

Kobuk River Test Fishing Project, 2003



By

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ABSTRACT

Catch statistics, and age, sex, and length catch data for chum salmon, *Oncorhynchus keta*, for the Kobuk River test fish project 2003 were summarized. A total of 214 drifts were fished from July 9 through August 13 to catch 1,073 chum salmon. Cumulative catch per unit of effort (CPUE) were 748.86, which ranked third lowest in the eleven years of the project. The midpoint of the test net CPUE was on August 2, which was average when compared to other years of the project. Age-0.3 chum salmon comprised 54.2% of the test fish samples. Average lengths of chum salmon were greater for age 0.4 and age 0.5 when compared to the same ages in all other years of the project. Also, age-0.3 chum lengths were greater when compared to most years of the project.

KEY WORDS: Kobuk, Kotzebue, chum, age, catch per unit of effort, *Oncorhynchus keta*

INTRODUCTION

The Kobuk River originates on the south side of the Brooks Range in the Arrigetch ("Fingers Outstretched") Peaks inside the Gates of the Arctic National Park. The river flows approximately 500 river miles west where it terminates at Hotham Inlet. The lower two-thirds of the river are stained by tannin primarily from the Pah River, an upper river tributary. Five villages are located on the Kobuk River; Norvik, Kiana, Ambler, Shungnak, and Kobuk, and all depend on chum salmon, *Oncorhynchus keta*, for subsistence use. Also, residents of Kotzebue depend on the Kobuk River chum salmon as a subsistence resource. Kobuk River is thought to support up to 60% of the commercial catch of chum salmon in the Kotzebue District.

This was the eleventh consecutive year a drift gillnet test fishing project operated in the lower Kobuk River (Lingnau, 1993; Lingnau, 1994; Lingnau, 1995; Lingnau, 1996; Lingnau, 1997; Kohler, 2000a; Kohler, 2000b; Kohler, 2001; Kohler, 2002; Menard 2003). Because of the Kobuk River's tannic stain, test fishing is less susceptible to net avoidance by salmon than clear water systems. The only previous salmon project in the Kobuk River drainage was a counting tower, operated in 1982 and 1984, on the Squirrel River, too distant to provide timely information for fisheries management. This report presents the results of the eleventh year of the Kobuk River drift test fishing project.

Management of the Kotzebue District commercial salmon fishery, particularly during the month of July, is dependent primarily on comparing commercial fishing period and cumulative season catch statistics to those of prior years. Because of the change in market demand in recent years, these comparisons are no longer reliable. The drift test fishing project was initiated because of the need for an inseason index of run timing and abundance for the Kobuk River chum salmon stocks, which largely support the first portion of the salmon migration into the Kotzebue District. While test fishing is a relatively low cost approach, it can also be susceptible to inter-annual variability in catch rates which typically requires the data to be interpreted in a somewhat qualitative way as an abundance index if calibration is not possible between years. The objectives of the test fishing project for 2003:

1. Evaluate chum salmon abundance migrating into the Kobuk River drainage a comparison of systematic drift gillnet catches.
2. Describe the migratory timing for chum salmon in the lower Kobuk River.
3. Sample chum salmon for age, sex, and length.

METHODS

Site Description

The site is approximately 70 river miles from the eastern boundary of the commercial salmon fishing district (Figure 1). This site is the furthest downstream where the river runs through a single channel and is below all spawning tributaries that support spawning chum salmon. The test fish site was selected because of its desirable stream characteristics. The site consists of approximately a one-mile river section located approximately three miles downstream from Kiana. The width of the river was approximately 300 meters and was divided into two sites (Figure 2). Site N is the north side of the river (right bank), which is the cut bank side of the river with the swiftest current. Site S is located on the south side of the river (left bank). Site S is located downstream from a major sandbar and has a gradual gradient. This site has the slowest current. A bottom profile at the test fish site in 1997 revealed a near uniform bottom with a maximum depth of six meters. The deepest portion of the river was in the first quartile from the right bank (Lingnau 1997).

Test Fishing

Fishing was scheduled to sample salmon passage during three different segments of the day at each of the two sites: morning (0800 h), midday (1500 h), and late evening (2200 h). A two-person crew conducted drifts seven days per week.

All test fishing drifts were approximately 20 minutes duration, using a 50-fathom gillnet. The net had 5 7/8 in (14.9 cm) stretched mesh multifilament webbing, 40 meshes deep, and hung at a ratio of 2:1. Netting was conducted from a 20-foot boat, powered by an 85 hp outboard motor. If catch rates were high, fishing time was reduced to control mortality. Mortalities were primarily given to village elders and other individuals for subsistence purposes. The availability of chum salmon (mortalities) was announced over a CB radio.

Standardized Catches

Actual catches were converted to catch per unit of effort (CPUE) by considering fishing time and the length of net used. Each CPUE index was the number of fish, which would have been caught if 100 fathoms of net had been fished for 60 minutes. The index (I) was calculated as follows:

$$I = \frac{6,000 (c)}{(l) (t)}$$

Where: c = number of chum salmon caught
 l = length of net in fathoms
 t = mean fishing time in minutes

Mean fishing time (t) was defined as the amount of time the entire net was fishing plus half the time it took to deploy and retrieve the net. Mean daily drift CPUE indices were calculated using the sum of the total time fished and total fish caught for each day. The mean daily indices were summed to produce total seasonal CPUE indices for the period of data collection. Cumulative proportions of seasonal total test fish CPUE indices were also calculated and used to estimate the midpoint of the chum salmon run past the test fish site.

Catch rate for each time period and site was determined by using the fishing time and number of fish caught for those specific time periods and sites. Seasonal abundance by site and time period was indexed by summing CPUE indices for each of the daily sites and time periods. Temporal distribution was depicted as a percent calculated by dividing each time period total by the total CPUE indices. Spatial distribution was described as a percent by dividing each site's CPUE seasonal total by the total of both site's CPUE indices. Temporal and spatial distributions are described as a percent since the number of drifts made at each site and the amount of the time fished varied (Lingnau 1997).

Age, Sex, and Length

Age-sex-length (ASL) data were collected from up to 25 chum salmon per day. Scales were collected from the left side of the fish approximately two rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gum cards and impressions made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). Salmon were measured to the nearest one-half centimeter from the middle of the eye to the fork of the tail. The sex of each fish was determined from external characteristics.

Ages for salmon were determined by examining scales (Mosher 1968). European notation (e.g. 0.3; Koo 1962) was used to record ages; numerals preceding the decimal refer to number of freshwater annuli and numerals following the decimal refer to number of marine annuli. Total age from time of egg deposition or brood year is the sum of these numbers plus one.

Atmospheric and Hydrologic Observations

Project personnel recorded standard environmental factors during project operations at 0800 hours. Water level, water temperature, and turbidity (determined by secchi disk) were normally recorded at the site. Visual estimates of cloud cover were recorded.

RESULTS

Drifting began with the 1500 h drift on 9 July and continued through 13 August. CPUE indices were calculated for each drift and site, and are reported in Table 1, and compared graphically with other years in Figure 3. There were 1,073 chum salmon, 6 pink salmon, 16 Dolly Varden and 530 sheefish caught in a total of 214 drifts. The cumulative chum salmon CPUE was 748.66 (Table 1). Percentages of CPUE indices were 30.91 at site N and 69.09 at site S, and 37.37, 32.85 and 29.78 percent of CPUE indices were caught at 0800, 1500 and 2200 hour drifts (Table 2). The peak catch and CPUE occurred on August 7 with a catch of 95 chum salmon, which was a mean daily CPUE of 62.81.

A total of 566 chum salmon scales were aged from the test net samples. Test fish samples were separated into four periods. Females were the majority of samples in all four periods and comprised 70.8% of season's chum salmon samples. Age-0.3 chum salmon were the largest age group throughout the last three sampling periods. Seasonal age composition was 1.6% age 0.2, 54.2% age 0.3, 30.4% age 0.4, and 13.8% age 0.5 (Table 3). Comparisons of mean lengths during the season for all sample periods indicated males to be larger than females, except for age-0.2 chum salmon (Table 4). Test fishing was done twice in August on the Noatak River with similar nets as those used at the Kobuk River project, to compare chum salmon ASL composition. In the Noatak River samples, age-0.3 chum salmon were the predominant age and females were most of the catch (Table 5). As observed in the Kobuk River chum salmon samples, males were larger than females in the Noatak River samples (Table 6).

A total of 969 chum salmon scales were aged from the commercial catch samples. The commercial catch samples were separated into four periods. Females comprised 51.1% and age-0.3 chum comprised 62.3% of the samples (Table 7). Mean lengths of the commercial catch samples were usually larger for males and mean lengths generally increased with age (Table 8).

Climatologic data indicated water temperatures fluctuated between 9 and 16 degrees C during the season. The water depth fluctuated 33 inches (83.8 cm) during the season and was at its lowest point on the July 17 and at its highest point on July 31. Secchi disk readings ranged from 1.00 to 3.75 meters during the season (Table 9).

DISCUSSION

The 2003 Kobuk River test fish project operated from July 9 through August 13. A total of 214 drifts were made with a cumulative CPUE of 748.86. Total number of drifts this season ranked fifth highest out of eleven years and the cumulative CPUE was the ninth highest (Appendices 1–3).

The midpoint of test net CPUE was on August 2, which was average when compared to other years of the project (Appendix 2). Commercial harvest in 2003 was approximately 20% of the previous 10-year (1993-2002) average harvest (Appendix 4).

Of the 3 drift periods each day, the 0800 h drift had a larger CPUE during the season compared to the 1500 h or 2200 h drifts. Larger CPUEs have occurred during the 0800 h drift in 4 of the 10 previous years of the project (Appendix 5). As with all previous years of the project most catches occurred at the South site.

Test fishing with gillnets does result in some selectivity in the size of fish captured. However, using the same type of net and the same mesh size each year does allow comparison between years. The 2003 chum salmon test fish catch samples had the second highest observed age-0.5 fish. The percentage of age-0.5 samples was 13.8%, which was slightly below the previous record high of 15.2% in 1997 (Appendix 6). Last year the same brood year (age-0.4 fish in 2002) samples were a record high.

Catches by the few commercial fishers in 2003 were poor and the cumulative CPUE at the test fish site was in the bottom half historically. Commercial chum salmon catch samples in Kotzebue had the second lowest percentage age-0.4 in the last ten years (Appendix 7). Similarly, test fish catch samples had the second lowest percentage of age-0.4 fish of any year in the project's history. Also, the previous year the age-0.3 chum samples at the project were the second lowest on record. Likely, 1998 was a poor brood year for Kobuk River chum stocks. There were no commercial catch samples taken in 2002, but in previous years, comparisons of age and sex composition in the Kotzebue commercial catch samples and the Kobuk River test fish catch samples show less than 10% difference in age compositions between the two catches.

Noatak River test net catch samples in 2003 had a similar percentage of age-0.3 fish as Kobuk River samples, but had higher percentage of age-0.4 fish. Historical comparisons of Noatak River test fish samples in the last 11 years are presented in Appendix 8.

In 2003, chum salmon sampled at the Kobuk project had average lengths that were greater than all other years in age classes 0.4 and 0.5 and above average in age classes 0.2 and 0.3 (Appendix 9). Larger average lengths may have been a result of larger fish getting past Kotzebue that in other years would have been captured in the commercial fishery. However, in some years the average

length of Kotzebue chum salmon commercial catch samples has been less than that of Kobuk River test fish catch samples (Appendix 10). Noatak River test net catch samples average lengths by age class were larger than normal for age-0.4 fish (Appendix 11).

There were 530 Inconnu (sheefish), *Stenodus leucichthys*, caught in the test net in 2003. In comparison to previous years the 2003 catch was third highest out of six years. Catches of sheefish were 121 in 1997, 357 in 1999, 636 in 2000, 744 in 2001, and 314 in 2002. Other fish caught in the test net were 6 pink salmon, *Oncorhynchus gorbuscha*, and 16 Dolly Varden, *Salvelinus malma*. The first pink salmon was caught on July 20 and one pink salmon was caught approximately every third day and the last pink salmon caught was on August 8. This was the first year the crew was instructed to record catches of pink salmon so comparisons with other years cannot be made. The first Dolly Varden was caught on July 19 and they were caught sporadically until the last four days of test fishing (August 10 – 13) when they were caught daily. The peak catch was 4 Dolly Varden caught on August 11. Comparisons with previous years cannot be made since this was the first year the crew recorded catches of Dolly Varden.

The cumulative sheefish CPUE was 407.55 (Table 10). Percentages of CPUE indices were 37.03 at site N and 62.97 at site S, and 32.51, 29.99 and 37.50 percent of CPUE indices were caught at 0800, 1500 and 2200 hour drifts (Table 11). The peak catch occurred on July 10 with a catch of 76 sheefish, which was a mean daily CPUE of 55.27. The highest mean daily CPUE was 60.54 was on July 9, but only afternoon and evening drifts were done as the test fishing for the season started with the afternoon drifts on that day. Historically, the highest mean daily CPUE for sheefish occur within the first few days of test fishing as the sheefish run is usually at its midpoint the first or second week of July (Appendices 12 and 13). The sheefish cumulative CPUE ranked third out of six years (Appendix 14). However, the sheefish cumulative CPUE is greatly affected by the test fishing start date. The project is designed to index the chum salmon run and test fishing starts early in the chum run, but at the midpoint of the sheefish. For example, in the first three days of test fishing in 2003, 17 chum salmon and 174 sheefish were caught, and those numbers represented approximately 2% of the season's chum catch and 33% of the sheefish catch.

The historical distribution of sheefish CPUE by test fish site and time is presented in Appendix 15. Like chum salmon most of the sheefish have been caught on the south bank. However, sheefish catches tend to be distributed more equally between the three drift periods than chum salmon in most years.

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Table 1. Kobuk River drift test fish chum salmon catch per unit of effort (CPUE) by day, drift, and site, 2003.

Date	CPUE by Drift ^a			CPUE by Site ^b		Daily CPUE	Cum. CPUE
	#1 ^c	#2	#3	N	S		
9-Jul		12.74	2.20	10.79	6.55	7.57	7.57
10-Jul	2.18	8.50	0	0	7.23	3.64	11.21
11-Jul	0	9.23	2.26	0	7.45	3.76	14.97
12-Jul	4.40	2.22	0	0	4.31	2.20	17.17
13-Jul	2.22	2.18	11.32	0	10.06	5.19	22.36
14-Jul	11.21	4.49	2.33	0	11.64	6.06	28.42
15-Jul	2.29	6.73	4.40	0	8.62	4.49	32.91
16-Jul	6.79	6.92	2.29	1.80	8.78	5.33	38.24
17-Jul	0	0	0	0	0	0	38.24
18-Jul	21.62	2.22	2.24	1.78	15.35	8.83	47.07
19-Jul	9.06	0	6.99	3.53	7.55	5.37	52.44
20-Jul	21.05	21.43	2.24	13.33	18.57	15.14	67.58
21-Jul	2.20	4.49	0	1.74	2.93	2.23	69.81
22-Jul	6.55	0	0	0	4.26	2.20	72.01
23-Jul	8.65	2.26	6.73	1.75	10.00	5.93	77.94
24-Jul	15.41	13.09	4.44	3.50	18.46	11.01	88.95
25-Jul	36.61	11.11	2.24	5.18	28.97	17.30	106.25
26-Jul	46.39	33.39	44.00	5.26	70.66	41.36	147.61
27-Jul	32.14	38.00	17.79	1.74	54.36	29.65	177.26
28-Jul	27.61	26.42	15.86	23.66	26.18	23.41	200.67
29-Jul	23.57	42.86	46.78	24.00	53.04	37.89	238.56
30-Jul	44.21	68.03	47.18	28.73	77.14	53.63	292.19
31-Jul	45.13	66.34	33.10	10.43	80.00	48.54	340.73
1-Aug	40.71	9.32	2.26	15.65	22.09	17.94	358.67
2-Aug	22.22	24.22	64.12	26.47	54.36	38.62	397.29
3-Aug	37.89	4.49	2.26	12.17	19.88	15.41	412.70
4-Aug	31.11	24.44	4.53	68.50	82.20	20.12	432.82
5-Aug	34.90	9.14	44.08	68.50	82.00	29.14	461.96
6-Aug	33.03	31.11	29.43	21.02	43.37	31.21	493.17
7-Aug	88.89	22.43	69.42	36.00	88.80	62.81	555.98
8-Aug	29.16	39.27	48.40	29.78	52.72	39.29	595.27
9-Aug	41.08	2.29	37.09	25.90	32.00	27.24	622.51
10-Aug	26.42	22.22	38.57	19.41	41.18	29.18	651.69
11-Aug	6.67	66.57	40.71	33.53	50.98	40.34	692.03
12-Aug	2.29	31.30	16.15	7.06	27.14	17.04	709.07
13-Aug	42.24	59.20	9.14	27.52	53.20	39.79	748.86
Total	805.90	728.65	660.54	528.73	1182.03	748.86	

^a Catch per unit of effort is calculated in catch/100 fathoms of net/hour

^b Site N is the North Bank (right bank when facing downstream) and Site S is the South Bank (left bank).

^c Drift 1 begins at 0800, Drift 2 at 1500, and Drift 3 at 2200.

Table 2. Kobuk River drift test fish chum salmon CPUE indices, mean CPUE and percent by drift and site, 2003.

Drift Period	Season CPUE Indices	No. of Period Drifts ^a	Season Mean CPUE	Percent	Station	Season CPUE Indices	No. of Site Drifts	Season Mean CPUE	Percent
1 0800 hr.	805.90	35	23.03	37.37	N North Bank	528.73	107	4.94	30.91
2 1500 hr.	728.65	36	20.24	32.85	S South Bank	1182.03	107	11.05	69.09
3 2200 hr.	660.54	36	18.35	29.78					
Total	2195.09	107	20.54	100.00	Total	1710.76	214	7.99	100.00

^a One drift period is equal to one test fish drift on the north bank and one test fish drift on the south bank.

Table 3. Kobuk River age and sex composition of chum salmon test fish catch samples, 2003.

		Brood Year and Age Group				Total
		2000	1999	1998	1997	
		0.2	0.3	0.4	0.5	
Sampling Dates:	7/09-7/25					
Sample Size:	122					
Male	Percent of Catch	0.8	9.8	13.1	10.7	34.4
	Number of Samples	1	12	16	13	42
Female	Percent of Catch	0.0	17.2	32.8	15.6	65.6
	Number of Samples	0	21	40	19	80
Total	Percent of Catch	0.8	27.0	45.9	26.2	100.0
	Number of Samples	1	33	56	32	122
Sampling Dates:	7/26-8/01					
Sample Size:	157					
Male	Percent of Catch	0.6	10.8	9.6	4.5	25.5
	Number of Samples	1	17	15	7	40
Female	Percent of Catch	1.9	33.1	28.0	11.5	74.5
	Number of Samples	3	52	44	18	117
Total	Percent of Catch	2.5	43.9	37.6	15.9	100.0
	Number of Samples	4	69	59	25	157
Sampling Dates:	8/02-8/07					
Sample Size:	140					
Male	Percent of Catch	0.0	20.7	5.7	2.9	29.3
	Number of Samples	0	29	8	4	41
Female	Percent of Catch	0.7	46.4	16.4	7.1	70.7
	Number of Samples	1	65	23	10	99
Total	Percent of Catch	0.7	67.1	22.1	10.0	100.0
	Number of Samples	1	94	31	14	140
Sampling Dates:	8/08-8/13					
Sample Size:	147					
Male	Percent of Catch	0.7	20.4	6.8	0.7	28.6
	Number of Samples	1	30	10	1	42
Female	Percent of Catch	1.4	55.1	10.9	4.1	71.4
	Number of Samples	2	81	16	6	105
Total	Percent of Catch	2.0	75.5	17.7	4.8	100.0
	Number of Samples	3	111	26	7	147
Sampling Dates:	7/09-8/13					
Sample Size:	566	Season Total				
Male	Percent of Catch	0.5	15.5	8.7	4.4	29.2
	Number of Samples	3	88	49	25	165
Female	Percent of Catch	1.1	38.7	21.7	9.4	70.8
	Number of Samples	6	219	123	53	401
Total	Percent of Catch	1.6	54.2	30.4	13.8	100.0
	Number of Samples	9	307	172	78	566

Table 4. Length by age and sex of Kobuk River chum salmon test fish catch samples, 2003.

		Brood Year and Age Group				Total
		2000	1999	1998	1997	
		0.2	0.3	0.4	0.5	
Sampling Dates: 7/09-7/25 Sample Size: 122						
Male	Number of Samples	1	12	16	13	42
	Average Length (mm)	650.0	626.3	662.8	679.6	655.9
Female	Number of Samples	0	21	40	19	80
	Average Length (mm)	0	600.5	624.1	640.0	621.4
Sampling Dates: 7/26-8/01 Sample Size: 157						
Male	Number of Samples	1	17	15	7	40
	Average Length (mm)	570.0	636.8	644.7	685.0	648.9
Female	Number of Samples	3	52	44	18	117
	Average Length (mm)	583.3	598.8	613.4	622.8	607.5
Sampling Dates: 8/02-8/07 Sample Size: 140						
Male	Number of Samples	0	29	8	4	41
	Average Length (mm)	0	636.2	648.8	667.5	641.5
Female	Number of Samples	1	65	23	10	99
	Average Length (mm)	560.0	598.0	614.6	618.0	603.9
Sampling Dates: 8/08-8/13 Sample Size: 147						
Male	Number of Samples	1	30	10	1	42
	Average Length (mm)	545.0	639.7	665.2	685.0	633.3
Female	Number of Samples	2	81	16	6	105
	Average Length (mm)	580.0	593.1	619.1	606.7	597.2
Sampling Dates: 7/09-8/13 Sample Size: 566						
			Season Total			
Male	Number of Samples	3	88	49	25	165
	Average Length (mm)	588.3	636.1	655.5	679.4	647.2
Female	Number of Samples	6	219	123	53	401
	Average Length (mm)	578.3	596.6	617.8	626.2	608.2

Table 5. Noatak River age and sex composition of chum salmon test fish catch samples, 2003.

		Brood Year and Age Group					Total
		2000	1999	1998	1997	1996	
		0.2	0.3	0.4	0.5	0.6	
Sampling Date:	8/01						
Sample Size:	22						
Male	Percent of Catch	0.0	40.9	18.2	4.5	0.0	63.6
	Number of Samples	0	9	4	1	0	14
Female	Percent of Catch	0.0	0.0	31.8	4.5	0.0	36.4
	Number of Samples	0	0	7	1	0	8
Total	Percent of Catch	0.0	40.9	50.0	9.1	0.0	100.0
	Number of Samples	0	9	11	2	0	22
<hr/>							
Sampling Date:	8/18						
Sample Size:	27						
Male	Percent of Catch	0.0	14.8	11.1	0.0	0.0	25.9
	Number of Samples	0	4	3	0	0	7
Female	Percent of Catch	0.0	51.9	22.2	0.0	0.0	74.1
	Number of Samples	0	14	6	0	0	20
Total	Percent of Catch	0.0	66.7	33.3	0.0	0.0	100.0
	Number of Samples	0	18	9	0	0	27
<hr/>							
Sampling Dates:	8/01 - 8/18						
Sample Size:	49	Season Total					
Male	Percent of Catch	0.0	26.5	14.3	2.0	0.0	42.9
	Number of Samples	0	13	7	1	0	21
Female	Percent of Catch	0.0	28.6	26.5	2.0	0.0	57.1
	Number of Samples	0	14	13	1	0	28
Total	Percent of Catch	0.0	55.1	40.8	4.1	0.0	100.0
	Number of Samples	0	27	20	2	0	49

Table 6. Length by age and sex of Noatak River chum salmon test fish catch samples, 2003.

		Brood Year and Age Group					Total
		2000	1999	1998	1997	1996	
		0.2	0.3	0.4	0.5	0.6	
Sampling Date: 8/01							
Sample Size: 22							
Male	Number of Samples	0	9	4	1	0	14
	Average Length (mm)	0	599.4	671.3	635.0	0	622.5
Female	Number of Samples	0	0	7	1	0	8
	Average Length (mm)	0	0	635.7	635.0	0	635.6
Sampling Date: 8/18							
Sample Size: 27							
Male	Number of Samples	0	4	3	0	0	7
	Average Length (mm)	0	633.8	653.8	0	0	643.6
Female	Number of Samples	0	14	6	0	0	20
	Average Length (mm)	0	594.3	597.5	0	0	595.3
Sampling Date: 8/01-8/18							
Sample Size: 49		Season Total					
Male	Number of Samples	0	13	7	1	0	21
	Average Length (mm)	0	610.0	663.8	635.0	0	629.5
Female	Number of Samples	0	14	13	1	0	28
	Average Length (mm)	0	594.3	618.1	635.0	0	606.8

Table 7. Commercial chum salmon catch samples age and sex composition, Kotzebue Sound, 2003.

		Brood Year and Age Group						Total
		2000	1999	1998	1997	1996	1995	
		0.2	0.3	0.4	0.5	0.6	0.7	
Sampling Dates: 7/22-7/25								
Sample Size: 268								
Male	Percent of Catch	0.4	19.0	22.0	10.8	2.2	0.4	54.9
	Number of Samples	1	51	59	29	6	1	147
Female	Percent of Catch	0.0	11.6	22.8	9.3	1.1	0.4	45.1
	Number of Samples	0	31	61	25	3	1	121
Total	Percent of Catch	0.4	30.6	44.8	20.1	3.4	0.7	100.0
	Number of Samples	1	82	120	54	9	2	268
Sampling Dates: 7/29-7/31								
Sample Size: 193								
Male	Percent of Catch	0.0	27.5	15.5	1.0	0.0	0.0	44.0
	Number of Samples	0	53	30	2	0	0	85
Female	Percent of Catch	0.5	30.6	21.2	3.6	0.0	0.0	56.0
	Number of Samples	1	59	41	7	0	0	108
Total	Percent of Catch	0.5	58.0	36.8	4.7	0.0	0.0	100.0
	Number of Samples	1	112	71	9	0	0	193
Sampling Dates: 8/12								
Sample Size: 194								
Male	Percent of Catch	1.0	44.3	10.3	0.5	0.0	0.0	56.2
	Number of Samples	2	86	20	1	0	0	109
Female	Percent of Catch	0.0	30.4	11.9	1.5	0.0	0.0	43.8
	Number of Samples	0	59	23	3	0	0	85
Total	Percent of Catch	1.0	74.7	22.2	2.1	0.0	0.0	100.0
	Number of Samples	2	145	43	4	0	0	194
Sampling Dates: 8/18-8/19								
Sample Size: 314								
Male	Percent of Catch	0.6	36.0	5.4	0.3	0.0	0.0	42.4
	Number of Samples	2	113	17	1	0	0	133
Female	Percent of Catch	0.0	48.4	7.3	1.9	0.0	0.0	57.6
	Number of Samples	0	152	23	6	0	0	181
Total	Percent of Catch	0.6	84.4	12.7	2.2	0.0	0.0	100.0
	Number of Samples	2	265	40	7	0	0	314
Sampling Dates: 7/22-8/19								
Sample Size: 969								
		Season Total						
Male	Percent of Catch	0.5	31.3	13.0	3.4	0.6	0.1	48.9
	Number of Samples	5	303	126	33	6	1	474
Female	Percent of Catch	0.1	31.1	15.3	4.2	0.3	0.1	51.1
	Number of Samples	1	301	148	41	3	1	495
Total	Percent of Catch	0.6	62.3	28.3	7.6	0.9	0.2	100.0
	Number of Samples	6	604	274	74	9	2	969

Table 8. Commercial chum salmon catch samples age, sex, and length (mid-eye to fork-of-tail in mm) composition, Kotzebue Sound, 2003.

		Brood Year and Age Group						Total
		2000	1999	1998	1997	1996	1995	
		0.2	0.3	0.4	0.5	0.6	0.7	
Sampling Dates: 7/22-7/25								
Sample Size: 268								
Male	Number of Samples	1	51	59	29	6	1	147
	Average Length (mm)	585.0	612.9	636.1	649.7	625.0	610.0	629.8
Female	Number of Samples	0	31	61	25	3	1	121
	Average Length (mm)	0	602.1	619.2	634.2	606.7	695.0	618.2
Sampling Dates: 7/29-7/31								
Sample Size: 193								
Male	Number of Samples	0	53	30	2	0	0	85
	Average Length (mm)	0	617.3	652.7	654.0	0	0	630.7
Female	Number of Samples	1	59	41	7	0	0	108
	Average Length (mm)	555.0	590.7	618.7	642.7	0	0	604.8
Sampling Dates: 8/12								
Sample Size: 194								
Male	Number of Samples	2	86	20	1	0	0	109
	Average Length (mm)	555.0	616.2	640.8	615.0	0	0	619.6
Female	Number of Samples	0	59	23	3	0	0	85
	Average Length (mm)	0	592.8	618.0	635.0	0	0	601.1
Sampling Dates: 8/18-8/19								
Sample Size: 314								
Male	Number of Samples	2	113	17	1	0	0	133
	Average Length (mm)	555.0	591.5	627.5	650.0	0	0	596.0
Female	Number of Samples	0	152	23	6	0	0	181
	Average Length (mm)	0	580.3	593.9	619.8	0	0	583.6
Sampling Dates: 7/22-8/19								
Sample Size: 969								
		Season Total						
Male	Number of Samples	5	303	126	33	6	1	474
	Average Length (mm)	561.0	606.6	639.6	648.9	625.0	610.0	627.4
Female	Number of Samples	1	301	148	41	3	1	495
	Average Length (mm)	555.0	587.0	615.0	633.6	606.7	695.0	604.6

Table 9. Kobuk River atmospheric and hydrologic data, 2003.

Date	Water Temp. (C)	Water Guage (inches) ^a	Secchi (meters)	Percent Cloud Cover
9-Jul	14	0.0	1.25	100
10-Jul	14	-2.5	1.50	100
11-Jul	14	-8.0	1.75	75
12-Jul	13	-12.5	2.00	100
13-Jul	13	-18.0	2.00	100
14-Jul	13	-20.0	2.50	100
15-Jul	11	-21.5	2.75	75
16-Jul	10	-23.0	2.50	75
17-Jul	10	-24.0	2.50	50
18-Jul	11	-16.0	2.75	0
19-Jul	12	-17.0	3.00	0
20-Jul	14	-18.0	3.50	0
21-Jul	14	-19.0	3.50	100
22-Jul	15	-19.0	3.50	100
23-Jul	15	-20.0	3.75	100
24-Jul	14	-21.0	3.75	75
25-Jul	12	-14.0	3.50	100
26-Jul	11	-5.0	3.00	100
27-Jul	11	1.0	3.00	0
28-Jul	10	5.0	2.00	100
29-Jul	11	8.0	1.00	100
30-Jul	10	8.5	1.50	75
31-Jul	10	9.0	1.50	100
1-Aug	9	6.0	2.00	15
2-Aug	10	-1.0	2.50	100
3-Aug	9	-1.5	2.75	100
4-Aug	9	0.0	3.00	100
5-Aug	11	0.0	3.00	75
6-Aug	11	0.0	3.00	25
7-Aug	11	-1.0	3.00	0
8-Aug	12	-2.0	2.50	0
9-Aug	13	-6.0	3.00	100
10-Aug	14	-9.5	3.50	50
11-Aug	16	-16.0	3.00	100
12-Aug	14	-14.0	2.50	100
13-Aug	12	-1.0	2.50	100

^a The guage is set even (0.0 inches) with the water level at the start of season.

^b Regular day off.

Table 10. Kobuk River drift test fish sheefish catch per unit of effort (CPUE) by day, drift, and site 2003.

Date	CPUE by Drift ^a			CPUE by Site ^b		Daily CPUE	Cum. CPUE
	#1 ^c	#2	#3	N	S		
9-Jul		53.10	68.26	78.20	58.91	60.54	60.54
10-Jul	63.27	40.35	62.80	62.54	56.39	55.27	115.81
11-Jul	50.64	27.69	15.85	26.28	40.25	31.60	147.41
12-Jul	33.03	26.67	37.09	15.65	50.30	32.29	179.70
13-Jul	31.11	24.00	18.11	18.99	31.62	24.44	204.14
14-Jul	8.97	11.21	6.99	0	17.45	9.09	213.23
15-Jul	6.86	8.97	15.41	5.37	15.81	10.47	223.70
16-Jul	2.26	6.92	16.00	1.80	14.63	8.38	232.08
17-Jul	11.32	6.86	4.62	1.79	13.42	7.62	239.70
18-Jul	4.32	11.11	29.16	5.33	23.72	14.72	254.42
19-Jul	15.85	6.92	11.65	12.35	12.08	11.50	265.92
20-Jul	8.42	12.86	13.46	13.33	11.43	11.53	277.45
21-Jul	15.41	6.73	13.46	12.17	13.17	11.89	289.34
22-Jul	8.73	24.00	15.56	5.18	26.98	16.10	305.44
23-Jul	15.14	4.53	6.73	1.75	15.71	8.89	314.33
24-Jul	2.20	8.73	4.44	0	9.94	5.14	319.47
25-Jul	4.07	8.89	6.73	3.45	9.66	6.49	325.96
26-Jul	4.03	0	6.00	1.75	4.87	3.39	329.35
27-Jul	12.86	4.00	11.11	5.22	13.26	9.18	338.53
28-Jul	6.37	6.61	2.26	0	10.18	5.12	343.65
29-Jul	6.43	0	0	5.14	0	2.11	345.76
30-Jul	12.63	3.78	4.10	1.69	11.02	6.70	352.46
31-Jul	16.41	7.80	14.48	17.39	10.91	12.81	365.27
1-Aug	12.86	11.65	15.85	8.70	19.14	13.46	378.73
2-Aug	0	4.40	12.82	3.53	9.28	6.21	384.94
3-Aug	12.63	6.73	0	5.22	8.52	6.61	391.55
4-Aug	2.22	6.67	15.85	0	16.00	8.20	399.75
5-Aug	0	6.86	0	0	4.39	2.30	402.05
6-Aug	0	0	0	0	0	0	402.05
7-Aug	0	0	3.97	0	2.40	1.32	403.37
8-Aug	0	0	2.02	0	1.39	0.71	404.08
9-Aug	2.16	0	2.18	0	2.91	1.47	405.55
10-Aug	0	0	0	0	0	0	405.55
11-Aug	0	0	0	0	0	0	405.55
12-Aug	0	0	2.31	0	1.43	0.74	406.29
13-Aug	0	3.20	0	3.06	0	1.26	407.55
Total	370.20	351.24	439.27	315.88	537.17		

^a Catch per unit of effort is calculated in catch/100 fathoms of net/hour

^b Site N is the North Bank (right bank when facing downstream) and Site S is the South Bank (left bank).

^c Drift 1 begins at 0800, Drift 2 at 1500, and Drift 3 at 2200.

Table 11. Kobuk River drift test fish sheefish CPUE indices, mean CPUE and percent by drift and site, 2003.

Drift Period	Season CPUE Indices	No. of Period Drifts ^a	Season Mean CPUE	Percent	Station	Season CPUE Indices	No. of Site Drifts	Season Mean CPUE	Percent
1 0800 hr.	370.20	35	10.58	32.51	N North Bank	315.88	107	2.95	37.03
2 1500 hr.	351.24	36	9.76	29.99	S South Bank	537.17	107	5.02	62.97
3 2200 hr.	439.27	36	12.20	37.50					
Total	1160.71	107	10.85	100.00	Total	853.05	214	3.99	100.00

^a One drift period is equal to one test fish drift on the north bank and one test fish drift on the south bank.

Figure 1. Kotzebue Sound commercial fishing district, villages and subsistence fishing areas.

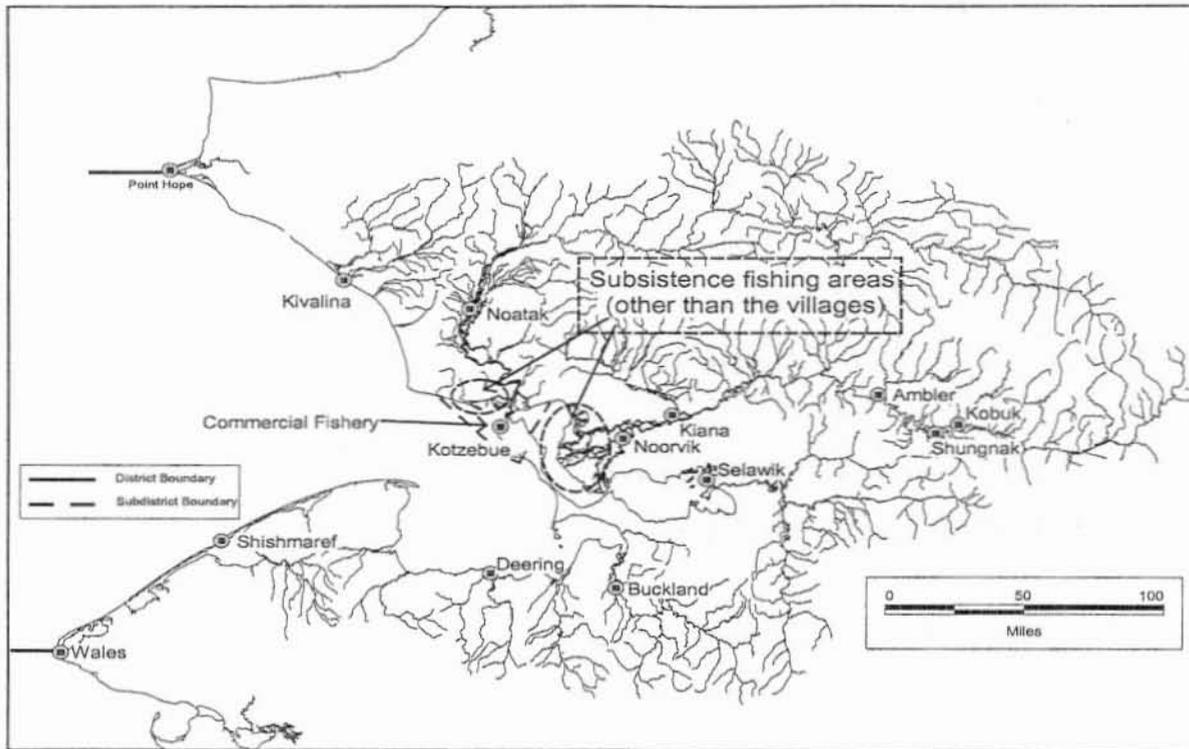


Figure 2. Kobuk River drift test fishing sites.

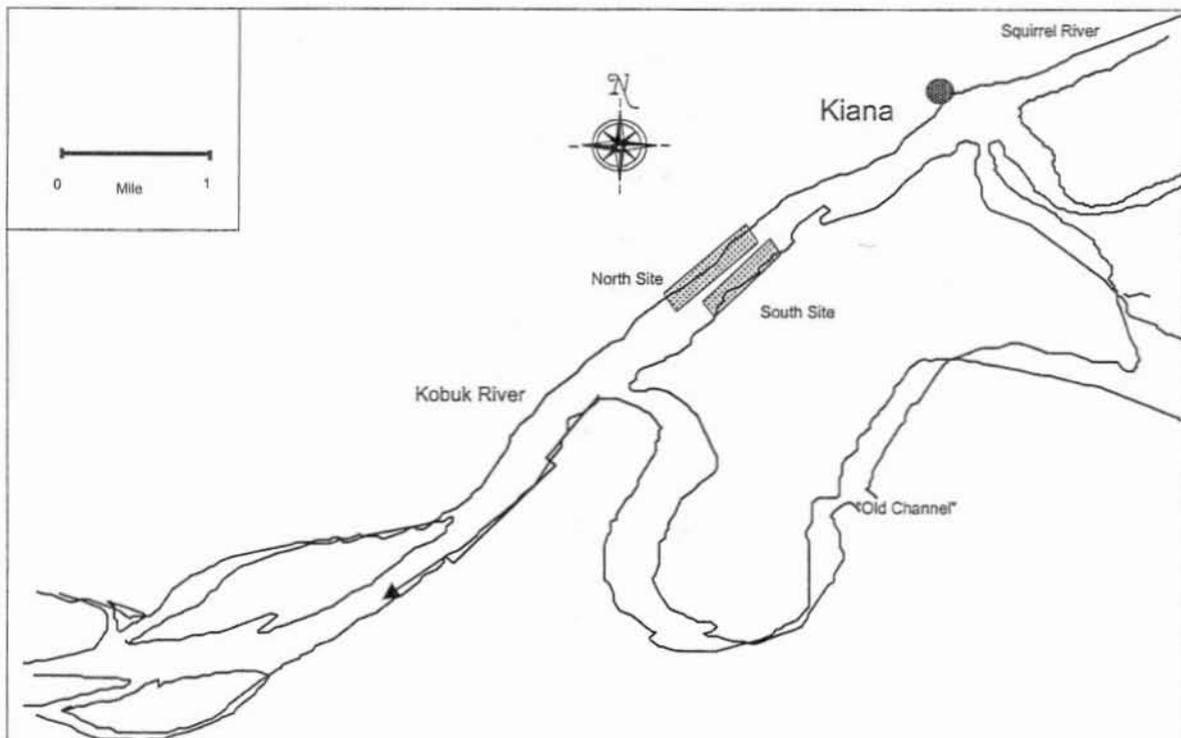
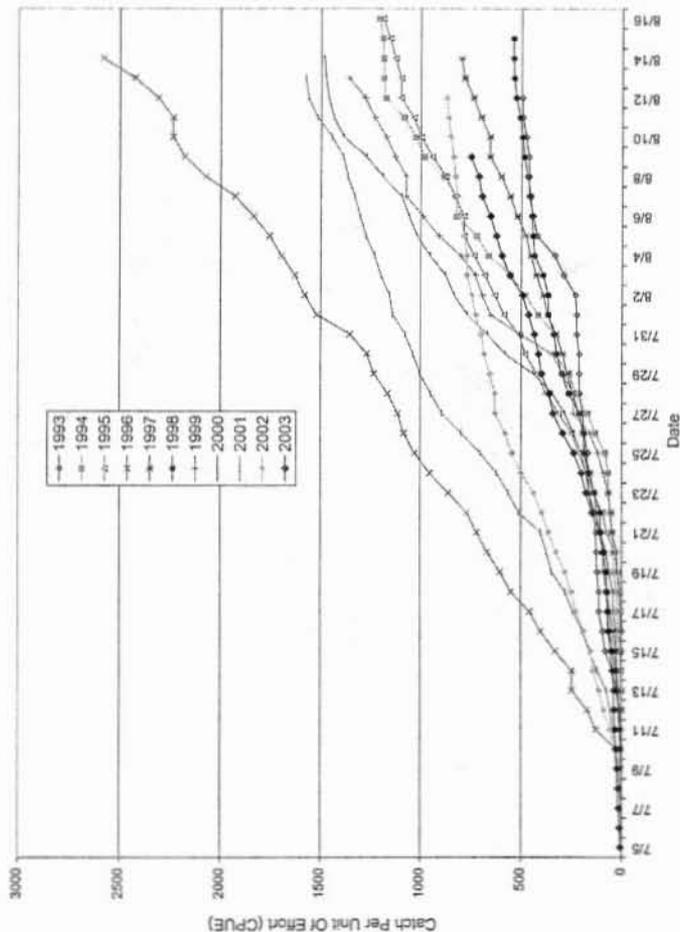


Figure 3. Kobiuk River chum salmon drift-lead fish cumulative CPUE, 1993 - 2003.



Date	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
7/5	11.18	0	0	12.77	5.65	6.22	0	1.26	2.59	0	5
7/7	25.4	0	0	27.77	11.65	8.07	0	2.11	5.03	8.39	20.89
7/9	45.97	2.69	0.93	37.3	18.35	6.07	0	4.61	9.36	26.57	7.57
7/11	81.05	5.26	3.73	245.08	18.35	6.07	0	8.07	16.97	45.07	12.21
7/12	111.51	16.81	8.5	326.73	28.25	21.96	0	11.5	23.4	62.54	17.17
7/13	144.96	29.82	16.2	401.08	42.53	60.89	0	14.04	28.93	80.8	22.38
7/14	182.22	36.17	23.77	546.43	57.7	65.96	4.26	22.81	47.99	111.47	28.42
7/15	194.96	49.82	34.5	601.17	73.82	74.98	12.74	26.86	58.42	153.79	32.91
7/16	222.22	58.82	41.8	656.87	88.18	85.94	18.63	30.63	62.22	180.06	36.24
7/17	250.55	68.82	50.18	711.54	102.48	90.94	24.48	33.49	67.22	205.96	40.77
7/18	278.88	78.82	59.48	766.22	116.78	95.91	30.33	36.35	72.11	231.86	45.3
7/19	307.22	88.82	68.78	820.91	131.08	100.81	36.18	39.2	76.84	257.76	49.83
7/20	335.55	98.82	78.08	875.6	145.38	105.72	42.03	42.03	81.57	283.66	54.34
7/21	363.88	108.82	87.38	930.29	159.68	110.62	47.88	44.94	86.3	309.56	58.85
7/22	392.22	118.82	96.68	984.98	173.98	115.51	53.73	47.8	91.04	335.46	63.36
7/23	420.55	128.82	105.98	1039.67	188.28	120.4	59.58	50.7	95.79	361.36	67.87
7/24	448.88	138.82	115.28	1094.36	202.58	125.3	65.43	53.64	100.54	387.26	72.38
7/25	477.22	148.82	124.58	1149.05	216.88	130.2	71.28	56.5	105.29	413.16	76.89
7/26	505.55	158.82	133.88	1203.74	231.18	135.1	77.13	59.4	110.04	439.06	81.4
7/27	533.88	168.82	143.18	1258.43	245.48	140.0	83.0	62.3	114.79	464.96	85.91
7/28	562.22	178.82	152.48	1313.12	259.78	144.9	88.85	65.2	119.54	490.86	90.42
7/29	590.55	188.82	161.78	1367.81	274.08	149.8	94.7	68.1	124.29	516.76	94.93
7/30	618.88	198.82	171.08	1422.5	288.38	154.7	100.55	70.4	129.04	542.66	99.44
7/31	647.22	208.82	180.38	1477.19	302.68	159.6	106.4	73.3	133.79	568.56	103.95
8/1	675.55	218.82	189.68	1531.88	316.98	164.5	112.25	76.2	138.54	594.46	108.46
8/2	703.88	228.82	198.98	1586.57	331.28	169.4	117.9	79.1	143.29	620.36	112.97
8/3	732.22	238.82	208.28	1641.26	345.58	174.3	123.6	82.0	148.04	646.26	117.48
8/4	760.55	248.82	217.58	1695.95	359.88	179.2	129.35	84.9	152.79	672.16	121.99
8/5	788.88	258.82	226.88	1750.64	374.18	184.1	135.1	87.8	157.54	698.06	126.5
8/6	817.22	268.82	236.18	1805.33	388.48	189.0	140.85	90.7	162.29	723.96	131.01
8/7	845.55	278.82	245.48	1860.02	402.78	193.9	146.6	93.6	167.04	749.86	135.52
8/8	873.88	288.82	254.78	1914.71	417.08	198.8	152.35	96.5	171.79	775.76	140.03
8/9	902.22	298.82	264.08	1969.4	431.38	203.7	158.1	99.4	176.54	801.66	144.54
8/10	930.55	308.82	273.38	2024.09	445.68	208.6	163.85	102.3	181.29	827.56	149.05
8/11	958.88	318.82	282.68	2078.78	459.98	213.5	169.6	105.2	186.04	853.46	153.56
8/12	987.22	328.82	291.98	2133.47	474.28	218.4	175.4	108.1	190.79	879.36	158.07
8/13	1015.55	338.82	301.28	2188.16	488.58	223.3	181.25	111.0	195.54	905.26	162.58
8/14	1043.88	348.82	310.58	2242.85	502.88	228.2	187.0	113.9	200.29	931.16	167.09
8/15	1072.22	358.82	319.88	2297.54	517.18	233.1	192.75	116.8	205.04	957.06	171.6
8/16	1100.55	368.82	329.18	2352.23	531.48	238.0	198.5	119.7	209.79	982.96	176.11

Appendix 1. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE, 1993-2003. (page 1 of 2)

Date	1993		1994		1995		1996		1997	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
5-Jul										
6-Jul										
7-Jul										
8-Jul										
9-Jul							12.77	12.77	5.85	5.85
10-Jul							15.00	27.77	0	5.85
11-Jul							98.38	126.15	5.31	11.16
12-Jul	11.18	11.18			0	0	45.54	171.69	7.19	18.35
13-Jul	14.22	25.40	0	0	0.93	0.93	74.29	245.98	a	18.35
14-Jul	20.57	45.97	2.68	2.68	2.80	3.73	a	245.98	6.25	24.60
15-Jul	35.08	81.05	2.58	5.26	2.77	6.50	83.75	329.73	3.65	28.25
16-Jul	13.19	94.24	11.35	16.61	a	6.50	71.35	401.08	14.28	42.53
17-Jul	17.27	111.51	a	16.61	0	6.50	55.49	456.57	15.17	57.70
18-Jul	a	111.51	7.16	23.77	1.81	8.31	89.86	546.43	16.12	73.82
19-Jul	10.71	122.22	12.40	36.17	9.89	18.20	54.74	601.17	17.98	91.80
20-Jul	2.76	124.98	3.65	39.82	16.30	34.50	63.70	664.87	a	91.80
21-Jul	3.20	128.18	7.30	47.12	38.54	73.04	52.12	716.99	18.53	110.33
22-Jul	5.52	133.70	3.56	50.68	21.18	94.22	50.97	767.96	13.28	123.61
23-Jul	27.15	160.85	16.49	67.17	50.58	144.80	91.36	859.32	10.79	134.40
24-Jul	9.06	169.91	a	67.17	28.46	173.26	91.89	951.21	22.86	157.26
25-Jul	a	169.91	14.38	81.55	40.16	213.42	76.80	1028.01	21.57	178.83
26-Jul	15.22	185.13	47.65	129.20	35.15	248.57	55.68	1083.69	14.66	193.49
27-Jul	8.06	193.19	40.66	169.86	63.94	312.51	29.79	1113.48	18.46	211.95
28-Jul	16.36	209.55	57.83	227.69	62.49	375.00	49.06	1162.54	30.53	242.48
29-Jul	0.93	210.48	33.62	261.31	46.11	421.11	70.13	1232.67	28.13	270.61
30-Jul	0.92	211.40	69.21	330.52	57.86	478.97	35.29	1267.96	22.33	292.94
31-Jul	12.58	223.98	a	330.52	29.89	508.86	82.27	1350.23	32.57	325.51
1-Aug	a	223.98	82.16	412.68	72.91	581.77	167.67	1517.90	41.41	366.92
2-Aug	6.74	230.72	65.12	477.80	48.71	630.48	62.02	1579.92	22.41	389.33
3-Aug	57.08	287.80	71.79	549.59	48.40	678.88	48.70	1628.62	35.21	424.54
4-Aug	44.23	332.03	108.98	658.57	53.00	731.88	65.93	1694.55	26.67	451.21
5-Aug	89.30	421.33	59.74	718.31	49.95	781.83	60.33	1754.88	24.47	475.68
6-Aug	18.60	439.93	102.56	820.87	a	781.83	80.47	1835.35	42.25	517.93
7-Aug	20.52	460.45	a	820.87	46.39	828.22	90.99	1926.34	36.00	553.93
8-Aug	a	460.45	62.75	883.62	44.02	872.24	146.94	2073.28	45.07	599.00
9-Aug	1.84	462.29	96.86	980.48	68.22	940.46	106.11	2179.39	55.14	654.14
10-Aug	12.63	474.92	45.83	1026.31	56.33	996.79	56.95	2236.34	a	654.14
11-Aug	18.11	493.03	57.02	1083.33	37.95	1034.74	a	2236.34	43.75	697.89
12-Aug	3.74	496.77	90.54	1173.87	63.92	1098.66	72.29	2308.63	37.36	735.25
13-Aug			11.36	1185.23	a	1098.66	114.63	2423.26	45.93	781.18
14-Aug			a	1185.23	29.35	1128.01	158.13	2581.39	16.01	797.19
15-Aug			5.13	1190.36	25.26	1153.27				
16-Aug			16.23	1206.59	35.04	1188.31				
17-Aug			0	1206.59						
18-Aug			0	1206.59						
19-Aug			3.12	1209.71						
20-Aug			0	1209.71						
21-Aug			a	1209.71						
22-Aug			0	1209.71						
23-Aug			0	1209.71						
24-Aug			0	1209.71						
25-Aug			0.91	1210.62						
26-Aug			5.56	1216.18						
27-Aug			1.86	1218.04						
28-Aug			0.93	1218.97						
29-Aug			0	1218.97						
30-Aug			0	1218.97						

^a Regular day off.

Appendix 1. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE, 1993-2003. (page 2 of 2)

Date	1998		1999		2000		2001		2002		2003	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
5-Jul							0	0	5.00	5.00		
6-Jul							2.59	2.59	3.39	8.39		
7-Jul					1.28	1.28	2.44	5.03	12.50	20.89		
8-Jul					0.83	2.11	0.83	5.86	5.98	26.87		
9-Jul					0	2.11	10.72	16.58	1.70	28.57	7.57	7.57
10-Jul	5.22	5.22			2.50	4.61	8.39	24.97	6.83	35.40	3.64	11.21
11-Jul	0.85	6.07	0	0	3.44	8.05	20.07	45.04	22.86	58.26	3.76	14.97
12-Jul	a	6.07	0	0	3.45	11.50	12.63	57.67	31.54	89.80	2.20	17.17
13-Jul	15.89	21.96	0	0	2.54	14.04	17.32	74.99	21.67	111.47	5.19	22.36
14-Jul	7.53	29.49	0	0	8.57	22.61	45.57	120.56	28.05	139.52	6.06	28.42
15-Jul	14.07	43.56	0	0	0.87	23.48	38.86	159.42	14.27	153.79	4.49	32.91
16-Jul	17.33	60.89	0	0	3.38	26.86	32.80	192.22	35.27	189.06	5.33	38.24
17-Jul	5.07	65.96	4.26	4.26	12.77	39.63	48.77	240.99	36.50	225.56	0.00	38.24
18-Jul	9.02	74.98	8.48	12.74	3.58	43.21	36.98	277.97	24.41	249.97	8.83	47.07
19-Jul	a	74.98	5.89	18.63	19.51	62.72	67.08	345.05	30.30	280.27	5.37	52.44
20-Jul	18.66	93.64	5.11	23.74	14.57	77.29	26.05	371.10	44.91	325.18	15.14	67.58
21-Jul	11.87	105.51	23.75	47.49	27.69	104.98	29.51	400.61	36.30	361.48	2.23	69.81
22-Jul	0	105.51	11.91	59.40	41.00	145.98	108.97	509.58	33.08	394.56	2.20	72.01
23-Jul	29.58	135.09	6.09	65.49	16.29	162.27	50.79	560.37	40.00	434.56	5.93	77.94
24-Jul	27.33	162.42	24.95	90.44	14.62	176.89	58.96	619.33	62.76	497.32	11.01	88.95
25-Jul	24.68	187.10	28.73	119.17	22.98	199.87	80.59	699.92	45.64	542.96	17.30	106.25
26-Jul	a	187.10	39.72	158.89	40.28	240.15	94.06	793.98	34.29	577.25	41.36	147.61
27-Jul	23.91	211.01	80.39	239.28	41.52	281.67	95.06	889.04	50.41	627.66	29.65	177.26
28-Jul	51.91	262.92	a	239.28	62.34	344.01	58.24	947.28	a	627.66	23.41	200.67
29-Jul	34.16	297.08	55.00	294.28	96.00	440.01	54.33	1001.61	25.74	653.40	37.89	238.56
30-Jul	24.59	321.67	49.66	343.94	138.20	578.21	35.36	1036.97	28.90	682.30	53.63	292.19
31-Jul	15.69	337.36	160.53	504.47	85.87	664.08	38.63	1075.60	12.68	694.98	48.54	340.73
1-Aug	25.44	362.80	145.02	649.49	101.16	765.24	61.50	1137.10	27.85	722.83	17.94	358.67
2-Aug	a	362.80	41.67	691.16	64.37	829.61	16.55	1153.65	19.93	742.76	38.62	397.29
3-Aug	26.67	389.47	33.19	724.35	44.32	873.93	44.21	1197.86	25.31	768.07	15.41	412.70
4-Aug	42.35	431.82	74.23	798.58	77.14	951.07	30.71	1228.57	a	768.07	20.12	432.82
5-Aug	8.57	440.39	108.04	906.62	67.26	1018.33	43.64	1272.21	12.86	780.93	29.14	461.96
6-Aug	6.00	446.39	82.79	989.41	38.92	1057.25	30.00	1302.21	23.05	803.98	31.21	493.17
7-Aug	5.11	451.50	82.73	1072.14	37.50	1094.75	26.31	1328.52	10.18	814.16	62.81	555.98
8-Aug	16.40	467.90	a	1072.14	93.37	1188.12	34.40	1362.92	11.96	826.12	39.29	595.27
9-Aug	17.20	485.10	55.58	1127.72	81.50	1269.62	23.01	1385.93	8.60	834.72	27.24	622.51
10-Aug	9.46	494.56	44.73	1172.45	113.87	1383.49	54.88	1440.81	15.27	849.99	29.18	651.69
11-Aug	10.29	504.85	58.13	1230.58	50.57	1434.06	73.64	1514.45	11.10	861.09	40.34	692.03
12-Aug	19.44	524.29	48.50	1279.08	24.86	1458.92	47.23	1561.68	7.66	868.75	17.04	709.07
13-Aug	10.21	534.50	78.37	1357.45	14.57	1473.49	13.04	1574.72			39.79	748.86
14-Aug	3.85	538.35			7.83	1481.32						
15-Aug	0	538.35										
16-Aug												
17-Aug												
18-Aug												
19-Aug												
20-Aug												
21-Aug												
22-Aug												
23-Aug												
24-Aug												
25-Aug												
26-Aug												
27-Aug												
28-Aug												
29-Aug												
30-Aug												

^a Regular day off.

Appendix 2. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE proportions, 1993-2003. (page 1 of 2)

Date	1993		1994		1995		1996		1997	
	Daily	Cum.								
5-Jul										
6-Jul										
7-Jul										
8-Jul										
9-Jul							0.005	0.005	0.007	0.007
10-Jul							0.006	0.011	0.000	0.007
11-Jul							0.038	0.049	0.007	0.014
12-Jul	0.023	0.023			0.000	0.000	0.018	0.067	0.009	0.023
13-Jul	0.029	0.051	0.000	0.000	0.001	0.001	0.029	0.095	a	0.023
14-Jul	0.041	0.093	0.002	0.002	0.002	0.003	a	0.095	0.008	0.031
15-Jul	0.071	0.163	0.002	0.004	0.002	0.005	0.032	0.128	0.005	0.035
16-Jul	0.027	0.190	0.009	0.014	a	0.005	0.028	0.155	0.018	0.053
17-Jul	0.035	0.224	a	0.014	0.000	0.005	0.021	0.177	0.019	0.072
18-Jul	a	0.224	0.006	0.020	0.002	0.007	0.035	0.212	0.020	0.093
19-Jul	0.022	0.246	0.010	0.030	0.008	0.015	0.021	0.233	0.023	0.115
20-Jul	0.006	0.252	0.003	0.033	0.014	0.029	0.025	0.258	a	0.115
21-Jul	0.006	0.258	0.006	0.039	0.032	0.061	0.020	0.278	0.023	0.138
22-Jul	0.011	0.269	0.003	0.042	0.018	0.079	0.020	0.297	0.017	0.155
23-Jul	0.055	0.324	0.014	0.055	0.043	0.122	0.035	0.333	0.014	0.169
24-Jul	0.018	0.342	a	0.055	0.024	0.146	0.036	0.368	0.029	0.197
25-Jul	a	0.342	0.012	0.067	0.034	0.180	0.030	0.398	0.027	0.224
26-Jul	0.031	0.373	0.039	0.106	0.030	0.209	0.022	0.420	0.018	0.243
27-Jul	0.016	0.389	0.033	0.139	0.054	0.263	0.012	0.431	0.023	0.266
28-Jul	0.033	0.422	0.047	0.187	0.053	0.316	0.019	0.450	0.038	0.304
29-Jul	0.002	0.424	0.028	0.214	0.039	0.354	0.027	0.478	0.035	0.339
30-Jul	0.002	0.426	0.057	0.271	0.049	0.403	0.014	0.491	0.028	0.367
31-Jul	0.025	0.451	a	0.271	0.025	0.428	0.032	0.523	0.041	0.408
1-Aug	a	0.451	0.067	0.339	0.061	0.490	0.065	0.588	0.052	0.460
2-Aug	0.014	0.464	0.053	0.392	0.041	0.531	0.024	0.612	0.028	0.488
3-Aug	0.115	0.579	0.059	0.451	0.041	0.571	0.019	0.631	0.044	0.533
4-Aug	0.089	0.668	0.089	0.540	0.045	0.616	0.026	0.656	0.033	0.566
5-Aug	0.180	0.848	0.049	0.589	0.042	0.658	0.023	0.680	0.031	0.597
6-Aug	0.037	0.886	0.084	0.673	a	0.658	0.031	0.711	0.053	0.650
7-Aug	0.041	0.927	a	0.673	0.039	0.697	0.035	0.746	0.045	0.695
8-Aug	a	0.927	0.051	0.725	0.037	0.734	0.057	0.803	0.057	0.751
9-Aug	0.004	0.931	0.079	0.804	0.057	0.791	0.041	0.844	0.069	0.821
10-Aug	0.025	0.956	0.038	0.842	0.047	0.839	0.022	0.866	a	0.821
11-Aug	0.036	0.992	0.047	0.889	0.032	0.871	a	0.866	0.055	0.875
12-Aug	0.008	1.000	0.074	0.963	0.054	0.925	0.028	0.894	0.047	0.922
13-Aug			0.009	0.972	a	0.925	0.044	0.939	0.058	0.980
14-Aug			a	0.972	0.025	0.949	0.061	1.000	0.020	1.000
15-Aug			0.004	0.977	0.021	0.971				
16-Aug			0.013	0.990	0.029	1.000				
17-Aug			0.000	0.990						
18-Aug			0.000	0.990						
19-Aug			0.003	0.992						
20-Aug			0.000	0.992						
21-Aug			a	0.992						
22-Aug			0.000	0.992						
23-Aug			0.000	0.992						
24-Aug			0.000	0.992						
25-Aug			0.001	0.993						
26-Aug			0.005	0.998						
27-Aug			0.002	0.999						
28-Aug			0.001	1.000						
29-Aug			0.000	1.000						
30-Aug			0.000	1.000						

^a Regular day off.

Appendix 2. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE proportions, 1993-2003. (page 2 of 2)

Date	1998		1999		2000		2001		2002		2003	
	Daily	Cum.										
5-Jul							0.000	0.000	0.006	0.006		
6-Jul							0.002	0.002	0.004	0.010		
7-Jul					0.001	0.001	0.002	0.003	0.014	0.024		
8-Jul					0.001	0.001	0.001	0.004	0.007	0.031		
9-Jul					0.000	0.001	0.007	0.011	0.002	0.033	0.010	0.010
10-Jul	0.010	0.010			0.002	0.003	0.005	0.016	0.008	0.041	0.005	0.015
11-Jul	0.002	0.011	0.000	0.000	0.002	0.005	0.013	0.029	0.026	0.067	0.005	0.020
12-Jul	a	0.011	0.000	0.000	0.002	0.008	0.008	0.037	0.036	0.103	0.003	0.023
13-Jul	0.030	0.041	0.000	0.000	0.002	0.009	0.011	0.048	0.025	0.128	0.007	0.030
14-Jul	0.014	0.055	0.000	0.000	0.006	0.015	0.029	0.077	0.032	0.161	0.008	0.038
15-Jul	0.026	0.081	0.000	0.000	0.001	0.016	0.025	0.101	0.016	0.177	0.006	0.044
16-Jul	0.032	0.113	0.000	0.000	0.002	0.018	0.021	0.122	0.041	0.218	0.007	0.051
17-Jul	0.009	0.123	0.003	0.003	0.009	0.027	0.031	0.153	0.042	0.260	0.000	0.051
18-Jul	0.017	0.139	0.006	0.009	0.002	0.029	0.023	0.177	0.028	0.288	0.012	0.063
19-Jul	a	0.139	0.004	0.014	0.013	0.042	0.043	0.219	0.035	0.323	0.007	0.070
20-Jul	0.035	0.174	0.004	0.017	0.010	0.052	0.017	0.236	0.052	0.374	0.020	0.090
21-Jul	0.022	0.196	0.017	0.035	0.019	0.071	0.019	0.254	0.042	0.416	0.003	0.093
22-Jul	0.000	0.196	0.009	0.044	0.028	0.099	0.069	0.324	0.038	0.454	0.003	0.096
23-Jul	0.055	0.251	0.004	0.048	0.011	0.110	0.032	0.356	0.046	0.500	0.008	0.104
24-Jul	0.051	0.302	0.018	0.067	0.010	0.119	0.037	0.393	0.072	0.572	0.015	0.119
25-Jul	0.046	0.348	0.021	0.088	0.016	0.135	0.051	0.444	0.053	0.625	0.023	0.142
26-Jul	a	0.348	0.029	0.117	0.027	0.162	0.060	0.504	0.039	0.664	0.055	0.197
27-Jul	0.044	0.392	0.059	0.176	0.028	0.190	0.060	0.565	0.058	0.722	0.040	0.237
28-Jul	0.096	0.488	a	0.176	0.042	0.232	0.037	0.602	a	0.722	0.031	0.268
29-Jul	0.063	0.552	0.041	0.217	0.065	0.297	0.035	0.636	0.030	0.752	0.051	0.319
30-Jul	0.046	0.598	0.037	0.253	0.093	0.390	0.022	0.659	0.033	0.785	0.072	0.390
31-Jul	0.029	0.627	0.118	0.372	0.058	0.448	0.025	0.683	0.015	0.800	0.065	0.455
1-Aug	0.047	0.674	0.107	0.478	0.068	0.517	0.039	0.722	0.032	0.832	0.024	0.479
2-Aug	a	0.674	0.031	0.509	0.043	0.560	0.011	0.733	0.023	0.855	0.052	0.531
3-Aug	0.050	0.723	0.024	0.534	0.030	0.590	0.028	0.761	0.029	0.884	0.021	0.551
4-Aug	0.079	0.802	0.055	0.588	0.052	0.642	0.020	0.780	a	0.884	0.027	0.578
5-Aug	0.016	0.818	0.080	0.668	0.045	0.687	0.028	0.808	0.015	0.899	0.039	0.617
6-Aug	0.011	0.829	0.061	0.729	0.026	0.714	0.019	0.827	0.027	0.925	0.042	0.659
7-Aug	0.009	0.839	0.061	0.790	0.025	0.739	0.017	0.844	0.012	0.937	0.084	0.742
8-Aug	0.030	0.869	a	0.790	0.063	0.802	0.022	0.865	0.014	0.951	0.052	0.795
9-Aug	0.032	0.901	0.041	0.831	0.055	0.857	0.015	0.880	0.010	0.961	0.036	0.831
10-Aug	0.018	0.919	0.033	0.864	0.077	0.934	0.035	0.915	0.018	0.978	0.039	0.870
11-Aug	0.019	0.938	0.043	0.907	0.034	0.968	0.047	0.962	0.013	0.991	0.054	0.924
12-Aug	0.036	0.974	0.036	0.942	0.017	0.985	0.030	0.992	0.009	1.000	0.023	0.947
13-Aug	0.019	0.993	0.058	1.000	0.010	0.995	0.008	1.000			0.053	1.000
14-Aug	0.007	1.000			0.005	1.000						
15-Aug	0.000	1.000										
16-Aug												
17-Aug												
18-Aug												
19-Aug												
20-Aug												
21-Aug												
22-Aug												
23-Aug												
24-Aug												
25-Aug												
26-Aug												
27-Aug												
28-Aug												
29-Aug												
30-Aug												

^a Regular day off.

Appendix 3. Kobuk River chum salmon drift test fish comparison, 1993-2003.

Year	Project Operation Dates	Number of test fish drifts	Number of days off inseason ^a	Rank by number of drifts	Cumulative CPUE	Rank by cumulative CPUE
1993	7/12-8/12	164	4	11	496.77	11
1994	7/13-8/30	248	6	1	1,218.97	5
1995	7/12-8/16	196	3	8	1,188.31	6
1996	7/09-8/14	208	2	6	2,581.39	1
1997	7/09-8/14	202	3	7	797.19	8
1998	7/10-8/15	182	4	9	538.35	10
1999	7/11-8/13	176	2	10	1,357.45	4
2000	7/07-8/14	228	0	3	1,481.32	3
2001	7/05-8/13	232	0	2	1,574.72	2
2002	7/05-8/12	218	2	4	868.75	7
2003	7/09-8/13	214	0	5	748.86	9

^a Number of days during the season where the crew had the day off and no test fishing occurred.

Appendix 4. Kobuk River test fish and Kotzebue commercial catch data, 1993 - 2003.

Year	Date	Drifts	CPUE	Commercial Catch	Subsistence Kobuk River	Total Catch	Kobuk River Escapement ^a
1993	7/12 - 8/12	164	496.77	73,071	^b	73,071	31,697
1994	7/13 - 8/30	248	1,218.97	153,452	26,612	180,064	
1995	7/12 - 8/16	196	1,188.31	290,730	38,867	329,597	64,219
1996	7/09 - 8/14	208	2,581.39	82,110	39,076	121,186	131,105
1997	7/09 - 8/14	202	797.19	142,720	25,242	167,962	
1998	7/10 - 8/15	182	538.35	55,907	21,398	77,305	
1999	7/11 - 8/13	176	1,357.45	138,605	27,958	166,563	48,748
2000	7/07 - 8/14	228	1,481.32	159,802	21,538	181,340	
2001	7/05 - 8/13	232	1,574.72	211,672	29,193 ^c	240,865	
2002	7/05 - 8/12	218	868.75	8,390	13,943 ^b		
2003	7/09 - 8/13	216	748.86	25,763	^d		

^a The escapement goal for rivers surveyed in the Kobuk River system is 30,500 chums. Years in which there were poor aerial survey conditions, or no surveys done, were left blank in the table.

^b Several Kobuk River villages were not surveyed in 1993.

^c Ambler village was not surveyed in 2001.

^d Subsistence survey data not yet available.

Appendix 5. Kobuk River chum salmon drift test fish time and site distribution expressed as mean CPUE, 1993-2003.

Year	Mean CPUE by Drift Period ^a			Yearly Mean CPUE	Percent Mean CPUE by Drift Period			Mean CPUE by Site ^b		Yearly Mean CPUE	Percent Mean CPUE by Site	
	1	2	3		1	2	3	N	S		N	S
1993	13.0	21.3	15.9	16.7	25.8	42.5	31.6	3.4	8.5	6.0	28.6	71.4
1994	25.8	33.2	23.7	27.6	31.2	40.1	28.7	1.7	18.6	10.1	8.4	91.6
1995	32.1	37.6	39.9	36.5	29.3	34.3	36.4	8.5	16.2	12.4	34.3	65.7
1996	73.2	81.7	66.5	73.8	33.1	36.9	30.0	13.7	36.4	25.0	27.3	72.7
1997	23.9	23.3	23.6	23.6	33.7	32.9	33.4	4.3	11.4	7.8	27.3	72.7
1998	18.6	19.4	13.1	17.0	36.4	38.1	25.6	2.8	8.6	5.7	24.4	75.6
1999	49.7	38.6	25.4	37.9	43.7	34.0	22.3	5.2	25.5	15.4	17.0	83.0
2000	40.9	36.7	36.1	37.9	35.9	32.3	31.8	9.1	16.3	12.7	35.8	64.2
2001	47.8	34.1	34.8	38.9	41.0	29.2	29.8	8.0	18.4	13.2	30.2	69.8
2002	20.9	26.5	22.9	23.5	29.7	37.7	32.6	4.3	11.0	7.6	28.0	72.0
2003	23.0	20.2	18.4	20.5	37.4	32.8	29.8	4.9	11.1	8.0	30.9	69.1

^a Drift 1 begins at 0800, Drift 2 at 1500 and Drift 3 at 2200. There are two drifts (one on each riverbank) in each drift period.

^b Site N is the North Bank and Site S is the South Bank. The Mean CPUE is the cumulative CPUE for each riverbank for the season divided by the number of drifts on that riverbank during the season.

Appendix 6. Comparison of age and sex compositions by year for Kobuk River test net chum salmon catch, 1993 - 2003.

Year	Date	No. of samples	Percent by Sex		Percent by Age Group					
			Male	Female	0.2	0.3	0.4	0.5	0.6	0.7
1993	7/17-8/12	462	52.6	47.4	1.7	28.8	66.0	3.5	0.0	0.0
1994	7/13-8/29	624	63.0	37.0	3.0	58.0	36.6	2.4	0.0	0.0
1995	7/13-8/16	1,025	63.3	36.7	2.2	61.5	34.0	2.2	0.0	0.0
1996	7/09-8/18	1,633	54.8	45.2	0.5	31.9	58.4	8.9	0.3	0.0
1997	7/09-8/14	756	56.2	43.8	1.3	23.9	59.3	15.2	0.3	0.0
1998	7/10-8/15	536	43.5	56.5	4.9	51.3	31.0	11.9	0.9	0.0
1999	7/17-8/13	913	59.7	40.3	0.4	92.0	5.9	1.4	0.2	0.0
2000	7/07-8/14	635	47.1	52.9	1.1	60.9	37.6	0.3	0.0	0.0
2001	7/06-8/13	930	42.0	58.0	1.9	36.9	58.6	2.6	0.0	0.0
2002	7/05-8/12	793	45.0	55.0	0.1	24.8	67.2	7.8	0.0	0.0
2003	7/09-8/13	566	29.2	70.8	1.6	54.2	30.4	13.8	0.0	0.0

Appendix 7. Comparison of age and sex compositions by year for Kotzebue commercial chum salmon catch, 1993 - 2003.

Year	Date	No. of samples	Percent by Sex		Percent by Age Group					
			Male	Female	0.2	0.3	0.4	0.5	0.6	0.7
1993	7/09-8/28	1,870	52.3	47.7	1.4	20.4	73.3	4.8	0.2	0.0
1994	7/12-8/24	3,614	55.2	44.8	3.3	63.0	30.8	2.9	0.0	0.0
1995	7/11-8/28	4,621	51.4	48.6	2.2	58.9	36.9	1.9	0.0	0.0
1996	7/08-8/26	2,386	49.6	50.4	0.9	40.7	48.9	9.0	0.4	0.0
1997	7/10-8/29	4,824	57.6	42.4	1.4	28.7	58.3	10.2	1.4	0.0
1998	7/10-8/30	3,128	57.2	42.8	6.2	50.4	29.3	13.3	0.7	0.0
1999	7/13-8/27	3,288	51.3	48.7	0.9	87.5	10.6	0.9	0.2	0.0
2000	7/11-8/24	3,179	39.2	60.7	2.1	61.6	35.2	1.0	0.0	0.0
2001	7/10-8/24	3,670	41.9	58.1	2.4	45.7	49.9	2.0	0.1	0.0
2002	No samples taken because of lack of a major buyer in 2002.									0.0
2003	7/22-8/19	969	48.9	51.1	0.6	62.3	28.3	7.6	0.9	0.2

Appendix 8. Comparison of age and sex compositions by year for Noatak River test net chum salmon catch, 1993 - 2003.

Year	Date	No. of samples	Percent by Sex		Percent by Age Group				
			Male	Female	0.2	0.3	0.4	0.5	0.6
1993	7/24-9/13	956	42.6	57.4	4.8	34.2	58.8	1.8	0.3
1994	7/22-9/10	1,160	47.6	52.6	3.1	68.5	26.8	1.6	0.0
1995	7/20-8/29	1,266	49.2	50.8	2.0	56.1	39.8	1.9	0.2
1996	7/28-8/27	347	45.5	54.5	0.6	47.0	45.5	6.9	0.0
1997	7/27-8/28	214	67.3	32.7	0.5	34.1	56.1	8.9	0.5
1998	7/27-8/28	284	53.1	46.9	5.6	70.1	21.5	2.5	0.3
1999	8/14-8/29	140	52.9	47.1	0.7	80.7	17.1	0.7	0.7
2000	No test fishing occurred in 2000.								
2001	8/08-8/15	257	28.8	71.2	4.7	72.4	21.4	1.6	0.0
2002	7/13-8/14	171	42.1	57.9	0.6	42.1	53.2	3.5	0.6
2003	8/01-8/18	49	42.9	57.1	0.0	55.1	40.8	4.1	0.0

Appendix 9. Comparison of length by age, sex and year for Kobuk River test net chum salmon catch, 1993 - 2003.

Year	Date	No. of samples	Sex	Age Group				
				0.2	0.3	0.4	0.5	0.6
1993	7/17-8/12	462	Male	565	611	624	629	
			Female	557	580	594	623	
1994	7/13-8/29	624	Male	561	603	622	624	
			Female	559	587	601	599	
1995	7/13-8/16	1,025	Male	577	604	618	627	
			Female	553	588	595	599	
1996	7/09-8/18	1,633	Male	570	615	636	636	643
			Female	592	599	611	618	645
1997	7/09-8/14	756	Male	562	619	637	647	613
			Female	550	596	613	624	
1998	7/10-8/14	536	Male	577	618	636	636	
			Female	562	592	607	623	616
1999	7/17-8/13	913	Male	573	608	607	609	590
			Female		592	587	580	610
2000	7/07-8/14	635	Male	570	596	616	570	
			Female	566	581	591	580	
2001	7/06-8/13	930	Male	583	606	621	629	
			Female	575	583	599	622	
2002	7/05-8/12	793	Male	641	650	648	647	
			Female	565	608	617	608	614
2003	7/09-8/13	566	Male	588	636	655	679	
			Female	578	597	618	626	

Appendix 10. Comparison of length by age, sex and year for Kotzebue chum salmon catch, 1993 - 2003.

Year	Date	No. of samples	Sex	Age Group					
				0.2	0.3	0.4	0.5	0.6	0.7
1993	7/09-8/28	1,870	Male	589	619	633	641	701	
			Female	572	597	610	620	625	
1994	7/12-8/24	3,614	Male	567	601	621	629		
			Female	566	582	600	601		
1995	7/11-8/28	4,621	Male	577	614	625	638	638	
			Female	574	592	602	614		
1996	7/08-8/26	2,386	Male	562	609	632	639	642	
			Female	558	586	606	608	632	
1997	7/10-8/29	4,824	Male	564	610	639	654	663	
			Female	560	588	609	620	641	
1998	7/10-8/30	3,128	Male	583	619	632	646	669	
			Female	579	600	614	627	621	
1999	7/13-8/27	3,288	Male	583	609	636	626	636	
			Female	579	600	614	627	621	
2000	7/11-8/24	3,179	Male	576	618	638	637		
			Female	572	593	611	615		
2001	7/10-8/24	3,670	Male	574	607	633	633	630	
			Female	565	585	608	622	588	
2002	No samples taken because of lack of a major buyer in 2002.								
2003	7/22-8/19	969	Male	561	607	640	649	625	610
			Female	555	587	615	634	607	695

Appendix 11. Comparison of length by age, sex and year for Noatak River test net chum salmon catch, 1993 - 2003.

Year	Date	No. of samples	Sex	Age Group				
				0.2	0.3	0.4	0.5	0.6
1993	7/24-9/13	956	Male	542	581	604	625	652
			Female	539	558	572	562	650
1994	7/22-9/10	1,160	Male	543	580	604	643	
			Female	525	558	574	579	
1995	7/20-8/29	1,266	Male	576	597	609	622	620
			Female	547	569	576	589	600
1996	7/28-8/27	347	Male		608	631	639	608
			Female	547	593	604	616	
1997	7/27-8/28	214	Male		565	613	636	653
			Female		604	619	625	
1998	7/27-8/28	284	Male	560	606	621	634	
			Female	566	589	601	606	576
1999	8/14-8/29	140	Male	627	613	625	628	623
			Female	560	606	621	634	
2000	No test fishing occurred in 2000.							
2001	8/08-8/15	257	Male	567	600	627	655	
			Female	554	576	602	577	
2002	7/13-8/14	171	Male		625	646	692	683
			Female	590	603	616	590	
2003	8/01-8/18	49	Male		610	664	635	
			Female		594	618	635	

Appendix 12. Kobuk River sheefish drift test fish mean daily and cumulative CPUE, 1997 and 1999-2003.

Date	1997		1999		2000		2001		2002		2003	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
5-Jul							20.87	20.87	30.00	30.00		
6-Jul							22.45	43.32	16.11	46.11		
7-Jul					24.25	24.25	64.27	107.59	25.00	71.11		
8-Jul					34.17	58.42	48.17	155.76	17.94	89.05		
9-Jul	0	0			34.77	93.19	35.46	191.22	23.83	112.88	60.54	60.54
10-Jul	13.64	13.64			40.00	133.19	33.57	224.79	17.94	130.82	55.27	115.81
11-Jul	9.74	23.38	25.04	25.04	23.23	156.42	30.50	255.29	16.33	147.15	31.60	147.41
12-Jul	6.29	29.67	23.66	48.70	22.45	178.87	37.05	292.34	23.08	170.23	32.29	179.70
13-Jul	a	29.67	22.82	71.52	41.41	220.28	22.27	314.61	11.24	181.47	24.44	204.14
14-Jul	2.68	32.35	26.29	97.81	36.00	256.28	20.51	335.12	7.79	189.26	9.09	213.23
15-Jul	2.76	35.11	26.29	124.10	25.99	282.27	15.24	350.36	10.07	199.33	10.47	223.70
16-Jul	4.46	39.57	16.06	140.16	21.97	304.24	15.20	365.56	1.56	200.89	8.38	232.08
17-Jul	2.70	42.27	14.47	154.63	26.38	330.62	15.48	381.04	1.55	202.44	7.62	239.70
18-Jul	1.79	44.06	10.65	165.28	26.07	356.69	20.46	401.50	2.44	204.88	14.72	254.42
19-Jul	0	44.06	21.05	186.33	25.44	382.13	16.40	417.90	3.99	208.87	11.50	265.92
20-Jul	a	44.06	21.20	207.53	23.14	405.27	19.74	437.64	2.21	211.08	11.53	277.45
21-Jul	1.76	45.82	9.33	216.86	14.27	419.54	19.42	457.06	1.48	212.56	11.89	289.34
22-Jul	0.89	46.71	27.23	244.09	1.71	421.25	1.95	459.01	1.54	214.10	16.10	305.44
23-Jul	2.70	49.41	6.09	250.18	1.71	422.96	8.96	467.97	1.45	215.55	8.89	314.33
24-Jul	4.40	53.81	9.46	259.64	4.30	427.26	5.81	473.78	4.83	220.38	5.14	319.47
25-Jul	2.70	56.51	16.06	275.70	5.96	433.22	13.28	487.06	6.63	227.01	6.49	325.96
26-Jul	1.84	58.35	5.07	280.77	7.55	440.77	13.14	500.20	1.52	228.53	3.39	329.35
27-Jul	12.26	70.61	10.64	291.41	7.47	448.24	24.94	525.14	0	228.53	9.18	338.53
28-Jul	5.94	76.55	a	291.41	7.01	455.25	8.82	533.96	a	228.53	5.12	343.65
29-Jul	2.64	79.19	0	291.41	11.64	466.89	10.32	544.28	4.98	233.51	2.11	345.76
30-Jul	2.23	81.42	1.66	293.07	14.16	481.05	14.29	558.57	4.82	238.33	6.70	352.46
31-Jul	0.86	82.28	0	293.07	16.15	497.20	13.97	572.54	5.92	244.25	12.81	365.27
1-Aug	0	82.28	0.85	293.92	10.47	507.67	6.75	579.29	1.64	245.89	13.46	378.73
2-Aug	0	82.28	4.17	298.09	6.36	514.03	7.45	586.74	3.32	249.21	6.21	384.94
3-Aug	0	82.28	1.26	299.35	1.67	515.70	5.53	592.27	1.63	250.84	6.61	391.55
4-Aug	0	82.28	4.95	304.30	4.68	520.38	4.04	596.31	a	250.84	8.20	399.75
5-Aug	0	82.28	0.82	305.12	3.82	524.20	4.51	600.82	0	250.84	2.30	402.05
6-Aug	0	82.28	1.67	306.79	0	524.20	5.68	606.50	3.97	254.81	0	402.05
7-Aug	0	82.28	3.28	310.07	6.67	530.87	2.46	608.96	2.54	257.35	1.32	403.37
8-Aug	0	82.28	a	310.07	4.38	535.25	1.56	610.52	3.42	260.77	0.71	404.08
9-Aug	0	82.28	0	310.07	0.75	536.00	1.64	612.16	6.88	267.65	1.47	405.55
10-Aug		82.28	0	310.07	2.16	538.16	0	612.16	4.24	271.89	0	405.55
11-Aug	0	82.28	0	310.07	0.80	538.96	0	612.16	0.85	272.74	0	405.55
12-Aug	0	82.28	0	310.07	0	538.96	0	612.16	4.26	277.00	0.74	406.29
13-Aug	1.15	83.43	0	310.07	1.71	540.67	2.61	614.77			1.26	407.55
14-Aug	0	83.43			0	540.67						
15-Aug												

^a Regular day off.

Appendix 13. Kobuk River sheefish drift test fish mean daily and cumulative CPUE proportions, 1997 and 1999-2003.

Date	1997		1999		2000		2001		2002		2003	
	Daily	Cum.										
5-Jul							0.034	0.034	0.108	0.108		
6-Jul							0.037	0.070	0.058	0.166		
7-Jul					0.045	0.045	0.105	0.175	0.090	0.257		
8-Jul					0.063	0.108	0.078	0.253	0.065	0.321		
9-Jul	0.000	0.000			0.064	0.172	0.058	0.311	0.086	0.408	0.149	0.149
10-Jul	0.163	0.163			0.074	0.246	0.055	0.366	0.065	0.472	0.136	0.284
11-Jul	0.117	0.280	0.081	0.081	0.043	0.289	0.050	0.415	0.059	0.531	0.078	0.362
12-Jul	0.075	0.356	0.076	0.157	0.042	0.331	0.060	0.476	0.083	0.615	0.079	0.441
13-Jul	a	0.356	0.074	0.231	0.077	0.407	0.036	0.512	0.041	0.655	0.060	0.501
14-Jul	0.032	0.388	0.085	0.315	0.067	0.474	0.033	0.545	0.028	0.683	0.022	0.523
15-Jul	0.033	0.421	0.085	0.400	0.048	0.522	0.025	0.570	0.036	0.720	0.026	0.549
16-Jul	0.053	0.474	0.052	0.452	0.041	0.563	0.025	0.595	0.006	0.725	0.021	0.569
17-Jul	0.032	0.507	0.047	0.499	0.049	0.612	0.025	0.620	0.006	0.731	0.019	0.588
18-Jul	0.021	0.528	0.034	0.533	0.048	0.660	0.033	0.653	0.009	0.740	0.036	0.624
19-Jul	0.000	0.528	0.068	0.601	0.047	0.707	0.027	0.680	0.014	0.754	0.028	0.652
20-Jul	a	0.528	0.068	0.669	0.043	0.750	0.032	0.712	0.008	0.762	0.028	0.681
21-Jul	0.021	0.549	0.030	0.699	0.026	0.776	0.032	0.743	0.005	0.767	0.029	0.710
22-Jul	0.011	0.560	0.088	0.787	0.003	0.779	0.003	0.747	0.006	0.773	0.040	0.749
23-Jul	0.032	0.592	0.020	0.807	0.003	0.782	0.015	0.761	0.005	0.778	0.022	0.771
24-Jul	0.053	0.645	0.031	0.837	0.008	0.790	0.009	0.771	0.017	0.796	0.013	0.784
25-Jul	0.032	0.677	0.052	0.889	0.011	0.801	0.022	0.792	0.024	0.820	0.016	0.800
26-Jul	0.022	0.699	0.016	0.906	0.014	0.815	0.021	0.814	0.005	0.825	0.008	0.808
27-Jul	0.147	0.846	0.034	0.940	0.014	0.829	0.041	0.854	0.000	0.825	0.023	0.831
28-Jul	0.071	0.918	a	0.940	0.013	0.842	0.014	0.869	a	0.825	0.013	0.843
29-Jul	0.032	0.949	0.000	0.940	0.022	0.864	0.017	0.885	0.018	0.843	0.005	0.848
30-Jul	0.027	0.976	0.005	0.945	0.026	0.890	0.023	0.909	0.017	0.860	0.016	0.865
31-Jul	0.010	0.986	0.000	0.945	0.030	0.920	0.023	0.931	0.021	0.882	0.031	0.896
1-Aug	0.000	0.986	0.003	0.948	0.019	0.939	0.011	0.942	0.006	0.888	0.033	0.929
2-Aug	0.000	0.986	0.013	0.961	0.012	0.951	0.012	0.954	0.012	0.900	0.015	0.945
3-Aug	0.000	0.986	0.004	0.965	0.003	0.954	0.009	0.963	0.006	0.906	0.016	0.961
4-Aug	0.000	0.986	0.016	0.981	0.009	0.962	0.007	0.970	a	0.906	0.020	0.981
5-Aug	0.000	0.986	0.003	0.984	0.007	0.970	0.007	0.977	0.000	0.906	0.006	0.987
6-Aug	0.000	0.986	0.005	0.989	0.000	0.970	0.009	0.987	0.014	0.920	0.000	0.987
7-Aug	0.000	0.986	0.011	1.000	0.012	0.982	0.004	0.991	0.009	0.929	0.003	0.990
8-Aug	0.000	0.986	a	1.000	0.008	0.990	0.003	0.993	0.012	0.941	0.002	0.991
9-Aug	0.000	0.986	0.000	1.000	0.001	0.991	0.003	0.996	0.025	0.966	0.004	0.995
10-Aug	a	0.986	0.000	1.000	0.004	0.995	0.000	0.996	0.015	0.982	0.000	0.995
11-Aug	0.000	0.986	0.000	1.000	0.001	0.997	0.000	0.996	0.003	0.985	0.000	0.995
12-Aug	0.000	0.986	0.000	1.000	0.000	0.997	0.000	0.996	0.015	1.000	0.002	0.997
13-Aug	0.014	1.000	0.000	1.000	0.003	1.000	0.004	1.000			0.003	1.000
14-Aug	0.000	1.000			0.000	1.000						
15-Aug												

^a Regular day off.

Appendix 14. Kobuk River sheefish drift test fish comparison, 1993-2003.

Year	Project Operation Dates	Number of test fish drifts	Number of days off inseason ^a	Rank by number of drifts	Cumulative CPUE	Rank by cumulative CPUE
1997	7/09-8/14	202	3	5	83.43	6
1999	7/11-8/13	176	2	6	310.07	4
2000	7/07-8/14	228	0	2	540.67	2
2001	7/05-8/13	232	0	1	614.77	1
2002	7/05-8/12	218	2	3	277.00	5
2003	7/09-8/13	214	0	4	407.55	3

^a Number of days during the season where the crew had the day off and no test fishing occurred.

Appendix 15. Kobuk River sheefish drift test fish time and site distribution expressed as mean CPUE, 1993-2003.

Year	Mean CPUE by Drift Period ^a			Yearly Mean CPUE	Percent Mean CPUE by Drift Period			Mean CPUE by Site ^b		Yearly Mean CPUE	Percent Mean CPUE by Site	
	1	2	3		1	2	3	N	S		N	S
1997	2.5	2.4	2.5	2.5	33.7	32.8	33.5	0.3	1.4	0.8	17.6	82.4
1999	10.0	10.7	10.5	10.4	32.0	34.4	33.6	1.8	5.4	3.6	24.5	75.5
2000	12.7	14.2	15.2	14.0	30.1	33.7	36.2	3.1	6.6	4.9	31.9	68.1
2001	13.8	15.9	17.2	15.6	29.5	34.0	36.6	4.6	6.4	5.5	41.4	58.6
2002	7.0	7.0	7.2	7.1	33.0	33.0	34.0	1.8	3.5	2.6	33.6	66.4
2003	10.6	9.8	12.2	10.8	32.5	30.0	37.5	3.0	5.0	4.0	37.0	63.0

^a Drift 1 begins at 0800, Drift 2 at 1500 and Drift 3 at 2200. There are two drifts (one on each riverbank) in each drift period.

^b Site N is the North Bank and Site S is the South Bank. The Mean CPUE is the cumulative CPUE for each riverbank for the season divided by the number of drifts on that riverbank during the season.