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KOTZEBUE SOUND CHUM SALMON (*Oncorhynchus keta*) ESCAPEMENT AND RETURN DATA, 1962-1984

By:
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July 1985

ALASKA DEPARTMENT OF FISH AND GAME
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Commissioner

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ABSTRACT

Kotzebue Sound chum salmon *(Oncorhynchus keta)* escapement and return data have been compiled from all available sources into this report for the purpose of critical review and summarization. Where possible, original data forms were consulted for age composition. Published and unpublished Department reports provided commercial fishery and escapement statistics. A brief outline is given for each seasons escapement and return data quality.

KEY WORDS: Pacific salmon, *Oncorhynchus keta*, escapement and return, Kotzebue Sound, Alaska.

INTRODUCTION

The Kotzebue Sound district includes all waters from Point Hope south to Cape Prince of Wales. Since 1968, commercial salmon fishing in the Kotzebue District has been restricted to ocean waters north of the Baldwin Peninsula (Figure 1). Although minor contributions are made by other streams in the district, the Noatak and Kobuk River drainages produce virtually all commercially harvested salmon *(Oncorhynchus* sp.*)*.

The occurrence of five species of Pacific salmon has been noted in Kotzebue Sound but chum salmon *(O. keta)* make up the overwhelming majority. Chinook salmon *(O. tshawytscha)*, Arctic char *(Salvelinus alpinus)* and sheefish *(Stenodus leucichthys)* are also commercially harvested but in minor numbers (ADF&G 1962a-1983a). Significant numbers of pink salmon *(O. gorbuscha)* have been noted in the district (Bigler 1983a) but an assessment of abundance has not been attempted.

Estimated annual chum salmon returns prior to 1974 averaged just over 230,000. Over the last 10 years (1974-1984) the average estimated annual returns increased to nearly 480,000 fish. During this period the annual chum salmon commercial harvest averaged 342,000 distributed among approximately 190 fishermen, the subsistence harvest has averaged 13,600, and the annual total escapement has averaged 124,000 chum salmon.

The purpose of this report is to review and summarize, in a single document, Kotzebue Sound annual chum salmon escapement, return, and age composition data for the years 1962-1984. Chum salmon data collected from this region are published in several documents. The condensation of data contained in all sources will provide easy access and simplify data management. Additionally, this report will establish a standardized procedure to deal with incomplete escapement data.

Mixed Noatak and Kobuk River chum salmon stocks are harvested in the Kotzebue Sound commercial fishing district. Spatial and temporal migration characteristics of these stocks have been examined in two separate mark and recapture experiments (Yanagawa 1968; Dinnocenzo 1982; Bigler and Burwen 1984). These studies indicate sufficient overlap in the distribution of stocks in the fishery to preclude use of spatial or temporal tendencies alone in assigning river of origin to commercial catches. Until the relative contribution of these two stocks to the commercial catch can be determined, isolating returns to each river is not possible.

Throughout this paper age classes are designated by only one digit (3,4,5,6), which is an abbreviation of the Gilbert-Rich formula where the numerical subscript pertaining to freshwater age (always a "1" for chum salmon) is deleted.

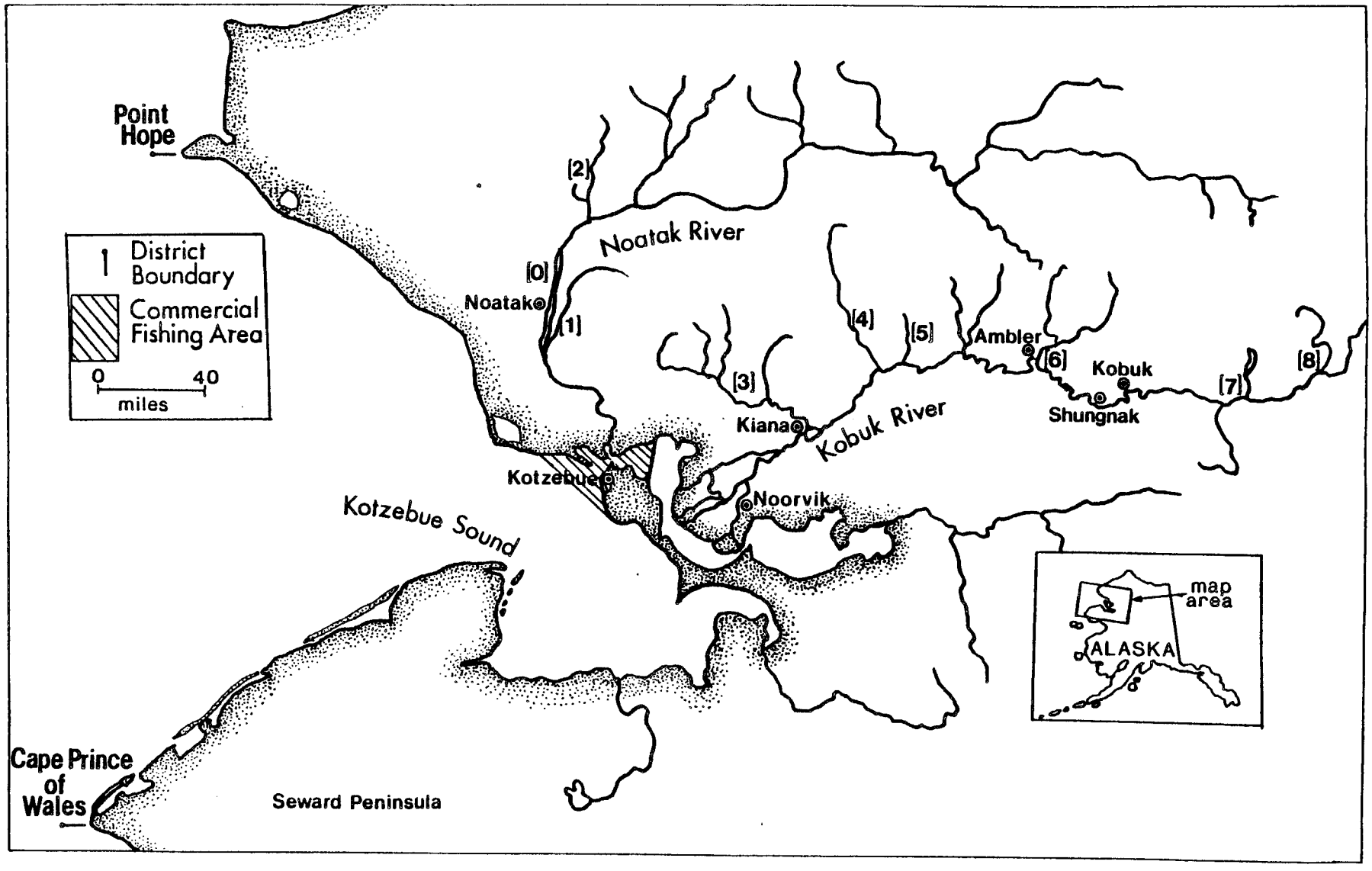

Figure 1. Kotzebue Sound commercial salmon fishing district and major chum salmon spawning index areas of the Noatak and Kobuk Rivers: [0] - Noatak River, [1] - Eli River, [2] - Kelly Lake and Creek, [3] - Squirrel River, [4] - Salmon River, [5] - Tutuksuk River, and combined to represent the upper Kobuk River, [6] - Ambler River, [7] - Selby Slough and, [8] - Beaver Creek.

METHODS

Age Composition

Age composition data are based on analysis of scale samples collected from commercial, subsistence, and test net catches and spawning ground surveys using standard techniques (Sharr 1982). Findings by Bernard (1982) demonstrated sample size requirements to achieve specified levels of precision and accuracy in salmon age, sex, or size composition data. For chum salmon, a minimum of 450 samples must be collected over a given period of time to achieve levels of precision and accuracy of 0.10 and 0.05, respectively. This means that there is a 1 in 10 chance that the true proportion of a given age class is not bracketed by plus or minus 5% of the proportion obtained in the sample.

Original Age-Weight-Length (AWL) forms stored in the Anchorage archives formed the primary source for age composition data listed in this report. The author found an acceptable aging accuracy through spot checks of several original forms and scale acetate cards. Where original forms were not available, summary data contained in the AYK Region Age, Sex, and Size Composition of Salmon Report series were used.

Because commercial catch samples are collected throughout each fishing season it is possible to weight the estimate of total annual age class percentage:

$$\text{Percent Agei} = \frac{\sum_{i=1}^{n} \text{Percent Ageij (Catchj)}}{\sum_{i=1}^{n} \text{Catchj}}$$

Where "Percent Agei" is the annual weighted percentage of age class i, "Percent Ageij" is the percentage of age class i in the jth commercial fishing period, and "Catchj" is the commercial harvest in the jth fishing period.

Where sufficient data have been collected, age composition of Noatak and Kobuk River escapements are weighted by collection site, using an expression similar to the above (Appendix A).

Commercial Harvest

The Commercial Fisheries Division of ADF&G has prepared an Annual Management Report (AMR) for the Kotzebue Sound district commercial fishery since 1962 (ADF&G 1962a-1983a). These reports provide annual commercial and subsistence harvest statistics for the Kotzebue Sound district. While all other elements of the data base contain uncertainties as to accuracy for interpretation, the commercial catch and related statistics are considered the most error-free source of data. Enumeration data are based on fish sold to commercially

licensed processors who are under legal obligation to report such information (Appendix B).

Subsistence Harvest

Subsistence harvest figures listed have been compiled only from Kotzebue and Kobuk River villages. Subsistence fishing effort on the Noatak River typically does not begin until late September or early October, which is after aerial surveys are normally conducted. Noatak village subsistence catches are not included in order to avoid double counting.

Two methods are employed to collect subsistence information in the Kotzebue region: 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. 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. Usually, less than 5% of all subsistence catch calendars are returned. Both methods only document the subsistence harvest of known or available fishermen and should be considered a minimum estimate only.

Escapement

Aerial surveys of the Noatak and Kobuk Rivers have been attempted each year since 1962 with varying degrees of success (Appendix C). Aerial survey estimates are derived by the estimation of spawner abundance from small, single engine aircraft, which must fly low and slow over the spawning grounds. Surveys are rated "Good" when conditions are most ideal for counting, i.e., low, clear water conditions coupled with calm winds and clear skies. As weather and water conditions deteriorate, surveys may receive ratings of "Fair" or "Poor". Even under ideal conditions aerial survey results are considered minimum estimates of escapement due to spawner die off and replacement during the spawning period and the fact that substantial numbers may not be observed on single surveys. Aerial surveys are conducted coincident with anticipated peaks of chum salmon abundance on the Noatak and Kobuk River spawning grounds (Table 1) as documented in the Norton Sound/Kotzebue Sound Stream Catalog (ADF&G 1983b).

Estimation of Missing Escapement Data

Aerial survey results from primary escapement index streams were assembled and examined for each season since 1962 (Appendix C). Some annual surveys were found to have been performed under poor weather and/or water conditions, others were found to have not included the entire spawning area. Accordingly, surveys not performed under optimum conditions are not considered a realistic representation of escapement and receive overall ratings of "Poor". For the purpose of this paper, judgment of whether peak surveys represent reasonable estimates of escapement abundance is dependent upon associated ratings of quality meeting two conditions:

1) The peak aerial survey of the Noatak River had to be rated at

Table 1. Periods of expected peak chum salmon abundance on index spawning grounds of the Kotzebue Sound district (ADF&G 1983c).

Major Drainage	Spawning Stream	Peak Spawning Period
Noatak		
	Eli River	8/15 - 9/15
	Kelly River	8/20 - 9/20
	Kelly Lake	8/20 - 9/20
	Main Noatak River	8/20 - 9/20
Kobuk		
	Squirrel River	8/4 - 8/20
	Salmon River	8/4 - 8/20
	Tutuksuk River	8/4 - 8/20
	Main Kobuk (Headwaters area)	8/25 - 9/20

least "Fair".

2) The majority of aerial surveys conducted on other streams had to be rated at least "Fair". That is, if condition #1 is met, a simple majority of the six remaining index areas had to be rated "Good" or "Fair".

Peak annual aerial escapement survey results which met the two above conditions were pooled to represent annual escapement estimates for the region. Pooled escapement estimates for each season were then correlated with fisheries statistics that may relate to population size (commercial and subsistence harvest, commercial CPUE (Catch per Boat-Hour), subsistence and commercial catch per fisherman, and the average weight of chum salmon in the commercial catch). A significant correlation with one or more variables would allow estimation of escapement values, for seasons not meeting the established conditions, using the identified mathematical relationship.

RESULTS AND DISCUSSION

As much as possible, original documents were consulted as data sources for this paper. Several non-original sources, which carry summary tables from year to year, were found to include typographical errors that did not agree with original documents. For this reason, this paper supersedes most previous work as a source for Kotzebue Sound chum salmon escapement and return information.

Age Composition

Some of the Kotzebue Sound chum salmon age, sex, and size reports contain brief narratives which discuss a time-related age class shift in chum salmon populations (ADF&G 1964b, 1965b, 1966b; Geiger, et al. 1967, 1968). Similar shifts in age composition are notable in subsequent reports though no discussion is offered (ADF&G 1972b-1979b, 1981b, 1982b; Bigler 1983b; Lean, et al. 1984). Typically, at the onset of migration, age six fish are detected but not age three fish. As the migration progresses the abundance of age six fish declines and age three fish increases. The percentage of age four and five chum salmon fluctuate slightly over the course of each season, perhaps due more to sample size rather than any biological process. These observations underline the importance of collecting age data on regular intervals throughout the season to allow weighting of the annual age composition over time. Chum salmon age composition from 1962 through 1966, 1970, 1974, and 1975 are based on samples taken at irregular intervals or are derived using minimal sample size.

Original Age-Weight-Length data for the years 1967, 1968, 1971, 1972, and 1973 have been lost. Age composition for these years have been taken from tables contained in annual age, sex, and size reports (Geiger, et al. 1967, 1968; ADF&G 1972b, 1973b, 1974b).

Though not true in every case, age class composition of commercial catch and escapement samples reported prior to 1983 resulted from summing all age data and applying calculated percentages to the number of salmon enumerated (Bigler 1983c). This approach assumes that age class composition is constant, an assumption that is probably violated. Since 1972 the commercial catch has been sampled for age structure during each open fishing period. Age class percentages of these samples have been applied to the number of salmon sold during each period to define the age composition of each commercial opening. Summation over all periods produces a weighted age opening. Summation over all periods produces a weighted age composition for each season. This method has been applied, in principle, to seasons prior to 1972 where catches were not sampled systematically (Appendix B).

It is not possible to weight escapement age class information as data is not usually collected systematically throughout the season (Appendix A).

Age information has been collected from Noatak River chum salmon every year subsequent to 1974. Uncertainties are introduced by applying commercial catch age composition to escapement estimates prior to 1974. Applying age data collected from the Noatak River to that of the Kobuk River is not an acceptable solution. Also, poor aerial escapement survey results necessitated the estimation of annual escapement values for 1977, 1978, and 1982, seasons when age data was collected from the Noatak River.

The commercial fishery in Kotzebue Sound is comprised of mixed Noatak and Kobuk River chum salmon stocks. In the absence of data from the respective escapements, or where escapements are estimated, extrapolation from this fishery will provide the most reasonable estimate of age composition. The age composition of Kobuk River chum salmon escapement in 1975, 1976, and 1981 (Appendix Table A14, A15, A20), and of the combined estimated escapements of 1977, 1978, and 1982 (Appendix Table A16, A17, and A21) are based on the commercial catch in Kotzebue Sound.

The annual return of chum salmon to Kotzebue Sound is usually composed of an average of 65.0% age four, 19.3% age five, 15.1% age three, and 0.7% age six chum salmon. Age seven fish have been identified twice (Appendix Tables A18 and A23) and one age two chum salmon was collected by Geiger, et al. (1967).

Estimation of Missing Escapement Data

The most significant correlation of fisheries variables and pooled escapement estimates meeting the established conditions resulted from linear correlation between escapement and the annual catch per unit effort (CPUE) of the commercial fleet (Table 2). Regression analysis indicated that: Escapement = CPUE (24,083) + 7,833; $r = 0.7476$; $P<0.001$; $n=14$ (Figure 2). Escapement values in years of poor survey conditions are estimated according to this relationship (Table 3).

The relationship suggested by the regression in Figure 2, may be affected by at least two factors. First, harvest efficiency and effort have not remained static since the inception of the commercial fishery in 1962. The increasing availability of large outboard motors and better boats has provided fishermen

Table 2. Correlation matrix of several variables associated with Kotzebue Sound chum salmon.

	Escapement	Commercial Harvest	Subsistence Harvest(1)	Commercial CPUE	Subsistence CPUE	Commercial Catch Per Fisherman	Average Weight(2)
Escapement	1.0000						
Commercial Harvest	0.7066	1.0000					
Subsistence Harvest(1)	0.6640	0.6450	1.0000				
Commercial CPUE	0.7476	0.8260	0.7666	1.0000			
Subsistence CPUE(2)	0.0090	-0.1324	-0.2595	0.0963	1.0000		
Commercial Catch Per Fisherman	0.7532	0.9151	0.7769	0.9171	0.0172	1.0000	
Average Weight(3)	-0.0472	-0.0726	-0.4575	-0.2650	0.0319	-0.2874	1.0000

(1) Only Kotzebue and Kobuk River villages.
(2) Subsistence chum salmon catch per fisherman.
(3) Average weight of chum salmon captured in the commercial fishery.

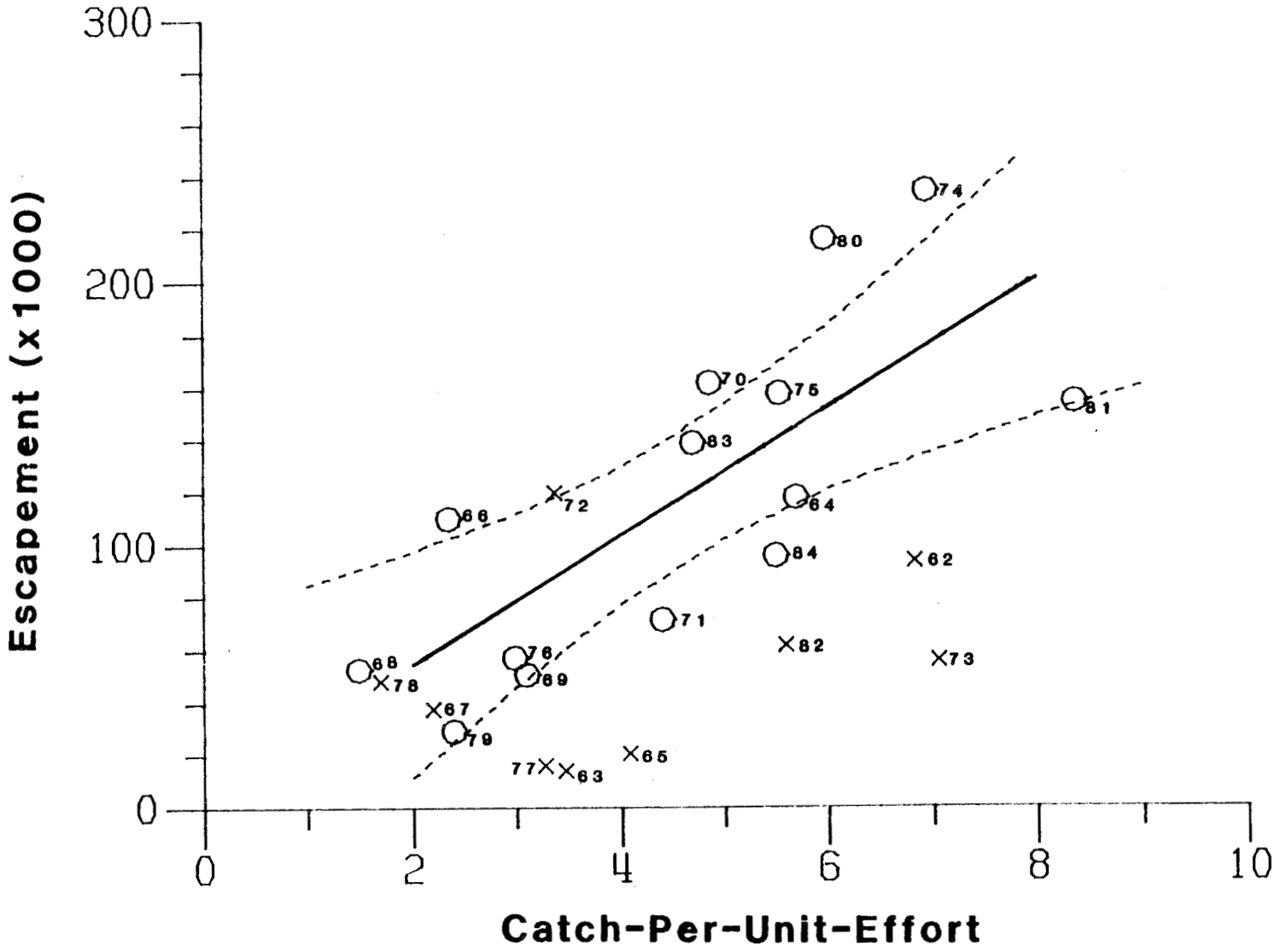

Figure 2. Chum salmon escapements for Kotzebue Sound region versus the annual CPUE for the commercial fleet, 1962-1984. The relation between escapement indexes meeting established levels of acceptance ("O") and the corresponding CPUE data has been used to estimate missing or unacceptable escapement estimates ("X").

Table 3. Peak Kotzebue Sound region chum salmon aerial escapement survey results and adjustments for poor surveys, 1962-1984.

Year	River	Escapement Index	Index Rating(1)	Survey Date	Commercial Fishery CPUE(2)	Escapement(3)
1962	Noatak	33,700	3	8/23		
	Eli	9,080	3	8/12		
	Kelly	1,818	3	8/21		
	Kobuk	9,224	2	9/16		
	Squirrel	16,261	1	8/8		
	Salmon	12,936	2	8/9		
	Tutuksuk	10,841	2	8/9		(Estimated)
	Total	93,860			6.83	172,320
1963	Noatak	1,970	3	None		
	Eli	35	None	9/5		
	Kelly	600	None	None		
	Kobuk	4,535	1	9/7		
	Squirrel	2,200	2	8/14		
	Salmon	1,535	None	8/6		
	Tutuksuk	670	2	8/6		(Estimated)
		16,080			3.27	86,585
1964	Noatak	89,798	2	8/11		
	Eli	None				
	Kelly	None				
	Kobuk	7,985	None	8/12		
	Squirrel	8,009	2	8/11		
	Salmon	9,353	1	8/12		
	Tutuksuk	2,685	1	8/12		
		117,830			5.69	117,830
1965	Noatak	6,152	3	9/20		
	Eli	None				
	Kelly	3,155	1	9/20		
	Kobuk	2,750	2	9/15		
	Squirrel	7,230	1	8/17		
	Salmon	1,500	2	8/3		
	Tutuksuk	None				(Estimated)
		20,787			4.09	106,333
1966	Noatak	101,640	2	8/16		
	Eli	120	2	8/6		
	Kelly	570	2	8/22		
	Kobuk	1,474	None	9/5		
	Squirrel	1,350	2	8/6		
	Salmon	3,957	1	8/13		
	Tutuksuk	1,383	1	8/13		
		110,494			2.34	110,494

-Continued-

Table 3. Peak Kotzebue Sound region chum salmon aerial escapement survey results and adjustments for poor surveys, 1962-1984 (continued).

Year	River	Escapement Index	Index Rating(1)	Survey Date	Commercial Fishery CPUE(2)	Escapement(3)
1967	Noatak	29,120	2-3(4)	9/15		
	Eli	None				
	Kelly	225	2	8/15		
	Kobuk	2,495	2	8/28		
	Squirrel	3,332	1	8/12		
	Salmon	2,116	1	8/12		
	Tutuksuk	169	2	8/12		(Estimated)
		37,457			2.20	60,816
1968	Noatak	39,394	2	8/28		
	Eli	5,502	1	8/29		
	Kelly	375	None	8/29		
	Kobuk	2,370	2	9/14		
	Squirrel	6,746	2	8/9		
	Salmon	3,367	2	8/9		
	Tutuksuk	823	2	8/13		
		58,577			1.48	58,577
1969	Noatak	33,945	None	8/26		
	Eli	68	2	8/16		
	Kelly	150	2	9/17		
	Kobuk	7,500	2	9/10		
	Squirrel	6,714	2	8/16		
	Salmon	2,561	2	8/16		
	Tutuksuk	159	2	8/16		
		51,097			3.10	51,097
1970	Noatak	138,145	2	9/5		
	Eli	None				
	Kelly	None				
	Kobuk	13,908	1	9/5		
	Squirrel	4,418	3	8/6		
	Salmon	3,000	None	8/6		
	Tutuksuk	2,000	None	8/6		
		161,471			4.86	161,471
1971	Noatak	41,056	2-1(4)	8/28		
	Eli	None				
	Kelly	None				
	Kobuk	17,202	1	8/30		
	Squirrel	6,628	2	8/28		
	Salmon	5,453	1	8/30		
	Tutuksuk	1,384	2	8/30		
		71,723			4.40	71,723

-Continued-

Table 3. Peak Kotzebue Sound region chum salmon aerial escapement survey results and adjustments for poor surveys, 1962-1984 (continued).

Year	River	Escapement Index	Index Rating(1)	Survey Date	Commercial Fishery CPUE(2)	Escapement(3)
1972	Noatak	64,315	3	8/11		
	Eli	3,286	2	8/11		
	Kelly	None				
	Kobuk	18,155	2	8/22		
	Squirrel	32,126	1	8/3		
	Salmon	2,073	3	8/24		
	Tutuksuk	None				(Estimated)
		119,955			3.37	88,993
1973	Noatak	32,144	2-3(4)	9/7		
	Eli	None				
	Kelly	2,590	1	9/6		
	Kobuk	2,470	3	None		
	Squirrel	12,345	2	8/4		
	Salmon	6,891	2	8/4		
	Tutuksuk	None				(Estimated)
		56,440			7.06	177,859
1974	Noatak	112,836	1	9/11		
	Eli	22,249	1	9/25		
	Kelly	1,381	1	9/11		
	Kobuk	28,120	1	8/21		
	Squirrel	32,523	1	8/20		
	Salmon	29,190	1	8/21		
	Tutuksuk	8,312	2	8/6		
		234,611			6.94	234,611
1975	Noatak	96,509	1	8/16		
	Eli	1,302	1	8/16		
	Kelly	3,937	2	9/12		
	Kobuk	10,642	1	8/24		
	Squirrel	34,236	None	8/24		
	Salmon	9,721	2	8/24		
	Tutuksuk	1,344	1	8/3		
		157,691			5.52	157,691
1976	Noatak	44,574	1	8/26		
	Eli	1,205	1	8/16		
	Kelly	217	1	8/19		
	Kobuk	2,522	3	9/2		
	Squirrel	7,229	2	8/19		
	Salmon	1,161	2	8/19		
	Tutuksuk	758	2	8/19		
		57,666			2.98	57,666

-Continued-

Table 3. Peak Kotzebue Sound region chum salmon aerial escapement survey results and adjustments for poor surveys, 1962-1984 (continued).

Year	River	Escapement Index	Index Rating(1)	Survey Date	Commercial Fishery CPUE(2)	Escapement(3)
1977	Noatak	11,221	3	8/31		
	Eli	742	2	8/31		
	Kelly	290	1	9/8		
	Kobuk	None				
	Squirrel	1,964	3	8/31		
	Salmon	None				
	Tutuksuk	None				(Estimated)
		14,217			3.47	91,401
1978	Noatak	37,817	3	8/15		
	Eli	5,525	1	8/17		
	Kelly	168	1	8/15		
	Kobuk	1,981	None	None		
	Squirrel	1,863	1	7/24		
	Salmon	814	1	7/24		
	Tutuksuk	368	1	7/28		(Estimated)
		48,536			1.70	48,774
1979	Noatak	19,655	1	10/3		
	Eli	1,794	2	9/10		
	Kelly	3,200	1	10/3		
	Kobuk	2,008	1	9/12		
	Squirrel	1,500	3	8/15		
	Salmon	674	2	8/15		
	Tutuksuk	382	2	8/15		
		29,213			2.40	29,213
1980	Noatak	164,474	1	9/10		
	Eli	10,227	1	9/11		
	Kelly	7,416	1	9/11		
	Kobuk	11,472	1	9/11		
	Squirrel	13,536	1	8/17		
	Salmon	8,456	1	8/17		
	Tutuksuk	1,165	1	8/17		
		216,746			5.96	216,746
1981	Noatak	116,352	2	9/16		
	Eli	None				
	Kelly	13,770	2	9/14		
	Kobuk	8,648	1	9/15		
	Squirrel	9,854	1	8/17		
	Salmon	4,709	2	8/17		
	Tutuksuk	1,114	1	8/5		
		154,447			8.36	154,447

-Continued-

Table 3. Peak Kotzebue Sound region chum salmon aerial escapement survey results and adjustments for poor surveys, 1962-1984 (continued).

Year	River	Escapement Index	Index Rating(1)	Survey Date	Commercial Fishery CPUE(2)	Escapement(3)
1982	Noatak	20,682	2-3(4)	8/9		
	Eli	295	1	8/28		
	Kelly	11,604	2	9/27		
	Kobuk	14,674	None	8/26		
	Squirrel	7,690	2	8/24		
	Salmon	5,392	1	9/4		
	Tutuksuk	1,727	1	9/5		(Estimated)
		62,064			5.59	142,457
1983	Noatak	79,773	2	9/5		
	Eli	3,044	2	9/5		
	Kelly	12,137	3	9/23		
	Kobuk	33,746	2	9/19		
	Squirrel	6,075	1	8/25		
	Salmon	1,677	1	8/25		
	Tutuksuk	2,637	1	8/25		
		139,089			4.70	139,089
1984	Noatak	67,873	1	9/4		
	Eli	5,027	2	9/15		
	Kelly	3,499	1	9/4		
	Kobuk	10,621	1	9/5		
	Squirrel	5,473	2	8/13		
	Salmon	1,471	2	8/27		
	Tutuksuk	1,132	2	8/27		
		95,096			5.49	95,622

(1) Codes for aerial surveys as rated by the surveyor: (1)=Good, (2)=Fair, (3)=Poor.

(2) Seasonal Catch/Boat-Hour.

(3) Estimate based on the relationship between CPUE of the commercial fishery and total aerial escapement surveys that were rated "Fair" or "Good" (rating codes 1 or 2): Escapement=CPUE(24,083) + 7,833; $r=0.7476$; $P<0.001$; $n=14$.

(4) The rating that appears first was the original survey rating, explanations in the Annual Management Reports or footnotes in the Stream Catalog indicate a tendency toward the rating listed second.

more mobility and the capability to operate more net gear. In addition, innovations in the construction and manufacture of gill nets has lead to far more sophistication and efficiency in recent years. Gear characteristics have only recently been documented (Woodby 1984). Most biologists question the comparability of CPUE data over the 20-year history of the fishery. Second, few aerial surveys are comparable. Conditions of weather, water, as well as the surveyor, play significant roles in the overall survey effectiveness.

On the other hand, there is reason to place validity in the regression relationship and its use to estimate escapement values in the absence of any other method. First, most of the data points included in the regression analysis are from recent years (eight points from 1974-1984, five points from 1962-1973) which decreases the problem of CPUE comparability. Second, CPUE values used in the regression range from 1.48 (1968) to 8.46 (1981), all estimated escapements are based on CPUE's that fall within this range. There are no extrapolations beyond the range of the independent regression variable.

There are serious difficulties in accepting the estimation of the combined escapement to two different river systems (Noatak and Kobuk Rivers), based on the observation of one other variable (Commercial CPUE). The relationship used for estimation is statistically significant ($P>0.001$) but practical consideration of the variables involved place the results in question. These data are interesting for their value to fill in missing data, but further use of estimated escapements should consider the derivation.

Critique of Data Quality

Data quality and collection methods have improved markedly since the fishery was established and should continue to improve. Using these data, detailed analysis of Kotzebue Sound chum salmon population biology are possible which may lead to refinement of management and forecasting techniques. Furthermore, listing all sources will allow critique of data quality in the analysis of population biology.

Judgment of escapement index quality is largely based on ratings assigned by the original surveyor. Some additional information contained in AMR's has been used when ratings are missing or unclear (1967, 1971, 1973, 1982).

Quality of age class data is based on sample size, collection technique, and sample origin.

1) As noted above, a minimum sample size of 450 scales, collected in a systematic manner over any time period, is necessary to provide acceptable levels of precision and accuracy.

2) Due to the temporal shift in age composition, it is necessary to collect age samples over the entire season.

3) Samples should be collected from both commercial and subsistence catches and escapements.

By these criteria, high age data quality would be achieved from the collection of 450 samples at regular intervals from each escapement index area and each commercial fishing period.

The escapement values summarized in Table 4 referred to as "estimated" have been generated from the relationship with the CPUE of the commercial fishery.

1962

The first commercial harvest of Kotzebue Sound chum salmon since 1918 occurred in 1962. Fishing restrictions were imposed by Emergency Regulations adopted immediately prior to the season (ADF&G 1962). Age class information is based on 68 scale samples that were collected in late season from the commercial catch (Appendix Table B1). Escapement surveys were conducted early in the season and were generally rated "Poor" (Appendix Table C1) which necessitated the estimation of the 1962 escapement (Appendix Table A1).

1963

Age composition of the entire return is estimated from 255 scale samples that were collected at odd intervals from the commercial catch (Appendix Table B2, Appendix Table A2). Escapements were estimated due to poorly rated aerial surveys of the Noatak River (Appendix Table C2).

1964

Age samples were collected from the commercial catch four times, at irregular intervals, and amounted to 463 samples (Appendix Table B3; Appendix Table A3). Noatak River aerial surveys were conducted more than one week before the anticipated peak spawner abundance period and no ratings were listed by the surveyor. Clarification by ADF&G (1964a) indicate survey conditions and results were "Fair" (Appendix Table C3).

1965

Age composition is based on a sample size of 478 and only the commercial catch was sampled (Appendix Table B4). Aerial surveys of the Noatak River were performed under adverse weather conditions and resulted in "Poor" surveys (Appendix Table C4), which made estimation of the escapement necessary (Appendix Table A4).

1966

Age composition samples amounted to 430 and were collected throughout the season (Appendix Table B5). Aerial survey conditions were considered very good (Appendix Table C5; Appendix Table A5).

Table 4. Estimated annual returns of Kotzebue Sound chum salmon, by enumerated component and age class, 1962-1984.

Year	Commercial Catch	Escapement	Subsistence Catch	Total Returns(1)	Age Class Percent(2) 3	4	5	6	Age Class Numbers 3	4	5	6
1962	129,948	172,320(5)	21,393	323,661	7.3	63.3	28.0	1.4	23,628	204,878	90,625	4,531
1963	54,445	86,585(5)	14,307	155,337	30.1	50.9	18.6	0.4	46,788	79,035	28,878	635
1964	76,499	117,830	16,999	211,328	53.3	45.1	1.6		112,716	95,249	3,362	
1965	40,025	106,333(5)	19,629	165,987	2.3	91.0	6.7		3,866	150,982	11,152	
1966	30,764	110,494	9,650	150,908	10.1	67.1	22.8		15,242	101,247	34,431	
1967	29,400	60,816(5)	10,225	100,441	8.8	72.3	18.5	0.5	8,789	72,639	18,533	481
1968	30,199	58,577	12,323	101,099	21.2	58.1	19.8	0.9	21,391	58,729	20,047	940
1969	59,335	51,097	13,257	123,689	36.8	58.3	4.9		45,542	72,087	6,060	
1970	159,664	161,471	22,667	343,802	3.9	91.0	5.1		13,277	312,922	17,605	
1971	154,956	71,723	20,941	247,620	7.1	67.3	26.3		17,505	166,517	64,998	
1972	169,664	88,993(5)	10,613	269,270	15.8	59.4	24.1	0.6	42,573	160,023	65,002	1,672
1973	375,432	177,859(5)	15,806	569,097	16.7	69.5	13.8		94,979	395,695	78,423	
1974	627,912	234,611	19,680	882,203	28.5	63.5	7.8	0.2	251,767	559,732	69,161	1,570
1975	563,345	157,691	23,145	744,181	2.5	86.9	10.7		18,464	646,425	79,298	
1976	159,796	57,666	9,378	226,840	11.2	51.6	37.2	0.1	25,320	116,992	84,407	139
1977	195,895	91,401(5)	4,127	291,423	6.7	73.0	18.6	1.7	19,614	212,776	54,143	4,887
1978	111,494	48,774(5)	11,369	171,637	10.5	57.5	31.8	0.2	18,002	98,671	54,545	413
1979	141,623	29,213	9,378	180,214(3)	30.6	53.2	15.2	1.0	55,221	95,867	27,329	1,871
1980	367,284	216,746	8,500	592,530	15.1	78.1	6.6	0.2	89,228	462,655	39,330	1,116
1981	677,239	154,447	11,836	843,522	2.4	67.1	30.6		20,180	565,698	257,645	
1982	417,790	142,457(5)	23,747	583,994	5.9	48.3	40.3	5.5	34,235	282,308	235,233	32,128
1983	175,762	139,089	12,940	327,791	5.8	57.8	34.2	2.3	18,853	189,293	112,016	7,672
1984	320,206	95,096	15,508	430,810(4)	14.2	64.0	20.4	1.3	61,233	275,731	88,066	5,594
Means	220,377	114,426	14,670	349,474	15.1	65.0	19.3	0.7	46,018	233,746	66,969	2,767

(1) Total Returns may not equal total Age Class Numbers due to rounding.

(2) Rounded to the nearest tenth, see Appendix A.

(3) Includes 136 age 7.

(4) Includes 149 age 7.

(5) Estimated.

1967

Original AWL forms for the 1,865 samples collected in 1967 are not in the Anchorage scale archives. Age composition could not be verified (Appendix Table B6) and has been calculated from summary tables listed by Geiger, et al. (1967). The single aerial survey of the Noatak River was rated in the Stream Catalog (ADF&G 1983b) as "Fair" (Appendix Table C6), but clarification by ADF&G (1967a) indicates this survey was performed under poor weather conditions, and did not include the entire spawning area. Estimation of total escapement was necessary (Appendix Table A6).

1968

A total of 1,989 scale samples were collected in 1968 (Appendix Table B7), but aging accuracy cannot be verified because the original AWL forms are missing. Age composition (Appendix Table A7) has been calculated from summary tables by Geiger et al. (1968). Numbers of fish estimated by aerial escapement surveys were below average but rated acceptably (Appendix Table C7; Appendix Table A7).

1969

A large number of scale samples (1,131), was collected in a systematic manner throughout the season (Appendix Table B8). Aerial surveys were rated acceptable and were conducted closely coincident with anticipated peak spawning activity (Appendix Table C8). Data collected in 1969 are the most comprehensive prior to 1971 (Appendix Table A8).

1970

Aerial surveys conducted in 1970 are considered acceptable (Appendix Table C9), age composition is based on 267 scale samples collected from the commercial fishery (Appendix Table B9; Appendix Table A9).

1971-1973

Age composition collected in 1971, 1972, and 1973 cannot be confirmed for accuracy because the original AWL forms are missing (Appendix Tables B10, B11, and B12). Age composition are calculated from summary tables (ADF&G 1972b, 1973b, and 1974b). Aerial surveys conducted in 1971 were acceptable; but poorly rated for 1972 (Appendix Tables C10 and C11). Estimation of escapements was necessary for 1972 (Appendix Table A11).

Aerial survey information listed for 1973 in the Stream Catalog were extracted from the 1973 AMR. The Stream Catalog shows that the Noatak River survey conducted that year was rated "Fair", but clarification in the AMR indicates river conditions were flooded and that a "Poor" rating is more appropriate (ADF&G 1973a) (Appendix Table C12). Estimation of escapements in 1973 was necessary (Appendix Table A12).

1974

The total sample size amounted to 358, all collected from the commercial catch (Appendix Table B13). Aerial surveys were conducted close to peak spawning periods and all peak surveys were rated acceptably (Appendix Table C13). The largest recorded return of chum salmon to Kotzebue Sound occurred in 1974 (Appendix Table A13).

1975

Age composition samples (505) were collected for the first time from the Noatak River escapement of chum salmon (Appendix Table A14). The opportunity for this sampling was provided by the operation of 5-7/8 inch stretched mesh size test gill nets on the lower Noatak River (Cunningham 1976). This test net project was not intended to provide an escapement estimate; an inseason escapement abundance index was one of the primary objectives. Age composition of the commercial catch is based on a sample size of 228 (Appendix Table B14).

1976

Age information (n=566) was collected from the commercial fishery in a systematic manner for the first time (Appendix Table B15). Noatak River test netting provided age information from that drainage, the commercial catch samples were used to estimate age composition of the Kobuk River escapement population (Appendix Table A15). Aerial surveys were reasonably comprehensive and highly rated (Appendix Table C15).

1977-1978

Commercial catch age composition data was collected in a systematic manner throughout both seasons; total sample sizes amounted to 457 and 527, respectively, (Appendix Tables B16 and B17). Aerial escapement surveys of the Noatak River were rated "Poor" in both years, surveys in the other spawning areas were highly rated (Appendix Tables C16 and C17). Despite the age composition data collected from the Noatak River (1977:n=310; 1978:n=161) age structure of the estimated escapements for 1977 and 1978 is based on samples collected from the commercial catch (Appendix Tables A16 and A17). This is done to maintain consistency in data handling techniques. Age composition of Noatak River test fishing samples collected in these seasons are listed by ADF&G (1977b and 1978b).

1979

Age composition samples were collected from both major spawning drainages (Kobuk; n=517-Noatak;n-400) and the commercial catch (n=658) (Appendix Table B18; Appendix Table A18). In addition, aerial surveys were generally rated highly (Appendix Table C18).

1980

Age samples were collected systematically in the commercial fishery (n=710) (Appendix Table B19). Age samples were also collected from the Noatak (N=644) and the Squirrel (n=375) Rivers (Appendix Table A19). Exceptionally favorable survey conditions accounted for all peak surveys rated highly (Appendix Table C19).

1981

The largest recorded commercial chum salmon harvest in Kotzebue Sound was sampled throughout the season (n=1,167) (Appendix Table B20). Timing of peak aerial surveys coincided with anticipated peak spawning (Appendix Table C20). Escapement age samples were collected only from the Noatak River (n=631) (Appendix Table A20).

1982

One of two escapement surveys of the Noatak River was rated "Fair", the other was rated "Poor". Although rated acceptably, the former survey was conducted extremely early in the spawning season (August 9) and is not considered a realistic estimate of the 1982 Noatak River escapement (Appendix Table C21). The age composition of the estimated total escapement is based on that of the commercial fishery (Appendix Table A21) in which samples were collected each open fishing period (Appendix Table B21). The age composition of 1982 escapement samples (n=405) are listed by Bigler (1983).

1983

Age class samples (n=1,306) were collected from the commercial catch each fishing period (Appendix Table B22). Aerial surveys were comprehensive (Appendix Table C22) and escapement age composition is based on samples collected within both the Noatak (n=473) and Kobuk (n=200) Rivers (Appendix Table A22).

1984

Aerial surveys were conducted on all index spawning grounds (Appendix Table C23). The commercial harvest was sampled (n=1,834) systematically for age composition (Appendix Table B23) and samples were collected from several spawning areas of the Noatak (total n=929) and the Kobuk (total n=645) River (Appendix Table A23).

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APPENDIX A

Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1962-1984.

Appendix Table A1. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1962.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1962											
	Commercial Catch	129,948	68	7.30	63.30	28.00	1.40	9,487	82,257	36,385	1,819
	Escapement(1)	172,320		7.30	63.30	28.00	1.40	12,579	109,079	48,250	2,412
	Subsistence Catch(2)	21,393		7.30	63.30	28.00	1.40	1,562	13,542	5,990	300
	Total	323,661	68	7.30	63.30	28.00	1.40	23,628	204,878	90,625	4,531

(1) Estimated escapement. No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A2. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1962.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1963	Commercial Catch	54,445	255	30.12	50.88	18.59	0.41	16,400	27,702	10,122	221
	Escapement(1)	86,585		30.12	50.88	18.59	0.41	26,079	44,054	16,096	355
	Subsistence Catch(2)	14,307		30.12	50.88	18.59	0.41	4,309	7,279	2,660	59
	Total(3)	155,337	255	30.12	50.88	18.59	0.41	46,788	79,035	28,878	635

(1) Estimated escapement. No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A3. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1964.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1964	Commercial Catch	76,499	463	53.34	45.07	1.59		40,802	34,479	1,217	
	Escapement:(1)										
	Noatak River	89,798		53.34	45.07	1.59		47,895	40,473	1,429	
	Eli River	---									
	Kelly River	---									
	Kobuk River	7,985		53.34	45.07	1.59		4,259	3,599	127	
	Squirrel River	8,009		53.34	45.07	1.59		4,272	3,610	127	
	Salmon River	9,353		53.34	45.07	1.59		4,989	4,216	149	
	Tutuksuk River	2,685		53.34	45.07	1.59		1,432	1,210	43	
	Total Escapement	117,830		53.34	45.07	1.59		62,847	53,108	1,875	
	Subsistence Catch(2)	16,999		53.34	45.07	1.59		9,067	7,662	270	
	Total(3)	211,328	463	53.34	45.07	1.59		112,716	95,249	3,362	

(1) No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A4. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1965.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1965	Commercial Catch	40,025	478	2.33	90.96	6.72		931	36,407	2,688	
	Escapement(1)	106,333		2.33	90.96	6.72		2,478	96,720	7,146	
	Subsistence Catch(2)	19,629		2.33	90.96	6.72		457	17,855	1,318	
	Total(3)	165,987	478	2.33	90.96	6.72		3,866	150,982	11,152	

(1) No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A5. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1966.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1966	Commercial Catch	30,764	430	10.10	67.09	22.82		3,107	20,640	7,019	
	Escapement:(1)										
	Noatak River	101,640		10.10	67.09	22.82		10,265	68,192	23,190	
	Eli River	120		10.10	67.09	22.82		12	81	27	
	Kelly River	570		10.10	67.09	22.82		58	382	130	
	Kobuk River	1,474		10.10	67.09	22.82		149	989	336	
	Squirrel River	1,350		10.10	67.09	22.82		136	906	308	
	Salmon River	3,957		10.10	67.09	22.82		400	2,655	903	
	Tutuksuk River	1,383		10.10	67.09	22.82		140	928	316	
	Total Escapement	110,494		10.10	67.09	22.82		11,160	74,133	25,210	
	Subsistence Catch(2)	9,650		10.10	67.09	22.82		975	6,474	2,202	
	Total(3)	150,908	430	10.10	67.09	22.82		15,242	101,247	34,431	

(1) No escapement age class information collected, age class percentages based on commercial catch sampled.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

(4) Estimated escapement. No escapement age class information collected, age class percentages based on commercial catch samples.

Appendix Table A6. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1967.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1967	Commercial Catch	29,400	1,865	8.75	72.32	18.45	0.48	2,573	21,262	5,425	140
	Escapement(1)	60,816		8.75	72.32	18.45	0.48	5,321	43,982	11,221	292
	Subsistence Catch(2)	10,225		8.75	72.32	18.45	0.48	895	7,395	1,887	49
	Total(3)	100,441	1,865	8.75	72.32	18.45	0.48	8,789	72,639	18,533	481

(1) Estimated escapement. No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A7. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1968.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1968	Commercial Catch	30,199	1,989	21.16	58.09	19.83	0.93	6,390	17,543	5,987	281
	Escapement:(1)										
	Noatak River	39,394		21.16	58.09	19.83	0.93	8,336	22,884	7,812	366
	Eli River	5,502		21.16	58.09	19.83	0.93	1,164	3,196	1,091	51
	Kelly River	375		21.16	58.09	19.83	0.93	79	218	74	3
	Kobuk River	2,370		21.16	58.09	19.83	0.93	501	1,377	470	22
	Squirrel River	6,746		21.16	58.09	19.83	0.93	1,427	3,919	1,338	63
	Salmon River	3,367		21.16	58.09	19.83	0.93	712	1,956	668	31
	Tutuksuk River	823		21.16	58.09	19.83	0.93	174	478	163	8
	Total Escapement	58,577		21.16	58.09	19.83	0.93	12,393	34,028	11,616	544
	Subsistence Catch(2)	12,323		21.16	58.09	19.83	0.93	2,608	7,158	2,444	115
	Total(3)	101,099	1,989	21.16	58.09	19.83	0.93	21,391	58,729	20,047	940

(1) No escapement age class information collected, age class percentages based on commercial catch sampled.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A8. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1969.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1969	Commercial Catch	59,335	1,131	36.82	58.28	4.90		21,846	34,581	2,907	
	Escapement:(1)										
	Noatak River	33,945		36.82	58.28	4.90		12,499	19,783	1,663	
	Eli River	68		36.82	58.28	4.90		25	40	3	
	Kelly River	150		36.82	58.28	4.90		55	87	7	
	Kobuk River	7,500		36.82	58.28	4.90		2,762	4,371	368	
	Squirrel River	6,714		36.82	58.28	4.90		2,472	3,913	329	
	Salmon River	2,561		36.82	58.28	4.90		943	1,493	125	
	Tutuksuk River	159		36.82	58.28	4.90		59	93	8	
	Total Escapement	51,097		36.82	58.28	4.90		18,815	29,780	2,503	
	Subsistence Catch(2)	13,257		36.82	58.28	4.90		4,881	7,726	650	
	Total(3)	123,689	1,131	36.82	58.28	4.90		45,542	72,087	6,060	

(1) No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A9. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1970.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1970	Commercial Catch	159,664	267	3.86	91.02	5.12		6,169	145,319	8,177	
	Escapement:(1)										
	Noatak River	138,145		3.86	91.02	5.12		5,332	125,740	7,073	
	Eli River	---									
	Kelly River	---									
	Kobuk River	13,908		3.86	91.02	5.12		537	12,659	712	
	Squirrel River	4,418		3.86	91.02	5.12		171	4,021	226	
	Salmon River	3,000		3.86	91.02	5.12		116	2,731	154	
	Tutuksuk River	2,000		3.86	91.02	5.12		77	1,820	102	
	Total Escapement	161,471		3.86	91.02	5.12		6,233	146,971	8,267	
	Subsistence Catch(2)	22,667		3.86	91.02	5.12		875	20,632	1,161	
	Total(3)	343,802	267	3.86	91.02	5.12		13,277	312,922	17,605	

(1) No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A10. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1971.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1971	Commercial Catch	154,956	1,105	7.07	67.25	26.25		10,954	104,201	40,674	
	Escapement:(1)										
	Noatak River	41,056		7.07	67.25	26.25		2,903	27,610	10,777	
	Eli River	---									
	Kelly River	---									
	Kobuk River	17,202		7.07	67.25	26.25		1,216	11,568	4,516	
	Squirrel River	6,628		7.07	67.25	26.25		468	4,457	1,740	
	Salmon River	5,453		7.07	67.25	26.25		385	3,667	1,431	
	Tutuksuk River	1,384		7.07	67.25	26.25		98	931	363	
	Total Escapement	71,723		7.07	67.25	26.25		5,070	48,233	18,827	
	Subsistence Catch(2)	20,941		7.07	67.25	26.25		1,481	14,083	5,497	
	Total(3)	247,620	1,105	7.07	67.25	26.25		17,505	166,517	64,998	

(1) Estimated escapement. No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A11. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1972.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1972	Commercial Catch	169,664	980	15.81	59.43	24.14	0.62	26,825	100,827	40,957	1,054
	Escapement(1)	88,993		15.81	59.43	24.14	0.62	14,070	52,889	21,483	552
	Subsistence Catch(2)	10,613		15.81	59.43	24.14	0.62	1,678	6,307	2,562	66
	Total(3)	269,270	980	15.81	59.43	24.14	0.62	42,573	160,023	65,002	1,672

(1) Estimated escapement. No escapement age class information collected, age class percentages based on co-mercial catch samples.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A12. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1973.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1973	Commercial Catch	375,432	598	16.69	69.53	13.78		62,656	261,040	51,736	
	Escapement(1)	177,859		16.69	69.53	13.78		29,685	123,665	24,509	
	Subsistence Catch(2)	15,806		16.69	69.53	13.78		2,638	10,990	2,178	
	Total(3)	569,097	598	16.69	69.53	13.78		94,979	395,695	78,423	

(1) Estimated escapement. No escapement age class information collected, age class percentages based on commercial catch samples.

(2) Source: Arctic Yukon Kuskokwim Region Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A13. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1974.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1974	Commercial Catch	627,912	358	28.54	63.45	7.84	0.18	179,193	398,385	49,225	1,112
	Escapement:										
	Noatak River	112,836		28.54	63.45	7.84	0.18	32,203	71,594	8,846	203
	Eli River	22,249		28.54	63.45	7.84	0.18	6,350	14,117	1,744	40
	Kelly River	1,381		28.54	63.45	7.84	0.18	394	876	108	3
	Kobuk River	28,120		28.54	63.45	7.84	0.18	8,025	17,842	2,205	51
	Squirrel River	32,523		28.54	63.45	7.84	0.18	9,282	20,636	2,550	59
	Salmon River	29,190		28.54	63.45	7.84	0.18	8,331	18,521	2,288	53
	Tutuksuk River	8,312		28.54	63.45	7.84	0.18	2,372	5,274	652	15
	Total Escapement	234,611		28.54	63.45	7.84	0.18	66,957	148,860	18,393	423
	Subsistence Catch(1)	19,680		28.54	63.45	7.84	0.18	5,617	12,487	1,543	35
	Total(2)	882,203	358	28.54	63.45	7.84	0.18	251,767	559,732	69,161	1,570

(1) Source: Arctic Yukon Kuskokwim Region Annual Management Report, 1983. Age class percentages based on commercial catch samples.

(2) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A14. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1975.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1975	Commercial Catch	563,345	228	1.43	87.29	11.28		8,063	491,759	63,528	
	Escapement:(1)										
	Noatak River	96,509	505	9.11	84.16	6.73		8,792	81,222	6,495	
	Eli River	1,302		9.11	84.16	6.73		119	1,096	88	
	Kelly River	3,937		9.11	84.16	6.73		359	3,313	265	
	Kobuk River	10,642		1.43	87.29	11.28		152	9,289	1,200	
	Squirrel River	34,236		1.43	87.29	11.28		490	29,885	3,862	
	Salmon River	9,721		1.43	87.29	11.28		139	8,485	1,097	
	Tutuksuk River	1,344		1.43	87.29	11.28		19	1,173	152	
	Total Escapement	157,691		6.39	85.27	8.34		10,070	134,463	13,159	
	Subsistence Catch(2)	23,145		1.43	87.29	11.28		331	20,203	2,611	
	Total(3)	744,181	733	2.48	86.86	10.66		18,464	646,425	79,298	

(1) Age class information collected from the Noatak River is applied to the Eli and Kelly Rivers. Kobuk River age class percentages based on commercial catch.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A15. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1976.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1976	Commercial Catch	159,796	566	10.88	50.63	38.48		17,391	80,908	61,496	
	Escapement:(1)										
	Noatak River	44,574	767	12.26	55.28	32.20	0.30	5,465	24,641	14,353	134
	Eli River	1,205		12.26	55.28	32.20	0.30	148	666	388	4
	Kelly River	217		12.26	55.28	32.20	0.30	27	120	70	1
	Kobuk River	2,522		10.88	50.63	38.48		274	1,277	970	
	Squirrel River	7,229		10.88	50.63	38.48		787	3,660	2,782	
	Salmon River	1,161		10.88	50.63	38.48		126	588	447	
	Tutuksuk River	758		10.88	50.63	38.48		82	384	292	
	Total Escapement	57,666		11.98	54.34	33.47	0.24	6,909	31,336	19,302	139
	Subsistence Catch(2)	9,378		10.88	50.63	38.48		1,020	4,748	3,609	
	Total(3)	226,840	1,333	11.17	51.57	37.21	0.06	25,320	116,992	84,407	139

(1) Age class information collected from the Noatak River is applied to the Eli and Kelly Rivers. Kobuk River age class percentages based on commercial catch.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A16. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1977.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1977	Commercial Catch	195,895	457	6.73	73.01	18.58	1.68	13,185	143,031	36,394	3,282
	Escapement(1)	91,401		6.73	73.01	18.58	1.68	6,151	66,732	16,982	1,536
	Subsistence Catch(2)	4,127		6.73	73.01	18.58	1.68	278	3,013	767	69
	Total(3)	291,423	457	6.73	73.01	18.58	1.68	19,614	212,776	54,143	4,887

(1) Estimated escapement. To maintain continuity of data derivation, age class percentages are based on the commercial catch; in spite of age samples collected from the Noatak River.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age percentages based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A17. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1978.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1978	Commercial Catch	111,494	527	10.49	57.49	31.78	0.24	11,693	64,095	35,432	269
	Escapement(1)	48,774		10.49	57.49	31.78	0.24	5,116	28,040	15,500	117
	Subsistence Catch	11,369		10.49	57.49	31.78	0.24	1,193	6,536	3,613	27
	Total(2)	171,637	527	10.49	57.49	31.78	0.24	18,002	98,671	54,545	413

(1) Estimated escapement. Age class percentages are based on commercial catch.

(2) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A18. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1979.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	7	Age Class Numbers 3	4	5	6	7
1979	Commercial Catch	141,623	658	28.35	54.62	15.95	1.10		40,156	77,350	22,583	1,560	
	Escapement:												
	Noatak River(1)	19,655	400	32.35	54.00	13.35	0.50		6,358	10,614	2,624	98	
	Eli River	1,794		32.35	54.00	13.35	0.50		580	969	239	9	
	Kelly River	3,200		32.35	54.00	13.35	0.50		1,035	1,728	427	16	
	Kobuk River(2)	2,008	517	50.87	37.33	10.44	1.35	0.97	1,021	750	210	27	19
	Squirrel River	1,500		50.87	37.33	10.44	1.35	0.97	763	560	157	20	15
	Salmon River	674		50.87	37.33	10.44	1.35	0.97	343	252	70	9	7
	Tutuksuk River	382		50.87	37.33	10.44	1.35	0.97	194	143	40	5	4
	Total Escapement	29,213		35.24	51.40	12.89	0.63	0.15	10,294	15,016	3,767	184	45
	Subsistence Catch(3)	9,378		50.87	37.33	10.44	1.35	0.97	4,771	3,501	979	127	91
	Total(4)	180,214	1,575	30.64	53.20	15.16	1.04	0.07	55,221	95,867	27,329	1,871	136

(1) Age class samples taken from Noatak Village (163), Noatak River spawning grounds (43), and Noatak River test fish project (194).

(2) Age class samples taken from Noorvik (314), Ambler (184), and Kobuk (24) villages. Seven-year-old chum salmon (4) collected from Ambler.

(3) Age class percentages from Kobuk River samples.

(4) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A19. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1980.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1980	Commercial Catch	367,284	710	16.57	77.48	5.80	0.14	60,876	284,590	21,310	509
	Escapement:(1)										
	Noatak River	164,474	644	12.42	79.04	8.23	0.31	20,428	130,000	13,336	510
	Eli River	10,227		12.42	79.04	8.23	0.31	1,270	8,083	842	32
	Kelly River	7,416		12.42	79.04	8.23	0.31	921	5,862	610	23
	Kobuk River	11,472		16.57	77.48	5.80	0.14	1,901	8,889	665	16
	Squirrel River	13,536	375	6.13	82.67	11.20		830	11,190	1,516	
	Salmon River	8,456		16.57	77.48	5.80	0.14	1,401	6,552	490	12
	Tutuksuk River	1,165		16.57	77.48	5.80	0.14	193	903	68	2
	Total Escapement	216,746		12.43	79.12	8.09	0.27	26,944	171,479	17,527	595
	Subsistence Catch(2)	8,500		16.57	77.48	5.80	0.14	1,408	6,586	493	12
	Total(3)	592,530	1,729	15.06	78.08	6.64	0.19	89,228	462,655	39,330	1,116

(1) Age class information collected from the Noatak River is applied to the Eli and Kelly Rivers. Kobuk River age class percentages based on commercial catch (except Squirrel River).

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age percents based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A20. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1981.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1981	Commercial Catch	677,239	1,167	2.22	67.76	30.02		15,042	458,919	203,277	
	Escapement:(1)										
	Noatak River	116,352	631	3.33	63.23	33.44		3,875	73,569	38,908	
	Eli River	---									
	Kelly River	13,770		3.33	63.23	33.44		459	8,707	4,605	
	Kobuk River	8,648		2.22	67.76	30.02		192	5,860	2,596	
	Squirrel River	9,854		2.22	67.76	30.02		219	6,677	2,958	
	Salmon River	4,709		2.22	67.76	30.02		105	3,191	1,414	
	Tutuksuk River	1,114		2.22	67.76	30.02		25	755	334	
	Total Escapement	154,447		3.16	63.94	32.90		4,875	98,759	50,815	
	Subsistence Catch(2)	11,836		2.22	67.76	30.02		263	8,020	3,553	
	Total(3)	843,522	1,798	2.39	67.06	30.55		20,180	565,698	257,645	

(1) Age class information collected from the Noatak River is applied to the Kelly River. Kobuk River age class percentages based on commercial catch.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983. Age percents based on commercial catch samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A21. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1982.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1982	Commercial Catch	417,790	985	5.86	48.34	40.28	5.50	24,495	201,957	168,281	22,987
	Escapement(1)	142,457		5.86	48.34	40.28	5.50	8,348	68,864	57,382	7,835
	Subsistence Catch(2)	23,747		5.86	48.34	40.28	5.50	1,392	11,479	9,565	1,306
	Total(3)	583,994	985	5.86	48.34	40.28	5.50	34,235	282,300	235,233	32,128

(1) Estimated escapement. Age class percentages are based on commercial catch.

(2) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1983.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A22. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1983.

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	Age Class Numbers 3	4	5	6
1983	Commercial Catch	175,762	1,306	2.29	56.97	38.40	2.36	4,031	100,134	67,490	4,148
	Escapement:(1)										
	Noatak River	79,773	473	9.94	58.99	28.96	2.11	7,929	47,058	23,102	1,683
	Eli River	3,044		9.94	58.99	28.96	2.11	303	1,796	882	64
	Kelly River	12,137	50	2.00	50.00	38.00	10.00	243	6,069	4,612	1,214
	Kobuk River	33,746	99	13.13	61.62	25.25		4,431	20,794	8,521	
	Squirrel River	6,075		2.29	56.97	38.40	2.36	139	3,460	2,333	143
	Salmon River	1,677	51	9.80	52.94	31.37	5.88	164	888	526	99
	Tutuksuk River	2,637		2.29	56.97	38.40	2.36	60	1,502	1,013	62
	Total Escapement	139,089		9.54	58.64	29.47	2.35	13,269	81,567	40,989	3,265
	Subsistence Catch(2)	12,940		12.00	58.67	27.33	2.00	1,553	7,592	3,537	259
	Total(3)	327,791	1,979	5.75	57.75	34.17	2.34	18,853	189,293	112,016	7,672

(1) Noatak and Eli River age class percent from test fishing project. Kobuk River age samples from Selby River and Beaver Creek. Squirrel and Tutuksuk River River age percentages based on Salmon River samples.

(2) Subsistence information extremely limited, catch estimated from average of previous five years; age class percent based on combined Kobuk River samples.

(3) Total Chum Salmon Counted may not equal total Age Class Numbers due to rounding.

Appendix Table A23. Age class composition and total annual returns of chum salmon to the Kotzebue Sound district, 1984 (1).

Year	Source	Chum Salmon Counted	Age Samples	Age Class Percent 3	4	5	6	7	Age Class Numbers 3	4	5	6	7
1984	Commercial Catch	320,206	1,834	13.39	65.40	19.87	1.35		42,875	209,406	63,636	4,246	
	Escapement:(2)												
	Noatak River	67,873	929	11.95	62.76	23.68	1.51	0.11	8,111	42,597	16,072	1,025	75
	Eli River	5,027		11.95	62.76	23.68	1.51	0.11	601	3,155	1,190	76	6
	Kelly River	3,499		11.95	62.76	23.68	1.51	0.11	418	2,196	829	53	4
	Kobuk River	10,621	193	35.23	46.12	18.65			3,742	4,898	1,981		
	Squirrel River	5,473	360	16.66	63.05	18.05	1.66	0.55	912	3,451	988	91	30
	Salmon River	1,471	92	14.14	66.28	19.58			208	975	288		
	Tutuksuk River	1,132		16.08	63.69	18.37	1.33	0.44	182	721	208	15	5
	Total Escapement	95,096	1,574	14.90	60.98	22.67	1.32	0.13	14,174	57,993	21,556	1,260	120
	Subsistence Catch(3)	15,508		26.98	53.73	18.53	0.57	0.19	4,184	8,332	2,874	88	29
	Total	430,810	3,408	14.21	64.00	20.44	1.30	0.03	61,233	275,731	88,066	5,594	149

(1) Preliminary data, some values may change in future reports.

(2) Noatak, Eli, and Kelly River age class percent from test fishing project. Kobuk River age samples from Selby River (99) and Beaver Creek (94). Tutuksuk River age percentages based on Squirrel and Salmon River samples.

(3) Source: Norton Sound-Port Clarence-Kotzebue Annual Management Report, 1984 (in press).

APPENDIX B

Age structure and catch per unit effort of the Kotzebue Sound commercial catch, by fishing period, 1962-1984.

FOOTNOTES AND COMMENTS PERTAINING TO APPENDIX B

(1) CPUE = Catch per Boat Hour. Period CPUE is calculated by the expression:

$$\frac{\text{Total Period Catch}}{\text{(Hours Fished) (Boats Fishing)}}$$

Total Annual CPUE is calculated by the expression:

$$\sum_{i=1}^{n} \frac{\text{Total Season Catch}}{\text{(Hours Fished}_i\text{) (Boats Fishing}_i\text{)}}$$

where, Hours Fishedi is the total number of hours fished in period i, and Boats Fishingi is the total number of boats that made at least one delivery in period i. The figure for Boats Fishing in period i is reliant upon data collected each fishing season and documented in the respective Annual Management Report.

(2) Fishing period catches not represented by age samples are summed and age structure of next or nearest available sample is applied. Age structure of fishing periods occurring at the end of the season are derived from the last samples collected.

Appendix Table B1. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1962.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1962													
7/23	24	15	622	1.73									
7/24	24	23	1,647	2.98									
7/25	24	22	5,242	9.93									
7/26	18	30	3,947	7.31									
7/29	6	10	747	12.45									
7/30	24	45	7,408	6.86									
7/31	24	48	15,162	13.16									
8/1	24	54	12,007	9.26									
8/2	18	48	8,944	10.35									
8/6	30	24	1,934	2.69									
8/7	24	50	9,352	7.79									
8/8	24	48	5,046	4.38									
8/9	24	54	5,995	4.63									
8/10	24	50	4,791	3.99									
8/11	6	40	2,793	11.64									
Subtotal			85,637		68	7.30	63.30	28.00	1.40	6,252	54,208	23,978	1,199
8/13	18	47	8,071	9.54									
8/14	24	52	10,849	8.69									
8/15	6	42	5,203	20.65									
8/16	18	43	4,173	5.39									
8/17	24	46	6,755	6.12									
8/18	6	36	2,942	13.62									
8/20	18	38	2,656	3.88									
8/21	24	38	1,650	1.81									
8/22	6	26	603	3.87									
8/23	18	7	257	2.04									
8/24	24	16	620	1.61									
8/25	6	14	532	6.33									
Subtotal			44,311							3,235	28,049	12,407	620
Total			129,948	6.83	68	7.30	63.30	28.00	1.40	9,487	82,257	36,385	1,819

Appendix Table B2. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1963.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1963													
7/19	30	11	1,320										
7/20	18	25	1,118	3.13									
7/23	30	32	1,018										
7/24	18	42	1,696	1.58									
Subtotal			5,152		70	8.57	50.00	37.14	4.29	442	2,576	1,913	221
7/26	30	42	2,334										
7/27	18	47	3,817	1.45									
7/30	30	42	3,122										
7/31	18	38	1,789	2.44									
8/1	6	21	2,673										
8/2	24	49	6,728										
8/3	18	50	4,209	5.67									
8/5	6	22	1,420										
8/6	24	39	1,762										
8/7	18	44	4,145	3.46									
8/8	6	21	1,610										
8/9	24	42	2,295										
8/10	18	33	1,432	2.65									
8/12	6	15	2,085										
8/13	24	48	4,020										
8/14	18	48	3,014										
Subtotal			46,455	3.96	70	31.43	51.43	17.14		14,600	23,892	7,962	
8/16	30	43	1,395										
8/17	18	23	333										
Subtotal			1,728	0.84	115	47.83	43.48	8.70		827	751	150	
8/19	6	17	436										
8/20	24	24	540										
8/21	18	9	134										
Subtotal			1,110	0.96						531	483	97	
Total			54,445	3.27	255	30.12	50.88	18.59	0.41	16,400	27,702	10,122	221

Appendix Table B3. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1964.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1964													
7/16	6	1	86										
7/17	24	1	277										
			363	12.10									
7/22	18	2	58	1.61									
7/24	30	6	878										
7/25	18	6	699										
			1,577	5.48									
7/28	30	13	2,031										
7/29	18	15	2,501										
			4,532	6.29									
7/30	6	4	879										
7/31	24	21	4,863										
8/1	18	25	5,176										
			10,918	9.10									
8/3	6	5	514										
8/4	24	24	4,482										
8/5	18	36	5,154										
			10,150	5.87									
Subtotal			27,598		116	36.21	62.93	0.86		9,993	17,367	237	
8/6	6	3	339										
8/7	24	34	3,768										
8/8	18	39	5,143										
			9,250	4.94	117	47.86	49.57	2.56		4,427	4,585	237	

-Continued-

Appendix Table B3. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1964 (continued).

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1964 (Continued)													
8/10	6	5	439										
8/11	24	36	4,425										
8/12	24	40	4,168										
8/13	24	34	4,942										
8/14	24	29	3,166										
8/15	18	33	2,969										
			20,109	4.19	85	54.12	43.53	2.35		10,883	8,753	473	
8/16	6	4	187										
8/17	24	25	2,175										
8/18	24	31	3,473										
8/19	24	31	2,965										
8/20	24	31	3,656										
8/21	24	29	2,783										
8/22	18	17	1,703										
			16,942	3.80	145	79.31	19.31	1.38		13,437	3,272	234	
8/25	24	5	406										
8/26	24	9	717										
8/27	24	7	281										
8/28	24	8	756										
8/29	18	8	440										
			2,600	2.53						2,062	502	36	
Total			76,499	5.69	463	53.34	45.07	1.59		40,802	34,479	1,217	

Appendix Table B4. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1965.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1965													
7/9	30	1	12										
7/10	18	4	161										
			173	0.90									
7/12	6	4	274										
7/13	24	1	28										
7/14	18	1	45										
			347	1.81									
7/15	6	3	54										
7/16	24	8	725										
7/17	18	7	617										
			1,396	3.64									
7/20	30	5	573										
7/21	18	9	1,199										
			1,772	4.10									
7/23	30	17	1,563										
7/24	18	12	945										
			2,508	3.07									
7/27	30	13	904										
7/28	18	16	1,331										
			2,235	2.91									
Subtotal			8,431		116	0.86	89.66	9.48		73	7,559	799	
7/30	30	20	3,689										
7/31	18	17	1,922										
			5,611	5.84	55	1.82	96.36	1.82		102	5,407	102	
8/3	30	25	3,967										
8/4	18	28	2,075										
			6,042	4.50	109	3.67	90.83	5.50		222	5,488	332	

-Continued-

Appendix Table B4. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1965 (continued).

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1965 (Continued)													
8/6	30	24	2,605										
8/7	18	30	4,070										
			6,675	4.64									
8/10	30	25	2,852										
8/11	18	31	4,007										
			6,859	4.61									
Subtotal			13,534		85	3.53	88.24	8.24		478	11,942	1,115	
8/12	6	2	614										
8/13	24	26	2,090										
8/14	18	25	1,448										
			4,152	3.33									
8/17	30	19	1,155										
8/18	18	10	400										
			1,555	1.71									
Subtotal			5,707		113	0.88	93.81	5.31		50	5,354	303	
8/19	6	2	52										
8/20	24	3	35										
8/21	24	8	182										
			269	0.63									
8/23	48	6	124										
8/24	24	7	111										
8/25	18	7	135										
			370	0.59									
8/27	30	3	44										
8/28	24	2	17										
			61	0.38									
Subtotal			700							6	657	37	
Total			40,025	4.09	478	2.33	90.96	6.72		931	36,407	2,688	

Appendix Table B5. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1966.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1966													
7/13	18	2	44	1.22									
7/15	30	9	194										
7/16	18	12	798										
			992	1.72									
7/19	30	14	590										
7/20	18	15	716										
			1,306	1.81									
7/21	6	1	4										
7/22	24	15	755										
7/23	18	14	501										
			1,260	1.75									
7/26	30	12	667										
7/27	18	15	957										
			1,624	2.26									
Subtotal			5,226		86	1.16	50.00	48.84		61	2,613	2,552	
7/28	6	2	125										
7/29	24	28	3,117										
7/30	18	21	1,554										
			4,796	3.57									
8/2	30	20	1,259										
8/3	18	23	790										
			2,049	1.86									
8/5	30	21	1,666										
8/6	18	21	1,175										
			2,841	2.82									
Subtotal			9,686		189	8.47	66.67	24.87		820	6,457	2,409	

-Continued-

Appendix Table B5. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1966 (continued).

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1966 (Continued)													
8/9	30	29	2,691										
8/10	18	31	1,891										
			4,582	3.08									
8/12	30	28	2,077										
8/13	18	28	2,357										
			4,434	3.30									
Subtotal			9,016		105	9.52	75.24	15.24		858	6,784	1,374	
8/16	30	8	712										
8/17	24	19	863										
8/18	24	2	42										
8/19	24	19	544										
8/20	18	28	908										
			3,069	1.80									
8/22	30	20	1,093										
8/23	24	25	681										
8/24	24	24	658										
8/25	24	6	123										
8/26	24	7	208										
8/27	18	12	466										
			3,229	1.40									
Subtotal			6,298		50	20.00	70.00	10.00		1,260	4,409	630	
8/29	30	9	153										
8/30	24	8	129										
8/31	24	9	182										
9/1	24	3	35										
9/2	24	3	39										
Subtotal			538	0.65						108	377	54	
Total			30,764	2.34	430	10.10	67.09	22.82		3,107	20,640	7,019	

Appendix Table B6. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1967.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1967 *													
7/17-19	48	1	68	1.42									
7/20-22	48	6	405	1.41									
7/24-26	48	10	787	1.64									
Subtotal			1,260		159	2.52	63.52	31.45	2.52	32	800	396	32
7/27-29	48	9	594	1.38									
7/31-8/2	48	12	1,445	2.51									
Subtotal			2,039		344	3.49	66.28	28.78	1.45	71	1,351	587	30
8/3-6	72	20	5,444	3.78									
8/7-9	48	23	3,389	3.07									
Subtotal			8,833		319	6.58	75.55	17.87		581	6,673	1,578	
8/10-13	72	23	2,341	1.41									
8/14-15	48	20	2,028	2.11									
8/16-17	48	18	1,709	1.98									
Subtotal			6,078		542	7.20	73.06	19.56	0.18	437	4,441	1,189	11
8/18-19	48	21	3,517	3.49									
8/20-21	48	26	2,920	2.34									
8/22-23	48	27	2,308	1.78									
8/24-25	48	22	1,005	0.95									
8/26-27	48	12	1,124	1.95									
8/28	24	13	316	1.01									
Subtotal			11,190		501	12.97	71.46	14.97	0.60	1,452	7,997	1,675	67
Total			29,400	2.20	1,865	8.75	72.32	18.45	0.48	2,573	21,262	5,425	140

* Original AWL forms are missing from the Anchorage scale archives. Age percent data from Geiger, et al. (1967).

Appendix Table B7. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1968.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1968 *													
7/15-17	48	6	367	1.27									
7/18-20	48	17	1,349	1.65									
Subtotal			1,716		263	9.13	49.05	39.92	1.90	157	842	685	33
7/22-24	48	35	3,768	2.24									
7/26-27	24	29	1,077	1.55									
Subtotal			4,845		367	8.45	71.39	19.07	1.09	409	3,459	924	53
7/30-31	24	34	1,461	1.79									
8/1-3	48	46	4,594	2.08									
Subtotal			6,055		399	10.03	69.42	19.80	0.75	607	4,204	1,199	46
8/5-7	48	46	4,410	2.00									
8/8-10	48	41	3,062	1.56									
Subtotal			7,472		292	20.21	60.27	18.15	1.37	1,510	4,504	1,356	102
8/12-14	48	41	2,475	1.26									
8/15-18	72	43	3,755	1.21									
Subtotal			6,230		378	32.01	46.56	20.90	0.53	1,994	2,901	1,302	33
8/19-21	48	44	2,430	1.15									
8/22-25	72	20	942	0.65									
Subtotal			3,372		290	44.14	42.07	13.45	0.34	1,488	1,419	453	12
8/26-28	48	20	440	0.46									
8/29-9/1**	72	2	69	0.48									
Subtotal			509							225	214	68	2
Total			30,199	1.48	1,989	21.16	58.09	19.83	0.93	6,390	17,543	5,987	281

* Original AWL forms are missing from the Anchorage scale archives. Age percent data from Geiger, et al. (1968).

** The commercial fishing season continued until 9/15, to maintain comparability in these tables, fishing effort and catches after 9/1 are excluded (only 13 additional chum salmon were harvested during the period 9/2-15).

Appendix Table B8. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1969.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1969													
7/10-12	48	6	279	0.97									
7/14-16	48	13	294	0.47									
7/17-19	48	18	1,291	1.49									
7/21-23	48	21	1,165	1.16									
7/24-26	48	26	2,048	1.64									
Subtotal			5,077		191	4.71	86.39	8.90		239	4,386	452	
7/28-30	48	33	3,473	2.19									
7/31-8/2	48	38	7,357	4.03									
Subtotal			10,830		200	14.50	78.00	7.50		1,570	8,447	812	
8/4-6	48	10	798	1.66									
8/7-9	48	27	3,336	2.57									
Subtotal			4,134		205	30.73	62.93	6.34		1,270	2,602	262	
8/11-13	48	39	6,034	3.22	196	38.27	57.14	4.59		2,309	3,448	277	
8/14-16	48	38	12,358	6.78	54	42.59	51.85	5.56		5,263	6,408	687	
8/18-20	48	16	3,331	4.34									
8/21-23	48	28	8,081	6.01									
Subtotal			11,412		111	45.05	52.25	2.70		5,141	5,963	308	
8/25-27	48	28	4,151	3.09	174	63.79	35.06	1.15		2,648	1,455	48	
8/28-30	48	19	2,657	2.91									
9/1-3	48	10	595	1.24									
9/4-6	48	14	1,170	1.74									
9/8-10	48	7	536	1.60									
9/11-13	48	7	330	0.98									
9/15-17	48	1	51	1.06									
Subtotal			5,339							3,406	1,872	61	
Total			59,335	3.10	1,131	36.82	58.28	4.90		21,846	34,581	2,907	

Appendix Table B9. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1970.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1970													
7/9-11	48	10	327	0.68									
7/13-15	48	20	2,298	2.39									
7/16-18	48	33	5,886	3.72									
7/20-22	48	44	9,667	4.58									
Subtotal			18,178		42	7.14	90.48	2.38		1,298	16,447	433	
7/23-25	48	49	8,843	3.76									
7/27-29	48	47	6,283	2.79									
7/30-8/1	48	46	12,021	5.44									
Subtotal			27,147		115	2.61	95.65	1.74		709	25,966	472	
8/3-5	48	62	19,122	6.43									
8/6-8	48	62	30,943	10.40									
Subtotal			50,065		110	3.64	90.00	6.36		1,822	45,059	3,184	
8/10-12	48	60	22,721	7.89									
8/13-15	48	62	16,259	5.46									
8/17-19	48	59	11,083	3.91									
8/20-22	48	44	6,005	2.84									
8/24-26	48	41	5,184	2.63									
8/27-29	48	31	2,525	1.70									
8/31-9/2	48	14	497	0.74									
Subtotal			64,274							2,340	57,847	4,088	
Total			159,664	4.86	267	3.86	91.02	5.12		6,169	145,319	8,177	

Appendix Table B10. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1971.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1971 *													
7/14	18	2	40	1.11									
7/15-17	48	14	574	0.85									
7/19-21	48	36	2,275	1.32									
7/22-24	48	48	3,282	1.42									
7/26-28	48	57	6,400	2.34									
Subtotal			12,571		116	18.10	46.55	35.34		2,275	5,852	4,443	
7/29-30	24	54	3,804	2.94	109	13.76	52.29	37.61		523	1,989	1,291	
8/2-3	24	56	4,321	3.22	115	18.26	53.04	28.70		789	2,292	1,240	
8/5-6	24	59	7,828	5.53	116	13.79	61.21	25.00		1,080	4,791	1,957	
8/9-10	48	74	26,981	7.60									
8/12-14	48	64	28,636	9.32									
8/16-18	48	77	24,524	6.64									
Subtotal			80,141		112	3.57	73.32	24.11		2,862	57,959	19,320	
8/19-21	48	46	10,372	4.70	85	5.88	74.12	20.00		610	7,687	2,074	
8/23-25	48	66	15,839	5.00	223	8.52	62.78	28.70		1,350	9,944	4,546	
8/26-28	48	59	8,363	2.95	173	7.51	63.58	28.90		628	5,318	2,417	
8/30-9/4	120	43	11,717	2.27	56	7.14	71.43			837	8,369	3,386	
Total			154,956	4.40	1,105	7.07	67.25	26.25		10,954	104,201	40,674	

* Original AWL forms are missing from the Anchorage scale archives. Age class percentage data are from ADF&G (1972b).

Appendix Table B11. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1972.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1972 *													
7/17-19	48	39	3,475	1.86									
7/20-22	48	64	13,862	4.51									
7/24-26	48	74	14,587	4.11									
Subtotal			31,924		58	15.52	44.83	37.93	1.72	4,954	14,311	12,109	550
7/27-29	48	78	20,555	5.49	27	14.81	66.67	18.52		3,045	13,703	3,806	
7/31-8/2	48	85	24,600	6.03	167	11.98	72.46	15.57		2,946	17,824	3,830	
8/3-5	48	78	19,462	5.20									
8/7-9	48	82	20,543	5.22									
Subtotal			40,005		172	14.53	65.12	19.77	0.58	5,815	26,050	7,908	233
8/10-12	48	72	13,672	3.96	171	19.30	54.39	25.73	0.58	2,638	7,436	3,518	79
8/14-19	132	81	28,879	2.70	269	21.56	52.79	25.28	0.37	6,227	15,245	7,300	107
8/21-26	132	56	7,989	1.08	117	11.97	62.39	24.79	0.85	956	4,985	1,980	68
8/28-9/2	132	34	1,851	0.41									
9/4-6	66	4	189	0.72									
Subtotal			2,040							244	1,273	506	17
Total			169,664	3.37	981	15.81	59.43	24.14	0.62	26,825	100,827	40,957	1,054

* Original AWL forms are missing from the Anchorage scale archives. Age class percentage data are from ADF&G (1973b).

Appendix Table B12. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1973.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1973 *													
7/11	18	1	156	8.67									
7/12-14	48	4	1,229	6.40									
7/16-18	48	72	14,992	4.34									
7/19-21	48	84	34,601	8.58									
7/23-25	48	106	34,632	6.81									
7/26-28	48	88	15,323	3.63									
Subtotal			100,933		58	13.79	79.31	6.90		13,922	80,050	6,961	
7/30-8/1	48	91	41,427	9.48									
8/2-8/4	48	117	51,604	9.19									
Subtotal			93,031		117	23.93	47.01	29.06		22,264	43,733	27,035	
8/6-8	48	125	67,329	11.22									
8/9-11	48	101	33,539	6.92									
Subtotal			100,868		172	13.95	82.56	3.49		14,075	83,275	3,519	
8/13-15	48	107	42,906	8.35									
8/16-18	48	110	25,814	4.89									
Subtotal			68,720		167	15.57	68.26	16.17		10,698	46,911	11,110	
8/20-22	48	103	11,880	2.40	84	14.29	59.52	26.19		1,697	7,071	3,111	
Total			375,432	7.06	598	16.69	69.53	13.78		62,656	261,040	51,736	

* Original AWL forms are missing from the Anchorage scale archives. Age class percentage data are from ADF&G (1974b).

Appendix Table B13. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1974.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1974													
7/9-10	42	20	3,117	3.71									
7/11-13	48	69	3,936	1.19									
7/15-17	48	111	15,094	2.83									
7/18-20	48	124	34,827	5.85									
7/22-24	48	147	50,514	7.16									
7/25-27	48	138	39,037	5.89									
7/29-31	48	153	58,714	7.99									
Subtotal			205,239		54	7.41	83.33	9.26		15,208	171,026	19,005	
8/1-3	48	161	90,937	11.77	86	23.26	61.63	15.12		21,152	56,044	13,750	
8/5-7	48	152	58,836	8.06	53	39.62	47.17	11.32	1.89	23,311	27,753	6,660	1,112
8/8-10	48	161	77,370	10.01	53	35.85	60.38	3.77		27,737	46,716	2,917	
8/12-14	48	147	58,812	8.34	54	51.85	44.44	3.70		30,494	26,136	2,176	
8/15-17	48	153	69,589	9.48	58	44.83	51.72	3.45		31,197	35,991	2,401	
8/19-21	48	146	41,772	5.96									
8/22-24	48	77	11,408	3.09									
8/26-28	48	97	11,054	2.37									
8/29-31	48	31	2,895	1.95									
Subtotal			67,129							30,094	34,722	2,315	
Total			627,912	6.94	358	28.54	63.45	7.84	0.18	179,193	398,385	49,225	1,112

Appendix Table B14. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1976.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1975													
7/3-5	48	12	1,244	2.16									
7/7-9	48	1	174	3.63									
7/10-12	48	2	154	1.60									
7/14-16	48	45	3,762	1.74									
7/17-19	48	92	13,079	2.96									
7/21-23	48	127	16,705	2.74									
Subtotal			35,118		57		80.70	19.30			28,341	6,777	
7/24-26	48	154	44,028	5.96									
7/28-30	48	156	37,457	5.00									
7/31-8/2	48	170	29,629	3.63									
8/4-6	48	185	84,218	9.48									
8/7-9	48	199	85,620	8.96									
8/11-13	48	192	85,230	9.24									
8/14-16	48	193	55,818	6.03									
Subtotal			422,000		26		88.46	11.54			373,301	48,699	
8/18-20	54	189	50,687	4.97									
8/21	24	153	15,649	4.26									
8/22	24	136	10,166	3.11									
8/23	24	139	11,652	3.49									
8/24	24	69	3,138	1.89									
8/25	24	11	403	1.53									
8/26	24	5	278	2.32									
8/27	24	49	2,762	2.35									
8/28	24	64	3,222	2.10									
8/29	24	64	3,710	2.42									
8/30	24	51	2,992	2.44									
8/31	24	31	1,568	2.11									
Subtotal			106,227		145	7.59	84.83	7.59		8,063	90,112	8,063	
Total			563,345	5.52	228	1.43	87.29	11.28		8,063	491,759	63,528	

Appendix Table B15. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1977.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1976													
7/15-17	48	44	5,258	2.49									
7/19-21	48	128	15,505	2.52									
7/22-24	48	153	17,618	2.40									
Subtotal			38,381		59	3.39	61.02	35.59		1,301	23,420	13,660	
7/26-28	48	149	12,534	1.75	58		53.45	46.55			6,699	5,835	
7/29-30	24	157	18,885	5.01	56	8.93	53.57	37.50		1,686	10,117	7,082	
8/3-4	24	174	20,333	4.87	58	13.79	50.00	36.21		2,804	10,167	7,363	
8/5-6	24	182	23,438	5.37	55	9.09	43.64	47.27		2,131	10,228	11,079	
8/10-11	24	175	15,685	3.73	55	14.55	56.36	29.09		2,282	8,840	4,563	
8/12-13	24	179	14,486	3.37	54	14.81	40.74	44.44		2,145	5,902	6,438	
8/17-18	24	168	7,389	1.83	59	23.73	38.98	37.29		1,753	2,880	2,755	
8/19-20	24	134	5,188	1.61	59	35.59	32.20	32.20		1,846	1,671	1,671	
8/24-25	24	119	3,477	1.22	53	41.51	28.30	30.19		1,443	984	1,050	
Total			159,796	2.98	566	10.88	50.63	38.48		17,391	80,908	61,496	

Appendix Table B16. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1977.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1977													
7/7-9	48	1	1	0.02									
7/14-16	48	4	55	0.29									
7/18-20	48	72	4,019	1.16									
7/21-23	48	142	25,327	3.27									
Subtotal			29,402		53		67.92	32.08			19,970	9,432	
7/25-27	48	164	21,165	2.69	52		69.23	25.00	5.77		14,653	5,291	1,221
7/28-30	48	177	27,701	3.26	43	2.33	72.09	25.58		645	19,970	7,086	
8/2-3	24	160	20,852	5.43	56	1.79	78.57	17.86	1.79	373	16,383	3,724	373
8/5-6	24	171	21,877	5.33	56	10.71	69.64	17.86	1.79	2,343	15,235	3,907	392
8/9-10	24	169	25,784	6.36	53	9.43	81.13	9.43		2,431	20,919	2,431	
8/12-13	24	171	15,630	3.81	46	13.04	78.26	4.35	4.35	2,038	12,232	680	680
8/16-17	24	172	16,411	3.98									
8/19-20	24	162	10,012	2.58									
Subtotal			26,423		43	13.95	72.09	11.63	2.33	3,686	19,048	3,073	616
8/23-24	24	126	4,172	1.38									
8/26-27	24	59	1,492	1.05									
Subtotal			5,664		55	23.64	65.45	10.91		1,339	3,707	618	
8/30-31	24	43	1,397	1.35						330	914	152	
Total			195,895	3.47	457	6.73	73.01	18.58	1.68	13,185	143,031	36,394	3,282

Appendix Table B17. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1978.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1978													
7/1	18	25	820	1.82									
7/3-5	48	72	2,709	0.78									
7/6-8	48	83	2,201	0.55									
7/10-12	48	120	5,609	0.97									
7/13-15	48	137	6,109	0.93									
7/17-19	48	140	7,356	1.09									
7/20-22	48	159	9,571	1.25									
7/24-25	24	162	6,863	1.77									
Subtotal			41,238		57	3.51	61.40	35.09		1,447	25,320	14,470	
7/28-29	24	157	6,570	1.74	58	3.45	53.45	43.10		227	3,512	2,832	
8/1-2	24	171	15,414	3.76	59	5.08	57.63	37.29		783	8,883	5,748	
8/4-5	24	156	17,943	4.79	59	11.86	59.32	28.81		2,128	10,644	5,169	
8/11-12	24	163	13,838	3.54	57	10.53	61.40	26.32	1.75	1,457	8,497	3,642	242
8/16-17	24	158	8,294	2.19	59	28.81	45.76	25.42		2,390	3,795	2,108	
8/21-22	24	122	3,488	1.19	60	41.67	40.00	18.33		1,453	1,395	639	
8/24-25	24	108	3,115	1.20	59	38.98	42.37	18.64		1,214	1,320	581	
8/28-29	24	55	886	0.67	59	37.29	45.76	15.25	1.69	330	405	135	15
8/31-9/1	24	45	708	0.66						264	324	108	12
Total			111,494	1.70	527	10.49	57.49	31.78	0.24	11,693	64,095	35,432	269

Appendix Table B18. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1978.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1979													
7/10-11	24	25	602	1.32									
7/13-14	24	76	1,580	1.11									
Subtotal			2,182		56	8.90	51.80	35.70	3.60	194	1,130	779	79
7/17-18	24	91	3,149	1.44	54	13.00	57.40	24.10	5.50	409	1,808	759	173
7/20-21	24	120	6,388	2.22	59	11.90	57.60	28.80	1.70	760	3,679	1,840	109
7/24-25	24	134	8,006	2.49	56	8.90	48.20	35.70	7.20	713	3,859	2,858	576
7/27-28	24	149	20,507	5.73	58	10.40	53.50	34.50	1.60	2,133	10,971	7,075	328
7/30-8/1	48	164	31,481	4.00	58	15.50	70.70	13.80		4,880	22,257	4,344	
8/2-4	48	157	15,935	2.11	59	28.80	61.00	8.50	1.70	4,589	9,720	1,354	271
8/6-8	48	157	15,880	2.11	59	33.90	54.20	11.90		5,383	8,607	1,890	
8/9-11	48	155	12,241	1.65									
8/16-17	24	146	15,153	4.32									
Subtotal			27,394		58	56.90	39.70	3.50		15,587	10,875	959	
8/20-22	48	126	7,303	1.21	58	51.70	41.40	6.90		3,776	3,023	504	
8/23-24	24	106	2,148	0.84	28	50.00	42.90	7.10		1,074	921	153	
8/27-28	24	63	900	0.60	55	52.70	40.00	5.40	1.90	474	360	49	17
8/30-31	24	34	350	0.43						184	140	19	7
Total			141,623	2.40	658	28.35	54.62	15.95	1.10	40,156	77,350	22,583	1,560

Appendix Table B19. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1980.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1980													
7/10-11	24	36	1,738	2.01	60	5.00	75.00	20.00		87	1,304	348	
7/14-15	24	57	4,614	3.37	60		86.70	13.30			4,000	614	
7/17-18	24	79	7,816	4.12	57	3.50	86.00	10.50		274	6,722	821	
7/21-22	24	100	12,599	5.25	59	1.70	91.50	6.80		214	11,528	857	
7/24-25	24	115	29,933	10.85	60	5.00	85.00	8.30	1.70	1,497	25,443	2,484	509
7/28-29	24	131	34,001	10.81	58	1.70	87.90	10.40		578	29,887	3,536	
7/31-8/1	36	143	54,765	10.64	59	5.10	86.40	8.50		2,793	47,317	4,655	
8/4-6	36	136	15,151	3.09									
8/7-9	48	147	60,330	8.55									
Subtotal			75,481		60	15.00	83.30	1.70		11,322	62,876	1,283	
8/11-13	48	156	64,914	8.67	60	23.30	71.70	5.00		15,125	46,543	3,246	
8/14-16	48	153	30,784	4.19	59	35.60	61.00	3.40		10,959	18,778	1,047	
8/18-20	48	138	20,499	3.20	59	35.60	57.60	6.80		7,298	11,807	1,394	
8/21-23	48	86	13,215	3.09									
8/25-27	48	86	12,359	2.99									
Subtotal			25,574		59	35.60	61.00	3.40		9,104	15,600	870	
8/28-30	48	50	4,566	1.90						1,625	2,785	155	
Total			367,284	5.96	710	16.57	77.48	5.80	0.14	60,876	284,590	21,310	509

Appendix Table B20. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1981.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1981													
7/9-10	24	54	4,822	3.72	59		44.10	55.90			2,127	2,695	
7/13-14	24	104	12,824	5.14	89		30.30	69.70			3,886	8,938	
7/16-17	24	136	20,668	6.33	93	1.1	50.5	48.40		227	10,437	10,003	
7/20-22	36	153	49,639	9.01	56		53.60	46.40			26,607	23,032	
7/23-25	36	163	61,062	10.41	115		67.80	32.20			41,400	19,662	
7/27-29	48	162	45,816	5.89	88	2.30	56.80	40.90		1,054	26,023	18,739	
7/30-8/1	48	172	59,196	7.17	59	1.70	64.40	33.90		1,006	38,122	20,067	
8/3-4	30	161	46,723	9.67									
8/5	24	160	58,361	15.20									
8/6	24	158	40,642	10.72									
8/7	24	154	28,335	7.67									
8/8	18	147	21,384	8.08									
Subtotal			195,445		103	2.00	66.00	32.00		3,909	128,994	62,542	
8/9-10	30	134	53,126	13.22									
8/11	24	154	43,813	11.85									
8/12	24	153	37,882	10.32									
8/13	24	86	18,159	8.80									
Subtotal			152,980		164	2.40	79.90	17.70		3,672	122,231	27,077	
8/14	24	99	16,954	7.14									
8/15	24	87	6,770	3.24									
8/16-17	30	67	15,361	7.64									
8/18	24	93	11,749	5.26									
Subtotal			50,834		88	5.70	81.80	12.50		2,898	41,582	6,354	
8/19	24	72	5,368	3.11									
8/20	24	57	2,813	2.06									
8/21	24	38	4,137	4.54									
8/22	24	64	11,635	7.57									
Subtotal			23,953		253	9.50	73.10	17.40		2,276	17,510	4,168	
Total			677,239	8.36	1,167	2.22	67.76	30.02		15,042	458,919	203,277	

Appendix Table B21. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1982.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1982													
7/8-9	24	59	4,203	2.97	57		24.50	68.50	7.00		1,030	2,879	294
7/12-13	24	99	5,965	2.51	56		35.70	51.80	12.50		2,130	3,090	746
7/15-16	24	117	7,491	2.67	57	1.80	47.40	43.90	7.00	135	3,551	3,289	524
7/19-20	24	158	15,707	4.14	62	1.60	35.50	51.60	11.30	251	5,576	8,105	1,775
7/22-23	24	163	20,731	5.30	84	1.20	44.10	48.80	6.00	249	9,142	10,117	1,244
7/26-27	24	134	8,589	2.67	65		44.60	41.50	13.90		3,831	3,564	1,194
7/29-30	24	166	48,000	12.05	77	2.60	52.00	42.90	2.60	1,248	24,960	20,592	1,248
8/2-4	36	179	99,220	15.40	84	3.60	45.20	44.00	7.10	3,572	44,847	43,657	7,045
8/5-7	48	179	68,422	7.96	58	5.20	43.10	44.80	6.90	3,558	29,490	30,653	4,721
8/9-11	48	183	65,662	7.48	55	3.60	50.90	41.80	3.60	2,364	33,422	27,447	2,364
8/12-14	48	147	17,038	2.41	69	20.30	56.50	17.40	5.80	3,459	9,626	2,965	988
8/16-18	48	164	28,613	3.63	87	9.20	63.20	25.30	2.30	2,632	18,083	7,239	658
8/19-21	48	156	16,383	2.19	56	28.60	59.00	12.50		4,686	9,666	2,048	
8/22-24	48	94	8,183	1.81	58	24.10	53.50	22.40		1,972	4,378	1,833	
8/26-28	48	52	3,583	1.44	58	10.30	62.10	22.40	5.20	369	2,225	803	186
Total			417,790	5.59	983	5.86	48.34	40.28	5.50	24,495	201,957	168,281	22,987

Appendix Table B22. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1983.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1983													
7/11-12	24	14	1,304	3.88	63		46.00	54.00			600	704	
7/14-15	24	64	4,702	3.06	55		43.70	50.90	5.40		2,055	2,393	254
7/18-19	24	107	11,159	4.35	65		46.20	52.30	1.50		5,155	5,836	167
7/21-22	24	126	10,652	3.52	68	1.50	36.70	58.80	3.00	160	3,909	6,263	320
7/25-26	24	149	21,533	6.02	61		34.50	58.90	6.60		7,429	12,683	1,421
7/28-29	24	162	30,754	7.91	71	1.40	59.20	38.00	1.40	431	18,206	11,687	431
8/1-3	36	163	33,747	5.75	205	1.50	56.10	39.50	2.90	506	18,932	13,330	979
8/4-6	36	164	19,044	3.22	182	4.30	65.60	29.10	1.00	819	12,493	5,542	190
8/8-10	36	143	25,181	4.89	223	4.00	76.70	18.00	1.30	1,007	19,314	4,533	327
8/11-12	24	133	11,713	3.67	222	7.20	68.40	23.90	0.50	843	8,012	2,799	59
8/18-19	24	97	6,013	2.58	91	4.40	67.00	28.60		265	4,029	1,720	
Total			175,762	4.70	1,306	2.29	56.97	38.40	2.36	4,031	100,134	67,490	4,148

Appendix Table B23. Age structure and CPUE of the Kotzebue Sound commercial catch, by fishing period, 1984.

Date of Landing	Hours Fished	Boats Fishing	Total Catch	Period CPUE(1)	Sample Size	Percent Age Class Composition 3	4	5	6	Age Class Numbers(2) 3	4	5	6
1984													
7/9-10	24	12	482	1.67	74	1.35	62.16	35.14	1.35	7	300	169	7
7/12-13	24	30	2,334	3.24	75	6.67	53.33	34.67		156	1,245	809	
7/16-17	24	93	10,255	4.59	261	1.92	63.22	32.57	3.07	196	6,483	3,340	314
7/19-20	24	120	22,145	7.69	85		64.71	29.41	5.88		14,329	6,513	1,303
7/23-24	24	137	22,573	6.87	84		58.33	40.48	1.19		13,168	9,137	269
7/26-27	24	151	39,951	11.02	84	4.76	73.81	20.24	1.19	1,902	29,488	8,085	476
7/30-8/1	36	107	14,001	3.63	85	7.06	75.29	17.65		988	10,542	2,471	
8/2-4	48	160	66,477	8.66	221	10.41	67.42	21.27	0.90	6,918	44,819	14,138	602
8/6-8	48	161	52,943	6.85	183	13.66	67.21	17.49	1.64	7,233	35,585	9,258	868
8/9-11	48	167	42,362	5.28	221	25.79	60.63	13.57		10,926	25,686	5,750	
8/13-15	48	156	28,149	3.76	224	28.57	61.61	8.93	0.89	8,043	17,342	2,513	251
8/16-18	48	135	14,287	2.20	119	34.45	56.30	8.40	0.84	4,922	8,044	1,201	120
8/20-22	48	85	4,247	1.04	118	37.29	55.93	5.93	0.85	1,584	2,375	252	36
Total			320,206	5.49	1,834	13.39	65.40	19.87	1.33	42,875	209,406	63,636	4,246

APPENDIX C

Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1962-1984.

SURVEY CONDITION CODES AND FOOTNOTES FOR APPENDIX C.

(1) Descriptive codes; method used in the survey, distance of survey, observers initials and agency conducting the survey are not listed.

(2) Wind=Wi:
- 1 - No wind affect on counts
- 2 - Slight riffle or turbulence, only slightly affecting counts
- 3 - Moderate riffle or turbulence, affecting counts
- 4 - Heavy riffle activity or turbulence, badly affecting counts

(3) Weather=We:
- 1 - Clear
- 2 - Partial overcast, 5-30%
- 3 - Overcast, 31-70%
- 4 - Overcast, 70-100%

(4) Water=Wa:
- 1 - Clear
- 2 - Slightly turbid, bottom visible in most areas, deep pools obscured
- 3 - Turbid, bottom visible only along bars and in shallow areas
- 4 - Extremely turbid, counts impossible

(5) Water Visibility=Vi:
- 1 - Good, optimum conditions
- 2 - Fair, counts partially obscured by glare, shadow, ice, etc.
- 3 - Poor, counts badly obscured by glare, shadows, ice, etc.

(6) Bottom-Bot:
- 1 - No adverse affect on survey
- 2 - Slightly adverse affect of survey
- 3 - Moderately adverse affect on survey
- 4 - Extremely adverse affect on survey

(7) Time=Ti:
- 1 - No adverse affect on survey
- 2 - Slightly adverse affect on survey
- 3 - Moderately adverse affect on survey
- 4 - Extremely adverse affect on survey

(8) Spawning Stage=Sp:
- 1 - Before peak
- 2 - At peak
- 3 - After peak

(9) Overall effectiveness (rating) of survey=Rt:
- 1 - Good
- 2 - Fair
- 3 - Poor

(10) Any information useful for clarification beyond catalog comments.

(11) Annual Management Report; published annually since 1962, available from ADF&G, 333 Raspberry Road, Anchorage, Alaska, 99502.

Appendix Table C1. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1962.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1962												
	Noatak	8/23	33,700								3	Rating from AMR(11)
		Catalog Comment: Fish counted mostly chums. Majority between Noatak and Kelly										
	Eli	8/12	9,080								3	Rating from AMR
		Catalog Comment: Majority of fish spawning. Includes 10% carcasses. Overcast sky and and slightly turbid waters. Fish counted are small salmon. Data from 1962 AMR.										
	Kelly	8/21	1,818			1	1				3	Rating from AMR
	Kobuk	9/16	9,224			2	2				2	
		Catalog Comment: Most salmon are probably chums some may be sheefish. This information taken from 1962 AMR										
	Squirrel	7/21	5,834							1		No rating listed
		Catalog Comment: No spawning noted. This information is from 1962 AMR										
		8/08	16,050			1	1				1	
		Catalog Comment: Small salmon. 211 carcasses										
	Salmon	8/09	12,875			1	1				2	
		Catalog Comment: Small salmon. 61 carcasses observed										
	Tutuksuk	8/09	10,841						2		2	
		Catalog Comment: Small salmon, probably chum										

Appendix Table C2. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1963.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1963												
	Noatak	0/00	1,970			2	2				3	No date listed
		Catalog Comment: Very turbid could only see into very shallow and side channels. Est 1,600 chums counted in 5-6 mi side channel 1/2 way between Kelly R and Noatak village.										
	Eli	9/05	35									No ratings listed
		Catalog Comment: Survey data from 1963 AMR.										
	Kelly	9/--	600			1						No date or ratings
	Kobuk	9/07	400			2					1	Area 102
		9/07	1,530			2					1	Area 103
		9/07	1,045			2					1	Area 104
		9/07	1,095			2					1	Area 105
		9/07	465			2					1	Area 106
		Total	4,535									
		Catalog Comment: 101=Kobuk to Pah R. 102=Pah R. to just below Selby R. 103=Selby R. and slough 104=Selby R. to Beaver R. 105=Beaver R. mouth 106=Above Beaver River.										
	Squirrel	8/14	2,200	1		1	1		1	3	2	No footnote
	Salmon	8/06	1,535	2		1		1	1			No rating
	Tutuksuk	8/06	670							1	2	No footnote

Appendix Table C3. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1964.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1964												
	Noatak	8/11	89,798			2	2				None	
		Catalog Comment: Half way between Eli and Aggie Mouths to 6 mi below mouth Kelly R.)										
	Eli											No survey
	Kelly											No survey
	Kobuk	8/12	7,985	2		2		1	1			No rating
		Catalog Comment: Kallarichuk River mouth to Tutuksuk River mouth.										
	Squirrel	8/11	8,009	2	1					2	2	No footnote
	Salmon	8/12	9,353	2		1		1	1		1	Few carcasses
	Tutuksuk	8/12	2,685	2		1		1	1		1	Few carcasses

Appendix Table C4. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1965.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1965												
	Noatak	8/20	1,975	1		1	1	1	1		2	
		9/20	6,152							3	3	
	Eli											No survey
	Kelly	9/20	3,155	2		1		1	1	2	1	
		Catalog Comment: No survey of lake.										
	Kobuk	9/15	1,750			2	2	2	1	3	2	Area 101
		9/15	500			2	2	2	1	3	2	Area 102
		9/15	500			2	2	2	1	3	2	Area 103
		Total	2,750									
		Catalog Comment: 101=Selby R. channel and mouth 102=mouth of Maneluk R 103=slough between Selby and Maneluk Rivers, many carcasses.										
	Squirrel	8/17	7,230	2		1		1	1		1	Headwaters to mouth
	Salmon	8/03	1,500	3		2		1	1	1		
		Catalog Comment: Not actual survey. Flew section of river missing many bends.										
	Tutuksuk											No survey

Appendix Table C5. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1966.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1966												
	Noatak	8/16	101,640	2		2	2	2	1		2	
		Catalog Comment: One mi above mouth Aggie Cr. to 5 mi below Kelly R. mouth.										
	Eli	8/06	120								2	
		Catalog Comment: Survey data taken from 1966 AMR.										
	Kelly	8/22	570	2		1		1	1		2	No footnote
	Kobuk	9/05	266	2		1		1	1			Area 101
		9/05	630	2		1		1	1			Area 103
		9/05	460	2		1		1	1			Area 105
		9/05	118	2		1		1	1			Area 106
		Total	1,474									
		Catalog Comment: Index area counts from 1982 AMR. Index area codes are the same as in 1983.										
	Squirrel	8/6	1,350	3		1	2	2	1		2	Headwaters to mi. 15
	Salmon	8/13	3,957	1		1		1	1	2	1	
		Catalog Comment: Upstream from mouth to mile 40 about 90% of chums were spawning.										
	Tutuksuk	8/13	1,383	1		1		1	1	3	1	Mi 40 to mouth

Appendix Table C6. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1967.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1967												
	Noatak	9/15	29,120	1		2	2	2	1	3	2	
		Catalog Comment: Mouth of Aggie Creek to mouth of Kelly River.										
	Eli		No Survey									
	Kelly	8/15	225	1		1		2	3	2	2	No footnote
	Kobuk	8/28	1,625	1		2	2	1	1	3	2	Area 103
		8/28	75	1		2	2	1	1	3	2	Area 104
		8/28	795	1		2	2	1	1	3	2	Area 105
		Total	2,495									
		Catalog Comment: Index area counts from 1982 AMR. Index area codes are the same as in 1983.										
	Squirrel	8/12	340	1		1	2	2	1		1	Area 101
		8/12	2,548	1		1	2	2	1		1	Area 102
		8/12	444	1		1	2	2	1		1	Area 103
		Total	3,332									
		Catalog Comment: 101=mouth to Timber Ck. 102=Timber Ck to Omar Ck 103=Omar Ck to end.										
	Salmon	8/10	1,095	1		1		1	1		1	No footnote
		8/12	2,116								1	From 1967 AMR
	Tutuksuk	8/12	169	1		1		1	1	1	2	No footnote

Appendix Table C7. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1968.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1968												
	Noatak	8/28	39,394	2		2	2	1	1		2	Rating from Amr
		Catalog Comment: Few hundred carcasses;5 mi below Eli to Kelly many char and whitefish										
	Eli	8/29	5,502								1	From 1968 AMR
	Kelly	8/29	375	2		1		1	1			No footnote
	Kobuk	9/14	530	1		1		2	1		2	Area 101
		9/14	50	1		1		2	1		2	Area 102
		9/14	70	1		1		2	1		2	Area 103
		9/14	170	1		1		2	1		2	Area 104
		9/14	1,550	1		1		2	1		2	Area 105
		Total	2,370									
		Catalog Comment: 4,973 sheefish observed 5 mi below Kallar to Maneluk R. Majority of chums (1550) observed near mouth of Beaver R. Index area counts are from the 1982 AMR. Codes same as 1983.										
	Squirrel	8/09	6,746	1	1	2		1	1		2	Klery Ck to end
	Salmon	8/09	3,367	2	2	1		1	1		2	
	Tutuksuk	8/13	823	4		1		1	1	3	2	No footnote

Appendix Table C8. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1969.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1969												
	Noatak	8/24	24,550	1	1	1	1	1	1		2	Area 101
		8/24	3,275	1	1	1	1	1	1		2	Area 102
		Total	27,825									
		Catalog Comment: Many char and whitefish. Did not survey west bank. Surveyed 10 mile below Aggie Cr. to 15 miles below Kelly R. 101=Below Noatak. 102=Above Noatak.										
		8/26	31,945									Area 101
		8/26	2,000									Area 102
		Total	33,945									
		Catalog Comment: 3 miles above Aggie Cr. to 5 miles above Noatak. 101=above Noatak. 102=Above Noatak. Also estimate 21,000 char.										
	Eli	8/16	68								2	From 1969 AMR
	Kelly	9/17	150	1		1		2	1		2	
		Catalog Comment: Counted 250 in lake rest were in lower 8 miles of river.										
	Kobuk	8/25	470								2	Area 101
		8/25	5								2	Area 102
		8/25	1,610								2	Area 103
		8/25	1,142								2	Area 104
		8/25	1,045								2	Area 105
		Total	4,272									
		Catalog Comment: 101=Kobuk to Pah R. 102=Pah R. to just below Selby R. 103=Selby R. and slough 104=Selby R. to Beaver R. 105=Beaver R. mouth. 5,930 sheefish observed										
		9/10	7,500	1		1	2	2	1		2	No footnote
	Squirrel	8/16	6,714								2	No footnote
	Salmon	8/16	2,561	2		1	1	1	1		2	No footnote
	Tutuksuk	8/16	159	1		1		1	1	2	2	No footnote

Appendix Table C9. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1970.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1970												
	Noatak	9/05	48,470	2	1	2	2	1	1	2	2	Area 101
		9/05	89,675	2	1	2	2	1	1	2	2	Area 102
		Total	138,145									
		Catalog Comment: 101= Aggie Cr. to Noatak. 102= Noatak to Kelly R.										
	Eli											No survey
	Kelly											No survey
	Kobuk	9/05	1,753	1	1	1		1	1	2	1	Area 101
		9/05	20	1	1	1		1	1	2	1	Area 102
		9/05	4,820	1	1	1		1	1	2	1	Area 103
		9/05	2,385	1	1	1		1	1	2	1	Area 104
		9/05	4,930	1	1	1		1	1	2	1	Area 105
		Total	13,908									
		Catalog Comment: 101=Kobuk to Pah R. 102=Pah R. to just below Selby R. 103=Selby R. and slough 104=Selby R. to Beaver R. 105=Beaver R. mouth.										
	Squirrel	8/06	3,933	1		1	2	2	1		3	Area 101
		8/06	485	1		1	2	2	1		3	Area 102
		Total	4,418									
		Catalog Comment: 101=Fork at head to Omar Ck. 102=Omar Ck to Timber Ck.										
	Salmon	8/06	3,000	1		1		1	1			No rating
		Catalog Comment: Surveyed known spawning areas only.										
	Tutuksuk	8/06	2,000	1	1	1	1	1	1			No rating

Appendix Table C10. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1971.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1971												
	Noatak	8/28	27,546	1	2	2	2	1	1		2	Area 101
		8/28	13,510	1	2	2	2	1	1		2	Area 102
		Total	41,056									
		Catalog Comment: 101=Aggie Cr. to Noatak. 102= Noatak to Kelly R.										
	Eli											No survey
	Kelly											No survey
	Kobuk	8/30	4,953	1	1	1		1	2		1	Area 101
		8/30	2,039	1	1	1		1	2		1	Area 102
		8/30	3,100	1	1	1		1	2		1	Area 103
		8/30	390	1	1	1		1	2		1	Area 104
		8/30	4,720	1	1	1		1	2		1	Area 105
		8/30	2,000	1	1	1		1	2		1	Area 106
		Total	17,202									
		Catalog Comment: 101=Kobuk to Pah R. 102=Pah R. to just below Selby R. 103=Selby R. 104=Selby slough 105=Selby R. to Beaver R. 106=Beaver R. mouth and Old River.										
	Squirrel	7/28	15	1	1	1		1	1		2	No footnote
		8/05	1,763	1	1	1		1	1		3	Many char
		8/28	6,628	1	1	1		1	1	2	2	10-15000 char
	Salmon	8/30	5,453	1	1	1		1	1		1	Many carcasses
	Tutuksuk	8/30	1,384	1	1	1		1	1		2	Many carcasses

Appendix Table C11. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1972.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1972												
	Noatak	8/11	14,750	1	2	1	1		1	1	3	Area 101
		8/11	30,880	1	2	1	1		1	1	3	Area 102
		8/11	18,685	1	2	1	1		1	1	3	Area 103
		Total	64,315									
		Catalog Comment: 101=seven miles below Eli R. to Eli R. 102=Eli R. to Noatak. 103=Noatak to Kelly R.										
	Eli	8/03	2,871	1	1	1	1	1	1		2	
		Catalog Comment: Lower 10 miles.										
		8/11	3,286	2	2	2	2	1	2		1	No footnote
	Kelly											No survey
	Kobuk	8/22	1,865	2	2	2		1	1		2	Area 101
		8/22	7,400	2	2	2		1	1		2	Area 102
		8/22	3,170	2	2	2		1	1		2	Area 103
		8/22	5,720	2	2	2		1	1		2	Area 104
		Total	18,155									
		Catalog Comment: 101=Pah R. to just below Selby R. 102=Selby R. mouth 103=Selby R. to Beaver R. 104=Beaver R. area.										
	Squirrel	8/03	32,126	1	1	1		1	1	1	1	No footnote
	Salmon	8/24	2,073	1	1	1		1	1		3	No footnote
	Tutuksuk											No survey

Appendix Table C12. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1973.

Year	River	Survey Date(mo/dy)	Chum salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1973												
	Noatak	9/07	32,144								2	No Areas listed
		Catalog Comment: Survey data from 1973 AMR.										
	Eli											No survey
	Kelly	9/06	2,590	1	1	1		1	1		1	
		Catalog Comment: 740 of total chums in lake.										
	Kobuk	None	920								3	Area 104
		None	850								3	Area 105
		None	700								3	Area 106
		Total	2,470									
		Catalog Comment: Information taken from 1973 AMR. Index areas are same in 1983.										
	Squirrel	8/04	12,345	1	1	1		1	1		2	Head to Klery Ck
	Salmon	8/04	6,891	1	1	1		1	1	1	2	No footnote
	Tutuksuk											No survey

Appendix Table C13. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1974.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1974												
	Noatak	9/11	42,914		1	1	1	1	1	2	1	Area 101
		9/11	18,820		1	1	1	1	1	2	1	Area 102
		9/11	29,674		1	1	1	1	1	2	1	Area 103
		9/11	18,690		1	1	1	1	1	2	1	Area 104
		9/11	2,738		1	1	1	1	1	2	1	Area 105
		Total	112,836									
		Catalog Comment: Sections of survey not described on field data forms.										
		9/25	80,707	1	1	1	1	1	1		1	
		Catalog Comment: Kelly R. to Eli R.										
	Eli	9/25	22,249	1	1	1	1	1	1		1	No footnote
	Kelly	8/30	541	1	3	1		1	1		3	No footnote
		9/11	1,381	1	1	1		1	1	2	1	No footnote
	Kobuk	8/21	2,255	1	1	1		1	1		1	Area 101
		8/21	4,710	1	1	1		1	1		1	Area 102
		8/21	7,380	1	1	1		1	1		1	Area 103
		8/21	13,775	1	1	1		1	1		1	Area 104
		Total	28,120									
		Catalog Comment: 101=below Salmon R. 102=Pah R. to Selby R. 103=Selby R. area 104=Selby R. to Reed R. Chums in 102 probably includes some sheefish.										
		8/31	73	2	2	3		2	1		3	Area 101
		8/31	1,476	2	2	3		2	1		3	Area 102
		8/31	1,454	2	2	3		2	1		3	Area 103
		Total	3,003									
		Catalog Comment: 101=Kobuk to Pah 102=PahR. to Selby R. 103=Selby river to Beaver Ck.										

Appendix Table C13. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1974.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1974 (Continued)												
	Squirrel	7/24	2,450	1	1	1		1	1		1	No footnote
		8/06	16,604	1	1	1		1	1	1	2	No footnote
		8/20	25,638	1	1	1		1	1	2	1	Area 101
		8/20	6,885	1	1	1		1	1	2	1	Area 102
		Total	32,523									
		Catalog Comment: Head to Omar R. =101 Head to North Fk. 102= North Fk. to Omar R.										
	Salmon	8/03	3,754	1	1	1		1	1		2	No footnote
		8/06	18,198	1	1	1		1	1		1	No footnote
		8/07	12,198	1	1	1		1	1	1	1	No footnote
		8/21	29,190	1	1	1		1	1		1	
		Catalog Comment: Mouth to a few miles above foothills.										
	Tutuksuk	8/06	8,312	1	1	1		1	1		2	No footnote
		8/07	3,412	1	1	1		1	1	1	1	No footnote
		8/21	6,265	1	1	1		1	1		1	
		Catalog Comment: Foothills to mouth										

Appendix Table C14. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1975.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1975												
	Noatak	8/03	20,474	1	1	2	2	1	1		2	
		Catalog Comment: From Aggie Cr. to Noatak Village.										
		8/16	74,588	1	1	1	1	1	1	1	1	Area 101
		8/16	8,709	1	1	1	1	1	1	1	1	Area 102
		8/16	8,992	1	1	1	1	1	1	1	1	Area 103
		8/16	2,654	1	1	1	1	1	1	1	1	Area 104
		8/16	1,566	1	1	1	1	1	1	1	1	Area 105
		Total	96,509									
		Catalog Comment: 101=Aggie to Noatak 102=Noatak area 103=Parame Island 104=Fish-hook area 105= Kelly Bluff										
	Eli	8/16	1,302	1	1	1	1	1	1	1	1	No footnote
	Kelly	8/16	805	1	1	1		1	1		1	No footnote
		9/12	3,937	1	2	1		1	1		2	No footnote
		9/24	535	1	1	1		1	1	2	1	
		Catalog Comment: Reds and chums mixed, redds abundant. Ice covers 2/3 of lake.										
	Kobuk	8/24	1,873	1	2	1		1	1		1	Area 101
		8/24	3,968	1	2	1		1	1		1	Area 102
		8/24	4,801	1	2	1		1	1		1	Area 103
		Total	10,642									
		Catalog Comment: 101=Above Pah 102=Pah R. to Selby R. 103=Selby river to Beaver Ck.										

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Appendix Table C14. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1975 (continued).

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1975 (Continued)												
	Squirrel	7/27	6,701	1	1	1		2	1	1	2	Area 101
		7/27	279	1	1	1		2	1	1	2	Area 102
		Total	6,980									
		Catalog Comment: 101=Below Omar Cr. 102=Above Omar Cr.										
		8/03	7,225	1	1	1		2	1	1	1	Area 101
		8/03	8,199	1	1	1		2	1	1	1	Area 102
		Total	15,424									
		Catalog Comment: 101=mouth to Omar. 102= Above Omar Ck.										
		8/24	28,261									No ratings
		8/24	5,975									No ratings
		Total	34,236									
		Catalog Comment: 101=Below Omar Cr. 102=Above Omar Cr.										
	Salmon	8/24	9,721	1	2	1		1	1	2	2	No footnote
	Tutuksuk	8/03	1,344	1		1	1	1	1	1	1	
		Catalog Comment: Chums conc. in lower river										

Appendix Table C15. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1976.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1976												
	Noatak	8/19	23,879	1	1	1	1	1	1		2	Area 101
		8/19	795	1	1	1	1	1	1		2	Area 102
		8/19	1,464	1	1	1	1	1	1		2	Area 103
		Total	26,138									
		Catalog Comment: 101=Section one. 102=Section two. 103=Section three.										
		8/26	34,273	1		2	2	2	1		1	Area 101
		8/26	6,262	1		2	2	2	1		1	Area 102
		8/26	1,714	1		2	2	2	1		1	Area 103
		8/26	2,325	1		2	2	2	1		1	Area 104
		Total	44,574									
		Catalog Comment: 101=Section one. 102=Section two. 103=Section three. 104=Section four.										
	Eli	8/16	1,205	1	1	1	1	1	1		1	No footnote
		8/19	898	1	1	1	1	1	1		1	No footnote
	Kelly	8/19	217	1		1	1	1	1		1	No footnote
	Kobuk	8/05	910	1	1	1		1	1		2	Area 101
		8/05	485	1	1	1		1	1		2	Area 102
		Total	1,395									
		Catalog Comment: 101=Below Salmon R. 102=Below confluence with Tutuksuk										
		9/02	2,037	2	2	2		1	1		3	Area 101
		9/02	485	2	2	2		1	1		3	Area 102
		Total	2,522									
		Catalog Comment: 101=Above Pah to Selby 102=Selby R to Shungnak.										
		9/09	618	1	2	2		2	1		2	Area 101
		9/09	493	1	2	2		2	1		2	Area 102
		9/09	85	1	2	2		2	1		2	Area 103
		Total	1,196									
		Catalog Comment: 101=Pah R. to Beaver Cr. 102=Selby R. to Pah. 103=Shungnak to Selby										

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Appendix Table C15. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1976 (continued).

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1976 (Continued)												
	Squirrel	8/03	116	1	2	1		1	1	1	2	Area 101
		8/03	65	1	2	1		1	1	1	2	Area 102
		8/03	715	1	2	1		1	1	1	2	Area 103
		Total	896									
		Catalog Comment: 101=Below North Fork 102=North Fk. to Omar 103= Omar to 5 mile u/s. mouth.										
		8/05	1,552	1	1	1		1	1	1	1	Area 101
		8/05	4,305	1	1	1		1	1	1	1	Area 102
		Total	5,857									
		Catalog Comment: 101=Head to Omar Ck. 102=Omar to mouth										
		8/19	3,499	1		1		2	1		2	Area 101
		8/19	2,015	1		1		2	1		2	Area 102
		8/19	1,715	1		1		2	1		2	Area 103
		Total	7,229									
		Catalog Comment: 101=15 mi down headwaters to North Fk. 102=North Fk to Omar 103= Omar to 5 mi up mouth. 18,050 char										
	Salmon	8/03	200	1	2	1		1	1	1	2	No footnote
		8/19	1,161	1	2	2		1	2		2	No footnote
	Tutuksuk	8/19	758	1	2	2		1	2		2	No footnote

Appendix Table C16. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1977.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1977												
	Noatak	8/31	5,860	1	3	3	2	1	1		3	Area 101
		8/31	3,195	1	3	3	2	1	1		3	Area 102
		8/31	1,635	1	3	3	2	1	1		3	Area 103
		8/31	531	1	3	3	2	1	1		3	Area 104
		Total	11,221									
		Catalog Comment: Water = 4 2 mi. below Eli River. No fish on Noatak Racks. No large aggregations seen.										
		9/08	0		1	1	1	1	1	3	3	Area 101
		9/08	5,216		1	1	1	1	1	3	3	Area 102
		9/08	1,385		1	1	1	1	1	3	3	Area 103
		Total	6,601									
		Catalog Comment: Survey = 1 secs. 2-4; sec. 1 too turbid for counting. Turbidity appears to extend downriver from tundra burn area near Eli R. No subs fish Noatak.										
	Eli	8/31	742	1	3	1	2	1	1	2	2	
		Catalog Comment: Water extremely shallow, only a trickle within 3 mi of mouth.										
	Kelly	9/08	290	1	1	1	1	1	1	3	1	
		Catalog Comment: River extremely low. Redds visible. No fish subs racks.										
	Kobuk											No survey
	Squirrel	8/31	1,964	1	3	2	2	1	1	3	3	
		Catalog Comment: Water = 4 below Omar Ck. Fish on redds. Few migrants										
	Salmon											No survey
	Tutuksuk											No survey

Appendix Table C17. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1978.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1978												
	Noatak	8/15	24,285	1	3	2	2	2	1	2	3	Area 101
		8/15	8,632	1	3	2	2	2	1	2	3	Area 102
		8/15	3,065	1	3	2	2	2	1	2	3	Area 103
		8/15	1,835	1	3	2	2	2	1	2	3	Area 104
		Total	37,817									
		Catalog Comment: Sec 1 poor survey; secs 2-4 fair spawning in progress. 16,950 char/ whitefish first salmon seen 3 miles below Eli River.										
		8/17	18,358	1	1	1	1	1	1	2	1	Area 101
		8/17	6,317	1	1	1	1	1	1	2	1	Area 102
		8/17	2,343	1	1	1	1	1	1	2	1	Area 103
		Total	27,018									
		Catalog Comment: Spawning in progress survey done with Schaefer.										
	Eli	8/15	5,305	1	3	1	2	1	1	2	1	
		Catalog Comment: Nos of fish just within mouth may be bound for Eli or Noatak River spawning areas.										
		8/17	5,525	1	1	1	1	1	1	2	1	No footnote
	Kelly	8/15	168	1	3	2	1	1	1	2	1	No footnote
	Kobuk	None	269									No ratings
		None	1,448									No ratings
		None	211									No ratings
		None	53									No ratings
		Total	1,981									
	Squirrel	7/23	1,623	2	3	1	2	1	1	1	2	
		Catalog Comment: Spawnings in upriver areas 163 chum above confluence of North Fork (some spawning).										
		7/24	1,863	1	1	1	1	1	1	1	1	
		Catalog Comment: Almost all fish above Omar Ck. No evidence of new migrants 5,000 char; 15,000 whitefish species checked by ground surveys										
	Salmon	7/24	814	1	1	1	1	1	1	1	1	
	Tutuksuk	7/28	368	1	1	1	1	1	1	1	1	
		Catalog Comment: Some spawning in progress. No evidence of new migrants										

Appendix Table C18. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1979.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1979												
	Noatak	9/10	0	1	1	1	1	1	1	2	2	Area 101
		9/10	1,261	1	1	1	1	1	1	2	2	Area 102
		9/10	1,040	1	1	1	1	1	1	2	2	Area 103
		9/10	11,270	1	1	1	1	1	1	2	2	Area 104
		9/10	2,150	1	1	1	1	1	1	2	2	Area 105
		Total	15,721									
		Catalog Comment: Live and dead combined. Based on ground/air ratio of 2.6 to 1.0 counts are expanded to 40,875. Total Sept expanded count for Noatak and tribs is 44,766.										
		9/12	2,057	2	1	1	2	2	1	2	1	Area 101
		9/12	575	2	1	1	2	2	1	2	1	Area 102
		9/12	205	2	1	1	2	2	1	2	1	Area 103
		Total	2,837									
		Catalog Comment: Largest school = 350 fish. Subs. fishing in progress at Noatak village. No counts possible below Eli River due to turbid water.										
		10/3	4,300	1	1	1	1	1	1	3	1	Area 102
		10/3	8,180	1	1	1	1	1	1	3	1	Area 104
		10/3	7,175	1	1	1	1	1	1	3	1	Area 105
		Total	19,655									
		Catalog Comment: Live and dead combined. Count not expanded.										
	Eli	9/10	1,794	1	1	1	1	3	1	2	2	
		Catalog Comment: Live and dead combined. Expanded count based on ground count to air ratio of 2.6 to 1.0 provides count of 3180.										
		9/12	1,183	1	1		1	1	1	3	1	
		Catalog Comment: Wat=3 from mouth to 5 miles upstream;Wat=2 remainder Largest school in upper mouth of Eli.										
		10/3	1,000	1	1	1	1	2	1	3	1	
		Catalog Comment: Live and dead combined. Count not expanded.										

-Continued-

Appendix Table C18. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1979 (continued).

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1979 (Continued)												
	Kelly	8/24	30	1	1	1	1	1	1	1	1	Area 102
		Catalog Comment: Count not expanded. 100 is total. 101 is Kelly River only. 102 is Kelly lake.										
		9/10	311	1	1	1	1	1	1	1	1	Area 101
		9/10	400	1	1	1	1	1	1	1	1	Area 102
		Total	711									
		Catalog Comment: Count not expanded. 100 is all Kelly River. 101 is Kelly River only. 102 is Kelly Lake.										
		10/3	3,200	1	1	1	1	1	1	1	1	Area 102
		Catalog Comment: 100 is all Kelly River. 101 is Kelly River only. 102 is Kelly Lake.										
	Kobuk	9/12	75	1	1		1	1	1		1	Area 101
		9/12	183	1	1		1	1	1		1	Area 102
		9/12	1,110	1	1		1	1	1		1	Area 103
		9/12	640	1	1		1	1	1		1	Area 104
		Total	2,008									
		Catalog Comment: Wat=2-3 downstream from Pah River										
	Squirrel	8/15	1,500	1	2	3	1	3	1		3	
		Catalog Comment: Water high/turbid mouth to headwaters. All fish seen in one school 2 miles downstream from confluence with East Fork.										
	Salmon	8/15	674	1	1	2	1	2	1	3	2	
		Catalog Comment: River very turbid from mouth to 5 miles upstream										
	Tutuksuk	8/15	362	1	1	2	1	2	1	3	2	Area 101
		8/15	20	1	1	2	1	2	1	3	2	Area 102
		Total	382									
		Catalog Comment: River very turbid from mouth to 3 miles upstream 101=Tutuksuk R. 102=E. Fk. Tutuksuk R.										

Appendix Table C19. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1980.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1980												
	Noatak	8/07	8,121	1	1	1	1	1	1	1	2	Area 101
		8/07	20,000	1	1	1	1	1	1	1	2	Area 102
		8/07	7,086	1	1	1	1	1	1	1	2	Area 103
		Total	35,207									
		Catalog Comment: Started at sonar site to 5 miles below Kelly River.										
		8/18	7,137	1	1	3	3	3	1	1	3	
		Catalog Comment: Water very muddy/survey unacceptable.										
		9/10	4,491	1	1	1	1	2	1	1	1	Area 101
		9/10	68,703	1	1	1	1	2	1	1	1	Area 102
		9/10	29,854	1	1	1	1	2	1	1	1	Area 103
		9/10	61,426	1	1	1	1	2	1	1	1	Area 104
		Total	164,474									
		Catalog Comment: 103 change to:Noatak to Keeluk Slough. 104 change to:Keeluk Slough to Kelly River ie. combines areas 104 and 105 essentially.										
		9/12	12,445	1	1	1	1	1	1	2	1	Area 102
		9/12	82,714	1	1	1	1	1	1	2	1	Area 105
		Total	95,159									
		Catalog Comment: Area 101 not surveyed. Area 103, 104, 105 listed as 105, good survey.										
	Eli	8/18	4,276	1	1	1	1	2	1	2	1	No footnote
		9/11	10,227	1	1	1	1	2	1	1	1	No footnote
	Kelly	8/18	1,404	1	1	1	1	1	1	1	1	No footnote
		9/11	1,240	1	1	1	1	2	1	1	1	Area 101
		9/11	6,176	1	1	1	1	2	1	1	1	Area 102
		Total	7,416									
		Catalog Comment: 101 is Kelly River. 102 is Kelly Lake and creek.										
		9/12	1,846	1	1	1	1	0	1	2	1	
		Catalog Comment: Good survey										

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Appendix Table C19. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1980 (continued).

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1980 (Continued)												
	Kobuk	9/11	1,694	1	1	1	1	1	1	2	1	Area 101
		9/11	2,069	1	1	1	1	1	1	2	1	Area 102
		9/11	6,925	1	1	1	1	1	1	2	1	Area 104
		9/11	784	1	1	1	1	1	1	2	1	Area 105
		Total	11,472									
		Catalog Comment: Some chum counted could have been sheefish/Area 103 not surveyed										
	Squirrel	7/30	2,374	1	1	1	1	1	1	1	1	
		8/07	3,347	1	2	1	1	1	1	1	1	Area 101
		8/07	823	1	2	1	1	1	1	1	1	Area 102
		8/07	3,085	1	2	1	1	1	1	1	1	Area 103
		Total	7,255									
		Catalog Comment: 101 head to North Fk. mostly spawners 102 North Fk to Omar 103 Omar to Timber most non spawners most pinks spawning										
		8/17	13,536	2	1	1	1	1	1	1	1	No footnote
	Salmon	7/30	1,290	1	1	1	1	1	1	1	1	
		Catalog Comment: Surveyed from mouth to where we ran out of fish										
		8/06	4,290	1	3	1	1	1	1	1	1	No footnote
		8/17	8,456	2	1	1	1	1	1	1	1	No footnote
	Tutuksuk	7/30	550	1	1	1	1	1	1	1	1	No footnote
		8/17	1,165	2	1	1	1	1	1	1	1	No footnote

Appendix Table C20. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1981.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1981												
	Noatak	9/16	4,376	1	3	1	1	1	1	2	2	Area 101
		9/16	32,998	1	3	1	1	1	1	2	2	Area 102
		9/16	78,978	1	3	1	1	1	1	2	2	Area 103
		Total	116,352									
		Catalog Comment: 101:Aggie to Eli 102:Eli to Noatak 103:Noatak to Kelly Survey rating fair 50% cloud cover probably missed fish 9,675 char.										
	Eli											No survey
	Kelly	9/14	13,770							3	2	
		Catalog Comment: Incomplete survey due to logistical constraints. Some live chum are carcasses. Count is taken from 1981 AMR.										
	Kobuk	9/15	18	1	1	1	1	1	1	3	1	Area 101
		9/15	309	1	1	1	1	1	1	3	1	Area 102
		9/15	8,321	1	1	1	1	1	1	3	1	Area 103
		Total	8,648									
		Catalog Comment: Kobuk to Maneluk = 101 Maneluk to Selby = 102 Selby to canyon = 103. Good survey conditions, many chum may be sheefish										
	Squirrel	8/17	9,854	1	1	1	1	1	1	2	1	
		Catalog Comment: Good survey										
		8/31	2,628	1	1	1	1	1	1	3	1	
		Catalog Comment: Float trip on Sept 1 counted 2,652 live and 3,486 dead chum.										
	Salmon	8/05	3,374	1	1	1	1	1	1	1	1	
		Catalog Comment: Excellent survey										
		8/17	4,709	1	1	1	1	1	3	2	2	
		Catalog Comment: Fair survey: cloud cover made spotting hard at times										
		9/--	1,027	1	1	1	1	1	1	3	1	
		Catalog Comment: Float trip on Sept 1 counted 1,103 live, and 4,558 dead chum										
	Tutuksuk	8/05	1,114	1	1	1	1	1	1	1	1	
		Catalog Comment: Good survey										
		8/17	300	1	1	1	1	1	3	2	3	
		Catalog Comment: Unacceptable survey; 100% overcast										

Appendix Table C21. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1982.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1982												
	Noatak	8/04	4	2	2	4	3	1	1	1	4	Area 101
		8/04	1	2	2	4	3	1	1	1	4	Area 102
		8/04	1	2	2	4	3	1	1	1	4	Area 103
		Total	6									
		Catalog Comment: Survey unacceptable due to turbid water 101 is Aggie Cr to Eli R 102 is Eli R to Noatak 103 is Noatak to Kelly R mouth.										
		8/09	5,387	2	2	2	2	2	1	1	2	Area 101
		8/09	13,309	2	2	2	2	2	1	1	2	Area 102
		8/09	1,986	2	2	2	2	2	1	1	2	Area 103
		Total	20,682									
		Catalog Comment: 101 Aggie mouth to Eli mouth 102 Eli mouth to Noatak 103 Noatak to 5 miles above Noatak more fish above 103. Visibility poor in 101.										
		8/30	5,843	1	1	1	1	1	1	2	1	
		Catalog Comment: Survey covered hatchery to Kelly R. by boat.										
	Eli	8/09	189	1	2	1	1	1	1	2	1	Many spawning
		8/28	295	1	1	1	1	1	1	3	1	
		Catalog Comment: 2 day float trip										
	Kelly	9/09	3,609	3	2	1	2	1	1	3	1	Excellent survey
		Catalog Comment: Float trip from Kelly Lake downstream to mouth										
		9/27	1,559	3	1	1	2	2	2	3	2	Area 101
		9/27	10,045	3	1	1	2	2	2	3	2	Area 102
		Total	11,604									
		Catalog Comment: 101 is Kelly River 102 is Kelly Lake and creek. 35 Char in mouth										
	Kobuk	8/26	2,643	1	1	2	2	1	1	2	2	Area 101
		8/26	598	1	1	2	2	1	1	2	2	Area 102
		8/26	2,454	1	1	2	2	1	1	2	2	Area 103
		8/26	7,268	1	1	2	2	1	1	2	2	Area 104
		8/26	1,711	1	1	2	2	1	1	2	2	Area 105
		Total	14,674									
		Catalog Comment: Inexperienced observer some salmon may be sheefish Most salmon were spawners, murky water below Pah River.										

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Appendix Table C21. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1982 (continued).

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
				Survey Conditions(1)								
1982 (Continued)												
	Kobuk (Continued)	9/16	40	3	4	3	3	2		1	3	Area 102
		9/16	5,529	3	4	3	3	2		1	3	Area 103
		9/16	2,438	3	4	3	3	2		1	3	Area 104
		Total	8,007									
		Catalog Comment: Conditions too poor to see any fish in 101. 101=Kobuk to Pah River 102= Pah River to Maneluk 103=Maneluk to Beaver Cr 104 Beaver Cr. up										
	Squirrel	8/03	874	2	1	2	2	1	2	1	2	Area 101
		8/03	54	2	1	2	2	1	2	1	2	Area 102
		8/03	132	2	1	2	2	1	2	1	2	Area 103
		Total	1,060									
		Catalog Comment: Inexperienced observer, 101=mouth to tower 102=tower to Omar Cr. 103=Omar to North Fork										
		8/24	80	1	4	2	2	1	1	2	2	Area 101
		8/24	1,026	1	4	2	2	1	1	2	2	Area 102
		8/24	1,431	1	4	2	2	1	1	2	2	Area 103
		8/24	5,042	1	4	2	2	1	1	2	2	Area 104
		8/24	111	1	4	2	2	1	1	2	2	Area 105
		Total	7,690									
		Catalog Comment: 104= above North Fork 105= Omar River.										
		8/26	3,551	3	2	1	1	1	1	2	2	
		Catalog Comment: Float trip covered lower river above tower site										
		9/03	4,324	4	2	1	1	1	1	3	1	
		Catalog Comment: Float trip covered 40 miles above tower site										
	Salmon	8/03	585	2	1	1	1	1	2	1	1	
		Catalog Comment: Inexperienced observer, species identification may be inaccurate										
		8/20	1,871	3	2	3	3	1	1	2	2	60 mile float trip
		8/23	1,240	1	1	2	1	1	2	3	1	
		9/04	5,392	2	2	1	1	1	1	3	1	60 mile float trip
	Tutuksuk	8/03	254	2	2	1	1	1	2	1	1	
		Catalog Comment: Inexperienced observer, species identification may be inaccurate.										
		8/23	1,322	1	1	2	2	1	1	3	2	
		9/05	1,727	2	4	1	1	1	1	3	1	25 mile float trip

Appendix Table C22. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1983.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1983												
	Noatak	9/05	9,586	1	2	3	2	2	2	1	2	Area 101
		9/05	20,662	1	2	3	2	2	2	1	2	Area 102
		9/05	49,525	1	2	3	2	2	2	1	2	Area 103
		Total	79,773									
		Catalog Comment:	101=hatchery to Eli R. Mouth 102=Eli R. to Noatak 103=Noatak to Kelly R. mouth. Survey conditions poor in 101 some chums may be char.									
		9/23	20,504	2	2	3	3	1	1	3	3	Area 102
		9/23	51,257	2	2	3	3	1	1	3	3	Area 103
		Total	71,761									
		Catalog Comment:	Conditions unacceptable in 101 and in main channel due to ice Some salmon may be char. 425 char. Index areas as in 9/05/83.									
	Eli	9/05	3,044	1	2	2	2	2	1	2	2	
		Catalog Comment:	Extremely high water probably flushed many carcasses away from view. Surveyed from mouth.									
	Kelly	9/05	2,430	1	1	1	2	2	2	1	1	Area 101
		9/05	3,585	1	1	1	2	2	2	1	1	Area 102
		Total	6,015									
		Catalog Comment:	101=Kelly River mouth to mouth of Wrench Cr. 102=Kelly Lakes and creek some salmon may be char.									
		9/18	3,456	2	2	3	2	2	1	2	2	Area 101
		9/18	3,561	2	2	3	2	2	1	2	2	Area 102
		Total	7,017									
		Catalog Comment:	Some salmon may be char. Index areas as in 9/5/83.									
		9/23	3,164	2	1	3	2	2	3	2	3	Area 101
		9/23	8,973	2	1	3	2	2	3	2	3	Area 102
		Total	12,137									
		Catalog Comment:	Some ice on Kelly Lake. Some salmon may be char. Index areas as in 9/5/83.									
	Kobuk	9/01	322	3	1	2	2	2	2	1	2	Area 101
		9/01	1,589	3	1	2	2	2	2	1	2	Area 102
		9/01	3,157	3	1	2	2	2	2	1	2	Area 103
		9/01	6,915	3	1	2	2	2	2	1	2	Area 104
		9/01	1,844	3	1	2	2	2	2	1	2	Area 105
		9/01	2,915	3	1	2	2	2	2	1	2	Area 106
		Total	16,742									
		Catalog Comment:	101=Kobuk to Pah 102=Pah R. to Selby R. 103=Selby R and slough 104=Selby R. to Beaver R. 105=Beaver mouth 106=Above Beaver. Survey conditions in 101 were poor.									

Appendix Table C22. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1983 (continued).

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1983 (Continued)												
	Kobuk	9/19	2,147	3	1	2	2	2	2	2	2	Area 101
	(Continued)	9/19	2,433	3	1	2	2	2	2	2	2	Area 102
		9/19	11,683	3	1	2	2	2	2	2	2	Area 103
		9/19	13,011	3	1	2	2	2	2	2	2	Area 104
		9/19	3,059	3	1	2	2	2	2	2	2	Area 105
		9/19	1,413	3	1	2	2	2	2	2	2	Area 106
		Total	33,746									
		Catalog Comment: Some chums may be sheefish. Index areas as in 9/1/83.										
	Squirrel	7/25	456	2	3	1	2	1	1	1	1	Area 101
		7/25	5	2	3	1	2	1	1	1	1	Area 103
		Total	461									
		Catalog Comment: 101=mouth to tower site; 102=tower to Omar R.; 103=Omar to North Fork; 104= above North Fork; 105=Omar R.										
		7/29	1,325	2	3	1	1	1	2	1	2	Area 101
		7/29	137	2	3	1	1	1	2	1	2	Area 102
		7/29	155	2	3	1	1	1	2	1	2	Area 103
		7/29	30	2	3	1	1	1	2	1	2	Area 104
		7/29	41	2	3	1	1	1	2	1	2	Area 105
		Total	1,688									
		Catalog Comment: 101=mouth to tower site; 102=tower to Omar R.; 103=Omar to North Fork; 104= above North Fork; 105=Omar R.										
		8/14	1,589	2	4	3	2	1	1	2	3	Area 103
		8/14	1,515	2	4	3	2	1	1	2	3	Area 104
		Total	3,104									
		Catalog Comment: All areas below Omar R. too muddy to survey. Index area same as 7/29/83										
		8/22	1,010	2	3	2	2	1	1	2	2	Area 101
		8/22	380	2	3	2	2	1	1	2	2	Area 102
		8/22	626	2	3	2	2	1	1	2	2	Area 103
		8/22	3,147	2	3	2	2	1	1	2	2	Area 104
		8/22	181	2	3	2	2	1	1	2	2	Area 105
		Total	5,344									
		Catalog Comment: Index areas same as 7/29/83										

Appendix Table C22. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1983 (continued).

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1983 (Continued)												
	Squirrel	8/25	916	2	1	2	2	1	1	2	1	Area 101
	(Continued)	8/25	559	2	1	2	2	1	1	2	1	Area 102
		8/25	665	2	1	2	2	1	1	2	1	Area 103
		8/25	3,514	2	1	2	2	1	1	2	1	Area 104
		8/25	421	2	1	2	2	1	1	2	1	Area 105
		Total	6,075									
		Catalog Comment: Index areas same as 7/29/83										
	Salmon	7/25	859	2	3	1	1	2	1	1	1	
		Catalog Comment: 300 chums at mouth. Surveyed from mouth until fish ran out.										
		7/29	761	1	3	1	1	1	1	1	1	
		Catalog Comment: 855 chums in Kobuk River at mouth. Surveyed as on 7/25										
		8/25	1,677	2	1	1	1	1	1	2	1	
		Catalog Comment: Surveyed as on 7/25/83										
	Tutuksuk	7/25	469	2	3	1	1	1	1	1	1	
		Catalog Comment: 60 chums on redds 1,760 chums in Kobuk R. at mouth. Surveyed from mouth until no fish seen, main and E. Fork.										
		7/29	2,566	1	3	1	1	1	1	1	1	
		Catalog Comment: 1,266 chums in Kobuk at mouth. Surveyed as 7/25/83										
		8/25	2,637	2	1	1	1	1	1	2	1	
		Catalog Comment: Surveyed as 7/25/83										

Appendix Table C23. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1984.

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1984												
	Noatak	7/27	4,445	1	2	1	1	1	1	1	2	Area 101
		7/27	2,411	1	2	1	1	1	1	1	2	Area 102
		Total	6,856									
		Catalog Comment: Survey from Agi to Noatak Village.										
		9/4	4,485	1	1	1	1	1	1	2	1	Area 101
		9/4	20,303	1	1	1	1	1	1	2	1	Area 102
		9/4	43,085	1	1	1	1	1	1	2	1	Area 103
		Total	67,873									
		Catalog Comment: Area 103 is Noatak Village to Kelly River.										
	Eli	9/15	5,027	1	2	2	2	2	1	3	2	
		Catalog Comment: Some chums may be pinks but timing makes it unlikely. Survey started at mouth.										
	Kelly	9/4	905	1	1	1	1	1	1	2	1	Area 101
		9/4	2,594	1	1	1	1	1	1	2	1	Area 102
		Total	3,499									
		Catalog Comment: 101 is Kelly River, 102 is Kelly Lake.										
	Kobuk	9/5	402	1	1	1	1	1	1	2	1	Area 101
		9/5	257	1	1	1	1	1	1	2	1	Area 102
		9/5	5,910	1	1	1	1	1	1	2	1	Area 103
		9/5	4,052	1	1	1	1	1	1	2	1	Area 104
		Total	10,621									
		Catalog Comment: 101=Kobuk to Pah River, 102=Pah River to Selby River, 103=Selby River to Beaver River, 104=Beaver River to lower canyon. 9 subsistence nets fishing.										

-Continued-

Appendix Table C23. Stream catalog entries for Kotzebue Sound chum salmon aerial escapement surveys, 1984 (continued).

Year	River	Survey Date(mo/dy)	Chum Salmon Counted	Survey Conditions(1) Wi(2)	We(3)	Wa(4)	Vi(5)	Bot(6)	Ti(7)	Sp(8)	Rt(9)	Comments(10)
1984 (Continued)												
	Squirrel	7/24	962	2	4	2	2	1	1	1	2	Area 101
		7/24	34	2	4	2	2	1	1	1	2	Area 102
		7/24	56	2	4	2	2	1	1	1	2	Area 103
		7/24	6	2	4	2	2	1	1	1	2	Area 104
		Total	1,058									
		Catalog Comment: 101=Mouth to tower, 102=tower to Omar River 103=Omar R mouth to North Fork, 104=above North Fork mouth.										
		8/13	249	3	4	2	2	1	1	1	2	Area 101
		8/13	816	3	4	2	2	1	1	1	2	Area 102
		8/13	685	3	4	2	2	1	1	1	2	Area 103
		8/13	3,723	3	4	2	2	1	1	1	2	Area 104
		Total	5,473									
		8/27	312	0	4	2	2	1	1	3	2	Area 101
		8/27	1,621	0	4	2	2	1	1	3	2	Area 102
		8/27	350	0	4	2	2	1	1	3	2	Area 103
		8/27	2,260	0	4	2	2	1	1	3	2	Area 104
		8/27	314	0	4	2	2	1	1	3	2	Area 105
		Total	4,857									
		Catalog Comment: 105=Omar River, other areas as in previous survyes. Survey conditions poor in lower 30 miles of river. Many carcasses not visible due to recent flooding.										
	Salmon	7/25	305	2	4	2	2	2	1	1	2	
		Catalog Comment: 165 chums in Kobuk River at mouth										
		8/27	1,471	1	3	2	2	2	1	3	2	
		Catalog Comment: Many red(d)s without carcasses. Recent flooding probably washed carcasses away.										
	Tutksuk	7/25	630	2	4	2	2	2	1	1	2	
		Catalog Comment: All fish were in lower 10 miles.										
		8/27	1,132	1	3	2	2	2	1	3	2	
		Catalog Comment: Many red(d)s without carcasses. Recent flooding probably washed carcasses away.										

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