An Estimate of the Number of Spiridon Lake Sockeye Salmon Commercially Harvested Within the Northwest Kodiak and Southwest Kodiak Districts, 1994

By
Patricia A. Nelson
and
Bruce M. Barrett

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ACKNOWLEDGEMENTS

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INTRODUCTION

Spiridon Lake, located in the Central Section of the Northwest (NW) Kodiak District, is the third largest lake (9.6 km long, 1.6 km maximum width) on Kodiak Island (Figures 1 and 2). Historically, Spiridon Lake has been void of anadromous fish due to a series of barrier falls preventing access to the lake outlet (Kyle et al. 1990). In 1990, sockeye salmon *Oncorhynchus nerka* eggs for brood stock were secured from the Upper Station late run and reared to fry at the Kodiak Regional Aquaculture Association (KRAA) Pillar Creek Hatchery. Introduction of fry to Spiridon Lake and construction of a barrier falls bypass system began in 1991 (Steve Honnold, Alaska Department of Fish and Game, personal communication). The first major smolt outmigration occurred in 1992 with an estimated 1.38 million age-1. smolt exiting Spiridon Lake. From this outmigration, a run of 100-150 thousand age-1.2 adult sockeye salmon was anticipated in 1994 (Lorne White, Alaska Department of Fish and Game, personal communication). The Kodiak westside timing of this run was projected to be from mid-July through mid-September, overlapping the timing of local pink and late-run Karluk sockeye stocks (Barrett and Nelson 1994).

In accordance with the State Board of Fisheries (BOF) adopted management plan, the Spiridon Lake sockeye run is intended to be harvested in traditional commercial fishing areas of the NW Kodiak District during openings directed on local stocks (ADF&G 1993). The remainder is to be taken in an exclusive purse seine and beach seine special harvest area in the vicinity of Telrod Cove within Spiridon Bay (Figure 3).

Because multiple sockeye stocks migrate along Kodiak's westside, stock separation is required to quantify the Spiridon Lake sockeye component of the catch. In this report we will estimate the number of Spiridon Lake sockeye salmon commercially harvested within the NW Kodiak and Southwest (SW) Kodiak Districts in 1994 using the unique freshwater scale pattern of these fish (Figures 2 and 4; Appendix A.1-11).

METHODS

Stock Selection and Standards

Scale pattern standards for the 1994 Spiridon Lake run of age-1.2 fish were obtained from 196 age-1.1 fish collected at Telrod Cove on 3 September 1993. Age-1.2 scale pattern standards for other Kodiak stocks were obtained from escapements sampled weekly at weir sites during 1994 (ADF&G 1994). The local stocks considered were those having a 1994 age-1.2 run component (Appendix B.1-5) and a west side Kodiak run potential of not less than 50,000 fish for July and August combined (Barrett and Nelson 1994). Kodiak stocks meeting these criteria included Karluk late run, Ayakulik, Frazer, and Upper Station late run.

Non-local stocks consisting of Chignik late run and Upper Cook Inlet sockeye salmon were considered as potential contributors to the post 15 July westside Kodiak catch based on previous stock evaluation work (Barrett and Swanton 1991).

Upper Cook Inlet stocks having an age-1.2 component of greater than 20% and a potential Kodiak westside run timing occurring between late July and mid September were considered. The stock meeting this criteria was Yentna River (Jeff Fox, Alaska Department of Fish and Game, personal communication).

The Chignik age-1.2 stock standards were obtained from Chignik Lagoon catch samples collected from 17 July through 24 August, 1994.

Commercial Catch Sampling

During July and August, the commercial sockeye harvest from the following seven areas were sampled weekly for age with a targeted sample size of 600 fish per area:

Northwest Kodiak District

Central Section
Uyak Bay (254-10 through 254-40)
Uganik Bay (253-11 through 253-35)

Southwest Kodiak District

Inner and Outer Karluk Sections
Halibut Bay Section
Sturgeon Section
Inner and Outer Ayakulik Sections

Additional catch sampling occurred in the Spiridon Bay Special Harvest Area (SBSHA; Figure 3) from 1 August through 5 September with a targeted sample size of 240 fish, biweekly.

Scale Collection and Age Designation

Methods utilized for collection and preparation of scales along with age designation rules (European notation) followed Koo (1962). Ages were assigned using a microfiche reader (48x).

Stock Identification

Age-1.2 fish from all selected local and non-local stocks were evaluated visually for freshwater scale pattern growth characteristics including number of circuli, distance between circuli, and total size of freshwater growth. Photographs were taken of each stock to be used as standards (Appendix A.1-11).

All age-1.2 scales identified in Kodiak commercial catch samples were classified as either Spiridon or non-Spiridon based on visual scale pattern evaluation and comparison with photograph standards.

A test of the visual identification procedure was conducted using the Biosonics optical pattern recognition system (OPRS)[1]. The Spiridon scale pattern standard was determined by measuring 100 age 1.1 scales (210x) collected at Telrod Cove in 1993. Scale measurements included number of freshwater circuli and total distance from the center of the focus to the last circulus (Swanton and Murphy 1992). Similarly, the first 60 (30 each) age-1.2 scales visually classified as Spiridon origin fish in the Uyak Bay and Uganik Bay catch samples were measured. The Hotellings T^2 test (α=0.05; Dillon and Goldstein 1984) was used to determine whether there was a significant difference between those fish known to be of Spiridon origin and those visually classified as Spiridon fish in the Uyak and Uganik Bays catch samples.

Catch Assignment

Catch numbers by area were obtained from the Alaska Department of Fish and Game (ADF&G) fish ticket database on 7 October, 1994. The number of Spiridon fish caught by area within the NW Kodiak and SW Kodiak Districts was estimated using four methods:

1. When a sample was collected during a particular week from Uyak Bay (statistical areas 254-10 through 254-40), Uganik Bay (statistical areas 253-11 through 253-35), Inner and Outer Karluk Sections combined, Halibut Bay Section, or Inner and Outer Ayakulik Sections combined the following formula was used:

$$\hat{n}sp = \hat{P}kn * C$$

where:
nsp = Estimated number of Spiridon fish in the weekly catch
Pkn = Percent of Spiridon fish identified in the weekly catch sample
C = Commercial catch (number of fish)

2. When a weekly sample was collected from Uyak or Uganik Bays that was contaminated with fish from the terminal fishery, the formula used was:

$$\hat{P}uk = \frac{(Pkn(nt+nnt) - (nt*Psp))}{nnt}$$

where:
Puk = Estimated percent Spiridon in mixed stock fishery
Pkn = Percent Spiridon fish identified in the contaminated mixed stock fishery sample
nt = Number of fish from terminal area mixed with tender delivery
nnt = Number of non-terminal fish in tender delivery
Psp = Estimated percent of Spiridon fish in the terminal fishery sample

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[1] Reference to equipment tradenames does not imply endorsement by the Alaska Department of Fish and Game.

3. When a weekly sample was not available in the NW Kodiak District during a fishery, an average of adjacent weekly samples were used.

4. The Spiridon component of the SBSHA sockeye catch was determined by assigning all estimated age-1.2 and 2.1 fish in the catch, as determined from weekly catch sampling to Spiridon. All fish with age designations other than 1.2 and 2.1 were assumed to be of non-Spiridon origin.

RESULTS

The scale pattern of Spiridon Lake sockeye salmon was consistent and easily distinguishable from other selected stocks (Appendix A.1-11). Circuli counts and total freshwater distance measurements from known Spiridon fish and those visually identified from both Uyak and Uganik Bays were not significantly different ($P = 0.079$ and $P = 0.602$, respectively).

Estimated Spiridon Sockeye Catch and Timing

In 1994, a total of 622,658 sockeye salmon were harvested in the NW Kodiak District from 5 July through 5 September (Table 1). An estimated 42% (261,678 fish) were of Spiridon Lake origin (Figure 5). Most (44.2%) of the Spiridon fish were harvested in the SBSHA, followed by Uyak Bay (29.7%) and Uganik Bay (26.1%; Figure 6).

In Uganik and Uyak Bays, the peak catch of Spiridon sockeye salmon occurred during the last week in August (8/23-29) while in the SBSHA, the second week of August (8/9-15; Figure 7).

Within the SBSHA, the sockeye harvest consisted primarily of Spiridon Lake sockeye salmon. Non-Spiridon sockeye salmon represented less than 1% of the entire catch based on catch samples taken during the 2 August through 5 September period (Table 1).

The SW Kodiak District catch was not sampled frequently enough to determine the total contribution of the Spiridon stock to the 5 July through 5 September catch. However based on limited samples from the Inner and Outer Karluk, and Halibut Bay Sections, Spiridon sockeye salmon were present but were not dominant; the estimated highest Spiridon sockeye component in the Halibut Bay Section was 16.1% during early August (8/2-8; Table 1). In the Inner and Outer Ayakulik Sections of the SW Kodiak District, Spiridon sockeye salmon were estimated to be absent from the catch during late July (7/19-8/1) which was the only period sampled.

Of the total SW Kodiak District sockeye catch of 169,469 fish during the 5 July through 5 September period, 2,072 fish were estimated to be of Spiridon origin (Table 1). However, this does not represent the total catch of Spiridon fish as not all weeks and SW District catch areas were sampled.

For the NW Kodiak and SW Kodiak Districts combined, an estimated 263,750 Spiridon origin sockeye salmon were harvested during the period of 5 July through 5 September (Table 1). As

expected, most (99%) of the assigned catch occurred in the NW Kodiak District (Figure 8). The relatively weak showing of Spiridon fish in the SW Kodiak District catch indicates that Spiridon bound sockeye salmon migrate into Uyak Bay primarily from the north. This is consistent with earlier tagging work suggesting that west side Kodiak stocks have a strong tendency to migrate from the north in Shelikof Strait (Tyler et al. 1986).

The estimated 263,750 fish harvest of Spiridon origin sockeye salmon is a minimum value for the following reasons: these fish may have contributed to other Kodiak area fisheries outside the NW Kodiak and SW Kodiak Districts; and fishing continued in the NW Kodiak District (including the SBSHA) after 5 September. It is our opinion that the unestimated Spiridon origin catch component is negligible.

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Table 1. Estimated number of Spiridon sockeye salmon harvested by district, area, and week, 5 July through 5 September, 1994.

District Area	Week	Dates	Age Sample (Numbers) Total	Age Sample (Numbers) Est. Spiridon Component	Catch Number of fish	Catch Est. Spiridon Percent	Catch Est. Spiridon Number
NW KODIAK							
Uganik Bay							
	28	7/05-7/11	391	0	25,927	0	0
	29	7/12-7/18	0		30,360		
	30	7/19-7/25	506	15	18,385	3.0	545
	31	7/26-8/01	509	47	33,118	9.2	3,058
	32	8/02-8/08	499	173	63,897	34.7	22,153
	33	8/09-8/15	0		No fishery		
	34	8/16-8/22	536	265	22,963	49.4	11,353
	35	8/23-8/29	532	289	48,977	54.3	26,606
	36	8/30-9/05	0[a]		8,887		4,611
Total			2,973	789	252,514	27.1	68,325
Uyak Bay							
	28	7/05-7/11	522	0	18,454	0.0	0
	29	7/12-7/18	509	0	12,907	0.0	0
	30	7/19-7/25	509	41	21,006	8.1	1,692
	31	7/26-8/01	525	106	13,942	20.2	2,815
	32	8/02-8/08	524	117	37,425	22.3	8,356
	33	8/09-8/15	0		No fishery		
	34	8/16-8/22	497	165	59,061	33.2	19,608
	35	8/23-8/29	487	283	76,828	58.1	44,645
	36	8/30-9/05	527[b]	210	14,698	39.8	627
Total			4,100	922	254,321	30.6	77,744
Spiridon Special Harvest Area							
	28	7/05-7/11	0		No fishery		
	29	7/12-7/18	0		No fishery		
	30	7/19-7/25	0		No fishery		
	31	7/26-8/01	0		No fishery		
	32	8/02-8/08	269		312	99.3	310
	33	8/09-8/15	262		78,424	99.9	78,346
	34	8/16-8/22	326		13,890	99.4	13,807
	35	8/23-8/29	290		9,997	99.5	9,947
	36	8/30-9/05	78		13,200	100.0	13,200
Total			1,225		115,823	99.8	115,609
NW Kodiak Total			**8,298**	**1,711**	**622,658**	**42.0**	**261,678**
SW KODIAK							
Inner/Outer Karluk							
	28	7/05-7/11	506	0	39,529	0.0	0
	29	7/12-7/18	0		3,887		
	30	7/19-7/25	0		11,066		
	31	7/26-8/01	349	25	8,041	7.2	576
	32	8/02-8/08	0		2,885		
	33	8/09-8/15	0		No fishery		
	34	8/16-8/22	0		No fishery		
	35	8/23-8/29	0		No fishery		
	36	8/30-9/05	0		No fishery		
Total			855	25	65,408		576
Sturgeon							
	28	7/05-7/11	0		No fishery		
	29	7/12-7/18	0		No fishery		
	30	7/19-7/25	0		No fishery		

-Continued-

Table 1. (page 2 of 2)

District Area	Week	Dates	Age Sample: Sample Size	Age Sample: Est. Spiridon Component	Catch: Number of fish	Catch: Est. Spiridon Percent	Catch: Est. Spiridon Number
Sturgeon (Cont.)							
	31	7/26-8/01	0		3,887		
	32	8/02-8/08	0		No fishery		
	33	8/09-8/15	0		No fishery		
	34	8/16-8/22	0		No fishery		
	35	8/23-8/29	0		No fishery		
	36	8/30-9/05	0		No fishery		
Total			0		3,887		
Halibut Bay							
	28	7/05-7/11	0		No fishery		
	29	7/12-7/18	0		No fishery		
	30	7/19-7/25	507	0	14,692	0.0	0
	31	7/26-8/01	497	3	18,441	0.6	111
	32	8/02-8/08	385	62	8,598	16.1	1,385
	33	8/09-8/15	0		No fishery		
	34	8/16-8/22	0		No fishery		
	35	8/23-8/29	0		4,700		
	36	8/30-9/05	0		5,210		
Total			1,389	65	51,641		1,496
Inner/Outer Ayakulik							
	28	7/05-7/11	0		No fishery		
	29	7/12-7/18	0		No fishery		
	30	7/19-7/25	443	0	19,554	0.0	0
	31	7/26-8/01	527	0	10,983	0.0	0
	32	8/02-8/08	0		9,821		
	33	8/09-8/15	0		No fishery		
	34	8/16-8/22	0		No fishery		
	35	8/23-8/29	0		4,250		
	36	8/30-9/05	0		3,925		
Total			970	0	48,533		0
SW Kodiak Total			**3,214**	**90**	**169,469**		**2,072**
Grand Total			**11,512**	**1,801**	**792,127**		**263,750**

[a] No sample was collected due to mixed tender deliveries.

[b] Sample was a mixture of Uyak Bay and Spiridon Special Harvest Area catch. Catch assignment method #2 was used.

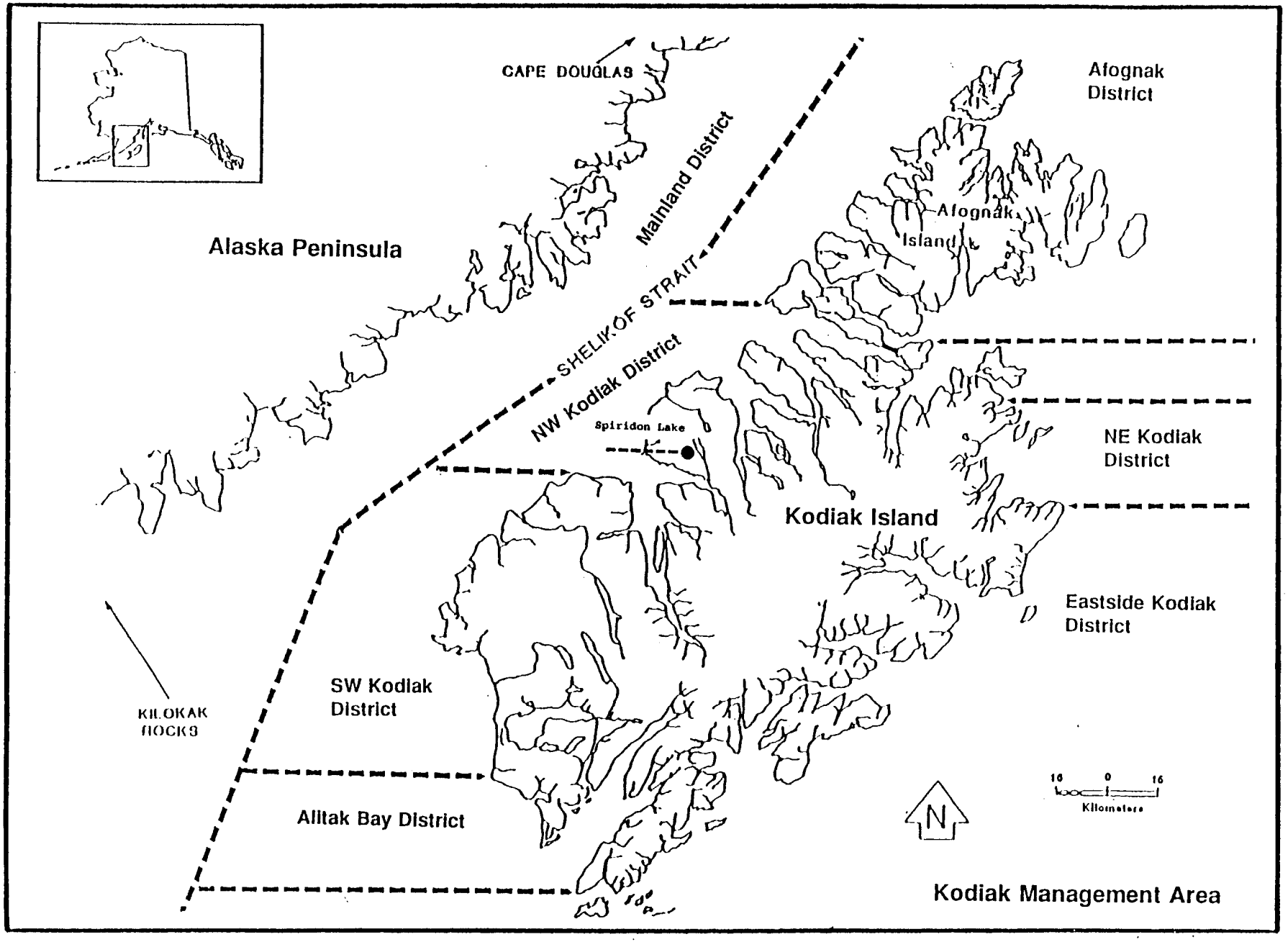


Figure 1. Map of the Kodiak Management Area showing fishing districts and location of Spiridon Lake.

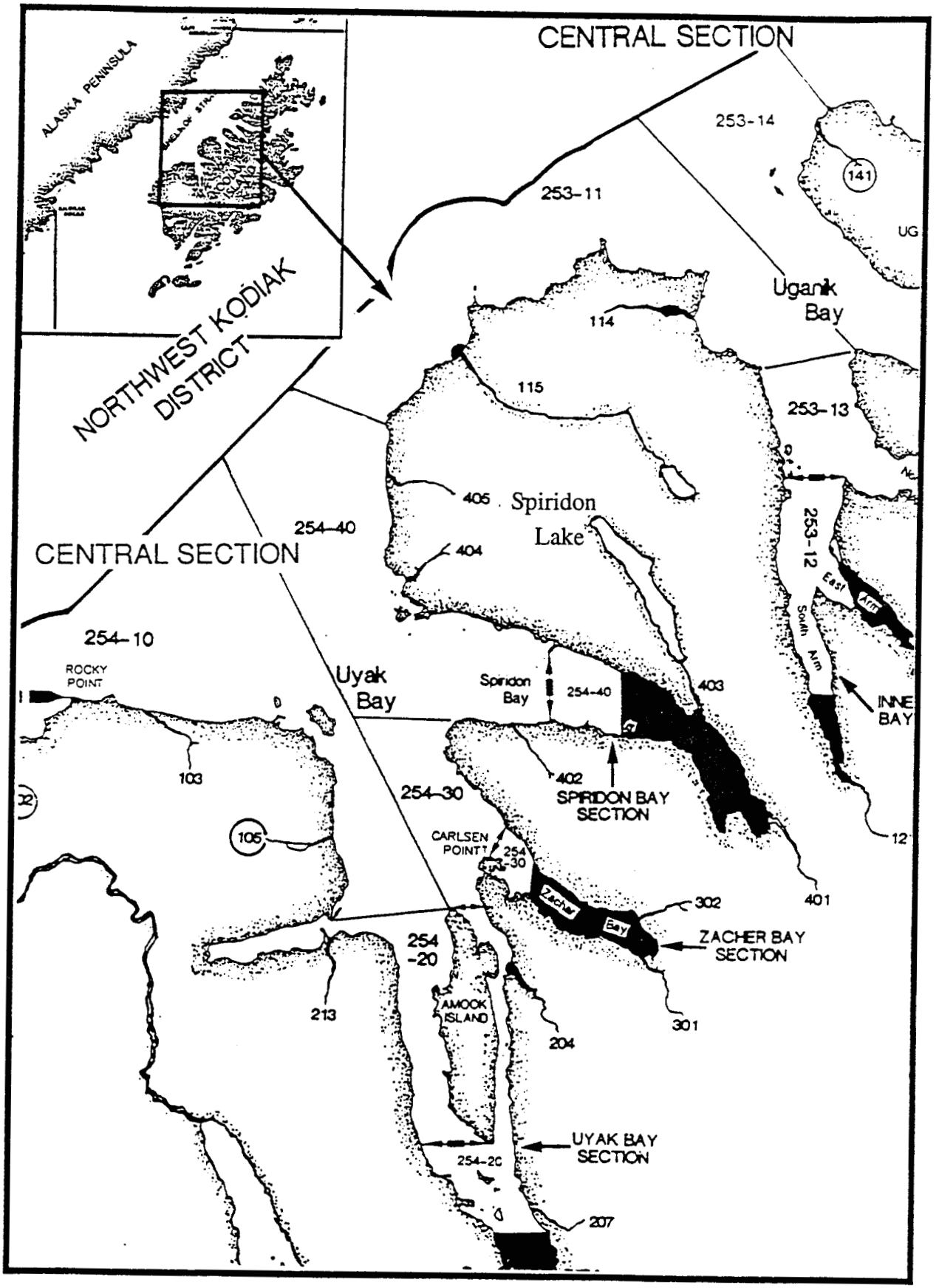


Figure 2. Map illustrating the Central Section of the Northwest Kodiak District, 1994.

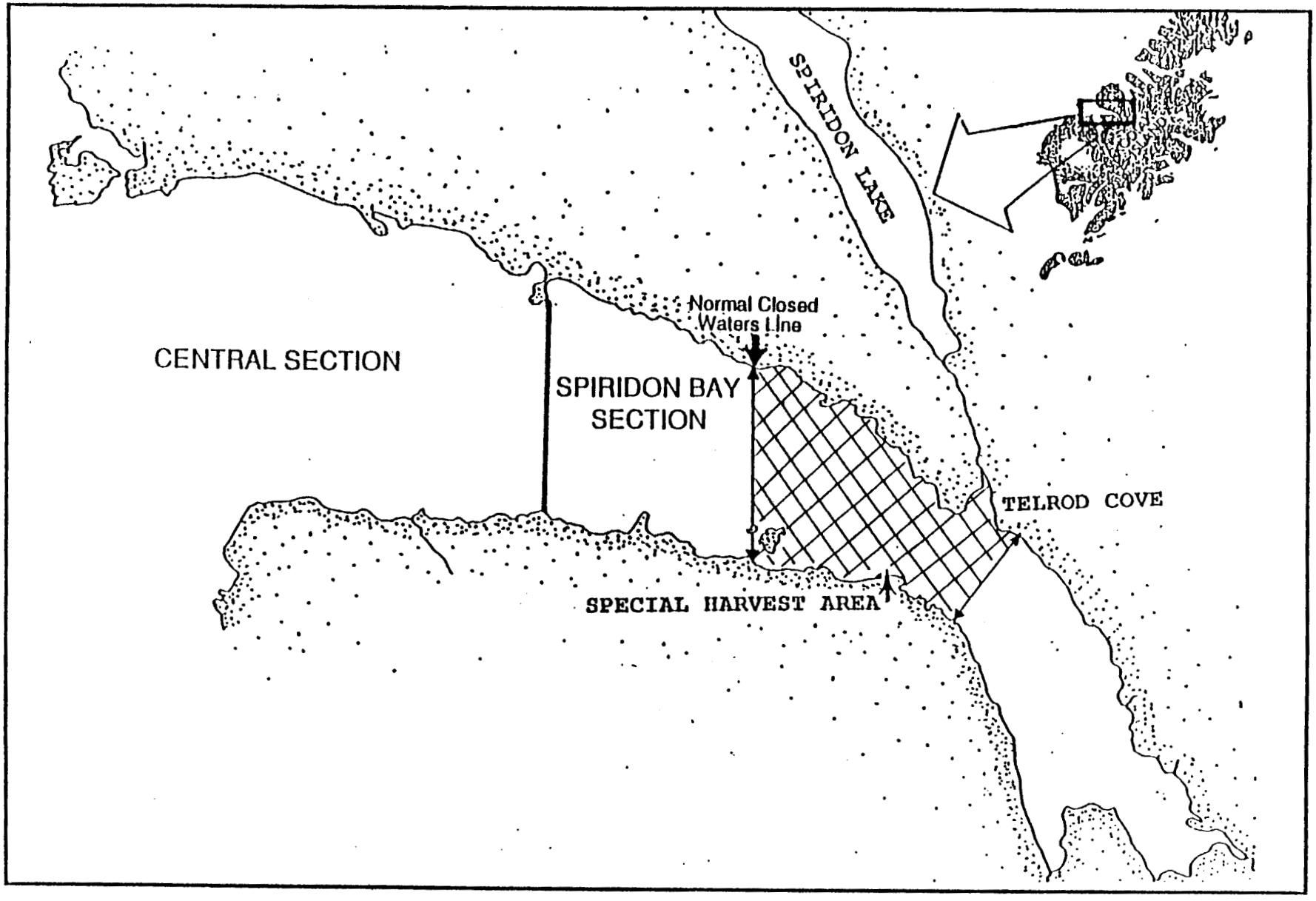


Figure 3. Map identifying the approximate boundaries of the Special Harvest Area of the Spiridon Bay Sockeye Salmon Management Plan for the Kodiak Management Area. In 1994, only the northern 50% of the Special Harvest Area was open to commercial fishing.

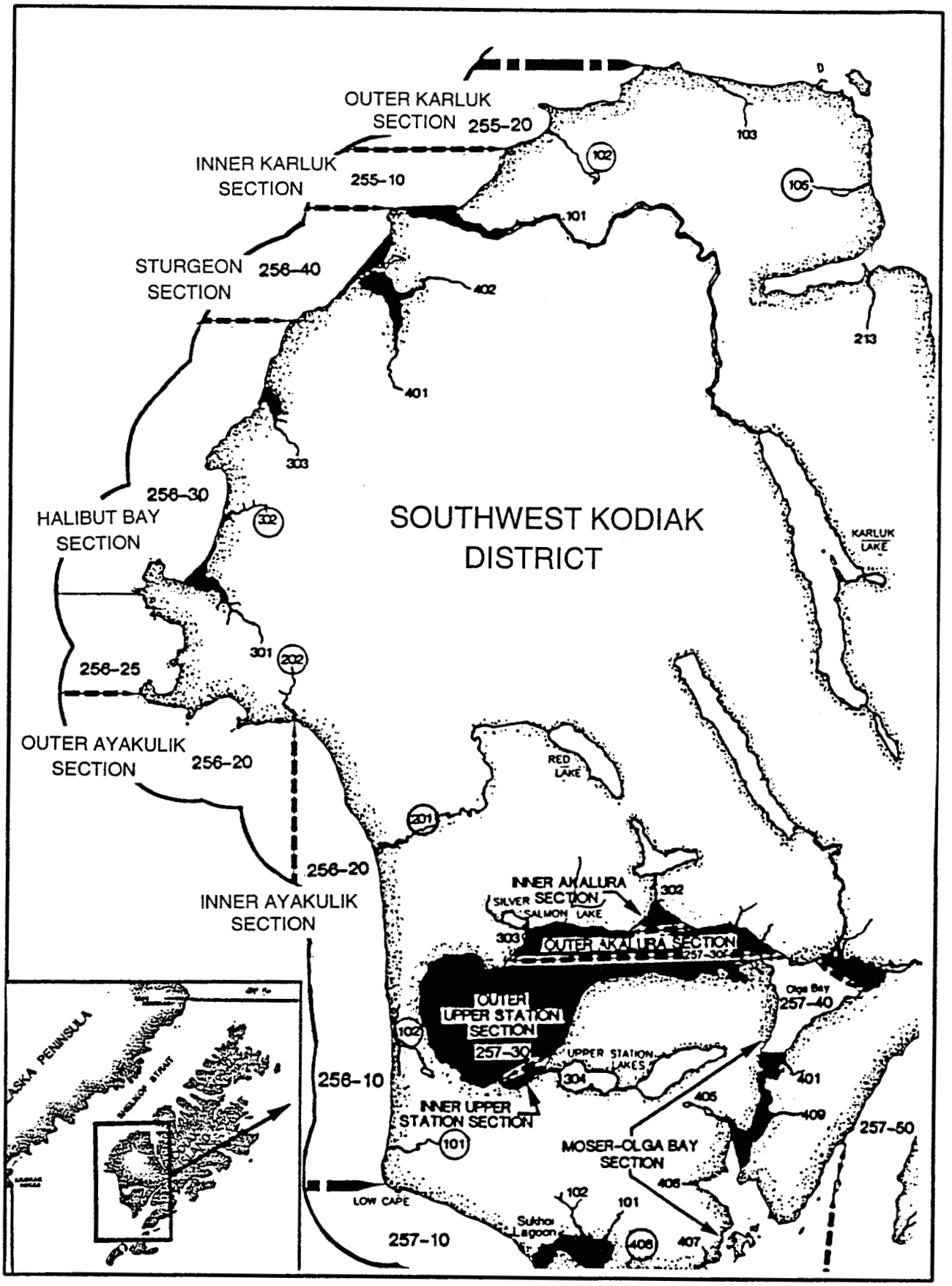


Figure 4. Map illustrating the sections of the Southwest Kodiak District, 1994

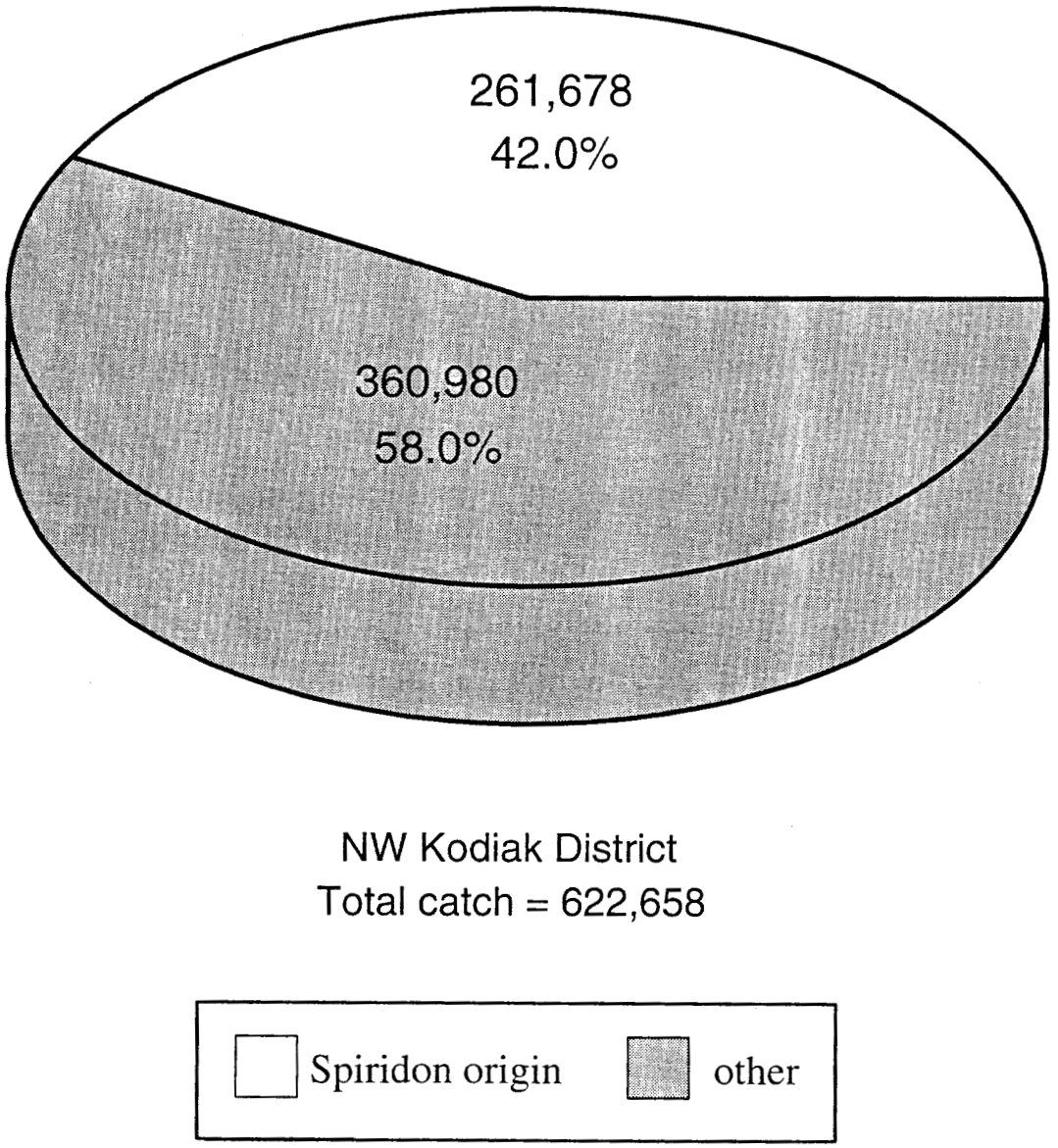


Figure 5. Estimated number and percent of Spiridon Lake sockeye salmon commercially harvested in the Northwest Kodiak District, 5 July through 5 September, 1994.

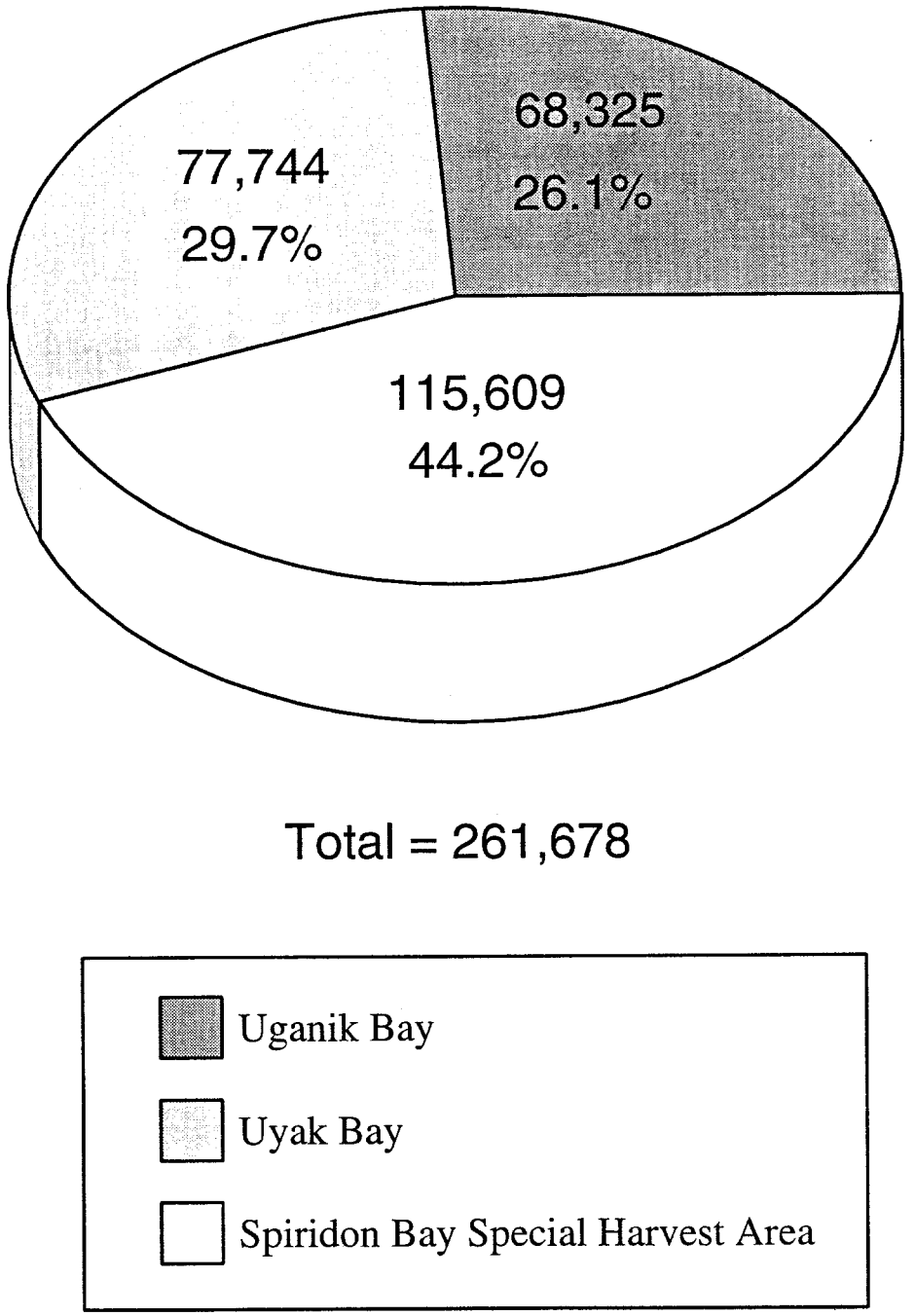


Figure 6. Estimated number and percent of Spiridon Lake sockeye salmon harvested by area in the Northwest Kodiak District, 5 July through 5 September, 1994.

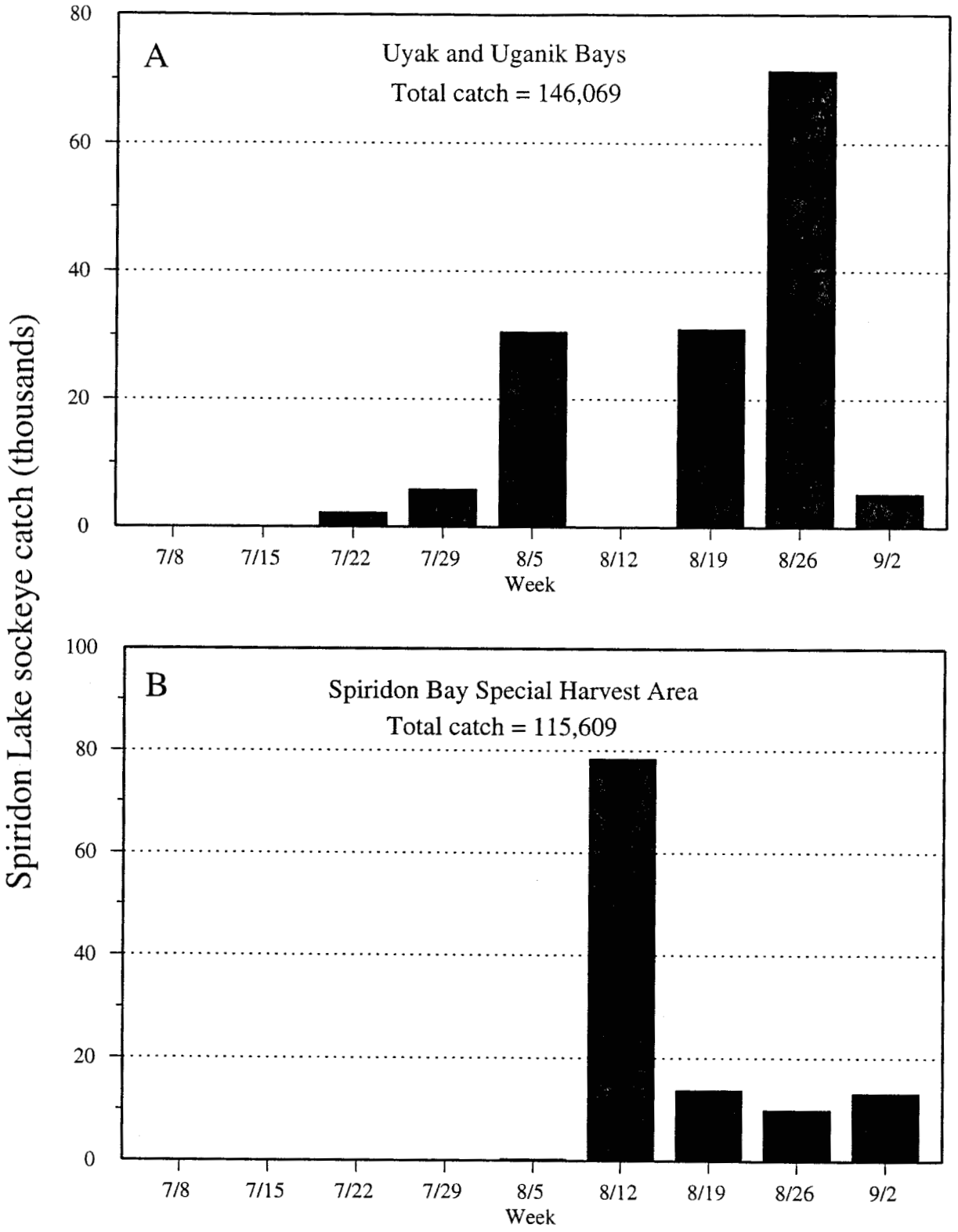


Figure 7. Distribution of Spiridon Lake sockeye salmon harvested by week within (A) Uyak and Uganik Bays, and (B) the Spiridon Bay Special Harvest Area, 1994.

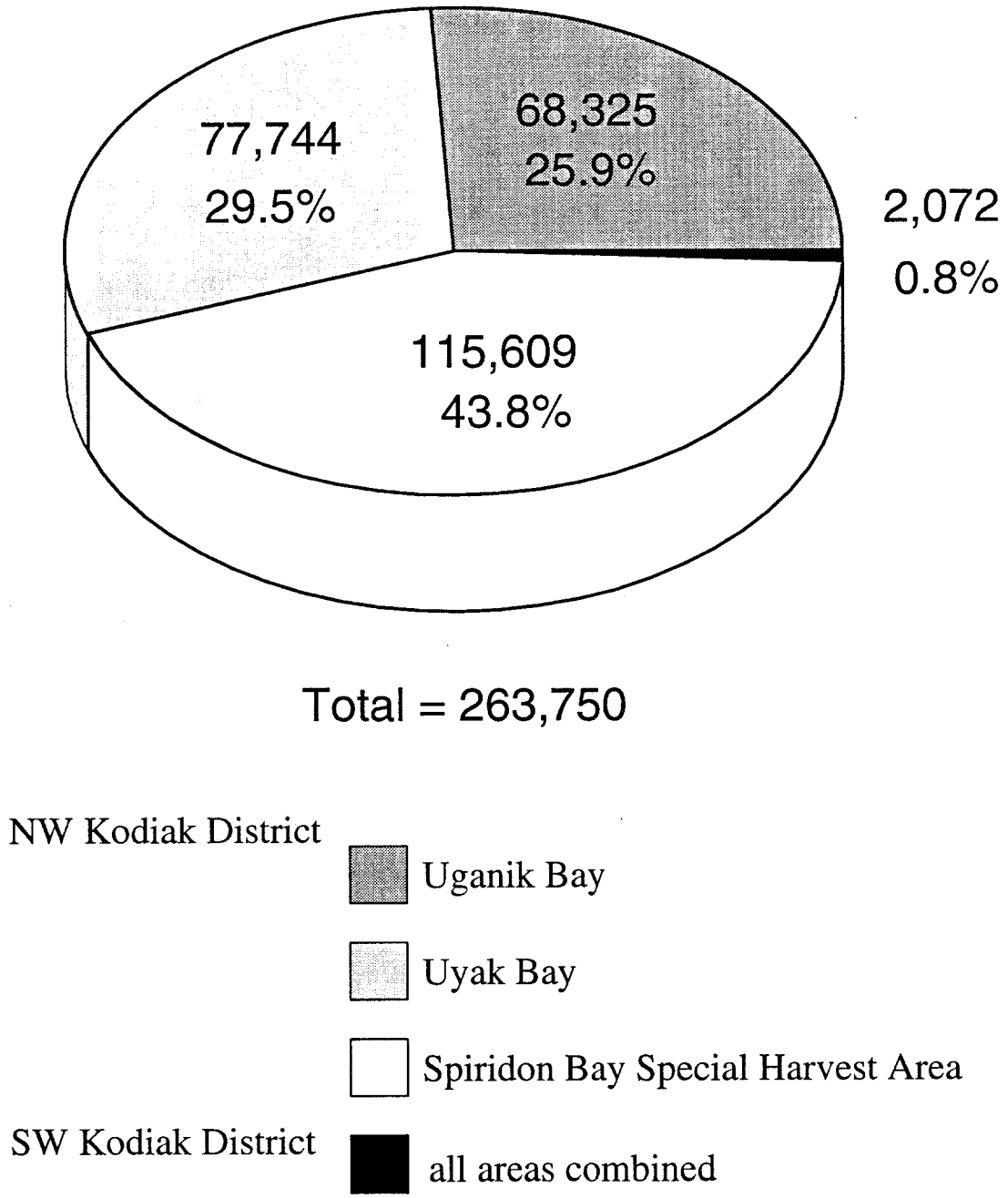


Figure 8. Estimated number and percent of Spiridon Lake sockeye salmon harvested in Northwest Kodiak District areas and the Southwest Kodiak District, 5 July through 5 September, 1994.

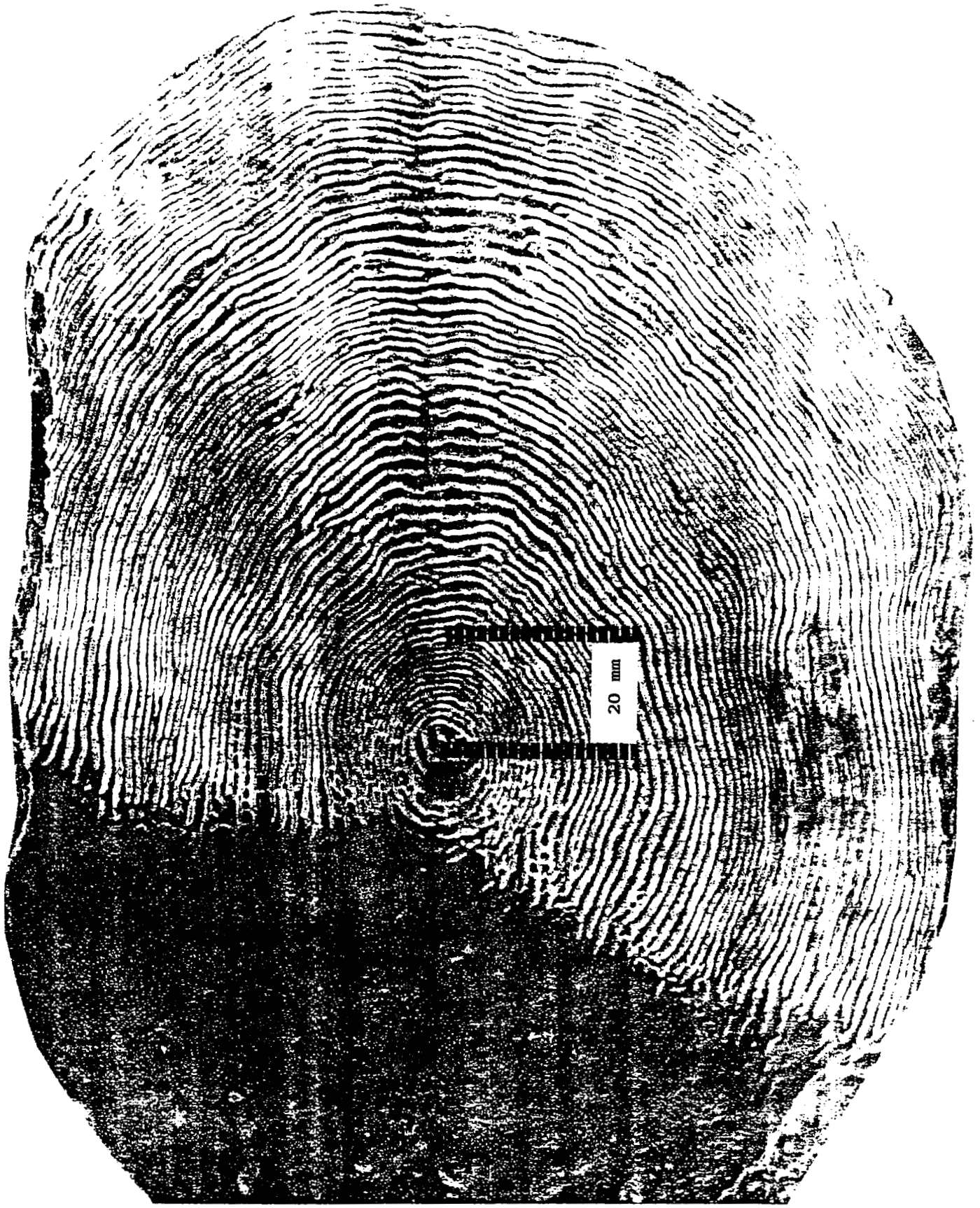
APPENDIX

Appendix A.1. Scale pattern of age-1.1 sockeye salmon collected at Telrod Cove, 3 September 1993.

Appendix A.2. Scale pattern of age-1.2 sockeye salmon collected at Karluk weir, 12 July 1994.

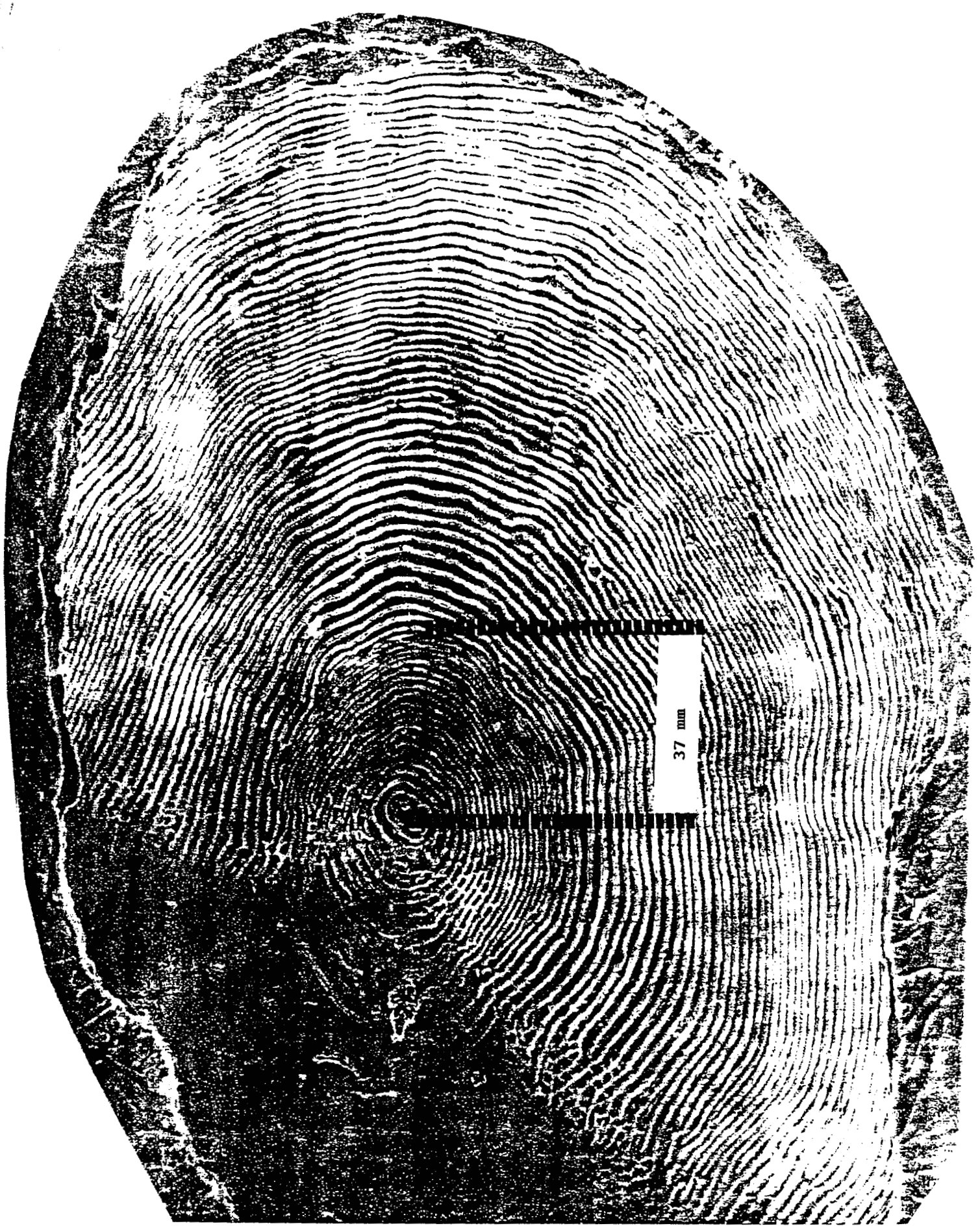
Appendix A.3. Scale pattern of age-1.2 sockeye salmon collected at Ayakulik weir, 9 August 1994.

Appendix A.4. Scale pattern of age-1.2 sockeye salmon collected at Frazer Lake, 29 July 1994.

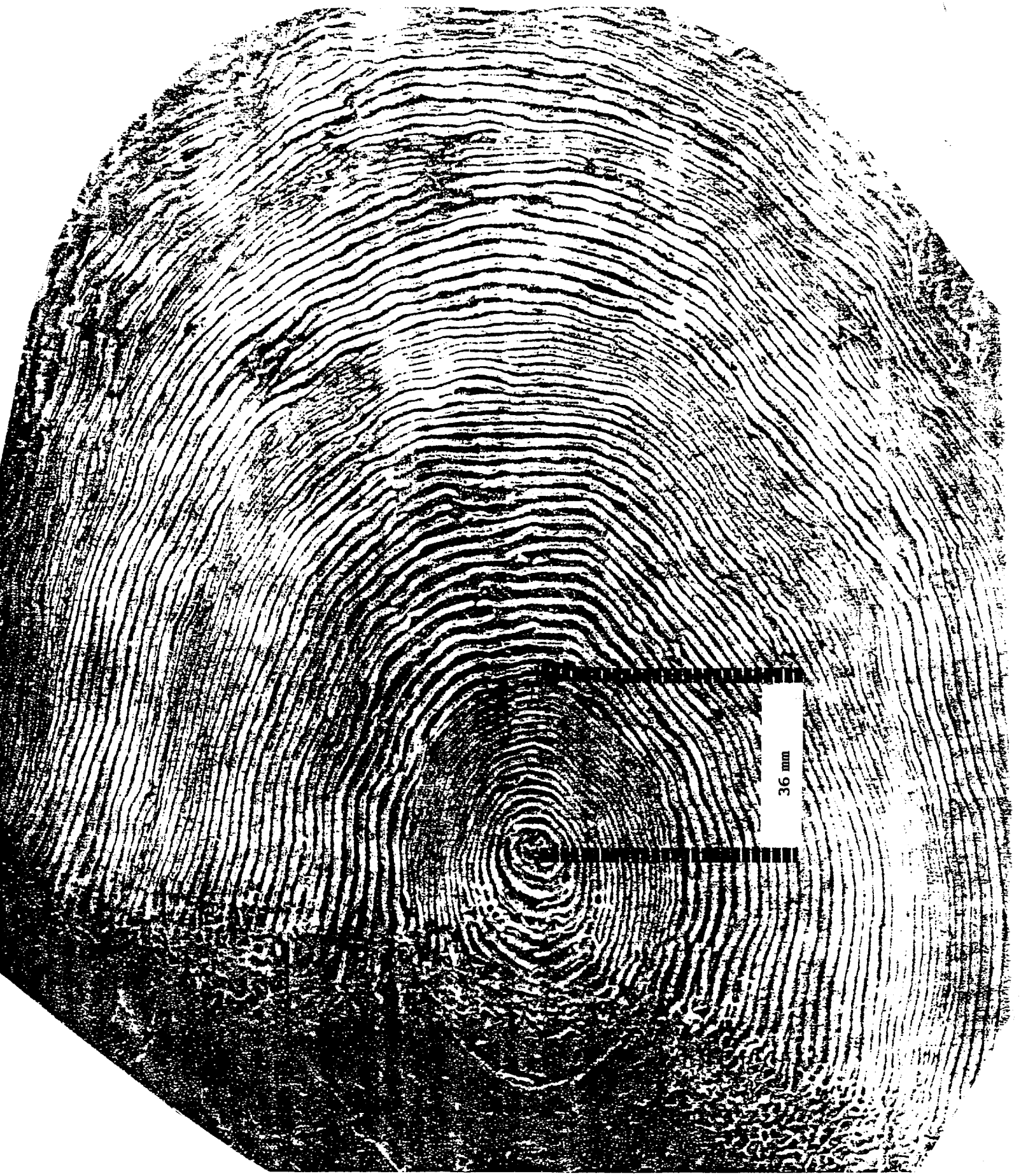


Appendix A.5. Scale pattern of age-1.2 sockeye salmon collected at Upper Station weir. 6 July 1994.

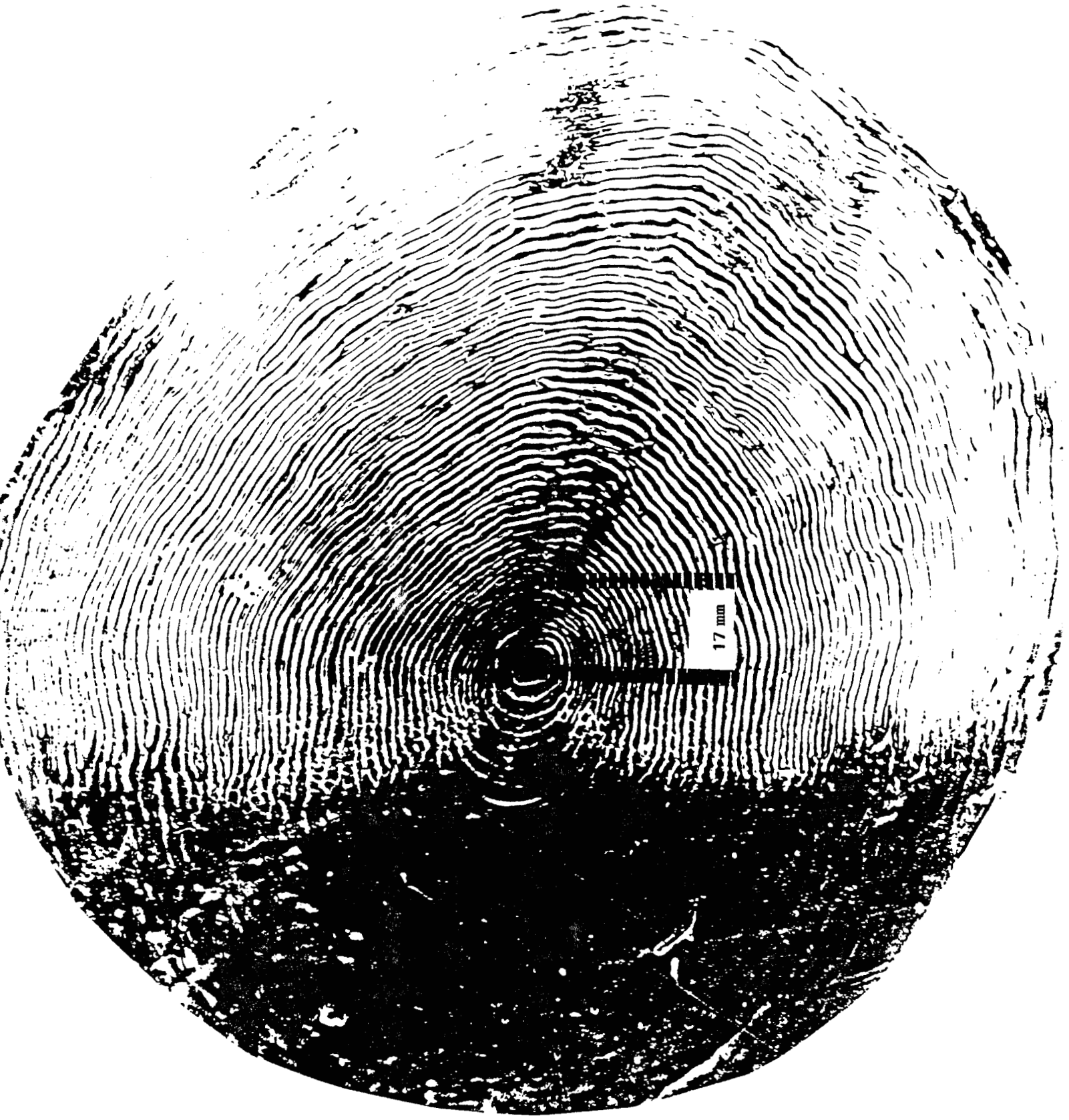
Appendix A.6. Scale pattern of age-1.2 sockeye salmon collected from the Spiridon Bay Special Harvest Area, 28 July 1994.



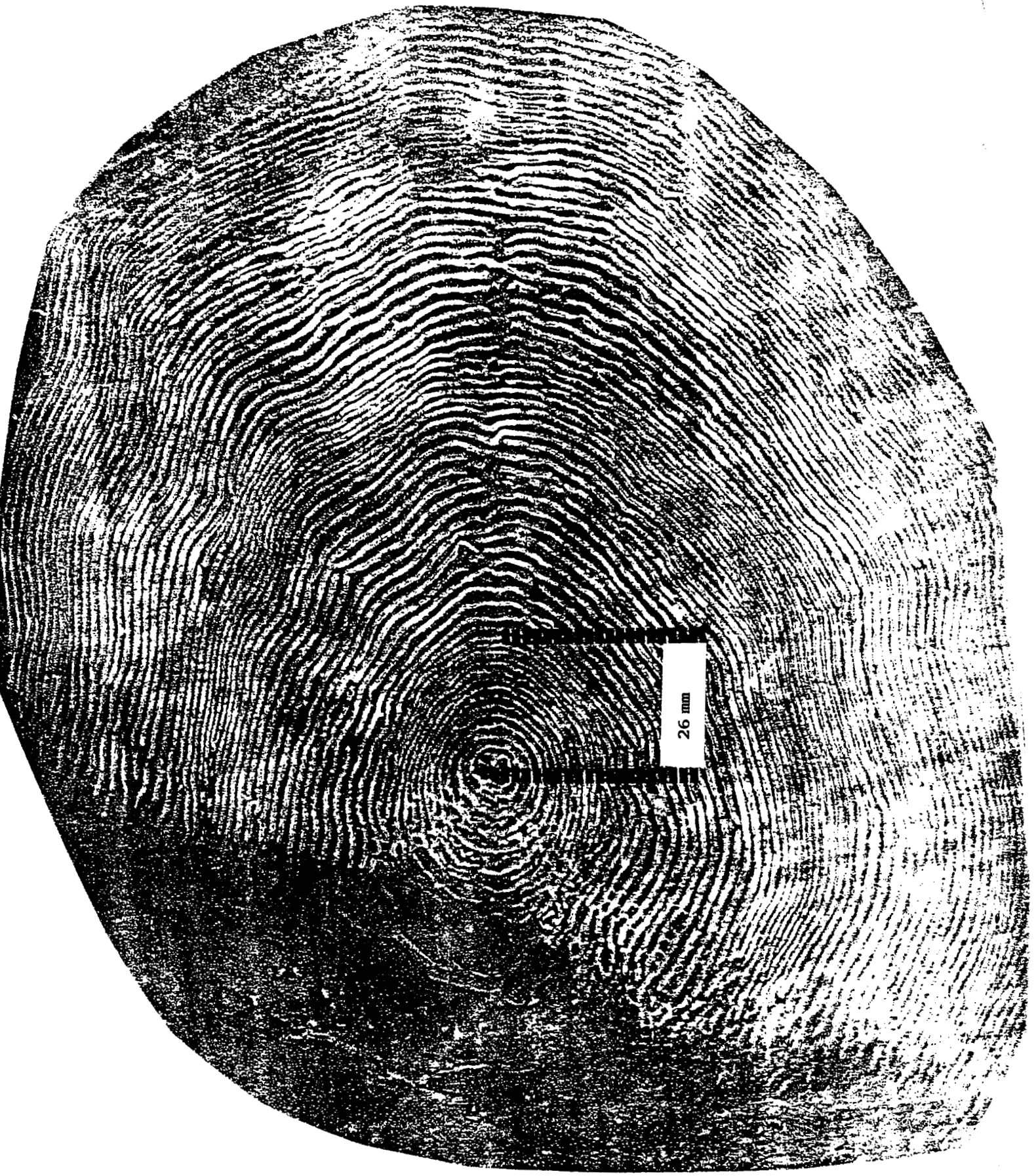
Appendix A.7. Scale pattern of age-1.2 sockeye salmon identified as Spiridon Lake stock collected from the Uganik Bay commercial catch. 20 August 1994.



Appendix A.8. Scale pattern of age-1.2 sockeye salmon identified as Spiridon Lake st collected from the Uyak Bay commercial catch, 19 July 1994.



Appendix A.9. Scale pattern of age-1.2 sockeye salmon collected from the Yentna River escapement, Upper Cook Inlet, July 1994.



Appendix A.10. Scale pattern of age-1.2 sockeye salmon collected from the Chignik Lagoon commercial catch, 28 July 1994.

Appendix B.1. Estimated age composition of Karluk River late run sockeye escapement by week, post 21 July, 1994.[a]

Week	Sample Size		Ages 0.2	1.1	0.3	1.2	2.1	1.3	2.2	3.1	2.3	3.2	2.4	3.3	4.2	4.3	Total
30	0	Percent	0.0	1.0	0.0	2.6	2.6	4.1	41.0	3.1	19.0	20.0	0.5	6.2	0.0	0.0	100.0
(7/19-7/25)		Numbers	0	40	0	100	100	160	1,602	120	741	781	20	240	0	0	3,904
31	195	Percent	0.0	1.2	0.0	3.0	2.3	4.1	41.3	2.9	19.2	18.8	0.4	6.9	0.0	0.0	100.0
(7/26-8/01)		Numbers	0	68	0	172	132	237	2,402	169	1,113	1,094	24	399	0	0	5,810
32	176	Percent	0.2	1.8	0.0	3.3	1.1	3.2	48.1	1.9	15.3	17.4	0.2	7.6	0.0	0.0	100.0
(8/02-8/08)		Numbers	5	62	0	110	38	107	1,617	65	512	583	5	254	0	0	3,358
33	181	Percent	0.4	1.8	0.0	0.4	0.9	1.1	60.6	1.2	4.7	25.7	0.4	2.8	0.0	0.0	100.0
(8/09-8/15)		Numbers	22	92	0	23	46	55	3,099	59	239	1,315	22	142	0	0	5,114
34	159	Percent	0.4	0.0	0.0	0.9	0.8	0.3	61.0	1.3	4.9	27.9	0.0	2.5	0.0	0.0	100.0
(8/16-8/22)		Numbers	39	4	0	92	79	33	6,388	140	513	2,923	1	257	0	0	10,469
35	141	Percent	1.1	0.0	0.4	0.9	0.4	0.4	61.3	0.9	1.8	32.2	0.0	0.7	0.0	0.0	100.0
(8/23-8/29)		Numbers	1,413	0	566	1,132	561	566	79,018	1,127	2,259	41,512	0	847	0	0	129,001
36	158	Percent	1.4	0.0	1.2	1.3	0.0	0.6	57.4	0.6	2.5	34.1	0.0	0.9	0.0	0.0	100.0
(8/30-9/05)		Numbers	85	0	75	82	0	39	3,515	36	151	2,089	0	52	0	0	6,126
37	127	Percent	2.5	0.0	6.6	1.5	0.0	0.5	37.0	0.0	8.5	36.5	0.0	6.4	0.3	0.3	100.0
(9/06-9/12)		Numbers	112	0	294	65	0	22	1,654	1	380	1,632	0	285	13	13	4,471
38	130	Percent	1.3	0.0	1.7	1.3	0.2	0.2	36.8	0.3	9.2	36.7	0.0	11.0	0.6	0.6	100.0
(9/13-9/19)		Numbers	3,353	0	4,395	3,397	424	425	92,799	849	23,171	92,386	0	27,704	1,463	1,463	251,830
39	145	Percent	0.7	0.0	0.0	5.5	0.7	0.7	41.4	1.4	18.6	19.3	0.0	11.7	0.0	0.0	100.0
(9/20-9/26)		Numbers	1,153	0	0	9,223	1,153	1,153	69,176	2,306	31,129	32,282	0	19,600	0	0	167,175
Total	1,412	Percent	1.1	0.0	0.9	2.5	0.4	0.5	44.5	0.8	10.3	30.1	0.0	8.5	0.3	0.3	100.0
		Numbers	6,182	266	5,330	14,396	2,533	2,797	261,270	4,872	60,208	176,597	72	49,780	1,476	1,476	587,258

[a] Percents are figured on escapement after rounding, not on samples. Sample sizes are for the indicated week. Age composition is calculated daily. Composition is based on two samples when the date falls between two sample dates. When the date falls on a sample date, or before the first sample or after the last sample, calculations are based on only one sample date.

Appendix B.2. Estimated age composition of Ayakulik River sockeye escapement by week, 1994.[a]

Week	Sample Size		Ages													
			0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	Total
22	0	Percent	0.0	3.7	5.8	0.0	6.3	0.0	7.9	58.2	0.0	0.0	10.1	1.6	0.5	5.8	100.0
(5/24-5/30)		Numbers	0	13	21	0	23	0	29	210	0	0	36	6	2	21	360
23	189	Percent	0.0	3.8	6.2	0.1	6.4	0.0	8.1	58.4	0.0	0.0	9.6	1.5	0.5	5.5	100.0
(5/31-6/06)		Numbers	0	227	369	8	379	0	481	3,485	0	0	572	89	27	326	5,964
24	204	Percent	0.0	3.7	6.7	1.0	5.9	0.2	8.0	62.8	0.0	0.0	7.9	0.8	0.0	3.1	100.0
(6/07-6/13)		Numbers	0	1,536	2,787	407	2,436	77	3,305	26,025	0	0	3,267	335	2	1,289	41,465
25	199	Percent	0.3	6.0	5.1	1.7	5.8	0.2	4.9	65.1	0.9	0.0	7.1	0.8	0.0	2.0	100.0
(6/14-6/20)		Numbers	142	2,757	2,332	760	2,663	95	2,237	29,666	427	0	3,233	380	0	904	45,598
26	187	Percent	0.2	7.7	3.4	1.5	5.5	0.0	6.0	65.1	1.6	0.0	6.6	1.1	0.0	1.3	100.0
(6/21-6/27)		Numbers	92	3,197	1,414	634	2,299	0	2,497	27,163	674	0	2,775	449	0	542	41,736
27	185	Percent	0.0	9.3	1.0	0.7	4.9	0.0	5.7	67.1	1.4	0.0	7.2	1.6	0.0	1.2	100.0
(6/28-7/04)		Numbers	0	4,230	460	307	2,240	0	2,576	30,557	632	0	3,265	737	0	565	45,568
28	200	Percent	0.0	10.9	0.0	0.0	4.6	0.0	3.4	71.4	0.5	0.0	5.9	1.7	0.0	1.5	100.0
(7/05-7/11)		Numbers	0	4,225	0	0	1,781	0	1,318	27,665	185	0	2,273	677	0	598	38,723
29	189	Percent	0.0	9.0	0.0	0.2	3.6	0.0	3.2	76.7	0.0	0.0	4.1	2.1	0.0	1.1	100.0
(7/12-7/18)		Numbers	0	3,548	0	77	1,433	0	1,278	30,404	0	0	1,637	823	0	421	39,621
30	169	Percent	0.0	5.9	0.0	0.4	1.8	0.0	1.1	83.5	0.0	0.0	3.3	4.0	0.0	0.1	100.0
(7/19-7/25)		Numbers	0	1,939	0	121	587	0	345	27,290	0	0	1,071	1,317	0	21	32,692
31	239	Percent	0.0	0.3	0.0	0.2	0.7	0.0	0.6	87.9	0.0	0.0	5.7	4.5	0.0	0.2	100.0
(7/26-8/01)		Numbers	0	82	0	41	202	0	161	23,714	0	0	1,524	1,205	0	41	26,971
32	194	Percent	0.0	0.8	0.4	0.7	1.0	0.0	0.8	83.6	0.0	0.2	6.7	5.3	0.0	0.5	100.0
(8/02-8/08)		Numbers	0	185	81	153	217	0	185	18,559	0	40	1,491	1,168	0	113	22,192
33	202	Percent	0.0	0.5	0.5	0.7	0.3	0.0	0.5	83.5	0.0	0.2	8.6	4.9	0.0	0.2	100.0
(8/09-8/15)		Numbers	0	98	90	143	54	0	98	16,485	0	45	1,700	972	0	46	19,733
34	201	Percent	0.2	0.4	0.0	0.5	0.5	0.0	1.0	85.8	0.0	0.0	7.7	3.9	0.0	0.0	100.0
(8/16-8/22)		Numbers	24	56	0	81	81	0	154	13,230	0	0	1,195	605	0	0	15,425
35	168	Percent	0.4	0.0	0.0	2.5	0.4	0.0	1.6	84.0	0.0	0.0	7.2	3.8	0.0	0.0	100.0
(8/23-8/29)		Numbers	12	0	0	77	13	0	50	2,576	0	0	220	117	0	0	3,066
36	14	Percent	0.0	0.0	0.0	7.1	0.0	0.0	0.0	78.6	0.0	0.0	7.1	7.1	0.0	0.0	100.0
(8/30-9/05)		Numbers	0	0	0	66	0	0	0	728	0	0	66	66	0	0	927

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Week	Sample Size		Ages 0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	Total
37 (9/06-9/12)	0	Percent	0.0	0.0	0.0	7.1	0.0	0.0	0.0	78.6	0.0	0.0	7.1	7.1	0.0	0.0	100.0
		Numbers	0	0	0	10	0	0	0	110	0	0	10	10	0	0	140
Total	2,540	Percent	0.1	5.8	2.0	0.8	3.8	0.0	3.9	73.1	0.5	0.0	6.4	2.4	0.0	1.3	100.0
		Numbers	270	22,093	7,554	2,885	14,408	172	14,714	277,867	1,918	85	24,335	8,956	31	4,887	380,181

[a] Percents are figured on esacpement after rounding, not on samples. Sample sizes are for the indicated week. Age composition is calculated daily. Composition is based on two samples when the date falls between two sample dates. When the date falls on a sample date, or before the first sample or after the last sample, calculations are based on only one sample date.

Appendix B.3. Estimated age composition of Frazer Lake sockeye escapement by week, 1994.[a]

Week	Sample Size		Ages 1.1	1.2	2.1	1.3	2.2	3.1	2.3	3.2	2.4	3.3	Total
25	206	Percent	0.0	1.5	3.1	29.1	43.6	1.9	18.5	2.3	0.0	0.0	100.0
(6/14-6/20)		Numbers	0	241	490	4,666	6,987	307	2,963	373	0	4	16,031
26	212	Percent	0.1	2.4	5.2	29.7	49.3	2.2	9.5	1.2	0.0	0.5	100.0
(6/21-6/27)		Numbers	35	673	1,420	8,173	13,557	604	2,607	324	0	125	27,519
27	215	Percent	0.4	2.5	4.9	30.8	47.5	4.0	6.9	2.7	0.0	0.4	100.0
(6/28-7/04)		Numbers	118	738	1,457	9,183	14,184	1,190	2,073	791	0	120	29,854
28	201	Percent	0.5	1.2	7.3	23.5	50.9	4.9	6.9	4.8	0.0	0.0	100.0
(7/05-7/11)		Numbers	167	397	2,493	8,071	17,456	1,679	2,356	1,657	0	16	34,291
29	213	Percent	0.4	1.4	7.5	14.2	61.8	2.5	6.4	5.7	0.0	0.0	100.0
(7/12-7/18)		Numbers	159	552	2,868	5,441	23,649	957	2,458	2,168	0	0	38,252
30	200	Percent	0.0	4.0	4.4	15.4	62.8	0.4	11.5	1.5	0.0	0.0	100.0
(7/19-7/25)		Numbers	5	1,179	1,307	4,527	18,527	127	3,382	428	0	0	29,482
31	211	Percent	0.1	3.4	3.7	19.6	58.1	0.1	13.3	1.6	0.1	0.0	100.0
(7/26-8/01)		Numbers	13	770	833	4,385	12,988	22	2,974	369	13	0	22,366
32	216	Percent	0.4	11.2	2.9	18.8	58.2	0.4	7.1	0.6	0.4	0.0	100.0
(8/02-8/08)		Numbers	34	924	240	1,552	4,817	34	588	53	34	0	8,276
Total	1,674	Percent	0.3	2.7	5.4	22.3	54.4	2.4	9.4	3.0	0.0	0.1	100.0
		Numbers	531	5,474	11,108	45,998	112,165	4,920	19,401	6,163	47	265	206,071

[a] Percents are figured on escapement after rounding, not on samples. Sample sizes are for the indicated week. Age composition is calculated daily. Composition is based on two samples when the date falls between two sample dates. When the date falls on a sample date, or before the first sample or after the last sample, calculations are based on only one sample date.

Appendix B.4. Estimated age composition of Upper Station late run sockeye escapement by week, post 15 July, 1994.[a]

Week	Sample Size		Ages 0.1	0.2	1.1	0.3	1.2	2.1	1.3	2.2	3.1	1.4	2.3	3.2	3.3	Total
29	12	Percent	0.0	40.3	8.7	0.2	16.2	0.3	0.2	26.1	0.0	0.0	0.0	8.0	0.0	100.0
(7/16-7/18)		Numbers	0	9	2	0	4	0	0	6	0	0	0	2	0	23
30	211	Percent	0.0	16.1	14.5	8.7	6.8	5.2	5.6	41.7	0.0	0.2	0.4	0.4	0.4	100.0
(7/19-7/25)		Numbers	0	485	435	261	206	156	170	1,253	0	5	12	12	12	3,007
31	191	Percent	0.1	37.8	2.7	29.1	9.5	0.9	11.5	7.3	0.0	0.9	0.2	0.1	0.1	100.0
(7/26-8/01)		Numbers	13	3,249	229	2,501	816	74	984	624	0	73	18	5	5	8,592
32	195	Percent	4.0	36.9	1.6	37.2	2.3	1.8	3.6	10.6	0.0	0.0	1.8	0.0	0.0	100.0
(8/02-8/08)		Numbers	1,283	11,748	514	11,845	743	585	1,157	3,383	0	0	572	0	0	31,829
33	173	Percent	3.6	22.1	1.6	28.2	4.8	2.4	12.1	24.1	0.0	0.0	0.5	0.5	0.0	100.0
(8/09-8/15)		Numbers	2,135	13,008	929	16,603	2,841	1,397	7,103	14,143	0	0	310	317	0	58,786
34	206	Percent	1.3	9.4	1.5	18.0	7.0	2.2	19.4	40.0	0.2	0.0	0.5	0.6	0.0	100.0
(8/16-8/22)		Numbers	992	7,455	1,153	14,250	5,507	1,761	15,377	31,703	161	0	384	447	0	79,192
35	206	Percent	1.1	5.7	2.5	12.5	7.0	6.3	14.8	49.0	0.5	0.0	0.7	0.0	0.0	100.0
(8/23-8/29)		Numbers	306	1,538	673	3,362	1,883	1,704	3,982	13,201	129	0	177	0	0	26,955
36	213	Percent	1.2	4.6	5.0	5.5	6.7	11.2	5.3	59.6	0.3	0.0	0.7	0.0	0.0	100.0
(8/30-9/05)		Numbers	81	318	344	375	463	767	364	4,090	18	0	49	0	0	6,868
37	219	Percent	0.9	4.6	5.9	4.1	4.1	8.2	3.2	68.5	0.0	0.0	0.5	0.0	0.0	100.0
(9/06-9/12)		Numbers	59	293	381	264	264	528	205	4,399	0	0	29	0	0	6,423
Total	1,626	Percent	2.2	17.2	2.1	22.3	5.7	3.1	13.2	32.8	0.1	0.0	0.7	0.4	0.0	100.0
		Numbers	4,869	38,103	4,660	49,461	12,727	6,972	29,342	72,802	308	78	1,551	783	17	221,675

[a] Percents are figured on escapement after rounding, not on samples. Sample sizes are for the indicated week. Age composition is calculated daily. Composition is based on two samples when the date falls between two sample dates. When the date falls on a sample date, or before the first sample or after the last sample, calculations are based on only one sample date.

Appendix B.5. Estimated age composition of Telrod Cove terminal sockeye catch by week, 1994.[a]

Week	Sample Size		Ages 1.1	1.2	2.1	1.3	2.2	2.3	Total
32	269	Percent	0.0	99.3	0.0	0.3	0.0	0.3	100.0
(8/02-8/08)		Numbers	0	310	0	1	0	1	312
33	262	Percent	0.1	99.8	0.1	0.0	0.0	0.0	100.0
(8/09-8/15)		Numbers	56	77,661	56	8	0	8	77,789
34	326	Percent	0.5	98.9	0.5	0.0	0.0	0.0	100.0
(8/16-8/22)		Numbers	73	13,738	75	2	2	0	13,890
35	290	Percent	0.2	98.9	0.6	0.2	0.2	0.0	100.0
(8/23-8/29)		Numbers	20	9,884	56	19	19	0	9,997
36	78	Percent	0.0	98.7	1.3	0.0	0.0	0.0	100.0
(8/30-9/05)		Numbers	0	13,031	169	0	0	0	13,200
Total	1,329	Percent	0.1	99.5	0.3	0.0	0.0	0.0	100.0
		Numbers	149	114,624	356	30	21	9	115,188

[a] Percents are figured on catch after rounding, not on samples. Sample sizes are for the indicated week. Age composition is calculated daily. Composition is based on two samples when the date falls between two sample dates. When the date falls on a sample date, or before the first sample or after the last sample, calculations are based on only one sample date.