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AGE, SEX, AND SIZE OF NORTON SOUND AND KOTZEBUE SOUND SALMON CATCH AND ESCAPEMENT, 1983

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November 1984

ALASKA DEPARTMENT OF FISH AND GAME
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Don W. Collinsworth
Commissioner

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Division of Commercial Fisheries
Anchorage, Alaska

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ABSTRACT

The 1983 commercial, subsistence, and sport harvest of the five species of Pacific salmon *(Oncorhynchus* sp.*)* found in the Norton Sound-Kotzebue Sound area are presented by age, sex, length, or fishing district along with appendices of historical performance. Peak aerial survey salmon escapement counts, side-scan sonar, and tower counts are presented for all systems enumerated. Age, sex, and length data from escapement sampling are also presented.

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 Division of Commercial Fisheries of the Alaska Department of Fish and Game (ADF&G) has divided the state into numerous fishing districts. The Norton Sound and Kotzebue Sound salmon commercial fishing districts have been defined as the area from Point Hope to Canal Point in northwestern Alaska. The Port Clarence District, is also located within this region though commercial salmon fishing has been prohibited since 1966. The Norton Sound District includes all waters from Canal Point north to Cape Douglas. This district is divided into six subdistricts (Figure 1): Nome (subdistrict 1), Golovin (subdistrict 2), Moses Pt. (subdistrict 3), Norton Bay (subdistrict 4), Shaktoolik (subdistrict 5), and Unalakleet (subdistrict 6). The Kotzebue Sound fishing district includes all waters from Point Hope to Cape Prince of Wales, where commercial fishing is restricted to ocean waters north of the Baldwin Peninsula (Figure 2).

Five species of Pacific salmon *(Oncorhynchus* sp.*)* are found in the Norton Sound and Kotzebue Sound areas. In order of economic importance to the commercial fisherman, are chum *(O. keta)*, chinook *(O. tshawytscha)*, coho *(O. kisutch)*, pink *(O. gorbuscha)*, and sockeye salmon *(O. nerka)*. Numerically the even-year returns of pink salmon are the largest of the five species followed by chum, coho, chinook, and sockeye salmon.

Adequate management of the salmon resource in the study area requires knowledge of certain fundamental parameters of each contributing stock. Initially the determination of brood stock requirements needed to maintain the population is of particular importance with the result that the harvest be adequately controlled. To carry out this objective, it is necessary to accurately assess: (1) the magnitude of the removal (harvest) and its characteristics (distribution, age, sex, and size composition); and (2) the magnitude of the breeding population (spawning escapement) and its characteristics. The objective of this report is to present estimates of the age, sex, and length composition for the inshore return of salmon to the Norton Sound and Kotzebue Sound area. Summary information is presented for each harvest and escapement population sampled. Detailed information for each fishery as to 1983 period catch, historical performance, weekly age, sex, and length information is presented in the Appendices. Results of special studies involving small populations and samples are also presented in the Appendices.

Basic fishery statistics for the Norton Sound-Kotzebue Sound area are available from several additional sources. Commercial and subsistence harvest data are presented in the 1983 Norton Sound-Port Clarence-Kotzebue Sound Annual Management Report (In Prep). Historical escapement data are maintained and displayed in a computerized database. In addition, the results from escapement enumeration projects are analyzed and reported yearly for the Unalakleet River (Lean and Peterson 1983), Kwiniuk River (Lean 1983), and the Noatak River (Bigler In Prep). Previously age, sex, and size data were presented in the report series, ADF&G Arctic-Yukon-Kuskokwim Region Age, Sex, and Size Composition of Salmon.

METHODS

Abundance Data

The commercial catch data presented in this report were compiled from harvest

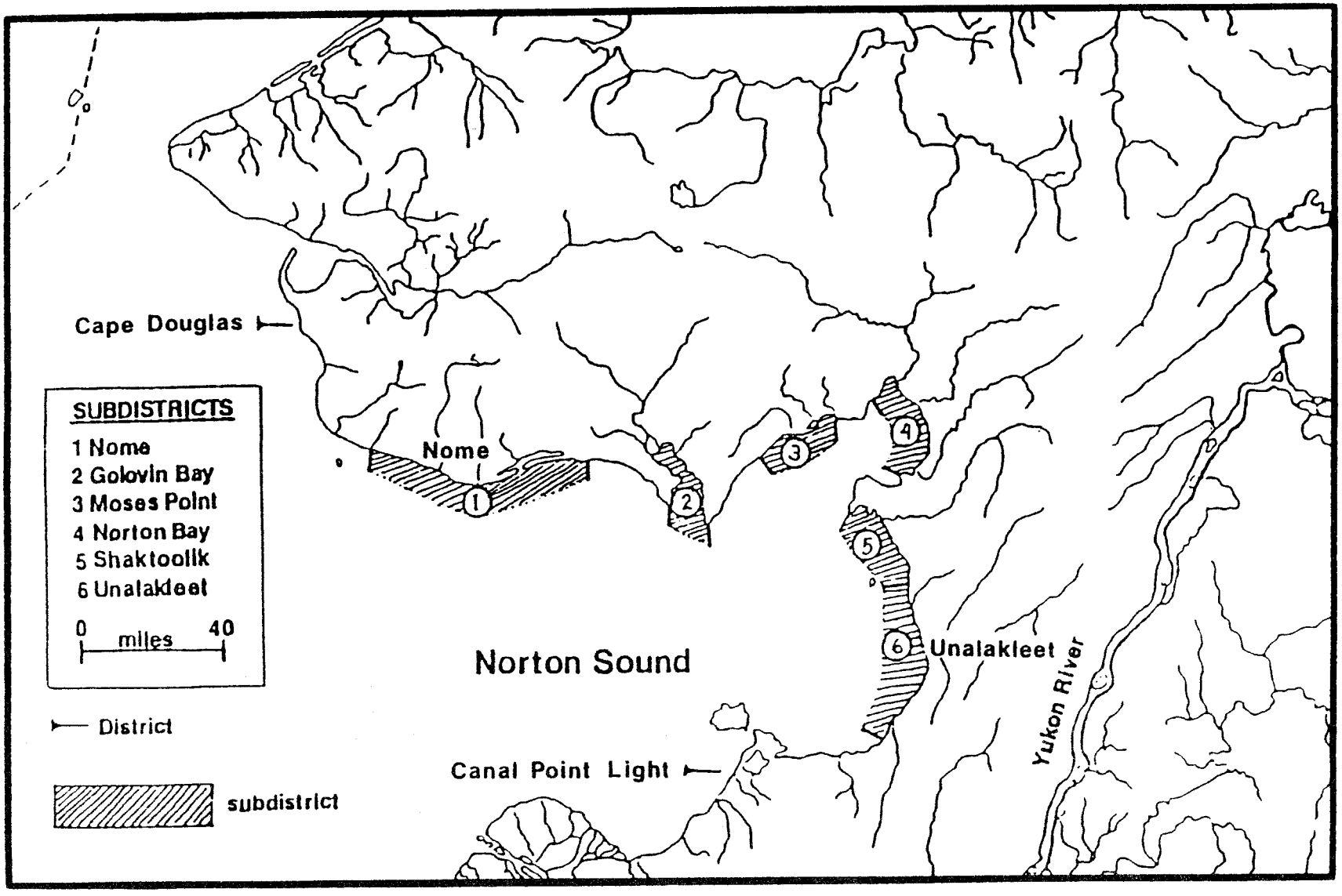

Figure 1. Norton Sound commercial salmon fishing subdistricts.

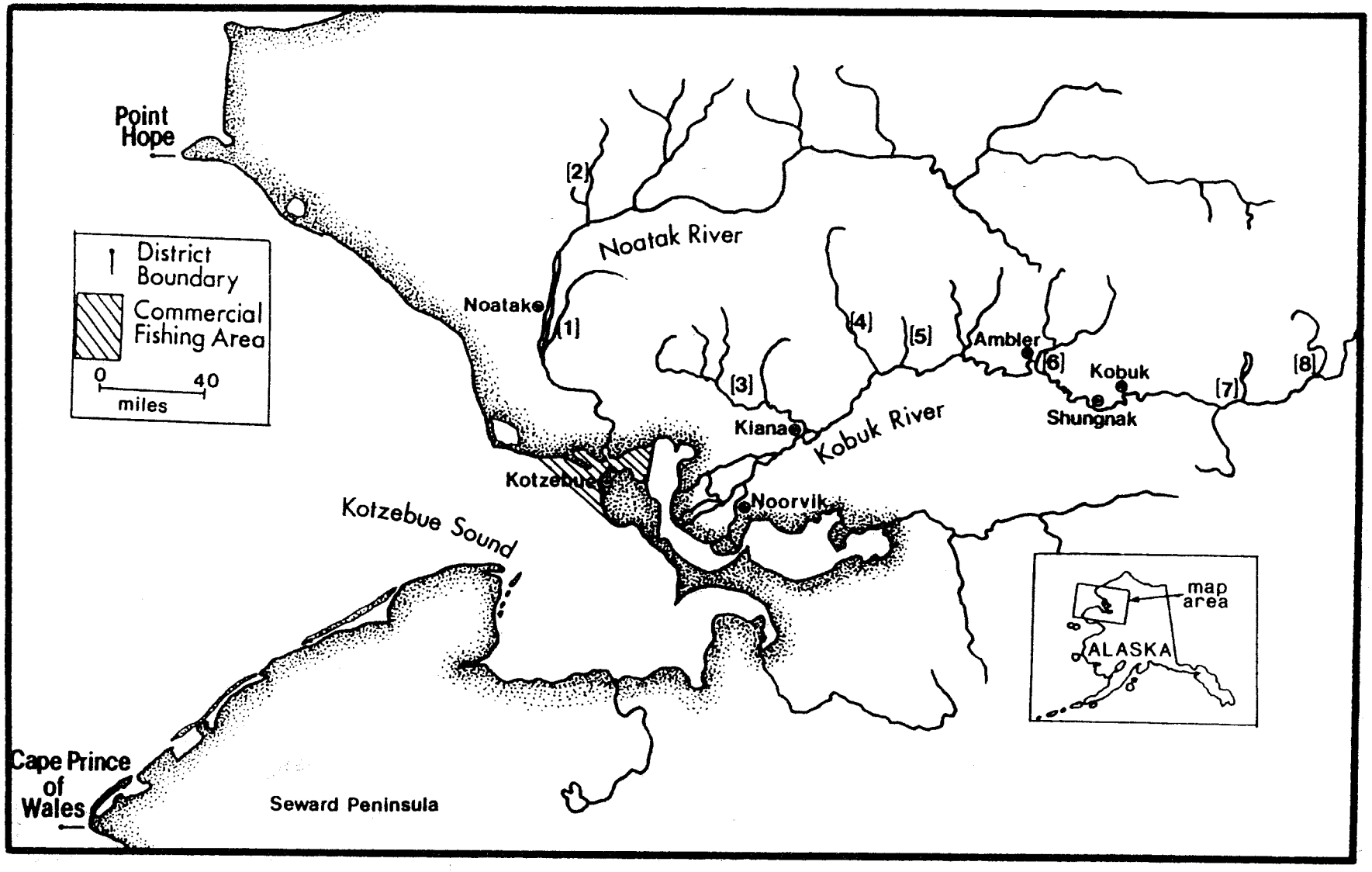

Figure 2. Kotzebue Sound commercial fishing district.

receipts (fish tickets) which document each sale by a licensed fisherman. These data were entered during the commercial fishing season into a microcomputer in the Nome and Kotzebue area offices and are preliminary. Keying errors or late arriving tickets may change the figures slightly in later reports.

Subsistence catches are not monitored as closely as commercial catches in the Norton Sound-Kotzebue Sound area. Three methods of data collection are generally employed: (1) personal and household interviews conducted late in the season, or (2) the return of catch calendars which are mailed to all known subsistence fishermen for reporting daily catches, and (3) a permit is required in the Nome subdistrict with catch limits for each permit. Irrespective of which data collection method is used, each has inherent and unavoidable sources of error. When personal interviews are used, it is assumed that fishermen can accurately recall the harvest, which may have occurred over several weeks. Annually, less than 5% of all subsistence catch calendars are returned. All methods only document the subsistence harvest of known or available fishermen and should be considered a minimum estimate only.

Sport fishing for salmon is monitored by the ADF&G, Division of Sport Fish. The sport salmon catch was estimated from postal surveys which consist of repeated mailing of questionnaires to random samples of Alaska sport fishing license holders by the Division of Sport Fish.

Escapement surveys are the main method for monitoring salmon escapement into the Norton Sound and Kotzebue Sound drainages. Note that aerial surveys of escapement result in peak counts or a series of counts and are not a total enumeration of salmon spawning abundance. However, aerial survey escapement counts can be regarded as an index of relative abundance for the surveyed stream and have the potential for use in annual or interdrainage comparison of escapement. Two sonar enumeration projects and a counting tower also operate in the area. Sonar counts provide an alternative index of escapement for turbid or large drainages that are difficult to count visually. Counting towers provide the most exact count of escapement. Both sonar and counting towers provide data concerning migratory timing.

Age, Sex, and Length Data Collection

Sampling goals for age, sex, and length composition of salmon returning to the Norton Sound-Kotzebue Sound area in 1983 involved techniques considered more comprehensive than previous years (Brannian and Arvey 1983). Chum salmon, which comprise the bulk of the commercial catch, were sampled in the Kotzebue District and in three subdistricts of Norton Sound. Commercial catches of chinook salmon were sampled in three subdistricts of Norton Sound and coho salmon in one. Salmon escapements were sampled in conjunction with enumeration projects (i.e., sonar counters, counting towers, and test fisheries) or on the spawning grounds. Subsistence catches were not sampled in 1983.

All salmon were sampled for age, sex, and length (mideye to fork of tail, in millimeters). Sex was determined by either internal examination of gonads for dead fish, or external morphology on live fish. External characteristics include snout, vent, body symmetry, and occasional appearance of milt or eggs. Scales were taken from the left side approximately two scale rows above the lateral line and on the diagonal from the posterior insertion of the dorsal fin. Scales were

mounted on gum cards and impressions made in cellulose acetate. Ages were reported in Gilbert-Rich notation[1].

Sample Size

Minimum sample size goals for temporal stratification were derived for each species of interest. The objective was to obtain an estimated proportion by age class at a 10% level of significance (for a 90% confidence interval) with a 0.05 level of accuracy. This resulted in a stratum sample size goal for readable scales of 502 chinook salmon with three major age classes, 450 for chum salmon with two major age classes, and 247 for coho salmon with one major age class. Minor age classes comprising less than 10% were pooled and treated as a single age class in this analysis. Actual collection goals required that sample sizes be increased to include an expected proportion of unreadable scales. Therefore, conclusions, valid in the above mentioned levels, can be drawn, for example, concerning coho salmon from any time frame where a minimum of 247 samples were taken. In cases where the total number of samples collected was less than the goal, data were pooled into fewer stratum and a standard error presented.

This report is a synopsis of the 1983 inshore return of salmon to the Norton Sound-Kotzebue Sound area. It presents the commercial salmon catch by subdistrict and fishing period or week. Length, age, and sex of commercial catch samples were extrapolated to the commercial catch by age and sex. Escapement indices are tabulated and escapement samples used to estimate the sex and age composition of specified drainages. Data are presented in summarized form in the body of this report, with more detailed tables given in Appendix A - Norton Sound, Tables 1-15 and Appendix B, Tables 1-10.

RESULTS

Norton Sound

The commercial, sport, and subsistence harvests; escapement abundance; and biological sampling; i.e., age, sex, and length for Norton Sound follows.

Commercial, Sport, and Subsistence Harvest:

Commercial harvest in the Norton Sound District totaled 10,308 chinook; 319,437 chum; 76,913 pink; 49,735 coho; and 27 sockeye salmon. The chinook salmon harvest was taken predominately in the Unalakleet (6) and Shaktoolik (5) subdistricts from 12 to 25 June (Table 1). These fisheries operate with setnets with most fishermen targeting on chinook salmon using 210 mm (8-1/4 in) mesh gillnets. In all other subdistricts the landing of chinook salmon is incidental to the taking

[1] Gilbert-Rich formula: the first digit refers to the total age, the second digit, normally subscripted, refers to the freshwater age, leaving the difference between the two digits as the marine age. In some computer-derived tables the second digit is not subscripted.

Table 1. Commercial harvest of chinook salmon in Norton Sound by subdistrict, 1983.

	Subdistrict						
Inclusive Dates	1	2	3	4	5	6	Total
June 5–June 11					155	245	400
June 12–June 18		10	30	45	671	2,061	2,817
June 19–June 25	15	16	80	81	1,119	2,723	4,034
June 26–July 2	7	6	99[1]	56	585	1,259	2,012
July 3–July 9		7	26	24	120	394	571
July 10–July 16		0	9	4	55	154	222
July 17–July 23		2	9	3	9	66	89
July 24–July 30		2	1		10	65	78
July 31–Aug. 31	1	9		2	18	55	85
Total	23	52	254	215	2,742	7,022	10,308

[1] Includes 72-hour fishing period 6/30–7/3.

of chum salmon with set gillnets with an average 149 mm (5-7/8 in) mesh. The 1983 harvest was 27% above the recent 5-year average (8,131) and 89% above the recent 10-year average (5,466 for 1972-1982) (Appendix A Table 1). The harvest of chum salmon peaked the last week of June (Table 2) and was maintained through July. In the Shaktoolik and Unalakleet Districts, there is a gradual changeover (not mandatory) to the smaller mesh gillnet (149 mm or 5-7/8 in) which is more efficient in the capture of chum salmon. The 1983 chum salmon harvest was the largest on record, 85% larger than the recent 5-year average (172,781) and 93% greater than the recent 10-year average of 165,416 fish (Appendix A Table 1). The harvest of coho salmon was taken predominately in the Shaktoolik and Unalakleet subdistricts (Table 3) peaking in the month of August. The 1983 harvest was 30% greater than the 5-year average (38,373) and 12% greater than the recent 10-year average (21,846).

The subsistence harvest totaled 2,066 chinook, 14,701 chum, 23,011 pink, 10,141 coho, and 87 sockeye salmon (Table 4). These figures represent only the harvest of individuals who were interviewed, returned catch calendars, or obtained Nome subdistrict (1) permits, and should be considered only as a documented minimum. In general the subsistence harvest is taken using set gillnets in rivers and occasionally seines are used inriver to catch chum and pink salmon. The total harvest of 50,006 was 34% lower than the past 5-year average but only 4% lower than the past 10-year average (Appendix A Table 1). The sport harvest (Table 5) totaled 687 chinook, 2,042 chum, 4,583 pink, and 3,823 coho salmon (Mills 1984).

Escapement Abundance:

Peak aerial survey salmon escapement counts and other enumeration project results for the Norton Sound area are presented in Table 6 for 1983. Chinook salmon were most abundant in tributaries draining into subdistricts 5 and 6 with the Shaktoolik River producing a peak count of 1,080 and the Unalakleet River with a sonar count of 3,025. Chum salmon display a broader spawning distribution throughout the Norton Sound drainage. Chum salmon escapement counts (Appendix A Table 2) were less than the historically observed average in the Nome subdistrict (1), above average in subdistricts (3) through (6), and above the historically observed average only in the Fish River (20,077) for stream surveyed within the Golovin subdistrict (2). Pink salmon peak in even-year cycles and, therefore, returned in low numbers in 1983. Few aerial surveys are flown during the peak spawning activity of coho salmon. Escapements into the Unalakleet River of 3,025 chinook, 58,540 chum, and 14,656 coho salmon were estimated using side-scan sonar (Table 6). A counting tower on the Kwiniuk River provided escapement estimates of 267 chinook, 56,907 chum, and 251,965 pink salmon (Table 6).

Age, Sex, and Length Composition:

In 1983, chinook salmon were sampled from the commercial catches in three subdistricts (Table 7). Age 6_2 chinook salmon predominated in the catches of subdistrict (5) and (6) and were approximately equal in percentage of males and females in both districts. In fact the age composition for the two subdistricts were quite similar. In contrast, the incidental harvest in small mesh gear (149 mm or 5-7/8 in) of chinook salmon in the Moses Point (3) subdistrict resulted in 50% age 4_2. Subsistence catches of chinook salmon were not sampled. See Appendix A Tables 3 through 7 for the age composition of a small sample of Unalakleet sport caught

Table 2. Commercial harvest of chum salmon in Norton Sound by subdistrict, 1983.

	Subdistrict						
Inclusive Dates	1	2	3	4	5	6	Total
June 5–June 18		805	1,132	52	685	311	2,985
June 19–June 25	4,978	11,769	9,591	1,456	9,100	4,651	41,545
June 26–July 2	6,605	17,393	27,045[1]	5,502	18,059	24,510	99,114
July 3–July 9		12,403	13,234	4,231	14,896	19,431	64,195
July 10–July 16		2,967	10,586	2,481	11,890	20,467	48,391
July 17–July 23		2,153	4,109	1,859	5,213	13,638	26,972
July 24–July 30		651	79	445	3,654	14,918	19,747
July 31–Aug. 6	57	117		1,131	2,172	8,156	11,633
Aug. 7–Sept. 3	51	25			1,641	3,138	4,855
Total	11,691	48,283	65,776	17,157	67,310	109,220	319,437

[1] Includes 72-hour fishing period 6/30 - 7/3.

Table 3. Commercial harvest of coho salmon in Norton Sound by subdistrict, 1983.

	Subdistrict						
Inclusive Dates	1	2	3	4	5	6	Total
July 10-July 16		0		0	2	6	8
July 17-July 23		2		0	45	213	260
July 24-July 30		114		20	1,004	3,404	4,542
July 31-Aug. 6	24	92		184	1,096	10,222	11,718
Aug. 7-Aug. 13	52				944	9,020	10,016
Aug. 14-Aug. 20	185	87			4,429	7,237	11,938
Aug. 21-Aug. 27					4,737	4,354	9,091
Aug. 28-Aug. 31					620	1,642	2,262
Total	261	295		204	12,877	36,098	49,735

Table 4. Norton Sound subsistence salmon catches, 1983.

Sub-district	Village	Number Fishermen Interviewed	Chinook	Sockeye	Coho	Pink	Chum
1[1]	Nome	130	74	53	1,911	8,086	7,091
2[2]	White Mountain	3	7	0	351	430	608
2[2]	Council	1	0	0	63	1	1
4[2]	Koyuk	3	4	0	0	0	1,114
5[2]	Shaktoolik	2	18	0	29	432	141
6[3]	Unalakleet River	68	1,480	24	6,311	13,458	4,124
	Ocean	17	388	9	577	350	277
	Subtotal	74[4]	1,868	33	6,888	13,808	4,401
[2]	St Michaels	3	95	1	899	254	1,345
	Totals	216	2,066	87	10,141	23,011	14,701

[1] Data collected from returned permits.
[2] Data collected from returned catch calendars.
[3] Data collected from household interviews.
[4] Eleven fishermen fished both river and ocean.

Table 5. Norton Sound area sport fish salmon harvest, 1983[1].

Area/River	Chinook	Coho	Pink	Chum
Norton Sound Marine	260	408	278	0
Unalakleet	93	1,596	909	687
Nome	93	204	1,782	538
Fish-Niuklok	0	1,355	631	371
Pilgrim	0	37	37	111
Other Streams	241	223	575	335
Lakes	0	0	371	0
Total	687	3,823	4,583	2,042

[1] Source: Mills, M.J. 1984. Alaska statewide sport fish harvest studies 1983 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, Vol. 25 (SW-I-A) 85 pp.

Table 6. Peak aerial survey counts and escapement enumeration project results for streams in the Norton Sound drainage, 1983.

Subdistrict	Stream Name	Chinook	Coho	Pink	Chum
Nome (1)	Bonanza	11	100	10,576	723
	Eldorado	2		270	994
	Flambeau	2	365	200	1,195
	Nome River	48	96	9,170	198
	Sinuk			10,770	2,150
	Solomon			8,180	310
Golovin (2)	Boston	154			704
	Fish	87		300	20,077
	Niukluk	54		50	8,886
Moses Pt. (3)	Kwiniuk[1]	267		251,965	56,907
	Tubutulik	135		40,797	16,345
Norton Bay (4)	Ungalik	21		23,380	8,357
Shaktookik (5)	Shaktoolik	1,080		18,705	12,414
Unalakleet (6)	North River	347		4,980	4,135
	Unalakleet System[2]	3,025	14,656	89,324	58,540
South of Subdistrict 6	Kogok				1,200
	Pikmiktalik	13		1,500	3,228

[1] Tower count.
[2] Sonar count.

Table 7. Age composition of chinook salmon from the Norton Sound District gillnet fishery, 1983.

Sex/Age [1]	Percent Age Composition by Subdistrict		
	Moses Pt (3)	Shaktoolik (5)	Unalakleet (6)
Males	50.0	60.5	64.0
32	0	0.8	0.6
42	40.0	0.8	2.5
52	10.0	24.2	27.3
62	0	30.6	33.5
73	0	3.2	0
Females	50.0	39.5	36.0
32	0	0	0
42	10.0	0	0
52	10.0	8.1	5.6
62	30.0	31.5	30.5
73	0	0	0
Both Sexes			
32	0	0.8	0.6
42	50.0	0.8	2.5
52	20.0	32.3	32.9
62	30.0	62.1	64.0
73	0	3.2	0
Sample size	10	124	454

[1] Gilbert-Rich formula: the first digit refers to the total age, the second digit, normally subscripted, refers to the freshwater age, leaving the difference between the two digits as the marine age. In some computer-derived tables the second digit is not subscripted.

chinook salmon, samples from the Unalakleet River test fishery, sample size, and length data from commercial samples.

In 1983 chum salmon were sampled from commercial catches in three subdistricts. Age 4_1 predominated the age composition of the samples ranging from approximately 63% in the Moses Point harvest to 58% in both the Shaktoolik and Unalakleet subdistrict catches (Table 8). The sex ratios were fairly equal in subdistrict (3) and (6) but samples from subdistrict (5) were 73% male. Length at age varied between subdistricts (Table 9) but females were consistently smaller than males of a similar age. See Appendix A Tables 8 through 10 for sample size data for commercial samples. Chum salmon escapement into the Kwiniuk and Unalakleet Rivers were sampled in 1983. Females were in the majority in both systems representing 53% of the Kwiniuk River sample and 67% of the Unalakleet River sample (Table 10). See Appendix A Tables 11 and 12 for sample size and mean length data for escapement samples. Temporal trends in age composition were evident in the Unalakleet River sample (Appendix A Table 12) with age 5_1 comprising greater than 80% through June with 4_1 increasing from 38% the week of 27 June to 69% the last week of July. Overall age 4_1 comprised 61% of the Unalakleet River and 59% of the Kwiniuk River samples (Table 10).

Coho salmon were sampled in the Unalakleet subdistrict in 1983. Age 4_3 was the dominant age class comprising nearly 94% of the commercial sample (Table 11) and 98% of those captured in the Unalakleet River test fishery. See Appendix A Table 13 through 15 for coho salmon mean length data and age composition data from sockeye salmon captured in the Unalakleet River test net fishery.

Kotzebue Sound

The commercial, sport, and subsistence harvests; escapement abundance; and biological sampling; i.e., age, sex, and length for Kotzebue Sound follows.

Commercial, Sport, and Subsistence Harvest:

The 1983 commercial harvest of chum salmon in the Kotzebue District totaled 175,762 chum, 121 chinook, and 114 pink salmon (Table 12). The harvest was taken using set gillnets of 140 mm (5-1/2 in) to 165 mm (6-1/2 in) mesh and up to 274 m (150 fm) in length. The 1983 commercial chum salmon harvest was above the recent 22-year average of 117,200 though it was the lowest since 1979 (Appendix B Table 1). Chum salmon catches peaked at 33,747 during the first commercial fishing period of August with a relatively rapid decline thereafter (Table 12). Low commercial harvest chum salmon catch per unit effort (CPUE) was the primary factor leading to the closure of the 1983 season by emergency order on 20 August.

In 1983 only the Noatak and Shungnak villages were surveyed for estimates of subsistence harvest (3,556 Shungnak and 4,035 Noatak chum salmon, Table 13). Because the subsistence harvest of these villages was considered average, (combined total of 7,591 chum salmon) an adjusted region-wide estimate of 12,900 was derived using the previous 5-year average of contribution by those two villages to the total (Appendix B Table 1). The 1983 estimated harvest of 12,900 was 12% below the recent 22-year average of 14,600. The estimated sport fish harvest (Table 14) was 463 chum salmon.

Table 8. Age composition of chum salmon from the Norton Sound District gillnet fishery, 1983.

	Percent Age Composition By Subdistrict		
Sex/Age	Moses Pt (3)	Shaktoolik (5)	Unalakleet (6)
Males	49.6	73.1	48.0
31	0.2	0	0.9
41	31.8	40.9	25.6
51	16.6	31.2	21.3
61	0.9	1.1	0.6
Females	50.4	26.9	52.0
31	0.2	0	0
41	30.7	17.2	32.0
51	19.5	9.7	20.1
61	0	0	0
Both Sexes			
31	0.4	0	0.9
41	62.6	58.1	57.6
51	36.1	40.9	41.5
61	0.9	1.1	0.6
Sample Size	446	93	328

Table 9. Mean length of chum salmon in selected Norton Sound catch and escapement samples.

	Moses Pt.[1]	Kwiniuk[2]	Unalakleet[1]	Unalakleet Inriver Testfishery[3]
Males				
31	560		563	528
41	589	593	602	589
51	609	618	593	610
61	637		620	
Females				
31	520			535
41	570	562	570	565
51	591	572	625	585
61				612

[1] From samples of the commercial fishery.
[2] Sampled from Beach seine catches.
[3] Sampled from test net catches of 133mm (5 1/4") gear.

Table 10. Age composition of chum salmon from Norton Sound escapements, 1983.

Sex/Age	Percent Age Composition By River	
	Kwiniuk[1] River	Unalakleet[2] River
Males	47.0	32.6
31	0	0.4
41	26.1	19.0
51	20.9	13.3
61	0	0
Females	53.0	67.4
31	0	1.5
41	33.0	42.0
51	20.0	23.8
61	0	0.2
Both Sexes		
31	0	1.8
41	59.1	61.0
51	40.9	37.0
61	0	0.2
Sample size	115	543

[1] Beach seine catches see Appendix Table 11.
[2] Catches sampled from the Unalakleet River test fishery, see Appendix Table 12.

Table 11. Age composition of coho salmon from the Unalakleet commercial fishery and inriver test net fishery, 1983.

	Percent Age Composition	
Sex/Age	Commercial Gillnet Fishery	Unalakleet River Test Fishery
Males	51.9	53.3
32	2.5	0.5
43	48.8	51.6
54	0.6	0.5
Females	48.1	46.7
32	2.5	0
43	43.0	46.2
54	0.6	0
Both Sexes		
32	5.0	0.5
43	93.8	97.8
54	1.3	0.5
Sample Size	160	184

Table 12. Commercial harvest of salmon in the Kotzebue District in 1983.

Inclusive Dates	Hours Fished	Number of Boats	Total Catch		
			Chinook	Pink	Chum
7/11-7/12	24	14	2		1,304
7/14-7/15	24	64	12	84	4,702
7/18-7/19	24	107	1	10	11,159
7/21-7/22	24	126	2		10,652
7/25-7/26	24	149	16	20	21,533
7/28-7/29	24	162	20		30,754
8/01-8/03	36	163	27		33,747
8/04-8/06	36	164	21		19,004
8/08-8/10	36	143	7		25,181
8/11-8/12	24	136	10		11,713
8/18-8/19	24	97	3		6,013
Total			121	114	175,762

Table 13. Kotzebue District subsistence chum salmon catches, 1983.

Village	Chum Harvest[1]
Noorvik	277
Kiana	223
Ambler	1,062
Shungnak	3,556
Kobuk	368
Total Kobuk River	5,486
Total Noatak Village/River	4,035
Kotzebue	347
Deering	219
Kivalina	200
District Total	10,287

[1] During 1983 household surveys were conducted in Noatak, Kivalina, and Shungnak only. Other harvest information is from the limited return of mail-in calendars. Harvest data should be considered a minimum only.

Table 14. Kotzebue area sport fish harvest, 1983[1].

Area	Chum Salmon
Noatak R.	278
Kobuk R.	74
Wulik R.	0
Other Streams	111
Lakes	0
Total	463

[1] Source: Mills, M.J. 1984 Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, Vol. 25 (SW-I-A) 85 pp.

Escapement Abundance:

The Kobuk and Noatak River systems provide the majority of spawning habitat for Kotzebue Sound chum salmon. A side-scan sonar enumeration project was located on river mile 34 of the Noatak River which produced an index count of 22,327 chum salmon for 1983. In the Noatak River few chum salmon spawn in tributaries and most spawning occurs in the main river downstream (and inclusive) of the Kelly River. Aerial surveys are conducted for estimates of chum salmon spawning escapement in both the Noatak and Kobuk River systems resulting in peak counts only. Survey conditions were good in 1983 and the estimated escapement on the Noatak system of 94,954 chum salmon (Table 15) was slightly above the observed average of 84,160 fish (Appendix B Table 2). Chum salmon spawn throughout the Kobuk River system. Peak aerial survey counts of selected tributaries and mainstem index areas totaled 44,135 chum salmon (Table 15). Aerial escapement counts were below the observed average for the Squirrel and Salmon Rivers and average for the Tutuksuk River.

Age, Sex, and Length Composition:

In 1983 chum salmon were sampled from the commercial catch and numerous spawning tributaries. Temporal changes in age composition were present in the commercial samples (Table 16). Age 5_1 comprised almost 52% of sampling period one dropping to 21% by period three. In contrast age 4_1 built from 45% in period one to 73% in period three. See Appendix B Table 3 for length and sample size information. The change in age composition was also evident when viewing the samples by commercial fishing period (Appendix B Table 4). Overall age 4_1 comprised 56% of the commercial sample and was the major age class in escapement samples from all tributaries surveyed (Table 16). The Noatak River sample was 59% age 4_1 and the lower and upper Kobuk 53% and 61%, respectively (Table 17). See Appendix B Tables 5 through 9 for information on sample size, length, and standard errors of the age class proportions for the escapement samples. The 1983 season total age composition of chum salmon was estimated to be 5.7% age 3_1, 57.1% age 4_1, 34.9% age 5_1, and 2.3% age 6_1 (Table 17 and Appendix B Table 10). The sex ratio of samples collected from the Kotzebue District ranged from 32% males in the Noatak River to 72% in the Kelly River. The sex composition of the commercial catch samples was 43% males (Table 17). In general females are smaller than males for a given age (Table 18) and both exhibit an increase in mean length with age.

Table 15. Aerial survey escapement estimates of chum salmon in the Kotzebue District, 1983.

River	Chum Salmon
Noatak River System	
Noatak River (below Kelly River)	79,773
Eli River	3,044
Kelly River & Lake	12,137
Total	94,954
Kobuk River System	
Main Kobuk River	
Mouth to Kobuk	---
Kobuk to Pah River	2,147
Pah River to just below Selby River	2,433
Selby River mouth to Slough	11,683
Selby River mouth to just below Beaver River	13,011
Beaver River mouth	3,059
Above Beaver River	1,413
Main Kobuk River Total	33,746
Squirrel River	6,075
Salmon River	1,677
Tutuksuk River	2,637
Kobuk River System Total	44,135

Table 16. Age and sex summary of Kotzebue Sound commercial set gillnet catch of chum salmon, by statistical sampling period, 1983. All percents rounded to the nearest tenth.

Sex/ Age	Sample Period 1 7/12-7/29 Percent	Numbers	2 8/1-8/6 Percent	Numbers	3 8/8-8/12 Percent	Numbers	4 8/18-8/19 Percent	Numbers	Total Percent	Numbers
Males	47.0	37,649	42.1	22,219	36.6	13,514	47.3	2,844	43.4	76,226
31	0.5	401	1.8	950	2.9	1,070	1.1	66	1.4	2,487
41	20.4	16,341	25.5	13,452	24.1	8,891	28.6	1,720	23.0	40,404
51	24.5	19,625	13.2	6,963	9.2	3,394	17.6	1,058	17.7	31,040
61	1.6	1,282	1.6	844	0.4	148	0.0		1.3	2,274
Females	53.0	42,455	57.9	30,539	63.4	23,380	52.7	3,169	56.6	99,536
31	0.0	-0-	1.0	528	2.7	996	3.3	198	1.0	1,722
41	24.3	19,465	35.0	18,463	48.6	17,930	38.4	2,309	33.1	58,167
51	27.4	21,948	21.4	11,289	11.7	4,317	11.0	661	21.7	38,215
61	1.3	1,041	0.5	264	0.4	148	0.0		0.8	1,453
Both Sexes	100.0	80,104	100.0	52,751	100.0	36,894	100.0	6,013	100.0	175,762
31	0.5	401	2.8	1,477	5.6	2,073	4.4	265	2.4	4,209
41	44.7	35,806	60.5	31,914	72.6	26,779	67.0	4,029	56.1	98,571
51	51.9	41,574	34.6	18,252	20.9	7,710	28.6	1,720	39.4	69,255
61	2.9	2,323	2.1	1,108	0.9	332	0.0		2.1	3,727

Table 17. Summary of total chum salmon return to the Kotzebue District by age, sex, and collection site, 1983[1].

Sex/ Age	Commercial Catch Percent	Commercial Catch Numbers	Noatak River Escapement Percent	Noatak River Escapement Numbers	Kelly River Escapement Percent	Kelly River Escapement Numbers	Lower Kobuk Escapement[2] Percent	Lower Kobuk Escapement[2] Numbers	Upper Kobuk Escapement[3] Percent	Upper Kobuk Escapement[3] Numbers	Total Return Percent	Total Return Numbers
Males	43.4	76,226	31.9	26,419	72.0	8,739	62.8	6,524	60.6	20,450	43.9	138,358
31	1.4	2,487	5.4	4,472	0.0	0	5.9	613	7.1	2,396	3.2	9,968
41	23.0	40,404	16.6	13,747	34.0	4,127	31.4	3,262	35.3	11,912	23.3	73,452
51	17.7	31,040	9.3	7,702	28.0	3,398	21.6	2,244	18.2	6,142	16.0	50,526
61	1.3	2,274	0.6	497	10.0	1,214	3.9	405	0.0	0	1.4	4,390
Females	56.6	99,536	68.1	56,398	28.0	3,398	37.2	3,865	39.4	13,296	56.1	176,493
31	1.0	1,722	4.6	3,810	2.0	243	3.9	405	6.1	2,059	2.6	8,239
41	33.1	58,167	42.3	35,032	16.0	1,942	21.6	2,244	25.3	8,538	33.6	105,923
51	21.7	38,215	19.6	16,232	10.0	1,213	9.8	1,018	8.1	2,733	18.9	59,411
61	0.8	1,453	1.6	1,325	0.0	0	2.0	208	0.0	0	0.9	2,986
Both Sexes	100.0	175,762	100.0	82,817	100.0	12,137	100.0	10,389	100.0	33,746	100.0	314,851
31	2.4	4,209	10.0	8,282	2.0	243	9.8	1,018	13.1	4,420	5.7	18,172
41	56.1	98,571	58.9	48,779	50.0	6,069	52.9	5,496	60.6	20,450	57.1	179,365
51	39.4	69,255	28.9	23,934	38.0	4,612	31.4	3,262	26.3	8,875	34.9	109,938
61	2.1	3,727	2.2	1,823	10.0	1,213	5.9	613	0.0	0	2.3	7,376
Sample Size		1,979		473		50		51		99		

[1] Commercial catch and Noatak River escapement samples taken by 149mm (5 7/8") to 152mm (6") mesh set gillnets. Kelly River salmon collected by beach seine. Upper and Lower Kobuk River sampled with sport tackle.

[2] Squirrel, Salmon and Tutuksuk Rivers; ages based on sagital otoliths samples taken from Salmon River.

[3] Combined Selby Slough, Beaver Creek and main stem Kobuk River; ages based on sagital otoliths sampled from Selby Slough and Beaver Creek.

Table 18. Mean length of chum salmon in selected Kotzebue catch and escapement samples.

	Commercial Catch [1]	Noatak River [1]	Kelly River [2]	Salmon River [2]	Kobuk River [2]	Beaver Creek [2]
Males						
31	563	559		534	601	593
41	618	608	646	609	626	621
51	642	637	681	615	629	623
61	661	625	696	678		
Females						
31	555	561	610	555	553	578
41	590	591	604	596	599	588
51	612	614	653	580	599	614
61	633	625		617		

[1] Gillnet catches from 149mm (5 7/8") to 152mm (6") gear.
[2] Collected by snagging with sport tackle.

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APPENDIX A

Tables 1 - 15

NORTON SOUND

Appendix A Table 1. Commercial and subsistence salmon catches by species, for the Norton Sound District, 1961-1983.

	Commercial					Subsistence				Combined				
Year	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
1961	5300	35	13807	34327	48332	--	--	--	--	5300	35	13807	34237	48332
1962	7286	18	9156	33187	182784	--	--	--	--	7286	18	9156	33187	182784
1963	6613	71	16765	55625	154789	5	118	16607	17635	6618	71	16883	72232	172424
1964	2018	126	98	13567	148862	565	2567	9225	12486	2583	126	2665	22792	161348
1965	1449	30	2030	220	36795	574	4812	19131	30772	2023	30	6842	19351	67567
1966	1553	14	5755	12778	80245	269	2210	14335	21873	1822	14	7965	27113	102118
1967	1804	-	2379	28879	41756	817	1222	17516	22724	2621	-	3601	46395	64480
1968	1045	-	6885	71179	45300	237	2391	36912	11661	1282	-	9276	108091	57051
1969	2392	-	6836	86949	82795	436	2191	18562	15615	2828	-	9027	105511	98410
1970	1853	-	4423	64908	107034	561	4675	26127	22763	2414	-	9098	91035	129797
1971	2593	-	3127	4895	131362	1026	4097	10863	21815[1]	3619	-	7224	15758	153177
1972	2938	-	454	45182	100920	804	2319	14158	13966[2]	3742	-	2773	59340	114886
1973	1918	-	9282	46499	119098	392	520	14770	7185	2310	-	9802	61269	126283
1974	2951	-	2092	148519	162267	420	1064	16426	3958	3371	-	3156	164945	166225
1975	2393	2	4593	32388	212485	186	192	15803	8124[3]	2579	2	4785	48191	220609
1976	2243	11	6934	87919	95956	203	1004	18048	7718	2446	11	7938	105964	103674
1977	4500	5	3690	48675	200455	846	2530	14296	26607	5346	5	6220	62971	227062
1978	9819	12	7335	325503	189279	1211	2981	35281	12257	11030	12	10316	360784	201536
1979	10706	57	31438	167411	140789	747	8487	25247	11975	11453	57	39925	192658	152764
1980	6311	40	29842	227352	180792	1397	8625	63778	19622	7708	40	38467	291130	200414
1981	7929	56	31562	232479	169708	2021	13416	28741	32866	9950	94	44978	261220	202574
1982	5892	10	91690	230281	183335	1328	17874	56295	23185	220	18	109564	286576	206520
1983	10308	27	49735	76913	319437	--	--	--	--	-	--	--	--	--
5-Yr Avg. [4]	8131	35	38373	236605	172781	1341	10277	41868	19981	9472	44	48650	278474	192762
10-Yr Avg. [5]	5466	19	21846	154702	165416	875	5669	28869	15350	6341	24	27515	183571	180766

[1] Includes 197 recorded sockeye salmon in all subdistricts
[2] Includes 93 recorded sockeye salmon in all subdistricts
[3] Includes 11 recorded sockeye salmon in all subdistricts
[4] 1978-1982
[5] 1973-1982

Appendix A Table 2. The historical averages of aerial survey counts of chum salmon in selected streams in the Norton Sound District. Only complete surveys of good or excellent rating were considered.

Subdistrict and River	Average Aerial Survey Count	Number Years Used
Nome Subdistrict (1)		
Sinuk	4729	6
Nome	2841	7
Flambeau	5068	8
Eldorado	5264	7
Bonanza	1524	7
Solomon	834	5
Golovin Subdistrict (2)		
Fish	15108	9
Niukluk	17474	14
Boston	2729	14
Moses Point Subdistrict (3)		
Kwiniuk	28750 (Tower)	19
Tubutulik	10118	8
Norton Bay Subdistrict (4)		
Ungalik	2925	4
Inglutalik	5785	4
Shaktoolik Subdistrict (5)		
Shaktoolik	10521	8
Unalakleet Subdistrict (6)		
Unalakleet	17620	2
North R.	4744	3
North Fork	1247	3
Old Woman	1993	3

Appendix A Table 3. Age, sex, and size composition of chinook salmon sampled from the Moses Point Subdistrict commercial gillnet fishery with 140 to 152 mm (5-1/2" - 6") gear, 1983.

	Combined			Age Class								
				4-2			5-2			6-2		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	5	50.0	593.0	4	40.0	557.5	1	10.0	735.0	0	0	—
Female	5	50.0	825.0	1	10.0	610.0	1	10.0	815.0	3	30.0	900.0
Total	10	100.0	709.0	5	50.0	568.0	2	20.0	775.0	3	30.0	900.0
Standard Error[1]					15.8			12.6			14.5	

[1] Standard Error of the percent by age class.

Appendix A Table 4. Age, sex, and size composition of chinook salmon sampled from the Shaktoolik Subdistrict commercial gillnet fishery, 1983.

	Combined			Age Class								
				3-2			4-2			5-2		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	75	60.5	812.0	1	0.8	570.0	1	0.8	530.0	30	24.2	747.7
Female	49	39.5	855.2	0	0	—	0	0	—	10	8.1	800.0
Total	124	100.0	829.1	1	0.8	570.0	1	0.8	530.0	40	32.3	760.8
Standard Error					0.8			0.8			4.2	

	Age Class								
		6-2			6-3			7-3	
	No.	%	Length	No.	%	Length	No.	%	Length
Male	38	30.6	872.2	1	0.8	735.0	4	3.2	872.5
Female	39	31.5	869.4	0	0	—	0	0	—
Total	77	62.1	870.8	1	0.8	735.0	4	3.2	872.5
Standard Error[1]		4.4			0.8			1.6	

[1] Standard Error of the percent by age class.

Appendix A Table 5. Age, sex, and size composition of chinook salmon sampled from the Unalakleet Subdistrict commercial gillnet fishery, 1983.

	Combined			Age Class											
				3-2			4-2			5-2			6-2		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	103	64.0	809.8	1	0.6	517.0	4	2.5	536.5	44	27.3	773.4	54	33.5	865.1
Female	58	36.0	862.6	0	0	—	0	0	—	9	5.6	834.0	49	30.4	867.8
Subtotal	161	100.0	828.8	1	0.6	517.0	4	2.5	536.5	53	32.9	783.7	103	64.0	866.4
Samples Unsexed	293	100.0	816.6	1	0.3	505.0	11	3.8	601.8	95	32.4	770.8	186	63.5	854.4
Total	454	100.0	820.9	2	0.4	511.0	15	3.3	584.4	148	32.6	775.4	289	63.7	858.7
Standard Error[1]					0.3			0.8			2.2			2.3	

[1] Standard Error of the percent by age class.

Appendix A Table 6. Age, sex, and size composition of chinook salmon sampled from the Unalakleet River sport catch and from spawning ground surveys, 1983.

	Combined			Age Class								
				3-2			4-2			4-3		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	31	64.6	670.2	5	10.4	501.0	8	16.7	568.8	1	2.1	590.0
Female	17	35.4	854.0	0	0	—	1	2.1	545.0	0	0	—
Total	48	100.0	735.3	5	10.4	501.0	9	18.8	566.1	1	2.1	590.0
Standard Error[1]					4.5			5.7			2.1	

	Age Class											
		5-2			6-2			7-2			7-3	
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	11	22.9	738.2	6	12.5	835.0	0	0	—	0	0	—
Female	2	4.2	792.5	12	25.0	874.2	1	2.1	1065.0	1	2.1	835.0
Total	13	27.1	746.5	18	37.5	861.1	1	2.1	1065.0	1	2.1	835.0
Standard Error[1]		6.5			7.1			2.1			2.1	

[1] Standard Error of the percent by age class.

Appendix A Table 7. Age, sex, and size composition of chinook salmon sampled from the Unalakleet River test gillnet fishery, 1983.

	Combined			Age Class														
				4-2			5-2			5-3			6-2			7-2		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
210mm (8 1/4")																		
Male	3	33.3	810.7				1	11.1	580.0				2	22.2	926.0			
Female	6	66.7	829.5				1	11.1	760.0				4	44.4	831.0	1	11.1	893.0
Total	9	100.0	823.2				2	22.2	670.0				6	66.7	862.7	1	11.1	893.0
Standard Error[1]								14.7						16.7			11.1	
133mm (5 1/4")																		
Male	19	100.0	629.8	12	63.2	539.2	4	21.1	699.0				3	15.8	899.7			
Female																		
Total	19	100.0	629.8	12	63.2	539.2	4	21.1	699.0				3	15.8	899.7			
Standard Error[1]					11.4			9.6										
102 mm (4") or Smaller																		
Male	6	66.7	593.0	1	11.1	466.0	2	22.2	632.5	3	33.3	609.0						
Female	3	33.3	897.0										3	33.3	897.0			
Total	9	100.0	694.3	1	11.1	466.0	2	22.2	632.5	3	33.3	609.0	3	33.3	897.0			
Standard Error[1]					11.1			14.7			16.7			16.7				
Total																		
Male	28	75.7	641.3	13	35.1	533.6	7	18.9	663.0	3	8.1	609.0	5	13.5	910.2			
Female	9	24.3	852.0				1	2.7	760.0				7	18.9	859.3	1	2.7	893.0
Total	37	100.0	692.5	13	35.1	533.6	8	21.6	675.1	3	8.1	609.0	12	32.4	880.5	1	2.7	893.0
Standard Error[1]					8.0			6.9			4.5			7.8			2.7	

[1] Standard error of the percent by age class.

Appendix A Table 8. Age, sex, and size composition of chum salmon sampled from the Moses Point Subdistrict commercial gillnet fishery, 1983.

	Combined			Age Class											
				3-1			4-1			5-1			6-1		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	221	49.6	596.8	1	0.2	560.0	142	31.8	589.4	74	16.6	609.3	4	0.9	637.5
Female	225	50.4	578.2	1	0.2	520.0	137	30.7	570.2	87	19.5	591.4	0	0	—
Total	446	100.0	587.4	2	0.4	540.0	279	62.6	580.0	161	36.1	599.6	4	0.9	637.5
Standard Error[1]					0.3			2.3			2.3			0.4	

[1] Standard Error of the percent by age class.

Appendix A Table 9. Age, sex, and size composition of chum salmon sampled from the Shaktoolik Subdistrict commercial gillnet fishery, 1983.

	Combined			Age Class											
				3-1			4-1			5-1			6-1		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	68	73.1	612.7				38	40.9	599.1	29	31.2	626.2	1	1.1	735.0
Female	25	26.9	585.6				16	17.2	576.8	9	9.7	601.2			
Total	93	100.0	605.4				54	58.1	592.5	38	40.9	620.3	1	1.1	735.0
Standard Error [1]								5.1			5.1				

[1] Standard Error of the percent by age class.

Appendix A Table 10. Age, sex, and size composition of chum salmon sampled from the Unalakleet Subdistrict commercial gillnet fishery, 1983.

	Combined			Age Class											
				3-1			4-1			5-1			6-1		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	159	48.0	598	3	0.9	563	84	25.6	602	70	21.3	593	2	0.6	620
Female	171	52.0	591	0	0	--	105	32.0	570	66	20.1	625	0	0	--
Total	328	100.0	594	3	0.9	563	189	57.6	584	136	41.5	609	2	0.6	620
Standard Error[1]					0.5			2.7			2.7			0.4	

[1] Standard Error of the percent by age class.

Appendix A Table 11. Age, sex, and size composition of chum salmon sampled from the Kwiniuk River, 1983.

	Combined			Age Class											
				3-1			4-1			5-1			6-1		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	54	47.0	604.3				30	26.1	593.3	24	20.9	618.1			
Female	61	53.0	566.1				38	33.0	562.4	23	20.0	572.2			
Total	115	100.0	584.0				68	59.1	576.0	47	40.9	595.6			
Standard Error[1]								4.6			4.6				

[1] Standard Error of the percent by age class.

Appendix A Table 12. Weekly age, sex, and size composition of chum salmon sampled from the Unalakleet River test gillnet fishery.

	Combined			Age Class											
				3-1			4-1			5-1			6-1		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
133mm (5 1/4") and 149mm (5 7/8") gear															
Male															
Female	5	100.0	582.8							5	100.0	582.8			
Total	5	100.0	582.8							5	100.0	582.8			
6/10-6/12															
Male	8	57.1	610.8				2	14.3	578.0	6	42.9	621.7			
Female	6	42.9	581.0							6	42.9	581.0			
Total	14	100.0	598.1				2	14.3	578.0	12	85.7	601.4			
6/13-6/19															
Male	8	33.3	610.2				2	8.3	632.5	6	25.0	602.8			
Female	16	66.7	589.0				1	4.2	552.0	15	62.5	591.5			
Total	24	100.0	596.1				3	12.5	605.7	21	87.5	594.7			
6/20-6/26															
Male	19	42.2	591.1				7	15.6	606.7	12	26.7	582.0			
Female	26	57.8	584.3				10	22.2	573.1	16	35.6	591.2			
Total	45	100.0	587.1				17	37.8	586.9	28	62.2	587.3			
6/27-7/3															
Male	17	36.2	614.6				8	17.0	608.1	9	19.1	620.4			
Female	30	63.8	575.0				17	36.2	564.6	13	27.7	588.5			
Total	47	100.0	589.3				25	53.2	578.5	22	46.8	601.5			
7/4-7/10															

-Continued-

Appendix A Table 12. Weekly age, sex, and size composition of chum salmon sampled from the Unalakleet River test gillnet fishery (continued).

	Combined			Age Class											
				3-1			4-1			5-1			6-1		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
133mm (5 1/4") and 149mm (5 7/8") gear															
Male	32	31.4	589.8				16	15.7	579.1	16	15.7	600.5			
Female	70	68.6	571.8				43	42.2	566.6	27	26.5	580.1			
Total	102	100.0	577.5				59	57.8	570.0	43	42.2	587.7			
7/11-7/17															
Male	33	38.4	595.1				23	26.7	583.3	10	11.6	622.2			
Female	53	61.6	569.0				34	39.5	562.4	19	22.1	580.7			
Total	86	100.0	579.0				57	66.3	570.9	29	33.7	595.0			
7/18-7/24															
Male	19	30.6	601.3				12	19.4	587.2	7	11.3	625.4			
Female	43	69.4	576.0	1	1.6	520.0	31	50.0	568.2	10	16.1	602.1	1	1.6	612.0
Total	62	100.0	583.7	1	1.6	520.0	43	69.4	573.5	17	27.4	611.7	1	1.6	612.0
7/25-7/31															
Male	11	21.2	590.4	1	1.9	535.0	8	15.4	579.9	2	3.8	660.0			
Female	41	78.8	559.2	3	5.8	538.0	34	65.4	561.2	4	7.7	558.2			
Total	52	100.0	565.8	4	7.7	537.2	42	80.8	564.8	6	11.5	592.2			
8/1-8/7															
Male	7	26.9	600.3	0	0	—	5	19.2	594.6	2	7.7	614.5			
Female	19	73.1	568.2	1	3.8	540.0	15	57.7	569.9	3	11.5	569.0			
Total	26	100.0	576.8	1	3.8	540.0	20	76.9	576.1	5	19.2	587.2			
8/8-8/14															
Male	14	46.7	594.8	1	3.3	521.0	12	40.0	596.3	1	3.3	650.0			
Female	16	53.3	568.3	1	3.3	546.0	10	33.3	569.7	5	16.7	570.0			
Total	30	100.0	580.6	2	6.7	533.5	22	73.3	584.2	6	20.0	583.3			
8/15-8/21															
Male	6	27.3	602.2	0	0	—	5	22.7	591.8	1	4.5	654.0			
Female	16	72.7	566.8	1	4.5	513.0	12	54.5	564.6	3	13.6	593.7			
Total	22	100.0	576.5	1	4.5	513.0	17	77.3	572.6	4	18.2	608.8			
8/22-8/28															

-Continued-

Appendix A Table 12. Weekly age, sex, and size composition of chum salmon sampled from the Unalakleet River test gillnet fishery (continued).

	Combined			Age Class 3-1			4-1			5-1			6-1		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
133mm (5 1/4") and 149mm (5 7/8") gear															
Male	2	18.2	565.0				2	18.2	565.0	0	0	--			
Female	9	81.8	554.1				8	72.7	557.1	1	9.1	530.0			
Total	11	100.0	556.1				10	90.9	558.7	1	9.1	530.0			
8/29-9/4															
Male	0	0	--				0	0	--						
Female	7	100.0	579.4				6	85.7	573.5	1	14.3	615.0			
Total	7	100.0	579.4				6	85.7	573.5	1	14.3	615.0			
9/5-9/11															
Male	1	10.0	572.0	0	0	--	1	10.0	572.0	0	0	--			
Female	9	90.0	566.1	1	10.0	546.0	7	70.0	561.0	1	10.0	622.0			
Total	10	100.0	566.7	1	10.0	546.0	8	80.0	562.4	1	10.0	622.0			
9/12-9/18															
Totals 133mm (5 1/4") and 149mm (5 7/8")															
Male	177	32.6	597.3	2	0.4	528.0	103	19.0	589.2	72	13.3	610.8	0	0	—
Female	366	67.4	571.7	8	1.5	534.9	228	42.0	565.4	129	23.8	584.8	1	0.2	612.0
Total	543	100.0	580.0	10	1.8	533.5	331	61.0	572.8	201	37.0	594.1	1	0.2	612.0
Standard Error[1]					0.6			2.1			2.1			0.2	
Total 210mm (8 1/4") Gear															
Male	20	87.0	653.7				9	39.1	651.9	11	47.8	655.1			
Female	3	13.0	544.0				2	8.7	555.0	1	4.3	522.0			
Total	23	100.0	639.4				11	47.8	634.3	12	52.2	644.0			
Standard Error[1]								10.4			10.4				

-Continued-

Appendix A Table 12. Weekly age, sex, and size composition of chum salmon sampled from the Unalakleet River test gillnet fishery (continued).

	Combined			Age Class											
				3-1			4-1			5-1			6-1		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Total 102mm (4") Gear and variable mesh smaller than 102mm (4")															
Male	60	58.3	614.6				32	31.1	604.0	28	27.2	626.8			
Female	43	41.7	563.0				27	26.2	550.3	16	15.5	584.3			
Total	103	100.0	598.5				59	57.3	579.4	44	42.7	611.4			
Standard Error[1]								4.9			4.9				

[1] Standard Error of the percent by age class.

Appendix A Table 13. Age, sex, and size composition of coho salmon sampled from the Unalakleet River commercial gillnet fishery, 1983.

	Combined			Age Class								
				3-2			4-3			5-4		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	83	51.9	563.0	4	2.5	545.0	78	48.8	563.7	1	0.6	580.0
Female	77	48.1	567.6	4	2.5	566.2	72	45.0	568.5	1	0.6	510.0
Total	160	100.0	565.2	8	5.0	555.6	150	93.8	566.0	2	1.3	545.0
Standard Error [1]					1.2			1.3			0.6	

[1] Standard Error of the percent by age class.

Appendix A Table 14. Age, sex, and size composition of coho salmon sampled from the Unalakleet River test gillnet fishery, 1983.

	Combined			Age Class											
				3-2			4-3			4-4			5-4		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
133mm (5 1/4") and 149mm (5 7/8") gear															
Male	9	90.0	548.9				9	90.0	548.9						
Female	1	10.0	552.0				1	10.0	552.0						
Total	10	100.0	549.2				10	100.0	549.2						
7/25-7/31															
Male	15	93.8	564.5				15	93.8	564.5						
Female	1	6.2	575.0				1	6.2	575.0						
Total	16	100.0	565.1				16	100.0	565.1						
8/1-8/7															
Male	24	54.5	566.8				23	52.3	576.8	1	2.3	335.0			
Female	20	45.5	563.1				20	45.5	563.1						
Total	44	100.0	565.1				43	97.7	570.4	1	2.3	335.0			
8/8-8/14															
Male	7	50.0	579.7				7	50.0	579.7						
Female	7	50.0	559.6				6	42.9	558.7				1	7.1	565.0
Total	14	100.0	569.6				13	92.9	570.0				1	7.1	565.0
8/15-8/21															
Male	5	45.5	549.2				5	45.5	549.2						
Female	6	54.5	555.2				6	54.5	555.2						
Total	11	100.0	552.5				11	100.0	552.5						
8/22-8/28															

-Continued-

Appendix A Table 14. Age, sex, and size composition of coho salmon sampled from the Unalakleet River test gillnet fishery, 1983 (continued).

	Combined			Age Class											
				3-2			4-3			4-4			5-4		
	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
133mm (5 1/4") and 149mm (5 7/8") gear															
Male	10	45.5	565.4				10	45.5	565.4						
Female	12	54.5	572.0				12	54.5	572.0						
Total	22	100.0	569.0				22	100.0	569.0						
8/29-9/4															
Male	9	29.0	572.3				9	29.0	572.3						
Female	22	71.0	570.4				22	71.0	570.4						
Total	31	100.0	570.9				31	100.0	570.9						
9/5-9/11															
Male	15	53.6	588.7				15	53.6	588.7						
Female	13	46.4	585.5				13	46.4	585.5						
Total	28	100.0	587.2				28	100.0	587.2						
9/12-9/18															
Male	4	50.0	593.5	1	12.5	632.0	2	25.0	573.5				1	12.5	595.0
Female	4	50.0	551.0	0	0		4	50.0	551.0				0	0	
Total	8	100.0	572.2	1	12.5	632.0	6	75.0	558.5				1	12.5	595.0
9/19-9/25															
Totals															
Male	98	53.3	569.6	1	0.5	632.0	95	51.6	571.2	1	0.5	335.0	1	0.5	595.0
Female	86	46.7	568.2	0	0		85	46.2	568.2	0	0		1	0.5	565.0
Total	184	100.0	568.9	1	0.5	632.0	180	97.8	569.8	1	0.5	335.0	2	1.1	580.0
Standard Error[1]					0.5			1.1			0.5			0.8	
102mm (4") or smaller gear															
Male	72	75.8	572.7				71	74.7	574.1				1	1.1	475.0
Female	23	24.2	557.0				22	23.2	559.2				1	1.1	508.0
Total	95	100.0	568.9				93	97.9	570.6				2	2.1	491.5
Standard Error[1]								1.1						1.1	

[1] Standard Error of the proportion for each age class.

Appendix A Table 15. Age, sex, and size composition of Norton Sound sockeye salmon, sampled from the Unalakleet River test net fishery, 1983. Samples combined for 149 mm (5-7/8"), 133 mm (5-1/4"), 210 mm (8-1/4"), 102 mm (4"), and variable mesh gillnets.

	Combined			Age Class											
				4-2			5-2			5-3					
Sex	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length	No.	%	Length
Male	4	66.7	570.8	0	0		3	50.0	588.7	1	16.7	517.0			
Female	2	33.3	533.5	1	16.7	518.0	1	16.7	549.0	0	0				
Total	6	100.0	558.4	1	16.7	518.0	4	66.7	578.8	1	16.7	517.0			
Standard Error[1]					16.7			21.1			16.7				

1 Standard Error of the proportion for each age class.

APPENDIX B

Tables 1 - 10

KOTZEBUE SOUND

Appendix B Table 1. Total annual chum salmon returns (in thousands) to the Kotzebue region, 1962-1983.

Year	Escapement Index	Commercial Catch	Subsistence Catch(1)	Total Return
1962	180.5	129.9	21.4	331.8
1963	88.6	54.4	14.3	157.3
1964	117.8	74.5	17.0	209.3
1965	109.3	40.0	19.6	168.9
1966	110.5	30.8	9.6	150.9
1967	61.0	29.4	10.2	100.6
1968	53.1	30.4	12.3	95.8
1969	51.0	59.3	13.3	123.6
1970	161.5	159.7	22.7	343.9
1971	71.7	155.0	20.9	247.6
1972	91.2	169.7	10.6	271.5
1973	186.5	375.4	15.8	577.7
1974	251.4	627.4	19.7	898.5
1975	157.8	553.0	23.1	733.9
1976	57.6	159.8	9.9	227.3
1977	93.8	195.9	4.1	288.0
1978	48.1	111.5	11.3	170.9
1979	29.2	141.6	9.4	180.2
1980	216.7	367.3	8.5	592.5
1981	154.4	677.2	11.8	843.4
1982	148.5	417.8	23.7	590.0
1983	139.1	175.7	12.9	327.7
Mean	117.2	215.3	14.6	346.9
Std. Dev.	59.8	198.5	5.6	245.4

(1) Includes only Kotzebue and Kobuk River Villages. Noatak Village subsistence catch is considered part of the escapement index.

Appendix B Table 2. Average aerial survey counts of chum salmon in selected streams in the Kotzebue District. Only complete surveys of good or excellent rating were considered.

River	Average Aerial Survey Count	Number of Years Used	Years Excluded
Noatak (including Kelly and Eli Rivers)	84,160	6	(1963, 65, 72, 77, 81, 82)
Squirrel	11,008	10	(1977, 79)
Salmon	6,184	7	(1965, 70, 72, 77, 79)
Tutuksuk	2,362	4	(1965, 68, 70, 72, 73, 75, 77 & 79)
Upper Kobuk R. (between Kobuk and the lower canyon)	11,160	9	(1973, 76, 77)

Appendix B Table 3. Chum salmon age, sex, and length (mm) sampled from the Kotzebue Sound commercial set gillnet fishery, by statistical sampling period, 1983.

Period 1: July 12 - July 29, 1983

	Age Class				
	31	41	51	61	Total
Males					
Percent	.50	20.40	24.50	1.60	47.00
Avg. Length	570.00	623.94	646.90	655.00	636.37
Std. Error[1]	20.00	4.02	4.11	10.33	2.79
Sample Size	2	78	94	6	180
Females					
Percent	0.00	24.30	27.40	1.30	53.00
Avg. Length	0.00	597.87	614.99	641.00	607.79
Std. Error[1]	0.00	3.32	2.60	5.57	2.03
Sample Size	0	93	105	5	203
Sexes Combined					
Percent	.50	44.70	51.90	2.90	100.00
Avg. Length	570.00	609.76	630.06	648.64	621.22
Std. Error[1]	20.00	2.57	2.38	6.18	1.70
Sample Size	2	171	199	11	383

Period 2: August 1 - August 6, 1983

	Age Class				
	31	41	51	61	Total
Males					
Percent	1.80	25.50	13.20	1.60	42.10
Avg. Length	564.00	619.74	643.37	676.67	626.84
Std. Error[1]	10.13	3.13	3.79	10.39	2.31
Sample Size	7	99	51	6	163
Females					
Percent	1.00	35.00	21.40	.50	57.90
Avg. Length	550.00	591.59	610.12	630.00	598.06
Std. Error[1]	7.36	2.56	3.51	50.00	2.07
Sample Size	4	135	83	2	224
Sexes Combined					
Percent	2.80	60.50	34.60	2.10	100.00
Avg. Length	558.91	603.50	622.77	665.00	610.18
Std. Error[1]	6.98	1.98	2.61	14.73	1.54
Sample Size	11	234	134	8	387

-Continued-

Appendix B Table 3. Chum salmon age, sex, and length (mm) sampled from the Kotzebue Sound commercial set gillnet fishery, by statistical sampling period, 1983 (continued).

Period 3: August 8 - August 12, 1983

	Age Class 31	41	51	61	Total
Males					
Percent	2.90	24.10	9.20	.40	36.60
Avg. Length	564.54	609.85	631.56	633.50	611.99
Std. Error[1]	9.43	3.02	9.86	14.50	3.27
Sample Size	13	107	41	2	163
Females					
Percent	2.70	48.60	11.70	.40	63.40
Avg. Length	558.33	585.44	613.44	615.00	589.66
Std. Error[1]	7.12	1.85	4.50	5.00	1.67
Sample Size	12	216	52	2	282
Sexes Combined					
Percent	5.60	72.58	20.90	.90	100.00
Avg. Length	561.56	593.53	621.43	624.25	597.84
Std. Error[1]	5.98	1.59	5.02	7.67	1.60
Sample Size	25	323	93	4	445

Period 4: August 18 - August 19, 1983

	Age Class 31	41	51	Total
Males				
Percent	1.10	28.60	17.60	47.30
Avg. Length	523.00	626.69	638.19	628.56
Std. Error[1]	0.00	7.11	10.18	5.86
Sample Size	1	26	16	43
Females				
Percent	3.30	38.40	11.00	52.70
Avg. Length	550.33	586.51	600.10	587.08
Std. Error[1]	6.44	5.15	9.56	4.27
Sample Size	3	35	10	48
Sexes Combined				
Percent	4.40	67.00	28.60	100.00
Avg. Length	543.50	603.64	623.54	606.68
Std. Error[1]	6.44	4.23	7.26	3.56
Sample Size	4	61	26	91

[1] Standard error of the average length.

Appendix B Table 4. Age, sex, and length (mm) of chum salmon in the Kotzebue Sound commercial catch, by commercial fishing period, 1983.

Period 1: 7/11-7/12

	Age Class			
	41	51	61	Total
Males				
Percent	20.60	28.60		49.20
Avg. Length	606.08	629.61		619.74
Std. Error[1]	8.79	7.58		5.74
Sample Size	13	18		31
Females				
Percent	25.40	25.40		50.80
Avg. Length	583.50	587.62		585.56
Std. Error[1]	7.91	7.21		5.35
Sample Size	16	16		32
Sexes Combined				
Percent	46.00	54.00		100.00
Avg. Length	593.62	609.85		602.38
Std. Error[1]	5.88	5.26		3.92
Sample Size	29	34		63

Period 2: 7/14-7/15

	Age Class			
	41	51	61	Total
Males				
Percent	18.20	20.00	3.60	41.80
Avg. Length	601.50	641.82	665.00	626.31
Std. Error[1]	7.64	10.49	5.00	6.03
Sample Size	10	11	2	23
Females				
Percent	25.50	30.90	1.80	58.20
Avg. Length	596.79	615.88	630.00	607.97
Std. Error[1]	9.15	6.29	0.00	5.38
Sample Size	14	17	1	32
Sexes Combined				
Percent	43.70	50.90	5.40	100.00
Avg. Length	598.75	626.07	653.33	615.64
Std. Error[1]	6.21	5.62	5.00	4.02
Sample Size	24	28	3	55

-Continued-

Appendix B Table 4. Age, sex, and length (mm) of chum salmon in the Kotzebue Sound commercial catch, by commercial fishing period, 1983 (continued).

Period 3: 7/18-7/19

	Age Class			
	41	51	61	Total
Males				
Percent	24.70	24.60	1.50	50.80
Avg. Length	625.19	652.50	695.00	640.55
Std. Error[1]	7.86	6.75	0.00	5.18
Sample Size	16	16	1	33
Females				
Percent	21.50	27.70	0.00	49.20
Avg. Length	594.00	620.44	0.00	608.87
Std. Error[1]	8.54	5.12	0.00	4.72
Sample Size	14	18	0	32
Sexes Combined				
Percent	46.20	52.30	1.50	100.00
Avg. Length	610.63	635.53	695.00	624.95
Std. Error[1]	5.78	4.18	0.00	3.50
Sample Size	30	34	1	65

Period 4: 7/21-7/22

	Age Class				
	31	41	51	61	Total
Males					
Percent	1.50	19.10	26.40	1.50	48.50
Avg. Length	550.00	635.38	670.56	625.00	651.67
Std. Error[1]	0.00	11.91	6.69	0.00	6.33
Sample Size	1	13	18	1	33
Females					
Percent	0.00	17.60	32.40	1.50	51.50
Avg. Length	0.00	597.92	619.73	645.00	612.97
Std. Error[1]	0.00	8.27	5.16	0.00	4.44
Sample Size	0	12	22	1	35
Sexes Combined					
Percent	1.50	36.70	58.80	3.00	100.00
Avg. Length	550.00	617.40	642.60	635.00	631.75
Std. Error[1]	0.00	7.36	4.14	0.00	3.81
Sample Size	1	25	40	2	68

-Continued-

Appendix B Table 4. Age, sex, and length (mm) of chum salmon in the Kotzebue Sound commercial catch, by commercial fishing period, 1983 (continued).

Period 5: 7/25-7/26

	Age Class			
	41	51	61	Total
Males				
Percent	14.80	32.70	3.30	50.80
Avg. Length	628.89	645.30	640.00	640.19
Std. Error[1]	8.11	9.11	0.00	6.77
Sample Size	9	20	2	31
Females				
Percent	19.70	26.20	3.30	49.20
Avg. Length	590.00	624.37	645.00	612.00
Std. Error[1]	9.98	5.10	15.00	4.93
Sample Size	12	16	2	30
Sexes Combined				
Percent	34.50	58.90	6.60	100.00
Avg. Length	606.67	636.00	642.50	626.33
Std. Error[1]	6.68	5.54	15.00	4.17
Sample Size	21	36	4	61

Period 6: 7/28-7/29

	Age Class				
	31	41	51	61	Total
Males					
Percent	1.40	23.90	15.50	0.00	40.80
Avg. Length	590.00	638.24	636.36	0.00	635.86
Std. Error[1]	0.00	9.26	20.02	0.00	9.67
Sample Size	1	17	11	0	29
Females					
Percent	0.00	35.30	22.50	1.40	59.20
Avg. Length	0.00	613.60	619.37	640.00	616.43
Std. Error[1]	0.00	5.47	6.27	0.00	4.14
Sample Size	0	25	16	1	42
Sexes Combined					
Percent	1.40	59.20	38.00	1.40	100.00
Avg. Length	590.00	623.57	626.29	640.00	624.37
Std. Error[1]	0.00	4.96	8.96	0.00	4.63
Sample Size	1	42	27	1	71

-Continued-

Appendix B Table 4. Age, sex, and length (mm) of chum salmon in the Kotzebue Sound commercial catch, by commercial fishing period, 1983 (continued).

Period 7: 8/1-8/3

	Age Class				
	31	41	51	61	Total
Males					
Percent	1.00	28.40	14.10	2.40	45.90
Avg. Length	572.50	619.31	644.86	683.80	629.63
Std. Error[1]	17.50	4.41	5.24	9.24	3.22
Sample Size	2	58	29	5	94
Females					
Percent	.50	27.70	25.40	.50	54.10
Avg. Length	550.00	592.23	605.81	680.00	599.00
Std. Error[1]	0.00	4.63	4.99	0.00	3.40
Sample Size	1	57	52	1	111
Sexes Combined					
Percent	1.50	56.10	39.50	2.90	100.00
Avg. Length	565.00	605.89	619.79	683.17	613.04
Std. Error[1]	17.50	3.20	3.71	9.24	2.36
Sample Size	3	115	81	6	205

Period 8: 8/4-8/6

	Age Class				
	31	41	51	61	Total
Males					
Percent	2.70	22.60	12.10	.50	37.90
Avg. Length	560.60	620.34	641.41	641.00	623.03
Std. Error[1]	13.22	4.34	5.52	0.00	3.31
Sample Size	5	41	22	1	69
Females					
Percent	1.60	43.00	17.00	.50	62.10
Avg. Length	550.00	591.12	617.35	580.00	597.13
Std. Error[1]	10.41	2.87	4.03	0.00	2.31
Sample Size	3	78	31	1	113
Sexes Combined					
Percent	4.30	65.60	29.10	1.00	100.00
Avg. Length	556.62	601.19	627.34	610.50	606.95
Std. Error[1]	9.14	2.40	3.29	0.00	1.91
Sample Size	8	119	53	2	182

-Continued-

Appendix B Table 4. Age, sex, and length (mm) of chum salmon in the Kotzebue Sound commercial catch, by commercial fishing period, 1983 (continued).

Period 9: 8/8-8/10

	Age Class				
	31	41	51	61	Total
Males					
Percent	2.20	30.90	9.00	.90	43.00
Avg. Length	548.40	609.42	630.30	633.50	611.09
Std. Error[1]	10.69	3.14	18.81	14.50	4.57
Sample Size	5	69	20	2	96
Females					
Percent	1.80	45.80	9.00	.40	57.00
Avg. Length	545.50	591.42	620.75	610.00	594.74
Std. Error[1]	13.96	2.60	6.34	0.00	2.37
Sample Size	4	102	20	1	127
Sexes Combined					
Percent	4.00	76.70	18.00	1.30	100.00
Avg. Length	547.11	598.68	625.53	625.67	601.78
Std. Error[1]	8.59	2.00	9.93	14.50	2.39
Sample Size	9	171	40	3	223

Period 10: 8/11-8/12

	Age Class				
	31	41	51	61	Total
Males					
Percent	3.60	17.10	9.50	0.00	30.20
Avg. Length	574.62	610.63	632.76	0.00	613.27
Std. Error[1]	13.01	6.37	7.69	0.00	4.61
Sample Size	8	38	21	0	67
Females					
Percent	3.60	51.30	14.40	.50	69.80
Avg. Length	564.75	580.09	608.87	620.00	585.50
Std. Error[1]	7.75	2.55	6.08	0.00	2.30
Sample Size	8	114	32	1	155
Sexes Combined					
Percent	7.20	68.40	23.90	.50	100.00
Avg. Length	569.68	587.73	618.34	620.00	593.88
Std. Error[1]	7.57	2.49	4.77	0.00	2.13
Sample Size	16	152	53	1	222

-Continued-

Appendix B Table 4. Age, sex, and length (mm) of chum salmon in the Kotzebue Sound commercial catch, by commercial fishing period, 1983 (continued).

Period 11: 8/11-8/12

	Age Class 31	41	51	Total
Males				
Percent	1.10	28.60	17.60	47.30
Avg. Length	523.00	626.69	638.19	628.56
Std. Error[1]	0.00	7.11	10.18	5.86
Sample Size	1	26	16	43
Females				
Percent	3.30	38.40	11.00	52.70
Avg. Length	550.33	586.51	600.10	587.08
Std. Error[1]	6.44	5.15	9.56	4.27
Sample Size	3	35	10	48
Sexes Combined				
Percent	4.40	67.00	28.60	100.00
Avg. Length	543.50	603.64	623.54	606.68
Std. Error[1]	6.44	4.23	7.26	3.56
Sample Size	4	61	26	91

[1] Standard Error of the average length.

Appendix B Table 5. Noatak River chum salmon sex, age, and length (mm), 1983. Fish were sampled from Noatak test fish project using 149 mm (5-7/8") mesh set gillnets. Age based on scale samples.

	Age Class				
	31	41	51	61	Total
Males					
Percent	5.40	16.60	9.30	0.60	31.90
Avg. Length	558.54	607.65	636.73	625.00	608.14
Std. Error[1]	8.84	4.13	6.59	19.63	3.27
Sample Size	26	78	44	3	151
Females					
Percent	4.60	42.30	19.60	1.60	68.10
Avg. Length	561.36	591.33	614.00	625.12	596.62
Std. Error[1]	4.80	1.91	2.92	11.28	1.51
Sample Size	22	199	93	8	322
Sexes Combined					
Percent	10.00	58.90	28.90	2.20	100.00
Std. Error[2]	1.4	2.3	2.1	0.7	
Avg. Length	559.84	595.93	621.31	625.09	600.30
Std. Error[1]	5.27	1.80	2.90	9.80	1.47
Sample Size	48	277	137	11	473

[1] Standard Error of the average length.
[2] Standard Error of the age class percent.

Appendix B Table 6. Chum salmon age, sex, and length data collected from Kelly Lake, in the Noatak River drainage, 1983. Age based on sagital otoliths; fish collected by snagging with sport tackle.

	Age Class				
Males	31	41	51	61	Total
Percent		34.0	28.0	10.0	72.0
Avg. Length		646.1	681.2	696.4	666.8
Std. Error[1]		38.5	27.7	31.4	38.6
Sample Size		17	14	5	36
Females					
Percent	2.0	16.0	10.0		28.0
Avg. Length	610.0	604.1	653.0		618.4
Std. Error[1]		24.2	35.0		29.7
Sample Size	1	8	5		14
Both Sexes					
Percent	2.0	50.0	38.0	10.0	100.0
Std. Error[2]	2.0	7.1	6.9	4.3	
Avg. Length	610.0	632.7	671.1	696.4	653.2
Std. Error[1]		39.5	31.7	31.4	42.2
Sample Size	1	25	19	5	50

[1] Standard Error of the average length.
[2] Standard Error of the age class percent.

Appendix B Table 7. Chum salmon age, sex, and length data collected from Salmon River, 1983 in the Kobuk drainage. Age based on sagital otolith; fish collected by snagging with sport tackle.

	Age Class				
Males	31	41	51	61	Total
Percent	5.9	31.4	21.6	3.9	62.8
Avg. Length	534.0	608.7	614.9	678.0	608.2
Std. Error[1]	46.0	29.1	16.7	11.3	38.8
Sample Size	3	16	11	2	32
Females					
Percent	3.9	21.6	9.8	2.0	37.2
Avg. Length	555.0	595.5	580.0	617.0	588.3
Std. Error[1]	28.3	30.4	28.8		31.0
Sample Size	2	11	5	1	19
Both Sexes					
Percent	9.8	52.9	31.4	5.9	100.0
Std. Error[2]	4.2	7.1	6.6	3.3	
Avg. Length	542.4	603.3	604.0	657.7	600.7
Std. Error[1]	37.3	29.8	26.2	36.1	37.1
Sample Size	5	27	16	3	51

[1] Standard Error of the average length.
[2] Standard Error of the age class percent.

Appendix B Table 8. Chum salmon age, sex, and length data collected from Selby Slough on the Kobuk River, 1983. Age based on sagital otoliths; fish collected by snagging with sport tackle.

	Age Class				
Males	31	41	51	61	Total
Percent	10.2	26.5	16.3		53.1
Avg. Length	600.6	626.1	628.8		622.0
Std. Error[1]	20.3	25.6	39.9		29.0
Sample Size	5	13	8		26
Females					
Percent	6.1	32.7	8.2		46.9
Avg. Length	553.3	598.6	599.3		592.8
Std. Error[1]	54.4	48.8	40.8		48.1
Sample Size	3	16	4		23
Both Sexes					
Percent	16.3	59.2	24.5		100.0
Std. Error[2]	5.3	7.1	6.2		
Avg. Length	582.9	610.9	619.0		608.3
Std. Error[1]	33.1	38.4	40.2		39.0
Sample Size	8	29	12		49

1 Standard Error of the average length.
2 Standard Error of the age class percent.

Appendix B Table 9. Chum salmon age, sex, and length data collected from Beaver Creek in the Kobuk River drainage, 1983. Age based on sagital otolith; fish collected by snagging with sport tackle.

	Age Class				
Males	31	41	51	61	Total
Percent	4.0	48.0	20.0		70.0
Avg. Length	593.0	620.5	623.0		619.6
Std. Error[1]	35.4	24.2	33.0		27.4
Sample Size	2	23	10		35
Females					
Percent	6.0	18.0	26.0		30.0
Avg. Length	578.0	588.3	613.7		591.3
Std. Error[1]	20.7	18.5	37.9.		24.8
Sample Size	3	9	3		15
Both Sexes					
Percent	10.0	64.0	26.0		100.0
Std. Error[2]	4.3	6.9	6.3		
Avg. Length	584.0	611.4	620.9		611.1
Std. Error[1]	24.4	26.8	32.8		29.4
Sample Size	5	32	13		50

1 Standard Error of the average length.
2 Standard Error of the age class percent.

Appendix B Table 10. Comparative age and sex composition of Kotzebue District chum salmon, 1962-1983.

Year	Sample Size	Percent Males	Percent Females	Percent Age Class 31	41	51	61
1962	69	26.1	73.9	8.7	62.3	27.5	1.5
1963	255	35.0	65.0	32.6	47.4	18.8	1.2
1964	463	43.6	56.4	55.7	42.5	1.8	0.0
1965	480	42.1	57.9	2.7	92.3	5.0	0.0
1966	430	40.2	59.8	8.6	65.8	25.6	0.0
1967	1865	37.3	62.7	7.6	70.9	20.7	0.7
1968	1989	48.2	51.8	20.3	57.3	21.4	1.0
1969	1125	53.7	46.3	24.5	70.7	4.9	0.0
1970	267	45.3	54.7	3.7	92.6	3.7	0.0
1971	1105	54.6	45.4	10.6	61.3	28.0	0.0
1972	980	50.9	49.1	16.6	59.7	23.3	0.4
1973	598	46.0	54.0	16.4	68.0	15.6	0.0
1974	350	47.1	52.9	35.2	58.8	6.0	0.0
1975	340	46.4	63.6	3.6	70.9	26.5	0.0
1976	566	47.9	52.1	17.0	54.2	28.8	0.0
1977	446	49.3	50.7	8.1	71.8	18.1	2.0
1978	579	49.9	50.1	18.5	51.8	29.4	0.3
1979	658	53.3	46.7	28.3	54.0	15.4	2.7
1980	710	56.4	43.6	16.6	77.6	5.8	0.1
1981	1167	52.4	47.6	3.9	69.4	26.7	0.0
1982	983	48.8	51.2	7.5	47.8	38.5	6.1
1983	1979	43.4	56.6	5.7	57.1	34.9	2.3

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