NOME RIVER SALMON COUNTING WEIR PROJECT, 2001

By

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and

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ABSTRACT

The Alaska Department of Fish and Game operated a counting tower on the Nome River approximately five km east of Nome from 1993 until 1995. In 1996 a weir replaced the counting tower and 2001 was the sixth consecutive year of weir operations. The objectives of the project are to obtain daily and seasonal counts and timing of the Pacific salmon *Oncorhynchus sp.* and Dolly Varden *Salvelinus malma* escapement by species to the Nome River. The Nome River camp is approximately 3 km upstream from the mouth of the river, on land leased to the Alaska Department of Fish & Game (ADF&G) by the Sitnasuak Native Corporation. Counting began on 8 July and continued through 11 September. The total cumulative weir counts were: 2,859 chum salmon *O. keta*, 3,138 pink salmon *O. gogbuscha*, 7 chinook salmon *O. tshawytscha*, 2,418 coho salmon *O. kisutch*, 55 sockeye salmon *O. nerka*, and 529 Dolly Varden. This was the ninth consecutive year of operation for an escapement project on the Nome River. The escapement for chum salmon in 2001 was below the historical average. The pink salmon escapement in 2001 was one third of the odd-numbered year escapement average but slightly better than its 1999 parent year. The chinook salmon escapement in 2001 was the fourth lowest since 1993 and the coho salmon escapement was about twice the 1993-2000 average. The chum salmon age composition was dominated by age class 0.4 (84.1%) and age class 0.3 (13.8%). Analysis of the coho salmon scale samples showed that 9.9% of the fish sampled were age-1.1, and 89.6% were age-2.1.

Key Words: chum salmon, Dolly Varden, chinook salmon, pink salmon, coho salmon, weir, Nome, *Oncorhynchus*

INTRODUCTION

The Nome River flows approximately 50 km south from the Kigluaik Mountains and drains into Norton Sound approximately five km east of Nome (Figure 1). Commercial fishing has been progressively reduced through regulatory restrictions since the late 1970s and the marine waters near the mouth have been closed since 1984. The Nome River has been closed to sport and subsistence fishing in recent years because of low numbers of returning salmon. The subsistence and sport fisheries are now managed at a level of intensity similar to a commercial fishery, with Emergency Orders regulating restrictions and fishing periods.

A salmon counting tower was operated on the Nome River starting in 1993 (Bue 1994, Rob 1995a and 1995b). A weir replaced the counting tower beginning in 1996. The 2001 season was the sixth year of weir operation (Rob 1997, 1998, 1999, and Kohler 2000, 2001). In 2001 the returns of chum *Oncorhnychus. keta*, pink *O. gorbusacha*, chinook *O. tshawytscha*, sockeye *O. nerka,* and coho salmon *O .kisutch* and of Dolly Varden *Salvelinus malma* were enumerated. The project operates as a means to obtain timely and accurate escapement information that is required to actively manage the stocks throughout the season.

OBJECTIVES

1. Obtain daily and seasonal counts, and run timing of the salmon escapement by species to the Nome River.
2. Obtain daily and seasonal counts, and run timing of the Dolly Varden escapement to the Nome River.
3. Estimate the age-sex-length (ASL) composition of chum and coho salmon from a minimum of three segments of the escapement such that the simultaneous interval estimates of the age composition of each segment have a maximum width of 0.20 with a significance level of 0.05.

METHODS

The Nome River camp is approximately 5 km upstream from the mouth of the river, on land leased to the Alaska Department of Fish & Game (ADF&G) by the Sitnasuak Native Corporation (Figure 1). In 1997 the project site was moved approximately one km downstream from the previous counting tower site. The new site is wider, shallower and better suited for weir operations.

The crew began working on 5 July 2001. After inventorying equipment and purchasing supplies, equipment was moved to the project site by truck and jet boat and the camp established. A full weir was built to completely block the river to unmonitored fish passage. A gate was installed in the weir to allow fish passage and enumeration. The weir was made of a series of 1¼" pipes (sizes are listed in inches, common material trade sizes) assembled in pairs using locking metal brackets. Aluminum stringers 3.6m (12 ft.) long connected the pairs of pipes horizontally. Metal

conduit pipes 3m (10ft) long were inserted vertically in holes 4.5cm (1¾") on center on the stringers. This weir was designed to be fish tight, easily cleaned, and removed in the event of a flash flood.

The crew traveled to Nome to pick up groceries, supplies, and mail. Nome office staff transported the crew to and from the Nome River highway bridge and provided other logistical support. Daily weir counts, water temperatures, and levels were relayed to the Nome ADF&G office by VHF radio.

Scales were taken, sex identified, and lengths measured (ASL sampling) from chum and coho salmon that were collected by beach seine and in the weir trap. Age was determined from scales removed from the left side of the fish in an area above the lateral line (2-3 scale rows) crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. Scales were mounted on gum cards and impressions were later made in cellulose acetate cards with a scale press. The scales were read with the aid of a microfiche reader and ages were reported in European notation (the first digit refers to the freshwater age and does not include the year spent in the gravel; the second digit refers to the ocean age) (Koo 1962). Sex was determined by examining external characteristics, such as: snout, vent, and body symmetry. Fish length was measured to the nearest five mm from mid-eye to fork-of-tail (fork length, FL). ASL samples for both chum and coho salmon were divided into three segments by time to track changes in age and sex composition.

Air temperatures were taken from a dial thermometer mounted on the side of the camp tent. Water temperatures were collected with a hand-held thermometer suspended below the water surface by a string tied to the weir. A staff gauge was attached to one of the weir uprights at the beginning of the season for relative water level determination. The air temperature, water temperature, and water level were recorded daily just prior to the last weir count in the evening and varied by time.

RESULTS

The total cumulative weir counts were: 2,859 chum salmon, 3,138 pink salmon, 7 chinook salmon, 2,418 coho salmon, 55 sockeye salmon, and 529 Dolly Varden). The daily and cumulative season counts by species were recorded and relayed to the Nome ADF&G office (Table 1).

Counting began on 8 July 2001. Chum salmon were first observed on 10 July, pink salmon and Dolly Varden were first observed on 14 July, chinook salmon were first observed on 15 July, and coho salmon were first observed on 19 July (Table 1). The daily peak of 408 chum salmon occurred on 14 July, the daily peak of 1,141 pink salmon occurred on 4 August, the daily peak of 706 coho salmon occurred on 23 August, and the daily peak of 148 Dolly Varden occurred on 23 August (Table 1). Most chum salmon returned during the three-week period from 10 July through 31 July. By 21 July, 50% of the chum salmon had passed the weir (Table 1 and Figures 2 and 3). Most pink salmon also returned during the two-week period from 29 July through 12 August. Fifty percent of the pink salmon had passed the weir on 4 August (Table 1 and Figures 4 and 5). Chinook salmon returned from 15 July to 1 September (Table 1 and Figures 6 and 7). Most coho salmon returned during the last three weeks of weir operation when 72% passed the

weir (Table 1 and Figures 8 and 9). Dolly Varden returned between 14 July and 11 September (Table 1 and Figures 10 and 11).

A peak aerial survey count of 946 chum salmon was made on 31 July 2001, which was 33% of the total season weir count of chum salmon. This survey counted 896 chum salmon above the weir on 31 July when the cumulative weir count of chum salmon was 1,925, which accounted for 47% of the cumulative weir count on 31 July (Table 1).

A peak aerial survey count of 790 pink salmon was made on 31 July 2001. The peak aerial survey counted 25% of the total season weir count of pink salmon. The peak aerial survey counted 285 pink salmon above the weir on 31 July, which represented 56% of the 509 cumulative pink salmon weir count on 31 July (Table 1).

A total of 529 usable chum salmon samples (scales) were collected during the period from 7 July to 14 August 2001. The ASL composition of the sampled fish is presented in Table 2. The chum salmon age composition was dominated by age class 0.4 (84.1%) and age class 0.3 (13.8%) (Table 2). A total of 445 usable coho salmon samples were collected during the period from 9 August to 6 September, 2001. Analysis of the coho salmon scale samples showed that 9.9% of the fish sampled were age-1.1, and 89.6% were age-2.1. The age, sex and mean length composition of the samples is presented in Table 3.

Air temperatures ranged from 3.3 to 13.3 °C at the Nome River weir site (Table 4). Water temperatures averaged 9.8 °C and ranged from 5.5 °C to 15.0 °C. The water level fluctuation for 2001 was from –1.5 to 49.1 cm, with a total difference of 50.6cm.

DISCUSSION

The escapement for chum salmon in 2001 was near the average since the project began (Figure 12). The odd-numbered year pink salmon escapement in 2001 was the latest run timing and second weakest on record and only a small fraction of its 1999 parent year escapement (Figures 4, 5 and 13). The even-numbered year pink salmon escapements from 1994 to 2000 are shown for comparison in Figure 14. Chinook salmon escapement in 2001 was the lowest since 1993 (Figure 15). Coho salmon escapement in 2001 was near average (Figure 16 and Appendix 1). The counts of Dolly Varden escapement for 2001 are shown in Figure 17, with comparisons for previous years.

This was the ninth consecutive year of operation for an escapement project on the Nome River. During the first four years the project site was approximately one km upstream of the current weir site at a location better suited to operation of a counting tower.

River conditions at the Nome weir were good throughout the 2001 counting season and no washouts occurred. In previous years a portion of the run was estimated because washouts allowed unmonitored passage of salmon. Comparisons of these estimates by year are presented in Appendix Table 2.

Table 1. Daily passage of all salmonid species at the Nome River weir, Norton Sound, 2001. [1]

Date	Daily chum salmon	Cumulative chum salmon	Daily pink salmon	Cumulative pink salmon	Daily chinook salmon	Cumulative chinook salmon	Daily coho salmon	Cumulative coho salmon	Daily Dolly Varden	Cumulative Dolly Varden	Daily Sockeye Salmon	Cumulative Sockeye Salmon
8-Jul	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
10-Jul	32	32	0	0	0	0	0	0	0	0	0	0
11-Jul	131	163	0	0	0	0	0	0	0	0	0	0
12-Jul	120	283	0	0	0	0	0	0	0	0	0	0
13-Jul	3	286	0	0	0	0	0	0	0	0	0	0
14-Jul	408	694	6	6	0	0	0	0	7	7	0	0
15-Jul	314	1,008	10	16	1	1	0	0	0	7	2	2
16-Jul	77	1,085	0	16	0	1	0	0	0	7	0	2
17-Jul	45	1,130	0	16	0	1	0	0	7	14	0	2
18-Jul	71	1,201	4	20	0	1	0	0	6	20	1	3
19-Jul	75	1,276	3	23	0	1	1	1	4	24	1	4
20-Jul	131	1,407	15	38	1	2	0	1	20	44	3	7
21-Jul	68	1,475	35	73	0	2	0	1	10	54	1	8
22-Jul	156	1,631	122	195	0	2	1	2	10	64	7	15
23-Jul	33	1,664	38	233	0	2	0	2	4	68	0	15
24-Jul	0	1,664	13	246	0	2	0	2	0	68	0	15
25-Jul	16	1,680	34	280	0	2	0	2	0	68	1	16
26-Jul	2	1,682	10	290	0	2	0	2	0	68	1	17
27-Jul	3	1,685	1	291	0	2	2	4	0	68	0	17
28-Jul	36	1,721	25	316	0	2	1	5	0	68	0	17
29-Jul	180	1,901	146	462	1	3	1	6	11	79	5	22
30-Jul	4	1,905	2	464	0	3	0	6	0	79	0	22
31-Jul	20	1,925	45	509	0	3	0	6	2	81	0	22
1-Aug	11	1,936	30	539	0	3	0	6	1	82	0	22
2-Aug	7	1,943	24	563	0	3	0	6	1	83	0	22
3-Aug	59	2,002	133	696	0	3	0	6	0	83	0	22
4-Aug	378	2,380	1,141	1,837	2	5	3	9	4	87	14	36
5-Aug	0	2,380	64	1,901	0	5	0	9	0	87	0	36
6-Aug	2	2,382	59	1,960	0	5	0	9	0	87	0	36
7-Aug	2	2,384	23	1,983	0	5	0	9	0	87	0	36
8-Aug	28	2,412	220	2,203	0	5	0	9	4	91	0	36
9-Aug	47	2,459	213	2,416	0	5	1	10	5	96	3	39
10-Aug	99	2,558	200	2,616	0	5	9	19	15	111	1	40
11-Aug	0	2,558	44	2,660	0	5	0	19	0	111	0	40
12-Aug	8	2,566	30	2,690	0	5	1	20	2	113	0	40
13-Aug	100	2,666	242	2,932	1	6	97	117	8	121	4	44
14-Aug	14	2,680	17	2,949	0	6	29	146	2	123	0	44
15-Aug	9	2,689	14	2,963	0	6	21	167	8	131	0	44
16-Aug	4	2,693	6	2,969	0	6	2	169	1	132	1	45
17-Aug	7	2,700	7	2,976	0	6	12	181	5	137	0	45
18-Aug	13	2,713	19	2,995	0	6	7	188	4	141	1	46
19-Aug	9	2,722	10	3,005	0	6	63	251	6	147	1	47
20-Aug	0	2,722	3	3,008	0	6	0	251	2	149	0	47
21-Aug	0	2,722	3	3,011	0	6	0	251	8	157	0	47
22-Aug	1	2,723	0	3,011	0	6	0	251	2	159	0	47
23-Aug	40	2,763	60	3,071	0	6	706	957	148	307	2	49
24-Aug	17	2,780	0	3,071	0	6	126	1,083	23	330	0	49
25-Aug	2	2,782	8	3,079	0	6	84	1,167	10	340	0	49
26-Aug	7	2,789	2	3,081	0	6	9	1,176	33	373	0	49
27-Aug	12	2,801	7	3,088	0	6	48	1,224	24	397	2	51
28-Aug	5	2,806	1	3,089	0	6	120	1,344	22	419	0	51
29-Aug	10	2,816	7	3,096	0	6	434	1,778	1	420	0	51
30-Aug	2	2,818	4	3,100	0	6	6	1,784	4	424	0	51
31-Aug	1	2,819	0	3,100	0	6	15	1,799	0	424	0	51
1-Sep	5	2,824	4	3,104	1	7	18	1,817	7	431	0	51
2-Sep	6	2,830	4	3,108	0	7	33	1,850	8	439	0	51
3-Sep	1	2,831	0	3,108	0	7	0	1,850	1	440	0	51
4-Sep	14	2,845	6	3,114	0	7	374	2,224	60	500	1	52
5-Sep	0	2,845	1	3,115	0	7	0	2,224	0	500	0	52
6-Sep	2	2,847	5	3,120	0	7	39	2,263	11	511	0	52
7-Sep	2	2,849	2	3,122	0	7	77	2,340	7	518	1	53
8-Sep	0	2,849	0	3,122	0	7	0	2,340	0	518	0	53
9-Sep	0	2,849	0	3,122	0	7	0	2,340	0	518	0	53
10-Sep	8	2,857	12	3,134	0	7	69	2,409	9	527	1	54
11-Sep	2	2,859	4	3,138	0	7	9	2,418	2	529	1	55
Total	2,859		3,138		7		2,418		529		55	

[1] Only the fish trap was open on September 5, 8 and 9 to collect scale samples so passage numbers do not indicate abundance.

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Table 2. Age, sex, and length composition of chum salmon samples, Nome River, Norton Sound, 2001.

		Brood Year and (Age Group)				
		1999 (0.2)	1998 (0.3)	1997 (0.4)	1996 (0.5)	Total
Sampling Dates:	7/16-7/29					
Sample Size:	157					
Male	Percent of Sample	0.6%	5.1%	43.3%	0.6%	49.7%
	Number in Sample	1	8	68	1	78
	Avg. Length(mm)[1]	609	612	624	576	
Female	Percent of Sample	0.6%	4.5%	45.2%	0.0%	50.3%
	Number in Sample	1	7	71	0	79
	Avg. Length(mm)[1]	576	558	582		
Total	Percent of Sample	1.3%	9.6%	88.5%	0.6%	100.0%
	Number in Sample	2	15	139	1	157
Sampling Dates:	7/30-8/3					
Sample Size:	262					
Male	Percent of Sample	1.3%	10.2%	61.8%	0.0%	43.9%
	Number in Sample	2	16	97	0	115
	Avg. Length(mm)[1]	530	593	623		
Female	Percent of Sample	0.6%	14.6%	78.3%	0.0%	56.1%
	Number in Sample	1	23	123	0	147
	Avg. Length(mm)[1]	575	555	580		
Total	Percent of Sample	1.9%	24.8%	140.1%	0.0%	100.0%
	Number in Sample	3	39	220	0	262
Sampling Dates:	8/4-8/22					
Sample Size:	110					
Male	Percent of Sample	0.0%	2.5%	24.8%	0.6%	40.0%
	Number in Sample	0	4	39	1	44
	Avg. Length(mm)[1]		593	648	695	
Female	Percent of Sample	0.6%	9.6%	29.9%	1.9%	60.0%
	Number in Sample	1	15	47	3	66
	Avg. Length(mm)[1]	539	576	600	576	
Total	Percent of Sample	0.6%	12.1%	54.8%	2.5%	70.1%
	Number in Sample	1	19	86	4	110
Sampling Dates:	7/16-8/22	Season Total				
Sample Size:	529					
Male	Percent of Sample	0.6%	5.3%	38.6%	0.4%	44.8%
	Number in Sample	3	28	204	2	237
	Avg. Length(mm)[1]	556	598	628	635	
Female	Percent of Sample	0.6%	8.5%	45.6%	0.6%	186.0%
	Number in Sample	3	45	241	3	292
	Avg. Length(mm)[1]	563	562	584	576	
Total[2]	Percent of Sample	1.1%	13.8%	84.1%	0.9%	100.0%
	Number in Sample	6	73	445	5	529

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

[2] The number of fish in total are the sample sums; total percentages are derived from the sums.

Table 3. Age, sex, and length composition of coho salmon samples, Nome River, Norton Sound, 2001.

		Brood Year and (Age Group)[2]			
		1998 (1.1)	1997 (2.1)	1996 (3.1)	Total
Stratum Dates:	7/19-8/23				
Sampling Dates:	8/9-8/23				
Sample Size:	217				
Male	Percent of Sample	4.1%	47.5%	0.5%	52.1%
	Number in Escapement	39	455	5	499
	Avg. Length(mm)[1]	552	585	638	
Female	Percent of Sample	1.8%	45.2%	0.9%	47.9%
	Number in Escapement	17	433	9	458
	Avg. Length(mm)[1]	584	586	605	
Total	Percent of Sample	5.9%	92.7%	1.4%	100.0%
	Number in Escapement	56	887	13	957
Stratum Dates:	8/24-8/31				
Sampling Dates:	8/29				
Sample Size:	70				
Male	Percent of Sample	5.7%	45.7%	0.0%	51.4%
	Number in Escapement	48	385	0	433
	Avg. Length(mm)[1]	551	592		
Female	Percent of Sample	4.3%	44.3%	0.0%	48.6%
	Number in Escapement	36	373	0	409
	Avg. Length(mm)[1]	575	555		
Total	Percent of Sample	10.0%	90.0%	0.0%	100.0%
	Number in Escapement	84	758	0	842
Stratum Dates:	9/1-9/11				
Sampling Dates:	9/6-9/10				
Sample Size:	158				
Male	Percent of Sample	8.9%	41.1%	0.0%	50.0%
	Number in Escapement	55	254	0	310
	Avg. Length(mm)[1]	599	589		
Female	Percent of Sample	7.0%	43.0%	0.0%	50.0%
	Number in Escapement	43	266	0	310
	Avg. Length(mm)[1]	592	584		
Total	Percent of Sample	15.9%	84.1%	0.0%	100.0%
	Number in Escapement	98	521	0	619
Stratum Dates:	7/19-9/11				
Sampling Dates:	8/9-9/6		Season Total		
Sample Size:	442				
Male	Percent of Sample	5.9%	45.2%	0.2%	51.3%
	Number in Escapement	142	1,094	5	1,241
	Avg. Length(mm)[1]	576	587	638	
Female	Percent of Sample	4.0%	44.3%	0.4%	48.7%
	Number in Escapement	97	1,072	9	1,177
	Avg. Length(mm)[1]	587	580	605	
Total[3]	Percent of Sample	9.9%	89.6%	0.6%	100.0%
	Number in Escapement	239	2,166	13	2,418

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

[2] The number of fish in each stratum age and sex category are derived from the sample percentages.

[3] The number of fish in total are the stratum sums; total percentages are derived from the sums.

Table 4. Climatological observations at the Nome River weir, Norton Sound, 2001.[1]

Date	Air Temp °C	Water Temp °C	Water Gauge cm	Weather
9-Jul		5.5		Cloudy
10-Jul		8.0	17.1	
11-Jul		9.0	15.2	
12-Jul	11.7	9.0	15.8	Fog/drizzle
13-Jul	10.0	9.5	15.2	Clearing
14-Jul	11.7	11.0	13.7	
15-Jul	11.7	10.5	15.2	High winds
16-Jul	10.0	8.5	29.6	Fog/drizzle
17-Jul	9.4	9.0	34.7	Rain/wind
18-Jul	11.7	10.0	21.6	Drizzle
19-Jul	10.0	10.0	26.8	Heavy rain
20-Jul	10.0	12.0	20.7	Fog
21-Jul	10.0	11.5	17.1	Fog
22-Jul	9.4	10.3	15.2	Fog
23-Jul	9.4	15.0	13.7	Overcast
24-Jul	9.4	9.5	12.5	Fog
25-Jul	10.0	10.8	11.0	Calm
26-Jul	9.4	8.5	9.1	
27-Jul	8.9	8.5	8.8	Fog/drizzle
28-Jul	8.3	11.0	7.6	Fog/drizzle
29-Jul	12.8	11.0	6.1	Partly cloudy
30-Jul	5.6	10.5	4.9	
31-Jul	12.8	10.5	3.4	Winds 30 mph
1-Aug	8.9	8.0	3.0	Rain
2-Aug	5.0	10.3	1.8	Mostly sunny
3-Aug	3.3	8.0	0.3	Frost
4-Aug		11.5	-0.9	
5-Aug	6.1	9.0	-0.9	Fog
6-Aug	10.0	9.5	-0.9	Fog
7-Aug	8.3	9.0	-0.6	Fog
8-Aug	8.3	9.0	15.8	Rain
9-Aug	8.3	9.5	10.7	Rain
10-Aug	8.9	8.5	5.2	Fog
11-Aug	7.2	8.5	2.7	Fog
12-Aug	7.2	9.5	5.2	Rain/fog
13-Aug	7.8	10.0	49.1	Rain/fog
14-Aug	9.4	10.3	21.3	Mostly cloudy
15-Aug	7.8	9.0	12.2	Mostly cloudy
16-Aug	1.1	9.8	8.8	Frost
17-Aug	5.6	8.5	7.0	Partly cloudy
18-Aug	6.1	9.5	5.5	Partly cloudy
19-Aug	12.8	10.0	4.9	Mostly sunny
20-Aug	7.2	11.0	4.0	Partly cloudy
21-Aug	8.9	11.0	3.4	Fog
22-Aug	6.7	9.8	2.7	Fog
23-Aug	10.0	10.3	1.8	Overcast
24-Aug	6.1	12.3	1.2	Fog
25-Aug	6.7	10.0	0.9	Fog
26-Aug	11.1	11.8	0.3	
27-Aug	5.6	12.0	0.0	Mostly sunny
28-Aug	13.3	12.8	-0.6	Rain
29-Aug	10.0	12.3	0.3	Rain
30-Aug	11.1	11.5	4.9	Rain
31-Aug	8.9	9.0	2.7	Partly cloudy
1-Sep	12.8	10.0	0.0	Partly cloudy
2-Sep	4.4	10.0	-0.9	Partly cloudy
3-Sep	6.7	8.3	-0.9	Wind/rain
4-Sep	7.2	10.0	10.1	Fog/rain
5-Sep	3.3	9.0	4.0	Partly cloudy
6-Sep	5.6	9.8	0.9	Partly cloudy
7-Sep	4.4	9.0	-0.6	Partly cloudy
8-Sep	5.6	8.0	-1.5	Cloudy
9-Sep	6.7	7.5	1.5	Rain
10-Sep	7.8	7.5	0.9	Cloudy
11-Sep	7.8	9.5	0.9	Cloudy
12-Sep	3.3	6.5	0.0	Mostly sunny

[1] Weather observations were recorded prior to the last count in the evening and varried by time.

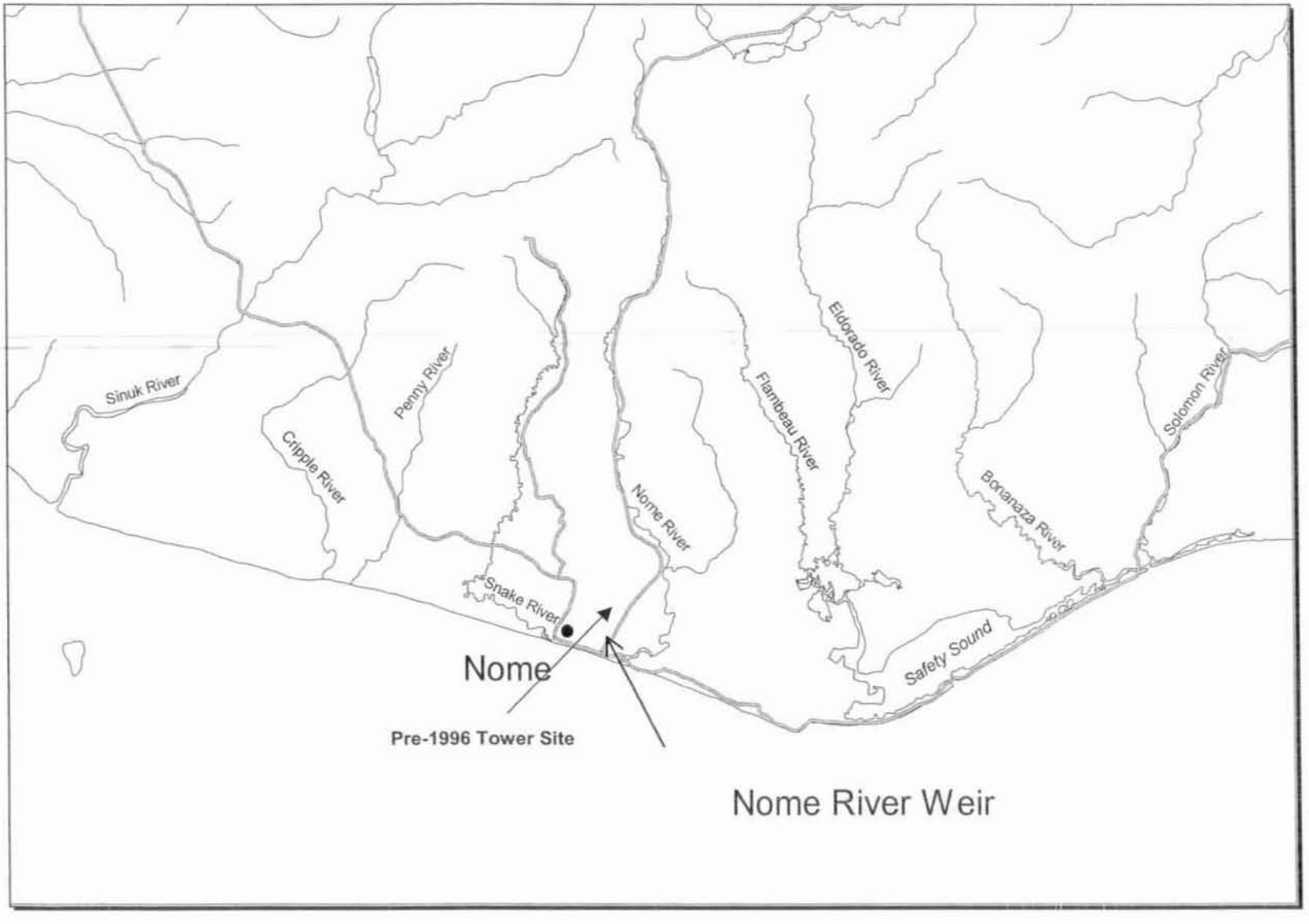

Figure 1. Area location map of the Nome River weir project site, Norton Sound, 2001.

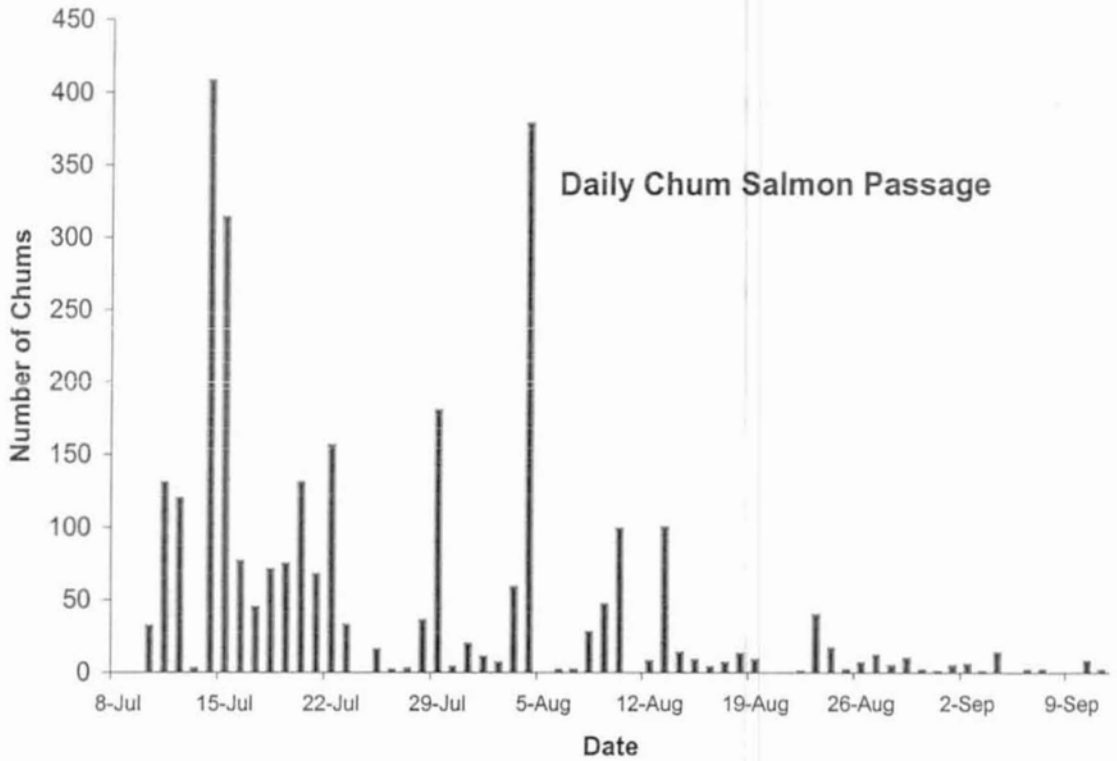

Figure 2. Daily chum salmon migration past the Nome River weir, Norton Sound, 2001.

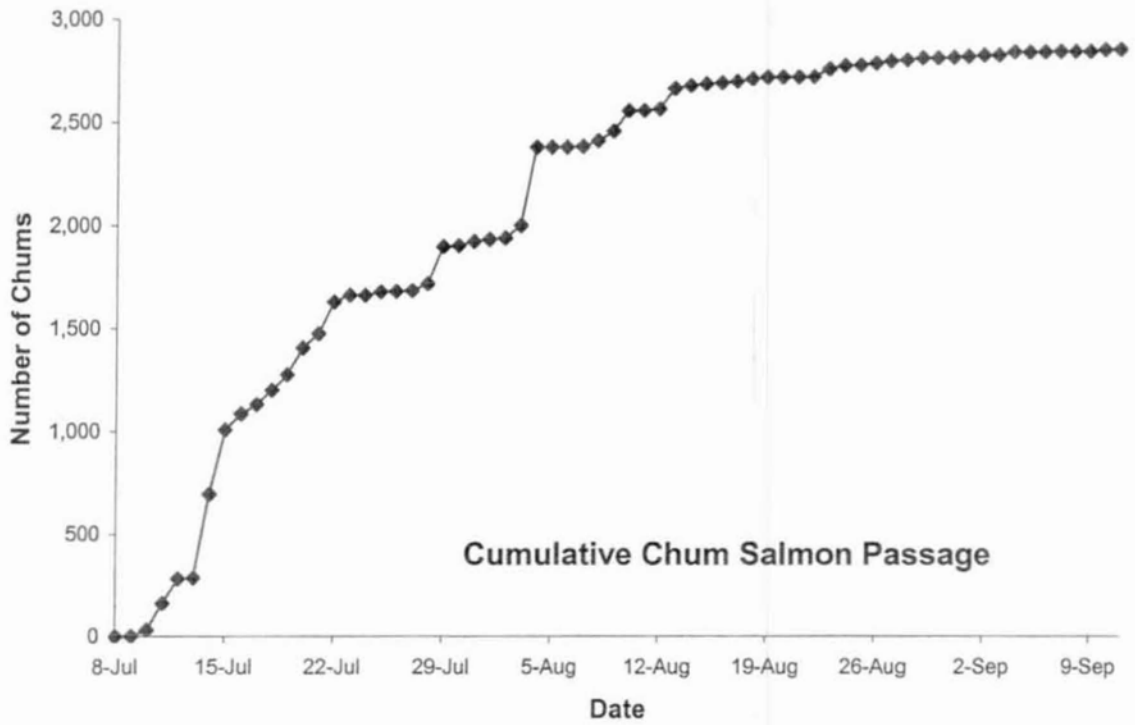

Figure 3. Cumulative chum salmon migration past the Nome River weir, Norton Sound 2001.

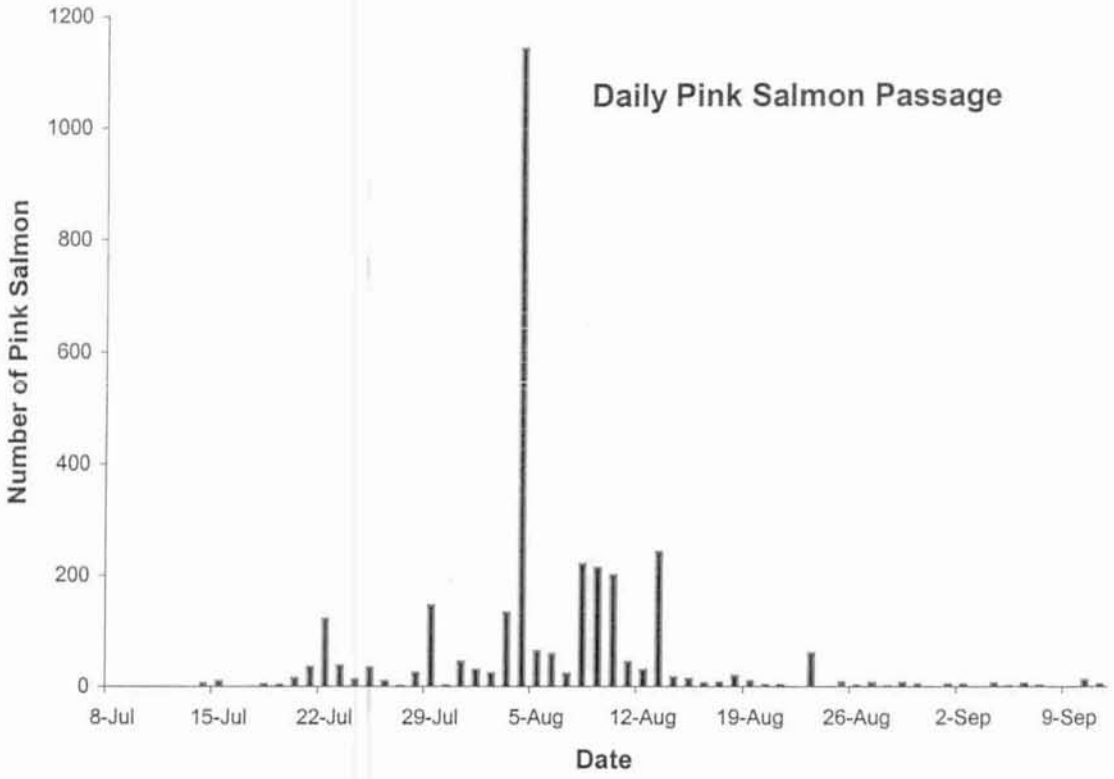

Figure 4. Daily pink salmon migration past the Nome River weir, Norton Sound, 2001.

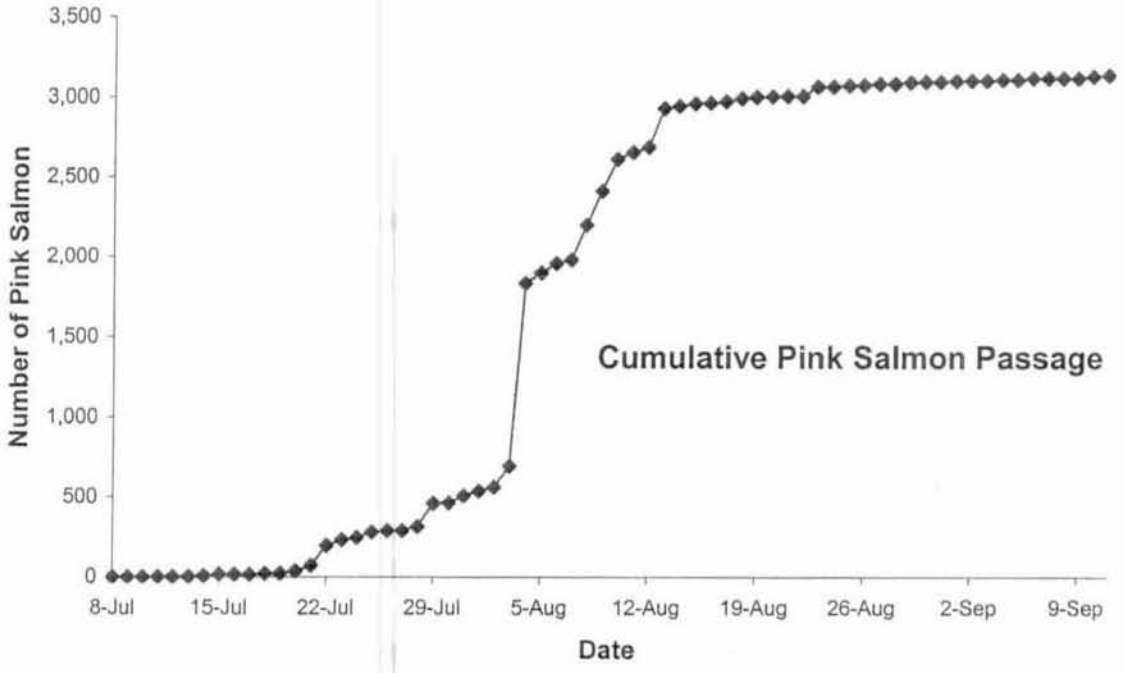

Figure 5. Cumulative pink salmon migration past the Nome River weir, Norton Sound, 2001.

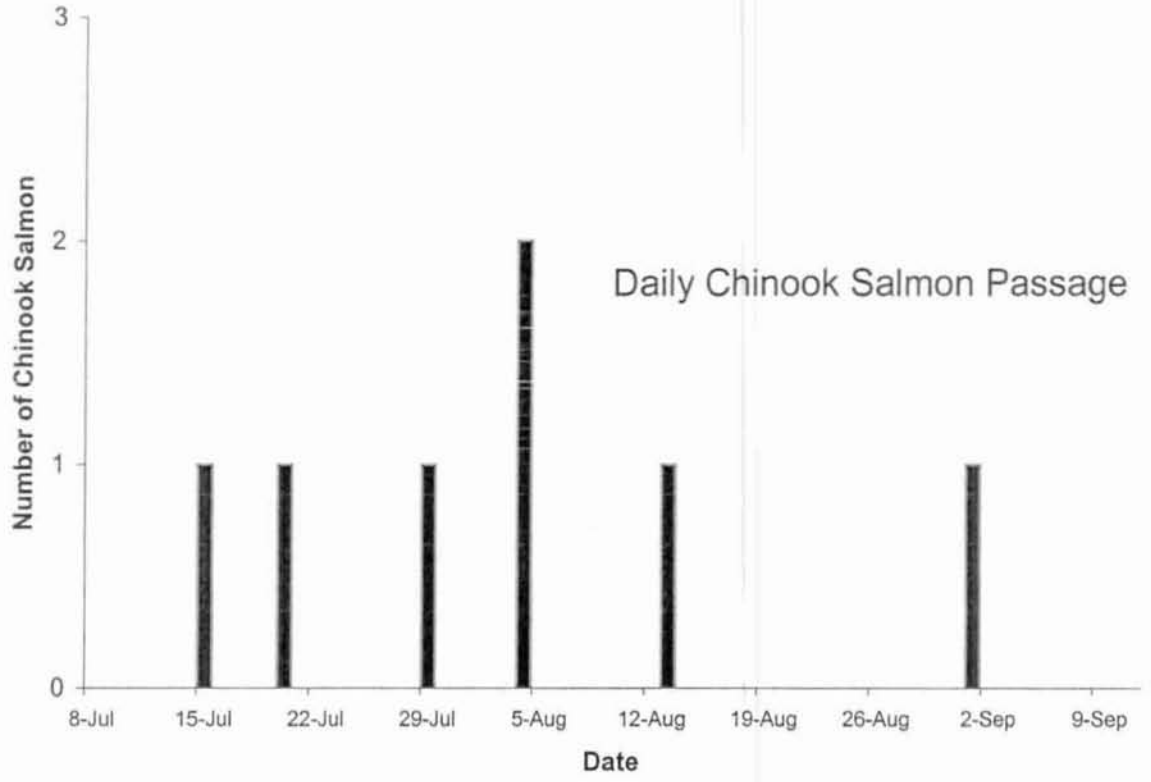

Figure 6. Daily chinook salmon migration past the Nome River weir, Norton Sound, 2001.

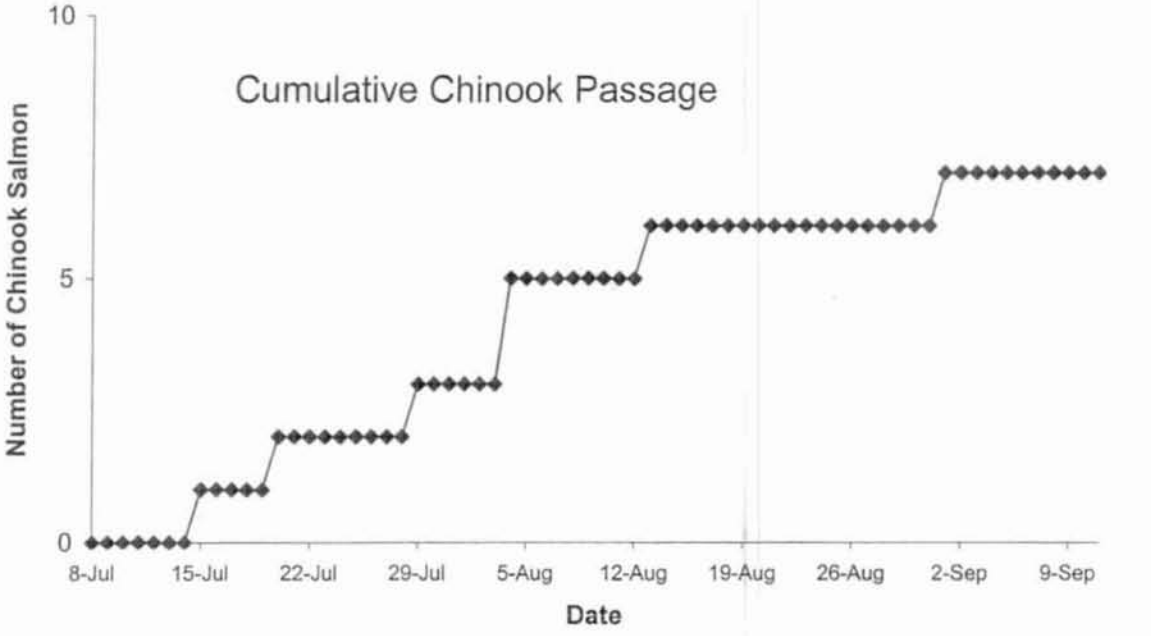

Figure 7. Cumulative chinook salmon migration past the Nome River weir, Norton Sound, 2001.

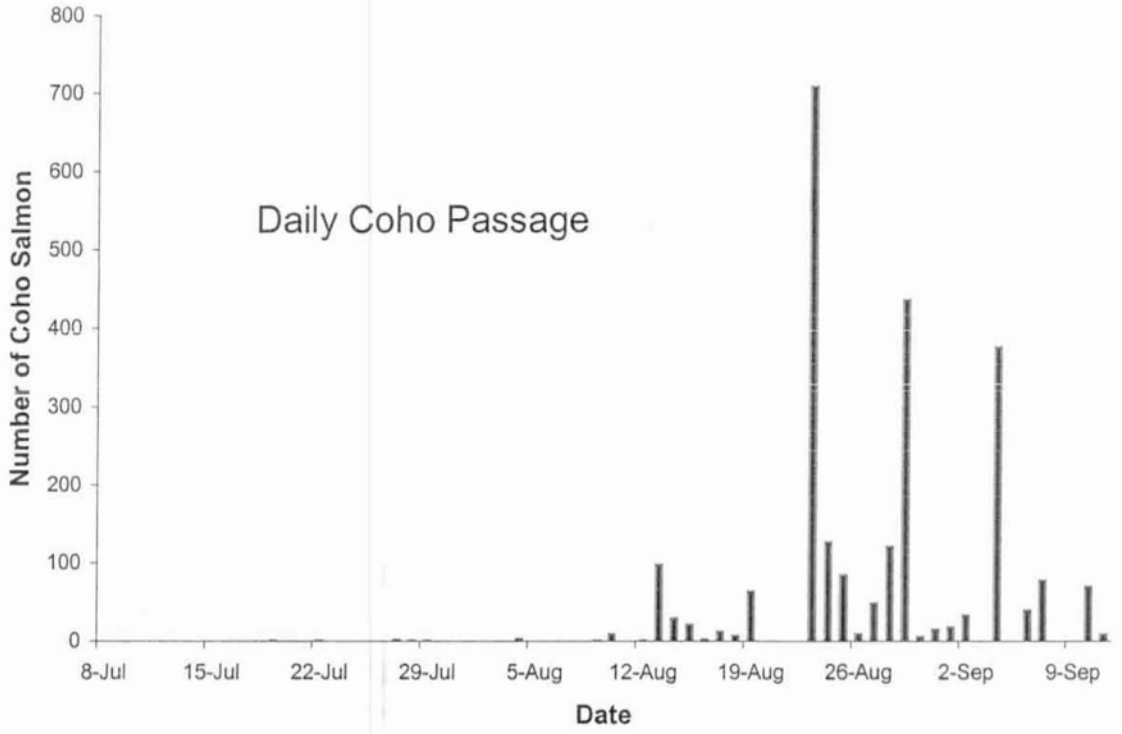

Figure 8. Daily coho salmon migration past the Nome River weir, Norton Sound, 2001.

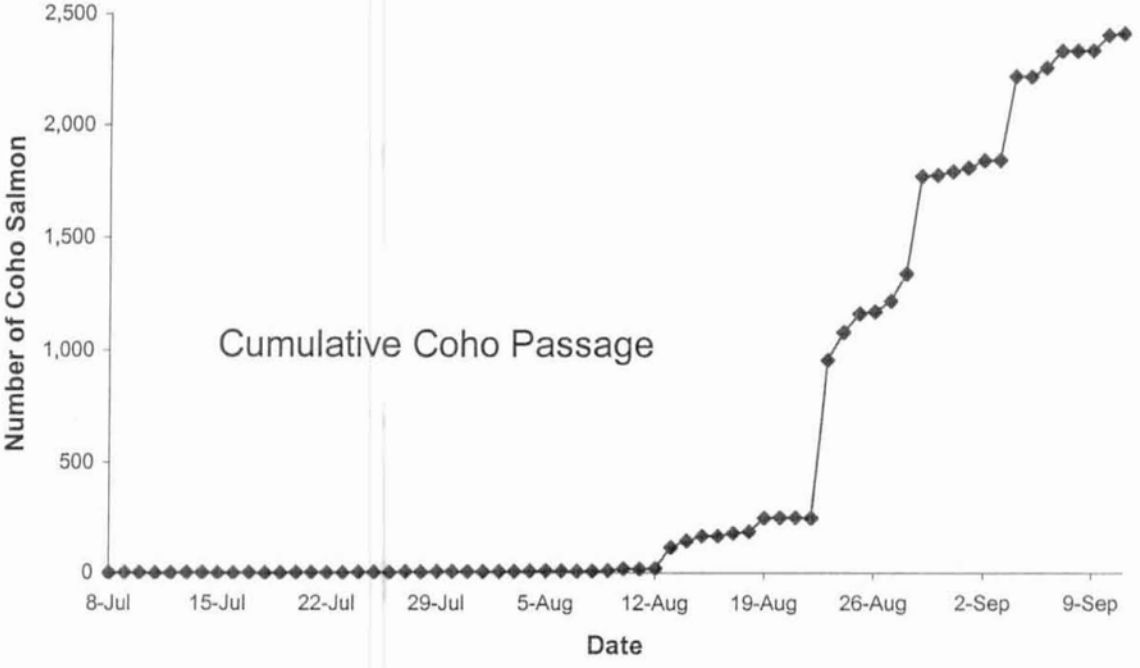

Figure 9. Cumulative coho salmon migration past the Nome River weir, Norton Sound, 2001.

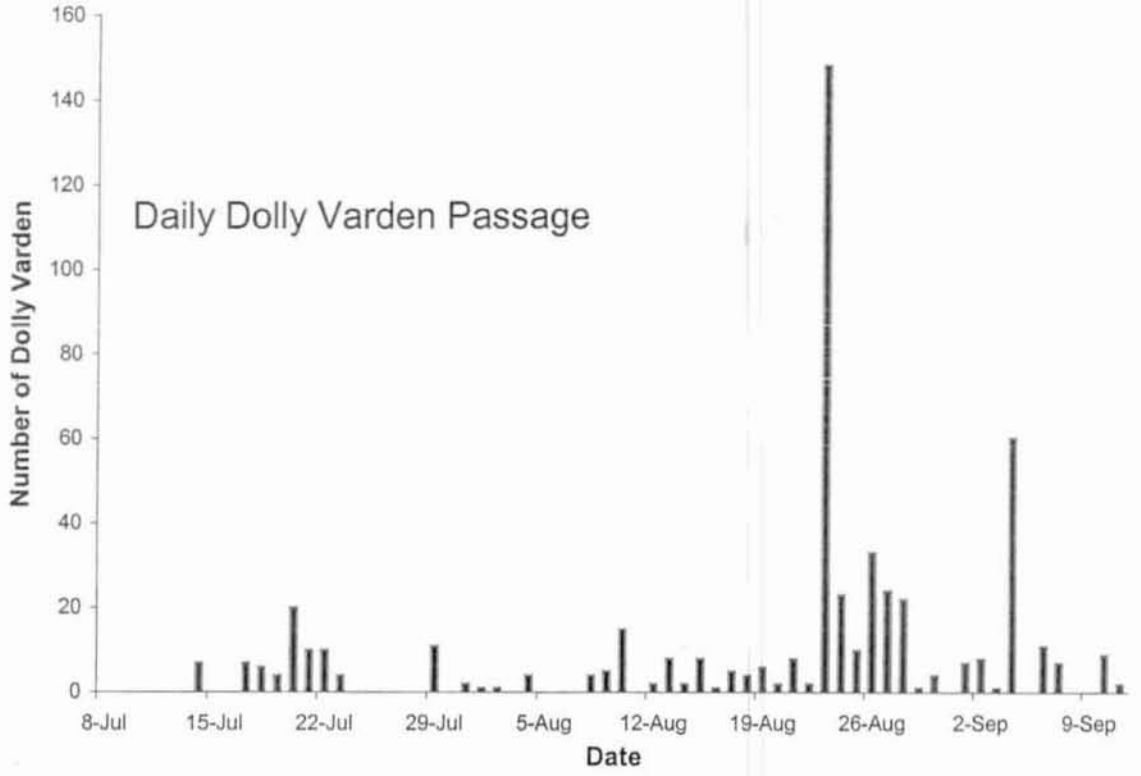

Figure 10. Daily Dolly Varden migration past the Nome River weir, Norton Sound, 2001.

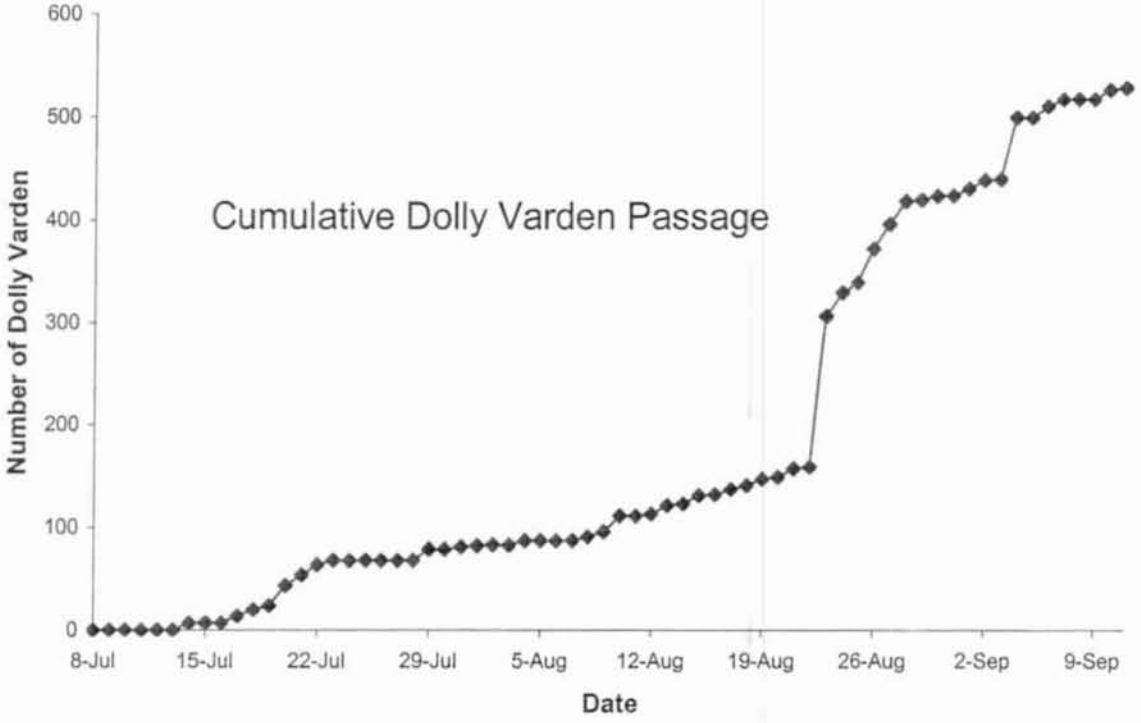

Figure 11. Cumulative Dolly Varden migration past the Nome River weir, Norton Sound, 2001.

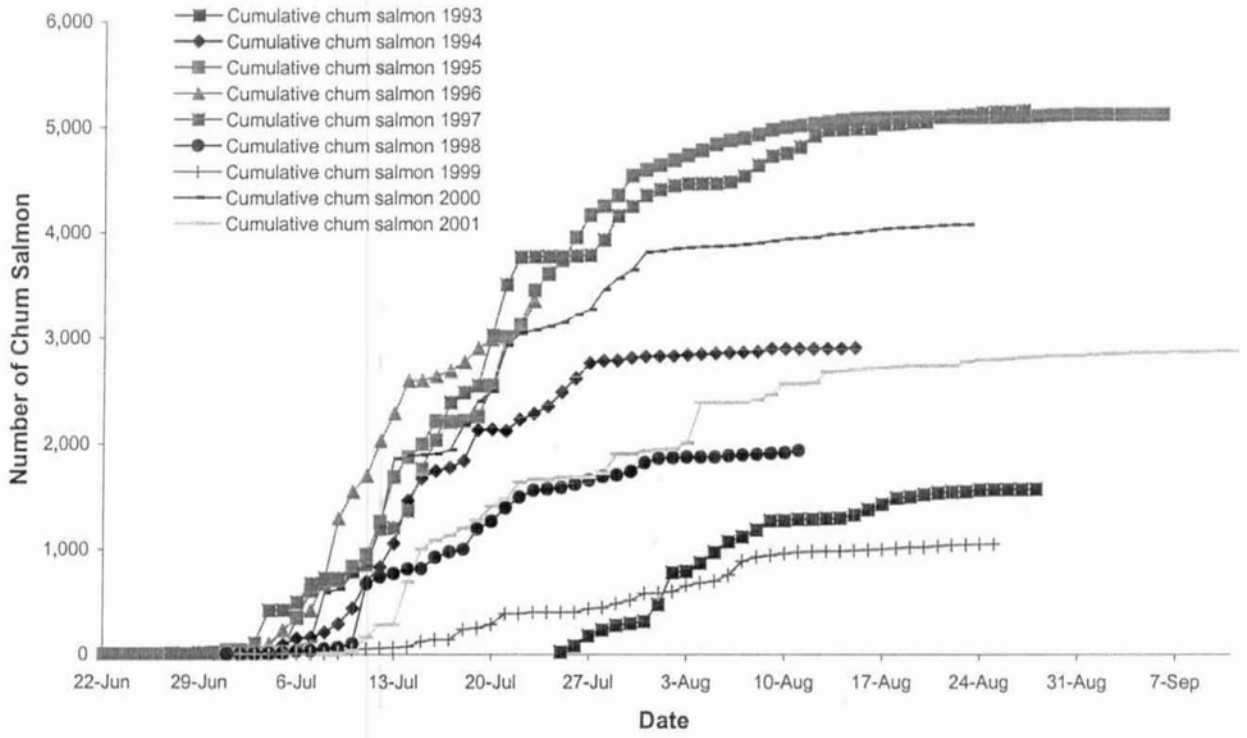

Figure 12. Cumulative passage of chum salmon past the Nome River counting tower, 1993-1995, and the Nome River weir, 1996-2001, Norton Sound.

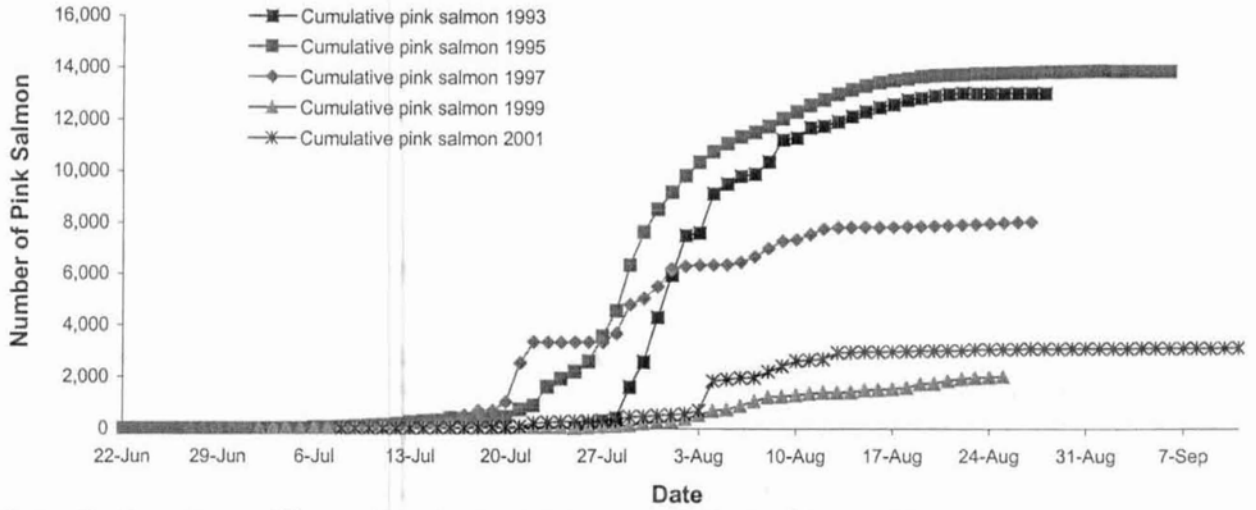

Figure 13. Cumulative odd year pink salmon migration past the Nome River counting tower, 1993-1995, and the Nome River weir, 1997-2001, Norton Sound.

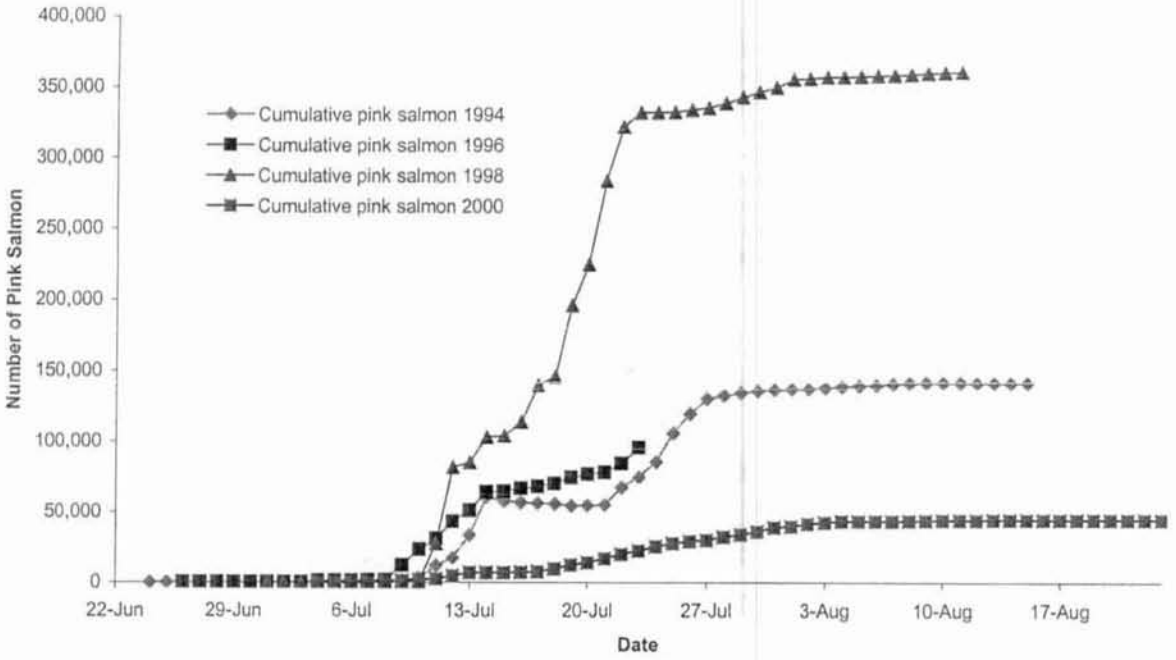

Figure 14. Cumulative even year pink salmon migration past the Nome River counting tower, 1994, and the Nome River weir, 1996, 1998, and 2000, Norton Sound.

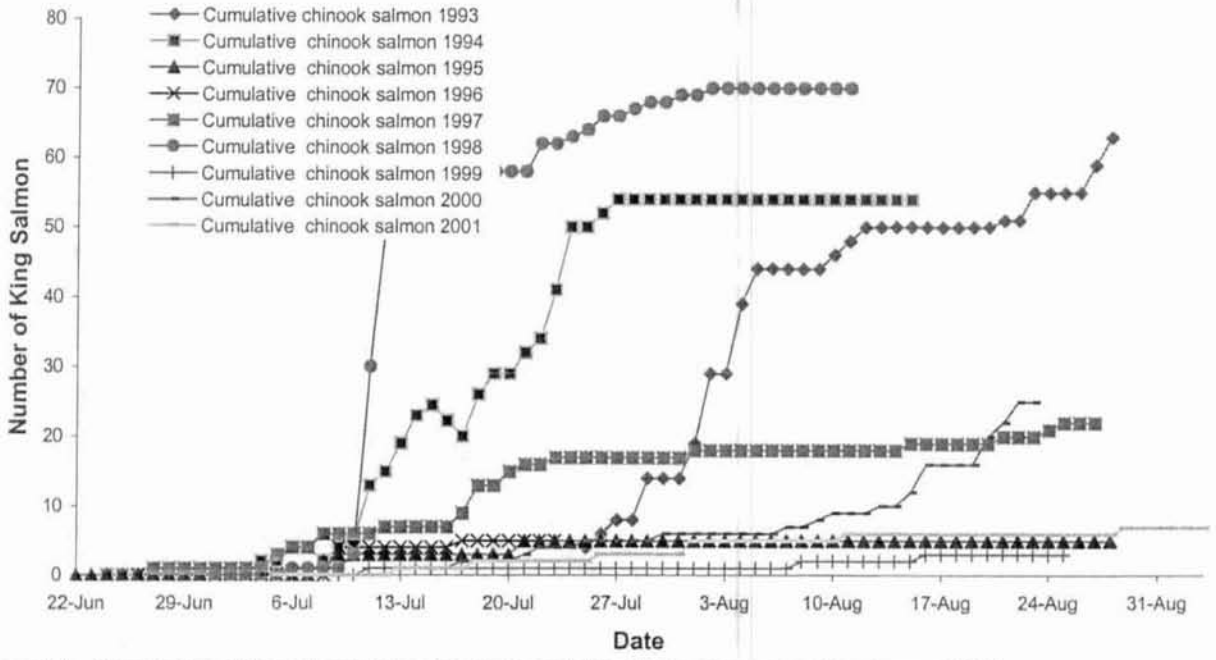

Figure 15. Cumulative chinook salmon migration past the Nome River counting tower, 1993-1995, and the Nome River weir, 1996-2001, Norton Sound.

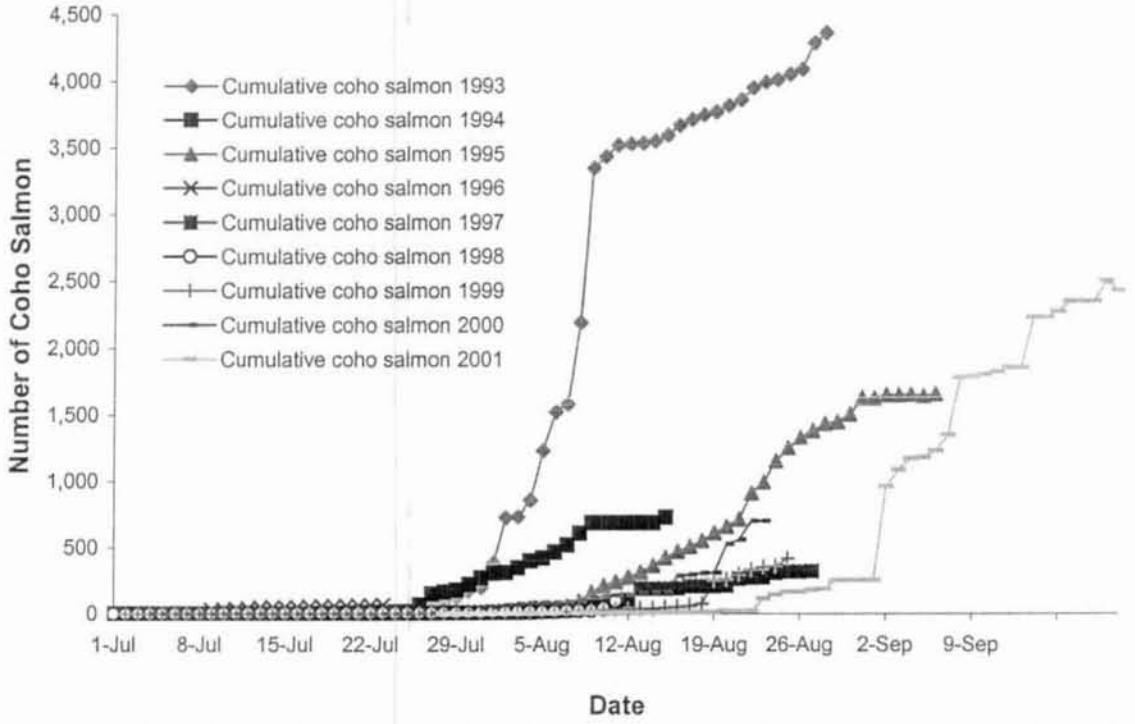

Figure 16. Cumulative coho salmon migration past the Nome River counting tower, 1993-1995, and the Nome River weir, 1996-2001, Norton Sound.

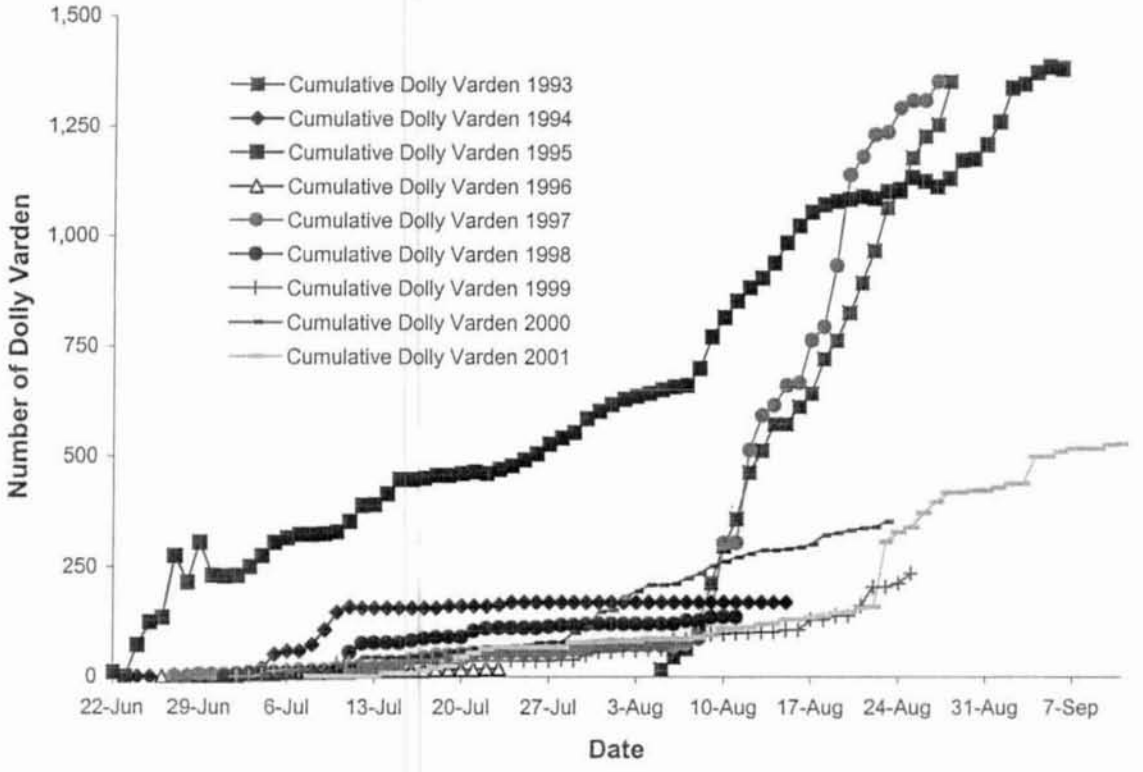

Figure 17. Cumulative Dolly Varden migration past the Nome River counting tower, 1993-1995, and the Nome River weir, 1996-2001, Norton Sound.

Appendix Table 1. Historical salmon escapement at the Nome River counting tower, 1993-1995 and weir 1996-2001.

Year	Operating period	Chum	Pink[1]	Chinook	Coho
1993	July 25-Aug 28	1,566	13,034	63	4,349
1994	June 24-Aug 15	2,893	141,246	54	726
1995	June 22-Sept 6	5,092	13,890	5	1,650
1996	June 26-Jul 23	3,339	95,681	5	66
1997	June 27-Aug 27	5,131	8,035	22	321
1998	July 01-Aug 11	1,930	359,469	70	96
1999	July 02-Aug 25	1,048	2,033	3	417
2000	June 29-Aug 25	4,056	44,368	25	698
2001	July 8-Sept 11	2,859	3,138	7	2,418
1993-2000 Average		3,132	9,248 [2]	31	1,040

[1] In 1996 the majority of pink salmon escaped through the pickets and were not counted.

[2] Pink salmon average is for odd-numberd years.

Appendix Table 2. Percentage of salmon counts estimated at the Nome River counting tower project 1993-1995 and weir 1996-2001.

Year	Operating period	Chum	Pink	Chinook	Coho
1993	July 25-Aug 28	15.3%	31.5%	30.2%	20.8%
1994	June 24-Aug 15	-3.0%	-95.9%	7.4%	32.5%
1995	June 22-Sept 6	3.1%	27.6%	20.0%	18.2%
1996	June 26-Jul 23[1]			[2] 0.0%	0.0%
1997	June 29-Aug 19[1]				
1998	July 01-Aug 11[1]				
1999	July 02-Aug 25[1]				
2000	June 29-Aug 25	5.0%	4.2%	0.0%	2.6%
2001	July 8-Sept 11	0.0%	0.0%	0.0%	0.0%

[1] No estimates were made in 1996, 1997, 1998 , and 1999.

[2] In 1996 the majority of pink salmon escaped through the pickets and were not counted.