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Abundance and Run Timing of Adult Pacific Salmon in the East Fork Andreafsky River, Yukon Delta National Wildlife Refuge, Alaska, 2005

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Abstract

A resistance board weir was used to collect abundance, run timing, and biological data from salmon returning to the East Fork Andreafsky River, a tributary to the lower Yukon River, between June 26 and September 11, 2005. In 2005, an estimated 2,239 Chinook salmon *Oncorhynchus tshawytscha* migrated through the weir. The run timing was early compared to the 1994-2004 average. Four age groups were identified from 389 Chinook salmon sampled with age 1.3 (64%) dominating. The sex composition was 50% female. The mean length for 193 females was 774 mm, range 510 to 1,015 mm, and the mean length for 196 males was 703 mm, range 410 to 995 mm. An estimated 20,127 chum salmon *O. keta* migrated through the weir. The run timing was later than the 1994-2004 average. Three age groups were identified from 658 summer chum salmon sampled, with age 0.3 (94%) dominating. The sex composition was 44% female. The mean length for 275 females was 542 mm, range 435 to 670 mm, and the mean length for 383 males was 590 mm, range 330 to 775 mm. An estimated total of 5,303 coho salmon *O. kisutch* migrated through the weir. The run timing was comparable to the 1995-2004 average. Three age groups were identified from 277 coho salmon sampled, with age 2.1 (85%) dominating. The sex composition was 51% female. The mean length for 131 females was 540 mm, range 425 to 620 mm, and the mean length for 146 males was 539 mm, range 400 to 655 mm. An estimated total of 39,030 pink salmon *O. gorbuscha* and 151 sockeye salmon *O. nerka* migrated through the weir. Other species counted through the weir during 2005 included 3,116 whitefish (Coregoninae), 3 Arctic grayling *Thymallus arcticus*, and 37 northern pike *Esox lucius*.

Introduction

The Andreafsky River is one of several lower Yukon River tributaries on the Yukon Delta National Wildlife Refuge (Refuge). The Andreafsky River and its primary tributary, the East Fork Andreafsky River, provide important spawning and rearing habitat for Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, coho *O. kisutch*, pink *O. gorbuscha*, and sockeye *O. nerka* salmon (USFWS 1991). The Andreafsky River supports one of the largest returns of Chinook salmon, has the second largest return of summer chum salmon (Bergstrom et al. 1998), and is believed to have the largest return of pink salmon in the Yukon River drainage (USFWS 1991). These Andreafsky River salmon stocks contribute to a large subsistence fishery in the lower Yukon River.

The Alaska National Interest Lands Conservation Act (ANILCA) mandates that salmon populations and their habitats be conserved within National Wildlife Refuge lands, international treaty obligations be fulfilled, and subsistence opportunities for local residents be maintained

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(USFWS 1991). Compliance with ANILCA mandates cannot be ensured without reliable data on salmon stocks originating from within Refuge boundaries. It is the goal of the U.S. Fish and Wildlife Service (USFWS) to conserve fish and wildlife populations, maintain habitats in their natural diversity, and provide the opportunity for continued subsistence use by local residents.

Due to declines in Yukon River salmon runs, particularly summer and fall chum salmon, there have been harvest restrictions, complete fishery closures, and spawning escapements below management goals on many tributaries in the Yukon River drainage (Vania et al. 2002; Kruse 1998). The need to collect accurate escapement estimates is required to maintain genetic diversity, determine exploitation rates, and spawner recruit relationships (Labelle 1994). Data on escapement counts, which are necessary for effective management, are lacking for many individual stocks in the Yukon River drainage. Individual salmon stocks that are returning in low numbers or having early and late run timing, may be incidentally over-harvested. Federal and State fishery managers attempt to distribute salmon harvest over time to avoid over-harvesting individual salmon stock (Mundy 1982).

In compliance with ANILCA mandates, the USFWS has operated a weir on the East Fork Andreafsky River since 1994. Specific objectives of the project are to: (1) enumerate adult salmon escapement; (2) describe run timing of Chinook, summer chum, and coho salmon returns; (3) estimate age, sex, and length composition of adult Chinook, summer chum, and coho salmon populations; and (4) identify and count other fish species passing through the weir.

Study Area

The Andreafsky River is located in the lower Yukon River drainage in western Alaska (Figure 1). The regional climate is subarctic with extreme temperatures reaching 28˚ C in summer and – 42˚C in winter at St. Mary's, Alaska (Leslie 1989). Mean July high and February low temperatures between 1976 and 2000 were 18˚ and – 22˚C respectively. Average yearly precipitation is approximately 48 cm of rain and 172 cm of snow. The Andreafsky River ice breakup typically occurs in May or early June, and usually begins to freeze in late October (USFWS 1991). Maximum discharge is most often reached following breakup. Sporadic high discharge periods generated by heavy rains occur between late July and early September.

The Andreafsky River is one of the three largest Yukon River tributaries within the Refuge boundaries (USFWS 1991) and drains a watershed of approximately 5,450 km^2. The mainstem and the East Fork Andreafsky River parallel each other in a southwesterly direction for more than 200 river-kilometers (rkm) before converging 7 rkm above its confluence with the Yukon River. The mouth of the Andreafsky River is approximately 160 rkm upstream from the mouth of the Yukon River. The East Fork and main-stem Andreafsky River flow through the Andreafsky Wilderness and the portions of each river within Refuge boundaries are designated as Wild and Scenic Rivers.

The East Fork Andreafsky River originates in the Nulato Hills at approximately 700 m elevation and drains an area of about 1,950 km^2 (USFWS 1991). The river cuts through alpine tundra at an average gradient of 7.6 m per km for 48 rkm. It then flows for 130 rkm through a forested river valley bordered by hills that rarely exceed 400 m elevation. Willow, spruce, alder, and birch dominate the riparian zone and much of the hillsides. This section drops at an average rate of 1.4 m per km and is characterized by glides and riffles with a gravel and rubble substrate. The river widens in the lowermost 38 rkm and the gradient changes to 0.14 m per km. The valley here is a wetland, interspersed with forest and tundra, and bordered by hills that are typically less than 230 m elevation. Aquatic vegetation grows in the slower flowing stream channels. Water level fluctuations on the Yukon River also affect the stage height in the lower sections of the East Fork and main-stem Andreafsky River.

Methods

Weir Operation

A modified resistance board weir (Tobin 1994; Tobin and Harper 1995; Zabkar and Harper 2003) spanning 105 m was installed in the East Fork Andreafsky River (62^{o} 07'N, 162^{o} 48.4'W) approximately 43 rkm upstream from the Yukon-Andreafsky River confluence and 26 air-km northeast of St. Mary's, Alaska (Figure 1). The weir site is located approximately 2.4 rkm downstream from the 1994 weir site described by Tobin and Harper (1995) and 2.1 rkm downstream from the 1981-1988 sonar and counting tower site described by Sandone (1989). Weir panel picket spacing (4.8 cm) was designed to remain functional during higher water flow, but allowed some small pink salmon and resident fish to pass through the weir undetected. Beginning in 1995, weir operation was extended into September to collect coho salmon data.

A staff gauge was installed upstream of the weir to measure daily water levels. Staff gauge measurements were calibrated to correspond with the average water depth across the river channel at the upstream edge of the weir. Water temperatures were collected once daily between 0730 and 0830 hours.

Two passage chutes were installed, one approximately 9 meters from the left bank and the other approximately 7 meters from the right bank A fish trap was installed on the left passage chute to facilitate efficient biological sampling during various river stage heights. The right passage chute was for use during extreme low water levels or when large numbers of fish began building up below the weir. It was used intermittently in 2005. All fish, except whitefish (Coregoninae), were enumerated to species as they passed through the live trap. Fish were counted 24 hours per day and the numbers were recorded hourly. On August 6, the daily counting schedule was reduced to 16 hours per day until the end of the season. The trap was kept closed during periods when fish were not being counted.

The weir was cleaned and its integrity visually checked daily. Cleaning consisted of raking debris from the upstream surface of the weir or walking across each panel to submerge it enough to allow the current to wash debris downstream. Repairs were made as necessary.

Biological Data

Adult salmon were identified and counted as they migrated through the weir each day to determine run timing and escapement. A stratified random sampling design (Cochran 1977) was used to collect age, length, and sex ratio information for Chinook, summer chum, and coho salmon. Biological sampling commenced at the beginning of each week, and an effort was made to obtain a weekly sample of 160 Chinook, 160 summer chum, and 120 coho salmon spread over a minimum four-day period. All target species within the trap were sampled to prevent bias. Non-target species were identified and counted but not sampled. Whitefish species were grouped together under the subfamily Coregoninae.

Fish sampling consisted of identifying salmon species, determining sex, measuring length, collecting scales, and then releasing the fish upstream of the weir. Secondary sex characteristics were utilized to determine sex. Length was measured from mid-eye to the fork of the caudal fin and rounded to the nearest 5 mm. Scales were removed from the preferred area for age determination (Koo 1962; Devries and Frie 1996). Three scales were collected from each Chinook and coho salmon sampled. One scale was collected from each summer chum salmon sampled. Scale impressions were made on cellulose acetate cards using a heated scale press and examined with a microfiche reader (Zabkar and Harper 2003). Age was determined by an Alaska Department of Fish and Game (ADF&G) biologist and reported according to the European method (Koo 1962). Daily sex ratios were collected by the sexing of each fish when sampling for age and length. The daily escapement counts and sex ratios were reported daily to the USFWS Fairbanks Fish and Wildlife Field Office and ADF&G.

Data Analysis

Incomplete 24-h counts were adjusted for a 24-h period. No complete daily counts were missed in 2005, so estimates for missing days were not needed. Historic run totals were revised to account for missing and incomplete daily counts. Missing daily counts due to high water were estimated by linear interpolation between the daily counts before and after the high water event. Revised daily and seasonal totals are presented in Appendices 1-6. The annual counts are minimum estimates of escapement since fish may pass by the site undetected before and after the weir becomes operational. Substantial numbers of coho salmon in 1998 and all salmon species in 2001 were missed due to high water; therefore the counts for these years were not included in any annual comparative analyses.

Calculations for age and sex information were treated as a stratified random sample (Cochran 1977), with statistical weeks as the strata. Each statistical week was defined as beginning on Sunday and ending the following Saturday. Strata with small numbers of fish or containing incomplete weeks were combined. Within a stratum, the proportion of the samples composed of a given sex or age, $\hat{p}_{ij}$, was calculated as

$$\hat{p}_{ij} = \frac{n_{ij}}{n_j},$$

where n_{ij} is the number of fish by sex *i* or age *i* sampled in week *j*, and n_j is the total number of fish sampled in week *j*. The variance of $\hat{p}_{ij}$ was calculated as

$$\hat{v}(\hat{p}_{ij}) = \frac{\hat{p}_{ij}(1-\hat{p}_{ij})}{n_j - 1}.$$

Sex and age compositions for the total run of Chinook and summer chum salmon of a given sex/age, $\hat{p}_i$ were calculated as

$$\hat{p}_i = \sum_{j-1} \hat{W}_j \hat{p}_{ij,}$$

where the stratum weight $\hat{W}_j$ was calculated as

$$\hat{W}_j = \frac{N_j}{N},$$

and N_j equals the total number of fish of a given species passing through the weir during week j, and N is the total number of fish of a given species passing through the weir during the run. Variance, $\hat{v}(\hat{p}_i)$ of sex and age compositions for the run was calculated as

$$\hat{v}(\hat{p}_i) = \sum_{j-1} \hat{W}_j^2 \hat{v}(\hat{p}_{ij}).$$

Results and Discussion

Weir Operation

In 2005, high water delayed the start date of the weir project for eight days, allowing some fish to migrate up the East Fork Andreafsky River without being enumerated. The weir was operational from June 26 through September 11, 2005. The average stage height during weir operations was 26 cm with a range between 10 and 77 cm (Figure 2). Water temperature during weir operations averaged 13°C and ranged between 8 and 17°C (Figure 2). High water stopped fish counting on September 12 (Figure 2). The trap gates were left open during the high water event to allow fish to continue migrating upstream. The water remained high until October 2 when the weir was removed.

Picket spacing in the weir panels allowed smaller pink salmon and resident fish to pass unhindered through the weir, yet effectively blocked passage of other salmon species and larger fish (Zabkar and Harper 2003). Consequently, counts of pink salmon, whitefish, Arctic grayling (*Thymallus arcticus*), and northern pike (*Esox lucius*) were conservative.

Biological Data

An estimated 2,239 Chinook, 20,127 summer chum, 5,303 coho, 39,030 pink, and 151 sockeye salmon migrated through the weir (Table 1). Non-salmon species recorded moving through the weir include 3,116 whitefish, 3 Arctic grayling, and 37 northern pike. Passage estimates were conservative due to an unknown number of fish passing before and after the weir was operational.

In general, Yukon River Chinook and chum salmon runs have improved since 2001 (JTC 2005). Preliminary ADF&G reports indicated the 2005 Chinook and summer chum run to be at or above average in most tributaries. However, the East Fork Andreafsky River weir recorded the second lowest annual return for Chinook salmon and a new historical low for summer chum salmon.

Chinook Salmon

The 2005 Chinook salmon escapement estimate (2,239 fish) was 49% of the 1994-2004 historical average of 4,537 fish (Figure 3). Peak passage (1,000 fish) occurred during the week of July 3 to 9 (Table 1; Figure 4). The 2005 run timing was earlier than average. The first quartile passed on July 3 (yearly average July 6), the median run passage date at the weir was July 7 (yearly average July 10), and the third quartile passage date was July 14 (yearly average July 15; Table 2).

The average female Chinook salmon length was 774 mm with a range from 510 to 1,015 mm, and the average male Chinook salmon length was 703 mm with a range from 410 to 995 mm (Table 3). A total of 426 Chinook salmon were sampled for age composition and 37 (9%) were unreadable principally because of scale regeneration. The age composition of sampled Chinook salmon included four age groups: age 1.5 (1%), age 1.4 (21%), age 1.3 (64%), and age 1.2 (15%; Table 4). Females composed an estimated 50% of the overall escapement and were predominant before July 10 (Table 4; Figure 5). The age distribution of female and male Chinook salmon were similar with age 1.3 dominating, 65% for females and 63% for males.

The 2005 ADF&G aerial survey conducted on the Andreafsky River estimated Chinook salmon escapement at 1,715 fish for the East Fork and 1,492 fish for the mainstem (Appendix 1). These counts were above the minimum Sustainable Escapement Goals of 960 to 1,900 Chinook salmon for the East Fork and 640 to 1,600 Chinook salmon for the mainstem (ADF&G 2004).

Chum Salmon

The 2005 summer chum salmon escapement estimate (20,127 fish) was 25% of the 1994-2004 historical average of 78,935 fish (Figure 3). It was the lowest return ever recorded at the weir and below the Biological Escapement Goal of 65,000 to 135,000 fish (Appendix 1; ADF&G 2004). Peak passage (8,733 fish) occurred during the week of July 3 to 9 (Table 1; Figure 4). The 2005 run timing was later than average. The first quartile passed on July 4 (yearly average July1), the median run passage date at the weir was July 8 (yearly average July 5), and the third quartile passage date was July 14 (yearly average July 11; Table 2).

The average female summer chum salmon length was 542 mm with a range from 435 to 670 mm, and the average male summer chum salmon length was 590 mm with a range from 330 to 775 mm (Table 3). A total of 830 summer chum salmon were sampled for age composition and 172 (21%) were classified as unreadable, principally because of inverted scale mounting. The age composition of sampled summer chum salmon included three age groups: age 0.5 (1 male), age 0.4 (6%), and age 0.3 (94%; Table 5). Females composed an estimated 44% of the overall escapement with four of five weekly strata dominated by males (Table 5; Figure 5). The age distribution of female and male summer chum salmon were similar with age 0.3 dominating, 97% for females and 92% for males.

Coho Salmon

The 2005 coho salmon escapement estimate (5,303 fish) was 38% lower than the 1995-2004 historical average of 8,742 fish (Figure 3). The high water event on September 12 stopped weir operations early, resulting in a conservative estimate of coho salmon passage. Peak passage (2,946 fish) occurred during the week of August 28 to September 3 (Table 1; Figure 4). The first coho salmon passed through the weir on August 1. Coho salmon run timing during 2005 was average. The first quartile passed on August 28 (yearly average August 28), the median run passage date at the weir was August 30 (yearly average August 31), and the third quartile passage date was September 4 (yearly average September 4; Table 2).

The average female coho salmon length was 540 mm with a range from 425 to 620 mm, and the average male coho salmon length was 539 mm with a range from 400 to 655 mm (Table 3). A total of 368 coho salmon were sampled for age composition and 91 (25%) were unreadable, principally because of scale regeneration. The age composition of sampled coho salmon included three age groups: age 3.1 (8%), age 2.1 (85%), and age 1.1 (8%; Table 6). Females composed an estimated 51% of the overall escapement and were predominate from August 28 to September 3 (Table 6; Figure 5). The age distribution for female and male coho salmon were similar with age 2.1 dominate, 85% for both females and males.

Pink Salmon

Pink salmon have strong returns to the East Fork Andreafsky River during even-numbered years and relatively weak returns during odd-numbered years (Appendix 5). The 2005 escapement through the East Fork Andreafsky River weir was the strongest odd-year return (39,030 fish) ever recorded at the weir, and over 20 times the odd-year historical average (1995-2003) of 1,868 fish (Figure 3). Pink salmon counts on the Andreafsky River are a measure of relative abundance due to small pink salmon being able to pass uncounted between the weir pickets. Peak passage (15,556 fish) occurred during the week of July 10 to 16 (Table 1; Figure 4). The median run passage date at the weir was July 14, while the first quartile passed on July 8 and the third quartile passed on July 19 (Table 2).

Sockeye Salmon

The 2005 sockeye salmon escapement estimate of 151 fish was below the 1995-2004 historical average of 210 fish (Appendix 6). Large populations of sockeye salmon are absent in the Yukon River drainage (Bergstrom et al. 1995), but small populations have been identified in several Yukon River tributaries (Alt 1983; O'Brien 2006), including the Andreafsky River. Peak passage (38 fish) occurred during the week of August 28 to September 3 (Table 1). The median run passage date at the weir was August 14, while the first quartile passed on July 27 and the third quartile passed on August 28 (Table 2). Age, sex, and length data for sockeye salmon were gathered for the first time in 2005 (n = 54 fish). Fin-clip samples for genetic analysis were also obtained. These data will be presented in a future report specific to Yukon River sockeye salmon populations

Conclusion

The East Fork Andreafsky River weir has been an important tool for monitoring refuge-originating salmon stocks and assisting both ADF&G and USFWS in-season managers with management of Yukon River fisheries. This project continues to build a long-term database unique in the lower Yukon River drainage. The present weir project provides accurate escapement and biological data dating back to 1994 for Chinook, summer chum, and pink salmon, and back to 1995 for coho and sockeye salmon. Prior data from 1981 through 1988 using sonar and tower methodologies and aerial survey data starting in 1954 also add to this important database.

Due to the complexity of the Yukon River mixed-stock salmon fishery and the difficulty in managing specific stocks, it is vital to continue collecting information from individual salmon populations, including stocks in the Andreafsky River drainage. It is also recommended that spawning and rearing locations for sockeye salmon be investigated to assure long-term viability of this small unique population.

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Table 1. Escapement estimates, by stratum, recorded at the East Fork Andreafsky River weir, Alaska, 2005.

Stratum dates	Chinook salmon	Chum salmon	Coho salmon	Pink salmon	Sockeye salmon
Jun 26 - Jul 2	486	2,914	0	240	2
Jul 3 - 9	1,000	8,733	0	11,630	0
Jul 10 - 16	301	5,468	0	15,556	17
Jul 17 - 23	199	1,948	0	6,602	2
Jul 24 - 30	84	480	0	3,466	29
Jul 31 - Aug 6	31	236	2	1,250	7
Aug 7 - 13	67	81	9	201	16
Aug 14 - 20	24	41	257	42	20
Aug 21 - 27	14	46	375	10	11
Aug 28 - Sep 3	28	123	2,946	19	38
Sep 4 - 10	5	50	1,512	8	9
Sep 11	0	7	202	6	0
Total	2,239	20,127	5,303	39,030	151

Table 2. Daily and total estimates of Chinook, summer chum, coho, pink, and sockeye salmon escapement through the East Fork Andreafsky River weir, Alaska, 2005. Partial daily counts, adjusted to 24-hour count, are indicated by *. Run passage by quartile is shown in shaded box.

Date	Chinook salmon		Chum salmon		Coho salmon	Pink salmon		Sockeye salmon
26-Jun	16	*	256	*	0	0		0
27-Jun	2		9		0	2		0
28-Jun	42		424		0	10		0
29-Jun	88		473		0	27		0
30-Jun	238		432		0	97		1
1-Jul	11		239		0	15		1
2-Jul	89		1,081		0	89		0
3-Jul	135	25%	1,063		0	453		0
4-Jul	114		1,238	25%	0	652		0
5-Jul	111		993		0	985		0
6-Jul	154		1,218		0	2,334		0
7-Jul	271	50%	1,839		0	3,071		0
8-Jul	169		1,270	50%	0	2,443	25%	0
9-Jul	46		1,112		0	1,692		0
10-Jul	7		1,370		0	1,266		0
11-Jul	15		195		0	1,453		0
12-Jul	9		197		0	385		1
13-Jul	58		1,458		0	2,865		0
14-Jul	108	75%	1,242	75%	0	5,106	50%	15
15-Jul	49		557		0	2,489		0
16-Jul	55		449		0	1,992		1
17-Jul	30		196		0	678		0
18-Jul	14		246		0	945		0
19-Jul	22		141		0	450	75%	0
20-Jul	17		523		0	1,140		0
21-Jul	50		493		0	1,852		2
22-Jul	51		182		0	814		0
23-Jul	15		167		0	723		0

Table 2. Continued.

Date	Chinook salmon	Chum salmon	Coho salmon	Pink salmon	Sockeye salmon
24-Jul	22	54	0	256	5
25-Jul	46	80	0	158	5
26-Jul	4	28	0	425	2
27-Jul	4	32	0	307	5 25%
28-Jul	4	100	0	889	4
29-Jul	0	112	0	744	7
30-Jul	4	74	0	687	1
31-Jul	3	79	0	341	1
1-Aug	2	50	1	430	0
2-Aug	2	25	0	140	0
3-Aug	8	23	0	79	0
4-Aug	4	5	1	55	0
5-Aug	8	24	0	91	2
6-Aug	4	30	0	114	4
7-Aug	3	14	1	41	0
8-Aug	2	19	4	68	8
9-Aug	9	9	2	39	1
10-Aug	35	8	2	17	1
11-Aug	14	18	0	23	2
12-Aug	2	10	0	10	1
13-Aug	2	3	0	3	3
14-Aug	5	7	4	11	3 50%
15-Aug	7	9	9	10	0
16-Aug	3	8	37	12	4
17-Aug	1	5	6	5	0
18-Aug	3	11	173	3	13
19-Aug	3	0	24	1	0
20-Aug	2	1	4	0	0
21-Aug	2	3	2	3	1
22-Aug	0	2	2	0	0
23-Aug	5	25	21	0	0
24-Aug	0	4	101	2	7
25-Aug	1	6	19	2	1
26-Aug	3	3	102	1	2
27-Aug	3	3	128	2	0
28-Aug	7	20	1,084 25%	7	15 75%
29-Aug	6	22	475	3	5
30-Aug	5	24	647 50%	1	5
31-Aug	2	12	218	2	1
1-Sep	3	7	23	3	2
2-Sep	3	10	23	2	2
3-Sep	2	28	476	1	8
4-Sep	3	9	483 75%	0	1
5-Sep	1	4	77	2	3
6-Sep	0	13	128	0	3
7-Sep	0	7	207	1	0
8-Sep	1	6	80	0	0
9-Sep	0	3	194	2	0
10-Sep	0	8	343	3	2
11-Sep	0	7	202	6	0
Total	2,239	20,127	5,303	39,030	151

= indicates dates at which 25, 50, and 75 percent of the run had passed the weir.

Table 3. Mid-eye to fork length (mm) at age of female and male Chinook, summer chum, and coho salmon sampled at East Fork Andreafsky River weir, Alaska, 2005.

	Female					Male				
Age	N	Mean	Median	SE	Range	N	Mean	Median	SE	Range
					Chinook salmon					
1.2	11	576	575	14.3	510-645	48	582	580	7.7	410-695
1.3	125	760	760	5.2	590-935	123	728	730	5.8	540-890
1.4	55	838	840	8.0	700-980	25	814	810	24.1	525-995
1.5	2	928	928	87.5	840-1015	0				
Total	193	774	775	6.1	510-1015	196	703	713	7.4	410-995
					Chum salmon					
0.3	266	542	535	2.6	435-670	353	588	580	3.0	330-775
0.4	9	570	570	14.5	500-660	29	618	615	11.3	505-765
0.5	0					1	630	630	0.0	630-630
Total	275	542	535	2.6	435-670	383	590	580	2.9	330-775
					Coho salmon					
1.1	6	538	538	10.1	500-570	15	532	545	19.1	405-655
2.1	111	540	545	3.4	425-620	124	541	543	4.1	440-625
3.1	14	537	535	9.4	485-605	7	527	565	28.7	400-590
Total	131	540	545	3.0	425-620	146	539	545	4.2	400-655

Table 4. Age and sex ratio estimates by stratum of Chinook salmon sampled at East Fork Andreafsky River weir, Alaska, 2005. Standard errors are in parentheses. Season totals are calculated from weighted weekly strata totals. The ending stratum has combined weeks due to small numbers of fish at the end of the run. Unknown age data are from unreadable scale samples and are listed for informational purposes. They were not included in calculations.

					Brood year and age			
					1998	1999	2000	2001
Strata	Run size (N)	Sample size (n)	Unknown age	Percent female	1.5	1.4	1.3	1.2
Jun 26-Jul 2	486	88	6	51 (5.4)	1% (1.1)	19% (4.2)	64% (5.2)	16% (3.9)
Jul 3-9	1,000	150	12	55 (4.1)	1% (0.7)	16% (3.0)	69% (3.8)	14% (2.8)
Jul 10-16	301	110	13	45 (4.8)	0% (0.0)	26% (4.2)	55% (4.8)	18% (3.7)
Jul 17-23	199	30	5	33 (8.8)	0% (0.0)	23% (7.9)	63% (8.9)	13% (6.3)
Jul 24-Sep 11	253	11	1	45 (15.7)	0% (0.0)	27% (14.1)	73% (14.1)	0% (0.0)
Total	2,239	389	37	50 (3.0)	1% (0.4)	21% (2.1)	64% (2.4)	15% (1.8)
Female	1,120	193	22		1% (0.7)	28% (3.3)	65% (3.4)	6% (1.7)
Male	1,119	196	15		0% (0.0)	13% (2.4)	63% (3.5)	24% (3.1)

Table 5. Age and sex ratio estimates by stratum of summer chum salmon sampled at East Fork Andreafsky River weir, Alaska, 2005. Standard errors are in parentheses. Season totals are calculated from weighted weekly strata totals. The ending stratum has combined weeks due to small numbers of fish at the end of run. Unknown age data are from unreadable scale samples and are listed for informational purposes. They were not included in calculations.

					Brood year and age			
					1999	2000	2001	2002
Strata	Run size (N)	Sample size (n)	Unknown age	Percent female	0.5	0.4	0.3	0.2
Jun 26-Jul 2	2,914	131	29	36 (4.2)	0% (0.0)	9% (2.5)	91% (2.5)	0% (0.0)
Jul 3-9	8,733	134	26	50 (4.3)	0% (0.0)	10% (2.6)	90% (2.6)	0% (0.0)
Jul 10-16	5,468	162	36	43 (3.9)	1% (0.6)	3% (1.4)	96% (1.5)	0% (0.0)
Jul 17-23	1,948	131	29	34 (4.2)	0% (0.0)	1% (0.8)	99% (0.8)	0% (0.0)
Jul 24-Sep 11	1,064	100	52	47 (5.0)	0% (0.0)	7% (2.6)	93% (2.6)	0% (0.0)
Total	20,127	658	172	44 (2.3)	<1% (0.9)	6% (0.9)	94% (0.9)	0% (0.0)
Female	8,910	275	85		0% (0.0)	3% (1.1)	97% (1.1)	0% (0.0)
Male	11,217	383	87		<1% (0.3)	8% (1.4)	92% (1.4)	0% (0.0)

Table 6. Age and sex ratio estimates by stratum of coho salmon sampled at East Fork Andreafsky River weir, Alaska, 2005. Standard errors are in parentheses. The totals are calculated from weighted weekly strata totals. Beginning and ending strata have combined weeks due to small numbers of fish at the beginning and end of the runn. Unknown age data are from unreadable scale samples and are listed for informational purposes. They were not included in calculations.

					Brood year and age		
					2000	2001	2002
Strata	Run size (N)	Sample size (n)	Unknown age	Percent female	3.1	2.1	1.1
Jul 31 - Aug 27	643	75	13	35 (5.5)	7% (2.9)	88% (3.8)	5% (2.6)
Aug 28 - Sep 3	2,946	98	42	56 (5.0)	6% (2.4)	84% (3.8)	10% (3.1)
Sep 4 - Sep 11	1,714	104	36	48 (4.9)	10% (2.9)	84% (3.6)	7% (2.5)
Total	5,303	277	91	51 (3.3)	8% (1.6)	85% (2.2)	8% (1.6)
Female	2,700	131	36		11% (2.7)	85% (3.2)	5% (1.8)
Male	2,603	146	55		5% (1.8)	85% (3.0)	10% (2.5)

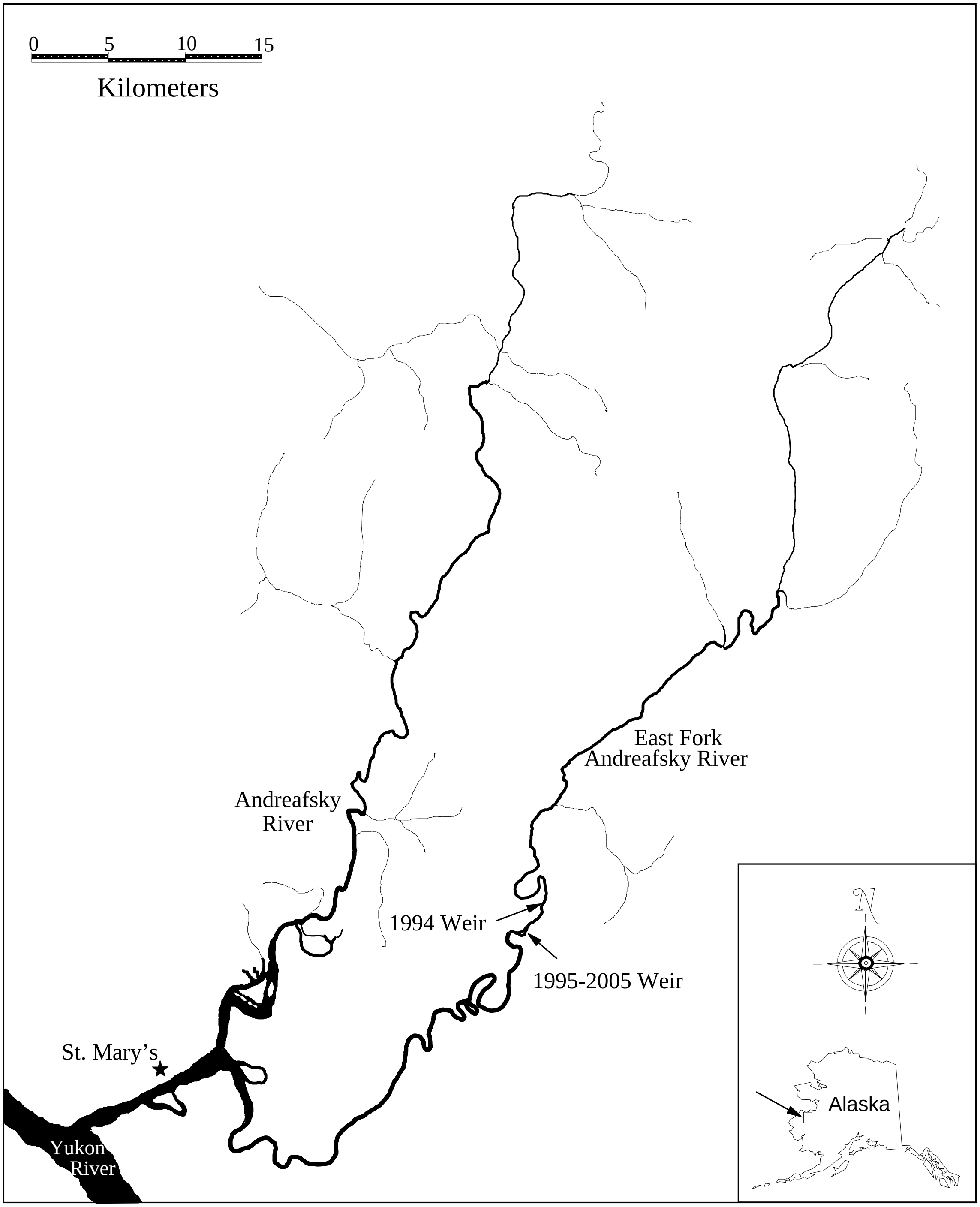

Figure 1. Weir locations in the East Fork Andreafsky River, Alaska, 1994-2005.

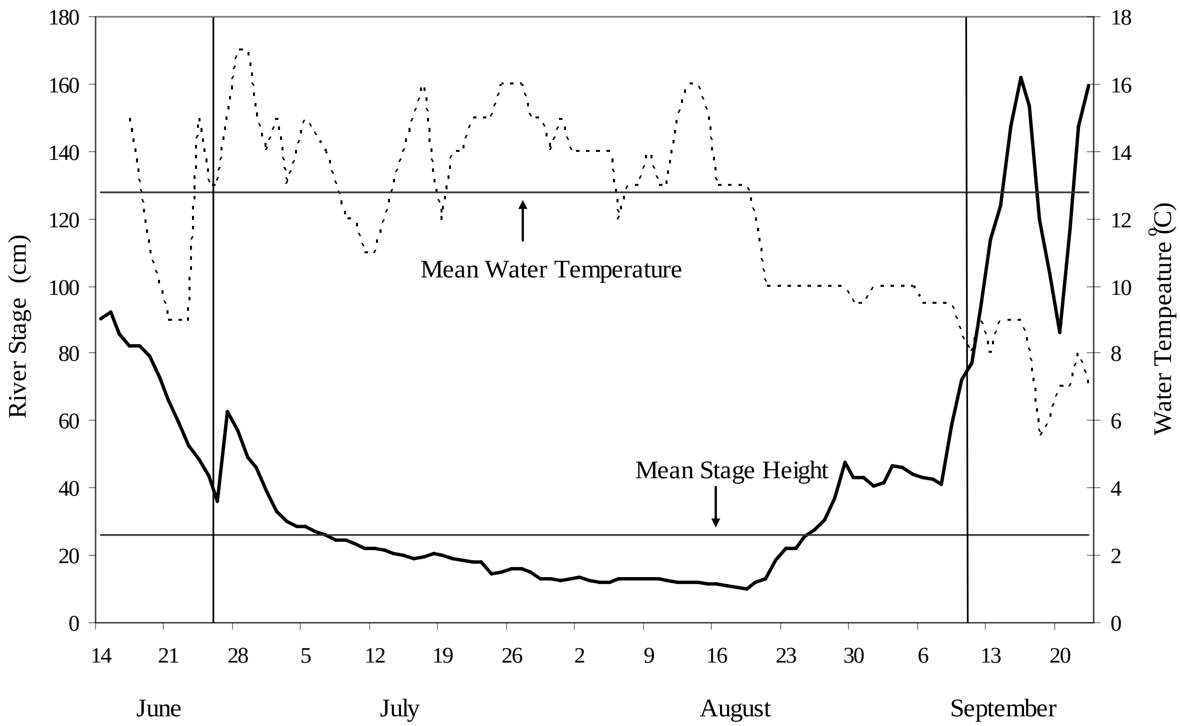

Figure 2. River stage heights and water temperatures at the East Fork Andreafsky River weir, 2005. Vertical lines represent the first and last day of counting.

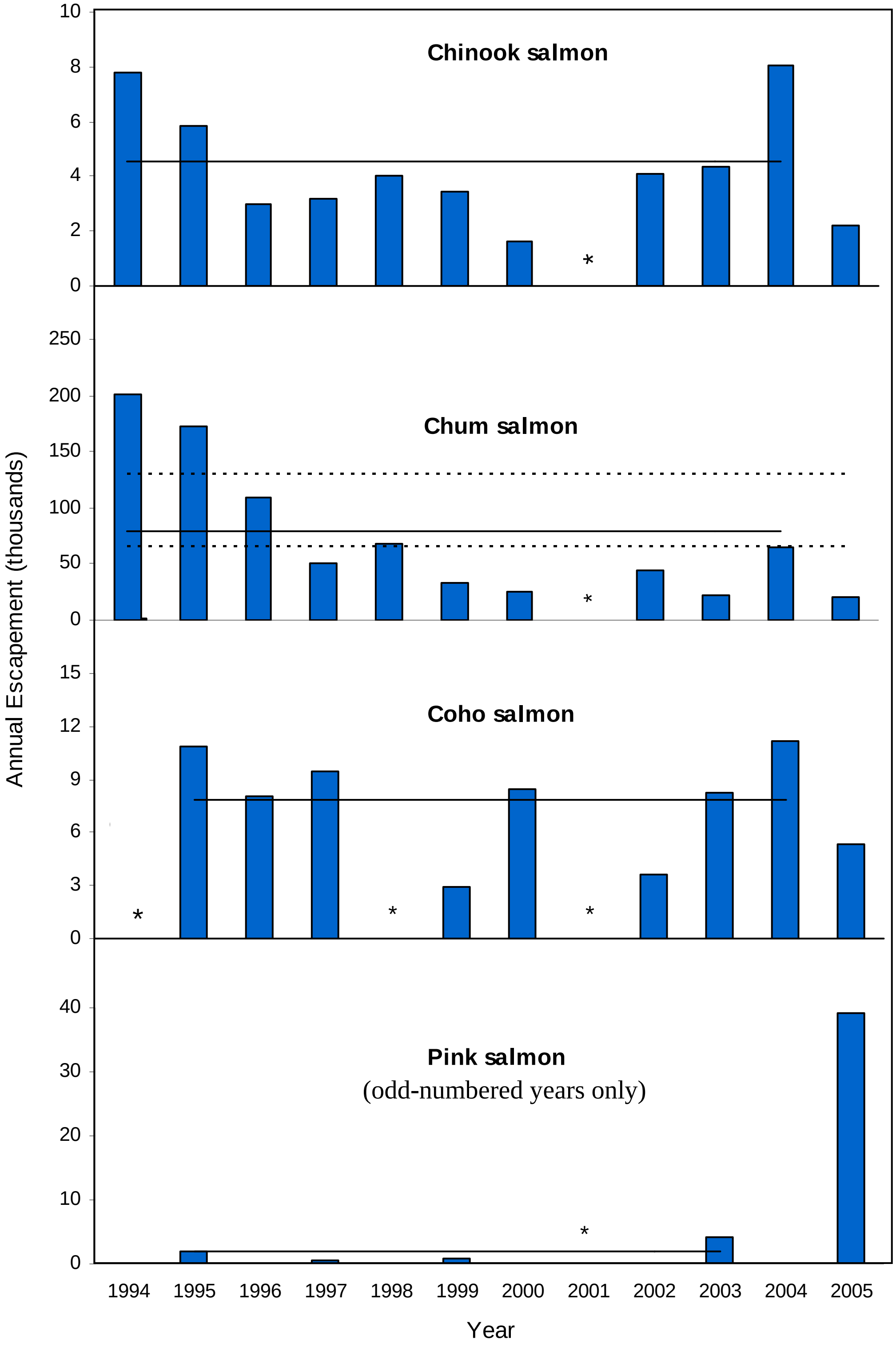

Figure 3. Annual escapement estimates of Chinook, summer chum, coho, and odd-year pink salmon migrating through the East Fork Andreafsky River weir, Alaska, 1994 to 2005. Historical average represented by the solid horizontal line. The dotted horizontal lines in the chum salmon chart represent the maximum and minimum BEG. Asterisk denotes missing annual count.

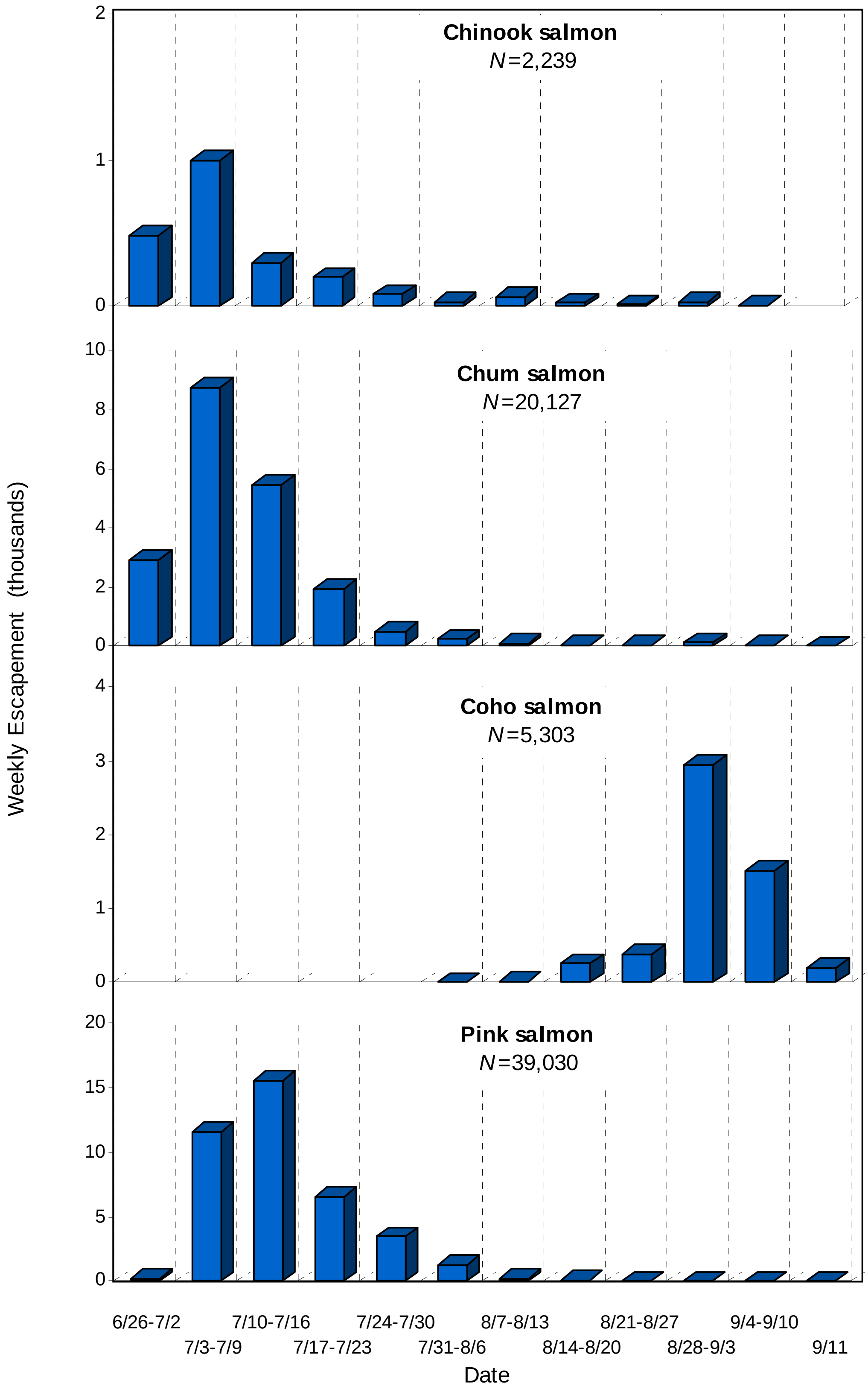

Figure 4. Weekly Chinook, summer chum, coho, and pink salmon escapement estimates through the East Fork Andreafsky River weir, Alaska, June 26 to September 11, 2005.

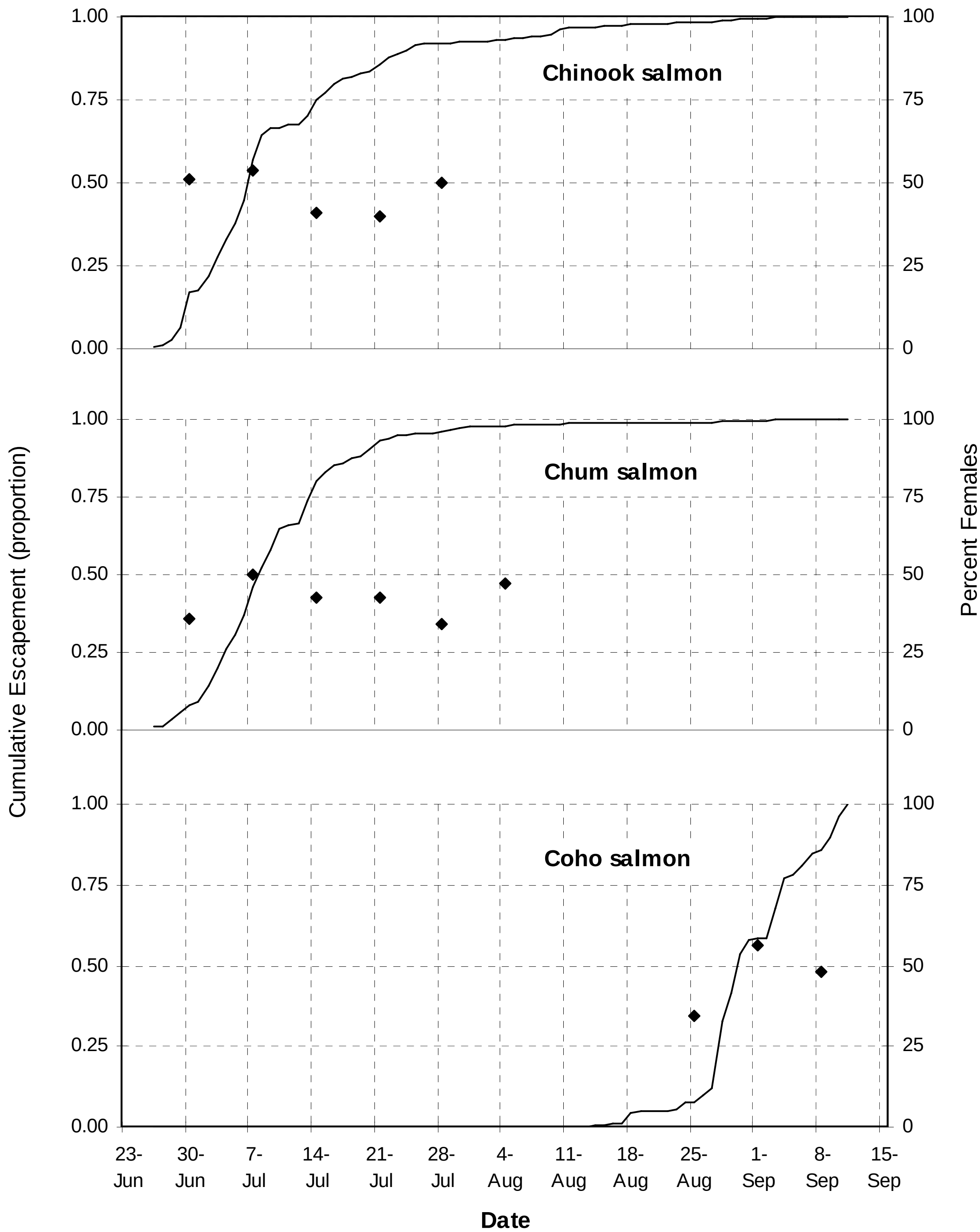

Figure 5. Cumulative escapement expressed as a proportion of total run (solid line) and the percent females in weekly samples (diamonds) of Chinook, summer chum, and coho salmon, East Fork Andreafsky River weir, Alaska, June 26 to September 11, 2005.

Appendix 1. Historical Chinook, summer chum, and coho salmon escapement estimates recorded for the Andreafsky River, Alaska, 1954-2005. Data from Barton, L.H. (1984), Bergstrom et al. (1998), Zabkar and Harper (2003), and ADF&G (2004). Totals in bold indicate revisions from previously published data.

	East Fork Andreafsky River						Main-stem Andreafsky River		
	Aerial Index Estimates			Sonar, Tower, or Weir			Aerial Index Estimates		
Year	Chinook salmon	Chum salmon	Coho salmon	Chinook salmon	Chum salmon	Coho salmon	Chinook salmon	Chum salmon	Coho salmon
1954	*a*	*a*					2,000 *a*	7,000 *a*	
1955									
1956	336 *b*	15,356 *b*							
1957									
1958	50 *b*	3,500 *b*					150 *b*	30,000 *b*	
1959	150 *b*	4,000 *b*					300 *b*	7,000 *b*	
1960	1,020	10,530					1,220	6,016	
1961	1,003	8,110							
1962	675 *b*	18,040					762 *b*	19,530	
1963									
1964	867	8,863					705	12,810	
1965							355 *b*	14,670 *b*	
1966	361	25,619 *b*					303	18,145	
1967							276 *b*	14,495 *b*	
1968	380	17,600					383 *b*	74,600 *b*	
1969	231 *b*	119,000					374 *b*	159,500 *b*	
1970	665	84,090					574 *b*	91,710 *b*	
1971	1,904	98,095					1,682	71,745	
1972	798 *b*	41,460 *b*					582 *b*	25,573	
1973	825	10,149 *b*					788	51,835	
1974		3,215 *b*					285	33,578	
1975	993	223,485					301	235,954	
1976	818	105,347					643	118,420	
1977	2,008	112,722					1,499	63,120	
1978	2,487	127,050					1,062	57,321	
1979	1,180	66,471					1,134	43,391	
1980	958 *b*	36,823 *b*					1,500	115,457	
1981	2,146 *b*	81,555	1,657 *b*	5,343 *c*	147,312 *c*		231 *b*		
1982	1,274	7,501 *b*			180,078 *c*		851	7,267 *b*	
1983				2,720 *c*	110,608 *c*				
1984	1,573 *b*	95,200 *b*			70,125 *c*		1,993	238,565	
1985	1,617	66,146					2,248	52,750	
1986	1,954	83,931		1,530 *d*	167,614 *d*		3,158	99,373	
1987	1,608	6,687 *b*		2,011 *d*	45,221 *d*		3,281	35,535	
1988	1,020	43,056	1,913	1,339 *d*	68,937 *d*		1,448	45,432	830
1989	1,399	21,460 *b*					1,089		
1990	2,503	11,519 *b*					1,545	20,426 *b*	
1991	1,938	31,886					2,544	46,657	
1992	1,030 *b*	11,308 *b*					2,002 *b*	37,808 *b*	
1993	5,855	10,935 *b*					2,765	9,111 *b*	
1994	300 *b*			7,801	200,981		213 *b*		
1995	1,635			5,841	172,148	10,901	1,108		
1996				2,955	108,450	8,037	624		
1997	1,140			3,186	51,139	9,472	1,510		
1998	1,027			**4,034**	**67,720**	5,417 *e*	1,249 *b*		
1999				**3,444**	**32,587**	2,963	870 *b*		

Appendix 1. Continued.

	East Fork Andreafsky River						Main-stem Andreafsky River		
	Aerial Index Estimates			Sonar, Tower, or Weir			Aerial Index Estimates		
Year	Chinook salmon	Chum salmon	Coho salmon	Chinook salmon	Chum salmon	Coho salmon	Chinook salmon	Chum salmon	Coho salmon
2000	1,018			**1,609**	**24,785**	**8,451**	427		
2001	1,065			1,148 *ef*	2,086 *ef*	9,252 *e*	570		
2002	1,447			4,123	44,194	**3,577**	977		
2003				**4,336**	**22,461**	**8,231**	1,578 *b*		
2004	2,879			**8,045**	**64,883**	**11,146**	1,317		
2005	1,715			2,239	20,127	5,303	1,492		
SEG *g*	960 - 1,900						640 - 1,600		
BEG *h*					65,000 - 135,000				

a Counts for both forks were combined into Andreafsky River count
b Incomplete survey and/or poor survey timing or conditions resulting in minimal or inaccurate count
c Sonar count
d Tower count
e Incomplete count, missing data not estimated
f Weir installed to late for an accurate count
g Sustainable Escapement Goal
h Biological Escapement Goal

Appendix 2. Historical daily Chinook salmon escapements recorded at the East Fork Andreafsky River weir 1994-2005. Annual weir totals were revised to account for missing and incomplete daily counts. Data for 2001 were not used in calculations and are shown for informational purposes only. Totals in bold indicate revisions from previously published data.

Date	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
15-Jun				0								
16-Jun		0		0								
17-Jun		0		0		0						
18-Jun		0		0		0						
19-Jun		0	0	0		0			0	0		
20-Jun		1	0	0		0			0	0		
21-Jun		0	10	0		0			1	0		
22-Jun		1	0	0		0			20	0		
23-Jun		0	33	14	0	0			0	4	67	
24-Jun		2	6	21	0	0			0	2	26	
25-Jun		0	0	59	0	0			3	7	15	
26-Jun		0	59	0	0	0			1	3	55	16
27-Jun		41	42	101	1	0			26	12	181	2
28-Jun		48	19	11	0	0			314	19	534	42
29-Jun	1	67	6	1	10	0			119	4	290	88
30-Jun	188	104	8	0	34	47	9		27	0	461	238
1-Jul	141	81	72	75	93	19	16		319	176	582	11
2-Jul	54	71	21	24	17	9	39		105	295	25	89
3-Jul	222	17	205	29	36	0	89		230	22	375	135
4-Jul	156	55	124	49	75	12	74		5	6	353	114
5-Jul	651	107	309	98	336	97	38		20	83	263	111
6-Jul	225	678	258	356	373	42	407		356	136	1,187	154
7-Jul	1,156	433	280	227	386	114	18		307	336	878	271
8-Jul	108	155	244	123	204	197	71		130	469	463	169
9-Jul	351	260	186	49	129	216	17		178	823	503	46
10-Jul	375	250	111	64	167	256	30		191	48	368	7
11-Jul	288	382	72	69	255	507	57		264	107	122	15
12-Jul	581	1,022	52	88	138	214	35		166	345	315	9
13-Jul	779	697	100	15	62	331	55		191	311	106	58
14-Jul	433	375	96	16	61	97	18		158	340	105	108
15-Jul	352	292	62	124	91	22	90	169	140	2	53	49
16-Jul	389	97	95	274	197	33	76	87	210	7	58	55
17-Jul	144	46	110	91	263	75	62	41	119	25	54	30
18-Jul	285	38	55	25	184	63	48	196	94	235	29	14
19-Jul	161	25	42	70	240	65	34	71	75	158	40	22
20-Jul	53	37	69	264	67	302	22	107	50	28	57	17
21-Jul	66	74	51	148	129	55	12	175	29	10	40	50
22-Jul	62	33	26	35	117	67	21	66	12	2	13	51
23-Jul	209	24	2	103	57	15	6	15	32	23	17	15
24-Jul	149	7	4	57	66	54	11	5	16	58	12	22
25-Jul	25	78	6	0	12	24	10	17	7	31	19	46
26-Jul	51	21	3	11	8	5	9	7	3	4	5	4
27-Jul	92	12	6	3	8	34	7	17	6	22	14	4
28-Jul	20	15	16	29	11	6	3	10	3	108	23	4
29-Jul	10	9	13	58	23	159	57	41	4	28	19	0
30-Jul	13	5	7	144	31	80	4	16	2	4	7	4
31-Jul	10	1	10	2	17	59	20	11	46	0	15	3
1-Aug	1	8	4	8	20	38	12	8	55	2	13	2
2-Aug		2	2	4	4	18	4	12	48	5	4	2
3-Aug		13	2	128	11	42	24	4	10	1	3	8
4-Aug		5	5	2	1	11	19	8	3	1	6	4

Appendix 2. Continued.

Date	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5-Aug		6	6	1	7	5	14	6	3	4	5	8
6-Aug		6	2	0	9	2	9	1	4	0	10	4
7-Aug		19	7	1	10	1	4	11	4	1	8	3
8-Aug		20	3	2	3	4	7	0	0	3	6	2
9-Aug		25	2	2	5	0	10	4	0	1	13	9
10-Aug		25	5	1	7	1	3	2	0	0	39	35
11-Aug		7	2	1	1	2	8	1	4	1	17	14
12-Aug		4	3	7	8	5	4	1	0	1	23	2
13-Aug		11	0	14	7	3	1	10	1	2	21	2
14-Aug		2	0	18	1	9	3	0	1	3	19	5
15-Aug		2	0	26	0	2	6	11	0	3	17	7
16-Aug		3	3	2	12	4	2	8	0	2	16	3
17-Aug		3	0	4	9	7	1	2	3	1	14	1
18-Aug		3	2	3	5	3	2	2	0	1	10	3
19-Aug		2	2	3	2	0	2	2	1	2	9	3
20-Aug		1	3	2	2	6	3	1	0	2	6	2
21-Aug		2	3	1	2	0	1	0	0	0	8	2
22-Aug		0	0	4	1	1	1	1	5	0	5	0
23-Aug		1	2	2	1	0	0	0	0	0	1	5
24-Aug		1	0	1	1	0	1	1	1	2	3	0
25-Aug		0	0	4	1	0	0	0	0	2	1	1
26-Aug		0	1	0	1	1	2	0	0	1	0	3
27-Aug		0	0	0	0	1	0	0	0	0	1	3
28-Aug		3	0	1	0	0	0	0	0	0	0	7
29-Aug		1	2	2	0	0	0	0	0	0	0	6
30-Aug		0	1	3	1	0	0	0	1	0	4	5
31-Aug		0	2	1	1	0	0	0	0	0	2	2
1-Sep		1	0	0	0	0	0	0	0	0	2	3
2-Sep		0	0	0	0	1	1		0	0	0	3
3-Sep		0	0	4	0	0	0		0	0	0	2
4-Sep		0	0	0	0	0	0		0	0	1	3
5-Sep		1	0	1	0	1	0		0	0	1	1
6-Sep		0	1	1	0	0	0		0	0	2	0
7-Sep		0	0	0	1	0	0		0	0	0	0
8-Sep		3	0	2	0	0	0		0	0	1	1
9-Sep		0	0	1	1	0	0		0	1	1	0
10-Sep		0	0	0	0	0	0	0	0	0	0	0
11-Sep		0	0	0	1	0	0	0	0	0	2	0
12-Sep		0	0	2	0		0	0	0	0	0	
13-Sep			0	0	0		0	0	0	0	0	
14-Sep			0				0	0	0	0	0	
15-Sep			0				0	1		1	0	
16-Sep			0				0				0	
17-Sep			0				0				1	
18-Sep							0				0	
19-Sep							0				1	
20-Sep							0					
21-Sep							0					
22-Sep							0					
23-Sep							0					
Total	7,801	5,841	2,955	3,186	**4,034**	**3,444**	**1,609**	* *	4,123	**4,336**	**8,045**	2,239

= corrected for missing day
= corrected for incomplete day
* * = incomplete count, missing data not estimated

Appendix 3. Historical daily summer chum salmon estimates recorded at the East Fork Andreafsky River weir 1994-2005. Annual weir totals were revised to account for missing and incomplete daily counts. Data for 2001 were not used in calculations and are shown for informational purposes only. Totals in bold indicate revisions from previously published data.

Date	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2,005
15-Jun				0								
16-Jun		52		1								
17-Jun		332		4		0						
18-Jun		191		71		0						
19-Jun		423	62	539		0			0	0		
20-Jun		2,198	424	981		0			0	0		
21-Jun		861	3,315	192		0			117	2		
22-Jun		1,170	1,036	53		0			1,782	87		
23-Jun		228	11,195	3,141	13	1			0	564	3,045	
24-Jun		1,951	798	1,620	18	1			6	182	1,062	
25-Jun		364	303	1,422	264	0			522	484	985	
26-Jun		504	7,306	208	175	7			694	183	2,467	256
27-Jun		12,620	3,435	1,691	535	8			2,448	396	4,638	9
28-Jun		11,201	1,463	1,196	65	0			6,754	546	8,461	424
29-Jun	609	9,256	2,335	61	3,153	331			1,765	219	3,807	473
30-Jun	19,254	10,938	314	80	4,585	4,459	837		836	271	7,081	432
1-Jul	12,435	8,654	9,164	1,537	4,003	765	1,725		4,403	928	1,590	239
2-Jul	2,840	5,553	3,326	619	652	459	1,460		2,467	339	153	1,081
3-Jul	4,973	2,710	8,973	756	1,687	24	1,750		2,291	713	5,689	1,063
4-Jul	13,321	10,678	10,018	1,264	3,561	3,000	2,070		28	175	3,940	1,238
5-Jul	12,552	10,026	7,355	831	7,996	4,605	2,300		347	484	2,011	993
6-Jul	4,043	23,584	3,351	3,428	6,030	1,185	3,717		4,423	1,051	1,791	1,218
7-Jul	27,527	8,514	3,124	2,980	4,696	1,619	72		2,254	1,376	2,474	1,839
8-Jul	5,251	732	4,771	2,440	3,088	1,569	1,548		845	2,476	2,096	1,270
9-Jul	3,883	4,808	3,500	1,799	845	1,754	942		2,265	2,025	1,990	1,112
10-Jul	12,416	6,473	2,303	3,195	1,003	2,135	727		1,732	244	2,069	1,370
11-Jul	6,896	6,072	1,275	1,792	4,003	1,897	855		1,221	412	1,609	195
12-Jul	8,424	3,973	1,497	1,738	4,401	501	477		1,099	1,762	1,815	197
13-Jul	14,628	4,552	1,680	1,062	829	710	911		1,055	586	1,071	1,458
14-Jul	11,611	2,990	1,038	1,302	1,248	1,223	352		544	254	896	1,242
15-Jul	8,275	2,874	935	3,222	2,160	412	638	196	1,014	33	605	557
16-Jul	4,690	3,449	1,280	2,441	2,747	507	551	133	581	123	569	449
17-Jul	4,886	2,739	774	1,150	3,038	547	464	95	420	445	465	196
18-Jul	4,532	1,495	852	715	1,580	494	377	229	492	1,078	326	246
19-Jul	2,977	651	1,848	624	1,365	666	290	102	392	708	217	141
20-Jul	1,091	1,150	1,721	1,220	370	816	206	74	192	681	276	523
21-Jul	1,351	807	1,116	800	335	242	424	228	153	283	142	493
22-Jul	2,228	591	605	668	304	240	280	72	61	47	59	182
23-Jul	1,320	742	246	405	248	201	116	29	201	306	77	167
24-Jul	868	290	291	313	200	173	84	32	98	222	116	54
25-Jul	1,349	1,214	196	121	220	131	159	155	26	348	171	80
26-Jul	1,977	521	365	339	166	73	130	116	22	218	85	28
27-Jul	2,196	605	278	400	130	132	64	110	60	220	69	32
28-Jul	841	265	738	219	202	92	43	88	123	389	73	100
29-Jul	564	211	334	234	145	245	173	78	17	220	52	112
30-Jul	524	248	272	131	115	242	70	37	36	61	37	74
31-Jul	410	94	260	86	140	200	172	10	119	80	34	79
1-Aug	239	160	93	134	191	158	89	24	81	104	17	50
2-Aug		81	158	81	91	118	125	40	33	111	21	25
3-Aug		147	91	182	76	124	109	28	36	40	28	23
4-Aug		59	192	48	56	117	83	17	40	91	22	5

Appendix 3. Continued.

Date	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5-Aug		77	132	101	73	45	57	13	3	182	25	24
6-Aug		115	215	77	71	17	31	2	7	52	31	30
7-Aug		76	163	29	104	11	5	7	13	85	33	14
8-Aug		78	54	31	77	16	12	7	5	44	16	19
9-Aug		70	110	44	34	10	10	7	5	21	36	9
10-Aug		61	137	17	57	32	13	4	13	21	26	8
11-Aug		35	63	14	39	14	10	4	11	27	34	18
12-Aug		60	65	65	77	29	9	3	2	40	26	10
13-Aug		73	26	36	100	16	22	15	0	21	30	3
14-Aug		62	35	33	58	6	13	9	0	52	35	7
15-Aug		49	59	31	34	10	4	9	1	43	39	9
16-Aug		95	80	46	32	13	4	11	6	35	44	8
17-Aug		64	35	37	27	10	5	6	1	27	48	5
18-Aug		83	33	58	21	6	13	6	2	19	18	11
19-Aug		41	110	43	16	3	5	10	0	32	7	0
20-Aug		45	33	95	15	3	3	7	2	22	12	1
21-Aug		47	64	54	13	19	0	7	0	21	5	3
22-Aug		43	27	37	12	2	1	3	2	10	4	2
23-Aug		35	37	31	10	6	2	10	3	12	3	25
24-Aug		35	26	41	9	5	4	5	3	11	14	4
25-Aug		56	103	41	8	5	6	4	3	24	5	6
26-Aug		53	35	18	6	2	19	2	1	13	2	3
27-Aug		57	26	20	5	9	17	3	0	11	2	3
28-Aug		31	39	38	3	7	13	3	1	5	10	20
29-Aug		53	78	57	2	5	10	1	0	14	8	22
30-Aug		34	66	73	4	11	9	4	0	6	19	24
31-Aug		63	31	21	11	13	2	11	0	2	20	12
1-Sep		48	38	14	8	18	6	10	0	1	22	7
2-Sep		75	40	13	4	19	5		0	1	14	10
3-Sep		36	49	53	5	15	4		0	5	5	28
4-Sep		25	48	28	8	5	2		0	0	5	9
5-Sep		30	37	38	1	4	1		0	0	16	4
6-Sep		50	29	31	8	4	1		0	2	8	13
7-Sep		60	50	51	6	3	1		1	4	11	7
8-Sep		96	39	28	4	2	0		0	2	12	6
9-Sep		42	32	22	3	2	0		0	3	4	3
10-Sep		42	32	24	9	3	9	2	2	1	3	8
11-Sep		37	24	48	10	4	3	0	1	0	6	7
12-Sep		15	16	42	3		5	1	8	16	2	
13-Sep			18	23	4		1	1	2	3	6	
14-Sep			39				2	3	1	1	3	
15-Sep			33				5	3		3	3	
16-Sep			38				18				2	
17-Sep							3				5	
18-Sep							6				0	
19-Sep							4				3	
20-Sep							8					
21-Sep							10					
22-Sep							1					
23-Sep							1					
Total	200,981	172,148	108,450	51,139	**67,720**	**32,587**	**24,785**	* *	44,194	**22,461**	**64,883**	20,127

= corrected for missing day
= corrected for incomplete day
* * = incomplete count, missing data not estimated

Appendix 4. Historical daily coho salmon estimates recorded at the East Fork Andreafsky River weir, 1995-2005. Annual weir totals were revised to account for missing and incomplete daily counts. Data for 1998 and 2001 were not used in calculations and are shown for informational purposes only. Totals in bold indicate revisions from previously published data.

Date	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2,005
15-Jun			0								
16-Jun	0		0								
17-Jun	0		0		0						
18-Jun	0		0		0						
19-Jun	0	0	0		0			0	0		
20-Jun	0	0	0		0			0	0		
21-Jun	0	0	0		0			0	0		
22-Jun	0	0	0		0			0	0		
23-Jun	0	0	0	0	0			0	0	0	
24-Jun	0	0	0	0	0			0	0	0	
25-Jun	0	0	0	0	0			0	0	0	
26-Jun	0	0	0	0	0			0	0	0	0
27-Jun	0	0	0	0	0			0	0	0	0
28-Jun	0	0	0	0	0			0	0	0	0
29-Jun	0	0	0	0	0			0	0	0	0
30-Jun	0	0	0	0	0	0		0	0	0	0
1-Jul	0	0	0	0	0	0		0	0	0	0
2-Jul	0	0	0	0	0	0		0	0	0	0
3-Jul	0	0	0	0	0	0		0	0	0	0
4-Jul	0	0	0	0	0	0		0	0	0	0
5-Jul	0	0	0	0	0	0		0	0	0	0
6-Jul	0	0	0	0	0	0		0	0	0	0
7-Jul	0	0	0	0	0	0		0	0	0	0
8-Jul	0	0	0	0	0	0		0	1	0	0
9-Jul	0	0	0	0	0	0		0	0	0	0
10-Jul	0	0	0	0	0	0		0	0	0	0
11-Jul	0	0	0	0	0	0		0	0	0	0
12-Jul	0	0	0	0	0	0		0	0	0	0
13-Jul	0	0	0	0	0	0		0	0	0	0
14-Jul	0	0	0	0	0	0		0	0	0	0
15-Jul	0	0	0	0	0	0	0	0	2	0	0
16-Jul	0	0	0	0	0	0	0	0	0	0	0
17-Jul	0	0	0	0	0	0	0	0	0	0	0
18-Jul	0	0	0	0	0	0	0	0	0	0	0
19-Jul	0	0	0	0	0	0	0	0	0	1	0
20-Jul	0	0	0	0	0	0	0	0	1	0	0
21-Jul	0	0	0	0	0	0	0	0	0	0	0
22-Jul	0	0	0	0	0	0	0	0	0	0	0
23-Jul	0	11	0	0	0	0	0	0	0	0	0
24-Jul	0	2	0	0	0	0	0	0	2	0	0
25-Jul	0	1	0	0	0	0	0	0	0	0	0
26-Jul	0	4	0	0	0	0	0	0	0	0	0
27-Jul	0	0	0	0	0	0	0	0	0	0	0
28-Jul	0	3	0	1	0	0	0	0	0	2	0
29-Jul	0	3	0	0	0	0	0	0	0	0	0
30-Jul	0	9	0	1	0	1	0	0	1	1	0
31-Jul	0	25	0	0	0	1	0	0	2	2	0
1-Aug	0	1	0	0	0	7	0	0	0	1	1
2-Aug	0	7	0	1	0	9	0	0	1	4	0
3-Aug	1	4	0	5	0	18	0	0	1	0	0
4-Aug	0	15	0	8	9	16	0	1	1	0	1

Appendix 4. Continued.

Date	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5-Aug	0	20	0	8	4	14	0	0	2	8	0
6-Aug	0	10	0	5	4	13	0	0	4	10	0
7-Aug	1	26	1	16	0	12	0	0	28	14	1
8-Aug	1	20	0	9	0	35	0	0	25	16	4
9-Aug	3	26	0	5	1	79	0	0	27	98	2
10-Aug	8	138	0	8	2	125	0	1	5	62	2
11-Aug	12	105	0	3	2	89	0	0	9	115	0
12-Aug	5	50	10	4	5	51	0	0	19	86	0
13-Aug	3	16	47	111	1	211	0	0	40	78	0
14-Aug	3	11	35	71	1	137	1	0	194	71	4
15-Aug	9	19	6	9	0	64	22	0	146	63	9
16-Aug	5	276	8	61	5	34	33	0	98	56	37
17-Aug	11	92	7		2	23	5	0	50	48	6
18-Aug	24	179	12		0	137	5	0	2	163	173
19-Aug	41	1,052	13	8	0	108	51	1	7	384	24
20-Aug	24	100	50		1	333	532	0	21	170	4
21-Aug	95	149	414		42	303	270	0	11	185	2
22-Aug	246	9	222		48	59	312	3	3	150	2
23-Aug	305	32	22		0	10	343	6	24	80	21
24-Aug	414	12	16		26	44	583	3	263	185	101
25-Aug	245	1,539	577		8	533	217	7	1,744	243	19
26-Aug	692	449	150		4	1,401	857	0	634	453	102
27-Aug	1,436	5	10		4	1,643	382	0	288	17	128
28-Aug	368	1	24		3	279	403	2	197	4	1,084
29-Aug	938	179	2,335	371	0	626	103	0	243	38	475
30-Aug	335	1,489	2,714	618	2	278	1,078	0	552	178	647
31-Aug	265	374	122	568	1	192	2,264	0	729	490	218
1-Sep	444	374	73	336	411	358	1,576	0	172	505	23
2-Sep	863	147	53	17	162	238		14	107	897	23
3-Sep	14	100	421	80	1,255	162		29	9	234	476
4-Sep	29	250	355	490	704	160		43	646	167	483
5-Sep	6	337	219	228	122	39		640	275	609	77
6-Sep	21	78	514	591	40	46		738	14	1,550	128
7-Sep	164	84	435	12	0	52		413	42	1,011	207
8-Sep	2,403	24	169	0	14	48		345	459	578	80
9-Sep	854	16	223	94	19	55		103	268	337	194
10-Sep	391	1	52	555	41	94	85	237	9	535	343
11-Sep	127	0	83	1,104	20	31	30	117	211	259	202
12-Sep	95	0	64	6		79	20	726	231	13	
13-Sep		0	16	13		30	43	113	399	57	
14-Sep		0				22	21	35	8	37	
15-Sep		3				16	16		4	201	
16-Sep		160				28				240	
17-Sep						19				241	
18-Sep						3				42	
19-Sep						5				157	
20-Sep						5					
21-Sep						34					
22-Sep						32					
23-Sep						10					
Total	10,901	8,037	9,472	* *	2,963	**8,451**	* *	**3,577**	**8,231**	**11,146**	5,303

= corrected for missing day
= corrected for incomplete day
* * = incomplete count, missing data not estimated

Appendix 5. Historical daily pink salmon escapement estimates recorded at the East Fork Andreafsky River weir, 1994-2005. Annual weir totals were revised to account for missing and incomplete daily counts. Data for 2001 were not used in calculations and are shown for informational purposes only. Totals in bold indicate revisions from previously published data.

Date	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
15-Jun				0								
16-Jun		0		0								
17-Jun		0		0		0						
18-Jun		0		0		0						
19-Jun		0	12	0		0			0	0		
20-Jun		0	4	0		0			0	0		
21-Jun		0	40	0		0			52	0		
22-Jun		0	42	0		0			462	0		
23-Jun		0	157	0	0	0			0	0	19	
24-Jun		0	67	0	0	0			22	0	15	
25-Jun		0	24	0	8	0			148	3	24	
26-Jun		0	153	0	3	0			338	0	102	0
27-Jun		1	218	1	22	0			431	6	189	2
28-Jun		0	80	0	2	0			7,808	4	341	10
29-Jun	8	2	78	0	112	0			5,076	3	374	27
30-Jun	451	3	41	0	258	0	18		1,509	0	1,671	97
1-Jul	409	13	184	2	750	0	5		6,192	16	1,049	15
2-Jul	194	4	107	0	65	0	383		3,345	12	140	89
3-Jul	305	4	347	0	704	0	52		6,876	13	1,186	453
4-Jul	780	5	1,254	1	1,008	0	224		257	13	2,327	652
5-Jul	1,027	9	6,678	0	3,595	0	162		1,626	16	5,175	985
6-Jul	772	98	4,676	2	4,136	2	1,228		13,433	24	4,203	2,334
7-Jul	4,026	77	3,834	0	4,292	2	354		10,268	94	17,994	3,071
8-Jul	1,736	4	7,472	1	2,968	1	972		4,815	172	13,079	2,443
9-Jul	4,263	18	8,905	2	1,382	2	1,680		8,765	259	16,044	1,692
10-Jul	4,744	33	10,290	1	1,169	10	897		12,942	16	22,171	1,266
11-Jul	3,313	23	5,822	2	9,872	20	7,849		10,764	43	15,664	1,453
12-Jul	8,447	100	4,662	4	21,285	17	2,726		9,207	185	15,661	385
13-Jul	13,568	109	9,484	6	11,399	18	7,044		9,161	173	15,313	2,865
14-Jul	24,842	94	11,760	1	5,846	7	1,468		7,819	189	25,780	5,106
15-Jul	22,460	81	9,754	35	21,785	2	966	10	6,958	28	16,578	2,489
16-Jul	20,612	64	13,476	31	11,087	2	1,206	4	8,224	13	22,322	1,992
17-Jul	27,053	60	12,222	13	23,930	4	1,446	5	6,724	96	16,143	678
18-Jul	18,277	31	12,682	5	31,639	4	1,686	26	8,701	702	14,713	945
19-Jul	20,792	15	14,282	6	27,014	14	1,926	15	6,058	459	15,635	450
20-Jul	23,511	30	17,477	4	7,204	69	2,170	47	1,983	288	28,631	1,140
21-Jul	10,872	40	18,780	4	4,672	38	2,549	61	1,239	98	19,851	1,852
22-Jul	8,975	48	13,018	4	2,460	41	1,143	19	564	18	12,446	814
23-Jul	17,692	77	4,744	5	3,512	25	454	18	1,060	107	9,880	723
24-Jul	15,120	25	3,778	2	7,181	23	609	38	1,092	107	9,973	256
25-Jul	3,566	216	2,473	0	5,278	22	1,055	124	385	124	12,352	158
26-Jul	10,225	88	3,365	6	3,496	11	335	53	429	43	12,184	425
27-Jul	13,821	37	3,768	13	1,186	24	731	68	232	47	10,978	307
28-Jul	15,302	20	5,036	9	1,496	11	612	94	305	130	9,686	889
29-Jul	9,736	14	1,035	20	1,134	26	415	56	49	140	7,911	744
30-Jul	6,159	29	205	26	982	13	202	22	62	29	5,421	687
31-Jul	2,476	11	706	2	1,315	10	244	10	232	65	4,258	341
1-Aug	996	22	169	7	962	8	145	17	131	69	2,669	430
2-Aug		23	107	2	474	5	129	19	61	54	2,342	140
3-Aug		44	127	8	440	48	81	17	73	33	1,206	79
4-Aug		20	300	3	303	60	65	12	34	34	843	55

Appendix 5. Continued.

Date	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5-Aug		17	237	3	127	28	49	5	11	35	890	91
6-Aug		22	61	1	73	14	33	10	13	17	729	114
7-Aug		37	109	1	104	13	17	10	7	20	789	41
8-Aug		20	61	5	140	19	17	0	4	9	513	68
9-Aug		29	55	1	68	7	35	3	5	8	439	39
10-Aug		46	77	4	36	16	15	6	9	9	384	17
11-Aug		18	44	7	40	15	11	10	2	6	205	23
12-Aug		11	51	6	43	17	8	3	4	10	152	10
13-Aug		12	25	4	52	8	14	8	1	14	140	3
14-Aug		32	16	3	40	5	11	6	4	21	128	11
15-Aug		20	7	0	11	3	9	2	1	16	116	10
16-Aug		19	25	3	18	17	2	1	0	11	104	12
17-Aug		17	8	5	10	1	1	1	1	6	96	5
18-Aug		6	17	4	8	6	1	1	0	1	34	3
19-Aug		7	40	2	2	0	3	6	0	14	35	1
20-Aug		4	4	4	2	1	3	1	0	18	17	0
21-Aug		7	2	1	2	1	1	0	1	10	17	3
22-Aug		6	3	2	2	3	2	1	1	8	7	0
23-Aug		4	8	2	2	2	1	3	2	12	5	0
24-Aug		8	7	8	2	7	4	1	3	13	6	2
25-Aug		3	16	10	2	1	5	0	1	10	7	2
26-Aug		5	28	3	2	4	0	1	0	9	12	1
27-Aug		9	1	1	2	1	0	0	0	2	4	2
28-Aug		0	1	9	2	6	2	0	0	4	4	7
29-Aug		7	1	15	2	6	1	0	0	3	5	3
30-Aug		5	6	16	1	2	9	3	1	1	11	1
31-Aug		0	4	1	2	3	2	0	0	0	18	2
1-Sep		0	7	1	2	1	1		1	10	13	3
2-Sep		2	4	0	0	1	0		1	2	35	2
3-Sep		1	7	20	4	8	0		0	6	6	1
4-Sep		0	1	13	5	2	0		0	8	11	0
5-Sep		1	3	5	0	4	0		2	5	34	2
6-Sep		1	0	2	2	2	0		0	4	47	0
7-Sep		1	1	3	3	3	0		0	8	30	1
8-Sep		1	0	3	0	0	0		0	12	24	0
9-Sep		0	1	5	2	0	0		1	7	22	2
10-Sep		1	0	4	2	0	1	0	0	5	13	3
11-Sep		0	0	12	1	3	0	0	1	6	6	6
12-Sep		1	0	6	2		0	0	2	4	4	
13-Sep			3	6	0		0	2	0	7	1	
14-Sep			0				1	0	0	3	3	
15-Sep			0				1	1		4	3	
16-Sep			1				0				3	
17-Sep							0				2	
18-Sep							0				3	
19-Sep							0				0	
20-Sep							0					
21-Sep							0					
22-Sep							0					
23-Sep							0					
Total	316,530	1,972	214,837	429	**227,244**	**769**	43,491	* *	**165,991**	4,303	**399,670**	39,030

= corrected for missing day
= corrected for incomplete day
* * = incomplete count, missing data not estimated

Appendix 6. Historical daily sockeye salmon estimates recorded at the East Fork Andreafsky River weir, 1994-2005. Annual weir totals were revised to account for missing daily counts. Data for 2001 were not used in calculations and are shown for informational purposes only. Totals in bold indicate revisions from previously published data.

Date	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
14-Jun												
15-Jun				0								
16-Jun		0		0								
17-Jun		0		0		0						
18-Jun		0		0		0				0		
19-Jun		0	0	0		0			0	0		
20-Jun		0	0	0		0			0	0		
21-Jun		0	0	0		0			0	0		
22-Jun		0	0	0		0			0	0		
23-Jun		0	0	0	0	0			0	0	0	
24-Jun		0	0	0	0	0			0	0	0	
25-Jun		0	0	0	0	0			0	0	0	
26-Jun		0	0	0	0	0			0	0	0	0
27-Jun		0	0	0	0	0			0	0	1	0
28-Jun		0	0	0	0	0			0	0	2	0
29-Jun	0	0	0	1	3	1			0	1	5	0
30-Jun	0	0	0	0	0	0	0		0	0	2	1
1-Jul	0	2	0	1	0	0	0		0	0	0	1
2-Jul	0	0	6	0	0	0	0		0	0	3	0
3-Jul	0	1	9	0	0	0	0		0	0	5	0
4-Jul	0	0	16	0	0	1	0		0	1	3	0
5-Jul	0	1	6	0	0	8	0		0	4	9	0
6-Jul	0	4	1	0	0	1	0		1	4	7	0
7-Jul	2	0	7	1	0	2	0		0	4	22	0
8-Jul	1	0	0	0	3	6	0		0	2	18	0
9-Jul	0	0	10	0	0	2	0		0	2	14	0
10-Jul	0	1	6	1	0	0	0		0	13	15	0
11-Jul	1	1	6	0	4	7	1		0	14	18	0
12-Jul	0	0	8	0	8	0	0		1	4	16	1
13-Jul	0	0	7	0	3	0	0		0	4	19	0
14-Jul	0	0	9	2	0	0	1		0	1	10	15
15-Jul	1	0	4	1	10	0	0	0	0	8	3	0
16-Jul	2	0	5	2	7	1	0	0	3	13	6	1
17-Jul	0	0	4	1	5	5	0	0	1	23	9	0
18-Jul	2	3	8	1	13	2	0	1	2	0	7	0
19-Jul	0	0	7	0	17	0	0	0	3	9	12	0
20-Jul	3	1	6	1	3	2	0	0	1	3	12	0
21-Jul	2	2	3	0	1	0	0	0	1	1	7	2
22-Jul	0	0	4	2	6	0	0	4	1	8	2	0
23-Jul	0	0	4	1	3	0	0	1	2	11	7	0
24-Jul	1	0	1	0	1	0	0	2	4	11	10	5
25-Jul	1	8	1	0	9	1	0	1	0	2	16	5
26-Jul	1	2	3	0	0	0	0	0	0	15	9	2
27-Jul	5	1	3	0	0	0	0	2	1	25	16	5
28-Jul	4	0	2	3	6	0	0	0	2	19	6	4
29-Jul	3	1	0	3	5	0	0	0	0	9	5	7
30-Jul	2	3	0	2	5	1	1	0	0	18	6	1
31-Jul	0	0	5	0	4	1	1	0	4	7	7	1
1-Aug	2	4	1	3	5	0	0	0	3	16	8	0
2-Aug		0	1	2	1	0	0	0	3	4	9	0
3-Aug		3	1	1	6	0	1	1	0	11	3	0
4-Aug		0	4	0	4	1	1	0	0	40	7	0

Appendix 6. Continued.

Date	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5-Aug		0	1	0	3	0	1	0	0	5	2	2
6-Aug		0	4	0	2	2	0	0	1	11	8	4
7-Aug		1	3	0	5	0	0	0	0	9	9	0
8-Aug		1	1	0	2	0	2	0	0	4	8	8
9-Aug		0	5	0	2	0	1	0	1	2	6	1
10-Aug		0	3	0	1	0	0	0	1	6	3	1
11-Aug		0	2	0	4	1	1	0	0	6	5	2
12-Aug		0	0	0	2	1	0	0	2	3	5	1
13-Aug		3	0	2	12	1	0	1	0	12	4	3
14-Aug		3	1	0	2	0	0	0	0	8	3	3
15-Aug		3	1	0	1	0	0	0	0	7	2	0
16-Aug		5	5	0	3	0	0	0	0	6	1	4
17-Aug		5	0	0	2	0	1	0	0	5	0	0
18-Aug		1	1	1	1	0	1	0	0	8	6	13
19-Aug		1	5	2	0	2	1	0	0	8	4	0
20-Aug		3	1	5	0	3	0	1	0	17	5	0
21-Aug		1	3	5	0	2	0	0	0	0	6	1
22-Aug		13	1	1	0	0	0	0	0	6	3	0
23-Aug		9	0	1	0	1	0	0	0	11	0	0
24-Aug		4	3	1	0	0	2	0	1	10	5	7
25-Aug		0	16	8	0	0	3	0	0	5	15	1
26-Aug		1	6	2	0	2	0	0	1	1	4	2
27-Aug		0	2	1	0	0	11	0	0	6	2	0
28-Aug		4	2	2	0	2	3	0	0	6	2	15
29-Aug		1	4	5	0	0	4	0	1	4	2	5
30-Aug		1	5	6	3	2	3	1	0	2	4	5
31-Aug		2	0	0	0	0	5	0	0	2	1	1
1-Sep		3	2	0	1	4	13	0	0	2	6	2
2-Sep		0	1	4	1	2	5		0	1	6	2
3-Sep		0	3	2	0	9	2		0	1	2	8
4-Sep		2	3	1	0	13	2		0	5	5	1
5-Sep		0	3	1	0	15	0		0	4	15	3
6-Sep		3	2	2	0	2	0		0	0	6	3
7-Sep		1	1	3	0	0	0		1	0	1	0
8-Sep		2	0	1	1	1	0		0	1	2	0
9-Sep		0	0	4	6	2	1		1	0	4	0
10-Sep		1	0	4	0	0	2	0	0	0	1	2
11-Sep		1	0	2	2	4	0	0	0	1	1	0
12-Sep		0	0	3	0		0	0	0	0	1	
13-Sep			0	2	0		2	0	0	1	0	
14-Sep			0				1	0	0	1	0	
15-Sep			0				0			0	0	
16-Sep			0				0				1	
17-Sep							1				3	
18-Sep							0				2	
19-Sep							0				1	
20-Sep							1					
21-Sep							3					
22-Sep							1					
23-Sep							0					
Total	* *	113	248	100	**188**	**113**	**79**	* *	43	494	508	151

[yellow box] = corrected for missing day
* * = incomplete count, missing data not estimated