AYK REGION NORTON SOUND/
KOTZEBUE ESCAPEMENT
REPORT # 22

KWINIUK RIVER SALMON STUDIES
1980

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Introduction

The Kwiniuk River is located about 98 miles northeast of Nome and drains into Norton Sound. A salmon counting tower was initiated on this system in 1965. Methodology has not changed significantly and will not be repeated here. It can be reviewed in the A-Y-K escapement series, 1976 Kwiniuk River report.

Objectives

1. Obtain daily and seasonal timing and magnitude of salmon escapement.

2. Periodically sample the Moses Point commercial salmon catch and the Kwiniuk River escapement for age, sex, and size composition.

Results

The Kwiniuk River salmon counting tower crew was deployed on June 17, and actual counting procedures were begun on June 22. Due to a lack of migrating salmon, a full 18 hour counting schedule did not begin until June 24. The tower was erected near the 1975-1978 location (Figure 1). An unexpanded total of 177 chinook and an expanded total of 19,374 chum and 319,363 pink salmon were counted.

Discussion

The tower crew operated on an 18 hour per day counting schedule. The actual count from this index period was expanded by standard percentages, determined during the previous year's study, to account for the hours not normally counted, i.e., from 0600 - 1200 hours. Periodically throughout the season counts were continued 24 hours per day to insure that the "standard percentages" did not change appreciably.

One of the objectives of the Tubutulik tower project was to determine the rate of salmon migration from Kwiniuk Inlet to the tower site. A small scale tagging project was used to tag approximately 30 pinks and 20 chums in Kwiniuk Inlet. Two pink and four chum salmon were counted past the Kwiniuk River tower.

Results from the tagging project indicate that both pink and chum salmon do pass through the slough. The average time elapsed between tagging and passing the Kwiniuk River tower was 6.5 days, with a range of three to nine days. This suggests that Kwiniuk Inlet may be a milling area since the tagging site was only about 8 miles from the tower site. Part of the delay may be attributable to stress due to tagging, however tagging shock should have been minimal as the fish were removed from the net immediately after capture and tagged with a rubber band and color coded streamer tape placed around the caudal peduncle.

The 1980 counting tower operation was very successful in that counting procedures were not hampered by poor weather or water conditions. Low, clear water prevailed most of the summer and enabled very accurate escapement counts to be made. Early aerial and boat surveys indicated very few chum salmon had migrated past the tower site prior to the initiation of counting procedures.

Recommendations

Rapid changes in the Kwiniuk River water levels can cause problems in maintaining the weir which diverts the fish toward the tower. In the past a combination of fencing stakes, sandbags, and poultry netting has been used as a weir. This is effective under normal conditions; however, when conditions are poor, i.e., high, muddy water, when the wier is most needed, it has a tendency to wash out or collapse. A Holitna River type weir would be very effective, even in the worst situations on the Kwiniuk River, and should be made a high priority item for this project.

Escapement counts have been made at the Kwiniuk River tower for 16 years, and a subsample count has been made during the first 10 minutes of each hour. A high degree of correlation has been found when comparing the season total expanded actual count to the 10 minute estimated expanded count. The degree of correlation is not as good on a daily count basis.

The area management biologist should determine whether the 10 minute data is needed and is to be used or if only the actual full hour count data is to be used. If we are not going to use the "10 minute data" we should dispense with its collection.

The purchase of a powerful spotlight, such as those used on performing stages, may be of some value in reducing "blind spots" over the flash panel which occur under certain light conditions. The spotlight could be directed to a specific location as needed.

A wet suit sized to fit the project leader and/or the crewleader should be purchased. A wet suit is needed during times of high water (early summer) to install the weir and flash panel. The purchase of a weight belt would also be necessary.

Table 1. Estimates of daily salmon migration past Kwiniuk River tower, using expanded 10 minute counts, Kwiniuk River, 1980.

	CHUM SALMON			PINK SALMON		
Date	10 minute Counts	Expanded[1/] 10 minute Counts	Actual Counts	10 minute Counts	Expanded[1/] 10 minute Counts	Actual Counts
6/22	0	0	0	0	0	0
6/23	1	6	10	0	0	3
6/24	2	12	44	0	0	17
6/25	24	144	147	1	6	14
6/26	32	192	138	3	18	9
6/27	7	42	51	1	6	5
6/28	44	264	249	5	30	27
6/29	47	282	346	6	36	41
6/30	31	186	114	12	72	14
7/01	326	1956	2480	110	660	682
7/02	37	222	-50	-32	-192	-211
7/03	-6	-36	-93	19	114	107
7/04	9	54	215	134	804	615
7/05	361	2166	1617	292	1752	1238
7/06	175	1050	1453	185	1110	1391
7/07	160	960	1329	271	1626	3524
7/08	422	2532	2914	4372	26232	28356
7/09	199	1194	605	1095	6570	6135
7/10	135	810	534	2492	14952	11454
7/11	114	684	598	1423	8538	8996
7/12	191	1146	1099	2354	14124	16047
7/13	400	2400	1668	8232	49392	37531
7/14	-24	-144	-246	-381	-2286	-4335
7/15	40	240	235	1589	9534	7872
7/16	62	372	293	1601	9606	10612
7/17	130	780	755	6170	37020	30594
7/18	115	690	656	4702	28212	26746
7/19	116	696	584	6849	41094	39359
7/20	77	462	527	4939	29634	27826
7/21	77	462	414	4577	27462	30421
7/22	10	60	85	636	3816	6585
7/23	40	240	123	1922	11532	7657
7/24	7	42	37	471	2826	2363
7/25	1	6	29	614	3684	3551
7/26	1	6	4	219	1314	1798
7/27	1	6	7	179	1074	1692
7/28	1	6	3	70	420	341
Totals	3365	20190	18974	55132	330792	309077

1/ Expanded to eighteen hour count.

Table 2. Daily/Hourly migration past Kwiniuk River counting tower, 1980. Species: CHUM

Hour/ Date	00	01	02	03	04	05	12	13	14	15	16	17	18	19	20	21	22	23	Daily Total	Daily % of Total
6/22							0	0	0	0	0	0	0						0	0
6/23							0	0	0	0	0	0	5	4	1	0	0	0	10	0
6/24	-2	0	0	0	0	3	10	0	0	0	0	0	0	2	8	16	7	0	44	.2
6/25	11	32	0	0	0	8	16	0	0	0	1	3	1	8	33	19	5	10	147	.8
6/26	13	20	6	8	8	17	0	0	0	4	2	0	24	20	6	0	0	10	138	.7
6/27	-2	22	7	8	3	4	0	-5	3	0	-1	0	0	2	0	4	6	2	51	.2
6/28	3	8	6	1	3	8	27	0	0	-3	0	-2	40	52	44	33	17	12	249	1.3
6/29	9	14	45	62	19	1	2	3	1	0	1	3	2	25	15	28	71	45	346	1.8
6/30	14	7	7	3	3	2	0	-15	0	0	0	0	0	-1	1	4	34	55	114	.6
7/01	31	42	30	11	5	1	-11	-1	-6	5	14	-6	165	1138	503	133	243	183	2480	13.0
7/02	46	60	56	22	-1	4	-6	-25	-3	-14	-10	-35	-17	-30	20	12	-20	-109	-50	-.2
7/03	-10	-53	-42	-19	-28	-8	-2	0	-1	14	32	13	2	3	0	1	7	-2	-93	-.5
7/04	-40	-5	-12	0	3	-1	0	0	0	0	1	-1	57	30	43	48	53	30	215	1.1
7/05	-19	-6	1	0	0	0	6	-2	2	3	2	52	98	27	127	588	551	187	1617	8.5
7/06	13	12	9	19	33	32	36	29	17	5	76	173	187	250	184	152	122	104	1453	7.6
7/07	4	0	2	7	10	2	5	2	0	-1	2	15	8	35	18	142	553	525	1329	7.0
7/08	150	259	388	89	75	15	-5	-2	2	5	22	107	184	110	279	547	359	330	2914	15.3
7/09	120	40	11	-15	-12	41	3	3	9	2	3	18	54	91	74	82	106	-25	605	3.1
7/10	2	0	0	2	1	4	2	4	3	0	5	28	92	47	63	105	106	70	534	2.8
7/11	12	3	4	21	12	13	40	35	10	2	13	66	130	89	104	99	3	-58	598	3.1
7/12	-14	-28	-6	-20	-5	0	0	0	0	0	8	2	44	191	176	287	339	125	1099	5.8
7/13	60	68	20	14	15	4	3	-7	82	117	126	277	329	266	129	149	34	-27	1668	8.8
7/14	-6	-4	-66	-39	-21	-21	0	-4	-9	-16	-14	-7	-8	-5	-7	18	0	-37	-246	-1.3
7/15	-16	-1	0	-1	0	0	0	0	0	7	17	8	28	61	64	47	11	10	235	1.2
7/16	17	7	3	4	8	2	0	-3	0	3	1	1	1	11	39	46	76	77	293	2.0
7/17	56	29	18	12	8	6	1	0	19	11	8	25	58	205	163	80	22	34	755	4.0
7/18	55	56	27	29	16	12	0	4	27	13	16	-2	73	151	85	47	27	20	656	3.4
7/19	39	19	21	53	32	7	0	1	0	5	9	10	15	98	134	78	27	36	584	3.0
7/20	21	14	43	48	31	4	0	0	2	54	32	23	30	29	86	49	36	25	527	2.7

Table 2. Daily/Hourly migration past Kwiniuk River counting tower, 1980. Species: CHUM (continued)

Hour/ Date	00	01	02	03	04	05	12	13	14	15	16	17	18	19	20	21	22	23	Daily Total	Daily % of Total
7/21	11	-1	5	17	19	14	5	6	8	8	3	6	57	158	57	23	9	9	414	2.2
7/22	7	4	7	5	10	4	0	0	0	-3	1	2	10	19	9	2	1	7	85	.4
7/23	9	9	-	-	3	4	2	2	0	11	23	42	0	12	5	0	0	0	123	.6
7/24	7	1	4	1	6	0	0	0	1	2	0	4	5	4	2	0	0	0	37	.2
7/25	1	0	4	1	1	1	0	0	4	6	4	2	4	1	0	0	0	0	29	.1
7/26	0	0	1	0	1	1	0	0	0	0	0	1	-	-	-	-	-	-	4	0
7/27	-	-	-	-	-	-	0	0	0	2	0	0	0	3	2	0	0	0	7	0
7/28	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Hourly Total	603	630	593	326	258	169	134	25	171	242	397	828	1678	3106	2467	2839	2805	1650	18974	100
% of Hourly Total	3.2	3.3	3.1	1.7	1.3	.9	.7	.1	.9	1.2	2.0	4.3	8.8	16.3	12.9	14.9	14.7	8.6		

Table 3. Daily/Hourly salmon migration past Kwiniuk River counting tower, 1980. Species: PINK

Hour/ Date	00	01	02	03	04	05	12	13	14	15	16	17	18	19	20	21	22	23	Daily Total	Daily % Total
6/22	-	-	-	-	-	-	0	0	0	0	0	0	0						0	0.0
6/23	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	3	0	0	3	0.0
6/24	0	0	0	0	0	1	0	0	0	0	14	2	0	0	0	0	0	0	17	0.0
6/25	0	0	0	0	0	1	0	3	1	0	0	2	0	1	2	3	1	0	14	0.0
6/26	1	2	0	0	0	0	0	1	2	0	1	1	0	1	0	0	0	0	9	0.0
6/27	1	0	0	0	0	1	0	0	0	0	0	0	0	1	4	0	0	0	5	0.0
6/28	0	0	0	0	0	0	0	0	0	0	1	0	9	5	7	3	1	1	27	0.0
6/29	1	0	5	3	-2	3	0	0	0	0	0	0	3	3	2	3	20	0	41	0.0
6/30	0	0	0	-1	-1	-9	0	-18	0	0	0	0	0	0	0	7	12	24	14	0.0
7/01	11	31	25	1	1	7	-2	13	6	30	25	20	105	282	55	15	21	36	682	0.2
7/02	33	17	27	2	1	-1	-6	-22	-19	-67	-48	-27	-17	-7	-7	-22	-11	-37	-211	0.0
7/03	-14	-10	0	0	-9	0	-1	0	0	18	95	28	1	0	-3	3	-2	1	107	0.0
7/04	-6	0	0	0	0	0	1	1	0	0	1	25	104	91	136	109	97	37	615	0.2
7/05	-6	-4	1	1	0	1	1	0	0	2	0	30	63	30	75	670	271	103	1238	0.4
7/06	2	4	0	17	26	10	14	28	7	4	21	102	253	298	239	215	93	58	1391	0.4
7/07	6	0	0	-1	0	1	13	6	2	0	4	9	19	35	30	414	988	1998	3524	1.1
7/08	109	247	352	872	1391	234	3	0	43	72	94	869	2992	1649	3951	9720	3760	1998	28356	9.2
7/09	421	99	15	-478	-275	-144	-2	2	12	6	11	109	646	1958	2470	760	650	-125	6135	1.9
7/10	-1293	-188	-33	-24	27	21	19	-26	41	20	14	292	1550	1220	1240	4390	2660	1524	11454	3.7
7/11	41	1	22	138	124	32	1392	359	109	0	758	1685	2790	1250	2750	2360	-1925	-2890	8996	2.9
7/12	-195	-290	-80	-223	-52	4	-5	0	0	10	21	13	285	1219	3030	4450	5630	2240	16047	5.2
7/13	1207	880	171	188	173	27	-17	-67	1018	1650	3590	7380	8720	5460	4550	3690	550	-1630	37531	12.1
7/14	-307	-85	-793	-1050	-640	-319	0	-13	-58	-150	-218	-127	-279	-204	-127	490	-290	-165	-4335	-1.4
7/15	-129	-11	0	-50	0	4	0	0	0	95	105	68	950	2450	2020	1190	740	440	7872	2.5
7/16	720	116	43	260	215	55	-4	-120	0	37	68	19	481	562	1305	1450	2635	2770	10612	3.4
7/17	1540	692	373	801	350	219	-2	0	126	441	130	379	1695	4660	3720	4100	6090	5280	30594	9.9
7/18	1640	1065	941	1962	810	572	0	42	172	128	421	703	2410	5020	2400	3810	2810	1840	26746	8.6
7/19	720	244	1070	4140	2390	389	0	3	4	36	145	358	2260	6260	8060	6460	4140	2680	39359	12.7
7/20	695	165	1390	3030	1300	647	9	37	24	1920	1330	899	1710	2010	4260	3510	2920	1970	27826	9.0

Table 3. Daily/Hourly salmon migration past Kwiniuk River counting tower, 1980. Species: PINK (Continued)

Hour/ Date	00	01	02	03	04	05	12	13	14	15	16	17	18	19	20	21	22	23	Daily Total	Daily % Total
7/21	161	57	170	1990	1460	542	91	36	86	95	137	466	4050	11240	4690	1960	1800	1390	30421	9.8
7/22	244	71	44	1060	908	193	0	-2	12	-46	43	79	830	1520	738	100	11	780	6585	2.1
7/23	520	83	-	-	114	78	56	4	69	534	1965	3380	-31	550	310	0	0	25	7657	2.4
7/24	115	61	23	250	379	89	0	10	12	28	-12	372	464	363	124	76	0	9	2363	0.7
7/25	25	19	99	527	303	49	0	0	55	244	241	170	834	668	248	63	6	0	3551	1.1
7/26	57	14	22	308	821	238	0	0	0	91	99	148	-	-	-	-	-	-	1798	0.6
7/27	-	-	-	-	-	-	0	0	0	83	13	33	265	802	466	20	10	0	1692	0.5
7/28	42	13	10	0	5	9	-	0	0	20	-115	48	53	49	99	29	45	34	341	0.1
Hourly Total	6362	3293	3897	13723	9819	2954	1560	277	1724	5301	8954	17535	34165	42916	46844	50051	33733	20391	309077	
% of Hourly Total	2.0	1.0	1.2	4.4	3.2	0.9	0.5	0.1	0.5	1.7	2.9	5.7	11.0	13.9	15.1	16.2	10.9	6.6		100.0

Table 4. Actual and expanded daily salmon migration, Kwiniuk River, 1980.

Date	CHUM Actual Count	CHUM Expanded 1/ Count	PINK Actual Count	PINK Expanded 2/ Count
6/22	0	0	0	0
6/23	10	10	3	3
6/24	44	44	17	18
6/25	147	150	14	15
6/26	138	141	9	9
6/27	51	52	5	5
6/28	249	254	27	28
6/29	346	353	41	43
6/30	114	116	14	15
7/01	2480	2532	682	707
7/02	-50	-49	-211	-219
7/03	-93	-91	107	111
7/04	215	219	615	637
7/05	1617	1651	1238	1283
7/06	1453	1484	1391	1442
7/07	1329	1357	3524	3653
7/08	2914	2965	28356	29394
7/09	605	617	6135	6359
7/10	534	545	11454	11873
7/11	598	610	8996	9325
7/12	1099	1122	16047	16634
7/13	1668	1703	37531	38904
7/14	-246	-241	-4335	-4493
7/15	235	240	7872	8160
7/16	293	299	10612	11000
7/17	755	771	30594	31713
7/18	656	670	26746	27724
7/19	584	596	39359	40799
7/20	527	538	27826	27844
7/21	414	421	30421	31534
7/22	85	87	6585	6826
7/23	123	126	7657	7937
7/24	37	38	2363	2449
7/25	29	30	3551	3680
7/26	4	4	1798	1864
7/27	7	7	1692	1734
7/28	3	3	341	353
Totals	18974	19374	309077	319363

1/ Chum salmon counts expanded by 2.1%
2/ Pink salmon counts expanded by 3.66%

Table 5. Water temperatures, and pink and chum migration percentages Kwiniuk River, 1980

Date	TEMPERATURE Celsius	PINK % of migration	CHUM % of migration
6/22	12.0	0.0	0.0
6/23	11.0	0.0	0.0
6/24	11.0	0.0	0.2
6/25	12.5	0.0	0.8
6/26	11.0	0.0	0.7
6/27	10.5	0.0	0.2
6/28	15.0	0.0	1.3
6/29	13.0	0.0	1.7
6/30	17.0	0.0	0.6
7/1	21.0	0.2	13.0
7/02	10.0	0.0	-.2
7/03	10.0	0.0	-.5
7/04	9.0	0.2	1.1
7/05	14.0	0.4	8.5
7/06	11.0	0.4	7.6
7/07	20.0	1.1	7.0
7/08	21.0	9.2	15.3
7/09	20.0	1.9	3.1
7/10	20.0	3.7	2.8
7/11	13.0	2.9	3.1
7/12	17.0	5.2	5.7
7/13	12.0	12.1	8.7
7/14	10.0	-1.4	-1.3
7/15	12.0	2.5	1.2
7/16	11.0	3.4	2.0
7/17	20.0	9.9	3.9
7/18	26.0	8.6	3.4
7/19	26.0	12.7	3.0
7/20	22.0	9.0	2.7
7/21	20.0	9.8	2.2
7/22	20.5	2.1	0.4
7/23	20.0	2.4	0.6
7/24	21.0	0.7	0.2
7/25	15.0	1.1	0.1
7/26	12.0	0.6	0.0
7/27	13.0	0.5	0.0
7/28	no data	0.1	0.0

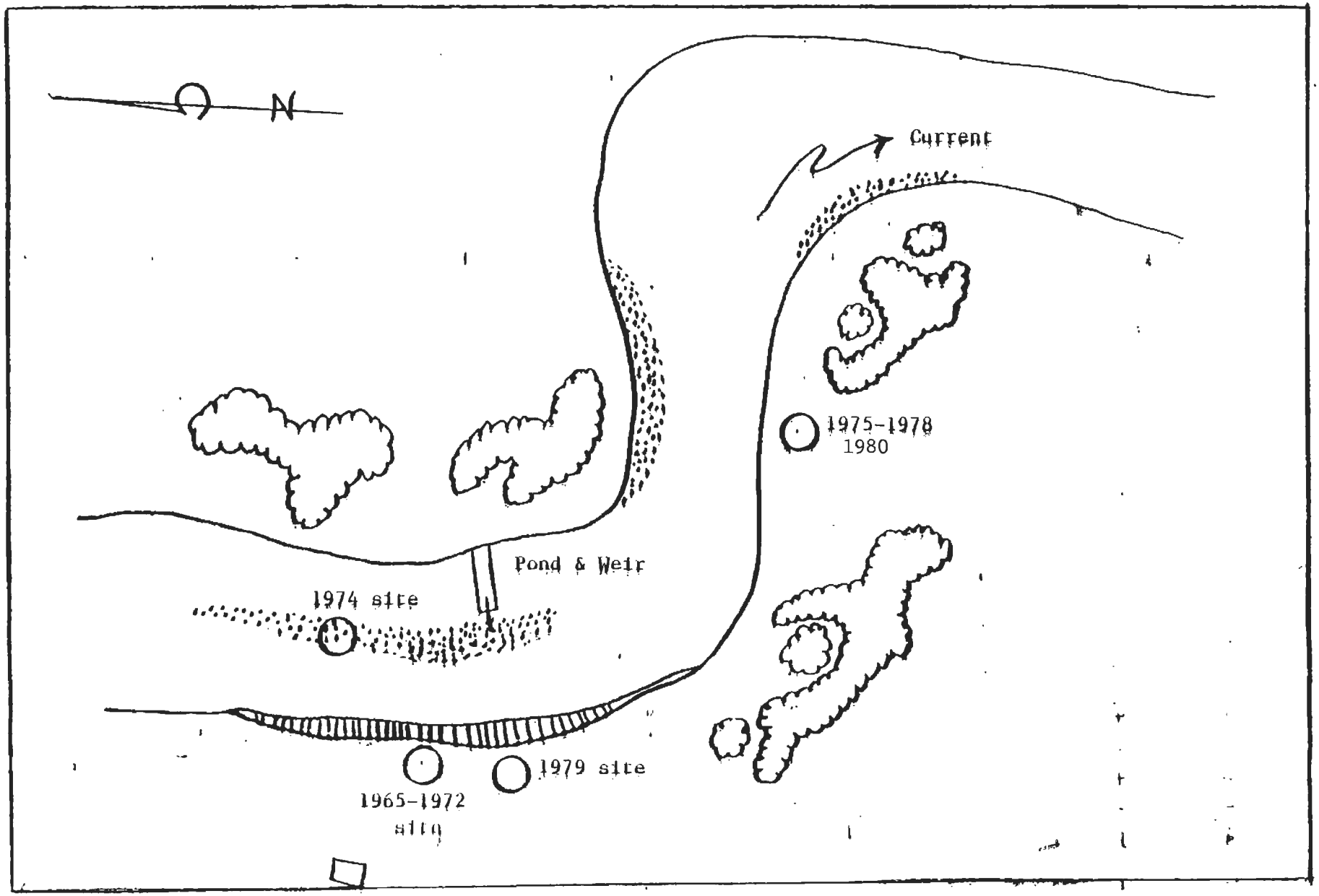

Figure 1. 1980 Kwiniuk River salmon counting tower site

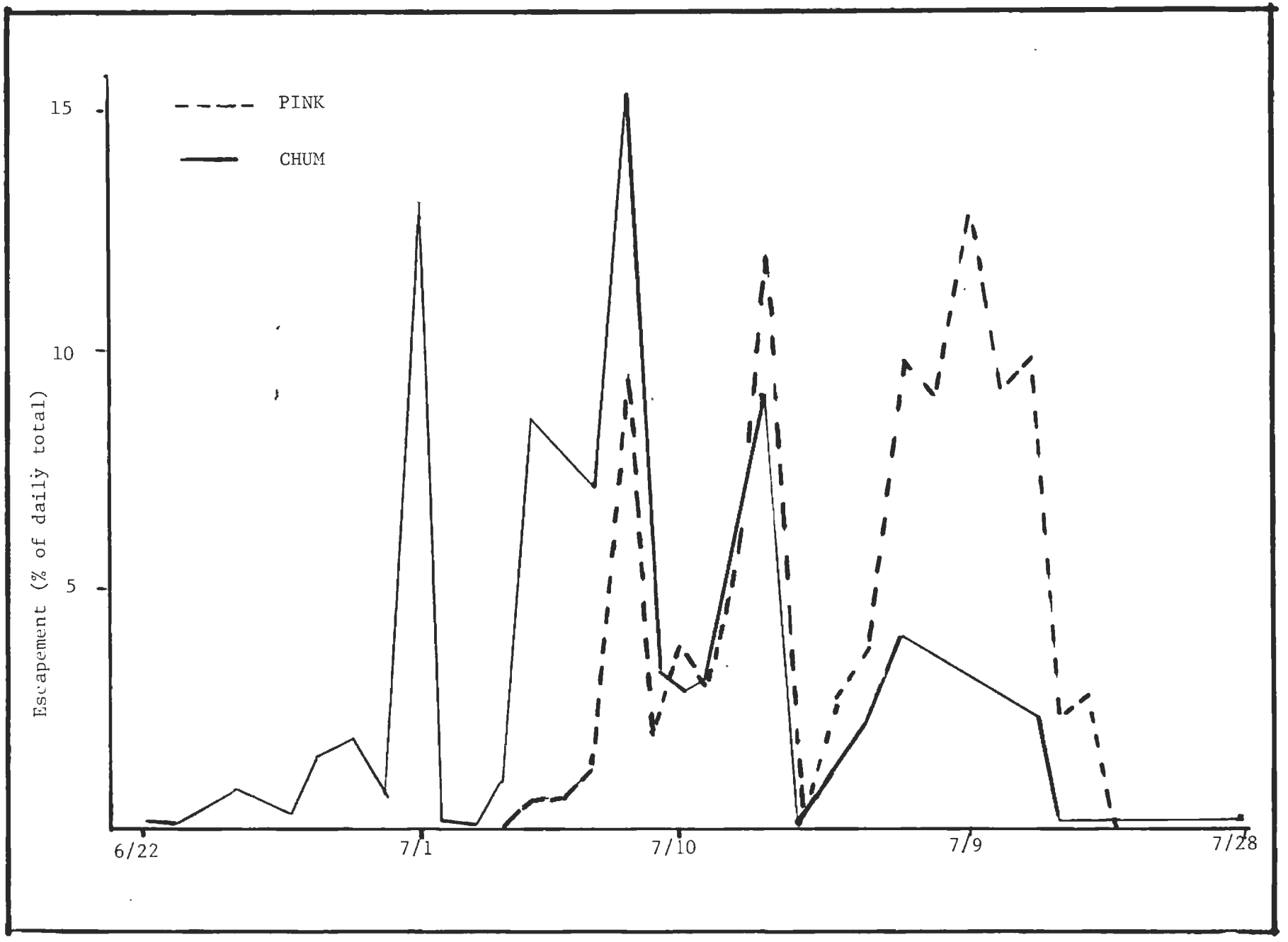

Figure 2. Daily salmon escapement past Kwiniuk Riv counting tower, 1980.

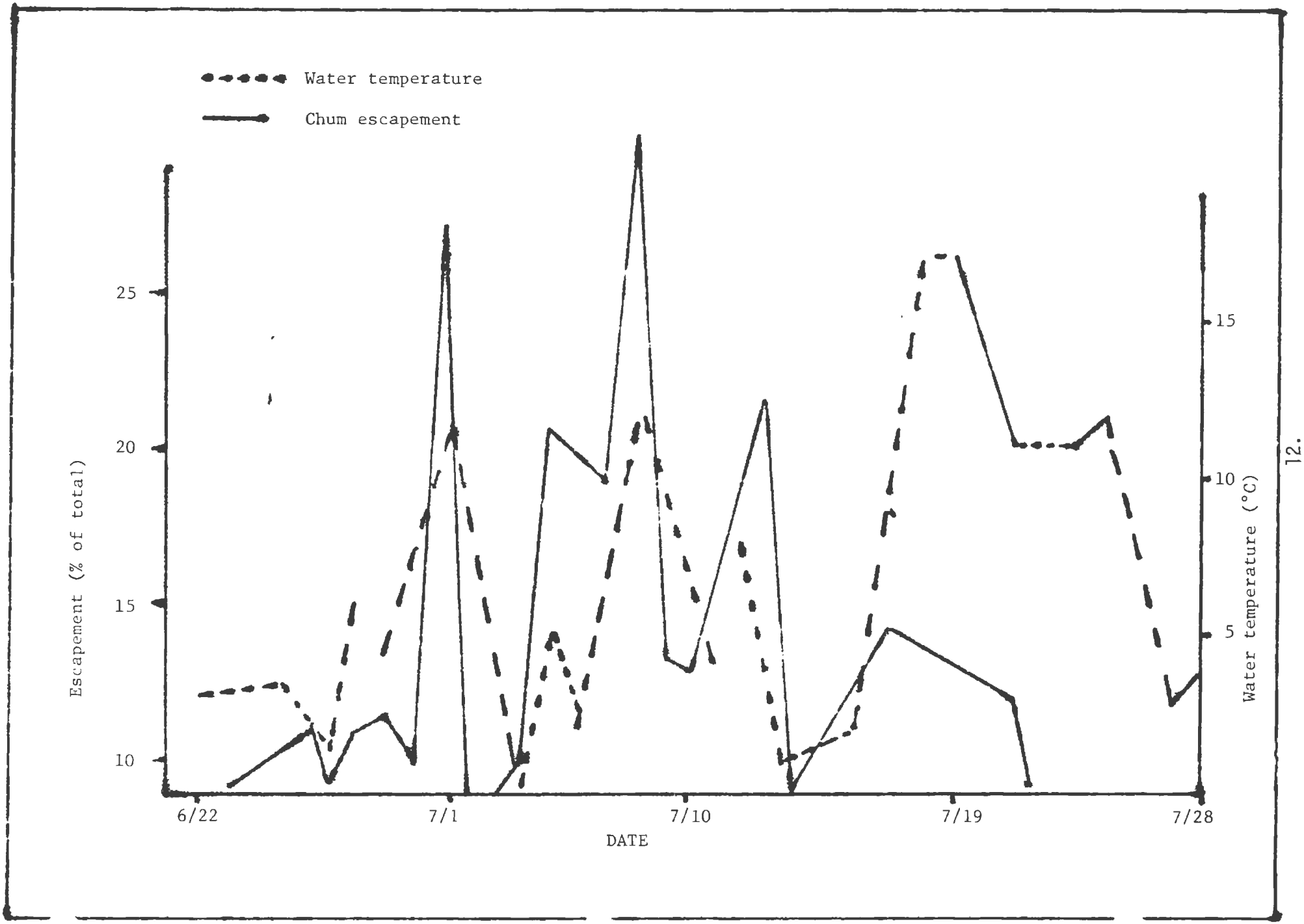

Figure 3. Kwiniuk River water temperature and chum salmon escapement, by day 1980.

Appendix Table 1. Daily total cumulative salmon escapement, Kwiniuk River. 1965-1980.

Species	Date	1976	1977	1978 3/	1979 3/	1980
CHUM	6/18					
	6/19					
	6/20					
	6/21					
	6/22					0
	6/23					10
	6/24					54
	6/25					201
	6/26					339
	6/27		12		14	390
	6/28	6	271		188	639
	6/29	31	468		294	985
	6/30	33	678		1923	1099
	7/01	105	2095		2185	3579
	7/02	134	2924		2316	3529
	7/03	195	4133		2588	3436
	7/04	428	4607	591	2842	3651
	7/05	746	6065	1498	2884	5268
	7/06	884	7049	3163	3228	6721
	7/07	1095	8295	4203	3406	8050
	7/08	1515	11949	5320	3594	10965
	7/09	1622	14680	6112	4508	11569
	7/10	1776	16207	6812	5216	12103
	7/11	2160	18118	7496	5418	12701
	7/12	2639	19264	8754	5528	13800
	7/13	3343	19445	9181	6236	15468
	7/14	3459	19867	9448	6866	15222
	7/15	3872	20601	10173	8141	15457
	7/16	4239	20716	10470	9196	15750
	7/17	4809	20999	10564	9757	16505
	7/18	4899	21245	10830	8910	17161
	7/19	5112	21492	10827	10272	17745
	7/20	5419	21643	10891	10688	18272
	7/21	5773	21815	10952	11275	18686
	7/22	6021	22083	10957	11938	18771
	7/23	6300	22189		12027	18894
	7/24	6384	22255		12069	18931
	7/25	6484	22289		12101	18960
	7/26	6675				18964
	7/27	6732				18971
	7/28	6770				18974
	7/29	6804				
	7/30	6813				
	8/01	6834				

3/ Corrected figures. Expanded to compensate for missing hourly counts.
4/ Point estimate (range 13,698-15,120). Expanded figure to compensate for fish not counted before 6/4 and after 7/22.

Appendix Table 1. Daily total cumulative salmon escapement, Kwiniuk River, 1965-1980.

Species	Date	1975	1976	1977	1978	1979	1980
PINK	6/18						
	6/19						
	6/20						
	6/21						
	6/22						0
	6/23						3
	6/24						20
	6/25						34
	6/26						43
	6/27			17			48
	6/28		213	35		17	75
	6/29		406	116		17	116
	6/30		439	191		213	130
	7/01		702	313		572	812
	7/02		781	491		605	601
	7/03		1004	592		1051	708
	7/04		1756	669	98	1531	1323
	7/05		2763	884	460	1662	2561
	7/06	79	3300	1240	1473	2683	3952
	7/07	185	4229	2037	2341	5062	7476
	7/08	176	5869	2707	3142	6547	35832
	7/09	294	6942	5478	4487	9744	41967
	7/10	584	8034	9435	7227	12746	53421
	7/11	820	9903	21882	9475	14356	62417
	7/12	959	11105	27876	18087	15615	78464
	7/13	1001	14384	30466	26128	20113	115995
	7/14	1013	14982	33086	28619	27872	111660
	7/15	1304	16072	37508	37930	44290	119532
	7/16	1770	16947	38005	41055	63390	130144
	7/17	2529	19185	39530	45077	75904	160738
	7/18	5183	19692	40232	52343	82253	187484
	7/19	10772	20121	40926	54786	100508	226843
	7/20	22354	20956	41480	60573	113462	254669
	7/21	38220	22084	42361	60273	134349	285090
	7/22	45466	23038	43467	69719	153686	291675
	7/23	50902	24663	44236		158229	299332
	7/24	52935	25170	44479		160871	301695
	7/25	54858	25710	44602		161578	305246
	7/26	55293	26411				307044
	7/27		27045				308736
	7/28		27333				309077
	7/29		27549				
	7/30		28063				
	7/31		28307				
	8/01		28431				

1/ 1970 was the first year of 18-hour counts, 12 noon until 6 AM the next day. The average escapement for the hours from 6 AM until 12 noon for the years 1965-1969 was 2.1 percent of the total escapement for chums and 3.66 percent for pink salmon.

2/ Subsistence catch.

3/ Corrected figure. Expanded to compensate for missing hourly counts.

4/ Expanded to compensate for an estimated 9% of total pink escapement not counted after 7/22.

Appendix Table 2. Daily total cumulative salmon escapements, Kwiniuk River, 1965-1979.

Species	Date	1965	1966	1967	1968	1969
CHUM	6/18	6				
	6/19		24			
	6/20		50			
	6/21		158			
	6/22		506			
	6/23		759			
	6/24		1,048	5		
	6/25		597	24	66	
	6/26		1,060	77	231	57
	6/27	218	1,189	270	1,066	113
	6/28	983	1,697	315	1,812	427
	6/29	2,376	1,768	1,455	2,338	571
	6/30	3,445	2,180	2,148	3,509	1,475
	7/1	7,741	5,728	2,739	4,443	2,057
	7/2	8,794	7,619	3,027	5,971	2,744
	7/3	9,988	8,054	3,491	6,914	3,861
	7/4	11,050	10,050	5,647	8,427	6,056
	7/5	12,078	11,958	6,157	9,409	7,137
	7/6	12,602	13,184	9,605	10,247	8,107
	7/7	13,445	13,703	13,088	12,428	9,514
	7/8	13,824	15,703	15,691	15,033	10,568
	7/9	15,630	17,703	18,513	16,720	11,727
	7/10	19,147	17,472	21,487	18,003	12,197
	7/11	22,818	19,551	23,459	18,284	12,377
	7/12	23,491	25,549	26,165	18,349	13,200
	7/13	26,444	27,225	26,473	18,415	14,198
	7/14	32,026	27,579	26,459	18,431	14,879
	7/15	32,190	28,604	26,532	18,564	16,057
	7/16	32,437	28,336	26,584	18,590	16,634
	7/17	32,503	28,884	26,598	18,601	17,117
	7/18	32,861	29,965	26,625	18,636	18,345
	7/19		31,584	26,631	18,760	18,707
	7/20		32,154	26,681	18,815	18,918
	7/21		32,389	26,661	18,347	19,233
	7/22		32,723		18,907	19,373
	7/23		32,938		18,951	19,390
	7/24		33,030		19,976	19,525
	7/25		33,137			19,554
	7/26		33,153			19,749
	7/27		33,153			
	7/28		33,184			
	7/29		33,182			
		-6,227 2/	-396 2/	-2,217 2/	-163 2/	-62 2/
		26,634	32,786	24,444	18,813	19,687

1/1970 was the first year of 18-hour counts, 12 noon until 6AM the next day. The average escapement for the hours from 6AM until 12 noon for the years 1965-1969 was 2.1 percent of the total escapement for chums and 3.66 percent for pink salmon.

2/Subsistence catch.

Appendix Table 2. (continued) Daily total cumulative salmon escapements, Kwiniuk River, 1965-1979.

Species	Date	1965	1966	1967	1968	1969
PINK	6/18					
	6/19					
	6/20					
	6/21					
	6/22					
	6/23					
	6/24					
	6/25					
	6/26					17
	6/27					19
	6/28	174			48	41
	6/29	260			214	52
	6/30	220			534	117
	7/1	276		1	755	131
	7/2	314	11	3	1,330	232
	7/3	349	29	4	1,732	378
	7/4	396	317	6	2,501	1,165
	7/5	388	517		3,141	2,259
	7/6	390	533		4,777	3,974
	7/7	412	568	18	13,719	6,415
	7/8	388	607	45	38,560	8,683
	7/9	650	673	521	67,509	11,406
	7/10	820	683	718	81,776	12,684
	7/11	1,120	722	1,282	105,997	13,539
	7/12	1,526	758	1,926	112,984	15,447
	7/13	1,653	817	2,685	113,323	18,250
	7/14	2,856	898	3,138	113,247	19,379
	7/15	4,488	1,205	3,160	114,504	25,056
	7/16	7,301	1,008	3,320	115,018	27,850
	7/17	7,456	1,206	3,348	117,172	34,863
	7/18	7,571	1,771	3,380	121,392	37,840
	7/19	8,668	3,269	3,406	124,510	43,897
	7/20		3,864	3,432	125,848	47,626
	7/21		4,190	3,367	127,088	51,943
	7/22		5,358	3,387	128,002	54,177
	7/23		6,777		128,466	54,772
	7/24		7,843		129,052	55,741
	7/25		10,015			56,217
	7/26		10,691			57,497
	7/27		10,798			
	7/28		10,364			
	7/29					
		-367 2/	-235 2/	-79 2/	-2,288 2/	-814 2/
		8,301	10,629	3,308	126,764	56,683

2/Subsistence catch.

Appendix Table 2. (continued) Daily total cumulative salmon escapements, Kwiniuk River, 1965–1979.

Species	Date	1970	1971	1972	1973	1974	1975
CHUM	6/18						
	6/19					16	
	6/20					79	
	6/21					80	
	6/22					202	
	6/23					479	
	6/24					950	
	6/25	2			11	1,113	
	6/26	17	23		13	3,316	
	6/27		51		17	5,047	
	6/28		95	33	17	6,942	
	6/29	645	139	51	17	8,358	
	6/30	2,302	196	158	26	9,805	
	7/1	3,327	452	697	97	11,266	
	7/2	6,420	728	1,375	207	13,776	
	7/3	14,467	1,181	1,607	402	15,674	
	7/4	20,873	3,362	2,793	1,514	16,985	72
	7/5	26,699	4,783	4,143	4,545	17,972	363
	7/6	30,596	6,178	5,314	4,933	19,061	728
	7/7	31,468	6,651	9,277	5,075	19,479	835
	7/8	34,695	10,677	12,100	8,495	19,766	985
	7/9	40,012	11,539	14,384	8,870	20,126	1,136
	7/10	40,362	13,401	16,242	15,022	20,347	1,446
	7/11	44,180	16,902	17,537	15,337	21,633	1,887
	7/12	47,305	18,694	21,735	16,303	22,745	2,046
	7/13	47,738	19,346	22,997	16,776	23,682	2,354
	7/14	50,304	20,566	24,998	18,944	25,084	3,430
	7/15	56,943	20,858	25,589	19,666	31,243	5,151
	7/16	60,275	21,909	25,805	20,138	32,179	7,395
	7/17	62,577	26,955	26,133	22,396	32,570	9,497
	7/18	63,065	27,836	27,284	24,075	33,388	10,443
	7/19	63,624	30,680	27,993	26,227	33,891	11,919
	7/20	65,673	33,800	28,371	26,995	34,084	12,676
	7/21	65,717	34,473	28,502	27,304	34,209	13,435
	7/22	66,062	35,237	29,020	27,341	34,294	13,809
	7/23	66,176	35,510	29,458	27,570	34,676	13,962
	7/24	66,336	36,185	29,756	28,008	34,979	14,033
	7/25	66,545	36,959	29,995	28,029	35,130	14,049
	7/26	66,584	37,680	30,005		35,161	
	7/27	66,599	38,107				
	7/28	66,602	38,186				
	7/29	66,604	38,243				
		x 2.1%1/	x 2.1%1/	x 2.1%1/	x 2.1%1/	x 2.1%1/	x 2.1%1/
Expanded		1,400	803	631	588	738	295
Escapement		+66,604	+38,243	+30,055	+28,029	+35,161	+14,049
Total		68,004	39,046	30,686	28,617	35,899	14,344
Expanded			- 367 2/				
Escapement			38,679				

Appendix Table 2. (continued) Daily total cumulative salmon escapements, Kwiniuk River, 1965-1979.

Species	Date	1970	1971	1972	1973	1974
PINK	6/18					
	6/19					
	6/20					1
	6/21					2
	6/22					39
	6/23					223
	6/24					464
	6/25	3			322	559
	6/26	13			831	1,513
	6/27	16			1,053	2,436
	6/28	17	9	15	1,276	3,455
	6/29	47	12	48	1,413	5,390
	6/30	198	31	513	1,575	8,306
	7/1	298	125	1,490	1,762	10,047
	7/2	465	182	2,780	1,854	12,512
	7/3	1,096	241	2,899	1,938	14,668
	7/4	4,643	552	4,210	2,190	17,674
	7/5	10,949	819	7,564	3,491	19,180
	7/6	20,413	1,221	10,521	3,556	21,600
	7/7	20,159	1,327	21,264	3,631	22,668
	7/8	25,359	2,343	27,662	4,795	23,385
	7/9	30,729	2,490	35,297	4,979	23,781
	7/10	31,439	3,061	39,082	7,079	24,187
	7/11	39,601	5,963	42,329	7,327	24,764
	7/12	50,921	6,462	47,520	8,539	25,604
	7/13	52,800	6,994	49,581	9,281	26,840
	7/14	59,521	7,418	52,553	12,512	29,336
	7/15	90,681	7,519	53,539	13,393	33,294
	7/16	127,335	7,732	53,923	14,569	34,160
	7/17	148,750	9,646	54,483	18,347	34,502
	7/18	155,935	10,401	55,674	21,214	35,690
	7/19	161,963	12,470	57,721	27,748	36,513
	7/20	179,160	13,938	57,698	30,789	36,920
	7/21	185,247	14,571	57,997	32,842	37,086
	7/22	198,958	15,123	59,024	33,249	37,298
	7/23	208 403	15,309	59,576	35,112	38,101
	7/24	214,233	15,485	59,892	36,956	38,668
	7/25	222,209	15,658	60,147	37,070	39,263
	7/26	225,546	15,818	60,246		39,375
	7/27	226,712	15,996	60,256		
	7/28	226,829	16,089			
	7/29	226,831	16,151			
		x 3.66%1/	x3.66%1/	x3.66%1/	x3.66%1/	x3.66%1/
		8,300	59	2,205	1,356	1,441
Expanded		226,831	+16,151	+60,256	+37,070	+39,375
Escapement		235,131	16,742	62,461	38,426	40,816
			-108 2/			
Total Expanded Escapement			16,634			

1/1970 was the first year of 18-hour counts, 12 noon until 6AM the next day. The average escapement for the hours from 6AM until 12 noon for the years 1965-1969 was 2.1 percent of the total escapement for chums and 3.66 percent for pink salmon.

2/Subsistence catch.