

GOODNEWS RIVER FISHERIES STUDIES, 1988

By:

Charles Burkey Jr.

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AUTHOR

Charles Burkey Jr. is assistant area management biologist for the Alaska Department of Fish and Game, Division of Commercial Fisheries, P.O. Box 90, Bethel, AK 99559.

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ABSTRACT

The Goodnews River salmon counting tower operated from 23 June through 30 July 1988. An estimated 2,712 chinook (*Oncorhynchus tshawytscha*), 15,799 sockeye (*O. nerka*), 6 coho (*O. kisutch*), 6,781 pink (*O. gorbuscha*) and 20,799 chum (*O. keta*) salmon migrated past the counting tower during the 1988 operational period. The chinook and sockeye salmon season passage was below the minimum escapement objective established for the project. Chum salmon season passage was above escapement objectives.

Aerial survey counts of the Goodnews River system, in combination with tower estimates of the Middle Fork Goodnews River, provided a 1988 escapement estimate of 5,419 chinook, 38,319 sockeye, 11,019 pink and 39,501 chum salmon returning to the Goodnews River. The escapement estimates combined with the reported commercial and the estimated subsistence harvest in Goodnews Bay yields a total run estimate of 10,693 chinook, 75,752 sockeye, 16,528 pink and 73,008 chum salmon.

INTRODUCTION

Description of the Area

The Goodnews River originates in the Ahklun Mountains and flows southwest approximately 60 miles to Goodnews Bay (Figure 1). The Middle Fork parallels the length of the mainstem (North Fork) Goodnews River before joining near its mouth. The Goodnews River system drains an area of roughly 910 square miles and contains many lakes. All five species of Pacific salmon reside in the Goodnews River drainage.

Commercial Fishery

Commercial salmon fishing has occurred annually since 1968 in Goodnews Bay. The prevailing commercial gear employed consists of drift gill nets fished in tidal channels radiating from the Goodnews River (Figure 2). The 1988 Goodnews Bay reported commercial harvest totaled 4,964 chinook (*Oncorhynchus tshawytscha*), 36,368 sockeye (*O. nerka*) 30,832 coho (*O. kisutch*), 5,509 pink (*O. gorbuscha*) and 33,059 chum (*O. keta*) salmon (Table 1). The 1988 chinook salmon harvest was 28% below the previous (1983-1987) five year average. The commercial harvest of sockeye salmon was the third highest on record, more than double the previous five year average of 17,352 sockeye salmon. The coho salmon harvest was slightly below the previous five year average. The pink salmon commercial harvest may not truly reflect abundance as pink salmon is the least commercially valuable species and is not targeted. The even year pink salmon run is historically larger than the odd year run. The chum salmon commercial harvest was a record exceeding the previous record of 20,381 chum salmon in 1987 (Appendix 1).

Subsistence Fishery

Goodnews Bay residents have long depended upon the fishery resources as a source of food. The Department has documented subsistence salmon harvests in Goodnews Bay since 1977 (Appendix 2). Harvest estimates in 1988 were made from interviews with subsistence fishing families in November. In 1988 the Subsistence Division interviewed 26 subsistence fishing families. The estimated subsistence harvest was 310 chinook, 1,065 sockeye, 1,162 coho, and 448 chum salmon (Table 2).

Escapement Objectives

Preliminary escapement objectives of 3,000 to 4,000 chinook, 35,000 to 45,000 sockeye and 13,000 to 18,000 chum salmon were established in 1983 (Schultz, 1984). The objectives represent those escapement levels thought to be necessary to maintain returns at current levels, and are based on historical aerial surveys and three years of counting tower information. Escapement objectives are useful in evaluating abundance trends and the success of fishery management strategies. In-season cumulative counting tower escapement estimates can be

compared with historic migratory timing to predict whether escapement objectives will be achieved. This information helps managers of the Goodnews Bay commercial fishery determine commercial periods. Continuing assessment of salmon returns may require future adjustments of the escapement objectives to optimize salmon production.

METHODS

Atmospheric and Hydrological Observations

Project personnel recorded standard environmental factors including relative water level, precipitation, and air and water temperatures daily at the tower site. Changes in water level, usually associated with precipitation, influence the ability to enumerate and identify salmon. Increased water level usually increases turbidity making enumeration and identification more difficult. Air and water temperatures are collected to establish a data base that may provide significant relationships with run timing, survival, or other parts of the life history.

Salmon Estimates

The sampling scheme used for the 1988 field season was similar to that used since 1985. The hour was the primary sample unit, with three secondary units (3 consecutive 20-minute periods). The observer monitored the first 20-minutes of each hour. To obtain the net number of salmon going upriver during the 20-minute counting period, the recorded number of salmon of each species that went downstream was subtracted from those that traveled upriver. The 20-minute count was multiplied by three to estimate the full hour passage. Six 24 consecutive hour counts (one 20-minute period per hour) were conducted in 1988 to determine daily diel passage rates for salmon.

Historical (1981-1988) average counts by hour for each species, as a percentage of the daily total (Appendices 3-6), were used to expand passage estimates for those hours that the tower was not in operation. With the limited data base available for coho salmon, the average historical sockeye salmon hourly migration percentage was used to determine coho salmon passage during hours the tower was not operating. The historical hourly migration percentages during high pink salmon return years (1982, 1984, 1986 and 1988) has a large enough data base to evaluate the passage of pink salmon during hours the tower was not in operation.

The average of the previous and succeeding daily counts was used to estimated daily counts for scheduled crew days off (Sundays and holidays).

Migration Timing

To evaluate fish travel time between the Goodnews Bay commercial fishery and the tower site, tower counts were compared with commercial fishery catch per unit

effort (CPUE) statistics. The CPUE calculation assumes that if a fisherman delivered at least once during a commercial period, he fished the entire period. The CPUE is calculated by dividing the catch by the total fisherman hours for that period. Fishing conditions prevailing during the commercial period, salmon abundance and many other factors can influence the CPUE calculations. However, this method was used as a very approximate estimate of travel time.

Age, Sex and Size

The Department has established escapement sample objectives for age, length and sex information of 580 chinook, 600 sockeye and 450 chum salmon. Fish were collected by beach seining below the tower site on the Middle Fork Goodnews River.

Aerial Survey

The Department conducted an aerial survey on 15 July 1988 to assess escapement on the Goodnews River system. Aerial surveys count only a percentage of the fish present, which may vary depending on the experience of the surveyor, weather conditions and the spawning stage of the salmon at the time of the survey. The percentage of the salmon observed by the surveyor was calculated by comparing the aerial survey count above the tower site with the tower count through that date. Expanding the aerial survey count of the entire Goodnews River to estimate total escapement based on this relationship assumes the surveyor was observing the same percentage of the fish present throughout the survey.

RESULTS

Atmospheric and Hydrological Observations

Atmospheric and hydrological observations at the Goodnews River salmon counting tower site are found in Appendix 7. Personnel shortages delayed the start of the project until 23 June. The scheduled operational date was 15 June 1988. Precipitation in late June contributed to the increasing river water level on 28 June (Figure 3). Water levels and visibility did not adversely affect fish counts during tower operation in 1988.

Salmon Estimates

An unexpanded total of 621 chinook, 3,773 sockeye, 2 coho, 1,871 pink and 5,472 chum salmon were counted during 603 twenty-minute tower counting periods (Tables 3-7). The 20-minute estimates expanded by a factor of three yields of total estimate of 1,863 chinook, 11,319 sockeye, 6 coho, 5,613 pink and 16,416 chum salmon passing the site during operational hours (Tables 8-11). An estimated 2,712 chinook, 15,799 sockeye, 6 coho, 6,781 pink and 20,799 chum salmon passed the tower site in 1988 when expanding the counts to include the hours the tower was not in operation (Table 12). Historic estimates of daily and cumulative salmon escapements for the Goodnews River counting tower are shown in Appendices 8-12.

The 1988 expanded escapement estimate of 2,712 chinook salmon was slightly below the minimum objective of 3,000 chinook salmon. Run timing was earlier than the 1981 to 1988 average (Appendix 13), with 50 percent of the chinook salmon migration passing the tower site by 5 July (Figure 4).

The 1988 expanded escapement estimate of 15,779 sockeye salmon is approximately 55 percent below the minimum escapement objective of 35,000 sockeye salmon. Run timing was early as compared to the average for the eight years the tower has been in operation (Appendix 14). Fifty percent of the run passed by 4 July (Figure 5).

The 1988 expanded escapement estimate of 20,799 chum salmon exceeded the escapement objective of 13,000 to 18,000 chum salmon. Run timing was earlier than average with 50 percent of the chum salmon migration passing the tower site by 11 July (Figure 6). The average (1981-1988) migration timing is for 50 percent of the migration to pass by 16 July (Appendix 15).

Historic daily cumulative proportions of coho and pink salmon escapement are shown in Appendices 16 and 17. These are incomplete since tower operation is discontinued well before the peak of migration for these species.

Average daily diel count distributions for chinook, sockeye and chum salmon were similar (Appendices 18-21 and Figure 7). Peak passage time was between noon and midnight when approximately 75% of the fish were observed. The best period for chinook and sockeye salmon passage was between 10:00 pm and 11:00 pm when 11.2% of chinook and 10.6% of sockeye were counted. Peak hour for chum salmon passage was between 1:00 pm and 2:00 pm when 16.6% of the fish were observed.

Migration Timing

To evaluate fish travel time between the Goodnews Bay commercial fishery and the tower site, the tower counts were compared with the commercial fishery CPUE. In 1988, it appears that sockeye salmon had the most rapid travel time of approximately five to seven days (Figure 5). Chum and chinook salmon had a travel time of 10 to 15 days from fishery to tower (Figures 4 and 6). These travel time estimates are consistent with past observations (Schultz 1987).

Age, Sex and Size

Successful methods and locations were identified for capturing chum and sockeye salmon, for which sampling objectives were achieved. A total of 94 chinook, 314 sockeye and 412 chum salmon with readable scales was sampled by beach seine in 1988 (Tables 13-16). Chinook salmon were mainly age 6 (58%), sockeye salmon were predominately age 5 (84%) and the majority of chum salmon (68%) were age 5 fish.

Aerial Survey

An aerial survey was flown on 15 July to enumerate the salmon escapement in the Goodnews River. The surveyor rated the conditions fair with clear skies, low and clear river water levels and before peak chinook, sockeye and chum salmon

spawning stage. The surveyor counted 3,591 chinook, 10,262 sockeye and 6,104 chum salmon (Table 17). Of this total, 884 chinook, 4,231 sockeye and 3,214 chum salmon were counted above the tower site. Based on the tower estimate through the date of the survey the surveyor counted 39.4, 29.6 and 21.0 percent of the chinook, sockeye and chum salmon escapement, respectively.

Assuming the surveyor counted the same percentage throughout the drainage, the total escapement into the Goodnews River on July 30 was estimated to be 5,419 chinook, 38,319 sockeye, 11,019 pink and 39,501 chum salmon (Table 17). The escapement estimates combined with commercial and estimated subsistence harvest in Goodnews Bay result in a total run size estimate of 10,693 chinook, 75,752 sockeye, 16,528 pink and 73,008 chum salmon. The commercial fishery exploitation rate was approximately 46, 48, 33 and 45 percent of the estimated run size for chinook, sockeye, pink and chum salmon, respectively (Appendix 22).

DISCUSSION

Adjustment of the time allowed for commercial fishing is the primary method of controlling the harvest in Goodnews Bay. The apparent lag time between the commercial fishery and the tower project is too large to use the tower estimate for in-season management during the early portion of the chinook salmon migration. This inability to accurately assess the run status of chinook salmon early makes it necessary to take a conservative approach towards chinook salmon management. The tower estimates become more useful as an in-season indicator of the chinook salmon run as the season progresses. Preliminary 1988 tower count estimates confirmed preseason forecasts of an average chinook salmon return, and suggested that chinook salmon escapement objectives would be achieved. The Goodnews Bay commercial fishery opened on 16 June and a "normal" schedule of two 12-hour periods per week was maintained in June. To minimize transfer of fishermen from Districts 1 and 4, the openings were scheduled to coincide with commercial fishery openings in these districts.

Historical commercial fishery statistics are the primary tool available to the managers of the Goodnews Bay commercial fishery during the early portion of the chinook salmon migration. However, managers can use tower estimates as early as 1 July since 15 percent of the historical (1981-1988) average migration has passed the tower by that date (Appendix 13). Historically, 60 to 70 percent of the chinook salmon migration has passed through the commercial fishery by 1 July. This is not too late to adjust commercial periods to accommodate the chinook salmon escapement objective.

The project is an excellent in-season management tool for sockeye salmon which have a short travel time between the commercial fishery and the tower site. It was apparent early in July 1988 that the sockeye salmon escapement was below average. Managers allowed a restrictive two 12-hour period per week schedule ("normal" schedule is three 12-hour periods per week) until 20 July, when the fishery was closed to allow additional sockeye salmon escapement. A more restrictive schedule would have increased sockeye salmon escapement but would have prevented the harvest of surplus chum salmon. Preliminary evaluation of the sockeye salmon exploitation rate in previous years indicated that the sockeye salmon escapement objective should be reduced to optimize production

(Appendix Table 22). The commercial harvest of 36,368 sockeye salmon was above the previous five year average (1983-1987) of 17,352 salmon. Sockeye escapement was 55 percent below the objective range established for this system.

The return of chum salmon into the Goodnews Bay fishery coincides with the sockeye salmon migration. There are only limited ways to segregate the harvest of these two species within Goodnews Bay, with sockeye salmon the primary species of management concern. The commercial harvest of 33,059 chum salmon was a record and well above the previous five year average (1983-1987) of 11,325 salmon. The tower escapement estimate of 20,799 chum salmon was above the escapement objective of 13,000 to 18,000 salmon.

LITERATURE CITED

Schultz, K. 1984. Goodnews River Studies, 1984. AYK Region, Kuskokwim Escapement Report. ADF&G, Commercial Fisheries Division Bethel.

Schultz, K. 1987. Goodnews River Studies, 1986. AYK Region, Kuskokwim Escapement Report. ADF&G, Commercial Fisheries Division, Bethel.

TABLES

Table 1. Goodnews Bay, District 5, commercial salmon harvest by species and fishing effort by period, 1988.

Date	Permits	Ldggs.	CATCH									
			CHINOOK		SOCKEYE		COHO		PINKS		CRUM	
			NO.	LBS.	NO.	LBS.	NO.	LBS.	NO.	LBS.	NO.	LBS.
6/16	22	25	251	4,613	696	5,549					1,091	9,197
6/20	32	37	404	6,620	1,989	16,056					3,501	28,882
6/23	68	107	1,639	28,056	2,701	20,760			1	5	7,833	67,118
6/28	48	63	1,307	22,168	2,932	23,370			5	17	8,369	70,021
7/02	42	49	234	3,514	2,657	21,026			16	50	3,434	26,435
7/05	36	49	467	7,751	3,328	25,572			44	135	3,193	25,348
7/08	47	53	147	2,427	3,600	27,534			4	12	1,894	14,492
7/11	54	60	124	1,800	2,851	21,624			35	103	1,525	10,718
7/14	48	55	89	1,253	3,173	24,582			110	362	1,019	7,167
7/18	48	51	71	961	3,049	24,031			172	568	649	4,546
7/25	39	41	30	425	1,534	11,986	24	166	440	1,612	227	1,584
7/29	35	37	32	482	1,312	10,167	91	653	530	1,590	72	493
8/01	33	34	27	356	811	6,030	171	1,263	683	2,049	55	401
8/03	23	23	13	185	578	4,297	192	1,478	471	1,413	33	221
8/05	25	26	12	196	527	4,097	752	5,887	517	1,896	63	385
8/08	30	35	19	319	926	7,183	1,343	11,108	531	1,766	23	165
8/10	31	33	10	151	659	4,853	1,340	10,091	240	783	20	142
8/12	34	38	7	57	564	4,147	1,766	13,926	339	1,158	9	67
8/15	32	33	5	62	398	3,033	2,338	17,958	177	540	4	28
8/17	35	38	16	202	498	3,777	3,237	25,491	133	399	7	43
8/19	36	40	10	147	360	2,677	4,180	34,731	73	219	6	36
8/22	41	53	10	120	353	2,646	4,520	38,033	175	590	5	38
8/24	52	53	17	159	244	1,836	3,467	30,089	237	711	5	31
8/26	52	62	8	70	204	1,494	2,868	24,854	255	765	7	58
8/29	61	61	4	49	155	1,207	1,675	14,434	112	339	3	26
8/31	52	52	6	56	88	603	1,125	9,551	80	240	5	30
9/02	39	40	2	44	57	392	792	7,229	49	150	4	20
9/05	28	28	2	40	61	429	525	4,618	46	140	2	12
9/07	24	24	1	25	63	447	426	3,737	34	102	1	5
9/09	0	0										
NO COMMERCIAL FISHING - NO BUYERS												
Total	125	1,300	4,964	82,308	36,368	281,405	30,832	255,297	5,509	17,714	33,059	267,709
Average wt.				16.58		7.74		8.28		3.22		8.10

Table 2. Goodnews Bay area subsistence salmon fishery summary, 1988.

Village	Families Surveyed			Reported Harvest					Estimated Total No. Fishing Families	Expanded Harvest Estimates				
	Number	People	Dogs	Chinook	Sockeye	Coho	Pink	Chum		Chinook	Sockeye	Coho	Pink	Chum
Goodnews	20	85	35	289	898	1072	0	405	20	289	898	1072	0	405
Platinum	6	23	9	21	167	90	0	43	6	21	167	90	0	43
Goodnews Bay Total	26	108	44	310	1065	1162	0	448	26	310	1065	1162	0	448

Table 3. Chinook salmon escapement tower counts for the Goodnews River by 20-minute observation period, 1988.

Date	No. counts	Chinook salmon counted for 20-minute observation during hour:																					Total No. Chinook Salmon Counted			
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20		21	22	23
6/23	9															0	2	0	0	0	0	4	1	2	9	
6/24	18	1							0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	6	
6/25	17	2							0	1	0	0	1	0	0	0	1	0	1	1	0	6	9	7	29	
6/26	2	6	1																						7	
6/27	16								0	1	0	0	4	6	3	4	5	7	6	0	0	3	4	7	50	
6/28	19	5	2						0	0	0	0	0	-1	0	0	1	0	0	0	3	3	1	0	2	16
6/29	17	0							0	0	0	0	0	0	0	1	5	3	0	4	0	0	0	0	13	
6/30	18	0	1						1	0	0	0	0	1	2	2	7	7	5	4	1	9	7	2	49	
7/1	18	4	3						0	0	0	2	-1	2	0	4	4	7	13	12	8	4	7	1	70	
7/2	19	2	1						1	-1	1	0	1	1	0	8	1	1	5	2	0	1	3	2	0	29
7/3	1	2																							2	
7/4	0																								0	
7/5	16								0	0	1	0	0	0	4	1	4	2	1	5	2	1	0	0	21	
7/6	18	0	0						0	0	0	0	0	0	0	1	1	0	2	1	1	7	2	4	19	
7/7	19	1	2						1	1	1	1	0	0	0	2	0	1	3	3	2	1	2	2	4	27
7/8	18	1							1	0	0	0	0	3	3	-1	4	2	2	1	0	0	0	1	2	19
7/9	18	0							0	0	0	0	0	4	1	2	0	3	1	3	7	2	4	4	3	34
7/10	1	3																							3	
7/11	24	2	0	1	2	0	0	0	1	0	0	1	1	1	0	2	0	-1	7	0	2	6	7	2	4	38
7/12	24	1	0	-1	0	0	0	-2	0	1	3	1	2	4	0	2	0	1	1	6	2	3	0	3	0	27
7/13	17								0	0	1	0	0	1	0	0	0	2	3	1	5	0	1	1	0	15
7/14	24	0	0	-1	0	1	2	0	0	-1	0	0	-2	-1	4	0	1	0	0	1	1	1	0	1	1	8
7/15	24	3	-1	0	1	0	0	1	0	0	0	0	0	0	1	2	1	0	0	0	1	1	2	4	16	
7/16	16	0																							3	17
7/17	3	2	0	3																					5	
7/18	15										1	0	1	2	0	1	0	0	1	0	0	1	1	0	0	8
7/19	20	1	3	0					0	-1	1	0	1	-1	2	0	0	-1	0	1	2	0	1	0	0	9
7/20	24	1	0	0	0	0	-1	0	0	0	-1	1	-1	-1	0	0	0	1	1	0	3	1	1	0	2	7
7/21	16	0									1	0	0	0	0	0	0	0	1	0	1	0	0	-1	1	3
7/22	20	0	0	0					0	0	0	0	0	0	4	2	1	3	3	1	1	0	1	2	2	20
7/23	24	4	2	5	2	1	0	1	1	1	0	1	0	0	-1	-2	-3	3	-1	0	1	0	0	0	0	15
7/24	1	0																							0	
7/25	15										0	1	0	0	0	1	1	1	0	0	1	1	1	0	2	9
7/26	18	0	0	0							1	1	1	0	0	0	-1	0	0	1	0	1	0	0	0	4
7/27	18	0	0	0							0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
7/28	18	0	0	0							0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	5
7/29	19	0	0	0							0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	5
7/30	19	0	0								0	1	1	0	1	0	0	0	1	2	0	0	0	0	0	6
TOTAL	603	41	14	7	5	2	1	0	5	2	15	8	8	15	25	29	21	58	58	51	58	33	58	50	57	621

Table 4. Sockeye salmon escapement tower counts for the Goodnews River by 20-minute observation period, 1988.

Date	No. of counts	Sockeye counted for 20-minute observation during hour																				Total No. sockeye salmon counted					
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19		20	21	22	23	
6/23	9															1	4	12	10	21	0	10	1	3	62		
6/24	18	14							0	0	0	0	5	0	0	0	2	0	1	26	0	0	4	25	77		
6/25	17	31							0	0	5	0	0	1	0	2	4	2	34	32	57	5	9	12	194		
6/26	2	8	1																						9		
6/27	16								0	12	8	8	26	20	18	14	24	13	21	16	17	7	11	14	229		
6/28	19	11	31						0	3	1	0	0	3	0	11	12	41	20	3	28	36	7	2	1	210	
6/29	17	2								1	12	0	10	8	0	6	18	44	3	11	35	12	12	26	8	208	
6/30	18	7	20							7	5	8	19	9	20	2	13	23	2	18	24	9	14	9	29	238	
7/1	18	17	7							9	5	6	12	10	13	3	37	26	15	25	35	13	18	24	11	286	
7/2	19	8	4							14	1	6	6	5	18	20	9	7	5	12	17	10	5	4	8	7	166
7/3	1	10																								10	
7/4	0																									0	
7/5	16									1	6	3	19	13	10	5	13	15	38	14	21	7	3	2	4	174	
7/6	18	8	3							11	1	4	29	24	15	6	8	11	16	28	39	29	15	21	11	279	
7/7	19	1	10							5	2	5	8	2	5	4	16	10	13	18	22	12	16	18	7	8	182
7/8	18	10								3	2	3	15	0	3	6	11	26	10	24	9	20	11	32	7	8	200
7/9	18	4								1	4	2	1	4	3	8	2	17	5	2	2	20	9	58	23	22	187
7/10	1	12																									12
7/11	24	7	11	6	12	7	0	1	3	5	1	0	0	2	1	3	18	11	16	5	16	15	8	19	6	173	
7/12	24	15	6	9	9	1	1	3	6	1	0	0	0	4	3	2	4	3	26	3	31	20	10	16	6	179	
7/13	17									3	2	2	0	0	1	0	2	13	7	5	9	7	5	19	13	11	99
7/14	24	12	10	0	5	2	1	2	2	2	1	2	0	0	3	4	20	5	22	17	11	2	7	18	5	153	
7/15	24	4	2	1	3	0	2	4	4	4	0	0	5	1	1	1	0	5	8	6	10	3	4	7	7	82	
7/16	16	15								6	4	-2	3	0	1	1	3	13	5	5	0	2	3	13		72	
7/17	3	10	4	2																						16	
7/18	15									9	1	1	0	2	2	2	2	2	1	3	2	4	4	0	5	38	
7/19	20	2	4	2						0	0	0	0	1	4	2	2	1	2	5	4	13	0	3	3	0	48
7/20	24	4	1	5	2	1	2	1	0	0	1	2	1	2	1	0	0	-1	-1	1	3	4	4	2	2	37	
7/21	16	0								-1	1	1	1	2	0	0	1	2	1	4	2	2	3	8		27	
7/22	20	7	1	2						1	0	1	1	3	1	0	2	0	1	1	2	4	1	1	2	11	42
7/23	24	10	2	1	0	1	1	1	1	2	2	2	9	1	4	-1	0	0	0	0	0	0	0	0	5	41	
7/24	1	2																								2	
7/25	15									0	0	0	0	0	0	0	0	0	0	3	3	1	2	0	0	9	
7/26	18	0	-1	2						0	1	2	1	0	0	1	0	1	1	1	1	0	0	0	0	9	
7/27	18	0	0	0						0	0	1	0	0	0	1	0	1	1	2	0	1	0	0	0	7	
7/28	18	0	0	1						0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	5	
7/29	19	0	0	0						1	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	4	
7/30	19	2	1							0	0	0	0	0	0	0	2	1	0	0	0	0	1	0	0	7	
Total	603	233	117	31	31	12	7	12	43	58	80	78	131	149	136	107	239	269	280	277	452	278	271	240	242	3773	

Table 5. Coho salmon escapement tower counts for the Goodnews River by 20-minute observation period, 1988.

Date	No. of counts	Coho salmon counted for 20-minute observation during hour:																					Total No. coho salmon counted			
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20		21	22	23
6/23	9																								0	
6/24	18	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/25	17	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/26	2	0	0																							0
6/27	16									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/28	19	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/29	17	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/30	18	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/1	18	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/2	19	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/3	1	0																								0
7/4	0																									0
7/5	16										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/6	18	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/7	19	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/8	18	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/9	18	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/10	1	0																								0
7/11	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/12	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/13	17	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/14	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/15	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/16	16	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/17	3	0	0	0																						0
7/18	15										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/19	20	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/20	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/21	16	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/22	20	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/23	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/24	1	0																								0
7/25	15										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/26	18	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/27	18	0	0	0							0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
7/28	18	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/29	19	1	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/30	19	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	603	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2

Table 6. Pink salmon escapement tower counts for the Goodnews River by 20-minute observation period, 1988.

Date	No. of counts	Pink salmon counted for 20-minute observation during hour																						Total No. pink salmon counted		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21		22	23
6/23	9																								0	
6/24	18	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/25	17	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/26	2	0	0																							0
6/27	16								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/28	19	0	0					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/29	17	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/30	18	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/1	18	0	0						0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	4
7/2	19	0	0						0	0	0	1	0	2	1	0	0	0	0	1	1	0	1	0	0	7
7/3	1	0																								0
7/4	0																									0
7/5	16								0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	1	2	6
7/6	18	1	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	4
7/7	19	0	0						0	0	0	0	0	0	0	0	0	1	2	0	3	3	1	0	10	
7/8	18	0							1	0	0	0	0	0	0	0	1	2	0	1	1	0	0	1	7	
7/9	18	2							0	0	0	0	0	0	2	0	1	0	0	0	0	3	7	7	7	29
7/10	1	2																								2
7/11	24	5	2	0	0	0	0	0	0	0	0	0	1	0	2	0	1	8	0	3	3	4	4	3	36	
7/12	24	5	1	1	0	0	0	2	0	1	0	0	0	6	2	4	0	0	5	8	6	12	5	14	6	78
7/13	17								0	0	0	0	1	0	0	3	4	1	3	4	8	6	8	21	30	89
7/14	24	30	6	0	0	0	1	1	0	0	1	1	3	0	1	4	6	3	3	13	5	19	23	30	150	
7/15	24	15	6	0	2	0	2	3	1	0	0	0	0	0	0	2	3	5	14	10	7	13	27		110	
7/16	16	19								3	0	1	0	0	1	1	5	6	0	3	4	4	24	42		113
7/17	3	15	26	6																						47
7/18	15								0	0	2	0	2	5	6	4	6	14	14	29	15	6	14		117	
7/19	20	9	2	1				2	0	1	0	1	0	1	0	4	0	3	1	2	3	4	5	12		51
7/20	24	1	0	1	0	1	0	2	1	-1	0	0	1	3	8	4	1	2	10	11	15	10	13	5	5	93
7/21	16	7							0	1	-1	7	3	3	1	2	1	6	12	3	17	13	11			86
7/22	20	9	7	3				9	5	3	0	10	3	3	4	11	8	29	40	8	5	15	15	28		215
7/23	24	18	15	2	1	0	0	1	10	2	1	1	2	5	8	1	6	6	5	4	2	2	2	8	44	146
7/24	1	17																								17
7/25	15								0	0	-7	7	3	3	3	4	2	2	12	-3	7	0	0		33	
7/26	18	5	0	-2					-1	-1	0	2	0	7	6	7	6	9	9	2	2	0	4		55	
7/27	18	2	3	2					1	1	8	4	6	-1	11	0	4	7	10	1	5	12	13		89	
7/28	18	2	2	3					7	-1	3	1	8	6	5	8	7	15	3	2	17	27	0		115	
7/29	19	5	6	3					-1	6	2	2	5	3	1	11	11	20	8	5	9	2	7	0		105
7/30	19	4	0					14	-3	-4	-3	4	3	1	0	7	13	7	3	0	3	2	3	3		57
Total	603	173	76	20	3	1	2	9	39	3	18	2	28	52	51	44	84	82	129	144	141	114	164	210	282	1871

Table 7. Chum salmon escapement tower counts for the Goodnews River by 20-minute observation period, 1988.

Date	No. of counts	Chum salmon counted for 20-minute observation for hour:																				Total No. chum salmon counted					
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19		20	21	22	23	
6/23	9																0	0	0	0	0	0	0	0	0	0	
6/24	18	0							0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	2	5	
6/25	17	0							0	0	5	0	0	0	0	0	0	3	0	0	0	22	0	9	10	49	
6/26	2	3	0																							3	
6/27	16								0	0	0	0	0	0	1	1	4	12	5	7	1	9	6	23	69		
6/28	19	7	17						0	0	0	0	0	0	2	2	0	4	11	14	0	6	2	2	65		
6/29	17	5							1	4	1	0	0	1	2	0	61	9	0	0	1	0	0	2	87		
6/30	18	2	5						2	1	0	2	0	0	0	1	24	13	18	18	2	77	31	80	276		
7/1	18	24	40						0	0	1	1	2	2	1	21	30	16	37	73	23	39	40	18	368		
7/2	19	20	8						0	-1	1	0	0	6	2	2	0	2	12	1	7	6	10	3	85		
7/3	1	7																							7		
7/4	0																								0		
7/5	16								1	3	0	0	1	2	2	4	3	3	6	10	4	5	3	4	51		
7/6	18	6	1						0	0	0	2	7	-1	3	2	8	12	8	27	18	34	45	16	188		
7/7	19	4	29						4	1	-1	7	1	9	7	8	3	10	37	40	22	42	45	22	335		
7/8	18	50							4	2	2	0	0	0	5	2	50	13	13	11	19	19	30	9	261		
7/9	18	22							0	2	-1	-1	1	-3	1	4	10	17	8	8	78	83	71	76	498		
7/10	1	64																							64		
7/11	24	40	3	20	18	3	0	0	2	1	2	3	-1	1	1	14	18	10	16	6	26	36	21	33	34	307	
7/12	24	58	8	7	10	1	2	12	0	4	4	6	2	85	13	24	2	13	21	32	45	80	10	45	28	512	
7/13	17								0	2	1	2	-1	1	1	5	5	8	11	19	18	3	25	41	23	164	
7/14	24	45	11	1	6	-3	2	4	9	2	0	0	1	3	3	8	12	2	5	13	26	6	17	76	55	304	
7/15	24	21	1	0	-1	-1	3	1	4	2	1	1	0	2	2	3	-3	21	25	29	33	-31	68	-27	58	328	
7/16	16	69									1	2	0	2	2	3	2	14	19	5	6	9	18	21	44	217	
7/17	3	37	23	6																						66	
7/18	15										2	2	1	1	2	10	-2	4	5	11	6	22	4	6	11	85	
7/19	20	11	5	4					1	1	2	1	1	1	5	0	0	2	4	4	17	5	12	4	36	116	
7/20	24	17	8	-1	0	8	-1	6	4	-1	-4	0	-1	2	16	5	-3	-4	11	0	12	7	4	5	4	94	
7/21	16	12									-4	0	-2	-2	-5	-4	2	-3	5	11	12	10	10	8	31	81	
7/22	20	57	29	14					5	3	2	1	0	2	6	5	8	14	4	29	24	7	13	7	22	252	
7/23	24	21	19	15	2	1	0	3	3	1	0	-4	0	-2	4	-5	-1	-2	2	3	3	6	0	7	13	89	
7/24	1	21																								21	
7/25	15										5	5	9	0	5	4	6	0	3	5	2	4	1	-1	3	51	
7/26	18	4	2	3							-1	3	3	2	2	4	1	-3	4	3	8	1	4	-2	7	45	
7/27	18	2	2	3							6	6	2	2	1	1	4	5	2	3	2	2	5	9	11	68	
7/28	18	0	4	3							3	1	3	4	14	8	5	5	3	6	3	12	13	5	4	96	
7/29	19	10	3	1							0	2	2	1	10	3	4	17	12	2	5	7	4	1	5	102	
7/30	19	-3	3								0	3	0	0	5	2	1	2	3	4	31	0	3	1	1	4	63
Total	603	636	221	76	35	9	6	26	36	26	31	44	30	138	95	118	170	277	308	323	527	481	543	580	736	5472	

Table 8. Daily estimated chinook salmon escapement past the Goodnews River counting tower, 1988.

Date	Number of twenty minute counts	Salmon counted during twenty minute counts (A)	Expanded hour count (A*3)	Estimated percent of daily run counted (C)	Estimated daily count (A*3)/C
6/23	9	9	27	54.3	50
6/24	18	6	18	81.2	22
6/25	17	29	87	79.9	109
6/26	2	7	21	8.6	155 ^b
6/27	16	50	150	75.1	200
6/28	19	16	48	85.0	56
6/29	17	13	39	79.9	49
6/30	18	49	147	83.7	176
7/1	18	70	210	83.7	251
7/2	19	29	87	85.0	102
7/3	1	2	6	4.8	93 ^b
7/4	0	0	0	0.0	89 ^b
7/5	16	21	63	75.1	84
7/6	18	19	57	83.7	68
7/7	19	27	81	85.0	95
7/8	18	19	57	81.2	70
7/9	18	34	102	81.2	126
7/10	1	3	9	4.8	120 ^b
7/11	24	38	114	100.0	114
7/12	24	27	81	100.0	81
7/13	17	15	45	76.4	59
7/14	24	8	24	100.0	24
7/15	24	16	48	100.0	48
7/16	16	17	51	78.4	65
7/17	3	5	15	13.6	49 ^b
7/18	15	8	24	73.6	33
7/19	20	9	27	90.0	30
7/20	24	7	21	100.0	21
7/21	16	3	9	78.4	11
7/22	20	20	60	90.0	67
7/23	24	15	45	100.0	45
7/24	1	0	0	4.8	41 ^b
7/25	15	9	27	73.6	37
7/26	18	4	12	87.2	14
7/27	18	1	3	87.2	3
7/28	18	5	15	87.2	17
7/29	19	5	15	88.7	17
7/30	19	6	18	85.0	21
Total	603	621	1,863		2,712

Table 9. Daily estimated sockeye salmon escapement past the Goodnews River counting tower, 1988.

Date	Number of twenty minute counts	Salmon counted during twenty minute counts (A)	Expanded hour count (A*3)	Estimated percent of daily run counted (C)	Estimated daily count (A*3)/C
6/23	9	62	186	51.9	358
6/24	18	77	231	86.0	269
6/25	17	194	582	83.7	695
6/26	2	9	27	8.3	783 ^b
6/27	16	229	687	79.0	870
6/28	19	210	630	89.6	703
6/29	17	208	624	83.7	746
6/30	18	238	714	87.3	818
7/1	18	286	858	87.3	983
7/2	19	166	498	89.6	556
7/3	1	10	30	4.7	609 ^b
7/4	0	0	0	0.0	635 ^b
7/5	16	174	522	79.0	661
7/6	18	279	837	87.3	959
7/7	19	182	546	89.6	609
7/8	18	200	600	86.0	698
7/9	18	187	561	86.0	652
7/10	1	12	36	4.7	586 ^b
7/11	24	173	519	100.0	519
7/12	24	179	537	100.0	537
7/13	17	99	297	81.3	365
7/14	24	153	459	100.0	459
7/15	24	82	246	100.0	246
7/16	16	72	216	80.4	269
7/17	3	16	48	10.7	210 ^b
7/18	15	38	114	75.7	151
7/19	20	48	144	92.0	157
7/20	24	37	111	100.0	111
7/21	16	27	81	80.4	101
7/22	20	42	126	92.0	137
7/23	24	41	123	100.0	123
7/24	1	2	6	4.7	80 ^b
7/25	15	9	27	75.7	36
7/26	18	9	27	86.4	31
7/27	18	7	21	86.4	24
7/28	18	5	15	86.4	17
7/29	19	4	12	89.7	13
7/30	19	7	21	89.6	23
Total	603	3,773	11,319		15,799

Table 10. Daily estimated coho and pink salmon escapement past the Goodnews River counting tower, 1988.

Date	Number of twenty minute counts	Salmon counted during twenty minute counts	Expanded hour count	Estimated percent of daily run counted	Estimated daily count
		(A)	(A*3)	(C)	(A*3)/C
Coho					
7/27	18	1	3	86.4	3
7/28	18	0	0	86.4	0
7/29	19	1	3	89.7	3
7/30	19	0	0	89.6	0
Total	603	2	6		6
Pink					
7/1	18	4	12	89.7	13
7/2	19	7	21	92.9	23
7/4	1	0	0	7.0	23 ^b
7/4	0	0	0	0.0	23 ^b
7/5	16	6	18	80.0	23
7/6	18	4	12	89.7	13
7/7	19	10	30	92.9	32
7/8	18	7	21	90.2	23
7/9	18	29	87	90.2	96
7/10	1	2	6	7.0	102 ^b
7/11	24	36	108	100.0	108
7/12	24	78	234	100.0	234
7/13	17	89	267	83.2	321
7/14	24	150	450	100.0	450
7/15	24	110	330	100.0	330
7/16	16	113	339	84.9	399
7/17	3	47	141	10.6	425 ^b
7/18	15	117	351	77.9	451
7/19	20	51	153	93.8	163
7/20	24	93	279	100.0	279
7/21	16	86	258	84.9	304
7/22	20	215	645	93.8	688
7/23	24	146	438	100.0	438
7/24	1	17	51	7.0	283 ^b
7/25	15	33	99	77.9	127
7/26	18	55	165	88.5	186
7/27	18	89	267	88.5	302
7/28	18	115	345	88.5	390
7/29	19	105	315	90.6	348
7/30	19	57	171	92.9	184
Total	603	1,871	5,613		6,781

Table 11. Daily estimated chum salmon escapement past the Goodnews River counting tower, 1988.

Date	Number of twenty minute counts	Salmon counted during twenty minute counts (A)	Expanded hour count (A*3)	Estimated percent of daily run counted (C)	Estimated daily count (A*3)/C
6/23	9	0	0	58.5	0
6/24	18	5	15	83.7	18
6/25	17	49	147	82.4	178
6/26	2	3	9	9.9	225 ^b
6/27	16	69	207	76.3	271
6/28	19	65	195	87.5	223
6/29	17	87	261	82.4	317
6/30	18	276	828	86.2	961
7/1	18	368	1,104	86.2	1,281
7/2	19	85	255	87.5	291
7/3	1	7	21	6.1	246 ^b
7/4	0	0	0	0.0	224 ^b
7/5	16	51	153	76.3	201
7/6	18	188	564	86.2	654
7/7	19	335	1,005	87.5	1,149
7/8	18	261	783	83.7	935
7/9	18	498	1,494	83.7	1,785
7/10	1	64	192	6.1	1,353 ^b
7/11	24	307	921	100.0	921
7/12	24	512	1,536	100.0	1,536
7/13	17	164	492	77.6	634
7/14	24	304	912	100.0	912
7/15	24	328	984	100.0	984
7/16	16	217	651	80.9	805
7/17	3	66	198	13.0	573 ^b
7/18	15	85	255	74.8	341
7/19	20	116	348	90.6	384
7/20	24	94	282	100.0	282
7/21	16	81	243	80.9	300
7/22	20	252	756	90.6	834
7/23	24	89	267	100.0	267
7/24	1	21	63	6.1	236 ^b
7/25	15	51	153	74.8	205
7/26	18	45	135	87.8	154
7/27	18	68	204	87.8	232
7/28	18	96	288	87.8	328
7/29	19	102	306	89.3	343
7/30	19	63	189	87.5	216
Total	603	5,472	16,416		20,799

Table 12. Daily and cumulative salmon escapement estimates, Goodnews River tower, 1988.

Date	Chinook				Sockeye				Coho				Pink				Chum			
	Daily		Cumulative		Daily		Cumulative		Daily		Cumulative		Daily		Cumulative		Daily		Cumulative	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
6/23	50	1.84	50	1.84	358	2.27	358	2.27									0	0.00	0	0.00
6/24	22	0.81	72	2.65	269	1.70	627	3.97									18	0.09	18	0.09
6/25	109	4.02	181	6.67	695	4.40	1322	8.37									178	0.86	196	0.94
6/26	155	5.72	336	12.39	783	4.96	2105	13.32									225	1.08	421	2.02
6/27	200	7.37	536	19.76	870	5.51	2975	18.83									271	1.30	692	3.33
6/28	56	2.06	592	21.83	703	4.45	3678	23.28									223	1.07	915	4.40
6/29	49	1.81	641	23.64	746	4.72	4424	28.00									317	1.52	1232	5.92
6/30	176	6.49	817	30.13	818	5.18	5242	33.18									961	4.62	2193	10.54
7/01	251	9.26	1068	39.38	983	6.22	6225	39.40			13	0.19	13	0.19	1281	6.16	3474	16.70		
7/02	102	3.76	1170	43.14	556	3.52	6781	42.92			23	0.34	36	0.53	291	1.40	3765	18.10		
7/03	93	3.43	1263	46.57	609	3.85	7390	46.78			23	0.34	59	0.87	246	1.18	4011	19.28		
7/04	89	3.28	1352	49.85	635	4.02	8025	50.79			23	0.34	82	1.21	224	1.08	4235	20.36		
7/05	84	3.10	1436	52.95	661	4.18	8686	54.98			23	0.34	105	1.55	201	0.97	4436	21.33		
7/06	68	2.51	1504	55.46	959	6.07	9645	61.05			13	0.19	118	1.74	654	3.14	5090	24.47		
7/07	95	3.50	1599	58.96	609	3.85	10254	64.90			32	0.47	150	2.21	1149	5.52	6239	30.00		
7/08	70	2.58	1669	61.54	698	4.42	10952	69.32			23	0.34	173	2.55	935	4.50	7174	34.49		
7/09	126	4.65	1795	66.19	652	4.13	11604	73.45			96	1.42	269	3.97	1785	8.58	8959	43.07		
7/10	120	4.42	1915	70.61	586	3.71	12190	77.16			102	1.50	371	5.47	1353	6.51	10312	49.58		
7/11	114	4.20	2029	74.82	519	3.29	12709	80.44			108	1.59	479	7.06	921	4.43	11233	54.01		
7/12	81	2.99	2110	77.80	537	3.40	13246	83.84			234	3.45	713	10.51	1536	7.38	12769	61.39		
7/13	59	2.18	2169	79.98	365	2.31	13611	86.15			321	4.73	1034	15.25	634	3.05	13403	64.44		
7/14	24	0.88	2193	80.86	459	2.91	14070	89.06			450	6.64	1484	21.88	912	4.38	14315	68.83		
7/15	48	1.77	2241	82.63	246	1.56	14316	90.61			330	4.87	1814	26.75	984	4.73	15299	73.56		
7/16	65	2.40	2306	85.03	269	1.70	14585	92.32			399	5.88	2213	32.64	805	3.87	16104	77.43		
7/17	49	1.81	2355	86.84	210	1.33	14795	93.65			425	6.27	2638	38.90	573	2.75	16677	80.18		
7/18	33	1.22	2388	88.05	151	0.96	14946	94.60			451	6.65	3089	45.55	341	1.64	17018	81.82		
7/19	30	1.11	2418	89.16	157	0.99	15103	95.59			163	2.40	3252	47.96	384	1.85	17402	83.67		
7/20	21	0.77	2439	89.93	111	0.70	15214	96.30			279	4.11	3531	52.07	282	1.36	17684	85.02		
7/21	11	0.41	2450	90.34	101	0.64	15315	96.94			304	4.48	3835	56.56	300	1.44	17984	86.47		
7/22	67	2.47	2517	92.81	137	0.87	15452	97.80			688	10.15	4523	66.70	834	4.01	18818	90.48		
7/23	45	1.66	2562	94.47	123	0.78	15575	98.58			438	6.46	4961	73.16	267	1.28	19085	91.76		
7/24	41	1.51	2603	95.98	80	0.51	15655	99.09			283	4.17	5244	77.33	236	1.13	19321	92.89		
7/25	37	1.36	2640	97.35	36	0.23	15691	99.32			127	1.87	5371	79.21	205	0.99	19526	93.88		
7/26	14	0.52	2654	97.86	31	0.20	15722	99.51			186	2.74	5557	81.95	154	0.74	19680	94.62		
7/27	3	0.11	2657	97.97	24	0.15	15746	99.66	3	50.00	302	4.45	5859	86.40	232	1.12	19912	95.74		
7/28	17	0.63	2674	98.60	17	0.11	15763	99.77	0	0.00	390	5.75	6249	92.15	328	1.58	20240	97.31		
7/29	17	0.63	2691	99.23	13	0.08	15776	99.85	3	50.00	348	5.13	6597	97.29	343	1.65	20583	98.96		
7/30	21	0.77	2712	100.00	23	0.15	15799	100.00	0	0.00	184	2.71	6781	100.00	216	1.04	20799	100.00		

Table 13. Age, sex, and size composition of chinook salmon, from the Goodnews Bay commercial harvest and escapement, 1988.

	Age Class ^a				Total
	1.2	1.3	1.4	1.5	
<u>Commercial Harvest Sample</u>					
<u>Females</u>					
Mean Length	534.1	705.6	864.8	906.0	
Std. Error	7.02	15.76	5.84	13.08	
Range	425-621	473-890	662-1070	805-980	
Sample Size	38	39	129	16	222
<u>Males</u>					
Mean Length	534.7	682.0	880.9	902.1	
Std. Error	4.43	8.50	9.36	41.10	
Range	430-666	540-950	645-1051	612-1060	
Sample Size	89	76	72	12	249
<u>Total</u>					
Mean Length	534.5	690.0	870.5	904.3	
Std. Error	3.73	7.79	5.04	18.69	
Range	425-666	473-950	645-1070	612-1060	
Sample Size	127	115	201	28	471
Total Harvest ^b	1,422	1,288	2,251	314	5,274
<u>Escapement Sample</u>					
<u>Females</u>					
Mean Length	0.0	798.5	877.1	898.1	
Std. Error	0.00	32.44	13.99	15.15	
Range	0-0	645-1040	800-1035	845-960	
Sample Size	0	10	21	8	39
<u>Males</u>					
Mean Length	535.0	772.1	920.3	953.8	
Std. Error	20.00	27.10	10.66	25.14	
Range	515-555	625-920	815-1020	850-1040	
Sample Size	2	12	33	8	55
<u>Total</u>					
Mean Length	535.0	784.1	903.5	925.9	
Std. Error	20.00	20.57	8.89	15.89	
Range	515-555	625-1040	800-1035	845-1040	
Sample Size	2	22	54	16	94
Total Escapement	115	1,268	3,113	922	5,419

a European age designation

b Commercial and subsistence harvest

Table 14. Age, sex, and size composition of sockeye salmon from the Goodnews Bay commercial harvest and escapement, 1988.

	Age Class ^a										Total
	0.2	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	
Commercial Harvest Sample											
Females											
Mean Length	0.0	0.0	510.4	0.0	582.5	577.7	0.0	592.7	575.0	0.0	
Std. Error	0.00	0.00	24.03	0.00	5.50	1.37	0.00	6.43	0.00	0.00	
Range	0-0	0-0	441-588	0-0	577-588	490-630	0-0	555-690	575-575	0-0	
Sample Size	0	0	5	0	2	276	0	20	1	0	304
Males											
Mean Length	550.0	584.6	552.8	0.0	626.0	611.7	546.7	621.9	610.0	630.0	
Std. Error	0.00	5.32	8.36	0.00	0.00	1.34	19.65	8.35	0.00	0.00	
Range	550-550	569-599	484-620	0-0	626-626	500-677	520-585	540-700	610-610	630-630	
Sample Size	1	5	21	0	1	377	3	21	1	1	431
Total											
Mean Length	550.0	584.6	544.6	0.0	597.0	597.3	546.7	607.7	592.5	630.0	
Std. Error	0.00	5.32	8.62	0.00	14.84	1.17	19.65	5.73	17.50	0.00	
Range	550-550	569-599	441-620	0-0	577-626	490-677	520-585	540-700	575-610	630-630	
Sample Size	1	5	26	0	3	653	3	41	2	1	735
Total Harvest ^b	51	255	1,324	0	153	33,257	153	2,088	102	51	37,433
Escapement Sample											
Females											
Mean Length	0.0	555.8	509.4	338.0	0.0	564.2	0.0	557.3	552.5	0.0	
Std. Error	0.00	14.50	9.71	0.00	0.00	1.95	0.00	23.56	2.50	0.00	
Range	0-0	520-591	425-644	338-338	0-0	512-648	0-0	500-602	550-555	0-0	
Sample Size	0	4	20	1	0	151	0	4	2	0	182
Males											
Mean Length	0.0	598.0	563.6	0.0	581.0	601.8	582.0	618.3	0.0	0.0	
Std. Error	0.00	6.94	14.18	0.00	0.00	2.77	13.00	30.87	0.00	0.00	
Range	0-0	580-612	478-660	0-0	581-581	419-661	569-595	560-665	0-0	0-0	
Sample Size	0	4	12	0	1	110	2	3	0	0	132
Total											
Mean Length	0.0	576.9	529.7	338.0	581.0	580.0	582.0	583.4	552.5	0.0	
Std. Error	0.00	10.91	9.23	0.00	0.00	1.99	13.00	21.14	2.50	0.00	
Range	0-0	520-612	425-660	338-338	581-581	419-661	569-595	500-665	550-555	0-0	
Sample Size	0	8	32	1	1	261	2	7	2	0	314
Total Escapement	0	976	3,905	122	122	31,851	244	854	244	0	38,319

^a European age designation

^b Commercial and subsistence harvest combined

Table 15. Age, sex, and size composition of coho salmon from the Goodnews Bay commercial harvest and escapement, 1988.

	Age Class ^a			Total
	1.1	2.1	3.1	
<u>Commercial Harvest Sample</u>				
<u>Females</u>				
Mean Length	562.7	602.2	655.0	
Std. Error	45.96	2.83	0.00	
Range	473-625	500-666	655-655	
Sample Size	3	119	1	123
<u>Males</u>				
Mean Length	593.6	602.3	0.0	
Std. Error	9.85	3.23	0.00	
Range	555-630	480-682	0-0	
Sample Size	7	170	0	177
<u>Total</u>				
Mean Length	584.3	602.3	655.0	
Std. Error	14.43	2.22	0.00	
Range	473-630	480-682	655-655	
Sample Size	10	289	1	300
Total Harvest ^b	1,066	30,821	107	31,994
<u>Escapement Sample</u>				
<u>Females</u>				
Mean Length	805.0	0.0	0.0	
Std. Error	0.00	0.00	0.00	
Range	805-805	0-0	0-0	
Sample Size	1	0	0	1
<u>Males</u>				
Mean Length	666.0	0.0	0.0	
Std. Error	0.00	0.00	0.00	
Range	666-666	0-0	0-0	
Sample Size	1	0	0	1
<u>Total</u>				
Mean Length	735.5	0.0	0.0	
Std. Error	69.50	0.00	0.00	
Range	666-805	0-0	0-0	
Sample Size	2	0	0	2
Total Escapement ^c	6	0	0	6

a European age designation

b Commercial and subsistence harvest combined

c Goodnews Tower count. Tower project ends well before peak of coho salmon migration

Table 16. Age, sex, and size composition of chum salmon from the Goodnews Bay commercial harvest and escapement, 1988.

	Age Class ^a				Total
	0.2	0.3	0.4	0.5	
<u>Commercial Harvest Sample</u>					
<u>Females</u>					
Mean Length	545.0	573.4	591.2	617.0	
Std. Error	0.00	2.91	1.77	20.00	
Range	545-545	502-632	510-662	597-637	
Sample Size	1	64	191	2	258
<u>Males</u>					
Mean Length	550.0	610.1	623.5	631.2	
Std. Error	10.00	4.36	2.59	8.34	
Range	530-560	560-669	540-723	600-645	
Sample Size	3	44	159	5	211
<u>Total</u>					
Mean Length	548.8	588.4	605.8	627.1	
Std. Error	7.18	3.02	1.75	7.68	
Range	530-560	502-669	510-723	597-645	
Sample Size	4	108	350	7	469
Total Harvest ^b	286	7,716	25,005	500	33,507
<u>Escapement Sample</u>					
<u>Females</u>					
Mean Length	0.0	564.9	577.7	582.0	
Std. Error	0.00	3.07	2.07	10.19	
Range	0-0	515-619	518-670	562-605	
Sample Size	0	68	134	4	206
<u>Males</u>					
Mean Length	592.5	601.2	623.1	641.6	
Std. Error	19.50	4.20	2.60	38.01	
Range	573-612	528-674	541-695	564-775	
Sample Size	2	52	147	5	206
<u>Total</u>					
Mean Length	592.5	580.7	601.5	615.1	
Std. Error	19.50	3.00	2.16	22.98	
Range	573-612	515-674	518-695	562-775	
Sample Size	2	120	281	9	412
Total Escapement	192	11,505	26,941	863	39,501

a European age designation

b Commercial and subsistence harvest combined

Table 17. Aerial survey and tower count salmon escapement estimates, Goodnews River, 1988.

<u>Aerial Survey Estimates</u>					
<u>Goodnews River</u>	<u>Chinook</u>	<u>Sockeye</u>	<u>Coho^a</u>	<u>Pink^a</u>	<u>Chum</u>
Middle Fork	884	4,231			3,214
North Fork	2,707	6,031		275	2,890
Total	3,591	10,262		275	6,104
<u>Aerial Survey and Counting Tower Comparison, 1988</u>					
	<u>Chinook</u>	<u>Sockeye</u>	<u>Coho</u>	<u>Pink</u>	<u>Chum</u>
Aerial Survey Estimate Above the Counting Tower Site July 15, 1988	884	4,231		0	3,214
Counting Tower Estimate July 15, 1988	2,241	14,316		1,814	15,299
Percentage the Aerial Estimate is of Tower	39.4%	29.6%		0.0%	21.0%
<u>Escapement Estimate as of July 15, 1988</u>					
<u>Goodnews River</u>	<u>Chinook</u>	<u>Sockeye</u>	<u>Coho</u>	<u>Pink</u>	<u>Chum</u>
Middle Fork	2,241	14,316		1,814	15,299
North Fork	2,707	20,406		1,134	13,757
Total	4,948	34,722		2,948	29,056
<u>Escapement Estimate as of July 30, 1988</u>					
<u>Goodnews River</u>	<u>Chinook</u>	<u>Sockeye</u>	<u>Coho</u>	<u>Pink</u>	<u>Chum</u>
Middle Fork	2,712	15,799	6	6,781	20,799
North Fork	2,707	22,520		4,238	18,702
Total	5,419	38,319		11,019	39,501

a Tower project ends before peak of coho and pink salmon migrations therefore escapement estimates are minimum estimates

FIGURES

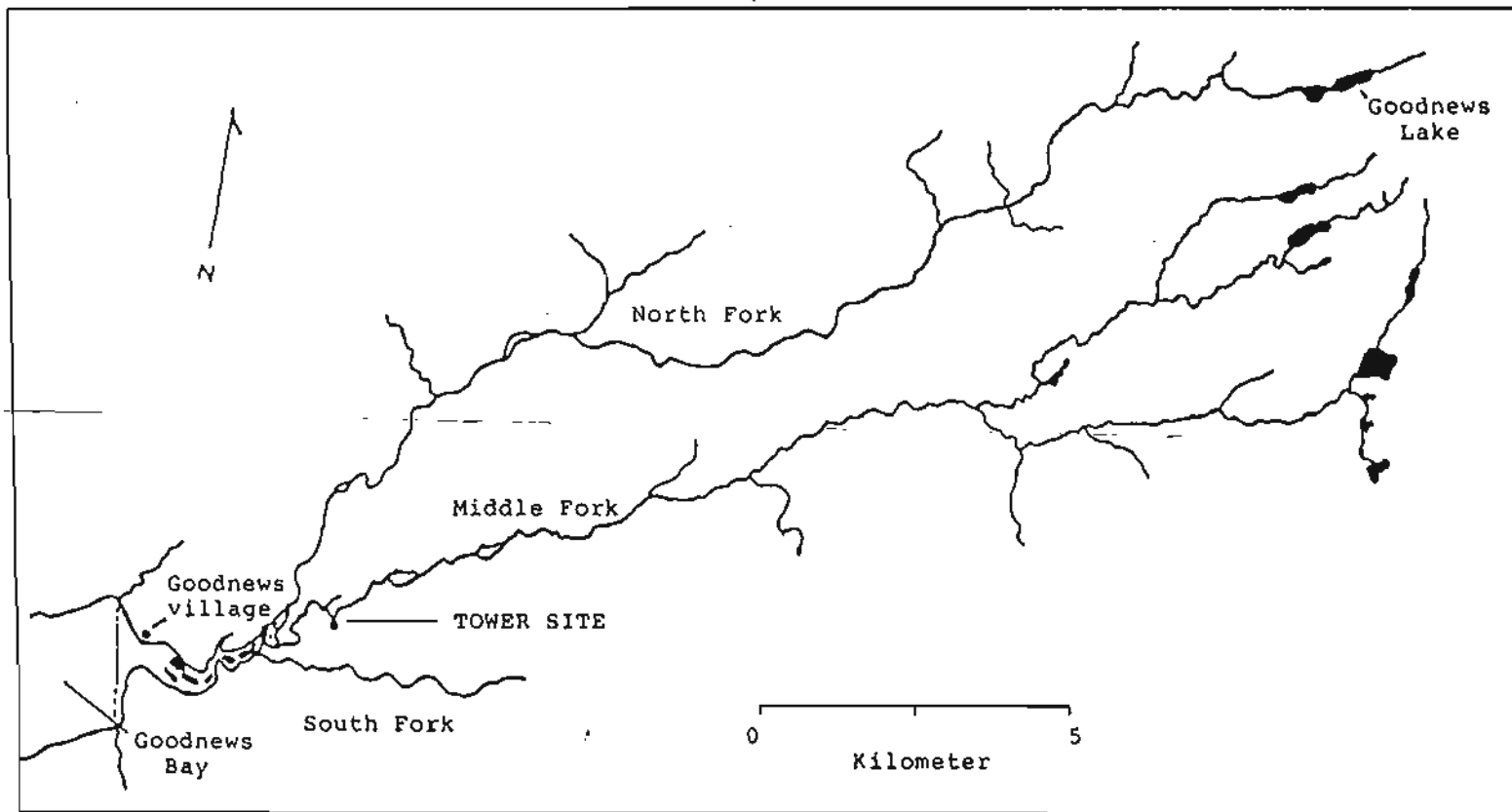


Figure 1. Map of the Goodnews River drainage.

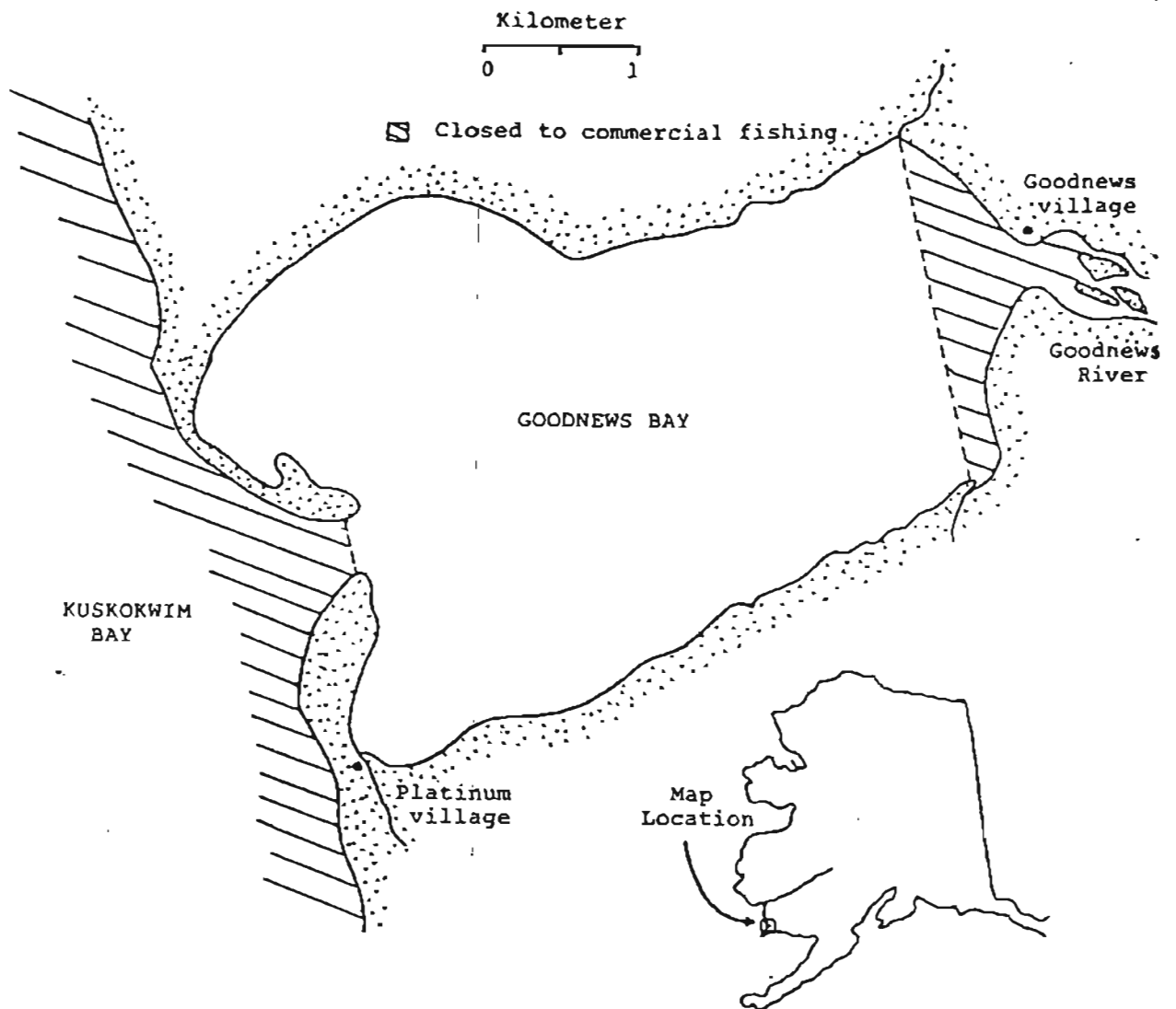


Figure 2. Map of Goodnews Bay, District 5, of the Kuskokwim Management Area.

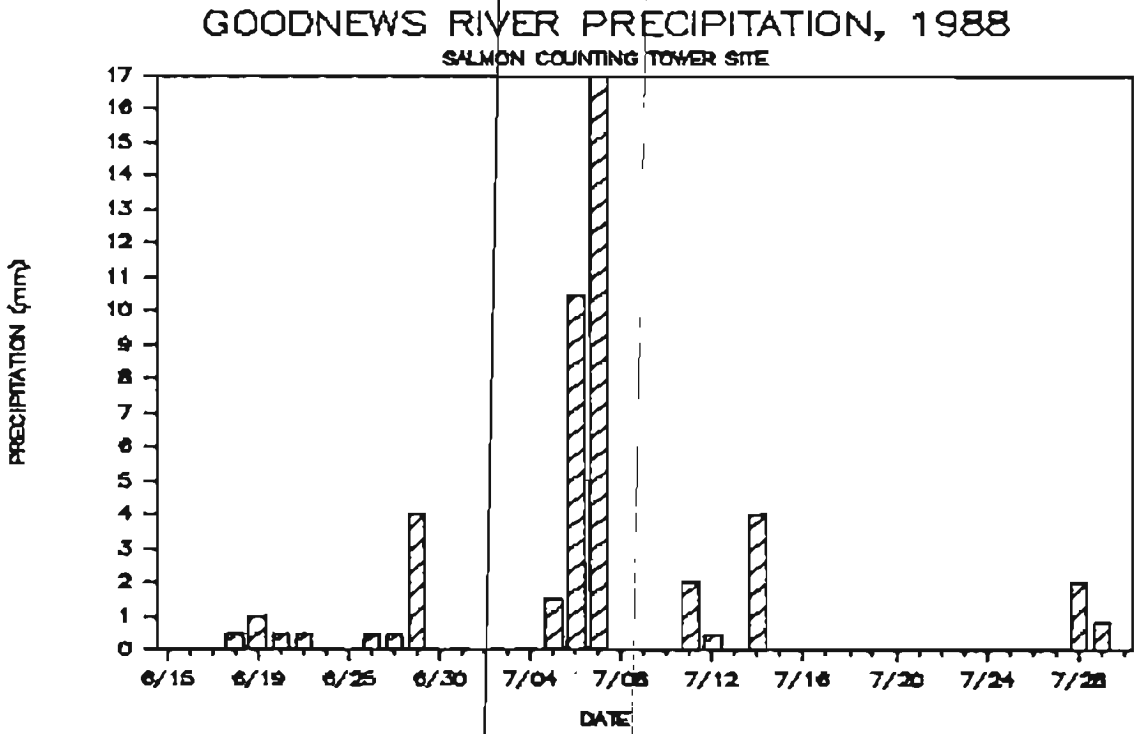
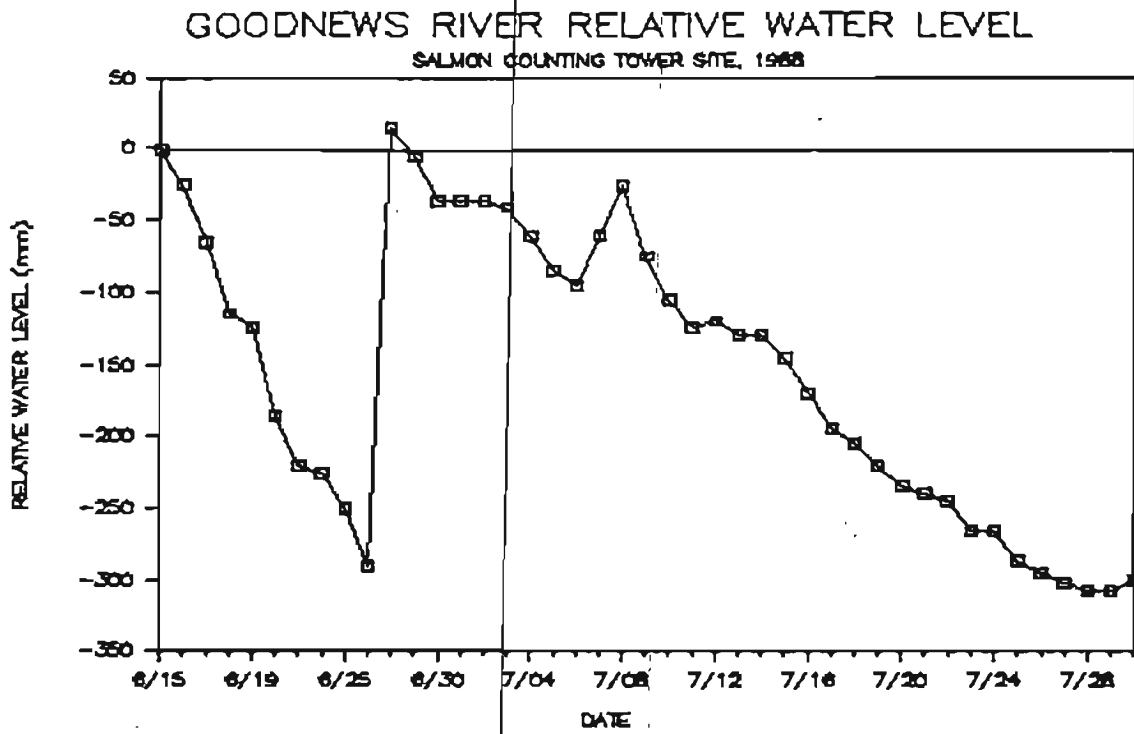


Figure 3. Relative water level and precipitation, Goodnews River counting tower, 1988.

Goodnews River Counting Tower

CHINOOK SALMON MIGRATION TIMING

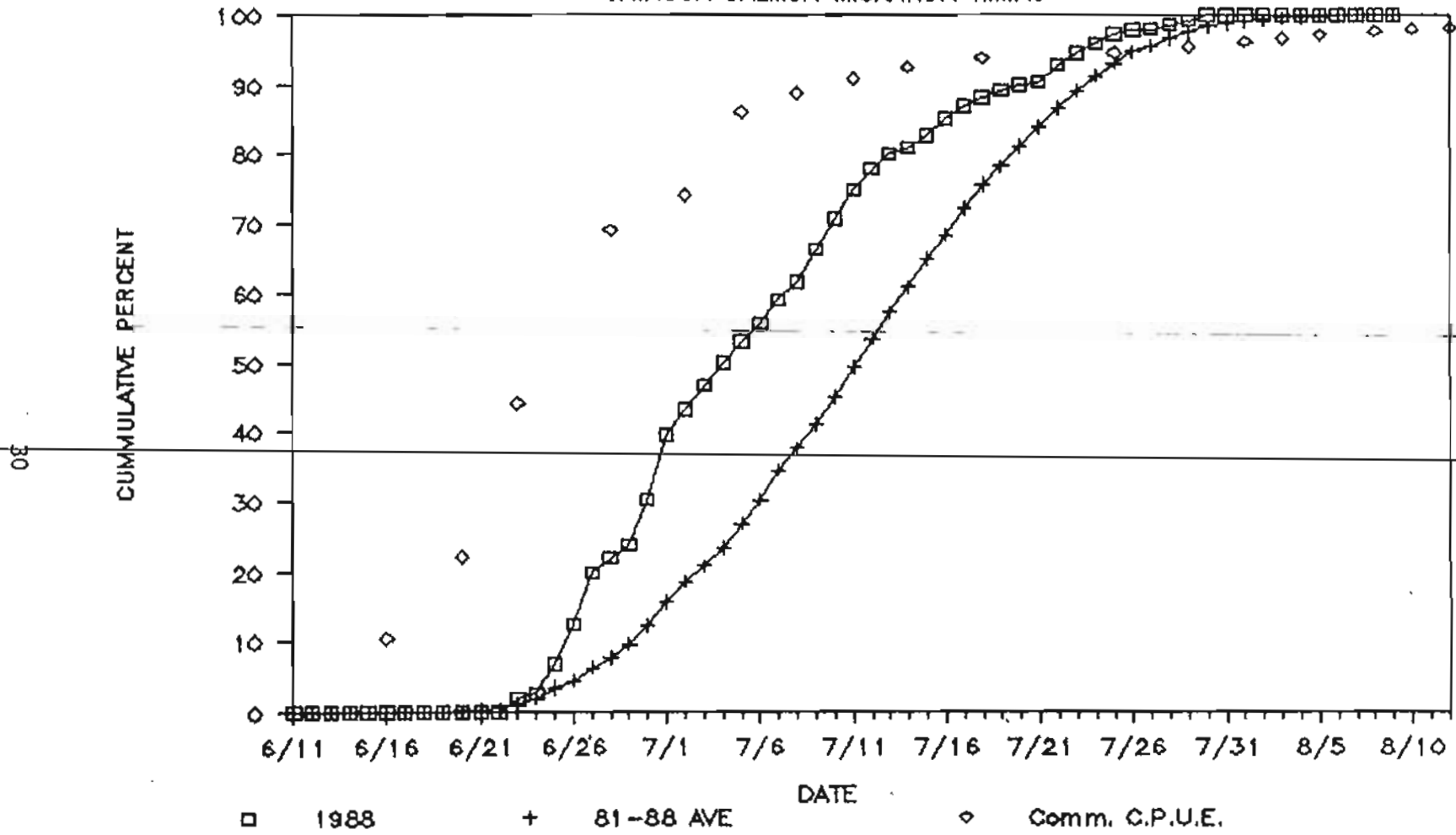


Figure 4. Chinook salmon migration timing, Goodnews River counting tower, 1988.

Goodnews River Counting Tower

SOCKEYE SALMON MIGRATION TIMING

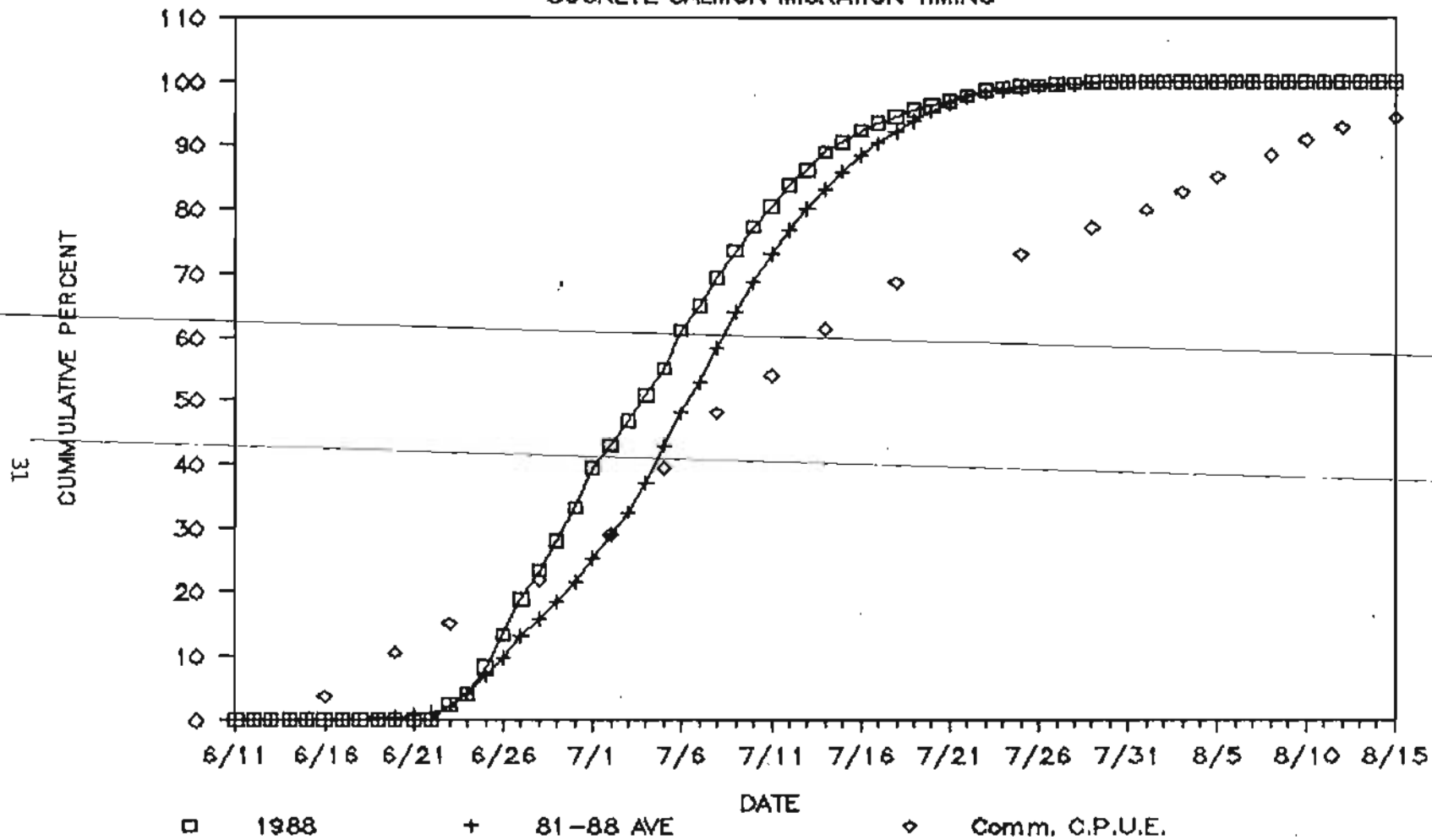


Figure 5. Sockeye salmon migration timing, Goodnews River counting tower, 1988.

Goodnews River Counting Tower

CHUM SALMON MIGRATION TIMING

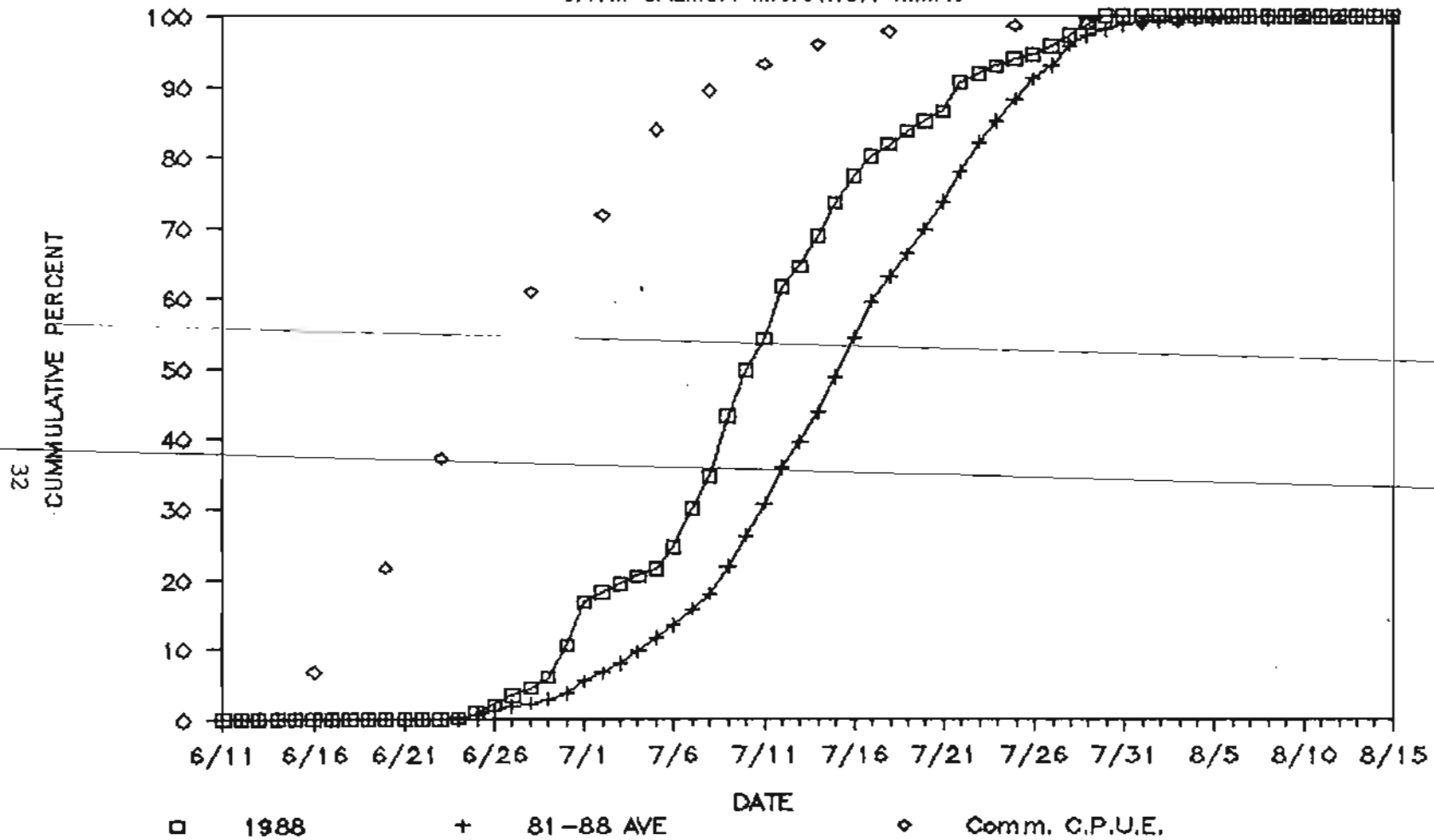


Figure 6. Chum salmon migration timing, Goodnews River counting tower, 1988.

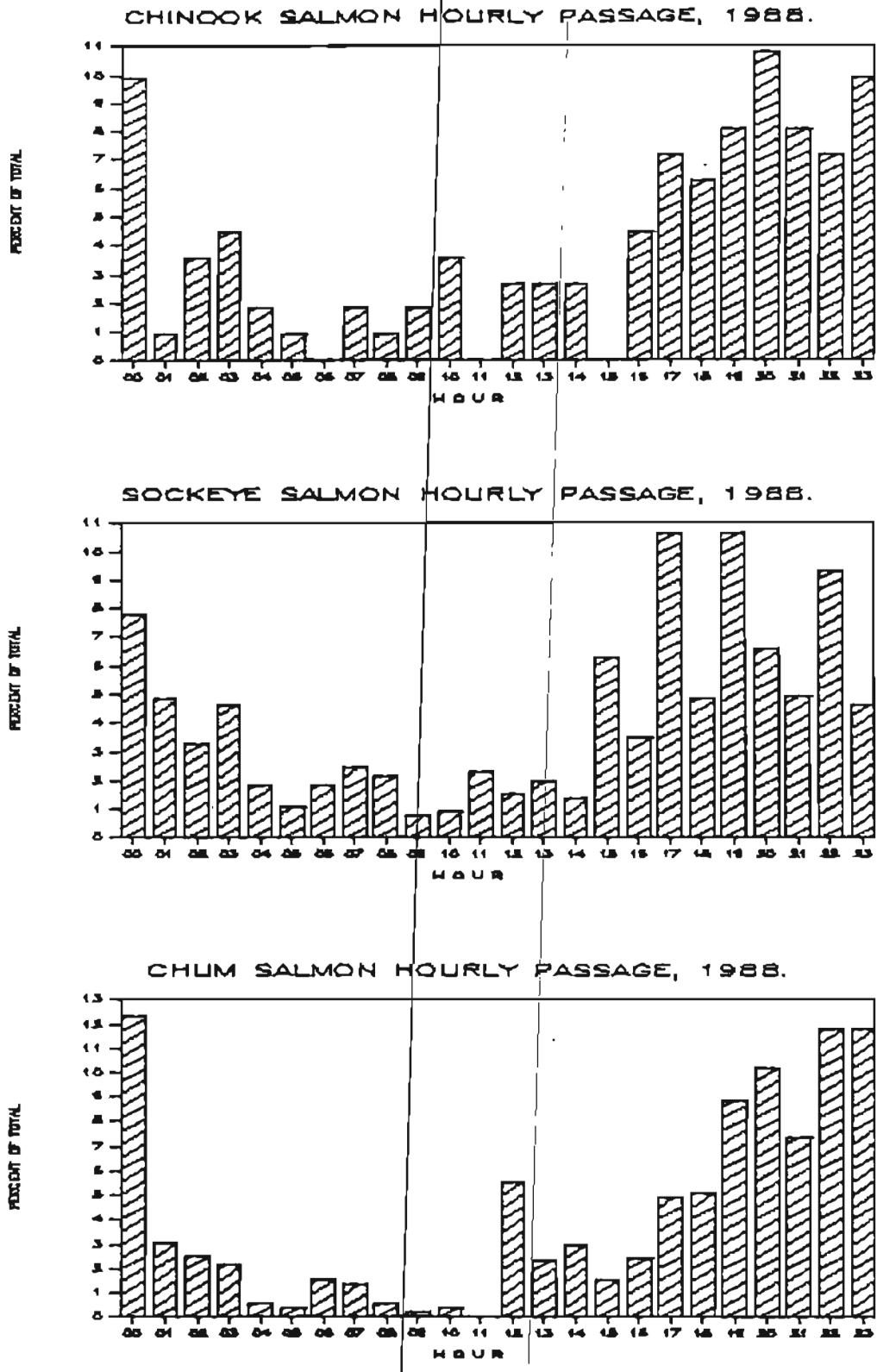


Figure 7. Average daily diel chinook, sockeye and chum salmon count distribution, Goodnews River counting tower, 1988.

APPENDICES

Appendix 1. Goodnews Bay, District 5, commercial salmon harvest, 1968-1988.

<u>YEAR</u>	<u>CHINOOK</u>	<u>SOCKEYE</u>	<u>COHO</u>	<u>PINK</u>	<u>CHUM</u>	<u>TOTAL</u>
1968			5,458			5,458
1969	3,978	6,256	11,631	298	5,006	27,169
1970	7,163	7,144	6,794	12,183	12,346	45,630
1971	477	330	1,771	0	301	2,879
1972	264	924	925	66	1,331	3,510
1973	3,543	2,072	5,017	324	15,781	26,737
1974	3,302	9,357	21,340	16,373	8,942	59,314
1975	2,156	9,098	17,889	419	5,904	35,466
1976	4,417	5,575	9,852	8,453	10,354	38,651
1977	3,336	3,723	13,335	29	6,531	26,954
1978	5,218	5,412	13,764	9,103	8,590	42,087
1979	3,204	19,581	42,098	201	9,298	74,382
1980	2,331	28,632	43,256	7,832	11,748	93,799
1981	7,190	40,273	19,749	11	13,642	80,865
1982	9,476	38,877	46,683	4,673	13,829	113,538
1983	14,117	11,716	19,660	0	6,766	52,259
1984	8,612	15,474	71,176	4,711	14,340	114,313
1985	5,793	6,698	16,498	8	4,784	33,781
1986	2,723	25,112	19,378	4,447	10,355	62,015
1987	3,357	27,758	29,057	54	20,381	80,607
1988	4,964	36,368	30,832	5,509	33,059	110,732
Five year Average (1983-1987)	6,920	17,352	31,154	1,844	11,325	68,595

Appendix 2. Goodnews Bay area subsistence salmon fishery harvest, 1977-1988.

Year	Village	Families Surveyed			Reported Harvest					Est. total No. Fishing Families	Expanded Harvest Estimates				
		Number	People	Dogs	Chinook	Sockeye	Coho	Pink	Chum		Chinook	Sockeye ^a	Coho ^b	Pink	Chum
1977	Goodnews	26	148	64	-	-	-	-	-	-	574	856	184	-	-
	Platinum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	26	148	64	-	-	-	-	-	-	574	856	184	-	-
1978	Goodnews	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Platinum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1979	Goodnews	15	89	21	-	-	-	-	-	-	228	554	176	-	-
	Platinum	6	36	9	-	-	-	-	-	-	110	528	50	-	-
	TOTAL	21	125	30	-	-	-	-	-	-	338	1,082	226	-	-
1980	Goodnews	44	205	75	-	-	-	-	-	-	498	1,823	4,226	-	-
	Platinum	11	28	16	-	-	-	-	-	-	192	0	248	-	-
	TOTAL	55	233	91	-	-	-	-	-	-	690	1,823	4,474	-	-
1981	Goodnews	13	68	40	-	-	-	-	-	-	1,309	3,178	1,622	-	-
	Platinum	4	17	4	-	-	-	-	-	-	100	333	0	-	-
	TOTAL	17	85	44	-	-	-	-	-	-	1,409	3,511	1,622	-	-
1982	Goodnews	17	91	37	-	-	-	-	-	39	1,185	2,210	2,518	-	-
	Platinum	5	24	4	-	-	-	-	-	9	51	544	174	-	-
	TOTAL	22	115	41	-	-	-	-	-	48	1,236	2,754	2,692	-	-
1983	Goodnews	24	170	88	709	702	2	0	221	34	1,004	1,308	3	-	-
	Platinum	6	48	14	53	180	1	0	0	7	62	210	2	-	-
	TOTAL	30	218	102	762	882	3	0	221	41	1,066	1,518	5	-	-
1984	Goodnews	18	138	25	307	474	28	34	97	35	597	922	54	66	189
	Platinum	4	21	20	18	24	57	0	0	7	32	42	100	0	0
	TOTAL	22	159	45	325	498	85	34	97	42	629	964	154	66	189
1985	Goodnews	13	72	27	179	252	94	1	152	29	399	562	210	2	339
	Platinum	3	17	4	20	107	8	0	7	4	27	142	11	0	9
	TOTAL	16	89	31	199	359	102	1	159	33	426	704	221	2	348
1986	Goodnews	20	121	29	311	521	0	0	114	33	513	860	0	0	188
	Platinum	4	21	5	28	55	5	0	2	6	42	83	8	0	3
	TOTAL	24	142	34	339	576	5	0	116	39	555	942	8	0	191
1987	Goodnews	17	-	-	311	405	0	0	180	35	640	834	0	0	371
	Platinum	7	-	-	123	85	30	0	145	10	176	121	43	0	207
	TOTAL	24	-	-	434	490	30	0	325	45	816	955	43	0	578
1988 ^c	Goodnews	20	85	35	289	898	1,072	0	405	20	289	898	1,072	0	405
	Platinum	6	23	9	21	167	90	0	43	6	21	167	90	0	43
	TOTAL	26	108	44	310	1,065	1,162	0	448	26	310	1,065	1,162	0	448

a 1977 through 1983 some small chinook, pink and chum salmon were reported as sockeye salmon.

b In most years, surveys were completed prior to the majority of the coho salmon subsistence harvest.

c Preliminary data.

Appendix 3. Historical hourly passage rate for chinook salmon, Goodnews River tower, 1981-1988.

Year	No. of Counts	Full hour counts																						Total No. Chinook Salmon Counted		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21		22	23
1981	6	6.0	6.6	5.7	1.3	0.0	3.8	0.0	1.1	0.7	1.9	6.4	5.1	6.2	6.8	3.8	3.6	6.6	3.8	7.0	7.4	3.4	4.7	5.5	2.6	531
1982	2	3.6	3.0	1.5	1.0	0.0	2.6	1.5	1.0	0.0	2.0	0.5	1.5	2.6	3.1	4.1	1.0	3.1	2.0	11.7	14.4	9.8	12.2	6.6	11.2	196
Year	No. of Counts	Twenty minute counts																						Total No. Chinook Salmon Counted		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21		22	23
1983	24	3.3	3.9	4.3	1.6	1.2	1.8	1.3	1.6	2.2	1.4	3.0	6.1	6.8	7.5	5.2	5.8	6.9	7.0	4.2	5.5	7.2	6.3	2.7	3.2	1,020
1984	21	3.8	2.9	1.4	0.3	0.0	0.6	1.8	0.9	0.9	0.8	1.3	4.2	3.2	2.8	5.5	6.7	7.2	5.9	10.4	8.1	7.0	8.1	9.7	6.5	781
1985	12	4.8	5.1	8.2	7.4	6.7	2.7	3.8	2.7	1.5	1.5	2.4	1.7	3.6	4.8	3.2	2.5	7.4	5.0	4.4	5.0	4.2	4.6	3.2	3.6	525
1986	6	1.1	6.5	8.6	14.6	7.0	3.8	0.5	0.0	3.2	-1.2	4.9	4.9	2.2	1.6	4.9	1.6	7.0	-0.5	0.0	7.0	1.1	3.2	13.0	4.9	185
1987	6	5.6	1.6	6.4	2.4	3.2	1.6	1.2	1.2	2.8	0.8	0.8	0.0	2.8	6.8	3.2	6.8	10.0	6.0	2.8	6.0	5.6	5.6	11.2	5.6	250
1988	6	9.9	0.9	3.6	4.5	1.8	0.9	0.0	1.8	0.9	1.8	3.6	0.0	2.7	2.7	2.7	0.0	4.5	7.2	6.3	8.1	10.8	8.1	7.2	9.9	111
Average		4.8	3.8	5.0	4.1	2.5	2.2	1.3	1.3	1.5	1.1	2.9	2.9	3.8	4.5	4.1	3.5	6.6	4.6	5.9	7.7	6.1	6.6	7.4	5.9	100.0

Appendix 4. Historic hourly passage rate for sockeye salmon, Goodnews River tower, 1981-1988.

Year	No. of Counts	Full Hour Counts																							Total No. Sockeye Salmon Counted	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22		23
1981	6	1.6	1.4	0.7	0.8	2.8	2.3	2.8	3.6	4.6	4.9	8.3	11.0	5.6	6.1	3.9	4.6	6.4	5.3	5.4	6.9	3.5	2.9	2.2	2.4	10,571
1982	2	2.4	3.6	1.8	1.1	1.6	3.2	2.7	2.3	3.2	3.8	3.2	5.9	5.8	4.6	3.5	4.7	6.3	6.0	6.7	6.6	5.3	5.0	4.2	6.5	2,610
Year	No. of Counts	Twenty Minute Counts																								
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22		23
1983	24	2.9	2.1	1.4	2.4	1.9	1.9	2.2	2.8	3.7	4.8	5.4	8.5	6.1	5.9	4.7	6.7	4.3	6.2	4.1	5.0	4.2	5.6	4.3	2.9	5,372
1984	21	6.9	3.7	1.7	1.0	0.5	0.6	3.4	1.0	1.2	1.4	3.1	4.4	4.3	2.8	7.3	4.5	7.1	4.4	8.1	8.0	4.9	6.8	5.8	7.1	7,131
1985	12	7.3	3.5	1.6	2.6	1.4	1.3	2.4	2.4	6.0	2.9	1.8	2.7	4.6	6.4	3.4	7.4	4.2	4.7	7.1	3.8	4.5	6.0	4.9	5.1	4,214
1986	6	4.2	5.8	3.5	2.6	2.1	1.2	2.1	1.5	3.3	0.4	0.6	5.9	2.5	2.7	6.0	9.3	6.0	6.8	6.4	5.3	4.0	4.7	7.8	5.2	3,662
1987	6	4.8	4.2	5.0	3.0	1.3	0.8	1.6	2.0	2.2	0.6	0.4	1.1	4.4	2.7	5.8	4.6	6.9	7.0	5.9	5.8	5.4	8.1	10.6	5.7	1,918
1988	6	7.8	4.8	3.3	4.7	1.8	1.1	1.8	2.4	2.1	0.8	0.9	2.3	1.5	2.0	1.4	6.3	3.5	10.7	4.8	10.7	6.6	5.0	9.3	4.7	665
Average		4.7	3.6	2.4	2.3	1.7	1.6	2.4	2.3	3.3	2.4	3.0	5.2	4.3	4.1	4.8	6.0	5.6	6.4	6.1	6.5	4.8	5.5	6.1	4.9	100.0

Appendix 5. Historical hourly passage rate for pink salmon, Goodnews River cover, 1981-1988.

Year	No. of Counts	Full Hour Counts																				Total No. Pink Salmon Counted				
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19		20	21	22	23
1981	6	0.8	1.6	0.0	2.4	3.1	3.9	0.8	2.4	3.1	1.6	1.6	7.1	5.5	3.1	6.3	4.7	6.4	12.6	7.9	7.1	5.5	5.5	3.9	3.1	127
1982	2	0.7	1.5	0.0	3.8	3.0	3.7	0.7	2.2	3.0	3.0	1.5	6.8	5.3	3.0	6.8	4.5	6.1	12.1	7.6	6.8	5.3	5.3	3.8	3.0	132
Year	No. of Counts	Twenty Minute Counts																				Total No. Pink Salmon Counted				
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19		20	21	22	23
1983	24	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	7.7	7.7	15.4	0.0	7.7	3.8	15.4	0.0	7.7	11.5	15.4	0.0	26	
1984	21	5.9	1.8	1.0	0.7	0.8	0.4	1.9	1.5	0.5	0.4	0.4	3.3	0.2	0.8	2.4	2.7	3.0	4.5	6.2	6.7	13.0	10.2	17.9	13.8	2,270
1985	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	3
1986	6	9.4	2.7	1.7	0.8	0.4	1.7	4.6	6.9	4.6	1.0	2.5	3.8	2.1	3.6	7.3	7.1	4.8	5.0	6.5	4.8	4.0	8.4	3.3	2.9	478
1987	6	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	33.3	0.0	0.0	0.0	0.0	3
1988	6	12.1	4.9	0.7	0.5	0.2	0.3	1.5	2.1	0.3	0.2	0.3	0.7	2.9	2.9	2.0	1.8	2.8	5.5	5.1	8.6	6.9	8.2	10.9	18.8	613
Average		3.6	5.7	0.9	1.0	0.9	1.3	1.2	1.9	1.4	4.9	0.8	3.2	7.1	2.6	5.0	2.6	3.8	5.4	10.2	8.4	5.3	6.1	11.1	5.2	99.9
Even Year Average		7.0	2.7	0.9	1.4	1.1	1.5	2.2	3.2	2.1	1.2	1.2	3.7	2.6	2.6	4.6	4.0	4.2	6.8	6.4	6.7	7.3	8.0	9.0	9.6	99.9

Appendix 6. Historical hourly passage rate for chum salmon, Goodnews River tower, 1981-1988.

Year	No. of Counts	Full Hour Counts																							Total No. Chum Salmon Counted	
		<u>00</u>	<u>01</u>	<u>02</u>	<u>03</u>	<u>04</u>	<u>05</u>	<u>06</u>	<u>07</u>	<u>08</u>	<u>09</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>		<u>23</u>
1981	6	3.0	3.9	2.1	1.1	1.4	5.5	1.2	0.9	1.7	1.2	6.5	10.5	4.2	5.4	2.4	7.4	10.8	5.1	5.6	6.6	4.0	3.8	3.2	2.5	4,813
1982	2	1.8	3.2	3.6	0.5	3.2	1.9	4.1	1.1	2.4	0.8	1.2	1.1	2.9	0.9	2.5	4.9	3.2	5.0	7.7	9.0	12.5	11.7	7.0	7.8	754
Year	No. of Counts	Twenty Minute Counts																							Total No. Chum Salmon Counted	
		<u>00</u>	<u>01</u>	<u>02</u>	<u>03</u>	<u>04</u>	<u>05</u>	<u>06</u>	<u>07</u>	<u>08</u>	<u>09</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>		<u>23</u>
1983	24	3.8	2.5	1.6	3.5	2.0	1.5	1.7	1.7	3.7	3.6	4.4	5.2	4.8	4.8	4.3	5.4	4.8	5.9	6.5	5.5	5.6	6.2	5.5	6.1	3,784
1984	21	5.9	3.0	1.1	0.7	0.2	0.4	3.4	0.5	0.4	0.4	1.2	7.7	0.6	0.7	1.9	2.0	3.3	3.2	8.7	5.9	11.1	10.1	14.5	13.1	5,418
1985	12	4.6	6.3	4.3	4.1	2.1	1.3	5.6	2.0	0.5	0.6	1.1	1.2	0.5	1.9	2.0	5.5	4.1	4.6	6.9	5.5	7.4	9.0	9.3	9.6	2,150
1986	6	6.3	4.7	6.3	3.7	1.6	3.0	3.1	1.3	1.5	0.5	0.9	0.7	2.1	1.2	3.7	4.3	2.0	5.2	8.2	5.6	4.7	10.6	10.2	8.8	1,279
1987	6	11.0	3.4	3.2	3.9	4.0	3.0	3.9	1.3	1.6	0.7	0.8	0.7	1.0	16.6	3.4	1.1	3.0	3.7	2.2	3.6	5.5	5.2	8.8	8.2	1,069
1988	6	12.4	3.1	2.6	2.1	0.6	0.4	1.6	1.3	0.6	0.2	0.4	0.1	5.6	2.4	3.0	1.5	2.4	4.9	5.1	8.9	10.2	7.3	11.8	11.8	1,634
Average		6.1	3.8	3.1	2.5	1.9	2.1	3.1	1.3	1.5	1.0	2.1	3.4	2.7	4.2	2.9	4.0	4.2	4.7	6.4	6.3	7.6	8.0	8.8	8.5	100.1

Appendix 7. Goodnews River tower meteorologic and hydrologic observations, 1988.

Date	Time	Cloud Cover (%)	Percip. (mm)	Wind (mph)	Temp. (C)		Water Level (mm)
					Air	Water	
6/15	1615	75	0.0	10		6	385
6/16	2130	75	0.0	15	48	7	360
6/17	1600	25	0.0	0	65	9	320
6/18	1835	75	<1.0	5	54	9	270
6/19	1420	75	1.0	10	57	8	260
6/21	1255	85	<1.0	10	56	9	200
6/22	1834	100	<1.0	15	50	9	165
6/24	1130	50	0.0	5	60	8	160
6/25	1250	75	0.0	5	66	10	135
6/27	1325	100	<1.0	<5	52	9	95
6/28	1330	75	<1.0	<5	62	9	400
6/29	1205	50	4.0	10	60	9	380
6/30	1255	10	0.0	10	60	12	350
7/01	1257	10	0.0	15	62	14	350
7/02	0830	50	0.0	15	64	15	350
7/03	1804	100	0.0	15	58	11	345
7/04	1553	100	0.0	10	58	10	325
7/05	1750	100	1.5	5	58	12	300
7/06	1230	100	10.5	5	50	10	290
7/07	1225	100	17.0	5	63	10	325
7/08	1225	100	0.0	5	63	11	360
7/09	1250	75	0.0	5	62	12	310
7/10	1317	75	0.0	10	63	12	280
7/11	1627	75	2.0	5	73	14	260
7/12	1240	85	0.5	10	62	12	265
7/13	1903	75	0.0	15	66	14	255
7/14	1355	100	4.0	0	62	12	255
7/15	1350	10	0.0	5	79	14	240
7/16	1223	25	0.0	10	66	14	215
7/17	2123	75	0.0	10	54	15	190
7/18	1428	75	0.0	15	67	14	180
7/19	1430	25	0.0	5	75	14	165
7/20	1224	10	0.0	5	64	13	150
7/21	1320	10	0.0	<5	79	14	145
7/22	1233	10	0.0	<5	72	15	140
7/23	1400	50	0.0	10	64	14	120
7/24	1207	10	0.0	<5	64	14	120
7/25	1228	100	0.0	<5	52	13	98
7/26	1715	100	0.0	5	58	12	90
7/27	1500	85	0.0	<5	63	11	83
7/28	1223	85	2.0	<5	60	11	77
7/29	1230	85	0.8	<5	63	12	78
7/30	1255	50	0.0	<5	65	13	85

Appendix 8. Estimated daily and cumulative chinook salmon escapement, Goodnews River tower, 1981-1988.

Date	YEAR															
	1981		1982		1983		1984		1985		1986		1987		1988	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/11					5	5										
6/12					0	5										
6/13	0	0			0	5										
6/14	0	0			-5	0										
6/15	0	0			0	0	0	0								
6/16	0	0			0	0	0	0			0	0				
6/17	2	2			0	0	0	0			6	6				
6/18	0	2			0	0	0	0			0	6				
6/19	4	6			0	0	4	4			6	12				
6/20	9	15			5	5	4	8			0	12				
6/21	11	26			16	21	12	20			0	12				
6/22	10	36			64	85	9	29			0	12	0	0		
6/23	16	52	0	0	186	271	6	35			0	12	0	0	50	50
6/24	21	73	22	22	118	389	26	61			0	12	0	0	22	72
6/25	41	114	28	50	106	495	46	107			26	38	0	0	109	181
6/26	30	144	4	54	55	550	15	122			0	38	4	4	155	336
6/27	82	226	2	56	21	571	11	133	4	4	79	117	0	4	200	536
6/28	92	318	0	56	171	742	51	184	0	4	45	162	8	12	56	592
6/29	166	484	0	56	341	1083	11	195	11	15	50	212	16	28	49	641
6/30	54	538	0	56	520	1603	8	203	10	25	55	267	36	64	176	817
7/1	86	624	0	56	273	1876	57	260	8	33	129	396	56	120	251	1068
7/2	186	810	3	59	263	2139	105	365	38	71	41	437	67	187	102	1170
7/3	90	900	2	61	113	2252	57	422	32	103	90	527	59	246	93	1263
7/4	134	1034	23	84	172	2424	58	480	60	163	65	592	51	297	89	1352
7/5	252	1286	44	128	231	2655	59	539	87	250	40	632	91	388	84	1436
7/6	237	1523	11	139	61	2716	105	644	132	382	53	685	130	518	68	1504
7/7	192	1715	24	163	656	3372	145	789	99	481	67	752	43	561	95	1599
7/8	206	1921	44	207	147	3519	158	947	66	547	57	809	37	598	70	1669
7/9	102	2023	50	257	102	3621	170	1117	126	673	38	847	71	669	126	1795
7/10	133	2156	26	283	198	3819	135	1252	132	805	87	934	141	810	120	1915
7/11	110	2266	66	349	205	4024	188	1440	192	997	78	1012	61	871	114	2029
7/12	78	2344	106	455	282	4306	105	1545	186	1183	64	1076	58	929	81	2110
7/13	92	2436	104	559	263	4569	159	1704	45	1228	86	1162	55	984	59	2169
7/14	61	2497	49	608	67	4636	202	1906	45	1273	109	1271	213	1197	24	2193
7/15	142	2639	85	693	157	4793	124	2030	45	1318	139	1410	132	1329	48	2241
7/16	67	2706	117	810	130	4923	46	2076	108	1426	79	1489	107	1436	65	2306
7/17	68	2774	96	906	116	5039	223	2299	141	1567	26	1515	114	1550	49	2355
7/18	69	2843	59	965	92	5131	70	2369	189	1756	84	1599	120	1670	33	2388
7/19	76	2919	22	987	106	5237	40	2409	183	1939	76	1675	85	1755	30	2418
7/20	81	3000	39	1026	160	5397	100	2509	162	2101	79	1754	49	1804	21	2439
7/21	26	3026	55	1081	187	5584	113	2622	96	2197	83	1837	48	1852	11	2450
7/22	48	3074	34	1115	67	5651	136	2758	30	2227	147	1984	69	1921	67	2517
7/23	68	3142	33	1148	58	5709	159	2917	96	2323	64	2048	45	1966	45	2562
7/24	85	3227	32	1180	89	5798	43	2960	97	2420	44	2092	73	2039	41	2603
7/25	50	3277	31	1211	79	5877	62	3022	101	2521			58	2097	37	2640
7/26	43	3320	31	1242	96	5973	54	3076	115	2636			47	2144	14	2654
7/27	23	3343	19	1261	38	6011	59	3135	20	2656			35	2179	3	2657

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Appendix 8. (page 2 of 2)

Date	YEAR															
	1981		1982		1983		1984		1985		1986		1987		1988	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/28	23	3366	36	1297	16	6027	59	3194	40	2696			22	2201	17	2674
7/29	39	3405	16	1313			39	3233	60	2756			26	2227	17	2691
7/30	18	3423	13	1326			19	3252	57	2813			45	2272	21	2712
7/31	34	3457	29	1355			8	3260	18	2831						
8/01	33	3490	17	1372												
8/02	46	3536	5	1377												
8/03	28	3564	18	1395												
8/04	36	3600														
8/05	36	3636														
8/06	20	3656														
8/07	13	3669														
8/08	12	3681														
8/09	7	3688														
8/10	7	3688														

Appendix 9. Estimated daily and cumulative sockeye salmon escapement, Goodnews River tower, 1981-1988.

Date	YEAR															
	1981		1982		1983		1984		1985		1986		1987		1988	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/11					0	0										
6/12					0	0										
6/13	0	0			0	0										
6/14	1	1			0	0										
6/15	0	1			0	0	92	92							0	
6/16	0	1			3	3	8	100			0	0			0	
6/17	32	33			0	3	11	111			0	0			0	
6/18	107	140			0	3	13	124			0	0			0	
6/19	259	399			0	3	143	267			0	0			0	
6/20	104	503			3	6	100	367			0	0			0	
6/21	291	794			0	6	452	819			292	292			0	
6/22	571	1365			0	6	289	1108			276	568	222	222		
6/23	669	2034	1822	1822	0	6	203	1311			261	829	193	415	358	358
6/24	633	2667	4201	6023	799	805	379	1690			59	888	121	536	269	627
6/25	868	3535	6010	12033	527	1332	554	2244			697	1585	427	963	695	1322
6/26	690	4225	5019	17052	404	1736	630	2874			431	2016	697	1660	783	2105
6/27	3108	7333	2559	19611	410	2146	1005	3879	125	125	1299	3315	818	2478	870	2975
6/28	2039	9372	98	19709	262	2408	1461	5340	235	360	1657	4972	794	3272	703	3678
6/29	1877	11249	268	19977	462	2870	1141	6481	616	976	1505	6477	771	4043	746	4424
6/30	1511	12760	438	20415	315	3185	1236	7717	825	1801	1353	7830	805	4848	818	5242
7/1	1798	14558	608	21023	481	3666	1546	9263	1033	2834	2514	10344	840	5688	983	6225
7/2	1861	16419	675	21698	1053	4719	1855	11118	883	3717	2487	12831	1104	6792	556	6781
7/3	1438	17857	966	22664	647	5366	1484	12602	565	4282	2442	15273	1333	8125	609	7390
7/4	1865	19722	2328	24992	1177	6543	1733	14335	1044	5326	2587	17860	1562	9687	635	8025
7/5	2970	22692	3690	28682	1708	8251	1981	16316	1523	6849	2732	20592	1595	11282	661	8686
7/6	2487	25179	2755	31437	1150	9401	1474	17790	1016	7865	3192	23784	1627	12909	959	9645
7/7	1511	26690	1578	33015	1483	10884	1931	19721	1087	8952	3651	27435	1761	14670	609	10254
7/8	2176	28866	2912	35927	1131	12015	2419	22140	1158	10110	3158	30593	1436	16106	698	10952
7/9	2195	31061	4382	40309	1166	13181	2907	25047	1680	11790	2700	33293	1044	17150	652	11604
7/10	2169	33230	2364	42673	1179	14360	1417	26464	1212	13002	3075	36368	1292	18442	586	12190
7/11	2778	36008	2194	44867	1961	16321	1018	27482	1362	14364	1896	38264	873	19315	519	12709
7/12	1476	37484	2023	46890	1617	17938	992	28474	777	15141	2098	40362	1012	20327	537	13246
7/13	1889	39373	1319	48209	1091	19029	862	29336	780	15921	1953	42315	1151	21478	365	13611
7/14	1223	40596	1567	49776	701	19730	774	30110	774	16695	1809	44124	1125	22603	459	14070
7/15	1450	42046	1097	50873	992	20722	549	30659	768	17463	1553	45677	1412	24015	246	14316
7/16	1439	43485	1513	52386	1002	21724	323	30982	753	18216	1243	46920	762	24777	269	14585
7/17	946	44431	785	53171	763	22487	260	31242	963	19179	799	47719	438	25215	210	14795
7/18	476	44907	534	53705	866	23353	121	31363	1077	20256	1104	48823	447	25662	151	14946
7/19	758	45665	282	53987	549	23902	117	31480	1038	21294	660	49483	449	26111	157	15103
7/20	753	46418	385	54372	439	24341	124	31604	1074	22368	486	49969	450	26561	111	15214
7/21	351	46769	238	54610	607	24948	124	31728	771	23139	311	50280	284	26845	101	15315
7/22	447	47216	202	54812	336	25284	97	31825	468	23607	331	50611	478	27323	137	15452
7/23	386	47602	187	54999	87	25371	70	31895	121	23728	307	50918	391	27714	123	15575
7/24	212	47814	172	55171	129	25500	22	31917	221	23949	151	51069	239	27953	80	15655
7/25	183	47997	157	55328	91	25591	19	31936	102	24051			382	28335	36	15691
7/26	144	48141	142	55470	65	25656	37	31973	37	24088			235	28570	31	15722
7/27	116	48257	120	55590	91	25747	34	32007	18	24106			87	28657	24	15746

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Appendix 9. (page 2 of 2)

Date	YEAR															
	1981		1982		1983		1984		1985		1986		1987		1988	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/28	197	48454	90	55680	66	25813	26	32033	11	24117			107	28764	17	15763
7/29	228	48682	73	55753			17	32050	4	24121			48	28812	13	15776
7/30	127	48809	83	55836			7	32057	0	24121			59	28871	23	15799
7/31	44	48853	92	55928			-4	32053	10	24131						15591
8/1	57	48910	109	56037												
8/2	47	48957	126	56163												
8/3	39	48996	92	56255												
8/4	53	49049														
8/5	39	49088														
8/6	7	49095														
8/7	1	49096														
8/8	7	49103														
8/9	2	49105														
8/10	0	49105														
8/11	11	49116														
8/12	-6	49110														
8/13	0	49110														
8/14	-2	49108														
8/15	0	49108														

Appendix 10. Estimated daily and cumulative coho salmon escapement, Goodnews River tower, 1981-1988.

Date	YEAR															
	1981		1982		1983		1984		1985		1986		1987		1988	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/17	0	0	2	2	0	0	0	0	0	0	3	3	0	0	0	0
7/18	0	0	1	3	0	0	0	0	0	0	0	3	0	0	0	0
7/19	2	2	1	4	0	0	0	0	0	0	0	3	0	0	0	0
7/20	4	6	1	5	0	0	0	0	0	0	2	5	0	0	0	0
7/21	6	12	0	5	0	0	3	3	0	0	4	9	0	0	0	0
7/22	3	15	0	5	0	0	4	7	0	0	134	143	0	0	0	0
7/23	1	16	0	5	0	0	4	11	0	0	17	160	0	0	0	0
7/24	2	18	0	5	0	0	25	36	0	0	3	163	0	0	0	0
7/25	2	20	1	6	0	0	7	43	7	7			0	0	0	0
7/26	1	21	3	9	0	0	35	78	78	85			0	0	0	0
7/27	1	22	5	14	0	0	21	99	51	136			0	0	3	3
7/28	1	23	9	23	0	0	39	138	45	181			0	0	0	3
7/29	9	32	10	33			30	168	38	219			0	0	3	6
7/30	4	36	6	39			21	189	29	248			62	62	0	6
7/31	4	40	4	43			60	249	34	282						
8/1	24	64	5	48												
8/2	14	78	6	54												
8/3	22	100	37	91												
8/4	15	115														
8/5	30	165														
8/6	22	187														
8/7	13	200														
8/8	22	222														
8/9	33	255														
8/10	16	271														
8/11	29	300														
8/12	25	325														
8/13	28	353														
8/14	3	356														
8/15	0	351														

Appendix 11. Estimated daily and cumulative pink salmon escapement, Goodnews River tower, 1981-1988.

Date	YEAR															
	1981		1982		1983		1984		1985		1986		1987		1988	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/1															13	13
7/2															23	36
7/3	0	0	0	0	0	0	11	11	0	0	0	0	0	0	23	59
7/4	0	0	0	0	0	0	10	21	0	0	4	4	0	0	23	82
7/5	0	0	3	3	0	0	8	29	0	0	7	11	0	0	23	105
7/6	2	2	1	4	0	0	18	47	0	0	16	27	0	0	13	118
7/7	2	4	4	8	0	0	18	65	0	0	25	52	0	0	32	150
7/8	9	13	10	18	9	9	42	107	0	0	60	112	0	0	23	173
7/9	9	22	42	60	0	9	84	191	0	0	20	132	0	0	96	269
7/10	17	39	17	77	12	21	61	252	0	0	93	225	0	0	102	371
7/11	10	49	61	138	9	30	431	683	0	0	63	288	0	0	108	479
7/12	13	62	105	243	3	33	266	949	0	0	117	405	0	0	234	713
7/13	16	78	225	468	0	33	176	1125	0	0	175	580	0	0	321	1034
7/14	15	93	227	695	0	33	276	1401	0	0	232	812	0	0	450	1484
7/15	26	119	183	878	9	42	459	1860	0	0	644	1456	4	4	330	1814
7/16	47	166	413	1291	0	42	642	2502	0	0	346	1802	0	4	399	2213
7/17	64	230	255	1546	0	42	1457	3959	0	0	329	2131	6	10	425	2638
7/18	48	278	183	1729	3	45	973	4932	0	0	532	2663	3	13	451	3089
7/19	81	359	110	1839	18	63	510	5442	0	0	481	3144	5	18	163	3252
7/20	101	460	223	2062	3	66	363	5805	9	9	924	4068	8	26	279	3531
7/21	58	518	484	2546	9	75	676	6481	5	14	1366	5434	17	43	304	3835
7/22	123	641	858	3404	0	75	702	7183	0	14	1376	6810	3	46	688	4523
7/23	161	802	848	4252	0	75	727	7910	0	14	987	7797	3	49	438	4961
7/24	76	878	837	5089	21	96	597	8507	3	17	337	8134	7	56	283	5244
7/25	41	919	827	5916	0	96	491	8998	27	44			4	60	127	5371
7/26	48	967	817	6733	0	96	753	9751	58	102			0	60	186	5557
7/27	55	1022	994	7727	0	96	789	10540	7	109			-4	56	302	5859
7/28	63	1085	680	8407	6	102	1071	11611	6	115			0	56	390	6249
7/29	12	1097	520	8927			871	12482	4	119			0	56	348	6597
7/30	18	1115	525	9452			671	13153	18	137			7	63	184	6781
7/31	26	1141	1144	10596			591	13744	7	144						
8/1	25	1166	1083	11679												
8/2	37	1203	1022	12701												
8/3	17	1220	1154	13855												
8/4	22	1242														
8/5	18	1260														
8/6	7	1267														
8/7	16	1283														
8/8	19	1302														
8/9	4	1306														
8/10	6	1312														
8/11	11	1323														
8/12	2	1325														
8/13	1	1326														
8/14	1															
8/15	0															

Appendix 12. Estimated daily and cumulative chum salmon escapement, Goodnews River tower, 1981-1988.

Date	YEAR															
	1981		1982		1983		1984		1985		1986		1987		1988	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/11					0	0										
6/12					0	0					0					
6/13	0	0			0	0					0					
6/14	0	0			0	0					0					
6/15	0	0			0	0	0	0			0					
6/16	1	1			0	0	0	0			0					
6/17	0	1			0	0	0	0			0					
6/18	0	1			0	0	0	0			0					
6/19	0	1			0	0	0	0			0					
6/20	4	5			0	0	0	0			0					
6/21	5	10			0	0	0	0			0					
6/22	35	45			0	0	0	0			0			0	0	
6/23	16	61	0	0	0	0	0	0			0			0	0	0
6/24	16	77	42	42	3	3	23	23			0			0	0	18
6/25	217	294	141	183	0	3	45	68			0			0	0	178
6/26	147	441	163	346	30	33	15	83			0			7	7	225
6/27	411	852	82	428	17	50	37	120	0	0	0			0	7	271
6/28	372	1224	0	428	0	50	107	227	0	0	0			9	16	223
6/29	293	1517	4	432	148	198	55	282	0	0	15	15		17	33	317
6/30	166	1683	8	440	82	280	55	337	0	0	30	45		61	94	961
7/1	339	2022	12	452	560	840	145	482	0	0	125	170		105	199	1281
7/2	556	2578	6	458	613	1453	234	716	11	11	68	238		58	257	291
7/3	189	2767	30	488	445	1898	491	1207	4	15	326	564		89	346	246
7/4	387	3154	65	553	545	2443	404	1611	78	93	404	968		121	467	224
7/5	353	3507	100	653	646	3089	316	1927	152	245	482	1450		141	608	201
7/6	552	4059	47	700	409	3498	264	2191	88	333	447	1897		162	770	654
7/7	443	4502	27	727	682	4180	232	2423	55	388	411	2308		168	938	1149
7/8	653	5155	126	853	459	4639	433	2856	21	409	268	2576		91	1029	935
7/9	659	5814	326	1179	892	5531	633	3489	81	490	422	2998		183	1212	1785
7/10	960	6774	224	1403	572	6103	680	4169	228	718	1478	4476		343	1555	1353
7/11	803	7577	308	1711	642	6745	1507	5676	570	1288	699	5175		281	1836	921
7/12	1058	8635	391	2102	1079	7824	906	6582	708	1996	412	5587		330	2166	1536
7/13	658	9293	339	2441	588	8412	1108	7690	288	2284	570	6157		379	2545	634
7/14	439	9732	490	2931	157	8569	1295	8985	450	2734	729	6886		408	2953	912
7/15	643	10375	371	3302	433	9002	1310	10295	612	3346	1457	8343		289	3242	984
7/16	727	11102	380	3682	407	9409	1325	11620	972	4318	934	9277		1216	4458	805
7/17	664	11766	212	3894	372	9781	2286	13906	777	5095	709	9986		990	5448	573
7/18	455	12221	167	4061	398	10179	396	14302	690	5785	755	10741		1011	6459	341
7/19	790	13011	122	4183	401	10580	159	14461	873	6658	433	11174		695	7154	384
7/20	1186	14197	193	4376	784	11364	466	14927	630	7288	512	11686		378	7532	282
7/21	711	14908	175	4551	1034	12398	964	15891	358	7646	592	12278		722	8254	300
7/22	1179	16087	197	4748	671	13069	630	16521	85	7731	1181	13459		1071	9325	834
7/23	1168	17255	219	4967	215	13284	284	16805	444	8175	981	14440		1479	10804	267
7/24	628	17883	242	5209	447	13731	201	17006	440	8615	324	14764		1130	11934	236
7/25	605	18488	264	5473	433	14164	256	17262	323	8938		14764		1717	13651	205
7/26	545	19033	286	5759	409	14573	441	17703	404	9342				1069	14720	154
7/27	326	19359	204	5963	381	14954	514	18217	261	9603				422	15142	232

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Date	YEAR															
	1981		1982		1983		1984		1985		1986		1987		1988	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/28	717	20076	116	6079	594	15548	300	18517	230	9833			1552	16694	328	20240
7/29	406	20482	132	6211			211	18728	198	10031			508	17202	343	20583
7/30	270	20752	83	6294			121	18849	113	10144			315	17517	216	20799
7/31	177	20929	74	6368			154	19003	223	10367						
8/1	135	21064	104	6472												
8/2	104	21168	134	6606												
8/3	103	21271	161	6767												
8/4	107	21378														
8/5	119	21497														
8/6	75	21572														
8/7	34	21606														
8/8	37	21643														
8/9	43	21686														
8/10	20	21706														
8/11	30	21736														
8/12	25	21761														
8/13	18	21779														
8/14	10	21789														
8/15	38	21827														

Appendix 13. Historic daily cumulative proportion of chinook salmon escapement at the Goodnews River counting tower, 1981-1988.

Date	1981	1982	1983	1984	1985	1986	1987	1988	Ave.
6/11	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
6/12	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
6/13	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
6/14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6/15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6/16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6/17	0.0005	0.0000	0.0000	0.0000	0.0000	0.0029	0.0000	0.0000	0.0004
6/18	0.0005	0.0000	0.0000	0.0000	0.0000	0.0029	0.0000	0.0000	0.0004
6/19	0.0016	0.0000	0.0000	0.0012	0.0000	0.0057	0.0000	0.0000	0.0011
6/20	0.0041	0.0000	0.0008	0.0025	0.0000	0.0057	0.0000	0.0000	0.0016
6/21	0.0070	0.0000	0.0035	0.0061	0.0000	0.0057	0.0000	0.0000	0.0028
6/22	0.0098	0.0000	0.0141	0.0089	0.0000	0.0057	0.0000	0.0000	0.0048
6/23	0.0141	0.0000	0.0450	0.0107	0.0000	0.0057	0.0000	0.0179	0.0117
6/24	0.0198	0.0158	0.0645	0.0187	0.0000	0.0057	0.0000	0.0273	0.0190
6/25	0.0309	0.0358	0.0821	0.0328	0.0000	0.0182	0.0000	0.0713	0.0339
6/26	0.0390	0.0387	0.0913	0.0374	0.0000	0.0182	0.0018	0.1311	0.0447
6/27	0.0613	0.0401	0.0947	0.0408	0.0014	0.0559	0.0018	0.2062	0.0628
6/28	0.0862	0.0401	0.1231	0.0564	0.0014	0.0774	0.0053	0.2182	0.0760
6/29	0.1312	0.0401	0.1797	0.0598	0.0053	0.1013	0.0123	0.2365	0.0958
6/30	0.1459	0.0401	0.2660	0.0623	0.0088	0.1276	0.0282	0.3078	0.1233
7/1	0.1692	0.0401	0.3113	0.0798	0.0117	0.1893	0.0528	0.3934	0.1559
7/2	0.2196	0.0423	0.3549	0.1120	0.0251	0.2089	0.0823	0.4307	0.1845
7/3	0.2440	0.0437	0.3737	0.1294	0.0364	0.2579	0.1083	0.4632	0.2063
7/4	0.2804	0.0602	0.4022	0.1472	0.0576	0.2830	0.1307	0.4931	0.2318
7/5	0.3487	0.0918	0.4405	0.1653	0.0883	0.3021	0.1708	0.5204	0.2660
7/6	0.4130	0.0996	0.4506	0.1975	0.1349	0.3274	0.2280	0.5487	0.3000
7/7	0.4650	0.1168	0.5595	0.2420	0.1699	0.3595	0.2469	0.5824	0.3428
7/8	0.5209	0.1484	0.5839	0.2905	0.1932	0.3867	0.2632	0.6066	0.3742
7/9	0.5485	0.1842	0.6008	0.3426	0.2377	0.4049	0.2945	0.6563	0.4087
7/10	0.5846	0.2029	0.6336	0.3840	0.2844	0.4455	0.3565	0.7027	0.4494
7/11	0.6144	0.2502	0.6677	0.4417	0.3522	0.4837	0.3834	0.7452	0.4923
7/12	0.6356	0.3262	0.7145	0.4739	0.4179	0.5143	0.4089	0.7755	0.5333
7/13	0.6605	0.4007	0.7581	0.5227	0.4338	0.5554	0.4331	0.7957	0.5700
7/14	0.6771	0.4358	0.7692	0.5847	0.4497	0.6076	0.5268	0.8080	0.6074
7/15	0.7156	0.4968	0.7953	0.6227	0.4656	0.6740	0.5849	0.8226	0.6472
7/16	0.7337	0.5806	0.8168	0.6368	0.5037	0.7118	0.6320	0.8502	0.6832
7/17	0.7522	0.6495	0.8361	0.7052	0.5535	0.7242	0.6822	0.8715	0.7218
7/18	0.7709	0.6918	0.8513	0.7267	0.6203	0.7643	0.7350	0.8864	0.7558
7/19	0.7915	0.7075	0.8689	0.7390	0.6849	0.8007	0.7724	0.8947	0.7824
7/20	0.8134	0.7355	0.8955	0.7696	0.7421	0.8384	0.7940	0.9014	0.8113
7/21	0.8205	0.7749	0.9265	0.8043	0.7761	0.8781	0.8151	0.9051	0.8376
7/22	0.8335	0.7993	0.9376	0.8460	0.7866	0.9484	0.8455	0.9372	0.8668
7/23	0.8520	0.8229	0.9472	0.8948	0.8206	0.9790	0.8653	0.9496	0.8914
7/24	0.8750	0.8459	0.9620	0.9080	0.8548	1.0000	0.8974	0.9615	0.9131
7/25	0.8886	0.8681	0.9751	0.9270	0.8905	1.0000	0.9230	0.9727	0.9306
7/26	0.9002	0.8903	0.9910	0.9436	0.9311	1.0000	0.9437	0.9776	0.9472
7/27	0.9065	0.9039	0.9973	0.9617	0.9382	1.0000	0.9591	0.9787	0.9557
7/28	0.9127	0.9297	1.0000	0.9798	0.9523	1.0000	0.9687	0.9851	0.9660
7/29	0.9233	0.9412	1.0000	0.9917	0.9735	1.0000	0.9802	0.9914	0.9752
7/30	0.9281	0.9505	1.0000	0.9975	0.9936	1.0000	1.0000	1.0000	0.9837
7/31	0.9374	0.9713	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9886
8/1	0.9463	0.9835	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9912
8/2	0.9588	0.9871	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9932
8/3	0.9664	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9958
8/4	0.9761	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9970
8/5	0.9859	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9982
8/6	0.9913	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9989
8/7	0.9948	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9994
8/8	0.9981	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998
8/9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Appendix 14. Historic daily cumulative proportion of sockeye salmon escapement at the Goodnews River counting tower, 1981-1988.

Date	1981	1982	1983	1984	1985	1986	1987	1988	Ave.
6/11	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.00001
6/12	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.00001
6/13	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.00001
6/14	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.00002
6/15	0.0000	0.0000	0.0001	0.0029	0.0000	0.0000	0.0000	0.0000	0.00038
6/16	0.0000	0.0000	0.0002	0.0031	0.0000	0.0000	0.0000	0.0000	0.00042
6/17	0.0007	0.0000	0.0002	0.0035	0.0000	0.0000	0.0000	0.0000	0.00055
6/18	0.0029	0.0000	0.0002	0.0039	0.0000	0.0000	0.0000	0.0000	0.00087
6/19	0.0081	0.0000	0.0002	0.0083	0.0000	0.0000	0.0000	0.0000	0.00209
6/20	0.0102	0.0000	0.0003	0.0114	0.0000	0.0000	0.0000	0.0000	0.00276
6/21	0.0162	0.0000	0.0003	0.0256	0.0000	0.0057	0.0000	0.0000	0.00597
6/22	0.0278	0.0000	0.0003	0.0346	0.0000	0.0111	0.0077	0.0000	0.01019
6/23	0.0414	0.0324	0.0003	0.0409	0.0000	0.0162	0.0144	0.0281	0.02172
6/24	0.0543	0.1071	0.0313	0.0527	0.0000	0.0174	0.0186	0.0486	0.04123
6/25	0.0720	0.2139	0.0517	0.0700	0.0000	0.0310	0.0334	0.0860	0.06975
6/26	0.0860	0.3031	0.0674	0.0897	0.0000	0.0395	0.0575	0.1342	0.09717
6/27	0.1493	0.3486	0.0833	0.1210	0.0052	0.0649	0.0858	0.1931	0.13141
6/28	0.1908	0.3504	0.0934	0.1666	0.0149	0.0974	0.1133	0.2303	0.15713
6/29	0.2291	0.3551	0.1113	0.2022	0.0404	0.1268	0.1400	0.2809	0.18574
6/30	0.2598	0.3629	0.1235	0.2408	0.0746	0.1533	0.1679	0.3321	0.21437
7/1	0.2964	0.3737	0.1421	0.2890	0.1174	0.2025	0.1970	0.3916	0.25124
7/2	0.3343	0.3857	0.1829	0.3469	0.1540	0.2512	0.2353	0.4274	0.28973
7/3	0.3636	0.4029	0.2080	0.3932	0.1774	0.2991	0.2814	0.4655	0.32388
7/4	0.4016	0.4443	0.2536	0.4472	0.2207	0.3497	0.3355	0.5046	0.36965
7/5	0.4621	0.5099	0.3198	0.5090	0.2838	0.4032	0.3908	0.5448	0.42792
7/6	0.5127	0.5588	0.3643	0.5550	0.3259	0.4657	0.4471	0.6055	0.47939
7/7	0.5435	0.5869	0.4218	0.6153	0.3710	0.5372	0.5081	0.6450	0.52859
7/8	0.5878	0.6386	0.4656	0.6907	0.4190	0.5991	0.5579	0.6874	0.58075
7/9	0.6325	0.7165	0.5108	0.7814	0.4886	0.6519	0.5940	0.7311	0.63835
7/10	0.6767	0.7586	0.5564	0.8256	0.5388	0.7121	0.6388	0.7695	0.68457
7/11	0.7332	0.7976	0.6324	0.8574	0.5953	0.7493	0.6690	0.8028	0.72962
7/12	0.7633	0.8335	0.6950	0.8883	0.6275	0.7903	0.7041	0.8373	0.76742
7/13	0.8018	0.8570	0.7373	0.9152	0.6598	0.8286	0.7439	0.8615	0.80064
7/14	0.8267	0.8848	0.7645	0.9394	0.6918	0.8640	0.7829	0.8890	0.83039
7/15	0.8562	0.9043	0.8029	0.9565	0.7237	0.8944	0.8318	0.9069	0.85959
7/16	0.8855	0.9312	0.8417	0.9666	0.7549	0.9188	0.8582	0.9232	0.88501
7/17	0.9048	0.9452	0.8713	0.9747	0.7948	0.9344	0.8734	0.9365	0.90437
7/18	0.9145	0.9547	0.9048	0.9785	0.8394	0.9560	0.8889	0.9468	0.92293
7/19	0.9299	0.9597	0.9261	0.9821	0.8824	0.9689	0.9044	0.9564	0.93874
7/20	0.9452	0.9665	0.9431	0.9860	0.9269	0.9785	0.9200	0.9627	0.95362
7/21	0.9524	0.9708	0.9666	0.9899	0.9589	0.9846	0.9298	0.9710	0.96548
7/22	0.9615	0.9743	0.9796	0.9929	0.9783	0.9910	0.9464	0.9800	0.97550
7/23	0.9693	0.9777	0.9830	0.9951	0.9833	0.9970	0.9599	0.9863	0.98146
7/24	0.9736	0.9807	0.9880	0.9958	0.9925	1.0000	0.9682	0.9906	0.98618
7/25	0.9774	0.9835	0.9915	0.9963	0.9967	1.0000	0.9814	0.9929	0.98997
7/26	0.9803	0.9860	0.9940	0.9975	0.9982	1.0000	0.9896	0.9949	0.99257
7/27	0.9827	0.9882	0.9976	0.9986	0.9990	1.0000	0.9926	0.9967	0.99440
7/28	0.9867	0.9898	1.0000	0.9994	0.9994	1.0000	0.9963	0.9976	0.99615
7/29	0.9913	0.9911	1.0000	0.9999	0.9996	1.0000	0.9980	0.9991	0.99738
7/30	0.9939	0.9926	1.0000	1.0001	0.9996	1.0000	1.0000	1.0000	0.99829
7/31	0.9948	0.9942	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99864
8/1	0.9960	0.9961	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99903
8/2	0.9969	0.9984	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99943
8/3	0.9977	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99973
8/4	0.9988	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99986
8/5	0.9996	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99996
8/6	0.9997	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99998
8/7	0.9998	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99998
8/8	0.9999	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/9	0.9999	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/10	0.9999	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/11	1.0002	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/13	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000

Appendix 15. Historic daily cumulative proportion of chin salmon escapement at the Goodnews River counting tower, 1981-1988.

Date	1981	1982	1983	1984	1985	1986	1987	1988	Ave.
6/11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00000
6/12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00000
6/13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00000
6/14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00000
6/15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00000
6/16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00001
6/17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00001
6/18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00001
6/19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00001
6/20	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00003
6/21	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00006
6/22	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00026
6/23	0.0028	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00035
6/24	0.0035	0.0062	0.0002	0.0012	0.0000	0.0000	0.0000	0.0008	0.00150
6/25	0.0135	0.0270	0.0002	0.0036	0.0000	0.0000	0.0000	0.0093	0.00670
6/26	0.0202	0.0511	0.0021	0.0044	0.0000	0.0000	0.0004	0.0211	0.01241
6/27	0.0390	0.0632	0.0032	0.0063	0.0000	0.0000	0.0004	0.0361	0.01854
6/28	0.0561	0.0632	0.0032	0.0119	0.0000	0.0000	0.0009	0.0438	0.02240
6/29	0.0695	0.0638	0.0127	0.0148	0.0000	0.0010	0.0019	0.0382	0.02776
6/30	0.0771	0.0650	0.0180	0.0177	0.0000	0.0030	0.0054	0.1122	0.03732
7/1	0.0926	0.0668	0.0540	0.0254	0.0000	0.0115	0.0114	0.1659	0.05345
7/2	0.1181	0.0677	0.0935	0.0377	0.0011	0.0161	0.0147	0.1766	0.06567
7/3	0.1268	0.0721	0.1221	0.0635	0.0014	0.0382	0.0198	0.1867	0.07882
7/4	0.1445	0.0817	0.1571	0.0848	0.0090	0.0656	0.0267	0.1964	0.09571
7/5	0.1607	0.0965	0.1987	0.1014	0.0236	0.0982	0.0347	0.2057	0.11494
7/6	0.1860	0.1034	0.2250	0.1153	0.0321	0.1285	0.0440	0.2404	0.13433
7/7	0.2063	0.1074	0.2688	0.1275	0.0374	0.1563	0.0535	0.2992	0.15707
7/8	0.2362	0.1261	0.2984	0.1503	0.0395	0.1745	0.0587	0.3382	0.17771
7/9	0.2664	0.1742	0.3557	0.1836	0.0473	0.2031	0.0692	0.4284	0.21598
7/10	0.3103	0.2073	0.3925	0.2194	0.0693	0.3032	0.0888	0.4952	0.26075
7/11	0.3471	0.2528	0.4338	0.2987	0.1242	0.3505	0.1048	0.5386	0.30633
7/12	0.3956	0.3106	0.5032	0.3464	0.1925	0.3794	0.1237	0.6110	0.35768
7/13	0.4258	0.3607	0.5410	0.4047	0.2203	0.4170	0.1453	0.6459	0.39509
7/14	0.4459	0.4331	0.5511	0.4728	0.2637	0.4664	0.1686	0.6855	0.43589
7/15	0.4753	0.4880	0.5790	0.5418	0.3228	0.5651	0.1851	0.7387	0.48695
7/16	0.5086	0.5441	0.6052	0.6115	0.4165	0.6284	0.2545	0.7730	0.54272
7/17	0.5391	0.5754	0.6291	0.7318	0.4915	0.6764	0.3110	0.7986	0.59411
7/18	0.5599	0.6001	0.6547	0.7526	0.5580	0.7275	0.3687	0.8155	0.62964
7/19	0.5961	0.6181	0.6805	0.7610	0.6422	0.7568	0.4084	0.8342	0.66217
7/20	0.6504	0.6467	0.7309	0.7855	0.7030	0.7915	0.4300	0.8468	0.69810
7/21	0.6830	0.6725	0.7974	0.8362	0.7375	0.8316	0.4712	0.8739	0.73793
7/22	0.7370	0.7016	0.8406	0.8694	0.7457	0.9116	0.5323	0.9028	0.78013
7/23	0.7905	0.7340	0.8544	0.8843	0.7886	0.9781	0.6168	0.9154	0.82025
7/24	0.8193	0.7698	0.8831	0.8949	0.8310	1.0000	0.6813	0.9265	0.85074
7/25	0.8470	0.8088	0.9110	0.9084	0.8622	1.0000	0.7793	0.9361	0.88159
7/26	0.8720	0.8510	0.9373	0.9316	0.9011	1.0000	0.8403	0.9420	0.90943
7/27	0.8869	0.8812	0.9618	0.9586	0.9263	1.0000	0.8644	0.9582	0.92968
7/28	0.9198	0.8983	1.0000	0.9744	0.9485	1.0000	0.9530	0.9747	0.95859
7/29	0.9384	0.9178	1.0000	0.9855	0.9676	1.0000	0.9820	0.9890	0.97254
7/30	0.9507	0.9301	1.0000	0.9919	0.9785	1.0000	1.0000	1.0000	0.98140
7/31	0.9589	0.9410	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.98749
8/1	0.9650	0.9564	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99018
8/2	0.9698	0.9762	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99325
8/3	0.9745	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99682
8/4	0.9794	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99743
8/5	0.9849	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99811
8/6	0.9883	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99854
8/7	0.9899	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99873
8/8	0.9916	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99895
8/9	0.9935	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99919
8/10	0.9945	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99931
8/11	0.9958	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99948
8/12	0.9970	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99962
8/13	0.9978	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99973
8/14	0.9983	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99978
8/15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000

Appendix 16. Historic daily cumulative proportion of coho salmon escapement at the Goodnews River counting tower, 1981-1988.

Date	1981	1982	1983	1984	1985	1986	1987	1988	Ave.
7/17	0.0000	0.0220		0.0000	0.0000	0.0184	0.0000	0.0000	0.00577
7/18	0.0000	0.0330		0.0000	0.0000	0.0184	0.0000	0.0000	0.00734
7/19	0.0056	0.0440		0.0000	0.0000	0.0184	0.0000	0.0000	0.00971
7/20	0.0169	0.0549		0.0000	0.0000	0.0307	0.0000	0.0000	0.01464
7/21	0.0337	0.0549		0.0120	0.0000	0.0552	0.0000	0.0000	0.02227
7/22	0.0421	0.0549		0.0281	0.0000	0.8773	0.0000	0.0000	0.14321
7/23	0.0449	0.0549		0.0442	0.0000	0.9816	0.0000	0.0000	0.16081
7/24	0.0506	0.0549		0.1446	0.0000	1.0000	0.0000	0.0000	0.17858
7/25	0.0562	0.0659		0.1727	0.0248	1.0000	0.0000	0.0000	0.18852
7/26	0.0590	0.0989		0.3133	0.3014	1.0000	0.0000	0.0000	0.25322
7/27	0.0618	0.1538		0.3976	0.4823	1.0000	0.0000	0.5000	0.37079
7/28	0.0646	0.2527		0.5542	0.6418	1.0000	0.0000	1.0000	0.50192
7/29	0.0899	0.3626		0.6747	0.7766	1.0000	0.0000	1.0000	0.55769
7/30	0.1011	0.4286		0.7590	0.8794	1.0000	1.0000	1.0000	0.73831
7/31	0.1124	0.4725		1.0000	1.0000	1.0000	1.0000	1.0000	0.79784
8/1	0.1798	0.5275		1.0000	1.0000	1.0000	1.0000	1.0000	0.81532
8/2	0.2191	0.5934		1.0000	1.0000	1.0000	1.0000	1.0000	0.83036
8/3	0.2809	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.89727
8/4	0.3230	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.90329
8/5	0.4635	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.92335
8/6	0.5253	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.93218
8/7	0.5618	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.93740
8/8	0.6236	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.94623
8/9	0.7163	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.95947
8/10	0.7612	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.96589
8/11	0.8427	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.97753
8/12	0.9129	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.98756
8/13	0.9916	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	0.99880
8/14	1.0000	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/15	1.0000	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	1.00000

Appendix 17. Historic daily cumulative proportion of pink salmon escapement at the Goodnews River counting tower, 1981-1988.

Date	1981	1982	1983	1984	1985	1986	1987	1988	Ava.
7/1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.00025
7/2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0055	0.00069
7/3	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0090	0.00123
7/4	0.0000	0.0000	0.0000	0.0015	0.0000	0.0005	0.0000	0.0125	0.00182
7/5	0.0000	0.0002	0.0000	0.0021	0.0000	0.0014	0.0000	0.0160	0.00246
7/6	0.0015	0.0003	0.0000	0.0034	0.0000	0.0033	0.0000	0.0174	0.00325
7/7	0.0030	0.0006	0.0000	0.0047	0.0000	0.0044	0.0000	0.0224	0.00463
7/8	0.0098	0.0013	0.0882	0.0078	0.0000	0.0138	0.0000	0.0269	0.01847
7/9	0.0166	0.0043	0.0882	0.0139	0.0000	0.0162	0.0000	0.0415	0.02260
7/10	0.0294	0.0056	0.2059	0.0183	0.0000	0.0277	0.0000	0.0564	0.04290
7/11	0.0369	0.0100	0.2941	0.0497	0.0000	0.0334	0.0000	0.0716	0.06221
7/12	0.0467	0.0175	0.3235	0.0690	0.0000	0.0498	0.0000	0.1045	0.07639
7/13	0.0588	0.0338	0.3235	0.0819	0.0000	0.0713	0.0000	0.1639	0.09164
7/14	0.0701	0.0502	0.3235	0.1019	0.0000	0.0998	0.0000	0.2208	0.10829
7/15	0.0897	0.0634	0.4118	0.1353	0.0000	0.1790	0.0635	0.2689	0.15144
7/16	0.1251	0.0932	0.4118	0.1820	0.0000	0.2215	0.0635	0.3364	0.17919
7/17	0.1733	0.1116	0.4118	0.2881	0.0000	0.2620	0.1587	0.4011	0.22582
7/18	0.2095	0.1248	0.4412	0.3588	0.0000	0.3274	0.2063	0.4629	0.26637
7/19	0.2705	0.1327	0.6176	0.3960	0.0000	0.3855	0.2857	0.4828	0.32149
7/20	0.3466	0.1488	0.6471	0.4224	0.0625	0.5001	0.4127	0.5246	0.38310
7/21	0.3904	0.1838	0.7353	0.4716	0.0972	0.6681	0.6825	0.5716	0.47505
7/22	0.4830	0.2457	0.7353	0.5226	0.0972	0.8372	0.7302	0.6783	0.54120
7/23	0.6044	0.3069	0.7353	0.5755	0.0972	0.9586	0.7778	0.7395	0.59940
7/24	0.6616	0.3673	0.9412	0.6190	0.1181	1.0000	0.8889	0.7785	0.67181
7/25	0.6925	0.4270	0.9412	0.6547	0.3056	1.0000	0.9524	0.7952	0.72107
7/26	0.7287	0.4860	0.9412	0.7095	0.7083	1.0000	0.9524	0.8225	0.79357
7/27	0.7702	0.5377	0.9412	0.7669	0.7569	1.0000	0.8889	0.8651	0.81836
7/28	0.8176	0.6068	1.0000	0.8448	0.7986	1.0000	0.8889	0.9235	0.86603
7/29	0.8267	0.6443	1.0000	0.9082	0.8264	1.0000	0.8889	0.9723	0.88334
7/30	0.8402	0.6822	1.0000	0.9570	0.9514	1.0000	1.0000	1.0000	0.92885
7/31	0.8598	0.7648	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.95308
8/1	0.8787	0.8429	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.96520
8/2	0.9066	0.9167	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.97791
8/3	0.9194	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.98992
8/4	0.9359	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99199
8/5	0.9495	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99369
8/6	0.9548	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99435
8/7	0.9668	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99586
8/8	0.9812	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99765
8/9	0.9842	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99802
8/10	0.9887	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99859
8/11	0.9970	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99962
8/12	0.9985	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99981
8/13	0.9992	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.99991
8/14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000
8/15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.00000

Appendix 18. Chinook salmon counts obtained during periods of 24 consecutive hourly observations, Goodnews River tower, 1988.

Date	Total Hour Count																							Total No. Chinook Salmon Counted	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22		23
7/11	2	0	1	2	0	0	0	1	0	0	1	1	1	0	2	0	-1	7	0	2	6	7	2	4	38
7/12	1	0	-1	0	0	0	-2	0	1	3	1	2	4	0	2	0	1	1	6	2	3	0	3	0	27
7/14	0	0	-1	0	1	2	0	0	-1	0	0	-2	-1	4	0	1	0	0	1	1	1	0	1	1	8
7/15	3	-1	0	1	0	0	1	0	0	0	0	0	0	0	1	2	1	0	0	0	1	1	2	4	16
7/20	1	0	0	0	0	-1	0	0	0	-1	1	-1	-1	0	0	0	1	1	0	3	1	1	0	2	7
7/23	4	2	5	2	1	0	1	1	1	0	1	0	0	-1	-2	-3	3	-1	0	1	0	0	0	0	15
Total	11	1	4	5	2	1	0	2	1	2	4	0	3	3	3	0	5	8	7	9	12	9	8	11	111
Percent																									
Total	9.9	0.9	3.6	4.5	1.8	0.9	0.0	1.8	0.9	1.8	3.6	0.0	2.7	2.7	2.7	0.0	4.5	7.2	6.3	8.1	10.8	8.1	7.2	9.9	100.0

Appendix 19. Sockeye salmon counts obtained during periods of 24 consecutive hourly observations, Goodnews River tower, 1988.

Date	Total Hour Count																							Total No. Sockeye Salmon Counted	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22		23
7/11	7	11	6	12	7	0	1	3	5	1	0	0	2	1	3	18	11	16	5	16	15	8	19	6	173
7/12	15	6	9	9	1	1	3	6	1	0	0	0	4	3	2	4	3	26	3	31	20	10	16	6	179
7/14	12	10	0	5	2	1	2	2	2	1	2	0	0	3	4	20	5	22	17	11	2	7	18	5	153
7/15	4	2	1	3	0	2	4	4	4	0	0	5	1	1	1	0	5	8	6	10	3	4	7	7	82
7/20	4	1	5	2	1	2	1	0	0	1	2	1	2	1	0	0	-1	-1	1	3	4	4	2	2	37
7/23	10	2	1	0	1	1	1	1	2	2	2	9	1	4	-1	0	0	0	0	0	0	0	0	5	41
Total	52	32	22	31	12	7	12	16	14	5	6	15	10	13	9	42	23	71	32	71	44	33	62	31	665
Percent																									
Total	7.8	4.8	3.3	4.7	1.8	1.1	1.8	2.4	2.1	0.8	0.9	2.3	1.5	2.0	1.4	6.3	3.5	10.7	4.8	10.7	6.6	5.0	9.3	4.7	100.0

Appendix 20. Pink salmon counts obtained during periods of 24 consecutive hourly observation, Goodnews River tower, 1988.

Date	Total Hour Count																							Total No. Pink Salmon Counted	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22		23
7/11	5	2	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	8	0	3	3	4	4	3	36
7/12	5	1	1	0	0	0	2	0	1	0	0	0	6	2	4	0	0	5	8	6	12	5	14	6	78
7/14	30	6	0	0	0	0	1	1	0	0	1	1	3	0	1	4	6	3	3	13	5	19	23	30	150
7/15	15	6	0	2	0	2	3	1	0	0	0	0	0	0	0	2	3	5	14	10	7	13	27	110	
7/20	1	0	1	0	1	0	2	1	-1	0	0	1	3	8	4	1	2	10	11	15	10	13	5	5	93
7/23	18	15	2	1	0	0	1	10	2	1	1	2	5	8	1	6	6	5	4	2	2	2	8	44	146
Total	74	30	4	3	1	2	9	13	2	1	2	4	18	18	12	11	17	34	31	53	42	50	67	115	613
Percent																									
Total	12.1	4.9	0.7	0.5	0.2	0.3	1.5	2.1	0.3	0.2	0.3	0.7	2.9	2.9	2.0	1.8	2.8	5.5	5.1	8.6	6.9	8.2	10.9	18.8	100.0

Appendix 21. Chum salmon counts obtained during periods of 24 consecutive hourly observation, Goodnews River tower, 1988.

Date	Total Hour Count																							Total No. Chum Salmon Counted	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22		23
7/11	40	3	20	18	3	0	0	2	1	2	3	-1	1	1	14	18	10	16	6	26	36	21	33	34	307
7/12	58	8	7	10	1	2	12	0	4	4	6	2	85	13	24	2	13	21	32	45	80	10	45	28	512
7/14	45	11	1	6	-3	2	4	9	2	0	0	1	3	3	8	12	2	5	13	26	6	17	76	55	304
7/15	21	1	0	-1	-1	3	1	4	2	1	1	0	2	2	3	-3	21	25	29	33	31	68	27	58	328
7/20	17	8	-1	0	8	-1	6	4	-1	-4	0	-1	2	16	5	-3	-4	11	0	12	7	4	5	4	94
7/23	21	19	15	2	1	0	3	3	1	0	-4	0	-2	4	-5	-1	-2	2	3	3	6	0	7	13	89
Total	202	50	42	35	9	6	26	22	9	3	6	1	91	39	49	25	40	80	83	145	166	120	193	192	1634
Percent Total	12.4	3.1	2.6	2.1	0.6	0.4	1.6	1.3	0.6	0.2	0.4	0.1	5.6	2.4	3.0	1.5	2.4	4.9	5.1	8.9	10.2	7.3	11.8	11.8	100.0

Appendix 22. Historical estimated run size and commercial exploitation rate, Goodnews River, 1981-1988.

Year	Species	Middle Fork Tower Estimate	Middle Fork Aerial Survey Count as a Percentage of Tower Estimate	Goodnews River Escapement Estimate	Goodnews Bay Subsistence Harvest Estimate	Goodnews Bay Commercial Harvest	Goodnews Bay Total Run Size Estimate	Exploitation ^a Percentage of Run Size
1981 ^b	Chinook	3,688	-	-	1,409	7,190	-	-
	Sockeye	49,108	-	-	3,511 ^c	40,273	-	-
	Chum	21,827	-	-	-	13,642	-	-
1982 ^b	Chinook	1,395	-	-	1,236	9,476	-	-
	Sockeye	56,255	-	-	2,754 ^c	38,877	-	-
	Chum	6,767	-	-	-	13,829	-	-
1983	Chinook	6,027	36%	14,398	1,066	14,117	29,581	51%
	Sockeye	25,816	22%	69,955	1,518 ^c	11,716	83,189	16%
	Chum	15,548	-	-	-	6,766	-	-
1984	Chinook	3,260	35%	8,743	629	8,612	17,984	51%
	Sockeye	32,053	27%	67,213	964	15,474	83,651	20%
	Chum	19,003	35%	117,739	189	14,340	132,268	11%
1985	Chinook	2,831	70%	7,979	426	5,793	14,198	44%
	Sockeye	24,131	11%	50,481	704	6,698	57,883	13%
	Chum	10,367	32%	25,025	348	4,784	30,157	17%
1986	Chinook	2,083	57%	4,094	555	2,723	7,372	44%
	Sockeye	51,069	28%	93,228	942	22,608	116,778	20%
	Chum	14,765	38%	51,910	191	10,355	62,456	17%
1987	Chinook	2,274	100%	4,490	816	3,357	8,663	48%
	Sockeye	28,871	85%	51,989	955	27,758	80,702	36%
	Chum	17,519	58%	37,802	578	20,381	58,761	36%
1988 ^d	Chinook	2,712	39%	5,419	310	4,964	10,693	46%
	Sockeye	15,799	30%	38,319	1,065	36,368	75,752	48%
	Chum	20,799	21%	39,501	448	33,059	73,008	45%

a Commercial and subsistence exploitation

b Incomplete aerial survey results.

c Subsistence caught chum salmon is included in subsistence sockeye salmon harvest.

d Preliminary figures.

