

MIDDLE FORK GOODNEWS RIVER FISHERIES STUDIES, 2000



By

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ABSTRACT

Commercial harvest and age, sex, and length data for Pacific salmon, *Oncorhynchus*, are reported for the 2000 season in District W-5. Escapement estimates and abundance data are summarized for Middle Fork Goodnews River spawning escapements for the 2000 season. Age, sex, and length data are summarized for coho salmon for the Goodnews Bay commercial fishery and the Middle Fork Goodnews River spawning escapement. A resistance board-floating weir is used on the Middle Fork Goodnews River to estimate escapement and to allow the collection of age, sex and length data. In 2000, 4,442 chinook salmon *Oncorhynchus tshawytscha*, 37,252, sockeye salmon *O. nerka*, 15,531 coho salmon *O. kisutch*, 7 pink salmon *O. gorbuscha*, and 7,450 chum salmon *O. keta*, salmon were commercially harvested in District W-5. During the 2000 season, the weir project was in operation during the majority of chinook and sockeye runs, and for all of the pink and coho salmon runs. The escapement count of 3,295 chinook salmon and 14,720 chum salmon were below the escapement goals of 3,500 and 15,000 fish, respectively. The escapement of 42,197 sockeye salmon exceeded the escapement goal of 25,000 fish. Escapements for coho and pink salmon were 19,676 and 2,530 fish, respectively. The predominant age classes of coho salmon sampled from the commercial harvest in District W-5 and the Middle Fork Goodnews River escapement project were age 2.1 (97.6 and 97.9%, respectively).

INTRODUCTION

Site Description

The Goodnews River originates in the Ahklun Mountains and flows southwest approximately 60 miles to Goodnews Bay. The Middle Fork parallels the length of the main stem (North Fork) Goodnews River before joining near its mouth. The Goodnews River system drains an area of approximately 910 square miles and contains many lakes. All five species of Pacific salmon reside in the Goodnews River drainage. The Alaska Department of Fish and Game (ADF&G) has operated a counting tower from 1981 through 1990, and a weir since 1991 on the Middle Fork Goodnews River (Schultz 1982, 1984a, 1984b, 1985, 1987; Schultz and Burkey 1989; Burkey 1989, 1990; Menard 1998, 1999).

Salmon Fisheries

District 5 (Goodnews Bay) is the southernmost salmon district in the Kuskokwim Area. Subsistence and commercial fisheries occur in Goodnews Bay while sport and subsistence fisheries occur in the Goodnews River drainage (Burkey et. al. 1997). Commercial fishing in Goodnews Bay has occurred annually since 1968 (Table 1). Commercial fishing is conducted primarily with the use of drift gillnets in tidal channels in Goodnews Bay and a few set gillnets near the mouth of the bay. The outlook for the 2000 season was for an average to below average harvest of salmon, ranging from 41,000 to 82,000 fish (all species combined). Pink salmon is the least commercially valuable species and is not targeted. Historically, the return of pink salmon in odd years is smaller than returns in even years.

Subsistence fishing is allowed throughout the Goodnews River drainage and in Goodnews Bay. Residents of the Goodnews Bay villages have long depended upon the fishery resources as a source of food. The Department has quantified subsistence harvests in Goodnews Bay since 1977.

Sport fishing occurs throughout the Goodnews River drainage. Many sport fish anglers take float trips from the lakes to Goodnews Bay. In the 1990s there has been one semi-permanent sport fishing lodge located on the North Fork Goodnews River approximately one mile up-river from the confluence of the North and Middle Forks. Also, there is one temporary sport fish camp located on the Middle Fork Goodnews River, approximately 15 miles upriver from the confluence of the North and Middle Forks.

Weir Project

The Middle Fork Goodnews River project is the third oldest continuing salmon escapement assessment project in the Kuskokwim Area. The Middle Fork Goodnews River study site for both the tower operations (1981-1990) and weir operations (1991-1999) is approximately 11 river miles (18 km) from Goodnews Bay village.

The project was initiated as a counting tower in 1981 and operated for ten seasons. The tower was

followed by a fixed panel weir that was operated from 1991 to 1997. In late July 1997, the fixed-panel weir was removed and a new resistance-board "floating weir" was installed. The resistance-board weir is able to handle higher water levels and a heavier debris load than the fixed-panel weir, allowed a more accurate species identification of the fish passing the weir, and allowed the project to remain in operation later into the season.

Water discharge largely determines the date in which the weir becomes operational (fish tight). Optimal discharge for weir installation is approximately 2500 cubic feet/second. Factors controlling water discharge include temperature, amount of snow fall the previous winter, and recent precipitation. Likewise, water discharge largely determines how long the weir remains in operation.

Escapement Objectives

The Goodnews River is the primary salmon spawning stream in District W-5. Salmon escapements are assessed in the drainage by means of aerial surveys and the passage of fish through the Middle Fork Goodnews River weir. Having the weir operational early in the season (prior to the beginning of migration of salmon upriver) determines the percentage of the escapement observed at the weir. Since 1998, the weir has begun counting as early as June 25th and as late as July 4th, and has finished counting as early as September 17th and as late as September 26th (Table 2). In 1999, because of the early installation date, it is estimated that 100% of the run of all species of salmon was observed at the Middle Fork Goodnews River Weir (Table 2).

Preliminary escapement objectives at the Middle Fork Goodnews River tower 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 1984b). The escapement objective for sockeye salmon was lowered to 20,000 to 30,000 in 1989 (Burkey, 1990) as an evaluation of the sockeye salmon exploitation rate in previous years indicated that historical harvest levels could be maintained with a reduced escapement objective.

The biological escapement goals (BEG's) for chinook, sockeye, and chum salmon for the 2000 season were at the midpoint of the escapement objectives; 3,500 chinook, 25,000 sockeye, and 15,000 chum salmon. The BEG's represent estimated escapement levels required to maintain returns at current levels. BEG's are based on historical aerial survey, counting tower, and weir passage data. BEG's are useful in evaluating abundance trends and the success of fishery management strategies. In-season cumulative escapement estimates can be compared with historical migratory timing to qualitatively assess whether BEG's will be achieved. This information aids in determining the appropriate level of commercial fishing effort. Continued assessment of salmon returns may include adjustments of the BEG's in the future to optimize salmon production. Chinook salmon returns have met escapement goals only 4 times since 1990 while sockeye salmon returns have met escapement goals consistently since 1990 (Table 3). Estimated escapement for coho salmon since 1995 has averaged 13,927, ranging from 5,415 to 35,441 (Table 3).

Escapement objectives for North Fork Goodnews River and Lake aerial surveys are 1,600 chinook, 15,000 sockeye and 17,000 chum salmon. Escapement objectives for Middle Fork Goodnews River

and Lakes aerial surveys are 800 chinook, 5,000 sockeye and 4,000 chum salmon (Table 4). The most recent 10 year average (1990-1999) for estimated exploitation rate (subsistence and commercial harvests) for chinook salmon is 25.8%, with a range of 18 to 50%, 27.4% for sockeye with a range of 14 to 43%, and 19.3% for chum with a range of 7 to 38% (Table 5).

This manuscript is an abbreviated version of the regional report written annually for the Goodnews River Weir Project. A 2-year regional report will be written by the spring of 2002.

METHODS

Resistance Board Weir

The resistance-board weir used at the Middle Fork Goodnews River site was approximately 130 ft (39.6 m) in length and attached at both ends to a fixed-panel weir anchored to the shore by a short section of fixed-picket weir. The weir was anchored to the stream bottom with duckbill anchors that secured a steel rail that ran perpendicular to the stream flow. The 4 ft (1.22 m) wide and 20 ft (6.10 m) long panels had two hooks, which attached to a cable on the steel rail. Each panel was comprised of 18, PVC Schedule 40, pipes (1 in. in diameter), with 2 ft (.61 m) by 4 ft (1.22 m) resistance boards attached to the downstream edge. The resistance boards provide lift to buoy the downstream end of the panel above the water.

The fixed-panel weir consisted of three major parts. Five wooden tripods, composed of three beams, 4 in (10.16 cm) by 6 in (15.24 cm), and a small wooden platform (approximately 2 ft (60.96 cm) below the intersection of the beams), were installed from the right bank (facing downstream) to the beginning of the resistance-board weir (approximately 50 ft). On the left bank, two tripods were used. Sandbags were placed on the tripod platform to provide stability against the current. Two 3 in (7.62 cm) diameter aluminum pipes (10 ft, 3.05 m) were positioned to span the distance between the front legs of adjacent tripods. The third major part of the weir consisted of weir panels positioned to rest on the upstream surface of the aluminum pipe. Weir panels consisted of fifteen aluminum pipes (pickets) 1 in (2.54 cm) in diameter, and measured 2ft 6in (0.76 m) wide by 6 ft 8 in (2.03 m) in length.

The fixed-picket weir is similar to the fixed-panel weir. The fixed-picket weir was approximately 2-3 ft long, and extended from the bank to fixed-panel weir on each side of the river. One tripod was used and two horizontal aluminum bars with holes, to allow individual pipes to be placed through, were placed across the tripod. The aluminum bars were secured to shore and individual pipes (1 in diameter) were slid through the bar holes.

Escapement Estimates

Fish were counted at different locations along the weir depending on water conditions. If the water level was high, the fish congregated behind the fixed-picket portion of the weir and a few pickets

could be removed to allow for the upstream passage of fish. At lower water levels, the fish were counted through the weir by partially removing a panel, in the fixed-panel section of the weir, or in the resistance-board section of the weir a specialized passing chute panel could be opened to allow fish passage. To help identify the salmon species in the deeper water, two aluminum panels, which aided visibility, were placed on the stream bottom.

The Department usually conducts spawning ground aerial surveys each year on the Goodnews River system. Aerial surveys occur from a fixed-wing airplane at a height of approximately 500 feet. Aerial surveys count only a percentage of the fish present, and the percentage counted may vary depending on the experience of the surveyor, weather conditions and the spawning stage of the salmon at the time of the survey. Aerial survey counts of salmon in the North Fork Goodnews River are expanded based on the ratio of the salmon counted during the aerial survey of the Middle Fork on the date of the aerial survey. 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 throughout the survey area. The final estimate of North Fork escapement is then adjusted for the percentage of passage through the Middle Fork weir after the survey.

Escapement objectives based on aerial index counts do not represent total escapement, but may reflect annual spawner abundance trends when made using standard survey methods under acceptable survey conditions.

Age, Sex, and Length

Escapement sampling was conducted based on a pulse sampling design (Molyneaux and DuBois 1999). Most sampling effort was focused on sockeye, chum, and coho salmon. A limited number of chinook salmon were also sampled. The goal for each pulse sample was 210 replicates per species. Each pulse sample was used to estimate the age, sex, and length (ASL) composition of the run for a given temporal stratum. A weighted mean, based on relative fish passage during each defined stratum as the weight, was used to estimate age composition of the total season passage.

Fish were captured with a trap installed in the fixed-panel weir. A weir panel in front of the trap was moved allowing salmon to pass upstream into the trap. The panel was immediately moved back to prevent subsequent downstream movement.

Scales were collected from the left side of the fish approximately two rows above the lateral line in the area defined by a diagonal line drawn from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gum cards and impressions made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). Salmon were measured to the nearest 0.5 cm from the middle of the eye to the fork of the caudal fin. The sex of each fish was determined from morphological characteristics.

Ages for salmon were determined by examining scale impressions (Mosher 1968). European notation (Koo 1962) was used to record ages (e.g. 2.2: numerals preceding the decimal refer to

number of freshwater annuli and numerals following the decimal refer to number of marine annuli. Total age from time of egg deposition or brood year is the sum of these numbers plus one).

RESULTS

Salmon Fisheries

The 2000 commercial salmon harvest in Goodnews Bay was 4,442 chinook, 37,252 sockeye, 7,450 chum and 15,531 coho, and 7 pink salmon. Harvests were below the most recent 10-year average (1990-99) for all species except chinook (Table 1). The subsistence harvest was estimated to be 703 chinook, 1,205 sockeye, and 364 chum (Table 5). The exploitation rate estimate of the run (commercial and subsistence harvest) was 35% for chinook, 25% for sockeye, and 13% for chum salmon (Table 5). No estimate for coho or pink exploitation was made because of the lack of coho and pink escapement data from the North Fork Goodnews River.

Escapement Estimates

In 2000, the weir was in operation from July 2 until September 22. Estimates of salmon escapement in 2000 at the Middle Fork Goodnews River weir were 3,295 chinook, 42,197 sockeye, 14,720 chum, 2,530 pink, and 19,676 coho salmon (Table 3). Both chinook and chum escapements fell short of escapement goals set for the 2000 season (3,500 and 15,000 fish, respectively) while sockeye salmon reached its escapement goal of 25,000 fish. Based on salmon migration timing in the Goodnews River Drainage and on a relatively late starting date for weir operation, an estimated 76% of the chinook, 77% of the sockeye, 94% of the chum, and 100% of the coho escapements passed the weir in 2000 (Table 2).

No aerial surveys were flown over the Goodnews River in 2000 due to poor weather and turbid water conditions (Table 4).

Age, Sex, and Length

A total of 439 coho salmon were sampled for ASL data from the commercial catch in District W-5 (Goodnews Bay). The estimated ASL compositions for 2000 District W-5 commercial coho catch samples were 48% males and 52% females, of which 98% were age-2.1 fish (Table 6). The mean lengths for males and females in the 2.1 age class were approximately 602 and 596 mm, respectively (Table 7). Mean length of age 1.1 coho salmon were 518 and 600 mm, males and females, respectively (Table 7), while mean length of age 3.1 coho salmon were 618 and 583 mm, males and females, respectively (Table 7).

Between July 2 and September 22 a total of 419 coho salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. The estimated ASL compositions for coho

salmon sampled were 52% males and 48% females and were primarily age-2.1 fish (98%; Table 8). The mean lengths for age 2.1 males and females were 592 mm and 598 mm, respectively (Table 9).

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Table 1. Goodnews Bay District commercial salmon harvest, 1968-2000.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1989	2,966	19,299	31,849	82	13,622	67,818
1990	3,303	35,823	7,804	629	13,194	60,753
1991	912	39,838	13,312	29	15,892	69,983
1992	3,528	39,194	19,875	14,310	18,520	95,427
1993	2,117	59,293	20,014	0	10,657	92,081
1994	2,570	69,490	47,499	18,017	28,477	166,053
1995	2,922	37,351	17,875	39	19,832	78,019
1996	1,375	30,717	43,836	22	11,093	87,043
1997	2,039	31,451	2,983	0	11,729	48,202
1998	3,675	27,161	21,246	411	14,155	66,648
1999	1,888	22,910	2,474	0	11,562	38,834
2000	4,442	37,252	15,531	7	7,450	64,682
Ten Year						
Average	2,433	39,322	19,690	3,699 ^a	15,511	80,656

^a Average of even years only

Table 2. Percentage of salmon escapement estimated at the Middle Fork Goodnews River project, 1991-2000.

Year	Operating Period ^a	Salmon				
		Chinook	Sockeye	Coho ^b	Pink	Chum
1991	June 29 – Aug 25	0	15	0	0	2
1992	June 21 – Aug 16	29	43	0	3	15
1993	June 22 – Aug 18	14	22	0	0	8
1994	June 22 – Aug 16	20	16	0	0	20
1995	June 19 – Aug 28	0	0	0	0	0
1996	June 18 – Aug 23	26	24	11	28	27
1997	June 12 – Sept 17	2	1	0	0	8
1998	July 04 – Sept 17	32	32	3	0	11
1999	June 25 – Sept 26	0	0	0	0	0
2000	July 02 – Sept 22	24	23	0	0	6

^a Estimates were made for some species when the weir was not operational from June 15 through August 16. Previous to 1991 the project was a counting tower and the majority of the escapement was estimated based on a systematic counting schedule.

^b The coho escapement continues into October and the majority of the run was not counted (except in 1997, 1998, 1999, and 2000). In 1999 the weir was out for 10 days in early August because of flooding.

Table 3. Historical salmon escapement at the Middle Fork Goodnews River project, 1981-2000.

Year	Operating Period ^a	Chinook	Sockeye	Coho ^b	Pink	Chum
1981	June 13 – Aug 15	3,688	49,108	357	1,327	21,827
1982	June 23 – Aug 03	1,395	56,255	62	13,855	6,767
1983	June 11 – July 28	6,027	25,813	0	34	15,548
1984	June 15 – July 31	3,260	32,053	249	13,744	19,003
1985	June 27 – July 31	2,831	24,131	282	144	10,367
1986	June 16 – July 24	2,080	51,069	163	8,133	14,764
1987	June 22 – July 30	2,272	28,871	62	62	17,517
1988	June 23 – July 30	2,712	15,799	6	6,781	20,799
1989	June 29 – July 31	1,915	21,186	145	246	10,380
1990	June 20 – July 24	3,636	31,679	0	3,378	6,410
1991	June 29 – Aug 25	1,952	47,397	1,978	1,694	27,525
1992	June 21 – Aug 16	1,903	27,267		23,030	22,023
1993	June 22 – Aug 18	2,349	26,452	1,451	318	14,952
1994	June 22 – Aug 16	3,856	55,751		38,705	34,849
1995	June 19 – Aug 28	4,836	39,009	5,415	330	33,669
1996	June 18 – Aug 23	2,882	57,504	10,869	20,105	40,125
1997	June 12 – Sept 17	2,937	35,530	9,619	940	17,296
1998	July 04 – Sept 17	4,584	47,951	35,441	10,376	28,905
1999	June 25 – Sept 26	3,221	48,205	11,545	914	19,533
2000	July 02 – Sept 22	3,295	42,197	19,676	2,530	14,720

^a In years where the project was initiated later than normal or during times the weir was not operational, interpolation was used to estimate escapement for the time period missed.

^b The coho escapement continues into October and the majority of the run was not counted (except in 1997, 1998, 1999 and 2000). No interpolation was attempted in 1992 or 1994 because of flooding.

Table 4. Aerial survey results, Goodnews River 1980-2000.

Year	Goodnews River and Lake				Middle Fork Goodnews River and Lakes			
	Chinook	Sockeye	Chum	Coho	Chinook	Sockeye	Chum	Coho
1980	1,228	75,639	1,975		1,164	18,926	3,782	
1981	a	a	a		a	a	a	
1982	1,990	19,160	9,700		1,546	2,327	6,300	
1983	2,600	9,650	a		2,500	5,900	a	
1984	3,245	9,240	17,250	43,925	1,930	12,897	9,172	
1985	3,535	2,843	4,415		2,050	5,470	3,593	
1986	1,068	8,960	11,850		1,249	16,990	7,645	
1987	2,234	19,786	12,103	11,122	2,222	34,585	9,696	
1988	637	5,820	3,846		1,024	5,831	5,814	
1989	651	3,605	a		1,277	8,044	2,922	
1990	626	27,689	a		a	a	a	
1991 ^b	a	a	a		a	a	a	
1992	875	10,397	1,950		1,012	7,200	3,270	
1993	a	a	a		a	a	a	
1994	a	a	a		a	a	a	
1995	3,314	a	a		a	a	a	
1996	a	a	a		a	a	a	
1997	3,611	12,610	a		1,447	19,843	a	
1998	578	3,497	2,743		731	11,632	3,619	
1999	a	a	a		a	a	a	
2000	a	a	a		a	a	a	
Escapement Objective ^c	1,600	15,000	17,000	800	800	5,000	4,000	20,000

^a Information not available.

^b Survey past peak.

^c Escapement objectives are preliminary and are subject to change as additional data becomes available. Escapement objectives are based on aerial index counts, which do not represent total escapement, but do reflect annual spawner abundance trends when made using standard survey methods under acceptable survey conditions.

Table 5. Historical estimated salmon run size and commercial exploitation rate, Goodnews River, 1981-2000.

Year	Species	Middle Fork	Middle Fork	North Fork	Goodnews	Total Run Size (% of Run)	Exploitation ^a Rate	
		Tower/Weir Estimate	Aerial Survey Count as a Percentage of Weir Est.	Goodnews River Escapement Estimate	Bay Subsistence Harvest			Goodnews Bay Commercial Estimate
1981	Chinook	3,688	b	7,766 ^c	1,409	7,190	20,053	43
	Sockeye	49,108	b	100,029 ^c	3,511 ^d	40,273	192,921	23
	Chum	21,827	b	53,799 ^c	na	13,642	89,268	15
1982	Chinook	1,395	b	2,937 ^c	1,236	9,476	15,044	71
	Sockeye	56,255	b	114,587 ^c	2,754 ^d	38,877	212,473	20
	Chum	6,767	b	16,679 ^c	na	13,829	37,275	37
1983	Chinook	6,022	36	14,398	1,066	14,117	35,603	43
	Sockeye	25,813	22	69,955	1,518 ^d	11,716	109,002	12
	Chum	15,548	b	38,323 ^c	na	6,766	60,637	11
1984	Chinook	3,260	35	8,743	629	8,612	21,244	43
	Sockeye	32,053	27	67,213	964	15,474	115,704	14
	Chum	19,003	35	117,739	189	14,340	151,271	10
1985	Chinook	2,831	70	7,979	426	5,793	17,029	37
	Sockeye	24,131	11	50,481	704	6,698	82,014	9
	Chum	10,367	32	25,025	348	4,784	40,524	13
1986	Chinook	2,092	57	4,094	555	2,723	9,464	35
	Sockeye	51,069	28	93,228	942	25,112	170,351	15
	Chum	14,764	38	51,910	191	10,355	77,220	14
1987	Chinook	2,272	100	4,490	816	3,357	10,935	38
	Sockeye	28,871	85	51,989	955	27,758	109,573	26
	Chum	17,517	58	37,802	578	20,381	76,278	27
1988	Chinook	2,712	39	5,419	310	4,964	13,405	39
	Sockeye	15,799	30	38,319	1065	36,368	91,551	41
	Chum	20,799	21	39,501	448	33,059	93,807	36
1989	Chinook	1,915	67	2,891	467	2,966	8,239	42
	Sockeye	21,186	60	35,476	869	19,299	76,830	26
	Chum	10,380	28	15,495	760	13,622	40,257	36
1990	Chinook	3,636	b	7,656 ^c	682	3,303	15,277	26
	Sockeye	31,679	b	64,528 ^c	905	35,823	132,935	28
	Chum	6,410	b	15,799 ^c	342	13,194	35,745	38
1991 ^e	Chinook	1,952	b	4,521 ^c	682	912	8,067	20
	Sockeye	47,397	b	96,544 ^c	900	39,838	184,679	22
	Chum	27,525	b	67,844 ^c	106	15,892	111,367	14

Table 5. continued (page 2 of 3)

Year	Species	Middle Fork Tower/Weir Estimate	Middle Fork	North Fork	Goodnews Bay		Total Run Size (% of Run)	Exploitation Rate ^a
			Aerial Survey Count as a Percentage of Weir Est.	Goodnews River Escapement Estimate	Goodnews Bay Subsistence Harvest	Goodnews Bay Commercial Estimate		
1992	Chinook	1,903	61	1,854	252	3,528	7,537	50
	Sockeye	27,268	21	52,501	905	39,194	119,868	33
	Chum	22,023	19	16,084	662	18,520	57,289	33
1993	Chinook	2,349	^b	4,727 ^c	488	2,117	9,681	27
	Sockeye	26,452	^b	54,325 ^c	572	59,293	140,642	43
	Chum	14,952	^b	38,061 ^c	133	10,657	63,803	17
1994	Chinook	3,856	^b	7,866 ^c	657	2,570	14,949	22
	Sockeye	55,751	^b	115,405 ^c	652	69,490	241,298	29
	Chum	34,849	^b	91,653 ^c	402	28,477	155,381	19
1995	Chinook	4,836	^b	9,865 ^c	552	2,922	18,175	19
	Sockeye	39,009	^b	80,749 ^c	787	37,351	157,896	24
	Chum	33,699	^b	88,628 ^c	329	19,832	142,488	14
1996	Chinook	2,930	^b	5,977 ^c	526	1,375	10,808	18
	Sockeye	58,264	^b	120,606 ^c	763	30,717	210,350	15
	Chum	40,450	^b	106,384 ^c	326	11,093	158,253	7
1997	Chinook	2,937	51	7,216	449	2,039	12,641	20
	Sockeye	35,530	57	23,462	609	31,451	91,052	35
	Chum	17,296	^b	45,488 ^c	133	11,729	74,646	16
1998	Chinook	4,584	18	3,797	718	3,675	12,774	34
	Sockeye	47,951	25	14,693	508	27,161	90,313	31
	Chum	28,905	15	24,940	316	14,155	68,316	21
1999	Chinook	3,221	^b	6,565 ^c	871	1,888	12,545	22
	Sockeye	48,205	^b	99,727 ^c	872	22,910	171,714	14
	Chum	19,533	^b	51,361 ^c	281	11,562	82,737	14
2000	Chinook	3,295	^b	6,458 ^c	703	4,442	14,898	35
	Sockeye	42,197	^b	73,845 ^c	1,205	37,252	154,499	25
	Chum	14,720	^b	35,475 ^c	364	7,450	58,009	13

Table 5 continued (3 of 3)

- ^a Commercial and subsistence exploitation.
- ^b Incomplete aerial survey results.
- ^c Average Middle Fork/Goodnews River escapement estimate ratio for 1983-1989 used to estimate Goodnews River escapement in years with no aerial survey data. After 1992, that year is included in the estimate ratio also.
- ^d Subsistence caught chum salmon is included in subsistence sockeye salmon harvest.
- ^e Goodnews Tower Project changed to weir project in 1991.
- na Data not available

Table 6. Summary of coho age by sex composition for District W-5 commercial catch, 2000

Stratum Dates	Sampling Dates	Sample Size	Sex	Age						Totals			
				1.1		2.1		3.1		Escapement	Percentage		
				Escapement	Percentage	Escapement	Percentage	Escapement	Percentage				
7/21-8/12	8/10	155	M	84	1.3	3,074	47.1	42	0.7	3,200	49		
			F	0	0	3,284	50.3	42	0.6				
			Subtotal	84	1.3	6,358	97.4	84	1.3			6,526	100
8/14-8/18	8/16	143	M	0	0	2,836	46.9	0	0	2,836	46.9		
			F	0	0	3,132	51.7	0	0			3,217	53.1
			Subtotal	0	0	5,968	98.6	0	0				
8/21-8/24	8/24	141	M	0	0	1,361	46.1	42	1.4	1,403	47.5		
			F	21	0.7	1,465	49.6	63	2.1			1,549	52.5
			Subtotal	21	0.7	2,826	95.7	105	3.5				
Seasonal		439	M	84	0.6	7,270	46.8	84	0.6	7,439	47.9		
			F	21	0.1	7,882	50.8	190	1.2			8,092	52.1
			Subtotal	105	0.7	15,152	97.6	274	1.8				

Table 7. Summary of coho length for 2000 commercial catch in District W-5

Stratum	Sampling Dates	Sex		age		
				1.1	2.1	3.1
7/21-8/12	8/10	M	Mean	518	586	635
			Std. err.	18	5	0
			Range	500-535	480-650	635-635
			N	2	73	1
		F	Mean		587	
			Std. errs.		3	
			Range	455-625		
			N	0	78	
					0	
8/14-8/18	8/16	M	Mean		610	
			Std. err.		5	
			Range		485-670	
			N	0	67	0
		F	Mean		603	562
			Std. err.		3	22
			Range	530-670	540-583	
			N	0	74	
					2	
8/21-8/24	8/24	M	Mean		625	600
			Std. err.		5	45
			Range		470-735	555-645
			N	0	65	2
		F	Mean	600	603	598
			Std. err.	0	3	12
			Range	600-600	525-650	
			N	1	70	
					3	
Seasonal		M	Mean	518	602	618
			Std. err.	18	3	45
			Range	500-535	470-735	555-645
			N	2	205	3
		F	Mean	600	596	583
			Std. err.	0	2	13
			Range	600-600	455-670	
			N	1	222	
					6	

Table 8. Age and sex composition for coho at the Middle Fork Goodnews River Weir, 2000

Stratum Dates	Sampling Dates	Sample Size	Sex	1.1		Age 2.1		3.1		Totals	
				Escapement	Percentage	Escapement	Percentage	Escapement	Percentage	Escapement	Percentage
7/29-8/18	8/14-8/15	149	M	0	0	2792	62.4	0	0	2792	62.4
			F	0	0	1682	37.6	0	0	1682	37.6
			Subtotal	0	0	4474	100	0	0	4474	100
8/19-8/25	8/21-8/22	137	M	0	0	1726	46	0	0	1726	46
			F	27	0.7	2000	53.3	0	0	2027	54
			Subtotal	27	0.7	3726	99.3	0	0	3753	100
8/26-8/30	8/28	76	M	0	0	4133	50	0	0	4133	50
			F	109	1.3	4024	48.7	0	0	4133	50
			Subtotal	109	1.3	8157	98.7	0	0	8266	100
9/3-9/4	8/31-9/22	57	M	0	0	1564	49.1	0	0	1564	49.1
			F	168	5.3	1340	42.1	112	3.5	1619	50.9
			Subtotal	168	5.3	2904	91.2	112	3.5	3183	100
Seasonal		419	M	0	0	10215	51.9	0	0	10215	51.9
			F	304	1.5	9046	46	112	0.6	9461	48.1
			Total	304	1.5	19261	97.9	112	0.6	19676	100

Table 9. Summary of coho length from the Middle Fork Goodnews River Weir, 2000

Stratum	Sampling Dates	Sex	Age			
			1.1	2.1	3.1	
7/29-8/18	8/14-8/15	M	Mean	567		
			Std. err.	5		
			Range	415-660		
		N	0	93	0	
		F	Mean	582		
			Std. err.	4		
Range	490-675					
8/19-8/25	8/21-8/22	M	Mean	602		
			Std. err.	8		
			Range	465-685		
		N	0	63	0	
		F	Mean	590	601	
			Std. err.	0	3	
Range	590-590		545-645			
8/26-8/30	8/28	M	Mean	583		
			Std. err.	9		
			Range	410-665		
		N	0	38	0	
		F	Mean	545	592	
			Std. err.	0	4	
Range	545-545		520-650			
8/31-9/22	9/3-9/4	M	Mean	648		
			Std. err.	9		
			Range	515-720		
		N	0	28	0	
		F	Mean	634		
			Std. err.	6		
Range	575-705					
Season		M	Mean	592		
			Std. err.	4		
			Range	410-720		
		N	0	222	0	
		F	Mean	584	598	
			Std. err.	8	2	
Range	545-625		490-705			
N	5	190	2			