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ORIGINS OF CHINOOK SALMON (*Oncorhynchus tshawytscha* Walbaum) IN THE COMMERCIAL CATCHES FROM THE CENTRAL DISTRICT EASTSIDE SET GILLNET FISHERY IN UPPER COOK INLET, 1984

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ABSTRACT

The stock structure of mixed stock catches of chinook salmon *(Oncorhynchus tshawytscha* Walbaum*)* in the commercial set net fishery along the eastern shore of upper Cook Inlet, Alaska was examined. Baseline population parameters (magnitude, timing, age, sex, and size data) for the 1984 return of chinook salmon to upper Cook Inlet were compiled and provided the basis for the analysis. Length-at-age was used in a univariate discriminant model to estimate the contribution of various chinook salmon runs to eastside set net catches. During 1984, a total of 50,301 chinook salmon was harvested by upper Cook Inlet fisheries of which 5,804 fish (16%) were harvested in the eastside set net fishery. The majority of these catches was 3-ocean (22.2%) and 4-ocean (48.3%) fish. Length-at-age of 3-ocean females and 4-ocean male and female chinook salmon from the late run Kenai River were significantly larger than other major stock groupings, i.e., Crooked Creek hatchery fish from the Kasilof River and northern Cook Inlet stocks primarily from the Susitna River. The contribution of late run Kenai River fish to the 3- and 4-ocean components of the eastside set net catches was estimated to be 75%.

KEY WORDS: chinook salmon, *Oncorhynchus tshawytscha*, Cook Inlet, Alaska, stock structure, discriminant analysis, age, sex, size, Kenai River, Kasilof River, Susitna River.

INTRODUCTION

Chinook salmon *(Oncorhynchus tshawytscha* Walbaum*)* are harvested by a variety of sport, commercial, and subsistence/personal-use fisheries in upper Cook Inlet[1], Alaska (Figure 1). Cook Inlet is unique in Alaska because annual sport catches of chinook salmon exceed commercial harvests. The average annual sport catch of chinook salmon in upper Cook Inlet has increased in recent years from approximately 22,000 fish for the period 1977-1980 to approximately 36,000 fish for the period 1981-1983 (Mills 1984). In 1984, a total of 38,315 chinook salmon was caught by the sport fishery. Chinook salmon are incidentally harvested to the more numerous sockeye salmon *(O. nerka)* by the upper Cook Inlet commercial salmon fishery. Annual commercial harvests of chinook salmon remained relatively constant during the period 1961-1980, averaging about 12,000 fish (McBride and Wilcock 1983). Recent commercial harvests (1981-1983) have increased, averaging about 18,000 fish annually. Since 1961, most of the harvest (about 65%) has occurred in the Central District eastside set gillnet fishery (Figure 2)(ADF&G 1984). A total of 8,819 chinook salmon was commercially harvested in upper Cook Inlet in 1984, of which 5,804 (66%) were caught by the eastside set net fishery.

Recently, much controversy has occurred regarding the number of chinook salmon intercepted by the commercial fishery. Of particular concern has been the eastside set net fishery because of the following factors: (1) this fishery accounts for the majority of the commercial harvest of chinook salmon in upper Cook Inlet; and (2) the close proximity of this fishery to the Kenai River. The Kenai River sport fishery is the single largest component of the upper Cook Inlet chinook salmon sport catch (1981-1983 catches averaged about 13,000 fish). The chinook salmon return to the Kenai River, particularly the latter portion or "late run"[2], exhibits the largest average size of any chinook salmon run in Alaska and is particularly prized as a sport fish.

Because of the high demand for the Kenai River chinook salmon resource, a complex allocative plan has been implemented in an attempt to accomplish the following: (1) to minimize commercial harvests of chinook salmon without compromising the ability to optimize commercial utilization of sockeye salmon; and (2) to maximize optimum yield of chinook salmon in the marine and inriver sport fisheries. To manage this resource with these goals requires an extensive data base such that the basic population dynamics of the Kenai River chinook salmon run can be understood. Of particular importance is determining the total size of the run so that spawner-return relationships can be calculated. Determination of total return requires quantitative estimates of the contribution of Kenai River chinook salmon to the mixed-stock catches in Cook Inlet.

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[1] Upper Cook Inlet refers to all waters north of Anchor Point.

[2] Two discrete components of the chinook salmon return to the Kenai River have been identified (Burger et al. 1985).

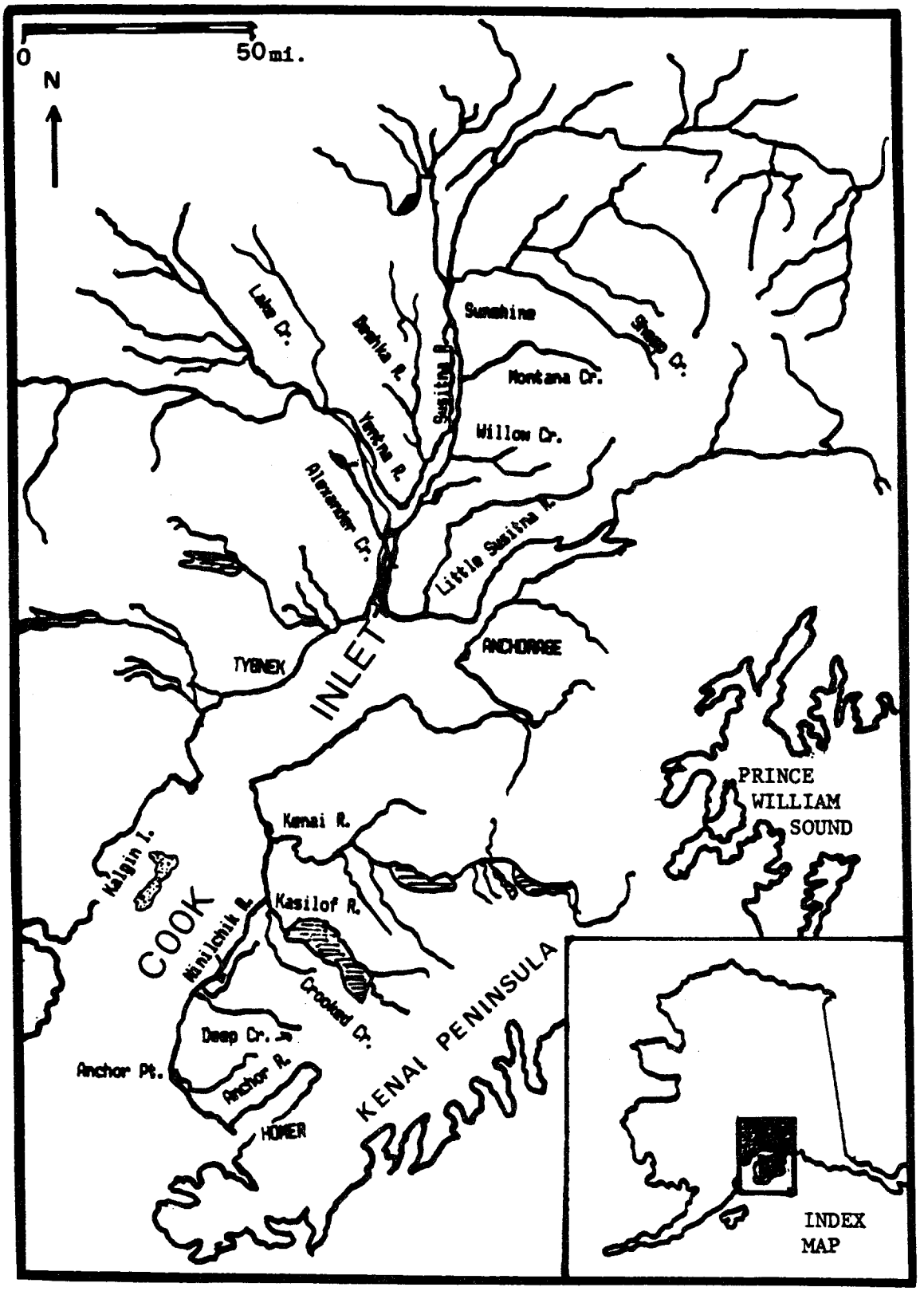

Figure 1. Cook Inlet area.

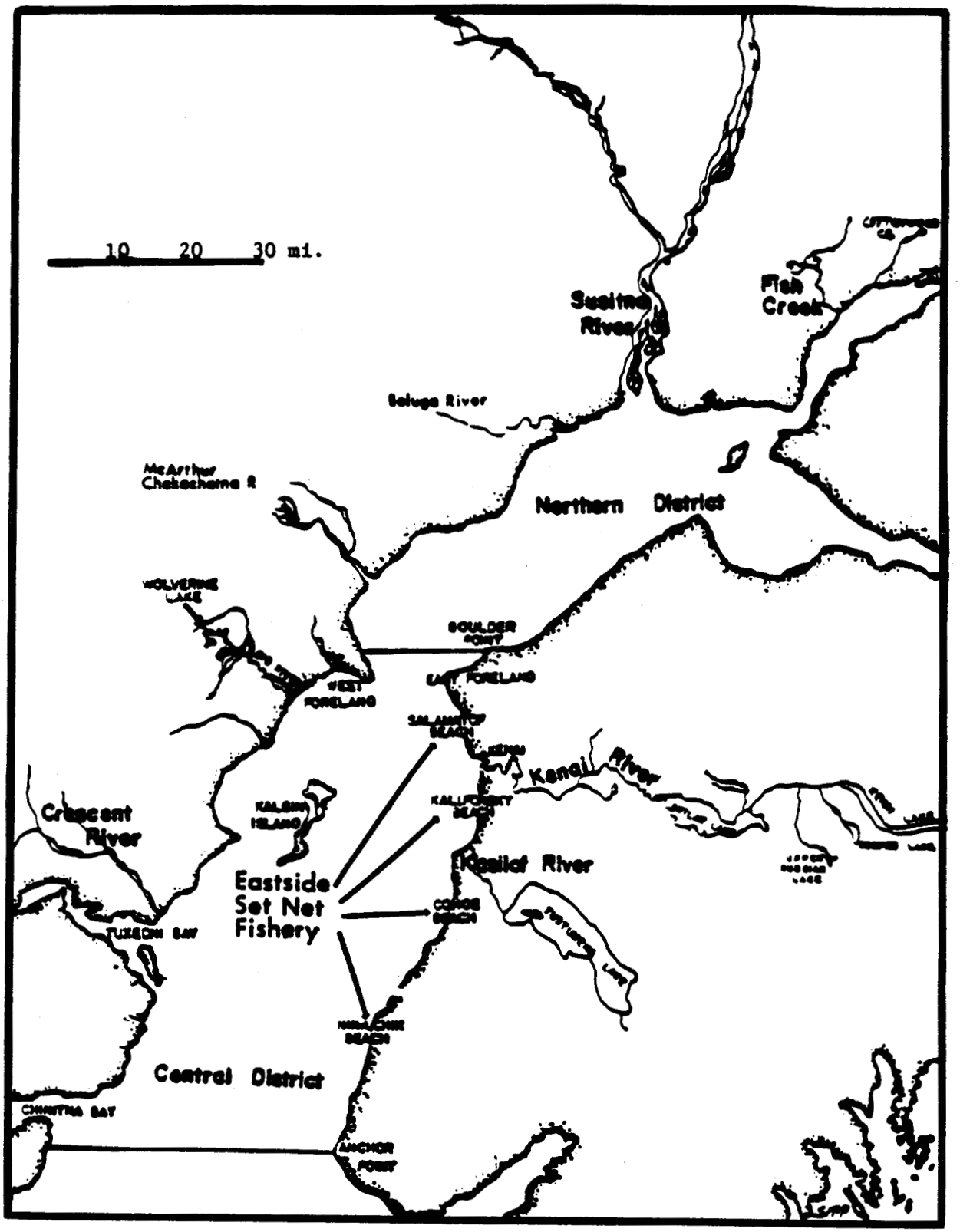

Figure 2. Fishing districts, rivers, and major features of upper Cook Inlet.

The objective of this study was to determine if the contributions of the major component stocks of chinook salmon to the eastside set net catches can be estimated. In this report, we have coalesced basic return data (magnitude, timing, age, sex, and size data) for the 1984 return of chinook salmon to upper Cook Inlet. These data served as the basis for examining the stock structure of the 1984 eastside set net catches. The feasibility of using length-at-age to estimate the contribution of specific chinook salmon runs to eastside set net catches is examined.

METHODS

1984 Return

The Alaska Department of Fish and Game (ADF&G) monitors the chinook salmon returns to upper Cook Inlet. Various agencies within ADF&G collect data from different components of the run. The Division of Commercial Fisheries collects and analyzes data from the commercial, subsistence, and personal-use fisheries in marine waters. Data from sport fisheries, both inriver, marine, and freshwater personal-use are compiled by the Division of Sport Fish. The Fisheries Rehabilitation, Enhancement, and Development Division (FRED) monitors returns to Crooked Creek. Escapements are generally monitored by the Division of Sport Fish, although ADF&G staff from the Susitna Hydroelectric project (SU-HYDRO) monitor escapements into sections of the Susitna River.

Abundance Data:

Commercial catch data were based on preliminary computer tabulations of individual sales records (fish tickets). The fish ticket tabulations used in this report were current through October 1984. Sport catch data were based on fishermen interviews (creel census) and were generally similar to final sport catch estimates based on mail questionnaire (Mills, in press). Browning compiled catch data from both the Tyonek subsistence fishery (1958a) and the Kasilof personal-use fishery (1985b).

Chinook salmon escapements to upper Cook Inlet were assessed by a variety of methods. The return to Crooked Creek on the Kasilof River was counted through a weir and the numbers of chinook salmon spawning below the weir were estimated by foot surveys (Waite, in press). Chinook salmon escapements to other portions of the Kasilof River system were not assessed. The numbers of chinook salmon in the late run to the Kenai River were estimated by a mark-recapture study (Logan et al. 1984). Escapement to Quartz Creek, a tributary of the Kenai River, was counted through a weir (Litchfield, personal communication). Several estimates were made of escapement to northern Cook Inlet systems, particularly the Susitna River. Escapement upriver from Sunshine Station (river mile 80) on the Susitna River was estimated by a mark-recapture study (Barrett et al. 1984). Escapement to the northern Cook Inlet complex[1]

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[1] The northern Cook Inlet complex includes the Susitna and Little Susitna River systems, river systems to the west of the Susitna River (Chuitna, Lewis, and Theodore Rivers), and systems to the east of the Susitna River that drain into Knik Arm.

was estimated by expansion of aerial and foot survey data (Hepler and Bentz, in press). Escapement to systems south of the Kasilof River (Deep Creek, Ninilchik River, and Anchor River) were assessed by aerial and foot surveys (Logan et al. 1984).

Age, Size, and Sex Data:

Fish were sampled for scales, sex, and length. Scale samples provided age information for fish in the catch and escapement[1]. Scales were taken from the left side of the fish approximately two rows above the lateral line and on the diagonal row downward from the posterior insertion of the dorsal fin (Clutter and Whitesel 1956). Scales were mounted on gummed cards and impressions made in cellulose acetate. Sex determination was based on examination of either morphometric characteristics or gonads. Fish length was measured from middle to eye to fork of tail and recorded to the nearest mm.

Age, size, and sex information were collected from most of the components of the 1984 return. Most of the commercial catch samples were from the eastside set net fishery and the remaining commercial catches were minimally sampled. The marine subsistence fishery at Tyonek and the marine sport fisheries were sampled; the Kasilof personal-use fishery was not. Virtually all of the inriver sport fisheries were sampled. Live fish were sampled at the Crooked Creek weir and the Quartz Creek weir. Escapement samples from the main stem Kenai River[2] were collected from spawned-out carcasses. Other spawning populations in the Kenai River were not sampled. Live fish were sampled from fishwheel catches at Sunshine Station on the Susitna River.

An age composition and average length-at-age was computed for each sampled fishery and escapement. Preliminary data summaries were provided for the Crooked Creek escapement (Waite, in press)[3], northern Cook Inlet sport catches (Hepler and Bentz, personal communication), and the Susitna River escapement above Sunshine (Barrett et al. 1984). The authors computed age and length statistics for the remaining samples.

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[1] Some of the fish returning to the Crooked Creek hatchery had been tagged as outmigrants, therefore, their age was known.

[2] These fish are assumed to be representative of the late run to the Kenai River.

[3] Sampling and aging procedures used to estimate age composition of the escapement past Crook Creek weir probably do not provide unbiased estimates of age composition. The age composition estimates provided in this report are compiled from all available samples.

Catch Apportionment

Quantitative descriptions of migratory timing and size at age were investigated as viable means to determine proportional estimates of major contributing stocks of chinook salmon to mixed-stock marine catches. The chinook salmon runs to Anchor River, Deep Creek, and Ninilchik River were not included in this portion of the analysis because historical catch and escapement data indicate these runs have essentially ended before the commercial fishing season begins. We assumed that the Kasilof[1], Kenai, and northern Cook Inlet chinook salmon stocks were the primary contributors to the commercial catch.

Migratory Timing:

The migratory timing of chinook salmon through selected areas was described through calculations of a mean and variance as described by Mundy (1982). The migratory time density consisted of values n_t, which are abundance (catch or escapements) or catch per unit effort (CPUE) over time intervals, t. Values of n_t were accumulated for the entire season to calculate total annual abundance or CPUE, N_t. For each time period, a proportion, p_t, was calculated where:

$$p_t = n_t/N_t.$$

The mean, $\bar{t}$, was calculated as:

$$\bar{t} = \sum_{t=1}^{m} (t * p_t);$$

and variance, S_t^2:

$$S_t^2 = \sum_{t=1}^{m} (t-\bar{t})^2 * p_t;$$

for a migration which occurs over a time period, m.

Means and variances were calculated for each commercial and subsistence/personal-use fishery using catch per fishing period data. Migratory timing statistics for the Crooked Creek migration were calculated from daily weir counts[2]. The entry of fish into the Kenai River was examined by calculation

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[1] Coded wire tagged fish from Crooked Creek hatchery have been recovered from eastside set net commercial catches in previous years (Flagg, personal communication).

[2] Fish were generally passed through the weir on alternate days and not on weekends. Also, only fish that had entered the holding facility were passed. Therefore, migration through the weir may have been delayed for several days.

of migratory timing statistics for the Kenai River sport fishery using catch per interviewed fisherman. These data were also used to differentiate early run and late run Kenai River stocks (Hammarstrom, personal communication). Migratory timing statistics for the Deshka River (Susitna River system) sport fishery were calculated using catch per week data. Fishwheel catch per unit effort (CPUE) data were used to calculate the mean and variance of the migration past Sunshine Station on the Susitna River (Barrett et al. 1984).

Length-at-Age:

Discriminant analysis of length-at-age was examined as a method to estimate the stock contribution rates to chinook salmon catches by the eastside set net fishery. Small samples sizes and reader variability in interpretation of freshwater scale patterns necessitated that the data be grouped by marine age. The analysis was limited to 3-ocean and 4-ocean fish because of the predominance of these age groups in the catches and escapements.

Samples of known origin (standards) from the Kasilof, Kenai, and northern Cook Inlet river systems were used to build the discriminant functions. As the objective of the discriminant models was to apportion the eastside set net commercial catches, therefore samples of known stock composition collected prior to the opening of the fishery (2 July) were not included in the models. Because of small sample sizes of 4-ocean fish from the Kasilof River (Crooked Creek weir), we investigated the variability in size at age between 4-ocean fish sampled before and after 2 July using independent t-tests (Sokal and Rohlf 1969). Samples collected after 2 July from the Kenai River sport fishery and from the carcass sampling were used for the Kenai standard. It was necessary to use all samples collected after 2 July for the northern Cook Inlet standard. Most of the samples in this standard were from Sunshine Station fishwheel catches.

Variability of length-at-age by sex for each of the standards was investigated using independent t-tests, also. Frequency histograms of length-at-age by sex were subjectively examined to determine probable stock groupings.

Length data from the standard samples were used to compute linear discriminant classification functions (Fisher 1936) for each sex and ocean age group. A nearly unbiased estimate of the classification accuracy for each discriminant function was determined using a leaving-one-out procedure (Lachenbruch 1967).

Length data from the commercial catch samples were then classified with the appropriate linear discriminant models. Contribution rates for 3-ocean and 4-ocean fish in the eastside set net commercial catches were estimated for each beach and as a pooled sample. The proportional estimates of contribution were adjusted for misclassification errors using the procedure of Cook and Lord (1978). The variance of these estimates were computed using the formulae of Pella and Robertson (1979).

RESULTS

1984 Return

Detailed information on the 1984 return of chinook salmon to upper Cook Inlet is presented in Appendices A-D.

Abundance:

During 1984, a total of 50,301 chinook salmon was harvested in upper Cook Inlet by sport, commercial, and subsistence/personal-use fisheries (Table 1). Most of the harvest was taken in sport fisheries (38,315 fish or 76%). The largest components of the sport catch occurred in the Susitna (12,678 fish or 33%) and Kenai (12,332 fish or 32%) rivers. The commercial fishery harvested 8,819 fish (18%), of which 5,804 fish (66%) were caught by the east-side set net fishery.

Most escapements of chinook salmon to upper Cook Inlet systems are not individually enumerated but indexed for abundance. The relative magnitude of the major spawning populations can be compared with these estimates. The largest component of the upper Cook Inlet chinook salmon escapement occurred in the Susitna River (Table 2). Barrett et al. (1984) estimated that 117,128 chinook salmon migrated past Sunshine Station[1]. Sport Fish Division estimated that the spawning escapement to all northern Cook Inlet systems to be 94,000 fish (Hepler and Bentz, in press).

The next largest chinook salmon escapement occurred in the Kenai River. An estimated 39,200 late run fish escaped the marine fisheries and returned to the Kenai River. The Kenai River sport fishery harvested about 7,400 fish from the late run escapement. No estimate was made of the early Kenai chinook salmon escapement. Smaller spawning populations were estimated in Crooked Creek (4,149 fish were counted through the weir and 407 fish counted below the weir), Anchor River (1,170), Ninilchik River (600), and Deep Creek (380). Total inriver run to the Kasilof River was estimated to be a minimum of 10,000 fish.

Age, Sex, and Size Composition:

Fish aged 1.4[2] were the predominant age group in the majority of the chinook salmon catches and escapements (Table 3). The exceptions were: the Central District drift fishery, where the 1.2 age group predominated (43.7%); Crooked Creek, where the dominant age group was age 0.3 (47.8%); the Kasilof River sport fishery, where the dominant age group was 1.3 (77.9%); and some of the

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[1] This estimate does not include chinook salmon less than 350 mm in length. Barrett et al. (1984) estimated that an additional 4,596 chinook salmon less than 350 mm migrated past Sunshine Station.

[2] European age designation: numeral before the decimal is the number of fresh water annuli - numeral after the decimal is the number of marine annuli. The total years of life is the sum of the two numbers plus 1.

Table 1. Harvest summary of chinook salmon by fishery in upper Cook Inlet, 1984.

		HARVEST					
SYSTEM	LOCATION	COMMERCIAL	SPORT[1]	SUBSISTENCE	PERSONAL-USE	EGG TAKE	TOTAL
MIXED STOCK MARINE	NORTHERN DISTRICT SET NET	885					885
	CENTRAL DISTRICT DRIFT	510					510
	CENTRAL DISTRICT WESTSIDE SET NET	1,184					1,184
	KALGIN ISLAND SET NET	436					436
	CENTRAL DISTRICT EASTSIDE SET NET	5,804					5,804
	TYONEK			2,354			2,354
	DEEP CREEK MARINE		3,221				3,221
	SUBTOTAL						14,394
CENTRAL COOK INLET SYSTEMS	ANCHOR RIVER		740				740
	DEEP CREEK		340				340
	NINILCHIK		440				440
	SUBTOTAL						1,520
KASILOF	KASILOF RIVER				165		165
	CROOKED CREEK		5,135			648	5,783
	SUBTOTAL						5,948
KENAI	EARLY RUN		4,956				4,956
	LATE RUN		7,376				7,376
	SUBTOTAL						12,332
SUSITNA	ALEXANDER CREEK		1,830				1,830
	DESHKA RIVER		4,652				4,652
	LAKE CREEK		2,148				2,148
	MONTANA CREEK		886				886
	WILLOW CREEK		805				805
	TALACHULITNA		320				320
	CASWELL CREEK		378				378
	CLEAR CREEK		1,323				1,323
	MARTIN CREEK		336				336
	SUBTOTAL						12,678
NORTHERN COOK INLET SYSTEMS	LITTLE SUSITNA		1,447				1,447
	CHUITNA RIVER		1,132				1,132
	LEWIS/THEODORE		850				850
	SUBTOTAL						3,429
TOTAL		8,819	38,315	2,354	165	648	50,301

[1] Sport harvest estimates include only chinook salmon >51 cm.

Table 2. Escapement summary of chinook salmon in upper Cook Inlet, 1984.

SYSTEM	LOCATION	METHOD OF ESTIMATE	NUMBER OF FISH
KASILOF	CROOKED CREEK	WEIR	4,149[2]
	CROOKED CREEK (BELOW WEIR)	FOOT	407
ANCHOR RIVER		FOOT/AERIAL	1,170
DEEP CREEK		FOOT/AERIAL	380
NINILCHIK RIVER		FOOT/AERIAL	600
KENAI	EARLY RUN	[1]	
	LATE RUN	MARK/RECAPTURE	39,200[3]
SUSITNA RIVER	SUNSHINE STATION	MARK/RECAPTURE	117,128
NORTHERN COOK INLET		EXPANDED FOOT/AERIAL	94,000

[1] The early run into the Kenai River was not estimated.

[2] Includes 499 chinook salmon < 300 mm (age 1-ocean).

[3] Includes 7,400 sport caught chinook salmon above the tagging site. Therefore, actual spawning escapement is estimated at 31,800 fish.

Table 3. Age composition summary of chinook salmon in upper Cook Inlet, 1984.

				PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP[3]												
				1982	1981		1980		1979		1978			1977		1976
SYSTEM	LOCATION	FISHERY	SAMPLE SIZE	0.1	0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	2.3	1.5	2.4	2.5
MIXED	SALAMATOF BEACH	COMMERCIAL SET NET	45	0.0	0.0	0.0	0.0	8.8	0.0	6.7	0.0	73.4	0.0	11.1	0.0	0.0
	KALIFONSKY BEACH	COMMERCIAL SET NET	287	0.0	0.0	4.2	1.1	19.2	1.7	22.3	0.0	44.6	0.0	6.6	0.3	0.0
	COHOE/NINILCHIK	COMMERCIAL SET NET	462	0.0	0.8	4.6	0.6	18.9	2.2	22.9	0.0	41.6	0.0	7.8	0.4	0.2
	CENTRAL EASTSIDE[1]	COMMERCIAL SET NET	862	0.0	0.6	3.8	0.8	17.9	1.9	21.3	0.0	46.0	0.1	7.2	0.3	0.1
	CENTRAL WESTSIDE	COMMERCIAL SET NET	225	0.0	0.0	0.4	0.0	16.9	0.0	35.1	0.0	43.6	0.0	3.1	0.9	0.0
	CENTRAL DISTRICT	COMMERCIAL DRIFT	32	0.0	3.1	6.3	0.0	43.7	0.0	12.5	0.0	31.3	0.0	3.1	0.0	0.0
	DEEP CREEK MARINE	SPORT CATCH	178	0.0	0.0	0.0	0.0	7.9	0.0	19.7	0.0	65.1	0.0	7.3	0.0	0.0
	TYONEK	SUBSISTENCE	647	0.0	0.0	0.2	0.2	21.3	0.0	38.4	0.0	37.7	0.3	0.8	1.0	0.1
LOWER KENAI PENINSULA	DEEP CREEK, ANCHOR, AND NINILCHIK RIVERS	SPORT CATCH	141	0.0	0.0	0.0	0.0	13.5	0.0	18.4	0.0	65.3	0.0	2.8	0.0	0.0
KASILOF	CROOKED CREEK[2]	ESCAPEMENT	433	16.4	0.0	0.0	47.8	6.7	0.2	16.2	0.2	11.6	0.0	0.9	0.0	0.0
	KASILOF RIVER	SPORT CATCH	104	0.0	0.0	0.0	0.0	7.7	0.0	77.9	0.0	14.4	0.0	0.0	0.0	0.0
KENAI	KENAI RIVER	ESCAPEMENT	399	0.0	0.0	0.0	0.2	5.6	0.8	16.3	0.0	66.1	0.2	10.0	0.5	0.3
	EARLY RUN	SPORT CATCH	239	0.0	0.0	1.3	0.8	4.6	0.0	28.4	0.0	58.2	0.4	5.9	0.4	0.0
	LATE RUN	SPORT CATCH	377	0.0	0.0	2.1	0.3	8.0	0.5	17.2	0.5	58.9	0.0	12.5	0.0	0.0
SUSITNA	SUNSHINE STATION	ESCAPEMENT	1,235	0.0	0.5	7.4	0.4	18.8	0.7	37.2	0.3	33.7	0.0	1.0	0.0	0.0
	CLEAR CREEK	SPORT CATCH	220	0.0	0.0	0.0	0.0	16.4	0.0	36.8	0.0	44.9	0.0	1.4	0.5	0.0
	WILLOW CREEK	SPORT CATCH	235	0.0	0.0	0.0	0.0	11.5	0.0	33.2	0.0	55.3	0.0	0.0	0.0	0.0
	MONTANA CREEK	SPORT CATCH	269	0.0	0.0	0.0	0.0	23.8	0.0	40.5	0.0	34.2	0.0	1.5	0.0	0.0
	ALEXANDER CREEK	SPORT CATCH	391	0.0	0.0	0.0	0.0	29.9	0.0	44.8	0.0	24.8	0.0	0.5	0.0	0.0
	DESHKA RIVER	SPORT CATCH	545	0.0	0.0	0.0	0.0	9.7	0.0	55.2	0.0	34.7	0.0	0.4	0.0	0.0
	LAKE CREEK	SPORT CATCH	300	0.0	0.0	0.0	0.0	15.7	0.0	39.0	0.0	43.6	0.0	1.7	0.0	0.0
	MARTIN CREEK	SPORT CATCH	63	0.0	0.0	0.0	0.0	11.1	0.0	42.9	0.0	46.0	0.0	0.0	0.0	0.0
CHUITNA	CHUITNA RIVER	SPORT CATCH	181	0.0	0.0	0.0	0.0	17.1	0.0	35.9	0.0	45.9	0.0	1.1	0.0	0.0
LITTLE SUSITNA	BURMA ROAD	SPORT CATCH	326	0.0	0.0	0.3	0.0	4.3	0.0	42.4	0.0	52.1	0.0	0.9	0.0	0.0
	PARKS HIGHWAY	SPORT CATCH	62	0.0	0.0	0.0	0.0	4.8	0.0	45.2	0.0	50.0	0.0	0.0	0.0	0.0

1 Includes Salamatof, Kalifonsky, Cohoe/Ninilchik, and those fish caught in the eastside set net fishery with an unspecified catch location.

2 Preliminary age composition taken from age-weight-length forms provided by Dave Waite, Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement, and Development, Soldotna, Alaska.

3 European age designation: numeral before the decimal is the number of fresh water annuli - numeral after the decimal is the number of marine annuli. The total years of life is the sum of the two numbers plus 1.

Susitna River sport fisheries where the dominant age group was 1.3, notably the Deshka River (55.2%), Alexander Creek (44.8%), and Montana Creek (40.5%). Fish aged 1.3 and 1.2 were generally more common in northern Cook Inlet in-river runs than in river systems on the Kenai Peninsula.

Age 1.5 fish were most common in the eastside set net fishery and the Kenai inriver run. Zero-freshwater age fish were generally not found outside of the Kasilof River.

Mean length-at-age for age 1.3 and 1.4 fish from the Kenai River were generally larger than for the Kasilof or Susitna Rivers (Table 4). The larger size was particularly pronounced for age 1.4 males and females and age 1.3 females from the late run.

The mean length of both sexes of age 1.4 fish from the eastside set net fishery was larger than those of the other marine fisheries except the Central District drift age 1.4 males. The mean length of age 1.4 fish harvested by the Tyonek subsistence fishery was smaller than that of other age 1.4 fish caught in marine waters.

Catch Apportionment

The origins of chinook salmon harvested in the 1984 eastside set net fishery were investigated through examination of migratory timing and length-at-age data.

Migratory Timing:

Fishing time for the eastside set net fishery was offered intermittently during the period 2 July to 13 August (Appendix Table A1). Timing information indicated a large portion of the upper Cook Inlet migration of chinook salmon was not available to the eastside set net fishery during 1984 (Table 5 and Figure 3). Major stock groupings not available to the eastside set net fishery included at least, the first half of the Crooked Creek run, virtually the entire Kenai River run, and at least 95% of the Susitna River run. Because of the lack of reliable data on run timing from the fishery to the various rivers, we did not account for fish between the fishery and the various in-river monitoring locations. Therefore, it is probable that the above estimates of fish not available to the eastside set net fishery are conservative.

Based on timing, virtually all of the late Kenai River run of chinook salmon was available to the eastside commercial set net fishery (Figure 3).

Length-at-Age:

There were not sufficient numbers of 4-ocean age samples from Crooked Creek collected after 2 July to build a discriminant model. The mean lengths of 4-ocean fish returning prior to 2 July were compared to those returning after 2 July using an independent t-test (Table 6). The means were not significantly different ($\alpha = 0.05$), therefore, all 4-ocean samples were included in the analysis.

Table 4. Length-at-age (mm) by sex summary of chinook salmon in upper Cook Inlet, 1984.

					MEAN LENGTH BY BROOD YEAR AND AGE GROUP												
					1982	1981		1980		1979		1978			1977		1976
SYSTEM	LOCATION	FISHERY	SAMPLE SIZE	SEX	0.1	0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	2.3	1.5	2.4	2.5
MIXED	SALAMATOF BEACH	COMMERCIAL SET NET	30	MALE	0.0	0.0	0.0	0.0	652.0	0.0	804.0	0.0	1,050.1	0.0	1,110.3	0.0	0.0
			15	FEMALE	0.0	0.0	0.0	0.0	655.0	0.0	0.0	0.0	1,034.2	0.0	1,092.0	0.0	0.0
	KALIFONSKY BEACH	COMMERCIAL SET NET	167	MALE	0.0	0.0	495.7	770.0	640.9	1,015.3	912.4	0.0	1,061.1	0.0	1,106.5	0.0	0.0
			118	FEMALE	0.0	0.0	390.0	856.0	646.8	1,028.0	857.5	0.0	1,015.4	0.0	1,045.3	962.0	0.0
	COHOE/NINILCHIK	COMMERCIAL SET NET	273	MALE	0.0	670.5	430.9	851.0	635.9	1,060.0	839.5	0.0	1,060.5	0.0	1,140.5	1,103.0	1,192.0
			188	FEMALE	0.0	664.0	405.6	636.0	638.5	1,046.6	840.3	0.0	1,016.5	0.0	1,060.8	1,045.0	0.0
	CENTRAL EASTSIDE	COMMERCIAL SET NET	509	MALE	0.0	670.5	457.3	781.8	639.8	1,048.9	867.2	0.0	1,063.2	1,082.0	1,127.6	1,103.0	1,192.0
			350	FEMALE	0.0	621.0	403.0	782.7	641.8	1,032.4	851.1	0.0	1,023.8	0.0	1,055.9	1,003.5	0.0
	CENTRAL WESTSIDE	COMMERCIAL SET NET	79	MALE	0.0	0.0	420.0	0.0	596.1	0.0	851.7	0.0	979.3	0.0	1,142.6	0.0	0.0
			70	FEMALE	0.0	0.0	0.0	0.0	687.8	0.0	826.4	0.0	939.5	0.0	1,084.0	763.0	0.0
	CENTRAL DISTRICT	COMMERCIAL DRIFT	27	MALE	0.0	611.0	392.5	0.0	617.8	0.0	747.7	0.0	1,065.0	0.0	0.0	0.0	0.0
			5	FEMALE	0.0	0.0	0.0	0.0	587.0	0.0	859.0	0.0	991.5	0.0	1,093.0	0.0	0.0
	DEEP CREEK MARINE	SPORT CATCH	178	ALL FISH	0.0	0.0	0.0	0.0	700.0	0.0	873.0	0.0	1,092.0	0.0	1,130.0	0.0	0.0
	TYONEK	SUBSISTENCE	371	MALE	0.0	0.0	410.0	770.0	609.1	0.0	833.9	0.0	963.6	845.0	1,085.0	1,022.7	1,068.0
			279	FEMALE	0.0	0.0	0.0	0.0	639.3	0.0	814.9	0.0	922.6	870.0	924.0	973.3	0.0
LOWER KENAI PENINSULA	DEEP CREEK, ANCHOR, AND NINILCHIK RIVERS	SPORT CATCH	141	ALL FISH	0.0	0.0	0.0	0.0	608.0	0.0	777.0	0.0	894.0	0.0	822.0	0.0	0.0
KASILOF	CROOKED CREEK	ESCAPEMENT	246	MALE	362.3	0.0	0.0	764.8	581.4	0.0	750.5	940.0	890.4	0.0	970.0	0.0	0.0
			187	FEMALE	0.0	0.0	0.0	768.5	550.0	890.0	744.8	0.0	854.0	0.0	838.3	0.0	0.0
	KASILOF RIVER	SPORT CATCH	104	ALL FISH	0.0	0.0	0.0	0.0	688.8	0.0	851.1	0.0	969.7	0.0	0.0	0.0	0.0
KENAI RIVER	KENAI RIVER	ESCAPEMENT	179	MALE	0.0	0.0	0.0	740.0	675.5	1,020.0	889.5	0.0	1,077.7	1,010.0	1,132.5	0.0	0.0
			219	FEMALE	0.0	0.0	0.0	0.0	665.0	982.5	928.6	0.0	1,023.1	0.0	1,060.2	1,107.5	960.0
	EARLY RUN	SPORT CATCH	124	MALE	0.0	0.0	440.0	760.0	650.0	0.0	845.5	0.0	1,030.9	0.0	1,075.0	1,090.0	0.0
			107	FEMALES	0.0	0.0	425.0	860.0	516.7	0.0	798.5	0.0	956.4	830.0	1,082.8	0.0	0.0
	LATE RUN	SPORT CATCH	209	MALE	0.0	0.0	393.8	700.0	667.2	1,070.0	822.4	0.0	1,073.9	0.0	1,144.4	0.0	0.0
			164	FEMALES	0.0	0.0	0.0	0.0	740.0	0.0	919.0	1,065.0	1,030.9	0.0	1,111.1	0.0	0.0

-Continued-

Table 4. Length-at-age (mm) by sex summary of chinook salmon in upper Cook Inlet, 1984 (continued).

					MEAN LENGTH BY BROOD YEAR AND AGE GROUP												
					1982	1981		1980		1979		1978			1977		1976
SYSTEM	LOCATION	FISHERY	SAMPLE SIZE	SEX	0.1	0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	2.3	1.5	2.4	2.5
SUSITNA RIVER	SUNSHINE STATION	ESCAPEMENT	617	MALE	0.0	434.0	348.0	634.0	585.0	927.0	792.0	855.0	932.0	0.0	1,037.0	0.0	0.0
			618	FEMALES	0.0	0.0	0.0	692.0	618.0	815.0	807.0	849.0	912.0	0.0	950.0	0.0	0.0
	CLEAR CREEK	SPORT CATCH	126	MALE	0.0	0.0	0.0	0.0	607.4	0.0	835.2	0.0	1,012.1	0.0	1,150.0	0.0	0.0
			92	FEMALES	0.0	0.0	0.0	0.0	0.0	0.0	836.1	0.0	940.0	0.0	905.0	0.0	0.0
	MONTANA CREEK	SPORT CATCH	154	MALE	0.0	0.0	0.0	0.0	621.6	0.0	795.2	0.0	1,000.6	0.0	1,065.0	0.0	0.0
			111	FEMALES	0.0	0.0	0.0	0.0	0.0	0.0	834.3	0.0	939.3	0.0	1,020.0	0.0	0.0
	WILLOW CREEK	SPORT CATCH	125	MALE	0.0	0.0	0.0	0.0	625.8	0.0	830.3	0.0	995.6	0.0	0.0	0.0	0.0
			109	FEMALES	0.0	0.0	0.0	0.0	0.0	0.0	844.2	0.0	948.8	0.0	0.0	0.0	0.0
	ALEXANDER CREEK	SPORT CATCH	248	MALE	0.0	0.0	0.0	0.0	584.5	0.0	769.9	0.0	924.8	0.0	0.0	0.0	0.0
			143	FEMALES	0.0	0.0	0.0	0.0	647.5	0.0	797.5	0.0	885.5	0.0	960.0	0.0	0.0
	DESHKA RIVER	SPORT CATCH	309	MALE	0.0	0.0	0.0	0.0	587.4	0.0	782.5	0.0	952.5	0.0	1,109.0	0.0	0.0
			236	FEMALES	0.0	0.0	0.0	0.0	600.0	0.0	788.2	0.0	900.7	0.0	900.0	0.0	0.0
	LAKE CREEK	SPORT CATCH	159	MALE	0.0	0.0	0.0	0.0	605.1	0.0	846.2	0.0	1,015.5	0.0	1,140.0	0.0	0.0
			141	FEMALES	0.0	0.0	0.0	0.0	735.0	0.0	876.5	0.0	963.3	0.0	1,050.0	0.0	0.0
	MARTIN CREEK	SPORT CATCH	41	MALE	0.0	0.0	0.0	0.0	640.7	0.0	832.0	0.0	997.1	0.0	0.0	0.0	0.0
			22	FEMALES	0.0	0.0	0.0	0.0	0.0	0.0	875.7	0.0	967.3	0.0	0.0	0.0	0.0
LITTLE SUSITNA	BURMA ROAD	SPORT CATCH	173	MALE	0.0	0.0	490.0	0.0	622.9	0.0	835.8	0.0	992.5	0.0	1,055.0	0.0	0.0
			145	FEMALES	0.0	0.0	0.0	0.0	0.0	0.0	835.9	0.0	929.6	0.0	1,000.0	0.0	0.0
	PARKS HIGHWAY	SPORT CATCH	37	MALE	0.0	0.0	0.0	0.0	606.7	0.0	840.6	0.0	955.9	0.0	0.0	0.0	0.0
			24	FEMALES	0.0	0.0	0.0	0.0	0.0	0.0	831.0	0.0	947.1	0.0	0.0	0.0	0.0
CHULITNA RIVER	CHULITNA RIVER	SPORT CATCH	90	MALE	0.0	0.0	0.0	0.0	605.3	0.0	808.6	0.0	988.8	0.0	1,140.0	0.0	0.0
			91	FEMALES	0.0	0.0	0.0	0.0	630.0	0.0	810.0	0.0	920.1	0.0	1,010.0	0.0	0.0

Table 5. Migratory timing summary of chinook salmon from selected locations in upper Cook Inlet, 1984.

			MIGRATORY TIMING STATISTICS	
SYSTEM	FISHERY	METHOD	MEAN DAY	VARIANCE
MARINE	EASTSIDE SET	COMMERCIAL CPUE	JULY 15	108.9
	CENTRAL DRIFT	COMMERCIAL CPUE	JULY 9	178.0
	WEST SIDE SET	COMMERCIAL CPUE	JUNE 27	164.8
	NORTHERN SET	COMMERCIAL CPUE	JULY 1	71.6
	KALGIN ISLAND SET	COMMERCIAL CPUE	JULY 4	146.3
	TYONEK	SUBSISTENCE CPUE	JUNE 5	61.6
KASILOF	CROOKED CREEK	DAILY WIER COUNTS	JULY 3	79.8
	KASILOF	PERSONAL USE CPUE	JUNE 24	5.6
KENAI	EARLY RUN	SPORT HARVEST CPUE	JUNE 13	57.6
	LATE RUN	SPORT HARVEST CPUE	JULY 18	66.1
	TOTAL RUN	SPORT HARVEST CPUE	JULY 2	364.9
SUSITNA	SUNSHINE STATION	FISHWHEEL CPUE	JUNE 21	71.9
	DESHKA RIVER	WEEKLY SPORT HARVEST	JUNE 8-14	72.5

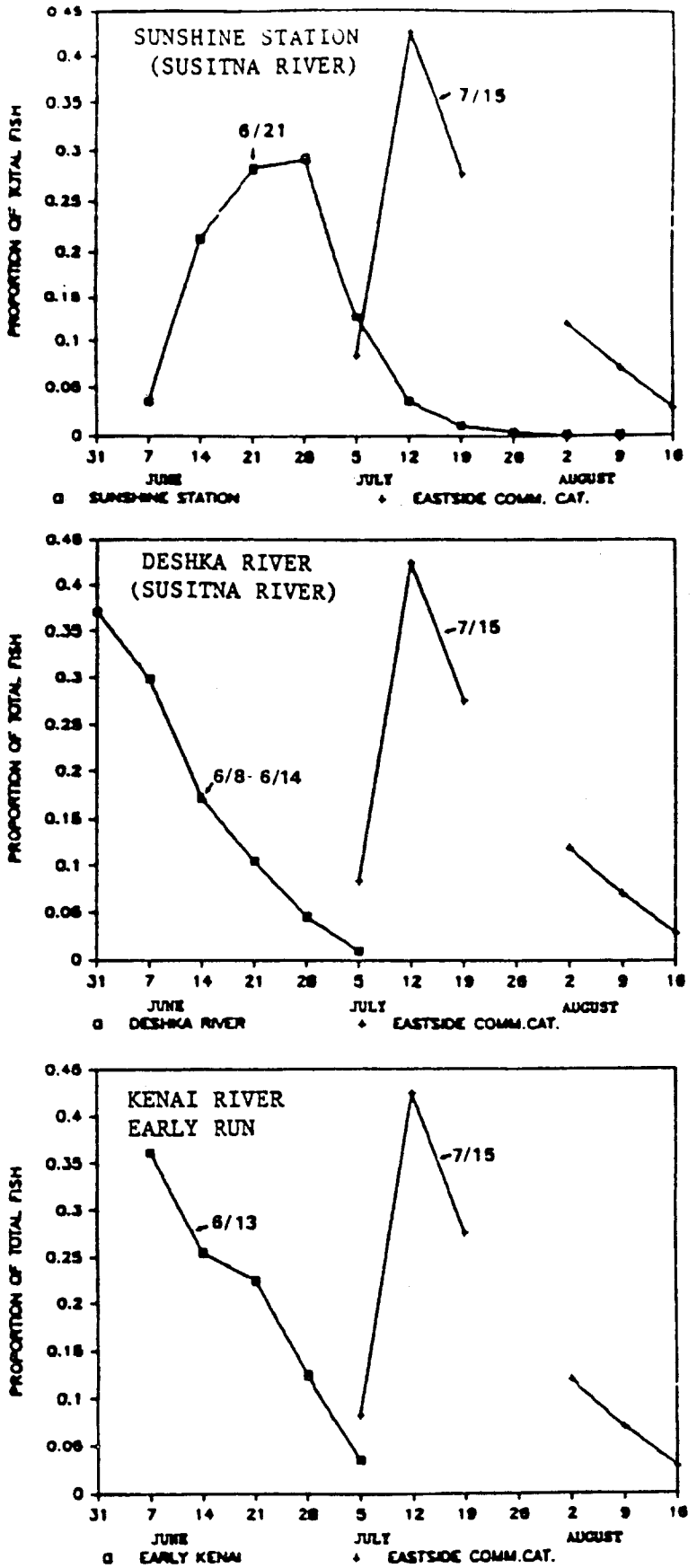
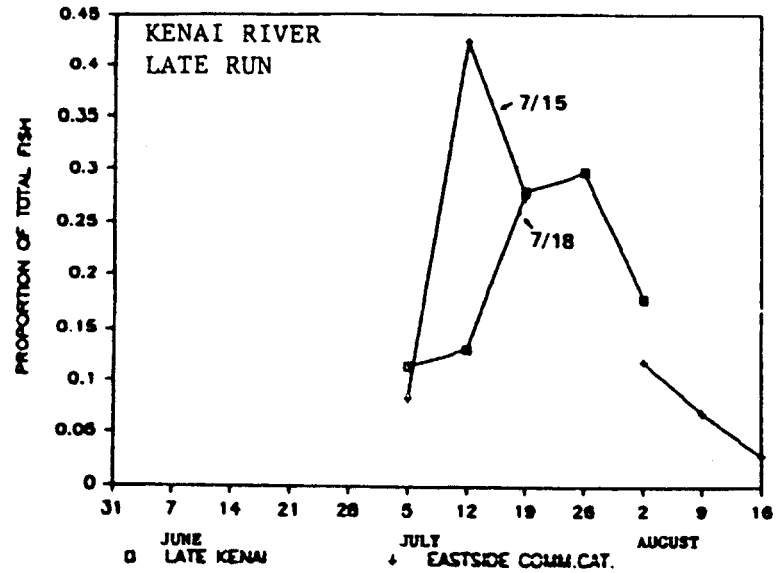


Figure 3. Migratory timing comparisons (mean indicated by arrow) of chinook salmon between eastside set net catches and selected locations in upper Cook Inlet, 1984.



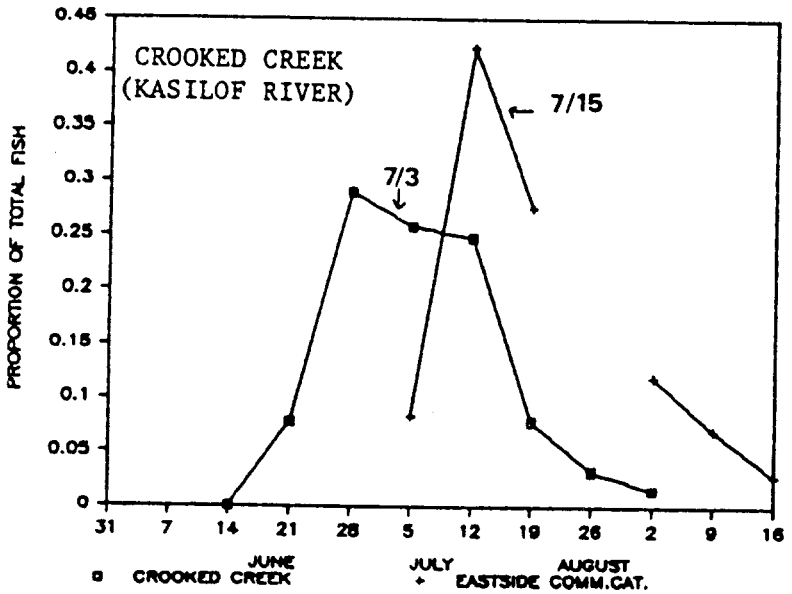


Figure 3. Migratory timing comparisons (mean indicated by arrow) of chinook salmon between eastside set net catches and selected locations in upper Cook Inlet, 1984 (continued).

Table 6. Mean length, variance, and t-statistics of length by sex for 4-ocean chinook salmon sampled from Crooked Creek before (early) and after (late) 2 July 1984.

	MALE			FEMALE		
	EARLY	LATE	POOLED	EARLY	LATE	POOLED
SAMPLE SIZE	15	10	25	14	12	26
MEAN	876.0	912.0	890.4	851.1	860.4	855.4
VARIANCE	7,254	6,646	7,016	2,128	4,857	3,378
t-STATISTIC			-1.05[1]			-0.41[1]

[1] Not significant, $\alpha = 0.05$.

Significant differences (α = 0.05) between sexes for length-at-age of 3-ocean and 4-ocean aged fish were indicated by the t-test of the mean lengths (Table 7). Significant differences were found for the 4-ocean fish from the late run Kenai and northern Cook Inlet systems, and for the 3-ocean fish from the late run Kenai. Because of these differences, separate analyses were conducted for males and females.

The distributions of length-at-age for late run Kenai fish were generally different from those of Kasilof and northern Cook Inlet fish (Figures 4 and 5). Differences between the late run Kenai fish and other stock groupings were particularly apparent for both sexes of the 4-ocean fish and the 3-ocean females. Chinook salmon from the Kasilof River and northern Cook Inlet generally had similar distributions, therefore, these fish were pooled into a non-Kenai standard for the linear discriminant analysis.

The classification accuracies of the linear discriminant functions (Table 8) were high for both the male and female 4-ocean models (86.9% and 87.1%, respectively) and the female 3-ocean model (90.5%). The classification accuracy of the 3-ocean male model (56.7%) was significantly lower than the other models and was considered inadequate for analysis of mixed-stock catches.

No significant differences were found in the proportional estimates of stock contribution between the Kalifonsky and Cohoe/Ninilchik Beach catches (Table 9, Figure 6). Therefore, samples from all the east side beaches were pooled and stock estimates for the total 4-ocean and 3-ocean female catch were calculated (Table 10, Figure 7). The proportion of late run Kenai fish in the 4-ocean catches was similar between males and females (0.863 and 0.832, respectively). A higher fraction of non-Kenai fish was found in the 3-ocean female catches (0.469) than in the 4-ocean male or female catches (0.137 and 0.168, respectively).

When the ocean age and sex components are considered in aggregate, most of the catch was composed of Kenai River fish (Table 11). The Kenai contribution was estimated at 314 3-ocean females, 1,365 4-ocean males, and 1,015 4-ocean females for a total of 2,694 fish. The non-Kenai contribution was smaller and was estimated at 278 3-ocean females, 217 4-ocean males, and 205 4-ocean females for a total of 700 fish.

DISCUSSION

Analysis of timing and length-at-age data provided the means to estimate most of the late run Kenai component of the east side set net catches with a high level of precision. We think it is important to note the estimated contribution of non-Kenai 4-ocean chinook salmon to the 1984 eastside set net fishery was significantly different (α = 0.05) than both zero and the estimated contribution of Kenai fish (Table 11).

Catch Composition

We think it appropriate to make some assumptions concerning other components of the catch. Because we found no differences in stock composition by sex

Table 7. Mean length, variance, and t-statistic of length-at-age for 3-ocean and 4-ocean chinook salmon sampled from Kasilof, late run Kenai, and northern Cook Inlet river systems, 1984.

			3-OCEAN			4-OCEAN		
LOCATION	FISHERY		MALE	FEMALE	POOLED	MALE	FEMALE	POOLED
KASILOF RIVER	ESCAPEMENT	SAMPLE SIZE	70	110	180	10	12	22
		MEAN LENGTH	785	771	777	912	860	884
		VARIANCE	5,447	1,745	3,180	6,646	4,857	5,662
		t- STATISTIC			1.59			1.60
KENAI RIVER	SPORT FISH AND ESCAPEMENT	SAMPLE SIZE	73	58	131	104	117	221
		MEAN LENGTH	848	926	883	1,074	1,031	1,051
		VARIANCE	10,783	3,093	7,385	4,466	6,820	5,713
		t-STATISTIC			-5.17[1]			4.22[1]
NORTHERN COOK INLET	SPORT FISH AND ESCAPEMENT	SAMPLE SIZE	123	120	243	75	191	266
		MEAN LENGTH	820	823	821	953	907	920
		VARIANCE	6,635	1,907	4,301	5,372	2,891	3,587
		t-STATISTIC			-0.36			5.65[1]

[1] SIGNIFICANT, $\alpha = 0.05$.

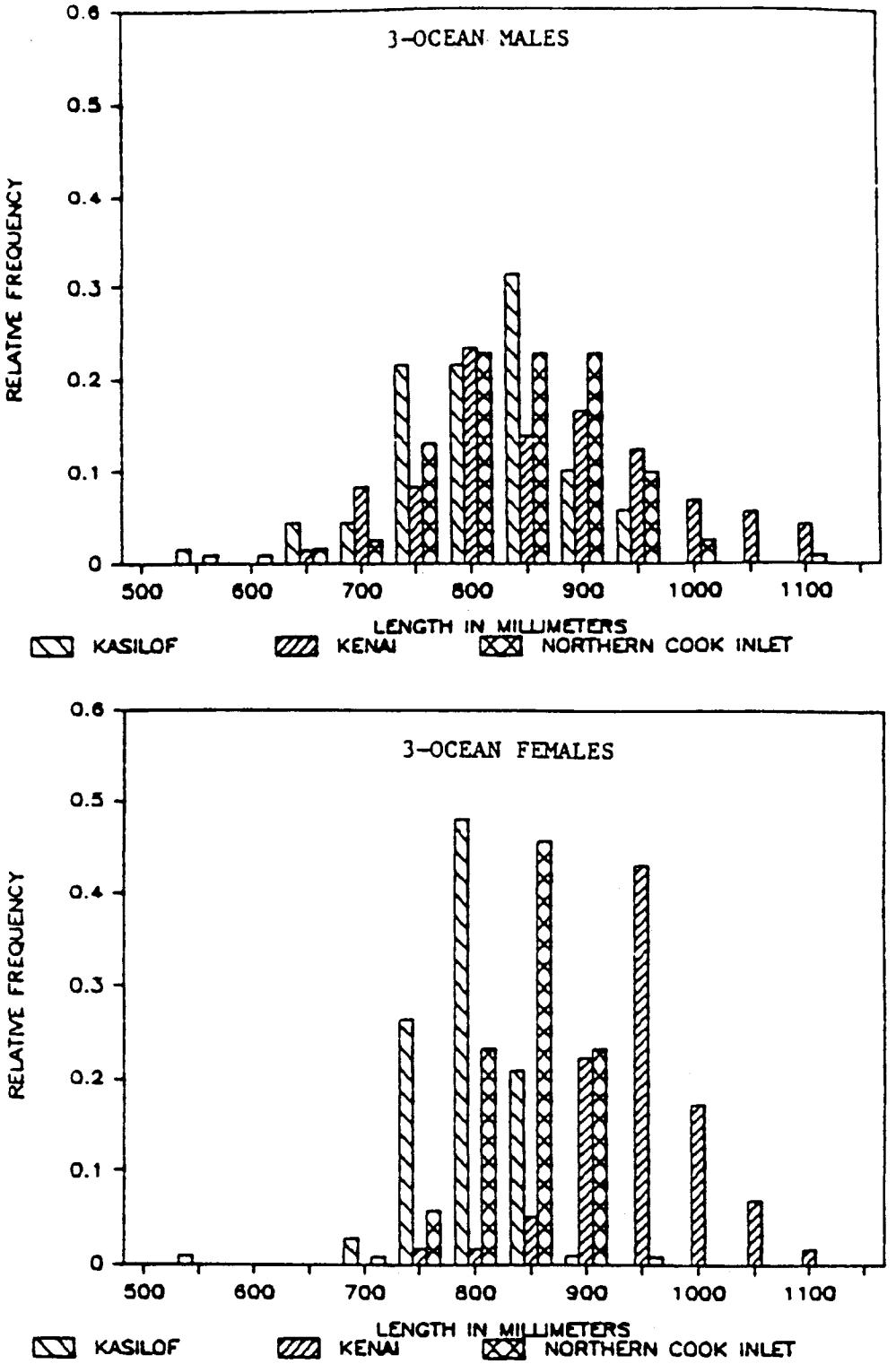
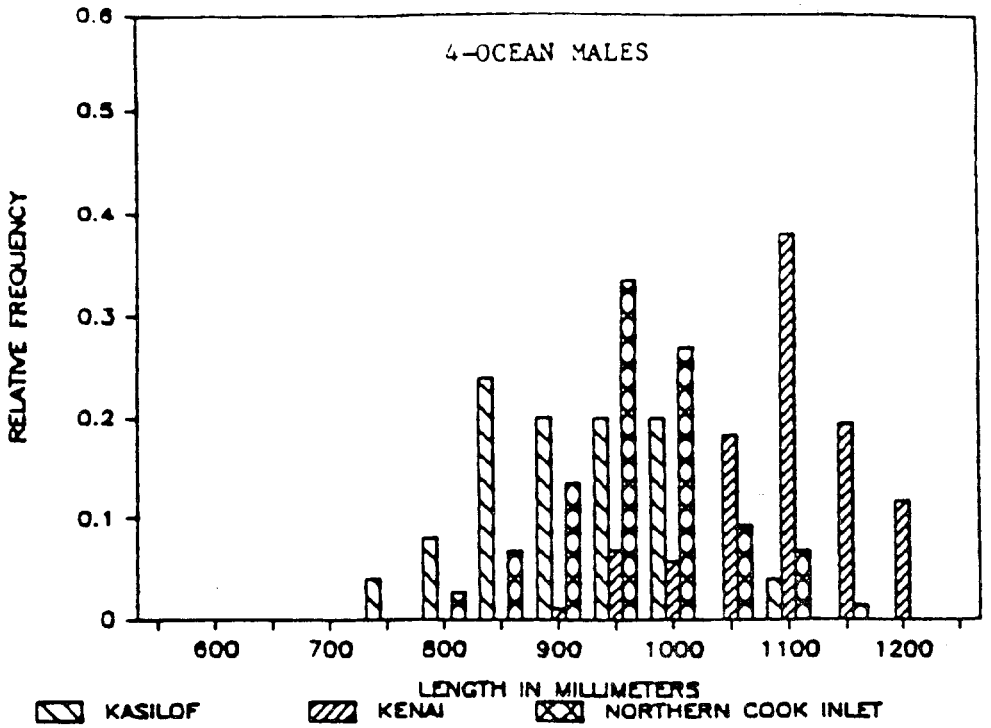


Figure 4. Distribution of lengths by sex of 3-ocean chinook salmon from selected locations in the Kasilof, late run Kenai, and northern Cook Inlet river systems, 1984.



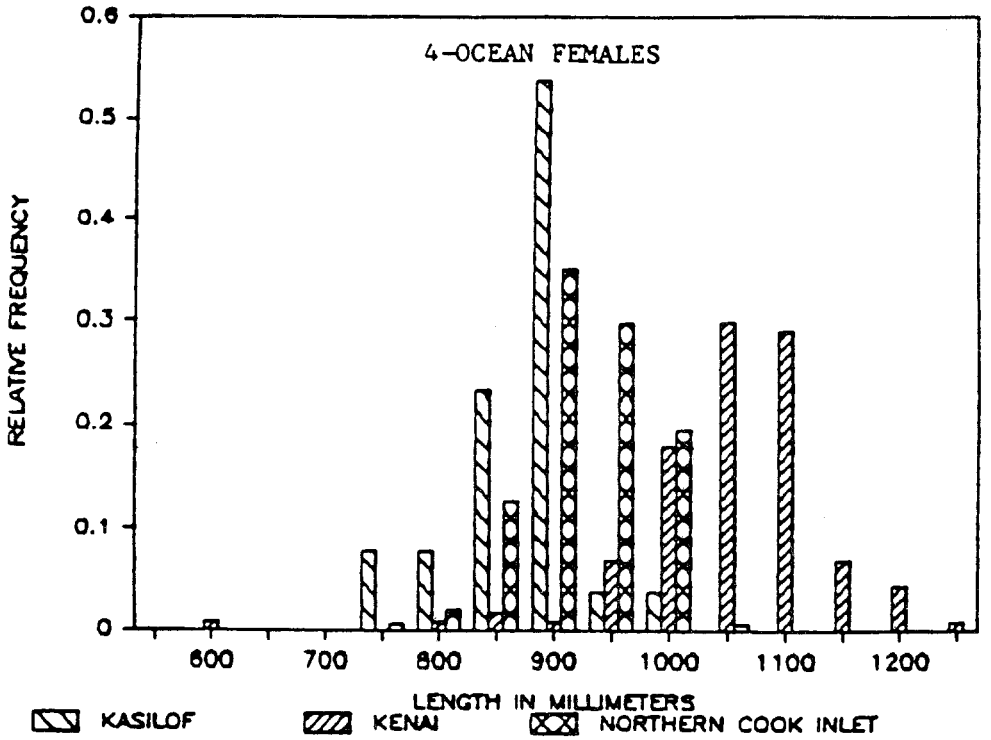


Figure 5. Distribution of lengths by sex of 4-ocean chinook salmon from selected locations in the Kasilof, late run Kenai, and northern Cook Inlet river systems, 1984.

Table 8. Classification matrices of linear discriminant models for 3-ocean and 4-ocean chinook salmon.

3-OCEAN MALES

ACTUAL GROUP OF ORIGIN	SAMPLE SIZE	CLASSIFIED GROUP OF ORIGIN: NON-KENAI	CLASSIFIED GROUP OF ORIGIN: KENAI
NON-KENAI [1]	194	0.613	0.387
KENAI	73	0.479	0.521

MEAN PROPORTION CORRECTLY CLASSIFIED = 0.567

4-OCEAN MALES

ACTUAL GROUP OF ORIGIN	SAMPLE SIZE	CLASSIFIED GROUP OF ORIGIN: NON-KENAI	CLASSIFIED GROUP OF ORIGIN: KENAI
NON-KENAI [1]	100	0.860	0.140
KENAI	104	0.135	0.865

MEAN PROPORTION CORRECTLY CLASSIFIED = 0.869

3-OCEAN FEMALES

ACTUAL GROUP OF ORIGIN	SAMPLE SIZE	CLASSIFIED GROUP OF ORIGIN: NON-KENAI	CLASSIFIED GROUP OF ORIGIN: KENAI
NON-KENAI [1]	230	0.913	0.087
KENAI	58	0.103	0.897

MEAN PROPORTION CORRECTLY CLASSIFIED = 0.905

4-OCEAN FEMALES

ACTUAL GROUP OF ORIGIN	SAMPLE SIZE	CLASSIFIED GROUP OF ORIGIN: NON-KENAI	CLASSIFIED GROUP OF ORIGIN: KENAI
NON-KENAI [1]	217	0.862	0.138
KENAI	117	0.120	0.880

MEAN PROPORTION CORRECTLY CLASSIFIED = 0.871

[1] Non-Kenai is composed of Kasilof and northern Cook Inlet rivers.

Table 9. Run composition estimates and 95% confidence intervals for chinook salmon from the Kalifonsky and Cohoe/Ninilchik commercial set net fisheries, 1984.

AGE/SEX GROUP	FISHERY	STOCK	NUMBER	PROPORTION	STANDARD ERROR	95.0% CONFIDENCE INTERVALS		
3-OCEAN FEMALE	KALIFONSKY BEACH	NON-KENAI	13	0.374	0.112	0.155	to	0.594
		KENAI	19	0.626	0.112	0.406	to	0.845
	COHOE/NINILCHIK BEACH	NON-KENAI	29	0.561	0.089	0.388	to	0.735
		KENAI	23	0.439	0.089	0.265	to	0.612
4- OCEAN MALE	KALIFONSKY BEACH	NON-KENAI	22	0.213	0.081	0.054	to	0.372
		KENAI	54	0.787	0.081	0.628	to	0.946
	COHOE/NINILCHIK BEACH	NON-KENAI	23	0.095	0.067	-0.037	to	0.226
		KENAI	90	0.905	0.067	0.774	to	1.037
4-OCEAN FEMALE	KALIFONSKY BEACH	NON-KENAI	13	0.151	0.084	-0.013	to	0.315
		KENAI	43	0.849	0.084	0.685	to	1.013
	COHOE/NINILCHIK BEACH	NON-KENAI	23	0.187	0.071	-0.048	to	0.326
		KENAI	66	0.813	0.071	0.674	to	0.952

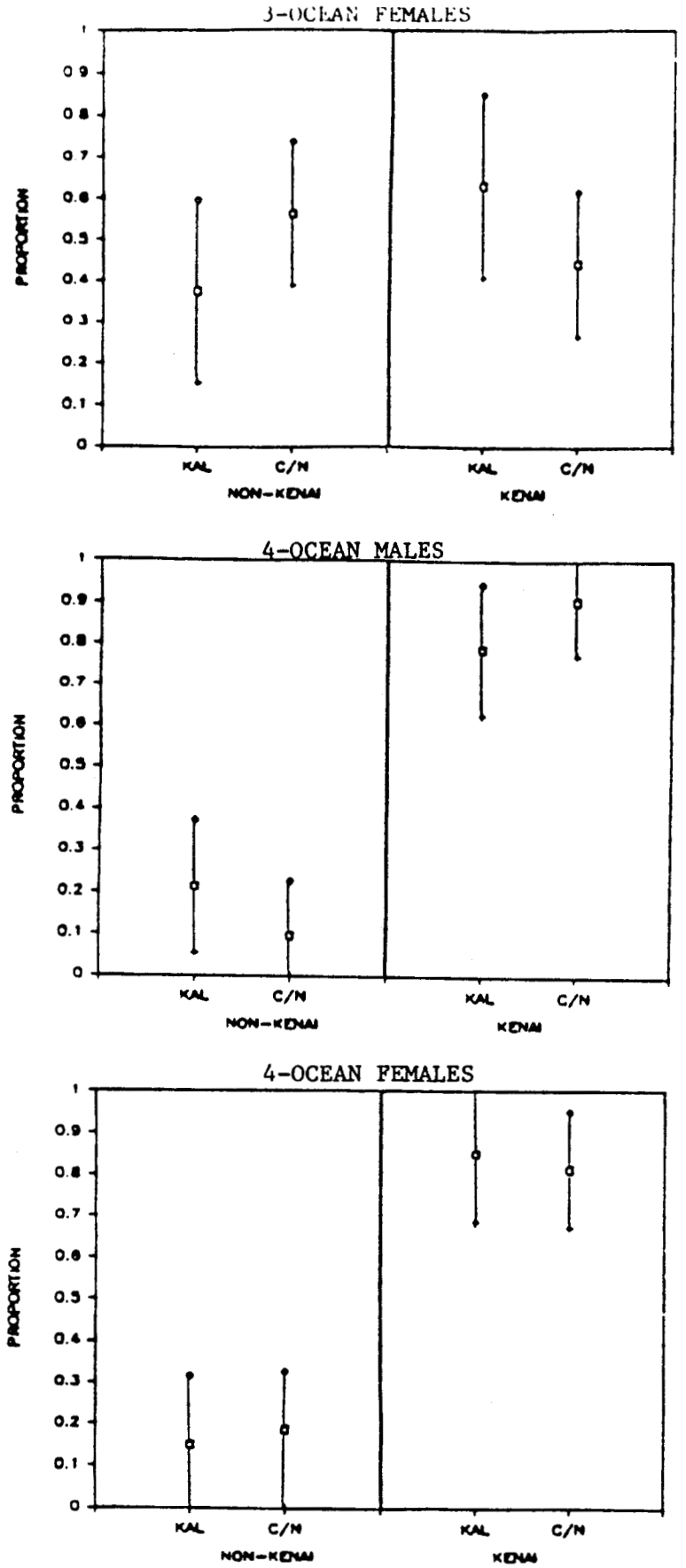


Figure 6. Run composition estimates and 95% confidence intervals for chinook salmon from the Kalifonsky (KAL) and Cohoe/Ninilchik (C/N) commercial set net fisheries, 1984.

Table 10. Run composition estimates and 95% confidence intervals of chinook salmon from the eastside set net commercial fishery, 1984.

AGE/SEX GROUP	STOCK	NUMBER	PROPORTION	STANDARD ERROR	95.0% CONFIDENCE INTERVALS		
3-OCEAN FEMALE	NON-KENAI	42	0.469	0.072	0.328	to	0.610
	KENAI	45	0.531	0.072	0.390	to	0.672
4-OCEAN MALE	NON-KENAI	55	0.137	0.056	0.028	to	0.245
	KENAI	180	0.863	0.056	0.755	to	0.972
4-OCEAN FEMALE	NON-KENAI	44	0.168	0.055	0.060	to	0.276
	KENAI	136	0.832	0.055	0.724	to	0.940

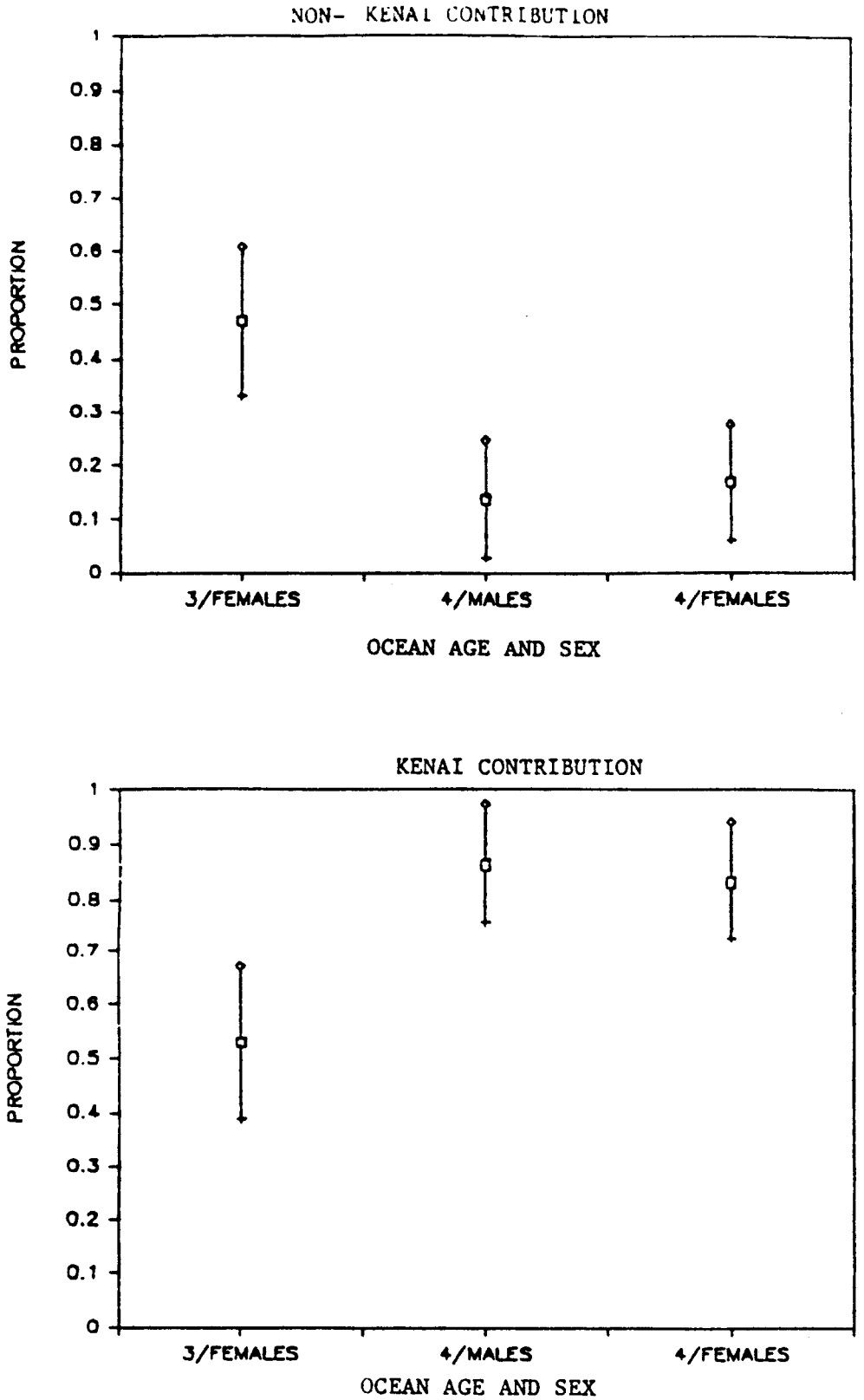


Figure 7. Run composition estimates and 95% confidence intervals for chinook salmon from the eastside set net fishery, 1984.

Table 11. Estimated catch of 3-ocean female and 4-ocean male and female chinook salmon of late Kenai and non-late Kenai origin by the eastside set net commercial fishery, 1984.

Group	Stock	Estimated Proportion	Standard Error	Estimated Catch	Standard Error
3-Ocean Female	Non-Kenai	0.469	0.07194	278	46
	Kenai	0.531	0.07194	314	47
4-Ocean Male	Non-Kenai	0.137	0.05556	217	88
	Kenai	0.863	0.05556	1,365	105
4-Ocean Female	Non-Kenai	0.168	0.05502	205	68
	Kenai	0.832	0.05502	1,015	79

within the 4-ocean component (Table 10), we assume that the 3-ocean male component has a similar stock composition to that of the 3-ocean female component. Therefore, we applied the stock contribution estimates from the 3-ocean female analysis to the 3-ocean male component of the catch (Table 12). The pooled ocean age analysis shows that approximately 75% of the 3- and 4-ocean catch was composed of late run Kenai fish and approximately 25% of the catch was composed of non-Kenai fish (Table 12, Figure 8).

Based on age composition, we assume that most of the 5-ocean fish harvested by the eastside set net fishery were destined for the Kenai River. Only trace amounts of 5-ocean fish were found in inriver runs other than the Kenai River (see Appendix B). Because more than trace amounts of 2-ocean fish occur in all of the potential contributing river systems, we found no basis to make assumptions concerning the stock composition of this component of the catch.

Based on reported differences in freshwater age between river systems (Table 3 and Appendix B), some assumptions might be made concerning differential stock composition by freshwater age. For example, 0-freshwater age chinook salmon were not reported in the Kasilof River sport catch but 0-freshwater age fish were the major age group in the Crooked Creek escapement (64.6%). Zero-freshwater age fish were reported in trace amounts in the marine catches. Although we are confident that 0-freshwater age chinook salmon are the predominate age group in the Crooked Creek run, we are not confident that freshwater age patterns are being correctly interpreted in other catches or escapements; particularly the marine catches, Susitna River sport catches, and Kasilof River sport catches. Because of the inconsistency in freshwater age interpretation, we feel it inappropriate to make assumptions about stock composition based on freshwater age.

Examination of the 1984 return data suggested several other conclusions concerning stock composition of upper Cook Inlet mixed stock catches. Based on timing and geographic proximity, it is tempting to assume that virtually all of the fish that classified as non-Kenai fish were actually destined for the Kasilof River. While fish of Crooked Creek origin are certainly present in the fishery (Flagg, personal communication); stocks other than Crooked Creek may have contributed to the non-Kenai component of the 1984 fishery. It is the opinion of ADF&G staff in Soldotna (Tarbox, personal communication) that the migratory timing of chinook salmon past the Crooked Creek weir is much later (as much as 1 month) than the migratory timing of the fish entering the Kasilof River. If this is true, then a larger portion of the Crooked Creek run would be in the Kasilof River prior to the eastside set net fishery than is indicated by the timing data presented in this report. Also, fish of northern Cook Inlet origin may be present based solely on the numerical superiority of these stocks (see Tables 1 and 2). Timing data (see Table 5 and Figure 3) indicated that approximately 5% of the Susitna River run was potentially available to the eastside set net fishery. However, a small fraction of this large population could contribute a substantial number of fish to the catch.

Table 12. Estimated catch of 3-ocean and 4-ocean chinook salmon of late Kenai and non-late Kenai origin by the eastside set net commercial fishery, 1984.

		Kenai		Non-Kenai		Totals	
Group	Sex	Estimated Proportion	Estimated Number	Estimated Proportion	Estimated Number	Number	Proportion
3-Ocean	Male	NA[1]	369	NA[1]	325		
	Female	0.531	314	0.469	278		
	Sub Total		683		603	1,286	0.315
4-Ocean	Male	0.863	1,365	0.137	217		
	Female	0.832	1,015	0.168	205		
	Sub Total		2,380		422	2,802	0.685
Total	Number		3,063		1,025	4,088	
	Proportion		0.749		0.251		

[1] Stock proportion was not directly estimated for 3-ocean males, however, it was assumed to be the same as that of the 3-ocean females.

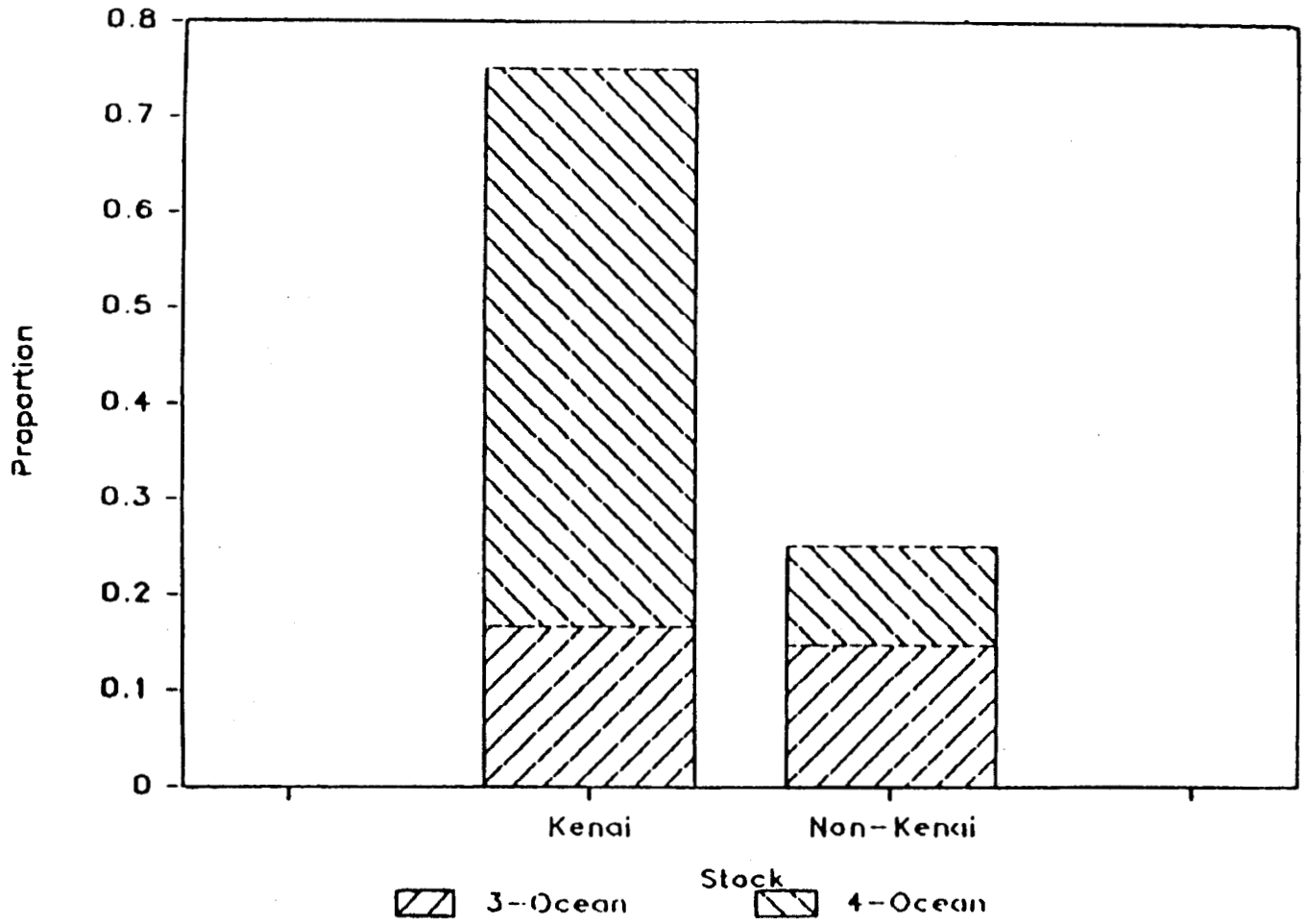


Figure 8. Estimated contribution of late Kenai and non-late Kenai chinook salmon to the 3-ocean and 4-ocean eastside set net catches, 1984.

Utility of Analysis

The continued use of discriminant analysis using only length-at-age data as a means to estimate run contribution rates to upper Cook Inlet mixed-stock chinook salmon catches is only of limited utility. At best, the length-at-age model enabled us to directly compute the contribution of late run Kenai River fish to the catch of 4-ocean fish and 3-ocean females caught in the eastside set net fishery. The univariate model was not sufficiently precise to differentiate between other stock groupings.

We were unable to directly estimate the contribution rates of the 2-ocean and 5-ocean catches (18% and 7% of the catch, respectively). Small sample sizes precluded the construction of models for other ocean ages.

A length-at-age discriminant model for fisheries that occur earlier in the season is probably not feasible. The late starting date for the 1984 eastside set net fishery (2 July) allowed us to eliminate a large portion of the total upper Cook Inlet run (particularly Susitna River and early run Kenai River fish) as potential contributors. Including these stocks, particularly the early run Kenai fish, in the analyses would have reduced the precision of the models.

RECOMMENDATIONS

Based on the findings of this study, we recommended that the ADF&G monitoring program for upper Cook Inlet chinook salmon stocks be altered as follows:

1) Expand the current catch sampling program to adequately sample other mixed-stock fisheries. Of particular importance are the Deep Creek sport and the Kalgin Island/western Central District commercial fisheries.

2) It became apparent during the study that the interpretation of the ages of chinook salmon from scales varies widely throughout Cook Inlet. This is particularly true for the freshwater age, but applies to the marine age, also. We suggest that a workshop involving all individuals who are involved with aging Cook Inlet chinook salmon scales be held with the intent of improving the consistency in age interpretation.

3) Expand the current escapement sampling program to include Kasilof River wild stocks.

4) Continue to estimate the contribution of late run Kenai fish to the eastside set net fishery based on analysis of timing and length-at-age.

5) Explore the feasibility of scale pattern analysis as a means to estimate the contribution of major component stocks of chinook salmon in all upper Cook Inlet mixed-stock catches.

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APPENDIX A

Abundance of chinook salmon in upper Cook Inlet, 1984

Appendix A-1. Commercial catch of chinook salmon by fishery and date, upper Cook Inlet, 1984.

DATE	NORTHERN DISTRICT SET	CENTRAL DISTRICT DRIFT	CENTRAL DISTRICT WEST SIDE	KALGIN ISLAND SET	EAST SIDE SET NET: SALAMATOF BEACH	EAST SIDE SET NET: KALIFONSKY BEACH	EAST SIDE SET NET: COHOE BEACH	EAST SIDE SET NET: NINILCHIK BEACH	EAST SIDE SET NET: EAST SIDE TOTAL	TOTALS
JUNE 18	CLOSED	CLOSED	370	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	370
JUNE 22	CLOSED	CLOSED	131	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	131
JUNE 25	209	43	140	123	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	515
JUNE 29	151	19	137	88	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	395
JULY 2	206	75	82	51	CLOSED	86	86	109	281	695
JULY 6	69	80	76	40	CLOSED	219	191	298	708	973
JULY 9	98	46	27	36	96	278	118	137	629	836
JULY 10	CLOSED	33	CLOSED	CLOSED	CLOSED	67	83	97	247	280
JULY 11	CLOSED	CLOSED	10	CLOSED	CLOSED	63	31	71	165	175
JULY 12	CLOSED	CLOSED	28	CLOSED	CLOSED	46	122	187	355	383
JULY 13	32	34	32	40	23	28	78	136	265	403
JULY 14	CLOSED	CLOSED	3	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	3
JULY 15	CLOSED	CLOSED	20	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	20
JULY 16	24	64	14	12	213	196	182	182	773	887
JULY 17	0	CLOSED	4	CLOSED	CLOSED	80	195	146	421	425
JULY 18	22	40	11	3	86	175	193	249	703	779
JULY 19	19	CLOSED	6	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	25
JULY 20	CLOSED	CLOSED	10	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	10
JULY 21	CLOSED	CLOSED	5	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	5
JULY 22	CLOSED	CLOSED	10	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	10
JULY 23	CLOSED	CLOSED	12	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	12
JULY 24	CLOSED	CLOSED	9	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	9
JULY 25	CLOSED	CLOSED	2	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	2
JULY 26	CLOSED	CLOSED	12	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	12
JULY 27	21	16	7	6	CLOSED	CLOSED	4	64	68	118
JULY 30	17	34	7	6	100	295	131	69	595	659
AUGUST 3	8	12	4	2	111	133	16	42	302	328
AUGUST 6	5	5	3	5	42	59	20	36	157	175
AUGUST 10	1	2	5	11	41	24	11	10	86	105
AUGUST 13	1	5	5	12	20	13	8	8	49	72
AUGUST 17	2	0	1	0	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	3
AUGUST 20	0	2	1	0	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	3
AUGUST 24	0	0	0	1	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	1
TOTALS	885	510	1,184	436	732	1,762	1,469	1,841	5,804	8,819

Appendix A-2. Sport catch of chinook salmon by fishery, upper Cook Inlet, 1984[1].

SUSITNA RIVER		KENAI RIVER		KASILOF RIVER		NORTHERN COOK INLET		OTHER SYSTEMS		TOTALS
LOCATION	NUMBER	LOCATION	NUMBER	LOCATION	NUMBER	LOCATION	NUMBER	LOCATION	NUMBER	
ALEXANDER CREEK	1,830	EARLY RUN	4,956	CROOKED CREEK	5,135	LITTLE SUSITNA	1,447	ANCHOR RIVER	740	
DESHKA RIVER	4,652	LATE RUN	7,376	CROOKED CREEK		CHUITNA RIVER	1,132	DEEP CREEK	340	
LAKE CREEK	2,148			(egg take)	648	LEWIS/THEODORE	850	NINILCHIK RIVER	440	
MONTANA CREEK	886							DEEP CREEK MARINE	3,221	
WILLOW CREEK	805									
TALACHULITNA	320									
CASWELL CREEK	378									
CLEAR CREEK	1,323									
MARTIN CREEK	336									
TOTALS	12,678		12,332		5,783		3,429		4,741	38,963

[1] Estimates of sport harvests include only chinook salmon greater than 51 cm.

Appendix A-3. Subsistence and personal-use catch of chinook salmon by fishery and date, upper Cook Inlet, 1984.

PERIOD DATE	TYONEK CHINOOK	TYONEK HARVEST	KASILOF CHINOOK	KASILOF HARVEST
MAY 15	8			
MAY 17	15			
MAY 18	22			
MAY 22	161			
MAY 24	225			
MAY 25	61			
MAY 29	369			
MAY 31	304			
JUNE 1	148			
JUNE 5	92			
JUNE 7	336			
JUNE 8	187			
JUNE 12	272			
JUNE 14	60			
JUNE 15	62			
JUNE 16	12			
JUNE 21			27	
JUNE 22			22	
JUNE 23	20		40	
JUNE 24			8	
JUNE 25			13	
JUNE 26			20	
JUNE 27			14	
JUNE 28			21	
TOTALS	2,354		165	

Appendix A-4. Crooked Creek escapement of chinook salmon by date, 1984.

	NUMBER OF FISH		PROPORTIONS	
DATE	DAILY	CUMULATIVE	DAILY	CUMULATIVE
JUNE 9	1	1	.000	0.000
JUNE 20	325	326	0.078	0.078
JUNE 22	510	836	0.123	0.201
JUNE 25	424	1,260	0.102	0.303
JUNE 27	268	1,528	0.065	0.368
JUNE 29	354	1,882	0.085	0.453
JULY 2	239	2,121	0.058	0.511
JULY 5	477	2,598	0.115	0.626
JULY 6	358	2,956	0.086	0.712
JULY 9	469	3,425	0.113	0.825
JULY 11	201	3,626	0.048	0.874
JULY 13	150	3,776	0.036	0.910
JULY 16	176	3,952	0.042	0.952
JULY 23	133	4,085	0.032	0.984
JULY 27	54	4,139	0.013	0.997
AUGUST 1	10	4,149	0.002	1.000
			MEAN=JULY 3	
TOTAL	4,149		VARIANCE= 79.8	

Appendix A-5. Escapement surveys conducted in northern Cook Inlet, 1984.

SYSTEM	LOCATION	DATE	ESCAPEMENT OBSERVED	ESCAPEMENT EXPANDED	SURVEY TYPE	CONDUCTED BY
SUSITNA RIVER						
	WILLOW CREEK	JULY 31	2,789	5,070	HELICOPTER	SPORT FISH
	DECEPTION CREEK		675		HELICOPTER	SPORT FISH
	DESHKA RIVER	AUGUST 3-4	16,892		HELICOPTER	SPORT FISH
	PETERS/MARTIN		324		HELICOPTER	SPORT FISH
	ALEXANDER CREEK	JULY 17-18	4,620		HELICOPTER	SPORT FISH
	TALACHULITNA RIVER	JUL 26 & 29	6,138		HELICOPTER	SPORT FISH
	MONTANA CREEK	JULY 24	2,309	2,309	FOOT COUNT	SPORT FISH
	KASHWITNA RIVER	JULY 31	111	202	HELICOPTER	SPORT FISH
	SHEEP CREEK	JULY 31	1,028	1,748	HELICOPTER	SPORT FISH
	GOOSE CREEK	JULY 31	258	469	HELICOPTER	SPORT FISH
	INDIAN RIVER	JULY 25	1,456	2,647	HELICOPTER	SU-HYDRO
	PORTAGE CREEK	JULY 25	2,341	4,256	HELICOPTER	SU-HYDRO
	CLEAR CREEK(CHUNILNA)	JULY 25	1,520	2,764	HELICOPTER	SU-HYDRO
	PRAIRE CREEK	JULY 24		9,000	AIRPLANE	SU-HYDRO
	CHULITNA (MID.FORK)		4,191	4,191	FOOT COUNT	SU-HYDRO
	BYERS CREEK		39	39	FOOT COUNT	SU-HYDRO
	BUNCO		51	51	FOOT COUNT	SU-HYDRO
OTHER WEST SIDE RIVERS	CHUITNA RIVER	JULY 19	2,845		HELICOPTER	SPORT FISH
	THEODORE RIVER	JULY 23-24	1,251		HELICOPTER	SPORT FISH
	LEWIS RIVER	JULY 23-24	947		HELICOPTER	SPORT FISH
	BISHOP CREEK		324		HELICOPTER	SPORT FISH
OTHER EAST SIDE RIVERS	MOOSE CREEK		541		HELICOPTER	SPORT FISH

Appendix A-6. Quartz Creek escapement of chinook salmon by date, 1984.

DATE	NUMBER OF FISH DAILY	NUMBER OF FISH CUMULATIVE	PROPORTIONS DAILY	PROPORTIONS CUMULATIVE
JULY 2	1	1	0.002	0.002
JULY 5	2	3	0.004	0.006
JULY 6	28	31	0.056	0.062
JULY 7	9	40	0.018	0.080
JULY 8	32	72	0.064	0.145
JULY 9	50	122	0.101	0.245
JULY 10	20	142	0.040	0.286
JULY 11	1	143	0.002	0.288
JULY 12	0	143	0.000	0.288
JULY 13	3	146	0.006	0.294
JULY 14	2	148	0.004	0.298
JULY 15	10	158	0.020	0.318
JULY 16	31	189	0.062	0.380
JULY 17	14	203	0.028	0.408
JULY 18	20	223	0.040	0.449
JULY 19	26	249	0.052	0.501
JULY 20	94	343	0.189	0.690
JULY 21	14	357	0.028	0.718
JULY 22	4	361	0.008	0.726
JULY 23	18	379	0.036	0.763
JULY 24	2	381	0.004	0.767
JULY 25	8	389	0.016	0.783
JULY 26	16	405	0.032	0.815
JULY 27	5	410	0.010	0.825
JULY 28	0	410	0.000	0.825
JULY 29	4	414	0.008	0.833
JULY 30	3	417	0.006	0.839
JULY 31	15	432	0.030	0.869
AUGUST 1	13	445	0.026	0.895
AUGUST 2	22	467	0.044	0.940
AUGUST 3	3	470	0.006	0.946
AUGUST 4	0	470	0.000	0.946
AUGUST 5	2	472	0.004	0.950
AUGUST 6	8	480	0.016	0.966
AUGUST 7	3	483	0.006	0.972
AUGUST 8	2	485	0.004	0.976
AUGUST 9	0	485	0.000	0.976
AUGUST 10	0	485	0.000	0.976
AUGUST 11	2	487	0.004	0.980
AUGUST 12	1	488	0.002	0.982
AUGUST 13	0	488	0.000	0.982
AUGUST 14	2	490	0.004	0.986
AUGUST 15	2	492	0.004	0.990
AUGUST 16	1	493	0.002	0.992
AUGUST 17	0	493	0.000	0.992
AUGUST 18	0	493	0.000	0.992
AUGUST 19	0	493	0.000	0.992
AUGUST 20	0	493	0.000	0.992
AUGUST 21	0	493	0.000	0.992
AUGUST 22	4	497	0.008	1.000
AUGUST 23	0	497	0.000	1.000
AUGUST 24	0	497	0.000	1.000
TOTAL	497			MEAN=JULY 19 VARIANCE=90.2

APPENDIX B

Age by sex summaries of chinook salmon in upper Cook Inlet, 1984.

Appendix B-1. Commercial catch of chinook salmon by age and sex, upper Cook Inlet, 1984.

			PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP											
			1981		1980		1979		1978		1977		1976	
FISHERY	SEX		0.2	1.1	0.3	1.2	0.4	1.3	1.4	2.3	1.5	2.4	2.5	TOTAL
SALAMATOF BEACH SET NET	MALE (N=30)	PERCENT	0.0	0.0	0.0	4.4	0.0	6.7	46.7	0.0	8.9	0.0	0.0	66.7
		NUMBER	0	0	0	32	0	49	342	0	65	0	0	488
	FEMALE (N=15)	PERCENT	0.0	0.0	0.0	4.4	0.0	0.0	26.7	0.0	2.2	0.0	0.0	33.3
		NUMBER	0	0	0	33	0	0	195	0	16	0	0	244
	ALL FISH (N=45)	PERCENT	0.0	0.0	0.0	8.8	0.0	6.7	73.4	0.0	11.1	0.0	0.0	100.0
		NUMBER	0	0	0	65	0	49	537	0	81	0	0	732
		STANDARD ERROR	0	0	0	30	0	27	47	0	34	0	0	
KALIFONSKY BEACH SET NET	MALE (N=167)	PERCENT	0.0	3.8	0.4	11.9	1.0	11.5	25.4	0.0	4.2	0.0	0.0	58.2
		NUMBER	0	68	6	209	18	203	448	0	74	0	0	1,026
	FEMALE (N=120)	PERCENT	0.0	0.4	0.7	7.3	0.7	10.8	19.2	0.0	2.4	0.3	0.0	41.8
		NUMBER	0	6	12	129	12	190	338	0	43	6	0	736
	ALL FISH (N=287)	PERCENT	0.0	4.2	1.1	19.2	1.7	22.3	44.6	0.0	6.6	0.3	0.0	100.0
		NUMBER	0	74	18	338	30	393	786	0	117	6	0	1,762
		STANDARD ERROR	0	19	10	38	12	40	47	0	24	6	0	
COHOE/NINILCHIK SET NET	MALE (N=273)	PERCENT	0.4	3.5	0.4	12.8	1.1	11.9	23.4	0.0	5.2	0.2	0.2	59.1
		NUMBER	14	115	14	423	36	394	774	0	172	7	7	1,956
	FEMALE (N=189)	PERCENT	0.4	1.1	0.2	6.1	1.1	11.0	18.2	0.0	2.6	0.2	0.0	40.9
		NUMBER	14	36	7	201	36	363	602	0	86	7	0	1,354
	ALL FISH (N=462)	PERCENT	0.8	4.6	0.6	18.9	2.2	22.9	41.6	0.0	7.8	0.4	0.2	100.0
		NUMBER	28	151	21	624	72	759	1,376	0	258	14	7	3,310
		STANDARD ERROR	13	30	11	56	21	60	70	0	38	9	7	
EASTSIDE SET NET TOTALS	MALE (N=509)	PERCENT	0.2	3.1	0.5	11.6	1.0	11.4	26.1	0.1	4.8	0.1	0.1	59.0
		NUMBER	13	182	27	673	61	660	1,515	7	276	7	7	3,428
	FEMALE (N=353)	PERCENT	0.4	0.7	0.3	6.3	0.9	9.9	19.9	0.0	2.4	0.2	0.0	41.0
		NUMBER	20	40	20	364	54	572	1,152	0	141	13	0	2,376
	ALL FISH (N=862)	PERCENT	0.6	3.8	0.8	17.9	1.9	21.3	46.0	0.1	7.2	0.3	0.1	100.0
		NUMBER	33	222	47	1,037	115	1,232	2,667	7	417	20	7	5,804
		STANDARD ERROR	14	35	16	70	25	75	91	6	47	11	6	
CENTRAL DISTRICT WESTSIDE SET NET	MALE (N=113)	PERCENT	0.0	0.4	0.0	11.1	0.0	16.0	20.0	0.0	2.7	0.0	0.0	50.2
		NUMBER	0	5	0	132	0	189	237	0	32	0	0	595
	FEMALE (N=112)	PERCENT	0.0	0.0	0.0	5.8	0.0	19.1	23.6	0.0	0.4	0.9	0.0	49.8
		NUMBER	0	0	0	68	0	226	279	0	5	11	0	589
	ALL FISH (N=225)	PERCENT	0.0	0.4	0.0	16.9	0.0	35.1	43.6	0.0	3.1	0.9	0.0	100.0
		NUMBER	0	5	0	200	0	415	516	0	37	11	0	1,184
		STANDARD ERROR	0	4	0	26	0	34	35	0	12	7	0	
CENTRAL DISTRICT DRIFT NET	ALL FISH (N=32)	PERCENT	3.1	6.3	0.0	43.7	0.0	12.5	31.3	0.0	3.1	0.0	0.0	100.0
		NUMBER	16	32	0	222	0	64	160	0	16	0	0	510
		STANDARD ERROR	15	22	0	44	0	29	41	0	15	0	0	

Appendix B-2. Kenai River sport catch of chinook salmon by age and sex, 1984.

			PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP										
			1981	1980		1979		1978			1977		
LOCATION	SEX		1.1	0.3	1.2	0.4	1.3	0.5	1.4	2.3	1.5	2.4	TOTAL
EARLY RUN	MALE	PERCENT	0.5	0.4	3.3	0.0	13.8	0.0	30.5	0.0	4.2	0.4	53.1
	(N=127)	NUMBERS	21	21	166	0	684	0	1,514	0	207	21	2,634
	FEMALE	PERCENT	0.8	0.4	1.3	0.0	14.6	0.0	27.7	0.4	1.7	0.0	46.9
	(N=112)	NUMBERS	41	21	62	0	726	0	1,368	21	83	0	2,322
	TOTAL	PERCENT	1.3	0.8	4.6	0.0	28.4	0.0	58.2	0.4	5.9	0.4	100.0
	(N=239)	NUMBERS	62	42	228	0	1,410	0	2,882	21	290	21	4,956
		STANDARD ERROR	35	29	66	0	141	0	155	20	74	20	
LATE RUN	MALE	PERCENT	2.1	0.3	7.7	0.5	11.1	0.0	27.1	0.0	6.6	0.0	55.4
	(N=209)	NUMBERS	157	20	567	39	822	0	1,995	0	489	0	4,089
	FEMALE	PERCENT	0.0	0.0	0.3	0.0	6.1	0.5	31.8	0.0	5.9	0.0	44.6
	(N=168)	NUMBERS	0	0	20	0	450	39	2,348	0	430	0	3,287
	TOTAL	PERCENT	2.1	0.3	8.0	0.5	17.2	0.5	58.9	0.0	12.5	0.0	100.0
	(N=377)	NUMBERS	157	20	587	39	1,272	39	4,343	0	919	0	7,376
		STANDARD ERROR	53	20	101	26	140	26	182	0	123	0	

Appendix B-3. Susitna River sport catch of chinook salmon by age and sex, 1984.

			PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP					
			1980	1979	1978	1977		
LOCATION	SEX		1.2	1.3	1.4	1.5	2.4	TOTAL
CLEAR CREEK	MALE	PERCENT	16.4	20.4	20.4	0.5	0.5	58.2
(CHUNILNA CREEK)	(N=128)	NUMBERS	216	271	271	6	6	770
	FEMALE	PERCENT	0.0	16.4	24.5	0.9	0.0	41.8
	(N=92)	NUMBERS	0	216	325	12	0	553
	ALL FISH	PERCENT	16.4	36.8	44.9	1.4	0.5	100.0
	(N=220)	NUMBERS	216	487	596	18	6	1,323
		STANDARD ERROR	30	39	41	9	5	
WILLOW CREEK	MALE	PERCENT	11.5	17.0	25.1	0.0	0.0	53.6
	(N=126)	NUMBERS	92	137	203	0	0	432
	FEMALE	PERCENT	0.0	16.2	30.2	0.0	0.0	46.4
	(N=109)	NUMBERS	0	130	243	0	0	373
	ALL FISH	PERCENT	11.5	33.2	55.3	0.0	0.0	100.0
	(N=235)	NUMBERS	92	267	446	0	0	805
		STANDARD ERROR	14	21	22	0	0	
MONTANA CREEK	MALE	PERCENT	23.8	20.8	13.4	0.7	0.0	58.7
	(N=158)	NUMBERS	211	184	119	6	0	520
	FEMALE	PERCENT	0.0	19.7	20.8	0.8	0.0	41.3
	(N=111)	NUMBERS	0	175	184	7	0	366
	ALL FISH	PERCENT	23.8	40.5	34.2	1.5	0.0	100.0
	(N=269)	NUMBERS	211	359	303	13	0	886
		STANDARD ERROR	19	22	21	5	0	
ALEXANDER CREEK	MALE	PERCENT	28.4	28.1	6.9	0.0	0.0	63.4
	(N=248)	NUMBERS	520	515	126	0	0	1,161
	FEMALE	PERCENT	1.5	16.7	17.9	0.5	0.0	36.6
	(N=143)	NUMBERS	28	304	328	9	0	669
	ALL FISH	PERCENT	29.9	44.8	24.8	0.5	0.0	100.0
	(N=391)	NUMBERS	548	819	454	9	0	1,830
		STANDARD ERROR	38	41	35	6	0	
DESHKA RIVER	MALE	PERCENT	9.5	30.8	16.2	0.2	0.0	56.7
	(N=309)	NUMBERS	444	1,434	751	9	0	2,638
	FEMALE	PERCENT	0.2	24.4	18.5	0.2	0.0	43.3
	(N=236)	NUMBERS	8	1,135	862	9	0	2,014
	ALL FISH	PERCENT	9.7	55.2	34.7	0.4	0.0	100.0
	(N=545)	NUMBERS	452	2,569	1,613	18	0	4,652
		STANDARD ERROR	56	93	89	11	0	

-Continued-

Appendix B-3. Susitna River sport catch of chinook salmon by age and sex, 1984 (continued).

			PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP					
			1980	1979	1978	1977		
LOCATION	SEX		1.2	1.3	1.4	1.5	2.4	TOTAL
LAKE CREEK	MALE	PERCENT	15.0	21.0	16.0	1.0	0.0	53.0
	(N=159)	NUMBERS	322	451	344	21	0	1,138
	FEMALE	PERCENT	0.7	18.0	27.6	0.7	0.0	47.0
	(N=141)	NUMBERS	15	387	594	14	0	1,010
	ALL FISH	PERCENT	15.7	39.0	43.6	1.7	0.0	100.0
	(N=300)	NUMBERS	337	838	938	35	0	2,148
		STANDARD ERROR	42	56	57	15	0	
MARTIN CREEK	MALE	PERCENT	11.1	31.8	22.2	0.0	0.0	65.1
	(N=41)	NUMBERS	37	107	75	0	0	219
	FEMALE	PERCENT	0.0	11.1	23.8	0.0	0.0	34.9
	(N=22)	NUMBERS	0	37	80	0	0	117
	AL FISH	PERCENT	11.1	42.9	46.0	0.0	0.0	100.0
	(N=63)	NUMBERS	37	144	155	0	0	336
		STANDARD ERROR	12	19	19	0	0	

Appendix B-4. Northern Cook Inlet[1] sport catch of chinook salmon by age and sex, 1984.

			PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP					
			1981	1980	1979	1978	1977	
LOCATION	SEX		1.1	1.2	1.3	1.4	1.5	TOTAL
CHUITNA RIVER	MALE	PERCENT	0.0	16.0	17.7	15.5	0.5	49.7
	(N=90)	NUMBERS	0	181	200	176	6	563
	FEMALE	PERCENT	0.0	1.1	18.2	30.4	0.6	50.3
	(N=91)	NUMBERS	0	13	206	344	6	569
	ALL FISH	PERCENT	0.0	17.1	35.9	45.9	1.1	100.0
	(N=181)	NUMBERS	0	194	406	520	12	1,132
		STANDARD ERROR	0	29	37	39	8	
LITTLE SUSITNA RIVER								
BURMA ROAD	MALE	PERCENT	0.3	4.3	20.3	29.1	0.6	54.6
	(N=178)	NUMBERS	3	44	206	296	6	555
	FEMALE	PERCENT	0.0	0.0	22.1	23.0	0.3	45.4
	(N=148)	NUMBERS	0	0	224	233	3	460
	ALL FISH	PERCENT	0.3	4.3	42.4	52.1	0.9	100.0
	(N=326)	NUMBERS	3	44	430	529	9	1,015
		STANDARD ERROR	3	9	23	23	4	
PARKS HIGHWAY	MALE	PERCENT	0.0	4.8	27.5	27.4	0.0	59.7
	(N=37)	NUMBERS	0	21	118	119	0	258
	FEMALE	PERCENT	0.0	0.0	17.7	22.6	0.0	40.3
	(N=25)	NUMBERS	0	0	77	97	0	174
	ALL FISH	PERCENT	0.0	4.8	45.2	50.0	0.0	100.0
	(N=62)	NUMBERS	0	21	195	216	0	432
		STANDARD ERROR	0	11	26	26	0	
TOTALS LITTLE SUSITNA (INCLUDES BURMA RD AND PARKS HIGHWAY)	MALE	PERCENT	0.3	4.4	21.4	28.9	0.5	55.4
	(N=215)	NUMBERS	4	63	310	418	7	802
	FEMALE	PERCENT	0.0	0.0	21.4	22.9	0.3	44.6
	(N=173)	NUMBERS	0	0	310	331	4	645
	ALL FISH	PERCENT	0.3	4.4	42.8	51.8	0.8	100.0
	(N=388)	NUMBERS	4	63	620	749	11	1,447
		STANDARD ERROR	3	13	31	31	6	

[1] Northern Cook Inlet sport catches not in the Susitna River drainage.

Appendix B-5. Chinook salmon escapement by age and sex, upper Cook Inlet, 1984.

				PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP													
				1982	1981		1980		1979		1978			1977		1976	
SYSTEM	LOCATION	SEX		0.1	0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	2.3	1.5	2.4	2.5	TOTAL
KASILOF RIVER																	
	CROOKED CREEK [1]	MALE	PERCENT	16.4	0.0	0.0	18.7	6.5	0.0	9.0	0.2	5.8	0.0	0.2	0.0	0.0	56.
		(N=246)	NUMBERS	680	0	0	776	270	0	374	8	241	0	8	0	0	2,35
		FEMALE	PERCENT	0.0	0.0	0.0	29.1	0.2	0.2	7.2	0.0	5.8	0.0	0.7	0.0	0.0	43.
		(N=187)	NUMBERS	0	0	0	1,207	8	8	299	0	241	0	29	0	0	1,79
		ALL FISH	PERCENT	16.4	0.0	0.0	47.8	6.7	0.2	16.2	0.2	11.6	0.0	0.9	0.0	0.0	100.
		(N=433)	NUMBERS	680	0	0	1,983	278	8	673	8	482	0	37	0	0	4,14
			STANDARD ERROR	70	0	0	95	48	8	70	8	61	0	18	0	0	
KENAI RIVER																	
	LATE RUN	MALE	PERCENT	0.0	0.0	0.0	0.2	5.3	0.3	7.0	0.0	27.8	0.2	4.0	0.0	0.0	44.
		(N=179)	NUMBERS	0	0	0	80	1,674	80	2,232	0	8,846	80	1,275	0	0	14,26
		FEMALE	PERCENT	0.0	0.0	0.0	0.0	0.3	0.5	9.3	0.0	38.3	0.0	6.0	0.5	0.3	55.
		(N=220)	NUMBERS	0	0	0	0	80	159	2,949	0	12,153	0	1,913	159	80	17,53
		ALL FISH	PERCENT	0.0	0.0	0.0	0.2	5.6	0.8	16.3	0.0	66.1	0.2	10.0	0.5	0.3	100.
		(N=399)	NUMBERS	0	0	0	80	1,754	239	5,181	0	21,039	80	3,188	159	80	31,80
			STANDARD ERROR	0	0	0	79	362	137	585	0	749	79	476	112	79	
	QUARTZ CREEK	ALL FISH	PERCENT	0.0	0.0	0.0	0.0	0.0	0.0	21.6	0.0	74.5	0.0	3.9	0.0	0.0	100.
	(PAST WEIR)	(N=51)	NUMBERS	0	0	0	0	0	0	107	0	371	0	19	0	0	49
			STANDARD ERROR	0	0	0	0	0	0	27	0	29	0	13	0	0	
SUSITNA RIVER																	
	SUNSHINE STATION	MALE	PERCENT	0.0	0.5	7.4	0.2	14.7	0.3	15.9	0.1	10.4	0.0	0.5	0.0	0.0	50.
		(N=617)	NUMBERS	0	586	8,667	234	17,218	351	18,624	117	12,181	0	586	0	0	58,56
		FEMALE	PERCENT	0.0	0.0	0.0	0.2	4.1	0.4	21.3	0.2	23.3	0.0	0.5	0.0	0.0	50.
		(N=618)	NUMBERS	0	0	0	234	4,802	469	24,948	234	27,291	0	586	0	0	58,56
		ALL FISH	PERCENT	0.0	0.5	7.4	0.4	18.8	0.7	37.2	0.3	33.7	0.0	1.0	0.0	0.0	100.
		(N=1,235)	NUMBERS	0	586	8,667	468	22,020	820	43,572	351	39,472	0	1,172	0	0	117,12
			STANDARD ERROR	0	234	868	209	1,296	277	1,603	181	1,568	0	330	0	0	

[1] Preliminary age composition. Proportion by age group taken from original age-length-weight forms provided by Dave Waite, Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement, and Development, Soldotna, Alaska.

Appendix B-6. Subsistence catch of chinook salmon by age and sex, upper Cook Inlet, 1984.

			PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP										
			1981	1980		1979		1978		1977		1976	
FISHERY	SEX		1.1	0.3	1.2	0.4	1.3	1.4	2.3	1.5	2.4	2.5	TOTAL
TYONEK SUBSISTENCE													
	MALE	PERCENT	0.2	0.2	14.2	0.0	20.2	21.5	0.1	0.3	0.5	0.1	57.3
	(N=371)	NUMBER	4	4	335	0	477	504	4	7	11	4	1,350
	FEMALE	PERCENT	0.0	0.0	7.1	0.0	18.2	16.2	0.2	0.5	0.5	0.0	42.7
	(N=276)	NUMBER	0	0	167	0	429	382	4	11	11	0	1,004
	ALL FISH	PERCENT	0.2	0.2	21.3	0.0	38.4	37.7	0.3	0.8	1.0	0.1	100.0
	(N=647)	NUMBER	4	4	502	0	906	886	8	18	22	4	2,354
		STANDARD ERROR	3	3	32	0	38	38	4	7	8	3	

Appendix B-7. Lower Kenai Peninsula sport catch by age and sex, upper Cook Inlet, 1984.

				PERCENT COMPOSITION BY BROOD YEAR AND AGE GROUP				
				1980	1979	1978	1977	
SYSTEM	LOCATION	SEX		1.2	1.3	1.4	1.5	TOTAL
MIXED MARINE	DEEP CREEK	ALL FISH (N=178)	PERCENT	7.9	19.7	65.1	7.3	100.0
			NUMBERS	NA	NA	NA	NA	NA
			STANDARD ERROR	2.0	3.0	3.6	2.0	
LOWER KENAI PENINSULA	DEEP CREEK, ANCHOR, AND NINILCHIK RIVERS	ALL FISH (N=141)	PERCENT	13.5	18.4	65.3	2.8	100.0
			NUMBERS	NA	NA	NA	NA	NA
			STANDARD ERROR	2.9	3.3	4.0	1.4	
KASILOF	KASILOF RIVER	ALL FISH (N=104)	PERCENT	7.7	77.9	14.4	0.0	100.0
			NUMBERS	NA	NA	NA	NA	NA
			STANDARD ERROR	2.6	4.1	3.5	0.0	

APPENDIX C

Length-at-age by sex of chinook salmon in upper Cook Inlet, 1984

Appendix C-1. Lengths (mm) of chinook salmon commercial catches by age and sex, upper Cook Inlet, 1984.

			MEAN LENGTH BY BROOD YEAR AND AGE GROUP										
			1981		1980		1979		1978		1977		1976
FISHERY	SEX		0.2	1.1	0.3	1.2	0.4	1.3	1.4	2.3	1.5	2.4	2.5
SALAMATOF BEACH SET NET	MALE (N=30)	MEAN LENGTH	0.0	0.0	0.0	652.0	0.0	804.0	1050.1	0.0	1110.3	0.0	0.0
		STANDARD ERROR	0.0	0.0	0.0	2.0	0.0	60.4	17.4	0.0	1.8	0.0	0.0
	FEMALE (N=15)	MEAN LENGTH	0.0	0.0	0.0	655.0	0.0	0.0	1034.2	0.0	1092.0	0.0	0.0
		STANDARD ERROR	0.0	0.0	0.0	35.0	0.0	0.0	22.1	0.0	0.0	0.0	0.0
	ALL FISH (N=45)	MEAN LENGTH	0.0	0.0	0.0	653.5	0.0	804.0	1044.3	0.0	1106.6	0.0	0.0
		STANDARD ERROR	0.0	0.0	0.0	14.3	0.0	60.4	13.5	0.0	3.9	0.0	0.0
KALIFONSKY BEACH SET NET	MALE (N=167)	MEAN LENGTH	0.0	495.7	770.0	640.9	1015.3	912.4	1061.1	0.0	1106.5	0.0	0.0
		STANDARD ERROR	0.0	66.3	0.0	9.9	31.4	49.1	18.3	0.0	22.8	0.0	0.0
	FEMALE (N=118)	MEAN LENGTH	0.0	390.0	856.0	646.8	1028.0	857.5	1015.4	0.0	1045.3	962.0	0.0
		STANDARD ERROR	0.0	0.0	34.0	7.9	50.0	14.6	10.5	0.0	33.1	0.0	0.0
	ALL FISH (N=285)	MEAN LENGTH	0.0	486.9	827.3	643.2	1020.4	886.2	1041.7	0.0	1083.9	962.0	0.0
		STANDARD ERROR	0.0	61.2	34.7	6.8	23.6	26.7	11.5	0.0	19.6	0.0	0.0
COHOE/NINILCHIK BEACH SET NET	MALE (N=273)	MEAN LENGTH	670.5	430.9	851.0	635.9	1060.0	839.5	1060.5	0.0	1140.5	1103.0	1192.0
		STANDARD ERROR	49.5	9.4	35.0	8.3	32.3	12.4	7.5	0.0	15.2	0.0	0.0
	FEMALE (N=188)	MEAN LENGTH	664.0	405.6	636.0	638.5	1046.6	840.3	1016.5	0.0	1060.8	1045.0	0.0
		STANDARD ERROR	0.0	15.7	0.0	11.8	34.1	13.4	13.9	0.0	14.3	0.0	0.0
	ALL FISH (N=461)	MEAN LENGTH	668.3	424.9	779.3	636.7	1053.3	839.9	1041.2	0.0	1113.9	1074.0	1192.0
		STANDARD ERROR	28.7	8.2	74.5	6.8	22.3	9.1	7.5	0.0	12.8	29.0	0.0
CENTRAL DISTRICT EASTSIDE TOTALS	MALE (N=509)	MEAN LENGTH	670.5	457.3	781.8	639.8	1048.9	867.2	1063.2	1082.0	1127.6	1103.0	1192.0
		STANDARD ERROR	49.5	27.5	48.5	6.2	21.4	18.3	7.3	0.0	11.2	0.0	0.0
	FEMALE (N=350)	MEAN LENGTH	621.0	403.0	782.7	641.8	1032.4	851.1	1023.8	0.0	1055.9	1003.5	0.0
		STANDARD ERROR	43.0	13.1	75.9	7.0	24.4	10.0	9.7	0.0	13.5	41.5	0.0
	ALL FISH (N=859)	MEAN LENGTH	645.8	447.5	782.1	640.5	1041.1	859.8	1046.2	1082.0	1103.3	1036.7	1192.0
		STANDARD ERROR	30.3	22.9	38.7	4.7	15.7	10.9	6.0	0.0	9.7	40.9	0.0
CENTRAL DISTRICT WESTSIDE SET NET	MALE (N=79)	MEAN LENGTH	0.0	420.0	0.0	596.1	0.0	851.7	979.3	0.0	1142.6	0.0	0.0
		STANDARD ERROR	0.0	0.0	0.0	12.5	0.0	17.1	19.4	0.0	26.8	0.0	0.0
	FEMALE (N=70)	MEAN LENGTH	0.0	0.0	0.0	687.8	0.0	826.4	939.5	0.0	1084.0	763.0	0.0
		STANDARD ERROR	0.0	0.0	0.0	41.8	0.0	11.6	13.3	0.0	0.0	0.0	0.0
	ALL FISH (N=152)	MEAN LENGTH	0.0	420.0	0.0	625.4	0.0	839.1	960.0	0.0	1132.8	763.0	0.0
		STANDARD ERROR	0.0	0.0	0.0	17.6	0.0	10.4	11.2	0.0	24.0	0.0	0.0
CENTRAL DISTRICT DRIFT NET	MALE (N=27)	MEAN LENGTH	611.0	392.5	0.0	617.8	0.0	747.7	1065.0	0.0	0.0	0.0	0.0
		STANDARD ERROR	0.0	13.5	0.0	10.9	0.0	37.7	40.0	0.0	0.0	0.0	0.0
	FEMALE (N=5)	MEAN LENGTH	0.0	0.0	0.0	587.0	0.0	859.0	991.5	0.0	1093.0	0.0	0.0
		STANDARD ERROR	0.0	0.0	0.0	0.0	0.0	0.0	47.5	0.0	0.0	0.0	0.0
	ALL FISH (N=32)	MEAN LENGTH	611.0	392.5	0.0	615.6	0.0	775.5	1050.3	0.0	1093.0	0.0	0.0
		STANDARD ERROR	0.0	13.5	0.0	10.4	0.0	38.5	33.8	0.0	0.0	0.0	0.0

Appendix C-2. Lengths (mm) of Kenai River sport catches of chinook salmon by age and sex, 1984.

			MEAN LENGTH BY BROOD YEAR AND AGE GROUP									
			1981	1980		1979		1978			1977	
FISHERY	SEX		1.1	0.3	1.2	0.4	1.3	0.5	1.4	2.3	1.5	2.4
EARLY RUN	MALE	MEAN LENGTH	440.0	760.0	650.0	0.0	845.5	0.0	1030.9	0.0	1075.0	1090.0
	(N=124)	STANDARD ERROR	0.0	0.0	55.4	0.0	15.6	0.0	10.2	0.0	21.6	0.0
	FEMALES	MEAN LENGTH	425.0	860.0	516.7	0.0	798.5	0.0	956.4	830.0	1082.8	0.0
	(N=107)	STANDARD ERROR	35.0	0.0	135.3	0.0	10.3	0.0	8.7	0.0	25.9	0.0
	ALL FISH	MEAN LENGTH	430.0	810.0	613.6	0.0	821.3	0.0	996.1	830.0	1077.2	1090.0
	(N=231)	STANDARD ERROR	20.8	50.0	54.0	0.0	9.6	0.0	7.5	0.0	16.6	0.0
LATE RUN	MALE	MEAN LENGTH	393.8	700.0	667.2	1070.0	822.4	0.0	1073.9	0.0	1144.4	0.0
	(N=209)	STANDARD ERROR	14.0	0.0	9.4	50.0	14.3	0.0	6.7	0.0	11.8	0.0
	FEMALES	MEAN LENGTH	0.0	0.0	740.0	0.0	919.0	1065.0	1030.9	0.0	1111.1	0.0
	(N=164)	STANDARD ERROR	0.0	0.0	0.0	0.0	11.5	75.0	7.6	0.0	15.1	0.0
	ALL FISH	MEAN LENGTH	393.8	700.0	669.7	1070.0	855.4	1065.0	1051.0	0.0	1128.8	0.0
	(N=376)	STANDARD ERROR	14.0	0.0	9.4	50.0	11.5	75.0	5.3	0.0	9.7	0.0

Appendix C-3. Lengths (mm) of Susitna River sport catches of chinook salmon by age and sex, 1984.

			MEAN LENGTH BY BROOD YEAR AND AGE GROUP			
			1980	1979	1978	1977
LOCATION	SEX		1.2	1.3	1.4	1.5
CLEAR CREEK (CHUNILNA CREEK)	MALE (N=126)	MEAN LENGTH	607.4	835.2	1012.1	1150.0
		STANDARD ERROR	6.9	12.3	10.6	0.0
	FEMALES (N=92)	MEAN LENGTH	0.0	836.1	940.0	905.0
		STANDARD ERROR	0.0	7.2	7.5	145.0
	ALL FISH (N=218)	MEAN LENGTH	607.4	835.6	974.0	986.7
		STANDARD ERROR	6.9	7.5	7.3	117.0
MONTANA CREEK	MALE (N=154)	MEAN LENGTH	621.6	795.2	1000.6	1065.0
		STANDARD ERROR	5.6	11.6	9.6	95.0
	FEMALES (N=111)	MEAN LENGTH	0.0	834.3	939.3	1020.0
		STANDARD ERROR	0.0	8.0	7.1	40.0
	ALL FISH (N=265)	MEAN LENGTH	621.6	814.0	966.3	1042.5
		STANDARD ERROR	5.6	7.3	6.6	44.1
WILLOW CREEK	MALE (N=126)	MEAN LENGTH	625.8	830.3	995.6	0.0
		STANDARD ERROR	6.2	16.9	8.9	0.0
	FEMALES (N=109)	MEAN LENGTH	0.0	844.2	948.8	0.0
		STANDARD ERROR	0.0	9.4	7.3	0.0
	ALL FISH (N=235)	MEAN LENGTH	625.8	837.1	970.4	0.0
		STANDARD ERROR	6.2	9.8	6.0	0.0
ALEXANDER CREEK	MALE (N=248)	MEAN LENGTH	584.5	769.9	924.8	0.0
		STANDARD ERROR	5.2	6.6	10.8	0.0
	FEMALES (N=143)	MEAN LENGTH	647.5	797.5	885.5	960.0
		STANDARD ERROR	23.0	6.1	6.1	40.0
	ALL FISH (N=391)	MEAN LENGTH	587.8	780.1	896.4	960.0
		STANDARD ERROR	5.2	4.8	5.6	40.0
DESHKA RIVER	MALE (N=309)	MEAN LENGTH	587.4	782.5	952.5	1109.0
		STANDARD ERROR	6.2	5.9	6.7	0.0
	FEMALES (N=236)	MEAN LENGTH	600.0	788.2	900.7	900.0
		STANDARD ERROR	0.0	4.3	5.0	0.0
	ALL FISH (N=545)	MEAN LENGTH	587.6	785.0	924.8	1004.5
		STANDARD ERROR	6.1	3.8	4.5	104.5
LAKE CREEK	MALE (N=159)	MEAN LENGTH	605.1	846.2	1015.5	1140.0
		STANDARD ERROR	6.5	10.5	11.3	10.4
	FEMALES (N=141)	MEAN LENGTH	735.0	876.5	963.3	1050.0
		STANDARD ERROR	35.0	5.7	5.3	20.0
	ALL FISH (N=300)	MEAN LENGTH	610.6	860.2	982.4	1104.0
		STANDARD ERROR	7.4	6.4	5.8	23.6
MARTIN CREEK	MALE (N=41)	MEAN LENGTH	640.7	832.0	997.1	0.0
		STANDARD ERROR	7.6	21.5	22.0	0.0
	FEMALES (N=22)	MEAN LENGTH	0.0	875.7	967.3	0.0
		STANDARD ERROR	0.0	22.1	9.5	0.0
	ALL FISH (N=63)	MEAN LENGTH	640.7	843.3	981.7	0.0
		STANDARD ERROR	7.6	17.2	11.8	0.0

Appendix C-4. Lengths (mm) of northern Cook Inlet[1] sport catches of chinook salmon by age and sex, 1984.

			MEAN LENGTH BY BROOD YEAR AND AGE GROUP				
			1981	1980	1979	1978	1977
LOCATION	SEX		1.1	1.2	1.3	1.4	1.5
CHUITNA RIVER	MALE	MEAN LENGTH	0.0	605.3	808.6	988.8	1140.0
	(N=90)	STANDARD ERROR	0.0	10.5	13.0	14.5	0.0
	FEMALES	MEAN LENGTH	0.0	630.0	810.0	920.1	1010.0
	(N=91)	STANDARD ERROR	0.0	10.0	8.2	5.8	0.0
	ALL FISH	MEAN LENGTH	0.0	606.9	809.3	943.3	1075.0
	(N=181)	STANDARD ERROR	0.0	9.9	7.6	7.1	65.0
LITTLE SUSITNA RIVER							
BURMA ROAD	MALE	MEAN LENGTH	490.0	622.9	835.8	992.5	1055.0
	(N=173)	STANDARD ERROR	0.0	14.9	11.0	6.1	45.0
	FEMALES	MEAN LENGTH	0.0	0.0	835.9	929.6	1000.0
	(N=145)	STANDARD ERROR	0.0	0.0	4.7	5.9	0.0
	ALL FISH	MEAN LENGTH	490.0	622.9	835.9	964.7	1036.7
	(N=318)	STANDARD ERROR	0.0	14.9	5.8	4.9	31.8
PARKS HIGHWAY	MALE	MEAN LENGTH	0.0	606.7	840.6	955.9	0.0
	(N=37)	STANDARD ERROR	0.0	NA	NA	NA	0.0
	FEMALES	MEAN LENGTH	0.0	0.0	831.0	947.1	0.0
	(N=24)	STANDARD ERROR	0.0	0.0	NA	NA	0.0
	ALL FISH	MEAN LENGTH	0.0	606.7	836.9	951.9	0.0
	(N=61)	STANDARD ERROR	0.0	NA	NA	NA	0.0

[1] Northern Cook Inlet catches not in the Susitna River.

Appendix C-5. Lengths (mm) of chinook salmon escapement by age and sex, upper Cook Inlet, 1984.

				MEAN LENGTH BY BROOD YEAR AND AGE GROUP												
				1982	1981		1980		1979		1978			1977		1976
SYSTEM	LOCATION	SEX		0.1	0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	2.3	1.5	2.4	2.5
KASILOF RIVER		MALE	MEAN LENGTH	362.3	0.0	0.0	764.8	581.4	0.0	750.5	940.0	890.4	0.0	970.0	0.0	0.0
	CROOKED CREEK	(N=246)	STANDARD ERROR	3.6	0.0	0.0	11.7	10.3	0.0	13.1	0.0	16.8	0.0	0.0	0.0	0.0
		FEMALE	MEAN LENGTH	0.0	0.0	0.0	768.5	550.0	890.0	744.8	0.0	854.0	0.0	838.3	0.0	0.0
		(N=187)	STANDARD ERROR	0.0	0.0	0.0	3.3	0.0	0.0	10.7	0.0	11.6	0.0	36.6	0.0	0.0
		ALL FISH	MEAN LENGTH	362.3	0.0	0.0	767.1	580.3	890.0	748.0	940.0	872.2	0.0	871.3	0.0	0.0
		(N=433)	STANDARD ERROR	3.6	0.0	0.0	5.0	10.0	0.0	8.6	0.0	10.4	0.0	41.9	0.0	0.0
KENAI RIVER		MALE	MEAN LENGTH	0.0	0.0	0.0	740.0	675.5	1020.0	889.5	0.0	1077.7	1010.0	1132.5	0.0	0.0
	LATE RUN	(N-179)	STANDARD ERROR	0.0	0.0	0.0	0.0	7.3	0.0	19.5	0.0	5.9	0.0	17.7	0.0	0.0
		FEMALE	MEAN LENGTH	0.0	0.0	0.0	0.0	665.0	982.5	928.6	0.0	1023.1	0.0	1060.2	1107.5	960.0
		(N=219)	STANDARD ERROR	0.0	0.0	0.0	0.0	0.0	62.5	9.4	0.0	4.0	0.0	10.9	27.5	0.0
		ALL FISH	MEAN LENGTH	0.0	0.0	0.0	740.0	675.0	995.0	912.8	0.0	1046.0	1010.0	1089.9	1107.5	960.0
		(N=400)	STANDARD ERROR	0.0	0.0	0.0	0.0	7.0	38.2	10.1	0.0	3.8	0.0	11.2	27.5	0.0
	QUARTZ CREEK	ALL FISH	MEAN LENGTH	0.0	0.0	0.0	0.0	0.0	0.0	795.0	0.0	942.8	0.0	1082.5	0.0	0.0
	(PAST WIER)	(N=51)	STANDARD ERROR	0.0	0.0	0.0	0.0	0.0	0.0	45.8	0.0	55.1	0.0	31.8	0.0	0.0
SUSITNA RIVER																
	SUNSHINE STATION	MALE	MEAN LENGTH	0.0	434.0	348.0	634.0	585.0	927.0	792.0	855.0	932.0	0.0	1037.0	0.0	0.0
		(N=617)	STANDARD ERROR	NA	NA	3.6	NA	4.8	NA	6.6	NA	8.7	NA	NA	NA	NA
		FEMALE	MEAN LENGTH	0.0	0.0	0.0	632.0	618.0	815.0	807.0	843.0	912.0	0.0	950.0	0.0	0.0
		(N=618)	STANDARD ERROR	NA	NA	NA	NA	8.9	NA	3.8	NA	4.1	NA	NA	NA	NA
		ALL FISH	MEAN LENGTH	0.0	434.0	348.0	663.0	592.0	865.0	801.0	851.0	918.0	0.0	994.0	0.0	0.0
		(N=1235)	STANDARD ERROR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix C-6. Lengths (mm) of subsistence catches of chinook salmon by age and sex, upper Cook Inlet, 1984.

			MEAN LENGTH BY BROOD YEAR AND AGE GROUP										
			1981	1980		1979		1978			1977		1976
LOCATION	SEX		1.1	0.3	1.2	0.4	1.3	0.5	1.4	2.3	1.5	2.4	2.5
TYONEK SUBSISTENCE	MALE	MEAN LENGTH	410	770	609.1	0.0	833.9	0.0	963.6	845	1085	1022.7	1068
	(N=371)	STANDARD ERROR	0	0	6.67	0.0	5.97	0.0	5.14	0	15	41.07	0
	FEMALE	MEAN LENGTH	0	0	638.3	0.0	814.9	0.0	922.6	870	924	973.3	0
	(N=276)	STANDARD ERROR	0	0	8.89	0.0	6.04	0.0	4.91	0	8.33	4.41	0
	ALL FISH	MEAN LENGTH	410	770	618.8	0.0	824.9	0.0	945.9	857.5	988.4	998	1068
	(N=647)	STANDARD ERROR	0	0	5.45	0.0	4.29	0.0	3.83	12.5	39.98	21.52	0

Appendix C-7. Lengths (mm) of lower Kenai Peninsula sport catches of chinook salmon by age, 1984.

SYSTEM	LOCATION	SEX		MEAN LENGTH BY BROOD YEAR AND AGE GROUP			
				1980	1979	1978	1977
				1.2	1.3	1.4	1.5
MIXED MARINE	DEEP CREEK	ALL FISH (N=178)	MEAN LENGTH	700.0	873.0	1,092.0	1,130.0
			STANDARD ERROR	NA	NA	NA	NA
LOWER KENAI PENINSULA	DEEP CREEK,ANCHOR, AND NINILCHIK RIVERS	ALL FISH (N=141)	MEAN LENGTH	608.0	777.0	894.0	822.0
			STANDARD ERROR	8.1	9.6	5.3	65.4
KASILOF	KASILOF RIVER	ALL FISH (N=104)	MEAN LENGTH	688.8	851.1	969.7	0.0
			STANDARD ERROR	23.7	6.4	23.1	NA

APPENDIX D

Migratory timing summaries of chinook salmon catches and escapements in upper Cook Inlet, 1984

Appendix D-1. Catch, effort, C.P.U.E., and proportion by date of chinook salmon catches from the eastside set net commercial fishery, 1984.

				CPUE PROPORTION	
DATE	EFFORT[1]	CATCH	CPUE	DAILY	CUMULATIVE
JULY 2	108	281	2.60	0.084	0.084
JULY 6	128	708	5.53	0.178	0.262
JULY 9	218	629	2.89	0.093	0.354
JULY 10	182	247	1.36	0.044	0.398
JULY 11	127	165	1.30	0.042	0.440
JULY 12	169	355	2.10	0.067	0.507
JULY 13	127	265	2.09	0.067	0.575
JULY 16	363	773	2.13	0.068	0.643
JULY 17	187	421	2.25	0.072	0.715
JULY 18	353	703	2.10	0.067	0.783
JULY 27	63	68	1.08	0.035	0.817
JULY 30	225	595	2.64	0.085	0.902
AUGUST 3	223	302	1.35	0.043	0.946
AUGUST 6	186	157	0.84	0.027	0.973
AUGUST 10	166	86	0.52	0.017	0.989
AUGUST 13	142	49	0.35	0.011	1.000
TOTALS	2,967	5,804	31.13		MEAN=JULY 15 VARIANCE=108.9

[1] Number of landings.

Appendix D-2. Catch, effort, C.P.U.E., and proportion by day of chinook salmon catches from the Central District drift net commercial fishery, 1984.

				C.P.U.E. PROPORTION	
DATE	EFFORT[1]	CATCH	CPUE	DAILY	CUMULATIVE
JUNE 25	224	42	0.19	0.131	0.131
JUNE 29	159	19	0.12	0.083	0.214
JULY 2	209	75	0.36	0.248	0.462
JULY 6	545	80	0.15	0.103	0.565
JULY 9	562	46	0.08	0.055	0.621
JULY 10	329	33	0.10	0.069	0.690
JULY 13	567	34	0.06	0.041	0.731
JULY 16	559	64	0.11	0.076	0.807
JULY 18	572	40	0.07	0.048	0.855
JULY 27	520	16	0.03	0.021	0.876
JULY 30	516	34	0.07	0.048	0.924
AUGUST 3	477	12	0.03	0.021	0.945
AUGUST 6	415	5	0.01	0.007	0.952
AUGUST 10	286	2	0.01	0.007	0.959
AUGUST 13	275	5	0.02	0.014	0.972
AUGUST 17	58	0	0.00	0.000	0.972
AUGUST 20	45	2	0.04	0.028	1.000
AUGUST 24	17	0	0.00	0.000	1.000
AUGUST 27	5	0	0.00	0.000	1.000
AUGUST 31	15	0	0.00	0.000	1.000
SEPTEMBER 3	8	0	0.00	0.000	1.000
SEPTEMBER 7	12	0	0.00	0.000	1.000
SEPTEMBER 10	7	0	0.00	0.000	1.000
TOTALS	6,382	509	1.45		MEAN=JULY 9 VARIANCE=178.0

[1] Number of landings.

Appendix D-3. Catch, effort, C.P.U.E., and proportions by day of chinook salmon catches from the Central District westside set net commercial fishery, 1984.

				C.P.U.E. PROPORTION	
DATE	EFFORT[1]	CATCH	CPUE	DAILY	CUMULATIVE
JUNE 18	29	370	12.76	0.320	0.320
JUNE 22	25	131	5.24	0.131	0.451
JUNE 25	20	140	7.00	0.175	0.627
JUNE 29	39	137	3.51	0.088	0.715
JULY 2	39	82	2.10	0.053	0.767
JULY 6	44	76	1.73	0.043	0.810
JULY 9	47	27	0.57	0.014	0.825
JULY 11	26	10	0.38	0.010	0.834
JULY 12	31	28	0.90	0.023	0.857
JULY 13	46	32	0.70	0.018	0.874
JULY 14	11	3	0.27	0.007	0.881
JULY 15	25	20	0.80	0.020	0.901
JULY 16	39	14	0.36	0.009	0.910
JULY 17	21	4	0.19	0.005	0.915
JULY 18	40	11	0.27	0.007	0.922
JULY 19	19	6	0.32	0.008	0.930
JULY 20	35	10	0.29	0.007	0.937
JULY 21	14	5	0.36	0.009	0.946
JULY 22	38	10	0.26	0.007	0.953
JULY 23	35	12	0.34	0.009	0.961
JULY 24	33	9	0.27	0.007	0.968
JULY 25	28	2	0.07	0.002	0.970
JULY 26	33	12	0.36	0.009	0.979
JULY 27	50	7	0.14	0.004	0.982
JULY 30	33	7	0.21	0.005	0.987
AUGUST 3	42	4	0.10	0.003	0.990
AUGUST 6	41	3	0.07	0.002	0.992
AUGUST 10	37	5	0.14	0.004	0.995
AUGUST 13	34	5	0.15	0.004	0.999
AUGUST 17	27	1	0.04	0.001	1.000
AUGUST 20	40	1	0.02	0.001	1.000
AUGUST 24	33	0	0.00	0.000	1.000
AUGUST 27	21	0	0.00	0.000	1.000
AUGUST 31	9	0	0.00	0.000	1.000
TOTALS	1,084	1,184	39.92		MEAN=JUNE 27 VARIANCE=164.8

[1] Number of landings.

Appendix D-4. Catch, effort, and C.P.U.E., and proportion by day of chinook salmon catches from the Northern District set net commercial fishery, 1984.

DATE	EFFORT[1]	CATCH	CPUE	C.P.U.E. PROPORTION DAILY	C.P.U.E. PROPORTION CUMULATIVE
JUNE 25	37	209	5.65	0.387	0.387
JUNE 29	50	151	3.02	0.207	0.594
JULY 2	72	206	2.86	0.196	0.790
JULY 6	84	69	0.82	0.056	0.846
JULY 9	105	98	0.92	0.063	0.909
JULY 13	100	32	0.32	0.022	0.931
JULY 16	161	24	0.15	0.010	0.941
JULY 18	202	22	0.11	0.008	0.949
JULY 19	114	17	0.15	0.010	0.959
JULY 20	13	2	0.15	0.010	0.969
JULY 27	171	21	0.12	0.008	0.977
JULY 30	164	17	0.10	0.007	0.984
JULY 31	13	0	0.00	0.000	0.984
AUGUST 3	150	8	0.05	0.003	0.988
AUGUST 6	111	5	0.05	0.003	0.991
AUGUST 10	63	1	0.02	0.001	0.992
AUGUST 13	28	1	0.04	0.003	0.995
AUGUST 17	30	2	0.07	0.005	1.000
AUGUST 20	26	0	0.00	0.000	1.000
AUGUST 24	14	0	0.00	0.000	1.000
AUGUST 27	8	0	0.00	0.000	1.000
AUGUST 31	6	0	0.00	0.000	1.000
TOTALS	1,722	885	14.6		MEAN=JULY 1 VARIANCE=71.6

[1] Number of landings.

Appendix D-5. Catch, effort, C.P.U.E., and proportion by day of chinook salmon catches from the Kalgin Island set net commercial fishery, 1984.

DATE	EFFORT[1]	CATCH	CPUE	C.P.U.E. PROPORTION DAILY	C.P.U.E. PROPORTION CUMULATIVE
JUNE 25	18	123	6.83	0.314	0.314
JUNE 29	21	88	4.19	0.193	0.507
JULY 2	18	51	2.83	0.130	0.637
JULY 6	19	40	2.11	0.097	0.734
JULY 9	22	36	1.64	0.075	0.809
JULY 13	19	40	2.11	0.097	0.906
JULY 16	16	12	0.08	0.003	0.910
JULY 18	20	3	0.02	0.001	0.911
JULY 22	4	0	0	0.000	0.911
JULY 27	22	6	0.27	0.012	0.923
JULY 30	21	6	0.29	0.013	0.936
AUGUST 3	22	2	0.09	0.004	0.940
AUGUST 6	23	5	0.22	0.010	0.951
AUGUST 10	22	11	0.50	0.023	0.974
AUGUST 13	22	12	0.55	0.025	0.999
AUGUST 17	16	0	0.00	0.000	0.999
AUGUST 20	19	0	0.00	0.000	0.999
AUGUST 24	13	1	0.02	0.001	1.000
AUGUST 27	6	0	0.00	0.000	1.000
AUGUST 31	9	0	0.00	0.000	1.000
TOTALS	352	436	21.74		MEAN=JULY 4 VARIANCE=146.3

[1] Number of landings.

Appendix D-6. Catch, effort, C.P.U.E., and proportion by day of chinook salmon catches from the Tyonek subsistence and Kasilof personal-use fisheries, 1984.

	TYONEK SUBSISTENCE					KASILOF PERSONAL USE			
				C.P.U.E. PROPORTION				C.P.U.E. PROPORTION	
DATE	EFFORT [1]	CATCH	CPUE [2]	DAILY	CUMULATIVE	EFFORT [3]	CATCH	DAILY	CUMULATIVE
MAY 15	107	8	0.07	0.003	0.003				
MAY 17	131	15	0.11	0.005	0.008				
MAY 18	73	22	0.30	0.012	0.020				
MAY 22	126	161	1.28	0.053	0.072				
MAY 24	177	225	1.27	0.052	0.125				
MAY 25	125	61	0.49	0.020	0.145				
MAY 29	202	369	1.83	0.075	0.220				
MAY 31	85	304	3.58	0.147	0.367				
JUNE 1	151	148	0.98	0.040	0.408				
JUNE 5	72	92	1.28	0.053	0.460				
JUNE 7	109	336	3.08	0.127	0.587				
JUNE 8	48	187	3.89	0.160	0.747				
JUNE 12	115	272	2.36	0.097	0.844				
JUNE 14	56	60	1.07	0.044	0.888				
JUNE 15	35	62	1.77	0.073	0.961				
JUNE 16	26	12	0.46	0.019	0.980				
JUNE 21						143	27	0.164	0.164
JUNE 22						166	22	0.133	0.297
JUNE 23	40	20	0.50	0.021	1.000	154	40	0.242	0.540
JUNE 24						148	8	0.048	0.588
JUNE 25						100	13	0.079	0.667
JUNE 26						98	20	0.121	0.788
JUNE 27						72	14	0.085	0.873
JUNE 28						65	21	0.127	1.000
				MEAN=JUNE 5					MEAN=JUNE 24
TOTALS	1,678	2,354	24.32	VARIANCE=61.6		946	165		VARIANCE=5.6

[1] Number of fathoms.

[2] Chinook/fathoms.

[3] Number of nets.

Appendix D-7. Catch, effort, C.P.U.E., and proportion by day of chinook salmon catches of the Kenai River sport fishery, 1984.

DATE	CPUE[1]	C.P.U.E. DAILY	PROPORTION CUMULATIVE
JUNE 1	.00	.000	0.000
JUNE 2	.00	.000	.000
JUNE 3	0.03	0.016	0.016
JUNE 4	0.05	0.027	0.044
JUNE 5	0.07	0.039	0.083
JUNE 6	0.09	0.051	0.134
JUNE 7	0.06	0.032	0.166
JUNE 8	0.06	0.033	0.198
JUNE 9	0.03	0.015	0.213
JUNE 10	0.03	0.017	0.230
JUNE 11	0.04	0.022	0.252
JUNE 12	0.02	0.011	0.264
JUNE 13	0.02	0.010	0.274
JUNE 14	0.02	0.009	0.283
JUNE 15	0.01	0.008	0.291
JUNE 16	0.01	0.007	0.299
JUNE 17	0.04	0.020	0.319
JUNE 18	0.04	0.023	0.342
JUNE 19	0.03	0.015	0.357
JUNE 20	0.01	0.006	0.363
JUNE 21	0.04	0.023	0.386
JUNE 22	0.03	0.016	0.402
JUNE 23	0.01	0.008	0.410
JUNE 24	0.03	0.015	0.425
JUNE 25	0.01	0.006	0.431
JUNE 26	0.01	0.003	0.434
JUNE 27	0.01	0.005	0.438
JUNE 28	0.01	0.005	0.443
JUNE 29	0.01	0.006	0.450
JUNE 30	0.01	0.007	0.457
JULY 1	0.01	0.003	0.459
	EARLY KENAI (JUNE 1-JULY 1)		MEAN=JUNE 13 VARANCE=57.6
JULY 2	0.02	0.013	0.473
JULY 3	0.03	0.018	0.490
JULY 4	0.03	0.015	0.506
JULY 5	0.03	0.015	0.521
JULY 6	0.03	0.015	0.537
JULY 7	0.01	0.006	0.542
JULY 8	0.02	0.010	0.553
JULY 9	0.02	0.010	0.562
JULY 10	0.02	0.010	0.572
JULY 11	0.01	0.008	0.580
JULY 12	0.02	0.012	0.592
JULY 13	0.01	0.007	0.599
JULY 14	0.01	0.007	0.606
JULY 15	0.05	0.028	0.634
JULY 16	0.03	0.018	0.652
JULY 17	0.04	0.022	0.674
JULY 18	0.06	0.033	0.707
JULY 19	0.06	0.037	0.743
JULY 20	0.04	0.022	0.765
JULY 21	0.04	0.023	0.788
JULY 22	0.05	0.027	0.816
JULY 23	0.07	0.039	0.855
JULY 24	0.05	0.028	0.883
JULY 25	0.02	0.011	0.894
JULY 26	0.02	0.010	0.904
JULY 27	0.05	0.028	0.932
JULY 28	0.02	0.011	0.943
JULY 29	0.02	0.010	0.953
JULY 30	0.03	0.019	0.972
JULY 31	0.05	0.028	1.000
	LATE KENAI (JULY 2-JULY 31)		MEAN=JULY 18 VARIANCE=66.1
TOTALS	1.75		MEAN=JULY 2 VARIANCE=364.9

[1] Catch per hour of interviewed anglers.

Appendix D-8. Catch, effort, C.P.U.E., and proportion by day of chinook salmon from the Deshka River sport catch, 1984.

DATE WEEKLY PERIODS	EFFORT[1]	TOTAL WEEKLY HARVEST	HARVEST/ ANGLER DAY	PROPORTION[2] DAILY	PROPORTION[2] CUMULATIVE
5/25-5/31	1,606.25	1,011.36	0.63	0.371	0.371
6/1-6/7	1,400.90	813.15	0.58	0.298	0.669
6/8-6/14	744.57	469.85	0.63	0.172	0.841
6/15-6/21	374.33	286.40	0.77	0.105	0.946
6/22-6/28	146.05	123.40	0.84	0.045	0.991
6/29-7/5	18.37	24.69	1.34	0.009	1.000
TOTALS	4,290.47	2,728.84			MEAN=JUNE 8-14 VARIANCE=72.5

[1] Angler days.

[2] Proportions are based on weekly harvest.

Appendix D-9. Catch, effort, C.P.U.E., and proportion by day of chinook salmon catches from the Sunshine Station fishwheels, 1984.

DATE	EFFORT[1]	CATCH	CPUE[2]	C.P.U.E. PROPORTION DAILY	C.P.U.E. PROPORTION CUMULATIVE
JUNE 4	31.0	2	0.06	0.001	0.001
JUNE 5	76.0	53	0.70	0.009	0.010
JUNE 6	94.0	138	1.47	0.018	0.028
JUNE 7	90.0	56	0.62	0.008	0.035
JUNE 8	93.0	91	0.98	0.012	0.047
JUNE 9	91.0	202	2.22	0.027	0.075
JUNE 10	93.0	172	1.85	0.023	0.097
JUNE 11	96.0	332	3.46	0.043	0.140
JUNE 12	96.0	377	3.93	0.048	0.188
JUNE 13	88.0	249	2.83	0.035	0.223
JUNE 14	79.5	167	2.10	0.026	0.249
JUNE 15	91.0	261	2.87	0.035	0.284
JUNE 16	80.0	156	1.95	0.024	0.308
JUNE 17	72.0	24	0.33	0.004	0.312
JUNE 18	85.0	122	1.44	0.018	0.330
JUNE 19	94.5	571	6.04	0.074	0.405
JUNE 20	92.0	623	6.77	0.083	0.488
JUNE 21	96.0	336	3.50	0.043	0.531
JUNE 22	96.0	345	3.59	0.044	0.575
JUNE 23	96.0	450	4.69	0.058	0.633
JUNE 24	96.0	291	3.03	0.037	0.670
JUNE 25	90.5	334	3.69	0.045	0.716
JUNE 26	96.0	393	4.09	0.050	0.766
JUNE 27	95.0	257	2.71	0.033	0.799
JUNE 28	96.0	174	1.81	0.022	0.822
JUNE 29	96.0	240	2.50	0.031	0.852
JUNE 30	94.5	234	2.48	0.030	0.883
JULY 1	96.0	162	1.69	0.021	0.904
JULY 2	94.0	136	1.45	0.018	0.922
JULY 3	96.0	86	0.90	0.011	0.933
JULY 4	96.0	63	0.66	0.008	0.941
JULY 5	94.5	64	0.68	0.008	0.949
JULY 6	96.0	63	0.66	0.008	0.957
JULY 7	95.0	53	0.56	0.007	0.964
JULY 8	92.0	55	0.60	0.007	0.971
JULY 9	92.0	39	0.42	0.005	0.977
JULY 10	96.0	28	0.29	0.004	0.980
JULY 11	96.0	18	0.19	0.002	0.982
JULY 12	96.0	13	0.14	0.002	0.984
JULY 13	91.5	17	0.19	0.002	0.986
JULY 14	94.0	23	0.24	0.003	0.989
JULY 15	96.0	13	0.14	0.002	0.991
JULY 16	96.0	14	0.15	0.002	0.993
JULY 17	96.0	5	0.05	0.001	0.993
JULY 18	96.0	4	0.04	0.001	0.994
JULY 19	92.5	6	0.06	0.001	0.995
JULY 20	94.0	7	0.07	0.001	0.996
JULY 21	93.5	5	0.05	0.001	0.996
JULY 22	95.0	2	0.02	.000	0.997
JULY 23	96.0	8	0.08	0.001	0.998
JULY 24	81.0	1	0.01	.000	0.998
JULY 25	88.5	3	0.03	.000	0.998
JULY 26	74.0	3	0.04	.000	0.999
JULY 27	63.5	2	0.03	.000	0.999
JULY 28	68.5	0	0.00	0.000	0.999
JULY 29	81.0	0	0.00	0.000	0.999
JULY 30	90.0	0	0.00	0.000	0.999
JULY 31	88.5	2	0.02	.000	0.999
AUGUST 1	75.5	2	0.03	.000	1.000
AUGUST 2	76.0	2	0.03	.000	1.000
AUGUST 3	84.0	0	0.00	0.000	1.000
AUGUST 4	79.0	1	0.01	.000	1.000
AUGUST 5	85.0	0	0.00	0.000	1.000
TOTALS	5,608.5	7,550	81.23		MEAN=JUNE 21 VARIANCE=71.9

[1] Number of fishwheel hours.

[2] Number of fish caught per fishwheel hour.

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