Kobuk River Test Fishing Project, 1998

By

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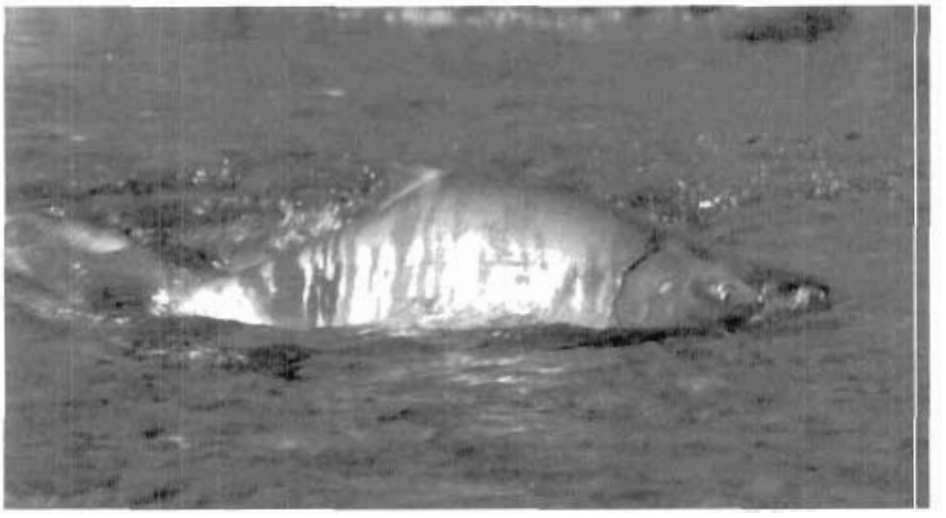

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INTRODUCTION

The Kobuk River originates on the south side of the Brooks Range in the Arrigetch Mountains inside the Gates of the Arctic National Park. The river flows roughly 500 river miles west where it terminates at Hotham Inlet. The lower two-thirds of the river is stained by tannin primarily from the Pah River, an upper river tributary. Five villages are located on the Kobuk River and all depend on chum salmon for subsistence use. Residents of Kotzebue also depend on Kobuk River chum salmon as a subsistence resource. The Kobuk River is also thought to support up to 60% of the commercial catch of chum salmon in the Kotzebue District.

This was the sixth consecutive year a drift gillnet test fishing project operated in the lower Kobuk River (Lingnau, 1993; Lingnau, 1994; Lingnau, 1995; Lingnau, 1996; Lingnau, 1997). Because of the Kobuk River's tannic stain, test fishing is less susceptible to net avoidance by salmon than in clear water systems. The only previous salmon project in the Kobuk River drainage was a counting tower site on the Squirrel River, which was too distant to provide timely information for fisheries management. This report presents the results of the sixth 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 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 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 1998 were:

1. To evaluate chum salmon abundance migrating into the Kobuk River drainage using a comparison of systematic drift gill net catches.
2. To assess, in a qualitative way, the impact of the Kotzebue District commercial salmon fishery on chum salmon abundance in the lower Kobuk River for fisheries management purposes.
3. Describe the migratory timing for chum salmon in the lower Kobuk River.
4. Sample 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 is the furthest downstream site where the river runs through a single

channel and is below all tributaries which support spawning chum salmon. The test-fishing site was also selected because of its desirable stream characteristics. The site consists of roughly a 1-mile river section located approximately 3 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. It is also the site with the slowest current. A bottom profile at the test fish site in 1997 revealed a near uniform bottom with a maximum depth of 6 meters. The deepest portion of the river was in the first quartile from the right bank.

Test Fishing

Fishing was scheduled to sample salmon passage during three different segments of the day at each of the two sites; morning (0800), mid-day (1500), and late evening (2200). A two-person crew conducted drifts, six days per week. During the peak of the run, drifts were conducted every day of the week.

All test-fishing drifts were made from a 20-foot open outboard motorboat for approximately 20 minutes with a 50-fathom gill net. If catch rates were high, fishing time was reduced in order to control mortality. The net was composed of 6-inch (15.2 cm) stretched mesh multifilament webbing, 40 meshes deep, and hung at a ratio of 2:1. Age-sex-length data were collected from up to 80 chum salmon per day. Mortalities were primarily given to elders but some were given to other individuals for subsistence purposes. The availability of chum salmon was announced over the 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.

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 distribution are described as a percent since the number of drifts made at each site and the amount of time fished varied (Lingnau 1997).

RESULTS

Drifting began on 10 July and continued through 15 August. CPUE indices were calculated for each drift and site (Table 1). There were 630 chum salmon caught in a total of 188 drifts (94 drift time periods) producing 1,526 chum salmon drift period CPUE index points (Table 6). The peak catch and CPUE occurred on 28 July with a catch of 61 salmon, which was a daily CPUE of 51.91 (9.67% of the seasonal CPUE index). Totals of 35.9, 38.9, and 25.2 percent of the seasonal CPUE indices were caught at 0800, 1500, and 2200 hours (Table 4). Totals of 24.4 and 75.6 percent of the total seasonal CPUE indices were caught at sites N and S. The CPUE was highest for period 2 at 20.1 followed by period 1 at 18.6 and period 3 at 14.0 in 1998 (Table 5). The mean secchi for 1998 was 2.5 meters. This is the most turbid water observed since the beginning of the project.

There were 536 aged chum salmon scales from test net samples. Enough scale samples were taken to stratify age and sex composition into three periods (Table 7). The age composition was 4.9% age-0.2, 51.3% age-0.3, 31.0% age-0.4, 11.9% age-0.5 and 0.9% age-0.6 (Table 8). The age composition of the 1998 Kotzebue commercial and Noatak River drift test fish catch is shown for comparison in Table 8. Chum salmon samples were caught with similar mesh size gear. Samples from the Kobuk and Noatak Rivers were from 6-inch mesh drift gillnet catches while commercial gear is 5-7/8 or 6 inch mesh set gillnet.

The test fishing methods for the Kobuk River project were the same as they had been in the prior five years. The test fishing gear was intended to match the gear typically used in the commercial fishery. Four days of test fishing were missed due to regular days off. Four drifts were missed due to personnel problems and two drifts were missed due to weather. Seasonal test fishing data for 1993-1998 is presented in Tables 2, 3, 5 and 6. Figure 3 shows test fishing cumulative CPUE by day for 1993-1998. Cumulative CPUE for 1998 was low, similar to the 1993, indicating a weak escapement for 1998. It is believed that the escapement was above the minimum escapement goal. Climatalogical data is presented in Table 9.

The test fishing CPUE indices generated (number of salmon caught) can be influenced considerably by normal commercial fishing activity in Kotzebue Sound, as well as by the number of drifts conducted and their timing compared to commercial periods. In addition, local salmon migration patterns can be greatly influenced by weather conditions. For these reasons, no interpolations were made for missing data points since the accuracy of such estimates may not be reliable.

CONCLUSIONS

The Kobuk River test-fishing project was once again successful. Due to the high water levels and turbidity in 1998 the Kobuk test fishery was the only indication of escapement in the Kotzebue district during the commercial season. During periods of low water at the beginning of the season, tannic staining of the river prevented net avoidance by migrating salmon. This contributed to stable catch efficiency throughout the season. The tannic stain provides concealment of the gillnets so that the ability to catch fish throughout the run remains relatively constant. This allows comparability within and between years.

This year's chum salmon passage by time of day was higher during the first two drift periods. When looking at the historical catch information, in most years, there has been very little difference in salmon passage during different times of the day. Just as consistent is the catch rate by site. In all but one year, roughly seventy percent of the salmon CPUE occurred on the south side of the channel. The one year that was different (1994), was a 50 year flood event.

This year's peak catches occurred between 23 July and 4 August. Because of the near daily commercial openings, there were no pronounced fluctuations in the test fishery data with which to evaluate the time of the migration from the commercial fishery to the test fishing site. Previous information from local residents and the department indicate that the migration time is 5 to 6 days. Local subsistence fishers were interviewed throughout the season by the test fishing crew. Catch rates from the test fishery seemed to track with subsistence catches throughout the season. The test fishery is most likely catching mixed stocks fish. Kiana residents are thought to harvest predominantly Squirrel River stocks. With the Kobuk River test fishing project providing fish to the community, pressure of subsistence harvests on Squirrel River stocks is most likely reduced.

The project was run as long as the budget would allow. It's six week duration is believed to have covered most of the migration. However, catches at the onset of test fishing indicated the early portion of the run was missed. Test fishing on the Kobuk River at the current drift gillnet site near Kiana is feasible and provides management with usable escapement indexing information in a cost effective manner. This project was used this year, and will be used in the future, as a management tool, to index escapements into the Kobuk River.

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Table 1. Kobuk River chum salmon drift test fish CPUE by day, drift and site, 1998. [a]

Date		CPUE by Drift [b] #1	#2	#3	CPUE by Site [c] N	S	Daily CPUE	Cum. CPUE
10-Jul				5.22	0.00	10.21	5.22	5.22
11-Jul		0.00	2.53	0.00	0.00	1.00	0.85	6.07
12-Jul	[d]							6.07
13-Jul		25.00	12.77	9.90	6.67	25.17	15.89	21.96
14-Jul		12.63	9.90	0.00	0.00	14.79	7.53	29.49
15-Jul		22.27	12.37	7.50	6.00	11.00	14.07	43.56
16-Jul		18.06	12.77	21.33	19.13	15.54	17.33	60.89
17-Jul		10.00	5.05	0.00	5.14	5.00	5.07	65.96
18-Jul		2.55	22.27	0.00	3.61	14.44	9.02	74.98
19-Jul	[d]							74.98
20-Jul		25.53	5.11	25.26	11.91	15.00	18.66	93.64
21-Jul		10.21	17.68	7.66	8.57	15.10	11.87	105.51
22-Jul								105.51
23-Jul		40.85	12.77	35.00	11.83	47.32	29.58	135.09
24-Jul		38.30	10.32	33.19	29.35	25.35	27.33	162.42
25-Jul		15.32	38.30	20.43	5.11	44.26	24.68	187.10
26-Jul	[d]							187.10
27-Jul		15.32	40.42	15.65	12.00	35.74	23.91	211.01
28-Jul		37.89	48.51	69.68	44.57	59.15	51.91	262.92
29-Jul		35.37	51.67	15.48	18.86	49.36	34.16	297.08
30-Jul		15.00	43.40	15.48	10.21	38.87	24.59	321.67
31-Jul		20.43	17.87	5.67	1.88	29.09	15.69	337.36
1-Aug		40.42	25.26	10.32	5.18	45.00	25.44	362.80
2-Aug	[d]							362.80
3-Aug		43.87	20.43	15.65	3.43	50.07	26.67	389.47
4-Aug		43.87	40.85		0.00	84.26	42.35	431.82
5-Aug		5.11	15.32	5.22	0.00	17.14	8.57	440.39
6-Aug		0.00	15.16	2.61	1.74	10.14	6.00	446.39
7-Aug		5.11	5.00	5.22	3.40	6.81	5.11	451.50
8-Aug		17.87	15.65	15.65	5.00	14.00	16.40	467.90
9-Aug		27.79	5.22	18.26	13.81	20.57	17.20	485.10
10-Aug		2.53	18.26	7.83	6.91	12.00	9.46	494.56
11-Aug		15.32	10.21	5.22	6.91	13.62	10.29	504.85
12-Aug		0.00	50.00	7.66	3.43	35.00	19.44	524.29
13-Aug		2.55	17.68	10.32	6.96	13.33	10.21	534.50
14-Aug		7.58	0.00				3.85	538.35
15-Aug			0.00	0.00	0.00	0.00	0.00	538.35

[a] Catch per unit effort is calculated in catch/100fm/hour.

[b] Drift 1 begins at 0800, Drift 2 at 1500, Drift 3 at 2200.

[c] Site N is the North Bank (right bank), Site S is the South Bank (left bank).

[d] Regular Day Off

'ble 2. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE, 1993-1998.

	1993		1994		1995		1996		1997		1998	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
09-Jul							12.77	12.8	5.85	5.9		
10-Jul							15.00	27.8	0.00	5.9	5.22	5.2
11-Jul							98.38	126.2	5.31	11.2	0.85	6.1
12-Jul	11.18	11.2			0.00	0.0	45.54	171.7	7.19	18.4	[a]	6.1
13-Jul	14.22	25.4	0.00	0.0	0.93	0.9	74.29	246.0	[a]	18.4	15.89	22.0
14-Jul	20.57	46.0	2.68	2.7	2.80	3.7	[a]	246.0	6.25	24.6	7.53	29.5
15-Jul	35.08	81.1	2.58	5.3	2.77	6.5	83.75	329.7	3.65	28.3	14.07	43.6
16-Jul	13.19	94.2	11.35	16.6	[a]	6.5	71.35	401.1	14.28	42.5	17.33	60.9
17-Jul	17.27	111.5	[a]	16.6	0.00	6.5	55.49	456.6	15.17	57.7	5.07	66.0
18-Jul	[a]	111.5	7.16	23.8	1.81	8.3	89.86	546.4	16.12	73.8	9.02	75.0
19-Jul	10.71	122.2	12.40	36.2	9.89	18.2	54.74	601.2	17.98	91.8	[a]	75.0
20-Jul	2.76	125.0	3.65	39.8	16.30	34.5	63.70	664.9	[a]	91.8	18.66	93.6
21-Jul	3.20	128.2	7.30	47.1	38.54	73.0	52.12	717.0	18.53	110.3	11.87	105.5
22-Jul	5.52	133.7	3.56	50.7	21.18	94.2	50.97	768.0	13.28	123.6		105.5
23-Jul	27.15	160.9	16.49	67.2	50.58	144.8	91.36	859.3	10.79	134.4	29.58	135.1
24-Jul	9.06	169.9	[a]	67.2	28.46	173.3	91.89	951.2	22.86	157.3	27.33	162.4
25-Jul	[a]	169.9	14.38	81.6	40.16	213.4	76.80	1,028.0	21.57	178.8	24.68	187.1
26-Jul	15.22	185.1	47.65	129.2	35.15	248.6	55.68	1,083.7	14.66	193.5	[a]	187.1
27-Jul	8.06	193.2	40.66	169.9	63.94	312.5	29.79	1,113.5	18.46	212.0	23.91	211.0
28-Jul	16.36	209.6	57.83	227.7	62.49	375.0	49.06	1,162.5	30.53	242.5	51.91	262.9
29-Jul	0.93	210.5	33.62	261.3	46.11	421.1	70.13	1,232.7	28.13	270.6	34.16	297.1
30-Jul	0.92	211.4	69.21	330.5	57.86	479.0	35.29	1,268.0	22.33	292.9	24.59	321.7
31-Jul	12.58	224.0	[a]	330.5	29.89	508.9	82.27	1,350.2	32.57	325.5	15.89	337.4
01-Aug	[a]	224.0	82.16	412.7	72.91	581.8	167.67	1,517.9	41.41	366.9	25.44	362.8
2-Aug	6.74	230.7	65.12	477.8	48.71	630.5	62.02	1,579.9	22.41	389.3	[a]	362.8
03-Aug	54.49	285.2	71.79	549.6	48.40	678.9	48.7	1,628.6	35.21	424.5	26.67	389.5
04-Aug	44.23	329.4	108.98	658.6	53.00	731.9	65.93	1,694.6	26.67	451.2	42.35	431.8
05-Aug	89.30	418.7	59.74	718.3	49.95	781.8	60.33	1,754.9	24.47	475.7	8.57	440.4
06-Aug	18.60	437.3	102.56	820.9	[a]	781.8	80.47	1,835.4	42.25	517.9	6.00	446.4
07-Aug	20.52	457.9	[a]	820.9	46.39	828.2	90.99	1,926.3	36.00	553.9	5.11	451.5
08-Aug	[a]	457.9	62.75	883.6	44.02	872.2	146.94	2,073.3	45.07	599.0	16.40	467.9
09-Aug	1.84	459.7	96.86	980.5	68.22	940.5	106.11	2,179.4	55.14	654.1	17.20	485.1
10-Aug	12.63	472.3	45.83	1,026.3	56.33	996.8	56.95	2,236.3	[a]	654.1	9.46	494.6
11-Aug	18.11	490.4	57.02	1,083.3	37.95	1,034.7	[a]	2,236.3	43.45	697.6	10.29	504.9
12-Aug	3.74	494.2	90.54	1,173.9	63.92	1,098.7	72.29	2,308.6	37.36	735.0	19.44	524.3
13-Aug			11.36	1,185.2	[a]	1,098.7	114.63	2,423.3	45.93	780.9	10.21	534.5
14-Aug			[a]	1,185.2	29.35	1,128.0	158.13	2,581.4	16.01	796.9	3.85	538.4
15-Aug			5.13	1,190.4	25.26	1,153.3					0	538.4
16-Aug			16.23	1,206.6	35.04	1,188.3						
17-Aug			0.00	1,206.6								
18-Aug			0.00	1,206.6								
19-Aug			3.12	1,209.7								
20-Aug			0.00	1,209.7								
21-Aug			[a]	1,209.7								
22-Aug			0.00	1,209.7								
23-Aug			0.00	1,209.7								
24-Aug			0.00	1,209.7								
25-Aug			0.91	1,210.6								
26-Aug			5.56	1,216.2								
27-Aug			1.86	1,218.0								
28-Aug			0.93	1,219.0								
29-Aug			0.00	1,219.0								
30-Aug			0.00	1,219.0								

'gular day off.

Table 3. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE proportions, 1993-1998.

	1993		1994		1995		1996		1997		1998	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
09-Jul							0.005	0.005	0.007	0.01		
10-Jul							0.006	0.011	0.000	0.01	0.010	0.01
11-Jul							0.038	0.049	0.007	0.01	0.002	0.01
12-Jul	0.023	0.023			0.000	0.000	0.018	0.067	0.009	0.02	[a]	0.01
13-Jul	0.029	0.051	0.000	0.000	0.001	0.001	0.029	0.095	[a]	0.02	0.030	0.04
14-Jul	0.042	0.093	0.002	0.002	0.002	0.003		0.095	0.008	0.03	0.014	0.05
15-Jul	0.071	0.164	0.002	0.004	0.002	0.005	0.032	0.128	0.005	0.03	0.026	0.08
16-Jul	0.027	0.191	0.009	0.014	[a]	0.005	0.028 [a]	0.155	0.018	0.05	0.033	0.11
17-Jul	0.035	0.226	[a]	0.014	0.000	0.005	0.021	0.177	0.019	0.07	0.010	0.12
18-Jul	[a]	0.226	0.006	0.020	0.002	0.007	0.035	0.212	0.020	0.09	0.017	0.14
19-Jul	0.022	0.247	0.010	0.030	0.008	0.015	0.021	0.233	0.023	0.11	[a]	0.14
20-Jul	0.006	0.253	0.003	0.033	0.014	0.029	0.025	0.258	[a]	0.11	0.035	0.18
21-Jul	0.006	0.259	0.006	0.039	0.032	0.061	0.020	0.278	0.023	0.13	0.022	0.20
22-Jul	0.011	0.271	0.003	0.042	0.018	0.079	0.020	0.297	0.017	0.15	0.000	0.20
23-Jul	0.055	0.325	0.014	0.055	0.043	0.122	0.035	0.333	0.014	0.16	0.055	0.25
24-Jul	0.018	0.344	[a]	0.055	0.024	0.146	0.036	0.368	0.029	0.19	0.051	0.30
25-Jul	[a]	0.344	0.012	0.067	0.034	0.180	0.030	0.398	0.027	0.22	0.046	0.35
26-Jul	0.031	0.375	0.039	0.106	0.030	0.209	0.022	0.420	0.018	0.24	[a]	0.35
27-Jul	0.016	0.391	0.033	0.139	0.054	0.263	0.012	0.431	0.023	0.26	0.045	0.40
28-Jul	0.033	0.424	0.047	0.187	0.053	0.316	0.019	0.450	0.038	0.30	0.097	0.49
29-Jul	0.002	0.426	0.028	0.214	0.039	0.354	0.027	0.478	0.035	0.33	0.064	0.56
30-Jul	0.002	0.428	0.057	0.271	0.049	0.403	0.014	0.491	0.028	0.36	0.046	0.60
31-Jul	0.025	0.453	[a]	0.271	0.025	0.428	0.032	0.523	0.041	0.40	0.029	0.63
01-Aug	[a]	0.453	0.067	0.339	0.061	0.490	0.065	0.588	0.052	0.46	0.048	0.68
02-Aug	0.014	0.467	0.053	0.392	0.041	0.531	0.024	0.612	0.028	0.48	[a]	0.68
03-Aug	0.110	0.577	0.059	0.451	0.041	0.571	0.019	0.631	0.044	0.53	0.050	0.73
04-Aug	0.090	0.667	0.089	0.540	0.045	0.616	0.026	0.656	0.033	0.56	0.079	0.81
05-Aug	0.181	0.847	0.049	0.589	0.042	0.658	0.023	0.680	0.031	0.59	0.016	0.83
06-Aug	0.038	0.885	0.084	0.673	[a]	0.658	0.031	0.711	0.053	0.64	0.011	0.84
07-Aug	0.042	0.927	[a]	0.673	0.039	0.697	0.035	0.746	0.045	0.69	0.010	0.85
08-Aug	[a]	0.927	0.051	0.725	0.037	0.734	0.057	0.803	0.057	0.75	0.031	0.88
09-Aug	0.004	0.930	0.079	0.804	0.057	0.791	0.041	0.844	0.069	0.82	0.032	0.91
10-Aug	0.026	0.956	0.038	0.842	0.047	0.839	0.022	0.866	[a]	0.82	0.018	0.93
11-Aug	0.037	0.992	0.047	0.889	0.032	0.871	0.000 [a]	0.866	0.055	0.88	0.019	0.95
12-Aug	0.008	1.000	0.074	0.963	0.054	0.925	0.028	0.894	0.047	0.92	0.035	0.98
13-Aug			0.009	0.972	[a]	0.925	0.044	0.939	0.057	0.98	0.018	0.99
14-Aug			[a]	0.972	0.025	0.949	0.061	1.000	0.020	1.00	0.006	1.00
15-Aug			0.004	0.977	0.021	0.971					0.000	1.00
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.

Table 4. Kobuk River chum salmon drift test fish CPUE indices, mean CPUE and percent by drift and site, 1998.

Drift Period	Season CPUE Indices	No. of Period Drifts	Season Mean CPUE	Percent	Station	Season CPUE Indices	No. of Site Drifts	Season Mean CPUE	Percent
1 0800 hr.	556.8	30	18.6	35.9	N North Bank	251.6	34	7.4	24.4
2 1500 hr.	602.8	30	20.1	38.9	S South Bank	778.3	34	22.9	75.6
3 2200 hr.	391.4	28	14.0	25.2					
Total	1,550.9	88	17.6	100.0		1,029.9	68	15.1	100.0

Table 5. Kobuk River chum salmon drift test fish diurnal and spatial distribution expressed as mean CPUE by drift period and by site, 1993-1998. [a]

Year	Mean CPUE by Drift Period			Yearly Mean CPUE	Percent Mean CPUE by Drift Period			Mean CPUE by Site		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	16.8	25.4	43.4	31.1	10.0	24.9	17.4	28.7	71.3
1994	25.8	33.2	23.7	27.5	31.7	39.8	28.5	4.9	53.5	29.2	8.4	91.6
1995	29.4	37.6	38.7	35.0	29.6	34.7	35.7	25.2	48.2	36.7	34.3	65.7
1996	73.2	81.7	66.5	73.8	32.4	37.2	30.3	40.7	108.1	74.4	27.3	72.7
1997	23.9	23.3	23.6	23.6	33.1	33.2	33.7	12.7	33.8	23.3	27.3	72.7
1998	18.6	20.1	14.0	17.6	35.9	38.9	25.9	7.4	22.9	15.1	24.4	75.6

[a] Drift 1 begins at 0800, Drift 2 at 1500, Drift 3 at 2200. Site N is the North Bank (right bank), Site S is the South Bank (left bank).

Table 6. Kobuk River chum salmon drift test fish CPUE and cumulative CPUE by drift, 1993-1998.

	1993			1994			1995			1996			1997			1998		
Date	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.
9-Jul										1			1					
										2	7.7	7.7	2	0.0	0.0			
										3	17.9	25.5	3	10.7	10.7			
10-Jul										1	5.2	30.7	1	0.0	10.7	1		
										2	21.1	51.8	2	0.0	10.7	2		
										3	19.1	70.9	3	0.0	10.7	3	5.2	5.2
11-Jul										1	78.1	149.0	1	0.0	10.7	1	0.0	5.2
										2	103.3	252.3	2	5.3	15.9	2	2.5	7.8
										3	122.1	374.4	3	10.8	26.7	3	0.0	7.8
12-Jul	1	15.5	15.5				1	0.0	0.0	1	88.4	462.8	1	0.0	26.7	1	[a]	7.8
	2	2.5	18.0				2	0.0	0.0	2	32.2	495.0	2	16.0	42.7	2		7.8
	3	16.0	34.0				3	0.0	0.0	3	38.4	533.4	3	5.3	48.1	3		7.8
13-Jul	1	5.4	39.4	1	0.0	0.0	1	0.0	0.0	1	61.9	595.4	1	[a]	48.1	1	25.0	32.8
	2	15.5	54.9	2	0.0	0.0	2	2.9	2.9	2	97.2	692.6	2		48.1	2	12.8	45.5
	3	25.4	80.3	3	0.0	0.0	3	0.0	2.9	3	66.0	758.6	3		48.1	3	9.9	55.4
14-Jul	1	13.2	93.5	1	0.0	0.0	1	2.8	5.7	1	[a]	758.6	1	0.0	48.1	1	12.6	68.1
	2	0.0	93.5	2	5.3	5.3	2	5.5	11.2	2		758.6	2	7.9	56.0	2	9.9	78.0
	3	46.1	139.5	3	2.6	7.9	3	0.0	11.2	3		758.6	3	10.8	66.8	3	0.0	78.0
15-Jul	1	20.6	160.1	1	5.0	12.8	1	5.6	16.8	1	100.7	859.2	1	2.8	69.5	1	22.3	100.2
	2	33.9	194.0	2	2.6	15.4	2	0.0	16.8	2	52.9	912.2	2	8.2	77.7	2	12.4	112.6
	3	46.5	240.5	3	0.0	15.4	3	2.8	19.5	3	100.7	1,012.8	3	0.0	77.7	3	7.5	120.1
16-Jul	1	2.7	243.2	1	5.1	20.6	1	[a]	19.5	1	50.2	1,063.0	1	10.7	88.4	1	18.1	138.2
	2	32.5	275.7	2	10.4	31.0	2		19.5	2	82.3	1,145.3	2	11.3	99.7	2	12.8	150.9
	3	2.7	278.5	3	18.9	49.9	3		19.5	3	85.0	1,230.3	3	20.9	120.5	3	21.3	172.3
17-Jul	1	23.5	302.0	1	[a]	49.9	1	0.0	19.5	1	93.7	1,323.9	1	21.3	141.9	1	10.0	182.3
	2	28.7	330.7	2		49.9	2	0.0	19.5	2	34.3	1,358.2	2	8.3	150.2	2	5.06	187.3
	3	0.0	330.7	3		49.9	3	0.0	19.5	3	56.7	1,414.9	3	15.7	165.8	3	0.00	187.3
18-Jul	1	[a]	330.7	1	2.6	52.5	1	2.8	22.3	1	59.2	1,474.1	1	16.0	181.8	1	25.53	212.8
	2		330.7	2	0.0	52.5	2	2.7	25.0	2	98.3	1,572.4	2	10.9	192.7	2	5.11	217.9
	3		330.7	3	18.5	71.0	3	0.0	25.0	3	117.8	1,690.2	3	21.3	214.0	3	25.26	243.2
19-Jul	1	5.5	336.1	1	23.7	94.7	1	0.0	25.0	1	69.8	1,760.1	1	8.1	222.1	1	10.21	253.4
	2	2.7	338.8	2	10.3	105.0	2	12.9	37.9	2	61.2	1,821.2	2	18.7	240.8	2	17.68	271.1
	3	23.5	362.3	3	2.8	107.8	3	16.2	54.1	3	36.9	1,858.2	3	27.3	268.1	3	7.66	278.8
20-Jul	1	2.8	365.1	1	2.9	110.6	1	10.8	64.8	1	70.3	1,928.5	1	[a]	268.1	1	[a]	278.8
	2	5.4	370.5	2	8.1	118.7	2	16.4	81.2	2	69.8	1,998.3	2		268.1	2		278.8
	3	0.0	370.5	3	0.0	118.7	3	21.8	103.0	3	48.7	2,047.0	3		268.1	3		278.8
21-Jul	1	2.8	373.2	1	10.8	129.5	1	39.1	142.2	1	66.7	2,113.7	1	11.0	279.1	1	40.85	319.7
	2	5.5	378.7	2	11.0	140.6	2	27.0	169.1	2	45.7	2,159.4	2	34.3	313.4	2	12.77	332.4
	3	1.9	380.6	3	0.0	140.6	3	49.0	218.2	3	47.4	2,206.8	3	8.3	321.7	3	35.00	367.4

(continued)

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Date	1993			1994			1995			1996			1997			1998		
	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.
22-Jul	1	2.8	383.4	1	5.5	146.0	1	20.7	238.8	1	27.6	2,234.4	1	8.1	329.8	1	38.30	405.7
	2	0.0	383.4	2	2.6	148.6	2	24.0	262.8	2	72.3	2,306.7	2	0.0	329.8	2	10.32	416.0
	3	13.2	396.6	3	2.7	151.3	3	18.9	281.7	3	58.2	2,364.9	3	31.3	361.1	3	33.19	449.2
23-Jul	1	2.7	399.3	1	24.8	176.1	1	53.1	334.7	1	53.0	2,417.9	1	18.5	379.5	1	15.32	464.6
	2	26.1	425.4	2	13.5	189.6	2	59.2	394.0	2	142.9	2,560.8	2	10.8	390.3	2	38.30	502.9
	3	51.6	477.0	3	11.2	200.8	3	37.7	431.7	3	105.3	2,666.0	3	2.8	393.1	3	20.43	523.3
24-Jul	1	8.2	485.2	1 [a]		200.8	1	39.1	470.7	1	62.8	2,728.8	1	16.4	409.4	1		523.3
	2	8.1	493.3	2		200.8	2	36.5	507.2	2	100.3	2,829.1	2	20.1	429.5	2		523.3
	3	10.9	504.2	3		200.8	3	10.9	518.1	3	122.8	2,951.9	3	31.0	460.5	3		523.3
25-Jul	1 [a]		504.2	1	24.3	225.0	1	16.2	534.3	1	30.0	2,981.9	1	13.8	474.3	1	15.32	538.6
	2		504.2	2	13.5	238.5	2	10.9	545.2	2	157.7	3,139.6	2	24.3	498.6	2	40.42	579.0
	3		504.2	3	5.4	243.9	3	109.4	654.6	3	16.8	3,156.4	3	26.4	524.9	3	15.65	594.7
26-Jul	1	10.9	515.1	1	32.7	276.6	1	20.6	675.2	1	113.2	3,269.6	1	21.8	546.7	1	37.87	632.5
	2	8.1	523.2	2	63.7	340.3	2	35.5	710.6	2	5.2	3,274.9	2	11.0	557.8	2	48.51	681.1
	3	26.4	549.6	3	44.7	384.9	3	47.4	758.0	3	27.7	3,302.6	3	11.0	568.8	3	69.68	750.7
27-Jul	1	15.5	565.1	1	21.3	406.3	1	50.2	808.3	1	15.2	3,317.8	1	26.4	595.2	1	35.37	786.1
	2	8.1	573.1	2	59.4	465.6	2	34.7	842.9	2	19.6	3,337.4	2	15.8	611.0	2	51.67	837.8
	3	0.0	573.1	3 [b]		465.6	3	102.9	945.8	3	72.7	3,410.1	3	13.2	624.2	3	15.48	853.3
28-Jul	1	11.2	584.3	1 [b]		465.6	1	39.4	985.2	1	52.0	3,462.1	1	29.3	653.5	1	15.00	868.3
	2	16.2	600.5	2 [b]		465.6	2	88.2	1,073.4	2	83.8	3,545.9	2	28.1	681.6	2	43.40	911.7
	3	21.6	622.1	3	57.8	523.5	3	67.9	1,141.3	3	8.3	3,554.2	3	33.9	715.5	3	15.48	927.1
29-Jul	1	2.7	624.8	1	34.3	557.7	1	48.8	1,190.0	1	110.0	3,664.2	1	34.3	749.8	1	20.43	947.6
	2	0.0	624.8	2	52.5	610.2	2	8.4	1,198.4	2	77.3	3,741.5	2	33.6	783.4	2	17.87	965.4
	3	0.0	624.8	3	19.3	629.6	3	85.1	1,283.5	3	20.4	3,761.9	3	16.2	799.6	3	5.67	971.1
30-Jul	1	0.0	624.8	1	83.1	712.6	1	67.1	1,350.5	1	51.1	3,813.0	1	13.3	812.9	1	40.42	1,011.5
	2	0.0	624.8	2	38.5	751.2	2	59.2	1,409.7	2	36.0	3,849.0	2	21.3	834.2	2	25.26	1,036.8
	3	2.8	627.5	3	82.0	833.1	3	48.6	1,458.3	3	22.9	3,871.8	3	33.0	867.2	3	10.32	1,047.1
31-Jul	1	16.2	643.7	1 [a]		833.1	1	49.0	1,507.4	1	71.3	3,943.1	1	24.6	891.8	1 [a]		1,047.1
	2	16.2	659.9	2		833.1	2	20.9	1,528.2	2	120.0	4,063.1	2	30.0	921.8	2		1,047.1
	3	5.4	665.3	3		833.1	3	19.1	1,547.3	3	59.1	4,122.2	3	42.5	964.3	3		1,047.1
1-Aug	1 [a]		665.3	1	51.4	884.5	1	61.5	1,608.8	1	122.2	4,244.4	1	55.6	1,019.9	1	43.87	1,091.0
	2		665.3	2	124.7	1,009.2	2	81.0	1,689.8	2	252.2	4,496.6	2	32.0	1,051.9	2	20.43	1,111.4
	3		665.3	3	67.2	1,076.4	3	76.9	1,766.8	3	80.0	4,576.6	3	37.6	1,089.5	3	15.65	1,127.1
2-Aug	1 [b]		665.3	1	27.0	1,103.4	1	45.0	1,811.8	1	120.0	4,696.6	1	20.9	1,110.3	1	43.87	1,170.9
	2	0.0	665.3	2	74.6	1,178.0	2	66.2	1,878.0	2	30.6	4,727.2	2	28.4	1,138.8	2	40.85	1,211.8
	3	13.3	678.6	3	92.8	1,270.8	3	35.5	1,913.4	3	28.5	4,755.7	3	18.9	1,157.6	3		1,211.8
3-Aug	1	42.2	720.8	1	62.3	1,333.1	1	53.7	1,967.1	1	76.7	4,832.3	1	33.9	1,191.5	1	5.11	1,216.9
	2	71.5	792.3	2	93.9	1,427.0	2	74.4	2,041.4	2	60.9	4,893.2	2	36.3	1,227.8	2	15.32	1,232.2
	3 [b]		792.3	3	51.7	1,478.7	3	22.1	2,063.5	3	3.8	4,896.9	3	35.5	1,263.3	3	5.22	1,237.4

(continued)

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Date	1993			1994			1995			1996			1997			1998		
	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.
4-Aug	1	16.7	809.1	1	124.9	1,603.6	1	45.3	2,108.8	1	52.0	4,948.9	1	29.6	1,292.9	1	0.00	1,237.4
	2	60.0	869.1	2	120.0	1,723.6	2	60.0	2,168.8	2	26.0	4,974.9	2	31.4	1,324.3	2	15.16	1,252.6
	3	51.3	920.3	3	82.4	1,806.0	3	53.8	2,222.6	3	145.0	5,119.9	3	19.3	1,343.6	3	2.61	1,255.2
5-Aug	1	40.9	961.2	1	78.9	1,884.9	1	55.1	2,277.8	1	53.8	5,173.7	1	23.0	1,366.6	1	5.11	1,260.3
	2	191.6	1,152.8	2	14.1	1,899.0	2	38.8	2,316.6	2	40.8	5,214.4	2	30.6	1,397.3	2	5	1,265.3
	3	2.7	1,155.5	3	78.3	1,977.3	3	56.7	2,373.3	3	80.0	5,294.4	3	19.1	1,416.4	3	5.22	1,270.5
6-Aug	1	12.8	1,168.3	1	116.1	2,093.5	1	[a]	2,373.3	1	44.1	5,338.5	1	41.9	1,458.2	1	17.87	1,288.4
	2	13.8	1,182.1	2	93.3	2,186.8	2		2,373.3	2	43.3	5,381.8	2	39.6	1,497.8	2	15.65	1,304.0
	3	29.3	1,211.4	3	92.9	2,279.7	3		2,373.3	3	148.0	5,529.8	3	45.7	1,543.5	3	15.65	1,319.7
7-Aug	1	47.5	1,258.9	1	[a]	2,279.7	1	55.8	2,429.1	1	136.3	5,666.1	1	35.1	1,578.6	1	27.79	1,347.5
	2	2.8	1,261.6	2		2,279.7	2	68.1	2,497.2	2	57.6	5,723.7	2	34.7	1,613.4	2	5.22	1,352.7
	3	8.4	1,270.0	3		2,279.7	3	19.8	2,516.9	3	51.8	5,775.4	3	38.1	1,651.4	3	18.26	1,371.0
8-Aug	1	[a]	1,270.0	1	77.7	2,357.3	1	21.6	2,538.5	1	94.6	5,870.0	1	69.0	1,720.5	1	2.52	1,373.5
	2		1,270.0	2	64.8	2,422.1	2	74.4	2,612.9	2	221.8	6,091.8	2	49.9	1,770.3	2	18.26	1,391.7
	3		1,270.0	3	49.7	2,471.8	3	41.7	2,654.6	3	98.8	6,190.6	3	11.4	1,781.8	3	7.83	1,399.6
9-Aug	1	5.5	1,275.5	1	85.2	2,556.9	1	38.9	2,693.5	1	120.0	6,310.6	1	45.5	1,827.2	1	15.32	1,414.9
	2	0.0	1,275.5	2	125.7	2,682.6	2	58.1	2,751.6	2	133.3	6,443.9	2	37.2	1,864.4	2	10.21	1,425.1
	3	0.0	1,275.5	3	74.8	2,757.4	3	114.1	2,865.7	3	66.5	6,510.4	3	94.3	1,958.7	3	5.22	1,430.3
10-Aug	1	0.0	1,275.5	1	9.5	2,766.9	1	73.2	2,938.9	1	32.5	6,542.9	1	[a]	1,958.7	1	0	1,430.3
	2	8.1	1,283.6	2	54.9	2,821.8	2	29.6	2,968.5	2	98.6	6,641.5	2		1,958.7	2	50	1,480.3
	3	29.3	1,313.0	3	86.0	2,907.8	3	71.3	3,039.8	3	42.6	6,684.1	3		1,958.7	3	7.66	1,488.0
11-Aug	1	11.3	1,324.2	1	105.8	3,013.6	1	56.8	3,096.6	1	[a]	6,684.1	1	43.6	2,002.4	1	2.55	1,490.5
	2	40.4	1,364.7	2	50.7	3,064.3	2	20.9	3,117.5	2		6,684.1	2	32.7	2,035.1	2	17.68	1,508.2
	3	0.0	1,364.7	3	9.4	3,073.7	3	34.3	3,151.8	3		6,684.1	3	56.0	2,091.1	3	10.32	1,518.5
12-Aug	1	11.3	1,376.0	1	17.9	3,091.6	1	31.3	3,183.1	1	123.3	6,807.4	1	36.7	2,127.8	1	7.58	1,526.1
	2	0.0	1,376.0	2	183.2	3,274.8	2	105.5	3,288.5	2	39.1	6,846.5	2	54.0	2,181.8	2	0.00	1,526.1
	3	0.0	1,376.0	3	0.0	3,274.8	3	56.3	3,344.8	3	28.2	6,874.7	3	16.0	2,197.8	3	[b]	1,526.1
13-Aug				1	23.5	3,298.3	1	[a]	3,344.8	1	105.2	6,979.9	1	41.1	2,238.9	1		1,526.1
				2	10.0	3,308.3	2		3,344.8	2	136.6	7,116.5	2	55.4	2,294.3	2	0.0	1,526.1
				3	3.4	3,311.7	3		3,344.8	3	102.9	7,219.4	3	39.3	2,333.6	3	0.0	1,526.1
14-Aug				1	[a]	3,311.7	1	8.1	3,352.9	1	77.3	7,296.7	1	35.2	2,368.8			
				2		3,311.7	2	54.4	3,407.3	2	197.3	7,493.9	2	13.0	2,381.8			
				3		3,311.7	3	23.5	3,430.8	3	181.5	7,675.4	3					
15-Aug				1	7.0	3,318.7	1	25.5	3,456.2									
				2	8.1	3,326.8	2	18.5	3,474.7									
				3	0.0	3,326.8	3	32.0	3,506.7									
16-Aug				1	3.3	3,330.1	1	22.9	3,529.5									
				2	33.8	3,363.9	2	45.4	3,574.9									
				3	11.3	3,375.1												

[a] Regular day off.

[b] No drift conducted because of mechanical problems or bad weather.

Table 7. Kobuk River chum salmon drift test fish catch age and sex composition, 1998.

		Brood Year and (Age Group)					
		1995 (0.2)	1994 (0.3)	1993 (0.4)	1992 (0.5)	1991 (0.6)	Total
Stratum Dates:	7/10-7/21						
Sampling Dates:	7/10-7/21						
Sample Size:	101						
Male	Percent of Catch	0.0	6.9	23.8	4.9	0.0	35.6
	Number in Catch	0	7	24	5	0	36
Female	Percent of Catch	0.0	15.9	24.7	20.8	3.0	64.4
	Number in Catch	0	16	25	21	3	65
Total	Percent of Catch	0.0	22.8	48.5	25.7	3.0	100.0
	Number in Catch	0	23	49	26	3	101
Stratum Dates:	7/23-8/1						
Sampling Dates:	7/22-8/1						
Sample Size:	260						
Male	Percent of Catch	0.7	19.6	16.1	8.1	0.0	44.6
	Number in Catch	2	51	42	21	0	116
Female	Percent of Catch	3.1	34.6	13.1	4.2	0.4	55.4
	Number in Catch	8	90	34	11	1	144
Total	Percent of Catch	3.8	54.2	29.2	12.3	0.4	100.0
	Number in Catch	10	141	76	32	1	260
Stratum Dates:	8/2-8/15						
Sampling Dates:	8/2-8/15						
Sample Size:	175						
Male	Percent of Catch	2.8	29.7	11.4	2.3	0.0	46.3
	Number in Catch	5	52	20	4	0	81
Female	Percent of Catch	6.3	33.7	12.0	1.1	0.6	53.7
	Number in Catch	11	59	21	2	1	94
Total	Percent of Catch	9.1	63.4	23.4	3.4	0.6	100.0
	Number in Catch	16	111	41	6	1	175
Stratum Dates:	7/10-8/15						
Sampling Dates:	7/10-8/15			Season Total			
Sample Size:	536						
Male	Percent of Catch	1.3	20.5	16.1	5.6	0.0	43.5
	Number in Catch	7	110	86	30	0	233
Female	Percent of Catch	3.6	30.8	14.9	6.3	0.9	56.5
	Number in Catch	19	165	80	34	5	303
Total	Percent of Catch	4.9	51.3	31.0	11.9	0.9	100.0
	Number in Catch	26	275	166	64	5	536

Table 8. Comparison of chum salmon age and sex composition and mean length from the Kobuk and Noatak River drift test fish catch, and the Kotzebue District commercial catch, 1993.

		Brood Year and (Age Group)					
		1995 (0.2)	1994 (0.3)	1993 (0.4)	1992 (0.5)	1991 (0.6)	Total
Stratum Dates:	7/10-8/14						
Sample Size:	536		Kobuk River				
Male	Percent of Catch	1.3	20.5	16.1	5.6	0.0	43.5
	Number in Catch	7	110	86	30	0	233
	Mean Length (mm)	577	618	636	636		
Female	Percent of Catch	3.6	30.8	14.9	6.3	0.9	56.5
	Number in Catch	19	165	80	34	5	303
	Mean Length (mm)	562	592	607	623	616	
Total	Percent of Catch	4.9	51.3	31.0	11.9	0.9	100.0
	Number in Catch	26	275	166	64	5	536
Stratum Dates:	7/27 - 8/28						
Sample Size:	214		Noatak River				
Male	Percent of Catch	4.9	35.9	10.9	1.4	0	53.1
	Number in Catch	14	102	31	4	0	151
	Mean Length (mm)	560	606	621	634		
Female	Percent of Catch	0.7	34.2	10.6	1.1	0.3	46.9
	Number in Catch	2	97	30	3	1	133
	Mean Length (mm)	566	589	601	606	576	
Total	Percent of Catch	5.6	70.1	21.5	2.5	0.3	100.0
	Number in Catch	16	199	61	7	1	284
Stratum Dates:	7/10-8/30						
			Kotzebue Commercial Catch				
Sample Size:	3,128						
Male	Percent of Sample	4.7	28.7	15.9	7.4	0.4	57.2
	Number in Catch	2,628	16,045	8,889	4,137	224	31,979
	Mean Length (mm)	583	619	632	646	669	
Female	Percent of Sample	1.5	21.7	13.4	5.9	0.3	42.8
	Number in Catch	839	12,132	7,492	3,299	168	23,928
	Mean Length (mm)	579	600	614	627	621	
Total	Percent of Sample	6.2	50.4	29.3	13.3	0.7	100.0
	Number in Catch	3,466	28,177	16,381	7,436	391	55,907

Table 9. Kobuk River drift test fish climatological data, 1998.

Date	Water Level Level (inches)	Adjusted to 0	Water Temp. (C)	Secchi (meters)	Wind Direction	Wind MPH	Cloud Cover	Precip.
11-Jul	22.0	0.0	20	2.8	calm	0	1	7
12-Jul [a]								
13-Jul	20.0	-2.0	17	2.6	SW	10	1	1
14-Jul	21.0	-1.0	17	2.8	W	15	3	2
15-Jul	21.5	-0.5	18	2.7	calm	0	3	7
16-Jul	22.0	0.0	16	3.3	E	5	1	7
17-Jul	24.0	2.0	17	7.8	W	12	4	0
18-Jul	27.0	3.0	16	2.7	SW	5	4	0
19-Jul [a]								
20-Jul	29.0	7.0	14	2.9	SW	13	4	0
21-Jul	29.0	7.0	14	2.8	E	5	3	7
22-Jul								
23-Jul	27.0	5.0	16	2.7	calm	0	5	0
24-Jul	18.0	-4.0	14	2.7	W	15	5	0
25-Jul	23.0	1.0	12	2.8	calm	0	5	0
26-Jul [a]								
27-Jul	20.0	-2.0	12	2.9	W	5	5	7
28-Jul	20.0	-2.0	10	2.9	SW	7	1	7
29-Jul	11.0	-11.0	10	3.0	SW	8	5	7
30-Jul	11.0	-11.0	15	3.0	SW	15	5	7
31-Jul	7.0	-15.0		3.0	SW	16	1	7
1-Aug	17.0	-5.0	14	3.1	E	13	3	7
2-Aug [a]								
3-Aug	25.0	3.0	14	3.2	calm	0	4	2
4-Aug	42.0	10.0	14	3.0	calm	0	4	0
5-Aug	27.0	5.0	13	1.1	E	5	4	0
6-Aug	47.0	25.0	11	0.8	SW	15	4	0
7-Aug	55.0	33.0	10	1.8	SW	6	1	7
8-Aug	53.0	31.0	11	1.8	calm	0	5	7
9-Aug	48.0	26.0	11	1.9	SW	5	3	7
10-Aug	37.0	15.0	13	2.3	SW	15	4	1
11-Aug	30.0	8.0	11	2.5	SW	12	4	2
12-Aug	24.0	2.0	13	3.0	SW	15	4	2
13-Aug	30.0	8.0	10	1.8	S	15	4	2
14-Aug	40.0	18.0	9	1.5	SE	15	4	0

[a] Regular day off.

Cloud cover:
0-No Observation
1-Clear sky; cloud cover less than 1/0th of the sky
2-Cloud cover not more than 1/2 of the sky
3-Cloud cover more than 1/2 of the sky
4-Sky is completely overcast
5-Fog or thick haze (smoke, dust, ect)

Precipitation:
0-No observation
1-Intermitent rain
2-Continuous rain
3-Snow
4-Mixed rain and snow
5-Hail
6-Thunderstorms
7-No precipitation

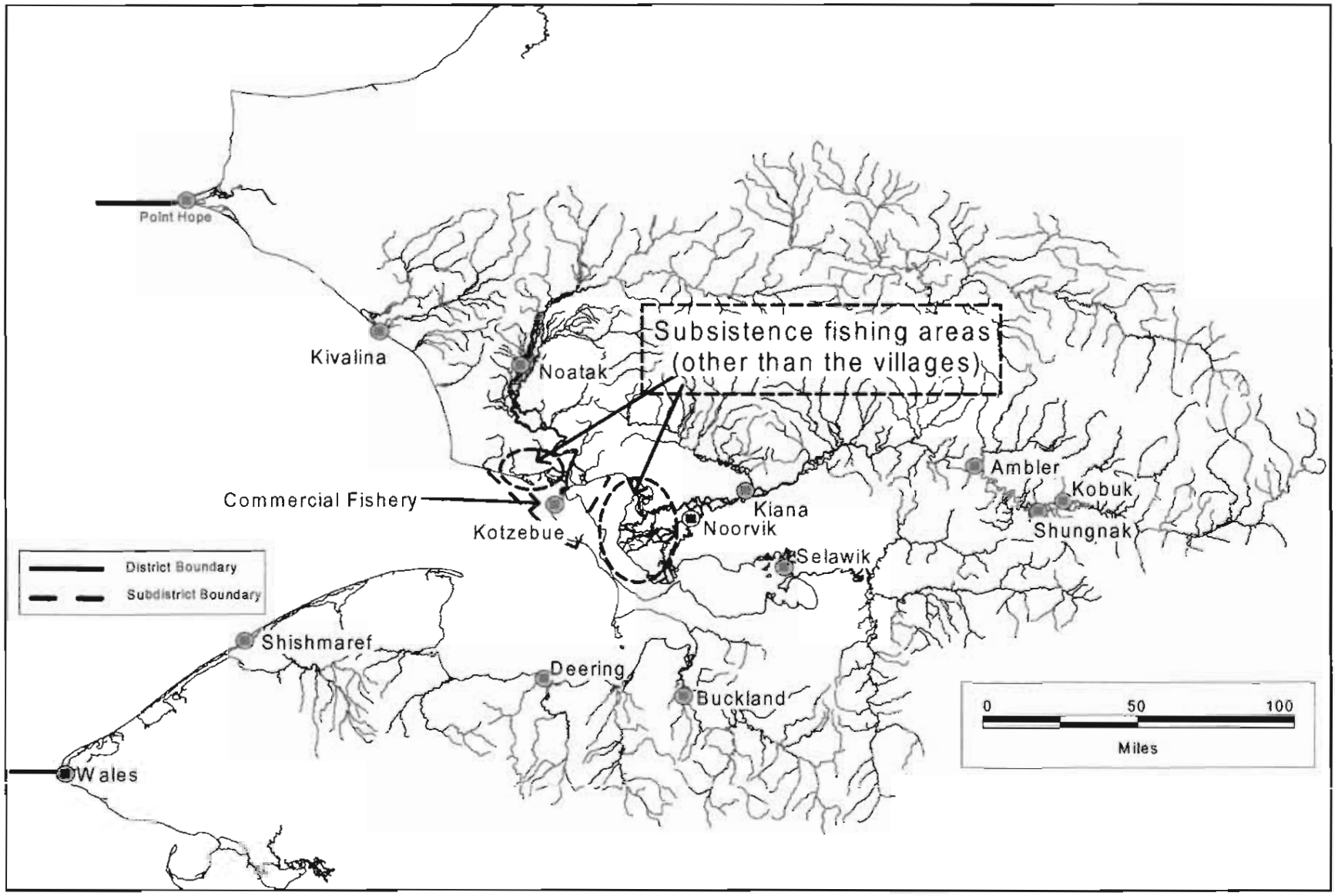


Figure 1. Kotzebue Sound commercial fishing districts, villages and subsistence fishing areas.

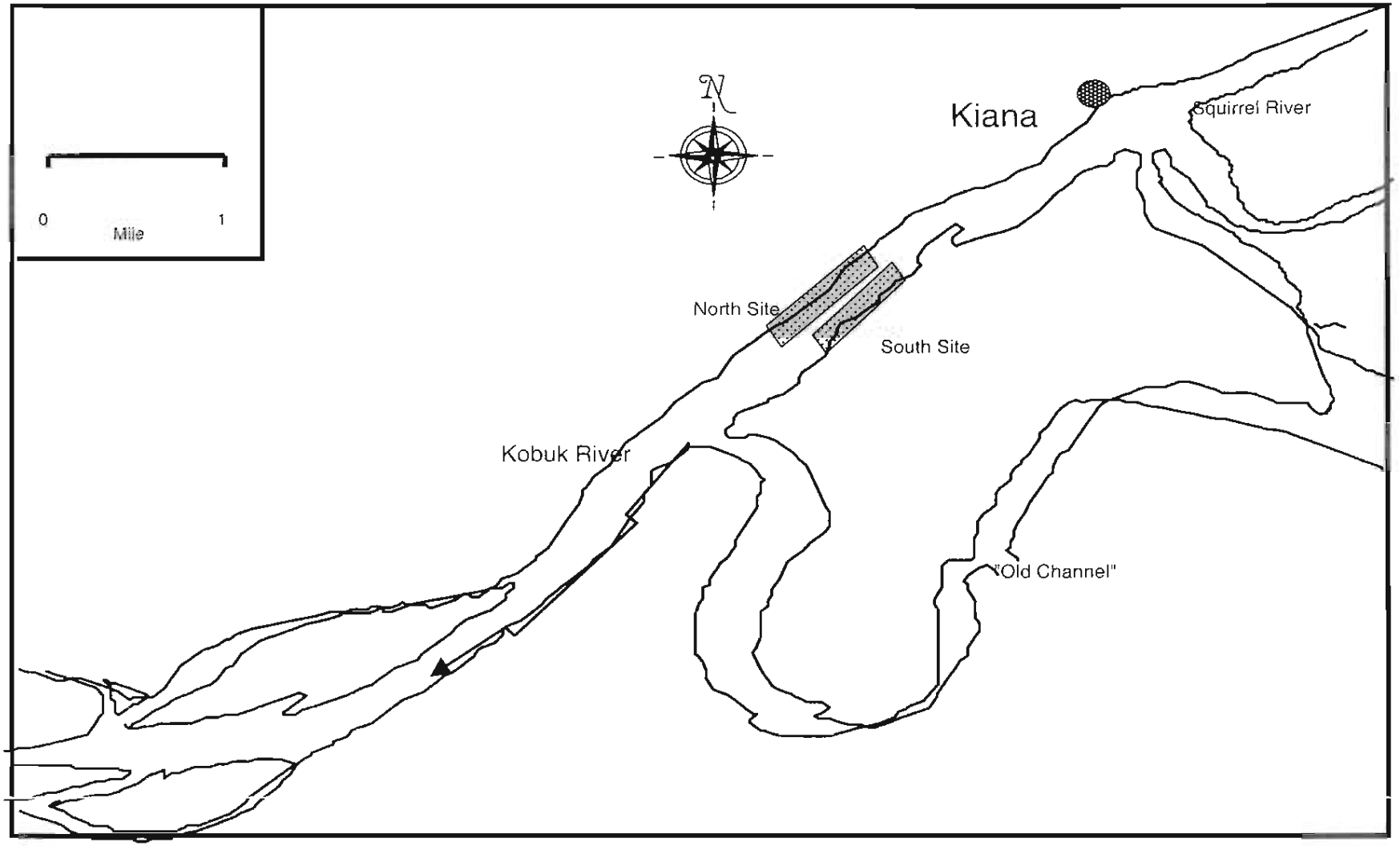
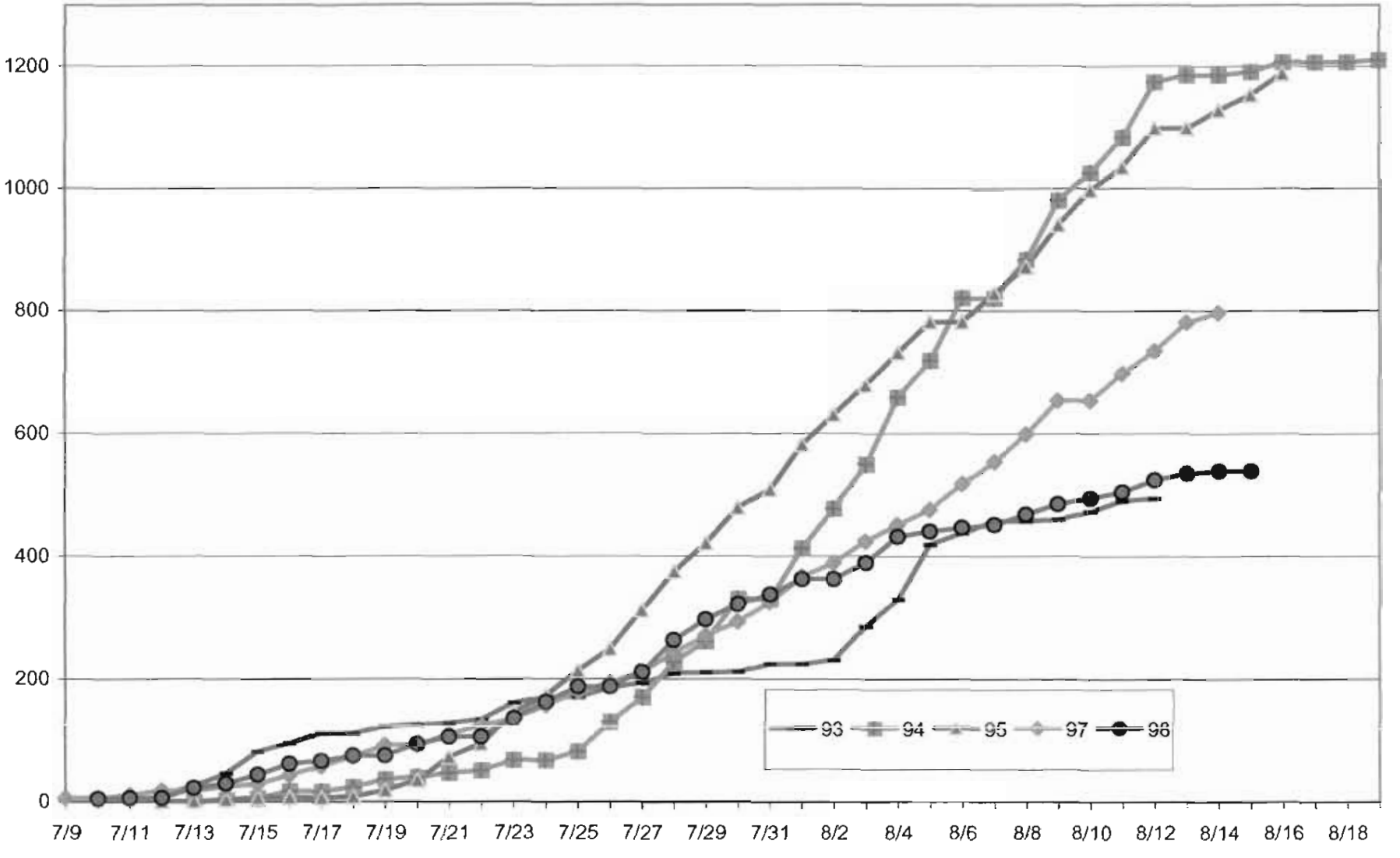


Figure 2. Lower Kobuk River drift test fishing sites.

Figure 3. Kobuk River chum salmon drift test fish cumulative CPUE, 1993-1998[a].



[a] 1996 omitted as the cumulative twice other years