

ADF&G TECHNICAL DATA REPORT NO. 181
(Limited Distribution)

STATE OF ALASKA
Bill Sheffield, Governor



ORIGINS OF SOCKEYE SALMON IN THE FISHERIES OF UPPER COOK INLET,
1983

By:

Beverly A. Cross
William E. Goshert
and
Debbie L. Hicks

September 1986

ALASKA DEPARTMENT OF FISH AND GAME
P.O. Box 3-2000, Juneau, Alaska 99802

Don W. Collinsworth
Commissioner

ADF&G TECHNICAL DATA REPORTS

This series of reports is designed to facilitate prompt reporting of data from studies conducted by the Alaska Department of Fish and Game, especially studies which may be of direct and immediate interest to scientists of other agencies.

The primary purpose of these reports is presentation of data. Description of programs and data collection methods is included only to the extent required for interpretation of the data. Analysis is generally limited to that necessary for clarification of data collection methods and interpretation of the basic data. No attempt is made in these reports to present analysis of the data relative to its ultimate or intended use.

Data presented in these reports is intended to be final, however, some revisions may occasionally be necessary. Minor revision will be made via errata sheets. Major revisions will be made in the form of revised reports.

ORIGINS OF SOCKEYE SALMON IN THE FISHERIES OF
UPPER COOK INLET, 1983

By

Beverly A. Cross

William E. Goshert

and

Debbie L. Hicks

Alaska Department of Fish and Game
Division of Commercial Fisheries
Anchorage, Alaska

September 1986

TABLE OF CONTENTS

	<u>Page</u>
LIST OF FIGURES	i
LIST OF TABLES	ii
LIST OF APPENDICES	iv
ABSTRACT	v
INTRODUCTION	1
METHODS	3
Catches and Escapements	3
Age Composition	3
Commercial Catch	4
Sport and Personal-Use Catch	4
Escapements	4
Catch Apportionment	4
Scale Pattern Measurements	5
Discriminant Analysis	5
Age 1.3 Model Construction	5
Classification of Age 1.3 Samples	9
Age 1.2 Model Construction	10
Classification of Age 1.2 Samples	13
Catch Allocation for the "Other" Age Groups	14
Returns	17
RESULTS AND DISCUSSION	17
Catches and Escapements	17
Age Composition	17
Classification Models	24
Age 1.3 Models	24
Age 1.2 Models	34
Catch Apportionment	40
Age 1.3 Catch Apportionment with Scale Pattern Analysis	40
Age 1.2 Catch Apportionment with Scale Pattern Analysis	40

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Catch Apportionment for all Ages	50
Returns by River System	50
Exploitation Rates	50
Returns Per Spawner	58
ACKNOWLEDGMENTS	58
LITERATURE CITED	63
APPENDICES	65

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1.	The Upper Cook Inlet area showing the location of the Northern and Central Districts and the major sockeye salmon spawning drainages	2
2.	Age 1.3 sockeye salmon scales showing the zones measured to generate the variables to build linear discriminant functions	6
3.	Number of circuli in the first zone of freshwater growth from scales taken from escapements of age 1.2 sockeye salmon in the Kenai River and Hidden Creek	11
4.	Size of the first zone of freshwater growth measured from scales taken from escapements of age 1.2 sockeye salmon in the Kenai River and Hidden Creek	12

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Scale variables screened for linear discriminant analysis of ages 1.3 and 1.2 sockeye salmon, Upper Cook Inlet, 1983	7
2. Sockeye salmon commercial catch in numbers of fish by fishery and date, Upper Cook Inlet, 1983	18
3. Escapement of sockeye salmon in Upper Cook Inlet, 1983 . . .	20
4. Age composition by fishery of the commercial sockeye salmon harvest, Upper Cook Inlet, 1983	22
5. Age composition by river of sockeye salmon escapement, Upper Cook Inlet, 1983	25
6. Mean (\bar{x}) and standard error (S.E.) of age 1.3 scale variables used to construct linear discriminant functions in 1983	27
7. Classification matrices from discriminant analyses of age 1.3 sockeye salmon scales from the Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers, Upper Cook Inlet, 1983	28
8. Mean (\bar{x}) and standard error (S.E.) of age 1.2 scale variables used to construct linear discriminant functions in 1983	35
9. Classification matrices from discriminant analyses of age 1.2 sockeye salmon scales from the Susitna, Kenai, Kasilof, Fish, Hidden, Big, and McArthur Rivers, Upper Cook Inlet, 1983 . .	36
10. Run composition estimates and 90% confidence intervals calculated from scale pattern analyses of age 1.3 sockeye salmon by fishery and date for Upper Cook Inlet, 1983 . . .	41
11. Estimated numbers of sockeye salmon aged 1.3 river harvested in Upper Cook Inlet	45
12. Run composition estimates and 90% confidence intervals calculated from scale pattern analyses of age 1.2 sockeye salmon by fishery and date for Upper Cook Inlet, 1983	47
13. Estimated numbers of sockeye salmon aged 1.2 by river harvested in the Central District drift and Northern District east-side set net fisheries, Upper Cook Inlet, 1983	49
14. Run composition estimates of the 1983 Upper Cook Inlet sockeye salmon harvest by age group and fishery	51

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
15. Catch of sockeye salmon by run and by fishery, Upper Cook Inlet, 1983	53
16. Catch, escapement, and return of sockeye salmon by age group and run, Upper Cook Inlet, 1983	54
17. Returns-per-spawner for sockeye salmon from the Susitna River, Upper Cook Inlet	59
18. Returns-per-spawner for sockeye salmon from the Kenai River, Upper Cook Inlet	60
19. Returns-per-spawner for sockeye salmon from the Kasilof River, Upper Cook Inlet	61
20. Returns-per-spawner for sockeye salmon from the Crescent River, Upper Cook Inlet	62

LIST OF APPENDICES

<u>Appendix Table</u>	<u>Page</u>
1. Run composition estimates of sockeye salmon catches by age group and date for the Central District drift fishery, Upper Cook Inlet, 1983	66
2. Run composition estimates of sockeye salmon catches by age group and date for the Salamatof Beach set net fishery, Upper Cook Inlet, 1983	70
3. Run composition estimates of sockeye salmon catches by age group and date for the Kalifonsky Beach set net fishery, Upper Cook Inlet, 1983	71
4. Run composition estimates of sockeye salmon catches by age group and date for the Cohoe/Ninilchik Beach set net fishery, Upper Cook Inlet, 1983	72
5. Run composition estimates of sockeye salmon catches by age group and date for the Kalgin Island set net fishery, Upper Cook Inlet, 1983	74
6. Run composition estimates of sockeye salmon catches by age group and date for the Central District west-side set net fishery, Upper Cook Inlet, 1983	75
7. Run composition estimates of sockeye salmon catches by age group and date for the Northern District east-side set net fishery, Upper Cook Inlet, 1983	76
8. Run composition estimates of sockeye salmon catches by age group and date for the Northern west-side set net fishery, Upper Cook Inlet, 1983	77
9. Age composition by river of sockeye salmon escapement, sport harvest, and spawners, Upper Cook Inlet, 1983	78

ABSTRACT

Estimates of run composition for the commercial sockeye salmon harvest (*Oncorhynchus nerka* Walbaum) in Upper Cook Inlet were calculated using analysis of scale patterns and age composition. Sockeye salmon runs in the analysis included: the Susitna River, Kenai River, Kasilof River, Crescent River, Fish Creek, Big River, McArthur River, and Chilligan River. Scale measurements of age 1.2 and age 1.3 fish from the escapements were used to build discriminant functions. Commercial catch samples were classified to river of origin with the discriminant functions. Catches of fish from age groups other than 1.2 and 1.3 were classified to river by combining results from analysis of scale patterns with escapement age composition.

The return of sockeye salmon to Upper Cook Inlet in 1983 was 6,489,939 fish of which 5,049,733 (78%) were commercially harvested. The majority of fish harvested by the commercial fishery were of Kenai River origin (58%), followed by Susitna River (18%), Kasilof River (9%), Crescent River (6%), Fish Creek (4%), Big River (3%), McArthur River (1%), and Chilligan River (1%). Rates of exploitation by the commercial fishery were highest for the Susitna River (.838), Kenai River (.816), and McArthur River (.808). The exploitation rates for Kasilof River (.669) and Fish Creek (.620) were similar as were the exploitation rates for Crescent River (.766) and Chilligan River (.757). The lowest rate of exploitation was on Big River fish (.546).

Ratios of returns-per-spawner for the 1978 brood year were estimated for the Susitna, Kenai, Kasilof, and Crescent Rivers. The ratios are preliminary because the six-year-old fish returning in 1984 were not included in the analysis. Returns-per-spawner from the 1978 brood year equaled: 7.3 for Susitna River, 9.1 for Kenai River, 5.4 for Kasilof River, and 4.2 for Crescent River.

KEY WORDS: sockeye salmon (*Oncorhynchus nerka*), scale pattern analysis, linear discriminant analysis, catch apportionment, exploitation rates, returns-per-spawner.

INTRODUCTION

Sockeye salmon (*Oncorhynchus nerka* Walbaum) returning to Upper Cook Inlet are a mixture of runs from numerous rivers. Systems which contribute to the returns of sockeye salmon are the Kenai, Kasilof, and Susitna Rivers, followed in magnitude by Crescent River and Fish Creek. Other rivers known to support sockeye salmon but for which data are limited include: McArthur River, Chakachatna River (major spawning tributary is the Chilligan River), Big River, Packers Creek, Beluga River, and Cottonwood Creek. Because the migration of the various runs through the fishery overlap spatially and temporally, the commercial fishery harvests differing proportions of fish from each river system. Estimates of catch composition are needed by fishery managers to assist them in stock-specific regulation. Allocation of the catch is also necessary for subsequent analyses of spawner-return relationships and the evaluation of escapement goals.

Scale pattern analysis has been used to allocate Upper Cook Inlet commercial catches of sockeye salmon to component river systems since 1978 (Bethe et al. 1980, Cross et al. 1981, 1982, 1983a, 1983b, 1985a). In 1983, scale pattern analysis was again used to identify the origins of commercially caught sockeye salmon.

The Upper Cook Inlet management area is divided into two fishing districts, the Northern and Central, which include all waters north of Anchor Point (Figure 1). There are a drift fishery and five set net fisheries in the Central District: Central District west-side, Kalgin Island, Salamatof Beach, Kalifonsky Beach, and Cohoe/Ninilchik Beach. There are two set net fisheries within the Northern District: the Northern District east-side and the Northern District west-side.

The commercial harvest in 1983 was 5,049,733 sockeye salmon; compared to an average catch from 1954 through 1982 of 1.2 million sockeye salmon. The number of permits issued for the Upper Cook Inlet area has averaged 557 drift net and 738 set net permits annually since 1976 and the ex-vessel value of the commercial sockeye salmon harvest in 1983 was approximately \$23.4 million.

This report builds upon the catch, escapement, and age composition data base compiled by Cross (1985b) for the 1983 returns of salmon to Upper Cook Inlet. Its objective is to apportion the 1983 commercial harvest of sockeye salmon to run of origin. We expanded the 1983 catch allocation to include not only the five principal runs (Kenai, Kasilof, Susitna, Crescent Rivers, and Fish Creek); but also three smaller systems (Big, McArthur, and Chilligan Rivers). Estimates of run composition for the catch are combined with estimates of escapement to provide estimates of return by river system. The results of this analysis add to the spawner-return data base for Upper Cook Inlet reported by Cross et al. (1983b, 1985a).

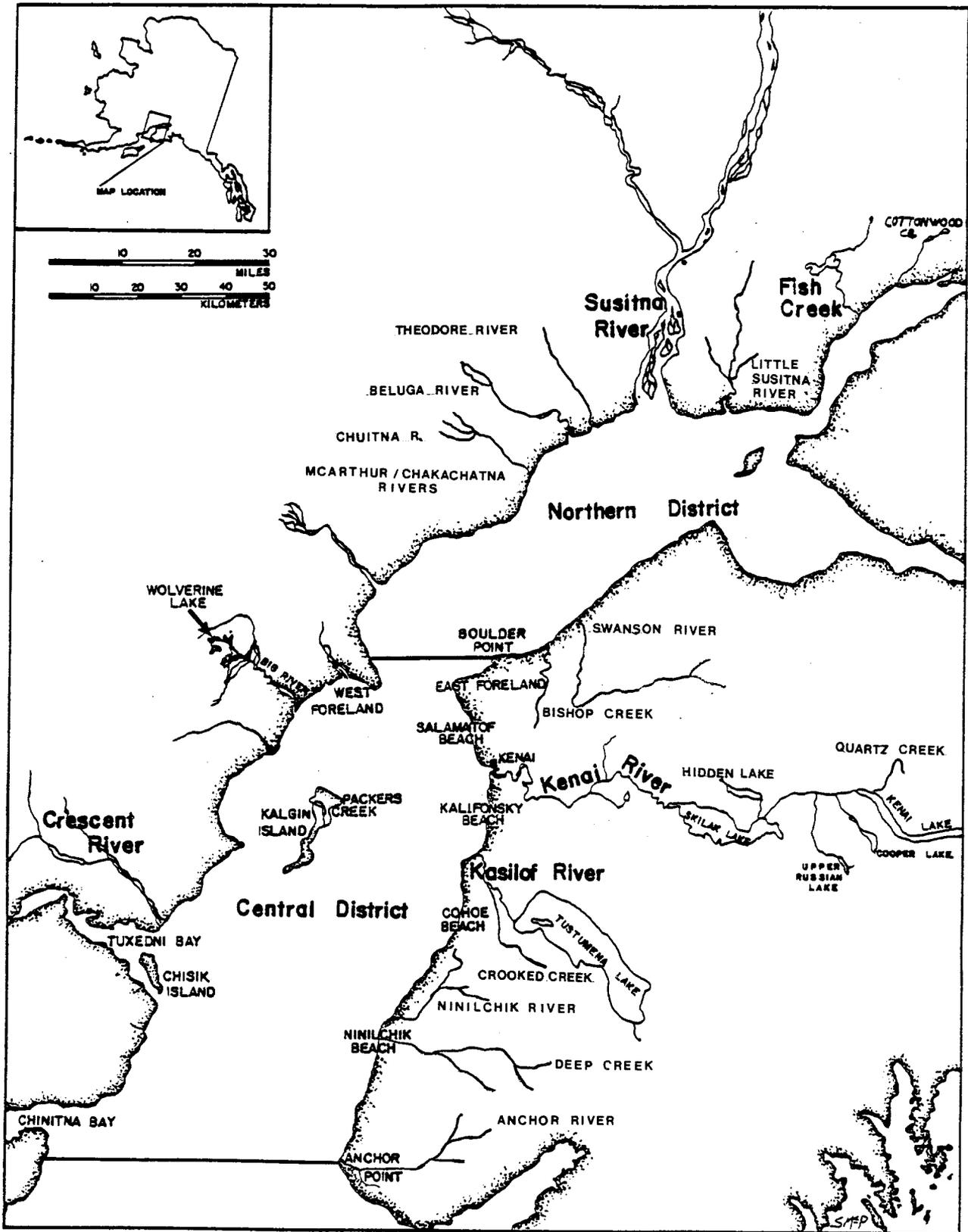


Figure 1. The Upper Cook Inlet area showing the location of the Northern and Central Districts and the major sockeye salmon spawning drainages.

METHODS

Catches and Escapements

Commercial, sport, and personal-use catch statistics presented in this report are documented by Cross (1985b).

Commercial catches were obtained from computer summaries of sales receipts ((dated 31 August 1984) compiled by the Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries. Sport and personal-use dip net harvests were estimated from an annual mail survey conducted by the Division of Sport Fisheries (ADF&G). Catches reported for the Kasilof River personal-use gillnet fishery were estimated from returned permit forms by the Division of Commercial Fisheries.

Escapements of sockeye salmon to rivers in Upper Cook Inlet are estimated with various methods and the figures used in this analysis are documented by Cross (1985b).

Side-scanning sonar is used to enumerate the returns of sockeye salmon to the Susitna River at Susitna and Yentna Stations, and to the mainstems of the Kenai, Kasilof, and Crescent Rivers. A mark-recapture program is conducted to estimate escapements of salmon past Sunshine, Talkeetna, and Curry Stations on the Susitna River. Weirs are used to count salmon returning to Fish Creek, Packers Creek, and Wolverine Creek (tributary of the Big River). Escapements of sockeye salmon into Russian River, Hidden Creek, and Quartz Creek (tributaries of the Kenai River) are also monitored by weirs. Aerial surveys are conducted on the following river systems to index abundance: McArthur River, Chakachatna River, Big River, Beluga River, Chickaloon River, Bishop Creek, Mystery Creek, and Nancy Lake.

Age Composition

Ages of sockeye salmon in the catch and escapement were determined by examining scales. Scales were collected 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 (INPFC 1963). Scales were mounted on gummed cards and impressions made in cellulose acetate (Clutter and Whitesel 1956). In addition to scales, otoliths were collected from carcasses of spawned-out sockeye salmon from the McArthur and Chilligan Rivers. Ages were recorded in European notation¹.

¹ European formula: Numerals preceding the decimal refer to the number of freshwater annuli, numerals following the decimal are the number of marine annuli. Total age from the brood year is the sum of these two numbers.

Commercial Catch:

The age composition of the commercial harvest of sockeye salmon was estimated with stratified systematic sampling programs according to Cochran (1977). Sampling was designed so that sufficient numbers of fish were sampled to simultaneously estimate the true proportion of each major age group in the catch within ± 5 percentage points 90% of the time.

Sockeye salmon were sampled from each of the eight major fisheries: Northern District east-side set, Northern District west-side set, Central District drift, Central District west-side set, Kalgin Island set, Salamatof Beach set, Kalifonsky Beach set, and Coho/Ninilchik Beach set. The number of time strata selected for sampling differed among fisheries; but generally depended on the rapidity of change in age composition as estimated from previous years data. Detailed age and sex composition by fishery and time are reported by Cross (1985b).

Sport and Personal-Use Catch:

Scales were not collected from sockeye salmon harvested by the sport or personal-use dip net fisheries. The age compositions of the respective escapements were applied to these catches to estimate the harvest by age. Scales were sampled from catches made by the Kasilof River personal-use gill net fishery.

Escapements:

Scales were collected from and the age composition estimated for the escapement of sockeye salmon to 17 river systems in Upper Cook Inlet. Cross (1985b) documents the sources for the escapement age composition presented in this report.

Fishwheels were used to capture fish for sampling on the Susitna River (all stations), mainstem of the Kenai River, Kasilof River, Crescent River, and Big River. Fish were sampled at weirs on the Russian River, and from Quartz, Hidden, Fish, Packers, and Wolverine Creeks. Scale samples were collected from carcasses during the peak of spawner die-off from the McArthur and Chilligan Rivers.

The number of scales sampled and the dates at which they were sampled varied among the river systems. Sampling programs at Susitna Station, the mainstem of the Kenai River, and the Kasilof River were stratified through time. The age composition for each time stratum was weighted by the sonar count for that time period to calculate a seasonal estimate. For the other rivers, daily samples were added together over the season and proportions by age group were calculated for one time stratum. Detailed age and sex composition by river and time are reported by Cross (1985b)

Catch Apportionment

Linear discriminant analysis (Fisher 1936) of scale patterns was used to allocate the 1983 Upper Cook Inlet sockeye salmon harvests to run of origin.

Scale Pattern Measurements:

Scale impressions were projected at 100X magnification using equipment similar to that described by Ryan and Christie (1976). Scale measurements were recorded on computer diskettes from a Talos digitizing tablet connected to a Vector Graphics microcomputer. Measurements were taken along the anterior-posterior axis of each scale. The distance between each circulus in three scale growth zones was recorded (Figure 2). The three zones were: (1) scale focus to the outside edge of the freshwater annulus, (2) outside edge of the freshwater annulus to the last circulus of the freshwater growth (freshwater plus growth), and (3) the last circulus of the freshwater plus growth zone to the outer edge of the first ocean annulus. In addition, the total width of the second ocean annulus was measured from scales of age 1.3 fish (Figure 2). Seventy-seven scale characters (Table 1) were calculated from the basic incremental distances and circuli counts. Because fish aged 1.3 and 1.2 dominated the commercial catch, we limited our measurements of scale patterns to the 1.3 and 1.2 age groups.

Discriminant Analysis:

Escapement samples provided scales of known origin that were used to build the linear discriminant functions (LDF). Commercial catch samples (samples of mixed stock proportions) were classified with the discriminant functions to estimate the contribution of each river to the age 1.3 and age 1.2 harvests.

Selection of scale characters for each discriminant model was by a forward stepping procedure using partial F statistics as the criteria for entry/removal of variables (Enslein et al. 1977). Variables were added until model accuracy ceased to improve. A nearly unbiased estimate of classification accuracy for each LDF was determined using a leaving-one-out procedure (Lachenbruch 1967).

Age 1.3 Model Construction. A seven-way linear discriminant model was constructed from scale measurements of age 1.3 scales representing fish entering the Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers. Fish Creek and Packers Creek were not included in the age 1.3 analysis because age 1.3 fish represented small percentages of either rivers escapement, 0.8% (976 fish) and 29% (5,318 fish), respectively. Models of scale measurements for the Susitna, Kenai, and Kasilof Rivers were constructed by weighting scale samples through time based on sonar counts. Because of limited sample sizes, all available age 1.3 scales were used to construct models representing the other rivers.

Other linear discriminant models, in addition to the seven-way model, were constructed as needed to classify catch samples. We assumed that Crescent, Big, McArthur, and Chilligan Rivers did not contribute significantly to the east-side beach set net harvests. A three-way model of Susitna, Kenai, and Kasilof Rivers was used to classify east-side beach harvests. We also assumed that Kenai and Kasilof Rivers did not contribute significantly to the Central or Northern Districts west-side set net harvests. A five-way model of Susitna, Crescent, Big, McArthur, and Chilligan Rivers was used to classify west-side beach harvests.

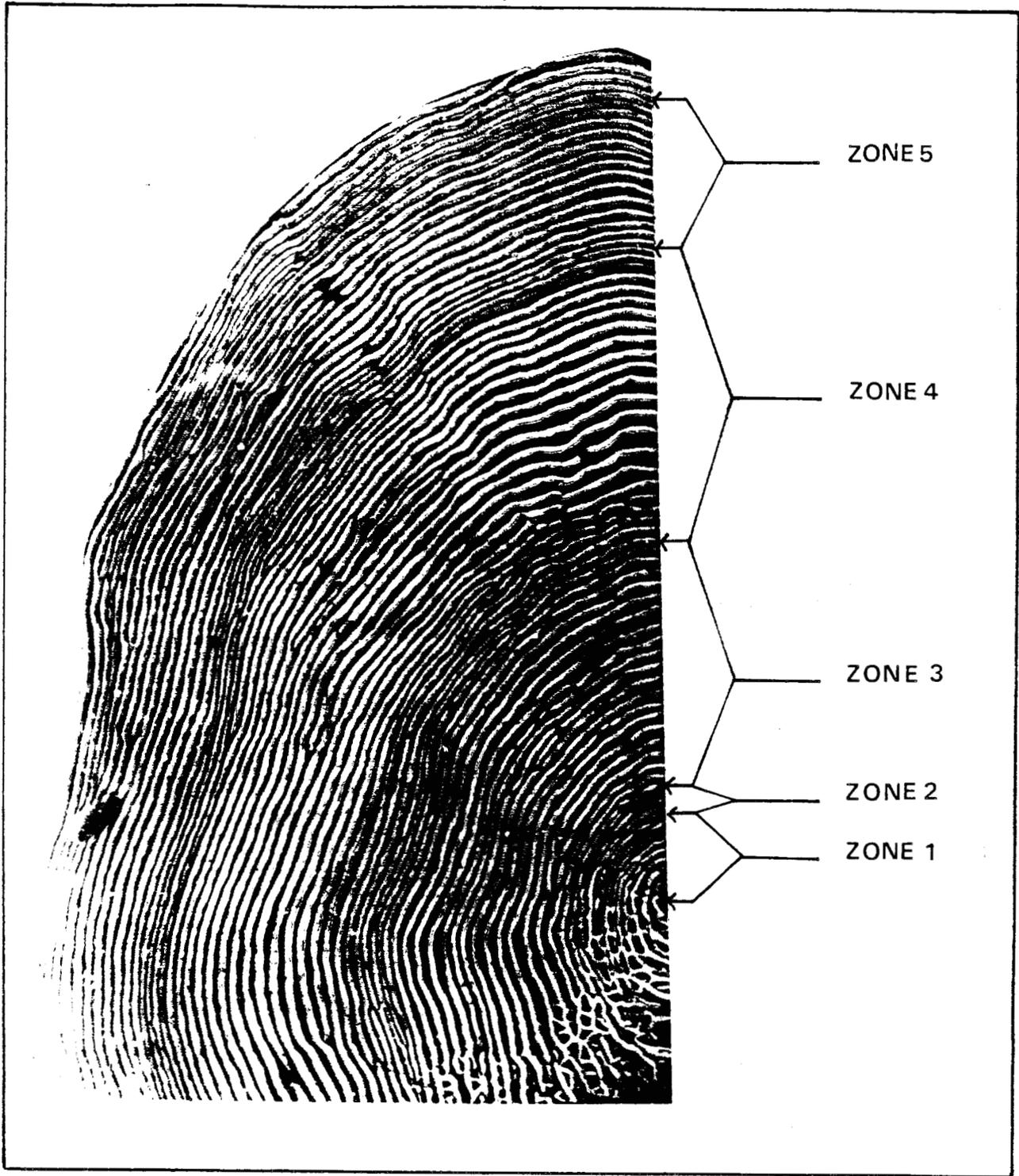


Figure 2. Age 1.3 sockeye salmon scale showing the zones measured to generate the variables to build linear discriminant functions.

Table 1. Scale variables screened for linear discriminant function analysis of ages 1.3 and 1.2 sockeye salmon, Upper Cook Inlet, 1983.

Variable Number	Variable Name	Zone
----- First Freshwater Annulus -----		
1	NC1FW	Number of circuli first freshwater
2	S1FW	Size (width) of first freshwater
3 (16)	C0-C2	Distance, scale focus (C0) to circulus 2 (C2)
4 (17)	C0-C4	Distance, scale focus to circulus 4
5 (18)	C0-C6	Distance, scale focus to circulus 6
6 (19)	C0-C8	Distance, scale focus to circulus 8
7 (20)	C2-C4	Distance, circulus 2 to circulus 4
8 (21)	C2-C6	Distance, circulus 2 to circulus 6
9 (22)	C2-C8	Distance, circulus 2 to circulus 8
10 (23)	C4-C6	Distance, circulus 4 to circulus 6
11 (24)	C4-C8	Distance, circulus 4 to circulus 8
12 (25)	C(NC-4)-E1FW	Distance, circulus (number circuli first freshwater minus 2) to end first freshwater
13 (26)	C(NC-2)-E1FW	Distance, circulus (number circuli first freshwater minus 4) to end first freshwater
14	C2-E1FW	Distance, circulus 2 to end first freshwater
15	C4-E1FW	Distance, circulus 4 to end first freshwater
16 thru	C0-C2/S1FW ...	Relative widths, (variables 3-13)/S1FW
26	C(NC-2)-E1FW/S1FW	
27	S1FW/NC1FW	Average interval between circuli in first freshwater
28	NC 1ST 3/4	Number of circuli in first 3/4 of first freshwater
29	MAX DIST	Maximum distance between 2 consecutive circuli in first freshwater
30	MAX DIST/S1FW	Relative width, (variable 29)/S1FW
----- Plus Growth -----		
61	NCPG	Number of circuli in plus growth
62	SPGZ	Size (width) plus growth zone
----- Freshwater and Plus Growth -----		
65	NC1FW + NCPG	Total number of circuli first freshwater and plus growth
66	S1FW + SPGZ	Total size (width) first freshwater and plus growth
67	S1FW/S1FW + SPGZ	Relative width, (variable 2)/S1FW + SPGZ

-Continued-

Table 1. Scale variables screened for linear discriminant function analysis of ages 1.3 and 1.2 sockeye salmon, Upper Cook Inlet, 1983 (continued).

Variable Number	Variable Name	Zone
----- First Marine Annulus -----		
70	NC10Z	Number of circuli in first ocean zone
71	S10Z	Size (width) first ocean zone
72 (90)	EFW-C3	Distance, end of freshwater growth to circulus 3
73 (91)	EFW-C6	Distance, end of freshwater growth to circulus 6
74 (92)	EFW-C9	Distance, end of freshwater growth to circulus 9
75 (93)	EFW-C12	Distance, end of freshwater growth to circulus 12
76 (94)	EFW-C15	Distance, end of freshwater growth to circulus 15
77 (95)	C3-C6	Distance, circulus 3 to circulus 6
78 (96)	C3-C9	Distance, circulus 3 to circulus 9
79 (97)	C3-C12	Distance, circulus 3 to circulus 12
80 (98)	C3-C15	Distance, circulus 3 to circulus 15
81 (99)	C6-C9	Distance, circulus 6 to circulus 9
82 (100)	C6-C12	Distance, circulus 6 to circulus 12
83 (101)	C6-C15	Distance, circulus 6 to circulus 15
84 (102)	C9-C15	Distance, circulus 9 to circulus 15
85 (103)	C(NC-6)-E10Z	Distance, circulus (number circuli first ocean minus 6) to end first ocean
86 (104)	C(NC-3)-E130Z	Distance, circulus (number circuli first ocean minus 3) to end first ocean
87	C3-E10Z	Distance, circulus 3 to end of first ocean
88	C9-E10Z	Distance, circulus 9 to end of first ocean
89	C15-E10Z	Distance, circulus 15 to end of first ocean
90 thru	EFW-C3/S10Z ...	Relative widths, (variables 72-86)/S10Z
104	C(NC-3)-E130Z/S10Z	
105	S10Z/NC10Z	Average interval between circuli in first ocean
106	NC 1ST 1/2	Number of circuli in first 1/2 of first ocean
107	MAX DIST	Maximum distance between 2 consecutive circuli in first ocean
108	MAX DIST/S10Z	Relative width, (variable 107)/S10Z
----- Second Marine Annulus -----		
109	S20Z	Size (width) of second ocean zone

Classification of Age 1.3 Samples. Linear discriminant models were used to assign unknown samples (age 1.3 scales from the commercial catches) to stream of origin. Estimates of proportions by run in the catch were adjusted for misclassification errors by the model using the procedure of Cook and Lord (1978). The variance and 90% confidence intervals for the adjusted estimates were computed using the procedures of Pella and Robertson (1979)¹. A catch sample was reclassified with a model representing fewer runs if the adjusted proportion was less than or equal to zero for the run in question.

Run composition estimates for age 1.3 fish harvested in the Central District drift fishery were calculated for individual fishing periods. For the remaining fisheries, samples were generally combined across contiguous fishing periods and one age 1.3 run estimate for the pooled time period was computed. The number of individual run estimates developed for each fishery depended on the number of sampled time strata. In general, fisheries harvesting the largest numbers of fish were sampled and analyzed the most intensely. The number of time strata or individual age 1.3 run estimates by fishery are: 14 for the Central District drift, 7 for both Cohoe/Ninilchik and Kalifonsky Beaches, 5 for Salamatof Beach, 4 for the Central District west-side, 3 for Kalgin Island, and 2 for the Northern District west-side. Age 1.3 scales were not measured from Northern District east-side catches because of the small numbers harvested.

We calculated the numbers of fish aged 1.3 by run in a specific catch from the product of the estimate of the run proportion by scale pattern analysis, the estimate of the proportion of the catch of that age, and the catch:

$$\hat{C}_{i1.3} = C_{P1.3} \hat{S}_{i1.3}$$

where:

C = Catch of sockeye salmon in a fishery at a given time.

$\hat{C}_{i1.3}$ = Estimated catch of fish aged 1.3 returning to run i.

¹ According the Cook (1982), the procedures of Pella and Robertson (1979) produce variances and confidence intervals which are conservative (too large for specified precision).

$\hat{P}_{1.3}$ = Estimated proportion of fish aged 1.3 in the catch.

$\hat{S}_{11.3}$ = Estimated proportion of run i aged 1.3 in the catch.

The variance of the estimated catch of sockeye salmon aged 1.3 from each run in a specified fishery at a given time was calculated as an exact variance of a product according to Goodman (1960):

$$v[\hat{C}_{11.3}] = C^2 v[\hat{P}_{1.3} \hat{S}_{11.3}]$$

$$v[\hat{P}_{1.3} \hat{S}_{11.3}] = v[\hat{P}_{1.3}] \hat{S}_{11.3}^2 + v[\hat{S}_{11.3}] \hat{P}_{1.3}^2 - v[\hat{S}_{11.3}] v[\hat{P}_{1.3}]$$

The contributions by run through time for a specific fishery were added to estimate the contribution to that fishery for the entire year; the variance of the yearly contribution was calculated as the sum of the variances for each time period. Finally, the contributions by run to each fishery were added to produce the total contribution by run to the Upper Cook Inlet age 1.3 sockeye salmon harvest, and the variance of the total contribution by run was calculated as the sum of the variances for each fishery. Variances calculated for run contributions which were estimated from samples pooled over time are probably minimum, changes in age or run composition through the pooled time period are unknown.

Age 1.2 Model Construction. Before we constructed the age 1.2 models, we plotted the major scale variables to determine if they were normally distributed (an underlying assumption of linear discriminant analysis). Plots of scale measurements representing Kenai River showed that the number of circuli (NCIFW) and width (SIFW) of the freshwater annulus were bimodally distributed (Figures 3 and 4). We knew from past scale examination that age 1.2 fish returning to Hidden Creek (a tributary of Kenai River) have very large freshwater growth which could explain the second mode in the distribution of Kenai River freshwater scale measurements. We measured growth zones from scales representing the 1983 sockeye escapement to Hidden Creek and plotted scale variables NCIFW and SIFW (Figures 3 and 4). Comparisons of the plots showed that samples from Hidden Creek were distributed similarly to the samples comprising the second or larger mode of Kenai River measurements. The mean values of NCIFW and SIFW for Hidden Creek samples in 1983 equaled 20

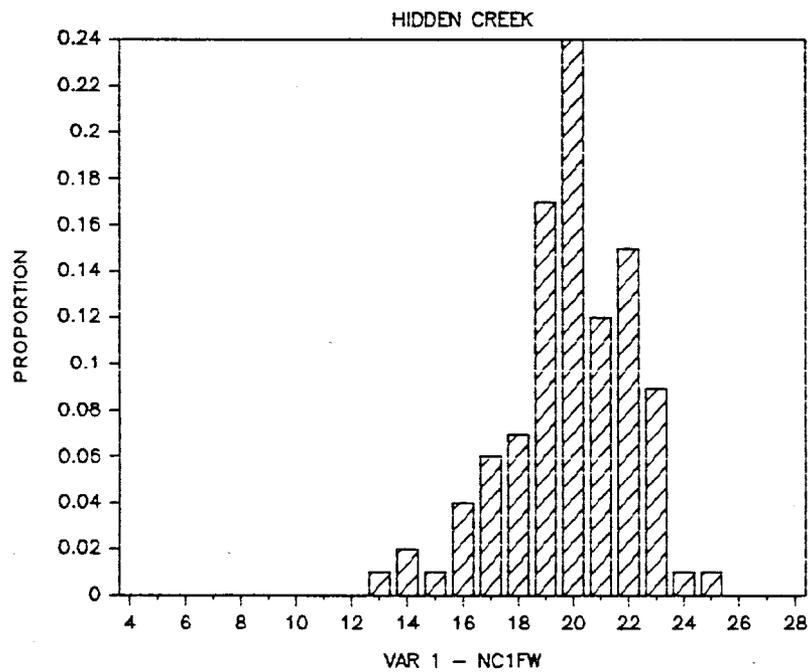
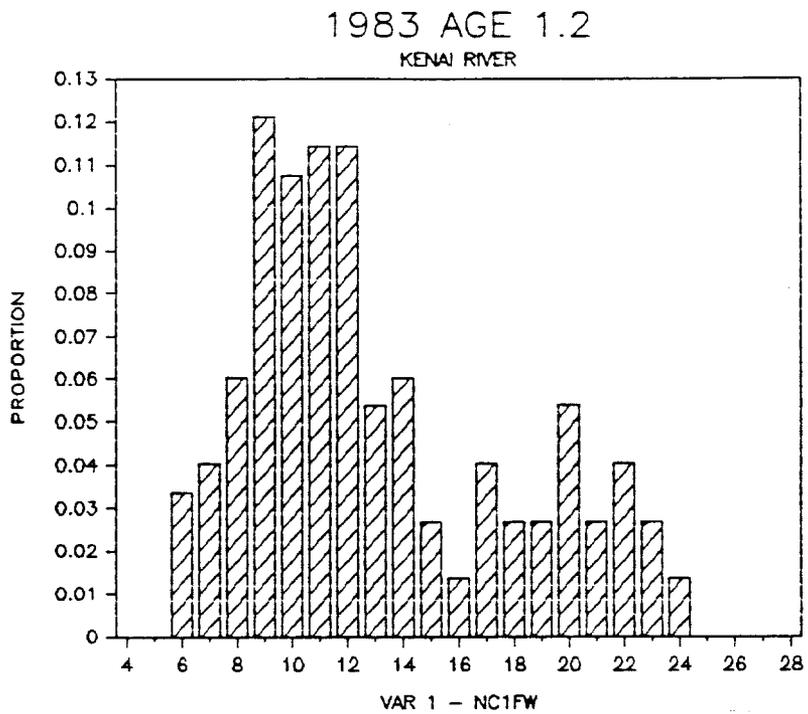


Figure 3. Number of circuli in the first zone of freshwater growth measured from scales taken from escapements of age 1.2 sockeye salmon in the Kenai River and Hidden Creek.

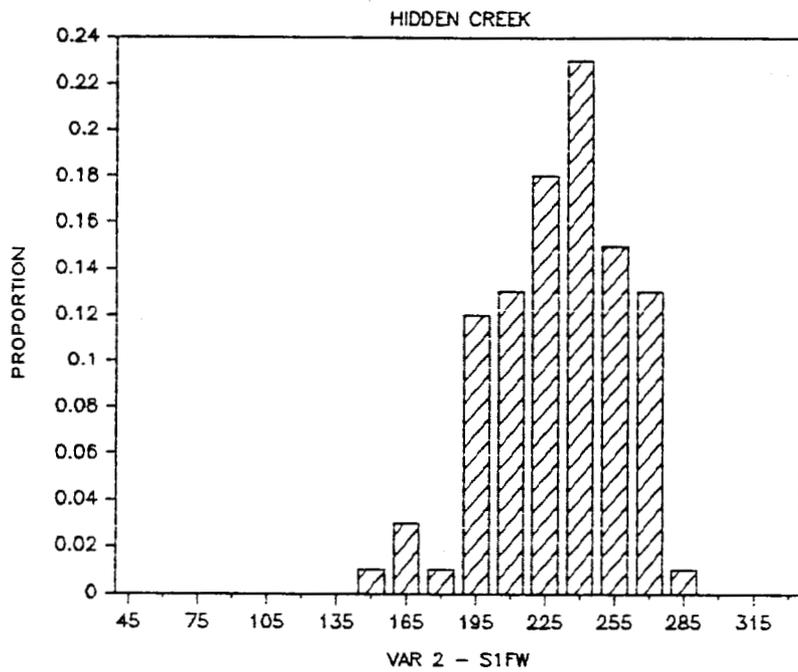
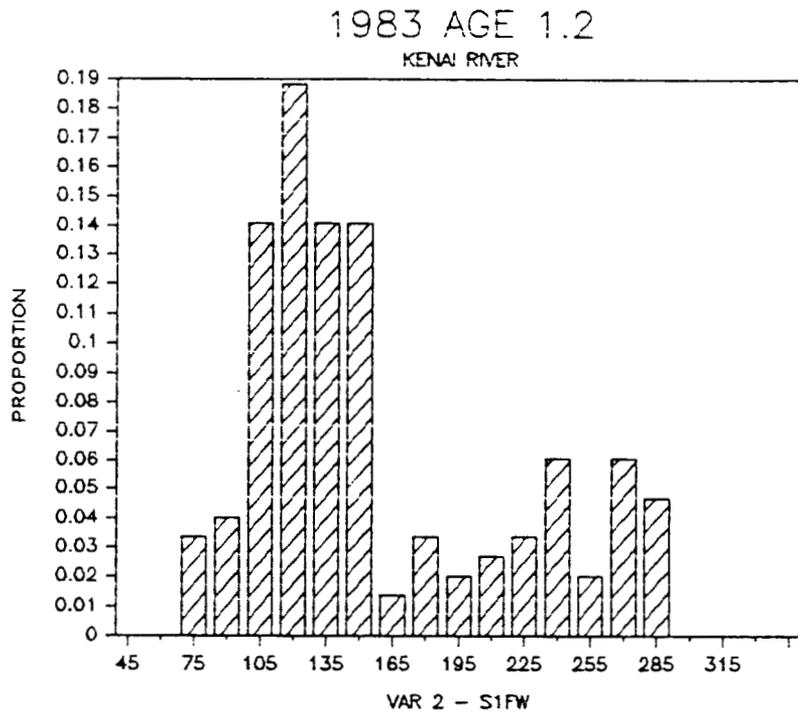


Figure 4. Size of the first zone of freshwater growth measured from scales taken from escapements of age 1.2 sockeye salmon in the Kenai River and Hidden Creek.

and 224, respectively. The escapement of age 1.2 fish to Hidden Creek in 1983 was 9,942 fish which represented approximately 19% of the total age 1.2 escapement into the Kenai River. Similarly, scales in the Kenai River sample with NCIFW ≥ 17 and SIFW ≥ 190 made up approximately 23% of the total sample. Based on these comparisons, we made the assumption that scales in the Kenai River sample with measurements for NCIFW ≥ 17 and SIFW ≥ 190 represented Hidden Creek fish, and subsequently removed those scales from the Kenai River model. A separate model was constructed from scale measurements representing fish returning to Hidden Creek. Subsequently, catch samples were classified separately to Kenai River (minus Hidden Creek measurements) and Hidden Creek. A total Kenai River contribution to a specific age 1.2 harvest was estimated by combining run proportions for the two categories, Kenai River (minus Hidden Creek) and Hidden Creek.

A seven-way linear discriminant model was constructed from scale measurements of age 1.2 scales representing fish entering the Susitna River, Kenai River (minus Hidden Creek), Kasilof River, Hidden Creek, Fish Creek, Big River, and McArthur River. Crescent and Chilligan Rivers were not included in the age 1.2 analysis because age 1.2 fish represented small percentages of either river escapement, 10.9% and 2.9%, respectively. Models of scale measurements for the Susitna, Kenai, and Kasilof Rivers were constructed by weighting scale samples through time based on sonar counts. Because of limited sample sizes, all available age 1.2 scales were used to construct models representing the other rivers.

Other linear distribution models were built as needed to classify catch samples. For the age 1.2 analysis, we assumed that Big and McArthur Rivers did not contribute to the east-side beach set net harvests and constructed a 5-way model (Susitna, Kenai, Kasilof, Hidden, and Fish) to classify the Coho/Ninilchik Beach catches. We also assumed that fish returning to Kasilof, Big, and McArthur Rivers were not harvested in the Northern District east-side set net fishery and classified those catches with a four-way model (Susitna, Kenai, Hidden, and Fish). A four-way model representing Susitna River, Fish Creek, Big River, and McArthur River was used to classify catches from the Northern District west-side fishery.

Classification of Age 1.2 Samples. Linear discriminant models were used to classify age 1.2 fish from the following catches: the Central District drift for all catch periods, Coho/Ninilchik Beach from 8 July through 20 July, Northern District east-side for all catch periods, and Northern District west-side for 20 July. All other age 1.2 catches were allocated to river based on the estimate for fish aged 1.3 (developed from scale pattern analysis) and the ratio of fish aged 1.3 to fish aged 1.2 in respective escapements as detailed in the section which follows.

Procedures used to adjust for misclassification of the age 1.2 models, and to compute variances and 90% confidence intervals for the age 1.2 estimates were the same as those used in the age 1.3 analysis. Formulas used to combine age 1.2 run estimates through time and to calculate the variance of the yearly run contributions for the Central District drift and Northern District east-side set net fisheries were the same as those outlined in the age 1.3 analysis.

Catch Allocation for the "Other" Age Groups:

Catches in which only the age 1.3 were allocated to river with scale pattern analysis, the "other" age groups were apportioned to stream of origin based on the estimate for fish aged 1.3 and the ratio of fish aged 1.3 to fish of other age groups in respective escapements:

$$\hat{S}_{ij} = \frac{\hat{S}_{i1.3} (\hat{A}_{ij} / \hat{A}_{i1.3})}{\sum_{i=1}^N \hat{S}_{i1.3} (\hat{A}_{ij} / \hat{A}_{i1.3})}$$

where:

\hat{S}_{ij} = Estimated proportion of run i in the catches of fish aged j.

$\hat{S}_{i1.3}$ = Estimated proportion of run i in the catches of fish aged 1.3.

\hat{A}_{ij} = Estimated proportion of age j fish in the escapement of run i.

$\hat{A}_{i1.3}$ = Estimated proportion of fish aged 1.3 in the escapement of run i.

N = Number of runs.

The numbers of sockeye salmon of age i contributing to a catch were then calculated as:

$$\hat{C}_{ij} = CP_j \hat{S}_{ij}$$

where:

\hat{C}_{ij} = Estimated numbers of fish aged j in run i caught in a fishery.

- \hat{P}_j = Estimated proportion of fish aged j in a catch.
- C = Numbers of fish caught.

Catches for which the above formulas were used to allocate "other" age groups include: all harvests from Salamatof Beach, Kalifonsky Beach, Central District west-side, and Kalgin Island. The above procedure was also used to apportion "other" age groups for the following individual fishery catch dates: 1 July through 6 July and 21 July through 15 August for Coho/Ninilchik Beach, and 27 July through 19 July for the Northern District west-side.

For the Northern District east-side fishery, the age group assigned to river of origin with scale pattern analysis was the 1.2 age group. All "other" age groups were allocated to river using the above formulas with age 1.2 replacing the age 1.3 subscripts.

Catches in which the age 1.2 and age 1.3 fish were allocated to river with scale pattern analysis, the "other" age groups were apportioned to stream of origin based on the combined estimates for fish aged 1.2 and 1.3, and the combined ratio of fish aged 1.2 and 1.3 to fish of other age groups in respective escapements:

$$\hat{S}_{ij} = \frac{\hat{S}_{i(1.2,1.3)} (\hat{A}_{ij} / \hat{A}_{i(1.2,1.3)})}{\sum_{i=1}^N \hat{S}_{i(1.2,1.3)} (\hat{A}_{ij} / \hat{A}_{i(1.2,1.3)})}$$

$$\hat{S}_{i(1.2,1.3)} = \frac{\hat{C}_{i1.2} + \hat{C}_{i1.3}}{\hat{C}_{1.2} + \hat{C}_{1.3}}$$

$$\hat{A}_{i(1.2,1.3)} = \frac{\hat{E}_{i1.2} + \hat{E}_{i1.3}}{E_i}$$

where:

\hat{S}_{ij} = Estimated proportion of run i in the catches of fish aged j .

$\hat{S}_{i(1.2,1.3)}$ = Estimated proportion of run i in the combined catches of fish aged 1.2 and 1.3.

\hat{A}_{ij} = Estimated proportion of age j fish in the escapement of run i .

$\hat{A}_{i(1.2,1.3)}$ = Estimated combined proportion of fish aged 1.2 and 1.3 in the escapement of run i .

$\hat{C}_{i1.2}$ = Estimated numbers of age 1.2 fish in run i caught in a fishery.

$\hat{C}_{i1.3}$ = Estimated numbers of age 1.3 fish in run i caught in a fishery.

$\hat{C}_{1.2}$ = Estimated numbers of age 1.2 fish caught in a fishery.

$\hat{C}_{1.3}$ = Estimated numbers of age 1.3 fish caught in a fishery.

$\hat{E}_{i1.2}$ = Estimated numbers of age 1.2 fish in the escapement of run i .

$\hat{E}_{i1.3}$ = Estimated numbers of age 1.3 fish in the escapement of run i .

E_i = Numbers of fish escaping in run i .

N = Number of runs.

Catches for which the above formulas were used to allocate "other" age groups include: all harvests from the Central District drift fishery, harvests from Coho/Ninilchik Beach from 8 July through 20 July, and harvests from the Northern District west-side on 20 July.

Returns

Numbers of fish returning by age to each river were estimated by adding the commercial catch by run, the escapement, and the sport and personal-use harvests not counted in the escapement. Ratios of returns to spawners were calculated for the Susitna, Kenai, Kasilof, and Crescent Rivers. Return estimates and ratios of returns to spawners for years prior to 1983 were taken from Cross et al. (1983b, 1985a).

RESULTS AND DISCUSSION

Catches and Escapements

Commercial fishermen harvested 5,049,733 sockeye salmon in Upper Cook Inlet in 1983 (Table 2). The majority (64%) of the fish were harvested by the drift fishery which caught 3,222,007 sockeye salmon. Set nets along the east-side beaches harvested 1,508,963 sockeye salmon which equaled 30% of the inlet-wide catch. Northern District fisheries took 4% of the catch (184,219) and the remaining 2% were caught in set nets along Kalgin Island (62,546) and the Central District west-side (71,998). Peak catches occurred during the two weeks from 8 July to 22 July.

Sport fishing for sockeye salmon in Upper Cook Inlet is concentrated on the Kenai River (Appendix Table 9). In 1983, an estimated 87,360 sockeye salmon were harvested by sport fishermen on the Kenai River. An additional 7,562 sockeye salmon were taken from the Kenai River by the personal-use dip net fishery. Combined sport and personal-use harvests of Kasilof River sockeye salmon equaled 21,833 fish. Sport catches of sockeye salmon from salmon equaled 21,833 fish. Sport catches of sockeye salmon from the Susitna River and Fish Creek were 4,372 and 6,013, respectively.

Approximately 1.4 million sockeye salmon were estimated to have escaped Upper Cook Inlet commercial fisheries in 1983 (Table 3). Estimates of total escapement are not available for several systems in Upper Cook Inlet (Big River, McArthur-Chakachatna Rivers, Beluga River), therefore the above figure is a minimum estimate. The largest escapement of sockeye salmon occurred in the Kenai River (630,340), followed by the Kasilof River (210,271), Susitna (175,936), Big River (138,189), Fish Creek (118,797), and Crescent River (92,343). Other rivers which had substantial numbers of sockeye salmon returning included Packers Creek (18,403) and McArthur-Chakachatna Rivers (17,824).

Age Composition

Sockeye salmon aged 1.3 dominated the commercial catch, comprising 69% of the total; while fish aged 1.2, 2.3, and 2.2 comprised 18%, 7%, and 3%, respectively (Table 4). Catch proportions by age differed among the fisheries. Fish aged 1.2 and 1.3 were caught in similar proportions by the

Table 2. Sockeye salmon commercial catch in numbers of fish by fishery and date, Upper Cook Inlet, 1983^{1/}.

Date	Northern Dist. East-side Set	Northern Dist. West-side Set	Central Dist. Drift	Central Dist. West-side Set 8/	Kaipin Island Set	Salamatof Beach Set	Kalifornsky Beach Set	Coho/Niniichik Beach Set	Total
6/17	Closed	Closed	Closed	1,013 9/	Closed	Closed	Closed	Closed	1,013
6/20	Closed	Closed	Closed	1,040 9/	Closed	Closed	Closed	Closed	1,040
6/24	Closed	Closed	Closed	2,200 9/	Closed	Closed	Closed	Closed	2,200
6/27	564	29	21,621 2/	4,138	8,962	Closed	Closed	Closed	35,314
7/01	1,433	357	58,278	2,901	3,965	3,239	6,409	12,281	88,863
7/04	1,729	483	162,872	3,150	867	1,499	1,762	9,839	182,201
7/06	Closed	Closed	65,568 3/	Closed	Closed	Closed	3,239	8,551	77,358
7/08	730	280	306,289	2,297	2,081	1,162	3,033	11,711	327,583
7/11	1,822	1,286	336,053	2,035	2,732	3,946	12,753	34,359	394,986
7/13	Closed	Closed	295,631 4/	2,714 9/	Closed	Closed	Closed	54,384	352,729
7/14	Closed	Closed	Closed	557 9/	Closed	Closed	Closed	13,871	14,428
7/15	14,620	23,090	376,919	4,506	2,826	43,271	23,767	32,934	521,933
7/16	Closed	Closed	Closed	2,977 9/	Closed	Closed	Closed	Closed	2,977
7/17	Closed	Closed	Closed	3,685 9/	Closed	35,047	29,725	42,156	110,613
7/18	24,221	47,961	292,408 5/	8,193	9,563	89,771	76,060	115,937	664,114
7/19	Closed	Closed	Closed	739 10/	Closed	36,210	30,263	26,241	93,459
7/20	4,367	15,378	303,631 5/	6,814 10/	3,780	35,787	46,961	31,744	448,462
7/21	Closed	Closed	333,277 5/	3,878 10/	4,276	40,801	48,643	38,384	469,259
7/22	6,151	15,424	217,310 5/	6,279	5,330	37,382	29,833	27,631	345,340
7/23	Closed	Closed	58,116 6/	1,547 9/	Closed	44,800	29,554	17,941	151,958
7/24	Closed	Closed	44,811 6/	844 9/	Closed	54,098	22,262	22,217	144,232
7/25	3,326	6,845	101,930 5/	3,656	5,014	19,599	14,732	12,290	167,392
7/26	Closed	Closed	38,527 6/	Closed	Closed	5,396	11,408	13,915	69,246
7/27	Closed	Closed	59,528 6/	Closed	Closed	8,575	26,958	17,160	112,221
7/28	Closed	Closed	30,412 6/	Closed	Closed	5,610	10,646	7,715	54,383
7/29	1,051	2,842	74,230 5/	2,723	4,528	9,643	12,945	8,078	116,040
8/01	2,293	1,967	36,344 5/	1,869 10/	2,607	5,845	9,320	7,436	67,681
8/05	2,437	829	4,843 7/	783 10/	1,816	Closed	Closed	Closed	10,708
8/07	1,221	Closed	Closed	Closed	Closed	Closed	Closed	Closed	1,221
8/08	351	90	2,675 7/	281 10/	2,280	Closed	Closed	Closed	5,677
8/10	Closed	Closed	Closed	Closed	Closed	4,453	1,228	500	6,181
8/12	373	56	397 5/	542 10/	1,167	1,848	599	142	5,124

-Continued-

Table 2. Sockeye salmon commercial catch in numbers of fish by fishery and date, Upper Cook Inlet, 1983^{1/}
(continued).

Date	Northern Dist. East-side Set	Northern Dist. West-side Set	Central Dist. Drift	Central Dist. West-side Set 8/	Kaigin Island Set	Salamatof Beach Set	Kalifornsky Beach Set	Cochce/Ninilchik Beach Set	Total
8/15	338	56	215	256	449	806	454	198	2,772
8/19	79	19	58 1/	158	108	Closed	Closed	Closed	422
8/22	41	18	14 1/	67	71	Closed	Closed	Closed	211
8/26	15	5	33 1/	88	73	Closed	Closed	Closed	214
8/29	32	Closed	11 1/	32	23	Closed	Closed	Closed	98
9/02	3	Closed	3 1/	22	20	Closed	Closed	Closed	48
9/05	7	Closed	2 1/	14	7	Closed	Closed	Closed	30
9/09	Closed	Closed	Closed	Closed	1	Closed	Closed	Closed	1
9/12	Closed	Closed	1 1/	Closed	0	Closed	Closed	Closed	1
Total	67,204	117,015	3,222,007	71,998	62,546	488,788	452,560	567,615	5,049,733

-19-

1/ Source: Alaska Department of Fish and Game, Division of Commercial Fisheries fish ticket summaries taken from files on the University of Alaska Honeywell computer.

2/ Drift gillnetting prohibited within 5 miles of the east-side beaches.

3/ Drift gillnetting only allowed between Cape Kasilof and Cape Ninilchik within five miles of the beach.

4/ Drift gillnetting allowed in the portion of the Central District south of a line from Clam Gulch Tower to the southern tip of Kaigin Island to Harriet Point.

5/ Drift gillnetting allowed in all portions of the Central District except Chinitna Bay.

6/ Drift gillnetting allowed east of a line from the East Foreland to Cape Ninilchik.

7/ Drift gillnetting allowed in all portions of the Central District except Chinitna Bay and within five miles of the eastside.

8/ The Central District west-side is comprised of three subdistricts: Western, Kustatan, and Chinitna Bay.

9/ Set gillnetting allowed in the Western subdistrict only.

10/ Set gillnetting allowed in all west-side subdistricts except Chinitna Bay.

Table 3. Escapement of sockeye salmon in Upper Cook Inlet, 1983.

System	Numbers	Method
Susitna River		
Susitna Station 1/	112,314	Sonar
Yentna Station 2/	104,414	Sonar
Sunshine Station 2/	71,522	Mark-Recapture
Talkeetna Station 2/	4,235	Mark-Recapture
Curry Station 2/	1,876	Mark-Recapture
Total 3/	175,936	
Kenai River		
Total Mainstem 1/	630,340	Sonar
Russian River 4/	55,245	Weir
Quartz Creek 5/	73,345	Weir
Hidden Creek 5/	11,297	Weir
Kasilof River 1/	210,271	Sonar
Crescent River 1/	92,343	Sonar
Fish Creek 6/	118,797	Weir
Nancy Lake 1/	4,800	Aerial Survey
Chickaloon River 7/	1,000	Aerial Survey
Mystery Creek 7/	2,000	Aerial Survey
Bishoo Creek 7/	4,500	Aerial Survey
Packers Creek 8/	18,403	Weir
Big River 9/		
Wolverine Creek	18,189	Weir
Clearwater Tributaries	120,000	Aerial Survey
McArthur-Chakachatna Rivers 1/	17,824	Aerial Survey
Beluga River		
Coal Creek 1/	2,450	Aerial Survey

1/ Source: King, B. and K. Tarbox. 1984. Upper Cook Inlet salmon (*Oncorhynchus* spp.) escapement studies. 1983. Alaska Department of Fish and Game, Technical Data Report No. 122. 152 pp.

2/ Source: Barrett, B., F. Thompson, and S. Wick. 1984. Adult anadromous fish investigations: May - October 1983. Alaska Department of Fish and Game. Susitna Hydro Aquatic Studies. Report No. 1.

-Continued-

Table 3. Escapement of sockeye salmon in Upper Cook Inlet, 1983
(continued).

-
- 3/ Estimate of total Susitna River escapement equals the summation of the Yentna River and Sunshine Station escapement estimates.
 - 4/ Source: Nelson, David. March 1985. Personal communication. Alaska Dept. of Fish and Game. Division of Sport Fish. Soldotna, Alaska.
 - 5/ Source: Hauser, William. March 1985. Personal communication. Alaska Dept. of Fish and Game. Fisheries Rehabilitation, Enhancement, and Development Div. Anchorage, Alaska.
 - 6/ Source: Chlupach, R. 1984. Evaluation of returning hatchery adult sockeye 1983. Alaska Dept. of Fish and Game, Fisheries Rehabilitation, Enhancement, and Development Div. Project Report. Draft No. 2. 01/25/84. 20 pp.
 - 7/ Source: Marcusson, Patrick. 1984. Personal communication. Cook Inlet Aquaculture Association. Soldotna, Alaska.
 - 8/ Source: Marcusson, P. 1984a. Technical report Packers Lake project. Progress Report 1983. Cook Inlet Aquaculture Association.
 - 9/ Source: Marcusson, P. 1984b. Big River Lakes pre-enhancement investigation 1983. Cook Inlet Aquaculture Association.

Table 4. Age composition by fishery of the commercial sockeye salmon harvest, Upper Cook Inlet, 1983^{1/}.

		Age Composition by Brood Year and Age Group											
		1980		1979			1978			1977		1976	
Fishery		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	Total
Northern	Percent	0.4	0.7	0.8	78.3	0.2	0.1	12.3	5.2	0.3	1.7	0.0	100.0
East-side	Numbers	293	490	525	52,627	147	73	8,231	3,480	188	1,150	0	67,204
Set Net	Standard Error	146	184	181	858	104	73	693	451	111	270	0	
Northern	Percent	0.6	0.0	7.9	46.7	0.0 2/	0.0	28.4	7.0	0.0	9.2	0.2	100.0
West-side	Numbers	634	0	9,196	54,695	15	0	33,217	8,268	0	10,783	207	117,015
Set Net	Standard Error	357	0	1,267	2,295	15	0	2,087	1,164	0	1,360	207	
Central	Percent	0.1	0.0 2/	1.6	14.8	0.0 2/	0.0 2/	73.6	2.2	0.4	7.3	0.0	100.0
District	Numbers	2,216	335	53,166	476,074	436	160	2,370,060	72,738	11,923	234,649	250	3,222,007
Drift Net	Standard Error	1,207	260	5,407	14,128	436	160	17,742	5,935	2,421	10,487	250	
Central	Percent	0.0 2/	0.0	0.2	16.6	0.0	0.0	50.5	15.1	0.3	17.3	0.0	100.0
West-side	Numbers	42	0	122	11,936	0	0	36,328	10,887	245	12,438	0	71,998
Set Net	Standard Error	33	0	61	929	0	0	1,294	923	159	1,021	0	
Kalgin	Percent	0.3	0.0	0.9	19.6	0.0	0.0	48.9	16.7	0.2	13.3	0.1	100.0
Island	Numbers	170	0	558	12,256	0	0	30,594	10,432	114	8,331	91	62,546
Set Net	Standard Error	98	0	202	999	0	0	1,255	935	80	888	91	

-Continued-

Table 4. Age composition by fishery of the commercial sockeye salmon harvest, Upper Cook Inlet, 1983^{1/}
(continued).

		Age Composition by Brood Year and Age Group											
		1980		1979			1978			1977		1976	
Fishery		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	Total
Salamatof	Percent	0.3	0.1	0.8	24.2	0.1	0.0	66.2	2.6	0.5	5.2	0.0	100.0
Beach	Numbers	1,227	726	3,833	118,234	274	0	323,455	12,681	2,686	25,672	0	488,788
Set Net	Standard Error	501	314	940	4,242	274	0	4,749	1,582	747	2,296	0	
Kalifornsky	Percent	0.0 2/	0.0	0.4	14.8	0.0	0.0	73.0	4.4	0.5	6.9	0.0	100.0
Beach	Numbers	37	0	1,658	66,899	0	0	329,904	20,011	2,440	31,611	0	452,560
Set Net	Standard Error	37	0	730	3,499	0	0	4,553	2,136	699	2,760	0	
Cohoe/													
Minilchik	Percent	0.0	0.0 2/	0.3	21.0	0.0 2/	0.0	63.7	5.5	0.5	9.0	0.0	100.0
Beach	Numbers	0	115	1,763	118,975	80	0	361,512	31,116	2,691	51,363	0	567,615
Set Net	Standard Error	0	58	655	4,202	80	0	5,096	2,417	243	395	0	
Total	Numbers	4,619	1,666	70,821	911,696	952	233	3,493,301	169,613	20,287	375,997	548	5,049,733
	Percent	0.1	.0 2/	1.4	18.1	.0 2/	.0 2/	69.2	3.4	0.4	7.4	.0	100.0
	Standard Error	1,367	451	5,724	15,980	532	176	19,802	7,170	2,648	11,259	337	

1/ Source: Age information summarized from original age-weight-length data forms. Harvest numbers taken from Alaska Dept. Of Fish and Game fish ticket summaries taken from files on the University of Alaska Honeywell computer system.

2/ Fish present, but represent less than 0.05% of the catch.

drift fishery (15% age 1.2 and 74% age 1.3) and set nets on Kalifonsky Beach (15% age 1.2 and 73% age 1.3). Catches on Salamatof Beach (24% age 1.2 and 66% age 1.3) and Coho/Ninilchik Beach (21% age 1.2 and 64% age 1.3) were comprised of similar age proportions. Higher proportions of fish aged 2.2 and 2.3 were harvested by set nets on Kalgin Island (17% age 2.2 and 13% 2.3) and on the Central District west-side (15% age 2.2 and 17% age 2.3) than elsewhere. Age 1.2 fish predominated in the Northern District east-side (78%) and Northern District west-side (47%) set net fisheries.

Age compositions of sockeye salmon entering the rivers in Upper Cook Inlet varied considerably among runs (Table 5). Sockeye salmon escapement into the Kenai River mainstem was dominated (79%) by fish aged 1.3. Fish aged 1.2 comprised the largest proportions of the escapement into the Susitna River (56% at Susitna Station), Kasilof River (50%), and Fish Creek (88%). The escapement into Crescent River was comprised of 42% age 1.3, 27% age 2.2, and 19% age 2.3 fish. Age 1.3 fish were in the majority in the escapements into Big River (60%) and McArthur River (55%). Fish spawning in Chilligan River were mostly age 2.3 (39%) and age 1.3 (38%).

Classification Models

Age 1.3 Models:

The size of the first freshwater annulus (variable 2) and the distance from the focus to circulus 6 in the first freshwater zone (variable 5) provided the greatest discrimination among the different runs of age 1.3 fish (Table 1). Freshwater growth was greatest for fish from Big River, followed by Susitna River (Table 6). Fish from Kenai, Crescent, and Chilligan Rivers had similar freshwater growth which was smaller than the other runs. Kasilof and McArthur River fish had freshwater growth intermediate to Kenai River and Big River fish.

Catches of age 1.3 fish made by the drift and Kalgin Island set net fisheries were initially classified with a seven-way model which included samples from Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers. Overall classification accuracy of the seven-way model was 51.7% (Table 7). Percentages correctly classified were fairly high and similar for Kenai River (65%), Kasilof River (63%), and Crescent River (63%). Correct classifications for Susitna River (42%), Big River (42%), McArthur River (40%), and Chilligan Rivers (47%) were substantially lower.

Age 1.3 fish harvested by the Central District east-side set nets were initially classified with a three-way model representing Susitna, Kenai, and Kasilof Rivers. Overall classification accuracy of this model was 72.1% (Table 7). Samples from Kenai and Kasilof Rivers were correctly classified 79% of the time; while samples from Susitna River were only classified correctly 58% of the time.

Catches of age 1.3 fish from the Central and Northern Districts west-side set net fisheries were classified with a five-way model representing Susitna, Crescent, Big, McArthur, and Chilligan Rivers. Overall classification accuracy of this model was 56% (Table 7). Classification accuracies were highest for Crescent River (68%), followed by Chilligan River (59%), Susitna River (54%), Big River (50%), and McArthur River (50%).

Table 5. Age composition by river of sockeye salmon escapement, Upper Cook Inlet, 1983^{1/}.

		Age Composition by Brood Year and Age Group														
System	Date	Sample Size	1980		1979			1978			1977		1976		Total	
			0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4		
Susitna River																
Susitna Station	7/01-8/08	1,899	Percent	2.6	0.3	4.5	55.9	0.6	0.0	23.7	9.5	0.2	2.4	0.0	0.3	100.0
			Numbers	2,885	338	5,049	62,895	656	0	26,592	10,671	233	2,677	0	318	112,314
			Std. Error	392	156	532	1,395	214	0	1,081	770	136	377	0	148	
Yentna Station	7/02-9/04	1,024	Percent	0.4	4.7	0.4	66.9	0.9	0.5	22.6	1.7	0.2	1.7	0.0	0.0	100.0
			Numbers	418	4,907	418	69,853	940	522	23,597	1,775	209	1,775	0	0	104,414
			Std. Error	205	688	205	1,529	307	229	1,359	420	145	420	0	0	
Sunshine Station	7/17-9/11	994	Percent	0.1	0.0	0.1	63.4	0.5	0.1	33.7	1.7	0.0	0.4	0.0	0.0	100.0
			Numbers	72	0	72	45,344	358	72	24,102	1,216	0	286	0	0	71,522
			Std. Error	71	0	71	1,086	159	71	1,065	291	0	142	0	0	
Talkeetna Station	7/15-9/12	344	Percent	0.3	4.1	0.0	50.9	4.9	0.0	38.0	1.8	0.0	0.0	0.0	0.0	100.0
			Numbers	13	174	0	2,155	208	0	1,609	76	0	0	0	0	4,235
			Std. Error	12	43	0	110	47	0	106	29	0	0	0	0	
Curry Station	7/17-9/03	118	Percent	0.9	5.9	0.0	69.5	2.5	0.9	18.6	1.7	0.0	0.0	0.0	0.0	100.0
			Numbers	17	111	0	1,303	47	17	349	32	0	0	0	0	1,876
			Std. Error	16	40	0	77	26	16	65	22	0	0	0	0	
Kenai River																
Total	6/22-8/12	1,765	Percent	0.0	0.3	0.3	8.4	0.5	0.0	79.0	2.2	0.3	8.9	0.0	0.1	100.0
			Numbers	0	1,955	1,904	53,075	3,109	0	497,960	13,950	1,664	56,146	0	577	630,340
			Std. Error	0	766	814	4,308	1,086	0	6,228	2,247	808	4,294	0	546	
Quartz Creek	6/28-10/11	229	Percent	0.0	0.0	0.0	4.0	0.4	0.0	87.3	0.8	0.9	6.6	0.0	0.0	100.0
			Numbers	0	0	0	2,934	293	0	64,030	587	660	4,841	0	0	73,345
			Std. Error	0	0	0	950	306	0	1,615	432	458	1,204	0	0	
Russian River	7/26-9/06	175	Percent	0.0	0.0	0.0	73.7	0.0	0.0	8.0	12.6	0.0	5.7	0.0	0.0	100.0
			Numbers	0	0	0	25,087	0	0	2,723	4,289	0	1,940	0	0	34,039
			Std. Error	0	0	0	1,133	0	0	698	854	0	597	0	0	
Hidden Creek	7/23-8/10	192	Percent	0.0	0.0	0.0	88.0	0.0	0.0	8.9	3.1	0.0	0.0	0.0	0.0	100.0
			Numbers	0	0	0	9,942	0	0	1,005	350	0	0	0	0	11,297
			Std. Error	0	0	0	263	0	0	231	140	0	0	0	0	

-Continued-

Table 5. Age composition by river of sockeye salmon escapement, Upper Cook Inlet, 1983^{1/} (continued).

			Age Composition by Brood Year and Age Group													
System	Date	Sample Size	1980		1979			1978			1977		1976		Total	
			0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4		
Kasilof River	6/22-7/31	1,997	Percent	0.0	0.0	0.0	49.5	0.0	0.0	33.2	12.8	0.0	4.5	0.0	0.0	100.0
			Numbers	0	0	0	104,112	0	0	69,687	27,032	0	9,440	0	0	210,271
			Std. Error	0	0	0	2,314	0	0	2,040	1,652	0	954	0	0	
Crescent River	7/01-7/31	662	Percent	0.0	0.0	0.0	10.9	0.6	0.0	42.3	27.4	0.2	18.6	0.0	0.0	100.0
			Numbers	0	0	0	10,065	554	0	39,061	25,302	185	17,176	0	0	92,343
			Std. Error	0	0	0	1,115	276	0	1,768	1,536	160	1,333	0	0	
Fish Creek	7/12-8/30	1,049	Percent	0.0	9.5	0.0	87.6	0.5	0.0	0.8	1.5	0.0	0.1	0.0	0.0	100.0
			Numbers	0	11,292	0	104,010	560	0	976	1,773	0	186	0	0	118,797
			Std. Error	0	1,112	0	1,233	181	0	358	436	0	105	0	0	
Packers Creek	5/23-8/29	804	Percent	0.0	0.2	0.0	24.2	3.4	0.0	28.9	40.2	0.0	3.1	0.0	0.0	100.0
			Numbers	0	37	0	4,454	626	0	5,318	7,398	0	570	0	0	18,403
			Std. Error	0	28	0	272	115	0	288	311	0	110	0	0	
Big River	5/25-7/27	2,471	Percent	0.3	1.1	0.3	26.6	0.8	0.0	60.0	8.8	0.1	1.9	0.1	0.0	100.0
			Std. Error	0.2	0.5	0.2	1.7	0.4	0.0	1.8	1.2	0.1	0.6	0.2	0.0	
Wolverine Creek	6/13-7/28	280	Percent	0.0	0.4	0.0	38.2	0.0	0.0	7.5	40.0	0.0	13.9	0.0	0.0	100.0
			Numbers	0	73	0	6,948	0	0	1,364	7,276	0	2,528	0	0	18,189
			Std. Error	0	68	0	525	0	0	285	529	0	374	0	0	
McArthur River	8/12-8/14	244	Percent	1.2	0.0	6.2	34.0	0.0	0.0	54.6	1.2	0.0	2.8	0.0	0.0	100.0
			Std. Error	0.7	0.0	1.5	3.0	0.0	0.0	3.2	0.7	0.0	1.1	0.0	0.0	
Chilligan River	9/13-9/14	758	Percent	0.0	0.0	0.0	2.9	2.0	0.0	37.7	17.8	0.1	39.5	0.0	0.0	100.0
			Std. Error	0.0	0.0	0.0	0.6	0.5	0.0	1.8	1.4	0.1	1.8	0.0	0.0	

1/ Source: Cross, B. 1985. Abundance, age, sex, and size data for Upper Cook Inlet sockeye, chinook, coho, chum, and pink salmon, 1983. Ak. Dept. Fish and Game Technical Data Report 159. 176 pp.

Table 6. Mean (\bar{x}) and standard error (S.E.) of age 1.3 scale variables used to construct linear discriminant functions in 1983.

	Susitna		Kenai		Kasilof		Crescent		Big		McArthur		Chilligan	
	\bar{x}	S.E.												
First Freshwater Annulus														
NC1FW	10.73	0.202	7.75	0.101	9.74	0.082	8.23	0.091	12.15	0.414	9.42	0.194	8.19	0.146
S1FW	134.58	2.476	94.75	1.071	123.87	0.947	89.34	0.907	135.45	3.706	114.40	2.331	98.28	1.433
C0-C6	90.02	0.964	80.62	0.654	92.51	0.547	71.13	0.574	82.04	1.072	84.73	0.814	80.55	0.856
C4-C6	22.05	0.391	17.72	0.241	21.18	0.235	16.14	0.204	18.55	0.387	20.57	0.404	16.97	0.350
C4-E1FW	67.20	2.082	31.89	0.876	52.54	0.826	34.29	0.802	71.96	3.804	51.01	2.011	34.50	1.255
C0-C4/S1FW	0.53	0.008	0.67	0.006	0.58	0.004	0.62	0.006	0.50	0.014	0.58	0.011	0.66	0.008
C0-C6/S1FW	0.69	0.009	0.86	0.007	0.75	0.004	0.80	0.007	0.65	0.018	0.75	0.011	0.83	0.009
C4-C6/S1FW	0.17	0.003	0.19	0.003	0.17	0.002	0.18	0.002	0.14	0.004	0.18	0.004	0.17	0.004
C(NC-4)-E1FW/S1FW	0.29	0.007	0.38	0.006	0.28	0.003	0.37	0.005	0.26	0.008	0.32	0.010	0.35	0.008
C(NC-2)-E1FW/S1FW	0.14	0.003	0.18	0.003	0.13	0.002	0.19	0.003	0.12	0.004	0.15	0.004	0.17	0.004
S1FW/NC1FW	12.64	0.127	12.37	0.111	12.78	0.078	10.97	0.089	11.42	0.138	12.21	0.110	12.13	0.143
NC 1ST 3/4	6.55	0.140	4.41	0.077	5.53	0.064	4.95	0.076	7.56	0.325	5.57	0.146	4.63	0.110
Plus Growth														
NCPG	4.10	0.137	5.42	0.129	3.84	0.087	4.64	0.120	3.64	0.204	3.78	0.169	4.22	0.166
SPGZ	47.53	1.730	60.69	1.620	38.73	1.025	55.39	1.539	36.87	2.049	40.66	1.945	45.90	2.053
Freshwater and Plus Growth														
NC1FW + NCPG	14.83	0.169	13.17	0.125	13.58	0.101	12.86	0.136	15.79	0.350	13.20	0.144	12.42	0.167
S1FW + SPGZ	182.11	1.870	155.44	1.538	162.60	1.243	144.73	1.637	172.32	3.118	155.06	1.887	144.17	1.990
S1FW/S1FW + SPGZ	0.73	0.010	0.62	0.008	0.77	0.005	0.63	0.007	0.78	0.120	0.74	0.012	0.69	0.011
First Marine Annulus														
NC10Z	23.69	0.191	24.78	0.193	25.26	0.167	23.56	0.169	25.42	0.269	23.75	0.266	23.09	0.255
S10Z	403.44	3.009	424.68	3.141	425.20	2.539	399.53	2.618	403.63	4.282	390.90	4.393	381.71	4.416
EFW-C9	167.32	1.120	161.77	1.211	159.21	1.128	160.77	1.216	151.56	1.727	154.26	1.543	154.55	1.523
EFW-C12	224.93	1.325	219.21	1.404	216.44	1.391	217.73	1.395	205.67	2.093	209.92	1.933	210.79	1.785
C(NC-6)-E10Z	84.37	0.785	87.83	0.707	83.85	0.725	88.25	0.697	75.17	0.882	82.46	1.105	85.52	0.999
S10Z/NC10Z	17.11	0.098	17.19	0.085	16.89	0.086	17.03	0.084	15.92	0.119	16.51	0.128	16.57	0.124
C9-E10Z	236.12	3.115	262.91	3.317	266.00	2.643	238.77	2.816	252.06	4.626	236.64	4.685	227.16	4.306
EFW-C12/S10Z	0.56	0.005	0.52	0.005	0.51	0.004	0.55	0.005	0.51	0.007	0.54	0.008	0.56	0.007
EFW-C15/S10Z	0.70	0.005	0.65	0.005	0.65	0.005	0.68	0.005	0.65	0.008	0.68	0.008	0.70	0.007
C(NC-6)-E10Z/S10Z	84.37	0.785	87.83	0.707	83.85	0.725	88.25	0.697	75.17	0.882	82.46	1.105	85.52	0.999
S10Z/NC10Z	17.11	0.098	17.19	0.085	16.89	0.086	17.03	0.084	15.92	0.119	16.51	0.128	16.57	0.124
NC 1ST 1/2	10.29	0.098	11.14	0.107	11.34	0.090	10.56	0.095	11.32	0.155	10.74	0.156	10.46	0.142
MAX DIST	27.23	0.297	28.29	0.365	27.45	0.323	28.58	0.299	25.85	0.405	25.94	0.375	25.89	0.382
MAX DIST/S10Z	0.68	0.001	0.67	0.001	0.67	0.001	0.67	0.001	0.67	0.001	0.67	0.001	0.67	0.001
Second Marine Annulus														
S20Z	282.00	2.793	317.07	2.896	282.62	2.805	297.06	2.787	263.38	4.789	283.03	4.318	286.01	3.883

Table 7. Classification matrices from discriminant analyses of age 1.3 sockeye salmon scales from the Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers, Upper Cook Inlet, 1983.

Actual Group Of Origin	Sample Size	Classified Group of Origin						
		Susitna	Kenai	Kasilof	Crescent	Big	McArthur	Chilligan
Susitna	197	<u>.421</u>	.096	.122	.086	.117	.091	.066
Kenai	196	.015	<u>.648</u>	.077	.153	.010	.051	.046
Kasilof	199	.080	.050	<u>.628</u>	.020	.020	.121	.080
Crescent	244	.004	.139	.037	<u>.627</u>	.004	.057	.131
Big	94	.096	.053	.191	.032	<u>.415</u>	.085	.128
McArthur	97	.134	.124	.113	.052	.031	<u>.402</u>	.144
Chilligan	97	.010	.113	.093	.175	.010	.124	<u>.474</u>

Overall correctly classified = .517

Actual Group Of Origin	Sample Size	Classified Group of Origin						
		Susitna	Kenai	Kasilof	Crescent	Big	Chilligan	
Susitna	197	<u>.462</u>	.102	.137	.096	.122	.081	
Kenai	196	.020	<u>.668</u>	.092	.163	.010	.046	
Kasilof	199	.095	.050	<u>.698</u>	.020	.020	.116	
Crescent	244	.012	.135	.053	<u>.643</u>	.004	.152	
Big	94	.096	.053	.234	.032	<u>.426</u>	.160	
Chilligan	97	.021	.113	.113	.175	.041	<u>.536</u>	

Overall correctly classified = .572

Actual Group Of Origin	Sample Size	Classified Group of Origin				
		Susitna	Kenai	Kasilof	Crescent	Big
Susitna	197	<u>.447</u>	.117	.188	.107	.142
Kenai	196	.031	<u>.673</u>	.122	.163	.010
Kasilof	199	.095	.060	<u>.769</u>	.035	.040
Crescent	244	.029	.164	.049	<u>.730</u>	.029
Big	94	.106	.085	.266	.043	<u>.500</u>

Overall correctly classified = .624

-Continued-

Table 7. Classification matrices from discriminant analyses of age 1.3 sockeye salmon scales from the Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers, Upper Cook Inlet, 1983 (continued).

Actual Group Of Origin	Sample Size	Classified Group of Origin				
		Susitna	Kenai	Kasilof	Crescent	Chilligan
Susitna	197	<u>.518</u>	.096	.193	.086	.107
Kenai	196	.010	<u>.668</u>	.112	.117	.092
Kasilof	199	.070	.055	<u>.754</u>	.025	.095
Crescent	244	.012	.143	.033	<u>.664</u>	.148
Chilligan	97	.041	.103	.165	.144	<u>.546</u>

Overall correctly classified = .630

Actual Group Of Origin	Sample Size	Classified Group of Origin				
		Susitna	Kenai	Crescent	Big	McArthur
Susitna	197	<u>.508</u>	.117	.102	.122	.152
Kenai	196	.036	<u>.724</u>	.163	.010	.066
Crescent	244	.025	.152	<u>.693</u>	.012	.119
Big	94	.160	.085	.043	<u>.489</u>	.223
McArthur	97	.186	.134	.062	.082	<u>.536</u>

Overall correctly classified = .590

Actual Group Of Origin	Sample Size	Classified Group of Origin				
		Susitna	Crescent	Big	McArthur	Chilligan
Susitna	197	<u>.543</u>	.127	.142	.117	.071
Crescent	244	.045	<u>.676</u>	.004	.111	.164
Big	94	.138	.032	<u>.500</u>	.202	.128
McArthur	97	.165	.062	.072	<u>.495</u>	.206
Chilligan	97	.031	.196	.021	.165	<u>.588</u>

Overall correctly classified = .560

-Continued-

Table 7. Classification matrices from discriminant analyses of age 1.3 sockeye salmon scales from the Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers, Upper Cook Inlet, 1983 (continued).

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Kenai	Kasilof	Crescent
Susitna	197	<u>.538</u>	.122	.218	.122
Kenai	196	.015	<u>.714</u>	.133	.138
Kasilof	199	.101	.065	<u>.794</u>	.040
Crescent	244	.020	.164	.049	<u>.766</u>

Overall correctly classified = .703

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Kenai	Kasilof	Big
Susitna	197	<u>.513</u>	.157	.173	.157
Kenai	196	.061	<u>.781</u>	.133	.026
Kasilof	199	.095	.070	<u>.774</u>	.060
Big	94	.149	.096	.223	<u>.532</u>

Overall correctly classified = .650

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Kenai	Crescent	Big
Susitna	197	<u>.558</u>	.147	.122	.173
Kenai	196	.061	<u>.750</u>	.158	.031
Crescent	244	.045	.168	<u>.754</u>	.033
Big	94	.202	.128	.053	<u>.617</u>

Overall correctly classified = .670

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Kenai	Crescent	Chilligan
Susitna	197	<u>.680</u>	.127	.081	.112
Kenai	196	.041	<u>.750</u>	.122	.087
Crescent	244	.037	.143	<u>.635</u>	.184
Chilligan	97	.052	.155	.175	<u>.613</u>

-Continued- Overall correctly classified = .671

Table 7. Classification matrices from discriminant analyses of age 1.3 sockeye salmon scales from the Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers, Upper Cook Inlet, 1983 (continued).

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Kasilof	Crescent	Big
Susitna	197	<u>.503</u>	.183	.168	.147
Kasilof	199	.095	<u>.804</u>	.050	.050
Crescent	244	.049	.078	<u>.844</u>	.029
Big	94	.128	.255	.064	<u>.553</u>

Overall correctly classified = .676

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Crescent	Big	McArthur
Susitna	197	<u>.563</u>	.142	.152	.142
Crescent	244	.061	<u>.775</u>	.012	.152
Big	94	.160	.064	<u>.521</u>	.255
McArthur	97	.206	.124	.093	<u>.577</u>

Overall correctly classified = .609

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Crescent	Big	Chilligan
Susitna	197	<u>.584</u>	.147	.188	.081
Crescent	244	.061	<u>.660</u>	.037	.242
Big	94	.160	.064	<u>.606</u>	.170
Chilligan	97	.082	.165	.093	<u>.660</u>

Overall correctly classified = .627

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Susitna	Kenai	Kasilof
Susitna	197	<u>.579</u>	.208	.213
Kenai	196	.041	<u>.791</u>	.168
Kasilof	199	.131	.075	<u>.794</u>

Overall correctly classified = .721

-Continued-

Table 7. Classification matrices from discriminant analyses of age 1.3 sockeye salmon scales from the Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers, Upper Cook Inlet, 1983 (continued).

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Susitna	Kenai	Crescent
Susitna	197	<u>.690</u>	.173	.137
Kenai	196	.046	<u>.811</u>	.143
Crescent	244	.045	.201	<u>.754</u>

Overall correctly classified = .752

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Susitna	Kenai	Big
Susitna	197	<u>.645</u>	.162	.193
Kenai	196	.046	<u>.888</u>	.066
Big	94	.191	.106	<u>.702</u>

Overall correctly classified = .745

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Susitna	Kenai	McArthur
Susitna	197	<u>.610</u>	.195	.195
Kenai	196	.045	<u>.804</u>	.151
McArthur	97	.160	.200	<u>.640</u>

Overall correctly classified = .685

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Susitna	Big	McArthur
Susitna	197	<u>.640</u>	.168	.193
Big	94	.170	<u>.606</u>	.223
McArthur	97	.206	.124	<u>.670</u>

Overall correctly classified = .639

-Continued-

Table 7. Classification matrices from discriminant analyses of age 1.3 sockeye salmon scales from the Susitna, Kenai, Kasilof, Crescent, Big, McArthur, and Chilligan Rivers, Upper Cook Inlet, 1983 (continued).

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Crescent	Big	McArthur
Crescent	244	<u>.836</u>	.016	.148
Big	94	.074	<u>.660</u>	.266
McArthur	97	.134	.103	<u>.763</u>
Overall correctly classified = .753				

Actual Group Of Origin	Sample Size	Classified Group of Origin	
		Susitna	Kenai
Susitna	197	<u>.785</u>	.215
Kenai	196	.095	<u>.905</u>
Overall correctly classified = .845			

Actual Group Of Origin	Sample Size	Classified Group of Origin	
		Susitna	Crescent
Susitna	197	<u>.807</u>	.193
Crescent	244	.090	<u>.910</u>
Overall correctly classified = .858			

Actual Group Of Origin	Sample Size	Classified Group of Origin	
		Kenai	Kasilof
Kenai	196	<u>.879</u>	.121
Kasilof	199	.121	<u>.879</u>
Overall correctly classified = .879			

When a catch sample was classified and the estimated contribution of a run was less than or equal to zero, a new model excluding that run was constructed and the catch sample reclassified. The overall classification accuracy for the six-way model was 57% and accuracies for the various five-way models ranged from 56% to 63% (Table 7). The range of classification accuracies was 61% to 70% for the four-way models; 64% to 75% for the three-way models; and 84% to 88% for the two-way models.

Age 1.2 Models:

Scale characters which were the most discriminatory among the runs of age 1.2 fish were the distance from circulus 4 to the end of the first freshwater annulus (variable 15) and the average distance between circuli from the end of the freshwater zone to circulus 3 in the first marine zone (variable 90). The mean values of variable 15 were greatest for samples from Fish and Hidden Creeks, approximately twice as large as the mean values for the other systems (Table 8). Samples from Kenai and McArthur Rivers had the smallest mean values for variable 15. The mean value of variable 15 for Big River samples was the third largest following Fish and Hidden Creeks. Values for variable 15 were similar for samples from Kasilof and Susitna Rivers and were intermediate to Big and Kenai Rivers. Samples from Fish and Hidden Creeks showed the greatest differences between the mean values for variable 90, with Fish Creek having the largest mean and Hidden Creek the smallest mean value of the seven systems (Table 8).

Catches of age 1.2 fish made by the drift fishery were initially classified with a seven-way model which included samples from Susitna River, Kenai River, Kasilof River, Fish Creek, Hidden Creek, Big River, and McArthur River. Overall classification accuracy of the seven-way model was 60.2% (Table 9). Percentages of correct classifications were highest for Fish Creek (84%) and Hidden Creek (83%). The classification accuracy for Kasilof River samples equaled 71%. The remaining systems had classification accuracies which were subsequently lower: 31% for Susitna River, 44% for Kenai River, 59% for Big River, and 49% for McArthur River.

Age 1.2 fish harvested on Coho/Ninilchik Beach were initially classified with a five-way model representing Susitna River, Kenai River, Kasilof River, Fish Creek, and Hidden Creek. Overall classification accuracy of the five-way model equaled 70.7% (Table 9). The five-way model classified samples from Hidden Creek (88%) and Fish Creek (85%) most accurately. Classification accuracies for Kasilof, Kenai, and Susitna Rivers equaled 75%, 64%, and 42%, respectively.

Harvests of age 1.2 fish made by the Northern District east-side set net fishery were classified with a four-way model which included samples from Susitna River, Kenai River, Fish Creek, and Hidden Creek. This four-way model had an overall classification accuracy of 76% (Table 9). Percentages of correct classifications equaled: 89% for Hidden Creek, 86% for Fish Creek, 65% for Kenai River, and 64% for Susitna River.

Additional models were constructed whenever the estimated contribution of a river to a catch was zero. Overall classification accuracies ranged from 66% to 70% for six-way models, and from 71% to 74% for five-way models (Table 9).

Table 8. Mean (\bar{x}) and standard error (S.E.) of age 1.2 scale variables used to construct linear discriminant functions in 1983.

	Susitna		Kerai		Kasilof		Fish		Hidden		Big		McArthur	
	\bar{x}	S.E.												
First Freshwater Annulus														
CO-C6	87.21	0.923	82.58	0.838	95.02	0.683	92.37	0.701	87.75	0.653	84.35	0.861	86.13	1.224
C2-C6	43.56	0.620	40.00	0.570	49.19	0.463	48.02	0.526	44.73	0.525	42.04	0.609	42.06	0.872
C4-C6	20.04	0.324	18.78	0.316	23.19	0.341	23.49	0.400	20.74	0.297	19.77	0.363	19.91	0.508
-C4-E1FW	61.48	2.068	56.13	2.176	63.37	1.218	187.51	3.158	156.68	2.557	80.50	3.015	50.58	1.772
CO-C2/S1FW	0.36	0.006	0.37	0.007	0.34	0.004	0.18	0.003	0.20	0.003	0.31	0.007	0.39	0.008
CO-C4/21FW	0.54	0.008	0.55	0.009	0.54	0.005	0.27	0.005	0.30	0.004	0.47	0.010	0.58	0.009
CO-C6/S1FW	0.70	0.009	0.71	0.011	0.71	0.006	0.37	0.006	0.40	0.005	0.61	0.012	0.75	0.009
C(NC-4)-E1FW/S1FW	0.29	0.006	0.28	0.008	0.27	0.004	0.14	0.004	0.16	0.003	0.24	0.006	0.28	0.007
S1FW/NC1FW	12.18	0.113	11.41	0.112	13.05	0.085	11.90	0.096	11.26	0.085	11.38	0.098	11.95	0.143
Plus Growth														
NCPG	3.76	0.134	4.30	0.171	2.94	0.093	3.31	0.160	1.87	0.110	4.07	0.236	3.39	0.137
Freshwater and Plus Growth														
NC/FW + NCPG	14.40	0.162	14.87	0.245	13.34	0.110	25.00	0.238	21.76	0.234	16.87	0.260	13.18	0.148
S1FW + SPGZ	169.07	1.93	162.55	2.77	165.63	1.32	290.28	2.54	243.69	2.84	189.61	2.77	152.55	1.91
S1FW/S1FW + SPGZ	0.76	0.009	0.74	0.011	0.82	0.005	0.88	0.007	0.92	0.004	0.77	0.013	0.77	0.010
First Marine Annulus														
NC10Z	24.50	0.200	25.71	0.210	26.38	0.178	24.42	0.218	27.34	0.261	25.36	0.228	24.17	0.304
EFW-C6	108.10	1.056	104.19	1.302	104.16	0.949	118.37	1.292	92.06	1.351	104.95	1.334	101.15	1.363
C(NC-6)-E10Z	83.42	0.774	80.85	0.984	80.38	0.897	74.82	1.077	75.17	1.018	74.38	1.125	79.14	1.175
C(NC-3)-E10Z	41.41	0.458	39.75	0.538	40.16	0.496	36.23	0.585	35.28	0.518	37.43	0.594	38.09	0.652
-EFW-C3/S10Z	0.13	0.002	0.12	0.002	0.12	0.002	0.14	0.002	0.10	0.002	0.13	0.002	0.13	0.003
EFW-C6/S10Z	0.27	0.003	0.25	0.003	0.24	0.002	0.30	0.003	0.22	0.004	0.26	0.004	0.27	0.004
C(NC-3)-E10Z/S10Z	0.10	0.001	0.10	0.001	0.09	0.001	0.09	0.001	0.08	0.001	0.09	0.001	0.10	0.002
NC 1ST 1/2	11.01	0.108	11.55	0.120	11.86	0.090	10.14	0.099	12.25	0.154	11.12	0.120	10.95	0.168

Table 9. Classification matrices from discriminant analyses of age 1.2 sockeye salmon scales from the Susitna, Kenai, Kasilof, Fish, Hidden, Big, and McArthur Rivers, Upper Cook Inlet, 1983.

Actual Group Of Origin	Sample Size	Classified Group of Origin						
		Susitna	Kenai	Kasilof	Fish	Hidden	Big	McArthur
Susitna	183	<u>.311</u>	.158	.202	.005	.011	.131	.180
Kenai	111	.162	<u>.441</u>	.090	.000	.009	.162	.135
Kasilof	146	.116	.034	<u>.712</u>	.000	.000	.048	.089
Fish	108	.000	.000	.000	<u>.843</u>	.074	.083	.000
Hidden	100	.000	.000	.000	.110	<u>.830</u>	.060	.000
Big	97	.041	.144	.072	.000	.052	<u>.588</u>	.103
McArthur	78	.205	.064	.205	.000	.000	.038	<u>.487</u>

Overall correctly classified = .602

Actual Group Of Origin	Sample Size	Classified Group of Origin					
		Susitna	Kenai	Kasilof	Fish	Hidden	Big
Susitna	183	<u>.372</u>	.246	.235	.005	.005	.137
Kenai	111	.171	<u>.532</u>	.108	.009	.009	.171
Kasilof	146	.130	.075	<u>.733</u>	.000	.000	.062
Fish	108	.000	.000	.000	<u>.843</u>	.065	.093
Hidden	100	.000	.000	.000	.110	<u>.830</u>	.060
Big	97	.052	.186	.082	.000	.052	<u>.629</u>

Overall correctly classified = .656

Actual Group Of Origin	Sample Size	Classified Group of Origin					
		Kenai	Kasilof	Fish	Hidden	Big	McArthur
Kenai	111	<u>.532</u>	.126	.009	.018	.180	.135
Kasilof	146	.055	<u>.795</u>	.000	.000	.068	.082
Fish	108	.000	.000	<u>.833</u>	.083	.083	.000
Hidden	100	.000	.000	.100	<u>.850</u>	.050	.000
Big	97	.186	.093	.000	.052	<u>.629</u>	.041
McArthur	78	.141	.218	.000	.000	.051	<u>.590</u>

Overall correctly classified = .705

-Continued-

Table 9. Classification matrices from discriminant analyses of age 1.2 sockeye salmon scales from the Susitna, Kenai, Kasilof, Fish, Hidden, Big, and McArthur Rivers, Upper Cook Inlet, 1983 (continued).

Actual Group Of Origin	Sample Size	Classified Group of Origin				
		Susitna	Kenai	Kasilof	Fish	Hidden
Susitna	183	<u>.415</u>	.311	.246	.005	.022
Kenai	111	.234	<u>.640</u>	.099	.009	.018
Kasilof	146	.178	.075	<u>.747</u>	.000	.000
Fish	108	.028	.028	.000	<u>.852</u>	.093
Hidden	100	.010	.010	.010	.090	<u>.880</u>

Overall correctly classified = .707

Actual Group Of Origin	Sample Size	Classified Group of Origin				
		Susitna	Kasilof	Fish	Hidden	Big
Susitna	183	<u>.536</u>	.251	.005	.005	.202
Kasilof	146	.151	<u>.788</u>	.000	.000	.062
Fish	108	.000	.000	<u>.852</u>	.074	.074
Hidden	100	.000	.000	.090	<u>.860</u>	.050
Big	97	.175	.082	.000	.052	<u>.691</u>

Overall correctly classified = .745

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Kenai	Fish	Hidden
Susitna	183	<u>.639</u>	.328	.005	.027
Kenai	111	.315	<u>.649</u>	.009	.027
Fish	108	.028	.028	<u>.861</u>	.083
Hidden	100	.000	.020	.090	<u>.890</u>

Overall correctly classified = .760

-Continued-

Table 9. Classification matrices from discriminant analyses of age 1.2 sockeye salmon scales from the Susitna, Kenai, Kasilof, Fish, Hidden, Big, and McArthur Rivers, Upper Cook Inlet, 1983 (continued).

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Kasilof	Fish	Hidden
Susitna	183	<u>.705</u>	.268	.005	.022
Kasilof	146	.199	<u>.801</u>	.000	.000
Fish	108	.037	.000	<u>.880</u>	.083
Hidden	100	.010	.010	.080	<u>.900</u>

Overall correctly classified = .821

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Kasilof	Fish	Big
Susitna	183	<u>.557</u>	.246	.005	.191
Kasilof	146	.158	<u>.767</u>	.000	.075
Fish	108	.000	.000	<u>.917</u>	.083
Big	97	.175	.093	.000	<u>.732</u>

Overall correctly classified = .743

Actual Group Of Origin	Sample Size	Classified Group of Origin			
		Susitna	Fish	Big	McArthur
Susitna	183	<u>.519</u>	.011	.197	.213
Fish	108	.000	<u>.935</u>	.065	.000
Big	97	.113	.010	<u>.753</u>	.124
McArthur	78	.321	.000	.051	<u>.628</u>

Overall correctly classified = .709

-Continued-

Table 9. Classification matrices from discriminant analyses of age 1.2 sockeye salmon scales from the Susitna, Kenai, Kasilof, Fish, Hidden, Big, and McArthur Rivers, Upper Cook Inlet, 1983 (continued).

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Susitna	Kasilof	Fish
Susitna	184	<u>.732</u>	.257	.011
Kasilof	146	.178	<u>.822</u>	.000
Fish	108	.037	.000	<u>.963</u>
Overall correctly classified = .839				

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Susitna	Fish	Hidden
Susitna	184	<u>.973</u>	.011	.016
Fish	108	.019	<u>.917</u>	.065
Hidden	100	.030	.060	<u>.910</u>
Overall correctly classified = .933				

Actual Group Of Origin	Sample Size	Classified Group of Origin		
		Susitna	Fish	Big
Susitna	184	<u>.770</u>	.005	.224
Fish	108	.000	<u>.944</u>	.056
Big	97	.227	.000	<u>.773</u>
Overall correctly classified = .829				

The ranges of classification accuracies were 71% to 82% for four-way models and 83% to 93% for three-way models.

Catch Apportionment

Age 1.3 Catch Apportionment with Scale Pattern Analysis:

Point estimates and confidence intervals of fish aged 1.3 estimated by analysis of scale patterns show temporal and spatial trends in run composition (Tables 10 and 11). Catches of age 1.3 fish from all fisheries, except Northern District and Central District west-side set nets, were comprised of increasing proportions of Kenai River fish, and conversely decreasing proportions of Kasilof River fish, through time. Temporal trends in contribution of Susitna River to the harvests of age 1.3 fish differed by fishery. In general, the proportions of Susitna River fish were low early in the season, increased rapidly, and gradually decreased late in the season. Temporal trends are not evident in the contributions of Crescent Big, McArthur, and Chilligan Rivers to the catch of age 1.3 fish in the drift fishery. The contributions of Big, McArthur, and Chilligan Rivers to the drift catch of age 1.3 fish were low throughout the year.

Kenai River fish accounted for most of the age 1.3 sockeye salmon harvested by the drift (72%), Salamatof Beach (81%), Kalifonsky Beach (82%), and Cohoe/Ninilchik Beach (76%) fisheries (Table 11). Catches of age 1.3 fish made by the Central District west-side fishery were predominantly (74%) Crescent River fish and those caught by the Northern District west-side were Susitna River (54%) fish. Big River contributed the largest percentage (53%) of fish to catches of age 1.3 sockeye salmon made by Kalgin Island set nets.

Coefficients of variation for estimated proportions of the age 1.3 catch were lowest for the major contributors: .11 for Susitna River, .03 for Kenai River, .14 for Kasilof River, and the 1.3 catch comprised of Big, McArthur, and Chilligan River fish had large coefficients of variation, .50, .47, and 1.60, respectively.

Age 1.2 Catch Apportionment with Scale Pattern Analysis:

Temporal trends are not evident in the estimates of run composition and confidence intervals calculated from scale pattern analysis of age 1.2 salmon (Tables 12 and 13). Fish Creek comprised the largest (37%) percentage of the drift catch of age 1.2 fish, followed by Susitna River (20%), Big River (16%), and Kasilof River (15%). Kenai and McArthur Rivers made up much smaller percentages of the age 1.2 drift harvest, 8% and 4%, respectively.

Age 1.2 harvests made on Cohoe/Ninilchik Beach were comprised primarily of Kasilof and Susitna River fish (Table 12). The Northern District east-side catches of 1.2 fish were predominately Susitna River (53%) and Fish Creek (30%) fish (Table 13).

Coefficients of variation for estimated proportions of the age 1.2 drift harvest equaled .18 for Susitna River, .31 for Kenai River, .15 for Kasilof River, .06 for Fish Creek, .17 for Big River, and .25 for McArthur River (Table 13). Coefficients of variation for proportions of the Northern

Table 10. Run composition estimates and 90% confidence intervals calculated from scale pattern analyses of age 1.3 sockeye salmon by fishery and date for Upper Cook Inlet, 1983/.

Fishery	Date	Susitna		Kenai		Kasilof		Crescent		Big		McArthur		Chilligan	
		Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.						
Central District Drift	6/27	0.011	(0,.281)	0.192	(0,.432)	0.574	(.244,.907)	0.102	(0,.334)	0.008	(0,.153)	0.037	(0,.420)	0.076	(0,.391)
	7/01	0.236	(.029,.444)	0.293	(.100,.487)	0.358	(.153,.562)	0.113	(0,.263)	Trace	2/	Trace		Trace	
	7/04	0.332	(.109,.556)	0.389	(.183,.596)	0.245	(.043,.446)	0.034	(0,.175)	Trace		Trace		Trace	
	7/06	0.089	(0,.243)	0.534	(.368,.701)	0.377	(.190,.564)	---		---		---		---	
	7/08	0.365	(.118,.612)	0.471	(.218,.724)	0.097	(0,.302)	0.043	(0,.227)	Trace		Trace		0.024	(0,.242)
	7/11	0.112	(0,.328)	0.669	(.374,.966)	0.115	(0,.329)	0.036	(0,.294)	0.038	(0,.213)	Trace		0.030	(0,.246)
	7/13	0.094	(0,.231)	0.676	(.443,.909)	0.067	(0,.230)	0.163	(0,.345)	Trace		Trace		Trace	
	7/15	0.200	(.042,.358)	0.771	(.631,.910)	Trace		Trace		0.029	(0,.160)	Trace		Trace	
	7/18	0.036	(0,.131)	0.857	(.681,1.00)	Trace		0.107	(0,.267)	Trace		Trace		Trace	
	7/21	0.148	(.025,.272)	0.737	(.555,.919)	Trace		0.115	(0,.273)	Trace		Trace		Trace	
	7/23	0.123	(.021,.225)	0.877	(.775,.979)	Trace		Trace		Trace		Trace		Trace	
	7/25	0.115	(0,.308)	0.629	(.401,.857)	Trace		0.218	(.019,.418)	0.038	(0,.174)	Trace		Trace	
	7/26	0.022	(0,.111)	0.978	(.889,1.00)	Trace		Trace		Trace		Trace		Trace	
	7/29	Trace		1.000	(.940,1.00)	Trace		Trace		Trace		Trace		Trace	

-Continued-

Table 10. Run composition estimates and 90% confidence intervals calculated from scale pattern analyses of age 1.3 sockeye salmon by fishery and date for Upper Cook Inlet, 1983^{1/} (continued).

Fishery	Date	Susitna		Kenai		Kasilof		Crescent		Big		McArthur		Chilligan	
		Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.
Salamatof Beach															
Set Net	7/18	0.138	(.034, .241)	0.862	(.759, .966)	Trace		---	---	---	---	---	---	---	---
	7/21	0.256	(.077, .434)	0.595	(.420, .771)	0.149	(0, .320)	---	---	---	---	---	---	---	---
	7/23	0.078	(0, .211)	0.845	(.679, 1.00)	0.077	(0, .243)	---	---	---	---	---	---	---	---
	7/25	0.035	(0, .152)	0.964	(.806, 1.00)	0.001	(0, .160)	---	---	---	---	---	---	---	---
	7/27	0.080	(0, .176)	0.920	(.824, 1.00)	Trace		---	---	---	---	---	---	---	---
Kalifonsky Beach															
Set Net	7/01	Trace		0.263	(.154, .371)	0.737 (.629, .846)		---	---	---	---	---	---	---	---
	7/04	0.209	(.019, .399)	0.275	(.121, .429)	0.516 (.325, .706)		---	---	---	---	---	---	---	---
	7/06	0.171	(0, .355)	0.257	(.108, .405)	0.572 (.384, .761)		---	---	---	---	---	---	---	---
	7/15	0.073	(0, .224)	0.512	(.349, .674)	0.415 (.230, .601)		---	---	---	---	---	---	---	---
	7/19	0.048	(0, .174)	0.813	(.649, .977)	0.139 (0, .310)		---	---	---	---	---	---	---	---
	7/25	0.152	(.047, .257)	0.848	(.743, .953)	Trace		---	---	---	---	---	---	---	---
	7/27	Trace		1.000	(.859, 1.00)	Trace		---	---	---	---	---	---	---	---

-42-

-Continued-

Table 10. Run composition estimates and 90% confidence intervals calculated from scale pattern analyses of age 1.3 sockeye salmon by fishery and date for Upper Cook Inlet, 1983^{1/} (continued).

Fishery	Date	Susitna		Kenai		Kasilof		Crescent		Big		McArthur		Chilligan	
		Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.
Cohoe/Minilchik															
Beach Set Net	7/01	Trace		0.197	(.092, .301)	0.803	(.699, .908)	---		---		---		---	
	7/06	0.139	(0, .322)	0.260	(.111, .410)	0.601	(.409, .791)	---		---		---		---	
	7/11	0.053	(0, .197)	0.543	(.382, .705)	0.404	(.220, .587)	---		---		---		---	
	7/13	0.190	(.023, .358)	0.608	(.435, .780)	0.202	(.026, .378)	---		---		---		---	
	7/18	0.218	(.055, .382)	0.728	(.556, .899)	0.054	(0, .213)	---		---		---		---	
	7/21	Trace		0.949	(.856, 1.00)	0.051	(0, .144)	---		---		---		---	
	7/26	Trace		1.000	(.923, 1.00)	Trace		---		---		---		---	
Kalgin Island															
Set Net	7/04	0.381	(.045, .716)	Trace		0.307	(.058, .556)	0.089	(0, .253)	0.223	(0, .501)	Trace		Trace	
	7/15	0.068	(0, .428)	0.007	(0, .209)	Trace		0.178	(0, .367)	0.747	(.381, 1.00)	Trace		Trace	
	7/23	0.272	(.050, .494)	0.219	(.080, .359)	Trace		Trace		0.509	(.287, .731)	Trace		Trace	

-Continued-

Table 10. Run composition estimates and 90% confidence intervals calculated from scale pattern analyses of age 1.3 sockeye salmon by fishery and date for Upper Cook Inlet, 1983^{1/} (continued).

Fishery	Date	Susitna		Kenai		Kasilof		Crescent		Big		McArthur		Chilligan	
		Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.	Pt. Est.	95% C.I.
Central District															
Westside Set Net	6/24	0.306	(0,.611)	---		---		0.222	(.037,.406)	0.032	(0,.245)	0.440	(.123,.760)	Trace	
	7/01	Trace		---		---		0.731	(.571,.891)	0.023	(0,.115)	0.246	(.060,.432)	Trace	
	7/11	0.007	(0,.169)	---		---		0.822	(.546,1.00)	0.163	(0,.347)	Trace		0.008	(0,.284)
	7/18	0.178	(.077,.279)	---		---		0.822	(.721,.923)	Trace		Trace		Trace	
Northern District															
Westside Set Net	7/15	0.427	(.093,.760)	---		---		0.239	(0,.489)	0.116	(0,.382)	0.154	(0,.504)	0.064	(0,.340)
	7/20	0.731	(.429,1.00)	---		---		Trace		0.265	(0,.538)	0.004	(0,.244)	Trace	

1/ The Central district drift net and Kalgin Island set net catches were classified with a model which included all seven systems. Catch samples from the eastside beaches (Salamatof, Kalifonsky, and Cohoe/Ninilchik) were classified with a three-way stock identification model which included Susitna, Kenai, and Kasilof Rivers. The Central District westside and Northern District westside set net catches were classified with a five-way model which included Susitna, Crescent, Big, McArthur, and Chilligan Rivers.

2/ Trace was recorded for systems that were originally included in the model used to classify the catch and their point estimates were less than zero, but the upper bounds of the 90% confidence interval was positive.

Table 11. Estimated numbers of sockeye salmon aged 1.3 by river harvested in Upper Cook Inlet, 1983.

Fishery	System	Estimated Proportion	Estimated Numbers	Standard Error of Estimate	Coefficient of Variation
North District West-side Set	Susitna	0.535	17,780	3,171	0.18
	Crescent	0.154	5,110	1,887	0.37
	Big	0.169	5,616	2,496	0.44
	McArthur	0.101	3,341	2,911	0.87
	Chilligan	0.041	1,369	2,041	1.49
	Total	1.000	33,216		
Central District Drift	Susitna	0.143	338,943	49,404	0.15
	Kenai	0.723	1,713,637	65,816	0.04
	Kasilof	0.049	114,972	22,472	0.20
	Crescent	0.071	169,324	51,041	0.30
	Big	0.009	20,741	21,908	1.06
	McArthur	0.000	469	1,490	3.18
	Chilligan	0.005	11,974	21,274	1.78
	Total	1.000	2,370,060		
Central District West-side Set	Susitna	0.133	4,846	1,367	0.28
	Crescent	0.735	26,710	1,842	0.07
	Big	0.041	1,479	669	0.45
	McArthur	0.089	3,232	648	0.20
	Chilligan	0.002	60	824	13.73
	Total	1.000	36,327		
Kalgin Island Set	Susitna	0.222	6,787	2,274	0.34
	Kenai	0.094	2,862	1,223	0.43
	Kasilof	0.068	2,073	694	0.33
	Crescent	0.084	2,582	965	0.37
	Big	0.532	16,290	2,349	0.14
	Total	1.000	30,594		

-Continued-

Table 11. Estimated numbers of sockeye salmon aged 1.3 by river harvested in Upper Cook Inlet, 1983 (continued).

Fishery	System	Estimated Proportion	Estimated Numbers	Standard Error of Estimate	Coefficient of Variation
Salamatof Beach Set	Susitna	0.136	44,118	11,254	0.26
	Kenai	0.812	262,570	14,430	0.05
	Kasilof	0.052	16,779	8,769	0.52
	Total	1.000	323,467		
Kalifonsky Beach Set	Susitna	0.072	23,646	11,386	0.48
	Kenai	0.815	269,018	14,943	0.06
	Kasilof	0.113	37,240	13,497	0.36
	Total	1.000	329,904		
Cohoe/Ninilchik Beach Set	Susitna	0.119	42,872	11,532	0.27
	Kenai	0.755	273,049	13,533	0.05
	Kasilof	0.126	45,591	12,198	0.27
	Total	1.000	361,512		
Total 1/	Susitna		478,992	53,359	0.11
	Kenai		2,521,136	70,341	0.03
	Kasilof		216,655	30,221	0.14
	Crescent		203,726	51,118	0.25
	Big		44,126	22,185	0.50
	McArthur		7,042	3,334	0.47
	Chilligan		13,403	21,388	1.60
	Total		3,485,080		

1/ Total figures do not include harvests made by set nets in the Northern District east-side set net fishery. Age 1.3 fish harvested by the Northern District east-side fishery were not allocated with scale pattern analysis, consequently, variance estimates are not available.

Table 12. Run composition estimates and 90% confidence intervals calculated from scale pattern analyses of age 1.2 sockeye salmon by fishery and date for Upper Cook Inlet, 1983.

Fishery	Date	Susitna		Kenai		Kasilof		Fish		Hidden		Big		McArthur	
		Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.
Central District Drift	7/01	0.128	(0,.429)	Trace		0.077	(0,.247)	0.340	(.184,.496)	0.001	(0,.091)	0.454	(.173,.736)	Trace	
	7/04	0.439	(.264,.615)	Trace		Trace		0.421	(.308,.535)	Trace		0.140	(0,.306)	Trace	
	7/08	0.250	(0,.522)	Trace		0.168	(0,.359)	0.461	(.288,.635)	0.060	(0,.168)	0.061	(0,.258)	Trace	
	7/11	0.223	(0,.513)	Trace		0.119	(0,.303)	0.409	(.243,.575)	0.007	(0,.094)	0.242	(0,.458)	Trace	
	7/13-7/15	Trace		0.083	(0,.294)	0.201	(.040,.362)	0.359	(.210,.508)	0.047	(0,.141)	0.154	(0,.356)	0.156	(0,.333)
	7/18-7/21	0.298	(0,.770)	0.094	(0,.470)	0.117	(0,.346)	0.327	(.162,.493)	0.019	(0,.106)	0.145	(0,.393)	Trace	
	7/23-7/25	0.167	(0,.779)	0.118	(0,.499)	0.137	(0,.369)	0.283	(.105,.462)	0.093	(0,.230)	0.174	(0,.455)	0.028	(0,.338)
	7/26-7/29	Trace		0.111	(0,.422)	0.058	(0,.245)	0.379	(.174,.583)	0.040	(0,.164)	0.175	(0,.456)	0.237	(0,.508)

-Continued-

Table 12. Run composition estimates and 90% confidence intervals calculated from scale pattern analyses of age 1.2 sockeye salmon by fishery and date for Upper Cook Inlet, 1983 (continued).

Fishery	Date	Susitna		Kenai		Kasilof		Fish		Hidden		Big		McArthur	
		Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.	Pt. Est.	90% C.I.
Cohoe/Ninilchik															
Beach Set Net	7/08	0.474	(.270, .679)	Trace		0.448	(.247, .649)	0.078	(.016, .139)	Trace					
	7/11	0.505	(.298, .712)	Trace		0.438	(.235, .642)	0.057	(.002, .111)	Trace					
	7/13	0.186	(0, .435)	Trace		0.736	(.489, .984)	0.054	(0, .117)	0.024	(0, .073)				
	7/18	0.388	(.133, .643)	Trace		0.519	(.271, .768)	0.088	(.010, .167)	0.005	(0, .048)				
Northern District															
Eastside Set Net	7/15	0.629	(.517, .740)	Trace				0.246	(.141, .351)	0.125	(.037, .213)				
	7/20	0.423	(.112, .735)	0.048	(0, .339)			0.359	(.209, .508)	0.170	(.045, .295)				
	7/29	0.724	(.308, 1.00)	0.040	(0, .442)			0.227	(.096, .358)	0.009	(0, .084)				
Northern District															
Westside Set Net	7/20	0.341	(.146, .537)					0.231	(.136, .326)			0.428	(.227, .628)	Trace	

Table 13. Estimated numbers of sockeye salmon aged 1.2 by river harvested in the Central District drift and Northern District east-side set net fisheries, Upper Cook Inlet, 1983.

Fishery	System	Estimated Proportion	Estimated Numbers	Standard Error of Estimate	Coefficient of Variation
Central District Drift	Susitna	0.203	96,705	17,415	0.18
	Kenai	0.082	38,985	11,955	0.31
	Kasilof	0.150	71,197	10,596	0.15
	Fish	0.366	174,440	10,514	0.06
	Big	0.159	75,778	12,543	0.17
	McArthur	0.040	18,969	4,734	0.25
	Total	1.000	476,074		
Northern District East-side Set	Susitna	0.528	27,790	3,830	0.14
	Kenai	0.167	8,780	3,858	0.44
	Fish	0.305	16,058	1,905	0.12
	Total	1.000	52,628		

District east-side harvest of age 1.2 fish ranged from .12 for Fish Creek to .44 for Kenai River.

Catch Apportionment for All Ages:

Contributions by river to the 1983 Upper Cook Inlet sockeye salmon harvest equaled: 58% Kenai River fish, 18% Susitna River fish, 9% Kasilof River fish, 6% Crescent River fish, 4% Fish Creek fish, 3% Big River fish, 1% McArthur River fish, and 1% Chilligan River fish (Table 14). Fish returning to Kenai River accounted for most of the harvested fish aged 1.1 (48%) 2.1 (54%), 0.4 (67%), 1.3 (72%), 1.4 (80%), and 2.3 (63%). The majority of sockeye salmon harvested for the 0.2 (95%), 0.3 (75%), 1.2 (32%), 2.2 (27%), and 2.4 (54%) age groups were of Susitna River origin. Kasilof River contributed most significantly to the age 1.2 (20%) and 2.2 (21%) catches. Run composition estimates through time for the individual fisheries are reported in Appendix Tables 1-8.

The drift fishery took the largest portions of the harvested fish from all seven runs: 56% of the Susitna River fish, 66% of the Kenai River fish, 45% of the Kasilof River fish, 77% of the Crescent River fish, 86% of the Fish Creek fish, 65% of the Big River fish, 66% of the McArthur River fish, and 85% of the Chilligan River fish (Table 15). Fisheries other than the drift fleet which caught appreciable percentages of the Susitna River catch included the Northern District set nets (11%) and the Central District east-side set nets (30%). Of the Kenai River fish harvested, the drift catch was followed in magnitude by catches made by set nets on Coho/Ninilchik Beach (12%), Kalifonsky Beach (11%), and Salamatof Beach (11%). Fisheries which accounted for large portions of the Kasilof River catch were: Coho/Ninilchik Beach (28%), Kalifonsky Beach (17%), and Salamatof Beach (9%). The Northern District set nets were important harvesters of Fish Creek fish (11%), Big River fish (14%), McArthur River fish (20%), and Chilligan River fish (14%). The Central District west-side set nets took substantial portions of the Crescent River catch (17%), and Kalgin Island harvested a large percentage of the Big River catch (19%).

Returns By River System

Approximately 6.5 million sockeye salmon returned to Upper Cook Inlet in 1983, of which 3.6 million (55%) were of Kenai River origin (Table 16). Returns of sockeye salmon to the other rivers were estimated as follows: 1,082,955 to Susitna River, 696,420 to Kasilof River, 394,488 to Crescent River, 328,662 to Fish Creek, 304,221 to Big River, 44,486 to McArthur River, and 38,272 to Chilligan River. The reader should be aware that return estimates for Big, McArthur, and Chilligan Rivers are probably minimal because escapements into these rivers are only indexed with aerial surveys.

Exploitation Rates

The rate of exploitation by the commercial fishery in 1983 was high for fish returning to Susitna River (.838), Kenai River (.816), and McArthur River (.808). Rates of commercial exploitation were similar for Kasilof River fish (.669) and Fish Creek fish (.620) as were the exploitation rates for Crescent River (.766), and Chilligan River (.757). The lowest rate of exploitation was on Big River stocks (.546).

Table 14. Run composition estimates of the 1983 Upper Cook Inlet sockeye salmon harvest by age group and fishery.

Fishery	System	0.2		1.1		0.3		1.2		2.1		0.4		1.3		2.2		1.4		2.3		2.4		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
Northern	Susitna	100.0	293	9.2	45	86.7	455	52.8	27,790	23.2	34	8.0	6	15.1	1,241	63.4	2,205	20.1	38	15.0	172	0.0	0	48.0	32,279
East-side	Kenai	0.0	0	10.3	51	13.3	70	16.7	8,780	66.3	98	91.9	67	84.7	6,976	32.8	1,141	79.9	150	84.8	976	0.0	0	27.3	18,309
Set Net	Fish	0.0	0	80.5	394	0.0	0	30.5	16,058	10.5	15	0.1	0	0.2	14	3.8	133	0.0	0	0.2	2	0.0	0	24.7	16,616
	Total	100.0	293	100.0	490	100.0	525	100.0	52,628	100.0	147	100.0	73	100.0	8,231	100.0	3,479	100.0	188	100.0	1,150	0.0	0	100.0	67,204
Northern	Susitna	91.5	581	0.0	0	85.2	7,844	59.2	32,362	47.4	7	0.0	0	53.5	17,780	42.5	3,511	0.0	0	25.5	2,747	100.0	207	55.6	65,039
West-side	Crescent	0.0	0	0.0	0	0.0	0	2.7	1,502	14.9	2	0.0	0	15.4	5,110	19.8	1,641	0.0	0	34.3	3,689	0.0	0	10.2	11,944
Set Net	Fish	0.0	0	0.0	0	0.0	0	9.7	5,290	0.0	0	0.0	0	Trace	0	0.9	79	0.0	0	0.1	14	0.0	0	4.6	5,383
	Big	1.9	12	0.0	0	1.4	124	23.9	13,083	22.8	4	0.0	0	16.9	5,616	32.4	2,682	0.0	0	15.7	1,697	0.0	0	19.8	23,218
	McArthur	6.6	42	0.0	0	13.4	1,228	4.3	2,338	0.0	0	0.0	0	10.1	3,341	0.4	36	0.0	0	2.6	281	0.0	0	6.2	7,266
	Chilligan	0.0	0	0.0	0	0.0	0	0.2	120	14.9	2	0.0	0	4.1	1,369	3.9	320	0.0	0	21.8	2,354	0.0	0	3.6	4,165
	Total	100.0	635	0.0	0	100.0	9,196	100.0	54,695	100.0	15	0.0	0	100.0	33,216	100.0	8,269	0.0	0	100.0	10,782	100.0	207	100.0	117,015
Central	Susitna	93.4	2,068	5.1	17	72.2	38,355	20.3	96,705	15.6	68	20.5	33	14.3	338,943	22.4	16,282	10.2	1,219	5.5	13,002	0.0	0	15.7	506,692
District	Kenai	0.0	0	17.8	60	20.5	10,903	8.2	38,985	78.3	341	55.5	89	72.3	1,713,637	22.2	16,147	82.5	9,832	64.7	151,637	100.0	250	60.2	1,941,881
Drift Net	Kasilof	0.0	0	0.0	0	0.0	0	15.0	71,197	0.0	0	0.0	0	4.9	114,972	15.1	10,978	0.0	0	5.2	12,257	0.0	0	6.5	209,404
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	7.1	169,324	25.8	18,777	6.0	714	18.2	42,711	0.0	0	7.2	231,526
	Fish	0.0	0	54.7	183	0.0	0	36.6	174,440	1.9	9	0.0	0	Trace	0	1.5	1,058	0.0	0	0.1	190	0.0	0	5.5	175,880
	Big	2.9	65	22.4	75	0.7	386	15.9	75,778	4.2	18	0.6	1	0.9	20,741	9.9	7,232	1.0	122	1.6	3,773	0.0	0	3.4	108,191
	McArthur	3.7	83	0.0	0	6.6	3,522	4.0	18,969	0.0	0	23.4	37	0.0	469	0.2	124	0.0	0	0.2	569	0.0	0	0.7	23,773
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.5	11,974	2.9	2,140	0.3	36	4.5	10,510	0.0	0	0.8	24,660
	Total	100.0	2,216	100.0	335	100.0	53,166	100.0	476,074	100.0	436	100.0	160	100.0	2,370,060	100.0	72,738	100.0	11,923	100.0	234,649	100.0	250	100.0	3,222,007
Central	Susitna	47.4	20	0.0	0	59.3	72	40.7	4,848	0.0	0	0.0	0	13.3	4,846	11.7	1,276	17.1	42	4.8	593	0.0	0	16.2	11,697
West-side	Crescent	0.0	0	0.0	0	0.0	0	36.9	4,407	0.0	0	0.0	0	73.5	26,710	83.5	9,096	79.6	195	92.1	11,464	0.0	0	72.1	51,872
Set Net	Big	46.4	20	0.0	0	40.7	50	10.1	1,211	0.0	0	0.0	0	4.1	1,479	4.1	445	2.9	7	1.2	147	0.0	0	4.7	3,359
	McArthur	6.2	3	0.0	0	0.0	0	12.3	1,468	0.0	0	0.0	0	8.9	3,232	0.5	49	0.0	0	1.3	161	0.0	0	6.8	4,913
	Chilligan	0.0	0	0.0	0	0.0	0	0.0	3	0.0	0	0.0	0	0.2	60	0.2	21	0.4	1	0.6	72	0.0	0	0.2	157
	Total	100.0	43	0.0	0	100.0	122	100.0	11,937	0.0	0	0.0	0	100.0	36,327	100.0	10,887	100.0	245	100.0	12,437	0.0	0	100.0	71,998
Malgin Is.	Susitna	87.5	149	0.0	0	95.7	534	39.8	4,869	0.0	0	0.0	0	22.2	6,787	23.5	2,449	50.3	57	17.2	1,431	100.0	91	26.2	16,367
Set Net	Kenai	0.0	0	0.0	0	0.8	4	0.6	77	0.0	0	0.0	0	9.4	2,862	0.8	83	18.3	21	5.9	491	0.0	0	5.7	3,538
	Kasilof	0.0	0	0.0	0	0.0	0	9.2	1,122	0.0	0	0.0	0	6.8	2,073	5.6	589	0.0	0	9.5	790	0.0	0	7.3	4,574
	Crescent	0.0	0	0.0	0	0.0	0	1.9	239	0.0	0	0.0	0	8.4	2,582	12.4	1,290	0.0	0	32.3	2,692	0.0	0	10.9	6,803
	Big	12.5	21	0.0	0	3.5	19	48.5	5,949	0.0	0	0.0	0	53.2	16,290	57.7	6,022	31.4	36	35.1	2,927	0.0	0	49.9	31,264
	McArthur	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
	Total	100.0	170	0.0	0	100.0	557	100.0	12,256	0.0	0	0.0	0	100.0	30,594	100.0	10,433	100.0	114	100.0	8,331	100.0	91	100.0	62,546

-Continued-

Table 14. Run composition estimates of the 1983 Upper Cook Inlet sockeye salmon harvest by age group and fishery (continued).

Fishery	System	0.2		1.1		0.3		1.2		2.1		0.4		1.3		2.2		1.4		2.3		2.4		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
Salamatof Beach Set Net	Susitna	100.0	1,231	19.6	139	89.1	3,397	63.1	74,667	100.0	274	0.0	0	13.6	44,118	52.5	6,653	25.7	696	12.2	3,125	0.0	0	27.5	134,300
	Kenai	0.0	0	80.4	572	10.9	417	20.4	24,060	0.0	0	0.0	0	81.2	262,570	28.1	3,569	74.3	2,014	82.0	21,079	0.0	0	64.3	314,281
	Kasilof	0.0	0	0.0	0	0.0	0	16.5	19,483	0.0	0	0.0	0	5.2	16,779	19.4	2,460	0.0	0	5.8	1,485	0.0	0	8.2	40,207
	Total	100.0	1,231	100.0	711	100.0	3,814	100.0	118,210	100.0	274	0.0	0	100.0	323,467	100.0	12,682	100.0	2,710	100.0	25,689	0.0	0	100.0	488,788
Kalifonsky Beach Set Net	Susitna	100.0	37	0.0	0	77.0	1,277	35.6	23,822	0.0	0	0.0	0	7.2	23,646	25.8	5,154	15.5	377	5.5	1,751	0.0	0	12.4	56,064
	Kenai	0.0	0	0.0	0	23.0	382	22.8	15,266	0.0	0	0.0	0	81.5	269,018	29.1	5,822	84.5	2,064	78.0	24,653	0.0	0	70.1	317,205
	Kasilof	0.0	0	0.0	0	0.0	0	41.6	27,810	0.0	0	0.0	0	11.3	37,240	45.1	9,034	0.0	0	16.5	5,207	0.0	0	17.5	79,291
	Total	100.0	37	0.0	0	100.0	1,659	100.0	66,898	0.0	0	0.0	0	100.0	329,904	100.0	20,010	100.0	2,441	100.0	31,611	0.0	0	100.0	452,560
Cohoe/Minilchik Beach Set Net	Susitna	0.0	0	Trace	0	68.1	1,201	23.8	28,299	Trace	0	0.0	0	11.9	42,872	25.2	7,841	17.9	483	7.6	3,885	0.0	0	14.9	84,581
	Kenai	0.0	0	100.0	115	31.9	562	18.9	22,505	100.0	80	0.0	0	75.5	273,049	27.3	8,492	82.1	2,209	72.7	37,346	0.0	0	60.6	344,358
	Kasilof	0.0	0	0.0	0	0.0	0	52.4	62,302	0.0	0	0.0	0	12.6	45,591	47.2	14,691	0.0	0	19.7	10,119	0.0	0	23.4	132,703
	Fish	0.0	0	Trace	0	0.0	0	4.9	5,869	Trace	0	0.0	0	Trace	0	0.3	92	0.0	0	0.0	12	0.0	0	1.1	5,973
	Total	0.0	0	100.0	115	100.0	1,763	100.0	118,975	100.0	80	0.0	0	100.0	361,512	100.0	31,116	100.0	2,692	100.0	51,362	0.0	0	100.0	567,615
Total	Susitna	94.7	4,379	12.2	201	75.0	53,135	32.2	293,362	40.2	383	16.7	39	13.7	480,233	26.7	45,371	14.3	2,912	7.1	26,706	54.4	298	18.0	907,019
	Kenai	0.0	0	48.3	798	17.4	12,338	12.0	109,673	54.5	519	67.0	156	72.4	2,528,112	20.8	35,254	80.2	16,290	62.8	236,182	45.6	250	58.2	2,939,572
	Kasilof	0.0	0	0.0	0	0.0	0	20.0	181,914	0.0	0	0.0	0	6.2	216,655	22.3	37,752	0.0	0	7.9	29,858	0.0	0	9.2	466,179
	Crescent	0.0	0	0.0	0	0.0	0	0.7	6,148	0.2	2	0.0	0	5.8	203,726	18.2	30,804	4.5	909	16.1	60,556	0.0	0	6.0	302,145
	Fish	0.0	0	34.9	577	0.0	0	22.1	201,657	2.5	24	0.0	0	.0	14	0.8	1,362	0.0	0	0.1	218	0.0	0	4.0	203,852
	Big	2.6	118	4.5	75	0.8	579	10.5	96,021	2.3	22	0.4	1	1.3	44,126	9.7	16,381	0.8	165	2.3	8,544	0.0	0	3.3	166,032
	McArthur	2.8	128	0.0	0	6.7	4,750	2.5	22,775	0.0	0	15.9	37	0.2	7,042	0.1	209	0.0	0	0.3	1,011	0.0	0	0.7	35,952
	Chilligan	0.0	0	0.0	0	0.0	0	.0	123	0.2	2	0.0	0	0.4	13,403	1.5	2,481	0.2	37	3.4	12,936	0.0	0	0.6	28,982
		Total	100.0	4,625	100.0	1,651	100.0	70,802	100.0	911,673	100.0	952	100.0	233	100.0	3,493,311	100.0	169,614	100.0	20,313	100.0	376,011	100.0	548	100.0

Table 15. Catch of sockeye salmon by run and by fishery, Upper Cook Inlet, 1983.

		FISHERY								
Run		Northern East-side Set Net	Northern West-side Set Net	Central District Drift Net	Central West-side Set Net	Kalgin Island Set Net	Salamatof Beach Set Net	Kalifonsky Beach Set Net	Cohoe/Ninilchik Beach Set Net	Total
Susitna	Numbers	32,279	65,039	506,692	11,697	16,367	134,300	56,064	84,581	907,019
	Percent	3.6	7.2	55.9	1.3	1.8	14.8	6.2	9.3	100.0
Kenai	Numbers	18,309	0	1,941,881	0	3,538	314,281	317,205	344,358	2,939,572
	Percent	0.6	0.0	66.1	0.0	0.1	10.7	10.8	11.7	100.0
Kasilof	Numbers	0	0	209,404	0	4,574	40,207	79,291	132,703	466,179
	Percent	0.0	0.0	44.9	0.0	1.0	8.6	17.0	28.5	100.0
Crescent	Numbers	0	11,944	231,526	51,872	6,803	0	0	0	302,145
	Percent	0.0	4.0	76.6	17.2	2.3	0.0	0.0	0.0	100.0
Fish	Numbers	16,616	5,383	175,880	0	0	0	0	5,973	203,852
	Percent	8.2	2.6	86.3	0.0	0.0	0.0	0.0	2.9	100.0
Big	Numbers	0	23,218	108,191	3,359	31,264	0	0	0	166,032
	Percent	0.0	14.0	65.2	2.0	18.8	0.0	0.0	0.0	100.0
McArthur	Numbers	0	7,266	23,773	4,913	0	0	0	0	35,952
	Percent	0.0	20.2	66.1	13.7	0.0	0.0	0.0	0.0	100.0
Chilligan	Numbers	0	4,165	24,660	157	0	0	0	0	28,982
	Percent	0.0	14.4	85.1	0.5	0.0	0.0	0.0	0.0	100.0

Table 16. Catch, escapement, and return of sockeye salmon by age group and run, Upper Cook Inlet, 1983.

River		Commercial Catch					Total
		1.2	1.3	2.2	2.3	Other	
Susitna	Numbers	293,362	480,233	45,371	26,706	61,347	907,019
	Percent	32.2	13.7	26.6	7.1	61.9	18.0
Kenai	Numbers	109,673	2,528,112	35,254	236,182	30,351	2,939,572
	Percent	12.0	72.4	20.8	62.8	30.6	58.2
Kasilof	Numbers	181,914	216,655	37,752	29,858	0	466,179
	Percent	20.0	6.2	22.3	7.9	0.0	9.2
Crescent	Numbers	6,148	203,726	30,804	60,556	911	302,145
	Percent	0.7	5.8	18.2	16.1	0.9	6.0
Fish	Numbers	201,657	14	1,362	218	601	203,852
	Percent	22.1	.0	0.8	0.1	0.6	4.0
Big	Numbers	96,021	44,126	16,381	8,544	960	166,032
	Percent	10.5	1.3	9.7	2.3	1.0	3.3
McArthur	Numbers	22,775	7,042	209	1,011	4,915	35,952
	Percent	2.5	0.2	0.1	0.3	5.0	0.7
Chilligan	Numbers	123	13,403	2,481	12,936	39	28,982
	Percent	.0	0.4	1.5	3.4	.0	0.6
Total	Numbers	911,673	3,493,311	169,614	376,011	99,124	5,049,733
	Percent	100.0	100.0	100.0	100.0	100.0	100.0

River		Escapement					Total
		1.2	1.3	2.2	2.3	Other	
Susitna 1/	Numbers	115,197	47,699	2,991	2,061	7,988	175,936
	Percent	26.8	6.5	3.3	2.2	23.5	12.7
Kenai 2/	Numbers	53,075	497,960	13,950	56,146	9,209	630,340
	Percent	12.4	67.5	15.4	59.9	27.1	45.5
Kasilof 3/	Numbers	104,112	69,687	27,032	9,440	0	210,271
	Percent	24.3	9.5	29.8	10.1	0.0	15.2
Crescent 4/	Numbers	10,065	39,061	25,302	17,176	739	92,343
	Percent	2.3	5.3	27.9	18.3	2.2	6.7
Fish 5/	Numbers	104,010	976	1,773	186	11,852	118,797
	Percent	24.3	0.1	2.0	0.2	34.9	8.6

-Continued-

Table 16. Catch, escapement, and return of sockeye salmon by age group and run, Upper Cook Inlet, 1983 (continued).

River		Escapement					Total
		1.2	1.3	2.2	2.3	Other	
Big 6/	Numbers	38,868	73,364	17,836	4,808	3,313	138,189
	Percent	9.1	10.0	19.7	5.1	9.8	10.0
McArthur 7/	Numbers	2,902	4,660	102	239	631	8,534
	Percent	0.7	0.6	0.1	0.3	1.9	0.6
Chilligan 7/	Numbers	269	3,502	1,654	3,670	195	9,290
	Percent	0.1	0.5	1.8	3.9	0.6	0.7
Total 8/	Numbers	428,498	736,909	90,640	93,726	33,927	1,383,700
	Percent	100.0	100.0	100.0	100.0	100.0	100.0

Sport and Personal-Use Catch (not counted in escapement)							
River		1.2	1.3	2.2	2.3	Other	Total
Kenai Personal-Use	Numbers	635	5,975	166	673	113	7,562
	Dipnet 9/ Percent	4.5	17.1	7.1	16.7	10.7	13.4
Kenai Sport Harvest 9/	Numbers	1,929	18,139	505	2,044	344	22,961
	Percent	13.6	52.1	21.5	50.8	32.5	40.6
Kasilof Personal-Use	Numbers	5,506	3,693	1,424	501	0	11,124
	Dipnet 10/ Percent	38.8	10.6	60.5	12.4	0.0	19.7
Kasilof Personal-Use	Numbers	867	7,006	168	805	0	8,846
	Gillnet Percent	6.1	20.1	7.1	20.0	0.0	15.7
Fish (saltwater) 11/	Numbers	5,268	48	90	6	601	6,013
	Percent	37.0	0.1	3.8	0.1	56.8	10.6
Total	Numbers	14,205	34,861	2,353	4,029	1,058	56,506
	Percent	100.0	100.0	100.0	100.0	100.0	100.0

-Continued-

Table 16. Catch, escapement, and return of sockeye salmon by age group and run, Upper Cook Inlet, 1983 (continued).

River		Return					Total
		1.2	1.3	2.2	2.3	Other	
Susitna	Numbers	408,559	527,932	48,362	28,767	69,335	1,082,955
	Percent	30.1	12.4	18.4	6.1	51.8	16.7
Kenai	Numbers	165,312	3,050,186	49,875	295,045	40,017	3,600,435
	Percent	12.2	71.4	19.0	62.2	29.8	55.4
Kasilof	Numbers	292,399	297,041	66,376	40,604	0	696,420
	Percent	21.6	7.0	25.3	8.6	0.0	10.7
Crescent	Numbers	16,213	242,787	56,106	77,732	1,650	394,488
	Percent	1.2	5.7	21.4	16.4	1.2	6.1
Fish	Numbers	310,935	1,038	3,225	410	13,054	328,662
	Percent	23.0	.0	1.2	0.1	9.7	5.1
Big	Numbers	134,889	117,490	34,217	13,352	4,273	304,221
	Percent	10.0	2.8	13.0	2.8	3.2	4.7
McArthur	Numbers	25,677	11,702	311	1,250	5,546	44,486
	Percent	1.9	0.3	0.1	0.3	4.1	0.7
Chilligan	Numbers	392	16,905	4,135	16,606	234	38,272
	Percent	.0	0.4	1.6	3.5	0.2	0.6
Total	Numbers	1,354,376	4,265,081	262,607	473,766	134,109	6,489,939
	Percent	100.0	100.0	100.0	100.0	100.0	100.0

- 1/ Susitna River escapement counts represent the combination of sonar counts from Yentna River and mark-recapture estimates from Sunshine Station.
- 2/ Kenai River escapement counts represent sonar counts from the mainstem and should be considered a total river-wide estimate.
- 3/ Kasilof River escapement counts represent sonar counts from the mainstem and should be considered a total river-wide estimate.
- 4/ Crescent River escapement counts represent sonar counts from the mainstem and should be considered a total river-wide estimate.
- 5/ Fish Creek escapement estimate represents weir counts.
- 6/ Big River escapement estimate represents the combination of a weir count (18,189) on Wolverine Creek and an aerial survey estimate (120,000) of other clearwater tributaries.
- 7/ McArthur and Chilligan Rivers escapement estimates represent aerial surveys.

-Continued-

Table 16. Catch, escapement, and return of sockeye salmon by age group and run, Upper Cook Inlet, 1983 (continued).

- 8/ Total estimate of escapement is a combination of estimates for the above rivers and should not be considered a total estimate for Upper Cook Inlet.
- 9/ Kenai River personal-use dipnet catch and the sport harvest below the sonar counters were not sampled for age composition. The age composition for the total escapement was used to expand these catches.
- 10/ Kasilof River personal-use dipnet catch was not sampled for age composition. The age composition for the total escapement was used to expand the catch.
- 11/ Fish Creek saltwater sport harvest was not sampled for age composition. The age composition for the total escapement was used to expand the catch.

Returns Per Spawner

Estimates of returns-per-spawner for brood years 1968-1976 for the Susitna, Kenai, Kasilof, and Crescent Rivers were estimated by Cross, et al. (1983b and 1985a). Return estimates for the 1.3 and 2.2 age groups from the 1977 brood year, and the 1.2 age group from the 1978 brood year are documented by Cross et al. (1985a). Allocation of the 1983 catch of sockeye salmon to age group and river provides return estimates for the 2.3 age group from the 1977 brood year, the 1.3 and 2.2 age group from the 1978 brood year, and the 1.2 age group from the 1979 brood year. Results from the 1983 catch apportionment were used to finalize the ratios of returns-per-spawner for the 1977 brood year and provide minimum estimates for the ratios of returns-per-spawner for the 1978 brood year (Tables 17-20). Ratios for the 1978 brood year are minimal because the six-year-old fish returning in 1984 are not included in the estimates of return.

The preliminary estimate of returns-per-spawner from the 1978 brood year for Susitna River is 7.3 which is greater than the 1968-1977 average of 4.6. Ratios of returns-per-spawner for Susitna River have ranged from 1.9 in 1977 to 8.5 in 1976 (Table 17). The preliminary 1978 estimate for Kenai River is 9.1 returns-per-spawner which is also higher than the 1968-1977 average of 6.1. Kenai River ratios of returns-per-spawner have ranged from a low of 3.3 in 1976 to a high of 11.1 in 1968 (Table 18). The preliminary ratio of returns-per-spawner for Kasilof River for the 1978 brood year is 5.4 which is slightly lower than the 1968-1977 average of 6.3. Kasilof River ratios of returns-per-spawner were lowest in 1968 at 2.0 and highest in 1975 at 12.3 (Table 19). The preliminary 1978 estimate for Crescent River is 4.2 returns-per-spawner which is greater than the 1968-1977 average of 2.4. Ratios of returns-per-spawner for Crescent River are generally lower than the other systems, and have ranged from 0.8 in 1969 to 5.2 in 1975 (Table 20).

ACKNOWLEDGMENTS

The authors are grateful to the Division of Commercial Fisheries, Upper Cook Inlet area staff for providing most of the catch and escapement figures included in this report and for assisting with the scale collection. In particular, we would like to thank Paul Ruesch, Ken Tarbox, Bruce King, Dave Waltemyer, and Jim Browning for their support and assistance. We are also grateful to Robert Chlupach of the Division of F.R.E.D., who provided escapement data and scale samples from Fish Creek. Thomas Mears and Patrick Marcuson of the Cook Inlet Aquaculture Association provided escapement data and scale samples from Packers Creek, Wolverine Creek, and Big River. Appreciation is given to the former Statewide Stock Biology Group staff, particularly Doug McBride, Dave Bernard, and Bob Conrad, for their advice and assistance in the data analysis. We are also very grateful to Linda Soquet for providing invaluable assistance by aging a large portion of the scales used in the analysis and for helping compile the age and stock composition data into tables.

Table 17. Returns-per-spawner for sockeye salmon from the Susitna River, Upper Cook Inlet^{1/}.

Brood		Returns by Age Group					Returns
Year	Spawners	1.2	1.3	2.2	2.3	Total 2/	Spawner
1966					43,207		
1967			206,250	6,656	12,717		
1968	61,010	21,005	147,208	10,043	4,997	183,253	3.0
1969	41,346	64,808	92,160	6,678	3,363	167,009	4.0
1970	44,371	75,213	170,546	9,537	2,488	257,784	5.8
1971	114,707	135,948	314,288	6,891	5,594	462,721	4.0
1972	91,927	128,451	502,234	25,950	17,350	673,985	7.3
1973	116,093	128,475	185,407	11,822	6,806	332,510	2.9
1974	71,849	133,795	118,312	26,451	34,547	313,105	4.4
1975	108,000	197,737	206,863	27,441	39,755	471,796	4.4
1976	111,000	214,715	640,532	23,349	68,883	947,479	8.5
1977	232,724	57,533	345,364	16,908	28,767	448,572	1.9
1978	93,029	103,111	527,932	48,362		679,405 4/	7.3
1979	154,848	408,559					
1980	189,231						
1981	338,353						
1982	262,687						
1983	171,564						
AVG 3/	99,303	115,768	272,291	16,507	21,255	425,821	4.6

1/ Allocation of 1983 commercial catches based on scale pattern analyses as reported in this report. Allocation of the 1982 commercial harvest based on scale pattern analyses and migratory timing. Source of 1982 catch allocations is Cross et al. 1985a. Allocation of 1978-1981 commercial catches based on scale pattern analyses, and the allocation of 1972-1977 commercial catches based on escapement age composition. Source of 1972-1981 data is Cross et al. 1983.

2/ Total returns only include age groups 1.2, 1.3, 2.2, 2.3.

3/ Average calculated for brood years 1968 through 1977.

4/ Preliminary return-per-spawner estimate. Estimate represents a minimum value because return of six-year fish in 1984 are not included.

Table 18. Returns-per-spawner for sockeye salmon from the Kenai River, Upper Cook Inlet^{1/}.

Brood		Returns by Age Group					Returns
Year	Spawners	1.2	1.3	2.2	2.3	Total 2/	Spawner
1966					163,441		
1967			318,338	148,526	114,176		
1968	82,180	159,584	628,356	58,057	68,402	914,399	11.1
1969	51,850	26,064	223,052	76,559	74,662	400,337	7.7
1970	72,400	55,509	202,006	132,228	130,287	520,030	7.2
1971	289,270	32,518	455,242	237,802	250,926	976,488	3.4
1972	301,950	443,153	1,496,332	147,373	99,741	2,186,599	7.2
1973	358,070	103,999	2,050,840	81,664	39,706	2,276,209	6.4
1974	144,470	37,255	361,109	75,709	128,564	602,637	4.2
1975	128,500	126,899	484,014	149,819	50,283	811,015	6.3
1976	353,160	226,646	737,456	78,617	118,783	1,161,502	3.3
1977	663,627	132,782	2,086,361	48,529	295,045	2,562,717	3.9
1978	349,928	91,983	3,050,186	49,875		3,192,044 4/	9.1
1979	245,842	165,312					
1980	411,918						
1981	369,829						
1982	535,862						
1983	565,941						
AVG 3/	244,548	134,441	872,477	108,636	125,640	1,241,193	6.1

1/ Allocation of 1983 commercial catches based on scale pattern analyses as reported in this report. Allocation of the 1982 commercial harvest based on scale pattern analyses and migratory timing. Source of 1982 catch allocations is Cross et al. 1985a. Allocation of 1978-1981 commercial catches based on scale pattern analyses, and the allocation of 1972-1977 commercial catches based on escapement age composition. Source of 1972-1981 data is Cross et al. 1983.

2/ Total returns only include age groups 1.2, 1.3, 2.2, 2.3.

3/ Average calculated for brood years 1968 through 1977.

4/ Preliminary return-per-spawner estimate. Estimate represents a minimum value because return of six-year fish in 1984 are not included.

Table 19. Returns-per-spawner for sockeye salmon from the Kasilof River, Upper Cook Inlet^{1/}.

Brood		Returns by Age Group					Returns
Year	Spawners	1.2	1.3	2.2	2.3	Total 2/	Spawner
1966					47,724		
1967			107,418	7,327	3,446		
1968	89,000	104,619	54,201	14,693	3,572	177,085	2.0
1969	46,000	10,677	115,328	7,492	7,709	141,206	3.1
1970	38,000	40,883	11,891	80,516	66,341	199,631	5.3
1971	90,000	28,182	191,159	107,736	58,593	385,670	4.3
1972	113,000	121,115	122,578	122,678	35,036	401,407	3.6
1973	40,000	108,465	299,775	48,922	15,763	472,925	11.8
1974	69,795	183,732	180,601	59,799	67,629	491,761	7.0
1975	47,832	194,165	304,276	80,138	11,643	590,222	12.3
1976	133,537	351,938	354,229	48,702	99,774	854,643	6.4
1977	153,493	185,027	837,384	77,653	40,604	1,140,668	7.4
1978	112,550	239,614	297,041	66,376		603,031 4/	5.4
1979	151,758	292,399					
1980	185,672						
1981	256,137						
1982	178,955						
1983	207,319						
AVG 3/	82,066	132,880	174,146	64,833	40,666	485,522	6.3

1/ Allocation of 1983 commercial catches based on scale pattern analyses as reported in this report. Allocation of the 1982 commercial harvest based on scale pattern analyses and migratory timing. Source of 1982 catch allocations is Cross et al. 1985a. Allocation of 1978-1981 commercial catches based on scale pattern analyses, and the allocation of 1972-1977 commercial catches based on escapement age composition. Source of 1972-1981 data is Cross et al. 1983.

2/ Total returns only include age groups 1.2, 1.3, 2.2, 2.3.

3/ Average calculated for brood years 1968 through 1977.

4/ Preliminary return-per-spawner estimate. Estimate represents a minimum value because return of six-year fish in 1984 are not included.

Table 20. Returns-per-spawner for sockeye salmon from the Crescent River, Upper Cook Inlet^{1/}.

Brood		Returns by Age Group					Returns
Year	Spawners	1.2	1.3	2.2	2.3	Total 2/	Spawner
1966					9,825		
1967			67,120	4,203	4,605		
1968	55,000	17,330	31,840	1,961	1,184	52,315	1.0
1969	51,000	7,948	27,816	1,810	2,906	40,480	0.8
1970	38,000	14,864	49,846	2,729	7,944	75,383	2.0
1971	44,000	10,394	55,063	3,429	12,895	81,781	1.9
1972	62,000	14,048	97,878	5,315	10,782	128,023	2.1
1973	29,000	19,281	93,223	0	216	112,720	3.9
1974	28,000	4,909	90,765	1,137	3,131	99,942	3.6
1975	41,000	35,113	141,777	6,867	28,164	211,921	5.2
1976	51,000	9,035	21,884	5,733	17,352	54,004	1.1
1977	87,000	5,060	170,079	1,020	77,732	253,891	2.9
1978	74,000	15,551	242,787	56,106		314,444 4/	4.2
1979	87,000	16,213					
1980	91,000						
1981	41,000						
1982	58,957						
1983	92,343						
AVG 3/	48,600	13,798	67,721	3,000	16,231	111,046	2.4

1/ Allocation of 1983 commercial catches based on scale pattern analyses as reported in this report. Allocation of the 1982 commercial harvest based on scale pattern analyses and migratory timing. Source of 1982 catch allocations is Cross et al. 1985a. Allocation of 1978-1981 commercial catches based on scale pattern analyses, and the allocation of 1972-1977 commercial catches based on escapement age composition. Source of 1972-1981 data is Cross et al. 1983.

2/ Total returns only include age groups 1.2, 1.3, 2.2, 2.3.

3/ Average calculated for brood years 1968 through 1977.

4/ Preliminary return-per-spawner estimate. Estimate represents a minimum value because returns of six-year fish in 1984 are not included.

LITERATURE CITED

- Bethe, M., P. Krasnowski, and S. Marshall. 1980. Origins of sockeye salmon in the Upper Cook Inlet fishery of 1978 based on scale pattern analysis. Alaska Department of Fish and Game. Informational Leaflet No. 186. 45 pp.
- Clutter, R. and L. Whitesel. 1956. Collection and interpretation of sockeye salmon scales. Bull. Int. Pac. Salmon Fish. Comm., No. 9. 159 pp.
- Cochran, W. 1977. Sampling Techniques, 3rd ed. John Wiley & Sons, Inc. New York. 428 pp.
- Cook, R. 1982. Estimating the mixing proportions of salmonids with scale pattern recognition applied to sockeye salmon (*Oncorhynchus nerka*) in and around the Japanese landbased driftnet fishery. Ph.D. Dissertation. University of Washington, Seattle. 128 pp.
- Cook, R. and G. Lord. 1978. Identification of stocks of Bristol Bay sockeye salmon by evaluating scale patterns with a polynomial discriminant method. U.S. Fish and Wildlife Service, Fish. Bull. 76(2): 415-423.
- Cross, B., S. Marshall, T. Robertson, G. Oliver, and S. Sharr. 1981. Origins of sockeye salmon in the Upper Cook Inlet fishery of 1979 based on scale pattern analysis. Alaska Department of Fish and Game. Technical Data Report No. 58. 76 pp.
- Cross, B., S. Marshall, G. Oliver, and S. Sharr. 1982. Origins of sockeye salmon in the Upper Cook Inlet fishery of 1980 based on scale pattern analysis. Alaska Department of Fish and Game. Technical Data Report No. 68. 81 pp.
- Cross, B., S. Marshall, G. Oliver, and D. Hicks. 1983a. Origins of sockeye salmon in the Upper Cook Inlet fishery of 1981 based on scale pattern analysis. Alaska Department of Fish and Game. Technical Data Report No. 83. 97 pp.
- Cross, B., D. Bernard, and S. Marshall. 1983b. Returns-per-spawner ratios for sockeye salmon in Upper Cook Inlet, Alaska. Alaska Department of Fish and Game. Informational Leaflet No. 221. 82 pp.
- Cross, B., D. Hicks, and W. Goshert. 1985a. Origins of sockeye salmon in the fisheries of Upper Cook Inlet in 1982. Alaska Department of Fish and Game. Technical Data Report No. 139. 109 pp.
- Cross, B. 1985b. Abundance, age, sex, and size data for Upper Cook Inlet sockeye, chinook, coho, chum, and pink salmon, 1983. Alaska Department of Fish and Game. Technical Data Report No. 159. 176 pp.
- Enslein, K., A. Ralston, and H. Wilf, Eds. 1977. Statistical methods for digital computers. John Wiley & Sons, Inc. New York, NY. 454 pp.

LITERATURE CITED (Continued)

- Fisher, R. 1936. The use of multiple measurements in taxonomic problems. Ann. Eugenics. 7:179-188.
- Goodman, L. 1960. On the exact variance of products. J. Amer. Stat. Assoc. 55:708-713.
- International North Pacific Fisheries Commission. 1963. Annual Report 1961. 167 pp.
- Lachenbruch, P. 1967. An almost unbiased method of obtaining confidence intervals for the probability of misclassification in discriminant analysis. Biometrics. 24(4):639-645.
- Pella, J. and T. Robertson. 1979. Assessment of composition of stock mixtures. Fishery Bulletin. 77(2):387-398.
- Ryan, P. and M. Christie. 1976. Scale reading equipment. Fisheries and Marine Service, Canada. Technical Report No. PAC/T-75-8. 38 pp.

APPENDICES

Appendix Table 1. Run composition estimates of sockeye salmon catches by age group and date for the Central District drift fishery, Upper Cook Inlet, 1983.

Date	System	0.2		1.1		0.3		1.2		2.1		0.4		1.3		2.2		1.4		2.3		2.4		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
6/27	Susitna	0.0	0	0.0	0	0.0	0	12.8	732	0.0	0	0.0	0	1.1	140	3.5	36	10.2	3	1.2	25	0.0	0	4.3	936
	Kenai	0.0	0	0.0	0	0.0	0	0.1	6	0.0	0	0.0	0	19.2	2,436	2.0	21	38.9	13	11.2	240	0.0	0	12.6	2,716
	Kasilof	0.0	0	0.0	0	0.0	0	7.7	440	0.0	0	0.0	0	57.4	7,284	39.7	416	0.0	0	19.0	404	0.0	0	39.6	8,544
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	10.2	1,294	22.1	233	23.1	8	20.4	435	0.0	0	9.1	1,970
	Fish	0.0	0	0.0	0	0.0	0	34.0	1,944	0.0	0	0.0	0	Trace	0	1.1	12	0.0	0	0.1	2	0.0	0	9.1	1,958
	Big	0.0	0	0.0	0	0.0	0	45.4	2,596	0.0	0	0.0	0	0.8	102	17.4	182	16.5	6	5.1	108	0.0	0	13.8	2,994
	McArthur	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	3.7	469	0.2	2	0.0	0	0.7	14	0.0	0	2.2	485
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	7.6	964	14.0	147	11.3	4	42.3	903	0.0	0	9.3	2,018
	Total	0.0	0	0.0	0	0.0	0	100.0	5,718	0.0	0	0.0	0	100.0	12,689	100.0	1,049	100.0	34	100.0	2,131	0.0	0	100.0	21,621
7/01	Susitna	0.0	0	4.0	4	91.4	928	12.8	2,175	0.0	0	0.0	0	23.6	7,651	17.0	518	0.0	0	8.3	391	0.0	0	20.0	11,667
	Kenai	0.0	0	3.5	3	5.3	54	0.1	17	0.0	0	0.0	0	29.3	9,498	3.5	107	0.0	0	27.1	1,276	0.0	0	18.8	10,955
	Kasilof	0.0	0	0.0	0	0.0	0	7.7	1,309	0.0	0	0.0	0	35.8	11,606	29.0	884	0.0	0	19.6	925	0.0	0	25.3	14,724
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	11.3	3,663	27.4	834	0.0	0	35.8	1,687	0.0	0	10.6	6,184
	Fish	0.0	0	66.7	61	0.0	0	34.0	5,778	0.0	0	0.0	0	Trace	0	1.4	44	0.0	0	0.2	8	0.0	0	10.1	5,891
	Big	0.0	0	25.8	24	3.3	34	45.4	7,715	0.0	0	0.0	0	Trace	0	21.7	661	0.0	0	9.0	423	0.0	0	15.2	8,857
	McArthur	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Total	0.0	0	100.0	92	100.0	1,016	100.0	16,994	0.0	0	0.0	0	100.0	32,418	100.0	3,048	0.0	0	100.0	4,710	0.0	0	100.0	58,278
7/04	Susitna	0.0	0	0.0	0	95.1	1,950	43.9	17,537	0.0	0	0.0	0	33.2	32,648	43.4	2,338	0.0	0	18.6	3,195	0.0	0	35.4	57,668
	Kenai	0.0	0	0.0	0	4.4	89	Trace	0	0.0	0	0.0	0	38.9	38,254	7.0	376	0.0	0	47.8	8,208	0.0	0	28.8	46,927
	Kasilof	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	24.5	24,093	27.1	1,457	0.0	0	16.1	2,762	0.0	0	17.4	28,312
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	3.4	3,343	12.5	672	0.0	0	14.4	2,464	0.0	0	4.0	6,479
	Fish	0.0	0	0.0	0	0.0	0	42.1	16,819	0.0	0	0.0	0	Trace	0	2.1	112	0.0	0	0.2	39	0.0	0	10.4	16,970
	Big	0.0	0	0.0	0	0.5	10	14.0	5,593	0.0	0	0.0	0	Trace	0	7.9	423	0.0	0	2.9	490	0.0	0	4.0	6,516
	McArthur	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Total	0.0	0	0.0	0	100.0	2,049	100.0	39,949	0.0	0	0.0	0	100.0	98,338	100.0	5,378	0.0	0	100.0	17,158	0.0	0	100.0	162,872
7/06	Susitna	0.0	0	0.0	0	85.8	1,738	25.3	4,221	0.0	0	0.0	0	8.9	3,202	16.9	499	21.1	66	6.1	469	0.0	0	15.5	10,195
	Kenai	0.0	0	0.0	0	14.2	287	6.8	1,141	0.0	0	0.0	0	53.4	19,212	9.8	289	78.9	245	56.8	4,334	0.0	0	38.9	25,508
	Kasilof	0.0	0	0.0	0	0.0	0	67.9	11,302	0.0	0	0.0	0	37.7	13,563	73.3	2,171	0.0	0	37.1	2,829	0.0	0	45.6	29,865
	Crescent	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
	Fish	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
	Big	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
	McArthur	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
	Chilligan	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
	Total	0.0	0	0.0	0	100.0	2,025	100.0	16,664	0.0	0	0.0	0	100.0	35,977	100.0	2,959	100.0	311	100.0	7,632	0.0	0	100.0	65,568

-Continued-

Appendix Table 1. Run composition estimates of sockeye salmon catches by age group and date for the Central District drift fishery, Upper Cook Inlet, 1983 (continued).

Date	System	0.2		1.1		0.3		1.2		2.1		0.4		1.3		2.2		1.4		2.3		2.4		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
7/08	Susitna	0.0	0	0.0	0	93.9	5,594	25.0	21,967	0.0	0	0.0	0	36.5	67,042	41.4	2,871	38.2	379	12.7	2,653	0.0	0	32.8	100,506
	Kenai	0.0	0	0.0	0	5.8	347	6.0	5,272	0.0	0	0.0	0	47.1	86,510	9.0	625	53.5	532	44.2	9,224	0.0	0	33.5	102,510
	Kasilof	0.0	0	0.0	0	0.0	0	16.8	14,761	0.0	0	0.0	0	9.7	17,816	19.6	1,364	0.0	0	8.4	1,749	0.0	0	11.7	35,690
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	4.3	7,898	15.8	1,100	5.2	51	13.1	2,726	0.0	0	3.8	11,775
	Fish	0.0	0	0.0	0	0.0	0	46.1	40,506	0.0	0	0.0	0	Trace	0	2.7	186	0.0	0	0.2	44	0.0	0	13.3	40,736
	Big	0.0	0	0.0	0	0.3	16	6.1	5,360	0.0	0	0.0	0	Trace	0	4.0	281	1.2	12	1.1	220	0.0	0	1.9	5,889
	McArthur	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	2.4	4,408	7.5	523	1.9	19	20.3	4,233	0.0	0	3.0	9,183
	Total	0.0	0	0.0	0	100.0	5,957	100.0	87,866	0.0	0	0.0	0	100.0	183,674	100.0	6,950	100.0	993	100.0	20,849	0.0	0	100.0	306,289
7/11	Susitna	0.0	0	0.0	0	80.4	1,743	22.3	16,922	0.0	0	0.0	0	11.2	24,647	18.6	2,519	15.1	82	4.4	1,050	0.0	0	14.0	46,963
	Kenai	0.0	0	0.0	0	17.2	373	0.7	531	0.0	0	0.0	0	66.9	147,221	14.0	1,890	73.0	396	52.8	12,586	0.0	0	48.5	162,997
	Kasilof	0.0	0	0.0	0	0.0	0	11.9	9,030	0.0	0	0.0	0	11.5	25,307	19.9	2,700	0.0	0	6.6	1,563	0.0	0	11.5	38,600
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	3.6	7,922	15.3	2,072	4.4	24	9.7	2,317	0.0	0	3.7	12,335
	Fish	0.0	0	0.0	0	0.0	0	40.9	31,036	0.0	0	0.0	0	Trace	0	2.0	268	0.0	0	0.1	29	0.0	0	9.3	31,333
	Big	0.0	0	0.0	0	2.4	52	24.2	18,364	0.0	0	0.0	0	3.8	8,362	19.4	2,631	5.1	27	3.9	930	0.0	0	9.0	30,366
	McArthur	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	3.0	6,602	10.8	1,470	2.4	13	22.5	5,374	0.0	0	4.0	13,459
	Total	0.0	0	0.0	0	100.0	2,168	100.0	75,883	0.0	0	0.0	0	100.0	220,061	100.0	13,550	100.0	542	100.0	23,849	0.0	0	100.0	336,053
7/13	Susitna	0.0	0	0.0	0	57.6	5,304	Trace	0	0.0	0	0.0	0	9.4	21,470	8.5	429	7.3	33	2.1	438	0.0	0	9.4	27,674
	Kenai	0.0	0	0.0	0	25.6	2,356	13.0	4,071	0.0	0	0.0	0	67.6	154,399	13.2	668	72.8	335	51.6	10,904	0.0	0	58.4	172,733
	Kasilof	0.0	0	0.0	0	0.0	0	20.1	6,294	0.0	0	0.0	0	6.7	15,303	11.0	560	0.0	0	3.7	794	0.0	0	7.8	22,951
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	16.3	37,229	63.4	3,209	19.1	88	41.5	8,798	0.0	0	16.7	49,324
	Fish	0.0	0	0.0	0	0.0	0	35.9	11,241	0.0	0	0.0	0	Trace	0	0.6	32	0.0	0	.0	8	0.0	0	3.8	11,281
	Big	0.0	0	0.0	0	0.6	55	15.4	4,822	0.0	0	0.0	0	Trace	0	3.1	156	0.8	4	0.6	136	0.0	0	1.7	5,173
	McArthur	0.0	0	0.0	0	16.2	1,495	15.6	4,885	0.0	0	0.0	0	Trace	0	0.2	11	0.0	0	0.5	104	0.0	0	2.2	6,495
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
	Total	0.0	0	0.0	0	100.0	9,210	100.0	31,313	0.0	0	0.0	0	100.0	228,401	100.0	5,065	100.0	460	100.0	21,182	0.0	0	100.0	295,631
7/15	Susitna	90.7	528	0.0	0	68.8	7,602	Trace	0	0.0	0	0.0	0	20.0	55,141	37.2	2,824	0.0	0	6.5	1,622	0.0	0	18.0	67,717
	Kenai	0.0	0	0.0	0	16.5	1,825	13.0	7,410	0.0	0	0.0	0	77.1	212,572	31.5	2,380	0.0	0	87.2	21,807	0.0	0	65.2	245,994
	Kasilof	0.0	0	0.0	0	0.0	0	20.1	11,458	0.0	0	0.0	0	Trace	0	10.1	761	0.0	0	2.4	607	0.0	0	3.4	12,826
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Fish	0.0	0	0.0	0	0.0	0	35.9	20,464	0.0	0	0.0	0	Trace	0	2.0	149	0.0	0	0.1	22	0.0	0	5.5	20,635
	Big	3.3	19	0.0	0	1.0	106	15.4	8,778	0.0	0	0.0	0	2.9	7,996	18.5	1,396	0.0	0	2.7	680	0.0	0	5.0	18,975
	McArthur	6.0	35	0.0	0	13.7	1,519	15.6	8,892	0.0	0	0.0	0	Trace	0	0.7	52	0.0	0	1.1	274	0.0	0	2.9	10,772
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
	Total	100.0	582	0.0	0	100.0	11,052	100.0	57,003	0.0	0	0.0	0	100.0	275,709	100.0	7,562	0.0	0	100.0	25,011	0.0	0	100.0	376,919

-Continued-

Appendix Table 1. Run composition estimates of sockeye salmon catches by age group and date for the Central District drift fishery, Upper Cook Inlet, 1983 (continued).

Date	System	0.2		1.1		0.3		1.2		2.1		0.4		1.3		2.2		1.4		2.3		2.4		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number								
7/18	Susitna	0.0	0	0.0	0	56.1	2,197	29.8	7,444	0.0	0	0.0	0	3.6	8,464	8.9	437	0.0	0	1.6	371	0.0	0	6.5	18,913
	Kenai	0.0	0	0.0	0	43.3	1,698	11.3	2,823	0.0	0	0.0	0	85.7	201,482	24.2	1,184	0.0	0	68.5	16,089	0.0	0	76.4	223,276
	Kasilof	0.0	0	0.0	0	0.0	0	11.7	2,923	0.0	0	0.0	0	Trace	0	2.1	104	0.0	0	0.5	123	0.0	0	1.1	3,150
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	10.7	25,156	60.8	2,980	0.0	0	28.9	6,803	0.0	0	11.9	34,939
	Fish	0.0	0	0.0	0	0.0	0	32.7	8,168	0.0	0	0.0	0	Trace	0	0.7	32	0.0	0	.0	7	0.0	0	2.8	8,207
	Big	0.0	0	0.0	0	0.6	23	14.5	3,622	0.0	0	0.0	0	Trace	0	3.3	161	0.0	0	0.5	117	0.0	0	1.3	3,923
	McArthur	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
Total		0.0	0	0.0	0	100.0	3,918	100.0	24,980	0.0	0	0.0	0	100.0	235,102	100.0	4,898	0.0	0	100.0	23,510	0.0	0	100.0	292,408
7/20 thru 7/21	Susitna	98.8	975	0.0	0	80.2	8,713	29.8	19,716	0.0	0	0.0	0	14.8	74,971	20.8	2,259	13.4	397	4.6	1,753	0.0	0	17.1	108,784
	Kenai	0.0	0	0.0	0	19.4	2,109	11.3	7,476	0.0	0	0.0	0	73.7	373,338	17.7	1,919	73.4	2,173	61.7	23,758	0.0	0	64.5	410,773
	Kasilof	0.0	0	0.0	0	0.0	0	11.7	7,741	0.0	0	0.0	0	Trace	0	2.2	239	0.0	0	0.7	258	0.0	0	1.3	8,238
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	11.5	58,255	55.2	5,999	12.5	371	32.4	12,482	0.0	0	12.1	77,107
	Fish	0.0	0	0.0	0	0.0	0	32.7	21,634	0.0	0	0.0	0	Trace	0	0.7	74	0.0	0	.0	15	0.0	0	3.4	21,723
	Big	1.2	12	0.0	0	0.4	40	14.5	9,593	0.0	0	0.0	0	Trace	0	3.4	372	0.7	21	0.6	245	0.0	0	1.6	10,283
	McArthur	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
Total		100.0	987	0.0	0	100.0	10,862	100.0	66,160	0.0	0	0.0	0	100.0	506,564	100.0	10,862	100.0	2,962	100.0	38,511	0.0	0	100.0	636,908
7/22 thru 7/23	Susitna	0.0	0	0.0	0	70.4	921	16.7	2,984	15.6	68	0.0	0	12.3	28,839	37.4	1,141	10.0	174	4.3	705	0.0	0	12.6	34,832
	Kenai	0.0	0	0.0	0	27.9	364	21.1	3,770	78.1	342	0.0	0	87.7	205,622	52.1	1,587	89.5	1,560	94.4	15,646	0.0	0	83.2	228,891
	Kasilof	0.0	0	0.0	0	0.0	0	13.7	2,448	0.0	0	0.0	0	Trace	0	3.7	114	0.0	0	0.6	98	0.0	0	1.0	2,660
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
	Fish	0.0	0	0.0	0	0.0	0	28.3	5,057	1.9	8	0.0	0	Trace	0	0.8	26	0.0	0	.0	4	0.0	0	1.8	5,095
	Big	0.0	0	0.0	0	0.3	4	17.4	3,109	4.2	18	0.0	0	Trace	0	5.9	181	0.5	9	0.6	95	0.0	0	1.2	3,416
	McArthur	0.0	0	0.0	0	1.4	18	2.8	500	0.0	0	0.0	0	Trace	0	0.1	2	0.0	0	0.1	12	0.0	0	0.2	532
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
Total		0.0	0	0.0	0	100.0	1,307	100.0	17,868	100.0	436	0.0	0	100.0	234,461	100.0	3,051	100.0	1,743	100.0	16,560	0.0	0	100.0	275,426
7/24 thru 7/25	Susitna	93.6	456	5.5	14	74.5	1,632	16.7	3,007	0.0	0	0.0	0	11.5	12,957	10.4	253	10.1	73	2.8	281	0.0	0	12.7	18,673
	Kenai	0.0	0	23.2	56	21.0	459	21.1	3,800	0.0	0	0.0	0	62.9	70,871	10.3	250	64.0	467	44.4	4,426	0.0	0	54.7	80,329
	Kasilof	0.0	0	0.0	0	0.0	0	13.7	2,467	0.0	0	0.0	0	Trace	0	2.1	51	0.0	0	0.8	78	0.0	0	1.8	2,596
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	21.8	24,562	68.9	1,678	23.5	172	50.1	5,000	0.0	0	21.4	31,412
	Fish	0.0	0	50.1	122	0.0	0	28.3	5,097	0.0	0	0.0	0	Trace	0	0.5	11	0.0	0	.0	3	0.0	0	3.6	5,233
	Big	5.2	25	21.2	51	1.6	35	17.4	3,133	0.0	0	0.0	0	3.8	4,282	7.8	190	2.4	18	1.8	180	0.0	0	5.4	7,914
	McArthur	1.2	6	0.0	0	2.9	64	2.8	504	0.0	0	0.0	0	Trace	0	.0	1	0.0	0	0.1	9	0.0	0	0.4	584
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
Total		100.0	487	100.0	243	100.0	2,190	100.0	18,008	0.0	0	0.0	0	100.0	112,672	100.0	2,434	100.0	730	100.0	9,977	0.0	0	100.0	146,741

-Continued-

Appendix Table 1. Run composition estimates of sockeye salmon catches by age group and date for the Central District drift fishery, Upper Cook Inlet, 1983 (continued).

Date	System	0.2		1.1		0.3		1.2		2.1		0.4		1.3		2.2		1.4		2.3		2.4		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
7/26	Susitna	68.3	109	0.0	0	20.5	33	Trace	0	0.0	0	20.5	33	2.2	1,772	8.2	159	1.6	10	0.6	49	0.0	0	2.2	2,165
thru	Kenai	0.0	0	0.0	0	55.5	89	15.1	1,042	0.0	0	55.5	89	97.8	78,791	77.7	1,498	97.8	628	97.9	7,379	0.0	0	91.2	89,516
7/27	Kasilof	0.0	0	0.0	0	0.0	0	5.8	400	0.0	0	0.0	0	Trace	0	2.4	46	0.0	0	0.3	20	0.0	0	0.5	466
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	Trace	0.0	0	Trace	0
	Fish	0.0	0	0.0	0	0.0	0	37.9	2,615	0.0	0	0.0	0	Trace	0	1.7	33	0.0	0	.0	3	0.0	0	2.7	2,651
	Big	5.6	9	0.0	0	0.6	1	17.5	1,208	0.0	0	0.6	1	Trace	0	9.1	174	0.6	4	0.6	45	0.0	0	1.5	1,442
	McArthur	26.1	42	0.0	0	23.4	37	23.7	1,636	0.0	0	23.4	37	Trace	0	0.9	16	0.0	0	0.6	47	0.0	0	1.9	1,815
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	Trace	0.0	0	Trace	0
	Total	100.0	160	0.0	0	100.0	160	100.0	6,901	0.0	0	100.0	160	100.0	80,563	100.0	1,926	100.0	642	100.0	7,543	0.0	0	100.0	98,055
7/28	Susitna	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
thru	Kenai	0.0	0	0.0	0	68.0	852	15.1	1,626	0.0	0	0.0	0	100.0	113,431	83.7	3,352	99.4	3,484	98.3	15,760	100.0	250	93.0	138,755
9/12	Kasilof	0.0	0	0.0	0	0.0	0	5.8	624	0.0	0	0.0	0	Trace	0	2.8	112	0.0	0	0.3	46	0.0	0	0.5	782
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
	Fish	0.0	0	0.0	0	0.0	0	37.9	4,081	0.0	0	0.0	0	Trace	0	2.0	80	0.0	0	.0	6	0.0	0	2.8	4,167
	Big	0.0	0	0.0	0	0.9	11	17.5	1,884	0.0	0	0.0	0	Trace	0	10.5	422	0.6	22	0.7	105	0.0	0	1.6	2,444
	McArthur	0.0	0	0.0	0	31.1	389	23.7	2,552	0.0	0	0.0	0	Trace	0	1.0	40	0.0	0	0.7	109	0.0	0	2.1	3,090
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
	Total	0.0	0	0.0	0	100.0	1,252	100.0	10,767	0.0	0	0.0	0	100.0	113,431	100.0	4,006	100.0	3,506	100.0	16,026	100.0	250	100.0	149,238
Total	Susitna	93.4	2,068	5.1	17	72.2	38,355	20.3	96,705	15.6	68	20.5	33	14.3	338,943	22.4	16,282	10.2	1,219	5.5	13,002	0.0	0	15.7	506,632
	Kenai	0.0	0	17.8	60	20.5	10,903	8.2	38,985	78.3	341	55.5	89	72.3	1,713,637	22.2	16,147	82.5	9,832	64.7	151,637	100.0	250	60.2	1,941,881
	Kasilof	0.0	0	0.0	0	0.0	0	15.0	71,197	0.0	0	0.0	0	4.9	114,972	15.1	10,978	0.0	0	5.2	12,257	0.0	0	6.5	209,404
	Crescent	0.0	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	7.1	169,324	25.8	18,777	6.0	714	18.2	42,711	0.0	0	7.2	231,526
	Fish	0.0	0	54.7	183	0.0	0	36.6	174,440	1.9	9	0.0	0	Trace	0	1.5	1,058	0.0	0	0.1	190	0.0	0	5.5	175,880
	Big	2.9	65	22.4	75	0.7	386	15.9	75,778	4.2	18	0.6	1	0.9	20,741	9.9	7,232	1.0	122	1.6	3,773	0.0	0	3.4	108,191
	McArthur	3.7	83	0.0	0	6.6	3,522	4.0	18,969	0.0	0	23.4	37	.0	469	0.2	124	0.0	0	0.2	569	0.0	0	0.7	23,773
	Chilligan	0.0	0	0.0	0	0.0	0	Trace	0	Trace	0	0.0	0	0.5	11,974	2.9	2,140	0.3	36	4.5	10,510	0.0	0	0.8	24,660
	Total	100.0	2,216	100.0	335	100.0	53,166	100.0	476,074	100.0	436	100.0	160	100.0	2,370,060	100.0	72,738	100.0	11,923	100.0	234,649	100.0	250	100.0	3,222,007

Appendix Table 2. Run composition estimates of sockeye salmon catches by age group and date for the Salamatof Beach set net fishery, Upper Cook Inlet, 1983.

Date	System	0.2		1.1		0.3		1.2		2.1		1.3		2.2		1.4		2.3		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
7/01	Susitna	0.0	0	0.0	0	88.9	60	78.0	2,150	0.0	0	13.8	299	69.8	338	26.1	7	12.6	51	49.2	2,905
thru	Kenai	0.0	0	0.0	0	11.1	7	22.0	605	0.0	0	86.2	1,865	30.2	146	73.9	20	87.4	352	50.8	2,995
7/08	Kasilof	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	0.0	0	0.0	0	100.0	67	100.0	2,755	0.0	0	100.0	2,164	100.0	484	100.0	27	100.0	403	100.0	5,900
7/11	Susitna	100.0	549	0.0	0	88.9	1,951	78.0	22,267	100.0	274	13.8	17,380	69.8	2,298	26.1	215	12.6	1,312	26.9	46,246
thru	Kenai	0.0	0	0.0	0	11.1	244	22.0	6,269	0.0	0	86.2	108,559	30.2	995	73.9	608	87.4	9,114	73.1	125,789
7/18	Kasilof	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	100.0	549	0.0	0	100.0	2,195	100.0	28,536	100.0	274	100.0	125,939	100.0	3,293	100.0	823	100.0	10,426	100.0	172,035
7/19	Susitna	100.0	373	0.0	0	95.6	891	67.9	25,067	0.0	0	25.6	17,039	58.1	1,517	48.7	272	22.9	1,111	41.0	46,270
thru	Kenai	0.0	0	0.0	0	4.4	41	7.1	2,626	0.0	0	59.5	39,604	9.4	244	51.3	287	59.3	2,872	40.5	45,674
7/21	Kasilof	0.0	0	0.0	0	0.0	0	25.0	9,223	0.0	0	14.9	9,917	32.5	849	0.0	0	17.8	865	18.5	20,854
	Total	100.0	373	0.0	0	100.0	932	100.0	35,916	0.0	0	100.0	66,560	100.0	2,610	100.0	559	100.0	4,848	100.0	112,798
7/22	Susitna	0.0	0	23.6	51	82.2	358	47.4	16,361	0.0	0	7.8	6,934	37.0	1,690	16.9	147	7.0	469	19.1	26,010
thru	Kenai	0.0	0	76.4	166	17.8	77	23.1	7,988	0.0	0	84.5	75,118	27.8	1,270	83.1	722	83.8	5,650	66.8	30,991
7/24	Kasilof	0.0	0	0.0	0	0.0	0	29.5	10,210	0.0	0	7.7	6,845	35.2	1,605	0.0	0	9.2	619	14.1	19,279
	Total	0.0	0	100.0	217	100.0	435	100.0	34,559	0.0	0	100.0	88,897	100.0	4,565	100.0	869	100.0	6,738	100.0	136,280
7/25	Susitna	100.0	125	10.8	22	64.5	48	44.3	2,766	0.0	0	3.5	565	34.0	238	7.4	13	3.2	42	15.3	3,819
thru	Kenai	0.0	0	89.2	178	35.5	27	54.9	3,433	0.0	0	96.4	15,565	65.1	455	92.6	162	96.7	1,282	84.4	21,102
7/26	Kasilof	0.0	0	0.0	0	0.0	0	0.8	50	0.0	0	0.1	16	0.9	7	0.0	0	0.1	1	0.3	74
	Total	100.0	125	100.0	200	100.0	75	100.0	6,249	0.0	0	100.0	16,146	100.0	700	100.0	175	100.0	1,325	100.0	24,995
7/27	Susitna	100.0	184	22.5	66	81.3	89	65.9	6,056	0.0	0	8.0	1,901	55.6	573	16.1	41	7.2	141	24.6	9,051
thru	Kenai	0.0	0	77.5	228	18.7	21	34.1	3,139	0.0	0	92.0	21,860	44.4	457	83.9	216	92.8	1,808	75.4	27,729
8/15	Kasilof	0.0	0	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	100.0	184	100.0	294	100.0	110	100.0	9,195	0.0	0	100.0	23,761	100.0	1,030	100.0	257	100.0	1,949	100.0	36,780
Total	Susitna	100.0	1,231	19.6	139	89.1	3,397	63.1	74,667	100.0	274	13.6	44,118	52.5	6,653	25.7	696	12.2	3,125	27.5	134,300
	Kenai	0.0	0	80.4	572	10.9	417	20.4	24,060	0.0	0	81.2	262,570	28.1	3,569	74.3	2,014	82.0	21,079	64.3	314,281
	Kasilof	0.0	0	0.0	0	0.0	0	16.5	19,483	0.0	0	5.2	16,779	19.4	2,460	0.0	0	5.8	1,485	8.2	40,207
	Total	100.0	1,231	100.0	711	100.0	3,814	100.0	118,210	100.0	274	100.0	323,467	100.0	12,682	100.0	2,710	100.0	25,689	100.0	488,788

Appendix Table 3. Run composition estimates of sockeye salmon catches by age group and date for the Kalifonsky Beach set net fishery, Upper Cook Inlet, 1983.

Date	System	0.2		0.3		1.2		1.3		2.2		1.4		2.3		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
7/01	Susitna	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Kenai	0.0	0	0.0	0	2.5	45	26.3	1,059	2.5	7	0.0	0	22.9	62	18.3	1,173
	Kasilof	0.0	0	0.0	0	97.5	1,788	73.7	2,966	97.5	274	0.0	0	77.1	208	81.7	5,236
	Total	0.0	0	0.0	0	100.0	1,833	100.0	4,025	100.0	281	0.0	0	100.0	270	100.0	6,409
7/04	Susitna	0.0	0	100.0	3	38.2	222	20.9	175	28.9	51	0.0	0	17.3	28	27.2	479
	Kenai	0.0	0	0.0	0	2.3	13	27.5	230	2.6	5	0.0	0	25.4	42	16.4	290
	Kasilof	0.0	0	0.0	0	59.5	347	51.6	430	68.5	122	0.0	0	57.3	94	56.4	993
	Total	0.0	0	100.0	3	100.0	582	100.0	835	100.0	178	0.0	0	100.0	164	100.0	1,762
7/06	Susitna	0.0	0	97.1	29	31.4	2,214	17.1	1,566	23.1	316	0.0	0	14.0	200	22.7	4,325
thru	Kenai	0.0	0	2.9	1	2.1	150	25.7	2,353	2.4	33	0.0	0	23.4	334	15.1	2,871
7/11	Kasilof	0.0	0	0.0	0	66.5	4,681	57.2	5,237	74.5	1,018	0.0	0	62.6	893	62.2	11,829
	Total	0.0	0	100.0	30	100.0	7,045	100.0	9,156	100.0	1,367	0.0	0	100.0	1,427	100.0	19,025
7/12	Susitna	100.0	37	87.7	32	20.4	1,562	7.3	914	14.4	262	24.0	9	6.1	100	12.3	2,916
thru	Kenai	0.0	0	12.3	5	6.4	494	51.2	6,411	7.0	128	76.0	28	47.6	781	33.0	7,847
7/16	Kasilof	0.0	0	0.0	0	73.2	5,611	41.5	5,196	78.6	1,435	0.0	0	46.3	762	54.7	13,004
	Total	100.0	37	100.0	37	100.0	7,667	100.0	12,521	100.0	1,825	100.0	37	100.0	1,643	100.0	23,767
7/17	Susitna	0.0	0	74.7	1,061	27.8	8,403	4.8	8,084	20.2	2,221	11.5	82	4.2	839	8.9	20,690
thru	Kenai	0.0	0	25.3	360	21.2	6,415	81.3	136,920	23.7	2,609	88.5	629	79.5	15,808	70.3	162,741
7/21	Kasilof	0.0	0	0.0	0	51.0	15,383	13.9	23,410	56.1	6,184	0.0	0	16.3	3,250	20.8	48,227
	Total	0.0	0	100.0	1,421	100.0	30,201	100.0	168,414	100.0	11,014	100.0	711	100.0	19,897	100.0	231,658
7/22	Susitna	0.0	0	90.0	151	79.9	11,421	15.2	12,908	72.1	2,304	28.4	286	13.9	583	25.7	27,653
thru	Kenai	0.0	0	10.0	17	20.1	2,872	84.8	72,012	27.9	891	71.6	723	86.1	3,621	74.3	80,136
7/26	Kasilof	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	0.0	0	100.0	168	100.0	14,293	100.0	84,920	100.0	3,195	100.0	1,009	100.0	4,204	100.0	107,789
7/27	Susitna	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	Trace	0	Trace	0
thru	Kenai	0.0	0	0.0	0	100.0	5,277	100.0	50,033	100.0	2,150	100.0	684	100.0	4,006	100.0	62,150
8/15	Kasilof	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	0.0	0	0.0	0	100.0	5,277	100.0	50,033	100.0	2,150	100.0	684	100.0	4,006	100.0	62,150
Total	Susitna	100.0	37	77.0	1,277	35.6	23,822	7.2	23,646	25.8	5,154	15.5	377	5.5	1,751	12.4	56,064
	Kenai	0.0	0	23.0	382	22.8	15,266	81.5	269,018	29.1	5,822	84.5	2,064	78.0	24,653	70.1	317,205
	Kasilof	0.0	0	0.0	0	41.6	27,810	11.3	37,240	45.1	9,034	0.0	0	16.5	5,207	17.5	79,291
	Total	100.0	37	100.0	1,659	100.0	66,898	100.0	329,904	100.0	20,010	100.0	2,441	100.0	31,611	100.0	452,560

Appendix Table 4. Run composition estimates of sockeye salmon catches by age group and date for the Cohoe/
Ninilchik Beach set net fishery, Upper Cook Inlet, 1983.

Date	System	1.1		0.3		1.2		2.1		1.3		2.2		1.4		2.3		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
7/01 thru	Susitna	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Kenai	0.0	0	100.0	70	1.7	93	0.0	0	19.7	2,628	1.7	17	0.0	0	16.9	398	14.5	3,206
7/04	Kasilof	0.0	0	0.0	0	98.3	5,298	0.0	0	80.3	10,713	98.3	951	0.0	0	83.1	1,952	85.5	18,914
	Fish	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	0.0	0	100.0	70	100.0	5,391	0.0	0	100.0	13,341	100.0	968	0.0	0	100.0	2,350	100.0	22,120
7/06	Susitna	0.0	0	96.4	13	26.2	876	0.0	0	13.9	489	18.9	167	0.0	0	11.3	89	19.1	1,634
	Kenai	0.0	0	3.6	0	2.2	74	0.0	0	26.0	914	2.5	22	0.0	0	23.5	186	14.0	1,196
	Kasilof	0.0	0	0.0	0	71.6	2,393	0.0	0	60.1	2,114	78.6	697	0.0	0	65.2	517	66.9	5,721
	Total	0.0	0	100.0	13	100.0	3,343	0.0	0	100.0	3,517	100.0	886	0.0	0	100.0	792	100.0	8,551
7/08	Susitna	0.0	0	95.4	18	47.4	2,070	0.0	0	9.6	493	28.7	267	0.0	0	14.5	183	25.8	3,031
	Kenai	0.0	0	4.6	1	Trace	0	0.0	0	40.1	2,057	4.9	45	0.0	0	39.2	496	22.2	2,599
	Kasilof	0.0	0	0.0	0	44.8	1,957	0.0	0	50.3	2,581	65.9	612	0.0	0	46.2	584	49.0	5,734
	Fish	0.0	0	0.0	0	7.8	341	0.0	0	Trace	0	0.5	5	0.0	0	0.1	1	3.0	347
	Total	0.0	0	100.0	19	100.0	4,368	0.0	0	100.0	5,131	100.0	929	0.0	0	100.0	1,264	100.0	11,711
7/11	Susitna	0.0	0	0.0	0	50.5	4,903	0.0	0	5.3	979	25.3	716	30.1	33	9.7	311	20.2	6,942
	Kenai	0.0	0	0.0	0	Trace	0	0.0	0	54.3	10,040	9.1	258	69.9	76	55.6	1,789	35.4	12,163
	Kasilof	0.0	0	0.0	0	43.8	4,252	0.0	0	40.4	7,470	65.3	1,852	0.0	0	34.7	1,116	42.8	14,690
	Total	0.0	0	0.0	0	100.0	9,708	0.0	0	100.0	18,489	100.0	2,836	100.0	109	100.0	3,217	100.0	34,359
7/13 thru	Susitna	0.0	0	88.4	279	18.6	5,302	0.0	0	19.0	10,681	24.4	1,661	25.2	200	8.3	713	18.6	18,836
	Kenai	0.0	0	11.6	37	2.4	684	0.0	0	60.8	34,179	11.2	765	74.8	592	61.3	5,239	41.1	41,496
	Total	0.0	0	100.0	316	100.0	28,504	0.0	0	100.0	56,216	100.0	6,810	100.0	792	100.0	8,551	100.0	101,189
7/16	Kasilof	0.0	0	0.0	0	73.6	20,979	0.0	0	20.2	11,356	64.1	4,361	0.0	0	30.4	2,597	38.8	39,293
	Fish	0.0	0	0.0	0	5.4	1,539	0.0	0	Trace	0	0.3	23	0.0	0	.0	2	1.5	1,564

-Continued-

Appendix Table 4. Run composition estimates of sockeye salmon catches by age group and date for the Cohoe/
Ninilchik Beach set net fishery, Upper Cook Inlet, 1983 (continued).

Date	System	1.1		0.3		1.2		2.1		1.3		2.2		1.4		2.3		Total	
		%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
7/17	Susitna	0.0	0	88.2	891	38.8	15,148	0.0	0	21.8	30,229	43.9	5,030	24.8	251	10.4	2,589	25.1	54,138
thru	Kenai	0.0	0	11.8	119	0.5	195	0.0	0	72.8	100,950	20.7	2,368	75.2	759	78.1	19,457	57.3	123,848
7/20	Kasilof	0.0	0	0.0	0	51.9	20,263	0.0	0	5.4	7,488	34.9	3,991	0.0	0	11.5	2,853	16.0	34,595
	Fish	0.0	0	0.0	0	8.8	3,436	0.0	0	Trace	0	0.5	54	0.0	0	.0	7	1.6	3,497
	Total	0.0	0	100.0	1,010	100.0	39,042	0.0	0	100.0	138,667	100.0	11,443	100.0	1,010	100.0	24,906	100.0	216,078
7/21	Susitna	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
thru	Kenai	0.0	0	100.0	168	57.0	9,498	0.0	0	94.9	72,016	57.3	2,989	0.0	0	93.9	7,745	87.0	92,416
7/24	Kasilof	0.0	0	0.0	0	43.0	7,160	0.0	0	5.1	3,870	42.7	2,227	0.0	0	6.1	500	13.0	13,757
	Fish	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	0.0	0	100.0	168	100.0	16,658	0.0	0	100.0	75,886	100.0	5,216	0.0	0	100.0	8,245	100.0	106,173
7/25	Susitna	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	Trace	0	Trace	0	Trace	0	Trace	0
thru	Kenai	0.0	0	100.0	80	100.0	8,835	100.0	80	100.0	37,587	100.0	1,767	100.0	723	100.0	2,008	100.0	51,080
7/28	Kasilof	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Fish	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	0.0	0	100.0	80	100.0	8,835	100.0	80	100.0	37,587	100.0	1,767	100.0	723	100.0	2,008	100.0	51,080
7/29	Susitna	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	Trace	0
thru	Kenai	100.0	115	100.0	87	100.0	3,126	0.0	0	100.0	12,678	100.0	261	100.0	58	100.0	29	100.0	16,354
8/15	Kasilof	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Fish	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	100.0	115	100.0	87	100.0	3,126	0.0	0	100.0	12,678	100.0	261	100.0	58	100.0	29	100.0	16,354
Total	Susitna	Trace	0	68.1	1,201	23.8	28,299	Trace	0	11.9	42,872	25.2	7,841	17.9	483	7.6	3,885	14.9	84,581
	Kenai	100.0	115	31.9	562	18.9	22,505	100.0	80	75.5	273,049	27.3	8,492	82.1	2,209	72.7	37,346	60.6	344,358
	Kasilof	0.0	0	0.0	0	52.4	62,302	0.0	0	12.6	45,591	47.2	14,691	0.0	0	19.7	10,119	23.4	132,703
	Fish	Trace	0	0.0	0	4.9	5,869	Trace	0	Trace	0	0.3	92	0.0	0	.0	12	1.1	5,973
	Total	100.0	115	100.0	1,763	100.0	118,975	100.0	80	100.0	361,512	100.0	31,116	100.0	2,692	100.0	51,362	100.0	567,615

Appendix Table 5. Run composition estimates of sockeye salmon catches by age group and date for the Kalgin Island set net fishery, Upper Cook Inlet, 1983.

Date	System	0.2		0.3		1.2		1.3		2.2		1.4		2.3		2.4		Total	
		%	Number																
6/27	Susitna	0.0	0	98.3	268	54.9	2,202	38.1	2,573	36.2	759	0.0	0	27.7	733	100.0	91	41.8	6,626
thru	Kenai	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0	Trace	0
7/08	Kasilof	0.0	0	0.0	0	27.9	1,122	30.7	2,072	28.0	589	0.0	0	29.8	790	0.0	0	28.8	4,573
	Crescent	0.0	0	0.0	0	1.4	56	8.9	601	13.7	287	0.0	0	28.1	743	0.0	0	10.6	1,687
	Big	0.0	0	1.7	5	15.8	634	22.3	1,506	22.1	464	0.0	0	14.4	380	0.0	0	18.8	2,989
	McArthur	0.0	0	Trace	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Total	0.0	0	100.0	273	100.0	4,014	100.0	6,752	100.0	2,099	0.0	0	100.0	2,646	100.0	91	100.0	15,875
7/09	Susitna	0.0	0	0.0	0	14.9	638	6.8	757	6.0	237	0.0	0	4.5	172	0.0	0	7.8	1,804
thru	Kenai	0.0	0	0.0	0	0.1	3	0.7	78	.0	2	0.0	0	0.5	19	0.0	0	0.4	102
7/21	Kasilof	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Crescent	0.0	0	0.0	0	4.3	182	17.8	1,981	25.3	1,004	0.0	0	51.1	1,949	0.0	0	22.1	5,116
	Big	0.0	0	0.0	0	80.7	3,447	74.7	8,315	68.7	2,721	0.0	0	43.9	1,672	0.0	0	69.7	16,155
	McArthur	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Chilligan	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Total	0.0	0	0.0	0	100.0	4,270	100.0	11,131	100.0	3,964	0.0	0	100.0	3,812	0.0	0	100.0	23,177
7/22	Susitna	87.5	149	93.3	265	51.1	2,030	27.2	3,457	33.2	1,452	50.3	57	28.1	527	0.0	0	33.8	7,937
thru	Kenai	0.0	0	1.5	4	1.9	74	21.9	2,784	1.9	81	18.3	21	25.2	471	0.0	0	14.6	3,435
9/09	Kasilof	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0
	Crescent	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0								
	Big	12.5	21	5.2	15	47.0	1,868	50.9	6,470	64.9	2,837	31.4	36	46.7	875	0.0	0	51.6	12,122
	McArthur	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0								
	Chilligan	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0								
	Total	100.0	170	100.0	284	100.0	3,972	100.0	12,711	100.0	4,370	100.0	114	100.0	1,873	0.0	0	100.0	23,494
Total	Susitna	87.5	149	95.7	534	39.8	4,869	22.2	6,787	23.5	2,449	50.3	57	17.2	1,431	100.0	91	26.2	16,367
	Kenai	0.0	0	0.8	4	0.6	77	9.4	2,862	0.8	83	18.3	21	5.9	491	0.0	0	5.7	3,538
	Kasilof	0.0	0	0.0	0	9.2	1,122	6.8	2,073	5.6	589	0.0	0	9.5	790	0.0	0	7.3	4,574
	Crescent	0.0	0	0.0	0	1.9	239	8.4	2,582	12.4	1,290	0.0	0	32.3	2,692	0.0	0	10.9	6,803
	Big	12.5	21	3.5	19	48.5	5,949	53.2	16,290	57.7	6,022	31.4	36	35.1	2,927	0.0	0	49.9	31,264
	McArthur	Trace	0	0.0	0	Trace	0	0.0	0	Trace	0								
	Chilligan	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0								
	Total	100.0	170	100.0	557	100.0	12,256	100.0	30,594	100.0	10,433	100.0	114	100.0	8,331	100.0	91	100.0	62,546

Appendix Table 6. Run composition estimates of sockeye salmon catches by age group and date for the Central District west-side set net fishery, Upper Cook Inlet, 1983.

Date	System	0.2		0.3		1.2		1.3		2.2		1.4		2.3		Total	
		%	Number														
6/17	Susitna	0.0	0	0.0	0	66.3	306	30.6	303	42.4	157	0.0	0	20.1	46	39.5	812
thru	Crescent	0.0	0	0.0	0	5.2	24	22.2	220	49.7	183	0.0	0	63.4	147	28.0	574
6/20	Big	0.0	0	0.0	0	3.4	16	3.2	32	4.6	17	0.0	0	1.9	4	3.4	69
	McArthur	0.0	0	0.0	0	25.1	116	44.0	436	3.3	12	0.0	0	14.7	34	29.1	598
	Chilligan	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	0.0	0	0.0	0	100.0	462	100.0	991	100.0	369	0.0	0	100.0	231	100.0	2,053
6/24	Susitna	77.2	9	0.0	0	66.3	689	30.6	1,065	42.4	417	0.0	0	20.1	165	37.0	2,345
thru	Crescent	0.0	0	0.0	0	5.2	55	22.2	773	49.7	488	0.0	0	63.3	520	29.0	1,836
6/27	Big	0.6	0	0.0	0	3.4	35	3.2	111	4.6	45	0.0	0	1.9	16	3.3	207
	McArthur	22.2	3	0.0	0	25.1	262	44.0	1,532	3.3	33	0.0	0	14.7	120	30.7	1,950
	Chilligan	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Total	100.0	12	0.0	0	100.0	1,041	100.0	3,481	100.0	983	0.0	0	100.0	821	100.0	6,338
7/01	Susitna	0.0	0	0.0	0	Trace	0										
thru	Crescent	0.0	0	0.0	0	51.2	1,341	73.1	3,758	96.9	368	98.2	33	95.6	165	67.9	5,665
7/08	Big	0.0	0	0.0	0	7.2	190	2.3	118	2.0	7	1.8	1	0.6	1	3.8	317
	McArthur	0.0	0	0.0	0	41.6	1,091	24.6	1,265	1.1	4	0.0	0	3.8	6	28.3	2,366
	Chilligan	0.0	0	0.0	0	Trace	0										
	Total	0.0	0	0.0	0	100.0	2,622	100.0	5,141	100.0	379	100.0	34	100.0	172	100.0	8,348
7/11	Susitna	35.9	11	59.3	72	3.9	85	0.7	53	0.5	15	1.3	1	0.2	6	1.5	243
thru	Crescent	0.0	0	0.0	0	50.8	1,086	82.2	6,141	87.7	2,927	87.8	54	93.8	3,103	80.7	13,311
7/17	Big	64.1	20	40.7	50	45.2	969	16.3	1,218	11.2	375	10.4	6	3.8	126	16.8	2,764
	McArthur	Trace	0	0.0	0	Trace	0	Trace	0								
	Chilligan	0.0	0	0.0	0	0.1	3	0.8	60	0.6	21	0.5	1	2.2	72	1.0	157
	Total	100.0	31	100.0	122	100.0	2,143	100.0	7,472	100.0	3,338	100.0	62	100.0	3,307	100.0	16,475
7/18	Susitna	0.0	0	0.0	0	66.5	3,768	17.8	3,425	11.8	687	27.9	42	4.8	376	21.4	8,298
thru	Crescent	0.0	0	0.0	0	33.5	1,901	82.2	15,818	88.2	5,131	72.1	107	95.2	7,530	78.6	30,487
9/05	Big	0.0	0	0.0	0	Trace	0										
	McArthur	0.0	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0	Trace	0
	Chilligan	0.0	0	0.0	0	Trace	0										
	Total	0.0	0	0.0	0	100.0	5,669	100.0	19,243	100.0	5,818	100.0	149	100.0	7,906	100.0	38,785
Total	Susitna	47.4	20	59.3	72	40.7	4,848	13.3	4,846	11.7	1,276	17.1	42	4.8	593	16.2	11,697
	Crescent	0.0	0	0.0	0	36.9	4,407	73.5	26,710	83.5	9,096	79.6	195	92.1	11,464	72.1	51,872
	Big	46.4	20	40.7	50	10.1	1,211	4.1	1,479	4.1	445	2.9	7	1.2	147	4.7	3,359
	McArthur	6.2	3	0.0	0	12.3	1,468	8.9	3,232	0.5	49	0.0	0	1.3	161	6.8	4,913
	Chilligan	0.0	0	0.0	0	.0	3	0.2	60	0.2	21	0.4	1	0.6	72	0.2	157
	Total	100.0	43	100.0	122	100.0	11,937	100.0	36,327	100.0	10,887	100.0	245	100.0	12,437	100.0	71,998

Appendix Table 7. Run composition estimates of sockeye salmon catches by age group and date for the Northern District east-side set net fishery, Upper Cook Inlet, 1983.

Date	System	0.2		1.1		0.3		1.2		2.1		0.4		1.3		2.2		1.4		2.3		Total	
		%	Number																				
6/27	Susitna	0.0	0	0.0	0	91.9	151	62.9	11,418	0.0	0	0.0	0	18.5	189	74.3	913	33.7	14	16.9	48	60.9	12,733
	thru Kenai	0.0	0	0.0	0	8.1	13	12.5	2,269	0.0	0	0.0	0	81.3	833	22.8	280	66.3	27	82.9	239	17.5	3,661
7/15	Fish	0.0	0	0.0	0	0.0	0	24.6	4,466	0.0	0	0.0	0	0.2	2	2.9	36	0.0	0	0.2	0	21.6	4,504
	Total	0.0	0	0.0	0	100.0	164	100.0	18,153	0.0	0	0.0	0	100.0	1,024	100.0	1,229	100.0	41	100.0	287	100.0	20,898
7/16	Susitna	100.0	293	4.7	10	81.4	238	42.3	12,069	23.2	34	8.0	6	8.0	460	53.2	1,053	16.4	24	7.3	48	37.4	14,235
	thru Kenai	0.0	0	15.9	35	18.6	55	21.8	6,219	66.3	98	91.9	67	91.9	5,253	42.3	837	83.6	123	92.5	611	34.9	13,298
7/28	Fish	0.0	0	79.4	175	0.0	0	35.9	10,243	10.5	15	0.1	0	0.1	8	4.5	90	0.0	0	0.2	1	27.7	10,532
	Total	100.0	293	100.0	220	100.0	293	100.0	28,531	100.0	147	100.0	73	100.0	5,721	100.0	1,980	100.0	147	100.0	660	100.0	38,065
7/29	Susitna	0.0	0	12.9	35	97.1	66	72.4	4,304	0.0	0	0.0	0	39.9	593	88.0	237	0.0	0	37.3	75	64.4	5,310
	thru Kenai	0.0	0	5.8	16	2.9	2	4.9	291	0.0	0	0.0	0	59.8	889	9.2	25	0.0	0	62.4	127	16.4	1,350
9/05	Fish	0.0	0	81.3	219	0.0	0	22.7	1,349	0.0	0	0.0	0	0.3	4	2.8	8	0.0	0	0.3	1	19.2	1,581
	Total	0.0	0	100.0	270	100.0	68	100.0	5,944	0.0	0	0.0	0	100.0	1,486	100.0	270	0.0	0	100.0	203	100.0	8,241
Total	Susitna	100.0	293	9.2	45	86.7	455	52.8	27,790	23.2	34	8.0	6	15.1	1,241	63.4	2,205	20.1	38	15.0	172	48.0	32,279
	Kenai	0.0	0	10.3	51	13.3	70	16.7	8,780	66.3	98	91.9	67	84.7	6,976	32.8	1,141	79.9	150	84.8	976	27.3	18,309
	Fish	0.0	0	80.5	394	0.0	0	30.5	16,058	10.5	15	0.1	0	0.2	14	3.8	133	0.0	0	0.2	2	24.7	16,616
	Total	100.0	293	100.0	490	100.0	525	100.0	52,628	100.0	147	100.0	73	100.0	8,231	100.0	3,479	100.0	188	100.0	1,150	100.0	67,204

Appendix Table 8. Run composition estimates of sockeye salmon catches by age group and date for the Northern District west-side set net fishery, Upper Cook Inlet, 1983.

Date	System	0.2		0.3		1.2		2.1		1.3		2.2		2.3		2.4		Total	
		%	Number																
6/27	Susitna	91.5	14	81.7	85	77.2	946	47.4	8	42.7	313	41.9	81	18.5	27	0.0	0	60.5	1,474
thru	Crescent	0.0	0	0.0	0	4.7	58	14.9	2	23.9	175	38.0	74	44.9	67	0.0	0	15.4	376
7/14	Big	1.9	0	0.7	1	10.3	126	22.8	3	11.6	85	11.9	23	4.5	7	0.0	0	10.1	245
	McArthur	6.6	1	17.6	19	7.4	90	0.0	0	15.4	112	0.8	2	3.4	5	0.0	0	9.4	229
	Chilligan	0.0	0	0.0	0	0.4	5	14.9	2	6.4	47	7.4	14	28.7	43	0.0	0	4.6	111
	Total	100.0	15	100.0	105	100.0	1,225	100.0	15	100.0	732	100.0	194	100.0	149	0.0	0	100.0	2,435
7/15	Susitna	91.5	567	81.7	5,569	77.2	23,607	0.0	0	42.7	8,819	42.0	1,733	18.5	1,491	100.0	207	59.1	41,993
thru	Crescent	0.0	0	0.0	0	4.7	1,444	0.0	0	23.9	4,936	37.9	1,567	44.9	3,622	0.0	0	16.3	11,569
7/19	Big	1.9	12	0.7	45	10.3	3,154	0.0	0	11.6	2,396	11.9	491	4.5	359	0.0	0	9.1	6,457
	McArthur	6.6	41	17.6	1,202	7.4	2,248	0.0	0	15.4	3,181	0.8	34	3.4	272	0.0	0	9.8	6,978
	Chilligan	0.0	0	0.0	0	0.4	115	0.0	0	6.4	1,322	7.4	306	28.7	2,311	0.0	0	5.7	4,054
	Total	100.0	620	100.0	6,816	100.0	30,568	0.0	0	100.0	20,654	100.0	4,131	100.0	8,055	100.0	207	100.0	71,051
7/20	Susitna	0.0	0	96.2	2,188	34.1	7,810	0.0	0	73.1	8,648	43.0	1,697	47.7	1,229	0.0	0	49.6	21,572
thru	Crescent	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
8/26	Fish	0.0	0	0.0	0	23.1	5,290	0.0	0	Trace	0	2.0	78	0.6	14	0.0	0	12.4	5,382
	Big	0.0	0	3.5	79	42.8	9,802	0.0	0	26.5	3,135	55.0	2,168	51.6	1,331	0.0	0	37.9	16,515
	McArthur	0.0	0	0.3	8	Trace	0	0.0	0	0.4	47	.0	1	0.1	4	0.0	0	0.1	60
	Chilligan	0.0	0	0.0	0	Trace	0	0.0	0	Trace	0	Trace	0	Trace	0	0.0	0	Trace	0
	Total	0.0	0	100.0	2,275	100.0	22,902	0.0	0	100.0	11,830	100.0	3,944	100.0	2,578	0.0	0	100.0	43,529
Total	Susitna	91.5	581	85.2	7,844	59.2	32,362	47.4	7	53.5	17,780	42.6	3,511	25.5	2,747	100.0	207	55.6	65,039
	Crescent	0.0	0	0.0	0	2.7	1,502	14.9	2	15.4	5,110	19.8	1,641	34.3	3,689	0.0	0	10.2	11,944
	Fish	0.0	0	0.0	0	9.7	5,290	0.0	0	Trace	0	0.9	79	0.1	14	0.0	0	4.6	5,383
	Big	1.9	12	1.4	124	23.9	13,083	22.8	4	16.9	5,616	32.4	2,682	15.7	1,697	0.0	0	19.8	23,218
	McArthur	6.6	42	13.4	1,228	4.3	2,338	0.0	0	10.1	3,341	0.4	36	2.6	281	0.0	0	6.2	7,266
	Chilligan	0.0	0	0.0	0	0.2	120	14.9	2	4.1	1,369	3.9	320	21.8	2,354	0.0	0	3.6	4,165
	Total	100.0	635	100.0	9,196	100.0	54,695	100.0	15	100.0	33,216	100.0	8,269	100.0	10,782	100.0	207	100.0	117,015

Appendix Table 9. Age composition by river of sockeye salmon escapement, sport harvest, and spawners, Upper Cook Inlet, 1983.

River		1.2	1.3	2.2	2.3	Other	Total	
Susitna River 1/ Escapement	Numbers	115,197	47,699	2,991	2,061	7,988	175,936	
	Percent	65.5	27.1	1.7	1.2	4.5	100.0	
	Sport Harvest	Numbers	2,864	1,185	74	52	197	4,372
		Percent	65.5	27.1	1.7	1.2	4.5	100.0
	Spawners	Numbers	112,333	46,514	2,917	2,009	7,791	171,564
		Percent	65.5	27.1	1.7	1.2	4.5	100.0
Kenai River 2/ Escapement	Numbers	53,075	497,960	13,950	56,146	9,209	630,340	
	Percent	8.4	79.0	2.2	8.9	1.5	100.0	
Russian River Sport Harvest	Numbers	11,792	1,280	2,016	912	0	16,000	
	Percent	73.7	8.0	12.6	5.7	0.0	100.0	
Kenai R. Sport Harvest Below Soldotna Bridge	Numbers	1,929	18,139	505	2,044	344	22,961	
	Percent	8.4	79.0	2.2	8.9	1.5	100.0	
Kenai R. Sport Harvest Above Soldotna Bride	Numbers	4,065	38,235	1,065	4,308	726	48,399	
	Percent	8.4	79.0	2.2	8.9	1.5	100.0	
Kenai R. Personal-Use Dipnet Harvest	Numbers	635	5,975	166	673	113	7,562	
	Percent	8.4	79.0	2.2	8.9	1.5	100.0	
Spawners	Numbers	37,218	458,445	10,869	50,926	8,483	565,941	
	Percent	6.6	81.0	1.9	9.0	1.5	100.0	
Kasilof River 3/ Escapement	Numbers	104,112	69,687	27,032	9,440	0	210,271	
	Percent	49.5	33.1	12.9	4.5	0.0	100.0	
Sport Harvest	Numbers	922	617	240	84	0	1,863	
	Percent	49.5	33.1	12.9	4.5	0.0	100.0	

Appendix Table 9. Age composition by river of sockeye salmon escapement, sport harvest, and spawners, Upper Cook Inlet, 1983 (continued).

River		1.2	1.3	2.2	2.3	Other	Total
Kasilof R.							
Personal-Use	Numbers	5,506	3,693	1,424	501	0	11,124
Dip Net Harvest	Percent	49.5	33.1	12.9	4.5	0.0	100.0
Kasilof R.							
Personal-Use	Numbers	867	7,006	168	805	0	8,846
Bill Net Harvest	Percent	9.8	79.2	1.9	9.1	0.0	100.0
Fish Taken for Eggs and Offspring Not Returned to Kasilof							
	Numbers	540	360	140	49	0	1,089
	Percent	49.5	33.1	12.9	4.5	0.0	100.0
Spawners							
	Numbers	102,650	68,710	26,652	9,307	0	207,319
	Percent	49.5	33.1	12.9	4.5	0.0	100.0
Crescent River 4/							
Spawners	Numbers	10,065	39,061	25,302	17,176	739	92,343
	Percent	10.9	42.3	27.4	18.6	0.8	100.0
Fish Creek 5/							
Escapement	Numbers	104,010	976	1,773	186	11,852	118,797
	Percent	87.6	0.8	1.5	0.1	10.0	100.0
Saltwater Sport Harvest	Numbers	5,268	48	90	6	601	6,013
	Percent	87.6	0.8	1.5	0.1	10.0	100.0

- 1/ Susitna River sport harvest includes those fish harvested above the escapement counting site. Scales were not sampled from the sport harvest, the age composition of the escapement was used to expand these estimates. Sport harvest was then subtracted from the escapement to calculate spawners.
- 2/ Scales were not sampled from the sport or dip net harvest, the age composition from the escapement through Russian River weir was used to expand the Russian River sport harvest estimates and the age composition from the total mainstem escapement was used to expand all other sport and dip net harvests. Sport harvests above the Soldotna Bridge were subtracted from the escapement to calculate numbers of spawners.
- 3/ Scales were not taken from fish caught in the sport fishery, dip net fishery, or from those fish taken for eggs. The age composition of the escapement was applied to those catches. The sport harvest and egg-take fish whose progeny were not returned to the Kasilof River were subtracted from the escapement to calculate numbers of spawners.
- 4/ An estimate of Crescent River sport harvest of sockeye salmon is not available, we assumed escapement equaled numbers of spawners.
- 5/ Scales were not taken from the Fish Creek sport harvest. The age composition of the escapement was applied to the sport harvest. Sport catches occurred in saltwater and were not included in the escapement counts. Estimates of escapement equals numbers of spawners.

Because the Alaska Department of Fish and Game receives federal funding, all of its public programs and activities are operated free from discrimination on the basis of race, religion, color, national origin, age, sex, or handicap. Any person who believes he or she has been discriminated against should write to:

O.E.O.
U.S. Department of the Interior
Washington, D.C. 20240
