

KODIAK MANAGEMENT AREA
1998 COMMERCIAL SAC ROE HERRING FISHERY
SEASON SUMMARY

By

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SEASON SUMMARY

The 1998 Kodiak Management Area (KMA) sac roe herring fishery season opened at 12:00 noon on April 15 and continued through June 30. The majority of the harvest occurred during the first two weeks of the season with the last harvest occurring on June 3 (Figure 1). A total of 42 permit holders made 136 deliveries during the 1998 season, with 35 purse seiners and 7 gillnetters harvesting 2,057 tons (Table 1 and Figure 2). Approximately 47 purse seine permit holders participated in this year's fishery; about 12 purse seine permit holders did not make any landings for the season. Eight gillnetters participated in the fishery with seven making at least one landing during the season. Effort levels were sharply down for both gear types due primarily to uncertainties concerning the 1998 herring price. This was the second year of low prices for sac roe herring and many permit holders refused to fish or became involved in the cod jig fishery. The cod jig fishery season overlaps with the sac roe herring fishery. The total 1998 guideline harvest level (GHL) was 2,030 tons which was distributed among 32 sections; harvests occurred in 21 sections (Table 2). The 1998 harvest of 2,057 tons was the smallest harvest since 1986 and was 27 tons greater than the total KMA GHL of 2,030 tons (Figure 3). Purse seine gear accounted for 95% (1,954 tons) of the harvest with gillnet gear accounting for 5% (103 tons Figure 4). From 1979-1997, the percentage of harvest for purse seine gear has ranged from 85% to 60% of the total catch and gillnet gear has ranged from 40% to 15%. A total of 47 tenders were registered to transport herring. Three floating processors and seven shore based plants registered to process herring. Roe recovery percentages averaged 10.6% for seine gear and 10.5% for gillnet gear.

From April 15 through May 4 purse seine fishing periods were restricted to 13 hour periods, from 12:00 noon to 10:00 p.m. on the odd-numbered days and from 9:00 a.m. to 12:00 noon on the even-numbered days of the week. In late April the purse seine, tender, and floating processor fleet participating in the KMA fishery diminished, most vessels moved to the Bristol Bay herring fishery. Harvest rates also diminished in late April (Figure 1) and all ADF&G field crews were actively monitoring the primary sections where harvests were anticipated to occur. With this reduction in effort, reduced harvest rates, and good coverage of the fishery by Alaska Department of Fish and Game (ADF&G) field crews, purse seine fishing periods were increased to 24-hour openings followed by 24-hour closures beginning May 5, for all sections not previously closed to fishing. Gillnet fishing periods were 24 hours in duration, from 12:00 noon on odd-numbered days of the week to 12:00 noon on even -numbered days of the week for the entire season.

The 1998 fishery was monitored by four ADF&G shorebased field crews and two ADF&G vessels, which were stationed in anticipated herring harvest locations. Crews monitored the fishery to gather effort and harvest data used to manage the fishery, and collected commercial catch samples to obtain age, weight, and length (AWL) data. A total of 20 emergency orders were issued during the season which established or adjusted fishing periods and closed sections when GHL's were achieved.

REGULATORY CHANGES

The Alaska Board of Fisheries (BOF) adopted new regulations for the KMA sac roe herring fishery during its November 1995 meeting. The BOF approved regulations were in effect for the 1996 through 1998 seasons. The BOF changes included the development of a regulatory harvest strategy and changes in purse seine and gillnet gear depth specifications. The ADF&G Division of Commercial Fisheries staff since the early 1980's had in essence used portions of the new regulatory harvest strategy (5 AAC 27.535 e) (1996-97 ADF&G). The ADF&G annually publishes a preseason harvest strategy which informs fishers on how the fishery will be managed and lists GHL's for sections (Gretsch 1998).

The major change addressed by the BOF regulatory harvest strategy was the shortening of fishing periods for purse seiners. This change resulted from ADF&G's inability to monitor purse seiners fishing during the night when near record levels of purse seine gear participated in the 1995 fishery. These factors prompted ADF&G to shorten the duration of fishing periods to slow the harvest rates of purse seiners (Gretsch 1995).

HARVEST STRATEGY EVALUATION

The reduction in purse seine fishing periods for the 1996 through 1998 seasons has aided the management of this fishery. During the first two weeks of the season when effort levels are the highest the 13 hour fishing periods were crucial in controlling the harvest and preventing overexploitation of KMA herring stocks. Prior to the 1996 season, it was very difficult and dangerous for ADF&G's field crews to monitor the seine fleet in darkness (10:00 p.m. to 6:00 a.m.) from small rafts and skiffs. Generally, seine catches improve as darkness approaches with fishery activity intensifying at or near the 10:00 p.m. closure time as herring move up in the water column. Catches which occur near 10:00 p.m. may take several hours to be loaded aboard a tender, which requires the field crews to be present to assess the harvest and evaluate the need to close a section if the GHL has been met. The 10:00 p.m. closure time has eliminated the unrestricted seine fishery during the night and has reduced the time field crews must work in potentially dangerous situations. The ADF&G field crews still must monitor the fishery during some periods of darkness during the first two weeks of the season.

There are many factors that contribute to harvest rates within the KMA fishery. These factors include effort levels, the availability of the biomass to harvest, and weather conditions. In evaluating the third season of the 1995 BOF harvest strategy a comparison of the GHL to the actual 1998 harvest is useful. For the West Afognak District the total GHL was 510 tons and the actual harvest for the season was 553 tons (Table 2). During the period of April 15-30 when effort levels were the highest, the Paramanof Bay (GHL 400 tons) and Foul Bay (GHL 100 tons) sections had harvests of 453 tons and 100 tons. These sections were closed on April 15 and 21 respectively. In the Uganik District, the total GHL was 650 tons the actual harvest was 777 tons. During the high effort level time period (April 15-30), the Village Island, Viekodan Bay, East Arm, and South Arm Uganik sections had a combined GHL of 400 tons and 556 tons were

harvested, with closures occurring on April 17, 19, 23, and 24 respectively. The harvest from the Viekoda Bay Section 189 tons (GHL 75 tons) greatly exceeded the GHL and this high harvest can mainly be attributed to a strong showing of younger age class herring into this section with approximately 20 seiners fishing. For the Alitak District, the total GHL was 75 tons and the actual harvest was 74 tons and there were no section closures during the April 15-30 time period. For the Eastside District, the total GHL was 640 tons and the actual harvest was 654 tons. There were six sections that closed during the April 15-30 period with combined harvests totaling 525 tons and combined GHL's of 460 tons. For the three Mainland Districts, the combined GHL was 140 tons; there was no harvest for the season from these districts.

For the 1998 fishery a total of 32 sections were open to fishing, harvests occurred in 21 sections, and 18 sections were closed during the season after the GHL had been achieved or approached. Of the 18 sections closed inseason, three had harvests that exceeded the section GHL's by 50% or more (Viekoda Bay, West Uganik Passage, and Pasagshak Bay). During the April 15-30 time period only the Viekoda Bay section experienced a harvest that greatly exceeded the GHL. Management sections with small GHL's (30 tons or less), such as the West Uganik Passage (GHL 20 tons) harvest 38 tons and Pasagshak Bay (GHL 10 tons) harvest 25 tons are the most difficult to manage due to the large harvest capability of seiners. In both of these sections the GHL was greatly exceeded with low effort levels, four and two seiners for the respective sections. In comparison to the 1996 and 1997 fisheries only two sections and six sections respectively had harvests that exceeded the GHL by 50% or more. Since the 1995 BOF regulatory changes, the occurrence of excessive harvests have been reduced with the reductions in seine fishing period duration and gear depths. Although there have not been any excessive harvests during the last three years like the 1995 harvest of 801 tons from the Foul Bay section (75 ton GHL) or the 1994 harvest of 1,093 tons from the South Arm Uganik Bay section (75 ton GHL), there will continue to be the potential for excessive harvests. During the 1998 season one seine set produced approximately 100 tons of herring.

CATCH SAMPLING

A total of 7,385 herring were collected for age-weight-length (AWL) analysis from the purse seine harvest of 17 sections. Age-5 herring were the dominant age class harvested in the 1998 season, representing an estimated 41% of the total purse seine harvest (Table 3). The remaining age classes represented the following percentage of the seine harvest; age-3 (3%), age-4 (30%), age-6 (4%), age-7 (3%), age-8 (2%), age-9 (2%), age-10 (11%), and age-11+ (3%). Generally, the herring from the eastside of the KMA are larger at age than those from the westside and the 1998 catch samples continue to show this trend (Table 4).

EXVESSEL VALUE OF THE FISHERY

The average price paid for 10% roe recovery was approximately \$300 per ton of herring. This was the second year in a row of record low herring prices. The average exvessel earnings for purse seine fishers was \$16,700 and for gillnetters \$4,400 (Figure 5). The total exvessel value of the 1998 fishery

was \$617,100, which is the lowest total value in the history of the fishery (Figure 6). The previous record low value of this fishery occurred in 1997 when 3,235 tons were harvested and was worth \$970,500.

1999 HARVEST EXPECTATIONS AND STOCK STATUS

Herring harvests in the West Afognak and Uganik Districts have relied strongly on a dominant single age class of herring (1988 brood year) to support these fisheries in the recent years of record harvest (1992-1997). The 1998 contribution to the fishery of age-10 herring ranged from 6-25% by section. Harvests from these districts accounted for 65% of the total 1998 KMA harvest. Several sections within these districts experienced fair to good recruitment of age-3 herring in 1998. Most of the 1999 harvest is expected to be age-5 and age-6 fish.

Similarly, the Eastside District also relied on a strong single age class to support the fisheries through 1997. In 1998, age-11 fish contribution to the section harvests ranged from approximately 1-18%. It is expected that the contribution from this age class will diminish further in 1999. Recruitment herring (age-3) harvested in the 1998 fishery indicates poor recruitment for the Eastside District. Age-5 herring dominated the 1998 Eastside District harvest and contributed 66-94% of the section harvests. The 1999 Eastside District fishery will likely be dependent on age-6 herring for the majority of the harvest.

The Alitak District has also experienced declines in herring abundance in recent years and for the 1998 season only three of the ten sections of the district were open to fishing. The Uyak District, South Afognak District, and most of the North Afognak District were closed for the 1995-1998 seasons due to a decline in herring abundance for the years 1991-1994. The Tonki Bay section was reopened for the 1998 season based on 1997 aerial survey data, however no harvest occurred. Several sections of the Inner Marmot District were also closed for the 1996 and 1997 seasons and in 1998 the entire district was closed. In addition, the Raspberry Strait and Malina Bay sections were closed to fishing in 1997 and 1998, as fishery performance was poor in 1995 and in 1996. The Northeast District was also closed for the 1998 season based on declining sac roe fishery performance for this district and a harvest in the Fall of 1997 of 120 tons during the food/bait fishery which was thought to have greatly impacted this stock. Lastly, for the 1998 season, the ADF&G reevaluated the sections that have been designated exploratory and that had little history of sac roe herring harvest. Several of these exploratory sections were assigned a GHL, while the remaining sections were closed to fishing. Fishery management options for these closed areas will be discussed during the winter and these same areas will likely be closed to fishing again in 1999.

The setting of the 1999 GHL's for the KMA sac roe herring fishery will be under evaluation during the winter and will be published in the Kodiak Sac Roe Herring Harvest Strategy, in mid-March of 1999. For planning purposes the 1999 GHL is expected to be approximately 1,700 tons, which is a 15% reduction from the total 1998 GHL.

STOCK ASSESSMENT PROGRAMS

The ADF&G proposed to conduct a test fishery revenue-gathering program in 1997 and 1998 to harvest approximately 50 tons of herring. These funds were to be utilized to conduct additional aerial surveys of the closed sections, along with contracting a seine vessel to make test sets on herring schools in the Uyak District. The current allowable 'test fish' budget for KMA herring is \$114,000. Due to the low herring price, the test fish program was halted as the necessary funds for the program could not be raised without a considerable harvest. Several ADF&G aerial surveys along with aerial surveys from industry spotters continue to indicate that the Uyak stocks are still depressed. The ADF&G hopes to conduct a more intensive stock assessment program in 1999 as funding allows.

In recent years, the ADF&G has also proposed doing hydroacoustic surveys of the East and West Sitkalidak Strait sections to assess the biomass within these areas if funding, personnel, and equipment are available. In late March and early April for at least the last ten years, a herring biomass of unknown size spawned in the East Sitkalidak Strait prior to the start of the fishery. This spawn activity indicates the total biomass within this section is larger than the actual fishery performance indicates, however the size of the biomass is unknown. A purse seiner was contracted in late March 1998 to make test sets on herring schools and conduct a hydroacoustic survey of the Sitkalidak Strait area. This limited survey did provide AWL data, which revealed the presence of older age class herring (age-7, -8, -10, and -11) that were not present during the commercial fishery for this section. The hydroacoustic survey found multiple schools of spawning herring in several locations within the Sitkalidak Strait but overall school sizes and distribution did not indicate a large biomass was present.

The ADF&G headquarters and Kodiak Area research staff have attempted an assessment of the stock status of KMA herring stocks. Staff concentrated their efforts on the West Afognak and Uganik Districts and conducted an age-structured analysis (ASA) of these districts. The ASA model is highly dependent on an accurate biomass estimate to guide the model. Unfortunately this information is not available for these districts. Until a more accurate assessment of the biomass can be determined, the ASA models usefulness will be limited.

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Table 1. Sac roe herring fishery summary of season length, guideline harvest level (GHL), harvest data by gear type, percentage of harvest by gear type, number of landings, and exvessel earnings, Kodiak Management Area, 1979-1998.

Year	Season Length (Days)	G-H-L (Tons)	Total Harvest (Tons)	Harvest by Gear Type		Percent Harvest by Gear Type		Number of Landings by Gear Type		Units of Gear Making Landings		Average Catch by Gear		Average Earnings		Price per Ton (\$)	Exvessel Total Value (\$)
				Seine (Tons)	Gillnet (Tons)	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine (Tons)	Gillnet (Tons)	Seine (\$)	Gillnet (\$)		
1979	36	2,400	1,735	1,457	278	84%	16%	-	-	57	125	26	2	\$38,342	\$3,336	\$1,500	\$2,602,500
1980	35	2,400	2,383	2,009	374	84%	16%	-	-	92	109	22	3	\$15,068	\$2,368	\$690	\$1,644,270
1981	48	2,400	2,065	1,596	469	77%	23%	207	406	79	114	20	4	\$14,647	\$2,983	\$725	\$1,497,125
1982	59	2,400	1,771	1,447	324	82%	18%	138	191	45	67	32	5	\$17,686	\$2,660	\$550	\$974,050
1983	51	2,400	2,319	1,797	522	77%	23%	164	284	41	64	44	8	\$35,063	\$6,525	\$800	\$1,855,200
1984	54	2,400	2,163	1,691	472	78%	22%	138	212	39	69	43	7	\$34,687	\$5,472	\$800	\$1,730,400
1985	59	2,000	1,968	1,244	724	63%	37%	118	348	34	81	37	9	\$32,929	\$8,044	\$900	\$1,771,200
1986	61	1,690	1,558	1,110	448	71%	29%	132	385	31	71	36	6	\$34,016	\$5,994	\$950	\$1,480,100
1987	61	1,640	2,146	1,591	554	74%	26%	122	411	29	62	55	9	\$54,862	\$8,935	\$1,000	\$2,146,000
1988	59	2,065	2,171	1,304	867	60%	40%	169	555	33	76	40	11	\$51,370	\$14,830	\$1,300	\$2,822,300
1989	76	2,415	2,249	1,513	736	67%	33%	171	627	37	83	41	9	\$34,749	\$7,535	\$850	\$1,911,149
1990	75	2,375	2,347	1,644	703	70%	30%	156	544	27	63	61	11	\$51,756	\$9,465	\$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	\$8,912	\$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	\$80,315	\$12,870	\$800	\$4,714,400
1995	73	4,480	4,604	3,837	768	83%	17%	280	642	73	71	53	11	\$66,858	\$13,759	\$1,272	\$5,856,288
1996	69	4,180	3,386	2,322	1,064	69%	31%	202	890	57	74	41	14	\$81,474	\$28,757	\$2,000	\$6,772,000
1997	49	3,435	3,235	2,629	606	81%	19%	183	418	64	59	41	10	\$12,323	\$3,081	\$300	\$970,500
1998	50	2,030	2,067	1,954	103	95%	5%	110	26	35	7	56	16	\$16,748	\$4,414	\$300	\$617,100
Averages																	
1979-1998	61	2,701	2,785	2,164	621	77%	23%	158	401	48	74	48	9	\$39,755	\$8,118	\$874	\$2,413,959
Five Year																	
1993-1997	68	4,034	4,409	3,593	816	81%	19%	237	546	60	69	62	12	\$55,470	\$12,622	\$984	\$4,204,828
Ten Year																	
1988-1997	71	3,228	3,553	2,739	816	75%	25%	204	576	47	71	59	12	\$50,105	\$11,163	\$927	\$3,196,124

Table 2. Sac roe herring fishery guideline harvest level (GHL) by management section, harvest by gear type, total harvest, and the date each section was closed, Kodiak Management Area, 1998.

Statistical Area	Management Section	GHL (Tons)	Seine Harvest (Tons)	Gillnet Harvest (Tons)	Total Harvest (Tons)	Date Management Section Closed
North Afognak District						
NA10	Shuyak Island	Closed	0.0	0.0	0.0	-
NA20	Delphin Bay	Closed	0.0	0.0	0.0	-
NA30	Perenosa Bay	Closed	0.0	0.0	0.0	-
NA40	Seal Bay	Closed	0.0	0.0	0.0	-
NA50	Tonki Bay	15	0.0	0.0	0.0	30-Jun
District Total		15	0.0	0.0	0.0	
West Afognak District						
WA10	Raspberry Strait	Closed	0.0	0.0	0.0	-
WA20	Malina Bay	Closed	0.0	0.0	0.0	-
WA31	Paramanof Bay	400	438.3	14.7	453.0	15-Apr
WA32	Foul Bay	100	99.7	0.0	99.7	21-Apr
WA40	Devils Inlet/Bluefox B.	10	0.0	0.0	0.0	30-Jun
WA50	Offshore W. Afognak	Closed	0.0	0.0	0.0	-
District Total		510	538.0	14.7	552.7	
South Afognak District						
SA10	Izhut Bay	Closed	0.0	0.0	0.0	-
SA20	Kitoy Bay	Closed	0.0	0.0	0.0	-
SA30	MacDonalds Lagoon	Closed	0.0	0.0	0.0	-
SA40	Danger Bay	Closed	0.0	0.0	0.0	-
SA50	Litnik	Closed	0.0	0.0	0.0	-
SA60	Duck Bay	Closed	0.0	0.0	0.0	-
District Total		Closed	0.0	0.0	0.0	
Uganik District						
UG10	Kupreanof	Closed	0.0	0.0	0.0	-
UG20	Viekoda Bay	75	189.2	0.0	189.2	19-Apr
UG21	Terror Bay	200	155.3	27.3	182.6	2-May
UG30	Village Island	150	134.1	3.6	137.7	17-Apr
UG31	W. Uganik Pass	20	38.4	0.0	38.4	3-May
UG32	NE. Arm Uganik	30	0.0	0.0	0.0	30-Jun
UG33	E. Arm Uganik	75	99.9	0.5	100.4	23-Apr
UG34	S. Arm Uganik	100	124.9	3.9	128.8	24-Apr
UG40	Offshore Uganik	Closed	0.0	0.0	0.0	-
District Total		650	741.8	35.3	777.1	

-Continued-

Table 2. (page 2 of 3)

Statistical Area	Management Section	GHL (Tons)	Selne Harvest (Tons)	Gillnet Harvest (Tons)	Total Harvest (Tons)	Date Management Section Closed
Uyak District						
UY10	Offshore Uyak	Closed	0.0	0.0	0.0	-
UY20	Harvester Island	Closed	0.0	0.0	0.0	-
UY30	Inner Uyak Bay	Closed	0.0	0.0	0.0	-
UY31	Larsen Bay	Closed	0.0	0.0	0.0	-
UY32	Browns Lagoon	Closed	0.0	0.0	0.0	-
UY40	Zachar Bay	Closed	0.0	0.0	0.0	-
UY50	Spiridon Bay	Closed	0.0	0.0	0.0	-
District Total		Closed	0.0	0.0	0.0	
Alitak District						
AL10	Outer Alitak	Closed	0.0	0.0	0.0	-
AL20	Inner Alitak	10	0.0	1.5	1.5	30-Jun
AL21	Inner Deadman Bay	Closed	0.0	0.0	0.0	-
AL22	Outer Deadman Bay	Closed	0.0	0.0	0.0	-
AL30	Sulua Bay	Closed	0.0	0.0	0.0	-
AL31	Portage Bay	50	58.5	0.0	58.5	4-Jun
AL40	Lower Olga/Moser	Closed	0.0	0.0	0.0	-
AL41	N.Upper Olga Bay	Closed	0.0	0.0	0.0	-
AL50	Upper Olga Bay	Closed	0.0	0.0	0.0	-
AL60	Geese/Twoheaded	15	13.8	0.0	13.8	14-May
District Total		75	72.3	1.5	73.8	
Sturgeon/Halibut District						
SH10	Sturgeon/Halibut	Closed	0.0	0.0	0.0	-
Eastside District						
EA10	Kaiugnak	10	0.0	0.0	0.0	30-Jun
EA20	SW. Sitkalidak	10	0.0	0.0	0.0	30-Jun
EA21	Three Saints Bay	30	0.0	9.4	9.4	30-Jun
EA22	Newman Bay	10	0.0	0.0	0.0	30-Jun
EA23	W.Sitkalidak Bay	50	57.5	4.1	61.6	7-May
EA24	Barling Bay	40	48.8	0.0	48.8	23-Apr
EA30	E.Sitkalidak Strait	50	16.7	15.6	32.3	30-Jun
EA31	Tanginak Anchorage	Closed	0.0	0.0	0.0	-
EA40	Outer Sitkalidak	Closed	0.0	0.0	0.0	-
EA41	Boulder Bay	10	0.0	0.0	0.0	30-Jun
EA42	Shearwater Bay	90	96.3	3.0	99.3	28-Apr
EA43	Outer Kiliuda Bay	90	79.4	10.1	89.5	28-Apr
EA44	Inner Kiliuda Bay	90	88.7	0.0	88.7	25-Apr
EA50	Outer Ugak Bay	60	82.3	0.0	82.3	24-Apr
EA51	Inner Ugak Bay	90	107.3	9.1	116.4	30-Apr
EA52	Pasagshak Bay	10	25.4	0.0	25.4	14-May
District Total		640	602.4	51.3	653.7	

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Table 2. (page 3 of 3)

Statistical Area	Management Section	GHL (Tons)	Seine Harvest (Tons)	Gillnet Harvest (Tons)	Total Harvest (Tons)	Date Management Section Closed
Northeast District						
NE10	Womens Bay	Closed	0.0	0.0	0.0	-
NE20	Kalsin Bay	Closed	0.0	0.0	0.0	-
NE30	Middle Bay	Closed	0.0	0.0	0.0	-
NE40	Inshore Chiniak	Closed	0.0	0.0	0.0	-
NE50	Offshore Chiniak	Closed	0.0	0.0	0.0	-
District Total		Closed	0.0	0.0	0.0	
Inner Marmot District						
IM10	Monashka Bay	Closed	0.0	0.0	0.0	-
IM20	Anton Larsen Bay	Closed	0.0	0.0	0.0	-
IM30	Sharatin Bay	Closed	0.0	0.0	0.0	-
IM40	Kizhuyak Bay	Closed	0.0	0.0	0.0	-
IM50	Spruce Island	Closed	0.0	0.0	0.0	-
District Total		Closed	0.0	0.0	0.0	-
North Mainland District						
NM10	Hallo Bay	Closed	0.0	0.0	0.0	-
NM20	Inner Kukak	25	0.0	0.0	0.0	30-Jun
NM30	Outer Kukak	Closed	0.0	0.0	0.0	-
NM40	Missak Bay	Closed	0.0	0.0	0.0	-
District Total		25	0.0	0.0	0.0	
Mid Mainland District						
MM10	Inner Katmai	50	0.0	0.0	0.0	30-Jun
MM20	Outer Katmai	Closed	0.0	0.0	0.0	-
MM30	Alinchak	15	0.0	0.0	0.0	30-Jun
MM40	Puale Bay	Closed	0.0	0.0	0.0	-
MM50	Portage Bay	Closed	0.0	0.0	0.0	-
MM60	Outer Portage-Puale	Closed	0.0	0.0	0.0	-
District Total		65	0.0	0.0	0.0	
South Mainland District						
SM10	Wide Bay	50	0.0	0.0	0.0	30-Jun
SM20	Lower Shelikof	Closed	0.0	0.0	0.0	-
District Total		50	0.0	0.0	0.0	
Grand Total		2,030	1,954.6	102.8	2,057.3	

Table 3. Age composition, by percent, of sac roe herring samples from the commercial purse seine harvest by section, Kodiak Management Area, 1998.^a

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+	
Paramanof Bay	453.0	0.0	2.3	19.2	26.4	7.1	4.9	6.0	6.2	24.9	2.5	545
Foul Bay	99.7	0.0	1.4	23.7	34.7	6.4	6.6	2.9	3.4	19.6	0.9	636
Viekoda Bay	189.2	0.0	4.1	60.0	24.8	2.5	0.9	1.2	0.0	6.1	0.0	310
Terror Bay	182.6	0.0	6.2	50.6	25.4	5.2	2.1	0.3	1.2	7.4	1.2	322
W. Uganik Passage	38.4	0.2	2.0	77.3	12.4	1.8	0.6	1.6	0.4	2.2	1.0	482
Village Islands	137.7	0.0	3.6	53.4	14.1	3.3	3.8	4.4	2.2	14.3	0.4	627
E. Arm Uganik	100.4	0.0	3.5	58.8	17.9	5.1	1.5	2.8	1.7	7.4	1.0	391
S. Arm Uganik	128.8	0.0	16.0	57.4	10.0	1.6	1.4	1.4	1.8	9.6	0.8	500
W. Sitkalidak Straits	61.6	0.0	0.0	5.7	82.6	0.5	4.6	0.0	0.0	2.8	3.4	173
Barling Bay	48.8	0.0	0.7	11.5	66.5	2.7	8.3	0.3	0.3	5.1	3.9	251
E. Sitkalidak Straits	32.3	1.0	1.0	2.6	86.9	0.5	4.1	0.0	0.0	1.5	2.0	192
Shearwater Bay	99.3	0.2	0.0	2.0	69.2	0.1	7.9	0.0	0.8	1.4	17.9	669
Outer Kiliuda Bay	89.5	0.8	0.6	3.0	73.4	0.4	4.7	0.0	1.5	3.2	11.9	460
Inner Kiliuda Bay	88.7	1.7	0.8	5.2	72.5	0.6	3.3	0.1	0.9	3.0	11.3	624
Pasagshak Bay	25.4	0.2	0.9	4.7	85.4	0.9	2.5	0.7	0.7	0.4	3.2	425
Outer Ugak Bay	82.3	0.0	1.2	21.3	75.9	0.2	0.5	0.0	0.2	0.0	0.5	399
Inner Ugak Bay	116.4	0.0	0.0	3.1	94.4	0.0	0.2	0.0	0.5	0.5	1.0	379
All samples combined 17 sections ^b	1974.1	0.2	3.2	30.1	40.9	3.5	3.4	2.3	2.3	10.6	3.2	7385

^a Of the 21 management units exploited in 1998, samples were collected from 17 (81%). These 17 units yielded 1,974 tons or 96% of the management area's total harvest of 2,057 tons.

^b All samples combined data, weights the percent of the harvest by section to the age class data to estimate the combined purse seine age composition.

Table 4. Average weight in grams by age class and section from samples taken from the commercial purse seine harvest, Kodiak Management Area, 1998.

District Section	Average Weight at Age (g)									
	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10	Age-11+
W.Afognak District										
Paramanof Bay	0	97	131	161	187	211	221	234	252	261
Foul Bay	0	88	135	169	188	222	235	234	249	277
Uganik District										
Viekoda Bay	0	95	121	153	159	210	215	0	241	0
Terror Bay	0	91	122	154	168	196	200	242	239	263
W. Uganik Passage	47	84	135	165	221	217	228	183	266	274
Village Islands	0	84	126	157	182	201	212	228	241	249
E. Arm Uganik	0	95	124	150	176	183	210	208	244	222
S. Arm Uganik	0	81	114	145	171	199	207	206	226	239
Eastside District										
W. Sitkalidak Straits	0	0	177	204	221	253	0	0	328	310
Barling Bay	0	124	162	196	211	278	252	314	311	331
E. Sitkalidak Straits	88	112	153	201	198	253	0	0	283	315
Shearwater Bay	91	0	165	203	221	279	0	308	315	336
Outer Kiliuda Bay	82	121	158	202	230	279	0	339	309	338
Inner Kiliuda Bay	78	110	147	189	189	273	329	309	304	325
Pasagshak Bay	0	100	153	179	194	257	282	288	271	308
Outer Ugak Bay	0	123	157	184	190	281	0	323	0	280
Inner Ugak Bay	0	0	154	179	0	241	0	299	276	322

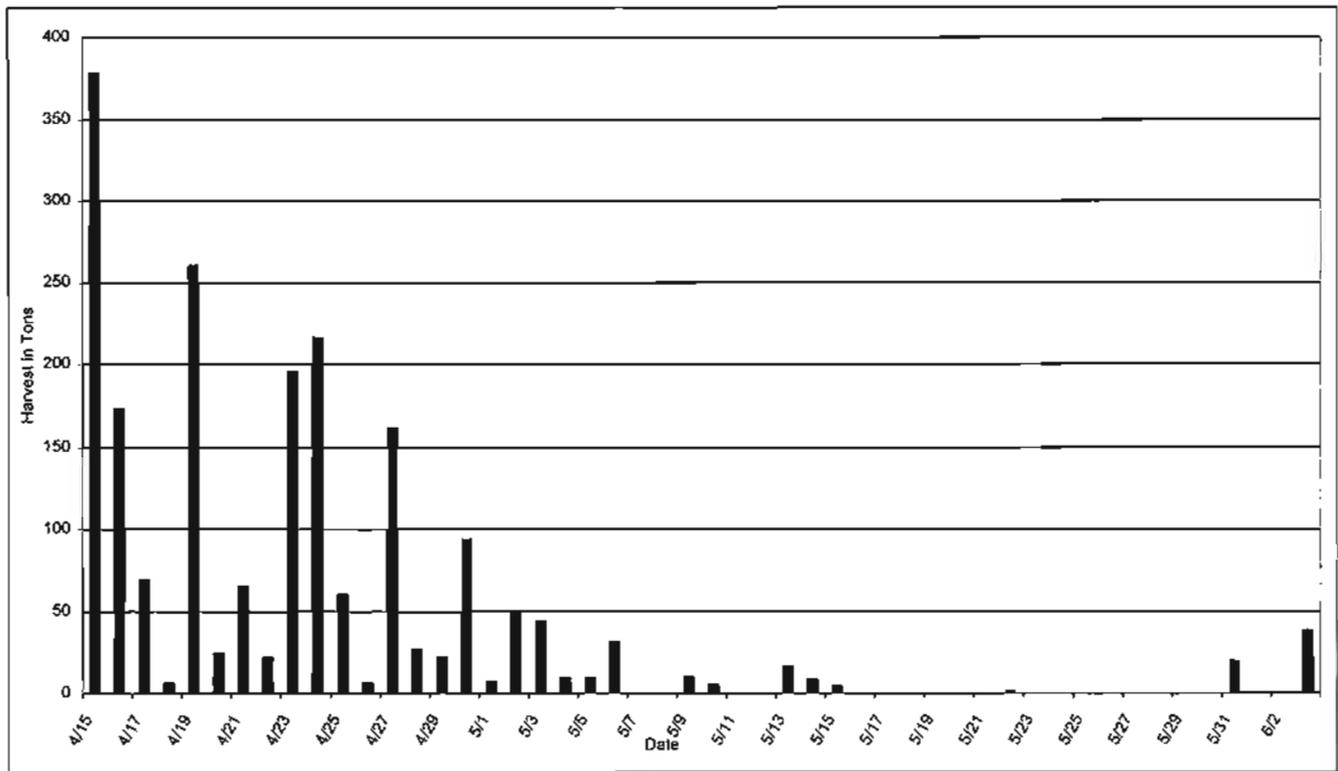


Figure 1. Commercial sac roe herring harvest by day for the Kodiak Management Area, 1998.

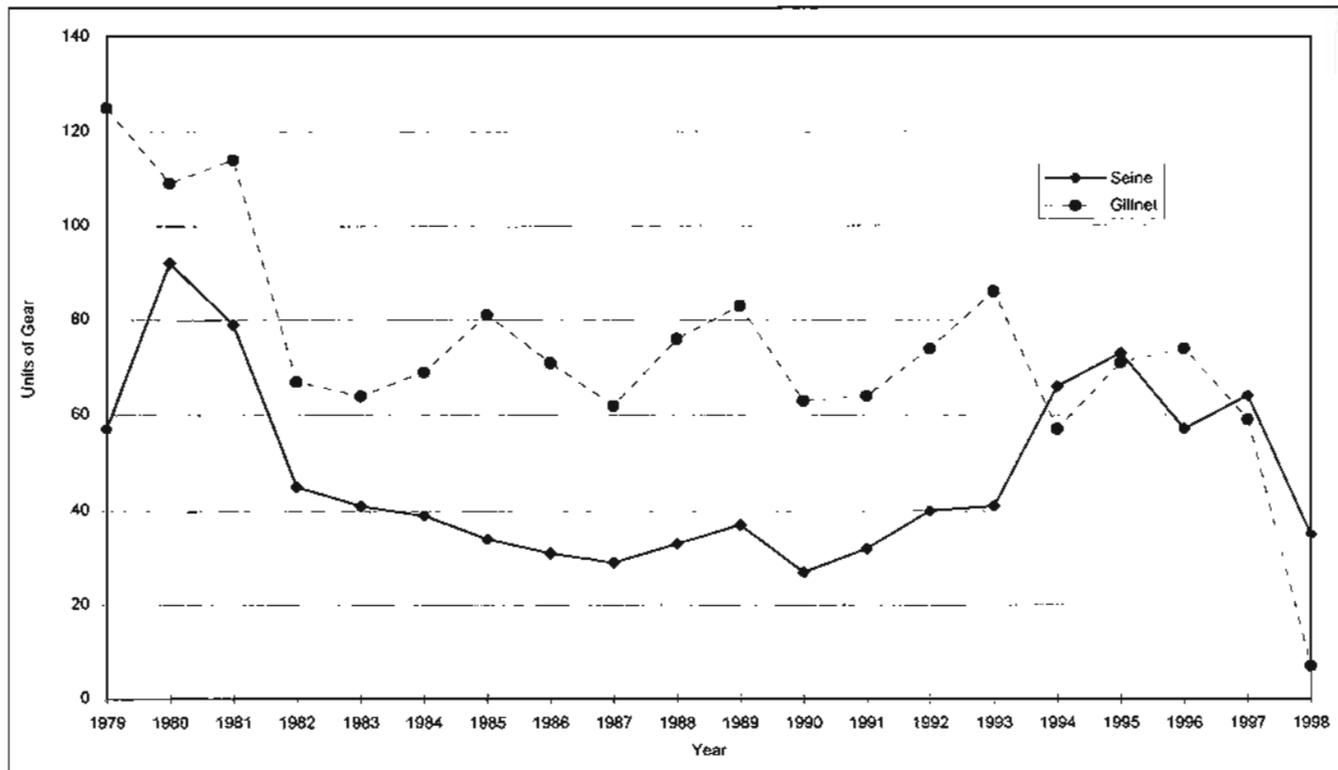


Figure 2. Number of units of each gear type which made landings in the Kodiak Management Area sac roe herring fishery, 1979-1998.

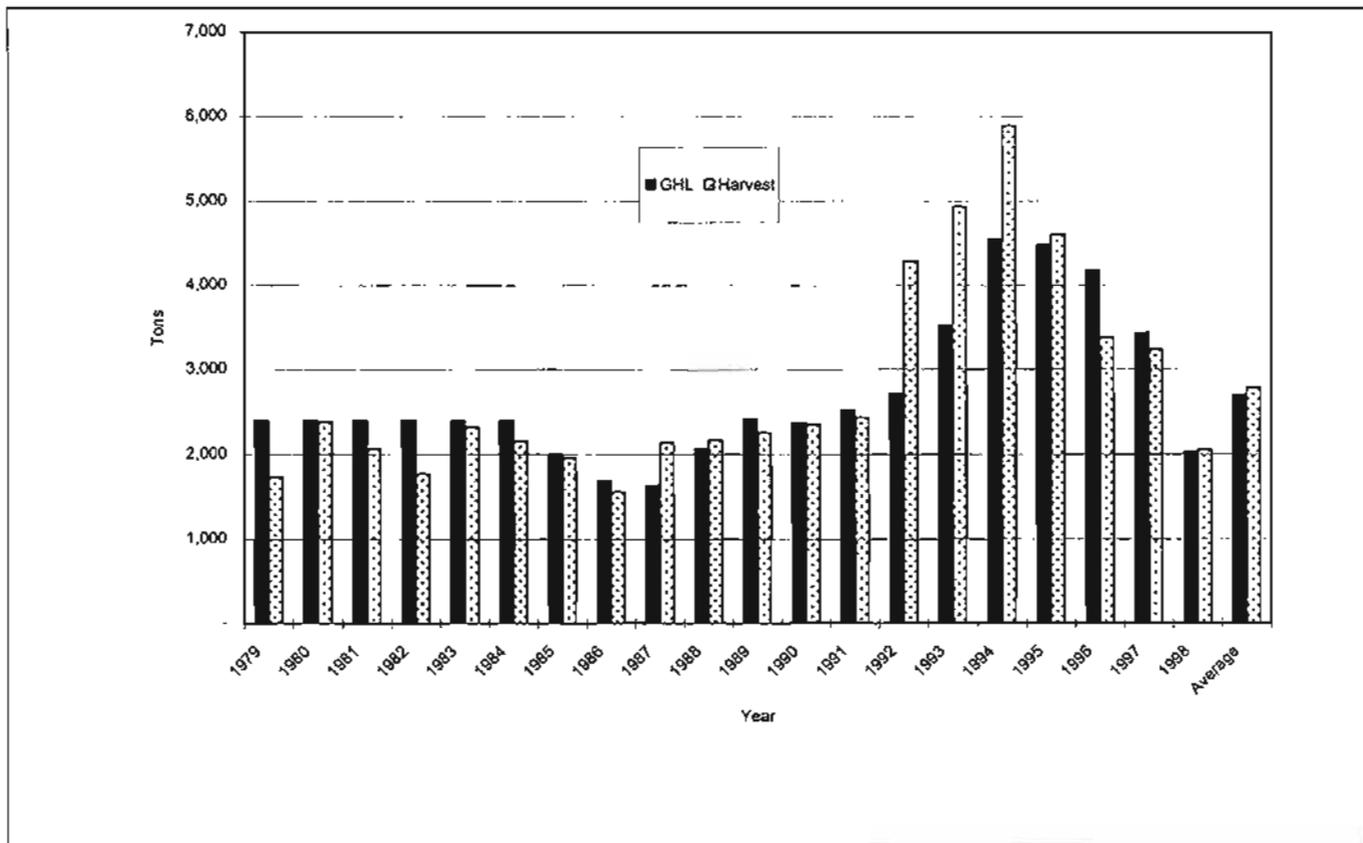


Figure 3. Comparison of the guideline harvest level (GHL) to the sac roe herring harvest in the Kodiak Management Area, 1979-1998.

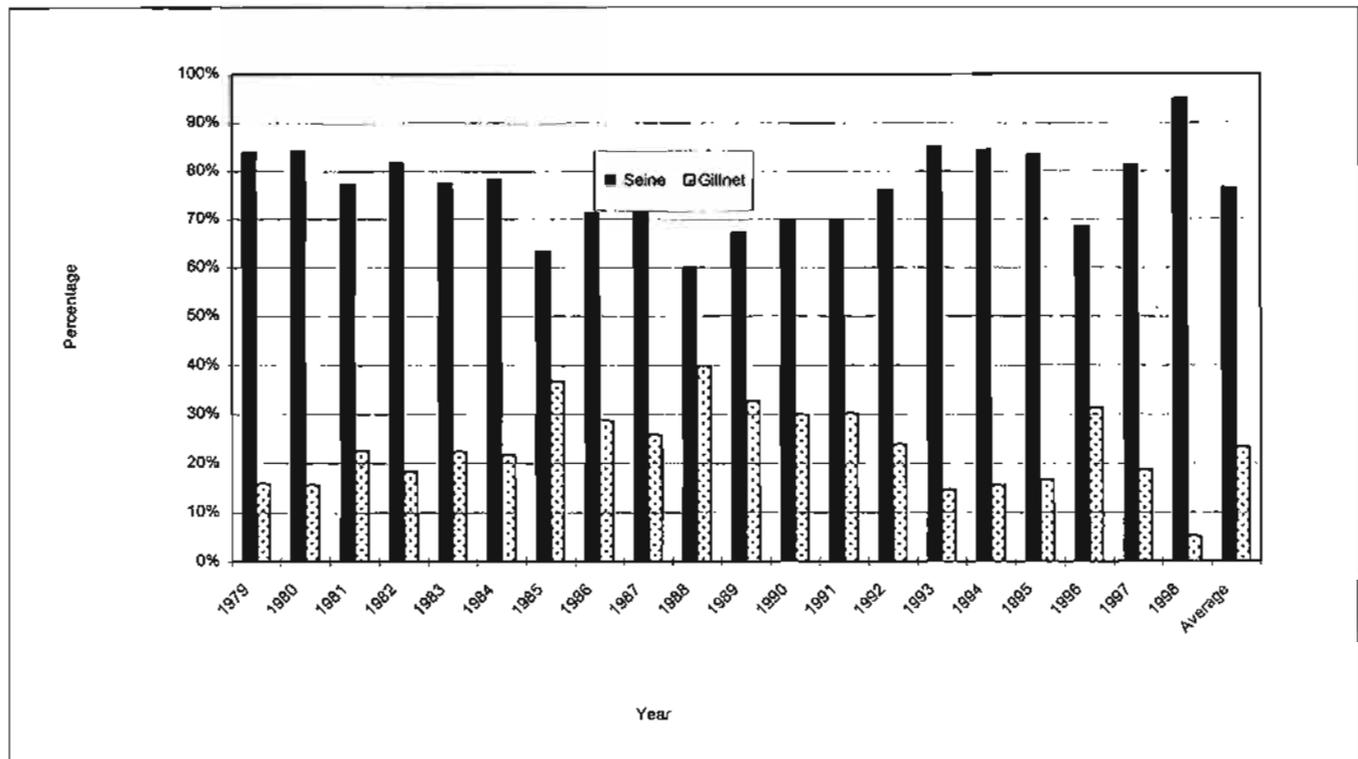


Figure 4. Percent of the sac roe herring harvest by gear type for the Kodiak Management Area, 1979-1998.

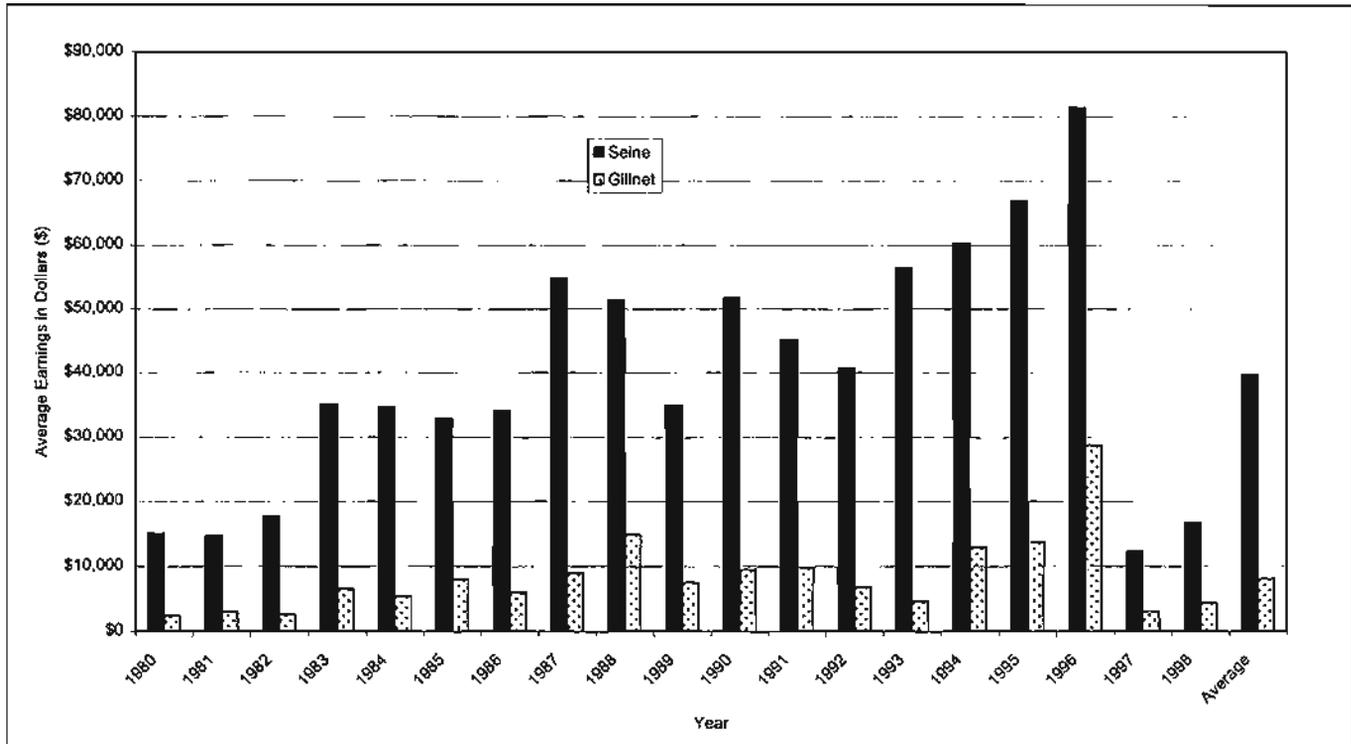


Figure 5. Average earnings (dollars) by year and gear type for the sac roe herring fishery, Kodiak Management Area, 1979-1998.

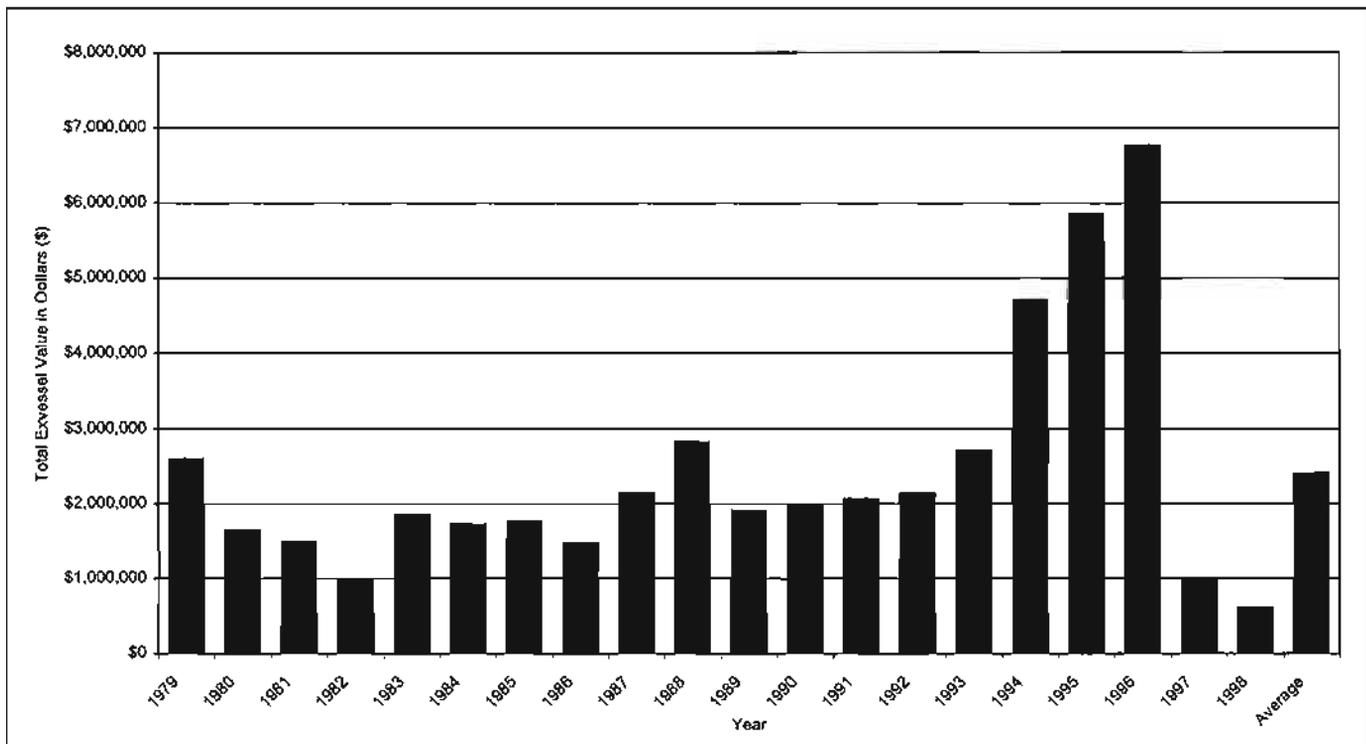


Figure 6. Total exvessel value (dollars) by year for the sac roe herring fishery in the Kodiak Management Area, 1979-1998.

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