HERRING BAIT FISHERIES IN ALASKA

By:

Fritz Funk

REGIONAL INFORMATION REPORT[1] NO. 5J92-03

Alaska Department of Fish and Game
Division of Commercial Fisheries
P.O. Box 3-2000
Juneau, Alaska 99802-2000

March 1992

[1] The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

INTRODUCTION

Pacific herring (*Clupea harengus pallasi*) are an important food item for commercially important fish and shellfish species in Alaska. For this reason herring are highly sought after for use as bait in longline, pot, and troll fisheries. While bait fisheries have never been the primary human use of herring in Alaska, adequate availability of good-quality herring bait is vital to the success of many valuable Alaskan fisheries. For some fisheries other bait can be substituted for herring, but particularly for hook and line fisheries, herring bait is essential.

Most reports which contain information about herring bait fisheries in Alaska have focused only on a single area. However, the market for herring bait operates on a statewide basis as herring caught in one area are frequently used for bait in fisheries in other areas. This report was prepared at the request of the Alaska Board of Fisheries to provide a statewide overview of herring bait fisheries in Alaska. The last statewide overview of herring bait fisheries was provided by Skud et al. (1960) and covered the period 1906-1956.

Herring bait fisheries usually occur during the fall, winter, and early spring. At that time herring are relatively thin and firm. When used for bait on hook and line gear, fall- and winter-caught herring and are retained longer on the hooks. Herring fat content is high during the summer and summer-caught herring do not preserve as well as fall- and winter-caught herring. High oil content is desirable for some methods of preserving herring for food. Earlier herring food fisheries often operated in the summer months. Herring have not been taken for food purposes in Alaska in recent years.

DATA SOURCES

Rounsefell (1930) compiled Alaska herring catch statistics through 1928 relying on various sources of information. For herring harvests prior to 1904, Rounsefell (1930) relied on catches reported in Moser (1899 and 1902) and Cobb (1906). Beginning in 1904, the Bureau of Fisheries required every individual or company fishing in Alaska to make a sworn annual statement of the total amounts and kinds of fishery products prepared, and of the amounts, kinds, and value of fishing gear, boats, and other apparatus used. Rounsefell (1930) consulted these annual sworn statements as well as the annual statistical review and monthly numbers of the trade Journal "Pacific Fisherman", individual herring company production records, and company receipt books in his compilation of Alaska herring catch statistics. Rounsefell (1930) listed herring catch statistics from Southeast Alaska for 1910-1928, Prince William Sound for 1917-1928, Cook Inlet for 1914-1928, and Kodiak for 1912-1928. Rounsefell (1935) extended the Prince William Sound catch series to 1930.

Most of the records used by Rounsefell (1930, 1935) in compiling catch statistics did not list amounts of raw herring captured but were reports of the amounts of finished products prepared. Product conversion factors were used to convert processed product back to pounds of herring harvested. Rounsefell (1930) noted that at least some of the conversion factors were empirically

determined, which may have created some biases. However, he felt that "such errors as may have arisen as a result are too small to have any appreciable effect on the analysis".

Skud et al. (1960) revised herring catches reported by Rounsefell (1930) through 1928, and extended the catch records to 1956. Skud et al. (1960) consulted the same data sources for early herring bait production as Rounsefell (1930), and cited the annual volumes of Fishery Industries of the United States and Fisheries Statistics of the United States as the sources for herring bait production from 1939-56. Skud et al. (1960) do not report bait herring harvests by area. However, Huizer (1952) summarized of Alaska bait herring harvests by area from 1922-49. Alaska Department of Fish and Game (ADF&G) area managers reports to the Alaska Board of Fisheries were consulted for bait herring harvests from 1960 through 1991. These reports also contain summaries of earlier harvests.

HISTORY OF ALASKA HERRING BAIT FISHERIES

The commercial catch of herring for bait in Alaska began around 1900 and has remained relatively stable in spite of very large fluctuations in the herring catch for the reduction, foreign, and sac roe fisheries (Figure 1). Since 1985, total Alaska herring harvests have stabilized at 45,000-55,000 tons and bait herring harvests have ranged from 6,500-8,500 tons. Herring bait production was typically 2,000 to 3,000 tons until the early 1970's. During this period herring bait was primarily used for halibut longline bait. The development of extensive crab fisheries in the 1970's increased the demand for herring and bait production increased 2-3 fold.

Southeast Alaska produced most of the herring used for bait until 1978 (Figure 2). In 1978, Prince William Sound began to contribute to the bait herring harvest, followed in 1981 by the fishery at Dutch Harbor. Fisheries in other areas have only contributed small amounts to the overall bait herring harvest.

Southeast Alaska

Because most halibut was delivered to plants in Southeast Alaska, the early herring bait fishery was centered there and the growth of the herring bait fishery was keyed to the growth of the halibut longline fishery (Huizer 1952). Rounsefell (1930) reports that halibut vessels obtained fresh herring bait directly from the herring reduction plants during the summer when the plants were operating. Processors kept herring alive in net impoundments and sold them to fishermen as needed. In 1910 the New England Fish Company introduced the first cold storage plant and herring began to be frozen for use by halibut vessels when fresh herring were not available from the reduction plants (Huizer 1952). A separate herring bait industry developed during the spring and fall to supply herring to the cold storage plants to be frozen for halibut bait. Rounsefell (1930) notes that records of the amount of herring used for bait, particularly fresh bait, are incomplete. During the reduction fishery, tensions developed between halibut fishermen and the herring reduction industry as the halibut fishermen feared that the huge reduction harvests would

deplete their source of bait (Huizer 1952). Similar tensions continue in contemporary herring fisheries as salmon trollers fear that herring fisheries may diminish their catches by reducing the prey available to feeding chinook and coho salmon.

Between 1910 and 1928, bait herring production in Southeast Alaska averaged 2,478 tons (Rounsefell 1930). The highest harvest of the 1910-1949 period was 4,462 tons in 1930 (Huizer 1952). During the reduction fishery era, herring harvests were taken from numerous locations in Southeast Alaska, depending on where the reduction harvest was occurring and on where cold storage plants were located.

Prince William Sound

The earliest documented herring bait production record from Prince William Sound is a 1,600 pound catch from 1913 (Rounsefell 1935), although early herring bait production was probably not well documented. The next documented record came from the newly-constructed cold storage plant at Seward in 1917 when 62.5 tons of herring bait were reported (Rounsefell 1935). Between 1917 and 1930 bait herring harvests from Prince William Sound averaged 227 tons. The peak bait harvest was 726 tons, occurring in 1923. Herring bait production in Prince William Sound remained sporadic and at low levels until the mid 1970s.

Kodiak

Until 1930, herring were only sporadically harvested for bait in the Kodiak area. Total harvests from 1912-28 totalled only 264 tons. During this period however, the herring pickling industry was well developed in the Kodiak area and harvested much larger quantities of herring. The earliest recorded bait herring harvest was 20 tons from the immediate vicinity of Kodiak in 1912. The largest harvest of 116 tons occurred in Three Saints Bay in 1926. Only small quantities of herring continued to be caught for bait until the much later development of crab fisheries in the Kodiak area.

CONTEMPORARY ALASKA HERRING BAIT FISHERIES

In recent years, most bait herring has been taken in directed food and bait fisheries. Lesser amounts of bait herring are taken during spring sac roe fisheries when herring are caught with a roe content too low to be marketed as sac roe. In addition Southeast Alaska has a small fresh bait pound and tray-pack herring fishery. Southeast Alaska, Prince William Sound, and Dutch Harbor have been the primary directed bait fisheries since 1980 (Figure 3). In the early 1980s, the Dutch Harbor fishery contributed most of the bait herring caught in Alaska. Catches at Dutch Harbor have declined in recent years because Board of Fisheries' regulations for the fishery have become more restrictive and because Bering Sea herring stocks have declined. Herring bait

production from Southeast Alaska was very low in the early 1980's because the herring stocks fished for food and bait were depressed. Catches then increased as stocks rebounded. Prince William Sound produced the highest bait catch in 1991 because the herring stock there reached an all-time record high biomass level.

Assuming that the Dutch Harbor bait fishery harvests primarily Togiak stocks, bait harvests are approximately distributed across Alaskan herring stocks in proportion to biomass (Figure 4).

Management Strategies

Management strategies for stocks involved in directed herring food and bait fisheries differ by area. In some areas, food and bait fisheries are the only allowable use of a particular herring stock. Table 1 summarizes regulations for herring bait fisheries.

In Southeast Alaska the spatial definitions of herring stocks are relatively small. Bait herring quotas are often set for individual bays and inlets, based on annual biomass assessments. With one exception, Southeast Alaska herring stocks are allocated either entirely to food and bait fisheries or entirely to sac roe fisheries. Under Board of Fisheries regulations, the Craig stock is allocated 85% to a food and bait fishery and 15% to a pound spawn on kelp fishery.

In Prince William Sound the spatial scale of the stock definition is much larger than in Southeast Alaska; herring that occur anywhere in Prince William Sound are treated as a single stock. Board of Fisheries regulations allocate 16.3% of the allowable annual harvest in Prince William Sound to the food and bait fishery.

In Kodiak, the spatial scale of herring stock definitions is also relatively small, similar to Southeast Alaska. Harvest quotas are established for each of 13 food and bait herring management units. Quotas for Kodiak herring stocks in each unit are limited to 10% of the sac roe harvest in the preceding spring in each unit. In addition, the Kodiak fishery harvests herring from the Kamishak stock, which winters in Shelikof Strait. Under Board of Fisheries regulations, the Kodiak fishery is allocated up to 2% of the spawning biomass of the Kamishak stock.

The Dutch Harbor food and bait fishery harvests a mixture of herring stocks that spawn in the eastern Bering Sea. Because the Togiak stock is thought to comprise most of the herring harvested at Dutch Harbor, the Dutch Harbor fishery quota is based on a 7% allocation of the allowable sac roe harvest at Togiak.

Summary of Contemporary Herring Bait Fisheries By Area

Southeast Alaska

Directed Food and Bait Fisheries. Current Board of Fisheries regulations (5 AAC 27.110) potentially allow fishing for food and bait herring in most of Southeast Alaska. Herring food and bait fishing is not permitted in those areas where sac roe herring fishing is allowed (Figure 5). In addition to the sac roe herring fishing areas, the portion of district 11A south of the Shrine of St. Therese is also closed to winter food and bait herring fishing. Regulations also do not allow any herring fishing in Favorite Bay (the southern arm of Kootznahoo Inlet, near Angoon), or portions of Wrangell Narrows and Wrangell Harbor (5 AAC 21.150). Although the existing regulations allow purse seines, set gill nets, and trawls, only purse seines have been used in the food and bait herring fishery in recent years.

In recent years, food and bait herring fishing has been restricted to only small portions of the allowable fishing areas under emergency order authority (AS 16.05.060). ADF&G attempts to delineate discrete herring stocks on the basis of spawning ground locations and information about migration routes and known wintering areas. For sizeable herring stocks, ADF&G has established threshold biomass levels which are believed to be necessary for sustained yield from the stock (Table 2). ADF&G conducts annual stock assessment surveys using spawn deposition surveys and hydroacoustic methods to attempt to determine the biomass of individual herring stocks. If biomass estimates are above threshold levels, harvests are allowed in accordance with ADF&G's variable exploitation rate harvest policy for Southeast Alaska (Figure 6).

Herring regulations specify that the Southeast Alaska winter food and bait herring fishery can occur from October 1 through February 28, but only during periods established by emergency order. Herring bait quality is best in late fall and early winter. During the 1970's the fishery occurred throughout the fall and winter months (Table 3). However, in recent years the Southeast Alaska herring bait fishery has opened in mid-January. This opening date is preferred by the processing industry for scheduling convenience. In addition, it provides ADF&G an opportunity to analyze hydroacoustical survey data from the wintering herring concentrations before the fishery occurs.

Prior to the 1978-79 season ADF&G established harvest quotas only for the largest food and bait stocks. Additional exploratory harvests of up to 100 tons were allowed in bays and inlets where biomass estimates were not made by ADF&G. In the 1977-78 fishing season harvests from these non-surveyed areas made up a substantial proportion of the harvest because of the lack of herring in traditional wintering areas. A threshold harvest policy was implemented for the 1978-79 food and bait herring fishery in Southeast Alaska (Blankenbeckler and Larson 1982). A minimum biomass of 1,000 tons was required in a wintering area before harvests were allowed.

The decline in Southeast Alaska food and bait harvests in the early 1980s resulted from recruitment failures in stocks traditionally fished for food and bait herring. Market conditions did not cause the drop in harvests (Blankenbeckler and Larson 1982). Southeast Alaska food and bait herring harvests have rebounded in recent years, primarily because of the increased biomass of

the Craig stock. The Craig and Tenakee Inlet stocks have contributed most of the bait herring caught the late 1980's (Table 4). Harvests have ranged from 2,500 to 4,000 tons since 1988.

Pound Bait Fisheries. In addition to the directed food and bait fishery, two types of bait herring pound fisheries are allowed in Southeast Alaska: tray pack bait pounds, and fresh bait pounds. The tray pack pound fishery was created in 1979 to produce very high quality frozen bait, packaged in plastic "trays", primarily for sport and commercial salmon troll fisheries. The Board of Fisheries allocated a harvest of 100 tons to the tray pack fishery. Only limited quantities of herring were harvested for the tray pack herring fishery in the early 1980's. In recent years there has been no harvest.

Fresh bait pounds are allowed by regulation under a permit system in six areas, including Tee Harbor, Indian Cove, Farragut Bay, Scow Bay, Sitka Sound and Lisianski Inlet, all in the Southeast Alaska Area (Figure 7). Herring are captured by purse seine and held in impoundments until needed for bait. Current regulations specify annual herring harvest quotas for six areas: 100 tons each for Farragut Bay, Scow Bay and Sitka Sound, 60 tons each for Tee Harbor and Indian Cove, and 25 tons for Lisianski Inlet. The average annual catch from 1983 through 1990 was 46 tons for all areas combined (Table 5). Only two permits were issued for pounds in 1990; both were for Sitka Sound where 38 tons was harvested.

Personal Use and Personal Bait Harvest Fisheries. The 1989 regulations established two new herring fisheries in the Southeast Alaska Region. First, a personal use fishery was established to allow Alaskan residents not domiciled in designated subsistence communities to continue to harvest herring for personal consumption. The personal use harvest does not have priority over other uses as does the subsistence harvest. However, in practice, the regulations allow herring personal use to continue the same as formerly allowed under the subsistence regulations. Harvest information is limited, as the personal use regulations require a permit only for the harvest of herring spawn-on-kelp. The regulations were effective during the 1990 spring spawn-on-kelp season and accounted for approximately 20% of the herring spawn-on-kelp harvest.
Second, the 1989 regulations established special provisions that allow commercial fishermen to harvest herring for their personal bait needs, but not for sale. This allows fishermen the opportunity to continue harvesting their own bait as in the past under the subsistence regulations. For harvests over 5 tons, a permit is required to allow tabulation of harvest. Approximately 40 tons of herring were estimated to have been harvested in Sitka Sound and 20 tons in Petersburg; estimates for other communities have not been made.

Prince William Sound

The directed food and bait fishery in Prince William Sound is restricted to the general district (Figure 8) and can occur from September 1 through January 31. In recent years the fishery opening has been delayed to October by emergency order to increase the quality of the bait harvested. There are no gear restrictions for the fishery, except that gillnets cannot exceed 150 fathoms in length.

The food and bait fishery is allocated 16.3% of the allowable Prince William Sound herring

harvest on which harvest quotas for the following spring's sac roe fishery are based. Because the Prince William Sound herring stock is currently at very high levels, the 1991 food and bait fishery was the largest on record and the largest in Alaska.

Upper Cook Inlet

A small fishery for herring bait occurs during the spring along the eastern shore of Upper Cook Inlet. The fishery opens by regulation on April 15. Although regulations allow the fishery to remain open until June 30 if guideline harvests have not been exceeded, by the end of May the fishery is often closed because of increasing interceptions of salmon. The Upper Cook Inlet fishery is restricted to gillnets and the aggregate length is limited to 105 fathoms. The maximum harvest in the fishery was 179 tons in 1986; only 15.9 tons were harvested in 1991.

Kodiak

Regulations allow fishing for herring for food and bait in the Kodiak area from August 1 through February 28 during periods specified by emergency order. Seines, gillnets and trawls may all be used to take herring in the Kodiak area, although only seines and trawls have been used in recent years.

The bays and inlets around Kodiak have been aggregated into 13 food and bait herring management units (Figure 9). The migration of the Kamishak herring stock into eastern Shelikof Strait during the winter has complicated management of the Kodiak food and bait herring fishery. Board of fisheries regulations allow harvests on Kodiak spawning stocks of 10% of the sac roe harvest in the preceding spring and on the Kamishak stock of up to 2% of the preceding spring's Kamishak spawning biomass. The Kamishak stock can be present in food and bait management units 1, 2, 4, 5, 11, and 12. Herring harvested from these management units are considered to be from Kodiak spawning stocks if the harvests occur in inshore locations, unless age-weight-length or biomass data indicate otherwise. In some years, age distributions or weight at age can be used to separate Kamishak and Kodiak stocks in these management units. Very large aggregations of herring in these management units are assumed to be Kamishak stocks. When the Kamishak food and bait quota is taken, all of these management units are closed to herring fishing to avoid further interceptions of Kamishak stocks, regardless of whether the quota of Kodiak stocks has been taken. In recent years, the total harvest in the Kodiak food and bait herring fishery has been only 200-400 tons.

Dutch Harbor

Because the Dutch Harbor food and bait fishery harvests primarily Togiak stocks, the Dutch Harbor harvests are keyed to the stock size at Togiak. Board of Fisheries regulations specify that the annual Dutch Harbor harvest is determined by subtracting 1,500 tons from the allowable Togiak harvest to account for the impact of the Togiak spawn-on-kelp fishery, and allocating 7% of the remaining allowable harvest to the Dutch Harbor fishery. Because other western Alaskan stocks may be present in the Dutch Harbor fishery, Board of Fisheries regulations do not allow

the Dutch Harbor fishery to open if any western Alaskan herring stocks are below their thresholds. For the purpose of determining whether to open the Dutch Harbor fishery, the Board established a special 2,000 ton threshold for the Nelson Island herring stock.

Regulations allow the Dutch Harbor fishery to open from July 16 through February 28 during periods specified by emergency order. In recent years the quota has been harvested within a few days after the fishery was opened; in 1991 the season lasted 6 hours. Gear is restricted to purse seines and gillnets, although most harvest has been taken by purse seines.

Herring were harvested at Dutch Harbor during an earlier fishery that lasted from 1928-1945 (Table 6). A large portion of the catch was brined for either food or bait purposes; some product was frozen. The Board of Fisheries re-instituted the fishery in 1981 with no harvest restrictions. In 1983 the Board restricted the harvest quota to 3,527 tons, and in 1986 reduced the quota to 2,453 tons. For the 1988 season, the Board initiated the allocation of 7% of the allowable Togiak harvest to the Dutch Harbor fishery.

DISCUSSION

Because stocks harvested for bait herring are at relatively high levels, most of the demand for high-quality herring bait is being met. When the demand for bait exceeds the supply of herring, other bait is substituted. Pacific cod are used for hanging bait in crab fisheries. Sablefish and squid are sometimes used for halibut bait. Herring from the east coast has been imported to fulfill bait needs in Bering Sea crab fisheries in recent years. If herring stock levels decline, reliance on these other bait sources will have to increase.

Not all existing Alaska bait herring fisheries are being fully utilized. Allowable bait harvests at Kodiak, Yakutat, and Chignik have not been taken in recent years. Bait herring harvests were allowed but rarely utilized in the South Peninsula area for many years before being eliminated by the Board of Fisheries in 1991. Interest in fully utilizing all existing herring bait stocks will likely increase if demand increases or fully-utilized bait herring stocks decline.

LITERATURE CITED

Blankenbeckler, D. and R. Larson. 1982. Pacific herring (*Clupea harengus pallasi*) harvest statistics, hydroacoustical surveys, age, weight, and length analysis, and spawning ground surveys for Southeastern Alaska, 1980-83.

Cobb, J.N. 1906. The commercial fisheries of Alaska in 1905. In: Report of the United States Commissioner of Fisheries for 1905. Bureau of Fisheries Document Number 603.

Huizer, J.E. 1952. History of the Alaska herring fishery. Alaska Department of Fish and Game Annual Report for 1952, pages 65-76. Alaska Department of Fish and Game, Juneau.

Moser, J.N. 1899. The salmon and salmon fisheries of Alaska. Bulletin of the United States Fish Commission 18:1-178.

Moser, J.N. 1902. Alaska salmon investigations in 1900 and 1901. Bulletin of the United States Fish Commission 21:173-398.

Rounsefell, G.A. 1930. Contribution to the biology of Pacific herring, *Clupea pallasi*, and the condition of the fishery in Alaska. Bulletin of the U.S. Bureau of Fisheries 45:227-320.

Rounsefell, G.A. 1935. Fluctuations in the supply of herring, *Clupea pallasi*, in Prince William Sound, Alaska. Bulletin of the U.S. Bureau of Fisheries 47:263-291.

Skud, B.E., H.M. Sakuda, and G.M. Reid. 1960. Statistics of the Alaska herring fishery 1878-1956. U.S. Fish and Wildlife Service Statistical Digest 48.

Table 1. Summary of Alaska food and bait herring fishery regulations[1].

Region	Mgt. Area	Fishery Location/Gear	CFEC Permit Code	Ltd. Entry	Super-Exclusive	Season Dates	Net Specifications: Mesh Size (inches) Min.	Mesh Size (inches) Max	Maximum Depth (meshes)	Maximum Length (fath.)	Guideline Harvest Level (GHL) Specification	Threshold (tons)
		Southeast										
		Craig/Meares Pass.	H01A	No	No	10/1-2/28			1,700	200	85% of Craig GHL	5,000
		Tenakee Inlet	H01A	No	No	10/1-2/28			1,700	200	Variable Rate	3,000
I	A	Lisianski Inlet	H01A	No	No	10/1-2/28			1,700	200	Variable Rate	2,500
		Pt. Houghton/Hobart B	H01A	No	No	10/1-2/28			1,700	200	Variable Rate	2,000
		Fresh Bait Pound	H21A	No	No	1/1-					445 tons [2]	
		Tray Pack Bait Pound	H21A	No	No	7/1-3/31					100 tons	
		Prince Wm. Sound									16.3% of PWS GHL	8,400
II	E	Purse Seine	H01E	No	Vessel	9/1-1/31			Unspec.	Unsp.		
		Gill Net	H34E	No	Vessel	9/1-1/31	2 1/8	3	Unspec.	150		
		Kodiak									10% of sac roe harvest	
	K	Purse Seine	H01K	No	No	8/1-2/28			1,025	100		
		Gill Net	H34K	No	No	8/1-2/28	2 1/8	2½	Unspec.	150		
		Trawl	H07K	No	No	8/1-2/28						
IV	L	Chignik	H01L	No	No	8/15-2/28			1,000	100		
		Dutch Harbor				7/16-2/28					7% of Togiak harvest	
	M	Purse Seine	H01M	No	No				Unspec.	250		
		Gill Net	H34M	No	No		2 1/8	2½	Unspec.	nspec.		

[1] This table is an attempt to summarize pertinent herring regulations. Regulations listed in the appropriate section of the herring regulation book or Alaska Administrative Code should be consulted for details.

[2] Fresh Bait Pound Quotas are established by area: Farragut Bay (100 tons), Scow Bay (100 tons), Tee Harbor (60 tons), Indian Cove (60 tons), Section 13-B (100 tons) and Lisianski Inlet (25 tons).

Table 2. Herring threshold biomass herring stocks for winter food and bait herring stocks in Southeast Alaska and Yakutat.

Area	Threshold Level (Tons)
Yakutat Bay	1,000
Lisianski Inlet	2,500
Tenakee Inlet	3,000
Port Houghton and Hobart Bay	2,000
Port Camden	2,500
Anita Bay	2,500
Deer Island	2,500
Tongass Narrows and George and Carroll Inlets	3,500
Craig (Meares Passage and Boca de Finas)	5,000

Table 3. Southeast Alaska winter food and bait herring harvest in pounds by fishing year and month, 1971/72 through 1989/90.[a/]

Year	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Total
1971-72	12,000	12,200	716,000	551,000	583,400	560,200	1,655,600	4,090,400
1972-73	1,800	504,800	748,600	1,173,600	1,694,600	2,349,000	1,435,600	7,908,000
1973-74	197,600	1,783,400	2,790,000	1,438,400	1,838,600	3,595,800	68,000	11,711,800
1974-75	0	2,306,400	3,422,200	2,569,000	1,174,800	1,330,600	1,017,800	11,820,800
1975-76	0	2,871,800	3,650,800	812,000	1,558,000	2,153,800	329,800	11,376,200
1976-77	0	1,560,000	4,391,400	2,948,600	2,044,600	1,874,200	0	12,818,800
1977-78	0	2,898,800	1,597,200	730,600	1,078,000	1,780,000	0	6,644,600
1978-79	0	0	4,788,000	0	0	2,182,000	0	6,970,000
1979-80	0	3,262,000	0	2,176,000	0	0	0	5,434,000
1980-81	0	0	0	0	2,102,000	1,240,000	0	3,342,000
1981-82	0	0	180,000	0	2,800,000	80,000	0	3,060,000
1982-83	0	196,000	1,102,000	0	0	1,040,000	0	2,338,000
1983-84	0	0	0	0	0	1,240,000	0	1,240,000
1984-85	0	0	0	0	2,862,000	0	0	2,862,000
1985-86	0	0	0	0	4,884,000	0	0	4,884,000
1986-87	0	0	0	0	4,694,645	0	0	4,694,645
1987-88	0	0	0	0	8,032,000	0	0	8,032,000
1988-89	0	0	0	0	6,232,000	0	0	6,232,000
1989-90	0	0	0	0	7,686,000	0	0	7,686,000

a/ These figures do not include herring bait pounds.

Table 4. Southeast Alaska food and bait fishery harvests by area in short tons, 1978-1992.

Year	Craig [1]	Behm [2] Narrows	Tongass Narrows/ George Inlet Carroll Inlet	Deer Island	Anita Bay	Port Camden	Sitka [3] Sound	Favorite Bay/ Hood Bay	Port Houghton/ Hobart Bay	Tenakee Inlet	Port Frederick	Lisianski Inlet	Yakutat Bay	Total
1978 - 79	165	595			305		265	120		200		1,830		3,480
1979 - 80	218	342			1,040		140			440	30	500		2,710
1980 - 81	400					130	265			825			140	1,620
1981 - 82	655						80			665			100	1,540
1982 - 83	140				125	40				750				1,155
1983 - 84										1,431				1,431
1984 - 85													20	2,350
1985 - 86										1,275				4,016
1986 - 87	1,055						257			1,516		280		3,116
1987 - 88	1,963									655		770		3,843
1988 - 89	1,691									595		27		3,273
1989 - 90	3,221													2,643
1990 - 91	3,273											353		
1991 - 92	2,290													

[1] Craig harvests include El Capitan Passage, Tonowek, Meares Passage, Boca de Finas

[2] Behm Narrows includes Spacious Bay, Burroughs Bay, Anchor Pass

[3] Sitka Sound harvests include those from Whale Bay, Crawfish Inlet, Necker Bay, Slocum Arm, and "South of Goddard hot springs north of Point Lauder"

Table 5. Fresh herring bait pound catches by area, 1983 through 1990.

Year	Catch by Area in Tons						
	Scow Bay	Farragut Bay	Sitka Sound	Tee Harbor	Indian Cove	Lisianski[a/] Inlet	Total
1983	7	14	0	0	0		21
1984	3	12	35	0	0		50
1985	4	0	33	0	0		37
1986	0	5	26	0	0		31
1987	0	3	62	0	0		65
1988	0	0	17	0	0		17
1989	0	0	66	0	0	0	66
1990	0	0	38	0	0	0	38
7yr.avg.	2	5	39	0	0	0	46

a/ Pounds were allowed by regulation in Sitka Sound in 1983 and Lisianski Inlet in 1989.

Table 6. Eastern Aleutian Islands (Dutch Harbor) food and bait fishery summary, 1929-1991.

Year	Harvest In Short Tons	No. Processors	No. Boats	No. Landings	Tons Per Boat	Tons Per Landing	$ Per Ton	$ Value (Millions)	$ Per Vessel (Millions)
1929	1,259	*	*	*	*	*	*	*	*
1930	1,916	*	*	*	*	*	*	*	*
1931	1,056	12	26	*	*	*	*	*	*
1932	2,510	12	30	*	*	*	*	*	*
1933	1,585	12	38	*	*	*	*	*	*
1934	1,533	9	*	*	*	*	*	*	*
1935	2,412	10	*	*	*	*	*	*	*
1936	1,379	8	*	*	*	*	*	*	*
1937	579	*	*	*	*	*	*	*	*
1938	513	*	*	*	*	*	*	*	*
1939-44	NO FISHERY								
1945	75	*	*	*	*	*	*	*	*
1946-80	NO FISHERY								
1981	704	2	2	16	352	44	300	0.211	0.11
1982	3,565	6	7	95	509	38	300	1.020	0.15
1983	3,567	5	8	96	446	37	232	0.828	0.10
1984	3,578	5	9	61	398	59	210	0.751	0.08
1985	3,480	3	6	78	560	45	162	0.564	0.09
1986	2,394	4	7	53	342	45	254	0.600	0.09
1987	2,503[a]	4	8[a]	45	373	56	300	0.751	0.09
1988	2,004[b]	6	8[b]	59	251	34	252	0.505	0.06
1989	3,081[c]	5	9[c]	69	342	45	283	0.873	0.10
1990	820	5	7	8	117	103	350	0.287	0.04
1991	1,325	5	8	18	166	74	300	0.398	0.05
1929-38 Average	1,474	11	31	*	*	*	*	*	*
1981-91 Average	2,456	5	7	54	351	53	268	0.617	0.09

* Data not available.
a Seven seiners and one gill netter participated. The gill net harvest was 1 ton.
b Seven seiners and one gill netter participated. The gill net harvest was 17 tons.
c Seven seiners and two gill netters participated. The gill net harvest was 2 tons.

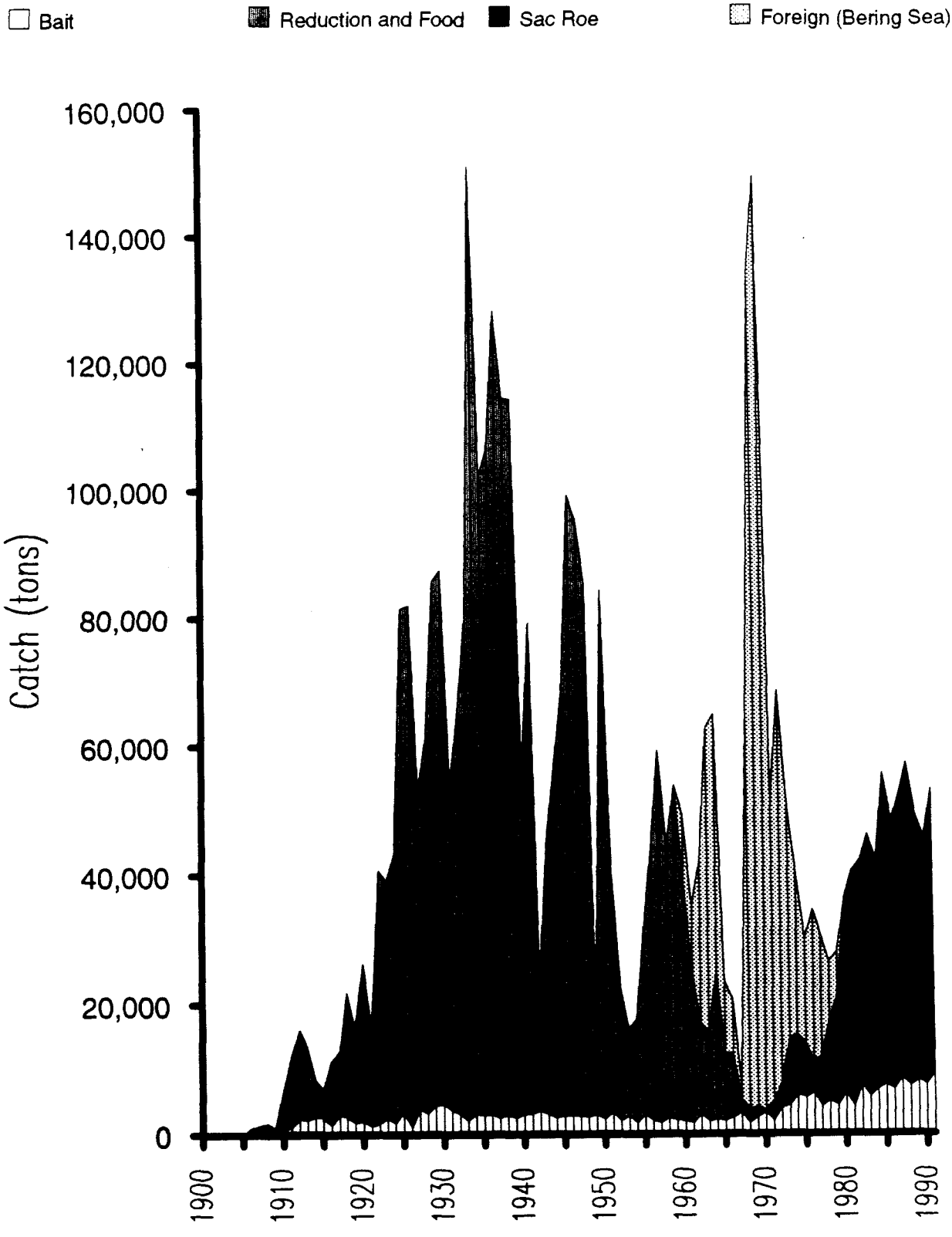

Figure 1. Alaska herring harvests by fishery, 1900-1991.

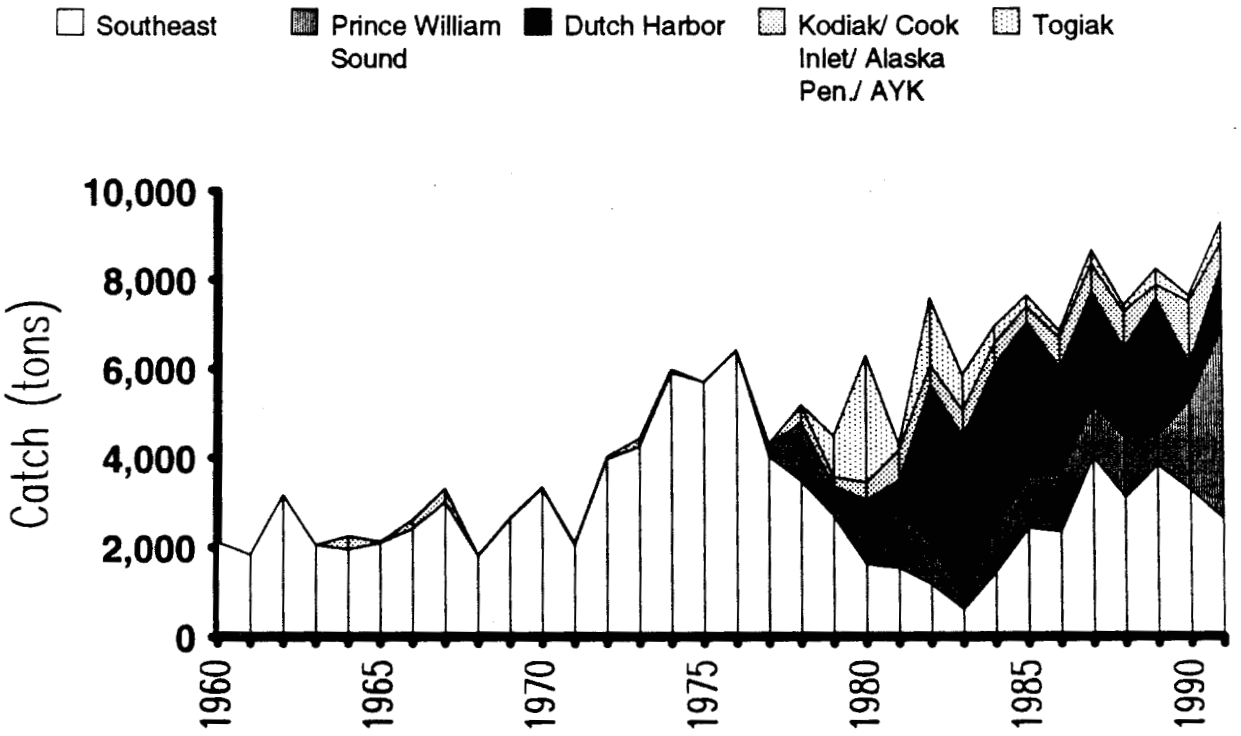

Figure 2. Alaska herring bait harvests by fishery, 1960-1991.

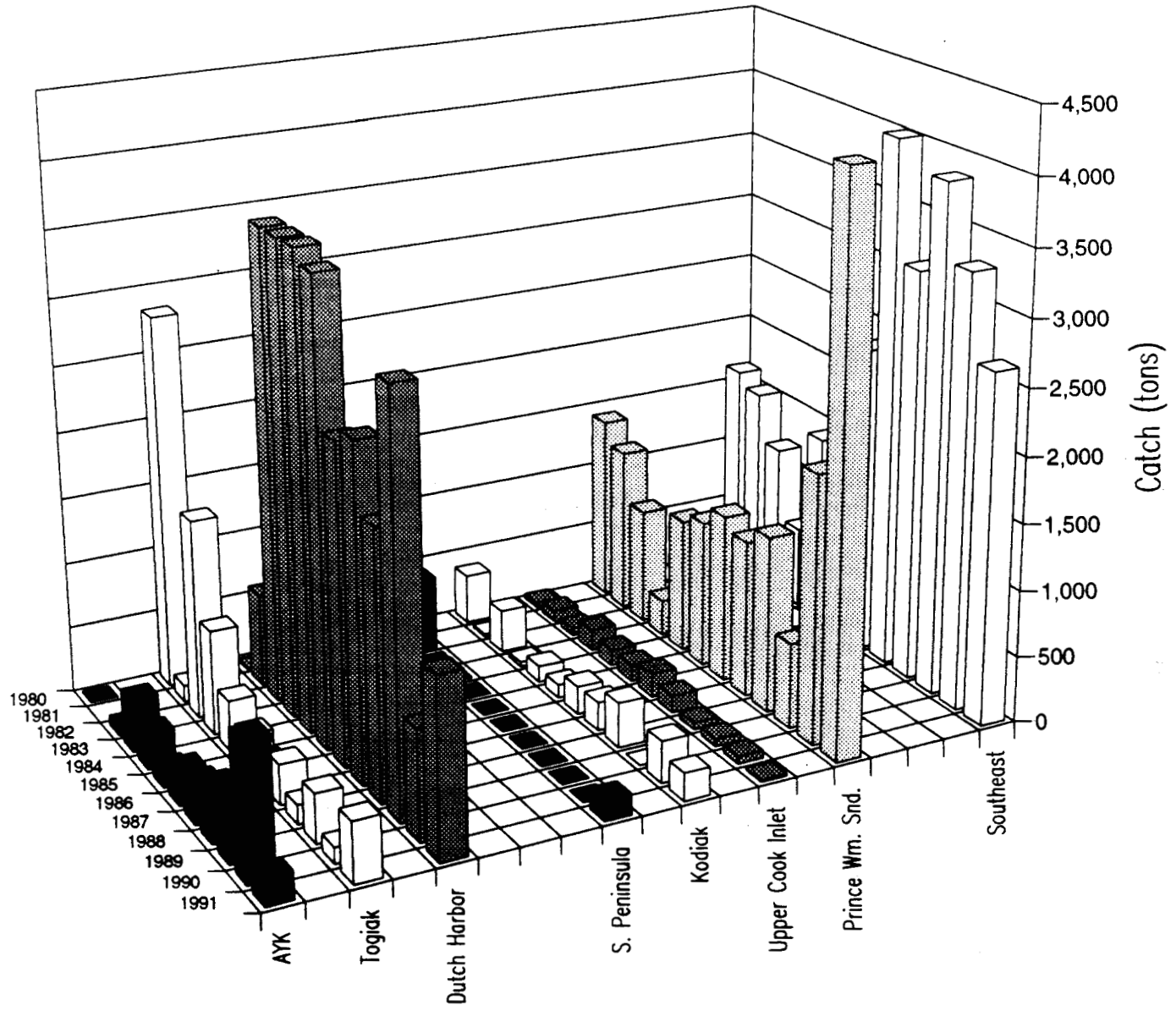

Figure 3. Recent Alaska herring bait harvests by fishery, 1980-1991.

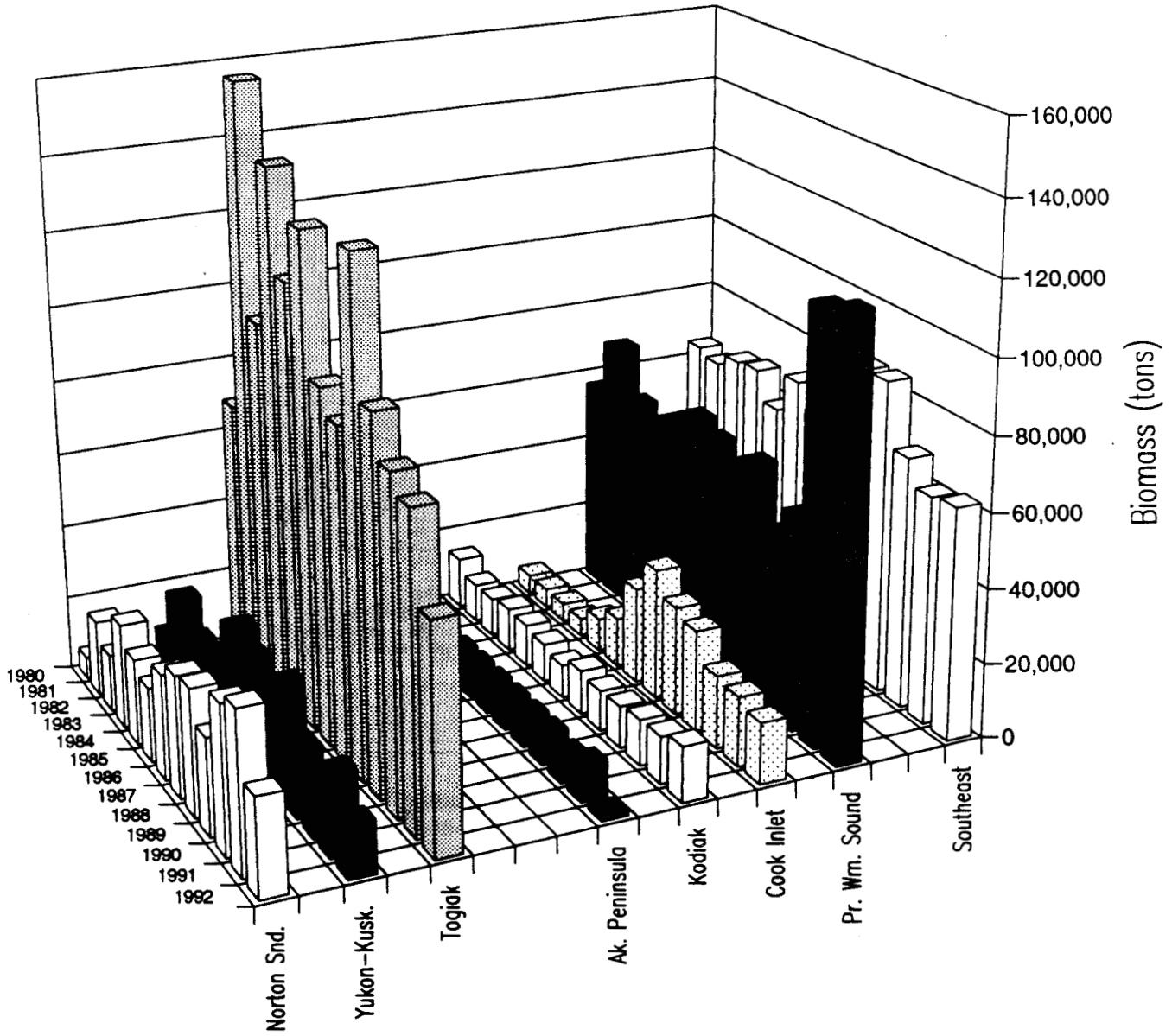

Figure 4. Biomass of principle Alaska herring stocks, 1980-1991.

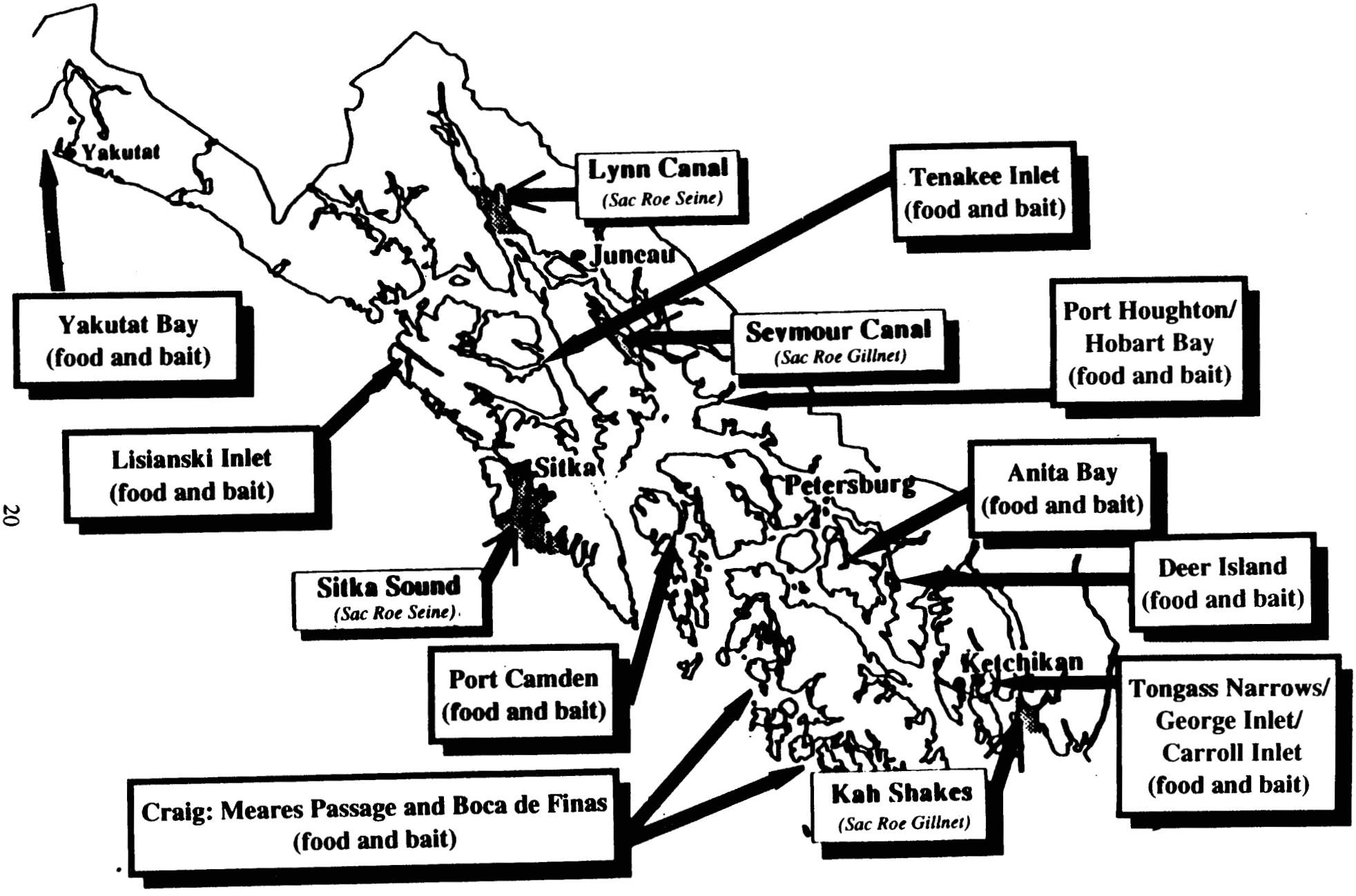

Figure 5. Locations of sac roe and food and bait herring fisheries in Southeastern Alaska.

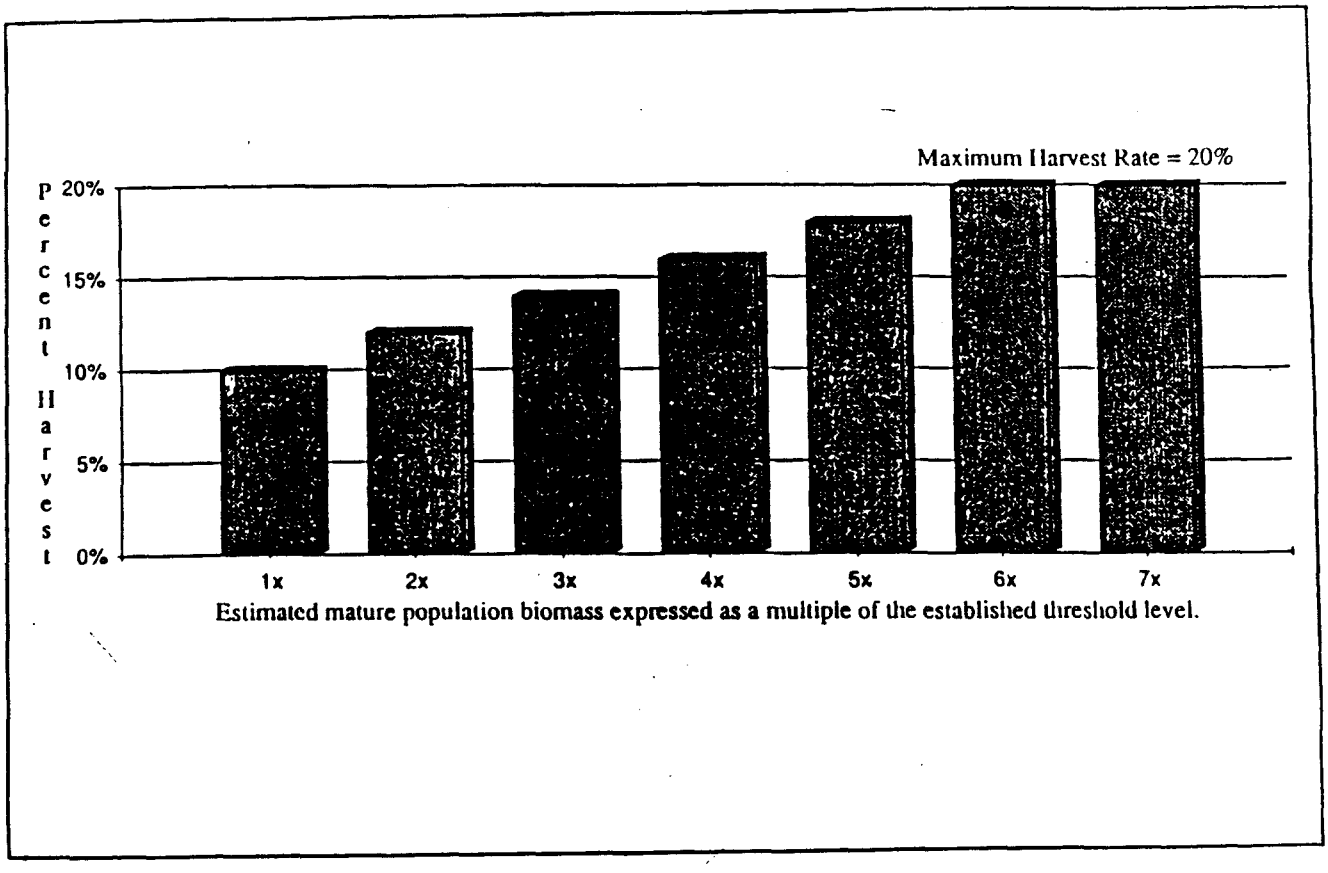

Figure 6. Generalized harvest strategy for Southeastern Alaska herring fisheries, showing the relationship between exploitation rate and the estimated biomass of the mature herring stock, expressed as a multiple of the established threshold level.

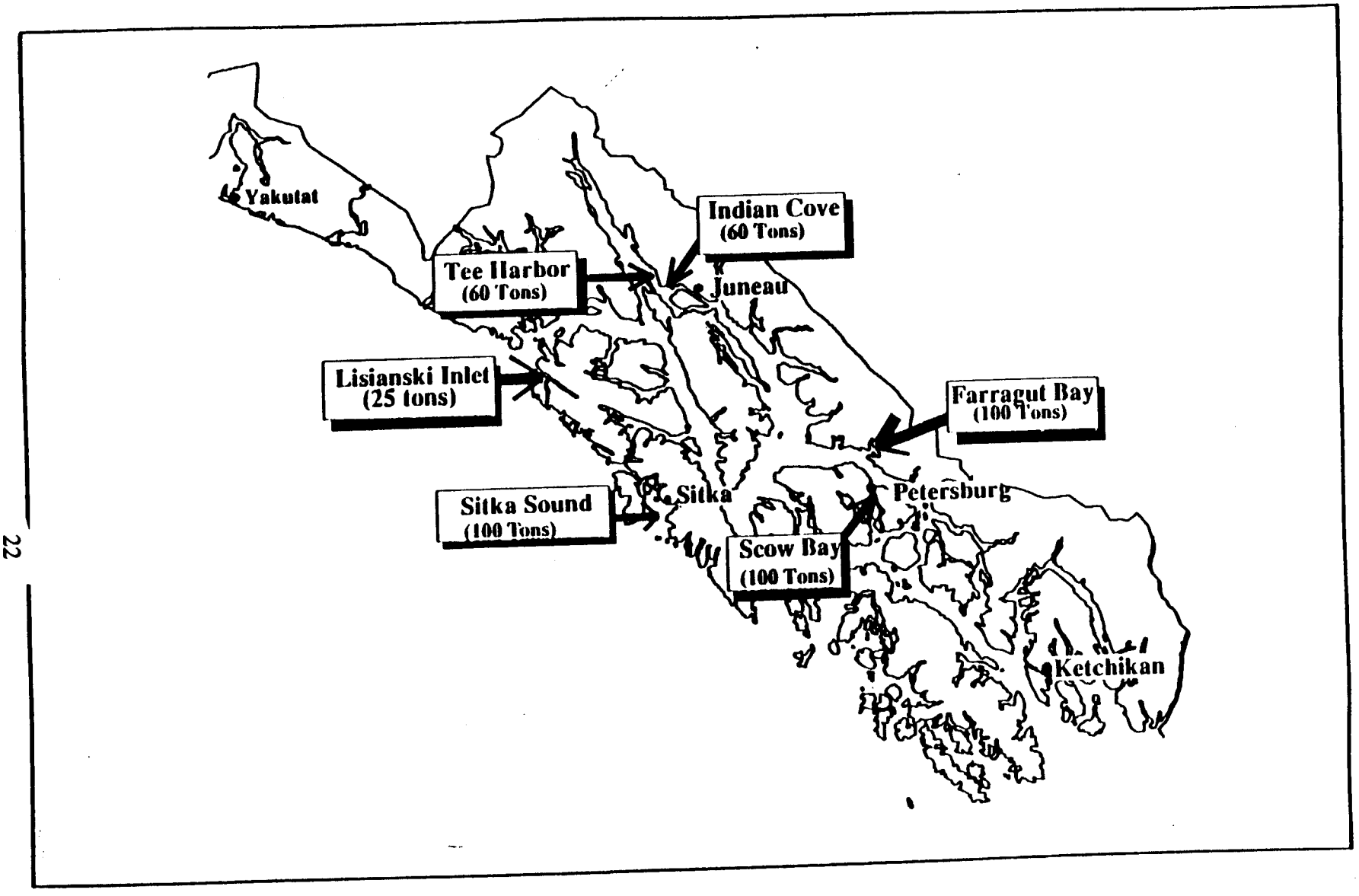

Figure 7. Locations and quotas for fresh bait pound fisheries in Southeastern Alaska.

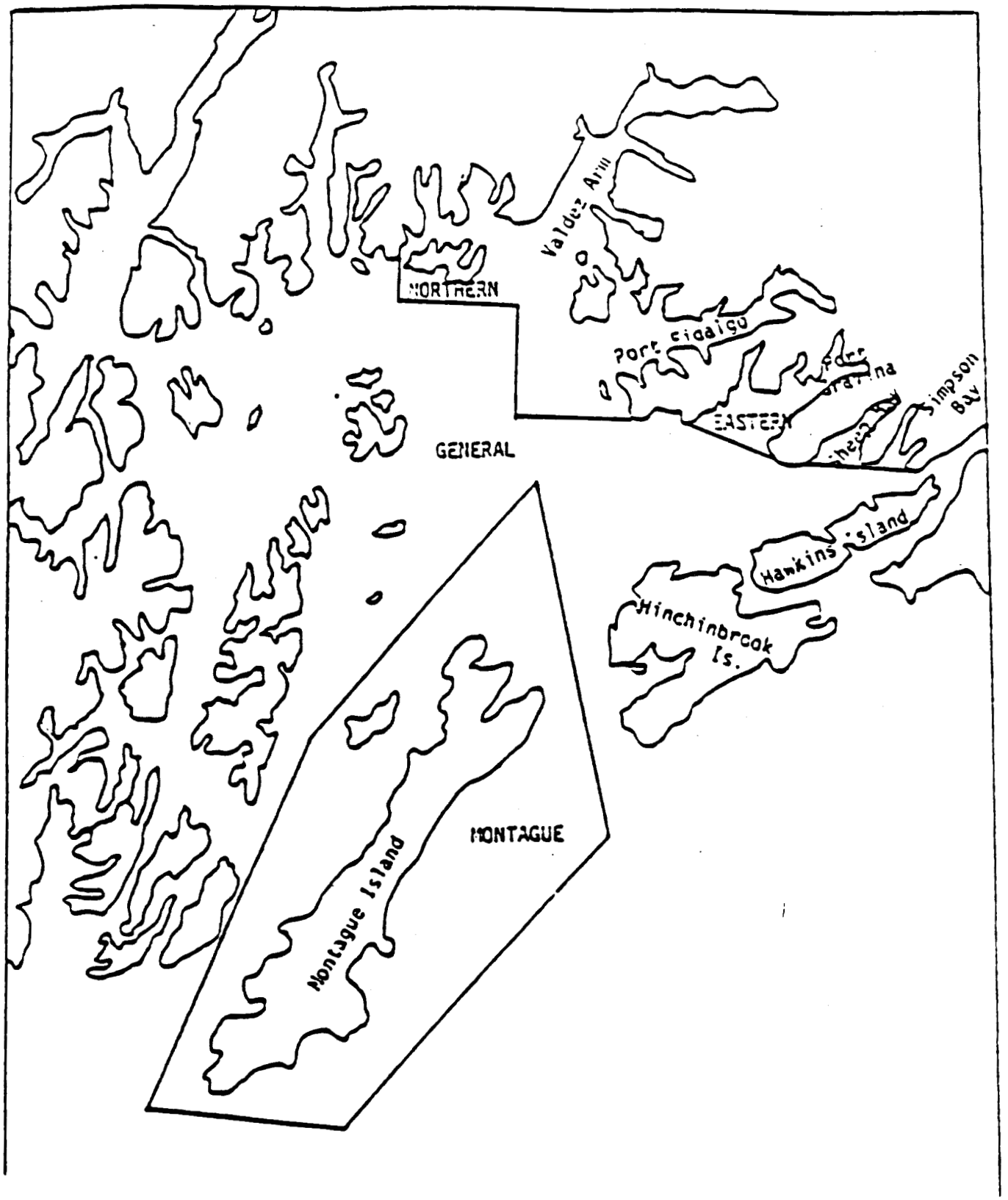

Figure 8. Prince William Sound fishing districts, showing the location of the General District where food and bait herring harvests are allowed.

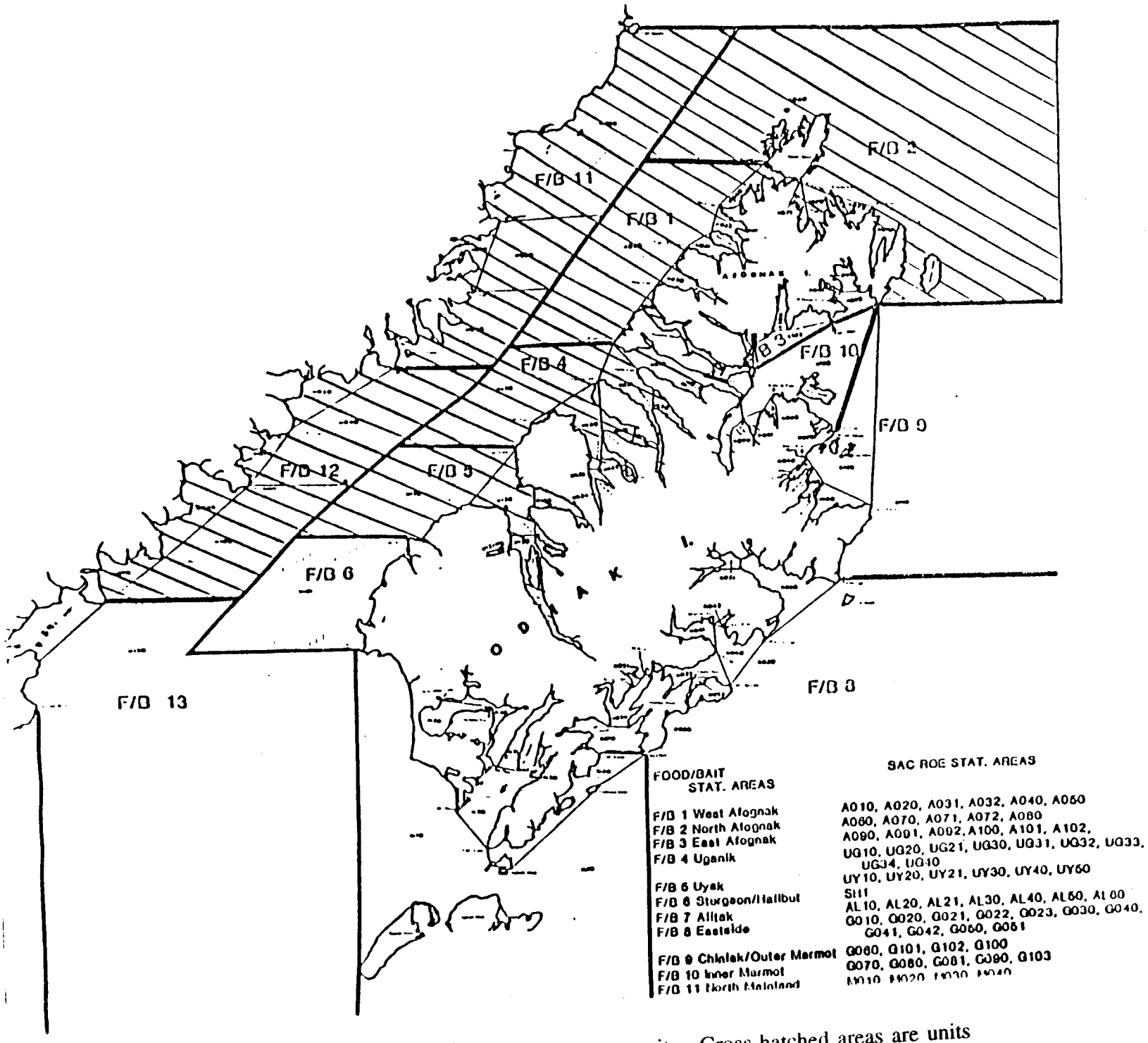

Figure 9. Kodiak Food and Bait fishery management units. Cross-hatched areas are units closed when the Kamishak food and bait herring allocation is reached.