

ALASKA PENINSULA AND ALEUTIAN ISLANDS MANAGEMENT
AREAS HERRING SAC ROE REPORT AND THE ALEUTIAN ISLANDS
MANAGEMENT AREA HERRING FOOD AND BAIT REPORT, 1992

By
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and
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ABSTRACT

The 1992 Pacific herring *Clupea Harengus Pallasii*, sac roe season extended from April 15 through July 15 in the Alaska Peninsula and Aleutian Islands waters. However, the opening of the Sand Point, Pavlof, and King Cove Districts were from April 15 through July 15; the Unimak, Akutan, Unalaska, Umnak, and Adak Districts were open from April 15 through June 15; the Amak and Port Heiden Districts were open from April 15 through June 30; and the Port Moller District was opened from May 21 through June 30. The Aleutian Islands Management Area "Dutch Harbor" herring food and bait fishery was open from July 16 through July 28.

In 1992, commercial sac roe catches occurred in North Peninsula waters from May 23 through June 17 and in South Peninsula waters from June 4 to June 7. No sac roe harvest occurred in the Aleutian Islands Management Area. The North Peninsula catch was 3,969.0 tons and the South Peninsula catch was 180.4 tons, producing a total Alaska Peninsula catch of 4,149.4 tons. The 1992 Alaska Peninsula sac roe catch was more than four times the 1987-91 average of 922.4 tons. During the sac roe fishery, 29 purse seine permit holders made 112 deliveries to 13 companies that purchased herring. The average roe recovery, not including herring purchased as bait during the sac roe season, was 8.99% for the North Peninsula, 10.83% for the South Peninsula, and overall 9.09%. The average price per ton was \$400 for 10% roe recovery and \pm \$50 for each percentage point above or below 10%, giving a sac roe ex-vessel value of about \$1,251,250 for the Alaska Peninsula fishery. During the North Peninsula sac roe season, 820.6 tons of herring were purchased as bait or dumped after processors refused purchase or fishermen held the herring too long without chilling the product. Bait herring were purchased at \$50 per ton.

Aerial survey estimates resulted in the largest biomass ever documented for the North Peninsula: 755 tons for Herendeen Bay, 8,269 tons for Moller Bay, 5,798 tons along the Bering Sea coast (most of which spawned in Inner Port Moller Bay Section), and 10,021 tons for Port Heiden. Fishermen and commercial pilots also reported herring in several locations ADF&G was unable to survey.

In 1992, commercial food and bait catches occurred in the Aleutian Islands Management Area from July 16 through July 28. The Aleutian Islands "Dutch Harbor" commercial food and bait harvest was 1,948.5 tons, with an allocation of 1,940.0 tons, and the test fish harvest of 33.3 tons. The average price per ton was \$300, giving a food and bait ex-vessel value of about \$584,550 for the Aleutian Islands Management Area food and bait fishery. During the food and bait fishery, eleven purse seine permit holders made 25 deliveries to five companies that purchased herring.

KEY WORDS: Alaska Peninsula, Aleutian Islands, herring, catch, age, length, weight, sex, sac roe, food

INTRODUCTION

The Alaska Peninsula and Aleutian Islands Management Areas (Figures 1-2) are described as Management Area "M" and are divided into three subareas; (1) the South Peninsula, consisting of Pacific Ocean coastal waters extending west of Kupreanof Point to 163°30' W. long. on Unimak Island; (2) the Aleutian Islands, consisting of Bering Sea waters extending west of Unimak Pass to the international dateline and Pacific Ocean waters extending west from 163°30' W. long. on Unimak Island to the international dateline; and (3) the North Peninsula, consisting of Bering Sea waters extending west from Cape Menshikof to Cape Sarichef (Figures 3-9).

The North Peninsula is comprised of three districts and 23 statistical areas, the South Peninsula of three districts and 45 statistical areas, and the Aleutian Islands of five districts and 41 statistical areas. Commercial Pacific herring *Clupea Harengus Pallasii* sac roe fishing normally begins in the latter part of May in North Peninsula waters, and mid-May in South Peninsula waters. The Aleutian Islands had no reported sac roe harvest since at least 1979; while the food and bait fishery normally begins on July 16.

Commercial herring fisheries have been regulated by emergency order to achieve exploitation mandates by the Alaska Board of Fisheries (BOF) and address problems with wastage. Management plans (McCullough and Stopha 1992a, McCullough and Stopha 1992b) and other directives from the BOF set policies by which these fisheries are allowed to operate (ADF&G 1992).

Herring have been reported throughout the South Peninsula, most areas in the North Peninsula, and in Unalaska Island waters of the Aleutian Islands. The major concentration of herring and fishing effort occurs in North Peninsula waters in Port Heiden, Port Moller, and Herendeen Bays, and along the Bering Sea coast in near shore waters from Entrance Point to Cape Seniavin. Known herring stocks and most fishing effort occurs in South Peninsula waters in the Shumagin Islands, and Stepovak, Pavlof, and Canoe Bays. Fishing effort in the Aleutian Islands Management Area has been limited to Unalaska and Akutan Islands waters.

From 1981 through 1992, the Alaska Department of Fish and Game (ADF&G) has deployed field crews in the Alaska Peninsula for the purpose of collecting data and to monitor the fishery. Crews have been successful in collecting samples and documenting spawning areas and substrate. Aerial surveys have been used with limited success to monitor the fishery, primarily due to the large area involved, weather, water conditions, and the sporadic and currently unpredictable appearance of the herring. In the twelve years that ADF&G has been conducting aerial surveys in the Alaska Peninsula, only surveys flown in 1989, 1991, and 1992 provided an accurate assessment of the total spawning biomass in North Peninsula waters.

Aerial surveys of the Port Moller area by ADF&G personnel in 1976 reported numerous schools of herring in Herendeen Bay (Warner and Shafford 1979). The first commercial catches of sac roe herring in North Peninsula waters occurred in 1982 when 513.5 tons were harvested (Table 1). From 1987-91, an average of 627.4 tons have been harvested during the North Peninsula sac roe fishery. Until 1992, the majority of the harvest was taken from Herendeen and Moller Bays, while the remaining balance of the catch was taken off the Bering Sea coast between Entrance Point and the Seal Islands (Table 2). In 1992, more than 40% of the North Peninsula harvest came from Port Heiden Bay.

Prior to 1982, fishing vessels destined to or returning from the Togiak herring fishery, frequently looked for herring in the Port Moller and Port Heiden Districts but made no deliveries. The run timing of the North Peninsula stocks appears to be later than the Togiak stocks.

The South Peninsula herring sac roe fishery continues to develop since it began in 1979. In South Peninsula waters, since 1980 and during years in which

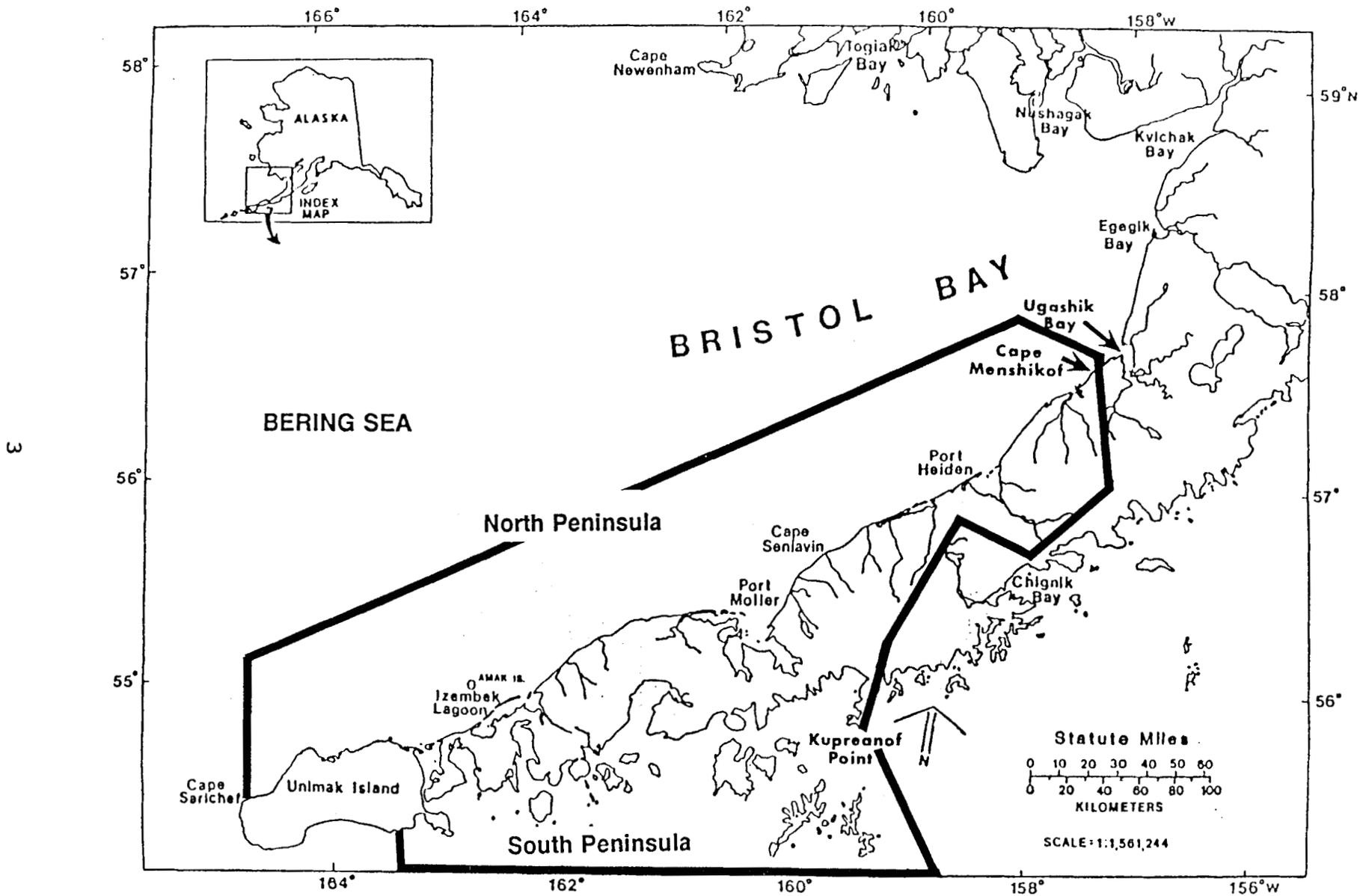


Figure 1. Map of the Alaska Peninsula Management Area, the study area on the Pacific Ocean portion of map is from Kupreanof Point to Unimak Island and on the Bering Sea from Cape Sarichef to Cape Menshikof.

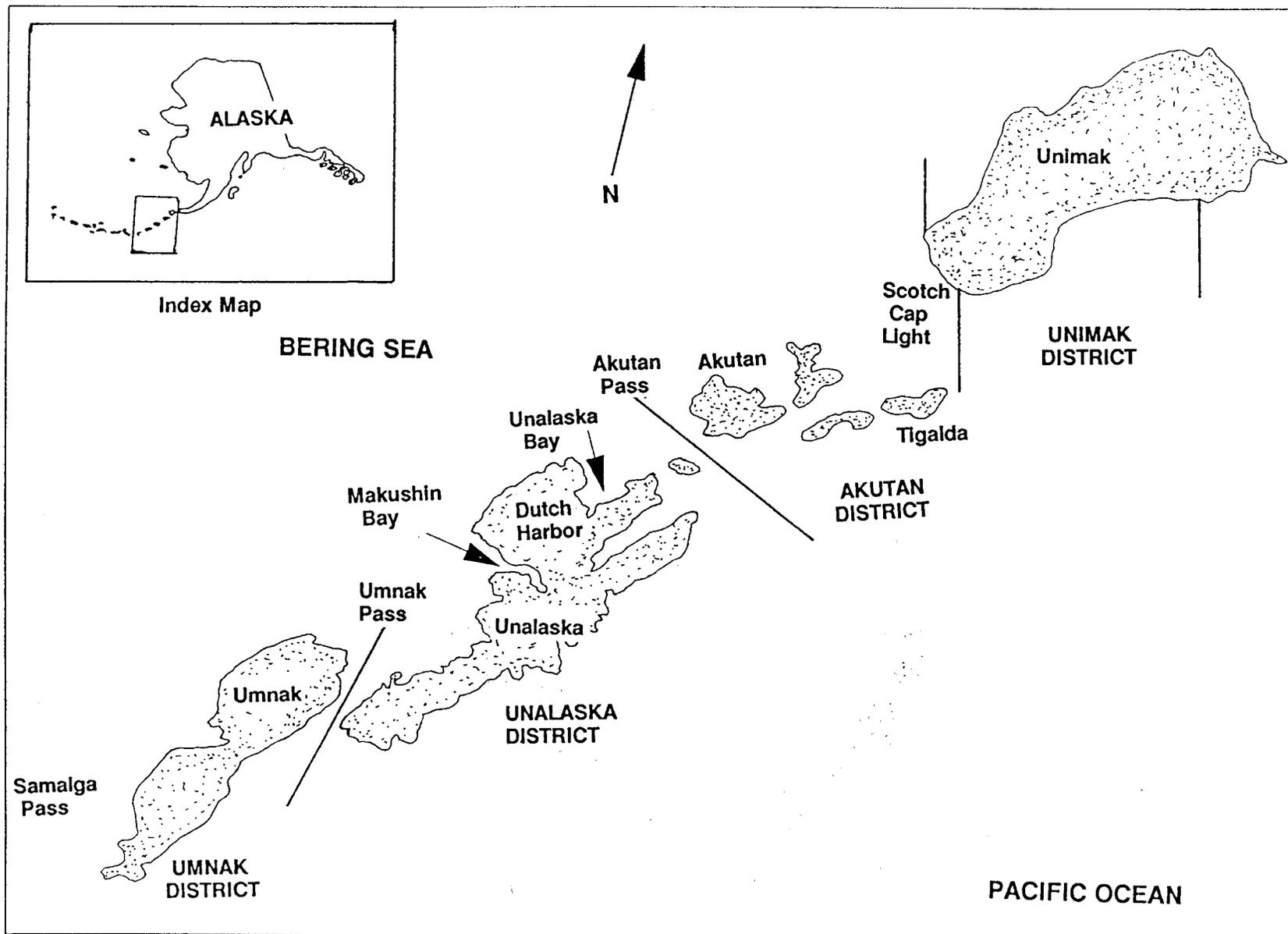


Figure 2. Map of the Aleutian Islands "Dutch Harbor" Management Area, the study area is from the Unimak District to Samalga Pass.

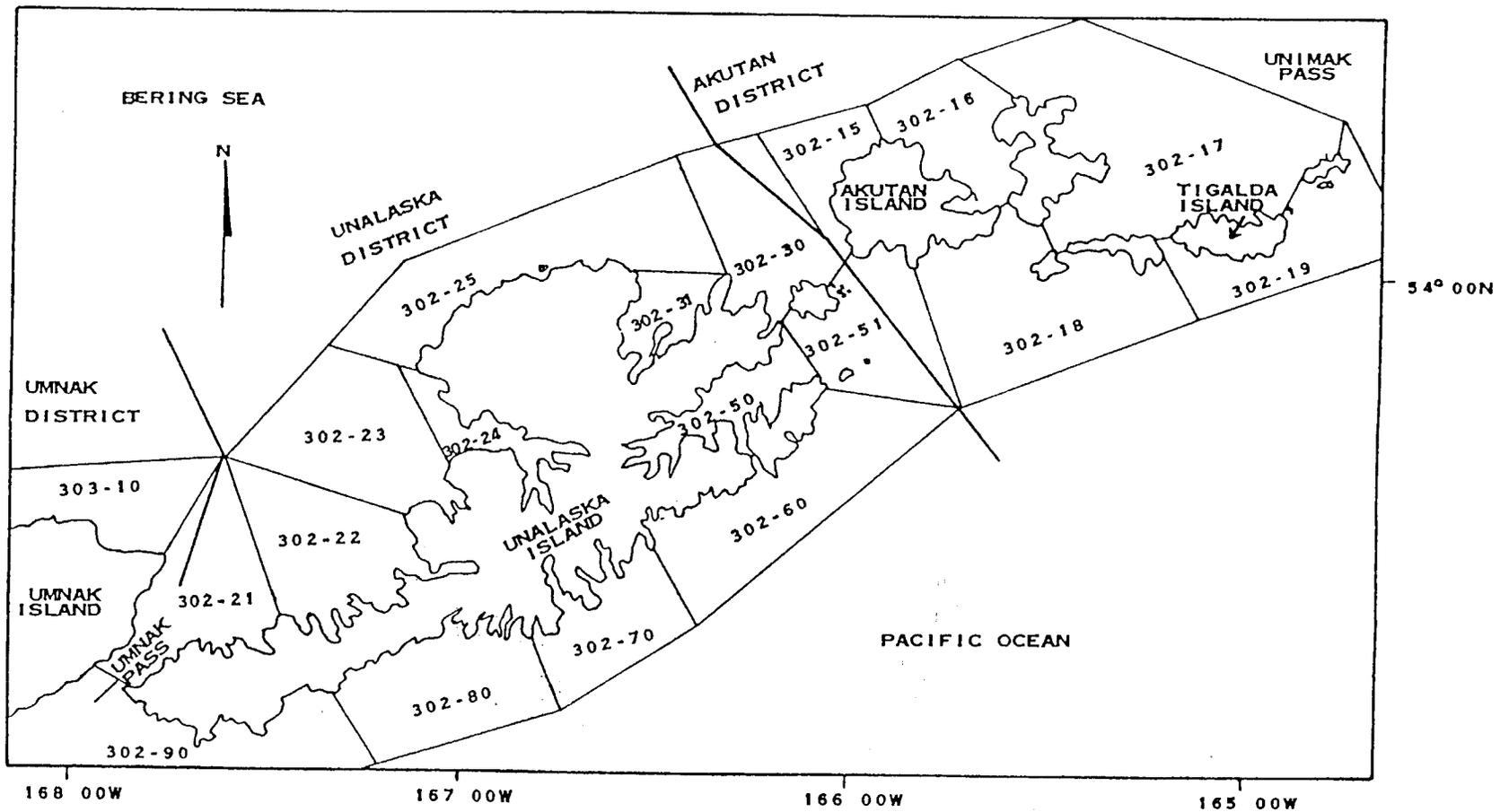


Figure 3. Map of the Aleutian Islands Area from Unmak Pass to Unimak Pass with the statistical herring fishing areas shown.

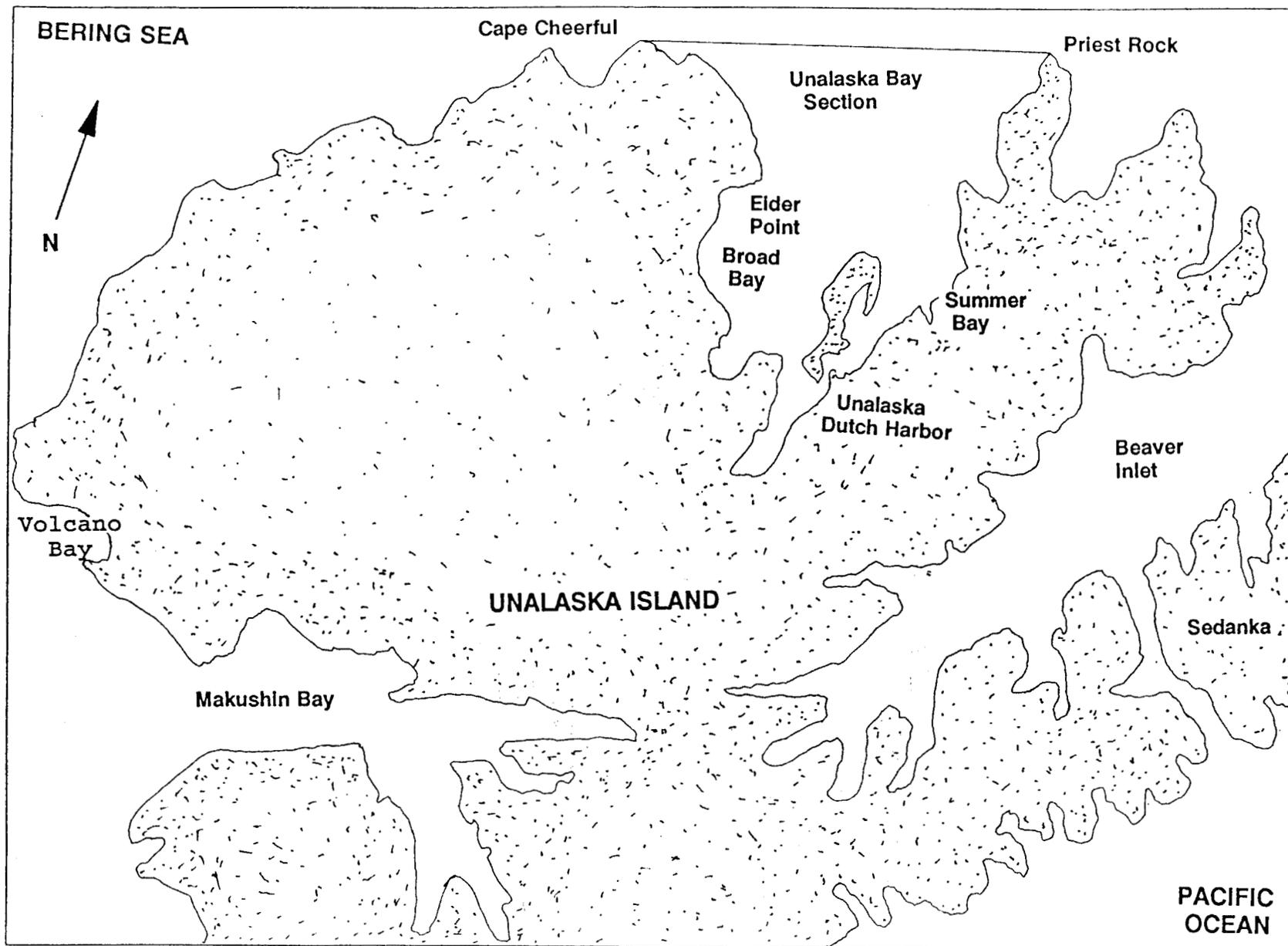


Figure 4. Map of Unalaska Island from Beaver Inlet to Volcano Bay.

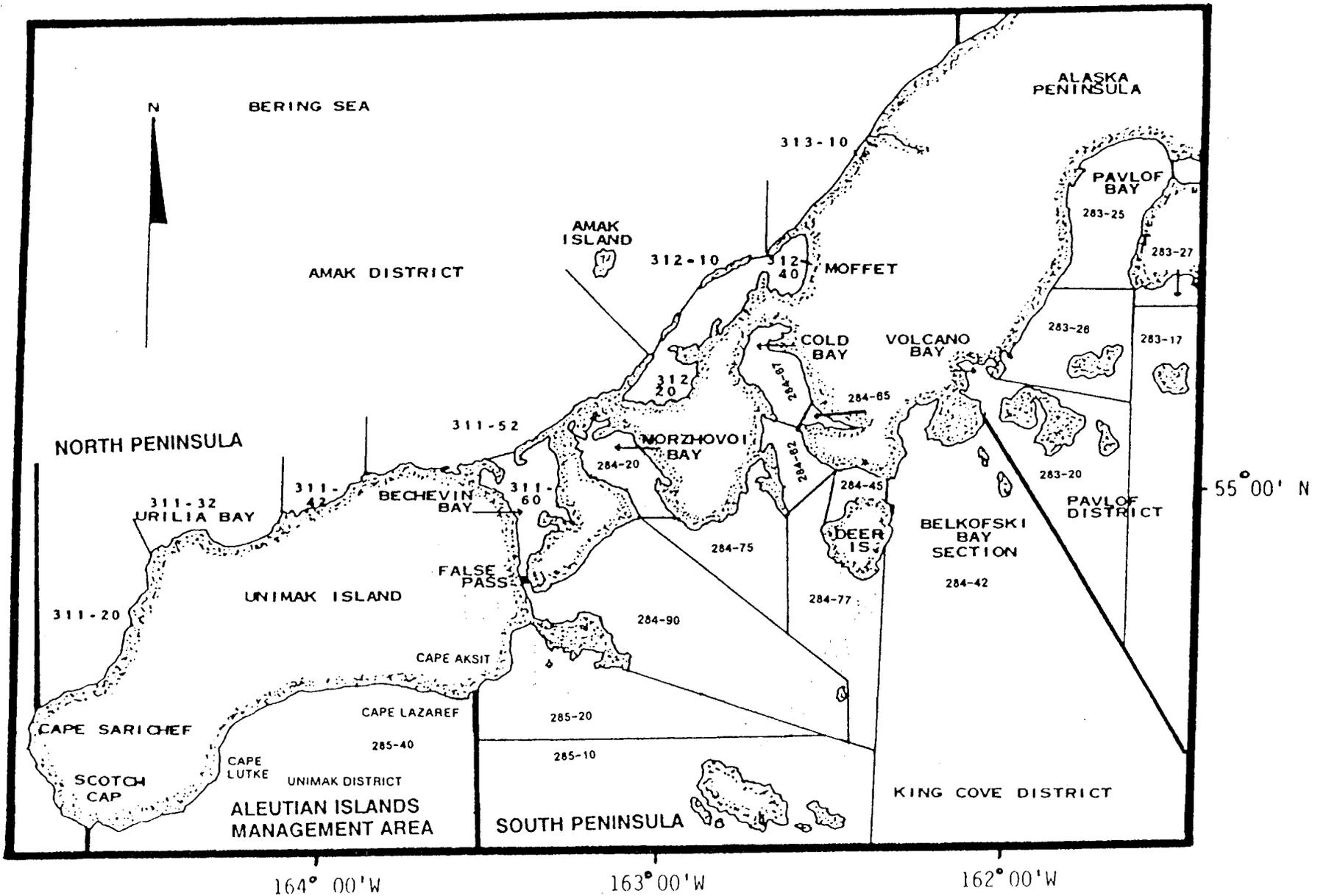


Figure 5. Map of the Alaska Peninsula Area from Cape Sarichef to Pavlof Bay with the statistical herring fishing areas shown.

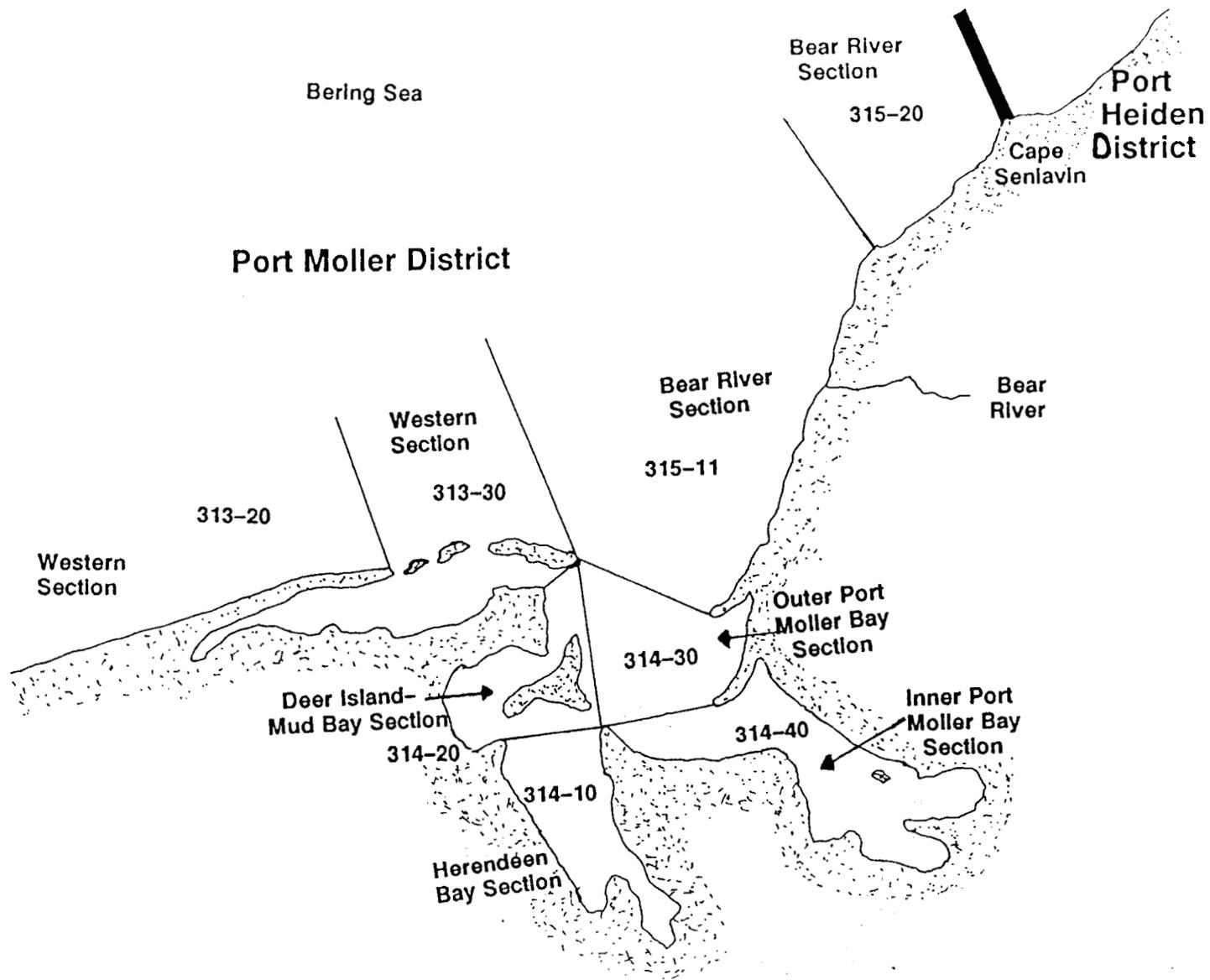


Figure 6. Map of the Port Moller District with the statistical herring fishing areas shown.

PORT HEIDEN DISTRICT

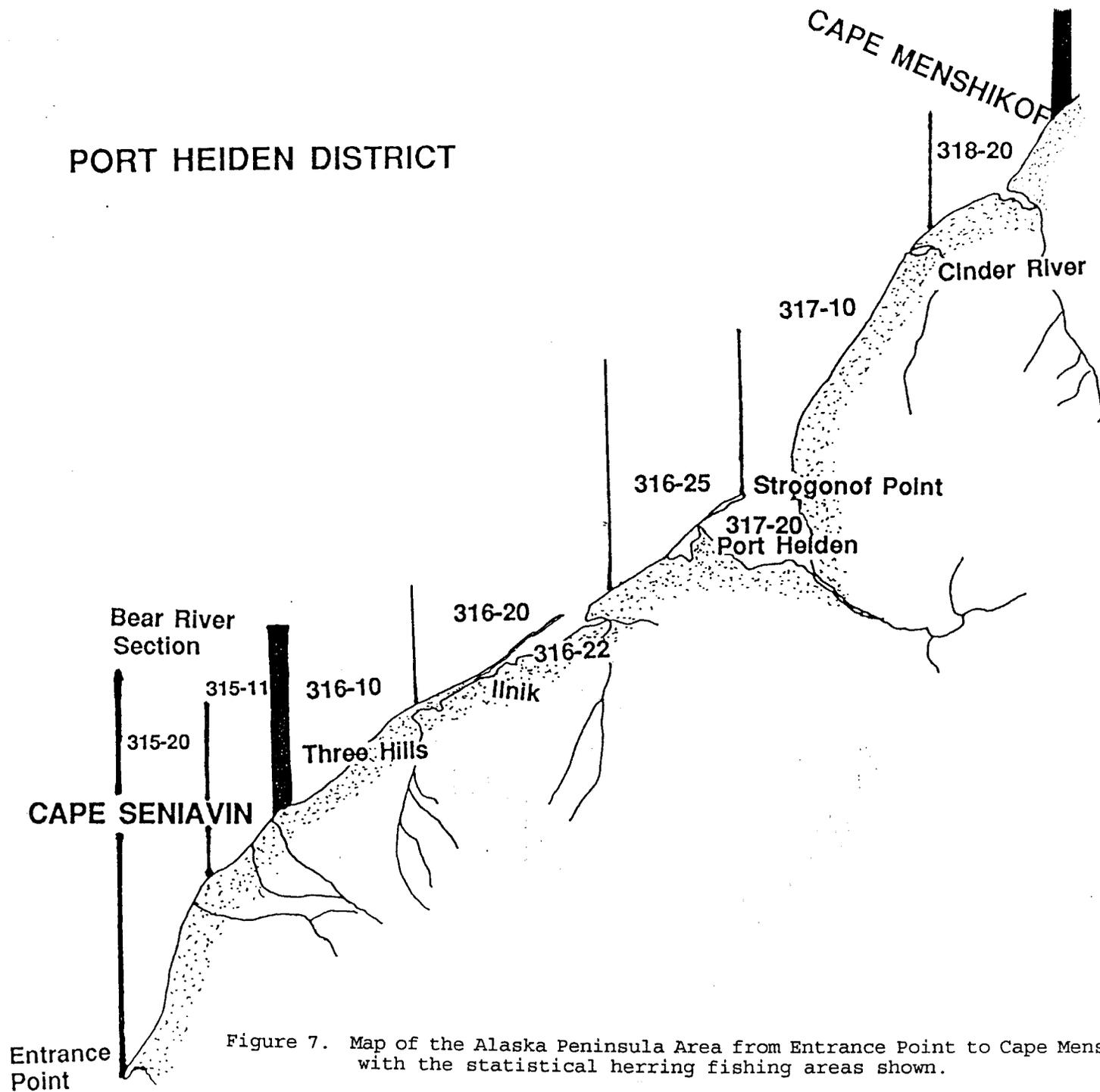


Figure 7. Map of the Alaska Peninsula Area from Entrance Point to Cape Menshikof with the statistical herring fishing areas shown.

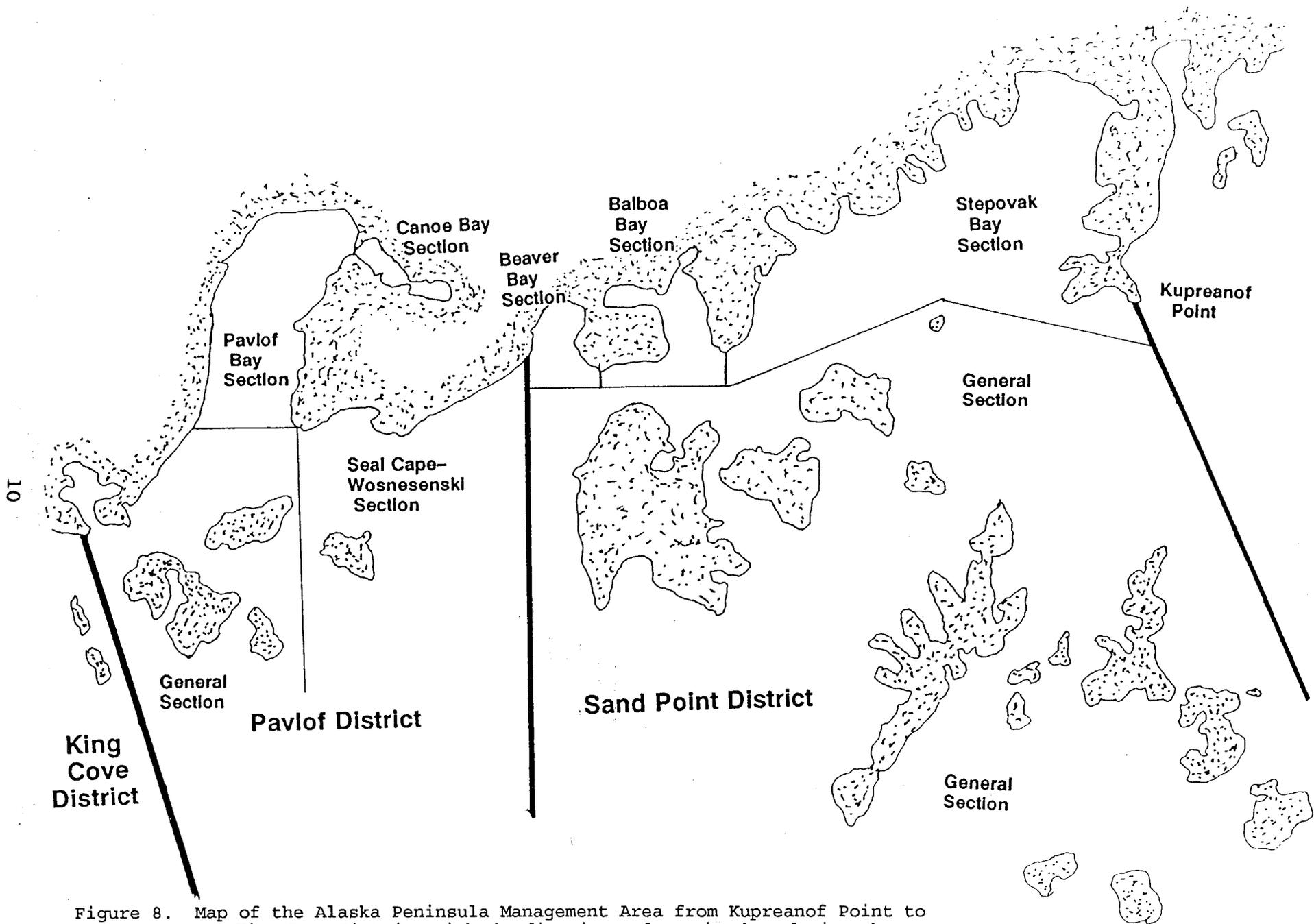


Figure 8. Map of the Alaska Peninsula Management Area from Kupreanof Point to the King Cove District with the district and section boundaries shown.

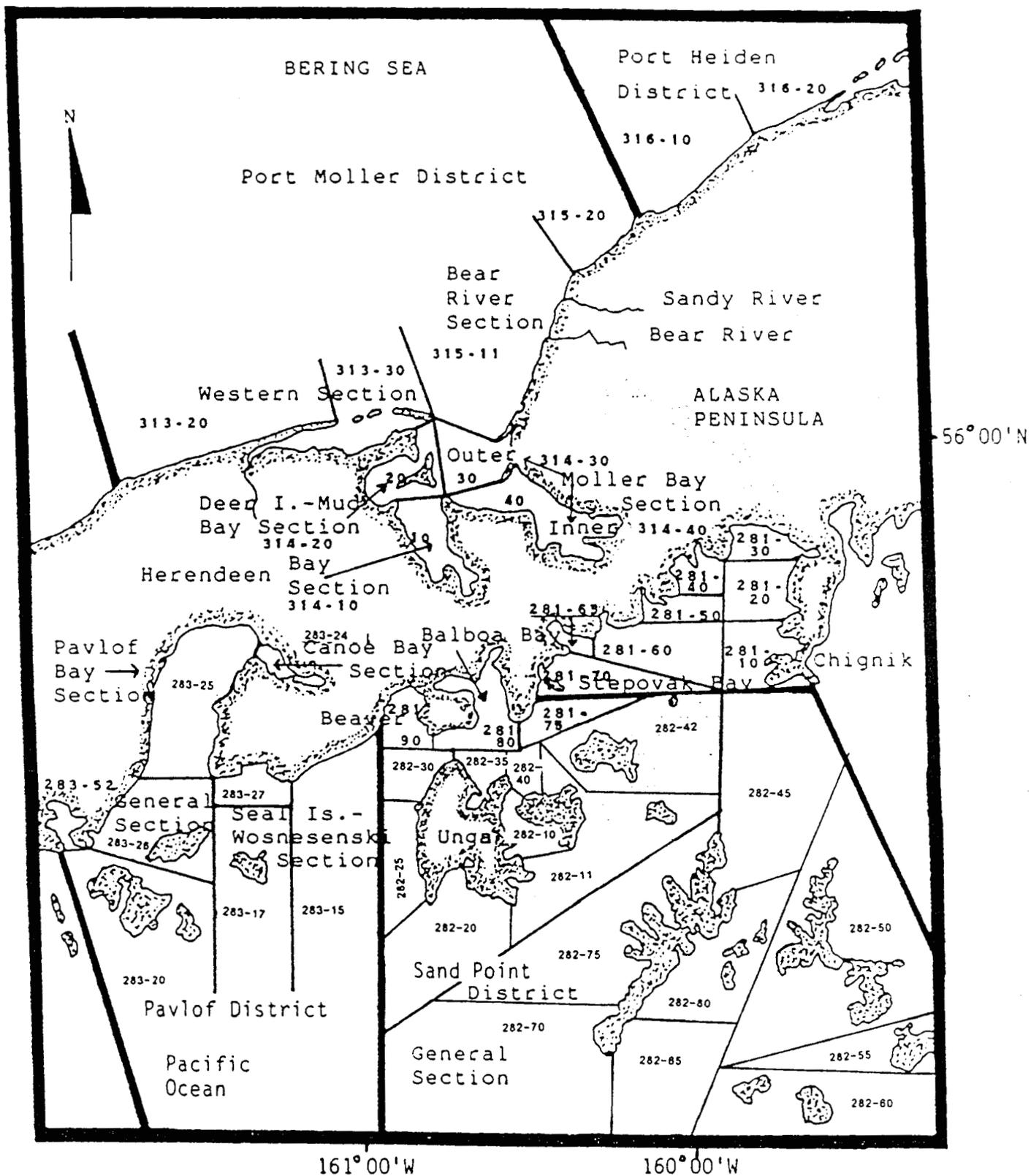


Figure 9. Map of the Alaska Peninsula Area from Bear Bay to Kupreanof Point with the statistical herring fishing areas shown.

Table 1. Alaska Peninsula Management Area commercial herring sac roe catch (short tons) by time period and area, 1979-92.

Year	South Peninsula	South Peninsula Time Period	North Peninsula	North Peninsula Time Period	Total
1979	10.1	July 4-July 4	0.0		10.1
1980	453.0	May 18-July 14	0.0		453.0
1981	787.0	May 9-June 23	0.0		787.0
1982	176.2	May 31-June 14	513.5	May 31-June 12	689.7
1983	0.0		637.5	May 9-May 29	637.5
1984	210.4	May 13-June 1	431.2	May 24-June 8	641.6
1985	345.0	June 1-June 11	716.0	May 24-June 4	1,061.0
1986	281.5	June 7-June 14	888.9	May 18-May 30	1,170.4
1987	319.0	June 8-June 19	512.4	May 9-June 5	831.4
1988	376.8	May 31-June 20	293.7	May 17-June 15	670.5
1989	310.0	May 13-June 19	744.7	May 28-June 23	1,054.7
1990	312.2	May 14-June 14	272.8	June 4-June 19	585.0
1991	157.4	May 16-June 11	1,313.0	May 17-July 4	1,470.5
Average	295.1 a/		627.3		922.4
1992	180.4	June 4-June 7	3,969.0	May 23-June 17	4,149.4

a/ Five year 1987-91 average

Table 2. North Peninsula commercial herring sac roe catch (short tons) by geographic area, 1982-92.

Year	Port Moller District			Bear River Bering Sea Coast	Port Heiden District	Total
	Deer Island	Herendeen Bay	Moller Bay		Port Heiden Bay	
1982	0.0	287.5	180.0	46.0	0.0	513.5
1983	0.0	520.5	36.0	81.0	0.0	637.5
1984	0.0	181.0	250.2	0.0	0.0	431.2
1985	73.0	100.0	256.0	287.0	0.0	716.0
1986	41.5	112.5	261.4	473.5	0.0	888.9
1987	0.0	160.8 a/	344.3	7.3	0.0	512.4
1988	0.0	8.2	285.5	0.0	0.0	293.7
1989	0.0	67.0	116.3	561.4	0.0	744.7
1990	0.0	155.8	117.1	0.0	0.0	272.9
1991	167.0	156.3	689.6	300.2	0.0	1,313.1
1987-91 Average	33.4	109.6	310.6	173.8	0.0	627.4
1992	18.3	0.0	2,350.7	0.0	1,600.0	3,969.0
1992 District Total						
		2,369.0			1,600.0	3,969.0

a/ at least 11 tons were caught in the Deer Island-Mud Bay Section.

commercial sac roe harvests occurred, landings were reported from 18 geographical locations; of these, only Canoe Bay produced an annual harvest (Tables 1, 3; Figure 8).

In South Peninsula waters, significant landings occurred in 1980 (453.0 tons), and peaked in 1981 (787.0 tons). The BOF closed the South Peninsula sac roe fishery in 1983, allocating all catches to a food and bait fishery that failed to develop. From 1984 through 1991, the BOF allocated the catch between the sac roe fishery (75% of the allowable harvest) and the food and bait fishery (25% of the allowable harvest). In 1992, the BOF allocated the entire harvest to the sac roe fishery (McCullough and Stopha 1992a). The BOF believed a herring food and bait closure was warranted in North Peninsula waters because: (1) the exploitation rate of the observed spawning biomass in the Port Moller District was about 16% during the sac roe season; (2) no unexploited local stocks were reported from other districts; (3) there had never been a documented North Peninsula herring harvest during the food and bait season; and (4) concerns have been expressed about the potential of this fishery harvesting stocks other than those from the North Peninsula during the food and bait season. North Peninsula coastal waters are the likely migration route of spent Togiak and perhaps other Bering Sea stocks from their spawning grounds to summer and fall feeding grounds in the Aleutian Islands. The BOF also determined that all South Peninsula herring should be allocated to sac roe fisheries because: (1) deliveries occurred only during 1982 (565.0 tons) and 1991 (161.4 tons); (2) the 1982 fishery in Stepovak Bay severely depressed herring stocks in Stepovak Bay for several years; (3) the 1991 fishery harvested mostly young herring (87.2% age 4 fish), it has been an ADF&G management policy to discourage the harvest of young herring; (4) the origin of harvested stocks is unknown; and (5) budget constraints have prevented biomass surveys to insure the BOF policy of 20% or less exploitation rate of a stock is maintained.

The Aleutian Islands Management Area herring food and bait season is from July 16 through February 28. Although the entire Aleutian Islands Management Area is open during the herring food and bait season, fishing effort, due to processing capabilities and herring concentrations, has been limited to the vicinity of Unalaska and Akutan Islands. The Unimak, Akutan, and Unalaska Districts and that portion of the Umnak District located east of Samalga Pass is commonly referred to as the "Dutch Harbor" herring food and bait fishery (Figures 2-5). Two management plans: (1) the Bering Sea herring fishery management plan (Appendix B), and (2) Aleutian Islands Management Area herring food and bait management plan, 1992 (McCullough and Stopha 1992b) and various regulations (ADF&G 1992) are used to manage the fishery.

Historically, the "Dutch Harbor" food and bait fishery occurred from 1929 through 1938 and in 1945 (Table 4). This fishery was a mixture of gill net and purse seine catches, holding pounds, and numerous small, shore-based hand packing operations. A large portion of the catch was brined for either food or bait purposes while some product was frozen. Purse seine gear provided the bulk of the harvest.

Recently, the "Dutch Harbor" food and bait fishery occurred from 1981 through 1992 (Tables 4, 5). Currently, fishing gear consists of purse seine vessels, which use large seines, up to 250 fathoms in length and 25 to 35 fathoms in depth. The entire 1981-86 and 1990-91 harvest was caught with purse seine gear. One gill net permit holder participated in the 1987 and 1988 seasons, and two gill net permit holders fished in 1989. Gill net vessels used in the fishery are typically 32 feet in length, and there is no restriction on gear length. Purse seine vessels used in the fishery average about 50 feet in keel length and the majority also participate in Management Area "M" salmon fisheries. Sonar aboard the vessels are critical to the fishing operation, much as the airplane is critical to sac roe fisheries.

Generally permit holders freely exchange information concerning the location of herring schools. When herring concentrations leave traditional fishing areas, fishermen will increase their efficiency by conducting organized "sonar searches"

Table 3. South Peninsula commercial herring sac roe catch (short tons) by geographic area, 1980-92.

Year	Stepovak Bay a/	Balboa Bay	Pavlof Bay	Canoe Bay	Volcano-Dolgoi	Belkofski Bay	Lenard Harbor	Dolgoi Harbor	Shumagin Islands	Total
1980	195.0	132.0	114.0	12.0	0.0	0.0	0.0	0.0	0.0	453.0
1981	122.0	36.0	225.0	206.0	65.0	23.0	110.0	0.0	0.0	787.0
1982	0.0	5.0	0.0	171.2	0.0	0.0	0.0	0.0	0.0	176.2
1983 b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984	30.0	25.0	0.0	155.4	0.0	0.0	0.0	0.0	0.0	210.4
1985	11.0	0.0	95.0	239.0	0.0	0.0	0.0	0.0	0.0	345.0
1986 c/	0.0	0.0	61.0	140.5	13.0	8.0	59.0	0.0	0.0	281.5
1987 c/	0.0	0.0	92.0	118.0	0.0	38.0	59.0	12.0	0.0	319.0
1988 d/	0.3	11.0	69.0	236.5	17.0	12.0	31.0	0.0	0.0	376.8
1989	39.0	17.0	53.0	148.0	0.0	0.0	9.0	5.0	39.0	310.0
1990	71.7	20.8	0.0	120.4	0.0	3.2	5.9	0.0	90.4	312.2
1991	19.3	19.3	0.0	77.5	0.0	0.0	0.0	0.0	41.4	157.4
1987-91 Average	26.1	13.6	42.8	140.1	3.4	10.6	21.0	3.4	34.2	295.1
1992	0.0	0.0	0.0	180.4	0.0	0.0	0.0	0.0	0.0	180.4

a/ The 1984-88 catches came from Ramsey Bay, the 1989 catch came from Granville Bay.

b/ In 1983 the South Peninsula sac roe fishery was closed, all herring catches were allocated to a food and bait fishery that did not develop.

c/ Stepovak Bay (Kupreanof Point to Swedania Point) was closed during 1986-87 due to the herring biomass being below the threshold required for a commercial fishery.

d/ In Stepovak Bay seven tons of green herring were dumped on May 7, and an additional two tons were dumped on May 11.

Table 4. Aleutian Islands "Dutch Harbor" area herring food and bait fisheries historical industry summary, 1929-92.

Year	Harvest In Short Tons	Number Processors	Number Permits	Number Landings	Tons Per Boat	Tons Per Landing	\$ Per Ton	\$ Value (Thousands)	\$ Per Vessel (Thousands)
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	*	*	16	352	44	300	211	*
1982	3,565	6	7	95	509	38	300	1,020	146
1983	3,567	5	8	96	446	37	232	828	104
1984	3,578	5	9	61	398	59	210	751	83
1985	3,480	3	6	78	560	45	162	564	94
1986	2,394	4	7	53	342	45	254	600	86
1987	2,503	4	8 ^b	45	373	56	300	751	94
1988	2,004	6	8 ^b	59	251	34	252	505	63
1989	3,081	5	9 ^b	69	342	45	283	873	97
1990	820	5	7	8	117	103	350	287	41
1991	1,325	5	8	18	166	74	300	398	50
1992	1,949	5	11	26	177	75	300	573	52
1929-38 Average	1,474	11	31	*	*	*	*	*	*
1982-92 Average	2,570	5	8	55	335	56	268	650	83

-Continued-

Table 4. (page 2 of 2)

*Data not available.

^aThe number of processors, fishing vessels, and catch by gear type can not be released due to state confidentiality requirements.

^bThe catch by gear type can not be released due to state confidentiality requirements.

Table 5. Aleutian Islands "Dutch Harbor" commercial herring food and bait catch, in short tons, 1981-92.

Year	Landing Date		Days Fished	Preseason Togiak Spawning Biomass	Harvest Quota	Food and Bait Harvest	% Togiak Spawning Biomass Harvested	Number Permit Holders Fishing
	First	Last						
1981	8/03	8/23	21	159,000	NONE	704	0.4	- ^a
1982	8/05	9/12	39	98,000	NONE	3,565	3.6	6
1983	7/23	9/06	46	142,000	3,525 ^b	3,567	2.5	5
1984	7/17	7/27	11	115,000	3,525 ^b	3,578	3.1	5
1985	7/17	8/11	26	132,000	3,525 ^b	3,480	2.6	3
1986	7\16	7/28	13	96,000	2,453 ^c	2,394	2.5	4
1987	7/16	7/23	4 ^d	88,000	2,332 ^c	2,503	2.8	9
1988	7/16	9/18	21	132,000	3,100 ^e	2,004	1.6	8
1989	7/16	8/05	19 ^f	100,108	3,100 ^e	3,081	3.2	9
1990	8/15	8/15	<1	72,000	903 ^e	820	1.1	7
1991	7/17 ^g	7/17	<1	83,229	931 ^e	1,325	1.6	8
1992	7/16	7/28 ^h	5	60,214 ⁱ	1,940 ⁱ	1,949	1.3	11
Average			16	106,463	2,413	2,414	2.2	7

^aNumber can not be released due to state confidentiality requirements.

^bHarvest ceiling of 3,525 established by Board of Fisheries.

^cHarvest quota set by ADF&G. Reduced proportionate with the drop from the 1985 Togiak spawning biomass level.

^dClosed 7/19, reopened for 14 hours on 7/23.

^eHarvest quota set under provisions of the Bering Sea Herring Fisheries Management Plan.

^fClosed 7/26, reopened 7/27 through 8/5.

^gFishery opened for six hours on 7/16; weather prevented any fishing effort.

^hFishery co-op after 7/16.

ⁱThe preseason forecasted biomass was adjusted by ADF&G, the final biomass estimate for Togiak was 146,037 tons and the harvest quota was adjusted to 1,940 tons.

over fairly large areas until concentrations of herring are located. During the last two seasons aircraft have also been used to spot herring. When catcher vessels leave the immediate area of shore-based processing facilities, industry follows with floating processors and tenders. Processing efficiency and product quality may decline when this occurs. Harvest locations have extended over approximately 90 miles, from Tigalda Island to Makushin Bay on Unalaska Island. The majority of the harvest occurred within a five mile radius of shore-based processing facilities in Unalaska and Akutan Bays.

A similarity between the recent and historical fisheries is the quality problem associated with feeding herring. Feed problems were overcome in the historical fishery by the use of holding pounds, where seine caught herring were held until their stomachs became empty. Gill net caught herring required special handling to prevent spoilage. In the current fishery, the use of ice and chilled seawater in conjunction with rapid processing alleviates most of the feed related problems. When feeding conditions are severe, the processors have suspended buying.

One difference between the current and historical (1929-38 and 1945) fisheries are the availability of herring. Historically, herring were categorized into an early summer run (late June to late July) and a late summer run (late August to early September). This pattern does not seem to apply in the current (post-1980) fishery. Herring now appear in the Dutch Harbor area about July 1 and are available through mid-September.

Shore-based processors purchase the majority of the herring harvested. Floating processors have been used most years; however, they are limited by daily handling capacities. In 1988 and 1990-91, some herring were tendered to the King Cove shore plant, in 1989 and 1990-91 to the Sand Point shore plant, and in 1988-91 to the Akutan shore plant.

Generally, the ex-vessel value for bait herring has exceeded that for food herring, although during the last few seasons the same price has been paid for both food and bait herring. Industry information indicates that foreign food markets currently have multiple sources of herring from European and Canadian stocks which have been cycling high in recent years. While Aleutian food herring are a suitable and desirable product, an ample and more reliable supply of food herring from other countries currently dominates the market. The bait product from this fishery has a more stable market. Bait is used locally and in other Alaskan fishing ports for the longline and crab fisheries. Bait demands have been increasing in recent years and a premium price is placed on quality bait which is fresh and has high oil content. Overall, the market for bait herring has remained more stable than that for food.

The harvest strategy of the Dutch Harbor food and bait herring fishery has evolved since it was re-established in 1981. During the 1981 and 1982 seasons, there were no harvest restrictions. From 1983 to 1985 the BOF implemented a harvest ceiling of 3,527 tons per year due to biological concern over multiple exploitation on Eastern Bering Sea spawning stocks, specifically the Bristol Bay, Nelson Island, and Port Moller stocks. Scale pattern analysis studies identified these stocks as comprising the Eastern Aleutian herring biomass (Rogers and Schnepf 1985). The extensive sac roe fisheries occurring on these stocks coupled with the "Dutch Harbor" food and bait fishery which may harvest some of these stocks, may create biological concern and possible exploitation above the board's 20% guideline policy. In 1986, a modification of the harvest ceiling was implemented by ADF&G in response to the BOF concern for the possible diminishing nature (lack of recruitment in the spawning stocks) of the contributing stocks (primarily Togiak, to which the bulk of the Aleutian catch is estimated to be comprised). The 1986 harvest allocation in the Aleutians was reduced by 30% (2,453 ton limit). This reduction corresponded with the percent reduction of the observed Togiak spawning biomass between the springs of 1985 and 1986. The 1987 harvest allocation was 2,332 tons, which was in line with the 1985 to 1987 reduction of observed Togiak spawning biomass.

In 1988, the BOF implemented the Bering Sea Herring Fisheries Management Plan, which established criteria for calculating the "Dutch Harbor" food and bait quota. To ensure the conservation of herring stocks, the BOF adopted a requirement that the overall exploitation of a herring stock should not exceed 20% of the spawning biomass. In the case of the Togiak spawning stock, an allocation between the sac roe fishery, spawn on kelp fishery, and the "Dutch Harbor" food and bait fishery was established so that the catch did not exceed 20% of the observed spawning biomass. The number of fishermen involved and the value of the fishery were factors considered by the BOF when allocations were determined. The Bering Sea Herring Fishery Management Plan defines under what conditions and the quota for the "Dutch Harbor" food and bait fishery (Appendix B).

In 1991, the BOF changed the "Dutch Harbor" food and bait herring fishery opening date from August 15 to July 16. This change was implemented to lessen the chance of catching herring stocks other than Togiak and North Alaska Peninsula in the "Dutch Harbor" fishery. In 1992, ADF&G action changed the fishery from night to a day time fishery; prior to 1992 the fishery located and set on herring schools at night using sonar. In 1992, as an aid in monitoring the fishery, ADF&G initially made day time fishing periods of two hours or less. Although sonar was still used to locate schools, spotter pilots and fishermen visually detected feeding birds and sea mammals which directed them to herring schools.

The objectives of this report are: (1) to present the numbers of herring in the commercial catch for each statistical day in the Alaska Peninsula and Aleutian Islands Management Areas during 1992; (2) to estimate the age and sex composition of harvests; (3) to estimate the mean length and weight of herring harvested in commercial fisheries; and (4) to estimate the biomass of herring within each area. This information will provide a data base for developing brood tables, forecasting runs, and evaluating management goals. This report is intended as a reference document; interpretation and discussion of the data are therefore limited.

METHODS

Commercial catch data were compiled by the Division of Commercial Fisheries of ADF&G. Data were based on computer tabulations originating from individual sale receipts (fish tickets) given to fishermen at the time of delivery. Fish tickets and the computer generated summaries were edited by ADF&G Alaska Peninsula staff for errors and omissions. Because extensive fish ticket editing is usually required to finalize the data for any given year, later reports may contain minor differences in the catch information listed in this report.

Catches were sampled throughout the season from harvests in the fishing areas. Catch sampling occurred in Port Moller, Sand Point, and Canoe Bay for Alaska Peninsula harvests, and in Kodiak for herring harvested in the Aleutian Islands. In the Alaska Peninsula, herring were randomly sampled, usually collected from the holds of tender vessels to minimize scale loss. The harvest area of each tender sampled was determined through vessel operator interviews and fish ticket information. In the Aleutian Islands, 50 pound boxes of frozen herring were randomly sampled from a Dutch Harbor shore based processor. This processor purchased about 24% of the total Aleutian Islands harvest from several fishing vessels and tenders.

Tender operators purchased fish from catcher vessels operating in combine with them. Since all Alaska Peninsula catch sampling occurred before sorting within the cannery, there was no preselection of herring other than from delivery areas; although not tested, each sample was assumed to be representative of the harvest within a sample area. In the Aleutian Islands, catch sampling occurred after the herring were frozen. The sample was assumed to be representative of the harvest, no herring were sorted. While this insured that samples were randomly selected

from the fishery, the samples may not be characteristic of the population structure because the distribution of the population is unknown in the fishery.

Age compositions were computed for the catch for each area sampled. Age was determined by examining scales (Warner and Shafford 1970). Scales were taken from the preferred area, located on the left side of the herring three rows below the lateral line and three scales posterior to the center of the operculum plate (Anonymous 1986). One scale was taken from each herring. Ages were recorded in actual fish age in years. The accuracy of age determination was not tested.

Standard length measurements were taken from the anterior most portion of the fish, including the lower jaw with the mouth closed, to the end of the vertebra (hypural plate) using a meter stick with 1 mm gradations and reading the measuring device to within 1 mm. Accuracy of a length measurement was within \pm 5 mm. Mean lengths were calculated from an unweighted composite of the data collected from each area sampled.

Weight measurements of fish were taken using a digital scale with 2.0 g gradations and reading the scale device to within 2.0 g. Accuracy of a weight measurement was within \pm 2.0 g. Mean weights were calculated from an unweighted composite of the data collected from each area sampled.

Sex compositions and sexual maturity were computed for each area sampled. Sex and sexual maturity were determined by either squeezing the fish or by internal observation of the gonads. The sexual maturity of a herring was classified as: (1) virgin herring, (2) virgin herring with small sexual organs, (3) gonads occupying about half the ventral cavity, (4) gonads almost as long as body cavity, (5) gonads fill body cavity, (6) ripe gonads, (7) spent herring, and (8) recovering spent herring.

Biomass estimates of herring schools occurred during aerial surveys. The methodology of these surveys is described by Anonymous (1986). Observers fly at a recommended altitude of 1,500 feet and count the number of schools of herring and measure the length and width of each school. Each school is classified into one of three size classes based on its surface area: small schools with an area ≤ 50 m²; medium-sized schools with a surface area >50 m² and ≤ 450 m²; and large schools with a surface area >450 m². The number of schools in each size-class are converted to Relative Abundance Indices (RAI) by assuming that one small school equals one RAI, one medium-sized school equals five RAI, and one large school equals surface area/50 m². Aerial observers also classify the conditions on each survey with a rating system: one equals excellent, two equals good, three equals fair, four equals poor, five equals unsatisfactory. A conversion factor of 1.52 short tons/RAI is used for schools observed in water depths of 16 feet or less and 2.58 short tons/RAI is used for schools observed in water depths of 16 to 26 feet. In deep water, no attempt was made to convert RAI units into tonnages due to the lack of data. Conversion factors were calculated from surveys of schools of known biomass and surface area in known water depths that were conducted with commercial fishing vessels in Bristol Bay in 1983. If more than one survey of an area was conducted in a single day, then the largest number of RAI's recorded in each area was chosen as the most accurate index of biomass, because observers were more likely to underestimate the biomass than they were to overestimate the biomass. Some schools of fish, especially in South Peninsula waters, may have been capelin or other finfish.

Harvest guidelines were established preseason and were based on past fishing performance, age class data, and biomass estimates from ADF&G and industry aerial surveys (Table 6). Areas where little or no data on stock biomass was known were open for exploration.

Table 6. Alaska Peninsula and Aleutian Islands Management Areas Herring sac roe harvest guideline levels, in short tons, by management area, 1992.^{1&2}

Management Area	<u>Guideline Harvest Level</u> Sac Roe Harvest
South Peninsula	
Sand Point District	
Stepovak Bay Section	60
Swedania Point-Balboa Bay Section	15
Point Aliaksin-Beaver Bay Section	15
General Section	3
Pavlof District	
Canoe Bay Section	100
Pavlof Bay Section	25
Seal Cape-Wosnesenski Section	3
General Section (Volcano Bay)	20
King Cove District	
Belkofski Section	25
Deer Passage Section	15
Cold Bay Section	25
General Section	3
South Peninsula Total	300
North Peninsula	
Amak District	3
Port Moller District ⁴	
Western Section	3
Deer Island Section	5
Herendeen Bay Section	150
Inner Moller Bay Section	150
Outer Moller Bay	150
Bear River Section	50 ⁶
Port Heiden District ^{3&4}	3
North Peninsula Total	500
Aleutian Islands	
Unimak District	3
Akutan District	3
Unalaska District	3
Umnak District	3
Adak District	3
Guideline Harvest Total ⁷	800

-Continued-

Table 6. (page 2 of 2).

¹The Aleutian Islands Management Area is open for exploration; no deliveries have ever been made from the Aleutian Islands.

²Portions of a section, district, or area may be closed if it is suspected that additional harvests in a given location will exceed 20% of the spawning biomass.

³All areas without guideline harvest levels are open for exploration. Harvests in these areas will be kept small until ADF&G is able to document the spawning biomass. For the Shumagin Islands, no more than 50 tons of herring will be allowed to be harvested from the waters near any single island in exploratory areas.

⁴Herring abundance in the Port Moller District is difficult to document. The guideline harvest levels listed may be conservative and reflect years when the observed abundance was low. The 1992 herring abundance may justify a larger catch than 500 tons, however to increase the guideline harvest level a larger than expected spawning biomass must be documented by ADF&G. Catches in the Port Heiden District will be counted against the Port Moller guideline harvest level if it is suspected that herring caught in the Port Heiden District were traveling to the Port Moller District.

⁵Herring harvested in the Deer Island Section of Herendeen Bay will be counted against the Herendeen Bay guideline harvest level.

⁶Herring harvested in the Bear River Section will be counted against the Port Moller and Herendeen Bays guideline harvest level if it is suspected that these herring were traveling into Port Moller or Herendeen Bays.

⁷Total does not include harvests that may occur in areas open for exploration.

SAC ROE FISHERY

Results

In 1992, 112 landings were made in the Alaska Peninsula Management Area by 29 purse seine permit holders. The 1992 catch of 4,149.4 tons of herring was the largest catch ever for the Alaska Peninsula and was more than four times the 1987-91 average harvest of 922.4 tons and more than 2.5 times larger than the 1991 catch of 1,470.5 tons (Table 1). The increased catch was due to above average Port Moller District catches and the first commercial harvest from Port Heiden Bay.

In 1992, 40 purse seine and 2 set gill net permit holders, 47 tenders, and 17 companies indicated an interest in fishing or purchasing fish in the Alaska Peninsula during the sac roe season. However, only 29 purse seine permit holders made at least one landing and 13 companies purchased herring. This was an increase of 11 purse seine permit holders making deliveries and an increase of eleven companies buying herring from the 1991 level.

The total 1992 commercial herring sac roe and bait catch during the sac roe season for the Alaska Peninsula and Aleutian Islands Management Areas was 4,149.4 tons (3,328.8 tons of sac roe product and 820.6 tons of bait or dumped product), with an ex-vessel value of about \$1,251,250.

Fishing Effort

In 1992, the number of permit holders making at least one delivery was almost twice that of 1991, with most of the increase in effort occurring in the Port Moller and Port Heiden Districts. The increased effort is in part due to the South Peninsula salmon season being delayed until June 13, which gave salmon fishermen time to participate in the herring fishery, an increasing herring biomass, and commercial quantities of herring being exploited in areas never before commercially fished.

In the Port Moller District, during the 1986-88 seasons, there was an average of 52 vessels present, although only a few permit holders actually made landings. Fishermen often stop in Port Moller on their way from the Togiak herring fishery for a few days to explore for commercial quantities of herring. In 1986, a trend began of increasing fishing effort effectively harvesting the early returning fish stocks. In order to shift fishing pressure from the earlier arriving stocks to the later more abundant stocks, the Port Moller District opening was initially delayed until May 30 from 1989 to 1992. However, the fishery may have opened prior to May 30 by emergency order if a large biomass of herring was documented in the area. The later opening date in the 1989-91 seasons caused a trend of decreasing effort. Fishermen returning from Togiak tended to pursue halibut or salmon fisheries rather than wait for the Port Moller herring fishery to open. The Port Moller District opened prior to May 30 in 1991 and 1992 due to herring biomass sufficient to warrant commercial harvests.

In 1992, the Port Moller District opened on May 21; it appears that the district biomass is currently large enough to warrant an opening date prior to May 30. Fishing vessels were not on the grounds until May 22; the first tender arrived on the grounds on May 23, and the first commercial harvest occurred on May 23. Only two companies, one shore based and one floating, processed herring in North Peninsula waters. Most herring were tendered out of North Peninsula waters. The shore based plant processed a limited amount of herring after late May while the floating processor arrived in mid-June.

In South Peninsula waters effort and harvests have generally decreased since 1981. Most bays have small harvestable quantities of herring but the cost of having fishing vessels, tenders, and air planes on call for the harvesting of each bays quota makes fishing halibut or North Peninsula herring more attractive (Table 6). South Peninsula herring also appear to spawn later than North Peninsula herring, this prevents many halibut and salmon fishermen from participating in the South Peninsula herring fishery.

In areas open for exploration (Aleutian Islands Management Area, the Port Heiden and Amak Districts, the Western Section of the Port Moller District, the Seal Cape-Wosnesenski Section of the Pavlof District and General Sections of the King Cove and Sand Point Districts), liberal fishing time was allowed to give fishermen the opportunity to locate and exploit unknown herring stocks. The Port Heiden District produced a harvest of 1,600 tons, all other exploration areas were unproductive (Tables 2, 3).

North Peninsula

There are three commercial herring fishing districts in North Peninsula waters: Port Heiden, Port Moller, and Amak Districts. No catches were reported nor were herring observed in the Amak District. In all districts herring may be taken with purse seines and gill nets, both gear types share common time and area openings.

The 1992 projected guideline herring harvest for North Peninsula commercial herring fisheries was 500 tons (Table 6), which does not include herring harvested in sections open for exploration (McCullough and Stopha 1992a). The Port Heiden District was open for exploration from April 15 through May 22. After May 22 fishing periods in the Port Moller and Port Heiden Districts were by emergency order when herring biomass and tender capacity warranted an opening. The Amak District was open for exploration continuously from April 15 through June 30. North Peninsula waters closed to herring fishing on June 30.

ADF&G herring staff arrived in Port Moller on May 15. The first commercial spotter pilot arrived on May 16, herring were first observed on May 19 (214 tons), and the first fishing vessels arrived on May 22. The Port Moller District opened to commercial herring fishing on May 21, because of the lack of tender and processing capability in the district the Port Moller District closed on May 22 until May 23 when the first tender arrived, no herring were harvested until the second opening on May 23-24. No advanced notice for commercial fishing periods are given in the Port Moller or Port Heiden Districts because herring are known to enter the Port Moller District and spawn on a single tide. By May 23, ADF&G had documented an estimated biomass of 1,940 tons of herring in Port Moller; effort consisted of one tender and 20 fishing vessels. During the second opening of May 23-24, other tenders arrived and the catch was estimated at 250 tons. Herring continued to enter the Port Moller District and another opening occurred on May 24. Herring appeared in commercial quantities for the first time in Port Heiden Bay, with about 450 tons observed by commercial herring pilots on May 24. An exploratory fishery on May 25 confirmed the presence of ripe herring and the entire fleet moved to Port Heiden for a 20 minute opening on May 26. On May 27, ADF&G observers documented an additional 1,400 tons of herring entering the Port Moller District; an opening was scheduled for May 28 and the entire fleet moved from Port Heiden to Port Moller. The May 28 fishing period produced some marketable herring but most were spawned-out or juvenile herring. Additional openings in the Port Moller District on May 29 produced marketable herring from schools that continued to enter the district. By May 30, the herring observed in Port Heiden Bay had spawned and departed. The northern portion of the Port Heiden District was opened on an exploratory basis, without any additional harvests. During June effort decreased and new herring continued to enter the Port Moller District. Fishing time was adjusted to keep the exploitation rate near 16% and to concentrate effort on arriving schools and away from spawned out herring. The last North Peninsula landing occurred on June 17. Herring

continued to enter Port Moller Bay through at least June 18, the date of the last ADF&G aerial survey.

Table 7 lists ADF&G aerial surveys of North Peninsula waters. In past years biomass estimates have been difficult due to survey conditions and the rapid arrival and departure of fish. In 1992, herring were visible in substantial numbers on 17 different surveys. Aerial survey estimates resulted in the largest biomass ever documented for the North Peninsula: 755 tons for Herendeen Bay, 8,269 tons for Moller Bay, 5,798 tons along the Bering Sea coast, and 10,021 tons for Port Heiden (Table 7). The Port Moller District biomass was estimated at 14,822 tons and the Port Heiden biomass was estimated at 10,021 tons for a total North Peninsula herring biomass of 24,843 tons. Herring biomass was not evenly distributed in the Port Moller District; the observed biomass in Herendeen Bay was 755 tons and in Moller Bay was 8,269 tons. Most of the herring observed along the Bering Sea coast spawned in the Inner Port Moller Bay Section (Table 7). Intensive aerial surveys by ADF&G to document spawning biomass and locations were open not possible after June 18 due to budget constraints. Also, the latter portion of the herring fishery takes place during the beginning of the June sockeye salmon fishery when personnel are limited.

In the Port Moller District, most herring spawned in the Inner Port Moller Bay Section, although limited spawning was observed in all other sections except for the Bear River and Western Sections. ADF&G did not document spawning in the Port Heiden District although herring were observed in very shallow water at the head of the bay. On May 28, several commercial herring pilots reported spawn of two to three miles in length and a quarter mile in width within Port Heiden Bay.

A total of 3,969 tons of herring were harvested in North Peninsula waters; 1,600 tons from the Port Heiden District and 2,369 tons from the Port Moller District (Table 2). In the Port Heiden District, most of the harvest (1,486.3 tons) occurred on May 26 during a 20 minute fishing period. A total of 2,369 tons of herring were harvested in the Port Moller District, about 50% of the harvest (1,141.2 tons) occurred on May 29 during two-60 minute fishing periods. Of the total 3,969 tons harvested, 3,148.4 tons were sold as a sac roe product and 820.6 tons were sold as bait or dumped after processors refused purchase or fishermen held the herring for too long without chilling the product. The exploitation rate in individual districts ranged from 0.0% (Amak District) to 16.0% (Port Moller and Port Heiden Districts). Prices paid by the 13 companies that bought herring from North Peninsula waters was about \$400 per ton for 10% roe recovery \pm \$50 for each percentage point above or below 10% and \$50 per ton for bait. The average roe recovery was 9.09%. The total ex-vessel value of the North Peninsula herring sac roe catch is estimated to be \$1,173,100.

Commercial catches of herring from the Port Moller District from 1982 to 1992 were landed from May 9 to July 4 (Figure 6, Table 1). Most catches were taken during a time period of 20 days or less (mid-May to mid-June). In 1992, the commercial catch occurred mostly in the Inner and Outer Port Moller Bay Sections, Outer Port Moller Bay Section (393.2 tons), Inner Port Moller Bay Section (1,957.5 tons), and Mud Bay-Deer Island Sections (18.3 tons; Table 8). In the Port Heiden District catches were taken during May 25-26 (1,600.0 tons), all within Port Heiden Bay.

A total of 286 herring were sampled from the Port Heiden commercial catch. In the Port Heiden District the most abundant age classes in the commercial harvest were estimated as 9% age 4, 64% age 5, and 13% age 8 (Tables 9, 10; Figure 10). The male to female ratio was 1:1.2. The average herring length in the catch was 259 mm, and the average weight was 217 g (Table 11).

A total of 105 herring were sampled from the commercial catch in Herendeen Bay. In the Deer Island-Mud Bay Section the most abundant age classes in the commercial harvest were estimated as 17% age 4, 64% age 5, and 6% age 8 (Tables 9, 10; Figure 10). The male to female ratio was 1:1.2. The average herring length in the catch was 256 mm, and the average weight was 213 g (Table 11). A total of 49 herring were sampled from the commercial catch in Outer Port Moller

Table 7. North Peninsula aerial herring biomass (short tons) surveys, 1992.

Date	Port Moller District									Port Heiden District		
	Herendeen Bay			Moller Bay			Bear River to Strogonof Point			Port Heiden Bay		
	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/
May 19	0	0	2	97	214 d/	2	0	0	2			
May 20	90	136 d/	1	381	578 d/	1						
May 21	0	0	2	389	592 d/	2	0	0	2			
May 22	53	81 d/	2	283	430	2	0	0	2			
May 23	168	256 d/	2	639	1,083 e/	2	0	0	2			
May 24	166	253 f/	2	563	856 g/	2	0	0	2			
May 25	124	188 g/	2	398	605 h/	2	0	0	2	6,593	10,021 d/	1
May 26	35	54 d/	2	221	336 d/	2	0	0	2	6,543	9,946	1
May 27	0	0	3	982	2,150 d/	3	2,549	6,575 i/	2	2,789	4,239	3
May 28	53	137	2	726	1,872 j/	2	717	1,474 k/	2			
May 30	0	0	2	71	183 l/	2	35	54 m/	2			
May 31	22	58 d/	2	326	555 d/	2						
June 1	0	0	2	6	9 d/	2	157	293 d/	2			
June 2	9	13 d/	2	681	1,036 d/	2	17	26 d/	2			
June 5	0	0	2	540	905 d/	2	0	0	2			
June 9	0	0	2	53	81 d/	2	0	0	2			
June 11	0	0	2	0	0	2	0	0	2			
June 12	0	0	2	0	0	2	53	81 d/	2			
June 13	0	0	3	0	0	3	0	0	3			
June 14				18	27 d/	2						
June 17	0	0	2	204	309 d/	2						

-Continued-

Table 7. (page 2 of 2)

Date	Herendeen Bay			Moller Bay			Bear River to Strogonof Point			Port Heiden		
	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/
June 18	18	27 d/	2	71	108 d/	2						
Total Biomass Observed												
	481	755		4,798	8,269		2,540	5,798		6,593	10,021	

Herendeen Bay includes both the Herendeen Bay and Deer Island-Mud Bay Sections.

Moller Bay includes both the Inner and Outer Port Moller Bay Sections.

RAI units express the surface area of herring schools in terms of small schools (surface area equal to 538 square feet). For example, 10 RAI units are equivalent to 10 small herring schools, each with a surface area of 538 square feet.

a/ Relative Abundance Index (RAI): small school (less than 538 square feet) = 1 RAI unit
 medium school (538 square feet to 4,841 square feet) = 5 RAI units
 large school (square feet/538 square feet)

b/ Tons: RAI units are multiplied by 1.52 (schools in water less than 16 feet of depth)
 RAI units are multiplied by 2.58 (schools in water 16 to 26 feet of depth)

c/ Rating of survey: (1) Excellent, (2) Good, (3) Fair, (4) Poor, (5) Unsatisfactory

d/ Used in calculating biomass estimate

e/ 555 tons were considered new herring.

f/ 30 tons were considered new herring.

g/ 100 tons were considered new herring.

h/ 250 tons were considered new herring.

i/ 4,589 tons were considered new herring.

j/ 265 tons were considered new herring.

k/ 800 tons were considered new herring.

l/ 200 tons were considered new herring.

m/ 10 tons were considered new herring.

Table 8. North Peninsula commercial herring sac roe catch (short tons) by area, day, and percent roe, 1992.

Area	Date	Catch		Percent Roe	Total
		Food/Bait	Sac Roe		
Deer Island	May 24		5.1	9.80	
	June 7		13.2	6.90	
	Total		18.3	7.71	18.3
Inner Moller Bay	May 23	83.2			
	May 24	222.1	267.0	8.6	
	May 28		98.6	10.08	
	May 29	116.1	1,091.4	9.43	
	June 2		15.4	10.30	
	June 6		38.7	8.30	
	June 17		25.0	10.00	
Total		421.4	1,536.1	9.3	1,957.5
Outer Moller Bay	May 23		11.3	8.20	
	May 24		50.5	8.20	
	May 29		49.8	6.90	
	June 2		277.7	9.92	
	June 10		3.9	6.20	
Total			393.2	9.23	393.2
Port Heiden Bay	May 25		113.7	8.69	
	May 26	399.2	1,087.1	7.69	
	Total	399.2	1,200.8		1,600.0
Total		820.6	3,148.4	8.99	3,969.0

Table 9. Estimated age composition of North Peninsula commercial purse seine herring sac roe catches by area and percent, 1985-92.

Year	-----Ages-----									
	2	3	4	5	6	7	8	9	10	11+
Herendeen Bay										
1985	0	5	49	21	15	6	4	0	0	0
1986	0	0	3	25	13	20	21	17	1	0
1987	0	2	4	22	24	17	13	10	6	2
1988	0	3	23	30	22	9	4	3	3	2
1989	0	0	2	62	22	5	1	1	0	7
1990	0	14	3	1	57	15	3	1	1	5
1991	0	2	72	5	2	11	4	0	2	3
1992	No catch in this section									
Deer Island-Mud Bay										
1991	0	1	65	7	3	18	5	0	1	1
1992	0	0	17	64	5	2	6	3	2	2
Inner Moller Bay										
1985	0	1	12	8	15	33	27	2	0	1
1986	0	1	7	21	12	18	19	20	1	1
1987	0	2	11	13	22	12	11	17	11	0
1988	0	1	30	29	12	6	5	5	8	5
1989	0	1	1	67	19	3	1	2	2	4
1990	0	13	4	2	49	16	5	2	2	6
1991	0	1	59	13	2	16	1	5	2	1
1992	0	0	23	60	4	2	6	2	1	2
Outer Moller-Bering Sea Coast										
1985	0	1	26	16	20	17	17	1	1	0
1986	0	0	2	22	13	21	23	18	1	0
1987	0	2	48	9	14	5	11	8	3	0
1988	No catch in this section									
1989	0	0	0	6	26	6	24	7	10	21
1990	90	10	0	0	0	0	0	0	0	0
1991 /a	0	3	74	6	1	11	2	1	1	0
1992 /a	0	2	41	49	2	0	2	2	0	2
Bering Sea Coast										
Bear River area										
1991	0	2	86	8	0	4	1	0	0	1
1992	No catch in this section									
Cape Kutuzof area										
1991	0	0	37	10	0	40	9	2	2	2
1992	No catch in this section									
Port Heiden										
1992	0	0	9	64	5	1	13	2	1	4

/a Outer Port Moller Bay Section samples only.

Table 10. Estimated age composition of Alaska Peninsula commercial purse seine herring sac roe catches by area and day, 1992.

Date	Sample Size	Ages									
		2	3	4	5	6	7	8	9	10	11+
North Peninsula											
Deer Island-Mud Bay											
May 24	150	0.0	0.0	17.1	63.8	4.8	1.9	5.7	2.9	1.9	1.9
Total	150	0.0	0.0	17.1	63.8	4.8	1.9	5.7	2.9	1.9	1.9
Inner Moller Bay											
May 24	227	0.0	0.4	31.3	50.7	4.8	2.6	2.6	3.1	3.1	1.3
May 28	53	0.0	0.0	17.0	64.2	0.0	1.9	13.2	1.9	0.0	1.9
May 29	522	0.0	0.2	20.9	65.5	3.8	1.0	5.9	0.8	0.6	1.3
June 2	173	0.0	0.0	22.5	56.1	4.0	2.3	8.1	2.3	1.7	2.9
Total	975	0.0	0.2	23.4	60.3	3.9	1.6	5.9	1.6	1.3	1.6
Outer Moller Bay											
May 23	49	0.0	2.0	40.8	49.0	2.0	0.0	2.0	2.0	0.0	2.0
Total	49	0.0	2.0	40.8	49.0	2.0	0.0	2.0	2.0	0.0	2.0
Port Heiden Bay											
May 27	286	0.0	0.0	9.4	64.0	4.9	1.4	12.9	2.1	1.4	3.8
Total	286	0.0	0.0	9.4	64.0	4.9	1.4	12.9	2.1	1.4	3.8
South Peninsula											
Canoe Bay											
June 4	58	0.0	1.7	10.3	10.3	1.7	48.3	17.2	6.9	0.0	3.4
June 5	57	0.0	0.0	3.5	3.5	0.0	57.9	26.3	7.0	0.0	1.8
June 6	98	0.0	0.0	4.1	8.2	1.0	57.1	25.5	2.0	0.0	2.0
June 7	45	0.0	0.0	8.9	13.3	0.0	55.6	17.8	2.2	0.0	2.2
Total	258	0.0	0.4	6.2	8.5	0.8	55.0	22.5	4.3	0.0	2.3

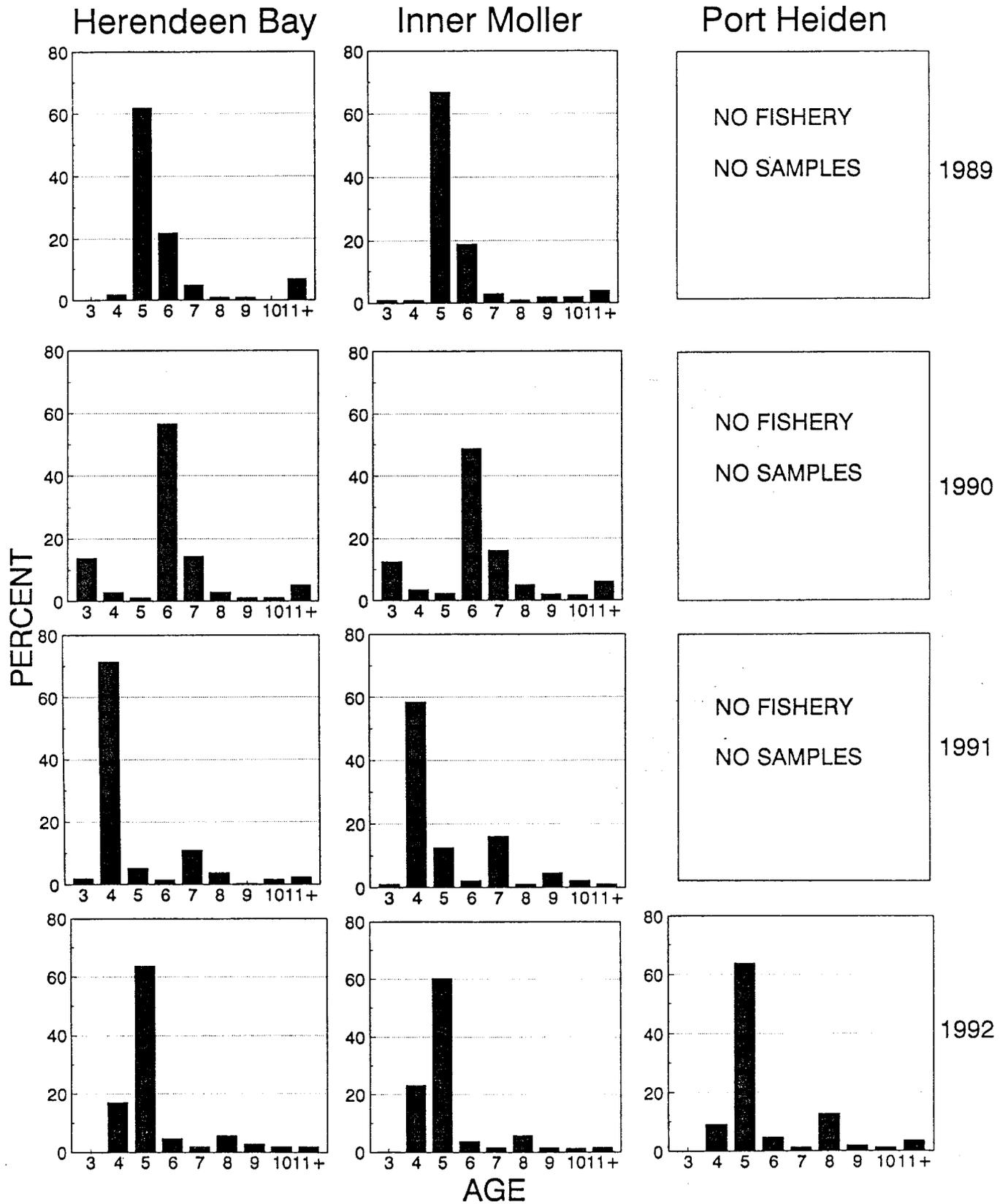


Figure 10. Age distribution of annual herring sac roe catches from Herendeen, Inner Moller, and Port Heiden Bays, 1989-92.

Table 11. Alaska Peninsula Management Area commercial purse seine herring sac roe harvest summary of average weights (g) and lengths (mm) by age, 1992.

Fishery/Area	Weight Length	Harvest (tons)	Sample Date	-----Age-----											Average	Sample Size
				2	3	4	5	6	7	8	9	10	11+			
North Peninsula																
Deer Island-Mud Bay	Weight	18.3	24 May	-	-	154	191	220	309	359	422	404	443	213	105	
	Length			-	-	234	251	256	283	299	308	310	325	256	105	
Inner Port Moller Bay	Weight	1,957.5	24 May - 2 June	-	107	153	190	212	284	289	333	369	336	197	975	
	Length			-	217	236	251	259	277	281	294	297	291	252	975	
Outer Port Moller Bay	Weight	393.2	23 May	-	172	147	190	188	-	344	390	-	172	179	49	
	Length			-	240	233	252	250	-	296	305	-	235	246	49	
Port Heiden	Weight	1,600.0	27 May	-	-	157	198	208	242	269	295	370	419	217	286	
	Length			-	-	239	254	257	264	274	281	301	303	259	286	
South Peninsula																
Canoe Bay	Weight	180.4	4 June - 7 June	-	86	210	267	306	346	354	399	-	414	335	258	
	Length			-	193	244	257	266	276	275	288	-	292	272	258	

Bay Section. In Outer Port Moller Bay the most abundant age classes in the commercial harvest were estimated as 41% age 4 and 49% age 5 (Tables 9, 10; Figure 10). The male to female ratio was 1:1.6. The average herring length in the catch was 246 mm, and the average weight was 179 g (Table 11). A total of 975 herring were sampled from the commercial catch in Inner Port Moller Bay Section. In Inner Port Moller the most abundant age classes in the commercial harvest were estimated as 23% age 4, 60% age 5, and 6% age 8 (Tables 9, 10; Figure 10). The male to female ratio was 1:0.9. The average herring length in the catch was 252 mm, and the average weight was 197 g (Table 11).

The herring biomass of age 4 and age 5 herring in the 1992 catches should produce substantial North Peninsula catches of age 5 and age 6 herring in 1993.

Several different Chi-square tests were run on the age structure of the Port Heiden and Port Moller herring samples to determine if they were significantly different from each other. All Chi-square tests indicated that the age structure of the harvest between the two areas were significantly different but whether the two areas populations are different can not be determined with our present knowledge.

From late-May through mid-June, commercial spotter pilots and ADF&G observers reported large amounts of capelin in the Entrance Point to Cape Seniavin reach.

South Peninsula

The 1992 projected guideline herring harvest for South Peninsula fisheries was 300 tons (Table 6), which did not include herring harvested in sections open for exploration (McCullough and Stopha 1992a). The General Sections of the Sand Point and King Cove Districts and the Seal Cape-Wosnesenski Section of the Pavlof District were open for exploration. South Peninsula herring fisheries were open seven days a week beginning April 15 through the closure of the sac roe season (July 15), except for the Canoe Bay Section, which closed on June 9.

South Peninsula commercial herring catches from 1980 to 1991 were landed from May 9 to June 23 and in 1992 were landed from June 4 to June 7 (Table 1). Most catches have been taken during a time period of 20 days or less. In 1992, commercial catches occurred only in Canoe Bay. From June 4 to June 7, 180.4 tons were harvested by 7 purse seine permit holders making 11 deliveries (Table 12). The average roe recovery was 10.83%. Prices paid by the two companies that purchased herring from South Peninsula waters was about \$400 per ton for 10% roe recovery \pm \$50 for each percentage point above or below 10% and \$50 per ton for bait. The South Peninsula herring sac roe fishery ex-vessel estimated value was \$78,150.

Biomass observations from the May 30 aerial survey warranted an increase in the Canoe Bay preseason guideline harvest of 100 tons to 200 tons (Table 13). The first fishing vessel arrived in Canoe Bay on May 31 and harvests occurred from June 4 through June 7. The Canoe Bay Section was closed on June 9 with a reported catch of 230 tons; fish tickets indicated the actual harvest was 180.4 tons but they were not received by ADF&G until August, well after the regulatory closure of the sac roe fishery.

Table 13 lists ADF&G aerial surveys of South Peninsula waters. Poor survey conditions and the late timing of the fishery (early June is the beginning of sockeye salmon fisheries and ADF&G personnel are occupied with salmon concerns) limited ADF&G aerial survey effort and commercial effort; possible late arriving herring produced poor catches and minimum biomass estimates. The first ADF&G survey to document herring occurred on May 19 in Stepovak and Beaver Bays, where 39 tons were observed in each bay. ADF&G also surveyed South Peninsula waters on May 23, May 30, and June 1 to document the presence of herring. Aerial surveys documented substantial numbers of herring during two surveys (Table 13). Herring appeared in commercial quantities in Canoe Bay (1,144 tons) and Stepovak

Table 12. South Peninsula commercial herring sac roe catch (short tons) by area, day, and percent roe, 1992.

Area	Date	Catch	Roe Percent
Canoe Bay	June 4	37.8	11.10
	June 5	18.9	9.60
	June 6	50.4	11.00
	June 7	73.4	10.89
Total		180.4	10.83

Table 13. South Peninsula aerial herring biomass (short tons) surveys, 1992.

Date	Stepovak Bay			Beaver Bay			Balboa Bay			Canoe Bay		
	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/	RAIa/	Tonsb/	Ratingc/
May 19	26	39 d/	2	26	39 d/	2	0	0	2	0	0	2
May 23	64	97 d/	2	0	0	2	192	292 d/	2	102	156 d/	2
May 30										399	988 d/	2
June 1	387	588 d/	1	3	5 d/	1	98	174 d/	1			
Total Biomass Observed												
	477	724		29	43		290	466		501	1,144	

RAI units express the surface area of herring schools in terms of small schools (surface area equal to 538 square feet). For example, 10 RAI units are equivalent to 10 small herring schools, each with a surface area of 538 square feet.

a/ Relative Abundance Index (RAI): small school (less than 538 square feet) = 1 RAI unit
 medium school (538 square feet to 4,841 square feet) = 5 RAI units
 large school (square feet/538 square feet)

b/ Tons: RAI units are multiplied by 1.52 (schools in water less than 16 feet of depth)
 RAI units are multiplied by 2.58 (schools in water 16 to 26 feet of depth)

c/ Rating of survey: (1) Excellent, (2) Good, (3) Fair, (4) Poor, (5) Unsatisfactory

d/ Used in calculating biomass estimate

Bay (724 tons), and the Swedania Point-Balboa Bay Sections (466 tons). Commercial spotter pilots and several fishing vessels reported herring through mid-July in other locations, but ADF&G was not able to document their presence. The harvest of 180.4 tons in Canoe Bay represents a 16.0% exploitation rate.

A total of 258 herring were sampled from the commercial catch in Canoe Bay. In Canoe Bay the most abundant age classes in the commercial harvest were estimated as 6% age 4, 9% age 5, 55% age 7, and 23% age 8 (Tables 10, 14; Figure 11). The male to female ratio was 1:1.1. The average herring length in the catch was 272 mm, and the average weight was 335 g (Table 11).

No spawning was observed by ADF&G personnel in South Peninsula waters but several schools of spawning herring were reported by commercial pilots. Other finfish (Capelin) were abundant in Stepovak and Canoe Bays.

ALEUTIAN ISLANDS FOOD AND BAIT FISHERY

The Aleutian Islands (Unimak, Akutan, and Unalaska Districts and that portion of the Umnak District located east of Samalga Pass) "Dutch Harbor" commercial food and bait herring fishery opened on July 16 from 8:00 a.m. through 10:00 a.m. and from noon through 5:00 p.m. (Figures 2-5). A 1,940 ton quota was allocated for the fishery and on July 16, 1,557.9 tons of herring were harvested (Table 15). Most of the harvest occurred in Unalaska Bay, although some herring were caught near Cape Cheerful. Only 382.1 tons remained on the quota following the July 16 periods. Because of the fleet size and the small remaining allowable harvest (382 tons), ADF&G did not reopen the fishery until processors and fishermen arranged to co-op the remaining quota. Six permit holders participated on July 20 and one permit holder fished on July 23, 25, and 28. Most herring were again harvested in Unalaska Bay although two deliveries were from Volcano Bay, which is about 32 nautical miles SW from Cape Cheerful (Figure 4). During the commercial fishery ADF&G conducted a test fishery where the herring harvested were sold to offset the cost of managing the fishery and sampling the catch. ADF&G contracted a commercial permit holder who harvested an additional 33.3 tons of herring.

Eleven purse seine permit holders made 26 landings for a commercial harvest of 1,949 tons of herring (Tables 4, 5, 15). At least 234.1 tons were processed as food and the remainder (1,707.6 tons) was processed as bait, an estimated 40 tons were dead loss. Prices paid by the five companies that purchased herring during this fishery was about \$300 per ton. The ex-vessel value of the fishery was about \$584,550.

A total of 640 herring were sampled from the commercial catch. The most abundant age classes in the harvest were estimated as 23.3% age 8, 25.0% age 9, 15.2% age 11, and 10.0% age 13 (Table 16; Figures 12, 13). The male to female ratio was 1:1.7. The average herring length in the catch was 297 mm, and the average weight was 397 g.

Table 14. Estimated age composition of South Peninsula commercial purse seine herring sac roe catches by area and percent, 1985-92.

Year	Ages									
	2	3	4	5	6	7	8	9	10	11
Stepovak Bay										
1985	No samples									
1986	No catch									
1987	No catch									
1988	0	5	78	17	0	0	1	0	0	0
1989	0	3	31	50	13	0	0	0	2	0
1990	1	6	8	28	50	7	1	0	1	1
1991 a/	0	4	13	6	23	42	13	0	0	0
1992	No catch									
Balboa										
1988	0	32	50	9	0	1	3	1	2	3
1989	No samples									
1990	0	4	7	22	59	4	0	4	0	0
1991	0	16	11	16	26	32	0	0	0	0
1992	No catch									
Shumagin Islands										
1989	0	1	15	79	1	0	0	3	0	2
1990	0	4	0	26	67	2	0	0	0	1
1991	0	0	17	2	30	48	2	0	0	0
1992	No catch									
Canoe Bay										
1985	0	1	3	81	7	6	1	1	0	1
1986	0	6	0	3	82	6	2	0	1	0
1987	0	25	28	1	5	34	3	3	0	0
1988	0	24	31	20	0	1	16	4	2	1
1989	0	6	56	22	9	0	0	5	1	1
1990	0	23	5	49	17	5	0	0	1	0
1991	0	27	16	1	41	12	2	0	1	0
1992	0	0	6	9	1	55	23	4	0	2
Pavlof Bay										
1985	No samples									
1986	No samples									
1987	0	6	18	5	11	48	9	2	1	0
1988	0	34	50	5	0	2	7	0	2	0
1989	No samples									
1990	No catch									
1991	No catch									
1992	No catch									

-Continued-

Table 14. (page 2 of 2)

Year	Ages									
	2	3	4	5	6	7	8	9	10	11
Leonard Harbor										
1986	0	3	0	3	83	7	4	0	0	0
1987	0	67	5	0	3	25	0	0	0	0
1988	No samples									
1989	No samples									
1990	0	3	2	35	46	6	0	3	6	0
1991	No catch									
1992	No catch									

a/ 1991 Stepovak Bay catch was in the Northeastern portion of the bay.

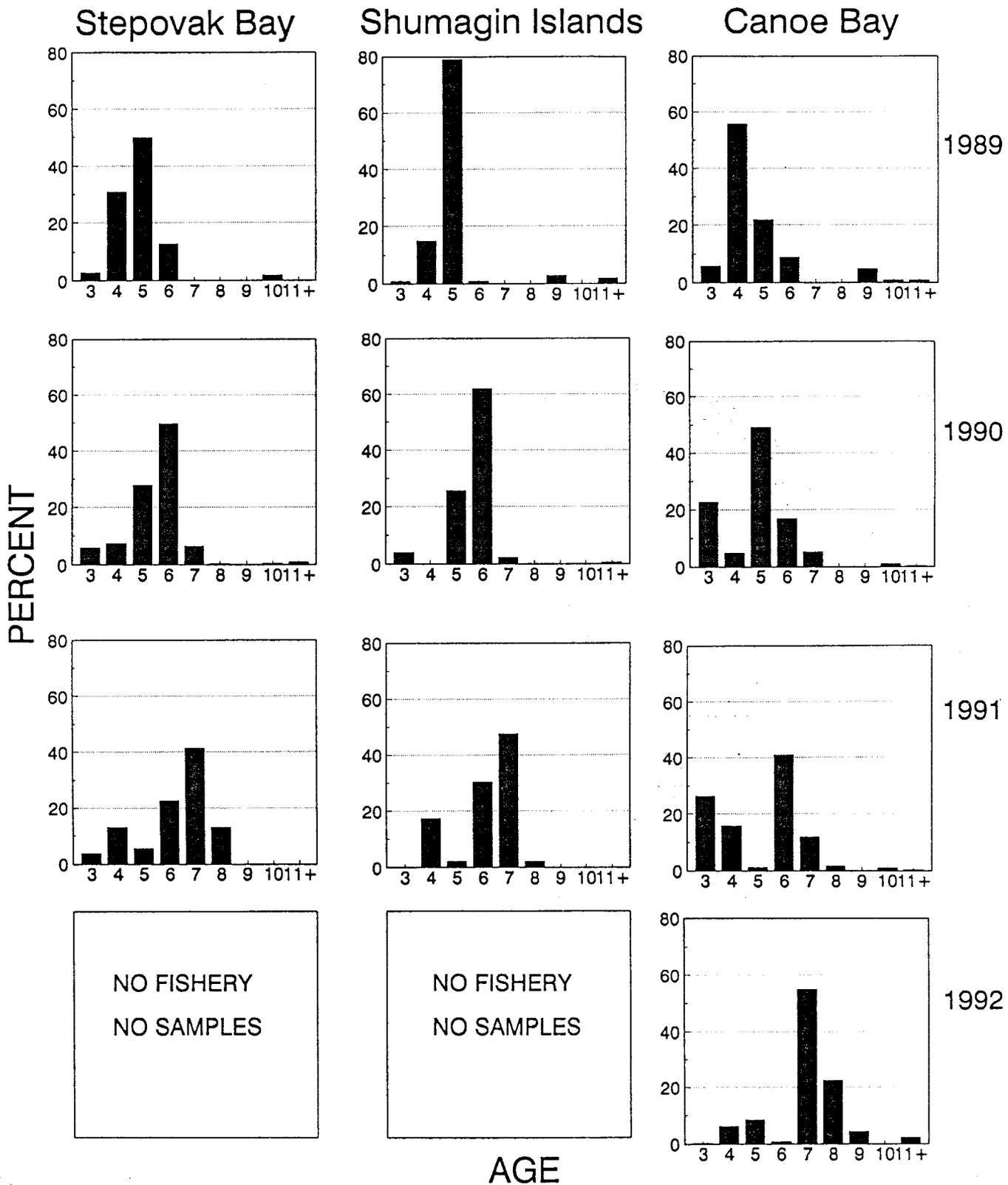


Figure 11. Age distribution of annual herring sac roe catches from Stepovak Bay, Shumagin Islands, and Canoe Bay, 1989-92.

Table 15. Aleutian Islands Management Area "Dutch Harbor"
commercial herring food and bait purse seine catch
(short tons) by day, 1992.

Area	Date	Catch		Total
		Food	Bait	
Unalaska Island	July 15		2.0	2.0
	July 16	54.1	1,463.8	1,557.9 a/
	July 20	83.6	235.9	319.5
	July 23	37.5	2.2	39.7
	July 25	37.4	2.2	39.6
	July 28	21.5	1.5	23.0
	Total		234.1	1,707.6

a/ In addition to the food and bait harvest there was an estimated 40 tons of dead loss

b/ There was an additional 33.3 tons harvested during test fisheries

Table 16. Estimated age, sex, weight, and length of herring harvested in the Aleutian Islands "Dutch Harbor" commercial herring food and bait fishery, July 16, 1992.

Age Years	Sample			Catch			Weight			Length		
	Male	Female	Total	(%) Male	(%) Female	(%) of Total	N	Mean (g)	STD (g)	N	Mean (mm)	STD (mm)
5	1	1	2	50.0	50.0	0.3	2	309	70.7	2	263	9.9
6	0	1	1	0.0	100.0	0.2	1	313		1	266	
7	0	2	2	0.0	100.0	0.3	2	374	67.2	2	289	6.4
8	60	89	149	40.3	59.7	23.3	146	357	43.8	149	286	9.3
9	52	108	160	32.5	67.5	25.0	159	374	37.1	160	291	7.3
10	12	19	31	38.7	61.3	4.8	31	390	43.2	31	297	8.1
11	29	68	97	29.9	70.1	15.2	97	410	47.8	97	301	8.4
12	28	29	57	49.1	50.9	8.9	56	436	54.9	57	306	9.5
13	24	40	64	37.5	62.5	10.0	63	441	58.7	64	308	10.5
14	23	37	60	38.3	61.7	9.4	60	446	60.8	60	312	9.2
15	4	12	16	25.0	75.0	2.5	16	456	61.5	16	316	11.6
16	1	0	1	100.0	0.0	0.2	1	443		1	306	
Total	234	406	640	36.6	63.4	100.0	634	397	59.0	640	297	13.0
Sex Composition of Unaged Herring												
		36.5	63.5									

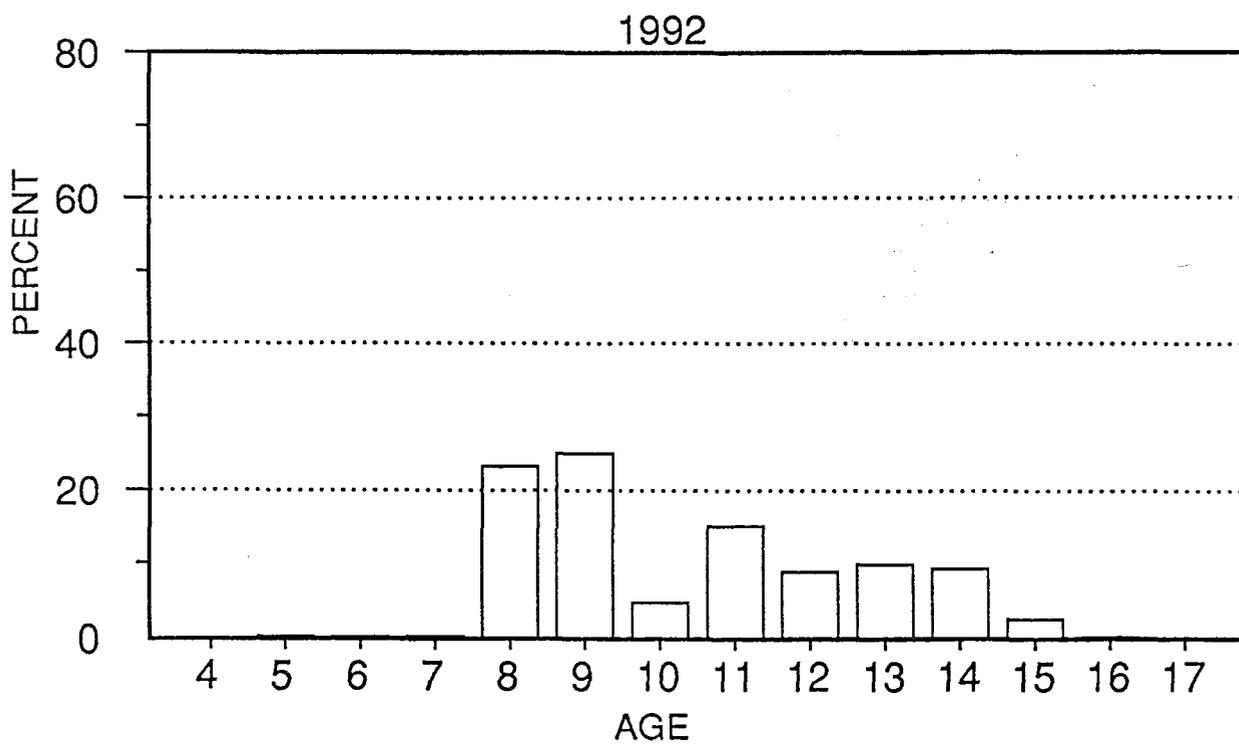
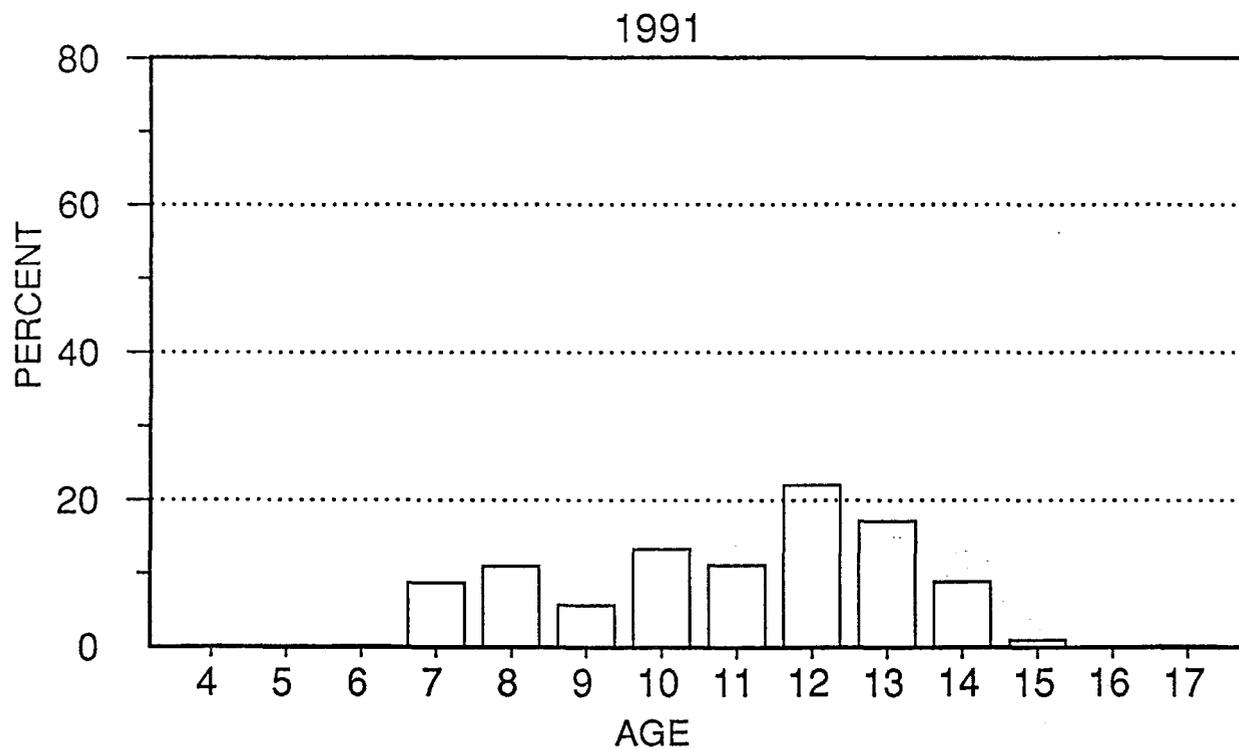


Figure 12. Age distribution of annual herring food and bait catches from the Aleutian Islands "Dutch Harbor" Management Area, 1991-92.

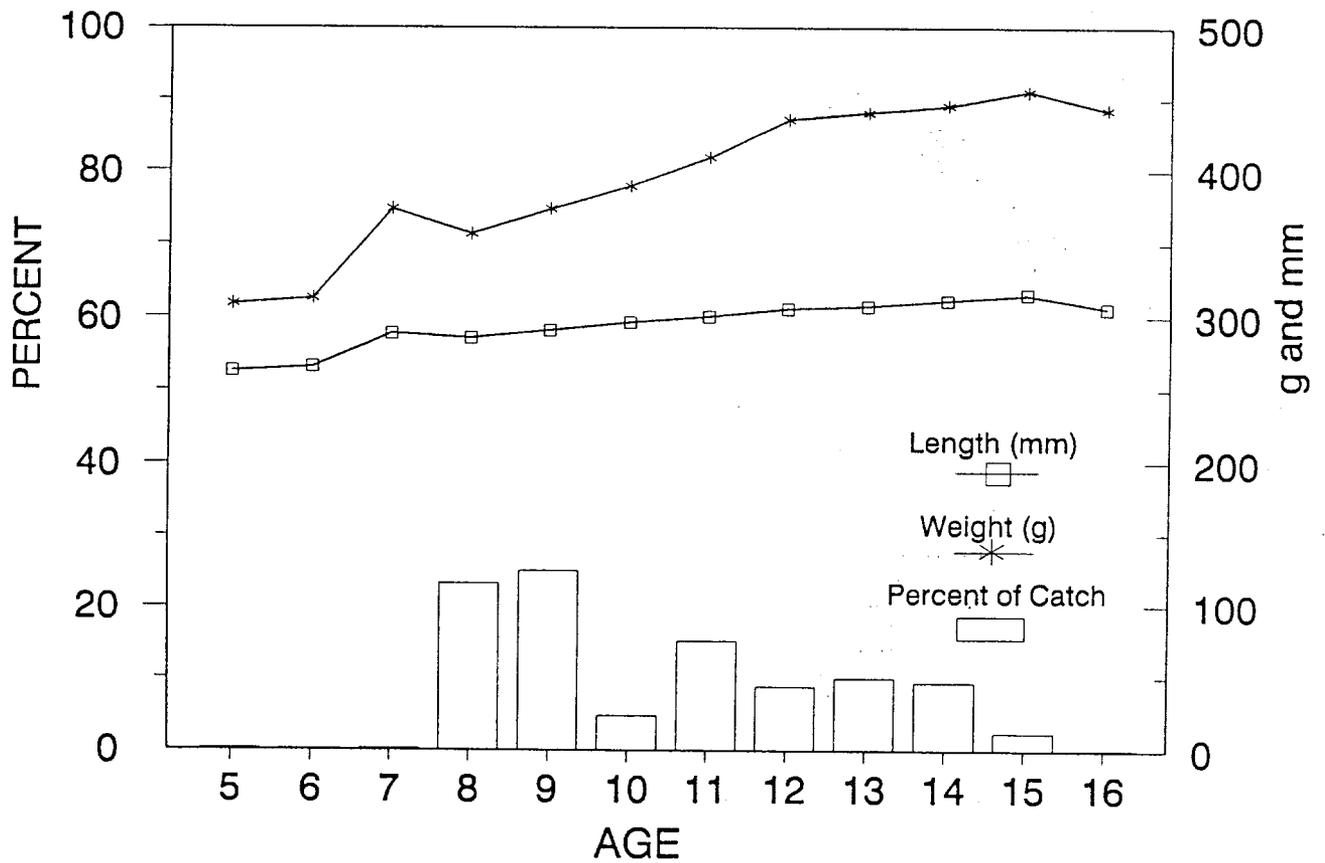


Figure 13. Length (mm), weight (g), and age distribution of annual herring food and bait catches from the Aleutian Islands "Dutch Harbor" Management Area, 1992.

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APPENDIX

APPENDIX A: EMERGENCY ORDER SUMMARY

ALASKA PENINSULA MANAGEMENT AREA

EMERGENCY ORDER NO. 4-F-M-SP-01-92

EFFECTIVE DATE: April 15, 1992

EXPLANATION: This emergency order establishes weekly commercial herring sac roe season fishing periods as follows for the Alaska Peninsula and Aleutian Islands Management Areas:

- (1) South Peninsula: Sand Point, Pavlof, and King Cove Districts.

April 15 through July 15 herring may be taken during Sunday through Saturday.

- (2) Aleutian Islands: Unimak, Akutan, Unalaska, Umnak, and Adak Districts.

April 15 through June 15 herring may be taken during Sunday through Saturday.

June 16 through July 15, no open fishing periods.

- (3) North Peninsula: Amak, Port Moller, and Port Heiden Districts.

- (a) Amak and Port Heiden Districts.

April 15 through June 30 herring may be taken during Sunday through Saturday. July 1 through July 15, no open fishing period

- (b) Port Moller District.

May 30 through June 30 herring may be taken during Sunday through Saturday. July 1 through July 15, no open fishing period.

JUSTIFICATION: Fishing time is needed to allow herring sac roe harvests in the Alaska Peninsula and Aleutian Islands Management Areas during the sac roe season. Effort is anticipated to be light in all districts. Therefore, until harvests indicate more conservative measures are needed, seven fishing days per week can be allowed without causing stock conservation concerns. The reason that portions of the area will remain closed during part of the sac roe season is as follows:

Unimak, Akutan, Unalaska, Umnak, and Adak Districts during June 16 through July 15:

These districts are managed on a herring food and bait fishery allocation during the food and bait season beginning July 16. The food and bait fishery is managed on the basis of 5 AAC 27.060 Bering Sea Herring Fishery Management Plan. During some years food and bait stocks (non local spawning stocks) are present in these areas by June 16. The closure from June 16 through July 15 will prevent food and bait herring being harvested prior to the food and bait season. If sac roe stocks are discovered during the June 16 through July 15 time period, appropriate locations can be opened to herring sac roe fishing by subsequent emergency order(s).

Port Moller District during April 15 through May 29:

Scale pattern analysis data indicates there are at least three stocks of herring in the Port Moller District. Herring arriving in early May were subject to intense fishing pressure prior to 1989, while the later (late May and June) arriving herring were not subject to the same exploitation rate. Until a large early biomass of herring is observed or until such time that the large late biomass is anticipated to arrive (after May 29), the time and duration of fishing periods will depend on factors such as observed biomass and effort levels.

Port Heiden, Port Moller, and Amak District during July 1 through July 15:

These districts are managed on local herring sac roe stocks. During some years non-local, spawned-out herring are present in coastal waters by July 1. The closure from July 1 through July 15 will prevent the harvested of any non-local, spawned-out herring. If sac roe stocks are discovered during the July 1 through July 15 time period, appropriate locations can be opened to herring sac roe fishing by subsequent emergency order(s).

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EMERGENCY ORDER NO. 4-F-SP-02-92

EMERGENCY ORDER NO. 4-F-M-SP-02-92

EFFECTIVE DATE: 9:00 P.M. May 21, 1992

EXPLANATION: This emergency order supersedes Emergency Order Number 4-F-M-SP-01-92 in regards to the Port Moller District commercial herring sac roe fishery opening time and date. This emergency order establishes an opening time of 9:00 P.M. May 21, 1992 for the Port Moller District herring sac roe season with fishing periods as follows:

(3) North Peninsula:

(b) Port Moller District.

May 21, 9:00 P.M. through June 30 herring may be taken during Sunday through Saturday.

July 1 through July 15, no open fishing periods.

JUSTIFICATION: An aerial survey by the Alaska Department of Fish and Game on May 20, 1992 documented a biomass of about 655 tons of herring in the Port Moller District. Spawning herring were observed in the Inner Port Moller Bay Section. There are no fishing vessels nor tenders on the grounds and one processing company has registered for the Port Moller District. Therefore, until harvests indicate more conservative measures are needed, seven fishing days per week can be allowed without causing stock conservation concerns. The guideline harvest level for the Port Moller District is 500 tons of herring.

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EMERGENCY ORDER NO. 4-F-M-SP-03-92

EFFECTIVE DATE: 10:30 A.M. May 22, 1992

EXPLANATION: This emergency order closes the Port Moller and Port Heiden Districts to commercial herring fishing effective 10:30 A.M. May 22, 1992 through 12:00 P.M. midnight July 15, 1992.

JUSTIFICATION: An aerial survey by the Alaska Department of Fish and Game on May 21, 1992 documented a biomass of about 1,225 tons of herring in the Port Moller District. There are several fishing vessels but no tenders on the grounds. Only one processing company has registered for the Port Moller District and they are not accepting herring at this time. Therefore, to avoid possible waste of

herring due to the current lack of herring markets in the Port Moller District; the Port Heiden and the Port Moller Districts will close to commercial herring fishing. The Port Heiden and Port Moller Districts will reopen to commercial herring fishing when either tendering and/or processing capabilities are in the district.

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EMERGENCY ORDER NO. 4-F-M-SP-04-92

EFFECTIVE DATE: 10:00 P.M. May 23, 1992

EXPLANATION: This emergency order opens the Port Moller and Port Heiden Districts to commercial herring fishing effective 10:00 P.M. Saturday, May 23, 1992 through 9:00 A.M. Sunday, May 24, 1992.

JUSTIFICATION: An aerial survey by the Alaska Department of Fish and Game during the evening of May 23, 1992 documented an estimated biomass of 715 tons of new herring that moved into the Port Moller District. The estimated total biomass to date for the Port Moller District is 1,940 tons of herring. There are about 20 fishing vessels and one empty tender currently on the grounds. The 1,000 ton minimum biomass threshold for the Port Moller District has been achieved. Those fishermen with the tender and a market need fishing time to harvest sac roe herring in the Port Moller or Port Heiden Districts.

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EMERGENCY ORDER NO. 4-F-M-SP-05-92

EFFECTIVE DATE: 7:00 P.M. May 24, 1992

EXPLANATION: This emergency order opens the Port Moller and Port Heiden Districts to commercial herring fishing effective 7:00 P.M. Sunday, May 24, 1992 through 10:30 P.M. Sunday, May 24, 1992.

JUSTIFICATION: An aerial survey by the Alaska Department of Fish and Game during the afternoon of May 24, 1992 documented an estimated biomass of 130 tons of new herring that moved into the Port Moller District. The estimated total biomass to date for the Port Moller District is 2,070 tons of herring. The current harvest in the Port Moller District is an estimated 250 tons, this is a 12% exploitation rate. There are about 30 fishing vessels and several tenders currently on the grounds. Those fishermen with tenders and markets need fishing time to harvest sac roe herring in the Port Moller and Port Heiden Districts.

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EMERGENCY ORDER NO. 4-F-M-SP-06-92

EFFECTIVE DATE: 7:00 P.M. May 25, 1992

EXPLANATION: This emergency order opens that portion of the Port Heiden District located North and East of Strogonof Point (158°50'36" W. long., 56°53'16" N. lat.) and all waters inside Port Heiden Bay to commercial herring fishing effective 7:00 P.M. Monday, May 25, 1992 through 12:00 P.M. midnight, Monday, May 25, 1992.

JUSTIFICATION: The Port Heiden District is an exploratory area. Historically, herring catches from the Port Heiden District have been sporadic and biomass estimates for herring stocks north of Cape Seniavin have not been determined. In prior years, herring have been observed by ADF&G moving along the Bering Sea coast from Ilnik into the Port Moller District. To allow fishing opportunities on an exploratory basis in the northern portion of the Port Heiden District while protecting migrating herring moving along the coast from Ilnik into the Port Moller District only the northern portion of the Port Heiden District will be open to commercial herring fishing.

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EMERGENCY ORDER NO. 4-F-M-SP-07-92

EFFECTIVE DATE: 7:00 P.M. May 26, 1992

EXPLANATION: This emergency order opens that portion of the Port Heiden District located North and East of Strogonof Point (158°50'36" W. long., 56°53'16" N. lat.) and all waters inside Port Heiden Bay to commercial herring fishing effective 7:00 P.M. Tuesday, May 26, 1992 through 7:20 P.M. Tuesday, May 26, 1992.

JUSTIFICATION: The Port Heiden District is an exploratory area. Historically, herring catches from the Port Heiden District have been sporadic and biomass estimates for herring stocks north of Cape Seniavin have not been determined. In prior years, herring have been observed by ADF&G moving along the Bering Sea coast from Ilnik into the Port Moller District. To allow fishing opportunities on an exploratory basis in the northern portion of the Port Heiden District while protecting migrating herring moving along the coast from Ilnik into the Port Moller District only the northern portion of the Port Heiden District will be open to commercial herring fishing. No herring were observed during an aerial survey this afternoon of the Bering Sea coast from Entrance Point to Strogonof Point under good conditions.

An aerial survey this afternoon of Port Heiden under fair conditions documented at least 2,400 tons of herring in and near Port Heiden, some of these herring are believed to be spawning in the upper portion of Port Heiden Bay. Species identification was difficult, an estimated 10,000 tons of fish were observed in and near Port Heiden but only 2,400 tons were identified as herring.

During a commercial herring fishing period on May 25 an estimated 430 tons of good quality herring were harvested. Today about 30 fishing vessels and several tenders are on the grounds. The observed fish are in more than 200 schools, some schools contain at least 200 tons of fish.

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EMERGENCY ORDER NO. 4-F-M-SP-08-92

EFFECTIVE DATE: 9:00 P.M. May 28, 1992

EXPLANATION: This emergency order opens the Port Moller District to commercial herring fishing effective 9:00 P.M. Thursday, May 28, 1992 through 9:20 P.M. Thursday, May 28, 1992.

JUSTIFICATION: An aerial survey during the afternoon of May 28 by the Alaska Department of Fish and Game under good to excellent conditions documented 1,400 tons of new herring in the Port Moller District. The estimated total biomass to date for the Port Moller District is 11,255 tons of herring. The current harvest in the Port Moller District is an estimated 625 tons, this is a 5.6% exploitation rate.

During prior years, feeding herring have caused "belly burn" problems in the Port Moller commercial herring fishery. Last year an estimated 307 tons of herring from the Port Moller District were dumped when tendering and processing capacities were exceeded. To give the fishing fleet and tenders time to return from the Port Heiden District, the Port Moller District opening has been delayed until 9:00 P.M., May 28.

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EMERGENCY ORDER NO. 4-F-M-SP-09-92

EFFECTIVE DATE: 8:30 A.M. May 29, 1992

EXPLANATION: This emergency order opens the Port Moller District to commercial herring fishing effective 8:30 A.M. Friday, May 29, 1992 through 9:30 A.M. Friday, May 29, 1992.

JUSTIFICATION: An aerial survey during the afternoon of May 28 by the Alaska Department of Fish and Game under good to excellent conditions documented 1,400 tons of new herring in the Port Moller District. The estimated total biomass to date for the Port Moller District is 11,255 tons of herring. The current harvest in the Port Moller District is an estimated 775 tons, this is a 6.9% exploitation rate. Most of the harvest during the May 28 fishing period were either spawnouts or juvenile herring, although an estimated 150 tons of marketable herring were harvested. Currently, there are about 20 fishing vessels in the district. Fishing time is needed to allow a herring sac roe harvest in the Port Moller District.

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EMERGENCY ORDER NO. 4-F-M-SP-10-92

EFFECTIVE DATE: 9:00 P.M. May 29, 1992

EXPLANATION: This emergency order opens the Port Moller District to commercial herring fishing effective 9:00 P.M. Friday, May 29, 1992 through 10:00 P.M. Friday, May 29, 1992.

JUSTIFICATION: A commercial herring period in the Port Moller District during the morning of May 29 resulted in an estimated harvest of 525 tons of herring. The current harvest in the Port Moller District is an estimated 1,300 tons. The estimated biomass for the district is 11,255 tons, this is a 11.6% exploitation rate. Currently, there are about 20 fishing vessels in the district. Fishing time is needed to allow a herring sac roe harvest in the Port Moller District.

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EMERGENCY ORDER NO. 4-F-M-SP-11-92

EFFECTIVE DATE: 12:00 A.M. noon, May 30, 1992

EXPLANATION: This emergency order opens that portion of the Port Heiden District located North and East of 158°30'00" W. long. to commercial herring fishing effective 12:00 A.M. noon, Saturday, May 30, 1992 through 12:00 P.M. midnight, June 30, 1992.

JUSTIFICATION: The Port Heiden District is an exploratory area. In prior years, herring have been observed by ADF&G moving along the Bering Sea coast in the Port Heiden District from Ilnik into the Port Moller District. In 1992, a substantial commercial herring fishery occurred for the first time in Port Heiden Bay. To allow fishing opportunities on an exploratory basis in the northern portion of the Port Heiden District while protecting migrating and spawned out herring in the remainder of the district, only the northern portion of the Port Heiden District will be open to commercial herring fishing.

Currently, only one or two fishing vessels and one tender are in the Northern portion of the Port Heiden District. Fishing time is needed to explore this portion of the Port Heiden District for any currently unexploited herring stocks.

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EMERGENCY ORDER NO. 4-F-M-SP-12-92

EFFECTIVE DATE: 8:00 P.M. June 2, 1992

EXPLANATION: This emergency order opens the Port Moller District to commercial herring fishing effective 8:00 P.M. Tuesday, June 2, 1992 through 9:00 P.M. Tuesday, June 2, 1992.

JUSTIFICATION: During an aerial survey on June 1, 1992 in the Port Moller District an estimated 305 tons of additional herring had moved into the district. The biomass estimate for the Port Moller District is 12,150 tons; the estimated harvest is 2,003 tons. This is a 16.5% exploitation rate. Seven fishing vessels and three tenders are currently on the grounds. Fishing time is needed to allow a herring sac roe harvest in the Port Moller District.

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EMERGENCY ORDER NO. 4-F-M-SP-13-92

EFFECTIVE DATE: 3:00 P.M. June 6, 1992

EXPLANATION: This emergency order opens the Port Moller District to commercial herring fishing effective 3:00 P.M. Saturday, June 6, 1992 through 4:00 P.M. Saturday, June 6, 1992.

JUSTIFICATION: During an aerial survey on June 5, 1992 in the Port Moller District an estimated 910 tons of additional herring had moved into the district. The biomass estimate for the Port Moller District is 14,005 tons; the estimated harvest is 2,290 tons. This is a 16.4% exploitation rate. Twelve fishing vessels and five tenders are currently on the grounds. Fishing time is needed to allow a herring sac roe harvest in the Port Moller District.

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EMERGENCY ORDER NO. 4-F-M-SP-14-92

EFFECTIVE DATE: 7:00 P.M. June 6, 1992

EXPLANATION: This emergency order opens the Port Moller District to commercial herring fishing effective 7:00 P.M. Saturday, June 6, 1992 through 10:00 P.M. Saturday, June 6, 1992.

JUSTIFICATION: During an aerial survey on June 5, 1992 in the Port Moller District an estimated 910 tons of additional herring had moved into the district. The biomass estimate for the Port Moller District is 14,005 tons. During the fishing period from 3:00 P.M. through 4:00 P.M. June 6, an estimated 10 tons of marketable herring were harvested; the estimated harvest to date is 2,300 tons. This is a 16.4% exploitation rate. Twelve fishing vessels and five tenders are currently on the grounds. Fishing time is needed to allow a herring sac roe harvest in the Port Moller District.

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EMERGENCY ORDER NO. 4-F-M-SP-15-92

EFFECTIVE DATE: 8:00 A.M. June 7, 1992

EXPLANATION: This emergency order opens the Port Moller District to commercial herring fishing effective 8:00 A.M. Sunday, June 7, 1992 through 11:00 A.M. Sunday, June 7, 1992.

JUSTIFICATION: During an aerial survey on June 5, 1992 in the Port Moller District an estimated 910 tons of additional herring had moved into the district. The biomass estimate for the Port Moller District is 14,005 tons. During the fishing period from 7:00 P.M. through 10:00 P.M. June 6, an estimated 34 tons of marketable herring were harvested; the estimated harvest to date is 2,334 tons. This is a 16.7% exploitation rate. Twelve fishing vessels and five tenders are

currently on the grounds. Fishing time is needed to allow a herring sac roe harvest in the Port Moller District.

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EMERGENCY ORDER NO. 4-F-M-SP-16-92

EFFECTIVE DATE: 9:15 A.M. June 9, 1992

EXPLANATION: This emergency order closes the Canoe Bay Section of the Pavlof District to commercial herring fishing effective 9:15 A.M. Tuesday, June 9, 1992 through 12:00 P.M. midnight, July 15, 1992.

JUSTIFICATION: The guideline harvest level established for the Canoe Bay Section sac roe fishery was 200 tons; fishing vessels, tenders, and processors report a harvest of 230 tons. Aerial surveys by the Alaska Department of Fish and Game do not warrant additional harvest of the Canoe Bay stock at this time. The Alaska Department of Fish and Game will continue aerial surveys and if a biomass of herring is observed that will lower the exploitation rate of the Canoe Bay herring stock well below 20%, the Canoe Bay Section may reopen at a later date.

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EMERGENCY ORDER NO. 4-F-M-SP-17-92

EFFECTIVE DATE: 4:00 P.M. June 9, 1992

EXPLANATION: This emergency order opens the Port Moller District to commercial herring fishing effective 4:00 P.M. Tuesday, June 9, 1992 through 12:00 P.M. midnight, June 30, 1992.

JUSTIFICATION: During an aerial survey on June 9, 1992 in the Port Moller District an estimated 85 tons of additional herring had moved into the district. Most of the spawnouts found during the last fishing period on June 7 are believed to have moved out of Port Moller Bay. The biomass estimate for the Port Moller District is 14,090 tons. The estimated harvest to date is 2,334 tons. This is a 16.6% exploitation rate. Five fishing vessels and one tender are currently on the grounds. Fishing time is needed to allow a herring sac roe harvest in the Port Moller District.

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EMERGENCY ORDER NO. 4-F-M-SP-18-92

EFFECTIVE DATE: 5:00 P.M. June 10, 1992

EXPLANATION: This emergency order closes the Inner Port Moller Bay Section to commercial herring fishing effective 5:00 P.M. Wednesday, June 10, 1992 until further notice.

JUSTIFICATION: The estimated herring biomass in the Port Moller District to date is 14,090 tons. The estimated catch to date in the Port Moller District is 2,344 tons, this is a 16.6% exploitation rate.

The North Peninsula sac roe guideline harvest level is reduced from the 20% maximum exploitation rate, as established by the Alaska Board of Fisheries, to a maximum harvest in North Peninsula waters of 18% to account for North Peninsula herring that are probably harvested during the Dutch Harbor food and bait herring fishery. Non-Togiak herring stocks comprise about 22% of the Dutch Harbor herring catch; due to the July 16 opening date of the food and bait fishery, North Peninsula herring stocks probably comprise the majority of the non-Togiak herring component.

Given the current biomass and catch estimates, there remains an estimated 195 tons of herring to be harvest to achieve a 18% exploitation rate.

Currently, herring schools in the Port Moller District are a mixture of spawn-outs and ripe herring. Ripe herring continue to enter the district as discrete schools then mix with spawned-out herring departing the district. The mixing of schools occurs most frequently in the Inner Port Moller Bay Section. The Inner Port Moller Bay Section will closed to commercial herring fishing because of the high abundance of spawned-out herring in this section and ADF&G concerns about possible mortality to herring when fishermen repeatedly set purse seine gear on schools of spawned-out or mixed ripe/spawned-out herring. In other sections of the Port Moller District, spawned-out schools usually depart quickly and are not as susceptible to being repeatedly set on by purse seine gear.

If the fishery demonstrates other areas of high abundances of spawned-out herring those areas will also be closed to commercial herring fishing.

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EMERGENCY ORDER NO. 4-F-M-SP-20-92

EFFECTIVE DATE: 12:00 noon, June 17, 1992

EXPLANATION: This emergency order opens the Inner Port Moller Bay Section to commercial herring fishing effective 12:00 noon, Wednesday, June 17, 1992 through 12:00 P.M. midnight, June 30, 1992.

JUSTIFICATION: An aerial survey during the morning of June 17, 1992 in the Harbor Spit portion of the Inner Port Moller Bay Section documented an estimated 70 tons of additional herring had moved into the district. No spawnouts were observed during the survey.

The biomass estimate for the Port Moller District is 14,160 tons. The estimated harvest to date is 2,334 tons. This is a 16.5% exploitation rate. An estimated 215 tons of herring remain to be harvested in the Port Moller District to achieve an 18% exploitation rate. Only minimal fishing effort is expected. All sections except the Inner Port Moller Bay Section have been open since 4:00 P.M. June 9 and have not produced any additional harvest. Fishing time is needed to allow a herring sac roe harvest in the Port Moller District.

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ALEUTIAN ISLANDS MANAGEMENT AREA

EMERGENCY ORDER NO. 4-F-M-SP-45-92

EFFECTIVE DATE: 8:00 A.M. Thursday, July 16, 1992

EXPLANATION: This emergency order opens the Unimak, Akutan, and Unalaska Districts and that portion of the Umnak District east of Samalga Pass "Dutch Harbor" commercial herring food and bait fishery effective 8:00 A.M. Thursday, July 16, 1992 through 10:00 A.M. Thursday, July 16, 1992.

JUSTIFICATION: Fishing time is needed to allow herring food and bait harvests in the "Dutch Harbor" fishery. The allocation for this fishery is 1,940 tons of herring. Effort consists of 11 permit holders-fishing vessels and 10 tenders with a total herring capacity of 1,830 tons. Herring are present in the Unalaska Bay Section; a two hour opening should allow for a harvest while not exceeding the allocation.

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EMERGENCY ORDER NO. 4-F-M-SP-46-92

EFFECTIVE DATE: 12:00 Noon Thursday, July 16, 1992

EXPLANATION: This emergency order opens the Unimak, Akutan, and Unalaska Districts and that portion of the Umnak District east of Samalga Pass "Dutch Harbor" commercial herring food and bait fishery effective 12:00 Noon Thursday, July 16, 1992 through 5:00 P.M. Thursday, July 16, 1992.

JUSTIFICATION: Fishing time is needed to allow herring food and bait harvests in the "Dutch Harbor" fishery. The allocation for this herring fishery is 1,940 tons. Effort consists of 11 permit holders-fishing vessels and several tenders with a total herring capacity of 1,700 tons. A two hour opening this morning July 16, resulted in a reported harvest of 450 tons, there remains about 1,040 tons of the allocation to harvest. There is a large biomass of herring in the deep water of Unalaska Bay. Fishermen are catching small schools in the range of 25 to 100 tons in shallow water where the seines are effective.

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EMERGENCY ORDER NO. 4-F-M-SP-47-92

EFFECTIVE DATE: 10:00 A.M. Monday, July 20, 1992

EXPLANATION: This emergency order opens that portion of the Unalaska District located North of the latitude of Cape Starichkof and West of the longitude of Cape Kalekta to commercial herring food and bait fishing effective 10:00 A.M. Monday, July 20, 1992 until an additional 240 tons of herring have been harvested or until the end of the herring food and bait season (midnight February 28, 1993); for the duration of this fishery tenders will not be allowed to transport herring.

JUSTIFICATION: Fishing time is needed to allow herring food and bait harvests in the "Dutch Harbor" fishery. The remaining allocation for this herring fishery is about 290 tons. Considering the small amount remaining on the quota, fishermen and processors have agreed to co-op the remaining allocation. The opening has been delayed until July 20 to allow time for industry to process all herring currently filling tenders and processors. Effort is expected to be less than the original fleet of eleven vessels, no tenders will be allowed for this clean-up fishery. To aid ADF&G monitoring of the harvest, waters open to herring fishing have been reduced.

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EMERGENCY ORDER NO. 4-F-M-SP-48-92

EFFECTIVE DATE: 12:00 Noon, Tuesday, July 28, 1992

EXPLANATION: This emergency order supersedes Emergency Order Number 4-FM-DUT-01-92 in regards to the Aleutian Islands Management Area, "Dutch Harbor" commercial herring food and bait fishery. This emergency order closes the Aleutian Islands Management Area, "Dutch Harbor" commercial herring food and bait fishery effective 12:00 Noon, Tuesday, July 28, 1992.

JUSTIFICATION: On July 17, 1992, a news release was issued stating that 240 tons of herring remained to be harvested during the "Dutch Harbor" commercial herring food and bait fishery. The fishery was reopened on July 20 for a co-op fishery in those waters North of the latitude of Cape Starichkof and West of the longitude of Cape Kalekta in the Unalaska District.

Catch estimates on July 28 indicate that the remainder of the quota was harvested during the evening of July 27. Therefore, the "Dutch Harbor" commercial herring food and bait fishery will close effective 12:00 noon, Tuesday, July 28, 1992.

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APPENDIX B. PARTIAL LISTING OF HERRING REGULATIONS, 1992

ARTICLE 2. - GENERAL SPECIFICATIONS.

5 AAC 27.060. BERING SEA HERRING FISHERY MANAGEMENT PLAN.

- (a) The department shall follow the directives of the Bering Sea Herring Management Plan, as well as the regulations that govern the individual herring fisheries, when managing the commercial herring fisheries that take place in the Bering Sea.
- (b) Unless otherwise specified in this chapter, the department shall manage the fisheries so that the exploitation rate on eastern Bering Sea herring stocks does not exceed 20 percent of the biomass of those stocks.
- (c) The following thresholds are minimum biomass levels for each herring fishing district. When the department estimates, in season, that the biomass in a district is below its threshold, the department may not allow a commercial harvest of herring in that district.

<u>District</u>	<u>Thresholds (s.t.)</u>
Port Moller	1,000
Togiak	35,000
Security Cove	1,200
Goodnews Bay	1,200
Cape Avinof	500
Nelson Island	3,000
Nunivak Island	1,500
Cape Romanzof	1,500
Norton Sound	7,000

- (d) The department shall manage the herring food and bait fishery that takes place in the Unimak, Akutan, and Unalaska Districts and that portion of the Umnak District east of Samalga Pass (Dutch Harbor fishery) so that it is allocated seven percent of the allowable Togiak District herring sac roe harvest determined under the provisions of the Bristol Bay Herring Management Plan (5 AAC 27.865).
- (g) When the Togiak District is below its threshold, the Dutch Harbor fishery will be closed for that season.
- (h) When any of the southwest Alaska herring stocks, from Security Cove to Port Clarence, identified in (c) of this section, is below its threshold, the Dutch harbor food and bait fishery will be closed for that season; for the purposes of determining the need for a closure of the Dutch Harbor food and bait fishery the threshold level for the Nelson Island herring stock will be 2,000 short tons; if it becomes necessary to close the Dutch Harbor food and bait herring fishery under this section, the herring harvest allocated for the Dutch Harbor food and bait herring fishery, in 5 AAC 27.865 (7), will not be reallocated to the Togiak sac roe herring fishery.

ARTICLE 12. - STATISTICAL AREA T; BRISTOL BAY AREA

5 AAC 27.865. BRISTOL BAY HERRING MANAGEMENT PLAN.

- (a) When managing the Bristol Bay commercial herring fishery, the primary objectives of the department will be to prosecute an orderly and manageable fishery, while striving for the highest level of product quality with a minimum of waste.

- (b) To ensure that no gear group is totally disadvantaged, the Board of Fisheries directs the department to take the following actions given the specified circumstances.
- (1) When circumstances preclude the department from adequately assessing the biomass, the fishery shall be managed for an exploitation based on the pre-season projected return.
 - (3) Whenever possible, openings for both gear types must begin during the hours of daylight, and special consideration will be given to afford the maximum amount of daylight.
 - (4) The department may allow only one gear type to operate in an area during any open period.
 - (7) The maximum exploitation rate for the Bristol Bay herring stock is 20 percent. Before opening the sac roe fishery, the department shall set aside approximately 1,500 short tons for the Togiak district herring spawn-on-kelp fishery, and seven percent of the remaining available harvest for the Dutch Harbor food and bait fishery.
 - (8) After the spawn-on-kelp harvest and the Dutch Harbor food and bait fishery have been subtracted, the remaining harvestable surplus is allocated to the sac roe fishery. The department shall manage for a removal of 25 percent of that surplus by the gill net fleet and 75 percent by the purse seine fleet.
 - (9) If a manageable separation of the year classes occurs, an exploitation rate of up to 20 percent may be allowed on the younger age herring (4 years or less), and no fishery will be considered if this recruit population is less than 20,000 short tons.
 - (10) Late season (post-peak) sac roe openings must be based on one or more of the following criteria:
 - (A) A definable increase in the biomass of herring present on the fishing grounds;
 - (B) A major shift in the age composition of the herring in a definable biomass that is large enough to allow a harvest; and
 - (C) a major improvement in the roe maturity of fish sampled over a broad area, indicating the arrival of a quantity of new herring.

ARTICLE 10. - STATISTICAL AREA M; ALASKA PENINSULA-ALEUTIAN ISLANDS AREA.

5 AAC 27.600. DESCRIPTION OF AREA. Statistical area M includes all waters bound on the east by a line extending southeast (135°) from the southernmost tip of Kupreanof Point, on the west by the International Date Line, and on the north by a line extending west from the westernmost tip of Cape Menshikof.

5 AAC 27.605. DESCRIPTION OF DISTRICTS AND SECTIONS.

- (a) Sand Point District: all waters on the south (Pacific) side of the Alaska Peninsula west of a line extending from 135° from Kupreanof Point (55°34' N. lat, 159°36' W. long.), and east of 160°59' W. long. (longitude of McGinty Point).
 - (1) Stepovak Bay Section: all waters of the Sand Point District located west of a line extending 135° from Kupreanof Point 55°34' N. lat.,

159°36' W. long., north of a line from approximately two nautical miles south of 135° from Kupreanof Point, west to 55°32'12" N. lat., 160°02'36" W. long., (approximately one nautical mile north of Karpa Island), and west to 55°26' N. lat., 160°31'30" W. long., (approximately two nautical miles south of the longitude of Swedania Point 160°31'30" W. long.).

- (2) Swedania Point-Balboa Bay Section: all waters of the Sand Point District located between 160°31'30" W. long. and 160°49' W. long., and north of 55°26' N. lat.
 - (3) Point Aliaksin-Beaver Bay Section: all waters of the Sand Point District located between 160°49' W. long. and 161°59' W. long., and north of 55°26' N. lat.
 - (4) General section: all other waters of the Sand Point District.
- (b) Pavlof District: all waters on the south (Pacific) side of the Alaska Peninsula between 160°59' W. long. and a line extending 150° from 55°05'54" N. lat., 161°59' W. long. through Inner and Outer Iliasik Islands, including Bear and Volcano Bays.
- (1) Canoe Bay Section: all waters of Canoe Bay east of 161°21'45" W. long.
 - (2) Pavlof Bay Section: all waters of Pavlof Bay north of 55°21'42" N. lat. (latitude of Cape Tolstoi), excluding the Canoe Bay and Seal Cape -Wosnesenski Sections.
 - (3) Seal Cape-Wosnesenski Section: all waters of the Pavlof District located between 160°59' W. long. and 161°30" W. long. (longitude of Cape Tolstoi).
 - (4) General section: all other waters of the Pavlof District.
- (c) King Cove District: all waters of the south (Pacific) side of the Alaska Peninsula between a line extending 150° from 55°05'54" N. lat., 161°59' W. long. through Inner and Outer Iliasik Islands and 163°30' W. long., including waters of Isanotski Strait south of a line from Nichols Point to the False Pass dock.
- (1) Belkofski Section: all waters of the King Cove District east of 162°15' W. long. (longitude of Bold Cape).
 - (2) Deer Passage Section: all waters of the King Cove District between 162°15' W. long. (longitude of Bold Cape) and 162°25' W. long (longitude of Vodapoini Point), and north of 54°55' N. lat., excluding all waters of Lenard Harbor.
 - (3) Cold Bay Section: all waters of the King Cove District bounded by a line from Thin Point to Vodapoini Point.
 - (4) General section: all other waters of the King Cove District.
- (d) Unimak District: all waters on the southside of Unimak Island between 163°30' W. long. and the longitude of Scotch Cap Light.
- (e) Akutan District: all waters extending west of Unimak Island to and including Akutan Pass.
- (f) Unalaska District: all waters west of Akutan Pass to and including Umnak Pass.
- (1) Unalaska Bay Section: all waters of the Unalaska Bay District enclosed

by a line from Priest Rock at 54°00'24" N. lat., 166°22'42" W. long. to Cape Cheerful at 54°00'33" N. lat., 166°37'45" W. long.

- (2) General Section: all waters of the Unalaska District not included in the Unalaska Bay Section.
- (g) Umnak District: all waters west of Umnak Pass to and including Atka Pass.
- (h) Adak District: all waters west of Atka Pass to the terminus of the Aleutian Islands.
- (i) Amak District: all Bering Sea waters south and west of Cape Lieskof (55°47' N. lat., 162°04' W. long.) to the longitude of Cape Sarichef Light, including all waters of Bechevin Bay and Isanotski Strait north of a line from the False Pass Cannery dock to the tip of Nichols Point.
- (j) Port Moller District: all Bering Sea waters between the latitude of Cape Lieskof and the latitude of Cape Seniavin (56°24' N. lat.).
- (1) Western Section: all waters of the Port Moller District west of the longitude of Wolf Point on Walrus Island, excluding the waters of Herendeen Bay and Deer Island - Mud Bay Sections.
- (2) Deer Island - Mud Bay Section: all waters of the Port Moller District bounded by a line from the northernmost tip of Point Edward to the southernmost tip of Wolf Point on Walrus Island to Point Divide (55°53'10" N. lat., 160°46' W. long.) to the northernmost tip of Black Point.
- (3) Herendeen Bay Section: all waters of Herendeen Bay south of a line from the northernmost tip of Black Point to Point Divide (55°53'10" N. lat., 160°47' W. long.).
- (4) Inner Port Moller Section: all waters of Port Moller Bay enclosed by a line from Point Divide (55°53'10" N. lat., 160°47' W. long.), to Harbor Point (55°55' N. lat., 160°34'30" W. long.).
- (5) Outer Port Moller Bay Section: all waters of the Port Moller District south and east of a line from Point Divide (55°53'10" N. lat., 160°47' W. long.) to the southernmost tip of Wolf Point on Walrus Island to the southernmost tip of Entrance Point (55°59'30" N. lat., 160°34' W. long.).
- (6) Bear River Section: all Bering Sea waters between the longitude of Wolf Point on Walrus Island and Cape Seniavin Light, excluding the waters of the Herendeen Bay, Deer Island - Mud Bay, Outer Port Moller Bay, and Inner Port Moller Bay Sections.
- (k) Port Heiden District: all waters between the latitude of Cape Seniavin (56°24' N. lat.) and the latitude of Cape Menshikof (57°31'20" N. lat.).

5 AAC 27.610. FISHING SEASONS AND PERIODS.

- (a) In the Sand Point, Pavlof, King Cove, Amak, Port Moller, and Port Heiden Districts, herring may be taken from April 15 through July 15 (sac roe season).
- (d) Herring may be taken only during periods established by emergency order.
- (e) In the Unimak, Akutan, Unalaska, Umnak, and Adak Districts, herring may be taken from April 15 through July 15 (sac roe season) and from July 16 through February 28 (food and bait season).

5 AAC 27.630. GEAR. Herring may be taken only by purse seines and gill nets.

5 AAC 27.631. GILL NET SPECIFICATIONS AND OPERATIONS.

- (a) During the herring sac roe season, the aggregate length of herring gill nets in use by a herring CFEC permit holder may not exceed 150 fathoms.
- (b) The interim-use or entry permit holder must be physically present while the gill net is being fished.
- (c) Each drift gill net in operation must have a buoy at one end and the opposite end must be attached to the fishing vessel. Each set gill net in operation must be anchored and buoyed at both ends. Each buoy must be plainly and legibly marked with the permanent vessel license plate number (ADF&G number) of the vessel operating the gear. The buoy may bear only a single number and this number must be that of the vessel used in operating the gear. The numbers must be painted on the top one-third of the buoy in numerals at least four inches in height, one-half inch in width and in a color contrasting to that of the buoy. The buoy markings must be visible on the buoy above the water surface.

5 AAC 27.632. SEINE SPECIFICATIONS AND OPERATIONS. During the herring sac roe season, no purse seine may be more than 1,000 meshes in depth and more than 100 fathoms in length. During the herring food and bait season, no purse seine may be more than 250 fathoms in length.

5 AAC 27.650. WATERS CLOSED TO HERRING FISHING.

- (a) Herring may not be taken from June 25 through September 30 in any waters closed to salmon fishing.

5 AAC 27.662. BUYER AND TENDER REPORTING REQUIREMENTS. In addition to the requirements of 5 AAC 39.130(f) each tender operator and each buyer or his agents shall report in person to and register with a local representative of the department upon arrival in the statistical area before commencing operations and before changing location of the operation. Each buyer shall:

- (1) identify all vessels to be employed in transporting or processing herring and shall register such vessels with a local representative of the department located in the statistical area before transporting or processing of herring;
- (2) make daily reports of all herring purchased from fishermen, and other processing records as specified by a local representative of the department; and
- (3) submit fish tickets before departure from the area and no later than 10 days after termination of buying operations in the area, or as otherwise specified by a local representative of the department.

APPENDIX C: ALASKA PENINSULA TIDES FOR 1992.

Appendix C.1. Port Moller tides, 1992.

Date	---HIGH TIDE---		---HIGH TIDE---		---LOW TIDE---		---LOW TIDE---		
	Time	Feet	Time	Feet	Time	Feet	Time	Feet	
May	1	10:05 AM	8.3	11:28 PM	10.3	4:20 AM	6.6	4:19 PM	1.0
	2	10:45 AM	8.1	:		5:13 AM	6.9	5:00 PM	0.4
	3	0:15 AM	10.8	11:28 AM	7.9	6:05 AM	7.0	5:43 PM	-0.1
	4	1:02 AM	11.3	12:14 PM	7.9	6:55 AM	6.9	6:28 PM	-0.6
	5	1:48 AM	11.7	1:03 PM	7.9	7:45 AM	6.6	7:15 PM	-1.0
	6	2:35 AM	12.0	1:58 PM	8.0	8:34 AM	6.0	8:05 PM	-1.2
	7	3:23 AM	12.2	2:56 PM	8.2	9:23 AM	5.3	8:59 PM	-1.0
	8	4:10 AM	12.3	3:58 PM	8.5	10:13 AM	4.3	9:54 PM	-0.5
	9	4:59 AM	12.2	5:04 PM	8.9	11:03 AM	3.0	10:53 PM	0.2
	10	5:47 AM	12.0	6:11 PM	9.3	11:54 AM	1.7	11:53 PM	1.3
	11	6:36 AM	11.7	7:18 PM	9.9	:		12:45 PM	0.3
	12	7:26 AM	11.2	8:25 PM	10.5	0:55 AM	2.5	1:36 PM	-0.9
	13	8:17 AM	10.7	9:29 PM	11.0	1:59 AM	3.6	2:28 PM	-1.8
	14	9:08 AM	10.1	10:31 PM	11.5	3:02 AM	4.5	3:19 PM	-2.4
	15	10:01 AM	9.5	11:29 PM	11.9	4:05 AM	5.2	4:10 PM	-2.5
	16	10:54 AM	9.0	:		5:06 AM	5.6	5:00 PM	-2.3
	17	0:24 AM	12.1	11:47 AM	8.5	6:05 AM	5.8	5:49 PM	-1.8
	18	1:16 AM	12.1	12:39 PM	8.1	7:01 AM	5.8	6:38 PM	-1.2
	19	2:05 AM	12.0	1:31 PM	7.7	7:53 AM	5.8	7:25 PM	-0.3
	20	2:50 AM	11.8	2:21 PM	7.5	8:43 AM	5.7	8:12 PM	0.4
	21	3:33 AM	11.5	3:12 PM	7.4	9:29 AM	5.5	8:58 PM	1.4
	22	4:13 AM	11.2	4:03 PM	7.4	10:13 AM	5.1	9:44 PM	2.3
	23	4:51 AM	10.8	4:55 PM	7.5	10:55 AM	4.6	10:31 PM	3.4
	24	5:27 AM	10.5	5:49 PM	7.7	11:36 AM	3.9	11:20 PM	4.4
	25	6:03 AM	10.1	6:43 PM	8.1	:		12:16 PM	3.2
	26	6:38 AM	9.7	7:37 PM	8.6	0:11 AM	5.3	12:56 PM	2.4
	27	7:14 AM	9.4	8:29 PM	9.1	1:04 AM	6.2	1:35 PM	1.5
	28	7:51 AM	9.0	9:21 PM	9.7	1:59 AM	6.9	2:15 PM	0.7
	29	8:30 AM	8.7	10:10 PM	10.4	2:53 AM	7.4	2:56 PM	-0.1
	30	9:11 AM	8.4	10:59 PM	11.0	3:48 AM	7.7	3:38 PM	-0.7
	31	9:56 AM	8.2	11:47 PM	11.5	4:42 AM	7.7	4:22 PM	-1.4
June	1	10:46 AM	8.1	:		5:35 AM	7.5	5:09 PM	-1.9
	2	0:35 AM	12.0	11:40 AM	8.1	6:27 AM	7.1	5:58 PM	-2.2
	3	1:23 AM	12.3	12:38 PM	8.2	7:18 AM	6.3	6:50 PM	-2.2
	4	2:11 AM	12.6	1:40 PM	8.4	8:09 AM	5.3	7:44 PM	-1.8
	5	2:58 AM	12.7	2:46 PM	8.6	9:00 AM	4.0	8:41 PM	-1.0
	6	3:46 AM	12.6	3:54 PM	8.9	9:51 AM	2.5	9:39 PM	0.1
	7	4:34 AM	12.4	5:02 PM	9.4	10:42 AM	0.9	10:40 PM	1.4
	8	5:22 AM	12.0	6:11 PM	9.9	11:34 AM	-0.5	11:42 PM	2.8
	9	6:12 AM	11.5	7:18 PM	10.5	:		12:25 PM	-1.7

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Appendix C.1. (page 2 of 4)

Date	---HIGH TIDE---		---HIGH TIDE---		---LOW TIDE---		----LOW TIDE---			
	Time	Feet	Time	Feet	Time	Feet	Time	Feet		
June	10	7:02 AM	10.9	8:23 PM	11.0	0:45 AM	4.1	1:17 PM	-2.6	
	11	7:53 AM	10.3	9:25 PM	11.4	1:49 AM	5.2	2:08 PM	-3.0	
	12	8:45 AM	9.7	10:23 PM	11.7	2:51 AM	5.9	2:59 PM	-3.0	
	13	9:37 AM	9.0	11:19 PM	11.9	3:53 AM	6.4	3:49 PM	-2.7	
	14	10:30 AM	8.5	:	:	4:52 AM	6.6	4:38 PM	-2.1	
	15	0:10 AM	11.9	11:21 AM	8.0	5:49 AM	6.7	5:25 PM	-1.3	
	16	0:58 AM	11.8	12:12 PM	7.6	6:42 AM	6.6	6:12 PM	-0.4	
	17	1:43 AM	11.6	1:02 PM	7.3	7:31 AM	6.5	6:56 PM	0.4	
	18	2:23 AM	11.3	1:52 PM	7.2	8:17 AM	6.1	7:41 PM	1.4	
	19	3:01 AM	11.1	2:42 PM	7.1	9:00 AM	5.7	8:25 PM	2.4	
	20	3:35 AM	10.8	3:33 PM	7.2	9:40 AM	5.0	9:10 PM	3.4	
	21	4:09 AM	10.5	4:26 PM	7.5	10:19 AM	4.3	9:57 PM	4.4	
	22	4:42 AM	10.2	5:19 PM	7.9	10:57 AM	3.4	10:46 PM	5.4	
	23	5:14 AM	9.9	6:12 PM	8.3	11:36 AM	2.5	11:37 PM	6.3	
	24	5:48 AM	9.6	7:04 PM	8.9	:	:	12:14 PM	1.5	
	25	6:24 AM	9.3	7:56 PM	9.5	0:30 AM	7.0	12:53 PM	0.6	
	26	7:02 AM	9.0	8:46 PM	10.1	1:24 AM	7.6	1:34 PM	-0.3	
	27	7:44 AM	8.8	9:37 PM	10.8	2:19 AM	8.0	2:17 PM	-1.2	
	28	8:30 AM	8.7	10:27 PM	11.3	3:13 AM	8.1	3:03 PM	-2.0	
	29	9:21 AM	8.7	11:16 PM	11.8	4:07 AM	7.9	3:51 PM	-2.6	
	30	10:17 AM	8.7	:	:	5:01 AM	7.4	4:42 PM	-2.9	
	July	1	0:06 AM	12.2	11:18 AM	8.7	5:54 AM	6.6	5:35 PM	-2.9
		2	0:54 AM	12.5	12:23 PM	8.8	6:47 AM	5.4	6:31 PM	-2.4
		3	1:43 AM	12.6	1:30 PM	9.1	7:40 AM	3.9	7:28 PM	-1.5
		4	2:31 AM	12.6	2:39 PM	9.4	8:33 AM	2.3	8:27 PM	-0.3
		5	3:20 AM	12.4	3:48 PM	9.8	9:25 AM	0.6	9:27 PM	1.1
		6	4:09 AM	12.1	4:57 PM	10.2	10:18 AM	-0.8	10:29 PM	2.5
		7	4:59 AM	11.6	6:03 PM	10.7	11:11 AM	-2.0	11:31 PM	3.8
		8	5:49 AM	11.1	7:08 PM	11.1	:	:	12:03 PM	-2.8
		9	6:41 AM	10.5	8:10 PM	11.3	0:33 AM	4.9	12:55 PM	-3.2
10		7:33 AM	9.9	9:10 PM	11.5	1:35 AM	5.8	1:47 PM	-3.1	
11		8:25 AM	9.3	10:06 PM	11.5	2:35 AM	6.3	2:38 PM	-2.6	
12		9:17 AM	8.8	10:59 PM	11.5	3:34 AM	6.7	3:28 PM	-2.0	
13		10:09 AM	8.3	11:49 PM	11.3	4:31 AM	6.9	4:16 PM	-1.2	
14		10:59 AM	7.9	:	:	5:24 AM	7.0	5:02 PM	-0.3	
15		0:34 AM	11.2	11:49 AM	7.6	6:14 AM	6.8	5:47 PM	0.6	
16		1:14 AM	10.9	12:38 PM	7.4	7:00 AM	6.5	6:31 PM	1.5	
17		1:51 AM	10.7	1:28 PM	7.3	7:43 AM	6.1	7:15 PM	2.5	
18		2:24 AM	10.4	2:18 PM	7.4	8:23 AM	5.5	7:59 PM	3.5	
19		2:56 AM	10.1	3:08 PM	7.6	9:01 AM	4.7	8:44 PM	4.4	
20		3:27 AM	9.9	3:58 PM	7.9	9:38 AM	3.9	9:31 PM	5.3	
21		3:58 AM	9.6	4:49 PM	8.4	10:15 AM	3.0	10:19 PM	6.1	
22		4:31 AM	9.4	5:39 PM	8.9	10:53 AM	2.0	11:09 PM	6.8	
23		5:05 AM	9.2	6:29 PM	9.4	11:32 AM	1.0	:	:	

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Date	---HIGH TIDE---		---HIGH TIDE---		---LOW TIDE---		---LOW TIDE---		
	Time	Feet	Time	Feet	Time	Feet	Time	Feet	
July	24	5:42 AM	9.1	7:19 PM	10.0	0:01 AM	7.3	12:13 PM	0.0
	25	6:24 AM	9.0	8:10 PM	10.5	12:53 AM	7.7	12:57 PM	-0.9
	26	7:10 AM	9.0	9:01 PM	11.0	1:45 AM	7.8	1:43 PM	-1.7
	27	8:02 AM	9.1	9:52 PM	11.4	2:39 AM	7.7	2:33 PM	-2.4
	28	8:59 AM	9.1	10:43 PM	11.8	3:33 AM	7.2	3:26 PM	-2.7
	29	10:01 AM	9.3	11:33 PM	12.0	4:27 AM	6.3	4:20 PM	-2.7
	30	11:07 AM	9.4	:	:	5:21 AM	5.1	5:17 PM	-2.3
	31	0:23 AM	12.2	12:15 PM	9.7	6:16 AM	3.6	6:16 PM	-1.4
Aug.	1	1:13 AM	12.1	1:24 PM	10.0	7:10 AM	2.0	7:15 PM	-0.3
	2	2:03 AM	12.0	2:32 PM	10.4	8:03 AM	0.3	8:16 PM	0.8
	3	2:53 AM	11.7	3:39 PM	10.8	8:57 AM	-1.0	9:17 PM	2.1
	4	3:44 AM	11.4	4:44 PM	11.1	9:51 AM	-2.0	10:18 PM	3.2
	5	4:36 AM	10.9	5:48 PM	11.3	10:44 AM	-2.6	11:18 PM	4.2
	6	5:28 AM	10.5	6:49 PM	11.4	11:38 AM	-2.8	:	:
	7	6:21 AM	10.0	7:48 PM	11.4	0:18 AM	5.0	12:31 PM	-2.6
	8	7:14 AM	9.5	8:45 PM	11.3	1:16 AM	5.6	1:23 PM	-2.1
	9	8:07 AM	9.0	9:39 PM	11.1	2:13 AM	6.1	2:14 PM	-1.4
	10	8:59 AM	8.6	10:29 PM	10.9	3:08 AM	6.4	3:04 PM	-0.6
	11	9:50 AM	8.3	11:16 PM	10.6	4:01 AM	6.5	3:52 PM	0.2
	12	10:41 AM	8.0	11:58 PM	10.4	4:51 AM	6.5	4:39 PM	1.1
	13	11:31 AM	7.9	:	:	5:37 AM	6.3	5:24 PM	2.0
	14	0:36 AM	10.1	12:20 PM	7.8	6:20 AM	5.9	6:09 PM	2.9
	15	1:10 AM	9.8	1:09 PM	7.9	7:01 AM	5.4	6:54 PM	3.8
	16	1:43 AM	9.5	1:58 PM	8.1	7:39 AM	4.7	7:40 PM	4.6
	17	2:14 AM	9.2	2:45 PM	8.4	8:17 AM	4.1	8:26 PM	5.3
	18	2:45 AM	9.0	3:32 PM	8.8	8:54 AM	3.3	9:12 PM	6.0
	19	3:17 AM	8.8	4:19 PM	9.2	9:31 AM	2.5	9:59 PM	6.5
	20	3:51 AM	8.7	5:06 PM	9.7	10:10 AM	1.6	10:47 PM	6.9
	21	4:28 AM	8.7	5:54 PM	10.1	10:51 AM	0.7	11:36 PM	7.1
	22	5:10 AM	8.8	6:44 PM	10.5	11:36 AM	-0.2	:	:
	23	5:57 AM	8.9	7:34 PM	10.9	0:26 AM	7.1	12:23 PM	-0.9
	24	6:50 AM	9.1	8:25 PM	11.2	1:17 AM	6.9	1:14 PM	-1.5
	25	7:48 AM	9.3	9:16 PM	11.4	2:09 AM	6.3	2:09 PM	-1.8
	26	8:50 AM	9.6	10:07 PM	11.5	3:03 AM	5.4	3:05 PM	-1.7
	27	9:56 AM	9.9	10:58 PM	11.6	3:56 AM	4.2	4:04 PM	-1.2
	28	11:03 AM	10.2	11:49 PM	11.5	4:51 AM	2.8	5:04 PM	-0.5
	29	:	:	12:11 PM	10.7	5:45 AM	1.2	6:04 PM	0.3
	30	0:41 AM	11.3	1:18 PM	11.1	6:39 AM	-0.1	7:05 PM	1.3
	31	1:33 AM	11.1	2:23 PM	11.5	7:33 AM	-1.3	8:06 PM	2.2
Sept.	1	2:26 AM	10.7	3:25 PM	11.7	8:28 AM	-2.0	9:06 PM	3.0
	2	3:19 AM	10.4	4:26 PM	11.8	9:22 AM	-2.4	10:05 PM	3.7
	3	4:13 AM	10.0	5:25 PM	11.8	10:16 AM	-2.3	11:03 PM	4.3
	4	5:07 AM	9.7	6:22 PM	11.6	11:09 AM	-2.0	11:59 PM	4.8

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Date	---HIGH TIDE---		---HIGH TIDE---		---LOW TIDE---		---LOW TIDE---	
	Time	Feet	Time	Feet	Time	Feet	Time	Feet
Sept. 5	6:01 AM	9.4	7:17 PM	11.3	:		12:03 PM	-1.3
6	6:55 AM	9.0	8:10 PM	11.0	0:53 AM	5.1	12:55 PM	-0.6
7	7:48 AM	8.8	9:00 PM	10.6	1:46 AM	5.4	1:46 PM	0.2
8	8:41 AM	8.5	9:46 PM	10.3	2:37 AM	5.5	2:36 PM	1.1
9	9:33 AM	8.4	10:29 PM	9.9	3:25 AM	5.5	3:25 PM	2.0
10	10:25 AM	8.4	11:09 PM	9.6	4:11 AM	5.3	4:13 PM	2.9
11	11:15 AM	8.4	11:46 PM	9.2	4:54 AM	4.9	5:01 PM	3.8
12	:		12:05 PM	8.6	5:35 AM	4.5	5:49 PM	4.5
13	0:21 AM	8.9	12:52 PM	8.8	6:14 AM	4.0	6:36 PM	5.2
14	0:55 AM	8.6	1:38 PM	9.1	6:53 AM	3.5	7:23 PM	5.7
15	1:28 AM	8.3	2:22 PM	9.5	7:30 AM	2.9	8:10 PM	6.1
16	2:02 AM	8.2	3:06 PM	9.8	8:09 AM	2.3	8:56 PM	6.4
17	2:37 AM	8.1	3:51 PM	10.2	8:48 AM	1.6	9:42 PM	6.6
18	3:16 AM	8.2	4:36 PM	10.5	9:30 AM	0.9	10:29 PM	6.6
19	3:59 AM	8.3	5:23 PM	10.8	10:15 AM	0.3	11:16 PM	6.4
20	4:48 AM	8.5	6:11 PM	11.1	11:04 AM	-0.2	:	
21	5:42 AM	8.8	7:01 PM	11.2	0:04 AM	6.0	11:56 AM	-0.5
22	6:41 AM	9.1	7:50 PM	11.3	0:54 AM	5.2	12:51 PM	-0.5
23	7:44 AM	9.5	8:41 PM	11.3	1:45 AM	4.2	1:49 PM	-0.2
24	8:50 AM	10.0	9:32 PM	11.1	2:37 AM	2.9	2:49 PM	0.3
25	9:57 AM	10.5	10:24 PM	10.9	3:30 AM	1.5	3:51 PM	1.0
26	11:03 AM	11.0	11:16 PM	10.6	4:23 AM	0.1	4:53 PM	1.8
27	:		12:08 PM	11.6	5:17 AM	-1.0	5:55 PM	2.5
28	0:10 AM	10.3	1:10 PM	12.0	6:10 AM	-1.9	6:56 PM	3.1
29	1:04 AM	10.0	2:10 PM	12.2	7:04 AM	-2.3	7:56 PM	3.5
30	1:59 AM	9.7	3:08 PM	12.3	7:58 AM	-2.5	8:54 PM	3.9

Tidal Station Location: Port Moller (Entrance Point) 55 59'N., 160 34'W.
 Port Heiden 56 56'N., 158 44'W.

Note: To correct the time and height for high and low tides for Port Heiden add time and feet from the Port Moller tide table.

Port Heiden:	Time		Feet	
	High	Low	High	Low
	1:30	2:04	0.6	0.8

Appendix C.2. Kodiak tides, 1992.

Date	---HIGH TIDE---		---HIGH TIDE---		---LOW TIDE---		---LOW TIDE---		
	Time	Feet	Time	Feet	Time	Feet	Time	Feet	
May	1	1:24 AM	8.7	2:18 PM	7.1	8:00 AM	-0.5	7:47 PM	1.6
	2	1:57 AM	9.2	2:59 PM	7.2	8:38 AM	-1.1	8:23 PM	1.7
	3	2:32 AM	9.5	3:41 PM	7.2	9:17 AM	-1.5	9:00 PM	1.8
	4	3:08 AM	9.7	4:24 PM	7.1	9:58 AM	-1.7	9:39 PM	2.0
	5	3:47 AM	9.7	5:10 PM	6.9	10:41 AM	-1.7	10:22 PM	2.2
	6	4:31 AM	9.4	6:01 PM	6.7	11:28 AM	-1.4	11:12 PM	2.5
	7	5:19 AM	9.0	6:56 PM	6.6	:		12:19 PM	-0.9
	8	6:16 AM	8.3	7:58 PM	6.7	0:11 AM	2.7	1:14 PM	-0.4
	9	7:25 AM	7.6	9:01 PM	7.0	1:24 AM	2.8	2:14 PM	0.1
	10	8:47 AM	7.0	10:01 PM	7.5	2:47 AM	2.5	3:17 PM	0.5
	11	10:12 AM	6.7	10:55 PM	8.1	4:11 AM	1.8	4:18 PM	0.9
	12	11:29 AM	6.7	11:44 PM	8.7	5:22 AM	0.9	5:16 PM	1.2
	13	:		12:34 PM	6.8	6:21 AM	-0.1	6:08 PM	1.4
	14	0:29 AM	9.2	1:30 PM	7.0	7:12 AM	-0.8	6:56 PM	1.6
	15	1:12 AM	9.6	2:20 PM	7.1	7:58 AM	-1.4	7:40 PM	1.8
	16	1:53 AM	9.8	3:06 PM	7.2	8:41 AM	-1.7	8:22 PM	1.9
	17	2:32 AM	9.7	3:49 PM	7.1	9:22 AM	-1.7	9:02 PM	2.1
	18	3:10 AM	9.5	4:31 PM	7.0	10:01 AM	-1.6	9:42 PM	2.4
	19	3:48 AM	9.2	5:13 PM	6.7	10:41 AM	-1.2	10:22 PM	2.6
	20	4:26 AM	8.7	5:55 PM	6.5	11:20 AM	-0.8	11:04 PM	2.9
	21	5:06 AM	8.1	6:40 PM	6.4	12:00 PM	-0.2	11:51 PM	3.1
	22	5:48 AM	7.5	7:26 PM	6.3	:		12:41 PM	0.2
	23	6:37 AM	6.8	8:15 PM	6.4	0:46 AM	3.2	1:24 PM	0.8
	24	7:36 AM	6.2	9:05 PM	6.6	1:51 AM	3.2	2:11 PM	1.3
	25	8:49 AM	5.7	9:53 PM	6.9	2:04 AM	2.9	3:01 PM	1.7
	26	10:08 AM	5.5	10:37 PM	7.4	4:16 AM	2.4	3:53 PM	2.0
	27	11:20 AM	5.5	11:20 PM	7.9	5:16 AM	1.6	4:45 PM	2.2
	28	:		12:22 PM	5.8	6:08 AM	0.7	5:35 PM	2.3
	29	0:01 AM	8.5	1:14 PM	6.1	6:54 AM	-0.1	6:23 PM	2.4
	30	0:42 AM	9.0	2:02 PM	6.5	7:37 AM	-0.9	7:09 PM	2.3
	31	1:23 AM	9.5	2:47 PM	6.8	8:19 AM	-1.5	7:54 PM	2.2
June	1	2:06 AM	9.9	3:32 PM	7.0	9:02 AM	-2.0	8:40 PM	2.1
	2	2:49 AM	10.1	4:16 PM	7.2	9:46 AM	-2.2	9:27 PM	2.1
	3	3:35 AM	10.0	5:02 PM	7.3	10:30 AM	-2.2	10:17 PM	2.1
	4	4:23 AM	9.7	5:49 PM	7.4	11:15 AM	-1.9	11:11 PM	2.1
	5	5:14 AM	9.1	6:38 PM	7.5	:		12:02 PM	-1.4
	6	6:11 AM	8.3	7:30 PM	7.7	0:12 AM	2.1	12:50 PM	-0.7
	7	7:16 AM	7.3	8:25 PM	7.9	1:21 AM	2.0	1:41 PM	0.1
	8	8:32 AM	6.5	9:21 PM	8.2	2:37 AM	1.7	2:36 PM	0.9
	9	9:55 AM	5.9	10:16 PM	8.6	3:55 AM	1.2	3:34 PM	1.6
	10	11:17 AM	5.8	11:10 PM	8.9	5:07 AM	0.5	4:34 PM	2.1
	11	:		12:28 PM	5.9	6:09 AM	-0.1	5:33 PM	2.4
	12	0:01 AM	9.1	1:26 PM	6.2	7:02 AM	-0.7	6:28 PM	2.5
	13	0:48 AM	9.3	2:16 PM	6.4	7:48 AM	-1.1	7:18 PM	2.6

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Date	---HIGH TIDE---		---HIGH TIDE---		---LOW TIDE---		---LOW TIDE---			
	Time	Feet	Time	Feet	Time	Feet	Time	Feet		
June	14	1:32 AM	9.4	3:00 PM	6.6	8:30 AM	-1.4	8:03 PM	2.5	
	15	2:13 AM	9.4	3:39 PM	6.8	9:09 AM	-1.5	8:45 PM	2.5	
	16	2:52 AM	9.3	4:17 PM	6.9	9:46 AM	-1.4	9:25 PM	2.5	
	17	3:30 AM	9.1	4:53 PM	6.9	10:21 AM	-1.2	10:05 PM	2.5	
	18	4:07 AM	8.7	5:28 PM	6.9	10:55 AM	-0.9	10:46 PM	2.6	
	19	4:43 AM	8.2	6:04 PM	6.9	11:28 AM	-0.5	11:29 PM	2.6	
	20	5:22 AM	7.6	6:39 PM	7.0	:		12:01 PM	0.0	
	21	6:03 AM	6.9	7:17 PM	7.0	0:17 AM	2.7	12:35 PM	0.5	
	22	6:51 AM	6.2	7:57 PM	7.2	1:11 AM	2.6	1:11 PM	1.1	
	23	7:52 AM	5.5	8:42 PM	7.4	2:12 AM	2.5	1:51 PM	1.7	
	24	9:09 AM	5.1	9:31 PM	7.6	3:21 AM	2.1	2:39 PM	2.2	
	25	10:35 AM	4.9	10:23 PM	8.0	4:30 AM	1.5	3:37 PM	2.6	
	26	11:52 AM	5.2	11:16 PM	8.5	5:32 AM	0.7	4:40 PM	2.8	
	27	:		12:55 PM	5.6	6:27 AM	-0.1	5:42 PM	2.8	
	28	0:09 AM	9.1	1:46 PM	6.1	7:16 AM	-1.0	6:40 PM	2.6	
	29	0:59 AM	9.7	2:32 PM	6.6	8:03 AM	-1.7	7:34 PM	2.3	
	30	1:49 AM	10.1	3:16 PM	7.1	8:47 AM	-2.2	8:26 PM	1.9	
	July	1	2:37 AM	10.4	3:58 PM	7.6	9:30 AM	-2.5	9:18 PM	1.6
		2	3:26 AM	10.3	4:41 PM	8.0	10:13 AM	-2.4	10:10 PM	1.3
		3	4:16 AM	9.9	5:24 PM	8.3	10:55 AM	-2.0	11:05 PM	1.1
		4	5:07 AM	9.1	6:08 PM	8.5	11:38 AM	-1.3	:	
		5	6:02 AM	8.1	6:55 PM	8.6	0:02 AM	1.1	12:21 PM	-0.5
		6	7:02 AM	7.0	7:45 PM	8.6	1:06 AM	1.0	1:06 PM	0.4
		7	8:13 AM	6.1	8:40 PM	8.6	2:16 AM	1.0	1:55 PM	1.4
		8	9:38 AM	5.4	9:39 PM	8.5	3:32 AM	0.8	2:52 PM	2.2
		9	11:06 AM	5.2	10:41 PM	8.6	4:48 AM	0.5	3:58 PM	2.8
		10	12:23 PM	5.4	11:39 PM	8.7	5:56 AM	0.0	5:07 PM	3.0
		11	:		1:22 PM	5.8	6:52 AM	-0.3	6:11 PM	3.0
		12	0:31 AM	8.8	2:08 PM	6.2	7:38 AM	-0.7	7:04 PM	2.9
		13	1:18 AM	9.0	2:46 PM	6.5	8:17 AM	-1.0	7:50 PM	2.6
14		2:00 AM	9.1	3:20 PM	6.8	8:53 AM	-1.1	8:32 PM	2.4	
15		2:38 AM	9.1	3:52 PM	7.1	9:25 AM	-1.1	9:10 PM	2.2	
16		3:14 AM	8.9	4:22 PM	7.3	9:55 AM	-1.0	9:47 PM	2.0	
17		3:49 AM	8.6	4:52 PM	7.4	10:25 AM	-0.8	10:25 PM	1.9	
18		4:23 AM	8.2	5:21 PM	7.5	10:53 AM	-0.4	11:03 PM	1.9	
19		4:58 AM	7.6	5:50 PM	7.5	11:21 AM	0.0	11:45 PM	1.9	
20		5:35 AM	6.9	6:21 PM	7.6	11:50 AM	0.6	:		
21		6:17 AM	6.2	6:56 PM	7.6	0:30 AM	1.9	12:20 PM	1.2	
22		7:09 AM	5.5	7:38 PM	7.7	1:24 AM	1.8	12:55 PM	1.8	
23		8:20 AM	4.9	8:30 PM	7.8	2:29 AM	1.7	1:40 PM	2.4	
24		9:56 AM	4.6	9:34 PM	8.0	3:44 AM	1.4	2:41 PM	2.9	
25		11:28 AM	4.9	10:42 PM	8.4	4:59 AM	0.7	3:58 PM	3.1	
26		12:36 PM	5.4	11:46 PM	9.0	6:03 AM	-0.1	5:16 PM	3.0	
27		:		1:26 PM	6.1	6:56 AM	-0.9	6:24 PM	2.5	

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Date	---HIGH TIDE---		---HIGH TIDE---		---LOW TIDE---		---LOW TIDE---		
	Time	Feet	Time	Feet	Time	Feet	Time	Feet	
July	28	0:44 AM	9.6	2:10 PM	6.9	7:43 AM	-1.6	7:23 PM	1.9
	29	1:37 AM	10.1	2:51 PM	7.6	8:27 AM	-2.1	8:16 PM	1.2
	30	2:28 AM	10.3	3:31 PM	8.3	9:09 AM	-2.3	9:08 PM	0.6
	31	3:17 AM	10.2	4:10 PM	8.8	9:49 AM	-2.1	9:59 PM	0.1
Aug.	1	4:06 AM	9.7	4:51 PM	9.1	10:29 AM	-1.6	10:50 PM	-0.1
	2	4:56 AM	8.9	5:32 PM	9.2	11:09 AM	-0.8	11:44 PM	0.0
	3	5:48 AM	7.9	6:16 PM	9.1	11:49 AM	0.0	:	
	4	6:46 AM	6.8	7:04 PM	8.8	0:42 AM	0.2	12:31 PM	1.0
	5	7:54 AM	5.8	7:59 PM	8.4	1:47 AM	0.5	1:18 PM	2.0
	6	9:20 AM	5.1	9:04 PM	8.1	3:03 AM	0.7	2:16 PM	2.8
	7	10:56 AM	5.0	10:15 PM	8.0	4:25 AM	0.7	3:31 PM	3.3
	8	12:13 PM	5.3	11:22 PM	8.0	5:39 AM	0.4	4:54 PM	3.4
	9	:		1:07 PM	5.8	6:36 AM	0.1	6:03 PM	3.1
	10	0:18 AM	8.3	1:47 PM	6.3	7:20 AM	-0.2	6:55 PM	2.7
	11	1:05 AM	8.5	2:19 PM	6.7	7:56 AM	-0.5	7:39 PM	2.3
	12	1:46 AM	8.7	2:49 PM	7.1	8:27 AM	-0.6	8:17 PM	1.8
	13	2:23 AM	8.8	3:16 PM	7.5	8:56 AM	-0.7	8:52 PM	1.5
	14	2:57 AM	8.7	3:43 PM	7.7	9:23 AM	-0.6	9:27 PM	1.2
	15	3:31 AM	8.4	4:09 PM	7.9	9:50 AM	-0.3	10:02 PM	1.0
	16	4:04 AM	8.0	4:35 PM	8.0	10:16 AM	0.0	10:37 PM	0.9
	17	4:37 AM	7.5	5:02 PM	8.1	10:42 AM	0.4	11:14 PM	0.9
	18	5:13 AM	6.9	5:31 PM	8.1	11:09 AM	1.0	11:56 PM	1.0
	19	5:53 AM	6.2	6:04 PM	8.0	11:38 AM	1.6		
	20	6:42 AM	5.5	6:46 PM	7.9	0:45 AM	1.1	12:12 PM	2.2
	21	7:52 AM	4.9	7:42 PM	7.8	1:47 AM	1.2	12:58 PM	2.7
	22	9:32 AM	4.7	8:57 PM	7.8	3:05 AM	1.1	2 :07 PM	3.2
	23	11:08 AM	5.0	10:19 PM	8.1	4:28 AM	0.7	3 :40 PM	3.3
	24	12:12 PM	5.7	11:31 PM	8.7	5:37 AM	0.0	5 :08 PM	2.9
	25	:		12:59 PM	6.6	6:31 AM	-0.6	6 :17 PM	2.1
	26	0:33 AM	9.3	1:40 PM	7.5	7:18 AM	-1.2	7 :14 PM	1.1
	27	1:27 AM	9.8	2:19 PM	8.4	8:01 AM	-1.5	8 :06 PM	0.1
	28	2:18 AM	9.9	2:58 PM	9.1	8:41 AM	-1.6	8 :56 PM	-0.5
	29	3:07 AM	9.8	3:36 PM	9.6	9:20 AM	-1.3	9 :44 PM	-1.0
	30	3:55 AM	9.3	4:15 PM	9.8	9:59 AM	-0.7	10:32 PM	-1.1
	31	4:44 AM	8.5	4:55 PM	9.7	10:37 AM	-0.1	11:22 PM	-0.8
Sept.	1	5:34 AM	7.5	5:37 PM	9.3	11:17 AM	0.8	:	
	2	6:29 AM	6.5	6:24 PM	8.7	0:15 AM	-0.3	11:58 AM	1.7
	3	7:35 AM	5.7	7:18 PM	8.1	1:15 AM	0.2	12:45 PM	2.5
	4	9:00 AM	5.1	8:27 PM	7.5	2:27 AM	0.7	1:47 PM	3.2
	5	10:35 AM	5.1	9:48 PM	7.3	3:51 AM	1.0	3:14 PM	3.6
	6	11:48 AM	5.5	11:02 PM	7.4	5:08 AM	0.9	4:53 PM	3.5
	7	:		12:36 PM	6.0	6:05 AM	0.6	5:42 PM	3.0
	8	0:01 AM	7.6	1:11 PM	6.5	6:47 AM	0.3	6:44 PM	2.4

-Continued-

Date	---HIGH TIDE---		---HIGH TIDE---		---LOW TIDE---		---LOW TIDE---	
	Time	Feet	Time	Feet	Time	Feet	Time	Feet
Sept. 9	0:48 AM	7.9	1:41 PM	7.1	7:22 AM	0.1	7:22 PM	1.7
10	1:28 AM	8.1	2:08 PM	7.6	7:52 AM	0.0	7:58 PM	1.1
11	2:05 AM	8.2	2:35 PM	8.0	8:20 AM	0.0	8:32 PM	0.6
12	2:40 AM	8.2	3:00 PM	8.3	8:47 AM	0.1	9:05 PM	0.2
13	3:13 AM	8.0	3:26 PM	8.5	9:13 AM	0.3	9:38 PM	0.0
14	3:47 AM	7.7	3:52 PM	8.6	9:40 AM	0.7	10:12 PM	-0.1
15	4:21 AM	7.3	4:19 PM	8.6	10:07 AM	1.1	10:49 PM	0.0
16	4:58 AM	6.8	4:49 PM	8.5	10:35 AM	1.6	11:30 PM	0.1
17	5:40 AM	6.2	5:24 PM	8.3	11:07 AM	2.1		
18	6:32 AM	5.6	6:09 PM	8.1	0:18 AM	0.4	11:45 AM	2.6
19	7:44 AM	5.1	7:10 PM	7.7	1:19 AM	0.7	12:38 PM	3.1
20	9:18 AM	5.1	8:32 PM	7.6	2:34 AM	0.8	2:00 PM	3.4
21	10:41 AM	5.6	10:02 PM	7.7	3:55 AM	0.6	3:41 PM	3.2
22	11:40 AM	6.4	11:19 PM	8.1	5:04 AM	0.2	5:05 PM	2.4
23	:		12:25 PM	7.3	5:59 AM	-0.1	6:11 PM	1.3
24	0:23 AM	8.6	1:06 PM	8.3	6:47 AM	-0.4	7:06 PM	0.1
25	1:18 AM	9.0	1:45 PM	9.1	7:30 AM	-0.6	7:55 PM	-0.8
26	2:09 AM	9.1	2:24 PM	9.8	8:11 AM	-0.5	8:42 PM	-1.5
27	2:57 AM	9.0	3:02 PM	10.1	8:50 AM	-0.1	9:28 PM	-1.8
28	3:45 AM	8.6	3:41 PM	10.1	9:29 AM	0.3	10:14 PM	-1.8
29	4:32 AM	7.9	4:20 PM	9.8	10:08 AM	0.9	11:00 PM	-1.4
30	5:21 AM	7.2	5:02 PM	9.3	10:47 AM	1.6	11:49 PM	-0.7

Note: To correct tables for local areas add or subtract time for high and low tides and feet for high and low tides.

Note: X Multiply height of district tide by ratio to result, add given correction for total height correction.

	Time		Feet	
	High	Low	High	Low
Alaska Peninsula:				
Fox Bay, Kupreanof Peninsula	+0:22	+0:36	X0.89	X0.89
Dent Point, Stepovak Bay	+0:21	+0:36	X0.89	X0.89
Albatross Anchorage,				
Balboa Bay	+0:32	+0:43	X0.91	X0.91
Beaver Bay	+0:37	+0:42	X0.87	X0.87
Seal Cape, Coal Bay	+0:34	+0:45	X0.84	X0.84
Ukolnoi Island	+0:41	+0:40	X0.83	X0.83
Dolgoi Harbor, Dolgoi Island	+0:44	+0:40	X0.79	X0.79
Settlement Point, Pavlof Bay	+0:43	+0:48	X0.84	X0.84
Canoe Bay, Pavlof Bay	+1:36	+1:30	X0.76	X0.76
King Cove	+0:40	+0:42	X0.80	X0.80
Lenard Harbor, Cold Bay	+0:46	+0:57	X0.85	X0.85
Cold Bay	+0:49	+1:03	X0.84	X0.84
Morzhovoi Bay	+0:50	+0:43	X0.80	X0.80

-Continued-

	Time		Feet	
	High	Low	High	Low
Shumagin Islands				
Korovin Island (east side)	+0:26	+0:52	X0.92	X0.92
Sanborn Harbor, Nagai Island	+0:37	+0:37	X0.86	X0.86
Mist Harbor, Nagai Island	+0:35	+0:38	X0.83	X0.83
Pirate Cove, Popof Island	+0:42	+0:43	X0.88	X0.88
Sand Point, Popof Island	+0:30	+0:42	X0.87	X0.87
Zachary Bay, Unga Island	+0:34	+0:49	X0.88	X0.88
Sanak Islands				
Peterson Bay	+0:29	+0:32	X0.73	X0.73
Sanak Harbor	+0:48	+0:43	X0.78	X0.78
Unimak Island				
Dora Harbor	+0:49	+0:55	X0.77	X0.77
Ikatan Bay	+0:43	+0:45	X0.78	X0.78

APPENDIX D: ALASKA PENINSULA HERRING SAC ROE FORECAST, 1993

This forecast is for North and South Peninsula areas with guideline harvest levels, excluding those areas open for exploration such as the General Section of the Sand Point District, Seal Cape-Wosnesenski Section, the General Section of the King Cove District, Amak District, and the Western Section of the Port Moller District. This forecast does not include the Aleutian Islands Management Area, which has no history of herring sac roe harvests.

The 1992 North Peninsula forecasted catch is 3,500 tons. The forecast is based on the 1992 catch of 3,969 tons and the observed biomass of 24,843 tons (16% exploitation rate). The forecast has been reduced by 275 tons to account for North Peninsula herring that are probably harvested during the Dutch Harbor herring food and bait fishery. Non-Togiak herring stocks comprise about 22% of the Dutch Harbor herring catch; due to the July 16 opening date of the food and bait fishery, North Peninsula herring stocks should comprise the majority of the non-Togiak herring component. Using a non-Togiak component mid point estimate of 11%, the North Peninsula guideline harvest level should be reduced during the sac roe fishery to insure that North Peninsula herring stocks are not harvested beyond a 20% exploitation rate. Age class data from the 1992 harvest indicates that in 1993 age 5 and 6 herring should dominate North Peninsula catches. The forecast also includes a 1,500 ton harvest in the Port Heiden District. The Port Heiden District was commercially fished for the first time in 1992; with only one year of data to use in the forecast the Port Heiden harvest may vary considerably.

The 1993 South Peninsula forecasted sac roe catch is 415 tons. The forecast is based on the 1988-92 average herring sac roe catch of 267 tons and the 1992 observed biomass of 2,377 tons. Age class data from the 1992 harvest indicates that in 1993 age 8 and age 9 herring should dominate Canoe Bay catches, no other samples were collected in South Peninsula waters.

APPENDIX E: ALEUTIAN ISLANDS "DUTCH HARBOR" HERRING FOOD AND BAIT FORECAST, 1993.

This forecast is for the "Dutch Harbor": Unimak, Akutan, and Unalaska Districts and that portion of the Umnak District located east of Samalga Pass, herring food and bait fishery.

A 1,978 ton quota was allocated for the "Dutch Harbor" herring food and bait fishery for 1993 using the Bering Sea Herring Management Plan allocation formula, as follows, given the maximum 20% exploitation rate of the projected biomass:

1992 Togiak Spawning Biomass	148,786 Tons
<u>@ 20% Maximum Exploitation</u>	
Total Allowable Catch	29,757 Tons
<u>Togiak Spawn on Kelp Allocation</u>	1,500 Tons
Remainder of Allowable Catch	28,257 Tons
<u>Dutch Harbor Allocation</u>	7%
Dutch Harbor Quota	1,978 Tons
Togiak District Sac Roe Harvest	26,279 Tons

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