

Fishery Management Report No. 23-21

**Kodiak Management Area Herring Fisheries Annual
Management Report, 2022**

by

Brad A. Fuerst

December 2023

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H_A
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, χ^2 , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient	
		corporate suffixes:		(simple)	r
Weights and measures (English)		Company	Co.	covariance	cov
cubic feet per second	ft ³ /s	Corporation	Corp.	degree (angular)	°
foot	ft	Incorporated	Inc.	degrees of freedom	df
gallon	gal	Limited	Ltd.	expected value	E
inch	in	District of Columbia	D.C.	greater than	>
mile	mi	et alii (and others)	et al.	greater than or equal to	≥
nautical mile	nmi	et cetera (and so forth)	etc.	harvest per unit effort	HPUE
ounce	oz	exempli gratia	e.g.	less than	<
pound	lb	(for example)		less than or equal to	≤
quart	qt	Federal Information Code	FIC	logarithm (natural)	ln
yard	yd	id est (that is)	i.e.	logarithm (base 10)	log
		latitude or longitude	lat or long	logarithm (specify base)	log ₂ , etc.
Time and temperature		monetary symbols		minute (angular)	'
day	d	(U.S.)	\$, ¢	not significant	NS
degrees Celsius	°C	months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	H_0
degrees Fahrenheit	°F	registered trademark	®	percent	%
degrees kelvin	K	trademark	™	probability	P
hour	h	United States (adjective)	U.S.	probability of a type I error	
minute	min	United States of America (noun)	USA	(rejection of the null hypothesis when true)	α
second	s	U.S.C.	United States Code	probability of a type II error	
		U.S. state	use two-letter abbreviations (e.g., AK, WA)	(acceptance of the null hypothesis when false)	β
Physics and chemistry				second (angular)	"
all atomic symbols				standard deviation	SD
alternating current	AC			standard error	SE
ampere	A			variance	
calorie	cal			population	Var
direct current	DC			sample	var
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

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ANNUAL MANAGEMENT REPORT, 2022**

by

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ABSTRACT

This report presents information concerning the commercial Pacific herring *Clupea pallasii* sac roe, food and bait, and subsistence fisheries in the Kodiak Management Area (KMA) in 2022.

Several significant regulation changes to the sac roe fishery occurred at the January 2020 Board of Fisheries meeting in Kodiak. The season start date was changed from April 15 to April 1. The allocative management plan that assigned GHLS and sections by gear type was removed, and both gear types can now fish the same sections. Fishing periods were changed so that purse seine permit holders and gillnet permit holders fish on alternating days. Purse seine fishing periods remained the same, but gillnet fishing periods were changed from 12:00 noon on even-numbered days to 12:00 noon on odd-numbered days.

The 2022 preseason GHL was established at 8,075 tons. There was no effort by gillnetters, and 11 purse seine permit holders participated in the fishery harvesting 8,913 tons.

A combine fishery was conducted for the 2022–2023 food and bait fishery due to small GHLS and overharvest concerns. The total GHL was 760 tons, and 912 tons were harvested during the food and bait fishery.

Subsistence herring harvests were reported from 15 subsistence permits. The total KMA subsistence harvest for 2022 was 3,266 pounds.

Keywords: 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 in the Kodiak Management Area (KMA) in 2022. 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 consists of 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 that define geographical areas used to manage both the herring sac roe and the food and bait fisheries (Figures 2–10). For the sac roe fishery, each district is divided into sections that define the spawning area used by specific herring stocks or a geographical area.

HERRING SAC ROE FISHERY

FISHERY CHARACTERISTICS

The KMA herring sac roe fishery began in 1964 (Table 1; Figure 11) and occurs in approximately 30 bays and coastal locations. Since 1964, harvests have averaged 2,229 tons (Table 1). Prior to 1974 the fishery was unregulated regarding guideline harvest levels (GHLS), gear types, seasons, and fishing periods (Gretsch 2001). Between 1974 to 1978 season dates were from March 1 through June 30 with an areawide quota of 3,400 tons. Legal gear included purse seine, beach seine, gillnet, and trawl. In 1979 the season length was shortened to May 1 through June 30 and the areawide quota was reduced to 2,400 tons. Trawl and beach seine were eliminated as legal gear types during the 1981 season. In 1982 the starting date for the season was changed to April 15 and GHLS were set annually on a stock-by-stock basis (Gretsch 2001). The April 15 opening, prior to

any major buildup of herring, was intended to distribute effort and harvest; however, in recent years, purse seiners have concentrated in areas known to have early-spawning herring and the largest GHLS. The fishery ends on June 30 (5 AAC 27.510(a)). In 2020 the season start date was moved to April 1 to accommodate early spawn timing observed in recent seasons.

The harvest strategy was allocative from 2000 to 2019 and required that 20% to 30% of the GHL be assigned to gillnet permit holders and 70% to 80% of the GHL be assigned to purse seine permit holders for each district with more than one section open to fishing (5 AAC 27.535(e)(2)(D)). This was accomplished by designating one gear type for each section with a GHL. In districts where assigning one gear type for each section would not achieve the required allocation, the department established GHLS for both gear types within a section, and fishing is separated by time or area. From May 1 through June 30, the department could open any area with a remaining GHL to any gear group if the fishery was not likely to result in overharvest (5 AAC 27.535(e)(1)(C)). In 2020, the allocation was eliminated and both gear types were allowed to fish the same sections on alternating days.

Gear

Purse seines and gillnets are the only gear types allowed in the commercial 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)).

Harvest Strategy

The herring sac roe fishery harvest strategy requires the Alaska Department of Fish and Game (ADF&G) to establish GHLS by section based on historical harvest data, current and past fishery performance, age composition of commercial catch samples, aerial surveys, and hydroacoustic biomass assessments.

Adjacent sections may be combined and managed as a single section if the same stock is present or moves between sections (5 AAC 27.535(e)(1)(A)). ADF&G may also use emergency order (EO) authority to restrict fishing time in any section if overharvest concerns exist or to open additional areas during the season.

After April 30, permit holders must be registered with ADF&G before participating in the fishery (5 AAC 27.510(a)(4)). To better keep track of active participants, the department has required by EO that sac roe fishers register with the Kodiak office since 2016.

Fishing Periods

From April 1 through May 7, fishing periods for purse seiners are from 12:00 noon until 9:00 p.m. on odd-numbered days and from 9:00 a.m. to 12:00 noon on even-numbered days. From May 8 through June 30, fishing periods for purse seiners are from 12:00 noon until 10:00 p.m. on odd-numbered days and from 9:00 a.m. to 12:00 noon on even-numbered days (5 AAC 27.510(a)(1)). Gillnet fishing periods are from 12:00 noon on even-numbered days until 12:00 noon on odd-numbered days (5 AAC 27.510(a)(2)).

2020 Regulation Changes

During the January 2020 Board of Fisheries (BOF) meeting in Kodiak, there were major changes to the management plan of the Kodiak herring sac roe fishery; they included the following items:

- The season start date was changed to April 1.
- The allocative management plan that provides opportunities for gillnet permit holders to harvest approximately 25% and purse seine permit holders to harvest approximately 75% of the GHL was removed.
- Both gear types will be allowed to fish the same sections on alternating days. Purse seine fishing periods will remain 12:00 noon to 9:00 p.m. on odd-numbered days and 9:00 a.m. to 12:00 noon on even-numbered days. Gillnet fishing periods are from 12:00 noon on even-numbered days to 12:00 noon on odd-numbered days.

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 but are conservative in nature due to the uncertainty in assessing biomass in the KMA. In 2022, section GHLS ranged from 10 to 1,200 tons (short; Table 2). Establishing the 2022 GHLS involved evaluation of a variety of information to determine stock status trends and conservative adjustment of GHLS, including the following:

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. ADF&G and industry aerial surveys;
5. hydroacoustic surveys; and
6. test fishery data including age composition and biomass estimates.

Preseason GHLS have generally reflected the actual harvests and have aided fishers and processors in planning prior to the start of each season (Figure 12).

Inseason Fishery Management

Inseason, processors and independent tender operators are required to provide daily tallies of herring tonnage and deliveries by section, as well as accurate estimates of herring tonnage onboard tenders that have not yet delivered to the processor. Reports from field personnel, processors, permit holders, spotter pilots, and tenders are tallied by ADF&G to assess herring harvests. Generally, once the harvest estimate draws near, meets, or exceeds the GHL, a section is closed for the season by EO. 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. Industry cooperation has greatly aided managers.

ADF&G has historically relied on the fishing industry to establish roe recovery and minimum size standards. The quality of Kodiak herring has generally been high and met industry standards due to selective harvest of mature herring by fishers and the inseason processing of relatively small amounts of herring over long time periods by local processors (Figure 13). In the 1990s, competition in the purse seine fishery intensified, and fishers were less selective in harvesting

high-quality herring. In 2003 and 2004, ADF&G 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 BOF meeting, the harvest strategy was changed to direct ADF&G to strive for the highest-quality product (5 AAC 27.535(e)(6)).

2022 SEASON SUMMARY

The 2022 sac roe season opened at 12:00 noon April 1. The last harvest occurred on April 24, and 19 EOs were issued during the season (Appendix A1). The total 2022 KMA GHF was established at 8,075 tons, and 8,912 tons were harvested (Table 3; Figures 11 and 12).

In 2022, 11 purse seine permit holders made 133 landings and harvested all 8,075 tons. No gillnet permit holders participated (Table 3; Figure 14).

The new earlier opening date caused fishers to target herring in areas of the Eastside District where the first herring are known to appear and spawn. Harvests occurred early in the season, with Shearwater Bay closing on April 1 (Appendix A1). Fishers continued to concentrate effort in the southern portion of the Eastside District, closing many areas on April 4 (Appendix A1). These early harvests totaled 883 tons in Barling Bay, Southwest Sitkalidak, West Sitkalidak, Geese-Twoheaded, and Outer Kiliuda Bay Sections.

Fishers turned their attention to open sections on the northern end of the Eastside District and Northeast District, closing the Kalsin Bay Section on April 6 and the Inner and Outer Kiliuda Sections and the East Sitkalidak and Tanginak Anchorage Sections on April 8 (Appendix A1). Harvest in these areas totaled 574 tons.

Tonki Bay of the North Afognak District closed on April 10 with a harvest of 72 tons (Table 1; Appendix A1).

Harvests in the Uganik District began on April 10, with 1,108 tons taken by April 12. Open sections closed in rapid succession, with the combined Village Islands and Uganik Bay Sections closing on April 12 (Appendix A1).

The combined areas of Delphin Bay and Perenosa Bay of the North Afognak District closed on April 13 with a harvest of 71 tons (Appendix A1).

Fishers then began to target Uyak Bay District herring, and closures occurred of the combined sections of the Zachar Bay and Spiridon Bay Sections on April 16 with a harvest of 749 tons (Appendix A1). Closure of the combined Inner Uyak and Browns Lagoon Sections occurred the next day with a harvest of 97 tons (Appendix A1). The Kizhuyak Bay Section of the Inner Marmot District also closed on April 17 with a harvest of 201 tons (Appendix A1).

The Danger Bay Section of the South Afognak District closed on April 18 with a harvest of 395 tons (Appendix A1). The West Afognak District areas closed on April 19 with harvests in the combined Paramanof Bay and Foul Bay Sections as well as the Malina Bay Section totaling 885 tons (Appendix A1). The South Afognak District areas of Izhut Bay, Kitoi Bay, and MacDonalds Lagoon Sections closed April 20 with a harvest of 52 tons (Appendix A1).

The combined areas of Inner Ugak Bay and Outer Ugak Bay Sections closed on April 22 with a harvest of 459 tons (Appendix A1). The season wrapped up with the closure of combined Inner Alitak, Inner Deadman Bay, Outer Deadman Bay, and Sulua Bay Sections on April 24 with a harvest of 144 tons (Appendix A1).

The fishery was monitored by 2 ADF&G vessels that traveled to anticipated herring harvest locations. Vessels monitored the fishery to gather effort and harvest data used to manage the fishery and collected commercial catch samples to obtain age, weight, and length (AWL) data. A field crew was also stationed in the Outer Ugak Bay Section to monitor the fishery there, as well as collect AWL data.

There were a total of 48 sections open to fishing; however, 6 sections were exploratory and had little or no historic harvests. Harvest occurred within 41 sections. There were 19 EOs issued concerning the fishery (Appendix A1).

Exvessel Value of the Fishery

In 2022 the exvessel price paid for 10% roe recovery herring was approximately \$158 per ton at the dock, which was similar to recent seasons (Table 3). The estimated average exvessel earnings per purse seine permit holder was \$128,009 (Figure 16). The total exvessel value of the 2022 fishery was worth an estimated \$1,408,096 (Table 3; Figure 17), which does not include any adjustments in value for roe recovery above or below 10% recovery, herring that are sold as bait, or herring that were discarded. Roe recovery averaged 10.4% (Figure 13). As is usually the case, seine gear accounted for the majority of the harvest (Figure 15).

STOCK ASSESSMENT

ADF&G evaluates fishery performance and survey information to assess trends in stock status. Hydroacoustic and aerial surveys are conducted by ADF&G to assess herring abundance prior to, during, and after the commercial fishery and to survey closed sections. Herring samples come from commercial harvests and from research vessels (using a midwater trawl). Age composition information from these samples provides insight into recruitment and aids managers in making GHL adjustments. For example, areas with strong percentages of age-4 and younger herring (recruitment) will not be aggressively fished and will have conservative GHLs established, whereas areas with older age classes (9 or more years old) will be more aggressively fished with higher GHLs.

Industry aerial observers and permit holders have aided managers by providing biomass estimates, spawn observations, fleet movements, and harvest estimates. Although aerial and hydroacoustic assessments provide an evaluation of the biomass, there are problems associated with herring assessment in the KMA. These problems include the following:

1. Herring tend to be deeper in the water column during the day and rise toward the surface in the evening and early morning hours, limiting the time fish are observable from the air.
2. Most fishing sections have several distinct aggregations 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 limit the extent of surveys.
6. Hydroacoustic surveys are limited to shallower waters, and vessel avoidance by herring is known to occur (Hjellvik et al. 2008).

7. A substantial amount of subtidal spawning may occur in water 10 to 20 fathoms in depth, which is not detectable from aerial surveys.

Catch Sampling

A total of 5,750 herring were collected and analyzed for AWL data from harvests and ADF&G trawl samples during the 2022 sac roe season. Samples were taken from 21 sections, all of which had commercial harvests. Age-6 herring were the dominant age class, representing approximately 73% of the sampled herring (Table 4). The samples consisted of 73% age-6, 21% age-3, 3% age-4, 1% age-5, 1% age-7, and 1% age-8 herring (Table 4). Herring sizes from the Eastside were generally larger at age than samples taken throughout the rest of the KMA (Table 5).

Stock Status by District

Herring can generally be found seasonally in all bays of the KMA (Figure 2). ADF&G monitors approximately 70 sections that are known to have spawning populations of herring, with the majority of effort spent on 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 areas, such as in the Mainland Districts, several years may elapse before new information becomes available. ADF&G also considers information provided by commercial herring fishers, spotter pilots, air taxi operators, and remote area residents concerning herring distribution, biomass estimates, and spawn sightings.

North Afognak District

Five sections compose the North Afognak District. Spawning stocks of herring occur in all 5 sections, although these stocks tend to be small (Figure 3). The Tonki Bay Section had a GHL of 75 tons and the combined Delphin and Perenosa Bay Sections had a 50-ton GHL. On April 15, 72 tons were harvested from the Tonki Bay Section and 71 tons in Delphin/Perenosa Sections (Table 2). The harvest was composed of 93% age-6 herring for Tonki Bay and 91% age-6 for Delphin/Perenosa Sections (Table 4).

West Afognak District

The West Afognak District has 6 sections, 5 of which are known to have spawning stocks of herring (Figure 3). These stocks have been at low levels since 2005 but have improved in recent years. The combined Paramanof/Foul Bay Sections had a GHL of 500 tons. The Malina Bay Section and the Raspberry Strait Section each had a GHL of 250 tons. Harvest from the Malina Bay Section was 138 tons, and 825 tons were harvested from the combined Paramanof/Foul Bay. There was no harvest from Raspberry Strait (Table 2). Harvest from both areas were composed of 72% age-6 and 20% age-3 herring (Table 4).

South Afognak District

The South Afognak District contains six sections, and the Danger Bay Section currently has the largest stock of herring in this district (Figure 3). A 400-ton GHL was established (Table 2). Approximately 3,000 tons were observed during hydroacoustic surveys, and 395 tons were harvested (Table 2). Samples collected were composed of 81% age-6, 11% age-3, and 3% age-4 (Table 4).

The MacDonalds Lagoon, Kitoi Bay, and Izhut Bay Sections were combined and managed as one unit with a 100-ton GHL; approximately 52 tons were harvested (Table 2).

Uganik District

The Uganik District consists of 9 sections on the northwest side of Kodiak Island (Figure 4). Recently this district had the largest harvests in the KMA. The 2022 GHL for the combined Village Islands/Uganik Bay Sections was set at 1,000 tons. Purse seine permit holders harvested 1,107 tons (Table 2). Samples from the fishery were composed of 86% age-6 and 13% age-3 herring (Table 4).

The Viekoda Bay, Terror Bay, and West Uganik Passage Sections were combined and managed as one area with a GHL of 1,200 tons. Hydroacoustic and aerial surveys estimated approximately 12,000 tons of herring in these areas. Purse seine permit holders harvested 1,335 tons (Table 2). Samples from the harvest were composed of 51% age-6, 43% age-3, and 5% age-4 herring (Table 4).

Uyak District

The Uyak District is made of 7 sections located on the west side of Kodiak Island (Figure 5). Through the 1980s, the Uyak District was the largest herring-producing district in the KMA. 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 by 2004, several sections were reopened for the first time since 1994.

The combined Inner Uyak Bay and Brown's Lagoon Sections were opened with a 400-ton GHL, and 486 tons were harvested (Table 2). The harvest was composed of 72% age-6, 21% age-3, and 5% age-4 herring. Approximately 5,300 tons were observed during aerial surveys.

The combined Zachar Bay and Spiridon Bay Sections had a 400-ton GHL. Purse seiners harvested approximately 749 tons, and the harvest was made up of 83% age-6, 11% age-3, and 4% age-4 herring (Tables 2 and 4).

Alitak District

All sections in the Alitak District, except the Outer Alitak Section, are known to have herring stocks (Figure 6). These stocks began to decline in the early 1990s, and by 1998, most sections were closed. In 2002, aerial survey 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.

The Inner Alitak, Inner Deadman Bay, Outer Deadman Bay, and Sulua Bay Sections currently have the largest biomass and were combined and managed as one section in 2022. These combined sections had a GHL of 150 tons (Table 2). The harvest of 144 tons was made up of 94% age-6 herring (Table 4).

The East Upper Olga Bay and West Upper Olga Bay Sections were combined with the Lower Olga-Moser Section and managed as one area with a GHL of 100 tons, although no harvest occurred.

The Geese-Twoheaded Section was open in 2022 with a GHL of 150 tons (Table 2). Purse seiners observed a large biomass and harvested 253 tons from this section (Table 2).

Eastside District

The Eastside District is composed of 4 bay complexes: Ugak Bay, Kiliuda Bay, East Sitkalidak Strait, and West Sitkalidak Strait (Figure 7). Sixteen sections have been established, and only one,

the Outer Sitkalidak Section, has no history of herring sac roe harvests. Hydroacoustic surveys in this district are conducted less frequently than other portions of the KMA.

Generally, the East and West Sitkalidak Sections have the earliest spawning herring in the KMA, with initial spawns sometimes occurring in March. In 2022, the East Sitkalidak and Tanginak Anchorage Sections were combined with a 1,000-ton GHL. Fishers harvested 1,022 tons with the harvest composed of 71% age-6, 24% age-3, 2% age-8, and 1% age-5 herring (Tables 2 and 4). Hydroacoustic surveys estimated nearly 12,000 tons in these sections.

The West Sitkalidak, Three Saints Bay, Barling Bay, and Newman Bay Sections were combined and managed as one area with a GHL of 400 tons. The harvest of 271 tons was composed of 88% age-6, 7% age-3, and 3% age-8 herring (Table 4). Surveys estimated approximately 1,000 tons in the West Sitkalidak Section.

The Inner Kiliuda Bay and Outer Kiliuda Bay Sections also have some of the earliest spawning herring in the KMA. These sections were combined and managed as a single section with a 600-ton GHL (Table 2). Aerial and hydroacoustic surveys indicated a substantial biomass of around 12,000 tons. Purse seiners harvested 517 tons here, composed of 80% age-6, 17% age-3, and 2% age-8 herring (Table 4).

The Shearwater Bay Section was opened with a 200-ton GHL, and 506 tons were harvested by purse seine gear (Table 2). The harvest was composed of 90% age-6; 5% age-3; 2% age-7; and 1% each of age-7, age-9, and age-10 herring (Table 4). Aerial and hydroacoustic surveys documented approximately 8,200 tons of herring.

The Inner Ugak Bay and Outer Ugak Bay Sections have recently been strong herring producers. The Inner Ugak Bay and Outer Ugak Bay Sections were combined and managed as one area with a 500-ton GHL (Table 2). The harvest of 459 tons was composed of 72% age-6, 23% age-3, 2% age-8, and 1% age-4 herring (Table 4).

Northeast District

The Northeast District is composed of 5 sections, 4 of which have known spawning stocks of herring (Figure 8). The Womens Bay and Kalsin Bay Sections currently have the largest stocks of herring in this district. The Kalsin Bay Section opened with a 100-ton GHL, and 104 tons were harvested (Table 2). The harvest was composed of 93% age-6 and 4% age-3 herring (Table 4).

Inner Marmot District

There are 5 sections within the Inner Marmot District. All have known spawning stocks of herring, although most stocks are small (Figure 9). The Kizhuyak Bay Section has the largest stock of herring in the district. This section was opened with a 250-ton GHL, and 202 tons were harvested (Table 2). The harvest was composed of 60% age-6, 30% age-3, 8% age-4, and 1% each of age-5 and age-8 herring (Table 4).

Mainland District

There are 3 Mainland Districts containing 12 sections (Figure 10). The last commercial herring harvest from the Mainland Districts occurred in 1997. In 2022, 6 sections were open as exploratory; however, no effort occurred. The Inner Kukak Bay Section has the largest known biomass in the Mainland Districts, and between 20,000 and 30,000 tons have recently been estimated based on hydroacoustic surveys.

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)). GHLS for the fishery are established by district and are based upon 10% of the GHLS 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 GHLS and ADF&G'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 fishers who made landings between 1994 and 1998 (Gretsch 2001). Because of the relatively low GHLS available (60 tons in the Uganik District and 47 tons in the Eastside District), ADF&G did not allow a competitive fishery in 2001. As an alternative, the interim permit holders formed a combine, and ADF&G 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 consisting of 5 purse seine/gillnet permits and 4 trawl permits.

Combine fisheries have been conducted under similar conditions each season since 2002. Generally, 1 purse seine vessel is used to harvest herring that are then loaded onto a tender for transport. Fishing efforts have been focused mainly in the Uganik, West Afognak, and South Afognak Districts in recent years. Only purse seine vessels have been used to harvest herring for the combine.

Kamishak Stock

During the fall and winter months of the early 1980s, large 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 fishers 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 (unpublished ADF&G report by B. A. Johnson, C. Burkey, and D. Gaudet, 1988, 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. Ten percent of the allowable harvest of Kamishak Bay herring were allocated to the Shelikof food and bait fishery. To alleviate the problem of identifying the spawning stock of a harvest in areas where intermixing may occur, the harvest strategy combined the Kamishak stock GHL with the Kodiak stock GHL for food and bait management units along the Shelikof Strait. When this combined GHL was achieved the Shelikof Strait food and bait management units were closed collectively (5 AAC 27.535(a)). The harvest strategy also closed the food and bait fishery north of the latitude of Miners Point (Uganik Bay) when the Kamishak spawning biomass fell below 6,000 tons (5 AAC 27.535(d)). Surveys of Kamishak Bay were suspended in 2016 and the current spawning biomass is unknown.

During the January 2020 BOF meeting in Kodiak, the Kamishak allocation was removed from the management plan. Food and bait GHLs are now based solely on Kodiak stocks and cannot exceed 10% of the GHL during the previous sac roe season. To ease concerns over Kamishak herring being harvested, the offshore sections along the Shelikof Strait may not open during the food and bait fishery (5 AAC 27.535 (b)).

2022/2023 SEASON

The biggest obstacle to manage a competitive fishery is how to determine an equitable fishing period for the 2 gear types. For the 2022/2023 season, permit holders again requested a combine fishery. ADF&G accommodated the permit holders' request, and the West Afognak District (100-ton GHL), the Eastside District (280-ton GHL), the South Afognak District (40-ton GHL), the Uganik District (220-ton GHL), the Uyak District (80-ton GHL), and the Alitak District (40-ton GHL) opened on October 1, 2022 (Table 6). The Uganik and Uyak Districts closed on November 10 with a harvest of 375 tons. The West Afognak District closed on November 11 with a harvest of 186 tons. The South Afognak District closed on November 12 with no harvest. The Eastside District closed on November 17 with a harvest of 351 tons. The overall food and bait herring harvest for the season was 912 tons (Table 7).

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 20 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; Gretsck 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 increased due to bait needs created with the reopening of the commercial Tanner crab fishery in the KMA. ADF&G was concerned about the increased herring subsistence harvest and the appropriateness of taking subsistence herring for use as bait in a commercial fishery. ADF&G proposed regulation changes to the BOF in 2001, which were approved 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 fishers obtain a permit prior to fishing (5 AAC 01.530 (d)). Herring were included on the existing KMA salmon and crab subsistence permit. A permit that allows for the harvest of up to 1,000 pounds of herring to be used bait by commercial permit holders in commercial fisheries was also created (5 AAC 27.545).

2022 SEASON SUMMARY

In 2022, a total of 15 KMA subsistence permits were returned to ADF&G with herring subsistence harvest data, as required for reporting purposes. The reported subsistence herring harvests totaled 3,266 pounds (Table 8). The majority of the harvest was from the Eastside District with smaller harvests occurring throughout the KMA.

REFERENCES CITED

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- Hjellvik, V., N. O. Handegard, and E. Ona. 2008. Correcting for vessel avoidance in acoustic-abundance estimates for herring. *ICES Journal of Marine Science* 65(6):1036-1045.

TABLES AND FIGURES

Table 1.—Annual harvests by weight and percent in the KMA commercial herring sac roe and food and bait fisheries, from 1964 through 2022.

Year	Sac roe harvest (tons)	Food/bait harvest (tons)	Total herring harvest (tons)	Sac roe % of total harvest	Food/bait % 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%

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Table 1.–Page 2 of 2.

Year	Sac roe harvest (tons)	Food/bait harvest (tons)	Total herring harvest (tons)	Sac roe % of total harvest	Food/bait % of total harvest
2007	2,546	154	2,700	94%	6%
2008	3,099	202	3,301	94%	6%
2009	4,759	263	5,022	95%	5%
2010	5,701	191	5,892	97%	3%
2011	2,957	212	3,169	93%	7%
2012	4,260	299	4,559	93%	7%
2013	4,447	291	4,738	94%	6%
2014	2,463	124	2,587	95%	5%
2015	357	106	463	77%	23%
2016	365	0	365	100%	0%
2017	125	77	202	62%	38%
2018	226	59	285	79%	21%
2019	^a	121	^a	^a	^a
2020	4,127	339	4,466	92%	8%
2021	7,903	685	8,588	92%	8%
2022	8,912	912	9,825	90%	10%
Average					
1964–2021	2,229	213	2,442	89%	11%
10-year average					
2012–2021	2,429	210	2,639	80%	20%
5-year average					
2017–2021	2,479	256	2,735	67%	33%

^a Confidential.

Table 2.–Herring sac roe fishery GHGs by section and gear type, harvest by section and gear type, and date sections were closed, KMA, 2022.

Statistical area	Management section	GHL	Harvest		Date closed
			Purse seine	Gillnet	
NORTH AFOGNAK DISTRICT					
NA10	Shuyak Island	Closed	–	–	–
NA20 ^a	Delphin Bay	a	a	a	a
NA30 ^a	Perenos Bay	50	71	0	4/13
NA40	Seal Bay	Closed	–	–	–
NA50	Tonki Bay	75	72	0	4/10
DISTRICT TOTAL		125	143		
WEST AFOGNAK DISTRICT					
WA10	Raspberry Strait	250	0	0	6/30
WA20	Malina Bay	250	138	0	4/19
WA31 ^b	Paramanof Bay	500	825	0	4/19
WA32 ^b	Foul Bay	b	b	b	b
WA40	Bluefox Bay	Closed	–	–	–
WA50	Offshore W. Afognak	Closed	–	–	–
DISTRICT TOTAL		1,000	963		
SOUTH AFOGNAK DISTRICT					
SA10 ^c	Izhut Bay	100	52	0	4/20
SA20 ^c	Kitoy Bay	c	c	c	c
SA30 ^c	MacDonald Lagoon	c	c	c	c
SA40	Danger Bay	300	395	–	4/18
SA50	Litnik	Closed	–	–	–
SA60	Duck Bay	Closed	–	–	–
DISTRICT TOTAL		400	447	0	
UGANIK DISTRICT					
UG10	Kupreanof	Closed	–	–	–
UG20 ^d	Viekoda Bay	1,200	1,335	0	4/15
UG21 ^d	Terror Bay	d	d	d	d
UG30 ^e	Village Islands	1,000	1,107	0	4/12
UG31 ^d	West Uganik Passage	d	d	d	d
UG32 ^e	NE Arm Uganik Bay	e	e	e	e
UG33 ^e	East Arm Uganik Bay	e	e	e	e
UG34 ^e	South Arm Uganik Bay	e	e	e	e
UG40	Offshore Uganik	Closed	–	–	–
DISTRICT TOTAL		2,200	2,442	0	
UYAK DISTRICT					
UY10	Offshore Uyak	Closed	–	–	–
UY20	Harvester Island	Closed	–	–	–
UY30 ^f	Inner Uyak	400	486	–	4/17
UY32 ^f	Browns Lagoon	f	f	f	f
UY31	Larsen Bay	Closed	–	–	–
UY40 ^g	Zachar Bay	400	749	–	4/16
UY50 ^g	Spiridon Bay	g	g	g	g
DISTRICT TOTAL		800	1,235		

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Table 2.–Page 2 of 3.

Statistical area	Management section	GHL	Harvest		Date Closed
			Purse seine	Gillnet	Purse seine
ALITAK DISTRICT					
AL10	Outer Alitak	Closed	–	–	–
AL20 ^h	Inner Alitak	150	144	0	4/24
AL21 ^h	Inner Deadman Bay	h	h	h	h
AL22 ^h	Outer Deadman Bay	h	h	h	h
AL30 ^h	Sulua Bay	h	h	h	h
AL40 ⁱ	Lower Olga-Moser	100	0	0	6/30
AL41 ⁱ	East Upper Olga Bay	i	i	i	i
AL50 ⁱ	West Upper Olga Bay	i	i	i	i
AL60	Geese/Twoheaded	150	253	0	4/4
DISTRICT TOTAL		400	397	0	
STURGEON/HALIBUT DISTRICT					
SH10	Sturgeon/Halibut	CLOSED	CLOSED		
EASTSIDE DISTRICT					
EA10 ^j	Kaiugnak	100	204	0	4/3
EA20 ^j	SW. Sitkalidak	j	j	j	j
EA21 ^k	Three Saints Bay	400	271	0	4/3
EA22 ^k	Newman Bay	k	k	k	k
EA23 ^k	W. Sitkalidak Strait	k	k	k	k
EA24 ^k	Barling Bay	k	k	k	k
EA30 ^l	E. Sitkalidak Strait	1,000	1,022	0	4/8
EA31 ^l	Tanginak Anchorage	l	l	l	l
EA40	Outer Sitkalidak	Closed	–	–	–
EA41	Boulder Bay	Closed	–	–	–
EA42	Shearwater Bay	200	506	0	4/1
EA43 ^m	Outer Kiliuda Bay	600	517	0	4/8
EA44 ^m	Inner Kiliuda Bay	m	m	m	m
EA50 ⁿ	Outer Ugak Bay	500	459	–	4/22
EA51 ⁿ	Inner Ugak Bay	n	n	n	n
EA52	Pasagshak Bay	Closed	–	–	–
DISTRICT TOTAL		2,800	2,979	0	
NORTHEAST DISTRICT					
NE10	Womens Bay	Closed	–	–	–
NE20	Kalsin Bay	100	104	0	4/6
NE30	Middle Bay	Closed	–	–	–
NE40	Inshore Chiniak	Closed	–	–	–
NE50	Offshore Chiniak	Closed	–	–	–
DISTRICT TOTAL		100	104	0	

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Table 2.–Page 3 of 3.

Statistical area	Management section	GHL	Harvest		Date closed
			Purse seine	gillnet	Purse seine
INNER MARMOT DISTRICT					
IM10	Monashka Bay	Closed	–	–	–
IM20	Anton Larsen Bay	Closed	–	–	–
IM30	Sharatin Bay	Closed	–	–	–
IM40	Kizhuyak Bay	250	202	0	4/17
IM50	Spruce Island	Closed	–	–	–
NE AND IM DISTRICT TOTAL		250	202	0	
NORTH MAINLAND DISTRICT					
NM10	Hallo Bay	Closed	–	–	–
NM20	Inner Kukak	Exploratory	0	0	6/30
NM30	Outer Kukak	Closed	–	–	–
NM40	Missak Bay	Closed	–	–	–
MID MAINLAND DISTRICT					
MM10	Inner Katmai	Exploratory	0	0	6/30
MM20	Outer Katmai	Closed	–	–	–
MM30	Alinchak	Exploratory	0	0	6/30
MM40	Puale Bay	Exploratory	0	0	6/30
MM50	Portage Bay	Exploratory	0	0	6/30
MM60	Outer Portage	Closed	–	–	–
SOUTH MAINLAND DISTRICT					
SM10	Wide Bay	Exploratory	0	0	6/30
SM20	Lower Shelikof	Closed	–	–	–
MAINLAND DISTRICTS TOTAL			0	0	
GRAND TOTAL		8,075	8,912	0	

- ^a NA20 and NA30 were combined and managed as one section.
- ^b WA31 and WA32 were combined and managed as one section.
- ^c SA10, SA20, and SA30 were combined and managed as one section.
- ^d UG20, UG21, and UG31 were combined and managed as one section.
- ^e UG30, UG32, UG33, and UG34 were combined and managed as one section.
- ^f UY30 and UY32 were combined and managed as one section.
- ^g UY40 and UY50 were combined and managed as one section.
- ^h AL20, AL21, AL22, and AL30 were combined and managed as one section.
- ⁱ AL40, AL41, and AL50 were combined and managed as one section.
- ^j EA10 and EA20 were combined and managed as one section.
- ^m EA43 and EA 44 were combined and managed as one section.
- ⁿ EA50 and EA51 were combined and managed as one section.

Table 3.—Summary of GHL, harvest by gear type, percentage of harvest by gear type, number of landings, and estimated exvessel earnings for the herring sac roe fishery in the KMA, 1979–2022.

Year	GHL (tons)	Total harvest (tons)	Harvest (tons)		Percent harvest by gear type		Number of landings by gear type		Units of gear fished		Average catch (tons) by gear		Estimated average earnings ^a		Price per ton ^a	Estimated exvessel total value ^a
			Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet		
1979	2,400	1,735	1,457	278	84%	16%	—	—	57	125	26	2	\$38,342	\$3,336	\$1,500	\$2,602,500
1980	2,400	2,383	2,009	374	84%	16%	—	—	92	109	22	3	\$15,068	\$2,368	\$690	\$1,644,270
1981	2,400	2,065	1,596	469	77%	23%	207	406	79	114	20	4	\$14,647	\$2,983	\$725	\$1,497,125
1982	2,400	1,771	1,447	324	82%	18%	138	191	45	67	32	5	\$17,686	\$2,660	\$550	\$974,050
1983	2,400	2,319	1,797	522	77%	23%	164	284	41	64	44	8	\$35,063	\$6,525	\$800	\$1,855,200
1984	2,400	2,163	1,691	472	78%	22%	138	212	39	69	43	7	\$34,687	\$5,472	\$800	\$1,730,400
1985	2,000	1,968	1,244	724	63%	37%	118	348	34	81	37	9	\$32,929	\$8,044	\$900	\$1,771,200
1986	1,690	1,558	1,110	448	71%	29%	132	385	31	71	36	6	\$34,016	\$5,994	\$950	\$1,480,100
1987	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	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	2,415	2,249	1,513	736	67%	33%	171	627	37	83	41	9	\$34,758	\$7,537	\$850	\$1,911,650
1990	2,375	2,347	1,644	703	70%	30%	156	544	27	63	61	11	\$51,756	\$9,485	\$850	\$1,994,950
1991	2,510	2,432	1,697	735	70%	30%	169	587	32	64	53	11	\$45,077	\$9,762	\$850	\$2,067,200
1992	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	3,525	4,929	4,203	726	85%	15%	237	294	41	86	103	8	\$56,382	\$4,643	\$550	\$2,710,950
1994	4,550	5,893	4,976	917	84%	16%	285	485	66	57	75	16	\$60,315	\$12,870	\$800	\$4,714,400
1995	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	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	3,435	3,235	2,629	606	81%	19%	183	418	64	59	41	10	\$20,539	\$5,136	\$500	\$1,617,500
1998	2,030	2,057	1,954	103	95%	5%	110	26	35	7	56	15	\$27,914	\$7,357	\$500	\$1,028,500
1999	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	1,735	1,370	1,290	80	94%	6%	57	23	31	10	42	8	\$29,129	\$5,600	\$700	\$959,000
2001	1,540	1,694	1,412	282	83%	17%	67	37	33	9	43	31	\$21,394	\$15,667	\$500	\$847,000
2002	1,860	1,677	1,274	403	76%	24%	37	50	30	14	42	29	\$21,233	\$14,393	\$500	\$838,500
2003	2,600	1,992	1,738	254	87%	13%	59	45	31	11	56	23	\$28,032	\$11,545	\$500	\$996,000

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Table 3.—Page 2 of 3.

Year	GHL (tons)	Total harvest (tons)	Harvest (tons) by gear type		Percent harvest by gear type		Number of landings by gear type		Units of gear fished		Average catch (tons) by gear		Estimated average earnings ^a		Price per ton ^a	Estimated exvessel total value ^a
			Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet		
2004	2,850	3,167	2,894	273	91%	9%	95	36	27	11	107	25	\$53,593	\$12,409	\$500	\$1,583,500
2005	3,475	3,463	2,932	531	85%	15%	134	61	32	12	92	44	\$45,813	\$22,125	\$500	\$1,731,500
2006	3,705	2,643	2,617	^c	99%	0%	86	^c	21	^c	125	^c	\$34,270	^c	\$275	\$726,825
2007	4,000	2,546	2,510	36	99%	1%	105	8	21	3	120	12	\$47,810	\$4,800	\$400	\$1,018,400
2008	4,290	3,099	3,086	^c	100%	0%	108	^c	22	^c	140	^c	\$73,643	^c	\$525	\$1,626,975
2009	4,765	4,759	4,549	210	96%	4%	218	19	31	6	147	35	\$77,040	\$18,375	\$525	\$2,498,475
2010	6,075	5,701	5,538	163	97%	3%	277	14	36	7	154	23	\$61,533	\$9,314	\$400	\$2,280,400
2011	6,135	2,957	2,937	20	99%	1%	95	6	14	3	210	7	\$41,957	\$1,333	\$200	\$591,400
2012	5,355	4,260	4,253	^c	100%	0%	164	^c	23	^c	185	^c	\$55,474	^c	\$300	\$1,278,000
2013	5,410	4,447	4,298	149	97%	3%	189	18	33	5	130	30	\$29,956	\$6,854	\$230	\$1,022,810
2014	5,830	2,463	2,463	0	100%	0%	99	0	21	0	117	0	\$11,729	\$0	\$100	\$246,300
2015	3,190	357	357	0	100%	0%	19	0	9	0	40	0	\$4,363	\$0	\$110	\$39,270
2016	1,670	365	365	0	100%	0%	15	0	3	0	122	0	\$15,817	\$0	\$130	\$47,450
2017	1,645	125	124	^c	99%	0%	6	^c	3	^c	41	^c	\$6,613	^c	\$160	\$20,000
2018	1,185	226	226	0	100%	0%	8	0	3	0	75	0	\$15,067	\$0	\$200	\$45,200
2019	1,405	^c	^c	0	100%	0%	^c	0	^c	0	^c	0	\$0	\$0	\$0	\$0
2020	3,150	4,127	4,127	0	100%	0%	91	0	9	0	459	0	\$66,491	\$0	\$145	\$598,415
2021	7,895	7,903	7,903	0	100%	0%	136	0	13	0	608	0	\$100,307	\$0	\$165	\$1,303,995
2022	8,075	8,912	8,912	0	100%	0%	133	0	11	0	810	-	\$128,009	\$0	\$158	\$1,408,096
Average																
1979 to 2021	3,146	2,714	2,367	347	87%	13%	130	204	33	37	95	14	\$39,296	\$7,225	\$596	\$1,644,933
10-Year																
2012 to 2021	3,674	2,429	2,413	16	100%	0%	73	2	12	1	179	13	\$30,582	\$911	\$154	\$460,144
5-Year																
2017 to 2021	3,056	2,479	2,479	0	100%	0%	48	0	6	0	239	-	\$37,696	\$32	\$134	\$393,522

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

^b From 2000 to 2019, an allocative harvest strategy was in effect.

^c Confidential.

Table 4.–Age composition of herring samples from the commercial sac roe fishery, by section in the KMA, 2022.

Section	n	Percent at age										
		age-1	age-2	age-3	age-4	age-5	age-6	age-7	age-8	age-9	age-10	age-11+
Danger Bay	490	0%	0%	11%	3%	1%	81%	1%	2%	1%	1%	0%
Raspberry Strait	322	0%	5%	77%	12%	2%	4%	0%	0%	0%	0%	0%
Paramanof/Foul Bay	528	0%	0%	20%	5%	2%	72%	1%	0%	0%	0%	0%
Perenosa	161	0%	0%	6%	1%	2%	91%	1%	0%	0%	0%	0%
Tonki	168	0%	0%	4%	1%	1%	93%	1%	0%	0%	0%	0%
Kizhuyak	384	0%	0%	30%	8%	1%	60%	0%	1%	0%	0%	0%
Kalsin	146	0%	0%	4%	1%	1%	93%	1%	0%	0%	0%	0%
Inner and Outer Ugak	450	0%	0%	23%	1%	0%	72%	1%	2%	0%	0%	0%
Shearwater	310	0%	0%	5%	0%	1%	90%	2%	1%	0%	1%	0%
Inner and Outer Kiliuda	654	0%	0%	17%	1%	0%	80%	0%	2%	0%	0%	0%
Tanginak Anchorage	474	0%	0%	24%	0%	1%	71%	1%	2%	0%	0%	0%
Barling	233	0%	0%	7%	0%	0%	88%	0%	3%	0%	0%	0%
SW Sitkalidak	210	0%	0%	24%	0%	1%	70%	0%	4%	0%	0%	0%
Inner Alitak	144	0%	0%	2%	1%	0%	94%	1%	3%	0%	0%	0%
Inner Uyak	114	0%	0%	21%	5%	1%	72%	1%	0%	0%	0%	0%
Zachar	446	0%	0%	11%	4%	1%	83%	1%	0%	0%	0%	0%
Village Islands	181	0%	0%	13%	0%	0%	86%	0%	1%	1%	0%	0%
Viekoda	335	0%	0%	43%	5%	0%	51%	0%	0%	0%	0%	0%
All samples combined	5,750	0%	0%	21%	3%	1%	73%	1%	1%	0%	0%	0%

Table 5.—Average weight of herring samples from the commercial sac roe fishery, by age and section in the KMA, 2022.

Section	n	Weight at age (g)										
		age-1	age-2	age-3	age-4	age-5	age-6	age-7	age-8	age-9	age-10	age-11+
Danger Bay	490	0	0	86	111	154	169	175	221	210	238	0
Raspberry Strait	322	0	33	51	74	90	108	0	0	0	0	0
Paramanof/Foul Bay	528	0	0	83	108	123	152	176	272	0	269	0
Perenosa	161	0	0	91	131	138	155	155	0	0	0	0
Tonki	168	0	0	90	115	131	166	157	0	0	0	0
Kizhuyak	384	0	0	83	119	122	159	148	193	0	280	0
Kalsin	146	0	0	85	122	142	179	184	0	0	0	0
Inner and Outer Ugak	450	0	32	80	123	112	171	195	218	207	223	0
Shearwater	310	0	0	90	0	137	174	187	229	0	244	0
Inner and Outer Kiliuda	654	0	0	81	99	128	171	200	214	0	242	0
Tanginak Anchorage	474	0	0	81	0	133	175	199	224	0	0	0
Barling	233	0	0	85	0	122	175	180	236	253	0	0
Newman	210	0	0	86	120	165	174	170	238	0	0	0
Inner Alitak	144	0	0	90	103	0	171	205	220	0	0	0
Inner Uyak	114	0	0	89	102	132	154	155	0	0	0	0
Zachar	446	0	0	81	114	128	156	160	216	0	260	219
Village Islands	181	0	0	80	0	0	149	0	225	275	0	0
Veikoda	335	0	0	78	99	163	144	0	177	211	0	0
All samples combined	5,750	0	33	76	103	128	165	181	223	223	246	219

Table 6.–KMA herring food and bait commercial fishery GHLS and harvest (tons) by district, 2022.

Management district	GHL	Harvest
F/B 1 – West Afognak	100	186
F/B 3 – South Afognak	40	0
F/B 4 – Uganik	220	375
F/B 5 – Uyak	80	0
F/B 7 – Alitak	40	0
F/B 8 – Eastside	280	351
Total	760	912

Table 7.–KMA herring food and bait commercial fishery GHLS and harvest (tons), 2001–2022.

Year	GHL	Harvest
2001	107	114
2002	134	135
2003	197	199
2004	225	190
2005	302	168
2006	342	169
2007	370	154
2008	351	202
2009	420	263
2010	555	191
2011	405	212
2012	404	299
2013	454	291
2014	310	124
2015	113	106
2016	101	0
2017	129	77
2018	91	59
2019	111	121
2020	319	339
2021	720	685
2022	760	912
Average 2012–2021	275	210

Table 8.—Subsistence herring harvest summary for the KMA, 1993 through 2022.

Year	Permits issued	Permits returned	Estimated harvest in pounds by district								Total
			Afognak	Northeast	Inner Marmot	Uganik	Uyak	Eastside	Alitak	Other	
1993	50	16	90	3,000	3,910	550	50	0	0	0	7,600
1994	47	14	90	740	1,350	2,000	200	0	0	0	4,380
1995	20	6	75	0	500	0	340	0	175	0	1,090
1996	23	10	550	180	140	0	590	0	0	0	1,460
1997	16	7	0	200	350	50	1,325	0	0	0	1,925
1998	18	10	1,240	0	0	50	0	0	0	0	1,290
1999	15	9	0	200	350	0	425	0	0	0	975
2000	39	21	575	21,150	0	1,825	0	0	700	0	24,250
2001	48	19	3,000	0	875	0	1,015	10,500	0	0	15,390
2002	^a	23	1,170	1,150	420	0	200	903	0	0	3,843
2003	^a	16	0	220	300	0	420	1,210	30	0	2,180
2004	^a	24	200	580	465	206	1,580	1,142	0	0	4,173
2005	^a	37	300	850	1,070	160	550	2,300	155	0	5,385
2006	^a	33	600	1,109	1,175	250	415	1,650	0	0	5,199
2007	^a	37	200	912	1,430	5	1,470	850	300	0	5,167
2008	^a	21	100	1,134	1,110	50	1,020	610	0	0	4,024
2009	^a	36	625	660	520	400	451	980	0	330	3,966
2010	^a	26	401	527	650	200	250	595	150	0	2,773
2011	^a	27	10	425	355	550	310	505	200	30	2,385
2012	^a	24	262	1,508	25	0	330	920	200	15	3,260
2013	^a	24	615	668	50	75	200	585	200	0	2,393
2014	^a	17	232	682	0	0	150	500	500	100	2,164
2015	^a	13	0	100	20	150	150	745	350	0	1,515
2016	^a	15	500	195	500	140	30	135	300	0	1,800
2017	^a	11	0	140	900	89	200	510	424	0	2,263
2018	^a	8	0	245	17	365	350	325	0	0	1,302
2019	^a	8	0	10	230	5	490	570	0	0	1,305
2020	^a	17	480	155	120	290	175	1,755	100	0	3,075
2021	^a	21	479	140	0	4,040	200	1,340	100	0	6,299
2022	^a	15	200	81	0	640	270	2,025	50	0	3,266

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

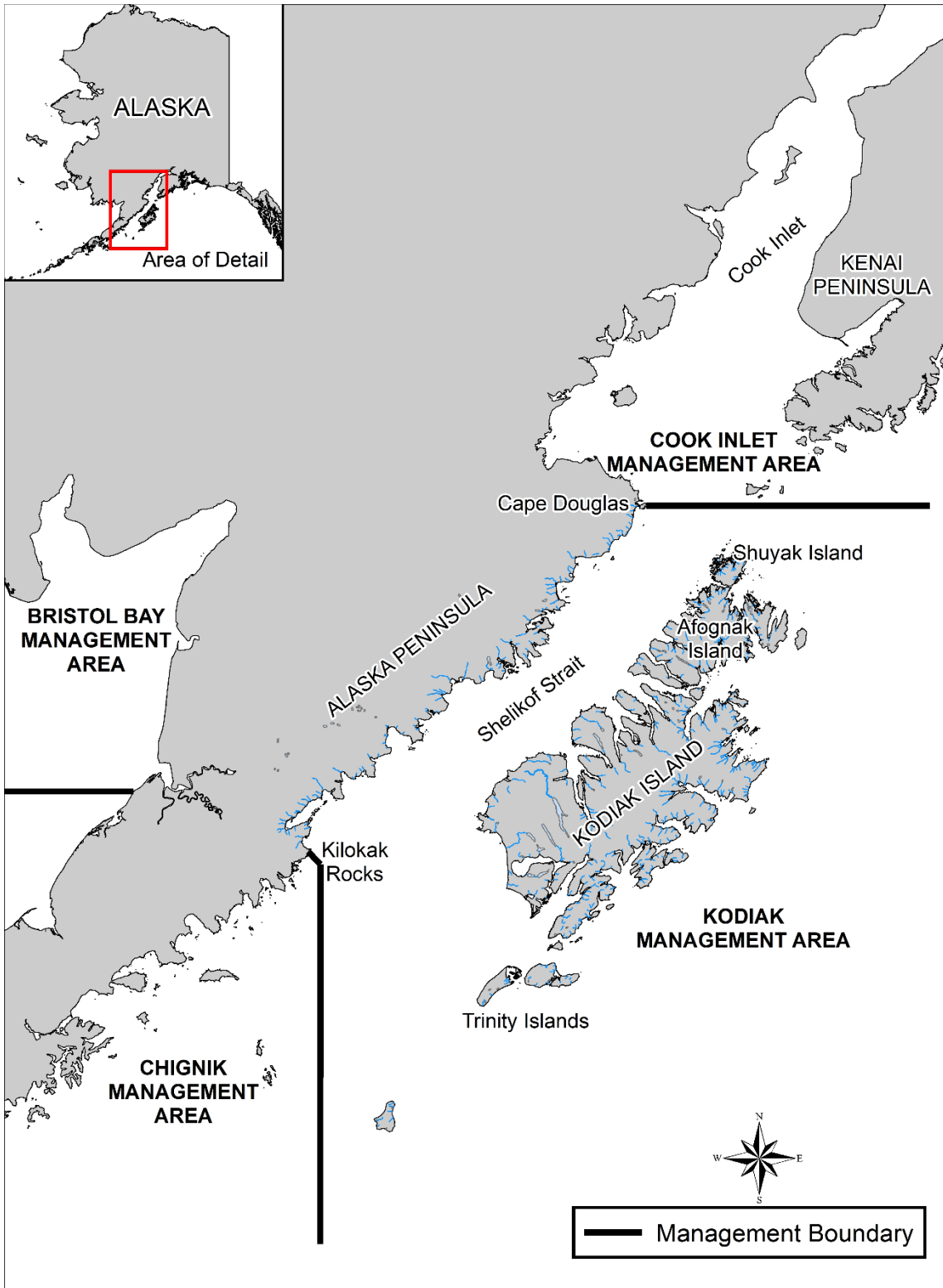


Figure 1.—Map of southwestern Alaska showing the KMA and surrounding management areas.

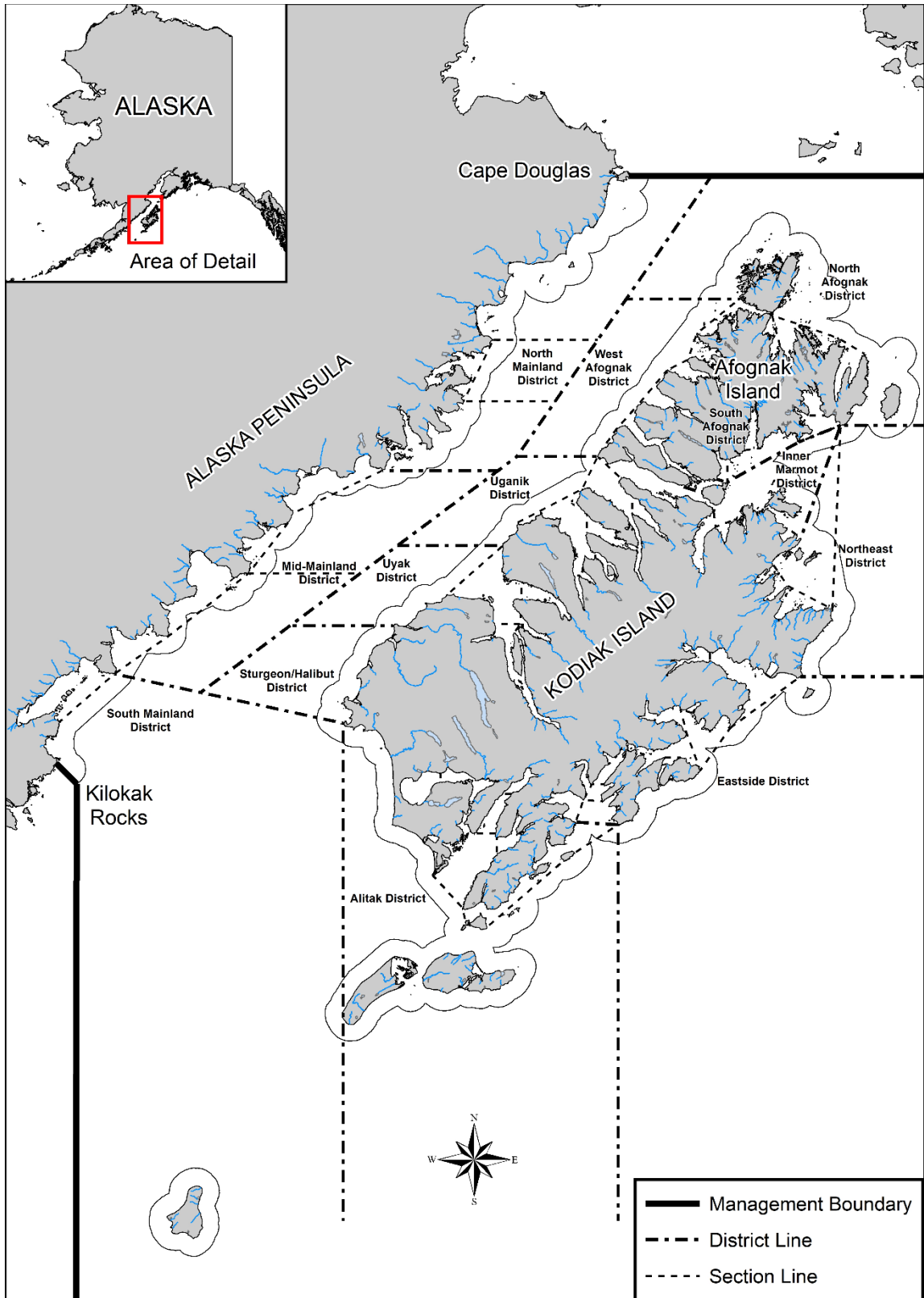


Figure 2.—Map of the KMA illustrating the herring commercial fishery districts.

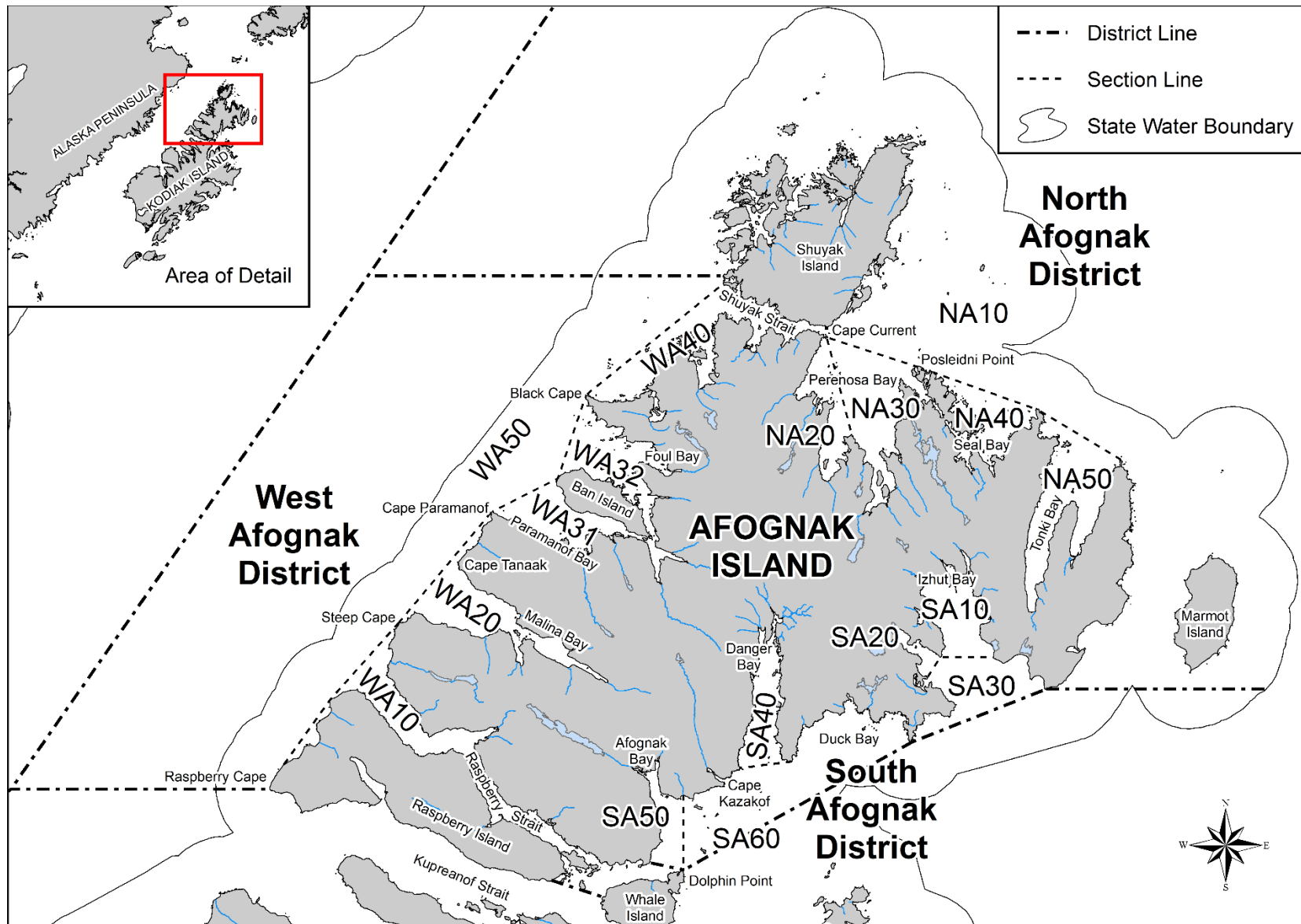


Figure 3.—Map showing the Afognak Districts.

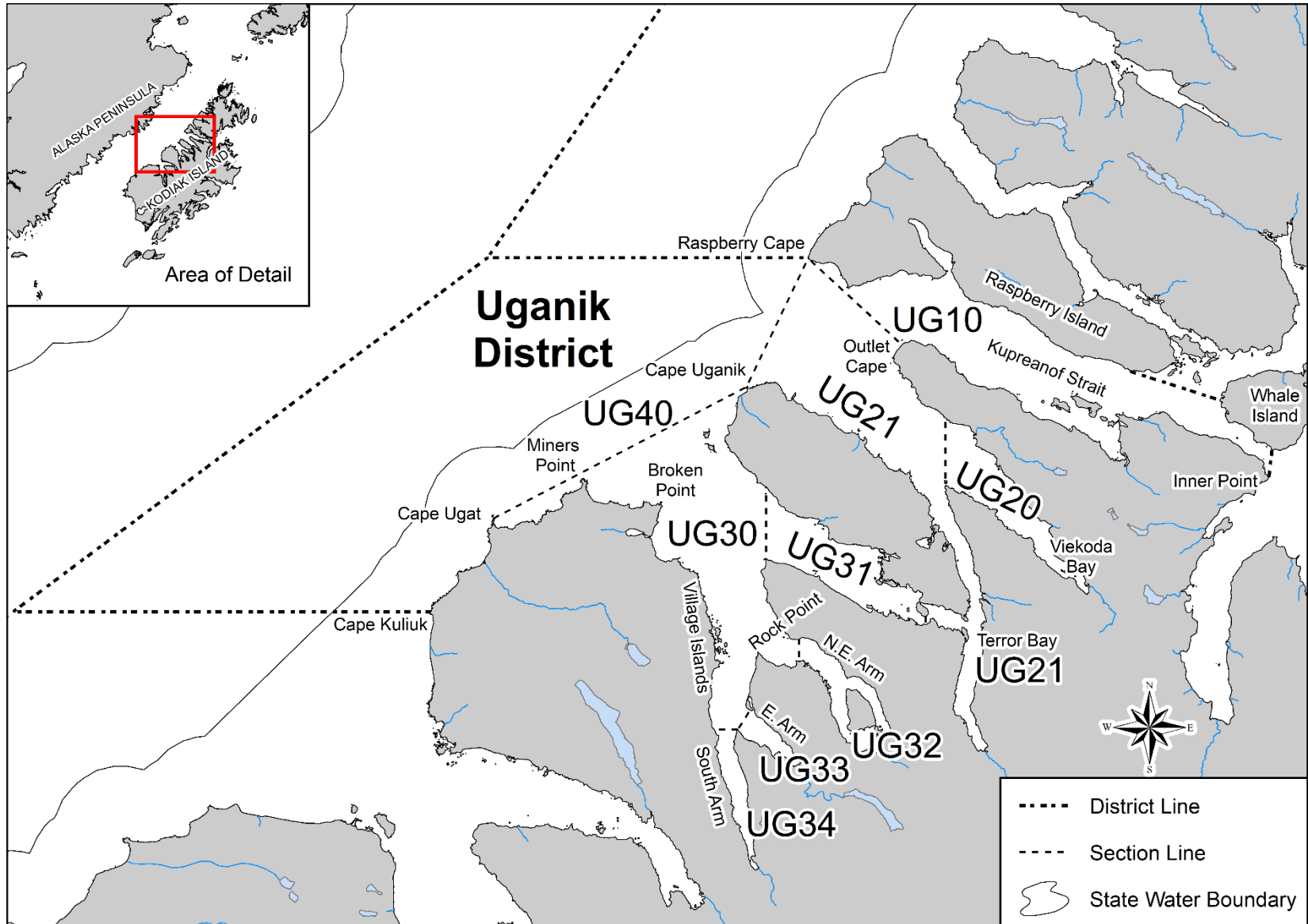


Figure 4.–Map showing the Uganik District.

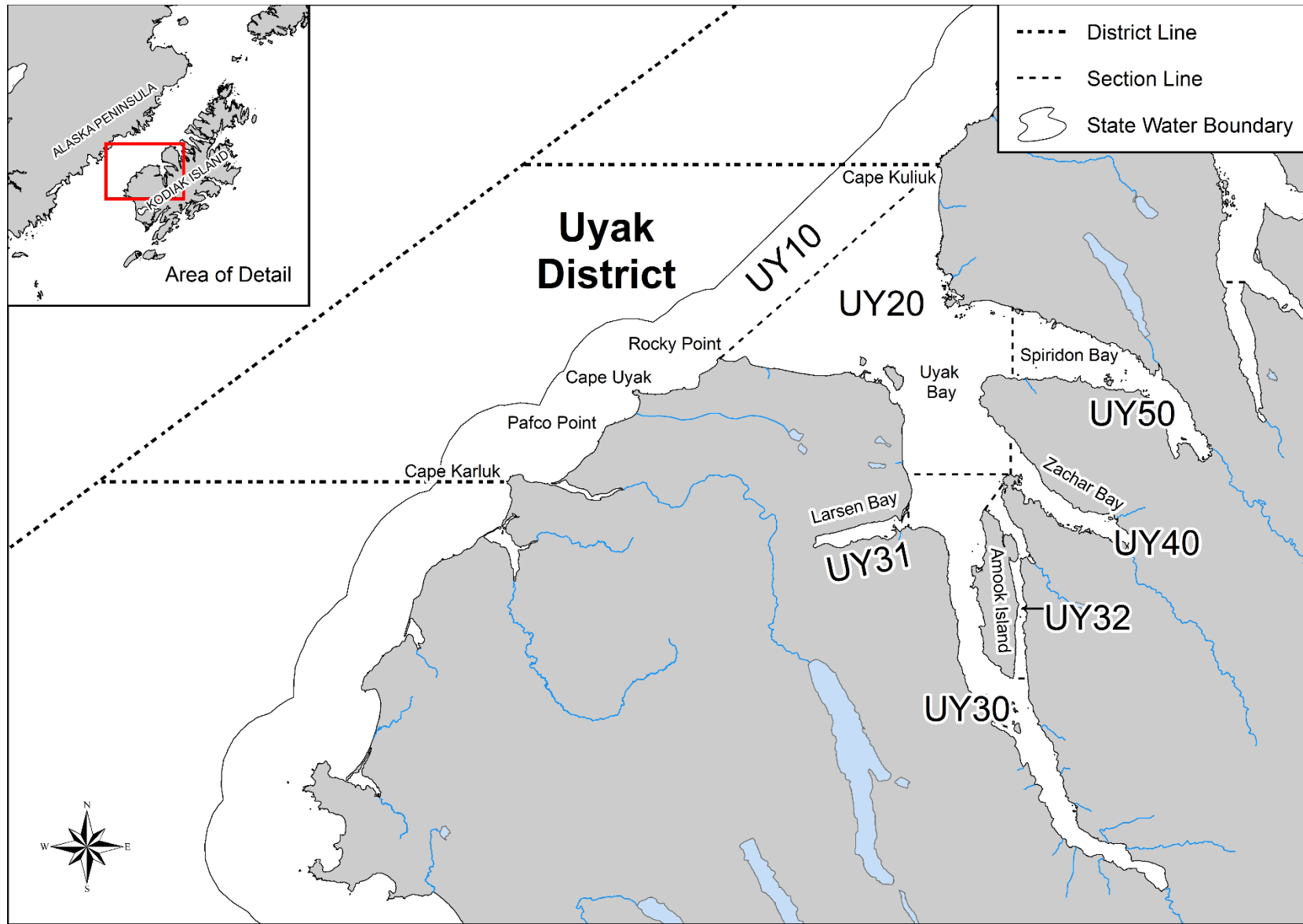


Figure 5.—Map showing the Uyak District.

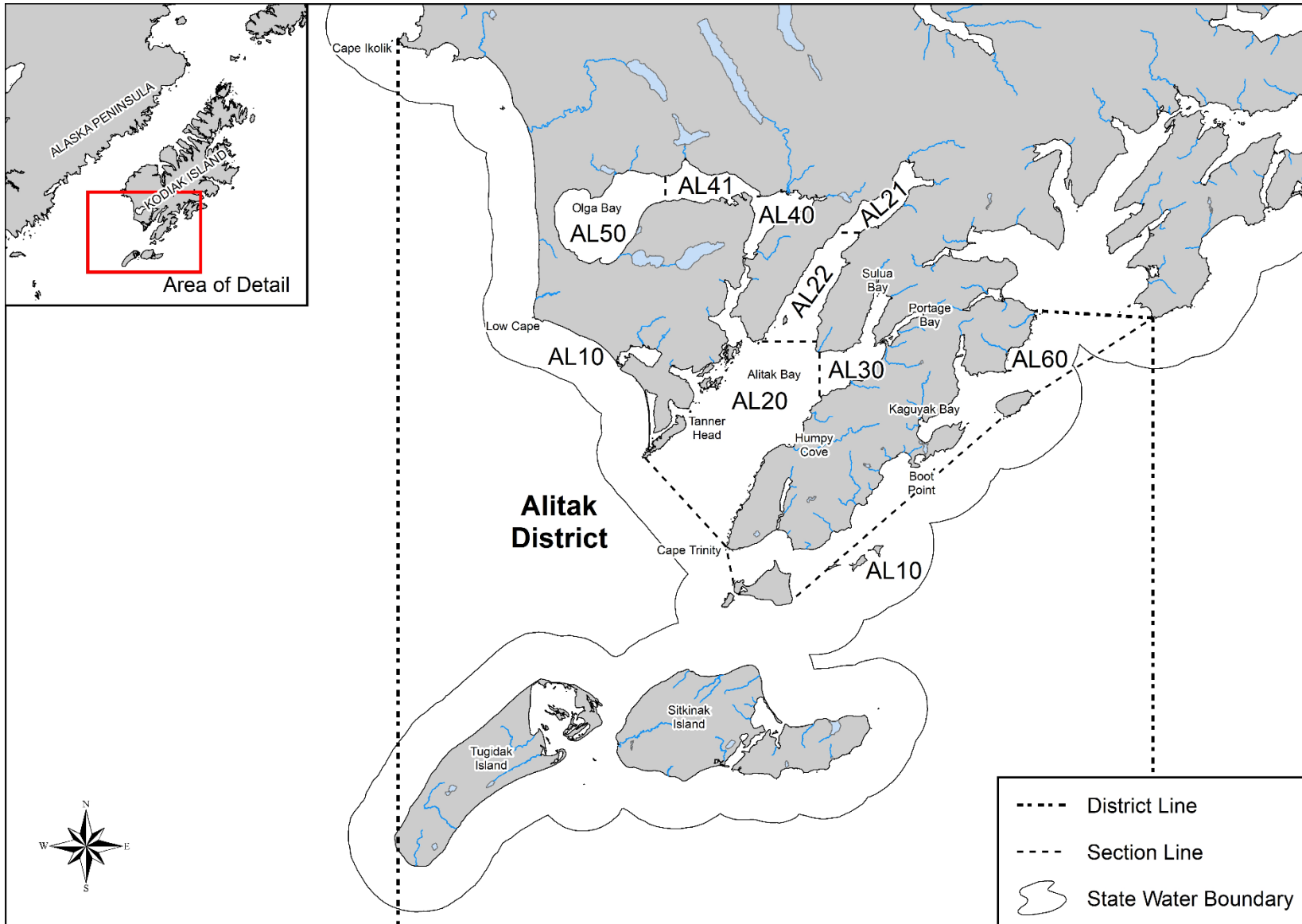


Figure 6.—Map showing the Alitak District.

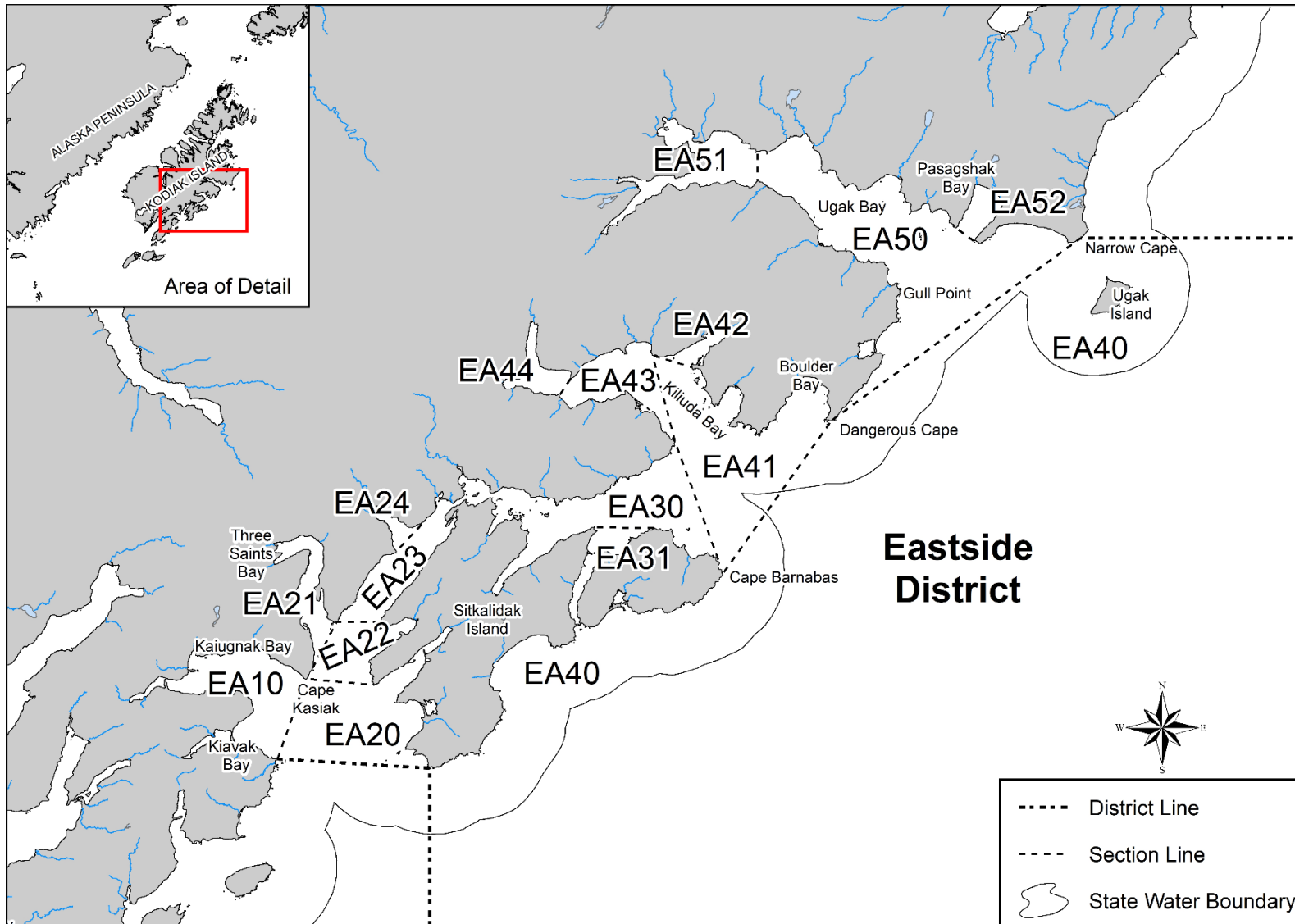


Figure 7.—Map showing the Eastside District.

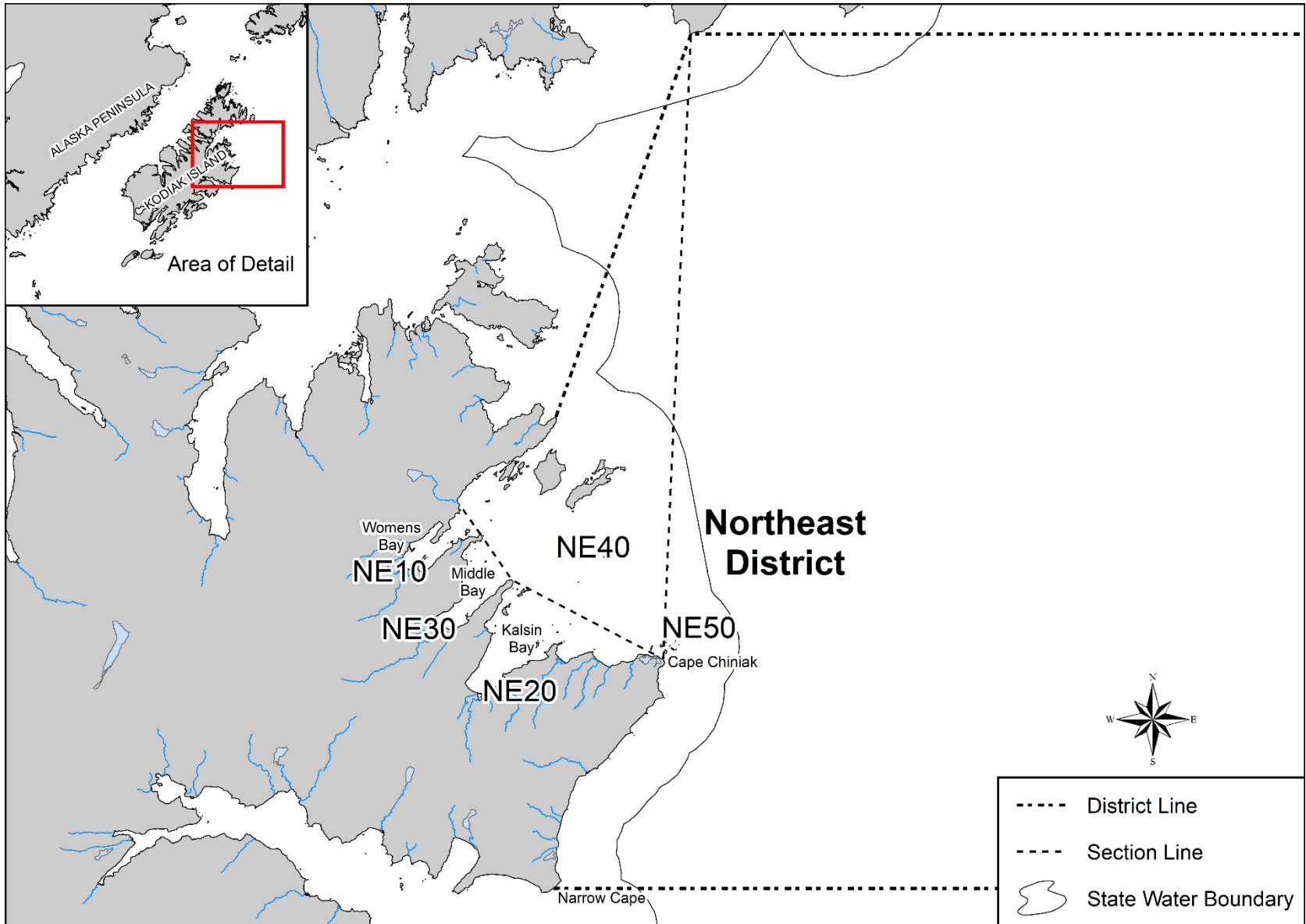


Figure 8.—Map showing the Northeast District.

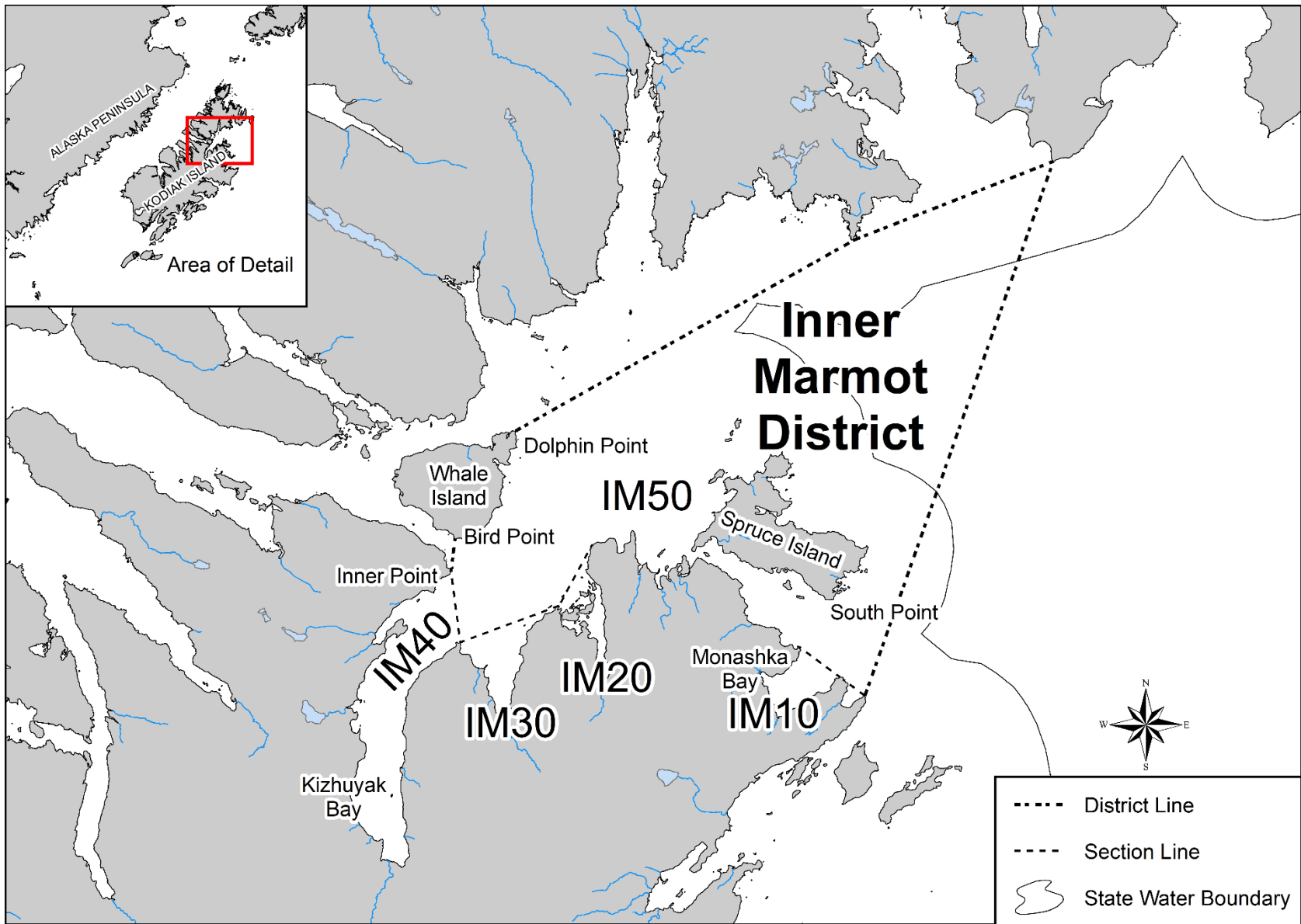


Figure 9.—Map showing the Inner Marmot District.

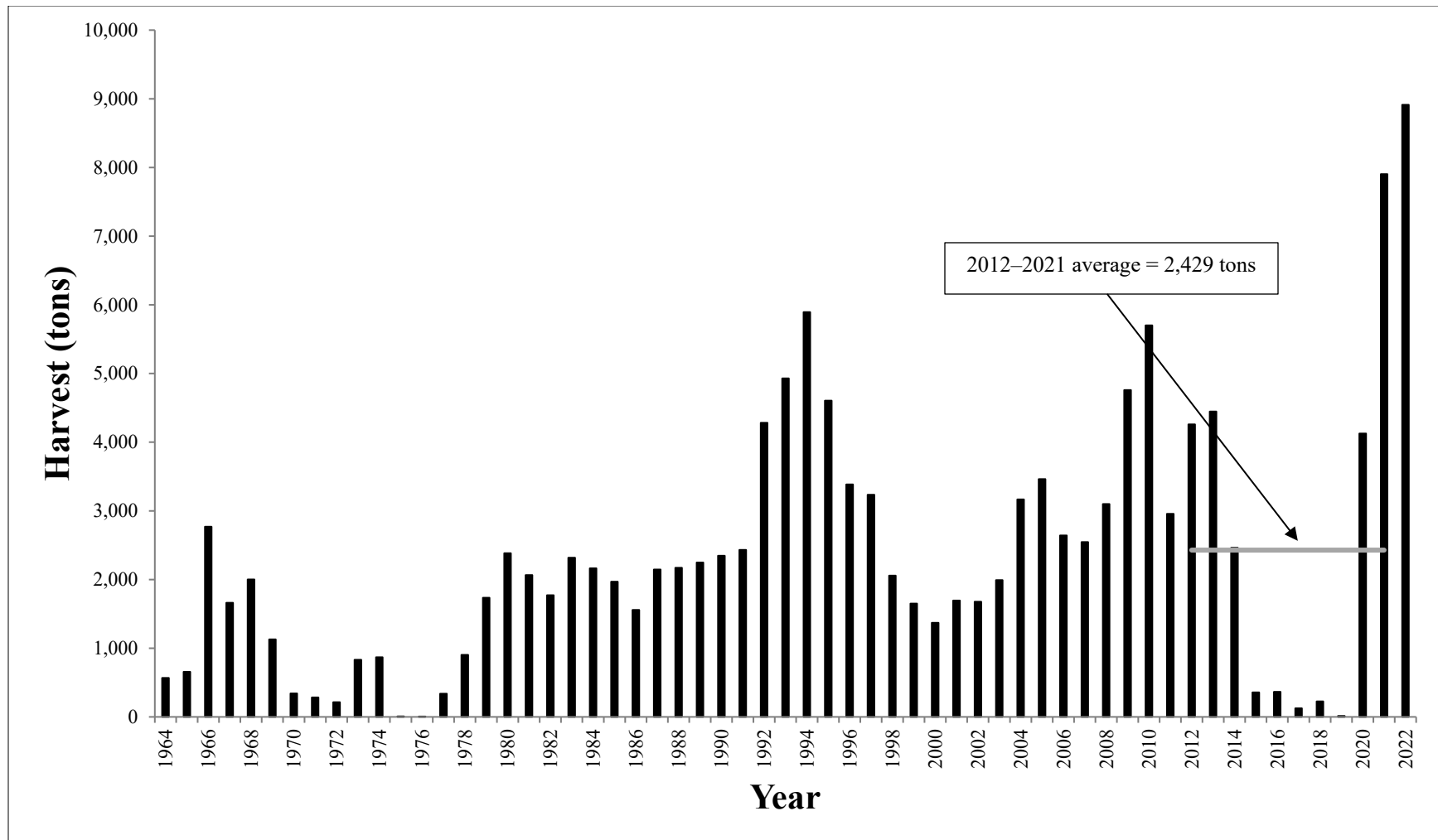


Figure 11.—KMA herring sac roe commercial fishery harvest, 1964–2022.

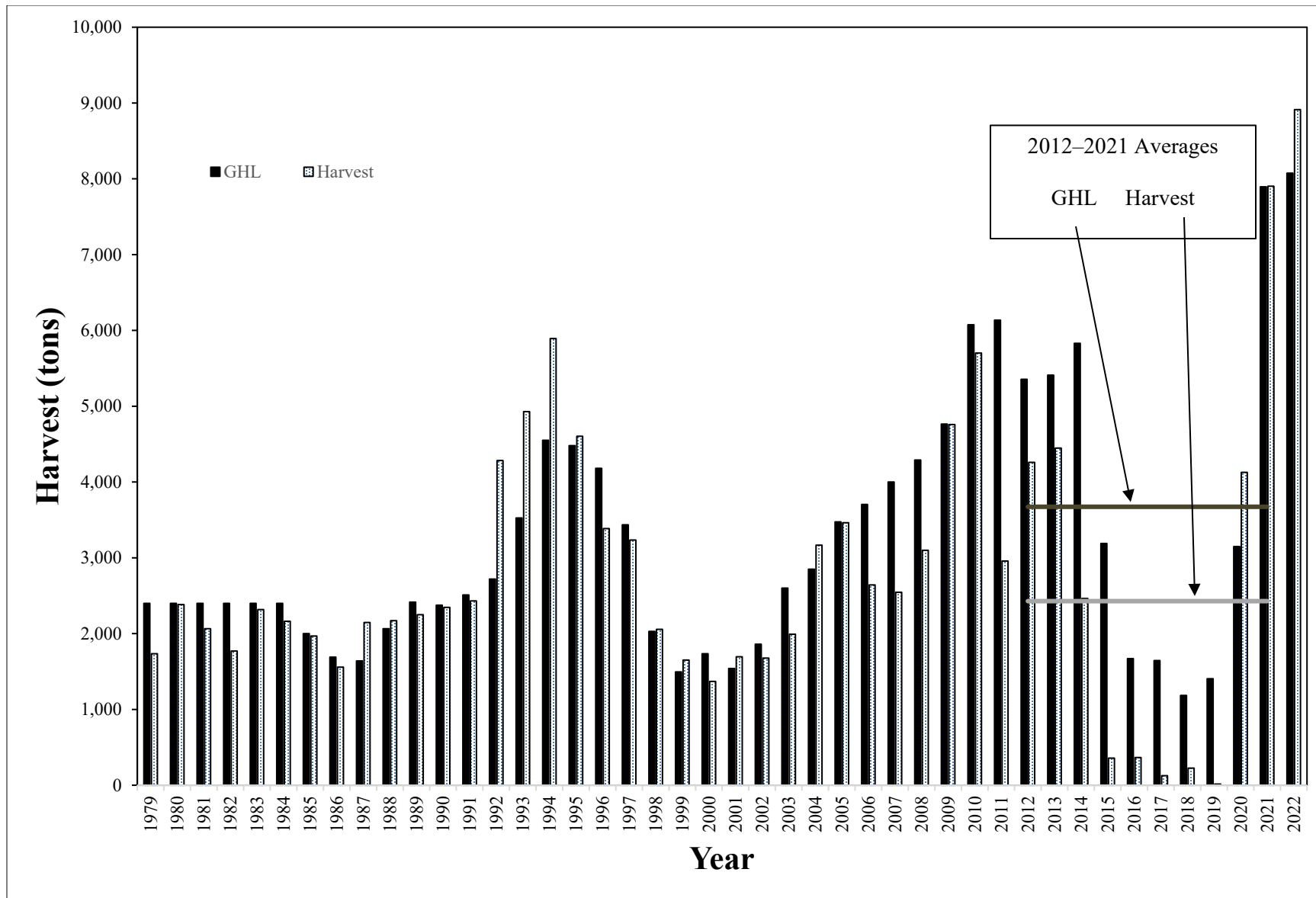


Figure 12.—Comparison of KMA herring sac roe GHGs to harvest, 1979–2022.

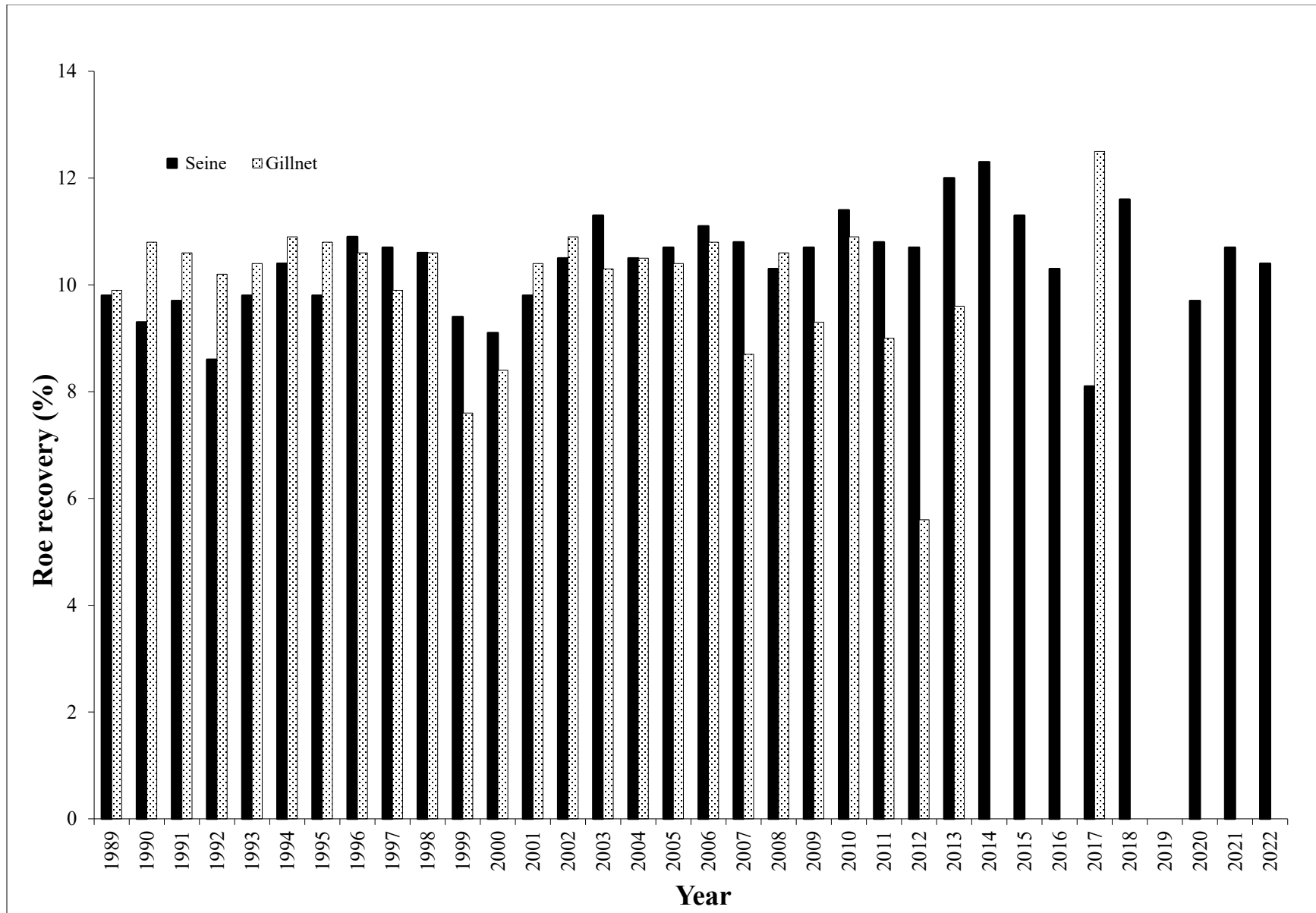


Figure 13.–KMA herring sac roe fishery roe recovery, 1989–2022.

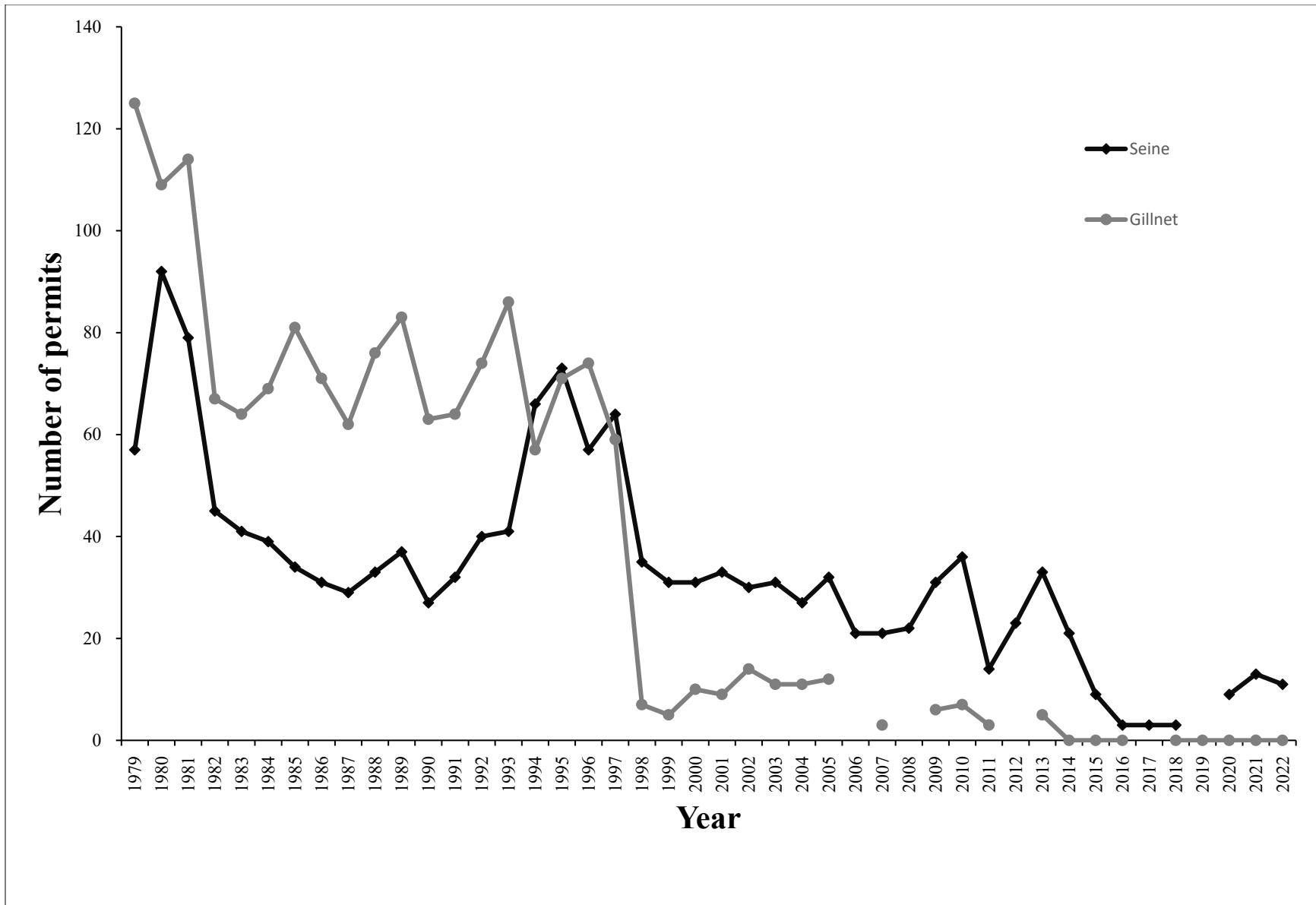


Figure 14.–KMA herring sac roe commercial fishery participation, by gear type, 1979–2022.

Note: 2006, 2008, 2012, and 2017 gillnet data and 2019 purse seine data are confidential.

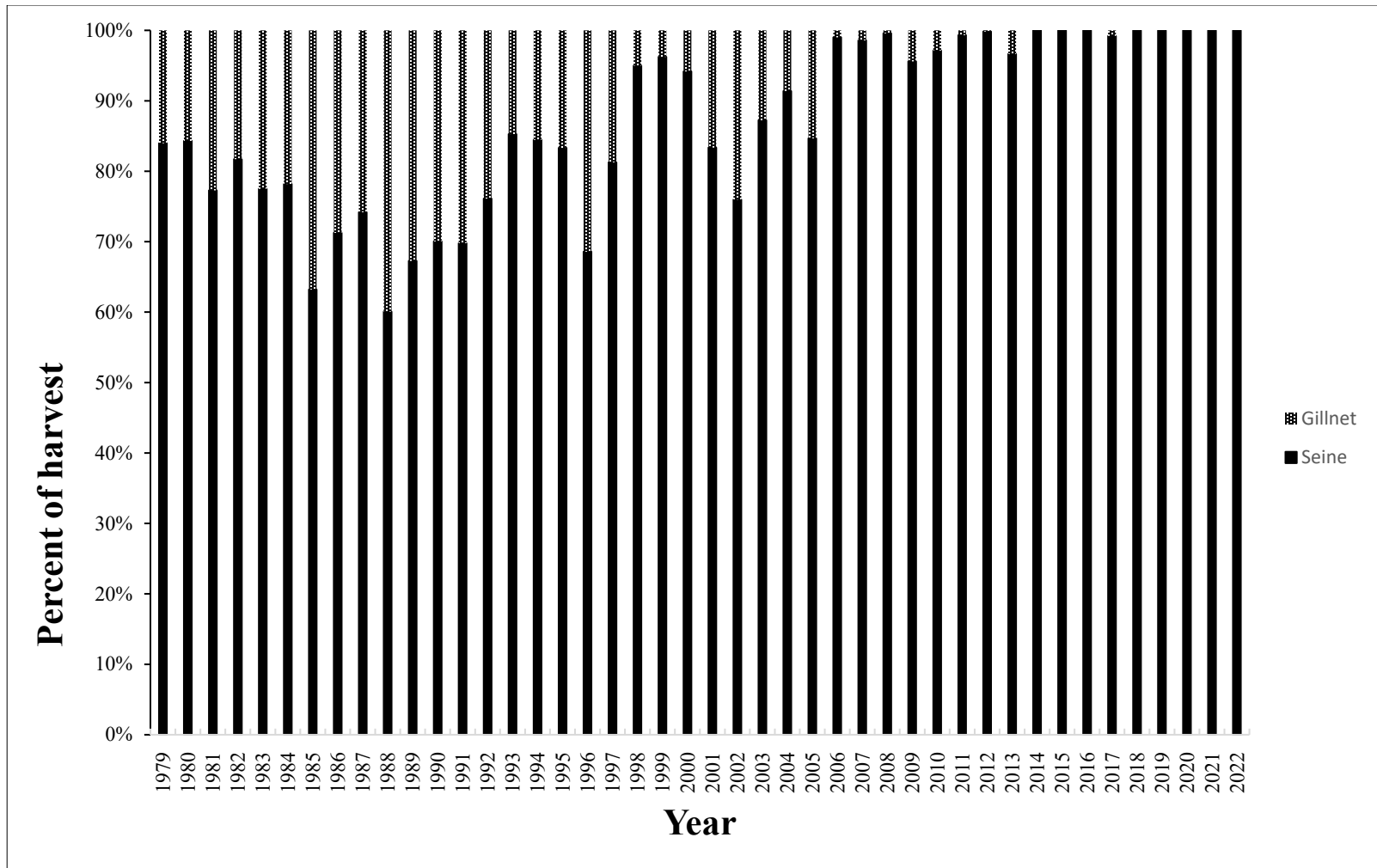


Figure 15.—Percent of the total harvest taken by gear type in the KMA herring sac roe commercial fishery, 1979–2022.

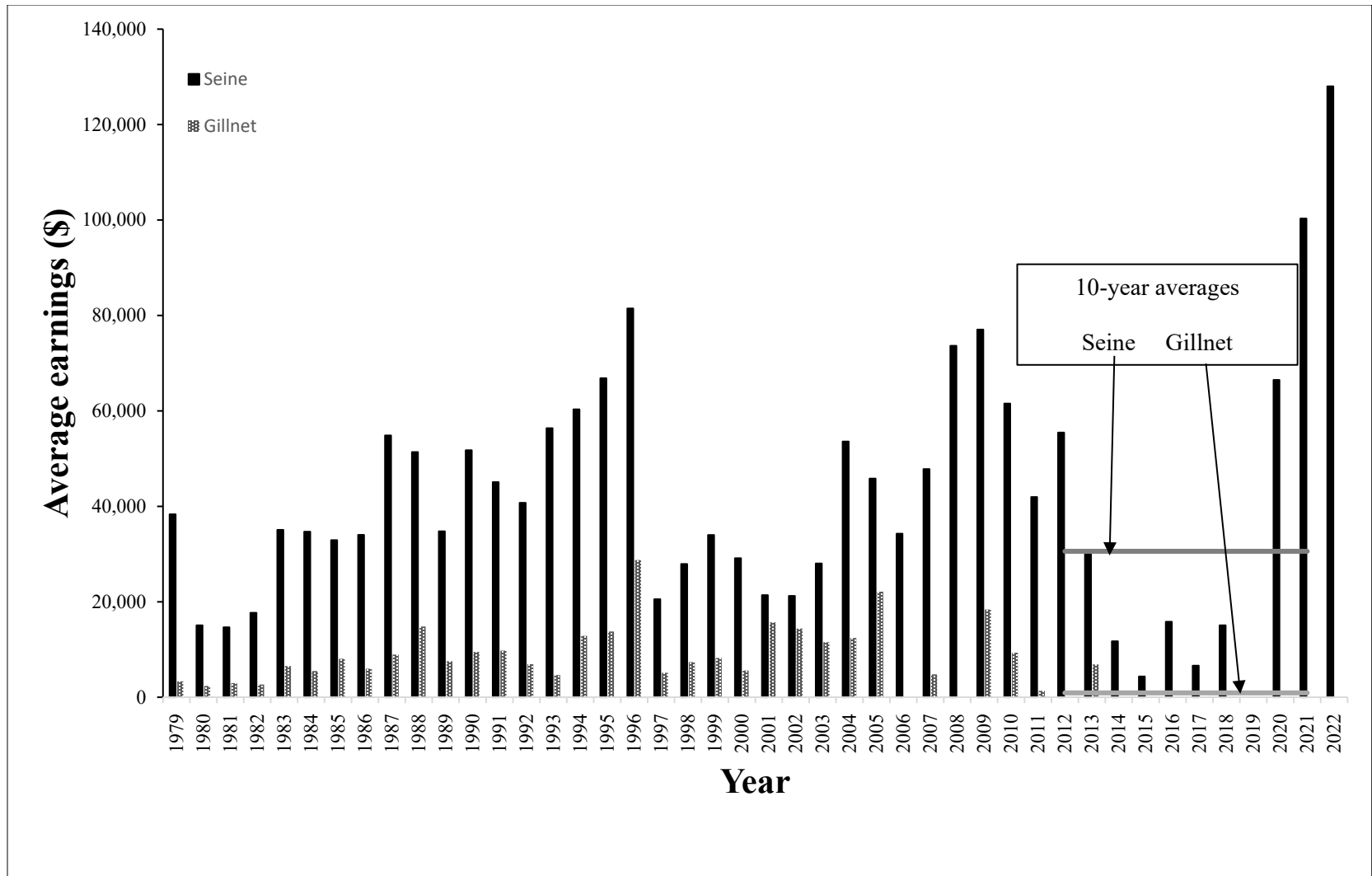


Figure 16.—Average earnings by gear type for KMA herring sac roe commercial fisheries 1979–2022.

Note: 2006, 2008, 2012, and 2017 gillnet data and 2019 purse seine data are confidential.

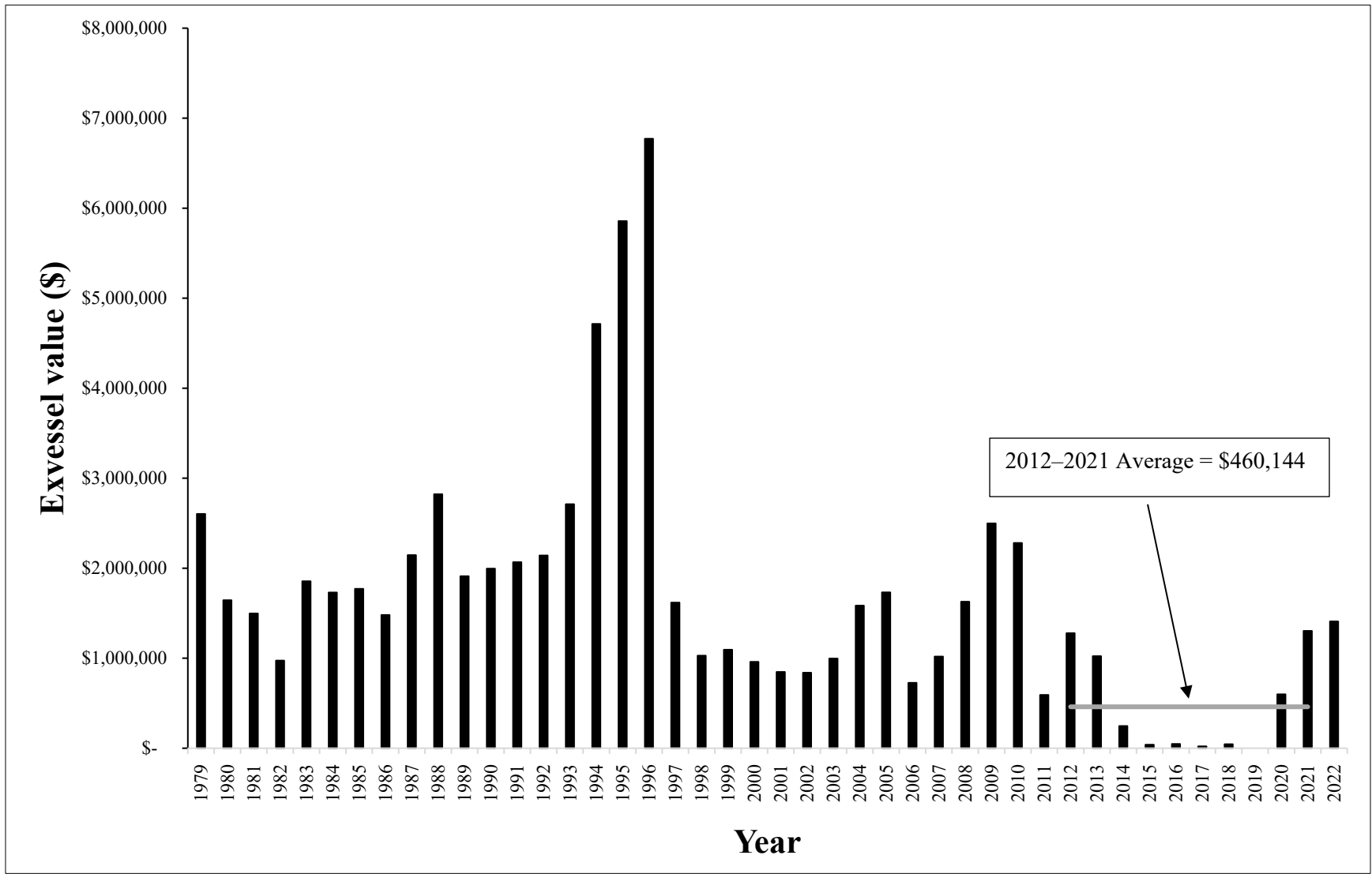


Figure 17.—Total exvessel value for KMA herring sac roe commercial fisheries, 1979–2022.

**APPENDIX A: SUMMARY OF EMERGENCY ORDERS
ISSUED FOR THE HERRING COMMERCIAL FISHERIES
IN THE KODIAK MANAGEMENT AREA, 2022**

Appendix A1.—Summary of emergency orders issued for the herring commercial fisheries in the Kodiak Management Area, 2022.

Emergency Order #	Issued	Effective:	Action Taken:
1	10:00 a.m. March 11	12:00 noon April 1	<u>Open Sac Roe Fishery</u> : Initial fishing periods, GHs, and open sections for sac roe herring fishery
2	3:45 p.m. April 1	2:40 p.m. April 1	<u>Closure</u> : The Shearwater Bay Section (EA42) at 2:40 p.m. April 1.
3	4:10 p.m. April 3	2:45 p.m. April 3	<u>Closure</u> : The combined Barling Bay (EA24), Three Saints Bay (EA21), Newman Bay (EA22), and West Sitkalidak Strait (EA23) Sections at 2:45 p.m. April 3 and the combined Kaiugnak (EA10) and SW Sitkalidak (EA20) Sections at 3:27 p.m. April 3.
4	10:30 a.m. April 4	10:40 a.m. April 4	<u>Closure</u> : The Geese-Two Headed (AL60) Section at at 10:40 a.m. April 4.
5	10:50 a.m. April 6	11:00 a.m. April 6	<u>Closure</u> : The Kalsin Bay (NE20) Section at 11:00 a.m. April 6.
6	12:30 p.m. April 8	10:25 a.m. April 8	<u>Closure</u> : The combined Inner Kiliuda (EA44) and Outer Kiliuda (EA43) at 10:25 a.m. April 8 and the combined East Sitkalidak (EA30) and Tanginak Anchorage (EA31) Sections at 12:00 noon April 8.
7	1:30 p.m. April 10	12:00 noon April 10	<u>Closure</u> : The Tonki Bay (NA50) Section at 12:00 noon April 10.
8	10:00 a.m. April 12	10:46 a.m. April 12	<u>Closure</u> : The combined Village Islands/Uganik Bay Sections (UG30,32-34) at 10:46 a.m. April 12.
9	12:00 noon April 13	12:00 noon April 15	<u>Fishing Period</u> : The combined Outer Ugak (EA50) and Inner Ugak (EA51) Sections, the combined Inner Uyak (UY30) and Browns Lagoon (UY32) Sections, and the combined Zachar Bay (UY40) and Spiridon Bay (UY50) Sections at 12:00 noon April 15.
10	7:20 p.m. April 13	7:30 p.m. April 13	<u>Closure</u> : The combined Delphin Bay (NA20) and Perenosa Bay (NA30) Sections at 7:30 p.m. April 13.

Emergency Order #	Issued	Effective:	Action Taken:
11	1:00 p.m. April 15	12:05 p.m. April 15	<u>Closure:</u> The combined Viekoda Bay (UG20), Terror Bay (UG21), and West Uganik Passage (UG31) Sections at 12:05 p.m. April 15.
12	10:30 a.m. April 16	9:35 a.m. April 16	<u>Closure:</u> The combined Zachar Bay (UY40) and Spiridon Bay (UY50) Sections at 9:35 a.m. April 16.
13	1:45 p.m. April 17	1:00 p.m. April 17	<u>Closure:</u> The Kizhuyak Bay (IM40) Section at 1:00 p.m. April 17.
14	8:00 p.m. April 17	7:00 p.m. April 17	<u>Closure:</u> The combined Inner Uyak (UY30) and Browns Lagoon (UY32) Sections at 7:00 p.m. April 17.
15	12:00 noon. April 18	9:45 a.m. April 18	<u>Closure:</u> The Danger Bay (SA40) Section at 9:45 a.m. April 18.
16	3:00 p.m. April 19	12:32 p.m. April 19	<u>Closure:</u> The combined Paramanof Bay (WA31) and Foul Bay (WA32) Sections at 12:32 p.m. and the Malina Bay (WA20) Section at 1:15 p.m. April 19.
17	3:00 p.m. April 20	12:00 noon April 20	<u>Closure:</u> The combined Izhut Bay (SA10), Kitoi Bay (SA20), and MacDonalds Lagoon (SA30) Sections at 12:00 noon April 20.
18	2:00 p.m. April 22	12:00 noon April 22	<u>Closure:</u> The combined Outer Ugak (EA50) and Inner Ugak (EA51) at 12:00 noon April 22.
19	6:15 p.m. April 24	12:00 noon April 24	<u>Closure:</u> The combined Inner Alitak (AL20), Inner Deadman Bay (AL21), Outer Deadman Bay (AL22), and Sulua Bay (AL30) Sections at 12:00 noon April 24.
20	10:00 a.m. November 1	12:00 noon November 1	<u>Open Food and Bait Fishery:</u> Initial opening of the food and bait fishery for the West Afognak, Eastside, South Afognak, Uganik, Alitak, and Uyak Districts.
21	10:00 a.m. November 10	12:00 noon November 10	<u>Closure:</u> The Uganik and Uyak Districts for food and bait at 12:00 noon November 10.

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Emergency Order #	Issued	Effective:	Action Taken:
22	5:30 p.m. November 11	6:00 p.m. November 11	<u>Closure:</u> The West Afognak District for food and bait at 6:00 p.m. November 11.
23	4:45 p.m. November 12	5:15 p.m. November 12	<u>Closure:</u> The South Afognak District for food and bait at 5:15 p.m. November 12.
24	10:00 a.m. November 17	12:00 noon November 17	<u>Closure:</u> The Eastside District for food and bait at 12:00 noon November 17.
