

Snake River Salmon Counting Tower  
Project Summary Report, 1998

by

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## INTRODUCTION

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

This was the fourth consecutive year a counting tower has been operated on the Snake River (Rob 1995, 1997 and 1998). The project is operated to obtain timely and accurate escapement information required for the active management of the salmon stocks throughout the season. The Snake River drains into Norton Sound at the Port of Nome (Figure 1).

## OBJECTIVES

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

## METHODS

The Snake River counting tower camp is located approximately 5 miles from Nome where the Snake River turns north. The camp is approximately 15 minutes by boat from the Nome boat harbor.

A tent camp with two tent frames and an outhouse was established during late June. A 15 foot high scaffolding tower was erected on the east bank of the river to serve as an observation platform. A 50 x 8 foot vinyl canvas flash panel was placed on the river bottom directly in front of the tower. A weir to direct the fish over the flash panel was built from the mid-stream end of the flash panel to the opposite bank. This weir was made of livestock fencing and thawfield pipes. An array of 120 volt lights was mounted on the tower to illuminate the flash panel during periods of low light and darkness.

The counting schedule began on 1 July and ended on 11 August. The two person crew counted 16 half-hour counts each day from 12 noon to 0400 hours the following day. A 24 hour count and one day off were scheduled weekly. Daily counts were radioed to the Nome office of the Kawerak Corporation, which relayed them to the Nome office of ADF&G every morning. These counts were then expanded to account for the time periods not counted.

The expanded counts in this report were calculated by first multiplying the half hour counts by two to obtain hourly counts. The crew began the 24 hour counts at 0800 hours on one day and finished the 24 hour count at 0800 hours the following day. This schedule counted the hours normally taken off in separate 4 hour blocks on two days. The expanded counts

were compiled from 0800 hours to 0700 hours the following day to follow this schedule. The 16 hour 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 16 hours of the day off. Next an expansion factor was calculated to compensate for the 4 hours not normally counted from 0800 through 1100 hours and for the 4 hours not normally counted from 0400 through 0700 hours. These factors were derived from the weekly 24 hour count by dividing the total count from 0800 hours through 1100 hours during the 24 hour count by the total normal sixteen hour count during the 24 hour count and by dividing the total count from 0400 hours through 0700 hours during the 24 hour count by the total normal sixteen hour count during the 24 hour count. Then each 16 hour count for the remaining days was expanded to 24 hour counts by applying the expansion factors to the three days before and after each 24 hour count by first multiplying each days 16 hour total by the 0800 through 1100 hours expansion factor and then multiplying each days 16 hour total by the 0400 through 0700 hours expansion factor and then adding both numbers to the 16 hour count for each day. This expansion was done for all species counted.

The expanded counts for other days missed were linearly interpolated as follows. For a day with the normal 16 hour count missed, the count for the missing day was calculated by adding the counts of each hour of the day before the missed period to the counts of each hour of the day following the missed period and dividing the result by two. If two or more normal 16 hour count days were missed the count for the missing days was calculated by adding the counts of each hour of the day before the missed period to the counts of each hour of the day following the missed period and dividing the result by two. Then each 16 hour count was expanded to a 24 hour count by multiplying each days 16 hour total by the nearest 24 hour expansion factors, and adding those numbers to the 16 hour count for each day.

Expanded counts for the calendar days were then calculated to give daily totals that can be compared to those of other years.

## RESULTS

Table 1 shows the expanded daily and cumulative totals for each salmon species. Figure 2 shows the cumulative migration of all salmon species. The reported total hourly counts were: 6,530 chum salmon, 143,415 pink salmon, 0 king salmon, and 136 coho salmon (Tables 6-9). The expanded counts were: 11,067 chum salmon, 219,679 pink salmon, 0 king salmon, and 178 coho salmon (Tables 2-5). Dolly Varden were not counted.

Pink salmon were observed on 3 July, the third day of counting. Chum salmon were first observed on 5 July. Coho salmon were first observed on 4 August. No king salmon were observed. The daily peak count of 1,802 chum salmon occurred on 17 July; the daily peak count of 31,030 pink salmon occurred on 18 July; the daily peak count of 32 coho salmon occurred on 10 August (Table 1).

Most chum salmon returned during the two week period from 10 through 23 July when 92% passed the tower (Table 2 and Figures 3 and 4). Most pink salmon returned during the three week period from 11 through 31 July when 98% passed the tower (Table 3 and Figures 5 and 6). All coho salmon counted passed during the last eight days of tower operation (Table 5 and Figures 7 and 8).

All species counted exhibited a diurnal pattern of migration past the counting tower. The greatest hourly chum salmon passage occurred during the hour from 2300 to 2400 hours when 33.9% passed the tower. During the six hour period from 2200 through 0300 hours, 89% of the chum salmon passed the tower (Table 2 and Figure 9). The greatest hourly pink salmon passage occurred during the hour from 2300 to 2400 hours when 40.4% passed the tower. During the six hour period from 2200 through 0300 hours, 86% of the pink salmon passed the tower (Table 3 and Figure 10). The greatest hourly coho salmon passage occurred during the hour from 0000 to 0100 hours when 18% passed the tower. During the six hour period from 2100 through 0200 hours 64% of the coho salmon passed the tower, while another 10.7% passed the tower during the hour from 1800 to 1900 hours (Table 5 and Figure 11).

An aerial survey of the Snake River counted 2,057 chum salmon on 20 July, 1998. The total season expanded tower count of chum salmon was 11,067. The aerial survey counted 19% of the total season expanded tower count of chum salmon (Table 1).

An aerial survey of the Snake River counted 21,470 pink salmon on 20 July, 1998. The total season expanded tower count of pink salmon was 219,679. The aerial survey counted 10% of the total season expanded tower count of pink salmon (Table 1).

## DISCUSSION

This was the fourth consecutive year of operation for the Snake River counting tower project. Don Styles of Kawerak Incorporated supervised the project. Counting began on 1 July. The first pink and chum salmon were counted a few days later, indicating that the beginning of the chum and pink salmon escapements were counted this year. Counting ended on 11 August because of high water.

The chum salmon escapements in 1995, 1997 and 1998 were one week to twelve days later than in 1996 (Figure 12) and the 1998 escapement was almost double the 1997 escapement and the largest recorded (Figure 15). The even year pink salmon escapement in 1998 was similar in timing to the even year escapement in 1996 (Figure 13) and the pink salmon escapement in 1998 was almost five times larger than the size of the 1996 escapement (Figure 17). There was no escapement of king salmon observed in 1995, 5 king salmon were observed in 1996, 12 king salmon were observed in 1997 and no king salmon were observed this year (Rob 1995, 1997, 1998 and Table 1). The observed coho salmon

escapement in 1995, 1997 and 1998 was about one week later than in 1996 (Figure 14). The magnitude of the 1998 coho salmon escapement cannot be compared to previous years because the counting season ended early due to high water.

It is recommended that the normal counting schedule be adjusted so that the crew counts 16 half-hour counts from 1500 hours through 0600 hours and that the eight hours taken off go from 0700 hours through 1400 hours. The diurnal pattern graphs for chum, pink and coho salmon (Figures 9, 10 and 11) indicate that passage is relatively high when the present daily eight hour non-counting period begins, and is low when counting resumes. In order to better estimate passage during the non-counting period using the interpolation method, it would be preferable to have count data during this transition period in abundance. The observed diurnal patterns of migration for all species indicate that migration is at a minimum during the eight hour period from 0700 through 1400 hours (Tables 6-9), and it is recommended that this be the non-counting period in the future.

It is also recommended that the 24 hour count run from 0000 hours through 2400 hours so that the expansion can be performed simply.

The value of a counting tower on this watershed is evident. The salmon escapements documented by the Snake River tower provided fishery managers a valuable tool for assessing the salmon returns to the Nome area watersheds.

#### ACKNOWLEDGMENTS

The ADF&G thanks Kawerak Incorporated for funding and operating this project. A draft of this report was reviewed by Larry Buklis.

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Table 1. Expanded daily and cumulative salmon migration past the Snake River counting tower, Norton Sound, 1998.

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily King	Cumulative King	Daily Coho	Cumulative Coho
1-Jul	0	0	0	0	0	0	0	0
2-Jul	0	0	0	0	0	0	0	0
3-Jul	0	0	6	6	0	0	0	0
4-Jul	0	0	2	8	0	0	0	0
5-Jul	16	16	19	27	0	0	0	0
6-Jul	17	33	14	41	0	0	0	0
7-Jul	17	50	21	62	0	0	0	0
8-Jul	48	98	130	192	0	0	0	0
9-Jul	222	320	458	650	0	0	0	0
10-Jul	55	375	249	899	0	0	0	0
11-Jul	293	668	854	1,753	0	0	0	0
12-Jul	733	1,401	2,212	3,965	0	0	0	0
13-Jul	311	1,712	1,657	5,622	0	0	0	0
14-Jul	1,032	2,744	14,149	19,771	0	0	0	0
15-Jul	1,318	4,062	19,341	39,112	0	0	0	0
16-Jul	1,318	5,380	19,341	58,453	0	0	0	0
17-Jul	1,802	7,182	29,302	87,755	0	0	0	0
18-Jul	1,333	8,515	31,030	118,785	0	0	0	0
19-Jul	316	8,831	5,903	124,688	0	0	0	0
20-Jul	396	9,227	19,889	144,577	0	0	0	0
21-Jul	595	9,822	21,905	166,482	0	0	0	0
22-Jul	475	10,297	13,505	179,987	0	0	0	0
23-Jul	248	10,545	8,449	188,436	0	0	0	0
24-Jul	73	10,618	3,867	192,303	0	0	0	0
25-Jul	49	10,667	3,037	195,340	0	0	0	0
26-Jul	24	10,691	2,268	197,608	0	0	0	0
27-Jul	48	10,739	4,227	201,835	0	0	0	0
28-Jul	118	10,857	5,410	207,245	0	0	0	0
29-Jul	42	10,899	3,413	210,658	0	0	0	0
30-Jul	43	10,942	2,504	213,162	0	0	0	0
31-Jul	38	10,980	1,951	215,113	0	0	0	0
1-Aug	4	10,984	51	215,164	0	0	0	0
2-Aug	18	11,002	866	216,030	0	0	0	0
3-Aug	10	11,012	605	216,635	0	0	0	0
4-Aug	12	11,024	708	217,343	0	0	14	14
5-Aug	7	11,031	550	217,893	0	0	20	34
6-Aug	7	11,038	383	218,276	0	0	21	55
7-Aug	8	11,046	292	218,568	0	0	28	83
8-Aug	4	11,050	411	218,979	0	0	12	95
9-Aug	1	11,051	399	219,378	0	0	21	116
10-Aug	8	11,059	207	219,585	0	0	32	148
11-Aug	8	11,067	94	219,679	0	0	30	178

Table 2. Expanded daily hourly chum salmon migration past the Snake River counting tower, Norton Sound, 1998.

Outlined areas indicate hours not counted. Numbers in outlined areas indicate estimated passage.

Date	0800-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	0000	0100	0200	0300	0400-0700	Total	0000-2400 Total	% of Total	
1-Jul					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%	
2-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3%	
3-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.0%	
4-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	16	0.1%	
5-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	9	0	0	17	0.2%	
6-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	9	0	0	17	23.0%	
7-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	18	1.1%	
8-Jul	0	0	0	0	0	0	0	4	0	4	22	0	0	0	28	28	14	0	100	48	0.2%	
9-Jul	0	0	0	0	0	0	0	0	0	0	4	80	68	6	12	10	14	13	207	222	0.0%	
10-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	24	26	10	10	5	75	55	2.0%	
11-Jul	0	0	0	0	0	0	0	0	0	4	62	74	78	156	70	312	134	59	949	293	0.8%	
12-Jul	0	0	0	0	0	0	0	0	0	0	0	0	2	6	8	0	0	1	17	733	7.2%	
13-Jul	0	0	0	0	0	0	0	0	0	0	32	194	70	86	68	42	22	34	548	311	8.6%	
14-Jul	0	0	0	0	0	0	2	2	2	0	16	173	585	55	158	177	66	82	1,318	1,032	0.9%	
15-Jul	0	0	0	0	0	0	2	2	2	0	16	173	585	55	158	177	66	82	1,318	1,318	6.5%	
16-Jul	0	0	0	0	0	0	2	2	2	0	16	173	585	55	158	177	66	82	1,318	1,318	0.0%	
17-Jul	0	0	0	0	0	0	4	4	4	0	0	152	1,100	24	248	312	110	29	1,987	1,802	6.2%	
18-Jul	0	0	0	4	0	0	0	30	104	52	36	220	164	32	64	48	22	12	788	1,333	7.6%	
19-Jul	0	0	0	0	0	0	0	0	0	0	2	10	52	74	36	30	42	56	4	306	316	3.7%
20-Jul	0	0	0	0	0	0	0	0	0	0	0	2	52	174	150	96	78	64	9	625	396	0.0%
21-Jul	0	0	0	0	0	0	0	0	0	12	4	52	130	176	128	36	0	8	546	595	4.2%	
22-Jul	0	0	0	0	1	0	3	3	3	12	6	29	70	97	70	20	0	5	319	475	5.4%	
23-Jul	0	0	0	0	2	0	6	6	6	12	8	6	10	18	12	4	0	1	91	248	1.6%	
24-Jul	0	0	0	0	0	0	4	6	12	8	8	0	2	0	6	4	0	1	49	73	3.3%	
25-Jul	0	0	0	0	0	0	0	4	0	6	6	14	8	0	6	4	0	10	58	4		
26-Jul	0	0	0	0	0	0	0	2	0	0	0	2	0	2	0	2	4	2	14	2		
27-Jul	0	0	0	0	0	0	0	0	0	8	22	8	2	30	28	12	14	24	146	48	...	
28-Jul	0	0	0	0	0	0	0	0	4	4	0	0	2	14	2	4	0	6	36	118	1.1%	
29-Jul	0	0	0	0	0	0	0	0	2	2	1	1	10	10	2	3	0	6	37	42	1.4%	
30-Jul	0	0	0	0	0	0	0	0	0	0	2	2	18	6	2	2	0	6	38	43	0.0%	
31-Jul	0	0	0	0	0	0	0	0	0	4	2	4	12	0	0	0	0	4	26	38	0.0%	
1-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.4%	
2-Aug	0	0	0	0	0	0	0	2	12	0	0	2	2	4	0	0	0	0	22	18	0.2%	
3-Aug	0	0	0	0	0	0	0	0	0	2	0	0	4	2	0	4	0	0	12	10	0.4%	
4-Aug	0	0	0	0	0	0	0	4	0	0	0	2	0	2	0	0	0	0	8	12	0.8%	
5-Aug	0	0	0	0	0	0	0	2	0	0	0	3	0	2	0	0	1	0	8	7	0.1%	
6-Aug	0	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	2	0	8	7	0.1%	
7-Aug	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	6	8	0.0%	
8-Aug	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	3	4	0.0%	
9-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	1	0.0%	
10-Aug	0	0	0	2	0	0	0	2	2	0	0	0	0	0	2	0	0	4	12	8	0.0%	
11-Aug	0	0	0	0	0	0	0	0	0	0	2	0	0	End of counting season				2	8	0.0%		
Total	0	0	0	6	3	0	25	75	155	132	275	1,474	3,755	1,082	1,383	1,508	701	493	11,067	11,067		
	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.7%	1.4%	1.2%	2.5%	13.3%	33.9%	9.8%	12.5%	13.6%	6.3%	4.5%	100.0%			

Table 3. Expanded daily hourly pink salmon migration past the Snake River counting tower, Norton Sound, 1998.

Outlined areas indicate hours not counted. Numbers in outlined areas indicate estimated passage.

Date	0800-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	0000	0100	0200	0300	0400-0700	Total	0000-2400 Total	% of Total		
1-Jul					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%	
2-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3%	
3-Jul		0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6	6	4.0%	
4-Jul		0	0	0	0	0	2	0	0	0	0	0	0	10	0	0	0	0	0	12	2	0.1%	
5-Jul		0	0	0	0	0	1	0	0	0	1	5	2	5	0	0	0	0	0	14	19	0.2%	
6-Jul		0	0	0	0	0	1	0	0	0	1	5	2	5	0	0	0	0	0	14	14	23.0%	
7-Jul		0	0	0	0	0	0	0	0	0	2	10	4	0	0	0	0	0	0	16	21	1.1%	
8-Jul		0	0	0	0	0	0	2	0	0	24	88	16	2	86	54	26	0	0	298	130	0.2%	
9-Jul		0	0	0	0	0	0	0	0	0	6	170	114	90	46	36	30	0	0	47	539	458	0.0%
10-Jul		0	0	0	0	0	0	0	0	0	0	0	0	128	78	46	40	0	28	320	249	2.0%	
11-Jul		0	0	0	0	0	0	0	0	16	170	194	154	484	330	668	358	0	226	2,600	854	0.8%	
12-Jul		0	0	0	0	0	0	0	0	0	18	0	128	26	24	0	0	0	19	215	2,212	7.2%	
13-Jul		0	0	0	0	0	0	80	0	0	228	712	568	762	506	568	400	0	364	4,188	1,657	8.6%	
14-Jul		0	0	0	0	0	0	40	0	20	229	1,976	9,284	649	3,138	1,389	935	1,681	19,341	14,149	0.9%		
15-Jul		0	0	0	0	0	0	40	0	20	229	1,976	9,284	649	3,138	1,389	935	1,681	19,341	19,341	6.5%		
16-Jul		0	0	0	0	0	0	40	0	20	229	1,976	9,284	649	3,138	1,389	935	1,681	19,341	19,341	0.0%		
17-Jul		0	0	0	0	0	0	0	0	40	230	3,240	18,000	536	5,770	2,210	1,470	840	32,336	29,302	6.2%		
18-Jul		0	0	190	12	0	0	190	492	1,116	1,054	1,950	15,200	316	1,302	514	326	605	23,267	31,030	7.6%		
19-Jul		0	0	0	0	0	0	0	0	72	158	1,020	1,590	766	748	792	1,112	167	6,425	5,903	3.7%		
20-Jul		0	0	0	0	0	0	0	16	112	596	1,980	13,600	6,250	4,950	2,700	1,900	857	32,961	19,889	0.0%		
21-Jul		0	0	0	0	0	0	0	16	210	132	740	4,150	660	4,740	3,726	16	384	14,774	21,905	4.2%		
22-Jul		0	0	0	30	11	20	105	204	363	371	632	2,243	744	2,715	2,019	8	253	9,718	13,505	5.4%		
23-Jul		0	0	0	60	22	40	210	392	516	610	524	336	828	690	312	0	121	4,661	8,449	1.6%		
1-Jul		0	0	0	22	52	26	124	206	424	640	280	142	106	122	222	86	65	2,517	3,867	3.3%		
5-Jul		0	0	0	22	24	174	158	162	194	216	816	670	606	210	112	122	138	3,624	3,037	1.0%		
26-Jul		0	0	0	0	44	36	50	42	46	160	424	278	318	262	152	290	83	2,185	2,268	1.4%		
27-Jul		0	0	0	0	8	0	10	146	558	1,220	660	520	960	640	312	156	206	5,396	4,227	3.1%		
28-Jul		0	0	0	38	48	252	290	412	382	402	656	656	208	370	152	122	158	4,146	5,410	1.1%		
29-Jul		0	0	0	19	24	135	145	206	314	215	550	795	311	228	95	77	123	3,237	3,413	1.4%		
30-Jul		0	0	0	0	18	0	0	246	28	444	934	414	86	38	32	0	89	2,329	2,504	0.0%		
31-Jul		0	0	0	0	0	0	0	36	202	112	364	578	0	0	0	0	51	1,343	1,951	0.0%		
1-Aug		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	0.4%		
2-Aug		0	0	0	0	32	42	102	294	146	120	84	46	32	22	10	0	105	1,035	866	0.2%		
3-Aug		0	0	0	0	0	24	26	76	54	134	74	48	54	28	42	26	66	652	605	0.4%		
4-Aug		0	0	12	40	42	38	54	62	102	44	44	54	46	48	22	18	71	697	708	0.8%		
5-Aug		6	10	11	24	27	24	34	31	56	26	42	54	49	38	22	22	54	530	550	0.1%		
6-Aug		12	20	10	8	12	10	14	0	10	8	40	54	52	28	22	26	37	363	383	0.1%		
7-Aug		0	8	0	0	10	12	18	14	12	18	22	13	18	14	20	28	69	276	292	0.0%		
8-Aug		22	30	20	24	32	18	14	12	22	26	18	24	22	18	24	18	115	459	411	0.0%		
9-Aug		12	16	14	22	18	20	16	18	22	14	18	12	14	13	12	10	84	335	399	0.0%		
10-Aug		0	0	0	2	0	0	8	22	12	10	8	6	6	8	0	2	30	120	207	0.0%		
11-Aug		0	0	0	0	0	10	16	0	0	12	0	10	End of counting season					48	94	0.0%		
Total		0	52	84	259	321	406	911	1,800	2,849	5,305	7,691	21,740	88,859	16,775	33,534	19,069	9,526	10,498	219,679	219,679	100.0%	
		0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.4%	0.8%	1.3%	2.4%	3.5%	9.9%	40.4%	7.6%	15.3%	8.7%	4.3%	4.8%	100.0%			

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

Outlined areas indicate hours not counted. Numbers in outlined areas indicate estimated passage.

Date	0800-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	0000	0100	0200	0300	0400-0700	Total	0000-2400 Total	% of Total
1-Jul					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%
2-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3%
3-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.0%
4-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1%
5-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%
6-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23.0%
7-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1%
8-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0%
11-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%
12-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.2%
13-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.6%
14-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9%
15-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.5%
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.2%
18-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.6%
19-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7%
20-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
21-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2%
22-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.4%
23-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6%
24-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.3%
25-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1%
28-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1%
29-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4%
30-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
31-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
1-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4%
2-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%
3-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4%
4-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%
5-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1%
6-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1%
7-Aug	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%
9-Aug	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	0	0	0	0	0	0.0%
11-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ble 5. Expanded daily hourly coho salmon migration past the Snake River counting tower, Norton Sound, 1998.

Outlined areas indicate hours not counted. Numbers in outlined areas indicate estimated passage.

Date	Hourly Migration																Total	0000-2400						
	0800-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	0000	0100	0200		0300	0400-0700	Total	% of Total			
1-Jul					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%	
2-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3%	
3-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.0%	
4-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1%	
5-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%	
6-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23.0%	
7-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1%	
8-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%	
9-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
10-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0%	
11-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%	
12-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.2%	
13-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.6%	
14-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9%	
15-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.5%	
16-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
17-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.2%	
18-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.6%	
19-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7%	
20-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2%	
22-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.4%	
23-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6%	
24-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.3%	
25-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0%	
26-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4%	
27-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.1%	
28-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1%	
29-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4%	
30-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
31-Jul		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
1-Aug		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4%	
2-Aug		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%	
3-Aug		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4%	
4-Aug		0	0	0	0	0	0	10	0	2	0	2	0	2	6	0	0	0	0	0	0	0	0.8%	
5-Aug		0	0	0	0	0	0	5	0	1	0	3	3	3	6	2	0	0	0	0	0	0	0.1%	
6-Aug		0	0	0	0	0	0	0	0	0	0	4	6	4	6	4	0	0	0	0	0	0	0.1%	
7-Aug		0	0	0	0	4	0	0	0	0	6	0	4	2	0	0	0	0	0	0	0	0	0.0%	
8-Aug		0	0	0	4	0	0	0	0	0	0	4	8	4	0	4	0	0	0	0	0	0	0.0%	
9-Aug		0	0	0	0	0	0	0	0	0	0	2	7	3	2	2	0	0	0	0	0	0	0.0%	
10-Aug		0	0	0	0	2	4	4	2	0	2	0	2	6	2	4	0	0	0	0	0	0	0.0%	
11-Aug		0	0	0	8	0	0	0	2	0	4	0	0	End of counting season				0	0	0	0	0	0	0.0%
Total		0	0	0	8	4	6	4	19	4	3	12	9	21	32	27	12	6	11	178	178			
Total =		0.0%	0.0%	0.0%	4.5%	2.2%	3.4%	2.2%	10.7%	2.2%	1.7%	6.7%	5.1%	11.8%	18.0%	15.2%	6.7%	3.4%	6.2%	100.0%				

Table 6. Reported hourly chum salmon observations at the Snake River counting tower, Norton Sound, 1998.

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				
1-Jul																	0	0	0	0	0	0	0	0	0	0	0.0%			
2-Jul	0	0	0	0	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
3-Jul	0	0	0	0	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
4-Jul	0	0	0	0	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
5-Jul	16	0	0	0	[Not counted]									0	0	0	0	[Not counted]									16	0.2%		
6-Jul					[Not counted]																								0	0.0%
7-Jul					[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
8-Jul	0	0	0	18	[Not counted]									0	0	0	0	0	0	0	4	0	4	22	0	0	48	0.7%		
9-Jul	0	28	28	14	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	4	80	68	222	3.4%	
10-Jul	6	12	10	14	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	0.6%	
11-Jul	24	26	10	10	[Not counted]									0	0	0	0	0	0	0	0	0	0	4	62	74	78	288	4.4%	
12-Jul	156	70	312	134	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	0	2	674	10.3%	
13-Jul	6	8	0	0	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	32	194	70	310	4.7%	
14-Jul	86	68	42	22	14	20	0	0	[Not counted]																	252	3.9%			
15-Jul					[Not counted]																								0	0.0%
16-Jul					[Not counted]																								0	0.0%
17-Jul					[Not counted]									0	0	0	0	0	0	4	4	4	4	0	0	152	1,100	1,264	19.4%	
18-Jul	24	248	312	110	[Not counted]									0	0	4	0	0	0	0	30	104	52	38	220	164	1,304	20.0%		
19-Jul	32	64	48	22	[Not counted]									0	0	0	0	0	0	0	0	0	0	2	10	52	74	304	4.7%	
20-Jul	36	30	42	56	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	2	52	174	392	6.0%	
21-Jul	150	96	78	64	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	12	4	52	130	386	6.0%
22-Jul	176	128	36	0	0	0	2	4	2	[Not counted]																	348	5.3%		
23-Jul					[Not counted]									0	0	2	0	6	6	6	6	12	8	6	10	58	0.9%			
24-Jul	18	12	4	0	[Not counted]									0	0	0	0	0	0	4	6	12	8	6	0	2	72	1.1%		
25-Jul	0	6	4	0	[Not counted]									0	0	0	0	0	0	0	4	0	6	6	14	8	48	0.7%		
26-Jul	0	6	4	0	[Not counted]									0	0	0	0	0	0	0	2	0	0	0	2	0	14	0.2%		
27-Jul	2	0	2	4	[Not counted]									0	0	0	0	0	0	0	0	0	0	6	22	8	2	46	0.7%	
28-Jul	30	28	12	14	[Not counted]									0	0	0	0	0	0	0	0	0	4	4	0	0	2	94	1.4%	
29-Jul	14	2	4	0	4	0	2	0	[Not counted]																	26	0.4%			
30-Jul					[Not counted]									0	0	0	0	0	0	0	0	0	0	0	2	2	18	22	0.3%	
31-Jul	6	2	2	0	[Not counted]									0	0	0	0	0	0	0	0	0	0	4	2	4	12	32	0.5%	
1-Aug	0	0	0	0	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
2-Aug	0	0	0	0	[Not counted]									0	0	0	0	0	0	0	2	12	0	0	2	2	18	0.3%		
3-Aug	4	0	0	0	[Not counted]									0	0	0	0	0	0	0	0	0	0	2	0	0	4	10	0.2%	
4-Aug	2	0	4	0	0	0	0	0	[Not counted]																	12	0.2%			
5-Aug	2	0	0	0	[Not counted]																								2	0.0%
6-Aug					[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0.1%	
7-Aug	2	0	0	2	[Not counted]									0	0	0	0	0	0	0	0	0	0	2	0	2	0	8	0.1%	
8-Aug	0	0	0	0	[Not counted]									0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0.0%	
9-Aug	0	0	0	0	[Not counted]									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
10-Aug					[Not counted]									0	0	2	0	0	0	2	2	0	0	0	0	0	0	6	0.1%	
11-Aug	0	2	0	0	2	0	0	2	[Not counted]																	8	0.1%			
12-Aug	End of counting season																													
Total	792	836	954	484	20	22	6	4	0	0	0	0	0	0	6	2	0	16	64	144	118	220	922	1,920	6,530					
	12.1%	12.8%	14.6%	7.4%	0.3%	0.3%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	1.0%	2.2%	1.8%	3.4%	14.1%	29.4%	100.0%					



Table 8. Reported hourly king salmon observations at the Snake River counting tower, Norton Sound, 1998.

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			
1-Jul																0	0	0	0	0	0	0	0	0	0			
2-Jul	0	0	0	0	[Outlined area]								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	0	0	0	0	0			
5-Jul	0	0	0	0	[Outlined area]								0	0	0	0	[Outlined area]											
6-Jul																												
7-Jul													0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8-Jul	0	0	0	0	[Outlined area]								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	[Outlined area]								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
12-Jul	0	0	0	0	[Outlined area]								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
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			
15-Jul	[Outlined area]																											
16-Jul																												
17-Jul													0	0	0	0	0	0	0	0	0	0	0	0	0	0		
18-Jul	0	0	0	0	[Outlined area]								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
20-Jul	0	0	0	0	[Outlined area]								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Jul	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-Jul	0	0	0	0	0	0	0	0	0	0	0	0	[Outlined area]															
23-Jul																												
24-Jul	0	0	0	0	[Outlined area]								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Jul	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jul	0	0	0	0	[Outlined area]								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Jul	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Jul	0	0	0	0	[Outlined area]								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Jul	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Jul													0	0	0	0	0	0	0	0	0	0	0	0	0			
31-Jul	0	0	0	0	[Outlined area]								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Aug	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Aug	0	0	0	0	[Outlined area]								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Aug	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Aug	0	0	0	0	0	0	0	0	0	0	0	0	[Outlined area]															
5-Aug	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	0	0	0	0		
7-Aug	0	0	0	0	[Outlined area]								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
9-Aug	0	0	0	0	[Outlined area]								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
11-Aug	0	0	0	0	0	0	0	0	0	0	0	0	[Outlined area]															
12-Aug																							0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Table 9. Reported hourly coho salmon observations at the Snake River counting station, Norton Sound, 1998.

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		
1-Jul																	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	0	0	0	0	0	0	0.0%	
5-Jul	0	0	0	0									0	0	0	0										0	0.0%	
6-Jul																										0	0.0%	
7-Jul													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	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%	
12-Jul	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%	
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%	
15-Jul																										0	0.0%	
16-Jul																										0	0.0%	
17-Jul													0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
18-Jul	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%	
20-Jul	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Jul	0	0	0	0				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
22-Jul	0	0	0	0	0	0	0	0																		0	0.0%	
23-Jul													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	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
26-Jul	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
27-Jul	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
28-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%	
29-Jul	0	0	0	0	0	0	0	0																		0	0.0%	
30-Jul													0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
31-Jul	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
1-Aug	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
2-Aug	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
3-Aug	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
4-Aug	0	0	0	0	0	0	0	0					0	0	0	0	0	0	10	0	2	0	2	0	0	14	10.3%	
5-Aug	2	6	0	0																						8	5.9%	
6-Aug													0	0	0	0	0	0	0	0	0	0	0	4	6	10	7.4%	
7-Aug	4	6	4	0									0	0	0	4	0	0	0	0	0	6	0	4	4	28	20.8%	
8-Aug	2	0	0	0									0	0	0	4	0	0	0	0	0	0	0	4	4	10	7.4%	
9-Aug	8	4	0	4									0	0	0	0	0	0	0	0	0	0	0	2	2	18	13.2%	
10-Aug													0	0	0	0	2	4	4	2	0	2	0	2	0	2	18	13.2%
11-Aug	6	2	4	0	0	2	0	2					0	0	8	0	0	0	0	2	0	4	0	0	0	30	22.1%	
12-Aug	End of counting season																							0	0.0%			
Total	22	18	8	4	0	2	0	2	0	0	0	2	0	0	8	4	6	4	14	4	2	12	6	18	136	100.0%		
	16.2%	13.2%	5.9%	2.9%	0.0%	1.5%	0.0%	1.5%	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%	5.9%	2.9%	4.4%	2.9%	10.3%	2.9%	1.5%	8.8%	4.4%	13.2%	100.0%			

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

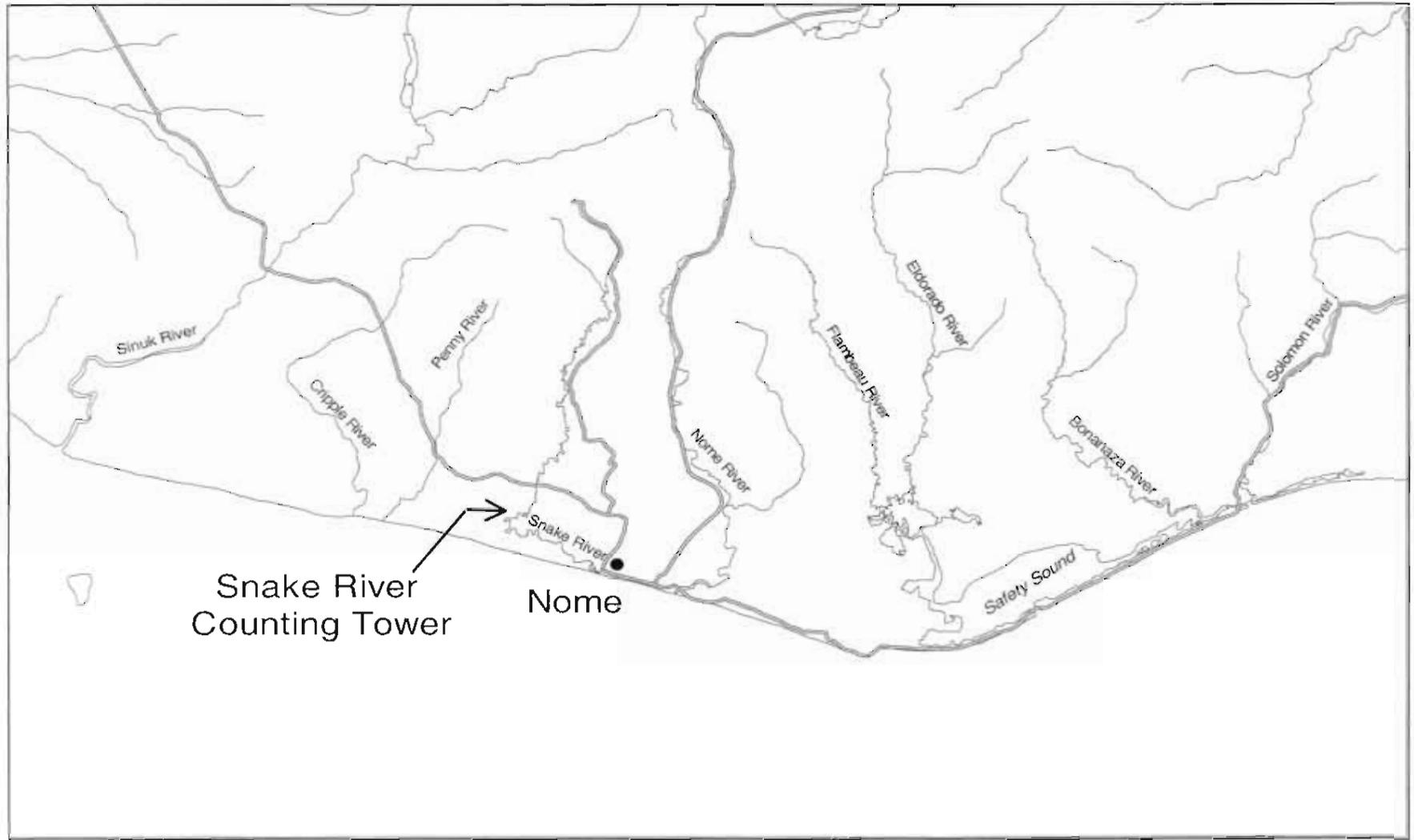


Figure 2. Cumulative migration of all species past the Snake River counting tower, Norton Sound, 1998.

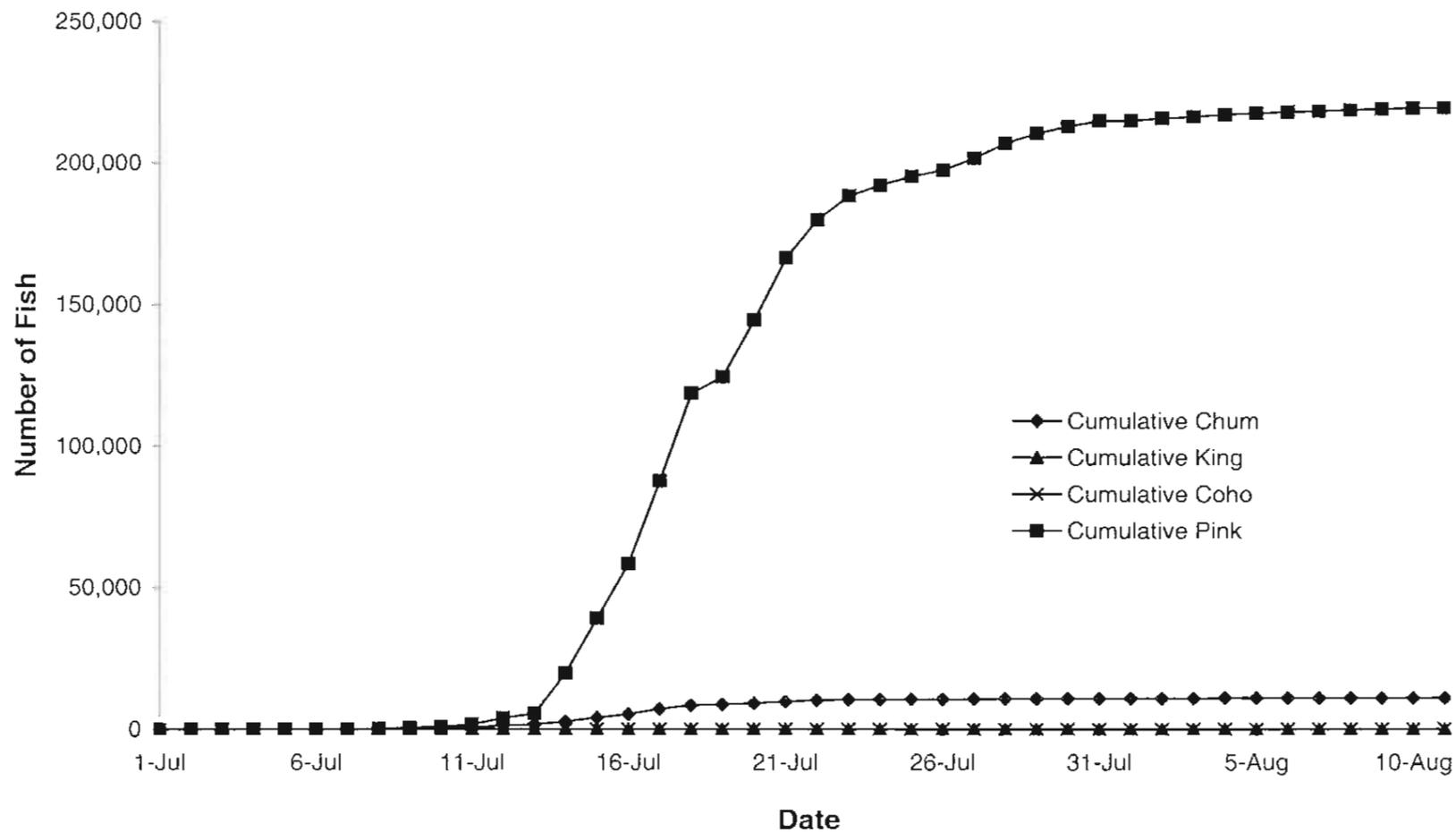


Figure 3. Daily chum salmon migration past the Snake River counting tower, Norton Sound, 1998.

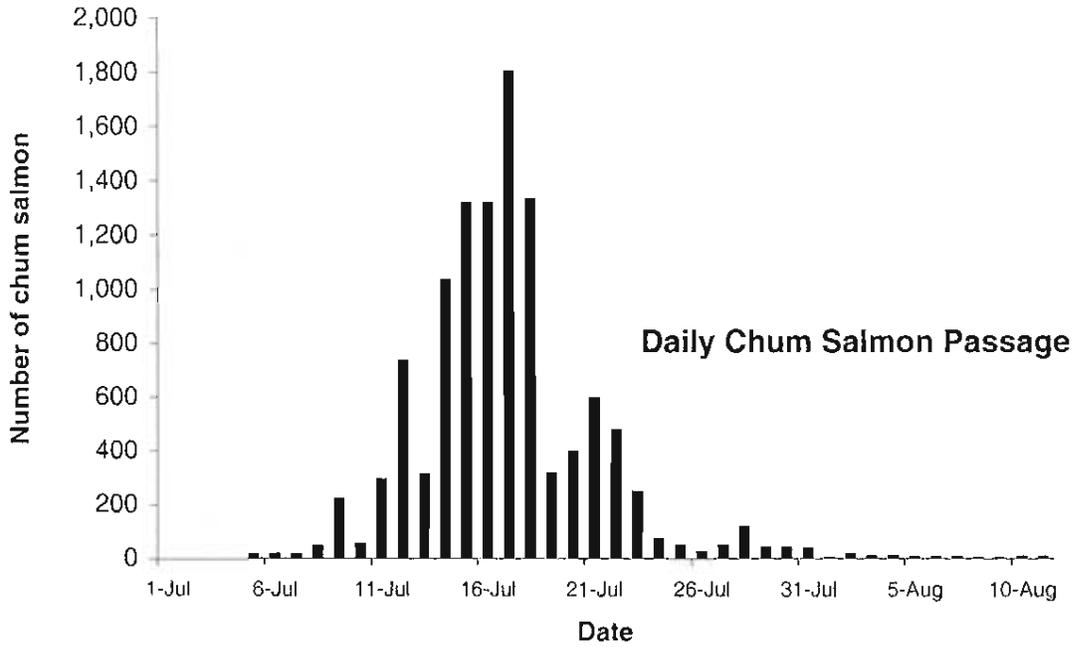


Figure 4. Cumulative chum salmon migration past the Snake River counting tower, Norton Sound, 1998.

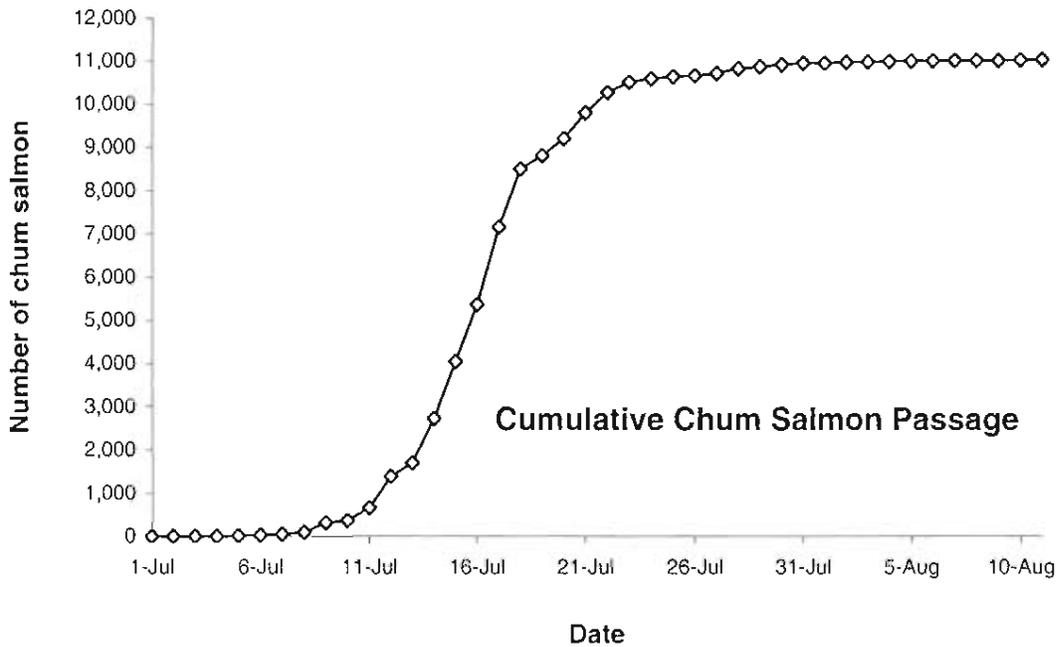


Figure 5. Daily pink salmon migration past the Snake River counting tower, Norton Sound, 1998.

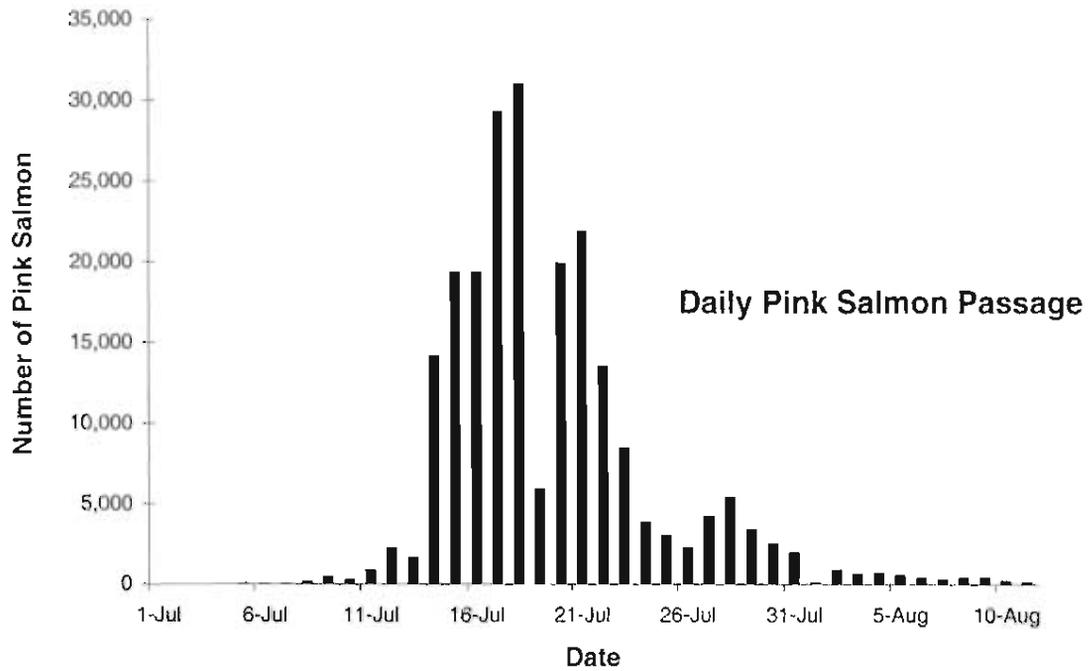


Figure 6. Cumulative pink salmon migration past the Snake River counting tower, Norton Sound, 1998.

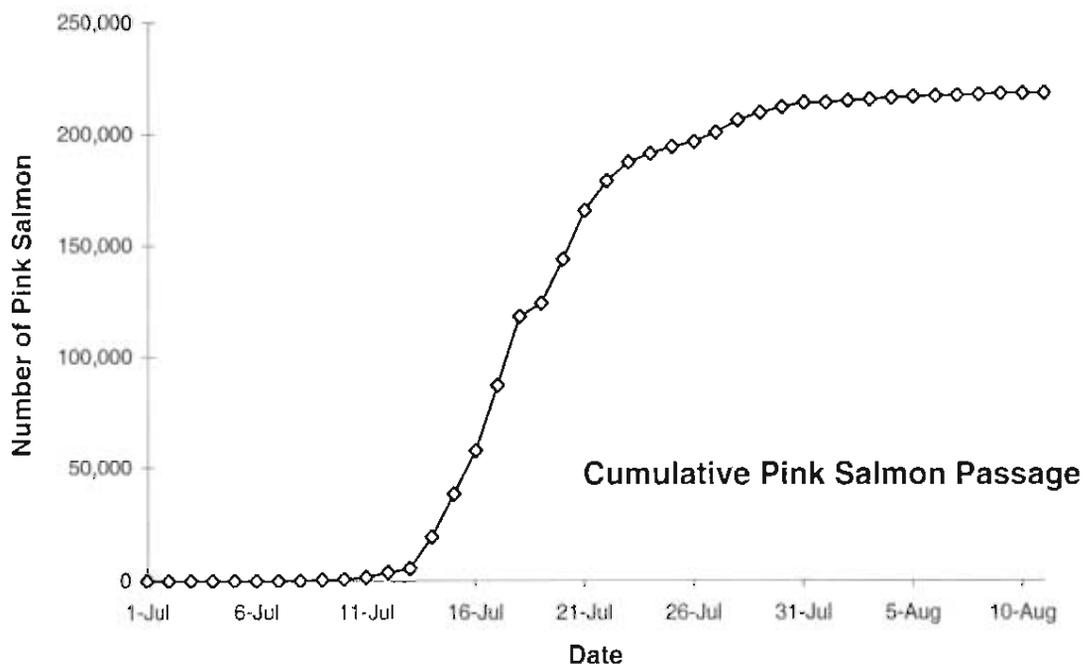


Figure 7. Daily coho salmon migration past the Snake River counting tower, Norton Sound, 1998.

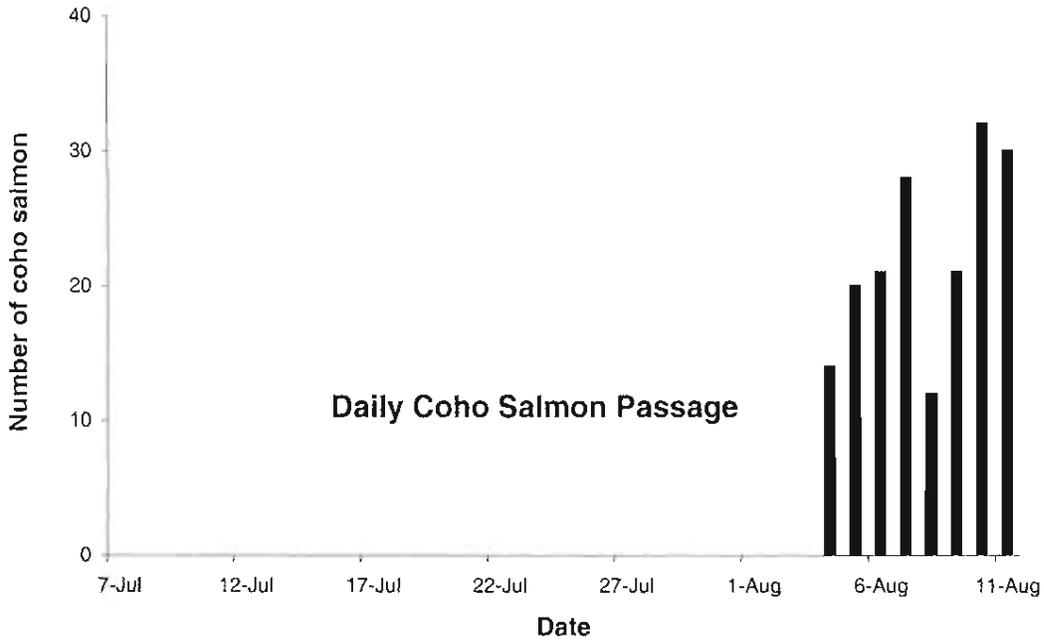


Figure 8. Cumulative coho salmon migration past the Snake River counting tower, Norton Sound, 1998.

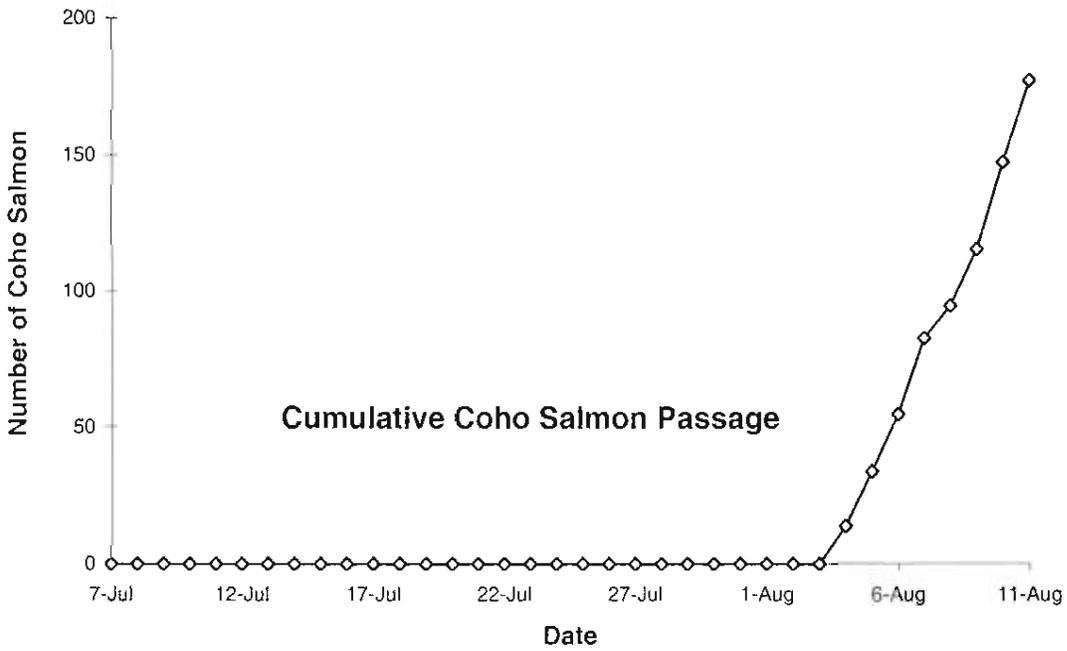


Figure 9. Diurnal pattern of chum salmon migration past the Snake River counting tower, Norton Sound, 1998.

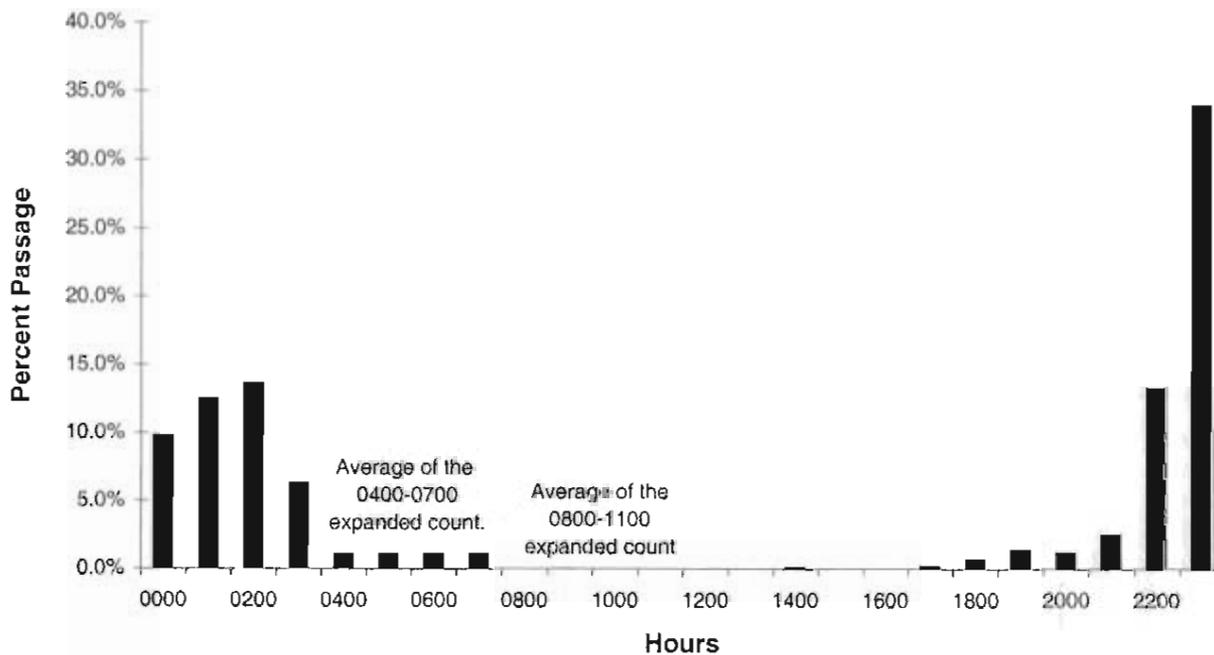


Figure 10. Diurnal pattern of pink salmon migration past the Snake River counting tower, Norton Sound, 1998.

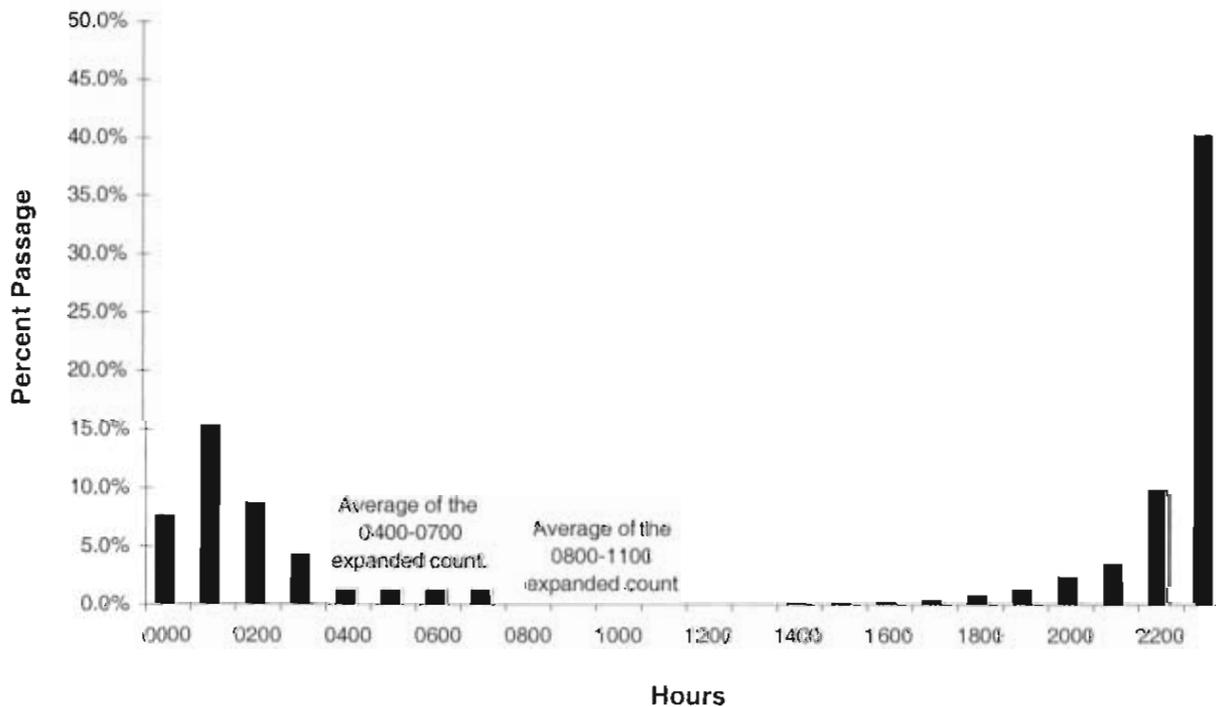


Figure 11. Diurnal pattern of coho salmon migration past the Snake River counting tower, Norton Sound, 1998.

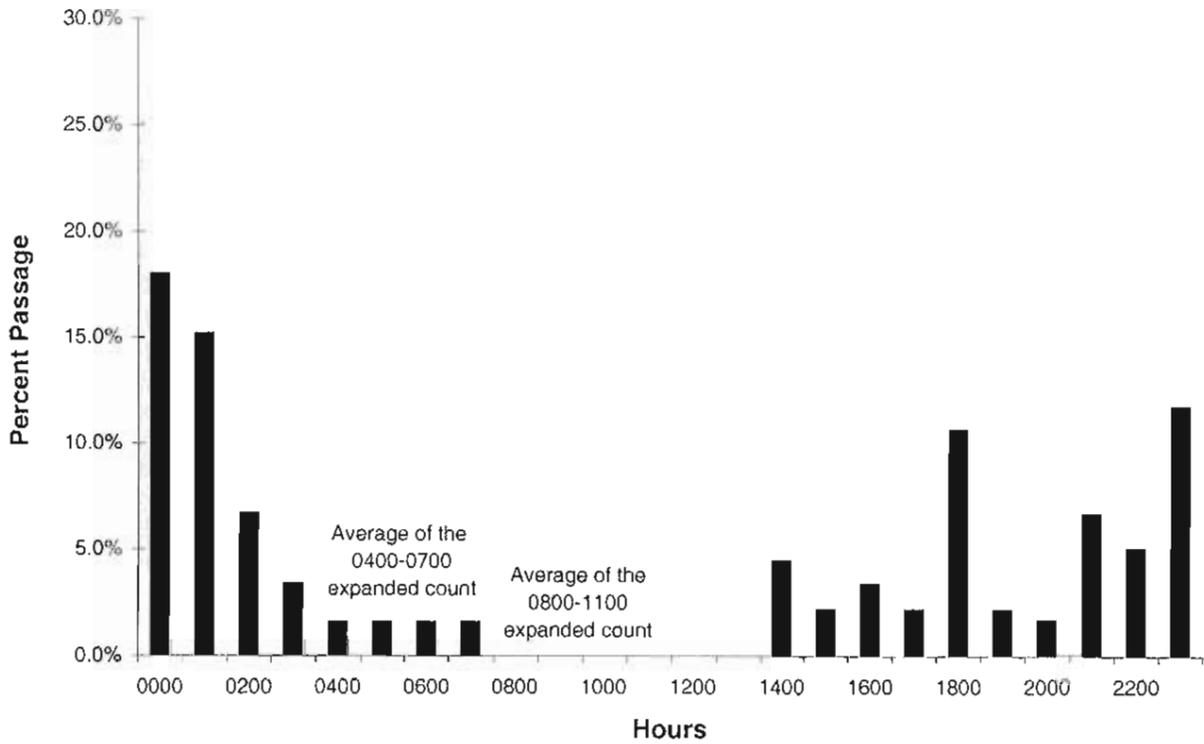


Figure 12. Chum salmon run-timing past the Snake River counting tower, Norton Sound, 1995-1998.

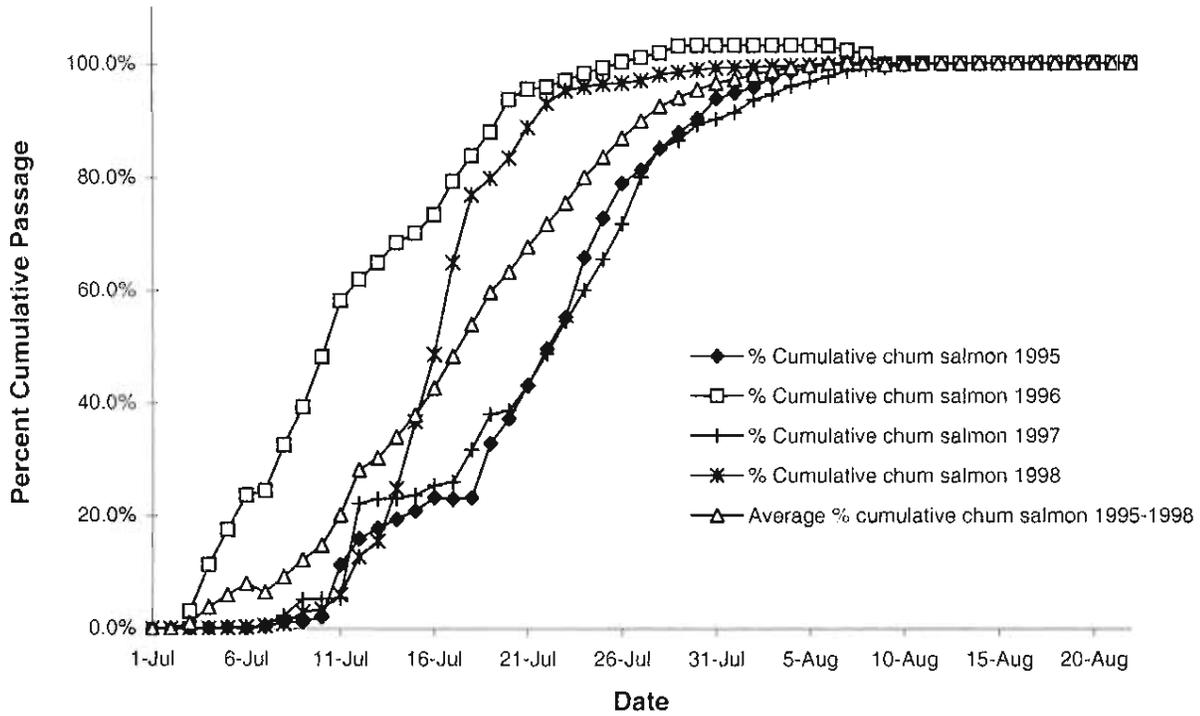


Figure 13. Pink salmon run-timing past the Snake River counting tower, Norton Sound, 1995-1998.

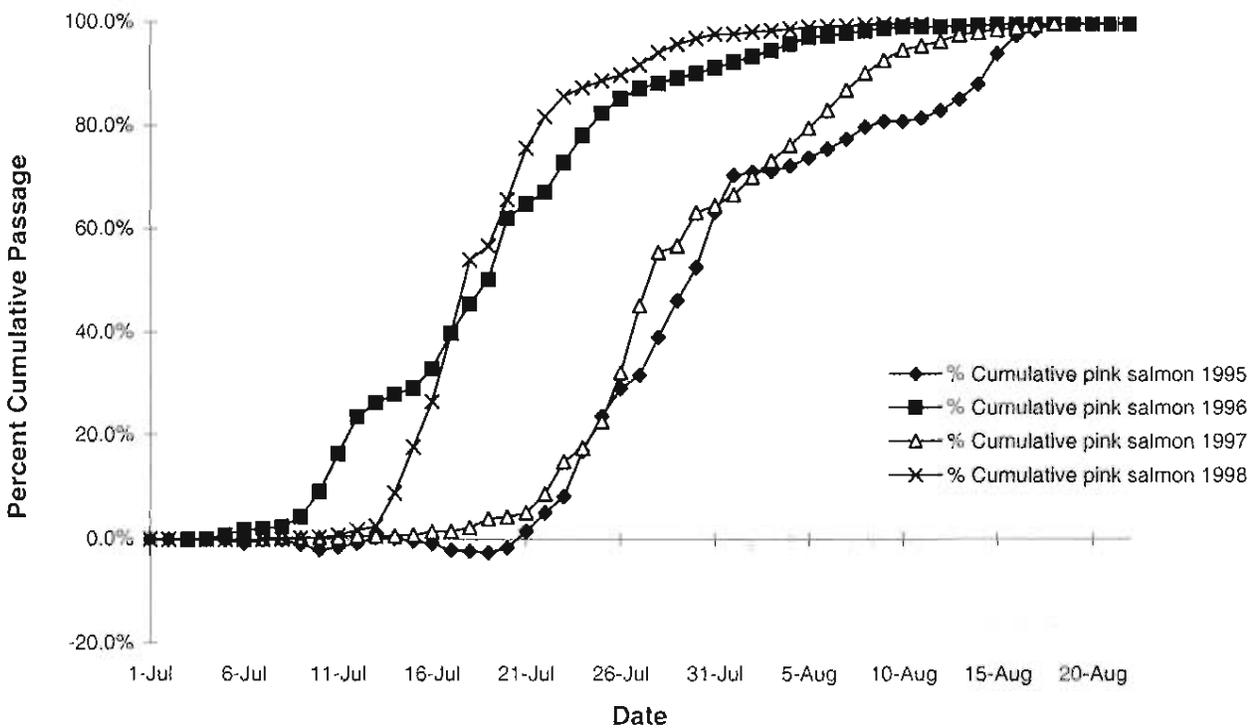


Figure 14. Coho salmon run-timing past the Snake River counting tower, Norton Sound, 1995-1998.

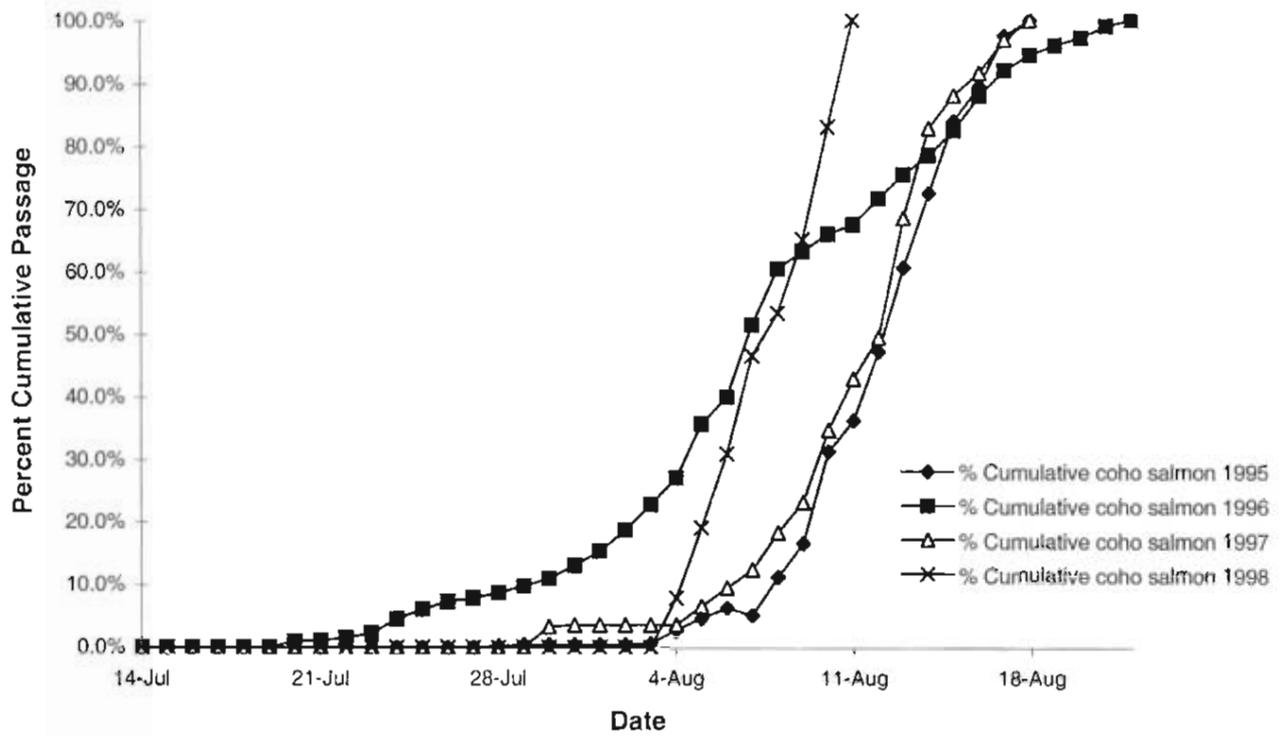


Figure 15. Cumulative chum salmon migration past the Snake River counting tower, Norton Sound, 1995-1998.

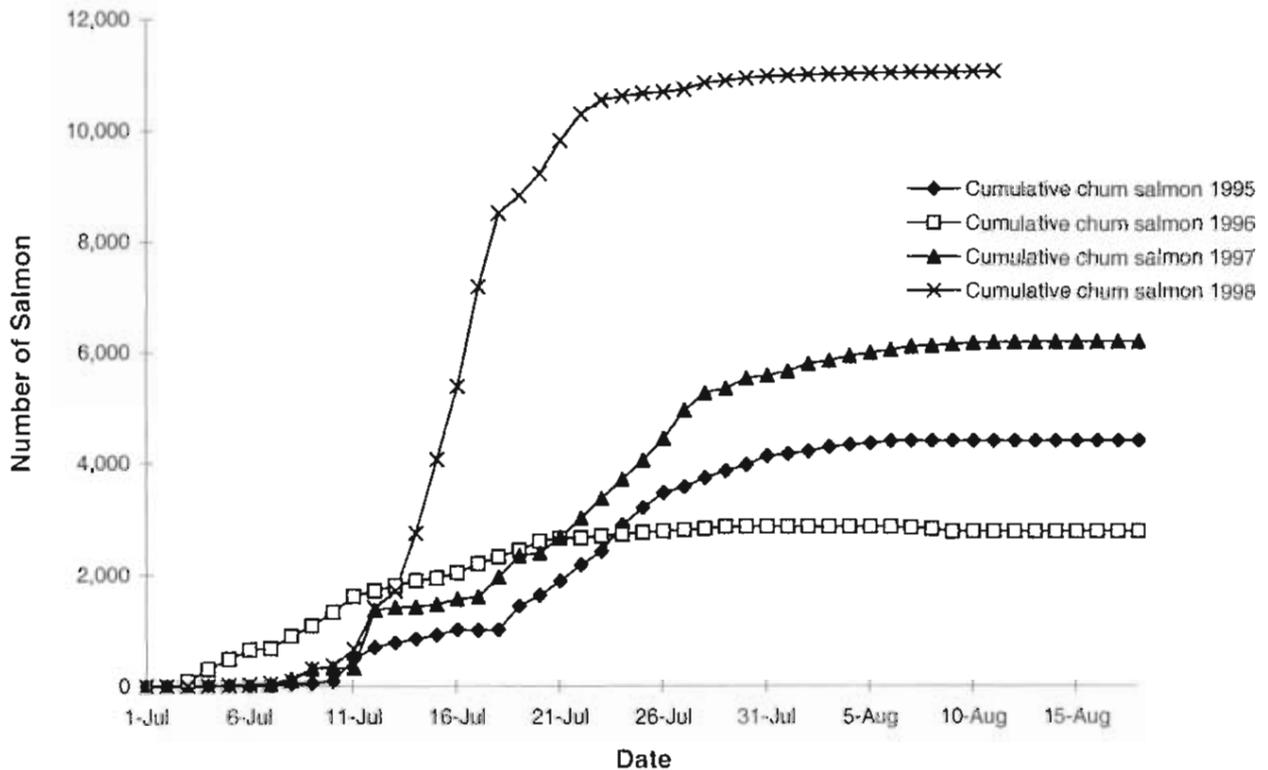


Figure 16. Cumulative odd year pink salmon migration past the Snake River counting tower, Norton Sound, 1995 - 1997.

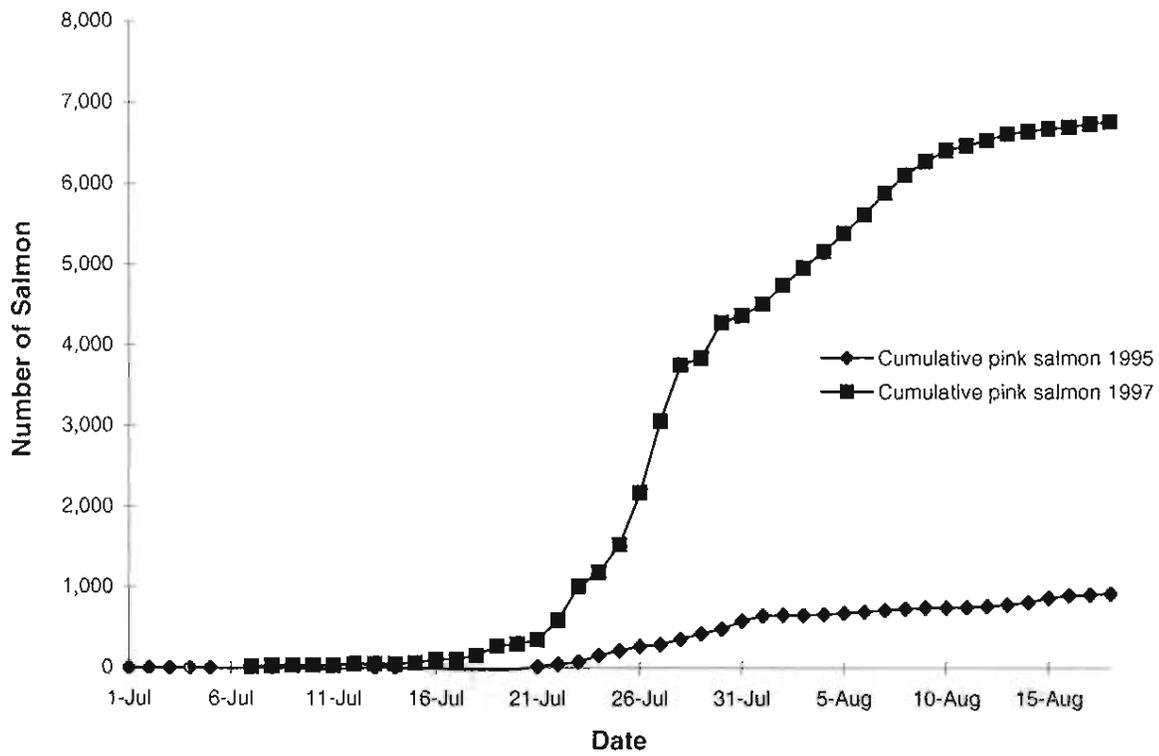


Figure 17. Cumulative even year pink salmon migration past the Snake River counting tower, Norton Sound, 1996 - 1998.

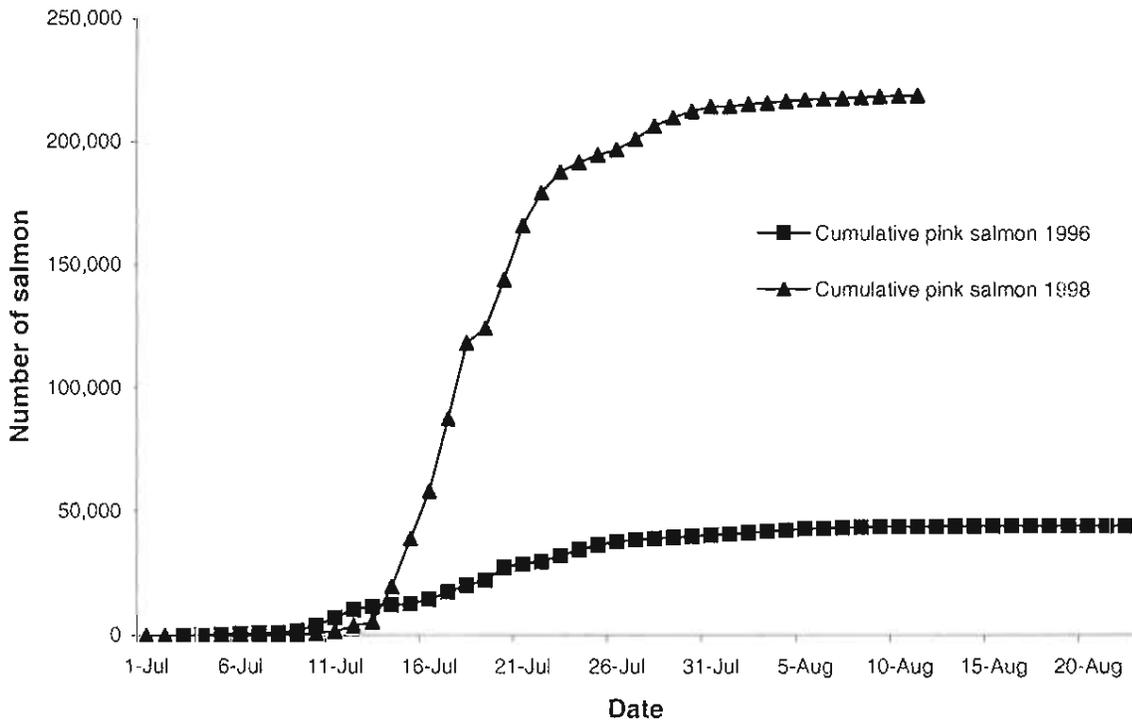


Figure 18. Cumulative coho salmon migration past the Snake River counting tower, Norton Sound, 1995-1998.

