Fishery Management Report No. 12-16

Alaska Peninsula-Aleutian Islands Herring Sac Roe and Food and Bait Fisheries Annual Management Report, 2011

by

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May 2012

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
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

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

FISHERY MANAGEMENT REPORT NO. 12-16

ALASKA PENINSULA-ALEUTIAN ISLANDS HERRING SAC ROE AND FOOD AND BAIT FISHERIES ANNUAL MANAGEMENT REPORT, 2011

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ABSTRACT

This report presents information concerning commercial Pacific herring *Clupea pallasii* food and bait fisheries that occurred in Alaska Peninsula-Aleutian Islands Management Area (Area M) in 2011. Area M is split into three sub-areas: North Alaska Peninsula, South Alaska Peninsula, and Aleutian Islands.

In 2011, the total herring biomass estimated from aerial surveys in the North Alaska Peninsula was 4,842 tons. There were no aerial surveys conducted on the South Alaska Peninsula or in the Aleutian Islands Management Area in 2011. There was no sac roe fishery in 2011 due to lack of industry interest.

In 2011, 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 1,867 tons, of which 1,606 tons were allocated to the seine fleet and 261 tons to the gillnet fleet. A total of 1,795 tons of herring were harvested in the seine fishery, but there were no herring harvested in the gillnet fishery during the 2011 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* food and bait fishery that occurred in Dutch Harbor within the Alaska Peninsula–Aleutian Islands Management Area (Area M) for the 2011 season. This report is intended as a reference document, describes harvest strategies, a summary of 2011 fishery management activities, as well as age, weight, and length (AWL) data collected from commercial harvests. For information and historical perspective considering 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 December 2011. 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 1–4). 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. 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).

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*", has occurred annually. During the 1981 and 1982 seasons, there were no harvest restrictions (Schwarz 1988). From 1983 through 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 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. 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 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 6; 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 (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 through 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%. 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 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. 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.

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.

2011 SEASON SUMMARY

The Dutch Harbor food and bait fishery was allocated 1,867 tons of herring for the 2011 season (Table 8; Appendix C1). The purse seine fishery was allocated 1,606 tons and the 2011 set gillnet fishery was allocated 261 tons of herring (Table 8). ADF&G did not conduct aerial surveys in 2011 to assess herring biomass in the Dutch Harbor area because of budget constraints and poor weather conditions.

Gillnet Fishery

In 2011, the Dutch Harbor food and bait herring commercial gillnet fishery occurred from July 19 until December 31, 2011 (Appendix D1). A confidential number of permit holders and processors registered in this fishery. From noon July 19 until December 31, the commercial herring gillnet fishery was open continually in Unalaska Bay Section and Akutan Districts. In 2011, no herring were harvested in the gillnet fishery since there was no participation by the gillnet fleet (Table 7).

Purse Seine Fishery

In 2011, Dutch Harbor food and bait seine fishery occurred from July 15 through July 22 within Unalaska and Akutan districts (Figure 6, 7, and 9). The seine fishery was allocated 1,606 tons of herring for the 2011 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. Over the course of the seine fishery, 15 deliveries were made for a total harvest of 1,795 tons of herring, of which the majority of herring was captured in Akutan District (Tables 8 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 2011 purse seine fishery was an estimated $898,000 (Table 6).

2011 Catch Sampling

A total of 143 herring were sampled from the purse seine fishery (Table 10). The most abundant age classes were years 7 (34.3%) and 6 (28.7%; Table 10; Figure 10). They were followed by age 8 represented at 18.2% (Table 10; Figure 10). Average herring length in the sample was 286.8 mm, and average weight was 431 g (Table 10). The sex composition of the sample was 43% male and 57% 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 11; Figure 11).

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TABLES AND FIGURES

Table 1.–Herring biomass estimates in tons for the North Alaska Peninsula, by area, 1984–2011.

	Port Moller District				Port Heiden District			
Date	Herendeen Bay	Port Moller Bay	Additional Biomass Harvested	Bear River to Strogonof Point	Port Heiden Bay Section	Total Biomass Estimate	Aerial Survey Dates Begin	End
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	May22
2011	70	662	0	4,110	0	4,842	May 18	May 19
2001–2010 Average	960	4,761	35	3,150	0	8,696		

[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 herring food and bait fisheries historical summary for the purse seine fishery, 1929–2011.

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)
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[e]	1,038	3	16	346	65	$100–500	$309	$103

-continued-

Table 2.–Page 2 of 2.

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)
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
2011 [g]	1,795	2	15	898	120	$500	$898	$449
1929–1938 Average	1,474	– [a]	– [a]	– [a]	– [a]	– [a]	– [a]	– [a]
2006–2010 Average	1,397	2	15	699	97	$100–500	$531	$266
2001–2010 Average	1,456	5	16	477	102	$225–460	$499	$172

[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 Commercial Fisheries Entry Commission (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 3.–Aleutian Islands Area Dutch Harbor herring food and bait gillnet historical summary, 2001–2011.

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]	$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]								
2011 [c]								
2006–2010 Average	18	– [b]	– [b]	– [b]	– [b]	$340	$5,100	$3,720

[a] 20 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 4.–Aleutian Islands Area herring food and bait fisheries allocations (tons), commercial harvest (tons), and effort by gear type, 1991–2011.

	All Gear Types		Gillnet Fishery					Seine Fishery				
Year	Allocation	Harvest	Allocation	Harvest	Permits	Landings	Days Fished	Allocation	Harvest	Permits	Landings	Days Fished
1991	931	1,325	– [a]					931	1,325	8	18	1
1992	1,940	1,982	– [a]					1,940	1,982	11	26	5
1993	2,193	2,824	– [a]					2,193	2,824	13	32	1
1994	2,215	3,349	– [a]					2,215	3,349	14 [c]	65	4
1995	1,982	1,705	– [a]					1,982	1,705	14 [c]	24	1
1996	1,793	2,279	– [a]					1,793	2,279	24	29	1
1997	1,645	1,950	– [a]					1,645	1,950	26	63	5
1998	1,590	1,994	– [a]					1,590	1,994	22	22	1
1999	2,082	2,437	– [a]					2,082	2,437	21	21	4
2000	1,728	2,014	– [a]					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	0	1,677	1,941 [g]	2 [f]	18	14.5
2011	1,867	1,795	261	0	0	0	0	1,606	1,795 [g]	2 [f]	15	6.5
Average 2006–2010	1,753	1,412	245	14	1	3	8	1,477	1,262	2	15	11
2001–2010	1,684	1,520	202	63	6	14	9	1,457	1,402	8	14	9

[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 5.–Aleutian Islands Area, Dutch Harbor commercial herring food and bait fishery (all gear combined) summary, 1981–2011.

Year	Landing Date First	Landing Date Last	Days Fished	Preseason Togiak Spawning Biomass Tons	Dutch Harbor Allocation Tons	Food and Bait Harvest Tons	Number Vessels Fishing
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]
2011 [j]	Jul 15	Jul 22	6.5	140,860	1,867	1,795	2 [k]
2006–2010 Average			15	132,727	1,753	1,412	3
2001–2010 Average			15	127,801	1,684	1,498	11

[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.

-continued-

[e] Includes both gillnet and seine harvest.

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

[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 and 2011, 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 6.–Age, sex, weight and length of herring harvested by purse seine gear in Akutan District, 2011.

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	0	1	0	1	0.7	271	-	1	255	-	1
5	6	9	0	15	10.5	339	90.0	15	269	17.4	15
6	21	20	0	41	28.7	388	69.6	41	281	16.6	41
7	20	29	0	49	34.3	414	69.3	49	281	13.7	49
8	11	15	0	26	18.2	465	77.8	26	296	14.9	26
9	1	3	0	4	2.8	480	39.3	4	299	10.7	4
10	0	1	0	1	0.7	548	-	1	306	-	1
11	0	1	0	1	0.7	542	-	1	310	-	1
Regen. [a]	3	2	0	5	3.5	432	50.9	5	284	11.0	5
Total	62	81	0	143	100.0	-	-	143	-	-	143
Average	-	-	-	-	-	431	66.1	-	286.8	14.1	-

[a] Age could not be determined due to regenerated scale.

Table 7.–Estimated age composition of Aleutian Islands commercial herring food and bait purse seine harvests, 1991–2011.

	Percent at Age (Years)														
Year	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
2006–2010 Average															
	1.9	9.0	17.1	16.0	13.4	17.2	12.6	4.5	2.4	1.7	0.8	0.8	0.3	0.2	0.1
2001–2010 Average															
	1.1	5.1	9.5	14.3	19.9	16.7	11.2	7.1	4.5	4.2	2.6	1.5	0.5	0.6	0.2

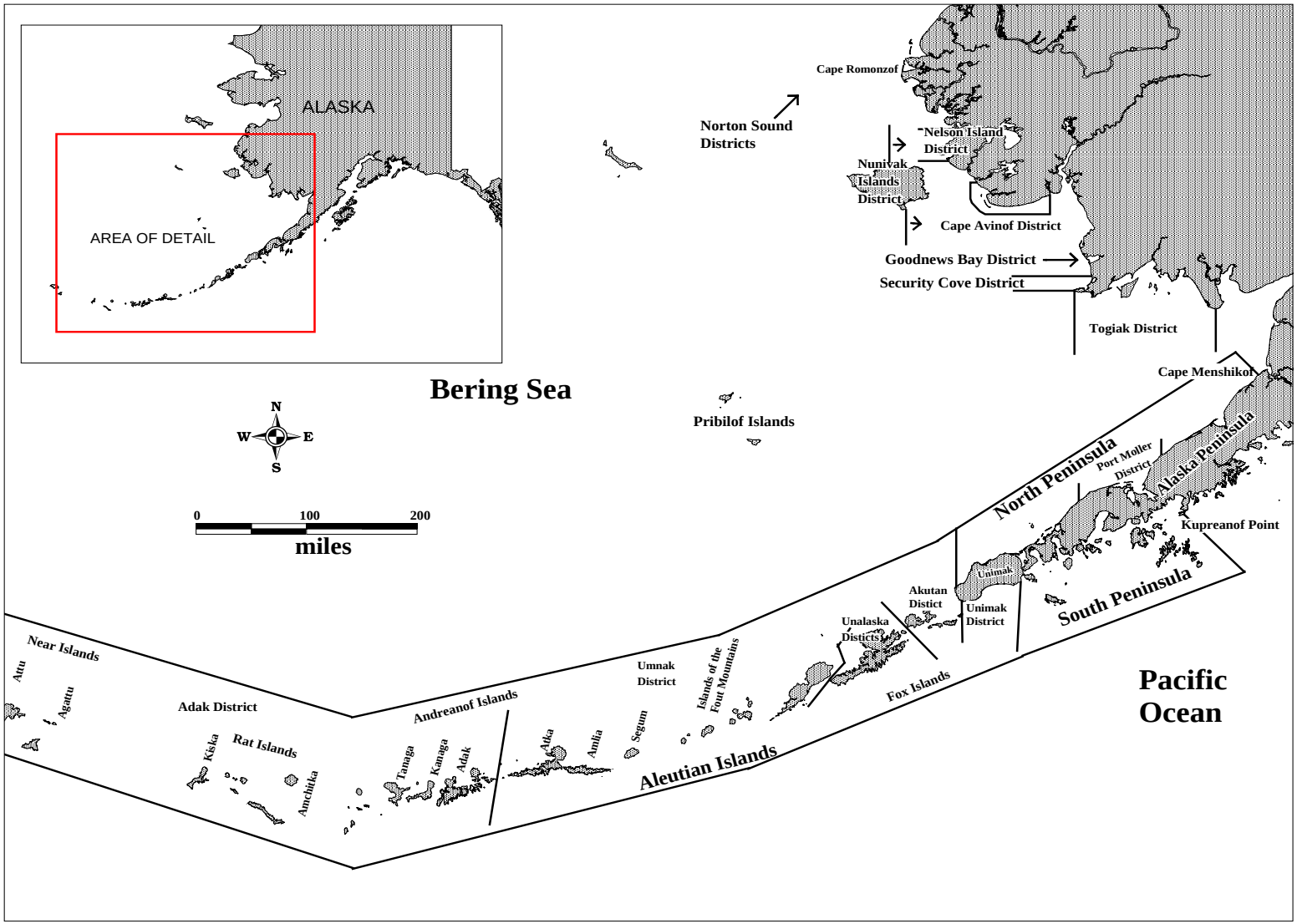

Figure 1.–Map of Bering Sea Management Plan (5 AAC 27.060) commercial herring districts.

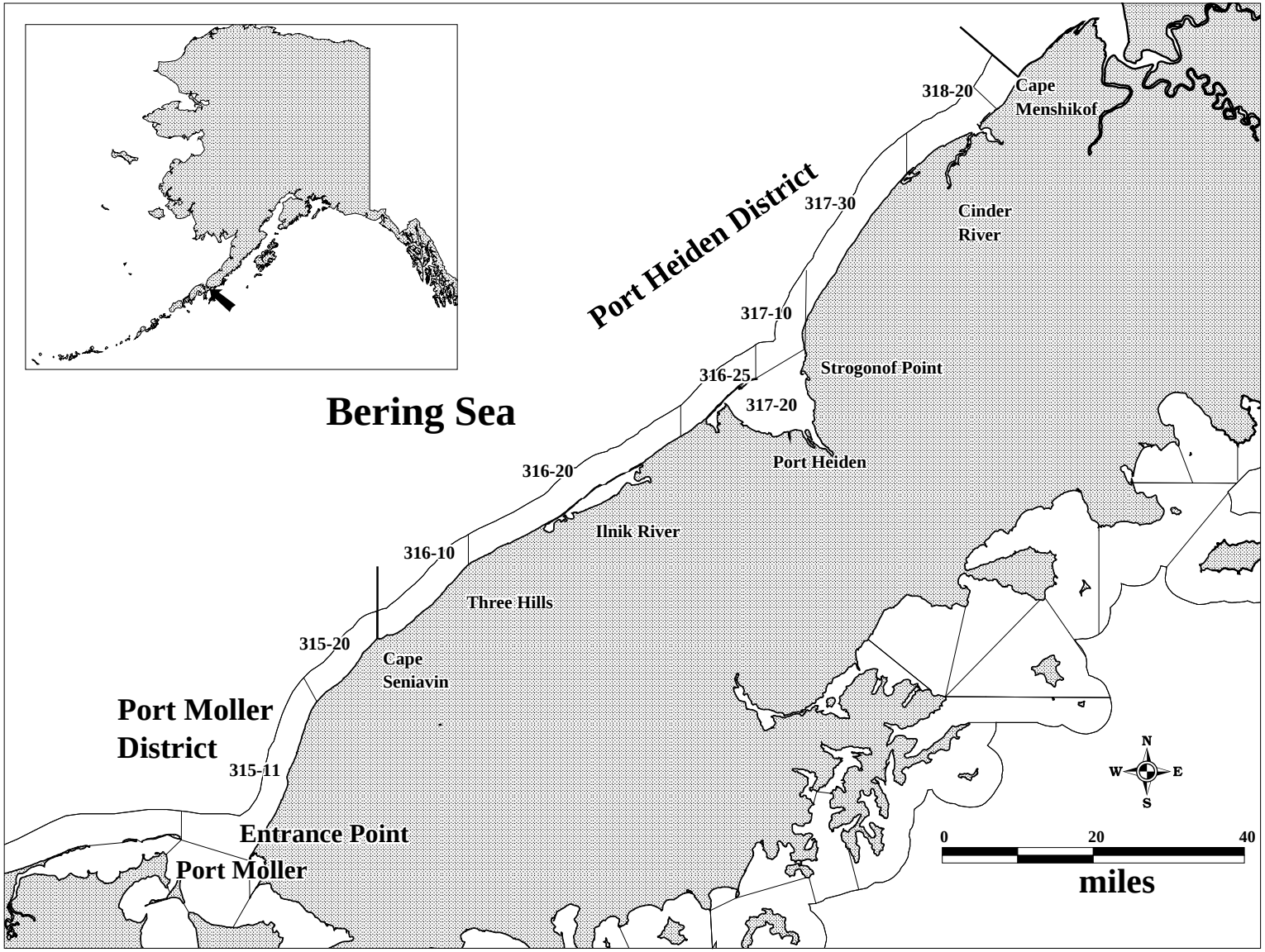

Figure 2.–Map of Port Heiden and Port Moller districts with commercial herring fishing statistical areas shown.

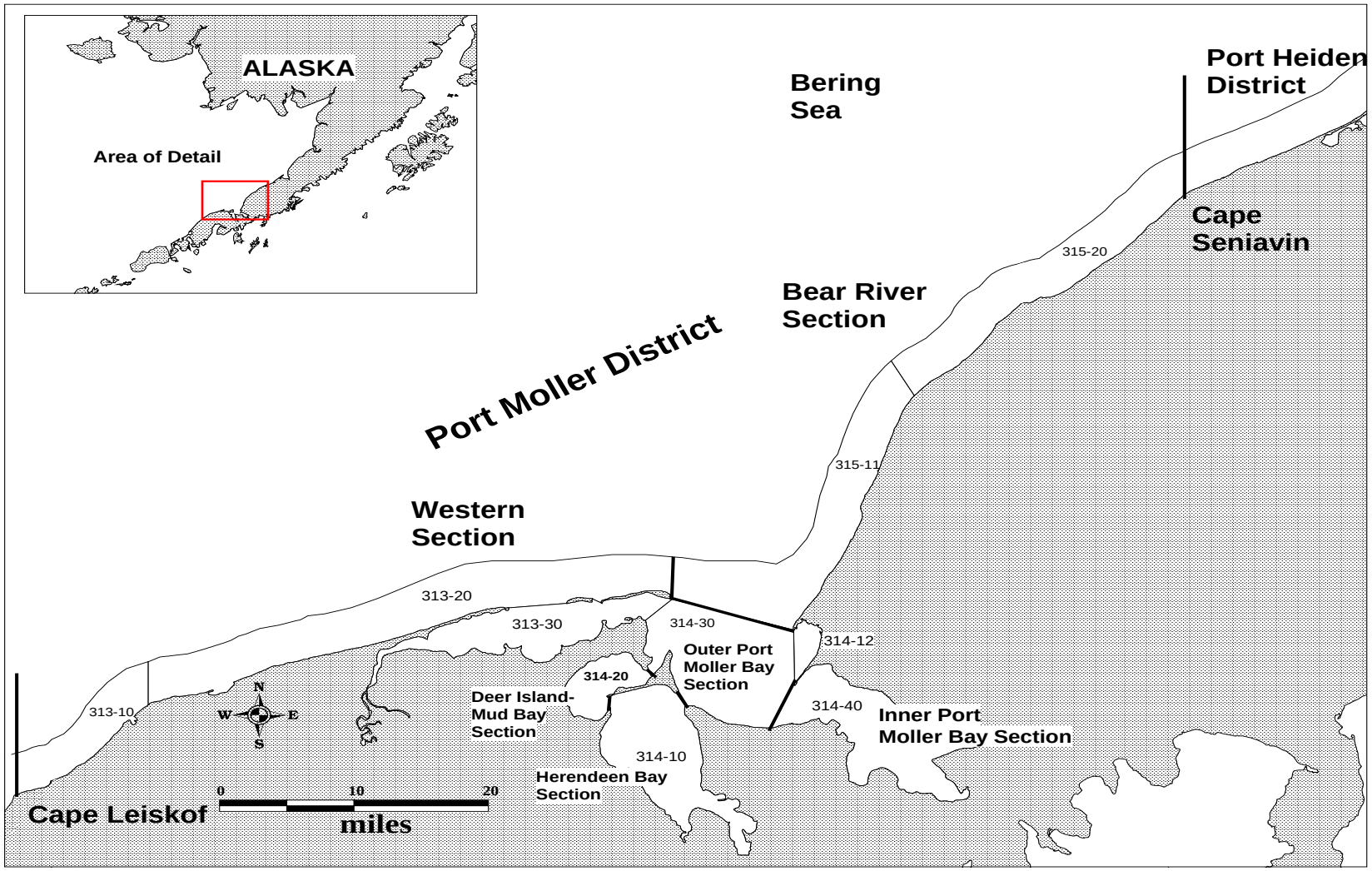

Figure 3.–Map of Port Moller District with commercial herring fishing statistical areas shown.

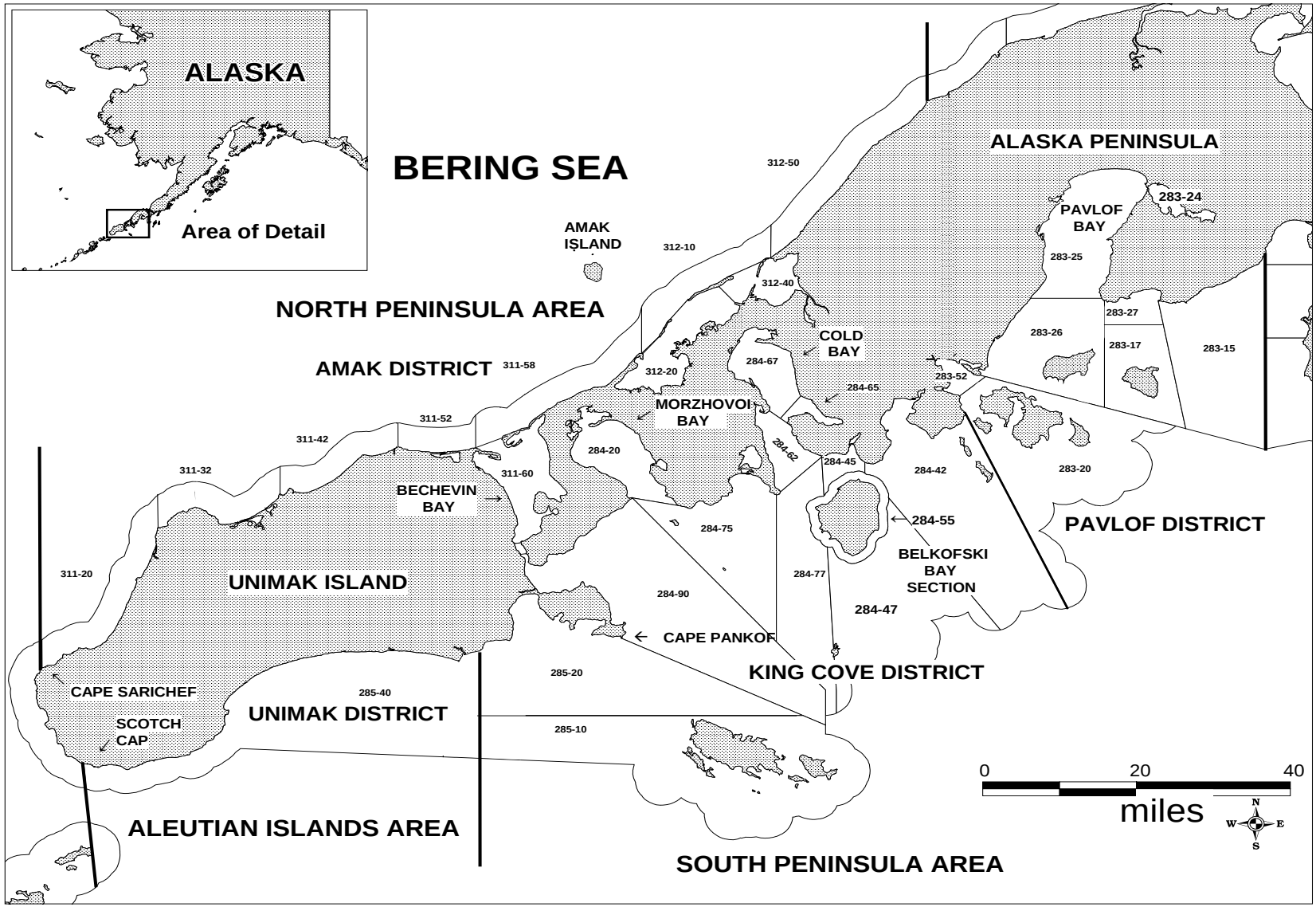

Figure 4.–Map of Amak, Unimak, King Cove, and Pavlof districts with commercial herring fishing statistical areas shown.

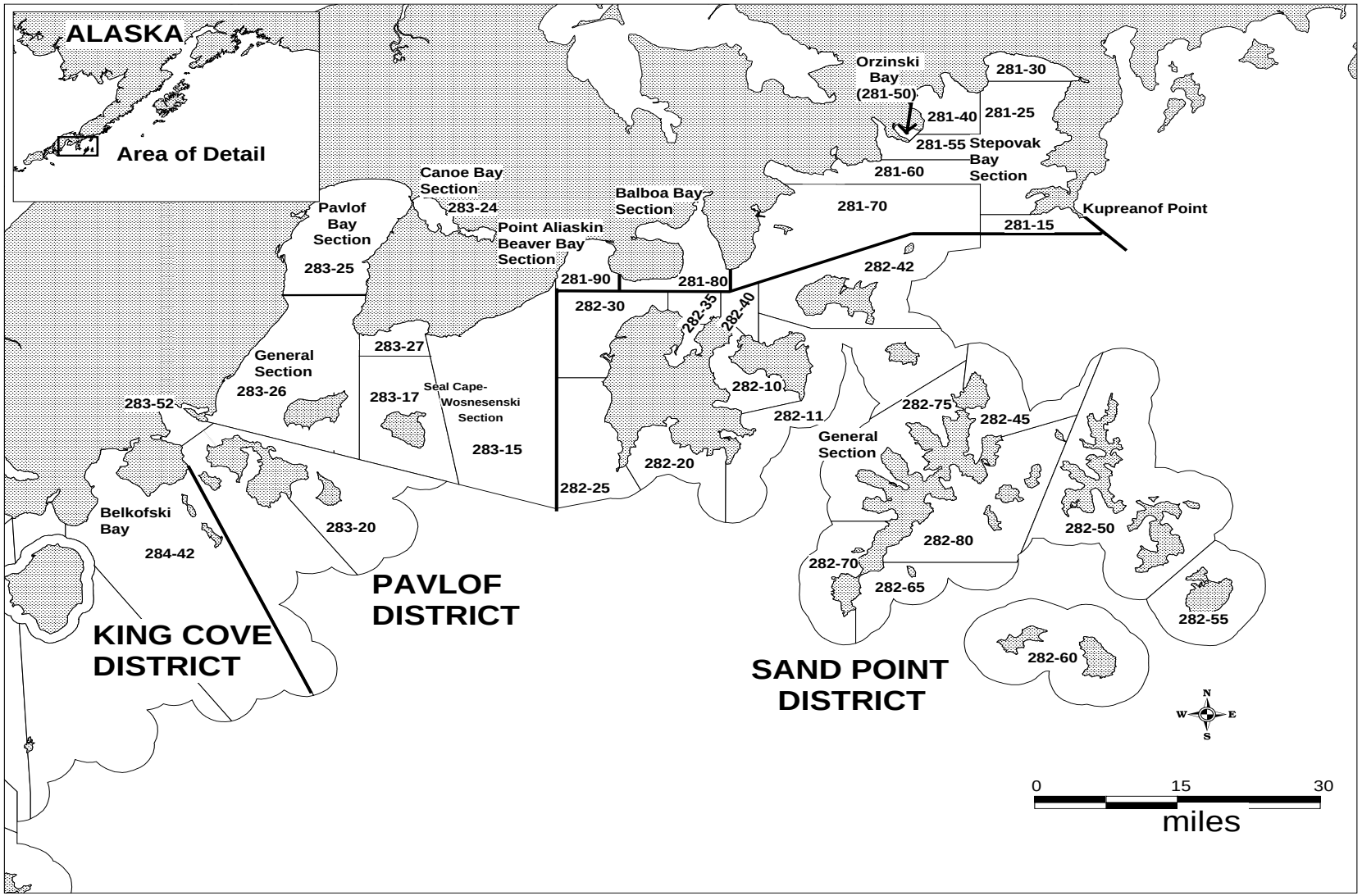

Figure 5.–Map of Pavlof and Sand Point districts with commercial herring fishing statistical areas shown.

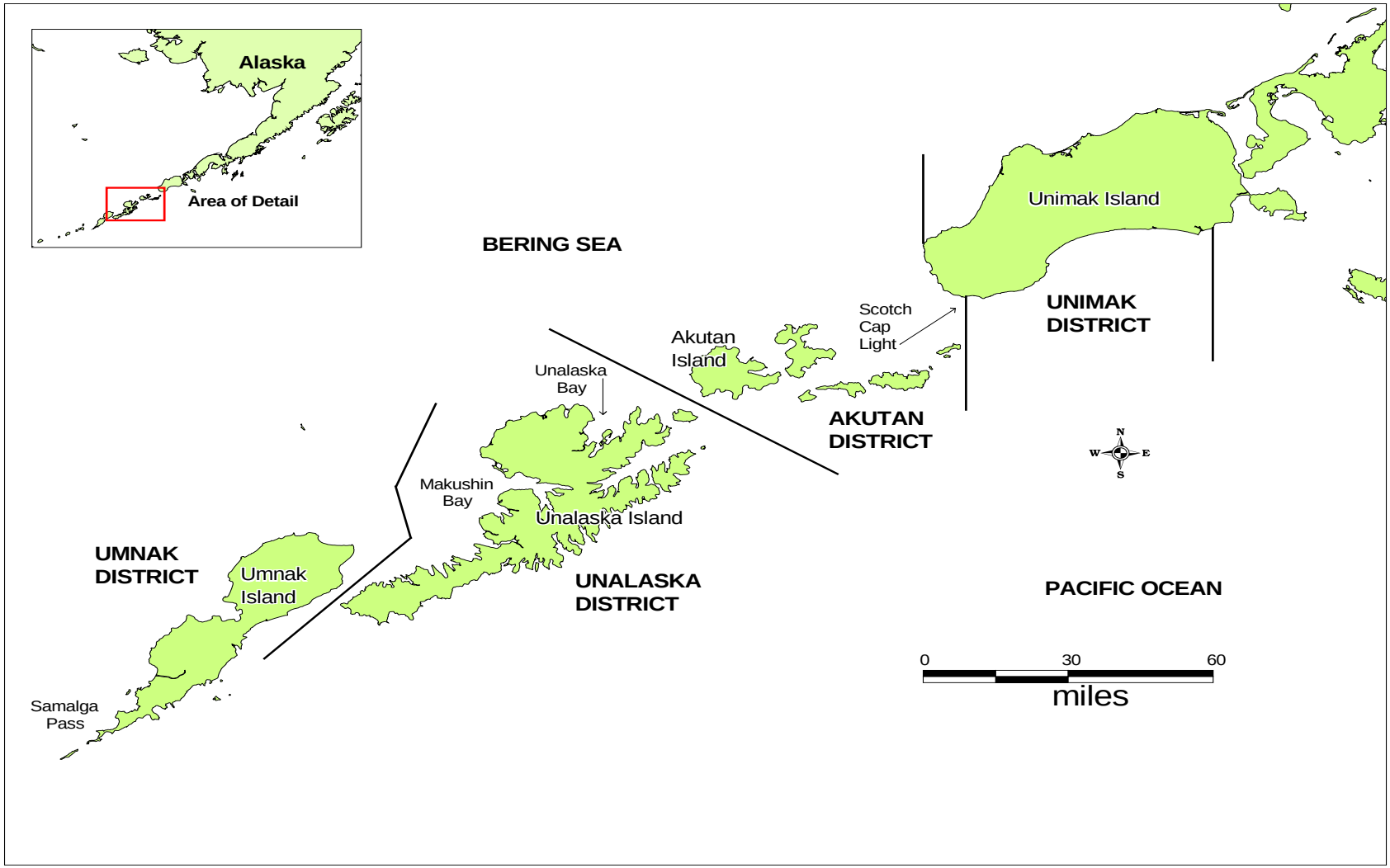

Figure 6.–Map of Aleutian Islands from Samalga Pass to Unimak Island with commercial herring fishing districts shown.

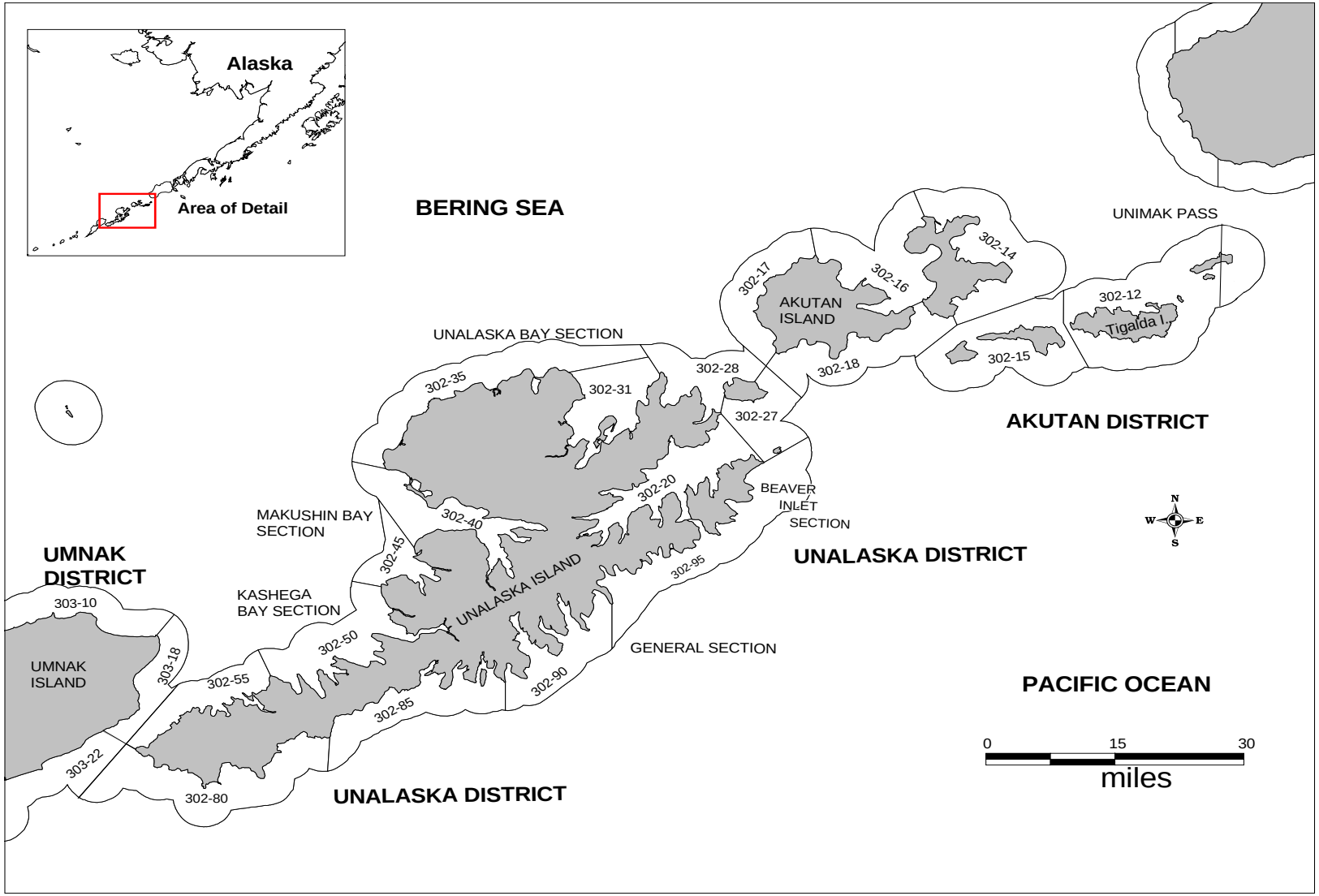

Figure 7.–Map of Aleutian Islands from Unimak Island to Umnak Island with commercial herring fishing statistical areas shown.

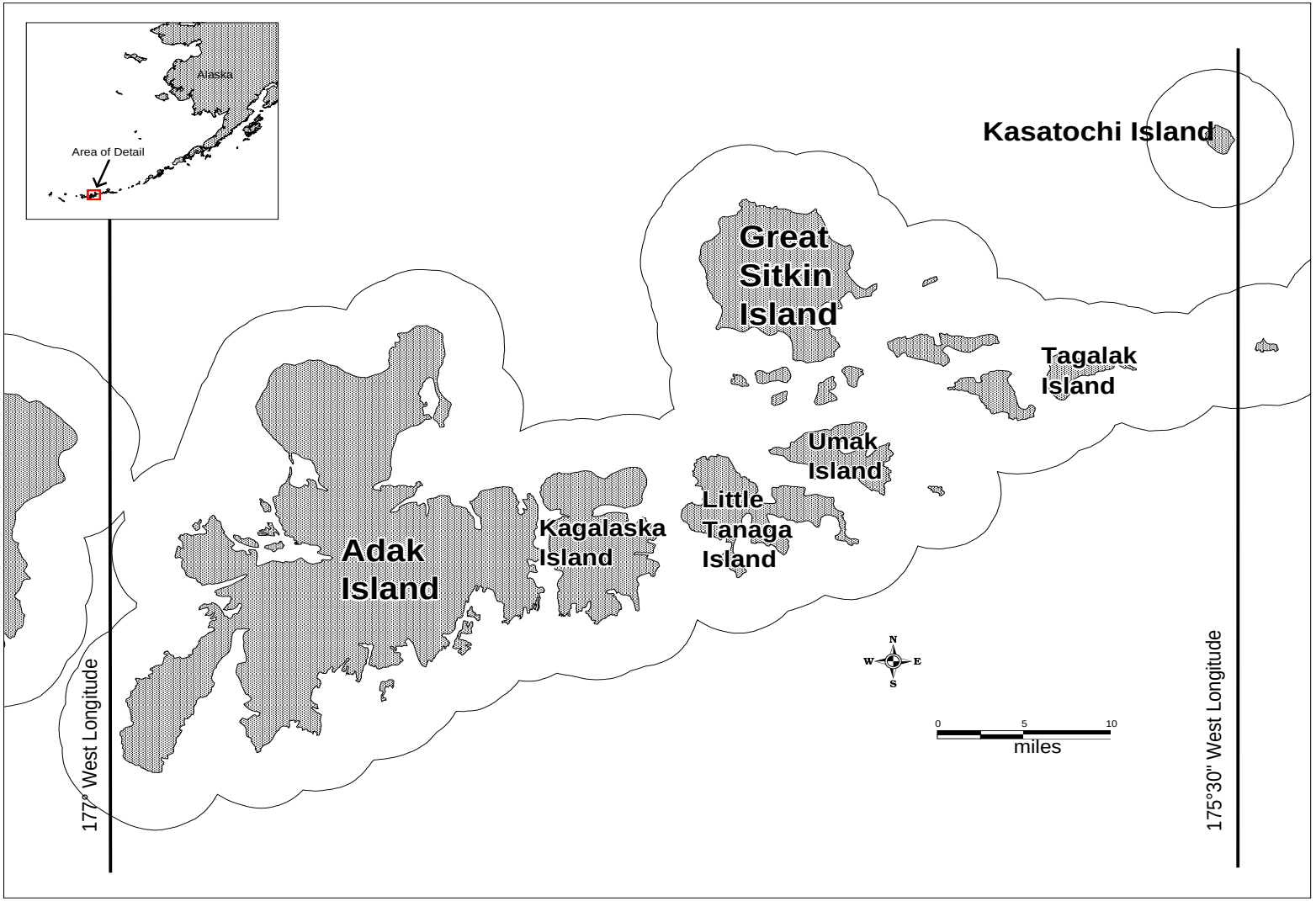

Figure 8.–Map of Adak Island area with boundaries of exploratory herring fishery defined.

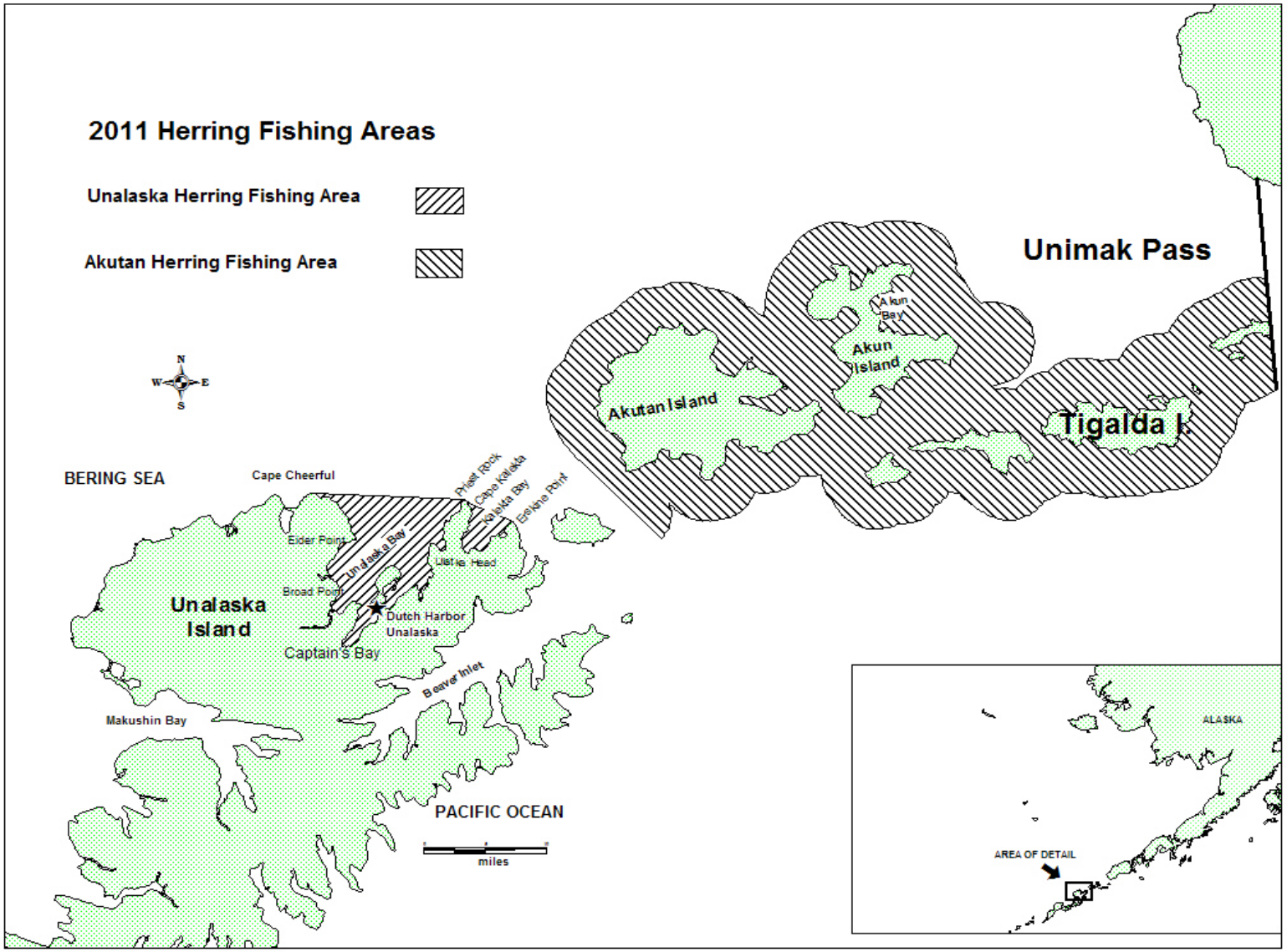

Figure 9.–Map of Akutan and Unalaska islands, with the 2011 commercial herring fishery open areas shown.

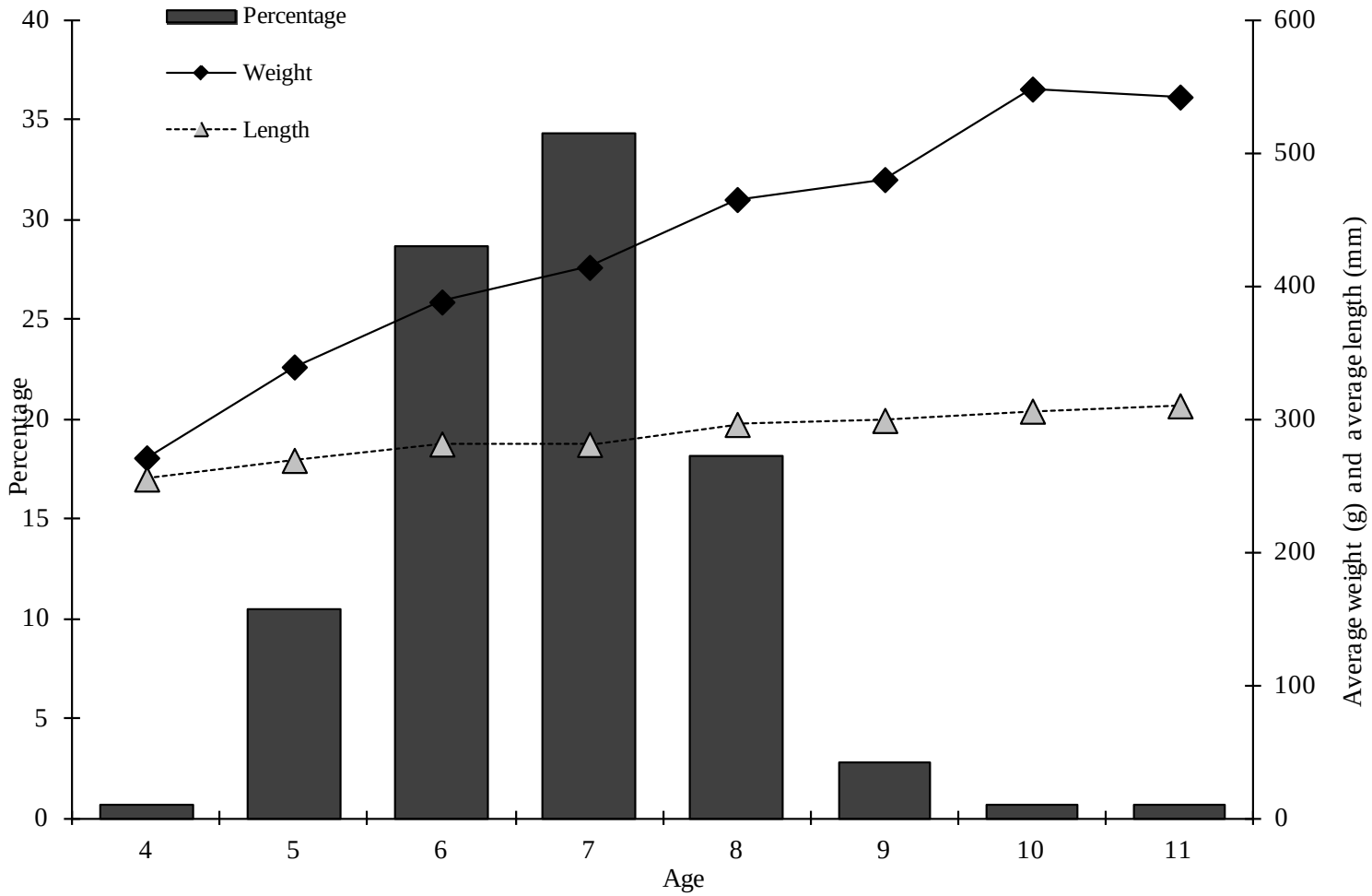

Figure 10.–Estimated average length-at-age (mm), average weight-at-age (g), and age composition of herring harvested in Akutan District, 2011 (n = 143).

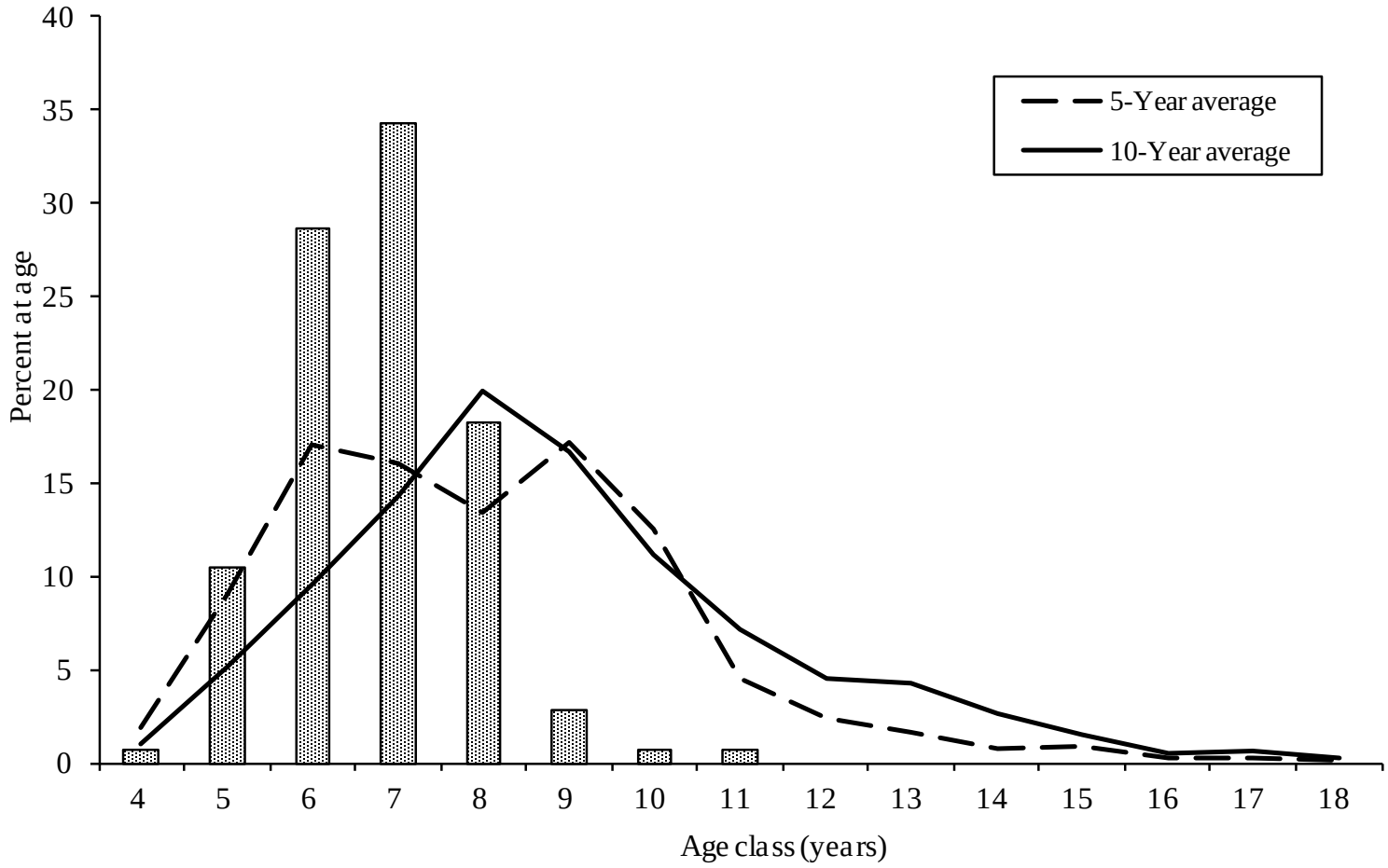

Figure 11.–Estimated 2011 percent age composition of Aleutian Islands commercial herring food and bait fishery, with five and ten year averages.

APPENDIX A. ARCTIC-YUKON-KUSKOKWIM HERRING OUTLOOK

ALASKA DEPARTMENT OF FISH AND GAME
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2011 Arctic-Yukon-Kuskokwim Herring Outlook

The 2011 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, 2011.

District	Threshold	2010 Observed Biomass (tons)		2011 Projected Biomass (tons)	Exploitation Rate (%)	2011 Harvest Guideline (tons)
Security Cove	1,200	13,440		13,119	20	2,624
Goodnews Bay	1,200	33,490	[b]	36,810	20	7,362
Cape Avinof	500	2,393	[c]	2,324	15	349
Nelson Island [a]	3,000	5,449	[c]	5,252	16	850
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	43,454	[c]	42,477	20	8,495
Port Clarence	-	-		-	-	165
Totals				108,843	20	21,617

[a] Nelson Island commercial harvest is 20% of projected biomass minus 200 tons for subsistenc

[b] Biomass estimates from Goodnews Bay include Jacksmith Bay aerial survey estimates conducted on the same day.

[c] 2009 projected biomass was used because recent biomass estimate was unavailable.

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2011 Arctic-Yukon-Kuskokwim Herring Forecast Summary

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 2011. 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.

Based on postseason escapement projections, the 2011 estimated spawning biomass for northeastern Bering Sea herring stocks (Security Cove to Norton Sound Districts) will be 112,695 tons. If the return is as anticipated the total allowable harvest could be 21,617 tons. A harvest of this magnitude in the AYK herring fishery would be one of the largest on record.

The 2011 AYK Region biomass projection was based on good aerial survey biomass estimates from Security Cove, Goodnews Bay, and Jacksmith Bay. Biomass estimates from previous years were used for Cape Avanof, Nunivak Island, Nelson Island, Cape Romanzof, and Norton Sound. In 2010 the Alaska Department of Fish and Game (department) collected herring samples from the test fishery at Goodnews Bay and Nelson Island in Kuskokwim Bay, and from the commercial fishery in Norton Sound. Samples were analyzed for age class composition, which suggested that the forecasted population will be comprised of herring ages 6-7 (47%), ages 8-9 (32%), ages 10+ (15%), and ages 4-5 (6%).

The actual biomass observed in 2011 may fall above or below the preseason projections based on variability in the quality of aerial biomass assessments and annual fluctuation of survival or recruitment rates. Recruitment events typically occur every eight to ten years, as suggested by the dominant age 5-6 herring and high biomass estimates in Security Cove, Goodnews Bay, and Jacksmith Bay during 2010. The expected low proportion of age 4-5 herring in 2011 may signal that the recruitment period will be complete.

The department will conduct aerial surveys as regularly as possible and monitor catch statistics inseason. Guideline harvest levels, therefore, 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 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.

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Security Cove District

The 2011 projected biomass for the Security Cove District is 13,119 tons and the minimum biomass threshold is 1,200 tons. A 20% exploitation rate would result in a harvest of 2,624 tons. The department will plan to verify herring biomass inseason to determine if the biomass is large enough to support this level of harvest. Herring ages 6-9 are expected to comprise 80% of the returning biomass (30%, 21%, 13%, and 10%, respectively). Age 10 and older herring are expected to comprise 15% of the biomass.

Goodnews Bay District

The 2011 projected biomass for the Goodnews Bay District is 36,810 tons and the minimum biomass threshold is 1,200 tons. A 20% exploitation rate would result in a harvest of 7,362 tons. This harvest guideline is the largest on record. The department will plan to verify herring biomass inseason to determine if the biomass is large enough to support this level of harvest. Herring ages 6-7 (53%) and ages 8-9 (22%) are expected to dominate the fishery with age 10 and older (15%) and ages 4-5 (6%) are expected to comprise the remaining biomass.

Cape Avinof District

The 2011 projected biomass for the Cape Avinof District is 2,393 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, and would potentially result in a harvest of 349 tons. Herring ages 6-9 are expected to comprise 83% of the returning biomass. Age 10 and older herring are expected to comprise approximately 13% of the biomass.

Nelson Island District

The 2011 projected biomass for the Nelson Island District is 5,252 tons and the minimum biomass threshold is 3,000 tons. A 20% exploitation rate would result in a commercial harvest of 850 tons after 200 ton subsistence harvest is accounted for. Herring Ages 6-9 are expected to make up 84% of the returning population, contributing 17%, 26%, 23%, and 18% respectively. Herring age 10 and older, 13%, and ages 4-5 (4%) are expected to comprise the remaining biomass.

Nunivak Island District

The 2011 projected biomass for the Nunivak Island District is 3,322 tons and a minimum biomass threshold of 1,500 tons. A 20% exploitation rate would result in a harvest of 664 tons. Ages 6-9 are expected to comprise 83% of the returning biomass, 16%, 26%, 23%, and 18% respectively. Herring age 10 and older, 13%, and ages 4-5 (4%) are expected to comprise the remaining biomass.

Cape Romanzof District

The 2011 projected biomass for the Cape Romanzof District is expected to be 5,538 tons and the minimum biomass threshold is 1,500 tons. A 20% exploitation rate would result in a harvest of 1,108 tons. Since water turbidity in the Cape Romanzof area generally prevents aerial observations

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of herring, spawn deposition and test and commercial catch rates will be used to determine the timing and duration of commercial fishing periods. Herring ages 6-9 are expected to comprise 83% of the returning biomass, 16%, 26%, 23% and 18%, respectively. Herring age 10 and older, 13%, and ages 4-5 (4%) are expected to comprise the remaining biomass.

Norton Sound District

The 2011 projected biomass for the Norton Sound District is 42,477 tons and a minimum biomass threshold of 7,000 tons. A 20% exploitation rate would result in a guideline harvest of 8,495 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 8,175 tons for sac roe harvest. The beach seine harvest is allocated 10% of the sac roe projected harvest, or 818 tons. The 2011 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 6-9 are expected to comprise 83% of the returning biomass, 16%, 26%, 23% and 18%, respectively. Herring age 10 and older, 13%, and ages 4-5 (4%) are expected to comprise the remaining 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 will determine the allowable harvest in 2011. 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

Appendix B1.–Forecasted harvest allocation for Togiak sac roe and Dutch Harbor herring food and bait fisheries, 2011.

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

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Date Issued: November 12, 2010
Time: 1:00 p.m.

2011 TOGIAK HERRING FORECAST

The 2011 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:

Harvest Allocation of the 2011 Forecasted Pacific Herring Run Biomass, Togiak District, Bristol Bay

	Biomass (Short Tons)	Harvest (Short Tons)
Forecasted Biomass for 2011	140,860	
Total Allowable Harvest (20% exploitation rate)		28,172
Togiak Spawn-on-Kelp Fishery (Fixed Allocation)		1,500
Remaining Allowable Harvest		26,672
Dutch Harbor Food/Bait Allocation (7.0% of the remaining allocation)		1,867
Remaining Allowable Harvest for Togiak District Sac Roe Fishery:		24,805
Purse Seine Allocation 70.0%		17,364
Gill Net Allocation 30.0%		7,442

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2011 TOGIAK HERRING FORECAST SUMMARY

The Pacific herring population is forecasted to be 140,860 tons in Togiak District during 2011 (Figure 1). Younger herring (ages 4–6), returning from the 2005 through 2007 year classes, are expected to comprise 38.2% of the biomass in 2011 (Figure 2). The remainder of the population biomass will be comprised of herring ages 7–8 (32.8%), ages 9–11 (20.2%) and ages 12+ (8.8%). The forecasted individual average weight of herring in the harvest biomass is 340 g.

A run biomass of 140,860 tons would be ~1% less than the recent 10-year average observed biomass of 142,319 tons. A biomass of this size would potentially produce an overall harvest of 28,172 tons in all fisheries and 24,805 tons in the Togiak sac roe fisheries (purse seine and gillnet). A harvest of this size in the Togiak sac roe fisheries would be ~17% more than the recent 10-year average harvest of 20,589 tons.

We use an age-structured analysis (ASA) model 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 (1978–2010), 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). The model estimates were generated by comparing them 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 2011 was predicted using the recent four-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. However, the 2010 inshore spawning biomass consisted largely of younger herring age 5–8 with a few discrete pulses of older fish. Herring between age 5 and age 8 (inclusive) made up 51.4% of the total commercial purse seine harvest, 45.2% of the total harvest, 37.8% of the total run and 47.8% of the escapement by weight.

Large recruitments in this population are typical every eight to ten years. During the last few years, one of these recruitment events appears to have been underway. However, the contribution of age-4 fish to the total run dropped to less than 5% in 2010 from the 10–20% observed in 2008 and 2009. This may be a signal that this period of high recruitment is complete. 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 2010 was estimated to be 135,214 tons. This was the sum of the peak biomass observed on the aerial survey conducted 18 May (98,290 tons) and postseason survey conducted 2 June (36,924 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 the district on 10 May, when approximately 2,371 tons were documented, mostly around Hagemeister Island and between Anchor Point and Right Hand Point. The biomass steadily increased through 18 May before declining, with herring most heavily concentrated in Togiak Bay throughout the season (Figure 3).

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There is always uncertainty in forecasting the Togiak District herring biomass and predicting the 2011 run is no different. Although the ASA model has had a tendency to under-forecast since its inception in 1993, it over-forecast the 2010 run (146,775 tons forecast and 135,214 tons observed). The mean percent error (MPE) has been -19.7% for years with reliable total run biomass estimates (Figure 1). The accuracy or mean absolute percent error (MAPE) of the ASA model is currently running at 19%. The forecast range for 2011 is from 114,067 tons to 167,653 tons based on a MAPE of 20%. We consider this population to be healthy and sustainable.

Greg Buck, Fred West and Tim Baker
Bristol Bay Fishery Research Staff
Anchorage

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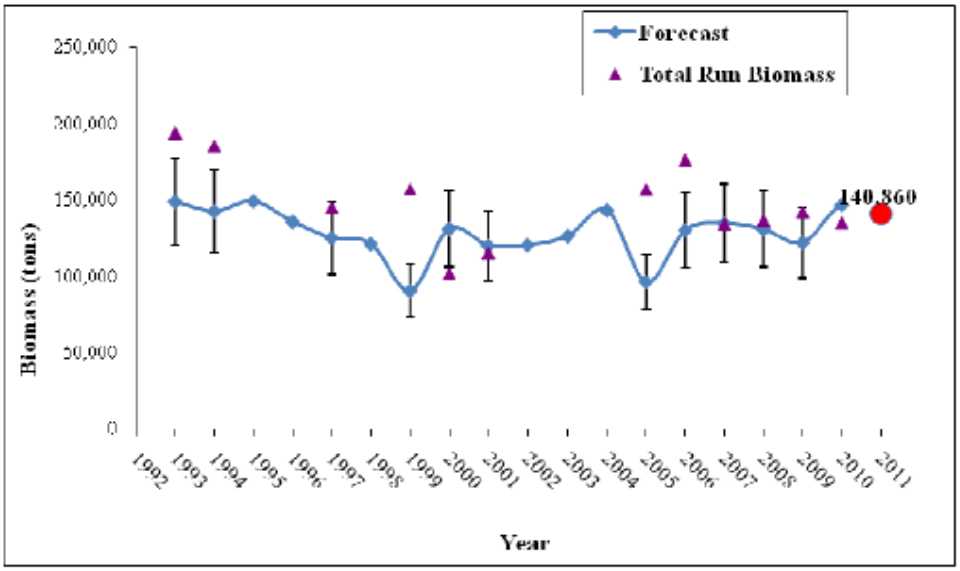

Figure 1.–Annual observed Togiak herring total run biomass estimates and preseason forecasts based on the ASA model. Mean absolute percent error (MAPE) of 25% around the forecast is also shown for years with a reliable total run biomass estimate.

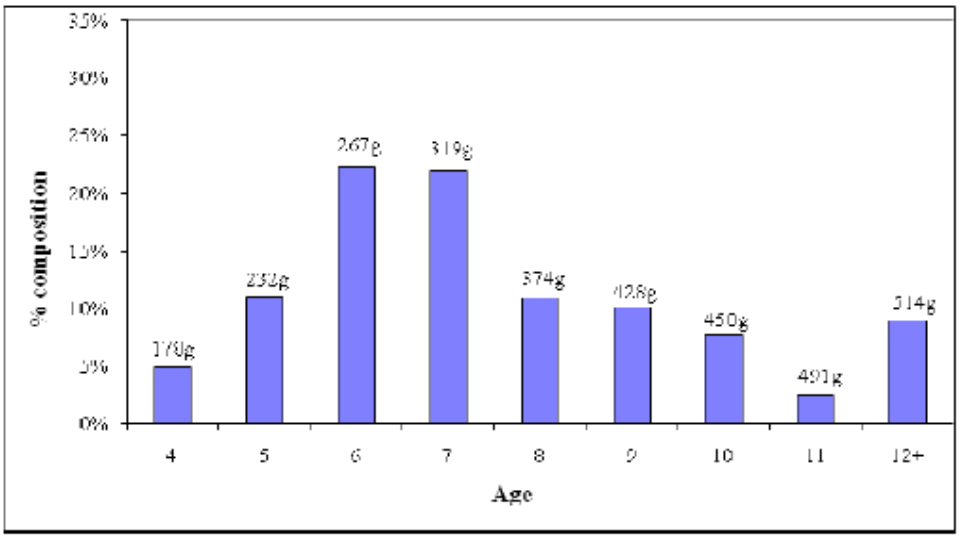

Figure 2.–Forecasted age composition by weight for the 2011 Togiak herring return. Forecasted average weight (grams) shown for each age category.

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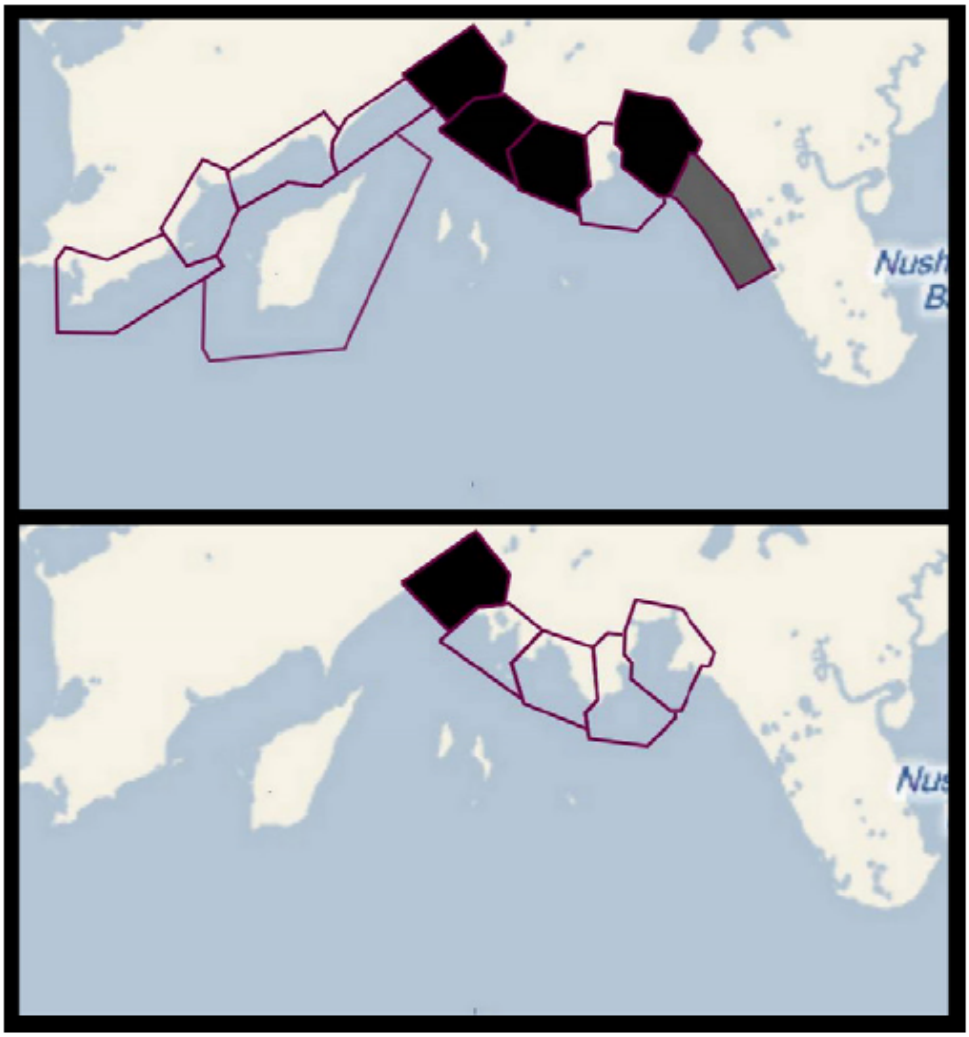

Figure 3.–Herring spawning distribution observed during aerial surveys conducted on 18 May 2010 (top) and 2 June 2010 (bottom). Aerial survey sections with measurable biomass are outlined while sections with biomass >5,000 tons are shaded grey and sections with biomass >10,000 tons are shaded black.

APPENDIX C. ALEUTIAN ISLANDS FOOD AND BAIT HERRING FISHERY EMERGENCY ORDER SUMMARY

Appendix C1.–Emergency order summary, 2011.

EMERGENCY ORDER NO. 4-FH-M-SP-01-11 EFFECTIVE DATE: noon Friday, July 15, 2011 EXPLANATION: This emergency order establishes a commercial herring fishery with purse seine gear in the Unalaska and Akutan districts for 72 hours from noon July 15 until noon July 18, 2011.
EMERGENCY ORDER NO. 4-FH-M-SP-02-11 EFFECTIVE DATE: noon Monday, July 18, 2011 EXPLANATION: This emergency order extends the current commercial herring fishery with purse seine gear in the Unalaska and Akutan districts for 72 hours from noon July 18 until noon July 21, 2011
EMERGENCY ORDER NO. 4-FH-M-SP-03-11 EFFECTIVE DATE: noon Tuesday, July 19, 2011 EXPLANATION: This emergency order establishes a commercial herring fishery with gillnet gear in the Unalaska and Akutan districts form noon July 19, 2011 until further notice.
EMERGENCY ORDER NO. 4-FH-M-SP-04-11 EFFECTIVE DATE: 1:00 PM Thursday, July 21, 2011 EXPLANATION: This emergency order establishes a commercial herring fishing period with purse seine gear in the Unalaska and Akutan districts for 6 hours form 1:00 p.m. July 21, until 7:00 p.m. July, 21, 2011