

Eldorado River Salmon Counting Tower
Project Summary Report, 1997

by

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INTRODUCTION

The Eldorado 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 to produce this report, as part of its contribution to this cooperative effort.

The counting tower was successfully operated in 1995 and 1996 (Rob 1995 and Rob 1997). The 1997 season was the third year a salmon counting tower has been operated on the Eldorado River. The project is operated to obtain timely and accurate escapement information required for the active management of the salmon stocks throughout the season. The Eldorado River drains into Safety Sound approximately 14 miles east of Nome (Figure 1). Historically this drainage supports the largest escapements of chum salmon of the various streams in the Nome Subdistrict.

OBJECTIVES

1. To obtain daily and seasonal information concerning the timing and magnitude of the chum, pink, king and coho salmon escapement to the Eldorado River.
2. To establish a base for possible egg takes to facilitate rehabilitation of the salmon stocks of the Eldorado River.

METHODS

The Eldorado River counting tower camp is located on Sitnasuak Native Corporation land, just above the furthest upstream connecting channel to the Flambeau River. The camp is approximately 45 minutes by boat from the Safety Sound highway bridge.

A tent camp with two tent frames and an outhouse was set up at the end of June. A 15 foot high scaffolding tower was erected on the 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. An array of four 120 volt lights was mounted on a post below the tower to illuminate the flash panel during periods of low light and darkness.

Counting began on 29 June and ended on 19 August. The counting schedule was 18 half-hour counts each day from 12 noon to 0600 hours the following day. A 24 hour count and one day off were scheduled weekly. 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. On the 24 hour count days each

entire hour was counted. Each day the reported hourly counts were added to produce a daily unexpanded total. Every day, the daily and cumulative unexpanded totals for each species were relayed to the Nome office by radio.

The expanded counts for this report were calculated using the following methods. The 18 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 18 hours of the day off. Next an expansion factor was calculated to compensate for the 6 hours not normally counted. This factor was derived from the weekly 24 hour count by dividing the total count from 0600 hours to 1200 hours during the 24 hour count by the total normal 18 hour count during the 24 hour count. Then each 18 hour count for the remaining days was expanded to 24 hour counts by applying the expansion factor to the three days before and after each 24 hour count by multiplying each days 18 hour total by the 24 hour expansion factor, and adding that number to the 18 hour count for each day. This expansion was done for all species counted.

The expanded counts for the days missed because of high water or poor visibility were linearly interpolated as follows. For a day with the normal 18 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 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 18 hour count was expanded to a 24 hour count by multiplying each days 18 hour total by the nearest 24 hour expansion factor, and adding that number to the 18 hour count for each day.

RESULTS

Table 1 shows the expanded daily and cumulative totals for each species. The reported total hourly counts were: 9,543 chum salmon, 627 pink salmon, 80 king salmon, and 132 coho salmon (Tables 6-9). The expanded counts were: 14,302 chum salmon, 1,022 pink salmon, 98 king salmon, and 194 coho salmon (Tables 2-5).

Chum and king salmon were observed on 29 June, the first day of counting. Pink salmon were first observed on 5 July. Coho salmon were first observed on 2 August. The daily peak count of 1,391 chum salmon occurred on 20 July; the daily peak count of 582 pink salmon occurred on 9 August; the daily peak count of 16 king salmon occurred on 7 July; the daily peak count of 30 coho salmon occurred on 8 August (Table 1).

Most chum salmon returned during the first four weeks of counting when 93% passed the tower (Table 2 and Figures 3 and 4). Most pink salmon returned during the week beginning 5 August when 82% passed the tower (Table 3 and Figures 5 and 6). Most

king salmon returned during the first four weeks of counting when 96% passed the tower (Table 4 and Figures 7 and 8). All coho salmon counted returned during the last eighteen days of counting (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 1400 through 0100 hours, 84% of the chum salmon passed the tower (Table 2 and Figure 11). During the three hour period from 0000 through 0200 hours, 44% of the pink salmon passed the tower. There was a downstream migration of -3% of the pink salmon during the hour beginning at 0400 hours and there was a downstream migration of -2% of the pink salmon during the hour beginning at 2000 hours (Table 3 and Figure 12). During the two hour period from 0100 through 0200 hours, 56% of the king salmon passed the tower. During the six hour period from 0600 through 1100 hours, there was a net downstream migration of -8% of the king salmon. There was a downstream migration of -5% of the king salmon during the hour beginning at 1600 hours and there was a downstream migration of -4% of the king salmon during the hour beginning at 2100 hours (Table 4 and Figure 13). The diurnal pattern of coho salmon migration was more complex than that of the other species. During the two hour period from 0000 through 0100 hours, 51% of the coho salmon passed the tower; during the one hour period beginning at 0200 hours, there was a downstream migration of -2% of the coho salmon; during the three hour period from 0300 through 0500 hours, 27% of the coho salmon passed the tower; during the hour from 2000 to 2100 hours there was a downstream migration of -2% of the coho salmon; during the two hour period from 1500 through 1600 hours there was no migration of coho salmon (Table 5 and Figure 14).

An aerial survey of the Eldorado River counted 5,967 chum salmon on 16 July, 1997. The total season expanded tower count of chum salmon was 14,302. The aerial survey counted 42% of the total season expanded tower count of chum salmon. The aerial survey counted 5,767 chum salmon above the counting tower on 16 July, when the cumulative tower count of chum salmon was 8,400. The aerial survey counted 69% of the cumulative tower count on 16 July (Table 1).

An aerial survey of the Eldorado River counted 11 king salmon on 16 July, 1997. The total season expanded tower count of king salmon was 98. The aerial survey counted 11% of the total season expanded tower count of king salmon. The aerial survey counted 11 king salmon above the counting tower on 16 July, when the cumulative tower count of king salmon was 53. The aerial survey counted 21% of the cumulative tower count on 16 July (Table 1).

An aerial survey of the Eldorado River counted 37 coho salmon on 27 August, 1997, which was 8 days after conclusion of the counting tower project. The total season expanded tower count of coho salmon was 194. The aerial survey counted 19% of the total season expanded tower count of coho salmon (Table 1).

DISCUSSION

This was the third consecutive year of operation for the Eldorado River counting tower. The 1995 escapement of chum salmon began about one week later and the size of the escapement was three times larger in 1995 than in 1996 and 1997 (Figure 15). The odd year escapement of pink salmon began about one week earlier in 1997 and was almost 5 times smaller than the odd year escapement in 1995 (Figure 16). The 1996 and 1997 escapement of king salmon began at least two weeks earlier than in 1995 and the size of the 1997 escapement of king salmon was about four times larger than in 1995 and 1996 (Figure 17). The 1996 escapement of coho salmon began eleven days earlier and the size of the escapement was more than 1½ times larger than it was in 1997. Comparisons for the 1995 coho escapement are not possible because only eight days of the escapement were counted before the tower project concluded in 1995 (Figure 18).

The value of a counting tower on this watershed is evident. The chum salmon escapement documented through the 1995, 1996 and 1997 seasons shows the relative importance of the Eldorado and Flambeau watersheds to the various salmon user groups in the Nome Subdistrict. The Eldorado tower provided fishery managers a valuable tool for assessing the salmon returns of the Safety Sound watersheds.

After the 1995 counting season, it was recommended that counting in 1996 begin one week earlier so that the beginning of the chum salmon escapement could be counted. This was done, but because of the early timing in 1996 the beginning of the chum, pink and king salmon escapements were missed. In 1997 the beginning of the chum and king salmon escapements were missed. It is recommended that if funding is available the project should start yet another week earlier to count chum, pink and king salmon and if additional funding is available should remain in operation three weeks later to count coho salmon.

ACKNOWLEDGEMENTS

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Table 1. Expanded daily and cumulative migration of all salmon species past the Eldorado River counting tower, Norton Sound, 1997.

Date	Chum	Cumulative Chum	Pink	Cumulative Pink	King	Cumulative King	Coho	Cumulative Coho
29-Jun	228	228	0	0	1	1	0	0
30-Jun	255	483	0	0	6	7	0	0
1-Jul	215	698	0	0	10	17	0	0
2-Jul	596	1,294	1	1	-1	16	0	0
3-Jul	546	1,840	3	4	1	17	0	0
4-Jul	593	2,433	3	7	1	18	0	0
5-Jul	944	3,377	4	11	1	19	0	0
6-Jul	173	3,550	4	15	3	22	0	0
7-Jul	520	4,070	4	19	16	38	0	0
8-Jul	822	4,892	0	19	0	38	0	0
9-Jul	79	4,971	0	19	0	38	0	0
10-Jul	550	5,521	0	19	2	40	0	0
11-Jul	984	6,505	0	19	3	43	0	0
12-Jul	115	6,620	0	19	-4	39	0	0
13-Jul	319	6,939	0	19	2	41	0	0
14-Jul	104	7,043	0	19	4	45	0	0
15-Jul	416	7,459	0	19	-2	43	0	0
16-Jul	941	8,400	0	19	10	53	0	0
17-Jul	335	8,735	0	19	0	53	0	0
18-Jul	816	9,551	7	26	1	54	0	0
19-Jul	880	10,431	11	37	7	61	0	0
20-Jul	1,391	11,822	12	49	8	69	0	0
21-Jul	279	12,101	12	61	9	78	0	0
22-Jul	256	12,357	14	75	8	86	0	0
23-Jul	162	12,519	6	81	3	89	0	0
24-Jul	131	12,650	6	87	4	93	0	0
25-Jul	483	13,133	21	108	1	94	0	0
26-Jul	181	13,314	15	123	1	95	0	0
27-Jul	119	13,433	9	132	1	96	0	0
28-Jul	99	13,532	-1	131	1	97	0	0
29-Jul	23	13,555	-1	130	1	98	0	0
30-Jul	-29	13,526	-2	128	1	99	0	0
31-Jul	24	13,550	-4	124	2	101	0	0
1-Aug	71	13,621	3	127	0	101	0	0
2-Aug	134	13,755	-4	123	-2	99	4	4
3-Aug	-31	13,724	-6	117	-1	98	2	6
4-Aug	58	13,782	0	117	0	98	3	9
5-Aug	59	13,841	36	153	0	98	14	23
6-Aug	59	13,900	36	189	0	98	14	37
7-Aug	87	13,987	47	236	0	98	10	47
8-Aug	112	14,099	94	330	0	98	30	77
9-Aug	164	14,263	582	912	0	98	23	100
10-Aug	13	14,276	40	952	0	98	19	119
11-Aug	2	14,278	-3	949	0	98	0	119
12-Aug	5	14,283	1	950	0	98	6	125
13-Aug	-3	14,280	19	969	0	98	11	136
14-Aug	-4	14,276	36	1,005	0	98	16	152
15-Aug	10	14,286	4	1,009	0	98	6	158
16-Aug	4	14,290	3	1,012	0	98	6	164
17-Aug	6	14,296	0	1,012	0	98	18	182
18-Aug	2	14,298	4	1,016	0	98	6	188
19-Aug	4	14,302	6	1,022	0	98	6	194

Table 2. Expanded daily hourly chum salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

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

Date	0000	0100	0200	0300	0400	0500	0600 - 1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total
29-Jun	0	-8	0	0	0	0	-4	0	0	0	0	4	-6	2	54	80	70	30	4	228	1.6%
30-Jun	2	52	31	7	0	0	-4	0	0	56	62	0	0	0	-1	16	21	13	13	255	1.8%
1-Jul	88	66	10	12	0	0	-3	0	-4	0	0	0	0	6	6	-2	2	34	0	215	1.5%
2-Jul	2	164	50	4	16	16	-9	12	6	-6	0	60	240	5	-13	27	1	17	4	596	4.2%
3-Jul	1	109	32	2	22	36	-9	12	6	-6	0	60	240	5	-13	27	1	17	4	546	3.8%
4-Jul	1	109	32	2	22	36	38	12	6	-6	0	60	240	5	-13	27	1	17	4	593	4.1%
5-Jul	1	109	32	2	22	36	60	24	16	-12	0	120	480	4	-32	56	1	17	6	944	6.6%
6-Jul	0	54	14	0	28	56	11	0	0	0	-2	0	0	-8	20	0	0	0	0	173	1.2%
7-Jul	0	6	5	36	148	110	33	0	-1	0	-2	0	1	0	60	4	0	32	88	520	3.6%
8-Jul	252	46	0	0	64	90	52	0	160	0	0	0	92	56	0	10	0	0	0	822	5.7%
9-Jul	-6	-2	0	0	0	0	6	0	-4	0	4	0	0	-8	0	0	-4	0	94	79	0.6%
10-Jul	54	22	-2	-40	-2	-32	35	0	58	0	-38	12	113	11	21	4	-2	75	259	550	3.8%
11-Jul	39	-2	-2	-18	18	-8	9	0	120	0	-76	24	226	30	42	6	0	150	424	984	6.9%
12-Jul	24	-26	-2	4	38	16	1	4	26	0	2	0	0	20	0	-2	10	0	0	115	0.8%
13-Jul	-2	38	14	4	0	0	3	2	0	0	24	14	0	10	0	20	38	176	-22	319	2.2%
14-Jul	1	6	-5	-2	2	5	1	0	2	0	1	-7	4	-1	0	-16	24	93	-4	104	0.7%
15-Jul	80	-36	-4	2	-38	44	4	0	2	0	92	166	2	36	6	0	0	0	58	416	2.9%
16-Jul	40	-20	0	-18	0	20	9	40	10	206	202	-42	30	58	62	16	64	200	64	941	6.6%
17-Jul	0	70	2	0	6	6	3	0	2	-8	-2	58	40	56	36	42	6	8	8	336	2.3%
18-Jul	-2	58	0	2	2	0	-3	0	0	87	79	269	-137	53	66	23	3	27	15	816	5.7%
19-Jul	6	89	26	2	1	0	-3	0	0	87	79	269	-137	53	66	23	3	27	15	880	6.2%
20-Jul	6	89	26	2	1	0	-5	0	-2	182	160	480	234	50	96	4	0	46	22	1,391	9.7%
21-Jul	14	120	51	1	0	0	-1	-3	-1	1	1	0	0	-1	-11	13	2	72	21	279	2.0%
22-Jul	92	2	36	9	3	3	-1	0	2	0	0	0	2	6	4	12	10	-2	78	256	1.8%
23-Jul	2	54	36	9	3	3	-1	4	2	0	0	-6	0	4	0	0	2	32	18	162	1.1%
24-Jul	28	8	20	16	6	6	15	0	4	14	0	-6	6	22	-4	16	0	-14	-6	131	0.9%
25-Jul	0	4	10	8	4	10	57	12	40	-8	14	10	4	0	8	60	132	72	46	483	3.4%
26-Jul	0	16	10	8	4	4	21	8	2	12	18	0	-6	0	38	62	0	-14	-2	181	1.3%
27-Jul	11	1	0	0	2	-6	14	1	0	-2	25	10	20	5	4	0	20	4	10	119	0.8%
28-Jul	0	18	2	-5	0	0	3	2	3	1	0	16	-6	0	0	0	10	0	-3	99	0.7%
29-Jul	0	0	2	-5	0	0	3	2	3	1	0	16	-6	0	0	0	10	0	-3	23	0.2%
30-Jul	18	-13	2	-5	1	1	-13	2	3	1	0	-8	-12	0	0	0	0	0	-6	-29	-0.2%
31-Jul	36	-26	4	-10	2	2	11	-2	0	0	0	0	0	1	0	-2	0	-4	4	24	0.2%
1-Aug	32	-13	0	10	-2	-8	32	0	0	0	0	0	0	0	2	0	4	0	14	71	0.5%
2-Aug	28	0	-18	-6	-12	-16	60	0	0	12	6	2	0	8	16	10	8	10	26	134	0.9%
3-Aug	14	2	-10	0	-6	-9	-14	0	0	0	0	0	6	-2	-14	10	0	-8	0	-31	-0.2%
4-Aug	0	4	-2	6	0	0	26	0	0	0	0	0	3	-1	-3	5	3	-3	10	58	0.4%
5-Aug	16	15	2	3	0	-15	14	0	0	0	10	0	3	-1	-3	5	3	-3	10	59	0.4%
6-Aug	16	15	2	3	0	-15	14	0	0	0	10	0	3	-1	-3	5	3	-3	10	59	0.4%
7-Aug	16	15	2	3	0	-15	20	0	0	0	10	0	0	0	8	0	6	2	20	87	0.6%
8-Aug	32	26	6	0	0	-30	26	0	0	0	20	0	0	0	0	0	0	32	0	112	0.8%
9-Aug	6	6	-2	6	10	2	36	0	-2	0	0	78	0	0	0	0	0	0	20	164	1.1%
10-Aug	16	0	0	0	-2	-6	-3	0	0	0	2	0	0	0	0	0	0	0	0	13	0.1%
11-Aug	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	4	2	0.0%
12-Aug	0	4	0	2	-2	2	0	0	0	-1	0	-2	0	0	0	0	0	0	2	5	0.0%
13-Aug	0	2	0	1	-3	1	0	0	0	0	0	-4	0	0	0	0	0	0	0	-3	0.0%
14-Aug	0	0	0	0	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	0.0%
15-Aug	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	8	0	-2	10	0.1%
16-Aug	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.0%
17-Aug	0	0	0	0	0	0	0	0	0	2	-2	0	0	0	0	0	0	0	6	6	0.0%
18-Aug	8	-6	-4	0	6	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.0%
19-Aug	0	0	2	-2	4	0	End of counting season													4	0.0%
Total	972	1,249	412	55	367	340	560	136	454	716	713	1,677	2,233	484	507	548	467	1,164	1,334	1,302	%
	9%	8.7%	2.9%	0.4%	2.6%	2.4%	3.9%	1.0%	3.2%			5.0%	11.7%	15.6%	3.4%	3.5%	3.8%	3.3%	8.1%	9.7%	%

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

Date	0000	0100	0200	0300	0400	0500	0800 - 1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total					
29-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
30-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
1-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
2-Jul	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.1%				
3-Jul	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0.3%				
4-Jul	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0.3%				
5-Jul	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	4	0.4%				
6-Jul	0	0	0	4	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	4	0.4%				
7-Jul	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.4%				
8-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
9-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
10-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
11-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
12-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
13-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
14-Jul	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%				
15-Jul	0	0	0	0	0	0	-2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.0%				
16-Jul	0	0	0	0	0	0	-8	0	0	0	0	0	0	2	0	0	0	0	4	0	0	0.0%				
17-Jul	18	2	0	0	0	0	-24	0	0	0	0	0	0	4	0	0	2	0	0	0	0	0.0%				
18-Jul	0	0	0	0	0	0	0	0	0	0	2	0	2	1	0	2	2	0	0	0	7	0.7%				
19-Jul	1	-2	1	0	0	0	0	0	0	0	0	2	0	2	1	0	2	0	0	0	11	1.1%				
20-Jul	1	2	1	0	0	0	0	0	0	0	0	4	0	0	2	0	2	0	0	0	12	1.2%				
21-Jul	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	3	0	2	1	0	12	1.2%				
22-Jul	10	0	-1	0	0	1	0	0	0	0	0	0	2	0	0	0	0	2	0	0	14	1.4%				
23-Jul	0	2	-1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.4%					
24-Jul	0	0	-2	0	0	2	0	0	0	0	2	2	0	0	0	0	0	2	0	0	8	0.8%				
25-Jul	0	0	-1	0	0	2	0	0	0	12	6	0	0	0	0	0	0	2	0	0	21	2.1%				
26-Jul	0	0	-1	0	0	0	0	0	0	0	0	0	10	4	0	0	0	2	0	0	15	1.5%				
27-Jul	0	1	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	9	0.9%				
28-Jul	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-0.1%				
29-Jul	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-0.1%				
30-Jul	1	-2	0	-1	-1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	-0.2%				
31-Jul	2	-4	0	-2	-2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-0.4%				
1-Aug	1	-2	0	4	2	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.3%				
2-Aug	0	0	0	-2	-4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-0.4%				
3-Aug	0	0	3	-4	-2	0	3	0	0	0	0	0	0	0	0	-10	4	0	0	0	-8	-0.8%				
4-Aug	0	0	6	-8	0	0	0	0	0	0	0	0	0	0	0	-5	3	1	1	1	0	0.0%				
5-Aug	6	7	5	-2	0	4	16	0	0	0	0	0	0	0	0	-5	3	1	1	1	36	3.5%				
6-Aug	6	7	5	-2	0	4	16	0	0	0	0	0	0	0	0	-5	3	1	1	1	36	3.5%				
7-Aug	6	7	5	-2	0	4	21	0	0	0	0	0	0	0	0	0	2	2	2	2	47	4.6%				
8-Aug	12	14	4	2	0	8	42	0	0	0	0	0	0	2	0	0	0	10	0	0	94	9.2%				
9-Aug	60	104	24	34	10	2	260	0	0	28	0	0	0	38	0	0	0	0	24	0	582	56.9%				
10-Aug	20	0	0	0	-20	0	18	0	0	0	18	0	4	0	0	0	0	0	0	0	40	3.9%				
11-Aug	0	0	0	0	0	0	1	0	4	-2	0	-6	0	0	0	0	0	0	0	0	-3	-0.3%				
12-Aug	0	0	8	0	-4	0	-1	0	2	-1	0	-3	0	0	0	0	0	0	0	0	1	0.1%				
13-Aug	15	15	-4	0	-5	0	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1.9%				
14-Aug	30	30	0	0	-8	0	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	36	3.5%				
15-Aug	0	0	0	0	0	0	-2	0	0	0	2	0	0	0	0	0	0	2	2	2	4	0.4%				
16-Aug	0	0	4	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.3%				
17-Aug	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0.0%				
18-Aug	0	2	0	0	0	4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.4%				
19-Aug	2	-2	6	0	0	0	End of counting season										0	0	0	0	0	0	0	0	0	0.8%
Total	192	188	71	31	-32	32	316	0	0	41	28	6	16	52	5	-22	23	33	34	1,022	100.0%					
	18.8%	18.4%	6.9%	3.0%	-3.1%	3.1%	30.9%	0.0%	0.6%	4.0%	2.7%	0.6%	1.6%	5.1%	0.5%	-2.2%	2.3%	3.2%	3.3%							

Table 4. Expanded daily hourly king salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

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

Date	0000	0100	0200	0300	0400	0500	0600 - 1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
29-Jun	0	0	0	0	0	0		-1	0	0	0	0	0	0	0	0	2	0	0	1	1.0%	
30-Jun	0	0	0	2	0	0		-2	0	0	0	0	0	0	0	0	0	0	0	6	6.1%	
1-Jul	0	10	4	2	0	0		-4	0	0	0	0	0	0	0	0	-2	0	0	10	10.2%	
2-Jul	0	0	0	0	0	0		0	1	0	0	0	-1	1	-2	1	0	-1	0	0	-1	-1.0%
3-Jul	0	1	0	0	1	0		0	1	0	0	0	-1	1	-2	1	0	-1	0	0	1	1.0%
4-Jul	0	1	0	0	1	0		0	1	0	0	0	-1	1	-2	1	0	-1	0	0	1	1.0%
5-Jul	0	1	0	0	1	0		0	2	0	0	0	-2	2	-4	2	0	-1	0	0	1	1.0%
6-Jul	0	2	0	0	2	0		-1	0	0	0	0	0	0	0	0	0	0	0	0	3	3.1%
7-Jul	0	6	2	2	0	6		-4	2	0	0	2	0	0	0	0	0	0	0	18	16.3%	
8-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
9-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
10-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	2	0	2	2.0%
11-Jul	0	0	0	-1	0	0		0	0	0	0	0	0	0	0	0	0	0	4	0	3	3.1%
12-Jul	0	0	0	-2	0	0		0	0	0	0	0	0	0	0	0	0	0	-2	0	-4	-4.1%
13-Jul	0	2	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	2	2.0%	
14-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	4	0	4	4.1%
15-Jul	0	2	0	-2	0	0		0	0	0	0	0	0	0	0	0	-2	0	0	0	-2	-2.0%
16-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	6	2	2	0	10	10.2%
17-Jul	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	1	0	0	0	0	0	0	0	0	0	0	1	1.0%
19-Jul	1	1	2	1	0	0		1	0	1	0	0	0	0	0	0	0	0	0	0	7	7.1%
20-Jul	1	1	2	1	0	0		1	0	2	0	0	0	0	0	0	0	0	0	0	6	6.2%
21-Jul	1	1	4	1	0	0		1	0	0	0	0	0	0	0	0	0	0	0	1	9	9.2%
22-Jul	2	0	4	-1	0	0		1	0	0	0	0	0	0	0	0	0	0	0	2	6	6.2%
23-Jul	0	0	4	-1	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	3	3.1%
24-Jul	2	0	4	-2	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	4	4.1%
25-Jul	0	0	2	-1	0	0		0	0	2	0	0	0	0	0	0	0	-2	0	0	1	1.0%
26-Jul	2	0	2	-1	0	-2		0	0	0	0	0	0	4	0	-4	0	0	0	0	1	1.0%
27-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.0%
28-Jul	0	0	0	1	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.0%
29-Jul	0	0	0	1	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.0%
30-Jul	0	0	0	1	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.0%
31-Jul	0	0	0	2	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	2	2.0%
1-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
2-Aug	0	0	-2	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2.0%
3-Aug	0	0	-1	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1.0%
4-Aug	0	0	0	0	0	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%
6-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
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%
12-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
13-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
14-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	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%
16-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
17-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	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%
19-Aug	0	0	0	0	0	0		End of counting season										0	0.0%			
Total	9	28	27	3	5	4		-8	7	2	4	2	-5	5	-6	5	2	-4	8	10	98	17
	9.2%	28.6%	27.6%	3.1%	5.1%	4.1%		-8.2%	7.1%	2.0%	4.0%	2.0%	-5.1%	5.1%	-6.1%	5.1%	2.0%	-4.1%	8.2%	10.2%	17	

Table 5. Estimated daily hourly coho salmon migration past the Eldorado River counting tower, Norton, Oregon, July 1, 1997.

Blank areas indicate hours not counted. Numbers in shaded areas indicate estimated passages.

Date	0000	0100	0200	0300	0400	0500	0600 - 1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
29-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
30-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
1-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
2-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
3-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
4-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
5-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
6-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
7-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
8-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
9-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
10-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
11-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
12-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
13-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
14-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
15-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
16-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
18-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
19-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
20-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
22-Jul	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0.0%	
24-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
25-Jul	0	0	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	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	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%	
29-Jul	0	0	0	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	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	0.0%	
2-Aug	0	0	-2	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0	4	2.1%	
3-Aug	0	0	-1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0%	
4-Aug	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	3	1.5%	
5-Aug	5	6	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	-3	14	7.2%	
6-Aug	5	6	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	-3	14	7.2%	
7-Aug	5	6	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	-6	10	5.2%	
8-Aug	10	12	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	2	0	30	15.5%	
9-Aug	6	2	0	0	0	4	5	0	6	0	0	0	0	0	0	0	-4	0	2	2	23	11.9%	
10-Aug	12	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	1	0	19	9.8%	
11-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
12-Aug	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3.1%	
13-Aug	1	4	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	5.7%	
14-Aug	2	6	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	8.2%	
15-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	6	3.1%	
16-Aug	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3.1%	
17-Aug	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	14	18	9.3%	
18-Aug	0	4	-4	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3.1%	
19-Aug	0	0	0	4	0	2	End of counting season										0	0	0	0	0	6	3.1%
Total	46	52	-3	16	24	12	23	2	6	2	0	0	2	4	0	-4	4	5	3	194	100.0%		
	23.7%	26.8%	-1.5%	8.2%	12.4%	6.2%	11.9%	1.0%	3.1%	1.0%	0.0%	0.0%	1.0%	2.1%	0.0%	-2.1%	2.1%	2.6%	1.5%				

Table 6. Reported hourly chum salmon observations at the Eldorado River counting tower, Norton Sound, 1997.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
29-Jun	0	-8	0	0	0	0							0	0	0	0	4	-8	2	54	80	70	30	4	232	2.4%	
30-Jun	2	52	31	7	0	0		-2	0	0	-2	0	0	0	0	56	62	0	0	0	-1	16	21	13	255	2.7%	
1-Jul	88	66	10	12	0	0							0	-4	0	0	0	0	6	6	-2	2	34	0	218	2.3%	
2-Jul	2	164	50	4	16	16																			252	2.6%	
3-Jul																										0	0.0%
4-Jul																										0	0.0%
5-Jul													24	16	-12	0	120	480	4	-32	56				8	664	7.0%
6-Jul	0	54	14	0	28	56							0	0	0	-2	0	0	-8	20	0	0	0	0	182	1.7%	
7-Jul	0	6	5	36	148	110	31	0	0	0	1	1	0	-1	0	-2	0	1	0	60	4	0	32	88	520	5.4%	
8-Jul	252	46	0	0	64	90							0	160	0	0	0	0	92	56	0	10	0	0	770	8.1%	
9-Jul	-6	-2	0	0	0	0							0	-4	0	4	0	0	-8	0	0	-4	0	0	94	74	0.8%
10-Jul	54	22	-2	-40	-2	-32																				0	0.0%
11-Jul													0	120	0	-76	24	228	30	42	8	0	150	424	948	9.9%	
12-Jul	24	-26	-2	4	38	16							4	26	0	2	0	0	20	0	-2	10	0	0	114	1.2%	
13-Jul	-2	38	14	4	0	0							2	0	0	24	14	0	10	0	20	38	178	-22	316	3.3%	
14-Jul	1	6	-5	-2	2	5	-5	4	0	2	0	0	0	2	0	1	-7	4	-1	0	-16	24	93	-4	104	1.1%	
15-Jul	80	-36	-4	2	-38	44							0	2	0	92	166	2	38	6	0	0	0	0	68	412	4.3%
16-Jul	40	-20	0	-18	0	20							40	10	206	202	-42	30	56	62	16	54	200	64	932	9.8%	
17-Jul	0	70	2	0	8	6							0	2	-8	-2	58	40	56	36	42	6	8	8	332	3.6%	
18-Jul	-2	58	0	2	2	0																				60	0.6%
19-Jul																										0	0.0%
20-Jul													0	-2	182	160	480	234	50	96	4	0	46	22	1,272	13.3%	
21-Jul	14	120	51	1	0	0	0	1	2	-5	0	1	-3	-1	1	1	0	0	-1	-11	13	2	72	21	279	2.9%	
22-Jul	92	2							0	0	0	0	0	2	0	0	0	2	6	4	12	10	-2	78	206	2.2%	
23-Jul	2	54							0	0	0	-4	4	2	0	0	-6	0	4	6	0	2	32	18	108	1.1%	
24-Jul	28	8	20	16	6	6							0	4	14	0	-6	6	22	-4	16	0	-14	-6	116	1.2%	
25-Jul	0	4				10	-2	4	6				12	40	-8	14	10	4	0	8	80	132	72	46	412	4.3%	
26-Jul	0	16				4	4	0	0			2	8	2	12	18	0	-6	0	38	62	0	-14	-2	144	1.6%	
27-Jul	11	1	0	0	2	-6	-1	13	0	2	0	0	1	0	-2	25	10	20	6	4	0	20	4	10	119	1.2%	
28-Jul	0	18							4	0	0	-4	6	6	2	0	40	0	0	0	0	0	0	0	92	1.0%	
29-Jul	0	0			0	0	0	0																		0	0.0%
30-Jul																0	-8	-12	0	0	0	0	0	0	-6	-26	-0.3%
31-Jul	36	-26	4	-10	2	2	-6	2	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	2	0.0%	
1-Aug			0	10	-2	-8	0	-6					0	0	0	0	0	0	0	0	2	0	4	0	14	14	0.1%
2-Aug	28	0	-18	-8	-12	-18	52	0	8	0	0	0	0	0	12	8	2	0	8	16	15	8	10	26	134	1.4%	
3-Aug							40	20	-32	-44	0	4	0	0	0	0	0	6	-2	-14	10	0	-8	0	-20	-0.2%	
4-Aug	0	4	-2	6	0	0																				8	0.1%
5-Aug																										0	0.0%
6-Aug																										0	0.0%
7-Aug																		0	0	8	0	6	2	20	26	0.4%	
8-Aug	32	26	6	0	0	-30	0	10	16	0	0	0	0	0	0	20	0	0	0	0	0	0	0	32	0	112	1.2%
9-Aug	6	6	-2	6	10	2							0	0	0	0	78	0	0	0	0	0	0	0	20	126	1.3%
10-Aug	16	0	0	0	-2	-6							0	0	0	2	0	0	0	0	0	0	0	0	0	10	0.1%
11-Aug	0	0	0	0	0	0							0	0	-2	0	0	0	0	0	0	0	0	0	4	2	0.0%
12-Aug	0	4	0	2	-2	2	4	0																		10	0.1%
13-Aug													0	0	0	0	-4	0	0	0	0	0	0	0	0	-4	0.0%
14-Aug	0	0	0	0	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	0.0%
15-Aug	0	0	0	0	0	0							0	0	4	0	0	0	0	0	0	0	8	0	-2	10	0.1%
16-Aug	0	0	2	0	0	2							0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.0%
17-Aug	0	0	0	0	0	0							0	0	2	-2	0	0	0	0	0	0	0	0	6	6	0.1%
18-Aug	8	-6	-4	0	6	-2					0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0.1%
19-Aug	0	0	2	-2	4	0	-6	6	End of counting season															4	0.0%		
Total	806	723	172	34	274	289	109	54	4	-47	1	4	96	382	459	551	933	1,123	355	401	402	438	978	1,004	9,543	100.0%	
	8.4%	7.6%	1.8%	0.4%	2.9%	3.0%	1.1%	0.6%	0.0%	-0.5%	0.0%	0.0%		4.0%	4.8%	5.8%	9.8%	11.6%	3.7%	4.2%	4.2%	4.6%	10.2%	10.5%			

Table 7 Reported hourly pink salmon observations at the Eldorado River counting tower, Norton Sound, 1997.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total										
29-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%									
30-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%									
1-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%									
2-Jul	0	0	0	0	0	0																				0	0.0%									
3-Jul																										0	0.0%									
4-Jul																										0	0.0%									
5-Jul													0	0	0	0	2	0	0	0	0	0			0	2	0.3%									
6-Jul	0	0	0	4	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.6%									
7-Jul	0	0	0	4	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.6%									
8-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%									
9-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%									
10-Jul	0	0	0	0	0	0																				0	0.0%									
11-Jul													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%									
13-Jul	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	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0.0%									
15-Jul	0	0	0	0	0	0							0	0	0	2	0	0	0	0	0	0	0	0	0	2	0.3%									
16-Jul	0	0	0	0	0	0							0	0	0	0	0	2	0	0	0	0	4	0	0	6	1.0%									
17-Jul	16	2	0	0	0	0							0	0	0	0	0	0	4	0	0	2	0	0	0	24	3.6%									
18-Jul	0	0	0	0	0	0																				0	0.0%									
19-Jul																										0	0.0%									
20-Jul													0	0	0	0	4	0	0	2	0	2	0	0	0	8	1.3%									
21-Jul	1	3	1	0	0	0		0	0	-1	1	0	0	0	0	0	0	0	0	1	3	0	2	1	1	12	1.9%									
22-Jul	10	0							0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	14	2.2%									
23-Jul	0	2							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	6	1.0%									
24-Jul	0	0	-2	0	0	2							0	0	0	2	2	0	0	0	0	0	2	0	0	6	1.0%									
25-Jul	0	0				2		-2	4	0			0	0	12	6	0	0	0	0	0	0	2	0	0	24	3.8%									
26-Jul	0	0				0		2	0	0			0	0	0	0	0	10	4	0	0	0	2	0	0	18	2.9%									
27-Jul	0	1	0	0	0	0		0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	9	1.4%									
28-Jul	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%									
30-Jul																										0	0.0%									
31-Jul	2	-4	0	-2	-2	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	-1.0%									
1-Aug			0	4	2	0		0	2				0	0	0	0	0	0	0	0	0	0	0	0	0	8	1.3%									
2-Aug	0	0	0	-2	-4	0		4	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-0.6%									
3-Aug								0	0	0	-10	-2	2	0	0	0	0	0	0	0	0	-10	4	0	0	-16	-2.6%									
4-Aug	0	0	6	-6	0	0																				0	0.0%									
5-Aug																										0	0.0%									
6-Aug																										0	0.0%									
7-Aug																		0	0	0	0	2	2	2	2	6	1.0%									
8-Aug	12	14	4	2	0	8		12	8	22	0	0	0	0	0	0	0	2	0	0	0	0	10	0	94	15.0%										
9-Aug	80	104	24	34	10	2							0	0	28	0	0	0	36	0	0	0	0	0	24	322	51.4%									
10-Aug	20	0	0	0	-20	0							0	0	0	18	0	4	0	0	0	0	0	0	0	22	3.6%									
11-Aug	0	0	0	0	0	0							0	4	-2	0	-6	0	0	0	0	0	0	0	0	-4	-0.6%									
12-Aug	0	0	8	0	-4	0		2	0																	6	1.0%									
13-Aug																										0	0.0%									
14-Aug	30	30	0	0	-6	0		-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	5.7%									
15-Aug	0	0	0	0	0	0							0	0	0	2	0	0	0	0	0	0	2	2	6	1.0%										
16-Aug	0	0	4	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.6%									
17-Aug	2	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	-2	0	0.0%										
18-Aug	0	2	0	0	0	4					2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1.3%									
19-Aug	2	-2	6	0	0	0		0	0	0	End of counting season												0	0	0	0	0	0	0	0	0	0	0	0	0	1.0%
Total	155	152	51	35	-24	18	0	16	21	-9	0	0	0	4	42	28	4	16	48	3	-7	10	30	31	627	100.0%										
	24.7%	24.2%	8.1%	6.1%	-3.8%	2.9%	0.0%	2.6%	3.3%	-1.4%	0.0%	0.0%	0.0%	0.6%	6.7%	4.5%	0.6%	2.6%	7.7%	0.5%	-1.1%	1.6%	4.8%	4.9%	100.0%											

Table 8. Reported hourly king salmon observations at the Eldorado River counting tower, Norton Sound, 1997.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
29-Jun	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	2	0	0	2	2.5%		
30-Jun	0	0	0	2	0	0	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	7.5%	
1-Jul	0	10	4	2	0	0							0	0	0	0	0	0	0	0	0	-2	0	0	14	17.5%		
2-Jul	0	0	0	0	0	0																			0	0	0.0%	
3-Jul																									0	0	0.0%	
4-Jul																									0	0	0.0%	
5-Jul													2	0	0	0	-2	2	-4	2	0				0	0	0.0%	
6-Jul	0	2	0	0	2	0							0	0	0	0	0	0	0	0	0	0	0	0	4	4	5.0%	
7-Jul	0	6	2	2	0	6	0	2	0	-6	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	18	20.0%	
8-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
9-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
10-Jul	0	0	0	0	0	0																			0	0	0.0%	
11-Jul													0	0	0	0	0	0	0	0	0	0	0	4	0	4	5.0%	
12-Jul	0	0	0	-2	0	0							0	0	0	0	0	0	0	0	0	0	0	-2	0	-4	-5.0%	
13-Jul	0	2	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	2	2	2.5%	
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	4	0	4	5.0%	
15-Jul	0	2	0	-2	0	0							0	0	0	0	0	0	0	0	0	0	-2	0	0	-2	-2.5%	
16-Jul	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	6	2	2	0	10	12.5%	
17-Jul	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%	
19-Jul																										0	0	0.0%
20-Jul													0	0	2	0	0	0	0	0	0	0	0	0	0	2	2	2.5%
21-Jul	1	1	4	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9	11.3%	
22-Jul	2	0							0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	7.5%	
23-Jul	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
24-Jul	2	0	4	-2	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	5.0%
25-Jul	0	0				0	0	0	0				0	2	0	0	0	0	0	0	0	0	0	-2	0	0	0	0.0%
26-Jul	2	0				-2	4	0	-2			0	0	0	0	0	0	4	0	-4	0	-4	0	0	0	2	2	2.5%
27-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	1	1	1.3%	
28-Jul	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%
30-Jul																									0	0	0	0.0%
31-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	2	2.5%	
1-Aug			0	0	0	0	0	0					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
2-Aug	0	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	-2.5%	
3-Aug									0	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%
5-Aug																									0	0	0	0.0%
6-Aug																									0	0	0	0.0%
7-Aug																		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	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%
10-Aug	0	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	0.0%
12-Aug	0	0	0	0	0	0	0	0																	0	0	0	0.0%
13-Aug													0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
14-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	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%
16-Aug	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
17-Aug	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	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%
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%
Total	7	23	12	3	2	4	4	2	-2	-5	0	0	4	2	2	2	-2	2	0	2	2	0	6	10	80	100.0%		
	8.8%	28.8%	15.0%	3.8%	2.5%	5.0%	5.0%	2.5%	-2.5%	-6.3%	0.0%	0.0%	5%	2.5%	2.5%	-2.5%	2.5%	0.0%	2.5%	2.5%	0.0%	7.5%	12.5%	100.0%				

Table 9. Reported hourly

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
29-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
30-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0.0%	
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	0.0%	
3-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
4-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0.0%	
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	0.0%	
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	0.0%	
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	0.0%	
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	0.0%	
10-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
11-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0.0%	
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	0.0%	
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	0.0%	
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	0.0%	
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	0.0%	
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
18-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0.0%	
20-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0.0%	
22-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%	
23-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%	
24-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%	
25-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%	
26-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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	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	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	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	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	0	0	0	0	0.0%	
2-Aug	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	-4	3.0%
3-Aug	0	0	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	1.5%
4-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	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	0	0	0	0	0.0%
6-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	0.0%
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	-6	-4.5%
8-Aug	10	12	0	0	0	0	-2	6	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	30	22.7%	
9-Aug	6	2	0	0	0	4	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	-4	0	2	2	18	13.6%	
10-Aug	12	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	14	10.6%	
11-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	0.0%
12-Aug	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4.5%	
13-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	0.0%
14-Aug	2	6	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	12.1%	
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	6	4.5%	
16-Aug	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4.5%	
17-Aug	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	14	18	13.6%	
18-Aug	0	4	-4	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4.5%	
19-Aug	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	2	4	0	0	-4	4	4	4	12	6	4.5%	
Total	30	30	-2	12	12	10	-2	8	0	0	2	0	2	6	2	0	0	2	4	0	-4	4	4	4	12	132	100.0%	
	22.7%	22.7%	-1.5%	9.1%	9.1%	7.6%	-1.5%	6.1%	0.0%	0.0%	1.5%	0.0%	1.5%	4.5%	1.5%	0.0%	0.0%	1.5%	3.0%	0.0%	-3.0%	3.0%	3.0%	3.0%	9.1%	100.0%		

Figure 1. Area location map of the Eldorado River counting tower project site, Norton Sound, 1997.

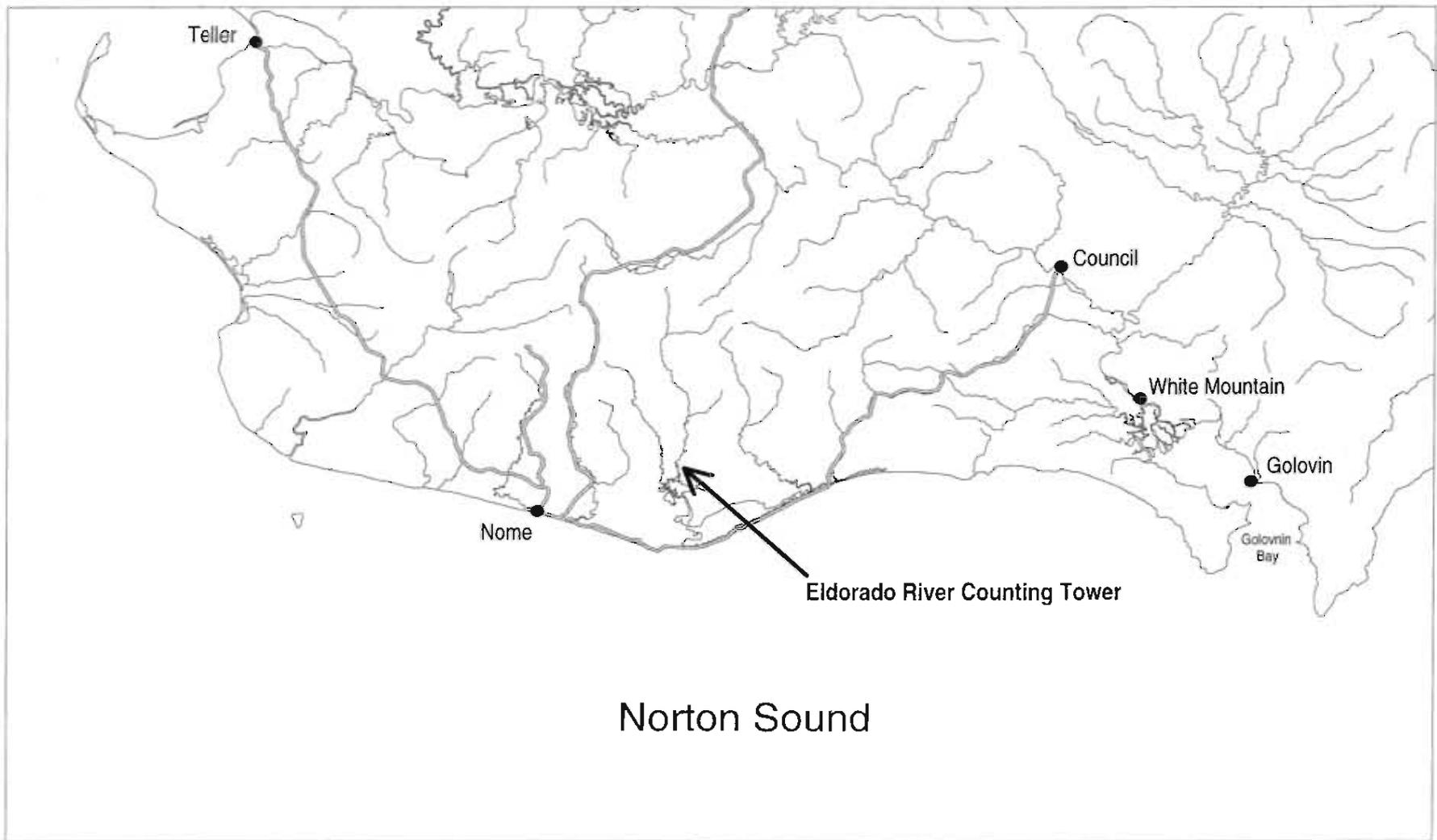


Figure 2. Cumulative migration of all salmon species past the Eldorado River counting tower, Norton Sound, 1997.

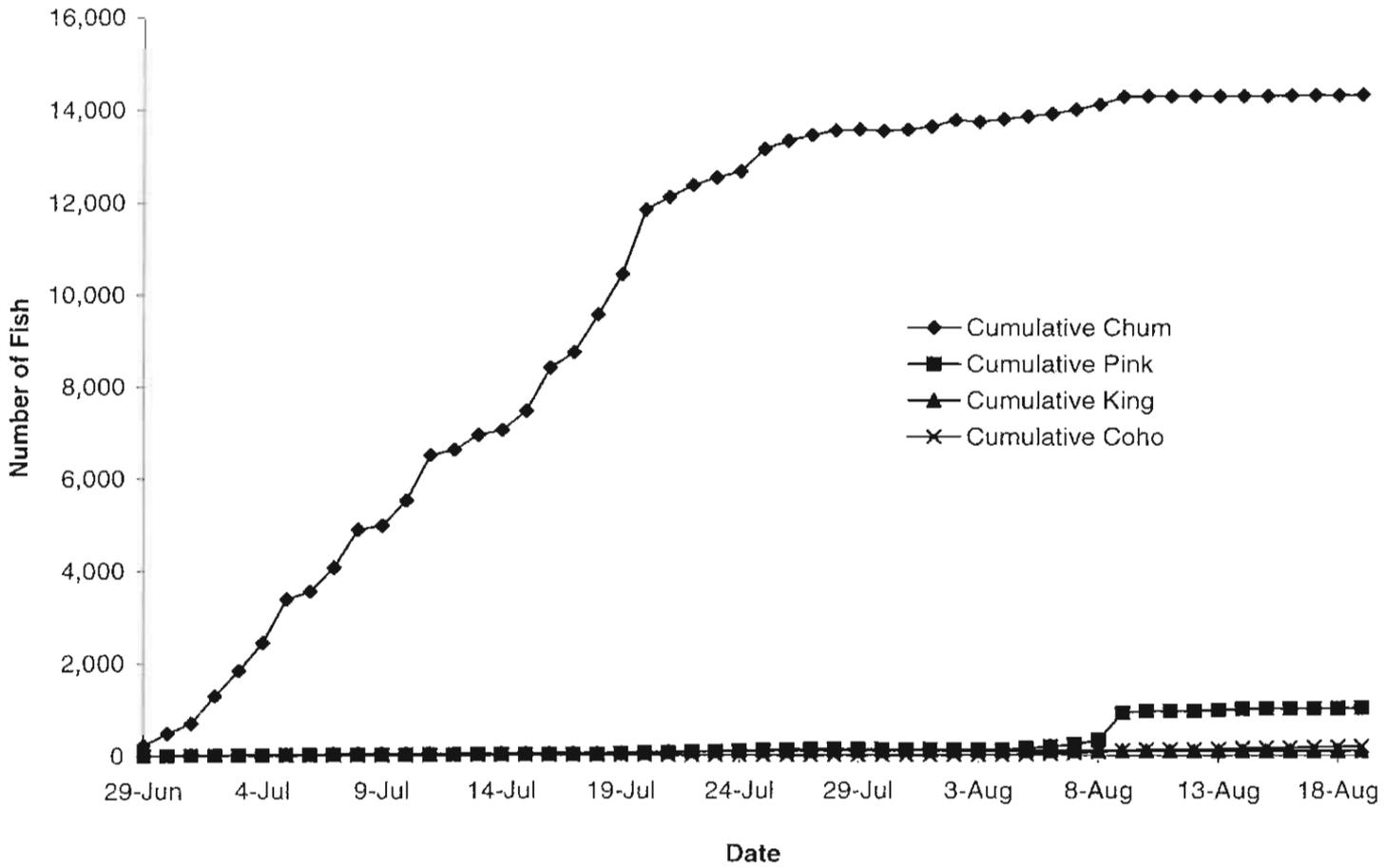


Figure 3. Daily chum salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

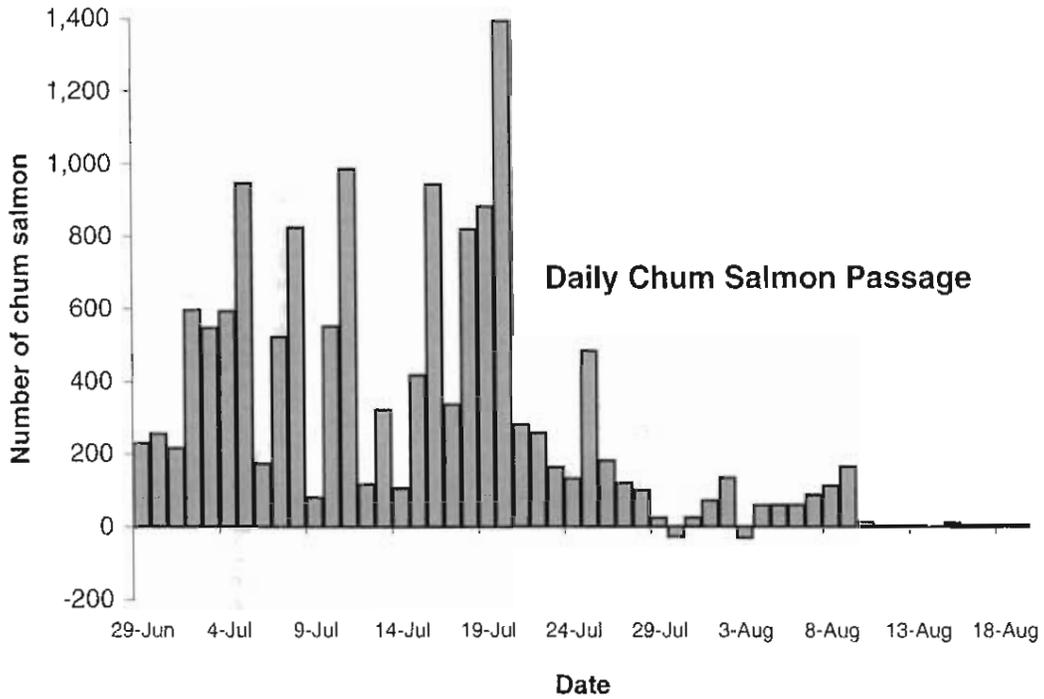


Figure 4. Cumulative chum salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

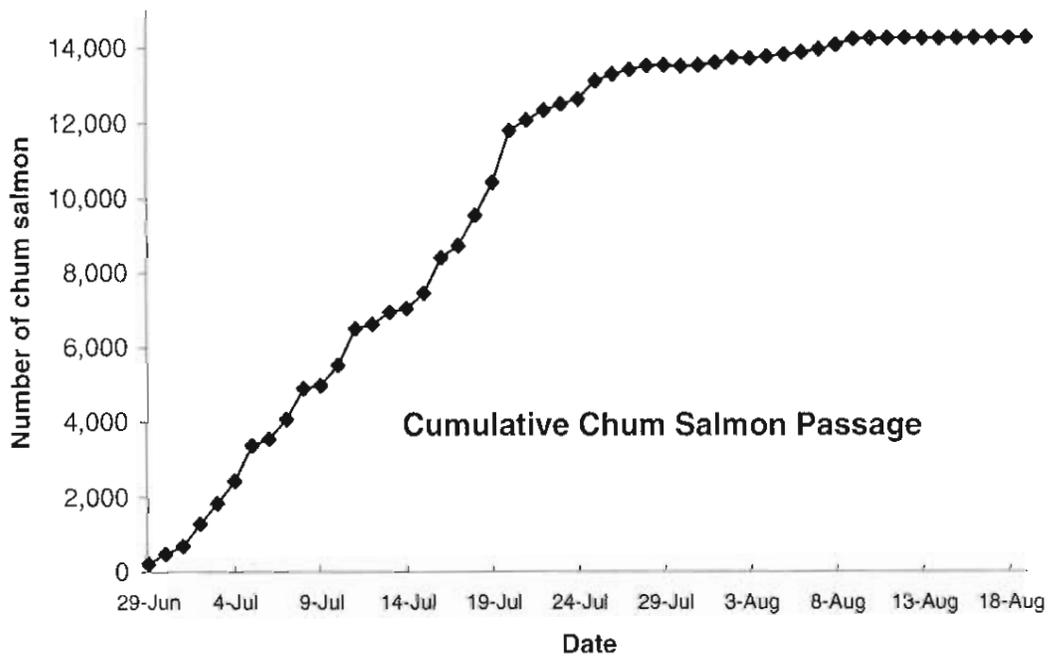


Figure 5. Daily pink salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

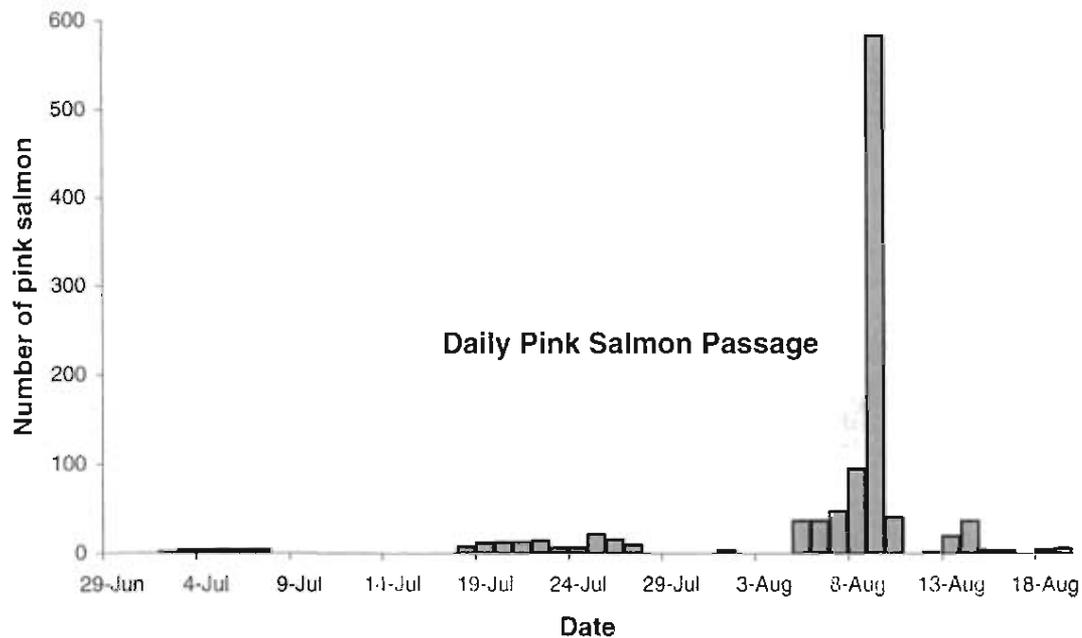


Figure 6. Cumulative pink salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

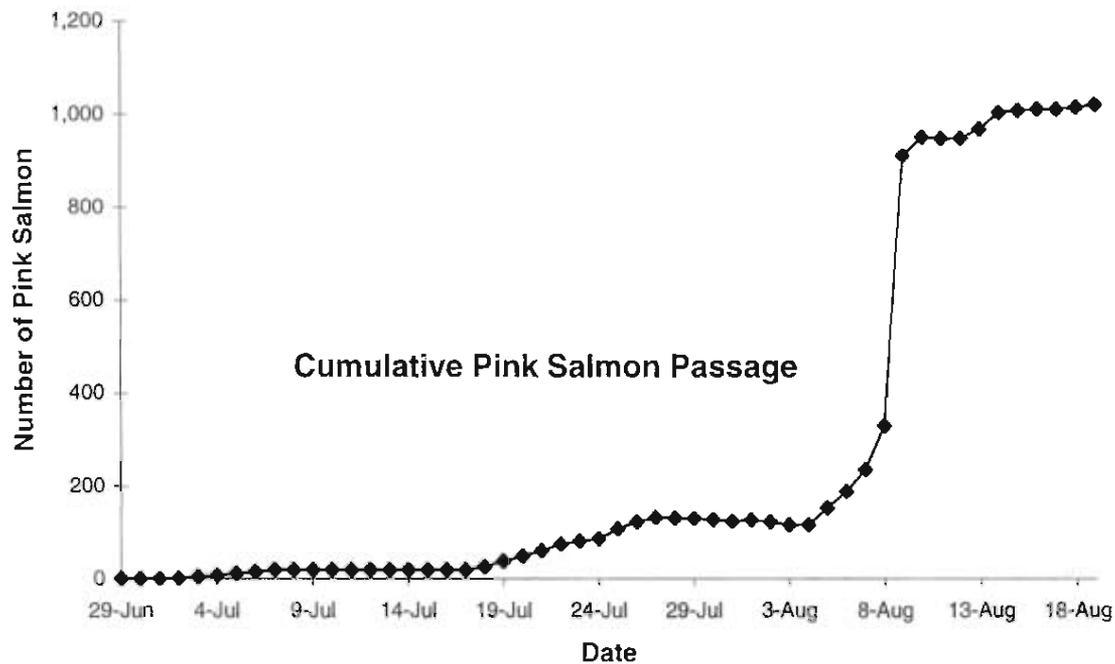


Figure 7. Daily king salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

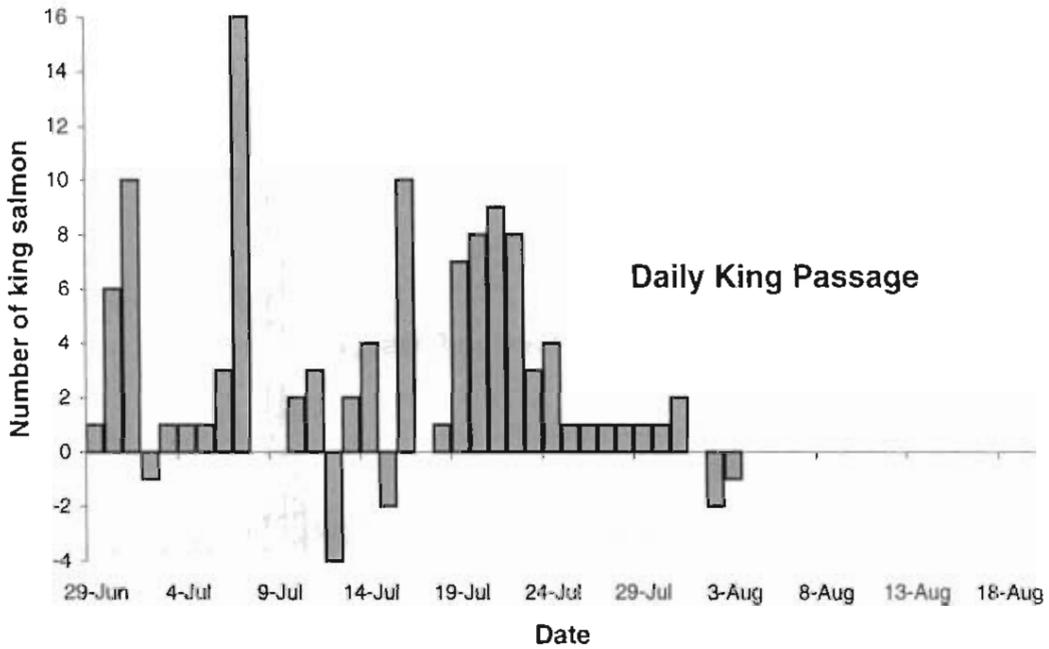


Figure 8. Cumulative king salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

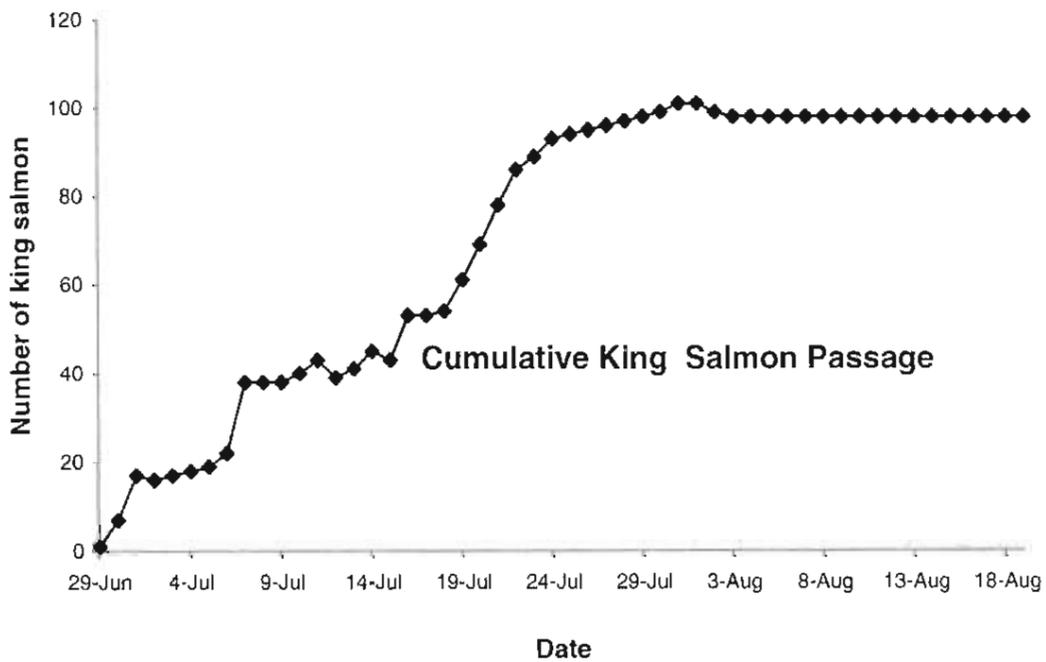


Figure 9. Daily coho salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

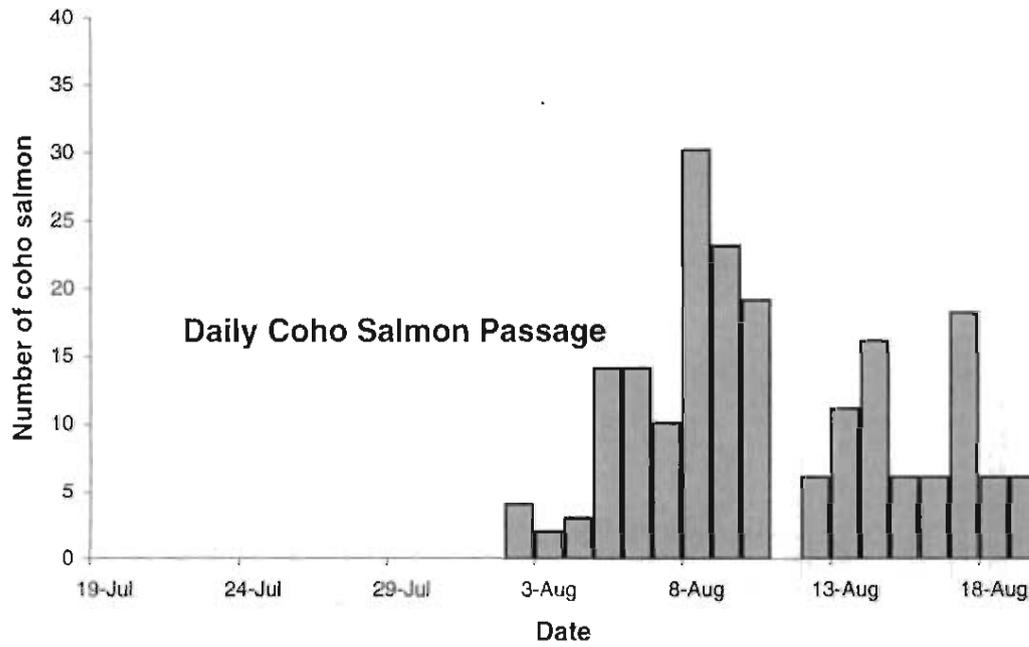


Figure 10. Cumulative coho salmon migration past the Eldorado River counting tower, Norton Sound, 1997.

