North River Salmon Counting Tower
Project Summary Report, 1999

by

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INTRODUCTION

The North River counting tower is a cooperative project funded and operated by the Kawerak Corporation. The Alaska Department of Fish & Game (ADF&G) provided equipment for this project. ADF&G analyzed and expanded the tower count data and produced this report, as part of its contribution to this cooperative effort.

The North River is the largest of the five major tributaries of the Unalakleet River, which is the largest salmon producing system in Norton Sound. This was the fourth consecutive year a salmon counting tower was operated on the North River, approximately two miles above it's confluence with the Unalakleet River (Figure 1) (Rob 1997, 1998, and 1999). A counting tower was previously operated on the North River for the three years from 1972 through 1974 near the North River bridge (Regnart and Trasky 1973, and Cunningham 1974 and 1975) and for the three years from 1984 through 1986 (Lean 1985,1986 and 1987). Chum salmon were the primary species of harvest for the Unalakleet Subdistrict commercial fishery during the early years of the project. The project was discontinued at that time because of a lack of funding and because the small chum salmon run on the North River was not considered to be a reliable index of chum salmon abundance for the entire Unalakleet River system. Recent increasing commercial importance of pink, king and coho salmon combined with the relatively large runs of these species in the North River, and the availability of funding combined to make this project feasible again.

OBJECTIVES

To obtain daily and seasonal information concerning the timing and magnitude of the chum, pink, king and coho salmon escapement to the North River.

METHODS

The North River counting tower camp is located on Unalakleet Native Corporation land. The camp is approximately 20 minutes by boat from the village of Unalakleet.

A tent camp with two tent frames and an outhouse was established during late June. A scaffolding tower was erected on the bank of the river to serve as an observation platform. A new vinyl canvas flash panel was placed on the river bottom directly in front of the tower. Due to damage in 1998 the weir was rebuilt and straightened from the mid-stream end of the flash panel to the opposite bank.

Counting began on 30 June and ended on 31 August. The crew counted 24 half-hour counts each day. One day off was scheduled each week. The daily counts considered in this report run from 0000 hours to 2400 hours. The counts for each half hour shift were doubled to produce the reported hourly counts for each species. Each day the reported

hourly counts were added to produce a daily subtotal. Every day, the daily and cumulative subtotals for each species were relayed to the ADF&G Unalakleet office by radio.

The expanded counts for this report were calculated using the following methods. The counts for the days off were estimated by adding the counts of each hour of the day before to the counts of each hour of the day following and dividing the result by two, giving expanded hourly counts for the hours of the day off. The expanded counts for periods of time greater than one day missed because of high water were linearly interpolated in a similar manner (Rob 1999).

RESULTS

Table 1 shows the expanded daily and cumulative totals for each salmon species. Challenges with high water conditions, described in the Discussion section, affected reliability of the reported salmon passage estimates, most notably after 20 July. This needs to be kept in mind when reporting results. The actual reported total hourly counts were: 2,874 chum salmon, 29,648 pink salmon, 1,016 king salmon, and 2,630 coho salmon (Tables 6-9). The expanded counts were: 5,600 chum salmon, 48,993 pink salmon, 2,263 king salmon, and 4,792 coho salmon (Tables 2-5).

King salmon were observed on 30 June, the first day of counting, chum salmon were first observed on 1 July, pink salmon were first observed on 6 July, and coho salmon were first observed on 20 July. The daily peak count of 411 chum salmon occurred on 17 July; the daily peak count of 5,947 pink salmon occurred on 17 July; the daily peak count of 424 king salmon occurred on 20 July; the daily peak count of 273 coho salmon occurred on 5 August (Table 1).

Approximately 50% of the chum salmon passage occurred during the month of July (Table 2 and Figures 3 and 4). Approximately 79% of the pink salmon passage occurred during the three weeks from 6 July through 26 July (Table 3 and Figures 5 and 6). Approximately 95% of the king salmon passage occurred prior to 25 July (Table 4 and Figures 7 and 8). Approximately 93% of coho salmon passage occurred during the last 31 days of counting tower operation (Table 5 and Figures 9 and 10).

All species counted exhibited a diurnal pattern of migration past the counting tower. During the twelve hour period from 1600 to 0400 hours, 70% of the chum salmon passed the tower (Table 2 and Figure 11). During the twleve hour period from 1500 to 0300 hours, 74% of the pink salmon passed the tower (Table 3 and Figure 12). During the period from 0000 to 1600 hours 85% of the king salmon passed the tower (Table 4 and Figure 13). During the ten hour period from 1800 to 0400 hours, 59% of the coho salmon passed the tower (Table 5 and Figure 14).

An aerial survey of the North River counted 1,480 chum salmon on 23 August, 1999. The total season expanded tower count of chum salmon was 5,600. The aerial survey

counted 26% of the total season expanded tower count of chum salmon. The cumulative tower count of chum salmon on the date of the survey was 4,877. The aerial survey counted 30% of the cumulative tower count through the date of the survey (Table 1).

An aerial survey of the North River counted 3,790 pink salmon on 23 August, 1999. The total season expanded tower count of pink salmon was 48,993. The aerial survey counted 8% of the total season expanded tower count of pink salmon. The aerial survey counted 1,480 pink salmon above the counting tower on 23 August, when the cumulative tower count of pink salmon was 48,959. The aerial survey counted 3% of the cumulative tower count through 23 August (Table 1).

An aerial survey of the North River counted 18 king salmon on 23 August, 1999. The total season expanded tower count of king salmon was 2,263. The aerial survey counted 1% of the total season expanded tower count of king salmon. Timing of the survey was late relative to king salmon (Table 1).

An aerial survey of the North River counted 533 coho salmon on 23 August, 1999. The total season expanded tower count of coho salmon was 4,792. The aerial survey counted 11% of the total season expanded tower count of coho salmon (Table 1). Timing of the survey was early relative to coho salmon.

Climatological observations are shown in Table 10.

DISCUSSION

This was the fourth year the North River tower project operated at this site. It was started in 1996 through the cooperation with the Bering Sea Fisherman's Association and Kawarak Incorporated. Water conditions at this site have been marginal at best with high water washouts causing the project to shut down early during the previous three seasons. In 1999 a late spring breakup delayed project startup by two weeks. Daily counting was begun on 30 June, but the weir and flash panel installation was not completely in the water until mid-July. An experimental type of weir was tried this season to see if the design could withstand high water events. It was constructed of ten foot sections of PVC pipe laid parallel and connected by T-fittings at one end and rope on the other. A rope was strung through the T-fittings which was anchored at both ends, holding one edge of the weir structure close to the bottom. The other end of each pipe was capped trapping air and causing the trailing edge of the weir to float at moderate water levels. The idea was to create a weir that would not load up with debris during heavy flows and result in washouts.

Initially, the trailing edge of the pipe weir did float at the surface, allowed debris to pass over the top, and routed fish over the flash panel as intended. The base of the weir needed better anchoring or sandbagging and midsections of the pipe needed to be harnessed in some fashion to minimize bowing of individual pipes, which created gaps. Heavy rains beginning 20 July caused the water level to rise 40 inches overnight and

stopped counting through 25 July due to cloudy water. The water cleared and the wier was visibly washed out of position making it no longer functional. However, counting was continued without the weir because it was felt that the minimal data collected was still useful for coho salmon management.

The counts were used as relative comparisons from day to day for assessing run strength. Large blocks of time were not counted due to poor conditions and personnel scheduling. Although count expansions were calculated to estimate salmon abundance, confidence in those numbers should be minimal due to the broad liberties taken with the sampling assumptions. After 20 July, the actual counts were from one half hour each hour for approximately 16 hours a day. Efforts were made to count during the times of day when the highest salmon passage typically occurred (evenings). However, morning shift was neglected later in the season due to staffing shortage and darkness. This is also an important time for salmon migration. Often, much of the river was not visible during low light and murky conditions after the weir washed out and the flash panel became semi-obscured. Therefore, actual counts should be considered minimal counts and expansions are simply best approximations after 20 July.

The chum salmon passage estimate the third best since the project started in 1972. Significant numbers of chum salmon were probably missed because of the problems with the weir and flash panel (Appendix Table 1 and Figure 15). The odd year pink salmon passage estimate was the second highest recorded and well above the minimum tower Biological Escapement Goal (BEG) of 8,500 (Appendix Table 2 and Figure 16). The odd year pink salmon escapements are shown in Appendix Table 2 and Figure 17). The king salmon passage estimate was the third best ever recorded and above the tower BEG range of 1,200 to 2,400. However, the king expansion for the period 21-25 July played a large role in the high passage estimate and it is not likely that many kings went up the river (Appendix Table 3 and Figure 18). The coho salmon escapement was the second highest ever recorded (Appendix Table 4 and Figure 19). The coho counts may be low due to weir problems and the morning hours missed.

ACKNOWLEDGEMENTS

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

After 20 July passage estimates are unreliable because of problems with the weir and flash panel

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily King	Cumulative King	Daily Coho	Cumulative Coho
30-Jun	0	0	0	0	6	6	0	0
1-Jul	2	2	0	0	8	14	0	0
2-Jul	1	3	0	0	3	17	0	0
3-Jul	0	3	0	0	2	19	0	0
4-Jul	0	3	0	0	0	19	0	0
5-Jul	0	3	0	0	0	19	0	0
6-Jul	0	3	166	166	0	19	0	0
7-Jul	14	17	1,006	1,172	2	21	0	0
8-Jul	2	19	718	1,890	6	27	0	0
9-Jul	66	85	1,763	3,653	30	57	0	0
10-Jul	73	158	1,759	5,412	35	92	0	0
11-Jul	85	243	1,299	6,711	52	144	0	0
12-Jul	24	267	600	7,311	48	192	0	0
13-Jul	58	325	2,026	9,337	24	216	0	0
14-Jul	46	371	1,208	10,545	56	272	0	0
15-Jul	136	507	2,150	12,695	36	308	0	0
16-Jul	151	658	2,169	14,864	54	362	0	0
17-Jul	411	1,069	5,947	20,811	123	485	0	0
18-Jul	225	1,294	4,058	24,869	85	570	0	0
19-Jul	138	1,432	2,952	27,821	60	630	0	0
20-Jul	290	1,722	2,418	30,239	424	1,054	1	1
21-Jul[a]	169	1,891	1,615	31,854	221	1,275	2	3
22-Jul[a]	169	2,060	1,615	33,469	221	1,496	2	5
23-Jul[a]	169	2,229	1,615	35,084	221	1,717	2	7
24-Jul[a]	169	2,398	1,615	36,699	221	1,938	2	9
25-Jul[a]	169	2,567	1,615	38,314	221	2,159	2	11
26-Jul	40	2,607	342	38,656	16	2,175	4	15
27-Jul	56	2,663	716	39,372	20	2,195	52	67
28-Jul	76	2,739	780	40,152	20	2,215	30	97
29-Jul	30	2,769	576	40,728	22	2,237	84	181
30-Jul	42	2,811	530	41,258	2	2,239	54	235
31-Jul	45	2,856	836	42,094	5	2,244	88	323
1-Aug	39	2,895	651	42,745	5	2,249	115	438
2-Aug	42	2,937	677	43,422	4	2,253	141	579
3-Aug	49	2,986	767	44,189	3	2,256	169	748
4-Aug	24	3,010	578	44,767	2	2,258	143	891
5-Aug	74	3,084	596	45,363	2	2,260	273	1,164
6-Aug	56	3,140	404	45,767	4	2,264	118	1,282
7-Aug	64	3,204	734	46,501	0	2,264	188	1,470
8-Aug	50	3,254	511	47,012	0	2,264	138	1,608
9-Aug	29	3,283	378	47,390	0	2,264	120	1,728
10-Aug	18	3,301	204	47,594	-2	2,262	128	1,856
11-Aug	47	3,348	229	47,823	-2	2,260	130	1,986
12-Aug	71	3,419	197	48,020	2	2,262	188	2,174
13-Aug	61	3,480	153	48,173	-2	2,260	130	2,304
14-Aug	60	3,540	157	48,330	-1	2,259	129	2,433
15-Aug	59	3,599	161	48,491	0	2,259	128	2,561
16-Aug	201	3,800	109	48,600	-4	2,255	220	2,781
17-Aug	129	3,929	95	48,695	0	2,255	112	2,893
18-Aug	117	4,046	91	48,786	0	2,255	80	2,973
19-Aug	112	4,158	49	48,835	0	2,255	95	3,068
20-Aug	220	4,378	51	48,886	2	2,257	257	3,325
21-Aug	192	4,570	29	48,915	1	2,258	194	3,519
22-Aug	177	4,747	26	48,941	1	2,259	202	3,721
23-Aug	130	4,877	18	48,959	1	2,260	199	3,920
24-Aug	146	5,023	14	48,973	1	2,261	167	4,087
25-Aug	142	5,165	10	48,983	1	2,262	197	4,284
26-Aug	152	5,317	10	48,993	1	2,263	163	4,447
27-Aug	104	5,421	0	48,993	0	2,263	120	4,567
28-Aug	69	5,490	0	48,993	0	2,263	76	4,643
29-Aug	69	5,559	0	48,993	0	2,263	76	4,719
30-Aug	37	5,596	0	48,993	0	2,263	61	4,780
31-Aug	4	5,600	0	48,993	0	2,263	12	4,792

[a] Interpolated data due to water conditions

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

Outlined areas indicate hours not counted. Numbers in outlined areas indicate estimated passage.
After 20 July passage estimates are unreliable because of problems with the weir and flash panel

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	Total
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	0	0	0.0%
1-Jul	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.0%
2-Jul	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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%
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	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	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	0	0	0.0%
7-Jul	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	2	14	0.3%
8-Jul	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	0.0%
9-Jul	3	6	0	1	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	30	22	66	1.2%
10-Jul	6	12	0	2	0	0	2	0	0	0	0	0	0	2	2	0	6	0	4	2	4	0	15	16	73	1.3%
11-Jul	0	0	4	42	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	1	2	0	15	16	85	1.5%
12-Jul	2	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	24	0.4%
13-Jul	10	4	16	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	-2	4	4	12	58	1.0%
14-Jul	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	22	8	0	0	0	0	0	0	0	46	0.8%
15-Jul	0	8	12	6	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	22	2	80	136	2.4%
16-Jul	0	0	2	2	6	0	0	0	0	0	0	0	0	0	0	2	8	12	18	34	1	11	2	53	151	2.7%
17-Jul	56	0	0	0	6	0	0	2	0	0	0	0	0	16	0	14	60	154	9	17	1	11	2	53	411	7.3%
18-Jul	0	8	0	0	0	6	0	0	0	0	2	0	4	0	0	0	30	82	9	17	1	11	2	53	225	4.0%
19-Jul	0	2	8	0	4	0	84	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0	2	26	138	2.5%
20-Jul	24	32	24	14	8	12	14	0	0	0	0	4	14	80	29	16	0	0	2	2	2	0	1	13	290	5.2%
21-Jul	14	18	12	7	5	6	7	0	0	0	1	3	8	41	16	10	1	2	2	2	2	0	1	13	169	3.0%
22-Jul	14	18	12	7	5	6	7	0	0	0	1	3	8	41	16	10	1	2	2	2	2	0	1	13	169	3.0%
23-Jul	14	18	12	7	5	6	7	0	0	0	1	3	8	41	16	10	1	2	2	2	2	0	1	13	169	3.0%
24-Jul	14	18	12	7	5	6	7	0	0	0	1	3	8	41	18	10	1	2	2	2	2	0	1	13	169	3.0%
25-Jul	14	18	12	7	5	6	7	0	0	0	1	3	8	41	16	10	1	2	2	2	2	0	1	13	169	3.0%
26-Jul	4	0	0	0	2	0	0	0	0	0	2	2	2	2	4	4	2	4	4	4	4	0	0	0	40	0.7%
27-Jul	6	4	0	-2	0	2	0	6	2	0	0	0	0	0	0	0	4	6	8	2	4	6	4	4	56	1.0%
28-Jul	4	8	6	2	0	0	2	0	0	0	0	0	0	0	0	0	4	4	0	8	10	10	6	12	76	1.4%
29-Jul	0	0	2	4	2	0	0	2	0	0	2	0	0	0	0	0	4	4	2	2	0	2	4	0	30	0.5%
30-Jul	0	2	2	2	6	0	0	4	0	0	0	0	2	0	0	0	4	2	4	2	8	0	4	0	42	0.8%
31-Jul	2	0	4	2	2	2	2	0	4	0	2	0	0	0	0	0	0	2	2	2	7	7	3	2	45	0.8%
1-Aug	0	0	0	2	0	0	0	0	0	0	1	1	1	0	1	4	3	3	2	2	7	7	3	2	39	0.7%
2-Aug	0	0	0	1	0	0	1	1	2	0	1	1	1	0	1	4	3	3	2	2	7	7	3	2	42	0.8%
3-Aug	0	0	0	1	0	0	1	1	2	0	1	1	1	0	1	4	3	3	2	2	6	14	2	4	49	0.9%
4-Aug	0	0	0	0	0	0	2	2	2	0	1	1	1	0	1	4	3	3	0	4	0	2	0	-2	24	0.4%
5-Aug	0	0	0	0	0	0	0	0	2	0	1	1	2	0	2	8	6	4	12	16	8	10	2	0	74	1.3%
6-Aug	0	0	0	0	0	0	0	0	4	0	0	2	2	4	4	0	0	2	8	4	6	2	16	4	56	1.0%
7-Aug	0	0	0	2	0	0	0	0	4	0	0	4	2	0	4	4	0	4	16	4	8	0	2	10	64	1.1%
8-Aug	2	4	0	0	0	0	0	4	6	1	0	2	4	1	3	2	0	2	6	2	3	0	1	5	50	0.9%
9-Aug	2	2	2	2	0	1	0	2	8	2	0	0	6	2	2	0	0	0	0	0	-2	0	0	0	29	0.5%
10-Aug	2	0	4	4	0	2	0	0	2	0	2	2	-2	2	0	0	0	0	2	0	6	0	0	-2	18	0.3%
11-Aug	3	6	7	3	2	3	1	0	2	0	0	2	6	2	4	6	0	0	2	0	0	0	0	-2	47	0.8%
12-Aug	3	6	7	3	2	3	1	0	4	4	4	0	0	2	2	0	2	0	2	4	-2	12	12	0	71	1.3%
13-Aug	3	6	7	3	2	3	1	0	4	0	4	6	4	2	4	2	0	-2	0	2	2	2	6	0	61	1.1%
14-Aug	3	6	7	3	2	3	1	0	3	0	4	4	2	4	5	2	0	-1	0	2	1	5	5	-1	60	1.1%
15-Aug	3	6	7	3	2	3	1	0	2	0	4	2	0	8	6	2	0	0	0	2	0	8	4	-2	59	1.1%
16-Aug	3	6	7	3	2	3	1	0	2	4	4	0	0	2	2	2	16	4	10	4	10	36	32	-46	201	3.6%
17-Aug	3	6	7	3	2	3	1	0	0	2	0	0	8	0	2	2	4	8	12	2	9	12	38	6	129	2.3%
18-Aug	3	6	7	3	2	3	1	0	0	-4	2	2	2	0	0	2	6	2	2	24	4	12	30	6	117	2.1%
19-Aug	4	12	10	2	4	4	2	0	2	0	-2	0	2	0	0	0	3	4	3	14	4	16	18	10	112	2.0%
20-Aug	18	20	16	18	14	6	14	4	0	4	4	12	6	2	0	10	3	4	3	14	4	16	18	10	220	3.9%
21-Aug	15	17	12	11	12	3	9	3	4	3	3	6	6	5	0	11	3	4	3	14	4	16	18	10	192	3.4%
22-Aug	15	17	12	11	12	3	9	3	4	3	3	6	6	5	0	12	0	6	4	4	4	20	6	12	177	3.2%
23-Aug	15	17	12	11	12	3	9	3	8	2	2	0	6	6	0	6	0	0	8	2	-2	6	2	0	130	2.3%
24-Aug	15	17	12	11	12	3	9	3	2	6	4	6	2	2	6	4	0	18	10	4	0	0	4	2	146	2.6%
25-Aug	15	17	12	11	12	3	9	3	-2	8	8	2	0	4	0	2	6	4	6	4	8	2	0	8	142	2.5%
26-Aug	15	17	12	11	12	3	9	3	2	0	0	0	0	4	0	4	0	18	6	12	10	4	6	6	152	2.7%
27-Aug	12	14	8	4	10	0	4	2	10	0	2	0	2	2	0	3	1	8	4	6	5	2	3	3	104	1.9%
28-Aug	6	7	4	2	5	0	2	1	6	0	1	0	1	1	-1	2	1	8	4	6	5	2	3	3	69	1.2%
29-Aug	6	7	4	2	5	0	2	1	6	0	1	0	1	1	-1	2	1	8	4	6	5	2	3	3	69	1.2%
30-Aug	6	7	4	2	5	0	2	1	6	0	0	0	0	0	-2	2	2	0	2	0	0	0	0	0	37	0.7%
31-Aug	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0			end of season						4	0.1%
Total	359	394	338	256	194	107	240	51	105	29	70	84	134	370	164	217	209	407	215	265	171	299	338	584	5,600	100%
	6.4%	7.0%	6.0%	4.6%	3.5%	1.9%	4.3%	0.9%	1.9%	0.5%	1.3%	1.5%	2.4%	6.6%	2.9%	3.9%	3.7%	7.3%	3.8%	4.7%	3.1%	5.3%	6.0%	10.4%	100.0%	

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

Outlined areas indicate hours not counted. Numbers in outlined areas indicate estimated passage.
After 20 July passage estimates are unreliable because of problems with the weir and flash panel

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
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	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	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	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	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	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	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	46	26	94	166	0.3%
7-Jul	120	172	26	20	48	0	0	18	2	0	0	0	0	0	0	2	8	222	160	54	74	6	28	46	1,006	2.1%
8-Jul	126	74	14	98	32	54	34	12	0	0	0	0	0	0	40	0	18	16	10	28	32	44	18	68	718	1.5%
9-Jul	122	140	101	97	75	92	30	19	0	0	0	0	0	0	0	0	11	22	0	2	6	88	290	668	1,783	3.6%
10-Jul	118	206	188	96	118	130	26	28	0	0	0	2	1	0	6	6	4	28	36	96	26	45	177	424	1,759	3.6%
11-Jul	42	68	40	112	116	22	54	36	0	0	0	4	2	0	8	2	6	20	51	49	21	45	177	424	1,299	2.7%
12-Jul	36	52	72	42	0	4	4	0	5	4	4	4	2	8	4	8	8	12	68	2	16	2	64	160	600	1.2%
13-Jul	1,370	90	64	32	24	20	28	10	4	-2	10	28	4	4	16	0	6	-2	26	22	8	68	56	140	2,026	4.1%
14-Jul	124	80	142	22	14	20	4	28	2	4	6	4	2	18	12	580	26	36	4	26	16	10	0	18	1,208	2.5%
15-Jul	320	628	62	26	34	8	0	0	0	4	2	6	4	2	2	0	6	12	48	10	20	434	22	500	2,150	4.4%
16-Jul	32	50	88	20	26	10	6	0	3	13	1	10	6	0	12	4	52	88	402	376	16	221	18	715	2,169	4.4%
17-Jul	1,028	92	186	54	52	6	8	18	3	13	0	14	4	38	12	70	144	2,814	205	216	16	221	18	715	5,947	12.1%
18-Jul	8	700	54	18	38	24	194	0	8	22	40	12	4	6	0	16	106	1,419	205	216	16	221	18	715	4,058	8.3%
19-Jul	6	42	36	22	10	8	1,508	4	2	0	16	6	8	42	26	36	68	24	8	56	12	6	14	930	2,952	6.0%
20-Jul	90	154	18	12	60	108	6	54	2	12	6	14	24	444	412	346	74	24	25	30	17	8	13	465	2,418	4.9%
21-Jul	50	80	16	10	31	59	6	31	7	14	8	17	23	225	218	187	44	31	25	30	17	8	13	465	1,615	3.3%
22-Jul	50	80	16	10	31	59	6	31	7	14	8	17	23	225	218	187	44	31	25	30	17	8	13	465	1,615	3.3%
23-Jul	50	80	16	10	31	59	6	31	7	14	8	17	23	225	218	187	44	31	25	30	17	8	13	465	1,615	3.3%
24-Jul	50	80	16	10	31	59	6	31	7	14	8	17	23	225	218	187	44	31	25	30	17	8	13	465	1,615	3.3%
25-Jul	50	80	16	10	31	59	6	31	7	14	8	17	23	225	218	187	44	31	25	30	17	8	13	465	1,615	3.3%
26-Jul	10	6	14	8	2	10	6	8	12	16	10	20	22	6	24	28	14	38	42	4	22	8	12	0	342	0.7%
27-Jul	20	12	8	0	14	6	18	20	20	12	14	32	42	50	18	78	100	34	36	46	70	26	28	12	716	1.5%
28-Jul	42	34	24	12	10	18	46	18	14	2	10	0	10	10	16	28	22	46	44	94	82	110	52	34	780	1.6%
29-Jul	42	16	58	34	48	22	50	84	12	12	20	6	24	38	10	30	10	12	16	12	4	8	6	2	576	1.2%
30-Jul	6	6	12	4	8	20	22	22	8	12	2	6	20	20	60	48	48	16	32	10	48	38	18	44	530	1.1%
31-Jul	52	68	106	62	30	32	24	6	6	10	24	14	38	22	12	8	16	22	36	28	61	64	44	51	836	1.7%
1-Aug	8	18	38	54	12	8	8	10	0	0	21	12	30	33	29	13	34	49	36	28	61	64	44	51	651	1.3%
2-Aug	19	7	26	29	21	13	15	21	8	13	21	12	30	33	29	13	34	49	36	28	61	64	44	51	677	1.4%
3-Aug	19	7	26	29	21	13	15	21	8	13	21	12	30	33	29	13	34	49	36	46	74	90	70	58	767	1.6%
4-Aug	32	4	14	4	30	18	22	32	8	13	21	12	30	33	29	13	34	49	40	16	38	32	26	28	578	1.2%
5-Aug	0	16	14	4	0	6	28	0	8	13	21	12	22	44	46	18	52	78	36	56	44	32	30	16	596	1.2%
6-Aug	14	0	2	0	0	12	12	8	16	28	18	10	20	12	8	8	18	22	46	24	32	44	28	24	404	0.8%
7-Aug	48	34	14	48	50	12	34	40	12	14	16	16	18	16	16	26	38	20	36	46	34	64	28	54	734	1.5%
8-Aug	32	20	28	18	12	14	22	10	19	18	11	10	18	14	17	19	19	17	27	31	38	44	18	37	511	1.0%
9-Aug	17	12	20	11	8	21	15	14	26	22	6	4	18	12	18	12	0	14	18	16	42	24	8	20	378	0.8%
10-Aug	2	4	14	4	4	28	8	18	10	4	0	10	-2	-4	6	6	8	12	16	4	6	20	14	12	204	0.4%
11-Aug	1	4	7	2	3	14	4	10	10	8	4	2	6	10	8	12	6	12	22	10	12	22	20	20	229	0.5%
12-Aug	1	4	7	2	3	14	4	10	14	6	2	4	0	0	0	4	6	8	28	12	20	24	16	8	197	0.4%
13-Aug	1	4	7	2	3	14	4	10	12	8	2	10	4	14	8	4	2	2	10	0	4	14	14	4	153	0.3%
14-Aug	1	4	7	2	3	14	4	10	8	7	4	10	6	8	6	10	1	8	10	3	6	15	9	1	157	0.3%
15-Aug	1	4	7	2	3	14	4	10	4	8	6	10	8	2	6	16	0	14	10	6	8	16	4	-0	161	0.3%
16-Aug	1	4	7	2	3	14	4	10	2	4	4	0	0	0	2	2	2	8	4	8	2	10	6	10	109	0.2%
17-Aug	1	4	7	2	3	14	4	10	8	2	2	0	4	0	0	10	2	0	2	8	0	0	10	6	95	0.2%
18-Aug	1	4	7	2	3	14	4	10	10	2	4	4	6	2	2	8	0	0	4	2	0	0	2	0	91	0.2%
19-Aug	0	4	0	0	2	0	0	2	6	4	0	8	2	2	6	6	1	0	3	2	0	0	1	0	49	0.1%
20-Aug	6	4	2	4	0	0	2	0	12	2	2	2	0	2	2	2	1	0	3	2	0	0	1	0	51	0.1%
21-Aug	4	2	1	2	0	0	1	0	6	1	1	1	0	1	1	1	1	0	3	2	0	0	1	0	29	0.1%
22-Aug	4	2	1	2	0	0	1	0	6	1	1	1	0	1	0	0	2	0	2	2	0	0	0	0	26	0.1%
23-Aug	4	2	1	2	0	0	1	0	0	0	0	0	0	0	0	2	0	2	2	0	0	0	0	2	18	0.0%
24-Aug	4	2	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	14	0.0%
25-Aug	4	2	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0.0%
26-Aug	4	2	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0.0%
27-Aug	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%
28-Aug	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%
29-Aug	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-Aug	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%
31-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	end of season								0	0.0%
Total	4,193	3,256	1,651	1,074	1,096	1,166	2,317	794	348	391	393	431	582	2,101	2,106	2,453	1,262	5,471	2,009	1,881	1,150	2,340	1,558	8,970	48,993	100%
	8.6%	6.6%	3.4%	2.2%	2.2%	2.4%	4.7%	1.6%	0.7%	0.8%	0.8%	0.9%	1.2%	4.3%	4.3%	5.0%	2.6%	11.2%	4.1%	3.8%	2.3%	4.8%	3.2%	18.3%	100.0%	

Table 4. Expanded daily hourly king salmon migration past the North River counting tower, Norton Sound, 1998.

Outlined areas indicate hours not counted. Numbers in outlined areas indicate estimated passage.
After 28 July passage estimates are unreliable because of problems with the weir and flash panel

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
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	0	0	0.3%
1-Jul	0	2	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	8	0.4%
2-Jul	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.1%
3-Jul	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1%
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	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	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	0	0	0.0%
7-Jul	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1%
8-Jul	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0.3%
9-Jul	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	10	30	1.3%
10-Jul	0	2	0	0	0	0	0	0	0	0	0	0	7	0	0	2	0	6	0	0	4	0	7	7	35	1.5%
11-Jul	2	6	0	4	4	0	0	2	0	0	0	0	14	0	0	0	0	3	1	0	2	0	7	7	52	2.3%
12-Jul	0	6	2	2	2	4	4	0	2	4	6	10	2	0	0	2	0	0	2	0	0	0	0	4	48	2.1%
13-Jul	2	4	4	6	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	24	1.1%
14-Jul	4	4	6	2	2	4	0	0	0	2	0	0	2	6	2	12	2	2	0	4	0	0	0	0	58	2.5%
15-Jul	0	2	4	0	6	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	4	0	14	36	1.6%
16-Jul	0	0	4	4	0	0	2	2	2	1	0	0	0	0	2	2	2	6	6	6	1	3	0	7	54	2.4%
17-Jul	12	16	4	2	4	8	4	18	2	1	0	0	4	2	0	2	6	18	5	4	1	3	0	7	123	5.4%
18-Jul	0	8	8	6	6	6	2	2	4	2	0	6	0	0	2	0	3	10	5	4	1	3	0	7	85	3.8%
19-Jul	0	8	14	12	0	0	4	6	2	0	0	2	0	0	6	0	0	2	2	0	0	2	0	0	60	2.7%
20-Jul	22	14	24	16	4	26	18	0	6	24	14	34	50	70	64	34	2	0	1	0	0	1	0	0	424	18.7%
21-Jul	11	9	12	9	2	13	10	0	3	12	7	17	26	36	33	17	2	0	1	0	0	1	0	0	221	9.8%
22-Jul	11	9	12	9	2	13	10	0	3	12	7	17	26	36	33	17	2	0	1	0	0	1	0	0	221	9.8%
23-Jul	11	9	12	9	2	13	10	0	3	12	7	17	26	36	33	17	2	0	1	0	0	1	0	0	221	9.8%
24-Jul	11	9	12	9	2	13	10	0	3	12	7	17	26	36	33	17	2	0	1	0	0	1	0	0	221	9.8%
25-Jul	11	9	12	9	2	13	10	0	3	12	7	17	26	36	33	17	2	0	1	0	0	1	0	0	221	9.8%
26-Jul	0	4	0	2	0	0	2	0	0	0	0	0	2	2	2	0	2	0	0	0	0	0	0	0	16	0.7%
27-Jul	0	0	4	4	0	2	0	2	0	0	0	0	0	0	0	2	0	0	0	0	2	4	0	0	20	0.9%
28-Jul	2	4	2	0	2	0	2	0	0	0	2	0	0	0	0	0	0	2	0	0	2	2	0	0	20	0.9%
29-Jul	0	2	8	2	4	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	1.0%
30-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0.1%
31-Jul	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	5	0.2%
1-Aug	0	0	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	5	0.2%
2-Aug	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	4	0.2%
3-Aug	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0.1%
4-Aug	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1%
5-Aug	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1%
6-Aug	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0.2%
7-Aug	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%
8-Aug	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%
9-Aug	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%
10-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	-2	-0.1%
11-Aug	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	-2	-0.1%
12-Aug	0	0	0	0	0	0	0	0	0	0	4	-2	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1%
13-Aug	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	-2	-0.1%
14-Aug	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	-1	0.0%
15-Aug	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%
16-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	-4	-0.2%
17-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	-2	0	0	0	0	0.0%
18-Aug	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%
19-Aug	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%
20-Aug	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1%
21-Aug	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0%
22-Aug	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0%
23-Aug	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0%
24-Aug	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0%
25-Aug	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0%
26-Aug	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0%
27-Aug	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%
28-Aug	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%
29-Aug	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-Aug	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%
31-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	end of season								0	0.0%
Total	99	131	156	115	46	123	96	32	33	94	70	140	208	260	249	135	31	52	31	20	15	29	33	65	2,263	100%
	4.4%	5.8%	6.9%	5.1%	2.0%	5.4%	4.2%	1.4%	1.5%	4.2%	3.1%	6.2%	9.2%	11.5%	11.0%	6.0%	1.4%	2.3%	1.4%	0.9%	0.7%	1.3%	1.5%	2.9%	100.0%	

Table 5. Expanded daily hourly coho salmon migration past the North River counting tower, Norton Sound, 1999.

Outlined areas indicate hours not counted. Numbers in outlined areas indicate estimated passage.
After 20 July passage estimates are unreliable because of problems with the weir and flash panel

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
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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	1	0	0	0	1	0.0%
21-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0.0%
22-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0.0%
23-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0.0%
24-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0.0%
25-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0.0%
26-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	4	0.1%
27-Jul	0	0	0	0	0	0	0	0	0	8	2	2	12	8	4	6	0	2	2	0	0	0	0	6	52	1.1%
28-Jul	2	0	0	0	0	0	0	0	2	4	0	0	0	0	0	4	2	2	4	4	0	0	4	2	30	0.6%
29-Jul	6	0	0	6	2	0	8	8	2	4	2	4	8	8	4	0	0	4	2	4	2	6	0	4	84	1.8%
30-Jul	6	4	2	2	0	0	2	0	0	0	0	2	2	4	0	0	2	2	4	2	6	2	8	4	54	1.1%
31-Jul	2	0	2	2	2	0	0	2	4	2	0	0	6	2	0	0	0	2	12	4	7	18	14	7	88	1.8%
1-Aug	2	2	4	0	0	0	2	4	2	0	2	1	7	4	4	4	7	8	12	4	7	18	14	7	115	2.4%
2-Aug	9	1	13	3	3	0	3	4	5	1	2	1	7	4	4	4	7	8	12	4	7	18	14	7	141	2.9%
3-Aug	9	1	13	3	3	0	3	4	5	1	2	1	7	4	4	4	7	8	12	6	8	34	20	10	169	3.5%
4-Aug	16	0	22	6	6	0	4	4	5	1	2	1	7	4	4	4	7	8	20	4	2	8	2	6	143	3.0%
5-Aug	26	12	42	14	14	2	14	0	5	1	2	1	8	6	8	8	14	14	16	30	10	6	8	12	273	5.7%
6-Aug	12	2	2	2	0	0	4	0	8	2	4	2	6	6	2	4	2	6	4	2	8	6	24	10	118	2.5%
7-Aug	24	8	6	10	10	4	0	4	0	2	0	6	2	4	8	12	14	6	14	10	18	8	6	12	188	3.9%
8-Aug	6	18	6	4	0	2	2	2	6	4	6	6	4	6	4	8	7	3	9	5	10	5	5	10	138	2.9%
9-Aug	5	12	7	8	2	2	4	6	12	6	12	6	6	8	0	4	0	0	4	0	2	2	4	8	120	2.5%
10-Aug	4	6	8	12	4	2	6	10	4	2	0	6	6	2	14	8	6	0	4	4	4	4	2	10	128	2.7%
11-Aug	7	7	5	8	5	3	3	8	4	2	8	6	6	6	14	8	4	2	0	0	16	4	2	2	130	2.7%
12-Aug	7	7	5	8	5	3	3	8	4	0	2	0	0	6	2	6	2	6	8	22	8	24	30	22	186	3.9%
13-Aug	7	7	5	8	5	3	3	8	2	4	2	8	6	8	8	10	0	10	14	0	0	0	2	12	130	2.7%
14-Aug	7	7	5	8	5	3	3	8	3	2	2	8	6	11	8	7	1	7	6	0	4	3	3	12	129	2.7%
15-Aug	7	7	5	8	5	3	3	8	4	0	2	8	6	14	10	4	2	4	-2	0	8	6	4	12	128	2.7%
16-Aug	7	7	5	8	5	3	3	8	10	6	4	0	0	8	2	0	4	10	6	0	8	44	22	50	220	4.6%
17-Aug	7	7	5	8	5	3	3	8	0	2	2	0	2	0	0	4	2	0	4	4	4	6	26	10	112	2.3%
18-Aug	7	7	5	8	5	3	3	8	-2	0	2	2	2	2	0	6	2	0	2	4	0	0	10	10	80	1.7%
19-Aug	10	8	2	4	8	4	0	6	2	6	2	4	2	2	0	0	1	0	3	8	0	8	6	11	95	2.0%
20-Aug	42	28	12	36	18	8	16	2	26	8	8	6	4	2	2	2	1	0	3	8	0	8	6	11	257	5.4%
21-Aug	29	20	15	21	13	6	9	4	15	4	6	5	5	2	2	1	1	0	3	8	0	8	8	11	194	4.0%
22-Aug	29	20	15	21	13	6	9	4	15	4	6	5	5	2	2	0	0	0	4	12	0	16	2	12	202	4.2%
23-Aug	29	20	15	21	13	6	9	4	4	0	4	4	6	2	4	12	0	4	10	8	0	2	6	16	199	4.2%
24-Aug	29	20	15	21	13	6	9	4	4	2	4	0	0	2	2	4	0	2	0	0	0	0	22	10	167	3.5%
25-Aug	29	20	15	21	13	6	9	4	6	8	6	0	2	6	4	2	0	6	0	0	8	4	2	28	197	4.1%
26-Aug	29	20	15	21	13	6	9	4	6	2	2	0	0	0	4	2	2	4	0	2	0	8	6	8	163	3.4%
27-Aug	16	12	18	6	8	4	2	6	8	4	6	2	0	0	6	6	1	2	0	1	1	8	4	4	120	2.5%
28-Aug	8	6	11	5	4	2	1	3	5	2	3	1	0	0	3	0	1	2	0	1	1	8	4	4	78	1.6%
29-Aug	8	6	11	5	4	2	1	3	5	2	3	1	0	0	3	0	1	2	0	1	1	8	4	4	79	1.6%
30-Aug	8	6	11	5	4	2	1	3	5	2	0	0	0	0	0	0	0	0	0	0	2	10	2	0	61	1.3%
31-Aug	0	0	4	4	0	0	0	0	2	0	0	0	0	2	0	0	end of season								12	0.3%
Total	451	308	326	327	208	94	151	159	188	98	110	99	140	143	134	132	100	141	192	182	160	313	294	362	4,792	100%
	9.4%	6.4%	6.8%	6.8%	4.3%	2.0%	3.2%	3.3%	3.9%	2.0%	2.3%	2.1%	2.9%	3.0%	2.8%	2.8%	2.1%	2.9%	4.0%	3.4%	3.3%	6.5%	6.1%	7.6%	100.0%	

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

Outlined areas indicate hours not counted

After 20 July passage estimates are unreliable because of problems with the weir and flash panel

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
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	0	0	0.0%
1-Jul	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1%
2-Jul									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%
4-Jul	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	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	0	0	0.0%
7-Jul	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	2	14	0.5%
8-Jul	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	0.1%
9-Jul									0	0	0	0	0	0	0	0			0	0	0	0	30	22	52	1.8%
10-Jul	6	12	0	2	0	0	2	0						2	2	0	6	0	4	2	4				42	1.5%
11-Jul	0	0	4	42	0	0	0	0	0	0	0	0	0	0	0	0									46	1.6%
12-Jul	2	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	24	0.8%
13-Jul	10	4	16	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	-2	4	4	12	58	2.0%
14-Jul	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	22	8	0	0	0	0	0	0	0	46	1.6%
15-Jul	0	8	12	6	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	22	2	80	136	4.7%
16-Jul	0	0	2	2	8	0	0	0					0	0	0	2	8	12	18	34					84	2.9%
17-Jul	58	0	0	0	6	0	0	2			0	0	0	16	0	14	60	164							318	11.1%
18-Jul	0	8	0	0	0	6	0	0	0	0	2	0	4	0	0	0									20	0.7%
19-Jul	0	2	8	0	4	0	84	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0	2	26	138	4.8%
20-Jul	24	32	24	14	8	12	14	0	0	0	0	4	14	60	28	16	0	0							270	9.4%
21-Jul																									0	0.0%
22-Jul																									0	0.0%
23-Jul																									0	0.0%
24-Jul																									0	0.0%
25-Jul																									0	0.0%
26-Jul	4	0	0	0	2	0	0	0	0	0	2	2	2	2	4	4	2	4	4	4	4	0	0	0	40	1.4%
27-Jul	6	4	0	-2	0	2	0	8	2	0	0	0	0	0	0	0	4	6	8	2	4	6	4	4	56	1.9%
28-Jul	4	8	6	2	0	0	2	0	0	0	0	0	0	0	0	0	4	4	0	8	10	10	6	12	76	2.6%
29-Jul	0	0	2	4	2	0	0	2	0	0	2	0	0	0	0	0	4	4	2	2	0	2	4	0	30	1.0%
30-Jul	0	2	2	2	6	0	0	4	0	0	0	0	2	0	0	0	4	2	4	2	8	0	4	0	42	1.5%
31-Jul	2	0	4	2	2	2	2	0	4	0	2	0	0	0	0	0	0	2							22	0.8%
1-Aug	0	0	0	2	0	0	0	0	0	0															2	0.1%
2-Aug																									0	0.0%
3-Aug																				2	6	14	2	4	28	1.0%
4-Aug	0	0	0	0	0	0	2	2											0	4	0	2	0	-2	8	0.3%
5-Aug	0	0	0	0	0	0	0	0					2	0	2	8	6	4	12	16	8	10	2	0	70	2.4%
6-Aug	0	0	0	0	0	0	0	0	4	0	0	2	2	4	4	0	0	2	6	4	6	2	16	4	56	1.9%
7-Aug	0	0	0	2	0	0	0	0	4	0	0	4	2	0	4	4	0	4	16	4	8	0	2	10	64	2.2%
8-Aug	2	4	0	0	0	0	0	4																	10	0.3%
9-Aug									8	2	0	0	6	2	2	0	0	0	0	0	-2	6	0	0	18	0.6%
10-Aug	2	0	4	4	0	2	0	0	2	0	2	2	-2	2	0	0	0	0	2	0	0	0	0	-2	18	0.6%
11-Aug									2	0	0	2	8	2	4	6	0	0	2	0	0	0	0	-2	22	0.8%
12-Aug									4	4	4	0	0	2	2	0	2	0	2	4	-2	12	12	0	46	1.6%
13-Aug									4	0	4	6	4	2	4	2	0	-2	0	2	2	2	6	0	36	1.3%
14-Aug																									0	0.0%
15-Aug									2	0	4	2	0	6	6	2	0	0	0	2	0	8	4	-2	34	1.2%
16-Aug									2	4	4	0	0	2	2	2	18	4	10	4	10	36	32	48	176	6.1%
17-Aug									0	2	0	0	6	0	2	2	4	8	12	2	8	12	38	6	104	3.6%
18-Aug									6	-4	2	2	2	0	0	2	6	2	2	24	4	12	30	8	92	3.2%
19-Aug	4	12	10	2	4	4	2	0	2	0	-2	0	2	0	0	0									40	1.4%
20-Aug	16	20	16	18	14	6	14	4	0	4	4	12	6	2	0	10									148	5.1%
21-Aug																									0	0.0%
22-Aug															0	12	0	6	4	4	4	20	6	12	68	2.4%
23-Aug									8	2	2	0	6	8	0	8	0	0	8	2	-2	6	2	0	48	1.7%
24-Aug									2	0	4	6	2	2	6	4	0	16	10	4	0	0	4	2	64	2.2%
25-Aug									-2	8	8	2	0	4	0	2	6	4	6	4	8	2	0	8	60	2.1%
26-Aug									2	0	0	0	0	4	0	4	0	16	6	12	10	4	6	6	70	2.4%
27-Aug	12	8	8	4	10	0	4	2	10	0	2	0	2	2	0	2									66	2.3%
28-Aug																									0	0.0%
29-Aug																									0	0.0%
30-Aug											0	0	0	0	-2	2	2	0	2	0	0	0	0	0	4	0.1%
31-Aug	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0			end of season						4	0.1%
Total	152	128	136	120	66	34	134	26	62	22	48	46	70	148	74	132	144	266	148	148	102	186	218	266	2,874	100%
	5.3%	4.5%	4.7%	4.2%	2.3%	1.2%	4.7%	0.9%	2.2%	0.8%	1.7%	1.6%	2.4%	5.1%	2.6%	4.6%	5.0%	9.3%	5.1%	5.1%	3.5%	6.5%	7.6%	9.3%	100.0%	

Table 7. Reported hourly pink salmon observations at the North River counting tower, Norton Sound, 1999.

Outlined areas indicate hours not counted

After 20 July passage estimates are unreliable because of problems with the weir and flash panel

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
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	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	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%
3-Jul	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%
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	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	46	26	94	166	0.6%
7-Jul	120	172	26	20	48	0	0	18	2	0	0	0	0	0	0	2	8	222	160	54	74	6	28	46	1,006	3.4%
8-Jul	126	74	14	98	32	54	34	12	0	0	0	0	0	0	40	0	18	16	10	28	32	44	18	68	718	2.4%
9-Jul									0	0	0	0	0	0	0	0			0	2	6	88	290	668	1,054	3.6%
10-Jul	118	206	188	96	118	130	26	26						0	6	8	4	28	36	96	26				1,110	3.7%
11-Jul	42	68	40	112	116	22	54	36	0	0	6	4	2	0	8	2									506	1.7%
12-Jul	36	52	72	42	0	4	4	0	6	4	4	4	2	8	4	8	8	12	66	2	16	2	64	180	600	2.0%
13-Jul	1,370	90	64	32	24	20	28	10	4	-2	10	28	4	4	16	0	6	-2	28	22	8	68	56	140	2,026	6.8%
14-Jul	124	80	142	22	14	20	4	28	2	4	6	4	2	18	12	590	26	36	4	26	16	10	0	18	1,208	4.1%
15-Jul	320	628	62	26	34	8	0	0	0	4	2	6	4	2	2	0	6	12	48	10	20	434	22	500	2,150	7.3%
16-Jul	32	50	88	20	26	10	6	0					6	0	12	4	52	58	402	376					1,172	4.0%
17-Jul	1,028	92	186	54	52	6	8	18			0	14	4	38	12	70	144	2,814							4,540	15.3%
18-Jul	8	700	54	18	38	24	194	0	6	22	40	12	4	6	0	16									1,142	3.9%
19-Jul	6	42	36	22	10	8	1,508	4	2	0	16	6	8	42	86	36	68	24	8	56	12	8	14	938	2,952	10.0%
20-Jul	90	154	18	12	60	108	6	54	2	12	6	14	24	444	412	346	74	24							1,860	6.3%
21-Jul																									0	0.0%
22-Jul																									0	0.0%
23-Jul																									0	0.0%
24-Jul																									0	0.0%
25-Jul																									0	0.0%
26-Jul	10	6	14	8	2	10	6	8	12	16	10	20	22	6	24	28	14	38	42	4	22	8	12	0	342	1.2%
27-Jul	20	12	8	0	14	6	18	20	20	12	14	32	42	50	18	78	100	34	36	46	70	26	28	12	718	2.4%
28-Jul	42	34	24	12	10	18	46	18	14	2	10	0	10	10	16	28	22	48	44	84	82	110	52	34	780	2.6%
29-Jul	42	16	58	34	46	22	50	84	12	12	20	8	24	38	10	30	10	12	16	12	4	8	6	2	576	1.9%
30-Jul	6	8	12	4	8	20	22	22	8	12	2	6	20	20	60	48	48	16	32	10	48	38	18	44	530	1.8%
31-Jul	52	68	106	62	30	32	24	6	6	10	24	14	38	22	12	8	16	22							552	1.9%
1-Aug	6	10	38	54	12	8	8	10	0	0															146	0.5%
2-Aug																									0	0.0%
3-Aug																				46	74	90	70	58	338	1.1%
4-Aug	32	4	14	4	30	18	22	32											40	16	38	32	26	28	336	1.1%
5-Aug	0	16	14	4	0	6	28	0					22	44	46	18	52	78	36	56	44	32	30	18	542	1.8%
6-Aug	14	0	2	0	0	12	12	8	16	26	18	10	20	12	6	8	18	22	46	24	32	44	28	24	404	1.4%
7-Aug	48	34	14	48	50	12	34	40	12	14	16	16	18	16	16	26	38	20	36	46	34	64	28	54	734	2.5%
8-Aug	32	20	26	18	12	14	22	10																	154	0.5%
9-Aug									26	22	6	4	18	12	18	12	0	14	18	16	42	24	8	20	260	0.9%
10-Aug	2	4	14	4	4	28	8	18	10	4	0	10	-2	-4	6	6	8	12	16	4	6	20	14	12	204	0.7%
11-Aug									10	8	4	2	6	10	8	12	6	12	22	10	12	22	20	20	184	0.6%
12-Aug									14	6	2	4	0	0	0	4	6	8	28	12	20	24	16	8	152	0.5%
13-Aug									12	6	2	10	4	14	6	4	2	2	10	0	4	14	14	4	108	0.4%
14-Aug																									0	0.0%
15-Aug									4	8	6	10	8	2	6	16	0	14	10	6	8	16	4	-2	116	0.4%
16-Aug									2	4	4	0	0	0	2	2	2	8	4	8	2	10	6	10	64	0.2%
17-Aug									6	2	2	0	4	0	0	10	2	0	2	6	0	0	10	6	50	0.2%
18-Aug									10	2	4	4	6	2	2	8	0	0	4	2	0	0	2	0	46	0.2%
19-Aug	0	4	0	0	2	0	0	2	6	4	0	8	2	2	6	6									42	0.1%
20-Aug	8	4	2	4	0	0	2	0	12	2	2	2	0	2	2	2									44	0.1%
21-Aug																									0	0.0%
22-Aug															0	0	2	0	2	2	0	0	0	0	8	0.0%
23-Aug									0	0	0	0	0	0	0	2	0	2	2	0	0	0	0	2	8	0.0%
24-Aug									0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	4	0.0%
25-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
26-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
27-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									0	0.0%
28-Aug																									0	0.0%
29-Aug																									0	0.0%
30-Aug											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
31-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			end of season						0	0.0%
Total	3,734	2,648	1,336	830	792	620	2,174	484	236	216	230	252	322	820	876	1,436	780	3,634	1,208	1,096	752	1,288	910	2,994	29,648	100%
	12.6%	8.9%	4.5%	2.8%	2.7%	2.1%	7.3%	1.6%	0.8%	0.7%	0.8%	0.8%	1.1%	2.8%	3.0%	4.8%	2.6%	12.3%	4.1%	3.7%	2.5%	4.3%	3.1%	10.1%	100.0%	

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

Outlined areas indicate hours not counted

After 20 July passage estimates are unreliable because of problems with the weir and flash panel

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
30-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	0.6%
1-Jul	0	2	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	8	0.8%
2-Jul									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
3-Jul	0	0	2	0	0	0	0	0									0	0	0	0	0	0	0	0	2	0.2%
4-Jul	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	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	0	0	0.0%
7-Jul	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2%
8-Jul	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0.6%
9-Jul									0	0	0	0	0	0	0	0			0	0	0	0	14	10	24	2.4%
10-Jul	0	2	0	0	0	0	0	0						0	0	2	0	6	0	0	4				14	1.4%
11-Jul	2	6	0	4	4	0	0	2	0	0	0	0	14	0	0	0									32	3.1%
12-Jul	0	6	2	2	2	4	4	0	2	4	6	10	2	0	0	-2	0	0	2	0	0	0	0	4	48	4.7%
13-Jul	2	4	4	6	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	24	2.4%
14-Jul	4	4	6	2	2	4	0	0	0	2	0	0	2	6	2	12	2	2	0	4	0	0	0	0	56	5.5%
15-Jul	0	2	4	0	6	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	4	0	14	36	3.5%
16-Jul	0	0	4	4	0	0	2	2					0	0	2	2	2	6	8	0					40	3.9%
17-Jul	12	16	4	2	4	8	4	18			0	0	4	2	0	2	6	18							100	9.8%
18-Jul	0	8	8	6	6	6	2	2	4	2	0	6	0	0	2	0									52	5.1%
19-Jul	0	8	14	12	0	0	4	6	2	0	0	2	0	0	6	0	0	2	2	0	0	2	0	0	60	5.9%
20-Jul	22	14	24	16	4	26	18	0	6	24	14	34	50	70	64	34	2	0							422	41.5%
21-Jul																									0	0.0%
22-Jul																									0	0.0%
23-Jul																									0	0.0%
24-Jul																									0	0.0%
25-Jul																									0	0.0%
26-Jul	0	4	0	2	0	0	2	0	0	0	0	0	2	2	2	0	2	0	0	0	0	0	0	0	16	1.6%
27-Jul	0	0	4	4	0	2	0	2	0	0	0	0	0	0	0	2	0	0	0	0	2	4	0	0	20	2.0%
28-Jul	2	4	2	0	2	0	2	0	0	0	2	0	0	0	0	0	0	2	0	0	2	2	0	0	20	2.0%
29-Jul	0	2	8	2	4	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	2.2%
30-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0.2%
31-Jul	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0							4	0.4%
1-Aug	0	0	2	0	0	0	0	0	0	0															2	0.2%
2-Aug																									0	0.0%
3-Aug																				0	0	0	0	0	0	0.0%
4-Aug	0	0	0	0	0	0	0	0											0	0	0	0	0	0	0	0.0%
5-Aug	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
6-Aug	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0.4%
7-Aug	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%
8-Aug	0	0	0	0	0	0	0	0																	0	0.0%
9-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
10-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	-2	-0.2%
11-Aug									0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	-2	-0.2%
12-Aug									0	0	4	-2	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2%
13-Aug									0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	-2	-0.2%
14-Aug																									0	0.0%
15-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
16-Aug									0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	-2	-4	-0.4%
17-Aug									0	0	0	0	0	0	0	0	0	0	2	0	-2	0	0	0	0	0.0%
18-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
19-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									0	0.0%
20-Aug	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0									2	0.2%
21-Aug																									0	0.0%
22-Aug															0	0	0	0	0	0	0	0	0	0	0	0.0%
23-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
24-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
25-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
26-Aug									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
27-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									0	0.0%
28-Aug																									0	0.0%
29-Aug																									0	0.0%
30-Aug											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
31-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			end of season						0	0.0%
Total	44	84	92	68	36	52	46	32	14	32	30	50	72	80	84	50	18	36	14	12	10	14	16	30	1,016	100%
	4.3%	8.3%	9.1%	6.7%	3.5%	5.1%	4.5%	3.1%	1.4%	3.1%	3.0%	4.9%	7.1%	7.9%	8.3%	4.9%	1.8%	3.5%	1.4%	1.2%	1.0%	1.4%	1.6%	3.0%	100.0%	

Table 9. Reported hourly coho salmon observations at the North River counting tower, Norton Sound, 1999.

Outlined areas indicate hours not counted

After 20 July passage estimates are unreliable because of problems with the weir and flash panel

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
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	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	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%
3-Jul	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%
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	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	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	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	0	0	0.0%
9-Jul									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%
11-Jul	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	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	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	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	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%
17-Jul	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%
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	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%
21-Jul																									0	0.0%
22-Jul																									0	0.0%
23-Jul																									0	0.0%
24-Jul																									0	0.0%
25-Jul																									0	0.0%
26-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	4	0.2%
27-Jul	0	0	0	0	0	0	0	0	0	8	2	2	12	8	4	6	0	2	2	0	0	0	0	6	52	2.0%
28-Jul	2	0	0	0	0	0	0	0	2	4	0	0	0	0	0	4	2	2	4	4	0	0	4	2	30	1.1%
29-Jul	6	0	0	6	2	0	8	8	2	4	2	4	8	8	4	0	0	4	2	4	2	8	0	4	84	3.2%
30-Jul	6	4	2	2	0	0	2	0	0	0	0	2	2	4	0	0	2	2	4	2	6	2	8	4	54	2.1%
31-Jul	2	0	2	2	2	0	0	2	4	2	0	0	6	2	0	0	0	2							26	1.0%
1-Aug	2	2	4	0	0	0	2	4	2	0															16	0.6%
2-Aug																									0	0.0%
3-Aug																				6	8	34	20	10	78	3.0%
4-Aug	16	0	22	6	6	0	4	4											20	4	2	8	2	6	100	3.8%
5-Aug	26	12	42	14	14	2	14	0					8	6	8	8	14	14	16	30	10	6	8	12	264	10.0%
6-Aug	12	2	2	2	0	0	4	0	8	2	4	2	6	6	2	4	2	6	4	2	8	6	24	10	118	4.5%
7-Aug	24	8	6	18	10	4	0	4	0	2	0	6	2	4	8	12	14	6	14	10	18	8	6	12	188	7.1%
8-Aug	6	18	6	4	0	2	2	2																	40	1.5%
9-Aug									12	6	12	6	6	8	0	4	0	0	4	0	2	2	4	8	74	2.8%
10-Aug	4	6	8	12	4	2	6	10	4	2	0	6	6	2	14	8	6	0	4	4	4	4	2	10	128	4.9%
11-Aug									4	2	8	6	6	6	14	6	4	2	0	0	16	4	2	2	84	3.2%
12-Aug									4	0	2	0	0	6	2	6	2	6	8	22	8	24	30	22	142	5.4%
13-Aug									2	4	2	8	6	8	6	10	0	10	14	0	0	0	2	12	84	3.2%
14-Aug																									0	0.0%
15-Aug									4	0	2	8	6	14	10	4	2	4	-2	0	8	6	4	12	82	3.1%
16-Aug									10	6	4	0	0	8	2	0	4	10	6	0	8	44	22	50	174	6.6%
17-Aug									0	2	2	0	2	0	0	4	2	0	4	4	4	6	28	10	68	2.5%
18-Aug									-2	0	2	2	2	2	0	0	2	0	2	4	0	0	10	10	34	1.3%
19-Aug	10	8	2	4	6	4	0	6	2	6	2	4	2	2	0	0									58	2.2%
20-Aug	42	28	12	36	18	8	16	2	26	8	8	8	4	2	2	2									220	8.4%
21-Aug																									0	0.0%
22-Aug															2	0	0	0	4	12	0	16	2	12	48	1.8%
23-Aug									4	0	4	4	6	2	4	12	0	4	10	8	0	2	6	16	82	3.1%
24-Aug									4	2	4	0	0	0	2	4	0	2	0	0	0	0	22	10	50	1.9%
25-Aug									6	8	6	0	2	8	4	2	0	6	0	0	6	4	2	26	80	3.0%
26-Aug									6	2	2	6	6	6	4	2	2	4	0	2	0	8	6	8	46	1.7%
27-Aug	16	72	18	6	8	4	2	6	8	4	6	2	0	0	6	0									98	3.7%
28-Aug																									0	0.0%
29-Aug																									0	0.0%
30-Aug											0	0	0	0	0	0	0	0	0	0	2	10	2	0	14	0.5%
31-Aug	0	0	4	4	0	0	0	0	2	0	0	0	0	2	0	0			end of season						12	0.5%
Total	174	100	130	108	70	26	60	48	114	74	74	48	92	108	98	100	58	88	120	198	176	200	214	274	2,630	100%
	6.6%	3.8%	4.9%	4.1%	2.7%	1.0%	2.3%	1.8%	4.3%	2.8%	2.8%	1.8%	3.5%	4.0%	3.7%	3.8%	2.2%	3.3%	4.6%	7.5%	6.7%	7.6%	8.1%	10.4%	100.0%	

Table 10. North River counting tower climatological and stream observations, Norton Sound 1999.

Date	Water Temp °C	Water Level "
30-Jun-99	12.0	27.5
1-Jul-99	12.0	26.5
2-Jul-99	11.0	26.0
3-Jul-99	11.0	15.5
4-Jul-99	10.0	25.0
5-Jul-99	10.0	25.0
6-Jul-99	11.0	24.0
7-Jul-99	9.0	23.5
8-Jul-99	9.0	23.5
9-Jul-99	9.0	23.0
10-Jul-99	11.0	23.0
11-Jul-99	13.0	24.0
12-Jul-99	13.0	23.0
13-Jul-99	12.5	22.5
14-Jul-99	13.0	23.0
15-Jul-99	12.0	23.0
16-Jul-99	12.0	23.0
17-Jul-99	11.0	23.5
18-Jul-99	12.0	24.0
19-Jul-99	11.0	23.0
20-Jul-99		30.0
21-Jul-99		
22-Jul-99		
23-Jul-99		
24-Jul-99		
25-Jul-99		
26-Jul-99	10.0	41.0
27-Jul-99	9.0	42.0
28-Jul-99	9.0	50.0
29-Jul-99	9.0	50.0
30-Jul-99	8.0	50.0
31-Jul-99	8.5	57.0
1-Aug-99	8.0	60+
2-Aug-99		
3-Aug-99		
4-Aug-99	8.0	50.0
5-Aug-99	8.5	48.0
6-Aug-99	9.0	46.5
7-Aug-99	9.0	45.0
8-Aug-99	9.0	43.5
9-Aug-99	9.0	40.0
10-Aug-99	9.0	39.0
11-Aug-99	8.5	40.0
12-Aug-99	9.0	39.0
13-Aug-99	8.0	39.5
14-Aug-99		
15-Aug-99	8.0	40.0
16-Aug-99	10.0	39.0
17-Aug-99	9.0	39.0
18-Aug-99	8.0	36.0

Figure 1. Area location map of the North River counting tower project site, Norton Sound, 1999.

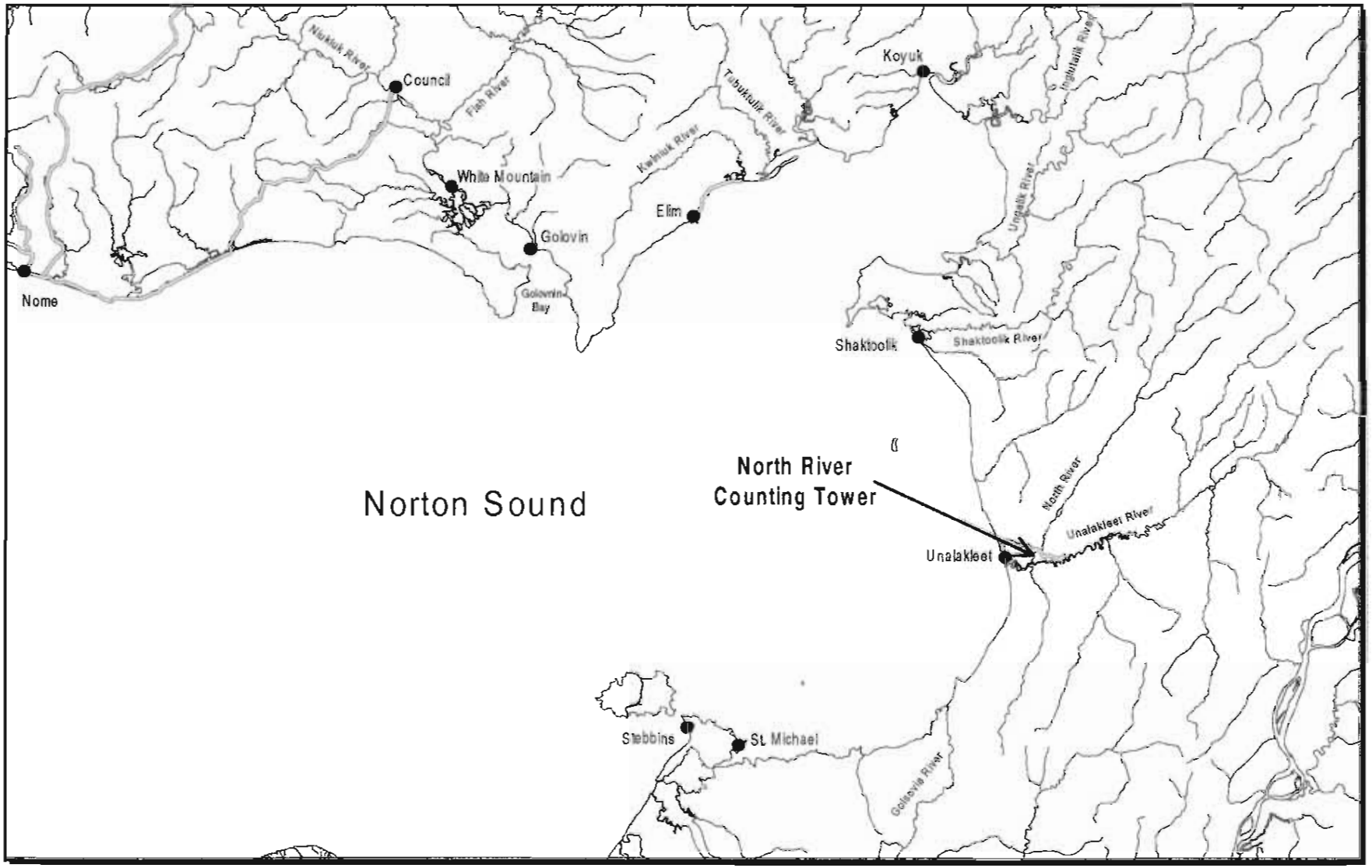


Figure 2. Cumulative migration of all salmon species, except pink salmon, past the North River counting tower, Norton Sound, 1999.

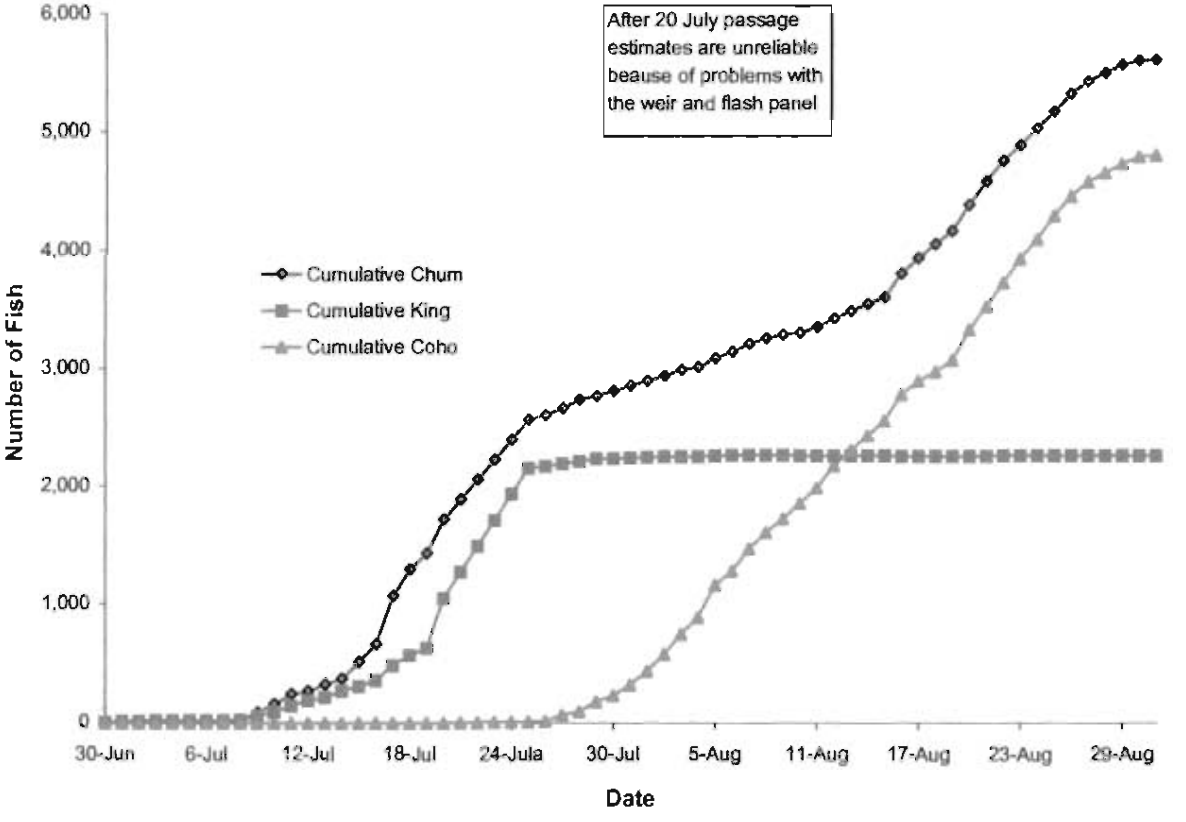


Figure 3. Daily chum salmon migration past the North River counting tower, Norton Sound, 1999.

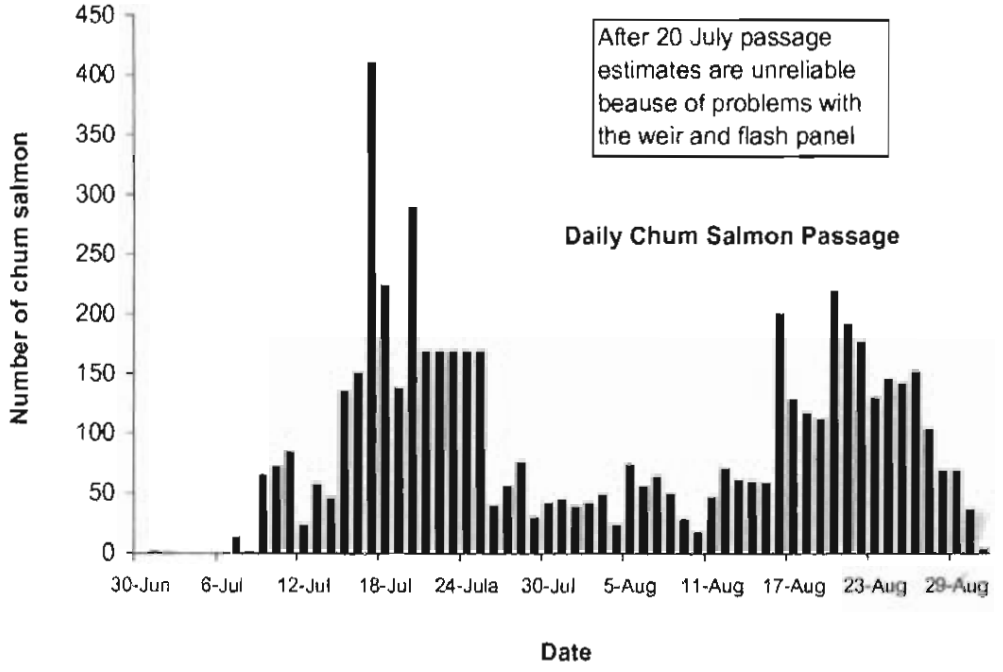


Figure 4. Cumulative chum salmon migration past the North River counting tower, Norton Sound, 1999.

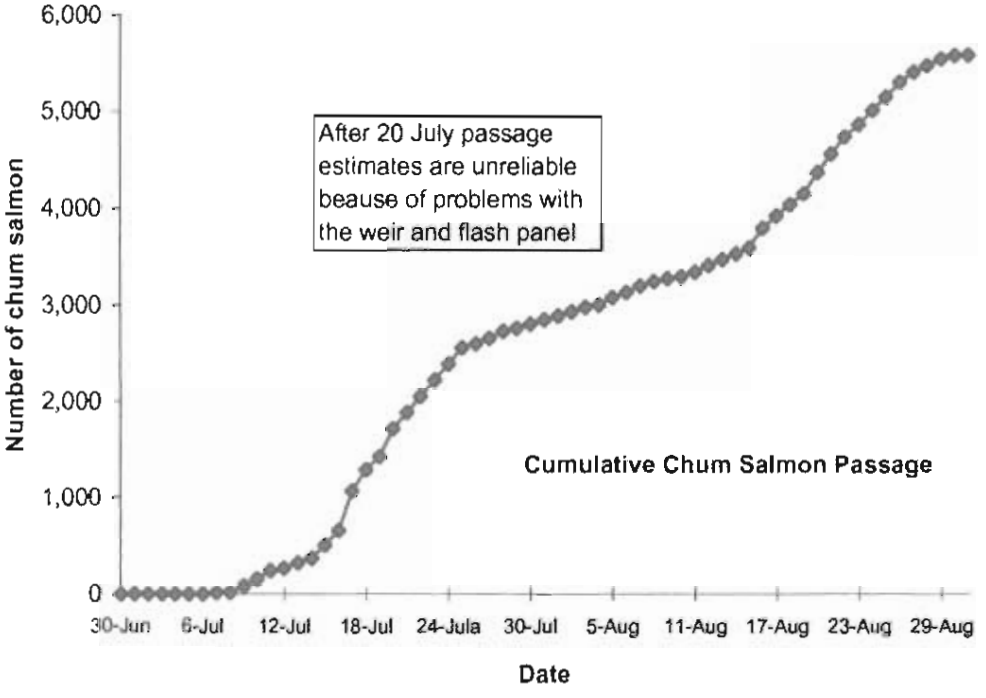


Figure 5. Daily pink salmon migration past the North River counting tower, Norton Sound, 1999.

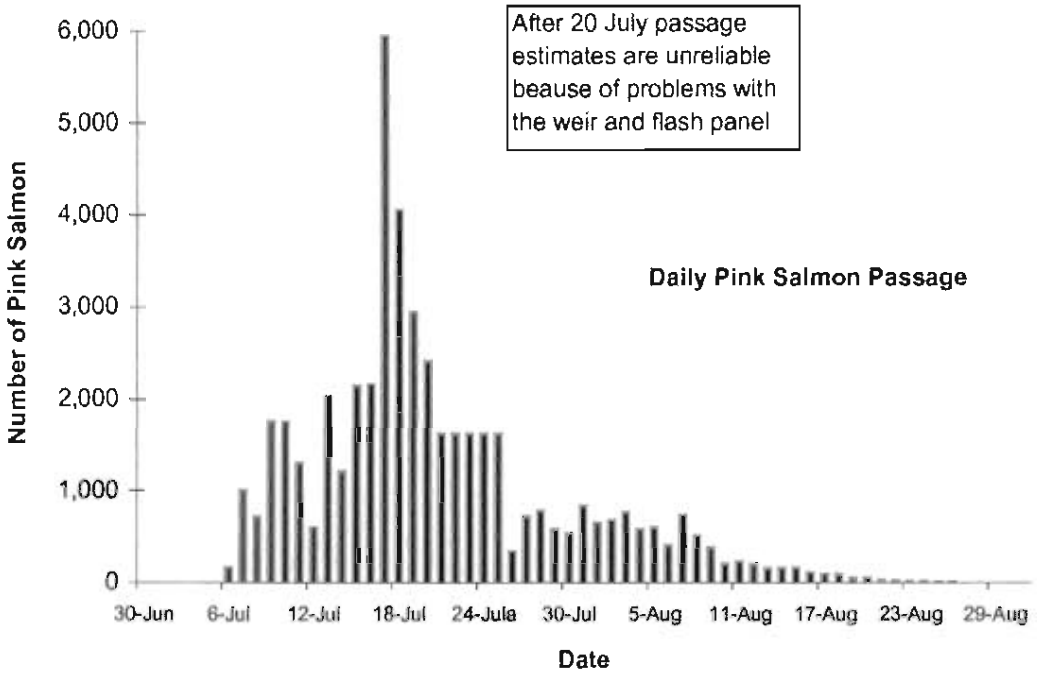


Figure 6. Cumulative pink salmon migration past the North River counting tower, Norton Sound, 1999.

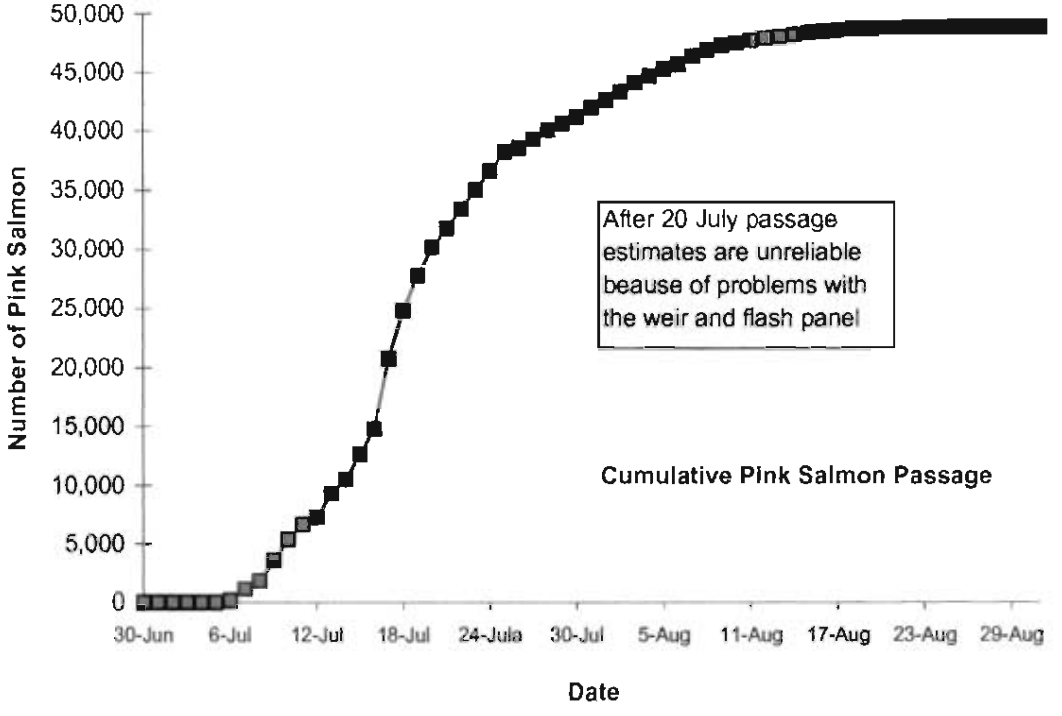


Figure 7. Daily king salmon migration past the North River counting tower, Norton Sound, 1999.

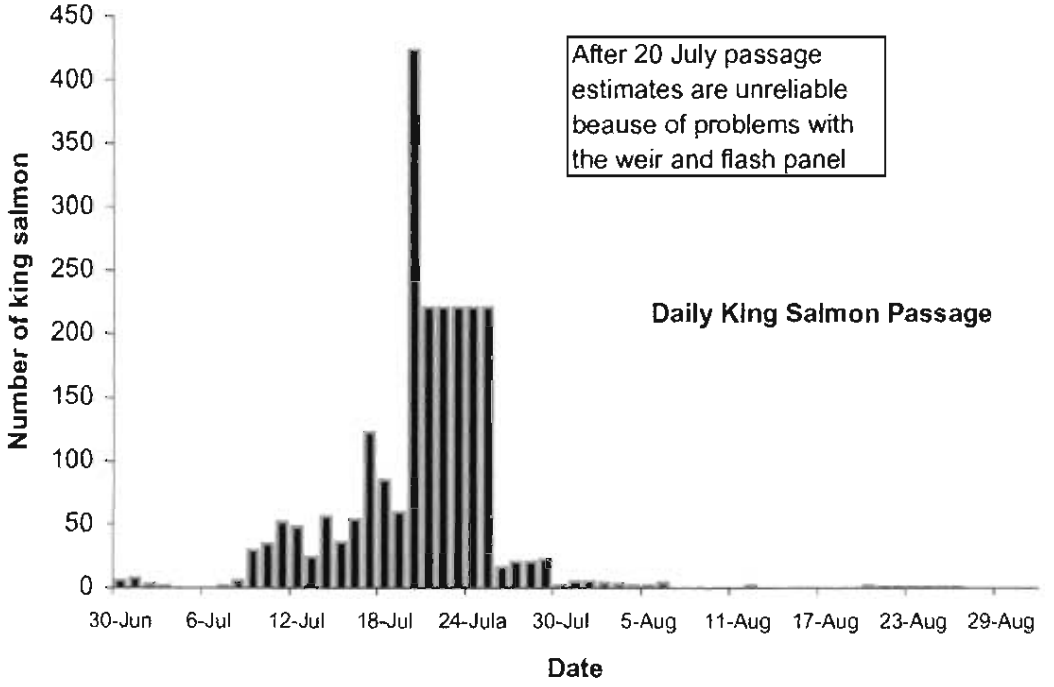


Figure 8. Cumulative king salmon migration past the North River counting tower, Norton Sound, 1999.

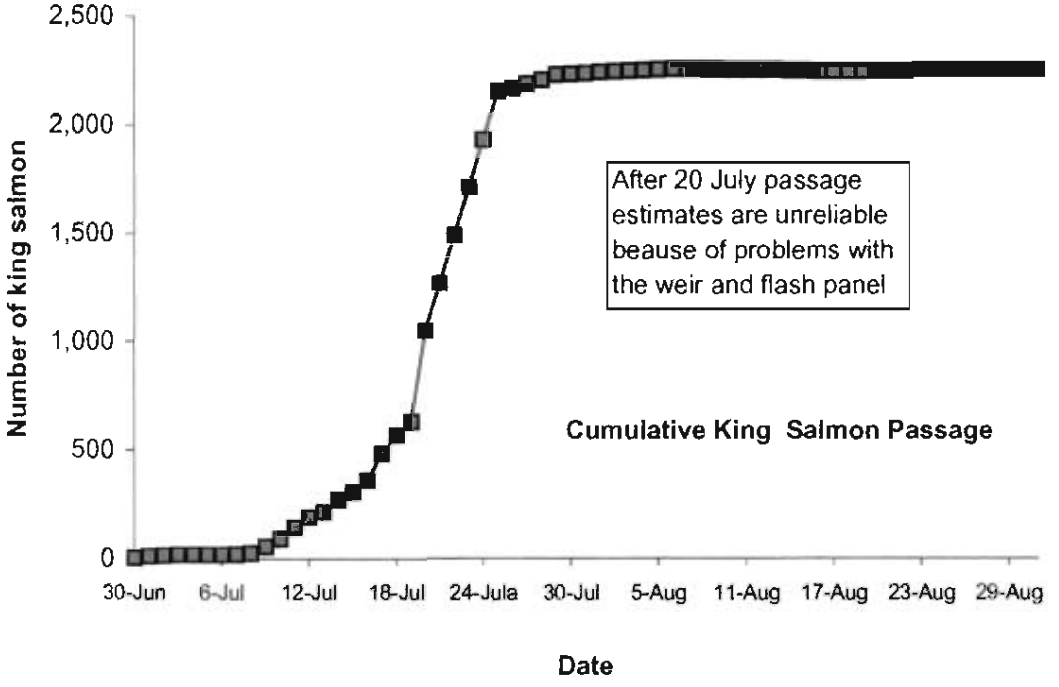


Figure 9. Daily coho salmon migration past the North River counting tower, Norton Sound, 1999.

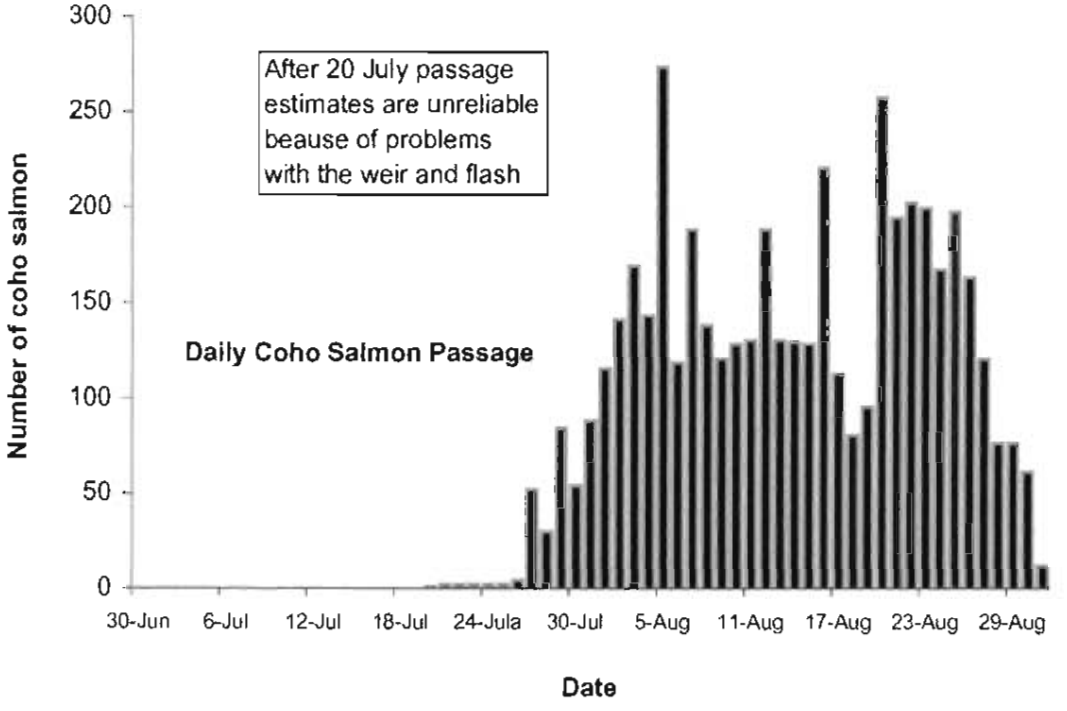


Figure 10. Cumulative coho salmon migration past the North River counting tower, Norton Sound, 1999.

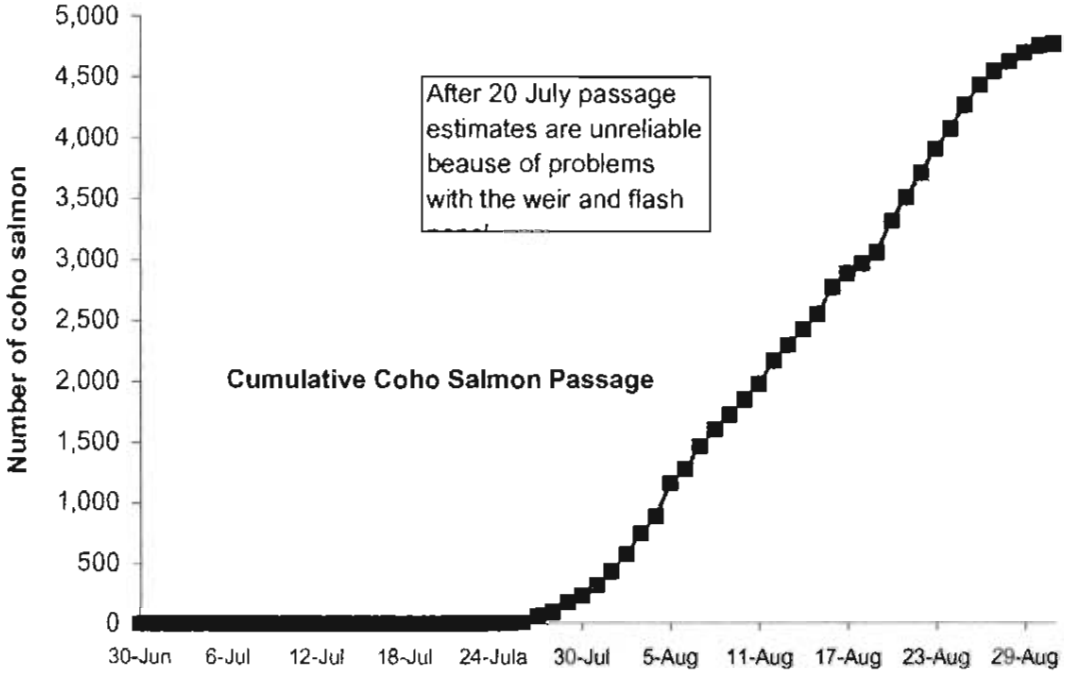


Figure 11. Diurnal pattern of chum salmon migration past the North River counting tower, Norton Sound, 1999.

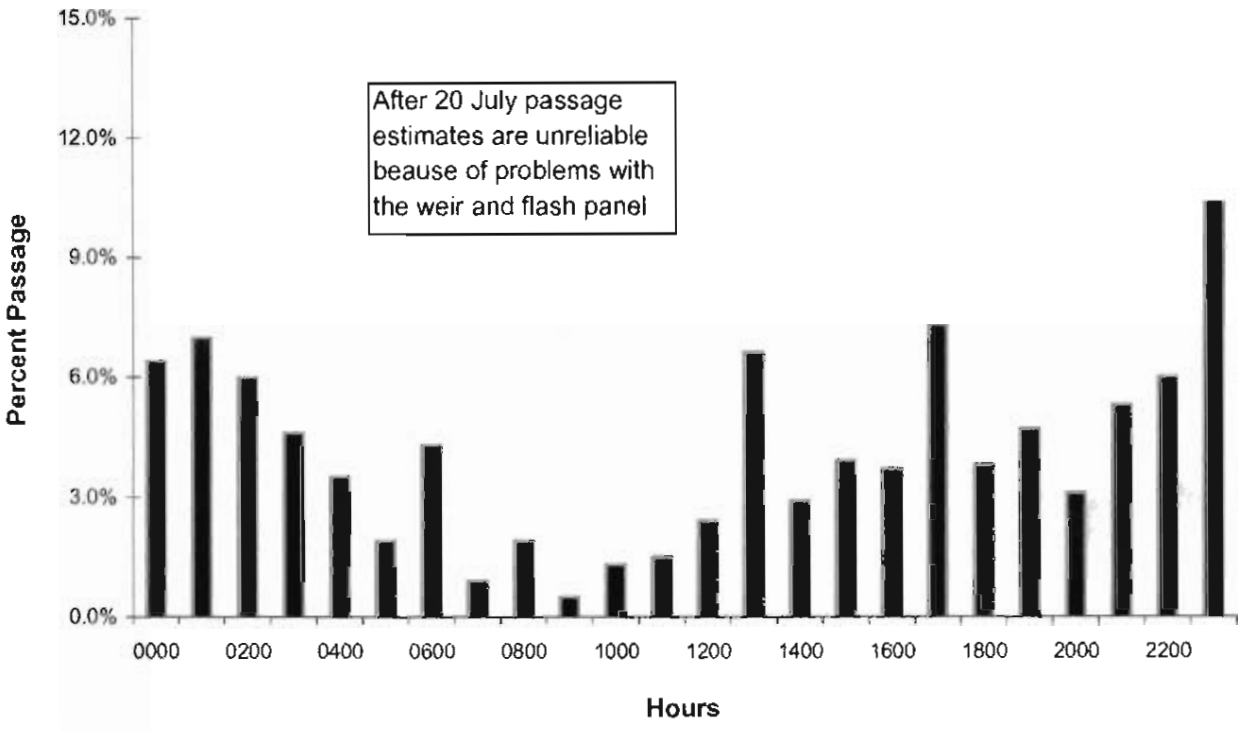


Figure 12. Diurnal pattern of pink salmon migration past the North River counting tower, Norton Sound, 1999.

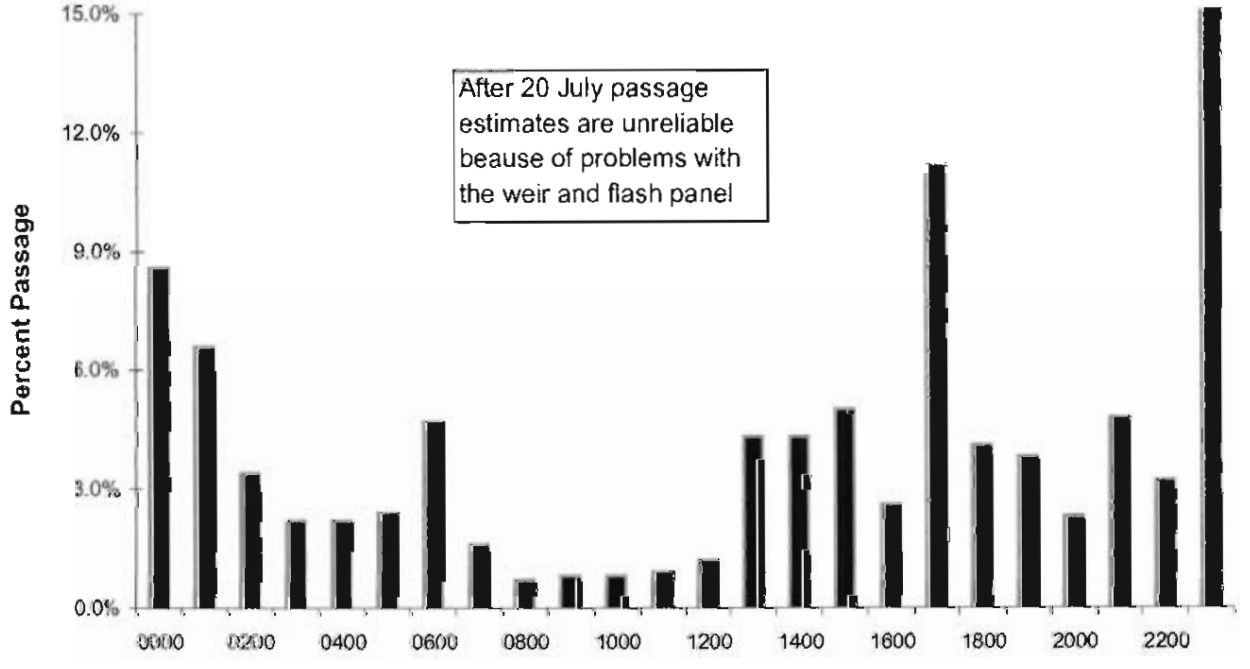


Figure 13. Diurnal pattern of king salmon migration past the North River counting tower, Norton Sound, 1999.

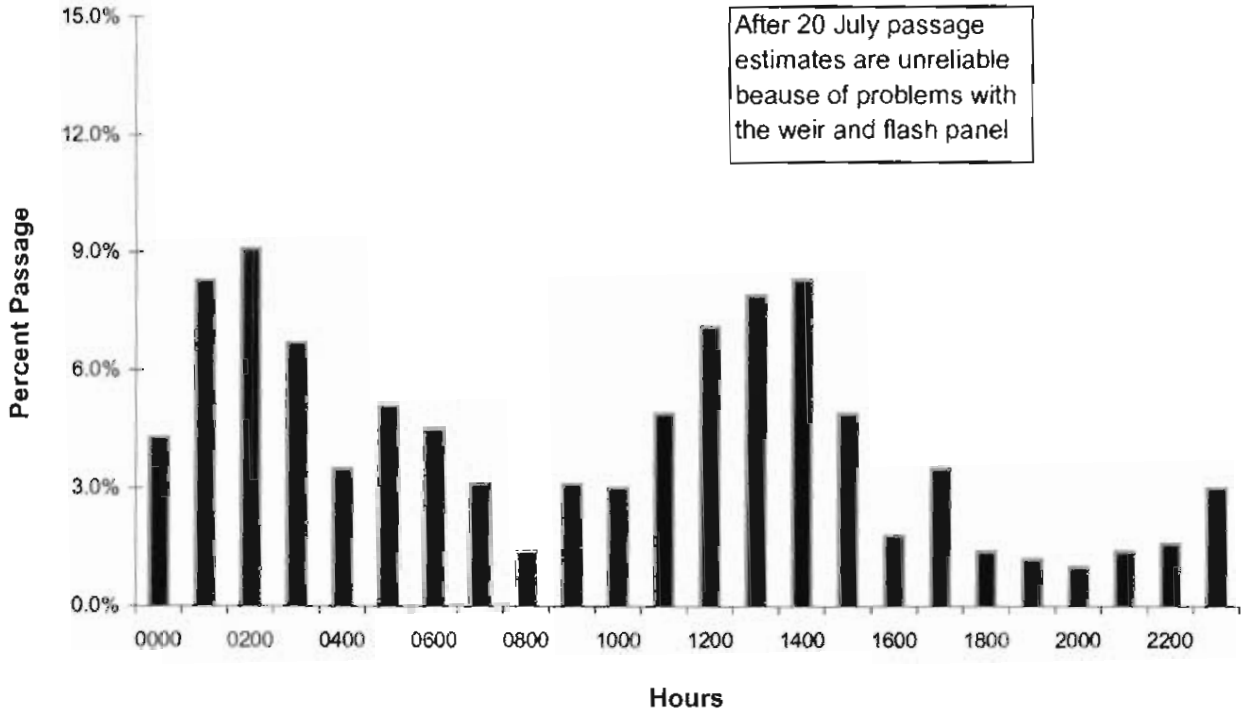


Figure 14. Diurnal pattern of coho salmon migration past the North River counting tower, Norton Sound, 1999.

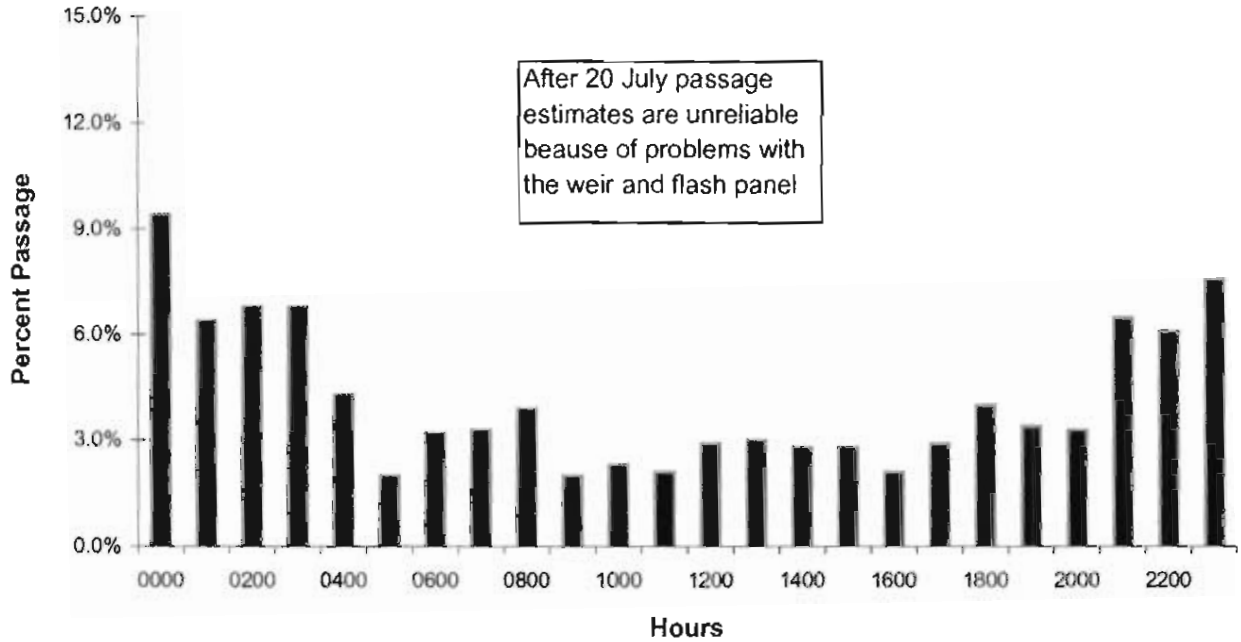


Figure 15. Average cumulative chum salmon passage past the North River counting tower, Norton Sounc 1972-1974, 1984-1986, 1996-1998 and 1999.

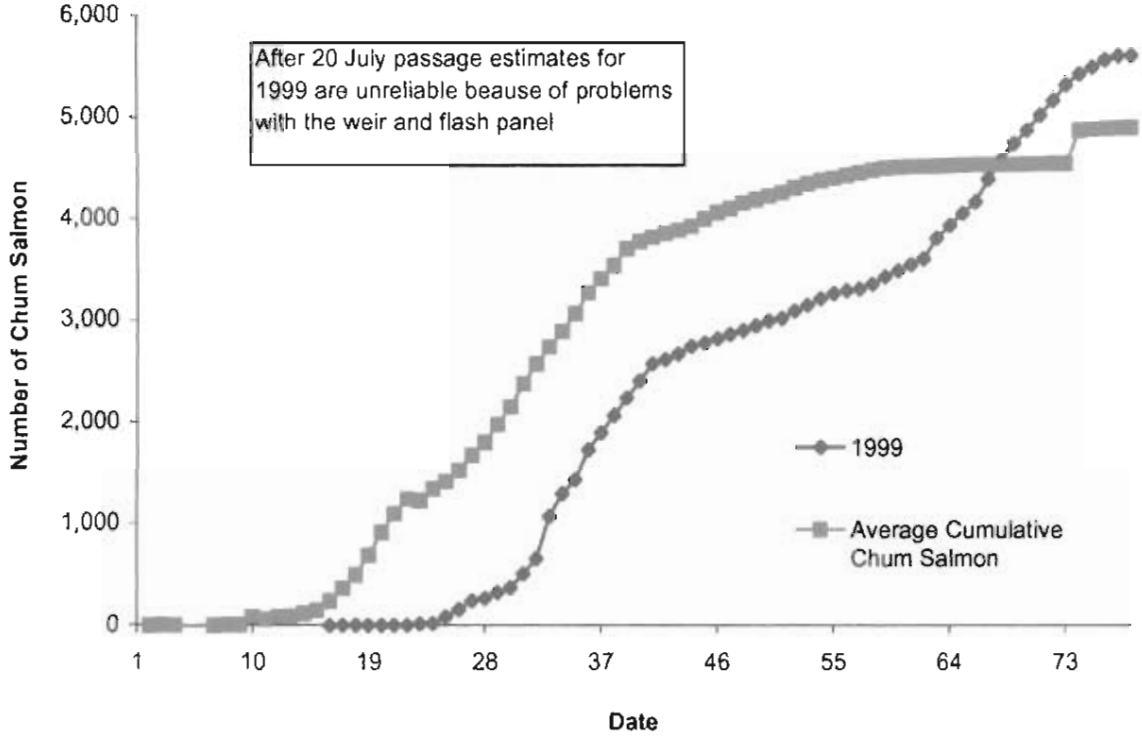


Figure 16. Even year cumulative pink salmon passage past the North River counting tower, Norton Sound, 1972-1974, 1984-1986, and 1996-1998.

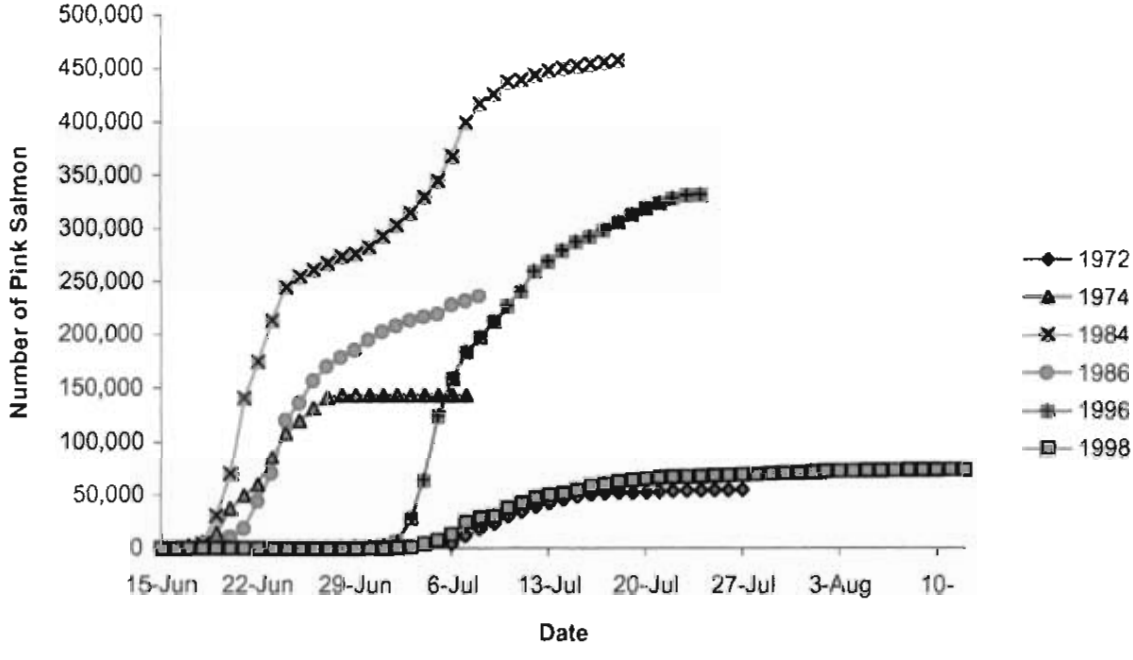


Figure 17. Odd year cumulative pink salmon passage past the North River counting tower, Norton Sound, 1973, 1985, 1997, and 1999.

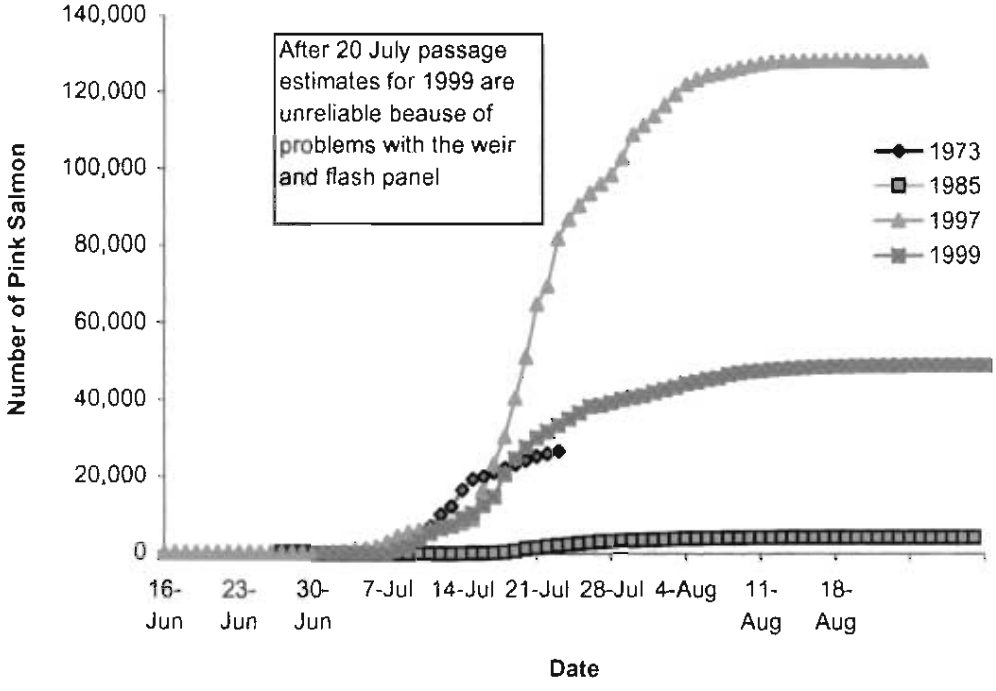


Figure 18. Average cumulative king salmon passage past the North River counting tower, Norton Sound, 1972-1974, 1984-1986, 1996-1998 and 1999.

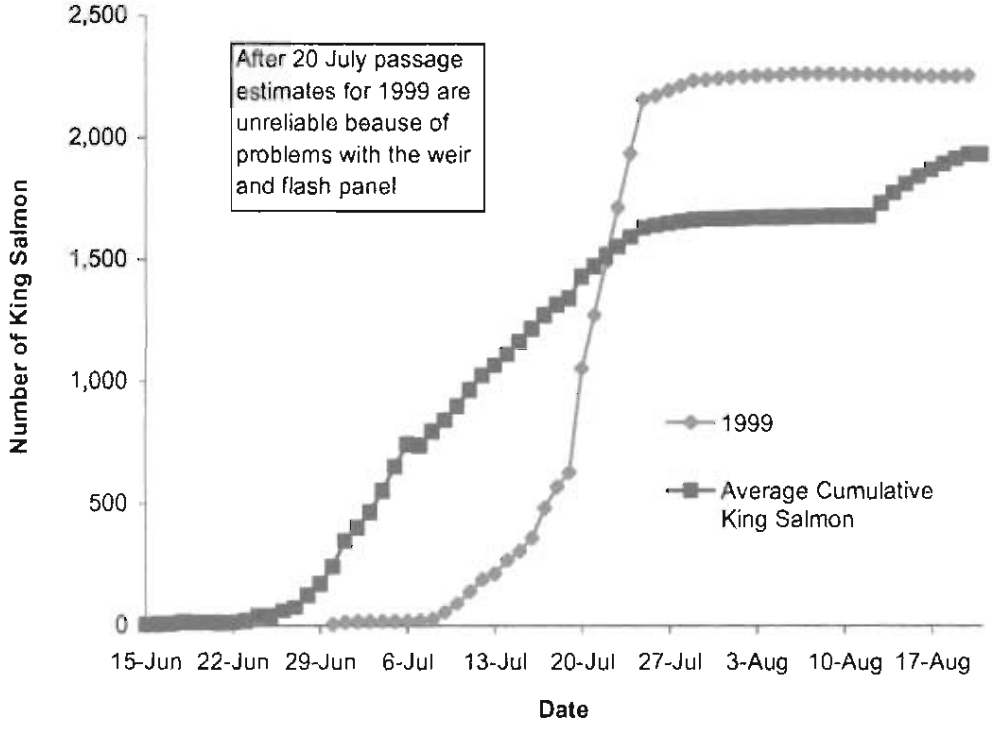
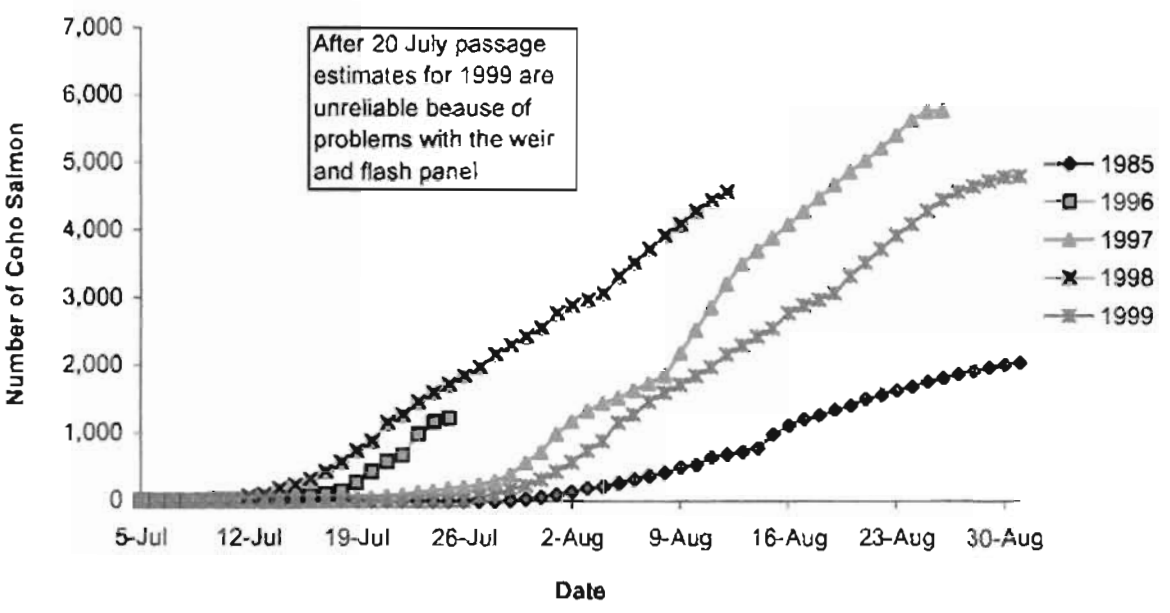


Figure 19. Cumulative coho salmon passage past the North River counting tower, Norton Sound, 1985, 1986 and 1996-1999.



Appendix Table 1. Estimated daily cumulative chum salmon escapement past the North River counting tower, Norton Sound, 1972-1974, 1984-1986 and 1996-1999.

Date	1972	1973	1974	1984	1985	1986	1996	1997	1998[a]	1999[b]	Average Cumulative Chum Salmon
15-Jun									0		
16-Jun							0	0	2		1
17-Jun							16	0	3		6
18-Jun							4	0	3		2
19-Jun							-18	0	3		-5
20-Jun							-10	0	3		-2
21-Jun							-6	2	3		0
22-Jun							-6	3	17		5
23-Jun							-6	5	19		6
24-Jun							168	7	85		87
25-Jun			0	0		0	180	19	158		60
26-Jun			0	1		0	201	58	243		84
27-Jun			19	1	0	0	226	107	267		89
28-Jun			23	1	0	14	253	222	325		120
29-Jun		0	33	88	0	82	289	335	371		150
30-Jun		0	91	124	0	308	335	571	507	0	215
1-Jul		9	177	320	0	562	497	701	658	2	325
2-Jul		9	217	395	0	784	737	737	1,069	3	439
3-Jul		19	369	431	0	999	1,585	809	1,294	3	612
4-Jul		59	533	489	0	1,439	2,468	898	1,432	3	813
5-Jul		72	633	511	0	1,485	3,360	987	1,722	3	975
6-Jul		79	717	533	15	1,668	3,916	1,118	1,891	3	1,104
7-Jul	96	88	751	551	20	1,792	4,446	1,232	2,060	17	1,105
8-Jul	215	96	769	570	23	1,921	4,914	1,339	2,229	19	1,210
9-Jul	272	121	776	579	25	2,011	5,038	1,481	2,398	85	1,279
10-Jul	344	288	776	600	25	2,251	5,268	1,548	2,567	158	1,383
11-Jul	548	681	776	675	38	2,485	5,610	1,598	2,607	243	1,526
12-Jul	687	891	776	776	52	2,655	5,976	1,680	2,663	267	1,642
13-Jul	777	1,041	780	952	364	2,807	6,468	1,803	2,739	325	1,806
14-Jul	958	1,545	793	1,184	458	2,953	6,734	1,873	2,769	371	1,964
15-Jul	1,114	2,144	798	1,437	573	3,158	7,122	2,169	2,811	507	2,183
16-Jul	1,419	2,190	810	1,531	633	3,552	7,340	2,734	2,856	658	2,372
17-Jul	1,696	2,436	826	1,895	694	3,628	7,450	3,058	2,895	1,069	2,565
18-Jul	1,742	2,666		2,072	826	3,738	7,820	3,290	2,937	1,294	2,721
19-Jul	1,742	3,087		2,150	1,077		8,350	3,582	2,986	1,432	2,897
20-Jul	1,754	3,310		2,461	1,730		8,671	3,880	3,010	1,722	3,110
21-Jul	1,859	3,546		2,572	1,834		8,883	4,310	3,064	1,891	3,254
22-Jul	1,990	3,798		2,692	1,985		9,173	4,464	3,140	2,060	3,387
23-Jul	2,119	4,334		2,812	2,126		9,501	4,647	3,204	2,229	3,554
24-Jul	2,204			2,846	2,276		9,715	4,719	3,254	2,398	3,631
25-Jul	2,241			2,870	2,413		9,789	4,817	3,283	2,567	3,688
26-Jul	2,268			2,896	2,539			4,943	3,301	2,607	3,724
27-Jul	2,285			2,908	2,643			5,044	3,348	2,663	3,758
28-Jul	2,332			2,915	2,733			5,175	3,419	2,739	3,800
29-Jul					3,129			5,382	3,480	2,769	4,040
30-Jul					3,261			5,770	3,540	2,811	4,109
31-Jul					3,353			5,958	3,599	2,856	4,152
1-Aug					3,526			6,076	3,800	2,895	4,211
2-Aug					3,638			6,150	3,929	2,937	4,251
3-Aug					3,750			6,235	4,046	2,986	4,291
4-Aug					3,839			6,316	4,158	3,010	4,325
5-Aug					3,959			6,392	4,378	3,084	4,379
6-Aug					4,040			6,468	4,570	3,140	4,424
7-Aug					4,098			6,504	4,747	3,204	4,462
8-Aug					4,129			6,556	4,877	3,254	4,491
9-Aug					4,176			6,612	5,023	3,283	4,522
10-Aug					4,212			6,663	5,165	3,301	4,549
11-Aug					4,265			6,707	5,317	3,348	4,582
12-Aug					4,301			6,740	5,421	3,419	4,609
13-Aug					4,326			6,778		3,480	4,623
14-Aug					4,362			6,793		3,540	4,635
15-Aug					4,366			6,808		3,599	4,644
16-Aug					4,377			6,823		3,800	4,669
17-Aug					4,406			6,838		3,929	4,688
18-Aug					4,425			6,853		4,046	4,705
19-Aug					4,457			6,868		4,158	4,723
20-Aug					4,472			6,877		4,378	4,750
21-Aug					4,473			6,881		4,570	4,770
22-Aug					4,480			6,875		4,747	4,792
23-Aug					4,488			6,877		4,877	4,807
24-Aug					4,499			6,891		5,023	4,826
25-Aug					4,512			6,904		5,165	4,845
26-Aug					4,520			6,904		5,317	4,863
27-Aug					4,526					5,421	4,875
28-Aug					4,531					5,490	4,883
29-Aug					4,537					5,559	4,891
30-Aug					4,550					5,596	4,897
31-Aug					4,567					5,600	4,899
	2,332	4,334	826	2,915	4,567	3,738	9,789	6,904	5,421	5,600	4,899

[a] 1998 estimates prior to 8 July are unreliable because of problems with the weir and flash panel

[b] 1999 estimates after 20 July are unreliable due to weir washout

Appendix Table 2. Estimated daily cumulative pink salmon escapement past the North River counting tower, Norton Sound, 1972-1974, 1984-1986, and 1996-1999.

Date	1972	1973	1974	1984	1985	1986	1996	1997	1998[a]	1999[b]	Average Cumulative Pink Salmon
15-Jun									0		
16-Jun							0	0	0		0
17-Jun							2	0	0		1
18-Jun							4	0	0		1
19-Jun							4	0	0		1
20-Jun							4	0	0		1
21-Jun							7	0	0		2
22-Jun							13	0	0		4
23-Jun							69	0	0		23
24-Jun							183	0	0		61
25-Jun			111	27		0	277	0	0		69
26-Jun			371	27		20	466	0	16		150
27-Jun			2,410	379	0	42	672	0	34		506
28-Jun			5,366	4,201	0	542	958	4	53		1,589
29-Jun		0	14,140	30,301	0	3,162	1,339	24	143		6,139
30-Jun		0	36,909	70,057	0	10,648	1,683	147	223	0	13,296
1-Jul		49	49,445	141,035	0	18,685	2,437	355	425	0	23,603
2-Jul		83	59,699	175,065	0	44,335	3,303	486	1,273	0	31,583
3-Jul		187	85,613	213,513	0	70,567	6,909	692	1,627	0	42,123
4-Jul		539	108,778	244,864	0	120,907	28,338	1,006	4,523	0	56,551
5-Jul		1,004	120,023	255,068	0	136,727	64,205	1,320	7,458	0	65,089
6-Jul		1,196	131,573	261,472	0	157,516	124,775	1,840	13,056	166	76,844
7-Jul	3,790	1,394	141,361	267,837	0	170,730	159,527	3,068	25,172	1,172	77,405
8-Jul	11,743	1,504	143,621	274,201	0	179,083	184,489	4,648	29,038	1,890	83,022
9-Jul	18,374	1,931	143,692	276,696	0	185,913	198,253	5,509	30,466	3,653	86,449
10-Jul	23,589	3,276	143,724	283,051	0	195,468	213,351	6,114	37,988	5,412	91,197
11-Jul	30,323	6,925	143,764	293,200	11	202,944	227,431	6,430	42,832	6,711	96,057
12-Jul	34,836	10,115	143,764	303,493	13	208,597	240,976	6,856	47,733	7,311	100,368
13-Jul	39,428	12,265	143,772	315,069	23	213,705	260,174	7,495	50,515	9,337	105,178
14-Jul	42,550	16,510	143,777	330,354	79	217,106	269,748	7,966	51,971	10,545	109,061
15-Jul	46,046	19,384	143,783	345,473	135	219,354	279,962	9,010	55,225	12,695	113,107
16-Jul	49,000	20,028	143,785	368,228	201	228,168	288,006	16,704	58,909	14,864	118,789
17-Jul	50,801	21,094	143,789	400,054	250	231,798	293,082	23,330	60,645	20,811	124,565
18-Jul	52,079	22,192		417,711	407	236,487	299,382	30,418	63,091	24,869	129,043
19-Jul	52,303	23,205		426,787	753		306,986	40,383	64,592	27,821	132,311
20-Jul	52,512	24,323		438,645	1,350		314,103	50,923	65,606	30,239	135,798
21-Jul	52,956	25,265		440,167	1,591		319,901	64,898	66,518	31,854	138,343
22-Jul	53,409	25,976		444,602	1,917		324,945	69,649	67,170	33,469	140,141
23-Jul	53,965	26,542		449,037	2,179		329,293	81,922	67,452	35,084	142,575
24-Jul	54,320			451,423	2,439		331,905	86,914	67,856	36,699	143,837
25-Jul	54,545			453,398	2,701		332,539	90,522	68,298	38,314	144,714
26-Jul	54,710			455,204	2,924			93,504	68,853	38,656	145,321
27-Jul	54,763			456,875	3,159			95,959	69,427	39,372	145,891
28-Jul	54,934			458,387	3,301			98,363	69,811	40,152	146,431
29-Jul					3,431			102,706	70,485	40,728	147,003
30-Jul					3,534			108,868	71,005	41,258	147,734
31-Jul					3,627			111,202	71,530	42,094	148,113
1-Aug					3,704			113,718	72,141	42,745	148,499
2-Aug					3,783			116,490	72,604	43,422	148,898
3-Aug					3,940			119,332	72,792	44,189	149,293
4-Aug					4,009			121,892	72,974	44,767	149,632
5-Aug					4,052			123,171	73,156	45,363	149,842
6-Aug					4,112			124,229	73,338	45,767	150,012
7-Aug					4,135			124,735	73,520	46,501	150,157
8-Aug					4,158			125,431	73,713	47,012	150,299
9-Aug					4,228			126,142	73,847	47,390	150,429
10-Aug					4,269			126,787	73,973	47,594	150,530
11-Aug					4,284			127,351	74,045	47,823	150,618
12-Aug					4,295			127,774	74,045	48,020	150,681
13-Aug					4,322			127,946		48,173	150,716
14-Aug					4,322			127,989		48,330	150,736
15-Aug					4,330			128,032		48,491	150,758
16-Aug					4,334			128,075		48,600	150,773
17-Aug					4,337			128,118		48,695	150,787
18-Aug					4,337			128,161		48,786	150,801
19-Aug					4,344			128,204		48,835	150,811
20-Aug					4,351			128,146		48,886	150,811
21-Aug					4,351			128,000		48,915	150,799
22-Aug					4,349			127,968		48,941	150,798
23-Aug					4,350			127,964		48,959	150,800
24-Aug					4,354			127,944		48,973	150,799
25-Aug					4,355			127,930		48,983	150,799
26-Aug					4,356			127,926		48,993	150,800
27-Aug					4,357					48,993	150,800
28-Aug					4,358					48,993	150,800
29-Aug					4,359					48,993	150,800
30-Aug					4,360					48,993	150,800
31-Aug					4,360					48,993	150,800

[a] 1998 estimates prior to 8 July are unreliable because of problems with the weir and fish panel

[b] 1999 estimates after 20 July are unreliable due to weir washout

Appendix Table 3. Estimated daily cumulative king salmon escapement past the North River counting tower, Norton Sound, 1972-1974, 1984-1986, and 1996-1999.

Date	1972	1973	1974	1984	1985	1986	1996	1997	1998[a]	1999[b]	Average Cumulative King Salmon
15-Jun									6		6
16-Jun							8	2	14		8
17-Jun							6	5	17		9
18-Jun							4	25	19		16
19-Jun							0	25	19		15
20-Jun							0	25	19		15
21-Jun							-6	27	19		13
22-Jun							-9	31	21		14
23-Jun							-9	45	27		21
24-Jun							-5	70	57		41
25-Jun			0	0		0	-9	150	92		39
26-Jun			0	0		2	-12	251	144		64
27-Jun			1	0	0	2	-13	367	192		78
28-Jun			3	0	0	2	-14	693	216		129
29-Jun		1	6	55	0	8	-14	1,091	272		177
30-Jun		1	42	101	0	42	-12	1,730	308	6	246
1-Jul		1	48	513	0	116	-2	2,118	362	14	352
2-Jul		6	53	642	0	158	6	2,288	485	17	406
3-Jul		10	68	745	0	198	44	2,543	570	19	469
4-Jul		16	125	984	0	326	145	2,756	630	19	556
5-Jul		19	151	1,038	1	338	306	2,969	1,054	19	655
6-Jul		2	173	1,207	35	438	416	3,150	1,275	19	746
7-Jul	11	22	184	1,274	34	609	528	3,220	1,496	21	740
8-Jul	15	26	191	1,341	34	731	606	3,304	1,717	27	799
9-Jul	30	33	191	1,367	34	827	652	3,324	1,938	57	845
10-Jul	50	43	192	1,418	34	953	708	3,358	2,159	92	901
11-Jul	126	71	192	1,648	32	1,167	738	3,379	2,175	144	967
12-Jul	172	82	192	1,957	33	1,230	793	3,416	2,195	192	1,026
13-Jul	194	83	193	2,126	39	1,294	869	3,460	2,215	216	1,069
14-Jul	245	87	196	2,242	71	1,364	927	3,508	2,237	272	1,115
15-Jul	309	94	196	2,358	126	1,446	1,005	3,584	2,239	308	1,167
16-Jul	376	97	196	2,481	213	1,518	1,033	3,690	2,244	362	1,221
17-Jul	406	119	196	2,602	260	1,557	1,059	3,830	2,249	485	1,276
18-Jul	458	150		2,674	314	1,613	1,077	3,879	2,253	570	1,318
19-Jul	466	150		2,706	366		1,113	3,939	2,256	630	1,344
20-Jul	475	216		2,784	563		1,153	3,998	2,258	1,054	1,431
21-Jul	492	231		2,803	635		1,179	4,048	2,260	1,275	1,473
22-Jul	508	262		2,825	748		1,187	4,078	2,264	1,496	1,518
23-Jul	521	298		2,847	824		1,193	4,116	2,264	1,717	1,559
24-Jul	535			2,845	958		1,197	4,131	2,264	1,938	1,598
25-Jul	544			2,840	1,093		1,197	4,150	2,264	2,159	1,635
26-Jul	551			2,844	1,168			4,158	2,262	2,175	1,646
27-Jul	556			2,848	1,213			4,160	2,260	2,195	1,654
28-Jul	561			2,844	1,266			4,169	2,262	2,215	1,662
29-Jul					1,300			4,180	2,260	2,237	1,669
30-Jul					1,322			4,186	2,259	2,239	1,672
31-Jul					1,328			4,186	2,259	2,244	1,673
1-Aug					1,341			4,186	2,255	2,249	1,674
2-Aug					1,356			4,185	2,255	2,253	1,676
3-Aug					1,366			4,185	2,255	2,256	1,677
4-Aug					1,381			4,185	2,255	2,258	1,679
5-Aug					1,382			4,185	2,257	2,260	1,679
6-Aug					1,392			4,185	2,258	2,264	1,681
7-Aug					1,397			4,185	2,259	2,264	1,681
8-Aug					1,414			4,185	2,260	2,264	1,683
9-Aug					1,418			4,185	2,261	2,264	1,684
10-Aug					1,423			4,185	2,262	2,262	1,684
11-Aug					1,427			4,185	2,263	2,260	1,684
12-Aug					1,429			4,185	2,263	2,262	1,685
13-Aug					1,429			4,185		2,260	1,737
14-Aug					1,432			4,185		2,259	1,781
15-Aug					1,428			4,185		2,259	1,817
16-Aug					1,428			4,185		2,255	1,849
17-Aug					1,425			4,185		2,255	1,875
18-Aug					1,424			4,185		2,255	1,899
19-Aug					1,424			4,185		2,255	1,920
20-Aug					1,425			4,185		2,257	1,939
21-Aug					1,426			4,185		2258[c]	1,939

[a] 1998 estimates prior to 8 July are unreliable because of problems with the weir and flash panel

[b] 1999 estimates after 20 July are unreliable due to weir washout

[c] 5 king salmon passed after 21 August

Appendix Table 4. Estimated daily cumulative coho salmon escapement past the North River counting tower, Norton Sound, 1985 and 1996-1999.

Date	1985	1996	1997	1998[a]	1999[b]	Average Cumulative Coho Salmon
5-Jul	0	0	0	1	0	0
6-Jul	0	0	0	3	0	1
7-Jul	0	0	0	5	0	1
8-Jul	0	0	0	7	0	1
9-Jul	0	6	0	9	0	3
10-Jul	0	8	0	11	0	4
11-Jul	0	8	0	15	0	5
12-Jul	0	12	0	67	0	16
13-Jul	0	29	0	97	0	25
14-Jul	0	41	0	181	0	44
15-Jul	0	53	0	235	0	58
16-Jul	0	73	3	323	0	80
17-Jul	0	103	9	438	0	110
18-Jul	0	149	18	579	0	149
19-Jul	0	279	35	748	0	212
20-Jul	0	441	54	891	1	277
21-Jul	0	593	80	1,164	3	368
22-Jul	0	681	100	1,282	5	414
23-Jul	0	997	140	1,470	7	523
24-Jul	0	1,175	158	1,608	9	590
25-Jul	0	1,229	192	1,728	11	632
26-Jul	0		214	1,856	15	663
27-Jul	0		246	1,986	67	706
28-Jul	0		301	2,174	97	760
29-Jul	8		395	2,304	181	823
30-Jul	31		569	2,433	235	899
31-Jul	57		725	2,561	323	979
1-Aug	97		991	2,781	438	1,107
2-Aug	140		1,181	2,893	579	1,204
3-Aug	193		1,338	2,973	748	1,296
4-Aug	216		1,448	3,068	891	1,370
5-Aug	265		1,527	3,325	1,164	1,502
6-Aug	319		1,640	3,519	1,282	1,598
7-Aug	374		1,738	3,721	1,470	1,706
8-Aug	419		1,858	3,920	1,608	1,807
9-Aug	500		2,192	4,087	1,728	1,947
10-Aug	536		2,532	4,284	1,856	2,087
11-Aug	645		2,865	4,447	1,986	2,234
12-Aug	686		3,209	4,567	2,174	2,373
13-Aug	725		3,499		2,304	2,465
14-Aug	781		3,694		2,433	2,541
15-Aug	988		3,889		2,561	2,647
16-Aug	1,117		4,084		2,781	2,756
17-Aug	1,211		4,279		2,893	2,836
18-Aug	1,272		4,474		2,973	2,903
19-Aug	1,345		4,669		3,068	2,976
20-Aug	1,409		4,860		3,325	3,078
21-Aug	1,507		5,026		3,519	3,170
22-Aug	1,568		5,208		3,721	3,259
23-Aug	1,631		5,404		3,920	3,350
24-Aug	1,688		5,629		4,087	3,440
25-Aug	1,759		5,758		4,284	3,519
26-Aug	1,816		5,768		4,447	3,565
27-Aug	1,872				4,567	3,601
28-Aug	1,920				4,643	3,625
29-Aug	1,966				4,719	3,650
30-Aug	2,010				4,780	3,671
31-Aug	2,045				4,792	3,680

[a] 1998 estimates prior to 8 July are unreliable because of problems with the weir and flash panel

[b] 1999 estimates after 20 July are unreliable due to weir washout