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COPPER RIVER HYDROACOUSTIC SALMON ENUMERATION STUDIES, 1992

By

Steven Morstad

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AUTHOR

Steve Morstad is Prince William Sound Assistant Area Management Biologist for the Alaska Department of Fish and Game, Division of Commercial Fisheries, P.O. Box 669, Cordova, Alaska 99574-0669.

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ABSTRACT

The Miles Lake sonar project began in 1978 to assess annual salmon escapement into the Copper River. The study conducted during 1992 used side scanning sonar equipment deployed on the north and south banks of the Copper River. Counting sites were located near the outlet of Miles Lake approximately 53 km upstream from the commercial fishing district. Escapement estimates for sockeye salmon (*Oncorhynchus nerka*) were 601,952 in 1992. Use of riverine sonar units capable of dividing the sonar beam into 16 monitoring sectors, each with adjustable hit criteria for targets, improved the accuracy of escapement estimates and allowed observations of salmon distribution across the counting transect to be obtained.

KEY WORDS: Copper River, hydroacoustics, migration, Miles Lake, *Oncorhynchus nerka*, Pacific salmon, riverine sonar, sockeye salmon, side scanning sonar, spawning escapement enumeration

INTRODUCTION

The Copper River drainage (Figure 1) has supported a commercial fishery since the early 1890's and a subsistence life style for the residents of this drainage for many years before that. Five species of Pacific salmon spawn in the Copper River. The most abundant species is sockeye salmon which makes up 92 percent of the total run. Coho salmon (*O. kisutch*) comprise approximately five percent and chinook salmon (*O. tshawytscha*) make up about three percent of the total run. Populations of pink (*O. gorbuscha*) and chum (*O. keta*) salmon are not abundant.

There are three major sockeye salmon spawning components in the Copper River system. The most abundant component, referred to as upper Copper River stocks, spawn in Copper River tributaries above Miles Lake. The second component, derived from upper Copper River stocks, is an artificially propagated Gulkana River hatchery stock. The hatchery, which has operated since the early 1970's, produces approximately 225,000 returning adult sockeye salmon. The third component, referred to as lower delta stocks, spawn in systems below the Chugach Mountains, between Eyak Lake and Katalla River.

Management of Copper River salmon resources is difficult due to several factors. The Copper River is a cold turbid system draining extensive glaciers originating in the Alaska, Chugach, Wrangell, and St. Elias mountain ranges. Enumerating the escapement within this drainage has been difficult since the main stem Copper River is too turbid to allow visual counting of salmon. While it is possible to survey clear tributary streams, sockeye and chinook salmon reach these months after they have passed through the commercial fishery. Such surveys have little value for inseason management decisions and make it impossible to ensure that minimum escapement levels are achieved. However, post season escapement estimates do provide data to forecast subsequent runs and to establish escapement goals.

Inseason escapement estimates first became possible in 1978, with the deployment of a single side scanning sonar salmon counter on the south bank of the Copper River at the outlet of Miles Lake (Mile 49 of the Copper River Highway) approximately 53 km upstream from the commercial fishing zone. In 1979 an additional side scanning unit was installed on the north bank of the river. Information from this project has been used for real time management of both the commercial and personal use fisheries. The Copper River management plan, 5AAC 29.360, specifies minimum escapement goals which are based on data obtained from this sonar project (ADF&G 1991). Emergency order regulation of the multi-million dollar commercial fishery as well as subsistence, personal use, and sport fisheries is based on escapement information collected at the Miles Lake sonar site.

METHODS

Methods used were consistent with those described by Morstad (1992).

Calibration's

Each year, frequent adjustments of substrates and transducers have been required on both river banks because of large fluctuations in river level, wave action caused by strong winds, and periods of heavy ice passage. During 1992, the south bank unit was calibrated every three hours for 30 minutes or until 100 fish were counted. The north bank sonar was calibrated every four hours for 30 minutes or until 100 fish were counted (Morstad 1992).

Species Apportionment

Due to similar run timing of chinook and sockeye salmon during May and early June, and since 95 percent of salmon migrating up the Copper River are sockeye, no species apportionment information is collected at the site. Test fishing programs were attempted from 1985 through 1987, but limited locations and small catches demonstrated that test fishing was not practical at Miles Lake (Morstad 1992).

RESULTS and DISCUSSION

Escapement Enumeration

In 1992, the sonar project operated from 26 May to 31 July. Estimated escapement during that time period was 601,952 salmon, 15 percent above the escapement goal (Table 1). Actual daily escapements were below anticipated daily escapements until 6 June, when daily escapement surged from 9,000 to over 14,500 salmon (Figure 3). However, actual cumulative escapement remained below the anticipated level until 15 June. After that date, actual escapement surpassed and remained above anticipated levels for the remainder of the season. Water level was below average until 13 June (Table 2).

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Table 1. Daily sockeye salmon escapement estimates at the Miles Lake sonar, 1992.

Date	Water Level [a]	Estimate North Bank	Estimate South Bank	Estimate Daily	Estimate Cumulative	Escapement Objective Daily	Escapement Objective Cumulative	Anticipated 0600	Anticipated Daily
22–May	39.62	0		0	0	2,996	10,382		
23–May	39.68	0		0	0	4,561	14,943		
24–May		0		0	0	6,913	21,856		0
25–May	39.92	0		0	0	7,031	28,887		0
26–May	40.10	0		0	0	7,025	35,912		0
27–May	40.30	210	1,016	1,226	1,226	8,905	44,817		0
28–May	40.55	328	1,103	1,431	2,657	10,092	54,909	307	1,228
29–May	40.73	380	1,982	2,362	5,019	7,384	62,293	399	1,596
30–May	40.94	548	5,188	5,736	10,755	8,745	71,038	1,221	4,884
31–May	40.97	217	7,714 [b]	7,931	18,686	11,039	82,077		
01–Jun	41.13	177	6,433	6,610	25,296	11,049	93,126	1,545	6,180
02–Jun	41.22	260	7,659	7,919	33,215	11,578	104,704	1,577	6,308
03–Jun	41.34	893	10,642	11,535	44,750	11,558	116,262	2,513	10,052
04–Jun	41.50	563	7,358	7,921	52,671	12,704	128,966	2,049	8,196
05–Jun	41.56	152	9,143	9,295	61,966	13,287	142,253	1,173	4,692
06–Jun	41.52	189	14,363	14,552	76,518	11,769	154,022	3,317	13,268
07–Jun	41.38	147	16,587	16,734	93,252	11,836	165,858	3,237	12,948
08–Jun	41.53	122	17,607	17,729	110,981	12,741	178,599	3,802	15,208
09–Jun	41.62	92	20,627	20,719	131,700	11,768	190,367	4,154	16,616
10–Jun	41.73	41	23,389	23,430	155,130	11,121	201,488	6,764	27,056
11–Jun	41.91	22	18,569	18,591	173,721	10,890	212,378	4,461	17,844
12–Jun	42.17	57	14,039	14,096	187,817	10,340	222,718	3,701	14,804
13–Jun	42.48	43	18,214	18,257	206,074	9,002	231,720	3,204	12,816
14–Jun	42.74	119	20,337	20,456	226,530	8,696	240,416	3,855	15,420
15–Jun	42.89	248	23,709	23,957	250,487	8,853	249,269	4,053	16,212
16–Jun	43.01	245	13,669	13,914	264,401	8,131	257,400	3,459	13,836
17–Jun	42.97	157	14,352	14,509	278,910	7,997	265,397	2,819	11,276
18–Jun	42.85	290	14,603	14,893	293,803	6,972	272,369	3,121	12,484
19–Jun	42.63	151	12,173	12,324	306,127	6,435	278,804	3,046	12,184
20–Jun	42.47	288	19,192	19,480	325,607	6,557	285,361	3,686	14,744
21–Jun	42.58	216	16,666	16,882	342,489	6,407	291,768	3,736	14,944
22–Jun	42.91	130	9,322	9,452	351,941	6,517	298,285	2,325	9,300
23–Jun	42.99	81	7,153	7,234	359,175	6,702	304,987	1,803	7,212
24–Jun	42.90	99	6,220	6,319	365,494	6,746	311,733	1,141	4,564
25–Jun	42.66	109	6,566	6,675	372,169	6,812	318,545	1,596	6,384
26–Jun	42.42	31	7,149	7,180	379,349	6,290	324,835	1,733	6,932
27–Jun	42.26	141	6,125	6,266	385,615	6,663	331,498	1,829	7,316
28–Jun	42.44	128	7,956	8,084	393,699	7,047	338,545	2,077	8,308
29–Jun	42.68	91	9,167	9,258	402,957	6,503	345,048	2,392	9,568
30–Jun	42.99	75	7,341	7,416	410,373	5,975	351,023	1,777	7,108

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Table 1. (page 2 of 2).

Date		Estimate North Bank	Estimate South Bank	Estimate Daily	Estimate Cumulative	Escapement Objective Daily	Escapement Objective Cumulative	Anticipated 0700	Anticipated Daily
01–Jul	43.28	152	6,968	7,120	417,493	5,872	356,895	1,657	6,628
02–Jul	43.61	217	5,374	5,591	423,084	5,738	362,633	1,740	6,960
03–Jul	44.15	222	4,419	4,641	427,725	5,412	368,045	1,177	4,708
04–Jul	44.35	127	5,286	5,413	433,138	6,113	374,158	884	3,536
05–Jul	44.53	138	4,286	4,424	437,562	5,763	379,921	1,527	6,108
06–Jul	44.55	246	6,741	6,987	444,549	5,184	385,105	829	3,316
07–Jul	44.38	350	7,011	7,361	451,910	5,111	390,216	1,230	4,920
08–Jul	44.19	507	5,251	5,758	457,668	5,567	395,783	847	3,388
09–Jul	43.71	562	11,375	11,937	469,605	5,418	401,201	3,043	12,172
10–Jul	43.39	417	8,722	9,139	478,744	6,299	407,500	2,303	9,212
11–Jul	43.34	330	8,050	8,380	487,124	6,076	413,576	2,375	9,500
12–Jul	43.48	477	7,482	7,959	495,083	6,011	419,587	1,941	7,764
13–Jul	43.72	646	6,095	6,741	501,824	5,466	425,053	1,548	6,192
14–Jul	43.65	453	8,121	8,574	510,398	6,242	431,295	1,244	4,976
15–Jul	43.42	364	8,607	8,971	519,369	6,551	437,846	1,663	6,652
16–Jul	43.41	504	7,179	7,683	527,052	6,909	444,755	2,140	8,560
17–Jul	43.27	492	6,226	6,718	533,770	6,717	451,472	1,875	7,500
18–Jul	43.19	480	8,327	8,807	542,577	6,830	458,302	2,210	8,840
19–Jul	43.16	413 [c]	8,202	8,615	551,192	6,703	465,005	1,656	6,624
20–Jul	43.16	273	6,829	7,102	558,294	6,693	471,698	2,093	8,372
21–Jul	43.31	188	4,710	4,898	563,192	5,345	477,043	1,246	4,984
22–Jul	43.34	177	4,435	4,612	567,804	4,390	481,433	1,059	4,236
23–Jul	43.14	209	5,217	5,426	573,230	4,286	485,719	1,249	4,996
24–Jul	42.92	147	3,674	3,821	577,051	3,856	489,575	757	3,028
25–Jul	42.84	115	2,869	2,984	580,035	3,272	492,847	567	2,268
26–Jul	43.11	131	3,281	3,412	583,447	2,798	495,645	446	1,784
27–Jul	43.26	139	3,480	3,619	587,066	2,563	498,208	891	3,564
28–Jul	43.18	123	3,082	3,205	590,271	2,490	500,698	618	2,472
29–Jul	42.99	152	3,802	3,954	594,225	2,117	502,815	1,120	4,480
30–Jul	42.88	149	3,723	3,872	598,097	1,864	504,679	848	3,392
31–Jul	42.81	148	3,707	3,855	601,952	1,522	506,201	503	2,012
Total		16,088	585,864	601,952					

a Meters above mean sea level.

b Went to permanent substrate.

c North bank pulled and all counts after July 19 are interpolated. North bank counts are derived from the average percent of North versus south bank counts of 3.9 percent.

Table 2. Water levels at Miles Lake, elevation in meters above sea level, Miles Lake sonar, Copper River, 1982 – 1992.

	Elevation Above Sea Level											
Date	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1982–1992 Average
15–May						38.99		40.05				39.52
16–May								40.04				40.04
17–May						39.09		40.01				39.55
18–May					39.19	39.10		40.01				39.43
19–May					39.31	39.05	39.70	40.06				39.53
20–May			39.05		38.97	39.05	39.62	40.07				39.35
21–May			39.08		38.95	39.10	39.65	40.02	40.79	39.42		39.57
22–May			39.31		39.19	39.14	39.65	40.14	40.92	39.52	39.62	39.69
23–May			39.45		39.29	39.21	39.60	40.23	40.81	39.70	39.68	39.75
24–May		39.39	39.48		39.37	39.28	39.61	40.27	40.63	39.96		39.75
25–May		39.39	39.57		39.38	39.29	39.64	40.16	40.48	40.17	39.92	39.78
26–May		39.36	39.61		39.46	39.36	39.67	40.17	40.48	40.33	40.10	39.84
27–May		39.37	39.71		39.54	39.46	39.75	40.27	40.58	40.41	40.30	39.93
28–May		39.39	39.75	40.28	39.60	39.46	39.78	40.42	40.77	40.51	40.55	40.05
29–May		39.38	39.61	40.34	39.77	39.48	39.82	40.60	41.00	40.55	40.73	40.13
30–May	39.62	39.44	39.55	40.31	39.97	39.45	39.87	41.00	41.47	40.56	40.94	40.20
31–May		39.58	39.47	40.18	39.96	39.48	40.00	41.49	41.72	40.58	40.97	40.34
01–Jun		39.94	39.46	40.03	39.97	39.76	40.12	41.82	41.00	40.51	41.13	40.37
02–Jun	40.03	40.64	39.42	39.90	39.96	39.98	40.14	41.87	42.03	40.42	41.22	40.51
03–Jun	40.31	41.00	39.39	39.88	39.97	40.33	40.16	41.70	42.18	40.32	41.34	40.60
04–Jun	40.60	40.94	39.45	39.95	39.90	40.36	40.26	41.70	42.26	40.31	41.50	40.66
05–Jun	40.72	40.94	39.61	40.18	39.88	40.30	40.32	42.02	42.45	40.38	41.56	40.76
06–Jun	40.83	40.89	39.75	40.44	39.98	40.43	40.35	42.11	42.67	40.42	41.52	40.85
07–Jun	40.71	40.82	40.04	40.36	40.19	40.73	40.61	42.06	42.81	40.47	41.38	40.93
08–Jun	40.69	40.82	40.34	40.11	40.43	40.88	40.82	42.00	42.98	40.55	41.53	41.01
09–Jun		40.85	40.36	40.03	40.46	40.69	41.15	41.89	42.96	40.60	41.62	41.06
10–Jun	41.50	40.84	40.36	40.06	40.36	40.64	41.48	41.92	42.85	40.58	41.73	41.12
11–Jun		40.82	40.43	40.01	40.24	40.54	41.80	41.80	42.63	40.71	41.91	41.09
12–Jun		40.84	40.56	40.01	40.13	40.38	42.00	41.65	42.47	40.87	42.17	41.11
13–Jun		40.81	40.68	40.11	40.22	40.34	42.19	41.73	42.44	41.06	42.48	41.21
14–Jun		40.67	40.84	40.13	40.33	40.37	42.36	41.78	42.61	41.31	42.74	41.31
15–Jun	41.27	40.71	40.97	40.16	40.62	40.36	42.45	42.03	42.66	41.53	42.89	41.42
16–Jun		40.60	41.07	40.13	41.05	40.36	42.64	42.13	42.58	41.77	43.01	41.53
17–Jun	41.06	40.75	41.05	40.13	41.58	40.44	42.80	42.02	42.52	42.00	42.97	41.57
18–Jun	40.93	40.88	40.89	40.36	41.83	40.57	42.99	41.94	42.39	42.10	42.85	41.61
19–Jun		40.97	40.97	40.49	41.88	40.51	42.90	42.02	42.15	42.04	42.63	41.66
20–Jun	41.16	41.31	41.15	40.49	41.89	40.43	42.56	42.09	42.03	42.05	42.47	41.60
21–Jun	41.50	41.58	41.31	40.51	41.71	40.36	42.32	42.15	41.91	42.53	42.58	41.68
22–Jun	41.54	41.85	41.66	40.34	41.54	40.70	42.53	42.22	41.92	43.14	42.91	41.85
23–Jun		41.95	41.76	40.39	41.43	41.18	42.25	42.34	41.93	43.69	42.99	41.99
24–Jun	41.35	42.01	41.99	40.46	41.29	41.27	41.82	42.48	42.01	44.02	42.90	41.96
25–Jun		42.19	42.35	40.74	41.11	41.23	41.73	42.84	42.02	44.03	42.66	42.09
26–Jun	41.62	42.43	42.60	40.79	41.00	41.10	41.68	43.13	42.09	43.83	42.42	42.06
27–Jun		42.44	42.75	40.77	40.97	40.98	41.68	43.11	42.31	43.64	42.26	42.09
28–Jun	42.39	42.43	42.58	40.97	41.17	41.28	41.55	43.01	42.59	43.57	42.44	42.18
29–Jun		42.60	42.37	41.20	41.52	41.00	41.79	42.98	42.96	43.66	42.68	42.27
30–Jun	42.90	42.55	42.14	41.43	41.62	41.53	41.79	43.03	43.27	43.78	42.99	42.46

–Continued–

Table 2. (page 2 of 2).

	Elevation Above Sea Level											
Date	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1982-1992 Average
01-Jul	42.81	42.43	41.88	41.86	41.96	42.37	41.73	43.10	43.49	43.87	43.28	42.62
02-Jul		42.24	41.94	42.32	42.37	42.83	41.82	43.31	43.78	43.90	43.61	42.81
03-Jul	42.57	42.33	41.91	42.55	42.61	42.85	41.99	43.49	43.76	43.77	44.15	42.91
04-Jul	42.18	42.51	41.91	42.62	42.70	42.91	42.29	43.41	43.71	43.76	44.35	42.94
05-Jul		42.60	41.96	42.62	42.85	43.04	42.51	43.43	43.71	43.53	44.53	43.08
06-Jul		42.67	41.86	42.67	43.03	43.16	42.66	43.38	43.74	43.24	44.55	43.10
07-Jul	41.92	42.70	42.06	42.85	43.11	43.12	42.95	43.42	43.85	43.07	44.38	43.04
08-Jul		42.84	42.29	42.93	43.13	42.93	43.08	43.43	43.75	43.08	44.19	43.16
09-Jul		42.81	42.52	42.75	43.03	42.33	43.06	43.50	43.51	43.22	43.71	43.04
10-Jul		42.82	42.72	42.55	42.70	42.52	42.94	43.63	43.14	43.49	43.39	42.99
11-Jul	42.72	42.72	42.62	42.52	42.62	42.49	42.72	43.74	42.81	43.22	43.34	42.87
12-Jul		42.55	42.47	42.55	42.76	42.50	42.53	43.95	42.58	43.04	43.48	42.84
13-Jul		42.14	42.32	42.62	42.80	42.53	42.72	44.07	42.51	42.94	43.72	42.84
14-Jul		41.98	42.19	42.60	42.78	42.41	42.73	44.03	42.42	42.92	43.65	42.77
15-Jul		41.80	42.16	42.55	42.51	42.47	42.66	43.82	42.37	42.85	43.42	42.66
16-Jul	42.44	41.95	42.06	42.44	42.35	42.43	42.64	43.51	42.28	42.82	43.41	42.58
17-Jul		42.10	41.96	42.42		42.47	42.72	43.20	42.12	42.96	43.27	42.58
18-Jul	42.35	42.23	41.83	42.49		42.35	43.03	43.14	42.50	42.86	43.19	42.60
19-Jul		42.46	41.96	42.49		42.36	43.18	43.30	42.78	42.50	43.16	42.69
20-Jul	42.39	42.55	41.99	42.60		42.63	43.18	43.47	43.06	42.17	43.16	42.72
21-Jul		42.53	41.76	42.90		42.78	43.24	43.58	43.28	42.11	43.31	42.83
22-Jul		42.48	41.63	42.88	43.53	43.36	43.53	43.32	43.57	42.27	43.34	42.99
23-Jul	42.09	42.27	41.61	42.62	43.41	43.51	43.40	43.14	43.62	42.41	43.14	42.84
24-Jul	42.58	42.30	41.66	42.37	43.34	43.39	43.38	43.00	43.72	42.70	42.92	42.85
25-Jul	42.72	42.30	41.86	42.24		43.17	43.04	42.91	43.83	42.87	42.84	42.78
26-Jul	42.98	42.20	42.06	42.24	42.77	43.01	42.70	42.86	43.75	42.97	43.11	42.79
27-Jul	43.13	42.10	42.19	41.99	42.45	43.02	42.54	42.81	43.25	42.95	43.26	42.70
28-Jul	43.09	42.23	42.29	41.99	42.22	43.16	42.58	42.75	42.90	42.90	43.18	42.66
29-Jul		42.51	42.29	42.11	42.01	43.23	42.58	42.87	43.15	42.82	42.99	42.66
30-Jul		42.68	42.39	42.24	41.94	43.29	42.43	42.96	43.46	42.77	42.88	42.71
31-Jul		42.76	42.34	42.39	41.98	43.26	42.38	43.13	43.51	42.65	42.81	42.72
01-Aug		42.79	42.39	42.55		43.07	42.31	43.29	43.51			42.84
02-Aug	43.90	42.66	42.32	42.98		42.98	42.33	43.37	43.51			43.01
03-Aug	43.84	42.61	42.34	44.35		42.92	42.48					43.09
04-Aug		42.55	42.34	45.09		42.93	42.81					43.14
05-Aug		42.62	42.42			42.88						42.64
06-Aug			42.42									42.42
07-Aug			42.42									42.42
08-Aug			42.42									42.42

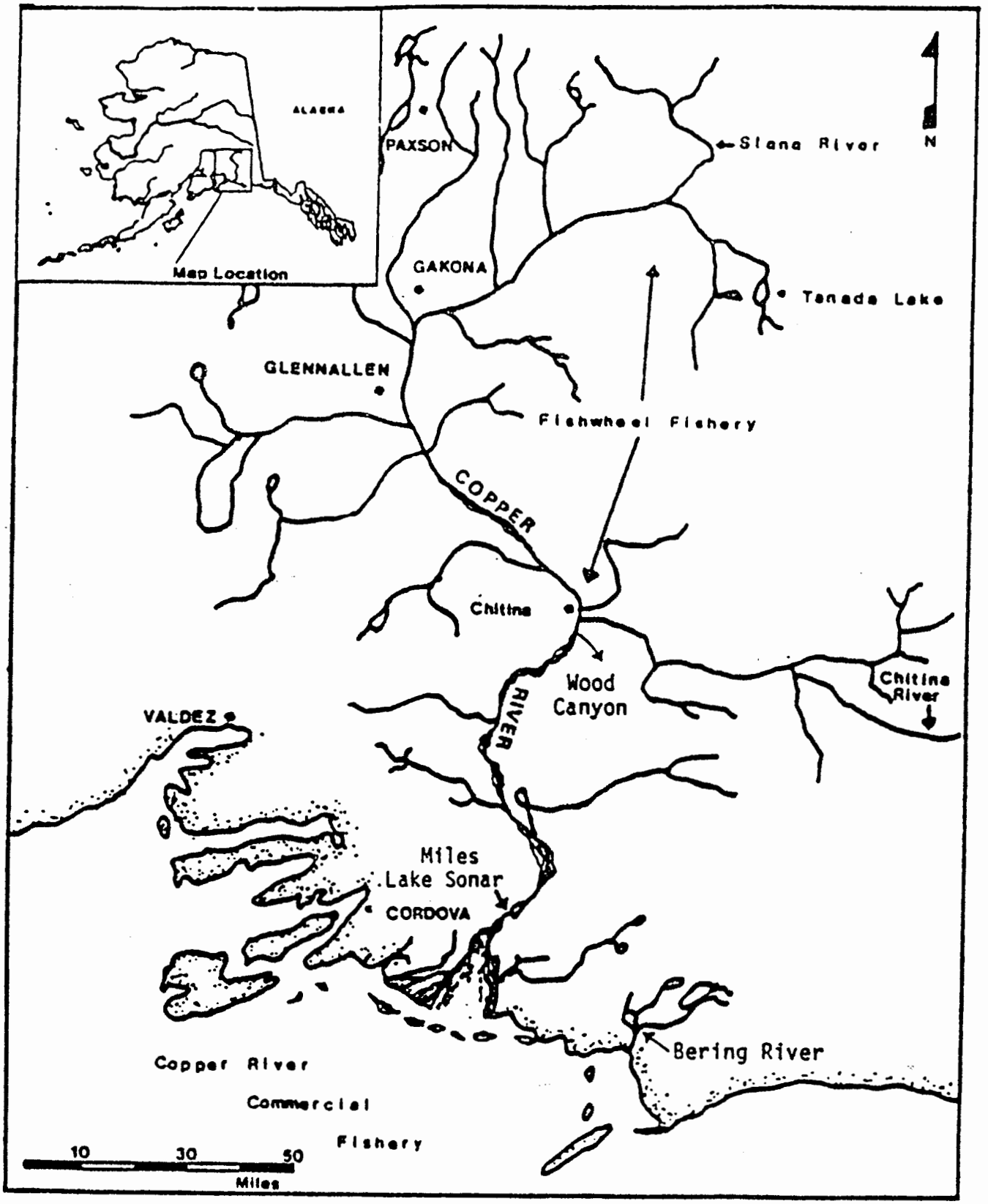

Figure 1. Commercial and subsistence fishing areas, Copper River drainage.

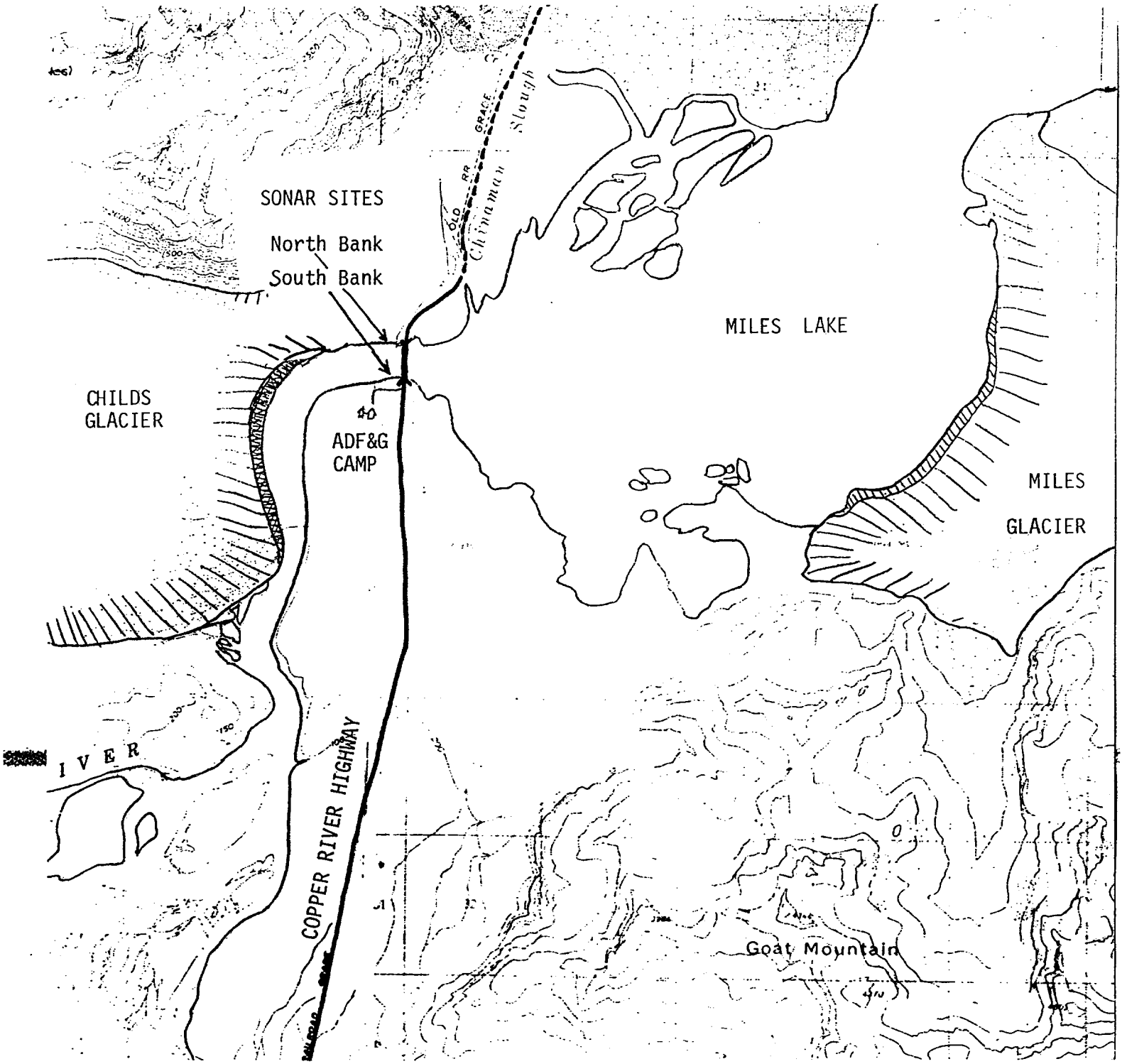

Figure 2. North and south bank sonar sites, Miles Lake area, Copper River.

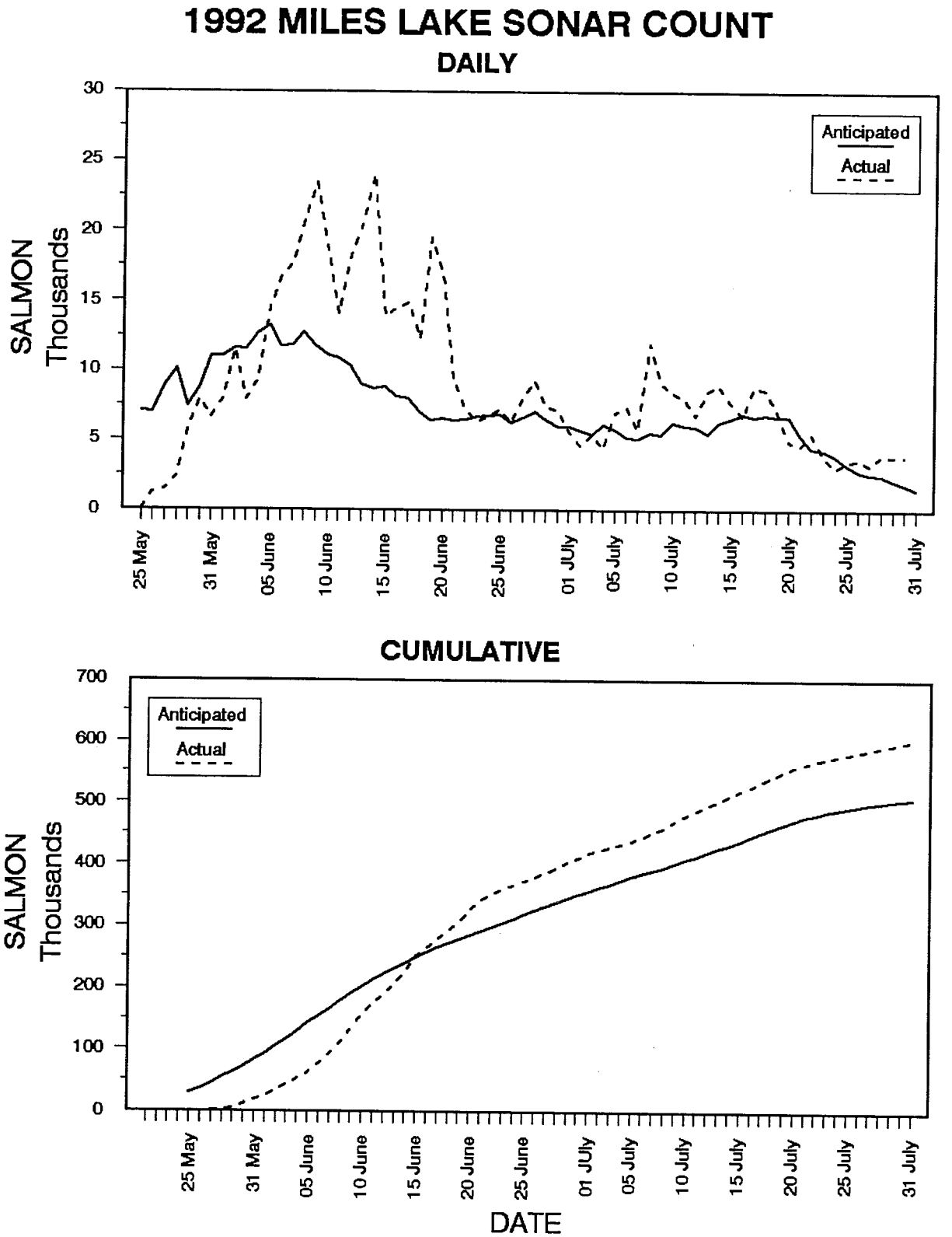

Figure 3. Anticipated and actual daily and cumulative salmon escapement estimates, Miles Lake sonar, 1992.

APPENDICES

Appendix 1. Daily salmon escapement estimates, Miles Lake sonar, Copper River, 1978–1992.

Date	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Average Daily Count	S.D.	C.V.
17–May				5,372								732				2,035	2,379	116.91
18–May		381	218	9,665								3,660				3,481	3,825	109.89
19–May		487	167	11,409			725				313	6,568				3,282	4,279	130.39
20–May		847	221	10,733			1,924			167	677	6,935				3,101	3,803	122.67
21–May		1,199	88	9,729			1,986			36	1,140	4,834	1,121	1,087		2,358	2,927	124.15
22–May		1,916	391	7,558			5,124			482	2,256	4,030	4,843	1,717		3,148	2,263	71.91
23–May		2,901	594	6,214		3,310	5,042			1,732	5,078	6,472	7,177	3,161		4,168	2,054	49.29
24–May		3,402	494	12,985	90	6,620	4,486			2,040	11,033	7,448	11,923	2,465		5,908	4,476	75.79
25–May		2,397	713	12,818	493	11,587	3,120		534	4,263	8,979	4,658	14,333	3,046		5,662	4,870	86.01
26–May	502	4,927	1,057	6,383	1,023	10,575	4,645		1,694	7,115	6,946	6,316	11,337	3,893		5,417	3,572	65.94
27–May	837	6,821	2,115	2,842	12,091	6,881	5,636		2,092	12,176	13,247	13,143	12,060	3,389	1,226	6,895	4,696	68.10
28–May	1,047	2,768	1,693	2,560	47,303	6,456	4,978	1,031	3,384	16,392	14,201	13,680	7,434	3,933	1,431	6,699	11,446	131.57
29–May	661	3,805	1,060	2,160	19,671	6,380	7,126	417	2,393	14,485	10,022	10,677	9,176	4,417	2,362	6,329	5,407	85.44
30–May	3,241	7,482	1,903	11,822	6,781	6,296	4,951	599	3,173	18,196	6,806	5,375	9,541	9,362	5,736	7,018	4,242	60.45
31–May	2,549	8,655	3,620	21,126	11,389	17,123	4,278	1,758	4,150	16,540	7,586	7,316	10,343	16,833	7,931	9,546	6,019	63.04
01–Jun	2,616	4,078	5,257	16,415	15,385	16,428	8,536	3,462	7,001	16,395	5,205	7,041	10,026	17,806	6,610	9,751	5,663	58.07
02–Jun	2,811	3,465	7,061	23,771	17,213	14,414	6,483	6,726	20,838	14,385	3,558	5,234	9,909	14,557	7,919	10,676	6,283	58.85
03–Jun	1,837	3,536	7,437	16,716	13,363	13,137	9,730	10,691	20,237	17,666	4,626	6,867	6,576	18,673	11,535	10,978	5,474	49.87
04–Jun	3,256	2,778	6,996	9,755	12,355	15,357	12,496	24,272	26,626	14,632	7,877	8,555	7,572	11,688	7,921	11,609	6,437	55.45
05–Jun	2,970	4,352	9,746	10,478	14,806	19,110	16,728	30,507	27,934	10,962	8,755	7,512	10,173	8,440	9,295	12,651	7,704	60.90
06–Jun	3,318	6,453	5,407	11,975	15,585	14,069	16,097	32,953	14,527	4,322	6,895	7,719	10,410	11,865	14,552	11,996	7,049	58.76
07–Jun	3,806	7,031	2,093	13,585	12,506	19,309	18,515	27,256	9,658	5,755	9,096	12,693	11,137	6,585	16,734	11,849	6,374	53.79
08–Jun	3,275	11,078	1,349	14,412	6,430	16,094	26,819	30,925	24,938	6,366	11,322	14,565	7,837	9,471	17,729	13,614	6,258	60.66
09–Jun	2,252	7,985	3,543	15,694	7,017	11,415	20,476	29,702	26,242	7,922	14,641	9,440	9,905	11,665	20,719	13,375	7,970	59.59
10–Jun	3,475	5,205	7,301	12,856	7,589	8,009	19,275	12,010	29,952	11,553	15,218	12,126	11,860	8,565	23,430	12,549	6,835	54.47
11–Jun	2,490	4,426	12,032	7,677	7,679	9,563	17,237	11,826	25,418	11,194	16,255	9,663	16,161	12,688	16,591	12,221	5,657	46.29
12–Jun	2,082	2,227	11,584	4,844	6,587	13,292	21,706	8,231	16,494	6,506	14,959	6,256	23,929	9,066	14,096	11,057	6,230	56.34
13–Jun	2,419	3,903	7,600	3,558	9,932	13,444	12,072	6,829	11,453	4,053	10,751	10,626	24,448	9,236	16,257	9,905	5,680	57.34
14–Jun	2,835	2,563	5,661	5,228	12,551	13,831	5,981	6,800	11,393	6,053	9,382	13,548	14,302	14,987	20,456	9,837	4,944	50.26
15–Jun	2,913	3,351	7,308	7,071	12,677	15,915	10,291	8,825	8,747	5,485	9,910	9,922	8,390	14,987	23,957	9,982	5,150	51.60
16–Jun	2,782	3,473	5,655	6,885	13,595	7,938	13,930	9,347	10,099	5,516	6,484	6,889	10,112	14,387	13,914	8,866	3,698	41.71
17–Jun	2,779	4,640	7,189	6,467	12,030	5,671	19,809	6,270	8,772	5,406	4,910	10,020	12,695	10,129	14,509	8,753	4,375	49.98
18–Jun	2,261	3,911	6,741	4,565	6,544	5,889	12,850	3,738	9,050	4,615	6,469	11,131	8,052	11,051	14,893	7,451	3,539	47.50
19–Jun	3,035	3,413	2,391	2,985	4,369	6,481	7,474	3,251	7,910	3,983	7,855	8,345	9,763	12,921	12,324	6,432	3,326	51.74
20–Jun	3,035	1,954	3,597	2,891	3,352	7,382	9,256	2,423	7,240	3,933	7,952	7,575	9,315	14,146	19,480	6,902	4,704	68.15
21–Jun	2,515	2,223	4,142	3,446	3,348	8,124	7,159	2,061	6,741	3,924	5,770	7,169	10,292	6,750	16,882	6,170	3,786	61.37
22–Jun	2,068	2,585	3,954	3,997	4,487	6,005	5,522	2,763	9,026	6,379	6,985	6,868	10,157	7,830	9,452	6,137	2,622	42.73
23–Jun	2,641	2,865	3,896	4,363	7,031	7,528	5,913	3,369	6,010	10,111	7,699	5,850	10,166	6,358	7,234	6,216	2,301	37.02
24–Jun	2,616	1,877	5,217	4,651	6,329	6,009	6,741	2,950	6,968	15,708	5,562	3,927	9,340	5,963	6,319	6,013	3,161	52.90
25–Jun	2,130	3,013	5,104	3,398	4,903	5,226	6,503	1,585	5,731	16,517	5,597	2,996	10,010	7,660	6,875	5,803	3,574	61.59
26–Jun	1,771	1,973	3,595	2,412	4,416	5,638	4,385	2,381	5,410	12,500	6,378	3,426	6,812	9,500	7,190	5,165	2,865	55.63
27–Jun	2,176	1,315	3,421	2,507	2,732	4,736	7,224	3,035	5,153	7,010	6,559	3,240	9,234	10,355	6,266	4,998	2,609	52.19
28–Jun	1,103	1,697	4,324	2,949	2,174	4,771	6,728	2,264	5,022	5,644	6,259	6,302	6,881	10,810	6,064	5,001	2,579	51.57
29–Jun	1,604	1,450	3,845	3,421	2,130	4,304	4,453	2,147	3,578	6,836	6,220	6,490	4,499	10,439	9,258	4,845	2,717	56.07
30–Jun	1,832	1,899	3,465	2,378	2,313	6,146	6,449	2,139	3,771	4,636	8,497	7,354	3,975	9,113	7,416	4,612	2,309	50.07
01–Jul	1,587	2,651	3,559	2,723	2,190	6,106	6,226	2,620	3,584	2,012	5,602	7,930	4,323	7,303	7,120	4,502	2,252	50.00751
02–Jul	2,533	2,524	3,385	2,606	4,420	6,113	7,554	2,608	3,152	3,406	4,680	5,296	5,067	5,109	5,591	4,268	1,481	34.70877
03–Jul	2,527	2,859	4,104	2,548	5,751	6,026	6,581	1,819	2,311	4,096	4,222	4,978	4,662	6,335	4,641	4,365	1,764	40.41907
04–Jul	2,960	3,806	2,934	4,094	5,245	6,943	6,515	3,536	1,805	7,100	3,532	7,369	5,665	6,680	5,413	4,906	1,724	35.11959
05–Jul	2,269	3,006	2,879	4,256	4,995	5,347	6,862	3,254	1,499	4,351	3,304	10,739	7,996	5,845	4,424	4,722	2,306	48.83847
06–Jul	1,623	1,996	3,025	3,476	6,300	3,973	5,449	4,664	2,809	3,393	3,510	10,024	7,749	6,213	6,987	4,746	2,259	47.60268
07–Jul	1,152	892	3,291	3,863	6,171	4,209	4,040	3,627	2,991	5,617	4,324	10,236	5,700	6,221	7,361	4,646	2,290	49.28839
08–Jul	831	2,091	2,995	3,774	3,990	4,080	3,906	3,893	2,860	6,616	6,499	11,113	5,192	7,067	5,758	4,844	2,543	52.48784
09–Jul	947	3,190	2,617	3,449	2,210	3,353	3,210	6,827	3,077	6,352	5,167	10,761	5,153	6,452	11,937	4,993	2,977	59.61134
10–Jul	1,252	4,209	3,642	2,942	2,070	3,644	2,927	10,807	5,435	6,585	6,347	9,506	6,620	4,609	9,139	5,436	2,818	51.84684
11–Jul	841	3,684	5,763	2,271	1,960	4,454	3,606	5,457	5,115	5,322	7,620	6,453	5,402	4,477	6,360	4,855	2,146	44.19684
12–Jul	341	3,262	4,768	3,468	3,420	4,541	4,280	6,329	5,042	5,757	7,881	11,953	9,338	4,617	7,959	5,545	2,738	49.38377
13–Jul	167	3,144	1,725	2,265	4,032	4,543	4,582	5,252	3,696	6,583	7,087	9,329	11,432	3,968	6,741	4,970	2,818	56.71045
14–Jul	290	4,124	1,679	2,596	4,339	5,619	6,573	8,113	3,530	6,439	7,012	10,270	8,206	7,487	6,574	5,537	2,653	47.91319
15–Jul	275	3,535	1,743	3,691	4,714	6,496	5,521	5,024	4,899	5,722	6,924	12,283	8,309	7,549	6,871	5,697	2,860	50.19801
16–Jul	538	5,175	2,515	2,580	3,561	6,970	6,755	5,339	2,227	6,259	5,457	10,897	6,093	9,870	7,683	5,448	2,739	50.28369
17–Jul	304	3,555	3,419	780	2,925	6,327	4,955	5,960	4,106	4,467	4,677	6,903	6,259	9,667	6,718	4,882	2,502	51.24569
18–Jul	284	3,760	5,676	6,833	3,413	4,326	4,738	5,110	4,993	4,620	3,657	11,811	5,726	7,339	8,907	5,553	2,640	47.54429
19–Jul	321	3,344	5,813	20,975	4,296	3,703	3,140	4,560	6,066	4,127	4,583	10,567	5,975	7,512	6,615	6,226	4,596	73.81668
20–Jul	238	2,716	5,060	20,511	3,920	3,968	3,369	6,178	5,997	3,634	4,483	10,169	4,315	10,679	7,102	6,292	4,657	74.01699
21–Jul	61	2,583	3,626	15,741	4,049	4,463	3,204	4,128	4,746	2,441	3,964	8,639	2,534	10,267	4,898	5,036	3,712	73.68924
22–Jul	18	2,012	3,173	6,566	3,871	4,681	3,780	3,158	3,408	1,273	2,797	8,908	2,457	9,700	4,612	4,041	2,545	62.98648
23–Jul	15	1,915	2,143	5,767	3,099	3,603	3,205	2,870	2,909	1,002	3,429	6,103	3,901	9,016	5,426	3,762	2,358	62.70016
24–Jul	40	2,182	1,353	5,063	3,061	3,903	2,198	2,162	2,633	625	3,900	6,250	2,883	4,244	3,821	2,955	1,590	53.61165
25–Jul	13	1,112	1,623	3,391	3,374	4,535	1,937	2,449	2,292	2,014	4,023	5,303	2,050	3,065	2,984	2,876	1,307	48.82427
26–Jul		771	1,256	2,493	2,596	3,839	1,687	1,974	1,799	368	4,142	5,706	2,257	4,421	3,412	2,623	1,455	55.49048
27–Jul		316	1,198	2,451	2,247	3,667	1,391	2,191	1,626	626	3,920	5,699	2,885	3,864	3,619	2,553	1,441	56.43203
28–Jul		387	698	2,785	2,375	5,234	1,004	2,839	1,797	2,494	3,452	4,926	1,934	4,793	3,205	2,709	1,473	54.3676
29–Jul		365	400	3,686	1,426	4,138	891	2,813	1,563	2,341	3,476	4,150	2,606	5,354	3,954	2,669	1,496	56.13966
30–Jul		491	470	3,614	963	3,512	938	2,790	1,489	2,075	2,423	2,519	2,462	4,710	3,672	2,323	1,291	55.56662
31–Jul		703	353	3,802	1,176	1,835	1,093	1,848	1,258	2,226	1,920	1,551	2,550	2,901	3,855	1,934	1,018	52.62145
01–Aug		758	825	3,396	511	1,912	1,047	1,070	1,172	2,726	1,438	2,299	3,839			1,749	1,045	59.78154
02–Aug		379	1,034	2,304	942	2,211	1,068	703	1,045	1,299	1,098	1,744	5,249			1,591	1,230	77.31648
03–Aug		227	764	1,913	494	2,068	1,213		770	1,702						1,146	647	56.41681
04–Aug		286	708	1,297	581	2,897	1,116		814	1,499						1,150	756	65.75834
05–Aug		173	756	1,181	122		1,009		435	518						599	373	62.2471
06–Aug		103	677	1,170			533		416							620	370	59.71947
07–Aug		76	615						192							294	232	78.69925
08–Aug			186						33							100	67	66.83417
09–Aug			239						47							143	96	67.13287
Total	107,011	237,173	278,538	535,263	467,306	545,724	536,806	436,313	508,600	483,478	488,398	607,797	581,859	579,412	601,952	432,335	183,068	

Apendix 2. Cumulative daily salmon escapement estimates, Miles Lake sonar, Copper River, 1978–1992.

Date	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Average Daily Count	S.D.	C.V.
17–May				5,372								732				3,052	2,320	76.02
18–May		381	216	15,037								4,392				5,007	6,027	120.38
19–May		868	385	26,446			725				313	10,960				6,620	9,649	145.78
20–May		1,715	606	37,179			2,649			167	1,190	17,915				8,774	12,962	147.72
21–May		2,914	694	48,908			4,635			203	2,630	22,749	1,121	1,067		9,216	14,882	161.49
22–May		4,830	1,065	54,466			9,759			685	4,886	26,779	5,964	2,804		12,362	16,653	134.71
23–May		7,731	1,679	60,680		3,310	14,801			2,417	9,964	33,251	13,141	5,965		15,294	17,476	114.28
24–May		11,133	2,173	73,665	90	11,930	19,287			4,457	20,997	40,699	25,064	8,430		19,811	20,379	102.87
25–May		13,530	2,866	86,481	583	23,517	22,407		534	8,720	30,978	45,357	39,397	11,476		23,822	23,617	99.14
26–May	502	18,457	3,943	92,864	1,606	34,092	27,052		2,228	15,635	39,922	53,875	50,734	16,643		27,658	25,697	92.91
27–May	1,339	25,278	6,058	95,706	13,697	42,753	32,868		4,320	28,011	53,169	66,818	62,794	22,032	1,226	32,576	27,517	84.47
28–May	2,386	28,046	7,751	98,266	61,000	51,209	37,866	1,031	7,704	44,403	67,370	80,698	70,228	25,965	2,857	39,105	30,598	78.24
29–May	3,047	31,951	6,831	100,426	80,671	57,589	44,992	1,448	10,097	58,888	77,392	91,375	79,404	30,382	5,019	45,434	33,904	74.62
30–May	6,288	39,433	10,734	112,248	89,452	65,885	49,943	2,047	13,270	77,084	84,198	96,750	88,945	39,744	10,755	52,452	36,567	69.72
31–May	8,837	46,088	14,354	133,374	100,841	83,008	54,221	3,805	17,420	95,624	91,784	104,066	99,288	56,577	16,686	61,998	40,704	65.65
01–Jun	11,453	52,166	19,611	151,789	116,228	101,436	62,757	7,267	24,421	112,019	96,989	111,107	109,314	95,536	25,296	73,159	45,015	61.53
02–Jun	14,264	55,631	26,672	175,560	133,439	115,850	71,240	13,993	45,059	126,404	100,547	116,341	119,223	110,093	33,215	83,835	48,301	57.61
03–Jun	16,101	59,167	34,109	192,276	146,822	128,987	80,970	24,684	65,296	144,070	105,173	123,208	127,799	128,786	44,750	94,812	50,722	53.50
04–Jun	19,357	61,945	43,105	202,031	159,177	144,344	93,466	48,956	91,922	158,702	113,050	131,763	135,371	140,454	52,671	106,421	50,935	47.86
05–Jun	22,327	66,297	52,851	212,509	173,963	163,454	110,194	79,463	119,856	169,864	119,805	139,275	145,544	148,894	61,966	119,072	51,454	43.21
06–Jun	25,645	72,750	58,258	224,484	189,568	177,523	126,291	112,416	134,383	173,966	128,700	148,994	155,954	170,030	76,518	131,700	52,724	40.03
07–Jun	29,453	79,781	60,351	238,069	202,074	196,832	146,806	139,672	144,041	179,741	137,796	159,687	167,091	178,595	93,252	143,549	54,661	38.22
08–Jun	32,728	90,859	61,700	252,481	210,504	212,926	173,425	170,597	168,979	186,107	149,118	174,252	174,728	158,365	110,981	155,183	56,684	36.53
09–Jun	34,980	98,844	65,243	268,175	217,521	224,341	193,901	200,299	197,221	194,029	163,759	183,692	184,633	170,030	131,700	168,558	59,889	35.53
10–Jun	38,455	104,049	72,544	281,031	225,120	232,350	213,176	212,309	227,173	205,582	178,975	195,818	196,293	178,595	155,130	181,107	62,438	34.48
11–Jun	40,945	106,475	84,578	288,908	232,999	241,913	230,413	224,135	252,591	216,776	195,230	205,481	212,474	199,387	173,721	193,868	64,621	33.33
12–Jun	43,027	110,702	96,160	293,752	241,586	255,205	252,119	232,366	269,085	223,282	210,189	213,737	236,403	208,453	187,817	204,926	67,090	32.74
13–Jun	45,446	114,605	103,760	297,308	251,516	268,649	264,191	239,195	280,538	227,335	220,940	224,363	260,651	217,689	206,074	214,831	69,259	32.24
14–Jun	48,281	117,168	109,421	302,536	264,069	282,480	270,172	245,995	291,931	235,388	230,322	237,911	275,153	232,656	226,530	224,668	71,599	31.87
15–Jun	51,194	120,519	116,729	309,807	276,746	296,395	280,463	254,820	300,676	240,873	240,232	247,833	283,543	232,656	250,487	233,652	73,838	31.60
16–Jun	53,976	123,992	122,384	316,492	290,341	306,333	294,393	264,167	310,777	246,389	246,716	256,722	293,655	247,023	264,401	242,517	76,170	31.41
17–Jun	56,755	128,632	129,573	322,959	302,371	312,004	314,202	270,437	319,549	251,795	251,626	266,742	306,350	257,152	278,910	251,270	78,395	31.20
18–Jun	59,016	132,543	136,314	327,524	308,915	317,693	327,052	274,175	328,599	256,610	258,095	277,873	314,402	268,203	293,803	258,721	80,042	30.94
19–Jun	62,051	135,956	138,705	330,509	313,284	324,154	334,526	277,426	336,509	260,593	265,950	288,216	324,165	281,124	306,127	265,153	81,624	30.78
20–Jun	65,086	137,910	142,302	333,400	318,636	331,538	343,784	279,848	343,749	264,526	273,902	293,783	333,480	295,270	325,607	272,055	83,672	30.76
21–Jun	67,601	140,133	146,444	336,846	319,982	338,660	350,943	281,910	350,490	268,450	279,672	300,962	343,772	304,020	342,489	278,225	85,628	30.78
22–Jun	69,669	142,716	150,396	340,643	324,449	347,665	356,465	284,673	359,516	274,829	286,857	309,830	353,929	311,850	351,941	284,362	87,430	30.75
23–Jun	72,510	145,583	154,294	345,206	331,480	355,193	362,378	288,042	367,526	284,940	294,356	315,660	364,095	318,206	359,175	290,576	88,925	30.60
24–Jun	75,126	147,460	159,511	349,857	337,809	361,202	369,119	290,992	374,494	300,648	299,938	319,807	373,435	324,171	365,494	296,591	90,229	30.42
25–Jun	77,256	150,473	164,615	353,255	342,712	366,428	375,622	292,577	380,225	317,165	305,535	322,603	383,445	331,831	372,169	302,394	91,477	30.25
26–Jun	79,027	152,446	168,210	355,867	347,128	372,066	380,007	294,958	385,635	329,685	311,913	326,029	390,257	341,331	379,349	307,579	92,619	30.16
27–Jun	81,205	153,761	171,631	358,174	349,860	376,804	387,231	297,993	390,788	336,675	318,472	329,269	399,491	351,686	385,615	312,577	94,315	30.17
28–Jun	82,308	155,456	175,955	361,123	352,034	361,575	393,959	300,257	395,810	342,319	324,731	335,571	406,372	362,496	393,699	317,578	95,850	30.18
29–Jun	83,912	156,908	179,800	364,544	354,184	385,879	398,412	302,404	399,388	349,155	332,951	342,061	410,871	372,935	402,957	322,423	97,180	30.13
30–Jun	85,544	158,807	183,265	366,922	356,477	392,025	404,861	304,543	403,159	353,791	339,446	349,415	414,846	382,048	410,373	327,035	98,448	30.10
01–Jul	87,131	161,458	186,824	369,845	356,867	396,131	413,067	307,163	406,743	355,803	345,050	357,345	419,189	389,351	417,493	331,537	99,857	30.06
02–Jul	89,684	163,962	190,189	372,251	363,067	404,244	420,641	309,771	409,895	359,209	349,730	362,641	424,236	394,460	423,084	335,606	100,589	29.95
03–Jul	92,191	166,841	194,293	374,799	368,836	410,270	429,222	311,590	412,206	363,305	353,952	367,617	428,918	400,795	427,725	340,171	101,451	29.82
04–Jul	95,171	170,847	197,227	378,893	374,083	417,213	435,737	315,126	414,011	370,405	357,484	374,986	434,583	407,475	433,138	345,079	102,354	29.66
05–Jul	97,440	173,655	200,106	383,149	379,076	422,560	442,399	318,380	415,510	374,756	360,788	385,725	442,581	413,320	437,562	349,801	103,487	29.58
06–Jul	99,063	175,851	203,131	386,625	385,376	426,533	447,848	323,044	418,319	378,149	364,298	395,749	450,330	419,533	444,549	354,547	104,673	29.58
07–Jul	100,215	176,543	206,422	390,488	391,549	430,742	451,888	328,671	421,310	383,766	368,622	405,985	456,030	425,754	451,910	359,193	106,367	29.61
08–Jul	101,046	178,634	209,417	394,262	395,539	434,822	455,794	330,564	424,170	390,382	377,121	417,098	461,222	432,622	457,668	364,037	107,747	29.80
09–Jul	101,993	181,824	212,234	397,711	397,749	438,175	459,004	337,391	427,247	396,734	382,268	427,859	466,375	439,274	469,605	369,031	109,174	29.58
10–Jul	103,245	186,033	215,678	400,653	399,819	441,819	461,931	347,998	432,882	405,319	388,635	437,365	472,995	443,883	478,744	374,486	110,252	29.44
11–Jul	104,086	189,717	221,639	402,924	401,799	446,273	465,539	353,455	437,797	410,641	396,255	445,818	478,397	448,360	487,124	379,322	111,214	29.32
12–Jul	104,427	192,979	226,427	406,392	405,219	450,814	469,819	359,784	442,839	416,396	404,136	457,771	487,735	453,177	495,083	384,867	112,866	29.33
13–Jul	104,594	196,123	228,152	408,857	409,251	455,357	474,401	365,036	448,535	422,981	411,223	487,100	499,167	457,145	501,824	389,836	114,771	29.44
14–Jul	104,884	200,247	229,631	411,253	413,590	461,176	480,974	371,149	450,065	429,420	418,235	477,370	507,373	464,642	510,398	395,374	116,808	29.54
15–Jul	105,158	203,782	231,574	414,944	418,304	467,672	486,495	376,173	454,764	435,142	425,159	489,653	515,882	472,191	519,369	401,071	119,065	29.69
16–Jul	105,697	208,957	234,089	417,524	421,865	474,642	493,250	361,512	456,991	441,401	430,616	500,550	521,775	461,861	527,052	406,519	120,852	29.73
17–Jul	106,001	212,512	237,508	418,304	424,790	480,969	498,205	387,472	461,099	445,868	435,493	509,453	528,034	491,527	533,770	411,400	122,499	29.78
18–Jul	106,285	216,272	243,388	426,937	428,203	485,295	502,941	392,582	466,092	450,488	439,350	521,264	533,780	498,866	542,577	416,953	124,058	29.75
19–Jul	106,606	219,616	248,999	447,912	432,499	488,998	506,061	397,142	472,158	454,615	443,933	531,631	539,735	508,378	551,192	423,180	125,723	29.71
20–Jul	106,844	222,332	254,059	468,423	436,419	492,966	509,470	405,316	478,155	458,249	448,416	542,000	544,050	517,058	558,294	429,472	127,531	29.69
21–Jul	106,925	224,915	257,865	484,184	440,488	497,449	512,674	409,446	482,901	460,690	452,380	550,639	546,584	527,324	563,192	434,509	129,152	29.72
22–Jul	106,943	226,927	261,058	490,730	444,338	502,330	516,454	412,604	486,309	481,963	455,177	559,547	549,041	537,025	567,804	438,550	130,884	29.80
23–Jul	106,958	228,842	263,201	496,517	447,438	505,933	519,659	415,474	489,218	462,965	456,606	567,650	552,942	546,041	573,230	442,312	132,305	29.91
24–Jul	106,998	231,024	264,554	501,580	450,499	509,836	521,857	417,636	491,851	463,590	462,506	573,900	555,825	550,265	577,051	445,266	133,404	29.98
25–Jul	107,011	232,136	266,177	504,971	453,873	514,371	523,794	420,085	494,143	465,804	466,529	579,203	557,875	553,850	580,035	447,944	134,348	29.99
26–Jul		232,907	267,433	507,464	456,469	518,210	525,481	422,059	495,942	465,972	470,671	584,909	560,132	557,771	583,447	474,919	103,090	21.71
27–Jul		233,225	268,631	509,915	458,716	521,897	526,872	424,250	497,568	466,598	474,591	590,606	563,017	561,655	587,066	477,472	104,064	21.80
28–Jul		233,612	269,329	512,700	461,091	527,131	527,876	427,089	499,365	489,092	478,043	595,534	564,951	568,447	590,271	460,181	105,059	21.86
29–Jul		233,977	269,729	516,388	462,517	531,269	528,787	429,902	500,928	471,433	481,519	599,684	567,759	571,801	594,225	482,850	106,163	21.99
30–Jul		234,488	270,199	520,200	463,460	534,781	529,705	432,692	502,417	473,506	483,942	602,203	570,221	576,511	598,097	485,173	107,045	22.06
31–Jul		235,171	270,552	524,002	464,656	536,616	530,798	434,540	503,676	475,734	485,862	603,754	572,771	579,412	601,952	487,107	107,709	22.11
01–Aug		235,929	271,377	527,398	465,187	538,528	531,845	435,810	504,848	478,460	487,300	606,053	576,610			471,584	107,507	22.80
02–Aug		236,308	272,411	529,702	466,109	540,739	532,933	438,313	505,893	479,759	488,398	607,797	581,659			473,185	108,179	22.86
03–Aug		236,535	273,175	531,615	466,603	542,827	534,146		506,663	481,461						448,828	113,766	25.48
04–Aug		236,821	273,883	532,912	467,184	545,724	535,264		507,477	482,960						447,778	114,245	25.51
05–Aug		236,994	274,641	534,093	467,306		538,273		507,912	483,476						434,385	115,699	26.64
06–Aug		237,097	275,516	535,263			536,806		508,328							418,602	133,454	31.86
07–Aug		237,173	276,133						508,520							340,609	119,792	35.17
08–Aug			276,299						508,553							392,426	116,127	29.59
09–Aug			276,538						508,600							392,569	118,031	29.56

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