

TECHNICAL FISHERY REPORT 94-05



Alaska Department of Fish and Game
Commercial Fisheries Management
and Development Division
P.O. Box 25526
Juneau, Alaska 99802-5526

May 1994

Norton Sound and Kotzebue Sound Management Area Salmon Catch and Escapement Report, 1992

by

Tracy Lingnau

The Technical Fishery Report Series was established in 1987, replacing the Technical Data Report Series. The scope of this new series has been broadened to include reports that may contain data analysis, although data oriented reports lacking substantial analysis will continue to be included. The new series maintains an emphasis on timely reporting of recently gathered information, and this may sometimes require use of data subject to minor future adjustments. Reports published in this series are generally interim, annual, or iterative rather than final reports summarizing a completed study or project. They are technically oriented and intended for use primarily by fishery professionals and technically oriented fishing industry representatives. Publications in this series have received several editorial reviews and at least one *blind* peer review refereed by the division's editor and have been determined to be consistent with the division's publication policies and standards.

NORTON SOUND AND KOTZEBUE SOUND MANAGEMENT AREA
SALMON CATCH AND ESCAPEMENT REPORT, 1992

By
Tracy Lingnau

Technical Fisheries Report No. 94-05

Alaska Department of Fish and Game
Commercial Fisheries Management
and Development Division
P.O. Box 25526
Juneau, Alaska 99802-5526

May 1994

AUTHOR

Tracy Lingnau is Assistant Area Management Biologist in Kotzebue for the Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, P.O. Box 689, Kotzebue, AK 99752.

ACKNOWLEDGMENTS

The author would like to thank Brook Everest, Jason Peterson, Steve Garrison, Joel Saccheus, Suzanne Bird, and Fred Bue for data collection in Norton Sound and Susan Bucknell and Jerry McCall for data collection in Kotzebue Sound. Charlie Lean reviewed the preliminary draft of this report and Larry Buklis provided valuable assistance and guidance.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	iv
LIST OF FIGURES	v
LIST OF APPENDICES	vi
ABSTRACT	vii
INTRODUCTION	1
METHODS	2
Harvest and Escapement	2
Age, Sex, and Length Data Collection	2
Sample Size	3
RESULTS	3
Norton Sound	3
Commercial and Subsistence Harvest	3
Escapement Abundance	5
Age, Sex, and Length Composition	5
Kotzebue Sound	6
Commercial and Subsistence Harvest	6
Escapement Abundance	7
Age, Sex, and Length Composition	7
LITERATURE CITED	8
TABLES	9
FIGURES	25
APPENDIX	29

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Norton Sound commercial salmon effort and catch by subdistrict, 1992.	9
2. Norton Sound subsistence salmon catch and effort in the Nome area, 1992 (preliminary data).	10
3. Norton Sound salmon aerial survey escapement counts by species for 1992 including survey count objectives for chum salmon.	11
4. Norton Sound Subdistrict 6 chinook salmon commercial catch sample age, and sex composition and mean length, 1992.	12
5. Unalakleet River chinook salmon test fish age and sex composition, and mean length, 1992.	13
6. Norton Sound Subdistrict 6 chum salmon commercial catch age and sex composition, and mean length, 1992.	14
7. Unalakleet River chum salmon test fish catch age and sex composition, and mean length, 1992.	15
8. Kwiniuk River chum salmon subsistence beach seine catch age and sex composition, and mean length, 1992.	16
9. Norton Sound Subdistrict 6 coho salmon commercial catch sample age and sex composition, and mean length, 1992.	17
10. Unalakleet River coho salmon test fish catch age and sex composition, and mean length, 1992.	18
11. Kotzebue District commercial catch, weight, and average weight of chum salmon, chinook salmon, and Dolly Varden by period, 1992.	19
12. Partial estimates of subsistence harvest of chum salmon, Dolly Varden, whitefish, sheefish and Northern Pike in the Kotzebue Area villages of Noatak, Noorvik, and Shungnak, 1992.	20
13. Kotzebue District chum salmon aerial survey escapement estimates for primary index streams, 1981–1992. Indices listed in this table are the peak survey observed for each tributary during the given year	21
14. Kotzebue District chum salmon commercial catch age and sex composition, and mean length, 1992.	22
15. Kotzebue District chum salmon tributary escapement age and sex composition, and mean length, 1992.	23

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1.	Norton Sound commercial salmon fishing subdistricts.	25
2.	Northern Norton Sound subsistence fishing sites.	26
3.	Kotzebue Sound commercial fishing district and major chum salmon spawning streams.	27
4.	Kotzebue Sound commercial salmon fishing subdistricts and statistical areas.	28

LIST OF APPENDICES

	<u>Page</u>
APPENDIX A - NORTON SOUND CATCH DATA	
A.1 Norton Sound Subdistrict 1 commercial salmon catch and effort by period, 1992.	31
A.2 Norton Sound Subdistrict 2 commercial salmon catch and effort by period, 1992.	32
A.3 Norton Sound Subdistrict 3 commercial salmon catch and effort by period, 1992.	33
A.4 Norton Sound Subdistrict 4 commercial salmon catch and effort by period, 1992.	34
A.5 Norton Sound Subdistrict 5 commercial salmon catch and effort by period, 1992.	35
A.6 Norton Sound Subdistrict 6 commercial salmon catch and effort by period, 1992.	36
APPENDIX B - NORTON SOUND AGE AND SEX COMPOSITION	
B.1 Norton Sound Subdistrict 6 chum salmon commercial catch sample age and sex composition by time period, 1992.	37
B.2 Unalakleet River chum salmon test gillnet catch age and sex composition by time period, 1992.	39
B.3 Norton Sound Subdistrict 6 coho salmon commercial catch sample age and sex composition by time period, 1992.	43
B.4 Unalakleet River coho salmon test gillnet catch age and sex composition by time period, 1992.	45
APPENDIX C - NORTON SOUND ESCAPEMENT DATA	
C.1 Kwiniuk River tower expanded daily and cumulative counts of pink, chum, and chinook salmon, 1992.	48
APPENDIX D - KOTZEBUE SOUND	
D.1 Kotzebue District chum salmon commercial catch age and sex composition by fishing period, 1992.	49

ABSTRACT

The 1992 commercial and subsistence harvest, and escapement samples of the five species of Pacific salmon *Oncorhynchus* found in the Norton Sound Management Area and one species of *Oncorhynchus* in Kotzebue Sound Management Area are presented by age, sex, and length. The 1992 Norton Sound District commercial harvest totaled 199,933 salmon and was composed of 4,541 chinook *O. tshawytscha*, 83,394 chum *O. keta*, 296 sockeye *O. nerka*, 6,284 pink *O. gorbuscha* and 105,418 coho *O. kisutch* salmon. The commercial harvest was 29% below the 1987–91 average for chinook salmon, 3% below for chum salmon, 60% below for pink salmon, and 133% above for coho salmon. Sockeye salmon are only present in small numbers in this area. Aerial surveys in southern Norton Sound subdistricts indicated that escapements were below average for chinook salmon. Aerial enumerations of chum salmon were difficult to quantify because of large numbers of pink salmon. Tributaries that were thought to be a good indication included the Eldorado (few pink salmon) and the Kwiniuk River (tower project), which were 7% and 40% below escapement objectives for chum salmon. Inclement weather prevented escapement estimation for coho salmon in most rivers; however, commercial and test net catches were above average, and escapement was assumed to be adequate. The age composition of a small sample from the chinook salmon harvest in Subdistrict 6 was composed of three major age classes: age 1.2 (46.4%), age 1.3 (32.1%), and age 1.4 (17.9%). This unusual age composition is attributed to no large-mesh gear being fished. Subdistrict 6 chum salmon age composition was 11.2% age 0.3 and 84.4% age 0.4. The coho salmon harvest in Subdistrict 6 was predominantly age 2.1 (70.2%). In the Kotzebue District the commercial harvest totaled 289,184 chum salmon. An incidental catch of 204 chinook salmon and 1,977 Dolly Varden was also reported. Subsistence catches of these species plus whitefish and sheefish also occur in the Kotzebue District. The chum salmon harvest was below the 1979–91 average of 306,574 fish. Fair to poor escapement survey conditions prevailed in 1992. An early survey of the Lower Kobuk tributaries indicated below average escapements, fair surveys of the Upper Kobuk indicated that escapement objectives were met. Sonar enumeration on the Noatak River indicated that the escapement goal may have been achieved. The age composition of the chum salmon harvest in the Kotzebue District commercial fishery was 0.9% age 0.2, 58.5% age 0.3, 37.5% age 0.4, and 3.1% age 0.5.

KEY WORDS: Norton Sound, Kotzebue Sound, harvest, escapement, *Oncorhynchus tshawytscha*, *O. nerka*, *O. keta*, *O. kisutch*, *O. gorbuscha*, age-size-sex composition, fishery synopsis

INTRODUCTION

The Norton Sound, Port Clarence, and Kotzebue Sound commercial salmon management districts include all waters of Alaska from Canal Point Light, south of Stebbins, to Point Hope, north of Kotzebue. The Port Clarence District has been closed to commercial salmon fishing since 1966. The Norton Sound District is composed of all waters of Alaska from Canal Point Light north to Cape Douglas (Figure 1) and consists of six subdistricts: 1 (Nome), 2 (Golovin), 3 (Moses Point), 4 (Norton Bay), 5 (Shaktoolik), and 6 (Unalakleet). The Kotzebue Sound District includes all waters of Alaska from Point Hope to Cape Prince of Wales, but commercial salmon fishing is restricted to Subdistricts 1 and 2, consisting of ocean waters north of the Baldwin Peninsula (Figures 3, 4). Subdistrict 2, Noatak River mouth, normally remains closed unless the chum salmon return is substantially above average.

Five species of Pacific salmon are found in the Norton and Kotzebue Sound areas. In descending order of economic importance, i.e., average exvessel value, they are chum salmon *Oncorhynchus keta*, coho salmon *O. kisutch*, chinook salmon *O. tshawytscha*, pink salmon *O. gorbuscha*, and sockeye salmon *O. nerka*. In Norton Sound the even-year returns of pink salmon are the largest of the five species, followed by chum, coho, chinook, and sockeye salmon. However, in 1992 coho salmon surpassed the chum salmon return. In the Kotzebue Sound District, chum salmon are the predominant species.

Knowledge of the magnitude, distribution, timing, and age-sex-size composition of both the harvest and escapement by stock is fundamental to managing salmon fisheries and achieving full production; i.e., salmon returns are directly related to the number of fish in each age, sex, and size category of the spawning population. Age, sex, and size composition of selected harvests and escapements in the Norton and Kotzebue Sound areas have been estimated annually since 1962 and are presented in this report for 1992.

Fishery statistics for the Norton Sound and Kotzebue Sound Districts are available from several additional sources. Commercial and subsistence harvest and spawning escapement data from 1961 to 1991 have been summarized in the Norton Sound - Port Clarence - Kotzebue Sound Annual Management Report (Lean et al. 1992). In addition, the results from escapement assessment projects are analyzed and reported annually. For the 1992 season these included test fishery projects on the Unalakleet River (Lean, personal communication) and a counting tower project on the Kwiniuk River (F. Bue, personal communication).

Age, sex, and size data for Norton Sound and Kotzebue Sound from 1962 to 1982 are summarized in an unpublished report series entitled ADF&G Arctic-Yukon-Kuskokwim Region Age-Sex-Size Composition of Salmon. Beginning with the 1983 season these data have been published in an annual report (Lean et al. 1984, 1992; Bigler and Lean 1986; Hamner 1987, 1989a, 1989b; Buklis 1991a, 1991b.)

METHODS

Harvest and Escapement

Commercial catch data presented in this report were compiled from harvest receipts, i.e., *fish tickets*, which document each sale by a licensed fisherman. These data were summarized by microcomputer in the Nome and Kotzebue offices during the fishing season.

Subsistence catches have not been monitored as closely as commercial catches in the Norton Sound and Kotzebue Sound Areas. Due to budget constraints, no subsistence harvest surveys were conducted in the Norton Sound area in 1992 by Division of Commercial Fisheries. Door-to-door surveys were conducted in Elim by Division of Subsistence. A subsistence permit is required to subsistence fish in the Nome Subdistrict, and catch limits are set by permit for each river and species. In the Kotzebue Area household interviews were conducted in the villages of Noatak, Noorvik, and Shungnak. The members of each household were asked how many fish of each species were caught for subsistence use. During these surveys it was assumed that fishermen could accurately recall their harvests, which may have occurred over several months.

Aerial surveys have been the primary method for monitoring salmon escapements to the Norton Sound and Kotzebue Sound drainage's, but they do not provide a total enumeration of salmon spawning abundance. Aerial survey escapement counts are, at best an index of relative abundance for the surveyed streams. To compare aerial surveys across years, surveys should be conducted on approximately the same dates each year under similar survey conditions and at the same locations. Comparing commercial catch statistics to previous years provides an index of run strength and timing. Test fishing also provides an index of escapement and species composition for turbid or large drainages that are difficult to monitor visually. Test fishery catch and catch per unit effort (CPUE) statistics are used as an index of relative abundance. Counting towers provide a better estimate of escapement. Both provide data on migratory timing. In 1992 a counting tower on the Kwiniuk River in the Moses Point Subdistrict and a test fishing project on the Unalakleet River in the Unalakleet Subdistrict were used to monitor escapements. A sonar escapement project on the Noatak River in its fourth year of operation became a routine management tool in 1992.

Age, Sex, and Length Data Collection

Age was determined from scales removed from the left side of the fish in an area above the lateral line crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. Scales were mounted on gum cards and impressions made in cellulose acetate. Ages were reported in European notation (the first digit refers to the freshwater age and does not include the year spent in the gravel; the second digit refers to the ocean age). Sex was determined by examining external characteristics, such as; snout, vent, body symmetry, extruded eggs, ovipositor or milt of live fish. The sex of dead fish was determined by examining the gonads, if necessary. Fish length from mid-eye to fork-of-tail was measured to the nearest millimeter.

In some cases sex and length data but no ageable scales were obtained from fish, and in other cases ageable scales were collected without corresponding sex or length data. Therefore, numbers of fish in a length-by-age summary table may differ from numbers of fish in a sex-by-age summary table for a given fishery or escapement sample.

Sample Size

Minimum sample size goals were established for temporal strata based upon interval estimation of age class composition. The ages of fish were categorized into three age classes for this purpose: age 4, age 5, and age 3 or age 6. Sample sizes were chosen such that the width of 95% confidence intervals (Goodman 1965; Bromaghin 1991) for the proportion of the harvest in each of the three age classes would not exceed 0.15 (Bromaghin, personal communication). A sample of approximately 250 fish per stratum satisfied this objective. However, sample sizes were increased to 280 fish per stratum to account for the expected number of unreadable scales.

RESULTS

Enough commercial fishery samples were collected to estimate age and sex composition of the harvest for chum and coho salmon in Norton Sound Subdistrict 6 and for the chum harvest in the Kotzebue District. Chinook, chum, and coho salmon were sampled from the Unalakleet River set gillnet test fishing catch. Because of the selectivity of the 5-7/8-in (149-mm) stretched-mesh gillnets used on the test net project, the samples are not an unbiased source of spawning escapement age, sex, and size composition. Kotzebue Sound chum salmon escapement carcass samples were collected from the Noatak, Squirrel, Salmon Rivers and from Selby Slough of the Kobuk River drainage. Comparisons of age, sex, and size composition were not substantiated by statistical testing.

Norton Sound

Commercial and Subsistence Harvest

The 1992 Norton Sound commercial harvest totaled 199,933 salmon and was composed of 4,541 chinook, 83,394 chum, 296 sockeye, 6,284 pink, and 105,418 coho salmon (Table 1; Appendix A). Effort and harvest this season tied the lowest on record since documentation in 1977. Low effort was attributed to the combination of an expected below-average chum salmon return and low market prices for all species. Subdistrict 6 accounted for 73.5% of the total salmon harvest in 1992, followed by Subdistrict 5 (21.8%), Subdistrict 3 (1.8%), and Subdistrict 2(1.6%).

The chinook salmon harvest was 29% below the 1987–91 average and composed 2.3% of the district's total salmon harvest. Most fishermen in the Unalakleet (6) and Shaktoolik (5) Subdistricts target on chinook salmon from the opening of the season in the first part of June until mid-June using set gillnets with 8-1/4 in (210 mm) stretched mesh. Initially the chinook salmon return was thought to be late because of the slow movement of sea ice out of the area, but was later concluded to be poor as indicated by subsistence fishermen and the department's test net operations in the Unalakleet River. Consequently, commercial fishing did not begin until July 2 and was restricted to a maximum mesh size of 6 in (152 mm). North of the Shaktoolik Subdistrict, fishermen typically use 5-7/8 in mesh gillnets throughout the fishing season to target on chum salmon and take chinook salmon incidentally. In Norton Sound chum salmon is normally the most important species economically, i.e., has the highest exvessel value. In 1992, however, record coho salmon catches accounted for 52.7% of the harvest and 60.4% of the exvessel value. The coho salmon harvest set a new record and was 133% above the 1987–91 average. Chum salmon composed 41.7% of the district's total harvest, were 3% below the 1987–91 average harvest, and accounted for 29% of the exvessel value for Norton Sound. Pink salmon returns in Norton Sound follow an even-year cycle of high abundance. A 24-h special pink salmon period occurred in Subdistrict 6 at the request of a buyer with a processing facility at St. Paul Island. The harvest was 60% below the 1987–91 average. The pink salmon were tendered to St. Paul and processed through their pollock processing equipment. Sockeye salmon are harvested in small numbers incidentally during the chum fishery: 296 were caught in 1992.

The Norton Sound commercial fishing season typically begins between June 8 and June 20. However, because of lingering ice conditions and a weak chinook salmon return in Norton Sound, Subdistricts 2, 3, 4, 5, and 6 did not open until the first week in July. Weak chinook returns throughout the district prompted mesh size restrictions at the earliest date allowed by regulation.

Commercial openings in Subdistrict 1 were delayed until August 1 because of an expected poor chum return. Subsistence and sport fishing was also curtailed by similar action in Subdistrict 1. Because of expected poor chum salmon returns in the northern subdistricts, restrictions were also set for Subdistricts 2 and 3. The allowable chum salmon harvest for Subdistrict 2 was limited to 10,000 fish. Because of low fishing effort and a lack of a commercial buyer, Subdistrict 2 was opened to typical fishing of two 48-h fishing periods per week. Only one fishermen fished and sold his own catch under a catcher/seller permit. Subdistrict 3 was opened with a single 24-h period to test the market. No fish were harvested because of lack of market. No additional openings were allowed because counting tower assessments on the Kwiniuk River indicated a weak run. Typical fishing schedules were allowed in Subdistricts 4, 5, and 6. One buyer operated in Subdistrict 4 for only three periods because fish had to be tendered 50 mi., and it was not economically feasible to continue purchasing fish.

In Subdistrict 1 strong returns of pink salmon facilitated increased subsistence and sport harvests with the stipulation that all chum salmon would be released and only harvested in gillnets. Because of strong coho salmon returns throughout the district subsistence and sport limitations were lifted. Commercial fishing was increased to the typical two 48-h periods per week in subdistricts having markets. In Subdistricts 2 and 6, commercial fishing was increased beyond the normal fishing schedule.

Although many of the 13,000 residents of the Norton Sound Area are dependent to some extent on the fish and game resources of the area, subsistence salmon catches have not been monitored since 1983 except in the Nome Subdistrict. Prior to 1983 the Department conducted annual household surveys in many of the villages. For the last 5 years in which thorough surveys were conducted, 1978–1982, the average annual subsistence catch in the Norton Sound area was 73,000 salmon for all species combined. Because not all fishermen were contacted, this should be considered a minimum estimate. In the Nome Subdistrict, subsistence permits require that fishermen document their harvest by species. There were 161 subsistence permits issued in 1992 (Figure 2). A total of 98 permit holders fished; they reported a harvest of 7,583 salmon composed of 131 chinook, 1,382 chum, 4,996 pink, 98 sockeye, and 976 coho salmon (Table 2).

Escapement Abundance

Subdistricts 5 and 6 support the largest chinook salmon returns in Norton Sound. Subdistricts 1, 2, 3, and 4 have had increasing returns in recent years. Escapement surveys and subsistence catches indicated below-average numbers of chinook salmon in Subdistricts 5 and 6. The Unalakleet River test fish project also indicated a below-average chinook salmon escapement.

Chum salmon escapements throughout the district were difficult to assess due to excessively large numbers of pink salmon. Tributaries with few pink salmon indicated below average chum escapements. The Kwiniuk River tower count was about 40% below the escapement objective of 19,500 chum salmon. The chum salmon escapement objective was achieved for the Ungalik River in Subdistrict 4, whereas the Inglutalik River was below the objective level. With above average commercial catches in Subdistricts 5 and 6 and a record catch in the Unalakleet River test fish project, chum salmon escapements were assumed to be adequate for the southern subdistricts.

Because of inclement weather during the coho migration, most aerial surveys were conducted under poor conditions. Aerial surveys on some tributaries were not attempted because of unfavorable conditions. Only tributaries in Subdistrict 1 were conducted with fair conditions. Surveys of streams in Subdistrict 1 were above average and fishermen indicated at least fair returns in Subdistricts 2 and 3. Record coho salmon catches in Subdistricts 5 and 6 indicated a strong coho return. Record catches in the Unalakleet River test nets also indicated good escapement.

Pink salmon escapements throughout the district were 2–3 fold greater than even-year averages. Escapement counting projects on the Kwiniuk River set a new pink salmon count record as did test net catches on the Unalakleet River.

Age, Sex, and Length Composition

A small sample of the chinook salmon commercial harvest in Subdistrict 6 was composed of 17.9% age-1.4, 32.1% age-1.3, 46.4% age-1.2, and 3.6% age-2.4 fish. Females and males had equal contributions

(50.0%) to the sample. A sample of 24 chinook salmon from the Unalakleet River test fishery was 70.8% age 1.2 and 20.8% age 1.3, and 41.7% of the total were female. Mean lengths by age group for all samples collected ranged from 582 mm for age-1.2 males from to 868 mm for age-1.4 females, both from the Subdistrict 6 commercial fishery sample (Tables 4, 5).

Subdistrict 6 chum salmon age composition was mostly age 0.4 (84.4%), followed by age 0.3 (11.2%). Females composed 51.0% of the total. A sample of 562 chum salmon from the Unalakleet River test fishery was 84.7% age 0.4 and 10.3% age 0.3, and 40.4% of the sample was female. A small sample (19) from a subsistence catch on the Kwiniuk River was 68.4% age 0.4, 52.6% being female. Mean lengths by age group for all samples collected ranged from 496 mm for age-0.3 females from Kwiniuk River to 612 mm for age-0.5 males from the Unalakleet River test fishery sample (Tables 6, 7, 8).

Subdistrict 6 coho salmon samples were dominated by age-2.1 fish (70.2%) and had a near equal male/female sex ratio. There were 253 coho salmon caught in the Unalakleet River test fishery and the age composition was similar to the Subdistrict 6 catch: 65.6% age-2.1 salmon, followed by age-1.1 (27.7%) and age 3.1 (6.7%). Mean lengths by age group for all samples collected ranged from 571 mm for age-3.1 males from Subdistrict 6 to 597 mm for age-1.1 females in the Unalakleet River test fishery (Tables 9, 10).

Kotzebue Sound

Commercial and Subsistence Harvest

The 1992 commercial harvest in the Kotzebue District totaled 289,184 chum salmon, 204 chinook salmon, and 1,977 Dolly Varden (Table 11). The chum salmon harvest was 6% below the 1979–91 average of 306,574 fish. Gear was limited to setnets having an aggregate of no more than 150 fathoms (274 m) per fisherman. Most fishermen operated with one end on or near shore and with all three shackles connected. Most gear used in the district is 5-7/8 in stretch multi-filament gillnet.

The Kotzebue Sound commercial season began on July 9. Commercial catch trends were driven by extreme weather patterns. One period may occur with strong onshore winds with the period after occurring with offshore winds. This caused catch rates to jump between nearly twice the average to below average catch rates. The first four periods were 24 h in duration with harvest rates near or above the recent 13-year average. With above average catch rates, Periods 5–10 were extended to 36 h in length. Catch rates of periods 5 through 10 were very erratic ranging from a CPUE of 5.5 for Period 6 to a CPUE of 13.0 for Period 9.

Low escapement counts compared to previous years at the Noatak River Sonar prompted management concern. Period 11 was reduced to 24 h to allow additional escapement. High water from continuous rains were expected to keep fish from entering Noatak River and possibly push some fish back into Kotzebue Sound. This would have created a “stockpile” of fish vulnerable to commercial fishing. With sonar counts remaining low and fish susceptible to overharvest, the 12th period was pulled to boost

escapement. After the high water started to recede, counts at the sonar site increased. After re-evaluating escapement indices, it was decided the district would conclude commercial fishing with three 24-h openings.

Door-to-door interviews with subsistence fishermen were conducted in the villages of Noorvik and Shungnak on the Kobuk River and in the village of Noatak on the Noatak River. Partial estimates of chum salmon subsistence harvests totalled 8,370 in Noorvik, 3,890 in Shungnak, and 2,043 in Noatak (Table 12). These do not represent the total subsistence harvest estimates for the Kotzebue Sound area because (1) the harvests were not expanded to estimate for households not interviewed, and (2) Kotzebue and several other communities that harvest chum salmon for subsistence use were not surveyed.

Escapement Abundance

Poor to fair conditions existed during 1992 for aerial escapement surveys in the Kotzebue District. Early surveys conducted on the Lower Kobuk tributaries indicated below-average salmon run strength (Table 13). Under fair conditions, surveys of the Upper Kobuk indicated that escapement objectives were met. Two surveys of the Noatak River under poor conditions enumerated only half of the escapement objective. However, the sonar project operating on the Noatak River indicated that escapement objectives may have been achieved. Considering the poor survey conditions, the sonar escapement of about 75,000 salmon (LaFlamme, personal communication), which was just below the aerial survey escapement objective of 80,000 salmon, is thought to be a better index than the aerial surveys.

Age, Sex, and Length Composition

Sufficient commercial fishery catch samples were collected to stratify the season by fishing period (Appendix D.1). As in previous years, a shift in age composition through the season was noted for 1992, age 0.4 decreasing and age 0.3 increasing as the season progressed. For the first fishing period, 72.7% of the catch was age 0.4 and 17.7% was age 0.3, whereas samples from the last period indicated 21.8% of the catch was age 0.4 and 74.0% was age 0.3. Although age-0.2 and age-0.5 fish typically contribute only a small percentage each year, age-0.2 fish composed less than one-sixth of the typical contribution for the season. The chum salmon commercial harvest for the entire season was composed of 58.5% age 0.3, 37.5% age 0.4, 0.9% age 0.2, and 3.1% age 0.5 (Table 14). Females were estimated to have contributed 60.1% to the harvest.

Spawning ground samples were collected for chum salmon from the Noatak, Squirrel, and Salmon Rivers, and from Selby Slough of the Kobuk River drainage. Age composition ranged from 64.0% to 76.6% for age 0.3 and from 20.6% to 34.0% for age 0.4. Mean lengths by age group for all escapement samples ranged from 510 mm for age-0.2 females from Selby Slough to 641 mm for age-0.4 males from the Noatak River (Table 15).

LITERATURE CITED

- Bigler, B. S., and C. F. Lean. 1986. Age, sex, and size of Norton Sound and Kotzebue Sound salmon catch and escapement, 1984. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 172, Juneau.
- Bromaghin, J. F. 1991. A note on constructing simultaneous confidence intervals about multinomial probabilities. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 3A91-23, Anchorage.
- Buklis, L. S. 1991a. Abundance, age, sex, and size of Norton Sound and Kotzebue Sound salmon catch and escapement, 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fisheries Report 91-02, Juneau.
- Buklis, L. S. 1991b. Abundance, age, sex, and size of Norton Sound and Kotzebue Sound salmon catch and escapement, 1989. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fisheries Report 91-03, Juneau.
- Goodman, L. A. 1965. On simultaneous confidence intervals for multinomial proportions. *Technometrics* 7, 247-254.
- Hamner, H. H. 1987. Abundance, age, sex, and size of Norton Sound and Kotzebue Sound salmon catch and escapement, 1985. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 193, Juneau.
- Hamner, H. H. 1989a. Abundance, age, sex, and size of Norton Sound and Kotzebue Sound salmon catch and escapement, 1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fisheries Report 89-08, Juneau.
- Hamner, H. H. 1989b. Abundance, age, sex, and size of Norton Sound and Kotzebue Sound salmon catch and escapement, 1987. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fisheries Report 89-09, Juneau.
- Lean C. F., B. B. Bigler, and L. K. Brannian. 1984. Age, sex, and size of Norton Sound and Kotzebue Sound salmon catch and escapement, 1983. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 130, Juneau.
- Lean, C. F., F. J. Bue, T. L. Lingnau. 1992. Norton Sound-Port Clarence-Kotzebue Sound Annual Management Report, 1989, 1990, and 1991. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A92-12, Anchorage.

Table 1. Norton Sound commercial salmon effort and catch by subdistrict, 1992.

Subdistrict	Number of Fishermen	Chinook		Sockeye		Coho			Pink		Chum		Total ^a	
		No. Fish	Weight	No. Fish	Weight	No. Fish	Weight	Roe	No. Fish	Weight	No. Fish	Weight	No. Fish	Weight
1	2	1	10	2	15	693	5,156	0	0	0	185	1,313	881	6,494
2	1	6	68	9	71	2,085	16,405	0	0	0	1,002	6,926	3,102	23,470
3	21	0	0	0	0	3,531	20,705	2,641	0	0	6	28	3,537	20,733
4	9	27	389	0	0	0	0	0	0	0	1,787	13,006	1,814	13,395
5	25	1,098	13,707	56	417	14,660	111,863	0	0	0	27,867	198,487	43,681	324,474
6	71	3,409	43,397	229	1,748	84,449	666,277	0	6,284	18,230	52,547	375,585	146,918	1,105,237
District Totals	110 ^b	4,541	57,571	296	2,251	105,418	820,406	2,641	6,284	18,230	83,394	595,345	199,933	1,493,803

^a Total does not include weight of coho roe.

^b Some fishermen fished more than one subdistrict.

Table 2. Norton Sound subsistence salmon catch and effort in the Nome area, 1992.

Location	Permits Issued ^a	Permits Returned	Permits Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
Marine Waters	75	41	31	122	84	486	2,380	1,321	4,393
Nome River	32	17	10	1	0	193	639	28	861
Snake River	6	5	2	1	0	46	35	6	88
Eldorado	11	6	3	0	0	81	0	12	93
Flambeau	4	1	1	1	2	89	0	6	98
Bonanza River	9	8	5	6	0	81	445	1	533
Solomon River	13	13	12	0	0	0	1,320	0	1,320
Safety Sound	3	3	2	0	0	0	176	1	177
Port Clarence ^b	8	4	1	0	12	0	1	7	20
Totals	161	98	67	131	98	976	4,996	1,382	7,583

^a Permits issued by Alaska Department of Fish and Game, Division of Commercial Fisheries, in Nome.

^b Includes the Kuzitrin and Pilgrim Rivers.

Table 3. Norton Sound salmon aerial survey escapement counts by species for 1992 including survey count objectives for chum salmon.

Location or Subdistrict	River / Lake	Chinook	Coho	Sockeye	Pink ^a	Chum	
						Count	Goal
Port Clarence	Salmon L.			1,500			
1	Glacial L.			510			
	Sinuk R.		422		292,400	470	4,500
	Cripple R.		272		13,650		
	Penny R.		53		8,300		
	Snake R.		92		24,700	943	1,000
	Nome R.	3	691	5	255,700	813	2,000
	Flambeau R.					606	3,250
	Eldorado R.		113		6,615	4,887	5,250
	Bonanza R.		1,209		799,000	80	1,500
	Solomon R.		443		37,250	25	550
2	Fish R.	4			1,387,000	390	17,500
	Boston C.	68			50,850	1,540	2,500
	Niukluk R.		812	2	803,200	7,770	8,000
	Ophir C.		224				
3	Kwiniuk R. ^b	524 ^b	532		1,016,222 ^b	11,546 ^b	19,500 ^c
	Tubutulik R.	560			138,600	2,595	12,000
4	Inglutalik R.				27,650	5,739	8,500
	Ungalik R.	76			46,000	5,370	2,500
5	Shaktoolik R.	132	219		310,000	790	11,000
6	North R.	329	398		631,140		
	Old Woman R.		24				2,000

^a Species identification difficult where large numbers of pink salmon were observed.

^b Preliminary expanded tower counts.

^c Chum goal is for tower count.

Table 4. Norton Sound Subdistrict 6 chinook salmon commercial catch sample age and sex composition and mean length, 1992.

		Brood Year and (Age Group)				
		1988 (1.2)	1987 (1.3)	1986 (1.4)	1985 (2.4)	Total
Stratum Dates:		7/02-9/05				
Sampling Dates:		7/07-7/15				
Sample Size:		28				
Female	Percent of Sample	14.3	17.9	14.3	3.6	50.0
	Sample Size	4	5	4	1	14
	Mean Length (mm) ^a	610.0	717.0	867.5	780.0	
	Standard Error	5.4	27.4	17.1	0.0	
Male	Percent of Sample	32.1	14.3	3.6	0.0	50.0
	Sample Size	9	4	1	0	14
	Mean Length (mm) ^a	582.2	726.3	845.0		
	Standard Error	7.9	45.9	0.0	0.0	
Total	Percent of Sample	46.4	32.1	17.9	3.6	100.0
	Sample Size	13	9	5	1	28
	Standard Error	3	3	2	1	

^a Length was from mid-eye to fork-of-tail.

Table 5. Unalakleet River chinook salmon test fish age and sex composition and mean length, 1992.

		Brood Year and (Age Group)			
		1988 (1.2)	1987 (1.3)	1986 (1.4)	Total
Stratum Dates:	6/27 – 8/31				
Sampling Dates:	6/27 – 8/31				
Sample Size:	24				
Female	Percent of Sample	25.0	8.3	8.3	41.7
	Sample Size	6	2	2	10
	Mean Length (mm) ^a	604.2	675.0	797.5	
	Standard Error	14.3	85.0	2.5	
Male	Percent of Sample	45.8	12.5	0.0	58.3
	Sample Size	11	3	0	14
	Mean Length (mm) ^a	603.4	723.3		
	Standard Error	10.5	39.0	0.0	
Total	Percent of Sample	70.8	20.8	8.3	100.0
	Sample Size	17	5	2	24
	Standard Error	2	2	1	

^a Length was from mid-eye to fork-of-tail.

Table 6. Norton Sound Subdistrict 6 chum salmon commercial catch age and sex composition, and mean length, 1992.

		Brood Year and Age Group				
		1989	1988	1987	1986	Total
		(0.2)	(0.3)	(0.4)	(0.5)	
Stratum Dates:	7/02-9/05					
Sampling Dates:	7/03-7/28					
Sample Size:	429					
Female	Percent of Sample	0.2	4.4	45.0	1.4	51.0
	Number in Catch	122	2,327	23,640	735	26,825
	Mean Length (mm) ^a	610.0	563.9	576.4	583.3	
	Standard Error	0.0	5.1	2.2	9.1	
Male	Percent of Sample	0.2	6.8	39.4	2.6	49.0
	Number in Catch	122	3,552	20,700	1,347	25,722
	Mean Length (mm) ^a	560.0	573.8	601.5	613.2	
	Standard Error	0.0	4.4	2.3	10.1	
Total	Percent of Sample	0.5	11.2	84.4	4.0	100.0
	Number in Catch	245	5,879	44,340	2,082	52,547
	Standard Error	173	801	922	495	

^a Length was from mid-eye to fork-of-tail.

Table 7. Unalakleet River chum salmon test fish catch age and sex composition, and mean length, 1992.

		Brood Year and (Age Group)			
		1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates:		6/23–9/08			
Sampling Dates:		6/23–9/08			
Sample Size:		562			
Female	Percent of Sample	2.8	36.1	1.4	40.4
	Sample Size	16	203	8	227
	Mean Length (mm) ^a	577.6	591.6	593.1	
	Standard Error	4.8	1.7	8.7	
Male	Percent of Sample	7.5	48.6	3.6	59.6
	Sample Size	42	273	20	335
	Mean Length (mm) ^a	593.0	606.2	612.0	
	Standard Error	6.2	1.6	10.4	
Total	Percent of Sample	10.3	84.7	5.0	100.0
	Sample Size	58	476	28	562
	Standard Error	7	9	5	

^a Length was from mid–eye to fork–of–tail.

Table 8. Kwiniuk River chum salmon subsistence beach seine catch age and sex composition, and mean length, 1992.

		Brood Year and (Age Group)		
		1988 (0.3)	1987 (0.4)	Total
Stratum Dates:				
Sampling Dates:		7/15-7/25		
Sample Size:		19		
Female	Percent of Sample	10.5	42.1	52.6
	Sample Size	2	8	10
	Mean Length (mm) ^a	495.5	545.6	
	Standard Error	15.5	11.6	
Male	Percent of Sample	21.1	26.3	47.4
	Sample Size	4	5	9
	Mean Length (mm) ^a	550.3	579.6	
	Standard Error	11.1	19.8	
Total	Percent of Sample	31.6	68.4	100.0
	Sample Size	6	13	19
	Standard Error	2	2	

^a Length was from mid-eye to fork-of-tail.

Table 9. Norton Sound Subdistrict 6 coho salmon commercial catch sample age and sex composition, and mean length, 1992.

		Brood Year and (Age Group)			
		1989 (1.1)	1988 (2.1)	1987 (3.1)	Total
Stratum Dates:	7/02–9/05				
Sampling Dates:	7/28–8/11				
Sample Size:	181				
Female	Percent of Sample	6.6	36.5	6.1	49.2
	Number in Catch	5,599	30,794	5,132	41,525
	Mean Length (mm) ^a	577.9	581.3	572.7	
	Standard Error	6.6	3.2	6.3	
Male	Percent of Sample	12.7	33.7	4.4	50.8
	Number in Catch	10,731	28,461	3,733	42,924
	Mean Length (mm) ^a	570.7	577.1	590.0	
	Standard Error	10.3	4.6	11.2	
Total	Percent of Sample	19.3	70.2	10.5	100.0
	Number in Catch	16,330	59,254	8,865	84,449
	Standard Error	2,486	2,880	1,929	

^a Length was from mid-eye to fork-of-tail.

Table 10. Unalakleet River coho salmon test fish catch age and sex composition, and mean length, 1992.

		Brood Year and (Age Group)			
		1989 (1.1)	1988 (2.1)	1987 (3.1)	Total
Stratum Dates:		7/20–9/08			
Sampling Dates:		7/20–9/08			
Sample Size:		253			
Female	Percent of Sample	10.7	28.9	3.6	43.1
	Sample Size	27	73	9	109
	Mean Length (mm) ^a	597.2	589.4	580.0	
	Standard Error	4.6	3.2	8.0	
Male	Percent of Sample	17.0	36.8	3.2	56.9
	Sample Size	43	93	8	144
	Mean Length (mm) ^a	594.8	585.6	595.6	
	Standard Error	5.4	4.1	12.7	
Total	Percent of Sample	27.7	65.6	6.7	100.0
	Sample Size	70	166	17	253
	Standard Error	7	8	4	

^a Length was from mid-eye to fork-of-tail.

Table 11. Kotzebue District commercial catch, weight, and average weight of chum salmon, chinook salmon, and Dolly Varden by period, 1992.

Period	Dates	Hours	Number of Fishermen	Chum			Chinook			Dolly Varden		
				Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.
1	7/09-7/10	24	38	5,605	48,607	8.7	14	174	12.4			
2	7/13-7/14	24	51	3,979	34,643	8.7	11	180	16.4			
3	7/16-7/17	24	85	5,857	52,142	8.9	21	294	14.0			
4	7/20-7/21	24	100	20,566	183,638	8.9	23	391	17.0			
5	7/23-7/24	36	111	27,342	236,979	8.7	27	370	13.7			
6	7/27-7/28	36	91	18,048	156,394	8.7	10	113	11.3			
7	7/30-7/31	36	114	53,356	464,804	8.7	20	320	16.0			
8	8/03-8/04	36	97	22,437	185,247	8.3	19	227	11.9			
9	8/06-8/07	36	108	50,664	410,090	8.1	25	241	9.6			
10	8/10-8/11	36	107	35,645	284,107	8.0	13	131	10.1	149	887	6.0
11	8/13-8/14	24	93	17,640	133,364	7.6	11	136	12.4	335	2,173	6.5
12	<i>Closed Period</i>											
13	8/21-8/22	24	75	15,160	112,778	7.4	1	9	9.0	891	4,842	5.4
14	8/24-8/25	24	75	9,672	71,029	7.3	6	80	13.3	530	3,564	6.7
15	8/27-8/28	24	54	3,213	23,480	7.3	3	48	16.0	72	485	6.7
Totals	7/09-8/28	408	149	289,184	2,397,302	8.3	204	2,714	13.3	1,977	11,951	6.0

Table 12. Partial estimates of subsistence harvest of chum salmon, Dolly Varden, whitefish, sheefish, and Northern Pike in the Kotzebue Area villages of Noatak, Noorvik, and Shungnak, 1992.

Village	Number of Households Interviewed That Fished	Total Household Members	Average Members per Household	Number of Fish				
				Chum Salmon	Dolly Varden	Whitefish	Sheefish	Northern Pike
Noatak	23	133	6	2,043	4,395	1,175	0	
Noorvik	27	148	5	8,370	250	12,160	1,966	1,710
Shungnak	16	86	5	3,890	0	4,150	855	
Total ^a	66	367	6	14,303	4,645	17,485	2,821	1,710

^a Subsistence catch estimates represent only households interviewed that fished.

Table 13. Kotzebue District chum salmon aerial survey escapement estimates for primary index streams, 1981–1992. Indices listed in this table are the peak survey observed for each tributary during the given year.

Stream	Aerial Escapement Goal	1981 ^a	1982 ^a	1983	1984	1985 ^a	1986 ^a	1987 ^a	1988 ^a	1989 ^b	1990 ^a	1991	1992 ^a
Kobuk Drainage	30,500	24,325	25,557	44,135	18,697	14,061	17,225	14,457	26,073		29,045	35,840	16,207
Squirrel R.	11,500	9,854	7,690	6,075	5,473	6,145	4,982	2,708	4,848		5,500	4,606	2,765
Salmon R.	7,000	4,709	1,871	1,677	1,471	2,816	1,971	3,333	6,208		6,335	5,845	1,345
Tutuksuk R.	2,000	1,114	1,322	2,637	1,132	5,100	4,257	206	3,122		2,275	744	1,162
Upper Kobuk	10,000	8,648	14,674	33,746	10,621		6,015	8,210	11,895		14,935	24,645	10,935
Noatak Drainage	80,000	120,283	32,286	21,268	17,764	43,526	41,585	9,295	56,029		26,670	84,104	36,771
Noatak R.	80,000	106,513	20,682			43,526	37,277	5,565	45,930		23,345	80,550	34,335
Eli R.					5,027		4,308	2,780	8,639		3,000	2,900	1,710
Kelly R. & Lake		13,770	11,604	12,137				950	1,460		325	654	726
Inmachhuk R.				9,131	12,737								

^a Poor or incomplete survey.

^b No survey due to poor weather conditions.

Table 14. Kotzebue District chum salmon commercial catch age and sex composition, and mean length, 1992.

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates:	7/10–8/28					
Sampling Dates:	7/11–8/28					
Sample Size:	3,686					
Female	Percent of Sample	0.5	35.4	22.5	1.7	60.1
	Number in Catch	1,491	102,383	65,039	4,864	173,856
	Mean Length (mm) ^a	563.4	586.8	611.3	622.9	
	Standard Error	5.6	0.7	1.0	4.1	
Male	Percent of Sample	0.4	23.2	15.0	1.4	39.9
	Number in Catch	1,020	66,843	43,307	4,001	115,328
	Mean Length (mm) ^a	579.6	611.3	640.9	664.2	
	Standard Error	10.4	1.0	1.5	4.5	
Total	Percent of Sample	0.9	58.5	37.5	3.1	100.0
	Number in Catch	2,511	169,227	108,346	8,865	289,184
	Standard Error	442	2,347	2,306	821	

^a Length was from mid-eye to fork-of-tail.

Table 15. Kotzebue District chum salmon tributary escapement age and sex composition, and mean length, 1992.

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Noatak River ^{a,b}						
Sampling Date:		9/24				
Sample Size:		150				
Female	Percent of Sample		31.3	12.0	1.3	44.7
	Number in Sample		47	18	2	67
	Mean Length (mm) ^c		552.0	588.1	552.5	
	Standard Error		4.5	5.5	7.5	
Male	Percent of Sample		32.7	22.0	0.7	55.3
	Number in Sample		49	33	1	83
	Mean Length (mm) ^c		602.6	641.4	625.0	
	Standard Error		6.3	6.5	0.0	
Total	Percent of Sample		64.0	34.0	2.0	100.0
	Number in Sample		96	51	3	150
	Standard Error		6	6	2	
Squirrel River ^{a,b}						
Sampling Dates:		9/01 – 9/04				
Sample Size:		157				
Female	Percent of Sample	0.6	37.3	16.3	0.0	54.1
	Number in Sample	1	58	26	0	85
	Mean Length (mm) ^c	575.0	541.7	560.0		
	Standard Error	0.0	3.2	7.3		
Male	Percent of Sample	0.6	29.6	15.0	0.6	45.8
	Number in Sample	1	46	24	1	72
	Mean Length (mm) ^c	585.0	593.8	623.3		
	Standard Error	0.0	5.3	7.4		
Total	Percent of Sample	1.3	66.8	31.3	0.6	100.0
	Number in Sample	2	105	49	1	157
	Standard Error	1	6	6	1	

(continued)

Table 15. (Page 2 of 2)

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Salmon River ^{a,b}						
Sampling Dates:		9/05–9/07				
Sample Size:		277				
Female	Percent of Sample	62.1	12.3	1.1	75.5	
	Number in Sample	172	34	3	209	
	Mean Length (mm) ^c	547.2	565.3	598.3		
	Standard Error	2.3	4.5	12.0		
Male	Percent of Sample	16.2	8.3	0.0	24.5	
	Number in Sample	45	23	0	68	
	Mean Length (mm) ^c	598.6	606.0	0.0		
	Standard Error	5.2	9.2	0.0		
Total	Percent of Sample	78.3	20.6	1.1	100.0	
	Number in Sample	217	57	3	277	
	Standard Error	7	7	2		
Upper Kobuk ^{a,b} (Selby Slough)						
Sampling Dates:		9/21–9/22				
Sample Size:		273				
Female	Percent of Sample	0.7	41.4	17.2	59.3	
	Number in Sample	2	113	47	162	
	Mean Length (mm) ^c	509.5	562.3	568.4		
	Standard Error	5.5	2.7	4.6		
Male	Percent of Sample	0.4	35.2	5.1	40.7	
	Number in Sample	1	96	14	111	
	Mean Length (mm) ^c	550.0	597.2	596.4		
	Standard Error	0.0	3.8	11.9		
Total	Percent of Sample	1.1	76.6	22.3	100.0	
	Number in Sample	3	209	61	273	
	Standard Error	2	7	7		

^a Escapements are based on peak aerial survey counts.

^b Age and sex composition, and length data was based on carcass samples.

^c Length was from mid-eye to fork-of-tail.

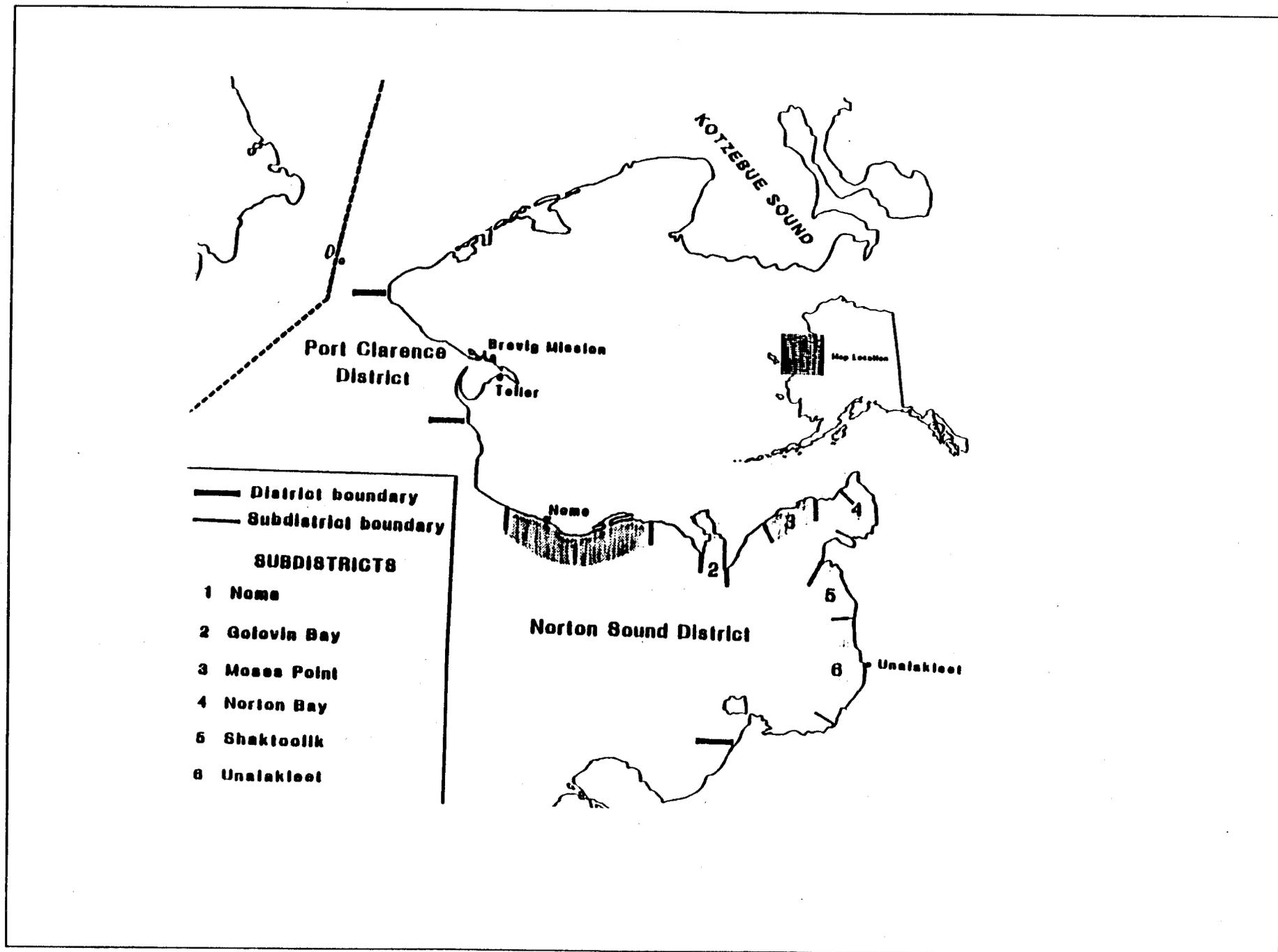


Figure 1. Norton Sound commercial salmon fishing subdistricts.

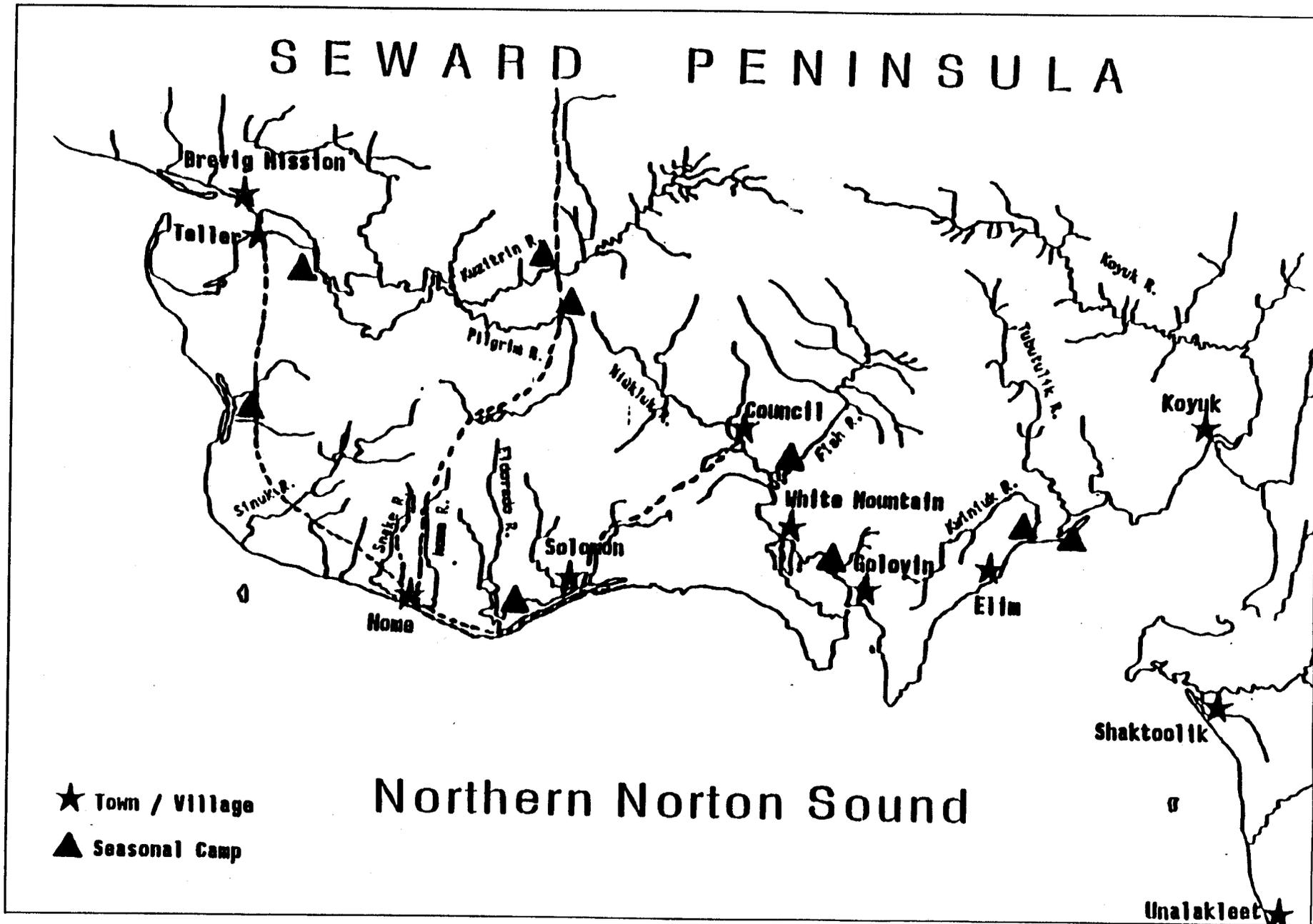


Figure 2. Northern Norton Sound subsistence fishing sites.

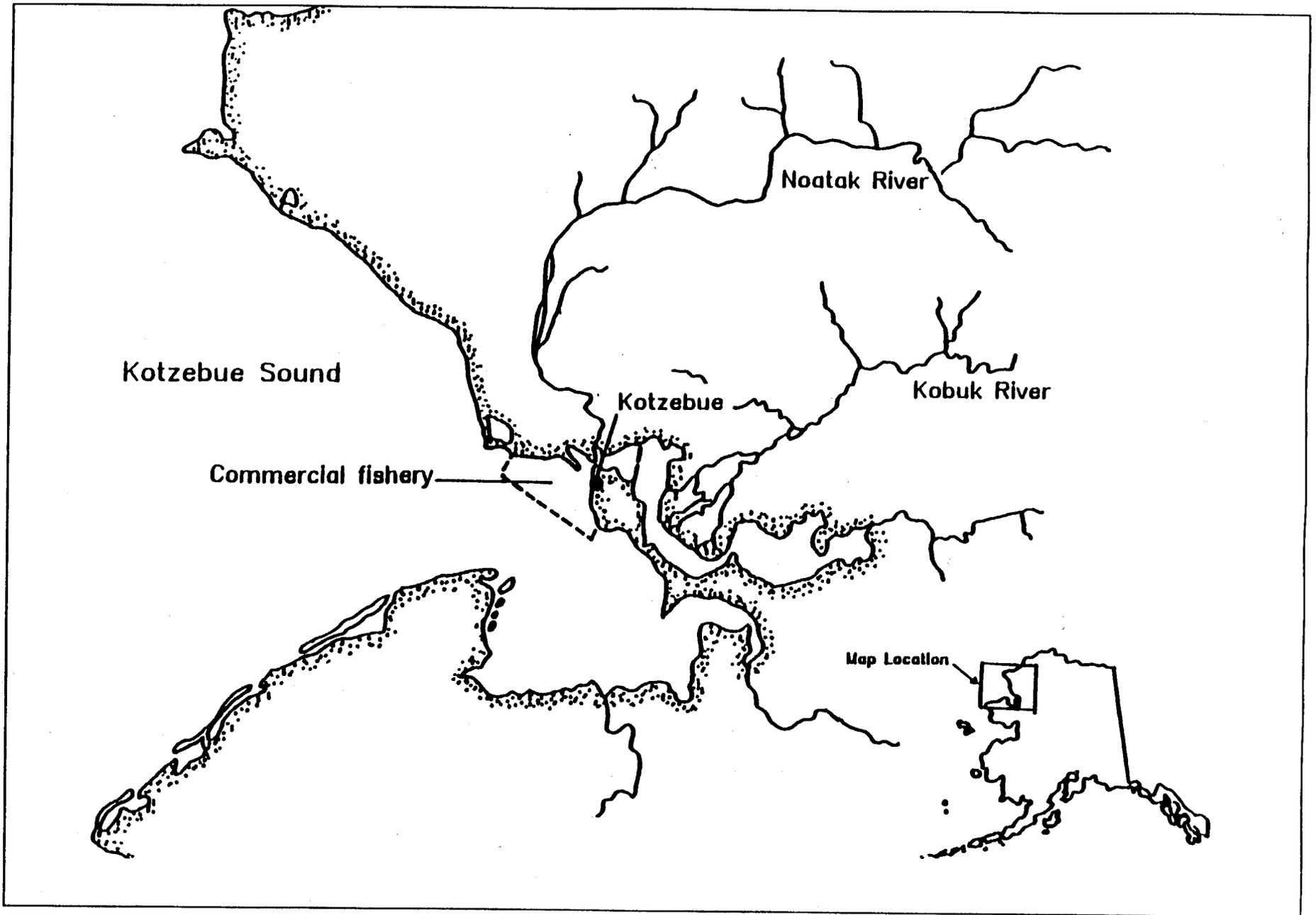


Figure 3. Kotzebue Sound commercial fishing district and major chum salmon spawning streams.

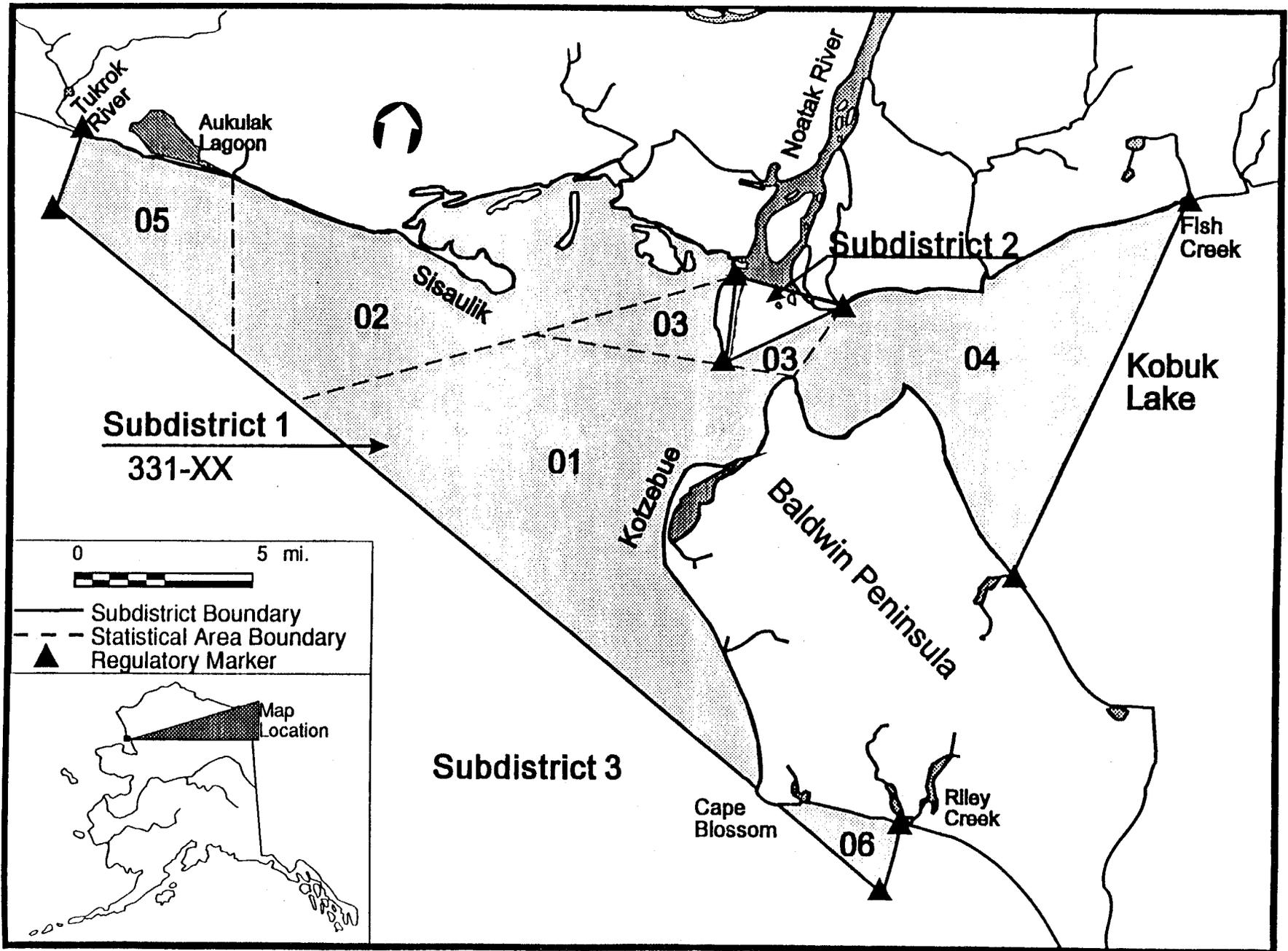


Figure 4. Kotzebue Sound commercial salmon fishing subdistricts and statistical areas.

APPENDIX

Appendix Table A.1. Norton Sound Subdistrict 1 commercial salmon catch and effort by period, 1992.

Period Number	Period Dates	Hours Fished	Number of Fishermen ^a	Number of Salmon			
				Chinook	Sockeye	Chum	Coho
1	8/03-8/04	24	0				
2	8/06-8/07	24	1	1	0	22	91
3	8/10-8/11	24	0				
4	8/13-8/15	48	2	0	0	59	409
5	8/17-8/19	48	1	0	0	10	35
6	8/20-8/22	48	0				
7	8/24-8/26	48	2	0	2	79	124
8	8/27-8/29	48	0				
9	8/31-9/02	48	1	0	0	15	34
10	9/03-9/05	48	0				
Season Total		408	2	1	2	185	693

^a All salmon were sold as permitted under Catcher/Seller status.

Appendix Table A.2. Norton Sound Subdistrict 2 commercial salmon catch and effort by period, 1992.

Period Number	Period Dates	Hours Fished	Number of Fishermen ^a	Number of Salmon			
				Chinook	Sockeye	Chum	Coho
1	7/03-7/04	24	0				
2	7/06-7/08	48	0				
3	7/09-7/11	48	0				
4	7/13-7/15	48	1	1	1	221	
5	7/16-7/18	48	1	0	0	262	
6	7/20-7/22	48	1	1	3	97	6
7	7/23-7/25	48	1	1	1	72	9
8	7/27-7/29	48	1	0	0	53	15
9	7/30-8/01	48	1	1	0	35	168
10	8/03-8/05	48	1	0	1	76	212
11	8/06-8/08	48	1	2	3	87	347
12	8/10-8/12	48	1	0	0	26	305
13	8/13-8/17	96	1	0	0	18	284
14	8/17-8/20	96	1	0	0	26	510
15	8/20-8/24	96	1	0	0	27	152
16	8/24-8/27	96	1	0	0	2	77
17	8/27-8/31	96	0				
Season Total		1,032	1	6	9	1,002	2,085

^a All salmon sold as permitted under Catcher/Seller status.

Appendix Table A.3. Norton Sound Subdistrict 3 commercial salmon catch and effort by period, 1992.

Period Number	Period Dates	Hours Fished	Number of Fishermen	Number of Salmon			
				Chinook	Sockeye	Chum	Coho ^a
1	7/03-7/04	24	<i>No Buyer</i>				
2	8/21-8/22	34	11	0	0	0	934
3	8/24-8/26	48	13	0	0	6	1,145
4	8/28-8/29	34	13	0	0	0	709
5	9/02-9/03	33	9	0	0	0	743
Season Total		173	21	0	0	6	3,531

^a Fishermen sold 2,641 pounds of coho roe which were recovered from the same fish reported in the catch.

Appendix Table A.4. Norton Sound Subdistrict 4 commercial salmon catch and effort by period, 1992.

Period Number	Period Dates	Hours Fished	Number of Fishermen	Number of Salmon			
				Chinook	Sockeye	Chum	Coho
1	7/02-7/04	48	<i>No Buyer</i>				
2	7/06-7/07	24	2	3	0	257	0
3	7/08-7/09	24	9	14	0	1,027	0
4	7/10-7/11	24	8	10	0	503	0
5	7/13-7/14	24	<i>No Buyer</i>				
6	7/15-7/16	24	<i>No Buyer</i>				
7	7/17-7/18	24	<i>No Buyer</i>				
8	7/20-7/21	24	<i>No Buyer</i>				
9	7/22-7/23	24	<i>No Buyer</i>				
10	7/24-7/25	24	<i>No Buyer</i>				
11	7/27-7/28	24	<i>No Buyer</i>				
12	7/29-7/30	24	<i>No Buyer</i>				
13	7/31-8/01	24	<i>No Buyer</i>				
14	8/03-8/04	24	<i>No Buyer</i>				
15	8/05-8/06	24	<i>No Buyer</i>				
16	8/07-8/08	24	<i>No Buyer</i>				
17	8/10-8/11	24	<i>No Buyer</i>				
18	8/12-8/13	24	<i>No Buyer</i>				
19	8/14-8/15	24	<i>No Buyer</i>				
20	8/17-8/18	24	<i>No Buyer</i>				
21	8/19-8/20	24	<i>No Buyer</i>				
22	8/21-8/22	24	<i>No Buyer</i>				
23	8/24-8/25	24	<i>No Buyer</i>				
24	8/26-8/27	24	<i>No Buyer</i>				
25	8/28-8/29	24	<i>No Buyer</i>				
26	8/31-9/01	24	<i>No Buyer</i>				
27	9/02-9/03	24	<i>No Buyer</i>				
28	9/04-9/05	24	<i>No Buyer</i>				
Season Total		480	9	27	0	1,787	0

Appendix Table A.5. Norton Sound Subdistrict 5 commercial salmon catch and effort by period, 1992.

Period Number	Period Dates	Hours Fished	Number of Fishermen	Number of Salmon			
				Chinook	Sockeye	Chum	Coho
1	7/02-7/04	48	14	188		3,349	
2	7/06-7/08	48	17	314		5,671	
3	7/09-7/11	48	20	152		5,314	
4	7/13-7/15	48	16	243	2	3,976	33
5	7/16-7/18	48	18	72	0	1,894	97
6	7/20-7/22	48	23	48	1	2,689	302
7	7/23-7/25	48	21	36	2	1,712	525
8	7/27-7/29	48	17	20	7	1,130	1,030
9	7/30-8/01	48	17	13	16	994	1,380
10	8/03-8/05	48	<i>Did Not Fish</i>				
11	8/06-8/08	48	19	6	23	701	5,547
12	8/10-8/12	48	11	0	4	157	1,817
13	8/13-8/15	48	11	2	0	80	2,093
14	8/17-8/19	48	10	4	1	200	1,836
15	8/20-8/22	48	<i>No Buyer</i>				
16	8/24-8/26	48	<i>No Buyer</i>				
17	8/27-8/29	48	<i>No Buyer</i>				
18	8/31-9/02	48	<i>No Buyer</i>				
19	9/03-9/05	48	<i>No Buyer</i>				
Season Total		912	25	1,098	56	27,867	14,660

Appendix Table A.6. Norton Sound Subdistrict 6 commercial salmon catch and effort by period, 1992.

Period Number	Period Dates	Hours Fished	Number of Fishermen	Number of Salmon			
				Chinook	Sockeye	Chum	Coho
1	7/02-7/04	48	40	819	16	12,416	
2	7/06-7/08	48	44	1,416	10	16,407	1
3	7/09-7/11	48	44	550	19	8,293	6
4	7/13-7/15	48	24	219	5	2,059	40
5	7/16-7/18	48	20	80	2	932	101
6 ^a	7/20-7/22	48	35	81	14	2,240	1,138
7	7/23-7/25	48	32	65	8	1,424	1,734
8	7/27-7/29	48	39	44	19	1,636	4,230
9	7/30-8/01	48	47	44	18	2,014	11,489
10	8/03-8/05	48	47	22	13	1,430	6,625
11	8/06-8/08	48	37	11	19	952	6,072
12	8/10-8/12	48	39	11	24	905	11,906
13	8/13-8/15	48	45	5	5	628	11,168
14	8/17-8/19	48	45	4	5	354	7,842
15	8/20-8/22	48	53	13	14	406	8,399
16	8/24-8/26	48	44	21	27	355	9,034
17	8/26-8/28	48	42	4	11	96	4,535
18 ^b	8/28-8/31	112	1	0	0	0	129
19 ^b	8/31-9/05		<i>No Buyer</i>				
Season Total		928	71	3,409	229	52,547	84,449

^a Nine fishermen sold 6,284 pink salmon during a special pink period.

^b Salmon buyer did not operate during periods 18 and 19. Fish sold as permitted under Catcher/Seller status during period 18.

Appendix Table B.1. Norton Sound Subdistrict 6 chum salmon commercial catch sample age and sex composition by time period, 1992.

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates: 7/02-7/04		Period 1				
Sampling Dates: 7/03						
Sample Size: 49						
Female	Percent of Sample	0.0	2.0	36.7	0.0	38.8
	Sample Size	0	1	18	0	19
Male	Percent of Sample	0.0	2.0	57.1	2.0	61.2
	Sample Size	0	1	28	1	30
Total	Percent of Sample	0.0	4.1	93.9	2.0	100.0
	Sample Size	0	2	46	1	49
	Standard Error	0	1	2	1	
Stratum Dates: 7/06-7/11		Periods 2, 3				
Sampling Dates: 7/10						
Sample Size: 100						
Female	Percent of Sample	0.0	5.0	46.0	2.0	53.0
	Sample Size	0	5	46	2	53
Male	Percent of Sample	1.0	6.0	37.0	3.0	47.0
	Sample Size	1	6	37	3	47
Total	Percent of Sample	1.0	11.0	83.0	5.0	100.0
	Sample Size	1	11	83	5	100
	Standard Error	1	3	4	2	
Stratum Dates: 7/13-7/18		Periods 4,5				
Sampling Dates: 7/17						
Sample Size: 117						
Female	Percent of Sample	0.0	7.7	42.7	1.7	52.1
	Sample Size	0	9	50	2	61
Male	Percent of Sample	0.0	7.7	37.6	2.6	47.9
	Sample Size	0	9	44	3	56
Total	Percent of Sample	0.0	15.4	80.3	4.3	100.0
	Sample Size	0	18	94	5	117
	Standard Error	0	4	4	2	

(continued)

Appendix Table B.1. (Page 2 of 2)

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates:		7/20-7/25		Periods 6,7		
Sampling Dates:		7/24				
Sample Size:		125				
Female	Percent of Sample	0.8	2.4	47.2	1.6	52.0
	Sample Size	1	3	59	2	65
Male	Percent of Sample	0.0	8.0	37.6	2.4	48.0
	Sample Size	0	10	47	3	60
Total	Percent of Sample	0.8	10.4	84.8	4.0	100.0
	Sample Size	1	13	106	5	125
	Standard Error	1	3	4	2	
Stratum Dates:		7/25-9/05		Periods 8-19		
Sampling Dates:		7/28				
Sample Size:		38				
Female	Percent of Sample	0.0	2.6	52.6	0.0	55.3
	Sample Size	0	1	20	0	21
Male	Percent of Sample	0.0	7.9	34.2	2.6	44.7
	Sample Size	0	3	13	1	17
Total	Percent of Sample	0.0	10.5	86.8	2.6	100.0
	Sample Size	0	4	33	1	38
	Standard Error	0	2	2	1	
Stratum Dates:		7/02-9/05		Season Total		
Sampling Dates:		7/03-7/28				
Sample Size:		429				
Female	Percent of Sample	0.2	4.4	45.0	1.4	51.0
	Sample Size	1	19	193	6	219
Male	Percent of Sample	0.2	6.8	39.4	2.6	49.0
	Sample Size	1	29	169	11	210
Total	Percent of Sample	0.5	11.2	84.4	4.0	100.0
	Sample Size	2	48	362	17	429
	Standard Error	1	7	8	4	

Appendix Table B.2. Unalakleet River chum salmon test gillnet catch age and sex composition by time period, 1992.

		Brood Year and (Age Group)			
		1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates:		6/21-6/27			
Sampling Dates:		6/21-6/27			
Sample Size:		56			
Female	Percent of Sample	1.8	41.1	3.6	46.4
	Sample Size	1	23	2	26
Male	Percent of Sample	0.0	50.0	3.6	53.6
	Sample Size	0	28	2	30
Total	Percent of Sample	1.8	91.1	7.1	100.0
	Sample Size	1	51	4	56
	Standard Error	1	2	2	
Stratum Dates:		6/28-7/04			
Sampling Dates:		6/28-7/04			
Sample Size:		149			
Female	Percent of Sample	2.7	34.9	0.7	38.3
	Sample Size	4	52	1	57
Male	Percent of Sample	5.4	48.3	8.1	61.7
	Sample Size	8	72	12	92
Total	Percent of Sample	8.1	83.2	8.7	100.0
	Sample Size	12	124	13	149
	Standard Error	3	5	3	
Stratum Dates:		7/05-7/11			
Sampling Dates:		7/05-7/11			
Sample Size:		148			
Female	Percent of Sample	1.4	38.5	1.4	41.2
	Sample Size	2	57	2	61
Male	Percent of Sample	4.1	54.7	0.0	58.8
	Sample Size	6	81	0	87
Total	Percent of Sample	5.4	93.2	1.4	100.0
	Sample Size	8	138	2	148
	Standard Error	3	3	1	

(continued)

Appendix Table B.2. (Page 2 of 4)

		Brood Year and (Age Group)			
		1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates:		7/12-7/18			
Sampling Dates:		7/12-7/18			
Sample Size:		79			
Female	Percent of Sample	2.5	27.8	1.3	31.6
	Sample Size	2	22	1	25
Male	Percent of Sample	10.1	54.4	3.8	68.4
	Sample Size	8	43	3	54
Total	Percent of Sample	12.7	82.3	5.1	100.0
	Sample Size	10	65	4	79
	Standard Error	3	3	2	
Stratum Dates:		7/19-7/25			
Sampling Dates:		7/19-7/25			
Sample Size:		28			
Female	Percent of Sample	7.1	25.0	3.6	35.7
	Sample Size	2	7	1	10
Male	Percent of Sample	10.7	53.6	0.0	64.3
	Sample Size	3	15	0	18
Total	Percent of Sample	17.9	78.6	3.6	100.0
	Sample Size	5	22	1	28
	Standard Error	2	2	1	
Stratum Dates:		7/26-8/01			
Sampling Dates:		7/26-8/01			
Sample Size:		28			
Female	Percent of Sample	0.0	25.0	0.0	25.0
	Sample Size	0	7	0	7
Male	Percent of Sample	14.3	60.7	0.0	75.0
	Sample Size	4	17	0	21
Total	Percent of Sample	14.3	85.7	0.0	100.0
	Sample Size	4	24	0	28
	Standard Error	2	2	0	

(continued)

Appendix Table B.2. (Page 3 of 4)

		Brood Year and (Age Group)			
		1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates:		8/02-8/08			
Sampling Dates:		8/02-8/08			
Sample Size:		29			
Female	Percent of Sample	3.4	44.8	0.0	44.8
	Sample Size	1	13	0	14
Male	Percent of Sample	17.2	27.6	6.9	34.5
	Sample Size	5	8	2	15
Total	Percent of Sample	20.7	72.4	6.9	79.3
	Sample Size	6	21	2	29
	Standard Error	2	2	1	
Stratum Dates:		8/09-8/15			
Sampling Dates:		8/09-8/15			
Sample Size:		20			
Female	Percent of Sample	0.0	50.0	0.0	50.0
	Sample Size	0	10	0	10
Male	Percent of Sample	20.0	25.0	5.0	30.0
	Sample Size	4	5	1	10
Total	Percent of Sample	20.0	75.0	5.0	80.0
	Sample Size	4	15	1	20
	Standard Error	2	2	1	
Stratum Dates:		8/16-8/22			
Sampling Dates:		8/16-8/22			
Sample Size:		19			
Female	Percent of Sample	10.5	47.4	5.3	52.6
	Sample Size	2	9	1	12
Male	Percent of Sample	15.8	21.1	0.0	21.1
	Sample Size	3	4	0	7
Total	Percent of Sample	26.3	68.4	5.3	73.7
	Sample Size	5	13	1	19
	Standard Error	2	2	1	

(continued)

Appendix Table B.2. (Page 4 of 4)

		Brood Year and (Age Group)			
		1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates:		8/23-9/08			
Sampling Dates:		8/23-9/08			
Sample Size:		6			
Female	Percent of Sample	33.3	50.0	0.0	50.0
	Sample Size	2	3	0	5
Male	Percent of Sample	16.7	0.0	0.0	0.0
	Sample Size	1	0	0	1
Total	Percent of Sample	50.0	50.0	0.0	50.0
	Sample Size	3	3	0	6
	Standard Error	1	1	0	
Stratum Dates:		6/23-9/08			
Sampling Dates:		6/23-9/08			
Sample Size:		562			
Female	Percent of Sample	2.8	36.1	1.4	40.4
	Sample Size	16	203	8	227
Male	Percent of Sample	7.5	48.6	3.6	59.6
	Sample Size	42	273	20	335
Total	Percent of Sample	10.3	84.7	5.0	100.0
	Sample Size	58	476	28	562
	Standard Error	7	9	5	

Appendix Table B.3. Norton Sound Subdistrict 6 coho salmon commercial catch sample age and sex composition by time period, 1992.

		Brood Year and (Age Group)			
		1989 (1.1)	1988 (2.1)	1987 (3.1)	Total
Stratum Dates: 7/02–8/01		Periods 1–8			
Sampling Dates: 7/31					
Sample Size: 112					
Female	Percent of Sample	7.1	35.7	6.3	49.1
	Sample Size	8	40	7	55
Male	Percent of Sample	12.5	34.8	3.6	50.9
	Sample Size	14	39	4	57
Total	Percent of Sample	19.6	70.5	9.8	100.0
	Sample Size	22	79	11	112
	Standard Error	4	5	3	
Stratum Dates: 8/03–8/08		Periods 10,11			
Sampling Dates: 8/11					
Sample Size: 37					
Female	Percent of Sample	5.4	29.7	2.7	37.8
	Sample Size	2	11	1	14
Male	Percent of Sample	10.8	43.2	8.1	62.2
	Sample Size	4	16	3	23
Total	Percent of Sample	16.2	73.0	10.8	100.0
	Sample Size	6	27	4	37
	Standard Error	2	3	2	
Stratum Dates: 8/10–9/05		Periods 12–19			
Sampling Dates: 8/11					
Sample Size: 32					
Female	Percent of Sample	6.3	46.9	9.4	62.5
	Sample Size	2	15	3	20
Male	Percent of Sample	15.6	18.8	3.1	37.5
	Sample Size	5	6	1	12
Total	Percent of Sample	21.9	65.6	12.5	100.0
	Sample Size	7	21	4	32
	Standard Error	2	3	2	

(continued)

Appendix Table B.3. (Page 2 of 2)

		Brood Year and (Age Group)			
		1989 (1.1)	1988 (2.1)	1987 (3.1)	Total
Stratum Dates:	7/02–9/05	Season Total			
Sampling Dates:	7/28–8/11				
Sample Size:	181				
Female	Percent of Sample	6.6	36.5	6.1	49.2
	Sample Size	12	66	11	89
Male	Percent of Sample	12.7	33.7	4.4	50.8
	Sample Size	23	61	8	92
Total	Percent of Sample	19.3	70.2	10.5	100.0
	Sample Size	35	127	19	181
	Standard Error	5	6	4	

Appendix Table B.4. Unalakleet River coho salmon test gillnet catch age and sex composition by time period, 1992.

		Brood Year and (Age Group)			
		1989 (1.1)	1988 (2.1)	1987 (3.1)	Total
Stratum Dates:		7/20-7/26			
Sampling Dates:		7/20-7/26			
Sample Size:		4			
Female	Percent of Sample	0.0	25.0	0.0	25.0
	Sample Size	0	1	0	1
Male	Percent of Sample	25.0	50.0	0.0	75.0
	Sample Size	1	2	0	3
Total	Percent of Sample	25.0	75.0	0.0	100.0
	Sample Size	1	3	0	4
	Standard Error	1	1	0	
Stratum Dates:		7/27-8/01			
Sampling Dates:		7/27-8/01			
Sample Size:		11			
Female	Percent of Sample	0.0	36.4	0.0	36.4
	Sample Size	0	4	0	4
Male	Percent of Sample	9.1	45.5	9.1	63.6
	Sample Size	1	5	1	7
Total	Percent of Sample	9.1	81.8	9.1	100.0
	Sample Size	1	9	1	11
	Standard Error	1	1	1	
Stratum Dates:		8/02-8/08			
Sampling Dates:		8/02-8/08			
Sample Size:		26			
Female	Percent of Sample	0.0	23.1	0.0	23.1
	Sample Size	0	6	0	6
Male	Percent of Sample	26.9	42.3	7.7	76.9
	Sample Size	7	11	2	20
Total	Percent of Sample	26.9	65.4	7.7	100.0
	Sample Size	7	17	2	26
	Standard Error	2	2	1	

(continued)

Appendix Table B.4. (Page 2 of 3)

		Brood Year and (Age Group)			
		1989 (1.1)	1988 (2.1)	1987 (3.1)	Total
Stratum Dates:		8/09–8/15			
Sampling Dates:		8/09–8/15			
Sample Size:		146			
Female	Percent of Sample	14.4	30.1	4.1	48.6
	Sample Size	21	44	6	71
Male	Percent of Sample	11.6	37.7	2.1	51.4
	Sample Size	17	55	3	75
Total	Percent of Sample	26.0	67.8	6.2	100.0
	Sample Size	38	99	9	146
	Standard Error	5	6	3	
Stratum Dates:		8/16–8/22			
Sampling Dates:		8/16–8/22			
Sample Size:		33			
Female	Percent of Sample	9.1	30.3	3.0	42.4
	Sample Size	3	10	1	14
Male	Percent of Sample	15.2	39.4	3.0	57.6
	Sample Size	5	13	1	19
Total	Percent of Sample	24.2	69.7	6.1	100.0
	Sample Size	8	23	2	33
	Standard Error	3	3	1	
Stratum Dates:		8/23–8/29			
Sampling Dates:		8/23–8/29			
Sample Size:		16			
Female	Percent of Sample	12.5	31.3	6.3	50.0
	Sample Size	2	5	1	8
Male	Percent of Sample	18.8	25.0	6.3	50.0
	Sample Size	3	4	1	8
Total	Percent of Sample	31.3	56.3	12.5	100.0
	Sample Size	5	9	2	16
	Standard Error	2	2	1	

(continued)

Appendix Table B.4. (Page 3 of 3)

		Brood Year and (Age Group)			
		1989	1988	1987	Total
		(1.1)	(2.1)	(3.1)	
Stratum Dates:		8/30-9/08			
Sampling Dates:		8/30-9/08			
Sample Size:		17			
Female	Percent of Sample	5.9	17.6	5.9	29.4
	Sample Size	1	3	1	5
Male	Percent of Sample	52.9	17.6	0.0	70.6
	Sample Size	9	3	0	12
Total	Percent of Sample	58.8	35.3	5.9	100.0
	Sample Size	10	6	1	17
	Standard Error	2	2	1	
Stratum Dates:		7/20-9/08			
Sampling Dates:		7/20-9/08			
Sample Size:		253			
Female	Percent of Sample	10.7	28.9	3.6	43.1
	Sample Size	27	73	9	109
Male	Percent of Sample	17.0	36.8	3.2	56.9
	Sample Size	43	93	8	144
Total	Percent of Sample	27.7	65.6	6.7	100.0
	Sample Size	70	166	17	253
	Standard Error	7	8	4	

Appendix Table C.1. Kwiniuk River tower expanded daily and cumulative counts of pink, chum, and chinook salmon, 1992.

Date	Pink Salmon		Chum Salmon		Chinook Salmon	
	Daily	Cum.	Daily	Cum.	Daily	Cum.
27-Jun	0	0	0	0	0	0
28-Jun	0	0	0	0	0	0
29-Jun	2,537	2,537	803	803	0	0
30-Jun	2,038	4,575	218	1,021	0	0
01-Jul	1,267	5,842	152	1,173	4	4
02-Jul	3,979	9,821	703	1,876	(2)	2
03-Jul	5,044	14,865	332	2,208	5	7
04-Jul	38,247	53,112	1,354	3,562	8	15
05-Jul	34,349	87,461	1,027	4,589	14	29
06-Jul	30,452	117,913	701	5,290	21	50
07-Jul	18,541	136,454	372	5,662	0	50
08-Jul	21,830	158,284	557	6,219	18	68
09-Jul	103,111	261,395	1,305	7,524	55	123
10-Jul	98,206	359,601	725	8,249	16	139
11-Jul	59,906	419,507	387	8,636	14	153
12-Jul	65,927	485,434	377	9,013	27	180
13-Jul	71,947	557,381	367	9,380	41	221
14-Jul	17,376	574,757	232	9,612	0	221
15-Jul	31,601	606,358	230	9,842	11	232
16-Jul	50,625	656,983	316	10,158	32	264
17-Jul	126,030	783,013	307	10,465	37	301
18-Jul	140,589	923,602	344	10,809	37	338
19-Jul	79,465	1,003,067	203	11,012	24	362
20-Jul	18,342	1,021,409	62	11,074	10	372
21-Jul	78,120	1,099,529	132	11,206	20	392
22-Jul	120,281	1,219,810	299	11,505	46	438
23-Jul	50,140	1,269,950	113	11,618	9	447
24-Jul	55,111	1,325,061	106	11,724	15	462
25-Jul	60,936	1,385,997	145	11,869	0	462
26-Jul	39,490	1,425,487	104	11,973	5	467
27-Jul	18,044	1,443,531	62	12,035	9	476
28-Jul	21,185	1,464,717	42	12,077	3	479

Appendix Table D.1. Kotzebue District chum salmon commercial catch age and sex composition by fishing period, 1992.

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates: 7/10-7/11		Period 1				
Sampling Dates: 7/11						
Sample Size: 260						
Female	Percent of Sample	0.0	10.0	40.0	4.6	54.6
	Number in Catch	0	561	2,242	259	3,061
Male	Percent of Sample	0.0	7.7	32.7	5.0	45.4
	Number in Catch	0	431	1,832	280	2,544
Total	Percent of Sample	0.0	17.7	72.7	9.6	100.0
	Number in Catch	0	992	4,074	539	5,605
	Standard Error	0	133	155	103	
Stratum Dates: 7/13-7/14		Period 2				
Sampling Dates: 7/14						
Sample Size: 238						
Female	Percent of Sample	0.0	16.8	36.6	5.5	58.8
	Number in Catch	0	669	1,455	217	2,341
Male	Percent of Sample	0.0	18.9	21.0	1.3	41.2
	Number in Catch	0	752	836	50	1,638
Total	Percent of Sample	0.0	35.7	57.6	6.7	100.0
	Number in Catch	0	1,421	2,290	267	3,979
	Standard Error	0	124	128	65	
Stratum Dates: 7/16-7/17		Period 3				
Sampling Dates: 7/17						
Sample Size: 240						
Female	Percent of Sample	0.0	19.2	42.1	3.8	65.0
	Number in Catch	0	1,123	2,465	220	3,807
Male	Percent of Sample	0.0	12.9	20.0	2.1	35.0
	Number in Catch	0	757	1,171	122	2,050
Total	Percent of Sample	0.0	32.1	62.1	5.8	100.0
	Number in Catch	0	1,879	3,636	342	5,857
	Standard Error	0	177	184	89	

(continued)

Appendix Table D.1. (Page 2 of 5)

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates: 7/20–7/21		Period 4				
Sampling Dates: 7/21						
Sample Size: 270						
Female	Percent of Sample	0.4	22.2	28.1	1.5	52.2
	Number in Catch	76	4,570	5,789	305	10,740
Male	Percent of Sample	0.4	24.4	21.1	1.9	47.8
	Number in Catch	76	5,027	4,342	381	9,826
Total	Percent of Sample	0.7	46.7	49.3	3.3	100.0
	Number in Catch	152	9,597	10,131	686	20,566
	Standard Error	108	626	627	225	
Stratum Dates: 7/23–7/24		Period 5				
Sampling Dates: 7/23–7/24						
Sample Size: 249						
Female	Percent of Sample	0.0	24.9	22.1	1.2	48.2
	Number in Catch	0	6,808	6,039	329	13,177
Male	Percent of Sample	0.0	26.1	23.3	2.4	51.8
	Number in Catch	0	7,137	6,369	659	14,165
Total	Percent of Sample	0.0	51.0	45.4	3.6	100.0
	Number in Catch	0	13,946	12,408	988	27,342
	Standard Error	0	868	864	324	
Stratum Dates: 7/27–7/28		Period 6				
Sampling Dates: 7/27–7/28						
Sample Size: 266						
Female	Percent of Sample	0.0	27.4	23.7	2.3	53.4
	Number in Catch	0	4,953	4,275	407	9,635
Male	Percent of Sample	0.4	25.2	18.8	2.3	46.6
	Number in Catch	68	4,546	3,392	407	8,413
Total	Percent of Sample	0.4	52.6	42.5	4.5	100.0
	Number in Catch	68	9,499	7,667	814	18,048
	Standard Error	68	554	548	230	

(continued)

Appendix Table D.1. (Page 3 of 5)

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates: 7/30-7/31		Period 7				
Sampling Dates: 7/30-7/31						
Sample Size: 265						
Female	Percent of Sample	0.0	28.7	25.3	1.5	55.5
	Number in Catch	0	15,302	13,490	805	29,597
Male	Percent of Sample	0.0	26.8	16.6	1.1	44.5
	Number in Catch	0	14,295	8,859	604	23,759
Total	Percent of Sample	0.0	55.5	41.9	2.6	100.0
	Number in Catch	0	29,597	22,349	1,409	53,356
	Standard Error	0	1,632	1,620	527	
Stratum Dates: 8/03-8/04		Period 8				
Sampling Dates: 8/03-8/04						
Sample Size: 275						
Female	Percent of Sample	0.7	46.9	12.4	1.5	61.5
	Number in Catch	163	10,525	2,774	326	13,789
Male	Percent of Sample	0.4	24.4	12.4	1.5	38.5
	Number in Catch	82	5,466	2,774	326	8,648
Total	Percent of Sample	1.1	71.3	24.7	2.9	100.0
	Number in Catch	245	15,991	5,548	653	22,437
	Standard Error	141	613	585	228	
Stratum Dates: 8/06-8/07		Period 9				
Sampling Dates: 8/06-8/07						
Sample Size: 272						
Female	Percent of Sample	0.4	39.2	17.3	1.1	57.9
	Number in Catch	186	19,845	8,754	559	29,345
Male	Percent of Sample	0.0	31.1	11.0	0.0	42.1
	Number in Catch	0	15,731	5,588	0	21,319
Total	Percent of Sample	0.4	70.2	28.3	1.1	100.0
	Number in Catch	186	35,577	14,342	559	50,664
	Standard Error	186	1,407	1,386	321	

(continued)

Appendix Table D.1. (Page 4 of 5)

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates: 8/10-8/11		Period 10				
Sampling Dates: 8/10-8/11						
Sample Size: 266						
Female	Percent of Sample	1.1	53.9	18.8	1.1	75.0
	Number in Catch	402	19,225	6,700	402	26,729
Male	Percent of Sample	0.0	17.9	7.1	0.0	25.0
	Number in Catch	0	6,369	2,546	0	8,916
Total	Percent of Sample	1.1	71.8	25.9	1.1	100.0
	Number in Catch	402	25,595	9,246	402	35,645
	Standard Error	231	985	960	231	
Stratum Dates: 8/13-8/14		Period 11				
Sampling Dates: 8/14						
Sample Size: 265						
Female	Percent of Sample	0.0	42.6	14.0	0.0	56.6
	Number in Catch	0	7,522	2,463	0	9,985
Male	Percent of Sample	0.4	34.0	8.7	0.4	43.4
	Number in Catch	67	5,991	1,531	67	7,655
Total	Percent of Sample	0.4	76.6	22.6	0.4	100.0
	Number in Catch	67	13,513	3,994	67	17,640
	Standard Error	67	460	454	67	
Stratum Dates: 8/21-8/22		Period 13				
Sampling Dates: 8/21-8/22						
Sample Size: 276						
Female	Percent of Sample	0.7	60.1	12.0	0.0	72.8
	Number in Catch	110	9,118	1,813	0	11,040
Male	Percent of Sample	0.4	21.7	5.1	0.0	27.2
	Number in Catch	55	3,296	769	0	4,120
Total	Percent of Sample	1.1	81.9	17.0	0.0	100.0
	Number in Catch	165	12,414	2,582	0	15,160
	Standard Error	95	352	344	0	

(continued)

Appendix Table D.1. (Page 5 of 5)

		Brood Year and (Age Group)				
		1989 (0.2)	1988 (0.3)	1987 (0.4)	1986 (0.5)	Total
Stratum Dates: 8/24-8/25		Period 14				
Sampling Dates: 8/25						
Sample Size: 271						
Female	Percent of Sample	0.7	46.3	15.5	0.0	62.6
	Number in Catch	71	4,481	1,499	0	6,051
Male	Percent of Sample	1.5	28.6	6.3	1.1	37.4
	Number in Catch	143	2,765	607	107	3,621
Total	Percent of Sample	2.2	74.9	21.8	1.1	100.0
	Number in Catch	214	7,245	2,106	107	9,672
	Standard Error	87	255	243	62	
Stratum Dates: 8/27-8/28		Period 15				
Sampling Dates: 8/28						
Sample Size: 273						
Female	Percent of Sample	2.9	51.3	12.1	0.4	66.7
	Number in Catch	94	1,648	388	12	2,142
Male	Percent of Sample	1.5	22.7	8.4	0.7	33.3
	Number in Catch	47	730	271	24	1,071
Total	Percent of Sample	4.4	74.0	20.5	1.1	100.0
	Number in Catch	141	2,377	659	35	3,213
	Standard Error	40	85	79	20	
Stratum Dates: 7/10-8/28		Season Total				
Sampling Dates: 7/11-8/28						
Sample Size: 3,686						
Female	Percent of Sample	0.5	35.4	22.5	1.7	60.1
	Number in Catch	1,491	102,383	65,039	4,864	173,856
Male	Percent of Sample	0.4	23.2	15.0	1.4	39.9
	Number in Catch	1,020	66,843	43,307	4,001	115,328
Total	Percent of Sample	0.9	58.5	37.5	3.1	100.0
	Number in Catch	2,511	169,227	108,346	8,865	289,184
	Standard Error	442	2,347	2,306	821	

The Alaska Department of Fish and Game administers all programs and activities free from discrimination on the basis of sex, color, race, religion, national origin, age, marital status, pregnancy, parenthood, or disability. For information on alternative formats available for this and other department publications, contact the department ADA Coordinator at (voice) 907-465-4120, or (TDD) 907-465-3646. Any person who believes he or she has been discriminated against should write to: ADF&G, PO Box 25526, Juneau, AK 99802-5526; or O.E.O., U.S Department of the Interior, Washington, DC 20240.