Fishery Management Report No. 16-18

South Alaska Peninsula Salmon Management Strategy, 2016

by

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and

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May 2016

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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by

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The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone regional peer review.

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ABSTRACT

The South Alaska Peninsula Management Area (Area M) commercial salmon fisheries are regulated by 3 distinct management plans. The South Unimak and Shumagin Islands June fisheries occur from June 7 through June 29 and target sockeye salmon *Oncorhynchus nerka*. The June fisheries commence according to a schedule that varies by gear type. The post-June fishery may occur from July 6 through October 31 and is guided by the results of an immature salmon test fishery and the strength of local sockeye, chum *O. keta*, pink *O. gorbuscha*, and coho salmon *O. kisutch* returns. The Southeastern District Mainland (SEDM) is managed independently from the remainder of the South Alaska Peninsula fisheries from June 1 through October 31. A sockeye salmon allocation exists between the Chignik Management Area (CMA) and the SEDM where 7.6% of the sockeye salmon harvested in the CMA may be harvested in the SEDM. Of the sockeye salmon harvested in the SEDM during the allocation timeframe (June 1 through July 25), 80% are attributed to the allocation. After July 25, the SEDM is managed strictly on local stocks. This document summarizes the management strategy of the South Alaska Peninsula fisheries and outlines the requirements for industry participation in 2016.

Key words: Alaska Peninsula, Area M, Shumagin Islands, South Unimak, June fishery, post-June, Southeastern District Mainland, SEDM, commercial salmon fisheries, sockeye salmon, *Oncorhynchus nerka*, chum salmon, *O. keta*, pink salmon, *O. gorbuscha*, coho salmon, *O. kisutch*, management plan, Alaska Department of Fish and Game, Fishery Management Report, CMA, Chignik, forecasts

INTRODUCTION

The South Alaska Peninsula salmon management area consists of those waters south of the Alaska Peninsula bounded on the west by Scotch Cap and on the east by Kupreanof Point (Figure 1). Three management plans guide the Alaska Department of Fish and Game's (ADF&G) approach to managing salmon fisheries in this area annually; they are the *South Unimak and Shumagin Islands June Salmon Management Plan* (5 AAC 09.365), the *Post-June Salmon Management Plan* (5 AAC 09.366), and the *Southeastern District Mainland Salmon Management Plan* (5 AAC 09.360).

The South Unimak and Shumagin Islands June commercial salmon fisheries target sockeye salmon *Oncorhynchus nerka* and are in effect from June 7 through June 29. The South Unimak June fishery occurs in the Unimak and Southwestern districts, a portion of the South Central District, and Bechevin Bay Section (Figure 1). The Shumagin Islands June fishery includes the Shumagin Islands Section of the Southeastern District (Figure 1).

The *Post-June Salmon Management Plan* covers all waters of the South Alaska Peninsula management area (except the Southeastern District Mainland) from July 1 through October 31.

The Southeastern District Mainland (SEDM) fishery occurs in the northern portion of the Southeastern District between McGinty Point in the west and Kupreanof Point in the east (Figures 2 and 3). The Chignik Management Area (CMA; Area L) lies immediately to the east of the SEDM (Figure 2). The SEDM is further subdivided into 6 sections: the Beaver Bay, Balboa Bay, Southwest Stepovak, Northwest Stepovak, East Stepovak, and Stepovak Flats sections (Figure 3). ADF&G will manage the SEDM fishery based on 3 distinct conditions and timeframes: 1) the strength of Chignik sockeye salmon stocks, 2) the strength of Orzinski Lake sockeye salmon in the Northwest Stepovak Section (NWSS) from July 1 through July 25, and 3) abundance of local coho *O. kisutch*, pink *O. gorbuscha*, and chum salmon *O. keta* stocks after July 25. From June 1 through July 25 (June 1 through June 30 in the NWSS), the SEDM fishery is allocated 7.6% of the total CMA sockeye salmon harvest. From July 1 through July 25, NWSS is managed based on the strength of sockeye salmon returning to Orzinski Lake. In NWSS,

harvest during the June 1 through July 25 timeframe has ranged from no commercial salmon harvest to over 300,000 sockeye salmon harvested.

This document provides commercial fishermen and processors with the ADF&G harvest strategy for the South Alaska Peninsula salmon fisheries. It also outlines the requirements of the industry to participate in these fisheries as well as how to provide information to ADF&G.

ANNOUNCEMENTS

Inseason announcements will be broadcast on radio station KSDP AM 830 KHz in Sand Point and rebroadcast over K201DA FM 88.1 MHz in King Cove, as well as on marine VHF channels 6 and 73 daily at 9:30 AM and 5:00 PM. Recorded information may also be obtained by calling the ADF&G recorder phone in Sand Point at (907) 383-2334 (383-ADFG) and in Cold Bay at (907) 532-2419. During the 2016 season, inseason harvest reports and fishery announcements will be available at the Commercial Fisheries website: http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareaakpeninsula.salmon.

HARVEST REPORTING

As required by 5 AAC 39.130(c), buyers, transporters, and catcher/processors must report their daily salmon harvest/purchases by species (in both numbers of fish and pounds), statistical area, and number of deliveries by gear type to the ADF&G office in Sand Point or Cold Bay by 10:00 AM the day following the delivery. Earlier reporting is appreciated and helps to manage an orderly fishery. Buyers may contact ADF&G offices in Cold Bay or Sand Point with their harvest information by phone, email, fax, and VHF channels 6 and 73.

Sand Point	Phone: 907-383-2066	Fax: 907-383-2606
Lisa Fox	E-mail: elisabeth.fox@alaska.gov	
Charles Russell	E-mail: charlie.russell@alaska.gov	
Cold Bay	Phone: 907-532-2419	Fax: 907-532-2470

Fish tickets must be received in the ADF&G office in Sand Point or Cold Bay (listed below) within 7 days of the purchase date (5 AAC 39.130(c)). Properly filled out fish tickets are essential to the management of these fisheries, and an informational packet containing detailed instructions for filling out and submitting fish tickets is available to all fish transporters, tender operators, and processor/buyers at ADF&G offices in Sand Point and Cold Bay.

Alaska Department of Fish and Game
P.O. Box 129
Sand Point, AK 99661

Alaska Department of Fish and Game
P.O. Box 50
Cold Bay, AK 99571

ALASKA BOARD OF FISHERIES REGULATION CHANGES FROM THE FEBRUARY 2016 MEETING

During the February 2016 Alaska Peninsula, Aleutian Islands, and Chignik meeting, the Alaska Board of Fisheries (BOF) made changes to the *South Unimak and Shumagin Islands June Salmon Management Plan* (5AAC 09.365) and the *Post-June Salmon Management Plan for the South Alaska Peninsula* (5AAC 09.366) by adopting regulation to limit the number of sockeye salmon harvested in the Western Alaska Salmon Stock Identification Program (WASSIP) described "Dolgoi Island Area" (statistical areas 283-15 through 283-26 and 284-36 through 284-42; Figure 4). From June 1 through July 25, there is a harvest limit of 191,000 sockeye salmon that can be harvested in these areas, based on fish ticket information. Once this harvest limit is reached, the portion of the West Pavlof Bay Section south of Black Point (statistical area 283-26) and waters of the Volcano Bay Section (statistical areas 284-37 through 284-39) will be closed to commercial salmon fishing through July 25 (Figure 4). However, the portion of West Pavlof Bay Section south of Black Point (statistical area 283-26) may reopen to commercial salmon fishing on July 17 (Figure 4). All other statistical areas will be managed in accordance with each prescribed management plan.

In addition to the changes made in the "Dolgoi Islands Area," BOF also repealed the minimum mesh size of drift gillnet gear during the post-June fisheries. There is now no minimum mesh size in Area M for drift gillnet gear.

The area wide pink salmon sustainable escapement goal was consolidated for both even and odd years to a range of 1,750,000 to 4,000,000 fish.

2016 MANAGEMENT PLANS

JUNE SALMON FISHERY

The *South Unimak and Shumagin Islands June Salmon Management Plan* (5 AAC 09.365) is in effect from June 7 through June 29. Complete details can be found in the Alaska Peninsula commercial salmon fishing regulations (5 AAC 09.365) available at ADF&G offices.

The South Unimak June fishery includes the following locations (Figures 1 and 2):

a. Unimak District as described in 5 AAC 09.200(c),

b. Bechevin Bay Section as described in 5 AAC 09.200(b)(2),

c. Southwestern District as described in 5 AAC 09.200(d), and

d. West Pavlof Bay and East Pavlof Bay sections of the South Central District as described in 5 AAC 09.200(e)(1) and (2).

The Shumagin Islands fishery includes the Shumagin Islands Section of the Southeastern District (Figure 2) as described in 5 AAC 09.200(f)(3).

Fishing periods for the 2016 June **set gillnet** fishery will be as follows (Figure 5):

Dates and Times	Duration
6:00 AM Tuesday, June 7 until 10:00 PM Friday, June 10	88 hours
6:00 AM Sunday, June 12 until 10:00 PM Wednesday, June 15	88 hours
6:00 AM Friday, June 17 until 10:00 PM Monday, June 20	88 hours
6:00 AM Wednesday, June 22 until 10:00 PM Saturday, June 25	88 hours
6:00 AM Monday, June 27 until 10:00 PM Wednesday, June 29	64 hours

Fishing periods for the 2016 June **seine and drift gillnet** fishery will be as follows (Figure 6):

Dates and Times	Duration
6:00 AM Friday, June 10 until 10:00 PM Monday, June 13	88 hours
6:00 AM Wednesday, June 15 until 10:00 PM Saturday, June 18	88 hours
6:00 AM Monday, June 20 until 10:00 PM Thursday, June 23	88 hours
6:00 AM Saturday, June 25 until 10:00 PM Tuesday, June 28	88 hours

In addition to the scheduled fishing periods during the month of June, the harvest of sockeye salmon in the WASSIP described "Dolgoi Island Area" (statistical areas 283-15 through 283-26 and 284-36 through 284-42) will be monitored through fish ticket information. Once the harvest of sockeye salmon reaches 191,000 fish, the waters of the West Pavlof Bay Section south of Black Point (statistical area 283-26) and the waters of the Volcano Bay Section (284-37 through 284-39) will close to commercial salmon fishing for the remainder of the June fisheries (Figure 4).

Fishermen should be aware that waters closed to commercial salmon fishing, as specified under 5 AAC 09.350 are in effect during June.

Latitude and longitude coordinates in the Alaska Peninsula Management Area will be determined and enforced using the Global Positioning System (GPS; North American Datum of 1983).

POST-JUNE SALMON FISHERY

Immature Test Fishery

In order to reduce the incidental harvest of immature salmon, ADF&G will conduct a purse seine test fishery in the Shumagin Islands Section in early July, before the post-June fishery begins, to assess the abundance of immature salmon. If 100 or more immature salmon, per set, are present, the commercial fishery will be closed to purse seine gear in an area to be determined by ADF&G (5 AAC 09.366(i)). For the purpose of this management plan, "immature salmon, per set, are present" is defined as the number of Chinook *O. tshawytscha*, sockeye, coho, and chum salmon that are observed to be gilled in the seine web (5 AAC 09.366(i)). Test fishing is standardized to purse seine gear, conducting two 20-minute sets at Popof Head, Middle Set, and Red Bluff located on Popof Island. The commercial fishery may be constrained based on the abundance of immature salmon observed during the test fishery. Gillnet gear is permitted to fish in these areas during the presence of immature salmon because the larger mesh size permits immature salmon to pass through the nets.

Harvest Strategy for July

Commercial salmon fishing opportunities during the month of July will consist of one 33-hour fishing period, followed by a 63-hour closure, followed by six 36-hour fishing periods, separated by 60-hour closures (5 AAC 09.366(d)). The first post-June fishing period will be on July 6, pending the results from the immature test fishery. The first commercial fishing period of the July 22 through July 31 periods will begin at 6:00 AM on July 22 (5 AAC 09.366(d); Figure 7). The post-June fishery July fishing schedule will be as follows:

Dates and Times	Duration
6:00 AM Wednesday, July 6 until 3:00 PM Thursday, July 7	33 hours
6:00 AM Sunday, July 10 until 6:00 PM Monday, July 11	36 hours
6:00 AM Thursday, July 14 until 6:00 PM Friday, July 15	36 hours
6:00 AM Monday, July 18 until 6:00 PM Tuesday, July 19	36 hours
6:00 AM Friday, July 22 until 6:00 PM Saturday, July 23	36 hours
6:00 AM Tuesday, July 26 until 6:00 PM Wednesday, July 27	36 hours
6:00 AM Saturday, July 30 until 6:00 PM Sunday, July 31	36 hours

Under the current management plan, commercial salmon fishing is permitted to occur concurrently in both terminal and non-terminal areas during the scheduled openings for the month of July in all areas of the South Alaska Peninsula. Terminal harvest areas are depicted in Figures 8 through 12, and non-terminal harvest areas are depicted in Figures 11 and 12.

Additional fishing time in terminal harvest areas may also be provided during closures in the July fishing schedule based on local salmon stock strength, which is evaluated from harvest data, escapement counts, and aerial surveys. From July 6 through July 21, terminal harvest areas are Zachary Bay, Canoe Bay, Cold Bay, Thin Point, and Morzhovoi Bay sections and the East and West Pavlof Bay sections north of the latitude of Black Point (Figure 11). Terminal harvest areas during the July 22 through July 31 time period include those areas specified for the July 6 through July 21 period, as well as the Deer Island, Belkofski Bay, and Mino Creek–Little Coal Bay sections (Figure 12).

In addition to the scheduled fishing periods during the month of July, the harvest of sockeye salmon in the WASSIP described “Dolgoi Island Area” (statistical areas 283-15 through 283-26 and 284-36 through 284-42) will be monitored through fish ticket information from the opening of the commercial salmon season through July 25. Once the harvest of sockeye salmon reaches 191,000 fish, the waters of the West Pavlof Bay Section south of Black Point (statistical area 283-26) and the waters of the Volcano Bay Section (284-37 through 284-39) will close to commercial salmon fishing for the remainder of the post-June fisheries until July 26. However, the portion of the West Pavlof Bay Section south of Black Point (statistical area 283-26) will reopen to commercial salmon fishing on July 17 consistent with scheduled fishing periods during the post-June fishery. Beginning July 26, the waters of the Volcano Bay Section (284-37 through 284-39) will be managed consistent with the scheduled fishing periods during the post-June fishery (Figure 4). All terminal harvest areas will be managed as specified in 5AAC 09.366 (f) and (g).

Harvest Strategies after July

From August 1 through August 31, fishing periods in the South Alaska Peninsula will be based on the strength of local sockeye, coho, pink, and chum salmon.

From September 1 through October 31, fishing periods will be based primarily on coho salmon abundance, although late pink and chum salmon run strength may be considered when determining fishing time. Fishing effort typically declines during the fall fishery. With decreased fishing effort, ADF&G will not attempt to have concurrent openings between the Southeastern District and the remainder of the South Peninsula after September 1.

In an effort to allow enforcement activities during daylight hours, with minimum impact to legal fishing activities, fishing periods in August will open at 8:00 AM and close at 9:00 PM (5 AAC 09.366(c)(2)), and fishing periods in September and October will open at 9:00 AM and close at 8:00 PM (5 AAC 09.366(c)(3)).

Salmon Escapement Goals

Aerial surveys will be conducted by ADF&G staff to estimate the escapement of sockeye, coho, pink, and chum salmon on the South Alaska Peninsula. Information from these surveys will be used for inseason management of the South Alaska Peninsula commercial salmon fishery. Aerial survey methods can be found in Keyse et al. (2016).

Pink and chum salmon escapements are estimated using an indexed total escapement method, whereas sockeye salmon systems are estimated using peak escapements beginning in mid-July through mid-September. Due to the late run timing of coho salmon, limited survey data is gathered and no indexed total escapement can be calculated. The 2016 pink salmon SEG range for the South Alaska Peninsula is 1,750,000 to 4,000,000 fish. The pink escapement goal was consolidated to one goal for both even and odd years. The 2016 chum SEG ranges are 106,400–212,800 fish in the Southeastern District, 89,800–179,600 fish in the South Central District, and 133,400–266,800 fish in the Southwestern District (Table 1). There are three sockeye salmon SEGs in the South Alaska Peninsula; 15,000–20,000 fish at Orzinski Lake, 14,000–28,000 fish at Thin Point Lake, and 3,200–6,400 fish at Mortensens Lagoon (Schaberg et al. 2015; Table 1).

SOUTHEASTERN DISTRICT MAINLAND SALMON FISHERY

Under the current SEDM Salmon Management Plan (5 AAC 09.360):

1. The percentage of Chignik-bound sockeye salmon allocated to the SEDM fishery is 7.6% of the total number of sockeye salmon harvested in the CMA through July 25.
2. From June 1 through July 25, 80% of the sockeye salmon caught in the SEDM are considered to be Chignik-bound salmon, excluding NWSS (Figure 3) after July 1.
3. Beginning July 1, sockeye salmon caught in NWSS will not be counted toward the Chignik allocation. Fishing periods in NWSS after June 30 will be based on sockeye salmon escapement into Orzinski Lake and there may not be more than 96 hours of fishing time during a 7-day period.
4. If the Orzinski Lake escapement meets or exceeds 25,000 sockeye salmon, NWSS and Orzinski Bay may be opened as follows:

   (a) set gillnet gear may be operated continuously until midnight July 25;

(b) purse seine and hand purse seine gear may not be operated for more than 96 hours during a 7-day period.

5. The BOF established a closed waters area encompassing Kupreanof Point from July 6 through August 31 (Figure 13; 5 AAC 09.350(37)). ADF&G may extend the Kupreanof Point closed waters area through the end of the season by emergency order when the waters specified in 5 AAC 15.350(20) are closed to conserve coho salmon.
6. From July 26 through October 31, the fishery is managed for local pink, chum, and coho salmon stocks.
7. From July 26 through October 31, the fishery will be closed for at least one 36-hour period within a 7-day period.

Northwest Stepovak Section

The Orzinski Lake sockeye salmon SEG range is 15,000–20,000 fish (Schaberg et al. 2015). Based on aerial surveys and weir counts, ADF&G developed interim sockeye salmon escapement objectives for Orzinski Lake (Figure 14). ADF&G has operated a weir on the Orzinski Lake system every year since 1990 and plans to do so again in 2016.

Stepovak Flats Section

The Stepovak Flats Section is open to commercial salmon fishing concurrently with the rest of SEDM. Of the sockeye salmon harvested in the Stepovak Flats Section prior to July 26, 80% are assigned to the 7.6% allocation criteria stated in the current SEDM salmon management plan. The Stepovak Flats Section is closed to all commercial fishing from July 29 through October 31 to protect schooling chum salmon.

Chignik River Sockeye Salmon Forecast and SEDM Allocation

The 2016 Chignik River forecast for the early-run harvest estimate is 1,400,000 sockeye salmon, and the late-run harvest estimate is 783,000 sockeye salmon (Appendix A1). ADF&G will manage the fisheries so that the number of sockeye salmon harvested in CMA, for both runs combined, will be at least 600,000 fish and the harvest of sockeye salmon considered to be Chignik bound in the SEDM will approach, as near as possible, 7.6% of the total CMA sockeye salmon harvest through July 25.

If the Chignik River early run fails to develop as predicted, the department will curtail fishing in the SEDM, excluding Orzinski Bay, until at least 300,000 sockeye salmon have been harvested in the CMA through July 8. From approximately June 26 through July 8, the strength of the Chignik River sockeye salmon late-run cannot be accurately evaluated due to the mixing of early- and late-run stocks. During this transition period, ADF&G may close or restrict commercial salmon fishing in SEDM until the strength of the late-run has been determined. After July 8, if at least 300,000 sockeye salmon have been harvested in the CMA and escapement objectives are being met for the late run, the department will manage the fishery so that the number of sockeye salmon harvested in the CMA is at least 600,000. The number of sockeye salmon harvested in the SEDM before July 25 (before July 1 in the NWSS) will be managed so that 7.6% of the total harvest of Chignik River sockeye salmon is taken in the SEDM. However, the harvest in SEDM at any time before July 25 may be permitted to fluctuate above or below 7.6% of the Chignik Area harvest (5 AAC 09.360(g)).

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Keyse, M. D., C. W. Russell, and E. K. C. Fox. 2016. South Alaska Peninsula salmon annual management report, 2015. Alaska Department of Fish and Game, Fishery Management Report, No. 16-02, Anchorage.

Schaberg, K. L., H. Finkle, M. B. Foster, D. L. Tracy, and M. L. Wattum. 2015. Review of salmon escapement goals in the Alaska Peninsula and Aleutian Islands Management Areas, 2015. Alaska Department of Fish and Game, Fishery Manuscript No. 15-03, Anchorage.

TABLES AND FIGURES

Table 1.–South Alaska Peninsula pink, chum, and sockeye salmon escapement goals for 2016.

	Range
Pink Salmon (SEG)	
South Peninsula Total	1,750,000 to 4,000,000
Chum Salmon (SEGs)	
Southeastern District	106,400 to 212,800
South Central District	89,800 to 179,600
Southwestern District	133,400 to 266,800
Sockeye Salmon (SEGs)	
Orzinski Lake	15,000 to 20,000
Mortensens Lagoon	3,200 to 6,400
Thin Point	14,000 to 28,000

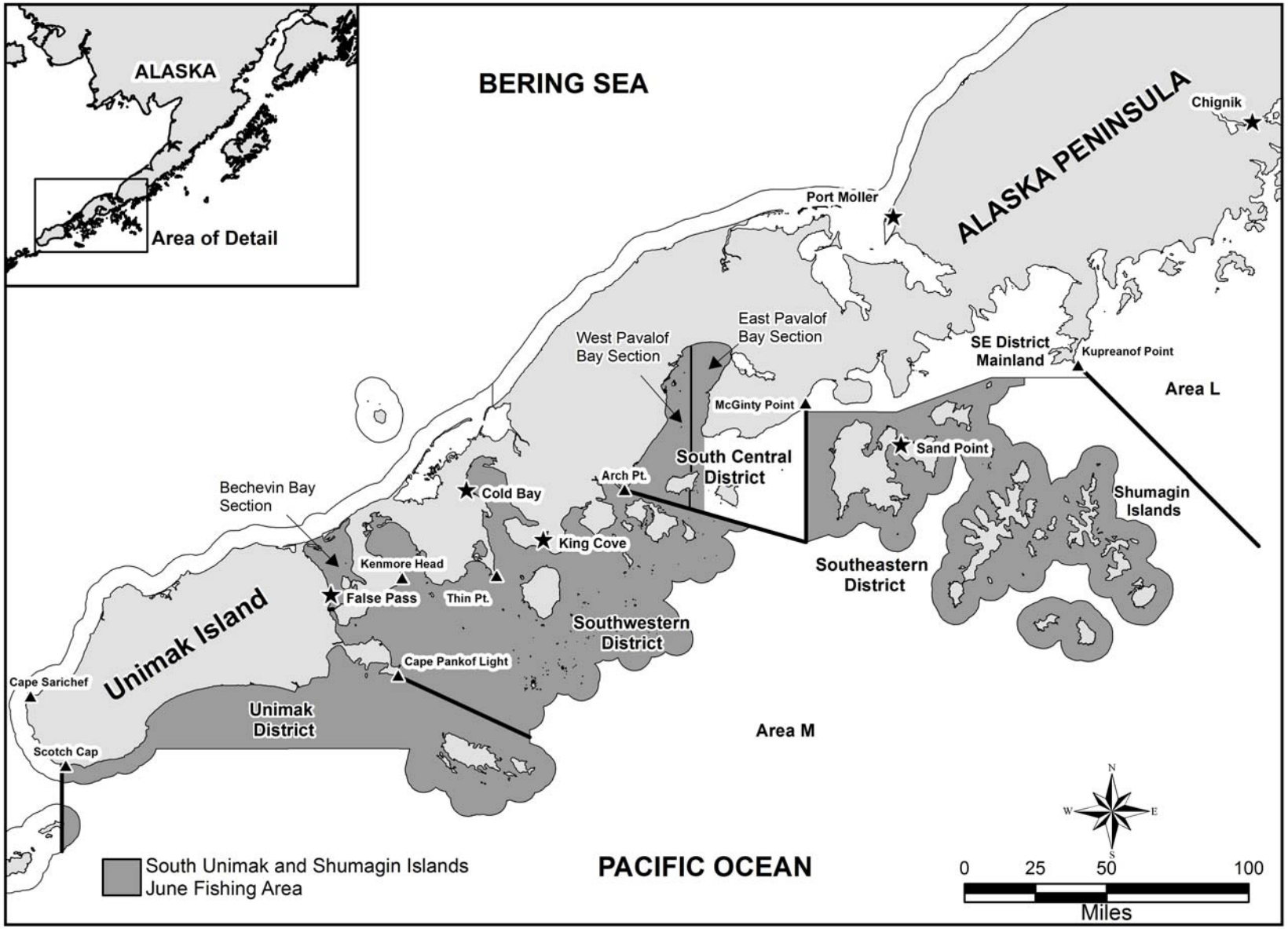

Figure 1.–Map depicting the locations of the South Unimak and Shumagin Islands June fisheries.

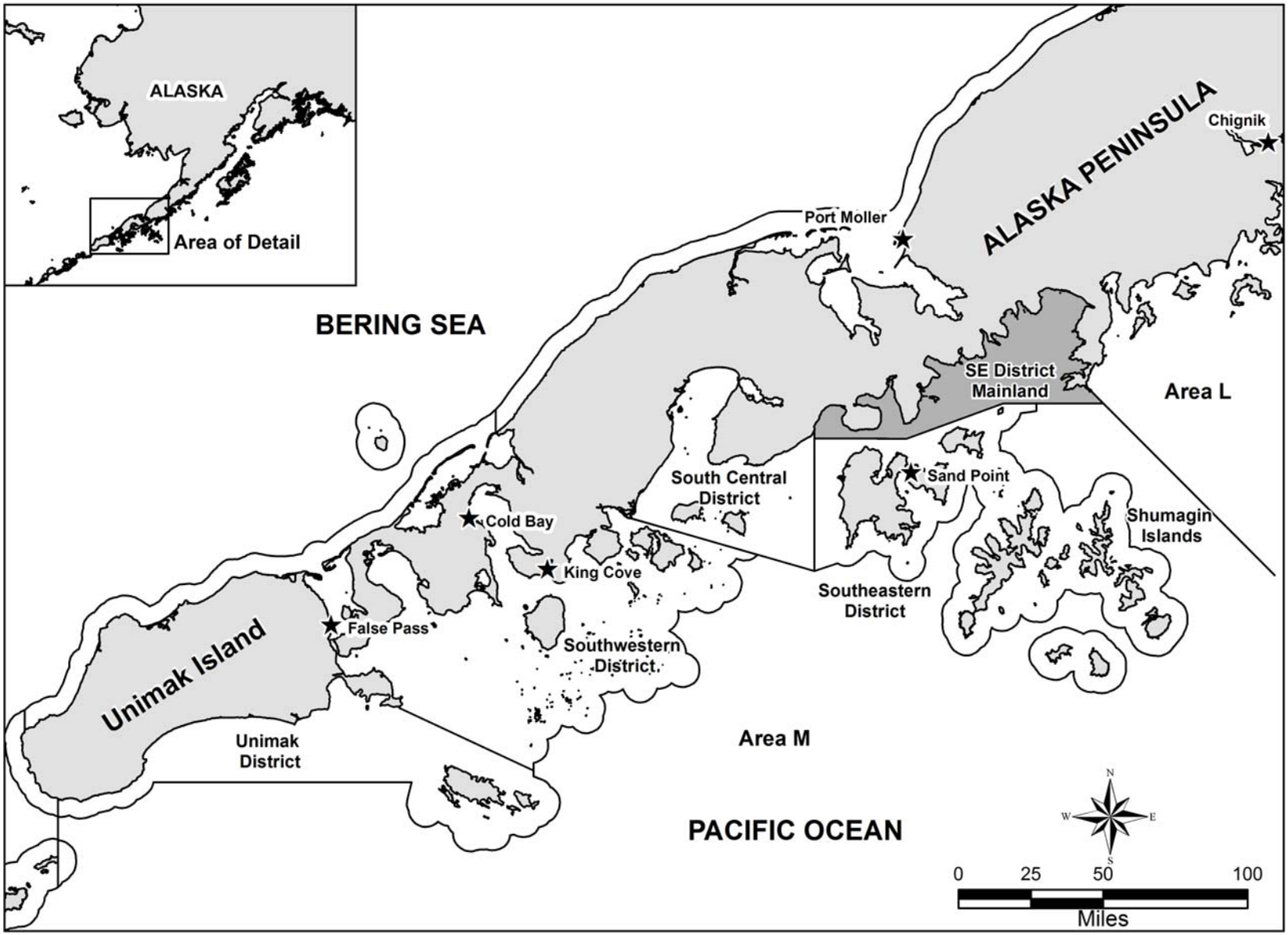

Figure 2.–Map of the South Alaska Peninsula Management Area with the Southeastern District Mainland defined.

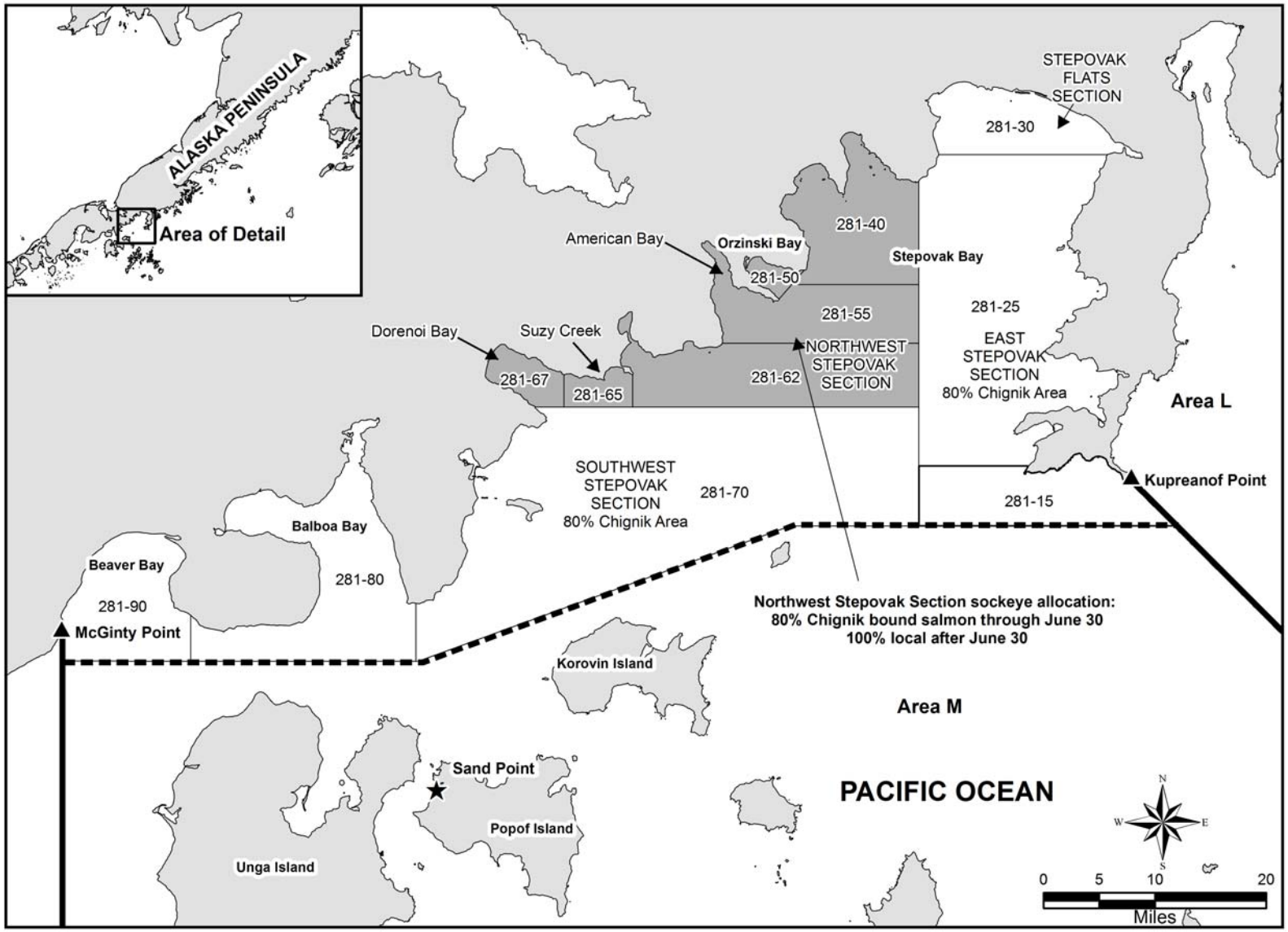

Figure 3.–Map of the Southeastern District Mainland from Kupreanof Point to McGinty Point with the commercial salmon fishery sections defined.

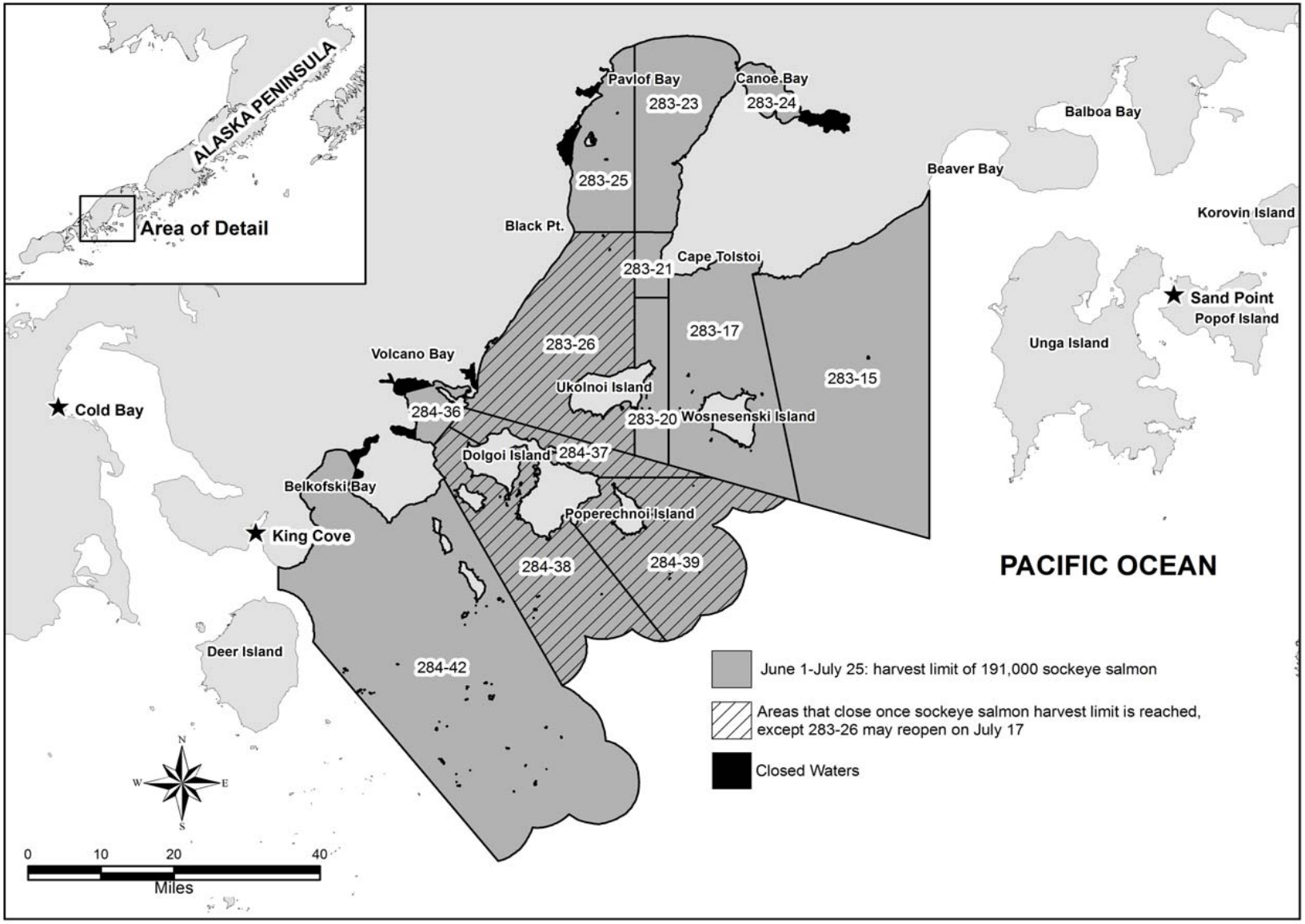

Figure 4.–Map depicting the statistical areas (283-15through 283-26 and 284-36 through 284-42) that contribute to the sockeye salmon harvest cap of 191,000 fish, and the areas that will close once the harvest cap is reached.

Figure 5.–Set gillnet fishing periods in the South Unimak and Shumagin Islands June fisheries, 2016.

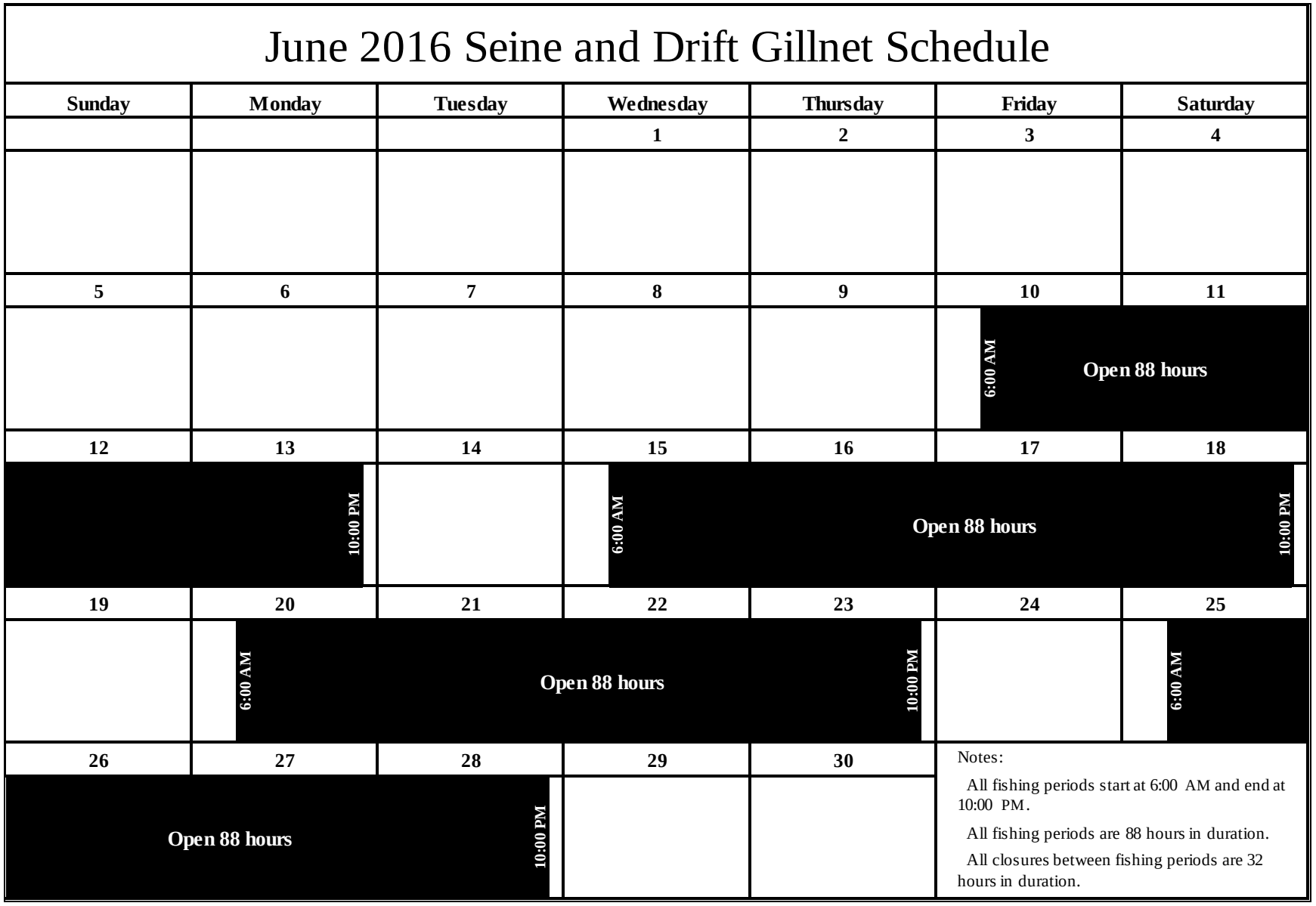

Figure 6.–Seine and drift gillnet fishing periods in the South Unimak and Shumagin Islands June fisheries, 2016.

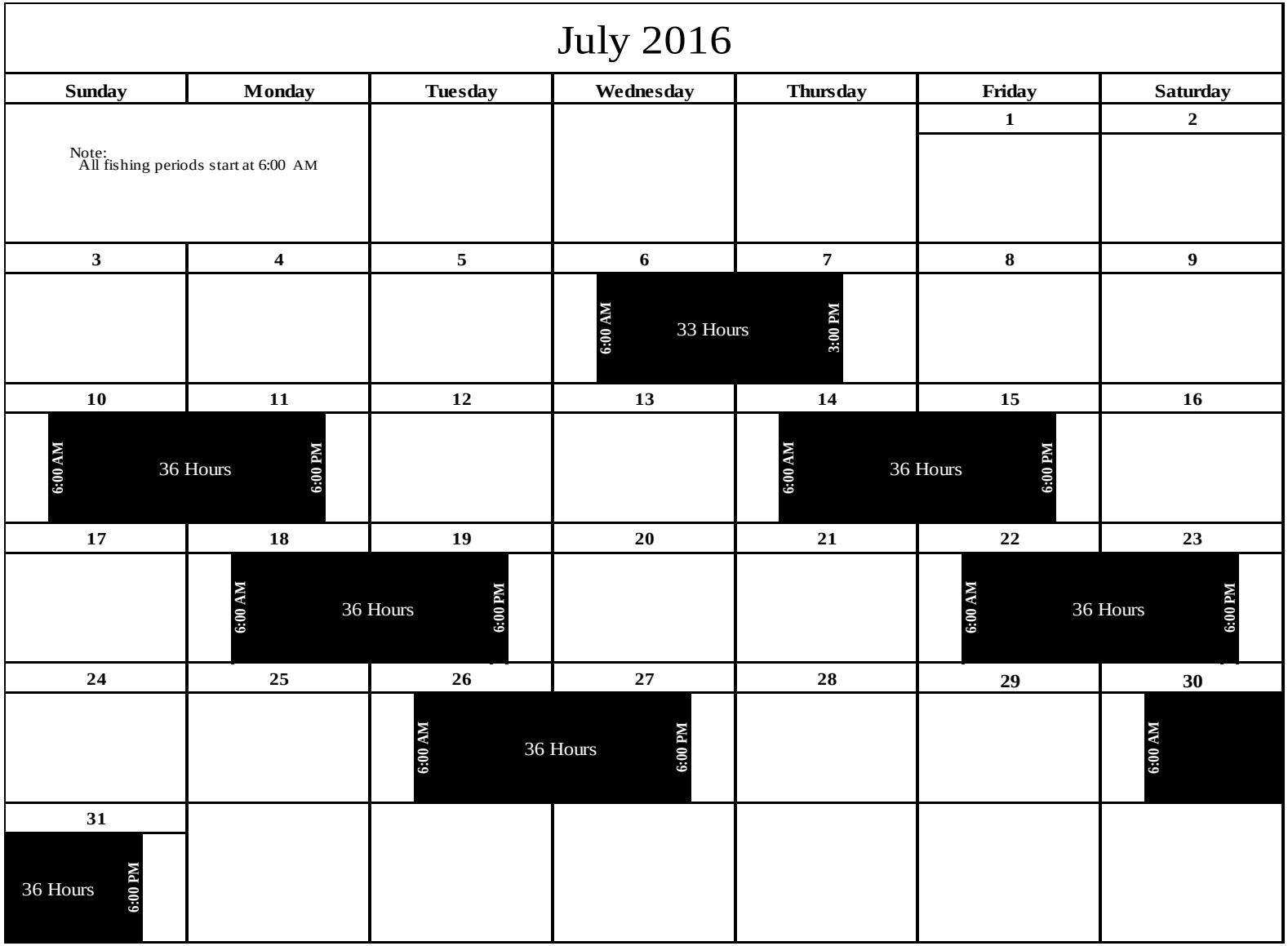

Figure 7.–South Alaska Peninsula July fishing schedule for non-terminal locations based on post-June salmon management plan, 2016.

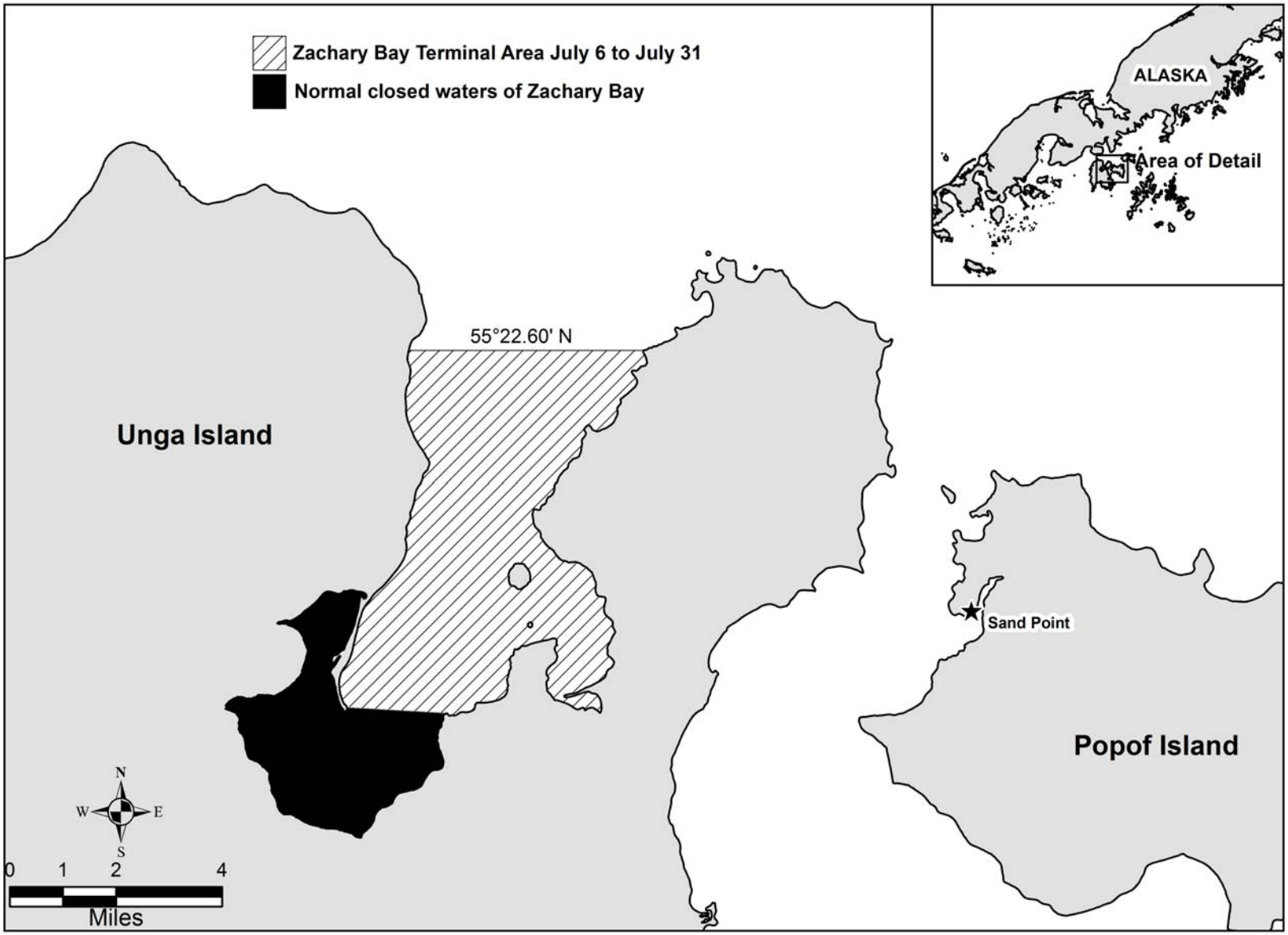

Figure 8.–Zachary Bay closed waters and post-June terminal fishing area.

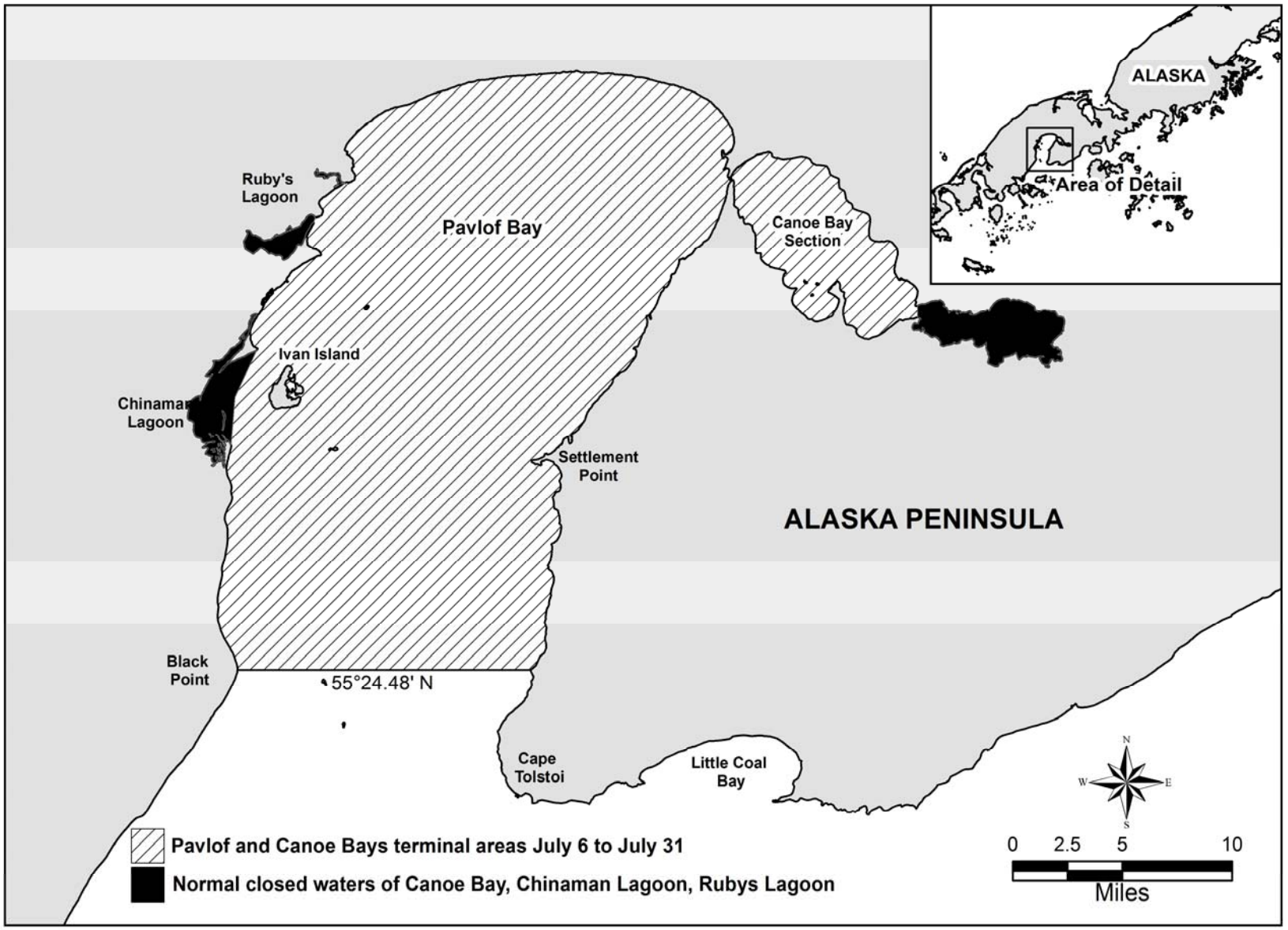

Figure 9.–Canoe Bay Section and Upper Pavlof Bay closed waters and post-June terminal fishing areas.

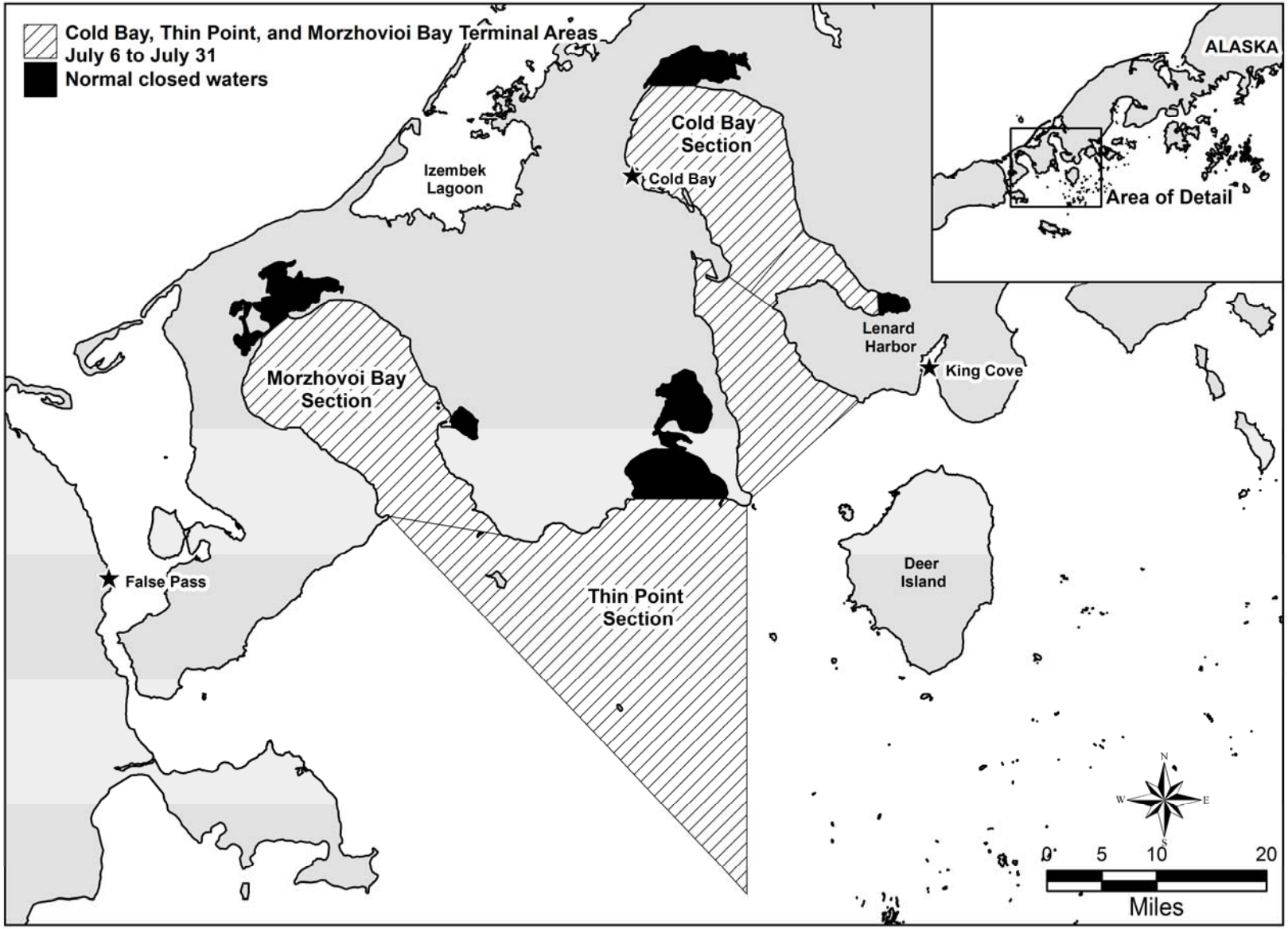

Figure 10.–Cold Bay, Thin Point, and Morzhovoi Bay sections closed waters and post-June terminal fishing areas.

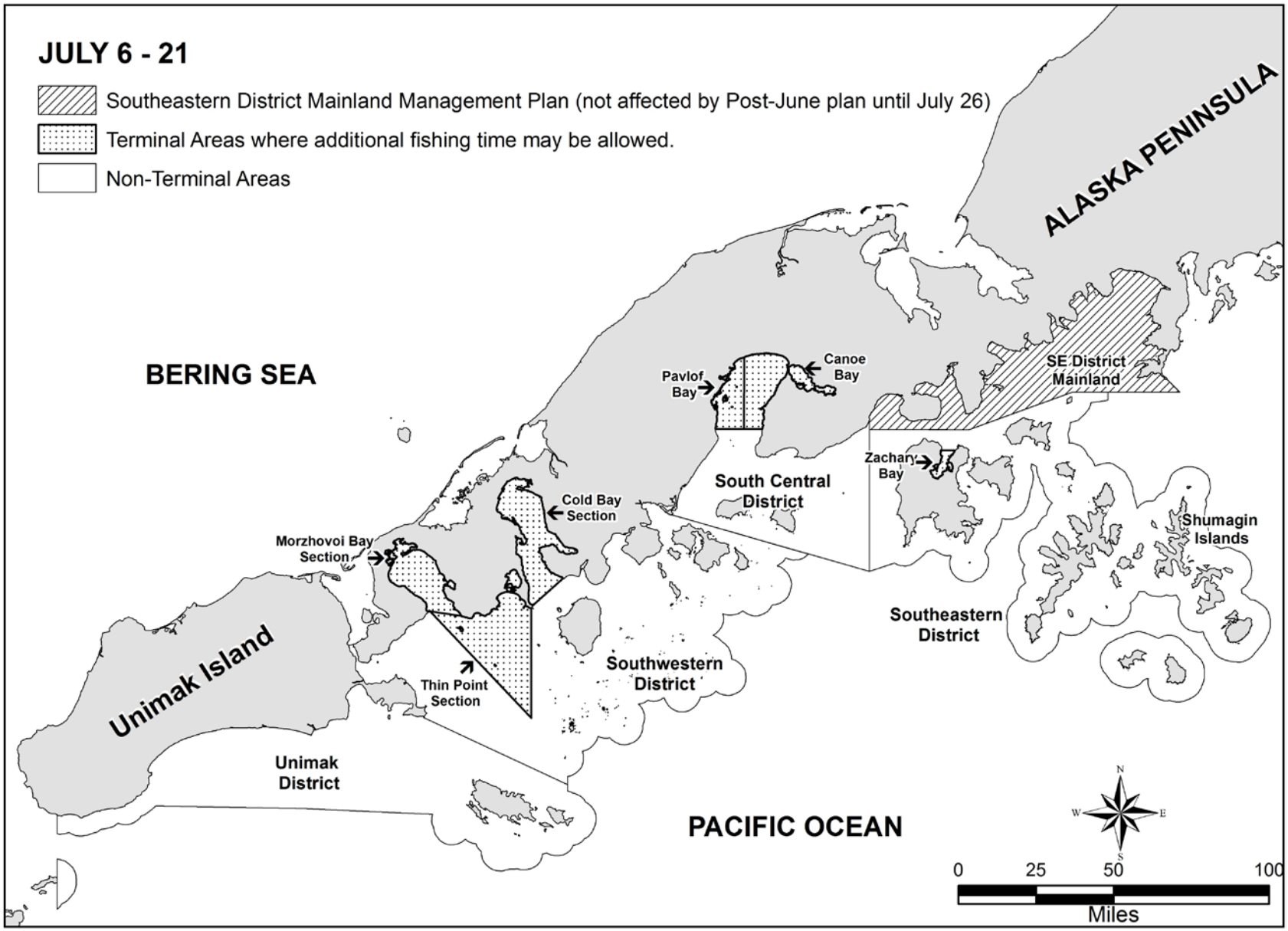

Figure 11.–South Alaska Peninsula post-June terminal fishing areas from July 6 through July 21.

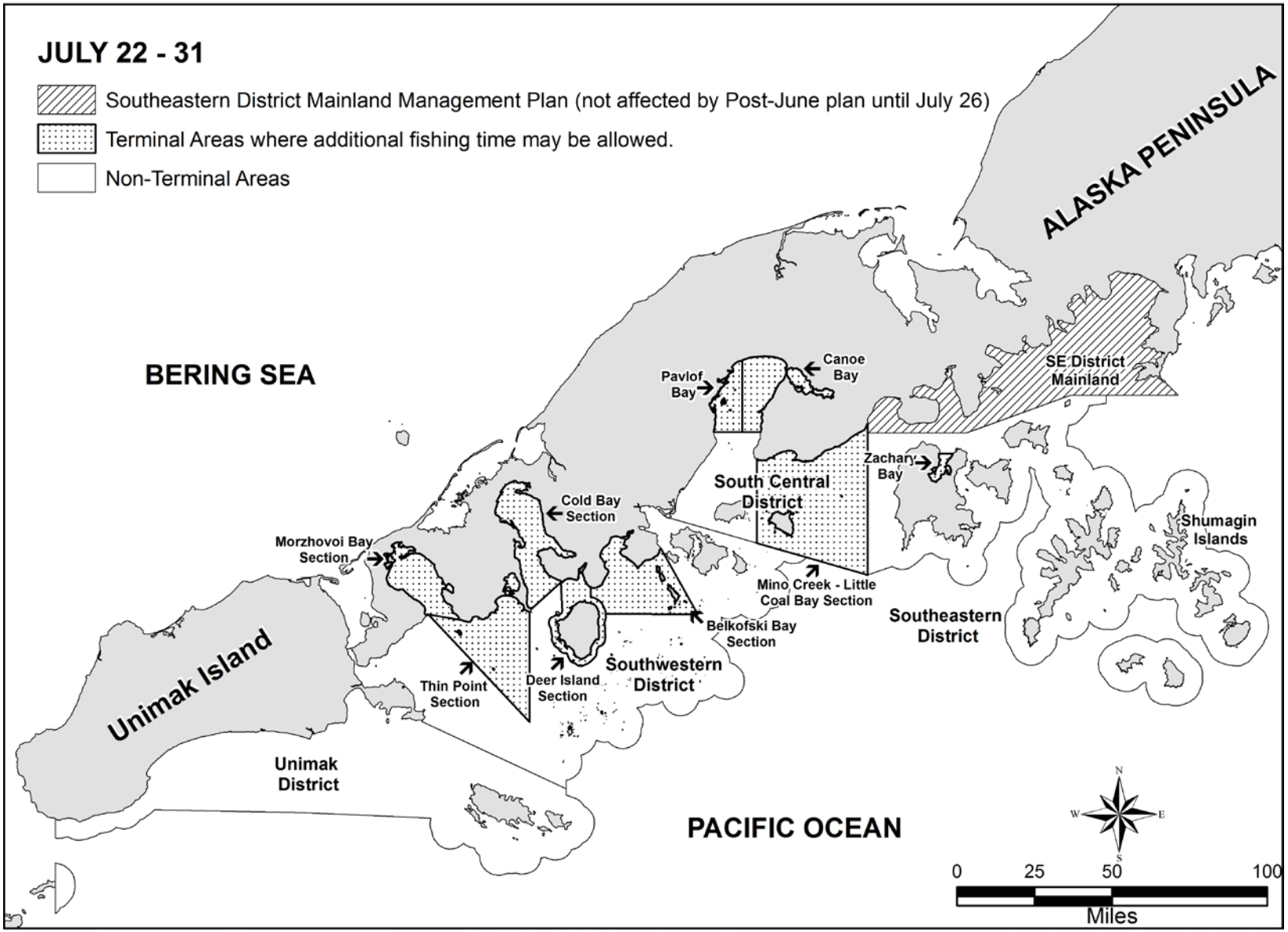

Figure 12.–South Alaska Peninsula post-June terminal fishing areas from July 22 through July 31.

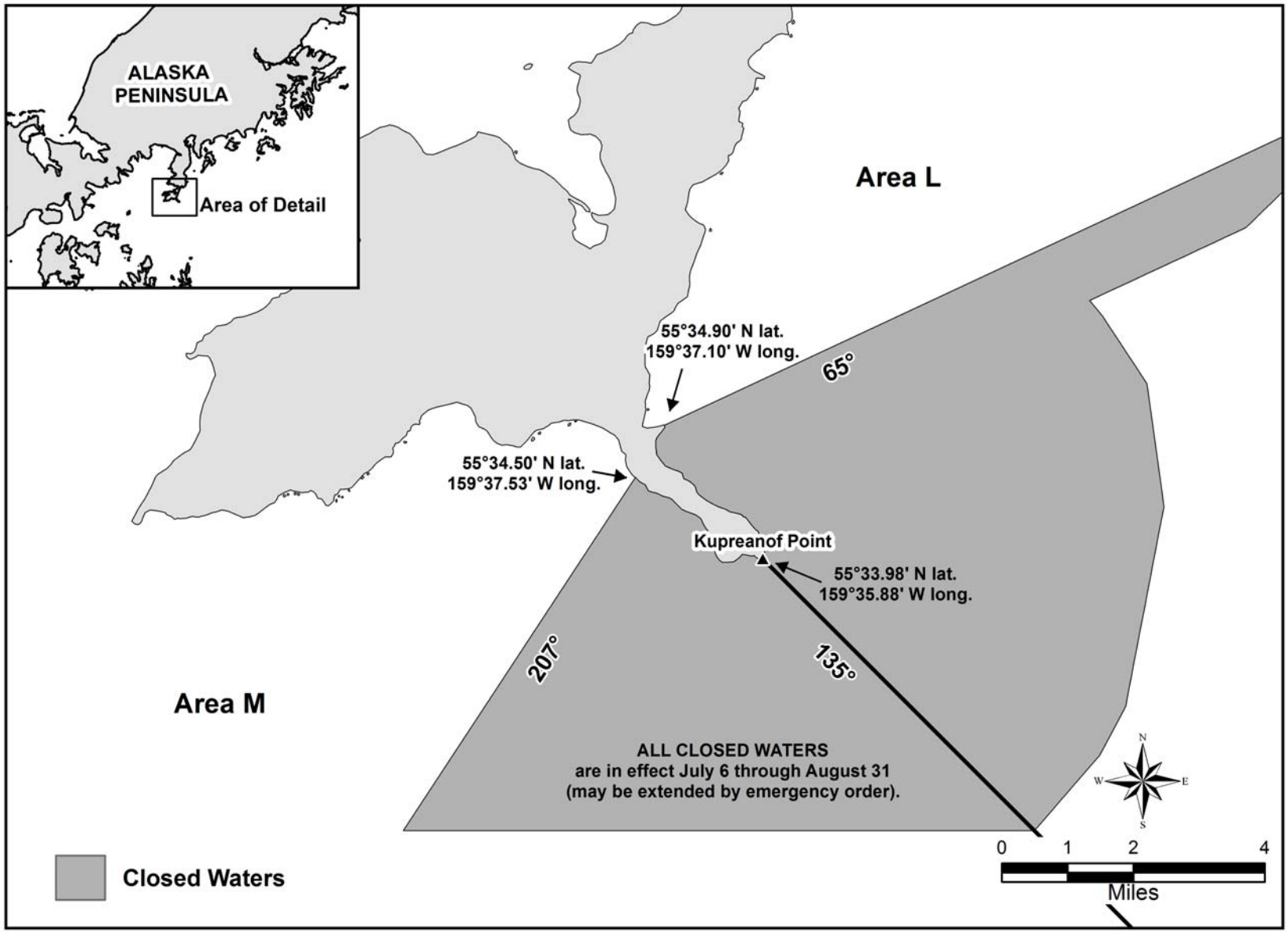

Figure 13.–Map of Kupreanof Point area closed waters.

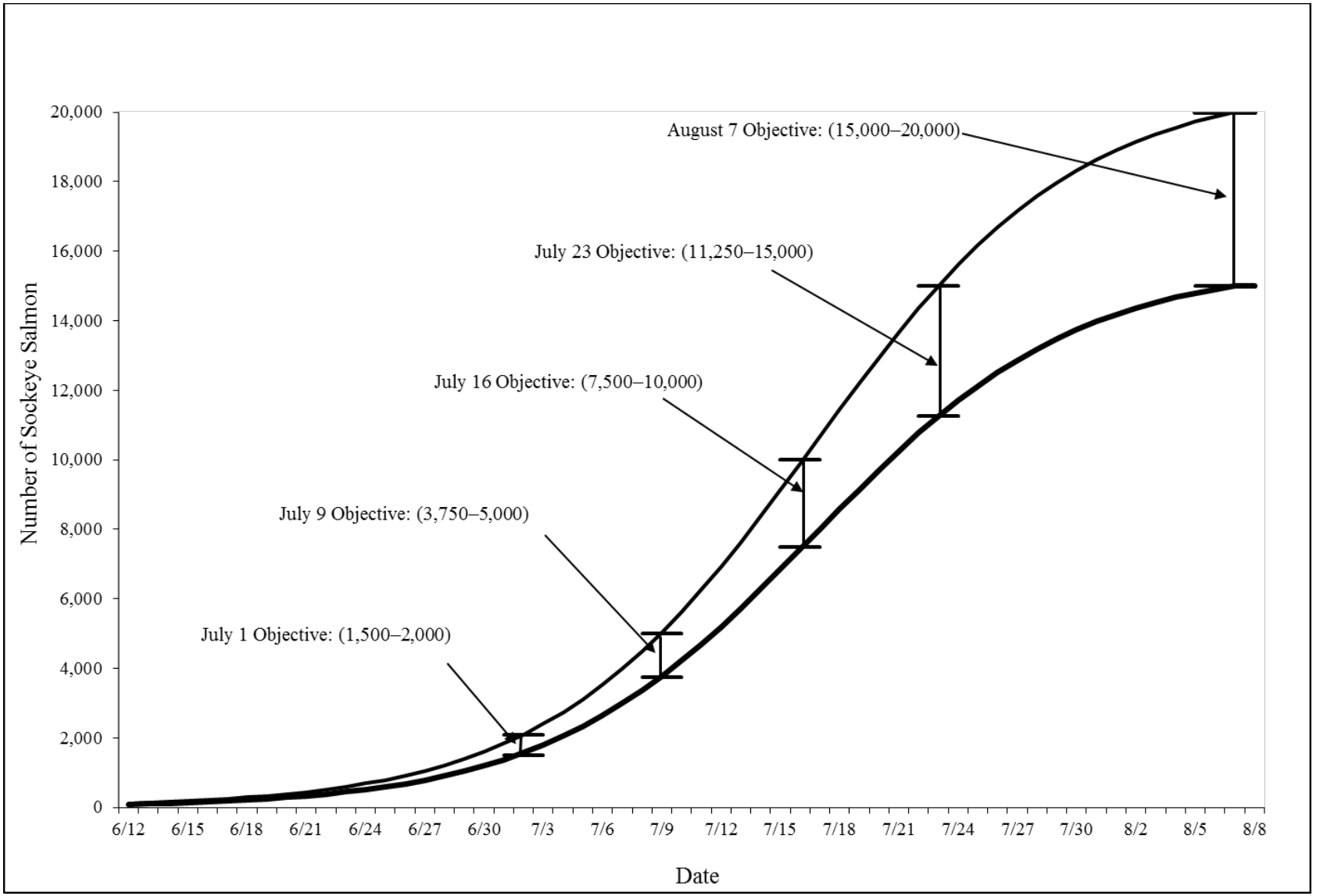

Figure 14.–Orzinski Lake interim sockeye salmon escapement objectives by date. Interim escapement objectives are general guidelines for inseason management and are subject to adjustment based on run timing of sockeye salmon returns in a given year.

APPENDIX A. 2016 CHIGNIK MANAGEMENT AREA SOCKEYE SALMON FORECAST

Appendix A1.–2016 Chignik Management Area sockeye salmon forecast.

Forecast Area: Chignik
Species: Sockeye Salmon

Preliminary Forecast of the 2016 Run

Total Production		Forecast Estimate (thousands)	Forecast Range (thousands)
Early Run (Black Lake)	Total Run Estimate	1,801	737–2,877
	Escapement Goal [a]	400	350–450
	Harvest Estimate [b]	1,407	
Late Run (Chignik Lake)	Total Run Estimate	1,108	436–1,781
	Escapement Goal [a]	325	275–400
	Harvest Estimate [b]	783	
Total Chignik System	Total Run Estimate	2,909	1,173–4,658
	Harvest Estimate [b]	2,190	
	Chignik Area	1,767	
	SEDM Area	139	
	Cape Igvak Section	284	

Note: Column numbers may not total or correspond exactly with numbers in text due to rounding.

[a] Harvest represents the midpoint of the escapement goal. An inriver run goal of 50,000 sockeye salmon is added to the lower bound of the late-run escapement goal.

[b] Includes anticipated harvests of Chignik-bound fish in Southeastern District Mainland and Cape Igvak fisheries.

Forecast Methods

Simple and multiple linear regressions models using age-class relationships and parent escapement data were used to forecast the 2016 early- and late- Chignik sockeye salmon runs. Each regression model was assessed with standard regression diagnostic procedures. Prediction intervals (80%) for the regression estimates were calculated using the variances of the regression models. Age classes that could not be estimated with one of these models were estimated using pooled medians, and the 10th and 90th percentiles of the data were used to calculate the prediction interval of the median estimates.

For the early run, simple linear regression was used to predict ocean-age-3 sockeye salmon from prior year ocean-age-2 returns using data from the 1998 outmigration year to the present. Remaining age-class components of the run were predicted by calculating median returns since the 1998 outmigration year (8% of the run).

The late run was predicted using ocean-age-class and sibling relationships. Age-1.3 sockeye salmon were predicted by simple linear regression from prior year age-1.2 returns from 1991 to the present. Age-2.3 sockeye salmon were predicted by simple linear regression from prior year age-2.2 returns from 1992 to the present. Remaining age-class components of the run (ocean-age-1,-2, -0.3, -3.3 and ocean-age-4 sockeye salmon) were predicted by calculating median returns since the 1991 outmigration year (<15% of the run).

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The early- and late-run regression and median estimates were summed to estimate the total Chignik River sockeye salmon run for 2016. The range was estimated as the overall 80% prediction intervals and calculated as the square root of the sum of the squared 80% prediction intervals for each age class forecasted. The combined early- and late-run 80% prediction interval was calculated by summing the lower prediction bounds and upper prediction bounds of the two runs.

Forecast Discussion

The 2016 Chignik sockeye salmon early run is forecasted to be 1.80 million fish, which is 548,000 fish more than the 10-year average run of 1.26 million and 645,000 fish more than the 2015 early run of 1,161,915 fish. The early run is predicted to comprise 92% ocean-age-3 fish, 7.8% ocean-age-2 fish, and <1% of remaining age-class components. The late run is forecasted to be 1.11 million fish, which is 9,000 fish more than the 10-year average run of 1.12 million fish and 511,000 fish less than the 2015 late run of 1,618,886 fish. The 2016 late run is predicted to comprise 86% ocean-age-3 (31% age-1.3 and 54% age-2.3), 13% ocean-age-2, and <1% ocean-age-1 and -4 fish. The total Chignik sockeye salmon run is expected to be 2.91 million fish, which is approximately 539,000 fish more than the 10-year average of 2.38 million and 135,000 fish more than the 2015 total run of 2.78 million.

Inseason genetic estimates of each run were used to manage the fishery in 2015, and will continue to be used in 2016. Inseason genetics proved particularly important in 2015, because both runs came in strong but late. The projected 2016 early-run total harvest estimate of 1.41 million fish is based on achievement of the mid-point of the early-run escapement goal range of 350,000–450,000 fish. The projected late-run harvest estimate of 783,000 fish is based on achieving the mid-point of the late-run goal of 200,000–400,000 sockeye salmon plus the inriver run goal of 50,000 fish which is added to the lower bound of the escapement goal. Therefore, the midpoint is the escapement objectives, or 325,000 fish. Sockeye salmon harvest estimates for both runs include fish harvested in the Chignik Management Area, Chignik-bound fish harvested in the Cape Igvak Section of the Kodiak Management Area, and in the Southeastern District Mainland of the Alaska Peninsula Management Area.

The 2016 forecast for the early run is larger than the most recent ten-year average run size, whereas the late-run forecast approximates the most recent ten-year average run size. Predicting future runs of salmon is always difficult, and the wide confidence interval around the point estimate of the 2016 forecasts is due to the substantial uncertainty included within each of forecast models. The magnitude of the early run is typically more variable than the late run, resulting in wider confidence intervals for early run. Exploratory analysis using other sibling relationships, smolt outmigration data, and environmental variables yielded results similar to this formal forecast. Similar methods have been used for forecasting the early and late runs since 2004. Due to the range of variation in the relationships used in these forecasts and their historical accuracy, our confidence in them is good.

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