

Fishery Management Report 08-65

2009 Report to the Alaska Board of Fisheries: Southeast Alaska—Yakutat Herring Fisheries

by

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and

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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

FISHERY MANAGEMENT REPORT NO. 08-65

**2009 REPORT TO THE ALASKA BOARD OF FISHERIES: SOUTHEAST
ALASKA—YAKUTAT HERRING FISHERIES**

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ABSTRACT

Herring in Southeast Alaska and Yakutat are harvested for commercial bait, commercial sac roe, commercial spawn-on-kelp, subsistence spawn-on-kelp, and personal use fisheries and Alaska Department of Fish and Game test fisheries. Prior to 1967 a reduction fishery accounted for most of the harvest with a historic high of 78,749 tons during the 1929/30 season. A winter bait fishery has generally occurred every year since the turn of the century. The sac roe fisheries became the dominant fishery beginning in 1971. A wild spawn-on-kelp fishery occurred between 1963 and 1969 with a closed pound fishery authorized by the Board of Fisheries beginning in 1990. During the 2007/08 season, the total regional commercial harvest of herring, including herring estimated for commercial spawn on kelp, was 21,520 tons. The sac roe harvest and winter bait fishery totaled 15,900 tons and 655 tons, respectively. The commercial harvest of spawn on kelp was 386.5 tons. Test fisheries accounted for approximately 133.8 tons of herring. No herring fishery occurred in Yakutat.

Keywords: commercial herring harvest, 2007/08 herring season, commercial bait, commercial sac roe, commercial spawn-on-kelp, subsistence, personal use fisheries, Southeast Alaska, Yakutat.

INTRODUCTION

This report summarizes historical harvests and management actions for commercial herring fisheries in Region I through the 2007/08 season with an outlook for the 2008/09 season. The Southeast Alaska Region is a composite of two Registration Areas. Area A, the Southeast Alaska area, encompasses the waters south of Cape Fairweather and north of the International Boundary at Dixon Entrance. Area D, the Yakutat area, extends west from Cape Fairweather to Cape Suckling (Figure 1). Commercial winter bait, sac roe, spawn-on-kelp, and bait pound fisheries occur in only the Southeast Alaska area. Only a winter bait season is provided by regulation in the Yakutat area. Subsistence and personal use harvesting of herring and spawn on kelp occurs in both areas.

HISTORY OF THE HERRING FISHERY

Pacific herring spawning aggregates are found throughout Southeast Alaska. Spawning aggregates vary greatly in size and productivity. In general, herring that spawn on the outer-coastal areas are more productive than those that spawn in the inside waters. Southeast Alaska herring have been commercially harvested since a salting operation was initiated in the 1880s. From the 1890s to the mid-1960s the catch was used primarily to supply herring for reduction to meal and oil. The reduction fishery occurred on mixed aggregates of feeding herring during the summer months. The reduction fishery peaked during the 1920s and 1930s when annual harvests commonly exceeded 50,000 tons (Table 1). The reduction industry was phased out in the mid 1960s due a decline in the abundance of herring and to the development of the Peruvian anchovy reduction industry.

Southeast Alaska herring have historically supplied most of the bait for Alaskan commercial longline and pot fisheries. This harvest occurs during the fall and winter months, a time when bait quality is best, on discrete wintering schools in major bays and inlets. All of the bait harvest is taken by purse seine gear. Relatively small quantities of herring have been harvested for fresh bait pounds. Existing regulations provide for a tray-pack bait fishery designed to produce a sport and commercial troll bait product; however, very little harvest has occurred for this purpose in recent years.

Currently, most of the annual herring harvest is taken in the spring sac roe fishery, which developed in the early 1970s. The sac roe fishery takes herring immediately prior to spawning

when egg maturity is highest. A wild, spawn-on-kelp fishery occurred during the 1960s; however, this fishery was phased out in 1969. A new herring spawn-on-kelp pound fishery was approved by the Alaska Board of Fisheries to begin in the spring of 1990 in Hoonah Sound. In 1992 the Alaska Board of Fisheries created a spawn-on-kelp fishery for the Craig/Klawock area and in 2003 created spawn-on-kelp fisheries in Ernest Sound and Tenakee Inlet.

Subsistence herring products have traditionally included spawn on kelp and herring spawn-on-hemlock branches. Commercial fishing regulations allow commercial fishers to harvest herring for their own bait.

The commercial utilization of Southeast Alaska herring resources has been historically controversial and that remains true today. The subsistence and personal use harvest levels are a minor portion of the total annual take, but are considered very important to the lifestyle and culture of local residents. Commercial harvesting is viewed by much of the public as having a great impact on the local availability of herring. Additionally, herring are a major forage fish and their abundance at fairly high levels is commonly viewed as necessary to ensure healthy populations of predatory fish such as salmon and halibut and associated marine life such as marine birds and several species of marine mammals.

MANAGEMENT STRATEGY

The following management plan for Southeast Alaska commercial herring fisheries was formalized at the January 1994 Board of Fisheries meeting.

5 AAC 27.190. HERRING MANAGEMENT PLAN FOR SOUTHEASTERN ALASKA AREA. For the management of herring fisheries in the Southeastern Alaska Area, the Alaska Department of Fish and Game (ADF&G):

- (1) Shall identify stocks of herring on a spawning area basis;
- (2) Shall establish minimum spawning biomass thresholds below which fishing will not be allowed;
- (3) Shall assess the abundance of mature herring for each stock before allowing fishing to occur;
- (4) Except as provided elsewhere, may allow a harvest of herring at an exploitation rate between 10 percent and 20 percent of the estimated spawning biomass when that biomass is above the minimum threshold level;
- (5) May identify and consider sources of mortality in setting harvest guidelines;
- (6) By emergency order, may modify fishing periods to minimize incidental mortalities during commercial fisheries.

Section 16.05.940.(16) defines a stock as "...a species, subspecies, geographic grouping or other category of fish manageable as a unit" and is here synonymous with spawning aggregate.

A "threshold level" is the minimum herring biomass needed to ensure sustained yield and maintain biological productivity. Threshold levels have been established for each of the winter bait, sac roe, and spawn-on-kelp pound spawning aggregates. Threshold levels are based on all

available data and may be evaluated and revised over time. Current threshold levels vary from 1,000 to 20,000 tons for the major sac roe, winter bait, and spawn-on-kelp fisheries (Table 3).

Herring aggregates with a spawning biomass of less than 2,000 tons, of which there are many, are not considered for harvesting in either the Southeast Alaska winter bait or sac roe fisheries. Under the current approach for setting seasonal harvest limits, herring aggregates of 2,000 tons of adult fish would allow for an annual harvest of 200 tons of herring. The region's current management capability prevents successful management of the winter bait or sac roe fisheries for harvests of less than 200 tons. The exceptions are the Hoonah Sound spawn-on-kelp fishery, and the Yakutat winter bait fishery (outside of Yakutat Bay, which is closed to commercial herring fishing), where the spawning threshold is 1,000 tons.

Annual harvest limits are based on a graduated scale that allows for higher harvest rates as the herring population increases relative to the threshold level (Figure 2). When the estimate of mature spawning aggregate is at the threshold level, a 10% harvest is allowed. The harvest rate increases 2% each time the estimated spawning biomass increases by an amount equal to the threshold level. The harvest rate reaches a maximum of 20% when the population is six times the threshold level. The approach allows for an annual harvest rate of between 10–20% of the mature herring if the established spawning threshold levels are satisfied. No commercial harvesting is allowed if the biomass estimate is less than the threshold.

Historically, there have been two direct observation methods for estimating herring biomass in Southeast Alaska: (1) egg deposition dive surveys and (2) vessel hydroacoustic surveys. In cases where egg deposition surveys are used, the biomass estimate is based on data only from mature herring that spawned that season. Acoustic surveys have not been used to estimate biomass since the 1993/94 season, because the method is thought to be less reliable than egg deposition estimation. Beginning in 1994, ADF&G modified the primary method of forecasting herring abundance for major spawning aggregates in Southeast Alaska. Age Structured Analysis (ASA), which relies on a time series of herring population assessment data, was used to forecast herring biomass for those spawning aggregates with adequate historical data (Kah Shakes/Cat Island, Craig, Sitka Sound, Tenakee Inlet, and Seymour Canal). ASA uses estimates of recruitment, age, growth, maturation, natural mortality, weight-at-age, and spawning escapement to forecast herring abundance. Age and growth information is obtained by samples collected from test fishing, commercial harvests, mid-water trawling (department survey), and sampling on the spawning grounds by the department. Forecasts for herring in other areas are currently computed using a biomass accounting method where the observed spawning biomass and age composition from one year is modified by estimates of growth and mortality to produce a subsequent year's biomass forecast.

In the future, ASA-based forecasts may be applied to other areas as the time series of data for those areas becomes sufficient. ADF&G plans to use this tool in additional areas where there is regular, annual collection of relevant age composition and abundance data. The ASA method is also used to forecast spawning biomass of herring in Southcentral Alaska, the Eastern Bering Sea, and British Columbia. Different forms of ASA models are also integral parts of the biomass assessment for most groundfish stocks in the Bering Sea and the Gulf of Alaska.

2007/08 SEASON SUMMARY

The 2007/08 season herring catch totaled approximately 21,520 tons of herring and herring equivalents (for spawn-on-kelp fisheries where mature herring are not harvested; Tables 1 and 2). The catch included 655 tons of winter bait herring, 15,900 tons of sac roe herring, approximately 133.8 tons of herring caught in test fisheries (consisting of 4.6 tons of spawn-on-kelp, 50.5 tons of winter bait, and 26.1 tons of sac roe), and 386.5 tons of spawn-on-kelp.

Six sac roe herring fisheries are established by regulation. They include two exclusive purse seine areas (Sitka Sound and Lynn Canal) and two exclusive set gillnet areas (Kah Shakes/Cat Island and Seymour Canal). Regulations for the Hobart Bay/Port Houghton area provide for a herring gillnet fishery if the winter bait fishery does not harvest the entire guideline harvest level (Figure 4). West Behm Canal provides for a commercial sac roe fishery such that set gillnet and purse seine fisheries alternate years (5 AAC 27.197). Both gear types are under a limited entry system. Sac roe fisheries opened in Sitka Sound, Seymour Canal, and Hobart-Houghton areas in spring 2008. During the 1998/99 season, in the Kah Shakes/Cat Island area, the total return of herring was much less than forecast and despite the fact that the guideline harvest level of 870 tons of herring was set for this area, the fishery did not open. The Kah Shakes/Cat Island area has since remained below threshold. Lynn Canal and West Behm Canal were both below threshold and did not open in 2008.

Spawn-on-kelp fisheries were conducted in Craig, Ernest Sound, and Hoonah Sound during 2008. The winter bait fishery was opened in Craig, Ernest Sound, and Hobart/Houghton. All other areas remained below required threshold levels and were not open to commercial harvest during the 2007/08 season.

2007/08 WINTER FOOD AND BAIT FISHERY

Winter herring fishing for food and bait is allowed by regulation in Districts and/or Sections 1-10, 11-B, 11-C, 12, 13-A, 13-B (only south of the latitude of Aspid Cape), 14, 15-A, and 16 in Southeast Alaska. In the Yakutat area, Yakutat Bay is closed to herring fishing.

The fishing season is set by regulation from October 1 through February 28. In Southeast Alaska, regulations specify that open fishing periods be established by emergency order. Although the existing regulations specify purse seines and set gillnets as legal allowable gear, only purse seine gear has been fished in recent years.

Three spawning aggregates were identified as having harvestable quantities of bait herring during the 2007/08 winter season (Figure 3): the Craig/Klawock area with a guideline harvest level (GHL) of 1,167 tons, Hobart-Houghton with a GHL of 462 tons, and the Ernest Sound fishery with a GHL of 1,244 tons. All three fisheries were open to the commercial harvest of herring December 3, 2007 and closed by regulation February 28, 2008. A total of 655 tons was harvested from the Craig/Klawock area and Ernest Sound (565 tons and 90 tons, respectively, Table 4). Though open to commercial harvest, none occurred in the Hobart/Houghton area. The forecast of returning biomass was below threshold for Tenakee Inlet and was therefore not opened.

2007/08 TEST FISHERIES

Three test fisheries were conducted in Southeast Alaska during the 2007/08 season. These included a herring sac roe fishery and a winter bait fishery in Sitka Sound and a spawn-on-kelp fishery in Hoonah Sound. The test fishery harvest consisted of 4.6 tons of spawn-on-kelp product, 50.5 tons of winter bait, and 26.1 tons of herring for sac roe. The funds generated were used to obtain data on age structure, spawn timing, and abundance of herring spawning populations. Revenues were also used to defray costs for managing and assessing herring populations in other areas of Southeast Alaska.

2007/08 SAC ROE FISHERY

A harvest of 15,900 tons of herring were taken in sac roe fisheries during the 2007/08 season. This harvest resulted from a Sitka Sound purse-seine catch of 14,386 tons, a Hobart Bay/Port Houghton gillnet catch of 306 tons, and a Seymour Canal gillnet catch of 1,208 tons (Table 5). Abundance forecasts were below minimum population threshold levels in Lynn Canal, Kah Shakes/Cat Island, and West Behm Canal and no fisheries were allowed in these areas during the 2007/08 season.

The Sitka Sound 2008 spawning biomass forecast resulted in a GHLL 14,723 tons. The Sitka Sound sac roe fishery went on two-hour notice effective 0800, March 24, 2008. A total of 14,386 tons was harvested during three openings (March 25, 26, and 41st for a total of 9.5 hr). The average roe percentage for all three openings was 11.6%. Fifty permit holders were registered for the fishery and 48 reported landing product.

The 2008 forecast of the mature spawning biomass for Seymour Canal herring was 8,721 tons. The sliding scale harvest rate allowed a 13.8% harvest rate for this biomass and a GHLL of 1,205 tons for the 2007/08 season. The Seymour Canal gillnet sac-roe fishery went on 12-hour notice effective 0930, May 6, 2008. The fishery opened May 10 at 1630 and closed May 11 at 1630. Of the 69 permit holders registered for this fishery, 47 reported landing 1,208 tons of herring.

The Hobart-Houghton 2008 forecast for mature spawning biomass was 3,884 tons and a harvest rate of 11.9%. No herring were harvested in the Hobart/Houghton winter food and bait fishery. By regulation, the 462 ton winter bait GHLL was available for the sac-roe gillnet fishery. The fishery was placed on two-hour notice effective 0800, May 2, 2008. The fishery opened 0930, May 8 and closed 1800, May 9, 2008. A total of 306 tons of sac-roe herring were harvested by 59 permit holders (69 permit holders were registered to fish).

The biomass for the West Behm Canal spawning aggregate was very small in the 1970s through the early 1990s. From approximately 1993 through 2003 the spawning biomass forecast increased from an estimated 283 tons in 1991 to a maximum forecast of 15,968 tons in 1999. The 2004 forecast was for 9,366 tons of mature spawning herring. In 2003 the threshold for West Behm Canal was increased from 2,000 tons to 6,000 tons. During the January 2000 Board of Fisheries meeting the herring committee recommended opposing, and the Board voted against, creating commercial herring fisheries in West Behm Canal. At its 2003 meeting in Sitka, the Alaska Board of Fisheries authorized a commercial herring sac roe fishery in Behm Canal. The fishery is to be managed (5 AAC 27.197.) such that in years when the threshold level is forecast to be met, fishing gear groups will alternate between set gillnet and purse seine. The West Behm Canal forecast for 2004 was 9,366 tons which would have allowed for a GHLL of 940 tons for the gillnet sac roe fishery and 100 tons for the bait pound fishery. This was the first time a sac-roe

fishery was to have been opened since the mid 1970s. Actual returns for West Behm Canal in 2004 were estimated at only 443 tons, much lower than forecast. Due to the much lower than expected return, there was no commercial fishery on West Behm Canal herring in 2004. The forecast for 2008 was a mature spawning biomass of 2,531 tons which is below the 6,000 ton threshold necessary to conduct a commercial fishery. No commercial herring sac-roë fisheries have occurred in West Behm Canal since the mid 1970s.

2007/08 HERRING POUND FISHERIES

There are three types of herring impoundment or “pound” fisheries in Southeast Alaska: tray pack bait, fresh bait, and spawn on kelp. The tray pack pound fishery was created in 1979 when the Board of Fisheries allocated a harvest of up to 100 tons. Fresh bait pounds have historically been allowed by regulation under a permit system in five areas: Tee Harbor, Indian Cove, Scow Bay, Sitka Sound (Section 13-B), and Lisianski Inlet (Figure 5). The conduct and management of the fresh bait and tray pack pound fisheries are essentially the same in that herring are impounded in net pens for a period of time to be sold as bait and both require a commissioner’s permit. During the 2003 Board of Fisheries meeting the two were combined under one management plan, 5 AAC 27.180. and 5 AAC 27.160.(b). In recent years there has been relatively little participation in either of the fresh bait pound fisheries (Table 6).

There are four spawn-on-kelp pound fisheries in Southeast Alaska: Craig/Klawock and Ernest Sound in Southern Southeast, and Hoonah Sound and Tenakee Inlet in Northern Southeast (Figure 7). The spawn-on-kelp fishery for the Craig/Klawock area was initiated in the spring of 1992. The harvest limit of herring is shared with the bait fishery with 40% of the total guideline harvest allocated to the spawn-on-kelp fishery and 60% allocated to the bait fishery. The 40:60% allocation split was new as of the 1997/98 season due to Board of Fisheries action (at the January 1997 meeting) which changed the previous allocation of 15% for spawn-on-kelp and 85% for bait. For the 2007/08 season, the original herring allocation was increased by 602 tons, the amount remaining on the bait fishery allocation, resulting in a total GHL of 1,380 tons of herring. There were 10 single-closed pound and 56 double-closed pounds on the grounds during the 2007/08 season with 122 permit holders landing 148.5 tons of spawn-on-kelp product (Table 7).

For the Hoonah Sound spawn-on-kelp fishery 2007/08 season, the GHL was 2,238 tons of herring. There were 98 single-closed and 3 double-closed herring pounds on the fishing grounds from which 101 permit holders landed spawn-on-kelp product. A total of 228.1 tons of spawn-on-kelp product was harvested during the fishery (Table 7).

During its meeting in January 2003, the Board of Fisheries created two new herring spawn-on-kelp fisheries in Southeast Alaska: District 7 (Ernest Sound) and Section 12-A (Tenakee Inlet). The Ernest Sound fishery is considered part of the Southern Southeast spawn-on-kelp limited entry fishery and Tenakee Inlet is considered part of the Northern Southeast spawn-on-kelp limited entry fishery. The Ernest Sound fishery has been opened twice: once in 2004 and again in 2008 when forecast spawning biomass was above threshold. A total of 13 permit holders landed 9.8 tons of spawn-on-kelp product from one single-closed and six double-closed pounds during the 2007/08 fishery (Table 7). The Tenakee Inlet spawn-on-kelp fishery was open during 2003, 2004, and 2005 but forecasts have been below threshold beginning with the 2006 season.

HERRING SPAWN-ON-KELP SUBSISTENCE FISHERY

The harvest of "wild" herring spawn on kelp has occurred traditionally throughout the region. The Southeast Alaska fishery is regulated solely through the issuance of subsistence spawn-on-kelp permits at local ADF&G offices, while no permit is required for the Yakutat area. The permits specify times, areas, and amounts of spawn on kelp allowed. The annual possession limit for herring spawn-on-kelp is 32 pounds for an individual or 158 pounds for a household of two or more persons. Additional permits for herring spawn-on-kelp above the annual possession limit is allowed at the department's discretion.

Subsistence spawn-on-kelp harvests generally occur in March and April near Craig, Hydaburg, and Sitka where major herring spawning populations are found (Figure 6). *Macrocystis* kelp is the preferred species of kelp. In 2008, based on department permits, an estimated combined total of 8,784 pounds (Table 8) of spawn-on-kelp product was harvested in these areas.

HISTORICAL VALUE

Exvessel value data was obtained September 29, 2008 from the Commercial Fisheries Entry Commission's (CFEC) web site at <http://www.cfec.state.ak.us/bit/mnuherr.htm> for 1977 through 2007. Data for 2008 from CFEC is not expected to be available until late 2009 and 2007 data is preliminary. Data is not inflation adjusted. Questions, definitions, and additional information concerning exvessel value may be directed to the above web site and CFEC, and is reproduced here for convenience (Table 9). CFEC data is collected and recorded on an annual basis. Consequently, winter bait fishery values do not reflect the seasonal but the annual values of a fishery.

From 1990 through 2007, commercial exvessel values have ranged from a low of \$1,971,960 in 1991 to a high of \$17,342,622 in 1996. Generally, the largest percentage of the total value occurs in the seine sac roe fishery. Fishery manager's preliminary estimate for the 2008 value of herring fisheries in Southeast Alaska is over \$18 million.

2008/09 SEASON OUTLOOK

There are five areas opened to the commercial bait pound fishery: Section 3-B and District 4 (100 ton GHL), portions of District 7 (53 ton GHL), portions of District 10 (25 ton GHL), Tenakee Inlet (87 ton GHL), and Sitka Sound (100 ton GHL). In District 7 and Tenakee Inlet, any remaining, unharvested GHL will be allocated to the District 7 and/or the Tenakee Inlet spawn-on-kelp fisheries. After the spawn-on-kelp fishery has closed, any remaining unharvested portion of the GHL will be allocated to the bait pound fishery (5 AAC 27.160(b)(6) and (9)).

The winter food and bait herring fisheries opened in Southeast Alaska December 8, 2008 in four areas with a combined GHL of 2,807 tons. The Craig/Klawock winter food and bait GHL of 1,167 tons is 60% of the total GHL of 1,945 tons. The remaining 40%, and any portion not harvested during the winter bait fishery, is allocated to the spawn-on-kelp fishery. The Ernest Sound winter food and bait GHL of 476 tons is 90% of the total Ernest Sound GHL of 529 tons. Any portion of the Ernest Sound GHL not taken by the winter bait fishery will be allocated to the herring spawn-on-kelp fishery; if the remaining GHL is less than 50 tons, there will be no spawn-on-kelp pound fishery (5 AAC 27.185(i)). The Hobart Bay/Port Houghton winter food and bait GHL is 376 tons; any portion not harvested will be allocated to the set gillnet sac roe fishery (5 AAC 27.160(f)). The Tenakee Inlet winter food and bait GHL is 875 tons; any portion

not harvested will be allocated to the herring spawn-on-kelp fishery; if the remain GHl is less than 50 tons, there will be no spawn-on-kelp fishery (5 AAC 27.185(j)).

The 2009 GHl for the Hoonah Sound spawn-on-kelp fishery is 2,238 tons. The kelp allocation for 2009 will be the same as 2008, the maximum allowed in regulation (5 AAC 27.185(c)).

The 2009 preliminary forecast for Sitka Sound is 76,542 tons with a preliminary GHl of 15,308 tons. The Sitka Sound spawning aggregate is expected to consist primarily of age-6 (13%), age-7 (14%), and age8+ (55%) fish. Samples will be collected from the scheduled winter bait test fishery in Sitka Sound to update the forecast.

The Seymour Canal forecast was not available by the time this report was published.

The forecast for West Behm Canal is below threshold for the 2008/09 season and no commercial harvest is scheduled for this area.

The Lynn Canal spawning stock remains below threshold; no commercial harvest has occurred in Lynn Canal since the 1981/82 season.

Similarly, relatively little to no spawning has occurred in recent years in the Kah Shakes/Cat Island area. Average nautical miles of spawn for the Kah Shakes/Cat Island area from 1974 through 1998 (latest year a commercial harvest occurred) was approximately 10.9 nmi; average spawn from 1999 through 2008 has been approximately 2.9 nmi with no spawn observed for three of those nine years.

TABLES AND FIGURES

Table 1.—Southeast Alaska herring harvests in tons, 1900/01 to 2007/08.

Season	Total harvest ^{a,b}	Season	Total harvest ^{a,b}	Season	Total harvest ^{a,b}
1900/01	1,194	1936/37	36,713	1972/73	6,307
1901/02	1,250	1937/38	50,334	1973/74	7,837
1902/03	812	1938/39	22,356	1974/75	7,985
1903/04	1,494	1939/40	20,028	1975/76	7,942
1904/05	1,521	1940/41	3,137	1976/77	8,640
1905–06	1,309	1941/42	6,230	1977/78	6,071
1906/07	1,005	1942/43	3,691	1978/79	6,532
1907/08	1,382	1943/44	6,235	1979/80	9,217
1908/09	1,711	1944/45	16,801	1980/81	8,393
1909/10	1,075	1945/46	24,126	1981/82	8,723
1910/11	6,867	1946/47	37,564	1982/83	9,764
1911/12	12,057	1947/48	41,829	1983/84	9,076
1912/13	16,067	1948/49	16,125	1984/85	11,079
1913/14	13,496	1949/50	14,279	1985/86	9,792
1914/15	8,318	1950/51	13,411	1986/87	8,369
1915/16	6,964	1951/52	10,652	1987/88	16,152
1916/17	11,194	1952/53	16,020	1988/89	16,191
1917/18	12,445	1953/54	12,435	1989/90	8,194
1918/19	17,825	1954/55	6,446	1990/91	6,034
1919/20	10,962	1955/56	11,368	1991/92	9,975
1920/21	16,452	1956/57	22,819	1992/93	12,253
1921/22	6,012	1957/58	24,745	1993/94	7,514
1922/23	16,950	1958/59	38,797	1994/95	5,104
1923/24	21,240	1959/60	49,866	1995/96	9,854
1924/25	29,395	1960/61	38,906	1996/97	14,729
1925/26	57,782	1961/62	24,709	1997/98	10,590
1926/27	73,843	1962/63	16,959	1998/99	12,903
1927/28	45,310	1963/64	15,703	1999/00	6,451
1928/29	53,007	1964/65	23,553	2000/01	14,706
1929/30	78,749	1965/66	12,390	2001/02	13,671
1930/31	70,855	1966/67	5,670	2002/03	11,950
1931/32	44,857	1967/68	3,214	2003/04	17,015
1932/33	49,786	1968/69	1,852	2004/05	18,410
1933/34	61,588	1969/70	2,644	2005/06	14,287
1934/35	66,842	1970/71	5,015	2006/07	16,014
1935/36	58,155	1971/72	3,867	2007/08	21,520

^a Harvests include the fresh bait pound harvest and test fishery harvests.

^b Includes spawn-on-kelp harvests converted to herring equivalents at 12.5 to 1 ratio.

Table 2.—Southeast Alaska annual herring catch (tons) by fishery, 1960/61 through 2007/08 seasons.

Year	Reduction	Winter Bait	Spawn on Kelp ^a	Sac Roe	Test ^b	Bait Pound	Total ^b
1960/61	36,790	2,116					38,906
1961/62	22,869	1,840					24,709
1962/63	13,765	3,172	22				16,959
1963/64	13,539	2,064	100				15,703
1964/65	21,397	1,957	199				23,553
1965/66	10,062	2,094	234				12,390
1966/67	2,918	2,422	330				5,670
1967/68		3,025	189				3,214
1968/69		1,816	36				1,852
1969/70		2,644					2,644
1970/71		3,324		1,691			5,015
1971/72		2,045		1,822			3,867
1972/73		3,954		2,353			6,307
1973/74		5,856		1,981			7,837
1974/75		5,910		2,075			7,985
1975/76		5,688		2,254			7,942
1976/77		6,409		2,231			8,640
1977/78		4,042		2,029			6,071
1978/79		3,485		3,047			6,532
1979/80		2,717		6,500			9,217
1980/81		1,671		6,722			8,393
1981/82		1,530		7,193			8,723
1982/83		1,030		8,713		21	9,764
1983/84		620		8,411		45.2	9,076
1984/85		1,406		9,636		37	11,079
1985/86		2,442		7,319		31	9,792
1986/87		2,347		5,957		65	8,369
1987/88		4,016		11,246		17	15,279
1988/89		3,155		12,970		66	16,191
1989/90		3,843	12	4,163		38	8,194
1990/91		3,273	13.3	2,514		81	6,034
1991/92		2,719	48.8	6,614		32.3	9,975
1992/93		1,052	19.7	10,955		*	12,253
1993/94		879	49.2	5,884	136	0	7,514
1994/95		464	54.4	3,850	109.8	0	5,104
1995/96		484	37.3	8,749	154.5	0	9,854
1996/97		727	88	12,726	176	0	14,729
1997/98		840	108.4	8,233	162	0	10,590
1998/99		1,033	108	10,348	172	0	12,903
1999/00		926	36	4,966	109	*	6,451
2000/01		775	92.2	12,654	124	0	14,706
2001/02		355	171.9	10,854	306.4	6.8	13,671
2002/03		*	263.4	8,570	86.5	0.6	11,950
2003/04		*	447.4	11,296	231	7.3	17,015
2004/05		553	392.2	12,515	440.1	*	18,410
2005/06		689	191.1	11,155	55.0	0	14,287
2006/07		576	203.9	12,790	99.0	0	16,014
2007/08		655	386.5	15,900	133.8	0	21,520

Note: * When number of permits is less than three, information is considered confidential.

^a A spawn-on-kelp pound fishery was implemented in the spring of 1990; prior harvests were from the “wild” spawn-on-kelp fishery. Harvest is tons of spawn-on-kelp product.

^b Includes spawn-on-kelp product converted to herring equivalents at 12.5 to 1 ratio.

Table 3.—Herring spawning threshold levels for major herring aggregates in Southeast Alaska and Yakutat.

Area	Threshold Level (tons)
Hoonah Sound	1,000
Yakutat Bay	1,000
Ernest Sound	2,500
Anita Bay	2,500
Port Camden	2,500
Hobart Bay/Port Houghton	2,000
Lisianski Inlet	2,500
Seymour Canal	3,000
Tenakee Inlet	3,000
Tongass Narrows and George and Carroll Inlets	3,500
Craig/Klawock	5,000
Kah Shakes and Cat Island	6,000
Lynn Canal	5,000
Sitka Sound	20,000
West Behm Canal	6,000
Other aggregates not included above	2,000

Table 4.–Southeast Alaska winter food and bait herring harvest in tons, by fishing area and season, 1982/83 through 2007/08.

Year	Craig / Klawock	Anita Bay	Earnest Sound	Hobart Bay / Houghton	Port Camden	Tenakee Inlet	Lisianski Inlet	Whale/ Necker Bay	Scow Bay	Slocum Arm	Total
1982/83	140	124	0	0	0	749	0	0	17	0	1,030
1983/84	0	0	0	0	42	619	0	0	0	0	661
1984/85	0	0	0	0	0	1,406	0	0	0	0	1,406
1985/86	302	0	0	0	0	2,040	0	0	0	0	2,342
1986/87	1,231	0	0	0	0	1,275	0	0	0	0	2,506
1987/88	2,014	0	0	0	0	1,577	280	0	0	257	4,128
1988/89	1,730	0	0	0	0	655	770	0	0	0	3,155
1989/90	3,221	0	0	0	0	595	27	0	0	0	3,843
1990/91	3,272	0	0	0	0	0	0	0	0	0	3,272
1991/92	2,295	0	0	0	0	0	353	0	0	0	2,648
1992/93	629	0	8	0	0	0	239	176	0	0	1,052
1993/94	636	0	0	140	0	0	0	103	0	0	879
1994/95	124	0	111	229	0	0	0	0	0	0	464
1995/96	34	0	220	230	0	0	0	0	0	0	264
1996/97	525	0	6	104.4	0	98	0	0	0	0	727
1997/98	254	0	0	0	0	586	0	0	0	0	840
1998/99	102	0	96	0	0	835	0	0	0	0	1,033
1999/00	*	0	0	432	0	494	0	0	0	0	926
2000/01	*	0	0	0	0	775	0	0	0	0	775
2001/02	*	0	0	0	0	355	0	0	0	0	355
2002/03	*	0	0	0	0	*	0	0	0	0	*
2003/04	*	0	*	0	0	*	0	0	0	0	*
2004/05	553	0	0	0	0	0	0	0	0	0	553
2005/06	689	0	0	0	0	0	0	0	0	0	689
2006/07	576	0	0	0	0	0	0	0	0	0	576
2007/08	565	0	90	0	0	0	0	0	0	0	655

Note: * Data considered confidential with fewer than three permits.

Table 5.—Annual Southeast Alaska sac roe herring harvest by area, in tons, 1971 through 2008.

Year	Sitka Sound	Lynn Canal	Seymour Canal	Revillagigedo Channel	Other Areas	All Areas
1971	748	688	35	0	220 ^a	1,691
1972	602	524	495	0	201 ^b	1,822
1973	597	798	506	0	452 ^c	2,353
1974	681	396	904	0	0	1,981
1975	1,517	558	0	0	0	2,075
1976	800	630	195	426	203 ^d	2,254
1977	0	926	485	820	0	2,231
1978	175	954	729	171	0	2,029
1978	2,250	0	269	528	0	3,047
1980	4,385	975	0	1,140	0	6,500
1981	3,506	761	615	1,840	0	6,722
1982	4,363	551	0	2,279	0	7,193
1983	5,450	0	0	3,250	0	8,713
1984	5,830	0	518	2,182	0	8,411
1985	7,475	0	0	2,161	0	9,636
1986	5,443	0	339	1,537	0	7,319
1987	4,216	0	302	1,439	0	5,957
1988	9,575	0	586	1,087	0	11,246
1989	12,135	0	547	592	0	12,970
1990	3,804	0	359	0	0	4,163
1991	1,908	0	0	660	0	2,514
1992	5,368	0	0	1,246	0	6,614
1993	10,186	0	0	737	0	10,953
1994	4,758	0	382	749	0	5,884
1995	2,908	0	319	626	0	3,853
1996	8,144	0	0	605	0	8,749
1997	11,147	0	0	1,137	442 ^e	12,726
1998	6,705	0	586	616	351 ^e	8,233
1999	9,136	0	706	0	506 ^e	10,348
2000	4,813	0	389	0	0	4,966
2001	11,972	0	620	0	0	12,654
2002	9,789	0	1,066	0	0	10,854
2003	7,051	0	1,519	0	0	8,570
2004	10,492	0	804	0	0	11,296
2005	11,366	0	945	0	204 ^e	12,515
2006	9,967	0	1,187	0	0	11,155
2007	11,571	0	1,219	0	0	12,790
2008	14,386	0	1,208	0	306 ^e	15,900

^a Washington Bay (76 tons), Lisianski Inlet (100 tons).

^b Lisianski Inlet.

^c Yakutat Bay (158 tons), Helm Bay (194 tons), and Lisianski Inlet (100 tons).

^d Helm Bay (26 tons), Chaik Bay (40 tons), Pybus Bay (22 tons), Gambier Bay (8 tons), and Kasaan Bay (107 tons).

^e Hobart Bay/Port Houghton commercial sac roe gillnet fishery harvest, not including test fishery harvest.

Table 6.–Fresh herring bait pound harvests in tons by area, 1983 through 2008.

Year	Scow Bay	Farragut Bay	Sitka Sound	Tee Harbor	Indian Cove	Lisianski Inlet	West Behm Canal	Total Harvest
1983	7	14	0 ^a	0	0	0		21
1984	0	10.2	35	0	0	0		45.2
1985	0	4.3	33	0	0	0		37.3
1986	0	5	26	0	0	0		31
1987	0	3	62	0	0	0		65
1988	0	0	17	0	0	0		17
1989	0	0	66	0	0	0 ^a		66
1990	0	0	38	0	0	0		38
1991	0	16	65	0	0	0		81
1992	0	15	17	0	0	0		32
1993	0	0	*	0	0	0		*
1994	0	0	*	0	0	0		*
1995	0	0	0	0	0	0		0
1996	0	0	0	0	0	0		0
1997	0	0	0	0	0	0		0
1998	0	0	0	0	0	0		0
1999	0	0	0	0	0	0		0
2000	0	0	*	0	0	0		*
2001	0	0	0	0	0	0		0
2002	0	0	6.8	0	0	0		6.8
2003	0	0	*	0	0	0	0.6	0.6
2004	0	0	7.3	0	0	0	0	7.3
2005	0	0	*	0	0	0	0	*
2006	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0

Note: * When number of permits are less than three, information is confidential.

^a Pounds were allowed by regulation in Sitka Sound in 1983 and in Lisianski Inlet in 1989.

Table 7.—Herring spawn-on-kelp (SOK) pound fishery in tons of SOK product, 1990 through 2008.

Year	Craig / Klawock	Hoonah Sound	Ernest Sound	Tenakee Inlet	Total
1990		11.9			11.9
1991		13.2			13.2
1992	25.7	23.1			48.8
1993	5.7	14			19.7
1994	16.5	32.7			49.2
1995	25.4	29			54.4
1996	37.2	0			37.2
1997	23	65			88
1998	22.4	86			108.4
1999	36	71.6			107.6
2000	0.0 ^a	35.7			35.7
2001	27.2	66.2			93.4
2002	41.7	136.6			178.3
2003	69.2	146.6	No Quota	47.6	263.4
2004	49.3	243.3	56.1	98.7	447.4
2005	115.2	183.3	No Quota	93.7	392.2
2006	29.0	162.1	No Quota	No Quota	191.1
2007	44.5	159.4	No Quota	No Quota	203.9
2008	148.5	228.1	9.8	No Quota	386.5

^a Craig/Klawock 2000 pound GHL was 280 tons of herring. Estimated Craig spawning biomass was 9,591 tons. No product was landed.

Table 8.—Herring spawn-on-kelp subsistence estimated harvest (lb), 1965 through 2008.

Year	CRAIG-KLAWOCK- HYDABURG			SITKA			KAH SHAKES			Other		
	Permits		Estimated Harvest *	Permits		Estimated Harvest *	Permits		Estimated Harvest *	Permits		Estimated Harvest *
	Issued	Returned		Issued	Returned		Issued	Returned		Issued	Returned	
1967	201	130	3,368									
1968	130	95	2,260									
1969	80	61	2,858									
1966	145	86	5,200									
1970	103	60	3,213									
1971	81	66	2,643									
1972	102	44	4,250									
1973	31	9	1,209									
1974	159	39	3,087									
1975	92	34	1,640									
1976	54	12	1,728									
1977	34	7	352									
1978	109	83	3,521				11	8	122			
1979	102	81	1,268	21	10	137	16	6	0			
1980	309	189	3,721	19	13	145	33	24	75			
1981	157	87	6,148	26	19	192	6	5	12			
1982	187	81	5,485	36	25	886	30	18	342			
1983	302	189	5,945	69	48	1,991	33	24	103			
1984	261	159	4,972	50	40	1,281	14	6	116			
1985	233	168	9,553	71	45	3,963	19	10	0			
1986	241	142	5,565	90	82	3,929	5	2	0			
1987	263	158	15,038	97	59	8,827	5	4	0			
1988	191	124	6,354	127	77	6,146	6	6	68			
1989	221	117	11,699	70	53	962	10	9	0			
1990	245	172	10,158	71	63	4,022	7	0	0			
1991	274	142	12,627	75	61	5,925	4	4	60			
1992	407	304	16,677	118	90	7,151	8	7	75			
1993	290	167	5,592	61	47	5,307	8	3	0			
1994	293	161	5,376	81	63	3,078	9	6	0			
1995	201	80	3,446	57	46	2,182	3	1	0			
1996	261	164	11,443	100	76	6,000	4	3	0			
1997	226	166	8,247	87	60	4,837	0	0	0			
1998	213	88	5,670	60	42	3,079	0	0	0			
1999	185	120	6,420	58	39	3,746	1	1	40			
2000	116	77	820	47	46	2,759	0	0	0			
2001	118	50	7,054	52	46	910	0	0	0			
2002	111	35	7,164	47	41	4,111	1	0	0			
2003	144	100	9,698	40	32	3,139	2	1	0	2 ^b	1	0
2004	95	57	5,685	52	36	10,412	6	5	0	7 ^b	6	0
2005	140	90	9,770	41	28	2,196	3	3	0	1 ^b	1	0
2006	92	82	6,074	32	31	3,399	0	0	0	0	0	0
2007	109	81	3,505	42	37	2,403	0	0	0	0	0	0
2008	117	57	7,043	41	39	1,741	0	0	0	0	0	0

^a Total harvest extrapolated from harvests reported on returned permits to include an estimate of unreported harvests.

^b West Behm Canal

Table 9.—Southeast Alaska commercial herring fisheries total gross earnings (in thousands), 1977 through 2008, by calendar year.

Year	Winter Bait	Seine Sac Roe	Gillnet Sac Roe	SOK -Southern	SOK -Northern	Total
1977	\$507 (42%)	\$695 (58%)				\$695
1978		\$1,422 (100%)				\$1,422
1979		\$9,052 (100%)				\$9,052
1980		\$2,132 (87%)	\$312 (13%)			\$2,445
1981	\$343 (9%)	\$2,376 (60%)	\$1,246 (31%)			\$3,622
1982	\$558 (20%)	\$1,663 (59%)	\$602 (21%)			\$2,265
1983	\$166 (2%)	\$5,032 (62%)	\$2,949 (36%)			\$7,981
1984	\$128 (2%)	\$3,729 (60%)	\$2,327 (38%)			\$6,056
1985	\$321 (3%)	\$7,883 (69%)	\$3,186 (28%)			\$11,069
1986	\$548 (5%)	\$7,413 (70%)	\$2,636 (25%)			\$10,049
1987	\$586 (8%)	\$4,396 (58%)	\$2,547 (34%)			\$6,943
1988	\$1,010 (12%)	\$4,169 (50%)	\$3,108 (38%)			\$7,277
1989	\$900 (26%)	\$1,182 (34%)	\$1,379 (40%)			\$2,561
1990	\$1,030 (30%)	\$1,950 (57%)	\$260 (8%)		\$199 (6%)	\$2,409
1991	\$916 (46%)	\$206 (10%)	\$624 (32%)		\$226 (11%)	\$1,056
1992	\$720 (16%)	\$1,373 (31%)	\$1,777 (40%)		\$529 (12%)	\$3,680
1993	\$471 (8%)	\$3,484 (61%)	\$1,300 (23%)		\$417 (7%)	\$5,201
1994	\$125 (2%)	\$3,626 (49%)	\$1,768 (24%)		\$1,823 (25%)	\$7,216
1995	\$147 (2%)	\$3,933 (47%)	\$1,864 (22%)	\$999 (12%)	\$1,476 (18%)	\$8,272
1996	(0%)	\$14,350 (83%)	\$1,665 (10%)	\$1,328 (8%)	Confidential	\$17,343
1997	\$175 (2%)	\$4,726 (65%)	\$990 (14%)	\$282 (4%)	\$1,082 (15%)	\$7,081
1998	\$526 (17%)	\$1,646 (54%)	\$613 (20%)	\$69 (2%)	\$169 (6%)	\$2,497
1999	\$397 (5%)	\$4,906 (64%)	\$713 (9%)	\$374 (5%)	\$1,244 (16%)	\$7,237
2000	\$236 (6%)	\$2,667 (72%)	\$226 (6%)		\$596 (16%)	\$3,489
2001	\$131 (2%)	\$5,794 (77%)	\$254 (3%)	\$342 (5%)	\$1,017 (13%)	\$7,407
2002	\$110 (2%)	\$4,441 (61%)	\$614 (8%)	\$352 (5%)	\$1,733 (24%)	\$7,141
2003	Confidential	\$3,201 (45%)	\$784 (11%)	\$759 (11%)	\$2,288 (33%)	\$7,032
2004	Confidential	\$5,162 (53%)	\$497 (4%)	\$653 (9%)	\$2,880 (34%)	\$9,192
2005	Confidential	\$6,118 (70%)	\$408 (5%)	\$625 (7%)	\$1,566 (18%)	\$8,716
2006	Confidential	\$2,645 (50%)	\$389 (7%)	\$289 (5%)	\$2,013 (38%)	\$5,336
2007 ^a	Confidential	\$5,392 (47%)	\$458 (4%)	\$1,088 (10%)	\$4,491 (39%)	\$11,429
Recent 10-yr (1998–2007) Average						
		\$4,197	\$496	\$506	\$4,197,239	\$6,948
Recent 5-yr (2003–2007) Average						
		\$4,504	\$507	\$683	\$4,503,557	\$8,341
2008 ^b	\$156 (1%)	\$8,834 (49%)	\$606 (3%)	\$3,281 (18%)	\$5,114 (28%)	\$18,023

^a Preliminary CFEC data.

^b Preliminary Division of Commercial Fishery manager estimates.

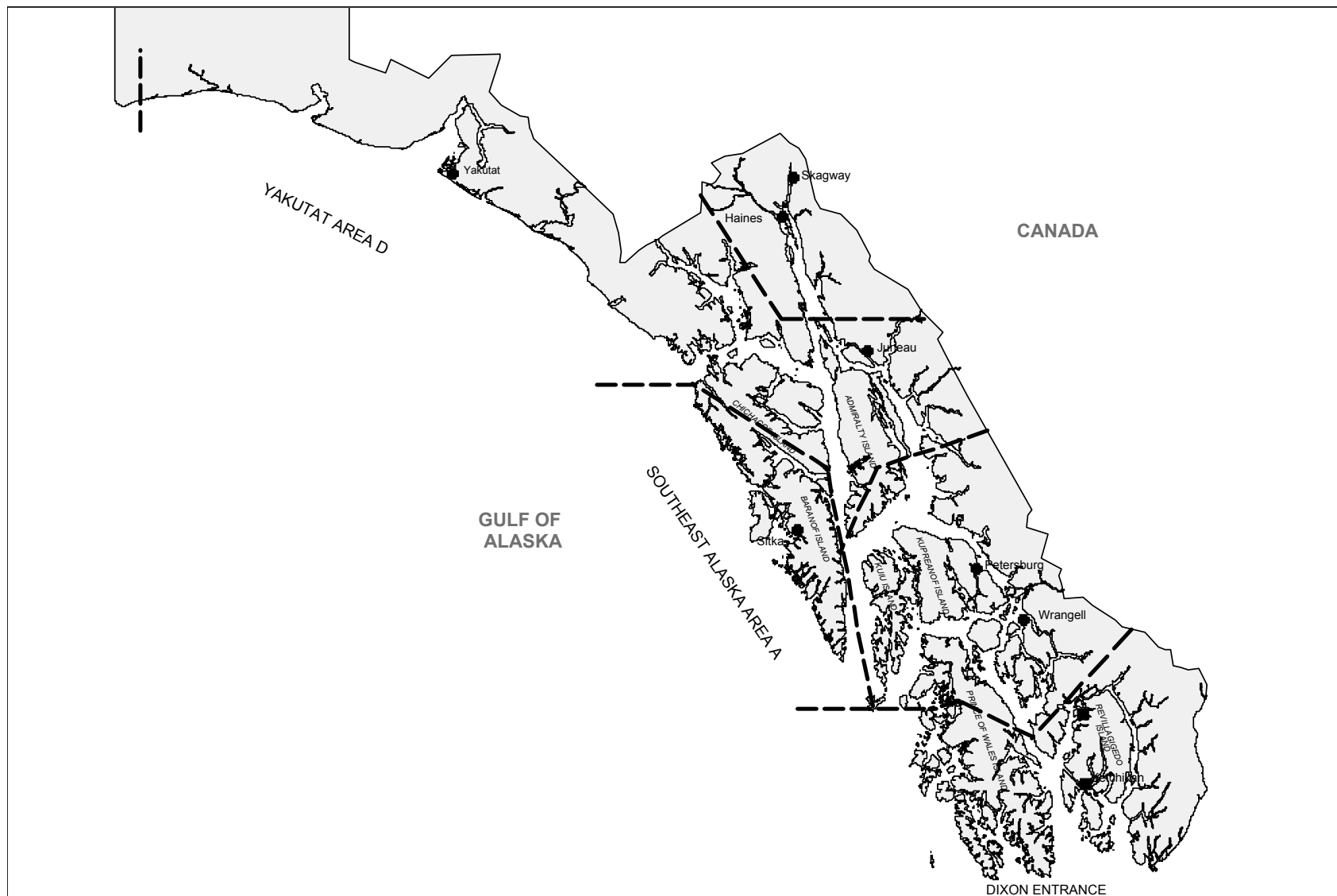


Figure 1.—Southeast Alaska Region (Region 1) herring registration areas (Southeast Alaska Area A and Yakutat Area D) and management area boundaries.

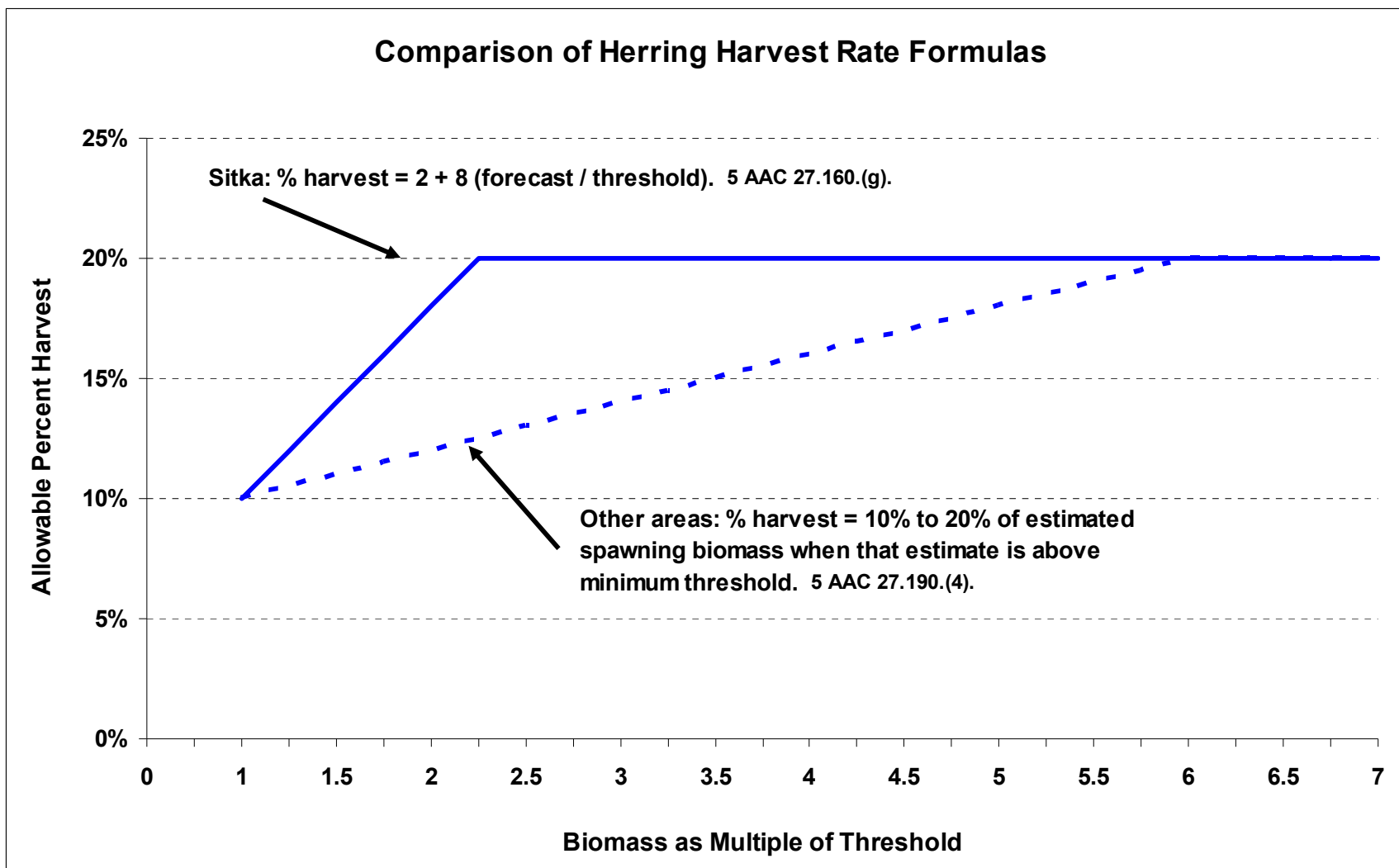


Figure 2.—Generalized harvest strategy for Southeast Alaska herring showing allowable percent annual exploitation rate as related to estimated biomass of mature herring, expressed as a multiple of the threshold level. No fishery occurs if below threshold and the maximum harvest rate is 20%.

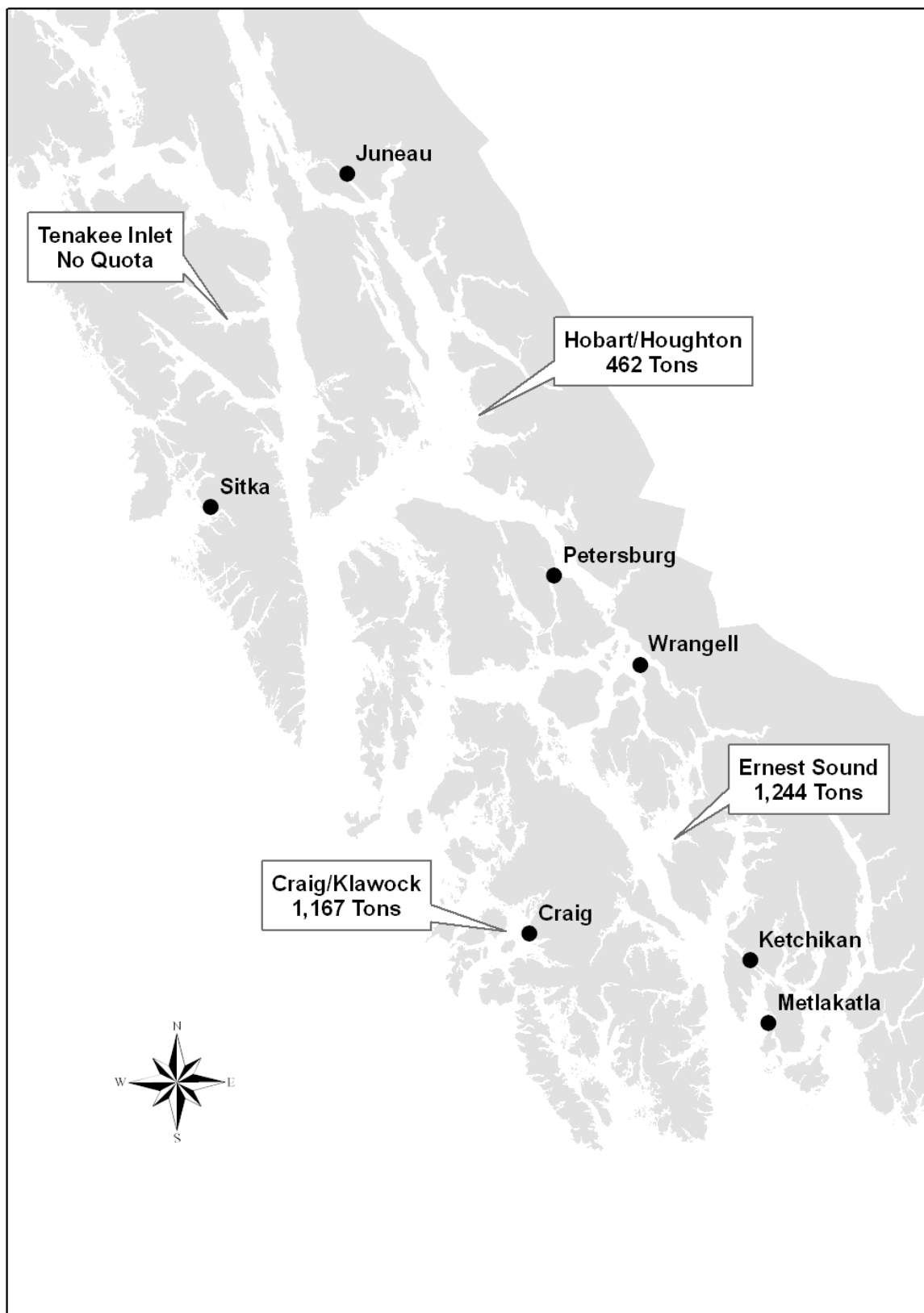


Figure 3.—Food and bait fishing areas and guideline harvest levels, 2007/08 season.

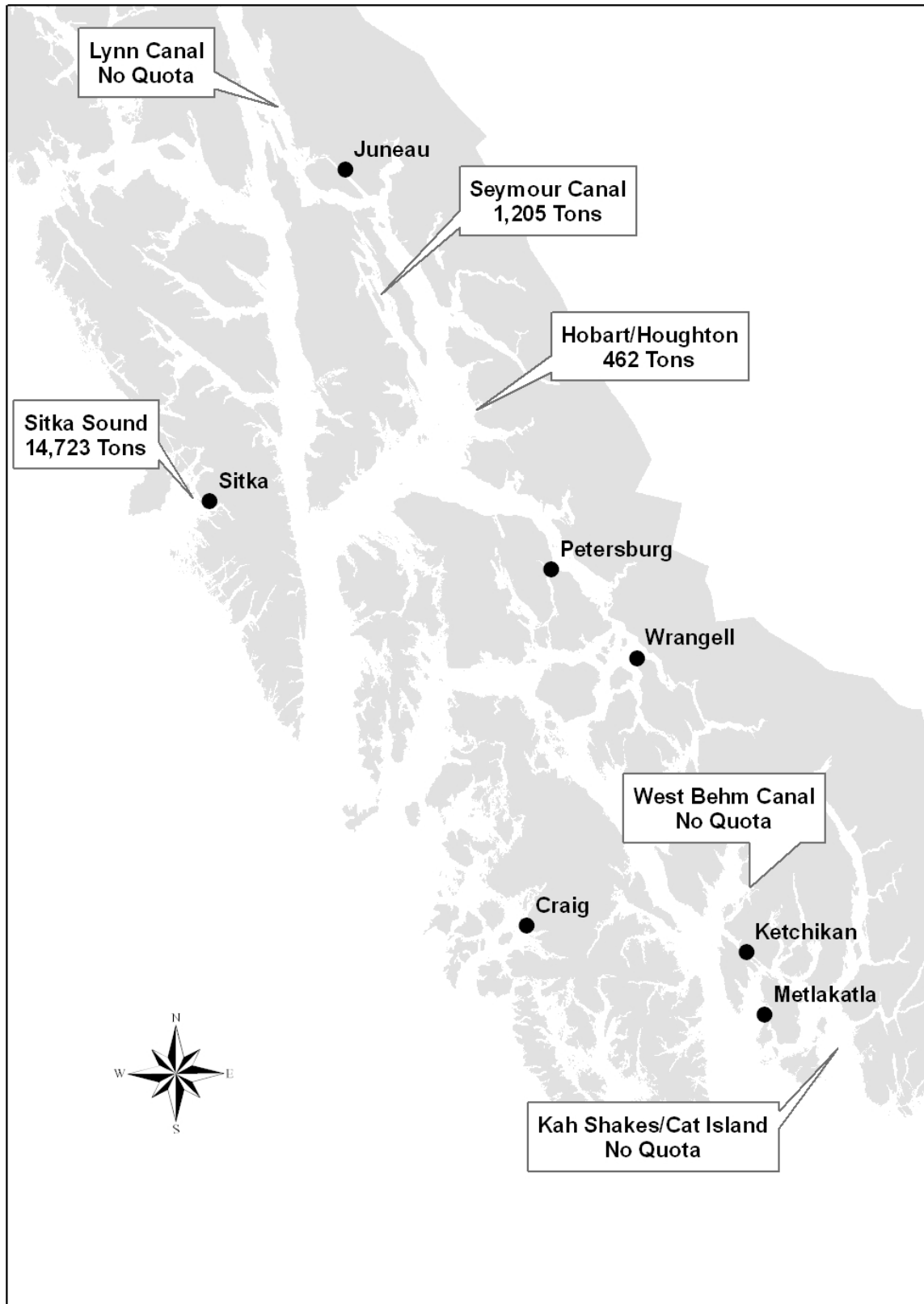


Figure 4.—Sac-roe fishing areas and guideline harvest levels, 2007/08 season.

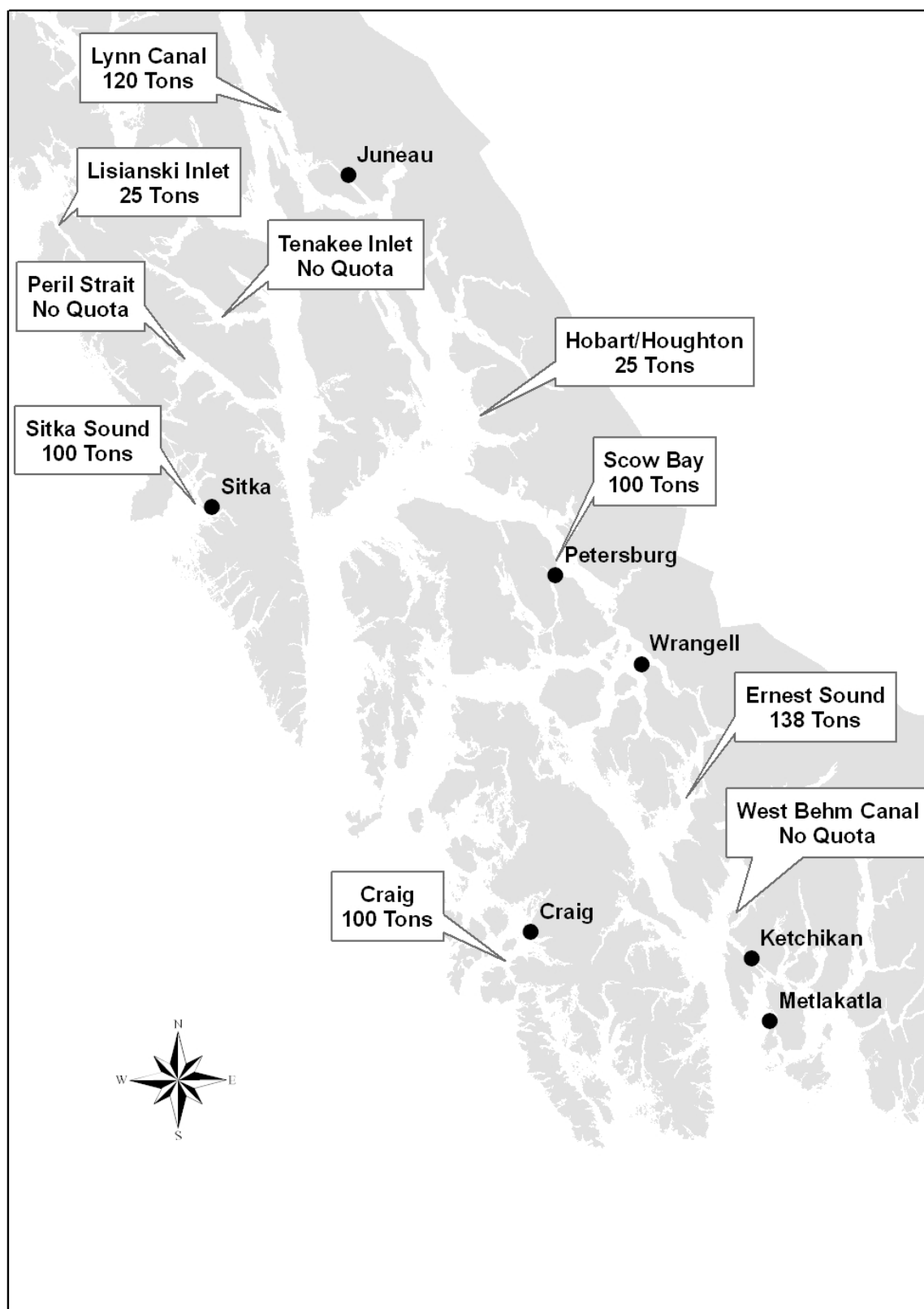


Figure 5.—Fresh bait pound fishing areas and guideline harvest levels, 2007/08 season.

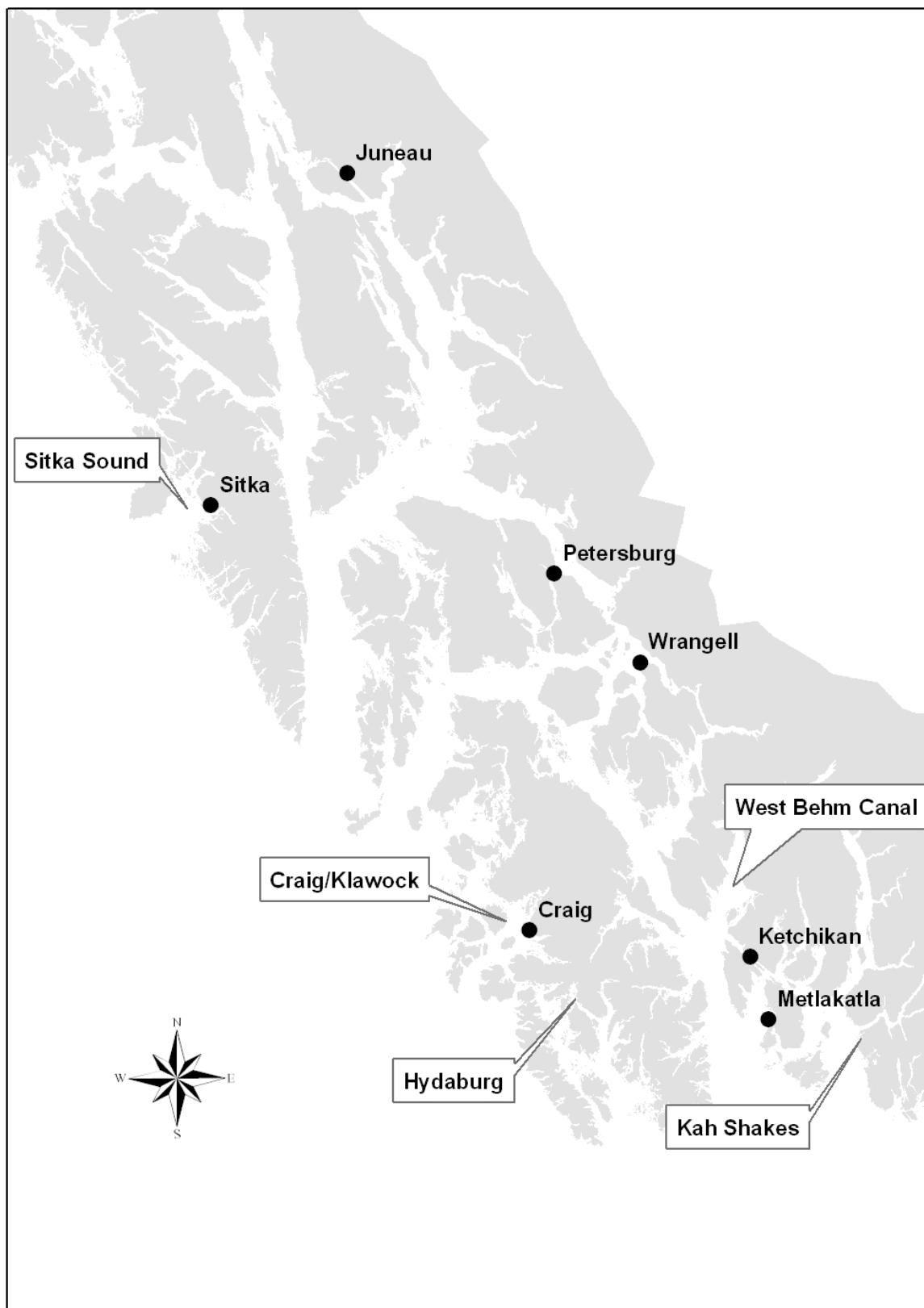


Figure 6.—Major Southeast Alaska spawn-on-kelp subsistence fishery areas.

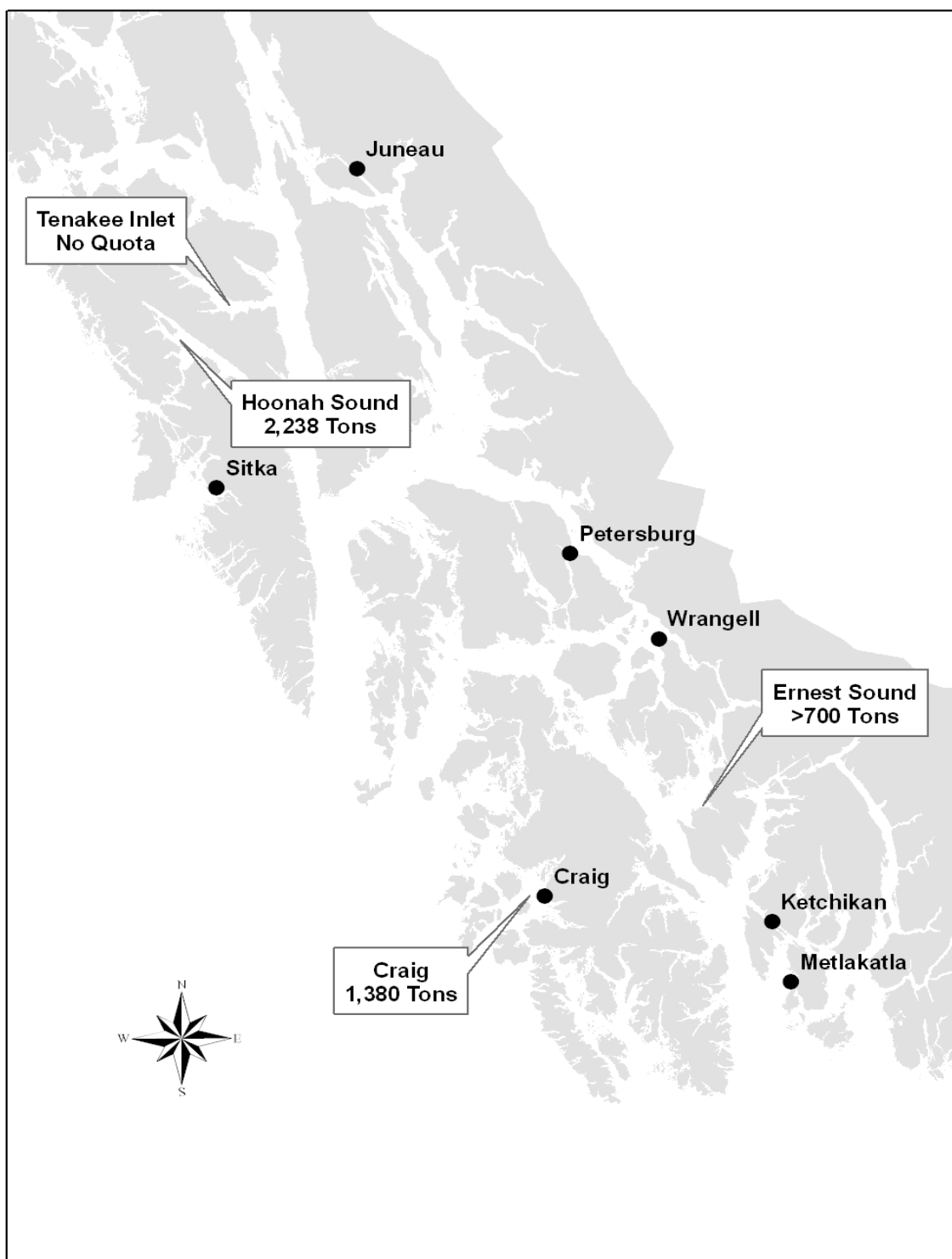


Figure 7.—Spawn-on-kelp fishing areas and guideline harvest levels (tons of herring), 2007/08 season. The total Ernest Sound 2007–08 GHL was 1,382. The spawn-on-kelp GHL is any remaining GHL not harvested by the winter food and bait fishery or the bait pound fishery. The winter food and bait harvest is confidential and there was no bait pound harvest. Therefore the remaining GHL for Ernest Sound spawn-on-kelp fishery was announced as greater than 700 tons.