

**Alaska Peninsula-Aleutian Islands Management Area
Herring Sac Roe and Food and Bait Fisheries Annual
Management Report, 2010**

by

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March 2011

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H _A
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	<i>e</i>
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, χ^2 , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient (multiple)	R
milliliter	mL	west	W	correlation coefficient (simple)	r
millimeter	mm	copyright	©	covariance	cov
		corporate suffixes:		degree (angular)	°
Weights and measures (English)		Company	Co.	degrees of freedom	df
cubic feet per second	ft³/s	Corporation	Corp.	expected value	<i>E</i>
foot	ft	Incorporated	Inc.	greater than	>
gallon	gal	Limited	Ltd.	greater than or equal to	≥
inch	in	District of Columbia	D.C.	harvest per unit effort	HPUE
mile	mi	et alii (and others)	et al.	less than	<
nautical mile	nmi	et cetera (and so forth)	etc.	less than or equal to	≤
ounce	oz	exempli gratia		logarithm (natural)	ln
pound	lb	(for example)	e.g.	logarithm (base 10)	log
quart	qt	Federal Information Code	FIC	logarithm (specify base)	log₂, etc.
yard	yd	id est (that is)	i.e.	minute (angular)	'
		latitude or longitude	lat. or long.	not significant	NS
Time and temperature		monetary symbols		null hypothesis	H _O
day	d	(U.S.)	\$, ¢	percent	%
degrees Celsius	°C	months (tables and figures): first three letters	Jan,...,Dec	probability	P
degrees Fahrenheit	°F	registered trademark	®	probability of a type I error (rejection of the null hypothesis when true)	α
degrees kelvin	K	trademark	™	probability of a type II error (acceptance of the null hypothesis when false)	β
hour	h	United States (adjective)	U.S.	second (angular)	"
minute	min	United States of America (noun)	USA	standard deviation	SD
second	s	U.S.C.	United States Code	standard error	SE
Physics and chemistry		U.S. state	use two-letter abbreviations (e.g., AK, WA)	variance	
all atomic symbols				population sample	Var var
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

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**ALASKA PENINSULA-ALEUTIAN ISLANDS MANAGEMENT AREA
HERRING SAC ROE AND FOOD AND BAIT FISHERIES
ANNUAL MANAGEMENT REPORT, 2010**

by

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES	ii
ABSTRACT	1
INTRODUCTION.....	1
NORTH ALASKA PENINSULA SAC ROE FISHERY	1
Historical Perspective	1
Harvest Strategy	2
Catch Sampling	2
2010 Season Summary	3
SOUTH ALASKA PENINSULA SAC ROE FISHERY	3
Historical Perspective	3
Harvest Strategy	3
2010 Season Summary	4
ALEUTIAN ISLANDS SAC ROE FISHERY	4
Historical Perspective	4
Harvest Strategy	4
2010 Season Summary	4
ALASKA PENINSULA HERRING FOOD AND BAIT FISHERIES	4
Historical Perspective	4
ALEUTIAN ISLANDS “DUTCH HARBOR” HERRING FOOD AND BAIT FISHERIES.....	4
Regulatory History	4
Historical Effort.....	5
Harvest Strategy	6
Catch Sampling	6
2010 Season Summary	6
ALEUTIAN ISLANDS “ADAK” HERRING FOOD AND BAIT FISHERIES	8
Historical Perspective	8
2010 Season Summary	8
REFERENCES CITED	9

LIST OF TABLES

Table	Page
1. Herring biomass estimates in tons for the North Alaska Peninsula, by area, 1984–2010.	12
2. Alaska Peninsula herring sac roe fishery harvest, number of landings, and permits fished by year, 1979–2010.	13
3. Alaska Peninsula Area commercial herring sac roe fishery harvest by time period, 1979–2010.	14
4. North Alaska Peninsula commercial herring sac roe fishery harvest in tons, by section, 1982–2010.	15
5. Age, sex, weight and length of herring harvested by purse seine gear in North Alaska Peninsula, 2010	16
6. South Alaska Peninsula commercial herring sac roe fishery harvest, in tons by geographic area, 1979–2010.	17
7. Aleutian Islands Area Dutch Harbor herring food and bait fisheries historical summary for the purse seine fishery, 1929–2010.	18
8. Aleutian Islands Area Dutch Harbor herring food and bait gillnet historical summary, 2001–2010.	20
9. Aleutian Islands Area herring food and bait fisheries allocations (tons), commercial harvest (tons), and effort by gear type, 1991–2010.	21
10. Aleutian Islands Area, Dutch Harbor commercial herring food and bait fishery (all gear combined) summary, 1981–2010.	22
11. Age, sex, weight and length of herring harvested by purse seine gear in Akutan District, 2010.	24
12. Estimated age composition of Aleutian Islands commercial herring food and bait purse seine harvests, 1991–2010.	25

LIST OF FIGURES

Figure	Page
1. Map of Bering Sea Management Plan (5 AAC 27.060) commercial herring districts.	26
2. Map of Port Heiden and Port Moller Districts, with commercial herring fishing statistical areas shown.	27
3. Map of Port Moller District, with commercial herring fishing statistical areas shown.	28
4. Map of Amak, Unimak, King Cove, and Pavlof Districts, with commercial herring fishing statistical areas shown.	29
5. Map of Pavlof and Sand Point districts, with commercial herring fishing statistical areas shown.	30
6. Map of Aleutian Islands from Samalga Pass to Unimak Island, with herring fishing districts shown.	31
7. Map of Aleutian Islands from Unimak Island to Umnak Island, with commercial herring fishing statistical areas shown.	32
8. Map of Adak Island area, with boundaries of exploratory herring fishery defined.	33
9. Map of Akutan and Unalaska islands, with the 2010 commercial herring fishery open areas shown.	34
10. Estimated average length-at-age (mm), average weight-at-age (g), and age composition of herring harvested in North Alaska Peninsula, 2010 (N = 60).	35
11. Estimated average length-at-age (mm), average weight-at-age (g), and age composition of herring harvested in Akutan District, 2010 (N = 371).	36
12. Estimated 2010 percent age composition of Aleutian Islands commercial herring food and bait fishery, with five- and ten-year averages.	37

LIST OF APPENDICES

Appendix	Page
A1. Alaska Peninsula herring sac roe fishery harvest projection, 2010.	40
B1. Arctic-Yukon-Kuskokwim herring outlook and management strategy for 2010.	42
C1. Forecasted harvest allocation for Togiak sac roe and Dutch Harbor herring food and bait fisheries, 2010.	46
D1. Emergency order summary, 2010.	52

ABSTRACT

This report presents information concerning commercial Pacific herring *Clupea pallasii* sac roe and food and bait fisheries that occurred in Alaska Peninsula-Aleutian Islands Management Area (Area M) in 2010. Area M is split into three sub-areas: North Alaska Peninsula, South Alaska Peninsula, and Aleutian Islands.

In 2010, a commercial herring sac roe fishery occurred in the North Peninsula. The total herring biomass estimated from aerial surveys in the North Peninsula was 32,445 tons. The North Peninsula herring sac roe fishery was open from May 24 through May 26, with a confidential amount of herring harvested. There were no deliveries in the South Alaska Peninsula and Aleutian Islands commercial herring sac roe fisheries due to lack of industry interest. There were no aerial surveys conducted on the South Peninsula or in the Aleutian Islands Management Area in 2010.

In 2010, commercial herring food and bait fishery harvests occurred in the Aleutian Islands during both gillnet and seine gear fishing periods. Aleutian Islands “Dutch Harbor” herring food and bait allocation was set at 1,950 tons, of which 1,677 tons were allocated to the seine fleet, 273 tons to the gillnet fleet, and 100 tons to the pound fishery. A total of 1,941 tons of herring were harvested in the seine fishery and there was no herring harvest in either gillnet or pound fisheries during the 2010 season.

Key words: Area M, Alaska Peninsula, Aleutian Islands, *Clupea pallasii*, Adak, herring, harvest, age, length, weight, sac roe, food, bait, combine, Dutch Harbor, Atka-Amlia, AMR.

INTRODUCTION

This report is a summary of commercial Pacific herring *Clupea pallasii* sac roe and food and bait fisheries that occurred in the Alaska Peninsula-Aleutian Islands Management Area (Area M) for the 2010 season. This report is intended as a reference document and provides a regulatory history, historical harvest data by fishery, harvest strategies, a summary of 2010 fishery management activities, as well as age, weight, and length (AWL) data collected from commercial harvests. Harvest information was taken from the Alaska Department of Fish and Game (ADF&G) fish ticket database in November 2010. Data provided in this report supersedes any data previously published by the department.

Area M herring fisheries are divided into three sub-areas: North Alaska Peninsula, South Alaska Peninsula, and Aleutian Islands (Figure 1). North Alaska Peninsula Area consists of Bering Sea waters extending west from Cape Menshikof to Cape Sarichef, encompassing Port Heiden, Port Moller and Amak districts (Figures 1–4). The South Alaska Peninsula Area consists of Pacific Ocean waters extending west of Kupreanof Point to a point on the south side of Unimak Island near Cape Lazaref (163°30' W long) and includes King Cove, Pavlof, and Sand Point districts (Figures 4 and 5). Finally, the Aleutian Islands Area consists of the Bering Sea waters extending west of Cape Sarichef and Pacific Ocean waters west of a point near Cape Lazaref (163°30' W long) to the International Date Line and includes the Unimak, Akutan, Unalaska, Umnak, and Adak districts (Figures 1 and 4; Figures 6–9; 5 AAC 27.605 and 27.600).

NORTH ALASKA PENINSULA SAC ROE FISHERY

HISTORICAL PERSPECTIVE

The ADF&G has been conducting herring biomass surveys in Alaska Peninsula-Aleutian Islands waters since 1976. In that time, major concentrations of herring have been documented on the Bering Sea coast from Adak to the Port Heiden District (Figures 1–3; Shaul et al. 1987; Warner and Shafford 1979; McCullough and Stopha 1993). However, these surveys have provided

limited and variable information on herring abundance and distribution primarily because of limited aerial survey coverage due to the large area involved, inclement weather conditions, water turbidity, lack of available staff, and suitable aircraft (Table 1).

Prior to 1982, fishing vessels returning from the Togiak herring sac roe fishery frequently surveyed for herring in North Alaska Peninsula waters but no harvest occurred (Shaul et al. 1982). Beginning in 1986, fishermen started targeting the earlier (May) herring biomass, effectively harvesting early run stocks. In 1989 through 1992, ADF&G delayed the opening of the fishery in Port Moller District until May 30 in an attempt to shift fishing pressure to the later and more abundant herring stocks (Witteveen et al. 1998). In some years, the Port Moller District was open to herring fishing prior to May 30, due to sufficient herring biomass (Tables 1–4). There was not a herring fishery in the North Peninsula area from 1999 through 2004 due to either low biomass estimates or the lack of industry interest in purchasing herring. In 2005, ADF&G opened the first sac roe fishery in North Alaska Peninsula waters since 1998, but there was little harvest due to limited market interest.

HARVEST STRATEGY

Herring may be commercially harvested each spring for their sac roe from April 15 through July 15 in the Amak, Port Moller, and Port Heiden districts (Figures 2–4; 5 AAC 27.610). The guideline harvest level (GHL) for the Port Moller District is determined inseason and is based on observed herring biomass from aerial surveys. As established in the *Bering Sea Herring Fishery Management Plan* (5 AAC 27.060), a minimum herring biomass threshold of 1,000 tons is required prior to ADF&G opening the commercial fishery in the Port Moller District. Once ADF&G assures that a biomass threshold of 1,000 tons has been observed, ADF&G then estimates an allowable harvest rate based on a sliding scale of the estimated mature biomass (Appendix A1). At low biomass levels (1,001–1,999 tons), a conservative approach will be taken and an exploitation rate of 10 percent will be allowed. If the observed biomass is between 2,000 and 2,999 tons, allowable exploitation increases from 10 percent to 15 percent. The Alaska Department of Fish and Game shall manage the fishery so that the exploitation rate on eastern Bering Sea herring stocks does not exceed 20 percent of the biomass of those stocks when they reach an observed biomass of 3,000 tons or greater (5 AAC 27.060(b)).

CATCH SAMPLING

Commercial harvest samples are collected in the North Alaska Peninsula herring sac roe fishery. These samples provide age composition, sex, maturity status, weight-at-age, and length-at-age data (Table 5). Age is determined by examining scales (Warner and Shafford 1979) taken from the preferred area located on the left side of the herring, three scales posterior to the center of the operculum. One scale was taken from each herring and ages were recorded and entered into a database.

Standard length measurements (lower jaw to the hypural plate) and fish weight are collected and entered into the herring database. Mean lengths (mm) and weights (g) are calculated for each year class and tabulated.

2010 SEASON SUMMARY

In 2010, a commercial herring sac roe fishery occurred in the North Alaska Peninsula. A total biomass estimate of 32,445 tons of herring was observed during aerial surveys conducted from May 21 through May 22 (Table 1). The commercial herring sac roe fishery was opened from May 24 through May 26 in the Port Moller District. During that period, a confidential amount of herring was harvested by a confidential number of permit holders (Table 3). The entire North Alaska Peninsula harvest of herring occurred in the Port Moller Bay Section, and was below the 10-year average for the North Alaska Peninsula (Table 4).

A total of 60 herring were sampled from the Port Moller District commercial herring fishery (Table 5). The most abundant age classes in the Port Moller District samples were age 4 (30%) and age 5 (30%) (Table 5; Figure 10). Average herring length in the sample was 279 mm, and average weight was 244 g (Table 5). Sex composition of the sample was 42% male and 58% female.

SOUTH ALASKA PENINSULA SAC ROE FISHERY

HISTORICAL PERSPECTIVE

Harvest of herring sac roe has fluctuated in South Alaska Peninsula waters since it began in 1979 (Shaul et al. 1991; Tables 2 and 3). The majority of the fishing effort has occurred around the Shumagin Islands, and Stepovak, Balboa, Pavlof, and Canoe bays (Table 6; Figures 4 and 5). Of these, only Canoe Bay (Figure 5) produced a consistent annual harvest (Table 6). Beginning in 1992, herring fishing effort and harvests gradually diminished in South Alaska Peninsula waters (Tables 2, 3, and 6). Many bays may have small harvestable quantities of herring but the cost of having fishing vessels, tenders, and airplanes available to harvest each section's small GHL has discouraged both fishermen and processors. There has been no commercial herring sac roe fishery in South Alaska Peninsula waters since 1996 (Table 6).

From 1981 to 1995 the department used field crews on the Alaska Peninsula to observe herring sac roe fisheries (McCullough and Campbell 1996). ADF&G personnel collected herring samples for age, weight, length, and sexual maturity. In addition, ADF&G personnel documented spawning areas and mapped spawning substrate. In 1996, ADF&G discontinued utilizing herring sac roe fishery field crews on the Alaska Peninsula due to budget constraints.

HARVEST STRATEGY

Herring may be commercially harvested each spring for their sac roe from April 15 through July 15 in the Sand Point, Pavlof, and King Cove districts (Figures 4 and 5; 5 AAC 27.610). Fishing openings are contingent upon industry interest in harvesting herring from a specific area and documentation by ADF&G of sufficient herring biomass. The South Alaska Peninsula herring sac roe fishery may be opened by emergency order with individual sections assigned GHLs of no more than 25 tons, and the potential of additional harvest opportunity if warranted after department surveys (Bernard 2010).

2010 SEASON SUMMARY

No commercial herring fishery occurred in South Alaska Peninsula waters in 2010, due to a lack of industry participation. No aerial surveys were conducted in South Alaska Peninsula waters, due to budget constraints and lack of industry interest.

ALEUTIAN ISLANDS SAC ROE FISHERY

HISTORICAL PERSPECTIVE

No herring sac roe has ever been harvested in Aleutian Islands Area, due to lack of interest and limited available biomass.

HARVEST STRATEGY

Herring may be commercially harvested each spring for their sac roe from April 15 through June 24 in the Unimak, Akutan, Unalaska, Umnak and Adak districts (Figures 1 and 6–8). The GHL for each individual section is determined in season based on observed herring biomass.

2010 SEASON SUMMARY

In 2010, there was no sac roe herring commercially harvested in Aleutian Islands Area. No aerial surveys were conducted in Aleutian Island waters due to lack of industry interest.

ALASKA PENINSULA HERRING FOOD AND BAIT FISHERIES

HISTORICAL PERSPECTIVE

There has never been a herring food and bait fishery in North Alaska Peninsula waters. In 1983, the Alaska Board of Fisheries (BOF) closed the South Alaska Peninsula herring sac roe fishery and changed the fishery to a winter herring food and bait fishery (Burkey and Duesterloh 2003). However, due to a lack of herring biomass in Stepovak Bay, the fishery failed to develop. From 1984 to 1991, the BOF allocated harvest 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 herring sac roe fishery (Burkey and Duesterloh 2003). Since 1996, there has not been a herring food and bait fishery in the South Alaska Peninsula, primarily due to lack of industry interest.

ALEUTIAN ISLANDS “DUTCH HARBOR” HERRING FOOD AND BAIT FISHERIES

REGULATORY HISTORY

The first documented herring fisheries in the Eastern Aleutian Islands occurred from 1929 through 1938 and again in 1945. From 1939 through 1944 and again from 1946 through 1980 no herring fisheries took place. Since 1981 the Eastern Aleutian Islands herring fishery, now known in regulations as the “*Dutch Harbor Food and Bait Herring Fishery*”, has occurred annually.

During the 1981 and 1982 seasons, there were no harvest restrictions (Schwarz 1988). From 1983 to 1985, the BOF implemented a harvest ceiling of 3,527 tons. In 1986, ADF&G was directed by the BOF to reduce the established harvest ceiling of 3,527 tons to 2,453 tons over concern for depressed western Alaska herring stocks. In 1988, the BOF implemented the *Bering Sea Herring Fishery Management Plan* (5 AAC 27.060(c) and (d)) that established the criteria for calculating the Dutch Harbor food and bait herring allocation. The plan directs ADF&G to manage the fishery so that the overall exploitation of a herring stock should not exceed 20% of the spawning biomass. The dominate stock harvested in the Dutch Harbor food and bait fishery is from the Togiak spawning stock (Rowell et al. 1991). An allocation plan between the Togiak sac roe and spawn on kelp fisheries, and the Dutch Harbor food and bait fishery, was established to prevent harvest from exceeding 20% of observed spawning biomass. The Dutch Harbor food and bait fishery was allocated 7% of Togiak District's harvestable biomass after deducting 1,500 tons for the Togiak District spawn-on-kelp fishery (5 AAC 27.865 (b)(7)).

In 1990, the BOF changed the opening date of the food and bait fishery from July 16 to August 15 to reduce the chance of catching non-Togiak and North Alaska Peninsula herring stocks (Shaul et al. 1991). In 1998, the BOF changed the opening date and time of the purse seine fishery to noon on July 15 because of safety concerns with the fishery being conducted in the dark (5 AAC 27.610(e)(2)(B); Witteveen et al. 1999). The gillnet fishery may open as early as noon on June 24.

In 2004, the BOF established a herring seine and pound fishery in Alaska Peninsula-Aleutian Islands Management Area with an allocation of 100 tons (5 AAC 27.655(c)). In a pound fishery, seine-caught herring are transferred to a holding pound and retained for several days for gut clearance. The rationale for this was to minimize belly burn and achieve a high quality product suitable for food markets. However, no significant amounts of herring were placed into the pound fishery.

During the 2010 BOF meeting, the BOF amended 5 AAC 25.655 (b) so that if the gillnet fishery has not harvested its allocation by July 25, the remaining allocation may be taken by either gear group. Additionally, if the seine group exceeds its allocation before July 25, then that amount shall be deducted from any remaining gillnet quota for that year after July 25. However, if the seine group exceeds the total allocation after July 25, then the seine group overage shall be deducted from the next year's seine allocation as stated in 5 AAC 27.655 (b).

HISTORICAL EFFORT

From 1929 to 1938 and in 1945, herring food and bait fisheries occurred in the vicinity of Unalaska Bay (Table 7; Figures 6 and 7). During that time, a mixture of gillnet, seine gear, and holding pounds were used and there were numerous, small, shore-based hand packing operations. A large portion of the catch was brined for either food or bait purposes. In those early years, seine gear provided the bulk of the herring harvest (Schwarz 1988). From 1946 to 1980, there was no commercial herring harvest.

When the fishery resumed in 1981, herring were harvested from Tigalda Island to Umnak Island (Figure 7). However, the majority of harvest occurred within several miles of shore-based processing facilities in Unalaska and Akutan bays. From 1981 through 1986, 1990 through 1996, and 1998 through 2000, only purse seine gear was used to harvest herring in the Dutch Harbor food and bait fishery (Table 7). However, in 1987, 1989, and 1997, gillnet permit holders

recorded landings. In 2001, the board adopted a regulation that allocated 7% of the total Dutch Harbor GHL to the gillnet fleet. From 2001 to 2003, the number of gillnet fishermen increased from 6 to 13 vessels (Tables 8 and 9). In 2004, the gillnet harvest allocation was further increased to 14%. However, since 2004, the Dutch Harbor food and bait herring gillnet harvest has been minor.

HARVEST STRATEGY

In recent years, three management plans, (1) the *Bering Sea Herring Fishery Management Plan* (5AAC 27.060); (2) the *Bristol Bay Herring Management Plan* (5 AAC 27.865 (b)(7)); and (3) the *Dutch Harbor Food and Bait Herring Allocation Plan* (5 AAC 27.655), have been used to manage the Aleutian Islands “Dutch Harbor” food and bait herring fishery. Fishing time is established by emergency order and is based on a 7% allocation of remaining available Togiak biomass harvest (5 AAC 27.865 (b)(7)), the inseason evaluation of the observed biomass, effort levels, and harvest.

In order for the Unimak, Akutan, Unalaska, or Umnak districts (Figures 1 and 7) to open to herring food and bait fishing, each Western Alaska herring stock must surpass its respective BOF mandated spawning biomass threshold 5 AAC 27.060 (d); (Appendix B1). These fisheries include Port Moller, Togiak, Security Cove, Goodnews Bay, Cape Avinof, Nelson Island, Nunivak Island, Cape Romonzof, and Norton Sound districts (Figure 1). The department updates biomass estimates for each stock as herring move into coastal waters during spawning migrations.

The Dutch Harbor herring food and bait allocation is divided between gear groups according to the *Dutch Harbor Food and Bait Herring Allocation Plan*, which allocates 86% to the seine fishery and 14% to the gillnet fishery. These allocations are considered independent of each other so that one gear group may not harvest herring allocated to the other gear group until July 25. After July 25, if the gillnet fishery has not harvested its allocation, the remaining allocation may be taken by either groups. Additionally, if the seine group exceeds its allocation before July 25, then that overage shall be deducted from any remaining quota for that year after July 25. However, if the seine group exceeds the total allocation after July 25, then the seine group overage shall be deducted from the next year’s seine allocation as stated in 5 AAC 27.655 (b). Furthermore, 100 tons may be reserved from the purse seine allocation for a herring pound fishery.

CATCH SAMPLING

Commercial harvest samples were collected in the Aleutian Islands “Dutch Harbor” food and bait fishery. These samples provided age composition, sex, maturity status, weight-at-age, and length-at-age data from the commercial harvest. One scale is taken from each herring and the ages are recorded and entered into a database. Standard length and weight measurements of each fish are collected and are used to calculate mean lengths (mm) and weights (g) for each year class entered into the herring database.

2010 SEASON SUMMARY

The Dutch Harbor food and bait fishery was allocated 1,950 tons of herring for the 2010 season (Table 10; Appendix C1). The purse seine fishery was allocated 1,677 tons, of which 100 tons

were allocated to the pound fishery. The 2010 set gillnet fishery was allocated 273 tons of herring (Table 9). ADF&G did not conduct aerial surveys in 2010 to assess herring biomass in the Dutch Harbor area because of budget constraints and poor weather conditions.

Gillnet Fishery

In 2010, the Dutch Harbor food and bait herring commercial gillnet fishery occurred from July 15 through July 29 (Table 10). A confidential number of permit holders and processors registered in this fishery. From 12:00 PM July 15 through 11:59 PM July 29, the commercial herring gillnet fishery was open continually in Unalaska Bay Section and Akutan Districts resulting in a total of 8 gillnet fishing periods (Appendix D1). In 2010, no herring were harvested in the gillnet fishery since there was no participation by the gillnet fleet (Table 8).

Purse Seine Fishery

In 2010, Dutch Harbor food and bait seine fishery occurred from July 15 through July 29 within Unalaska and Akutan districts (Figure 6, 7, and 9). The fishery was allocated 1,677 tons of herring for the 2010 season and were eligible to harvest any remaining gillnet allocation after July 25 (Table 9). Thirteen vessels and two processors registered to participate in this fishery. One seine permit holder represented a combine of 12 permit holders, while the other seine permit holder represented an independent market. The fishery was open simultaneously in Akutan District west of the longitude of Billings Head 165°28.67' W, Unalaska Bay Section and that portion of Kalekta Bay south of a line running from Erskine Point to Cape Kalekta (Figure 9). Over the course of the seine fishery, 18 deliveries were made for a total harvest of 1,941 tons of herring, of which the majority of herring was captured in Akutan District (Tables 7 and 9).

Exvessel prices ranged from \$100 to \$500 per ton, which has stayed consistent with the exvessel price range over that past ten years. Total exvessel value of the 2010 purse seine fishery was an estimated \$724,000 (Table 7).

2010 Catch Sampling

A total of 371 herring were sampled from the purse seine fishery (Table 11). The most abundant age classes were ages 7 (27.8%) and 6 (25.9%) (Table 11; Figure 11). They were followed by age 8 represented at 16.2% (Table 11; Figure 11). Average herring length in the sample was 326.3 mm, and average weight was 450 g (Table 11). The sex composition of the sample was 35% male and 65% female. The most abundant age class in the Dutch Harbor commercial herring food and bait fishery over the past 10 years has been age 8 (19.9%) (Table 12; Figure 12).

Pound Fishery

In 2010, there was no participation among the confidential number of fishermen who registered for the pound fishery.

ALEUTIAN ISLANDS “ADAK” HERRING FOOD AND BAIT FISHERIES

HISTORICAL PERSPECTIVE

In 2004 the BOF enacted the *Alaska Peninsula-Aleutian Islands Herring Management Plan* (5 AAC 27.657). This plan established an exploratory herring gillnet fishery in the Adak Island area (Figure 8) with a 500 ton allocation independent of the Dutch Harbor food and bait allocation. During the 2010 BOF meeting, the *Alaska Peninsula-Aleutian Islands Herring Management Plan* (5 AAC 27.657) was amended and established that both purse seine and gillnet gear may be used in the harvesting of the 500 ton herring allocation in the Adak Island area. Herring can be harvested as food and bait and the fishery occurs annually from June 24 until February 28. This fishery is managed in compliance with the terms of a commissioner's permit.

2010 SEASON SUMMARY

Due to lack of industry interest, there was no herring fishery in the Adak area in 2010. No effort has occurred in this fishery since it was established in 2004.

REFERENCES CITED

- Bernard, A. C. 2010. Alaska Peninsula–Aleutian Islands Management Area herring sac roe fishery management plan, 2010. Alaska Department of Fish and Game, Fishery Management Report No. 10-12, Anchorage.
- Burkey, C. and S. Duesterloh. 2003. Alaska Peninsula-Aleutian Islands Management Area herring sac roe and food and bait fisheries annual management report, 2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K03-63, Kodiak.
- McCullough, J. N. and R. D. Campbell. 1996. Alaska Peninsula - Aleutian Islands Management Areas sac roe herring report and the Aleutian Islands Management Area food and bait herring report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K96-12, Kodiak.
- McCullough, J. N. and M. E. Stopha. 1993. Alaska Peninsula and Aleutian Islands Management herring sac roe report and the Aleutian Islands Management Area herring food and bait report, 1992. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K93-3, Kodiak.
- Rowell, K. A., H. J. Geiger, and B. G. Bue. 1991. Stock Identification of Pacific herring in the eastern Bering Sea trawl bycatch and the Dutch Harbor directed food and bait fishery. Proceedings of the International Herring Symposium. Alaska Sea Grant Report, AK-SG-91-01, Fairbanks.
- Schwarz, L. 1988. Peninsula/Aleutians herring sac-roes fishery report to the Board of Fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K88-3, Kodiak.
- Shaul, A. R., T. R. Gilmer, J. N. McCullough, and L. M. Malloy. 1982. 1982 fin fisheries annual report Alaska Peninsula- Aleutian Islands Areas. Alaska Department of Fish and Game, Division of Commercial Fisheries, Area Management Report. Kodiak.
- Shaul, A. R., L. J. Schwarz, J. N. McCullough, L. M. Malloy, and S. J. Theis. 1987. 1986 Alaska Peninsula and Aleutian Islands Area annual finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Finfish Management Report 3-87.
- Shaul, A. R., J. N. McCullough, A. J. Quimby, R. S. Berceci, and M. E. Stopha. 1991. 1990 Alaska Peninsula–Aleutian Islands Areas salmon and herring annual management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K91-12, Kodiak.
- Warner, I. M. and P. Shafford. 1979. Forage fish spawning surveys-southern Bering Sea. Alaska Marine Environmental Assessment Project. Completion Report (revised November 1979), Alaska Department of Fish and Game, Kodiak.
- Witteveen, M. J., R. D. Campbell, R. L. Murphy. 1998. Alaska Peninsula and Aleutian Islands Management Areas sac roe report and the Aleutian Islands Management Area food and bait herring report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K98-14, Kodiak.
- Witteveen, M. J., R. D. Campbell, R. L. Murphy. 1999. Alaska Peninsula and Aleutian Islands Management Areas sac roe report and the Aleutian Islands Management Area food and bait herring report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K99-23, Kodiak.

TABLES AND FIGURES

Table 1.–Herring biomass estimates in tons for the North Alaska Peninsula, by area, 1984–2010.

Date	Port Moller District			Port Heiden District		Total Biomass Estimate	Aerial Survey Dates	
	Herendeen	Port Moller	Additional	Bear River to	Port Heiden Bay		Begin	End
	Bay	Bay	Biomass Harvested	Strogonof Point	Section			
1984 ^a	2,000	1,500-1,900	0	0	0	3,500-3,900	May 9 -	July 31
1985	260	1,305	0	5,240	0	6,805	May 1 -	June 13
1986	1	28	0	0	0	29	May 16 -	June 7
1987	0	5,125	0	0	0	5,125	May 6 -	June 3
1988	1,737	442	0	8	0	2,187	May 17 -	June 15
1989	1,163	1,471	0	0	0	2,634	May 19 -	June 16
1990	155	387	0	0	0	542	May 21 -	June 14
1991	2,278 (250) ^b	4,651	0	1,471	0	8,400	May 17 -	June 26
1992	755	8,269	0	5,798	10,021	24,843	May 19 -	June 18
1993	775	2,878	0	33	0	3,686	May 4 -	June 9
1994	381	274	74	0	0	729	May 22 -	May 28
1995	60	477	200	0	0	737	May 13 -	June 2
1996	390 (390) ^b	986 (755) ^b	0	309	65	1,750	May 9 -	June 18
1997	160	45	0	0	0	205	May 22 -	June 12
1998	930	135	0	360 (200) ^b	0	1,425	May 11 -	June 3
1999	10	220	0	0	0	230	May 16 -	June 14
2000	115	350	0	0	0	465	May 15 -	May 28
2001	335	1,980	0	0	0	2,315	May 14 -	May 22
2002	85	255	0	0	0	340	May 15 -	May 28
2003	400	100	0	500	0	800	May 17 -	May 29
2004	0	0	0	0	0	0	June 2 -	June 10
2005	1,500 ^c	3,300	351	50	0	3,300	May 8-May	24
2006	4,500	1,150	0	585	0	6,235	May 26-May	28
2007	290	1,515	0	0	0	1,805	May 19-May	20
2008	75	975	0	0	0	1,050	May 25-May	26
2009	1,692	36,610	0	365	0	38,667	May 16- June	2
2010	720	1,725	0	30,000	0	32,445	May 21-May	22
2000-2009								
Average	899	4,624	35	150	0	5,498		

^a Surveys were conducted from 1976–1983; however biomass estimates were not calculated

^b Biomass estimates (tons) conducted by commercial spotter pilots are enclosed in parenthesis (); these estimates are included in the total biomass estimates. They may not be comparable to the department estimates.

^c Biomass estimates (tons) conducted by both commercial spotter pilots and department biologists.

Table 2.—Alaska Peninsula herring sac roe fishery harvest, number of landings, and permits fished by year, 1979–2010.

Year	North Peninsula			South Peninsula			Total		
	Tons	Landings	Permits	Tons	Landings	Permits	Tons	Landings	Permits
1979	– a	– a	– a	10	– b	– b	– b	– b	– b
1980	– a	– a	– a	454	15	6	454	15	6
1981	– a	– a	– a	798	93	56	797	93	56
1982	– b	– b	– b	176	13	4	– b	– b	– b
1983	627	47	23	0	0	0	627	47	23
1984	431	20	11	210	20	5	642	40	15
1985	710	31	17	288	8	5	998	39	20
1986	894	116	50	282	14	6	1,176	130	51
1987	514	46	27	319	8	– b	833	54	27
1988	294	21	9	377	22	10	671	43	19
1989	729	24	10	310	31	13	1,039	55	19
1990	273	23	5	312	31	6	585	54	9
1991	1,313	59	11	157	26	10	1,470	85	18
1992	3,969	100	24	180	11	7	4,149	112	29
1993	536	44	16	– b	– b	– b	– b	– b	– b
1994	90	7	5	– b	– b	– b	– b	– b	– b
1995	337	37	12	– b	– b	– b	– b	– b	– b
1996	– b	– b	– b	117	8	4	– b	– b	– b
1997	– a	– a	– a	– a	– a	– a	– a	– a	– a
1998	– b	– b	– b	– a	– a	– a	– b	– b	– b
1999	– a	– a	– a	– a	– a	– a	– a	– a	– a
2000	– a	– a	– a	– a	– a	– a	– a	– a	– a
2001	– a	– a	– a	– a	– a	– a	– a	– a	– a
2002	– a	– a	– a	– a	– a	– a	– a	– a	– a
2003	– a	– a	– a	– a	– a	– a	– a	– a	– a
2004	– a	– a	– a	– a	– a	– a	– a	– a	– a
2005	351	12	4	– a	– a	– a	351	12	4
2006	– a	– a	– a	– a	– a	– a	– a	– a	– a
2007	– a	– a	– a	– a	– a	– a	– a	– a	– a
2008	– a	– a	– a	– a	– a	– a	– a	– a	– a
2009	3,027	46	4	– a	– a	– a	3,027	46	4
2010	– b	– b	– b	– a	– a	– a	– b	– b	– b
2000-2009									
Average	338	6	1	0	0	0	338	6	1

^a No fishery.^b Harvest numbers cannot be released due to state confidentiality requirements.

Table 3.—Alaska Peninsula Area commercial herring sac roe fishery harvest by time period, 1979-2010.

Year	North Peninsula		South Peninsula		Total
	Harvest (Tons)	Harvest Time Period	Harvest (Tons)	Harvest Time Period	
1979	- a	- a	- b	July 4-July 4	- b
1980	- a	- a	454	May 18-July 14	454
1981	- a	- a	798	May 9-June 23	798
1982	- b	May 31-June 12	176	May 31-June 14	- b
1983	627	May 9-May 29	- c		627
1984	431	May 24-June 8	210	May 13-June 1	642
1985	710	May 24-June 4	288	June 1-June 11	998
1986	894	May 18-May 30	282	June 7-June 14	1,176
1987	514	May 9-June 5	319	June 8-June 19	833
1988	294	May 17-June 15	377	May 31-June 20	671
1989	729	May 28-June 23	310	May 13-June 19	1,039
1990	273	June 4-June 19	312	May 14-June 14	585
1991	1,313	May 17-July 4	157	May 16-June 11	1,470
1992	3,969	May 23-June 17	180	June 4-June 7	4,149
1993	536	May 8-June 9	- b	May 27-June 9	- b
1994	90	May 21-June 7	- b	June 2-June 3	- b
1995	337	May 29-June 20	- b	June 6-June 17	- b
1996	- b	June 12-June 18	117	May 10-June 27	- b
1997	- a	- a	- a	- a	-
1998	- b	May 21-June 3	- a	- a	- b
1999	- a	- a	- a	- a	-
2000	- a	- a	- a	- a	-
2001	- a	- a	- a	- a	-
2002	- a	- a	- a	- a	-
2003	- a	- a	- a	- a	-
2004	- a	- a	- a	- a	-
2005	351	May 11-May 12	- a	- a	351
2006	- a	- a	- a	- a	-
2007	- a	- a	- a	- a	-
2008	- a	- a	- a	- a	0
2009	3,027	May 27- June 2	- a	- a	3,027
2010	- b	May 24-May 26	- a	- a	- b
2000-2009 Average	338		0		338

^a No fishery.

^b This information cannot be released due to confidentiality requirements.

^c Fishery closed.

Table 4.–North Alaska Peninsula commercial herring sac roe fishery harvest in tons, by section, 1982–2010.

Year	Port Moller District				Port Heiden District	Total
	Deer Island Mud Bay Section	Herendeen Bay Section	Port Moller Bay Section	Bear River Bering Sea Coast	Port Heiden Bay Section	
1982	0	– a	– a	– a	0	– a
1983	0	509	37	81	0	627
1984	0	181	250	0	0	431
1985	0	173	256	281	0	710
1986	0	156	255	484	0	894
1987	0	157 ^b	350	7	0	514
1988	0	8	286	0	0	294
1989	0	67	247	416	0	729
1990	0	156	117	0	0	273
1991	156	167	690	300	0	1,313
1992	18	0	2,351	0	1,600	3,969
1993	0	107	371	58	0	536
1994	7	0	83	0	0	90
1995	3	146	188	0	0	337
1996	0	– a	– a	0	0	– a
1997 ^c						
1998	0	0	– a	– a	0	– a
1999 ^c						
2000 ^c						
2001 ^c						
2002 ^c						
2003 ^c						
2004 ^c						
2005	0	0	351	0	0	351
2006 ^c						
2007 ^c						
2008 ^c						
2009	0	0	2,297	730	0	3,027
2010	0	0	– a	0	0	– a
2000-2009 Average	0	0	265	73	0	338

^a This information cannot be released due to confidentiality requirements.

^b At least 11 tons were caught in the Deer Island-Mud Bay Section.

^c No fishery.

Table 5.—Age, sex, weight and length of herring harvested by purse seine gear in North Alaska Peninsula, 2010

Age (Years)	Sex				Percent of Total	Weight			Standard Length		
	Male	Female	Unknown	Total		Mean (g)	Standard Dev.	Number Weighed	Mean (mm)	Standard Dev.	Number Measured
3	3	4	0	7	11.7	198	19	7	266	8	7
4	6	12	0	18	30.0	214	34	18	268	14	18
5	8	10	0	18	30.0	219	39	18	274	14	18
6	5	7	0	12	20.0	299	77	12	295	25	12
7	0	2	0	2	3.3	305	28	2	295	7	2
Regen. ^a	3	0	0	3	5.0	232	62	3	277	8	3
Total	25	35	0	60	100.0	-	-	60	-	-	60
Average	-	-	-	-	-	244	43	-	279	13	-

^a Age could not be determined due to regenerated scale.

Table 6.—South Alaska Peninsula commercial herring sac roe fishery harvest, in tons by geographic area, 1979–2010.

Year	Stepovak Bay ^a	Balboa Bay	Pavlof Bay	Canoe Bay	Volcano- Dolgoi	Belkofski Bay	Lenard Harbor	Dolgoi Harbor	Shumagin Islands	Total
1979	0	0	0	0	0	10	0	0	0	10
1980	196	132	114	12	0	0	0	0	0	454
1981	129	36	263	168	65	16	122	0	0	798
1982	0	5	0	171	0	0	0	0	0	176
1983 ^b	0	0	0	0	0	0	0	0	0	0
1984	29	25	0	156	0	0	0	0	0	210
1985	11	0	38	239	0	0	0	0	0	288
1986	0	0	61	141	13	8	59	0	0	282
1987	0	0	92	118	0	38	60	12	0	319
1988	0	11	69	237	17	12	31	0	0	377
1989	39	18	53	148	0	0	9	5	39	310
1990	72	21	0	120	0	3	6	0	90	312
1991	19	19	0	78	0	0	0	0	41	157
1992	0	0	0	180	0	0	0	0	0	180
1993	5	0	0	92	0	0	0	0	0	97
1994	0	0	0	8	0	0	0	0	0	8
1995	0	10	0	53	0	0	0	0	0	63
1996	21	4	0	77	0	0	0	0	16	117
1997-2010 ^c										

^a The 1984–1988 catches came from Ramsey Bay; the 1989 and 1993 catch came from Granville Bay.

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

^c No fishery.

Table 7.—Aleutian Islands Area Dutch Harbor herring food and bait fisheries historical summary for the purse seine fishery, 1929–2010.

Year	No. Vessels		Number Landings	Tons		Price Per Ton	Exvessel Value (Thousands)	Exvessel Value Per Vessel (Thousands)
	Harvest in Tons	Making Landings		Per Boat	Per Landing			
1929	1,259	— a	— a	— a	— a	— a	— a	— a
1930	1,916	— a	— a	— a	— a	— a	— a	— a
1931	1,056	26	— a	— a	— a	— a	— a	— a
1932	2,510	30	— a	— a	— a	— a	— a	— a
1933	1,585	38	— a	— a	— a	— a	— a	— a
1934	1,533	— a	— a	— a	— a	— a	— a	— a
1935	2,412	a	— a	— a	— a	— a	— a	— a
1936	1,379	a	— a	— a	— a	— a	— a	— a
1937	579	a	— a	— a	— a	— a	— a	— a
1938	513	a	— a	— a	— a	— a	— a	— a
1939-1944	— b	— b	— b	— b	— b	— b	— b	— b
1945	75	a	— a	— a	— a	— a	— a	— a
1946-1980	— b	— b	— b	— b	— b	— b	— b	— b
1981	704	— c	16	— c	44	\$300	— c	— c
1982	3,565	7	95	509	38	\$300	\$1,020	\$146
1983	3,567	8	96	446	37	\$232	\$828	\$104
1984	3,578	9	61	398	59	\$210	\$751	\$83
1985	3,554	6	68	592	52	\$162	\$564	\$94
1986	2,394	7	54	342	44	\$254	\$600	\$86
1987	2,485	8	44	311	56	\$300	\$751	\$94
1988	1,983	8	50	248	40	\$252	\$505	\$63
1989	3,079	9	67	342	46	\$283	\$873	\$97
1990	820	7	15	117	55	\$350	\$287	\$41
1991	1,325	8	18	166	74	\$300	\$398	\$50
1992	1,982	11	27	180	73	\$300	\$573	\$52
1993	2,824	13	33	217	86	\$300	\$837	\$64
1994	3,349	14	65	239	52	\$300	\$1,005	\$72
1995	1,705	14	23	122	74	\$300	\$524	\$37
1996	2,279	24	30	95	76	\$300	\$684	\$28
1997	1,950	26	63	75	31	\$300	\$585	\$23
1998	1,994	22	22	91	91	\$300	\$598	\$27
1999	2,437	21	72	116	34	\$400-600	\$1,038	\$49
2000	2,014	20	22	101	92	\$300-500	\$671	\$34
2001	1,332	14	29	95	46	\$300-500	\$406	\$29
2002	2,664	12	15	222	178	\$300-450	\$909	\$76
2003 ^d	1,379	6	16	230	86	\$50-400	\$342	\$57
2004 ^e	1,038	3	16	346	65	\$100-500	\$309	\$103

-continued-

Table 7.–Page 2 of 2.

2005 ^f	1,159	3	7	386	166	\$100-500	\$370	\$123
2006 ^g	952	2	18	476	53	\$100-500	\$384	\$192
2007 ^g	1,248	2	12	624	104	\$100-500	\$437	\$219
2008 ^g	1,536	2	14	768	110	\$300-490	\$592	\$296
2009 ^g	1,310	2	12	655	109	\$300-500	\$519	\$260
2010 ^g	1,941	2	18	971	108	\$100-500	\$724	\$362

Year	No. Vessels			Tons Per Boat	Tons Per Landing	Price Per Ton	Exvessel	Exvessel Value
	Harvest in Tons	Making Landings	Number Landings				Value (Thousands)	Per Vessel (Thousands)
1929-1938								
Average	1,474	– a	– a	– a	– a	– a	– a	– a
2005-2009								
Average	1,241	2	13	582	108	\$100-500	\$460	\$218
2000-2009								
Average	1,463	7	16	390	101	\$225-460	\$494	\$139

^a Information not available.

^b No fishery.

^c This information cannot be released due to state confidentiality requirements.

^d Fishery was conducted by a cooperative fishery of 14 permit holders using six vessels.

^e A cooperative fishery of 13 permit holders used one boat.

^f Eleven permit holders used three vessels in a cooperative fishery; one CFEC permit holder did not join this fishery.

^g Twelve CFEC permit holders formed a combine fishery, one CFEC permit holder did not join the combine.

Table 8.—Aleutian Islands Area Dutch Harbor herring food and bait gillnet historical summary, 2001–2010.

Year	Harvest in Short Tons	No. Vessels Making Landings	Number Landings	Tons Per Boat	Tons Per Landing	Price Per Ton (Thousands)	Exvessel Value (Thousands)	Exvessel Value Per Vessel (Thousands)
2001	105	6	25	18	4	\$300-500	\$53	\$9
2002	134	13	37	10	4	\$400	\$54	\$4
2003	108	13	23	8	5	\$400	\$35 ^a	\$3
2004	216	7	37	31	6	\$300	\$65	\$9
2005	0	0	0	0	0	\$300	\$0	\$0
2006 ^b						\$300	\$0	\$0
2007 ^b						\$300	\$1,800	\$900
2008 ^b						\$300	\$11,700	\$11,700
2009 ^b						\$500	\$12,000	\$6,000
2010 ^c								
2005-2009								
Average	14	– ^b	– ^b	– ^b	– ^b	\$340	\$5,100	\$3,720

^a Twenty of the 108 tons were not purchased because of spoilage.

^b This information cannot be released due to state confidentiality requirements.

^c No participation by gillnet fleet

Table 9.—Aleutian Islands Area herring food and bait fisheries allocations (tons), commercial harvest (tons), and effort by gear type, 1991–2010.

Year	All Gear Types		Gillnet Fishery					Seine Fishery				
	Allocation	Harvest	Allocation	Harvest	Permits	Landings	Days Fished	Allocation	Harvest	Permits	Landings	Days Fished
1991	931	1,325	– ^a	0	0	0	– ^b	931	1,325	8	18	1
1992	1,940	1,982	– ^a	0	0	0	– ^b	1,940	1,982	11	26	5
1993	2,193	2,824	– ^a	0	0	0	– ^b	2,193	2,824	13	32	1
1994	2,215	3,349	– ^a	0	0	0	– ^b	2,215	3,349	14 ^c	65	4
1995	1,982	1,705	– ^a	0	0	0	– ^b	1,982	1,705	14 ^c	24	1
1996	1,793	2,279	– ^a	0	0	0	– ^b	1,793	2,279	24	29	1
1997	1,645	1,950	– ^a	0	0	0	– ^b	1,645	1,950	26	63	5
1998	1,590	1,994	– ^a	0	0	0	– ^b	1,590	1,994	22	22	1
1999	2,082	2,437	– ^a	0	0	0	– ^b	2,082	2,437	21	21	4
2000	1,728	2,014	– ^a	0	0	0	– ^b	1,728	2,014	23	28	1
2001	1,572	1,437	110	105	6	25	9	1,462	1,332	14	16	2
2002	1,578	2,799	110	134	13	37	16	1,468	2,664	16	14	1
2003	1,662	1,487	116	108	13	23	5	1,546	1,379	14 ^b	16	4
2004	1,899	1,255	266	216	12	37	13	1,533	1,038	15 ^c	17	13
2005	1,365	1,159	191	0	9	0	11	1,174	1,159	12 ^d	7	9
2006	1,715	954	240	– ^e	– ^e	– ^e	2	1,375	952	2 ^f	18	15
2007	1,779	1,254	249	– ^e	– ^e	– ^e	2	1,530	1,248	2 ^f	12	12
2008	1,722	1,575	241	– ^e	– ^e	– ^e	7	1,481	1,536	2 ^f	14	10
2009	1,600	1,334	224	– ^e	– ^e	– ^e	28	1,321	1,310	2 ^f	12	5
2010	1,950	1,941	273	0	0	0	14.5	1,677	1 941 ^g	2 ^f	18	14.5
Average												
2005-2009												
	1,636	1,255	229	14	3	3	10	1,376	1,241	4	13	10
2000-2009												
	1,662	1,527	194	63	6	14	10	1,462	1,463	10	15	7

^a No allocation.

^b Fourteen permit holders used six vessels in a cooperative fishery.

^c Thirteen permit holders used one vessel in a cooperative fishery.

^d Eleven permit holders used three vessels in a cooperative fishery, one CFEC permit holder did not join the cooperative fishery.

^e This information cannot be released due to state confidentiality requirements.

^f A confidential number of CFEC permit holders formed a combine fishery, one CFEC permit holder did not join the combine.

^g Starting in 2010, any remaining gillnet allocation after July 25 may be harvested by either purse seine or gillnet gear (5 AAC 27.655 (b)).

Table 10.—Aleutian Islands Area, Dutch Harbor commercial herring food and bait fishery (all gear combined) summary, 1981–2010.

Year	Landing Date		Days	Preseason Togiak Spawning Biomass Tons	Dutch Harbor Allocation Tons	Food & Bait Harvest Tons	Number Vessels Fishing
	First	Last	Fished				
1981	Aug 3	Aug 23	21	159,000	— ^a	— ^b	— ^b
1982	Aug 5	Sep 12	39	98,000	— ^a	3,565	7
1983	Jul 23	Sep 6	46	142,000	3,525 ^c	3,567	8
1984	Jul 17	Jul 27	11	115,000	3,525 ^c	3,578	9
1985	Jul 17	Aug 11	26	132,000	3,525 ^c	3,554	6
1986	Jul 16	Jul 28	13	96,000	2,453	2,394	7
1987	Jul 16	Jul 23	4	88,000	2,332	2,485	9
1988	Jul 16	Sep 18	21	132,000	3,100	1,999	9
1989	Jul 16	Aug 5	19	100,108	3,100	3,081	9
1990	Aug 15	Aug 15	<1	72,000	903	820	7
1991	Jul 17	Jul 17	<1	83,229	931	1,325	8
1992	Jul 16	Jul 28	5	60,214	1,940	1,982	12
1993	Jul 16	Jul 16	<1	164,135	2,193	2,824	14
1994	Jul 16	Jul 19	4	165,747	2,215	3,349	14
1995	Jul 16	Jul 16	<1	149,093	1,982	1,705	15
1996	Jul 16	Jul 16	<1	135,585	1,793	2,279	27
1997	Jul 15	Jul 19	5	125,000	1,645	1,950	27
1998	Jul 16	Jul 16	<1	121,054	1,590	1,994	22
1999	Jul 16	Jul 20	4	156,200	2,082	2,437	22
2000	Jul 15	Jul 15	<1	130,904	1,728	2,014	20
2001 ^d	Jun 25	Jul 16	10	119,818	1,572	1,437 ^e	22
2002	Jun 25	Jul 16	17	120,196	1,578	2,799 ^e	28
2003	Jun 24	Jul 19	7	126,213	1,662	1,487 ^e	24 ^f
2004	Jul 15	Jul 29	26	143,124	1,899	1,038 ^e	15 ^g
2005	Jul 15	Aug 20	11	105,029	1,365	1,159 ^e	4 ^h
2006	Jul 16	Jul 27	12	129,976	1,715	954 ^e	4 ⁱ
2007	Jul 16	Jul 27	12	134,566	1,779	1,254 ^e	4 ⁱ
2008	Jul 12	Jul 27	10	130,516	1,722	1,575 ^e	3 ⁱ
2009	Jun 24	Jul 25	28	121,800	1,600	1,334 ^e	4 ⁱ
2010 ^j	Jul 15	Jul 29	14.5	146,775	1,950	1,941	2 ^k
2005-2009 Average			15	124,377	1,636	1,255	4
2000-2009 Average			15	126,214	1,662	1,505	13

^a No allocation.

^b Numbers may not be released due to state confidentiality requirements.

^c Harvest ceiling of 3,525 established by Alaska Board of Fisheries.

^d In 2001, a gillnet fishery was established.

^e Includes both gillnet and seine harvest.

^f Fourteen purse seine permit holders used six vessels in a cooperative fishery.

-continued-

Table 10.–Page 2 of 2

- ^g In 2004, the purse seine fishery operated under a cooperative agreement and 13 seine permit holders used one vessel.
- ^h In 2005, the gillnet fishery did not harvest any fish, and 11 seine permit holders formed a cooperative using three seine vessels; one CFEC permit holder did not join the cooperative fishery.
- ⁱ A confidential number of CFEC seine permit holders formed a cooperative using only one seine vessel; one CFEC seine permit holder did not join the cooperative fishery.
- ^j In 2010 the Alaska Board of Fisheries amended 5 ACC 27.655(b); after July 25 any remaining gillnet allocation may be harvested by either the purse seine or gillnet fleet.
- ^k In 2010, the gillnet fishery did not harvest any fish as there was no participation, also 12 seine permit holders formed a cooperative using one vessel; one CFEC permit holder did not join the cooperative fishery

Table 11.–Age, sex, weight and length of herring harvested by purse seine gear in Akutan District, 2010.

Age (Years)	Sex				Percent of Total	Weight			Standard Length		
	Male	Female	Unknown	Total		Mean (g)	Standard Dev.	Number Weighed	Mean (mm)	Standard Dev.	Number Measured
4	4	4	0	8	2.2	338	83.3	8	301.9	20.5	8
5	17	24	0	41	11.1	374	72.0	41	312.9	19.3	41
6	30	66	0	96	25.9	425	70.2	96	321.6	16.0	96
7	39	64	0	103	27.8	462	74.3	103	328.4	17.4	103
8	21	39	0	60	16.2	485	67.1	60	333.2	15.4	60
9	10	21	0	31	8.4	501	71.8	31	336.5	14.4	31
10	2	4	0	6	1.6	554	44.9	6	345.8	8.6	6
Regen. ^a	8	18	0	26	7.0	457	94.7	26	330.0	21.1	26
Total	131	240	0	371	100.0	0	0.0	421	0.0	0.0	371
Average	-	-	-	-	-	450	72.3	-	326.3	16.6	-

^a Age could not be determined due to regenerated scale.

Table 12.—Estimated age composition of Aleutian Islands commercial herring food and bait purse seine harvests, 1991–2010.

Year	Percent at Age (Years)														
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1991	0.2	0.2	0.2	8.7	11.0	5.7	13.4	11.2	22.1	17.2	8.9	1.0	0.0	0.2	0.0
1992	0.0	0.3	0.2	0.3	23.3	25.0	4.8	15.2	8.9	10.0	9.4	2.5	0.2	0.0	0.0
1993	0.3	9.5	51.8	5.1	5.9	13.2	6.2	2.5	1.6	1.7	1.3	0.8	0.0	0.0	0.0
1994	0.2	1.7	24.3	36.7	3.8	4.0	13.3	6.5	3.6	3.3	1.0	0.9	0.9	0.0	0.0
1995	0.2	3.2	5.6	30.4	27.5	4.5	4.3	10.4	5.0	1.9	4.8	1.4	0.6	0.2	0.0
1996	0.0	0.7	8.2	16.1	35.8	25.8	3.3	2.9	2.7	1.6	1.5	0.8	0.4	0.2	0.0
1997	0.0	3.2	15.2	31.3	9.3	21.2	9.5	1.8	4.5	1.6	1.2	0.5	0.1	0.0	0.0
1998	0.0	6.5	7.9	25.3	26.0	8.5	14.6	8.4	0.5	1.4	0.3	0.0	0.1	0.1	0.0
1999	0.2	0.2	12.2	8.2	21.8	21.1	10.2	15.6	5.6	2.2	0.9	1.3	0.4	0.0	0.0
2000	0.0	0.0	0.7	19.8	16.6	12.4	14.5	10.8	12.4	8.2	2.3	1.3	0.5	0.0	0.0
2001	0.0	3.5	2.1	6.4	31.4	12.8	11.9	9.7	5.7	10.7	4.0	0.9	0.4	0.0	0.0
2002	0.0	0.0	3.0	6.3	4.3	25.3	11.6	9.3	12.3	9.0	12.0	5.0	0.0	3.0	2.0
2003	0.0	0.0	3.0	27.4	16.8	7.5	15.6	9.9	5.4	6.6	3.3	2.7	0.9	0.6	0.0
2004	0.0	0.0	0.0	18.8	39.3	8.4	3.9	14.6	3.4	5.9	1.9	0.7	1.4	1.2	0.0
2005	1.1	2.5	1.4	4.3	40.0	27.2	5.6	5.1	6.4	1.9	1.2	1.4	0.8	0.3	0.0
2006	0.4	5.9	6.2	3.5	5.2	32.0	23.9	3.4	4.7	5.3	2.9	3.1	1.3	1.0	0.4
2007	0.5	5.2	12.2	7.8	12.8	21.6	20.7	9.3	4.6	2.3	0.8	0.8	0.2	0.2	0.0
2008	0.7	6.9	17.6	17.6	17.1	18.3	13.1	5.0	2.6	0.7	0.2	0.2	0.0	0.0	0.0
2009	5.6	15.9	23.4	23.4	15.9	5.6	3.7	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010	2.2	11.1	25.9	27.8	16.2	8.4	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005-2009 Average															
	1.7	7.3	12.2	11.3	18.2	20.9	13.4	5.5	3.7	2.0	1.0	1.1	0.5	0.3	0.1
2000-2009 Average															
	0.8	4.0	7.0	13.5	19.9	17.1	12.5	8.2	5.8	5.1	2.9	1.6	0.6	0.6	0.2

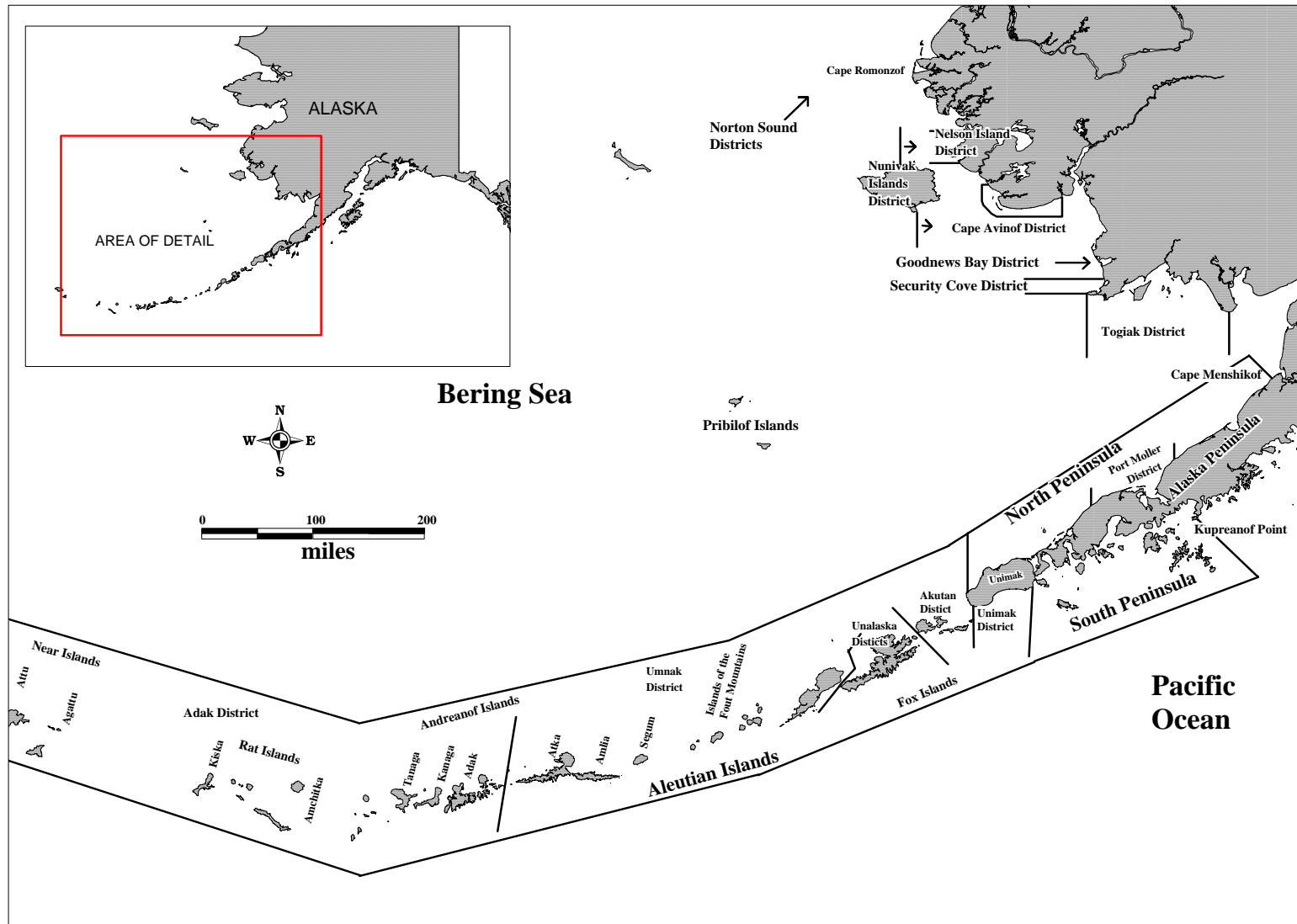


Figure 1.—Map of Bering Sea Management Plan (5 AAC 27.060) commercial herring districts.

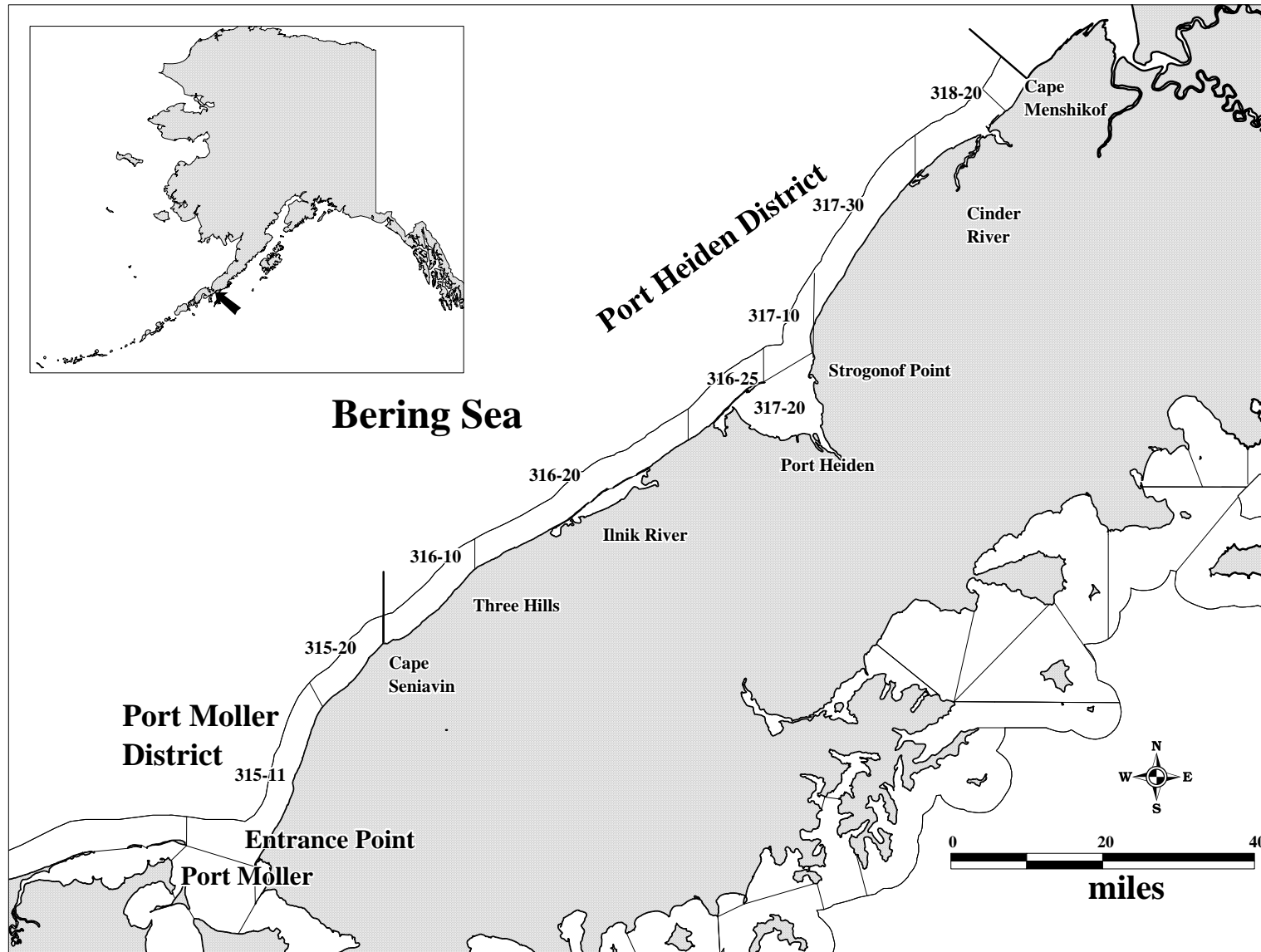


Figure 2.—Map of Port Heiden and Port Moller Districts, with commercial herring fishing statistical areas shown.

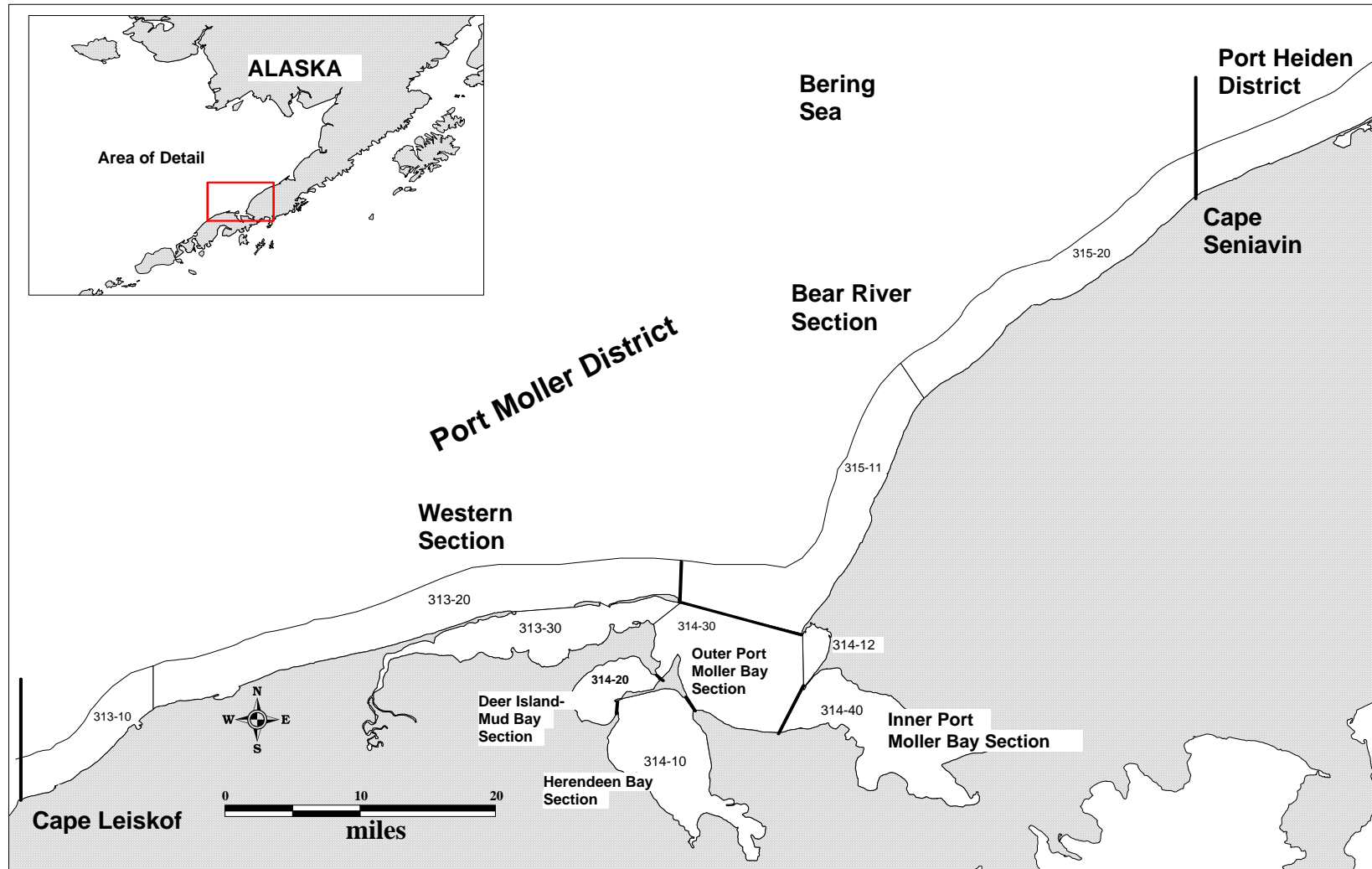


Figure 3.—Map of Port Moller District, with commercial herring fishing statistical areas shown.

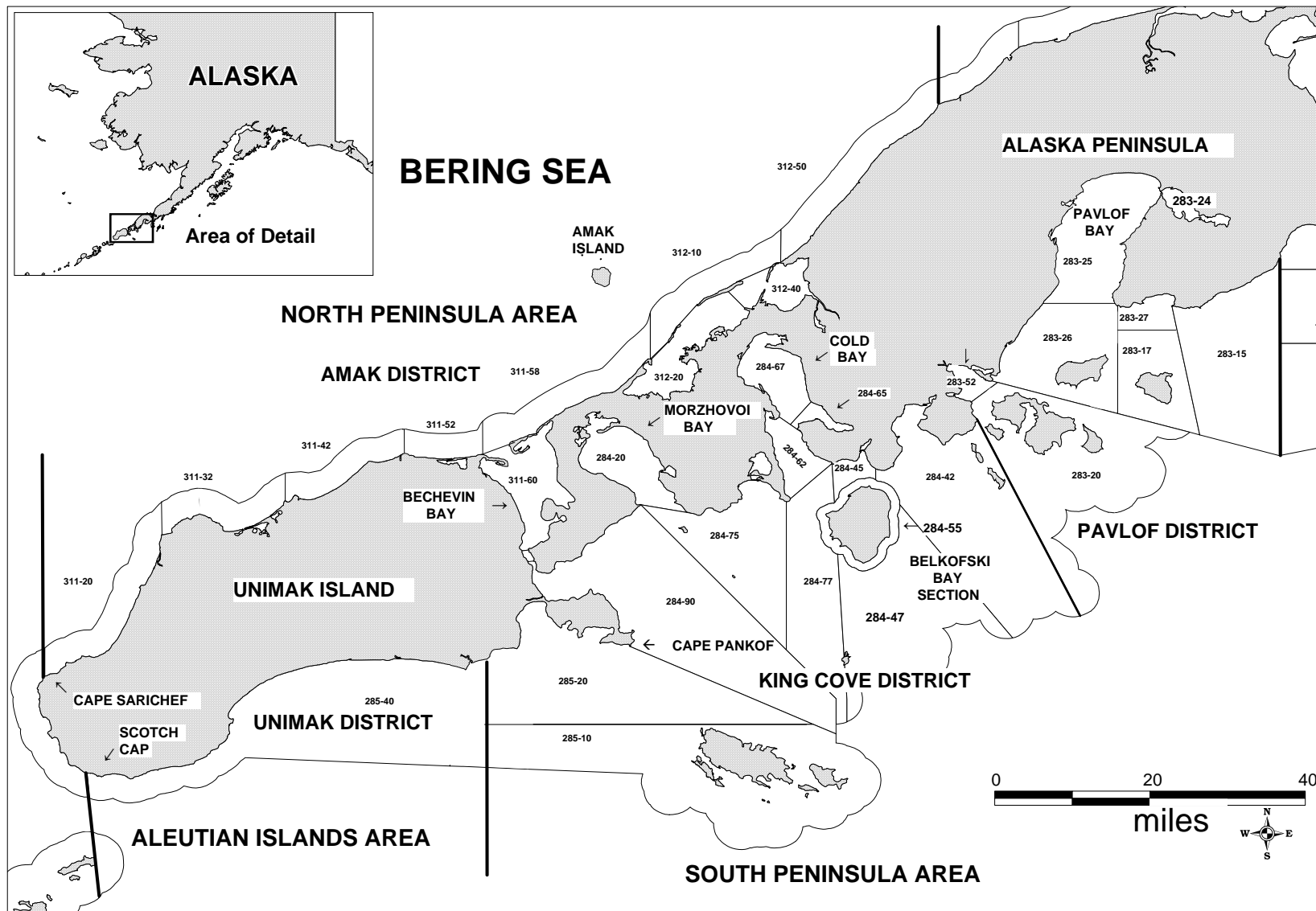


Figure 4.—Map of Amak, Unimak, King Cove, and Pavlof Districts, with commercial herring fishing statistical areas shown.

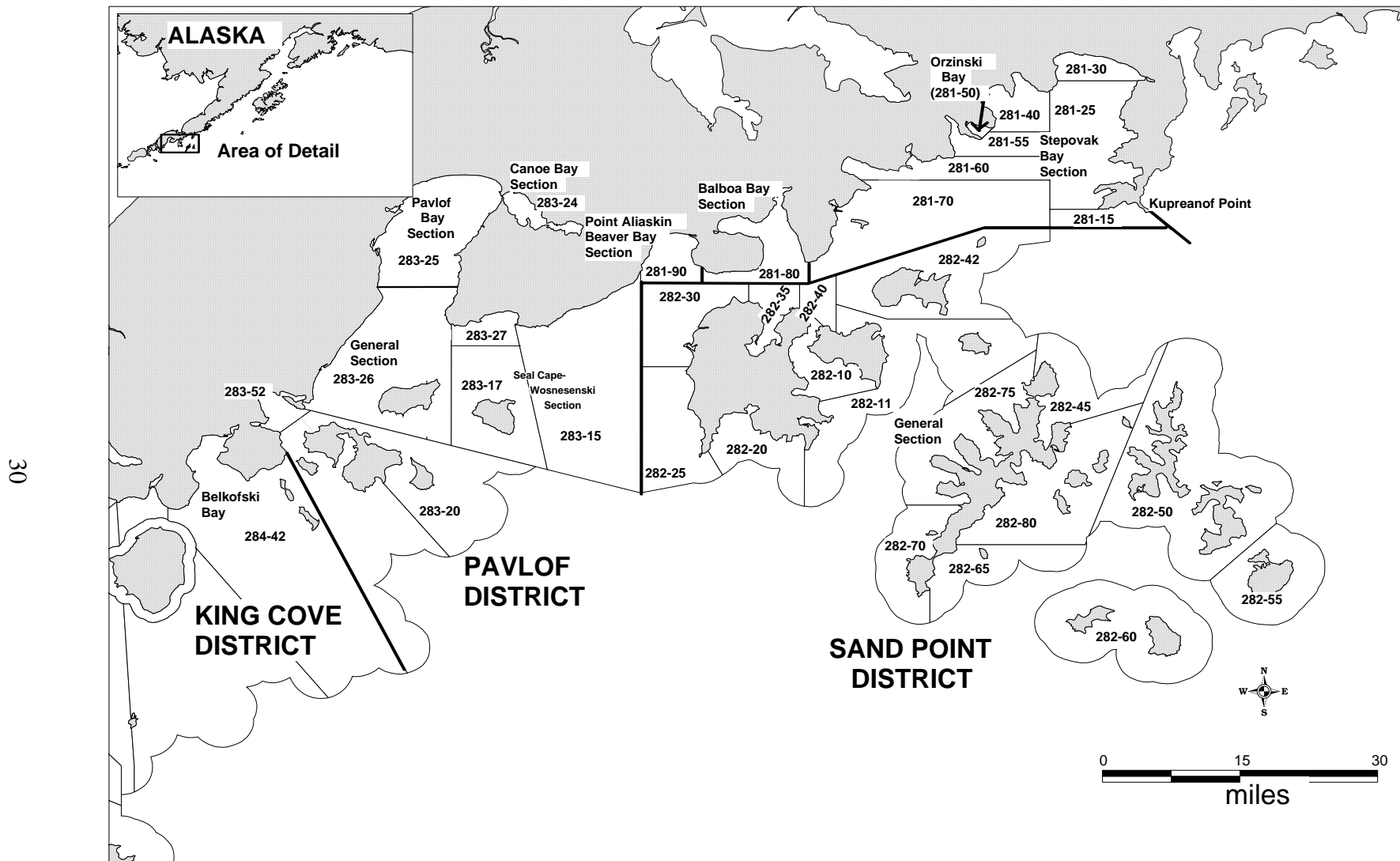


Figure 5.—Map of Pavlof and Sand Point districts, with commercial herring fishing statistical areas shown.

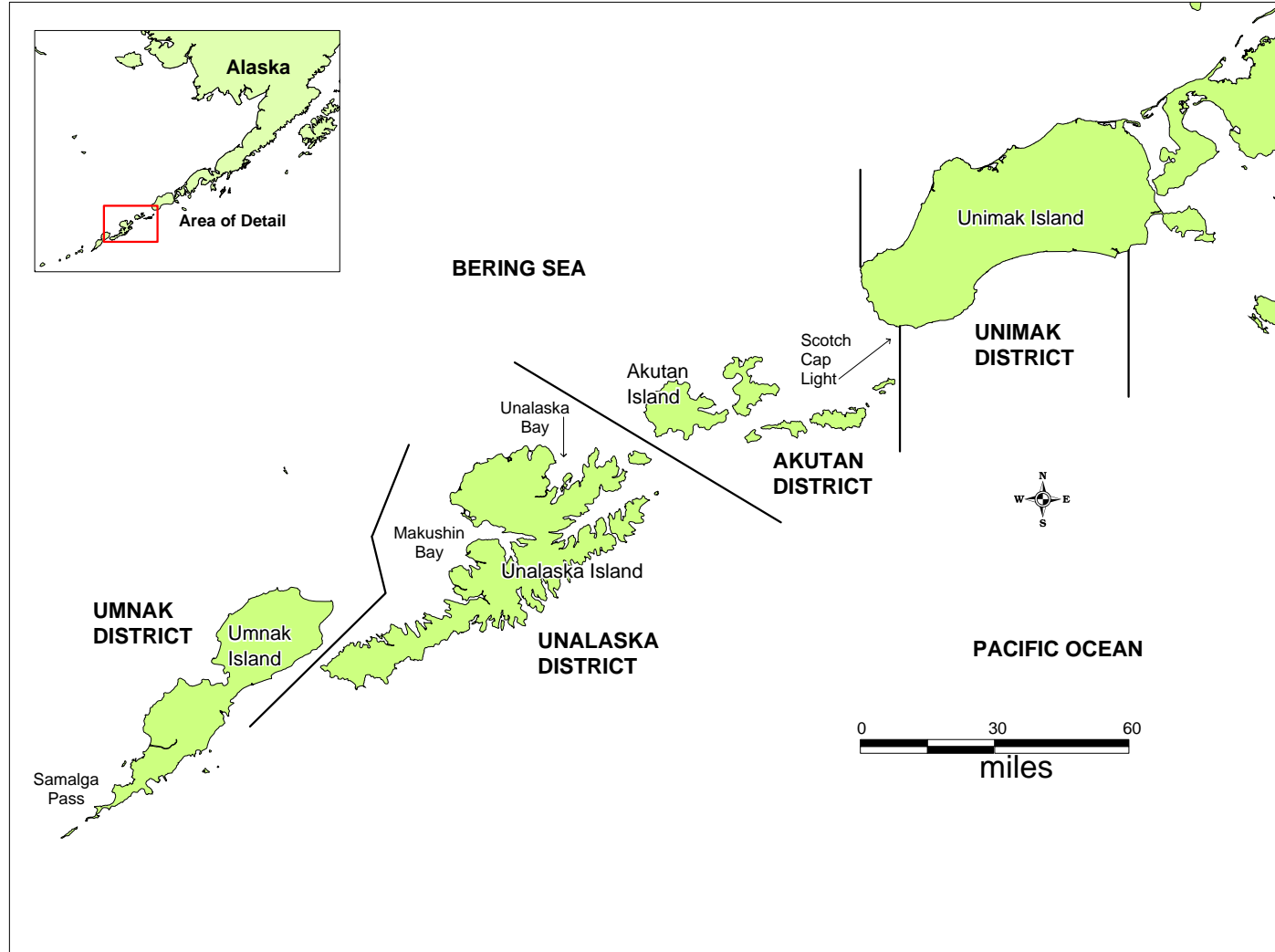


Figure 6.—Map of Aleutian Islands from Samalga Pass to Unimak Island, with herring fishing districts shown.

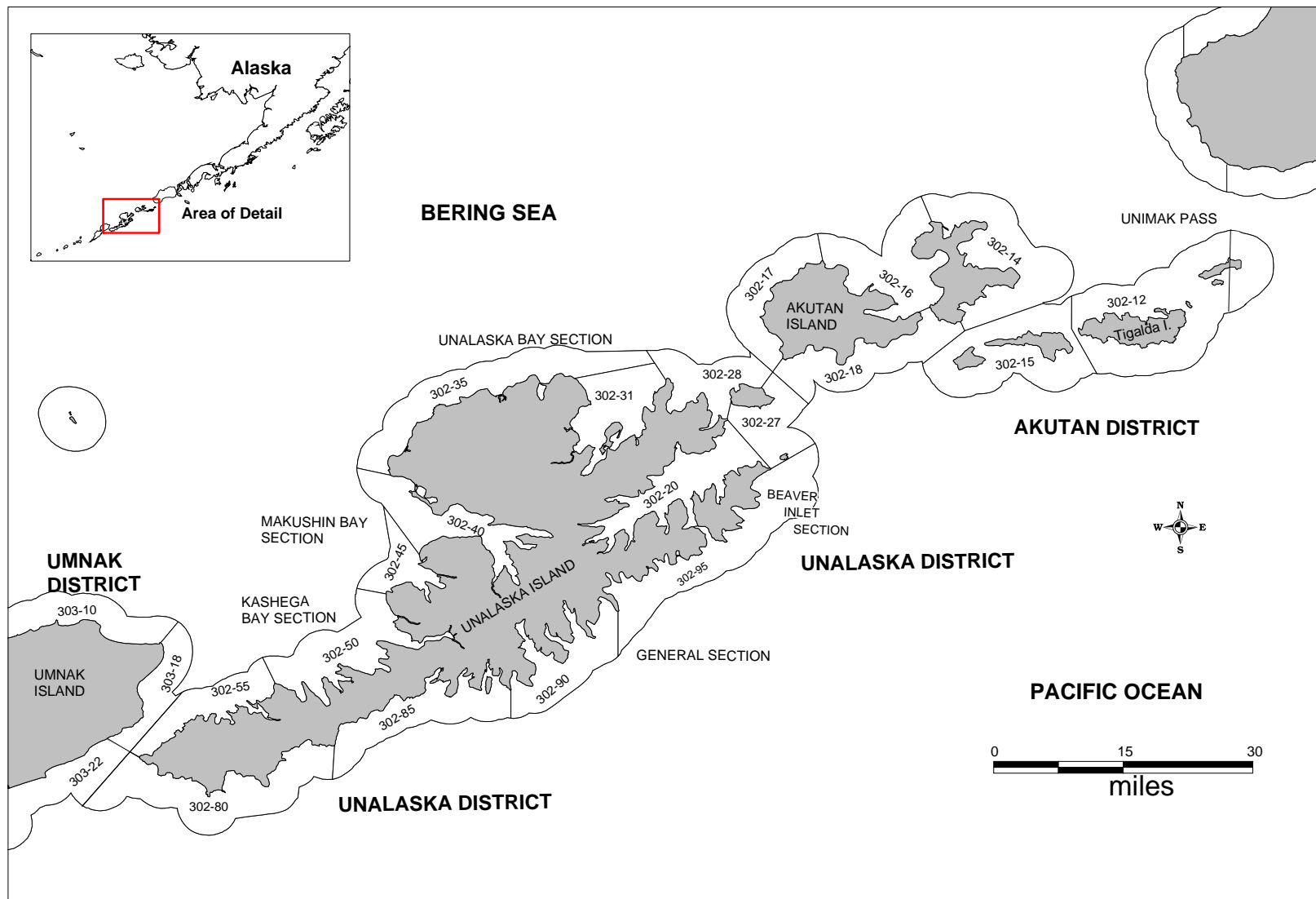


Figure 7.—Map of Aleutian Islands from Unimak Island to Umnak Island, with commercial herring fishing statistical areas shown.

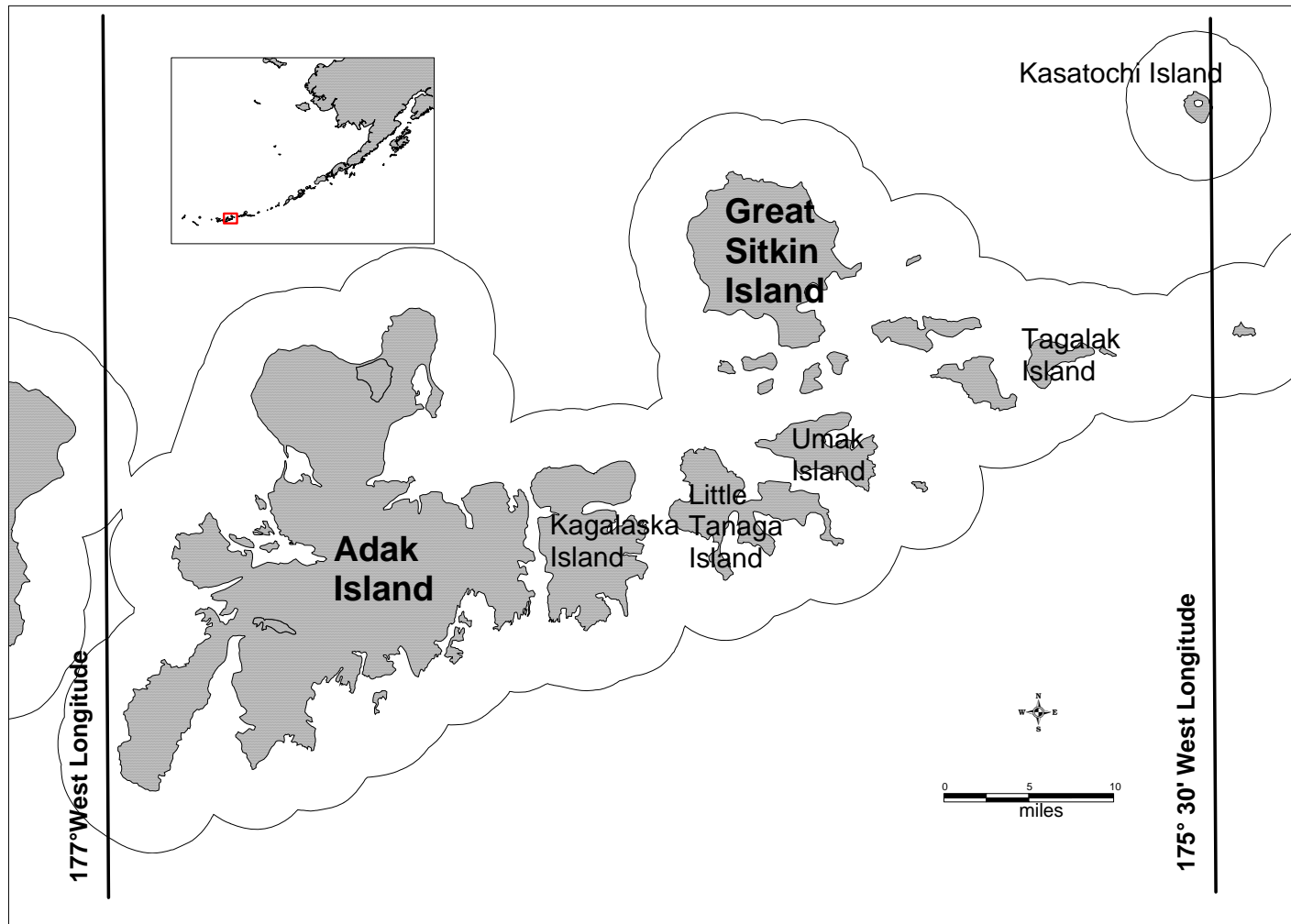


Figure 8.—Map of Adak Island area, with boundaries of exploratory herring fishery defined.

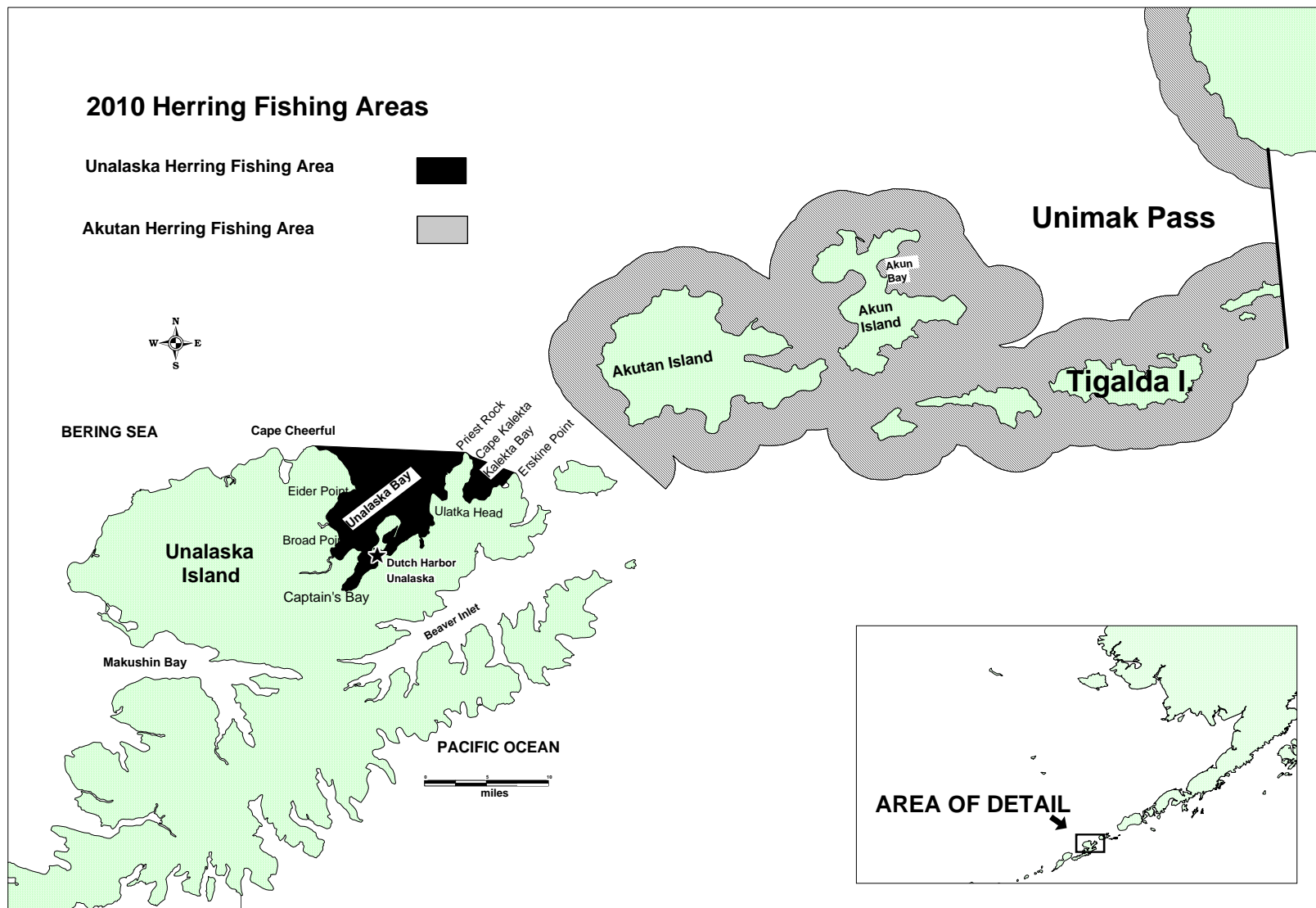


Figure 9.—Map of Akutan and Unalaska islands, with the 2010 commercial herring fishery open areas shown.

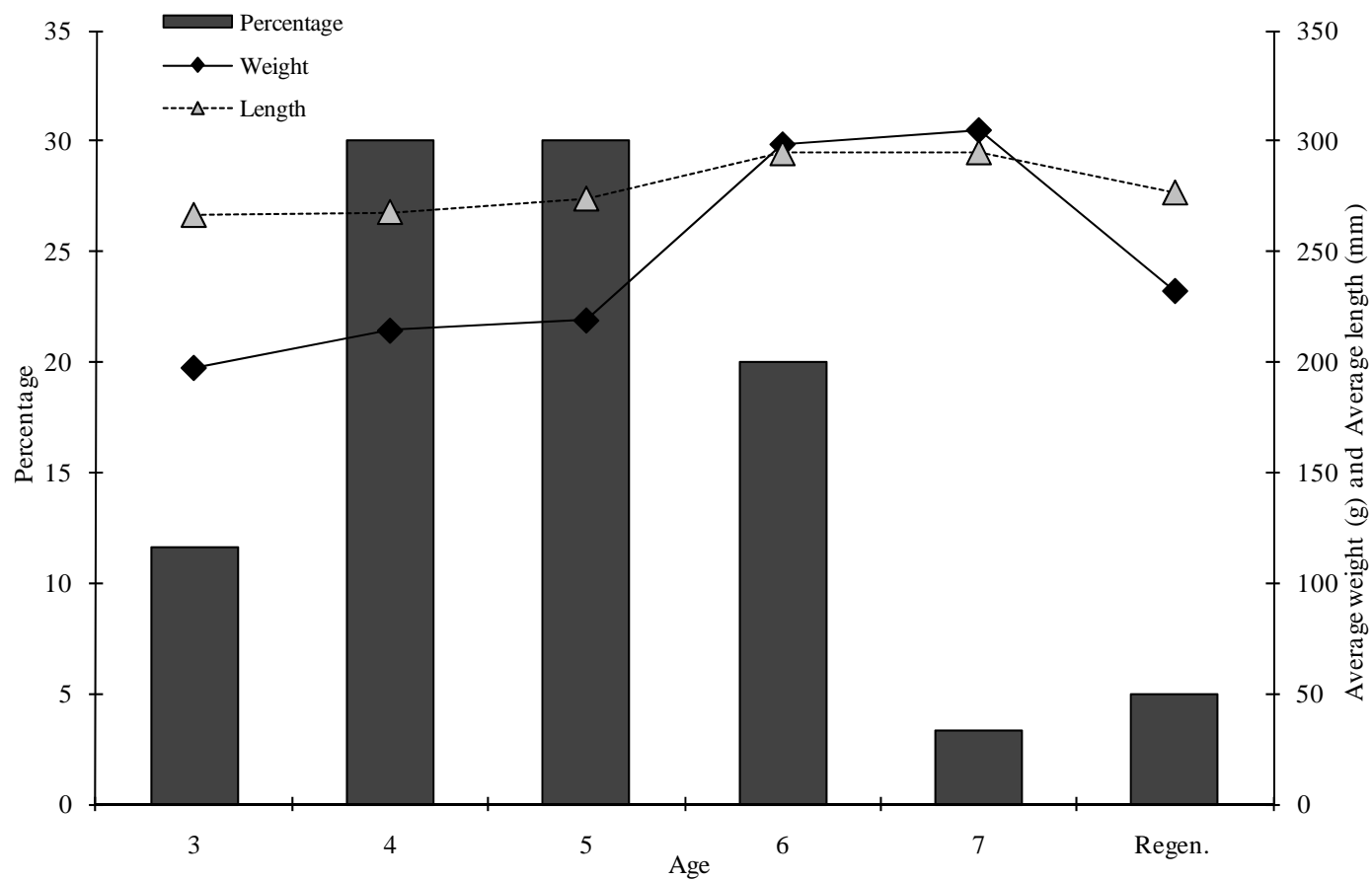


Figure 10.—Estimated average length-at-age (mm), average weight-at-age (g), and age composition of herring harvested in North Alaska Peninsula, 2010 (N = 60).

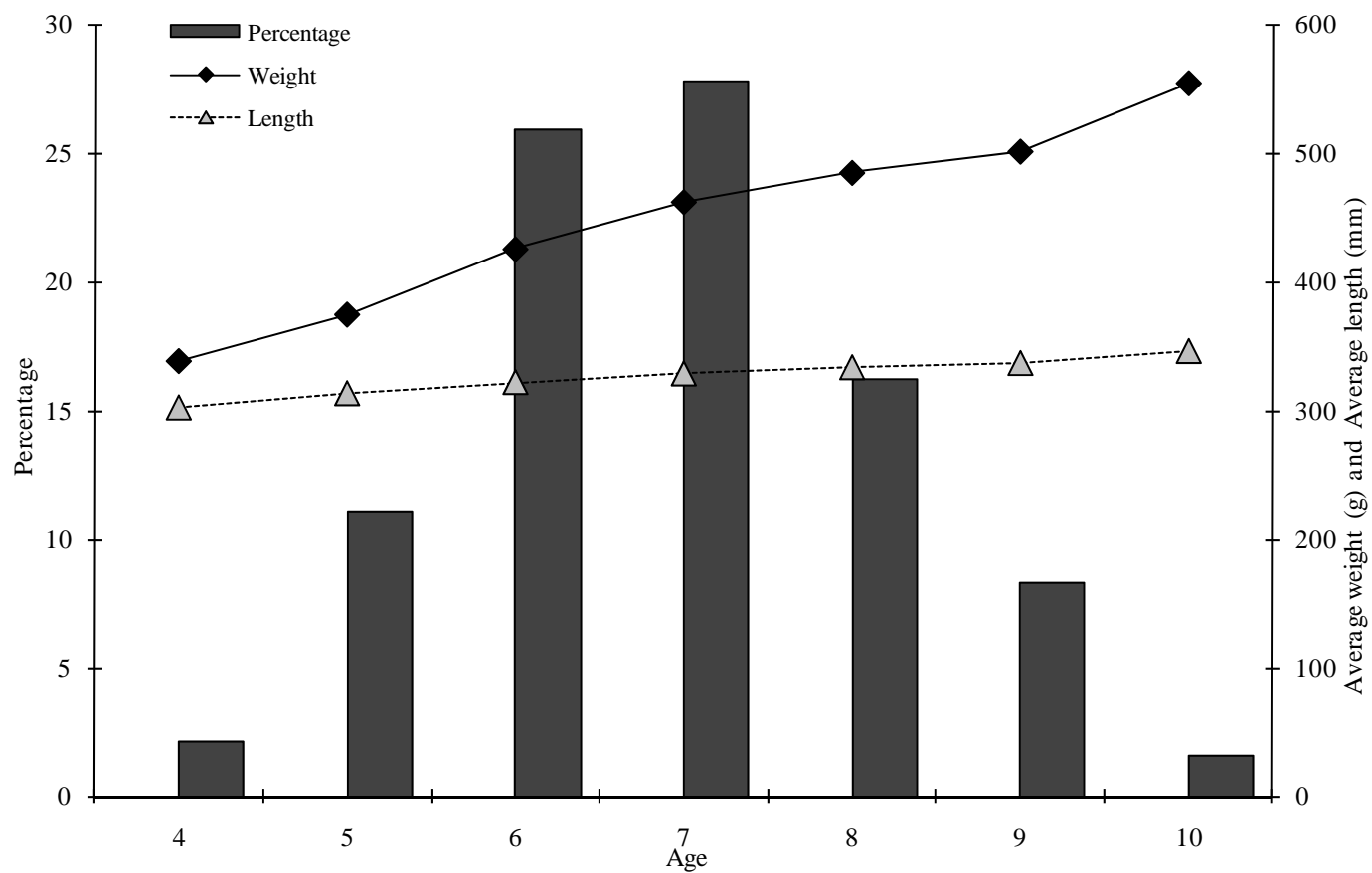


Figure 11.—Estimated average length-at-age (mm), average weight-at-age (g), and age composition of herring harvested in Akutan District, 2010 (N = 371).

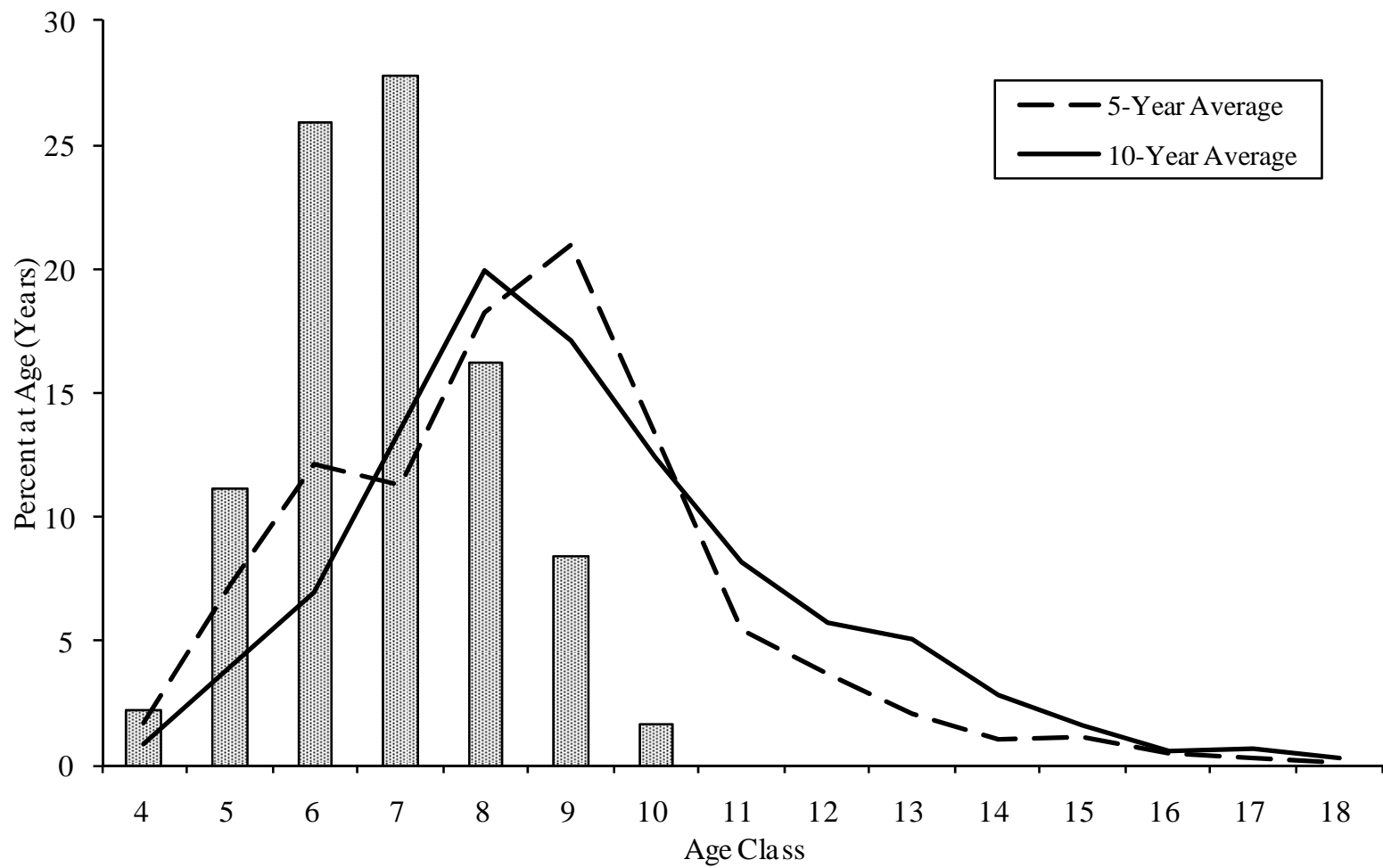


Figure 12.—Estimated 2010 percent age composition of Aleutian Islands commercial herring food and bait fishery, with five- and ten-year averages.

APPENDIX A. ALASKA PENINSULA HERRING SAC ROE FISHERY HARVEST PROJECTIONS

Appendix A1.—Alaska Peninsula herring sac roe fishery harvest projection, 2010.

This forecast is for North and South Alaska Peninsula areas with guideline harvest levels (GHL), 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, or the Port Heiden District.

Considering historical herring biomass estimates in the North Alaska Peninsula waters, management of the North Alaska Peninsula herring sac roe fishery will again be conservative in 2010. Historically, the previous year's North Alaska Peninsula herring biomass estimate has been a poor indicator of herring returns in the following year. The GHL will be adjusted in season based on the observed herring biomass. The following table shows the sliding scale allowable harvest on the estimated mature biomass when the threshold of 1,000 tons is assured.

Stock Size (Tons)	Sliding Scale	
	Allowable	
	Exploitation Rate	Harvest
Less than 1,000	0%	0
1,001–1,500	10%	100–150
1,501–1,999	10%	150–200
2,000–2,500	15%	300–375
2,501–3,000	15%	375–450
> 3,000	20%	> 450

At low biomass levels, a conservative approach will be taken to allow the local stocks to rebuild and to account for North Alaska Peninsula herring that may contribute to the Dutch Harbor food and bait fishery. Rowell et. al. (1991) estimated that up to 22% of the Dutch Harbor food and bait harvest may be non-Togiak herring. Based on estimated travel time of eastern Bering Sea herring stocks to Dutch Harbor and the fishery opening date of July 15, North Alaska Peninsula stocks may compose a portion of the non-Togiak component. During periods when large biomass levels are observed a higher harvest rate will be allowed. The Alaska Board of Fisheries has established a maximum exploitation rate of 20% of the spawning biomass of those stocks. The forecast does not include the Port Heiden District where commercial fishing occurred only during 1992.

Confidence in the North Alaska Peninsula harvest projection is only fair. In the Port Moller District, a 1,000 ton threshold of mature herring is required before the department may allow a commercial harvest in that district. Prior to 1996, aerial surveys were conducted but there was no threshold requirement.

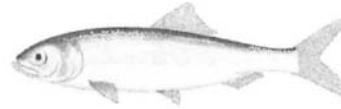
The 2010 South Alaska Peninsula forecasted sac roe harvest is 0 tons, based on the belief that industry will not be interested in harvesting herring in South Alaska Peninsula waters.

APPENDIX B. ARCTIC-YUKON-KUSKOKWIM HERRING OUTLOOK AND MANAGEMENT STRATEGIES

**ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES
NEWS RELEASE**



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Arctic-Yukon-Kuskokwim Herring Outlook and Management Strategy for 2010

Projections from postseason escapement estimates suggest that the 2010 spawning biomass for northeastern Bering Sea herring stocks (Security Cove to Norton Sound Districts) will be 71,907 tons, with an anticipated allowable harvest of 14,227 tons. Only the Goodnews Bay District biomass was based upon a good aerial survey biomass estimate in 2009. The remaining districts have not had reliable biomass estimates for several years. There has been no commercial herring sac roe fishery in AYK Region since 2006. Limited test fishing was conducted by the department the last 3 years at Goodnews Bay and at Cape Denbigh in Norton Sound. The age composition from this limited test fishing suggests younger age classes, ages 5-8 may be expected to dominate the biomass. Age 9 and older herring may comprise less than 20% of the returning biomass.

At this time, it is anticipated that some level of commercial sac roe herring fishing may occur in most of the AYK Region in 2010. This news release is to inform fishermen of projected biomass, guideline harvest levels, and the strategies to be employed if commercial fishing does occur.

Variability in the quality of aerial survey assessments of biomass and deviations from the assumed survival or recruitment rates may result in the observed biomass being either above or below these projections. Therefore, guideline harvest levels may be adjusted during the season according to observed herring spawning biomass. If determining herring abundance using aerial survey methods is not possible, stock abundance will be assessed using information from the projected biomass, test, and commercial catches, and spawn deposition observations. In accordance with the AYK Region harvest strategy, the commercial fishery will not target newly recruited age classes (age 2 through age 5 herring). In districts where a buyer is available, fishing will be opened by emergency order after it has been determined that the threshold herring biomass is present or significant spawning activity is observed. Furthermore, the department will work cooperatively with fishermen and buyers to optimize roe recovery by opening fishing by emergency order once it has been determined herring are of marketable quality and the buyer allowed to direct the fleet to maintain roe quality.

-continued-

Security Cove District

The 2010 projected return to the Security Cove District is 6,014 tons. A 20% exploitation rate would result in a harvest of 1,203 tons. Commercial fishing will not be allowed until the observed biomass reaches 1,200 tons, or significant spawning activity is observed.

Goodnews Bay District

The management strategy for the Goodnews Bay District will be similar to that of Security Cove. The season will open and close by emergency order when a biomass of 1,200 tons or significant spawning activity is observed. The 2010 projected return of herring to the Goodnews Bay District is 5,736 tons. A 20% exploitation rate would result in a harvest of 1,147 tons. Age 5-8 herring are expected to comprise a majority of the biomass.

Cape Avinof District

Either significant spawning activity or a biomass of 500 tons must be observed before the commercial herring season can be opened. The 2010 projected biomass for the Cape Avinof District is 2,393 tons. The exploitation rate will be no greater than 15% because of the limited database for this area and to ensure the subsistence fishing priority. A 15% commercial exploitation rate would result in a harvest of 359 tons.

Nelson Island District

In the Bering Sea Herring Fishery Management Plan, the Alaska Board of Fisheries set a minimum biomass threshold of 3,000 tons for the Nelson Island District. The inseason estimate of herring biomass must exceed the threshold level before a commercial fishery can be allowed. The spawning biomass projected to return in 2010 to the Nelson Island District is 5,449 tons. At a total exploitation rate of 20%, minus 200 tons for subsistence harvest, the commercial harvest guideline will be 890 tons.

Nunivak Island District

The biomass of herring projected to return to the Nunivak Island District in 2010 is 3,322 tons. A 20% exploitation rate would result in a harvest of 664 tons. If there is buyer interest, the commercial season will open when the biomass reaches 1,500 tons or when significant spawning is observed.

Cape Romanzof District

The projected biomass of herring to return to Cape Romanzof District in 2010 is expected to be 5,538 tons. At a 20% exploitation rate, the allowable harvest is expected to be 1,108 tons and will be based on inseason indicators of abundance. Since water turbidity in the Cape Romanzof area generally prevents aerial observations of herring, spawn deposition, test fishing and commercial catch rates, and the amount of fishing effort will be used to determine the timing and duration of commercial fishing periods.

Norton Sound District

The biomass of herring projected to return in 2010 to Norton Sound is 42,889 tons. A 20% exploitation rate would result in a harvest guideline of 8,578 tons. A maximum of 320 tons of herring are reserved to allow for the pound fishery to harvest a maximum of 90 tons of product (combined weight of herring roe and kelp). This leaves 8,258 tons for sac roe harvest. The beach seine harvest is, by regulation, 10% of the sac roe projected harvest, or 826 tons. The 2010 herring fishery will be opened by emergency order once it has been determined herring are of

marketable quality and the buyer will be allowed to direct the fleet to maintain roe quality. The fishery will close by emergency order when up to 20% of the available herring biomass has been harvested. Ages 5-8 are expected to dominate the returning population.

Port Clarence District

The department does not project an outlook for the Port Clarence fishery because of the lack of data for Port Clarence herring and the limited scope of the fishery. The guideline harvest of 165 tons established by the Alaska Board of Fisheries in 1981 will determine the allowable harvest in 2010. This harvest guideline is based on two years of research conducted by the department in both the Port Clarence and Kotzebue Districts. Even though this guideline has not appeared in the regulation book since 1984, it still represents the best estimate of allowable harvest.

Table 1. Projections of Pacific herring spawning biomass and harvest guideline for commercial fishing districts in the northeastern Bering Sea, Alaska, 2010.

District	Threshold	2009 Observed Biomass (st)	2010 Projected Biomass (st)	Exploitation Rate (%)	2010 Harvest Guideline
Security Cove	1,200	5,686 ^c	6,014	20	1,203
Goodnews Bay	1,200	6,143 ^b	5,736	20	1,147
Cape Avinof	500	2,251 ^c	2,393	15	359
Nelson Island	3,000	5,152 ^c	5,449	16	890
Nunivak Island	1,500	3,141 ^c	3,322	20	664
Cape Romanzof	1,500	4,852 ^c	5,538	20	1,108
Norton Sound	7,000	36,917 ^c	42,889	20	8,578
Port Clarence	-	-	-	-	165
Totals			71,343	20	14,114

^a Nelson Island commercial harvest is 20% of projected biomass minus 200 st for subsistence harvest.

^b Good aerial survey estimates from 2009 were used to project the biomass.

^c 2009 Projected biomass was used because recent biomass estimates were unavailable.

APPENDIX C. ALEUTIAN ISLANDS AREA DUTCH HARBOR HERRING FOOD AND BAIT FORECASTS

**ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES
NEWS RELEASE**



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Date Issued: 11/13/2009
Time: 1:00 p.m.

2010 TOGIAK HERRING FORECAST

The 2010 Togiak herring forecast and harvest allocation is listed below for the Togiak District sac roe fishery and the Dutch Harbor food and bait fishery, given a maximum 20% exploitation rate of the projected run biomass:

Harvest Allocation of the 2010 Pacific Herring Run Biomass Forecast, Togiak District, Bristol Bay

	Biomass (Short Tons)	Harvest (Short Tons)
Biomass Forecast for 2010	146,775	
Total Allowable Harvest (20% exploitation rate)		29,355
Togiak Spawn-on-Kelp Fishery (Fixed Allocation)		1,500
Remaining Allowable Harvest		27,855
Dutch Harbor Food/Bait Allocation (7.0% of the remaining allocation)		1,950
Remaining Allowable Harvest for Togiak District Sac Roe Fishery:		25,905
Purse Seine Allocation 70.0%		18,134
Gill Net Allocation 30.0%		7,772

2010 TOGIAK HERRING FORECAST SUMMARY

The Pacific herring population is forecast to be 146,775 tons in Togiak District during 2010 (Figure 1). Herring returning from 2004 through 2006-year classes (ages 4–6) are expected to comprise 45.1% of the biomass (Figure 2) in 2010. Ages 7–8 are expected to comprise 24.5% of the population while ages 9–11 and 12+ are forecast to comprise 16.8% and 13.6% of the population by weight, respectively. The individual average weight forecast of herring in the biomass is 330 g.

A run biomass of 146,775 tons would be ~5% more than the recent 10-year average observed biomass of 139,635 tons. A biomass of this size would potentially produce an overall harvest of 29,355 tons in all fisheries and 25,905 tons in the Togiak sac roe fisheries (purse seine and gill net). A harvest of this size in the Togiak sac roe fisheries would be ~28% more than the recent 10-year average harvest of 20,212 tons.

We used an age-structured analysis (ASA) model to forecast the Togiak herring population using catch and age composition data and total run biomass estimates. The ASA model integrates data from purse seine fishery age compositions (1978–2009), total run age compositions (1978–1995, 1997, 1999, 2001, and 2005–2009), and aerial survey biomass estimates (1981, 1983, 1992–1994, 1997, 1999–2001, and 2005–2009). The model estimates were generated by comparing to observed data. Samples from non-selective gear (commercial purse seine) were used to assess age composition of the total run biomass. Commercial purse seine catch samples ranged from age-3 to age-17. Age-4 herring average weight for 2010 was predicted using the recent 4-year average while simple linear regression models were used to forecast average weight of age-5 through age-15 herring based on their weight the previous year.

A temporal change in age composition from older to younger herring typically occurs during this fishery. A cohort of young herring (< age-7) and a cohort of older (ages 11–13) herring predominated in 2009, comprising 48.1% and 23.7% of the total commercial purse seine harvest by weight respectively. These two major age cohorts made up a significant portion of the observed biomass through 22 May, after which the older cohort had migrated through and the biomass came to be dominated by age-7 and younger herring after 22 May. The high abundance (15.4% by number of fish) of age-4 and age-3 herring (age classes that are typically not caught in significant numbers) in the purse seine harvest suggests very strong future year classes in years ahead. However, it should be noted that measuring contributions of younger age classes to the spawning biomass is difficult as they typically do not show up until late in the fishery and the department no longer conducts post-fishery sampling as was typical during the 1980s.

The biomass of the Togiak herring spawning population has been estimated with aerial surveys since the late 1970s, concurrent with development of the sac-roe fishery. Total run biomass for 2009 was estimated to be 142,133 tons. This was the sum of the peak aerial survey on 24 May (93,894 tons) and a survey on 16 May (48,239 tons). The time between these surveys leads us to believe that a near complete turnover of herring on the spawning grounds had occurred between these surveys. Herring were first observed in district on 13 May, when approximately 462 tons were documented in Togiak Bay. The biomass steadily increased through 16 May, with herring concentrated in areas east of Togiak Bay (Figure 3). Spawning biomass had extended westward by the time of the peak survey on 24 May and was most heavily concentrated in Togiak Bay. Large recruitments in this population are typical every 8 to 10 years. The last such event occurred off the 1996 and 1997-year classes and another currently appears to be underway with strong returns from 2005 and 2006-year classes.

There is always uncertainty in forecasting the Togiak District herring biomass and predicting the 2010 run is no different. The performance of the ASA model has had a tendency to forecast low since its inception in 1993, under-forecasting the run in 2009 run (121,800 tons forecast and 142,133 tons observed). The mean percent error (MPE) was -22.2% for years with reliable total run biomass estimates (Figure 1). The accuracy or mean absolute percent error (MAPE) of the ASA model has been 20%. The forecast range for 2010 is from 117,460 tons to 176,090 tons based on a MAPE of 20%. We consider this population to be healthy and sustainable.

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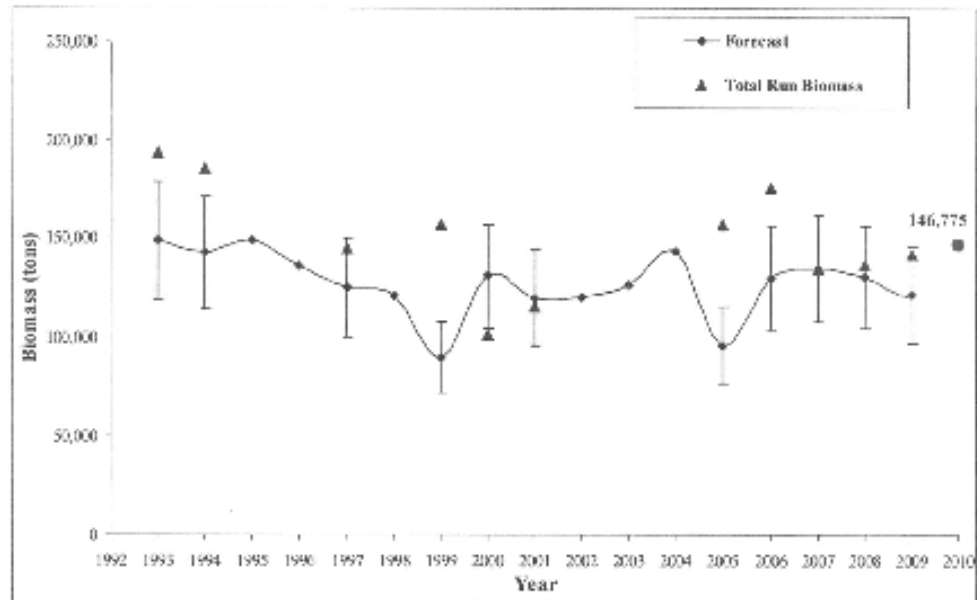


Figure 1.–Annual observed Togiak herring total run biomass estimates and preseason forecasts based on the ASA model. Mean absolute percent error (MAPE) of 25% around the forecast is also shown for years with a reliable total run biomass estimate.

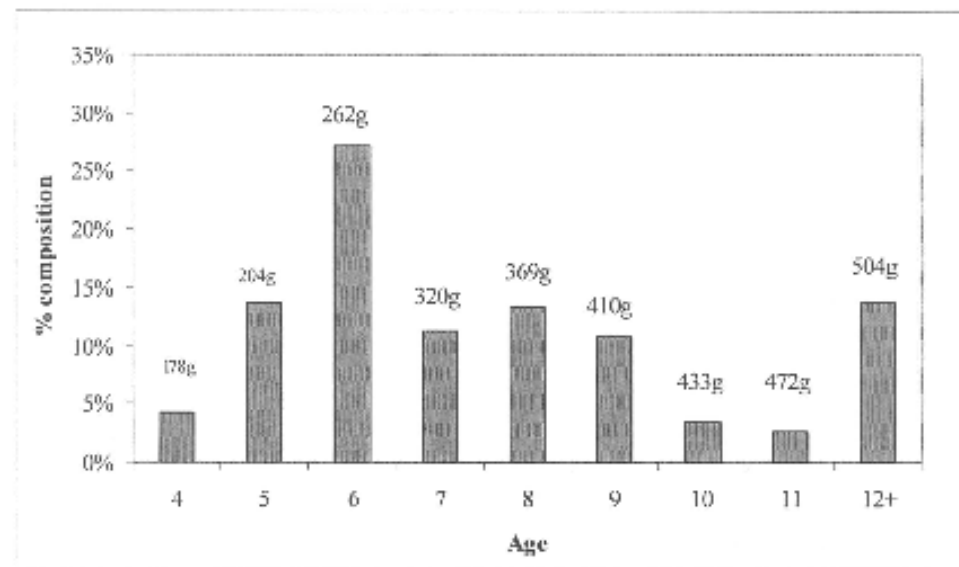


Figure 2. Age composition by weight for the 2010 Togiak herring biomass forecast. Average weight (grams) shown for each age category.

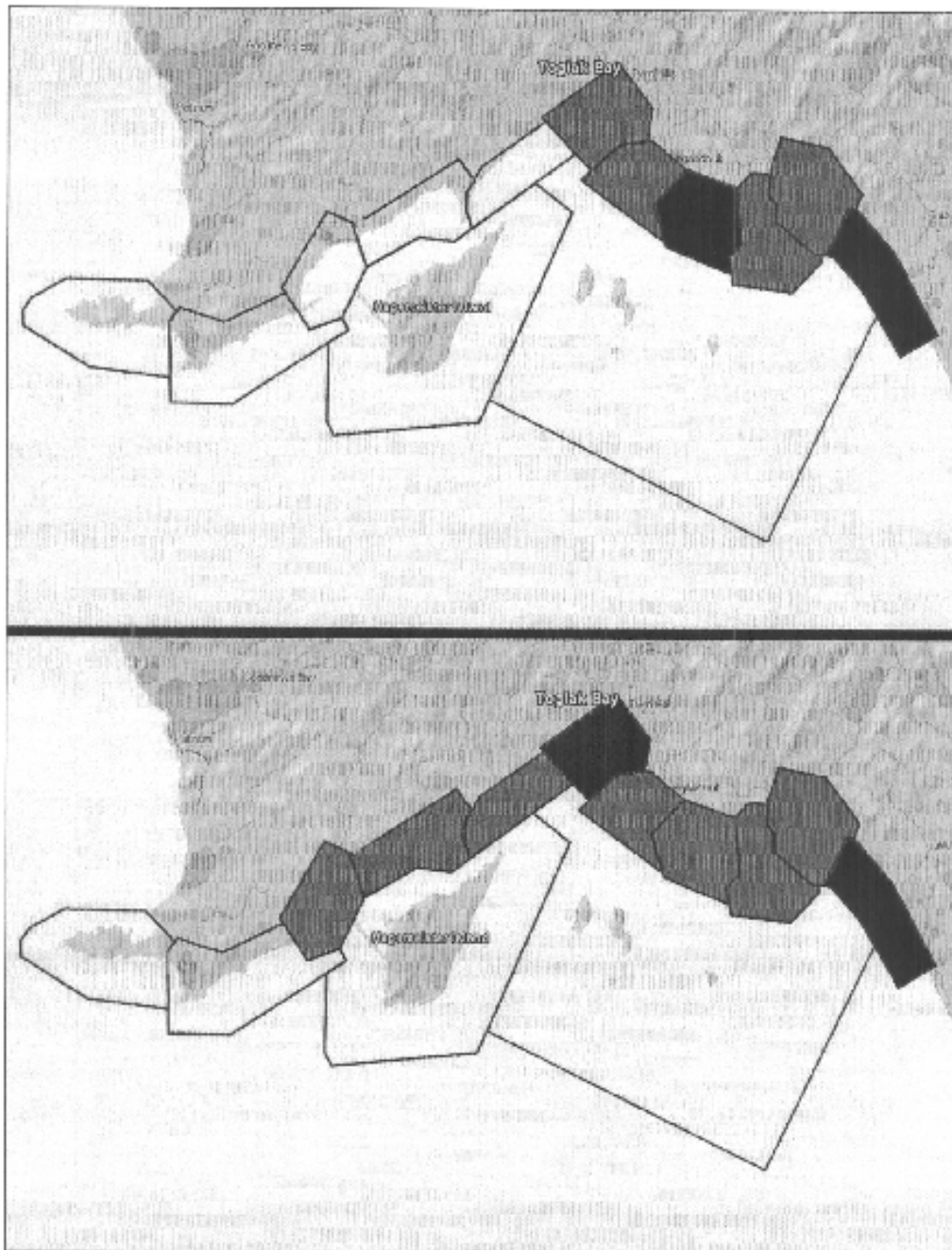


Figure 3.—Herring spawning distribution observed during aerial surveys conducted on 16 May 2009 (top) and 24 May 2009 (bottom). Aerial survey sections outlined. Sections with measurable biomass are shaded. Sections with biomass >10,000 t shaded in black.

**APPENDIX D: ALEUTIAN ISLANDS FOOD AND BAIT
HERRING FISHERY EMERGENCY ORDER SUMMARY**

Appendix D1.–Emergency order summary, 2010.

EMERGENCY ORDER NO. 4-FH-M-PM-01-10

EFFECTIVE DATE: 08:00 AM Monday, May 24, 2010

EXPLANATION: This emergency order establishes a commercial herring fishery for the Port Moller District for 24 hours from 08:00 a.m. Monday until 08:00 a.m. Tuesday, May 25.

EMERGENCY ORDER NO. 4-FH-M-PM-02-10

EFFECTIVE DATE: 08:00 AM Tuesday, May 25, 2010

EXPLANATION: This emergency order establishes a commercial herring fishery for the Port Moller District for 24 hours from 08:00 a.m. Tuesday until 08:00 a.m. Wednesday, May 26.

EMERGENCY ORDER NO. 4-FH-M-SP-01-10

EFFECTIVE DATE: 12:00 PM Thursday, July 15, 2010

EXPLANATION: This emergency order establishes a commercial herring fishery for the Akutan District west of the longitude of Billings Head at 165°28.67' W long, the Unalaska Bay Section, and that portion of Kalekta Bay south of a line running from Erksine Point at 53°58.92' N lat, 166°16.5' W long to Cape Kalekta at 54° N lat, 166°22' W long for 48 hours from 12:00 p.m. July 15 until 12:00 p.m. July 17, 2010 for purse seine, gillnet and pound gear.

EMERGENCY ORDER NO. 4-FH-M-SP-02-10

EFFECTIVE DATE: 12:00 PM Saturday, July 17, 2010

EXPLANATION: This emergency order extends the current commercial herring fishery in the Akutan District west of the longitude of Billings Head at 165°28.67' W long, the Unalaska Bay Section, and that portion of Kalekta Bay south of a line running from Erksine Point at 53°58.92' N lat, 166°16.5' W long to Cape Kalekta at 54° N lat, 166°22' W long for 48 hours from 12:00 p.m. July 17 until 12:00 p.m. July 19, 2010 for purse seine, gillnet and pound gear.

EMERGENCY ORDER NO. 4-FH-M-SP-03-10

EFFECTIVE DATE: 12:00 PM Monday, July 19, 2010

EXPLANATION: This emergency order extends the current commercial herring fishery in the Akutan District west of the longitude of Billings Head at 165°28.67' W long, the Unalaska Bay Section, and that portion of Kalekta Bay south of a line running from Erksine Point at 53°58.92' N lat, 166°16.5' W long to Cape Kalekta at 54° N lat, 166°22' W long for 48 hours from 12:00 p.m. July 19 until 12:00 p.m. July 21, 2010 for purse seine, gillnet and pound gear.

EMERGENCY ORDER NO. 4-FH-M-SP-04-10

EFFECTIVE DATE: 12:00 PM Wednesday, July 21, 2010

EXPLANATION: This emergency order extends the current commercial herring fishery in the Akutan District west of the longitude of Billings Head at 165°28.67' W long, the Unalaska Bay Section, and that portion of Kalekta Bay south of a line running from Erksine Point at 53°58.92' N lat, 166°16.5' W long to Cape Kalekta at 54° N lat, 166°22' W long for 48 hours from 12:00 p.m. July 21 until 12:00 p.m. July 23, 2010 for purse seine, gillnet and pound gear.

EMERGENCY ORDER NO. 4-FH-M-SP-05-10

EFFECTIVE DATE: 12:00 PM Friday, July 23, 2010

EXPLANATION: This emergency order extends the current commercial herring fishery in the Akutan District west of the longitude of Billings Head at 165°28.67' W long, the Unalaska Bay Section, and that portion of Kalekta Bay south of a line running from Erksine Point at 53°58.92' N lat, 166°16.5' W long to Cape Kalekta at 54° N lat, 166°22' W long for 48 hours from 12:00 p.m. July 23 until 12:00 p.m. July 25, 2010 for purse seine, gillnet and pound gear.

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EMERGENCY ORDER NO. 4-FH-M-SP-06-10

EFFECTIVE DATE: 12:00 PM Sunday, July 25, 2010

EXPLANATION: This emergency order extends the current commercial herring fishery in the Akutan District west of the longitude of Billings Head at 165°28.67' W long, the Unalaska Bay Section, and that portion of Kalekta Bay south of a line running from Erksine Point at 53°58.92' N lat, 166°16.5' W long to Cape Kalekta at 54° N lat, 166°22' W long for 48 hours from 12:00 p.m. July 25 until 12:00 p.m. July 27, 2010 for purse seine, gillnet and pound gear.

EMERGENCY ORDER NO. 4-FH-M-SP-07-10

EFFECTIVE DATE: 12:00 PM Tuesday, July 27, 2010

EXPLANATION: This emergency order extends the current commercial herring fishery in the Akutan District west of the longitude of Billings Head at 165°28.67' W long, the Unalaska Bay Section, and that portion of Kalekta Bay south of a line running from Erksine Point at 53°58.92' N lat, 166°16.5' W long to Cape Kalekta at 54° N lat, 166°22' W long for 48 hours from 12:00 p.m. July 27 until 12:00 p.m. July 29, 2010 for purse seine, gillnet and pound gear.

EMERGENCY ORDER NO. 4-FH-M-SP-08-10

EFFECTIVE DATE: 12:00 PM Thursday, July 29, 2010

EXPLANATION: This emergency order extends the current commercial herring fishery in the Akutan District west of the longitude of Billings Head at 165°28.67' W long, the Unalaska Bay Section, and that portion of Kalekta Bay south of a line running from Erksine Point at 53°58.92' N lat, 166°16.5' W long to Cape Kalekta at 54° N lat, 166°22' W long for 12 hours from 12:00 p.m. July 29 until 11:59 p.m. July 29, 2010 for purse seine, gillnet and pound gear.
