

Fishery Management Report No. 13-38

**Alaska Peninsula-Aleutian Islands Herring Sac Roe
and Food and Bait Fisheries Annual Management
Report, 2012**

By

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October 2013

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		<i>all standard mathematical</i>	
deciliter	dL	Code	AAC	<i>signs, symbols and</i>	
gram	g	all commonly accepted		<i>abbreviations</i>	
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H _A
kilogram	kg			base of natural logarithm	<i>e</i>
kilometer	km	all commonly accepted		catch per unit effort	CPUE
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	coefficient of variation	CV
meter	m			common test statistics	(F, t, χ^2 , etc.)
milliliter	mL	at	@	confidence interval	CI
millimeter	mm	compass directions:		correlation coefficient	
		east	E	(multiple)	R
		north	N	correlation coefficient	
		south	S	(simple)	r
		west	W	covariance	cov
Weights and measures (English)		copyright	©	degree (angular)	°
cubic feet per second	ft ³ /s	corporate suffixes:		degrees of freedom	df
foot	ft	Company	Co.	expected value	<i>E</i>
gallon	gal	Corporation	Corp.	greater than	>
inch	in	Incorporated	Inc.	greater than or equal to	≥
mile	mi	Limited	Ltd.	harvest per unit effort	HPUE
nautical mile	nmi	District of Columbia	D.C.	less than	<
ounce	oz	et alii (and others)	et al.	less than or equal to	≤
pound	lb	et cetera (and so forth)	etc.	logarithm (natural)	ln
quart	qt	exempli gratia		logarithm (base 10)	log
yard	yd	(for example)	e.g.	logarithm (specify base)	log ₂ , etc.
		Federal Information		minute (angular)	'
		Code	FIC	not significant	NS
Time and temperature		id est (that is)	i.e.	null hypothesis	H ₀
day	d	latitude or longitude	lat. or long.	percent	%
degrees Celsius	°C	monetary symbols		probability	P
degrees Fahrenheit	°F	(U.S.)	\$, ¢	probability of a type I error	
degrees kelvin	K	months (tables and		(rejection of the null	
hour	h	figures): first three		hypothesis when true)	α
minute	min	letters	Jan, ..., Dec	probability of a type II error	
second	s	registered trademark	®	(acceptance of the null	
		trademark	™	hypothesis when false)	β
Physics and chemistry		United States		second (angular)	"
all atomic symbols		(adjective)	U.S.	standard deviation	SD
alternating current	AC	United States of		standard error	SE
ampere	A	America (noun)	USA	variance	
calorie	cal	U.S.C.	United States	population	Var
direct current	DC		Code	sample	var
hertz	Hz	U.S. state	use two-letter		
horsepower	hp		abbreviations		
hydrogen ion activity	pH		(e.g., AK, WA)		
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

FISHERY MANAGEMENT REPORT NO. 13-38

**ALASKA PENINSULA-ALEUTIAN ISLANDS HERRING SAC ROE AND
FOOD AND BAIT FISHERIES ANNUAL MANAGEMENT REPORT, 2012**

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ABSTRACT

This report presents information concerning commercial Pacific herring *Clupea pallasii* sac roe and food and bait fisheries that occurred in the Alaska Peninsula-Aleutian Islands Management Area (Area M) in 2012. Area M is split into three sub-areas: North Alaska Peninsula, South Alaska Peninsula, and Aleutian Islands.

In 2012, a commercial herring sac roe fishery occurred in the North Peninsula. The total herring biomass estimated from aerial surveys in the North Peninsula was 4,920 tons. The North Peninsula herring sac roe fishery was open from May 27 through May 29, 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 2012.

In 2012, commercial herring food and bait fishery harvests occurred in the Aleutian Islands during seine gear fishing periods. Aleutian Islands “Dutch Harbor” herring food and bait allocation was set at 1,627 tons, of which 1,400 tons were allocated to the seine fleet and 227 tons to the gillnet fleet. A total of 1,807 tons of herring were harvested in the seine fishery, but there were no herring harvested in the gillnet fishery during the 2012 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) during the 2012 season. This report is intended as a reference document and provides a description of harvest strategies, a summary of 2012 fishery management activities, as well as age, weight, and length data collected from commercial harvests. For information and historical perspective concerning Area M commercial herring fisheries please refer to *Alaska Peninsula-Aleutian Islands Herring Sac Roe and Food and Bait Fisheries Annual Management Report, 2010*. Harvest information was taken from the Alaska Department of Fish and Game (ADF&G) fish ticket database in November 2012. Data provided in this report supersedes any data previously published by ADF&G.

Area M herring fisheries are divided into three sub-areas: North Alaska Peninsula, South Alaska Peninsula, and Aleutian Islands (Figure 1–7). 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. In 2012, a commercial herring sac roe fishery occurred in the North Peninsula. The total herring biomass estimated from aerial surveys in the North Peninsula was 4,920 tons. The North Peninsula herring sac roe fishery was open from May 27 through May 29, with a confidential amount of herring harvested (Table 1). 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 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 (Figure 1 and Figures 6–9; 5 AAC 27.605 and 27.600).

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 has occurred annually and is known as the “*Dutch Harbor Food and Bait Herring Fishery*.” During the 1981 and 1982 seasons, there were no harvest restrictions (Schwarz 1988). From 1983 through 1985, the Alaska Board of Fisheries (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 (Appendix A1). The dominant 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 (Appendix B1). 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 (Rowell et al. 1991). In 1998, the BOF changed the opening date 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 pounds.

During the 2010 BOF meeting, the BOF amended 5 AAC 27.655 (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 through 1938 and in 1945, herring food and bait fisheries occurred in the vicinity of Unalaska Bay (Table 2; 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 through 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. 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 through 2003, the number of gillnet fishermen increased from 6 to 13 vessels (Tables 3 and 4). In 2004, the gillnet harvest allocation was further increased to 14%. 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 (c) and (h); (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 biomass estimates are updated by ADF&G 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 as well as the Port Moller sac roe fishery. These samples provided age composition, sex, maturity status, weight-at-age, and length-at-age data from the commercial harvest. 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 is taken from each herring and the ages are recorded and entered into a database.

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

2012 SEASON SUMMARY

The Dutch Harbor food and bait fishery was allocated 1,627 tons of herring for the 2012 season (Table 4 and 5; Appendix B1). The purse seine fishery was allocated 1,400 tons and the 2012 gillnet fishery was allocated 227 tons of herring (Table 4). ADF&G did not conduct aerial surveys in 2012 to assess herring biomass in the Dutch Harbor area because of budget constraints and poor weather conditions.

Gillnet Fishery

In 2012, the Dutch Harbor food and bait herring commercial gillnet fishery occurred from July 15 through July 27, 2012 (Table 5; Appendix C1; Figures 6, 7, and 9). A confidential number of permit holders and processors registered in this fishery. From noon July 15 until noon July 27, the commercial herring gillnet fishery was open continually in Unalaska and Akutan districts. In 2012, there was no participation by the gillnet fleet (Table 3).

Purse Seine Fishery

In 2012, Dutch Harbor food and bait seine fishery occurred from July 15 through July 27 within Unalaska and Akutan districts (Table 5; Appendix C1; Figure 6, 7, and 9). The seine fishery was allocated 1,400 tons of herring for the 2012 season and were eligible to harvest any remaining gillnet allocation after July 25 (Table 4). Two vessels and two processors registered to participate in this fishery. One seine permit holder represented a combine of a confidential number of permit holders, while the other seine permit holder represented an independent market. Over the course of the seine fishery, 16 deliveries were made for a total harvest of 1,807 tons of herring. The majority of this herring was captured in the Unalaska District (Tables 4 and 5; Figures 6, 7, and 9). This harvest of 1,807 tons exceeded the allocation of 1,627 tons and will result in a 180 ton reduction for the 2013 seine allocation.

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 2012 purse seine fishery was an estimated \$542,000 (Table 2).

2012 Catch Sampling

A total of 254 herring were sampled from the Dutch Harbor food and bait purse seine fishery (Table 6). The most abundant age classes were ages 7 (28.3%) and 8 (22%), followed by ages 9 and 6 which represented 16.5% and 16.1%, respectively (Tables 6 and 7; Figures 10 and 11). Average herring length in the sample was 286.1 mm, and average weight was 426.0 g (Table 6). The sex composition of the sample was 47% male and 53% 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 (18.6%; Table 7; Figure 12).

A total of 25 herring were sampled from the Port Moller sac roe fishery. The most abundant age classes were years 8 (32%) and 7 (28%), followed by ages 9 and 6 which represented 20% and 16%, respectively (Figure 10).

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TABLES AND FIGURES

Table 1.—Herring biomass estimates in tons for the North Alaska Peninsula, by area, 1984–2012.

Date	Port Moller District			Port Heiden District		Total Biomass Estimate	Aerial Survey Date	
	Herendeen Bay	Port Moller Bay	Additional Biomass Harvested	Bear River to Strogonof Point	Port Heiden Bay Section		First	Last
1984 ^a	2,000	1,500–1,900	0	0	0	3,500–3,900	May 9	Jul 31
1985	260	1,305	0	5,240	0	6,805	May 1	Jun 13
1986	1	28	0	0	0	29	May 16	Jun 7
1987	0	5,125	0	0	0	5,125	May 6	Jun 3
1988	1,737	442	0	8	0	2,187	May 17	Jun 15
1989	1,163	1,471	0	0	0	2,634	May 19	Jun 16
1990	155	387	0	0	0	542	May 21	Jun 14
1991	2,278 (250) ^b	4,651	0	1,471	0	8,400	May 17	Jun 26
1992	755	8,269	0	5,798	10,021	24,843	May 19	Jun 18
1993	775	2,878	0	33	0	3,686	May 4	Jun 9
1994	381	274	74	0	0	729	May 22	May 28
1995	60	477	200	0	0	737	May 13	Jun 2
1996	390 (390) ^b	986 (755) ^b	0	309	65	1,750	May 9	Jun 18
1997	160	45	0	0	0	205	May 22	Jun 12
1998	930	135	0	360 (200) ^b	0	1,425	May 11	Jun 3
1999	10	220	0	0	0	230	May 16	Jun 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	Jun 2	Jun 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	Jun 2
2010	720	1,725	0	30,000	0	32,445	May 21	May 22
2011	70	662	0	4,110	0	4,842	May 18	May 19
2012	3,930	990	0	0	0	4,920	May 21	May 29
2002–2011 Average	933	4,629	35	3,561	0	8,948		

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

^b Biomass estimates (tons) conducted by commercial spotter pilots are enclosed in parentheses (); 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.—Aleutian Islands Area (Dutch Harbor) commercial herring food and bait seine fishery historical summary, 1929–2012.

Year	Harvest in Tons	No. Vessels		Tons Per Vessel	Tons Per Landing	Price Per Ton	Exvessel Value (Thousands)	Exvessel Value Per Vessel (Thousands)
		Making Landings	Number Landings					
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								
1945	75	a	a	a	a	a	a	a
1946–1980 ^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 ^d	1,038	3	16	346	65	\$100–500	\$309	\$103
2005 ^d	1,159	3	7	386	166	\$100–500	\$370	\$123
2006 ^d	952	2	18	476	53	\$100–500	\$384	\$192
2007 ^d	1,248	2	12	624	104	\$100–500	\$437	\$219

-continued-

Table 2.–Page 2 of 2.

Year	Harvest in Tons	No. Vessels		Tons Per Vessel	Tons Per Landing	Price Per Ton	Exvessel Value (Thousands)	Exvessel Value Per Vessel (Thousands)
		Making Landings	Number Landings					
2008 ^d	1,536	2	14	768	110	\$300–490	\$592	\$296
2009 ^d	1,310	2	12	655	109	\$300–500	\$519	\$260
2010 ^d	1,941	2	18	971	108	\$100–500	\$724	\$362
2011 ^d	1,795	2	15	898	120	\$500	\$898	\$449
2012 ^d	1,807	2	16	904	113	\$100–500	\$542	\$271
1929–1938								
Average	1,474	a	a	a	a	a	a	a
2007–2011								
Average	1,566	2	14	783	110	500	634	317
2002–2011								
Average	1,502	4	14	558	110	500	548	214

^a Information not available.

^b No fishery.

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

^d Several permit holders formed a cooperative and used one vessel.

Table 3.—Aleutian Islands Area (Dutch Harbor) commercial herring food and bait gillnet fishery historical summary, 2001–2012.

Year	Harvest in Tons	No. Vessels Making Landings	Number Landings	Tons Per Boat	Tons Per Landing	Price Per Ton	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	\$11
2004	216	7	37	31	6	\$300	\$65	\$9
2005 ^b	0	0	0	0	0	\$300	\$0	\$0
2006	c	c	c	c	c	\$300	\$0	\$0
2007	c	c	c	c	c	\$300	\$2	c
2008	c	c	c	c	c	\$300	\$12	c
2009	c	c	c	c	c	\$500	\$12	c
2010 ^d								
2011 ^d								
2012 ^d								
2007–2011								
Average	23	c	c	c	c	\$367	\$9	c

^a 20 of the 108 tons were not purchased due to spoilage.

^b No participation by gillnet fleet.

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

^d No participation by gillnet fleet.

Table 4.—Aleutian Islands Area (Dutch Harbor) herring food and bait fisheries allocations (tons), commercial harvest (tons), and effort by gear type, 1991–2012.

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	0	931	1,325	8	18	1.0
1992	1,940	1,982	a	0	0	0	0	1,940	1,982	12	26	5.0
1993	2,193	2,824	a	0	0	0	0	2,193	2,824	14	33	2.0
1994	2,215	3,349	a	b	b	b	1	2,215	3,349	14	65	4.0
1995	1,982	1,705	a	b	b	b	1	1,982	1,705	15	23	1.0
1996	1,793	2,279	a	0	0	0	0	1,793	2,279	27	30	1.0
1997	1,645	1,950	a	b	b	b	1	1,645	1,950	26	63	5.0
1998	1,590	1,994	a	b	b	b	1	1,590	1,994	22	22	1.0
1999	2,082	2,437	a	0	0	0	0	2,082	2,437	22	72	4.0
2000	1,728	2,014	a	0	0	0	0	1,728	2,014	20	22	1.0
2001	1,572	1,437	110	105	8	25	9	1,462	1,332	14	29	2.0
2002	1,578	2,799	110	134	15	37	16	1,468	2,664	13	15	1.0
2003	1,662	1,487	116	88	18	23	5	1,546	1,379	6 ^c	16	4.0
2004	1,899	1,255	266	216	12	37	13	1,533	1,038	3 ^c	16	13.0
2005	1,365	1,159	191	0	9	0	11	1,174	1,154	3 ^c	7	9.0
2006	1,715	954	240	b	b	b	2	1,375	952	2 ^c	18	15.0
2007	1,779	1,254	249	b	b	b	2	1,530	1,248	2 ^c	12	12.0
2008	1,722	1,575	241	b	b	b	7	1,481	1,536	2 ^c	14	10.0
2009	1,600	1,334	224	b	b	b	28	1,321	1,310	2 ^c	12	5.0
2010 ^d	1,950	1,941	273	0	0	0	0	1,677	1,941	2 ^c	18	14.5
2011	1,867	1,795	261	0	0	0	0	1,606	1,795	2 ^c	15	6.5
2012	1,627	1,807	227	0	0	0	0	1,400	1,807	2 ^c	16	5.5
Average												
2007–2011												
	1,784	1,580	250	0	0	0	7	1,523	1,566	2	14	10
2002–2011												
	1,714	1,555	217	73	9	16	8	1,471	1,502	4	14	9

^a No allocation.

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

^c Several permit holders formed a cooperative and used one vessel.

^d 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 5.—Aleutian Islands Area (Dutch Harbor) commercial herring food and bait fisheries (all gear combined) summary, 1981–2012.

Year	Landing Date		Days Fished	Togiak	Dutch Harbor	Dutch Harbor	Number Vessels Fishing
	First	Last		Forecast Tons	Allocation Tons	Harvest Tons	
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 ^f
2005	Jul 15	Aug 20	11	105,029	1,365	1,159 ^e	4 ^f
2006	Jul 16	Jul 27	12	129,976	1,715	954 ^e	4 ^f
2007	Jul 16	Jul 27	12	134,566	1,779	1,254 ^e	4 ^f
2008	Jul 12	Jul 27	10	130,516	1,722	1,575 ^e	3 ^f
2009	Jun 24	Jul 25	28	121,800	1,600	1,334 ^e	4 ^f
2010 ^g	Jul 15	Jul 29	14.5	146,775	1,950	1,941	2 ^f
2011	Jul 15	Jul 22	6.5	140,860	1,867	1,795	2 ^f
2012	Jul 15	Jul 27	5.5	123,745	1,627	1,807	2 ^f
2007–2011 Average			14	134,903	1,784	1,580	3
2002–2011 Average			14	129,906	1,714	1,534	9

^a No allocation.

^b This information cannot 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 Several permit holders formed a cooperative and used one vessel.

^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 6.—Age, sex, weight and length of herring harvested in the Aleutian Islands Area (Dutch Harbor) commercial food and bait fisheries, 2012.

Age (Years)	Sex				Percent of Total	Standard Length			Weight		
	Male	Female	Unknown	Total		Mean (mm)	Standard Dev.	Number Measured	Mean (g)	Standard Dev.	Number Weighed
3	0	0	0	0	0.0			0			0
4	1	0	0	1	0.4	240.0		1	249.2		1
5	3	3	0	6	2.4	262.0	18.8	6	321.1	85.3	6
6	22	19	0	41	16.1	264.5	6.9	41	331.0	38.9	41
7	29	43	0	72	28.3	275.6	18.5	72	370.1	57.5	72
8	23	33	0	56	22.0	285.0	10.6	56	418.5	50.4	56
9	22	20	0	42	16.5	300.7	22.8	42	444.8	40.3	42
10	10	8	0	18	7.1	302.2	6.0	18	486.0	40.0	18
11	4	2	0	6	2.4	306.5	3.9	6	486.8	40.0	6
12	2	3	0	5	2.0	307.2	7.7	5	529.1	47.3	5
13	0	2	0	2	0.8	312.0	4.2	2	588.1	14.8	2
Regen. ^a	3	2	0	5	2.0	290.8	22.4	5	461.2	127.4	5
Total	119	135	0	254	100.0	-	-	254	-	-	254
Average	-	-	-	-	-	286.1	12.2	-	426.0	54.2	-

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

Table 7.—Estimated age composition of Aleutian Islands Area (Dutch Harbor) commercial herring food and bait purse seine harvests, 1991–2012.

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
2011	0.7	10.5	28.7	34.3	18.2	2.8	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	0.4	2.4	16.1	28.3	22.0	16.5	7.1	2.4	2.0	0.8	2.0	0.0	0.0	0.0	0.0
2002–2011 Average	1.1	5.8	12.1	17.1	18.6	15.7	10.0	6.2	3.9	3.2	2.2	1.4	0.5	0.6	0.2
2007–2011 Average	1.9	9.9	21.6	22.2	16.0	11.3	8.0	3.9	1.4	0.6	0.2	0.2	0.0	0.0	0.0

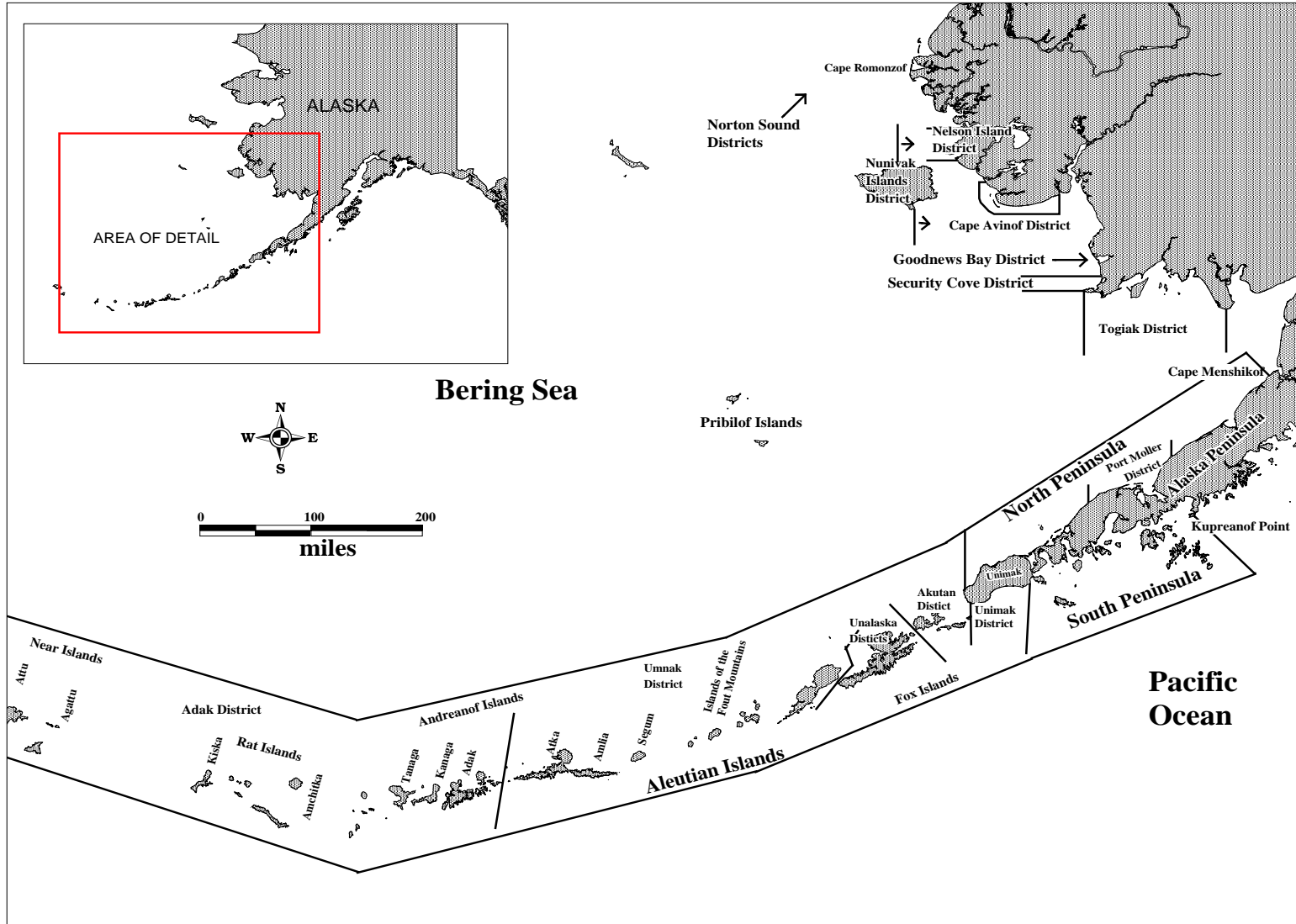


Figure 1.—Map of Bering Sea Management Plan (5 AAC 27.060) commercial herring districts.

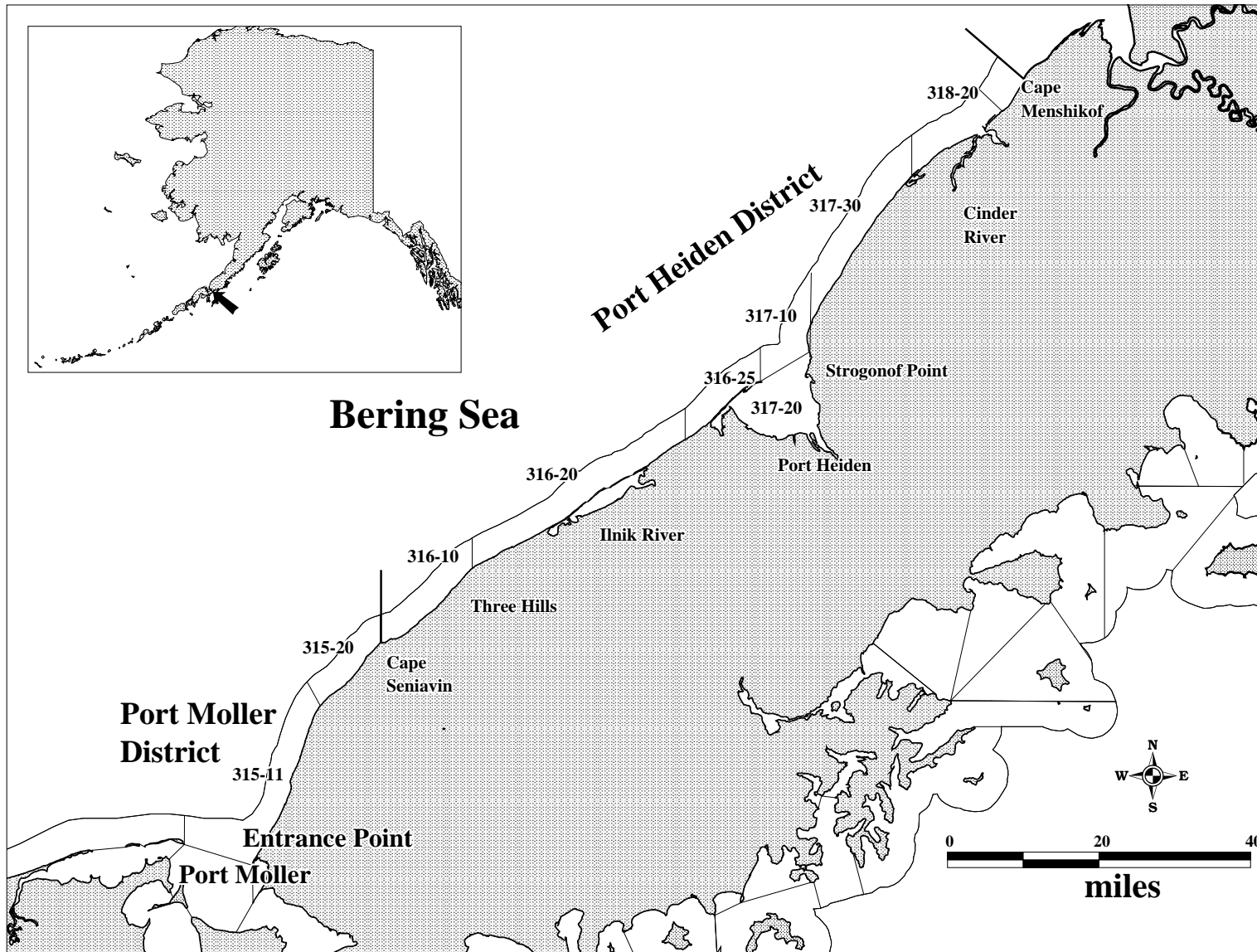


Figure 2.—Map of Port Heiden and Port Moller districts with commercial herring fishing statistical areas shown.

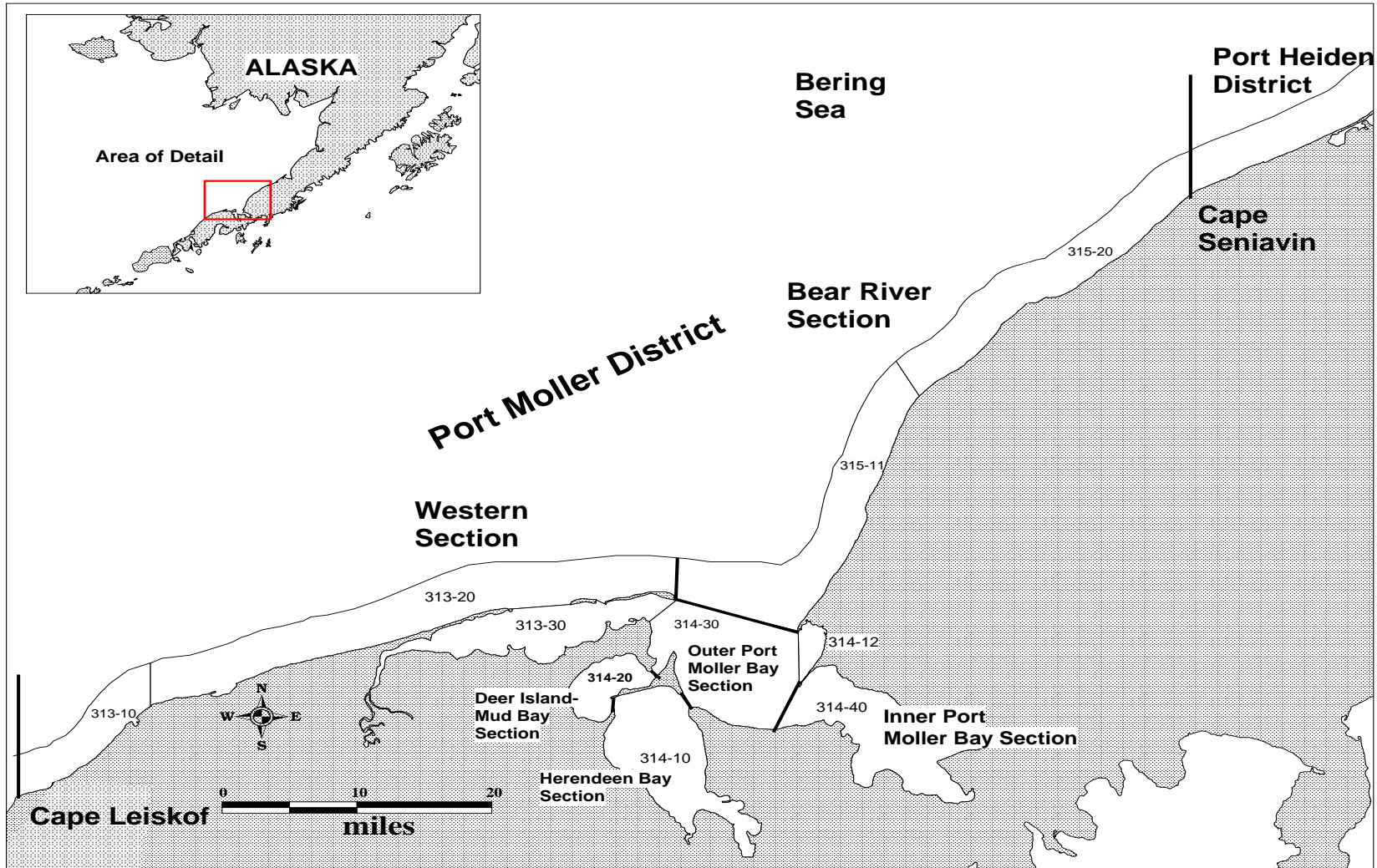


Figure 3.—Map of Port Moller District with commercial herring fishing statistical areas shown.

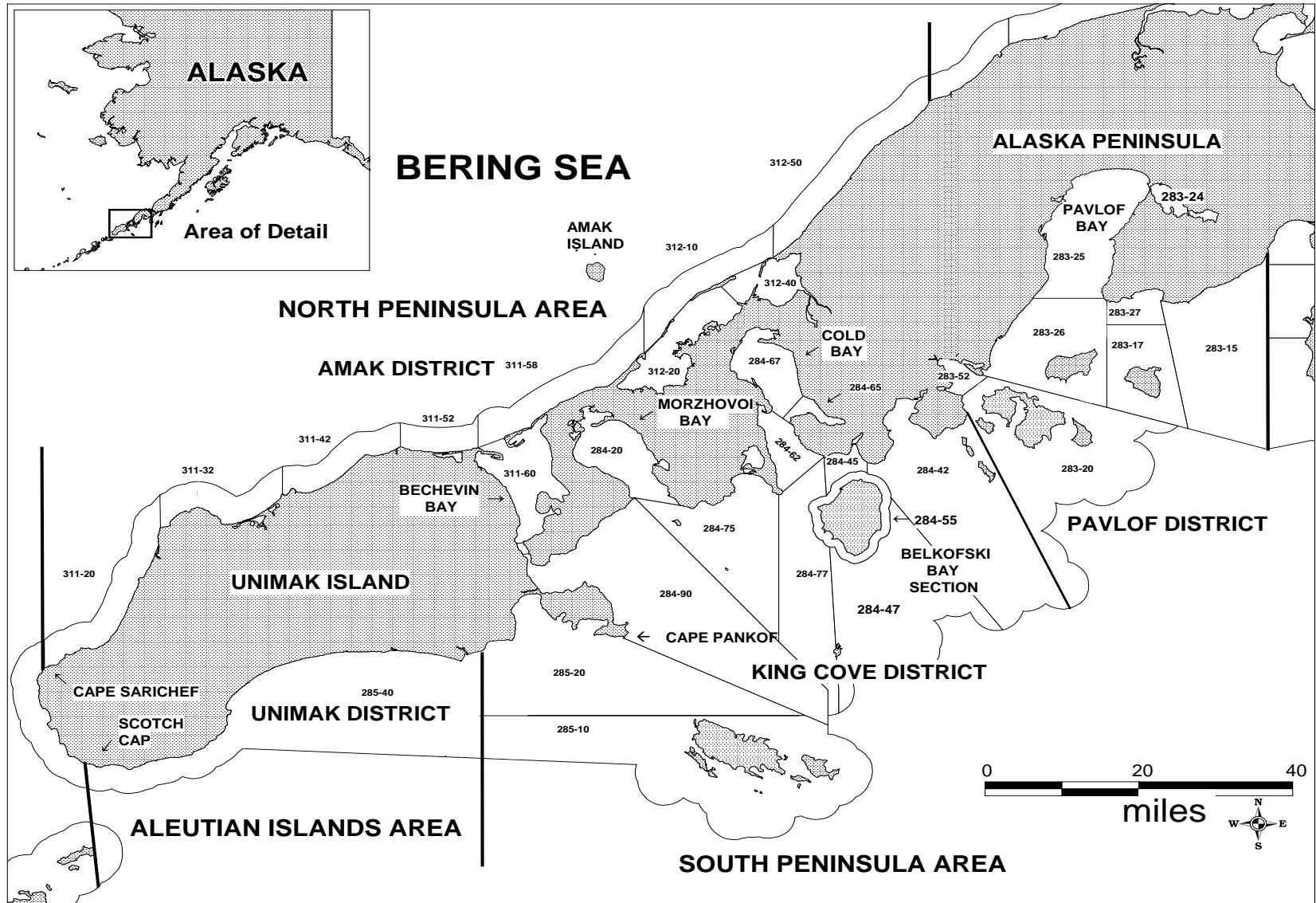


Figure 4.—Map of Amak, Unimak, King Cove, and Pavlof districts with commercial herring fishing statistical areas shown.

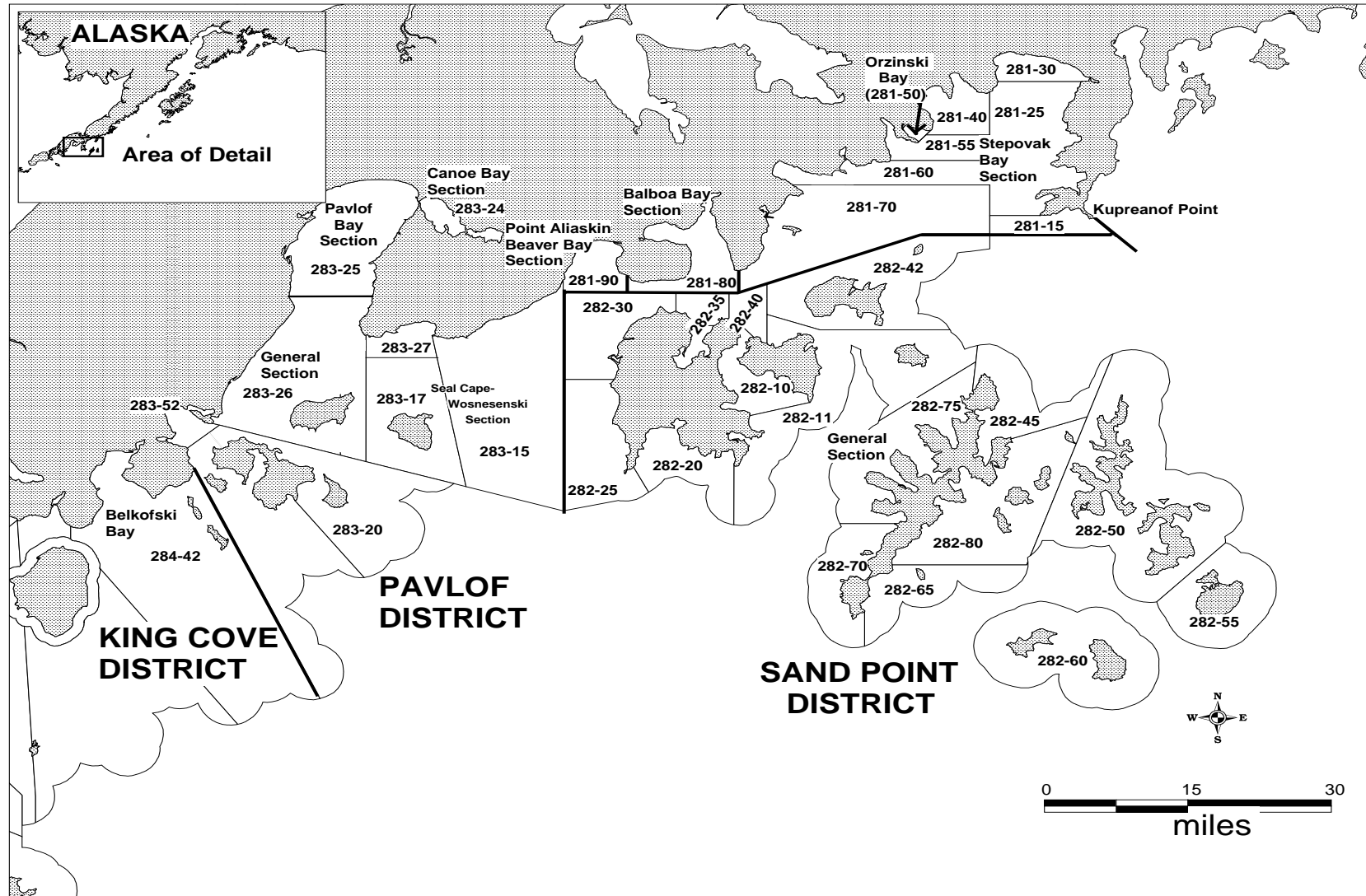


Figure 5.—Map of Pavlof and Sand Point districts with commercial herring fishing statistical areas shown.

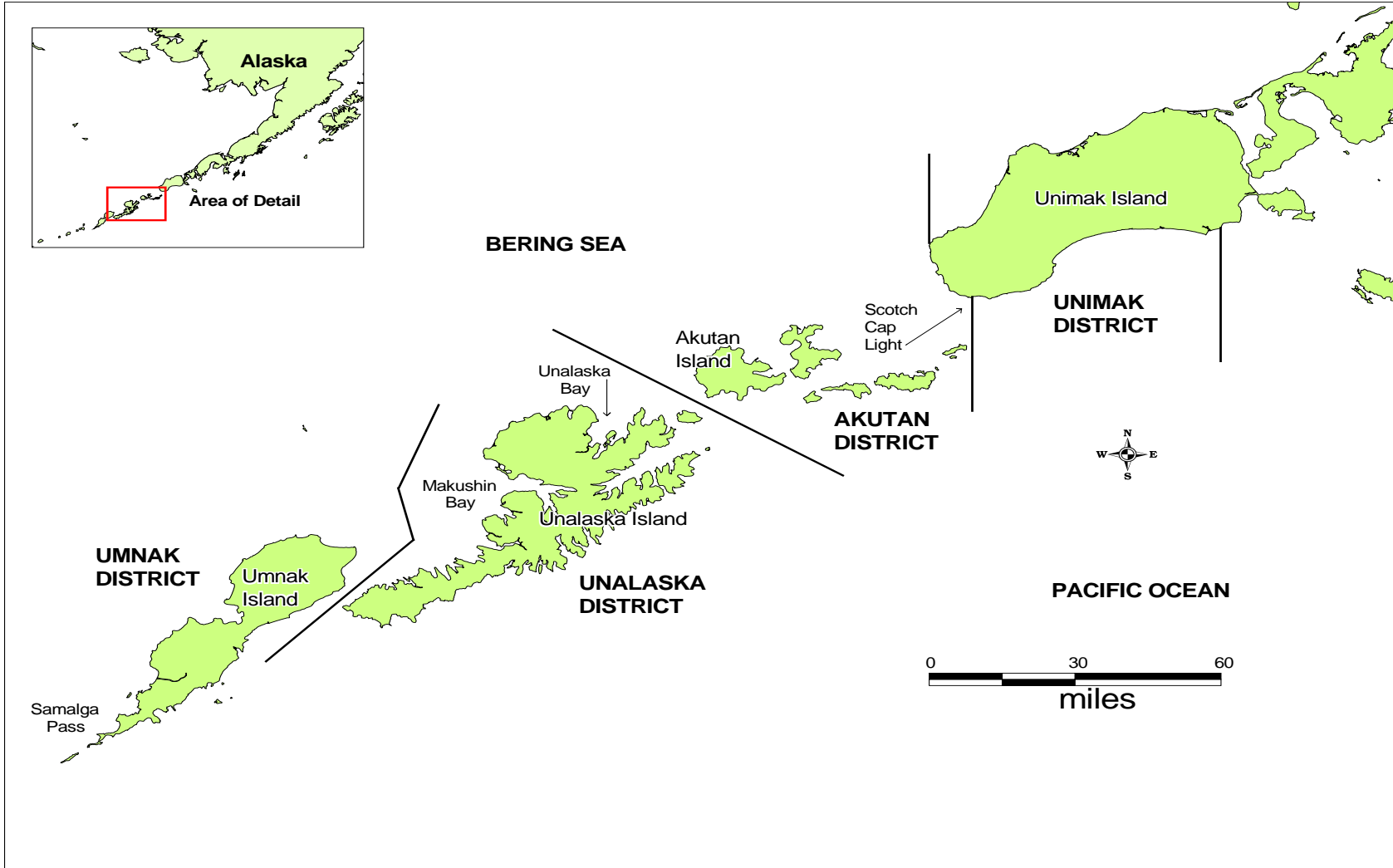


Figure 6.—Map of Aleutian Islands from Samalga Pass to Unimak Island with commercial herring fishing districts shown.

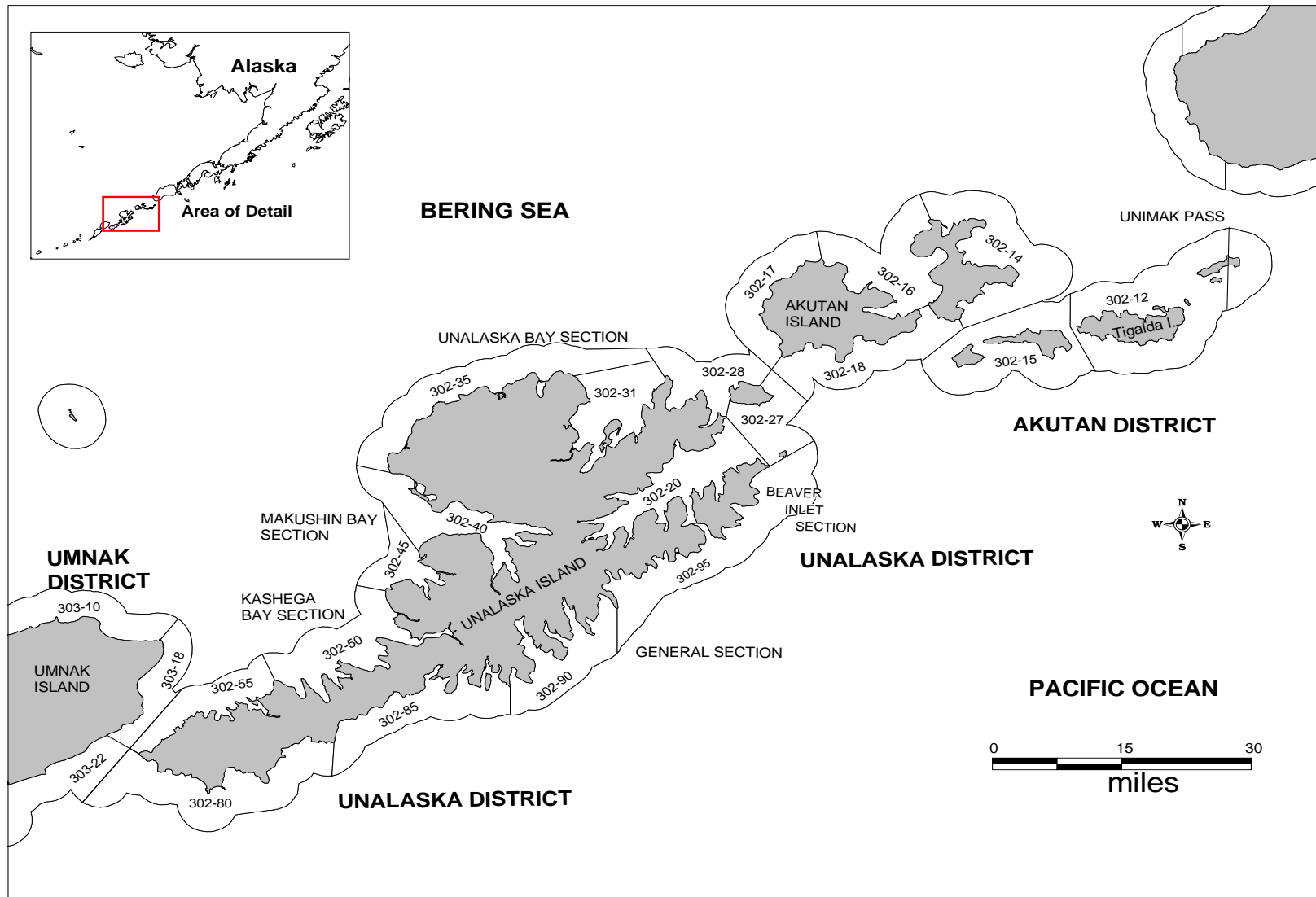


Figure 7.—Map of Aleutian Islands from Unimak Island to Umnak Island with commercial herring fishing statistical areas shown.

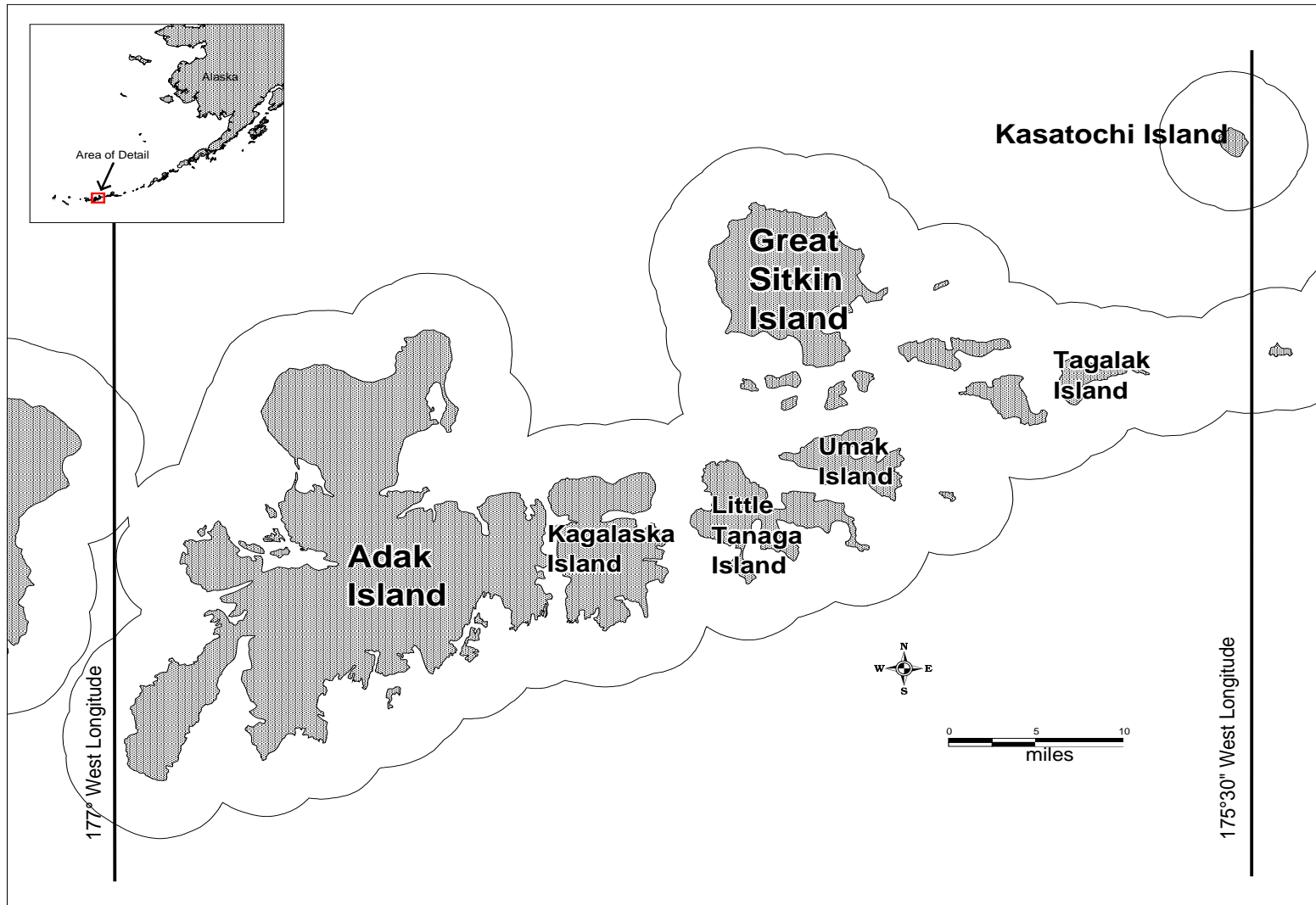


Figure 8.—Map of Adak Island area with boundaries of exploratory herring fishery defined.

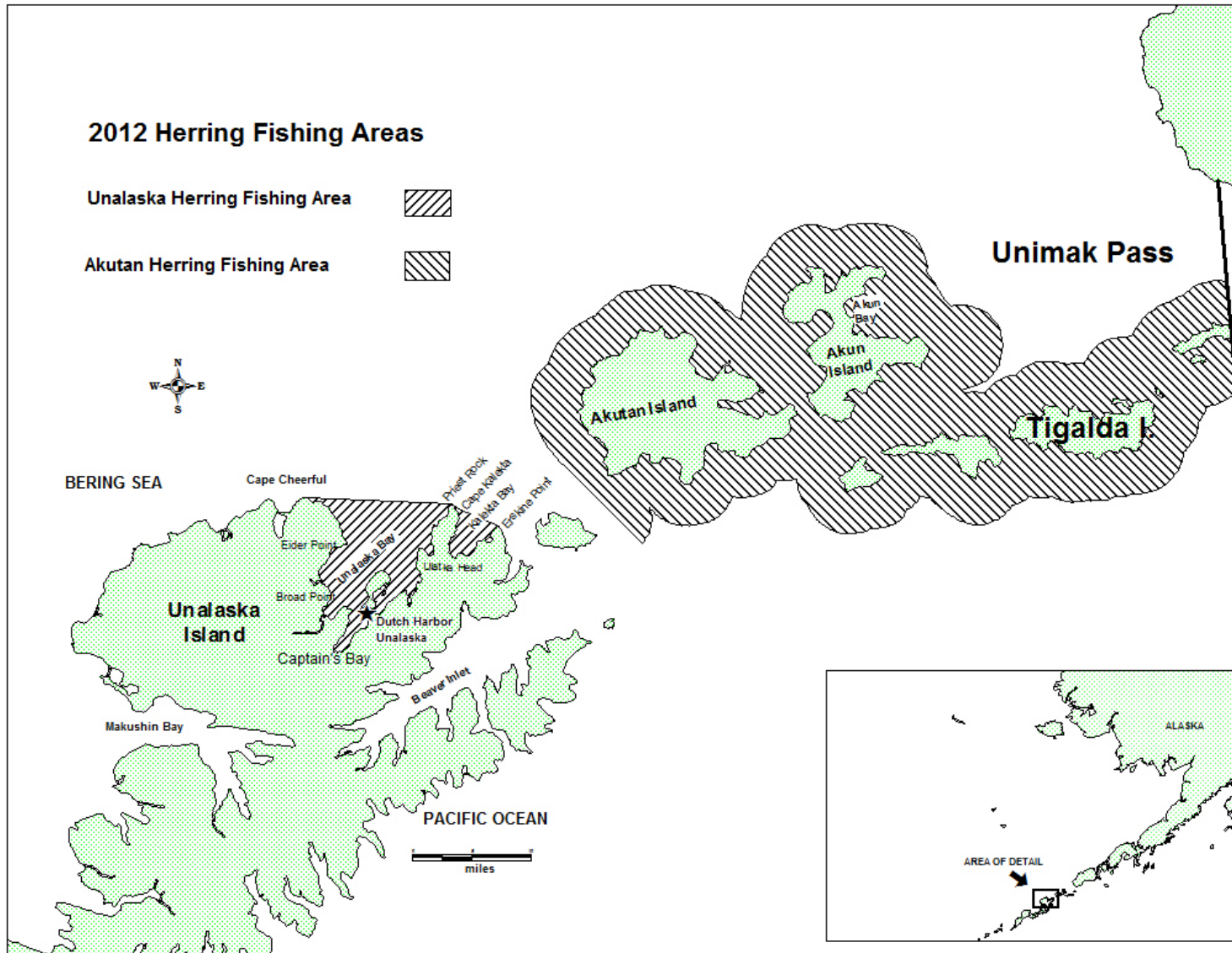


Figure 9.—Map of Akutan and Unalaska islands, with the 2012 commercial herring fishery open areas shown.

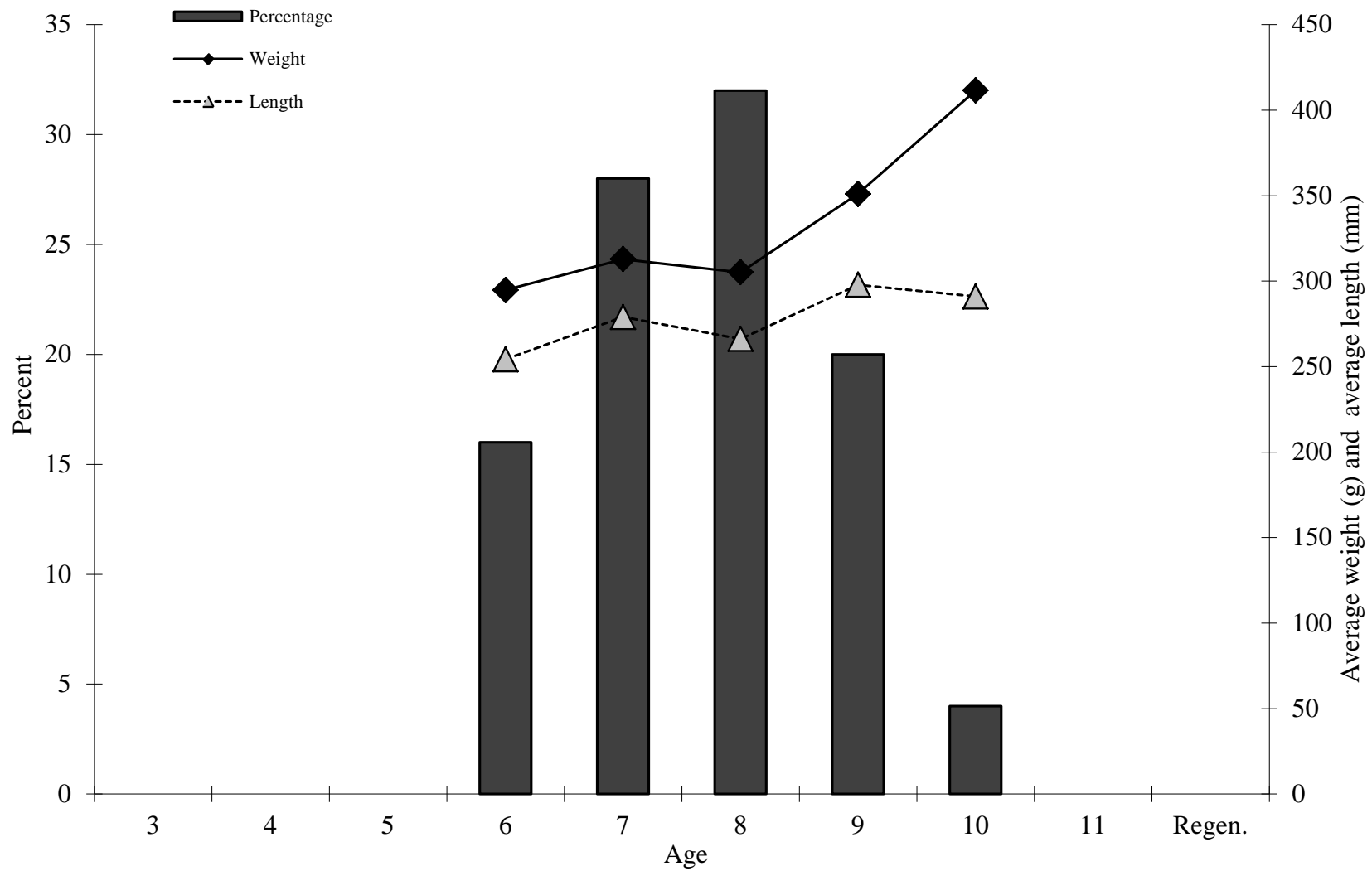


Figure 10.—Estimated average length-at-age (mm), average weight-at-age (g), and age composition of herring harvested in Port Moller District, 2012 (n = 25).

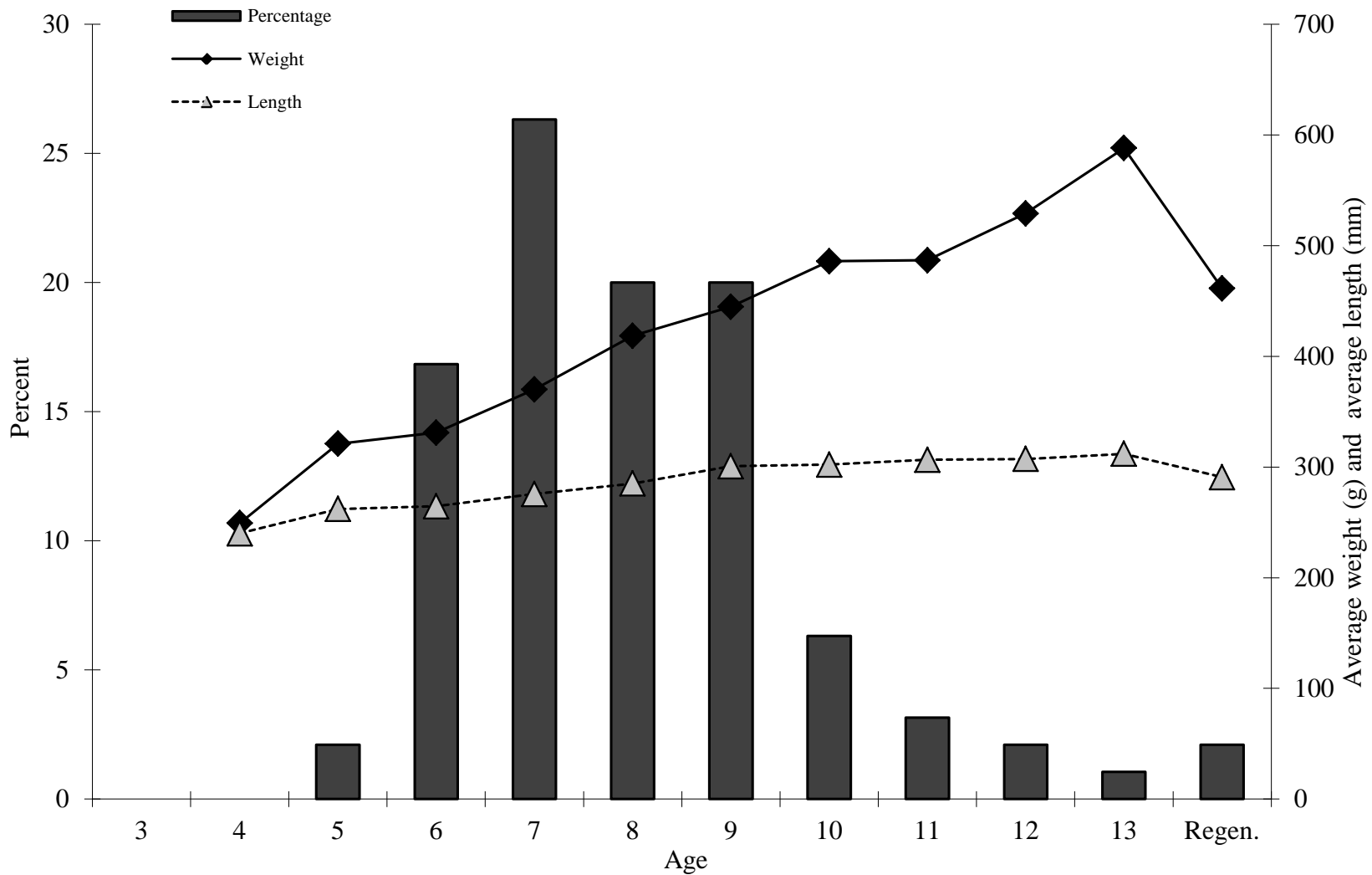


Figure 11.—Estimated average length-at-age (mm), average weight-at-age (g), and age composition of herring harvested in the Aleutian Islands Area (Dutch Harbor) commercial food and bait fisheries, 2012 (n = 254).

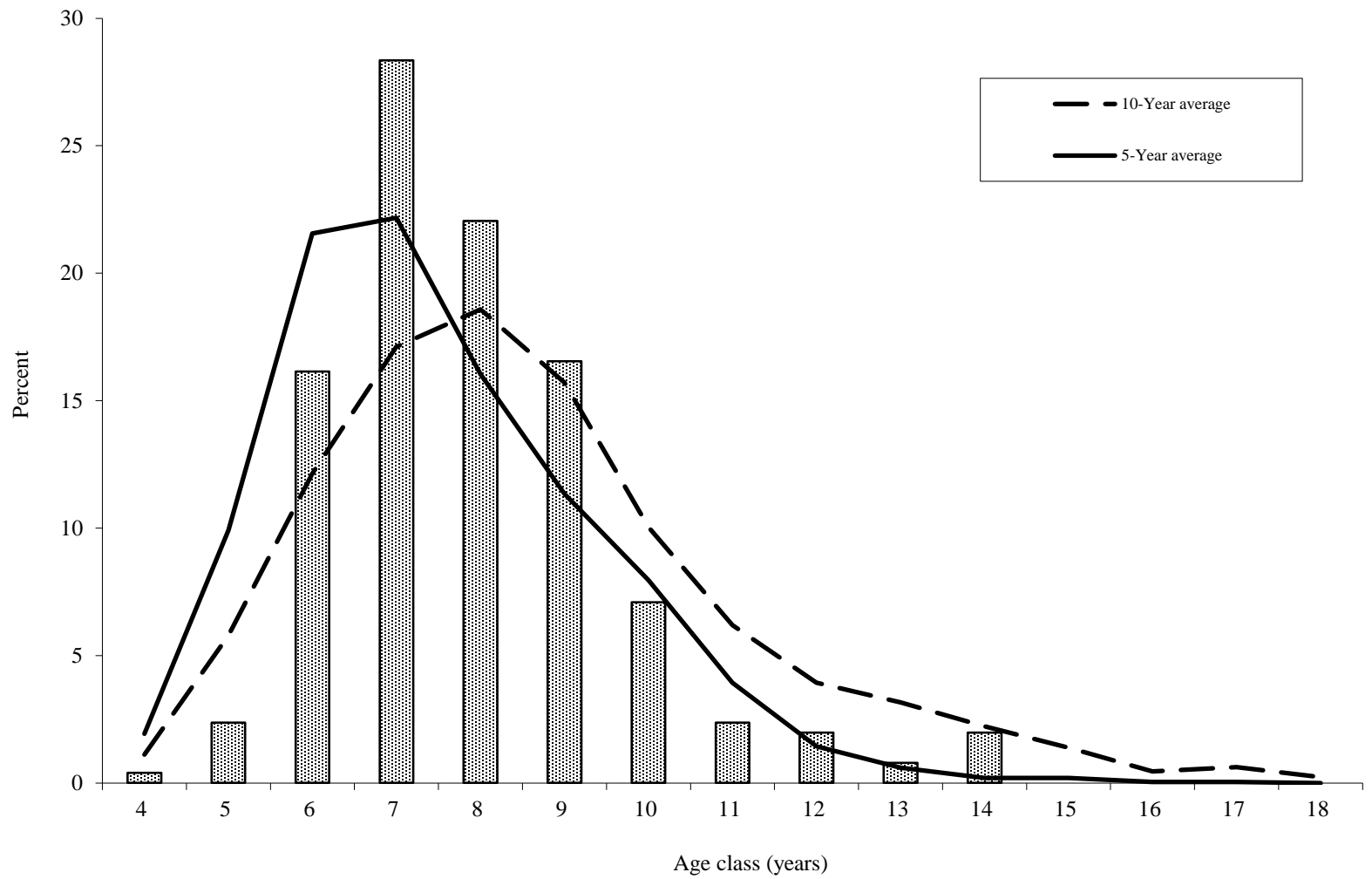


Figure 12.—Estimated 2012 percentage age composition of the Aleutian Islands Area (Dutch Harbor) commercial herring food and bait fisheries, with five and ten year averages.

**APPENDIX A. ARCTIC-YUKON-KUSKOKWIM HERRING
OUTLOOK**

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



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2012 Arctic-Yukon-Kuskokwim Herring Outlook

The 2012 Arctic-Yukon-Kuskokwim herring forecast and harvest allocations, given a maximum 20% exploitation rate of the projected biomass, are listed below for the northeastern Bering Sea herring stocks (Table 1).

Table 1. Projections of Pacific herring spawning biomass and harvest guideline for commercial fishing districts in the northeastern Bering Sea, Alaska, 2012.

District	Threshold	2011 Observed Biomass (tons)	2012 Projected Biomass (tons)	Exploitation Rate (%)	2012 Harvest Guideline (tons)
Security Cove	1,200	13,119 ^a	12,193	20	2,439
Goodnews Bay	1,200	36,810 ^a	33,008	20	6,602
Cape Avinof ^b	500	2,324 ^a	2,095	15	314
Nelson Island ^c	3,000	5,252 ^a	4,703	16	741
Nunivak Island	1,500	3,206 ^a	2,879	20	576
Cape Romanzof	1,500	5,343 ^a	4,794	20	959
Norton Sound	7,000	53,786	52,949	20	10,590
Port Clarence ^d	-	-	-	-	165
Totals		119,840	112,622	20	22,385

^a 2010 model projected biomass and age composition was used because of no survey efforts in 2011.

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

^c Cape Avinof commercial harvest is 15 % of projected biomass (SAAC27.895(a)).

^d Guideline Harvest of Port Clarence was set to 165 in 1984.

This news release is to inform fishermen of projected herring biomass and guideline harvest levels, and the strategies employed if commercial fishing does occur. At this time, it is anticipated that some level of commercial herring fishing may occur in the AYK Region in 2012. Under the Bering Sea Herring Fishery Management Plan 5 AAC 27.060 commercial fishing will not open in a district unless the minimum threshold biomass is observed in that district.

-continued-

Based on postseason escapement projections, the 2012 estimated spawning biomass for northeastern Bering Sea herring stocks (Security Cove to Norton Sound Districts) will be 112,622 tons. If the return is as anticipated the total allowable harvest could be 22,385 tons. A harvest of this magnitude in the AYK herring fishery would be one of the largest on record.

The 2012 AYK Region biomass projection was based on good aerial survey biomass estimates from Norton Sound in 2011 and biomass projections for 2011 were used for Security Cove, Goodnews Bay, Cape Avinof, Nunivak Island, Nelson Island, and Cape Romanzof. Herring samples collected from the test fishery at Goodnews Bay and Nelson Island in Kuskokwim Bay in 2010 and commercial and test fishery samples collected in Norton Sound through 2012 suggest that the forecasted population will be comprised primarily of herring ages 7–9 (76.1%) and ages 10 and older (16.9%).

The actual biomass observed in 2012 may fall above or below the preseason projections based on variability in the quality of aerial biomass assessments, the lack of recent aerial surveys, and annual fluctuation of survival or recruitment rates. Recruitment events typically occur every eight to ten years, as suggested by the dominant age 7 year class and high biomass estimates in Security Cove, Goodnews Bay, and Jacksmith Bay during 2010 and in Norton Sound during 2011.

The department will conduct aerial surveys as regularly as possible and monitor catch statistics inseason in Norton Sound. Guideline harvest levels may be adjusted according to inseason aerial assessments of herring biomass. If aerial surveys are not adequate because of poor weather and water clarity conditions, stock abundance will alternately be assessed using projected biomass, test fishery catches, and spawn deposition observations. In accordance with the AYK Region harvest strategy, any operational commercial fishery will not target newly recruited age classes (age 2 through age 5 herring). The duration of fishing periods and harvests would vary in each district depending on inseason biomass estimates, roe quality, spawning activity, weather conditions, fishing effort, and processor input.

Security Cove District

The 2012 projected biomass for the Security Cove District is 12,193 tons and the minimum biomass threshold is 1,200 tons. A 20% exploitation rate would result in a harvest of 2,439 tons. The department will plan to verify herring biomass inseason to determine the biomass is large enough to support this level of harvest if fishing occurs. Herring ages 7–9 are expected to comprise 68% of the returning biomass (34%, 22%, and 12%, respectively). Age 10 and older herring are expected to comprise 21% of the biomass.

Goodnews Bay District

The 2012 projected biomass for the Goodnews Bay District is 33,008 tons and the minimum biomass threshold is 1,200 tons. A 20% exploitation rate would result in a harvest of 6,602 tons. The department will plan to verify herring biomass inseason to determine the biomass is large enough to support this level of harvest if fishing occurs. Herring ages 7–8 (56%) and ages 9–10 (21%) are expected to dominate the fishery with age 11 and older (12%) and ages 5–6 (11%) expected to comprise the remaining biomass.

Cape Avinof District

The 2012 projected biomass for the Cape Avinof District is 2,095 tons and the minimum biomass threshold is 500 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. Based on this exploitation rate,

potential harvest could be 314 tons. Herring ages 7–9 are expected to comprise 68% of the returning biomass. Age 10 and older herring are expected to comprise approximately 27% of the biomass.

Nelson Island District

The 2012 projected biomass for the Nelson Island District is 4,703 tons and the minimum biomass threshold is 3,000 tons. A 20% exploitation rate would result in a commercial harvest of 741 tons after accounting for 200 tons in subsistence harvest uses. Herring ages 7–9 are expected to make up 69% of the returning population, contributing 21%, 26%, and 22% respectively. Herring age 10 and older are expected to comprise 26% of the biomass.

Nunivak Island District

The 2012 projected biomass for the Nunivak Island District is 2,879 tons and a minimum biomass threshold of 1,500 tons. A 20% exploitation rate would result in a harvest of 576 tons. Ages 7–9 are expected to comprise 68% of the returning biomass, 20%, 26%, and 22% respectively. Herring age 10 and older are expected to comprise 27% of the biomass.

Cape Romanzof District

The 2012 projected biomass for the Cape Romanzof District is expected to be 4,794 tons and the minimum biomass threshold is 1,500 tons. A 20% exploitation rate would result in a harvest of 959 tons. Since water turbidity in the Cape Romanzof area generally prevents aerial observations of herring, spawn deposition and test fishery and commercial catch rates will be used to determine the timing and duration of commercial fishing periods if fishing occurs. Herring ages 7–9 are expected to comprise 68% of the returning biomass, 20%, 26%, and 22%, respectively. Herring age 10 and older are expected to comprise 27% of the biomass.

Norton Sound District

The 2012 projected biomass for the Norton Sound District is 52,949 tons and a minimum biomass threshold of 7,000 tons. A 20% exploitation rate would result in a guideline harvest of 10,590 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 10,270 tons for sac roe harvest. The beach seine harvest is allocated 10% of the sac roe projected harvest, or 1,027 tons. The 2012 herring fishery will be opened by emergency order and the fishery will close by emergency order when up to 20% of the available herring biomass has been harvested. Varied harvest rates may be applied to individual subdistricts based on biomass distribution, roe quality, weather, and sea ice conditions. Herring ages 7–9 are expected to comprise 85% of the returning biomass, 36%, 31%, and 18%, respectively. Herring age 10 and older are expected to comprise 11% of the biomass.

Port Clarence District

Generally, the department does not project an outlook for the Port Clarence fishery because of the lack of data and the limited scope of the fishery. The guideline harvest of 165 tons established by the Alaska Board of Fisheries in 1981, and will be the allowable harvest in 2012. This harvest guideline is based on 2 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 harvestable biomass.

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

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



*Cora Campbell, Commissioner
Jeff Regnart, Director*



Contacts: Greg Buck & Fred West, Asst. Area Research Biologists Tim Baker, Area Research Biologist Phone: (907) 267-2355 Fax: (907) 267-2442	Anchorage Regional Office 333 Raspberry Road Anchorage, AK 99518 Date Issued: 11/10/11 Time: 1:00 p.m.
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2012 TOGIAK HERRING FORECAST

The 2012 Togiak herring forecast and harvest allocation are listed below for the Togiak District sac roe and spawn-on-kelp fishery, and the Dutch Harbor food and bait fishery, given a maximum 20% exploitation rate of the projected run biomass (5 AAC 27.865).

Harvest Allocation of the 2012 Forecasted Pacific Herring Run Biomass, Togiak District, Bristol Bay

	Biomass (Short Tons)	Harvest (Short Tons)
Forecasted Biomass	123,745	
Total Allowable Harvest (20% exploitation rate)		24,749
Togiak Spawn-on-Kelp Fishery (Fixed Allocation)		1,500
Remaining Allowable Harvest		23,249
Dutch Harbor Food/Bait Allocation (7.0% of the remaining allocation)		1,627
Remaining Allowable Harvest for Togiak District Sac Roe Fishery		21,622
Purse Seine Allocation 70.0%		15,135
Gillnet Allocation 30.0%		6,487

2012 TOGIAK HERRING FORECAST SUMMARY

The 2012 Pacific herring population forecast is 123,745 tons for the Togiak District 2012 (Figure 1). Age-7 and -8 herring returning from the 2005 and 2006 year classes are expected to comprise 52.1% of the biomass in 2012 (Figure 2). The remainder of the run will be comprised of herring ages 4–6 (19.1%), ages 9–11 (23.3%) and ages 12+ (5.5%) by weight. The forecasted individual average weight of herring in the harvest biomass is 323 g.

A run biomass of 123,745 tons would be ~16% less than the recent 10-year average. A biomass of this size has the potential to produce an overall harvest of 24,749 tons in all fisheries and 21,620 tons in the Togiak sac roe fisheries (purse seine and gillnet). A harvest of this size in the Togiak sac roe fisheries would be ~20% more than the recent 10-year average harvest.

An age-structured analysis (ASA) model was used to forecast the Togiak herring population that incorporates catch and age composition data as well as total run biomass estimates. The ASA model integrates data from purse seine fishery age compositions (1978–2011), total run age compositions (1978–1995, 1997, 1999, 2001, and 2005–2010), and aerial survey biomass estimates (1981, 1983, 1992–1994, 1997, 1999–2001, and 2005–2010). Samples from nonselective gear (commercial purse seine) are used to assess age composition of the total run biomass when a total run biomass is estimated. Commercial purse seine catch samples from 2011 ranged from age 4 to age 16. The average weight of age-4 herring for 2012 is estimated as the most recent 4-year average while simple linear regression models of historical trends are used to forecast average weights of remaining age classes.

A temporal change in age composition from older to younger herring typically occurs during this fishery. However, the 2011 inshore spawning biomass age composition was fairly stable and consisted largely of age-6 and -7 herring with a few discrete pulses of older fish. These age classes accounted for 47% of the total commercial purse seine harvest and 41% of the total harvest by weight.

The biomass of the Togiak herring spawning population has been estimated with aerial surveys since the late 1970s, concurrent with development of the sac-roë fishery. Total run biomass for 2011 was not estimated because aerial survey efforts were inadequate to measure the peak inshore biomass, primarily due to poor weather. Estimating the peak inshore biomass is a necessary precondition for estimating total run biomass. Surveys were flown between 27 April and 26 May and while most of the biomass was observed in the center of Togiak Bay, smaller concentrations of herring were noted in the vicinity of Nunavachak Bay to the east and Hagemeister Island to the west (Figure 3).

Herring become visible to our sampling effort when they recruit into the fishery; a process that we believe begins around age-4. Large recruitments in this population generally occur every 8 to 10 years. The last recruitment event experienced by Togiak herring was observed as the relatively large numbers of age-4 herring present in 2008 and 2009. It should be noted that measuring contributions of age classes less than three to the spawning biomass is difficult because these fish are not fully recruited (vulnerability to the gear) and they often arrive on the spawning grounds after older fish when sampling has ceased, unlike the post-fishery sampling that occurred in the 1980s.

There is always uncertainty in forecasting the Togiak District herring biomass. The mean percent error (MPE) has been -20% for years with reliable total run biomass estimates (Figure 1). The accuracy or mean absolute percent error (MAPE) of the ASA model is 19%. The forecast range for 2012 is 72,859 tons to 174,631 tons based on a MAPE of 20%. We consider this population to be healthy and sustainable.

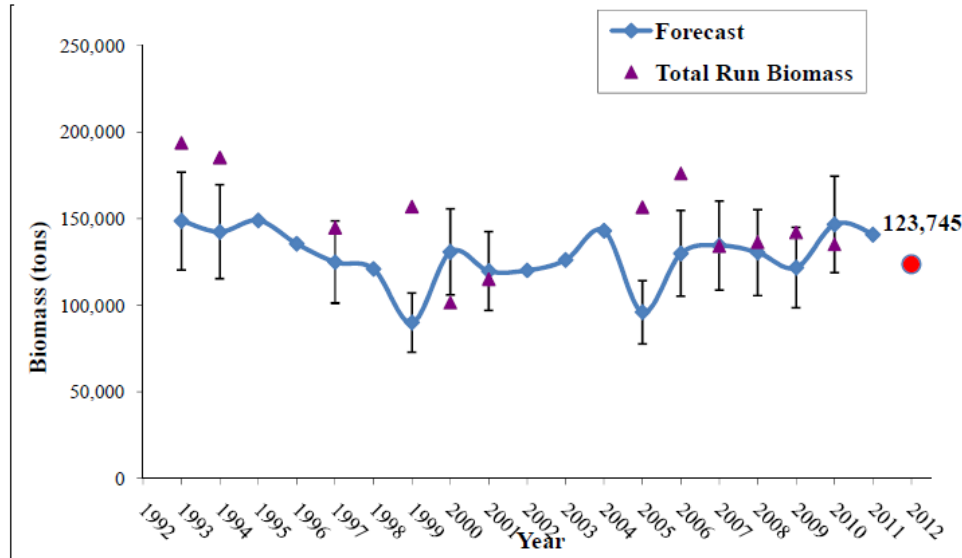


Figure 1.—Annual observed Togiak herring total run biomass estimates and preseason forecasts based on the ASA model. Mean absolute percent error (MAPE) of 25% around the forecast is also shown for years with a reliable total run biomass estimate.

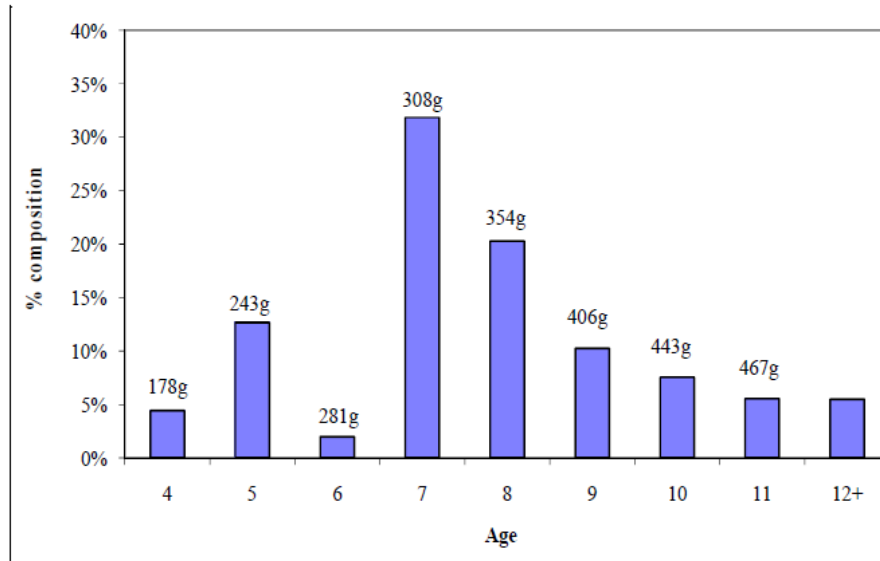


Figure 2.—Forecasted age composition by weight (grams) for the 2012 Togiak herring return. Forecasted average weight is shown for each age category.

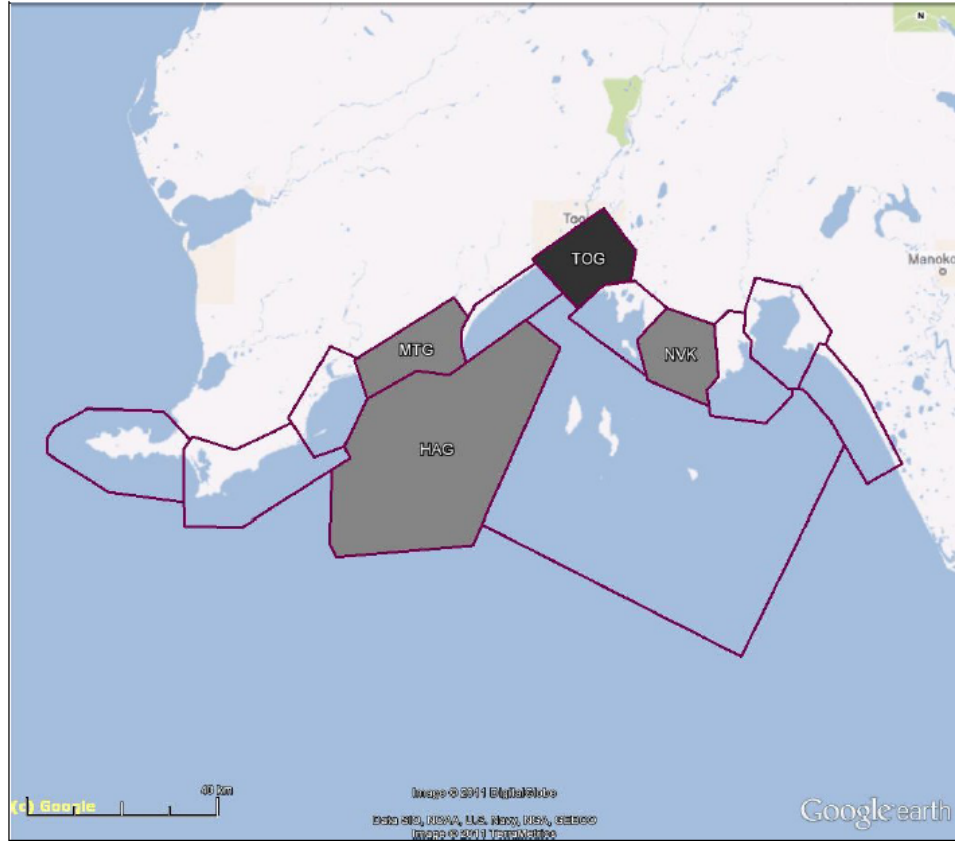


Figure 3.–Herring distribution observed during aerial surveys conducted during 2011. Survey section shaded in black (TOG=Togiak) recorded slightly more than 50% of the cumulative biomass measured across all surveys while sections with 6–12% of the cumulative recorded biomass are shaded grey (HAG=Hagemeister; MTG=Matogak; and NVK=Nunavachak). Herring were observed in all survey sections during 2011.

**APPENDIX C. ALASKA PENINSULA AND ALEUTIAN
ISLANDS SAC ROE AND FOOD AND BAIT HERRING
FISHERY EMERGENCY ORDER SUMMARY**

Appendix C1.–Emergency order summary, 2012.

EMERGENCY ORDER NO. 4-FH-M-PM-01-12

EFFECTIVE DATE: 7:00 PM Saturday, May 26, 2012

EXPLANATION: This emergency order establishes a commercial herring fishing period in the Port Moller District for 24 hours from 7:00 PM Saturday, May 26 until 7:00 PM Sunday, May 27, 2012.

EMERGENCY ORDER NO. 4-FH-M-PM-02-12

EFFECTIVE DATE: 7:00 PM Sunday, May 27, 2012

EXPLANATION: This emergency order extends the current commercial herring fishing period in the Port Moller District for 24 hours from 7:00 PM Sunday, May 27 until 7:00 PM Monday, May 28, 2012.

EMERGENCY ORDER NO. 4-FH-M-PM-03-12

EFFECTIVE DATE: 7:00 PM Monday, May 28, 2012

EXPLANATION: This emergency order extends the current commercial herring fishing period in the Port Moller District for 24 hours from 7:00 PM Monday, May 28 until 7:00 PM Tuesday, May 29, 2012.

EMERGENCY ORDER NO. 4-FH-M-PM-04-12

EFFECTIVE DATE: 7:00 PM Tuesday, May 29, 2012

EXPLANATION: This emergency order extends the current commercial herring fishing period in the Port Moller District for 24 hours from 7:00 PM Tuesday, May 29 until 7:00 PM Wednesday, May 30, 2012.

EMERGENCY ORDER NO. 4-FH-M-SP-01-12

EFFECTIVE DATE: NOON Sunday, July 15, 2012

EXPLANATION: This emergency order establishes a commercial herring fishing period in the Unalaska and Akutan district for 24 hours from NOON Sunday, July 15 until NOON Monday, July 16, 2012.

EMERGENCY ORDER NO. 4-FH-M-SP-02-12

EFFECTIVE DATE: NOON Monday, July 16, 2012

EXPLANATION: This emergency order extends the current commercial herring fishing period in the Unalaska and Akutan district for 48 hours from NOON Monday, July 16 until NOON Wednesday, July 18, 2012.

EMERGENCY ORDER NO. 4-FH-M-SP-03-12

EFFECTIVE DATE: NOON Wednesday, July 18, 2012

EXPLANATION: This emergency order extends the current commercial herring fishing period for vessels using purse seine gear in the Unalaska and Akutan district for 5 hours from NOON Wednesday, July 18 until 5:00 PM Wednesday, July 18, 2012. This emergency order also extends the current commercial herring fishing period for vessels using gillnet gear in the Unalaska and Akutan district for 7 days from NOON Wednesday, July 18 until NOON Wednesday, July 25, 2012.

EMERGENCY ORDER NO. 4-FH-M-SP-04-12

EFFECTIVE DATE: 5:00 AM Thursday, July 19, 2012

EXPLANATION: This emergency order establishes a commercial herring fishing period for vessels using purse seine gear in the Unalaska and Akutan district for 6 hours from 5:00 AM Thursday, July 19 until 11:00 AM Thursday, July 19, 2012.

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EMERGENCY ORDER NO. 4-FH-M-SP-05-12

EFFECTIVE DATE: NOON Wednesday, July 25, 2012

EXPLANATION: This emergency order establishes a commercial herring fishing period for vessels using purse seine and gillnet gear in the Unalaska and Akutan district for 48 hours from NOON Wednesday, July 25 until NOON Friday, July 27, 2012.
