

TECHNICAL FISHERY REPORT 91-18



Alaska Department of Fish and Game
Division of Commercial Fisheries
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**Southeast Alaska Sockeye Salmon Studies, 1987-89:
Completion Report for the Period 1 July 1987 to 30
June 1989**

by

Fred E. Bergander

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ABSTRACT

Sockeye salmon escapements to Chilkoote and Chilkat Lakes in 1988 were 81,375 and 27,566 fish, respectively. The 1988 Chilkoote Lake escapement was 96% of the 1976-87 average and 116% of the mid-range escapement goal for this system. The 1988 Chilkat Lake escapement was 43.7% of the 1967-87 average and only 39% of the its mid-range escapement goal. Preliminary estimates of juvenile sockeye rearing capacity for Chilkoote Lake based on limnological studies indicated optimum escapements are 41 thousand and Chilkat Lake 154 thousand fish. Spawner:recruit information for Chilkoote Lake indicated good returns were produced from escapements of 71 thousand and above; however, the highest return per spawner was produced by an escapement of 35 thousand fish. Variable returns were produced by Chilkat Lake escapements in the range of 70 to 85 thousand. Because these results do not support the optimum escapements based on limnological studies, further investigation is needed. Returns from brood year escapements in the range suggested for Chilkat Lake by the limnology studies were not computed by the end of this study period. Escapements in 1988 to Crescent, Speel, Hugh Smith, and Klawock Lakes and Naha and Karta Rivers were below the recorded average. The 1988 Salmon Bay escapement exceeded the average of record by 4,022 fish.

KEY WORDS: *Oncorhynchus*, sockeye, Chilkat, Chilkoote, Crescent, Speel, Hugh Smith, Klawock, Naha, Karta, escapement

INTRODUCTION

This report represents the completion of a two-year contract period for sockeye salmon *Oncorhynchus nerka* escapement studies in Southeast Alaska. These studies have been on going at Chilkat Lake since 1967 and Chilkoot Lake since 1976 (Figure 1). The primary emphasis of these studies was directed towards the Chilkat Lake and Chilkoot Lake stocks which have generated sockeye salmon harvests in the Lynn Canal, District 15, drift gill net fishery ranging from 18,338 (1975) to 450,000 (1983) fish. These stocks are unique because little effort is directed towards these stocks outside of District 15, and they are the primary contributors to this fishery; minimal contributions come from the mainstem Chilkat, Lace, Berners and Gilkey Rivers. The purpose of this study was to provide annual escapement estimates to determine if escapement goals were being met, to assess the effects of the various management decisions on the escapements to these systems, to develop a time series of run reconstruction statistics, and to determine optimum sustained yield. Sockeye escapement goals first established for these lakes in 1976 were 80-100 thousand for Chilkoot Lake and 60-70 thousand for Chilkat Lake. Escapement goals for these systems were revised in 1981 to 60-80 thousand for Chilkoot Lake and 70-90 thousand for Chilkat Lake.

Joint limnological and fisheries investigations were conducted at Chilkoot and Chilkat Lakes by the FRED and Commercial Fisheries Divisions in 1987 and 1988 to evaluate rearing conditions for juvenile sockeye salmon and to evaluate and refine escapement goals for these two lake systems (Barto 1989).

LYNN CANAL ESCAPEMENT ESTIMATION

Methods

Escapement enumeration was conducted at picket weirs located on the outlets of Chilkoot and Chilkat Lakes (Figure 1). Operation of these weirs commenced annually near the first of June and continued through the 15th of October or until the daily rates of escapement indicated that the runs were nearing their end.

Fish were passed through the weir by removing two or more pickets from the weir at the site of fish concentrations. Fish were counted as they passed through the opening. The daily totals were recorded in conjunction with water level, water flow conditions, and water temperature. Scale samples and length measurements were collected at the weir for age analysis. Approximately 3% or 300 fish per week were sampled. Scales were taken from the preferred area of the fish. The preferred scale is defined as being found two rows above the lateral line along a diagonal from the posterior insertion of the dorsal fin to the anal fin (Clutter and Whitesel 1956). Scales were mounted on gummed cards possessing 40 sequentially marked spaces. Corresponding length and sex data were recorded on mark-sense forms. Scale analysis was performed by the department's Salmon Management Group in Juneau and reported by McPherson (1989).

Results and Discussion

Since they were established in 1976, escapement goals were met or exceeded 12 years at Chilkoote Lake and 7 of the 12 years at Chilkat Lake. Annual sockeye salmon escapements to Chilkoote Lake ranged from 35,450 (1978) to 102,973 (1982); Chilkat Lake sockeye salmon escapements ranged from 22,343 (1967) to 134,002 (1983) fish (Appendix A.1). The sockeye salmon escapement to Chilkat Lake in 1987 was 48,378 fish and Chilkoote Lake received 95,185 fish. The 1988 sockeye salmon escapements to Chilkat and Chilkoote Lakes were 27,566 and 81,375, respectively. In-season timing of the 1988 escapements to Chilkoote Lake closely followed the 1976-87 average (Figure 2), and the season's total was 96% of the historical average. The Chilkat Lake sockeye escapement began to lag behind the 1976-87 average by July 4 and continued in this manner through the season (Figure 3).

Figure 4 presents the 1988 Chilkat Lake sockeye salmon escapement as a moving 3-day average. The Chilkat Lake escapement exhibited three periods of peak activity: the first between June 27 and July 6, the second between July 18 and August 5, and the third from September 3 through September 30. Appendix B.1 presents the 1988 Chilkat Lake daily escapement as a proportion of the season's total. The September period showed the greatest amount of migration activity and was consistent with the escapement timing previously observed. Overall, the 1988 escapement to Chilkat Lake ranked as the third lowest of record (Appendix 1.A) and represented 43.7% of the historical average.

The 1988 migratory timing for Chilkoote weir (Figure 5; Appendix B.2) exhibited its first peak in the daily rate of escapement between June 30 and July 6 and accounted for approximately 32% of the season's total escapement. The second peak in the daily rate of escapement lasted from August 18 through August 25 and accounted for approximately 14% of the escapement. The timing of the 1988 Chilkoote Lake escapement was more protracted with less exaggerated peaks than those generally observed in the past.

CHILKAT AND CHILKOOT LAKES ESCAPEMENT GOALS

Methods and Procedures

Spawner-recruit relationships were used to evaluate the production from known brood year escapements. Stock composition estimates of the Lynn Canal harvest by McPherson (*in press*) combined with escapements determined in my investigations provided an estimate of the total return from the respective brood year escapements. These data provided a means of estimating the spawner-recruit ratios for the observed brood year escapements.

Limnological studies conducted by the FRED Division provided a means of estimating the rearing capacity of Chilkoote and Chilkat Lakes (Bartoo, *in press*). Data collected were lake surface area, mean euphotic zone depth, and euphotic

zone volume in cubic meters. These data led to an estimate of fry and smolt rearing capacities for each of these systems. Preliminary analysis of these data by Bartoo (*in press*) has provided an estimate of the adult escapement required to generate such rearing populations.

Results and Discussion

Spawner-recruit ratios for Chilkoot and Chilkat Lakes for the years of record show sockeye returns per spawner to Chilkoot Lake were generally higher than returns to Chilkat Lake (Figures 6, 7). Appendices A.2 and A.3 present the total returns and spawner recruit ratios for known brood year escapements to Chilkoot and Chilkat Lakes. Returns to Chilkoot Lake ranged from 1.72 to 6.27 fish per spawner, and Chilkat returns ranged from 1.38 to 5.1 per spawner. In both cases the highest rate of return was realized from the lowest escapement. Although lower escapements resulted in the highest returns per spawner, the highest total returns to Chilkoot Lake were produced by brood year escapements of 95,948 (1979) and 102,973 (1982); the highest total return to Chilkat Lake, 293,171 fish, was produced by an escapement of 80,588 fish (Appendix A.2). Chilkoot Lake appeared to maintain a higher return per spawner than did Chilkat Lake.

The results of limnological studies at Chilkat and Chilkoot Lakes in 1987 and 1988 (Appendix Table A.4) provided an estimated spring rearing capacity for these systems of 18.83 million fry for Chilkat and 5.01 million for Chilkoot. If an egg to fry survival of 9% and an average fecundity of 2,700 eggs is assumed, then an adult escapement of 154,000 to Chilkat Lake and 41,000 to Chilkoot Lake (1:1 male:female) would be necessary to produce rearing populations of the size suggested by the limnology studies. The results of this study indicate that escapements realized at Chilkoot Lake since 1976, with the exception of 1978, may have exceeded the level this lake has the capacity to support, and lower escapements may be in order. However, even though the highest return per spawner to Chilkoot Lake was generated by an escapement of 35,000 and the limnology studies suggest escapement goals of approximately 41,000 fish, the overall returns, except for those returning from the 1976 brood year escapement, have been in excess of 2:1, which is generally considered acceptable.

The limnological studies indicated that Chilkat Lake was capable of supporting the fry from a much larger escapement than it has been receiving. The returns to Chilkat Lake from escapements below the level suggested by the limnology studies have been less than might have been expected, which suggests the possibility that Chilkat Lake sockeye may be limited by a variable other than rearing; in this case, spawning area was suspected of being limited.

OTHER MONITORED SOCKEYE SYSTEMS

Methods and Procedures

Sockeye salmon escapements were monitored at Crescent, Speel, Salmon Bay, Klawock, and Hugh Smith Lakes and the Karta and Naha Rivers (Figure 8). Picket weirs were located on the outlets of each of these systems and fish were counted as they passed through the weirs. Scale samples and associated length and sex information were collected from fish passing through these weirs. The samples were turned over to the department's Salmon Management Group for analysis, and will be reported separately.

Sockeye salmon escapements to McDonald Lake were monitored by foot surveys of Hatchery Creek, the main tributary. These were later expanded to represent an estimated total escapement. Earlier studies compared stream surveys of Hatchery Creek with weir counts; this produced an expansion factor of 1.39 times the stream survey number (M.H. Haddix, ADF&G, Ketchikan, personal communication) which has been used since 1985 to provide a means of estimating the escapement to this system without the use of a weir.

Results and Discussion

Sockeye salmon escapements in 1988 to all of the systems with counting weirs, except Salmon Bay, were below the recorded averages for the respective systems (Appendix A.5; Bergander 1989). Escapements ranged from 86% below average at Karta River to 41% below average at Klawock Lake. The 1988 Salmon Bay escapement of 22,210 sockeye salmon exceeded its previous 7-year average. Daily escapements and associated statistics are presented in Appendices B.3 through B.8.

The 1988 estimated sockeye salmon escapement to McDonald Lake was 70,335. Previous escapements have ranged from 16,587 (1982) to 170,000 (1987). Escapements of record to McDonald Lake are presented in Appendix A.6.

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FIGURES

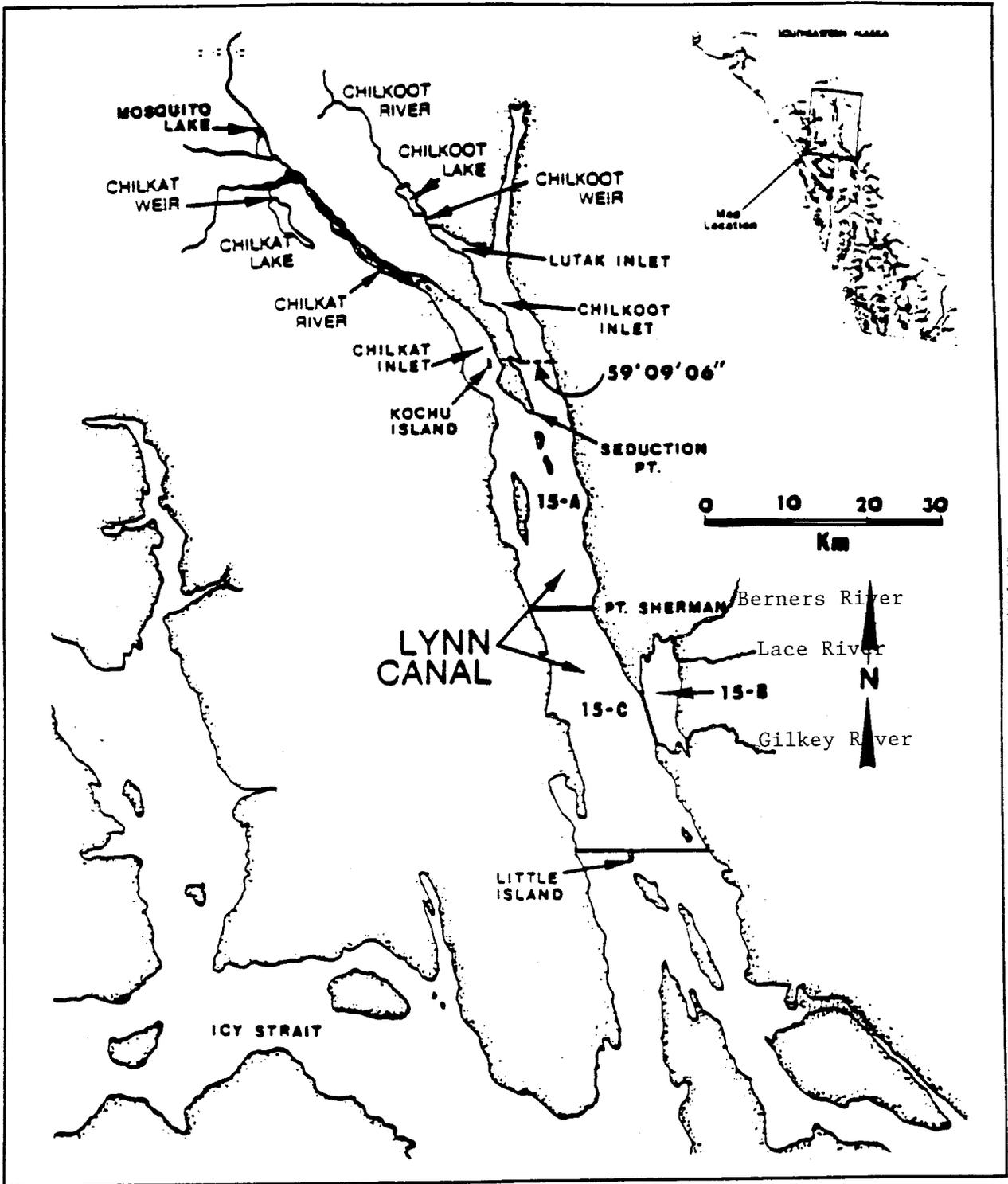


Figure 1. Lynn Canal fishery areas and supporting sockeye salmon spawning systems, Chilkoot and Chilkat Lakes.

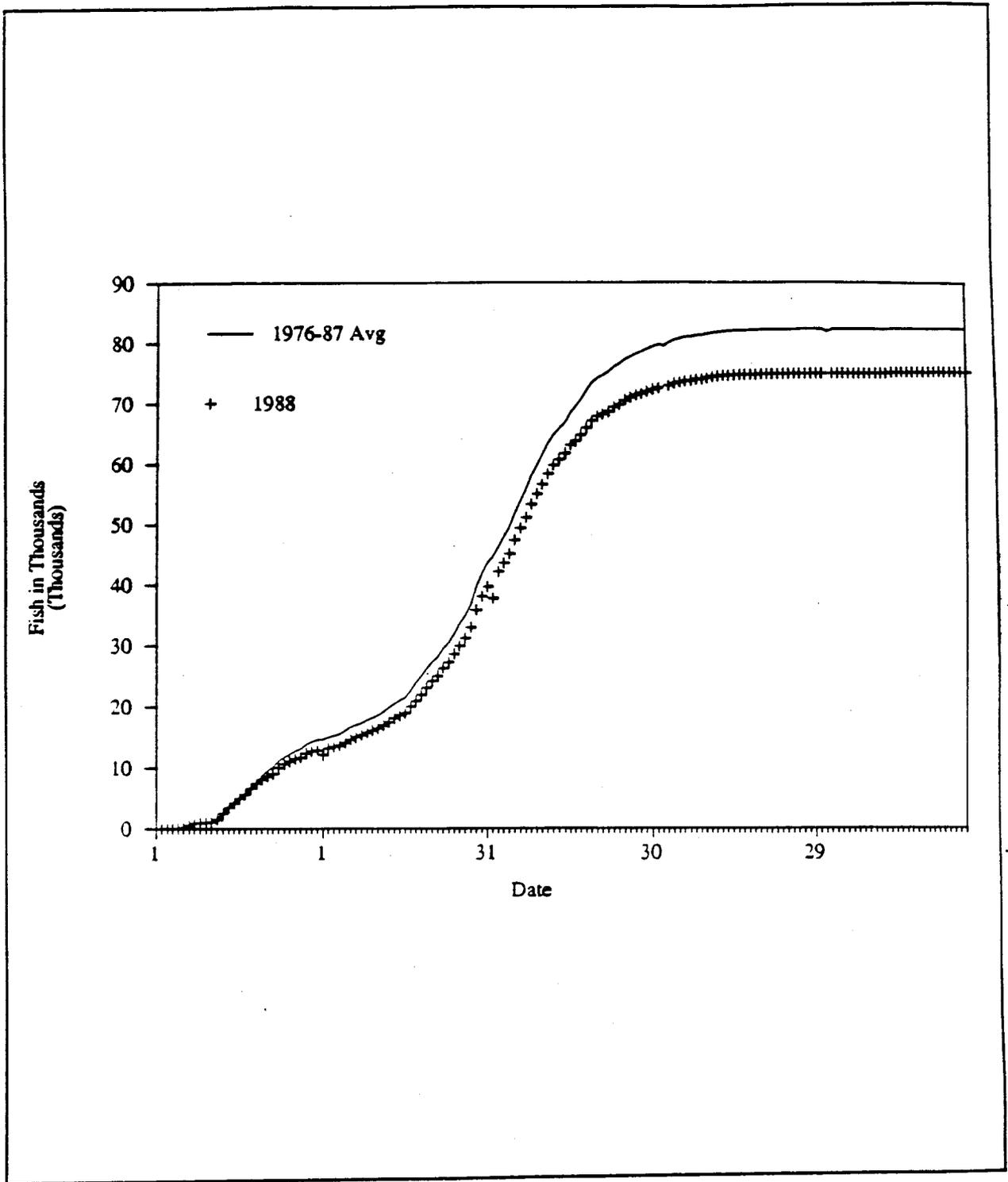


Figure 2. Chilkoot Lake sockeye salmon escapement, 1988 vs 1976-87 average.

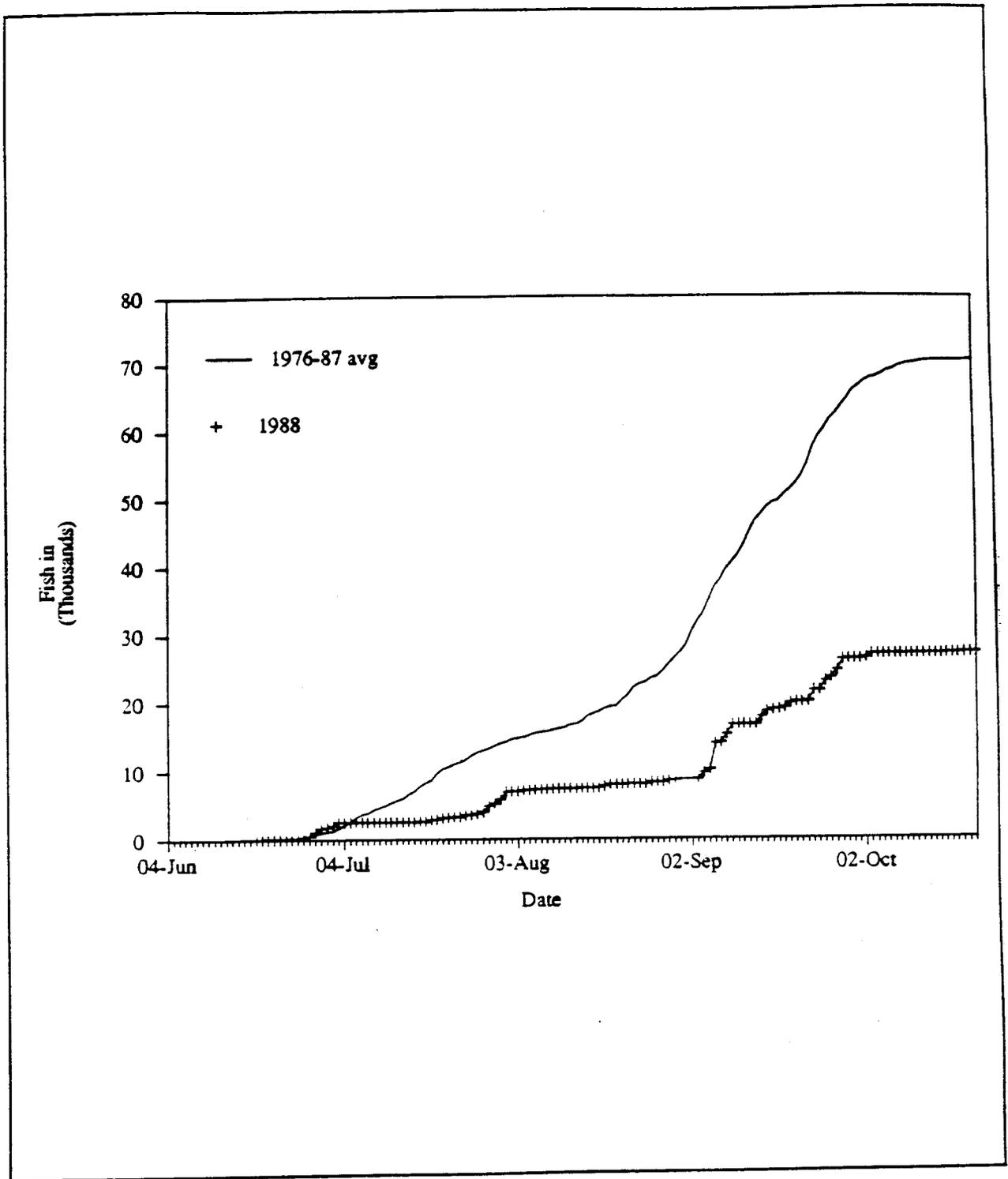


Figure 3. Chilkat Lake sockeye salmon escapement, 1988 vs 1976-87 average.

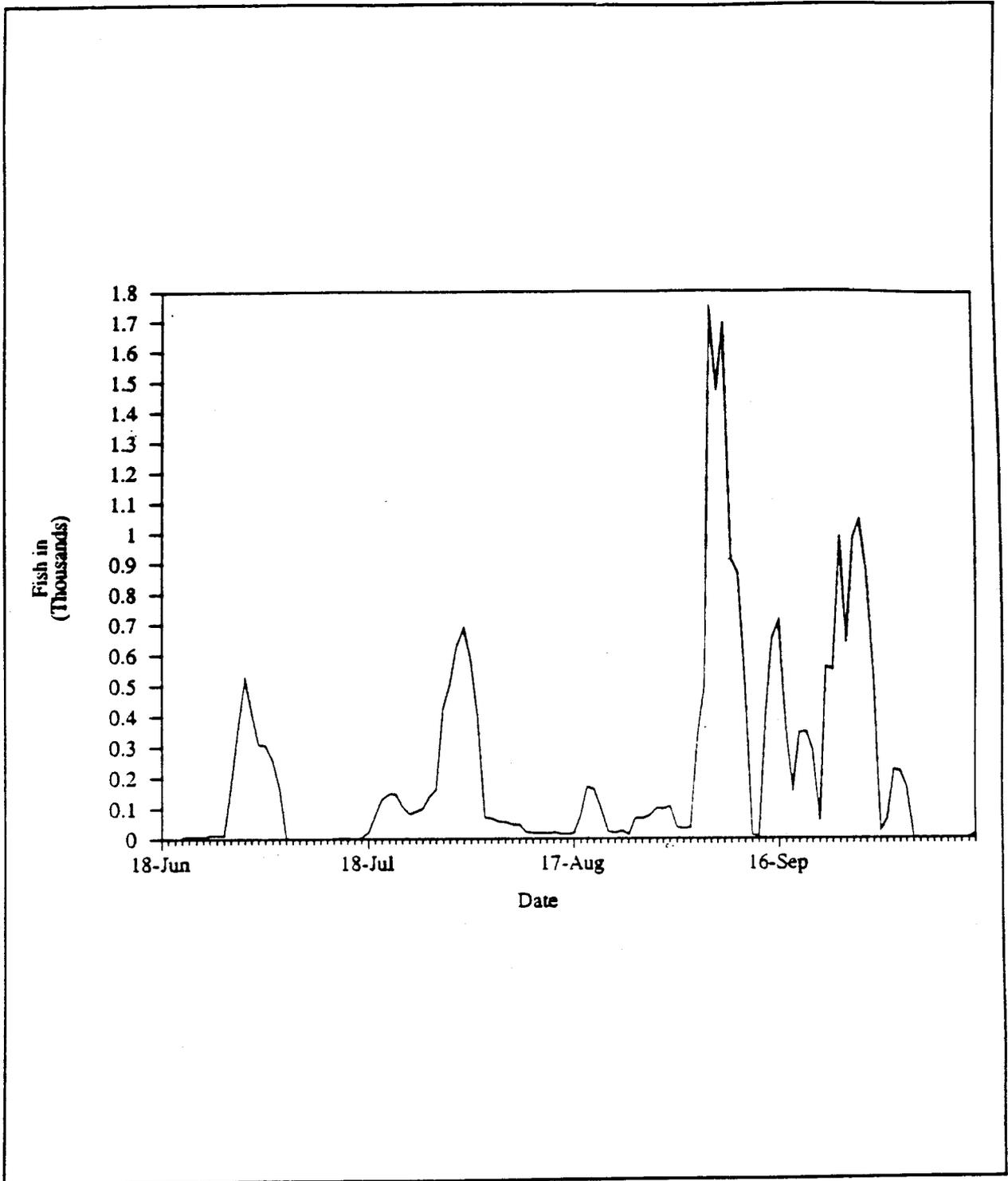


Figure 4. Chilkat Lake sockeye salmon escapement expressed as a moving 3-day average, 1988.

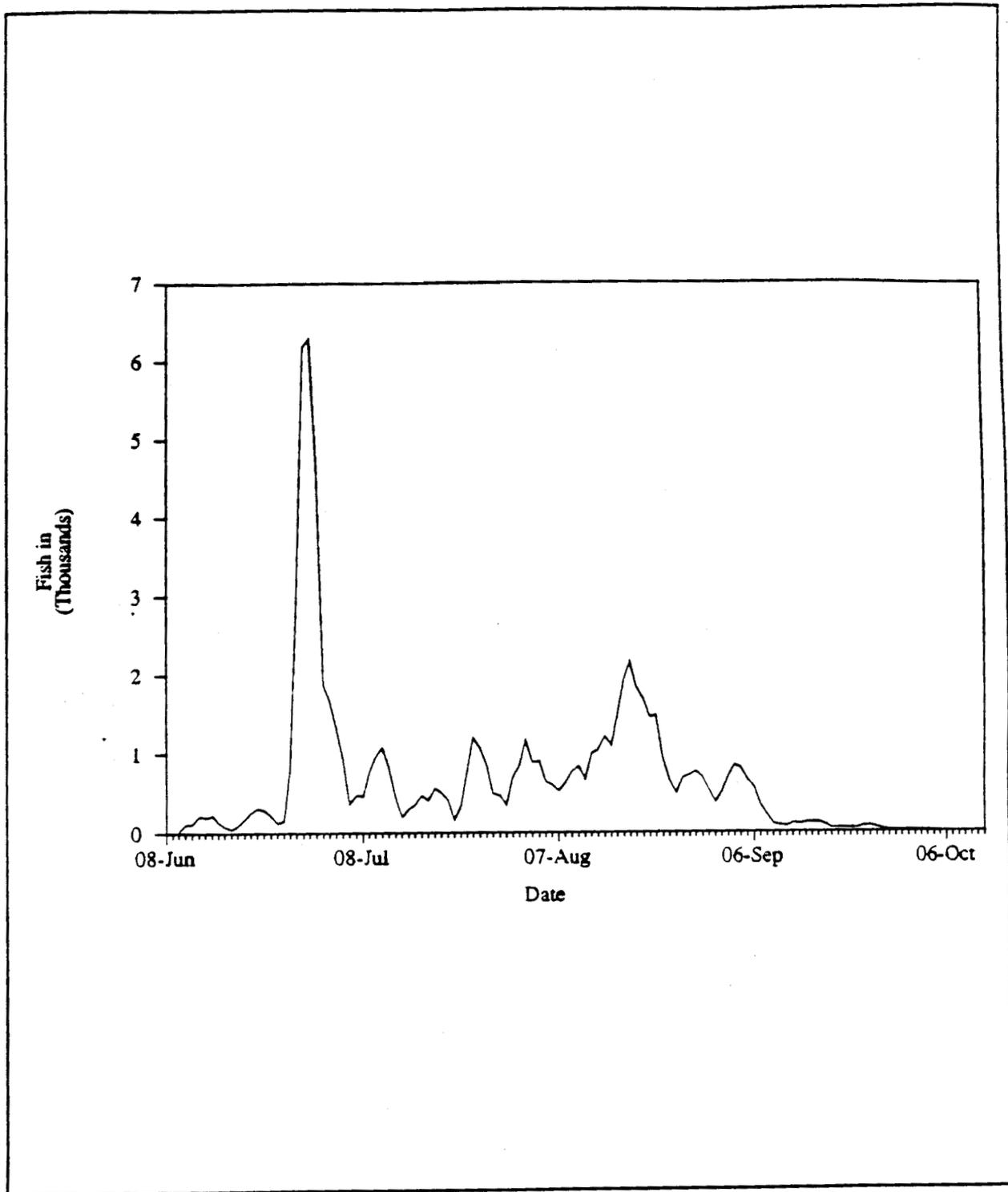


Figure 5. Chilkoote Lake sockeye salmon escapement expressed as a moving 3-day average, 1988.

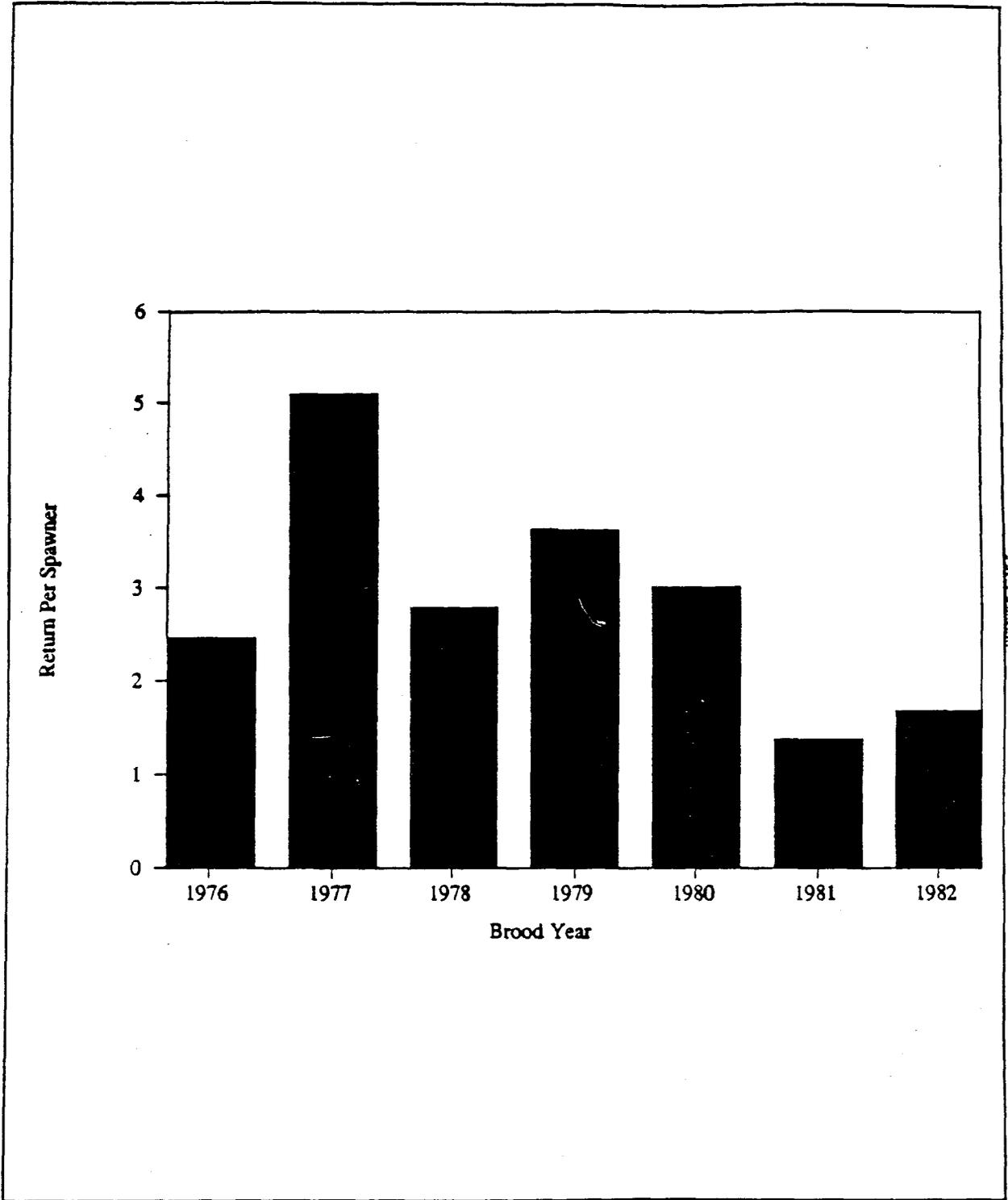


Figure 6. Returns per spawner for Chilkat Lake sockeye salmon from 1976-82 brood years.

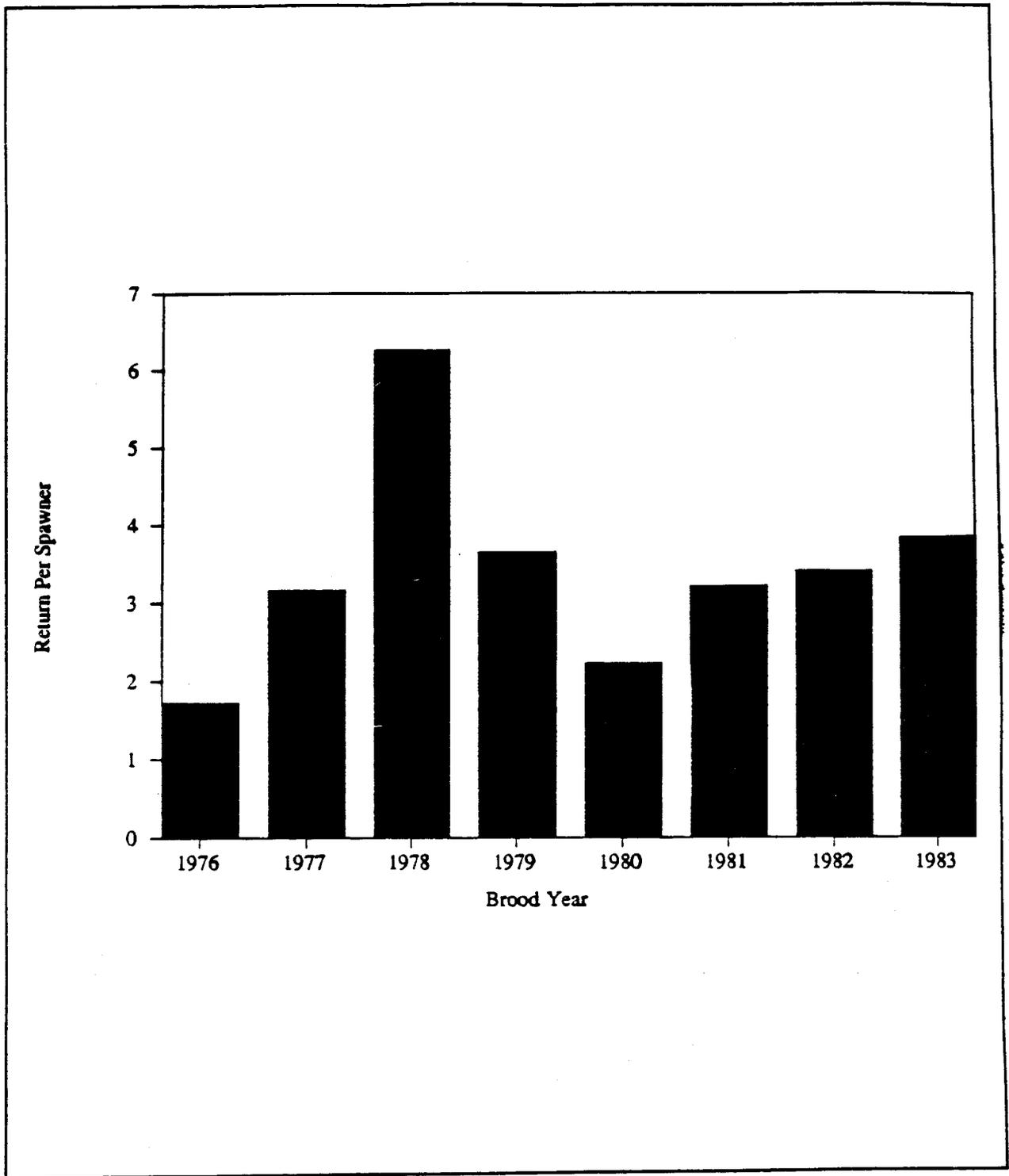


Figure 7. Returns per spawner for Chilkoot Lake sockeye salmon from 1976-83 brood years.

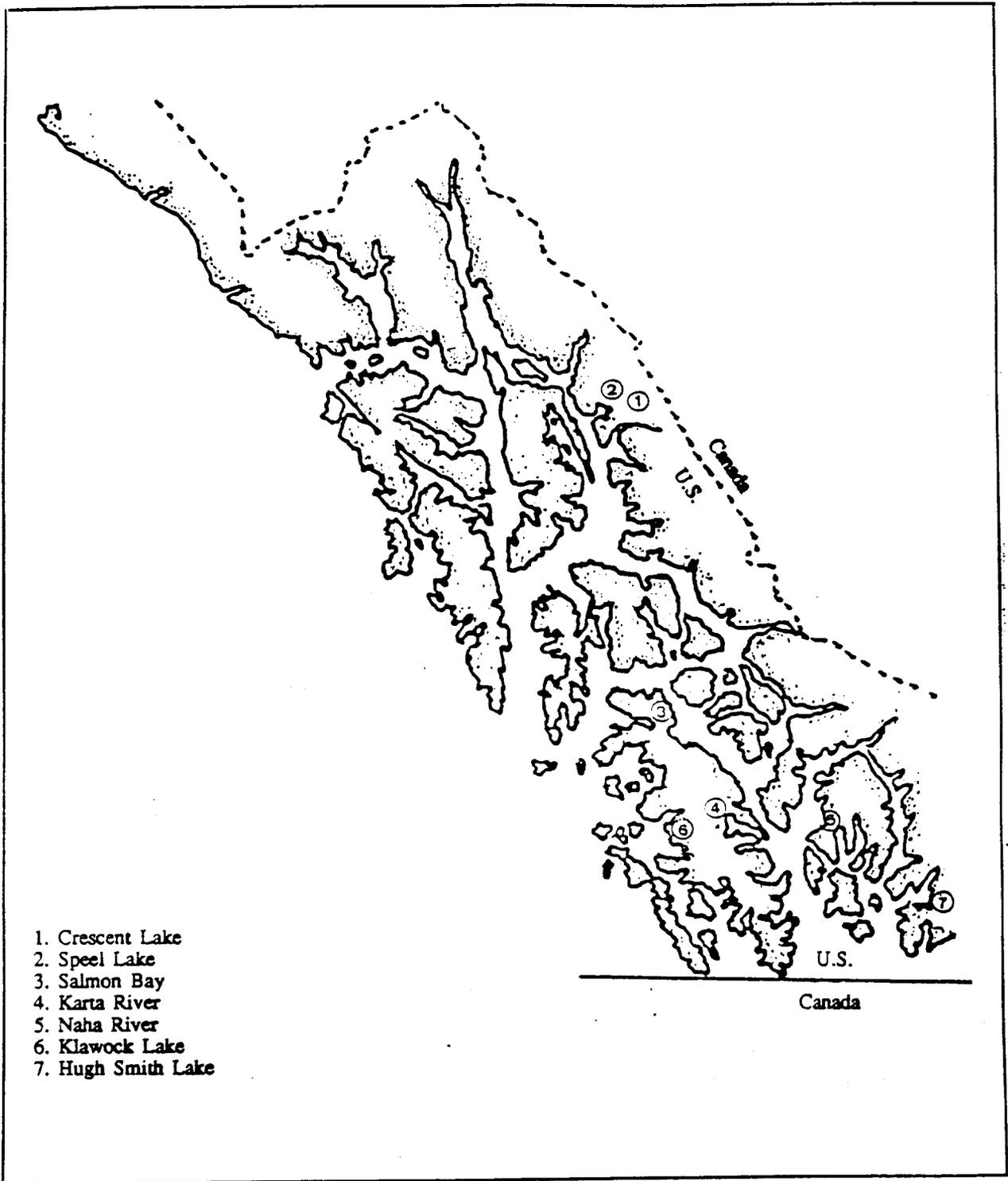


Figure 8. Southeast Alaska sockeye salmon weir sites funded by U.S./Canada Salmon Interception Treaty Funds.

APPENDICES

Appendix A.1. Annual salmon escapements through Chilkoot and Chilkat weirs, 1967-1988.

Year	Sockeye	Coho	Pink	Chum	Total	Period Operated
Chilkat						
1967	22,343				22,343	06/13-09/15
1968	41,256	168	4		41,428	06/07-09/13
1969	44,555				44,555	05/27-09/16
1970	41,085				41,085	05/29-09/17
1971	49,342	1,063			50,405	05/25-10/28
1972	51,860	518			52,378	06/03-10/12
1973	50,554	167			50,721	06/07-10/15
1974	84,237	161			84,398	05/30-10/12
1975	41,508	644			42,152	06/04-11/06
1976	69,984	204			70,188	06/03-09/27
1977	40,334				40,334	06/03-09/27
1978	69,498	390			69,888	06/05-11/05
1979	80,588	965			81,553	06/09-11/11
1980	85,066				85,066	06/05-11/05
1981	84,125	1,150			85,275	06/08-10/23
1982	78,986	157			79,143	06/24-10/06
1983	134,002	1,027			135,029	06/22-11/12
1984	115,051	691			115,742	06/09-10/11
1985	57,724	409	2		58,135	06/03-10/28
1986	23,952	635	4		24,591	06/18-11/14
1987	48,378	957	116		49,451	06/18-11/20
1988	27,566	1,307			28,873	06/18-14/11
Chilkoot						
1976	71,294	942		242	72,478	05/23-10/31
1977	97,217	1	5,368	165	102,751	05/28-09/12
1978	35,450	1,179		227	36,856	06/06-11/07
1979	95,948	899		253	97,100	06/05-11/06
1980	96,217	628		720	97,565	06/02-10/05
1981	85,072	1,479		269	86,820	06/04-10/12
1982	102,973	5		507	103,485	06/03-09/14
1983	80,087	1,740	11,227	501	93,555	06/04-11/13
1984	100,426	277	4,912	690	106,305	06/02-09/13
1985	69,026	2,184	32,743	1,019	104,972	06/02-10/28
1986	88,121	1,951	1,305	454	91,831	06/06-10/24
1987	95,185	548	6,689	430	102,852	06/04-11/01
1988	81,375	1,320	5,274	450	88,419	06/08-11/13

Appendix A.2. Returns per spawner to Chilkoot Lake sockeye salmon by brood year, 1976-84.

Brood Year	Brood Year Escapement	Return/Spawner	Total Return By Brood Year
1976	71,294	1.72	122,717
1977	97,217	3.16	307,213
1978	35,450	6.27	222,135
1979	95,948	3.65	350,471
1980	96,217	2.23	214,562
1981	85,072	3.22	273,567
1982	102,973	3.41	351,584
1983	80,087	3.84	307,812
1984	100,426	0.22 ^{a/}	21,973

^{a/} Returns incomplete: 5-year (1.3) fish scheduled for return in 1990.

Appendix A.3. Returns per spawner to Chilkat Lake sockeye salmon by brood year, 1976-84.

Brood Year	Brood Year Escapement	Return/Spawner	Total Return By Brood Year
1976	69,984	2.46	172,318
1977	40,334	5.10	205,663
1978	69,498	2.79	194,041
1979	80,588	3.64	293,171
1980	85,066	3.02	256,971
1981	84,125	1.38	116,306
1982	78,986	1.68	132,608
1983	134,002	0.37 ^{a/}	49,238
1984	115,051	0.03 ^{b/}	3,098

^{a/} Return incomplete; Age 6 (2.3) scheduled to return in 1989.

^{b/} Return incomplete; Age 5 and 6-year classes scheduled to return in 1989 and 1990.

Appendix A.4. Estimated mean production capacity for sockeye salmon fry, smolt, and adults based on the euphotic volume model developed by Koenings and Burkett (1987) and the over-wintering fry survival rates observed by Kyle (in press) for Chilkat and Chilkoot Lakes during 1987 and 1988.

Lake	Surface Area (Km ²)	Mean Euphotic zone depth (m)	Euphotic zone Volume m ² (millions)	Estimated fry Production Capacity		Estimated Smolt Production Capacity (millions)	Estimated Adult Production Capacity
				Spring (millions)	Fall (millions)		
Chilkat	9.8	17.5	171.8	18.67	5.60	3.95	428,750
Chilkoot	7.0	6.5	45.5	5.01	1.50	1.05	113,750

Appendix A.5. Summary of sockeye salmon escapements to seven spawning systems in Southeast Alaska, 1982-1988.

Year	Spawning System						
	Klawock	Hugh Smith	Karta	Naha	Salmon Bay	Speel	Crescent
1982	4,812	56,956	41,492		16,041		
1983	859	10,036	22,455	4,580	14,023	10,362	19,476
1984		16,191				9,764	6,807
1985		12,298	31,564		34,308	7,063	7,249
1986	14,697	2,312	5,929	10,612	8,967	5,860	3,405
1987	2,715	33,204	5,888	19,849	12,601	9,169	7,459
1988	3,426	4,960	3,151	1,340	22,210	938	1,199
1982-87 Average	5,771	21,833	21,466	11,680	17,188	8,444	8,879

Appendix A.6. Sockeye salmon escapement counts at McDonald Lake by visual counts of fish in the inlet stream and weir on the outlet stream, 1979-88.

Year	Escapement	Type
1979	30,900	Expanded Escapement Count
1980	77,344	Expanded Escapement Count
1981	129,653	Weir
1982	16,587	Weir
1983	56,142	Weir
1984	121,224	Weir
1985	103,555	Expanded Escapement Count
1986	98,134	Expanded Escapement Count
1987	170,000	Expanded Escapement Count
1988	70,335	Expanded Escapement Count

Appendix B.1. Daily sockeye salmon counts and associated statistics from the Chilkat Lake weir, 1988.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
June18	0	0	0.0000	0.0000
June19	0	0	0.0000	0.0000
June20	0	0	0.0000	0.0000
June21	0	0	0.0000	0.0000
June22	22	22	0.0008	0.0008
June23	0	22	0.0000	0.0008
June24	0	22	0.0000	0.0008
June25	24	46	0.0009	0.0017
June26	13	59	0.0005	0.0021
June27	0	59	0.0000	0.0021
June28	23	82	0.0008	0.0030
June29	493	575	0.0179	0.0200
June30	575	1,150	0.0209	0.0417
July 1	503	1,653	0.0182	0.0600
July 2	154	1,807	0.0056	0.0656
July 3	267	2,074	0.0097	0.0752
July 4	491	2,565	0.0178	0.0930
July 5	5	2,570	0.0002	0.0932
July 6	0	2,570	0.0000	0.0932
July 7	0	2,570	0.0000	0.0932
July 8	0	2,570	0.0000	0.0932
July 9	0	2,570	0.0000	0.0932
July10	0	2,570	0.0000	0.0932
July11	0	2,570	0.0000	0.0932
July12	0	2,570	0.0000	0.0932
July13	3	2,573	0.0001	0.0933
July14	2	2,575	0.0001	0.0934
July15	3	2,578	0.0001	0.0935
July16	0	2,578	0.0000	0.0935
July17	1	2,579	0.0000	0.0936
July18	18	2,597	0.0007	0.0942
July19	48	2,645	0.0017	0.0960
July20	169	2,814	0.0061	0.1021
July21	168	2,982	0.0061	0.1082
July22	105	3,087	0.0038	0.1120
July23	164	3,251	0.0059	0.1179
July24	50	3,301	0.0018	0.1197
July25	30	3,331	0.0011	0.1208
July26	193	3,524	0.0070	0.1278
July27	75	3,599	0.0027	0.1306

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Appendix B.1. (page 2 of 4.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
July28	153	3,752	0.0056	0.1361
July29	253	4,005	0.0092	0.1453
July30	881	4,886	0.0320	0.1772
July31	384	5,270	0.0139	0.1912
Aug. 1	623	5,893	0.0226	0.2138
Aug. 2	1,060	6,953	0.0385	0.2522
Aug. 3	58	7,011	0.0021	0.2543
Aug. 4	58	7,069	0.0021	0.2564
Aug. 5	90	7,159	0.0033	0.2597
Aug. 6	47	7,206	0.0017	0.2614
Aug. 7	29	7,235	0.0011	0.2625
Aug. 8	84	7,319	0.0030	0.2655
Aug. 9	28	7,347	0.0010	0.2665
Aug.10	24	7,371	0.0009	0.2674
Aug.11	11	7,382	0.0004	0.2678
Aug.12	19	7,401	0.0007	0.2685
Aug.13	27	7,428	0.0010	0.2695
Aug.14	7	7,435	0.0003	0.2697
Aug.15	28	7,463	0.0010	0.2707
Aug.16	11	7,474	0.0004	0.2711
Aug.17	8	7,482	0.0003	0.2714
Aug.18	38	7,520	0.0014	0.2728
Aug.19	189	7,709	0.0069	0.2797
Aug.20	282	7,991	0.0102	0.2899
Aug.21	10	8,001	0.0004	0.2902
Aug.22	11	8,012	0.0004	0.2906
Aug.23	45	8,057	0.0016	0.2923
Aug.24	0	8,057	0.0000	0.2923
Aug.25	31	8,088	0.0011	0.2934
Aug.26	8	8,096	0.0003	0.2937
Aug.27	165	8,261	0.0060	0.2997
Aug.28	20	8,281	0.0007	0.3004
Aug.29	42	8,323	0.0015	0.3019
Aug.30	234	8,557	0.0085	0.3104
Aug.31	15	8,572	0.0005	0.3110
Sept.1	67	8,639	0.0024	0.3134
Sept.2	24	8,663	0.0009	0.3143

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Appendix B.1. (page 3 of 4.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Sept.3	7	8,670	0.0003	0.3145
Sept.4	80	8,750	0.0029	0.3174
Sept.5	940	9,690	0.0341	0.3515
Sept.6	467	10,157	0.0169	0.3685
Sept.7	3,797	13,954	0.1377	0.5062
Sept.8	162	14,116	0.0059	0.5121
Sept.9	1,129	15,245	0.0410	0.5530
Sept10	1,459	16,704	0.0529	0.6060
Sept11	20	16,724	0.0007	0.6067
Sept12	11	16,735	0.0004	0.6071
Sept13	0	16,735	0.0000	0.6071
Sept14	9	16,744	0.0003	0.6074
Sept15	1,158	17,902	0.0420	0.6494
Sept16	808	18,710	0.0293	0.6787
Sept17	177	18,887	0.0064	0.6852
Sept18	91	18,978	0.0033	0.6885
Sept19	218	19,196	0.0079	0.6964
Sept20	732	19,928	0.0266	0.7229
Sept21	95	20,023	0.0034	0.7264
Sept22	43	20,066	0.0016	0.7279
Sept23	36	20,102	0.0013	0.7292
Sept24	1,609	21,711	0.0584	0.7876
Sept25	14	21,725	0.0005	0.7881
Sept26	1,343	23,068	0.0487	0.8368
Sept27	565	23,633	0.0205	0.8573
Sept28	1,050	24,683	0.0381	0.8954
Sept29	1,513	26,196	0.0549	0.9503
Sept30	54	26,250	0.0020	0.9523
Oct. 1	11	26,261	0.0004	0.9527
Oct. 2	15	26,276	0.0005	0.9532
Oct. 3	158	26,434	0.0057	0.9589
Oct. 4	497	26,931	0.0180	0.9770
Oct. 5	0	26,931	0.0000	0.9770
Oct. 6	0	26,931	0.0000	0.9770
Oct. 7	0	26,931	0.0000	0.9770
Oct. 8	0	26,931	0.0000	0.9770
Oct. 9	0	26,931	0.0000	0.9770
Oct.10	0	26,931	0.0000	0.9770

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Appendix B.1. (page 4 of 4.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Oct.11	0	26,931	0.0000	0.9770
Oct.12	0	26,931	0.0000	0.9770
Oct.13	0	26,931	0.0000	0.9770
Oct.14	0	26,931	0.0000	0.9770
Oct.15	12	26,943	0.0004	0.9774
Oct.16	36	26,979	0.0013	0.9787
Oct.17	22	27,001	0.0008	0.9795
Oct.18	25	27,026	0.0009	0.9804
Oct.19	3	27,029	0.0001	0.9805
Oct.20	12	27,041	0.0004	0.9810
Oct.21	34	27,075	0.0012	0.9822
Oct.22	36	27,111	0.0013	0.9835
Oct.23	34	27,145	0.0012	0.9847
Oct.24	26	27,171	0.0009	0.9857
Oct.25	22	27,193	0.0008	0.9865
Oct.26	31	27,224	0.0011	0.9876
Oct.27	8	27,232	0.0003	0.9879
Oct.28	31	27,263	0.0011	0.9890
Oct.29	57	27,320	0.0021	0.9911
Oct.30	38	27,358	0.0014	0.9925
Oct.31	49	27,407	0.0018	0.9942
Nov. 1	20	27,427	0.0007	0.9950
Nov. 2	36	27,463	0.0013	0.9963
Nov. 3	17	27,480	0.0006	0.9969
Nov. 4	3	27,483	0.0001	0.9970
Nov. 5	3	27,486	0.0001	0.9971
Nov. 6	9	27,495	0.0003	0.9974
Nov. 7	10	27,505	0.0004	0.9978
Nov. 8	15	27,520	0.0005	0.9983
Nov. 9	5	27,525	0.0002	0.9985
Nov.10	6	27,531	0.0002	0.9987
Nov.11	9	27,540	0.0003	0.9991
Nov.12	8	27,548	0.0003	0.9993
Nov.13	1	27,549	0.0000	0.9994
Nov.14	4	27,553	0.0001	0.9995
Nov.15	13	27,566	0.0005	1.0000

Mean Day of Migration = Sept. 1

Variance = 851.5 Days Squared

Appendix B.2. Daily sockeye salmon counts and associated statistics from the Chilkoot Lake weir, 1988.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
June 8	0	0	0.0000	0.0000
June 9	0	0	0.0000	0.0000
June10	0	0	0.0000	0.0000
June11	3	3	0.0000	0.0000
June12	50	53	0.0006	0.0007
June13	42	95	0.0005	0.0012
June14	252	347	0.0031	0.0043
June15	73	420	0.0009	0.0052
June16	337	757	0.0041	0.0093
June17	177	934	0.0022	0.0115
June18	160	1,094	0.0020	0.0135
June19	68	1,162	0.0008	0.0143
June20	15	1,177	0.0002	0.0145
June21	73	1,250	0.0009	0.0154
June22	218	1,468	0.0027	0.0181
June23	237	1,705	0.0029	0.0210
June24	334	2,039	0.0041	0.0251
June25	370	2,409	0.0046	0.0296
June26	153	2,562	0.0019	0.0315
June27	121	2,683	0.0015	0.0330
June28	112	2,795	0.0014	0.0344
June29	256	3,051	0.0031	0.0375
June30	2,117	5,168	0.0260	0.0636
July 1	6,446	11,614	0.0793	0.1429
July 2	10,000	21,614	0.1230	0.2659
July 3	2,402	24,016	0.0296	0.2955
July 4	1,513	25,529	0.0186	0.3141
July 5	1,689	27,218	0.0208	0.3349
July 6	1,814	29,032	0.0223	0.3572
July 7	493	29,525	0.0061	0.3633
July 8	478	30,003	0.0059	0.3692
July 9	131	30,134	0.0016	0.3708
July10	817	30,951	0.0101	0.3808
July11	450	31,401	0.0055	0.3864
July12	1,017	32,418	0.0125	0.3989
July13	1,409	33,827	0.0173	0.4162
July14	814	34,641	0.0100	0.4262
July15	257	34,898	0.0032	0.4294
July16	219	35,117	0.0027	0.4321
July17	113	35,230	0.0014	0.4335

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Appendix B.2. (page 2 of 4)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
July18	560	35,790	0.0069	0.4404
July19	378	36,168	0.0047	0.4450
July20	479	36,647	0.0059	0.4509
July21	355	37,002	0.0044	0.4553
July22	856	37,858	0.0105	0.4658
July23	286	38,144	0.0035	0.4693
July24	99	38,243	0.0012	0.4705
July25	101	38,344	0.0012	0.4718
July26	820	39,164	0.0101	0.4819
July27	1,422	40,586	0.0175	0.4994
July28	1,352	41,938	0.0166	0.5160
July29	427	42,365	0.0053	0.5213
July30	763	43,128	0.0094	0.5306
July31	280	43,408	0.0034	0.5341
Aug. 1	352	43,760	0.0043	0.5384
Aug. 2	402	44,162	0.0049	0.5434
Aug. 3	1,338	45,500	0.0165	0.5598
Aug. 4	804	46,304	0.0099	0.5697
Aug. 5	1,361	47,665	0.0167	0.5865
Aug. 6	493	48,158	0.0061	0.5925
Aug. 7	830	48,988	0.0102	0.6028
Aug. 8	596	49,584	0.0073	0.6101
Aug. 9	377	49,961	0.0046	0.6147
Aug. 10	595	50,556	0.0073	0.6220
Aug. 11	901	51,457	0.0111	0.6331
Aug. 12	820	52,277	0.0101	0.6432
Aug. 13	779	53,056	0.0096	0.6528
Aug. 14	397	53,453	0.0049	0.6577
Aug. 15	1,814	55,267	0.0223	0.6800
Aug. 16	915	56,182	0.0113	0.6913
Aug. 17	904	57,086	0.0111	0.7024
Aug. 18	1,475	58,561	0.0181	0.7205
Aug. 19	2,029	60,590	0.0250	0.7455
Aug. 20	2,280	62,870	0.0281	0.7736
Aug. 21	2,181	65,051	0.0268	0.8004
Aug. 22	1,067	66,118	0.0131	0.8135
Aug. 23	1,808	67,926	0.0222	0.8358

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Appendix B.2. (page 3 of 4)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug.24	1,509	69,435	0.0186	0.8543
Aug.25	1,120	70,555	0.0138	0.8681
Aug.26	131	70,686	0.0016	0.8697
Aug.27	702	71,388	0.0086	0.8784
Aug.28	628	72,016	0.0077	0.8861
Aug.29	752	72,768	0.0093	0.8953
Aug.30	806	73,574	0.0099	0.9053
Aug.31	760	74,334	0.0094	0.9146
Sept.1	514	74,848	0.0063	0.9209
Sept.2	344	75,192	0.0042	0.9252
Sept.3	251	75,443	0.0031	0.9283
Sept.4	907	76,350	0.0112	0.9394
Sept.5	962	77,312	0.0118	0.9513
Sept.6	665	77,977	0.0082	0.9594
Sept.7	809	78,786	0.0100	0.9694
Sept.8	502	79,288	0.0062	0.9756
Sept.9	380	79,668	0.0047	0.9802
Sept10	150	79,818	0.0018	0.9821
Sept11	92	79,910	0.0011	0.9832
Sept12	48	79,958	0.0006	0.9838
Sept13	99	80,057	0.0012	0.9850
Sept14	68	80,125	0.0008	0.9859
Sept15	160	80,285	0.0020	0.9878
Sept16	75	80,360	0.0009	0.9888
Sept17	118	80,478	0.0015	0.9902
Sept18	165	80,643	0.0020	0.9922
Sept19	74	80,717	0.0009	0.9931
Sept20	23	80,740	0.0003	0.9934
Sept21	30	80,770	0.0004	0.9938
Sept22	84	80,854	0.0010	0.9948
Sept23	26	80,880	0.0003	0.9952
Sept24	37	80,917	0.0005	0.9956
Sept25	93	81,010	0.0011	0.9968
Sept26	88	81,098	0.0011	0.9978
Sept27	37	81,135	0.0005	0.9983
Sept28	27	81,162	0.0003	0.9986
Sept29	16	81,178	0.0002	0.9988
Sept30	8	81,186	0.0001	0.9989

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Appendix B.2. (page 4 of 4)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Oct. 1	15	81,201	0.0002	0.9991
Oct. 2	9	81,210	0.0001	0.9992
Oct. 3	13	81,223	0.0002	0.9994
Oct. 4	15	81,238	0.0002	0.9996
Oct. 5	13	81,251	0.0002	0.9997
Oct. 6	15	81,266	0.0002	0.9999
Oct. 7	0	81,266	0.0000	0.9999
Oct. 8	0	81,266	0.0000	0.9999
Oct. 9	0	81,266	0.0000	0.9999
Oct.10	0	81,266	0.0000	0.9999
Oct.11	0	81,266	0.0000	0.9999
Oct.12	0	81,266	0.0000	0.9999
Oct.13	0	81,266	0.0000	0.9999
Oct.14	1	81,267	0.0000	0.9999
Oct.15	1	81,268	0.0000	0.9999
Oct.16	1	81,269	0.0000	0.9999
Oct.17	0	81,269	0.0000	0.9999
Oct.18	0	81,269	0.0000	0.9999
Oct.19	0	81,269	0.0000	0.9999
Oct.20	1	81,270	0.0000	1.0000
Oct.21	0	81,270	0.0000	1.0000
Oct.22	0	81,270	0.0000	1.0000
Oct.23	0	81,270	0.0000	1.0000
Oct.24	0	81,270	0.0000	1.0000
Oct.25	2	81,272	0.0000	1.0000
Oct.26	1	81,273	0.0000	1.0000
Oct.27	1	81,274	0.0000	1.0000
Oct.28	0	81,274	0.0000	1.0000
Oct.29	0	81,274	0.0000	1.0000
Oct.30	0	81,274	0.0000	1.0000
Oct.31	0	81,274	0.0000	1.0000
Nov. 1	0	81,274	0.0000	1.0000
Nov. 2	0	81,274	0.0000	1.0000
Nov. 3	0	81,274	0.0000	1.0000
Nov. 4	0	81,274	0.0000	1.0000
Nov. 5	0	81,274	0.0000	1.0000
Nov. 6	0	81,274	0.0000	1.0000
Nov. 7	0	81,274	0.0000	1.0000
Nov. 8	0	81,274	0.0000	1.0000
Nov. 9	0	81,274	0.0000	1.0000
Nov.10	0	81,274	0.0000	1.0000
Nov.11	0	81,274	0.0000	1.0000
Nov.12	0	81,274	0.0000	1.0000
Nov.13	0	81,274	0.0000	1.0000
Nov.14	0	81,274	0.0000	1.0000

Mean Day of Migration = July 28

Variance = 619.1 Days Squared

Appendix B.3. Daily sockeye salmon counts and associated statistics from the Speel Lake weir, 1988.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
July14	0	0	0.0000	0.0000
July15	0	0	0.0000	0.0000
July16	0	0	0.0000	0.0000
July17	0	0	0.0000	0.0000
July18	0	0	0.0000	0.0000
July19	0	0	0.0000	0.0000
July20	0	0	0.0000	0.0000
July21	0	0	0.0000	0.0000
July22	0	0	0.0000	0.0000
July23	0	0	0.0000	0.0000
July24	1	1	0.0011	0.0011
July25	0	1	0.0000	0.0011
July26	0	1	0.0000	0.0011
July27	0	1	0.0000	0.0011
July28	16	17	0.0171	0.0181
July29	16	33	0.0171	0.0352
July30	14	47	0.0149	0.0501
July31	9	56	0.0096	0.0597
Aug. 1	17	73	0.0181	0.0778
Aug. 2	3	76	0.0032	0.0810
Aug. 3	0	76	0.0000	0.0810
Aug. 4	1	77	0.0011	0.0821
Aug. 5	45	122	0.0480	0.1301
Aug. 6	12	134	0.0128	0.1429
Aug. 7	23	157	0.0245	0.1674
Aug. 8	21	178	0.0224	0.1898
Aug. 9	33	211	0.0352	0.2249
Aug.10	0	211	0.0000	0.2249
Aug.11	41	252	0.0437	0.2687
Aug.12	42	294	0.0448	0.3134
Aug.13	26	320	0.0277	0.3412
Aug.14	31	351	0.0330	0.3742
Aug.15	21	372	0.0224	0.3966
Aug.16	20	392	0.0213	0.4179
Aug.17	30	422	0.0320	0.4499
Aug.18	55	477	0.0586	0.5085
Aug.19	12	489	0.0128	0.5213
Aug.20	7	496	0.0075	0.5288
Aug.21	121	617	0.1290	0.6578
Aug.22	15	632	0.0160	0.6738
Aug.23	16	648	0.0171	0.6908

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Appendix B.3. (page 2 of 2.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug.24	69	717	0.0736	0.7644
Aug.25	34	751	0.0362	0.8006
Aug.26	11	762	0.0117	0.8124
Aug.27	66	828	0.0704	0.8827
Aug.28	29	857	0.0309	0.9136
Aug.29	18	875	0.0192	0.9328
Aug.30	29	904	0.0309	0.9638
Aug.31	34	938	0.0362	1.0000

Mean Day of Migration = Aug. 17

Variance = 81.2 Days Squared

Appendix B.4. Daily sockeye salmon counts and associated statistics from the Crescent Lake weir, 1988.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
July11	0	0	0.0000	0.0000
July12	0	0	0.0000	0.0000
July13	0	0	0.0000	0.0000
July14	5	5	0.0042	0.0042
July15	0	5	0.0000	0.0042
July16	22	27	0.0183	0.0225
July17	0	27	0.0000	0.0225
July18	19	46	0.0158	0.0384
July19	22	68	0.0183	0.0567
July20	14	82	0.0117	0.0684
July21	20	102	0.0167	0.0851
July22	21	123	0.0175	0.1026
July23	49	172	0.0409	0.1435
July24	2	174	0.0017	0.1451
July25	10	184	0.0083	0.1535
July26	36	220	0.0300	0.1835
July27	3	223	0.0025	0.1860
July28	0	223	0.0000	0.1860
July29	3	226	0.0025	0.1885
July30	26	252	0.0217	0.2102
July31	24	276	0.0200	0.2302
Aug. 1	16	292	0.0133	0.2435
Aug. 2	9	301	0.0075	0.2510
Aug. 3	0	301	0.0000	0.2510
Aug. 4	80	381	0.0667	0.3178
Aug. 5	25	406	0.0209	0.3386
Aug. 6	0	406	0.0000	0.3386
Aug. 7	13	419	0.0108	0.3495
Aug. 8	10	429	0.0083	0.3578
Aug. 9	48	477	0.0400	0.3978
Aug.10	25	502	0.0209	0.4187
Aug.11	49	551	0.0409	0.4595
Aug.12	0	551	0.0000	0.4595
Aug.13	23	574	0.0192	0.4787
Aug.14	22	596	0.0183	0.4971
Aug.15	11	607	0.0092	0.5063
Aug.16	56	663	0.0467	0.5530
Aug.17	63	726	0.0525	0.6055
Aug.18	37	763	0.0309	0.6364
Aug.19	17	780	0.0142	0.6505
Aug.20	31	811	0.0259	0.6764

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Appendix B.4. (page 2 of 2.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug.21	110	921	0.0917	0.7681
Aug.22	180	1,101	0.1501	0.9183
Aug.23	50	1,151	0.0417	0.9600
Aug.24	21	1,172	0.0175	0.9775
Aug.25	8	1,180	0.0067	0.9842
Aug.26	19	1,199	0.0158	1.0000
Aug.27	0	1,199	0.0000	1.0000
Aug.28	0	1,199	0.0000	1.0000

Mean Day of Migration = Aug. 11

Variance = 141.8 Days Squared

Appendix B.5. Daily sockeye salmon counts and associated statistics from the Salmon Bay weir, 1988.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
July 3	0	0	0.0000	0.0000
July 4	4	4	0.0002	0.0002
July 5	0	4	0.0000	0.0002
July 6	3	7	0.0001	0.0003
July 7	4	11	0.0002	0.0005
July 8	0	11	0.0000	0.0005
July 9	0	11	0.0000	0.0005
July10	0	11	0.0000	0.0005
July11	2	13	0.0001	0.0006
July12	0	13	0.0000	0.0006
July13	9	22	0.0004	0.0010
July14	128	150	0.0058	0.0068
July15	691	841	0.0311	0.0379
July16	168	1,009	0.0076	0.0454
July17	133	1,142	0.0060	0.0514
July18	57	1,199	0.0026	0.0540
July19	44	1,243	0.0020	0.0560
July20	35	1,278	0.0016	0.0575
July21	0	1,278	0.0000	0.0575
July22	122	1,400	0.0055	0.0630
July23	4	1,404	0.0002	0.0632
July24	2,381	3,785	0.1072	0.1704
July25	2,160	5,945	0.0973	0.2677
July26	412	6,357	0.0186	0.2862
July27	414	6,771	0.0186	0.3049
July28	454	7,225	0.0204	0.3253
July29	1,673	8,898	0.0753	0.4006
July30	150	9,048	0.0068	0.4074
July31	226	9,274	0.0102	0.4176
Aug. 1	642	9,916	0.0289	0.4465
Aug. 2	240	10,156	0.0108	0.4573
Aug. 3	190	10,346	0.0086	0.4658
Aug. 4	90	10,436	0.0041	0.4699
Aug. 5	83	10,519	0.0037	0.4736
Aug. 6	1,762	12,281	0.0793	0.5529
Aug. 7	1,506	13,787	0.0678	0.6208
Aug. 8	4,090	17,877	0.1842	0.8049
Aug. 9	161	18,038	0.0072	0.8122
Aug.10	79	18,117	0.0036	0.8157
Aug.11	41	18,158	0.0018	0.8176
Aug.12	842	19,000	0.0379	0.8555

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Appendix B.5. (page 2 of 2.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug.13	108	19,108	0.0049	0.8603
Aug.14	15	19,123	0.0007	0.8610
Aug.15	20	19,143	0.0009	0.8619
Aug.16	24	19,167	0.0011	0.8630
Aug.17	53	19,220	0.0024	0.8654
Aug.18	30	19,250	0.0014	0.8667
Aug.19	71	19,321	0.0032	0.8699
Aug.20	70	19,391	0.0032	0.8731
Aug.21	6	19,397	0.0003	0.8733
Aug.22	6	19,403	0.0003	0.8736
Aug.23	6	19,409	0.0003	0.8739
Aug.24	10	19,419	0.0005	0.8743
Aug.25	143	19,562	0.0064	0.8808
Aug.26	16	19,578	0.0007	0.8815
Aug.27	86	19,664	0.0039	0.8854
Aug.28	1,780	21,444	0.0801	0.9655
Aug.29	247	21,691	0.0111	0.9766
Aug.30	13	21,704	0.0006	0.9772
Aug.31	119	21,823	0.0054	0.9826
Sept.1	1	21,824	0.0000	0.9826
Sept.2	211	22,035	0.0095	0.9921
Sept.3	32	22,067	0.0014	0.9936
Sept.4	33	22,100	0.0015	0.9950
Sept.5	26	22,126	0.0012	0.9962
Sept.6	15	22,141	0.0007	0.9969
Sept.7	5	22,146	0.0002	0.9971
Sept.8	6	22,152	0.0003	0.9974
Sept.9	9	22,161	0.0004	0.9978
Sept10	3	22,164	0.0001	0.9979
Sept11	0	22,164	0.0000	0.9979
Sept12	46	22,210	0.0021	1.0000
Sept13	0	22,210	0.0000	1.0000
Sept14	0	22,210	0.0000	1.0000

Mean Day of Migration = Aug. 4

Variance = 142.3 Days Squared

Appendix B.6. Daily sockeye salmon counts and associated statistics from the Karta River weir, 1988.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
June25	9	9	0.0029	0.0029
June26	255	264	0.0810	0.0838
June27	81	345	0.0257	0.1095
June28	993	1,338	0.3152	0.4248
June29	6	1,344	0.0019	0.4267
June30	55	1,399	0.0175	0.4441
July 1	20	1,419	0.0063	0.4505
July 2	17	1,436	0.0054	0.4559
July 3	13	1,449	0.0041	0.4600
July 4	4	1,453	0.0013	0.4613
July 5	6	1,459	0.0019	0.4632
July 6	5	1,464	0.0016	0.4648
July 7	3	1,467	0.0010	0.4657
July 8	2	1,469	0.0006	0.4663
July 9	3	1,472	0.0010	0.4673
July10	5	1,477	0.0016	0.4689
July11	5	1,482	0.0016	0.4705
July12	4	1,486	0.0013	0.4717
July13	20	1,506	0.0063	0.4781
July14	6	1,512	0.0019	0.4800
July15	9	1,521	0.0029	0.4829
July16	5	1,526	0.0016	0.4844
July17	59	1,585	0.0187	0.5032
July18	54	1,639	0.0171	0.5203
July19	59	1,698	0.0187	0.5390
July20	52	1,750	0.0165	0.5556
July21	119	1,869	0.0378	0.5933
July22	101	1,970	0.0321	0.6254
July23	31	2,001	0.0098	0.6352
July24	240	2,241	0.0762	0.7114
July25	92	2,333	0.0292	0.7406
July26	69	2,402	0.0219	0.7625
July27	106	2,508	0.0337	0.7962
July28	76	2,584	0.0241	0.8203
July29	80	2,664	0.0254	0.8457
July30	28	2,692	0.0089	0.8546
July31	26	2,718	0.0083	0.8629
Aug. 1	13	2,731	0.0041	0.8670
Aug. 2	7	2,738	0.0022	0.8692
Aug. 3	3	2,741	0.0010	0.8702
Aug. 4	6	2,747	0.0019	0.8721

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Appendix B.6. (page 2 of 2.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug. 5	2	2,749	0.0006	0.8727
Aug. 6	4	2,753	0.0013	0.8740
Aug. 7	2	2,755	0.0006	0.8746
Aug. 8	4	2,759	0.0013	0.8759
Aug. 9	4	2,763	0.0013	0.8771
Aug. 10	7	2,770	0.0022	0.8794
Aug. 11	8	2,778	0.0025	0.8819
Aug. 12	49	2,827	0.0156	0.8975
Aug. 13	42	2,869	0.0133	0.9108
Aug. 14	20	2,889	0.0063	0.9171
Aug. 15	19	2,908	0.0060	0.9232
Aug. 16	44	2,952	0.0140	0.9371
Aug. 17	45	2,997	0.0143	0.9514
Aug. 18	11	3,008	0.0035	0.9549
Aug. 19	4	3,012	0.0013	0.9562
Aug. 20	3	3,015	0.0010	0.9571
Aug. 21	13	3,028	0.0041	0.9613
Aug. 22	9	3,037	0.0029	0.9641
Aug. 23	52	3,089	0.0165	0.9806
Aug. 24	61	3,150	0.0194	1.0000

Mean Day of Migration = July 15

Variance = 318.5 Days Squared

Appendix B.7. Daily sockeye salmon counts and associated statistics from the Hugh Smith Lake weir, 1988.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
June 5	0	0	0.0000	0.0000
June 6	0	0	0.0000	0.0000
June 7	0	0	0.0000	0.0000
June 8	0	0	0.0000	0.0000
June 9	0	0	0.0000	0.0000
June10	0	0	0.0000	0.0000
June11	0	0	0.0000	0.0000
June12	1	1	0.0002	0.0002
June13	0	1	0.0000	0.0002
June14	2	3	0.0004	0.0006
June15	0	3	0.0000	0.0006
June16	0	3	0.0000	0.0006
June17	0	3	0.0000	0.0006
June18	4	7	0.0008	0.0014
June19	8	15	0.0016	0.0030
June20	14	29	0.0028	0.0058
June21	15	44	0.0030	0.0089
June22	15	59	0.0030	0.0119
June23	25	84	0.0050	0.0169
June24	20	104	0.0040	0.0210
June25	30	134	0.0060	0.0270
June26	25	159	0.0050	0.0321
June27	27	186	0.0054	0.0375
June28	65	251	0.0131	0.0506
June29	92	343	0.0185	0.0692
June30	40	383	0.0081	0.0772
July 1	36	419	0.0073	0.0845
July 2	28	447	0.0056	0.0901
July 3	2	449	0.0004	0.0905
July 4	11	460	0.0022	0.0927
July 5	0	460	0.0000	0.0927
July 6	0	460	0.0000	0.0927
July 7	0	460	0.0000	0.0927
July 8	0	460	0.0000	0.0927
July 9	10	470	0.0020	0.0948
July10	0	470	0.0000	0.0948
July11	0	470	0.0000	0.0948
July12	0	470	0.0000	0.0948
July13	0	470	0.0000	0.0948
July14	0	470	0.0000	0.0948

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Appendix B.7. (page 2 of 3.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
July15	4	474	0.0008	0.0956
July16	0	474	0.0000	0.0956
July17	0	474	0.0000	0.0956
July18	0	474	0.0000	0.0956
July19	47	521	0.0095	0.1050
July20	89	610	0.0179	0.1230
July21	156	766	0.0315	0.1544
July22	150	916	0.0302	0.1847
July23	175	1,091	0.0353	0.2200
July24	248	1,339	0.0500	0.2700
July25	29	1,368	0.0058	0.2758
July26	12	1,380	0.0024	0.2782
July27	19	1,399	0.0038	0.2821
July28	13	1,412	0.0026	0.2847
July29	36	1,448	0.0073	0.2919
July30	10	1,458	0.0020	0.2940
July31	15	1,473	0.0030	0.2970
Aug. 1	11	1,484	0.0022	0.2992
Aug. 2	24	1,508	0.0048	0.3040
Aug. 3	17	1,525	0.0034	0.3075
Aug. 4	26	1,551	0.0052	0.3127
Aug. 5	27	1,578	0.0054	0.3181
Aug. 6	18	1,596	0.0036	0.3218
Aug. 7	120	1,716	0.0242	0.3460
Aug. 8	387	2,103	0.0780	0.4240
Aug. 9	461	2,564	0.0929	0.5169
Aug.10	92	2,656	0.0185	0.5355
Aug.11	80	2,736	0.0161	0.5516
Aug.12	40	2,776	0.0081	0.5597
Aug.13	97	2,873	0.0196	0.5792
Aug.14	81	2,954	0.0163	0.5956
Aug.15	23	2,977	0.0046	0.6002
Aug.16	26	3,003	0.0052	0.6054
Aug.17	37	3,040	0.0075	0.6129
Aug.18	61	3,101	0.0123	0.6252
Aug.19	104	3,205	0.0210	0.6462
Aug.20	149	3,354	0.0300	0.6762
Aug.21	185	3,539	0.0373	0.7135
Aug.22	99	3,638	0.0200	0.7335
Aug.23	65	3,703	0.0131	0.7466
Aug.24	50	3,753	0.0101	0.7567

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Appendix B.7. (page 3 of 3.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug.25	95	3,848	0.0192	0.7758
Aug.26	88	3,936	0.0177	0.7935
Aug.27	88	4,024	0.0177	0.8113
Aug.28	32	4,056	0.0065	0.8177
Aug.29	430	4,486	0.0867	0.9044
Aug.30	9	4,495	0.0018	0.9062
Aug.31	0	4,495	0.0000	0.9062
Sept.1	16	4,511	0.0032	0.9095
Sept.2	87	4,598	0.0175	0.9270
Sept.3	10	4,608	0.0020	0.9290
Sept.4	10	4,618	0.0020	0.9310
Sept.5	14	4,632	0.0028	0.9339
Sept.6	27	4,659	0.0054	0.9393
Sept.7	13	4,672	0.0026	0.9419
Sept.8	20	4,692	0.0040	0.9460
Sept.9	35	4,727	0.0071	0.9530
Sept10	23	4,750	0.0046	0.9577
Sept11	3	4,753	0.0006	0.9583
Sept12	121	4,874	0.0244	0.9827
Sept13	46	4,920	0.0093	0.9919
Sept14	11	4,931	0.0022	0.9942
Sept15	2	4,933	0.0004	0.9946
Sept16	8	4,941	0.0016	0.9962
Sept17	2	4,943	0.0004	0.9966
Sept18	0	4,943	0.0000	0.9966
Sept19	0	4,943	0.0000	0.9966
Sept20	3	4,946	0.0006	0.9972
Sept21	0	4,946	0.0000	0.9972
Sept22	0	4,946	0.0000	0.9972
Sept23	0	4,946	0.0000	0.9972
Sept24	1	4,947	0.0002	0.9974
Sept25	0	4,947	0.0000	0.9974
Sept26	3	4,950	0.0006	0.9980
Sept27	7	4,957	0.0014	0.9994
Sept28	0	4,957	0.0000	0.9994
Sept29	0	4,957	0.0000	0.9994
Sept30	0	4,957	0.0000	0.9994
Oct. 1	0	4,957	0.0000	0.9994
Oct. 2	0	4,957	0.0000	0.9994
Oct. 3	0	4,957	0.0000	0.9994
Oct. 4	3	4,960	0.0006	1.0000

Mean Day of Migration = Aug. 9

Variance = 402.7 Days Squared

Appendix B.8. Daily sockeye salmon counts and associated statistics from the Klawock Lake weir, 1988.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug.11	26	26	0.0076	0.0076
Aug.12	0	26	0.0000	0.0076
Aug.13	0	26	0.0000	0.0076
Aug.14	0	26	0.0000	0.0076
Aug.15	0	26	0.0000	0.0076
Aug.16	0	26	0.0000	0.0076
Aug.17	0	26	0.0000	0.0076
Aug.18	0	26	0.0000	0.0076
Aug.19	0	26	0.0000	0.0076
Aug.20	0	26	0.0000	0.0076
Aug.21	0	26	0.0000	0.0076
Aug.22	0	26	0.0000	0.0076
Aug.23	0	26	0.0000	0.0076
Aug.24	0	26	0.0000	0.0076
Aug.25	0	26	0.0000	0.0076
Aug.26	0	26	0.0000	0.0076
Aug.27	0	26	0.0000	0.0076
Aug.28	0	26	0.0000	0.0076
Aug.29	0	26	0.0000	0.0076
Aug.30	375	401	0.1095	0.1170
Aug.31	8	409	0.0023	0.1194
Sept.1	209	618	0.0610	0.1804
Sept.2	259	877	0.0756	0.2560
Sept.3	0	877	0.0000	0.2560
Sept.4	0	877	0.0000	0.2560
Sept.5	0	877	0.0000	0.2560
Sept.6	239	1,116	0.0698	0.3257
Sept.7	0	1,116	0.0000	0.3257
Sept.8	371	1,487	0.1083	0.4340
Sept.9	270	1,757	0.0788	0.5128
Sept10	354	2,111	0.1033	0.6162
Sept11	399	2,510	0.1165	0.7326
Sept12	349	2,859	0.1019	0.8345
Sept13	67	2,926	0.0196	0.8541
Sept14	2,971 45	0.0131	0.8672	
Sept15	37	3,008	0.0108	0.8780
Sept16	65	3,073	0.0190	0.8970
Sept17	0	3,073	0.0000	0.8970
Sept18	28	3,101	0.0082	0.9051
Sept19	0	3,101	0.0000	0.9051
Sept20	31	3,132	0.0090	0.9142

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Appendix B.8. (page 2 of 2.)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Sept21	0	3,132	0.0000	0.9142
Sept22	175	3,307	0.0511	0.9653
Sept23	40	3,347	0.0117	0.9769
Sept24	0	3,347	0.0000	0.9769
Sept25	0	3,347	0.0000	0.9769
Sept26	0	3,347	0.0000	0.9769
Sept27	8	3,355	0.0023	0.9793
Sept28	0	3,355	0.0000	0.9793
Sept29	48	3,403	0.0140	0.9933
Sept30	0	3,403	0.0000	0.9933
Oct. 1	0	3,403	0.0000	0.9933
Oct. 2	0	3,403	0.0000	0.9933
Oct. 3	12	3,415	0.0035	0.9968
Oct. 4	0	3,415	0.0000	0.9968
Oct. 5	0	3,415	0.0000	0.9968
Oct. 6	0	3,415	0.0000	0.9968
Oct. 7	0	3,415	0.0000	0.9968
Oct. 8	0	3,415	0.0000	0.9968
Oct. 9	0	3,415	0.0000	0.9968
Oct.10	0	3,415	0.0000	0.9968
Oct.11	0	3,415	0.0000	0.9968
Oct.12	11	3,426	0.0032	1.0000
Oct.13	0	3,426	0.0000	1.0000

Mean Day of Migration = Sept. 9

Variance = 53.8 Days Squared

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