Kwiniuk River Salmon Counting Tower
Project Summary Report, 1999

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. The last significant chum salmon commercial harvest occurred in 1988 (Bue and Lean 1997).

Since 1965 a salmon counting tower has been operated on the Kwiniuk River see (Lean 1994, and Rob 1996a, 1996b,1997, 1998, 1999for recent years results). The project operates as a means to obtain timely and accurate escapement information that is required to actively manage the stocks throughout the season.

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 21 June, 1999. 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 0000 hours on 25 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. Mondays 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 (Rob 1999).

RESULTS

Table 1 shows the expanded daily and cumulative totals for each salmon species. The expanded counts were: 8,763 chum salmon, 608 pink salmon, and 115 king salmon (Tables 2-4). The reported total hourly counts were: 6,806 chum salmon, 350 pink salmon and 94 king salmon (Appendix Tables 6-8). Figures 2-7 show graphs of the expanded daily totals and the cumulative expanded daily totals for each species counted. No coho salmon were observed during the 1999 counting season.

Counting began on 25 June. Pink salmon were first observed on the sixteenth day of counting, chum were first observed on the third day of counting and king salmon on the sixteenth day. The daily peak of 1,686 chum salmon occurred on 10 July, the daily peak of 102 pink salmon occurred on 14 July, and the daily peak of 36 king salmon occurred on 14 July (Table 1).

All species counted exhibited a diurnal pattern of migration past the counting tower. The greatest hourly chum salmon migration occurred during the hour from 2300 to 2400, when 13.0% passed the tower. During the eight hour period from 1900 through 0300 hours, 67.4% of the chum salmon passed the tower (Table 2 and Figure 8). The greatest hourly pink salmon upstream migration occurred during the hour from 2300 to 2400 hours, when 12.3% passed the tower. During the seven hour period from 2000 through 0300 hours, 51% of the pink salmon passed the tower (Table 3 and Figure 9). The greatest hourly king salmon migration occurred during the hour from 0100 to 0200 hours, when 15.6% passed the tower. During the six hour period from 2300 through 0500 hours, 56.4% of the king salmon passed the tower (Table 4 and Figure 10).

A total of 247 usable chum salmon samples were collected on 5 days during the period from 1 July to 23 July, 1999. The age, sex and mean length composition of the samples sorted by sampling date and age/sex category is presented in Table 5. Analysis of the chum salmon scale samples showed that 0.4% of the fish sampled were age-0.2, 47.0% were age-0.3, 51.8% were age-0.4, and 0.8% were age-0.5 (Table 5)

Climatological and stream observations are shown in Table 6.

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 1999.

The escapement of chum salmon in 1999 was below the current tower goal by almost 11,000 and only about 33% of the the average chum salmon tower count since 1965

(Figure 11). The first portion of the chum salmon escapement was ahead of the normal year timing model, except on 9 through 13 July when the 1999 escapement fell behind the normal model(Figures 12 and 13). The escapement of pink salmon was only 0.6% of the odd year average since 1982 (Figure 14). The pink salmon escapement was well ahead of the odd year pink salmon run-timing model but the small numbers probably make comparisons meaningless (Figure 15). The escapement of king salmon was 22% of the average since 1981 (Figure 16). King salmon timing was up to sixteen days behind the king salmon run-timing model at the beginning of the season (Figure 17).

River conditions for observation of fish passage this year were good to excellent for the entire season. Water levels and conditions did not adversely impact fish observation (Table 6).

ACKNOWLEDGMENTS

The crewleader for the season was Larry Neff. Joel Saccheus, Robert Saccheus and James Katongan were crewmembers. The Norton Sound Economic Development Corporation (NSEDC) provided funding for one crewmember through it's intern program. A draft of this report was reviewed by Larry Buklis.

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Table 1. Expanded daily and cumulative migration of all salmon species past the Kwiniuk River counting tower, Norton Sound, 1999.

Date	Daily chum salmon	Cumulative chum salmon	Daily pink salmon	Cumulative pink salmon	Daily king salmon	Cumulative king salmon
25-Jun	0	0	0	0	0	0
26-Jun	0	0	0	0	0	0
27-Jun	8	8	0	0	0	0
28-Jun	4	12	0	0	0	0
29-Jun	0	12	0	0	0	0
30-Jun	14	26	0	0	0	0
1-Jul	2	28	0	0	0	0
2-Jul	70	98	0	0	0	0
3-Jul	30	128	0	0	0	0
4-Jul	349	477	0	0	0	0
5-Jul	451	928	0	0	0	0
6-Jul	552	1,480	0	0	0	0
7-Jul	179	1,659	0	0	0	0
8-Jul	128	1,787	0	0	0	0
9-Jul	506	2,293	0	0	0	0
10-Jul	1,686	3,978	24	24	2	2
11-Jul	1,208	5,186	12	36	16	18
12-Jul	725	5,911	12	48	10	28
13-Jul	242	6,153	12	60	4	32
14-Jul	297	6,450	102	162	36	68
15-Jul	253	6,703	18	180	0	68
16-Jul	129	6,833	0	180	-4	64
17-Jul	243	7,076	25	205	10	74
18-Jul	203	7,278	30	236	0	74
19-Jul	317	7,595	37	273	8	82
20-Jul	432	8,027	44	317	16	98
21-Jul	59	8,086	12	329	3	101
22-Jul	50	8,136	2	331	2	102
23-Jul	44	8,181	14	344	0	102
24-Jul	33	8,214	14	359	0	102
25-Jul	328	8,541	113	472	6	108
26-Jul	153	8,694	62	534	3	111
27-Jul	-22	8,672	12	546	0	111
28-Jul	90	8,763	63	609	4	115

Table 2. Expanded daily hourly chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.

Outlined areas indicate hours not counted. Numbers in outlined 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
25-Jun												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%
27-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	0.1%
28-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	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%
30-Jun	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	6	0	4	14	0.2%
1-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0.0%
2-Jul	0	0	0	4	0	44	0	0	0	0	0	0	-2	6	0	0	10	0	8	70	0.8%
3-Jul	10	8	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	8	0	30	0.3%
4-Jul	14	-2	2	0	0	0	1	0	0	0	0	0	0	0	0	70	0	152	112	349	4.0%
5-Jul	17	54	11	4	0	0	2	-1	0	0	0	0	138	45	6	40	2	77	56	451	5.1%
6-Jul	20	110	20	8	0	0	2	-2	0	0	0	0	276	90	12	10	4	2	0	552	6.3%
7-Jul	66	4	8	70	18	0	1	6	0	0	0	0	0	2	0	2	0	2	0	179	2.0%
8-Jul	0	-40	-24	-24	0	0	0	0	0	0	0	0	0	0	0	16	30	64	106	128	1.5%
9-Jul	92	68	44	42	8	28	2	4	0	6	16	0	0	38	34	16	0	8	100	506	5.8%
10-Jul	20	146	146	166	96	12	98	0	6	38	28	20	10	-4	220	2	210	4	468	1,686	19.2%
11-Jul	230	32	288	122	68	76	70	8	76	80	60	46	14	0	0	0	2	34	2	1,208	13.8%
12-Jul	129	23	148	67	38	51	42	4	38	87	45	43	11	0	0	-1	1	17	2	725	8.3%
13-Jul	28	14	8	12	8	26	14	0	0	54	30	40	8	0	0	-2	0	0	2	242	2.8%
14-Jul	8	40	0	0	2	2	17	0	62	8	48	4	26	50	6	12	0	8	4	297	3.4%
15-Jul	2	2	4	4	2	2	15	0	0	0	0	-4	10	14	2	0	0	144	56	253	2.9%
16-Jul	6	4	0	0	-2	0	7	0	0	0	0	2	4	18	48	42	0	-4	4	129	1.5%
17-Jul	18	4	100	20	8	6	-9	0	-2	-4	38	54	-34	0	4	0	38	2	0	243	2.8%
18-Jul	4	10	6	54	14	0	-8	0	0	0	0	0	0	0	0	76	28	2	16	203	2.3%
19-Jul	50	19	5	65	28	7	-12	19	-41	5	17	30	5	-1	10	49	27	7	28	317	3.6%
20-Jul	96	28	4	76	42	14	-18	38	-82	10	34	60	10	-2	20	22	26	12	40	432	4.9%
21-Jul	2	-42	0	2	0	0	-2	-8	-2	6	17	29	5	-1	10	11	2	10	20	59	0.7%
22-Jul	18	14	0	2	2	12	-2	0	0	2	0	-2	0	0	0	0	-2	0	6	50	0.6%
23-Jul	10	0	4	6	-2	0	-2	0	0	2	0	0	0	0	0	0	24	0	2	44	0.5%
24-Jul	4	0	10	12	8	8	3	0	0	0	0	0	0	0	0	0	0	-10	-2	33	0.4%
25-Jul	-4	2	68	64	42	30	30	2	0	0	2	-2	0	0	10	4	-2	32	50	328	3.7%
26-Jul	-4	-8	35	28	19	15	14	1	0	2	1	-1	0	0	5	3	-1	16	28	153	1.7%
27-Jul	-4	-18	2	-8	-4	0	-2	0	0	4	0	0	0	0	0	2	0	0	6	-22	-0.3%
28-Jul	4	4	4	16	18	28	8	0	0	0	0	0	0	0	0	0	0	0	8	90	1.0%
Totals	836	476	893	812	413	363	274	71	55	282	336	319	483	255	387	376	407	587	1,138	8,763	100%
	9.5%	5.4%	10.2%	9.3%	4.7%	4.1%	3.1%	0.8%	0.6%	3.2%	3.8%	3.6%	5.5%	2.9%	4.4%	4.3%	4.6%	6.7%	13.0%	100.0%	

Table 3. Expanded daily hourly pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999

Outlined areas indicate hours not counted. Numbers in outlined 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
25-Jun												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%
27-Jun	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%
29-Jun	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%
1-Jul	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%
3-Jul	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%
5-Jul	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%
7-Jul	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%
9-Jul	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	16	0	2	0	0	0	0	0	0	0	0	0	6	24	3.9%
11-Jul	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	2	0	0	2	12	2.0%
12-Jul	2	0	0	0	0	0	8	0	0	0	0	0	0	0	0	1	0	0	1	12	2.0%
13-Jul	4	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	12	2.0%
14-Jul	0	6	0	0	0	0	68	0	2	6	2	14	4	0	0	0	0	0	0	102	16.8%
15-Jul	0	0	2	2	0	0	12	0	0	0	-2	-2	2	0	0	0	0	4	0	18	3.0%
16-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
17-Jul	0	8	6	0	4	0	3	0	0	0	-2	0	4	0	0	0	2	0	0	25	4.2%
18-Jul	4	0	0	12	0	0	4	0	0	0	0	0	0	0	0	0	0	0	10	30	4.9%
19-Jul	3	4	1	6	0	0	5	1	4	2	3	0	0	0	0	3	0	0	3	37	6.1%
20-Jul	2	8	2	0	0	0	6	2	8	4	6	0	0	0	0	6	0	0	0	44	7.2%
21-Jul	2	0	0	0	0	0	2	0	0	2	3	0	0	0	0	3	0	0	0	12	1.9%
22-Jul	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.4%
23-Jul	10	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	14	2.3%
24-Jul	4	4	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	14	2.4%
25-Jul	0	0	10	6	6	0	19	0	0	2	0	0	0	0	0	2	0	36	32	113	18.5%
26-Jul	4	-1	5	2	3	0	10	1	0	1	0	0	0	0	0	1	0	19	17	62	10.3%
27-Jul	8	-2	0	-2	0	0	2	2	0	0	0	0	0	0	0	0	0	2	2	12	2.0%
28-Jul	4	2	4	8	6	16	10	0	0	0	0	0	0	2	2	8	0	0	0	62	10.3%
Totals	49	29	34	34	19	18	186	6	16	17	10	12	10	2	2	26	2	61	75	608	100%
	8.1%	4.8%	5.6%	5.6%	3.1%	3.0%	30.6%	1.0%	2.6%	2.8%	1.6%	2.0%	1.6%	0.3%	0.3%	4.3%	0.3%	10.0%	12.3%	100.0%	

Table 4. Expanded daily hourly king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.

Outlined areas indicate hours not counted. Numbers in outlined 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
25-Jun												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
27-Jun	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
29-Jun	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
1-Jul	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
3-Jul	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
5-Jul	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
7-Jul	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
9-Jul	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	2	0	0	0	0	0	0	0	0	0	2
11-Jul	0	6	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	16
12-Jul	1	3	0	0	0	0	0	6	-1	1	0	0	0	0	0	0	0	0	0	10
13-Jul	2	0	0	0	0	0	0	2	-2	2	0	0	0	0	0	0	0	0	0	4
14-Jul	0	14	0	0	4	0	0	-2	12	0	4	4	0	0	0	0	0	0	0	36
15-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jul	2	-2	0	-2	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	-4
17-Jul	0	0	-2	8	0	4	-2	0	0	0	-2	2	0	0	0	2	0	0	0	10
18-Jul	0	0	-4	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0
19-Jul	0	0	1	2	0	4	-2	-3	1	1	2	0	0	1	0	1	0	-1	1	8
20-Jul	0	0	6	4	0	8	-4	-6	2	2	4	0	0	2	0	0	0	-2	0	16
21-Jul	0	0	0	0	0	0	-1	0	-2	1	2	0	0	1	0	0	2	0	0	3
22-Jul	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
23-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Jul	0	0	0	0	0	2	0	0	0	2	0	2	-2	0	0	0	0	0	2	6
26-Jul	-3	-1	0	0	0	0	0	0	0	1	0	4	-1	0	0	0	0	0	3	3
27-Jul	-6	-2	0	0	0	-2	0	0	0	0	0	6	0	0	0	0	0	0	4	0
28-Jul	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Totals	-4	18	1	16	4	18	-10	7	10	12	10	16	-3	4	0	5	2	-3	12	115
	-3.5%	15.6%	0.9%	13.9%	3.5%	15.6%	-8.3%	6.1%	8.7%	10.4%	8.7%	13.9%	-2.6%	3.5%	0.0%	4.3%	1.7%	-2.6%	10.4%	100%

Table 5. Age, sex, and length composition of chum salmon samples, Kwiniuk River counting tower, Norton Sound, 1999.

Sample Dates: 7/1-7/23/99
Sample Size: 247

Brood Year and Age Group

	1996 (0.2)		1995 (0.3)		1994 (0.4)		1993 (0.5)		
	# of fish	*Average length (mm)*[a]	# of fish	*Average length (mm)*[a]	# of fish	*Average length (mm)*[a]	# of fish	*Average length (mm)*[a]	Totals
Female chum	1	550	57	*550*	68	569	1	600	127
% of Total	0.4%		23.1%		27.5%		0.4%		51.4%
Male chum	0	525	59	582	60	599	1	625	120
% of Total	0.0%		23.9%		24.3%		0.4%		48.6%
Totals	1		116		128		2		247
	0.4%		47.0%		51.8%		0.8%		

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

Table 6 Kwiniuk River counting tower climatological and stream observations, Norton Sound 1999.

Date	Time	Air Temp °C	Water Temp °C	Cloud Cover %	Water Gauge Inches	Water Visibility	Remarks
25-Jun	1915	25	14	50%	18.50	Clear	N 5-10
26-Jun	1200	18	12	85%	24.00	Clear	N 5-10
27-Jun	1200	23	12	40%	28.50	Clear	S 5
28-Jun							
29-Jun	1200	23	13	10%	21.00	Clear	NE 10-15
30-Jun	1200	25	13	0%	23.50	Clear	E 5.10
1-Jul	1200	24	14	15%	25.00	Clear	S 5-10
2-Jul	1200	23	14	15%	22.50	Clear	S 5-10
3-Jul	1200	19	13	5%	15.50	Clear	S5-10
4-Jul	1200	17	12	50%	14.00	Clear	S 5-10
5-Jul							
6-Jul	1200	20	13	70%	14.00	Clear	S 0-5
7-Jul	1200	12	11	95%	15.50	Clear	SW 10-20
8-Jul	1200	13	9	70%	15.00	Clear	SE 5-10
9-Jul	1200	16	11	50%	16.00	Clear	N 0-5
10-Jul	1200	20	14	5%	15.00	Clear	N 5-10
11-Jul	1200	23	16	5%	24.50	Clear	SE 0-5
12-Jul							
13-Jul	1200	17	15	85%	16.00	Clear	N 5-10
14-Jul	1200	18	15	10%	18.00	Clear	S 0-5
15-Jul	1200	17	14	65%	19.00	Clear	S 5-10
16-Jul	1200	18	14	85%	17.50	Clear	S 5
17-Jul	1200	12	13	100%	20.00	Clear	S 5-10 LT RAIN
18-Jul	1200	12	11	100%	12.00	Clear	S 5
19-Jul							
20-Jul	1200	9	10	100%	44.00	Slightly Turbid	S 10-20
21-Jul	1200	10	9	85%	34.00	Poor Cloudy	CALM
22-Jul	1200	13	9	75%	24.00	good	S 0-5
23-Jul	1200	8	9	100%	20.00	Clear	N 0-5 LT RAIN
24-Jul	1200	9	9	100%	25.00	Clear	N 5-10 RAIN
25-Jul	1200	10	10	100%	32.50	Clear	S 10 LT RAIN
26-Jul	1200	10	10	100%	35.50	Slightly Turbid	S 5-10 LT RAIN
27-Jul	1200	11	9	95%	33.50	Slightly Turbid	CALM
28-Jul	1200	10	10	100%	28.00		CALM

Figure 1. Area location map of the Kwiniuk River counting tower project site, Norton Sound, 1998.

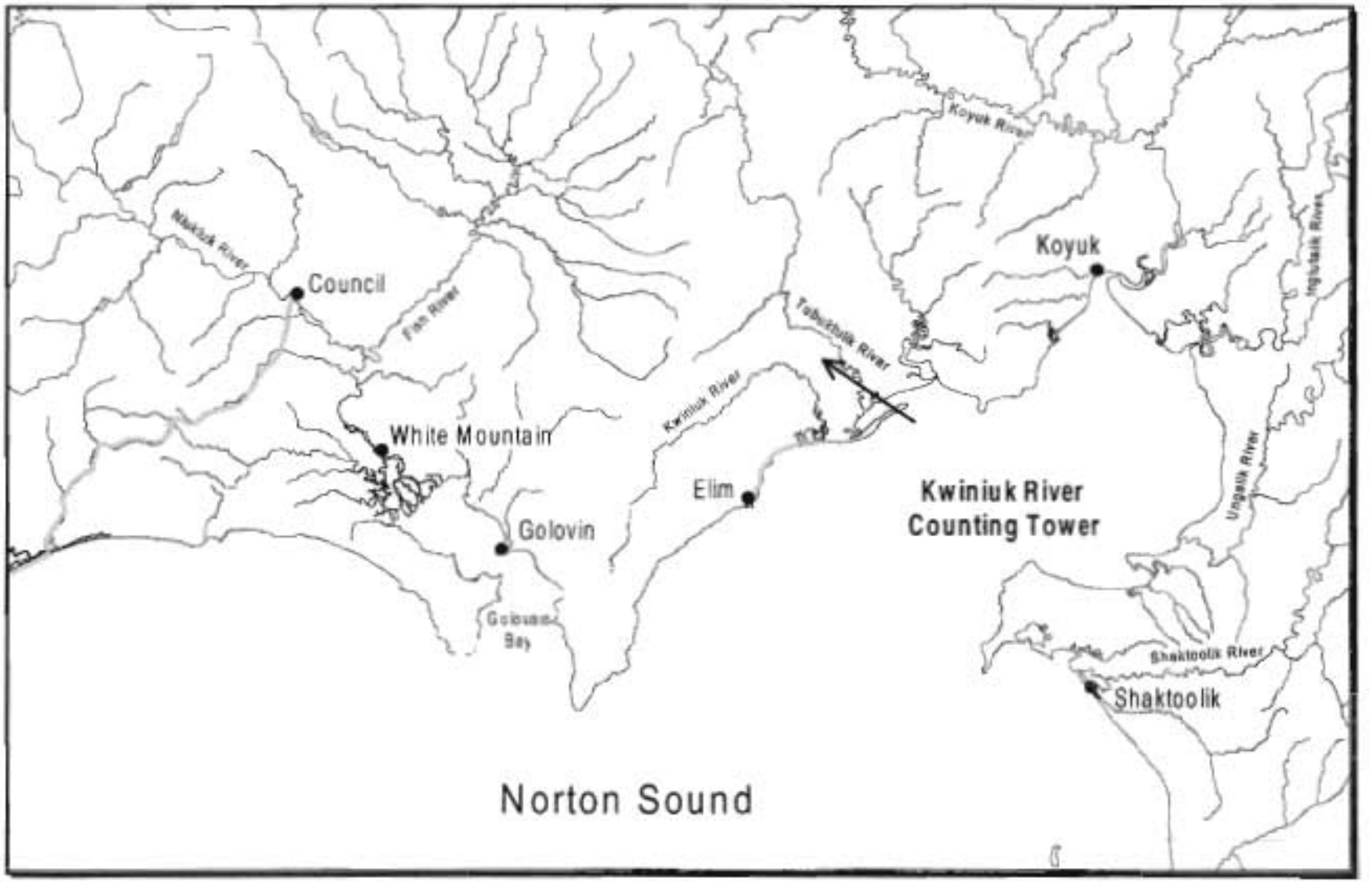


Figure 2. **Daily chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.**

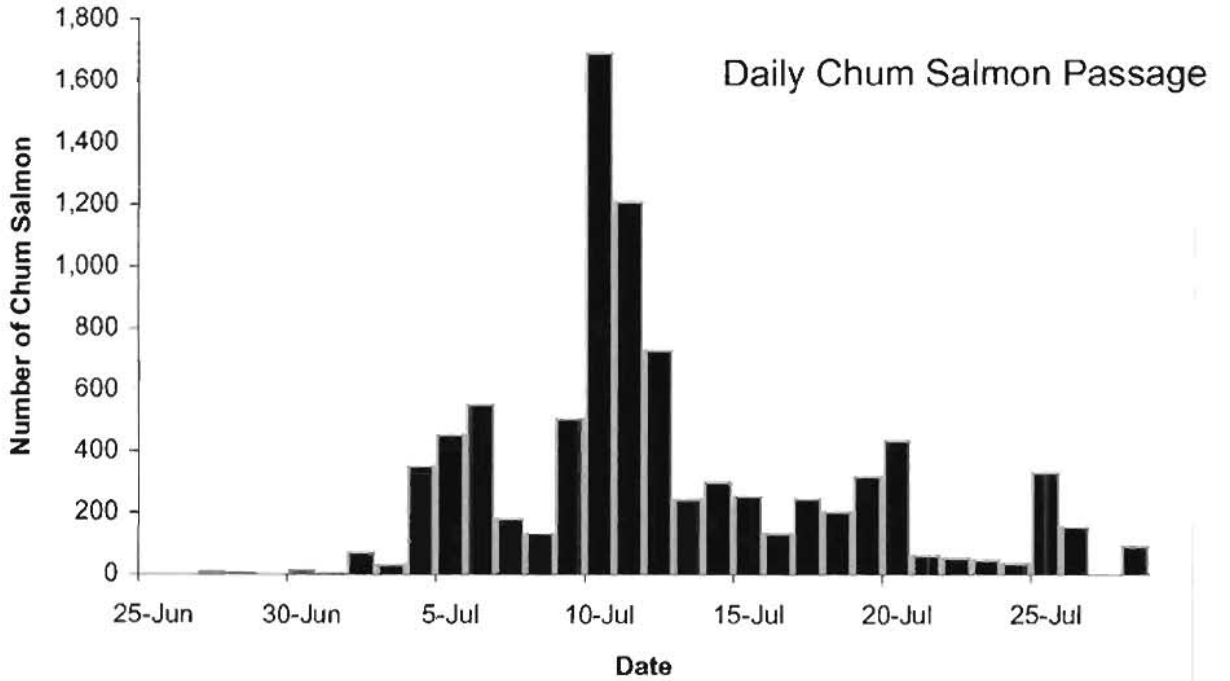
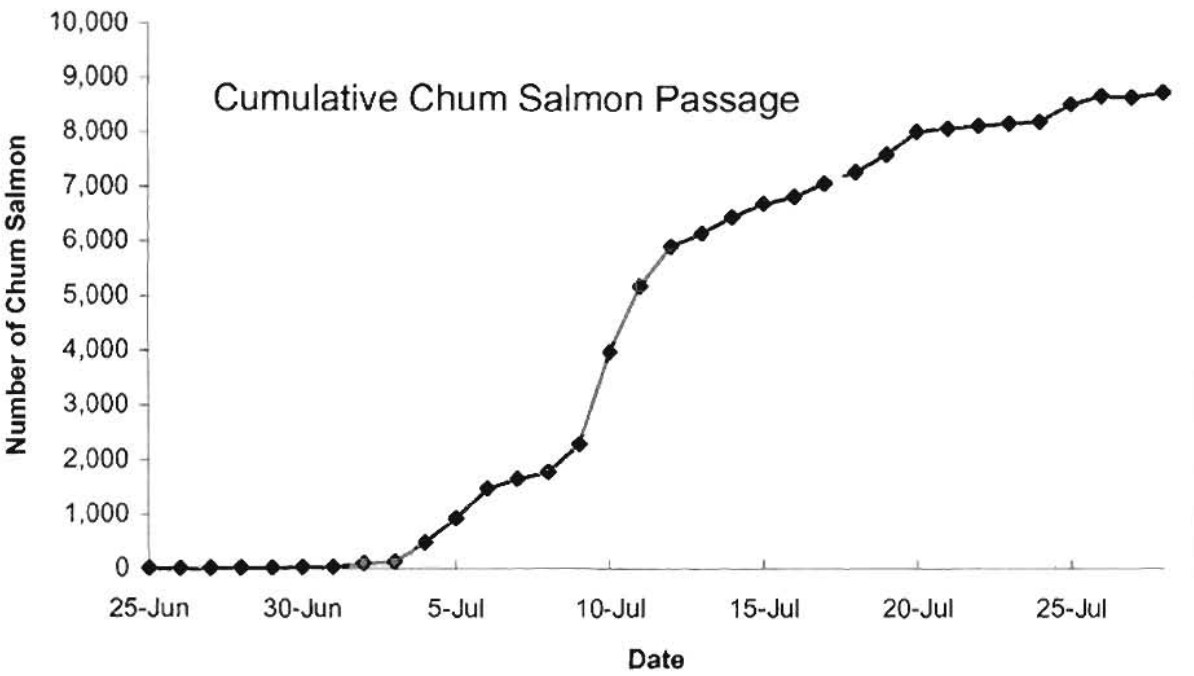


Figure 3. Cumulative chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.



igure 4. **Daily pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.**

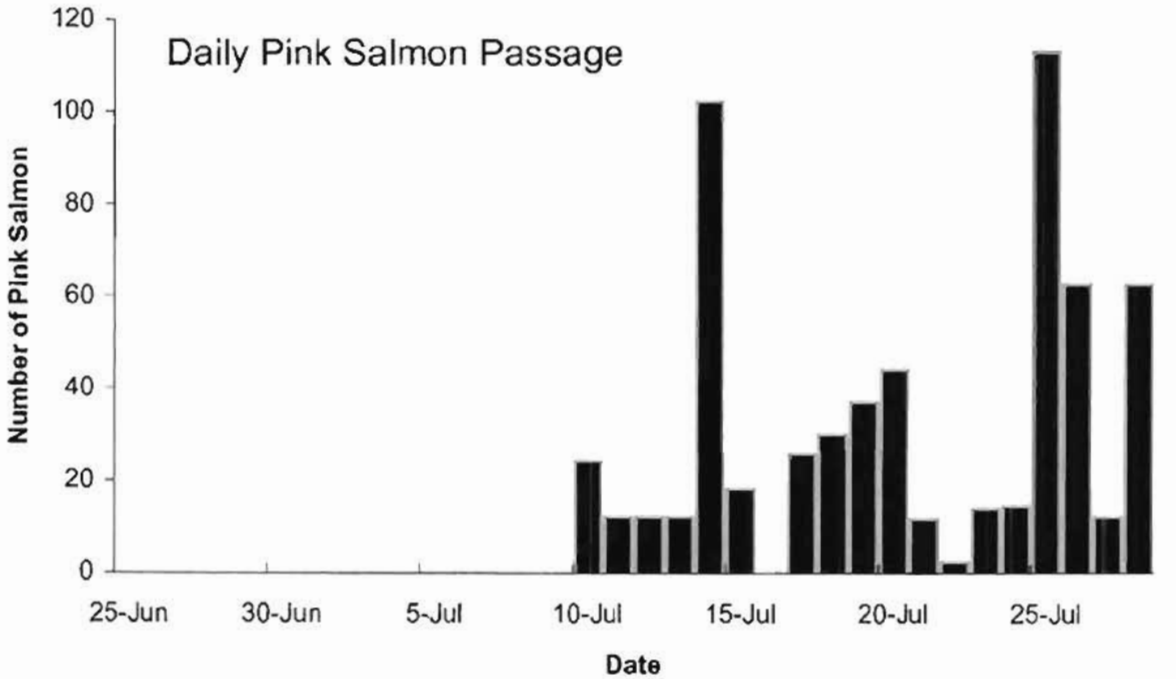


Figure 5. Cumulative pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.

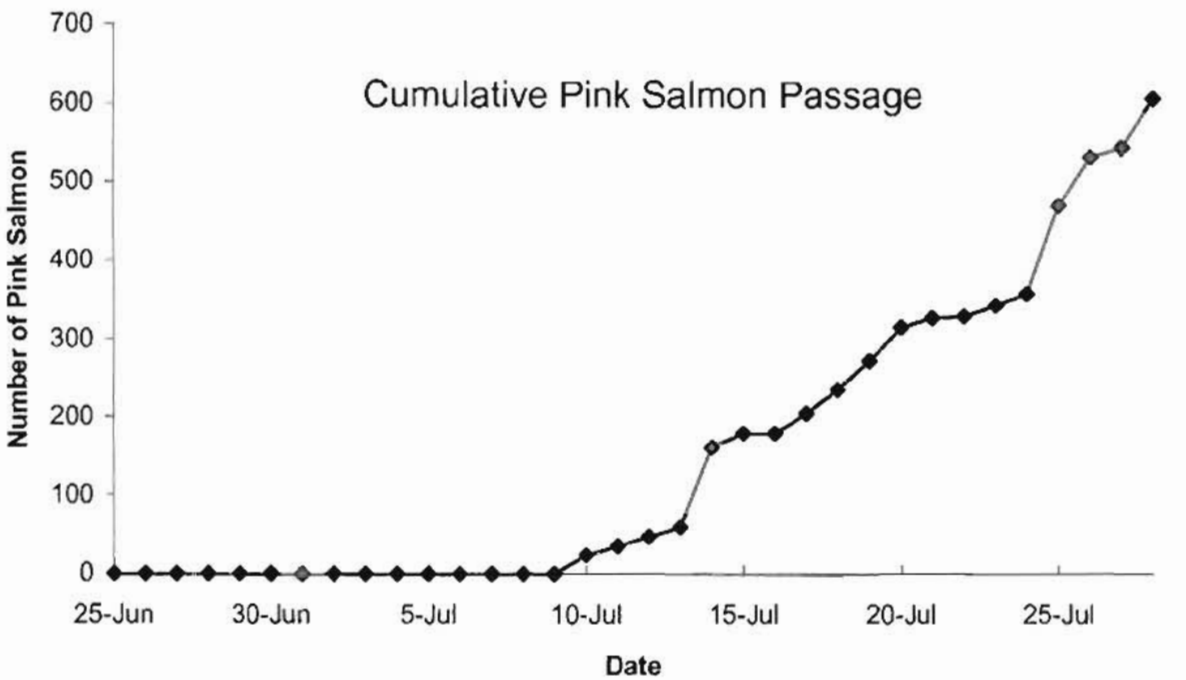


Figure 6. Daily king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.

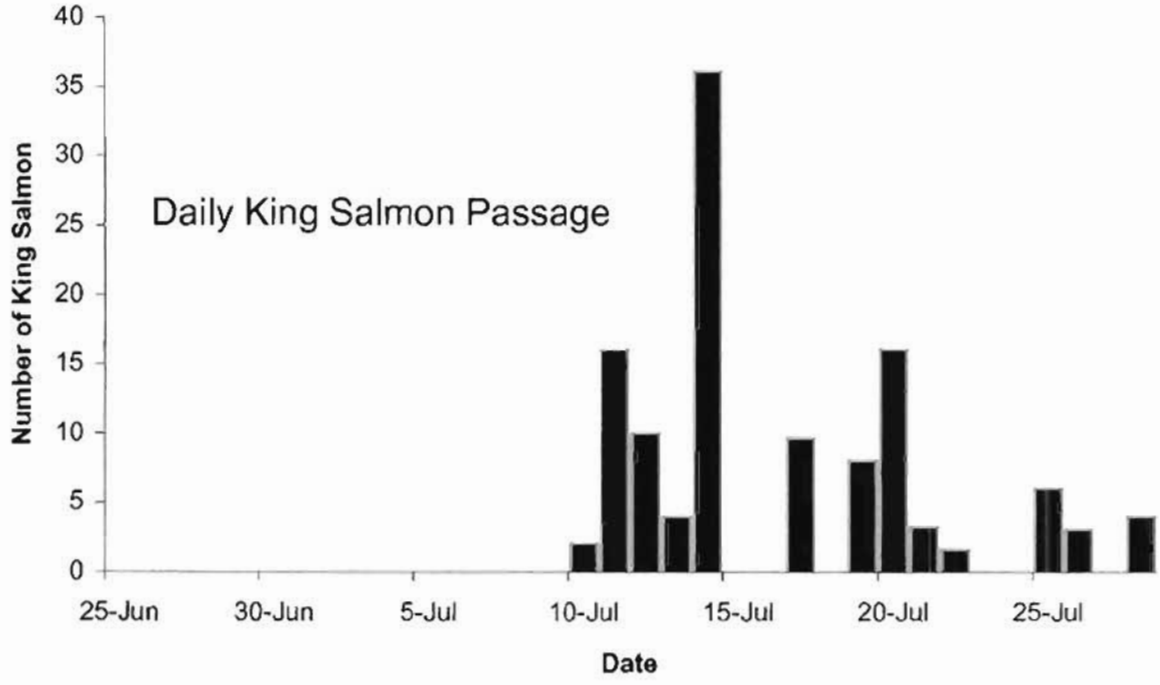


Figure 7. Cumulative king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.

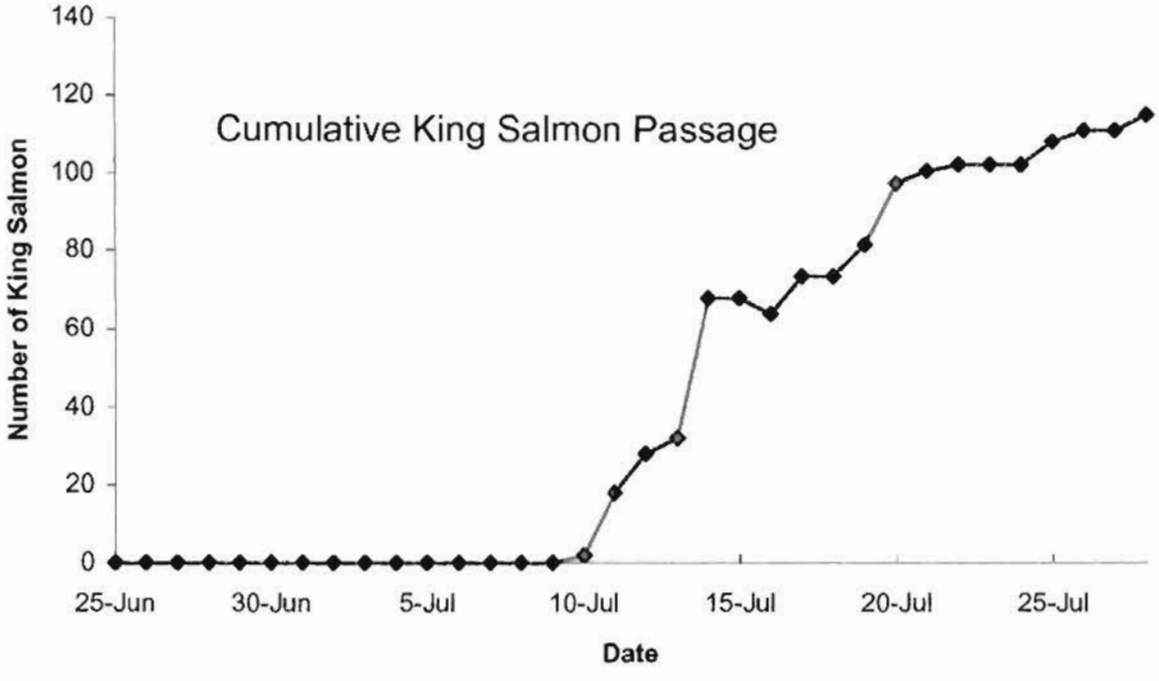


Figure 8. Diurnal pattern of chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.

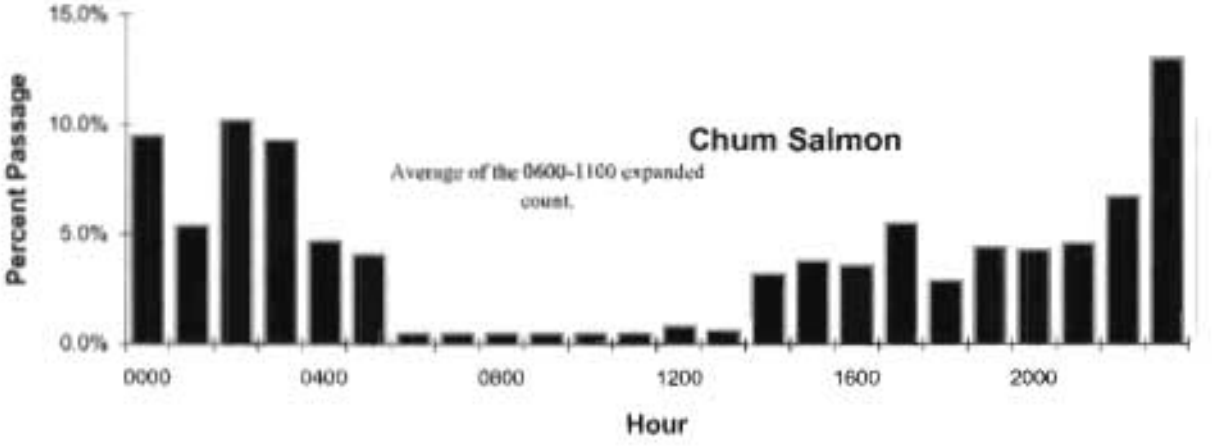


Figure 9. Diurnal pattern of pink salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.

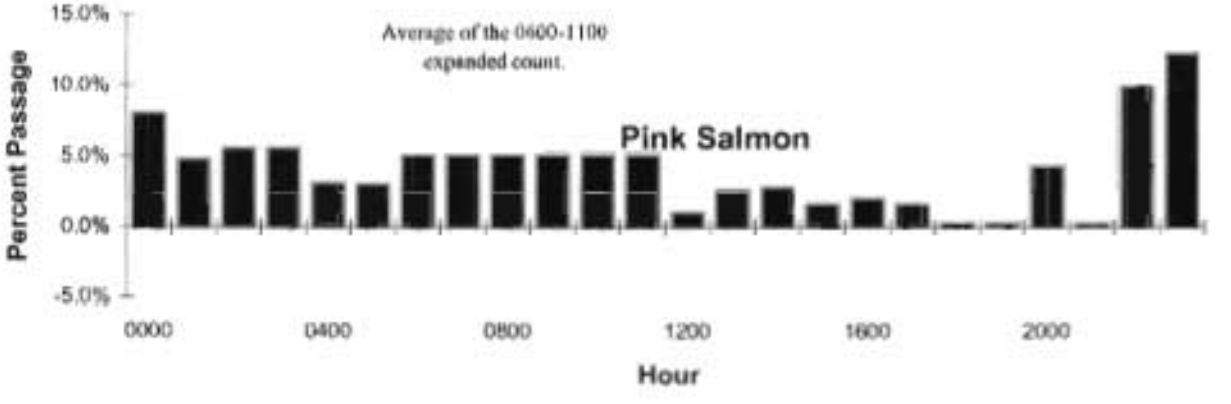


Figure 10. Diurnal pattern of king salmon migration past the Kwiniuk River counting tower, Norton Sound, 1999.

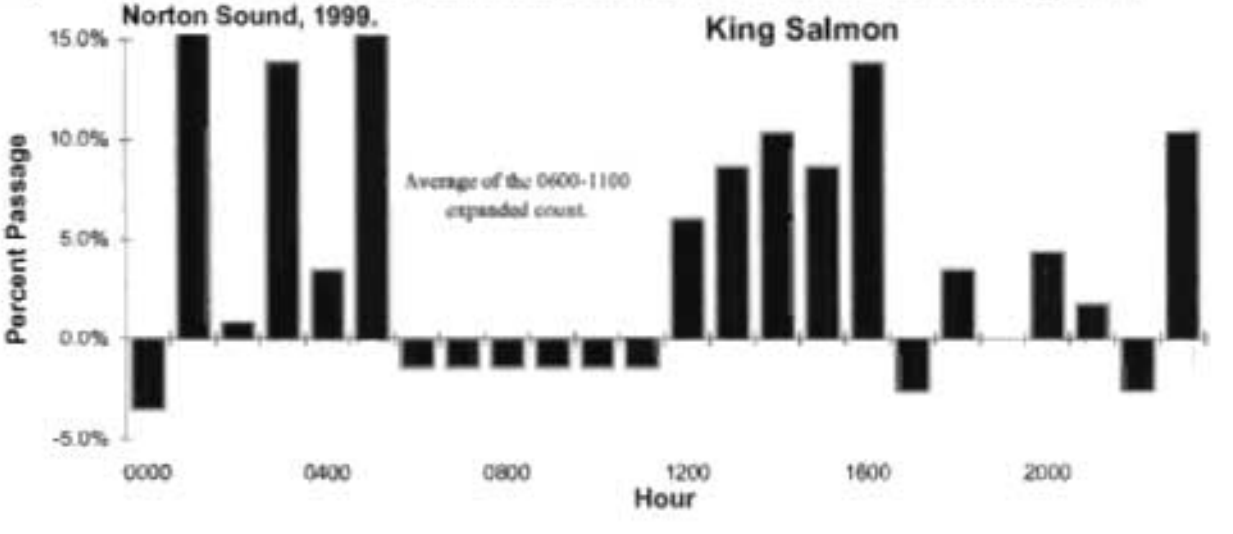


Figure 11. Annual chum salmon passage past the Kwiniuk River counting tower, Norton Sound, 1965-1999.

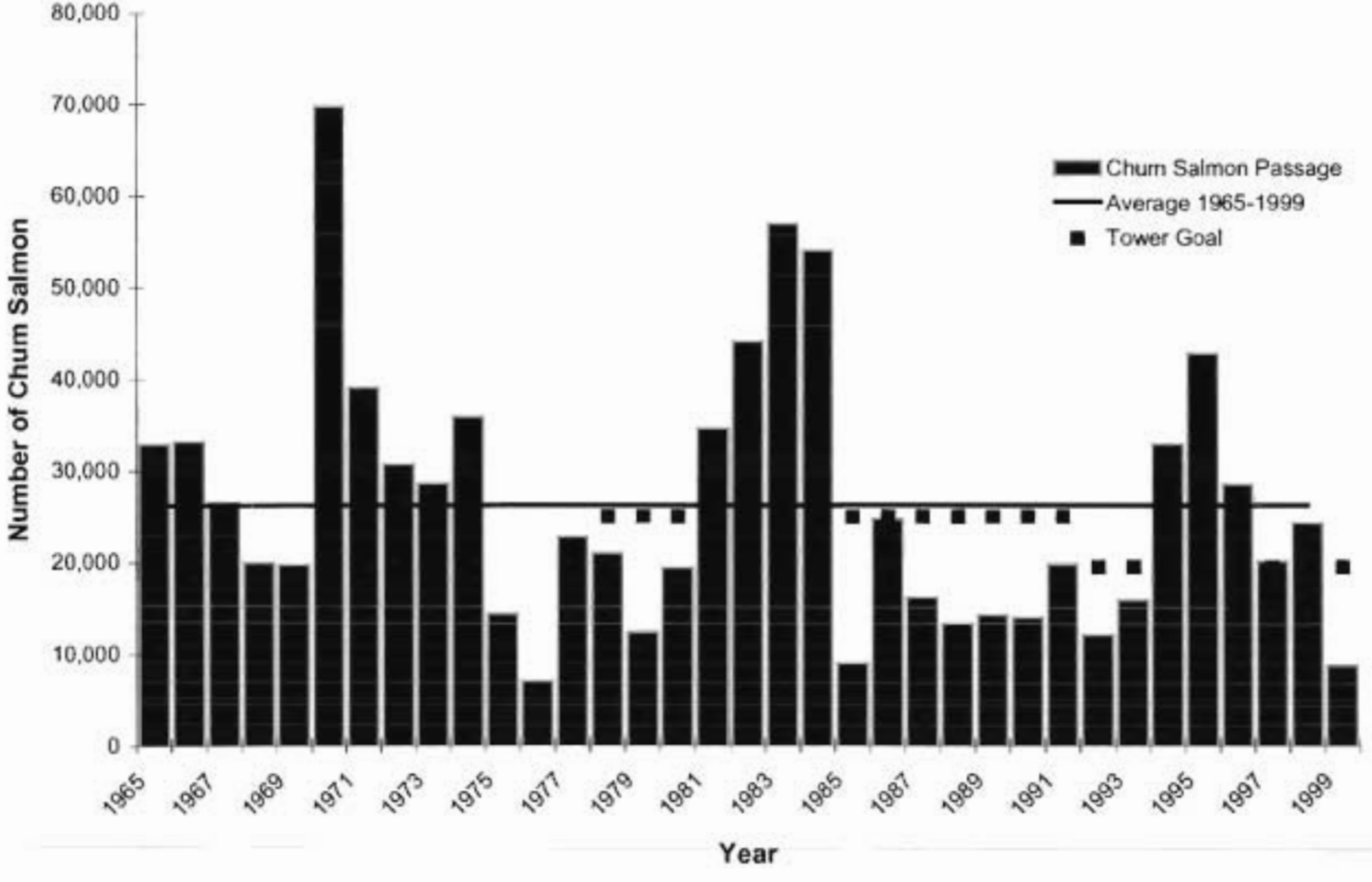


Figure 12. Chum salmon run-timing models for the Kwiniuk River, Norton Sound, 1965 - 1999.

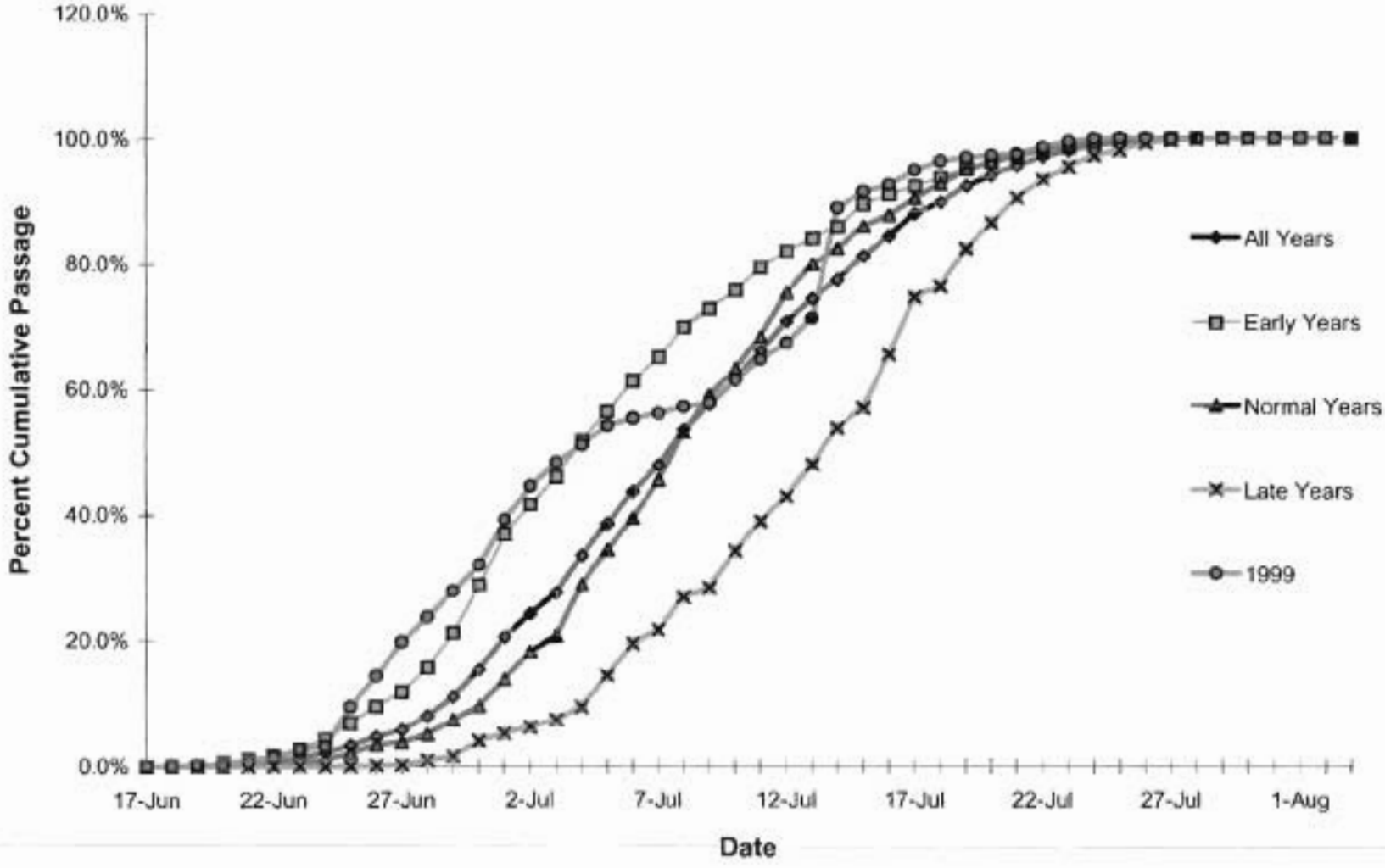


Figure 13. Percent cumulative 1999 chum salmon passage compared to the normal year run-timing model, 1965-1999, Kwiniuk River counting tower, Norton Sound.

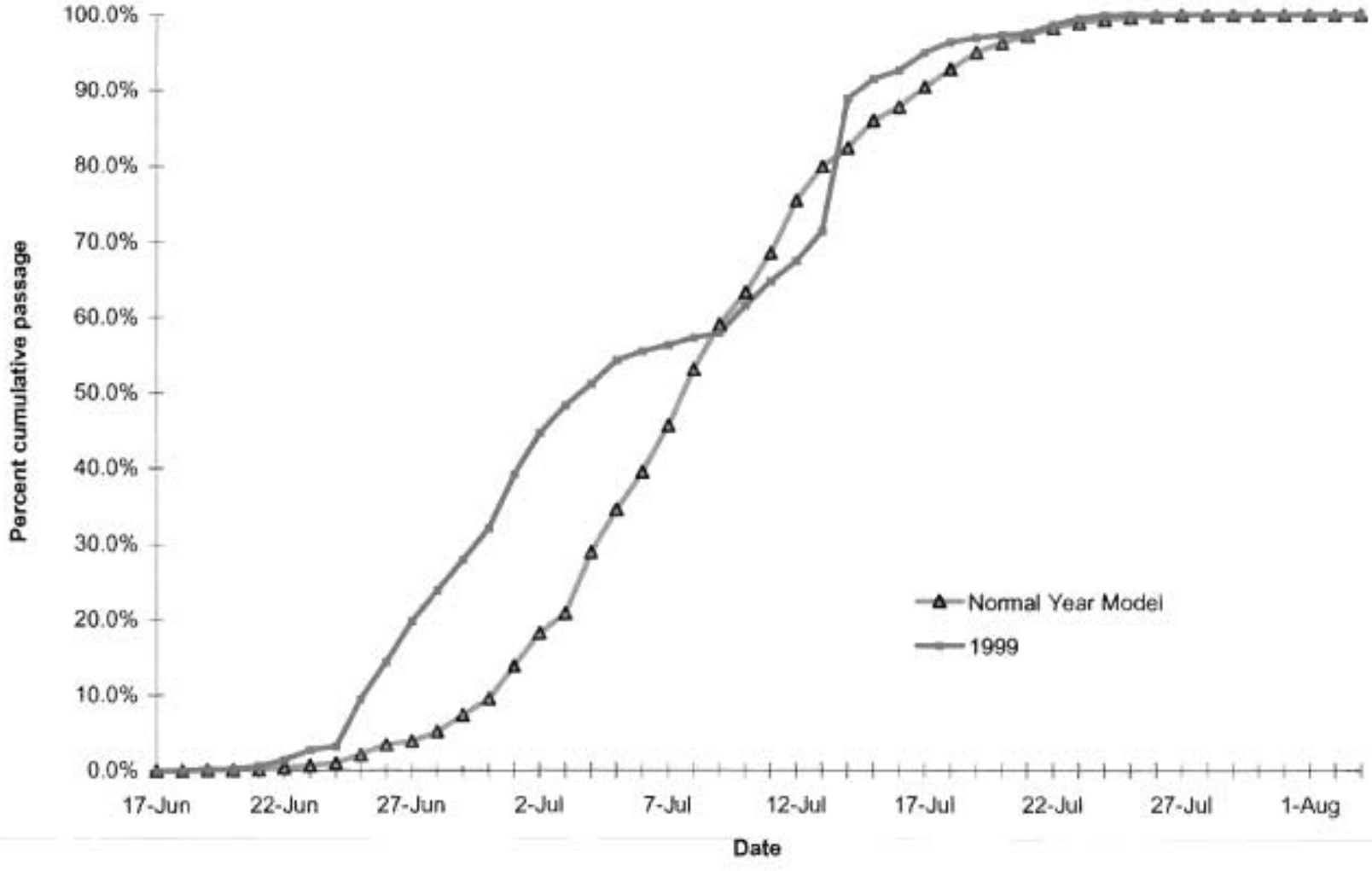


Figure 14. Annual pink salmon passage past the Kwiniuk River counting tower, Norton Sound, 1981-1999.

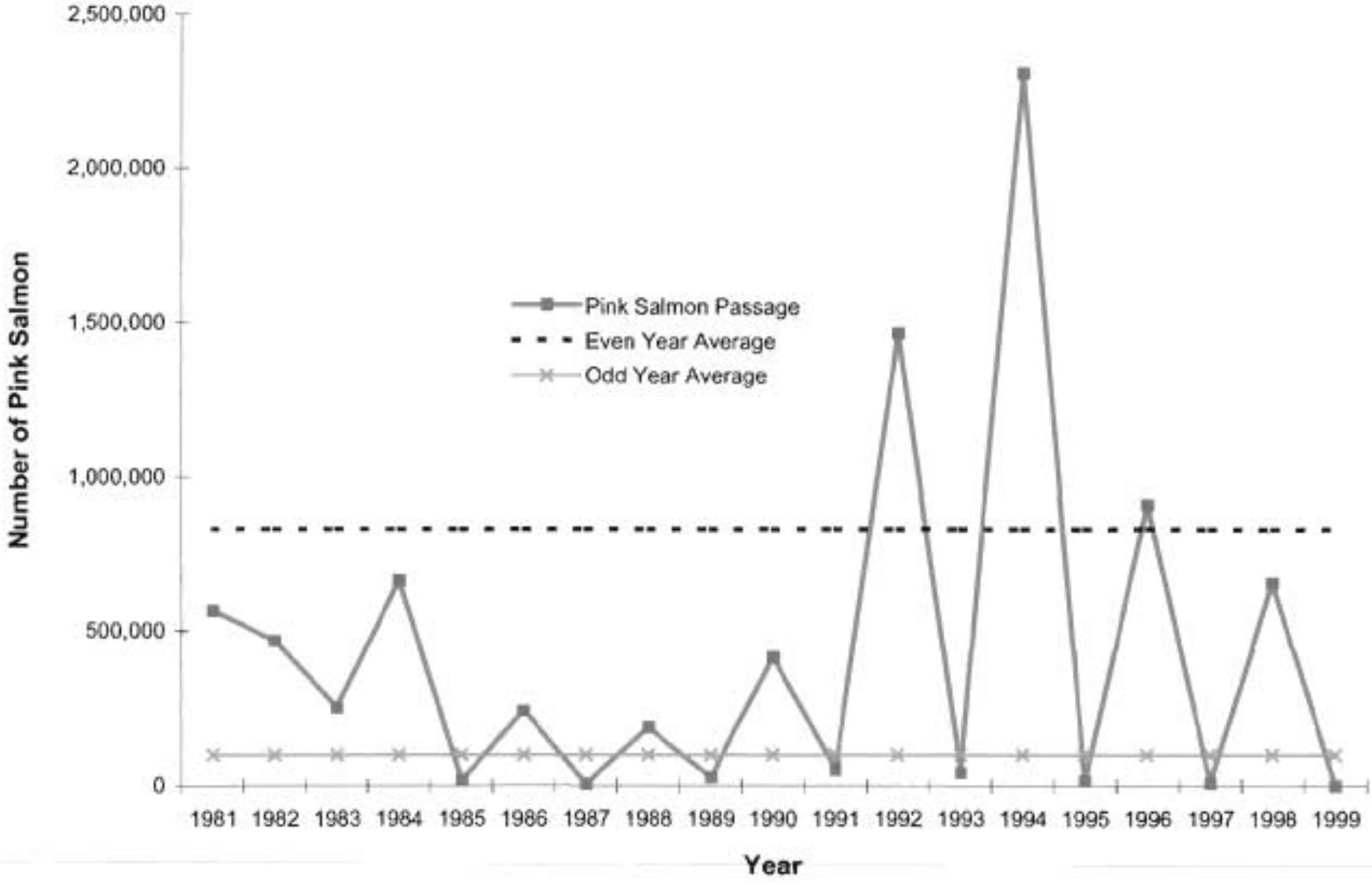


Figure 15. Pink salmon run-timing, Kwiniuk River counting tower, Norton Sound, 1981-1999.

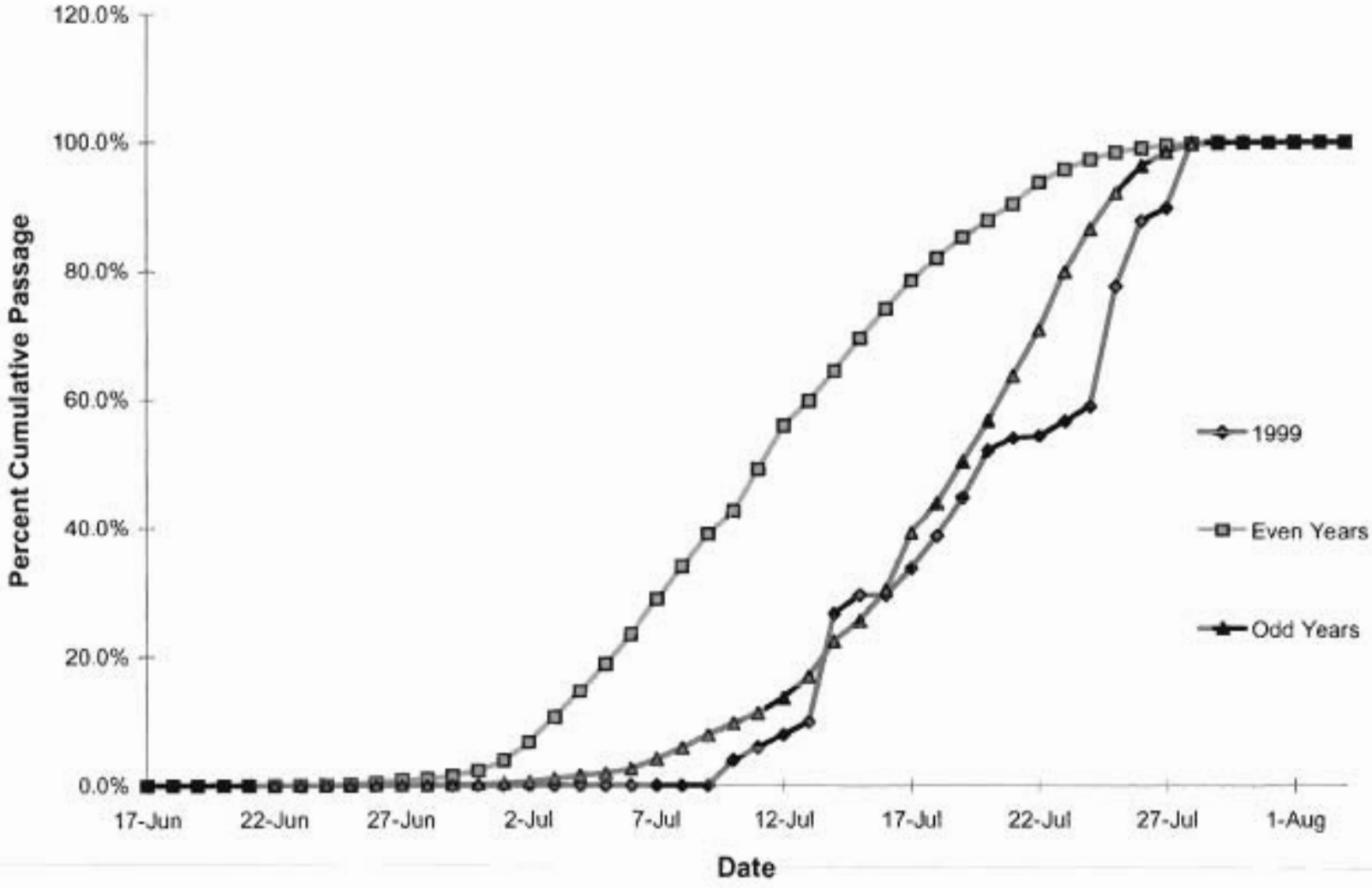


Figure 16. Annual king salmon passage past the Kwiniuk River counting tower, Norton Sound, 1981-1999.

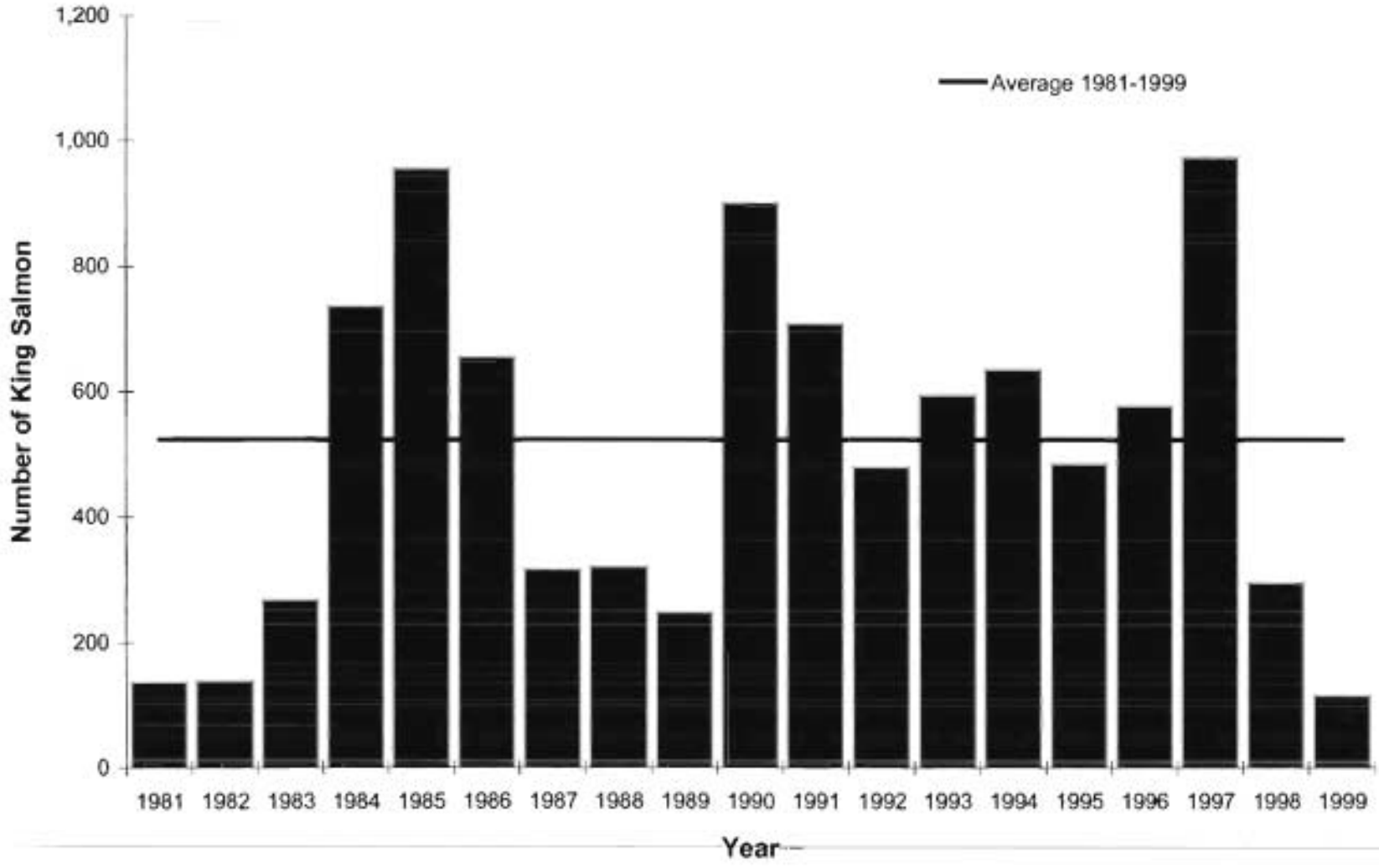
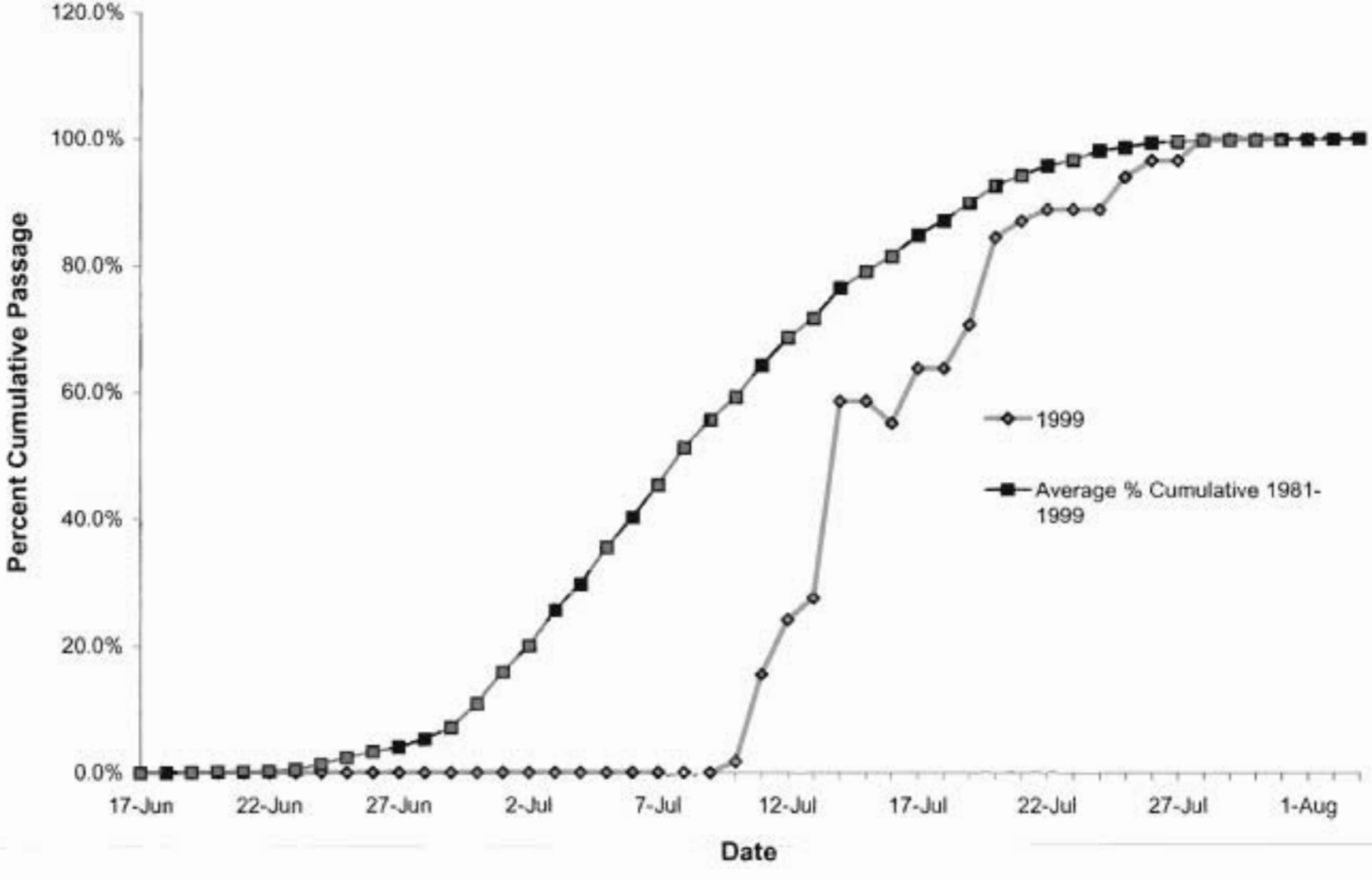


Figure 17. King salmon run-timing, Kwiniuk River counting tower, Norton Sound, 1981-1999.



Appendix Table 1. Cummulative expanded daily chum salmon migration past the Kwiniuk River counting tower, Norton Sound, 1965-1999.

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	34,663
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 indictae 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.

- continued -

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.

[f] Some missed counts were estimated. This footnote taken from the tower report. Estimation details not known.

[l] 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.

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Appendix Table 1. (Page 3 of 4).

Timing Date	Day	Late 1985g	Early 1986g	Normal 1987g	Early 1988g	Early 1989g	Early 1990g	Late 1991g	Normal 1992g	Normal 1993g	Early 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.

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Appendix Table 1. (Page 4 of 4).

Timing Date	Day	Early 1995[1]	Early 1996[1]	Normal 1997	Normal 1998	Early 1999
17-Jun	1					
18-Jun	2			0		
19-Jun	3			140		
20-Jun	4		707	220	0	
21-Jun	5	345	889	270	-13	
22-Jun	6	248	1,689	416	32	
23-Jun	7	1,314	3,218	789	194	
24-Jun	8	1,742	5,477	1,389	261	
25-Jun	9	1,534	5,661	1,793	236	0
26-Jun	10	1,536	5,675	2,293	292	0
27-Jun	11	3,910	6,036	2,492	290	8
28-Jun	12	7,121	8,796	3,028	942	12
29-Jun	13	10,016	12,014	3,443	1,317	12
30-Jun	14	15,564	14,860	4,257	1,477	26
1-Jul	15	18,262	16,445	5,471	3,949	28
2-Jul	16	18,110	16,767	6,115	4,480	98
3-Jul	17	18,935	16,945	6,854	5,519	128
4-Jul	18	19,827	19,299	8,718	7,644	477
5-Jul	19	24,763	20,321	9,435	9,573	928
6-Jul	20	27,913	22,286	10,349	11,292	1,480
7-Jul	21	29,315	23,804	11,432	12,802	1,659
8-Jul	22	30,414	24,819	12,684	13,506	1,787
9-Jul	23	31,212	25,331	13,062	13,916	2,293
10-Jul	24	32,931	25,660	13,185	14,370	3,978
11-Jul	25	35,198	26,026	13,288	16,038	5,186
12-Jul	26	36,696	26,388	13,327	18,240	5,911
13-Jul	27	38,699	26,630	14,189	19,335	6,153
14-Jul	28	39,724	26,917	14,828	19,323	6,450
15-Jul	29	40,372	27,087	15,244	19,863	6,703
16-Jul	30	40,644	27,139	15,523	21,777	6,833
17-Jul	31	40,764	27,397	17,109	22,947	7,076
18-Jul	32	41,049	27,499	17,438	23,133	7,278
19-Jul	33	41,372	27,718	18,331	23,417	7,595
20-Jul	34	41,714	27,971	18,884	23,683	8,027
21-Jul	35	42,012	28,075	19,266	23,931	8,086
22-Jul	36	42,234	28,232	19,478	24,117	8,136
23-Jul	37	42,378	28,442	19,796	24,164	8,181
24-Jul	38	42,578	28,465	20,053	24,192	8,214
25-Jul	39	42,703	28,493	20,081	24,204	8,541
26-Jul	40			20,087	24,216	8,694
27-Jul	41			20,118	24,248	8,672
28-Jul	42					8,763
29-Jul	43					
30-Jul	44					
31-Jul	45					
1-Aug	46					
2-Aug	47					
3-Aug	48					
Total		42,703	28,493	20,118	24,248	8,763

[1] First days count is an aerial survey count

Appendix Table 2. Cumulative percent daily chum salmon run-timing at the Kwiniuk River tower, Norton Sound, 1965-1999.

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.

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Appendix Table 2. (Page 2 of 4).

Timing Date	Day	Late 1975	Late 1976	Normal 1977	Early 1978[c]	Late 1979	Normal 1980	Normal 1981	Early 1982	Early 1983	Early 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] Countsprior 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.

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Appendix Table 2. (Page 3 of 4).

Timing		Late	Early	Normal	Early	Early	Early	Late	Normal	Normal	Early
Date	Day	1085	1986	1987	1988	1989	1990	1991	1992	1993	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.

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Appendix Table 2. (Page 4 of 4).

Timing Date	Day	Early 1995*	Early 1996*	Normal 1997	Normal 1998	Late 1999
17-Jun	1	0.0%	0.0%	0.0%	0.000%	0.0%
18-Jun	2	0.0%	0.0%	0.0%	0%	0.0%
19-Jun	3	0.0%	0.0%	0.7%	0.0%	0.0%
20-Jun	4	0.0%	2.5%	1.1%	0.0%	0.0%
21-Jun	5	0.8%	3.1%	1.3%	-0.1%	0.0%
22-Jun	6	0.6%	5.9%	2.1%	0.2%	0.0%
23-Jun	7	3.5%	11.3%	3.9%	0.8%	0.0%
24-Jun	8	4.1%	19.2%	6.9%	1.1%	0.0%
25-Jun	9	3.6%	19.9%	8.9%	1.0%	0.0%
26-Jun	10	3.6%	19.9%	11.4%	1.2%	0.0%
27-Jun	11	9.2%	21.2%	12.4%	1.2%	0.1%
28-Jun	12	16.7%	30.9%	15.1%	3.9%	0.1%
29-Jun	13	23.5%	42.2%	17.1%	5.5%	0.1%
30-Jun	14	36.4%	52.2%	21.2%	6.1%	0.3%
1-Jul	15	42.8%	57.7%	27.2%	16.3%	0.3%
2-Jul	16	42.4%	58.8%	30.4%	18.5%	1.1%
3-Jul	17	44.3%	59.5%	34.1%	22.8%	1.5%
4-Jul	18	46.4%	67.7%	43.3%	31.5%	5.4%
5-Jul	19	58.0%	71.3%	46.9%	39.5%	10.6%
6-Jul	20	65.4%	78.2%	51.4%	46.6%	16.9%
7-Jul	21	68.6%	83.5%	56.8%	52.8%	18.9%
8-Jul	22	71.2%	87.1%	63.0%	55.7%	20.4%
9-Jul	23	73.1%	88.9%	64.9%	57.4%	26.2%
10-Jul	24	77.1%	90.1%	65.5%	59.3%	45.4%
11-Jul	25	82.4%	91.3%	66.1%	66.1%	59.2%
12-Jul	26	85.9%	92.6%	66.2%	75.2%	67.5%
13-Jul	27	90.6%	93.5%	70.5%	79.7%	70.2%
14-Jul	28	93.0%	94.5%	73.7%	79.7%	73.6%
15-Jul	29	94.5%	95.1%	75.8%	81.9%	76.5%
16-Jul	30	95.2%	95.2%	77.2%	89.8%	78.0%
17-Jul	31	95.5%	96.2%	85.0%	94.6%	80.7%
18-Jul	32	96.1%	96.5%	86.7%	95.4%	83.1%
19-Jul	33	96.9%	97.3%	91.1%	96.6%	86.7%
20-Jul	34	97.7%	98.2%	93.9%	97.7%	91.6%
21-Jul	35	98.4%	98.5%	95.8%	98.7%	92.3%
22-Jul	36	98.9%	99.1%	96.3%	99.5%	92.8%
23-Jul	37	99.2%	99.8%	98.4%	99.7%	93.4%
24-Jul	38	99.7%	99.9%	99.7%	99.8%	93.7%
25-Jul	39	100.0%	100.0%	99.8%	99.8%	97.5%
26-Jul	40	100.0%	100.0%	99.8%	99.9%	99.2%
27-Jul	41	100.0%	100.0%	100.0%	100.0%	99.0%
28-Jul	42	100.0%	100.0%	100.0%	100.0%	100.0%
29-Jul	43	100.0%	100.0%	100.0%	100.0%	100.0%
30-Jul	44	100.0%	100.0%	100.0%	100.0%	100.0%
31-Jul	45	100.0%	100.0%	100.0%	100.0%	100.0%
1-Aug	46	100.0%	100.0%	100.0%	100.0%	100.0%
2-Aug	47	100.0%	100.0%	100.0%	100.0%	100.0%
3-Aug	48	100.0%	100.0%	100.0%	100.0%	100.0%

* 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, 1965-1999.

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

		All Years		Early Model[a]		Normal Model[b]		Late Model[c]			
Date	Day	Percent	Number	Percent	Number	Percent	Number	Percent	Number	1998	1999
17-Jun	1	0.0%	0	0.0%	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	0.0%	0.0%
19-Jun	3	0.1%	18	0.2%	30	0.1%	12	0.0%	0	0.0%	0.2%
20-Jun	4	0.3%	60	0.7%	132	0.1%	19	0.0%	0	0.0%	0.2%
21-Jun	5	0.5%	101	1.2%	228	0.1%	27	0.0%	0	-0.1%	0.6%
22-Jun	6	0.8%	161	1.8%	345	0.4%	70	0.0%	2	0.2%	1.4%
23-Jun	7	1.4%	265	2.8%	552	0.6%	126	0.0%	5	0.8%	2.7%
24-Jun	8	2.2%	424	4.3%	847	1.0%	192	0.0%	3	1.1%	3.2%
25-Jun	9	3.3%	651	6.9%	1,350	2.1%	410	0.1%	10	1.0%	9.4%
26-Jun	10	4.7%	920	9.5%	1,854	3.4%	668	0.2%	37	1.2%	14.4%
27-Jun	11	5.8%	1,130	11.8%	2,302	3.9%	754	0.3%	54	1.2%	19.7%
28-Jun	12	7.9%	1,549	15.8%	3,079	5.2%	1,009	0.9%	183	3.9%	23.8%
29-Jun	13	11.0%	2,147	21.3%	4,147	7.3%	1,431	1.6%	313	5.5%	27.9%
30-Jun	14	15.4%	2,999	28.8%	5,625	9.5%	1,858	4.1%	794	6.1%	32.0%
1-Jul	15	20.5%	4,005	37.0%	7,212	13.8%	2,696	5.2%	1,022	16.3%	39.2%
2-Jul	16	24.3%	4,729	41.6%	8,115	18.2%	3,541	6.3%	1,223	18.5%	44.6%
3-Jul	17	27.7%	5,395	46.1%	8,995	20.7%	4,044	7.3%	1,431	22.8%	48.3%
4-Jul	18	33.6%	6,545	51.9%	10,119	28.9%	5,636	9.4%	1,826	31.5%	51.1%
5-Jul	19	38.6%	7,519	56.6%	11,034	34.5%	6,719	14.4%	2,805	39.5%	54.2%
6-Jul	20	43.7%	8,531	61.4%	11,967	39.5%	7,701	19.5%	3,801	46.6%	55.4%
7-Jul	21	47.9%	9,348	65.1%	12,697	45.6%	8,897	21.8%	4,241	52.8%	56.2%
8-Jul	22	53.6%	10,449	70.0%	13,641	53.1%	10,359	26.9%	5,250	55.7%	57.2%
9-Jul	23	57.6%	11,234	72.9%	14,224	59.0%	11,512	28.4%	5,542	57.4%	57.9%
10-Jul	24	61.6%	12,010	75.8%	14,783	63.3%	12,335	34.3%	6,691	59.3%	61.5%
11-Jul	25	66.1%	12,882	79.4%	15,483	68.5%	13,349	38.9%	7,590	66.1%	64.7%
12-Jul	26	70.8%	13,814	82.0%	15,985	75.4%	14,703	42.9%	8,372	75.2%	67.4%
13-Jul	27	74.4%	14,510	84.1%	16,392	79.9%	15,588	48.0%	9,362	79.7%	71.3%
14-Jul	28	77.5%	15,107	85.9%	16,752	82.4%	16,068	53.9%	10,501	79.7%	88.9%
15-Jul	29	81.2%	15,842	89.5%	17,451	86.0%	16,764	57.1%	11,136	81.9%	91.5%
16-Jul	30	84.5%	16,468	91.1%	17,755	87.8%	17,116	65.5%	12,780	89.8%	92.6%
17-Jul	31	88.0%	17,151	92.4%	18,011	90.4%	17,629	74.7%	14,562	94.6%	95.0%
18-Jul	32	89.8%	17,510	93.7%	18,281	92.8%	18,093	76.4%	14,904	95.4%	96.4%
19-Jul	33	92.4%	18,023	95.2%	18,568	95.0%	18,531	82.4%	16,072	96.6%	96.9%
20-Jul	34	94.2%	18,376	96.3%	18,780	96.3%	18,771	86.5%	16,865	97.7%	97.3%
21-Jul	35	95.7%	18,661	96.9%	18,900	97.2%	18,962	90.5%	17,643	98.7%	97.5%
22-Jul	36	97.0%	18,924	97.8%	19,076	98.3%	19,165	93.5%	18,223	99.5%	98.6%
23-Jul	37	98.1%	19,121	98.6%	19,226	98.9%	19,289	95.5%	18,623	99.7%	99.5%
24-Jul	38	98.9%	19,292	99.5%	19,399	99.3%	19,366	97.2%	18,961	99.8%	99.9%
25-Jul	39	99.3%	19,372	99.7%	19,448	99.6%	19,422	98.1%	19,133	99.8%	100.0%
26-Jul	40	99.7%	19,443	99.8%	19,467	99.8%	19,471	99.3%	19,355	99.9%	100.0%
27-Jul	41	99.9%	19,479	99.9%	19,489	100.0%	19,493	99.7%	19,441	100.0%	100.0%
28-Jul	42	99.9%	19,490	100.0%	19,496	100.0%	19,500	99.8%	19,470	100.0%	100.0%
29-Jul	43	100.0%	19,496	100.0%	19,497	100.0%	19,500	99.9%	19,488	100.0%	100.0%
30-Jul	44	100.0%	19,497	100.0%	19,499	100.0%	19,500	100.0%	19,491	100.0%	100.0%
31-Jul	45	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	100.0%
1-Aug	46	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	100.0%
2-Aug	47	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	100.0%
3-Aug	48	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	19,500	100.0%	100.0%

[a] Includes 1968, 1974, 1982, 1984, 1986, 1988, 1989, 1990, 1994, 1995 and 1996.

[b] Includes 1965, 1966, 1967, 1969, 1972, 1977, 1980, 1981, 1987, 1992, 1993, 1997 and 1998.

[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, 1981-1999.

	1981		1982		1983		1984		1985		1986	
Date	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%		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 4).

	1987		1988		1989		1990		1991		1992	
Date	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 4).

	1993		1994[a]		1995		1996		1997		1998	
Date	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%		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%	4	0.0%
20-Jun		0.0%		0.0%		0.0%	130	0.0%	0	0.0%	0	0.0%
21-Jun		0.0%		0.0%	0	0.0%	46	0.0%	0	0.0%	2	0.0%
22-Jun		0.0%		0.0%	0	0.0%	121	0.0%	0	0.0%	15	0.0%
23-Jun	0	0.0%	24	0.0%	0	0.0%	314	0.1%	0	0.0%	28	0.0%
24-Jun	0	0.0%	51	0.0%	0	0.0%	506	0.1%	0	0.0%	2	0.0%
25-Jun	2	0.0%	80	0.0%	4	0.0%	154	0.1%	0	0.0%	-8	0.0%
26-Jun	6	0.0%	147	0.0%	8	0.1%	167	0.2%	0	0.0%	20	0.0%
27-Jun	4	0.0%	-16	0.0%	4	0.1%	350	0.2%	0	0.0%	65	0.0%
28-Jun	5	0.0%	248	0.0%	0	0.1%	429	0.2%	0	0.0%	276	0.1%
29-Jun	0	0.0%	427	0.0%	8	0.1%	2,989	0.6%	0	0.0%	144	0.1%
30-Jun	52	0.2%	208	0.1%	10	0.2%	10,749	1.8%	3	0.0%	12	0.1%
1-Jul	10	0.2%	3,883	0.2%	2	0.2%	10,455	2.9%	6	0.1%	2,287	0.4%
2-Jul	162	0.6%	2,830	0.3%	-1	0.2%	10,160	4.0%	46	0.6%	1,049	0.6%
3-Jul	139	0.9%	11,737	0.9%	-4	0.2%	2,765	4.3%	74	1.4%	6,463	1.6%
4-Jul	109	1.1%	20,644	1.7%	94	0.7%	18,838	6.4%	64	2.0%	5,645	2.4%
5-Jul	79	1.3%	5,741	2.0%	26	0.9%	37,349	10.5%	53	2.6%	14,396	4.6%
6-Jul	126	1.6%	20,537	2.9%	324	2.7%	67,926	18.0%	50	3.1%	48,332	12.0%
7-Jul	145	1.9%	18,667	3.7%	308	4.5%	89,625	27.9%	60	3.7%	82,268	24.5%
8-Jul	103	2.2%	14,329	4.3%	267	6.0%	94,440	38.3%	70	4.5%	36,454	30.1%
9-Jul	45	2.3%	44,231	6.2%	221	7.3%	99,256	49.2%	53	5.0%	46,445	37.2%
10-Jul	376	3.2%	65,165	9.1%	174	8.2%	42,444	53.9%	63	5.7%	34,536	42.4%
11-Jul	716	4.8%	96,099	13.2%	140	9.0%	69,116	61.5%	0	5.7%	21,589	45.7%
12-Jul	1,055	7.3%	150,841	19.8%	403	11.3%	44,221	66.4%	117	6.9%	41,422	52.1%
13-Jul	4,155	16.9%	177,003	27.4%	241	12.7%	38,966	70.7%	138	8.4%	22,693	55.5%
14-Jul	1,778	21.1%	196,651	36.0%	523	15.7%	52,897	76.5%	75	9.1%	3,964	56.1%
15-Jul	528	22.3%	316,264	49.7%	908	20.9%	28,870	79.7%	12	9.3%	17,121	58.7%
16-Jul	300	23.0%	362,910	65.4%	1,960	32.1%	4,844	80.2%	9	9.4%	41,951	65.1%
17-Jul	533	24.2%	269,451	77.1%	3,012	49.3%	20,016	82.4%	222	11.7%	38,769	71.0%
18-Jul	3,419	32.2%	175,992	84.7%	770	53.7%	6,130	83.1%	294	14.8%	21,332	74.3%
19-Jul	6,304	46.8%	115,883	89.7%	513	56.6%	25,524	85.9%	1,251	27.9%	31,999	79.2%
20-Jul	4,572	57.4%	15,884	90.4%	869	61.6%	53,438	91.8%	503	33.2%	35,595	84.6%
21-Jul	4,824	68.6%	17,012	91.2%	1,116	68.0%	23,359	94.3%	701	40.5%	39,192	90.6%
22-Jul	5,269	80.8%	54,172	93.5%	1,470	76.3%	23,937	97.0%	898	49.9%	45,485	97.5%
23-Jul	2,228	86.0%	16,721	94.2%	1,034	82.3%	24,516	99.7%	3,136	82.8%	3,137	98.0%
24-Jul	938	88.2%	12,680	94.8%	598	85.7%	1,737	99.9%	1,354	97.0%	2,402	98.3%
25-Jul	1,419	91.5%	8,640	95.2%	1,272	92.9%	1,109	100.0%	68	97.7%	1,626	98.6%
26-Jul	1,899	95.9%	14,792	95.8%	1,237	100.0%		100.0%	89	98.7%	3,616	99.1%
27-Jul	1,765	100.0%	45,610	97.8%		100.0%		100.0%	126	100.0%	5,606	100.0%
28-Jul		100.0%	28,491	99.0%		100.0%		100.0%		100.0%		100.0%
29-Jul		100.0%	9,034	99.4%		100.0%		100.0%		100.0%		100.0%
30-Jul		100.0%	6,929	99.7%		100.0%		100.0%		100.0%		100.0%
31-Jul		100.0%	4,824	99.9%		100.0%		100.0%		100.0%		100.0%
1-Aug		100.0%	431	99.9%		100.0%		100.0%		100.0%		100.0%
2-Aug		100.0%	588	100.0%		100.0%		100.0%		100.0%		100.0%
3-Aug		100.0%	646	100.0%		100.0%		100.0%		100.0%		100.0%
Total	43,065		2,306,481		17,509		907,894		9,536		655,933	

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.

- continued -

Appendix Table 4. (Page 4 of 4).

	1999		Even Year	Odd Year
Date	Daily	Percent Cumulative	Average % Cumulative[b]	Average % Cumulative[b]
17-Jun		0.0%	0.0%	0.0%
18-Jun		0.0%	0.0%	0.0%
19-Jun		0.0%	0.0%	0.0%
20-Jun		0.0%	0.0%	0.0%
21-Jun		0.0%	0.0%	0.0%
22-Jun		0.0%	0.0%	0.0%
23-Jun		0.0%	0.0%	0.0%
24-Jun		0.0%	0.0%	0.0%
25-Jun	0	0.0%	0.2%	0.0%
26-Jun	0	0.0%	0.5%	0.1%
27-Jun	0	0.0%	0.9%	0.1%
28-Jun	0	0.0%	1.1%	0.1%
29-Jun	0	0.0%	1.5%	0.1%
30-Jun	0	0.0%	2.3%	0.2%
1-Jul	0	0.0%	4.0%	0.4%
2-Jul	0	0.0%	6.8%	0.6%
3-Jul	0	0.0%	10.6%	1.0%
4-Jul	0	0.0%	14.6%	1.5%
5-Jul	0	0.0%	18.9%	1.9%
6-Jul	0	0.0%	23.5%	2.6%
7-Jul	0	0.0%	29.0%	4.1%
8-Jul	0	0.0%	34.1%	5.9%
9-Jul	0	0.0%	39.1%	7.8%
10-Jul	24	4.0%	42.6%	9.7%
11-Jul	12	5.9%	49.2%	11.3%
12-Jul	12	7.9%	56.0%	13.6%
13-Jul	12	9.9%	59.8%	17.0%
14-Jul	102	26.7%	64.5%	22.5%
15-Jul	18	29.7%	69.6%	25.6%
16-Jul	0	29.7%	74.2%	30.4%
17-Jul	25	33.8%	78.5%	39.2%
18-Jul	30	38.7%	82.0%	43.9%
19-Jul	37	44.8%	85.2%	50.3%
20-Jul	44	52.1%	87.9%	56.8%
21-Jul	12	54.0%	90.4%	63.7%
22-Jul	2	54.4%	93.8%	70.9%
23-Jul	14	56.7%	95.9%	80.0%
24-Jul	14	59.0%	97.4%	86.6%
25-Jul	113	77.6%	98.5%	92.2%
26-Jul	62	87.8%	99.1%	96.4%
27-Jul	12	89.8%	99.6%	98.5%
28-Jul	62	100.0%	99.9%	99.8%
29-Jul		100.0%	99.9%	99.9%
30-Jul		100.0%	100.0%	99.9%
31-Jul		100.0%	100.0%	100.0%
1-Aug		100.0%	100.0%	100.0%
2-Aug		100.0%	100.0%	100.0%
3-Aug		100.0%	100.0%	100.0%
Total	607			

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

[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, 1981-1999.

	1981		1982		1983		1984		1985		1986	
Date	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%		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.

- continued -

Appendix Table 5. (Page 2 of 4).

	1987		1988		1989		1990		1991		1992	
Date	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%	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%	0	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%	13	3.7%	35	14.4%	0	0.0%
30-Jun	0	1.6%	18	13.4%	10	4.8%	134	19.0%	68	24.0%	0	0.0%
1-Jul	2	2.2%	24	20.9%	12	9.7%	146	35.2%	82	33.6%	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	59.6%	71	56.2%	5	1.5%
4-Jul	6	4.1%	0	34.0%	14	32.7%	63	65.8%	0	56.2%	8	3.1%
5-Jul	19	10.1%	14	36.3%	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%	16	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%	18	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%	5	96.0%	11	97.0%	28	97.6%	37	62.8%
18-Jul	26	83.9%	5	79.8%	4	97.6%	15	98.7%	11	98.2%	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%	30	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%	13	96.5%
25-Jul	0	100.0%	7	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

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Appendix Table 5. (Page 3 of 4).

	1993		1994*		1995		1996		1997		1998	
Date	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%		0.0%		0.0%		0.0%	2	0.2%	0	0.0%
19-Jun		0.0%		0.0%		0.0%		0.0%	2	0.4%	0	0.0%
20-Jun		0.0%		0.0%		0.0%	2	0.3%	2	0.6%	0	0.0%
21-Jun		0.0%		0.0%	2	0.4%	0	0.3%	4	1.0%	-2	-0.7%
22-Jun		0.0%		0.0%	0	0.4%	8	1.7%	0	1.0%	-1	-1.0%
23-Jun	0	0.0%	0	0.0%	0	0.4%	6	2.8%	13	2.4%	0	-1.0%
24-Jun	0	0.0%	0	0.0%	24	5.4%	4	3.5%	26	5.0%	0	-1.0%
25-Jun	2	0.3%	0	0.0%	13	8.0%	0	3.5%	8	5.9%	0	-1.0%
26-Jun	12	2.4%	0	0.0%	2	8.5%	-2	3.1%	46	10.6%	0	-1.0%
27-Jun	16	5.1%	0	0.0%	2	8.9%	-6	2.1%	13	11.9%	2	-0.3%
28-Jun	2	5.4%	2	0.3%	24	13.8%	0	2.1%	53	17.4%	2	0.3%
29-Jun	-2	5.1%	2	0.6%	28	19.6%	14	4.5%	34	20.9%	2	1.0%
30-Jun	16	7.7%	0	0.6%	15	22.7%	46	12.5%	42	25.2%	2	1.7%
1-Jul	12	9.8%	12	2.5%	35	29.9%	21	16.1%	50	30.3%	10	5.1%
2-Jul	39	16.3%	4	3.1%	13	32.5%	-6	15.1%	103	40.9%	14	9.8%
3-Jul	32	21.7%	26	7.2%	-10	30.4%	26	19.6%	126	53.9%	4	11.2%
4-Jul	17	24.6%	48	14.8%	0	30.4%	9	21.2%	71	61.2%	0	11.2%
5-Jul	33	30.1%	18	17.6%	8	32.0%	78	34.7%	79	69.3%	9	14.1%
6-Jul	2	30.5%	26	21.7%	58	43.9%	97	51.5%	16	70.9%	19	20.6%
7-Jul	68	41.9%	8	23.0%	56	55.4%	83	65.9%	35	74.5%	30	30.7%
8-Jul	41	48.8%	4	23.6%	18	59.1%	54	75.3%	54	80.1%	49	47.4%
9-Jul	28	53.5%	49	31.3%	19	63.1%	26	79.8%	5	80.5%	11	51.0%
10-Jul	39	60.1%	39	37.5%	20	67.2%	0	79.8%	5	81.0%	13	55.4%
11-Jul	40	66.8%	29	42.0%	10	69.2%	12	81.9%	9	81.9%	10	58.7%
12-Jul	84	81.0%	43	48.8%	38	77.1%	19	85.1%	0	81.9%	14	63.5%
13-Jul	42	88.0%	73	60.3%	40	85.3%	0	85.1%	10	82.9%	7	65.8%
14-Jul	11	89.9%	39	66.5%	40	93.6%	16	87.9%	5	83.4%	4	67.2%
15-Jul	14	92.3%	53	74.8%	8	95.3%	8	89.3%	0	83.4%	0	67.2%
16-Jul	-4	91.6%	56	83.6%	4	96.1%	0	89.3%	14	84.9%	14	71.9%
17-Jul	6	92.6%	40	89.9%	0	96.1%	10	91.0%	50	90.0%	30	82.1%
18-Jul	6	93.6%	25	93.9%	0	96.1%	4	91.7%	14	91.5%	6	84.1%
19-Jul	27	98.1%	8	95.1%	2	96.5%	4	92.4%	22	93.7%	4	85.5%
20-Jul	6	99.2%	0	95.1%	2	96.9%	8	93.7%	14	95.2%	9	88.5%
21-Jul	2	99.5%	5	95.9%	2	97.3%	13	95.9%	7	95.9%	14	93.2%
22-Jul	2	99.8%	10	97.5%	4	98.1%	11	97.8%	0	95.9%	6	95.3%
23-Jul	0	99.8%	-6	96.5%	3	98.8%	10	99.6%	8	96.7%	12	99.3%
24-Jul	-2	99.5%	-2	96.2%	2	99.2%	0	99.6%	24	99.2%	2	100.0%
25-Jul	0	99.5%	2	96.5%	4	100.0%	3	100.0%	0	99.2%	0	100.0%
26-Jul	1	99.7%	0	96.5%	0	100.0%		100.0%	4	99.6%	0	100.0%
27-Jul	2	100.0%	2	96.9%		100.0%		100.0%	4	100.0%	0	100.0%
28-Jul	0	100.0%	0	96.9%		100.0%		100.0%		100.0%		100.0%
29-Jul	0	100.0%	0	96.9%		100.0%		100.0%		100.0%		100.0%
30-Jul	0	100.0%	0	96.9%		100.0%		100.0%		100.0%		100.0%
31-Jul	0	100.0%	0	96.9%		100.0%		100.0%		100.0%		100.0%
1-Aug	0	100.0%	1	97.0%		100.0%		100.0%		100.0%		100.0%
2-Aug	0	100.0%	7	98.1%		100.0%		100.0%		100.0%		100.0%
3-Aug	0	100.0%	12	100.0%		100.0%		100.0%		100.0%		100.0%
Total	594		635		485		577		972		296	

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

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

- continued -

Appendix Table 5. (Page 4 of 4).

	1999		1981-1999
Date	Daily	Percent Cumulative	Average % Cumulative[1]
17-Jun		0.0%	0.0%
18-Jun		0.0%	0.0%
19-Jun		0.0%	0.1%
20-Jun		0.0%	0.1%
21-Jun		0.0%	0.2%
22-Jun		0.0%	0.2%
23-Jun		0.0%	0.5%
24-Jun		0.0%	1.3%
25-Jun	0	0.0%	2.4%
26-Jun	0	0.0%	3.3%
27-Jun	0	0.0%	3.9%
28-Jun	0	0.0%	5.3%
29-Jun	0	0.0%	7.2%
30-Jun	0	0.0%	10.9%
1-Jul	0	0.0%	15.9%
2-Jul	0	0.0%	20.0%
3-Jul	0	0.0%	25.6%
4-Jul	0	0.0%	29.7%
5-Jul	0	0.0%	35.5%
6-Jul	0	0.0%	40.2%
7-Jul	0	0.0%	45.4%
8-Jul	0	0.0%	51.2%
9-Jul	0	0.0%	55.7%
10-Jul	2	1.7%	59.2%
11-Jul	16	15.5%	64.2%
12-Jul	10	24.1%	68.6%
13-Jul	4	27.6%	71.7%
14-Jul	36	58.6%	76.4%
15-Jul	0	58.6%	79.1%
16-Jul	-4	55.2%	81.5%
17-Jul	10	63.8%	84.8%
18-Jul	0	63.8%	87.0%
19-Jul	8	70.7%	89.8%
20-Jul	16	84.5%	92.6%
21-Jul	3	87.1%	94.2%
22-Jul	2	88.8%	95.7%
23-Jul	0	88.8%	96.6%
24-Jul	0	88.8%	98.1%
25-Jul	6	94.0%	98.6%
26-Jul	3	96.6%	99.3%
27-Jul	0	96.6%	99.5%
28-Jul	4	100.0%	99.7%
29-Jul		100.0%	99.7%
30-Jul		100.0%	99.8%
31-Jul		100.0%	99.8%
1-Aug		100.0%	99.8%
2-Aug		100.0%	99.9%
3-Aug		100.0%	100.0%
Total	116		

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

[1] Does not include the current year

Appendix Table 6. Reported hourly chum salmon observations at the Kwiniuk River counting tower, Norton Sound, 1999.

Outlined 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
25-Jun																	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%
27-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	8	8	0.1%
28-Jun																									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	0	0	0.0%
30-Jun	0	0	0	0	0	0							0	0	2	0	0	0	0	0	2	6	0	4	14	0.2%
1-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	2	0	0	2	0.0%
2-Jul	0	0	0	4	0	44							0	0	0	0	0	-2	6	0	0	10	0	8	70	1.0%
3-Jul	10	8	0	0	0	2							0	0	0	0	0	2	0	0	0	0	8	0	30	0.4%
4-Jul	14	-2	2	0	0	0							0	0	0	0	0	0	0	0	70	0	152	112	348	5.1%
5-Jul																									0	0.0%
6-Jul	20	110	20	8	0	0	0	2	0	0	0	0	-2	0	0	0	0	276	90	12	10	4	2	0	552	8.1%
7-Jul	66	4	8	70	18	0							6	0	0	0	0	0	2	0	2	0	2	0	178	2.6%
8-Jul	0	-40	-24	-24	0	0							0	0	0	0	0	0	0	0	16	30	64	106	128	1.9%
9-Jul	92	68	44	42	8	28							4	0	6	16	0	0	38	34	16	0	8	100	504	7.4%
10-Jul	20	146	148	186	96	12							0	6	38	28	20	10	-4	220	2	210	4	468	1,588	23.3%
11-Jul	230	32	288	122	68	76							8	76	80	60	46	14	0	0	0	2	34	2	1,138	16.7%
12-Jul																									0	0.0%
13-Jul	28	14	8	12	8	26	2	4	8	0	0	0	0	0	54	30	40	8	0	0	-2	0	0	2	242	3.6%
14-Jul	8	40	0	0	2	2							0	62	8	48	4	26	50	6	12	0	6	4	280	4.1%
15-Jul	2	2	4	4	2	2							0	0	0	0	-4	10	14	2	0	0	144	56	238	3.5%
16-Jul	0	4	0	0	-2	0							0	0	0	0	2	4	18	48	42	0	-4	4	122	1.8%
17-Jul	18	4	100	20	8	6							0	-2	-4	38	54	-34	0	4	0	38	2	0	252	3.7%
18-Jul	4	10	6	54	14	0							0	0	0	0	0	0	0	0	76	28	2	16	210	3.1%
19-Jul																									0	0.0%
20-Jul	96	28	4	76	42	14	56	-90	6	2	2	8	38	-82	10	34	60	10	-2	20	22	26	12	40	432	6.3%
21-Jul	2	-42	0	2	0	0							-6	-2								2	10	20	-16	-0.2%
22-Jul	18	14	0	2	2	12							0	0	2	0	-2	0	0	0	0	-2	0	6	52	0.8%
23-Jul	10	0	4	6	-2	0							0	0	2	0	0	0	0	0	0	24	0	2	46	0.7%
24-Jul	4	0	10	12	8	8							0	0	0	0	0	0	0	0	0	0	-10	-2	30	0.4%
25-Jul	-4	2	68	64	42	30							2	0	0	2	-2	0	0	10	4	-2	32	50	298	4.4%
26-Jul																									0	0.0%
27-Jul	-4	-18	2	-8	-4	0	-4	0	2	0	0	0	0	0	4	0	0	0	0	0	2	0	0	6	-22	-0.3%
28-Jul	4	4	4	16	18	28							0	0	0	0	0	0	0	0	0	0	0	8	82	1.2%
Totals	644	388	694	646	328	290	54	-84	16	2	2	8	48	58	202	256	218	324	212	356	274	378	470	1,020	6,806	100%
	9.5%	5.7%	10.2%	9.5%	4.8%	4.3%	0.8%	-1.2%	0.2%	0.0%	0.0%	0.1%	0.7%	0.9%	3.0%	3.8%	3.2%	4.8%	3.1%	5.2%	4.0%	5.6%	6.9%	15.0%	100%	

Appendix Table 7: Reported hourly pink salmon observations at the Kwiniuk River counting tower, Norton Sound, 1999

Outlined 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
25-Jun																	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%
27-Jun	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%
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	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%
1-Jul	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%
3-Jul	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%
5-Jul																									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	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%
8-Jul	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%
10-Jul	0	0	0	0	0	0							0	2	0	0	0	0	0	0	0	0	0	6	8	2.3%
11-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	2	0	0	2	4	1.1%
12-Jul																									0	0.0%
13-Jul	4	0	0	0	0	0	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	3.4%
14-Jul	0	6	0	0	0	0							0	2	6	2	14	4	0	0	0	0	0	0	34	9.7%
15-Jul	0	0	2	2	0	0							0	0	0	-2	-2	2	0	0	0	0	4	0	6	1.7%
16-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
17-Jul	0	8	6	0	4	0							0	0	0	-2	0	4	0	0	0	2	0	0	22	6.3%
18-Jul	4	0	0	12	0	0							0	0	0	0	0	0	0	0	0	0	0	10	26	7.4%
19-Jul																									0	0.0%
20-Jul	2	8	2	0	0	0	0	0	2	2	0	2	2	8	4	6	0	0	0	0	6	0	0	0	44	12.6%
21-Jul	2	0	0	0	0	0							0	6								0	0	2	10	2.9%
22-Jul	2	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	2	0.6%
23-Jul	10	0	2	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	12	3.4%
24-Jul	4	4	2	0	0	2							0	0	0	0	0	0	0	0	0	0	0	0	12	3.4%
25-Jul	0	0	10	6	6	0							0	0	2	0	0	0	0	0	2	0	36	32	94	26.9%
26-Jul																									0	0.0%
27-Jul	8	-2	0	-2	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	2	2	12	3.4%
28-Jul	4	2	4	8	6	18							0	0	0	0	0	0	2	2	8	0	0	0	52	14.9%
Totals	40	26	28	26	16	18	0	0	8	4	0	4	4	18	12	4	12	10	2	2	18	2	42	54	350	100%
	11.4%	7.4%	8.0%	7.4%	4.6%	5.1%	0.0%	0.0%	2.3%	1.1%	0.0%	1.1%	1.1%	5.1%	3.4%	1.1%	3.4%	2.9%	0.6%	0.6%	5.1%	0.6%	12.0%	15.4%	100%	

Appendix Table 8. Reported hourly king salmon observations at the Kwiniuk River counting tower, Norton Sound, 1999.

Outlined 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
25-Jun																	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%
27-Jun	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%
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	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%
1-Jul	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%
3-Jul	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%
5-Jul																									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	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%
8-Jul	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%
10-Jul	0	0	0	0	0	0							0	0	2	0	0	0	0	0	0	0	0	0	2	2.1%
11-Jul	0	6	0	0	0	0							10	0	0	0	0	0	0	0	0	0	0	0	16	17.0%
12-Jul																									0	0.0%
13-Jul	2	0	0	0	0	0	0	0	0	0	0	0	2	-2	2	0	0	0	0	0	0	0	0	0	4	4.3%
14-Jul	0	14	0	0	4	0							-2	12	0	4	4	0	0	0	0	0	0	0	36	38.3%
15-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
16-Jul	2	-2	0	-2	0	0							0	0	0	0	-2	0	0	0	0	0	0	0	-4	-4.3%
17-Jul	0	0	-2	8	0	4							0	0	0	-2	2	0	0	0	2	0	0	0	12	12.8%
18-Jul	0	0	-4	0	0	0							0	0	0	0	0	0	0	0	2	0	0	2	0	0.0%
19-Jul																									0	0.0%
20-Jul	0	0	6	4	0	8	2	-2	2	0	-6	0	-6	2	2	4	0	0	2	0	0	0	-2	0	16	17.0%
21-Jul	0	0	0	0	0	0							0	-2								2	0	0	0	0.0%
22-Jul	0	0	0	2	0	0							0	0	0	0	0	0	0	0	0	0	0	0	2	2.1%
23-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
24-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
25-Jul	0	0	0	0	0	2							0	0	2	0	2	-2	0	0	0	0	0	2	6	6.4%
26-Jul																									0	0.0%
27-Jul	-6	-2	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	4	0	0.0%
28-Jul	0	0	0	2	0	2							0	0	0	0	0	0	0	0	0	0	0	0	4	4.3%
Totals	-2	16	0	14	4	14	2	-2	2	0	-6	0	4	10	8	6	12	-2	2	0	4	2	-2	8	94	100%
	-2.1%	17.0%	0.0%	14.9%	4.3%	14.9%	2.1%	-2.1%	2.1%	0.0%	-6.4%	0.0%	4.3%	10.6%	8.5%	6.4%	12.8%	-2.1%	2.1%	0.0%	4.3%	2.1%	-2.1%	8.5%	100%	