

Fishery Management Report No. 06-17

**Southeastern District Mainland (Alaska Peninsula Area)
Salmon Management Plan, 2006**

by

Charles Burkey Jr.

March 2006

Alaska Department of Fish and Game

Divisions of Commercial Fisheries and Sport Fish



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SALMON MANAGEMENT PLAN, 2006**

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March 2006

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ABSTRACT

The Southeastern District Mainland commercial salmon fishery takes place on the south side of the Alaska Peninsula in Stepovak, Balboa, and Beaver Bays. Depending primarily on the strength of Chignik sockeye salmon *Oncorhynchus nerka* stocks, the fishery could begin in early June and last through July 25. This document describes how the fishery will be managed, the requirements of industry to participate in the fishery, and how to contact and relay information to Alaska Department of Fish and Game. Historical harvests for the Southeastern District Mainland fishery are presented as well as the 2006 season harvest projections. This document is intended as a guide for commercial salmon harvesters, buyers, transporters, and tenders. Information regarding commercial salmon openings should be obtained from the department prior to fishing.

Key words: Southeastern District Mainland, commercial salmon fishery, management plan, Alaska Peninsula Area

INTRODUCTION

This document provides commercial harvesters and processors a description of how the Alaska Department of Fish and Game (ADF&G) will manage the Southeastern District Mainland (SEDM) commercial salmon fishery. This document also outlines the requirements for industry to participate in the fishery, and how to contact and relay information to the department. Historical harvests for the Southeastern District Mainland fishery are presented as well as the 2006 season harvest projections.

DESCRIPTION OF FISHERY

The SEDM fishery takes place on the south side of the Alaska Peninsula in the Alaska Peninsula and Aleutian Islands Management Area (Area M; Figure 1). The SEDM is bordered by the Chignik Management Area (CMA) to the east and the South Central District of the Alaska Peninsula Management Area to the west. Included in this fishery are the Beaver Bay, Balboa Bay, Southwest Stepovak, Northwest Stepovak, East Stepovak, and Stepovak Flats Sections (Figure 2). The SEDM fishery is conducted according to a management plan originally established by the Alaska Board of Fisheries (BOF) in 1985, updated in 1991 and 1998, 2001, and most recently in March 2005 (Appendix A; 5 AAC 09.360). Excluding the Northwest Stepovak Section (NWSS) beginning July 1, the fishery is allocated 6.0% of the total Chignik bound sockeye salmon *Oncorhynchus nerka* harvest through July 25¹ while providing for specific biological and allocative requirements in the CMA. After July 25, the SEDM is managed under the Post-June Salmon Management Plan for the South Peninsula (5 AAC 09.366).

The global positioning system (GPS) will be used to determine latitude and longitude coordinates throughout all salmon fisheries in Area M (5 AAC 09.206).

LEGAL GEAR TYPES

In SEDM waters, set gillnet gear is the only legal gear type allowed through MIDNIGHT July 10. Beginning July 11, set gillnet, purse seine, and hand purse seine gear are allowed throughout the SEDM (5 AAC 09.330 (f)(3)).

¹ The total Chignik sockeye salmon harvest is calculated by adding 100% of those sockeye salmon caught within the CMA, 90% of the sockeye salmon caught in the Cape Igvak Section of the Kodiak Management Area (KMA) through July 25, and 80% of the sockeye salmon caught in the SEDM fishery through July 25, excluding the sockeye salmon caught in the NWSS from July 1 through July 25.

FISHING PERIODS

The SEDM fishery is managed independently of other fisheries occurring in the Alaska Peninsula Management Area. The ADF&G will attempt to have fishing periods in the Northwest Stepovak and Stepovak Flats Sections concurrent with fishing periods in the remainder of the SEDM area to avoid concentrating fishing gear in any particular area. During July 1-25, as required by regulation (5 AAC 09.360(e)), the fishing schedule for the NWSS, excluding Orzinski Bay, will not exceed four days during a seven-day period with a maximum of two consecutive fishing days. For the purposes of this fishing schedule, a “day” is considered one 24-hour period.

All fishing periods will be by emergency order. A minimum of 24 hours advance notice will be given prior to the first commercial fishing period of the season. At least 12 hours notice will be given prior to the opening of any additional fishing periods, unless the announcement extends a current fishing period.

HARVEST REPORTING

Buyers must report daily to the ADF&G office in Sand Point, as required by 5 AAC 39.130(a)(3). Salmon harvest reports, including number and pounds of fish by species and number of deliveries by gear type, must be received by 9:00 AM on the day following landings. Earlier reports are appreciated. Buyers may phone, e-mail, or fax their reports to:

ADF&G Sand Point office

(phone: 383-2066 fax: 383-2606

e-mail: james_jackson@fishgame.state.ak.us

Contact may also be made over VHF radio channels 6 or 73, or on SSB radio frequency 3.320 MHz.

Fish tickets must be received in the ADF&G Sand Point office (address below) within seven days of the purchase date, unless other arrangements have been made with ADF&G. Mail fish tickets to:

ADF&G, P.O. Box 129

Sand Point, AK, 99661

INSEASON ANNOUNCEMENTS

Inseason announcements will be distributed as news releases and broadcast by the ADF&G on VHF radio channels 6 and 73, and SSB radio frequency 3.230 MHz. Information may also be obtained over the ADF&G 24-hour recorded message line in Sand Point at 383-2334 (383-ADFG).

2006 MANAGEMENT PLAN

Under the current SEDM Management Plan (5 AAC 09.360; Appendix A):

1. The percentage of sockeye salmon allocated to the SEDM fishery by the BOF is 6.0% of the total number of sockeye salmon considered to be Chignik bound, harvested through July 25.
2. Prior to July 1, 80% of the sockeye salmon caught in the SEDM will be considered Chignik bound salmon.
3. Beginning July 1, sockeye salmon caught in the NWSS will be considered 100% local fish and not counted toward the Chignik allocation (Figure 3). Fishing time in the NWSS, excluding Orzinski Bay, after June 30 may not be more than four days within a seven-day period with not more than 48 hours continuous fishing during a seven-day period. A “day” in this context refers to a 24-hour period. Fishing time in Orzinski Bay, after June 30, will be based on sockeye salmon escapement into Orzinski Lake.
4. The Stepovak Flats Section will be managed for chum salmon *O. keta* returning to Stepovak Flats streams for the entire season. However, 80% of the sockeye salmon caught in this section through July 25 will be considered Chignik bound fish (Figure 2).
5. The BOF established a closed waters area encompassing Kupreanof Point (Figure 4; 5 AAC 09.350 (37)) from July 6 through August 31. The ADF&G may extend the Kupreanof Point closed waters area through the end of the season by emergency order. The Kupreanof Point closed waters extension will remain in effect until:
 - (A) ADF&G determines that the coho salmon *O. kisutch* subsistence needs of the residents of Perryville have been satisfied, and
 - (B) The Western and Perryville Districts of the CMA open to commercial salmon fishing after August 31. Please note: in the recent past, these districts have remained closed past August 20 because of concerns for local coho salmon and no change is anticipated for the 2006 season.

HARVEST SCENARIOS

The respective 2006 Chignik early- and late-run forecasted harvest estimates are 855,000 and 32,000 sockeye salmon (Appendix B). Because the harvestable surplus in Chignik is expected to exceed 600,000 sockeye salmon through July 25, the SEDM fishery could begin when the department determines that the runs are as strong as expected (5 AAC 09.360(c)).

If the Chignik early run is determined to be as strong as predicted, the ADF&G will manage the SEDM fishery so that the sockeye salmon harvest (excluding the post June 30 NWSS sockeye harvest) will approach, as near as possible, the 6.0% allocation of the total Chignik bound sockeye salmon catch through July 25.

If the Chignik early run is weak, the SEDM fishery (excluding Orzinski Bay after June 30) will be curtailed to allow a minimum harvest in the CMA of 300,000 sockeye salmon through July 8.

From June 26 through July 8, the strength of the late run of Chignik sockeye salmon cannot be accurately evaluated due to the mixing of early and late run stocks. During this period, ADF&G may close or restrict commercial salmon fishing in the SEDM, excluding Orzinski Bay beginning July 1, until the strength of the second run can be determined. Beginning July 1,

fishing time in the NWSS will be based on local stocks. All of the sockeye salmon caught after July 1 in the NWSS are considered to be from local stocks.

After July 8, the SEDM fishery, excluding the NWSS, will be managed based on the strength of the Chignik late run and the catch of Chignik bound sockeye salmon through July 25. If the late-run interim escapement objectives are being met and the total CMA harvest is at least 300,000 sockeye salmon by July 8, the SEDM may open to commercial salmon fishing. The ADF&G will manage the fishery so that the number of sockeye salmon harvested in the CMA from both runs combined will be at least 600,000 fish and the harvest in the SEDM (excluding the post June 30 NWSS sockeye salmon harvest) will approach, as near as possible, 6.0% of the total Chignik bound sockeye salmon harvest through July 25.

CHIGNIK RIVER SOCKEYE SALMON FORECAST AND SEDM ALLOCATION

The June 1 to July 25 SEDM sockeye salmon commercial harvest can be estimated based on:

- 1) The forecasted return of Chignik bound sockeye salmon (Appendix B),
- 2) The percent of the Chignik runs normally harvested during this time period, and
- 3) The regulatory allocation to the SEDM fisheries.

The 2006 harvest of Chignik early-run (Black Lake) sockeye salmon is expected to be 855,000 fish and a late-run (Chignik Lake) harvest is expected to be 32,000 sockeye salmon (Appendix B). Historically, approximately 100% of the early-run Chignik bound sockeye salmon harvest and approximately 75% of the late-run Chignik bound sockeye salmon harvest has occurred prior to July 26. Therefore, if 100% and 75% of the 2005 Chignik early- and late-runs' respective harvests occur prior to July 26, the SEDM (excluding the NWSS harvest beginning July 1) 6.0% allocation is projected to be approximately 52,740 sockeye salmon through July 25 that are considered Chignik bound (65,925 total SEDM sockeye salmon harvest, excluding the July 1-25 NWSS harvest, through July 25).

The 2006 SEDM projected harvest of 52,740 Chignik bound sockeye salmon (6% of total CMA sockeye salmon harvest forecast) through July 25 is below the 1996-2005 average harvest of 78,871 Chignik bound sockeye salmon (Table 1).

HARVEST GOALS

The SEDM fishery will be managed according to the regulatory management plan, 5 AAC 09.360 (ADF&G 2004; Appendix A). The management objective is to achieve the 6.0% allocation level through July 25 after the conditions of the management plan have been satisfied.

An interim management objective of 6.0% of the total Chignik bound sockeye salmon harvest as of MIDNIGHT July 10 is desired to give set gillnet permit holders opportunity to harvest their traditional proportion before the fishery opens to purse seine gear beginning July 11. To meet the interim and final objectives, the percentage may fluctuate above or below 6.0% prior to July 11 and July 25.

Because of fishing time restrictions placed upon the SEDM fishery to protect the Chignik runs, it may not be possible to achieve a 6.0% allocation level, even if escapement goals are met and the minimum catch level of 600,000 sockeye salmon at Chignik is exceeded.

LOCAL STOCKS

For the purposes of this plan, local runs include only those salmon in the waters:

- (1) In the Northwest Stepovak Section (beginning July 1) described in 5 AAC 09.200(f)(5), and
- (2) In the Stepovak Flats Section as described in 5 AAC 09.200(f)(6).

After July 25, the entire SEDM will be managed on the basis of local stocks, as described in 5 AAC 09.360 (h), and 5 AAC 09.366 Post-June Salmon Management Plan for the South Alaska Peninsula (g) (1)-(2) and (h) (ADF&G 2004).

Northwest Stepovak Section

Beginning July 1, all sockeye salmon caught in the Northwest Stepovak Section are considered to be 100% Orzinski Lake bound.

A weir was used to count salmon escapements into Orzinski Lake between 1935 and 1941, and again from 1990 through the present (Burkey et al. 2006). Based on aerial surveys and weir counts, the ADF&G has developed interim sockeye salmon escapement objectives for Orzinski Lake by time periods (Table 2). The Orzinski Lake sockeye salmon escapement goal range for the entire season is 15,000-20,000 adult salmon (Nelson et al. *In prep*). In 2005, the total estimated sockeye salmon escapement was 44,797 fish. ADF&G intends to operate a weir on the Orzinski Lake system in 2006.

In 2003 and 2004, there were large buildups of sockeye salmon in Orzinski Bay in late June. This led to relatively large escapements in early July and contributed to total season escapements over three times the upper goal of 20,000 fish (Burkey et al. 2006). To better control escapement into Orzinski Lake, the department will monitor Orzinski Bay for sockeye salmon buildup in late June. If a large buildup of salmon is present, the department will consider opening part of Orzinski Bay as early as July 1 to both seine and set gillnet gear.

Sockeye salmon usually begin entering Orzinski Lake in mid June and normally 50% of the annual escapement has been achieved by the second week of July. Generally, the Orzinski Lake sockeye salmon escapement is achieved by the first week of August. If the interim sockeye salmon escapement objectives into Orzinski Lake are not being met, the NWSS may be closed until escapement falls within the appropriate escapement objective range, or until management of the area shifts to a directed fishery for local pink salmon *O. gorbuscha* stocks in early August.

Stepovak Flats Section

Commercial salmon fishing in the Stepovak Flats Section is managed for chum salmon returning to Stepovak Flats systems. Through July 25, 80% of the sockeye salmon harvested in this section are considered Chignik bound fish and are included in the 6.0% allocation criteria stated in the SEDM management plan. After July 28, the entire Stepovak Flats Section and the northern portion of the East Stepovak Section, as described in 5 AAC 09.350 (36)(B) are closed to commercial salmon fishing to protect schooling chum salmon.

AIRCRAFT

As specified in 5 AAC 09.378, a person may not use or employ an aircraft one hour before, during, and one hour after a commercial salmon fishing period to locate salmon for the commercial taking or to direct commercial fishing operations in the Alaska Peninsula Area.

REFERENCES CITED

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TABLES AND FIGURES

Table 1.-Southeastern District Mainland commercial fishing effort and assignment of sockeye salmon harvests June 1-July 25, 1985-2005.

Year	Effort				Northwest Stepovak			SEDM minus Northwest Stepovak		SEDM		Total Catch
	Gillnet		Seine		Total	"Local"	Chignik Bound	Chignik		Chignik		
	Permits	Landings	Permits	Landings				"Local"	Bound	"Local"	Bound	
1985 ^a	49	367	23	51	16,681	16,681	0	12,855	51,421	29,536	51,421	80,957
1986	42	616	18	29	59,025	59,025	0	29,501	118,006	88,526	118,006	206,532
1987	53	528	6	9	61,287	61,287	0	36,722	146,886	98,009	146,886	244,895
1988	41	300	16	45	57,010	57,010	0	4,830	19,320	61,840	19,320	81,160
1989	42	248	25	54	83,618	83,618	0	1,121	4,485	84,739	4,485	89,224
1990	46	277	69	131	3,279	3,279	0	32,609	128,599	35,888	128,599	164,487
1991	59	747	39	71	98,834	98,834	0	38,179	152,714	137,013	152,714	289,727
1992 ^b	59	650	6	14	113,428	101,198	12,232	20,403	81,613	121,599	93,845	215,444
1993	64	763	53	82	73,747	54,955	18,792	27,436	109,744	82,391	128,536	210,927
1994	56	678	0	0	89,522	52,880	36,642	26,427	105,708	79,307	142,350	221,657
1995	58	718	26	30	62,598	51,723	10,875	19,357	77,426	71,079	88,301	159,380
1996 ^c	64	1,164	25	46	137,925	127,645	10,280	29,230	116,921	156,875	127,201	284,076
1997	57	1,173	12	23	304,865	304,865	0	0	0	304,865	0	304,865
1998	45	340	18	23	33,515	33,515	0	16,723	66,893	50,238	66,893	117,131
1999	63	649	27	30	32,884	6,577	26,307	36,828	147,313	43,405	173,621	217,026
2000	64	1,163	26	31	89,857	76,500	13,357	22,516	90,062	99,016	103,419	202,435
2001	51	551	16	20	42,681	42,681	0	12,785	51,141	55,466	51,141	106,607
2002	53	1,001	12	25	85,086	76,767	8,319	13,677	54,706	90,443	63,026	153,469
2003	48	1,035	11	20	142,410	136,391	6,019	16,006	64,025	152,397	70,044	222,441
2004	42	763	2	10	150,399	143,161	7,238	12,029	48,117	155,190	55,355	210,545
2005	43	420	21	30	58,243	29,865	28,378	37,382	149,528	67,247	177,906	245,153
Average:												
1985-1991	47	440	28	56	54,248	54,248	0	22,260	88,776	76,507	88,776	165,283
1992-1995	59	702	21	32	84,824	65,189	19,635	23,406	93,623	88,594	113,258	201,852
1996-1997	61	1,169	19	35	221,395	216,255	5,140	14,615	58,461	230,870	63,601	294,471
1998-2005	51	740	17	24	79,384	68,182	11,202	20,993	83,973	89,175	95,176	184,351
1996-2005	53	826	17	26	107,787	97,797	9,990	19,718	78,871	117,514	88,861	206,375

^a From 1985 through 1991, the Chignik contribution was 80% of the sockeye salmon harvested in Beaver Bay, Balboa Bay, Southwest Stepovak, Stepovak Flats, and East Stepovak Sections.

^b From 1992 through 1995, the Chignik contribution was 80% of the sockeye salmon harvested in the Southeastern District Mainland fishery, except Orzinski Bay where 100% of the sockeye salmon are considered local production.

^c Since 1996, the Chignik contribution is 80% of the sockeye harvested in Southeastern District Mainland fishery, except in the Northwest Stepovak Section where beginning July 1, 100% of the sockeye salmon are considered local.

Table 2.-Sockeye salmon interim escapement requirements for Orzinski Lake.

Time Period Ending Date	Escapement Objective for Period Ending	Cumulative Escapement Objective
1-Jul	1,500-2,000	1,500-2,000
9-Jul	2,250-3,000	3,750-5,000
16-Jul	3,750-5,000	7,500-10,000
23-Jul	3,750-5,000	11,250-15,000
7-Aug	3,750-5,000	15,000-20,000
Season Total Goal		15,000-20,000

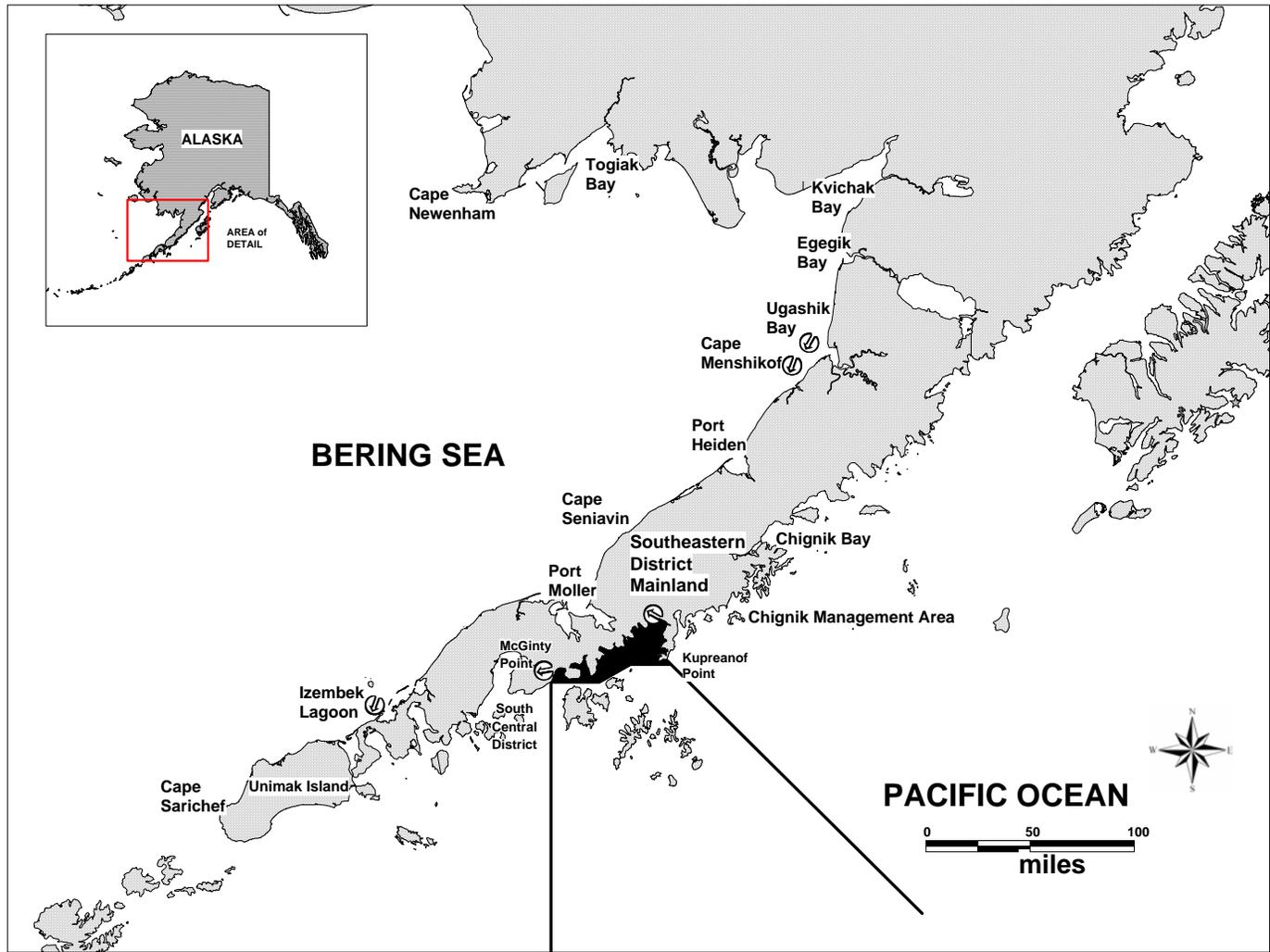


Figure 1.-Map of the Alaska Peninsula Management Area with the Southeastern District Mainland defined.

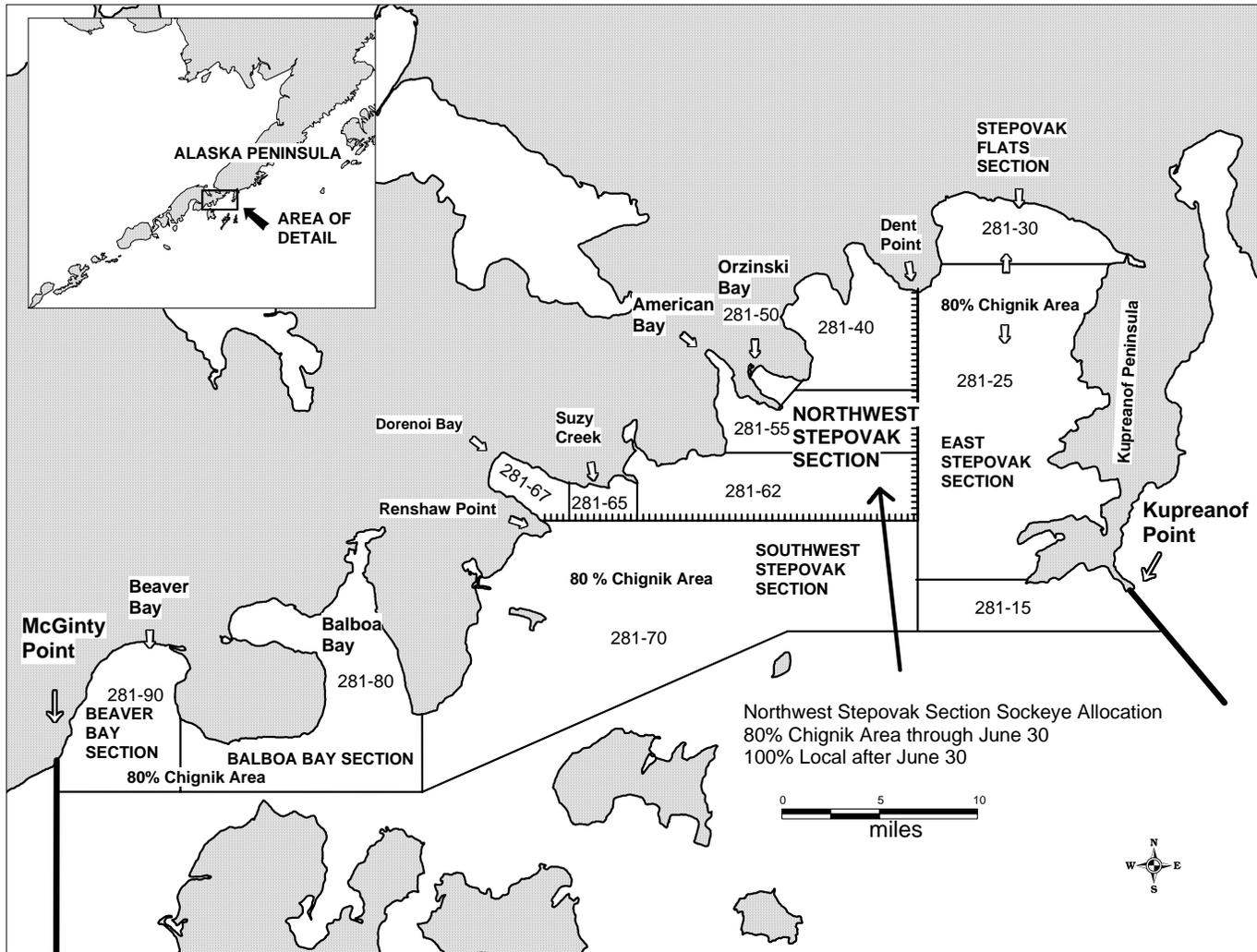


Figure 2.-Map of the Southeastern District Mainland from Kupreanof Point to McGinty Point with the salmon fishery sections defined.

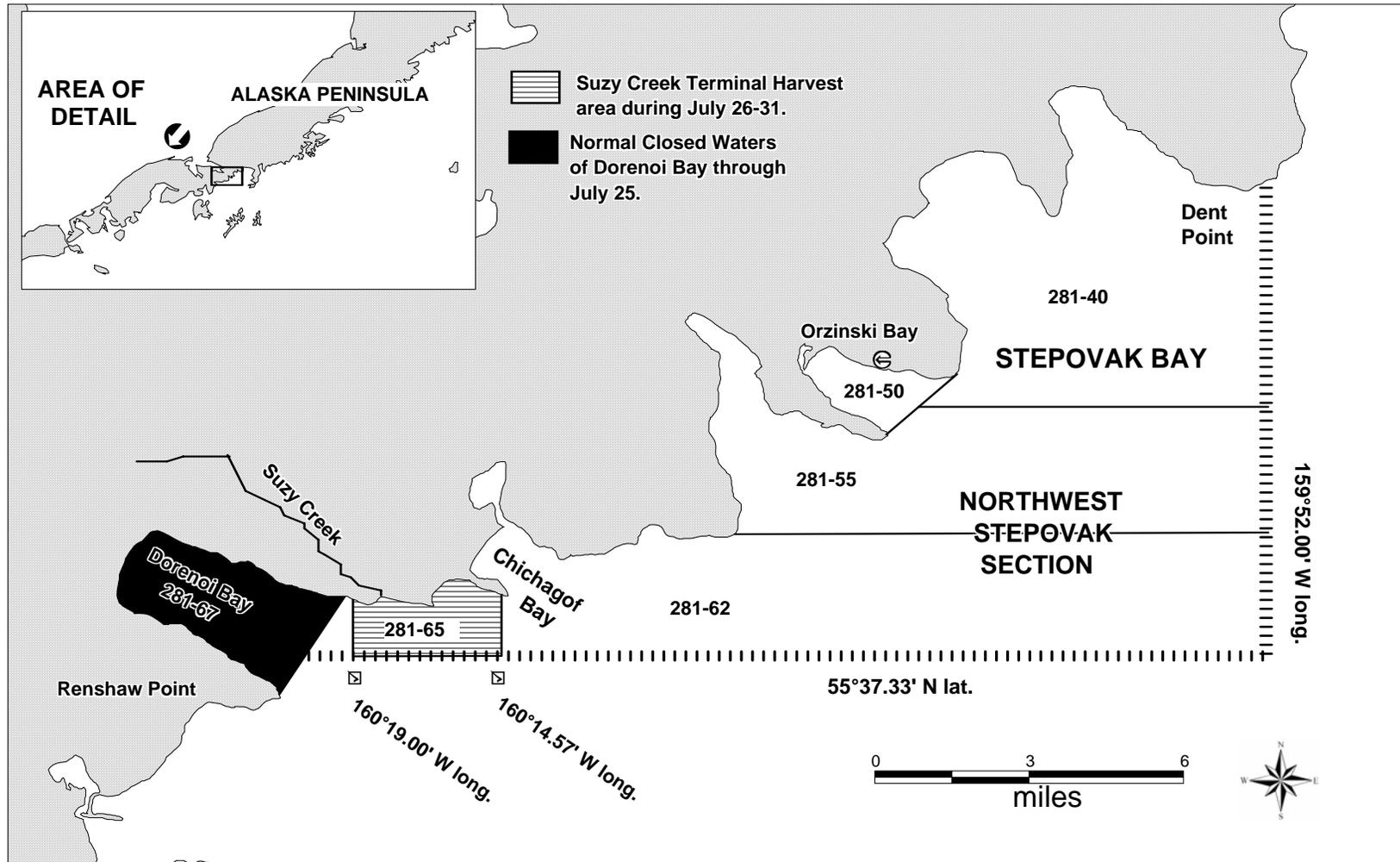


Figure 3-Map of the Northwest Stepovak Section, with Dorenoi Bay closed waters through July 25, and Suzy Creek Post-June terminal harvest area highlighted.

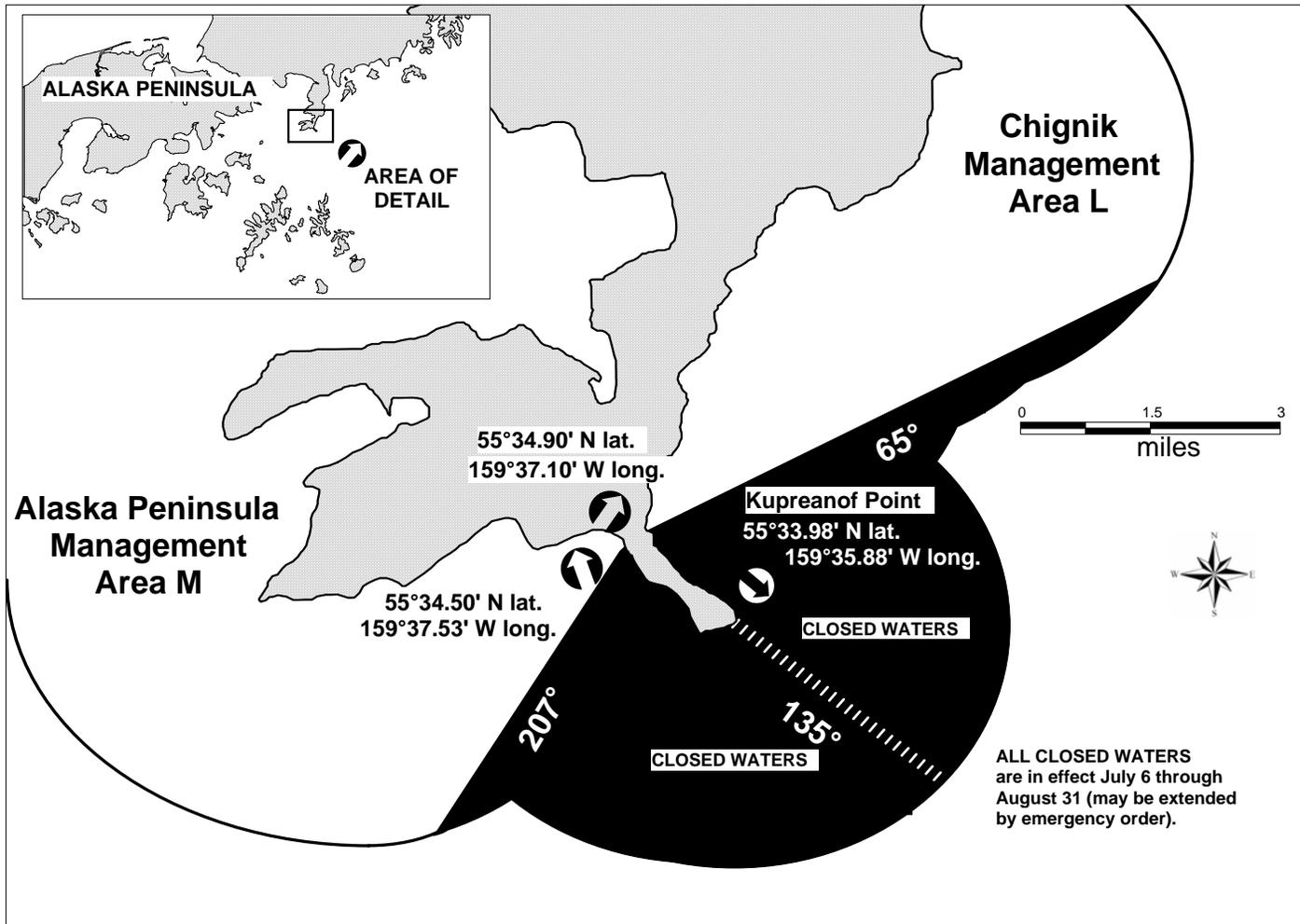


Figure 4-Map of the Kupreanof Point area with closed waters defined.

**APPENDIX A: SOUTHEASTERN DISTRICT MAINLAND SALMON
MANAGEMENT PLAN**

5 AAC 09.360. SOUTHEASTERN DISTRICT MAINLAND SALMON MANAGEMENT PLAN

(a) This plan pertains to the management of the interception of Chignik River sockeye salmon caught in the Southeastern District Mainland fishery: East Stepovak, Stepovak Flats, Northwest Stepovak, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections. Before July 11, only set gillnet gear may be used in these sections. For the purpose of this plan, local runs include only those salmon in the waters:

- 1) beginning July 1, in the Northwest Stepovak Section described 5 AAC 09.200(f)(5):
- 2) the Stepovak Flats Section as described in 5 AAC 09.200(f)(6).

(b) In years when a harvestable surplus for the first (Black Lake) and second (Chignik Lake) runs of Chignik River system sockeye salmon is expected to be less than 600,000, no commercial salmon fishery is allowed in the East Stepovak, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections, and in the Northwest Stepovak Section, as described in 5 AAC 09.200(f)(5) excluding Orzinski Bay of the Northwest Stepovak Section north of a line from Elephant Point at 55°41.92' N lat., 160°03.2' W long., to Waterfall Point at 55°43.18' N lat., 160°01.13' W long., until a harvest of 300,000 sockeye salmon is achieved in the Chignik Area, as described in 5 AAC 15.100. After July 8, if at least 300,000 sockeye salmon have been harvested in the Chignik Area, and if escapement goals are being met, the department shall manage the fishery so that the number of sockeye salmon harvested in the Chignik Area will be at least 600,000 and the number of sockeye salmon harvested in the East Stepovak, Stepovak Flats, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections and before July 1 in the Northwest Stepovak Section, approaches as near as possible six percent of the total Chignik sockeye salmon catch.

(c) In years when a harvestable surplus beyond escapement goals for the first and second runs of Chignik River system sockeye salmon is expected to be more than 600,000 but the first run fails to develop as predicted and it is determined that a total sockeye salmon harvest in the Chignik Area of 600,000 or more may not be achieved, the commercial salmon fishery in the East Stepovak, Stepovak Flats, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections, and in the Northwest Stepovak Section, excluding Orzinski Bay of the Northwest Stepovak Section north of a line from Elephant Point at 55°41.92' N lat., 160°03.20' W long., to Waterfall Point at 55°43.18' N lat., 160°01.13' W long., shall be curtailed in order to allow a harvest in the Chignik Area of 300,000 sockeye salmon through July 8 if that number of fish are determined to be surplus to the escapement goals of the Chignik River system. After July 8, if at least 300,000 sockeye salmon have been harvested in the Chignik Area, and if escapement goals are being met, the department shall manage the fishery so that the number of sockeye salmon harvested in the Chignik Area is at least 600,000 and the number of sockeye salmon harvested in the East Stepovak, Stepovak Flats, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections, and before July 1 in the Northwest Stepovak Section, approaches as near as possible six percent of the total Chignik sockeye salmon catch.

(d) In years when a harvestable surplus beyond the escapement goals for the first and second runs of Chignik River system sockeye salmon is expected to be more than 600,000 and the department determines that the runs are as strong as expected, the department shall manage the fishery so that the number of sockeye salmon taken in the East Stepovak, Stepovak Flats, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections, and before July 1 in the Northwest Stepovak Section, approaches as near as possible six percent of the total Chignik sockeye salmon catch.

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(e) Beginning July 1, the fishing schedule in the Northwest Stepovak Section, excluding the waters of Orzinski Bay located north of a line from Elephant Point at 55°41.92' N lat., 160°03.20' W long., to Waterfall Point at 55°43.18' N lat., 160°01.13' W long., may not be more than four 24-hour periods with no more than 48-hours continuous fishing during a seven-day period.

(f) The estimate of sockeye salmon destined for the Chignik River has been determined to be 80 percent of the sockeye salmon harvested in the East Stepovak, Stepovak Flats, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections, and before July 1 in the Northwest Stepovak Section. The sockeye salmon taken in the Northwest Stepovak Section beginning July 1 are considered to be 100% destined for Orzinski Bay.

(g) The total Chignik sockeye salmon catch constitutes those sockeye salmon caught within the Chignik Area, plus 80 percent of the sockeye salmon caught in the East Stepovak, Stepovak Flats, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections, and before July 1 in the Northwest Stepovak Section, as described in 5 AAC 09.200(f), plus 90 percent of the sockeye salmon caught in the Cape Igvak Section of the Kodiak Area. The percentage of Chignik sockeye salmon may be permitted to fluctuate above or below six percent at any time before July 25.

(h) This allocation method is in effect through July 25. The first fishing period of the commercial salmon fishing season in the East Stepovak, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections, and before July 1 in the Northwest Stepovak Section, may not occur before the first fishing period of the commercial salmon fishing season in the Chignik Area. After July 25, commercial salmon fishing in the entire Southeastern District Mainland area may be allowed for local stocks.

(i) During the period from approximately June 26 through July 8, the strength of the second run of the Chignik River system sockeye salmon cannot be evaluated. In order to prevent overharvest of the second run, the department may disallow or severely restrict commercial salmon fishing in the East Stepovak, Stepovak Flats, Southwest Stepovak, Balboa Bay, and Beaver Bay Sections during this period and from June 26 through June 30 in the Northwest Stepovak Section.

(j) The commissioner shall open all commercial salmon fishing periods by emergency order. Before commencement of the first commercial salmon fishing period of the season, the department shall give at least 24 hours notice. For subsequent fishing periods, the department shall give at least 12 hours notice. If an existing fishing period is extended, the department shall give notice of the extension as soon as possible before the end of the existing fishing period.

**APPENDIX B: CHIGNIK MANAGEMENT AREA SOCKEYE
SALMON FORECAST**

Appendix B1.-Chignik Management Area sockeye salmon forecast, 2006.

Forecast Area: Chignik

Species: Sockeye Salmon

Preliminary Forecast of the 2006 Run		Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:			
Early Run (Black Lake)	Total Run Estimate	1,210	506–1,905
	Escapement Goal	350	350–400
	Harvest Estimate ^a	855	
Late Run (Chignik Lake)	Total Run Estimate	282	74–490
	Escapement Objective ^b	250	250–300
	Harvest Estimate ^c	32	
Total Chignik System	Total Run Estimate	1,490	579–2,390
	Escapement Objective ^b	600	600–700
	Harvest Estimate ^a	887	

^a These figures include harvests of Chignik-bound sockeye salmon from the Southeastern District Mainland and the Cape Igvak fisheries; approximately 703 thousand sockeye salmon are projected to be harvested in the Chignik Management Area.

^b The Chignik Lake late-run escapement goal is 200,000 to 250,000 sockeye salmon, resulting in an escapement goal for the entire run of 550,000 to 650,000. However, managers try to achieve an additional escapement objective of 50,000 sockeye salmon in August and September.

^c No harvest of Chignik Lake late-run sockeye salmon was predicted to occur as the total run estimate does not allow for the achievement of the late-run escapement goals.

Forecast Methods

The forecasts for the 2006 early and late Chignik sockeye salmon runs were based on available data from 1980 to the present. Simple linear regressions were modeled using sibling, outmigration year, escapement age class, temperature data, and year class return relationships. Each regression model was assessed with standard regression diagnostic procedures. Regression models were only used in cases where the slope of the regression was significantly different from zero ($P < 0.25$). The variance of each estimate was calculated from the error structure of the regression. Prediction intervals were estimated at a coverage probability of 80 percent. Median estimators were used to estimate production of age classes where regression relationships were not significant.

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The predicted 2006 early-run ocean age three (3-ocean) sockeye salmon returns were estimated based on the abundance of prior ocean age two (2-ocean) sockeye salmon ($P = 2.2 \times 10^{-5}$). Eighty-percent prediction intervals were calculated using the variance of the regression model. Following non-significant regression results, the early-run ocean age one (1-ocean; ages 1.1 and 2.1), 2-ocean (ages 0.2, 1.2, 2.2, and 3.2), and ocean age four (4-ocean; ages 1.4 and 2.4) age class components were predicted by calculating the median returns. Prediction intervals for each median were calculated using the 10th and 90th percentiles of the returns.

Ocean age class relationships and temperature indices were analyzed for the late run forecast. Two-ocean sockeye salmon were predicted from prior year 1-ocean returns using simple linear regression, ($P = 2.1 \times 10^{-4}$). Three-ocean sockeye salmon were predicted by regressing the ratio between 3- and 2-ocean fish (same outmigration year) on a temperature index ($P = 0.003$). The temperature index was constructed using the average summer temperatures (May through September) from the corresponding outmigration year. Temperature data were obtained from the King Salmon Airport climate database. Four-ocean sockeye salmon were predicted from prior year 3-ocean returns using simple linear regression, ($P = 3.7 \times 10^{-3}$). Estimates of variance were calculated from each regression. Ocean age one sockeye salmon were predicted by calculating the median return and prediction intervals were calculated using the 10th and 90th percentiles of the returns. The variances associated with individual regression estimates by age class were summed to calculate 80 percent prediction intervals.

The total early- and late-run forecasts were calculated by summing individual and pooled age class estimates. When the median returns by age class were used, the 10th and 90th percentiles of the data were used to describe the range of the data. The variances associated with individual estimates were summed to estimate 80 percent prediction intervals, which were then added to the percentile estimates to calculate the forecast ranges. Regression and median estimates were summed to estimate the total Chignik watershed sockeye salmon run for 2006; 80 percent prediction intervals for the total run were calculated by combining the regression and median prediction intervals.

Forecast Discussion

The 2006 sockeye salmon run to the Chignik River is expected to be approximately 1.49 million fish. The early run is expected to be approximately 1.21 million fish. The late run is expected to be approximately 282 thousand fish. The 2006 sockeye salmon run to Chignik is expected to be approximately 963 thousand fish less than the recent 10-year average run (2.45 million) and 714 thousand fish less than the 2005 run (2.20 million).

The projected harvest estimate for the early run of 855 thousand fish is based on achievement of the lower end of the early-run escapement goal range of 350 thousand fish. The projected harvest estimate for the late run of 32 thousand is based on achievement of the lower end of the late-run management objective range through September 15 (250,000 sockeye salmon). Harvest estimates for the both runs include Chignik-bound sockeye salmon harvested in the Cape Igvak Section of the Kodiak Management Area and the Southeastern District Mainland of the Alaska Peninsula Management Area.

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Approximately 82% of the 2006 early run was estimated using ocean age class relationships. Using sibling relationships, the 2005 early run was overestimated by approximately 26 percent. Approximately 98 percent of the 2006 late run was estimated using simple linear regression relationships incorporating temperature indices. Climate indices were initially used in 2004 to forecast the 2005 Chignik late-run using ocean age class ratio simple regression models, which underestimated the late run by approximately 11 percent. Prior to 2004, median estimators have typically been used due to poor sibling relationships.

Available smolt data were analyzed and a significant multiple linear regression relationship was found using the total number of outmigrating smolt and a temperature index to predict the subsequent 3-ocean returns (about 82.6 percent of the run). This estimate was then expanded proportionally to account for other ocean ages not calculated by the simple regressions. The temperature index was constructed using the average temperatures during April through November from the corresponding outmigration year. Temperature data were obtained from the King Salmon Airport climate database. In 2005, returns were predicted using a different multiple regression approach which underestimated the total run by about 41 percent. The smolt-based forecast of the 2006 Chignik total sockeye salmon run is 954 thousand sockeye salmon, which is significantly less (533 thousand) than that predicted from ocean-age and sibling relationships and median estimates (1.49 million).

The disparity between the smolt forecast and the ocean age class forecast suggests the actual run may fall in the lower half of the forecast range. Given this ancillary information, our confidence in this forecast is fair.

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