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Kwiniuk River Salmon Counting Tower
Project Summary Report, 1995

by

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INTRODUCTION

The Kwiniuk River drains into Norton Sound just east of the village of Moses Point, approximately 100 miles east of Nome. The Kwiniuk and Tubutulik Rivers are the primary tributaries for salmon spawning in the Moses Point Subdistrict. In 1962 commercial salmon fishing began in the Moses Point Subdistrict. In recent years the returns of chum salmon have been poor. The last significant chum salmon harvest occurred in 1988 (Bue and Lean 1995).

Since 1965 a salmon counting tower has been operated on the Kwiniuk River (Lean 1994). The project operates as a means to obtain timely and accurate escapement information that is required to actively manage the stocks throughout the season. This year the project estimated returns of 42,703 chum salmon, 17,509 pink salmon, 485 king salmon, and 114 coho salmon from 21 June to 26 July (Table 1).

OBJECTIVES

1. Obtain daily and seasonal estimates of the timing and magnitude of the salmon escapement by species to the Kwiniuk River.
2. Collect age, sex, and length composition samples from the chum salmon escapement to the Kwiniuk River.

METHODS

The Kwiniuk River tower camp is approximately 4 miles upstream from the mouth of the river, on land leased to the Alaska Department of Fish & Game (ADF&G) by Hans Jemewouk of Moses Point (Figure 1).

The crew began working on 16 June, 1995. After inventorying equipment and purchasing supplies in Nome, they ferried equipment by air to Moses Point and by boat to the tower site. The camp was set up and radio communication with Nome established.

A 50 foot vinyl canvas flash panel placed on the river bottom provided a contrasting background where fish species could easily be identified. The flash panel covered approximately half the width of the river. The shore end of the

flash panel was placed next to the cut bank on the camp side of the river. An aircraft cable threaded through grommets along the upstream edge of the flash panel was staked at each end to hold the panel in place. Sandbags placed at intervals along the cable edge of the panel held it down on the stream bottom to prevent fish from moving under the panel.

A 20 foot high aluminum scaffold was assembled on the bank directly in line with the flash panel and about three feet from the edge of the river. The scaffold was used as a tower from which fish were observed and enumerated as they passed over the flash panel. The tower was guyed by aircraft cables tied off to stakes in the ground. Planks were used as footings and sandbags placed on boards set across the lowest rungs of the scaffolding provided a low center of gravity and stability.

A weir was built from the midstream end of the flash panel to the shore opposite the tower. The weir ensured that all fish passed over the flash panel. The weir was built of steel pipe posts, aluminum angle stringers and aluminum conduit pickets.

A 12 volt lighting system was installed to illuminate the flash panel during dark periods. These lights were powered by an automotive battery that was recharged using a portable generator.

The counting schedule began at 1600 hours on 21 June. The three person crew counted 18 half-hour counts from 1200 hours each day to 0600 hours the following day except for days off and days of 24 hour counts. Sundays were the normal day off. On the day following the day off, the crew counted 24 half-hour counts from midnight to midnight the following day. The daily counts considered in this report ran from midnight to midnight the following day.

The counts for each half hour shift were doubled to estimate hourly counts for each species. Each day the estimated hourly counts were added to produce a daily total. The daily and cumulative totals for each species were relayed to the Nome office by radio.

The expanded counts for this report were calculated as follows. The 18 hour counts for the day off, were estimated by adding the hourly counts of the day before to the hourly counts of the day following and dividing the result by two, giving expanded hourly counts for 18 hours of the day off. Next an expansion factor was calculated to compensate for the 6 hours not normally counted. This factor was derived from the weekly 24 hour count by dividing the total count from 0600 hours to 1200 hours during the 24 hour count by the total normal 18 hour count during the 24 hour count. The expansion factor was applied to data from the three days before and after each 24 hour count by multiplying each days 18

hour total by the 24 hour expansion factor, and adding that number to the 18 hour count for each day. This expansion was done for all species counted.

Scales were taken, lengths measured, and sex identified from chum salmon that were collected by beach seine from the Kwiniuk River.

RESULTS

Table 1 shows the expanded daily and cumulative totals for each species. The expanded counts were: 42,703 chum salmon, 17,509 pink salmon, 485 king salmon, and 114 coho salmon (Tables 2-5). The reported total hourly counts were: 30,677 chum salmon, 13,486 pink salmon, 410 king salmon, and 102 coho salmon (Appendix Tables 6-9). Figures 2-9 show graphs of the expanded daily totals and the cumulative expanded daily totals for each species counted.

Counting began on 21 June. King salmon were observed on the first day of counting, chum salmon were first observed on 22 June, pink salmon were first observed on 25 June, and coho salmon were first observed on 22 July (Table 1). The daily peak of 5,548 chum salmon occurred on 1 July, the daily peak of 3,012 pink salmon occurred on 17 July, the daily peak of 58 king salmon occurred on 6 July, and the daily peak coho salmon observation was made on 26 July (Table 1).

All species counted exhibited a diurnal pattern of migration past the counting tower. Most chum salmon migration occurred during the hour from 2300 to midnight, when 11% passed the tower. During the eight hour period from 2000 through 0300 hours, 60% of the chum salmon passed the tower. There was no time period with a net downstream migration of chum salmon for the season. The least upstream migration of chum salmon occurred during the hour period from 1200 to 1300 hours (Table 2 and Figure 10). Most pink salmon upstream migration occurred during the hour from 0400 to 0500 hours, when 14% passed the tower. During the ten hour period from 2000 through 0500 hours, 87% of the pink salmon passed the tower. There was no time period with a net downstream migration of pink salmon for the season. The least upstream migration of pink salmon occurred during the hour period from 1200 to 1300 hours, when 0.2% passed the tower (Table 3 and Figure 11). Most king salmon migration occurred during the hour from 0100 to 0200 hours, when 12% passed the tower. During the ten hour period from 1900 through 0400 hours, 69% of the king salmon passed the tower. There was no time period with a net downstream migration of king salmon for the season (Table 4 and Figure 12). Most coho salmon migration occurred during the hour from midnight to 0100, when 18% passed the tower. During the ten hour period from 2000 hours through 0500 hours, 92% of the total upstream migration of coho salmon occurred. There was no observed

downstream migration of coho salmon during the season (Table 5 and Figure 13).

A total of 370 chum salmon were sampled for sex, age and length information on 8 days during the period from 6/30/95 to 7/25/95. The length composition of these fish is presented as a histogram in Figure 14. Age could only be determined for 341 of the fish. Analysis of the chum salmon scale samples showed that 0.3% of the fish sampled were age-0.2, 56.1% were age-0.3, 39.5% were age-0.4 and 4.1% were age-0.5 (Table 6). The age and sex composition of the samples sorted by sampling date and age\sex category is presented in Table 7.

To estimate the sex and age composition of the total 1995 chum salmon escapement, the proportion of fish in each sex and age category was computed for each day that sampling was conducted. A simple linear model, with time as the predictor variable, was fit to the observed proportions for each sex and age category. The model was constrained so that all modeled proportions were between 0 and 1, and so that the proportions for all sex and age categories summed to 1 on all days. Weighted squared residuals were computed by multiplying the daily sample size by the squared difference between the observed and modeled sex and age proportions. The model parameters for all age and sex categories were simultaneously estimated by minimizing the sum of the weighted squared residuals using Microsoft Excel's Solver (Table 8), (Jeff Bromaghin, ADF&G, personal communication, 12 January 1996). Data on chum salmon whose age could not be determined were excluded from the analysis. Figure 15 presents graphs showing the observed and modeled proportions by date for each age and sex category; some of the extreme outliers in these graphs are associated with daily proportions based on very small sample sizes. The model parameters were multiplied by the daily tower escapement to apportion the escapement to all sex and age categories in proportions that sum to 1 for each day. The daily escapement estimates by sex and age were summed over time to estimate the sex and age composition of the total 1995 escapement (Table 9).

Climatological and stream observations are shown in Table 10.

DISCUSSION

The Kwiniuk River tower project has operated since 1965. The project ran well this year and provided timely escapement information that was useful for inseason fisheries management. The Kwiniuk River counting tower was the only escapement project operating in the Moses Point subdistrict during 1995.

The return of chum salmon was the best since 1984 and was more than double the tower goal and 60% above the average chum salmon tower count since 1965 (Figure 16). The chum salmon return followed the early year timing model for most of the season (Figure 17). The return of pink salmon was below average, 14% of the odd year average since 1981 (Figure 18). The pink salmon return followed the odd year pink salmon run-timing model for the entire season (Figure 19). The return of king salmon was 96% of the average since 1981 (Figure 20). King salmon returned ahead of the king salmon run-timing model all season, except for two days from 4-5 July (Figure 21).

In 1994 funding was available to operate the tower until 12 August so that the first two and a half weeks of the coho salmon return were counted (Rob 1996). In 1995, funding was limited and only the first five days of the coho salmon return were counted.

River conditions this year were fair to excellent for the entire season. Water levels and conditions did not adversely impact fish observation (Table 10).

ACKNOWLEDGEMENTS

The crewleader for the season was Chuck Blaney. Joel Saccheus, and James Kotongan were crewmembers. Jeff Bromaghin performed the age and sex analysis and provided guidance and assistance in the presentation of the data and results. Drafts of this report were reviewed by Larry Buklis and Jeff Bromaghin.

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Table 1. Expanded daily and cumulative migration of all species past the Kwiniuk River counting tower, Norton Sound, 1995.

Date	Daily chum salmon	Cumulative chum salmon	Daily pink salmon	Cumulative pink salmon	Daily king salmon	Cumulative king salmon	Daily coho salmon	Cumulative coho salmon
21-Jun		0	0	0	2	2	0	0
22-Jun	345	345	0	0	0	2	0	0
23-Jun	-97	248	0	0	0	2	0	0
24-Jun	1,065	1,314	0	0	24	26	0	0
25-Jun	429	1,742	4	4	13	39	0	0
26-Jun	-208	1,534	8	12	2	41	0	0
27-Jun	2	1,536	4	16	2	43	0	0
28-Jun	2,374	3,910	0	16	24	67	0	0
29-Jun	3,210	7,121	8	24	28	95	0	0
30-Jun	2,895	10,016	10	34	15	110	0	0
1-Jul	5,548	15,564	2	36	35	145	0	0
2-Jul	2,698	18,262	-1	35	13	158	0	0
3-Jul	-152	18,110	-4	31	-10	148	0	0
4-Jul	826	18,935	94	125	0	148	0	0
5-Jul	891	19,827	26	151	8	155	0	0
6-Jul	4,937	24,763	324	475	58	213	0	0
7-Jul	3,150	27,913	308	783	56	269	0	0
8-Jul	1,402	29,315	267	1,050	18	287	0	0
9-Jul	1,100	30,414	221	1,270	19	306	0	0
10-Jul	798	31,212	174	1,444	20	326	0	0
11-Jul	1,718	32,931	140	1,584	10	336	0	0
12-Jul	2,268	35,198	403	1,986	38	374	0	0
13-Jul	1,498	36,696	241	2,227	40	414	0	0
14-Jul	2,003	38,699	523	2,751	40	454	0	0
15-Jul	1,025	39,724	908	3,659	8	462	0	0
16-Jul	648	40,372	1,960	5,619	4	466	0	0
17-Jul	272	40,644	3,012	8,631	0	466	0	0
18-Jul	120	40,764	770	9,400	0	466	0	0
19-Jul	285	41,049	513	9,913	2	468	0	0
20-Jul	323	41,372	869	10,782	2	470	0	0
21-Jul	342	41,714	1,116	11,898	2	472	0	0
22-Jul	298	42,012	1,470	13,367	4	476	10	10
23-Jul	221	42,234	1,034	14,401	3	479	12	22
24-Jul	144	42,378	598	14,999	2	481	14	36
25-Jul	200	42,578	1,272	16,271	4	485	20	56
26-Jul	125	42,703	1,237	17,509	0	485	58	114

Table 2. Expanded daily hourly chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

Shaded areas indicate hours not counted. Numbers in shaded areas indicate estimated passage. Count advised at 1100 hours 6/22 by aerial survey. Previous counts omitted in Totals

Date	0000	0100	0200	0300	0400	0500	0600-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total			
21-Jun	Start of the counting season											-2	0	0	0	0	0	0	0	0	0	20	18	
22-Jun	14	2	-14	0	2	2	345	0	0	0	0	0	0	0	0	0	0	0	0	0	345	0.8%		
23-Jun	-8	-8	-32	-2	-14	-26	-5	0	0	0	0	0	0	-2	0	0	0	0	0	0	-97	-0.2%		
24-Jun	0	2	0	0	0	0	51	0	0	4	0	0	280	34	98	0	120	348	128	1,065	2.5%			
25-Jun	-1	-16	-20	-19	-24	0	21	-20	0	2	0	0	138	17	51	2	60	174	64	429	1.0%			
26-Jun	-2	-34	-40	-38	-48	0	-10	-40	0	0	0	0	-4	0	4	4	0	0	0	0	-208	-0.5%		
27-Jun	2	0	0	0	0	0	0	0	0	0	0	2	-2	0	0	0	0	0	0	0	2	0.0%		
28-Jun	510	514	296	92	142	24	114	0	0	22	14	0	2	0	0	400	20	158	66	2,374	5.6%			
29-Jun	654	532	536	466	236	246	154	0	0	0	4	62	-4	2	24	144	8	72	74	3,210	7.5%			
30-Jun	156	406	816	78	50	58	1,219	4	6	6	4	0	20	4	18	10	0	32	8	2,895	6.8%			
1-Jul	56	0	10	-10	-2	-2	2,336	-2	0	48	12	8	12	408	198	756	264	782	674	5,548	13.0%			
2-Jul	17	0	-2	8	-9	-4	1,136	-1	-3	26	7	-8	-23	166	97	376	127	391	397	2,698	6.3%			
3-Jul	-22	0	-14	26	-16	-6	-64	0	-6	4	2	-24	-58	-76	-4	-4	-10	0	120	-152	-0.4%			
4-Jul	-12	-124	-334	-70	-92	-70	348	-2	0	0	24	-16	18	18	46	16	598	300	178	826	1.9%			
5-Jul	46	0	62	6	-2	-10	375	0	2	0	0	0	0	8	70	112	52	68	102	891	2.1%			
6-Jul	274	112	84	210	164	238	2,079	0	4	0	318	110	300	10	214	30	0	410	380	4,937	11.6%			
7-Jul	118	524	906	440	216	130	8	58	2	64	58	14	14	4	12	438	32	48	64	3,150	7.4%			
8-Jul	184	68	18	6	12	8	4	18	84	132	82	6	468	160	30	-2	-14	132	6	1,402	3.3%			
9-Jul	225	63	58	21	11	6	3	11	42	66	42	4	241	80	43	81	18	66	19	1,100	2.6%			
10-Jul	266	58	98	36	10	4	2	4	0	0	2	2	14	0	56	164	50	0	32	798	1.9%			
11-Jul	70	138	170	320	716	146	4	6	4	0	0	0	2	2	2	16	12	24	86	1,718	4.0%			
12-Jul	128	126	188	164	12	2	6	2	2	106	20	8	234	50	0	4	316	154	746	2,268	5.3%			
13-Jul	388	88	66	20	16	10	4	30	6	20	68	288	56	30	6	4	246	6	146	1,498	3.5%			
14-Jul	328	360	160	102	26	12	103	0	4	2	10	38	2	14	78	74	14	62	614	2,003	4.7%			
15-Jul	162	100	58	4	0	30	53	0	0	38	24	20	8	4	12	6	96	110	300	1,025	2.4%			
16-Jul	107	97	32	7	3	27	33	0	0	19	12	10	4	4	6	3	64	67	153	648	1.5%			
17-Jul	52	94	6	10	6	24	14	0	0	0	0	0	0	4	0	0	32	24	6	272	0.6%			
18-Jul	8	4	2	2	0	14	6	0	0	-2	0	0	0	-8	8	70	8	4	4	120	0.3%			
19-Jul	8	20	12	8	6	14	15	0	2	0	8	0	2	0	0	88	48	24	30	285	0.7%			
20-Jul	48	34	40	24	38	42	17	-2	2	0	2	0	0	0	0	0	0	12	66	323	0.8%			
21-Jul	52	88	56	44	18	24	14	10	2	2	-2	2	0	0	0	2	0	6	24	342	0.8%			
22-Jul	32	26	44	44	12	2	12	2	8	8	0	18	16	6	22	34	6	4	2	298	0.7%			
23-Jul	21	21	50	26	14	6	9	1	4	7	4	9	10	3	12	17	4	1	2	221	0.5%			
24-Jul	10	16	56	8	16	10	6	0	0	6	8	0	4	0	2	0	2	-2	2	144	0.3%			
25-Jul	26	10	24	32	40	26	8	0	0	0	0	0	0	2	2	2	2	0	26	200	0.5%			
26-Jul	12	2	18	18	6	0	5	0	0	0	0	0	0	2	0	8	10	16	28	125	0.3%			
Totals	3,915	3,321	3,424	2,083	1,563	985	8,425	79	165	580	723	553	1,754	946	1,107	2,855	2,185	3,493	4,547	42,703				
	9.2%	7.8%	8.0%	4.9%	3.7%	2.3%	19.7%	0.2%	0.4%	1.4%	1.7%	1.3%	4.1%	2.2%	2.6%	6.7%	5.1%	8.2%	10.6%	100.0%				

Table 3. Expanded daily hourly pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

Shaded areas indicate hours not counted. Numbers in shaded areas indicate estimated passage.

Date	0000	0100	0200	0300	0400	0500	0600-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total									
21-Jun	Start of the counting season												0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
22-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
23-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
24-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
25-Jun	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.0%								
26-Jun	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0.0%								
27-Jun	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.0%								
28-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%								
29-Jun	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	8	0.0%								
30-Jun	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0.1%								
1-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0.0%								
2-Jul	1	-4	-4	7	-4	1	0	0	-1	0	0	0	0	0	0	0	-1	1	3	-1	-1	0.0%								
3-Jul	2	-8	-8	14	-8	2	0	0	-2	0	0	0	0	0	0	0	-2	0	6	-4	-4	0.0%								
4-Jul	0	16	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	52	20	8	94	0.5%									
5-Jul	-2	0	6	-2	0	0	0	0	0	0	0	0	0	0	0	8	0	6	10	26	0.1%									
6-Jul	18	10	2	14	88	48	0	0	0	0	0	0	2	12	20	0	0	46	64	324	1.9%									
7-Jul	8	0	98	38	20	6	4	2	0	4	0	0	2	0	4	82	0	0	40	308	1.8%									
8-Jul	16	0	0	0	0	2	3	2	32	58	0	0	18	38	12	8	4	52	22	267	1.5%									
9-Jul	13	2	0	1	1	1	3	1	16	29	0	0	9	19	22	44	18	31	11	221	1.3%									
10-Jul	10	4	0	2	2	0	2	0	0	0	0	0	0	0	32	80	32	10	0	174	1.0%									
11-Jul	12	6	4	10	82	10	2	0	0	0	0	0	0	0	0	2	0	12	0	140	0.8%									
12-Jul	12	18	8	12	0	0	5	0	2	2	2	4	0	0	0	0	100	34	204	403	2.3%									
13-Jul	66	26	18	6	6	2	3	2	2	2	2	2	2	14	0	0	58	4	26	241	1.4%									
14-Jul	86	96	38	4	8	6	17	0	4	2	0	0	0	18	30	34	6	14	160	523	3.0%									
15-Jul	212	90	42	20	14	0	30	0	0	6	12	4	2	62	38	28	34	74	240	908	5.2%									
16-Jul	274	460	107	94	578	78	65	0	0	3	6	7	1	31	21	14	44	46	131	1,960	11.2%									
17-Jul	336	830	172	168	1,142	156	100	0	0	0	0	10	0	0	4	0	54	18	22	3,012	17.2%									
18-Jul	110	72	68	44	62	56	26	0	0	0	0	0	4	0	0	164	150	6	8	770	4.4%									
19-Jul	78	78	74	20	34	42	17	0	0	0	0	0	0	0	0	54	34	42	40	513	2.9%									
20-Jul	218	108	150	110	62	78	29	0	0	0	0	0	0	0	0	0	0	22	92	869	5.0%									
21-Jul	282	112	102	78	60	70	146	24	0	0	4	24	16	2	6	4	2	18	166	1,116	6.4%									
22-Jul	120	138	86	18	4	14	192	2	8	10	42	26	100	8	66	358	110	102	66	1,470	8.4%									
23-Jul	95	83	92	31	40	66	135	2	6	7	28	14	50	4	34	182	66	56	43	1,034	5.9%									
24-Jul	70	28	98	44	76	118	78	2	4	4	14	2	0	0	2	6	22	10	20	598	3.4%									
25-Jul	96	76	92	94	132	138	166	0	0	0	0	0	0	0	2	2	0	34	440	1,272	7.3%									
26-Jul	220	78	114	96	44	6	161	2	4	0	0	0	0	2	6	18	92	218	176	1,237	7.1%									
Totals	2,355	2,329	1,365	923	2,443	900	1,194	39	75	127	110	93	204	210	299	1,088	875	882	1,998	17,509										
	13.5%	13.3%	7.8%	5.3%	14.0%	5.1%	6.8%	0.2%	0.4%	0.7%	0.6%	0.5%	1.2%	1.2%	1.7%	6.2%	5.0%	5.0%	11.4%											

Table 4. Expanded daily hourly king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

Shaded areas indicate hours not counted. Numbers in shaded areas indicate estimated passage.

Date	0000	0100	0200	0300	0400	0500	0600-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
21-Jun	Start of the counting season											0	0	0	0	0	2	0	0	2	0	2	0.4%
22-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
23-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
24-Jun	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	6	0	24	5.0%	
25-Jun	0	0	0	0	0	0	0	0	0	1	0	0	9	0	0	0	0	0	3	0	13	2.7%	
26-Jun	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0.4%	
27-Jun	2	0	0	0	0	0	0	0	0	0	0	2	-2	0	0	0	0	0	0	0	2	0.4%	
28-Jun	8	8	2	2	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	24	5.0%	
29-Jun	14	0	0	0	2	0	0	2	4	2	0	0	0	0	0	4	0	0	0	0	28	5.8%	
30-Jun	0	4	6	0	0	0	3	-2	0	0	0	0	2	0	0	2	0	0	0	0	15	3.1%	
1-Jul	0	0	0	0	0	0	7	2	2	0	0	0	0	4	6	8	2	0	4	0	35	7.2%	
2-Jul	0	0	0	0	-2	0	3	1	1	0	0	-2	0	2	3	4	1	0	0	2	13	2.6%	
3-Jul	0	0	0	0	-4	0	-2	0	0	0	0	-4	0	0	0	0	0	0	0	0	-10	-2.1%	
4-Jul	0	-4	-4	0	0	0	0	0	0	0	0	-2	0	0	0	0	10	0	0	0	0	0.0%	
5-Jul	0	0	2	0	0	-2	2	0	0	0	0	0	0	0	0	0	4	2	0	0	8	1.5%	
6-Jul	0	2	6	0	0	2	12	0	2	0	0	2	8	0	6	0	0	14	4	0	58	11.9%	
7-Jul	0	0	8	0	4	2	0	2	2	6	10	4	0	2	0	12	0	4	0	0	56	11.6%	
8-Jul	2	2	0	0	4	2	0	2	4	2	0	0	0	0	0	0	0	0	0	0	18	3.7%	
9-Jul	1	3	5	2	2	0	0	1	2	1	0	0	0	0	0	2	0	0	0	0	19	3.9%	
10-Jul	0	4	10	4	0	-2	0	0	0	0	0	0	0	0	0	4	0	0	0	0	20	4.1%	
11-Jul	2	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	2.1%	
12-Jul	0	14	2	0	2	0	0	0	2	2	2	0	0	0	0	0	2	0	12	0	38	7.8%	
13-Jul	10	6	0	4	4	0	0	16	-4	0	0	2	0	0	0	0	0	0	0	2	40	8.3%	
14-Jul	0	10	2	10	6	2	0	0	-2	0	4	0	0	0	2	0	0	0	0	6	40	8.3%	
15-Jul	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1.7%	
16-Jul	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.8%	
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
18-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
19-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	4	0	2	0.4%		
20-Jul	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.4%	
21-Jul	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.4%	
22-Jul	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	0.8%	
23-Jul	0	1	0	0	0	1	0	0	0	-1	1	0	0	0	0	1	0	0	0	0	3	0.6%	
24-Jul	0	0	0	0	0	2	0	0	0	-2	2	0	0	0	0	0	0	0	0	0	2	0.4%	
25-Jul	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.8%	
26-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
Totals	50	60	39	22	27	9	24	24	13	13	19	4	35	8	15	39	21	33	30	485			
	10.3%	12.4%	8.0%	4.5%	5.6%	1.9%	4.9%	5.0%	2.7%	2.7%	3.9%	0.8%	7.2%	1.7%	3.1%	8.0%	4.3%	6.8%	6.2%				

Table 5. Expanded daily hourly coho salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

Shaded areas indicate hours not counted. Numbers in shaded areas indicate estimated passage.

Date	0000	0100	0200	0300	0400	0500	0600-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
21-Jun	Start of the counting season												0	0	0	0	0	0	0	0	0	0	0.0%
22-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
23-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
24-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
25-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
26-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
27-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
28-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
29-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
30-Jun	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
2-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
3-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
4-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
5-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
6-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
7-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
8-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
9-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
10-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
11-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
12-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
13-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
14-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
15-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
16-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
17-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
18-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
19-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
20-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
21-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
22-Jul	2	2	2	0	0	0		0	0	0	0	2	0	0	0	2	0	0	0	0	10	8.8%	
23-Jul	2	2	2	0	0	1		0	0	0	0	1	0	1	1	1	1	1	0	0	12	10.5%	
24-Jul	2	2	2	0	0	2		0	0	0	0	0	0	2	2	0	2	0	0	0	14	12.3%	
25-Jul	0	0	4	0	2	4		0	0	0	0	0	0	0	0	0	0	0	0	10	20	17.5%	
26-Jul	14	4	2	6	10	6		0	0	0	0	0	0	0	0	2	4	6	4	58	50.9%		
Totals	20	10	12	6	12	13		0	0	0	0	3	0	3	3	5	7	6	14	114			
	17.5%	8.8%	10.5%	5.3%	10.5%	11.4%		0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	2.6%	2.6%	4.4%	6.1%	5.3%	12.3%				

Table 6. Age, sex, and length composition of chum salmon samples, Kwiniuk River counting tower, Norton Sound, 1995.

Stratum Dates: 6/30-7/25/95
 Sample Dates: 6/30-7/25/95
 Sample Size: 341

Brood Year and Age Group

	<u>1992 (0.2)</u>		<u>1991 (0.3)</u>		<u>1990 (0.4)</u>		<u>1989 (0.5)</u>		Totals
	# of fish	Average length (mm) ^a	# of fish	Average length (mm) ^a	# of fish	Average length (mm) ^a	# of fish	Average length (mm) ^a	
Female chum	1	530	96	559	59	563	7	574	163
% of Total	0.3%		28.2%		17.3%		2.1%		47.8%
Male chum	0		95	583	76	598	7	601	178
% of Total	0.0%		27.9%		22.3%		2.1%		52.2%
Totals	1		191		135		14		341
	0.3%		56.0%		39.6%		4.1%		

^a Length was measured from mid-eye to fork-of-tail.

Table 7. Results of chum salmon sampling sorted by date and age/sex category, Kwiniuk River counting tower, Norton Sound, 1995.

Date	Age 3 Female	Age 4 Female	Age 5 Female	Age 6 Female	Age 4 Male	Age 5 Male	Age 6 Male	Totals
6/30/95	0	6	6	0	10	11	0	33
7/1/95	0	10	12	2	21	25	4	74
7/11/95	0	16	6	1	16	17	0	56
7/13/95	1	4	4	2	5	2	0	18
7/14/95	0	23	12	0	20	10	2	67
7/19/95	0	1	0	0	0	0	0	1
7/21/95	0	31	19	2	22	9	1	84
7/25/95	0	5	0	0	1	2	0	8
Totals	1	96	59	7	95	76	7	341

Table 8. Age and sex category model parameters, Kwiniuk River counting tower, Norton Sound, 1995.

Age Sex Category	Parameter	Modeled Proportions
Age 3 Females	Y Intercept	0.0013
	Slope	0.0001
Age 4 Females	Y Intercept	0.0312
	Slope	0.0123
Age 5 Females	Y Intercept	0.1439
	Slope	0.0014
Age 6 Females	Y Intercept	0.0186
	Slope	0.0001
Age 3 Males	Y Intercept	0.0000
	Slope	0.0000
Age 4 Males	Y Intercept	0.3174
	Slope	-0.0019
Age 5 Males	Y Intercept	0.4433
	Slope	-0.0109
Age 6 Males	Y Intercept	0.0444
	Slope	-0.0012
Sum of the Y Intercepts =		1.0000
Sum of the Slopes =		0.0000
Minimized sum of all weighted square residuals =		3.2639

Table 9. Estimated chum salmon escapement age and sex composition, Kwiniuk River counting tower, Norton Sound, 1995.

Date	Day	Estimated Daily Tower Passage	<u>Females</u>				<u>Males</u>				Total
			Age 3	Age 4	Age 5	Age 6	Age 3	Age 4	Age 5	Age 6	
22-Jun	1	345	0	15	50	6	0	109	149	15	345
23-Jun	2	-97	0	-5	-14	-2	0	-30	-41	-4	-97
24-Jun	3	1,065	2	73	158	20	0	332	437	43	1,065
25-Jun	4	429	1	35	64	8	0	133	172	17	429
26-Jun	5	-208	0	-19	-31	-4	0	-64	-81	-8	-208
27-Jun	6	2	0	0	0	0	0	1	1	0	2
28-Jun	7	2,374	4	279	365	46	0	722	872	86	2,374
29-Jun	8	3,210	6	417	499	62	0	970	1,144	112	3,210
30-Jun	9	2,895	6	412	454	56	0	869	1,000	98	2,895
1-Jul	10	5,548	12	858	878	109	0	1,655	1,856	181	5,548
2-Jul	11	2,698	6	451	431	53	0	799	873	85	2,698
3-Jul	12	-152	0	-27	-24	-3	0	-45	-48	-5	-152
4-Jul	13	826	2	158	134	16	0	242	249	24	826
5-Jul	14	891	2	182	146	18	0	259	259	25	891
6-Jul	15	4,937	12	1,068	817	99	0	1,425	1,383	132	4,937
7-Jul	16	3,150	8	721	526	63	0	903	848	80	3,150
8-Jul	17	1,402	4	338	236	28	0	399	362	34	1,402
9-Jul	18	1,100	3	279	187	22	0	311	272	26	1,100
10-Jul	19	798	2	212	137	16	0	224	189	18	798
11-Jul	20	1,718	5	478	297	35	0	480	388	36	1,718
12-Jul	21	2,268	7	659	395	47	0	629	488	45	2,268
13-Jul	22	1,498	5	454	263	31	0	412	306	28	1,498
14-Jul	23	2,003	6	631	354	42	0	548	387	35	2,003
15-Jul	24	1,025	3	336	183	21	0	278	187	17	1,025
16-Jul	25	648	2	220	117	14	0	175	111	10	648
17-Jul	26	272	1	96	49	6	0	73	44	4	272
18-Jul	27	120	0	44	22	3	0	32	18	2	120
19-Jul	28	285	1	107	52	6	0	75	40	3	285
20-Jul	29	323	1	126	60	7	0	85	41	3	323
21-Jul	30	342	1	137	64	7	0	89	40	3	342
22-Jul	31	298	1	123	56	6	0	77	32	2	298
23-Jul	32	221	1	94	42	5	0	57	21	1	221
24-Jul	33	144	1	63	28	3	0	37	12	1	144
25-Jul	34	200	1	90	39	4	0	50	15	1	200
26-Jul	35	125	1	58	24	3	0	31	8	0	125
		42,703	106	9,162	7,056	855	0	12,340	12,036	1,149	42,703
			0.2%	21.5%	16.5%	2.0%	0.0%	28.9%	28.2%	2.7%	100.0%

Summary

	Number	Percent
Age 3	106	0.2%
Age 4	21,502	50.4%
Age 5	19,091	44.7%
Age 6	2,004	4.7%
Male	25,524	59.8%
Female	17,179	40.2%

Table 10. Kwiniuk River counting tower climatological and stream observations, Norton Sound 1995.

Date	Time	Air Temp °C	Water Temp °C	Cloud Cover %	Water Gauge Inches	Water Visibility
21-Jun	1400	16.0	14.0	10%		clear
22-Jun	1230	10.0	10.0	100%	17.5	clear
23-Jun	1230	13.0	10.0	15%		clear
24-Jun	1230	14.0	11.0	25%		clear
25-Jun	1630	10.0	8.0	100%		clear
26-Jun	1200	8.0	7.0	100%		clear
27-Jun	1230	12.0	8.0	40%		clear
28-Jun	1145	16.0	12.0	30%		clear
29-Jun	1155	18.0	13.0	30%	31.5	clear
30-Jun	1230	15.0	14.0	100%	30.0	fair
1-Jul	1240	13.0	14.0	80%	37.0	fair
2-Jul						fair
3-Jul	1200	10.0	8.0	100%	28.0	fair
4-Jul	1200	8.0	8.0	100%	24.0	fair
5-Jul	1200	10.0	8.0	100%	24.8	fair
6-Jul	1200	16.0	10.0	67%	23.3	clear
7-Jul	1200	14.0	12.0	100%	29.5	fair
8-Jul	1230	10.0	10.0	100%	52.0	poor
9-Jul						
10-Jul	1200	17.0	11.0	10%	32.0	clear
11-Jul	1430	15.0	13.0	10%	33.0	clear
12-Jul	1230	13.0	13.0	100%	36.0	fair
13-Jul	1400	14.0	13.0	50%	34.0	fair
14-Jul	1230	15.0	14.0	10%	31.0	excellent
15-Jul	1130	11.0	14.0	100%	22.0	fair
16-Jul						
17-Jul	1430	14.0	14.0	100%	22.0	good
18-Jul	1330	11.0	11.0	100%	21.0	good
19-Jul	1330	15.0	13.0	70%	21.0	excellent
20-Jul	1130	12.0	11.0	100%	26.0	excellent
21-Jul	1218	16.0	14.0	60%	28.0	excellent
22-Jul	1700	16.0	14.0	90%	19.0	excellent
23-Jul						excellent
24-Jul	1854	21.0	15.0	25%	20.0	
25-Jul	1300	17.0	13.0	5%	32.0	excellent
26-Jul	1326	17.0	13.0	0%	21.0	excellent

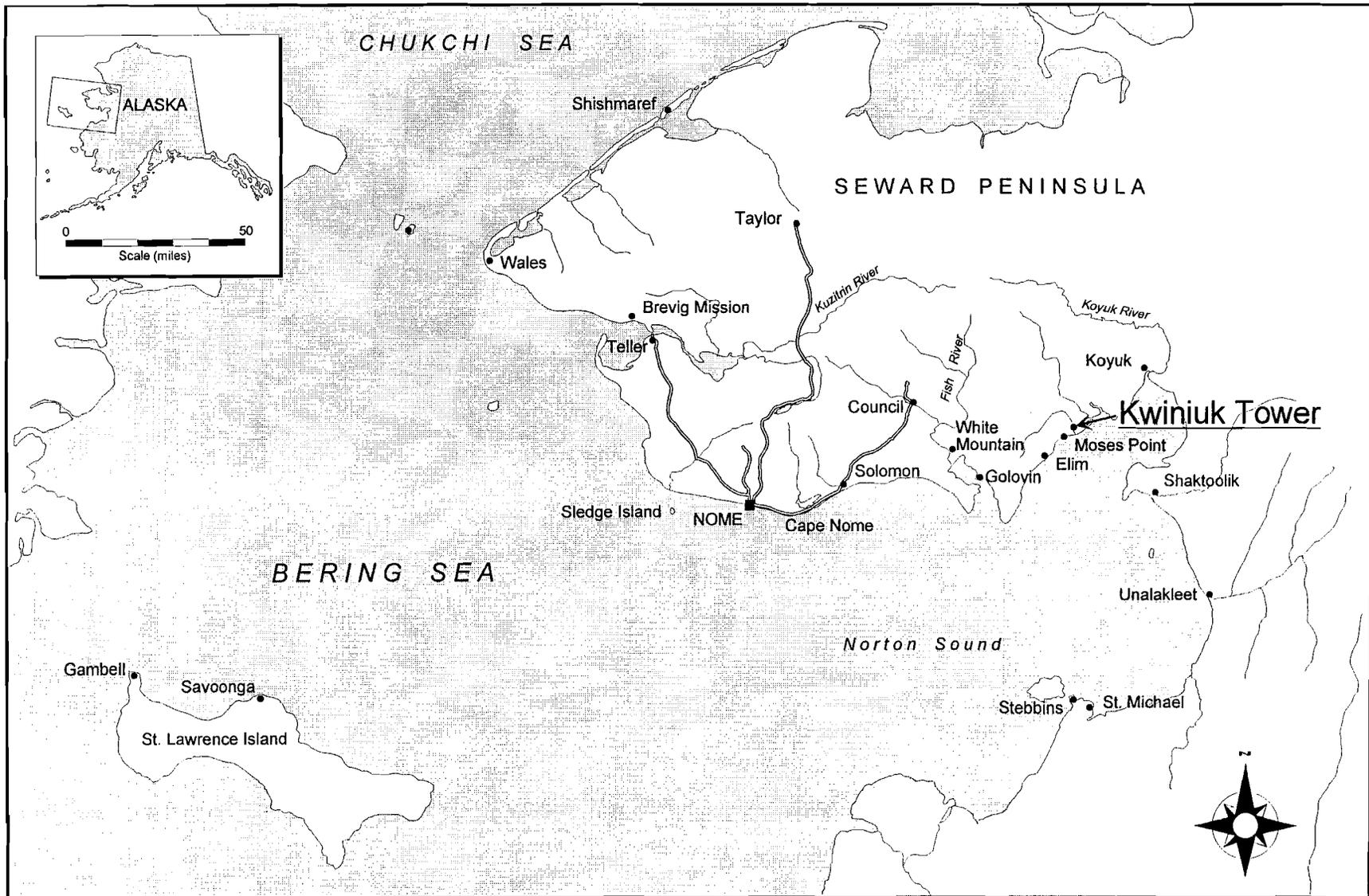


Figure 1. Area location map of the Kwiniuk River counting tower project site, Norton Sound, 1995.

Figure 2. Daily chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

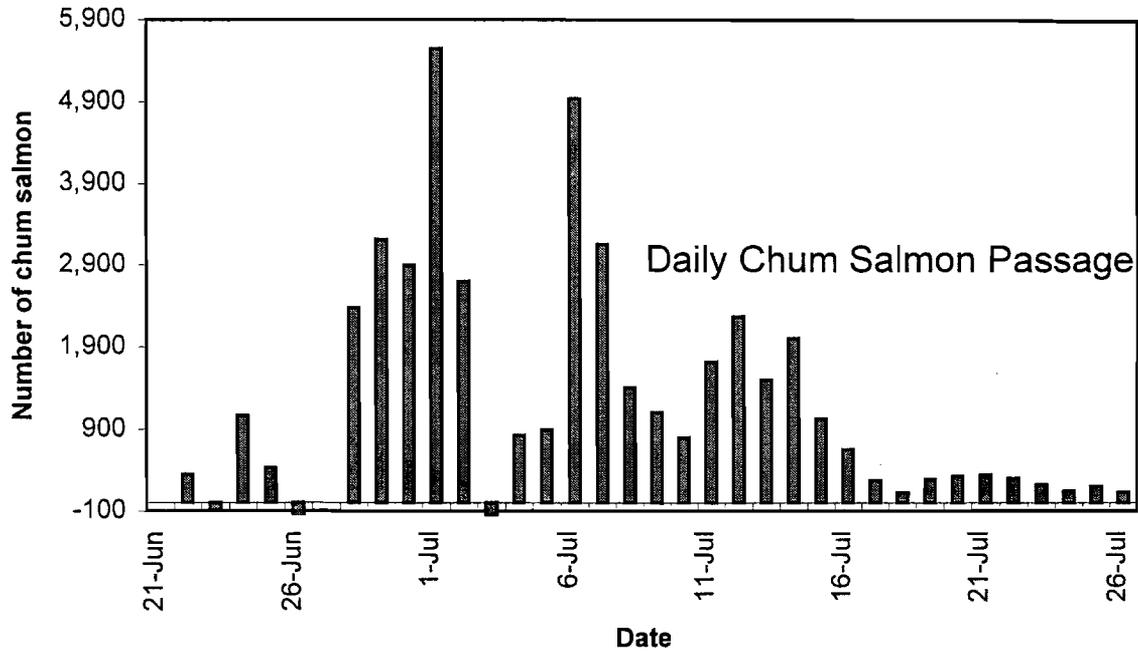


Figure 3. Cumulative chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

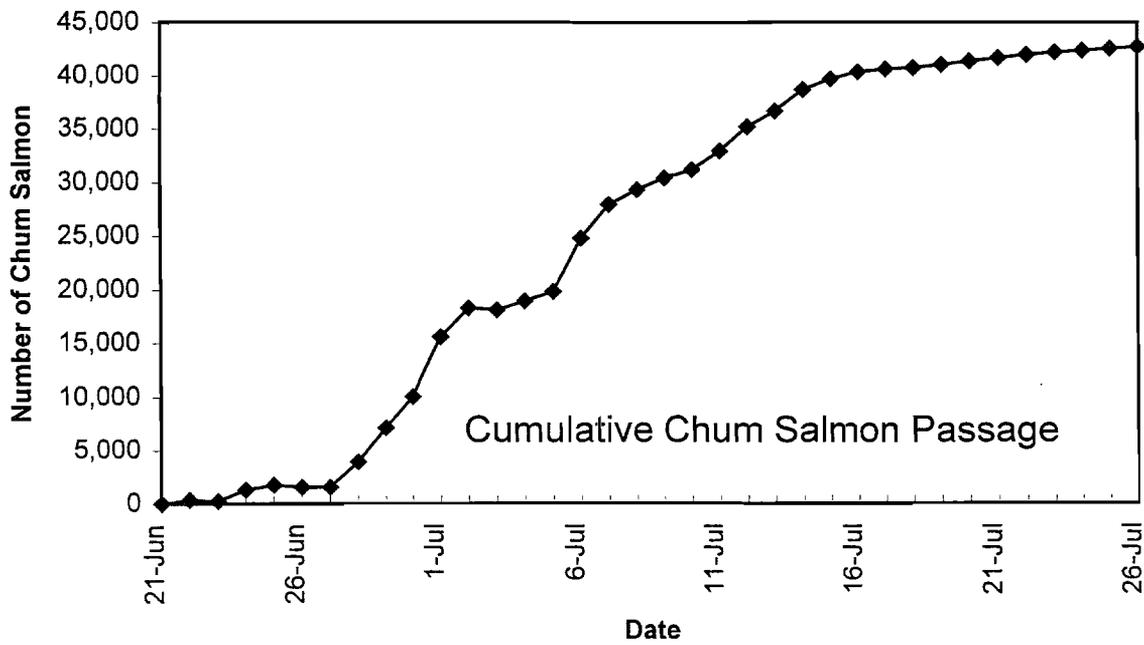


Figure 4. Daily pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

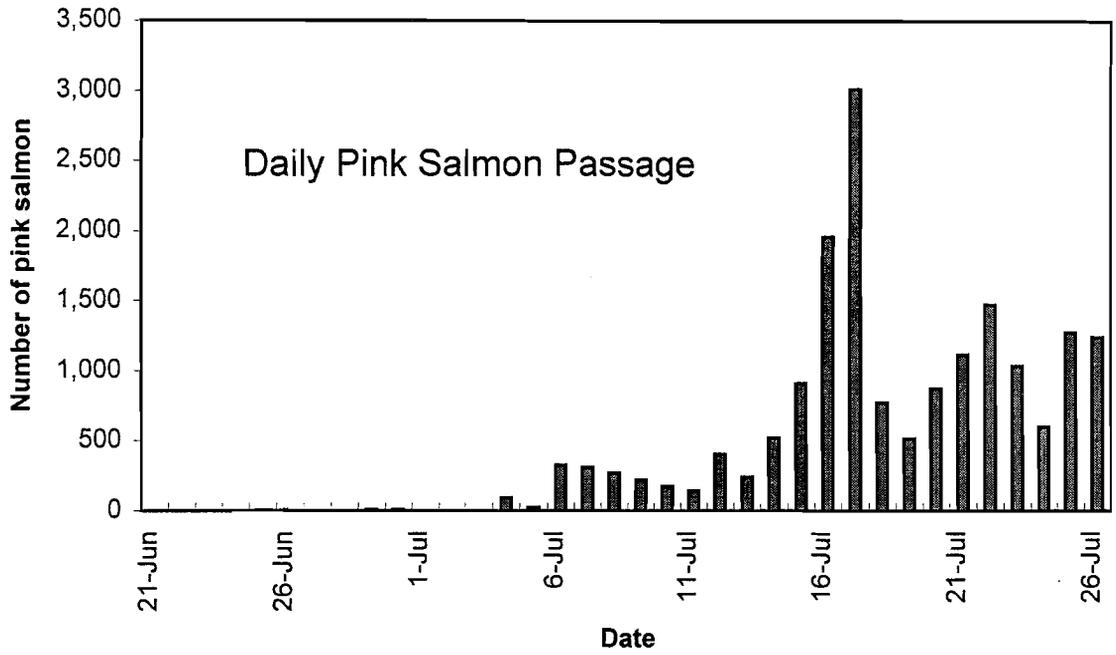


Figure 5. Cumulative pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

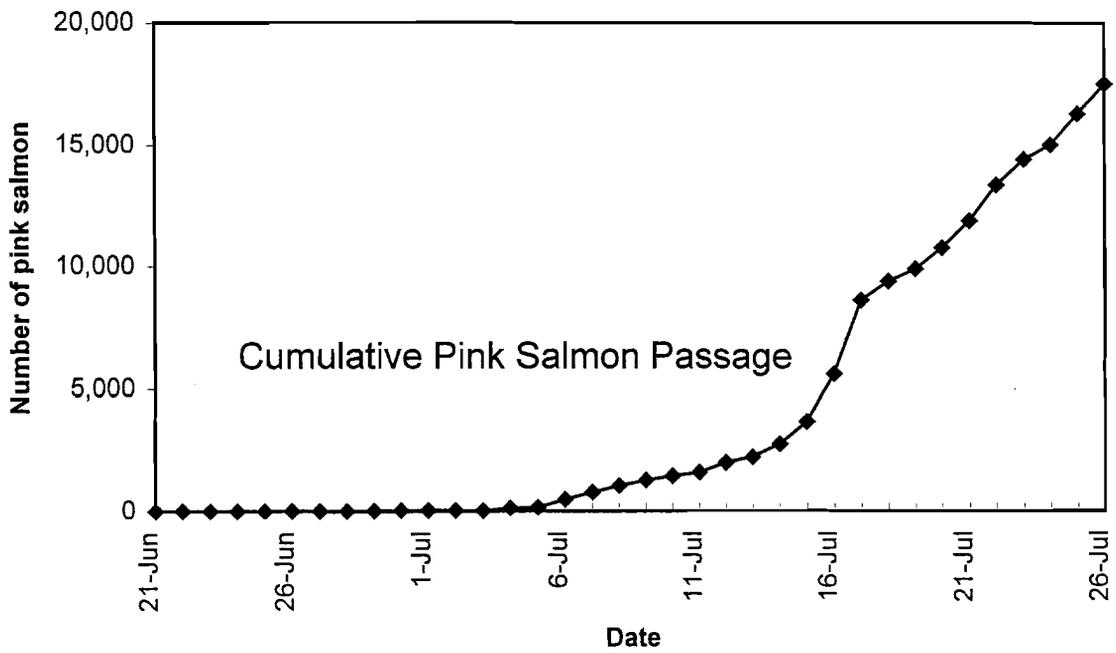


Figure 6. Daily king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

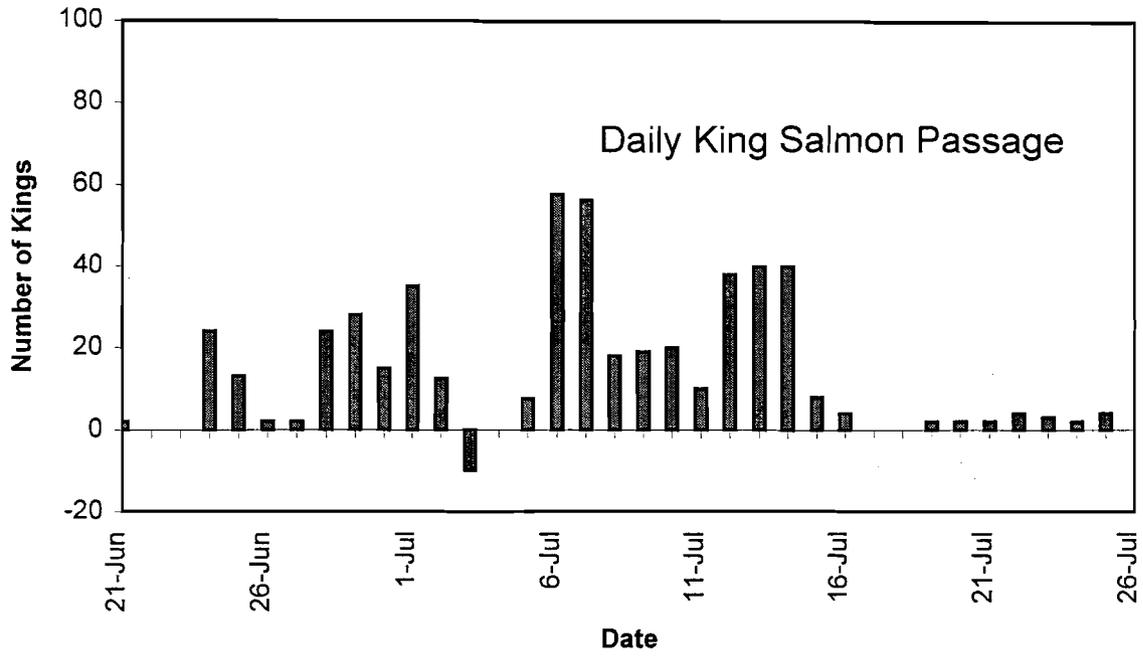


Figure 7. Cumulative king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

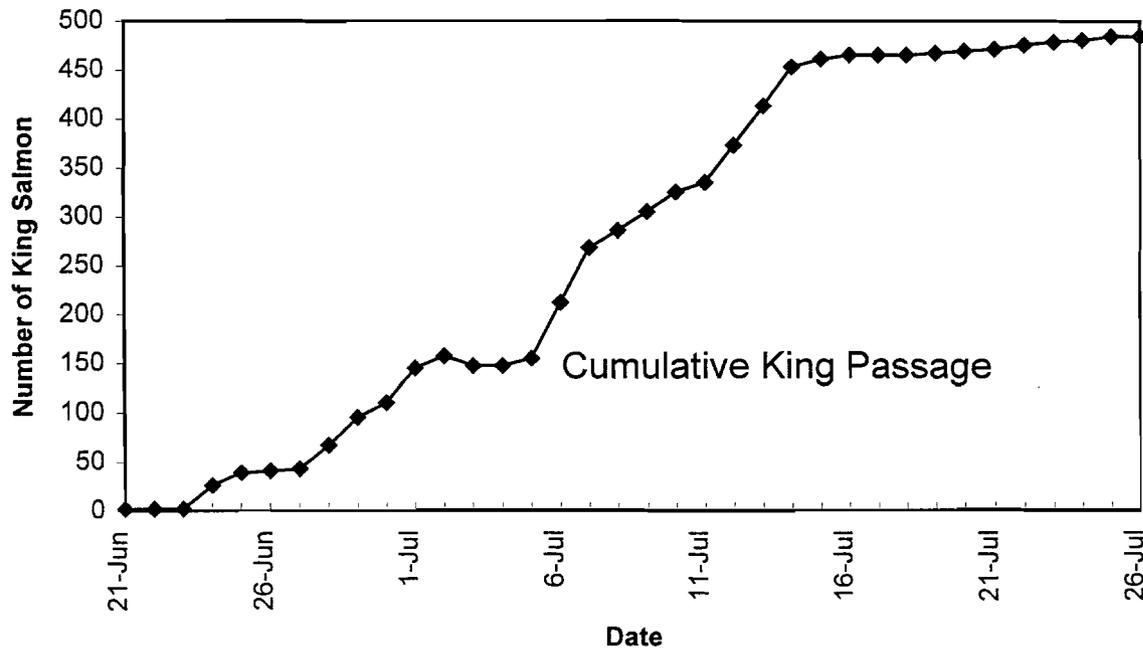


Figure 8. Daily coho salmon migration past the Kwiniuk River Counting Tower, Norton Sound, 1995.

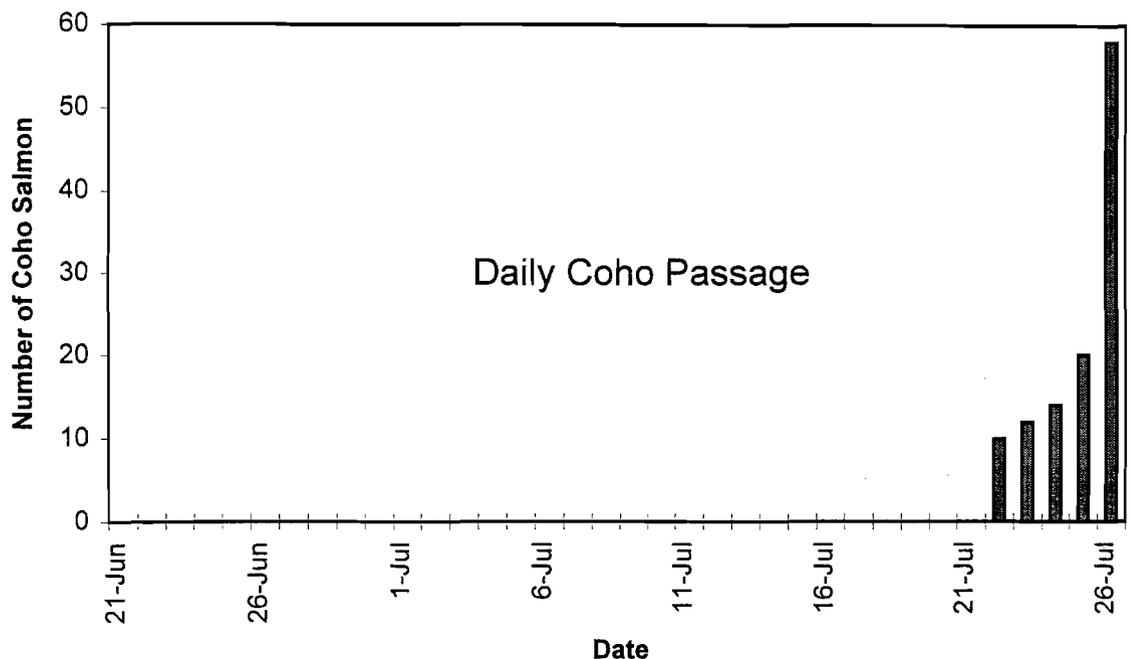


Figure 9. Cumulative coho salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

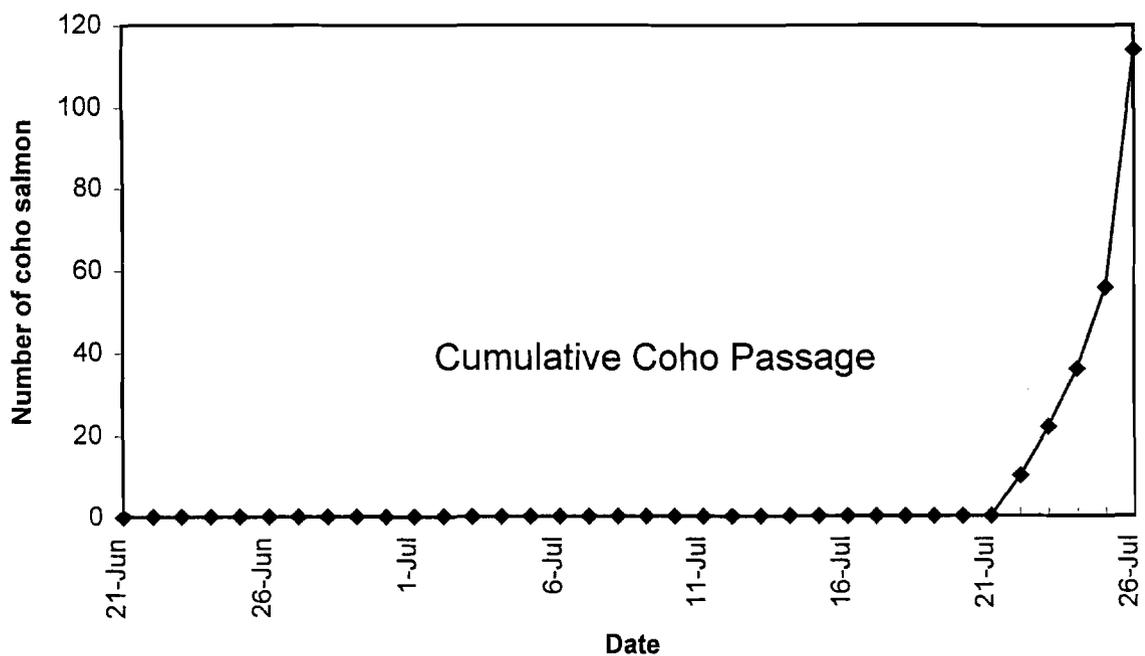


Figure 10. Diurnal pattern of chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

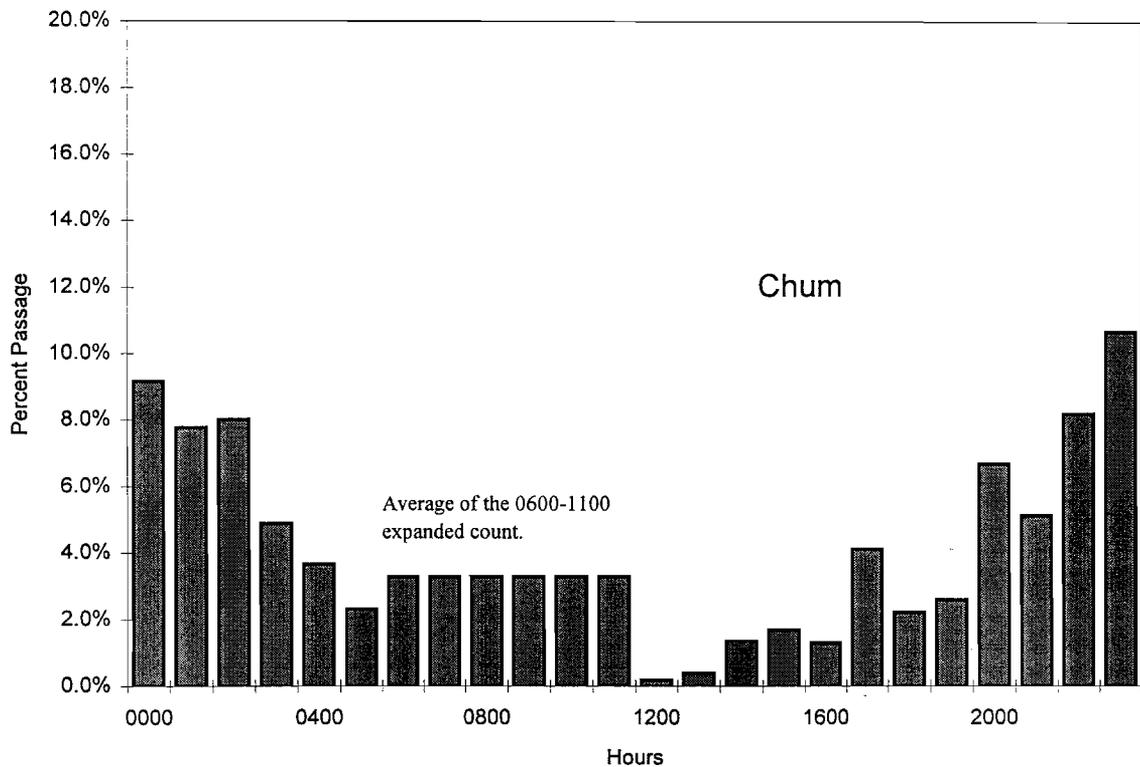


Figure 11. Diurnal pattern of pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

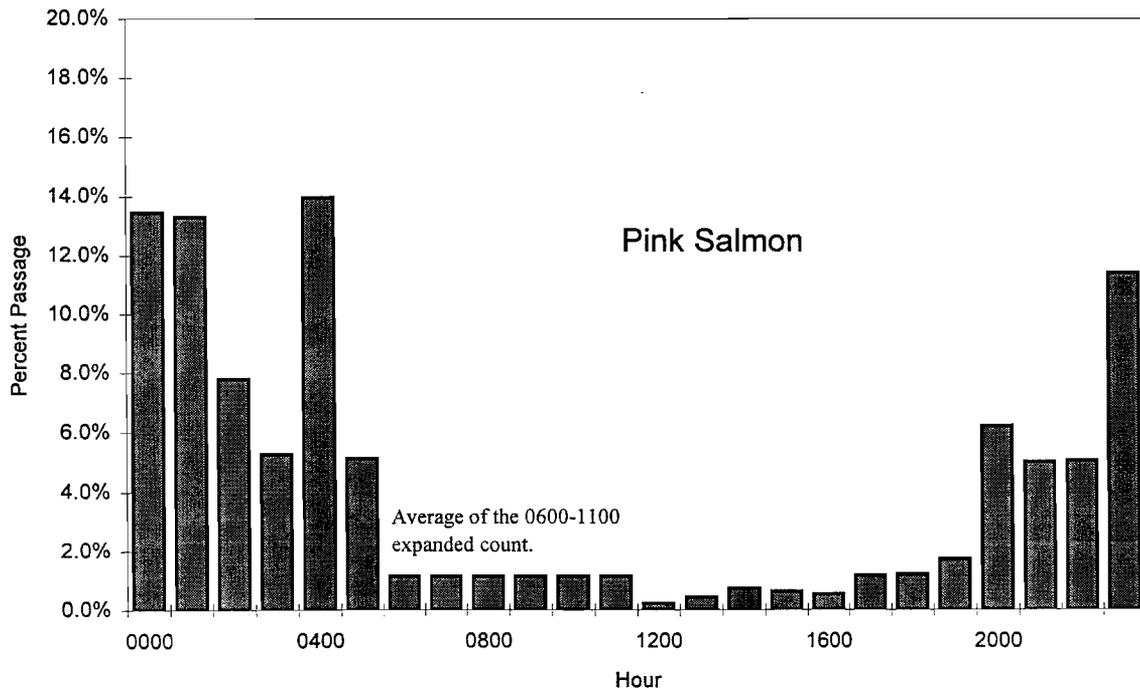


Figure 12. Diurnal pattern of king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

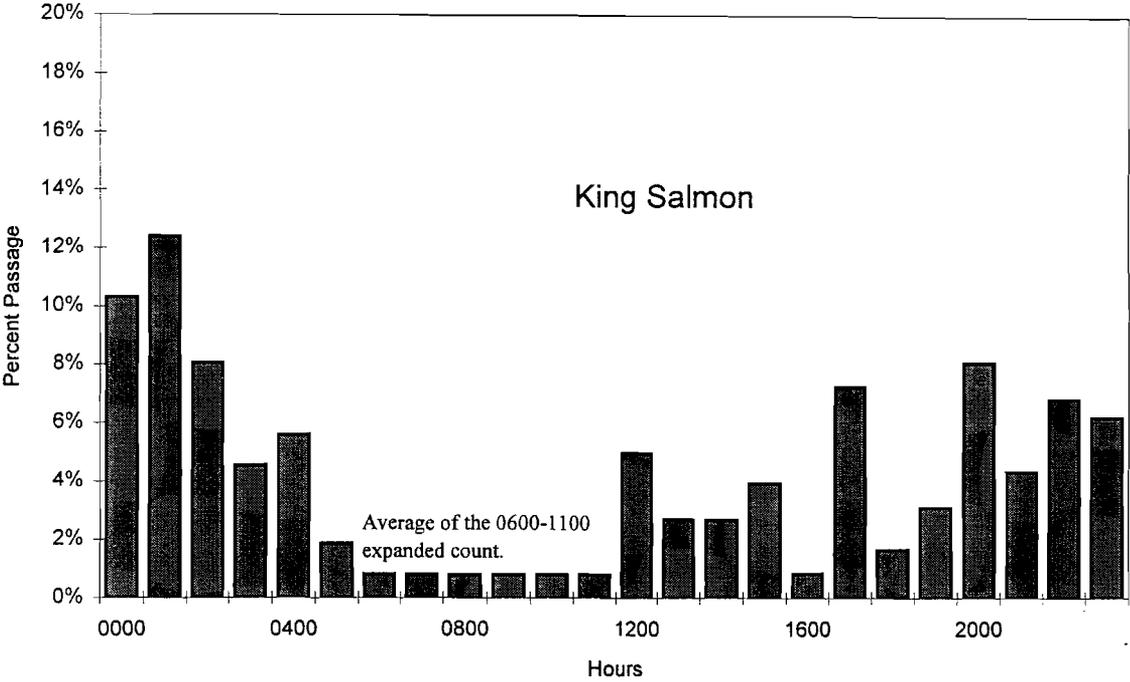


Figure 13. Diurnal pattern of coho salmon migration past the Kwiniuk River counting tower, Norton Sound, 1995.

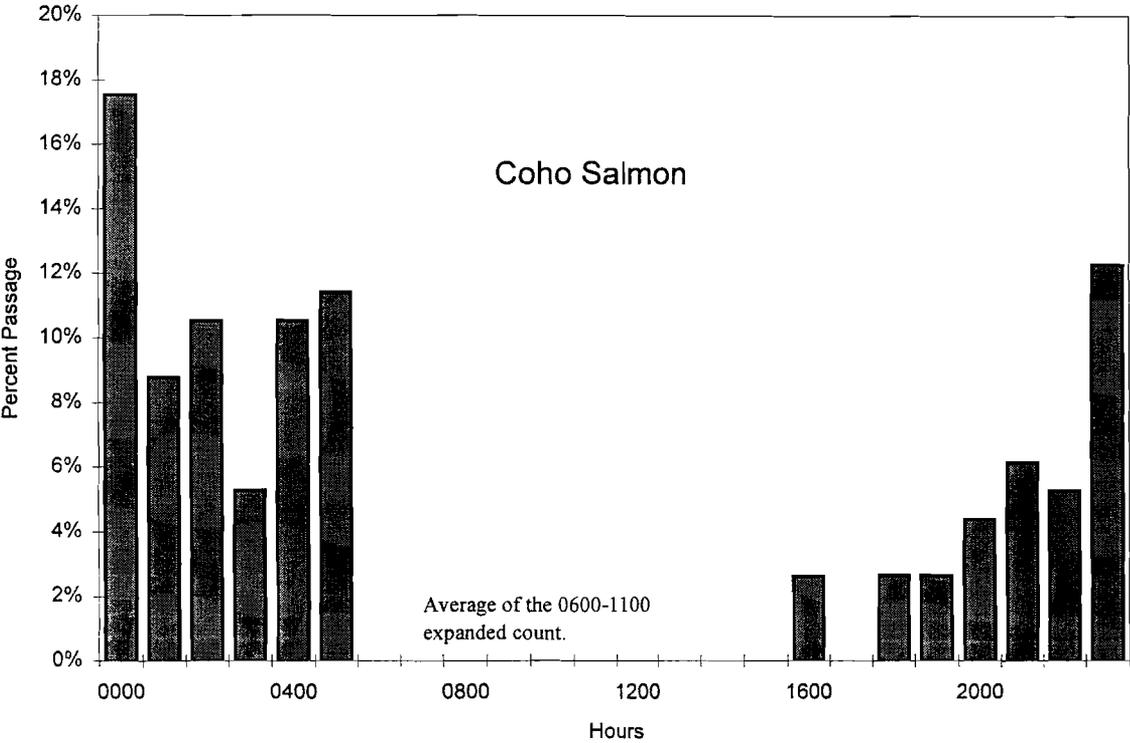


Figure 14. Chum salmon length frequency distribution, Kwiniuk River counting tower, Norton Sound, 1995.

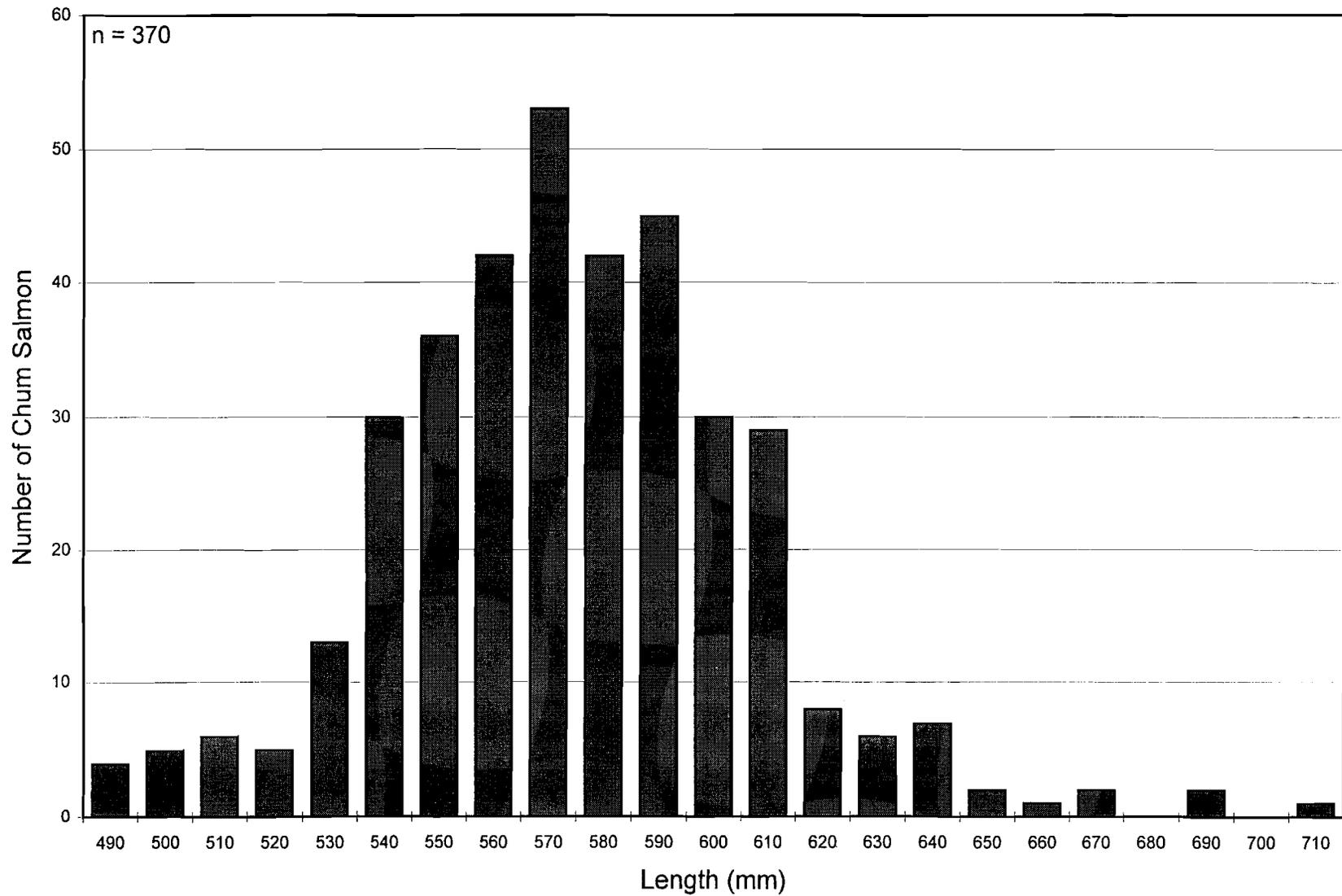
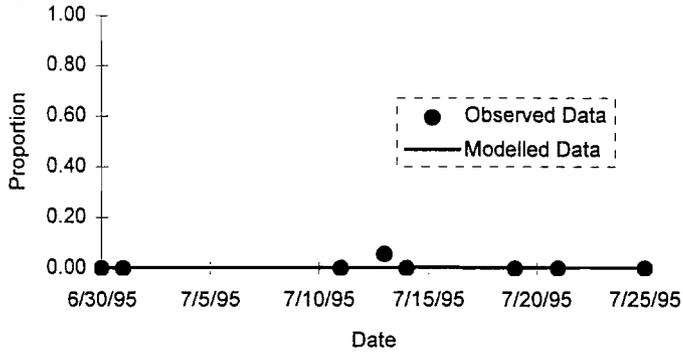
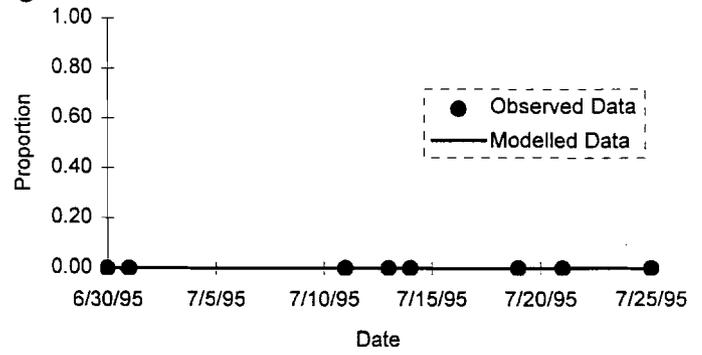


Figure 15. Chum salmon age and sex models, Kwiniuk River counting tower, Norton Sound, 1995.

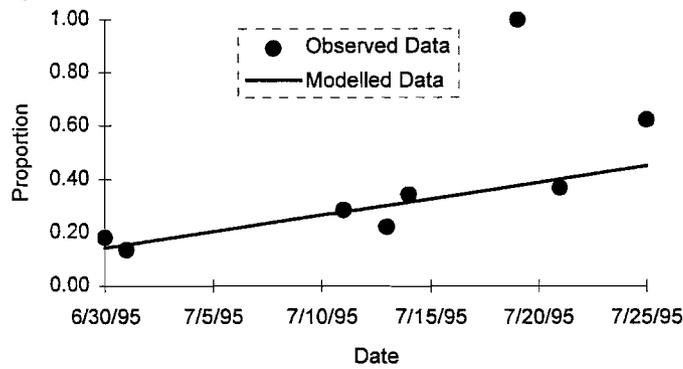
Age 3 Female



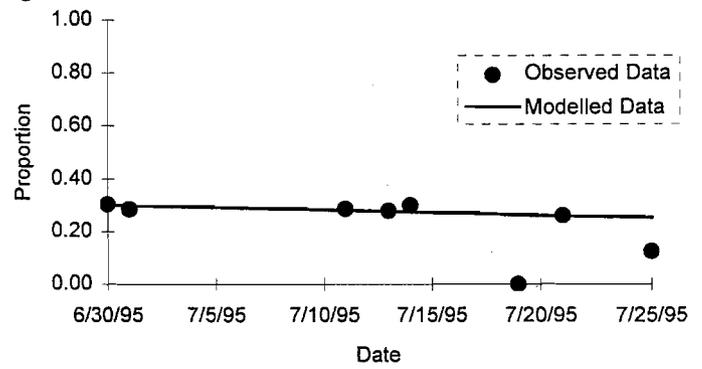
Age 3 Male



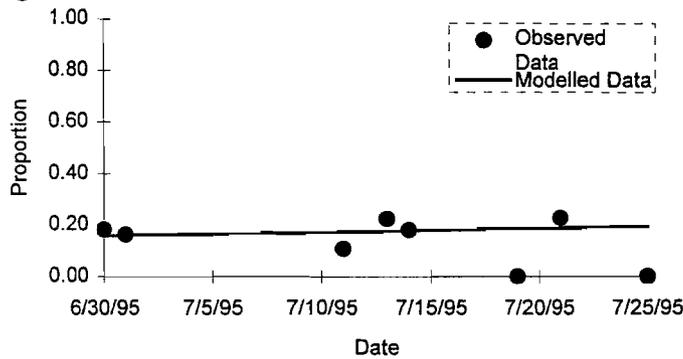
Age 4 Female



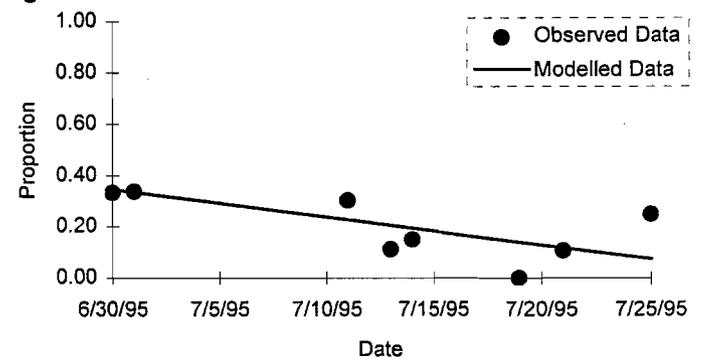
Age 4 Male



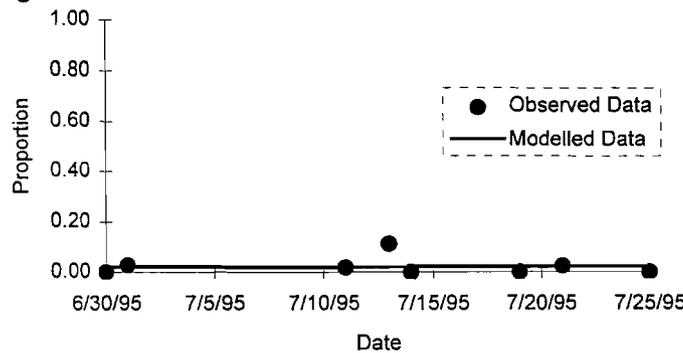
Age 5 Female



Age 5 Male



Age 6 Female



Age 6 Male

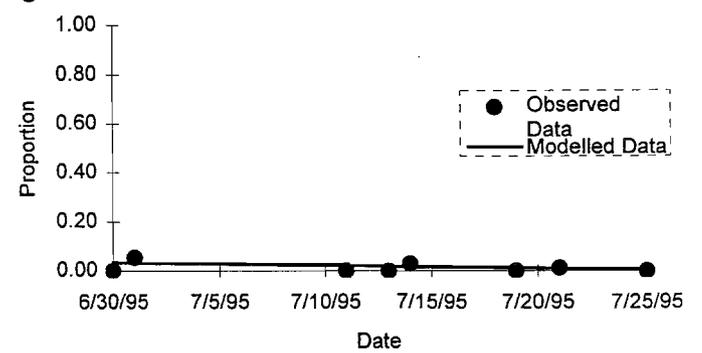


Figure 16. Annual chum salmon passage past the Kwiniuk River counting tower, Norton Sound, 1965-1995.

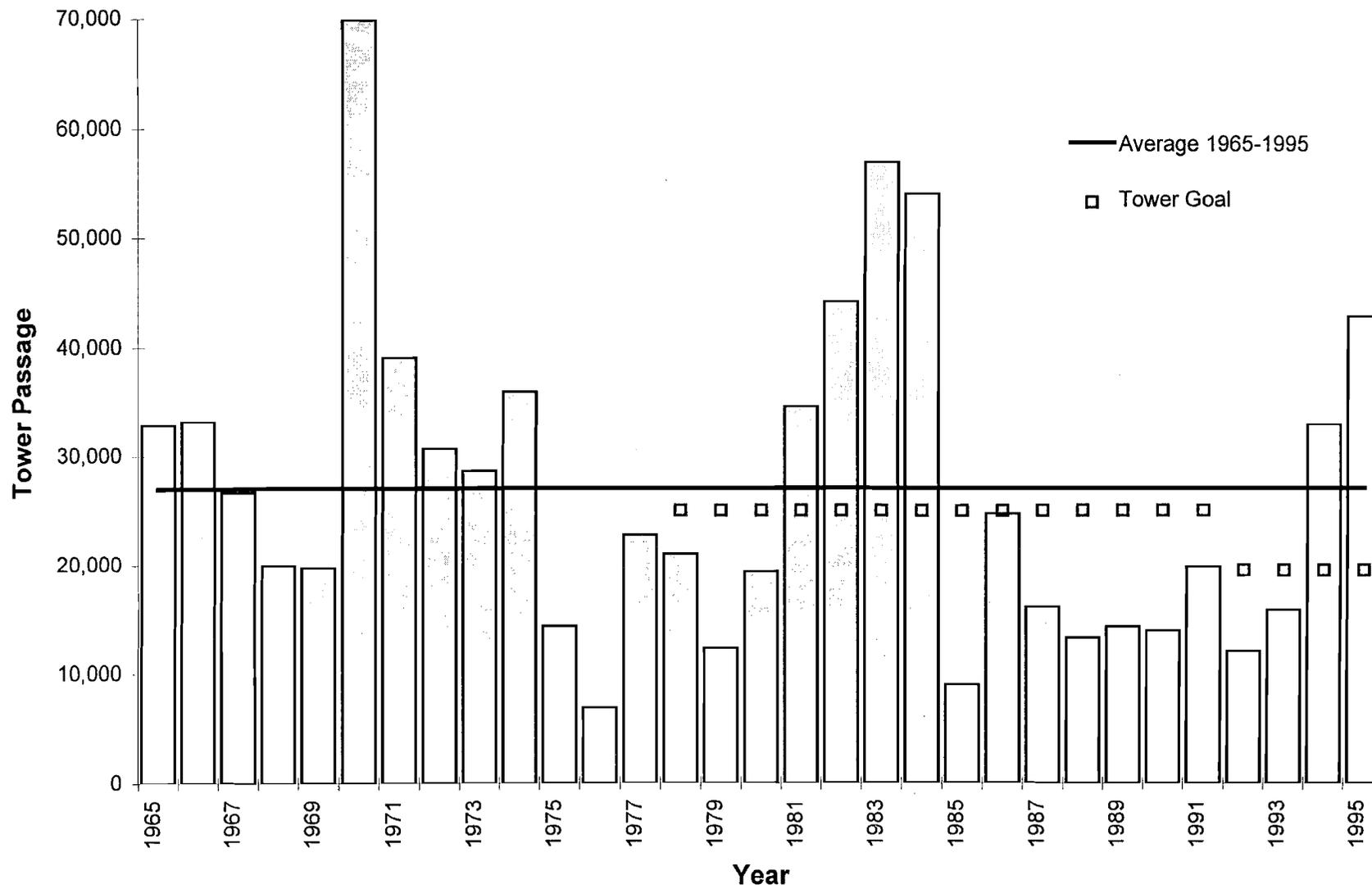


Figure 17. Chum salmon run-timing models for the Kwiniuk River, Norton Sound, 1965-1995.

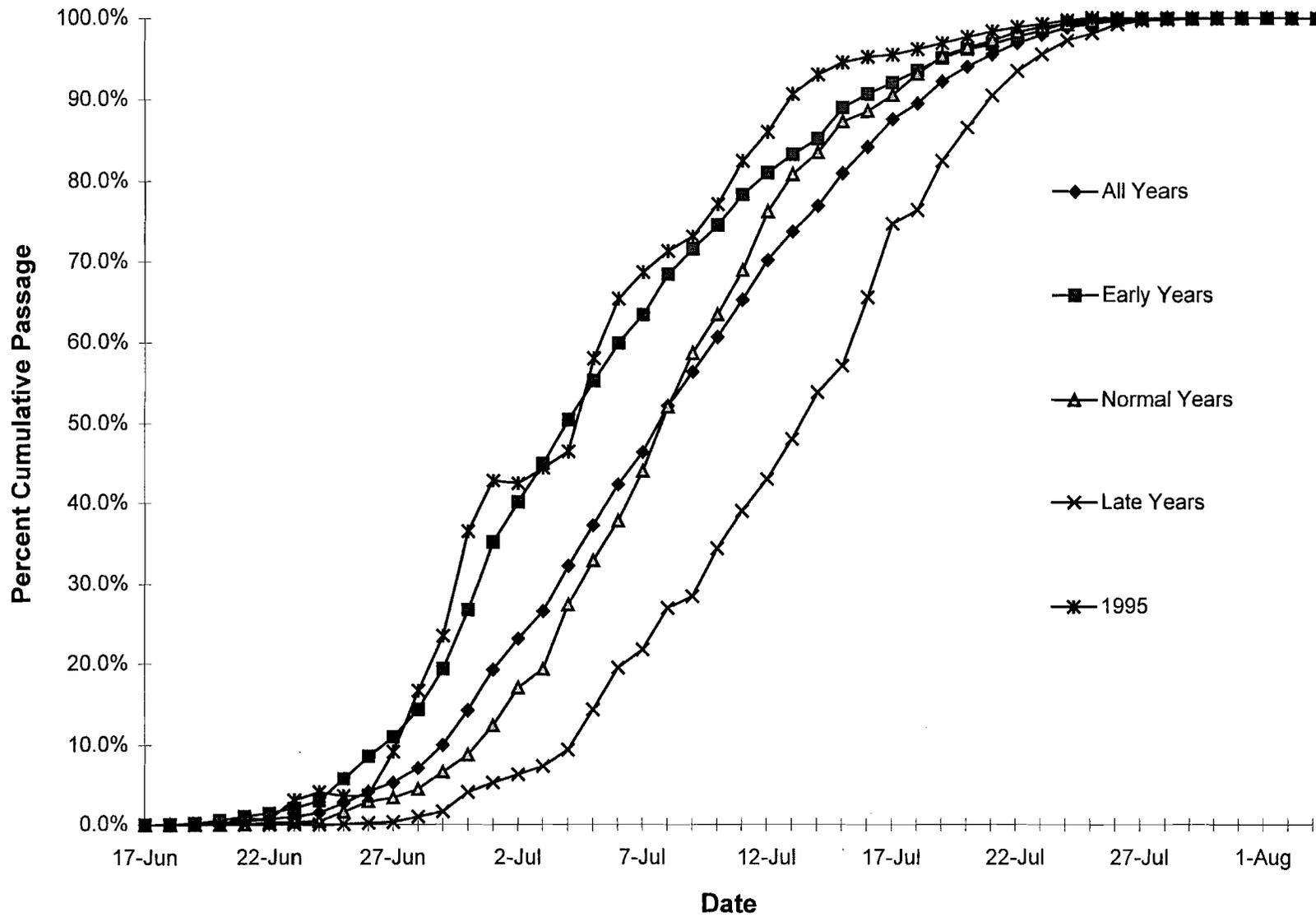


Figure 18. Annual pink salmon passage past the Kwiniuk River counting tower, Norton Sound, 1981-1995.

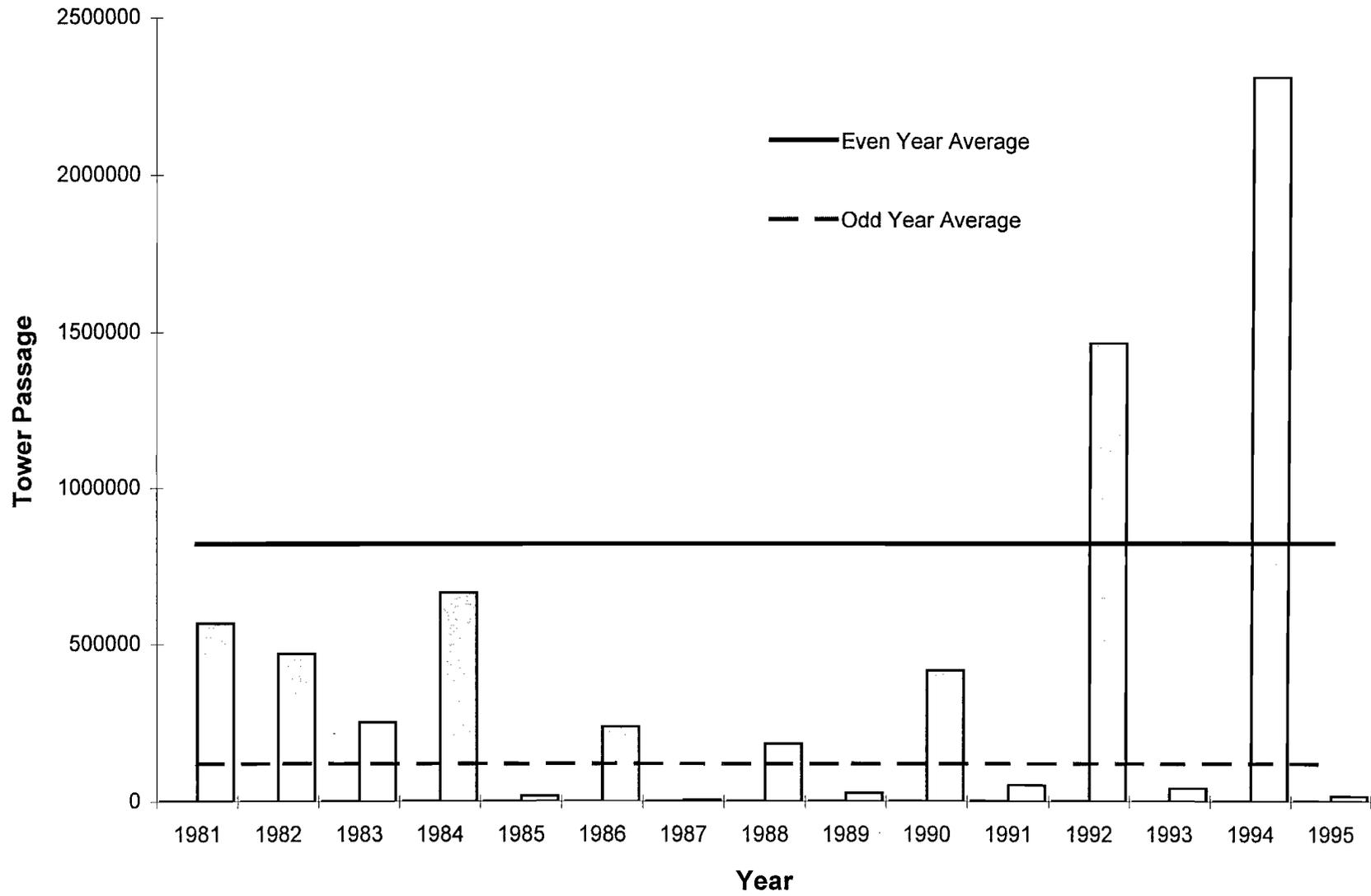
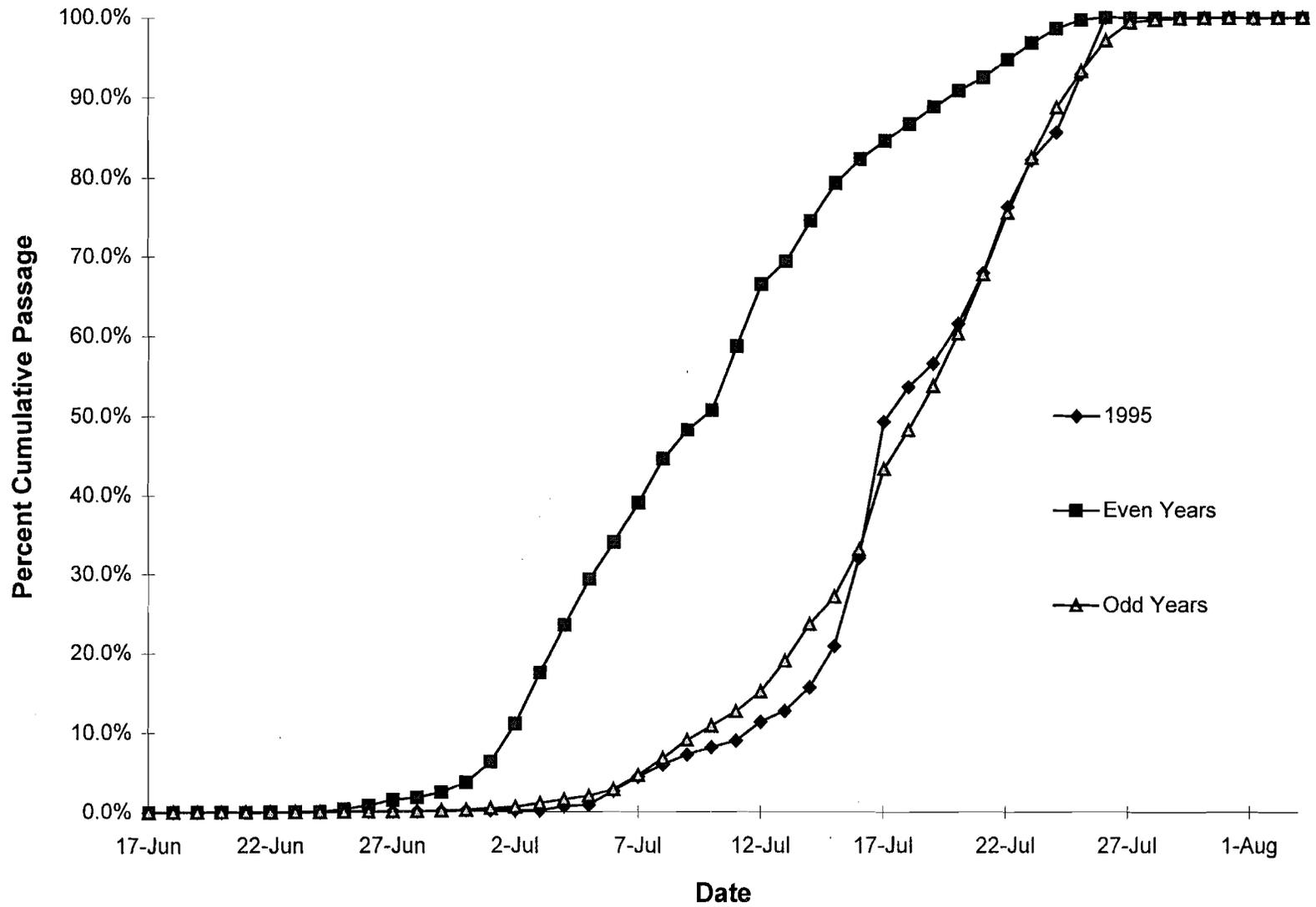


Figure 19. Pink salmon run-timing, Kwiniuk River counting tower, Norton Sound, 1981-1995.



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Figure 20. Annual king salmon passage past the Kwiniuk River counting tower, Norton Sound, 1981-1995.

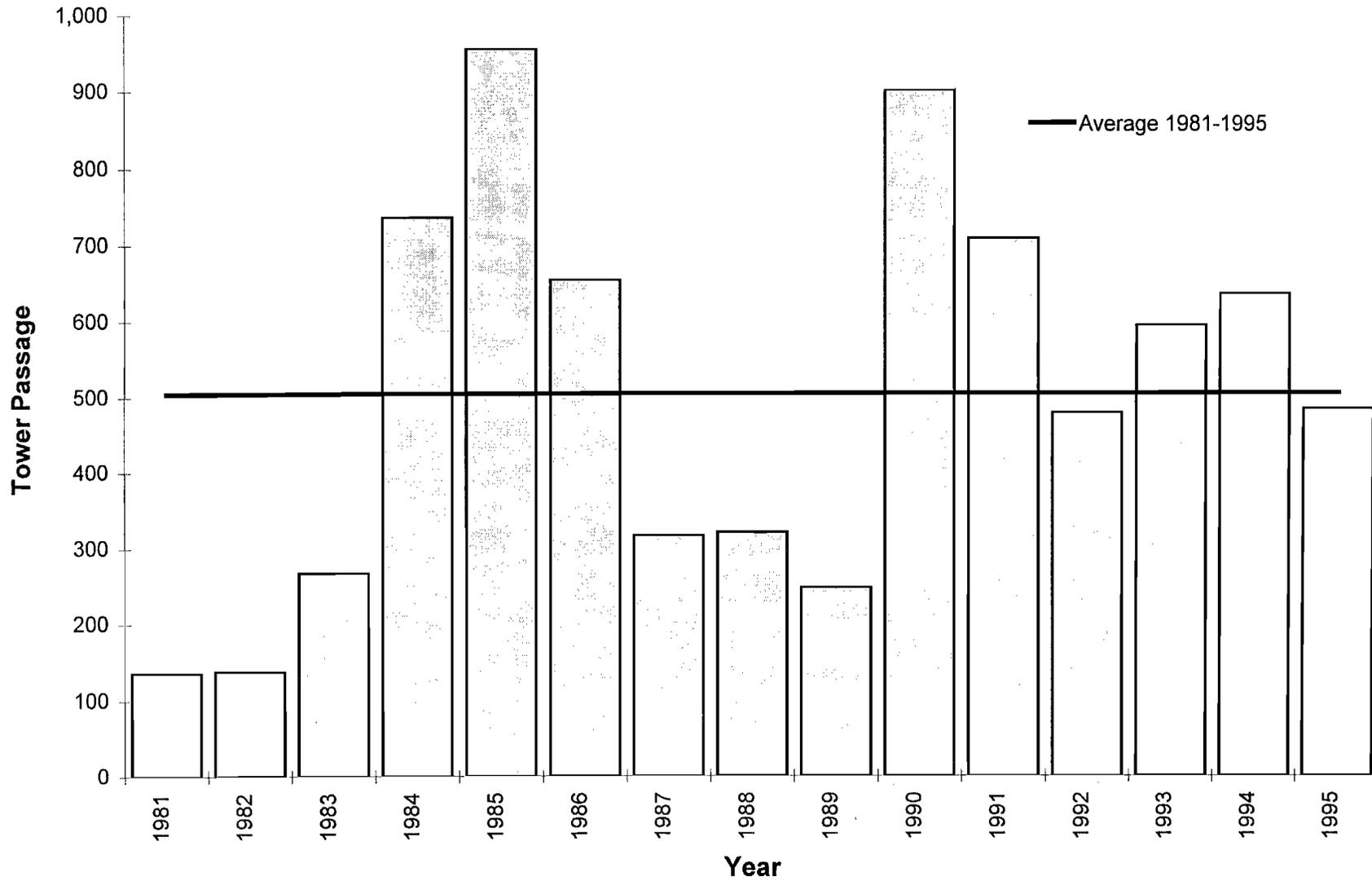
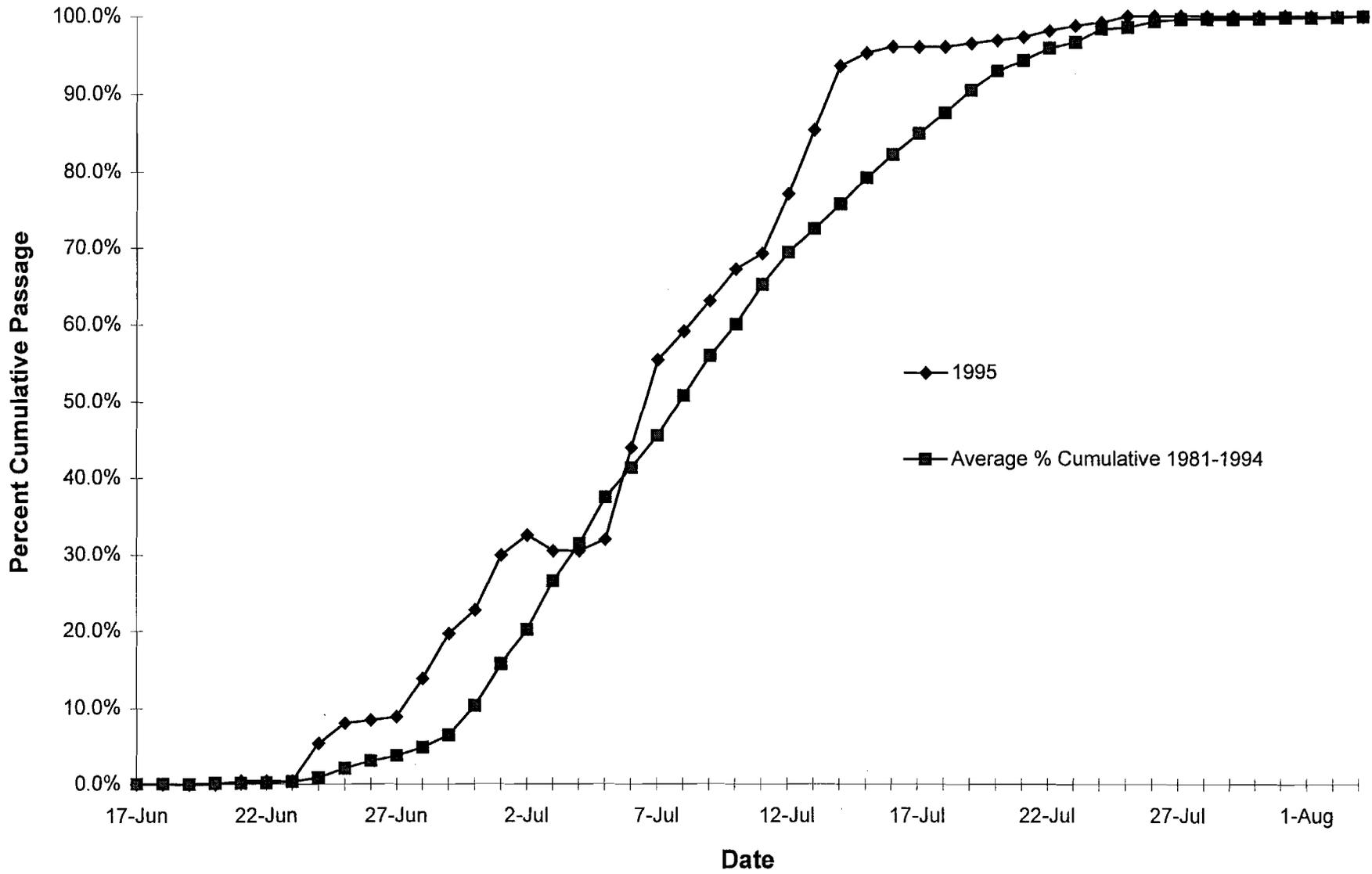


Figure 21. King salmon run-timing, Kwiniuk River counting tower, Norton Sound, 1981-1995.



Appendix Table 1. Cumulative expanded daily chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1965-1995.

Timing Date	Day	Normal 1965a	Normal 1966b	Normal 1967b	Early 1968	Normal 1969	Normal 1970cd	Late 1971d	Normal 1972d	Late 1973d	Early 1974d
17-Jun	1										
18-Jun	2	6									
19-Jun	3	6	24								16
20-Jun	4	6	50								81
21-Jun	5	6	158								82
22-Jun	6	6	506								206
23-Jun	7	6	759								489
24-Jun	8	6	1,048	5							970
25-Jun	9	6	597	24	66		2			11	1,136
26-Jun	10	6	1,060	77	231	57	17	23		13	3,386
27-Jun	11	6	1,189	270	1,066	113	682	32		17	5,153
28-Jun	12	218	1,697	315	1,812	427	1,772	97	34	17	7,088
29-Jun	13	983	1,768	1,455	2,838	571	2,413	142	52	17	8,534
30-Jun	14	2,576	2,180	2,148	3,509	1,475	4,105	200	161	26	10,011
1-Jul	15	3,445	3,728	2,739	4,443	2,057	5,152	461	610	99	11,503
2-Jul	16	7,741	7,619	3,027	5,971	2,744	8,309	743	1,404	211	14,065
3-Jul	17	3,794	8,054	3,491	5,914	3,861	16,525	1,206	1,641	410	16,003
4-Jul	18	9,988	10,050	5,647	8,427	6,056	23,066	3,433	2,852	1,546	17,342
5-Jul	19	11,050	11,958	6,157	9,409	7,137	29,014	4,883	4,230	4,640	18,349
6-Jul	20	12,078	13,184	9,605	10,247	8,107	32,993	6,308	5,426	5,037	19,461
7-Jul	21	12,502	13,703	13,088	12,428	9,314	33,883	6,668	9,472	3,140	19,888
8-Jul	22	13,445	15,703	15,691	15,033	10,368	37,178	10,901	12,354	8,673	20,181
9-Jul	23	13,824	17,703	18,513	16,720	11,727	42,607	11,781	14,686	9,056	20,549
10-Jul	24	15,630	17,472	21,487	18,003	12,197	42,964	13,682	16,583	15,337	20,774
11-Jul	25	19,147	19,551	23,459	18,284	12,577	46,862	17,257	17,905	15,659	22,087
12-Jul	26	22,518	25,549	25,165	18,349	13,200	50,053	19,087	22,191	16,645	23,223
13-Jul	27	23,491	27,225	26,473	18,415	14,198	50,495	19,752	23,480	17,128	24,179
14-Jul	28	26,444	27,579	26,459	18,431	14,379	53,115	20,998	25,523	19,342	25,611
15-Jul	29	32,026	28,604	26,532	18,564	15,057	59,893	21,296	25,922	20,079	31,899
16-Jul	30	32,190	28,336	26,584	18,590	16,634	63,295	22,369	25,836	20,561	32,855
17-Jul	31	32,437	28,384	26,398	18,601	17,117	65,645	27,521	26,682	22,866	33,254
18-Jul	32	32,503	29,965	26,625	18,636	18,345	66,144	27,910	27,857	24,581	34,089
19-Jul	33	32,861	31,884	26,631	18,760	18,707	66,714	31,324	28,581	25,757	34,603
20-Jul	34		32,154	26,631	18,315	18,918	68,806	34,510	28,967	26,541	34,800
21-Jul	35		32,389		18,347	19,233	68,851	35,197	29,101	27,877	34,927
22-Jul	36		32,723		18,907	19,373	69,203	35,977	29,629	27,915	35,014
23-Jul	37		32,938		18,951	19,390	69,320	36,256	30,077	28,149	35,404
24-Jul	38		33,000		19,976	19,525	69,483	36,945	30,381	28,596	35,714
25-Jul	39		33,137			19,534	69,697	37,735	30,625	28,618	35,868
26-Jul	40		33,153			19,749	69,736	38,471	30,686		35,899
27-Jul	41		33,153				69,752	38,907			
28-Jul	42		33,184				69,755	38,988			
29-Jul	43						69,758	39,046			
30-Jul	44										
31-Jul	45										
1-Aug	46										
2-Aug	47										
3-Aug	48										
Total		32,861	33,184	26,631	19,976	19,749	69,758	39,046	30,686	28,618	35,899

^a Although no counts were made from 6/19-6/27, crew notes indicate that few salmon passed during this period.

^b The last daily count was dropped because it resulted in a net decrease in escapement, probably caused by downstream movement of post-spawning salmon.

^c Counts for 6/27-6/28 estimated from the 1965-1993 "Normal" run-timing model. This year was excluded from the computation of mean run-timing models.

^d Reported counts are observed 18-hour counts expanded by 2.1%, based upon a comparison of 18-hour and 24-hour counts made from 1965 to 1969.

Appendix Table 1. (Page 2 of 4).

Timing Date	Day	Late 1975d	Late 1976d	Normal 1977d	Early 1978def	Late 1979de	Normal 1980d	Normal 1981g	Early 1982g	Early 1983g	Early 1984g
17-Jun	1				0						
18-Jun	2				3						
19-Jun	3				44			96		0	0
20-Jun	4				135			155		86	0
21-Jun	5				242			187	0	2,536	2
22-Jun	6				352		0	469	377	3,882	35
23-Jun	7				465		10	948	548	4,418	55
24-Jun	8				678		55	2,400	578	6,728	328
25-Jun	9				1,385		205	3,426	6,080	9,313	1,199
26-Jun	10				2,091		346	4,558	10,014	10,166	3,419
27-Jun	11			12	2,589	14	398	5,125	11,026	10,434	5,352
28-Jun	12		6	277	3,220	192	652	5,185	11,537	13,406	6,941
29-Jun	13		32	478	4,261	300	1,006	5,656	12,137	13,832	9,221
30-Jun	14		34	692	5,769	1,963	1,122	7,037	12,914	14,800	15,109
1-Jul	15		107	2,139	7,561	2,231	3,654	7,772	12,301	23,056	17,735
2-Jul	16		137	2,985	8,749	2,365	3,603	7,975	13,831	23,215	22,830
3-Jul	17		199	4,220	9,815	2,642	3,508	11,630	16,723	25,632	28,207
4-Jul	18	74	437	4,704	10,418	2,902	3,728	13,514	19,691	27,176	30,500
5-Jul	19	371	762	6,192	11,344	2,945	5,379	13,307	22,421	31,905	31,922
6-Jul	20	743	903	7,197	13,044	3,296	6,862	15,130	22,943	34,050	35,755
7-Jul	21	853	1,118	8,469	14,106	3,478	8,219	16,458	26,528	37,315	32,972
8-Jul	22	1,006	1,547	12,200	15,247	3,669	11,195	16,801	31,371	42,605	34,269
9-Jul	23	1,160	1,656	14,988	16,055	4,603	11,812	19,792	34,300	44,551	35,110
10-Jul	24	1,476	1,813	16,547	16,770	5,326	12,357	20,322	34,630	46,222	40,961
11-Jul	25	1,927	2,205	18,498	17,468	5,532	12,968	20,721	35,015	47,120	47,847
12-Jul	26	2,089	2,694	19,669	18,753	5,644	14,090	22,904	36,681	47,392	49,289
13-Jul	27	2,403	3,413	19,853	19,189	6,367	15,793	23,864	38,306	48,120	49,972
14-Jul	28	3,502	3,532	20,284	19,461	7,010	15,542	25,647	38,790	48,368	51,207
15-Jul	29	3,217	3,953	21,034	20,202	8,312	15,782	27,207	39,609	48,798	51,683
16-Jul	30	7,550	4,328	21,151	20,505	9,389	16,081	28,049	39,959	49,885	52,049
17-Jul	31	9,696	4,910	21,440	20,601	9,962	16,852	28,758	40,270	51,320	53,274
18-Jul	32	10,662	5,002	21,691	20,872	9,097	17,521	29,665	41,059	51,480	53,314
19-Jul	33	12,169	5,219	21,943	20,869	10,488	18,118	30,142	41,791	52,552	53,339
20-Jul	34	12,942	5,533	22,098	20,935	10,912	18,656	31,362	43,007	54,298	53,490
21-Jul	35	13,717	5,894	22,273	20,997	11,512	19,078	32,159	43,400	55,088	53,707
22-Jul	36	14,099	6,147	22,547	21,002	12,189	19,165	32,352	43,600	55,504	53,722
23-Jul	37	14,255	6,432	22,655		12,280	19,291	33,355	43,939	56,360	53,897
24-Jul	38	14,328	6,518	22,722		12,322	19,329	33,936	43,917	56,625	53,970
25-Jul	39	14,344	6,620	22,757		12,355	19,358	34,226	43,995	56,688	54,043
26-Jul	40		6,815				19,362	34,307	44,099	56,763	
27-Jul	41		6,873				19,369	34,417		56,907	
28-Jul	42		6,912				19,372	34,417			
29-Jul	43		6,947					34,518			
30-Jul	44		6,956					34,537			
31-Jul	45		6,978					34,548			
1-Aug	46							34,561			
2-Aug	47							34,566			
3-Aug	48										
Total		14,344	6,978	22,757	21,002	12,355	19,372	34,566	44,099	56,907	54,043

^d Reported counts are observed 18-hour counts expanded by 2.1%, based upon a comparison of 18-hour and 24-hour counts made from 1965 to 1969.

^e Some missed counts were estimated. This footnote taken from the tower report. Estimation details not known.

^f Counts prior to 7/4 estimated from 1963-1993 "Early" run-timing model. This year was excluded from the computation of the mean run-timing models.

^g Reported counts are observed 18-hour counts expanded by weekly 24-hour counts.

Appendix Table 1. (Page 3 of 4).

Timing		Late	Early	Normal	Early	Early	Early	Late	Normal	Normal	Early
Date	Day	1985g	1986g	1987g	1988g	1989g	1990g	1991g	1992g	1993g	1994gh
17-Jun	1										
18-Jun	2				16			0			
19-Jun	3		0		241			0			
20-Jun	4		42		676			0			
21-Jun	5		44		682		18	0			
22-Jun	6		323		595		88	12			
23-Jun	7		879		623		100	36		7	58
24-Jun	8		1,137		775		206	22		5	158
25-Jun	9		1,017	92	1,993		406	63		17	562
26-Jun	10	0	1,101	228	2,881		530	239		351	1,046
27-Jun	11	0	1,396	238	3,439	0	528	335	0	463	1,018
28-Jun	12	6	2,771	749	3,722	0	558	900	0	585	2,422
29-Jun	13	119	3,807	1,761	6,336	0	1,142	1,309	803	563	3,772
30-Jun	14	168	5,035	1,851	7,495	2,318	2,716	1,913	1,021	1,287	5,392
1-Jul	15	169	6,325	2,709	8,317	6,203	4,040	2,714	1,173	1,459	8,974
2-Jul	16	169	7,888	2,847	8,891	6,684	5,112	3,620	1,876	2,311	10,650
3-Jul	17	220	9,642	4,095	9,217	7,130	5,948	3,992	2,209	3,276	12,977
4-Jul	18	103	11,299	6,555	9,262	7,898	6,975	3,948	3,562	3,857	15,953
5-Jul	19	987	12,860	7,976	9,478	8,136	7,719	4,692	4,590	4,054	16,395
6-Jul	20	2,563	14,050	8,351	9,878	8,240	8,709	5,831	5,291	4,657	19,085
7-Jul	21	3,703	14,601	9,137	9,966	9,352	9,125	6,535	5,663	5,326	19,668
8-Jul	22	3,332	15,263	10,055	10,409	10,284	9,407	6,805	6,219	5,632	19,971
9-Jul	23	2,032	15,493	11,255	10,549	10,803	9,554	9,008	7,525	5,743	21,434
10-Jul	24	2,255	15,573	11,253	10,759	10,909	9,652	9,336	8,250	7,558	22,843
11-Jul	25	3,111	16,888	11,885	11,038	10,959	10,294	9,742	8,637	9,114	24,107
12-Jul	26	3,945	16,995	12,392	11,532	11,569	10,500	10,066	9,014	10,412	26,013
13-Jul	27	4,966	17,170	12,774	11,655	12,447	10,483	10,558	9,381	11,888	26,867
14-Jul	28	6,139	18,130	13,219	11,926	12,771	10,607	11,030	9,613	12,663	27,452
15-Jul	29	6,371	19,874	14,288	12,177	13,149	10,950	11,483	9,843	13,002	29,161
16-Jul	30	6,996	20,216	14,376	12,303	13,436	11,512	12,147	10,159	13,087	30,259
17-Jul	31	7,956	20,603	15,412	12,303	13,631	11,856	12,965	10,466	13,270	31,083
18-Jul	32	8,153	20,906	15,522	12,358	13,851	12,704	13,373	10,810	13,713	31,633
19-Jul	33	8,342	22,126	15,610	12,586	13,955	13,037	13,787	11,013	14,415	31,881
20-Jul	34	8,434	22,840	15,675	12,775	13,999	13,325	14,427	11,075	14,712	31,948
21-Jul	35	8,556	23,047	15,733	12,885	14,057	13,443	15,357	11,207	14,991	32,025
22-Jul	36	8,626	23,600	16,078	13,067	14,081	13,594	16,576	11,506	15,241	32,231
23-Jul	37	8,700	24,038	16,134	13,191	14,111	13,778	17,784	11,619	15,421	32,251
24-Jul	38	8,800	24,519		13,257	14,148	13,889	18,894	11,724	15,508	32,270
25-Jul	39	8,836	24,649		13,296	14,206	13,957	19,260	11,869	15,607	32,288
26-Jul	40	8,907	24,705		13,302	14,224		19,756	11,973	15,718	32,378
27-Jul	41	8,990				14,282		19,800	12,035	15,823	32,616
28-Jul	42	9,013							12,077		32,747
29-Jul	43										32,783
30-Jul	44										32,810
31-Jul	45										32,828
1-Aug	46										32,834
2-Aug	47										32,837
3-Aug	48										32,837
Total		9,013	24,705	16,134	13,302	14,282	13,957	19,800	12,077	15,823	32,837

^g Reported counts are observed 18-hour counts expanded by weekly 24-hour counts.

^h Count cut off on 8/3/94 for formatting purposes. 38 more chum salmon counted through 8/9/94.

Appendix Table 1. (Page 4 of 4).

Timing

Date	Day	1995 ⁱ
17-Jun	1	
18-Jun	2	
19-Jun	3	
20-Jun	4	
21-Jun	5	345
22-Jun	6	248
23-Jun	7	1,314
24-Jun	8	1,742
25-Jun	9	1,534
26-Jun	10	1,536
27-Jun	11	3,910
28-Jun	12	7,121
29-Jun	13	10,016
30-Jun	14	15,564
1-Jul	15	18,262
2-Jul	16	18,110
3-Jul	17	18,935
4-Jul	18	19,827
5-Jul	19	24,763
6-Jul	20	27,913
7-Jul	21	29,315
8-Jul	22	30,414
9-Jul	23	31,212
10-Jul	24	32,931
11-Jul	25	35,198
12-Jul	26	36,696
13-Jul	27	38,699
14-Jul	28	39,724
15-Jul	29	40,372
16-Jul	30	40,644
17-Jul	31	40,764
18-Jul	32	41,049
19-Jul	33	41,372
20-Jul	34	41,714
21-Jul	35	42,012
22-Jul	36	42,234
23-Jul	37	42,378
24-Jul	38	42,578
25-Jul	39	42,703
26-Jul	40	
27-Jul	41	
28-Jul	42	
29-Jul	43	
30-Jul	44	
31-Jul	45	
1-Aug	46	
2-Aug	47	
3-Aug	48	
Total		42,703

ⁱ First days count is an aerial survey count

Appendix Table 2. Percent cumulated daily chum salmon run-timing at the Kwiniuk River tower, Norton Sound, 1965-1995.

Timing Date	Day	Normal 1965a	Normal 1966	Normal 1967	Early 1968	Normal 1969	Normal 1970 ^b	Late 1971	Normal 1972	Late 1973	Early 1974
17-Jun	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18-Jun	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19-Jun	3	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
20-Jun	4	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
21-Jun	5	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
22-Jun	6	0.0%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
23-Jun	7	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%
24-Jun	8	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%
25-Jun	9	0.0%	1.8%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	3.2%
26-Jun	10	0.0%	3.2%	0.3%	1.2%	0.3%	0.0%	0.1%	0.0%	0.0%	9.4%
27-Jun	11	0.0%	3.6%	1.0%	5.3%	0.6%	1.0%	0.1%	0.0%	0.1%	14.4%
28-Jun	12	0.7%	5.1%	1.2%	9.1%	2.2%	2.5%	0.2%	0.1%	0.1%	19.7%
29-Jun	13	3.0%	5.3%	5.5%	14.2%	2.9%	3.5%	0.4%	0.2%	0.1%	23.8%
30-Jun	14	7.8%	6.6%	8.1%	17.6%	7.5%	5.9%	0.5%	0.5%	0.1%	27.9%
1-Jul	15	10.5%	11.2%	10.3%	22.2%	10.4%	7.4%	1.2%	2.0%	0.3%	32.0%
2-Jul	16	23.6%	23.0%	11.4%	29.9%	13.9%	11.9%	1.9%	4.6%	0.7%	39.2%
3-Jul	17	11.5%	24.3%	13.1%	29.6%	19.6%	23.7%	3.1%	5.3%	1.4%	44.6%
4-Jul	18	30.4%	30.3%	21.2%	42.2%	30.7%	33.1%	8.8%	9.3%	5.4%	48.3%
5-Jul	19	33.6%	36.0%	23.1%	47.1%	36.1%	41.6%	12.5%	13.8%	16.2%	51.1%
6-Jul	20	36.8%	39.7%	36.1%	51.3%	41.1%	47.3%	16.2%	17.7%	17.6%	54.2%
7-Jul	21	38.0%	41.3%	49.1%	62.2%	47.2%	48.6%	17.1%	30.9%	11.0%	55.4%
8-Jul	22	40.9%	47.3%	58.9%	75.3%	52.5%	53.3%	27.9%	40.3%	30.3%	56.2%
9-Jul	23	42.1%	53.3%	69.5%	83.7%	59.4%	61.1%	30.2%	47.9%	31.6%	57.2%
10-Jul	24	47.6%	52.7%	80.7%	90.1%	61.8%	61.6%	35.0%	54.0%	53.6%	57.9%
11-Jul	25	58.3%	58.9%	88.1%	91.5%	63.7%	67.2%	44.2%	58.3%	54.7%	61.5%
12-Jul	26	68.5%	77.0%	94.5%	91.9%	66.8%	71.8%	48.9%	72.3%	58.2%	64.7%
13-Jul	27	71.5%	82.0%	99.4%	92.2%	71.9%	72.4%	50.6%	76.5%	59.9%	67.4%
14-Jul	28	80.5%	83.1%	99.4%	92.3%	72.8%	76.1%	53.8%	83.2%	67.6%	71.3%
15-Jul	29	97.5%	86.2%	99.6%	92.9%	76.2%	85.9%	54.5%	84.5%	70.2%	88.9%
16-Jul	30	98.0%	85.4%	99.8%	93.1%	84.2%	90.7%	57.3%	84.2%	71.8%	91.5%
17-Jul	31	98.7%	85.5%	99.1%	93.1%	86.7%	94.1%	70.5%	87.0%	79.9%	92.6%
18-Jul	32	98.9%	90.3%	100.0%	93.3%	92.9%	94.8%	71.5%	90.8%	85.9%	95.0%
19-Jul	33	100.0%	96.1%	100.0%	93.9%	94.7%	95.6%	80.2%	93.1%	90.0%	96.4%
20-Jul	34	100.0%	96.9%	100.0%	91.7%	95.8%	98.6%	88.4%	94.4%	92.7%	96.9%
21-Jul	35	100.0%	97.6%	100.0%	91.8%	97.4%	98.7%	90.1%	94.8%	97.4%	97.3%
22-Jul	36	100.0%	98.6%	100.0%	94.6%	98.1%	99.2%	92.1%	96.6%	97.5%	97.5%
23-Jul	37	100.0%	99.3%	100.0%	94.9%	98.2%	99.4%	92.9%	98.0%	98.4%	98.6%
24-Jul	38	100.0%	99.4%	100.0%	100.0%	98.9%	99.6%	94.6%	99.0%	99.9%	99.5%
25-Jul	39	100.0%	99.9%	100.0%	100.0%	98.9%	99.9%	96.6%	99.8%	100.0%	99.9%
26-Jul	40	100.0%	99.9%	100.0%	100.0%	100.0%	100.0%	98.5%	100.0%	100.0%	100.0%
27-Jul	41	100.0%	99.9%	100.0%	100.0%	100.0%	100.0%	99.6%	100.0%	100.0%	100.0%
28-Jul	42	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	100.0%	100.0%
29-Jul	43	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
30-Jul	44	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
31-Jul	45	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1-Aug	46	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2-Aug	47	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
3-Aug	48	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

^a Although no counts were made from 6/19-6/27, crew notes indicate that few salmon passed during this period.

^b Counts for 6/27-6/28 estimated from the 1965-1992 "Normal" run-timing curve. This year was excluded from the computation of the "Normal" run-timing curve.

Appendix Table 2. (Page 2 of 4).

Timing		Late	Late	Normal	Early	Late	Normal	Normal	Early	Early	Early
Date	Day	1975	1976	1977	1978 ^c	1979	1980	1981	1982	1983	1984
17-Jun	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18-Jun	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19-Jun	3	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%
20-Jun	4	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.4%	0.0%	0.2%	0.0%
21-Jun	5	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.5%	0.0%	4.5%	0.0%
22-Jun	6	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	1.4%	0.9%	6.8%	0.1%
23-Jun	7	0.0%	0.0%	0.0%	2.2%	0.0%	0.1%	2.7%	1.2%	7.8%	0.1%
24-Jun	8	0.0%	0.0%	0.0%	3.2%	0.0%	0.3%	6.9%	1.3%	11.8%	0.6%
25-Jun	9	0.0%	0.0%	0.0%	6.6%	0.0%	1.1%	9.9%	13.8%	16.4%	2.2%
26-Jun	10	0.0%	0.0%	0.0%	10.0%	0.0%	1.8%	13.2%	22.7%	17.9%	6.3%
27-Jun	11	0.0%	0.0%	0.1%	12.3%	0.1%	2.1%	14.8%	25.0%	18.3%	9.9%
28-Jun	12	0.0%	0.1%	1.2%	15.3%	1.6%	3.4%	15.0%	26.2%	23.6%	12.8%
29-Jun	13	0.0%	0.5%	2.1%	20.3%	2.4%	5.2%	16.4%	27.5%	24.3%	17.1%
30-Jun	14	0.0%	0.5%	3.0%	27.5%	15.9%	5.8%	20.4%	29.3%	26.0%	28.0%
1-Jul	15	0.0%	1.5%	9.4%	36.0%	18.1%	18.9%	22.5%	27.9%	40.5%	32.8%
2-Jul	16	0.0%	2.0%	13.1%	41.7%	19.1%	18.6%	23.1%	31.4%	40.8%	42.2%
3-Jul	17	0.0%	2.9%	18.5%	46.7%	21.4%	18.1%	33.6%	37.9%	45.0%	52.2%
4-Jul	18	0.5%	6.3%	20.7%	49.6%	23.5%	19.2%	39.1%	44.7%	47.8%	56.4%
5-Jul	19	2.6%	10.9%	27.2%	54.0%	23.8%	27.8%	38.5%	50.8%	56.1%	59.1%
6-Jul	20	5.2%	12.9%	31.6%	62.1%	26.7%	35.4%	43.8%	52.0%	59.8%	66.2%
7-Jul	21	5.9%	16.0%	37.2%	67.2%	28.1%	42.4%	47.6%	60.2%	65.6%	61.0%
8-Jul	22	7.0%	22.2%	53.6%	72.6%	29.7%	57.8%	48.6%	71.1%	74.9%	63.4%
9-Jul	23	8.1%	23.7%	65.9%	76.4%	37.3%	61.0%	57.3%	77.8%	78.3%	65.0%
10-Jul	24	10.3%	26.0%	72.7%	79.8%	43.1%	63.8%	58.8%	78.5%	81.2%	75.8%
11-Jul	25	13.4%	31.6%	81.3%	83.2%	44.8%	66.9%	59.9%	79.4%	82.8%	88.5%
12-Jul	26	14.6%	38.6%	86.4%	89.3%	45.7%	72.7%	66.3%	83.2%	83.3%	91.2%
13-Jul	27	16.8%	48.9%	87.2%	91.4%	51.5%	81.5%	69.0%	86.9%	84.6%	92.5%
14-Jul	28	24.4%	50.6%	89.1%	92.7%	56.7%	80.2%	74.2%	88.0%	85.0%	94.8%
15-Jul	29	22.4%	56.7%	92.4%	96.2%	67.3%	81.5%	78.7%	89.8%	85.8%	95.6%
16-Jul	30	52.6%	62.0%	92.9%	97.6%	76.0%	83.0%	81.1%	90.6%	87.7%	96.3%
17-Jul	31	67.6%	70.4%	94.2%	98.1%	80.6%	87.0%	83.2%	91.3%	90.2%	98.6%
18-Jul	32	74.3%	71.7%	95.3%	99.4%	73.6%	90.4%	85.8%	93.1%	90.5%	98.7%
19-Jul	33	84.8%	74.8%	96.4%	99.4%	84.9%	93.5%	87.2%	94.8%	92.3%	98.7%
20-Jul	34	90.2%	79.3%	97.1%	99.7%	88.3%	96.3%	90.7%	97.5%	95.4%	99.0%
21-Jul	35	95.6%	84.5%	97.9%	100.0%	93.2%	98.5%	93.0%	98.4%	96.8%	99.4%
22-Jul	36	98.3%	88.1%	99.1%	100.0%	98.7%	98.9%	93.6%	98.9%	97.5%	99.4%
23-Jul	37	99.4%	92.2%	99.6%	100.0%	99.4%	99.6%	96.5%	99.6%	99.0%	99.7%
24-Jul	38	99.9%	93.4%	99.8%	100.0%	99.7%	99.8%	98.2%	99.6%	99.5%	99.9%
25-Jul	39	100.0%	94.9%	100.0%	100.0%	100.0%	99.9%	99.0%	99.8%	99.6%	100.0%
26-Jul	40	100.0%	97.7%	100.0%	100.0%	100.0%	99.9%	99.3%	100.0%	99.7%	100.0%
27-Jul	41	100.0%	98.5%	100.0%	100.0%	100.0%	100.0%	99.6%	100.0%	100.0%	100.0%
28-Jul	42	100.0%	99.1%	100.0%	100.0%	100.0%	100.0%	99.6%	100.0%	100.0%	100.0%
29-Jul	43	100.0%	99.6%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	100.0%	100.0%
30-Jul	44	100.0%	99.7%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	100.0%	100.0%
31-Jul	45	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	100.0%	100.0%
1-Aug	46	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2-Aug	47	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
3-Aug	48	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

^c Counts prior to 7/4 estimated from the 1965-1992 "Normal" run-timing curve. This year was excluded from the computation of the "Normal" run-timing curve.

- continued -

Appendix Table 2. (Page 3 of 4).

Timing Date	Day	Late 1085	Early 1986	Normal 1987	Early 1988	Early 1989	Early 1990	Late 1991	Normal 1992	Normal 1993	Early 1994 ^d
17-Jun	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18-Jun	2	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19-Jun	3	0.0%	0.0%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
20-Jun	4	0.0%	0.2%	0.0%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
21-Jun	5	0.0%	0.2%	0.0%	5.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
22-Jun	6	0.0%	1.3%	0.0%	4.5%	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%
23-Jun	7	0.0%	3.6%	0.0%	4.7%	0.0%	0.7%	0.2%	0.0%	0.0%	0.2%
24-Jun	8	0.0%	4.6%	0.0%	5.8%	0.0%	1.5%	0.1%	0.0%	0.0%	0.5%
25-Jun	9	0.0%	4.1%	0.6%	15.0%	0.0%	2.9%	0.3%	0.0%	0.1%	1.7%
26-Jun	10	0.0%	4.5%	1.4%	21.7%	0.0%	3.8%	1.2%	0.0%	2.2%	3.2%
27-Jun	11	0.0%	5.7%	1.5%	25.9%	0.0%	3.8%	1.7%	0.0%	2.9%	3.1%
28-Jun	12	0.1%	11.2%	4.6%	28.0%	0.0%	4.0%	4.5%	0.0%	3.7%	7.4%
29-Jun	13	1.3%	15.4%	10.9%	47.6%	0.0%	8.2%	6.6%	6.6%	3.6%	11.5%
30-Jun	14	1.9%	20.4%	11.5%	56.3%	16.2%	19.5%	9.7%	8.5%	8.1%	16.4%
1-Jul	15	1.9%	25.6%	16.8%	62.5%	43.4%	28.9%	13.7%	9.7%	9.2%	27.3%
2-Jul	16	1.9%	31.9%	17.6%	66.8%	46.8%	36.6%	18.3%	15.5%	14.6%	32.4%
3-Jul	17	2.4%	39.0%	25.4%	69.3%	49.9%	42.6%	20.2%	18.3%	20.7%	39.5%
4-Jul	18	1.1%	45.7%	40.6%	69.6%	55.3%	50.0%	19.9%	29.5%	24.4%	48.6%
5-Jul	19	11.0%	52.1%	49.4%	71.3%	57.0%	55.3%	23.7%	38.0%	25.6%	49.9%
6-Jul	20	28.4%	56.9%	51.8%	74.3%	57.7%	62.4%	29.4%	43.8%	29.4%	58.1%
7-Jul	21	41.1%	59.1%	56.6%	74.9%	65.5%	65.4%	33.0%	46.9%	33.7%	59.9%
8-Jul	22	37.0%	61.8%	62.3%	78.3%	72.0%	67.4%	34.4%	51.5%	35.6%	60.8%
9-Jul	23	22.5%	62.7%	69.8%	79.3%	75.6%	68.5%	45.5%	62.3%	36.3%	65.3%
10-Jul	24	25.0%	63.0%	69.7%	80.9%	76.4%	69.2%	47.2%	68.3%	47.8%	69.6%
11-Jul	25	34.5%	68.4%	73.7%	83.0%	76.7%	73.8%	49.2%	71.5%	57.6%	73.4%
12-Jul	26	43.8%	68.8%	76.8%	86.7%	81.0%	75.2%	50.8%	74.6%	65.8%	79.2%
13-Jul	27	55.1%	69.5%	79.2%	87.6%	87.2%	75.1%	53.3%	77.7%	75.1%	81.8%
14-Jul	28	68.1%	73.4%	81.9%	89.7%	89.4%	76.0%	55.7%	79.6%	80.0%	83.6%
15-Jul	29	70.7%	80.4%	88.6%	91.5%	92.1%	78.5%	58.0%	81.5%	82.2%	88.8%
16-Jul	30	77.6%	81.8%	89.1%	92.5%	94.1%	82.5%	61.3%	84.1%	82.7%	92.1%
17-Jul	31	88.3%	83.4%	95.5%	92.5%	95.4%	84.9%	65.5%	86.7%	83.9%	94.7%
18-Jul	32	90.5%	84.6%	96.2%	92.9%	97.0%	91.0%	67.5%	89.5%	86.7%	96.3%
19-Jul	33	92.6%	89.6%	96.8%	94.6%	97.7%	93.4%	69.6%	91.2%	91.1%	97.1%
20-Jul	34	93.6%	92.5%	97.2%	96.0%	98.0%	95.5%	72.9%	91.7%	93.0%	97.3%
21-Jul	35	94.9%	93.3%	97.5%	96.9%	98.4%	96.3%	77.6%	92.8%	94.7%	97.5%
22-Jul	36	95.7%	95.5%	99.7%	98.2%	98.6%	97.4%	83.7%	95.3%	96.3%	98.2%
23-Jul	37	96.5%	97.3%	100.0%	99.2%	98.8%	98.7%	89.8%	96.2%	97.5%	98.2%
24-Jul	38	97.6%	99.2%	100.0%	99.7%	99.1%	99.5%	95.4%	97.1%	98.0%	98.3%
25-Jul	39	98.0%	99.8%	100.0%	100.0%	99.5%	100.0%	97.3%	98.3%	98.6%	98.3%
26-Jul	40	98.8%	100.0%	100.0%	100.0%	99.6%	100.0%	99.8%	99.1%	99.3%	98.6%
27-Jul	41	99.7%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.7%	100.0%	99.3%
28-Jul	42	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.7%
29-Jul	43	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.8%
30-Jul	44	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%
31-Jul	45	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1-Aug	46	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2-Aug	47	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
3-Aug	48	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

^d Count cut off on 8/3/94 for formatting purposes. 38 more chum salmon counted through 8/9/94.

- continued -

Appendix Table 2. (Page 4 of 4).

Timing Date	Day	Early 1995 ^e
17-Jun	1	0.0%
18-Jun	2	0.0%
19-Jun	3	0.0%
20-Jun	4	0.0%
21-Jun	5	0.8%
22-Jun	6	0.6%
23-Jun	7	3.1%
24-Jun	8	4.1%
25-Jun	9	3.6%
26-Jun	10	3.6%
27-Jun	11	9.2%
28-Jun	12	16.7%
29-Jun	13	23.5%
30-Jun	14	36.4%
1-Jul	15	42.8%
2-Jul	16	42.4%
3-Jul	17	44.3%
4-Jul	18	46.4%
5-Jul	19	58.0%
6-Jul	20	65.4%
7-Jul	21	68.6%
8-Jul	22	71.2%
9-Jul	23	73.1%
10-Jul	24	77.1%
11-Jul	25	82.4%
12-Jul	26	85.9%
13-Jul	27	90.6%
14-Jul	28	93.0%
15-Jul	29	94.5%
16-Jul	30	95.2%
17-Jul	31	95.5%
18-Jul	32	96.1%
19-Jul	33	96.9%
20-Jul	34	97.7%
21-Jul	35	98.4%
22-Jul	36	98.9%
23-Jul	37	99.2%
24-Jul	38	99.7%
25-Jul	39	100.0%
26-Jul	40	100.0%
27-Jul	41	100.0%
28-Jul	42	100.0%
29-Jul	43	100.0%
30-Jul	44	100.0%
31-Jul	45	100.0%
1-Aug	46	100.0%
2-Aug	47	100.0%
3-Aug	48	100.0%

^e First days count is an aerial survey count

Appendix Table 3. Kwiniuk River counting tower chum salmon run-timing models, percent passage by day, Norton Sound, 1965-1995.

The run-timing expressed in numbers of chum reflects the tower passage goal of 19,500 chum salmon established in 1992.

Date	Day	All Years		Early Model ^a		Normal Model ^b		Late Model ^c	
		Percent	Number	Percent	Number	Percent	Number	Percent	Number
17-Jun	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0
18-Jun	2	0.0%	1	0.0%	2	0.0%	0	0.0%	0
19-Jun	3	0.1%	15	0.2%	33	0.0%	2	0.0%	0
20-Jun	4	0.2%	43	0.5%	100	0.0%	3	0.0%	0
21-Jun	5	0.4%	83	1.0%	194	0.0%	9	0.0%	0
22-Jun	6	0.6%	125	1.4%	271	0.2%	43	0.0%	2
23-Jun	7	1.0%	190	2.1%	402	0.3%	65	0.0%	5
24-Jun	8	1.5%	294	3.0%	583	0.4%	85	0.0%	3
25-Jun	9	2.7%	526	5.7%	1,120	1.6%	309	0.1%	10
26-Jun	10	4.1%	804	8.6%	1,670	2.9%	566	0.2%	37
27-Jun	11	5.2%	1,021	11.0%	2,136	3.3%	651	0.3%	54
28-Jun	12	7.1%	1,385	14.4%	2,812	4.4%	857	0.9%	183
29-Jun	13	10.0%	1,948	19.4%	3,777	6.6%	1,290	1.6%	313
30-Jun	14	14.3%	2,790	26.7%	5,212	8.8%	1,713	4.1%	794
1-Jul	15	19.3%	3,756	35.1%	6,845	12.4%	2,416	5.2%	1,022
2-Jul	16	23.1%	4,510	40.0%	7,809	17.0%	3,319	6.3%	1,223
3-Jul	17	26.6%	5,185	44.9%	8,758	19.3%	3,772	7.3%	1,431
4-Jul	18	32.2%	6,281	50.5%	9,838	27.4%	5,334	9.4%	1,826
5-Jul	19	37.2%	7,254	55.2%	10,773	32.9%	6,410	14.4%	2,805
6-Jul	20	42.3%	8,248	59.8%	11,669	37.8%	7,363	19.5%	3,801
7-Jul	21	46.3%	9,037	63.4%	12,370	44.0%	8,571	21.8%	4,241
8-Jul	22	52.1%	10,165	68.4%	13,337	52.0%	10,138	26.9%	5,250
9-Jul	23	56.4%	10,993	71.5%	13,942	58.6%	11,437	28.4%	5,542
10-Jul	24	60.6%	11,820	74.5%	14,531	63.4%	12,366	34.3%	6,691
11-Jul	25	65.2%	12,722	78.3%	15,271	68.9%	13,432	38.9%	7,590
12-Jul	26	70.1%	13,678	81.0%	15,796	76.3%	14,869	42.9%	8,372
13-Jul	27	73.7%	14,381	83.2%	16,225	80.8%	15,759	48.0%	9,362
14-Jul	28	77.0%	15,010	85.1%	16,600	83.4%	16,270	53.9%	10,501
15-Jul	29	81.0%	15,785	89.0%	17,352	87.3%	17,017	57.1%	11,136
16-Jul	30	84.2%	16,412	90.7%	17,681	88.6%	17,268	65.5%	12,780
17-Jul	31	87.6%	17,076	92.0%	17,944	90.5%	17,649	74.7%	14,562
18-Jul	32	89.5%	17,453	93.5%	18,232	93.1%	18,155	76.4%	14,904
19-Jul	33	92.2%	17,974	95.0%	18,532	95.2%	18,573	82.4%	16,072
20-Jul	34	94.0%	18,332	96.1%	18,746	96.3%	18,788	86.5%	16,865
21-Jul	35	95.5%	18,624	96.8%	18,871	97.2%	18,962	90.5%	17,643
22-Jul	36	96.9%	18,898	97.7%	19,053	98.3%	19,170	93.5%	18,223
23-Jul	37	97.9%	19,097	98.5%	19,205	98.9%	19,285	95.5%	18,623
24-Jul	38	98.9%	19,276	99.4%	19,392	99.2%	19,351	97.2%	18,961
25-Jul	39	99.3%	19,362	99.7%	19,444	99.6%	19,414	98.1%	19,133
26-Jul	40	99.7%	19,439	99.8%	19,464	99.8%	19,470	99.3%	19,355
27-Jul	41	99.9%	19,477	99.9%	19,488	100.0%	19,492	99.7%	19,441
28-Jul	42	99.9%	19,489	100.0%	19,495	100.0%	19,500	99.8%	19,470
29-Jul	43	100.0%	19,495	100.0%	19,497	100.0%	19,500	99.9%	19,488
30-Jul	44	100.0%	19,497	100.0%	19,499	100.0%	19,500	100.0%	19,491
31-Jul	45	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	19,500
1-Aug	46	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	19,500
2-Aug	47	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	19,500
3-Aug	48	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	19,500

^a Includes 1968, 1974, 1982, 1984, 1986, 1988, 1989, 1990, 1994, and 1995.

^b Includes 1965, 1966, 1967, 1969, 1972, 1977, 1980, 1981, 1987, 1992, and 1993.

^c Includes 1971, 1973, 1975, 1976, 1979, 1985, and 1991.

Appendix Table 4. Expanded daily and percent cumulative pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1981-1995.

Date	1981		1982		1983		1984		1985		1986	
	Daily	Percent Cumulative	Daily	Percent Cumulative	Daily	Percent Cumulative						
17-Jun		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
18-Jun		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
19-Jun	16	0.0%		0.0%	0	0.0%	0	0.0%		0.0%	0	0.0%
20-Jun	40	0.0%		0.0%	0	0.0%	33	0.0%		0.0%	0	0.0%
21-Jun	-23	0.0%	3	0.0%	0	0.0%	31	0.0%		0.0%	0	0.0%
22-Jun	19	0.0%	159	0.0%	0	0.0%	24	0.0%		0.0%	32	0.0%
23-Jun	49	0.0%	66	0.0%	0	0.0%	25	0.0%		0.0%	64	0.0%
24-Jun	204	0.1%	57	0.1%	0	0.0%	92	0.0%		0.0%	76	0.1%
25-Jun	165	0.1%	6,104	1.4%	38	0.0%	592	0.1%		0.0%	48	0.1%
26-Jun	240	0.1%	10,838	3.7%	110	0.1%	1,954	0.4%	0	0.0%	65	0.1%
27-Jun	200	0.2%	12,476	6.3%	1	0.1%	3,320	0.9%	6	0.0%	204	0.2%
28-Jun	108	0.2%	3,473	7.1%	52	0.1%	1,246	1.1%	12	0.1%	807	0.5%
29-Jun	266	0.2%	4,936	8.1%	29	0.1%	1,355	1.3%	55	0.4%	913	0.9%
30-Jun	426	0.3%	7,690	9.8%	69	0.1%	9,597	2.8%	17	0.5%	1,031	1.3%
1-Jul	339	0.4%	-2,483	9.2%	1,732	0.8%	16,599	5.3%	2	0.5%	7,663	4.5%
2-Jul	309	0.4%	1,481	9.5%	80	0.8%	46,310	12.2%	0	0.5%	13,144	10.0%
3-Jul	1,563	0.7%	24,331	14.7%	972	1.2%	51,190	19.9%	2	0.5%	17,262	17.1%
4-Jul	2,763	1.2%	39,665	23.2%	468	1.4%	14,206	22.1%	16	0.6%	20,767	25.7%
5-Jul	-117	1.2%	32,835	30.2%	2,746	2.5%	37	22.1%	112	1.2%	24,272	35.8%
6-Jul	5,210	2.1%	10,011	32.3%	2,440	3.4%	6,116	23.0%	230	2.5%	17,475	43.0%
7-Jul	4,182	2.8%	60,379	45.1%	4,976	5.4%	-5,809	22.1%	602	5.8%	10,031	47.2%
8-Jul	4,007	3.5%	67,221	59.5%	8,767	8.8%	2,831	22.6%	-9	5.7%	10,249	51.4%
9-Jul	13,401	5.9%	52,049	70.5%	18,285	16.0%	3,640	23.1%	-882	0.9%	2,563	52.5%
10-Jul	2,844	6.4%	13,666	73.4%	19,726	23.8%	13,814	25.2%	133	1.6%	2,127	53.3%
11-Jul	5,935	7.4%	13,865	76.4%	14,696	29.5%	124,383	43.9%	353	3.6%	16,734	60.3%
12-Jul	14,111	9.9%	25,637	81.9%	8,011	32.7%	83,245	56.5%	576	6.7%	3,672	61.8%
13-Jul	8,951	11.5%	19,410	86.0%	8,341	36.0%	46,722	63.5%	1,605	15.5%	2,269	62.7%
14-Jul	16,695	14.5%	10,799	88.3%	1,919	36.7%	94,373	77.8%	3,691	35.8%	11,210	67.4%
15-Jul	21,549	18.3%	8,153	90.0%	1,711	37.4%	46,960	84.8%	962	41.0%	20,151	75.7%
16-Jul	32,659	24.0%	3,749	90.8%	5,480	39.5%	29,263	89.2%	1,874	51.3%	9,005	79.5%
17-Jul	35,565	30.3%	5,121	91.9%	14,266	45.1%	29,810	93.7%	2,688	66.0%	5,387	81.7%
18-Jul	31,503	35.9%	6,562	93.3%	4,891	47.1%	3,265	94.2%	824	70.6%	6,330	84.3%
19-Jul	18,367	39.1%	6,119	94.6%	20,022	54.9%	1,924	94.5%	924	75.6%	6,380	86.9%
20-Jul	49,831	47.9%	11,385	97.0%	25,257	64.9%	4,096	95.1%	796	80.0%	5,012	89.0%
21-Jul	43,404	55.6%	6,433	98.4%	25,582	74.9%	10,266	96.7%	807	84.4%	3,643	90.5%
22-Jul	27,813	60.5%	2,156	98.9%	14,330	80.5%	1,767	96.9%	410	86.7%	10,063	94.7%
23-Jul	69,683	72.8%	1,216	99.1%	29,715	92.2%	8,297	98.2%	240	88.0%	4,919	96.7%
24-Jul	81,808	87.2%	163	99.2%	12,499	97.1%	7,180	99.3%	304	89.7%	3,707	98.3%
25-Jul	48,678	95.8%	2,077	99.6%	1,768	97.8%	4,779	100.0%	280	91.2%	2,244	99.2%
26-Jul	3,893	96.5%	1,872	100.0%	2,846	98.9%		100.0%	445	93.6%	1,927	100.0%
27-Jul	6,089	97.6%		100.0%	2,713	100.0%		100.0%	729	97.6%		100.0%
28-Jul	-92	97.5%		100.0%		100.0%		100.0%	433	100.0%		100.0%
29-Jul	8,531	99.1%		100.0%		100.0%		100.0%		100.0%		100.0%
30-Jul	1,657	99.3%		100.0%		100.0%		100.0%		100.0%		100.0%
31-Jul	1,689	99.6%		100.0%		100.0%		100.0%		100.0%		100.0%
1-Aug	1,175	99.9%		100.0%		100.0%		100.0%		100.0%		100.0%
2-Aug	829	100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
3-Aug		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
Total	566,534		469,674		254,538		663,533		18,237		241,446	

Annual totals have been calculated using fractions which may cause minor discrepancies with historic data.

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Appendix Table 4. (Page 2 of 3).

Date	1987		1988		1989		1990		1991		1992	
	Daily	Percent Cumulative	Daily	Percent Cumulative	Daily	Percent Cumulative	Daily	Percent Cumulative	Daily	Percent Cumulative	Daily	Percent Cumulative
17-Jun		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
18-Jun		0.0%	2	0.0%		0.0%		0.0%	0	0.0%		0.0%
19-Jun		0.0%	28	0.0%		0.0%		0.0%	0	0.0%		0.0%
20-Jun		0.0%	55	0.0%		0.0%		0.0%	0	0.0%		0.0%
21-Jun		0.0%	0	0.0%		0.0%	10	0.0%	0	0.0%		0.0%
22-Jun		0.0%	-11	0.0%		0.0%	2	0.0%	6	0.0%		0.0%
23-Jun		0.0%	23	0.1%		0.0%	0	0.0%	10	0.0%		0.0%
24-Jun		0.0%	16	0.1%		0.0%	20	0.0%	0	0.0%		0.0%
25-Jun	2	0.0%	120	0.1%		0.0%	40	0.0%	0	0.0%		0.0%
26-Jun	14	0.3%	143	0.2%		0.0%	50	0.0%	0	0.0%		0.0%
27-Jun	0	0.3%	165	0.3%	2	0.0%	22	0.0%	4	0.0%	0	0.0%
28-Jun	0	0.3%	167	0.4%	0	0.0%	52	0.0%	4	0.0%	0	0.0%
29-Jun	0	0.3%	2,980	2.0%	0	0.0%	269	0.1%	4	0.1%	2,537	0.2%
30-Jun	0	0.3%	3,871	4.0%	63	0.2%	2,807	0.8%	37	0.1%	2,038	0.3%
1-Jul	4	0.4%	9,525	9.1%	242	1.1%	12,328	3.7%	70	0.3%	1,267	0.4%
2-Jul	0	0.4%	10,952	14.9%	226	1.9%	21,849	9.0%	64	0.4%	3,979	0.7%
3-Jul	12	0.6%	12,379	21.5%	458	3.6%	22,332	14.4%	390	1.1%	5,044	1.0%
4-Jul	4	0.6%	2,483	22.8%	682	6.1%	39,003	23.7%	-74	1.0%	38,247	3.6%
5-Jul	45	1.5%	7,448	26.8%	80	6.4%	34,862	32.1%	85	1.1%	34,349	6.0%
6-Jul	55	2.4%	13,985	34.2%	70	6.6%	23,589	37.8%	216	1.5%	30,452	8.1%
7-Jul	171	5.5%	2,596	35.6%	794	9.5%	31,299	45.3%	198	1.9%	18,541	9.3%
8-Jul	77	6.9%	6,932	39.3%	2,574	18.9%	20,809	50.3%	179	2.2%	21,830	10.8%
9-Jul	226	11.0%	5,545	42.2%	1,557	24.5%	10,320	52.7%	1,533	5.1%	103,111	17.8%
10-Jul	0	11.0%	9,415	47.2%	539	26.5%	7,535	54.5%	771	6.5%	98,206	24.6%
11-Jul	46	11.8%	13,286	54.3%	174	27.1%	16,582	58.5%	714	7.9%	59,906	28.6%
12-Jul	92	13.4%	32,066	71.4%	926	30.5%	9,598	60.8%	631	9.1%	65,927	33.1%
13-Jul	90	15.1%	4,677	73.9%	1,340	35.4%	-502	60.7%	-2	9.0%	71,947	38.1%
14-Jul	90	16.7%	8,219	78.2%	964	38.9%	1,458	61.1%	389	9.8%	17,376	39.2%
15-Jul	314	22.3%	8,628	82.8%	1,394	44.0%	8,970	63.2%	781	11.2%	31,601	41.4%
16-Jul	370	29.0%	4,310	85.1%	1,576	49.7%	16,482	67.2%	2,836	16.5%	50,625	44.9%
17-Jul	1,508	56.1%	-8	85.1%	1,757	56.1%	12,999	70.3%	1,576	19.5%	126,030	53.5%
18-Jul	252	60.6%	670	85.5%	2,132	63.8%	23,693	76.0%	1,221	21.8%	140,589	63.1%
19-Jul	329	66.5%	2,862	87.0%	760	66.6%	19,937	80.8%	1,334	24.3%	79,465	68.5%
20-Jul	296	71.8%	3,553	88.9%	472	68.3%	14,003	84.1%	3,342	30.5%	18,342	69.7%
21-Jul	470	80.3%	3,727	90.9%	1,270	72.9%	8,256	86.1%	3,859	37.7%	78,120	75.1%
22-Jul	891	96.3%	4,687	93.4%	1,246	77.5%	14,074	89.5%	4,375	45.9%	120,281	83.3%
23-Jul	208	100.0%	4,451	95.7%	1,152	81.7%	19,893	94.3%	6,049	57.2%	50,140	86.7%
24-Jul		100.0%	4,214	98.0%	1,768	88.1%	16,516	98.2%	8,913	73.9%	55,111	90.5%
25-Jul		100.0%	3,216	99.7%	1,430	93.3%	7,355	100.0%	5,314	83.8%	60,936	94.6%
26-Jul		100.0%	614	100.0%	1,134	97.4%		100.0%	5,812	94.7%	39,490	97.3%
27-Jul		100.0%		100.0%	706	100.0%		100.0%	2,858	100.0%	18,044	98.6%
28-Jul		100.0%		100.0%		100.0%		100.0%		100.0%	21,185	100.0%
29-Jul		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
30-Jul		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
31-Jul		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
1-Aug		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
2-Aug		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
3-Aug		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
Total	5,566		187,991		27,488		416,512		53,499		1,464,716	

Annual totals have been calculated using fractions which may cause minor discrepancies with historic data.

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Appendix Table 4. (Page 3 of 3).

Date	1993		1994 ^a		1995		Even Year	Odd Year
	Daily	Percent Cumulative	Daily	Percent Cumulative	Daily	Percent Cumulative	Average % Cumulative ^b	Average % Cumulative ^b
17-Jun		0.0%		0.0%		0.0%	0.0%	0.0%
18-Jun		0.0%		0.0%		0.0%	0.0%	0.0%
19-Jun		0.0%		0.0%		0.0%	0.0%	0.0%
20-Jun		0.0%		0.0%		0.0%	0.0%	0.0%
21-Jun		0.0%		0.0%	0	0.0%	0.0%	0.0%
22-Jun		0.0%		0.0%	0	0.0%	0.0%	0.0%
23-Jun	0	0.0%	24	0.0%	0	0.0%	0.0%	0.0%
24-Jun	0	0.0%	51	0.0%	0	0.0%	0.0%	0.0%
25-Jun	2	0.0%	80	0.0%	4	0.0%	0.3%	0.0%
26-Jun	6	0.0%	147	0.0%	8	0.1%	0.9%	0.1%
27-Jun	4	0.0%	-16	0.0%	4	0.1%	1.6%	0.1%
28-Jun	5	0.0%	248	0.0%	0	0.1%	1.8%	0.1%
29-Jun	0	0.0%	427	0.0%	8	0.1%	2.5%	0.2%
30-Jun	52	0.2%	208	0.1%	10	0.2%	3.7%	0.2%
1-Jul	10	0.2%	3,883	0.2%	2	0.2%	6.4%	0.5%
2-Jul	162	0.6%	2,830	0.3%	-1	0.2%	11.1%	0.6%
3-Jul	139	0.9%	11,737	0.9%	-4	0.2%	17.5%	1.1%
4-Jul	109	1.1%	20,644	1.7%	94	0.7%	23.5%	1.6%
5-Jul	79	1.3%	5,741	2.0%	26	0.9%	29.4%	2.0%
6-Jul	126	1.6%	20,537	2.9%	324	2.7%	34.1%	2.9%
7-Jul	145	1.9%	18,667	3.7%	308	4.5%	39.1%	4.7%
8-Jul	103	2.2%	14,329	4.3%	267	6.0%	44.6%	6.8%
9-Jul	45	2.3%	44,231	6.2%	221	7.3%	48.2%	9.1%
10-Jul	376	3.2%	65,165	9.1%	174	8.2%	50.8%	10.9%
11-Jul	716	4.8%	96,099	13.2%	140	9.0%	58.7%	12.7%
12-Jul	1,055	7.3%	150,841	19.8%	403	11.3%	66.5%	15.1%
13-Jul	4,155	16.9%	177,003	27.4%	241	12.7%	69.4%	19.0%
14-Jul	1,778	21.1%	196,651	36.0%	523	15.7%	74.5%	23.6%
15-Jul	528	22.3%	316,264	49.7%	908	20.9%	79.3%	27.2%
16-Jul	300	23.0%	362,910	65.4%	1,960	32.1%	82.4%	33.1%
17-Jul	533	24.2%	269,451	77.1%	3,012	49.3%	84.5%	43.3%
18-Jul	3,419	32.2%	175,992	84.7%	770	53.7%	86.7%	48.2%
19-Jul	6,304	46.8%	115,883	89.7%	513	56.6%	88.8%	53.8%
20-Jul	4,572	57.4%	15,884	90.4%	869	61.6%	90.8%	60.3%
21-Jul	4,824	68.6%	17,012	91.2%	1,116	68.0%	92.5%	67.8%
22-Jul	5,269	80.8%	54,172	93.5%	1,470	76.3%	94.7%	75.6%
23-Jul	2,228	86.0%	16,721	94.2%	1,034	82.3%	96.8%	82.5%
24-Jul	938	88.2%	12,680	94.8%	598	85.7%	98.6%	88.7%
25-Jul	1,419	91.5%	8,640	95.2%	1,272	92.9%	99.7%	93.3%
26-Jul	1,899	95.9%	14,792	95.8%	1,237	100.0%	100.0%	97.1%
27-Jul	1,765	100.0%	45,610	97.8%		100.0%	100.0%	99.4%
28-Jul		100.0%	28,491	99.0%		100.0%	100.0%	99.7%
29-Jul		100.0%	9,034	99.4%		100.0%	100.0%	99.9%
30-Jul		100.0%	6,929	99.7%		100.0%	100.0%	99.9%
31-Jul		100.0%	4,824	99.9%		100.0%	100.0%	100.0%
1-Aug		100.0%	431	99.9%		100.0%	100.0%	100.0%
2-Aug		100.0%	588	100.0%		100.0%	100.0%	100.0%
3-Aug		100.0%	646	100.0%		100.0%	100.0%	100.0%
Total	43,065		2,306,481		17,509			

Annual totals have been calculated using fractions which may cause minor discrepancies with historic data.

^a Count cut off on 8/3/94 for formatting purposes. 38 more chum salmon counted through 8/9/94.

^b Does not include the current year

Appendix Table 5. Expanded daily and percent cumulative king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1981-1994.

Date	1981		1982		1983		1984		1985		1986	
	Daily	Percent Cumulative										
17-Jun		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
18-Jun		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
19-Jun	0	0.0%		0.0%	0	0.0%	0	0.0%		0.0%	0	0.0%
20-Jun	0	0.0%		0.0%	0	0.0%	0	0.0%		0.0%	0	0.0%
21-Jun	0	0.0%		0.0%	0	0.0%	0	0.0%		0.0%	0	0.0%
22-Jun	0	0.0%		0.0%	0	0.0%	0	0.0%		0.0%	2	0.3%
23-Jun	0	0.0%		0.0%	5	1.9%	1	0.1%		0.0%	4	0.9%
24-Jun	2	1.5%		0.0%	13	6.7%	0	0.1%		0.0%	0	0.9%
25-Jun	12	10.3%	7	5.1%	4	8.2%	0	0.1%		0.0%	0	0.9%
26-Jun	2	11.8%	6	9.4%	8	11.2%	3	0.5%	0	0.0%	0	0.9%
27-Jun	0	11.8%	4	12.3%	3	12.4%	3	1.0%	0	0.0%	0	0.9%
28-Jun	3	14.0%	4	15.2%	16	18.4%	1	1.1%	0	0.0%	0	0.9%
29-Jun	6	18.4%	-1	14.5%	1	18.7%	6	1.9%	9	0.9%	4	1.5%
30-Jun	6	22.8%	5	18.1%	12	23.2%	21	4.8%	0	0.9%	11	3.2%
1-Jul	2	24.3%	0	18.1%	61	46.1%	12	6.4%	1	1.0%	26	7.2%
2-Jul	4	27.2%	7	23.2%	3	47.2%	26	9.9%	2	1.3%	12	9.0%
3-Jul	19	41.2%	4	26.1%	19	54.3%	90	22.1%	0	1.3%	56	17.6%
4-Jul	15	52.2%	13	35.5%	11	58.4%	27	25.8%	0	1.3%	92	31.7%
5-Jul	1	52.9%	10	42.8%	25	67.8%	4	26.4%	0	1.3%	128	51.2%
6-Jul	9	59.6%	3	44.9%	16	73.8%	26	29.9%	2	1.5%	40	57.3%
7-Jul	4	62.5%	8	50.7%	7	76.4%	-21	27.0%	19	3.5%	41	63.6%
8-Jul	8	68.4%	28	71.0%	17	82.8%	13	28.8%	-2	3.2%	12	65.4%
9-Jul	16	80.1%	8	76.8%	5	84.6%	12	30.4%	-2	3.0%	10	67.0%
10-Jul	5	83.8%	0	76.8%	3	85.8%	139	49.3%	0	3.0%	5	67.7%
11-Jul	2	85.3%	1	77.5%	1	86.1%	217	78.8%	0	3.0%	37	73.4%
12-Jul	4	88.2%	5	81.2%	1	86.5%	67	87.9%	7	3.8%	6	74.3%
13-Jul	0	88.2%	5	84.8%	1	86.9%	20	90.6%	29	6.8%	2	74.6%
14-Jul	4	91.2%	3	87.0%	2	87.6%	27	94.3%	64	13.5%	21	77.8%
15-Jul	2	92.6%	2	88.4%	2	88.4%	9	95.5%	13	14.9%	40	83.9%
16-Jul	1	93.4%	4	91.3%	1	88.8%	17	97.8%	59	21.0%	48	91.3%
17-Jul	0	93.4%	0	91.3%	8	91.8%	5	98.5%	101	31.6%	2	91.6%
18-Jul	1	94.1%	2	92.8%	0	91.8%	0	98.5%	70	39.0%	12	93.4%
19-Jul	1	94.9%	4	95.7%	11	95.9%	1	98.6%	85	47.9%	12	95.3%
20-Jul	1	95.6%	3	97.8%	3	97.0%	2	98.9%	198	68.6%	12	97.1%
21-Jul	0	95.6%	0	97.8%	4	98.5%	2	99.2%	87	77.7%	11	98.8%
22-Jul	0	95.6%	0	97.8%	1	98.9%	2	99.5%	23	80.1%	2	99.1%
23-Jul	1	96.3%	0	97.8%	0	98.9%	1	99.6%	12	81.4%	6	100.0%
24-Jul	0	96.3%	1	98.6%	0	98.9%	2	99.9%	161	98.2%	-2	99.7%
25-Jul	0	96.3%	1	99.3%	0	98.9%	1	100.0%	11	99.4%	2	100.0%
26-Jul	2	97.8%	1	100.0%	2	99.6%	0	100.0%	7	100.1%	0	100.0%
27-Jul	0	97.8%	0	100.0%	1	100.0%	0	100.0%	-2	99.9%	0	100.0%
28-Jul	0	97.8%	0	100.0%	0	100.0%	0	100.0%	1	100.0%	0	100.0%
29-Jul	0	97.8%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
30-Jul	1	98.5%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
31-Jul	2	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
1-Aug	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
2-Aug	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
3-Aug	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
Total	136		138		267		736		955		654	

Annual totals have been calculated using fractions which may cause minor discrepancies with historic data.

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Appendix Table 5. (Page 2 of 3).

Date	1987		1988		1989		1990		1991		1992	
	Daily	Percent Cumulative										
17-Jun		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
18-Jun		0.0%	0	0.0%		0.0%		0.0%	0	0.0%		0.0%
19-Jun		0.0%	1	0.3%		0.0%		0.0%	2	0.3%		0.0%
20-Jun		0.0%	2	0.9%		0.0%		0.0%	4	0.8%		0.0%
21-Jun		0.0%	0	0.9%		0.0%	0	0.0%	0	0.8%		0.0%
22-Jun		0.0%	-2	0.3%		0.0%	0	0.0%	6	1.7%		0.0%
23-Jun		0.0%	0	0.3%		0.0%	0	0.0%	2	2.0%		0.0%
24-Jun		0.0%	0	0.3%		0.0%	3	0.3%	1	2.1%		0.0%
25-Jun	0	0.0%	0	0.3%		0.0%	6	1.0%	2	2.4%		0.0%
26-Jun	0	0.0%	3	1.2%		0.0%	7	1.8%	4	3.0%		0.0%
27-Jun	0	0.0%	5	2.8%	0	0.0%	0	1.8%	10	4.4%		0.0%
28-Jun	2	0.6%	0	2.8%	0	0.0%	2	2.0%	16	6.6%		0.0%
29-Jun	3	1.6%	16	7.8%	2	0.8%	15	3.7%	55	14.4%	0	0.0%
30-Jun	0	1.6%	18	13.4%	10	4.8%	138	19.0%	68	24.0%	0	0.0%
1-Jul	2	2.2%	24	20.9%	12	9.7%	146	35.2%	82	35.6%	4	0.8%
2-Jul	0	2.2%	22	27.7%	15	15.7%	154	52.3%	75	46.2%	-2	0.4%
3-Jul	0	2.2%	20	34.0%	28	27.0%	56	58.6%	71	56.2%	5	1.5%
4-Jul	6	4.1%	0	34.0%	14	32.7%	65	65.8%	0	56.2%	8	3.1%
5-Jul	19	10.1%	14	38.3%	18	39.9%	138	81.1%	14	58.2%	14	6.1%
6-Jul	27	18.6%	6	40.2%	2	40.7%	42	85.8%	32	62.7%	21	10.4%
7-Jul	43	32.2%	-2	39.6%	22	49.6%	40	90.2%	21	65.7%	0	10.4%
8-Jul	23	39.4%	-3	38.6%	42	66.5%	21	92.6%	9	66.9%	18	14.2%
9-Jul	23	46.7%	8	41.1%	23	75.8%	2	92.8%	54	74.6%	55	25.7%
10-Jul	0	46.7%	28	49.8%	4	77.4%	-2	92.6%	40	80.2%	16	29.0%
11-Jul	0	46.7%	48	64.8%	2	78.2%	0	92.6%	36	85.3%	14	31.9%
12-Jul	7	48.9%	29	73.8%	6	80.6%	6	93.2%	0	85.3%	27	37.6%
13-Jul	11	52.4%	-3	72.9%	10	84.7%	-4	92.8%	4	85.9%	41	46.1%
14-Jul	20	58.7%	13	76.9%	14	90.3%	2	93.0%	14	87.9%	0	46.1%
15-Jul	46	73.2%	4	78.2%	6	92.7%	7	93.8%	24	91.2%	11	48.4%
16-Jul	4	74.4%	2	78.8%	5	94.8%	12	95.1%	17	93.6%	32	55.1%
17-Jul	4	75.7%	0	78.8%	3	96.0%	17	97.0%	28	97.6%	37	62.8%
18-Jul	26	83.9%	3	79.8%	4	97.6%	15	98.7%	11	99.2%	37	70.6%
19-Jul	29	93.1%	4	81.0%	2	98.4%	4	99.1%	-4	98.6%	24	75.6%
20-Jul	6	95.0%	4	82.2%	0	98.4%	6	99.8%	2	98.9%	10	77.7%
21-Jul	6	96.8%	0	82.2%	0	98.4%	0	99.8%	0	98.9%	20	81.8%
22-Jul	8	99.4%	14	86.6%	0	98.4%	1	99.9%	-2	98.6%	46	91.4%
23-Jul	2	100.0%	14	91.0%	0	98.4%	1	100.0%	6	99.4%	9	93.3%
24-Jul	0	100.0%	14	95.3%	0	98.4%	-2	99.8%	0	99.4%	15	96.5%
25-Jul	0	100.0%	1	95.6%	0	98.4%	2	100.0%	0	99.4%	0	96.5%
26-Jul	0	100.0%	14	100.0%	2	99.2%	0	100.0%	4	100.0%	5	97.5%
27-Jul	0	100.0%	0	100.0%	2	100.0%	0	100.0%	0	100.0%	9	99.4%
28-Jul	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	3	100.0%
29-Jul	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
30-Jul	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
31-Jul	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
1-Aug	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
2-Aug	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
3-Aug	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%	0	100.0%
Total	317		321		248		900		708		479	

Annual totals have been calculated using fractions which may cause minor discrepancies with historic data.

- continued -

Appendix Table 5. (Page 3 of 3).

Date	1993		1994 ^a		1995		Average % Cumulative ^b
	Daily	Percent Cumulative	Daily	Percent Cumulative	Daily	Percent Cumulative	
17-Jun		0.0%		0.0%		0.0%	0.0%
18-Jun		0.0%		0.0%		0.0%	0.0%
19-Jun		0.0%		0.0%		0.0%	0.0%
20-Jun		0.0%		0.0%		0.0%	0.1%
21-Jun		0.0%		0.0%	2	0.4%	0.1%
22-Jun		0.0%		0.0%	0	0.4%	0.2%
23-Jun	0	0.0%	0	0.0%	0	0.4%	0.4%
24-Jun	0	0.0%	0	0.0%	24	5.4%	0.9%
25-Jun	2	0.3%	0	0.0%	13	8.0%	2.1%
26-Jun	12	2.4%	0	0.0%	2	8.5%	3.0%
27-Jun	16	5.1%	0	0.0%	2	8.9%	3.7%
28-Jun	2	5.4%	2	0.3%	24	13.8%	4.8%
29-Jun	-2	5.1%	2	0.6%	28	19.6%	6.4%
30-Jun	16	7.7%	0	0.6%	15	22.7%	10.3%
1-Jul	12	9.8%	12	2.5%	35	29.9%	15.7%
2-Jul	39	16.3%	4	3.1%	13	32.5%	20.1%
3-Jul	32	21.7%	26	7.2%	-10	30.4%	26.5%
4-Jul	17	24.6%	48	14.8%	0	30.4%	31.4%
5-Jul	33	30.1%	18	17.6%	8	32.0%	37.4%
6-Jul	2	30.5%	26	21.7%	58	43.9%	41.3%
7-Jul	68	41.9%	8	23.0%	56	55.4%	45.5%
8-Jul	41	48.8%	4	23.6%	18	59.1%	50.7%
9-Jul	28	53.5%	49	31.3%	19	63.1%	56.0%
10-Jul	39	60.1%	39	37.5%	20	67.2%	60.0%
11-Jul	40	66.8%	29	42.0%	10	69.2%	65.2%
12-Jul	84	81.0%	43	48.8%	38	77.1%	69.4%
13-Jul	42	88.0%	73	60.3%	40	85.3%	72.5%
14-Jul	11	89.9%	39	66.5%	40	93.6%	75.8%
15-Jul	14	92.3%	53	74.8%	8	95.3%	79.2%
16-Jul	-4	91.6%	56	83.6%	4	96.1%	82.2%
17-Jul	6	92.6%	40	89.9%	0	96.1%	84.9%
18-Jul	6	93.6%	25	93.9%	0	96.1%	87.6%
19-Jul	27	98.1%	8	95.1%	2	96.5%	90.5%
20-Jul	6	99.2%	0	95.1%	2	96.9%	92.9%
21-Jul	2	99.5%	5	95.9%	2	97.3%	94.4%
22-Jul	2	99.8%	10	97.5%	4	98.1%	95.9%
23-Jul	0	99.8%	-6	96.5%	3	98.8%	96.6%
24-Jul	-2	99.5%	-2	96.2%	2	99.2%	98.3%
25-Jul	0	99.5%	2	96.5%	4	100.0%	98.6%
26-Jul	1	99.7%	0	96.5%	0	100.0%	99.3%
27-Jul	2	100.0%	2	96.9%		100.0%	99.6%
28-Jul	0	100.0%	0	96.9%		100.0%	99.6%
29-Jul	0	100.0%	0	96.9%		100.0%	99.6%
30-Jul	0	100.0%	0	96.9%		100.0%	99.7%
31-Jul	0	100.0%	0	96.9%		100.0%	99.8%
1-Aug	0	100.0%	1	97.0%		100.0%	99.8%
2-Aug	0	100.0%	7	98.1%		100.0%	99.9%
3-Aug	0	100.0%	12	100.0%		100.0%	100.0%
Total	594		635		485		

Annual totals have been calculated using fractions which may cause minor discrepancies with historic data.

^a Count cut off on 8/3/94 for formatting purposes. 38 more chum salmon counted through 8/9/94.

^b Does not include the current year

Appendix Table 6. Reported hourly chum salmon observations at the Kwiniuk River counting tower, Norton Sound, 1995.

Shaded areas indicate hours not counted

Count adjusted at 1100 hours 6:22 by aerial survey. Previous counts omitted in totals

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
21-Jun																											
22-Jun	14	2	14	0	2	2						345														1.1%	
23-Jun	-8	-8	-32	-2	-14	-26																				-0.3%	
24-Jun	0	2	0	0	0	0																				3.3%	
25-Jun																										0.0%	
26-Jun	-2	-34	-40	-38	-48	0	0	0	0	0	0	-10	-40	0	0	0	0	0	0	4	4	0	0	0	0	-0.7%	
27-Jun	2	0	0	0	0	0																				0.0%	
28-Jun	510	514	296	92	142	24																				7.4%	
29-Jun	654	532	536	466	236	246																				10.0%	
30-Jun	156	406	816	78	50	58																				5.5%	
1-Jul	56	0	10	-10	-2	-2																				10.5%	
2-Jul																										0.0%	
3-Jul	-22	0	-14	26	-16	-6	4	-6	-2	-8	-36	-16	0	-6	4	2	-24	-58	-76	-4	-4	-10	0	0	0	-0.5%	
4-Jul	-12	-124	-334	-70	-92	-70																				1.6%	
5-Jul	46	0	62	6	-2	-10																				1.7%	
6-Jul	274	112	84	210	164	238																				9.3%	
7-Jul	118	524	906	440	216	130																				10.2%	
8-Jul	184	68	18	6	12	8																				4.6%	
9-Jul																										0.0%	
10-Jul	266	58	98	36	10	4	0	0	0	0	2	0	4	0	0	2	2	14	0	56	164	50	0	32	798	2.6%	
11-Jul	70	138	170	320	716	146																				5.6%	
12-Jul	128	126	188	164	12	2																				7.4%	
13-Jul	388	88	66	20	16	10																				4.9%	
14-Jul	328	360	160	102	26	12																				6.2%	
15-Jul	162	100	58	4	0	30																				3.2%	
16-Jul																										0.0%	
17-Jul	52	94	6	10	6	24	10	2	0	0	2	0	0	0	0	0	0	0	4	0	0	32	24	6	272	0.9%	
18-Jul	8	4	2	2	0	14																				0.4%	
19-Jul	8	20	12	8	6	14																				0.9%	
20-Jul	48	34	40	24	38	42																				1.0%	
21-Jul	52	88	56	44	18	24																				1.1%	
22-Jul	32	26	44	44	12	2																				0.9%	
23-Jul																										0.0%	
24-Jul	10	16	56	8	16	10	4	2	0	0	0	0	0	0	6	8	0	4	0	2	0	2	-2	2	144	0.5%	
25-Jul	26	10	24	32	40	26																				192	0.6%
26-Jul	12	2	18	18	6	0																				120	0.4%
Totals	3,546	3,156	3,306	2,040	1,568	950	18	-2	-2	0.0%	0.0%	-8	-32	319	88	122	460	658	538	1,384	676	898	2,376	1,912	2,794	3,912	30,677
	11.6%	10.3%	10.8%	6.6%	5.1%	3.1%	0.1%	0.0%	0.0%	0.0%	-0.1%	1.0%	0.3%	0.4%	1.5%	2.1%	1.8%	4.5%	2.2%	2.9%	7.7%	6.2%	9.1%	12.8%			

Appendix Table 7. Reported hourly pink salmon observations at the Kwiniuk River counting tower, Norton Sound, 1995.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total												
21-Jun	Start of the counting season																0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
22-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%						
23-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
24-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
25-Jun																										0	0	0	0	0.0%								
26-Jun	0	0	4	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	8	0.1%									
27-Jun	2	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0.0%									
28-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%								
29-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4	0.0%									
30-Jun	0	10	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	10	0.1%									
1-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0.0%									
2-Jul																										0	0	0	0	0.0%								
3-Jul	2	-8	-8	14	-8	2	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	-2	0	6	-4	6	-4	0.0%									
4-Jul	0	16	0	0	0	0							0	0	0	0	0	-2	0	0	0	52	20	8	94	0	94	0.7%										
5-Jul	-2	0	6	-2	0								0	0	0	0	0	0	0	0	8	0	6	10	26	0	26	0.2%										
6-Jul	18	10	2	14	88	48							0	0	0	0	0	2	12	20	0	0	46	64	324	0	324	2.4%										
7-Jul	8	0	98	38	20	6							2	0	4	0	0	2	0	4	82	0	0	40	304	0	304	2.3%										
8-Jul	16	0	0	0	0	2							2	32	58	0	0	18	38	12	8	4	52	22	264	0	264	2.0%										
9-Jul																										0	0	0	0.0%									
10-Jul	10	4	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	32	80	32	10	0	174	0	174	1.3%										
11-Jul	12	6	4	10	82	10							0	0	0	0	0	0	0	0	2	0	12	0	138	0	138	1.0%										
12-Jul	12	18	8	12	0	0							0	2	2	2	4	0	0	0	0	100	34	204	398	0	398	3.0%										
13-Jul	66	26	18	6	6	2							2	2	2	2	2	2	14	0	0	58	4	26	238	0	238	1.8%										
14-Jul	86	96	38	4	8	6							0	4	2	0	0	0	18	30	34	6	14	160	506	0	506	3.8%										
15-Jul	212	90	42	20	14	0							0	0	6	12	4	2	62	38	28	34	74	240	878	0	878	6.5%										
16-Jul																										0	0	0	0.0%									
17-Jul	336	830	172	168	1,142	156	82	12	4	2	0	0	0	0	0	0	10	0	0	4	0	54	18	22	3,012	0	3,012	22.3%										
18-Jul	110	72	68	44	62	56							0	0	0	0	0	4	0	0	164	150	6	8	744	0	744	5.5%										
19-Jul	78	78	74	20	34	42							0	0	0	0	0	0	0	0	54	34	42	40	496	0	496	3.7%										
20-Jul	218	108	150	110	62	78							0	0	0	0	0	0	0	0	0	0	22	92	840	0	840	6.2%										
21-Jul	282	112	102	78	60	70							24	0	0	4	24	16	2	6	4	2	18	166	970	0	970	7.2%										
22-Jul	120	138	86	18	4	14							2	8	10	42	26	100	8	66	358	110	102	66	1,278	0	1,278	9.5%										
23-Jul																										0	0	0	0.0%									
24-Jul	70	28	98	44	76	118	50	16	2	10	0	0	2	4	4	14	2	0	0	2	6	22	10	20	598	0	598	4.4%										
25-Jul	96	76	92	94	132	138							0	0	0	0	0	0	0	2	2	0	34	440	1,106	0	1,106	8.2%										
26-Jul	220	78	114	96	44	6							2	4	0	0	0	0	2	6	18	92	218	176	1,076	0	1,076	8.0%										
Totals	1970	1788	1164	790	1828	754	134	28	6	12	0	0	36	54	88	76	72	144	156	222	848	748	748	1810	13,486		13,486											
	15%	13%	9%	6%	14%	6%	1%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%	2%	6%	6%	6%	13%														

Appendix Table 8. Reported hourly king salmon observations at the Kwiniuk River counting tower, Norton Sound, 1995.

Shaded areas indicate expanded numbers

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
21-Jun	Start of the counting season																0	0	0	0	0	2	0	0	2	0.5%		
22-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
23-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
24-Jun	0	0	0	0	0	0							0	0	0	0	0	18	0	0	0	0	0	6	0	24	5.9%	
25-Jun																									0	0.0%		
26-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0.5%	
27-Jun	2	0	0	0	0	0							0	0	0	0	2	-2	0	0	0	0	0	0	0	2	0.5%	
28-Jun	8	8	2	2	2	0							0	0	0	0	2	0	0	0	0	0	0	0	0	24	5.9%	
29-Jun	14	0	0	0	2	0							2	4	2	0	0	0	0	0	4	0	0	0	0	28	6.8%	
30-Jun	0	4	6	0	0	0							-2	0	0	0	0	2	0	0	2	0	0	0	0	12	2.9%	
1-Jul	0	0	0	0	0	0							2	2	0	0	0	0	4	6	8	2	0	4	28	6.8%		
2-Jul																									0	0.0%		
3-Jul	0	0	0	0	-4	0	0	0	-2	0	0	0	0	0	0	0	-4	0	0	0	0	0	0	0	0	-10	-2.4%	
4-Jul	0	-4	-4	0	0	0							0	0	0	0	-2	0	0	0	0	10	0	0	0	0	0.0%	
5-Jul	0	0	2	0	0	-2							0	0	0	0	0	0	0	0	0	4	2	0	6	1.5%		
6-Jul	0	2	6	0	0	2							0	2	0	0	2	8	0	6	0	0	14	4	46	11.2%		
7-Jul	0	0	8	0	4	2							2	2	6	10	4	0	2	0	12	0	4	0	56	13.7%		
8-Jul	2	2	0	0	4	2							2	4	2	0	0	0	0	0	0	0	0	0	0	18	4.4%	
9-Jul																									0	0.0%		
10-Jul	0	4	10	4	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	20	4.9%		
11-Jul	2	4	0	0	4	0							0	0	0	0	0	0	0	0	0	0	0	0	0	10	2.4%	
12-Jul	0	14	2	0	2	0							0	2	2	2	0	0	0	0	0	2	0	12	38	9.3%		
13-Jul	10	6	0	4	4	0							16	-4	0	0	2	0	0	0	0	0	0	0	2	40	9.8%	
14-Jul	0	10	2	10	6	2							0	-2	0	4	0	0	0	2	0	0	0	0	6	40	9.8%	
15-Jul	6	0	0	0	2	0							0	0	0	0	0	0	0	0	0	0	0	0	0	8	2.0%	
16-Jul																									0	0.0%		
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
18-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
19-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	-2	0	0	4	0	2	0.5%		
20-Jul	0	2	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.5%	
21-Jul	0	2	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.5%	
22-Jul	0	2	0	0	0	0							0	0	0	0	0	0	0	0	0	2	0	0	0	4	1.0%	
23-Jul																									0	0.0%		
24-Jul	0	0	0	0	0	2	0	0	0	0	0	0	0	0	-2	2	0	0	0	0	0	0	0	0	0	2	0.5%	
25-Jul	2	0	0	0	0	2							0	0	0	0	0	0	0	0	0	0	0	0	0	4	1.0%	
26-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Totals	44	56	34	20	26	8	0	0	-2	0	0	0	22	10	10	18	4	10	6	12	32	18	24	28	410			
	10.7%	13.7%	8.3%	4.9%	6.3%	2.0%	0.0%	0.0%	-0.5%	0.0%	0.0%	0.0%	5.4%	2.4%	2.4%	4.4%	1.0%	2.4%	1.5%	2.9%	7.8%	4.4%	5.9%	6.8%				

Appendix Table 9. Reported hourly coho salmon observations at the Kwiniuk River counting tower, Norton Sound, 1995.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total									
21-Jun	Start of the counting season												0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
22-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%						
23-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%						
24-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%						
25-Jun																									0	0.0%									
26-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
27-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
28-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
29-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
30-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
1-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
2-Jul																									0	0.0%									
3-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%								
4-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
5-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
6-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
7-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
8-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
9-Jul																									0	0.0%									
10-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%								
11-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
12-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
13-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
14-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
15-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
16-Jul																									0	0.0%									
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%								
18-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%								
19-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
20-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
21-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%							
22-Jul	2	2	2	0	0	0							0	0	0	0	2	0	0	0	0	0	2	0	0	0	10	9.8%							
23-Jul																									0	0.0%									
24-Jul	2	2	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	0	14	13.7%									
25-Jul	0	0	4	0	2	4							0	0	0	0	0	0	0	0	0	0	0	0	10	20	19.6%								
26-Jul	14	4	2	6	10	6							0	0	0	0	0	0	0	0	0	2	4	6	4	58	56.9%								
Totals	18	8	10	6	12	12	0	0	0	0	0	0	0	0	0	0	2	0	2	2	4	6	6	14	102										
	17.6%	7.8%	9.8%	5.9%	11.8%	11.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	2.0%	2.0%	3.9%	5.9%	5.9%	13.7%											