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ALASKA SALMON STUDIES

The Study of Red Salmon in the Nushagak District

by

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THE STUDY OF RED SALMON IN THE NUSHAGAK DISTRICT

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INTRODUCTION

This study of the sockeye salmon populations in the Nushagak District of Bristol Bay is a continuation of a research program that began in 1946 with financial support from the Alaska Salmon Industry. It is currently supported by the National Marine Fisheries Service ($50,000). The emphasis of the program is a comparative ecological study of the lakes and lake systems to determine: 1) causes of annual and long-term variations in abundance of adult sockeye salmon; 2) the effects of abundance and age composition of spawners on the abundance of juveniles and adults in the Wood River lake system; and 3) methods for management of the freshwater environment by enhancing the growth and survival of juveniles to increase the production of adult salmon. Our present research is largely directed toward this last objective; however, we have continued our monitoring of several physical and biological parameters in the lake system. These long-term measurements (many covering 20 years or more) are valuable for our study as well as for other research projects in southwestern Alaska.

Our main purpose in 1980 was to determine the subsequent effects of the fertilizations of Little Togiak Lake during 1974-1978. The specific objectives were to determine: 1) the predation by Arctic char on migrating sockeye salmon smolts; 2) the abundance and size of smolts that migrated from the lake; 3) the relative abundances of phytoplankton, zooplankton, and chironomids; 4) the relative abundance and growth of juvenile sockeye salmon and associated fish; and 5) the abundance and age composition of sockeye salmon spawners.

This report summarizes observations from the 1980 field season with comparable observations from prior years. Analysis and interpretation of the data will be presented primarily in our future reports (in 1981) because this report comes so soon after the field season.

RESULTS

Char Predation on Sockeye Smolts

Arctic char were sampled in Little Togiak River to examine their predatory behavior in relation to the number and size of migrating juvenile sockeye. Arctic char were usually collected by a variable mesh drift gillnet that was fished for a period of 5 to 15 min, and to a lesser extent by hook and line. Arctic char were tagged and stomach

contents were removed by a stomach pump to allow recapture of previously examined char. Consumed smolts were divided into several digestion stages to determine their time of consumption. The relatively low percent occurrence and number of smolts found in the char stomachs during the first 2 days of sampling suggest that the smolt migration began just prior to our arrival. Throughout the month of June, the percent occurrence and number of smolts consumed were extraordinarily high. Smolt consumption tapered off in July. Fry consumption was high during the first 2 weeks of June, but was not as significant as the consumption of smolts (Table 1). In comparison with past years, the consumption of smolts by arctic char more than doubled that in any previous year; however, the size of char sampled this year was considerably greater than in past years (Table 2).

The large number of smolts consumed was probably due to the large size of char and the exceptionally large migration of sockeye smolts (Tables 3 and 4). The number of smolts migrating more than doubled that in any of the previous years' migrations. The relationship between the number of smolts migrating with percent occurrence and mean number of smolts per stomach indicates a type II functional response, where the number of prey consumed increases as prey availability increases, but at a decreasing rate (Fig. 1).

The growth of juvenile sockeye in the Wood River lakes is density-dependent, and the smolts that migrated in 1980 averaged 7 mm shorter than those in the prior largest migration (Table 2). Since the average size of smolts was relatively small, the possibility of detecting char selecting larger-than-average smolts was increased. A paired-sample t-test was conducted on the mean size of the smolts in the migration with the mean size of smolts consumed (Tables 5 and 6). No difference in size was observed; however, the absolute minimum size of smolts consumed was consistently smaller than the absolute minimum size observed in the migration.

Length-weight statistics for smolts in the 1980 migration are presented in Table 7. The age I smolts in 1980 were shorter, lighter, and weighed less at a given length than the smolts that migrated in 1977, 1978, and 1979 (years following lake fertilization), even though the smolts in 1980 had had better growth in the preceding summer. The growth of the juvenile sockeye in the fall of 1979 was apparently very poor. Therefore it appears that the fertilization of the lake did not have any continuing effect on the size of the smolts. They were very small and the rate of predation by Arctic char was high in 1980.

Climatological Data

Anomalies in weather can have a significant effect on the growth, survival, and migrations of salmon. For example, warm temperatures have been associated with above average growth or a longer growing

season, whereas cold temperatures have been associated with poor growth and delays in migration timing.

The weather in Bristol Bay (King Salmon and Dillingham) has been exceptionally warm since the winter of 1976-1977 (Fig. 2). This has been particularly true for temperatures during the winter months; however, temperatures during the summer of 1979 were also exceptionally warm (Fig. 3). In contrast, precipitation was exceptionally low during 1977-1979. Temperatures during April-May 1980 were above average and ice breakup was very early (mid-May); however, June and July were relatively cool and precipitation was above average. Water temperatures in the Wood River lakes were above average in early summer but only average by the end of August (Table 8).

Lake level was high in June and July but exceptionally low in early September when most sockeye salmon were spawning. In most years the water level rises in late August or September from rain; however, in 1980 it was unusually dry for this normally wet time of the year. Solar radiation was below normal in June and the first half of July and then above normal into early September.

Primary and Secondary Producers

The concentration of chlorophyll a in Little Togiak Lake was exceptionally high in late June 1980; but during July and August the concentration was comparable to that in 1979, and in 1973 and 1974 prior to fertilization (Fig. 4). The concentration of chlorophyll in June has been correlated with the abundance of sockeye salmon spawners in the previous fall. The amount of chlorophyll in Lake Aleknagik was above average throughout the summer of 1980. The concentration in early August was unusually high since this is when the chlorophyll concentration has been lowest during past summers (1967-1979). Both lakes had large escapements of sockeye salmon in 1979.

The settled volumes of zooplankton were generally low throughout the lake system in 1980 (Fig. 5). The average volume of zooplankton during the summer in Lake Aleknagik was the lowest observed since 1967, whereas in Little Togiak Lake the volume was about average in June-July, but the lowest observed in August since 1972. The abundance of zooplankton in the lakes (excluding the fertilized years in Little Togiak Lake) has been inversely related to the abundance of juvenile sockeye salmon, and the escapements to the lake system were 2.3, 1.7, and 3.0 million in 1978, 1979, and 1980, respectively (the 27-year median is .8 million). These consecutive large escapements may produce a very high abundance of juveniles in 1981 and perhaps the lowest abundance of zooplankton yet observed in the lakes. A high abundance of juveniles causes an excessive cropping of the zooplankton so that by

mid-summer of 1981 the food supply of the juveniles may be reduced to a below maintenance level and result in actual mortalities from starvation.

Catches of emergent chironomids in Little Togiak Lake have been generally higher since the whole lake was fertilized in 1976; however, the catches at individual stations have been quite variable (Table 9). The peak catches in 1980 were in late July at station 4, early August at stations 2 and 3, and in mid-August at station 1. Water temperatures were below 10°C until mid-July and the warmest temperatures were in late July and early August (13-15°C). Insect traps were not placed in Lake Aleknagik until mid-July (Table 10). Although high catches did not occur until July 23, we may have missed an early peak soon after ice breakup that has occurred in some years. Catches were uniformly low at all 3 stations after August 6. Chironomids are an important source of food for juvenile sockeye salmon, especially in the spring; and the early-summer growth of juveniles has usually been greater in Lake Aleknagik where chironomids are more abundant than in Little Togiak Lake.

Abundance and Size of Juvenile Sockeye Salmon

Beach seine catches and mean lengths by date in 1980 are summarized in Tables 11 and 12. The growth rate of sockeye salmon fry from June 20 to September 1 was about .35 mm/day in Lake Aleknagik and .26 mm/day in Little Togiak Lake. The 18-year average for Lake Aleknagik is .36 mm/day. The growth rate in Little Togiak Lake in 1980 was the second lowest observed since 1973; the lowest was .22 mm/day in 1975. Considering that the parent escapements were well above average in both lakes, the beach seine catches of sockeye salmon fry in 1980 were low (Table 13). If the seasonal distribution (availability to the beach seine) were normal in 1980 then the catches indicate that production from the 1979 brood was relatively poor.

Townet sampling was conducted in all of the lakes in 1980 and the mean catches and mean lengths (adjusted to 9/1) are given in Tables 14 and 15. Townet catches in Lake Aleknagik and Little Togiak Lake were low relative to the abundance of parent spawners; otherwise the catches in the other areas of the system were comparable to the distribution of the parent escapement. Mean townet catches of juvenile sockeye salmon and threespine stickleback from 1958 through 1980 are given in Tables 16-18. Townet catches in the upper lakes of the system (Beverley and Kulik) in 1980 were among the highest catches observed since 1958; however, mean catches of sockeye fry have not been closely correlated with the abundance of returning adults. Yearling sockeye salmon were relatively abundant in 1980 (as expected from the large escapement in 1978), but their abundance was not exceptional.

Statistics on juvenile and adult sockeye salmon from Little Togiak Lake are summarized in Table 19. Preliminary estimates of the adult returns in 1980 are included in parentheses. The marine survival for age I smolts has been estimated for 3 years: 4.5% for the 1959 brood, 32.3% for the 1974 brood, and 24.6% for the 1975 brood. The last two broods have had exceptional marine survival, or our estimates of the abundance of smolts have been too low. If our estimates of smolt abundance are correct, there may be a very large return of adults in 1981. It has not been possible, so far, to determine to what extent the lake fertilization has affected the marine survival of fish from Little Togiak Lake because marine survival appears to be high for these brood years in other stocks in Bristol Bay.

Abundance of Adult Sockeye Salmon

Escapement-return statistics for the Wood River lakes are presented in Tables 20-24. The escapement to Little Togiak Lake was enumerated again in 1980 (Table 25). The commercial fishery did not begin until July 3, so the early part of the run was practically unfished. The estimated escapement of 81,000 may be slightly high because there was a very large spawning population in Little Togiak River and many of these fish move up into the lake and then drop back into the river to spawn in August. The escapement to Little Togiak Lake has been enumerated for 7 years (1961, 1975-1980), and the travel time from the outlet of the lake system to Little Togiak River was estimated from the difference between the dates on which 50% of the fish were counted past Wood River tower and Little Togiak River counting station. The travel time was 3 days in 3 years, 4 days in 2 years, 5 days in 1980, and 6 days in 1978. Aerial survey estimates of the escapements to the lake (by M. Nelson, ADF&G) have been quite close to the enumerated escapements ($\pm$ 5-21%).

The return of sockeye salmon to the Nushagak District in 1980 was probably a record (12.7 million) that may have been exceeded only in 1937 (Fig. 6). The run was exceptionally large primarily because of the return to the Nuyakuk system (Fig. 7). The Wood River runs in 1978-1980 were similar to the large runs and escapements in 1946-1948 that preceded the low runs in the early 1950's, so that continued good production is not assured.

The total escapement to the Wood River lakes in 1980 was the largest escapement that has been enumerated (3 million). We conducted stream surveys as in past years (since 1946) and collected otoliths from the main spawning grounds. The Alaska Department of Fish and Game provided some financial assistance so we could sample the late beach spawning areas.

The surveyed creeks had above-average numbers of spawners but not record highs (Table 26). Beach spawning areas appeared to have above-

average abundances, but higher abundances have been observed in other years when the total system escapement was only one-half of that in 1980. The greatest abundance observed was in the Agulowak River. Fish were attempting to spawn throughout the length of the river, whereas in other years the spawning was typically concentrated in the upper one-fourth. The spawning abundance in 1980 was difficult to estimate because on each of four visits in late August to early September (the usual peak spawning period) the river seemed "full" of spawning fish, but there were still schools of fish above and in the river. The spawning population in the Agulowak River was probably about 1 million. The largest number of spawners previously estimated (by aerial survey) was 400,000 (1978). Spawning distribution thus was disproportionately concentrated in the main rivers. This distribution was anticipated because the spawning in 1975 and 1976 (parent brood years) was also concentrated in the main rivers.

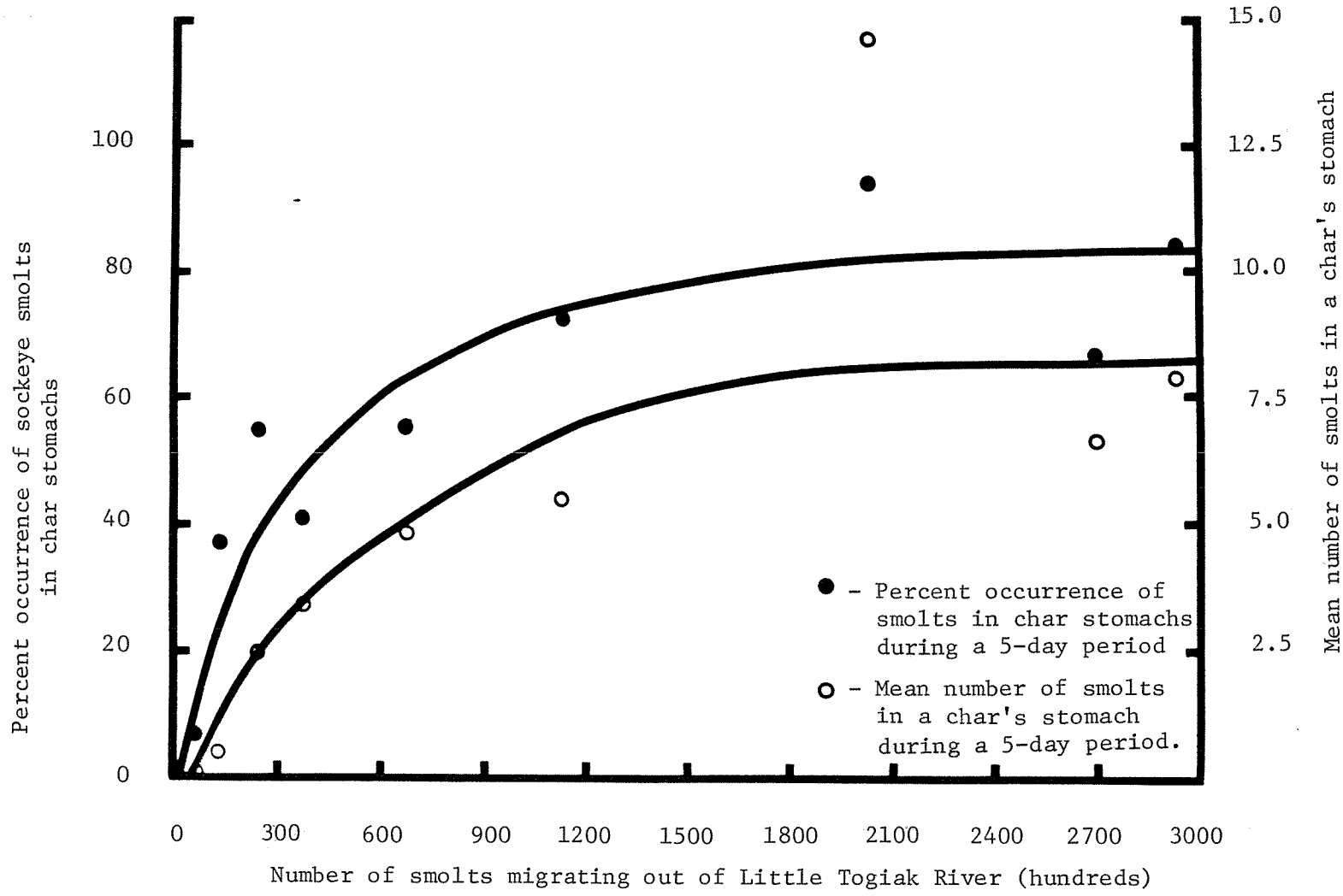

Fig. 1. Relationship between percent occurrence and mean number of smolts in a stomach with the number of smolts migrating.

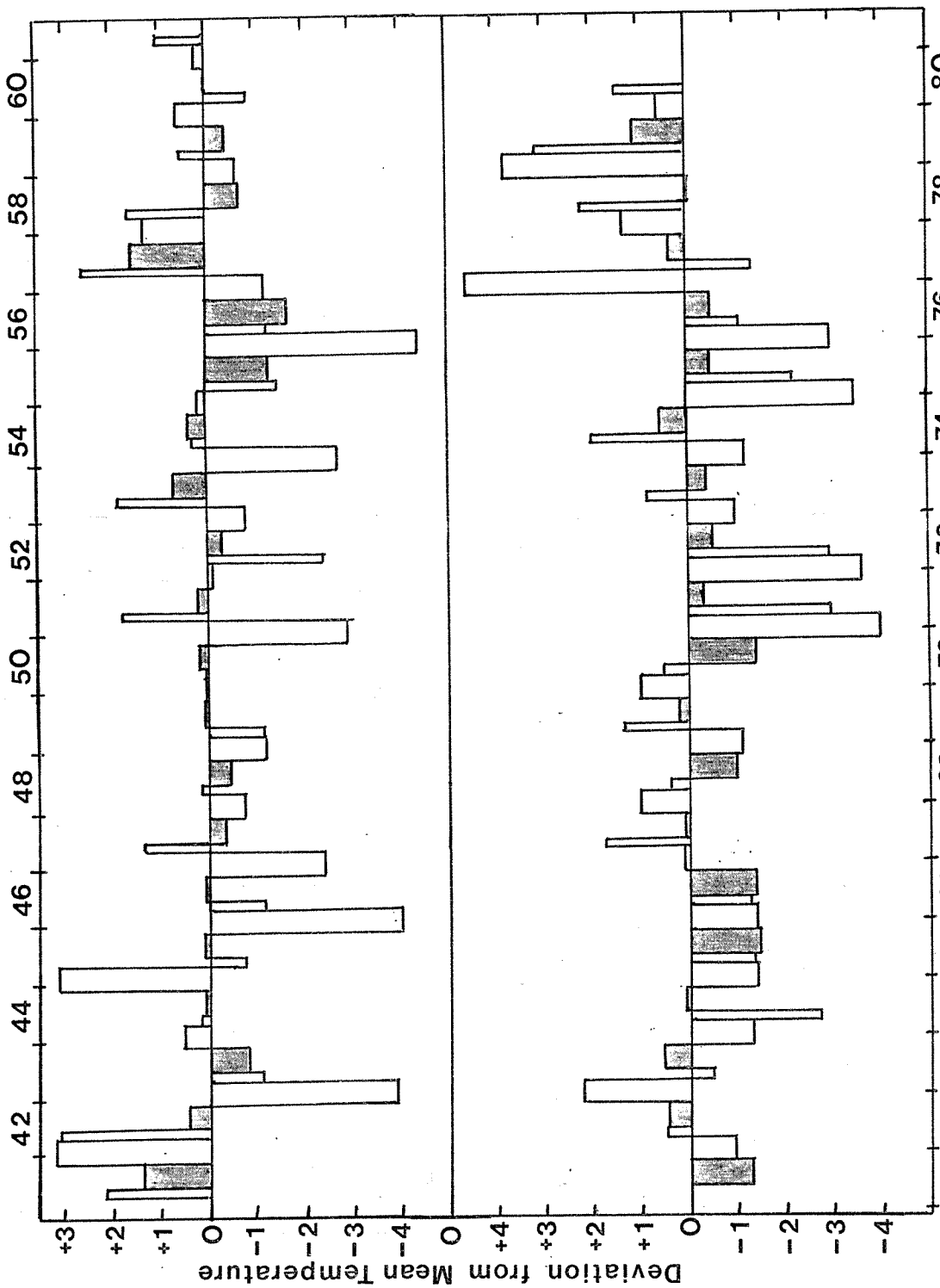

Fig. 2. Deviations from 60-year means of air temperatures in Bristol Bay for April-May (narrow bar), June-October (shaded bar), and November-March.

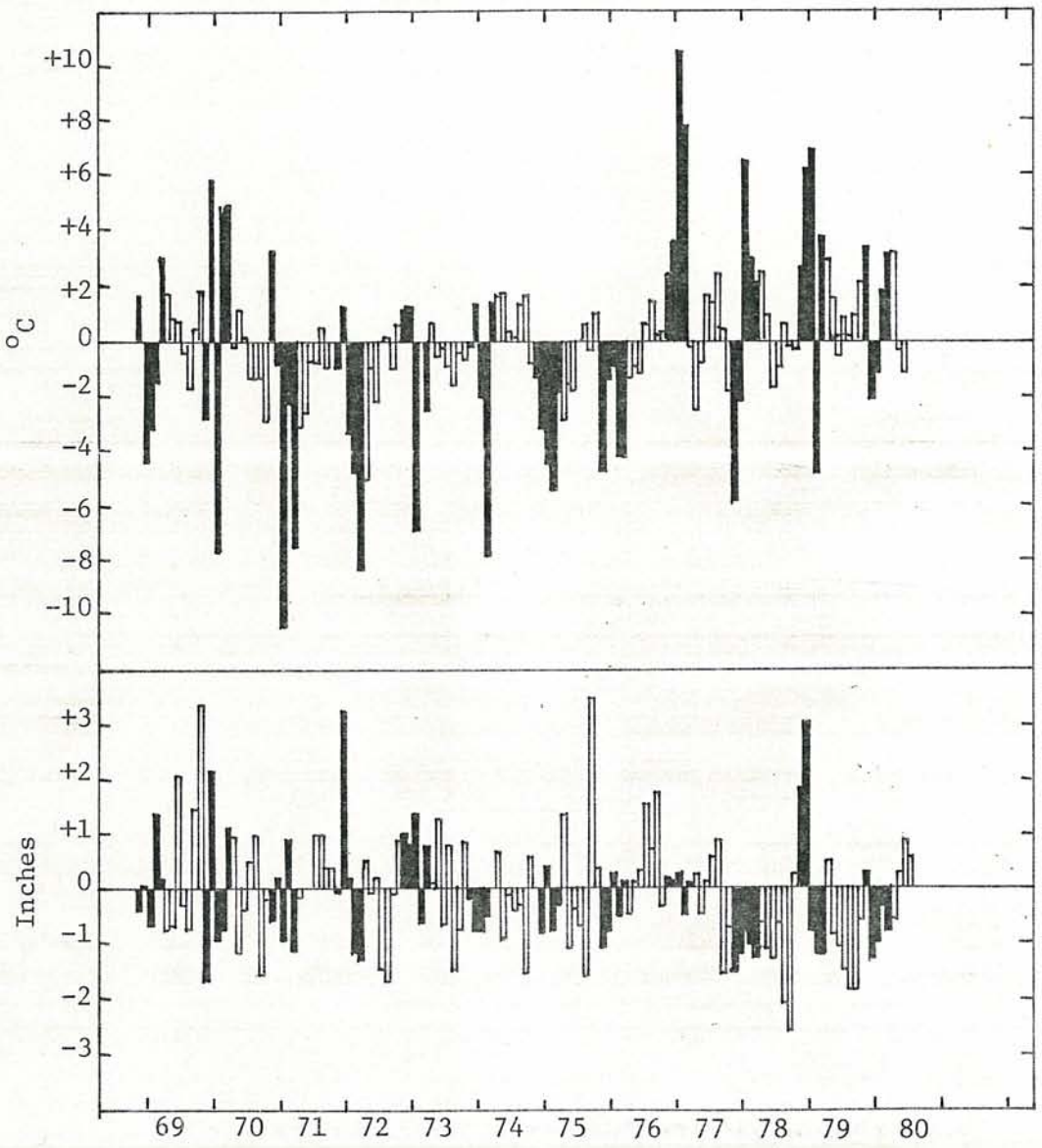

Fig. 3. Deviations from 60-year monthly means of air temperature (top) and precipitation (bottom) at Dillingham from November 1968 through July 1980. Solid bars for winter months (November-March).

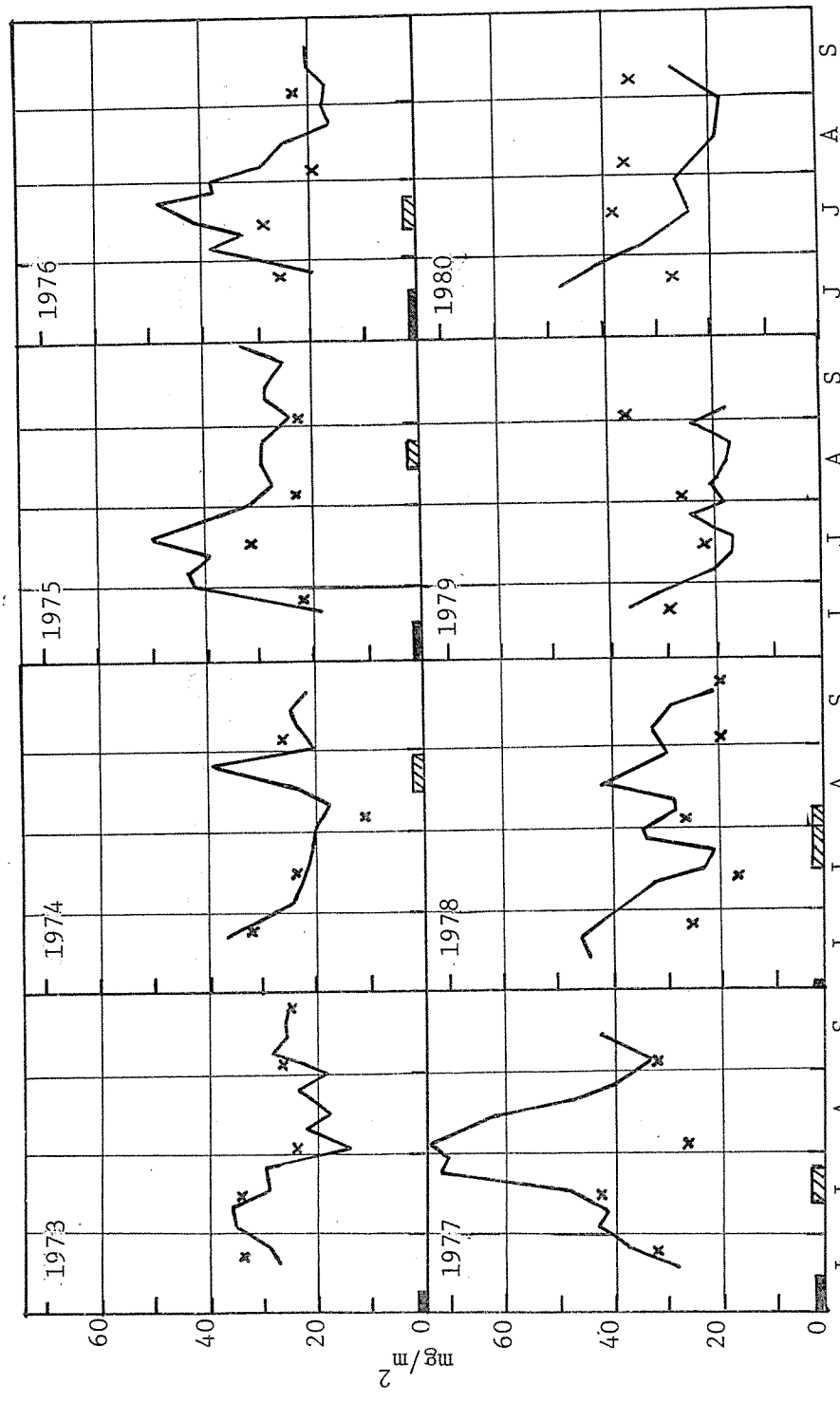

Fig. 4. Amount of chlorophyll a (mg/m^2) in the upper 20 m in Little Togiak Lake and Lake Aleknagik (X), 1973-1980. Ice cover on Little Togiak Lake is indicated by solid bar and periods of fertilization by hatched bar.

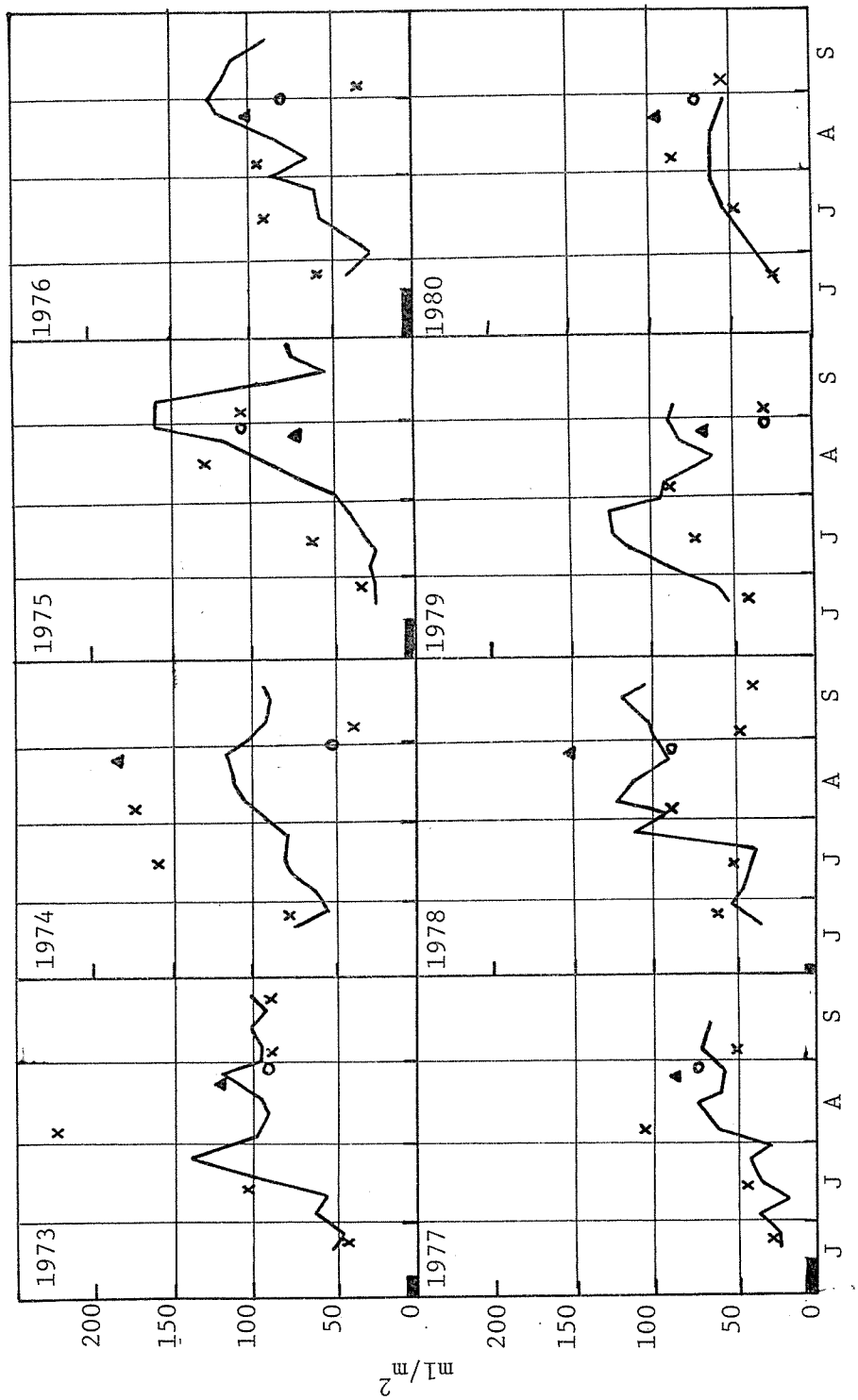

Fig. 5. Settled volume of zooplankton (ml/m^2) in Little Togiak Lake at weekly intervals and in Lake Aleknagik (X), Nerka (O), Beverley and Kulik (A). Ice cover on Little Togiak Lake indicated by solid bar.

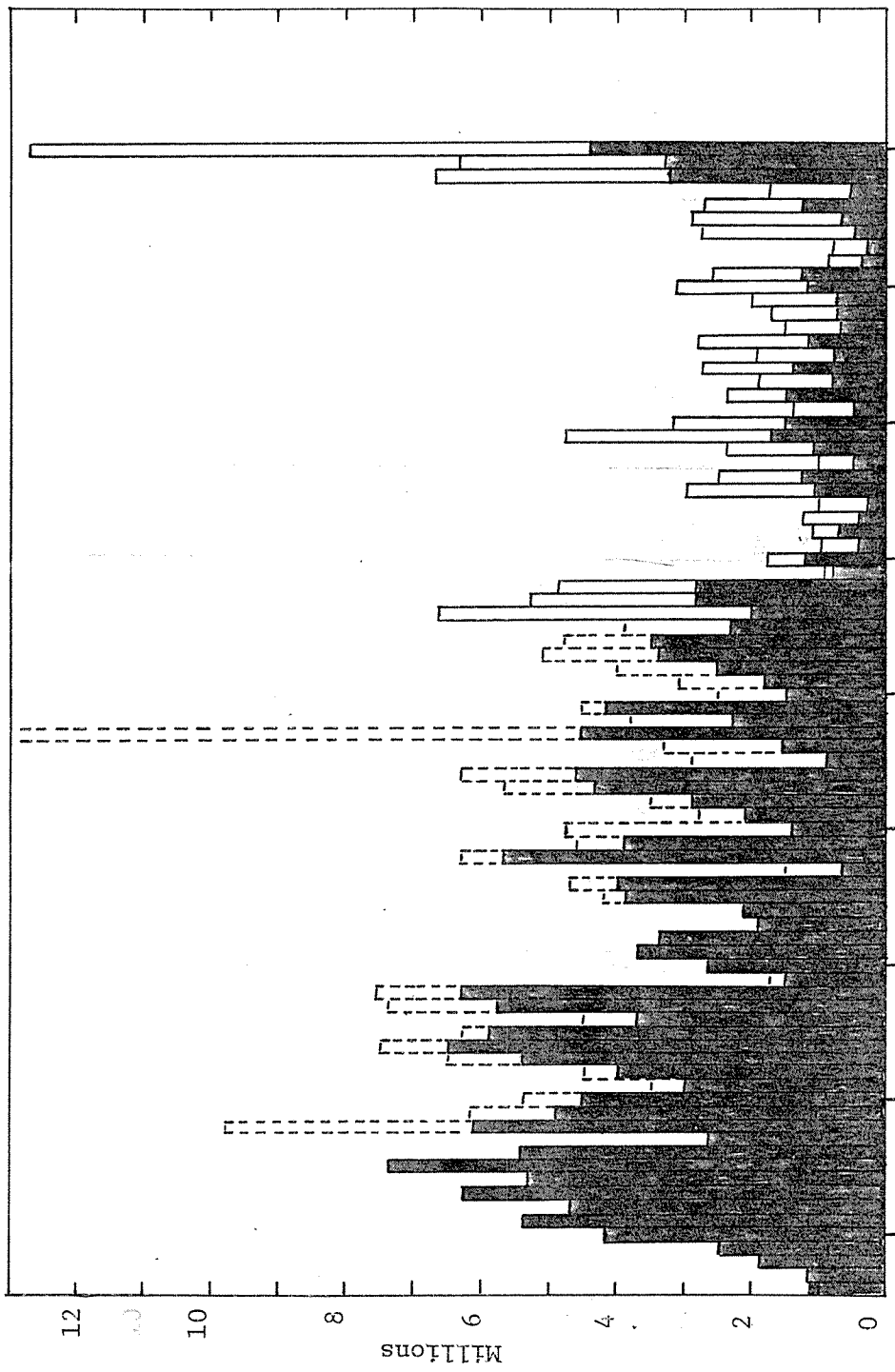

Fig. 6. Annual catches (solid bars) and runs (open bars) of sockeye salmon in the Nushagak District, 1896-1980.

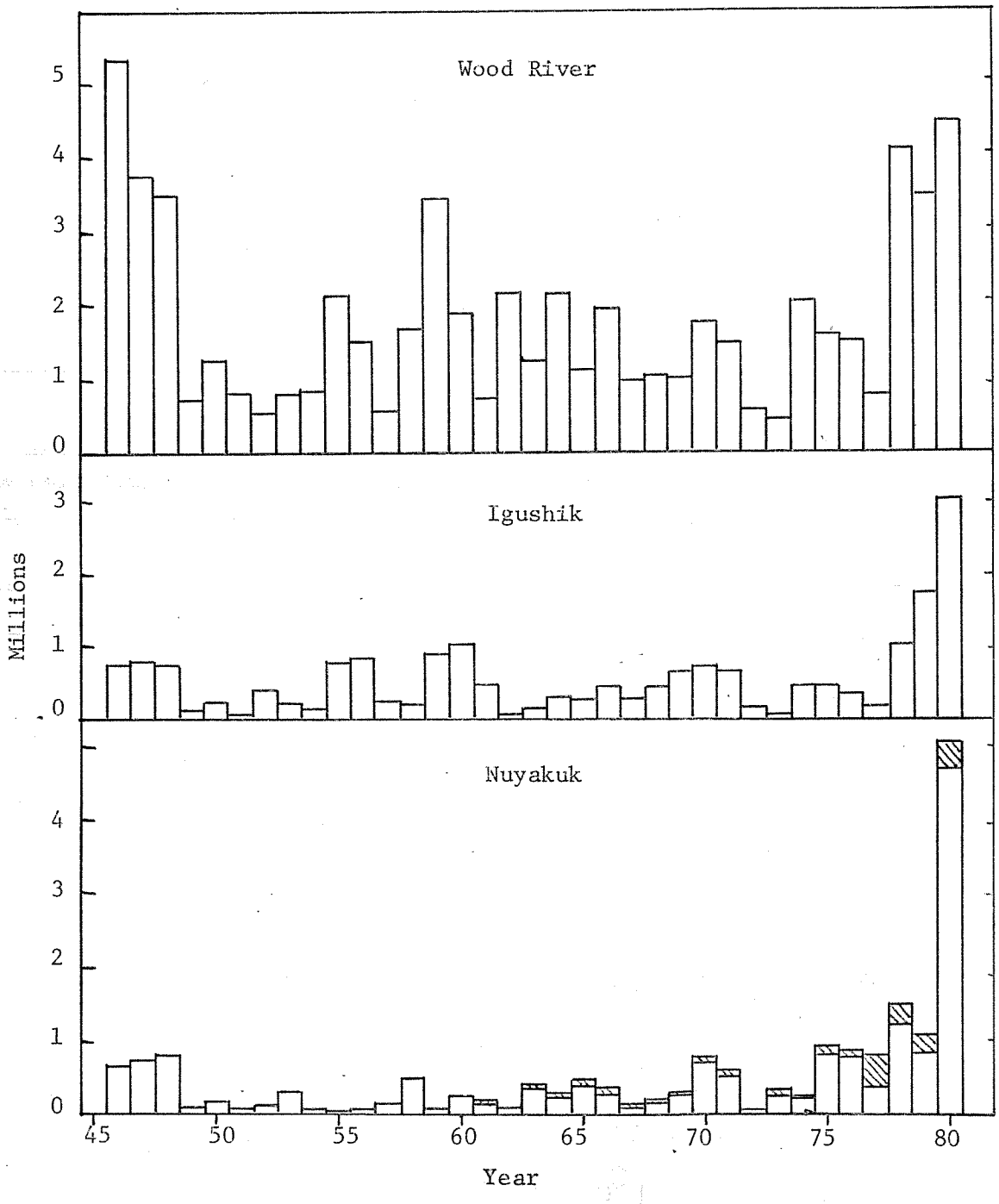

Fig. 7. Annual runs of sockeye salmon to the main river systems in the Nushagak District, 1946-80. (Nushagak-Mulchatna runs added to the Nuyakuk.)

Table 1. Percent occurrence and average number of juvenile sockeye salmon in stomachs of Arctic char from Little Togiak River by 5-day periods in 1980.

Date	Time collected	Arctic char			Sockeye salmon in stomachs			
		Number examined	Length mean	Range (mm)	Percent occurrence		Mean number per stomach	
					Fry	Smolts	Fry	Smolts
6/9-10	AM	5	480	443-555	20	100	0.4	13.2
	PM	13	418	336-525	46	38	3.2	1.7
11-15	AM	43	456	351-569	47	56	5.6	4.8
	PM	45	476	373-562	31	78	0.7	8.6
16-20	AM	22	463	359-566	32	86	0.4	8.6
	PM	72	463	342-570	21	96	0.4	16.6
21-25	AM	49	454	344-554	16	82	0.7	6.8
	PM	21	457	345-536	10	90	0.1	10.6
26-30	AM	47	451	333-528	6	81	0.1	6.5
	PM	31	446	375-537	13	61	0.2	4.2
7/1-5	AM	32	450	311-578	6	41	0.1	2.9
6-10	AM	29	456	376-548	3	55	0.1	2.5
	PM	2	507	454-560	0	50	0.0	2.0
11-15	AM	37	456	283-595	0	27	0.0	0.5
	PM	2	427	393-461	0	0	0.0	0.0
16-18	AM	14	417	314-550	7	7	0.1	0.1

Table 2. Statistics from stomach samples of Arctic char collected by hook and line from Little Togiak River during 30 days following ice breakup, 1972-1980.

	1972	1973	1974	1975	1976	1977	1978	1979	1980[2]
Samples collected in the day:									
Number examined	--	49	--	18	49	206	170	50	122
Mean length (mm)	--	470	--	449	435	399	443	431	457
Percent containing smolts	--	67	--	50	61	21	42	38	80
Mean number of smolts	--	4.9	--	3.3	3.1	0.5	1.6	1.6	6.5
Samples collected at night:									
Number examined	82	72	64	53	47	119	146	128	156
Mean length (mm)	446	429	429	404	400	411	431	441	461
Percent containing smolts	60	29	39	31	51	11	42	20	82
Mean number of smolts	4.5	1.6	1.6	1.3	1.2	0.3	1.4	1.0	11.7
Sockeye escapement to Little Togiak Lake in year-2 (thousands)	55	24	14	14	48	30	18	26	45
Number of smolts migrating (hundreds)	--	--	--	--	1,438	3,036	4,582	3,588	9,813
Mean length of smolts in migration (mm)	--	83	90	84	84	88	84	85	76
Lake level (cm)	177	161	121	150	122	206	133	164	172
Total number of char removed	463	208	283	71[1]	113[1]	574	587	344	87
Total number of char measured	729	208	263	71	113	574	587	344	512
Mean length (mm)	444	444	435	415	427	388	432	427	456

[1]Char were also removed by the Alaska Department of Fish and Game; however, the total number removed in each of these years was less than 200.

[2]Sixty-nine percent of char were captured by 5 to 15 minute drift gillnet sets.

Table 3. Daily estimates of the number and size of sockeye salmon smolts from Little Togiak River in 1980.

	Date	Number			Mean length (mm)		Mean weight (g)	
		Total	Age I	Age II	Age I	Age II	Age I	Age II
June	9	6,400	5,900	500	78.1	100.8	3.8	7.8
	10	20,100	19,000	1,100	77.7	99.4	3.7	7.7
	11	6,100	5,900	200	77.1	97.8	3.7	7.4
	12	6,500	6,500	0	76.4	--	3.6	--
	13	9,000	8,500	500	76.4	100.2	3.6	7.8
	14	166,700	166,000	700	75.4	100.0	3.4	7.7
	15	82,600	82,000	600	74.2	98.5	3.3	7.5
	16	17,200	17,100	100	75.1	105.2	3.4	8.2
	17	137,000	135,300	1,700	75.0	106.3	3.4	8.4
	18	15,000	14,600	400	74.5	97.2	3.3	7.2
	19	6,200	6,100	100	74.8	96.9	3.4	7.2
	20	30,800	29,000	1,800	76.5	98.8	3.6	7.6
	21	124,600	123,900	700	76.0	95.9	3.5	7.0
	22	145,200	144,600	600	75.1	91.0	3.4	6.0
	23	14,100	14,100	0	73.9	--	3.2	--
	24	2,800	2,700	100	74.8	102.1	3.4	8.0
	25	6,400	6,400	0	75.1	--	3.4	--
	26	49,900	49,900	0	74.9	--	3.4	--
	27	38,600	38,600	0	74.8	--	3.4	--
	28	15,100	15,100	0	73.3	--	3.2	--
	29	7,800	7,800	0	73.1	--	3.1	--
	30	2,200	2,200	0	72.8	--	3.1	--
July	1	1,800	1,700	100	76.3	94.8	3.6	6.8
	2	8,500	8,500	0	74.1	--	3.4	--
	3	14,800	14,800	0	75.6	--	3.5	--
	4	6,500	6,500	0	76.1	--	3.6	--
	5	5,400	5,400	0	74.6	--	3.4	--
	6	3,800	3,800	0	73.7	--	3.3	--
	7	2,600	2,600	0	74.5	--	3.4	--
	8	11,200	11,200	0	75.0	--	3.5	--
	9	5,200	4,800	400	76.4	96.9	3.6	7.6
	10	2,000	2,000	0	75.5	--	3.5	--
	11	1,600	1,600	0	78.4	--	3.9	--
	12	400	400	0	76.3	--	3.6	--

Table 3. Daily estimates of the number and size of sockeye salmon smolts from Little Togiak River in 1980 - continued.

	Date	Number			Mean length (mm)		Mean weight (g)	
		Total	Age I	Age II	Age I	Age II	Age I	Age II
July	13	2,100	2,100	0	77.9	--	3.9	--
	14	4,800	4,800	0	78.4	--	3.9	--
	15	2,100	2,100	0	77.8	--	3.8	--
	16	2,700	2,700	0	76.8	--	3.7	--
	17	600	600	0	78.1	--	3.9	--
	18	200	200	0	79.5	--	4.1	--
	19	700	700	0	79.7	--	4.2	--
	20	2,400	2,400	0	79.1	--	4.0	--
	21	400	400	0	--	--	--	--
	22	(400)	(400)	0	--	--	--	--
	23	(400)	(400)	0	--	--	--	--
	24	(300)	(300)	0	--	--	--	--
	25	(300)	(300)	0	--	--	--	--
	26	300	300	0	82.2	--	4.8	--
	27	300	300	0	82.1	--	4.8	--
	28	400	400	0	82.6	--	4.8	--

Table 4. Estimates of the abundance and size of sockeye salmon smolts from Little Togiak Lake by 5-day periods in 1980.

Date	Number (hundreds)			Mean length (mm)		Mean weight (g)	
	Age I	Age II	Total	Age I	Age II	Age I	Age II
June 1-5	no sampling						
6-10	623	40	663	77.8	99.8	3.7	7.7
11-15	2,689	20	2,709	75.1	99.4	3.4	7.6
16-20	2,021	41	2,062	75.2	101.9	3.4	7.9
21-25	2,917	14	2,931	75.4	94.2	3.4	6.6
26-30	1,136	0	1,136	74.5	--	3.3	--
July 1-5	369	1	370	75.2	94.8	3.5	6.8
6-10	244	4	248	75.1	96.9	3.5	7.6
11-15	110	0	110	78.1	--	3.9	--
16-20	66	0	66	78.1	--	3.9	--
21-25	18	0	18	(80.2)	--	(4.2)	--
26-30	16	0	16	82.4	--	4.8	--
Total	10,209	120	10,329	75.4	99.7	3.4	7.6

Table 5. Comparison of smolt size from Arctic char stomachs with the size of smolts from the corresponding migration using a paired sample to test.*

No. of smolts measured from stomach	No. of smolts measured from migration	Mean size of smolts in stomach (mm)	Mean size of smolts in migration (mm)	Difference (mm)	No. of smolts measured from stomach	No. of smolts measured from migration	Mean size of smolts in stomach (mm)	Mean size of smolts in migration (mm)	Difference (mm)
48	32	76.3	76.0	0.3	26	78	74.6	75.7	-1.1
33	66	78.1	77.3	0.8	27	86	75.0	75.7	-0.7
22	35	75.3	76.7	-1.4	20	43	77.1	75.4	1.7
60	107	75.4	76.3	-0.9	20	82	73.0	74.9	-1.9
64	89	76.4	75.9	0.5	27	78	79.0	76.7	2.3
58	109	74.8	76.5	-1.7	22	142	79.4	77.6	1.8
20	114	73.9	75.3	-1.4	37	86	79.4	76.8	2.6
30	72	75.2	76.4	-1.2	37	111	76.5	78.3	-1.8
71	32	75.6	76.3	-0.7	26	97	75.3	74.6	0.7
114	37	75.8	75.1	0.7	31	43	75.7	77.5	-1.8
30	37	75.8	75.1	0.7	51	140	78.2	75.6	2.6
77	32	74.6	76.3	-1.7	53	90	76.0	76.4	-0.4
86	115	74.9	75.6	-0.7	28	59	74.3	74.6	-0.3
65	32	77.3	76.3	1.0	38	78	74.0	73.5	0.5
23	125	72.4	75.3	-2.9	23	80	73.8	73.1	0.7
32	125	74.2	75.3	-1.1	43	48	75.2	72.6	2.6
52	47	74.7	74.4	0.3	20	34	75.6	75.6	0.0

H_o: There was no difference in mean lengths of smolts taken from char stomachs and the migration.

H_A: There was a difference in mean lengths of smolts taken from char stomachs and the migration.

$n = 34$

$\bar{d} = -0.0559$ mm

$S_{\bar{d}} = S/\sqrt{n} = \frac{1.4612}{5.8309} = 0.2506$

$t = \bar{d}/S\bar{d} = \frac{-0.0559}{0.2506} = -.2230$

$t.05(2),33 = 2.035 \quad P < .05$

therefore, do not reject H_o.

*Size of migrating smolts determined from samples taken up to 12 hours prior to the sampling of char for S/N digested smolts and between 12 to 24 hours for moderately digested smolts.

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980.

Date	Sample number	Time period of sample (hrs.)	Method of capture[1] / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
6/09	1	2000-2100	H.L./F.	10	402±52	30	S/N	0	0	---	---
							Mod.	0	0	---	---
							Adv.	8	8	76.4±11.2	69-82
							Bone	0	0	---	---
6/10	2	1015-1215	H.L./F.	5	480±48	100	S/N	6	6	80.4±10.8	64-90
							Mod.	42	35	77.3±8.3	62-95
							Adv.	18	1	78	---
							Bone	0	0	---	---
6/10	3	2330-0030	H.L./F.	3	470±49	66	S/N	1	1	78	---
							Mod.	10	8	80.5±6.7	67-83
							Adv.	3	0	---	---
							Bone	0	0	---	---
6/11	4	1000-1100	H.L./F.	4	510±44	75	S/N	2	2	86.0±14.0	
							Mod.	17	15	79.7±7.2	67-94
							Adv.	23	5	74.2±3.0	68-75
							Bone	2	0	---	---
6/11	5	2330-2345	H.L./F.	1	445	100	S/N	0	0	---	---
							Mod.	2	2	80.2±13.2	68-86
							Adv.	1	0	---	---
							Bone	1	0	---	---
6/12	6, 7	1030-1330	H.L./F.,B.I.	10	442±37	30	S/N	1	1	83	---
							Mod.	6	6	76.9±6.6	65-83
							Adv.	4	0	---	---
							Bone	1	0	---	---
6/12	8,9,10	2030-0030	H.L./F.,B.I.	11	454±37	36	S/N	0	0	---	---
							Mod.	12	12	80.5±7.3	71-96
							Adv.	6	0	---	---
							Bone	0	0	---	---

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980 - continued.

Date	Sample number	Time period of sample (hrs)	Method[1] of capture / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
6/13	11	0830-1130	H.L./F.	16	458±54	69	S/N	1	1	71	---
							Mod.	26	26	78.4±80	55-94
							Adv.	24	5	80.0±5.2	72-82
							Bone	4	0	---	---
6/13	12	2230-2300	H.L./F.	3	482±112	0	---	---	---	---	---
6/14	13	0930-1100	H.L./F.	5	426±46	0	---	---	---	---	---
6/14	14	2030-2100	G.N./F.	12	471±43	92	S/N	48	48	76.3±4.8	64-84
							Mod.	34	33	78.1±3.4	68-81
							Adv.	17	3	77.1±1.8	72-75
							Bone	8	0	---	---
6/15	15	1130-1300	G.N./F.	8	462±55	88	S/N	22	22	75.3±6.0	59-88
							Mod.	60	60	75.4±6.8	58-96
							Adv.	22	3	71.9±2.8	67-72
							Bone	13	0	---	---
6/15	16	2030-2045	G.N./F.	10	484±45	100	S/N	64	64	76.4±5.6	65-94
							Mod.	61	58	74.8±4.4	64-86
							Adv.	67	32	73.9±5.3	58-84
							Bone	44	0	---	---
6/15	17	2230-2400	H.L./F.	8	451±51	100	S/N	20	20	73.9±4.7	64-80
							Mod.	34	30	75.2±5.9	64-92
							Adv.	21	7	74.3±3.0	66-75
							Bone	12	0	---	---
6/16	18	2110-2155	G.N./F.	5	482±45	100	S/N	6	6	77.1±3.1	70-77
							Mod.	16	15	73.8±9.0	61-96
							Adv.	49	4	74.5±6.2	67-80
							Bone	6	0	---	---

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980 - continued.

Date	Sample number	Time period of sample (hrs)	Method[1] of capture / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
6/17	19	0015-0030	G.N./F.	15	450±59	93	S/N	72	71	75.6±5.5	65-99
							Mod.	114	114	75.8±6.8	61-98
							Adv.	89	41	71.8±4.9	58-80
							Bone	34	0	---	---
6/17	20	1330-1415	G.N./F.	15	452±50	93	S/N	30	30	75.8±5.7	66-89
							Mod.	83	77	74.6±6.2	62-94
							Adv.	147	4	77.6±10.3	65-84
							Bone	46	0	---	---
6/17	21	2150-2205	G.N./F.	18	470±53	100	S/N	86	86	74.9±5.3	64-91
							Mod.	85	65	77.3±6.5	64-98
							Adv.	142	10	73.6±4.6	64-79
							Bone	38	0	---	---
6/18	22	1540-1555	G.N./B.I.	4	468±46	100	S/N	8	8	77.6±8.1	63-91
							Mod.	23	23	72.4±5.6	59-86
							Adv.	27	2	83.36±16	69-91
							Bone	6	0	---	---
6/18	23	1725-1740	G.N./F.	4	459±37	100	S/N	0	0	---	---
							Mod.	34	32	74.24±6.3	62-91
							Adv.	25	8	75.8±4.0	64-76
							Bone	7	0	---	--
6/18	24	2205-2220	G.N./F.	11	476±56	91	S/N	9	9	74.5±3.8	68-79
							Mod.	57	52	74.7±6.2	53-90
							Adv.	93	47	71.2±4.8	56-80
							Bone	22	0	---	---
6/19	25	0850-0930	G.N./F.	10	459±65	90	S/N	26	26	74.6±4.7	65-83
							Mod.	32	27	75.0±5.0	67-88
							Adv.	56	22	72.0±4.1	61-75
							Bone	39	0	---	---

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980 - continued.

Date	Sample number	Time period of sample (hrs)	Method[1] of capture / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
6/20	26	1035-1145	G.N./F.	12	466±44	83	S/N	20	20	77.1±8.2	64-98
							Mod.	22	20	73.0±3.6	66-88
							Adv.	34	17	72.3±3.9	62-75
							Bone	28	0	---	---
6/20	27	2235-2245	G.N./D.O.	6	452±47	83	S/N	27	27	79.0±6.4	65-86
							Mod.	3	3	80.6±9.8	70-88
							Adv.	3	0	---	---
							Bone	7	0	---	---
6/21	28,29	1000-1050	H.L./F. G.N.	18	458±34	94	S/N	22	22	79.4±8.3	66-92
							Mod.	15	14	75.4±5.0	66-84
							Adv.	19	14	73.9±6.6	52-79
							Bone	26	0	---	---
6/21	30	1825-1925	G.N./F.	12	456±53	83	S/N	13	13	76.5±5.2	69-87
							Mod.	37	37	79.4±7.7	67-108
							Adv.	25	12	75.4±5.5	58-79
							Bone	28	0	---	---
6/22	31	1000-1015	G.N./F.	12	438±45	83	S/N	14	14	77.6±5.2	66-84
							Mod.	38	37	76.5±5.1	65-87
							Adv.	64	43	76.3±6.7	64-98
							Bone	28	0	---	---
6/22	32	1700-1800	H.L./D.O.	9	444±49	67	S/N	10	10	72.7±5.4	60-75
							Mod.	27	26	75.3±6.0	64-83
							Adv.	17	6	73.8±4.5	65-77
							Bone	10	0	---	---

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980 - continued.

Date	Sample number	Time period of sample (hrs)	Method[1] of capture / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
6/22	33	2110-2115	G.N./F.	9	459±39	100	S/N	31	31	75.7±6.2	63-84
							Mod.	53	51	78.2±6.5	66-90
							Adv.	64	40	75.7±4.8	65-86
							Bone	18	0	---	---
6/23	34	0820-0910	G.N./F.	9	467±68	89	S/N	14	14	73.2±4.1	64-78
							Mod.	53	53	76.0±6.2	64-93
							Adv.	26	16	74.0±6.4	58-83
							Bone	11	0	---	---
6/24	35	1020-1230	G.N./F.	10	453±45	80	S/N	5	5	71.1±2.5	66-72
							Mod.	16	14	75.8±9.2	65-97
							Adv.	48	12	75.8±12	58-102
							Bone	47	0	---	---
6/25	36,37	0840-1030	G.N./F.,D.O. H.L.	10	445±55	20	S/N	1	1	75	---
							Mod.	0	0	---	---
							Adv.	11	1	77	---
							Bone	17	0	---	---
6/26	38,39	0920-2035	G.N./F. H.L.	8	440±47	0	S/N	0	0	---	---
							Mod.	0	0	---	---
							Adv.	0	0	---	---
							Bone	4	0	---	---
6/27	40	0922-0937	G.N./F.	8	447±50	75	S/N	9	9	74.6±3.2	67-76
							Mod.	12	12	75.3±4.4	66-80
							Adv.	24	21	73.1±3.4	64-75
							Bone	12	0	---	---
6/28	41	1110-1125	G.N./F.	4	440±35	100	S/N	0	0	---	---
							Mod.	21	19	72.9±3.1	65-76
							Adv.	13	3	68.4±3.3	62-68
							Bone	3	0	---	---

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980 - continued.

Date	Sample number	Time period of sample (hrs)	Method[1] of capture / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
6/28	42	1920-1955	G.N./F.	10	450	80	S/N	19	17	74.5±2.8	68-79
							Mod.	15	9	78.4±7.8	69-93
							Adv.	3	0	---	---
							Bone	11	0	---	---
6/29	43	0020-0035	G.N./F.	16	446±45	75	S/N	7	7	74.7±5.5	66-83
							Mod.	29	28	74.3±6.7	65-94
							Adv.	59	47	72.9±4.5	62-83
							Bone	34	0	---	---
6/29	44	1125-1340	G.N./F.	20	453±31	85	S/N	17	17	73.1±2.4	66-78
							Mod.	39	38	74.0±4.1	63-79
							Adv.	46	15	74.5±5.3	64-80
							Bone	18	0	---	---
6/30	45	1045-1135	G.N./F.	12	464±31	92	S/N	23	23	73.8±4.3	66-83
							Mod.	45	43	75.2±5.5	66-97
							Adv.	56	19	72.8±2.7	64-73
							Bone	31	0	---	---
7/1	46	1030-1120	G.N./F.	10	466±43	40	S/N	7	7	80.1±1.1	62-122
							Mod.	3	3	78.5±6.3	69-81
							Adv.	8	4	69.8±3.5	62-69
							Bone	12	0	---	---
7/2	47,48	1120-1240	G.N./F. H.L.	4	485±78	0	---	---	---	---	---
7/3	49	0845-1015	H.L./F.	7	442±71	57	S/N	3	3	76.1±1.8	71-74
							Mod.	6	6	79.5±11.7	69-99
							Adv.	1	0	---	---
							Bone	0	0	---	---

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980 - continued.

Date	Sample number	Time period of sample (hrs)	Method[1] of capture / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
7/4	50	1000-1115	H.L./F.	8	418±73	50	S/N	20	20	75.6±4.3	68-91
							Mod.	11	11	75.7±3.8	68-78
							Adv.	7	4	74.2±1.8	69-73
							Bone	3	0	---	---
7/5	51	0745-0900	H.L./F.	3	457±67	33	S/N	0	0	---	---
							Mod.	1	1		---
							Adv.	25	6	71.4±7.2	60-80
							Bone	5	0	---	---
7/6	52	1000-1215	H.L./F.	5	418±28	60	S/N	4	4	75.5±4.0	68-77
							Mod.	9	9	76.1±7.5	67-91
							Adv.	6	0	---	---
							Bone	4	0	---	---
7/7	53	1000-1200	H.L./F.	2	498	0					
7/8	54	0745-0900	H.L./F.	8	460±43	38	S/N	1	1		---
							Mod.	2	2	71.9±1.5	68-70
							Adv.	6	1	64	---
							Bone	8	0	---	---
7/8	55	1800-1805	H.L./F.	2	507	50	S/N	0	0	---	---
							Mod.	0	0	---	---
							Adv.	4	4	73.5±3.6	67-75
							Bone	15	0	84.4±7.4	---
7/9	56,57	0845-1020	H.L./F. G.N.	7	460±36	71	S/N	7	7	76.7±2.1	72-77
							Mod.	7	7	77.6±2.8	70-78
							Adv.	6	4	79.2±5.6	68-80
							Bone	7	0	---	---
7/10	58,59	0855-1000	H.L./F. G.N.	7	463±46	71	S/N	1	1	77.0	---
							Mod.	9	7	76.5±4.5	68-79
							Adv.	14	3	74.7	69-75
							Bone	2	0	---	---

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980 - continued.

Date	Sample number	Time period of sample (hrs)	Method[1] of capture / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
7/11	60,61	0830-0930	H.L./F. G.N.	12	484±58	25	S/N	8	8	75.0±3.2	65-75
							Mod.	0	0	---	---
							Adv.	0	0	---	---
							Bone	4	0	---	---
7/11	62	2100-2115	H.L./F. G.N.	2	427	0					
7/12	63,64	0900-0930	H.L./F. G.N.	13	436±62	38	S/N	3	3	80.2±5.8	72-83
							Mod.	1	1	70.0	---
							Adv.	2	1	76.0	---
							Bone	4	0	---	---
7/13	65,66	0900-1100	H.L./F. G.N.	5	474±51	20	S/N	0	0	---	---
							Mod.	0	0	---	---
							Adv.	2	2	74.5±5.2	68-75
							Bone	0	0	---	---
7/15	67,68	0825-1000	H.L./F. G.N.	7	434±44	14	S/N	0	0	---	---
							Mod.	0	0	---	---
							Adv.	4	0	---	---
							Bone	2	0	---	---
7/16	69,70	0825-0945	H.L./F. G.N.	8	466±53	0	S/N	0	0	---	---
							Mod.	0	0	---	---
							Adv.	0	0	---	---
							Bone	1	0	---	---
7/18	71,72	1055-1220	H.L./F. G.N.	6	351±35	17	S/N	0	0	---	---
							Mod.	1	1	75	---
							Adv.	0	0	---	---
							Bone	0	0	---	---

Table 6. Summary of sockeye smolts consumed by Arctic char in Little Togiak River in 1980 - continued.

Date	Sample number	Time period of sample (hrs)	Method of capture[1] / area[2]	No. of char	Mean char length ± std. dev. (mm)	Percent smolt occurrence in char stomachs[3]	Digestion stage of smolts[4]	No. of smolts at digest. stage	No. of smolts measured at digest. stage	Mean length of smolts ± std. dev. (mm)	Size range of smolts (mm)
7/19	73,74	1030-1135	G.N./D.O. H.L.	11	465±36	9	S/N	0	0	---	---
							Mod.	0	0	---	---
							Adv.	5	0	---	---
							Bone	8	0	---	---
7/20	75	0920-1035	G.N./D.O.	7	431±59	0					
7/21	76	0935-1048	G.N./D.O.	4	454±83	0					
7/22	77	0915-1015	H.L./D.O.	1	401	0					
6/9 - 7/22		Totals		512	456	70	S/N	688	685	75.8	59-122
							Mod.	1,222	1,142	75.9	53-108
							Adv.	1,444	497	73.8	52-102
							Bone	691	0	---	---
							Total	4,045	2,324	75.4	52-122

[1] H.L.: Hook and line; G.N.: Gill Net.

[2] F: Near fyke net in Little Togiak River;
B.I.: Below island in Little Togiak River;
D.O.: Drop-off at mouth of Little Togiak River.

[3] Percent occurrence does not include those char with smolts only in the bone digestion category.

[4] S/N: Slight or none; Mod.: Moderate; Adv.: Advance; Bone: Nearly all of the flesh removed from vertebrae.

Table 7. Length-weight statistics for sockeye salmon smolts from Little Togiak Lake, 1980.

Length interval (mm)	June 12-23			July 3-15			July 28		
	Mean length (mm)	Mean weight (g)	Sample size	Mean length (mm)	Mean weight (g)	Sample size	Mean length (mm)	Mean weight (g)	Sample size
63-67	65.0	2.07	1	--	--	--	--	--	--
68-72	71.4	2.90	11	71.4	3.06	10	71.5	3.08	2
73-77	74.9	3.35	44	75.4	3.50	32	75.3	3.67	3
78-82	79.2	3.92	28	79.1	4.04	16	80.6	4.52	18
83-87	85.0	4.79	2	86.0	5.26	2	84.6	5.17	10
88-92	89.5	5.39	2	--	--	--	88.0	5.78	2
93-97	94.0	7.04	1	--	--	--	97.0	7.61	1
98-102	100.0	7.65	1	--	--	--	99.0	8.00	1

Table 8. Summary of physical measurements in the Wood River lake system in 1980 and the long-term means and ranges from prior years.

Measurement	1980	Long-term Mean	Long-term Range	Number of years
Date of ice breakup in Lake Aleknagik	5/17	6/1	5/14,6/16	31
Mean water temperature 0-20 m in Lake Aleknagik on:				
June 22	6.1	5.4	3.6, 7.6	18
July 16	8.4	8.2	5.7,11.3	18
Aug. 4	10.5	10.8	7.7,14.0	18
Sept 5	10.5	11.3	9.3,12.9	18
Mean water temperature about Sept. 1 in the lake system				
0-20 m	10.8	10.9	8.6,12.4	21
total water volume	7.2	7.2	6.1, 8.2	21
Mean daily solar radiation (g cal/cm^2) during:				
June 1-15	313	414	291,552	16
June 16-30	372	448	283,572	17
July 1-15	291	415	284,590	18
July 16-31	471	367	192,478	19
Aug 1-15	284	311	230,402	19
Aug 16-31	319	255	175,351	19
Sept 1-15	241	218	114,300	19
Sept 16-30	-	158	101,216	9
Mean lake level (cm) at Lake Nerka during:				
June 1-15	183	130	84,206	28
June 16-30	162	151	97,218	28
July 1-15	146	130	75,191	28
July 16-31	132	105	53,172	28
Aug 1-15	98	85	34,173	28
Aug 16-31	74	83	30,183	28
Sept 1-15	49	81	43,130	28
Sept. 16-30	-	89	45,179	24

Table 9. Average daily catches of chironomids at stations 1-4 in Little Togiak Lake by 5-day periods, 1973-1979. Asterisk indicates period in which ice breakup occurred.

Mid-date of period	1973	1974	1975	1976	1977	1978	1979	1980
May 24							*	-
29		*					-	*
June 3		-				*	-	-
8	*	-				-	-	-
13	0	3			*	5	-	4
18	1	3	*	*	2	3	2	4
23	1	2	3	1	3	3	1	3
28	7	4	3	2	2	3	2	3
July 3	9	4	2	2	2	2	2	2
8	14	4	3	3	2	2	4	1
13	11	6	2	2	2	10	17	6
18	9	5	3	6	2	7	9	16
23	10	5	7	12	7	3	14	5
28	7	3	6	13	11	24	13	22
Aug 2	6	4	5	15	18	48	4	23
7	6	4	8	7	19	23	4	15
12	17	3	7	7	14	23	5	12
17	5	5	5	5	12	15	4	10
22	17	7	3	5	18	7	4	6
27	12	10	1	7	11	7	2	6
Sept 1	10	4	1	4	10	5	0	6
6	7	2	1	2	6	4	-	0
11	6	4	1	2	2	2	-	-
16	2	2	1	1	-	1	-	-
21	2	1	0	-	-	-	-	-
Average catch 6/21 to 9/13								
Station 1	17	12	8	7	8	7	9	4
2	2	2	2	3	3	2	3	4
3	2	1	1	3	9	24	1	12
4	15	3	3	8	13	11	8	13
5	-	-	4	5	9	6	4	2

Table 10. Average daily catches of chironomids in Lake Aleknagik by 5-day periods, 1969-1979. Asterisk indicates period in which ice breakup occurred.

Mid-date of period	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
May 19											*	*
24		*				*				*	–	–
29		–				–				–	–	–
June 3	*	–			*	–			*	13	–	–
8	–	70		*	6	34	*	*	3	7	2	–
13	–	53		–	8	15	46	6	50	6	14	–
18	8	10	5*	2	12	7	94	35	168	5	7	–
23	10	7	6	7	12	7	42	10	5	5	18	–
28	6	6	7	4	12	5	11	4	2	8	8	–
July 3	3	8	13	3	11	8	4	4	1	12	8	–
8	4	12	19	7	23	12	4	4	1	15	3	–
13	2	21	15	11	26	28	3	3	1	14	17	–
18	7	24	12	13	27	16	2	5	4	36	21	5
23	50	40	10	13	23	19	7	13	13	19	31	10
28	59	39	14	45	56	17	46	35	35	31	32	11
Aug 2	2	77	15	27	76	7	73	24	23	39	26	7
7	67	17	40	86	80	3	43	15	15	23	24	4
12	28	13	54	52	34	3	22	9	19	27	15	2
17	–	–	70	9	33	3	13	8	13	19	7	2
22	–	–	28	–	–	2	12	8	13	5	4	1
27	–	–	–	–	–	3	11	1	5	10	4	1
Sept 1	–	–	–	–	–	5	8	1	9	10	2	1
6	–	–	4	–	–	6	9	1	6	11	–	1
11	–	–	29	–	–	–	6	–	5	13	–	–
16	–	–	–	–	–	–	4	–	–	9	–	–
Mean catch June-Aug	27	24	23	25	29	11	27	12	22	16	14	–

Table 11. Geometric means of beach seine catches and mean lengths (live equivalent, mm) by sampling area in Lake Aleknagik, 1980.

Date	Area A $\bar{C}$	Area A $\bar{L}$	Area B $\bar{C}$	Area B $\bar{L}$	Area C $\bar{C}$	Area C $\bar{L}$	Weighted mean $\bar{C}$	Weighted mean $\bar{L}$
			Sockeye salmon (age 0)					
June 21	13	30.8	45	29.8	128	31.5	42	31.0
June 28	97	31.3	82	31.9	56	31.3	76	32.1
July 6	35	33.5	114	32.1	38	32.3	53	32.4
July 13	18	33.9	5	35.0	14	35.6	10	34.7
Aug 3	2	44.5	52	43.8	5	44.7	8	43.9
Sept 3*	1	56.4	1	55.4	6	57.6	2	57.2
			Threespine stickleback (age I)					
June 21	2	34.6	9	30.1	14	31.1	6	31.0
June 28	4	28.8	38	30.0	3	31.7	8	30.0
July 6	5	35.6	82	32.9	28	32.1	23	32.8
July 13	22	33.3	20	31.8	16	33.1	20	32.8
Aug 3	4	38.1	2	36.1	2	36.8	3	37.2
Sept 3*	.2	45.7	11	44.3	22	45.6	6	45.2
			Arctic char (age 0)					
June 21	14	29.4	1	29.4	2	28.6	3	29.3
June 28	37	30.8	.4	29.9	1	29.3	4	30.7
July 6	10	30.9	1	32.7	1	28.9	2	30.8
July 13	6	32.0	1	29.9	1	29.3	2	31.4
Aug 3	2	35.2	5	37.3	.4	32.5	2	36.6

*Townet

Table 12. Geometric means of beach seine catches and mean lengths (live equivalent, mm) by sampling area in Little Togiak Lake, 1980.

Date	Area A $\bar{C}$	Area A $\bar{L}$	Area B $\bar{C}$	Area B $\bar{L}$	Area C $\bar{C}$	Area C $\bar{L}$	Weighted mean $\bar{C}$	Weighted mean $\bar{L}$
				Sockeye salmon (age 0)				
June 24	10	30.2	52	29.3	200	31.4	46	30.9
July 2	70	29.9	192	30.5	41	31.3	82	30.5
July 8	90	31.8	48	30.7	65	32.2	65	31.7
July 17	362	30.7	38	31.0	199	33.8	140	31.7
July 29	454	30.3	17	34.4	3	40.2	28	30.5
Aug 28*	35	45.2	39	47.5	13	48.2	26	46.7
				Threespine stickleback (age I)				
June 24	1	27.4	3	27.3	4	30.4	2	28.9
July 2	0	--	2	28.4	5	27.6	2	27.9
July 8	21	28.7	1	29.4	3	29.7	3	28.8
July 17	91	30.4	12	29.0	33	29.0	33	29.9
July 29	230	30.5	1	30.4	14	31.8	14	30.6
Aug 28*	4	37.7	6	40.5	3	40.1	4	39.5
				Arctic char (age 0)				
June 24	6	30.1	31	29.9	71	30.6	23	30.4
July 2	43	29.7	153	29.2	52	30.5	70	29.6
July 8	13	31.9	31	30.5	17	31.0	19	30.9
July 17	16	30.9	23	31.1	4	30.8	12	30.3
July 29	3	32.0	15	32.6	8	32.8	7	32.6

*Townet

Table 13. Geometric means of beach seine catches in Little Togiak Lake and Lake Aleknagik for the periods (1) June 20 - July 18 and (2) July 24 - August 11.

	Sockeye salmon Age 0		Sockeye salmon Age 1		Threespine Stickleback		Ninespine Stickleback		Slimy Sculpin		Char fry Age 1	
Year	1	2	1	2	1	2	1	2	1	2	1	2
L.T.												
1973	63	14	0	0	34	18	2	1	17	5	19	5
74	12	5	1	0	35	27	7	3	7	4	12	2
75	135	24	0	0	65	78	6	12	17	16	39	15
76	125	20	0	0	87	108	9	9	9	2	22	7
77	118	38	2	6	58	146	4	11	8	5	15	3
78	99	11	0	0	21	51	1	12	5	4	16	6
79	94	2	0	0	112	40	8	7	4	3	13	5
80	77	27	0	0	18	122	2	38	10	9	25	7
Aleknagik												
1962	278	9	3	1	222	41	12	6	38	10	6	6
63	--	3	--	1	--	23	--	4	--	7	--	9
64	171	23	2	1	277	197	20	16	45	13	4	6
65	565	81	1	1	199	197	8	9	31	12	2	5
66	380	19	3	2	228	164	4	6	18	8	6	1
67	335	57	10	10	369	152	22	14	19	9	6	3
68	35	6	6	1	193	80	32	44	24	13	5	0
69	85	18	2	1	212	125	22	23	26	11	2	3
70	127	49	2	1	132	149	16	18	29	12	4	5
71	405	56	4	1	202	69	11	8	40	22	2	2
72	131	74	2	5	40	72	3	7	34	36	4	4
73	22	4	3	0	24	26	6	4	30	15	5	8
74	26	0	1	0	34	38	8	28	12	19	10	2
75	97	6	1	1	51	55	16	18	22	14	2	3
76	204	48	2	3	211	129	22	15	12	3	3	2
77	174	170	4	3	180	224	4	8	6	10	3	7
78	34	1	4	0	71	13	8	7	15	8	4	2
79	160	14	0	0	71	29	9	7	20	6	5	2
80	36	7	2	1	28	16	9	19	25	5	3	2

Table 14. Mean lengths (live equivalent in mm on September 1) by sampling area in the Wood River lake system in 1980 and the means and ranges in means from previous years.

Lake		Sockeye salmon (age 0)			Sockeye salmon (age I)			Threespine Stickleback (age I)		
		1980	1958-1979		1980	1958-1979		1980	1958-1979	
		mean	mean	range	mean	mean	range	mean	mean	range
Aleknagik	A	55.5	54	42-62	71.1	86	70-108	45.2	42	38-49
	B	54.6	57	44-65	85.4	89	70-112	44.5	43	40-51
	C	56.8	58	44-69	78.9	92	69-114	45.1	44	40-51
South	A	51.9	59	52-67	81.7	99	85-111	41.9	45	42-49
Nerka	B	50.9	60	46-72	73.9	100	81-120	41.8	45	39-51
	C	55.4	63	54-75	84.5	99	86-107	44.3	46	42-54
Central	A	49.9	55	42-70	80.1	94	77-115	38.6	45	41-52
Nerka	B	48.6	58	50-65	79.0	95	77-110	41.3	44	38-49
	C	49.0	58	48-64	--	99	80-114	41.1	44	40-48
North	A	46.6	57	46-65	76.7	94	73-115	39.2	43	39-50
Nerka	B	48.1	58	45-69	77.0	92	78-114	42.6	43	37-51
	C	49.6	58	44-67	77.1	95	79-105	42.7	44	40-52
Beverley	A	44.1	54	43-61	71.6	91	75-104	38.6	44	38-48
	B	43.0	55	45-66	70.3	89	77-112	38.5	44	40-48
	C	46.3	61	48-69	72.0	91	81-94	38.8	44	37-47
Kulik	A	53.9	56	43-69	79.9	90	81-105	40.1	43	37-48
	B	52.0	57	46-72	82.3	90	81- 99	40.0	44	40-48
	C	53.3	57	41-66	85.7	90	80-106	41.2	43	37-47
Little	A	46.8	52	44-63	80.3	90	76-107	38.7	42	37-48
Togiak	B	49.1	53	45-62	78.3	92	77-105	41.5	43	36-48
	C	49.8	55	43-66	--	91	77-104	41.0	43	39-49

Table 15. Geometric means of townet catches by sampling area in the Wood River lake system in 1980 and the means and ranges in means from previous years.

Lake		Sockeye fry (age 0)			Sockeye (age I)			Threespine Stickleback		
		1980	1958-1979		1980	1958-1979		1980	1958-1979	
		mean	mean	range	mean	mean	range	mean	mean	range
Aleknagik	A	1	24	1-377	0.4	1.3	0-42	+	40	2-377
	B	1	27	1-478	0.7	1.2	0-43	16	50	1-502
	C	6	35	5-521	2.3	1.3	0-31	54	52	7-196
South	A	3	7	+-260	0.3	1.3	0-14	13	5	0-114
Nerka	B	1	7	+-101	0.3	1.0	0-12	60	6	+- 95
	C	+	3	0- 15	0.4	0.8	0- 5	13	2	0- 26
Central	A	3	4	0- 74	1.0	1.0	0-15	8	2	0- 99
Nerka	B	18	10	+- 65	0.4	1.0	0-13	10	7	+-125
	C	14	9	+- 60	0	0.9	0- 8	19	6	0-278
North	A	70	21	0-107	1.1	0.7	0- 4	75	14	+-243
Nerka	B	25	28	3-490	0.6	0.4	0- 5	29	9	0-112
	C	8	18	2-140	0.7	0.5	0- 3	37	15	0- 83
Beverley	A	24	13	+-163	4.6	1.3	0-10	117	12	+- 68
	B	2	6	+-117	16.6	1.0	0-11	197	6	+- 69
	C	158	5	0- 68	1.1	0.6	0- 7	41	10	1-108
Kulik	A	58	9	1- 92	3.9	1.1	0-52	69	9	0-107
	B	30	9	+- 73	2.7	1.3	0-28	5	6	0- 63
	C	222	14	0-130	6.3	1.9	0-31	118	7	1-108
Little	A	35	37	+-550	8.3	4.4	0-15	7	21	2-252
Togiak	B	39	42	3-304	2.6	3.4	0-53	16	58	4-1657
	C	13	23	3-145	1.3	2.5	0-102	37	41	2-245

+ = .1 to .4

Table 16. Average townet catches (5-min tows) of sockeye salmon fry (age 0).

Year	Aleknagik (83)	South Nerka (63)	Central Nerka (51)	North Nerka (87)	Little Togiak (6)	Beverley (90)	Kulik (45)	Lake System
1958	14	4	4	10	38	1	3	7
1959	13	17	9	4	228	49	25	23
1960	111	62	42	42	138	42	66	62
1961	103	108	57	64	184	23	39	68
1962	54	2	7	26	21	2	10	19
1963	24	58	18	55	120	97	61	55
1964	24	3	7	44	36	29	55	27
1965	103	15	8	93	113	12	27	49
1966	219	4	7	70	15	3	2	60
1967	49	8	18	58	62	18	14	31
1968	10	4	11	8	66	16	18	31
1969	78	15	4	27	3	7	11	26
1970	43	2	5	21	120	2	1	16
1971	17	3	9	197	10	1	10	47
1972	10	2	11	8	21	2	15	8
1973	3	1	3	11	6	+	24	6
1974	44	5	4	34	40	--	--	18
1975	8	7	15	9	24	35	26	17
1976	394	1	9	40	32	--	2	87
1977	25	19	50	143	28	5	6	45
1978	6	+	+	4	25	--	--	3
1979	130	3	17	50	138	--	36	53
1980	3	1	14	37	27	74	102	37

+ <1

Table 17. Average townet catches (5-min tows) of sockeye salmon yearlings.

Year	Aleknagik	South Nerka	Central Nerka	North Nerka	Little Togiak	Beverley	Kulik	Lake System
1958	1.2	1.7	.8	.2	.1	1.1	.4	.7
1959	.3	0	.3	.1	1.4	.1	.3	.2
1960	.2	1.4	.9	.3	2.7	7.0	1.8	2.1
1961	13.8	10.3	3.5	1.7	19.5	5.1	21.0	8.6
1962	2.2	2.1	1.4	1.0	8.2	1.3	3.9	1.9
1963	.4	.4	.7	.4	1.7	.1	.5	.4
1964	.7	1.3	1.8	1.4	3.5	7.1	2.7	2.7
1965	.2	2.7	4.7	2.2	7.4	3.7	26.0	5.1
1966	38.9	5.1	8.6	2.8	6.9	3.0	1.4	10.8
1967	6.3	.9	1.2	.5	4.4	.5	.1	1.8
1968	.5	.1	.4	+	4.8	.1	.3	.3
1969	.1	.3	.2	.1	1.2	.2	.1	.2
1970	.2	.1	+	0	.9	+	0	.1
1971	.4	.3	.4	.4	2.4	+	.1	.3
1972	1.3	3.9	4.2	.7	60.3	.5	1.0	2.5
1973	.9	2.5	1.9	.8	7.3	.3	8.5	2.0
1974	.1	.1	0	0	.5	--	--	.1
1975	0	+	0	0	2.5	+	.8	.1
1976	.9	.3	+	.2	3.1	--	.7	1.0
1977	7.7	2.8	2.9	4.1	5.9	1.5	6.9	4.2
1978	.5	+	.1	0	1.3	--	--	.2
1979	0	0	1.3	0	1.5	--	.8	.9
1980	1.1	.3	.3	.8	3.7	6.6	4.2	2.4

+ <.1

Table 18. Average townet catches (5-min tows) of threespine stickleback.

Year	Aleknagik	South Nerka	Central Nerka	North Nerka	Little Togiak	Beverley	Kulik	Lake System
1958	36	11	4	51	82	53	77	40
1959	136	53	23	30	57	39	18	54
1960	53	7	6	18	18	30	9	23
1961	38	3	6	12	39	8	10	14
1962	139	6	8	5	41	2	4	31
1963	46	5	1	16	55	34	10	22
1964	272	2	12	11	78	8	11	61
1965	183	4	2	16	53	7	2	42
1966	150	1	2	12	55	8	+	35
1967	61	2	16	15	58	14	3	21
1968	268	15	60	11	161	12	35	73
1969	81	4	1	30	24	33	14	31
1970	87	3	2	9	63	4	3	22
1971	3	+	+	8	6	1	4	3
1972	11	2	11	11	155	9	11	11
1973	8	+	2	7	3	1	15	5
1974	119	20	167	143	70	--	--	89
1975	132	41	49	79	601	53	16	75
1976	30	10	22	19	42	--	10	18
1977	36	24	20	9	38	9	42	22
1978	21	4	7	35	33	--	--	19
1979	50	29	92	66	144	--	54	59
1980	24	28	13	48	22	108	61	50

Table 19. Summary of statistics on sockeye salmon from Little Togiak Lake.

Brood year	Spawners (1,000's)	Fry (age 0) Catch B.S.	Fry (age 0) Catch T.N.	Fry (age 0) Mean weight	Yearlings (age 1) Catch B.S.	Yearlings (age 1) Catch T.N.	Yearlings (age 1) Mean weight	Smolts Age I No.	Smolts Age I Wt.	Smolts Age II No.	Smolts Age II Wt.	Adult returns (1,000's) 1.2	1.3	2.2	2.3	Total
1956	20	--	--	--	--	1	7.1	--	--	--	--	9	11	1	0	21
57	6	--	38	1.97	--	1	9.7	--	--	--	--	3	5	1	0	8
58	16	--	228	2.26	--	3	6.9	--	--	16	10.2	20	12	2	1	35
59	40	--	138	1.53	--	19	5.3	650	3.9	--	--	24	5	7	0	36
60	17	--	184	1.51	--	8	5.9	--	--	--	--	18	8	16	3	45
61	11	--	21	1.70	--	2	8.0	--	--	--	--	18	15	1	0	34
62	10	--	120	2.01	--	3	7.2	--	--	--	--	18	9	0	0	27
63	21	--	36	1.42	--	7	5.2	--	--	--	--	11	21	2	0	34
64	15	--	113	1.20	--	7	4.7	--	--	--	--	10	5	3	2	20
65	26	--	15	.90	--	4	5.7	--	--	--	--	23	15	15	1	54
66	22	--	62	1.34	--	5	5.4	--	--	--	--	45	28	2	1	76
67	10	--	66	1.61	--	1	7.7	--	--	--	--	11	8	2	2	23
68	20	--	3	1.17	--	1	6.0	--	--	--	--	9	15	0	0	24
69	20	--	120	1.44	--	2	5.6	--	--	--	--	2	18	16	1	37
70	55	--	10	.95	--	60	3.8	--	--	--	8.5	25	12	30	3	70
71	24	--	21	1.05	0	7	4.9	--	4.4	--	9.9	1	5	5	9	20
72	14	63	6	1.60	1	1	4.7	--	5.1	--	9.1	18	12	6	6	42
73	14	12	40	1.41	0	3	4.0	--	4.7	20	7.6	7	48	2	4	61
74	48	135	24	.80	0	3	5.6	167	4.7	144	9.4	28	26	35	(1)	90
75	30	125	32	1.06	2	6	4.5	366	5.4	62	9.6	27	(63)	(26)	--	--
76	18	118	28	.84	0	1	6.3	479	5.0	4+	9.2	(33)	--	--	--	--
77	26	99	25	1.49	0	2	7.1	129+	5.5	12	7.6	--	--	--	--	--
78	45	94	138	1.80	0	4	4.1	1,021	3.4	--	--	--	--	--	--	--
79	44	77	27	1.02	--	--	--	--	--	--	--	--	--	--	--	--
80	81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 20. Annual sockeye salmon escapements, relative abundance and mean weight of juveniles on September 1, and the adult returns to Lake Aleknagik.

Brood year (y)	Escapement		Average catch			Mean weight (gm)		Adult returns (thousands)				
	Number (thousands)	Eggs (millions)	Seine	Townet		Age 0 (y+1)	Age I (y+2)	Age 1.2 (y+4)	Age 1.3 (y+5)	Age 2.2 (y+5)	Age 2.3 (y+6)	Total
			Age 0	Age 0	Age I							
1956	252	474	-	-	1	-	5.3	27	192	1	0	220
1957	82	198	-	14	+	2.15	10.4	3	61	0	0	64
1958	63	130	-	13	+	2.22	6.1	80	35	0	1	116
1959	205	445	-	111	14	1.54	5.7	26	136	18	11	191
1960	85	212	-	103	2	1.79	5.6	176	321	18	33	548
1961	153	394	278	54	+	1.43	6.2	36	434	3	24	497
1962	48	108	-	24	1	2.15	8.6	83	119	0	1	202
1963	31	69	171	24	+	1.98	7.4	57	252	2	1	312
1964	155	355	565	103	39	1.39	4.3	45	82	145	57	329
1965	220	545	380	219	6	.97	2.7	58	395	31	117	601
1966	287	681	335	49	1	.74	4.0	38	216	8	35	297
1967	92	213	35	10	+	1.75	5.3	14	40	2	0	56
1968	177	386	85	78	+	2.09	6.6	70	206	1	1	278
1969	160	345	127	43	+	1.85	5.7	3	110	83	41	237
1970	302	619	405	17	1	1.46	8.0	106	426	29	24	585
1971	182	412	131	10	1	1.48	5.6	39	322	81	37	479
1972	97	191	22	3	+	2.72	5.4	132	150	2	0	284
1973	162	358	26	44	0	2.23	-	41	854	14	41	950
1974	242	560	97	8	1	1.52	5.3	223	560	62		
1975	457	1,010	204	394	8	1.11	3.0	91				
1976	314	790	174	25	1	1.00	4.7					
1977	152	223	34	6	0	2.22	-					
1978	612	1,391	160	130	1	1.23	4.0					
1979	354	811	36	3		1.61						
1980												

Table 21. Annual sockeye salmon escapements, relative abundance and mean weight of juveniles on September 1, and the adult returns to south and central Lake Nerka.

Brood year (y)	Escapement		Average tow-net catch		Mean weight (gm)		Adult returns (thousands)				Total
	Number (thousands)	Eggs (millions)	Age 0	Age I	Age 0 (y+1)	Age I (y+2)	Age 1.2 (y+4)	Age 1.3 (y+5)	Age 2.2 (y+5)	Age 2.3 (y+6)	
1956	278	481	--	1	--	9.4	276	77	6	0	359
1957	130	258	4	+	2.04	11.7	43	53	4	0	100
1958	221	432	13	1	2.40	6.9	372	66	1	4	443
1959	896	1,781	53	7	1.69	6.4	150	33	20	4	207
1960	368	842	85	2	1.74	7.9	416	118	21	14	569
1961	99	247	4	1	1.97	9.1	78	134	3	1	216
1962	170	366	40	1	2.11	7.5	293	63	1	2	359
1963	121	262	5	4	1.59	6.9	142	95	7	6	250
1964	269	591	12	7	1.58	6.4	132	26	17	3	178
1965	137	320	5	1	1.52	6.5	119	105	5	1	230
1966	290	617	12	+	1.96	8.9	272	114	4	0	390
1967	108	234	7	+	2.53	8.4	113	19	6	0	138
1968	149	297	10	+	2.41	11.2	127	38	0	1	166
1969	107	221	3	+	2.24	7.2	22	145	30	4	201
1970	273	497	6	4	1.29	6.7	289	147	26	2	464
1971	141	295	6	2	1.56	9.1	66	28	22	19	135
1972	119	218	2	+	2.01	11.4	189	84	7	5	285
1973	48	102	5	+	2.68	13.8	74	128	4	2	208
1974	377	862	11	+	1.55	4.7	463	304	61		
1975	196	419	5	3	1.09	4.9	446				
1976	146	349	33	+	1.47	6.3					
1977	132	212	+	1	1.77	3.0					
1978	332	681	9	+	1.57	4.1					
1979	388	816	7		1.07						
1980											

Table 22. Annual sockeye salmon escapements, relative abundance and mean weight of juveniles on September 1, and the adult returns to north Nerka.

Brood year (y)	Escapement		Average tow-net catch		Mean weight (gm)		Adult returns (thousands)				Total
	Number (thousands)	Eggs (millions)	Age 0	Age I	Age 0 (y+1)	Age I (y+2)	Age 1.2 (y+4)	Age 1.3 (y+5)	Age 2.2 (y+5)	Age 2.3 (y+6)	
1956	135	237	--	+	--	8.1	152	127	5	0	284
1957	52	110	10	+	2.09	7.1	25	88	12	0	125
1958	188	376	4	+	2.07	7.0	244	103	3	5	355
1959	395	795	42	2	1.22	6.2	106	81	33	13	233
1960	214	490	64	1	1.44	7.3	209	222	25	23	479
1961	143	363	26	+	1.85	10.2	60	231	5	4	300
1962	126	279	55	1	2.11	6.7	164	85	3	6	258
1963	110	246	44	2	2.31	5.7	135	180	4	9	328
1964	161	360	93	3	1.40	5.8	63	82	55	3	203
1965	184	450	70	1	1.44	5.9	273	206	6	11	496
1966	246	550	58	+	1.85	7.5	145	244	1	1	392
1967	114	251	8	+	2.47	12.2	71	52	0	0	125
1968	150	322	27	0	1.89	8.7	86	101	0	0	187
1969	266	558	21	+	2.22	5.3	6	122	46	24	198
1970	229	445	197	1	1.74	6.6	128	304	20	19	471
1971	178	392	8	1	1.48	4.9	17	172	22	52	263
1972	109	207	11	0	2.03	--	101	166	5	0	272
1973	83	182	34	0	2.40	--	35	324	25	4	388
1974	242	566	9	+	1.37	4.4	497	332	93		
1975	296	663	40	4	.84	3.9	177				
1976	176	444	143	0	1.22	--					
1977	173	276	4	0	2.28	--					
1978	460	983	50	1	1.76	3.6					
1979	287	632	37		.94						
1980											

Table 23. Annual sockeye salmon escapements, relative abundance and mean weight of juveniles on September 1, and the adult returns to Lake Beverley.

Brood year (y)	Escapement		Average tow-net catch		Mean weight (gm)		Adult returns (thousands)				Total
	Number (thousands)	Eggs (millions)	Age 0	Age I	Age 0 (y+1)	Age I (y+2)	Age 1.2 (y+4)	Age 1.3 (y+5)	Age 2.2 (y+5)	Age 2.3 (y+6)	
1956	56	102	--	+		9.0	83	19	1	0	103
1957	6	12	1	+	2.09	7.2	20	10	19	3	52
1958	354	671	49	7	1.60	4.2	947	74	80	11	1,116
1959	414	825	42	5	.92	5.2	311	44	190	5	552
1960	211	457	23	1	1.57	6.9	389	46	8	0	444
1961	32	78	2	+	2.12	6.1	46	21	4	1	72
1962	411	870	97	7	1.53	3.6	352	63	73	9	497
1963	281	598	29	4	1.08	4.6	102	90	20	0	212
1964	324	702	12	3	1.17	5.5	67	12	11	1	89
1965	67	155	3	1	1.62	8.1	19	3	1	1	24
1966	276	556	18	+	1.52	6.3	307	56	1	0	367
1967	117	253	16	+	2.37	5.9	298	10	10	0	318
1968	112	228	7	+	1.80	11.3	54	5	0	0	59
1969	27	57	2	+	1.82	4.6	9	32	17	0	58
1970	238	414	1	1	1.33	7.4	467	22	12	0	502
1971	245	491	2	+	1.61	5.3	121	20	28	0	120
1972	53	96	+	--	2.63	--	89	20	3	0	112
1973	12	25	--	+	--	8.7	25	48	8	6	88
1974	410	910	35	--	1.38	--	694	150	361		
1975	126	249	--	2	--	4.1	226				
1976	84	199	5	--	1.64	--					
1977	38	57	--	--	--	--					
1978	417	823	--	7	--	2.8					
1979	358	721	74		.88						
1980											

Table 24. Annual sockeye salmon escapements, relative abundance and mean weight of juveniles on September 1, and the adult returns to Lake Kulik.

Brood year (y)	Escapement		Average tow-net catch		Mean weight (gm)		Adult returns (thousands)				Total
	Number (thousands)	Eggs (millions)	Age 0	Age I	Age 0 (y+1)	Age I (y+2)	Age 1.2 (y+4)	Age 1.3 (y+5)	Age 2.2 (y+5)	Age 2.3 (y+6)	
1956	30	54	--	+	--	8.0	62	17	3	0	82
1957	5	10	3	+	2.12	5.3	8	10	2	0	20
1958	100	192	25	2	2.05	6.0	190	15	5	0	210
1959	228	472	66	21	1.37	5.2	214	35	103	1	354
1960	105	228	39	4	1.48	5.4	132	16	10	2	160
1961	19	48	10	1	2.06	6.6	18	19	2	0	39
1962	83	176	61	3	1.52	4.3	83	25	22	0	130
1963	144	301	55	26	1.20	4.5	75	14	29	3	121
1964	135	295	27	1	1.06	4.9	8	3	11	0	22
1965	28	64	2	+	1.55	7.0	13	0	1	0	14
1966	73	150	14	+	2.21	7.7	71	21	0	0	93
1967	61	131	18	+	3.23	5.9	76	8	6	0	90
1968	31	61	11	0	2.25	--	32	2	0	0	34
1969	17	35	1	+	2.32	6.6	8	20	21	1	50
1970	55	95	10	1	1.39	5.9	381	24	52	1	458
1971	66	132	15	9	1.36	5.7	102	24	43	3	172
1972	33	61	24	--	1.85	--	58	15	3	0	76
1973	10	19	--	1	--	5.6	24	0	0	17	65
1974	337	747	26	1	.86	4.9	650	131	208		
1975	137	273	2	7	.96	4.7	102				
1976	77	185	6	--	1.80	--					
1977	35	52	--	1	--	6.5					
1978	374	738	36	4	1.91	4.6					
1979	219	455	102		1.36						
1980											

Table 25. Daily escapements (in thousands) to the Wood River lake system and Little Togiak Lake, 1975-1980.

Date	1975		1976		1977		1978		1979		1980	
	WR	LT	WR	LT	WR	LT	WR	LT	WR	LT	WR	LT
June 23					1		8		0		+	
24					0		9		0		+	
25			1		3		11		55		+	
26			1		4		6		246		0	
27			0		3		5		160	(.5)	1	
28	1		1		8		14		18	2.3	1	
29	4		1		39		168		12	3.5	25	
30	6		0		62		107		9	2.3	120	
July 1	3		0		50		108	(.6)	264	3.2	176	(.2)
2	14		0		21		145	(.8)	530	1.1	341	.9
3	11		0		34	2.5	203	2.5	39	2.2	416	2.2
4	3		22		73	2.1	433	3.6	9	8.1	461	2.4
5	3	.2	120		65	.2	389	2.0	19	6.3	199	2.2
6	1	.2	88		28	1.2	85	2.1	167	5.0	141	7.7
7	34	.3	86		38	1.7	101	3.2	116	-.3	163	3.8
8	213	.2	27	1.4	25	1.4	142	4.1	18	0	230	4.3
9	307	.1	23	2.1	25	4.8	101	3.3	6	1.1	246	12.9
10	229	1.9	94	2.1	24	2.3	68	3.1	5	2.7	96	2.9
11	150	2.6	132	.7	7	.8	33	4.2	4	1.1	47	4.5
12	127	8.6	100	.4	5	2.0	28	3.5	8	1.2	119	3.5
13	65	5.5	41	1.1	22	3.4	25	2.6	5	-.1	77	8.7
14	20	4.2	17	2.8	13	1.6	12	1.6	4	1.1	32	8.3
15	19	2.8	12	3.7	3	1.0	8	1.1	5	.6	30	7.7
16	19	4.2	9	1.8	2	1.3	4	.9	5	.9	25	1.1
17	14	1.2	12	1.2	2	.4	9	.7	0	-.1	13	-1.2
18	10	-.5	10	.5	2	-.1	20	.5		0	7	.3
19	4	-.1	7	0	1	-.4	6	.5		.2	2	1.0
20	4	-.5	4	0	1	-.2	6	.2		.4		1.6
21	4	(-.5)	4	0	1		6	.6		.4		4.2
22	3	(-.4)	3	.1			4	1.1				2.6
23	1		1	.5			3	.6				-.3
24	1		1	.2			0	.5				(-.5)
25				(-.3)				.6				
26				(-.3)				.5				
Totals	1,270	30	817	18	562	26	2,267	45	1,706	44	2,969	81

Table 26. Ground survey counts of creek spawning populations in the Wood River lake system in 1980 (number of fish in hundreds).

Location	Date of Survey	Estimated off mouth	Number in creek			1952 - 1979	
			Live	Dead	Total	Median	Range
Aleknagik							
Yako	8/1	5	29	3	37	9	1, 40
Whitefish	8/10	3	10	1	14	8	1, 42
Eagle	8/7	8	64	2	74	8	1, 67
Hansen	8/6	0	46	19	65	29	2, 157
Happy	8/6	0	29	15	44	10	2, 57
Bear	8/5	8	70	22	100	29	12, 102
Ice*	8/8	0	63	83	146	64	22, 180
South Nerka							
Fenno	8/11	0	22	123	145	12	4, 170
Lynx	8/17	30	109	31	170	20	1, 150
Stovall*	8/20	0	25	7	32	20	3, 750
Central Nerka							
Elva	8/23	3	3	1	7	2	1, 15
Pick	8/14	20	225	89	334	82	24, 782
North Nerka							
Hidden Lake	8/18	4	36	27	67	21	1, 163
Kema*	8/21	0	10	19	29	26	2, 200

*Entire creek is not surveyed.