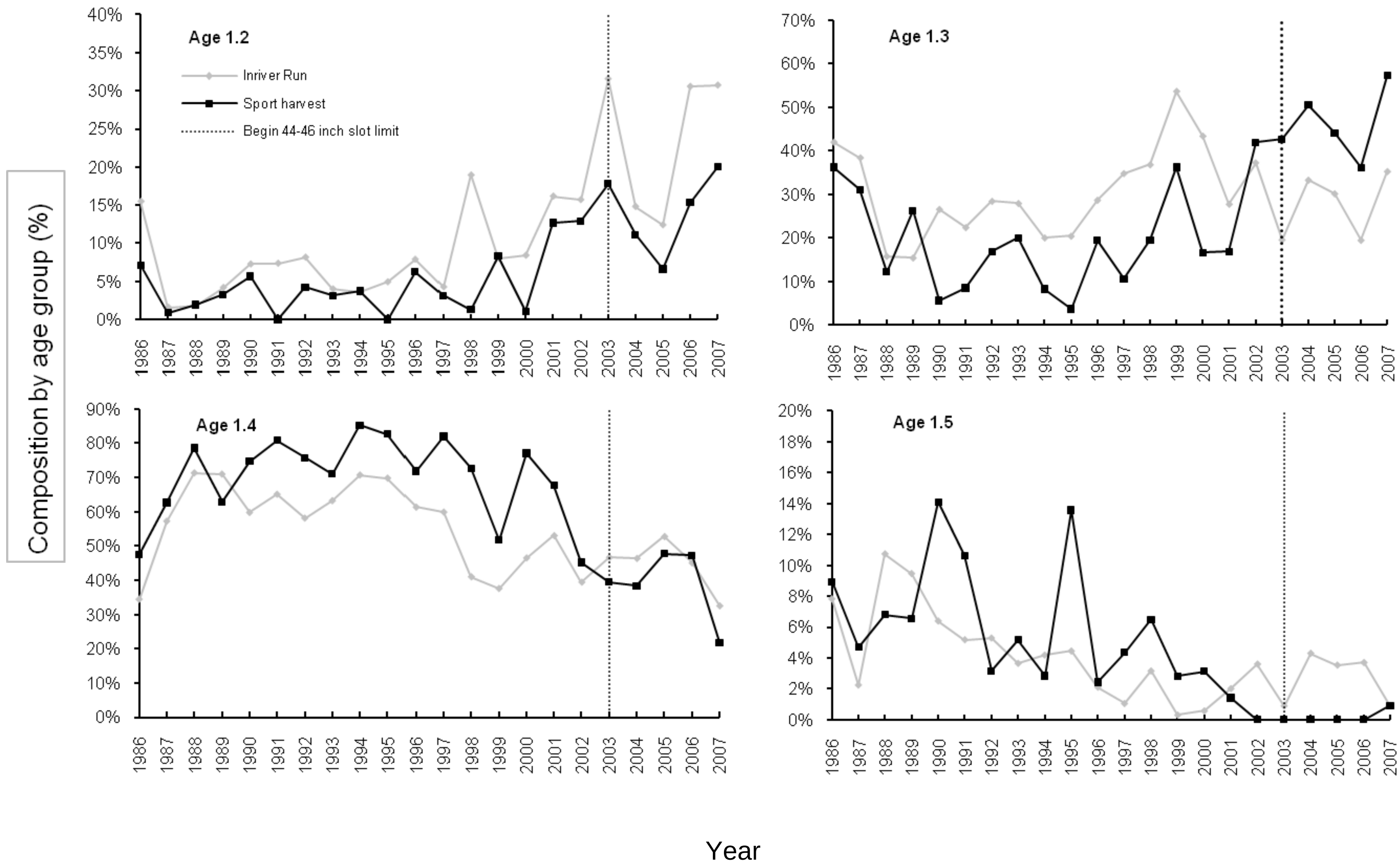
OTHER RESULTS

Kenai River discharge was above average for the early run and below average for most of the late run, while Secchi disk measurements of water clarity were average for the early run and above average for most of the late run (Figure 12). There were 396 unique Chinook salmon examined in the sport harvest for the presence of an adipose fin of which none were missing the adipose fin. There were 1,066 Chinook salmon examined in gillnets for the presence of an adipose fin, of which, 3 were missing their adipose fin. ADF&G staff sealed 3 Chinook salmon brought in to the ADF&G Soldotna office in fulfillment of the 55 inch or greater sealing requirement, all during the late run. Finally, tissue samples (fin clips) for future genetic analysis were taken from 371 Chinook salmon sampled from inriver gillnets, (121 early run, 250 late run) and 389 tissues samples were taken from Chinook salmon sampled from the creel survey (121 early run, 268 late run).

DISCUSSION AND RECOMMENDATIONS

CREEL SURVEY

The early-run Kenai River Chinook salmon slot limit regulation prohibiting retention of Chinook salmon between 44 and 55 inches TL has been effective at protecting age-1.5 Chinook salmon in the early run. Only one early-run age-1.5 Chinook salmon has been sampled in the creel survey



Note: Vertical bar denotes when 44-55 inch slot limit went into effect.

Figure 10.-Age composition of early-run Kenai River Chinook salmon sport harvest versus inriver return, 1986–2007.

Table 8.-Early-run Kenai River Chinook salmon lengths by sex and age from creel survey and inriver gillnet samples, 16 May to 30 June 2007.

	Age					
Parameter	1.2	1.3	1.4	1.5	2.2	Combined
Creel Survey						
Females						
Sample size[a]	3	26	17	1		47
Mean length (mm)	650	835	913	1,030		855
SE length (mm)	35	10	13			13
Min length (mm)	590	730	795	1,030		590
Max length (mm)	710	905	995	1,030		1,030
Males						
Sample size[a]	19	37	7			63
Mean length (mm)	615	806	934			763
SE length (mm)	15	10	18			15
Min length (mm)	450	630	835			450
Max length (mm)	730	900	980			980
Both sexes combined						
Sample size[a]	22	63	24	1		110
Mean length (mm)	620	818	919	1,030		802
SE length (mm)	14	8	11			11
Min length (mm)	450	630	795	1,030		450
Max length (mm)	730	905	995	1,030		1,030
Inriver Gillnet Samples						
Females						
Sample size[a]	17	41	44	2		104
Mean length (mm)	650	848	967	1,090		871
SE length (mm)	12	6	8	20		12
Min length (mm)	580	760	845	1,070		580
Max length (mm)	775	935	1,070	1,110		1,110
Males						
Sample size[a]	51	37	28		1	117
Mean length (mm)	626	797	989		510	766
SE length (mm)	8	10	12			15
Min length (mm)	480	665	870		510	480
Max length (mm)	730	920	1,115		510	1,115
Both sexes combined						
Sample size[a]	68	78	72	2	1	221
Mean length (mm)	632	824	976	1,090	510	815
SE length (mm)	7	7	7	20		10
Min length (mm)	480	665	845	1,070	510	480
Max length (mm)	775	935	1,115	1,110	510	1,115

Note: All lengths measured from mid eye to fork.

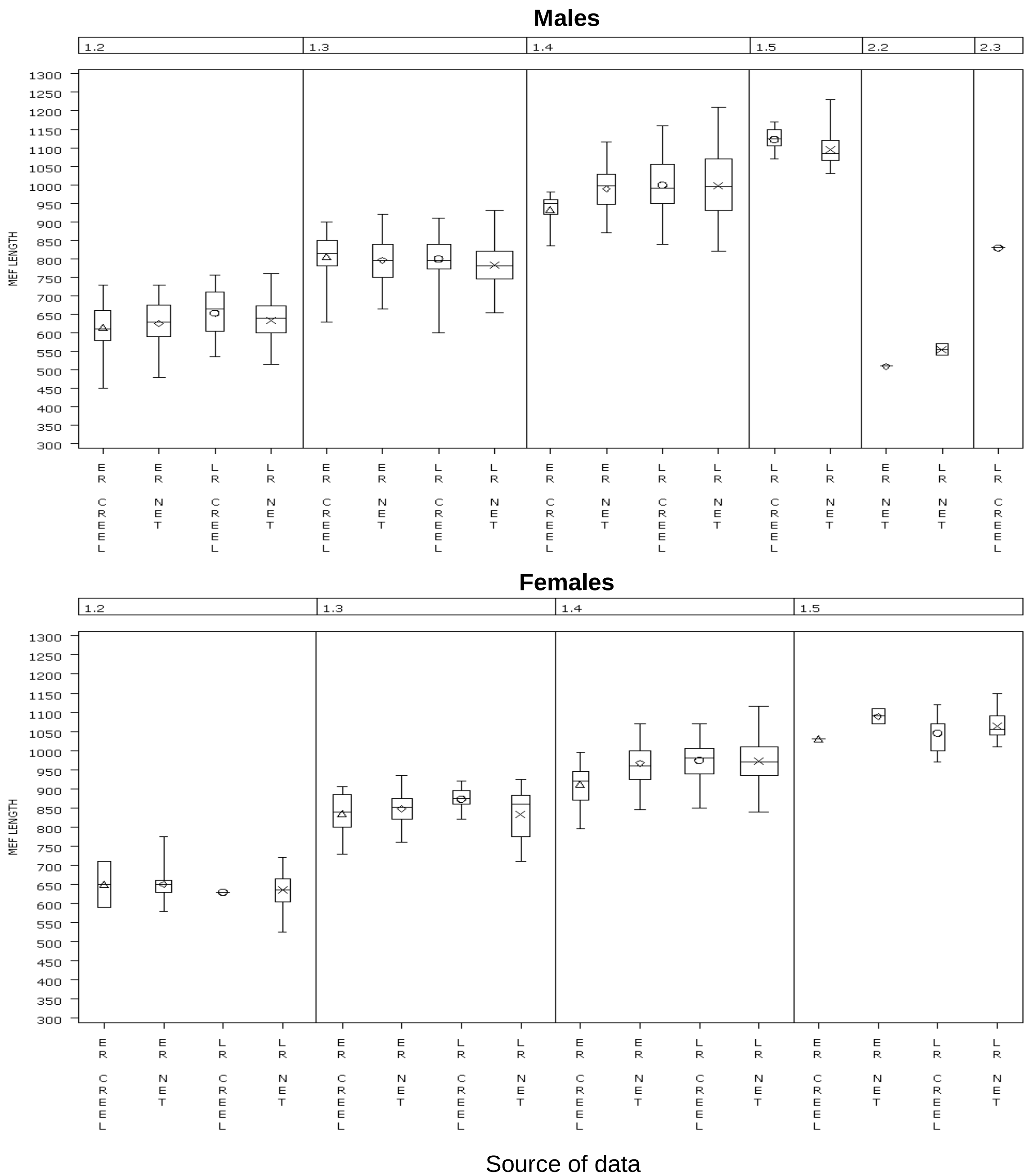
[a] Age and sex values may not sum to totals due to rounding.

Table 9.-Late-run Kenai River Chinook salmon lengths by sex and age from creel survey and inriver gillnet samples, 1 July to 31 July 2007.

	Age						
Parameter	1.2	1.3	1.4	1.5	2.2	2.3	Combined
Creel Survey							
Females							
Sample size[a]	1	21	78	5			105
Mean length (mm)	630	873	975	1,046			954
SE length (mm)		6	5	27			7
Min length (mm)	630	820	850	970			630
Max length (mm)	630	920	1,070	1,120			1,120
Males							
Sample size[a]	27	52	49	11		1	140
Mean length (mm)	654	800	1,000	1,123		830	867
SE length (mm)	11	8	10	9		830	14
Min length (mm)	535	600	840	1,070		1	535
Max length (mm)	755	910	1,160	1,170		830	1,170
Combined							
Sample size[a]	28	73	127	16		1	245
Mean length (mm)	653	821	984	1,099		830	905
SE length (mm)	11	7	5	13			9
Min length (mm)	535	600	840	970		830	535
Max length (mm)	755	920	1,160	1,170		830	1,170
Inriver Gillnet Samples							
Females							
Sample size[a]	13	28	127	16			184
Mean length (mm)	635	834	974	1,064			936
SE length (mm)	15	13	5	10			9
Min length (mm)	525	710	840	1,010			525
Max length (mm)	720	925	1,115	1,150			1,150
Males							
Sample size[a]	80	103	67	23	2		275
Mean length (mm)	635	783	998	1,095	555		817
SE length (mm)	6	6	10	10	15		10
Min length (mm)	515	655	820	1,030	540		515
Max length (mm)	760	930	1,210	1,230	570		1,230
Combined							
Sample size[a]	93	131	194	39	2		459
Mean length (mm)	635	794	982	1,082	555		865
SE length (mm)	5	5	5	8	15		8
Min length (mm)	515	655	820	1,010	540		515
Max length (mm)	760	930	1,210	1,230	570		1,230

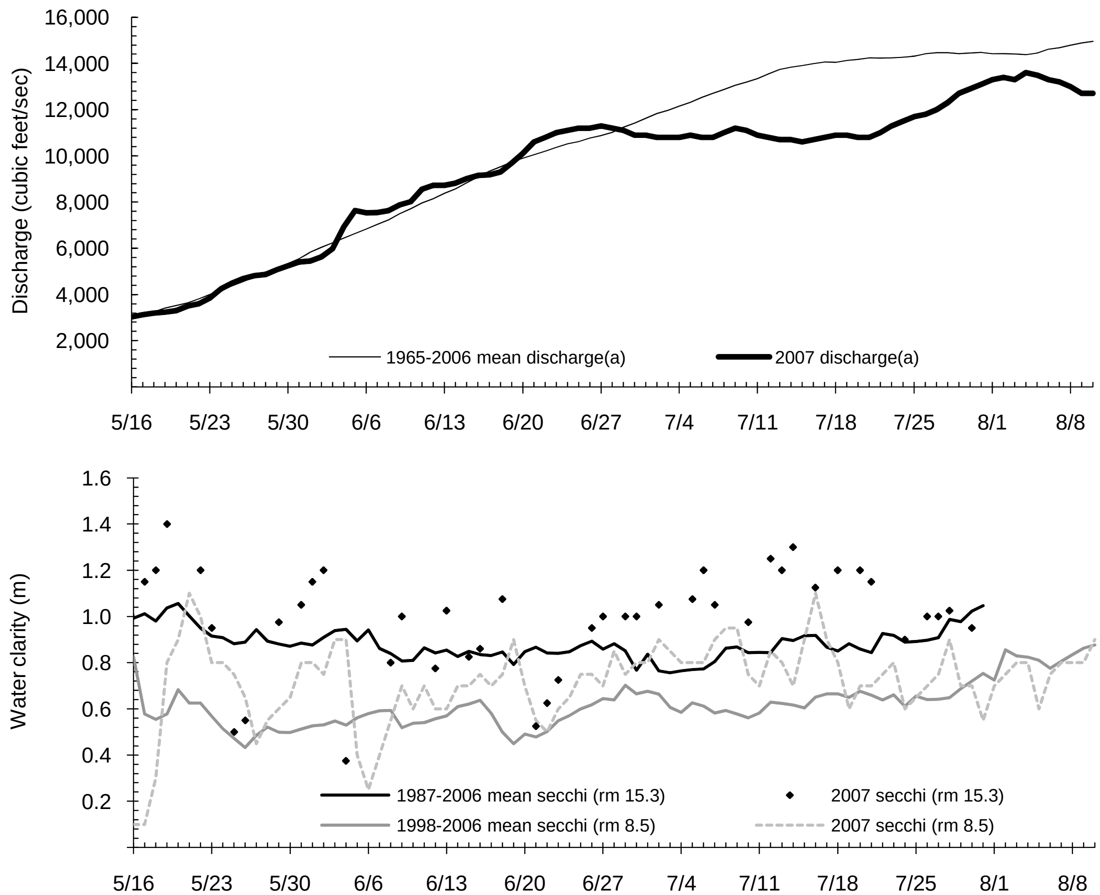
Note: All lengths measured from mid eye to fork.

[a] Age and sex values may not sum to totals due to rounding.



Note: All lengths measured from mid eye to fork; ER = early run; LR = late run. The horizontal lines in each box plot show the following values for each data set (from the lowest to highest value): the minimum, the 25 percentile, the median, the 75 percentile, and the maximum values. The box encompasses the interquartile range (e.g., 25 to 75 percentiles) and the horizontal line inside the box passes through the median or 50 percentile of the data set. The single character within each box identify the source of the data (e.g., Δ = early run creel, ◊ = early run net, O = late run creel, and X = late run net).

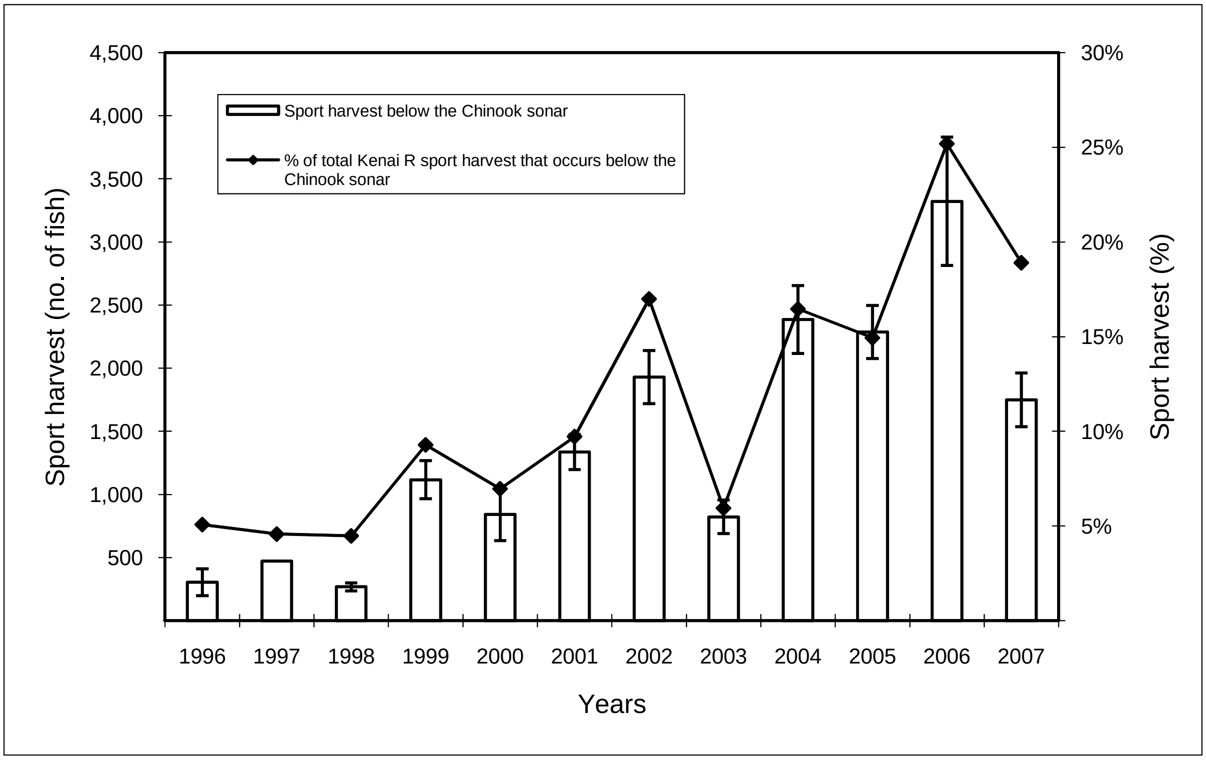
Figure 11.-Box plot of length distributions by sex and age of early- and late-run Kenai River Chinook salmon creel survey and inriver gillnetting program samples, 2007.



[a] *Source:* USGS Water Resources Database [Internet]. USGS 15266300 Kenai R at Soldotna AK Stream Site: daily statistics, discharge; [cited 14 Sep 2007]. Available from: http://waterdata.usgs.gov/ak/nwis/discharge?

Figure 12.-Kenai River discharge and water clarity, 16 May to 10 August 2007.

during the 5 years (2003-2007) the slot limit has been in effect and no age-1.5 fish have been brought in to the ADF&G Soldotna office to be sealed since the greater than 55 inch TL sealing requirement was instituted in 2003. The regulation has also reversed anglers' long standing tendency to selectively harvest age-1.4 Chinook salmon because some of those age-1.4 fish are also protected by the slot limit. Among age-1.4 fish in the early run, females have been harvested at a higher rate than males because age-1.4 males are on average larger than age-1.4 females, hence more males are protected under the slot limit than females. Also, age-1.3 fish have been selectively harvested in the early run since 2003, another result due in part to the imposed slot limit.



Note: Error bars show +/- 1 standard error. Precision estimates are unavailable for 1997.

Figure 13.-Estimated number and percent of the Kenai River Chinook salmon sport harvest that occurs between the Warren Ames Bridge (rm 6.1) and the Chinook sonar site (rm 8.6), 1996–2007.

In 2007, the early-run Kenai River Chinook salmon sport fishery was liberalized on 12 June by emergency order to allow bait. Effort and harvest were similar to the average effort and harvest since the inception of the slot limit in 2003 (Eskelin 2009). Despite the early liberalization, the early-run escapement was above the upper end of the OEG range of 5,300 to 9,000 Chinook salmon.

There were no inseason management actions in the late-run Kenai River Chinook salmon sport fishery. The estimated late-run sport harvest of Kenai River Chinook salmon was approximately 32% below the 5-year moving average (2002-2006) and near the historical (1976-2006) late run average harvest. Late-run effort was the lowest since 2003 but near the historical (1976-2006) average.

Harvest of Chinook salmon downstream of the Kenai River Chinook salmon sonar showed an upward trend from 1996 (when the creel survey began estimating upstream and downstream of the Chinook salmon sonar) to 2006, but declined in 2007 (Figure 13). This is due at least in part to the decrease in the total number of Chinook salmon harvested in 2007. However, the percent of total fish harvested that were harvested downstream of the Chinook salmon sonar also decreased in 2007 (Figure 13), yet water clarity measurements taken at rm 8.5 were consistently above historical averages for that section of river.

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 during the early run have never been sampled and Mondays have not been included in the late-run regular creel sampling since 2001, replaced instead by the single index angler count and ad hoc estimation method. Consequently, 2002-2007 estimates of effort, catch, and harvest have a small negative bias because they do not include Mondays, meaning the seasonal estimates are slightly larger than the estimates presented. Harvest and effort estimates in the late run have shown an upward trend since the inception of the "drift boat Monday" regulation in 1999. Estimates of effort and harvest on Mondays in 2007 were substantially higher than any previous year. Prior to 2007, Monday estimates of harvest had never exceeded 4%, whereas estimates of harvest on Mondays in the late run in 2007 were approximately 7% of total late run harvest. Estimated effort on Mondays in the late run in 2007 was approximately double the 5-year (2002-2006) moving average and harvest on Mondays in the late run in 2007 was 50% greater than the 5-year (2002-2006) moving average. This fishery is growing in popularity with anglers and should continue to be monitored.

INRIVER GILLNETTING

From 2004 through 2006, inriver gillnetting was conducted during a 6 h period from 3 h before low tide to 3 h after low tide. Analysis of historical sonar passage estimates revealed that fish tend to pass the sonar more near the high tide stage than during low tide and more fish could potentially be intercepted by gillnetting closer to high tide. Consequently, inriver gillnetting was scheduled to begin approximately 2 h earlier in the tide stage than in previous years beginning 1 h, instead of approximately 3 h, after high tide. The sampling schedule change resulted in a higher percentage of fish passing the Chinook salmon sonar during the time when inriver gillnetting was conducted than would have if the sampled schedule was left unchanged, especially in the late run. In 2007, approximately 25% of all fish passed the Chinook salmon sonar during the time when inriver gillnetting was conducted in the early run and approximately 26% of all fish passed the Chinook salmon sonar during the time when inriver gillnetting was conducted in the late run. If the sampling schedule was left unchanged and centered around the low tide, approximately 24% of all fish would have passed the Chinook salmon sonar during the time when inriver gillnetting was conducted in the early run, a 4% decrease and only 18% in the late run, a 28% decrease. Consequently, it is recommended that this change to the inriver gillnetting sampling schedule be retained in future years.

Sockeye salmon cumulative CPUE was substantially above the 2002-2006 average in both the early and late runs (Figure 14). High CPUE for sockeye salmon was documented in 2005 and 2006 for the early run but not for the late run (Eskelin 2007, 2009). Chinook salmon CPUE was comparable to the 2002-2006 average in the early run and below the 2002-2006 average in the late run.

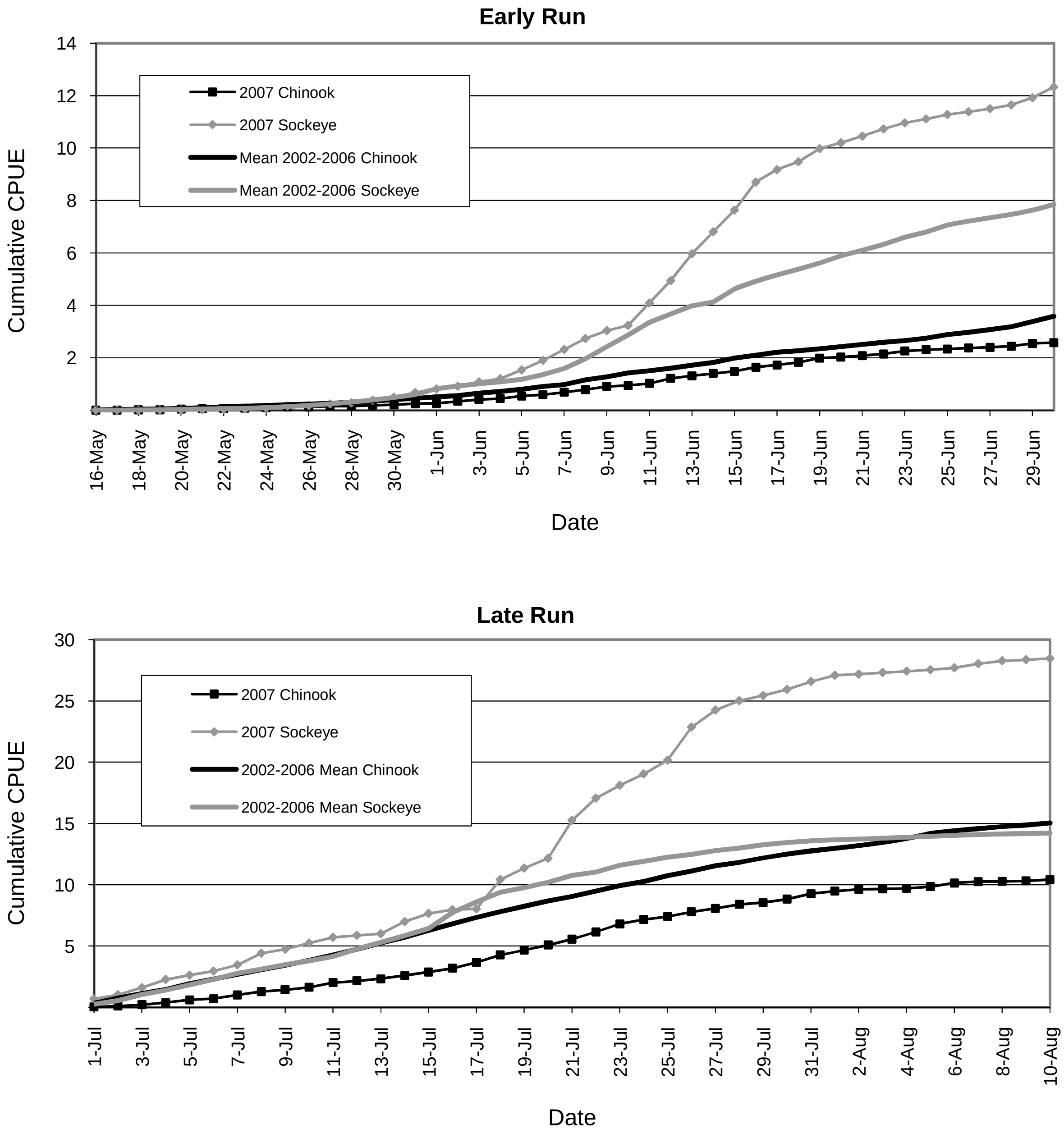


Figure 14.-Cumulative CPUE for early- and late-run Kenai River Chinook and sockeye salmon inriver gillnets catches, 2003–2007.

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APPENDIX A. BOAT AND ANGLER COUNTS DURING THE KENAI RIVER CHINOOK SALMON FISHERY, 2007

Appendix A1.-Guided and unguided boat angler counts, by geographic strata, during the early-run Kenai River Chinook salmon fishery, 17 May to 30 June 2007.

		Downstream[a]								Upstream[a]								Combined strata							
		Unguided anglers[b]				Guided anglers[b]				Unguided anglers[b]				Guided anglers[b]				Unguided anglers[b]				Guided anglers[b]			
Date (m/dd)	Day type[c]	A	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	wd	0	0	0	0	0	0	0		2	2	5	2	6	0	0		2	2	5	2	6	0	0	
5/20	wd	0	2	0	0	0	0			3	1	8	3	22	19			3	3	8	3	22	19		
5/19	we/hol	0	0	0	0	0	0	0		3	16	14	4	4	3	0		3	16	14	4	4	3	0	
5/20	we/hol	0	0	0	0					5	9	20	9					5	9	20	9				
5/23	wd	0	0	0	0		0	0		8	12	0	9		36	9		8	12	0	9		36	9	
5/24	wd	0	0	0	0	0	0	0		7	9	7	13	22	13	9		7	9	7	13	22	13	9	
5/26	we/hol	0	0	0	0	0	0			2	33	12	0	47	30			2	33	12	0	47	30		
5/27	we/hol	0	4	0	0					6	21	19	3					6	25	19	3				
5/30	wd	0	0	0	0	0	0	0		18	17	16	3	107	70	19		18	17	16	3	107	70	19	
6/01	wd	0	0	1	0		0	0		6	27	21	18		73	30		6	27	22	18		73	30	
6/02	we/hol	0	0	0	0	0	4	0		14	6	21	5	76	36	36		14	6	21	5	76	40	36	
6/03	we/hol	2	11	0	0					43	57	39	22					45	68	39	22				
6/05	wd	0	0	0	0	0	0	0		18	7	1	7	159	189	23		18	7	1	7	159	189	23	
6/09	we/hol	0	0	0	0		0	0		0	30	31	32		114	44		0	30	31	32		114	44	
6/10	we/hol	0	0	0	0					10	113	121	40					10	113	121	40				
6/13	wd	0	2	0	0		6	0		28	38	21	60		239	59		28	40	21	60		245	59	
6/14	wd	0	2	0	0	0	17			37	39	69	16	230	149			37	41	69	16	230	166		
6/16	we/hol	3	25	0	0	2	59			150	104	123	31	246	119			153	129	123	31	248	178		
6/17	we/hol	0	15	15	0					126	138	73	66					126	153	88	66				
6/19	wd	2	4	2	0		0	18		11	83	31	59		276	166		13	87	33	59		276	184	
6/22	wd	10	2	0	0	22	0	3		53	38	23	16	177	127	68		63	40	23	16	199	127	71	
6/23	we/hol	0	2	3	0	12	0	10		40	80	68	72	145	134	43		40	82	71	72	157	134	53	
6/24	we/hol	0	12	0	0					12	125	67	25					12	137	67	25				
6/27	wd	0	4	1	7		43	12		44	27	59	41		207	115		44	31	60	48		250	127	
6/28	wd	0	8	2	0	6	27	0		43	21	46	34	252	188	105		43	29	48	34	258	215	105	
6/30	we/hol	0	0	6	6	0	21	0		87	79	78	96	214	148	102		87	79	84	102	214	169	102	
Min (All A thru D)		0				0				0				0				0				0			
Mean (All A thru D)		1				5				34				94				36				99			
Max (All A thru D)		25				59				150				276				153				276			

Note: Blank space in data fields = fishing was closed for guided anglers during the time of this count, therefore no data to present.

[a] "Downstream" = Kenai River reach from Warren Ames Bridge to the Chinook salmon sonar site, "Upstream" = Kenai River reach from the Chinook salmon sonar site to Soldotna Bridge.

[b] Angler count times: A = 0400-0859 hours, B = 0900-1359 hours, C = 1400-1959 hours, and D = 2000-2359 hours.

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

Appendix A2.-Guided and unguided boat angler counts, by geographic strata, during the late-run Kenai River Chinook salmon fishery, 1 July to 31 July 2007.

Date	Day	Downstream[a]								Upstream[a]								Combined strata							
		Unguided anglers[b]				Guided anglers[b]				Unguided anglers[b]				Guided anglers[b]				Unguided anglers[b]				Guided anglers[b]			
(m/dd)	type[c]	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
7/01	we/hol	9	25	3	3					191	66	85	17					200	91	88	20				
7/03	wd	0	26	15	0		107	46		155	108	51	109		352	132		155	134	66	109		459	178	
7/06	wd	0	3	12	10		25	68		7	125	96	135		413	159		7	128	108	145		438	227	
7/07	we/hol	10	12	36	2	16	31			90	162	110	60	321	188			100	174	146	62	337	219		
7/08	we/hol	25	19	37	2					99	341	236	159					124	360	273	161				
7/11	wd	30	14	9	5	121	13			130	88	96	48	313	282			160	102	105	53	434	295 .		
7/13	wd	21	42	16	42	96	189	3		184	98	185	115	536	243	149		205	140	201	157	632	432	152	
7/14	we/hol	16	51	16	24	15	121	12		337	196	211	221	633	303	253		353	247	227	245	648	424	265	
7/15	we/hol	13	134	57	32					439	293	411	269					452	427	468	301				
7/17	wd	2	88	59	27		78	207		241	339	136	356		575	303		243	427	195	383		653	510	
7/19	wd	58	37	65	3	140	140	77		268	114	116	171	627	390	240		326	151	181	174	767	530	317	
7/21	we/hol	79	60	45	12	220	124	58		326	219	112	139	366	282	129		405	279	157	151	586	406	187	
7/22	we/hol	18	88	93	43					119	419	233	140					137	507	326	183				
7/25	wd	44	56	23	14	132	125	14		234	189	222	179	439	284	286		278	245	245	193	571	409	300	
7/27	wd	0	61	20	38		229	21		98	254	199	220		403	346		98	315	219	258		632	367	
7/28	we/hol	25	50	18	19	15	140	1		417	192	188	217	624	245	250		442	242	206	236	639	385	251	
7/29	we/hol	164	168	27	4					439	369	353	162					603	537	380	166				
7/31	wd	26	32	10	3	35	66	11		399	206	172	379	605	234	286		425	238	182	382	640	300	297	
Min (All A thru D)		0				1				7				129				7				152			
Mean (All A thru D)		33				82				198				339				231				421			
Max (All A thru D)		168				229				439				633				603				767			

Note: Blank space in data fields = fishing was closed for guided anglers during the time of this count, therefore no data to present.

[a] "Downstream" = Kenai River reach from Warren Ames Bridge to the Chinook salmon sonar site, "Upstream" = Kenai River reach from the Chinook salmon sonar site to Soldotna Bridge.

[b] Angler count times: A = 0400-0859 hours, B = 0900-1359 hours, C = 1400-1959 hours, and D = 2000-2359 hours.

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

APPENDIX B. EFFORT, CATCH, AND HARVEST ESTIMATES BY GEOGRAPHIC STRATA DURING THE KENAI RIVER CHINOOK SALMON FISHERY, 2007

Appendix B1.-Daily estimates of unguided boat angler CPUE, HPUE, angler effort, catch and harvest, by geographic strata, during the early-run Kenai River Chinook salmon fishery, 16 May to 30 June 2007.

		Angler interview data[a]					Downstream[b]								Upstream[b]							
			Catch		Harvest		Counts		Effort		Catch		Harvest		Counts		Effort		Catch		Harvest	
Date (m/dd)	Day type[c]	n[d]	CPUE	SE	HPUE	SE	n	Mean	Est.	SE	Est.	SE	Est.	SE	n	Mean	Est.	SE	Est.	SE	Est.	SE
5/16	wd	2	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	3	55	17	0	0	0	0
5/18	wd	0	0.000	0.000	0.000	0.000	4	1	10	12	0	0	0	0	4	4	75	36	0	0	0	0
5/19	we/hol	10	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	9	185	67	0	0	0	0
5/20	we/hol	22	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	11	215	66	0	0	0	0
5/23	wd	37	0.024	0.014	0.008	0.008	4	0	0	0	0	0	0	0	4	7	145	63	3	3	1	1
5/24	wd	22	0.014	0.015	0.014	0.015	4	0	0	0	0	0	0	0	4	9	180	27	3	3	3	3
5/26	we/hol	38	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	12	235	161	0	0	0	0
5/27	we/hol	31	0.000	0.000	0.000	0.000	4	1	20	23	0	0	0	0	4	12	245	90	0	0	0	0
5/30	wd	16	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	14	270	53	0	0	0	0
6/01	wd	16	0.046	0.036	0.015	0.016	4	0	5	6	0	0	0	0	4	18	360	90	16	14	5	6
6/02	we/hol	8	0.043	0.043	0.000	0.000	4	0	0	0	0	0	0	0	4	12	230	95	10	11	0	0
6/03	we/hol	73	0.027	0.009	0.017	0.008	4	3	65	58	2	2	1	1	4	40	805	116	22	8	13	6
6/05	wd	12	0.000	0.000	0.000	0.000	4	0	0	0	0	0	0	0	4	8	165	57	0	0	0	0
6/09	we/hol	14	0.042	0.025	0.027	0.021	4	0	0	0	0	0	0	0	4	23	465	123	19	13	13	10
6/10	we/hol	34	0.054	0.027	0.036	0.019	4	0	0	0	0	0	0	0	4	71	1,420	536	77	48	51	33
6/13 [e]	wd	29	0.042	0.020	0.042	0.020	4	1	10	12	0	1	0	1	4	37	735	178	31	17	31	17
6/14 [e]	wd	15	0.055	0.032	0.055	0.032	4	1	10	12	1	1	1	1	4	40	805	249	44	29	44	29
6/16 [e]	we/hol	59	0.044	0.013	0.030	0.011	4	7	140	136	6	6	4	4	4	102	2,040	427	89	33	62	27
6/17 [e]	we/hol	63	0.030	0.011	0.026	0.011	4	8	150	87	4	3	4	3	4	101	2,015	271	60	24	51	22
6/19 [e]	wd	34	0.097	0.032	0.076	0.029	4	2	40	14	4	2	3	2	4	46	920	380	90	47	70	39
6/22 [e]	wd	14	0.025	0.026	0.025	0.026	4	3	60	34	1	2	1	2	4	33	650	91	16	17	16	17
6/23 [e]	we/hol	25	0.027	0.019	0.027	0.019	4	1	25	15	1	1	1	1	4	65	1,300	171	35	25	35	25
6/24 [e]	we/hol	35	0.080	0.022	0.055	0.021	4	3	60	69	5	6	3	4	4	57	1,145	546	91	51	63	39
6/27 [e]	wd	33	0.010	0.010	0.000	0.000	4	3	60	32	1	1	0	0	4	43	855	165	9	9	0	0
6/28 [e]	wd	32	0.010	0.011	0.010	0.011	4	3	50	42	1	1	1	1	4	36	720	145	7	8	7	8
6/30 [e]	we/hol	30	0.024	0.014	0.024	0.014	4	3	60	24	1	1	1	1	4	85	1,700	81	40	23	40	23
Min		0	0.000		0.000		4	0	0		0		0		4	3	55		0		0	
Mean		27	0.027		0.019	#	4	1	29		1		1	#	4	34	690		25		19	
Max		73	0.097		0.076		4	8	150		6		4		4	102	2,040		91		70	

Notes: "Catch" = fish harvested plus fish released; "harvest" = fish kept; "CPUE" = catch per unit effort; "HPUE" = harvest per unit effort.

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

[b] "Downstream" = Kenai River reach from Warren Ames Bridge to the Chinook salmon sonar site, "Upstream" = Kenai River reach from the Chinook salmon sonar site to 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 by emergency order from 12 June on to allow the use of bait; slot limit (44-55 in TL) still in effect.

Appendix B2.-Daily estimates of guided boat angler CPUE, HPUE, angler effort, catch and harvest, by geographic strata, during the early-run Kenai River Chinook salmon fishery, 16 May to 30 June 2007.

		Angler interview data[a]					Downstream[b]								Upstream[b]							
Date	Day		Catch		Harvest		Counts		Effort		Catch		Harvest		Counts		Effort		Catch		Harvest	
(m/dd)	type[c]	n[d]	CPUE	SE	HPUE	SE	n	Mean	Est.	SE	Est.	SE	Est.	SE	n	Mean	Est.	SE	Est.	SE	Est.	SE
5/16	wd	6	0.000	0.000	0.000	0.000	3	0	0	0	0	0	0	0	3	2	24	21	0	0	0	0
5/18	wd	4	0.000	0.000	0.000	0.000	2	0	0	0	0	0	0	0	2	21	246	18	0	0	0	0
5/19	we/hol	0	0.000	0.000	0.000	0.000	3	0	0	0	0	0	0	0	3	2	28	11	0	0	0	0
5/23	wd	19	0.043	0.015	0.017	0.012	3	0	0	0	0	0	0	0	3	23	270	162	12	8	5	4
5/24	wd	14	0.032	0.019	0.011	0.011	3	0	0	0	0	0	0	0	3	15	176	34	6	3	2	2
5/26	we/hol	18	0.000	0.000	0.000	0.000	2	0	0	0	0	0	0	0	2	39	462	102	0	0	0	0
5/30	wd	34	0.045	0.014	0.018	0.009	3	0	0	0	0	0	0	0	3	65	784	218	35	15	14	8
6/01	wd	15	0.061	0.026	0.030	0.019	3	0	0	0	0	0	0	0	3	52	618	258	38	22	18	14
6/02	we/hol	28	0.045	0.017	0.045	0.017	3	1	16	20	1	1	1	1	3	49	592	139	26	12	26	12
6/05	wd	30	0.014	0.008	0.005	0.005	3	0	0	0	0	0	0	0	3	124	1,484	584	21	15	7	8
6/09	we/hol	13	0.040	0.024	0.040	0.024	3	0	0	0	0	0	0	0	3	79	948	420	38	28	38	28
6/13 [e]	wd	47	0.185	0.036	0.087	0.015	3	3	36	36	7	7	3	3	3	149	1,788	1,080	330	210	156	98
6/14 [e]	wd	31	0.084	0.024	0.056	0.016	2	9	102	102	9	9	6	6	2	190	2,274	486	191	68	127	46
6/16 [e]	we/hol	29	0.086	0.029	0.033	0.015	2	31	366	342	32	31	12	13	2	183	2,190	762	189	91	72	42
6/19 [e]	wd	48	0.131	0.024	0.108	0.022	3	9	108	108	14	14	12	12	3	221	2,652	660	348	108	287	93
6/22 [e]	wd	37	0.031	0.012	0.025	0.011	3	8	100	77	3	3	3	2	3	124	1,488	268	45	20	38	18
6/23 [e]	we/hol	47	0.021	0.008	0.017	0.008	3	7	88	54	2	1	2	1	3	107	1,288	318	26	12	22	11
6/27 [e]	wd	35	0.034	0.011	0.030	0.010	3	28	330	186	11	7	10	7	3	161	1,932	552	66	28	58	26
6/28 [e]	wd	11	0.071	0.034	0.052	0.031	3	11	132	118	9	10	7	7	3	182	2,180	363	154	78	114	71
6/30 [e]	we/hol	12	0.038	0.018	0.010	0.010	3	7	84	103	3	4	1	1	3	155	1,856	279	71	36	18	18
Min		0	0.000		0.000		2	0	0		0		0		2	2	24		0		0	
Mean		24	0.048		0.029		3	6	68		5		3		3	97	1,164		80		50	
Max		48	0.185		0.108		3	31	366		32		12		3	221	2,652		348		287	

Notes: "Catch" = fish harvested plus fish released; "harvest" = fish kept; "CPUE" = catch per unit effort; "HPUE" = harvest per unit effort.

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

[b] "Downstream" = Kenai River reach from Warren Ames Bridge to the Chinook salmon sonar site, "Upstream" = Kenai River reach from the Chinook salmon sonar site to 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 by emergency order from 12 June on to allow the use of bait; slot limit (44-55 in TL) still in effect.

Appendix B3.-Daily estimates of unguided boat angler CPUE, HPUE, angler effort, catch and harvest, by geographic strata, during the late-run Kenai River Chinook salmon fishery, 1 July to 31 July 2007.

		Angler interview data[a]					Downstream[b]								Upstream[b]							
Date	Day		Catch		Harvest		Counts		Effort		Catch		Harvest		Counts		Effort		Catch		Harvest	
(m/dd)	type[c]	n	CPUE	SE	HPUE	SE	n	Mean	Est.	SE	Est.	SE	Est.	SE	n	Mean	Est.	SE	Est.	SE	Est.	SE
7/01	we/hol	42	0.046	0.019	0.033	0.014	4	10.0	200	111	9	6	7	5	4	89.8	1,795	586	82	43	59	32
7/03	wd	32	0.020	0.012	0.014	0.010	4	10.3	205	131	4	4	3	3	4	105.8	2,115	383	43	27	29	22
7/06	wd	17	0.016	0.017	0.000	0.000	4	6.3	125	40	2	2	0	0	4	90.8	1,815	521	30	31	0	0
7/07	we/hol	26	0.022	0.015	0.022	0.015	4	15.0	300	170	6	6	6	6	4	105.5	2,110	416	46	34	46	34
7/08	we/hol	75	0.075	0.016	0.051	0.013	4	20.8	415	163	31	14	21	10	4	208.8	4,175	1,122	313	108	213	79
7/11	wd	24	0.071	0.024	0.007	0.008	4	14.5	290	70	20	9	2	2	4	90.5	1,810	262	128	47	13	14
7/13	wd	64	0.016	0.008	0.006	0.004	4	30.3	605	173	9	5	4	3	4	145.5	2,910	575	45	25	18	13
7/14	we/hol	38	0.036	0.014	0.007	0.007	4	26.8	535	205	19	10	4	4	4	241.3	4,825	580	172	70	34	34
7/15	we/hol	144	0.040	0.008	0.028	0.007	4	59.0	1,180	594	48	26	33	18	4	353.0	7,060	961	285	67	197	54
7/17	wd	72	0.058	0.011	0.027	0.008	4	44.0	880	393	51	25	24	13	4	268.0	5,360	1,286	308	95	147	57
7/19	wd	91	0.037	0.011	0.010	0.005	4	40.8	815	291	30	14	8	5	4	167.3	3,345	668	123	44	33	18
7/21	we/hol	72	0.066	0.020	0.041	0.012	4	49.0	980	167	65	22	40	13	4	199.0	3,980	628	262	89	162	53
7/22	we/hol	134	0.125	0.018	0.068	0.011	4	60.5	1,210	352	151	49	83	28	4	227.8	4,555	1,490	569	203	311	114
7/25	wd	24	0.042	0.019	0.016	0.013	4	34.3	685	148	29	15	11	9	4	206.0	4,120	288	174	80	68	52
7/27	wd	62	0.038	0.011	0.027	0.009	4	29.8	595	309	22	13	16	10	4	192.8	3,855	681	145	48	105	39
7/28	we/hol	90	0.049	0.012	0.031	0.009	4	28.0	560	166	27	10	17	7	4	253.5	5,070	926	246	74	156	53
7/29	we/hol	95	0.039	0.010	0.030	0.009	4	90.8	1,815	583	72	30	54	23	4	330.8	6,615	833	261	75	195	62
7/31	wd	49	0.046	0.012	0.042	0.012	4	17.8	355	97	16	6	15	6	4	289.0	5,780	1,164	264	90	241	85
Min		17	0.016		0.000		4	6.3	125		2		0		4	89.8	1,795		30		0	
Mean		64	0.047		0.025		4	32.6	653		34		19		4	198.0	3,961		194		113	
Max		144	0.125		0.068		4	90.8	1,815		151		83		4	353.0	7,060		569		311	

Notes: "Catch" = fish harvested plus fish released; "harvest" = fish kept; "CPUE" = catch per unit effort; "HPUE" = harvest per unit effort.

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

[b] "Downstream" = Kenai River reach from Warren Ames Bridge to the Chinook salmon sonar site, "Upstream" = Kenai River reach from the Chinook salmon sonar site to Soldotna Bridge.

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

Appendix B4.-Daily estimates of guided boat angler CPUE, HPUE, angler effort, catch and harvest, by geographic strata, during the late-run Kenai River Chinook salmon fishery, 3 July to 31 July 2007.

		Angler interview data[a]					Downstream[b]								Upstream[b]							
Date	Day		Catch		Harvest		Counts		Effort		Catch		Harvest		Counts		Effort		Catch		Harvest	
(m/dd)	type[c]	n	CPUE	SE	HPUE	SE	n	Mean	Est.	SE	Est.	SE	Est.	SE	n	Mean	Est.	SE	Est.	SE	Est.	SE
7/03	wd	60	0.025	0.008	0.015	0.006	3	76.5	918	366	23	12	13	7	3	242.0	2,904	1,320	73	40	42	25
7/06	wd	76	0.045	0.010	0.026	0.008	3	46.5	558	258	25	13	15	8	3	286.0	3,432	1,524	156	78	90	48
7/07	we/hol	36	0.033	0.013	0.029	0.011	2	23.5	282	90	9	5	8	4	2	254.5	3,054	798	100	48	88	41
7/11	wd	56	0.088	0.017	0.081	0.016	2	67.0	804	648	71	59	66	54	2	297.5	3,570	186	313	64	291	61
7/13	wd	32	0.043	0.015	0.043	0.015	3	96.0	1,152	720	49	35	49	35	3	309.3	3,712	1,066	159	71	159	71
7/14	we/hol	18	0.056	0.024	0.056	0.024	3	49.3	592	527	33	33	33	33	3	396.3	4,756	1,156	265	129	265	129
7/17	wd	78	0.069	0.011	0.046	0.010	3	142.5	1,710	774	118	57	78	39	3	439.0	5,268	1,632	364	127	242	91
7/19	wd	68	0.098	0.016	0.085	0.015	3	119.0	1,428	218	140	31	121	28	3	419.0	5,028	972	493	124	426	111
7/21	we/hol	64	0.088	0.015	0.063	0.013	3	134.0	1,608	404	142	43	101	33	3	259.0	3,108	605	274	71	195	56
7/25	wd	61	0.150	0.025	0.109	0.019	3	90.3	1,084	385	163	64	119	47	3	336.3	4,036	537	605	128	442	98
7/27	wd	87	0.089	0.013	0.071	0.012	3	125.0	1,500	1,248	134	113	107	91	3	374.5	4,494	342	400	65	319	60
7/28	we/hol	18	0.068	0.021	0.047	0.020	3	52.0	624	648	43	46	29	33	3	373.0	4,476	1,313	305	129	210	108
7/31	wd	90	0.080	0.011	0.065	0.009	3	37.3	448	219	36	18	29	15	3	375.0	4,500	1,298	359	115	291	94
Min		18	0.025		0.015		2	23.5	282		9		8		2	242.0	2,904		73		42	
Mean		57	0.072		0.057		3	81.5	978		76		59		3	335.5	4,026		297		235	
Max		90	0.150		0.109		3	142.5	1,710		163		121		3	439.0	5,268		605		442	

Notes: "Catch" = fish harvested plus fish released; "harvest" = fish kept; "CPUE" = catch per unit effort; "HPUE" = harvest per unit effort.

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

[b] "Downstream" = Kenai River reach from Warren Ames Bridge to the Chinook salmon sonar site, "Upstream" = Kenai River reach from the Chinook salmon sonar site to Soldotna Bridge.

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

APPENDIX C. EFFORT, CATCH, AND HARVEST ESTIMATES BY TEMPORAL AND GEOGRAPHIC STRATA DURING KENAI RIVER CHINOOK SALMON FISHERY, 2007

Appendix C1.-Estimated effort, catch, and harvest estimates, by geographic strata, during the early-run Kenai River Chinook salmon fishery, 16 May to 30 June 2007.

	Downstream[a] creel estimates						Upstream[a] creel estimates								
			Chinook salmon						Chinook salmon						
	Effort		Catch		Harvest		Effort		Catch		Harvest		Downstream		
	Days fished	SE	No. of fish	SE	No. of fish	SE	Days fished	SE	No. of fish	SE	No. of fish	SE	Effort (%)	Catch (%)	Harvest (%)
16-20 May															
Guided weekdays	0	0	0	0	0	0	540	316	0	0	0	0	0.0%	N/A	N/A
Guided weekends	0	0	0	0	0	0	28	11	0	0	0	0	0.0%	N/A	N/A
Unguided weekdays	20	22	0	0	0	0	260	63	0	0	0	0	7.1%	N/A	N/A
Unguided weekends	0	0	0	0	0	0	400	94	0	0	0	0	0.0%	N/A	N/A
22-27 May															
Guided weekdays	0	0	0	0	0	0	892	269	34	15	13	8	0.0%	0.0%	0.0%
Guided weekends	0	0	0	0	0	0	924	144	0	0	0	0	0.0%	N/A	N/A
Unguided weekdays	0	0	0	0	0	0	650	109	12	5	7	5	0.0%	0.0%	0.0%
Unguided weekends	30	33	0	0	0	0	720	225	0	0	0	0	4.0%	N/A	N/A
29 May-3 June															
Guided weekdays	0	0	0	0	0	0	2804	532	145	38	64	24	0.0%	0.0%	0.0%
Guided weekends	16	20	1	1	1	1	592	139	26	12	26	12	2.6%	2.6%	2.6%
Unguided weekdays	10	11	0	1	0	0	1260	195	33	30	11	11	0.8%	1.4%	1.4%
Unguided weekends	65	58	2	2	1	1	1035	150	31	13	13	6	5.9%	5.3%	7.5%
5-10 June															
Guided weekdays	0	0	0	0	0	0	5,936	1,169	85	30	28	15	0.0%	0.0%	0.0%
Guided weekends	0	0	0	0	0	0	948	420	38	28	38	28	0.0%	0.0%	0.0%
Unguided weekdays	0	0	0	0	0	0	660	113	0	0	0	0	0.0%	N/A	N/A
Unguided weekends	0	0	0	0	0	0	1,885	550	96	50	64	35	0.0%	0.0%	0.0%
12-17 June															
Guided weekdays	276	179	30	16	18	10	8,124	1,810	1,041	368	564	158	3.3%	2.8%	3.0%
Guided weekends	366	342	32	31	12	13	2,190	762	189	91	72	42	14.3%	14.3%	14.3%
Unguided weekdays	40	23	2	1	2	1	3,080	444	150	51	150	51	1.3%	1.3%	1.3%
Unguided weekends	290	161	11	7	8	5	4,055	506	149	41	113	35	6.7%	6.6%	6.7%
19-24 June															
Guided weekdays	416	188	34	26	28	22	8,280	1,930	787	455	650	377	4.8%	4.2%	4.2%
Guided weekends	88	54	2	1	2	1	1,288	318	26	12	22	11	6.4%	6.4%	6.4%
Unguided weekdays	200	59	11	5	9	4	3,140	672	212	126	172	97	6.0%	4.8%	5.0%
Unguided weekends	85	71	5	6	4	4	2,445	572	126	56	98	46	3.4%	4.1%	3.9%
26-30 June															
Guided weekdays	924	419	41	17	34	15	8,224	998	440	172	344	133	10.1%	8.5%	8.9%
Guided weekends	84	103	3	4	1	1	1,856	279	71	36	18	18	4.3%	4.3%	4.3%
Unguided weekdays	220	75	2	1	1	1	3,150	364	33	17	15	15	6.5%	6.5%	6.5%
Unguided weekends	60	24	1	1	1	1	1,700	81	40	23	40	23	3.4%	3.4%	3.4%
Day type subtotals															
Guided weekdays	1,616	493	106	35	80	28	34,800	3,134	2,532	612	1,664	431	4.4%	4.0%	4.6%
Guided weekends/holiday	554	362	37	32	15	13	7,826	988	351	103	176	56	6.6%	9.6%	7.9%
Unguided weekdays	490	101	15	5	12	4	12,200	921	439	140	354	111	3.9%	3.4%	3.3%
Unguided weekends/holiday	530	190	19	9	15	7	12,240	987	443	90	329	72	4.2%	4.1%	4.2%
Angler type subtotals															
Guided	2,170	612	143	47	95	31	42,626	3,286	2,884	621	1,840	435	4.8%	4.7%	4.9%
% Guided	68.0%		80.5%		78.0%		63.6%		76.6%		72.9%				
Unguided	1,020	215	35	11	27	8	24,440	1,350	882	167	684	132	4.0%	3.8%	3.8%
% Unguided	32.0%		19.5%		22.0%		36.4%		23.4%		27.1%				
Early-run total	3,190	648	178	48	121	32	67,066	3,552	3,766	643	2,523	455	4.5%	4.5%	4.6%

Note: "N/A" = not applicable.

[a] "Downstream" = Kenai River reach from Warren Ames Bridge to the Chinook salmon sonar site, "Upstream" = Kenai River reach from the Chinook salmon sonar site to Soldotna Bridge.

Appendix C2.-Estimated effort, catch, and harvest estimates, by geographic strata, during the late-run Kenai River Chinook salmon fishery, 1 July to 31 July 2007.

	Downstream[a] creel estimates						Upstream[a] creel estimates								
			Chinook salmon						Chinook salmon						
	Effort		Catch		Harvest		Effort		Catch		Harvest		Downstream		
	Days fished	SE	No. of fish	SE	No. of fish	SE	Days fished	SE	No. of fish	SE	No. of fish	SE	Effort (%)	Catch (%)	Harvest (%)
1 July															
Unguided weekends	200	111	9	6	7	5	1,795	586	82	43	59	32	10.0%	10.0%	10.0%
3-8 July															
Guided weekdays	2,952	813	97	25	56	16	12,672	2,947	457	170	264	102	18.9%	17.5%	17.5%
Guided weekends	282	90	9	5	8	4	3,054	798	100	48	88	41	8.5%	8.5%	8.5%
Unguided weekdays	660	224	12	7	6	5	7,860	1,008	146	61	57	51	7.7%	7.9%	8.8%
Unguided weekends	715	235	38	15	28	12	6,285	1,197	359	113	258	86	10.2%	9.5%	9.7%
10-15 July															
Guided weekdays	3,912	1,456	240	101	230	94	14,564	1,543	945	257	899	229	21.2%	20.2%	20.3%
Guided weekends	592	527	33	33	33	33	4,756	1,156	265	129	265	129	11.1%	11.1%	11.1%
Unguided weekdays	1,790	518	60	21	12	6	9,440	1,794	346	139	62	28	15.9%	14.7%	15.8%
Unguided weekends	1,715	629	67	28	37	19	11,885	1,123	457	97	232	64	12.6%	12.7%	13.7%
17-22 July															
Guided weekdays	6,276	1,205	516	97	399	91	20,592	2,707	1,713	311	1,335	331	23.4%	23.2%	23.0%
Guided weekends	1,608	404	142	43	101	33	3,108	605	274	71	195	56	34.1%	34.1%	34.1%
Unguided weekdays	3,390	697	161	49	64	30	17,410	3,510	863	300	359	182	16.3%	15.7%	15.2%
Unguided weekends	2,190	389	216	54	123	31	8,535	1,617	831	222	473	126	20.4%	20.6%	20.6%
24-29 July															
Guided weekdays	5,168	1,939	592	188	451	145	17,060	1,109	2,011	354	1,523	238	23.2%	22.8%	22.8%
Guided weekends	624	648	43	46	29	33	4,476	1,313	305	129	210	108	12.2%	12.2%	12.2%
Unguided weekdays	2,560	501	103	29	55	20	15,950	1,110	638	139	345	106	13.8%	13.9%	13.7%
Unguided weekends	2,375	607	99	31	71	24	11,685	1,246	507	105	351	81	16.9%	16.3%	16.8%
31 July															
Guided weekdays	448	219	36	18	29	15	4,500	1,298	359	115	291	94	9.1%	9.1%	9.1%
Unguided weekdays	355	97	16	6	15	6	5,780	1,164	264	90	241	85	5.8%	5.8%	5.8%
Day type subtotals															
Guided weekdays	18,756	2,835	1,480	236	1,164	197	69,388	4,617	5,484	575	4,312	487	21.3%	21.3%	21.3%
Guided weekends	3,106	932	227	71	171	57	15,394	2,016	945	202	758	182	16.8%	19.3%	18.4%
Unguided weekdays	8,755	1,032	352	62	151	38	56,440	4,375	2,257	375	1,065	234	13.4%	13.5%	12.4%
Unguided weekends	7,195	991	428	70	264	45	40,185	2,684	2,236	291	1,372	187	15.2%	16.1%	16.1%
Angler type subtotals															
Guided	21,862	2,984	1,707	247	1,335	205	84,782	5,038	6,428	609	5,070	520	20.5%	21.0%	20.8%
% Guided	57.8%		68.6%		76.3%		46.7%		58.9%		67.5%				
Unguided	15,950	1,431	780	94	415	59	96,625	5,133	4,493	474	2,437	300	14.2%	14.8%	14.6%
% Unguided	42.2%		31.4%		23.7%		53.3%		41.1%		32.5%				
Late-run total	37,812	3,310	2,487	264	1,750	213	181,407	7,192	10,921	772	7,507	600	17.2%	18.5%	18.9%

[a] "Downstream" = Kenai River reach from Warren Ames Bridge to the Chinook salmon sonar site, "Upstream" = Kenai River reach from the Chinook salmon sonar site to Soldotna Bridge.

APPENDIX D. INRIVER GILLNETTING DAILY CATCH, CPUE, AND SPECIES PROPORTION DURING THE KENAI RIVER CHINOOK SALMON FISHERY, 2007

Appendix D1.-Chinook and sockeye salmon catch, CPUE, and proportion of Chinook salmon caught inriver in 5.0 inch mesh gillnets during the early-run Kenai River Chinook salmon fishery, 16 May to 30 June 2007.

	Inriver drift gillnetting												
		Time	Catch										
Date	No. of	fished	Chinook salmon			Sockeye salmon			Combined total		Chinook salmon	
(m/dd)	drifts	(min)	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	Proportion [a]	SE
5/16	10	62	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/17	10	64	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/18	10	71	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/19	8	58	0	0.000	0.000	1	0.017	0.017	1	0.017	0.000	0.000
5/20	10	74	1	0.013	0.014	2	0.027	0.018	3	0.040	0.333	0.287
5/21	10	78	0	0.000	0.000	1	0.013	0.013	1	0.013	0.000	0.000
5/22	12	91	0	0.000	0.000	1	0.011	0.011	1	0.011	0.000	0.000
5/23	10	75	0	0.000	0.000	1	0.013	0.013	1	0.013	0.000	0.000
5/24	12	99	1	0.010	0.010	7	0.071	0.022	8	0.081	0.125	0.108
5/25	10	78	1	0.013	0.013	6	0.077	0.033	7	0.090	0.143	0.146
5/26	12	99	0	0.000	0.000	2	0.020	0.014	2	0.020	0.000	0.000
5/27	10	68	3	0.044	0.022	7	0.103	0.032	10	0.148	0.300	0.144
5/28	12	82	1	0.012	0.012	8	0.098	0.035	9	0.110	0.111	0.112
5/29	9	57	4	0.070	0.037	11	0.193	0.085	15	0.263	0.267	0.105
5/30	10	64	2	0.031	0.021	10	0.157	0.047	12	0.189	0.167	0.101
5/31	10	65	2	0.031	0.020	23	0.356	0.129	25	0.387	0.080	0.055
6/01	12	76	0	0.000	0.000	14	0.184	0.069	14	0.184	0.000	0.000
6/02	10	65	4	0.062	0.041	9	0.139	0.077	13	0.200	0.308	0.166
6/03	11	72	2	0.028	0.019	17	0.238	0.092	19	0.266	0.105	0.078
6/04	12	75	3	0.040	0.021	14	0.188	0.079	17	0.228	0.176	0.095
6/05	10	57	6	0.105	0.053	22	0.386	0.072	28	0.492	0.214	0.091
6/06	10	61	4	0.065	0.037	36	0.589	0.153	40	0.654	0.100	0.037
6/07	10	50	3	0.060	0.031	31	0.622	0.142	34	0.682	0.088	0.049
6/08	10	53	4	0.076	0.060	35	0.664	0.133	39	0.740	0.103	0.079
6/09	10	65	4	0.062	0.033	32	0.494	0.138	36	0.556	0.111	0.044
6/10	10	59	2	0.034	0.023	18	0.304	0.082	20	0.338	0.100	0.067
6/11	10	46	2	0.043	0.029	47	1.018	0.211	49	1.062	0.041	0.030
6/12	8	39	3	0.077	0.037	55	1.405	0.210	58	1.482	0.052	0.028
6/13	8	37	2	0.054	0.056	63	1.710	0.319	65	1.765	0.031	0.028
6/14	8	38	1	0.026	0.026	44	1.152	0.219	45	1.179	0.022	0.022
6/15	8	33	2	0.060	0.040	36	1.079	0.251	38	1.139	0.053	0.033
6/16	8	30	4	0.133	0.050	52	1.725	0.181	56	1.857	0.071	0.025
6/17	10	55	4	0.072	0.040	38	0.686	0.140	42	0.758	0.095	0.044
6/18	10	48	7	0.145	0.086	25	0.518	0.119	32	0.663	0.219	0.097
6/19	8	41	4	0.099	0.038	36	0.887	0.118	40	0.985	0.100	0.029
6/20	10	50	3	0.060	0.030	18	0.359	0.075	21	0.419	0.143	0.049
6/21	10	60	1	0.017	0.016	27	0.447	0.106	28	0.464	0.036	0.032
6/22	10	54	5	0.092	0.040	28	0.515	0.085	33	0.607	0.152	0.057
6/23	11	56	8	0.142	0.052	19	0.336	0.064	27	0.478	0.296	0.089
6/24	10	60	3	0.050	0.026	16	0.266	0.082	19	0.315	0.158	0.074
6/25	13	93	3	0.032	0.023	19	0.204	0.078	22	0.236	0.136	0.091
6/26	12	75	3	0.040	0.021	14	0.187	0.068	17	0.227	0.176	0.095
6/27	11	64	3	0.047	0.034	9	0.141	0.066	12	0.188	0.250	0.082
6/28	10	56	5	0.090	0.039	15	0.270	0.080	20	0.359	0.250	0.107
6/29	10	61	6	0.098	0.043	23	0.376	0.085	29	0.474	0.207	0.101
6/30	10	70	2	0.029	0.020	40	0.571	0.071	42	0.600	0.048	0.030
Total	465	2,884	118	2.162		932	18.817		1,050	20.979	NA	NA
Min	8	30	0	0.000		0	0.000		0	0.000	0.000	
Mean	10	63	3	0.047		20	0.409		23	0.456	0.125	
Max	13	99	8	0.145		63	1.725		65	1.857	0.333	

Note: NA = not applicable.

[a] Proportion of combined total catch = Chinook salmon CPUE/Combined total CPUE.

Appendix D2.-Chinook and sockeye salmon catch, CPUE, and proportion of Chinook salmon caught inriver in 7.5 inch mesh gillnets during the early-run Kenai River Chinook salmon fishery, 16 May to 30 June 2007.

	Inriver drift gillnetting												
		Time	Catch										
Date	No. of	fished	Chinook salmon			Sockeye salmon			Combined total		Chinook salmon	
(m/dd)	drifts	(min)	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	Proportion [a]	SE
5/16	10	58	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/17	10	60	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/18	10	77	2	0.026	0.018	0	0.000	0.000	2	0.026	1.00	0.00
5/19	10	71	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/20	8	56	3	0.053	0.027	0	0.000	0.000	3	0.053	1.00	0.00
5/21	12	91	1	0.011	0.011	0	0.000	0.000	1	0.011	1.00	0.00
5/22	10	68	2	0.029	0.020	1	0.015	0.015	3	0.044	0.67	0.29
5/23	10	76	2	0.026	0.026	0	0.000	0.000	2	0.026	1.00	0.00
5/24	12	94	2	0.021	0.021	1	0.011	0.011	3	0.032	0.67	0.33
5/25	10	74	4	0.054	0.022	6	0.081	0.022	10	0.134	0.40	0.13
5/26	12	94	0	0.000	0.000	1	0.011	0.011	1	0.011	0.00	0.00
5/27	12	80	1	0.012	0.012	1	0.012	0.013	2	0.025	0.50	0.37
5/28	10	67	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/29	10	68	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/30	8	50	0	0.000	0.000	3	0.060	0.042	3	0.060	0.00	0.00
5/31	12	78	5	0.064	0.035	1	0.013	0.013	6	0.077	0.83	0.17
6/01	10	65	2	0.031	0.020	11	0.169	0.068	13	0.199	0.15	0.12
6/02	10	66	6	0.092	0.035	5	0.076	0.035	11	0.168	0.55	0.13
6/03	10	63	7	0.111	0.042	6	0.095	0.051	13	0.205	0.54	0.15
6/04	12	76	2	0.026	0.026	5	0.065	0.030	7	0.092	0.29	0.20
6/05	8	43	3	0.070	0.033	11	0.258	0.097	14	0.328	0.21	0.12
6/06	10	63	2	0.032	0.032	7	0.112	0.035	9	0.144	0.22	0.17
6/07	8	43	6	0.139	0.055	6	0.139	0.059	12	0.279	0.50	0.13
6/08	10	60	7	0.116	0.045	8	0.133	0.049	15	0.249	0.47	0.08
6/09	8	48	8	0.166	0.062	6	0.125	0.054	14	0.291	0.57	0.18
6/10	10	62	2	0.033	0.021	6	0.098	0.049	8	0.130	0.25	0.14
6/11	8	45	6	0.133	0.055	21	0.467	0.146	27	0.601	0.22	0.10
6/12	8	38	12	0.315	0.169	12	0.315	0.107	24	0.630	0.50	0.17
6/13	8	43	6	0.139	0.078	13	0.300	0.096	19	0.439	0.32	0.17
6/14	10	46	6	0.130	0.046	22	0.478	0.120	28	0.608	0.21	0.06
6/15	8	42	4	0.096	0.039	18	0.430	0.126	22	0.526	0.18	0.07
6/16	10	49	7	0.144	0.070	23	0.473	0.128	30	0.617	0.23	0.10
6/17	10	54	5	0.092	0.042	14	0.257	0.067	19	0.349	0.26	0.07
6/18	11	63	3	0.048	0.034	3	0.048	0.034	6	0.095	0.50	0.28
6/19	8	41	9	0.220	0.101	5	0.122	0.037	14	0.342	0.64	0.15
6/20	10	52	1	0.019	0.019	5	0.096	0.051	6	0.115	0.17	0.14
6/21	10	59	6	0.101	0.042	2	0.034	0.023	8	0.135	0.75	0.13
6/22	10	59	2	0.034	0.023	3	0.051	0.027	5	0.085	0.40	0.18
6/23	10	53	4	0.075	0.043	5	0.094	0.032	9	0.169	0.44	0.18
6/24	10	59	3	0.051	0.027	2	0.034	0.034	5	0.085	0.60	0.29
6/25	12	83	1	0.012	0.012	8	0.096	0.054	9	0.108	0.11	0.12
6/26	12	77	3	0.039	0.028	2	0.026	0.018	5	0.065	0.60	0.21
6/27	10	61	0	0.000	0.000	7	0.115	0.035	7	0.115	0.00	0.00
6/28	10	62	0	0.000	0.000	2	0.032	0.022	2	0.032	0.00	0.00
6/29	9	59	7	0.119	0.052	10	0.171	0.054	17	0.290	0.41	0.15
6/30	10	67	2	0.030	0.020	16	0.237	0.050	18	0.267	0.11	0.07
Total	456	2,863	154	2.910		278	5.348		432	0.151	NA	NA
Min	8	38	0	0.000		0	0.000		0	0.000	0.00	
Mean	10	62	3	0.063		6	0.116		9	0.151	0.43	
Max	12	94	12	0.315		23	0.478		30	0.319	1.00	

Note: NA = not applicable.

[a] Proportion of combined total catch = Chinook salmon CPUE/Combined total CPUE.

Appendix D3.-Chinook and sockeye salmon catch, CPUE, and proportion of Chinook salmon caught inriver in 5.0 and 7.5 inch mesh gillnets during the early-run Kenai River Chinook salmon fishery, 16 May to 30 June 2007.

	Inriver drift gillnetting												
			Time	Catch									
Date		No. of	fished	Chinook salmon			Sockeye salmon			Combined total		Chinook salmon	
(m/dd)	Reps[a]	drifts	(min)	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	Proportion [b]	SE
5/16	5	20	120	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/17	5	20	124	0	0.000	0.000	0	0.000	0.000	0	0.000		
5/18	5	20	148	2	0.014	0.009	0	0.000	0.000	2	0.014	1.00	0.00
5/19	4	16	116	0	0.000	0.000	1	0.008	0.008	1	0.009	0.00	0.00
5/20	4	16	117	3	0.027	0.009	1	0.008	0.008	4	0.034	0.77	0.15
5/21	5	20	153	1	0.007	0.007	1	0.007	0.007	2	0.013	0.53	0.39
5/22	5	20	145	2	0.015	0.009	2	0.013	0.008	4	0.028	0.53	0.28
5/23	5	20	151	2	0.013	0.013	1	0.007	0.007	3	0.020	0.65	0.36
5/24	6	24	193	3	0.016	0.011	8	0.040	0.010	11	0.057	0.29	0.13
5/25	5	20	152	5	0.034	0.019	12	0.077	0.015	17	0.112	0.31	0.15
5/26	6	24	193	0	0.000	0.000	3	0.017	0.008	3	0.016	0.00	0.00
5/27	5	20	136	4	0.030	0.014	8	0.060	0.025	12	0.088	0.33	0.18
5/28	5	20	136	0	0.000	0.000	6	0.045	0.022	6	0.044	0.00	0.00
5/29	5	19	126	4	0.031	0.022	11	0.097	0.034	15	0.120	0.24	0.14
5/30	4	16	101	2	0.020	0.011	11	0.110	0.057	13	0.129	0.15	0.07
5/31	5	20	130	5	0.037	0.017	24	0.182	0.081	29	0.222	0.17	0.06
6/01	5	20	128	2	0.016	0.010	18	0.137	0.054	20	0.156	0.10	0.09
6/02	5	20	130	10	0.078	0.036	14	0.109	0.051	24	0.184	0.42	0.14
6/03	5	20	128	9	0.071	0.025	21	0.161	0.056	30	0.234	0.31	0.09
6/04	6	24	151	5	0.033	0.012	19	0.125	0.055	24	0.159	0.21	0.09
6/05	4	16	88	9	0.098	0.036	29	0.336	0.035	38	0.431	0.23	0.08
6/06	5	20	124	6	0.052	0.032	43	0.361	0.110	49	0.396	0.13	0.04
6/07	4	16	84	8	0.091	0.033	33	0.419	0.095	41	0.488	0.18	0.08
6/08	5	20	113	11	0.101	0.047	43	0.415	0.094	54	0.478	0.20	0.08
6/09	4	16	102	12	0.123	0.055	31	0.303	0.097	43	0.423	0.29	0.04
6/10	5	20	121	4	0.034	0.017	24	0.201	0.046	28	0.232	0.14	0.07
6/11	4	16	83	7	0.079	0.013	65	0.850	0.181	72	0.871	0.09	0.03
6/12	4	16	77	15	0.192	0.083	67	0.855	0.122	82	1.062	0.18	0.08
6/13	4	16	80	8	0.100	0.022	76	1.026	0.250	84	1.049	0.09	0.03
6/14	4	16	76	7	0.091	0.022	64	0.841	0.133	71	0.933	0.10	0.02
6/15	4	16	75	6	0.079	0.018	54	0.822	0.261	60	0.798	0.09	0.04
6/16	4	16	69	11	0.156	0.049	68	1.069	0.120	79	1.140	0.13	0.03
6/17	5	20	110	9	0.086	0.039	52	0.475	0.106	61	0.555	0.15	0.04
6/18	5	20	107	10	0.101	0.034	28	0.302	0.068	38	0.354	0.25	0.06
6/19	4	16	82	13	0.162	0.045	41	0.501	0.067	54	0.662	0.24	0.08
6/20	5	20	102	4	0.038	0.018	23	0.224	0.074	27	0.265	0.14	0.04
6/21	5	20	120	7	0.057	0.019	29	0.252	0.075	36	0.300	0.18	0.02
6/22	5	20	113	7	0.063	0.027	31	0.280	0.039	38	0.336	0.18	0.05
6/23	5	20	106	12	0.113	0.012	24	0.228	0.031	36	0.341	0.33	0.04
6/24	5	20	119	6	0.052	0.036	18	0.152	0.040	24	0.202	0.26	0.12
6/25	6	24	168	4	0.024	0.015	27	0.168	0.069	31	0.185	0.12	0.08
6/26	6	24	151	6	0.039	0.019	16	0.105	0.045	22	0.145	0.27	0.13
6/27	5	20	120	3	0.026	0.017	14	0.117	0.042	17	0.142	0.18	0.08
6/28	5	20	117	5	0.041	0.023	17	0.142	0.039	22	0.187	0.22	0.10
6/29	5	19	120	13	0.106	0.029	33	0.274	0.065	46	0.384	0.28	0.09
6/30	5	20	138	4	0.032	0.015	56	0.411	0.071	60	0.436	0.07	0.03
Total	222	886	5,543	266	2.577		1,167	12.332		1,433	0.259	NA	NA
Min	4	16	69	0	0.000		0	0.000		0	0.000	0.00	
Mean	5	19	120	6	0.056		25	0.268		31	0.259	0.24	
Max	6	24	193	15	0.192		76	1.069		84	0.436	1.00	

Note: NA = not applicable.

[a] 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.

[b] Proportion of combined total catch = Chinook salmon CPUE/Combined total CPUE.

Appendix D4.-Chinook, sockeye, coho, and pink salmon catch, CPUE, and proportion of Chinook salmon caught inriver in the 5.0 inch mesh gillnets during the late-run Kenai River Chinook salmon fishery, 1 July to 10 August 2007.

	Inriver drift gillnetting																	
		Time	Catch															
Date	No. of	fished	Chinook salmon			Sockeye salmon			Coho salmon			Pink salmon			Combined total		Chinook salmon	
(m/dd)	drifts	(min)	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	Proportion [a]	SE
7/01	10	59	0	0.000	0.000	54	0.915	0.072	0	0.000	0.000	0	0.000	0.000	54	0.915	0.00	0.00
7/02	10	56	3	0.053	0.027	32	0.567	0.108	0	0.000	0.000	0	0.000	0.000	35	0.621	0.09	0.04
7/03	10	57	5	0.087	0.047	45	0.787	0.144	0	0.000	0.000	0	0.000	0.000	50	0.875	0.10	0.05
7/04	8	41	9	0.217	0.056	33	0.796	0.213	0	0.000	0.000	0	0.000	0.000	42	1.013	0.21	0.05
7/05	8	51	9	0.178	0.037	25	0.494	0.116	0	0.000	0.000	0	0.000	0.000	34	0.672	0.26	0.06
7/06	8	64	7	0.110	0.041	20	0.315	0.081	0	0.000	0.000	0	0.000	0.000	27	0.425	0.26	0.09
7/07	8	62	10	0.162	0.096	40	0.650	0.095	0	0.000	0.000	0	0.000	0.000	50	0.812	0.20	0.10
7/08	8	54	12	0.221	0.049	65	1.197	0.324	0	0.000	0.000	1	0.018	0.025	78	1.436	0.15	0.04
7/09	10	70	11	0.158	0.070	35	0.502	0.105	0	0.000	0.000	0	0.000	0.000	46	0.660	0.24	0.10
7/10	8	58	10	0.173	0.032	40	0.691	0.105	0	0.000	0.000	1	0.017	0.023	51	0.881	0.20	0.04
7/11	8	44	14	0.316	0.097	28	0.632	0.088	0	0.000	0.000	0	0.000	0.000	42	0.948	0.33	0.09
7/12	9	45	8	0.177	0.058	17	0.377	0.109	0	0.000	0.000	0	0.000	0.000	25	0.554	0.32	0.08
7/13	8	54	7	0.130	0.046	13	0.241	0.073	0	0.000	0.000	0	0.000	0.000	20	0.370	0.35	0.11
7/14	6	37	4	0.110	0.057	41	1.123	0.324	0	0.000	0.000	0	0.000	0.000	45	1.232	0.09	0.04
7/15	8	40	5	0.125	0.056	37	0.922	0.276	0	0.000	0.000	0	0.000	0.000	42	1.047	0.12	0.04
7/16	7	36	7	0.196	0.061	15	0.419	0.155	0	0.000	0.000	0	0.000	0.000	22	0.615	0.32	0.12
7/17	8	41	14	0.344	0.129	4	0.098	0.053	0	0.000	0.000	0	0.000	0.000	18	0.442	0.78	0.13
7/18	6	21	8	0.383	0.078	59	2.825	0.549	0	0.000	0.000	0	0.000	0.000	67	3.208	0.12	0.03
7/19	9	36	6	0.168	0.074	45	1.261	0.232	0	0.000	0.000	0	0.000	0.000	52	1.457	0.12	0.05
7/20	6	31	7	0.225	0.111	27	0.870	0.214	0	0.000	0.000	0	0.000	0.000	34	1.095	0.21	0.09
7/21	7	20	3	0.151	0.067	68	3.417	0.892	0	0.000	0.000	0	0.000	0.000	71	3.568	0.04	0.02
7/22	8	22	7	0.320	0.138	56	2.561	0.438	0	0.000	0.000	0	0.000	0.000	63	2.881	0.11	0.04
7/23	10	28	14	0.497	0.165	36	1.278	0.307	0	0.000	0.000	0	0.000	0.000	50	1.775	0.28	0.08
7/24	9	38	5	0.132	0.071	41	1.084	0.316	0	0.000	0.000	0	0.000	0.000	46	1.216	0.11	0.07
7/25	10	36	4	0.110	0.061	57	1.568	0.368	0	0.000	0.000	0	0.000	0.000	61	1.678	0.07	0.02
7/26	11	24	6	0.255	0.096	90	3.822	0.630	1	0.042	0.059	0	0.000	0.000	97	4.119	0.06	0.03
7/27	7	29	9	0.308	0.098	46	1.576	0.442	0	0.000	0.000	0	0.000	0.000	56	1.919	0.16	0.07
7/28	8	27	7	0.258	0.102	26	0.957	0.139	0	0.000	0.000	0	0.000	0.000	33	1.215	0.21	0.08
7/29	10	50	5	0.099	0.062	31	0.615	0.132	0	0.000	0.000	0	0.000	0.000	36	0.714	0.14	0.08
7/30	10	43	7	0.163	0.037	27	0.628	0.296	0	0.000	0.000	0	0.000	0.000	34	0.791	0.21	0.09
7/31	8	28	9	0.319	0.067	29	1.029	0.365	0	0.000	0.000	0	0.000	0.000	38	1.348	0.24	0.08
8/01	8	49	9	0.183	0.057	30	0.610	0.313	0	0.000	0.000	0	0.000	0.000	39	0.793	0.23	0.11
8/02	12	74	7	0.095	0.042	9	0.122	0.031	1	0.014	0.013	1	0.014	0.013	18	0.244	0.39	0.13
8/03	9	64	2	0.031	0.021	16	0.249	0.057	1	0.016	0.016	0	0.000	0.000	19	0.295	0.11	0.07
8/04	10	76	3	0.039	0.020	16	0.210	0.101	5	0.066	0.064	0	0.000	0.000	24	0.315	0.13	0.08
8/05	8	57	7	0.123	0.033	12	0.211	0.047	2	0.035	0.038	0	0.000	0.000	21	0.370	0.33	0.04
8/06	8	44	8	0.182	0.078	12	0.273	0.073	4	0.091	0.093	0	0.000	0.000	24	0.546	0.33	0.09
8/07	7	56	6	0.108	0.045	35	0.629	0.124	4	0.072	0.071	0	0.000	0.000	45	0.809	0.13	0.06
8/08	8	70	1	0.014	0.014	29	0.412	0.098	13	0.185	0.183	0	0.000	0.000	43	0.611	0.02	0.02
8/09	9	77	2	0.026	0.017	10	0.129	0.057	4	0.052	0.056	0	0.000	0.000	16	0.207	0.13	0.06
8/10	10	74	9	0.122	0.041	13	0.177	0.056	2	0.027	0.031	0	0.000	0.000	24	0.326	0.38	0.08
Total	350	1,943	286	7.069		1,364	37.239		37	0.599		3	0.049		1,692	0.871	NA	NA
Min	6	20	0	0.000		4	0.098		0	0.000		0	0.000		16	0.804	0.00	
Mean	9	47	7	0.172		33	0.908		1	0.015		0	0.001		41	0.871	0.20	
Max	12	77	14	0.497		90	3.822		13	0.185		1	0.018		97	1.255	0.78	

Note: NA = not applicable.

[a] Proportion of combined total catch = Chinook salmon CPUE/Combined total CPUE.

Appendix D5.-Chinook, sockeye, coho, and pink salmon catch, CPUE, and proportion of Chinook salmon caught inshore in 7.5 inch mesh gillnets during the late-run Kenai River Chinook salmon fishery, 1 July to 10 August 2007.

	Inriver drift gillnetting																
		Time	Catch														
Date	No. of	fished	Chinook salmon			Sockeye salmon			Coho salmon			Pink salmon			Combined total		Chinook salmon	
(m/dd)	drifts	(min)	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	Proportion [a]	SE
7/01	10	65	4	0.062	0.035	29	0.449	0.085	0	0.000	0.000	0	0.000	0.000	33	0.511	0.12	0.06
7/02	10	62	6	0.097	0.035	8	0.130	0.049	0	0.000	0.000	0	0.000	0.000	14	0.227	0.43	0.06
7/03	8	43	5	0.115	0.048	10	0.231	0.073	0	0.000	0.000	0	0.000	0.000	15	0.346	0.33	0.10
7/04	10	52	7	0.135	0.030	27	0.522	0.138	0	0.000	0.000	0	0.000	0.000	34	0.657	0.21	0.07
7/05	8	49	14	0.284	0.068	10	0.203	0.058	0	0.000	0.000	0	0.000	0.000	24	0.486	0.58	0.09
7/06	10	70	6	0.085	0.024	23	0.326	0.049	0	0.000	0.000	0	0.000	0.000	29	0.411	0.21	0.05
7/07	7	45	19	0.420	0.081	18	0.398	0.077	0	0.000	0.000	0	0.000	0.000	37	0.818	0.51	0.08
7/08	8	50	15	0.299	0.066	27	0.538	0.191	0	0.000	0.000	0	0.000	0.000	42	0.837	0.36	0.09
7/09	10	66	10	0.152	0.037	10	0.152	0.105	0	0.000	0.000	0	0.000	0.000	20	0.303	0.50	0.20
7/10	8	56	12	0.213	0.056	18	0.320	0.080	0	0.000	0.000	0	0.000	0.000	30	0.533	0.40	0.08
7/11	8	41	17	0.413	0.177	13	0.316	0.081	0	0.000	0.000	0	0.000	0.000	30	0.728	0.57	0.13
7/12	10	57	10	0.177	0.040	1	0.018	0.018	0	0.000	0.000	0	0.000	0.000	11	0.195	0.91	0.09
7/13	8	54	9	0.167	0.053	1	0.019	0.018	0	0.000	0.000	0	0.000	0.000	10	0.186	0.90	0.10
7/14	6	38	16	0.418	0.109	31	0.810	0.226	0	0.000	0.000	0	0.000	0.000	47	1.228	0.34	0.07
7/15	8	40	18	0.449	0.133	16	0.399	0.136	0	0.000	0.000	0	0.000	0.000	34	0.847	0.53	0.08
7/16	8	45	18	0.399	0.115	11	0.244	0.092	0	0.000	0.000	0	0.000	0.000	29	0.643	0.62	0.11
7/17	7	36	23	0.640	0.141	1	0.028	0.028	0	0.000	0.000	0	0.000	0.000	24	0.668	0.96	0.04
7/18	6	27	22	0.827	0.183	52	1.954	0.336	0	0.000	0.000	0	0.000	0.000	74	2.780	0.30	0.06
7/19	8	32	20	0.619	0.126	18	0.557	0.247	0	0.000	0.000	0	0.000	0.000	38	1.176	0.53	0.14
7/20	7	37	21	0.568	0.120	25	0.677	0.148	0	0.000	0.000	0	0.000	0.000	46	1.245	0.46	0.06
7/21	6	19	15	0.783	0.186	37	1.930	0.510	0	0.000	0.000	0	0.000	0.000	52	2.713	0.29	0.05
7/22	8	21	17	0.810	0.232	20	0.952	0.234	0	0.000	0.000	0	0.000	0.000	37	1.762	0.46	0.10
7/23	8	24	17	0.703	0.214	13	0.538	0.192	0	0.000	0.000	0	0.000	0.000	30	1.241	0.57	0.15
7/24	10	37	21	0.571	0.140	28	0.761	0.226	0	0.000	0.000	0	0.000	0.000	49	1.332	0.43	0.10
7/25	10	35	13	0.372	0.061	20	0.573	0.120	0	0.000	0.000	0	0.000	0.000	33	0.946	0.39	0.06
7/26	12	33	15	0.456	0.128	60	1.823	0.461	0	0.000	0.000	0	0.000	0.000	75	2.278	0.20	0.07
7/27	6	28	9	0.324	0.091	28	1.008	0.241	0	0.000	0.000	0	0.000	0.000	37	1.333	0.24	0.08
7/28	8	27	10	0.366	0.109	13	0.476	0.204	0	0.000	0.000	0	0.000	0.000	23	0.842	0.43	0.12
7/29	10	47	9	0.190	0.063	12	0.253	0.086	0	0.000	0.000	0	0.000	0.000	21	0.443	0.43	0.12
7/30	10	45	18	0.396	0.094	9	0.198	0.079	0	0.000	0.000	0	0.000	0.000	27	0.594	0.67	0.12
7/31	7	29	15	0.520	0.116	4	0.139	0.137	0	0.000	0.000	0	0.000	0.000	19	0.658	0.79	0.18
8/01	8	55	14	0.256	0.069	17	0.311	0.097	0	0.000	0.000	0	0.000	0.000	31	0.568	0.45	0.07
8/02	11	66	11	0.166	0.056	4	0.060	0.034	1	0.015	0.021	0	0.000	0.000	16	0.242	0.69	0.12
8/03	10	62	2	0.032	0.021	2	0.032	0.021	0	0.000	0.000	0	0.000	0.000	4	0.064	0.50	0.26
8/04	10	74	4	0.054	0.022	1	0.014	0.013	0	0.000	0.000	0	0.000	0.000	5	0.068	0.80	0.19
8/05	10	67	11	0.164	0.048	2	0.030	0.019	1	0.015	0.020	0	0.000	0.000	14	0.209	0.79	0.12
8/06	8	45	17	0.380	0.139	2	0.045	0.045	0	0.000	0.000	0	0.000	0.000	19	0.425	0.89	0.08
8/07	8	63	5	0.080	0.030	5	0.080	0.054	1	0.016	0.021	0	0.000	0.000	11	0.176	0.45	0.12
8/08	8	65	2	0.031	0.020	5	0.077	0.044	1	0.015	0.021	0	0.000	0.000	8	0.124	0.25	0.18
8/09	10	84	5	0.060	0.026	6	0.071	0.027	0	0.000	0.000	0	0.000	0.000	11	0.131	0.45	0.16
8/10	10	71	6	0.084	0.030	3	0.042	0.022	1	0.014	0.019	0	0.000	0.000	10	0.141	0.60	0.06
Total	353	1,962	508	13.338		640	17.703		5	0.076		0	0.000		1,153	0.588	NA	NA
Min	6	19	2	0.031		1	0.014		0	0.000		0	0.000		4	0.209	0.12	
Mean	9	48	12	0.325		16	0.432		0	0.002		0	0.000		28	0.588	0.50	
Max	12	84	23	0.827		60	1.954		1	0.016		0	0.000		75	0.893	0.96	

Note: NA = not applicable.

[a] Proportion of combined total catch = Chinook salmon CPUE/Combined total CPUE.

Appendix D6.-Chinook, sockeye, coho, and pink salmon catch, CPUE, and proportion of Chinook salmon caught inriver in 5.0 and 7.5 inch mesh gillnets during the late-run Kenai River Chinook salmon fishery, 1 July to 10 August 2007.

	Inriver drift gillnetting																		
			Time	Catch															
Date		No. of	fished	Chinook salmon			Sockeye salmon			Coho salmon			Pink salmon			Combined total		Chinook salmon	
(m/dd)	Reps[a]	drifts	(min)	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	SE	No. of fish	CPUE	Proportion[b]	SE
7/01	5	20	124	4	0.028	0.012	83	0.683	0.058	0	0.000	0.000	0	0.000	0.000	87	0.704	0.04	0.01
7/02	5	20	118	9	0.073	0.018	40	0.342	0.065	0	0.000	0.000	0	0.000	0.000	49	0.415	0.18	0.04
7/03	4	16	89	10	0.108	0.049	51	0.574	0.124	0	0.000	0.000	0	0.000	0.000	61	0.688	0.16	0.08
7/04	4	16	85	14	0.167	0.013	58	0.666	0.162	0	0.000	0.000	0	0.000	0.000	72	0.852	0.20	0.05
7/05	4	16	100	23	0.231	0.038	35	0.348	0.065	0	0.000	0.000	0	0.000	0.000	58	0.580	0.40	0.07
7/06	4	16	122	11	0.089	0.025	41	0.336	0.025	0	0.000	0.000	0	0.000	0.000	52	0.426	0.21	0.05
7/07	4	15	107	29	0.319	0.058	58	0.514	0.097	0	0.000	0.000	0	0.000	0.000	87	0.814	0.38	0.08
7/08	4	16	104	27	0.263	0.033	92	0.945	0.310	0	0.000	0.000	1	0.010	0.010	120	1.149	0.22	0.05
7/09	5	20	136	21	0.153	0.041	45	0.323	0.102	0	0.000	0.000	0	0.000	0.000	66	0.486	0.32	0.09
7/10	4	16	114	22	0.198	0.041	58	0.500	0.093	0	0.000	0.000	1	0.010	0.010	81	0.709	0.28	0.07
7/11	4	16	86	31	0.383	0.102	41	0.472	0.062	0	0.000	0.000	0	0.000	0.000	72	0.842	0.45	0.04
7/12	5	19	102	18	0.164	0.032	18	0.174	0.068	0	0.000	0.000	0	0.000	0.000	36	0.354	0.49	0.05
7/13	4	16	108	16	0.149	0.028	14	0.129	0.055	0	0.000	0.000	0	0.000	0.000	30	0.278	0.54	0.09
7/14	3	12	75	20	0.272	0.034	72	0.987	0.200	0	0.000	0.000	0	0.000	0.000	92	1.230	0.22	0.06
7/15	4	16	80	23	0.288	0.102	53	0.666	0.265	0	0.000	0.000	0	0.000	0.000	76	0.947	0.30	0.10
7/16	4	15	81	25	0.310	0.057	26	0.306	0.119	0	0.000	0.000	0	0.000	0.000	51	0.631	0.50	0.11
7/17	4	15	77	37	0.466	0.032	5	0.061	0.033	0	0.000	0.000	0	0.000	0.000	42	0.548	0.88	0.06
7/18	3	12	48	30	0.616	0.097	111	2.401	0.514	0	0.000	0.000	0	0.000	0.000	141	2.968	0.20	0.05
7/19	4	16	64	25	0.386	0.080	60	0.929	0.253	0	0.000	0.000	0	0.000	0.000	86	1.336	0.29	0.09
7/20	3	12	63	27	0.417	0.130	50	0.796	0.192	0	0.000	0.000	0	0.000	0.000	77	1.217	0.34	0.09
7/21	3	12	36	18	0.483	0.105	98	3.099	1.068	0	0.000	0.000	0	0.000	0.000	116	3.248	0.13	0.02
7/22	4	16	43	24	0.595	0.095	76	1.815	0.413	0	0.000	0.000	0	0.000	0.000	100	2.333	0.25	0.02
7/23	4	16	45	29	0.654	0.219	45	1.046	0.130	0	0.000	0.000	0	0.000	0.000	74	1.649	0.38	0.10
7/24	5	19	75	26	0.353	0.071	69	0.927	0.269	0	0.000	0.000	0	0.000	0.000	95	1.273	0.28	0.07
7/25	5	20	71	17	0.246	0.037	77	1.119	0.243	0	0.000	0.000	0	0.000	0.000	94	1.319	0.18	0.03
7/26	6	23	56	21	0.385	0.079	150	2.704	0.484	1	0.023	0.023	0	0.000	0.000	172	3.046	0.12	0.04
7/27	3	12	53	15	0.280	0.056	73	1.388	0.246	0	0.000	0.000	0	0.000	0.000	88	1.667	0.17	0.05
7/28	4	16	54	17	0.324	0.035	39	0.765	0.122	0	0.000	0.000	0	0.000	0.000	56	1.028	0.30	0.04
7/29	5	20	98	14	0.146	0.033	43	0.428	0.120	0	0.000	0.000	0	0.000	0.000	57	0.583	0.25	0.07
7/30	5	20	88	25	0.282	0.055	36	0.490	0.257	0	0.000	0.000	0	0.000	0.000	61	0.690	0.37	0.10
7/31	4	15	57	24	0.442	0.045	33	0.647	0.301	0	0.000	0.000	0	0.000	0.000	57	0.999	0.41	0.11
8/01	4	16	104	23	0.217	0.051	47	0.507	0.242	0	0.000	0.000	0	0.000	0.000	70	0.675	0.30	0.10
8/02	6	23	140	18	0.140	0.019	13	0.090	0.029	2	0.014	0.009	1	0.007	0.007	34	0.243	0.56	0.09
8/03	5	19	126	4	0.037	0.021	18	0.134	0.038	1	0.007	0.007	0	0.000	0.000	23	0.182	0.21	0.11
8/04	5	20	150	7	0.047	0.013	17	0.107	0.063	5	0.031	0.014	0	0.000	0.000	29	0.193	0.25	0.07
8/05	4	16	115	15	0.132	0.019	14	0.125	0.032	3	0.025	0.016	0	0.000	0.000	32	0.278	0.47	0.05
8/06	4	16	89	25	0.311	0.158	14	0.154	0.060	4	0.052	0.025	0	0.000	0.000	43	0.485	0.60	0.09
8/07	4	15	118	11	0.103	0.018	40	0.340	0.047	5	0.042	0.01	0	0.000	0.000	56	0.474	0.21	0.04
8/08	4	16	135	3	0.021	0.013	34	0.233	0.075	14	0.104	0.035	0	0.000	0.000	51	0.378	0.06	0.03
8/09	5	19	161	7	0.039	0.017	16	0.090	0.035	4	0.025	0.018	0	0.000	0.000	27	0.167	0.25	0.11
8/10	5	20	145	15	0.099	0.016	16	0.108	0.020	3	0.022	0.014	0	0.000	0.000	34	0.235	0.43	0.04
Total	175	689	3,840	780	10.413		1979	28.467		42	0.344		3	0.026		2,805	0.730	NA	NA
Min	3	12	36	3	0.021		5	0.061		0	0.000		0	0.000		23	0.644	0.04	
Mean	4	17	94	19	0.254		48	0.694		1	0.008		0	0.001		68	0.730	0.31	
Max	6	23	161	37	0.654		150	3.099		14	0.104		1	0.010		172	1.067	0.88	

Note: NA = not applicable.

[a] 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.

[b] Proportion of combined total catch = Chinook salmon CPUE/Combined total CPUE.

APPENDIX E. LENGTH DATA FOR KENAI RIVER SOCKEYE SALMON SAMPLED IN INRIVER GILLNETS, 2007

Appendix E1.-Minimum, maximum, and mean length of Kenai River sockeye salmon inriver gillnet samples, 20 May to 10 August 2007.

Date[b] (m/dd)	Sockeye salmon captured in inriver gillnets[a] No. of fish	Length[c] (mm) Min	Max	Mean	SD
5/20	1	575	575	575	-
5/22	2	570	610	590	28.3
5/24	6	535	620	578	35.4
5/26	3	560	610	583	25.2
5/28	6	560	600	578	13.3
5/30	13	560	645	594	21.4
6/01	25	540	640	590	22.8
6/03	22	540	625	590	19.5
6/05	32	395	640	587	50.9
6/07	37	515	610	575	21.4
6/09	35	500	630	588	24.0
6/11	60	525	620	586	19.8
6/13	66	470	635	572	38.4
6/15	47	520	620	583	22.7
6/17	50	380	610	570	40.7
6/19	39	350	615	569	43.3
6/21	27	330	630	570	54.2
6/23	20	495	610	568	30.4
6/25	27	540	630	574	24.7
6/27	14	455	615	566	47.6
6/29	32	530	620	577	25.7
7/01	79	475	630	580.5	27.4
7/03	48	460	630	576.5	30.2
7/05	29	470	615	574.0	32.3
7/07	50	350	620	576.1	42.5
7/09	43	490	640	583.7	30.2
7/11	38	425	640	578.4	41.4
7/13	13	520	630	576.2	33.5
7/15	41	445	645	592.2	39.5
7/17	2	560	585	572.5	17.7
7/19	49	430	650	579.6	37.3
7/21	86	490	640	583.8	31.7
7/23	44	425	640	583.4	43.4
7/25	71	490	650	579.9	31.5
7/27	70	510	640	573.9	32.8
7/29	39	370	640	566.5	45.7
7/31	24	515	610	574.8	23.5
8/02	11	520	600	558.2	30.7
8/04	17	490	615	566.2	36.6
8/06	13	450	610	575.4	47.5
8/08	30	480	615	566.8	33.0
8/10	14	540	610	574.3	21.9

Note: "-" = cannot be computed due to limitations of the data.

[a] 5.0 and 7.5 inch mesh combined.

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

[c] All lengths measured mid eye to fork.

APPENDIX F. TEMPORALLY STRATIFIED SONAR PASSAGE ESTIMATES BY AGE CLASS FOR LATE-RUN KENAI RIVER CHINOOK SALMON, 2007

Appendix F1.-Temporally stratified sonar passage estimates by age class for late-run Kenai River Chinook salmon, 1 July to 10 August 2007.

	Age					
Parameter	1.2	1.3	1.4	1.5	2.2	Total
Late Run, 1 July-20 July						
Female						
Sample size	8	12	54	5		79
% sample	3.4%	5.2%	23.3%	2.2%		34.1%
SE % sample	1.2%	1.5%	2.8%	1.0%		3.1%
Sonar passage estimate	595	893	4,020	372		5,880
SE sonar passage estimate	313	381	737	249		825
Male						
Sample size	38	68	34	12	1	153
% sample	16.4%	29.3%	14.7%	5.2%	0.4%	65.9%
SE % sample	2.4%	3.0%	2.3%	1.5%	0.4%	3.1%
Sonar passage estimate	2,829	5,062	2,531	893	74	11,389
SE sonar passage estimate	425	528	405	252	74	590
Combined						
Sample size	46	80	88	17	1	232
% sample	19.8%	34.5%	37.9%	7.3%	0.4%	100.0%
SE % sample	2.6%	3.1%	3.2%	1.7%	0.4%	0.0%
Sonar passage estimate	3,424	5,955	6,550	1,265	74	17,269
SE sonar passage estimate	459	554	568	297	74	366
Late Run, 21 July-10 August						
Female						
Sample size	5	16	73	11		105
% sample	2.2%	7.1%	32.3%	4.9%		46.5%
SE % sample	1.0%	1.7%	3.1%	1.4%		3.3%
Sonar passage estimate	569	1,820	8,305	1,251		11,945
SE sonar passage estimate	252	441	823	370		896
Male						
Sample size	42	35	32	11	1	121
% sample	18.6%	15.5%	14.2%	4.9%	0.4%	53.5%
SE % sample	2.6%	2.4%	2.3%	1.4%	0.4%	3.3%
Sonar passage estimate	4,778	3,982	3,640	1,251	114	13,765
SE sonar passage estimate	675	626	603	370	114	909
Combined						
Sample size	47	51	105	22	1	226
% sample	20.8%	22.6%	46.5%	9.7%	0.4%	100.0%
SE % sample	2.7%	2.8%	3.3%	2.0%	0.4%	0.0%
Sonar passage estimate	5,347	5,802	11,945	2,503	114	25,710
SE sonar passage estimate	706	728	896	511	114	578

Note: Values given by age and sex may not sum to totals due to rounding.

APPENDIX G. AGE COMPOSITION ESTIMATES FOR THE KENAI RIVER CHINOOK SALMON INRIVER RETURN USING CATCH FROM 7.5 INCH MESH GILLNET, 2007

Appendix G1.-Age composition and estimated sonar passage by age class for early-run Kenai River Chinook salmon estimated from catches in a 7.5 inch mesh gillnet, 16 May to 30 June 2007.

	Age					
Parameter	1.2	1.3	1.4	1.5	2.2	Total
Early Run, 16 May-30 June						
Female						
Sample size	9	19	23	1		52
% sample	7.6%	16.0%	19.3%	0.8%		43.7%
SE % sample	2.4%	3.4%	3.6%	0.8%		4.6%
Sonar passage estimate	1,203	2,539	3,074	134		6,950
SE sonar passage estimate	388	540	583	134		747
Male						
Sample size	27	25	14		1	67
% sample	22.7%	21.0%	11.8%	0.0%	0.8%	56.3%
SE % sample	3.9%	3.8%	3.0%	0.0%	0.8%	4.6%
Sonar passage estimate	3,608	3,341	1,871	0	134	8,954
SE sonar passage estimate	620	602	474	0	134	761
Combined						
Sample size	36	44	37	1	1	119
% sample	30.3%	37.0%	31.1%	0.8%	0.8%	100.0%
SE % sample	4.2%	4.4%	4.3%	0.8%	0.8%	0.0%
Sonar passage estimate	4,811	5,880	4,945	134	134	15,904
SE sonar passage estimate	683	722	689	134	134	403

Note: Values given by age and sex may not sum to totals due to rounding.

Appendix G2.-Age composition and estimated sonar passage by age class for late-run Kenai River Chinook salmon estimated from catches in a 7.5 inch mesh gillnet, 1 July to 10 August 2007.

	Age					
Parameter	1.2	1.3	1.4	1.5	2.2	Total
Late Run, 1 July-20 July						
Female						
Sample size	3	6	38	2		49
% sample	2.1%	4.1%	26.0%	1.4%		33.6%
SE % sample	1.2%	1.6%	3.6%	1.0%		3.9%
Sonar passage estimate	355	710	4,495	237		5,796
SE sonar passage estimate	204	285	636	167		688
Male						
Sample size	18	45	25	9		97
% sample	12.3%	30.8%	17.1%	6.2%		66.4%
SE % sample	2.7%	3.8%	3.1%	2.0%		3.9%
Sonar passage estimate	2,129	5,323	2,957	1,065		11,473
SE sonar passage estimate	474	672	544	346		719
Combined						
Sample size	21	51	63	11		146
% sample	14.4%	34.9%	43.2%	7.5%		100.0%
SE % sample	2.9%	4.0%	4.1%	2.2%		0.0%
Sonar passage estimate	2,484	6,032	7,452	1,301		17,269
SE sonar passage estimate	506	695	727	379		366
Late Run, 21 July-10 August						
Female						
Sample size	1	9	47	10		67
% sample	0.7%	6.3%	33.1%	7.0%		47.2%
SE % sample	0.7%	2.1%	4.0%	2.2%		4.2%
Sonar passage estimate	181	1,630	8,510	1,811		12,131
SE sonar passage estimate	181	529	1,036	555		1,114
Male						
Sample size	26	23	17	8	1	75
% sample	18.3%	16.2%	12.0%	5.6%	0.7%	52.8%
SE % sample	3.3%	3.1%	2.7%	1.9%	0.7%	4.2%
Sonar passage estimate	4,707	4,164	3,078	1,448	181	13,579
SE sonar passage estimate	844	803	706	500	181	1,123
Combined						
Sample size	27	32	64	18	1	142
% sample	19.0%	22.5%	45.1%	12.7%	0.7%	100.0%
SE % sample	3.3%	3.5%	4.2%	2.8%	0.7%	0.0%
Sonar passage estimate	4,889	5,794	11,588	3,259	181	25,710
SE sonar passage estimate	857	914	1,108	1,055	181	578

-continued-

Appendix G2.-Page 2 of 2.

Parameter	Age 1.2	1.3	1.4	1.5	Total
Late Run, 1 July-10 August					
Female					
Sample size	4	15	85	12	116
% sample	536	2,339	13,004	2,047	17,927
SE % sample	272	601	1,216	580	1,310
Sonar passage estimate	1.2%	5.4%	30.3%	4.8%	41.7%
SE sonar passage estimate	0.6%	1.4%	2.8%	1.3%	3.0%
Male					
Sample size	44	68	42	17	172
% sample	6,837	9,487	6,035	2,513	25,052
SE % sample	968	1,047	891	608	1,334
Sonar passage estimate	15.9%	22.1%	14.0%	5.8%	58.3%
SE sonar passage estimate	2.2%	2.4%	2.1%	1.4%	3.0%
Combined					
Sample size	48	83	127	29	288
% sample	7,372	11,826	19,039	4,560	42,979
SE % sample	995	1,148	1,326	1,122	684
Sonar passage estimate	17.2%	27.5%	44.3%	10.6%	100.0%
SE sonar passage estimate	2.3%	2.6%	3.0%	1.9%	0.0%

Note: Values given by age and sex may not sum to totals due to rounding.