

KODIAK MANAGEMENT AREA
ANNUAL HERRING FISHERIES
MANAGEMENT REPORT, 2002



By

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ABSTRACT

The Kodiak Management Area (KMA) 2002 commercial Pacific herring *Clupea pallasii* sac roe fishery extended from April 15 through June 30. A total of 30 purse seiners and 14 gillnetters harvested 1,677 tons, compared to the preseason guideline harvest level (GHL) of 1,860 tons. A total of 39 sections were open to fishing and harvests occurred within 20 sections. This was the third season of management under the allocative harvest strategy that provides 75% of the total Kodiak GHL to seine gear and 25% to gillnet gear. Purse seine gear accounted for 76% of the total catch at 1,274 tons. Roe recovery percentages averaged 10.5% for seine gear and 10.9% for gillnet gear. The total exvessel value of the fishery was \$838,500, which is the fourth lowest total value in the history of the fishery. Age-5 herring were the dominant age class harvested, representing an estimated 38% of the purse seine harvest.

The KMA food/bait herring fishery was designated a limited entry fishery in 2001. A cooperative fishery was conducted in 2002 that allowed one catcher vessel to fish with a department observer onboard. There was no allocation of Lower Cook Inlet, Kamishak stock herring allowed for the Shelikof Strait fishery due to concerns for the low stock status and young age classes of Kamishak herring. That portion of the Uganik District south of the latitude of Miners Point and the Eastside District were open to fishing. The Uganik District was closed on October 16, 2002, with a harvest of 74 tons (72 ton GHL) and the Eastside District was closed on February 16, 2003, with a harvest of 61 tons (62 ton GHL).

A total of 23 subsistence herring permits were returned with herring harvest information in 2002. The total subsistence herring harvest for the KMA was 3,843 pounds.

INTRODUCTION

This report presents information concerning the commercial Pacific herring *Clupea pallasii* sac roe, food/bait, and subsistence fisheries that occur in the Kodiak Management Area (KMA). This information includes a regulatory history, historical harvest data by fishery, age and weight data of the commercial harvest, and a summary of fishery management activity. This report is intended as a reference document; interpretation and discussion of the data are therefore limited.

Area Description

The KMA comprises the entire Kodiak archipelago and that portion of the Alaska Peninsula that extends from Cape Douglas southwest to Kilokak Rocks at Imuya Bay. The archipelago is approximately 150 miles long, extending from Shuyak Island south to the Trinity Islands. The Alaska Peninsula portion of the KMA is about 160 miles long and is separated from the archipelago by Shelikof Strait that averages 30 miles in width (Figure 1).

HERRING SAC ROE FISHERY

Historical Perspective (1964-2002)

The commercial herring sac roe fishery began in Kodiak in 1964. From 1964 through 2002 herring sac roe harvests averaged 1,915 short tons (tons);(Table 1; Figure 2). From 1964 through 1977 purse seine gear was used exclusively, with an average annual harvest of 898 tons. Prior to 1974 the fishery was unregulated with regard to harvest quotas, gear types, seasons, and fishing periods. Annual harvests, along with effort levels, herring abundance, prices, and processor interest, fluctuated greatly from 1964 through 1977. Improved market conditions in 1978 prompted increased effort in this fishery with 28 purse seiners and 7 gillnetters participating. Between 1977 and 1982 the regulatory and management strategy went through a rapid development phase. It was during this period that spotter aircraft and tenders became involved in the fishery. Regulatory changes focused on gear efficiency, gear conflicts between seiners and gillnetters, and gear restrictions (exclusive registration and limited entry).

In the 1990s, closures of the Prince William Sound and Kamishak herring sac roe fisheries and increases in the Kodiak herring stocks resulted in increases in seine effort in the Kodiak fishery. Many of the inactive Kodiak seine permits were purchased by “circuit seiners”; individuals who fish all of Alaska’s major herring fisheries from Sitka Sound to Bristol Bay. These circuit seiners had experienced skippers and were equipped with high quality sonar electronics, nets, and vessels. With the addition of the circuit seiners to the already efficient local Kodiak seine fleet, effort levels grew with 73 vessels making landings in 1995. The increased seine effort made controlling harvests difficult. Regulatory changes involved several seine depth reductions and shorter seine fishing periods to reduce harvest rates. Herring prices dropped from a record \$2,000 per ton in 1996 to a record low of \$300 per ton in 1997 and 1998 (Table 2). With the sharp decline in prices, effort levels also dropped and gillnet gear accounted for a diminishing

percent of the total harvest in the late 1990s. In 2000, an allocative harvest strategy, including separate gear areas and harvest allocations, was established in regulation.

Season Dates

From 1974 through 1978 the season extended from March 1 through June 30. From 1979 through 1981 it was reduced to May 1 through June 30. In 1982 the season opening date was changed to April 15. The April 15 to June 30 season dates remain in effect.

Fishing Periods

Fishing periods from 1964 through 1978 were 24 hours per day, seven days per week. In 1979 and 1980 the fishing periods were scheduled with 48-hour openings followed by 24-hour closures. In 1981 the fishing periods were further reduced to 24-hour openings followed by 24-hour closures (NOON on odd-numbered days of the month to NOON on even-numbered days of the month), which remained in effect through 1994. In 1995 an emergency order was issued to reduce fishing periods to 10 hours for both gear types from April 21 to May 2 to reduce harvest rates.

From 1996 through 1999 fishing periods were limited for purse seiners to 13 hours in duration from April 15 through May 4 and beginning on May 5 fishing periods were 24 hours in duration followed by 24-hour closures for the remainder of the season. In 2000 and 2001 fishing periods were 12 hours in duration from April 15 through May 7 and from May 8 through June 30 they were 13 hours in duration, with 24-hour closures between periods. In 2002 the department used emergency order authority to reduce fishing period duration in sections that had high effort levels and a large available biomass to reduce harvests.

Since 1981 gillnet fishing periods have been set at 24-hour openings followed by 24-hour closures for the duration of the season except in 1995, when fishing periods were restricted by emergency order to 10 hours in duration.

Gear

Purse seine gear was unrestricted in this fishery through 1973. In 1974 it was limited to 150 fathoms in length and 1,000 meshes in depth. In 1979 gillnet lengths were first limited to a maximum of 300 fathoms with no depth restriction. In 1981 the maximum lengths were reduced again, to 150 fathoms for gillnets and 100 fathoms for purse seines; these regulations remained in effect through 1995. Also, in 1981 trawls and beach seines were eliminated as legal gear for the sac roe fishery. In 1996 purse seine depths were restricted to a maximum of 20 fathoms and gillnet depths were restricted to 230 meshes. In 2000 the seine depth was reduced to a maximum of 18 fathoms.

Gear Levels

Beginning in 1979 combined gear levels increased substantially from historic levels, reaching a high of 201 units (92 seine and 109 gillnet) in 1980 and 193 units (79 seine and 114 gillnet) in 1981 (Table 2; Figure 3). With the implementation of limited entry following the 1981 sac roe season, new entry into the fishery was restricted to past participants until permanent transferable permits could be awarded. From 1982 through 1993 gear levels were relatively constant with 29 to 45 seiners and 62 to 86 gillnetters participating. With an increase in herring abundance, an increase in herring prices, and the closure of the Prince William Sound herring fishery, seine gear participation increased abruptly during the 1994 through 1997 seasons, with 74 vessels fishing in 1997. The escalation in seine gear participation resulted in increased competition among seiners and between seiners and gillnetters. In 1997 and 1998 herring prices declined. After 1997 seine participation fell over 50% (average 32 vessels). Gillnet gear participation took an even sharper drop, with 59 permit holders fishing in 1997 but only an average of 8 gillnet fishermen participating annually since 1997.

Guideline Harvest Levels

From 1974 through 1978 there was an area-wide harvest quota of 3,400 tons. From 1979 through 1984 the area-wide harvest quota was reduced to 2,400 tons and GHGs were established for four large geographical areas. Descriptions of districts and sections were established in regulation in 1981, with 7 districts and 46 sections identified that year. Starting in 1985 GHGs were established on an annual basis by section and were based on stock status trends. From 1985 through 2001 the combined annual GHGs of all sections ranged from a high of 4,550 tons in 1994 to a low of 1,495 tons in 1999. During the last four years GHGs for the fishery have been at low levels, based on more conservative management and, for some sections, declines in herring abundance.

Harvest Strategy

The overall regulatory effect during the developmental phase of the fishery (1977-1982) was the emergence of a relatively stable herring sac roe fishery through 1991. Two strong year classes, from the 1987 and 1988 brood years, resulted in a dramatic biomass increase of some stocks and record to near-record harvests in the 1992 through 1995 seasons, ranging from 4,283 to 5,893 tons (Table 2). The increase in herring abundance occurred during years of high prices and fishery participation grew. With the crash in prices, followed by herring stock declines, gillnetters had little harvest opportunity when competing against seiners and they promoted a change in fishery management.

An allocative harvest strategy was developed through the efforts of an Alaska Board of Fisheries (BOF) Herring Task Force (established in 1999) that consisted of purse seine permit holders, gillnet permit holders, and Alaska Department of Fish and Game (ADF&G) staff. The harvest strategy provides opportunity for gillnet permit holders to harvest approximately 25% and purse seine permit holders to harvest approximately 75% of the total preseason GHG for the management area (5 AAC 27.535).

The harvest strategy requires the department to establish GHGs by section, based on historical harvest data, current and past fishery performance, commercial catch samples, and aerial surveys.

The department is then required, for each district that has more than one section open to fishing, to assign by section, 20% to 30% of the GHL to gillnet permit holders and 70% to 80% of the GHL to purse seine permit holders.

An additional conservation provision of the allocative harvest strategy provides for district GHLS. If the harvest from an individual section exceeds the section GHL then the overage is applied to the district GHL. The actual section harvests are summed and if the harvest from any number of sections within a district meets the aggregate GHL for that district, then the remaining open sections in that district are closed to further fishing, regardless of the remaining sections GHLS. This action may result in reduced harvests in sections that have later returning and spawning herring stocks.

During the 2002 BOF meeting only one change was made to the allocative harvest strategy. That change combined the three Afognak Districts, treating them as one district for allocation purposes.

Fishery Management

Districts and Management Sections

The KMA is currently divided into 13 districts, which define geographical areas used in managing both the herring sac roe and food/bait fisheries (Figure 4). For the sac roe fishery each district is divided into management sections that are intended to define the spawning area used by a stock of herring or define a geographical area. There are a total of 82 management sections.

GHL Criteria

Preseason GHLS are established for all management sections that have produced consistent herring harvests in previous seasons. These GHLS reflect the status of a particular stock of herring, by management section. The GHLS have ranged from 10 to 700 tons by section. Criteria for establishing the 2002 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 (age-3 herring) in catch samples, the proportion of the spawning population age-5 and younger, and the proportion of age-2 herring in the spawning biomass (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. The preseason GHL has generally reflected the actual harvests (Figure 5) and has aided fishermen and processors in planning prior to the start of each season.

Fishery Characteristics

The KMA herring sac roe fishery currently occurs in approximately 30 bays and coastal locations. The fishery opens at NOON on April 15, with most of the management area opening at one time. Several sections that are known to have later spawning and larger stocks are opened at a later date when a department management crew is available to monitor the fishery. A unique

characteristic of this fishery is that it typically commences prior to any major buildup of herring. This has generally allowed for a greater distribution of effort, which can reduce harvest rates within individual bays.

To reduce operational costs and to cover more areas, most purse seiners form combines of 2 to 10 vessels. These combines usually include one or several tenders and spotter aircraft. Light airplanes have been a very productive way to locate harvestable herring and direct seiners to those locations.

Gillnet vessels generally work independently and deliver their fish to the processor. A few gillnetters are equipped with scanning sonar but the majority of these fishers rely on color down-sounding sonar to locate herring schools.

The department relies on the fishing industry to establish roe recovery standards. Generally, tenders will have a processor representative onboard to ensure that marketable herring are harvested. Competition among shorebased processors has resulted in this fishery having one of the highest per ton exvessel values in Alaska. The quality of Kodiak sac roe herring is generally high, due to inseason processing of a relatively small amount of herring over a long time period.

Fishery Monitoring

This fishery is primarily managed on the fishing grounds by stationing department management personnel aboard state vessels or at shorebased tent/cabin field camps. The field crews are stationed in management sections that have historically produced the largest harvests for a district. These field crews are positioned in remote bays by chartered floatplanes or vessel and are equipped with an inflatable raft or skiff. Daily contact with fishermen, spotters, and tender operators is maintained in order to acquire fishery data. Management biologists receive reports from field personnel several times daily that include current harvest, effort levels, and fleet movement information. Information is reported by single side band (SSB) radio or satellite phone systems. The use of field personnel has been a key element in supporting this fishery's harvest strategy and preventing excessive harvests. Field personnel also identify herring spawning areas and collect age-weight-length (AWL) samples from the commercial harvest. Department aerial surveillance of the entire area supplements and often directs the placement of fishery monitoring field personnel.

Inseason Fishery Management

Processors and independent tender operators are required to provide daily tallies of herring deliveries by management section, as well as, accurate estimates of herring onboard tenders that have not yet delivered to the processor. Management biologists tally reports from field personnel, processors, and tenders, to assess herring harvests. Generally, once the harvest estimate meets or approaches the GHL, a management section is closed for the season by emergency order. Due to the rapid pace at which some harvests occur, inperiod closures are frequent. In management sections that have field personnel present inperiod closures may occur with as little as five minutes advance notice on the grounds. In management sections that do not have field personnel present inperiod closures may occur by either an announcement broadcast on SSB frequency 4.125 MHz following the marine weather forecast (at 8:00 AM or 6:00 PM daily), or by field announcement with the arrival of department staff.

Timely and accurate harvest reports, from department field personnel, permit holders, spotters, and processors, are critical for assessing herring harvests and managing the fishery. To date, industry cooperation has greatly aided managers.

Enforcement Issues

The Alaska Department of Public Safety, Fish and Wildlife Protection (FWP), provides enforcement coverage of the KMA herring fishery during the first two weeks of the season when effort levels are the greatest. The FWP utilized a vessel and an aircraft to monitor the 2002 fishery and worked closely with the department during the fishery.

The presence of FWP greatly reduces the enforcement burden on department field crews, especially during openings, closures, and inperiod emergency closures. During the fishery the majority of enforcement problems concern early (prior to the NOON or 9:00 AM openings) or late (after the closure time) purse seine sets. With the new harvest strategy gear conflicts, though minor in the past, are now non-existent.

2002 Season Summary

The total 2002 GHL was 1,860 tons, with 1,380 tons of the GHL (74%) assigned to purse seiners and 480 tons of the GHL (26%) assigned to gillnetters (Gretsch 2002a). The 2002 herring sac roe season opened at NOON on April 15 and continued through June 30. The initial fishing periods from April 15 through April 20 resulted in low harvests, a peak harvest occurred on April 23, and the last harvest occurred on May 30 (Figure 6). Cold winter and early spring climatic conditions likely contributed to the delayed roe development and slowed early season harvest rates. Some processors had also established minimum herring size restrictions and much of the early fisheries along the westside of Kodiak consisted of younger age classes that did not meet these requirements. A total of 44 permit holders made 87 deliveries during the season, with 30 purse seiners harvesting 1,274 tons and 14 gillnetters harvesting 403 tons. Effort levels in 2002 were similar to the previous 4 years for both gear types, with seiners ranging from 31 to 35 permit holders and gillnetters ranging from 5 to 10 permit holders (Figure 3). Two fishing vessels were operated using both gear types, seining during the early portion of the season and switching to gillnet gear later.

The 2002 season was the third year of management with the allocative harvest strategy. In 2000, 10 gillnetters harvested 6% of the total harvest and in 2001 9 gillnetters harvested 17% (Table 2). For the 2002 season effort levels increased to 14 gillnetters that harvested 24% of the total harvest. The 2002 season was the first season since the allocation plan went into effect that the harvest percentage by gear type approached the intended 25% gillnet and 75% seine (Figure 7).

There were a total of 39 sections open to fishing and harvests occurred within 20 sections (Table 3). The department issued 25 emergency orders pertaining to the herring sac roe fishery in 2002 (Appendix A.1). The department designated the five southern most sections of the Mainland districts as exploratory, which were open to both gear types with no GHLS. No fishing effort occurred in the three Mainland districts primarily due to the low herring values, small GHLS, and logistics of fishing these districts.

For the 2002 season the department informed fishers to expect more active management of certain sections to slow harvest rates (Gretsch 2002a). This would occur at the start of the season, when effort levels are the highest, in areas that are known to have early spawning stocks, such as the Paramanof Bay and Village Islands Sections. The department used emergency order authority in only the Village Islands Section (400 ton GHl) as a harvest control by limiting the duration of fishing periods and the specific portion of the section that was open, due to overharvest concerns (Appendix A.1). This style of management resulted in a 487 ton harvest with the added benefit of improved roe quality due to the later harvesting. The permit holders were very supportive of the departments management efforts in the Village Islands.

Also, new for the 2002 season was the opening of the Kizhuyak Bay Section in the Inner Marmot District and the Upper Olga Bay Section in the Alitak District to gillnetting with small GHls (10 tons); these sections had been closed since 1996 and 1998 respectively. Fishery performance in Kizhuyak Bay was excellent while only one vessel briefly fished the Upper Olga Bay Section with no harvest occurring.

The 2002 GHl (1,860 tons) was the fifth lowest GHl since 1979 (Figure 5). The 2002 harvest of 1,677 tons was the fourth lowest harvest since 1979, (Table 1). A total of 26 tenders were registered to transport herring to processors and there were 4 shorebased plants registered to process herring.

The 2002 fishery was monitored on the grounds by three department shorebased field crews and two department vessels, which were stationed in anticipated herring harvest locations. These crews monitored the fishery to gather effort and harvest data used to manage the fishery, and collected commercial catch samples to obtain AWL data. Office staff monitor all sections not covered by field crews through processor and fishers reports of herring harvests.

Exvessel Value of the Fishery. The price paid for 10% roe recovery herring was approximately \$500 per ton delivered to the processor. Roe recovery percentages were excellent and averaged 10.5% for seine gear and 10.9% for gillnet gear. The average exvessel earnings for purse seiners was \$21,200 and for gillnetters was \$14,400, with the gillnet earnings being the second highest experienced since 1996 (Figure 8). The total exvessel value of the 2002 fishery was \$838,500, which is the fourth lowest total value in the history of the fishery (Figure 9). The record low value of this fishery occurred in 1998 when 2,057 tons were harvested for a total exvessel value of \$617,100.

Catch Sampling

A total of 2,717 herring were collected for AWL analysis from the purse seine harvests in nine sections (Table 4). These nine sections accounted for 99% of the total KMA purse seine harvest. All samples were combined and weighted to the harvest. Age-5 herring was the dominant age class harvested in the 2002 season, representing an estimated 38% of the total purse seine harvest (Table 4). The remaining age classes represented the following percentage of the seine harvest: age-2 (0.4%), age-3 (20.7%), age-4 (13.4%), age-6 (1.9%), age-7 (1.6%), age-8 (6.1%), age-9 (13.0%), age-10 and older combined (4.4%).

A total of 585 herring were collected for AWL analysis from the gillnet harvest in eight sections. These eight sections accounted for 78% of the total KMA gillnet harvest. With all samples combined and weighted to the harvest, age-5 herring were the dominant age class representing 35.6% of the gillnet harvest (Table 5). The remaining age classes represented the following percentage of the gillnet harvest: age-3 (1.8%), age-4 (4.3%), age-6 (4.7%), age-7 (4.1%), age-8 (11.6%), age-9 (34.9%), age-10 and older combined (2.7%).

Generally, the herring from the east side of Kodiak Island (Eastside District) were larger at age than those found on the west side of Kodiak and Afognak Islands (Uganik and West Afognak Districts; Table 6 and 7). Weight-at-age of the younger age classes in 2002 were similar to those observed in recent years.

Stock Assessment

The department evaluates fishery performance and survey information to assess trends in stock status. Department hydroacoustic and aerial surveys are utilized to assess herring abundance prior to, during, and after the commercial fishery and to survey closed sections. Department vessels are used to collect samples by either trawl or gillnet gear.

Industry spotters and permit holders have greatly aided managers during past seasons by providing biomass estimates, spawn observations, fleet movements and harvest estimates. These spotters are very experienced and have been involved for several to many seasons in the KMA and other statewide herring fisheries. The department has received excellent assistance from industry spotters and air charter pilots with herring and spawn observations.

The result of aerial and hydroacoustic assessments provide a limited evaluation of the total biomass. Problems associated with herring assessment in the KMA include: 1) herring tend to be near the surface, and hence more visible, during the evening and early morning hours limiting the time fish are observable from the air; 2) most management sections have several distinct schools of herring that return to spawn from April through June; 3) herring may stay within an area for the duration of the sac roe season or may move to another district so that biomass estimates may be duplicated, incomplete, or incorrectly assigned to a spawning stock location; 4) the KMA encompasses a large geographical area (82 sections); 5) differential spawn timing of various KMA herring stocks; and 6) adverse weather conditions. Hydroacoustic surveys are also limited in shallower waters, and the extent of herring avoidance of vessel noise is unknown. 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.

Stock Status by District

The following is a review of stock status that summarizes 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. The department currently monitors approximately 70 sections that are known to have spawning populations of herring. The department relies greatly on fishery performance and catch samples to help evaluate trends in stock status. The majority of the department assessment efforts target larger herring stocks. Generally, there is less information

available for the smaller stocks of herring so the evaluation process 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.

West Afognak District

There are six sections in the West Afognak District, and five have spawning stocks of herring. Paramanof Bay has the largest spawning stock within this district. The Paramanof fishery performance has been excellent during the last 11 years and harvests have ranged from 362 to 709 tons. The large increase in this herring stock and associated harvests were related to the very strong 1988 brood year, and production has remained good. Large spawns have occurred annually since 1994. Age compositions from the 2002 fishery show the dominant age classes from the commercial catch were age-5 (31.3%), age-3 (25.0%), age-4 (14.1%), and age-8 (8.3%; Table 4). Age-3 (recruit) herring looked strong based on the 2002 harvest.

The Foul Bay Section is adjacent to Paramanof Bay. Age compositions and recruitment events tend to be similar between these two sections, though the Foul Bay spawning stock is much smaller than Paramanof Bay. Foul Bay has been designated as a gillnet section. Fishery performance was good in 2002, though the section was closed prior to reaching the GHL due to the Afognak District gillnet GHL being achieved. Age compositions from the 2002 fishery showed age-5 (60.1%), age-9 (10.5%), with a mix of other age classes, (Table 5).

The Malina Bay Section was closed to commercial fishing from 1997 through 2000. Aerial and hydroacoustic surveys (1998, 1999, and 2000) and AWL samples (2000) indicated that the spawning biomass was increasing and this section was opened to gillnetting in 2001, with a 15 ton GHL. Fishery performance was excellent in 2001 and for the 2002 season a 15 ton GHL was assigned again for the section. Fishery performance was poor in 2002 with 1.5 tons harvested and catch samples consisted of age-5 (27.5%), age-8 (13.7%), age-9 (13.7%), age-4 (10.3%), and age-7 (10.3%; Table 5).

The Raspberry Strait Section was open to fishing in 2001 after being closed since 1997. Fishery performance in 2001 was poor and hydroacoustic surveys in April 2001 also indicated low herring abundance. This section was closed for the 2002 season.

North Afognak District

Five sections compose the North Afognak District. Spawning stocks of herring occur in all five sections though these stocks tend to be small (less than 20 tons). Historically, small harvests have come from all five sections. The Perenosa Bay Section had the largest spawning stock and had a 56 ton catch in 1990. Declines in stock abundance and fishery performance prompted the department to close three sections to herring fishing in 1995, and a fourth section was closed in 1998. The Tonki Bay Section has been open to commercial fishing, however fishery participation has been low (one vessel or less annually) and no catch has occurred.

South Afognak District

The South Afognak District comprises six sections. Only the Danger Bay Section has been open to fishing during the 2001 and 2002 seasons; the remaining sections have been closed since 1995. Aerial surveys in recent years have shown a steady increase in the herring biomass of Danger Bay; the remaining sections have shown no increase in herring biomass. The increase in the Danger Bay stock prompted the department to open this section to gillnetting in 2001 with a small, 15 ton, GHL. Fishery performance was excellent and age composition data from the gillnet harvest showed the catch was predominantly age-7 and age-8 herring (72%). Fishery performance was also excellent in 2002 with 88 tons harvested and the GHL was 30 tons. No samples were collected from the 2002 harvest.

Uganik District

The Uganik District consists of nine sections in the waters located on the northwest side of Kodiak Island. During the last 10 years this district has been the most productive in the KMA. The Village Islands Section supports the largest spawning stock, followed by South Arm Uganik, Terror, and Viekoda Bays. Small stocks are also found in the West Uganik Passage, Northeast Arm Uganik Bay, and the East Arm Uganik Bay Sections. The Village Islands stock tends to move throughout the Uganik Bay complex (five sections) prior to spawning and historically has been harvested within sections adjacent to Village Islands. Commercial catches in these adjacent sections were at times high, which reflects the strength of the Village Islands stock and not necessarily the spawning stock of the harvest location.

Hydroacoustic and aerial survey information indicate that the Village Islands spawning biomass is the largest currently in the KMA. The total biomass of herring observed in the Village Islands, South Arm, Northeast Arm and East Arm (Uganik Bay) is estimated to be at least 10,000 tons and could range as high as 30,000 tons (herring congregate in Uganik Bay for a month or longer, complicating biomass estimation). Age composition data from the 2002 seine fishery for Village Islands shows a large number of young, age-3 (39.0%), age-5 (33.1%), and age-4 (13.2%; Table 4). The 2002 fishery performance was excellent, with initial harvests on April 15 being released due to low roe percentages. By April 23 roe percentages had improved and approximately 450 tons were harvested in 2 hours. A large spawn occurred on April 27. Fishery performance in the South Arm Uganik Section was also excellent in 2002 and accounted for nearly 25% of the total gillnet harvest. Age composition data from the gillnet catch showed age-5 (60.6%), age-8 (15.7%), and age-7 (7.8%) herring (Table 5). Large numbers of age-2 herring were observed in the outer portion of South Arm, within Northeast Arm, and in the Village Islands Section near Rock Point. Recruitment appears to be strong for Uganik Bay. The West Uganik Passage had a 48 ton harvest by gillnetters, the largest catch that has occurred in this section since 1997. Age compositions were age-5 (52.3%), age-8 (16.9%), and age-4 (15.3%; Table 5).

The Viekoda Bay and Terror Bay Sections were closed without a harvest in 2002 due to the Uganik District seine GHL being approached, as the Village Islands catch was 87 tons above the GHL. Some fishing did occur in these sections prior to the district closure announcement and small age-2 and age-3 herring were caught and released in both sections. Similarly for the gillnetters, the Northeast Arm and East Arm Uganik Sections were also closed as the Uganik District gillnet GHL was thought to have been met with harvest from South Arm. After all the

vessels had delivered it was found that only 154 tons of the 185 ton GHL had been harvested. The small herring stocks found in the East Arm Uganik and Northeast Arm Uganik Sections have had very little fishing activity in 2000-2002 seasons. Due to the low effort levels, fishery performance is not a good gauge of stock status for these sections.

Uyak District

Through the 1980s, the Uyak District was the largest herring producing district in the KMA. In the early 1990s, fishery performance and spotter observations indicated a decline in herring abundance. The department responded to this decline by reducing the GHGs for these sections within this district for the 1992 through 1994 seasons, but stocks continued to decline. In 1995 the entire district was closed to fishing, to promote the recovery of these stocks. The department proposed studies to assess the size of the herring stocks and the age compositions within this district but funding was unavailable, and the Uyak District remained closed to fishing through 2002.

No hydroacoustic surveys were conducted in 2002. In recent years department vessels have been used to conduct limited hydroacoustic surveys in this area. These surveys indicated the stock status for the district remained depressed, though the 2000 survey results were encouraging. A seine vessel was contracted in 2001 to survey for herring and collect age composition samples. The district was surveyed during a 4-day period (May 15 to 18) and Zachar and Spiridon Bays were found to have the largest amounts of fish. Overall, observations made during the survey period indicated that the Inner Uyak, Browns Lagoon, and Larsen Bay stocks remain at low abundance. The Zachar and Spiridon Bay stocks appear healthier and are gradually rebuilding. Historically, the commercial fishery took place throughout the month of May, so it is likely that herring returned before and after the survey period and so are unaccounted for. In mid-April 2002, a local air taxi pilot reported seeing a large biomass of herring present in the flats of Uyak Bay and another near Browns Lagoon.

Northeast District

There are five sections in the Northeast District and four have known stocks of herring. The Womens Bay Section had the largest stock of herring and commercial fishery harvests ranged from 74 to 149 tons for 1990 through 1992. Declines in fishery performance from 1995 to 1997 prompted the department to close this district to commercial fishing from 1998 through 2002. This section is near the city of Kodiak and has remained open to subsistence herring fishing. The subsistence harvest was 10 tons in 2000. Subsistence fishers estimated that approximately 100 tons were present (from sonar surveys) and a department aerial survey also indicated about 100 tons in 2000. The department conducted a hydroacoustic survey of the Womens Bay and Kalsin Bay Sections in 2001. Approximately 40 tons of herring were found in each of these sections and the age composition of samples from Womens Bay was primarily age-3 (42%) and age-4 (33%), which indicates good recruitment, and age-8 (17%). Subsistence fishery regulations became more restrictive in 2001 which resulted in reduced catches in 2001 and 2002, not because of a decrease in herring abundance.

Inner Marmot District

There are five sections within the Inner Marmot District. All sections have known stocks of herring though most are small. The Kizhuyak Bay Section has the largest stock of herring in the district with commercial harvests ranging from 102 to 117 tons from 1990 through 1992. Declines in fishery performance occurred from 1993 through 1995, and prompted the department to close the entire district from 1996 through 2001. Aerial surveys have consistently documented herring in this section in recent years, generally 50 to 100 tons. In 2001 the department conducted a hydroacoustic survey of Kizhuyak Bay and Anton Larsen Bay Sections. Approximately 115 tons were found in Kizhuyak Bay and sampling revealed these herring were all age-2. The Anton Larsen Bay Section was also surveyed in 2001 and 14 tons were observed with an age composition of age-5 (18%), age-6 (12%), age-7 (11%), and age-8 (53%) herring (Gretsch 2001).

In 2002 the Kizhuyak Bay Section was opened to gillnetting with a small 10 ton GHL. Fishery performance was excellent with 14 tons harvested with age compositions of age-9 (38.0%), age-7 (17.3%), age-8 (16.3%), and age-6 (10.8%).

Eastside District

Four bay complexes comprise the Eastside District: Ugak Bay, Kiluida Bay, East Sitkalidak Strait, and West Sitkalidak Strait. Sixteen sections have been established for the Eastside District and only one, the Outer Sitkalidak Section, has no history of herring sac roe harvest. 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, resulting in a lack of fishery performance information to help guide department stock evaluations.

Generally, the East and West Sitkalidak Sections have the earliest spawning concentrations of herring found in the KMA, with initial spawn occurring in late March. In the mid-1990s the East and West Sitkalidak Sections were the major herring producers of the district, but stock abundance and fishery performance decreased in 1996 and 1997. Part of the fishery performance problem was the difficulty fishermen had in finding marketable quality herring, as the stocks were generally mixed with ripe, green, and spawned out herring. The department reacted to the changes in the stocks by reducing the GHLs. During the last five years the GHLs have been set low (40 to 50 tons) and the stocks have shown improvement. The age composition of 2002 commercial catch samples from East Sitkalidak was predominantly age-5 (65.9%), age-4 (9.2%), and age-9 (5.7%) herring (Table 4). West Sitkalidak Strait is similar, with samples from the 2002 harvest consisting of age-5 (58.9%), age-4 (14.6%), and age-9 (6.6%) herring (Table 4).

The Barling Bay Section, adjacent to the West Sitkalidak Section, has been the most consistent herring producer in the Eastside District. GHLs have ranged from 40 to 50 tons during the last 10 years and harvests have ranged from 39 to 66 tons. Samples in 2002 were primarily comprised of age-5 (52.2%), age-4 (20.8%), and age-9 (13.9%) herring (Table 4). The Three Saints Bay Section, also adjacent to the West Sitkalidak Strait Section, is designated as a gillnet section, but no harvests have occurred from this section in the last three years.

The Inner Kiliuda Bay, Outer Kiliuda Bay, and Shearwater Bay Sections have been consistent and strong herring producers during the last 10 years. Fishery performance was excellent in all three sections in 2002. Age compositions in the Kiliuda Sections included age-5 (42.2%), age-9 (19.2%), and age-4 (17.0%; Table 4). Samples from the gillnet catch from Shearwater Bay included age-9 (64.7%), age-5 (9.4%), and age-3 (7.0%; Table 5).

The Inner and Outer Ugak Bay Sections also continued to be strong herring producers in 2002. Fishery performance has been excellent in both sections in recent years. Hydroacoustic and aerial surveys of prespawning herring concentrations in Outer Ugak Bay indicated that between 1,500 and 2,000 tons were present, which represents the largest biomass observations for these sections. Primary age compositions for the Outer Ugak Bay seine area included age-9 (42.9%), age-5 (32.8%), age-4 (10.8%), and age-8 (6.3%) herring (Table 4), and from the Inner Ugak Bay gillnet area also included age-9 (83.5%), and age-5 (6.8%) herring (Table 5). No new information is available for the Pasagshak Bay Section, a gillnet section adjacent to the Outer Ugak Bay Section, with no harvest in the last three years.

During the 2000, 2001, and 2002 sac roe fishing seasons district-wide closures were issued for the Eastside District for seine gear because section harvests exceeded the district GHL.

Alitak District

The Alitak District comprises 10 sections and all but the Outer Alitak Section are known to have a stock of herring. Large stocks of herring were once found in Olga, Deadman, and Sulua Bays and commercial harvests ranged from 500 to 900 tons annually for the years 1991 through 1994. The Upper Olga Bay stock was the first large stock of the district that experienced declines in abundance, based on fishery performance from 1991 through 1993. The department reacted to this decline by reducing the GHLs but by 1995 the catch had dropped to zero. By 1995, the two sections in Deadman Bay were also experiencing declines in fishery performance and similarly the GHLs were reduced in 1996 and 1997. In 1997 the last of the large herring stocks of the district, Sulua Bay, also appeared to be declining, based on fishery performance, aerial surveys, and department hydroacoustic surveys. In 1998, the department closed seven sections of the Alitak District to fishing and has relied on industry and department aerial surveys to assess changes in stock status. The department has kept the three outer sections of the Alitak District open (two are seine areas) to act as test fishery areas. This has kept industry spotters looking for herring in this district, not only in the open sections but also in closed sections (since they're in the vicinity). Industry spotter information has been shared with the department and is useful information in determining stock status trends.

In 2002 industry spotter reports indicated a major increase in herring abundance within the Alitak District. Improvements in stock status occurred in the Inner Deadman Bay, Outer Deadman Bay, Inner Alitak Bay, Portage Bay, and Upper Olga Bay. Fishery performance also improved and was excellent in the Portage Bay Section a seine area, with age compositions including age-5 (51.1%), age-4 (19.4%), age-3 (11.6%), and age-6 (9.4%; Table 4). The remaining open sections had no harvest and only one gillnetter fished the district. The Upper Olga Bay Section was opened to gillnetting in 2002 after being closed since 1998, though no harvest occurred.

Mainland Districts

There are three Mainland Districts, comprising 12 sections. These districts experience more extreme weather conditions than other districts around Kodiak and Afognak Islands. Weather conditions frequently consist of high winds, low ceilings, and limited visibility, greatly reducing the effectiveness of spotters. The severity of the weather conditions in the spring likely reduces the productivity of these herring stocks, compared to the more protected waters of Kodiak and Afognak Islands. Five sections in the southern portion of the Mainland District have been designated as exploratory and are open to both gear types. Fishing effort in these three districts generally involves only one or two seine combines and a few gillnet vessels annually; fishery performance is not a good indicator of stock status. No vessels fished the Mainland Districts in 2002 and only two harvests have occurred in the last five years. There is no new information concerning herring stocks in the Mainland Districts in 2002.

Sturgeon/Halibut District

The Sturgeon/Halibut District is located on the southwest side of Kodiak Island, and has no management sections. This district consists mostly of offshore areas that are not known to have, or are not likely to have, a spawning stock of herring; no GHL has been established. Herring are found in this district during the summer months.

Year 2003 Harvest Expectations and New Research

The apportionment of 2003 GHGs for the KMA herring sac roe fishery was completed in March 2003. The 2003 GHG was substantially increased, to 2,600 tons, up nearly 40% from the 2002 GHG. Major increases in the GHGs occurred in the Uganik and Eastside Districts (Gretsch 2003).

Several research projects concerning interactions between Stellar sea lions and herring in the KMA will continue through 2003. Quantitative analysis of herring biomass within select KMA bays will be estimated by these studies, which may in turn be used for fisheries management.

HERRING FOOD/BAIT FISHERY

Historical Perspective

The earliest recorded commercial food/bait herring harvest in the KMA occurred in 1912 (Table 8). In the early 1920s, the fishery expanded and large herring were sought for food products, such as salted and pickled herring, which were in high demand after World War I. By the late 1920s the demand for herring food products had declined and the fishery switched to reduction products, such as fishmeal and oil. During the peak years of the reduction fishery (1934-1950) the average harvest was 31,600 tons, which vastly surpasses recent food/bait herring harvests (Figure 11). During the reduction fishery the major harvest areas were located in eastern Shelikof Strait and adjacent bays and straits along the west side of Kodiak and Afognak Islands. Quotas and harvest weights were measured by barrels (250 lbs. of herring equaled one barrel) until 1956

when the unit of measure was changed to short tons. Historically, large (approximately 70 foot) "sardine seiner" type vessels were used in conjunction with holding pounds to supply herring to five major reduction plants. In addition, small seine and gillnet vessels participated in a portion of the food fishery and delivered to floating and shorebased salting and pickling operations.

From the early 1960s to 1973 there were no harvest quotas or closed seasons. From 1974 through 1980 an open fishing season was established between July 1 and February 28. In 1979 and 1980, GHLS for the food/bait season were established at 12,600 tons. The season opening date for the fishery changed from July 1 to August 15 for the years 1981 through 1984. As a result of the rapidly developing sac roe fishery, the GHLS for the food/bait season was reduced to 1,000 tons in 1981 and remained at that level through 1987. In 1985 the season opening date was moved to August 1. Regulatory GHLS for the herring food/bait fishery were replaced with a regulatory harvest strategy in 1988 that established variable GHLS based on herring stock status. The season opening date was moved to October 1 in 1999.

Fishing periods through 1996 were unrestricted, 24 hours per day, seven days per week. In 1997 fishing periods were restricted by emergency order to 12 hours in duration (8:00 AM to 8:00 PM), seven days per week. The reduction in fishing period length was intended to slow harvest rates in order to ensure that GHLS were not greatly exceeded.

Gear used in this fishery includes trawl, seine, and gillnet. Gear was first restricted for the 1986/87 season when seine gear was limited to 100 fathoms in length and 1,025 meshes in depth and gillnet gear was limited to 150 fathoms in length with no depth restrictions. For the 1993/94 season purse seine specifications were increased to 150 fathoms in length and 1,625 meshes in depth. These changes made seine gear more competitive with trawlers; seiners harvested an average of only 2% of the food/bait harvest from 1987 through 1992 compared to 54% of the total harvest from 1993 to 1998. There are no restrictions on trawl gear, which is fished mid-water with no bottom contact. All three gear types fished the same areas and were subject to the same fishing periods.

In 2001 this fishery was designated as a limited entry fishery by the Commercial Fisheries Entry Commission (CFEC) and a points system was developed to evaluate past fishery participation and determine who would receive a limited entry permit. In 2002 CFEC issued limited entry permits that included five purse seine/gillnet permits and four trawl permits.

Management Plan History

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 Kodiak and Afognak Islands. The biomass exceeded that of known KMA spawning stocks. Herring food/bait fishers targeted these herring and questions arose concerning the stock of origin of these fish. In 1986 a stock identification study, based on scale pattern analysis, was performed on herring harvested from a large biomass located in the east part of the Shelikof Strait (Johnson et. al. 1988). The study concluded that at least 80% of the East Shelikof herring sampled were Kamishak Bay stocks, which spawn within the Lower Cook Inlet (LCI) Management Area.

In 1988, the BOF allocated not more than two percent of the previous season's total available spawning biomass from Kamishak Bay for harvest during the Kodiak herring food/bait fishery.

For local Kodiak spawning stocks, which were exploited during the sac roe fishery, the food/bait GHL was based on 10% of the harvest that occurred in the previous KMA herring sac roe season.

Problems subsequently arose from this management plan because it was difficult to assign harvest from the intermixed stocks to Kodiak or Kamishak when both areas had similar age compositions. This plan was in effect through the 1992/93 season.

In the fall of 1992, the BOF approved the Kamishak Bay District Herring Management Plan (5 AAC 27.465), which outlines criteria for the management of the Kamishak Bay herring sac roe and the Shelikof Strait food/bait fishery (ADF&G 2002-2003). This plan defines allocations to each fishery based on biomass estimates.

In 1993, the BOF placed into regulation a harvest strategy defining the criteria for managing the Kodiak herring food/bait fishery (5 AAC 27.535). This strategy combines the Kamishak stock GHL with the Kodiak stock GHL for food/bait management districts FB 1 (West Afognak District), FB 4 (Uganik District), and FB 5 (Uyak District; Figure 4). This portion of the KMA bait fishery is referred to as the Shelikof Strait Food and Bait Herring Fishery. The Kamishak allocation to the Kodiak fishery generally ranges from 1% to 2% of the Kamishak spawning biomass. When the combined Kodiak-Kamishak GHL is achieved the Shelikof Strait food/bait management districts (West Afognak, Uganik, and Uyak) are closed collectively. This plan alleviated the problem of identifying the spawning stock of a harvest in areas where intermixing may occur. The plan also closed the Kamishak Bay sac roe fishery and the Shelikof Strait Food/Bait Fishery north of the latitude of Miners Point (Uganik Bay) when the Kamishak spawning biomass fell below 8,000 tons (the minimum Kamishak spawning biomass threshold; ADF&G 2002-2003).

In 1999, the BOF made additional changes to the KMA food/bait fishery. The season opening date was changed to October 1 so department staff in the LCI would have additional time to complete the Kamishak herring forecast and resulting allocation for the Shelikof fishery. Prior years' fisheries generally occurred based on preliminary Kamishak forecasts. Actual harvests were often either lower or higher than the final Kamishak allocation, which was sometimes completed weeks after the fishery occurred. This later season opening date also reduced the burden on department staff in both regions that were involved with managing salmon fisheries in August and September. The harvest strategy was also changed so that GHLs for KMA stocks were based upon 10% of the GHLs established for the preceding KMA sac roe fishery by section. The previous regulation based the food/bait GHL upon 10% of the actual KMA sac roe harvest by section. In cases where an excessive harvest occurred during the sac roe fishery the related food/bait GHL would also be high. Lastly, changes to the plan clarified and put into regulation the previous practice of limiting a district harvest to no more than the sum of the individual section GHLs it contains. These changes promoted a more conservative approach to managing this fishery.

In November of 2001, the BOF adopted changes to the Kamishak Bay District Herring Management Plan based on the results of a threshold analysis preformed by LCI department staff. The analysis concluded that the minimum spawning biomass threshold should be 6,000 tons, below the previous minimum spawning biomass threshold (8,000 tons). Other changes to the plan included a reduction in the maximum exploitation rate for the Shelikof Strait fishery from 2% to

1.5% of the Kamishak spawning biomass. Lastly, a portion of the plan relating to the Shelikof Strait fishery was eliminated, which required adjustment of Shelikof Strait young age class harvest amounts to reflect the estimated weight of an equal amount of older age class herring.

Kamishak Fishery Closure

The estimated biomass of Kamishak Bay herring in 2002 was 4,800 tons and was well below the minimum spawning biomass of 6,000 tons that must be met before a harvest may occur in the sac roe or food/bait fisheries. Stock assessment surveys determined that approximately 40% 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 that represent the future of the population. This is the fifth consecutive year that the Kamishak fishery has been closed and the population has sharply declined during the last three years. Due to the low stock status, the Kamishak Bay sac roe fishery was closed for the 2003 season and the Shelikof Strait food/bait fishery north of the latitude of Miner's Point was closed for the 2002 season.

Food/Bait Co-op Fishery

The KMA food/bait fishery was closed for the 1999 and 2000 seasons, because of low potential GHLS and the department's concern for manageability of a competitive fishery. In 2001, the CFEC designated the KMA herring food/bait fishery a limited entry fishery and issued 13 interim use permits to those fishers who made a landing between 1994 and 1998. However, because of the relatively small GHLS available (60 tons in the Uganik District and 47 tons in the Eastside District) the department once again would not allow an open competitive fishery to occur even if restricted to the 13 interim permit holders. As an alternative the interim permit holders formed a cooperative (co-op) arrangement and the department and CFEC agreed to allow a co-op fishery to occur. The 13 interim permit holders determined which vessel would conduct the co-op harvest, all marketing aspects, and all costs associated with harvesting or tendering the herring. The co-op fishery resulted with 63 tons harvested in the Uganik District (Village Islands) and 52 tons taken in the Eastside District (Ugak Bay).

In July, 2002 CFEC made a final determination on who would receive a permanent limited entry permit. Nine permanent limited entry permits were issued (five purse seine/gillnet permits and four trawl permits). With the closure of the 2003 Kamishak fishery only a portion of the Uganik District (72 ton GHL) and the Eastside District (62 ton GHL) could be opened to food/bait herring fishing. The department again had harvest concerns and the nine permit holders agreed to conduct a co-op fishery as in 2001. The department allowed only one catcher vessel on the grounds and a department observer was present onboard the fishing vessel during the fishery. The co-op fishery resulted in a 74 ton harvest in the Uganik District (South Arm), which closed on October 16, 2002, and a 61 ton harvest in the Eastside District (Ugak Bay), which closed on February 16, 2003 (Appendix A.1).

2003 Management Plans

It is uncertain when the Kamishak spawning biomass minimum threshold of 6,000 tons will be met or exceeded, so that the Shelikof Strait food/bait fishery and Kamishak sac roe fishery could reopen. Herring stocks in the KMA continue to increase while the Kamishak stock declines. Fishing opportunities will continue to be lost in the KMA in those waters north of the latitude of Miner's Point under the current management plan on KMA herring stocks. For the 2003/04 season it is anticipated that the Uganik District south of the latitude of Miners Point will open with a 123 ton GHL and the Eastside District with a 75 ton GHL. The department and permit holders will again need to work closely in order to conduct a fishery in 2003/2004 that has controlled harvest rates. The department may be able to achieve this through on the grounds monitoring of the fishery or other fishery management options, such another co-op fishery.

HERRING SUBSISTENCE FISHERY

Fishery Characteristics

Prior to 1999 the herring subsistence fishery was referred to as a Personal Use/Subsistence Fishery and has occurred for at least twenty years. The majority of the harvest in the fishery occurred near the port of Kodiak in Womens Bay and was caught by gillnets. The herring were used primarily for bait in commercial fishery longline (halibut) and pot fisheries. Also, prior to 1999 this fishery was only regulated during the herring sac roe season, from April 15 to June 30, through 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 concerning the KMA subsistence herring fishery. These regulations allowed for a harvest of up to 500 pounds of herring with no permit requirements, except during the April 15 to June 30 sac roe fishing season. A subsistence permit was only 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 recent years most of the herring caught for subsistence were used for sport or commercial fisheries bait, food, or fertilizer.

In 2000 harvests escalated due to bait needs created with the reopening of the commercial tanner crab fishery in the KMA. The department was concerned about the increased harvest and the inappropriateness of taking subsistence herring for use as bait in a commercial fishery. The department submitted proposals in 2001 and the BOF supported the changes to the regulations that allowed for both types of historic harvests. The new subsistence regulation allows for the harvest of up to 500 pounds of herring annually and instead of requiring a separate herring subsistence permit, herring were included on the KMA salmon and crab subsistence permit.

A new regulation (5 AAC 27.545) concerning the harvest of bait by commercial permit holders in Kodiak allows up to 500 pounds of herring to be harvested as bait to be used in commercial fisheries. No harvest occurred under this regulation in 2002.

2002 Season Summary

The subsistence harvest in 2002 was 3,843 pounds (Table 9). A total of 23 KMA subsistence permits were returned with herring harvest data, with most of the harvest coming from the Afognak, Northeast, and Eastside Districts.

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Table 1. Historical harvest data for the commercial herring sac roe and food/bait fisheries and percent of the total annual herring harvest that occurs by fishery, Kodiak Management Area, 1964-2002.

Year	Sac Roe Fishery Harvest (Tons)	Food and Bait Fishery 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	127	2,184	94%	6%
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%
Average					
1964-2002	1,915	217	2,131	90%	10%
5 Yr. Avg.					
1998-02	1,690	75	1,765	96%	4%
10 Yr. Avg.					
1993-02	3,050	381	3,430	91%	9%

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, 1979-2002.

Year	Season Length (Days)	G-H-L (Tons)	Total Harvest (Tons)	Harvest by Gear Type		Percent Harvest by Gear Type		Number of Landings by Gear Type		Units of Gear Fished ^a		Average Catch by Gear		Estimated Average Earnings		Price per Ton (\$)	Estimated Exvessel Total Value (\$)
				Seine (Tons)	Gillnet (Tons)	Seine	Gillnet	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	\$34,749	\$7,535	\$850	\$1,911,149
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	\$12,323	\$3,081	\$300	\$970,500
1998	50	2,030	2,057	1,954	103	95%	5%	110	26	35	7	56	15	\$16,749	\$4,414	\$300	\$617,100
1999	38	1,495	1,651	1,589	62	96%	4%	94	16	31	5	51	12	\$23,732	\$5,741	\$463	\$764,413
2000 ^b	37	1,735	1,370	1,290	80	94%	6%	57	23	31	10	42	8	\$20,806	\$4,000	\$500	\$685,000
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
Averages																	
1979-2002	58	2,527	2,587	2,035	552	78%	22%	156	370	45	63	47	11	\$36,761	\$8,424	\$810	\$2,142,254
Five Year																	
1998-2002	44	1,732	1,690	1,504	186	89%	11%	73	30	32	9	47	19	\$20,783	\$8,843	\$453	\$750,403
Ten Year																	
1993-2002	56	2,883	3,050	2,549	501	85%	15%	155	288	46	39	55	16	\$38,127	\$10,733	\$719	\$2,477,615

^a From 1979-1998 fishery participation was based on vessels making landings, 1999-2002 data based on actual participation.

^b An allocative harvest strategy was in effect starting in 2000.

Table 3. Herring sac roe fishery guideline harvest level (GHL) by section and gear type, harvest by section, and date sections were closed for the Kodiak Management Area 2002.

Statistical Area	Management Section	Date Closed	Purse Seine		Gillnet	
			GHL	Harvest	GHL	Harvest
NORTH AFOGNAK DISTRICT						
NA10	Shuyak Island	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NA20	Delphin Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NA30	Perenos Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NA40	Seal Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NA50	Tonki Bay	6/30/02	10	0	CLOSED	CLOSED
WEST AFOGNAK DISTRICT						
WA10	Raspberry Strait	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
WA20	Malina Bay	4/26/02	CLOSED	CLOSED	15	1.5
WA31	Paramanof Bay	4/23/02	250	223.0	CLOSED	CLOSED
WA32	Foul Bay	4/26/02	CLOSED	CLOSED	30	20.1
WA40	Blue Fox/Devil's Inlet	4/26/02	CLOSED	CLOSED	10	0
WA50	Offshore W. Afognak	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
SOUTH AFOGNAK DISTRICT						
SA10	Izhut Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
SA20	Kitot Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
SA30	MacDonalds Lagoon	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
SA40	Danger Bay	4/26/02	CLOSED	CLOSED	30	88.3
SA50	Litnik	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
SA60	Duck Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
AFOGNAK DISTRICTS TOTAL			260	223.0	85	109.9
UGANIK DISTRICT						
UG10	Kupreanof	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UG20	Viekoda	4/24/02	80	0	CLOSED	CLOSED
UG21	Terror Bay	4/24/02	60	0	CLOSED	CLOSED
UG30	Village Islands	4/23/02	400	486.7	CLOSED	CLOSED
UG31	West Uganik Pass	5/16/02	CLOSED	CLOSED	15	48.0
UG32	NE Arm Uganik	5/18/02	CLOSED	CLOSED	10	0
UG33	E. Arm Uganik	5/18/02	CLOSED	CLOSED	10	0
UG34	S. Arm Uganik	5/18/02	CLOSED	CLOSED	150	106.0
UG40	Offshore Uganik	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
DISTRICT TOTAL			540	486.7	185	154.0
UYAK DISTRICT						
UY10	Offshore Uyak	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UY20	Harvester Island	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UY30	Inner Uyak	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UY32	Browns Lagoon	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UY31	Larsen Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UY40	Zachar Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
UY50	Spiridon Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
DISTRICT TOTAL			CLOSED	CLOSED	CLOSED	CLOSED

-Continued-

Table 3. (page 2 of 3)

Statistical Area	Management Section	Date Closed	Purse Seine		Gillnet	
			GHL	Harvest	GHL	Harvest
ALITAK DISTRICT						
AL10	Outer Alitak	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
AL20	Inner Alitak	6/30/02	CLOSED	CLOSED	10	0
AL21	Inner Deadman Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
AL22	Outer Deadman Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
AL30	Sulua Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
AL31	Portage Bay	5/18/02	30	35.4	CLOSED	CLOSED
AL40	Lower Olga/Moser	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
AL41	No. Upper Olga Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
AL50	Upper Olga Bay	6/30/02	CLOSED	CLOSED	10	0
AL60	Geese/Twoheaded	6/30/02	15	0	CLOSED	CLOSED
DISTRICT TOTAL			45	35.4	20	0
STURGEON/HALIBUT DISTRICT						
SH10	Sturgeon/Halibut	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
EASTSIDE DISTRICT						
EA10	Kaiugnak	*Note: Sections EA10 and EA20 managed as one section, 10 ton GHL.				
EA20	SW. Sitkalidak	5/4/02	10	0	CLOSED	CLOSED
EA21	Three Saints Bay	6/30/02	CLOSED	CLOSED	15	0
EA22	Newman Bay	*Note: Sections EA22 and EA23 managed as one section, 50 ton GHL.				
EA23	W. Sitkalidak Strait	4/16/02	50	81.2	CLOSED	CLOSED
EA24	Barling Bay	4/27/02	40	53.3	CLOSED	CLOSED
EA30	E. Sitkalidak St.	4/17/02	50	75.3	CLOSED	CLOSED
EA31	Tanginak Anchorage	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
EA40	Outer Sitkalidak	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
EA41	Boulder Bay	6/30/02	CLOSED	CLOSED	10	0
EA42	Shearwater Bay	5/30/02	CLOSED	CLOSED	30	37.7
EA43	Outer Kiliuda Bay	5/4/02	80	52.1	CLOSED	CLOSED
EA44	Inner Kiliuda Bay	5/4/02	80	6.3	CLOSED	CLOSED
EA50	Outer Ugak Bay	5/4/02	160	260.5	CLOSED	CLOSED
EA51	Inner Ugak Bay	5/30/02	CLOSED	CLOSED	90	87.5
EA52	Pasagshak	6/30/02	CLOSED	CLOSED	10	0
DISTRICT TOTAL			470	528.7	155	125.2
NORTHEAST DISTRICT						
NE10	Womens Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NE20	Kalsin Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NE30	Middle Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NE40	Inshore Chiniak	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NE50	Offshore Chiniak	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
DISTRICT TOTAL			CLOSED	CLOSED	CLOSED	CLOSED
INNER MARMOT DISTRICT						
IM10	Monashka Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
IM20	Anton Larsen Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
IM30	Sharatin Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED

-Continued-

Table 3. (page 3 of 3)

Statistical Area	Management Section	Date Closed	Purse Seine		Gillnet	
			GHL	Harvest	GHL	Harvest
IM40	Kizhuyak Bay	5/22/02	CLOSED	CLOSED	10	13.7
IM50	Spruce Island	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
DISTRICT TOTAL		CLOSED	CLOSED	CLOSED	10	13.7
NORTH MAINLAND DISTRICT						
NM10	Hallo Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NM20	Inner Kukak	6/30/02	CLOSED	CLOSED	25	0
NM30	Outer Kukak	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NM40	Missak Bay	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
DISTRICT TOTAL			CLOSED	CLOSED	25	0
MID MAINLAND DISTRICT						
MM10	Inner Katmai	6/30/02	50	0	CLOSED	CLOSED
MM20	Outer Katmai	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
MM30	Alinchak	6/30/02	15	0	CLOSED	CLOSED
MM40	Puale Bay	EXPLORATORY		0		0
MM50	Portage Bay	EXPLORATORY		0		0
MM60	Outer Portage	EXPLORATORY		0		0
DISTRICT TOTAL			65	0	0	0
SOUTH MAINLAND DISTRICT						
SM10	Wide Bay	EXPLORATORY		0		0
SM20	Lower Shelikof	EXPLORATORY		0		0
DISTRICT TOTAL			0	0	0	0
			Seine		Gillnet	
	Total GHL All Gear	Total Catch All Gear	GHL	Harvest	GHL	Harvest
GRAND TOTAL	1,860	1,677	1,380	1,274	480	403
			% of GHL	% Harvest	% of GHL	% Harvest
			74%	76%	26%	24%

Table 4. Age composition, by percent, of herring sac roe samples from the commercial purse seine harvest by section, Kodiak Management Area, 2002.

Section	Harvest (tons)	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+		
Paramanof Bay	223.0	0.0	25.0	14.1	31.3	2.0	1.9	8.3	6.6	1.5	1.8	2.9	2.0	1.9	913	
Village Islands	486.7	0.3	39.0	13.2	33.1	1.0	2.2	6.5	2.2	0.1	1.0	0.3	0.3	0.3	582	
Portage Bay	35.4	1.6	11.6	19.4	51.1	9.4	2.7	2.2	1.1	0.0	0.0	0.0	0.0	0.5	180	
W. Sitkalidak Straits	81.2	0.0	0.4	14.6	58.9	0.9	1.8	5.1	6.6	0.4	0.0	1.4	2.3	7.0	212	
Barling Bay	53.3	0.0	2.9	20.8	52.2	2.4	0.4	2.9	13.9	0.4	1.9	0.9	0.4	0.0	201	
E. Sitkalidak Straits	75.3	0.0	0.0	9.2	65.9	1.7	0.4	3.5	5.7	1.3	1.3	2.6	3.0	4.8	226	
Outer Kiliuda Bay	52.1	3.7	6.6	17.0	42.2	3.7	0.7	4.4	19.2	0.7	0.0	0.0	0.7	0.7	135	
Outer Ugak Bay	260.5	0.3	2.9	10.8	32.8	2.2	0.7	6.3	42.9	0.3	0.0	0.0	0.3	0.0	268	
All samples combined ^a	1267.5	0.4	20.7	13.4	38.0	1.9	1.6	6.1	13.0	0.5	0.9	0.9	0.9	1.2	2,717	

^a Harvests occurred within 9 sections and catch samples were collected from 8 sections. These 8 sections yielded 1267.5 tons or 99.5% of the total seine harvest of 1273.8 tons. All samples combined data, weights the percent of the harvest by section to the age class data to estimate overall age compositions from the commercial purse seine harvest.

Table 5. Age composition, by percent, of herring sac roe samples from the commercial gillnet harvest by section, Kodiak Management Area, 2002.

Section	Harvest (tons)	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+		
Malina Bay	1.5	0.0	1.7	10.3	27.5	1.7	10.3	13.7	13.7	6.8	1.7	1.7	3.4	6.8	58	
Foul Bay	20.1	0.0	0.8	4.8	60.1	2.4	3.2	9.7	10.5	4.8	0.8	1.6	0.0	0.8	123	
W.Uganik Passage	48.0	0.0	0.0	15.3	52.3	9.2	1.5	16.9	3.0	0.0	0.0	1.5	0.0	0.0	65	
S. Arm Uganik	106.0	0.0	2.2	2.2	60.6	5.6	7.8	15.7	3.3	0.0	1.1	0.0	0.0	1.1	89	
Shearwater	37.7	0.0	7.0	2.3	9.4	3.5	2.3	7.0	64.7	1.1	2.3	0.0	0.0	0.0	85	
Inner Ugak Bay	87.5	0.0	0.0	1.3	6.8	1.3	0.0	5.4	83.5	1.3	0.0	0.0	0.0	0.0	73	
Kizhuyak	13.7	0.0	3.2	4.3	4.3	10.8	17.3	16.3	38.0	2.1	3.2	0.0	0.0	0.0	92	
All samples combined ^a	314.5	0.0	1.8	4.3	35.6	4.7	4.1	11.6	34.9	0.9	0.8	0.3	0.1	0.5	585	

^a Harvests occurred within 8 sections and catch samples were collected from 7 sections. These 7 sections yielded 314.5 tons or 78% of the total gillnet harvest of 402.6 tons. All samples combined data, weights the percent of the harvest by section to the age class data to estimate overall age compositions from the commercial gillnet harvest.

Table 6. Average weight in grams by age class of herring sac roe samples from the commercial purse seine harvest by section, Kodiak Management Area, 2002.

Section	Average Weight in Grams 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+	
Paramanof Bay	-	91	132	166	184	216	233	248	250	256	283	277	296	913
Village Islands	42	86	123	154	169	201	215	233	192	264	275	248	308	582
Portage Bay	65	123	175	202	236	240	277	335	-	-	-	-	337	180
W. Sitkalidak Straits	-	137	181	214	270	284	300	330	322	-	406	322	355	212
Barling Bay	-	110	163	208	211	290	324	313	310	327	294	322	-	201
E. Sitkalidak Straits	-	-	171	213	269	278	301	319	363	343	357	376	363	226
Outer Kiliuda Bay	69	112	148	182	229	280	277	291	276	-	-	327	393	135
Outer Ugak Bay	79	121	152	195	204	258	240	272	251	-	-	335	-	267

Table 7. Average weight in grams by age class of herring sac roe samples from the commercial gillnet harvest by section, Kodiak Management Area, 2002.

Section	Average Weight in Grams 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+	
Malina Bay	-	113	145	167	202	188	238	234	240	255	253	274	261	56
Foul Bay	-	123	157	173	197	229	218	237	259	267	267	-	318	123
W.Uganik Passage	-	-	147	163	191	166	207	210	-	-	214	-	-	65
S. Arm Uganik	-	133	155	160	173	187	185	201	-	303	-	-	293	89
Shearwater	-	142	156	206	240	249	268	297	286	322	-	-	-	85
Inner Ugak Bay	-	-	133	204	259	-	238	262	231	-	-	-	-	73
Kizhuyak	-	142	168	202	234	254	255	273	263	258	-	-	-	92

Table 8. Historical food/bait herring harvest for the Kodiak Management Area, 1912-2002.

Year	Tons	Year	Tons	Year	Tons
1912	20	1943	35,352	1974	40
1913	0	1944	26,835	1975	5
1914	0	1945	31,114	1976	No data
1915	0	1946	47,506	1977	No data
1916	70	1947	50,743	1978	399
1917	138	1948	46,428	1979	125
1918	118	1949	0	1980	381
1919	260	1950	44,133	1981	18
1920	46	1951	4,299	1982	326
1921	945	1952	1,389	1983	33
1922	1,483	1953	725	1984	123
1923	322	1954	0	1985	102
1924	4,823	1955	0	1986	213
1925	9,997	1956	13,524	1987	217
1926	2,681	1957	21,219	1988	340
1927	2,593	1958	1,711	1989	345
1928	625	1959	3,831	1990	313
1929	No data	1960	0	1991	215
1930	622	1961	0	1992	312
1931	1,000	1962	0	1993	784
1932	3,594	1963	0	1994	677
1933	2,313	1964	310	1995	507
1934	60,000	1965	35	1996	651
1935	No data	1966	198	1997	756
1936	24,748	1967	300	1998	127
1937	27,659	1968	15	1999	Fishery Closed
1938	24,522	1969	11	2000	Fishery Closed
1939	38,601	1970	8	2001	115
1940	22,677	1971	44	2002	135
1941	40,084	1972	50		
1942	16,791	1973	178		

Table 9. Subsistence herring harvest summary for the Kodiak Management Area, 1991-2002.

Year	Number Permits Issued	Number Permits Returned	Estimated Harvest (lbs.) 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 ^a	48	19	3,000	0	875	0	1,015	10,500	0	15,390
2002	^b	23	1,170	1,150	420	0	200	903	0	3,843

^a Catch data updated March, 2003.

^b In 2002 herring was added to the Kodiak subsistence salmon and crab permit, no separate permit required. Number of permits returned includes those with harvest data. Harvest data through March, 2003.

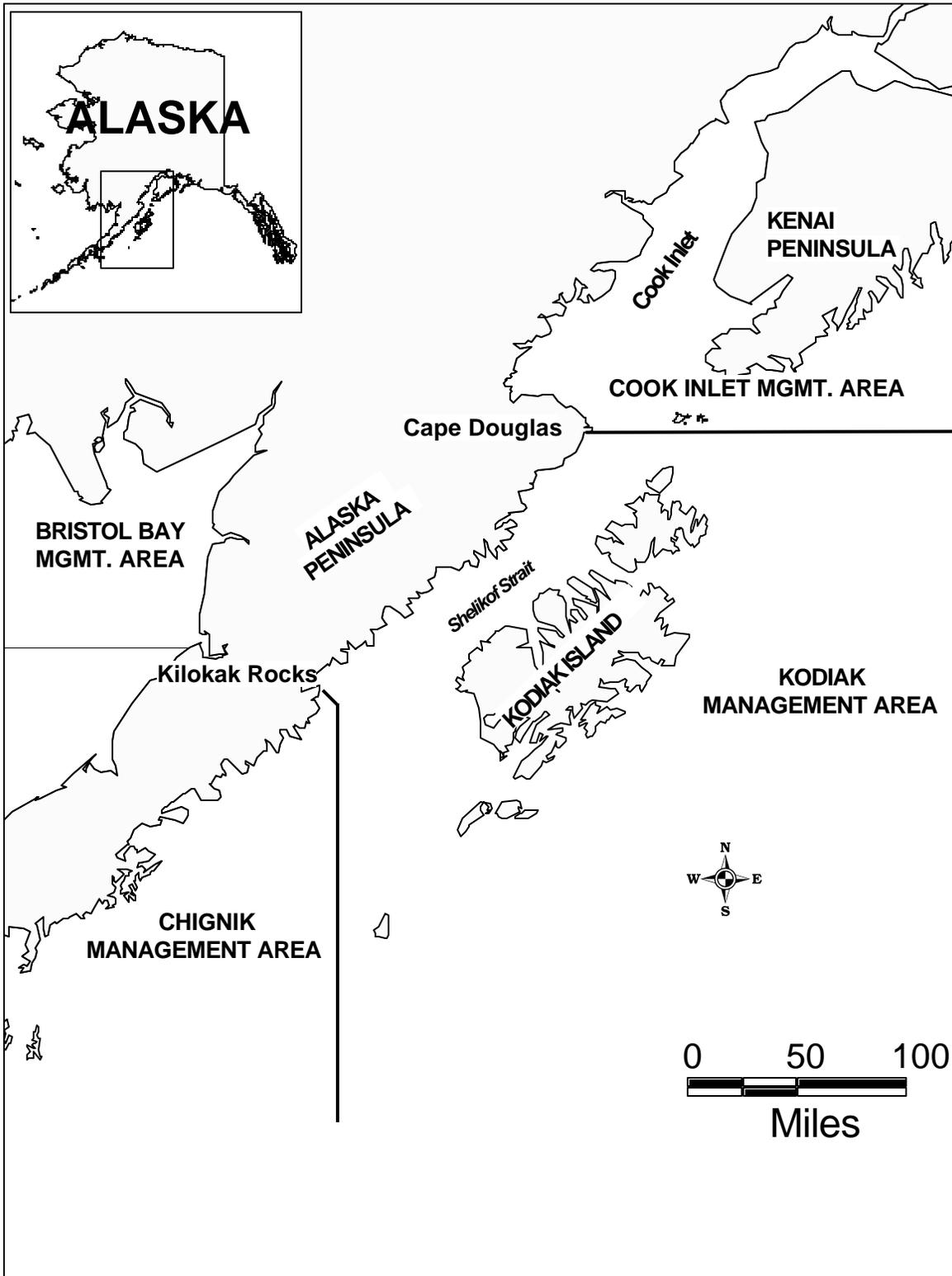


Figure 1. Map of southwestern Alaska emphasizing the Kodiak Management Area and its relationship to surrounding management areas

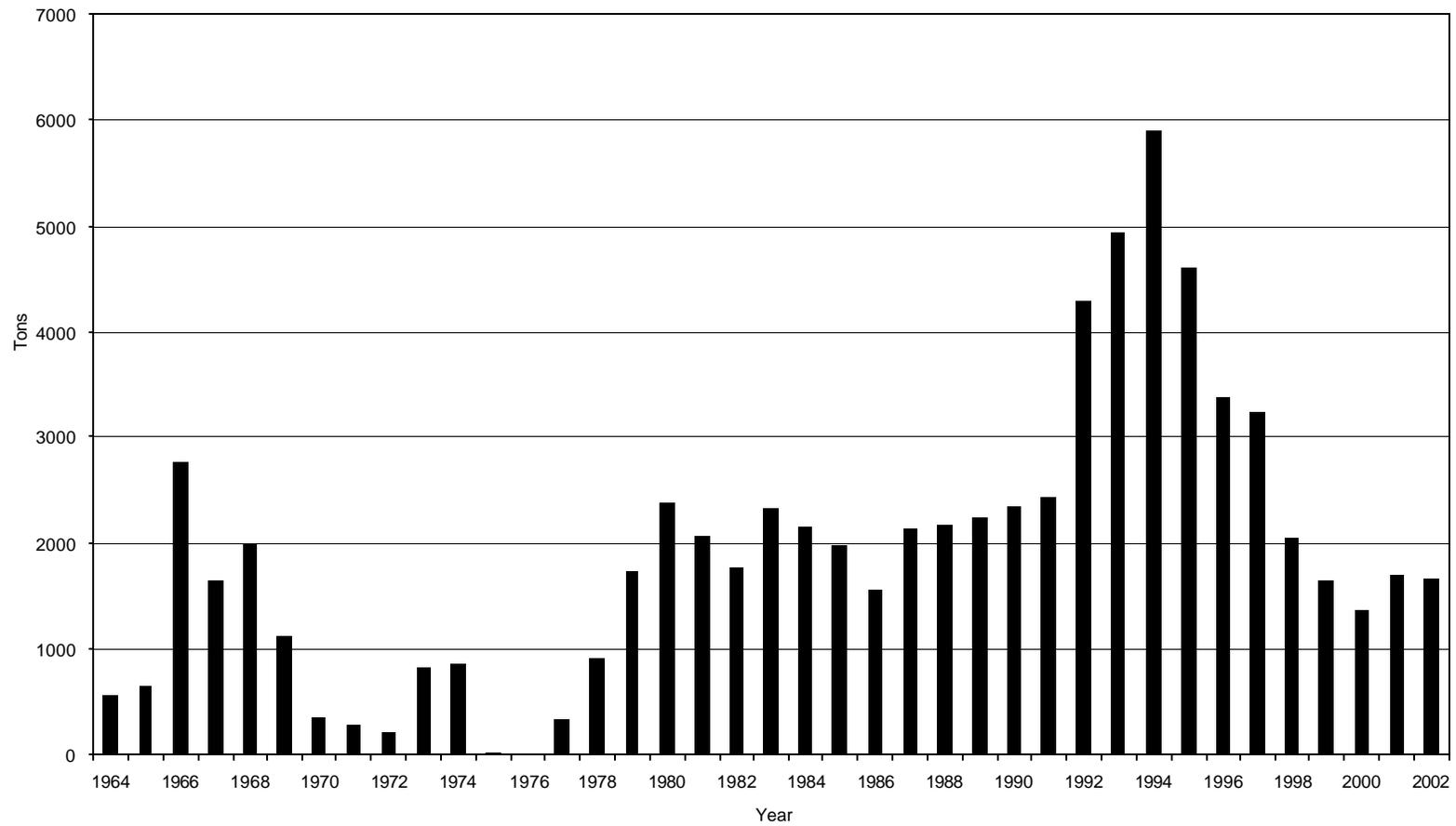


Figure 2. Historical commercial herring sac roe fishery harvest Kodiak Management Area, 1964-2002.

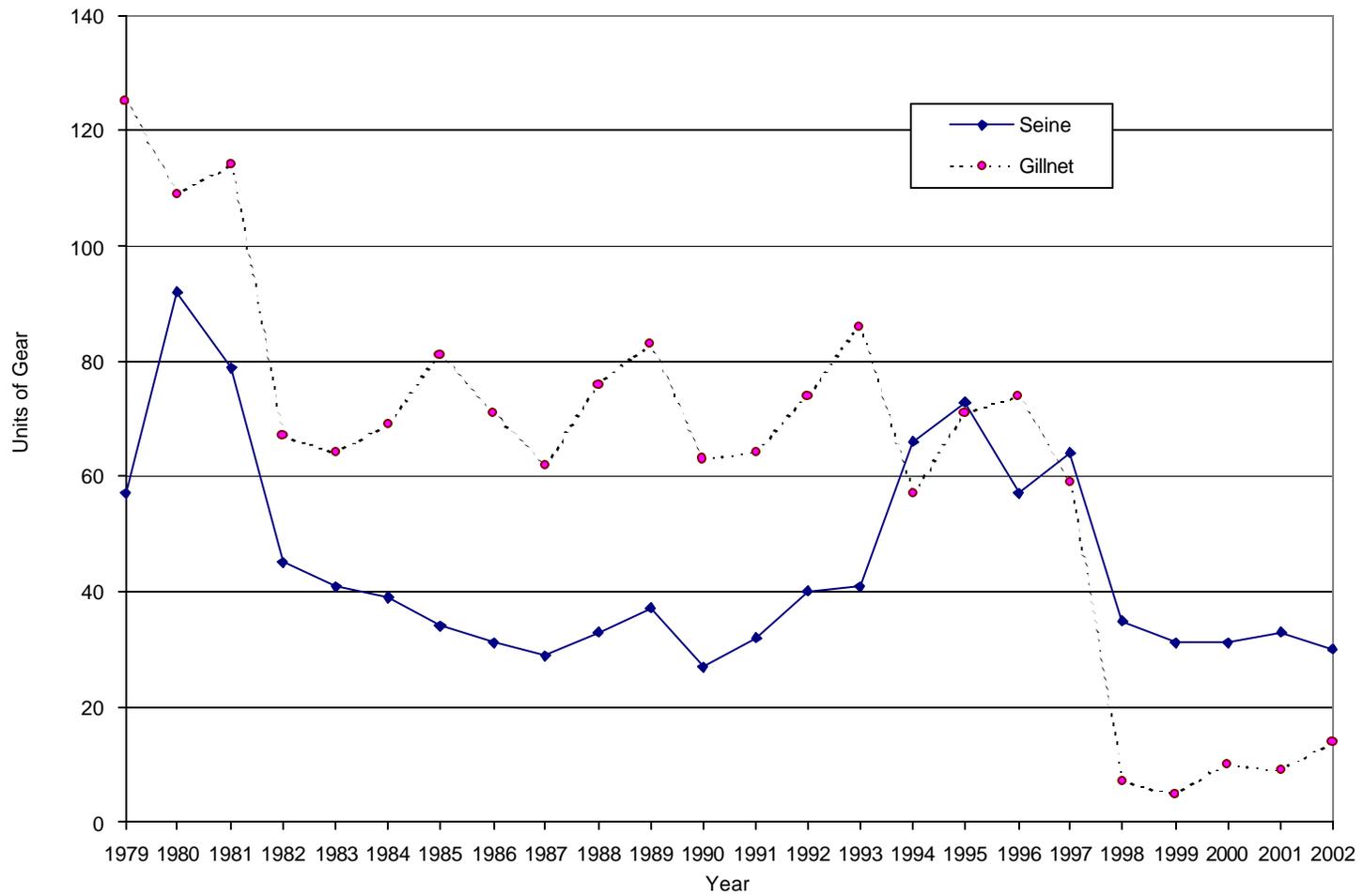


Figure 3. Number of units of gear which made a landing in 1979-1998 or participated in the 1999-2002 herring sac roe fishery in the Kodiak Management Area.

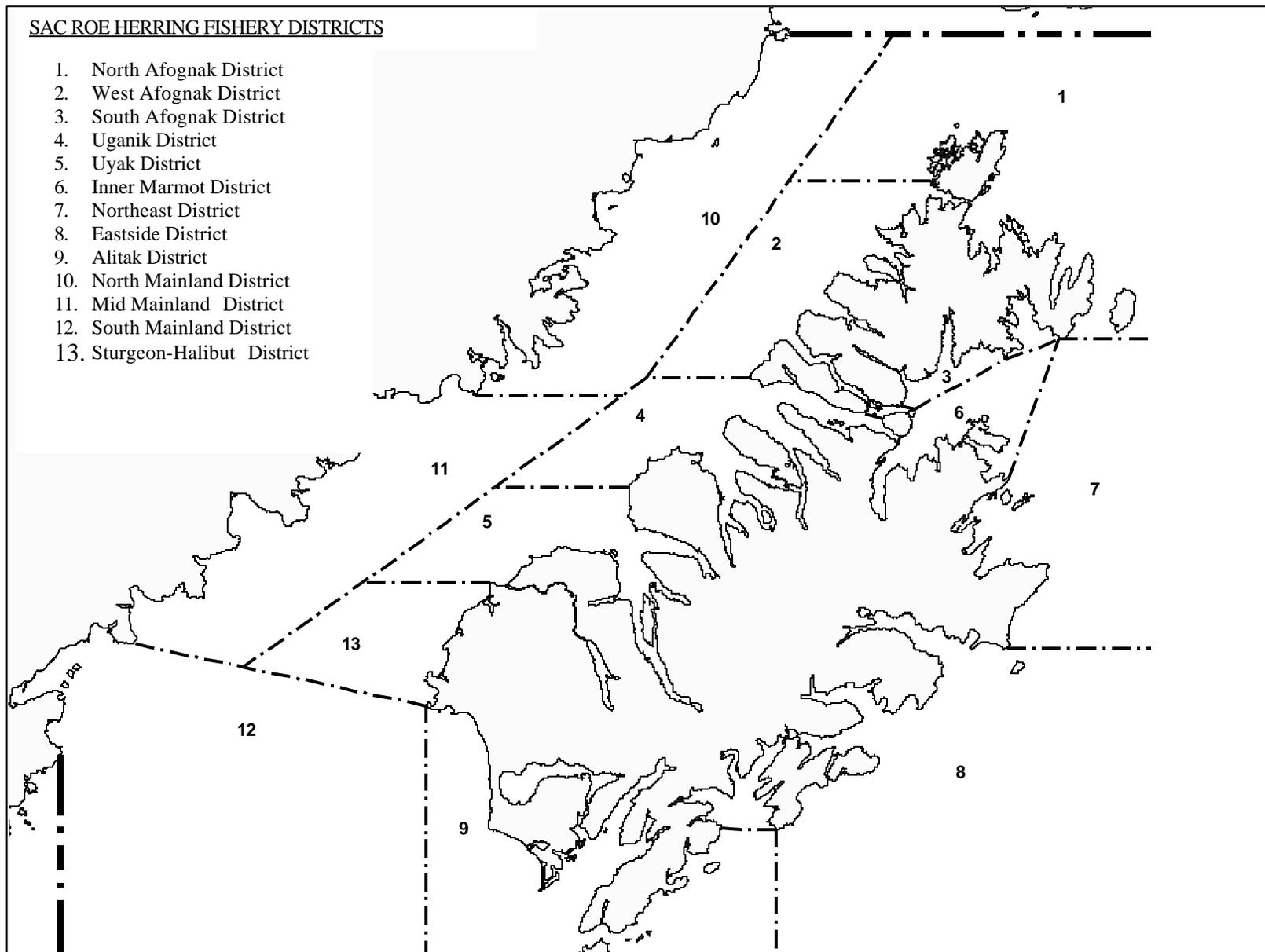


Figure 4. Map of the Kodiak Management Area illustrating the sac roe herring fishing districts.

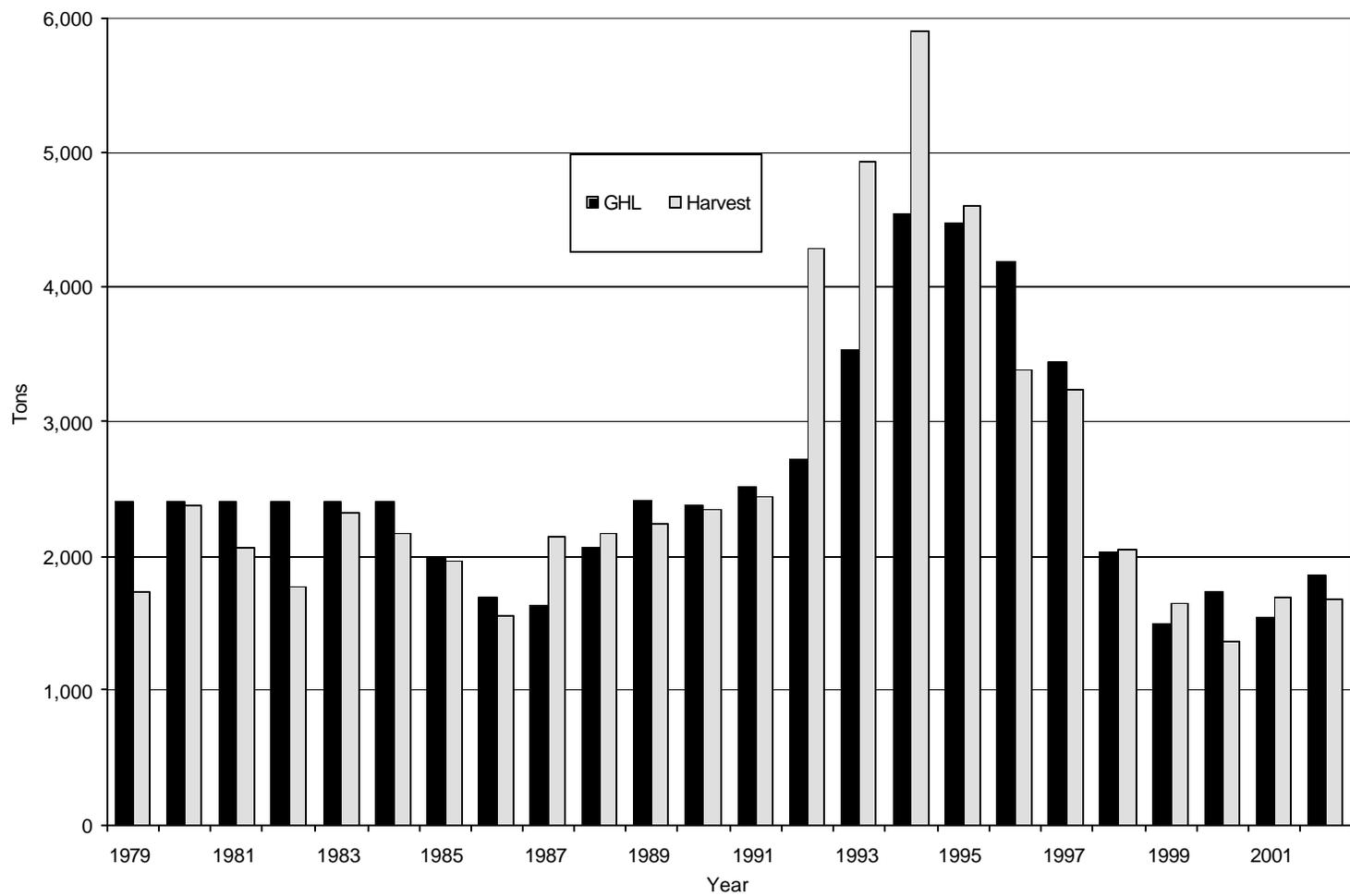


Figure 5. Comparison of the guideline harvest level (GHL) to the herring sac roe harvest in the Kodiak Management Area, 1979-2002.

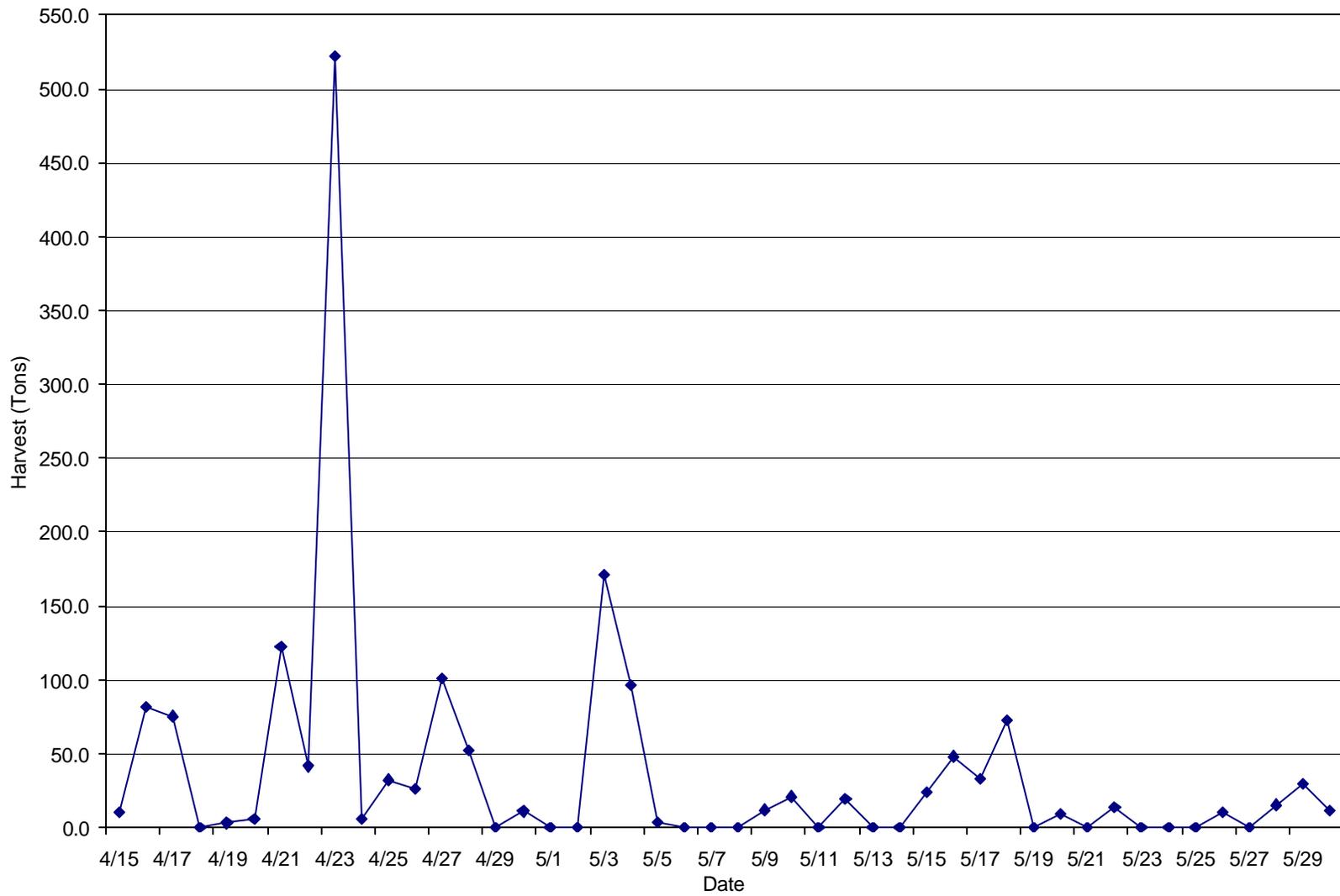


Figure 6. Commercial herring sac roe harvest by day for the Kodiak management Area, 2002.

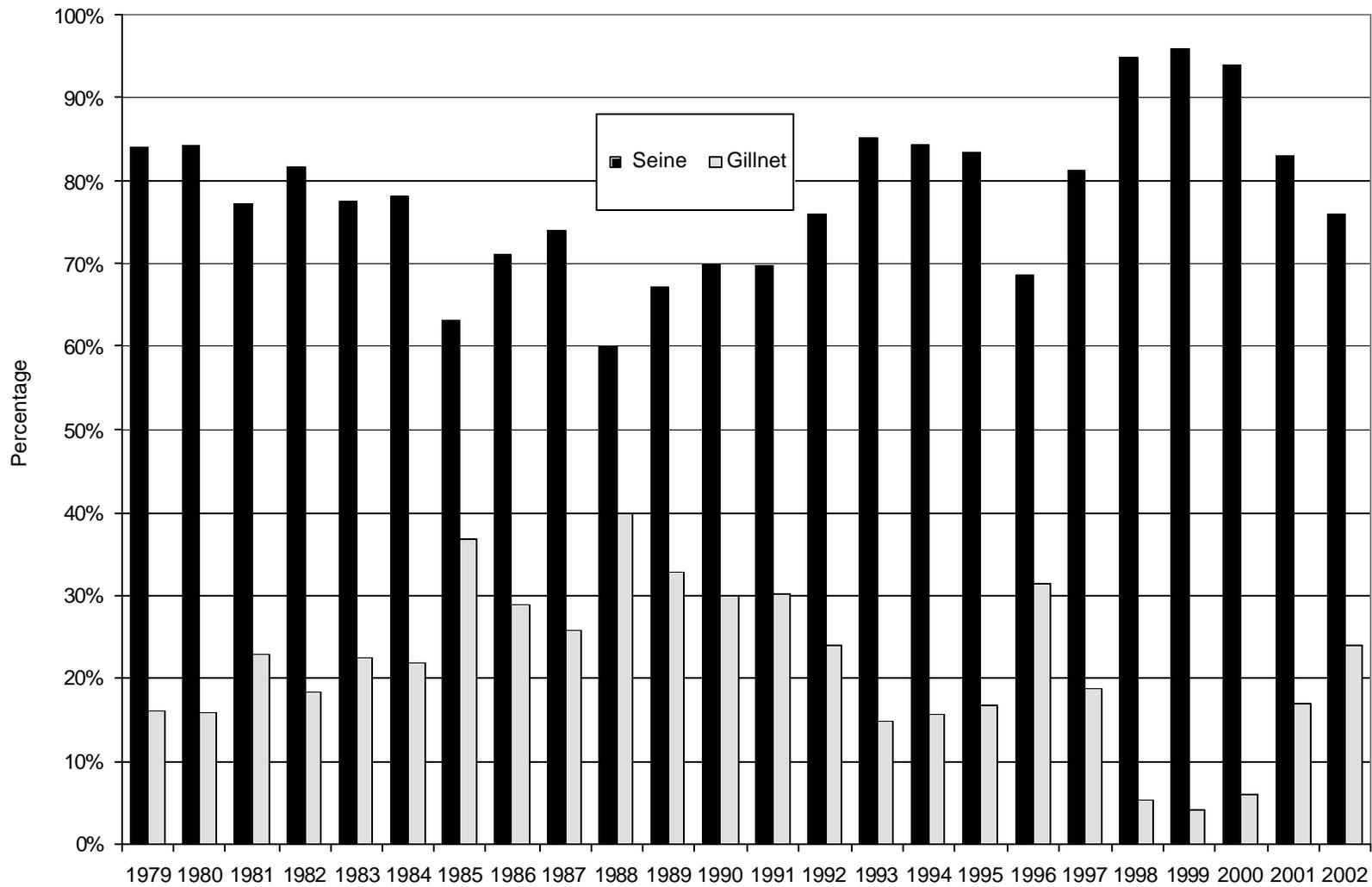


Figure 7. Percent of the total harvest taken by gear type for the herring sac roe fishery, Kodiak Management Area, 1979- 2002.

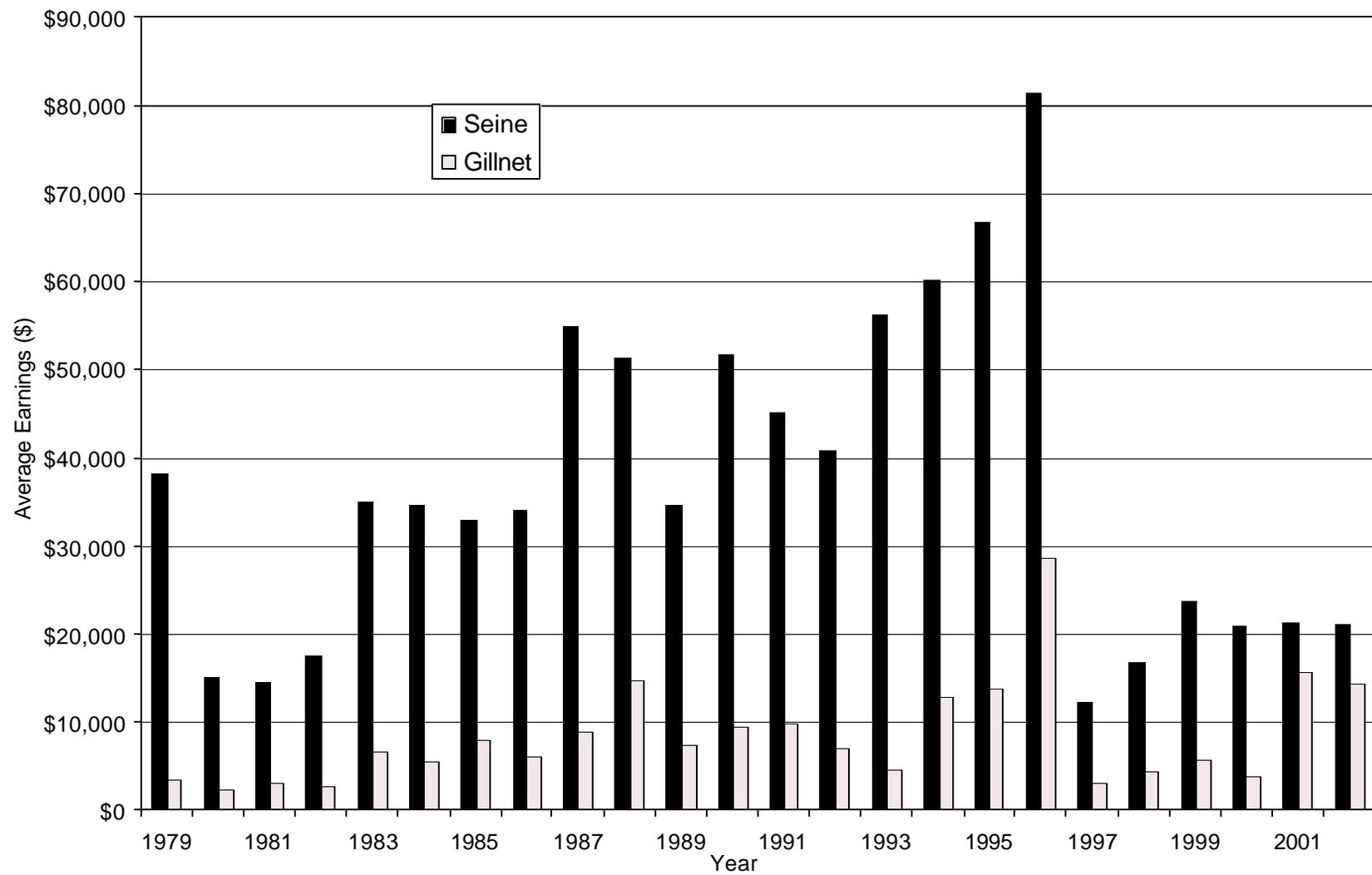


Figure 8. Average earnings (dollars) by year and gear type for the herring sac roe fishery Kodiak Management Area 1979-2002.

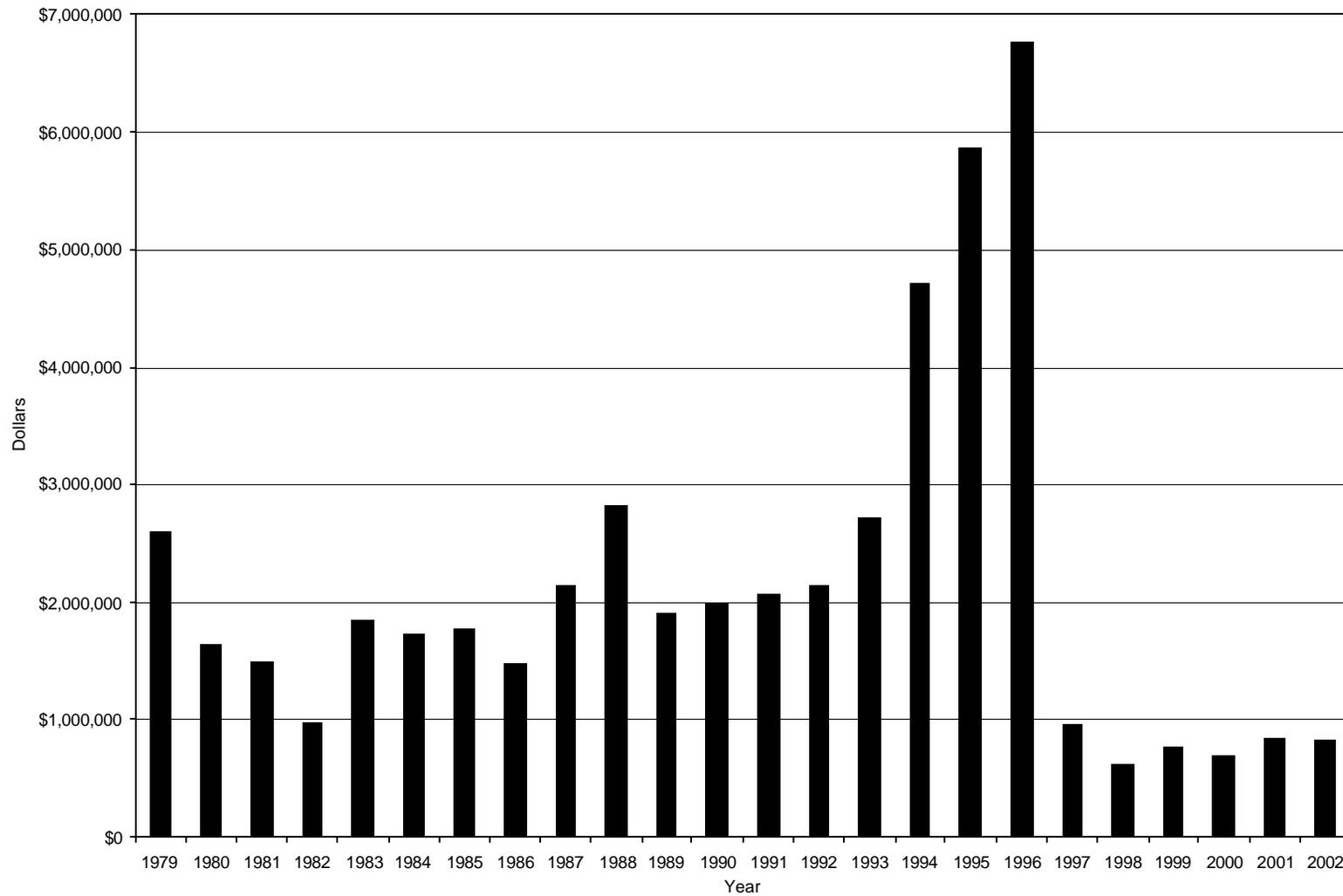


Figure 9. Total exvessel value (dollars) by year for the herring sac roe fishery in the Kodiak Management Area, 1979-2002.

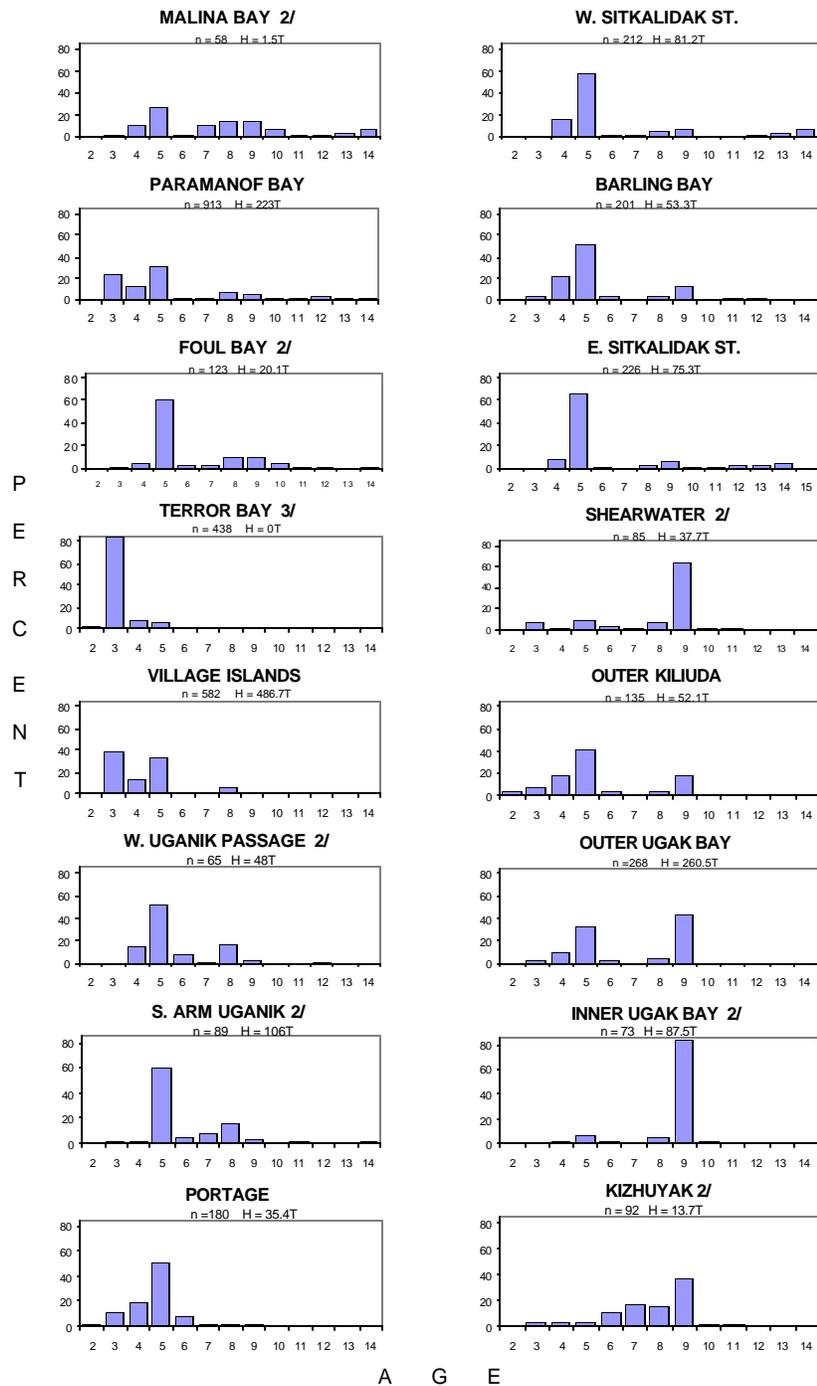


Figure 10. Age composition by section of commercial herring sac roe harvests, Kodiak Management Area, 2002. 1/

1 Samples were from commercial seine catches unless otherwise indicated.
 2 Commercial gillnet catches.
 3 Commercial seine test samples.

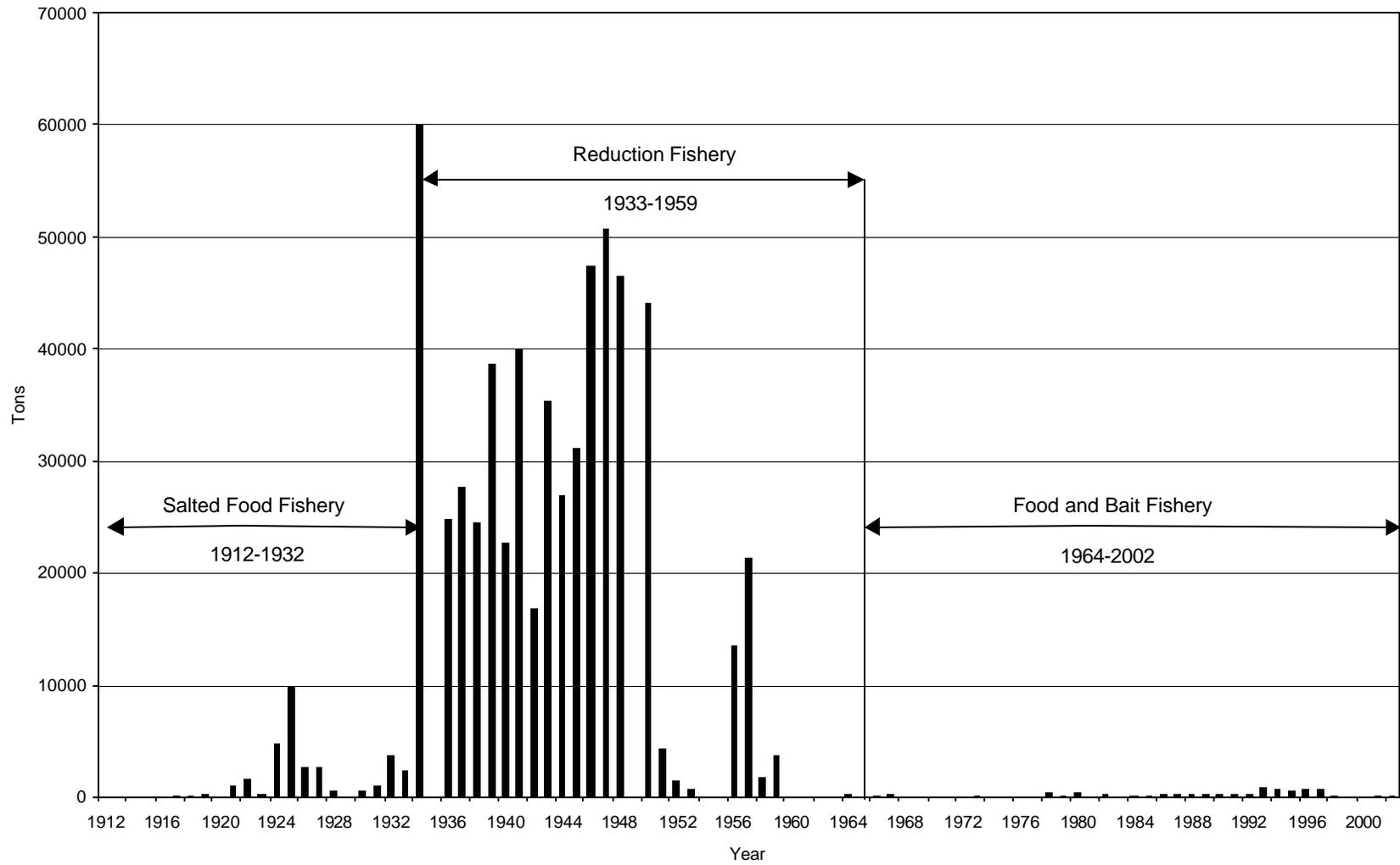


Figure 11. Historical food/bait herring fishery harvest for the Kodiak Management Area, 1912-2002.

APPENDIX

Appendix A.1. Summary of emergency orders issued for the commercial herring fisheries in the Kodiak Management Area, 2002.

Emergency Order #	Issued:	Effective:	Action Taken:
1	3:30 PM April 12	NOON April 15	<u>Open</u> : initial opening time and fishing periods by gear and section for sac roe herring fishery announced. Delay opening Inner and Outer Ugak Bay Sections (EA50 and EA51) and the Pasagshak Bay Section (EA52) until further notice.
2	12:30 PM April 16	NOON April 16	<u>Close</u> : Newman Bay and West Sitkalidak Strait Sections (EA22 and EA23).
3	1:30 PM April 17	12:36 PM April 17	<u>Close</u> : Village Islands Section (UG30) to evaluate catch will reopen if GHL not met.
4	5:30 PM April 17	5:15 PM April 17 9:00 AM April 18	<u>Close</u> : East Sitkalidak Straits (EA30). <u>Reopen</u> : Village Islands Section (UG30).
5	8:50 AM April 18	9:00 AM April 18	<u>Open</u> : That portion of the Village Islands Section (UG30) south of 57° 46.00' N. lat. will reopen from 9:00 AM through 12:00 NOON.
6	11:50 AM April 19	NOON April 19	<u>Open</u> : That portion of the Village Islands Section (UG30) south of 57° 46.30' N. lat., from 12:00 NOON through 12:10 PM.
7	4:30 PM April 19	4:45 PM April 19	<u>Open</u> : That portion of the Village Islands Section (UG30) between 57° 47.515' N. lat. and 57° 46.680' N. lat., from 4:45 PM through 4:55 PM.
8	9:00 AM April 20	9:15 AM April 20	<u>Open</u> : That portion of the Village Islands Section (UG30) south of 57° 47.350' N. lat., from 9:15 AM through 12:00 NOON.
9	8:45 AM April 22	9:00 AM April 22	<u>Open</u> : The Village Islands Section (UG30) from 9:00 AM through 12:00 NOON.
10	10:00 AM April 23	NOON April 23	<u>Open</u> : The Village Islands Section (UG30) from 12:00 NOON through 9:00 PM.
11	2:30 PM April 23	12:27 PM April 23	<u>Close</u> : The Paramanof Bay Section (WA31).
12	2:30 PM April 23	2:05 PM April 23	<u>Close</u> : The Village Islands Section (UG30).
13	NOON April 24	NOON April 24	<u>Close</u> : the Viekoda (UG20) and Terror Bay (UG21) Sections, the entire Uganik District is now closed to purse seine fishing.
14	3:30 PM April 27	1:00 PM April 27	<u>Close</u> : the Barling Bay Section (EA24).
15	2:30 PM April 28	NOON April 28	<u>Close</u> : the Danger Bay Section (SA40).

-Continued-

Appendix A.1. (Page 2 of 2)

Emergency Order #	Issued:	Effective:	Action Taken:
16	10:30 AM April 28	NOON April 29	<u>Close:</u> the Malina Bay (WA20), the Foul Bay (WA32), and the Blue Fox/Devils Inlet Sections (WA40). All Afognak Districts are now closed to gillnetting.
17	8:30 AM May 3	NOON May 3	<u>Open:</u> the Outer Ugak Bay (EA50), Inner Ugak Bay (EA51) and Pasagshak Bay (EA52) Sections.
18	9:30 AM May 4	9:27 AM May 4	<u>Close:</u> the Outer Ugak Bay Section (EA50).
19	12:30 PM May 4	NOON May 4	<u>Close:</u> the Kaiugnak (EA10), Southwest Sitkalidak (EA20), Outer Kiliuda Bay (EA43), and the Inner Kiliuda Bay (EA44) Sections. The Eastside District is now closed to purse seine fishing.
20	1:30 PM May 16	NOON May 16	<u>Close:</u> the West Uganik Passage Section (UG31).
21	5:30 PM May 18	NOON May 18	<u>Close:</u> the Northeast Arm Uganik (UG32), the East Arm Uganik (UG33), and the South Arm Uganik (UG34) Sections. The Uganik District is now closed to gillnet fishing.
22	8:30 AM May 19	NOON May 18	<u>Close:</u> the Portage Bay Section (AL31).
23	8:30 AM May 23	NOON May 23	<u>Close:</u> the Kizhuyak Bay Section (IM40).
24	12:30 PM May 30	NOON May 30	<u>Close:</u> the Inner Ugak Bay Section (EA51).
25	1:30 PM May 30	NOON May30	<u>Close:</u> the Shearwater Bay Section (EA42).
26	4:00 PM October 4	NOON October 5	<u>Open:</u> bait fishery co-op formed, open at NOON October 5, and fishing periods will be 24 hours open per day and seven days a week. The Eastside and part of the Uganik Districts only open areas.
27	4:15 PM October 16	4:00 PM October 16	<u>Close:</u> the Uganik District.

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