

Fishery Management Report No. 04-11

**Kodiak Management Area Herring Report to the
Alaska Board of Fisheries January 2005**

by

Dennis Gretsich

December 2004

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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BOARD OF FISHERIES JANUARY 2005**

by

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ABSTRACT

The Kodiak Management Area (KMA) 2004 commercial Pacific herring *Clupea pallasii* sac roe fishery extended from April 15 through June 30. A total of 27 purse seine and 11 gillnet fishermen harvested 3,167 tons, compared to the preseason guideline harvest level (GHL) of 2,850 tons. A total of 51 sections were open to fishing and harvests occurred within 22 sections. This was the fifth 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 fishermen accounted for 91% of the total catch at 2,894 tons and gillnet fishermen harvested 273 tons (9%). Roe recovery percentages averaged 10.6% for seine harvest and 10.5% for gillnet harvest. The total exvessel value of the fishery was an estimated \$1,583,500. Age-5 (23%), age-7 (22%), and age-3 (20%) herring were the dominant age classes harvested, representing an estimated 65% of the purse seine harvest. Age-5 herring were the dominant age class harvested representing 40% of the gillnet harvest.

Herring abundance overall in the KMA has been increasing. The KMA herring stock status in 2004 continued to increase from 2003 to 2004 in several sections along the westside of Kodiak (Uganik and Uyak Bays) and along the eastside of Kodiak (Sitkalidak Straits, Kiluida Bay, and Ugak Bay). Herring stocks in other sections within this same geographical area and in the Afognak District have are in a relatively low status, while many stocks are in a moderate status. Recruitment was strong particularly along the eastside of Kodiak and in the Alitak District. No new information is available for the Mainland District.

The KMA herring food and bait fishery was designated a limited entry fishery in 2001. A cooperative fishery is being conducted for the 2004/2005 season with one permit holder doing all the fishing. There was no allocation of Lower Cook Inlet, Kamishak stock herring, allowed in the Shelikof Strait fishery due to concerns for the low stock status and young age classes of Kamishak herring. To facilitate bait market needs the department opened that portion of the Uganik District south of the latitude of Miners Point on September 24 and October 16, 108 tons (102 ton GHL) were harvested. The Eastside District (90 ton GHL) and the Uyak District (33 ton GHL) may be opened if a market is available.

Subsistence herring harvest information for 2004 will not be available until February 2005. A total of 12 subsistence herring permits were returned with herring harvest information in 2003. The total subsistence herring harvest for the KMA in 2003 was 1,170 pounds.

Key words: Kodiak, Herring, sac roe commercial fishery, food and bait commercial fishery, subsistence fishery, stock status.

INTRODUCTION

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

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 (1964-2004)

The commercial herring sac roe fishery began in Kodiak in 1964. From 1964 through 2004 herring sac roe harvests averaged 1,947 short 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 sac roe fishery was unregulated with regard to harvest quotas, gear types, seasons, and fishing periods. Annual harvests, effort levels, herring abundance, prices, and processor interest, fluctuated greatly between 1964 and 1977. Improved market conditions in 1978 prompted increased effort in this fishery with 28 purse seine and 7 gillnet permit holders 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 were incorporated into the fishery. Regulatory changes focused on gear efficiency, gear conflicts between seine and gillnet fishermen, 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” (herring fishermen who participate in all of Alaska’s major herring fisheries from Sitka Sound to Bristol Bay). These circuit seiners had experienced crews 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 permit holders making landings in 1995 (Table 2). 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 high of \$2,000 per ton in 1996 to a record low of \$500 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 opportunity 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, for both gear types, were 24 hours per day, seven days per week. In 1979 and 1980 the fishing periods were 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 fishing periods were reduced for both gear types by emergency order to 10 hours from April 21 to May 2, to reduce harvest rates.

Since 1996 gillnet fishing periods were separated from the seine periods and were again set at 24-hour openings followed by 24-hour closures for the duration of the season.

From 1996 through 1999 fishing periods for purse seiners were limited 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 through 2004 fishing periods in most sections 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 through 2004 the department used emergency order authority to reduce fishing period duration in sections that had high effort levels and a large available biomass, in order to control harvests.

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 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, 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, 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 and prices, and the closure of the Prince William Sound herring fishery, seine gear participation increased abruptly during the 1994 through 1997 seasons, with 74 purse seine permit holders 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 11 gillnet fishermen participating annually since 2000.

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 guideline harvest levels (GHLs) 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 GHLs were established by section on an annual basis and were based on stock status trends. From 1985 through 2001 the combined annual GHLs of all sections ranged from a high of 4,550 tons in 1994 to a low of 1,495 tons in 1999. From 1999 through 2002 GHLs for the fishery were at low levels, based on more conservative management and, for some sections, declines in herring abundance. In 2003 the stock status for most districts improved with good recruitment and the GHL was raised to 2,600 tons.

Harvest Strategy

Overall, the regulatory effect of the developmental phase of the fishery (1977 to 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, gillnet permit holders had little harvest opportunity when competing against purse seine permit holders 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 and gillnet permit

holders, and the Alaska Department of Fish and Game (ADF&G) staff. The task force developed a harvest strategy that provides opportunity for gillnet permit holders to harvest approximately 25% and purse seine permit holders to harvest approximately 75% of the total preseason GHL 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 biomass 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 GHG to gillnet permit holders and 70% to 80% of the GHG to purse seine permit holders.

An additional conservation provision of the allocative harvest strategy provides for district GHGs. If the harvest from an individual section exceeds the section GHG then the overage is applied to the district GHG. The actual section harvests are summed and if the harvest from any number of sections within a district meets the aggregate GHG for that district, then the remaining open sections in that district are closed to further fishing, regardless of the remaining sections GHGs. 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

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

GHG Criteria

Preseason GHGs are established for all sections that have produced consistent herring harvests in previous seasons. These GHGs reflect the status of a particular herring stock by section. The section GHGs have ranged from 10 to 800 tons. Criteria for establishing the 2004 GHGs involved evaluation of a variety of information to determine stock status trends and conservative adjustment of GHGs, including: 1) fishery performance during preceding season or seasons (i.e., harvest timing, harvest duration, average school size); 2) trends in age composition (i.e., level of recruitment of age-3 herring, the proportion of age-5 and younger herring, and the proportion of age-2 herring as an indicator of future recruit strength); 3) observations of spawn and juvenile herring; 4) industry and department aerial surveys; 5) hydroacoustic surveys; 6) test fishery data including age composition and biomass estimates; and 7) aged-structured analysis (ASA) modeling. Preseason GHGs have generally reflected the actual harvests (Figure 5) and have 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 concurrently. Historically the concurrent opening of sections on April 15, prior to any major buildup of herring, was intended to distribute effort and harvest, however during the last 8 years purse seine fishermen have concentrated in areas known to have early spawning herring and the largest GHGs. With the

allocation plan in effect since 2000 the department has used emergency orders to adjust fishing time and the portion of a section opened if overharvest concerns exist when managing the fisheries. Several sections that are known to have later spawning and larger stocks were also opened at a later date, when the department was available to monitor the fishery.

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

Gillnet permit holders generally work independently and deliver their fish directly to the processor. A few gillnet fishermen are equipped with scanning sonar but the majority use color down-sounding sonar to locate herring schools.

The department historically relied on the fishing industry to establish roe recovery and minimum size standards. Competition among shorebased processors has resulted in this fishery having one of the highest per ton exvessel values in Alaska. The quality of Kodiak herring is generally high, due to inseason processing of relatively small amounts of herring over long time periods. In 2003 the department took a more active role in the Village Islands Section to manage for quality. In 2004 the department delayed opening the fishery in the Village Islands and in the Paramanof Bay Sections in an attempt to increase the quality and value of the catch. For the remaining sections it was left up to the permit holders on the grounds to determine if herring were marketable.

Fishery Monitoring

This fishery is primarily monitored on the fishing grounds by department management personnel stationed aboard state vessels or at shorebased tent/cabin field camps. The field crews are stationed in areas that have historically produced the largest harvests. 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. The department received reports from field personnel several times daily that included current harvests, effort levels, and fleet movements. 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 fishery monitoring and often directs the placement of field personnel.

Inseason Fishery Management

Processors and independent tender operators are required to provide daily tallies of herring deliveries by section, as well as accurate estimates of herring onboard tenders that have not yet delivered to the processor. The department tallies reports from field personnel, processors, and tenders, to assess herring harvests. Generally, once the harvest estimate meets or approaches the GHL, a section is closed for the season by emergency order. Due to the rapid pace at which some harvests occur, inperiod closures are frequent. In sections that have field personnel present on the grounds, inperiod closures may occur with only a few minutes of advance notice. In 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 (8:00 AM or 6:00 PM daily), or by field announcement with the arrival of department staff on the fishing grounds.

Timely and accurate harvest reports, from department field personnel, permit holders, spotter pilots, 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, (DPS), provides enforcement coverage of the KMA herring fishery during the first two weeks of the season when effort levels are the greatest. The DPS utilized a vessel and an aircraft to monitor the 2004 fishery and worked closely with the department.

The presence of DPS 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 purse seine sets that are made early (prior to the NOON or 9:00 AM openings) or late (after the closure time). With the allocative harvest strategy in effect since 2000, gear conflicts on the grounds, though minor in the past, are now non-existent.

2004 Season Summary

The 2004 sac roe season opened at 12:00 NOON April 15 (Appendix A.1.). The last harvest occurred on May 26 (Figure 6). The total 2004 KMA guideline harvest level (GHL) was 2,850 tons (Tables 2 and 3; Gretsches 2004a). The 2004 harvest was 3,167 tons, approximately 11% (317 tons) above the GHL.

From 2000 to 2004 the annual GHL averaged 2,117 tons and from 1995 to 2004 averaged 2,621 tons. The GHL has ranged from a low of 1,495 tons in 1999 to a high of 4,550 tons in 1994. From 2000 to 2004 the annual harvest has averaged 1,980 tons and from 1995 to 2004 averaged 2,483 tons (Figure 2). The harvest has ranged from a low of 1,370 tons in 2000 to a high of 5,893 tons in 1994.

In 2004, a total of 38 permit holders made 131 deliveries during the season, with 27 purse seine fishermen harvesting 2,894 tons and 11 gillnet fishermen harvesting 273 tons. Two vessels were fished with both purse seine and gillnet gear by individuals that had both types of limited entry permits. Purse seine fishermen harvested 91% and gillnet fishermen 9% of the total KMA harvest in 2004 (Figure 7). The average purse seine permit holder harvested 107 tons and that was the highest average harvest in the past 26 years. The average gillnet permit holder harvested 25 tons and was the third highest average harvest in the last 26 years. A total of 29 tenders were registered to transport herring to processors. There were 4 companies operating 4 shore-based processing facilities and 1 floating processor that were registered to process herring.

The 2004 fishery was monitored by two ADF&G shore-based field crews and two department vessels, which were stationed in anticipated herring harvest locations. Crews gathered effort and harvest data used to manage the fishery, and collected commercial catch samples to obtain age, weight, and length (AWL) data. The department conducted a herring test fishery program in 2004, which harvested 70.6 tons of herring. The proceeds from this test fishery were used to assist management and research programs.

There were a total of 51 sections open to fishing (Table 3). Harvests occurred within 22 sections, 17 sections were not fished, and the remaining sections were fished with no harvest. The bulk of the sections that were not fished were within the Mainland and Alitak Districts (Figure 1). The department also reopened several sections for the 2004 season that have been closed to fishing in

recent years. These sections included: Perenos Bay, Spiridon Bay, Tanginak Anchorage, North Upper Olga Bay, and Inner Uyak Bay.

Purse Seine Fishery

The department managed certain sections of the purse seine fishery differently within the KMA, based on the size of the GHLS, anticipated effort levels, and the spawn timing of the different stocks. Due to limited ability to monitor and manage all sections, opening some sections was delayed beyond the standard April 15 fishery opening date.

The largest herring biomass in the KMA is found in the vicinity of Village Islands in the Uganik District (Figure 4). In 2004 the department managed this fishery to enhance the value of the landed product and control the harvest rates. This was accomplished by conducting roe testing prior to any fishing, limiting the fishery to short openings, and opening only a portion of the Village Islands Section. On April 15 the department started a daily testing program to assess roe quality and the size of herring present. The goal was to target the harvest on fish of at least 11% roe recovery with a minimum average size of 130 grams. Initial roe testing indicated the herring congregated near Village Islands were 6 to 9% roe recovery and an average weight of 150 grams. By April 19 roe quality had improved and the Village Islands fisheries were allowed. For the first opening 13 purse seine permit holders were present and during the last opening 19 participated. Five openings were allowed from April 19 through April 22 and openings were from 10 to 20 minutes in duration. All 5 openings were restricted to only a small portion of the Village Islands Section. The Village Islands Section was closed for the season on April 22. The harvest was 1,108 tons (GHL 800 tons) and roe recovery averaged 10.6%.

For the 2004 season the Paramanof and Foul Bay Sections in the West Afognak District were also managed for roe quality and fish size. Test fishing began on April 15 and by April 17 roe quality appeared to have improved to meet the industry and department requirements. Three openings occurred on April 17 in only a portion of the section. The openings were 30 to 85 minutes in duration, and 206 tons were harvested. Roe recovery was 8.7%. Two more openings, 30 and 60 minutes in duration, were allowed on April 22 after additional herring had arrived within Paramanof Bay. Approximately 60 tons were harvested that averaged 9.3% roe recovery. Effort levels for this fishery included 8 purse seine permit holders, the total harvest was 266 tons (GHL 300 tons), average roe recovery was 8.9% and the size of fish ranged from 190 to 210 grams.

A fishery occurred in the Inner Uyak Bay Section in 2004, which had been closed since 1995. The department assessed the biomass within the Inner Uyak Bay Section on April 23 and April 24, with aerial and hydroacoustic surveys. The biomass was estimated at approximately 3,000 to 4,000 tons. Test sets were made on April 24 and April 25 that determined the herring ranged in size from 150 to 185 grams and roe recovery ranged from 9.5 to 12.5%. Based on the surveys and test set results the department established a 300 ton GHL. A 15 minute fishing period was allowed in a portion of the Inner Uyak Bay Section during the evening of April 25 and 13 purse seine permit holders participated and harvested 25 tons. On April 26, it appeared that the entire herring biomass observed in recent days within Uyak Bay had congregated at the head of the bay in shallow waters and would be very vulnerable to harvest. Permit holders volunteered to co-op the remaining portion of the GHL, which alleviated the departments overharvest concerns. The total catch from this section was 370 tons and roe recovery averaged 10.6%. With the completion

of the major fisheries along the westside of the KMA, approximately half of the seine fleet departed for the Togiak herring fishery between April 23 to April 28.

In the Eastside District most sections opened on April 15. Early spawning occurred within several sections along Sitkalidak Straits starting on April 11. In the West Sitkalidak Strait Section 69 tons were harvested (GHL 75 tons) and 64 tons harvested from the Barling Bay Section (GHL 75 tons). Effort levels were low in this district during the early portion of the season with 1 to 5 permit holders participating and roe recovery averaging 10.9%. In the Inner and Outer Kiluida Bay Sections in early May 258 tons were harvested (GHL 300 tons) and roe recovery averaged 10.3%. The Inner and Outer Ugak Bay and Pasagshak Sections remained closed until May 5 when the department was able to station a fishery monitoring crew in the bay to aid with management of the fishery. In the Outer Ugak Bay Section with 41 minutes of fishing 13 purse seine permit holders harvested 617 tons (GHL 250 tons) with an average roe recovery of 11.2%.

Only a couple of purse seine permit holders fished after May 5, with 51 tons harvested from the Inner Alitak Bay Section (75 ton GHL) of the Alitak District. There was also a 43 ton harvest from the Tonki Bay Section, an exploratory unit of the North Afognak District, with an average roe recovery of 13%. Fishermen expressed interest in fishing the Mainland District as they returned from the Togiak fishery in mid-May but there was no effort. Processors ceased buying herring on May 26.

Gillnet Fishery

Most sections that were designated for the gillnet fishery opened on April 15, with the exception of the Inner Ugak Bay and Pasagshak Bay Sections that opened on May 5. In the Afognak District, the Danger Bay Section had 74 tons harvested (70 ton GHL) by 4 permit holders, and the roe recovery averaged 8.8%. There was no harvest from the other two sections that were designated for gillnet gear in the Afognak District.

In the Uganik District six sections were open to gillnetting. In the West Uganik Passage Section where 6 gillnet permit holders harvested 96 tons (GHL 30 tons). Roe recovery averaged 11.8%, and the section was closed on April 28. In the Terror Bay Section 21 tons were harvested (20 ton GHL) by 2 permit holders and roe recovery averaged 12.4%. This section was also closed on April 28. The bulk of the herring found in the South Arm Uganik, East Arm Uganik, and Viekoda Bay Sections were juvenile age-2 or age-3 herring that were not marketable. In the South Arm Uganik Section only 17 tons (100 tons GHL) and in Viekoda Bay only 3 tons (50 ton GHL) were harvested. Roe recovery from the harvest from these sections was approximately 11%.

Two sections were opened exclusively for gillnetters in the Uyak District. Two permit holders fished the district and 16 tons were harvested (15 ton GHL) from the Zachar Bay Section with 12% roe recovery. The Zachar Bay Section was closed on May 16, 2004.

In the Eastside District 7 sections were opened exclusively to gillnet gear, but only 3 sections were fished. The Inner Ugak Bay Section was the most productive with 33 tons harvested (60 ton GHL). The East Sitkalidak Strait Section was designated for gillnet gear in 2004 but effort was very low and only 4 tons were harvested (75 ton GHL). The Shearwater Bay Section produced 4 tons (25 ton GHL) but received only minor gillnet effort.

The only other gillnet harvest occurred in the Womans Bay Section with 4 tons harvested (20 ton GHL). The bulk of the herring spawned in Womans Bay prior to any fishing.

Exvessel Value of the Fishery

The price paid for 10% roe recovery herring was approximately \$500 per ton, at the dock. Roe recovery from this year's fishery averaged 10.6% for purse seine gear and 10.5% for gillnet gear. The estimated average exvessel earnings for purse seiners was \$53,600 and for gillnetters \$12,400 (Figure 8). The total exvessel value of the 2004 fishery was an estimated \$1,583,000 (Figure 9).

CATCH SAMPLING

A total of 3,852 herring were collected for AWL data from purse seine harvests, representing nine of the ten sections that had a harvest in 2004 (Table 4). These nine sections accounted for 98% of the total KMA purse seine harvest. Age-5 herring were the dominant age class harvested in the 2004 season, representing an estimated 22.5% of the total purse seine harvest (Table 4). Age-7 (21.5%) and age-3 (20.2%) were nearly as prevalent as the age-5 herring. The remaining age classes represented the following percentage of the purse seine harvest: age-4 (10.8%), age-6 (8.3%), age-8 (1.1%), age-9 (2.7%), age-10 (4.5%), age-11 (7.2%), and age-12 and older combined (0.9%).

A total of 909 herring were collected for AWL data from the gillnet harvests, representing four of the ten sections that had a harvest in 2004 (Table 5). The four sections accounted for 80% of the total KMA gillnet harvest. Age-5 herring were also the dominant age class harvested representing 40.2% of the gillnet harvest (Table 5). The remaining age classes represented the following percentage of the gillnet harvest: age-3 (1.2%), age-4 (12.7%), age-6 (12.9%), age-7 (12.4%), age-8 (1.3%), age-9 (2.0%), age-10 (7.5%), age-11 (8.9%), and age-12 and older combined (0.6%).

Generally, the herring from the eastside 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; Tables 6 and 7). Weight-at-age of the younger age classes in 2004 were similar to those observed in recent years (Gretsch 2004b).

STOCK ASSESSMENT

The department evaluates fishery performance and survey information to assess trends in stock status. Hydroacoustic and aerial surveys, conducted by commercial fisheries biologists, are utilized to assess herring abundance prior to, during, and after the commercial fishery and to survey closed sections. ADF&G research vessels are also used to collect samples by trawl, gillnet, or jig gear.

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

The results of aerial and hydroacoustic assessments can 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, which limits the time fish are observable from the air; 2) most fishing sections have several distinct schools of herring that 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, 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 (82 sections); 5) adverse weather conditions. Hydroacoustic surveys are also limited in shallower waters, and the extent of herring avoidance to 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.

Due to the low gillnet effort since 1998 it is difficult to use fishery performance as an indicator of stock status within the gillnet sections.

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. Management biologists greatly rely on fishery performance and catch samples to evaluate trends in stock status. The majority of the department's assessment efforts target larger herring stocks. Generally, there is less information available for the smaller stocks of herring so the evaluation of these stocks is more tenuous. In some cases, such as sections of the Mainland District, several years may elapse before new information becomes available. The department also considers information provided by commercial herring fishermen and spotters, air taxi operators, and remote area residents, concerning herring distribution, biomass estimates, and spawn sightings, when determining stock status.

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 Bay fishery during the last 10 years has had harvests that have ranged from 223 to 709 tons. The large increase in this herring stock and associated harvests in the late 1990s was related to the very strong 1988 brood year. Since 1999 the department has maintained GHLS in the 225 to 350 ton range for this section since the spawning biomass of the older age classes has declined. Large spawns have occurred annually since 1994. Age compositions from 2004 commercial catch samples show the dominant age classes were age-7 (29.1%), age-5 (23.4%), and age-6 (12.8%; Table 4). Age-3 (recruit) herring represented 4.7% of the harvest. Overall, this stock of herring has decreased from the high levels that occurred from 1994 through 2001, but still remains one of the larger and stronger stocks in the KMA. Post fishery hydroacoustic surveys indicated 1,000 to 1,500 tons were present within Paramanof Bay on April 23. The total biomass is likely much larger since spawning generally doesn't occur until the end of April through early May.

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 that of Paramanof Bay. Foul Bay was designated as a gillnet section from 2000 through 2002. Age compositions from the 2002 gillnet fishery consisted primarily of age-5 (60.1%) and age-9 (10.5%) herring, with a mix of other age classes (Gretsch 2003b). It was designated as a purse seine section for the 2003 and 2004 seasons. However, the harvest in Paramanof Bay (269 tons in 2004 and 308 tons in 2003) resulted in a closure of the remaining Afognak purse seine sections (a district closure) due to the seine harvest exceeding the district GHL. There was no harvest from the Foul Bay Section in 2003 or 2004.

The Malina Bay Section was closed to commercial fishing from 1997 through 2000. Aerial and hydroacoustic surveys (1998, 1999, 2000, 2003, and 2004) and AWL samples (2000) indicated that the spawning biomass was increasing. This section was opened to gillnet gear in 2001, with a 15 ton GHL and it was increased in 2004 to 20 tons. Harvests were small in 2002 through 2004. However, few permit holders participated or spent a significant amount of time fishing this section. In both 2002 and 2003 this section was closed due to excessive gillnet harvests in the Danger Bay Section that resulted in a district closure of the Afognak Districts. Age compositions from 2002 Malina Bay Section commercial catch samples show the predominant age classes were age-5 (27.5%), age-8 (13.7%), and age-9 (13.7%; Gretsche 2003b). The department conducted a hydroacoustic survey of Malina Bay prior to the start of the 2003 season, and estimated that there was at least 200 to 300 tons of herring present. A hydroacoustic survey was also conducted on May 1, 2004, and 100 tons were observed. The commercial harvest for the last two seasons was 0.5 tons.

The Raspberry Strait Section was open to gillnet gear in 2001 after being closed since 1997. Less than one ton was harvested and hydroacoustic surveys in April 2001 indicated low herring abundance. This section was closed for the 2002 through 2004 seasons, and spring hydroacoustic surveys in 2002 through 2004 indicated continued low herring abundance.

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 prompted the department to close three sections to herring fishing in 1995, and a fourth section was closed in 1998. In 2004 the Perenosa Bay Section was opened as a test fishery and was designated as exploratory, although no harvest occurred. Due to occasional aerial observation of small herring schools, the Tonki Bay Section has been open to commercial fishing since 1998. However, fishery participation was low (one permit holder or less annually) and no catch occurred through 2003. In 2004 the Tonki Bay Section was designated exploratory and 43 tons were harvested by one purse seine permit holder. Age compositions from the commercial catch samples indicated the predominant age classes were age-3 (30.6%), age-6 (18.2%), age-5 (17.5%), and age-4 (14.5%; Table 4).

South Afognak District

The South Afognak District comprises six sections. The Danger Bay Section was open to gillnet fishing during the 2001 through 2004 seasons. In 2003 and 2004 the Izhut Bay Section was also open to gillnet fishing. The remaining South Afognak sections have been closed since 1995. Aerial and hydroacoustic surveys in recent years have shown a steady increase of herring biomass in Danger Bay. An observed increase in the Danger Bay stock prompted the department to open this section to gillnet gear in 2001, with a small, 15 ton GHL and 20 tons were harvested. The department increased the GHL in 2002 (30 tons), in 2003 (50 tons), and in 2004 (70 tons) and the GHL was met or exceeded each season. Age compositions from 2004 Danger Bay Section commercial catch samples indicated that the predominant age classes were age-5 (52.1%), age-6 (20.0%), and age-4 (13.0%, Table 5). A post fishery hydroacoustic survey on May 6, 2004, indicated that 200 tons of herring were present.

For the Izhut Bay Section, the department received several reports from cod fishermen that indicated a sizeable herring biomass was present in the spring, and this section was opened in

2003 to gillnet gear with a 10 ton GHL as a test fishery. No gillnetters fished the Izhut Bay Section in 2003 or 2004. A department hydroacoustic survey indicated that 20 tons were present on May 6, 2004.

Uganik District

The Uganik District consists of nine sections 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 herring spawning stock, followed by South Arm Uganik, West Uganik Passage, Terror, and Viekoda Bays. Small stocks are also found in the Northeast Arm Uganik Bay and the East Arm Uganik Bay Sections. The Village Islands stock can move throughout the Uganik Bay complex (five sections) prior to spawning and historically has been harvested within sections in or adjacent to the Village Islands. Commercial catches in adjacent sections were at times high reflecting the strength of the Village Islands stock.

Hydroacoustic and aerial survey information indicate that the Village Islands spawning biomass is currently the largest in the KMA. The total biomass of herring observed in the Village Islands, 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). During the last two years, the department has conducted daily hydroacoustic surveys of the Village Islands Section from approximately April 13 through April 25 and a survey following the fishery. The Village Islands spawning stock of herring appears to be at record high abundance and has been stable to increasing during the last three years. Age composition data from the 2004 Village Islands Section commercial sac roe fishery show the predominant age classes were age-5 (40.0%), age-7 (22.3%), age-4 (15.6%) and age-6 (10.6%; Table 4). Age-3 (recruit) herring were present in 2004 and represented 4.7% of the harvest. The 2003 and 2004 fisheries emphasized harvesting larger and older herring in the Village Islands Section, thus evaluating recruitment trends based on the sac roe commercial harvest maybe less reliable. A bait herring fishery that occurred in September, 2004, near Village Islands was also sampled and consisted of age-2 (31.7%), age-3 (31.7%), age-4 (15.4%), age-5 (12.7%), and age-6+ (6.8%). The age composition of the bait fishery sample would indicate recruitment may be strong for the Village Islands Section in 2005. In 2004, small spot spawns occurred in the Village Islands from April 24 through early May, and large spawns occurred from May 2 through 4.

There were three hydroacoustic surveys of the South Arm Uganik Section in mid-April, late April, and in early May 2004. During all surveys, many scattered schools of herring were found in the outer portions of the bay and total biomass estimates ranged from 1,000 to 5,000 tons. Surveys in mid-April and early May also found large concentrations of herring in the inner portion of the bay that ranged from 500 to 1,500 tons. Jigging on these schools produced small samples that consisted mostly of age-2 and age-3 herring that were ripe. Herring schools frequently move between the Village Islands and the South Arm Uganik Sections, though spawning mainly occurs in the Village Islands. The gillnet harvest for the South Arm Uganik Section was only 17.2 tons although there was a 100 ton GHL (Table 3). The department does not believe that this harvest accurately reflects the stock status of the herring found in this section.

The West Uganik Passage and was open to gillnet gear in 2004 and 96.2 tons harvested (30 ton GHL; Table 3). Age compositions from 2004 commercial gillnet catch samples indicated that the predominant age classes were age-5 (47.8%), age-7 (23.4%), and age-6 (12.9%; Table 5). Two aerial and one hydroacoustic surveys occurred for this section by the department, however no

herring were observed. Purse seine spotter pilots reported seeing between 1,000 and 1,500 tons in this section in mid-April. Large concentrations of herring were observed in this section in 1997 and 2002, though no spawning was observed. In 2003 large numbers of age-3 herring were found in this section although the commercial catch was only 7.5 tons. Herring move between the Village Islands and West Uganik Passage Sections, though spawning occurs mainly in the Village Islands Section.

Two hydroacoustic surveys of the Terror Bay Section were completed in late April and early May 2004. There were many small scattered schools of herring present in the outer bay that totaled 200 to 300 tons with another concentration of herring near the head of the bay estimated at 50 tons. This section was open to gillnet gear in 2004 and several permit holders fished the section. This section was closed on April 28 with 21.2 tons harvested (20 ton GHL). No herring samples were collected, however fishermen reports indicated that catches were made up of 170 gram average weight herring, indicating age-5 and age-6 herring.

Hydroacoustic and aerial surveys indicated between 200 and 250 tons of herring were present in the Viokoda Bay Section in late April 2004. The Viokoda Bay Section was first designated a gillnet gear section in 2003 and 46.2 tons were harvested (80 ton GHL; Gretsich 2004b). No herring samples were collected, but fishermen reported that their harvest consisted of primarily smaller, younger herring. In 2004 fishery only 3.3 tons were harvested (50 ton GHL).

The Northeast Arm Uganik and East Arm Uganik Sections were open to gillnet gear though there was no harvest. There was a 10 ton GHL for each section (Table 3). There has been very little fishing activity in either section since the 1999 season. A hydroacoustic survey in late April 2004 estimated at least 600 to 800 tons of herring in the outer portion of the Northeast Arm Section and another 200 tons in the inner portion of the bay. Several hydroacoustic surveys were done within the East Arm Uganik Section and at least 400-500 tons of herring were present in the outer portion of the bay from mid to late-April. Small jigged samples from both sections indicated that most of these herring were younger fish, age-2 to age-4.

Uyak District

Through the 1980s, the Uyak District was the largest herring producing district in the KMA. In the early 1990s, harvest data and spotter pilot observations indicated a decline in herring abundance. The department responded to this decline by reducing the GHLs 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 biomass and the age compositions of the herring stocks within this district, but funding has been limited. The Uyak District remained closed to fishing through 2002.

In recent years, both department and contracted vessels have been used to conduct limited hydroacoustic surveys in this area. These surveys indicated the Uyak herring stocks status remained depressed, though the 2000 and 2001 survey results were encouraging especially for the Zachar and Spiridon Bay Sections. No hydroacoustic surveys were conducted in 2003.

Historically, the commercial fishery in the Uyak District took place throughout the month of May, with the Inner Uyak Section fishery generally occurring in late May. 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. A large biomass was again observed in 2003 during mid-April by the same air taxi operator and was confirmed by industry spotter pilots and a department

management biologist. The biomass observed was estimated to range from 600 to 2,000 tons. An industry spotter was able to jig a small sample that indicated the fish were ripe adults of mixed age classes (predominately age-6). At least 600 tons of herring were observed spawning within this section in late April. Based on the improvements in stock status in 2002 and in 2003 the department informed purse seine permit holders they may have an opportunity to fish the Inner Uyak Bay Section in 2004 if biomass estimates exceeded 800 tons and sampling indicates that age composition of the herring biomass is older than age-3 (Gretsch 2004a).

The department assessed the biomass within Inner Uyak Bay Section on April 23 and 24, 2004 with both aerial and hydroacoustic surveys. Surveys indicated that between 3,000 and 4,000 tons of herring were present. The department established a 300 ton GHL. Approximately 370 tons were harvested during the commercial fishery. Age compositions from 2004 commercial catch samples indicated that the predominant age classes were age-7 (39.1%), age-5 (28.2%), and age-4 (10.3%; Table 4).

In 2003, the department opened the Zachar Bay Section to gillnet gear as a test fishery to further evaluate stock status. There was 18.9 tons harvested (15 ton GHL) and age compositions indicated that the predominant age classes were age-6 (50.0%) and age-4 (22.6%; Gretsch 2003b). Based on the positive results in 2003 the department opened the section again in 2004 with a 15 ton GHL. There was 15.6 tons harvested and catch samples indicated that the predominant age classes were age-4 (53.7%), age-5 (22.3%), and age-6 (7.4% Table 5). Aerial surveys indicated that 200 to 300 tons of herring were present in late April, but a hydroacoustic survey in late April only found 75 to 100 tons. The 2004 fishery took place in mid-May, several weeks after the surveys were conducted.

With the positive results in the Zachar Bay Section in 2003 the department opened the Spiridon Bay Section in 2004 with a 15 ton GHL. No harvest occurred. No herring were observed during aerial surveys and one hydroacoustic survey conducted in late April 2004. The Spiridon Bay Section herring biomass does not appear to have improved as in the Inner Uyak and Zachar Bay Sections.

Northeast District

There are five sections in the Northeast District and four have known spawning stocks of herring. The Womens Bay Section had the largest stock of herring and commercial fishery harvests ranged from 74 to 149 tons from 1990 through 1992 (Prokopowich et al. 1992; Gretsch et al 1992, 1993). Declines in fishery performance from 1995 to 1997 prompted the closure of 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, which generally occurred during the winter months. Subsistence fishery regulations became more restrictive in 2001, which resulted in reduced catches in 2001 through 2003 (the harvest decline was not related to a decrease in herring abundance). The remaining sections of the district have small herring stocks and historic harvests have been relatively small and sporadic.

The Womens Bay Section was opened to gillnet gear in 2003 as a test fishery, with a 10 ton GHL. Though only one gillnet permit holder fished this section and 7.3 tons of herring harvested. Age composition from 2003 commercial catch samples show the predominant age classes were age-4 (31.7%), age-5 (30.7%), age-6 (16.3%), and age-10 (14.4%, Gretsch 2004b). With the positive results in 2003, the department increased the GHL for the 2004 season to 20 tons. Two permit holders fished this section in 2004, however they were late in finding the herring. Most spawned prior to any fishing effort and only 4.5 tons were harvested. Permit holders estimated that between 150 to 200 tons of herring were observed spawning within the section in early May.

Inner Marmot District

There are five sections within the Inner Marmot District. All sections have known spawning stocks of herring though most are small. The Kizhuyak Bay Section has had the largest stock of herring in the district with commercial harvests ranging from 102 to 117 tons from 1990 through 1992 (Prokopowich et al. 1992; Gretsches et al 1992, 1993). Declines in herring abundance occurred from 1993 through 1995, and prompted a closure of the entire district from 1996 through 2001. Aerial surveys have consistently documented herring in this section in recent years, with 400 tons observed in 2003 by an industry spotter.

The Kizhuyak Bay Section was opened to gillnet gear in 2002 as a test fishery, with a 10 ton GH and 14 tons were harvested (Gretsches 2003a). The GH was increased to 15 tons in 2003 and 23.4 tons were harvested (Gretsches 2004b). Based on the positive fishery results the Kizhuyak Bay Section was opened in 2004 with a 50 ton GH. Following the herring allocation plan, this section was designated for purse seine gear in 2004. Purse seiners harvested 44 tons and commercial catch samples showed the predominant age classes were age-3 (57.7%), age-4 (22.7%), and age-5 (13.3%; Gretsches 2004b). A hydroacoustic survey after the fishery indicated up to 300 tons of herring were present in the Kizhuyak Bay Section.

The Anton Larsen Bay and Sharatin Bay Sections were opened as a test fishery for gillnet gear in 2004 with 10 tons each as the GHs. No gillnet permit holders fished either section. A hydroacoustic survey in early May 2004 found an estimated 200 tons of herring within the Anton Larsen Bay Section and 100 tons in the Sharatin Bay Section. The survey results indicate these sections have experienced an increase in herring biomass in the last two years, similar to the increase experienced in the adjacent Kizhuyak Bay Section.

Eastside District

Four bay complexes compose the Eastside District: Ugak Bay, Kiliuda 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 harvests. Due to the reduced gillnet fleet and low herring prices, the smaller and more distant gillnet sections of this district have not been fished in recent years. Hydroacoustic surveys in this district are less frequent than other portions of the KMA.

Generally, the East and West Sitkalidak Sections have the earliest spawning herring in the KMA, with initial spawns 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 decreased in 1996 and 1997. Permit holders also had a difficult time 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 GHs. From 1998 through 2003 the GHs have been set low (30 to 50 tons per section) and the stocks have shown improvement, GHs for both sections were increased in 2004.

In 2004 the East Sitkalidak Strait Section was opened to gillnet gear with a 75 ton GH, however only 3.6 tons were harvested. From 2000 through 2003, this section was open to purse seine gear only and the GH was caught annually. The poor gillnet harvest was related to the low effort and doesn't reflect on the stock strength for this section. The age composition of 2003 East Sitkalidak Section commercial catch was predominantly composed of age-6 (56.1%) and age-5 (11.4%) herring based on catch samples (Gretsches 2004b).

The West Sitkalidak Section GHL was increased to 75 tons in 2004. The section was open to purse seine gear and 69 tons were harvested. Age composition from catch samples was predominantly composed of age-3 (69.8%) and age-7 (12.0%) herring (Table 4). Recruitment appears strong with the high percentage of age-3 herring present.

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 36 to 74 tons. The purse seine GHL for this section was increased in 2004 to 75 tons and 64 tons were harvested. Commercial catch samples in 2004 were primarily composed of age-3 (80.1%), age-7 (4.7%), and age-11 (4.7%) herring (Table 4). Recruitment appears strong with the high percentage of age-3 herring present.

The Three Saints Bay Section, also adjacent to the West Sitkalidak Section, was designated as a gillnet section, but no permit holders have fished this section during the past five years.

The Inner Kiliuda Bay and Outer Kiliuda Bay Sections have been consistent and strong herring producers during the last 10 years. These two adjoining sections have been managed as one section during the last two seasons since the spawning stock is likely the same. In the Kiliuda Bay Sections in 2004, 258 tons were harvested (300 ton GHL). The 2004 GHL for these sections was the highest on record and was based on the high percentage (46.7%) of age-10 herring harvested during the 2003 fishery (Gretsch 2004b). Age composition of the 2004 commercial catch samples from the Kiliuda sections was predominantly age-3 (35.5%), age-11 (24.7%), age-10 (11.9%), and age-7 (9.9%; Table 4). Industry aerial surveys in 2003 and 2004 have reported the biomass in these two sections at approximately 3,000 to 4,000 tons.

The Shearwater Bay Section, adjacent to the Outer Kiliuda Bay Section, has also been a strong herring producer. However, during the last two years fishing effort has consisted of only two gillnet permit holders annually and only 6.8 tons were harvested in 2003 (50 ton GHL) and 3.9 tons in 2004 (25 ton GHL). No gillnet permit holders fished this section after April 23 and most of the catch from the Kiliuda Bay Sections occurred in early May (these sections have similar spawn timings). No catch samples were collected in 2004. Samples from the gillnet catch in 2003 included age-10 (42.4%), age-3 (30.3%) and age-4 (15.1%) herring (Gretsch 2004b). Recruitment of age-3 herring was strong in the Eastside District in 2004 and likely was strong for the Shearwater Bay Section.

The Inner and Outer Ugak Bay Sections also continued to be strong herring producers in 2004. The Inner Ugak Bay Section has been designated for gillnet gear while the Outer Ugak Bay Section has been designated for purse seine gear during the last 5 years. Harvests diminished in the Inner Ugak Section in 2003 and 2004, due to the high percentage of males in the spawning stock. With high male abundance it is difficult to obtain a marketable roe percentage. Catch samples in 2004 consisted primarily of age-11 herring (52.7%), of which 62% were males. Other age classes showed even sex ratios and the only other dominant age class was age-10 herring at 30.9%. Herring frequently move between the Inner and Outer Ugak Bay Sections, spawning occurs within each section, but size-at-age and recruitment events tend to indicate these herring are likely the same stock.

In the Outer Ugak Bay Section 617 tons were harvested by 13 purse seine permit holders in 41 minutes of fishing in 2004. Catch samples were predominantly age-3 (40.2%), age-11 (19.5%), and age-7 (16.1%) herring (Table 4). Recruitment of age-3 herring was very strong in 2004. This is a major improvement for the Outer Ugak Bay Section as recruitment appeared weak during the previous two years, based on commercial catch samples. Although the 2004 harvest exceeded the 250 ton GHL, post fishery aerial surveys indicate at least 500 tons spawned in the section two days

after the fishery occurred. Industry aerial surveys indicate that the combined herring biomass between the Inner and Outer Ugak Bay Sections totalled 3,000 to 4,000 tons.

No new information is available for the Pasagshak Bay Section, a gillnet section adjacent to the Outer Ugak Bay Section. No one fished this section in 2004, nor has there been a harvest during the past five years. The Tanginak Anchorage Section was closed from 1998 through 2003. This section was opened in 2004 as a test fishery for gillnet gear. However no gillnet permit holders fished the section in 2004, and no new information was obtained.

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 1991 through 1994 (Gretsch et al 1992, 1993, 1994, 1995). From 1991 through 1993, the Upper Olga Bay stock was the first large stock of the district that experienced declines in abundance. The department reacted by reducing the GHL, but by 1995 the catch had dropped to zero. By 1995 the Inner and Outer Deadman Bay Sections were also experiencing declining fishery performance and, similarly, the GHLS were reduced in 1996 and 1997. In 1997 the last large herring stock of the district, in Sulua Bay, also appeared to be declining based aerial and hydroacoustic surveys. In 1998, seven sections of the Alitak District were closed to fishing. The department has since relied on aerial surveys to assess changes in stock status. Three sections were opened in 2004 (two are seine areas) to act as test fisheries. Industry spotter pilots looked for herring in this district, not only in the open sections but also in closed sections (due to the geographic proximity).

In 2002 industry spotter pilot reports indicated a major increase in herring abundance in the Alitak District (Gretsch 2003b). Stock in the Inner Deadman Bay, Outer Deadman Bay, Inner Alitak Bay, Portage Bay, and Upper Olga Bay Sections had improved. In 2003 and 2004 similar spotter pilot reports indicated continued improvements in the Alitak District. However, the Sulua Bay Section stock status still remains poor, with no herring observed. In 2003 and in 2004, the Inner and Outer Deadman Bay Sections were opened to gillnet gear as a test fishery, with a 20 ton GHL in 2004 (Table 3). The Upper Olga Bay Section was also open to gillnet gear in 2003 and 2004, with a 10 ton GHL. No gillnet permit holders have fished this district during the last two years.

For the 2004 season, the department opened the Inner Alitak and Portage Bay Sections to purse seine gear, with a combined GHL of 75 tons and 51.5 tons harvested (Table 3). No catch samples were taken, however permit holders suggest that recruitment was strong as there were large numbers of age-3 herring present in their harvest. Industry spotter pilots reported continued improvement in the volume and distribution of herring within Alitak and Deadman Bays. The remaining sections open to seine gear were not fished in 2004.

Mainland Districts

There are three Mainland Districts, comprising 12 sections. These districts experience more extreme weather than other districts in the KMA. Conditions frequently consist of high winds, low ceilings, and limited visibility, greatly reducing the effectiveness of spotter pilots. The severity of the weather in the spring likely reduces the productivity of these herring stocks, compared to the more protected waters of Kodiak and Afognak Islands. The last commercial herring harvest from the Mainland Districts occurred in 1997. The department increased fishing opportunities in 2004 by opening

seven sections as exploratory. No one fished the Mainland Districts in 2004 and there is no new information concerning herring stocks in the Mainland Districts.

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.

HERRING FOOD AND BAIT FISHERY

HISTORICAL PERSPECTIVE

The earliest recorded commercial herring food and bait 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 to 1950) the average harvest was 31,600 tons, which vastly surpasses recent food and bait herring harvests (Figure 10). 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. 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 operators 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 and 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 GHL for the food and 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 and 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. The herring food and bait season closing date has remained February 28.

Fishing periods through 1996 were unrestricted, 24 hours per day, seven days per week. In 1997, fishing periods were reduced to 12 hours (8:00 AM to 8:00 PM), seven days per week. The restriction of 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; seine fishermen harvested an average of only 2% of the food and 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 the Kodiak Archipelago. The biomass exceeded that of known KMA spawning stocks. Herring food and bait fishermen targeted these herring, but the origin of the stock was questioned. In 1986 a stock identification study, based on scale pattern analysis, was conducted on herring harvested from a large biomass located in the northeastern part of the Shelikof Strait (Johnson et. al. 1988). The study concluded that at least 80% of the Shelikof herring catch 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 Kamishak Bay spawning herring biomass for harvest during the Kodiak herring food and bait fishery. For local Kodiak spawning stocks, which were exploited during the sac roe fishery, the food and bait GHL was to be determined based on 10% of the harvest that occurred in the previous KMA herring sac roe season.

Problems subsequently developed after implementation of this management plan because it was difficult to assign harvest from the intermixed stocks to either Kodiak or Kamishak if the stocks from 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 herring food and bait fisheries (ADF&G 2003-2004). 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 and bait fishery (5 AAC 27.535). This strategy combines the Kamishak stock GHL with the Kodiak stock GHL for food and bait districts (West Afognak District), (Uganik District), and the (Uyak District; Figure 4). This portion of the KMA food and bait fishery is referred to as the Shelikof Strait food and bait herring fishery. The Kamishak allocation to the Shelikof Strait food and bait herring fishery ranges from 1% to 2% of the Kamishak spawning biomass. When the combined GHL is achieved the Shelikof Strait food and bait (West Afognak, Uganik, and Uyak) are closed collectively. This harvest strategy alleviates the problem of identifying the spawning stock of a harvest in areas where intermixing may occur. The plan also closes the Kamishak Bay sac roe fishery and the Shelikof Strait food and bait fishery north of the latitude of Miners Point (Uganik Bay) when the Kamishak spawning biomass falls below 8,000 tons (the minimum Kamishak spawning biomass threshold; ADF&G 2002-2003).

In 1999 the BOF made additional changes to the KMA herring food and bait fishery. The season opening date was changed to October 1 so department staff in the LCI management area would have additional time to complete the Kamishak herring forecast and determine the resulting

allocation for the Shelikof Strait food and bait fishery. Prior years' fisheries generally occurred based on preliminary Kamishak forecasts, and actual harvests were often either lower or higher than the final Kamishak allocation, which was sometimes completed weeks after the fishery occurred. 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 and 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 and 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 2001 the BOF adopted changes to the Kamishak Bay District Herring Management Plan based on the results of a threshold analysis performed by LCI department staff. The analysis concluded that the minimum spawning biomass threshold should be 6,000 tons, 2,000 tons less than the previous minimum spawning biomass threshold (8,000 tons). Other changes to the plan included a reduction in the maximum exploitation rate for Kamishak herring, which in turn lowered the allowable exploitation rate of the Shelikof Strait fishery from 2% to 1.5% of the Kamishak spawning biomass. Last, a portion of the plan, which required adjustment of Shelikof Strait young age class harvests to reflect the estimated weight of an equal amount of older age class herring, was eliminated.

KAMISHAK FISHERY CLOSURE

The biomass forecast for Kamishak Bay herring in 2005 is approximately 3,058 tons, well below the minimum spawning biomass of 6,000 tons that must be met before a fishery may occur in the Kamishak sac roe or Shelikof Strait food and bait fisheries (L. Hammarstrom, Alaska Department of Fish and Game, Homer, personal communication). Additionally, stock assessment surveys determined that approximately 48% of the population consisted of younger age class fish. The Kamishak Bay District Herring Management Plan states that commercial harvests must target older, repeat spawners in order to protect recruit-class herring. This was the seventh consecutive year that the Kamishak Bay District fishery has been closed and the population has sharply declined during the last five years (Otis and Cope 2004). Due to the low stock status, the Kamishak Bay sac roe fishery will be closed for the 2005 season and the Shelikof Strait food and bait fishery north of the latitude of Miner's Point was closed for the 2004/2005 season.

FOOD AND BAIT COOPERATIVE FISHERIES 2001-2004

The KMA herring food and 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 on a highly aggregated stock. In 2001 the Commercial Fisheries Entry Commission (CFEC) designated the KMA herring food and bait fishery a limited entry fishery and issued 13 interim use permits to those fishermen who made landings between 1994 and 1998. However, because of the relatively small GHLS available (60 tons in the Uganik District and 47 tons in the Eastside District) the department again did not allow an open competitive fishery to occur even though the fishery was restricted to the 13 interim permit holders. As an alternative, the interim permit holders formed a 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 and tendering

the herring. The 2001 co-op fishery resulted in a harvest of 63 tons of food and bait herring from the Uganik District (Village Islands) and 52 tons from the Eastside District (Ugak Bay).

In July 2002, the CFEC made a final determination on these limited entry permits. Nine permanent limited entry permits were issued; five purse seine/gillnet permits and four trawl permits. The Kamishak Bay District fishery was closed for 2003 due to below threshold stock abundance, so only a portion of the Uganik District (south of Miners Point; 72 ton GHL) and the Eastside District (62 ton GHL) could be opened to food and bait herring fishing (Gretsch 2003b). The department again had harvest concerns and the nine permit holders agreed to conduct a co-op fishery, as in 2001. The department and co-op agreed to a single catcher vessel on the grounds and a department observer was present onboard the fishing vessel during the fishery. The 2002/2003 KMA herring food and bait co-op fishery resulted in a 74 ton harvest from the Uganik District, and a 61 ton harvest from the Eastside District.

For the 2003/2004 season the situation was much the same, and the department felt that the fishery could exceed the GHLs if all permit holders participated. Only two districts could be opened, including that portion of the Uganik District south of Miners Point, with a 122 ton GHL, and the Eastside District, with a 75 ton GHL (Gretsch 2003c). The limited entry permit holders asked the department to again allow a co-op fishery for the 2003 season. The permit holders and area processors also requested that the department open the fishery prior to October 1, the regulatory season opening date. An earlier opening date provided a larger market and higher price for bait herring, as much of the catch could be used for the Bering Sea red king crab fishery that was to begin on October 15. Many of the Bering Sea crab vessels are based in or pass through the port of Kodiak prior to that fishery, and prefer to use fresh bait. To facilitate market needs the department opened that portion of the Uganik District south of the latitude of Miners Point (122 ton GHL) on September 21, 2003, for one hour, and 116 tons were harvested near Village Islands. The Eastside District (75 ton GHL) was opened on November 14, 2003, for 12 hours, and 83 tons were harvested.

Circumstances for the 2004/2005 season were similar to those for the 2003/2004 season. The permit holders again requested a co-op fishery and an earlier fishery opening date from the department. The department agreed with the permit holders request and that portion of the Uganik District south of Miners Point, was opened from 6:00 PM September 24 through 6:00 AM September 26, 2004. Approximately 60 tons were harvested of the 102 ton GHL (Gretsch 2004c). The 60 tons harvested provided the bulk of the herring bait needed for the Bering Sea red king crab fleet ported in Kodiak. A second opening was allowed in that portion of the Uganik District south of Miners Point, from 6:00 AM October 16 through 6:00 PM October 17, 2004 and 48 tons were harvested. The total harvest was 108 tons, and the Uganik District was closed to herring bait fishing for the remainder of the 2004/2005 season. Two other areas may be opened to herring bait fishing during the remainder of the 2004/2005 season, including the Eastside District with a 90 ton GHL and the Uyak District with a 33 ton GHL. The department will open these districts if requested by the permit holders and if markets are available.

CATCH SAMPLING

A total of 227 herring were collected for AWL analysis from first fishing period in the Uganik District by purse seine gear. Age compositions from the sample were Age-1 (1.3%), Age-2 (31.7%), age-3 (31.7%), Age-4 (15.4%), Age-5 (12.7%), Age-6 (3.9%), Age-7 (1.3%), and Age-8+ (1.6%).

HERRING SUBSISTENCE FISHERY

FISHERY CHARACTERISTICS

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

In 1999 more restrictive regulations were approved by the BOF. These regulations allowed for a harvest of up to 500 pounds of herring with no permit requirements, except during the sac roe fishing season (April 15 to June 30). 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 recent years most of the herring caught for subsistence were used for bait (in sport or commercial fisheries), food, or fertilizer.

In 2000 herring subsistence 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 herring subsistence harvest and the appropriateness of taking subsistence herring for use as bait in a commercial fishery. The department submitted proposals for regulation changes to the BOF in 2001, and the BOF changed regulations to allow for both types of historic harvests. The new subsistence regulation allows for the harvest of up to a total of 500 pounds of herring annually and requires that fishermen obtain a permit prior to fishing. Herring were included on the existing KMA salmon and crab subsistence permit.

A new regulation (5 AAC 27.545) allows for the harvest of up to 500 pounds of herring by commercial permit holders to be used as bait in commercial fisheries.

2003 SEASON SUMMARY

Subsistence herring harvests for 2004 will be summarized from returned subsistence permits in January through March 2005. The reported subsistence herring harvest in 2003 was 2,180 pounds (Table 9). A total of 16 KMA subsistence permits were returned with herring harvest data, with most of the harvest coming from the Eastside and Uyak Districts. No harvest by commercial permit holders, to be used as bait in commercial fisheries, has occurred through November 2004.

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TABLES AND FIGURES

Table 1.-Historical harvest data for the commercial herring sac roe and food and bait fisheries and percent of the total annual herring harvest that occurs by fishery, Kodiak Management Area, 1964-2004.

Year	Sac Roe Harvest (Tons)	Food/Bait Harvest (Tons)	Total Herring Harvest (Tons)	Sac Roe Fishery Percent of Total Harvest (%)	Food/Bait Fishery Percent of Total Harvest (%)
1964	568	310	878	65%	35%
1965	657	35	692	95%	5%
1966	2,769	198	2,967	93%	7%
1967	1,662	300	1,962	85%	15%
1968	2,001	15	2,016	99%	1%
1969	1,130	11	1,141	99%	1%
1970	342	8	350	98%	2%
1971	284	44	328	87%	13%
1972	215	50	265	81%	19%
1973	831	178	1,009	82%	18%
1974	868	40	908	96%	4%
1975	8	5	13	62%	38%
1976	5	0	5	100%	0%
1977	338	0	338	100%	0%
1978	904	399	1,303	69%	31%
1979	1,735	125	1,860	93%	7%
1980	2,383	381	2,764	86%	14%
1981	2,065	18	2,083	99%	1%
1982	1,771	326	2,097	84%	16%
1983	2,318	33	2,351	99%	1%
1984	2,163	123	2,286	95%	5%
1985	1,968	102	2,070	95%	5%
1986	1,558	213	1,771	88%	12%
1987	2,146	217	2,363	91%	9%
1988	2,171	340	2,511	86%	14%
1989	2,249	345	2,594	87%	13%
1990	2,347	313	2,660	88%	12%
1991	2,432	215	2,647	92%	8%
1992	4,283	312	4,595	93%	7%
1993	4,929	837	5,766	85%	15%
1994	5,893	677	6,570	90%	10%
1995	4,604	507	5,111	90%	10%
1996	3,386	651	4,037	84%	16%
1997	3,235	756	3,991	81%	19%
1998	2,057	151	2,208	93%	7%
1999	1,651	0	1,651	100%	0%
2000	1,370	0	1,370	100%	0%
2001	1,694	115	1,809	94%	6%
2002	1,677	135	1,812	93%	7%
2003	1,992	199	2,191	91%	9%
2004	3,167	106	3,273	97%	3%
Average					
1964 to 2004	1,947	214	2,161	90%	10%
10 Year					
1995 to 2004	2,483	262	2,745	92%	8%
5 Year					
2000 to 2004	1,980	111	2,091	95%	5%

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, 1979-2004.

Year	Season Length (Days)	GHL (Tons)	Total Harvest (Tons)	Harvest by Gear Type		Percent Harvest by Gear Type		Number of Landings by Gear Type		Units of Gear Fished ^a		Average Catch by Gear		Estimated Average Earnings ^b		Price per Ton ^b (\$)	Estimated Exvessel Total Value ^b (\$)
				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	\$20,539	\$5,136	\$500	\$1,617,500
1998	50	2,030	2,057	1,954	103	95%	5%	110	26	35	7	56	15	\$27,914	\$7,357	\$500	\$1,028,500
1999	38	1,495	1,651	1,589	62	96%	4%	94	16	31	5	51	12	\$33,984	\$8,221	\$663	\$1,094,613
2000 ^c	37	1,735	1,370	1,290	80	94%	6%	57	23	31	10	42	8	\$29,129	\$5,600	\$700	\$959,000
2001	47	1,540	1,694	1,412	282	83%	17%	67	37	33	9	43	31	\$21,394	\$15,667	\$500	\$847,000
2002	46	1,860	1,677	1,274	403	76%	24%	37	50	30	14	42	29	\$21,233	\$14,393	\$500	\$838,500
2003	42	2,600	1,992	1,738	254	87%	13%	59	45	31	11	56	23	\$28,032	\$11,545	\$500	\$996,000
2004	42	2,850	3,167	2,894	273	91%	9%	95	36	27	11	107	25	\$53,593	\$12,409	\$500	\$1,583,500
Average																	
1979 to 2004	57	2,542	2,586	2,057	530	79%	21%	149	342	44	59	50	12	\$38,533	\$9,046	\$817	\$2,140,623
10 Year																	
1995 to 2004	49	2,621	2,483	2,094	390	86%	14%	118	218	41	27	53	18	\$38,415	\$12,284	\$764	\$2,159,290
5 Year																	
2000 to 2004	43	2,117	1,980	1,722	258	86%	14%	63	38	30	11	58	23	\$30,676	\$11,923	\$540	\$1,044,800

^a From 1979 to 1998 fishery participation was based on vessels making landings; 1999 to 2004 data is based on actual fishery participation.

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

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

Table 3.-Herring sac roe fishery guideline harvest level (GHL) by section and gear type, harvest by section, and date sections were closed, Kodiak Management Area, 2004.

Statistical Area	Management Section	Date Closed ^a	Purse Seine		Gillnet	
			GHL	Harvest	GHL	Harvest
NORTH AFOGNAK DISTRICT						
NA10	Shuyak Island	CLOSED	-	-	-	-
NA20	Delphin Bay	CLOSED	-	-	-	-
NA30	Perenos Bay	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
NA40	Seal Bay	CLOSED	-	-	-	-
NA50	Tonki Bay	5/8/2004	EXPLORATORY	43.2	EXPLORATORY	0
WEST AFOGNAK DISTRICT						
WA10	Raspberry Strait	CLOSED	-	-	-	-
WA20	Malina Bay	6/30/2004	CLOSED	-	20	0
WA31	Paramanof Bay	4/22/2004	250	269.0	CLOSED	-
WA32	Foul Bay	4/22/2004	50	0	CLOSED	-
WA40	Blue Fox/Devil's Inlet	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
WA50	Offshore W. Afognak	CLOSED	-	-	-	-
SOUTH AFOGNAK DISTRICT						
SA10	Izhut Bay	6/30/2004	CLOSED	-	10	0
SA20	Kitoy Bay	CLOSED	-	-	-	-
SA30	MacDonalds Lagoon	CLOSED	-	-	-	-
SA40	Danger Bay	4/22/2004	CLOSED	-	70	74.1
SA50	Litnik	CLOSED	-	-	-	-
SA60	Duck Bay	CLOSED	-	-	-	-
AFOGNAK DISTRICTS TOTAL			300	312.2	100	74.1
UGANIK DISTRICT						
UG10	Kupreanof	CLOSED	-	-	-	-
UG20	Viekoda	6/30/2004	CLOSED	-	50	3.3
UG21	Terror Bay	4/28/2004	CLOSED	-	20	21.2
UG30	Village Island	4/23/2004	800	1108.4	CLOSED	-
UG31	West Uganik Pass	4/28/2004	CLOSED	-	30	96.2
UG32	NE Arm Uganik	6/30/2004	CLOSED	-	10	0
UG33	E. Arm Uganik	6/30/2004	CLOSED	-	10	0
UG34	S. Arm Uganik	6/30/2004	CLOSED	-	100	17.2
UG40	Offshore Uganik	CLOSED	-	-	-	-
UGANIK DISTRICT TOTAL			800	1108.4	220	137.9
UYAK DISTRICT						
UY10	Offshore Uyak	CLOSED	-	-	-	-
UY20	Harvester Island	CLOSED	-	-	-	-
UY30	Inner Uyak	4/26/2004	300	370.0	CLOSED	-
UY32	Browns Lagoon	CLOSED	-	-	-	-
UY31	Larsen Bay	CLOSED	-	-	-	-
UY40	Zachar Bay	5/16/2004	CLOSED	-	15	15.6
UY50	Spiridon Bay	CLOSED	CLOSED	-	15	0
UYAK DISTRICT TOTAL			300	370.0	30	15.6

-Continued-

Table 3. (page 2 of 3)

Statistical Area	Management Section	Date Closed ^a	Purse Seine		Gillnet	
			GHL	Harvest	GHL	Harvest
ALITAK DISTRICT						
AL10	Outer Alitak	CLOSED	-	-	-	-
AL20	Inner Alitak	6/30/2004	75	51.5	CLOSED	-
AL21	Inner Deadman Bay	6/30/2004	CLOSED	-	20	0
AL22	Outer Deadman Bay	Note: Sections AL21 and AL22 managed as one section, 20 ton GHL.				
AL30	Sulua Bay	CLOSED	-	-	-	-
AL31	Portage Bay	Note: Sections AL20 and AL31 managed as one section, 75 ton GHL.				
AL40	Lower Olga/Moser	CLOSED	-	-	-	-
AL41	No. Upper Olga Bay	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
AL50	Upper Olga Bay	6/30/2004	CLOSED	-	10	0
AL60	Geese/Twoheaded	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
ALITAK DISTRICT TOTAL			75	51.5	30	0
STURGEON/HALIBUT DISTRICT						
SH10	Sturgeon/Halibut	CLOSED	CLOSED	-	CLOSED	-
EASTSIDE DISTRICT						
EA10	Kaiugnak	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
EA20	SW. Sitkalidak	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
EA21	Three Saints Bay	6/30/2004	CLOSED	0	15	0
EA22	Newman Bay	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
EA23	W. Sitkalidak Strait	4/23/2004	75	69.0	CLOSED	-
EA24	Barling Bay	5/5/2004	75	63.9	CLOSED	-
EA30	E. Sitkalidak St.	6/30/2004	CLOSED	-	75	3.6
EA31	Tanginak Anchorage	6/30/2004	CLOSED	-	10	0
EA40	Outer Sitkalidak	CLOSED	CLOSED	-	CLOSED	-
EA41	Boulder Bay	6/30/2004	CLOSED	-	10	0
EA42	Shearwater Bay	6/30/2004	CLOSED	-	25	3.9
EA43	Outer Kiliuda Bay	5/3/2004	300	258.4	CLOSED	-
EA44	Inner Kiliuda Bay	Note: Sections EA43 and EA44 managed as one section, 300 ton GHL.				
EA50	Outer Ugak Bay	5/5/2004	250	616.7	CLOSED	-
EA51	Inner Ugak Bay	6/30/2004	CLOSED	-	60	33.4
EA52	Pasagshak	6/30/2004	CLOSED	-	10	0
EASTSIDE DISTRICT TOTAL			700.0	1008.0	205	40.9
NORTHEAST DISTRICT						
NE10	Womens Bay	6/30/2004	CLOSED	-	20	4.5
NE20	Kalsin Bay	CLOSED	-	-	-	-
NE30	Middle Bay	CLOSED	-	-	-	-
NE40	Inshore Chiniak	CLOSED	-	-	-	-
NE50	Offshore Chiniak	CLOSED	-	-	-	-
NORTHEAST DISTRICT TOTAL			-	-	20	4.5
INNER MARMOT DISTRICT						
IM10	Monashka Bay	CLOSED	-	-	-	-
IM20	Anton Larsen Bay	6/30/2004	CLOSED	-	10	0
IM30	Sharatin Bay	6/30/2004	CLOSED	-	10	0
IM40	Kizhuyak Bay	4/22/2004	50	44.0	CLOSED	-
IM50	Spruce Island	CLOSED	-	-	-	-
INNER MARMOT DISTRICT TOTAL			50	44.0	20	0

-Continued-

Table 3. (page 3 of 3)

Statistical Area	Management Section	Date Closed ^a	Purse Seine		Gillnet	
			GHL	Harvest	GHL	Harvest
NORTH MAINLAND DISTRICT						
NM10	Hallo Bay	CLOSED	-	-	-	-
NM20	Inner Kukak	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
NM30	Outer Kukak	CLOSED	-	-	-	-
NM40	Missak Bay	CLOSED	-	-	-	-
NORTH MAINLAND DISTRICT TOTAL				0	0	
MID MAINLAND DISTRICT						
MM10	Inner Katmai	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
MM20	Outer Katmai	CLOSED	-	-	-	-
MM30	Alinchak	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
MM40	Puale Bay	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
MM50	Portage Bay	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
MM60	Outer Portage	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
MID MAINLAND DISTRICT TOTAL				0	0	
SOUTH MAINLAND DISTRICT						
SM10	Wide Bay	6/30/2004	EXPLORATORY	0	EXPLORATORY	0
SM20	Lower Shelikof	CLOSED	-	-	-	-
SOUTH MAINLAND DISTRICT TOTAL				0	0	
GRAND TOTAL	Total GHL All Gear	Total Catch All Gear	Purse Seine		Gillnet	
	2,850	3,167.1	GHL	Harvest	GHL	Harvest
			2,225	2,894.1	625	273.0
			% of GHL	% Harvest	% of GHL	% Harvest
			78%	91%	22%	9%

^a Sections marked 'Closed' did not open during the 2004 sac roe season. Sections marked 'EXPLORATORY' were open to both gear types, with no set GHL.

Table 4.-Age composition, by percent, of herring samples from the commercial purse seine sac roe fishery harvest, by section, Kodiak Management Area, 2004.

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+	
Tonki Bay	43.2	0.0	30.6	14.5	17.5	18.2	7.2	1.4	2.1	4.3	3.6	0.0	0.0	0.0	137
Paramanof Bay	269.0	0.0	4.7	8.7	23.4	12.8	29.1	2.6	4.5	6.6	3.2	1.0	1.2	1.6	827
Village Islands	1108.4	0.0	4.7	15.6	40.0	10.6	22.3	0.8	2.7	1.7	0.5	0.1	0.2	0.2	730
Inner Uyak Bay	370.0	0.0	7.2	10.3	28.2	9.2	39.1	0.8	2.2	1.3	0.0	0.0	0.8	0.4	358
Kizhuyak Bay	44.0	0.0	57.7	22.7	13.3	2.5	1.2	0.3	0.6	0.9	0.3	0.0	0.0	0.0	308
West Sitkalidak Straits	69.0	0.0	69.8	5.5	1.1	3.1	12.0	0.0	0.6	2.0	4.2	0.4	0.2	0.6	448
Barling Bay	63.9	0.0	80.1	4.1	2.5	1.8	4.7	0.9	0.3	0.3	4.7	0.0	0.3	0.0	317
Inner/Outer Kiluida Bay	258.4	0.0	35.5	4.9	2.3	3.6	9.9	3.0	2.8	11.9	24.7	0.6	0.2	0.0	461
Outer Ugak Bay	616.7	0.0	40.2	6.0	1.1	4.5	16.1	0.7	3.0	8.2	19.5	0.3	0.0	0.0	266
All Samples Combined ^a	2,842.6	0.0	20.2	10.8	22.5	8.3	21.5	1.1	2.7	4.5	7.2	0.3	0.3	0.3	3,852

^a For 'All Samples Combined', the percent of the harvest by section is weighted to the age class data to estimate overall age composition of the purse seine harvest.

Table 5.-Age composition, by percent, of herring samples from the commercial gillnet sac roe fishery harvest, by section, Kodiak Management Area, 2004.

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+	
Danger Bay	74.1	0.0	2.6	13.0	52.1	20.0	4.3	0.0	0.0	6.0	1.7	0.0	0.0	0.0	115
West Uganik Passage	96.2	0.0	0.7	9.0	47.8	12.9	23.4	1.4	2.2	1.4	0.7	0.0	0.0	0.0	672
Zachar Bay	15.6	0.0	0.0	53.7	22.3	7.4	5.9	5.9	2.9	1.4	0.0	0.0	0.0	0.0	67
Inner Ugak Bay	33.4	0.0	0.0	3.6	0.0	0.0	1.8	1.8	5.4	30.9	52.7	3.6	0.0	0.0	55
All Samples Combined ^a	219.3	0.0	1.2	12.7	40.2	12.9	12.4	1.3	2.0	7.5	8.9	0.6	0.0	0.0	909

^a For 'All Samples Combined', the percent of the harvest by section is weighted to the age class data to estimate overall age composition of the gillnet harvest.

Table 6.-Average weight in grams by age class of herring samples from the commercial purse seine sac roe fishery harvest, by section, Kodiak Management Area, 2004.

Section	Average Weight at Age in Grams													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+	
Tonki Bay	-	113	160	189	224	241	272	274	295	277	-	-	-	137
Paramanof Bay	-	98	139	161	184	204	208	226	233	237	230	265	269	826
Village Islands	-	98	129	149	171	194	218	218	228	251	227	242	286	730
Inner Uyak Bay	-	93	135	151	178	199	181	219	224	-	-	262	282	358
Kizhuyak Bay	-	115	152	175	196	264	230	284	214	294	-	-	-	308
West Sitkalidak Straits	-	118	174	220	259	281	-	278	353	356	404	293	473	448
Barling Bay	-	120	168	214	262	293	276	400	367	357	-	367	-	317
Inner/Outer Kiluida Bay	-	121	161	235	284	284	306	315	335	351	339	368	-	461
Outer Ugak Bay	-	115	146	194	216	256	263	299	299	320	343	-	-	265

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Table 7.-Average weight in grams by age class of herring samples from the commercial gillnet sac roe fishery harvest, by section, Kodiak Management Area, 2004.

Section	Average Weight at Age in Grams													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+	
Danger Bay	-	128	158	186	207	222	-	-	278	290	-	-	-	115
West Uganik Passage	-	132	141	152	171	188	193	204	206	229	-	-	-	672
Zachar Bay	-	-	159	168	176	193	230	236	237	-	-	-	-	67
Inner Ugak Bay	-	-	167	-	-	254	272	245	284	284	277	-	-	55

Table 8.-Herring food and bait commercial fishery harvest, Kodiak Management Area, 1912 to 2004.

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	151
1937	27,659	1968	15	1999	Closed
1938	24,522	1969	11	2000	Closed
1939	38,601	1970	8	2001	115
1940	22,677	1971	44	2002	135
1941	40,084	1972	50	2003	199
1942	16,791	1973	178	2004	108

Table 9.-Subsistence herring harvest summary for the Kodiak Management Area, 1991-2003.

Year	Permits Issued	Permits Returned	Estimated Harvest in Pounds by District							Total
			Afognak	Northeast	Inner Marmot	Uganik	Uyak	Eastside	Alitak	
1991	50	9	2,110	1,745	1,745	1,000	0	0	0	6,600
1992	45	10	120	250	250	1,000	0	0	320	1,940
1993	50	16	90	3,000	3,910	550	50	0	0	7,600
1994	47	14	90	740	1,350	2,000	200	0	0	4,380
1995	20	6	75	0	500	0	340	0	175	1,090
1996	23	10	550	180	140	0	590	0	0	1,460
1997	16	7	0	200	350	50	1,325	0	0	1,925
1998	18	10	1,240	0	0	50	0	0	0	1,290
1999	15	9	0	200	350	0	425	0	0	975
2000	39	21	575	21,150	0	1,825	0	0	700	24,250
2001	48	19	3,000	0	875	0	1,015	10,500	0	15,390
2002	^a	23	1,170	1,150	420	0	200	903	0	3,843
2003	^a	16	0	220	300	0	420	1,210	30	2,180

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

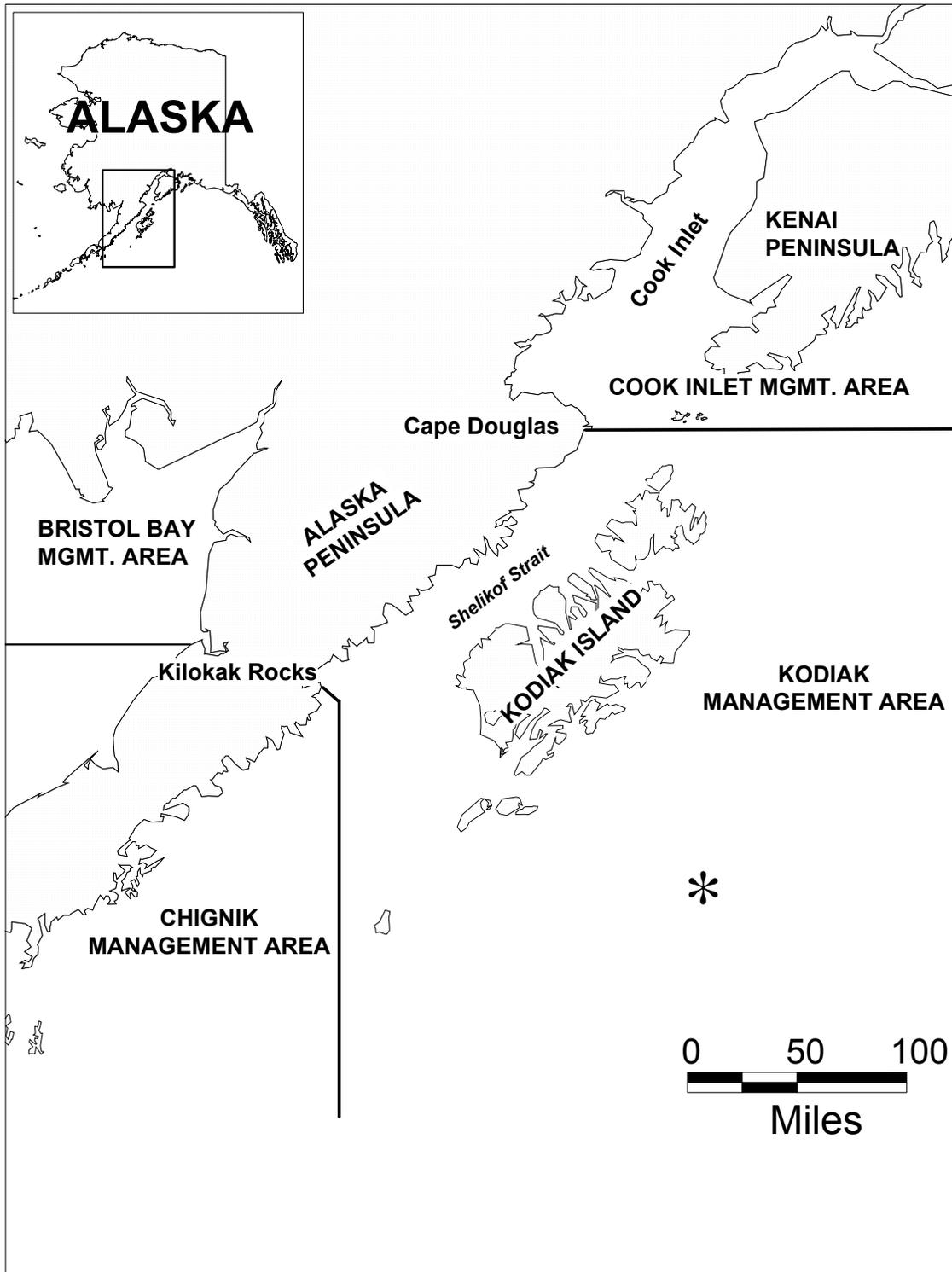


Figure 1.-Map of southwestern Alaska emphasizing the Kodiak Management Area and its relationship to surrounding management areas.

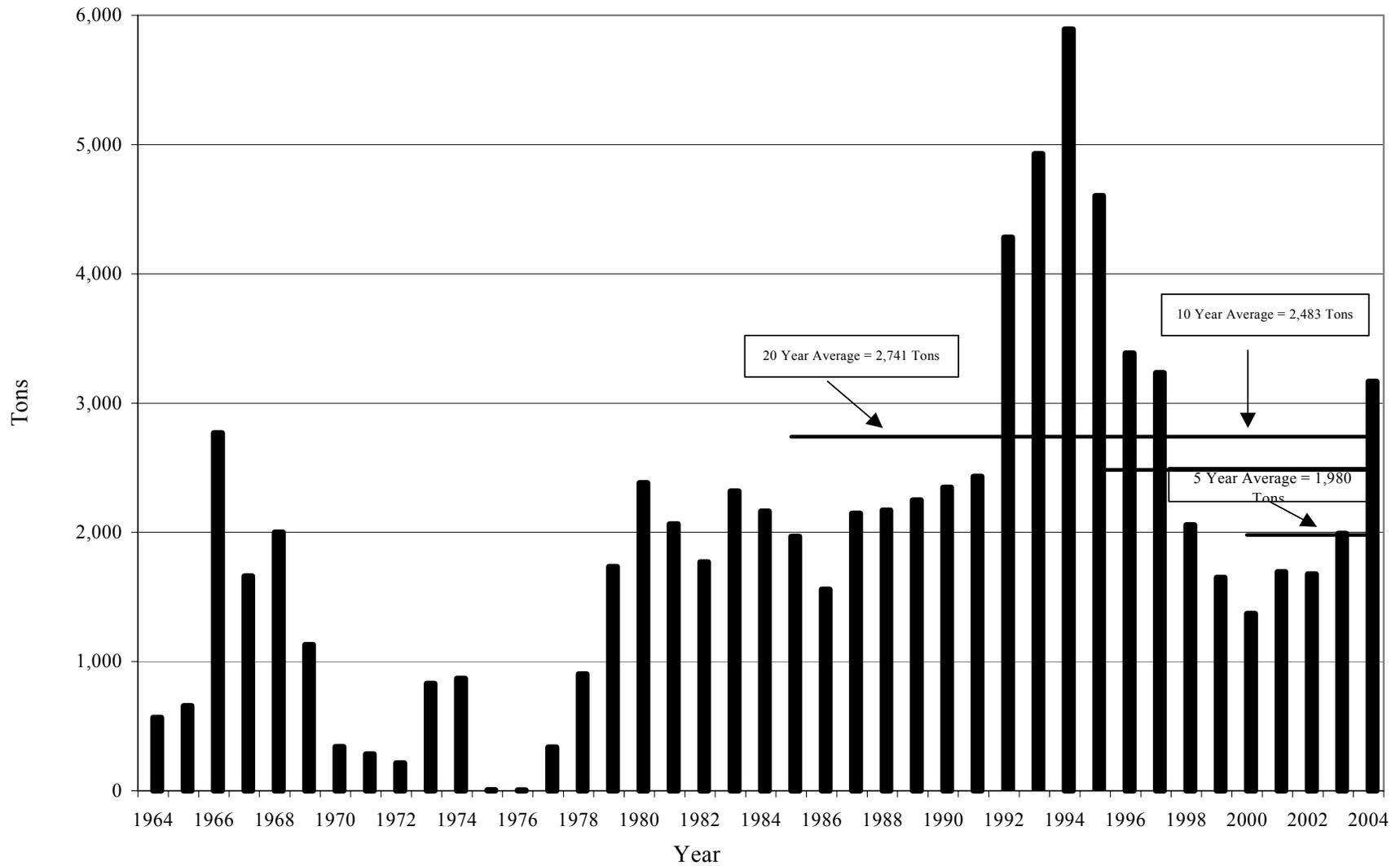


Figure 2.-Herring sac roe commercial fishery harvest, Kodiak Management Area, 1964 to 2004.

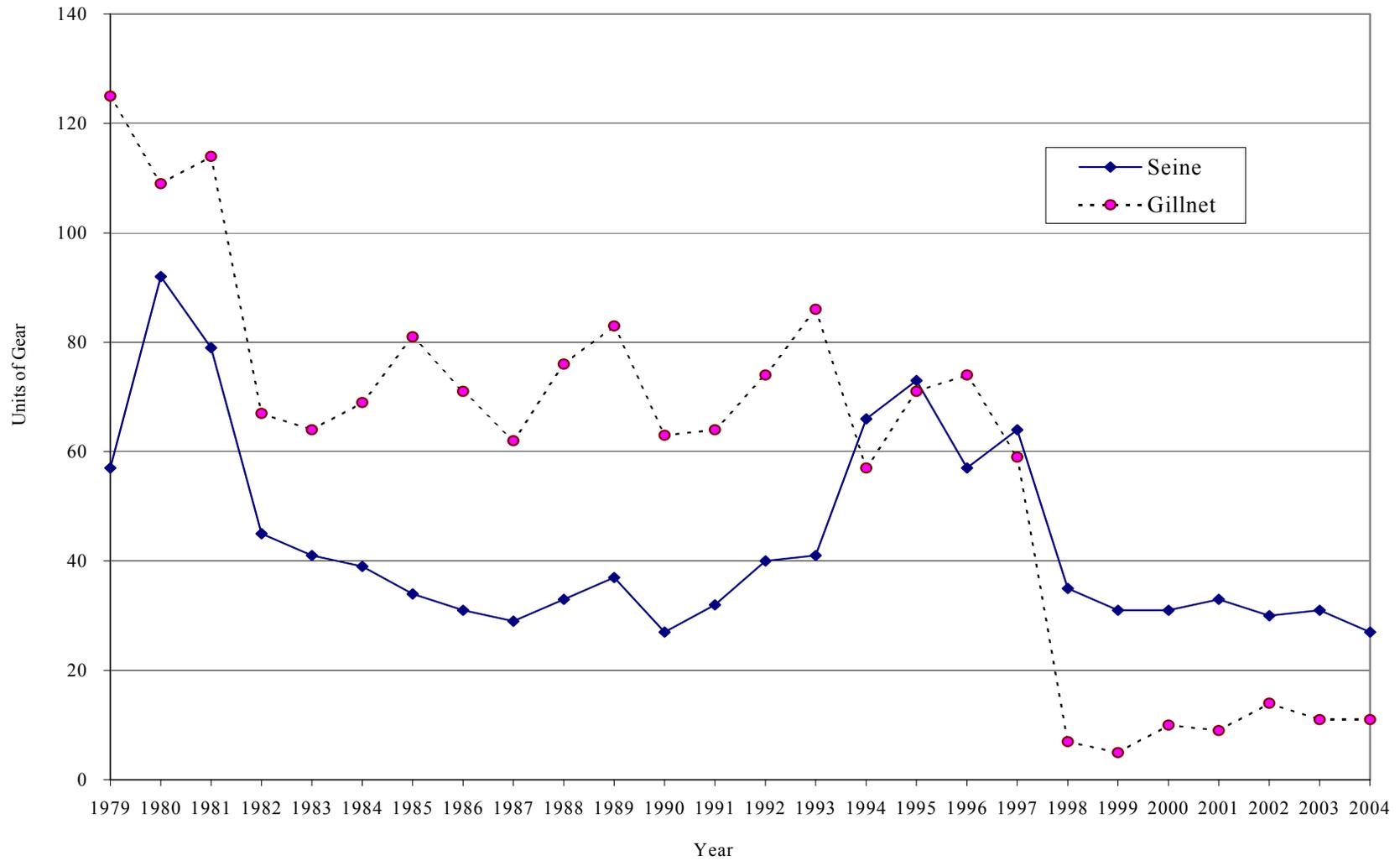


Figure 3.-Units of gear that made a landing from 1979-1998 or participated in the 1999-2004 herring sac roe commercial fisheries, Kodiak Management Area.

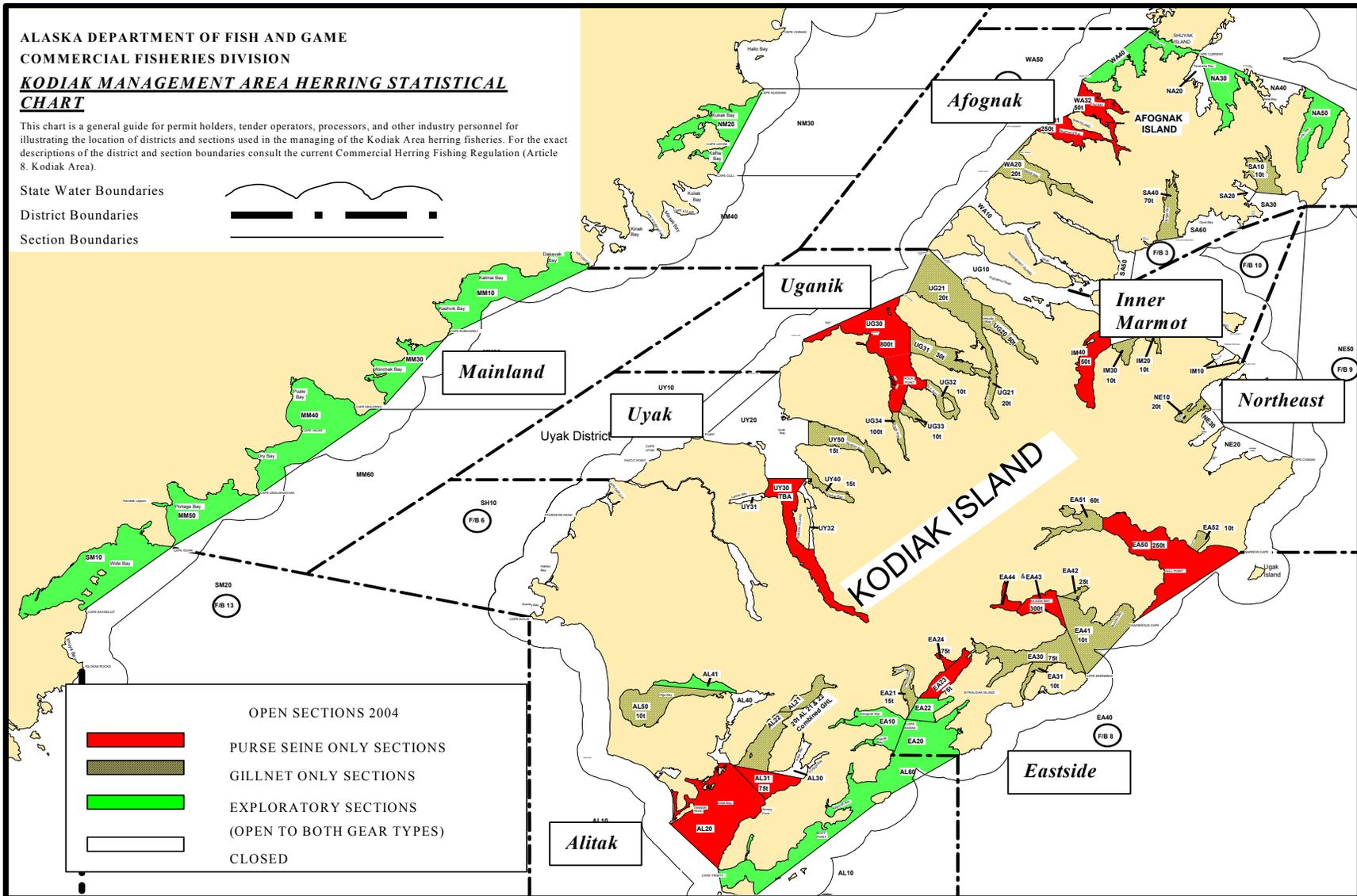


Figure 4.-Map of the Kodiak Management Area illustrating the herring commercial fishery districts.

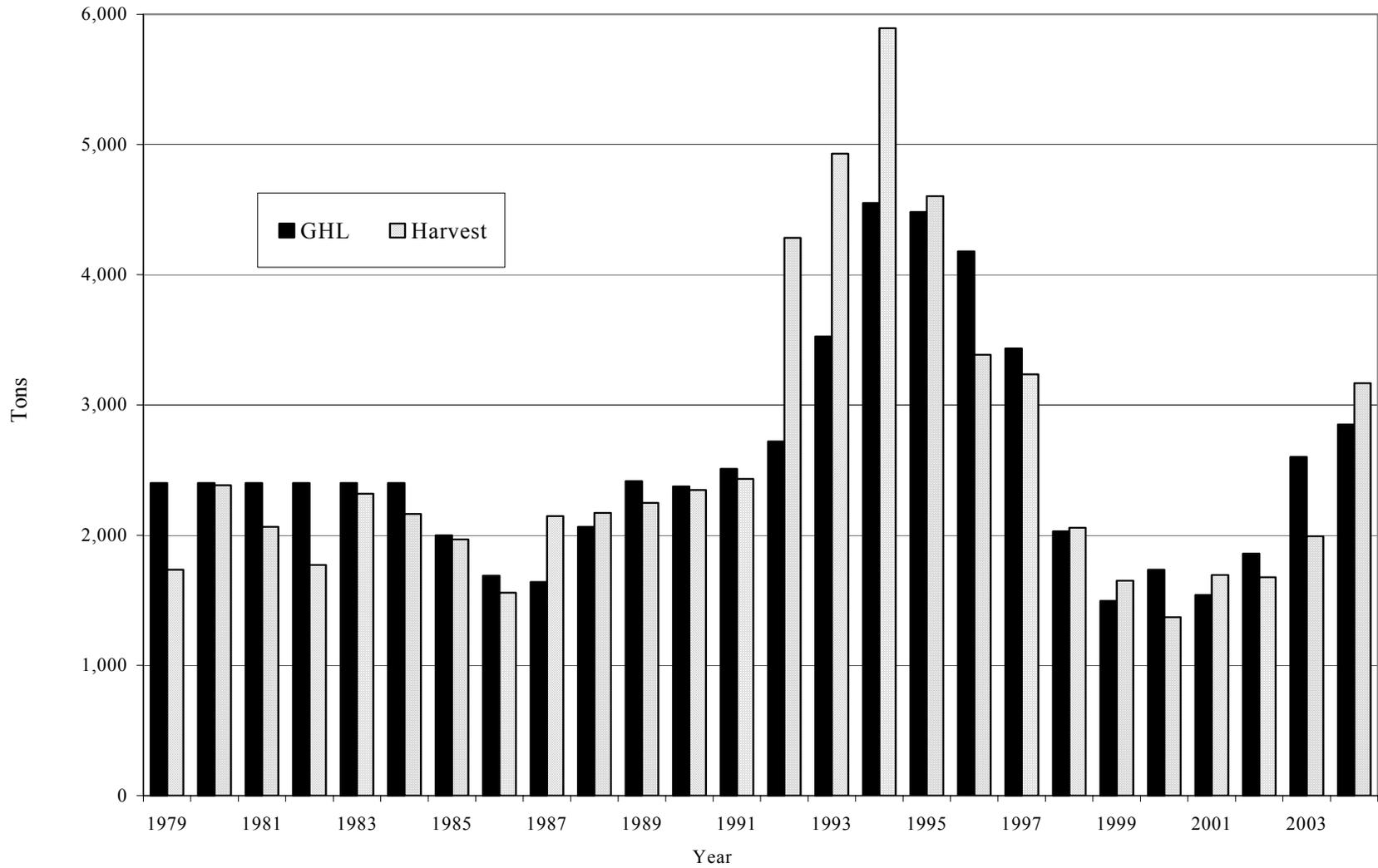


Figure 5.-Comparison of guideline harvest levels (GHLs) to the herring sac roe commercial harvest, Kodiak Management Area, 1979 to 2004.

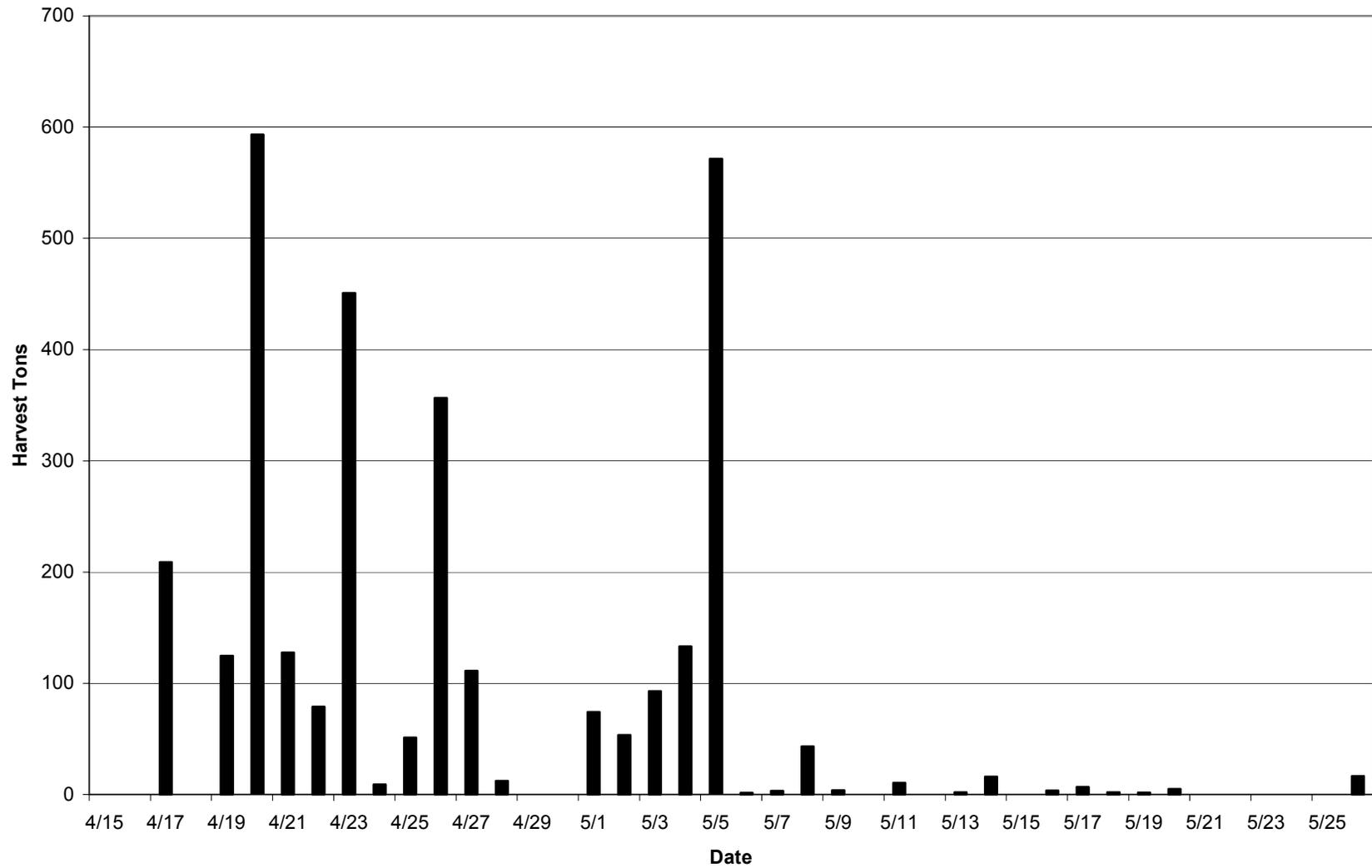


Figure 6.-Herring sac roe fishery harvest by day, Kodiak Management Area 2004.

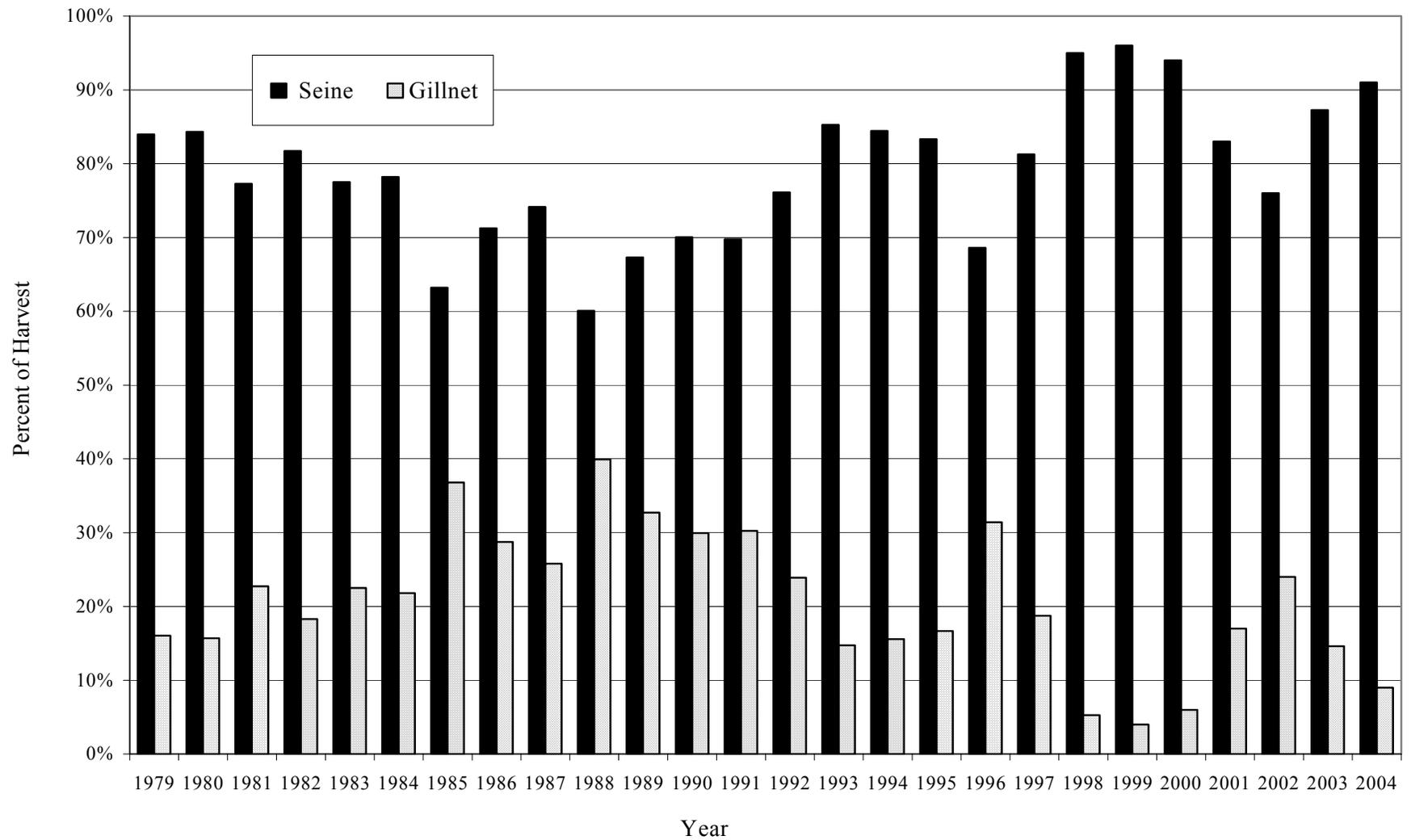


Figure 7.-Percent of the total harvest taken by gear type in herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2004.

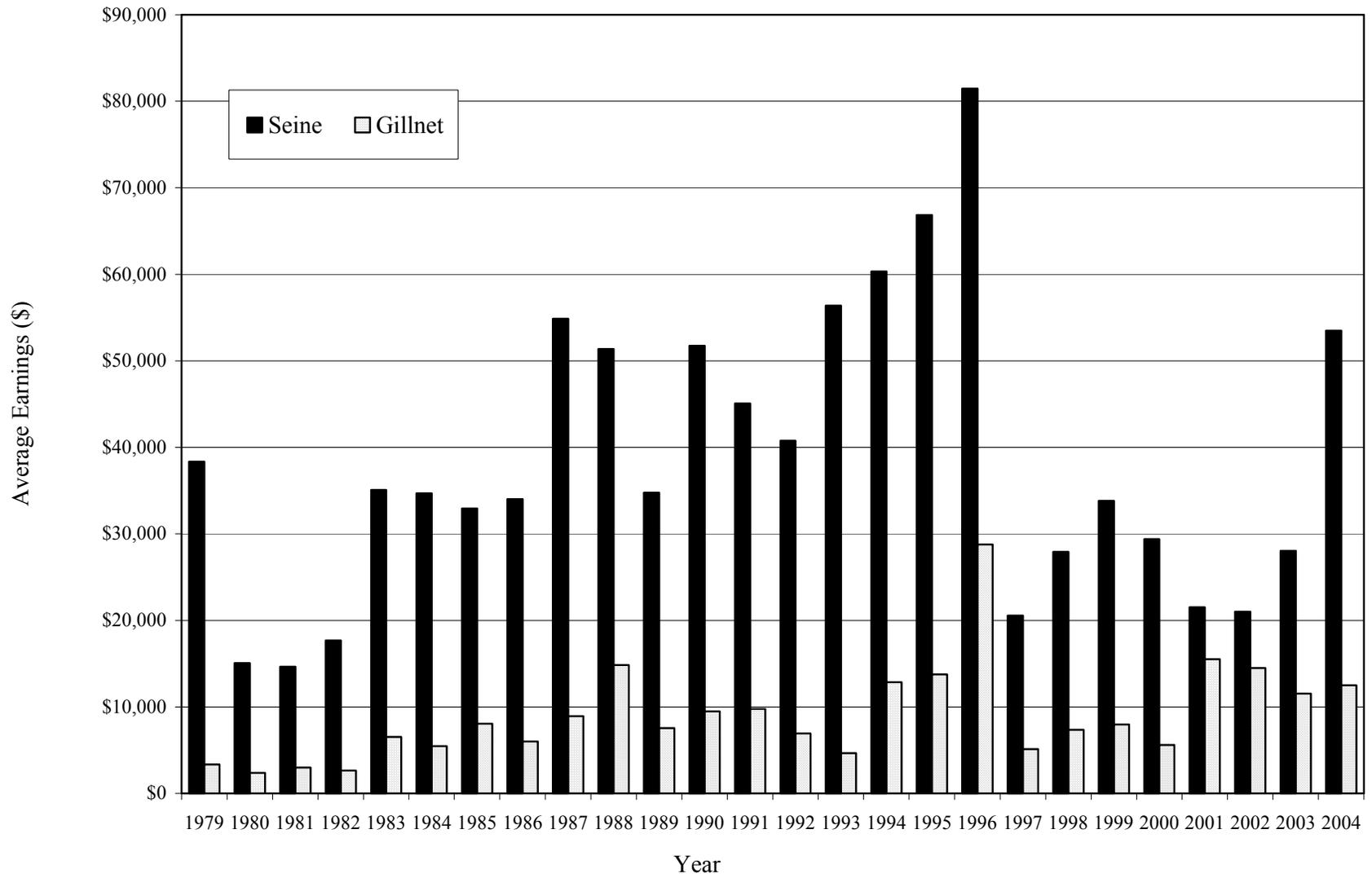


Figure 8.-Average earnings by gear type for herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2004.

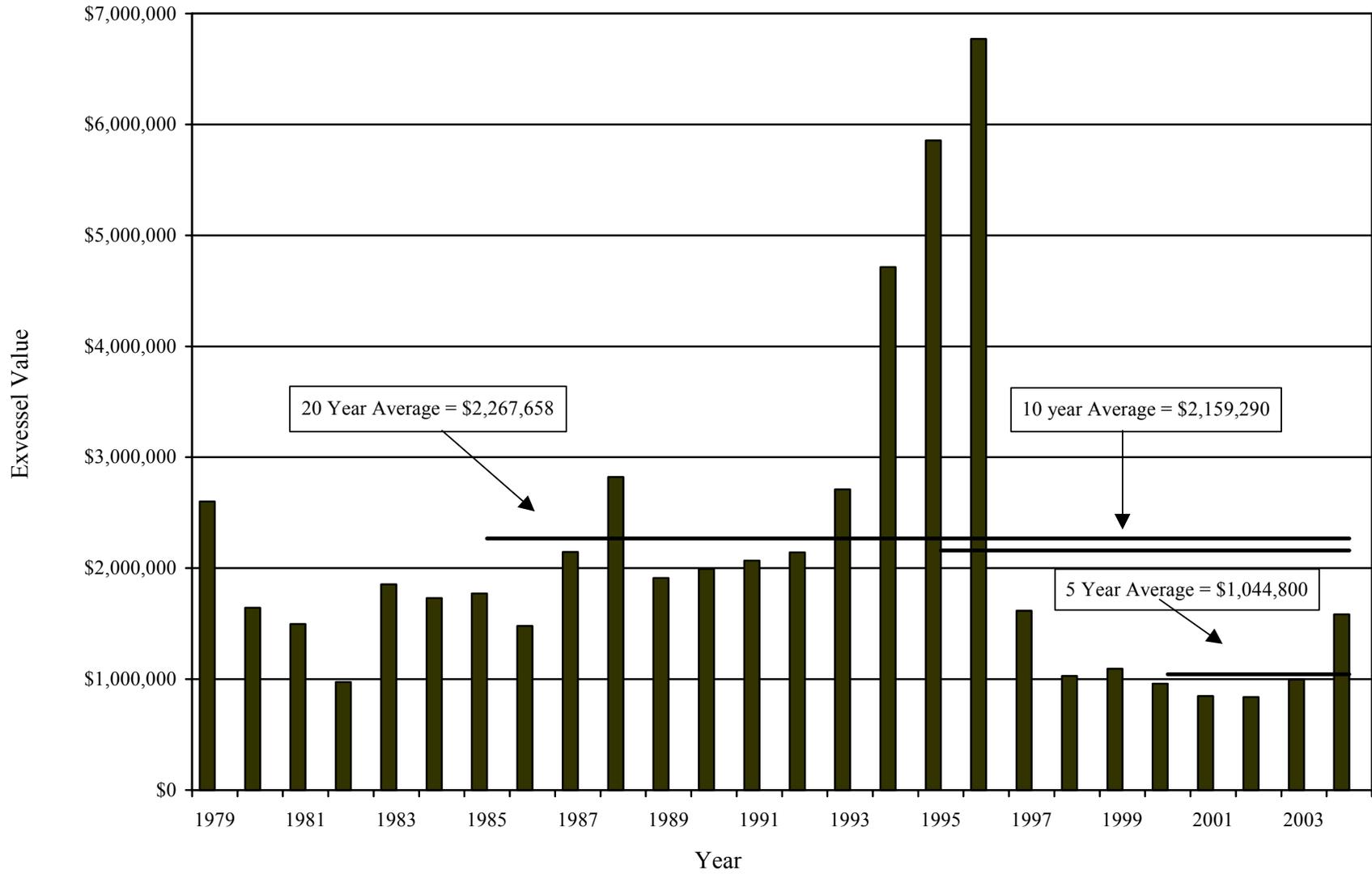


Figure 9.-Total exvessel value for herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2004.

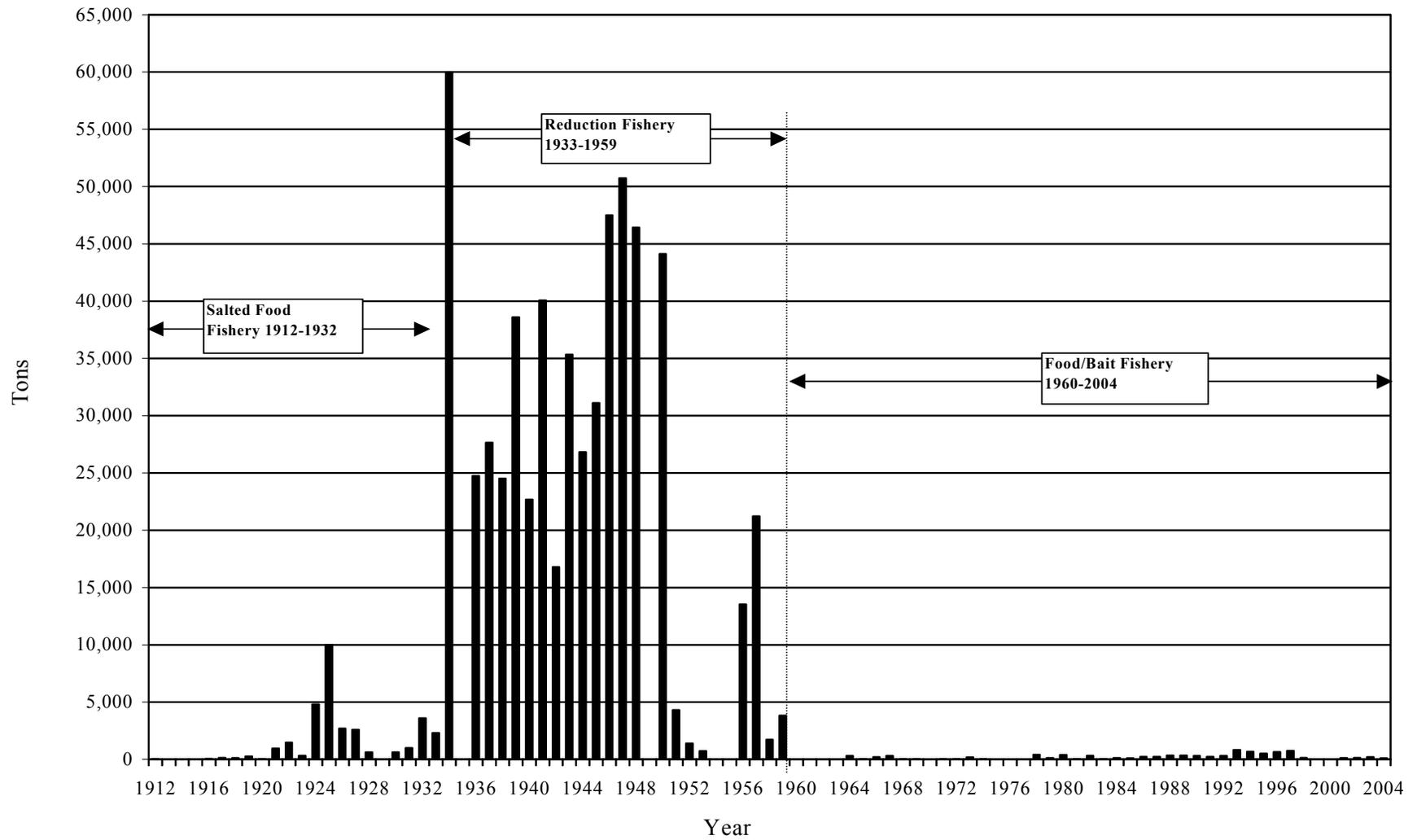


Figure 10.-Herring food and bait commercial fishery harvest, Kodiak Management Area, 1912 to 2004.

**APPENDIX A: SUMMARY OF EMERGENCY ORDERS ISSUED FOR
THE HERRING COMMERCIAL FISHERIES IN THE KODIAK
MANAGEMENT AREA, 2004**

Appendix A1.-Summary of emergency orders issued for herring commercial fisheries, Kodiak Management Area, 2004.

Emergency Order #	Issued:	Effective:	Action Taken:
1	3:00 PM April 9	NOON April 15	<u>Open:</u> initial opening times and fishing periods by gear and section for sac roe herring fishery announced. <u>Delay:</u> opening will be delayed in the Paramanof and Foul Bay Sections (WA 31 and 32), Village Islands Section (UG 30), Inner and Outer Ugak Bay Sections (EA50 and EA51), and the Pasagshak Bay Section (EA52) until further notice.
2	2:30 PM April 17	3:30 PM April 17	<u>Fishing Period:</u> 30 minute commercial herring fishing period in that portion of the Paramanof Bay Section (WA 31) south of 58° 17.40' N. latitude and east of 152° 50.00' W. longitude from 3:30 PM to 4:00 PM, April 17.
3	5:30 PM April 17	5:45 PM April 17	<u>Fishing Period:</u> 30 minute commercial herring fishing period in that portion of the Paramanof Bay Section (WA 31) north of 58° 17.40' N. latitude and south of 58° 20.00' N. latitude from 5:45 PM to 6:15 PM, April 17.
4	7:25 PM April 17	7:35 PM April 17	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Paramanof Bay Section (WA 31) east of 152° 50.00' W. longitude and in that portion of the Foul Bay Section (WA 32) south of 58° 20.00' N. latitude from 7:35 PM to 9:00 PM April 17.
5	8:45 PM April 19	8:50 PM April 19	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Village Island Section (UG 30) north of 57° 46.00' N. latitude and south of 57° 46.25' N. latitude from 8:50 PM to 9:00 PM April 19.
6	11:50 AM April 20	12:00 NOON April 20	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Village Island Section (UG 30) north of 57° 46.00' N. latitude and south of 57° 46.375' N. latitude from 12:00 NOON to 12:20 PM April 20.
7	6:00 PM April 20	12:01 AM April 20	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Village Island Section (UG 30) north of 57° 45.60' N. latitude and south of 57° 46.00' N. latitude from 3:05 PM to 3:20 PM April 20.

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Emergency Order #	Issued:	Effective:	Action Taken:
8	5:55 PM April 20	6:05 PM April 20	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Village Island Section (UG 30) north of 57° 46.00' N. latitude and south of 57° 46.411' N. latitude from 6:05 PM to 6:25 PM April 20.
9	10:25 AM April 22	10:45 AM April 22	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Paramanof Bay Section (WA 31) east of 152° 49.80' W. longitude south of 58° 17.40' N. latitude from 10:45 AM to 11:45 AM April 22.
10	11:05 AM April 22	11:15 AM April 22	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Village Island Section (UG 30) north of 57° 45.00' N. latitude and south of 57° 45.60' N. latitude from 11:15 AM to 11:25 AM April 22.
11	12:15 PM April 22	12:30 PM April 22	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Paramanof Bay Section (WA 31) east of 152° 50.40' W. longitude south of 58° 18.40' N. latitude from 12:30 PM to 3:30 PM April 22.
12	2:19 PM April 22	NOON April 22	<u>Closure:</u> the Paramanof Bay and Foul Bay Sections (WA 31 and WA32) at 2:19 PM April 22. The Danger Bay Section (SA40) at 12:00 NOON April 22.
13	9:40 AM April 23	9:45 AM April 23	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Village Island Section (UG 30) north of 57° 46.50' N. latitude and south of 57° 47.00' N. latitude from 9:45 AM to 9:55 AM April 23.
14	1:45 PM April 23	2:15 PM April 23	<u>Closure:</u> the Kizhuyak Bay Section (IM40) at 2:15 PM April 23.
15	6:50 PM April 23	6:53 PM April 23	<u>Closure:</u> the West Sitkalidak Strait Section (EA23) at 6:53 PM April 23.
16	8:10 PM April 25	8:15 PM April 25	<u>Fishing Period:</u> commercial herring fishing will be open in that portion of the Inner Uyak Bay Section (UY30) south of 57° 19.60' North latitude from 8:15 PM to 8:30 PM April 25.
17	11:30 AM April 26	NOON April 26	<u>Fishing Period:</u> commercial herring fishing will be open in the Inner Uyak Bay Section (UY30) from 12:00 NOON to 2:00 PM, April 26. Thirteen purse seine vessels present agreed to fish cooperatively.

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Emergency Order #	Issued:	Effective:	Action Taken:
18	4:30 PM April 28	NOON April 28	<u>Closure:</u> the Terror Bay (UG21) and West Uganik Passage (UG31) Sections at 12:00 NOON April 28.
19	9:00 AM May 4	9:00 PM May 3	<u>Closure:</u> the Inner and Outer Kiluida Bay Sections (EA44 and EA43) at 9:00 PM May 3. <u>Opening:</u> the Outer Ugak Bay Section (EA 50), the Inner Ugak Bay Section (EA 51), and the Pasagshak Section (EA 52) at 12:00 NOON May 5.
20	2:00 PM May 5	12:41 PM May 5	<u>Closure:</u> the Outer Ugak Bay Section (EA50) at 12:41 PM and the Barling Bay Section (EA24) at 2:00 PM May 5.
21	2:20 PM May 8	2:00 PM May 8	<u>Closure:</u> the Tonki Bay Section (NA50) at 2:00 PM May 8.
22	6:00 PM September 27	3:30 PM September 24	<u>Opening:</u> that portion of the Uganik District south of of Miners Point to commercial food and bait herring fishing from 6:00 PM September 24 to 6:00 AM September 26.
23	8:00 AM October 18	6:00 AM October 16	<u>Opening:</u> that portion of the Uganik District south of the latitude of Miners Point to commercial food and bait herring fishing from 6:00 AM October 16 to 6:00 PM October 17.