

**Fishery Management Report No. 12-17**

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**Alaska Peninsula-Aleutian Islands Management Area  
Food and Bait Herring Management Plans, 2012**

by

**Aaron R. Tiernan**

April 2012

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient (multiple)	R
milliliter	mL	west	W	correlation coefficient (simple)	r
millimeter	mm	copyright	©	covariance	cov
		corporate suffixes:		degree (angular)	°
<b>Weights and measures (English)</b>		Company	Co.	degrees of freedom	df
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	expected value	$E$
foot	ft	Incorporated	Inc.	greater than	>
gallon	gal	Limited	Ltd.	greater than or equal to	≥
inch	in	District of Columbia	D.C.	harvest per unit effort	HPUE
mile	mi	et alii (and others)	et al.	less than	<
nautical mile	nmi	et cetera (and so forth)	etc.	less than or equal to	≤
ounce	oz	exempli gratia	e.g.	logarithm (natural)	ln
pound	lb	(for example)		logarithm (base 10)	log
quart	qt	Federal Information Code	FIC	logarithm (specify base)	log <sub>2</sub> , etc.
yard	yd	id est (that is)	i.e.	minute (angular)	'
		latitude or longitude	lat. or long.	not significant	NS
<b>Time and temperature</b>		monetary symbols (U.S.)	\$, ¢	null hypothesis	$H_0$
day	d	months (tables and figures): first three letters	Jan, ..., Dec	percent	%
degrees Celsius	°C	registered trademark	®	probability	P
degrees Fahrenheit	°F	trademark	™	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
degrees kelvin	K	United States (adjective)	U.S.	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
hour	h	United States of America (noun)	USA	second (angular)	"
minute	min	U.S.C.	United States Code	standard deviation	SD
second	s	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard error	SE
				variance	
<b>Physics and chemistry</b>				population sample	Var var
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				

***FISHERY MANAGEMENT REPORT NO. 12-17***

**ALASKA PENINSULA-ALEUTIAN ISLANDS MANAGEMENT AREA  
FOOD AND BAIT HERRING FISHERY MANAGEMENT PLANS, 2012**

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## ABSTRACT

The commercial food and bait fisheries for Pacific herring *Clupea pallasii* in the Alaska Peninsula-Aleutian Islands Herring Management Area (Area M) occurs within the Unimak, Akutan, Unalaska, Umnak, and Adak districts. The Dutch Harbor food and bait herring fishery takes place from June 24 until February 28 and is allocated 7 percent of the Togiak sac roe herring total allowable harvest (minus the Togiak spawn-on-kelp fishery fixed allocation). The 2012 Dutch Harbor food and bait herring allocation is 1,627 tons, of which 227 (14%) tons is allocated to the gillnet fishery. The purse seine allocation will be 1,400, of which 100 tons is set aside for the experimental pound fishery. The Adak food and bait herring fishery is allocated 500 tons that may be harvested, from June 24 until February 28, with both purse seine and gillnet gear. This document describes how the fisheries will be managed, the industry requirements to participate in the fisheries, and how to contact and relay information to the Alaska Department of Fish and Game.

Key words: Pacific herring, *Clupea pallasii*, commercial food and bait fishery, Alaska Peninsula-Aleutian Islands, Area M, Dutch Harbor herring fishery, Togiak, herring gillnet, herring sac roe, herring seine, herring pound, Adak herring fishery, Fishery Management Plan.

## INTRODUCTION

This document is intended to provide commercial herring harvesters and buyers with information and guidelines for participating in the Alaska Peninsula-Aleutian Islands Management Area (Area M) Pacific herring *Clupea pallasii* food and bait fisheries. Information on inseason management of the Alaska Peninsula-Aleutian Islands Management Area herring sac roe fisheries can be found in Tiernan (2012).

The Alaska Peninsula-Aleutian Islands Herring Management Area consists of Bering Sea waters extending west of Cape Menshikof, and Pacific Ocean state waters extending west of Kupreanof Point, to the International Dateline (Figure 1; 5 AAC 27.600). Fishermen may only harvest food and bait herring in the Unimak, Akutan, Unalaska, Umnak, and Adak districts (Figures 1–4).

There are two food and bait fisheries in Area M, the Dutch Harbor and the Adak herring fisheries. In recent years, three management plans have been used to manage the Dutch Harbor herring fishery: (1) the Bering Sea Herring Fishery Management Plan (5 AAC 27.060) establishes that in any district, if the Togiak District herring stocks are below their minimum threshold, the Dutch Harbor food and bait fishery will be closed for the season; (2) the Bristol Bay Herring Management Plan (5 AAC 27.865 (b)) establishes a 7% allocation of the Togiak Districts sac roe herring harvest to the Dutch Harbor food and bait fishery; and (3) the Dutch Harbor Food and Bait Herring Fishery Allocation Plan (5 AAC 27.655) which splits the 7% allocation by gear type, 86% for the purse seine and 14% for the gillnet fishery. At the February 2010 Alaska Board of Fisheries (BOF) meeting, the board amended the language to 5 AAC 27.655. It was decided that after July 25, if the gillnet fishery has not harvested its allocation, the remaining allocation may be taken by either group. Additionally, if the seine group exceeds its allocation before July 25, then that amount shall be deducted from any remaining quota for that year after July 25. If the seine group exceeds the total allocation after July 25, then the seine group overage shall be deducted from the next years' seine allocation as stated in 5 AAC 27.655 (b).

In 2004, the BOF created the Alaska Peninsula-Aleutian Islands Herring Management Plan (5 AAC 27.657), establishing a herring fishery in the Adak District (Figure 3) with a 500-ton allocation independent of the Dutch Harbor food and bait allocation. This plan was amended at the 2010 BOF meeting, to allow both purse seine and gillnet gear to harvest the 500 ton Adak allocation. Since the plan's inception in 2004, there has been no harvest in the Adak District.

# **THE ALASKA PENINSULA-ALEUTIAN ISLANDS (DUTCH HARBOR) FOOD AND BAIT HERRING FISHERY**

## **FISHERY REQUIREMENTS**

In order for Alaska Department of Fish and Game (ADF&G) to open Unimak, Akutan, Unalaska, or Umnak districts (Figure 2) to food and bait herring fishing, each Western Alaska herring biomass projection must surpass its BOF mandated district threshold (5 AAC 27.060). These biomass projections are for fisheries located in the Security Cove, Goodnews Bay, Cape Avinof, Nelson Island, Nunivak Island, Cape Romonzof, Togiak, and Norton Sound districts (Figure 1). The biomass of all the Bering Sea herring stocks are forecasted to be above their threshold levels and the probability of the 2012 Dutch Harbor food and bait herring fishery occurring is favorable (Appendix A1).

## **ALLOCATION**

ADF&G will attempt to manage the Dutch Harbor food and bait herring fishery so that the harvest remains within the allocation (Appendix B1). A “rollover” provision was adopted during the 2001 BOF meeting (5 AAC 27.655 (b)), during years when herring harvest exceeds the allocation, the amount of harvest over the allocation shall be deducted from the next year’s allocation, by gear group. During the 2011 season neither gear group exceeded their respective allocations.

Of the Dutch Harbor food and bait harvest, 86% is allocated to the seine fishery and 14% to the gillnet fishery (5 AAC 27.655 (a)). These allocations are considered independent of each other so that one gear group may not harvest herring allocated to the other gear group. Furthermore, 100 tons may be reserved from the purse seine allocation for an experimental herring pound fishery (5 AAC 27.655(c)). After July 25, if the gillnet fishery has not harvested its allocation, the remaining allocation may be taken by either group. Additionally, if the seine group exceeds its allocation before July 25, then that amount shall be deducted from any remaining quota for that year after July 25. 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 (5 AAC 27.655 (b)). The 2012 harvest allocation is 1,400 tons for the purse seine fishery, of which 100 tons is reserved for the seine pound fishery and 227 tons for the gillnet fishery (Table 1).

Inseason news releases will be broadcasted on VHF channel 12 in Dutch Harbor, which will serve as the designated ADF&G channel for communications during the herring fishery. Fishermen, tenders, and processors should monitor this channel.

## **REGISTRATION REQUIREMENTS FOR PERMIT HOLDERS, TENDERS, AND PROCESSORS**

All processors must make daily reports of all herring purchased from fishermen, and other processing records as specified by ADF&G (5 AAC 27.662 (a)(2)). These daily reports can be provided to the ADF&G by VHF, SSB, phone, fax, or e-mail. The following ADF&G offices can be contacted for information concerning the Dutch Harbor and Adak food and bait herring fisheries:

**Sand Point:**

Alaska Department of Fish and Game  
P.O. Box 129  
Sand Point, AK 99661

Phone: (907) 383-2066  
Fax: (907) 383-2606  
VHF channels 6 & 72  
Single Side Band 3.230 MHz  
KWB 362 (call sign)

**Dutch Harbor:**

Alaska Department of Fish and Game  
P.O. Box 920587  
Dutch Harbor, AK 99692

Phone: (907) 581-1239  
Fax: (907) 581-1572  
VHF 12  
Single Side Band 4.125 MHz  
WIM 76 (call sign)

Prior to harvesting, tendering, buying, or processing any herring, permit holders must register at the ADF&G office in Dutch Harbor. Even if no herring are harvested or vessels are not actively fishing, each permit holder, tender, and processor must still report daily by 10:00 AM or until registration from the fishery is withdrawn. If conditions arise which require additional time for permit holders to report herring harvests, ADF&G must be informed of the situation prior to fishing operations. Catch reporting instructions will be explained in detail during registration.

**FISH TICKETS**

Permit holders must provide specific harvest locations (statistical area and specific landmark) to buyers, so that they can be recorded on fish tickets. **Fish tickets must be delivered, by mail or in person, to the Dutch Harbor ADF&G office within ten days after the closure of the fishery (5 AAC 27.662 (3)).** If 10 days are insufficient time to submit fish tickets, other arrangements must be made by contacting the ADF&G in Sand Point.

**FISHING PERIODS**

The herring gillnet fishery can open by emergency order beginning noon June 24 and may be extended until the allocation is reached, or until ADF&G decides that an additional fishing period might exceed the allocation or the season ends on February 28 (5AAC 27.610 (e)(2)(A)). It is the intention of ADF&G to begin the fishery no later than July 1. Effort levels and harvest rates will be considered when establishing fishery openings. If possible, the fishery will be conducted in the waters of Unalaska Bay (Figure 4).

The initial purse seine herring fishing period may occur as early as noon on July 15 (5 AAC 27.610 (e) (2) (B)). Unless harvesters form a combine, the department anticipates that purse seine fishing periods will be short in duration and the fishery will be conducted within designated portions of Unalaska Bay. Short openings over several days may be required to prevent exceeding the allocation. Generally, there will be a 12-hour closure between fishing periods to allow permit holders an opportunity to deliver their catch and the department to assess the harvest and processing capacity. A shorter closed period may be allowed if ADF&G receives harvest reports promptly from all permit holders. ADF&G may cancel or extend a fishing period with little notice.

In the past, widespread overharvesting has occurred in the Dutch Harbor food and bait fishery. To avoid potential overharvest issues, ADF&G instituted the policy that if the average allocation per vessel fished (total allocation/number of vessels registered) is less than 150 tons per registered vessel, ADF&G will drastically limit both the length of the fishing periods and the size of the area open to commercial herring fishing.

Harvesters and spotter pilots are encouraged to relay biomass information to ADF&G prior to the opening. Past cooperation between ADF&G and the fishing industry has proven valuable in gaining information critical to management of the fishery. ADF&G will try to assess herring biomass in the area prior to opening the fishery.

### **HERRING SEINE POUND FISHERY**

One hundred tons of herring will be allocated to the herring seine pound fishery, which is deducted from the purse seine allocation. A person planning to operate a pound must check in with ADF&G and include detailed plans describing the design and operation of the pound, including exact location and timing of pound operation. These plans must be received by ADF&G in a timely manner to allow preparation of a Commissioner's permit for pound operation. A permit holder intending to operate a pound is encouraged to register with ADF&G in Dutch Harbor or Sand Point no later than 4:30 PM June 30, 2012.

Herring for pounding may only be harvested during purse seine fishery openings. If the herring pound allocation is not harvested, it will then be rolled over into the seine allocation. If the seine fishery exceeds the allocation, the penalty provision (5 AAC 27.655(b)) will be applied to the next year's total allocation. If two or more permit holders register for the pound fishery, the pound allocation is divided equally among them.

### **GEAR TESTING**

Prior to opening the fishery, purse seine gear may be tested during daylight hours until 5:00 PM July 14. Gear testing will only be allowed at a time and place designated by ADF&G. Permit holders must contact ADF&G in Dutch Harbor on VHF channel 12 or in person prior to setting gear. In addition, any fish caught during gear testing must immediately be released unharmed. After the fishery has been closed and all herring on the vessel have been offloaded, participants may, after notifying ADF&G, set their net to straighten, clean, and organize their gear at a time and place designated by ADF&G.

### **COMMERCIAL HARVEST SAMPLING**

Cooperation from harvesters, tender operators, and processors will be appreciated when ADF&G personnel request herring samples from the commercial catch. These samples will be used to determine the age, sex, and size composition of the stock.

## **ALASKA PENINSULA-ALEUTIAN ISLANDS (ADAK) HERRING FISHERY**

Beginning in 2004, the BOF authorized a herring set gillnet fishery in the Adak District (Figure 3) with a 500-ton allocation. However in 2010, the BOF amended the regulations to include both seine and gillnet gear in the harvest of up to 500 tons within the waters around Adak. This allocation is independent of the Dutch Harbor food and bait allocation. Herring can be harvested in this fishery as either sac roe or food and bait (Tiernan *In prep*). ADF&G has no information about the size, timing, or condition of herring stocks in the Adak area. ADF&G may station a representative in Adak to manage this fishery and collect herring samples.

## **COMMISSIONER'S PERMIT**

Each permit holder, tender operator, and buyer must register and obtain a Commissioner's permit for the Adak herring fishery at the ADF&G office in Sand Point or Dutch Harbor prior to catching, tendering, buying, or processing herring. The buyer and tender reporting requirements are described in 5AAC 27.662. Permit holders are encouraged to check with their markets prior to fishing to determine which products are acceptable.

## **FISHING SEASONS, AREA, AND GEAR OPERATION**

In that portion of the Adak District from 175°30' W long to 177° W long, herring may be taken in the food and bait fishery from June 24 through February 28 (5 AAC 27.657; Figure 3).

The permit holder must be physically present while the set gillnet is being fished. Each set gillnet in operation must be anchored and buoyed at both ends. Each buoy must be plainly and legibly marked with the permanent vessel license plate number (ADF&G number) of the vessel operating the gear. The numbers must be painted on the top one-third of the buoy in numerals at least four inches in height, one-half inch in width, and in a color contrasting to that of the buoy. The buoy markings must be visible above the water surface.(5 AAC 27.631(b)(c))

## **REFERENCES CITED**

- Tiernan, A. R. 2012. Alaska Peninsula-Aleutian Islands Management Area sac roe herring fishery management plans, 2012. Alaska Department of Fish and Game, Fishery Management Report No. 12-08, Anchorage.
- Tiernan, A. R. *In prep.* Alaska Peninsula-Aleutian Islands Management Area herring sac roe and food and bait fisheries annual management report, 2011. Alaska Department of Fish and Game, Fishery Management Report, Anchorage.



## **TABLES AND FIGURES**

Table 1.–Harvest allocation of the 2012 forecasted Pacific herring run biomass, Togiak District, Bristol Bay.

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This forecast is for the "Dutch Harbor", Unimak, Akutan, and Unalaska districts and that portion of the Umnak District located east of Samalga Pass, and west of Adak at 177° W. Long., herring food and bait fishery.

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	Biomass ( Short Tons)	Harvest (Short Tons)
2012 Togiak District Forecasted Biomass Exploitation at maximum 20%	123,745	
Total Allowable Harvest		24,749
Togiak Spawn on Kelp Fishery (Fixed Allocation)		1,500
Remaining Allowable Harvest		23,249
Dutch Harbor Food/Bait Allocation <sup>a</sup>		1,627
Purse Seine Allocation (86%) <sup>b</sup>		1,300
Overharvest penalty from previous year.		0
<b>2012 Seine Allocation</b>		<b>1,300</b>
Pound Fishery Allocation		100
Overharvest penalty from previous year.		0
Gillnet Allocation (14%) <sup>c</sup>		227
Overharvest penalty from previous year.		0
<b>2012 Gillnet Allocation</b>		<b>227</b>

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<sup>a</sup> The Dutch Harbor Food/Bait allocation is 7% of the remaining allowable harvest from the Togiak District.

<sup>b</sup> The purse seine allocation for 2012 is 86% of the Dutch Harbor allocation minus the pound fishery allocation of 100 tons.

<sup>c</sup> The gillnet allocation for 2012 is 14% of the Dutch Harbor allocation.

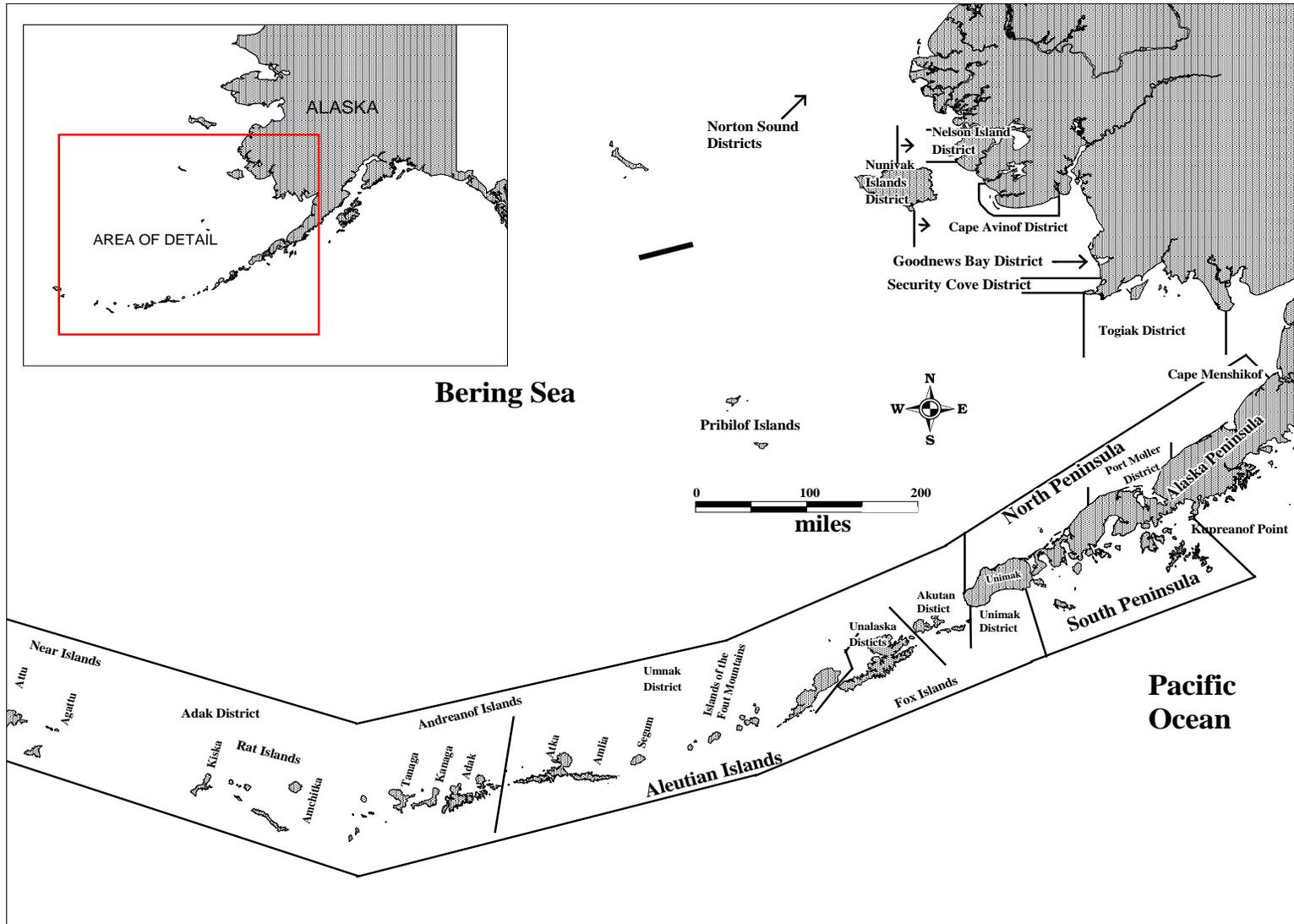


Figure 1.—Map of the Bering Sea Management Plan (5 AAC 27.060) commercial herring districts.

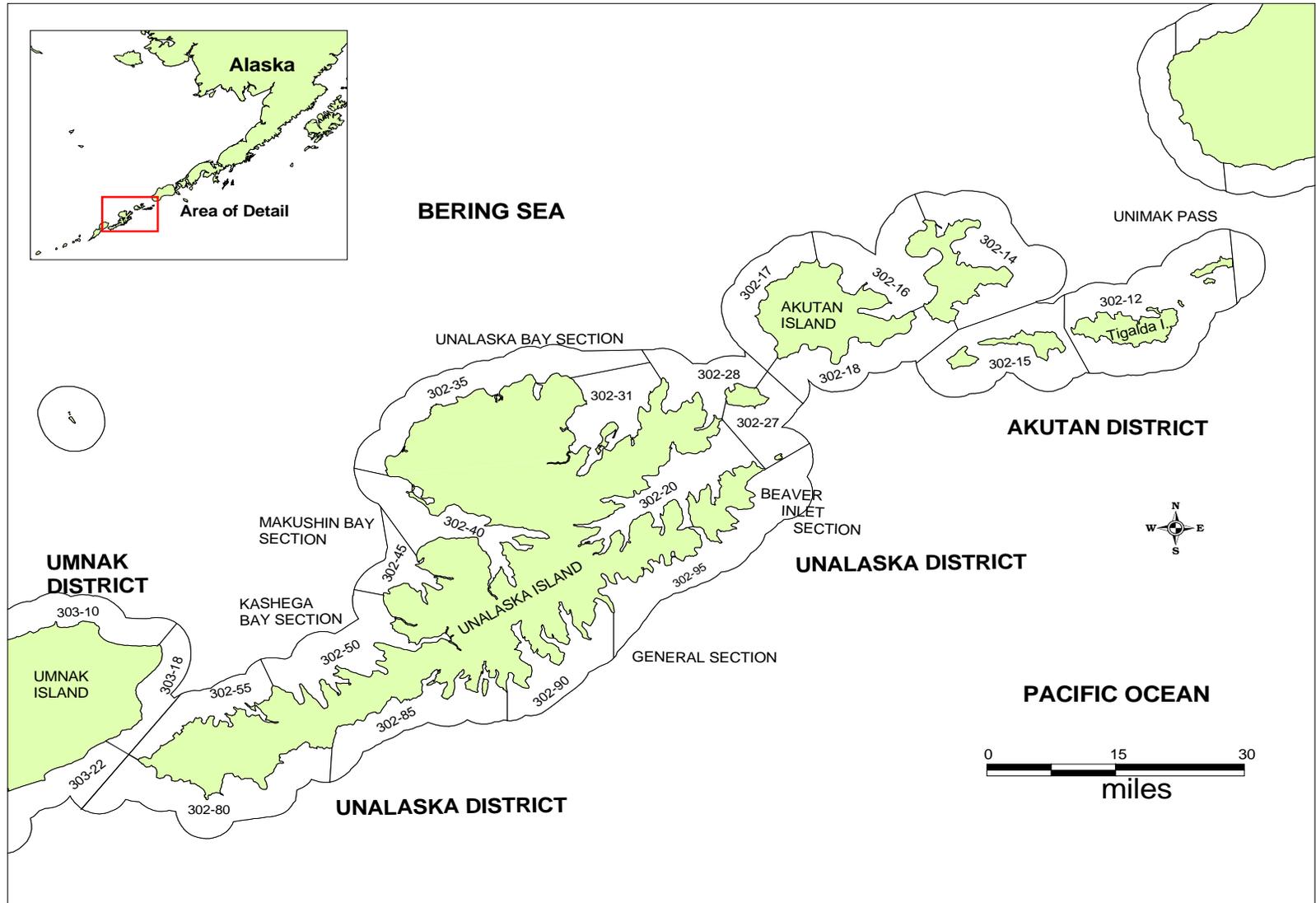


Figure 2.—Map of the Aleutian Islands from Tigalda Island to Umnak Island illustrating the herring fishing statistical areas.

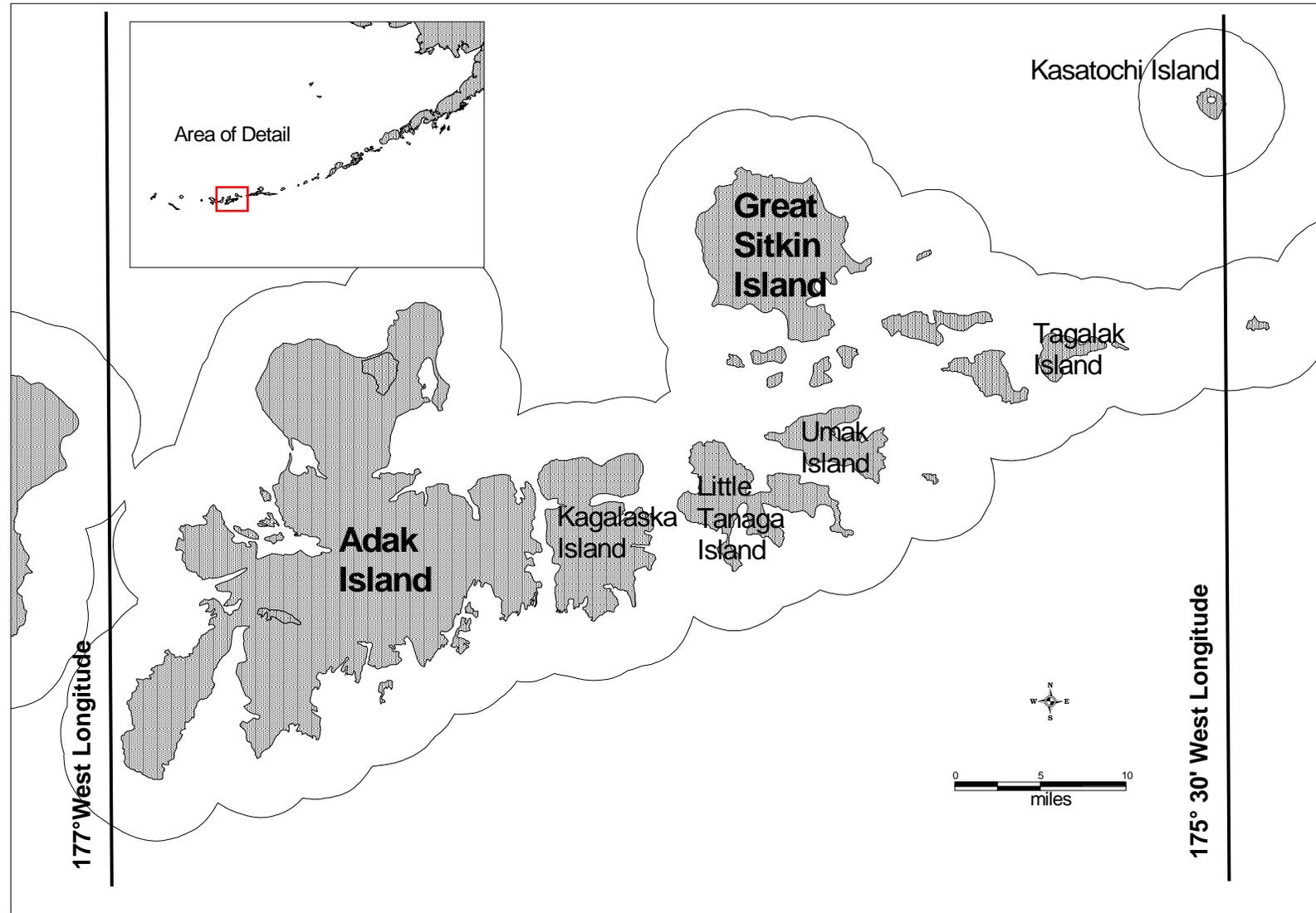


Figure 3.—Map of the Adak District illustrating the herring fishery boundaries.

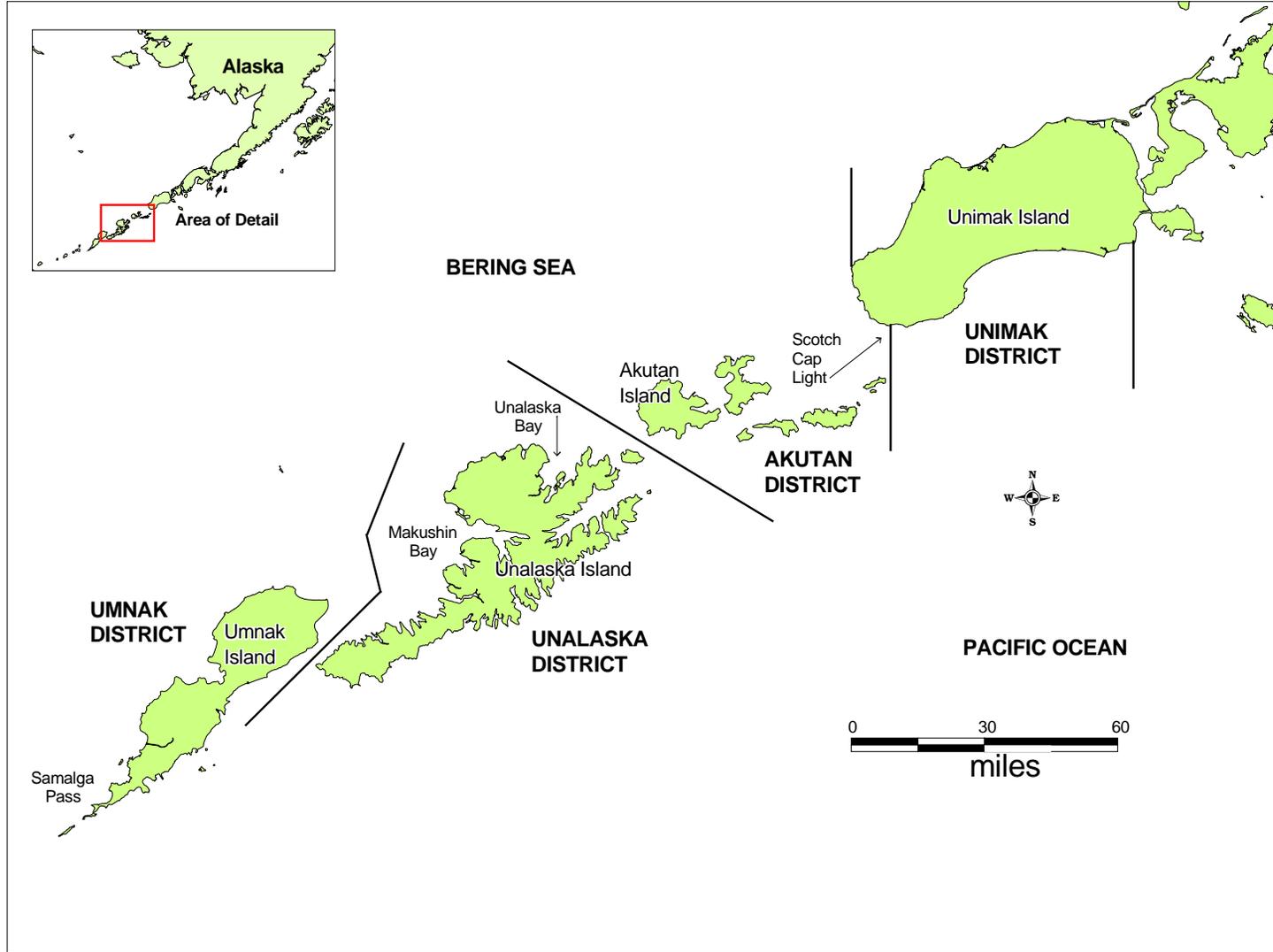


Figure 4.—Map of the eastern Aleutian Islands from Samalga Pass to Unimak Island illustrating the herring fishing district boundaries.

**APPENDIX A. ARCTIC-YUKON-KUSKOKWIM HERRING  
OUTLOOK AND MANAGEMENT STRATEGY FOR 2012**

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



*Cora Campbell, Commissioner  
Jeff Regnart, Director*



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 Jeff Estensen, Yukon Area Manager (907) 267-2383  
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Anchorage Area Office  
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 Anchorage, AK, 99518  
 Date issued: March 8, 2012

**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 <sup>a</sup>	12,193	20	2,439
Goodnews Bay	1,200	36,810 <sup>a</sup>	33,008	20	6,602
Cape Avinof <sup>b</sup>	500	2,324 <sup>a</sup>	2,095	15	314
Nelson Island <sup>c</sup>	3,000	5,252 <sup>a</sup>	4,703	16	741
Nunivak Island	1,500	3,206 <sup>a</sup>	2,879	20	576
Cape Romanzof	1,500	5,343 <sup>a</sup>	4,794	20	959
Norton Sound	7,000	53,786	52,949	20	10,590
Port Clarence <sup>d</sup>	-	-	-	-	165
<b>Totals</b>		<b>119,840</b>	<b>112,622</b>	<b>20</b>	<b>22,385</b>

<sup>a</sup> 2010 model projected biomass and age composition was used because of no survey efforts in 2011.

<sup>b</sup> Nelson Island commercial harvest is 20% of projected biomass minus 200 tons for subsistence harvest.

<sup>c</sup> Cape Avinof commercial harvest is 15 % of projected biomass (5AAC27.895(a)).

<sup>d</sup> 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,

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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.

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**APPENDIX B. FORECASTED HARVEST ALLOCATION  
FOR TOGIAK SAC ROE AND DUTCH HARBOR FOOD  
AND BAIT HERRING FISHERIES, 2012**

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



*Cora Campbell, Commissioner  
Jeff Regnart, Director*



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Anchorage Regional Office  
333 Raspberry Road  
Anchorage, AK 99518  
Date Issued: November 10, 2011  
Time: 1:00 p.m.

**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 (Bristol Bay Herring Management Plan 5 AAC 27.865):

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

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	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
Gill Net Allocation 30.0%		6,487

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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 non-selective 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 four-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.

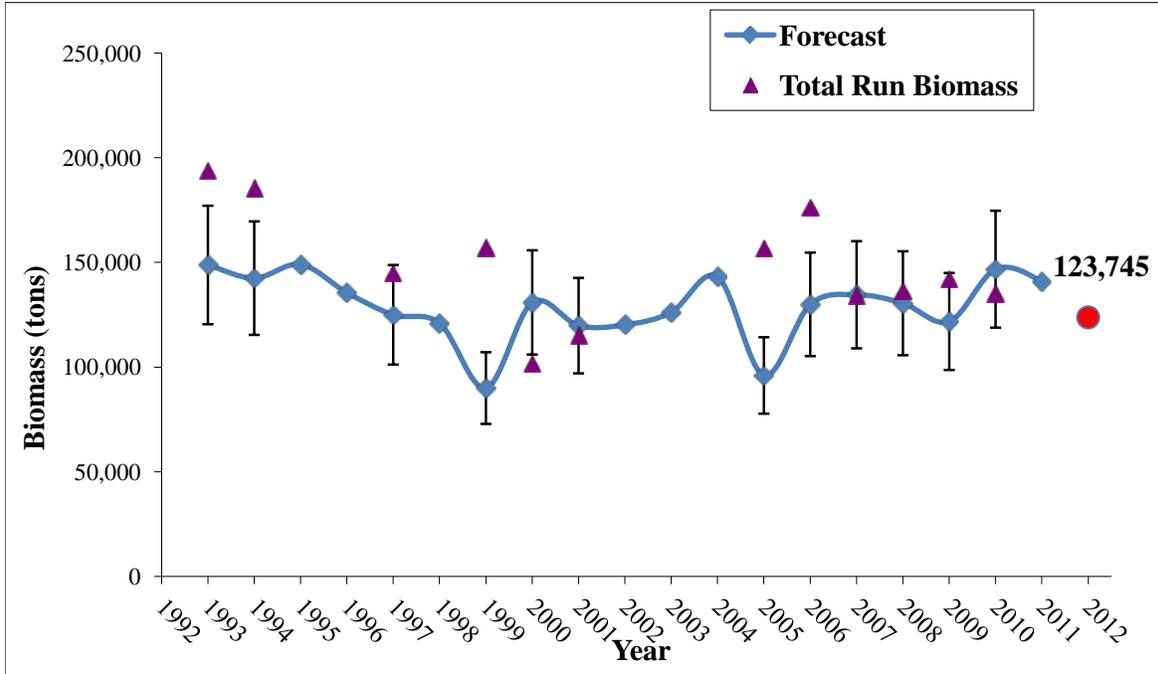
The biomass of the Togiak herring spawning population has been estimated with aerial surveys since the late 1970s, concurrent with development of the sac-roe fishery. Total run biomass for 2011 was not estimated because aerial survey efforts were inadequate to measure the peak inshore biomass, primarily 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 eight to ten 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.

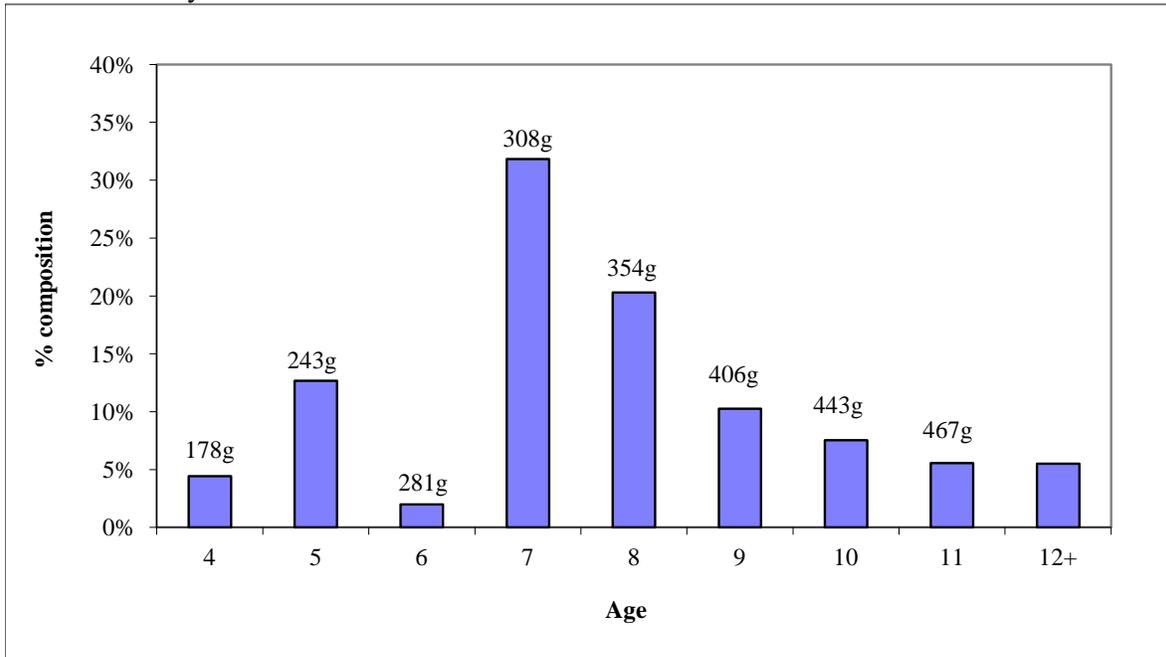
There is always uncertainty in forecasting the Togiak District herring biomass. The mean percent error (MPE) has been -20% for years with reliable total run biomass estimates (Figure 1). The accuracy or mean absolute percent error (MAPE) of the ASA model is 19%. The forecast range for 2012 is 72,859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

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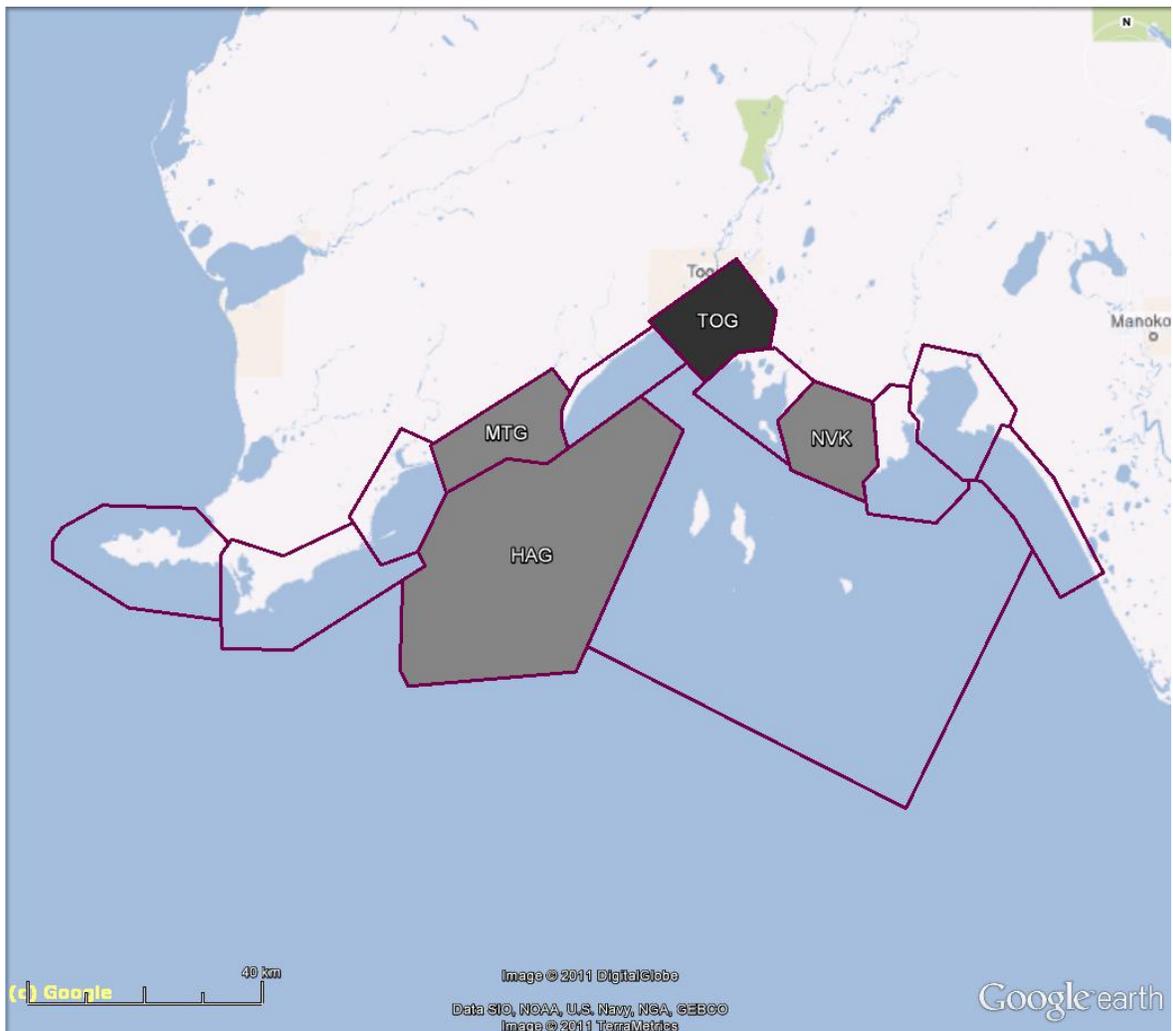


**Figure 1-** Annual observed Togiak herring total run biomass estimates and preseason forecasts based on the ASA model. Mean absolute percent error (MAPE) of 25% around the forecast is also shown for years with a reliable total run biomass estimate.



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

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**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.