

Fishery Management Report No. 09-26

**Kodiak Management Area Herring Fisheries Annual
Management Report, 2007**

by

Geoff Spalinger

June 2009

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



Symbols and Abbreviations

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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mideye to fork	MEF
gram	g	all commonly accepted		mideye to tail fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
Weights and measures (English)		north	N	base of natural logarithm	<i>e</i>
cubic feet per second	ft ³ /s	south	S	catch per unit effort	CPUE
foot	ft	west	W	coefficient of variation	CV
gallon	gal	copyright	©	common test statistics	(F, t, χ^2 , etc.)
inch	in	corporate suffixes:		confidence interval	CI
mile	mi	Company	Co.	correlation coefficient	
nautical mile	nmi	Corporation	Corp.	(multiple)	R
ounce	oz	Incorporated	Inc.	correlation coefficient	
pound	lb	Limited	Ltd.	(simple)	r
quart	qt	District of Columbia	D.C.	covariance	cov
yard	yd	et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
Time and temperature		exempli gratia		expected value	<i>E</i>
day	d	(for example)	e.g.	greater than	>
degrees Celsius	°C	Federal Information		greater than or equal to	≥
degrees Fahrenheit	°F	Code	FIC	harvest per unit effort	HPUE
degrees kelvin	K	id est (that is)	i.e.	less than	<
hour	h	latitude or longitude	lat. or long.	less than or equal to	≤
minute	min	monetary symbols		logarithm (natural)	ln
second	s	(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
Physics and chemistry		figures): first three		minute (angular)	'
all atomic symbols		letters	Jan, ..., Dec	not significant	NS
alternating current	AC	registered trademark	®	null hypothesis	H ₀
ampere	A	trademark	™	percent	%
calorie	cal	United States		probability	P
direct current	DC	(adjective)	U.S.	probability of a type I error	
hertz	Hz	United States of		(rejection of the null	
horsepower	hp	America (noun)	USA	hypothesis when true)	α
hydrogen ion activity	pH	U.S.C.	United States	probability of a type II error	
(negative log of)			Code	(acceptance of the null	
parts per million	ppm	U.S. state	use two-letter	hypothesis when false)	β
parts per thousand	ppt, ‰		abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
volts	V			standard error	SE
watts	W			variance	
				population	Var
				sample	var

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ANNUAL MANAGEMENT REPORT, 2007**

by
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June 2009

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This document should be cited as:

Spalinger G. 2009. Kodiak management area herring fisheries annual management report, 2007. Alaska Department of Fish and Game, Fishery Management Report No. 09-26, Anchorage.

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES.....	ii
ABSTRACT.....	1
INTRODUCTION.....	1
HERRING SAC ROE FISHERY.....	1
Fishery Characteristics.....	1
Gear.....	2
Harvest Strategy.....	2
Fishery Management.....	2
Establishing GHLS.....	2
Inseason Fishery Management.....	3
2007 Season Summary.....	3
Purse Seine Fishery.....	4
Gillnet Fishery.....	4
Exvessel Value of the Fishery.....	4
Stock Assessment.....	4
Catch Sampling.....	5
Stock Status by District.....	6
HERRING FOOD AND BAIT FISHERY.....	9
Fishery Characteristics.....	9
Harvest Strategy.....	9
Combine Fisheries.....	9
Kamishak Stock.....	9
Kamishak Fishery Closure.....	10
2007/2008 Season.....	10
Catch Sampling.....	10
HERRING SUBSISTENCE FISHERY.....	11
Fishery Characteristics.....	11
2007 Season Summary.....	11
REFERENCES CITED.....	11
TABLES AND FIGURES.....	13
APPENDIX A: SUMMARY OF EMERGENCY ORDERS ISSUED FOR THE HERRING COMMERCIAL FISHERIES IN THE KODIAK MANAGEMENT AREA, 2007.....	33

LIST OF TABLES

Table	Page
1. Historical harvest data for the commercial herring sac roe and food and bait fisheries and percent of the total annual herring harvest that occurs by fishery, Kodiak Management Area, 1964 to 2007.....	14
2. Herring sac roe fishery summary of season length, guideline harvest level (GHL), harvest data by gear type, percentage of harvest by gear type, number of landings, and estimated exvessel earnings, Kodiak Management Area, 1979-2007.....	15
3. Herring sac roe fishery guideline harvest level (GHL) by section and gear type, harvest by section, and date sections were closed, Kodiak Management Area, 2007.	16
4. Age composition, by percent, of herring samples, by section, Kodiak Management Area, 2007.	18
5. Average weight in grams by age class of herring samples from the commercial sac roe fishery harvest, by section, Kodiak Management Area, 2007.	19
6. Herring food and bait commercial fishery harvest, Kodiak Management Area, 1912 to 2007.	20
7. Subsistence herring harvest summary for the Kodiak Management Area, 1991-2007.....	21

LIST OF FIGURES

Figure	Page
1. Map of the Kodiak Management Area and its relationship to surrounding management areas.	22
2. Map of the Kodiak Management Area illustrating the herring commercial fishery districts.	23
3. Herring sac roe commercial fishery harvest, Kodiak Management Area, 1964 to 2007.....	24
4. Herring sac roe fishery harvest by day, Kodiak Management Area, 2007.	25
5. Comparison of guideline harvest levels (GHLs) to the herring sac roe commercial harvest, Kodiak Management Area, 1979 to 2007.	26
6. Herring sac roe commercial fishery participation, Kodiak Management Area, 1979-2007.	27
7. Percent of the total harvest taken by gear type in herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.	28
8. Average earnings by gear type for herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.....	29
9. Total exvessel value for herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.....	30
10. Map showing the boundary lines in effect for the Alitak District in 2007.	31

LIST OF APPENDICES

Appendix	Page
A1. Summary of emergency orders issued for the herring commercial fisheries in the Kodiak Management Area, 2007.....	34

ABSTRACT

The Kodiak Management Area (KMA) 2007 commercial Pacific herring *Clupea pallasii* sac roe fishery extended from April 15 through June 30. Fishermen harvested 2,546 tons, compared to the preseason guideline harvest level (GHL) of 4,000 tons. A total of 44 sections were open to fishing and harvests occurred within 13 sections. The herring sac roe fishery is managed under an allocative harvest strategy that provides 75% of the total Kodiak GHL to seine gear and 25% to gillnet gear. Purse seine fishermen accounted for 99% of the total catch at 2,510 tons (86% of their allocation) and gillnet fishermen harvested 36 tons (3% of their allocation, 1% of the total harvest). Roe recovery percentages averaged 10.8% for seine harvest and 8.7% for gillnet harvest. The total exvessel value of the fishery was an estimated \$1,018,400. Herring abundance in the KMA has been increasing and recruitment was strong in several sections during 2007. Samples taken from harvests and test sets throughout the KMA were composed of 2.9% age-2, 11.8% age-3, 13.4% age-4, 9.4% age-5, 46.7% age-6, 5.7% age-7, 4.0% age-8, 2.1% age-9, 2.4% age-10, and less than 1% age-11 and older herring.

The KMA herring food and bait fishery was designated a limited entry fishery in 2001 with five purse seine and four trawl permits issued. A combine fishery was conducted for the 2001 to 2007 seasons due to the small GHLs when only one permit holder annually harvested fish for the combine. For the 2007 season, there was no allocation of Lower Cook Inlet, Kamishak stock herring allowed in the Shelikof Strait fishery due to concerns for the low biomass estimate and young age classes of Kamishak herring. The food and bait fishery in the Shelikof Strait north of the latitude of Miners Point was closed in 2007. Two trips were made to the Uganik District in 2007 harvesting 154 tons (179 ton GHL). The Eastside District (106 ton GHL), the Uyak District (40 ton GHL), and the Alitak District (45 ton GHL) could have been opened in 2007; however, no requests were made to the department to open these districts.

Subsistence herring harvests were reported from a total of 36 subsistence permits through May 7, 2008. The total subsistence herring harvest for the KMA in 2007 was 4,887 pounds.

Key words: Kodiak, Herring, *Clupea pallasii*, sac roe commercial fishery, food and bait commercial fishery, subsistence fishery, stock status, GHL, KMA, AMR.

INTRODUCTION

This report presents information on the commercial Pacific herring *Clupea Pallasii* sac roe, food and bait, and subsistence fisheries that occurred in the Kodiak Management Area (KMA) in 2007. This includes harvest data by fishery, age and weight data collected from the commercial harvest, stock status, and a summary of fishery management activity.

The KMA comprises the waters of the Kodiak Archipelago and that portion of the Alaska Peninsula extending from Cape Douglas southwest to Kilokak Rocks (Figure 1). The archipelago is approximately 250 kilometers (150 miles) long, extending from Shuyak Island in the North to the Trinity Islands in the South. The Alaska Peninsula portion of the KMA is about 267 kilometers (160 miles) long and is separated from the archipelago by Shelikof Strait (Figure 1).

The KMA is divided into 13 districts which define geographical areas used in managing both the herring sac roe and food and bait fisheries (Figure 2). For the sac roe fishery, each district is divided into sections that define the spawning area used by herring stocks or a geographical area.

HERRING SAC ROE FISHERY

FISHERY CHARACTERISTICS

The KMA herring sac roe fishery began in 1964 (Table 1; Figure 3) and occurs in approximately 30 bays and coastal locations. The fishery currently opens at NOON on April 15, with most of the management area opening concurrently. Historically the concurrent opening of sections on April 15, prior to any major buildup of herring, was intended to distribute effort and harvest; however,

during the last 8 years purse seine fishermen have concentrated in areas known to have early spawning herring and the largest guideline harvest levels (GHLs). The fishery ends on June 30 (5 AAC 27.510(a)).

Gear

Purse seines and gillnets are the only gear types allowed in the sac roe fishery. Purse seines may not exceed 18 fathoms stretch measure in depth or 100 fathoms in length (5 AAC 27.525(a)). Gillnets may not exceed an aggregate length of 150 fathoms (5 AAC 27.520(a)). For purse seiners, fishing periods from April 15 through May 7 are from NOON until 9:00 PM on odd-numbered days and from 9:00 AM to NOON on even-numbered days. From May 8 through June 30 fishing periods for purse seiners are from NOON until 10:00 PM on odd-numbered days and from 9:00 AM to NOON on even-numbered days (5 AAC 27.510(a)(1)). For gillnets fishing periods are from noon on odd-numbered days until noon on even-numbered days (5 AAC 27.510(a)(2)).

Harvest Strategy

The herring sac roe fishery is managed under an allocative harvest strategy that has been in effect since 2000. The harvest strategy provides opportunities for purse seine permit holders to harvest approximately 75% of the preseason GHL and gillnetters to harvest approximately 25%. The harvest strategy requires the department to establish GHLs by section, based on historical harvest data, current and past fishery performance, commercial catch samples, and aerial biomass surveys. The department is then required, for each district that has more than one section open to fishing, to assign 20% to 30% of the GHL to gillnet permit holders and 70% to 80% of the GHL to purse seine permit holders (5 AAC 27.535(e)(2)(D)). This is accomplished by designating one gear type for each section with a GHL. In districts where this can not be accomplished the department establishes GHLs for both gear types and fishing is separated by time or area. The department may also use EO authority to restrict fishing time and open areas in any section if over-harvest concerns exist during the season.

FISHERY MANAGEMENT

Establishing GHLs

Preseason GHLs are established for all sections that have produced consistent herring harvests in previous seasons. These GHLs reflect the status of a particular herring stock by section. In 2007, section GHLs ranged from 10 to 1,700 tons (Table 3). Establishing the 2007 GHLs involved evaluation of a variety of information to determine stock status trends and conservative adjustment of GHLs including:

- 1) fishery performance during preceding season or seasons (i.e., harvest timing, harvest duration, average school size);
- 2) trends in age composition (i.e., level of recruitment of age-3 herring, the proportion of age-5 and younger herring, and the proportion of age-2 herring as an indicator of future recruit strength);
- 3) observations of spawn and juvenile herring;
- 4) industry and department aerial surveys;
- 5) hydroacoustic surveys;

- 6) test fishery data including age composition and biomass estimates; and
- 7) aged-structured analysis (ASA) modeling.

Preseason GHGs have generally reflected the actual harvests (Figure 3) and have aided fishermen and processors in planning prior to the start of each season.

ADF&G historically relied on the fishing industry to establish roe recovery and minimum size standards. Prior to the 1990s quality of Kodiak herring was generally high due to careful selective harvest of mature herring by fishermen and the inseason processing of relatively small amounts of herring over long time periods by local processors. However, in the 1990s competition in the purse seine fishery intensified and fishermen were less selective in harvesting high quality herring. In 2003 and 2004 the department took a more active role in some sections to manage for roe quality, which resulted in delayed openings of sections and an increase in roe quality. During the 2005 Alaska Board of Fisheries (BOF) meeting, the harvest strategy was changed so that the department is now directed to strive for the highest level of product quality (5 AAC 27.535(e)(6)).

Inseason Fishery Management

Processors and independent tender operators are required to provide daily tallies of herring deliveries by section, as well as accurate estimates of herring onboard tenders that have not yet delivered to the processor. The department tallies reports from field personnel, processors, permit holders, spotter pilots, and tenders to assess herring harvests. Generally, once the harvest estimate meets or approaches the GHG, a section is closed for the season by emergency order. Due to the rapid pace at which some harvests occur, inperiod closures are frequent. In sections that have field personnel present on the grounds, inperiod closures may occur with only a few minutes of advance notice. To date, industry cooperation has greatly aided managers.

2007 SEASON SUMMARY

The 2007 sac roe season opened at NOON April 15 and 30 emergency orders (EOs) concerning this fishery were issued during the season (Appendix A1). The last harvest occurred on May 21 (Figure 4) The total 2007 KMA GHG was 4,000 tons (Tables 2 and 3; Wadle et al. 2007) and the harvest was 2,546 tons (Table 2; Figure 5).

In 2007, 21 purse seine permit holders made 105 deliveries during the season harvesting 2,510 tons (Table 2; Figure 6). Three gillnet permit holders made eight deliveries and harvested 36 tons (Table 2; Figure 6). Purse seine fishermen harvested 99% (86% of their allocation) and gillnet fishermen harvested 1% (3% of their allocation) of the total KMA harvest in 2007 (Table 2; Figure 7). The 2007 average individual purse seine permit holder harvest was 120 tons, the second highest average harvest for the years 1979-2007 (Table 2). The 2007 individual gillnet permit holder harvest averaged approximately 12 tons, the lowest value since 2000 (Table 2). There were three companies operating four shore-based processing facilities that were registered to buy and process herring.

The 2007 fishery was monitored by two ADF&G shore-based field crews and two department vessels, which were stationed in anticipated herring harvest locations. Crews gathered effort and harvest data used to manage the fishery, and collected commercial catch samples to obtain age, weight, and length (AWL) data.

There were a total of 44 sections open to fishing; however, 14 of these sections have had little or no historic harvests and are designated as exploratory (Table 3). Harvests occurred within 13 sections, while 31 sections were either not fished or no harvests occurred. The bulk of the sections that were not fished were within the Mainland Districts.

Purse Seine Fishery

In 2007, the Kodiak area experienced a late winter which likely contributed to a one to two week delay in the harvests of most sections. Water temperatures were colder than normal and herring ripened and spawned late. In 2007, fishermen had trouble finding marketable older age-class herring that were not mixed with smaller, younger, and non-marketable herring.

Purse seine harvests in 2007 occurred in similar areas as previous years. The largest harvest was in the Village Islands/Uganik Bay sections of the Uganik District with a harvest of 1,389 tons out of a GHL of 1,350 tons for purse seine gear (Table 3). A total of 597 tons were harvested from the East Sitkalidak, West Sitkalidak, Barling Bay, Outer Ugak Bay, and Outer Kiliuda Bay sections of the Eastside District where the combined GHLS were 800 tons (Table 3). The Inner Alitak Bay, Outer Deadman Bay, and Inner Deadman Bay sections of the Alitak District had 350 tons harvested where the combined GHLS were 325 tons (Table 3). A harvest of 174 tons occurred in the Danger Bay Section in the South Afognak District where the GHL was 120 tons (Table 3). No herring were harvested in the Inner Uyak Bay Section where it was difficult to find marketable herring (Table 3). Roe recovery from purse seine harvests averaged 10.8%.

Gillnet Fishery

Gillnet effort was expected to be minimal in 2007. As a result, the department opened gillnet only areas to continuous fishing beginning at noon on April 15. Normally gillnet areas follow a fishing schedule that allows them to fish from noon on even-numbered days until noon on odd-numbered days (24-hour open periods followed by 24-hour closed periods).

Gillnet permit holders harvested 17 tons from the 30 ton GHL in the Women's Bay Section of the Northeast District (Table 3). The Kizhuyak Bay Section of the Inner Marmot District had a gillnet harvest of 6 tons out of a 60 ton GHL (Table 3). Harvests totaled 13 tons from the 40 ton GHL in the combined Izhut Bay, Kitoi Bay, and MacDonalds Lagoon sections of the South Afognak District (Table 3). Gillnet harvests averaged 8.7% roe recovery.

Exvessel Value of the Fishery

The exvessel price paid for herring with 10% roe recovery was approximately \$400 per ton at the dock, an increase over the all time low of \$275 per ton paid in 2006 (Table 2). Roe recovery from this year's fishery averaged 10.8 %. The estimated average exvessel earnings for purse seine permit holders was \$47,810 and \$4,800 for gillnet permit holders (Table 2; Figure 8). The total exvessel value of the 2007 fishery was an estimated \$1,018,400 (Table 2; Figure 9), which does not include any adjustments in value for roe recovery above or below 10%, herring that are sold as bait, herring that were discarded, or costs associated with tendering herring.

STOCK ASSESSMENT

The department evaluates fishery performance and survey information to assess trends in stock status. Hydroacoustic and aerial surveys, conducted by the department, are utilized to assess herring abundance prior to, during, and after the commercial fishery and to survey closed sections. ADF&G

collects herring samples from commercial harvests and research vessels are also used to collect samples by trawl and jig gear. Age composition information from these samples provides insight into recruitment trends and guides the department when adjusting GHLS. For example, areas with high percentages of age-4 and younger herring (recruitment) will not be aggressively fished and will have conservative GHLS, while areas with older age classes (9 or more years old) will be more aggressively fished with increased GHLS.

Industry aerial observers and permit holders have aided managers by providing biomass estimates, spawn observations, fleet movements, and harvest estimates. Commercial herring pilots are very experienced and have been involved for several seasons in the KMA and other statewide herring fisheries. The department has also received assistance from air charter pilots with herring and spawn observations.

While aerial and hydroacoustic assessments provide an evaluation of the biomass, there are problems associated with herring assessment in the KMA. These problems include:

- 1) herring tend to be deeper during the day and rise toward the surface during the evening and early morning hours, limiting the time fish are observable from the air;
- 2) most fishing sections have several distinct schools of herring that spawn from April through June, making complete biomass estimates difficult;
- 3) herring may stay within an area for the duration of the sac roe season or may move to another district, which may lead to duplicated or incomplete biomass estimates, or incorrect assignment to a spawning stock location;
- 4) the KMA encompasses a large geographical area;
- 5) adverse weather conditions;
- 6) Hydroacoustic surveys are limited in shallower waters, and the extent of herring avoidance to vessel noise is unknown; and
- 7) There also appears to be a significant amount of subtidal spawning, occurring in water 10 to 20 fathoms in depth, which is not detectable from aerial surveys.

Fishery performance is used to evaluate stock status; however, due to the low gillnet effort since 1998 it is difficult to use fishery performance as an indicator of stock status within the gillnet sections. In 2007, no commercial catch samples were collected from gillnet sections. Participation in most purse seine sections has been consistent and commercial catch samples have been taken consistently.

Catch Sampling

A total of 3,913 herring were collected for age, weight, and length (AWL) data from harvests, test sets, and ADF&G trawl samples during the 2007 sac roe season (Table 4). Samples were taken from 12 sections, nine of which had commercial harvests. The remaining three sections were either closed, or no harvest occurred. Age-6 herring were the dominant age class in the 2007 season, representing an estimated 46.7% of the total herring sampled (Table 4). The remaining age classes represented the following percentage of the samples taken: 2.9% age-2, 11.8% age-3, 13.4% age-4, 9.4% age-5, 5.7% age-7, 4.0% age-8, 2.1% age-9, 2.4% age-10, and less than 1% age-11 and older (Table 4). No herring were collected from gillnet harvests. Generally, herring from Alitak Bay and the east side of Kodiak Island were larger at age than those found on the west side of Kodiak (Table 5).

Stock Status by District

The following is a review of stock status as indicated by recent fishery performance, age composition data, recruitment trends, and survey data by district. Herring can generally be found seasonally in all bays of the KMA (Figure 2). The department currently monitors approximately 70 sections that are known to have spawning populations of herring. The majority of the department's assessment efforts target larger herring stocks. Generally, there is less information available for the smaller stocks of herring so the evaluation of these stocks is more tenuous. In some cases, such as sections of the Mainland District, several years may elapse before new information becomes available. The department also considers information provided by commercial herring fishermen and pilots, air taxi operators, and remote area residents, concerning herring distribution, biomass estimates, and spawn sightings, when determining stock status.

North Afognak District

Five sections compose the North Afognak District and spawning stocks of herring occur in all five sections though these stocks tend to be small (less than 20 tons; Figure 2). However, large biomasses were observed in some of these sections during 2007. A department aerial survey observed over 600 combined tons in the Perenosa Bay and Delphin Bay sections. Industry pilots also reported seeing large numbers of herring in these areas. Purse seine fishermen reported seeing several large schools in the Tonki Bay Section that were composed of young fish, indicating strong recruitment for this section. Tonki Bay had a 20 ton GHL; however, no harvest occurred in 2007.

West Afognak District

There are six sections in the West Afognak District, and five are known to have spawning stocks of herring (Figure 2). Paramanof Bay has the largest spawning stock within this district; however, this stock has been at low levels since 2005. In 2007, the R/V Resolution conducted hydroacoustic surveys in mid-April in Paramanof Bay and observed a biomass estimated to be greater than 2,500 tons. Department staff were able to trawl and collect samples in Paramanof Bay which consisted of 88.8% age-2, 9.0% age-3, and 2.0% age-4 (Table 4). Stocks in the West Afognak District appear to be rebounding from recent low levels with excellent recruitment observed in 2007.

South Afognak District

The South Afognak District comprises six sections and the Danger Bay Section currently has the largest stock of herring in this district (Figure 2). In 2007, a 120 ton GHL was established for this section and purse seine permit holders harvested a total of 174 tons (Table 3). Commercial catch samples taken in Danger Bay showed the harvest consisted of 17.8% age-3, 28.4% age-4, 11.4% age-5, 18.8 % age-6, 11.4% age-7, and 6.4% age-8 (Table 4). Hydroacoustic surveys estimated nearly 3,000 tons in the Danger Bay Section during 2007.

In 2007, the MacDonalds Lagoon, Kitoi Bay, and Izhut Bay sections were combined and managed as one gillnet section with a 40 ton GHL (Table 3). Gillnet permit holders harvested 13 tons from this section (Table 3).

Uganik District

The Uganik District consists of nine sections on the northwest side of Kodiak Island (Figure 2). During the last 10 years this district has been the most productive in the KMA, and 2007 hydroacoustic and aerial survey information indicate that the Village Islands spawning biomass

is currently the largest in the KMA. The total biomass of herring observed in the Village Islands/Uganik Bay sections was estimated from 10,000 to 30,000 tons (herring congregate in Uganik Bay for a month or longer, complicating biomass estimation). The 2007 GHLL for this section was a record 1,700 tons for all gears combined and 1,389 tons were harvested by purse seine gear (Table 3). Age composition data from the 2007 Village Islands/Uganik Bay sections commercial sac roe purse seine fishery indicate excellent recruitment. The predominant age classes were composed of 14.6% age-3, 28.8% age-4, 13.7% age-5, 9.5% age-6, 8.5% age-7, 12.3% age-8, 5.1% age-9, and 5.6% age-10 (Table 4). Stocks in the Uganik District are at historic high levels.

Uyak District

Seven sections compose the Uyak District. Through the 1980s, the Uyak District was the largest herring producing district in the KMA (Figure 2). In the early 1990s these stocks began declining and were at low levels for several years. In 2002, aerial surveys indicated that these stocks were improving and several sections were reopened in 2004. These stocks have improved from the low levels of the 1990s. In 2007 the GHLL for the Inner Uyak Bay Section was 300 tons but no harvest occurred (Table 3). Fishermen had trouble catching marketable herring and their catches were composed of juvenile herring that were released. Samples from test sets were composed of 14.2% age-3, 37.4% age-4, 22.4% age-5, and 11.5% age-6 herring (Table 4). Aerial and hydroacoustic surveys indicated approximately 2,000 tons were in this section during 2007.

The Brown's Lagoon Section was open to gillnet gear in 2007 with a 50 ton GHLL (Table 3). No effort was made in this section; however, the R/V Resolution was able to conduct hydroacoustic surveys and collect trawl samples. Approximately 800 tons of herring were estimated in the section. Samples showed the predominant age classes were composed of 19.0% age-2, 43.8% age-3, and 21.9% age-4 (Table 4).

Alitak District

In 2007, the ten sections in the Alitak District were modified and one was eliminated by EO in order to clarify section lines (Figure 10). All but the Outer Alitak Section are known to have herring stocks. In the early 1990s, herring stocks began declining in the Alitak District, and by 1998, most sections were closed. In 2002, aerial surveys reports indicated an increase in herring abundance. In 2003 and 2004, some sections were opened to gillnet gear to act as test fisheries. By 2005, several sections that had been closed were reopened. Stocks in the Alitak District are healthy and appear to be increasing.

In 2007, the GHLL for the Inner Deadman Bay Section was set at 75 tons and 159 tons were harvested by purse seine gear (Table 3). Age classes from this harvest were dominated by age-6 herring but harvests also showed good recruitment. The harvest was composed of 6.9% age-3, 12.3% age-4, 6.4% age-5, and 71.7% age-6 herring. A department aerial survey estimated approximately 2,500 tons in this section.

The GHLL for the Outer Deadman Bay Section was set at 75 tons and 97 tons were harvested by purse seine gear (Table 3). Age compositions from the harvest were composed of 4.4% age-3, 8.6% age-4, 8.3% age-5, 69.8% age-6, and 3.8% age-7 (Table 4).

The Inner Alitak Bay Section was open to purse seine gear in 2007 with a 75 ton GHLL and 94 tons were harvested (Table 3). Age compositions from the harvest also showed excellent recruitment and were composed of 8.1% age-3, 8.5% age-4, 10.5% age-5, 66.2% age-6, and 2.8% age-7 (Table 4).

No other information was obtained from the Alitak District in 2007; however, age compositions in previous years from the Upper Olga Bay and North Olga Bay sections have been similar to other sections in the district.

Eastside District

The Eastside District is composed of four bay complexes; Ugak Bay, Kiliuda Bay, East Sitkalidak Strait, and West Sitkalidak Strait (Figure 2). Sixteen sections have been established and only one, the Outer Sitkalidak Section, has no history of herring sac roe harvests. Due to the reduced gillnet fleet and low herring prices, the smaller and more distant gillnet sections of this district have not been fished in recent years. Hydroacoustic surveys in this district have occurred less frequently than other portions of the KMA in recent years.

Generally, the East and West Sitkalidak sections have the earliest spawning herring in the KMA, with initial spawns occurring in late March. In 2007, the GHL for the East Sitkalidak Section was established at 150 tons with 144 tons harvested by purse seine gear (Table 3). Age compositions from the harvest included 6.5% age-5, 83.5% age-6, and 6.0% age-7 herring (Table 4).

The West Sitkalidak Section GHL was established at 125 tons in 2007 and 144 tons were harvested (Table 3). Age compositions from this harvest were composed of 5.0% age-5, 81.0% age-6, and 6.0% age-7 herring (Table 4).

The Barling Bay Section, adjacent to the West Sitkalidak Section, has historically been the most consistent herring producer in the Eastside District and 75 tons were harvested from the 75 ton GHL in 2007 (Table 3). Commercial catch samples taken from Barling Bay were composed of 12.3% age-3, 5.1% age-4, 5.8% age-5, 59.7% age-6, and 6.4% age-10 herring (Table 4).

The Inner and Outer Kiliuda Bay sections have been consistent and strong herring producers during the last 10 years. In 2007, the GHL for the Outer Kiliuda Bay Section was set at 200 tons (Table 3). However, fishermen had trouble locating marketable herring and only 9 tons were harvested (Table 3). No commercial catch samples were obtained from the Kiliuda Bay sections in 2007. In 2007, the GHL for the Inner Kiliuda Bay Section was set at 75 tons but no fish were harvested by gillnet vessels (Table 3).

The Inner and Outer Ugak Bay sections have been strong herring producers in the past. The 2007 GHL for the Outer Ugak Bay Section was 250 tons for purse seiners (Table 3). A total of 225 tons were harvested and age composition from the harvest comprised 40.0% age-3, 10.8% age-4, 10.5% age-5, and 22.4% age-6 (Table 4). Herring stocks in the Eastside District are near historic high levels and increasing in some sections.

Northeast District

The Northeast District is composed of five sections and four have known spawning stocks of herring (Figure 2). The Women's Bay Section currently has the largest stock of herring in this district with a 30 ton GHL. In 2007, 17 tons were harvested by gillnet permit holders (Table 3).

Inner Marmot District

There are five sections within the Inner Marmot District and all have known spawning stocks of herring though most are small (Figure 2). The Kizhuyak Bay Section has the largest stock of herring in the district. In 2007, this section was opened to gillnet gear with a 60 ton GHL and approximately six tons were harvested (Table 3).

Mainland District

There are three Mainland districts comprising 12 sections (Figure 2). The last commercial herring harvest from the Mainland Districts occurred in 1997. Seven sections were open as exploratory in 2007; however, no effort occurred. No information has been obtained from the Mainland District in recent years, making stock status difficult to determine

HERRING FOOD AND BAIT FISHERY

FISHERY CHARACTERISTICS

Harvest Strategy

The herring food and bait season currently opens September 1 and lasts until February 28 (5 AAC 27.510(b)). The GHGs for the fishery are established by district and are based upon 10% of the GHGs established for the preceding sac roe fishery by section (5 AAC 27.535(b)).

Combine Fisheries

The KMA herring food and bait fishery was closed for the 1999 and 2000 seasons because of low potential GHGs and the department's concern for manageability of a competitive fishery on a highly aggregated stock. In 2001, the Commercial Fisheries Entry Commission (CFEC) designated the KMA herring food and bait fishery a limited entry fishery and issued 13 interim use permits to those fishermen who made landings between 1994 and 1998 (Gretsch 2001). Because of the relatively small GHGs available (60 tons in the Uganik District and 47 tons in the Eastside District) the department did not allow an open competitive fishery to occur even though the fishery was restricted to the 13 interim permit holders. As an alternative, the interim permit holders formed a combine and the department and CFEC agreed to allow a combine fishery to occur. The 13 interim permit holders determined which vessel would conduct the harvest, all marketing aspects, and all costs associated with harvesting and tendering the herring. In July 2002, the CFEC made a final determination on these limited entry permits. Nine permanent limited entry permits were issued, five were purse seine/gillnet permits and four were trawl permits.

Combine fisheries have been conducted under similar conditions for the 2002-2007 seasons. Different purse seine permit holders have participated in the harvesting of the herring for a larger portion of the proceeds, while the trawl permit holders and those purse seine permit holders who are not harvesting, receive a check for a lesser portion of the total co-op proceeds. Generally, one tender has also been used and two purse seine permit holders have worked together on one purse seine vessel to catch the herring. Fishing efforts have targeted the two larger GHG areas including the Uganik and Eastside districts while the two areas with smaller GHGs, the Alitak and Uyak districts, have remained unfished. The trawl permit holders have not participated in the harvesting for the combine fishery. In some years the combine fishery has operated smoothly, while in other years disagreements have occurred when the harvesting permit holders failed to catch the herring or failed to meet market deadlines.

Kamishak Stock

During the fall and winter months of the early 1980s, major concentrations of herring were observed in eastern Shelikof Strait and adjacent bays along the west side of the Kodiak Archipelago. The biomass exceeded that of known KMA spawning stocks. Herring food and bait

fishermen targeted these herring, but the stock composition was unknown. In 1986, a stock identification study, based on scale pattern analysis, was conducted on herring harvested from a large biomass located in the northeastern part of the Shelikof Strait (Johnson et al., *Unpublished report, Stock Identification of Pacific Herring in the Bait Fishery in Shelikof Strait, Alaska, 1985/86*, available through Geoff Spalinger, ADF&G fishery management biologist, Kodiak, Alaska). Results of the study indicated that at least 80% of the Shelikof herring catch sampled were Kamishak Bay stocks, which spawn within the Lower Cook Inlet (LCI) Management Area. The current harvest strategy alleviates the problem of identifying the spawning stock of a harvest in areas where intermixing may occur by closing the food and bait fishery north of the latitude of Miners Point (Uganik Bay) when the Kamishak spawning biomass falls below 6,000 tons (5 AAC 27.535(d)).

KAMISHAK FISHERY CLOSURE

The 2008 biomass forecast for Kamishak Bay herring affects the 2007/2008 Kodiak food and bait fishery in the Shelikof Strait. The biomass forecast for Kamishak Bay herring for the 2008 season was estimated at approximately 2,069 tons (Lee Hammarstrom, Lower Cook Inlet Finfish Area Management Biologist, ADF&G, Homer, Alaska, *Personal Communication*), well below the minimum spawning biomass of 6,000 tons that must be met before commercial fisheries may occur. Additionally, stock assessment surveys determined that approximately 53% of the population consisted of younger age class fish. The Kamishak Bay District Herring Management Plan states that commercial harvests must target older, repeat spawners in order to protect recruit-class herring. This was the ninth consecutive year that the Kamishak Bay District fishery has been closed, and the population has been in sharp decline since 2000 (Otis and Cope 2004). Due to the low stock status, the Kamishak Bay sac roe fishery was closed for the 2008 season and the Shelikof Strait food and bait fishery north of the latitude of Miner's Point was closed for the 2007/2008 season.

2007/2008 SEASON

For the 2007/2008 season, permit holders again requested a combine fishery though there was some discussion of having a competitive fishery. The biggest obstacle to a competitive fishery is how to decide an equitable fishing period for the two gear types. The department agreed with the permit holders request and that portion of the Uganik District south of Miners Point was opened on September 29 with a 179 ton GHL. Other areas that could have opened by EO included the Eastside District (106 ton GHL), the Uyak District (40 ton GHL), and the Alitak District (45 ton GHL). Approximately 78 tons were harvested on October 3. A second trip was made on October 9 and approximately 76 tons were harvested for a total harvest of 154 tons (Table 6). This provided the bulk of the herring bait needed for the Bering Sea red king crab fleet ported in Kodiak. No other trips were made to the Uganik District to harvest the remaining 25 tons of the GHL and there were no other requests to open other areas.

CATCH SAMPLING

A total of 120 herring were collected for AWL analysis from the Uganik District by purse seine gear. Age compositions from the sample were 9.1% age-4, 16.6% age-5, 24.1% age-6, 25.0 % age-7, 8.3% age-8, 10.0 % age-9, and 5.0% age-10.

HERRING SUBSISTENCE FISHERY

FISHERY CHARACTERISTICS

Prior to 1999, the herring subsistence fishery was referred to as a Personal Use/Subsistence Fishery and had occurred for at least twenty years. The majority of the harvest occurred near the Port of Kodiak in Womens Bay and was caught by gillnets. The herring were used primarily for bait in commercial longline and pot fisheries. Also, prior to 1999, this fishery was only regulated during the herring sac roe season, from April 15 to June 30, under the conditions of the subsistence permit issued in Kodiak. Gear was limited to a 25 fathom gillnet but there was no harvest limit. The remainder of the year there were no permit requirements, gear restrictions, or harvest limits.

In 1999, more restrictive regulations were approved by the BOF. These regulations allowed for a harvest of up to 500 pounds of herring with no permit requirements, except during the sac roe fishing season (April 15 to June 30; Gretsche 2001). A subsistence permit was required for those individuals that wished to fish during the sac roe season or intended to harvest more than 500 pounds of herring annually. The maximum annual harvest was limited to 2,000 pounds per permit.

In 2000, herring subsistence harvests escalated due to bait needs created from the reopening of the commercial tanner crab fishery in the KMA. The department was concerned about the increased herring subsistence harvest and the appropriateness of taking subsistence herring for use as bait in a commercial fishery. The department submitted proposals for regulation changes to the BOF in 2001, and the BOF approved changing regulations to allow for both types of historic harvests. The current subsistence regulation allows for the harvest of up to a total of 500 pounds of herring annually and requires that fishermen obtain a permit prior to fishing (5 AAC 01.530(d)). Herring were included on the existing KMA salmon and crab subsistence permit. Also in 2001, a regulation was adopted which allows for the harvest of up to 500 pounds of herring by commercial permit holders to be used as bait in commercial fisheries (5 AAC 27.545).

2007 SEASON SUMMARY

Through May 7, 2008 approximately 86% of the KMA subsistence permits were returned to the department as required for reporting purposes with subsistence harvest information from 2007. Reported subsistence herring harvests for 2007 totaled 4,887 pounds (Table 7). A total of 36 KMA subsistence permits were returned with herring harvest data, with most of the harvest coming from the Uyak, Inner Marmot, Northeast, and Eastside districts. No commercial permit holders harvested herring to be used as bait in commercial fisheries during 2007. One permit holder did harvest 150 pounds of spawn on kelp from the Uganik District.

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TABLES AND FIGURES

Table 1.—Historical harvest data for the commercial herring sac roe and food and bait fisheries and percent of the total annual herring harvest that occurs by fishery, Kodiak Management Area, 1964 to 2007.

Year	Sac Roe Harvest (Tons)	Food/Bait Harvest (Tons)	Total Herring Harvest (Tons)	Sac Roe Fishery Percent of Total Harvest (%)	Food/Bait Fishery Percent of Total Harvest (%)
1964	568	310	878	65%	35%
1965	657	35	692	95%	5%
1966	2,769	198	2,967	93%	7%
1967	1,662	300	1,962	85%	15%
1968	2,001	15	2,016	99%	1%
1969	1,130	11	1,141	99%	1%
1970	342	8	350	98%	2%
1971	284	44	328	87%	13%
1972	215	50	265	81%	19%
1973	831	178	1,009	82%	18%
1974	868	40	908	96%	4%
1975	8	5	13	62%	38%
1976	5	0	5	100%	0%
1977	338	0	338	100%	0%
1978	904	399	1,303	69%	31%
1979	1,735	125	1,860	93%	7%
1980	2,383	381	2,764	86%	14%
1981	2,065	18	2,083	99%	1%
1982	1,771	326	2,097	84%	16%
1983	2,318	33	2,351	99%	1%
1984	2,163	123	2,286	95%	5%
1985	1,968	102	2,070	95%	5%
1986	1,558	213	1,771	88%	12%
1987	2,146	217	2,363	91%	9%
1988	2,171	340	2,511	86%	14%
1989	2,249	345	2,594	87%	13%
1990	2,347	313	2,660	88%	12%
1991	2,432	215	2,647	92%	8%
1992	4,283	312	4,595	93%	7%
1993	4,929	837	5,766	85%	15%
1994	5,893	677	6,570	90%	10%
1995	4,604	507	5,111	90%	10%
1996	3,386	651	4,037	84%	16%
1997	3,235	756	3,991	81%	19%
1998	2,057	151	2,208	93%	7%
1999	1,651	0	1,651	100%	0%
2000	1,370	0	1,370	100%	0%
2001	1,694	115	1,809	94%	6%
2002	1,677	135	1,812	93%	7%
2003	1,992	199	2,191	91%	9%
2004	3,167	190	3,357	94%	6%
2005	3,463	168	3,631	95%	5%
2006	2,643	169	2,812	94%	6%
2007	2,546	154	2,700	94%	6%
Average					
1964 to 2007	2,011	213	2,224	90%	10%
10 Year Average					
1998 to 2007	2,226	128	2,354	95%	5%
5 Year Average					
2003 to 2007	2,762	176	2,938	94%	6%

Table 2.—Herring sac roe fishery summary of season length, guideline harvest level (GHL), harvest data by gear type, percentage of harvest by gear type, number of landings, and estimated exvessel earnings, Kodiak Management Area, 1979-2007.

Year	Season Length (Days)	GHL (Tons)	Total Harvest (Tons)	Harvest by Gear Type		Percent Harvest by Gear Type		Number of Landings by Gear Type		Units of Gear Fished		Average Catch by Gear		Estimated Average Earnings ^a		Price per Ton ^a (\$)	Estimated Exvessel Total Value ^a (\$)
				Seine (Tons)	Gillnet (Tons)	Seine (%)	Gillnet (%)	Seine	Gillnet	Seine (Tons)	Gillnet (Tons)	Seine (\$)	Gillnet (\$)				
1979	36	2,400	1,735	1,457	278	84%	16%	-	-	57	125	26	2	\$38,342	\$3,336	\$1,500	\$2,602,500
1980	35	2,400	2,383	2,009	374	84%	16%	-	-	92	109	22	3	\$15,068	\$2,368	\$690	\$1,644,270
1981	48	2,400	2,065	1,596	469	77%	23%	207	406	79	114	20	4	\$14,647	\$2,983	\$725	\$1,497,125
1982	59	2,400	1,771	1,447	324	82%	18%	138	191	45	67	32	5	\$17,686	\$2,660	\$550	\$974,050
1983	51	2,400	2,319	1,797	522	77%	23%	164	284	41	64	44	8	\$35,063	\$6,525	\$800	\$1,855,200
1984	54	2,400	2,163	1,691	472	78%	22%	138	212	39	69	43	7	\$34,687	\$5,472	\$800	\$1,730,400
1985	59	2,000	1,968	1,244	724	63%	37%	118	348	34	81	37	9	\$32,929	\$8,044	\$900	\$1,771,200
1986	61	1,690	1,558	1,110	448	71%	29%	132	385	31	71	36	6	\$34,016	\$5,994	\$950	\$1,480,100
1987	61	1,640	2,146	1,591	554	74%	26%	122	411	29	62	55	9	\$54,862	\$8,935	\$1,000	\$2,146,000
1988	59	2,065	2,171	1,304	867	60%	40%	169	555	33	76	40	11	\$51,370	\$14,830	\$1,300	\$2,822,300
1989	76	2,415	2,249	1,513	736	67%	33%	171	627	37	83	41	9	\$34,758	\$7,537	\$850	\$1,911,650
1990	75	2,375	2,347	1,644	703	70%	30%	156	544	27	63	61	11	\$51,756	\$9,485	\$850	\$1,994,950
1991	83	2,510	2,432	1,697	735	70%	30%	169	587	32	64	53	11	\$45,077	\$9,762	\$850	\$2,067,200
1992	77	2,720	4,283	3,260	1,023	76%	24%	185	706	40	74	82	14	\$40,750	\$6,912	\$500	\$2,141,500
1993	77	3,525	4,929	4,203	726	85%	15%	237	294	41	86	103	8	\$56,382	\$4,643	\$550	\$2,710,950
1994	71	4,550	5,893	4,976	917	84%	16%	285	485	66	57	75	16	\$60,315	\$12,870	\$800	\$4,714,400
1995	73	4,480	4,604	3,837	768	83%	17%	280	642	73	71	53	11	\$66,858	\$13,759	\$1,272	\$5,856,288
1996	69	4,180	3,386	2,322	1,064	69%	31%	202	890	57	74	41	14	\$81,474	\$28,757	\$2,000	\$6,772,000
1997	49	3,435	3,235	2,629	606	81%	19%	183	418	64	59	41	10	\$20,539	\$5,136	\$500	\$1,617,500
1998	50	2,030	2,057	1,954	103	95%	5%	110	26	35	7	56	15	\$27,914	\$7,357	\$500	\$1,028,500
1999	38	1,495	1,651	1,589	62	96%	4%	94	16	31	5	51	12	\$33,984	\$8,221	\$663	\$1,094,613
2000 ^b	37	1,735	1,370	1,290	80	94%	6%	57	23	31	10	42	8	\$29,129	\$5,600	\$700	\$959,000
2001	47	1,540	1,694	1,412	282	83%	17%	67	37	33	9	43	31	\$21,394	\$15,667	\$500	\$847,000
2002	46	1,860	1,677	1,274	403	76%	24%	37	50	30	14	42	29	\$21,233	\$14,393	\$500	\$838,500
2003	42	2,600	1,992	1,738	254	87%	13%	59	45	31	11	56	23	\$28,032	\$11,545	\$500	\$996,000
2004	42	2,850	3,167	2,894	273	91%	9%	95	36	27	11	107	25	\$53,593	\$12,409	\$500	\$1,583,500
2005	31	3,475	3,463	2,932	531	85%	15%	134	61	32	12	92	44	\$45,813	\$22,125	\$500	\$1,731,500
2006	34	3,705	2,643	2,617	26	99%	1%	86	c	21	c	125	c	\$34,270	c	\$275	\$726,825
2007	28	4,000	2,546	2,510	36	99%	1%	105	8	21	3	120	12	\$47,810	\$4,800	\$400	\$1,018,400
Average																	
1979 to 2007	54	2,665	2,617	2,122	495	81%	19%	144	319	42	55	56	13	\$38,957	\$9,162	\$773	\$2,039,083
10 Year																	
1998 to 2007	40	2,529	2,226	2,021	205	91%	9%	84	34	29	8	73	21	\$34,317	\$10,569	\$504	\$1,082,384
5 Year																	
2003 to 2007	35	3,326	2,762	2,538	224	92%	8%	96	38	26	8	100	23	\$41,903	\$10,891	\$435	\$1,211,245

^a Exvessel values are based on dock delivered herring and inseason data.

^b Beginning in 2000, an allocative harvest strategy was in effect.

^c Confidential data.

Table 3.–Herring sac roe fishery guideline harvest level (GHL) by section and gear type, harvest by section, and date sections were closed, Kodiak Management Area, 2007.

Statistical Area	Management Section	Date Closed ^a	Purse Seine		Gillnet	
			GHL	Harvest	GHL	Harvest
NORTH AFOGNAK DISTRICT						
NA10	Shuyak Island	CLOSED	-	-	-	-
NA20	Delphin Bay	CLOSED	-	-	-	-
NA30	Perenosa Bay	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
NA40	Seal Bay	CLOSED	-	-	-	-
NA50	Tonki Bay	6/30/2007	20	0	CLOSED	-
WEST AFOGNAK DISTRICT						
WA10	Raspberry Strait	6/30/2007	CLOSED	-	10	0
WA20	Malina Bay	6/30/2007	CLOSED	-	10	0
WA31	Paramanof Bay	CLOSED	-	-	-	-
WA32	Foul Bay	CLOSED	-	-	-	-
WA40	Blue Fox/Devil's Inlet	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
WA50	Offshore W. Afognak	CLOSED	-	-	-	-
SOUTH AFOGNAK DISTRICT						
SA10	Izhut Bay	6/30/2007	CLOSED	-	40	13
SA20	Kitoi Bay	Note: SA10, SA20, and SA30 will be managed as one section.				
SA30	MacDonalds Lagoon	Note: SA10, SA20, and SA30 will be managed as one section.				
SA40	Danger Bay	4/24/2007	120	174	CLOSED	-
SA50	Litnik	CLOSED	-	-	-	-
SA60	Duck Bay	CLOSED	-	-	-	-
TOTAL ALL AFOGNAK DISTRICTS			140	174	60	13
UGANIK DISTRICT						
UG10	Kupreanof	CLOSED	-	-	-	-
UG20	Viekoda Bay	6/30/2007	CLOSED	-	25	0
UG21	Terror Bay	6/30/2007	CLOSED	-	30	0
UG31	West Uganik Passage	6/30/2007	CLOSED	-	40	0
UG30	Village Islands	6/30/2007	1,350	1,389	350	0
UG32	NE Arm Uganik Bay	Note: Sections UG30, UG32, UG33, and UG34 were managed as one section and with an allocation by gear type.				
UG33	East Arm Uganik Bay					
UG34	South Arm Uganik Bay					
UG40	Offshore Uganik	CLOSED	-	-	-	-
UGANIK DISTRICT TOTAL			1,350	1,389	445	0
UYAK DISTRICT						
UY10	Offshore Uyak	CLOSED	-	-	-	-
UY20	Harvester Island	CLOSED	-	-	-	-
UY30	Inner Uyak	5/5/2007	300	0	CLOSED	-
UY32	Browns Lagoon	6/30/2007	CLOSED	-	50	0
UY31	Larsen Bay	CLOSED	-	-	-	-
UY40	Zachar Bay	6/30/2007	CLOSED	-	40	0
UY50	Spiridon Bay	6/30/2007	CLOSED	-	10	0
UYAK DISTRICT TOTAL			300	0	100	0
ALITAK DISTRICT						
AL10	Outer Alitak	CLOSED	-	-	-	-
AL20	Inner Alitak	5/17/2007	75	94	CLOSED	-
AL21	Inner Deadman Bay	5/11/2007	75	159	CLOSED	-
AL22	Outer Deadman Bay	5/13/2007	75	97	CLOSED	-
AL30	Sulua Bay	6/30/2007	CLOSED	-	75	0
AL31	Portage Bay	-	Note: New section boundaries split this section with AL30 and AL20.			
AL40	Lower Olga/Moser	6/30/2007	CLOSED	-	50	0
AL41	No. Upper Olga Bay	6/30/2007	50	0	CLOSED	-
AL50	Upper Olga Bay	6/30/2007	50	0	CLOSED	-
AL60	Geese/Twoheaded	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
ALITAK DISTRICT TOTAL			325	350	125	0
STURGEON/HALIBUT DISTRICT						
SH10	Sturgeon/Halibut	CLOSED	CLOSED	-	CLOSED	-

-continued-

Table 3.–page 2 of 2

Statistical Area	Management Section	Date Closed ^a	Purse Seine		Gillnet	
			GHL	Harvest	GHL	Harvest
EASTSIDE DISTRICT						
EA10	Kaiugnak	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
EA20	SW. Sitkalidak	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
EA21	Three Saints Bay	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
EA22	Newman Bay	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
EA23	W. Sitkalidak Strait	4/17/2007	125	144	CLOSED	-
EA24	Barling Bay	5/8/2007	75	75	CLOSED	-
EA30	E. Sitkalidak Strait	4/15/2007	150	144	CLOSED	-
EA31	Tanginak Anchorage	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
EA40	Outer Sitkalidak	CLOSED	-	-	-	-
EA41	Boulder Bay	CLOSED	-	-	-	-
EA42	Shearwater Bay	6/30/2007	CLOSED	-	40	0
EA43	Outer Kiliuda Bay	6/30/2007	200	9	CLOSED	-
EA44	Inner Kiliuda Bay	6/30/2007	CLOSED	-	75	0
EA50	Outer Ugak Bay	5/3/2007	250	225	CLOSED	-
EA51	Inner Ugak Bay	6/30/2007	CLOSED	-	150	0
EA52	Pasagshak Bay	CLOSED	-	-	-	-
EASTSIDE DISTRICT TOTAL			800	597	265	0
NORTHEAST DISTRICT						
NE10	Womens Bay	6/30/2007	CLOSED	-	30	17
NE20	Kalsin Bay	CLOSED	-	-	-	-
NE30	Middle Bay	CLOSED	-	-	-	-
NE40	Inshore Chiniak	CLOSED	-	-	-	-
NE50	Offshore Chiniak	CLOSED	-	-	-	-
NORTHEAST DISTRICT TOTAL			CLOSED	0	30	17
INNER MARMOT DISTRICT						
IM10	Monashka Bay	CLOSED	-	-	-	-
IM20	Anton Larsen Bay	CLOSED	-	-	-	-
IM30	Sharatin Bay	CLOSED	-	-	-	-
IM40	Kizhuyak Bay	6/30/2007	CLOSED	-	60	6
IM50	Spruce Island	CLOSED	-	-	-	-
INNER MARMOT DISTRICT TOTAL			0	0	60	6
NORTH MAINLAND DISTRICT						
NM10	Hallo Bay	CLOSED	-	-	-	-
NM20	Inner Kukak	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
NM30	Outer Kukak	CLOSED	-	-	-	-
NM40	Missak Bay	CLOSED	-	-	-	-
MID MAINLAND DISTRICT						
MM10	Inner Katmai	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
MM20	Outer Katmai	CLOSED	-	-	-	-
MM30	Alinchak	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
MM40	Puale Bay	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
MM50	Portage Bay	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
MM60	Outer Portage	CLOSED	-	-	-	-
SOUTH MAINLAND DISTRICT						
SM10	Wide Bay	6/30/2007	EXPLORATORY	0	EXPLORATORY	0
SM20	Lower Shelikof	CLOSED	-	-	-	-
MAINLAND DISTRICTS TOTAL				0		0
GRAND TOTAL						
	Total GHL All Gear	Total Catch All Gear	Purse Seine		Gillnet	
	4,000	2,546	GHL	Harvest	GHL	Harvest
			2,915	2,510	1,085	36
			% of GHL	% of Harvest	% of GHL	% of Harvest
			72.9%	98.6%	27.1%	1.4%

^a Sections marked 'CLOSED' did not open during the 2007 sac roe season. Sections marked 'EXPLORATORY' were open to both gear types, with no set GHL.

Table 4.—Age composition, by percent, of herring samples, by section, Kodiak Management Area, 2007.

Section	Percent at Age													
	N	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10	Age-11	Age-12	Age-13	Age-14+
Village Islands/Uganik Bays	821	0.0	14.6	28.8	13.7	9.5	8.5	12.3	5.1	5.6	0.6	0.3	0.2	0.2
Inner Uyak Bay	495	0.0	14.2	37.4	22.4	11.5	4.7	2.0	2.7	4.0	0.6	0.0	0.0	0.0
Brown's Lagoon	105	19.0	43.8	21.9	5.7	3.8	2.8	0.0	0.0	2.8	0.0	0.0	0.0	0.0
Danger Bay	363	0.0	17.8	28.4	11.4	18.8	11.4	6.4	0.9	2.2	0.9	0.9	0.4	0.0
Paramanof Bay	476	88.8	9.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Sitkalidak Strait	223	0.0	0.2	1.3	6.5	83.5	6.0	0.8	0.5	0.7	0.0	0.0	0.0	0.0
West Sitkalidak Strait	174	0.0	0.2	2.3	5.0	81.0	6.0	2.5	1.8	0.8	0.0	0.0	0.0	0.0
Barling Bay	189	1.2	12.3	5.1	5.8	59.7	3.8	0.6	2.5	6.4	0.0	0.0	1.9	0.0
Outer Ugak Bay	180	0.7	40.0	10.8	10.5	22.4	4.7	1.7	2.7	2.7	1.0	1.5	0.7	0.0
Inner Alitak Bay	344	0.0	8.1	8.5	10.5	66.2	2.8	0.8	2.0	0.0	0.4	0.0	0.0	0.4
Outer Deadman Bay	241	0.0	4.4	8.6	8.3	69.8	3.8	1.6	0.9	0.9	0.6	0.3	0.3	0.0
Inner Deadman Bay	302	0.0	6.9	12.3	6.4	71.7	0.4	0.9	0.0	0.4	0.0	0.0	0.4	0.0
All Samples combined	3,913	2.9	11.8	13.4	9.4	46.7	5.7	4.0	2.1	2.4	0.4	0.3	0.2	0.0

Table 5.—Average weight in grams by age class of herring samples from the commercial sac roe fishery harvest, by section, Kodiak Management Area, 2007.

Section	Average Weight at Age (g)													
	N	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10	Age-11	Age-12	Age-13	Age-14+
Village Islands/Uganik Bays	821	-	88	118	155	179	194	219	225	225	237	270	259	-
Inner Uyak Bay	495	-	88	131	172	195	208	227	238	272	264	293	269	-
Brown's Lagoon	105	35	84	120	148	168	208	-	-	237	-	-	-	-
Danger Bay	363	-	104	150	183	206	228	254	260	282	267	313	355	-
East Sitkalidak Strait	476	-	122	157	198	226	255	287	291	-	300	296	-	-
Barling Bay	223	-	120	150	194	221	253	279	281	-	-	-	364	-
Outer Kiluida Bay	174	-	102	146	199	245	249	278	319	346	391	347	394	-
Inner Ugak Bay	189	-	124	160	203	223	254	270	-	289	315	330	344	313
Inner Deadman Bay	180	-	-	152	201	235	228	299	288	303	353	-	-	-
Outer Deadman Bay	344	47	98	147	181	191	-	171	308	324	-	404	-	-
North Olga Bay	241	-	135	145	196	227	196	295	279	301	-	-	-	-
Upper Olga Bay	302	-	111	153	196	225	262	-	282	298	341	-	-	-

Table 6.—Herring food and bait commercial fishery harvest, Kodiak Management Area, 1912 to 2007.

Year	Tons	Year	Tons	Year	Tons
1912	20	1944	26,835	1976	ND
1913	0	1945	31,114	1977	ND
1914	0	1946	47,506	1978	399
1915	0	1947	50,743	1979	125
1916	70	1948	46,428	1980	381
1917	138	1949	0	1981	18
1918	118	1950	44,133	1982	326
1919	260	1951	4,299	1983	33
1920	46	1952	1,389	1984	123
1921	945	1953	725	1985	102
1922	1,483	1954	0	1986	213
1923	322	1955	0	1987	217
1924	4,823	1956	13,524	1988	340
1925	9,997	1957	21,219	1989	345
1926	2,681	1958	1,711	1990	313
1927	2,593	1959	3,831	1991	215
1928	625	1960	0	1992	312
1929	ND	1961	0	1993	784
1930	622	1962	0	1994	677
1931	1,000	1963	0	1995	507
1932	3,594	1964	310	1996	651
1933	2,313	1965	35	1997	756
1934	60,000	1966	198	1998	151
1935	ND	1967	300	1999	a
1936	24,748	1968	15	2000	a
1937	27,659	1969	11	2001	115
1938	24,522	1970	8	2002	135
1939	38,601	1971	44	2003	199
1940	22,677	1972	50	2004	190
1941	40,084	1973	178	2005	168
1942	16,791	1974	40	2006	169
1943	35,352	1975	5	2007	154
Average					
1912 to 2007	4,878				
10 Year Average					
1998 to 2007	160				
5 Year Average					
2003 to 2007	176				

^a No fishery occurred in 1999 and 2000.

Table 7.—Subsistence herring harvest summary for the Kodiak Management Area, 1991-2007.

Year	Permits Issued	Permits Returned	Estimated Harvest in Pounds by District							Total
			Afognak	Northeast	Inner Marmot	Uganik	Uyak	Eastside	Alitak	
1991	50	9	2,110	1,745	1,745	1,000	0	0	0	6,600
1992	45	10	120	250	250	1,000	0	0	320	1,940
1993	50	16	90	3,000	3,910	550	50	0	0	7,600
1994	47	14	90	740	1,350	2,000	200	0	0	4,380
1995	20	6	75	0	500	0	340	0	175	1,090
1996	23	10	550	180	140	0	590	0	0	1,460
1997	16	7	0	200	350	50	1,325	0	0	1,925
1998	18	10	1,240	0	0	50	0	0	0	1,290
1999	15	9	0	200	350	0	425	0	0	975
2000	39	21	575	21,150	0	1,825	0	0	700	24,250
2001	48	19	3,000	0	875	0	1,015	10,500	0	15,390
2002	^a	23	1,170	1,150	420	0	200	903	0	3,843
2003	^a	16	0	220	300	0	420	1,210	30	2,180
2004	^a	22	200	780	450	206	1,570	942	0	4,148
2005	^a	37	300	995	920	160	550	2,255	155	5,335
2006	^a	30	200	1,170	1,040	250	265	1,610	0	4,535
2007	^a	36	240	872	1,150	5	1,470	850	300	4,887

^a Beginning in 2002 herring was added to the Kodiak subsistence salmon and crab permit; no separate permit was required.

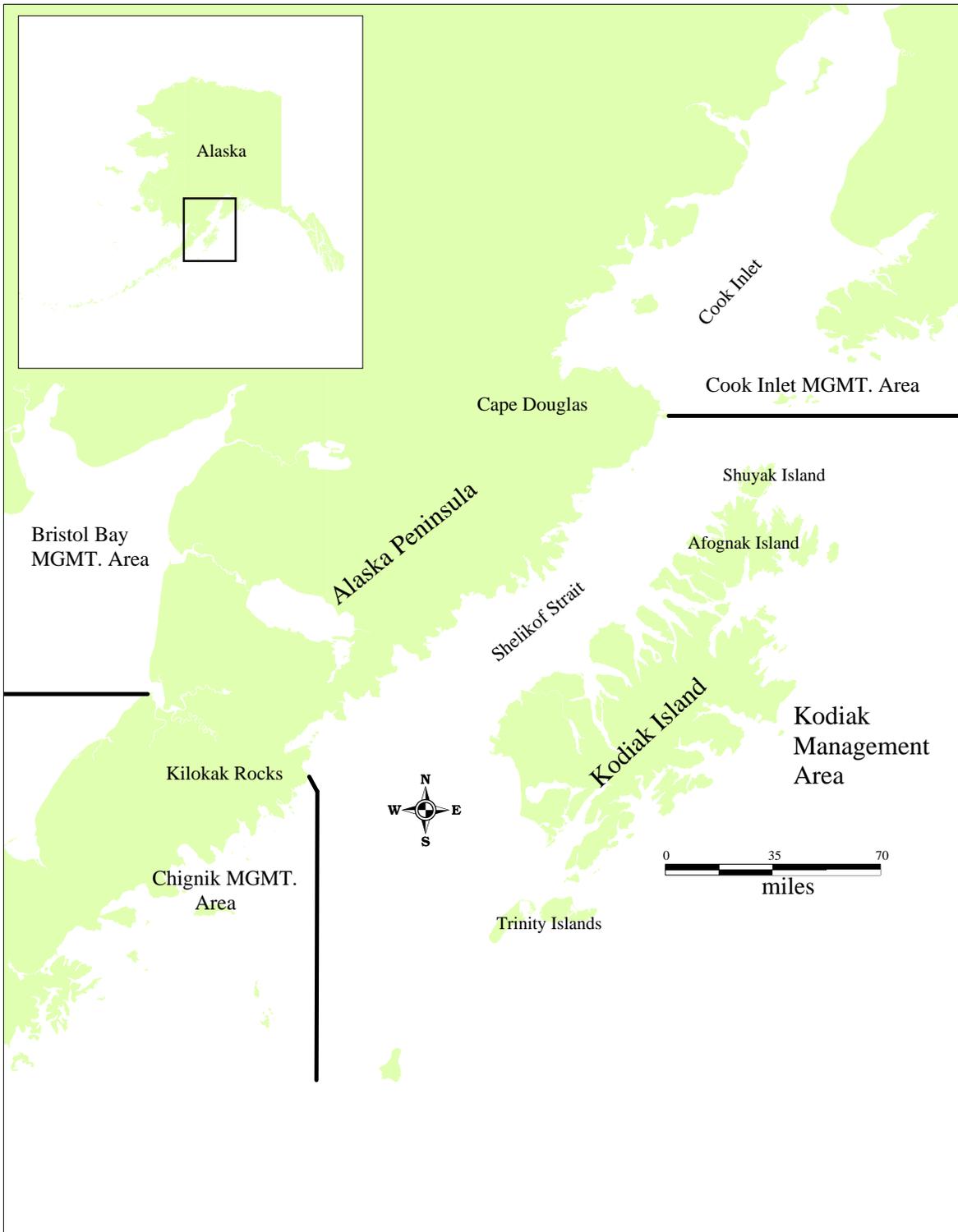


Figure 1.–Map of the Kodiak Management Area and its relationship to surrounding management areas.

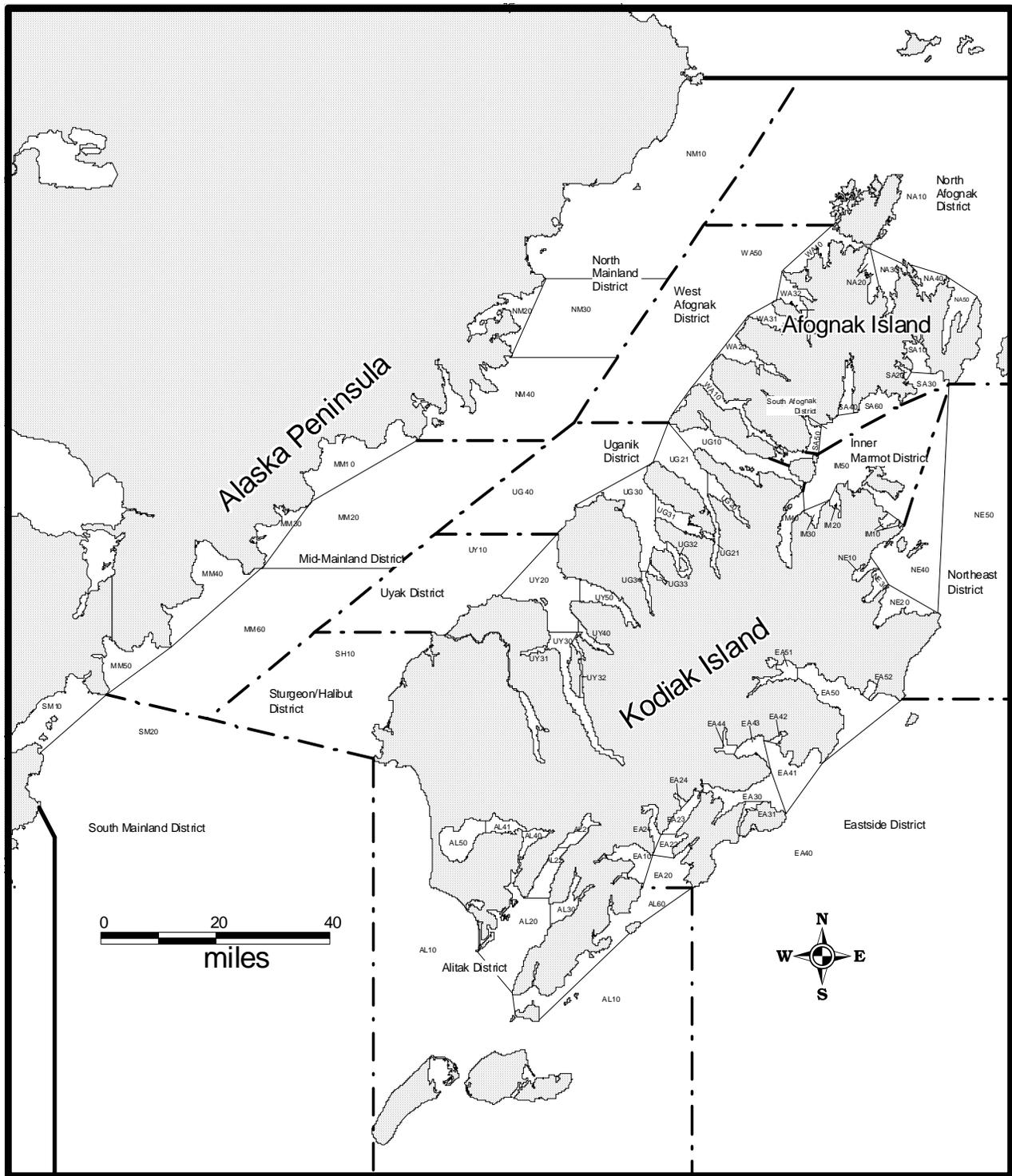


Figure 2.—Map of the Kodiak Management Area illustrating the herring commercial fishery districts.

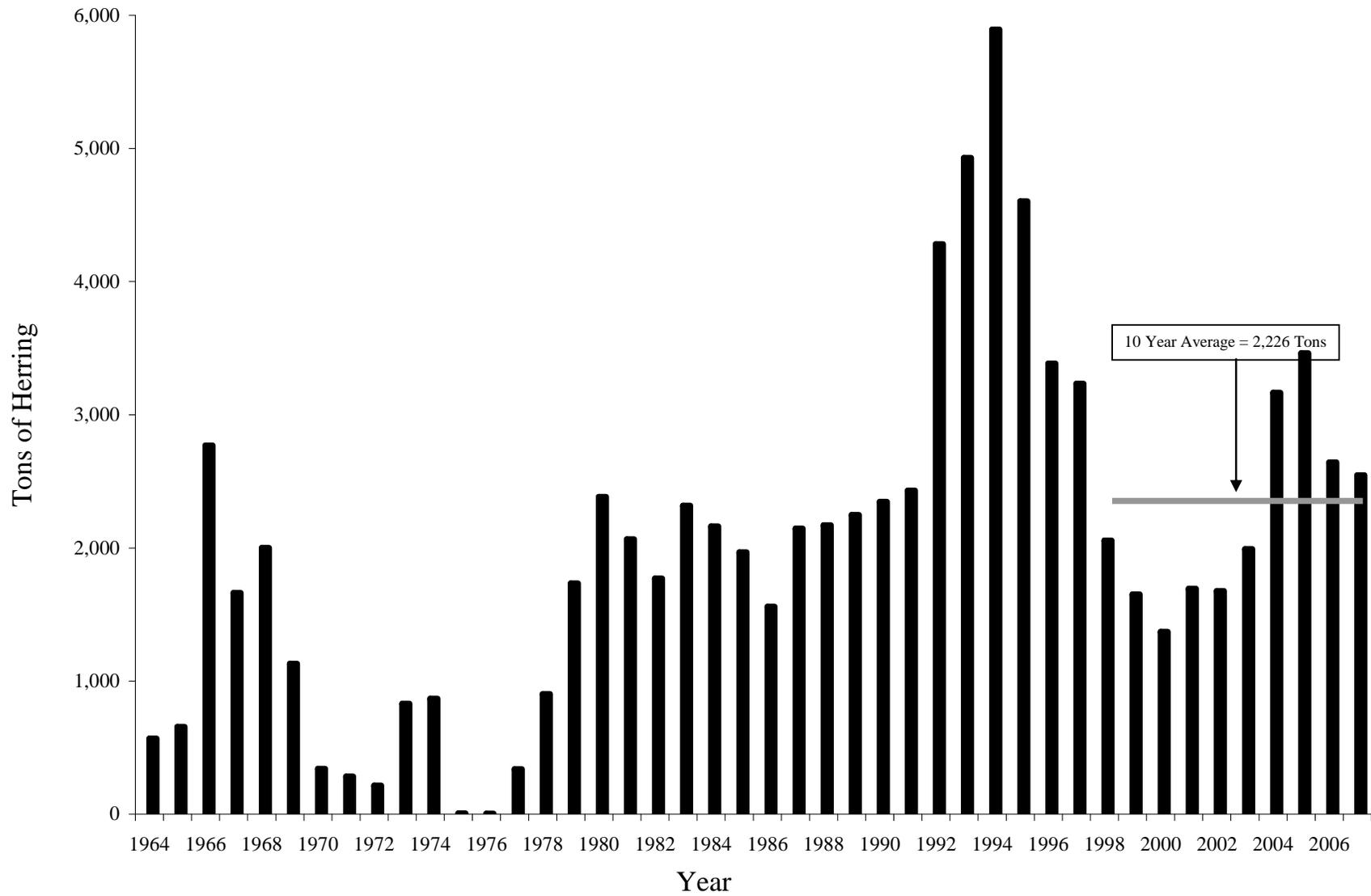


Figure 3.—Herring sac roe commercial fishery harvest, Kodiak Management Area, 1964 to 2007.

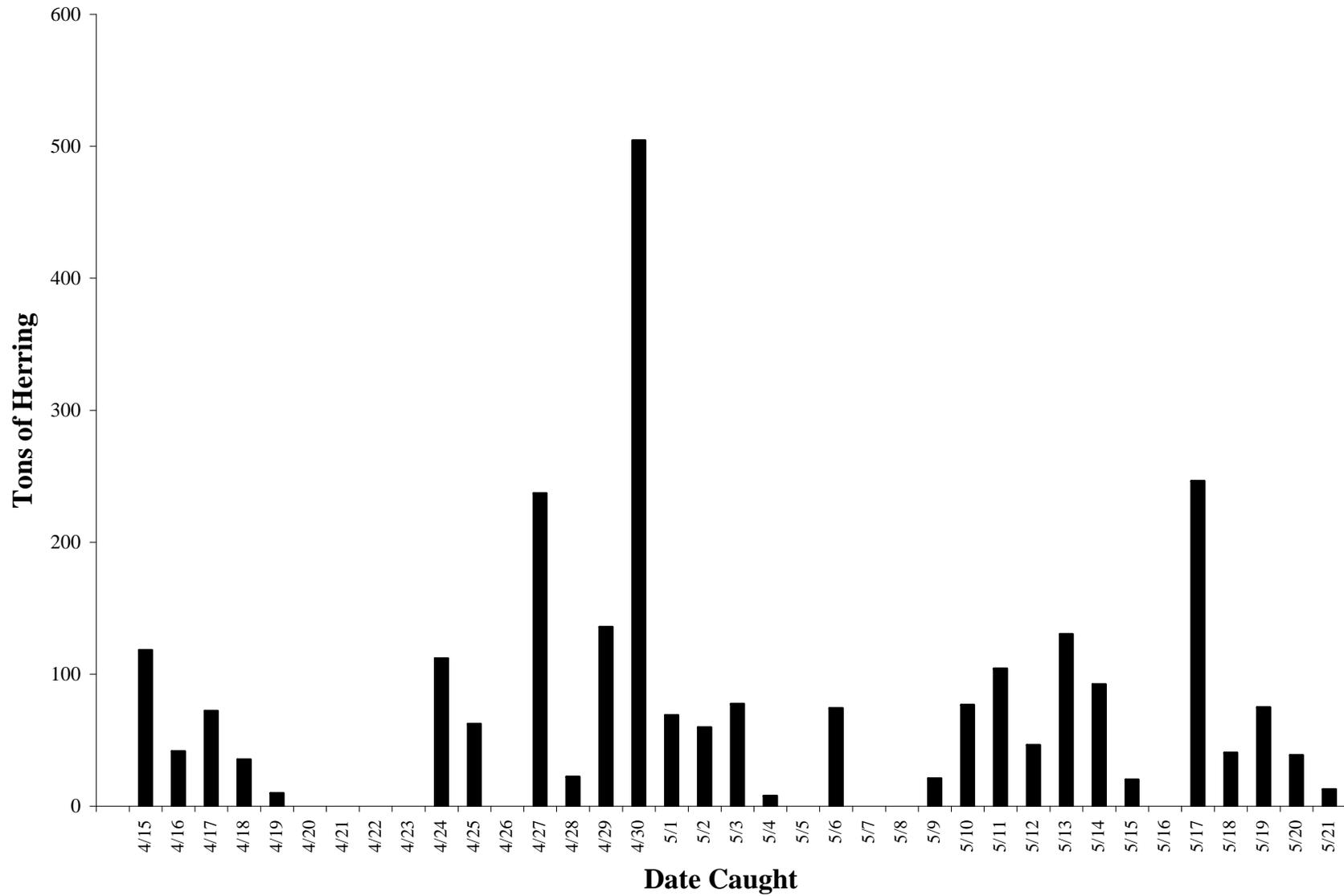


Figure 4.—Herring sac roe fishery harvest by day, Kodiak Management Area, 2007.

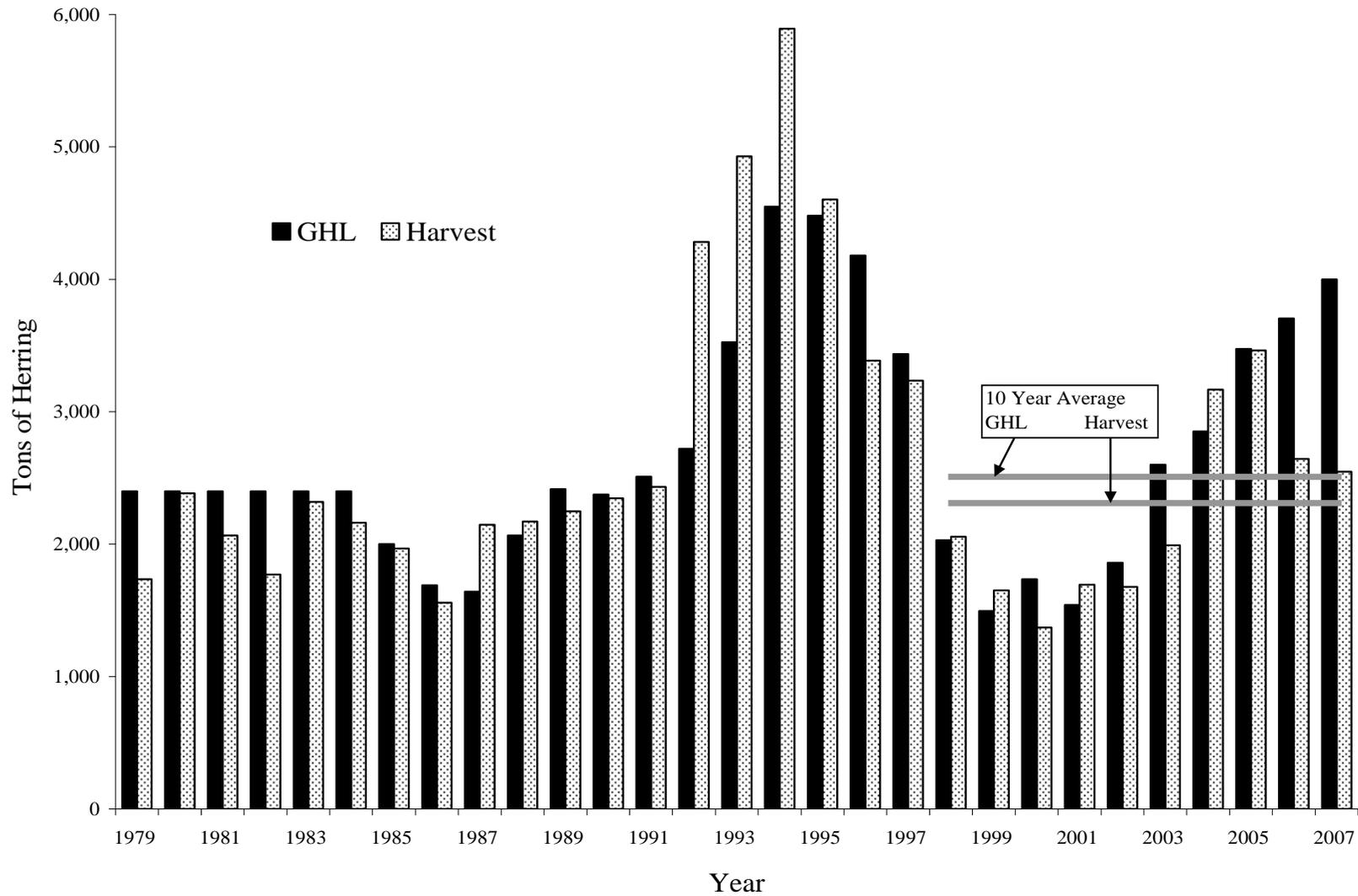
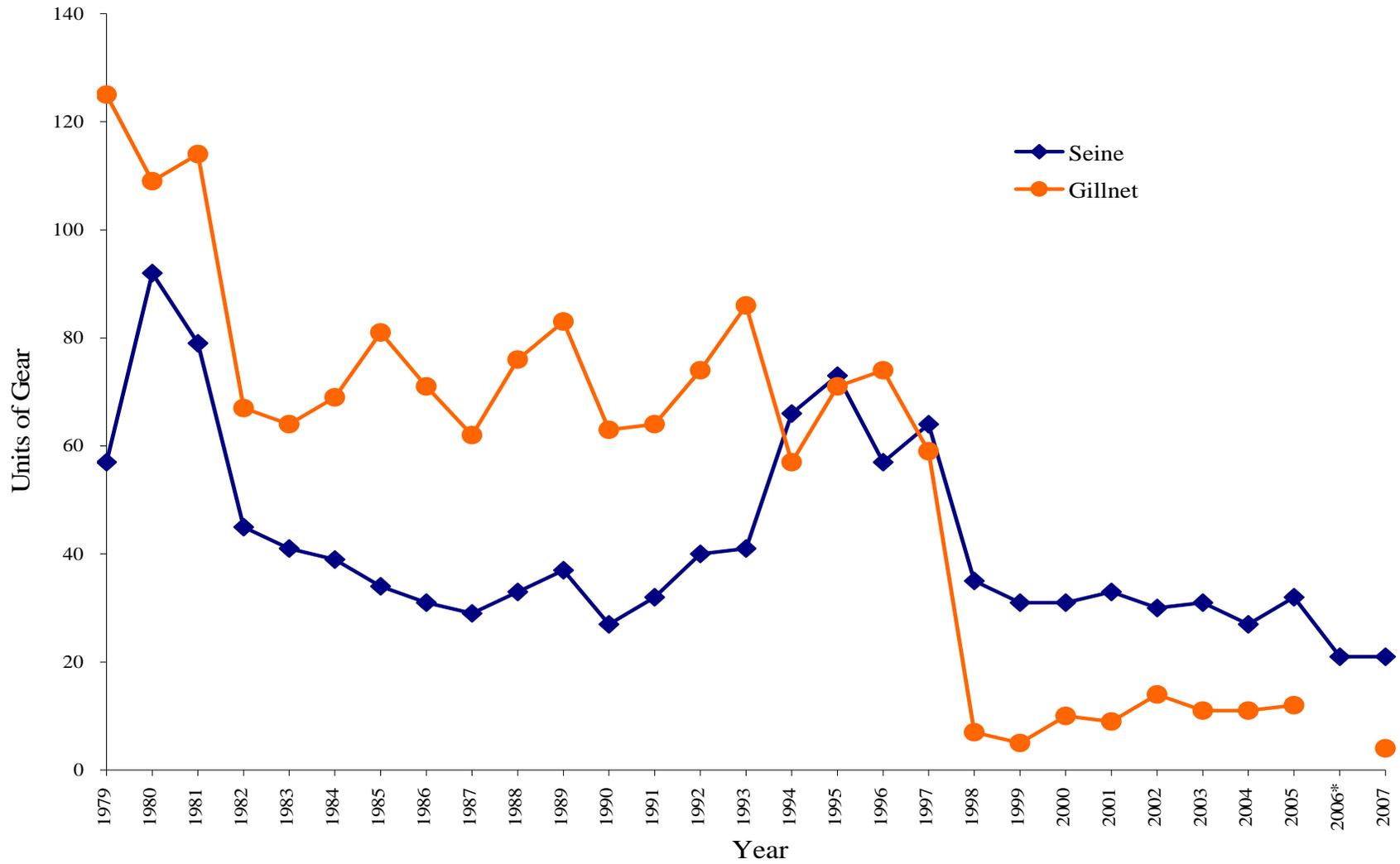


Figure 5.—Comparison of guideline harvest levels (GHLs) to the herring sac roe commercial harvest, Kodiak Management Area, 1979 to 2007.



* 2006 gillnet data are confidential

Figure 6.—Herring sac roe commercial fishery participation, Kodiak Management Area, 1979-2007.

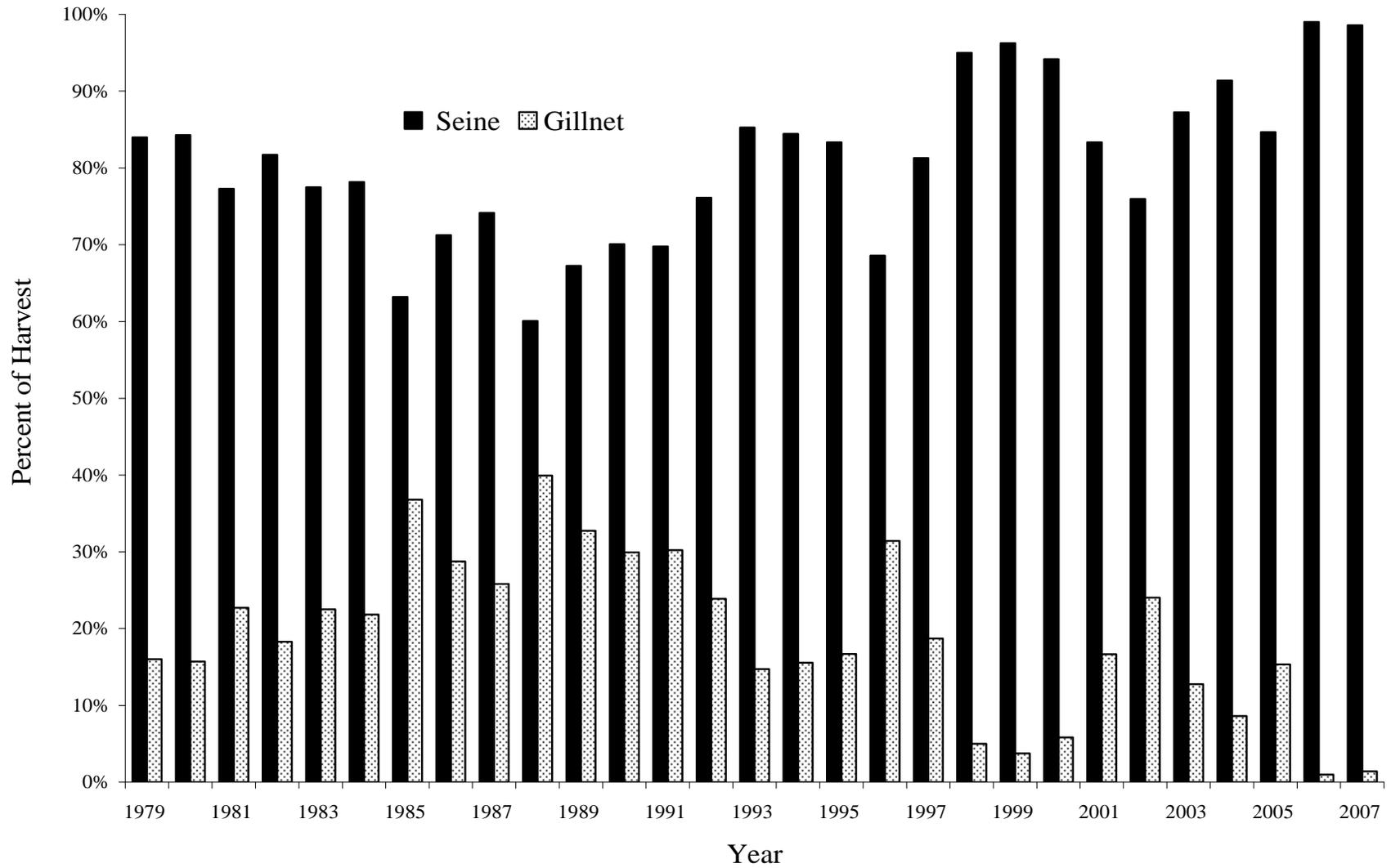
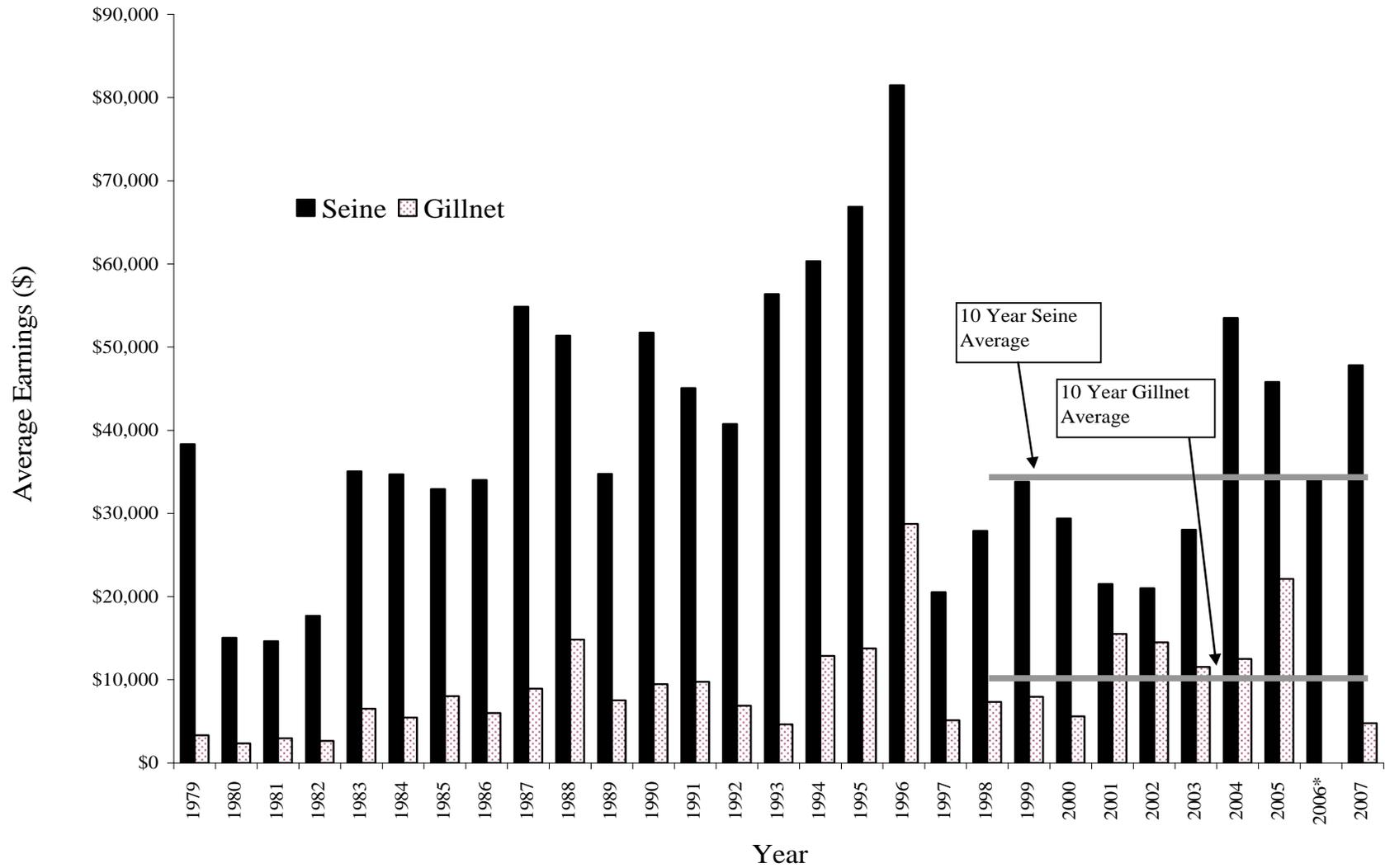


Figure 7.—Percent of the total harvest taken by gear type in herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.



* 2006 gillnet data are confidential

Figure 8.—Average earnings by gear type for herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.

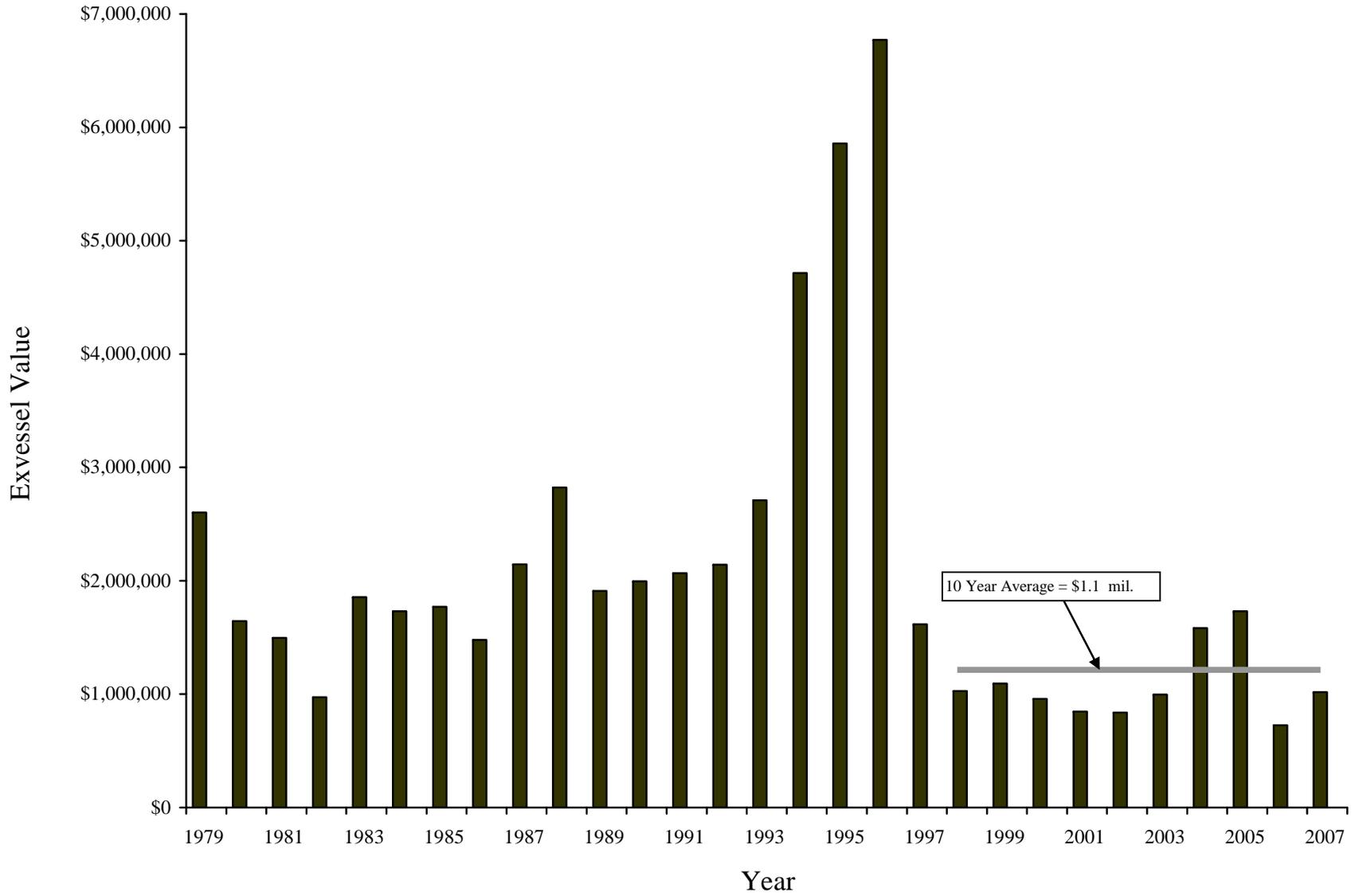


Figure 9.—Total exvessel value for herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.

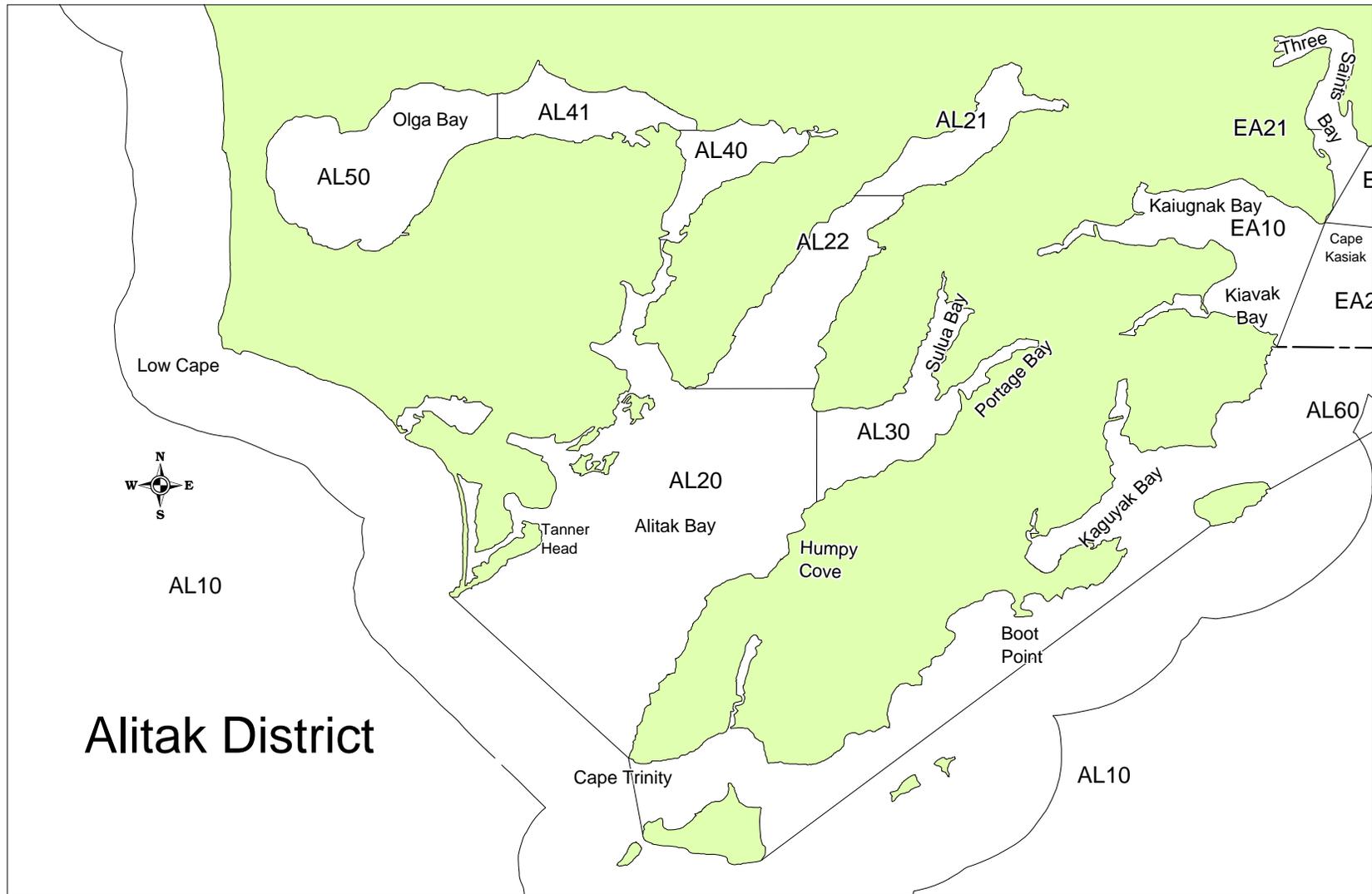


Figure 10.—Map showing the boundary lines in effect for the Alitak District in 2007.

**APPENDIX A: SUMMARY OF EMERGENCY ORDERS
ISSUED FOR THE HERRING COMMERCIAL FISHERIES
IN THE KODIAK MANAGEMENT AREA, 2007**

Appendix A1.–Summary of emergency orders issued for the herring commercial fisheries in the Kodiak Management Area, 2007.

Emergency Order #		Effective:	Action Taken:
1	NOON April 2	NOON April 15	<u>Open Sac Roe Fishery</u> : initial opening times and fishing periods by gear and section for sac roe herring fishery announced. This EO also modified sections and section lines in the Alitak District.
2	8:30 AM April 16	9:00 PM April 15	<u>Closure</u> : the East Sitkalidak Section (EA30) of the Eastside District at 9:00 PM April 15.
3	6:00 PM April 17	5:30 PM April 17	<u>Closure</u> : the West Sitkalidak Section (EA23) of the Eastside District at 5:30 PM April 17.
4	3:00 PM April 20	9:00 AM April 24	<u>Fishing Period</u> : commercial herring fishing opened in the Danger Bay Section (SA40) of the Afognak Districts from 9:00 AM to NOON April 24, and then followed normal purse seine fishing periods
5	11:30 AM April 24	11:30 AM April 24	<u>Closure</u> : The Danger Bay Section (SA40) of the Afognak Districts at 11:30 AM April 24.
6	10:00 AM April 27	NOON April 29	<u>Fishing Period</u> : commercial herring fishing opened in the Outer Ugak Bay Section (EA50) at NOON April 29 and followed normal purse seine fishing periods.
7	12:45 PM April 27	1:15 PM April 27	<u>Fishing Period</u> : commercial herring fishing opened in the Village Islands/Uganik Bay sections (UG30, 32-34) for purse seine gear from 1:15 PM to 3:15 PM April 27 in that portion south of 57°46.65' N. lat. and north of 57°42.80' N. lat.
8	6:50 PM April 27	7:00 PM April 27	<u>Fishing Period</u> : commercial herring fishing opened in the Village Islands/Uganik Bay sections (UG30, 32-34) for purse seine gear from 7:00 PM to 9:00 PM April 27 in that portion south of 57°46.65' N. lat. and north of 57°42.80' N. lat.

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Emergency Order #	Issued:	Effective:	Action Taken:
9	10:00 PM April 27	9:00 AM April 28	<u>Fishing Period:</u> commercial herring fishing opened to gillnet gear in the Village Islands/Uganik Bay sections (UG30, 32-34) from 9:00 AM April 28 to 9:00 AM April 29 in that portion south of 57° 46.00' N. lat. And north of 57°41.50' N. lat.
10	8:30 AM April 29	9:00 AM April 29	<u>Fishing Period:</u> commercial herring fishing opened in the Village Islands/Uganik Bay sections (UG30, 32-34) for purse seine gear from 9:00 AM to 9:00 PM April 29 in that portion south of 57°46.65' N. lat. and north of 57°42.00' N. lat.
11	11:15 AM April 29	11:30 AM April 29	<u>Closure:</u> the Village Islands/Uganik Bay sections (UG 30, 32-34) at 11:30 AM
12	1:30 PM April 29	2:30 PM April 29	<u>Fishing period:</u> commercial herring fishing opened in the Village Islands/Uganik Bay sections (UG30, 32-34) for purse seine gear from 2:30 PM to 9:00 PM April 29 in that portion south of 57°46.65' N. lat. and north of 57°42.00' N. lat
13	9:30 AM April 30	10:00 AM April 30	<u>Fishing Period:</u> commercial herring fishing opened in the Village Islands/Uganik Bay sections (UG30, 32-34) for purse seine gear from 10:00 AM to NOON April 30 in that portion north of 57°46.00' N. lat. Additional closed waters were south of 57°47.55' N. lat., north of 57°46.95' N. lat, and west of 153°32.60' W. long.
14	11:45 April 30	NOON April 30	<u>Extension:</u> commercial herring fishing was extended in the Village Islands/Uganik Bay sections (UG30, 32-34) for purse seine gear until 6:00 PM April 30. Closed waters were reduced to north of 57°43.50' N. lat.
15	8:30 May 1	9:00 AM May 1	<u>Fishing Period:</u> commercial herring fishing opened for gillnet gear in the Village Islands/Uganik Bay sections (UG30, 32-34) from 9:00 AM May 1 to 9:00 AM May 2 in that portion north of 57°42.80' N. lat. Additional closed waters were south of 57°47.55' N. lat., north of 57°46.95' N. lat, and west of 153°32.60' W. long.

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Emergency Order #	Issued:	Effective:	Action Taken:
16	9:00 AM May 1	9:00 AM May 1	<u>Closed Water Adjustment</u> : commercial herring fishing for gillnet gear in the Village Islands/Uganik Bay Sections (UG30, 32-34) will be allowed in those waters south of 57°47.55' N. lat., north of 57°46.95' N. lat, and west of 153°32.60' W. long.
17	1:30 PM May 2	2:00 PM May 2	<u>Fishing Period</u> : commercial herring fishing opened for purse seine gear in the Village Islands/Uganik Bay Sections (UG30, 32-34) from 2:00 PM to 3:00 PM May 2. in that portion north of 57°43.00' N. lat.
18	2:45 PM May 2	3:00 PM May 2	<u>Extension</u> : commercial herring fishing was extended for purse seine gear in the Village Islands/Uganik Bay Sections (UG30, 32-34) until 4:00 PM May 2.
19	3:45 PM May 2	4:00 PM May 2	<u>Extension</u> : commercial herring fishing was extended for purse seine gear in the Village Islands/Uganik Bay Sections (UG30, 32-34) until 9:00 PM May 2.
20	8:37 PM May 3	8:37 PM May 3	<u>Closure</u> : the Outer Ugak bay Section (EA 50) of the the Eastside District at 8:37 PM May 3.
21	1:00 PM May 5	9:00 AM May 5	<u>Fishing Period</u> : commercial herring fishing opened for gillnet gear in the Village Islands/Uganik Bay sections (UG30, 32-34) at 9:00 AM May 5 to 9:00 AM May 6.
22	1:30 PM May 5	2:00 PM May 5	<u>Fishing Period</u> : commercial herring fishing opened in the Inner Uyak Bay Section (UY 30) from 2:00 PM to 9:00 PM May 5 in that portion south of 57°25.70' N. lat. and north of 57°19.50' N. lat.
23	3:40 PM May 5	3:40 PM May 5	<u>Closure</u> : the Inner Uyak Bay Section (UY30) of the Uyak District at 3:40 PM May 5.
24	9:00 AM May 7	9:30 AM May 7	<u>Fishing Period</u> : commercial herring fishing opened for purse seine gear in the Village Islands/Uganik Bay Sections (UG30, 32-34) from 9:30 AM to 9:00 PM May 7.

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Emergency Order #	Issued:	Effective:	Action Taken:
25	NOON May 8	NOON May 9	<p><u>Fishing Period:</u> commercial herring fishing opened for purse seine gear in the Village Islands/Uganik Bay sections (UG30, 32-34) from NOON to 10:00 PM on odd numbered days and from 9:00 AM to NOON on even numbered days beginning at NOON May 9.</p> <p><u>Fishing Period:</u> commercial herring fishing opened for gillnet gear in the Village Islands/Uganik Bay sections (UG30, 32-34) from NOON on even-numbered days to NOON on odd-numbered days beginning at NOON May 10.</p>
26	2:00 PM May 8	NOON May 8	<u>Closure:</u> the Barling Bay Section (EA24) of the Eastside District at NOON May 8.
27	2:30 PM May 11	2:00 PM May 11	<u>Closure:</u> the Inner Deadman Bay Section (AL21) of the Alitak District at 2:00 PM on May 11
28	3:30 PM May 13	3:30 PM May 13	<u>Closure:</u> the Outer Deadman Bay Section (AL22) of the Alitak District at 3:30 PM May 13.
29	4:30 PM May 17	4:45 PM May 17	<u>Closure:</u> the Inner Alitak Section (AL20) of the Alitak District at 4:45 PM May 17.
30	NOON May 24	NOON May 25	<p><u>Fishing Period:</u> commercial herring fishing opened for purse seine gear in the South Arm Section (UG 34) from NOON to 10:00 PM on odd numbered days and from 9:00 AM to NOON on even numbered days beginning at NOON May 25.</p> <p><u>Fishing Period:</u> commercial herring fishing opened for gillnet gear in the South Arm Section (UG 34) from NOON on even-numbered days to NOON on odd-numbered days beginning at NOON May 26.</p>