

Fishery Data Series No. 02-25

**Chinook Salmon Creel Survey and Inriver
Gillnetting Study, Lower Kenai River, Alaska,
1999 and 2000**

by

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Alaska Department of Fish and Game

Division of Sport Fish



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Weights and measures (metric)		General		Mathematics, statistics, fisheries
centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis H_A
deciliter	dL	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm e
gram	g	and	&	catch per unit effort CPUE
hectare	ha	at	@	coefficient of variation CV
kilogram	kg	Compass directions:		common test statistics F, t, χ^2 , etc.
kilometer	km	east	E	confidence interval C.I.
liter	L	north	N	correlation coefficient R (multiple)
meter	m	south	S	correlation coefficient r (simple)
metric ton	mt	west	W	covariance cov
milliliter	ml	Copyright	©	degree (angular or temperature) °
millimeter	mm	Corporate suffixes:		degrees of freedom df
		Company	Co.	divided by \div or / (in equations)
Weights and measures (English)		Corporation	Corp.	equals =
cubic feet per second	ft ³ /s	Incorporated	Inc.	expected value E
foot	ft	Limited	Ltd.	fork length FL
gallon	gal	et alii (and other people)	et al.	greater than >
inch	in	et cetera (and so forth)	etc.	greater than or equal to \geq
mile	mi	exempli gratia (for example)	e.g.,	harvest per unit effort HPUE
ounce	oz	id est (that is)	i.e.,	less than <
pound	lb	latitude or longitude	lat. or long.	less than or equal to \leq
quart	qt	monetary symbols (U.S.)	\$, ¢	logarithm (natural) ln
yard	yd	months (tables and figures): first three letters	Jan, ..., Dec	logarithm (base 10) log
Spell out acre and ton.		number (before a number)	# (e.g., #10)	logarithm (specify base) \log_2 , etc.
		pounds (after a number)	# (e.g., 10#)	mid-eye-to-fork MEF
Time and temperature		registered trademark	®	minute (angular) '
day	d	trademark	™	multiplied by x
degrees Celsius	°C	United States (adjective)	U.S.	not significant NS
degrees Fahrenheit	°F	United States of America (noun)	USA	null hypothesis H_0
hour (spell out for 24-hour clock)	h	U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	percent %
minute	min			probability P
second	s			probability of a type I error (rejection of the null hypothesis when true) α
Spell out year, month, and week.				probability of a type II error (acceptance of the null hypothesis when false) β
Physics and chemistry				second (angular) "
all atomic symbols				standard deviation SD
alternating current	AC			standard error SE
ampere	A			standard length SL
calorie	cal			total length TL
direct current	DC			variance Var
hertz	Hz			
horsepower	hp			
hydrogen ion activity	pH			
parts per million	ppm			
parts per thousand	ppt, ‰			
volts	V			
watts	W			

FISHERY DATA SERIES NO. 02-25

**CHINOOK SALMON CREEL SURVEY AND INRIVER GILLNETTING
STUDY, LOWER KENAI RIVER, ALASKA, 1999 AND 2000**

by

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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, Alaska, between the Soldotna and Warren Ames bridges from 15 May-31 July in 1999 and 2000.

For the 1999 early run (May and June), estimated angler effort was 110,788 (SE = 3,218) angler-hours and harvest was 5,534 (SE = 393) chinook salmon. Unguided anglers accounted for 37% of the fishing effort and 18% of the harvest, versus guided anglers who accounted for 63% of the effort and 82% of the harvest. During the early run, most fish in the inriver return and recreational harvest were age 1.3 or age 1.4.

For the 1999 late run (July), angler effort was 252,460 (SE = 7,945) angler-hours and harvest was 12,027 (SE = 963) chinook salmon. Unguided anglers accounted for 53% of the effort and 37% of the harvest, versus guided anglers who accounted for 47% of the effort and 63% of harvest. During the late run, most fish in the inriver return and recreational harvest were age 1.3 or age 1.4.

For the 2000 early run, estimated angler-effort was 81,619 (SE = 3,104) angler-hours and harvest was 1,149 (SE = 157) chinook salmon. Unguided anglers accounted for 34% of the fishing effort and 25% of the harvest, versus guided anglers who accounted for 66% of the effort and 75% of the harvest. During the early-run, most fish in the inriver return and recreational harvest were age 1.3 or age 1.4.

For the late run, angler effort was 248,382 (SE = 5,249) angler-hours and harvest was 12,065 (SE = 720) chinook salmon. Unguided anglers accounted for 54% of the effort and 45% of the harvest, versus guided anglers who accounted for 46% of the effort and 55% of harvest. During the late-run, most fish in the inriver return and recreational harvest were age 1.3 or age 1.4.

CPUE by species from inriver gillnet samples is also presented for years 1998-2000.

Key words: Kenai River, *Oncorhynchus tshawytscha*, chinook salmon, creel survey, effort, harvest, inriver gillnetting.

INTRODUCTION

The Kenai River (Figure 1) supports the largest freshwater recreational fishery in Alaska with an average annual effort of 312,535 angler-days for all species from 1990–2000, which represents about 13% of the state's average annual recreational fishing effort during the same period (Mills 1991-1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. *In prep*). Angler effort in the Kenai River is split amongst 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 fishery detailed in this report, Kenai River chinook salmon, has averaged 37% of the total Kenai River angler effort from 1977-1996 (Nelson et al. 1999).

Prior to 1970, the recreational fishery in the Kenai River was primarily shorebased anglers targeting sockeye salmon in July and coho salmon in August and September. The department implemented a creel survey in 1974 in response to rising effort and harvest from boat anglers targeting chinook salmon. Angler effort and harvest increased through 1988 but dropped during the early 1990s because of small chinook salmon runs and fishery restrictions (Figures 2 and 3). Effort and harvest have never returned to 1987 and 1988 levels in the early run (Figure 2), but have been similar to historical averages in the late run since 1992 (Figure 3). Beginning in 1981, separate effort and harvest estimates have been produced for guided and unguided anglers. Guided anglers have accounted for an increasing proportion of the total effort and harvest in both runs (Figures 2 and 3).

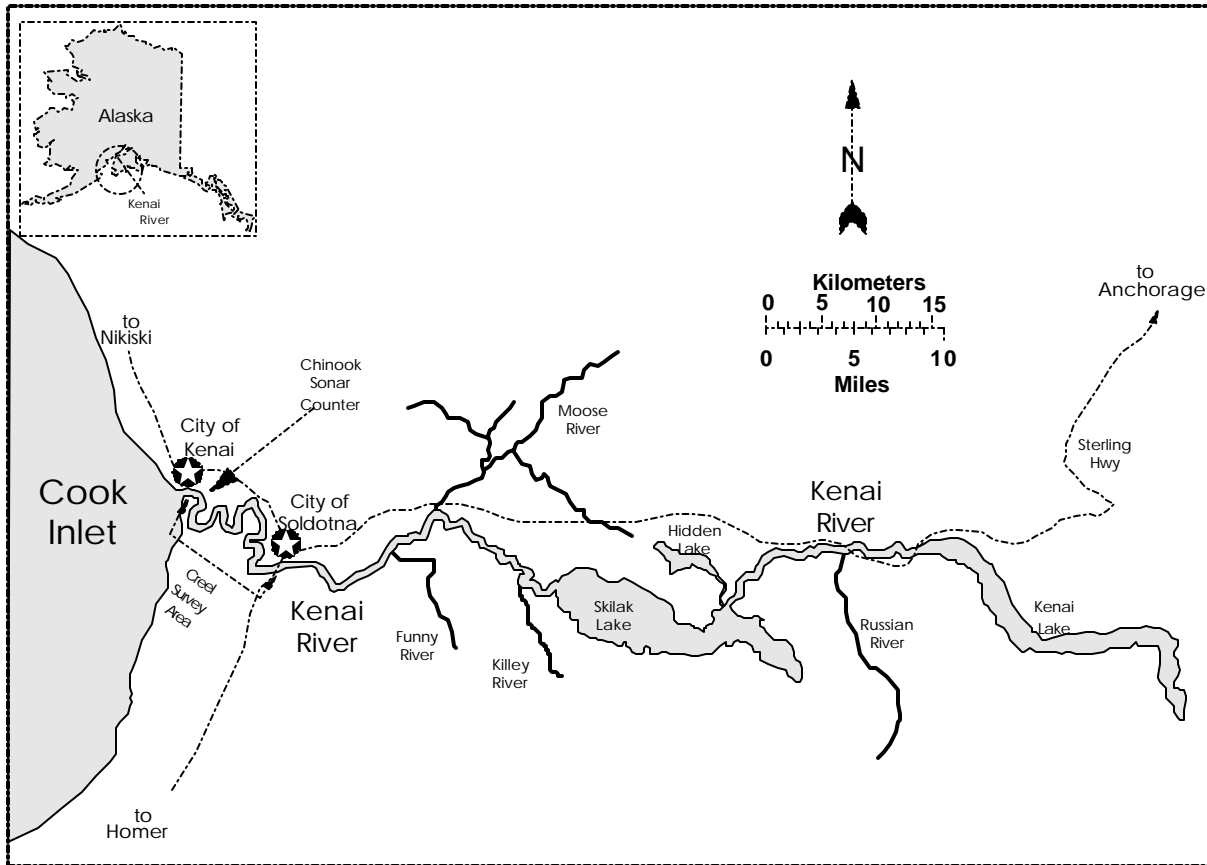


Figure 1.-The Kenai River drainage.

Chinook salmon return to the Kenai River in two periods: an early run from early May until late June, and a late run from late June through early August. For management purposes the early run is defined as all chinook salmon entering the river prior to 1 July, and the late run is defined as fish entering on or after 1 July. Recreational anglers value fish from both runs due to the large fish size; average weight is about 18 kg (40 lb) and some fish exceed 36 kg (80 lb). Late-run fish are generally larger at age than early-run fish; however, the world record sport-caught chinook salmon of 44.1kg (97 lb) was harvested from the Kenai River in May 1985.

The creel surveys conducted in 1999 and 2000 were designed to estimate angler effort, catch and harvest of chinook salmon by the Kenai River sport fishery. Harvested chinook salmon were also sampled to estimate the age, sex and length (ASL) composition of the harvest. Inriver gillnetting was conducted to estimate the ASL composition of the inriver return as well as to estimate catch per unit effort (CPUE) as a secondary index of chinook salmon abundance. These program elements, along with a companion study that estimated inriver return of chinook salmon with sonar (Miller et al. 2002, Miller and Burwen 2002), provided data for inseason management decisions. Information from the creel survey, inriver gillnetting, and sonar studies are also used by the Board of Fisheries (BOF) to refine long-term management objectives for Kenai River chinook salmon stocks as well as to allocate these salmon resources among user groups.

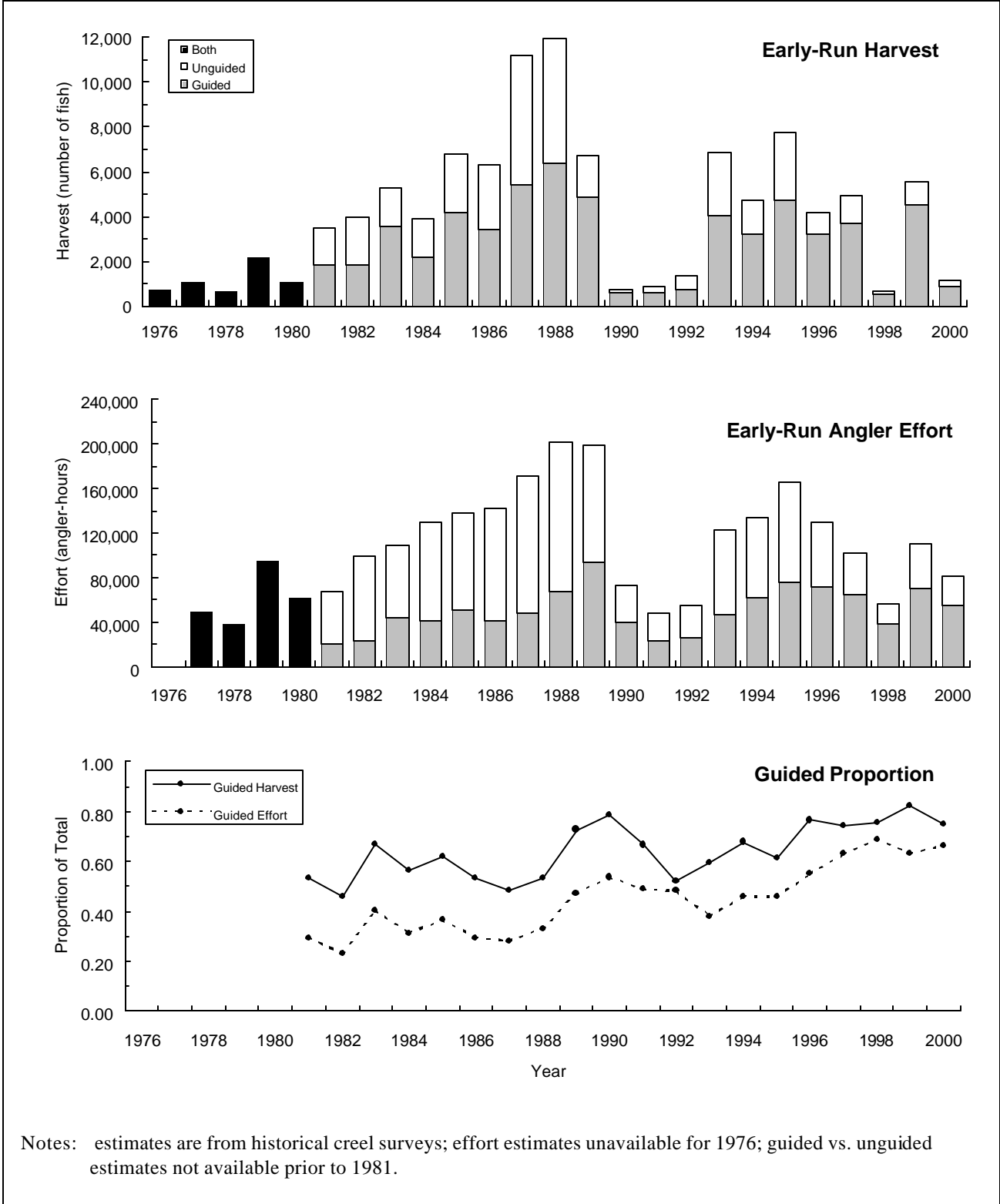
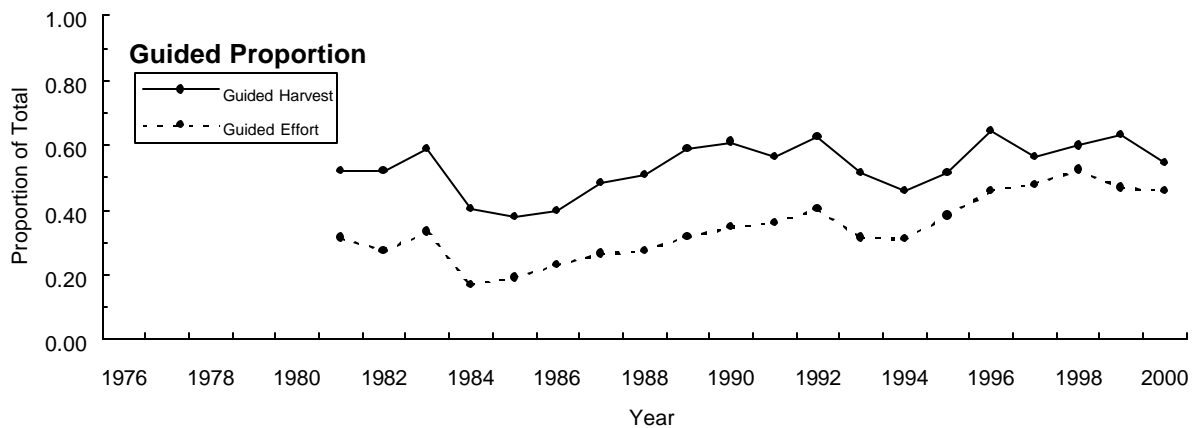
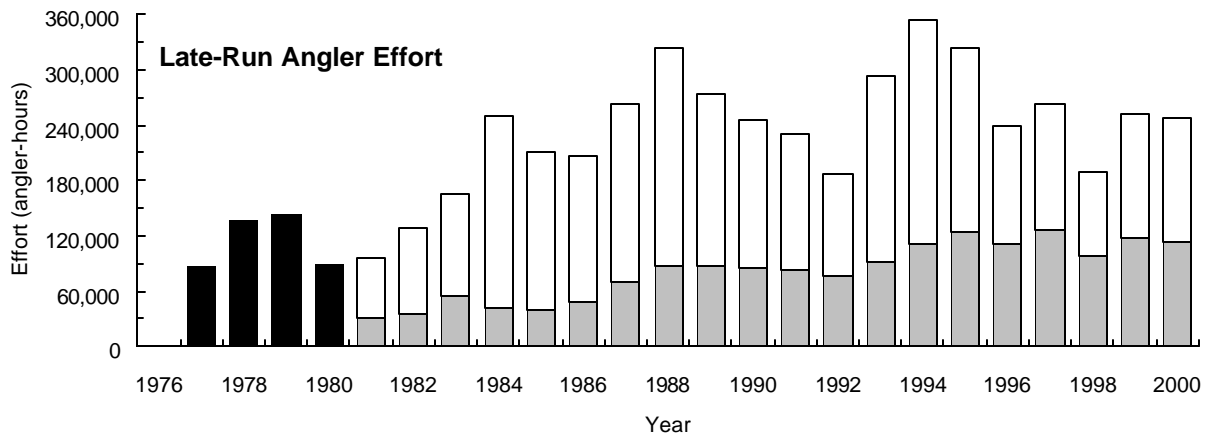
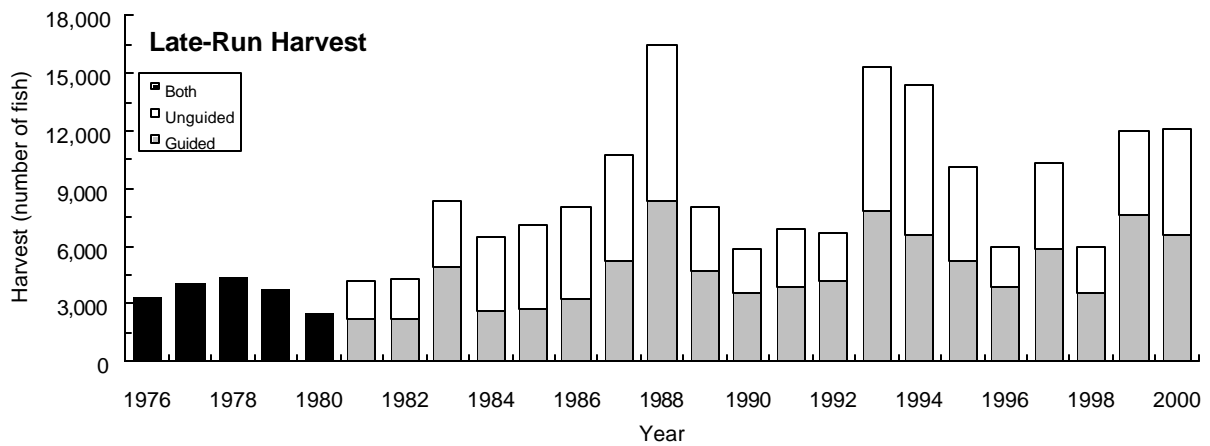


Figure 2.-Historical harvest and effort in the early-run Kenai River chinook salmon fishery, 1976–2000.



Notes: estimates are from historical creel surveys; effort estimates unavailable for 1976; guided vs. unguided estimates not available prior to 1981.

Figure 3.-Historical harvest and effort in the late-run Kenai River chinook salmon fishery, 1976–2000.

MANAGEMENT PLANS

The early- and late-run chinook salmon returns to the Kenai River have separate inseason management plans adopted by the Board of Fisheries. Both plans utilize estimates of inriver return and harvest. Estimates of inriver return are obtained with sonar (Miller et al. 2002, Miller and Burwen 2002) while estimates of harvest are obtained from the creel survey described herein. Previous information on the chinook salmon fisheries in the Kenai River is presented in (Hammarstrom and Timmons 2001a and b, Marsh 2000). Additionally, postseason estimates of angler effort and harvest by species are available from the Alaska Statewide Sport Fish Harvest Survey (Howe et al. 2001a; Walker et al. *In prep*).

The Kenai River Early-Run Chinook Salmon Management Plan (Figure 4) mandates the fishery be managed to achieve a spawning escapement of 7,200-14,400 chinook salmon. Bait, multiple hooks and Monday boat fishing are prohibited until an estimated spawning escapement exceeding 14,400 fish is projected. If the projected spawning escapement is below 7,200 fish the department will restrict the sport fishery. In 1999 the management plan called for catch-and-release restrictions. In 2000, trophy fishing (i.e. catch-and-release of fish less than 132 cm [52 in]) was the mandated restriction. If the projected spawning escapement remains below 7,200 with catch-and-release/trophy restrictions the sport fishery will close until 1 July downstream of the Funny River and 10 July upstream of the Funny River (Figure 1).

Management of the late-run sport fishery is more complicated because of the relatively large commercial chinook salmon harvest by the setnet fishery along the eastern shore of Cook Inlet (McBride et al. 1985). The Kenai River Late-Run Chinook Salmon Management Plan (Figure 4) mandates the fishery is managed to achieve a spawning escapement of 17,800 to 35,700 chinook salmon. Bait and single hooks are permitted so long as the spawning escapement is projected to be above 17,800. If the projected spawning escapement falls below 17,800 then the sport fishery will be closed. If the projected spawning escapement exceeds 35,700 then the sport fishing season can be extended, past the normal closing day of July 31, until August 7 downstream of Eagle Rock (river mile [rm] 11.25, river kilometer [rkm] 7; Figure 5).

FISHING REGULATIONS

Regulations for the chinook salmon fishery in the Kenai River are among the most restrictive of any open waters in Alaska. The river is open to chinook salmon fishing between the outlet of Skilak Lake and Cook Inlet, with the exception of the confluence areas of Slikok Creek, Funny River, Moose River and the Lower Killey River with the Kenai River. The Slikok Creek and Funny River confluence areas are closed until July 15, the Lower Killey River confluence area is closed from June 25 to July 14, and the Moose River closure is in effect for the entire chinook salmon fishing season. In addition, the area between Centennial Campground and the Soldotna Bridge is closed to fishing from boats for the entire chinook salmon fishing season. The chinook salmon season effectively begins in early to mid-May and normally ends on July 31.

The daily bag and possession limit is one chinook salmon per day greater than 41 cm (16 in) in length. The seasonal limit is two chinook salmon greater than 41 cm. Anyone retaining a chinook salmon that is greater than 41 cm in length is prohibited from fishing from a boat in the Kenai River downstream of Skilak Lake for the remainder of that day. The early-run fishery is restricted from using bait or treble hooks until the department is able to project an escapement of at least 14,400 fish. The late-run fishery is restricted from using treble hooks. Fishing from

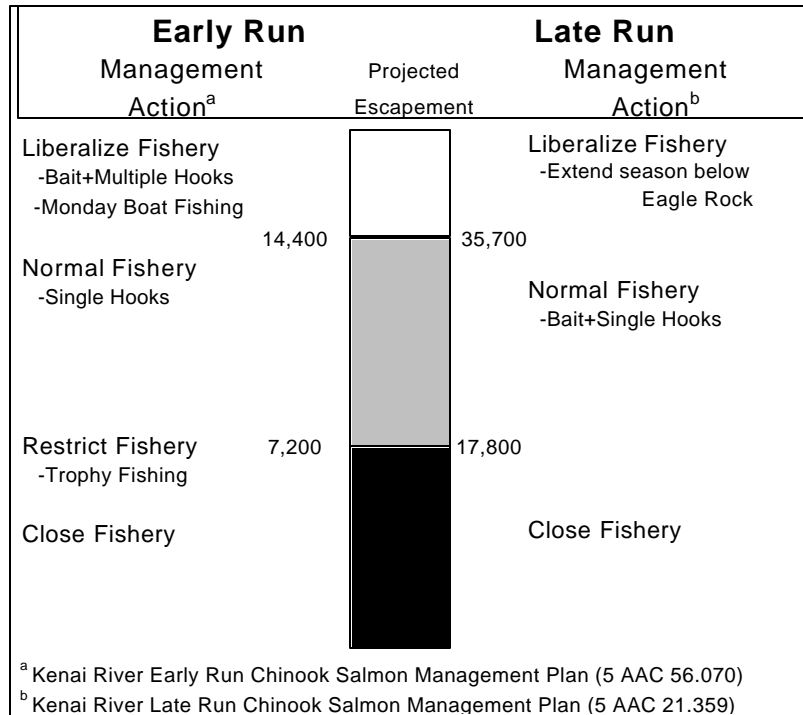


Figure 4.-Escapement levels and required inriver management actions for early-run (prior to 1 July) and late-run (after 30 June) chinook salmon fisheries of the Kenai River, 1999 and 2000.

boats downstream from the outlet of Skilak Lake is prohibited on Mondays in May and June, except Memorial Day Monday. Mondays in July are open to fishing from unguided drift boats.

There are further restrictions for guided anglers. In June and July of 1999 guided anglers were only allowed to fish between 0600 hours and 1800 hours and were prohibited on Sundays and Mondays. For 2000, these guided angler restrictions applied to May, June and July. Further, guides are prohibited from personally engaging in fishing while conducting clients.

In 1999, the early-run fishery was liberalized by emergency order to allow bait and treble hooks starting on June 16. This management action was required because the spawning escapement was predicted to exceed 14,400. The 1999 late-run fishery was extended until August 7 below Eagle Rock because spawning escapement was estimated to exceed 35,700. Despite the fishing extension, the creel survey ceased on July 31 due to budgetary constraints.

In 2000, the early-run fishery was restricted to catch-and-release fishing for all chinook salmon less than 132 cm (52 inches) by emergency order on June 13. This management action was required to curtail harvest in response to low numbers of returning chinook salmon as estimated by sonar. On June 27, the catch-and-release restriction was lifted to allow retention of all sizes of chinook salmon. This management action was in response to the department's projection that the spawning escapement of chinook salmon would exceed 7,200 fish.

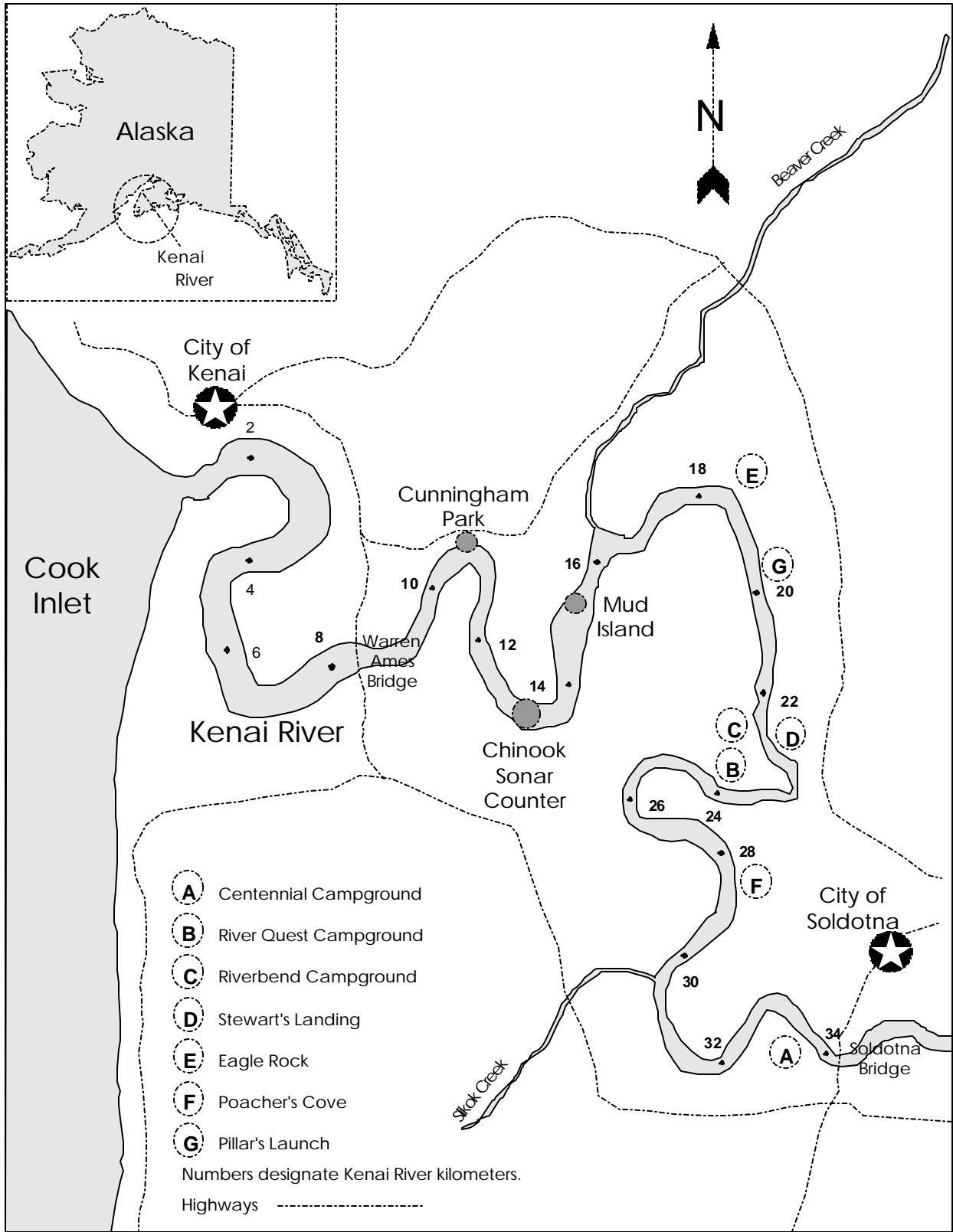


Figure 5.-The Kenai River creel survey study area.

METHODS

CREEL SURVEY

A stratified, two-stage roving-access creel survey (Bernard et al. 1998a and b) was utilized to estimate sport fishing effort, catch and harvest of chinook salmon from the Warren Ames Bridge (rm 5, rkm 8) to the Soldotna Bridge (rm 21, rkm 34) (Figure 5). Angler effort was estimated by conducting angler counts. HPUE (harvest per unit effort) and CPUE for chinook salmon were estimated from completed-trip angler interviews. The number of chinook salmon caught or harvested by the fishery was estimated as the product of the effort and catch or harvest rate estimates. Harvest refers to fish caught and retained by anglers as part of their creel. Catch refers to fish caught and retained plus those reported as released by anglers, but not those fish that escaped before being brought to the boat.

Regulations and the inherent nature of the chinook salmon fishery determined how the creel survey was stratified. The fishery historically occurred upstream of the sonar site, allowing returning chinook salmon to be enumerated prior to harvest by the recreational fishery. However, the fishery has expanded downstream of the sonar site over time, and significant harvest downstream of that area would cause the inriver return to be underestimated by the sonar. Therefore, in 1996-1998, angler counts and angler interviews were geographically stratified to estimate harvest between the Warren Ames Bridge and the sonar site, and between the sonar site and the Soldotna Bridge. In 1999 and 2000, angler counts continued to be geographically stratified to help gauge the effect of the sport fishery on the sonar counter. However, angler interviews were not stratified for several reasons: (1) previous estimates for the area from the Warren Ames Bridge to the sonar site were based on very few interviews and were considered unreliable; (2) gathering additional information complicated the interview process for our staff and the interviewed public; and (3) the estimates represented less than 1% of the inriver return (Bosch and Burwen 2000) for each run in 1996, 1997 and 1998.

Both unguided and guided anglers participate in the Kenai River chinook salmon fishery, generally fishing from boats. By Alaska State Parks regulation, guides are required to register and place a decal on their boat(s), making them easy to identify on the river. Angler counts and interviews were stratified by angler type because catch rates are significantly different between guided and unguided anglers (King 1996) and the times/days when guides participate in the fishery are restricted by regulation.

Harvest and catch rates also differ by time intervals and between weekdays and weekend/holidays (J. H. Hasbrouck, Alaska Department of Fish and Game, Anchorage, personal communication). Therefore, the creel survey was further stratified into weekly time intervals and by day type (weekdays and weekends/holidays). The creel survey began 15 May and continued through 31 July in 1999 and 2000. The two-stage design consisted of periods, 12 or 20 hours in length (the entire angler-day), as the first stage and angler-trips the second stage. The entire fishing day was sampled to minimize problems with length-of-stay bias (Bernard et al. 1998b). The unguided angler day was 20 hours long, from 0400 to 2400 hours. The guided angler day was 20 hours long in May 1999 and 12 hours long in June and July 1999 and May, June and July 2000.

Table 1 outlines the strata used for estimating angler effort, catch and harvest. There was a total of 104 strata in both years. All weekend/holidays and Mondays were sampled, approximately

half of all weekdays were sampled. Weekdays to sample were randomly chosen from all possible weekday days in each temporal stratum. Estimates were poststratified by angler type.

Anglers who had completed fishing were interviewed at the following popular campground/boat launch areas (Figure 5):

- A) Centennial Campground
- B) River Quest
- C) Riverbend Campground
- D) Stewart's Landing
- E) Eagle Rock Launch Area
- F) Poacher's Cove
- G) Pillar's Launch Area

Interview sites were selected randomly without replacement and sampled with equal weight. After 4 June 2000 interviews were no longer conducted at Stewart's Landing due to a lack of cooperation from the property owner.

Table 1.-Description of strata used to estimate angler effort, catch, and harvest in the chinook salmon fishery, Kenai River, 1999 and 2000.

Stratum	Number of Strata	Description
Geographic:	2 strata	Upstream and downstream of the chinook salmon sonar site (angler counts only)
Temporal:	13 strata	<u>Early Run 1999:</u> 15-16 May, 17-23 May, 24-31 May, 1-6 June, 7-15 June, 16-20 June, 21-27 June, 28-30 June <u>Late Run 1999:</u> 1-4 July, 5-11 July, 12-18 July, 19-25 July, 26-31 July <u>Early Run 2000:</u> 15-21 May, 22-29 May, 30 May-4 June, 5-11 June, 12-18 June, 19-25 June, 26-30 June <u>Late Run 2000:</u> 1-2 July, 3-9 July, 10-16 July, 17-23 July, 24-30 July, 31 July
Day Type:	2 strata	Weekday and Weekend/Holiday
Angler Type:	2 strata	Guided and Unguided

Angler Counts

Two Fish and Wildlife Technician IIIs conducted angler counts on each sampled day. Five angler counts were made during each sample day. The first count was randomly chosen to begin at either 0400, 0500, 0600 or 0700 hours. All remaining counts were made systematically every 4 hours thereafter. This schedule allowed at least three counts between 0600 and 1800 hours for guided anglers. Some deviation from the schedule occurred due to mechanical breakdown and/or other duties such as public assistance or law enforcement.

Counts were conducted from a boat between the Soldotna Bridge and the Warren Ames Bridge. The starting point of each count (upstream or downstream end of the survey area) was chosen at random. Anglers were counted while driving the boat at a constant rate of speed through the survey area. The entire count usually required about 45 minutes and every effort was made to

ensure that the trip was completed in less than 1 hour. Angler counts were treated as if they were instantaneous and reflected fishing effort at the time the count began. Nine "tally-whackers" 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), and (9) shore anglers.

Boats and anglers were considered engaged in fishing and were counted if the boat was in operation, regardless of whether or not an angler's line was in the water when the count was conducted. Guides were not included in the counts during the chinook salmon fishery as they are prohibited from fishing while guiding.

Angler Interviews

Angler interviews were conducted from 0400 to 2400 hours on each sampled day. Two Fish and Wildlife Technician IIs conducted interviews. The following information was recorded for each angler who had completed fishing: (1) powered or drift boat, (2) guided or unguided angler, (3) number of hours spent fishing (to the nearest 0.5 hour), (4) number of fish retained by species, and (5) number of fish released by species.

INRIVER GILLNETTING

The emphasis of the drift gillnetting program in 1999 and 2000 was to implement a repeatable, standardized program to estimate CPUE by species while collecting ASL samples from the inriver return of chinook salmon. Sampling occurred for 8 hours daily from 15 May until 10 August in 1999 and 2000. The daily sampling schedule was constrained by the tidal influence at the study site, which can make drifting the net difficult during rising and high tide stages. The daily sampling schedule was 4 hours before to 4 hours after low tide, excluding hours of darkness (2300-0400 hours). During each day only one low tide was sampled.

Chinook salmon were captured with 7.5 in mesh cable-gear nylon gillnets. Each net was 10 fathoms (60 ft) long and 55 meshes deep. The mesh color was dark green. All nets used for this study were the same color, size and mesh.

Each drift was positioned to sample fish that would pass through the insonified river channel (i.e. 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 and ended 1.2 km (0.75 mi) downstream. As the boat drifted downstream from the sonar transducers, and the effective insonified area became difficult to define, the net was drifted in the deepest channel. Drifts were terminated when a chinook salmon was captured or the end of the drift area was reached. If the net was pulled before reaching the end of the study area, the next drift began at the approximate river mile where the previous drift was terminated. Markers were placed onshore every 0.1 mi in the study area to help the crew know and record their location. For each set, the start and stop time (to the nearest minute) and location (river mile to the nearest 0.1 mile) was recorded. If fish were caught then the number captured by species was recorded.

In 1998, drift gillnetting was conducted in a similar manner, except that alternative sites at Cunningham Park (rm 6.6, rkm 10.6) and Mud Island (rm 9.5, rkm 15.2) were sampled intermittently throughout the season (Figure 5). Biological data collected in 1998 were presented by Marsh (2000); however, CPUE data were not published and so are included in this report.

WATER LEVEL AND CLARITY

Water level and clarity were recorded at the beginning, end, and midpoint of each gillnetting shift. Water level was a relative measure using a staff gauge at the sonar site. Water clarity was measured near the staff gauge each day with a Secchi disk.

The creel crew also made Secchi disc measurements twice daily at rm 15.6. Daily averages reflect water clarity, and are used inseason to compare catch rates between years.

AGE, SEX AND LENGTH

Recreational Harvest

Harvested chinook salmon were sampled for ASL during angler interviews. Length (MEF) was measured to the nearest one-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 read with a microfiche reader to age the fish. For both years, sport harvest ASL samples were stratified into three 2-week strata in the early run (15-31 May, 1-15 June and 16-30 June) and into two 2-week strata in the late run (1-15 July and 16-31 July).

Additionally, harvested fish were inspected for an adipose fin clip indicating the fish had received a coded wire tag as a juvenile. Coded wire tags help estimate the stock contribution of harvested Kenai River chinook (King and Breakfield 1998). If an adipose fin clip was found, and permission was granted from the angler, the fish's head was removed for coded wire tag recovery. Fish sampled during interviews were marked with a hole punch in the dorsal or caudal fin to prevent resampling.

Inriver Return

Chinook salmon captured in gillnets were untangled from the net and placed in a tagging cradle (Larson 1995) for ASL sampling prior to release. All samples were handled and recorded in the same manner as those from the creel survey. For both years, sampling was stratified into two 3-week strata during each run. Dates for early-run strata were 15 May-8 June and 9-30 June; for late-run, 1-23 July and 24 July-15 August.

DATA ANALYSES

Total effort, catch, and harvest were estimated by expanding means over all days sampled in a stratum (i.e., weekly, day type, and angler type) using the equations below. All estimates used the same procedures for guided and unguided anglers.

Effort

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

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

where:

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

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

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

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

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

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

where:

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

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

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

The mean effort of stratum h was estimated by:

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

where:

d_h = number of days sampled in stratum h.

Days were sampled at random in each stratum; however, every weekend/holiday day was sampled. The sample variance of daily effort for stratum h was estimated by:

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

Total effort of stratum h was estimated by:

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

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 (Cochran 1977):

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

where:

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

Harvest and Catch

Catch and harvest per unit of effort of each day sampled was estimated from angler interviews using the jackknife method to minimize the bias of these ratio estimators (Efron 1982). A jackknife estimate of CPUE (similarly HPUE) was made for angler j by:

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

where:

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

$e_{hia} =$ effort (hours fished) of 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 of day i was the mean of the angler estimates:

$$\overline{CPUE}_{hi}^* = \frac{\sum_{j=1}^{m_{hi}} CPUE_{hij}^*}{m_{hi}}, \quad (10)$$

and the bias corrected mean was:

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

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:

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

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

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

and the variance by (Goodman 1960):

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

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.

Estimates of total effort, catch, and harvest, and their respective variances, were summed across strata within each run as these estimates were considered independent. Covariances that arise because angler type was poststratified (i.e., estimates of these strata are not statistically independent) are likely too small to affect the precision of the estimates.

Age and Sex Composition

Age and sex composition of the chinook salmon harvest and inriver return was estimated for each run. The proportion of chinook salmon in age/sex group b in stratum t was estimated as:

$$\hat{p}_{bt} = \frac{n_{bt}}{n_t}, \quad (15)$$

where:

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

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

The variance of \hat{p}_{bt} was estimated as (Scheaffer et al. 1979):

$$\hat{V}(\hat{p}_{bt}) = \frac{\hat{p}_{bt}(1 - \hat{p}_{bt})}{(n_t - 1)}. \quad (16)$$

If age/sex composition did not differ significantly ($P < 0.05$) among strata, the proportion of chinook salmon in age/sex group b during an entire run, and its variance, was estimated by pooling data across strata (equations 15-16 ignoring stratum subscripts t).

CPUE from Inriver Gillnetting

Daily catch per unit effort r of species s for day i, and its variance were estimated by:

$$\hat{r}_{si} = \frac{\sum_{k=1}^{K_i} c_{sik}}{\sum_{k=1}^{K_i} e_{ik}}, \text{ and} \quad (17)$$

$$\hat{V}(\hat{r}_{si}) = \frac{\sum_{k=1}^{K_i} (c_{sik} - \hat{r}_{si}e_k)^2}{\bar{e}_i^2 K_i (K_i - 1)}, \quad (18)$$

where:

- c_{sik} = catch of species s on day i during drift k ,
- e_k = effort during drift k ,
- \bar{e}_i = mean effort during day i , and
- K_i = number of drifts on day i .

1999 RESULTS

CREEL SURVEY

During the 1999 creel survey, which ran from 15 May to 31 July, we sampled 52 of 72 possible days. The early-run fishery was open 41 days, 28 of which were sampled. Sampling occurred on 24 of the 31 open days during the late run for unguided anglers and 16 of the 23 open days for guided anglers. A total of 3,214 angler interviews were collected, 1,375 during the early run and 1,839 during the late run (Tables 2 and 3).

Only 2.2% of the early-run effort and 8.7% of the late-run effort occurred downstream of the sonar site (Appendices A1 and A2). Because so few people fished downstream of the sonar site, very few completed-trip interviews were collected from anglers who fished in this area of the river. Based on a lack of fishing effort and the potential for biases in estimating harvest and catch rates downstream of the sonar site, count and interview data were combined across spatial strata to provide more accurate estimates of total effort, catch, and harvest for both early and late runs.

During the early run, angler counts ranged from 0 to 249 for unguided anglers and from 0 to 331 for guided anglers (Appendix A1). The largest count occurred on 19 June for unguided anglers and on 29 June for guided anglers. During the late run, angler counts ranged from 4 to 523 for unguided anglers and from 141 to 719 for guided anglers (Appendix A2). The largest counts occurred on 18 July and 17 July for unguided anglers and guided anglers, respectively.

Estimated effort was 110,788 (SE = 3,218) angler-hours during the early run (Table 2) and 252,460 (SE = 7,945) angler-hours during the late run (Table 3). The relative precision of both the early ($\pm 5.7\%$) and late ($\pm 6.2\%$) run effort estimates satisfied the goals for the survey ($\pm 10\%$ of the true value 95% of the time). Guided anglers accounted for 63% of the early-run effort and 47% of the late-run effort.

Daily catch rates of early-run chinook salmon ranged from 0 to 0.326 (SE = 0.116) fish per hour for unguided anglers and from 0 to 0.204 (SE = 0.031) fish per hour for guided anglers (Appendices B1 and B2). Peak daily catch rates of early-run chinook salmon occurred on 1 June for unguided anglers and on 22 June for guided anglers. Daily catch rates of late-run chinook salmon by unguided anglers ranged from 0 to 0.112 (SE = 0.042) fish per hour and from 0.021 (SE = 0.011) to 0.168 (SE = 0.029) fish per hour for guided anglers (Appendices B3 and B4).

Table 2.-Estimated effort, catch, and harvest for the early-run Kenai River chinook salmon fishery in 1999.

	n ^a	N ^b	Int. ^c	Effort		Catch		Harvest	
				Estimate	SE	Estimate	SE	Estimate	SE
15 - 16 May									
Guided weekdays	0	0	0	0	0	0	0	0	0
Guided weekends	2	2	16	380	89	0	0	0	0
Unguided weekdays	0	0	0	0	0	0	0	0	0
Unguided weekends	2	2	24	420	65	6	4	6	4
17 - 23 May									
Guided weekdays	1	4	11	1,616	455	55	22	55	22
Guided weekends	2	2	24	1,640	493	52	24	41	20
Unguided weekdays	1	4	4	448	132	30	14	30	14
Unguided weekends	2	2	35	668	131	6	6	6	6
24 - 31 May									
Guided weekdays	2	4	27	4,872	1,119	189	125	155	96
Guided weekends	3	3	99	4,352	543	208	45	197	44
Unguided weekdays	2	4	22	512	77	6	5	6	5
Unguided weekends	3	3	96	3,044	324	50	19	43	18
01 - 06 June									
Guided weekdays	2	4	36	4,816	551	500	95	500	95
Guided weekends	2	2	52	3,272	349	151	51	151	51
Unguided weekdays	2	4	14	1,376	264	197	128	102	64
Unguided weekends	2	2	67	3,600	311	191	63	84	34
07 - 15 June									
Guided weekdays	2	5	70	12,270	1,703	577	102	522	97
Guided weekends	2	2	24	2,452	128	51	33	51	33
Unguided weekdays	2	5	53	5,150	437	147	38	74	38
Unguided weekends	2	2	64	2,220	328	124	44	69	26
16 - 20 June^d									
Guided weekdays	2	3	28	7,842	778	383	131	268	96
Guided weekends	2	2	29	3,768	587	181	75	181	75
Unguided weekdays	2	3	72	4,026	372	81	32	81	32
Unguided weekends	2	2	71	4,360	845	204	61	155	52
21 - 27 June									
Guided weekdays	2	4	81	12,768	815	2,287	315	1,690	269
Guided weekends	2	2	87	5,172	639	562	110	471	94
Unguided weekdays	2	4	76	5,864	529	285	68	168	53
Unguided weekends	2	2	64	5,528	443	159	55	91	41
28 - 30 June									
Guided weekdays	2	2	71	4,752	761	356	92	259	74
Guided weekends	0	0	0	0	0	0	0	0	0
Unguided weekdays	2	2	58	3,600	680	148	64	78	48
Unguided weekends	0	0	0	0	0	0	0	0	0
Subtotals									
Guided weekdays	13	26	324	48,936	2,552	4,347	400	3,449	340
Guided weekends	15	15	331	21,036	1,199	1,205	155	1,092	143
Unguided weekdays	13	26	299	20,976	1,079	894	167	539	109
Unguided weekends	15	15	421	19,840	1,114	740	114	454	82
Guided Total									
	28	41	655	69,972	2,820	5,552	429	4,541	369
Unguided Total									
	28	41	720	40,816	1,551	1,634	202	993	136
Early-run Total									
	28	41	1,375	110,788	3,218	7,186	475	5,534	393

^a Number of days during which interviews were collected.

^b Number of days possible for interviewing.

^c Complete trip interviews only.

^d Fishery was liberalized allowing use of bait and treble hooks by emergency order on 16 June.

Table 3.-Estimated effort, catch, and harvest for the late-run Kenai River chinook salmon fishery in 1999.

	n ^a	N ^b	Int. ^c	Effort		Catch		Harvest	
				Estimate	SE	Estimate	SE	Estimate	SE
01 - 04 July									
Guided weekdays	2	2	77	5,748	461	313	71	277	63
Guided weekends	1	1	22	3,592	282	112	57	112	57
Unguided Monday	0	0	0	0	0	0	0	0	0
Unguided weekdays	2	2	43	3,720	449	68	30	40	24
Unguided weekends	2	2	80	8,152	751	108	55	83	49
05 - 11 July									
Guided weekdays	2	4	121	15,232	1,247	1,093	150	805	116
Guided weekends	1	1	50	4,676	452	310	77	292	75
Unguided Monday	1	1	19	592	194	35	17	35	17
Unguided weekdays	2	4	48	9,000	1,016	56	56	56	56
Unguided weekends	2	2	107	12,548	991	480	97	177	62
12 - 18 July									
Guided weekdays	3	4	138	24,080	1,423	1,365	245	967	182
Guided weekends	1	1	60	7,504	788	306	80	306	80
Unguided Monday	1	1	24	704	203	79	36	12	8
Unguided weekdays	3	4	172	20,837	1,452	788	176	651	141
Unguided weekends	2	2	119	15,792	1,061	680	138	520	126
19 - 25 July									
Guided weekdays	2	4	113	25,472	3,428	3,539	1,132	2,212	544
Guided weekends	1	1	58	5,616	709	447	109	409	106
Unguided Monday	1	1	52	907	573	50	34	31	21
Unguided weekdays	2	4	162	27,048	2,309	1,912	722	1,205	387
Unguided weekends	2	2	128	10,980	1,199	844	158	379	94
26 - 31 July									
Guided weekdays	2	4	63	21,808	3,016	2,747	367	1,889	291
Guided weekends	1	1	52	4,468	555	352	83	336	81
Unguided Monday	1	1	24	868	225	54	23	54	23
Unguided weekdays	2	4	53	17,400	4,828	1,257	413	1,078	504
Unguided weekends	1	1	54	5,716	459	202	75	101	46
Subtotals									
Guided weekdays	11	18	512	92,340	4,964	9,057	1,226	6,150	657
Guided weekends	5	5	242	25,856	1,310	1,527	186	1,455	182
Unguided Monday	4	4	119	3,071	677	218	57	132	37
Unguided weekdays	11	18	478	78,005	5,656	4,081	852	3,030	653
Unguided weekends	9	9	488	53,188	2,078	2,314	249	1,260	182
Guided Total	16	23	754	118,196	5,134	10,584	1,240	7,605	682
Unguided Total	24	31	1,085	134,264	6,063	6,613	890	4,422	679
Late-run Total			1,839	252,460	7,945	17,197	1,527	12,027	963

^a Number of days during which interviews were collected.

^b Number of days possible for interviewing.

^c Complete trip interviews only.

Peak daily catch rates of late-run chinook salmon occurred on 12 July for unguided anglers and on 20 July for guided anglers. During both runs, catch rates were generally higher for guided anglers than for unguided anglers.

An estimated 5,534 (SE = 393) chinook salmon were harvested during the early run (Table 2). Unguided anglers harvested 18% of the total and guided anglers the remaining 82%. The estimated catch of early-run chinook was 7,186 (SE = 475), meaning 23% of the catch was voluntarily released. The relative precision for total catch and harvest ($\pm 13.9\%$ and $\pm 12.9\%$, respectively) satisfied the project goals ($\pm 15\%$ of the true value 95% of the time). The fishery liberalization allowing bait and treble hooks by emergency order for 16 June through 30 June (regulatory end of the early-run) increased the catch and harvest of chinook salmon dramatically. Sixty-five percent of the early-run catch and 62% of the early-run harvest were obtained after bait and treble hooks were allowed even though only 29% (12 of the 41) possible fishing days were affected.

An estimated 12,027 (SE = 963) chinook salmon were harvested during the late run (Table 3). Unguided anglers accounted for 37% of the harvest compared to 63% for guided anglers. The estimated catch was 17,197 (SE = 1,527) chinook salmon. Approximately 30% of the catch was voluntarily released during the late run. The relative precision for total catch and harvest ($\pm 17.4\%$ and $\pm 15.7\%$, respectively) was outside desired levels of precision ($\pm 15\%$ of the true value 95% of the time).

AGE, SEX, AND LENGTH

Recreational Harvest

The age distribution of the early-run harvest showed weakly significant differences ($\chi^2 = 8.6$, $df = 4$, $P = 0.07$) between temporal strata (15-31 May, 1-15 June, 16-30 June) with all age classes considered. When the analysis was restricted to the 1.3 and 1.4 age classes (>88% of the sample) significant differences were found ($\chi^2 = 6.4$, $df = 2$, $P = 0.04$). Therefore, estimates of age composition were stratified. Most chinook salmon in the harvest were ages 1.3 or 1.4 (Table 4).

During the late-run, the age composition of the sampled harvest did not differ significantly ($\chi^2 = 3.2$, $df = 2$, $P = 0.21$) between temporal strata (1-15 July and 16-31 July). The most abundant age class in the late-run harvest was age-1.4 fish, which comprised 57.2% (SE = 2.8%) of the harvest (Table 5). Other age classes were 1.2-, 1.3- and 1.5-aged fish.

Inriver Return

For the early-run inriver return, there was no significant difference ($\chi^2 = 0.24$, $df = 2$, $P = 0.89$) in the age composition between the first 3-week stratum and second 3-week stratum (15 May-8 June, 9-30 June). Thus, it was not necessary to temporally stratify the netting data to estimate the age structure of the early-run inriver return. The most abundant age class was 1.3-aged fish, representing 53.7% (SE = 2.8%) of the inriver return (Table 6). Age classes 1.4 (37.7%, SE = 2.7) and 1.2 (8.0%, SE = 1.5) were the next largest contributors.

During the late run, there was no significant difference ($\chi^2 = 1.56$, $df = 2$, $P = 0.46$) by temporal stratum (1-23 July, 24 July-15 August) in the age composition of the major age classes of the inriver return. The most abundant age classes were 1.4-age fish (60.9%, SE = 2.5%) and 1.3-age fish (21.2%, SE = 2.1%; Table 7).

Table 4.-Temporally stratified age composition and mean length-at-age (mid-eye to fork in millimeters) for sport harvested early-run Kenai River chinook salmon in 1999.

Parameter	Age						Total
	1.1	1.2	1.3	1.4	1.5	2.2	
15 May-31 May							
Female							
MEF			832	963			
SE MEF			31	16			
Sample size			5	14			19
Percent			17.9%	50.0%			67.9%
SE Percent			7.4%	9.6%			9.0%
Male							
MEF		640	870	1,030	1,035		
SE MEF			30	44	85		
Sample size		1	2	4	2		9
Percent		3.6%	7.1%	14.3%	7.1%		32.1%
SE Percent		3.6%	5.0%	6.7%	5.0%		9.0%
Combined							
Sample size		1	7	18	2		28
Percent		3.6%	25.0%	64.3%	7.1%		100.0%
SE Percent		3.6%	8.3%	9.2%	5.0%		0.0%
1 June-15 June							
Female							
MEF		610	826	936			
SE MEF		20	12	16			
Sample size		2	25	15			42
Percent		2.4%	30.5%	18.3%			51.2%
SE Percent		1.7%	5.1%	4.3%			5.6%
Male							
MEF		608	819	997	1,070		
SE MEF		14	24	17			
Sample size		3	15	21	1		40
Percent		3.7%	18.3%	25.6%	1.2%		48.8%
SE Percent		2.1%	4.3%	4.8%	1.2%		5.6%
Combined							
Sample size		5	40	36	1		82
Percent		6.1%	48.8%	43.9%	1.2%		100.0%
SE Percent		2.7%	5.6%	5.5%	1.2%		0.0%
16 June-30 June							
Female							
MEF		620	822	944	1,110	726	
SE MEF		21	10	10			
Sample size		7	30	40	1	1	79
Percent		5.0%	21.6%	28.8%	0.7%	0.7%	56.8%
SE Percent		1.9%	3.5%	3.9%	0.7%	0.7%	4.2%
Male							
MEF	350	623	809	982	1,087		
SE MEF		22	19	10	47		
Sample size	1	7	15	34	3		60
Percent	0.7%	5.0%	10.8%	24.5%	2.2%		43.2%
SE Percent	0.7%	1.9%	2.6%	3.7%	1.2%		4.2%
Combined							
Sample size	1	14	45	74	4	1	139
Percent	0.7%	10.1%	32.4%	53.2%	2.9%	0.7%	100.0%
SE Percent	0.7%	2.6%	4.0%	4.2%	1.4%	0.7%	0.0%

Table 5.-Age composition and mean length-at-age (mid-eye to fork in millimeters) for sport harvested late-run Kenai River chinook salmon in 1999.

Parameter	Age					Total
	1.1	1.2	1.3	1.4	1.5	
Female						
MEF		624	825	960	1,066	
SE MEF		15	9	6	24	
Sample size		16	47	112	4	179
Percent		5.0%	14.7%	35.0%	1.3%	55.9%
SE Percent		1.2%	2.0%	2.7%	0.6%	2.8%
Male						
MEF	336	622	825	985	1,092	
SE MEF		13	13	7	18	
Sample size	1	19	41	71	9	141
Percent	0.3%	5.9%	12.8%	22.2%	2.8%	44.1%
SE Percent	0.3%	1.3%	1.9%	2.3%	0.9%	2.8%
Combined						
Sample size	1	35	88	183	13	320
Percent	0.3%	10.9%	27.5%	57.2%	4.1%	100.0%
SE Percent	0.3%	1.7%	2.5%	2.8%	1.1%	0.0%

Table 6.-Age composition and mean length-at-age (mid-eye to fork in millimeters) for the inriver return of early-run Kenai River chinook salmon in 1999.

Parameter	Age					Total
	1.2	1.3	1.4	1.5	2.3	
Female						
MEF	655	849	971	1,085	790	
SE MEF	25	5	8			
Sample size	2	80	64	1	1	148
Percent	0.6%	24.7%	19.8%	0.3%	0.3%	45.7%
SE Percent	0.4%	2.4%	2.2%	0.3%	0.3%	2.8%
Male						
MEF	646	822	1,008			
SE MEF	11	7	12			
Sample size	24	94	58			176
Percent	7.4%	29.0%	17.9%			54.3%
SE Percent	1.5%	2.5%	2.1%			2.8%
Combined						
Sample size	26	174	122	1	1	324
Percent	8.0%	53.7%	37.7%	0.3%	0.3%	100.0%
SE Percent	1.5%	2.8%	2.7%	0.3%	0.3%	0.0%

Table 7.-Age composition and mean length-at-age (mid-eye to fork in millimeters) for the inriver return of late-run Kenai River chinook salmon in 1999.

Parameter	Age						Total
	1.1	1.2	1.3	1.4	1.5	2.3	
Female							
MEF		645	865	986	1,083		
SE MEF		35	14	5	27		
Sample size		3	17	117	8		145
Percent		0.8%	4.4%	30.3%	2.1%		37.6%
SE Percent		0.4%	1.0%	2.3%	0.7%		2.5%
Male							
MEF	420	645	798	1,021	1,138	753	
SE MEF		8	9	7	20	13	
Sample size	1	45	65	118	10	2	241
Percent	0.3%	11.7%	16.8%	30.6%	2.6%	0.5%	62.4%
SE Percent	0.3%	1.6%	1.9%	2.3%	0.8%	0.4%	2.5%
Combined							
Sample size	1	48	82	235	18	2	386
Percent	0.3%	12.4%	21.2%	60.9%	4.7%	0.5%	100.0%
SE Percent	0.3%	1.7%	2.1%	2.5%	1.1%	0.4%	0.0%

Analysis-of-variance was used to test for differences in mean length-at-age by sex, run, and sampling method (recreational harvest or inriver gillnetting) for age-1.2, age-1.3 and age-1.4 fish. Separate analyses were done for each age class. Age-1.2 fish sampled with gillnets were weakly significantly larger ($F = 3.29$; $df = 1, 121$; $P = 0.072$) than those sampled from the sport harvest. For age-1.3 fish, females were significantly larger ($F = 12.42$; $df = 1, 429$; $P = 0.001$) than males, although the difference was more pronounced for gillnet-sampled fish than for sport-harvested fish. For age-1.4 fish, three significant differences were found. First, age-1.4 fish from the early run were weakly significantly smaller ($F = 2.93$; $df = 1, 660$; $P = 0.088$) than fish from the late run. Second, age-1.4 males were significantly larger ($F = 45.03$; $df = 1, 660$; $P = 0.0001$) than females. Lastly, age-1.4 fish caught in gillnets were significantly larger ($F = 24.36$; $df = 1, 660$; $P < 0.0001$) than those sampled from the sport harvest.

Water clarity was near the historic median, except for a period of high clarity (~1.2 m) in early June and low clarity (~0.5 m) in mid June (Figure 6).

CPUE FROM INRIVER GILLNETTING IN 1998 AND 1999

In 1998, 91 salmon were captured at Cunningham Park (Appendix C1), 130 salmon at Mud Island (Appendix C2), 335 salmon at the sonar site during the early run (Appendix C3), and 736 salmon at the sonar site during the late run (Appendix C4). The mean ratio of chinook salmon CPUE to CPUE for all salmon was 0.82 at Cunningham Park, 0.71 at Mud Island, and 0.72 at the sonar site.

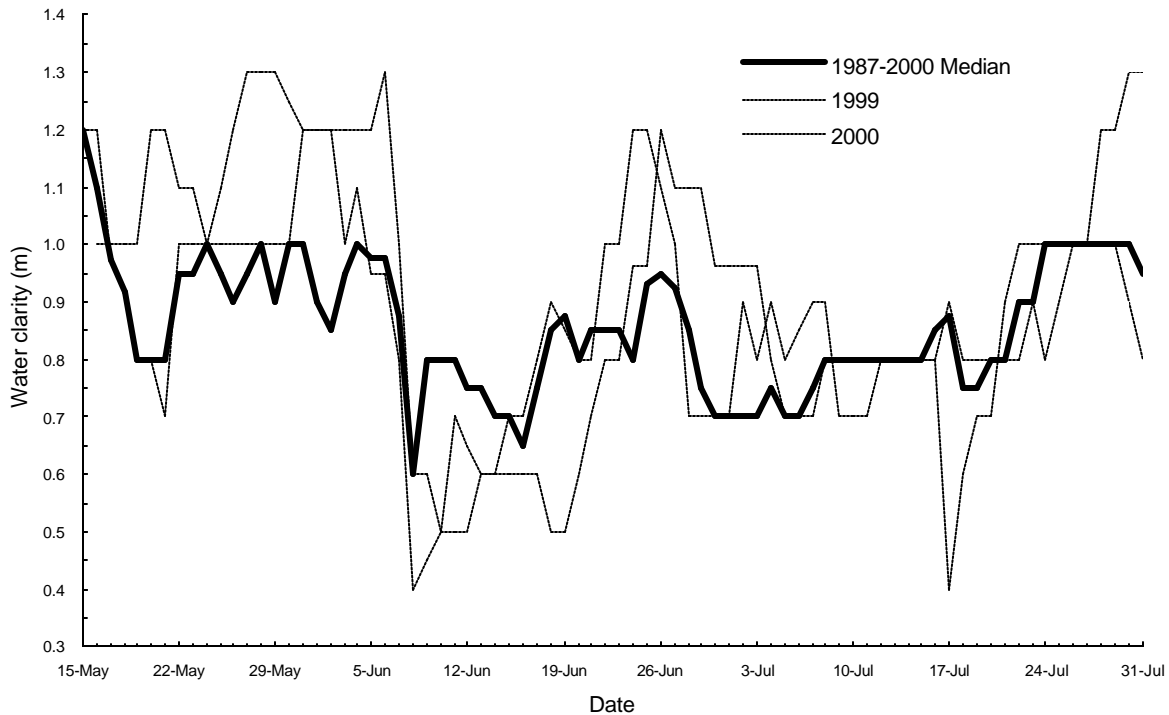


Figure 6.-Kenai River water clarity, 1987–2000.

During 1999 early run, we captured a total of 765 salmon during inriver gillnetting, 404 chinook salmon and 361 sockeye salmon. Daily CPUE ranged from 0 to 0.116 chinook salmon per minute drifted (Appendix C5). The mean ratio of chinook salmon CPUE to total salmon CPUE was 0.62.

During the 1999 late run, 383 chinook salmon and 252 sockeye salmon were captured. Daily CPUE ranged from 0 to 0.281 chinook salmon per minute drifted (Appendix C6). The mean ratio of chinook salmon CPUE to total salmon CPUE was 0.65.

2000 RESULTS

CREEL SURVEY

The 2000 creel survey was conducted from 15 May until 31 July. Unguided anglers were surveyed on 51 of the 72 days open to unguided fishing; 27 of 41 open days during the early run and 24 of 31 open days during the late run. Guided angler counts occurred on 35 of the 56 days open to guided fishing; 21 of 35 open days during the early run and 14 of 21 open days during the late run. A total of 2,844 completed-trip angler interviews were collected; 971 interviews during the early run and 1,873 interviews during the late run (Tables 8 and 9).

Relatively few anglers, 1.3% during the early-run and 6.8% during the late run, were observed fishing downstream of the sonar site (Appendices A3 and A4). During the early run, angler counts ranged from 0 to 256 for unguided anglers and from 22 to 422 for guided anglers (Appendix A3). The largest counts occurred on 3 June for unguided anglers and on 27 June for

Table 8.-Estimated effort, catch, and harvest for the early-run Kenai River chinook salmon fishery in 2000.

	n ^a	N ^b	Int. ^c	Effort		Catch		Harvest	
				Estimate	SE	Estimate	SE	Estimate	SE
15 - 21 May									
Guided weekdays	2	4	16	1,512	175	155	43	137	48
Guided weekends	1	1	6	492	120	11	14	11	14
Unguided weekdays	2	4	19	867	160	21	14	21	14
Unguided weekends	2	2	48	1,052	178	36	19	23	13
22 - 29 May									
Guided weekdays	2	4	34	3,824	616	185	82	185	82
Guided weekends	2	2	85	3,024	310	78	23	59	20
Unguided weekdays	2	4	35	1,232	138	67	36	35	16
Unguided weekends	3	3	110	3,712	447	44	19	44	19
30 May - 4 June									
Guided weekdays	2	4	53	3,424	541	81	30	81	30
Guided weekends	1	1	44	1,356	512	32	16	32	16
Unguided weekdays	2	4	40	2,864	1,517	23	19	15	13
Unguided weekends	2	2	74	3,380	1,048	81	31	60	25
5 - 11 June									
Guided weekdays	2	4	52	8,576	788	142	107	80	64
Guided weekends	1	1	16	1,468	336	59	30	47	27
Unguided weekdays	2	4	25	2,152	251	56	29	56	29
Unguided weekends	2	2	32	2,180	371	22	20	15	18
12 - 18 June^d									
Guided weekdays	2	4	34	5,632	778	353	87	0	0
Guided weekends	1	1	20	1,616	317	54	25	0	0
Unguided weekdays	2	4	2	1,664	465	0	0	0	0
Unguided weekends	2	2	15	1,316	151	93	43	20	21
19 - 25 June									
Guided weekdays	2	4	38	9,064	1,124	321	81	0	0
Guided weekends	1	1	16	1,604	335	0	0	0	0
Unguided weekdays	2	4	12	1,464	246	23	23	0	0
Unguided weekends	2	2	26	1,696	287	29	22	0	0
26 - 30 June^e									
Guided weekdays	2	4	91	12,656	1,089	276	62	228	75
Unguided weekdays	2	4	28	3,792	548	67	57	0	0
Subtotals									
Guided weekdays	14	28	318	44,688	2,092	1,513	197	711	140
Guided weekends	7	7	187	9,560	836	234	50	149	39
Unguided weekdays	14	28	161	14,035	1,728	257	81	127	39
Unguided weekends	13	13	305	13,336	1,254	305	66	162	44
Guided Total	21	35	505	54,248	2,253	1,747	203	860	145
Unguided Total	27	41	466	27,371	2,135	562	104	289	58
Early-run Total			971	81,619	3,104	2,309	229	1,149	157

^a Number of days during which interviews were collected.

^b Number of days possible for interviewing.

^c Complete trip interviews only.

^d Fishery restricted.

^e Restrictions lifted.

Table 9.-Estimated effort, catch, and harvest for the late-run Kenai River chinook salmon fishery in 2000.

	n ^a	N ^b	Int. ^c	Effort		Catch		Harvest	
				Estimate	SE	Estimate	SE	Estimate	SE
1 - 2 July									
Guided weekends	1	1	52	4,024	867	502	141	434	126
Unguided weekends	2	2	97	7,780	903	525	115	359	98
3 - 9 July									
Guided weekdays	2	3	52	11,646	2,041	574	156	464	126
Guided weekends	2	2	78	10,556	899	853	178	808	175
Unguided Monday	1	1	22	624	197	24	12	19	11
Unguided weekdays	2	3	44	7,656	985	212	76	212	76
Unguided weekends	3	3	178	10,484	942	447	90	351	78
10 - 16 July									
Guided weekdays	2	4	164	21,928	1,693	1,825	191	1,377	188
Guided weekends	1	1	53	4,604	464	329	74	235	63
Unguided Monday	1	1	22	1,496	257	136	39	58	24
Unguided weekdays	2	4	70	15,392	1,239	1,395	329	1,146	255
Unguided weekends	2	2	112	9,520	1,408	400	104	247	80
17 - 23 July									
Guided weekdays	2	4	116	27,704	907	2,018	229	1,385	348
Guided weekends	1	1	54	4,972	894	298	86	281	84
Unguided Monday	1	1	18	672	284	15	11	7	7
Unguided weekdays	2	4	112	22,848	1,464	848	223	587	234
Unguided weekends	2	2	119	15,484	1,860	842	185	688	167
24 - 30 July									
Guided weekdays	2	4	94	22,904	1,176	1,582	257	1,388	247
Guided weekends	1	1	52	6,024	908	247	74	213	69
Unguided Monday	1	1	44	688	217	60	22	49	19
Unguided weekdays	2	4	123	24,624	1,155	1,106	178	970	154
Unguided weekends	2	2	164	15,464	1,216	826	158	729	150
31 July									
Unguided Monday	1	1	33	1,288	266	71	24	58	22
Subtotals									
Guided weekdays	8	15	426	84,182	3,039	5,999	423	4,614	483
Guided weekends	6	6	289	30,180	1,844	2,229	264	1,971	250
Unguided Monday	5	5	139	4,768	551	306	54	191	39
Unguided weekdays	8	15	349	70,520	2,608	3,561	457	2,915	398
Unguided weekends	11	11	670	58,732	2,795	3,040	279	2,374	250
Guided Total	14	21	715	114,362	3,555	8,228	499	6,585	544
Unguided Total	24	31	1,158	134,020	3,862	6,907	538	5,480	472
Late-run Total			1,873	248,382	5,249	15,135	734	12,065	720

^a Number of days during which interviews were collected.

^b Number of days possible for interviewing.

^c Complete trip interviews.

guided anglers. During the late run, angler counts ranged from 2 to 610 for unguided anglers and from 104 to 636 for guided anglers (Appendix A4). The largest count for unguided anglers occurred on 23 July and for guided anglers on 11 July.

Estimated effort during the early run was 81,619 (SE = 3,104) angler-hours (Table 8). The relative precision of the effort estimate ($\pm 7.5\%$) for the early run was within the levels desired for this survey ($\pm 10\%$ of the true value 95% of the time). Estimated effort during the late run was 248,382 (SE = 5,249) angler-hours (Table 9). The relative precision ($\pm 4.1\%$) of the effort estimate for the late run was also within the desired level of precision ($\pm 10\%$ of the true value 95% of the time). Guided anglers accounted for 66% of the early-run effort and 46% of the late-run effort.

Daily catch rates of early-run chinook salmon by unguided anglers ranged from 0 to 0.084 (SE = 0.034) fish per hour and from 0 to 0.133 (SE = 0.088) fish per hour for anglers employing guides (Appendices B5 And B6). Peak daily catch rates of early-run chinook salmon occurred on 25 May for unguided anglers and on 16 May for guided anglers. Daily catch rates of late-run chinook salmon by unguided anglers ranged from 0.021 (SE = 0.016) to 0.123 (SE = 0.029) fish per hour and from 0.041 (SE = 0.011) to 0.125 (SE = 0.023) fish per hour for guided anglers (Appendices B7 and B8). Peak daily catch rates of late-run chinook salmon occurred on 12 July for unguided anglers and on 1 July for guided anglers.

An estimated 1,149 (SE = 157) chinook salmon were harvested during the early run (Table 8). Unguided anglers harvested 25% of the total and guided anglers the remaining 75%. The estimated catch of early-run chinook was 2,309 (SE = 229). The relative precision for total harvest ($\pm 26.8\%$) exceeded, whereas the relative precision for total catch ($\pm 19.4\%$) satisfied, the desired levels of precision ($\pm 20\%$ of the true value 95% of the time). The catch-and-release/trophy emergency order for 13 June through 27 June increased the proportion of chinook salmon released by anglers. During the catch-and-release/trophy fishery, 96% of the catch was released, but during the non-restricted fishery 21% of catch was released.

An estimated 12,065 (SE = 720) chinook salmon were harvested during the late run (Table 9). Unguided anglers accounted for 45% of the harvest and guided anglers harvested the remaining 55%. The estimated catch of chinook salmon was 15,135 (SE = 734). The relative precision for total catch and harvest ($\pm 9.5\%$ and $\pm 11.7\%$, respectively) was within desired levels of precision ($\pm 20\%$ of the true value 95% of the time). Approximately 20% of the catch was voluntarily released during the late run.

AGE, SEX, AND LENGTH

Recreational Harvest

The age distribution of the early-run harvest did not differ significantly ($\chi^2 = 2.6$, $df = 2$, $P = 0.27$) between temporal strata (15-31 May, 1-15 June, and 16-30 June) for ages 1.3 and 1.4 which made up 93.8% of the sampled harvest. The most abundant age group in the early-run harvest was age-1.4 fish, which comprised 77.1% (SE = 4.3%) of the harvest (Table 10). The only other major age class was 1.3-aged chinook salmon (16.7%; SE = 3.8).

During the late run, the age composition of the sampled harvest differed significantly ($\chi^2 = 12.4$, $df = 2$, $P < 0.01$) between temporal strata (1-16 July and 17-31 July) for ages 1.2, 1.3 and 1.4. The most abundant age classes were age-1.3 and age-1.4 fish (Table 11).

Table 10.-Age composition and mean length-at-age (mid-eye to fork in millimeters) for sport harvested early-run Kenai River chinook salmon in 2000.

Parameter	Age						Total
	0.2	1.1	1.2	1.3	1.4	1.5	
Female							
MEF				817	962	984	
SE MEF				22	8	16	
Sample size				8	47	3	58
Percent				8.3%	49.0%	3.1%	60.4%
SE Percent				2.8%	5.1%	1.8%	5.0%
Male							
MEF	585	390	640	797	1,016		
SE MEF				24	11		
Sample size	1	1	1	8	27		38
Percent	1.0%	1.0%	1.0%	8.3%	28.1%		39.6%
SE Percent	1.0%	1.0%	1.0%	2.8%	4.6%		5.0%
Combined							
Sample size	1	1	1	16	74	3	96
Percent	1.0%	1.0%	1.0%	16.7%	77.1%	3.1%	100.0%
SE Percent	1.0%	1.0%	1.0%	3.8%	4.3%	1.8%	0.0%

Inriver Return

For the early run, there was a significant difference ($\chi^2 = 13.2$, $df = 2$, $P < 0.01$) in the age composition of the inriver return between the first 3-week stratum and second 3-week stratum (15 May-8 June, 9-30 June). Most fish were age 1.3 and age 1.4 (Table 12).

During the late run, there was no significant difference ($\chi^2 = 3.6$, $df = 2$, $P = 0.17$) in the age composition of the inriver return by temporal stratum (1-23 July, 24 July – 15 August). The most abundant age classes were age-1.4 (62.1%, $SE = 2.5\%$) and age-1.3 fish (31.3%, $SE = 2.4\%$; Table 13).

Analysis-of-variance was used to test for differences in mean length-at-age by sex, run, and sampling method (recreational harvest or inriver gillnetting) for age-1.2, age-1.3 and age-1.4 fish. Separate analyses were done for each age class, but the age-1.2 model was insignificant. For age-1.3 fish, males were significantly smaller ($F = 12.16$; $df = 1, 372$; $P < 0.001$) than females. For age-1.4 fish, males were significantly larger ($F = 85.81$; $df = 1, 716$; $P < 0.0001$) than females. Also, late-run age-1.4 fish were significantly larger than early-run fish ($F = 16.03$; $df = 1, 716$; $P < 0.0001$), although males from the late run were larger than females from the early run. Likewise, males caught in gillnets were larger than sport harvested males, although the effect was not seen for females.

Water clarity was near the historic median, except for a period of high clarity (~1.2 m) in late May (Figure 6).

Table 11.-Temporally stratified age composition and mean length-at-age (mid-eye to fork in millimeters) for sport harvested late-run Kenai River chinook salmon in 2000.

Parameter	Age							Total
	0.2	0.4	1.1	1.2	1.3	1.4	1.5	
1 July-16 July								
Female								
MEF			240	736	834	1,003	1,241	
SE MEF					15	9		
Sample size			1	1	50	77	1	130
Percent			0.4%	0.4%	19.2%	29.5%	0.4%	49.8%
SE Percent			0.4%	0.4%	2.4%	2.8%	0.4%	3.1%
Male								
MEF	585		392	673	790	1,016	1,042	
SE MEF			13	17	12	12	26	
Sample size	1		5	9	47	67	2	131
Percent	0.4%		1.9%	3.4%	18.0%	25.7%	0.8%	50.2%
SE Percent	0.4%		0.9%	1.1%	2.4%	2.7%	0.5%	3.1%
Combined								
Sample size	1		6	10	97	144	3	261
Percent	0.4%		2.3%	3.8%	37.2%	55.2%	1.1%	100.0%
SE Percent	0.4%		0.9%	1.2%	3.0%	3.1%	0.7%	0.0%
17 July-31 July								
Female								
MEF			363		888	1,005	1,056	
SE MEF					12	6		
Sample size			1.0		31.0	86.0	1.0	119.0
Percent			0.5%		14.0%	38.7%	0.5%	53.6%
SE Percent			0.5%		2.3%	3.3%	0.5%	3.4%
Male								
MEF	1,048		940	686	856	1,047	1,125	
SE MEF				26	15	8	5	
Sample size	1.0		1.0	4.0	22.0	73.0	2.0	103.0
Percent	0.5%		0.5%	1.8%	9.9%	32.9%	0.9%	46.4%
SE Percent	0.5%		0.5%	0.9%	2.0%	3.2%	0.6%	3.4%
Combined								
Sample size	1.0		2.0	4.0	53.0	159.0	3.0	222.0
Percent	0.5%		0.9%	1.8%	23.9%	71.6%	1.4%	100.0%
SE Percent	0.5%		0.6%	0.9%	2.9%	3.0%	0.8%	0.0%

CPUE FROM INRIVER GILLNETTING

During the early run, we captured a total of 408 salmon during inriver gillnetting, 298 chinook salmon and 110 sockeye salmon. Daily CPUE ranged from 0 to 0.118 chinook salmon per minute drifted (Appendix C7). The mean ratio of chinook salmon to total salmon captured was 0.76.

During the late run, 473 chinook salmon and 754 sockeye salmon were captured. Daily CPUE ranged from 0.018 to 0.184 chinook salmon per minute drifted (Appendix C8). The mean ratio of chinook salmon to the total catch was 0.47.

Table 12.-Temporally stratified age composition and mean length-at-age (mid-eye to fork in millimeters) for the inriver return of early-run Kenai River chinook salmon in 2000.

Parameter	Age						Total
	0.3	0.4	1.2	1.3	1.4	1.5	
15 May-8 June							
Female							
MEF	870			833	944		
SE MEF				9	7		
Sample size	1			23	38		62
Percent	1.0%			22.3%	36.9%		60.2%
SE Percent	1.0%			4.1%	4.8%		4.8%
Male							
MEF	823	810	620	802	1,039		
SE MEF	53			16	10		
Sample size	2	1	1	15	22		41
Percent	1.9%	1.0%	1.0%	14.6%	21.4%		39.8%
SE Percent	1.4%	1.0%	1.0%	3.5%	4.1%		4.8%
Combined							
Sample size	3	1	1	38	60		103
Percent	2.9%	1.0%	1.0%	36.9%	58.3%		100.0%
SE Percent	1.7%	1.0%	1.0%	4.8%	4.9%		0.0%
9 June-30 June							
Female							
MEF			688	849	975		
SE MEF				9	13		
Sample size			1	33	26		60
Percent			0.8%	26.6%	21.0%		48.4%
SE Percent			0.8%	4.0%	3.7%		4.5%
Male							
MEF			655	811	1,070	1,140	
SE MEF			11	13	12		
Sample size			13	24	26	1	64
Percent			10.5%	19.4%	21.0%	0.8%	51.6%
SE Percent			2.8%	3.6%	3.7%	0.8%	4.5%
Combined							
Sample size			14	57	52	1	124
Percent			11.3%	46.0%	41.9%	0.8%	100.0%
SE Percent			2.9%	4.5%	4.4%	0.8%	0.0%

DISCUSSION

CREEL SURVEY

Angler effort during the 1999 and 2000 early runs were 18% and 40% less, respectively, than the 1974-2000 historical average (135,158 angler hours). The decreased effort is not surprising for 2000, and probably was spurred by the catch-and-release/trophy fishing restrictions. In contrast, the 1999 early run was liberalized to encourage an increase in fishing effort and harvest. Both management actions achieved their desired effect; 1999 effort increased during the emergency order, 2000 harvest decreased during the emergency order (Figure 7) and the desired escapement was achieved in both years. Fishing effort during the late run in 1999 and 2000 was larger than the 1974-2000 historical average of 234,132 angler hours by 7% and 6%, respectively.

Table 13.-Age composition and mean length-at-age (mid-eye to fork in millimeters) for the inriver return of late-run Kenai River chinook salmon in 2000.

Parameter	Age				Total
	1.2	1.3	1.4	1.5	
Female					
MEF	710	887	1,003	1,020	
SE MEF	10	8	6	30	
Sample size	2	36	135	4	177
Percent	0.5%	9.4%	35.2%	1.0%	46.2%
SE Percent	0.4%	1.5%	2.4%	0.5%	2.6%
Male					
MEF	681	820	1,050	1,153	
SE MEF	10	9	8	18	
Sample size	13	84	103	6	206
Percent	3.4%	21.9%	26.9%	1.6%	53.8%
SE Percent	0.9%	2.1%	2.3%	0.6%	2.6%
Combined					
Sample size	15	120	238	10	383
Percent	3.9%	31.3%	62.1%	2.6%	100.0%
SE Percent	1.0%	2.4%	2.5%	0.8%	0.0%

Effect of Losing Stewart's Landing as an Interview Site

Losing Stewart's Landing as an interview site was a significant loss to our creel program, particularly in the early run. Forty-three percent of the total interviews collected were collected at Stewart's Landing prior to 4 June 2000, the last day we were permitted to sample there. Likewise, 20% of the 1999 early-run interviews and 18% of the 1999 late-run interviews came from Stewart's landing. Since interview sites were randomly selected and equally weighted in 1999 and 2000, these percentages approximate actual use and Stewart's Landing sees above average use (if all seven launches were used equally each would expect 14% of the traffic) during both runs. The effect is most noticeable in May when most of the other boat launches are inaccessible due to low water and gathering sufficient interviews is a serious problem due to low overall effort.

The possibility for a bias in the estimates due to our inability to sample those anglers who use Stewart's Landing seems small because the mean daily CPUE and HPUE for Stewart's Landing is comparable to the other launches during both runs.

INRIVER GILLNETTING

Recent work indicates that the sonar may overestimate chinook salmon abundance when sockeye salmon are abundant in the middle of the river (Burwen et al. 1998); (Hammarstrom and Hasbrouck 1998, 1999). Consequently, the inriver gillnetting program, originally designed to collect ASL samples, was modified to assess the feasibility of using catch per unit effort (CPUE) from the drift nets as an alternative index of chinook salmon abundance. Beginning in 1998,

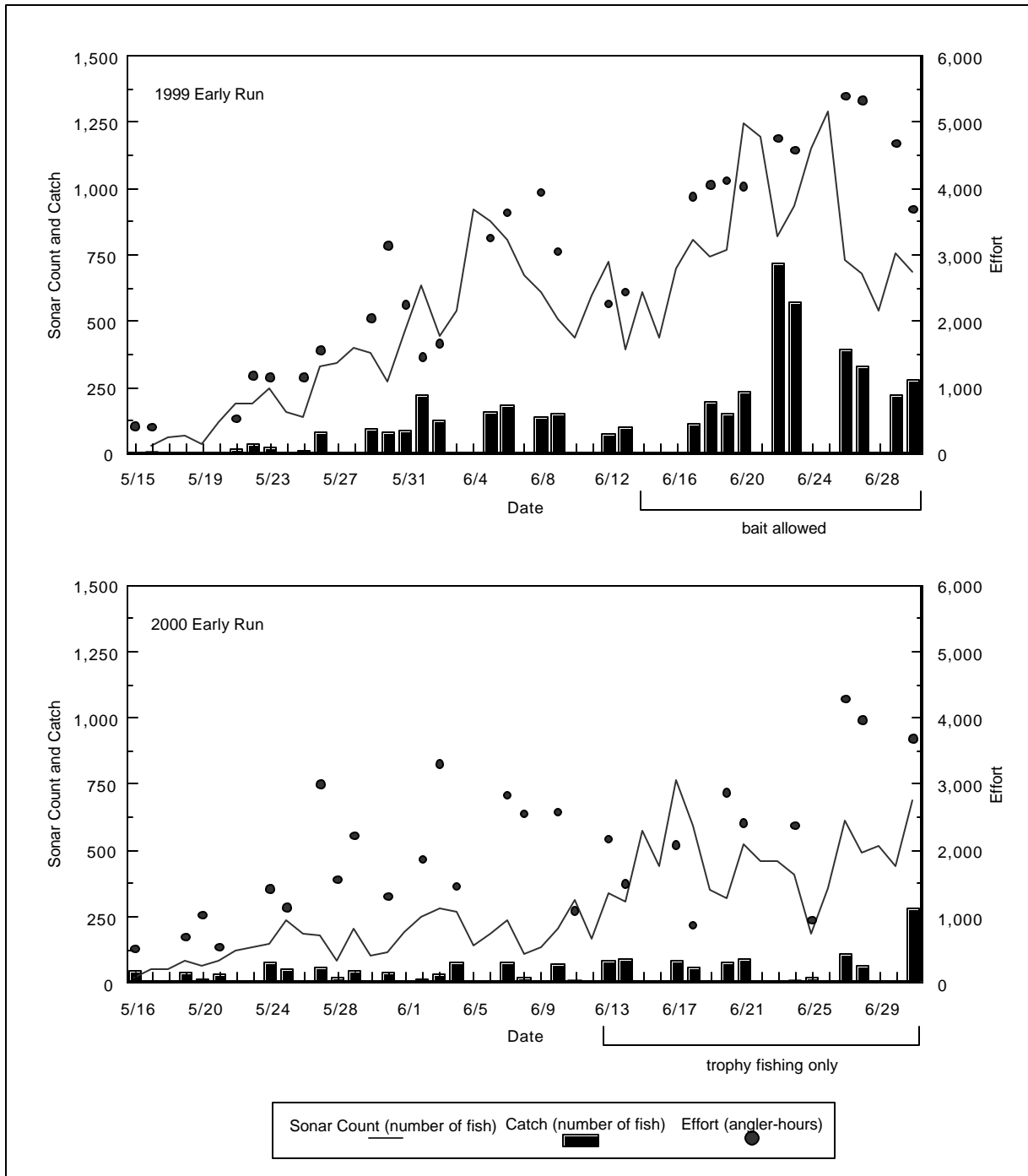


Figure 7.-Daily catch, effort, and passage of early-run Kenai River chinook salmon during 1999 and 2000.

location of drifts, capture methods, and the timing of sampling relative to tide cycles were standardized. In addition, the schedule was intensified so that CPUE estimates could be generated daily.

Analysis of 3 years (1998-2000) of CPUE and corresponding sonar data provided several insights into the utility of CPUE as an index of abundance. Netting CPUE often tracked the number of fish traveling upstream past the sonar for the short term, but the relationship between the two, and thus the efficiency of the netting, changed over time (Figure 8). Generally netting efficiency (q = number of fish caught in the netting program/number of fish traveling upstream past the sonar) declined over the course of the season, and appeared to be influenced by the amount of water in the river (discharge measured by USGS at the Soldotna bridge), and water clarity (Secchi disk readings during net sampling). Nets were most efficient when the river was low and turbid, and least efficient when the river was high and clear (Figure 9).

If CPUE is to serve as an index of abundance, it is critical to know or to be able to predict netting efficiency. Regression analysis indicated that approximately half of the variation ($R^2=0.48$) in $\log(q)$ could be explained by discharge and water clarity measurements. However, regression relationship differed among years ($F = 10.0$; $df = 2, 240$; $P < 0.0001$) and substantial variation in $\log(q)$ remained after controlling for Secchi and discharge ($MSE = 0.28^2$). Therefore we conclude that, at best, CPUE would be an imprecise predictor of abundance, because the *magnitude* of net catches is so variable and so dependent upon river conditions.

The netting data may be most useful as an index of species composition rather than abundance. After controlling for discharge and water clarity, $\log(q)$ did not differ between days when the catches were dominated by chinook salmon and days when sockeye were more abundant (multiple regression of q on discharge, Secchi, and proportion of chinook salmon in the net catch; $F = 0.24$; $df = 1, 240$; $P = 0.62$). This indicates that chinook and sockeye salmon may be caught with similar efficiency by the netting program as a whole, and thus the species composition of fish caught in the net may be representative of fish in the river. We recommend that further consideration be given to estimating species composition from the netting data in 2001, and possibly applying the species composition estimates to the sonar estimates of abundance.

ACKNOWLEDGEMENTS

We would like to express our gratitude to those individuals involved with the continued success of this project. Tim McKinley oversaw the entire project as well as the Kenai River chinook salmon fishery as a whole. The creel crew for 1999 and 2000 included Ed Borden, Tony Eskelin and Gary Titus as boat technicians conducting angler counts and Nate Lockwood, Tarrah Sonnenschein and Jess Sotelo as access technicians conducting angler interviews. The drift gillnetting crew for 1999 and 2000 was Justin Broyles, Geoff Clark, Tony Eskelin, Stacie Mallette, Oralee Nudson and Mike Purviance. Patti Berkhahn prepared and aged scales, and provided the age and sex composition for the creel and netting samples. We would also like to thank Jim Hasbrouck and Steve Fleischman who provided vital biometric assistance.

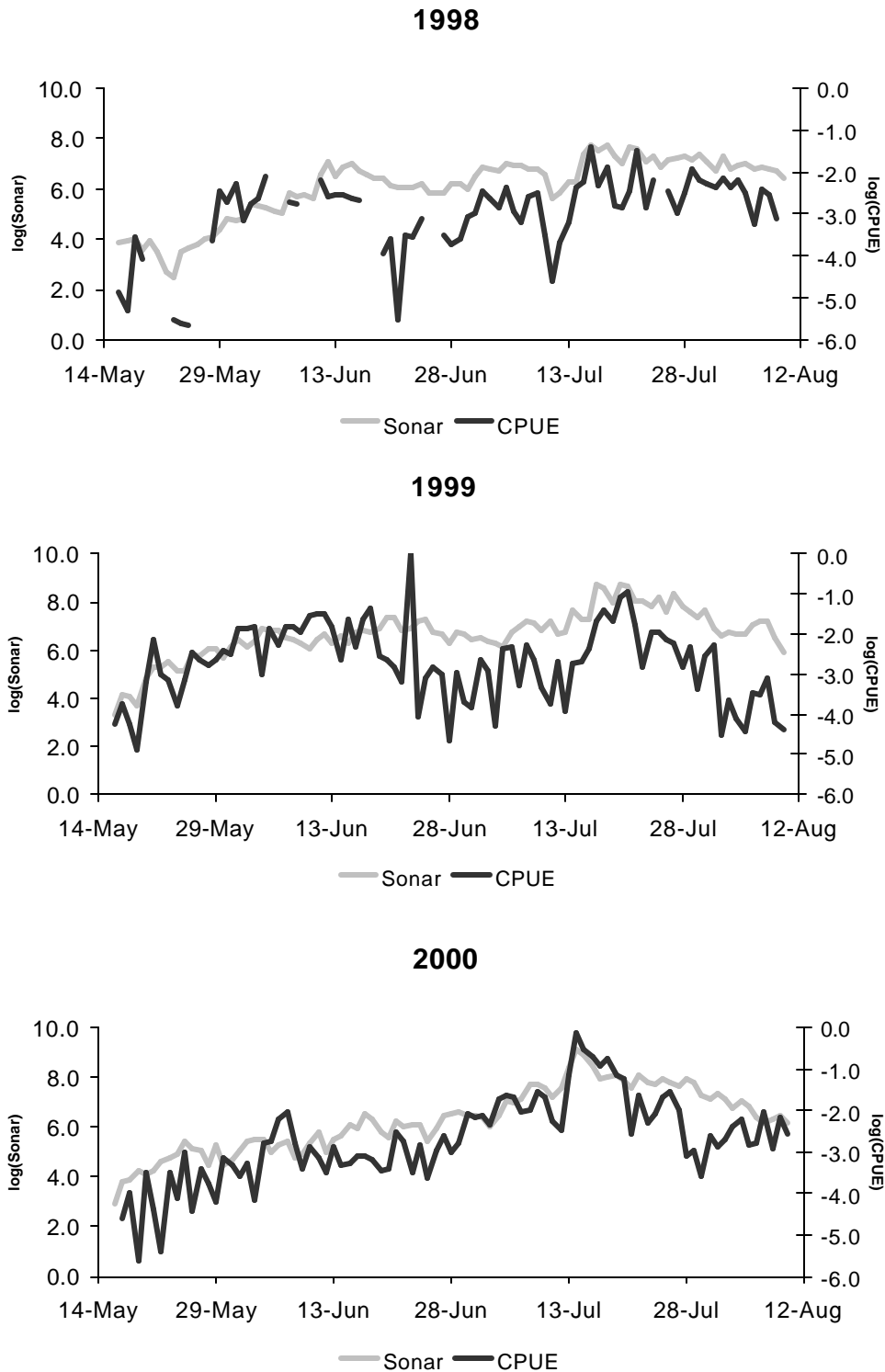
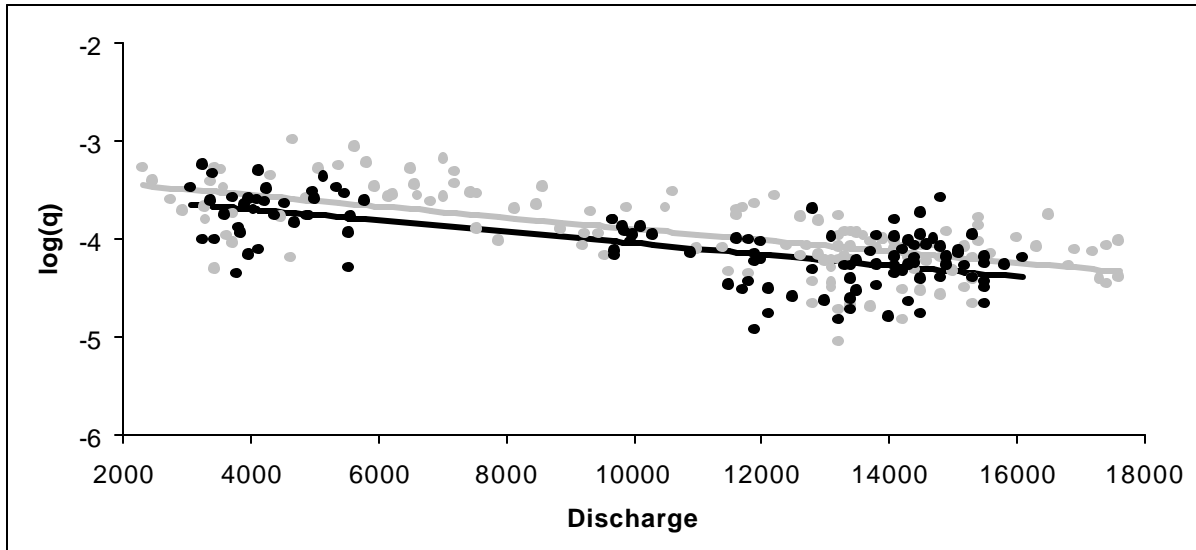


Figure 8.-Time series of the number of fish traveling upstream past the sonar (gray) and netting CPUE (black), both log 10 transformed, at km 13 of the Kenai River, 1998-2000.



Notes: Gray = days with Secchi visibility ≤ 0.6 m; black = days with Secchi visibility > 0.6 m.

Netting efficiency q = number of fish caught in the netting program divided by the number of fish traveling upstream past the sonar.

Figure 9.-Regression of daily netting efficiency (log 10 transformed) vs. Kenai River discharge at Soldotna Bridge.

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**APPENDIX A. BOAT ANGLER COUNTS DURING THE KENAI
RIVER CHINOOK SALMON FISHERY, 1999 AND 2000**

Appendix A1.-Guided and unguided boat angler counts, by geographic strata, for the 1999 early run.

Date	Day Type ^b	Downstream ^a										Upstream ^a					Combined Strata														
		Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers				
		A ^c	B ^c	C ^c	D ^c	E ^c	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
5/15	We	0	0	0	0	0	0	0	0	0	0	0	10	9	15	14	0	19	17	11	6	0	10	9	15	14	0	19	17	11	6
5/16	We	0	0	0	0	0	2	0	0	0	0	0	11	17	20	9	0	18	14	4	4	0	11	17	20	9	2	18	14	4	4
5/17	Mo	CLOSED					CLOSED					CLOSED					CLOSED					CLOSED					CLOSED				
5/18	Wd	Not Sampled																													
5/19	Wd	Not Sampled																													
5/20	Wd	Not Sampled																													
5/21	Wd	0	0	0	0	0	0	0	0	0	0	0	17	9	0	2	0	60	34	4	3	0	17	9	0	2	0	60	34	4	3
5/22	We	0	0	0	0	0	0	0	0	0	0	13	19	23	9	12	57	90	37	7	25	13	19	23	9	12	57	90	37	7	25
5/23	We	0	0	0	0	0	0	0	0	0	0	17	42	23	9	1	117	63	10	3	0	17	42	23	9	1	117	63	10	3	
5/24	Mo	CLOSED					CLOSED					CLOSED					CLOSED					CLOSED					CLOSED				
5/25	Wd	0	0	0	0	0	0	0	0	0	0	1	12	8	4	7	4	115	75	56	5	1	12	8	4	7	4	115	75	56	5
5/26	Wd	0	0	0	0	0	0	0	0	0	0	2	6	4	13	7	0	121	162	47	24	2	6	4	13	7	0	121	162	47	24
5/27	Wd	Not Sampled																													
5/28	Wd	Not Sampled																													
5/29	We	0	0	0	0	0	0	0	0	0	0	15	44	41	54	22	25	134	98	58	17	15	44	41	54	22	25	134	98	58	17
5/30	We	0	0	0	0	0	0	0	0	0	0	34	67	58	87	54	99	107	120	124	31	34	67	58	87	54	99	107	120	124	31
5/31	Mo ^a	0	0	0	0	0	0	0	2	0	0	43	76	99	54	13	74	102	65	28	4	43	76	99	54	13	74	102	67	28	4
6/1	Wd	0	0	0	0	0	0	0	0	0	0	3	28	11	16	10	152	97	44	0	3	28	11	16	10	152	97	44	0	0	
6/2	Wd	0	0	0	0	0	0	0	0	0	0	12	26	32	22	12	140	124	45	0	12	26	32	22	12	140	124	45	0	0	
6/3	Wd	Not Sampled																													
6/4	Wd	Not Sampled																													
6/5	We	0	0	0	0	0	0	0	0	0	0	100	104	56	83	54	177	157	81	0	100	104	56	83	54	177	157	81	0	0	
6/6	We	0	0	0	0	0	0	0	0	0	0	168	136	99	77	23	141	161	101	0	168	136	99	77	23	141	161	101	0	0	
6/7	Mo	CLOSED					CLOSED					CLOSED					CLOSED					CLOSED					CLOSED				
6/8	Wd	0	0	0	0	0	0	0	0	0	0	97	54	52	48	27	311	231	162	0	97	54	52	48	27	311	231	162	0	0	
6/9	Wd	0	2	0	0	0	18	0	0	0	0	47	45	67	37	39	261	160	84	0	47	47	67	37	39	279	160	84	0	0	
6/10	Wd	Not Sampled																													
6/11	Wd	Not Sampled																													
6/12	We	0	0	3	0	0	0	0	0	0	0	5	70	52	72	43	114	99	104	0	5	70	55	72	43	114	99	104	0	0	
6/13	We	0	0	7	0	0	0	0	6	0	0	63	83	93	58	6	96	114	80	0	63	83	100	58	6	96	114	86	0	0	

-continued-

Appendix A1.-Page 2 of 2.

Date	Day Type ^b	Downstream ^a					Upstream ^a					Combined Strata																	
		Unguided Anglers			Guided Anglers		Unguided Anglers			Guided Anglers		Unguided Anglers			Guided Anglers														
		A ^c	B ^c	C ^c	D ^c	E ^c	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E								
6/14	Mo	CLOSED					CLOSED					CLOSED																	
6/15	Wd	CLOSED					CLOSED					CLOSED																	
6/16	Wd ^d	CLOSED					CLOSED					CLOSED																	
6/17	Wd	0	0	0	0	6	0	0	0			63	66	54	50	56	285	267	119			63	66	54	50	62	285	267	119
6/18	Wd	0	0	6	0	2	0	0	0			106	89	57	83	33	287	207	142			106	89	63	83	35	287	207	142
6/19	We	0	0	14	6	0	0	0	3			22	96	235	136	55	239	140	82			22	96	249	142	55	239	140	85
6/20	We	0	0	0	6	0	0	0	0			45	159	181	79	56	200	202	76			45	159	181	85	56	200	202	76
6/21	Mo	CLOSED					CLOSED					CLOSED																	
6/22	Wd	8	8	0	2	0	4	0	0			111	106	78	62	30	310	301	166			119	114	78	64	30	314	301	166
6/23	Wd	0	15	3	0	0	0	8	0			68	58	87	62	35	323	278	206			68	73	90	62	35	323	286	206
6/24	Wd	CLOSED					CLOSED					CLOSED																	
6/25	Wd	CLOSED					CLOSED					CLOSED																	
6/26	We	0	5	7	6	0	24	24	0			129	141	117	163	93	291	209	138			129	146	124	169	93	315	233	138
6/27	We	3	14	21	5	5	0	37	64			144	159	141	165	64	169	229	108			147	173	162	170	69	169	266	172
6/28	Mo	CLOSED					CLOSED					CLOSED																	
6/29	Wd	0	2	4	0	0	14	47	0			66	192	57	73	98	317	176	123			66	194	61	73	98	331	223	123
6/30	Wd	0	0	8	0	0	0	9	0			22	114	70	77	117	262	95	145			22	114	78	77	117	262	104	145

^a Downstream = Between the chinook salmon sonar and the Warren Ames Bridge. Upstream = Between the chinook salmon sonar and the Soldotna Bridge.

^b Wd = weekday, We = weekend, Mo = Monday.

^c Angler count timeframes: A = 0400-0759 hours, B = 0800-1159 hours, C = 1200-1559 hours, D = 1600-1959 hours, E = 2000-2359 hours.

^d Fishing from boats was allowed on Monday, 31 May 1999 because of the Memorial Day holiday.

^e Fishery was liberalized to allow use of bait and treble hooks by emergency order on 16 June.

Appendix A2.-Guided and unguided boat angler counts, by geographic strata, for the 1999 late run.

Date	Day Type ^b	Downstream ^a					Upstream ^a					Combined Strata																						
		Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers																	
		A ^c	B ^c	C ^c	D ^c	E ^c	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E								
7/1	Wd	0	0	13	5	0		0	73	0	15	89	28	100	162		294	148	141	15	89	41	105	162		294	221	141						
7/2	Wd	0	2	12	0	0	0	21	55		105	110	68	79	142	282	267	156	105	112	80	79	142	282	288	211								
7/3	We	0	26	27	0	0	0	72	82		162	180	145	229	71	336	249	159	162	206	172	229	71	336	321	241								
7/4	We	3	23	33	6	0		CLOSED					173	285	190	233	252		CLOSED					176	308	223	239	252		CLOSED				
7/5	Mo ^d	0	0	0	0	0		CLOSED					34	71	24	15	4		CLOSED					34	71	24	15	4		CLOSED				
7/6	Wd	2	15	22	6	0		13	2	0	142	135	125	72	117		419	329	204	144	150	147	78	117		432	331	204						
7/7	Wd	0	7	0	3	4	0	21	13		88	155	98	63	71	363	362	178	88	162	98	66	75	363	383	191								
7/8	Wd																																	
7/9	Wd																																	
7/10	We	0	24	27	31	18		76	10	23	175	281	237	227	232		411	360	289	175	305	264	258	250		487	370	312						
7/11	We	15	22	0	13	5		CLOSED					359	406	458	437	170		CLOSED					374	428	458	450	175		CLOSED				
7/12	Mo ^d	0	0	0	0	2		CLOSED					31	77	42	14	10		CLOSED					31	77	42	14	12		CLOSED				
7/13	Wd	5	19	33	2	0	0	47	79		450	348	241	278	151	521	573	553	455	367	274	280	151	521	620	632								
7/14	Wd																																	
7/15	Wd	0	0	41	3	10		0	119	0	170	250	158	182	253		536	323	316	170	250	199	185	263		536	442	316						
7/16	Wd	3	25	40	0	4	0	24	94		208	256	273	323	181	526	492	312	211	281	313	323	185	526	516	406								
7/17	We	0	51	42	0	6	0	84	53		510	470	316	354	404	657	635	447	510	521	358	354	410	657	719	500								
7/18	We	3	11	20	31	0		CLOSED					401	512	318	171	328		CLOSED					404	523	338	202	328		CLOSED				
7/19	Mo ^d	0	0			0		CLOSED					7	91			38		CLOSED					7	91			38		CLOSED				
7/20	Wd	10	26	30	34	19	8	10	49		510	441	326	233	247	677	591	547	520	467	356	267	266	685	601	596								
7/21	Wd																																	
7/22	Wd																																	
7/23	Wd	14	71	30	29	16	41	124	49		404	271	267	257	146	528	298	262	418	342	297	286	162	569	422	311								
7/24	We	52	77	26	14	21	185	170	56		224	244	441	205	71	402	217	374	276	321	467	219	92	587	387	430								
7/25	We	33	66	71	17	13		CLOSED					374	313	274	143	66		CLOSED					407	379	345	160	79		CLOSED				
7/26	Mo ^d	0	0	0	0	0		CLOSED					20	31	62	82	22		CLOSED					20	31	62	82	22		CLOSED				
7/27	Wd	28	51	24	6	26		98	187	9	488	321	176	146	231		576	338	399	516	372	200	152	257		674	525	408						
7/28	Wd																																	
7/29	Wd	13	35	0	2	0	30	63	0		162	168	113	158	27	454	314	258	175	203	113	160	27	484	377	258								
7/30	Wd																																	
7/31	We	0	84	59	3	0	6	122	89		317	303	258	238	167	375	320	205	317	387	317	241	167	381	442	294								

^a Downstream = Between the chinook salmon sonar and the Warren Ames Bridge. Upstream = Between the chinook salmon sonar and the Soldotna Bridge.

^b Wd = Weekday, We = Weekend/holiday, Mo=Monday.

^c Angler count timeframes: A = 0400-0759 hours, B = 0800-1159 hours, C = 1200-1559 hours, D = 1600-1959 hours, E = 2000-2359 hours.

^d Only unguided drift fishing.

Appendix A3.-Guided and unguided boat angler counts, by geographic strata, for the 2000 early run.

Date	Day Type ^b	Downstream ^a										Upstream ^a										Combined Strata									
		Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers				
		A ^c	B ^c	C ^c	D ^c	E ^c	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
5/15	Mo	CLOSED					CLOSED					CLOSED					CLOSED					CLOSED					CLOSED				
5/16	Wd	0	0	0			0	0				0	8	19				32	22				0	8	19				32	22	
5/17	Wd																														
5/18	Wd																														
5/19	Wd			0	0	0			0				16	14	8			36					16	14	8			36			
5/20	We	0	0	0	0	0	0	0	0		13	46	21	29	23	43	56	24				13	46	21	29	23	43	56	24		
5/21	We	0	0	0	0	0					16	45	26	28	16							16	45	26	28	16					
5/22	Mo	CLOSED					CLOSED					CLOSED					CLOSED					CLOSED									
5/23	Wd																														
5/24	Wd	0	0	0	0	0	0	0	8		0	9	23	22	18	136	104	31				0	9	23	22	18		136	104	39	
5/25	Wd	0	0	0	0	0	0	0	0		3	16	11	18	34	94	72	33				3	16	11	18	34		94	72	33	
5/26	Wd																														
5/27	We	0	1	0	0	0	0	0	0		24	86	77	57	77	135	168	121				24	87	77	57	77	135	168	121		
5/28	We	0	0	0	0	0					25	80	128	95	58							25	80	128	95	58					
5/29	Mo ^d	0	4	0	0	0	0	4	0		29	92	49	32	14	94	139	95				29	96	49	32	14	94	143	95		
5/30	Wd																														
5/31	Wd	0	0	0	0	0	0	0	0		22	21	13	19	5	104	82	56				22	21	13	19	5	104	82	56		
6/1	Wd																														
6/2	Wd	0	0	4	0	0	0	15	0		13	181	23	25	32	30	85	56				13	181	27	25	32	30	100	56		
6/3	We	0	0	0	0	0	0	6	0		16	256	62	66	83	64	176	93				16	256	62	66	83	64	182	93		
6/4	We	0	0	0	0	0					21	127	93	53	68							21	127	93	53	68					
6/5	Mo	CLOSED					CLOSED					CLOSED					CLOSED					CLOSED									
6/6	Wd																														
6/7	Wd	0	0	0	0	0	0	0	0		40	29	10	41	9	234	218	124				40	29	10	41	9	234	218	124		
6/8	Wd	0	0	0	0	0	0	0	0		24	29	18	36	33	204	191	101				24	29	18	36	33	204	191	101		
6/9	Wd																														
6/10	We	0	0	0	0	0	0	0	0		14	49	95	80	37	172	144	51				14	49	95	80	37	172	144	51		
6/11	We	0	0	4	0	0					58	105	82	10	11							58	105	86	10	11					
6/12	Mo	CLOSED					CLOSED					CLOSED					CLOSED					CLOSED									
6/13	Wd ^e	0	0	0	0	0	0	0	0		36	40	26	21	21	153	177	66				36	40	26	21	21	153	177	66		

-continued-

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Date	Day Type ^b	Downstream ^a										Upstream ^a										Combined Strata									
		Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers				
		A ^c	B ^c	C ^c	D ^c	E ^c	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
14-Jun	Wd	0	0	0	0	0	0	4	0			11	21	16	4	12	125	109	70			11	21	16	4	12	125	113	70		
15-Jun	Wd																														
16-Jun	Wd																														
17-Jun	We	0	0	5	0	0	0	0	12			29	12	21	37	9	145	173	74			29	12	26	37	9	145	173	86		
18-Jun	We	0	0	8	0	0						33	51	44	52	28						33	51	52	52	28					
19-Jun	Mo																														
20-Jun	Wd	0	0	0	0	0	0	0	0			21	10	8	23	14	274	244	121			21	10	8	23	14	274	244	121		
21-Jun	Wd	0	0	0	0	0	0	8	0			18	26	15	35	13	207	181	98			18	26	15	35	13	207	189	98		
22-Jun	Wd																														
23-Jun	Wd																														
24-Jun	We	0	0	0	4	0	0	0	11			38	45	28	31	44	138	176	76			38	45	28	35	44	138	176	87		
25-Jun	We	0	0	0	0	0						16	48	102	43	25						16	48	102	43	25					
26-Jun	Mo																														
27-Jun	Wd ^f	0	0	0	0	0	39	0	0			114	74	35	21	25	383	238	138			114	74	35	21	25	422	238	138		
28-Jun	Wd	0	0	0	0	0	0	36	0			39	37	23	76	30	272	255	221			39	37	23	76	30	272	291	221		
29-Jun	Wd																														
30-Jun	Wd																														

^a Downstream = Between the chinook salmon sonar and the Warren Ames Bridge. Upstream = Between the chinook salmon sonar and the Soldotna Bridge.

^b Wd = Weekday, We = Weekend/holiday, Mo=Monday.

^c Angler count timeframes: A = 0400-0759 hours, B = 0800-1159 hours, C = 1200-1559 hours, D = 1600-1959 hours, E = 2000-2359 hours.

^d Fishing from a boat was allowed on Monday, 29 May 2000 because of the Memorial Day holiday.

^e Fishery was restricted to catch and release of chinook salmon less than 52 in by emergency order on 13 June.

^f Catch-and-release restriction lifted.

Appendix A4.-Guided and unguided boat angler counts, by geographic strata, for the 2000 late run.

Date	Day Type ^b	Downstream ^a										Upstream ^a										Combined Strata									
		Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers					Unguided Anglers					Guided Anglers				
		A ^c	B ^c	C ^c	D ^c	E ^c	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
7/1	We	0	10	14	0	0		10	12	0		95	210	113	161	120		455	217	312		95	220	127	161	120		465	229	312	
7/2	We	0	15	4	12	0						160	319	239	287	186						160	334	243	299	186					
7/3	Mo ^d	0	0	0	0	0						28	70	30	25	3						28	70	30	25	3					
7/4	Wd	0	0	19	0	0	0	0	62			237	202	112	108	134	519	539	279		237	202	131	108	134	519	539	341			
7/5	Wd																														
7/6	Wd	0	8	9	17	0	0	0	0			112	137	75	96	84	444	451	278		112	145	84	113	84	444	451	278			
7/7	Wd	6	0	5	16	7	0	2	14			74	120	117	236	157		478	184	90		80	120	122	252	164		478	186	104	
7/8	We	0	11	9	12	0	0	8	34			118	214	185	78	56	407	481	310		118	225	194	90	56	407	489	344			
7/9	We	3	8	20	10	0						148	180	342	271	144						151	188	362	281	144					
7/10	Mo ^d	0	0	0	0	0						101	119	110	38	6						101	119	110	38	6					
7/11	Wd	5	8	8	9	0	0	4	5			257	296	144	97	202		636	512	304		262	304	152	106	202		636	516	309	
7/12	Wd	0	10	24	0	5	26	116	0			160	170	135	142	252		501	300	337		160	180	159	142	257		527	416	337	
7/13	Wd																														
7/14	Wd																														
7/15	We	0	42	44	6	7	9	95	0			38	279	259	233	191	439	230	378		38	321	303	239	198		448	325	378		
7/16	We	0	0	51	0	0						27	356	288	304	255						27	356	339	304	255					
7/17	Mo ^d	0	0	0	0	0						5	81	55	15	12						5	81	55	15	12					
7/18	Wd																														
7/19	Wd	0	19	74	0	0	0	15	119			254	327	366	248	188	635	570	431		254	346	440	248	188	635	585	550			
7/20	Wd	0	13	28	0	0	0	6	36			316	374	193	247	209	607	612	432		316	387	221	247	209	607	618	468			
7/21	Wd																														
7/22	We	0	19	30	39	2	0	23	72			252	576	433	149	304	452	497	199		252	595	463	188	306	452	520	271			
7/23	We	7	9	13	21	0						310	601	471	342	293						317	610	484	363	293					
7/24	Mo ^d	0	0	0	0	0						3	65	52	26	26						3	65	52	26	26					
7/25	Wd																														
7/26	Wd																														
7/27	Wd	17	55	23	16	31	56	134	35			360	224	246	290	201	510	277	359		377	279	269	306	232	566	411	394			
7/28	Wd	28	49	37	10	10	51	156	31			382	251	253	306	289	506	291	457		410	300	290	316	299	557	447	488			
7/29	We	0	48	52	42	8	16	182	83			495	457	246	252	149	545	420	260		495	505	298	294	157	561	602	343			
7/30	We	0	100	182	90	22						395	388	419	280	241						395	488	601	370	263					
7/31	Mo ^d	0	0	0	0	3						2	53	99	108	57						2	53	99	108	60					

^a Downstream = Between the chinook salmon sonar and the Warren Ames Bridge. Upstream = Between the chinook salmon sonar and the Soldotna Bridge.

^b Wd = Weekday, We = Weekend/holiday, Mo=Monday.

^c Angler count timeframes: A = 0400-0759 hours, B = 0800-1159 hours, C = 1200-1559 hours, D = 1600-1959 hours, E = 2000-2359 hours.

^d Only unguided drift fishing.

**APPENDIX B. EFFORT, CATCH AND HARVEST FOR THE
KENAI RIVER CHINOOK SALMON FISHERY, 1999 AND 2000**

Appendix B1.-Daily estimates for unguided boat anglers during the 1999 early-run Kenai River chinook salmon fishery.

Date	Day Type ^a	Number of Counts	Mean Count	Number of Interviews	Effort (hours)		Catch				Harvest			
					Total	SE	Total	SE	CPUE	SE	Total	SE	HPUE	SE
5/15	We	5	10	12	192	37	0	0	0.000	0.000	0	0	0.000	0.000
5/16	We	5	11	12	228	54	6	4	0.028	0.018	6	4	0.028	0.018
5/21	Wd	5	6	4	112	66	7	7	0.066	0.062	7	7	0.066	0.062
5/22	We	5	15	14	304	51	6	6	0.018	0.018	6	6	0.018	0.018
5/23	We	5	18	21	364	121	0	0	0.000	0.000	0	0	0.000	0.000
5/25	Wd	5	6	17	128	40	3	2	0.022	0.016	3	2	0.022	0.016
5/26	Wd	5	6	5	128	37	0	0	0.000	0.000	0	0	0.000	0.000
5/29	We	5	35	33	704	143	9	6	0.012	0.009	9	6	0.012	0.009
5/30	We	5	60	26	1,200	176	27	15	0.022	0.012	27	15	0.022	0.012
5/31	We	5	57	37	1,140	231	15	11	0.013	0.009	7	8	0.007	0.007
6/1	Wd	5	14	4	272	99	89	44	0.326	0.116	41	31	0.152	0.105
6/2	Wd	5	21	10	416	66	10	10	0.024	0.025	10	10	0.024	0.025
6/5	We	5	79	30	1,588	197	57	31	0.036	0.019	19	19	0.012	0.012
6/6	We	5	101	37	2,012	241	134	55	0.067	0.026	66	28	0.033	0.014
6/8	Wd	5	56	28	1,112	152	30	16	0.027	0.014	22	13	0.020	0.012
6/9	Wd	5	47	25	948	114	29	19	0.031	0.019	7	7	0.008	0.008
6/12	We	5	49	23	980	236	50	32	0.051	0.031	24	16	0.025	0.016
6/13	We	5	62	41	1,240	227	74	30	0.060	0.022	44	20	0.036	0.015
6/17 ^p	Wd	5	59	24	1,180	56	28	20	0.024	0.017	28	20	0.024	0.017
6/18	Wd	5	75	48	1,504	192	26	16	0.017	0.011	26	16	0.017	0.011
6/19	We	5	113	43	2,256	692	85	39	0.038	0.013	36	23	0.016	0.009
6/20	We	5	105	28	2,104	485	119	47	0.057	0.019	119	47	0.057	0.019
6/22	Wd	5	81	33	1,620	163	79	38	0.049	0.023	52	27	0.032	0.017
6/23	Wd	5	66	43	1,312	135	64	25	0.049	0.018	32	14	0.024	0.011
6/26	We	5	132	21	2,644	293	58	41	0.022	0.015	28	29	0.011	0.011
6/27	We	5	144	43	2,884	333	101	38	0.035	0.013	63	29	0.022	0.010
6/29	Wd	5	98	42	1,968	590	59	28	0.030	0.012	19	15	0.010	0.007
6/30	Wd	5	82	16	1,632	337	89	57	0.055	0.034	59	46	0.036	0.028

^a Wd = weekdays, We = weekends.

^b Fishery was liberalized to allow use of bait and treble hooks by emergency order on 14 June.

Appendix B2.-Daily estimates for guided boat anglers during the 1999 early-run Kenai River chinook salmon fishery.

Date	Day Type ^a	Number of Counts	Mean Count	Number of Interviews	Effort (hours)		Catch				Harvest			
					Total	SE	Total	SE	CPUE	SE	Total	SE	HPUE	SE
5/15	We	5	11	10	212	65	0	0	0.000	0.000	0	0	0.000	0.000
5/16	We	5	8	6	168	61	0	0	0.000	0.000	0	0	0.000	0.000
5/21	Wd	5	20	11	404	228	14	11	0.034	0.023	14	11	0.034	0.023
5/22	We	5	43	11	864	226	30	17	0.035	0.018	30	17	0.035	0.018
5/23	We	5	39	13	776	439	22	18	0.029	0.020	12	11	0.015	0.015
5/25	Wd	5	51	13	1,020	411	11	10	0.010	0.010	11	10	0.010	0.010
5/26	Wd	5	71	14	1,416	548	84	48	0.059	0.027	67	37	0.047	0.020
5/29	We	5	66	37	1,328	406	86	32	0.065	0.015	86	32	0.065	0.015
5/30	We	5	96	33	1,924	298	52	23	0.027	0.012	42	21	0.022	0.010
5/31	We	5	55	29	1,100	203	70	21	0.064	0.016	70	21	0.064	0.016
6/1	Wd	3	98	4	1,172	265	132	55	0.112	0.041	132	55	0.112	0.041
6/2	Wd	3	103	32	1,236	279	118	37	0.096	0.021	118	37	0.096	0.021
6/5	We	3	138	21	1,660	272	102	46	0.062	0.026	102	46	0.062	0.026
6/6	We	3	134	31	1,612	219	49	24	0.031	0.014	49	24	0.031	0.014
6/8	Wd	3	235	33	2,816	366	110	45	0.039	0.015	110	45	0.039	0.015
6/9	Wd	3	174	37	2,092	489	121	44	0.058	0.017	99	39	0.047	0.016
6/12	We	3	106	15	1,268	55	25	16	0.020	0.012	25	16	0.020	0.012
6/13	We	3	99	9	1,184	115	26	29	0.022	0.025	26	29	0.022	0.025
6/17 ^b	Wd	3	224	6	2,684	516	85	63	0.032	0.023	85	63	0.032	0.023
6/18	Wd	3	212	22	2,544	357	170	62	0.067	0.023	94	47	0.037	0.018
6/19	We	3	155	12	1,856	392	68	45	0.037	0.024	68	45	0.037	0.024
6/20	We	3	159	17	1,912	437	113	60	0.059	0.029	113	60	0.059	0.029
6/22	Wd	3	260	47	3,124	470	638	136	0.204	0.031	360	92	0.115	0.024
6/23	Wd	3	272	34	3,260	305	506	118	0.155	0.033	485	110	0.149	0.031
6/26	We	3	229	65	2,744	435	335	72	0.122	0.018	301	67	0.110	0.017
6/27	We	3	202	22	2,428	468	227	83	0.093	0.030	170	66	0.070	0.024
6/29	Wd	3	226	26	2,708	510	165	63	0.061	0.021	123	55	0.045	0.019
6/30	Wd	3	170	45	2,044	565	192	67	0.094	0.021	137	50	0.067	0.017

^a Wd = Weekdays, We = Weekends.

^b Fishery was liberalized to allow use of bait and treble hooks by emergency order on 14 June.

Appendix B3.-Daily estimates for unguided boat anglers during the 1999 late-run Kenai River chinook salmon fishery.

Date	Day Type ^a	Number of Counts	Mean Count	Number of Interviews	Effort (hours)		Catch				Harvest			
					Total	SE	Total	SE	CPUE	SE	Total	SE	HPUE	SE
7/1	Wd	5	82	8	1,648	389	0	0	0.000	0.000	0	0	0.000	0.000
7/2	Wd	5	104	35	2,072	225	68	30	0.033	0.014	40	24	0.019	0.012
7/3	We	5	168	37	3,360	560	51	36	0.015	0.010	25	25	0.008	0.008
7/4	We	5	240	43	4,792	501	57	42	0.012	0.009	57	42	0.012	0.009
7/5	Mo ^b	5	30	19	592	194	35	17	0.058	0.024	35	17	0.058	0.024
7/6	Wd	5	127	28	2,544	252	0	0	0.000	0.000	0	0	0.000	0.000
7/7	Wd	5	98	20	1,956	327	28	28	0.014	0.014	28	28	0.014	0.014
7/10	We	5	250	47	5,008	432	207	63	0.041	0.012	104	45	0.021	0.009
7/11	We	5	377	60	7,540	892	273	74	0.036	0.009	74	43	0.010	0.006
7/12	Mo ^b	5	35	24	704	203	79	36	0.112	0.042	12	8	0.017	0.010
7/13	Wd	5	305	66	6,108	575	304	75	0.050	0.012	214	64	0.035	0.010
7/15	Wd	5	213	26	4,268	391	138	83	0.032	0.019	138	83	0.032	0.019
7/16	Wd	5	263	80	5,252	501	149	46	0.029	0.008	136	44	0.026	0.008
7/17	We	5	431	36	8,612	546	205	95	0.024	0.011	205	95	0.024	0.011
7/18	We	5	359	83	7,180	910	476	101	0.066	0.011	315	84	0.044	0.010
7/19	Mo ^b	3	45	52	907	573	50	34	0.055	0.017	31	21	0.035	0.011
7/20	Wd	5	375	111	7,504	480	722	122	0.096	0.015	427	80	0.057	0.010
7/23	Wd	5	301	51	6,020	483	234	84	0.039	0.014	175	73	0.029	0.012
7/24	We	5	275	61	5,500	1005	312	108	0.057	0.017	175	66	0.032	0.011
7/25	We	5	274	67	5,480	654	532	115	0.097	0.018	204	66	0.037	0.011
7/26	Mo ^b	5	43	24	868	225	54	23	0.062	0.022	54	23	0.062	0.022
7/27	Wd	5	299	16	5,988	798	415	198	0.069	0.032	415	198	0.069	0.032
7/29	Wd	5	136	37	2,712	536	214	73	0.079	0.022	124	54	0.046	0.018
7/31	We	5	286	54	5,716	459	202	75	0.035	0.013	101	46	0.018	0.008

^a Wd = weekdays, We = weekends, Mo = Monday.

^b Unguided drift fishing only.

Appendix B4.-Daily estimates for guided boat anglers during the 1999 late-run Kenai River chinook salmon fishery.

Date	Day Type ^a	Number of Counts	Mean Count	Number of Interviews	Effort (hours)		Catch				Harvest			
					Total	SE	Total	SE	CPUE	SE	Total	SE	HPUE	SE
7/1	Wd	3	219	31	2,624	375	54	28	0.021	0.011	54	28	0.021	0.011
7/2	Wd	3	260	46	3,124	268	259	66	0.083	0.020	224	57	0.072	0.017
7/3	We	3	299	22	3,592	282	112	57	0.031	0.016	112	57	0.031	0.016
7/6	Wd	3	322	55	3,868	562	283	76	0.073	0.017	201	57	0.052	0.013
7/7	Wd	3	312	66	3,748	669	263	72	0.070	0.015	202	60	0.054	0.013
7/10	We	3	390	50	4,676	452	310	77	0.066	0.015	292	75	0.062	0.015
7/13	Wd	3	591	50	7,092	345	395	99	0.056	0.014	332	84	0.047	0.012
7/15	Wd	3	431	49	5,176	545	179	55	0.035	0.010	146	50	0.028	0.009
7/16	Wd	3	483	39	5,792	383	449	109	0.078	0.018	247	81	0.043	0.014
7/17	We	3	625	60	7,504	788	306	80	0.041	0.010	306	80	0.041	0.010
7/20	Wd	3	627	63	7,528	291	1,264	226	0.168	0.029	728	124	0.097	0.016
7/23	Wd	3	434	50	5,208	638	505	117	0.097	0.019	378	100	0.073	0.017
7/24	We	3	468	58	5,616	709	447	109	0.080	0.017	409	106	0.073	0.017
7/27	Wd	3	536	35	6,428	656	636	165	0.099	0.024	446	139	0.069	0.021
7/29	Wd	3	373	28	4,476	554	738	172	0.165	0.033	499	142	0.111	0.029
7/31	We	3	372	52	4,468	555	352	83	0.079	0.016	336	81	0.075	0.016

^a Wd = weekdays, We = weekends.

Appendix B5.-Daily estimates for unguided boat anglers during the 2000 early-run Kenai River chinook salmon fishery.

Date	Day Type ^a	Number of Counts	Mean Count	Number of Interviews	Effort (hours)		Catch				Harvest			
					Total	SE	Total	SE	CPUE	SE	Total	SE	HPUE	SE
5/16	Wd	3	9	13	180	78.5	3	3	0.015	0.017	3	3	0.015	0.017
5/19	Wd	3	13	6	253	36.5	8	8	0.031	0.033	8	8	0.031	0.033
5/20	We	5	26	27	528	135	4	4	0.008	0.008	4	4	0.008	0.008
5/21	We	5	26	21	524	116	32	18	0.060	0.033	19	12	0.036	0.022
5/24	Wd	5	14	12	288	54.2	6	6	0.021	0.021	6	6	0.021	0.021
5/25	Wd	5	16	23	328	70.6	28	12	0.084	0.034	12	7	0.035	0.021
5/27	We	5	64	32	1,288	221	25	15	0.019	0.011	25	15	0.019	0.011
5/28	We	5	77	47	1,544	279	19	11	0.012	0.007	19	11	0.012	0.007
5/29	Mo	5	44	31	880	270	0	0	0.000	0.000	0	0	0.000	0.000
5/31	Wd	5	16	27	320	54.5	11	7	0.035	0.020	8	5	0.024	0.017
6/2	Wd	5	56	13	1,112	721	0	0	0.000	0.000	0	0	0.000	0.000
6/3	We	5	97	20	1,932	977	0	0	0.000	0.000	0	0	0.000	0.000
6/4	We	5	72	54	1,448	377	81	31	0.056	0.017	60	25	0.042	0.014
6/7	Wd	5	26	12	516	157	8	9	0.016	0.017	8	9	0.016	0.017
6/8	Wd	5	28	13	560	69.2	20	15	0.035	0.027	20	15	0.035	0.027
6/10	We	5	55	10	1,100	233	15	18	0.014	0.017	15	18	0.014	0.017
6/11	We	5	54	22	1,080	289	8	8	0.007	0.007	0	0	0.000	0.000
6/13 ^b	Wd	5	29	0	576	48.7	0	0	0.000	0.000	0	0	0.000	0.000
6/14	Wd	5	13	2	256	57.7	0	0	0.000	0.000	0	0	0.000	0.000
6/17	We	5	23	5	452	118	31	29	0.068	0.063	0	0	0.000	0.000
6/18	We	5	43	10	864	94.9	62	32	0.072	0.037	20	21	0.023	0.024
6/20	Wd	5	15	6	304	65.7	11	12	0.038	0.039	0	0	0.000	0.000
6/21	Wd	5	21	6	428	103	0	0	0.000	0.000	0	0	0.000	0.000
6/24	We	5	38	16	760	68.4	10	10	0.013	0.013	0	0	0.000	0.000
6/25	We	5	47	10	936	278	20	19	0.021	0.021	0	0	0.000	0.000
6/27 ^c	Wd	5	54	12	1,076	183	33	23	0.031	0.021	0	0	0.000	0.000
6/28	Wd	5	41	16	820	226	0	0	0.000	0.000	0	0	0.000	0.000

^a Wd = weekdays, We = weekends.

^b Fishery was restricted to catch-and-release/trophy fishing by emergency order on 13 June.

^c Catch-and-release/trophy fishing restriction lifted by emergency order on 27 June.

Appendix B6.-Daily estimates for guided boat anglers during the 2000 early-run Kenai River chinook salmon fishery.

Date	Day Type ^a	Number of Counts	Mean Count	Number of Interviews	Effort (hours)		Catch				Harvest			
					Total	SE	Total	SE	CPUE	SE	Total	SE	HPUE	SE
5/16	Wd	2	27	4	324	60	43	29	0.133	0.088	43	29	0.133	0.088
5/19	Wd	1	36	12	432		35		0.080	0.043	26		0.059	0.038
5/20	We	3	41	6	492	120	11	14	0.023	0.029	11	14	0.023	0.029
5/24	Wd	3	93	21	1,116	251	70	30	0.062	0.023	70	30	0.062	0.023
5/25	Wd	3	66	13	796	155	23	16	0.028	0.020	23	16	0.028	0.020
5/27	We	3	141	36	1,696	199	34	15	0.020	0.009	20	12	0.012	0.007
5/29	Mo	3	111	49	1,328	238	44	17	0.033	0.011	38	16	0.029	0.011
5/31	Wd	3	81	29	968	118	28	12	0.029	0.012	28	12	0.029	0.012
6/2	Wd	3	62	24	744	286	13	8	0.017	0.010	13	8	0.017	0.010
6/3	We	3	113	44	1,356	512	32	16	0.023	0.008	32	16	0.023	0.008
6/7	Wd	3	192	36	2,304	330	71	27	0.031	0.011	40	21	0.017	0.009
6/8	Wd	3	165	16	1,984	315	0	0	0.000	0.000	0	0	0.000	0.000
6/10	We	3	122	16	1,468	336	59	30	0.040	0.018	47	27	0.032	0.017
6/13 ^b	Wd	3	132	12	1,584	393	84	48	0.053	0.028	0	0	0.000	0.000
6/14	Wd	3	103	22	1,232	155	92	37	0.075	0.029	0	0	0.000	0.000
6/17	We	3	135	20	1,616	317	54	25	0.033	0.014	0	0	0.000	0.000
6/20	Wd	3	213	17	2,556	439	70	39	0.027	0.015	0	0	0.000	0.000
6/21	Wd	3	165	21	1,976	321	91	36	0.046	0.017	0	0	0.000	0.000
6/24	We	3	134	16	1,604	335	0	0	0.000	0.000	0	0	0.000	0.000
6/27 ^c	Wd	3	266	36	3,192	725	74	36	0.023	0.010	74	36	0.023	0.010
6/28	Wd	3	261	55	3,136	251	64	23	0.020	0.007	40	18	0.013	0.006

^a Wd = Weekdays, We = Weekends.

^b Fishery was restricted to catch-and-release/trophy fishing by emergency order on 13 June.

^c Catch-and-release/trophy fishing restriction lifted by emergency order on 27 June.

Appendix B7.-Daily estimates for unguided boat anglers during the 2000 late-run Kenai River chinook salmon fishery.

Date	Day Type ^a	Number of Counts	Mean Count	Number of Interviews	Effort (hours)		Catch				Harvest			
					Total	SE	Total	SE	CPUE	SE	Total	SE	HPUE	SE
7/1	We	5	145	46	2,892	520.7	247	69	0.085	0.019	107	44	0.037	0.014
7/2	We	5	244	51	4,888	738	278	92	0.057	0.017	252	88	0.052	0.016
7/3	Mo ^b	5	31	22	624	196.8	24	12	0.038	0.017	19	11	0.030	0.015
7/4	Wd	5	162	64	3,248	273.3	156	39	0.048	0.011	116	35	0.036	0.010
7/6	Wd	5	108	25	2,152	254.8	81	39	0.038	0.018	81	39	0.038	0.018
7/7	Wd	5	148	19	2,952	512.3	61	46	0.021	0.016	61	46	0.021	0.016
7/8	We	5	137	39	2,732	493.8	77	42	0.028	0.015	77	42	0.028	0.015
7/9	We	5	225	75	4,504	754.8	214	69	0.048	0.013	157	55	0.035	0.011
7/10	Mo ^b	5	75	22	1,496	257.2	136	39	0.091	0.021	58	24	0.039	0.015
7/11	Wd	5	205	38	4,104	601.7	257	89	0.063	0.020	231	85	0.056	0.019
7/12	Wd	5	180	32	3,592	378.9	440	112	0.123	0.029	342	114	0.095	0.030
7/15	We	5	220	72	4,396	928.4	184	61	0.042	0.011	113	46	0.026	0.009
7/16	We	5	256	40	5,124	1059	216	85	0.042	0.014	134	65	0.026	0.012
7/17	Mo ^b	5	34	18	672	283.9	15	11	0.022	0.015	7	7	0.011	0.011
7/19	Wd	5	295	51	5,904	760	271	92	0.046	0.015	217	82	0.037	0.013
7/20	Wd	5	276	61	5,520	589.2	153	49	0.028	0.008	77	34	0.014	0.006
7/22	We	5	361	62	7,216	1499	278	98	0.039	0.011	231	88	0.032	0.010
7/23	We	5	413	57	8,268	1101	564	157	0.068	0.017	457	142	0.055	0.016
7/24	Mo ^b	5	34	44	688	216.5	60	22	0.088	0.017	49	19	0.071	0.016
7/27	Wd	5	293	60	5,852	406.8	266	85	0.045	0.014	246	76	0.042	0.013
7/28	Wd	5	323	63	6,460	362.8	287	90	0.044	0.014	239	77	0.037	0.012
7/29	We	5	350	60	6,996	785.7	373	110	0.053	0.015	344	107	0.049	0.014
7/30	We	5	423	104	8,468	928.6	453	114	0.053	0.012	384	105	0.045	0.011
7/31	Mo ^b	5	64	33	1,288	266.5	71	24	0.055	0.015	58	22	0.045	0.015

^a Wd = weekdays, We = weekends, Mo = Monday.

^b Unguided drift fishing only.

Appendix B8.-Daily estimates for unguided boat anglers during the 2000 late-run Kenai River chinook salmon fishery.

Date	Day Type ^a	Number of Counts	Mean Count	Number of Interviews	Effort (hours)		Catch				Harvest			
					Total	SE	Total	SE	CPUE	SE	Total	SE	HPUE	SE
7/1	We	3	335	52	4,024	866.6	502	141	0.125	0.023	434	126	0.108	0.022
7/4	Wd	3	466	46	5,596	689.4	424	109	0.076	0.017	379	103	0.068	0.017
7/6	Wd	3	391	30	4,692	599.8	239	78	0.051	0.015	166	68	0.035	0.014
7/7	Wd	3	256	22	3,072	1051	144	75	0.047	0.020	144	75	0.047	0.020
7/8	We	3	413	32	4,960	577.1	429	141	0.087	0.027	429	141	0.087	0.027
7/11	Wd	3	487	85	5,844	828.8	467	107	0.080	0.015	382	90	0.065	0.012
7/12	Wd	3	427	79	5,120	472	445	79	0.087	0.013	306	62	0.060	0.011
7/15	We	3	384	53	4,604	464	329	74	0.072	0.014	235	63	0.051	0.013
7/19	Wd	3	590	60	7,080	211.4	522	112	0.074	0.016	450	107	0.064	0.015
7/20	Wd	3	564	56	6,772	521	487	111	0.072	0.015	242	76	0.036	0.011
7/22	We	3	414	54	4,972	894.1	298	86	0.060	0.014	281	84	0.056	0.014
7/27	Wd	3	457	52	5,484	540.2	444	113	0.081	0.019	402	98	0.073	0.017
7/28	Wd	3	497	42	5,968	406.7	348	105	0.058	0.017	293	94	0.049	0.015
7/29	We	3	502	52	6,024	908.4	247	74	0.041	0.011	213	69	0.035	0.010

^a Wd = weekdays, We = weekends.

**APPENDIX C. SUPPORTING STATISTICS FOR CPUE
ESTIMATES FROM INRIVER GILLNETTING, 1998-2000**

Appendix C1.-Inriver gillnetting catch, CPUE and proportion of chinook salmon at Cunningham Park during the early-run Kenai River chinook salmon fishery, 1998.

Date	Drifts	Minutes	Chinook			Sockeye			Total All Species			Ratio Chinook/Total ^a	
			n	CPUE	SE	n	CPUE	SE	n	CPUE	SE		SE
5/15/98	6	68	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000		
5/18/98	14	197	6	0.030	0.011	0	0.000	0.000	6	0.030	0.011	1.00	0.00
5/20/98	2	32	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000		
5/23/98	17	208	4	0.019	0.010	0	0.000	0.000	4	0.019	0.010	1.00	0.00
5/29/98	18	220	12	0.055	0.019	0	0.000	0.000	12	0.055	0.019	1.00	0.00
6/1/98	12	158	5	0.032	0.016	0	0.000	0.000	5	0.032	0.016	1.00	0.00
6/7/98	18	235	13	0.055	0.013	8	0.034	0.012	21	0.089	0.020	0.62	0.09
6/11/98	20	194	9	0.046	0.020	1	0.005	0.005	10	0.052	0.020	0.90	0.10
6/15/98	20	167	12	0.072	0.020	4	0.024	0.012	16	0.096	0.027	0.75	0.08
6/21/98	13	184	3	0.016	0.010	3	0.016	0.009	6	0.033	0.017	0.50	0.12
6/27/98	14	194	7	0.036	0.017	4	0.021	0.013	11	0.057	0.027	0.64	0.12
Total	154	1,857	71	0.362		20	0.100		91	0.462			
Mean	14	169	6.455	0.033		1.818	0.009		8.273	0.042		0.82	

^a Ratio of the chinook salmon CPUE to the CPUE for all species.

Appendix C2.-Inriver gillnetting catch, CPUE and proportion of chinook salmon at Mud Island during the early-run Kenai River chinook salmon fishery, 1998

Date	Drifts	Minutes	Chinook			Sockeye			Total All Species ^a			Ratio Chinook/Total ^b	
			n	CPUE	SE	n	CPUE	SE	n	CPUE	SE		SE
5/16/1998	6	206	2	0.010	0.007	0	0.000	0.000	2	0.010	0.007	1.00	0.00
5/20/1998	12	76	4	0.053	0.045	0	0.000	0.000	4	0.053	0.045	1.00	0.00
5/28/1998	12	254	7	0.028	0.011	0	0.000	0.000	7	0.028	0.011	1.00	0.00
5/30/1998	13	73	6	0.082	0.029	3	0.041	0.027	9	0.123	0.035	0.67	0.18
6/3/1998	10	236	6	0.025	0.007	5	0.021	0.008	11	0.047	0.007	0.55	0.15
6/8/1998	18	154	11	0.071	0.019	6	0.039	0.015	17	0.110	0.024	0.65	0.11
6/14/1998	18	216	21	0.097	0.024	7	0.032	0.014	28	0.130	0.030	0.75	0.08
6/16/1998	20	174	8	0.046	0.013	4	0.023	0.013	12	0.069	0.018	0.67	0.14
6/22/1998	13	217	2	0.009	0.006	1	0.005	0.005	3	0.014	0.007	0.67	0.28
6/28/1998	13	225	5	0.022	0.010	6	0.027	0.011	11	0.049	0.016	0.45	0.14
7/13/1998	4	74	1	0.014	0.015	2	0.027	0.017	3	0.041	0.020	0.33	0.31
8/2/1998	16	152	17	0.112	0.039	1	0.007	0.007	23	0.151	0.044	0.74	0.11
Total	155	2,057	90	0.569		35	0.222		130	0.823			
Mean	12.917	171	7.5	0.047		2.917	0.018		10.83	0.069		0.71	

^a Includes salmon species in addition to chinook and sockeye.

^b Ratio of the chinook salmon CPUE to the CPUE for all species.

Appendix C3.-Inriver gillnetting catch, CPUE and proportion of chinook salmon at the chinook salmon sonar site during the early-run Kenai River chinook salmon fishery, 1998.

Date	Drifts	Minutes	Chinook			Sockeye			Total All Species			Ratio Chinook/ Total ^a	
			n	CPUE	SE	n	CPUE	SE	n	CPUE	SE	Total ^a	SE
5/15/98	5	162	2	0.012	0.010	0	0.000	0.000	2	0.012	0.010	1.00	0.00
5/16/98	13	131	1	0.008	0.008	0	0.000	0.000	1	0.008	0.008	1.00	0.00
5/17/98	10	200	1	0.005	0.006	0	0.000	0.000	1	0.005	0.006	1.00	0.00
5/18/98	19	209	5	0.024	0.010	0	0.000	0.000	5	0.024	0.010	1.00	0.00
5/19/98	12	240	3	0.013	0.008	1	0.004	0.004	4	0.017	0.011	0.75	0.16
5/20/98	4	145	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000		
5/23/98	10	274	1	0.004	0.003	0	0.000	0.000	1	0.004	0.003	1.00	0.00
5/24/98	9	278	1	0.004	0.004	0	0.000	0.000	1	0.004	0.004	1.00	0.00
5/25/98	10	286	1	0.003	0.003	0	0.000	0.000	1	0.003	0.003	1.00	0.00
5/28/98	13	277	3	0.011	0.006	4	0.014	0.009	7	0.025	0.010	0.43	0.23
5/29/98	19	212	16	0.075	0.027	2	0.009	0.007	18	0.085	0.029	0.89	0.08
5/30/98	19	206	13	0.063	0.020	2	0.010	0.007	15	0.073	0.020	0.87	0.09
5/31/98	17	168	19	0.113	0.017	0	0.000	0.000	19	0.113	0.017	1.00	0.00
6/1/98	17	239	7	0.029	0.011	3	0.013	0.008	10	0.042	0.014	0.70	0.15
6/2/98	16	260	11	0.042	0.015	5	0.019	0.010	16	0.062	0.019	0.69	0.13
6/3/98	15	237	4	0.017	0.009	13	0.055	0.023	17	0.072	0.024	0.24	0.12
6/4/98	23	213	12	0.056	0.017	5	0.023	0.010	17	0.080	0.019	0.71	0.11
6/7/98	20	178	8	0.045	0.015	2	0.011	0.008	10	0.056	0.018	0.80	0.12
6/8/98	17	216	9	0.042	0.014	5	0.023	0.011	14	0.065	0.016	0.64	0.14
6/11/98	21	249	19	0.076	0.023	7	0.028	0.012	26	0.104	0.031	0.73	0.07
6/12/98	14	237	8	0.034	0.016	10	0.042	0.020	18	0.076	0.028	0.44	0.15
6/13/98	17	218	9	0.041	0.014	8	0.037	0.014	17	0.078	0.016	0.53	0.15
6/14/98	19	241	9	0.037	0.014	10	0.041	0.015	19	0.079	0.021	0.47	0.12
6/15/98	12	155	11	0.071	0.029	0	0.000	0.000	11	0.071	0.029	1.00	0.00
6/16/98	16	219	7	0.032	0.011	8	0.037	0.014	15	0.068	0.019	0.47	0.11
6/19/98	15	255	2	0.008	0.006	3	0.012	0.007	5	0.020	0.010	0.40	0.18
6/20/98	17	286	3	0.010	0.006	5	0.017	0.010	8	0.028	0.013	0.38	0.16
6/21/98	12	251	1	0.004	0.004	0	0.000	0.000	1	0.004	0.004	1.00	0.00
6/22/98	14	237	4	0.017	0.010	3	0.013	0.007	7	0.030	0.015	0.57	0.16
6/23/98	14	240	5	0.021	0.010	2	0.008	0.006	7	0.029	0.011	0.71	0.19
6/24/98	11	202	1	0.005	0.005	8	0.040	0.015	9	0.045	0.015	0.11	0.11
6/27/98	18	263	7	0.027	0.012	1	0.004	0.004	8	0.030	0.012	0.88	0.12
6/28/98	14	283	4	0.014	0.008	3	0.011	0.006	7	0.025	0.009	0.57	0.21
6/29/98	15	183	6	0.033	0.014	1	0.005	0.006	7	0.038	0.015	0.86	0.14
6/30/98	28	236	9	0.038	0.012	2	0.008	0.008	11	0.047	0.014	0.82	0.16
Total	525	7,886	222	1.034		113	0.485		335	1.520			
Mean	15	225	6.343	0.030		3.229	0.014		9.571	0.043		0.72	

^a Ratio of the chinook salmon CPUE to the CPUE for all species.

Appendix C4.-Inriver gillnetting catch, CPUE and proportion of chinook salmon at the chinook salmon sonar site during the late-run Kenai River chinook salmon fishery, 1998.

Date	Drifts	Minutes	Chinook			Sockeye			Total All Species			Ratio Chinook/ Total ^a	
			n	CPUE	SE	n	CPUE	SE	n	CPUE	SE	Total ^a	SE
7/1/98	25	232	6	0.026	0.012	6	0.026	0.011	12	0.052	0.016	0.50	0.17
7/2/98	12	129	8	0.062	0.022	3	0.023	0.013	11	0.085	0.023	0.73	0.14
7/3/98	22	204	12	0.059	0.020	4	0.020	0.010	16	0.078	0.022	0.75	0.12
7/4/98	23	214	7	0.033	0.013	5	0.023	0.008	12	0.056	0.014	0.58	0.14
7/5/98	21	210	10	0.048	0.013	10	0.048	0.022	20	0.095	0.025	0.50	0.13
7/6/98	21	201	7	0.035	0.012	3	0.015	0.008	10	0.050	0.015	0.70	0.13
7/7/98	23	218	4	0.018	0.009	5	0.023	0.015	11	0.050	0.018	0.36	0.16
7/8/98	22	212	10	0.047	0.021	6	0.028	0.012	16	0.075	0.026	0.63	0.14
7/9/98	20	206	10	0.049	0.015	7	0.034	0.015	17	0.083	0.016	0.59	0.15
7/10/98	16	171	4	0.023	0.014	1	0.006	0.006	5	0.029	0.015	0.80	0.19
7/11/98	20	197	1	0.005	0.005	1	0.005	0.005	2	0.010	0.007	0.50	0.36
7/12/98	19	199	5	0.025	0.011	1	0.005	0.005	6	0.030	0.011	0.83	0.16
7/13/98	16	149	6	0.040	0.020	0	0.000	0.000	6	0.040	0.020	1.00	0.00
7/14/98	23	188	17	0.090	0.027	1	0.005	0.005	18	0.096	0.025	0.94	0.06
7/15/98	45	328	30	0.091	0.016	9	0.027	0.008	39	0.119	0.019	0.77	0.06
7/16/98	17	103	13	0.126	0.037	12	0.117	0.070	25	0.243	0.079	0.52	0.17
7/17/98	19	192	5	0.026	0.011	14	0.073	0.042	19	0.099	0.041	0.26	0.15
7/18/98	21	149	18	0.121	0.032	5	0.034	0.016	23	0.154	0.038	0.78	0.09
7/19/98	23	233	7	0.030	0.011	7	0.030	0.014	14	0.060	0.018	0.50	0.15
7/20/98	23	241	7	0.029	0.010	7	0.029	0.011	14	0.058	0.012	0.50	0.15
7/21/98	21	194	10	0.052	0.016	7	0.036	0.014	17	0.088	0.017	0.59	0.15
7/22/98	19	126	14	0.111	0.034	15	0.119	0.050	29	0.230	0.064	0.48	0.12
7/23/98	14	154	4	0.026	0.013	6	0.039	0.027	11	0.071	0.030	0.36	0.20
7/24/98	17	130	12	0.092	0.033	3	0.023	0.012	16	0.123	0.034	0.75	0.14
7/26/98	23	200	11	0.055	0.017	6	0.030	0.015	17	0.085	0.021	0.65	0.14
7/27/98	22	224	10	0.045	0.011	0	0.000	0.000	10	0.045	0.011	1.00	0.00
7/28/98	17	178	10	0.056	0.014	5	0.028	0.014	16	0.090	0.015	0.63	0.13
7/29/98	22	166	18	0.108	0.028	6	0.036	0.016	25	0.151	0.029	0.72	0.10
7/30/98	21	160	17	0.106	0.027	1	0.006	0.006	19	0.119	0.027	0.89	0.10
7/31/98	23	186	14	0.075	0.018	6	0.032	0.017	23	0.124	0.017	0.61	0.13
8/1/98	21	211	7	0.033	0.012	13	0.062	0.012	26	0.123	0.021	0.27	0.08
8/2/98	20	156	18	0.115	0.030	1	0.006	0.006	26	0.167	0.039	0.69	0.14
8/3/98	24	175	17	0.097	0.030	0	0.000	0.000	28	0.160	0.040	0.61	0.16
8/4/98	29	178	20	0.112	0.031	0	0.000	0.000	33	0.185	0.043	0.61	0.09
8/5/98	22	187	14	0.075	0.020	1	0.005	0.005	45	0.241	0.060	0.31	0.10
8/6/98	19	204	5	0.025	0.011	3	0.015	0.008	47	0.230	0.047	0.11	0.05
8/7/98	15	132	11	0.083	0.033	1	0.008	0.008	20	0.152	0.044	0.55	0.14
8/8/98	21	162	10	0.062	0.022	3	0.019	0.010	27	0.167	0.040	0.37	0.10
8/9/98	9	90	4	0.044	0.028	0	0.000	0.000	5	0.056	0.028	0.80	0.20
Total	810	7,189	413	2.357		184	1.035		736	4.169			
Mean	20.769	184	10.59	0.060		4.718	0.027		18.87	0.107		0.61	

^a Ratio of the chinook salmon CPUE to the CPUE for all species.

Appendix C5.-Inriver gillnetting catch, CPUE and proportion of chinook salmon during the early-run Kenai River chinook salmon fishery, 1999.

Date	Drifts	Minutes	Chinook			Sockeye			Total All Species			Ratio Chinook/ Total ^a	
			n	CPUE	SE	n	CPUE	SE	n	CPUE	SE	Total ^a	SE
5/15/99	7	109	1	0.009	0.011	0	0.000	0.000	1	0.009	0.011	1.00	0.00
5/16/99	10	207	3	0.014	0.009	0	0.000	0.000	3	0.014	0.009	1.00	0.00
5/17/99	12	208	5	0.024	0.011	0	0.000	0.000	5	0.024	0.011	1.00	0.00
5/18/99	10	215	3	0.014	0.008	0	0.000	0.000	3	0.014	0.008	1.00	0.00
5/19/99	11	265	2	0.008	0.005	0	0.000	0.000	2	0.008	0.005	1.00	0.00
5/20/99	15	246	7	0.028	0.012	3	0.012	0.012	10	0.041	0.016	0.70	0.24
5/21/99	13	101	10	0.099	0.029	2	0.020	0.014	12	0.119	0.032	0.83	0.11
5/22/99	13	142	5	0.035	0.013	2	0.014	0.013	7	0.049	0.015	0.71	0.23
5/23/99	14	189	8	0.042	0.014	0	0.000	0.000	8	0.042	0.014	1.00	0.00
5/24/99	13	261	6	0.023	0.009	0	0.000	0.000	6	0.023	0.009	1.00	0.00
5/25/99	14	210	8	0.038	0.015	1	0.005	0.005	9	0.043	0.015	0.89	0.11
5/26/99	13	201	6	0.030	0.013	11	0.055	0.027	17	0.085	0.027	0.35	0.17
5/27/99	16	250	9	0.036	0.011	9	0.036	0.011	18	0.072	0.020	0.50	0.08
5/28/99	13	178	7	0.039	0.016	4	0.022	0.010	11	0.062	0.017	0.64	0.14
5/29/99	16	212	10	0.047	0.021	5	0.024	0.013	15	0.071	0.027	0.67	0.14
5/30/99	13	159	7	0.044	0.014	7	0.044	0.014	14	0.088	0.017	0.50	0.13
5/31/99	13	207	5	0.024	0.013	12	0.058	0.028	17	0.082	0.030	0.29	0.16
6/1/99	20	204	23	0.113	0.025	9	0.044	0.023	32	0.157	0.042	0.72	0.09
6/2/99	16	173	20	0.116	0.035	7	0.040	0.021	27	0.156	0.045	0.74	0.10
6/3/99	14	154	11	0.071	0.019	14	0.091	0.024	25	0.162	0.026	0.44	0.10
6/4/99	9	143	3	0.021	0.011	4	0.028	0.019	7	0.049	0.027	0.43	0.12
6/5/99	18	135	15	0.111	0.027	6	0.044	0.016	21	0.156	0.024	0.71	0.11
6/6/99	18	212	14	0.066	0.017	8	0.038	0.019	22	0.104	0.029	0.64	0.11
6/7/99	20	208	21	0.101	0.020	13	0.063	0.014	34	0.163	0.022	0.62	0.08
6/8/99	16	194	14	0.072	0.023	18	0.093	0.043	32	0.165	0.050	0.44	0.13
6/9/99	16	161	8	0.050	0.015	15	0.093	0.033	23	0.143	0.029	0.35	0.13
6/10/99	20	160	11	0.069	0.023	23	0.144	0.038	34	0.213	0.041	0.32	0.10
6/11/99	15	131	13	0.099	0.028	17	0.130	0.041	30	0.229	0.050	0.43	0.11
6/12/99	16	166	14	0.084	0.023	24	0.145	0.039	38	0.229	0.050	0.37	0.08
6/13/99	21	214	13	0.061	0.020	21	0.098	0.038	34	0.159	0.040	0.38	0.13
6/14/99	22	234	10	0.043	0.013	7	0.030	0.015	17	0.073	0.018	0.59	0.14
6/15/99	20	178	11	0.062	0.017	23	0.129	0.044	34	0.191	0.054	0.32	0.07
6/16/99	19	198	7	0.035	0.014	12	0.061	0.027	19	0.096	0.028	0.37	0.15
6/17/99	23	206	17	0.083	0.020	24	0.117	0.029	41	0.199	0.037	0.41	0.08
6/18/99	13	141	12	0.085	0.023	24	0.170	0.125	36	0.255	0.130	0.33	0.17
6/19/99	13	153	10	0.065	0.022	2	0.013	0.013	12	0.078	0.023	0.83	0.15
6/20/99	16	155	7	0.045	0.014	4	0.026	0.012	11	0.071	0.018	0.64	0.14
6/21/99	17	188	8	0.043	0.017	3	0.016	0.009	11	0.059	0.019	0.73	0.13
6/22/99	21	270	8	0.030	0.012	3	0.011	0.006	11	0.041	0.012	0.73	0.15
6/23/99	2	30	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000		
6/24/99	14	178	2	0.011	0.008	1	0.006	0.006	3	0.017	0.009	0.67	0.28
6/25/99	9	113	4	0.035	0.016	1	0.009	0.009	5	0.044	0.016	0.80	0.19
6/26/99	23	276	7	0.025	0.011	9	0.033	0.015	16	0.058	0.017	0.44	0.17
6/27/99	23	264	9	0.034	0.011	4	0.015	0.009	13	0.049	0.014	0.69	0.15
6/28/99	20	312	1	0.003	0.003	2	0.006	0.004	3	0.010	0.005	0.33	0.28
6/29/99	19	218	7	0.032	0.014	4	0.018	0.014	11	0.050	0.018	0.64	0.21
6/30/99	15	205	2	0.010	0.007	3	0.015	0.011	5	0.024	0.016	0.40	0.15
Total	724	8,934	404	2.231		361	2.014		765	4.245			
Mean	15	190	9	0.047		8	0.043		16	0.090		0.62	

^a Ratio of the chinook salmon CPUE to the CPUE for all species.

Appendix C6.-Inriver gillnetting catch, CPUE and proportion of chinook salmon during the late-run Kenai River chinook salmon fishery, 1999.

Date	Drifts	Minutes	Chinook			Sockeye			Total All Species ^a			Ratio Chinook/ Total ^b	
			n	CPUE	SE	n	CPUE	SE	n	CPUE	SE	Total ^b	SE
7/1/1999	16	235	4	0.017	0.010	1	0.004	0.004	5	0.021	0.011	0.80	0.19
7/2/1999	16	171	8	0.047	0.019	4	0.023	0.014	12	0.070	0.025	0.67	0.15
7/3/1999	27	260	10	0.038	0.013	4	0.015	0.009	14	0.054	0.015	0.71	0.15
7/4/1999	15	220	3	0.014	0.008	0	0.000	0.000	3	0.014	0.008	1.00	0.00
7/5/1999	23	236	19	0.081	0.021	3	0.013	0.007	22	0.093	0.021	0.86	0.07
7/6/1999	24	221	18	0.081	0.021	4	0.018	0.008	22	0.100	0.024	0.82	0.07
7/7/1999	14	163	6	0.037	0.018	0	0.000	0.000	6	0.037	0.018	1.00	0.00
7/8/1999	22	156	14	0.090	0.022	2	0.013	0.009	17	0.109	0.025	0.82	0.09
7/9/1999	19	169	12	0.071	0.024	0	0.000	0.000	12	0.071	0.024	1.00	0.00
7/10/1999	24	281	8	0.028	0.011	2	0.007	0.005	10	0.036	0.013	0.80	0.12
7/11/1999	23	292	7	0.024	0.010	0	0.000	0.000	7	0.024	0.010	1.00	0.00
7/12/1999	21	224	7	0.031	0.015	8	0.036	0.022	15	0.067	0.026	0.47	0.20
7/13/1999	22	260	5	0.019	0.008	0	0.000	0.000	5	0.019	0.008	1.00	0.00
7/14/1999	17	167	5	0.030	0.013	6	0.036	0.013	11	0.066	0.023	0.45	0.10
7/15/1999	14	145	5	0.034	0.015	5	0.034	0.014	10	0.069	0.020	0.50	0.15
7/16/1999	19	175	10	0.057	0.018	6	0.034	0.015	16	0.091	0.026	0.63	0.12
7/17/1999	18	191	19	0.099	0.022	17	0.089	0.030	37	0.194	0.028	0.51	0.12
7/18/1999	19	184	22	0.120	0.023	24	0.130	0.065	46	0.250	0.077	0.48	0.11
7/19/1999	22	145	17	0.117	0.034	10	0.069	0.022	27	0.186	0.046	0.63	0.08
7/20/1999	6	32	9	0.281	0.101	2	0.063	0.040	11	0.344	0.127	0.82	0.08
7/21/1999	22	136	27	0.199	0.051	25	0.184	0.072	52	0.382	0.099	0.52	0.10
7/22/1999	17	187	15	0.080	0.024	17	0.091	0.028	32	0.171	0.038	0.47	0.10
7/23/1999	22	274	9	0.033	0.010	7	0.026	0.013	16	0.058	0.018	0.56	0.13
7/24/1999	20	259	7	0.027	0.011	29	0.112	0.037	36	0.139	0.041	0.19	0.07
7/25/1999	21	214	19	0.089	0.019	11	0.051	0.016	30	0.140	0.021	0.63	0.10
7/26/1999	18	208	10	0.048	0.018	15	0.072	0.022	25	0.120	0.033	0.40	0.09
7/27/1999	21	197	15	0.076	0.025	6	0.030	0.014	21	0.107	0.028	0.71	0.11
7/28/1999	19	202	10	0.050	0.014	2	0.010	0.007	12	0.059	0.016	0.83	0.10
7/29/1999	17	194	14	0.072	0.018	5	0.026	0.015	19	0.098	0.023	0.74	0.12
7/30/1999	21	296	8	0.027	0.010	2	0.007	0.005	10	0.034	0.010	0.80	0.13
7/31/1999	21	262	5	0.019	0.008	15	0.057	0.018	20	0.076	0.022	0.25	0.08
8/1/1999	17	198	11	0.056	0.017	9	0.045	0.013	25	0.126	0.029	0.44	0.13
8/2/1999	14	186	1	0.005	0.006	1	0.005	0.005	2	0.011	0.008	0.50	0.37
8/3/1999	17	237	4	0.017	0.010	2	0.008	0.006	6	0.025	0.011	0.67	0.21
8/4/1999	19	243	4	0.016	0.008	0	0.000	0.000	6	0.025	0.010	0.67	0.20
8/5/1999	19	255	2	0.008	0.005	1	0.004	0.004	3	0.012	0.007	0.67	0.28
8/6/1999	14	160	3	0.019	0.011	2	0.013	0.008	5	0.031	0.015	0.60	0.18
8/7/1999	11	137	2	0.015	0.010	2	0.015	0.010	4	0.029	0.020	0.50	0.00
8/8/1999	12	135	6	0.044	0.014	0	0.000	0.000	7	0.052	0.015	0.86	0.14
8/9/1999	18	272	3	0.011	0.007	1	0.004	0.003	4	0.015	0.007	0.75	0.22
8/10/1999	13	166	0	0.000	0.000	2	0.012	0.008	2	0.012	0.008	0.00	0.00
Total	754	8,345	383	2.228		252	1.357		645	3.637			
Mean	18.39	204	9.341	0.054		6.146	0.033		15.73	0.089		0.65	

^a Includes salmon species in addition to chinook and sockeye.

^b Ratio of the chinook salmon CPUE to the CPUE for all species.

Appendix C7.-Inriver gillnetting catch, CPUE and proportion of chinook salmon during the early-run Kenai River chinook salmon fishery, 2000.

Date	Drifts	Minutes	Chinook			Sockeye			Total All Species			Ratio Chinook/ Total ^a	
			n	CPUE	SE	n	CPUE	SE	n	CPUE	SE		SE
5/16/00	8	186	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000		
5/17/00	14	202	2	0.010	0.007	0	0.000	0.000	2	0.010	0.007	1.00	0.00
5/18/00	9	217	4	0.018	0.007	0	0.000	0.000	4	0.018	0.007	1.00	0.00
5/19/00	11	277	1	0.004	0.004	0	0.000	0.000	1	0.004	0.004	1.00	0.00
5/20/00	15	259	7	0.027	0.010	1	0.004	0.004	8	0.031	0.010	0.88	0.12
5/21/00	14	318	4	0.013	0.007	0	0.000	0.000	4	0.013	0.007	1.00	0.00
5/22/00	11	220	1	0.005	0.004	0	0.000	0.000	1	0.005	0.004	1.00	0.00
5/23/00	14	200	5	0.025	0.012	1	0.005	0.005	6	0.030	0.013	0.83	0.16
5/24/00	11	186	2	0.011	0.008	1	0.005	0.006	3	0.016	0.010	0.67	0.29
5/25/00	18	220	10	0.045	0.013	1	0.005	0.005	11	0.050	0.012	0.91	0.09
5/26/00	14	329	3	0.009	0.005	1	0.003	0.003	4	0.012	0.006	0.75	0.22
5/27/00	14	213	7	0.033	0.010	0	0.000	0.000	7	0.033	0.010	1.00	0.00
5/28/00	11	217	4	0.018	0.009	1	0.005	0.005	5	0.023	0.009	0.80	0.19
5/29/00	14	198	3	0.015	0.008	0	0.000	0.000	3	0.015	0.008	1.00	0.00
5/30/00	15	185	7	0.038	0.015	1	0.005	0.006	8	0.043	0.017	0.88	0.12
5/31/00	13	226	4	0.018	0.008	4	0.018	0.010	8	0.035	0.014	0.50	0.16
6/1/00	14	255	6	0.024	0.011	1	0.004	0.004	7	0.027	0.011	0.86	0.14
6/2/00	16	267	6	0.022	0.008	4	0.015	0.006	10	0.037	0.010	0.60	0.14
6/3/00	16	316	2	0.006	0.006	3	0.009	0.005	5	0.016	0.008	0.40	0.29
6/4/00	17	271	6	0.022	0.009	11	0.041	0.013	17	0.063	0.017	0.35	0.12
6/5/00	11	173	8	0.046	0.017	3	0.017	0.013	11	0.064	0.020	0.73	0.18
6/6/00	11	111	9	0.081	0.022	3	0.027	0.017	12	0.108	0.023	0.75	0.14
6/7/00	18	144	17	0.118	0.027	2	0.014	0.009	19	0.132	0.027	0.89	0.07
6/8/00	21	247	14	0.057	0.014	1	0.004	0.004	15	0.061	0.016	0.93	0.06
6/9/00	19	270	7	0.026	0.010	2	0.007	0.005	9	0.033	0.011	0.78	0.13
6/10/00	13	180	6	0.033	0.011	4	0.022	0.014	10	0.056	0.019	0.60	0.15
6/11/00	12	211	4	0.019	0.008	5	0.024	0.012	9	0.043	0.016	0.44	0.15
6/12/00	14	196	4	0.020	0.009	2	0.010	0.007	6	0.031	0.010	0.67	0.20
6/13/00	17	211	10	0.047	0.014	2	0.009	0.007	12	0.057	0.016	0.83	0.10
6/14/00	13	219	2	0.009	0.006	6	0.027	0.016	8	0.037	0.015	0.25	0.18
6/15/00	18	260	6	0.023	0.008	4	0.015	0.007	10	0.038	0.009	0.60	0.16
6/16/00	21	269	7	0.026	0.009	5	0.019	0.009	12	0.045	0.014	0.58	0.14
6/17/00	17	238	10	0.042	0.013	1	0.004	0.004	11	0.046	0.013	0.91	0.09
6/18/00	20	267	9	0.034	0.009	2	0.007	0.005	11	0.041	0.009	0.82	0.12
6/19/00	10	126	4	0.032	0.019	0	0.000	0.000	4	0.032	0.019	1.00	0.00
6/20/00	19	214	5	0.023	0.010	2	0.009	0.007	7	0.033	0.014	0.71	0.15
6/21/00	16	150	12	0.080	0.021	0	0.000	0.000	12	0.080	0.021	1.00	0.00
6/22/00	16	184	7	0.038	0.016	5	0.027	0.022	12	0.065	0.027	0.58	0.23
6/23/00	23	292	7	0.024	0.011	2	0.007	0.005	9	0.031	0.012	0.78	0.15
6/24/00	26	299	10	0.033	0.013	7	0.023	0.011	17	0.057	0.016	0.59	0.15
6/25/00	17	268	6	0.022	0.009	1	0.004	0.004	7	0.026	0.009	0.86	0.14
6/26/00	13	209	8	0.038	0.017	3	0.014	0.007	11	0.053	0.019	0.73	0.13
6/27/00	14	163	6	0.037	0.018	6	0.037	0.015	12	0.074	0.022	0.50	0.16
6/28/00	18	248	7	0.028	0.008	5	0.020	0.010	12	0.048	0.014	0.58	0.14
6/29/00	14	209	8	0.038	0.012	5	0.024	0.012	13	0.062	0.021	0.62	0.11
6/30/00	22	181	21	0.116	0.019	2	0.011	0.008	23	0.127	0.023	0.91	0.05
Total	702	10,301	298	1.455		110	0.504		408	1.959			
Mean	15	224	6	0.032		2	0.011		9	0.043		0.76	

^a Ratio of the chinook salmon CPUE to the CPUE for all species.

Appendix C8.-Inriver gillnetting catch, CPUE and proportion of chinook salmon during the late-run Kenai River chinook salmon fishery, 2000.

Date	Drifts	Minutes	Chinook			Sockeye			Total All Species ^a			Ratio Chinook/ Total ^b	
			n	CPUE	SE	n	CPUE	SE	n	CPUE	SE		SE
7/1/2000	24	219	20	0.091	0.019	5	0.023	0.011	25	0.114	0.021	0.80	0.08
7/2/2000	19	215	20	0.093	0.023	6	0.028	0.013	26	0.121	0.024	0.77	0.10
7/3/2000	14	117	9	0.077	0.028	2	0.017	0.011	11	0.094	0.030	0.82	0.11
7/4/2000	21	140	18	0.129	0.031	7	0.050	0.020	25	0.179	0.043	0.72	0.08
7/5/2000	14	124	13	0.105	0.026	11	0.089	0.027	24	0.194	0.041	0.54	0.09
7/6/2000	12	116	8	0.069	0.019	14	0.121	0.035	22	0.190	0.043	0.36	0.08
7/7/2000	22	175	19	0.109	0.024	4	0.023	0.010	23	0.131	0.025	0.83	0.08
7/8/2000	19	211	18	0.085	0.022	11	0.052	0.021	29	0.137	0.028	0.62	0.12
7/9/2000	19	229	13	0.057	0.014	36	0.157	0.032	51	0.223	0.041	0.25	0.05
7/10/2000	12	133	6	0.045	0.020	19	0.143	0.029	25	0.188	0.036	0.24	0.09
7/11/2000	16	171	9	0.053	0.020	9	0.053	0.024	18	0.105	0.035	0.50	0.13
7/12/2000	15	141	8	0.057	0.023	4	0.028	0.017	12	0.085	0.027	0.67	0.17
7/13/2000	19	193	20	0.104	0.027	42	0.218	0.064	62	0.321	0.066	0.32	0.09
7/14/2000	15	152	25	0.164	0.040	110	0.724	0.116	135	0.888	0.125	0.19	0.04
7/15/2000	15	168	19	0.113	0.038	81	0.482	0.188	100	0.595	0.184	0.19	0.09
7/16/2000	15	164	12	0.073	0.021	70	0.427	0.091	82	0.500	0.099	0.15	0.04
7/17/2000	18	137	15	0.109	0.028	40	0.292	0.093	55	0.401	0.100	0.27	0.08
7/18/2000	19	114	21	0.184	0.055	34	0.298	0.097	55	0.482	0.121	0.38	0.09
7/19/2000	17	193	9	0.047	0.015	52	0.269	0.084	61	0.316	0.095	0.15	0.03
7/20/2000	18	235	13	0.055	0.019	54	0.230	0.060	67	0.285	0.060	0.19	0.07
7/21/2000	16	179	6	0.034	0.014	8	0.045	0.013	14	0.078	0.016	0.43	0.14
7/22/2000	15	213	13	0.061	0.016	28	0.131	0.031	41	0.192	0.037	0.32	0.07
7/23/2000	13	183	9	0.049	0.013	9	0.049	0.019	18	0.098	0.020	0.50	0.13
7/24/2000	19	219	16	0.073	0.017	11	0.050	0.014	27	0.123	0.016	0.59	0.11
7/25/2000	16	142	14	0.099	0.028	12	0.085	0.038	27	0.190	0.048	0.52	0.13
7/26/2000	14	131	9	0.069	0.014	19	0.145	0.044	30	0.229	0.049	0.30	0.08
7/27/2000	13	140	8	0.057	0.021	11	0.079	0.039	19	0.136	0.045	0.42	0.15
7/28/2000	16	222	5	0.023	0.011	5	0.023	0.011	10	0.045	0.014	0.50	0.19
7/29/2000	17	210	7	0.033	0.013	4	0.019	0.011	12	0.057	0.018	0.58	0.20
7/30/2000	8	110	2	0.018	0.013	1	0.009	0.010	3	0.027	0.015	0.67	0.29
7/31/2000	14	160	7	0.044	0.015	5	0.031	0.019	14	0.088	0.032	0.50	0.16
8/1/2000	10	123	5	0.041	0.019	2	0.016	0.012	7	0.057	0.021	0.71	0.19
8/2/2000	10	121	3	0.025	0.015	5	0.041	0.021	8	0.066	0.027	0.38	0.17
8/3/2000	19	172	10	0.058	0.016	6	0.035	0.021	18	0.105	0.034	0.56	0.15
8/4/2000	13	183	12	0.066	0.021	6	0.033	0.022	23	0.126	0.039	0.52	0.19
8/5/2000	12	172	8	0.047	0.018	2	0.012	0.012	20	0.116	0.027	0.40	0.13
8/6/2000	11	144	5	0.035	0.014	4	0.028	0.021	10	0.069	0.024	0.50	0.20
8/7/2000	17	115	13	0.113	0.029	2	0.017	0.010	23	0.200	0.035	0.57	0.11
8/8/2000	19	183	8	0.044	0.015	2	0.011	0.007	22	0.120	0.035	0.36	0.12
8/9/2000	12	105	11	0.105	0.032	1	0.010	0.009	20	0.190	0.051	0.55	0.14
8/10/2000	10	91	7	0.077	0.031	0	0.000	0.000	12	0.132	0.055	0.58	0.24
Total	637	6,665	473	2.987		754	4.591		1,286	7.996			
Mean	15.537	163	11.54	0.073		18	0.112		31	0.195		0.47	

^a Includes salmon species in addition to chinook and sockeye.

^b Ratio of the chinook salmon CPUE to the CPUE for all species.