Regional Information Report No. 1J11-02

2011 Southeast Alaska Sac Roe Herring Fishery Management Plan

by

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and

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Alaska Department of Fish and Game **Division of 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)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

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

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The Regional Information Report Series was established in 1987 and was redefined in 2007 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.sf.adfg.ak.us/statewide/divreprots/htlm/intersearch.cfm.

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ABSTRACT

This report describes the Southeast Alaska herring sac roe fishery regulations, fishing areas, and Guideline Harvest Levels for 2011. Management plans for the 2011 purse seine and gillnet fisheries are reviewed, including procedures for announcing fishery openings and closures, vessel registration, and catch reporting requirements. A review of herring stock status is presented by spawning area. Alaska Department of Fish and Game management contacts are listed.

Key words: Herring, sac roe, set gillnet, purse seine, management, guideline harvest levels, commercial herring, fishing regulations.

INTRODUCTION

Southeast Alaska commercial herring fisheries occur during the winter when herring are harvested for use primarily as bait, and during the spring when herring are harvested for their roe. The roe harvest includes the traditional sac roe fisheries and, in recent years, spawn-on-kelp pound fisheries. A combined management plan for the northern and southern Southeast Alaska spawn-on-kelp pound fisheries will be available as a separate publication at local department area offices and on the department's web site by the middle of March. This management plan provides an overview of the 2011 sac roe herring fisheries for Southeast Alaska including expected harvest levels and management strategy.

Southeast Alaska roe herring are commercially harvested by purse seine and set gillnet gear types, both of which are included in the limited entry system. There are currently six sac roe herring fishing areas in Southeast Alaska consisting of two exclusive purse seine and three exclusive gillnet areas. An additional area in West Behm Canal will be open on alternate years for set gillnet or purse seine gear in years when the threshold level is met. Sac roe fishing areas are shown in Figure 1.

Approximately 18,615 tons of herring were harvested in commercial sac roe herring fisheries conducted in Southeast Alaska during 2010. A harvest of approximately 21,601 tons is anticipated for the 2011 season.

REGULATIONS

Commercial herring fishing regulations are outlined by the Alaska Department of Fish and Game (ADF&G) in the 2010–2011 Statewide Commercial Herring Fishing Regulations pamphlet. Copies of the pamphlet may be obtained at any ADF&G office. Management plans which apply to the herring harvest in the sac roe fisheries include: statewide Management Guidelines for Commercial Herring Sac Roe Fisheries [5AAC 27.059], Herring Management Plan for Southeast Alaska Area [5AAC 27.190], the Sitka Sound Commercial Sac Roe Herring Fishery Management Plan [5AAC 27.195] and [5AAC 27.197] SECTIONS 1-E AND 1-F COMMERCIAL SAC ROE HERRING FISHERY.

New regulations were adopted by the Alaska Board of Fisheries during the February 17–26, 2009, meeting. The new regulations are now in effect. The adopted regulation changes include the following;

- Section 13-A south of the latitude of Point Kakul (57°21.75' N. lat.) in Salisbury Sound will formally be included in the Sitka Sound herring sac roe seine area [5 AAC 27.110(b)(1)(D)].

- The threshold mature biomass below which no fishery would occur in Sitka Sound was increased from 20,000 tons to 25,000 tons. The harvest rate when the biomass is above 25,000 tons does not change from the harvest rate currently established in regulation except that the minimum harvest rate, when the forecast biomass is at 25,000 tons, will be 12% [5 AAC 27.160(g)].
- The board has increased the range of the amount of herring spawn reasonably necessary for subsistence in Section 13-A and Section 13-B north of Aspid Cape from 105,000–158,000 pounds to 136,000–227,000 pounds [5 AAC 01.716(b)].

ADF&G staff listed at the conclusion of this plan are available to provide further details.

VESSEL CHECK-IN, CHECK-OUT, AND REPORTING PROCEDURE

Buyers or buyer's agents shall register all vessels employed in transporting and processing herring with ADF&G prior to commencing with those activities and make daily reports of herring purchased from fishers as specified by a local representative of ADF&G [5AAC 27.162(a)]. ADF&G requires that tenders and fishing vessels not previously registered through buyers or buyer's agents, check-in and check-out of the fishing areas with department personnel located on the fishing grounds to facilitate timely and complete assessment of herring landings.

Fish tickets must be provided to the CFEC permit holder at the time of delivery to the first buyer or buyer's agent [5 AAC 27.162(c)]. This means that there must be a separate fish ticket for each delivery to a tender before the tender leaves the fishing grounds to make a landing. At the request of the CFEC permit holder, on-the-grounds weight and estimated roe content shall both be recorded on the fish ticket. Operators who will transport fish out of Alaska before processing must submit a fish ticket to the department before departing the state [5 AAC 39.130(c)]. Fully completed fish tickets with updated accurate and final weights and roe percentages must be submitted to ADF&G within 10 days after the termination of buying operations, unless otherwise specified by ADF&G [5 AAC 27.162(a)(3)].

REPORTING PROCEDURES FOR FLOATING FISH PROCESSORS

Operators of floating fish processing vessels are required to report in person, by radio, or telephone, to the local department representative in the management area of intended operation before processing begins [5 AAC 39.130 (g)]. The report must include the location and dates of intended operation.

ANNOUNCEMENT OF OPENINGS AND CLOSURES

Fishery openings and closures will be implemented via department emergency order (EO). Announcements of EOs will be issued through normal news release channels and on the fishing grounds over VHF radio for the set gillnet sac roe fisheries and EOs concerning the Sitka Sound seine sac roe fishery are only announced over of the VHF radio. The VHF radio channel for receiving field announcements will be indicated on the fishing grounds. Harvesters should expect short notification of opening and closing times. Short notification is necessary to provide fishing opportunities prior to major spawning and to maintain the harvest at desired levels.

ADF&G will monitor herring in advance of the expected fishery opening dates. Fisheries will be placed on a two-hour notice prior to the first opening. During the Sitka fishery, ADF&G will try to give the industry a 36-hour advance warning of the time that the fishery goes on two-hour notice. Announcement of the time 2-hour notice goes into effect will be made by an ADF&G

news release. However, if spawning is either earlier or heavier than anticipated and waiting 36 hours could result in loss of fishing opportunity, this much advance notice will not be given. During the Seymour Canal, Hobart/Houghton and West Behm Canal gillnet fisheries, ADF&G will provide the industry with a 12-hour advance notice of a possible decision to place the fishery on two-hour notice. The 12-hour notice helps limit the amount of time vessels must remain on the fishing grounds prior to the start of the fishery.

MANAGEMENT STRATEGY

The harvest strategy for Southeast Alaska herring sac roe fisheries is based on the availability and distribution of mature herring containing quality roe (at least 10% mature roe), mature spawning biomass estimates, population age structure, recruitment, size-at-age, and past spawning success.

Herring populations are assessed annually to determine whether individual spawning stocks are above threshold and to determine the appropriate harvest rate (see Sliding Scale Harvest Rate on next page). As specified in 5AAC 27.190 HERRING MANAGEMENT PLAN FOR SOUTHEASTERN ALASKA AREA, harvest of a particular spawning stock is not allowed unless an assessment of the abundance and general condition of that spawning stock has been conducted and the estimated biomass is above the minimum spawning biomass threshold level.

The threshold level is the herring biomass needed to meet minimum spawning and/or allocation requirements. The established threshold levels for the herring sac roe fishing areas are:

Fishing Area	Threshold Level
Seymour Canal	3,000 tons
Revilla Channel	6,000 tons
Lynn Canal	5,000 tons
Sitka Sound	25,000 tons
Hobart/Houghton	2,000 tons
West Behm Canal	6,000 tons

Varieties of methods have been used to assess the status of herring populations in Southeast Alaska. Before 1970, herring abundance was assessed through visual estimates made from vessels using depth sounders and sonar immediately prior to spawning or on wintering aggregations. In addition, miles of spawn were documented with aerial or skiff surveys. A computer-assisted hydro acoustic survey method was developed in the early 1970s and used extensively during the late 1970s to the mid-1980s. Spawn deposition surveys were first used in 1976 and continue to be a key component of current assessment methods. The spawn deposition method combines diver estimates of herring egg deposition on the spawning grounds along with estimates of total area receiving spawn, average fecundity, average weight-at-age, and age composition, to yield an estimate of spawning biomass. In past years, estimates of spawning biomass from one year were used as the forecast to set harvest quotas for individual spawning stocks for the following year.

Beginning in 1993, ADF&G began using age-structured analysis (ASA) to forecast abundance for selected spawning stocks with sufficient historic stock information. The ASA method relies

on a time series of herring population assessment data (e.g., survey estimates of egg deposition (trillions of eggs), fecundity, age composition and weight-at-age from samples of spawning herring, catch age composition and weight-at-age, weight-at-age from winter test sampling, and estimates of harvest-related mortality) to forecast herring biomass for specific spawning stocks. This method applies estimates of recruitment, growth, maturation, and natural mortality to an estimate of spawning escapement from one year to forecast biomass for the next year. This is an important development because gains in herring biomass due to recruitment, growth, and maturity are often not equal to the loss of biomass due to natural mortality, as is assumed when using the spawn deposition method for forecasting abundance. The ASA method is currently used to forecast herring abundance for the Sitka, and Seymour Canal sac roe fisheries.

Beginning in 1995, ADF&G began using a biomass accounting (BA) method to forecast abundance for stocks without sufficient historic stock information for ASA modeling. Spawn deposition estimates were obtained for these areas as an initial indication of the likelihood that the spawning biomass would be above the respective thresholds for each area. For those areas likely to be above their thresholds, biomass accounting was then used to forecast biomass. The BA method uses the most recent year's spawn deposition estimate of eggs, the age composition of the spawning biomass, weight-at-age, and fecundity to project the following year's return of mature herring. It also uses survival and maturity-at-age estimates from the forecast of the nearest stock for which ASA modeling was used. The median historical level of recruitment of age-3 herring specific to each stock is also applied to forecast biomass. The BA method is currently used to forecast herring abundance for the West Behm Canal and the Hobart/Houghton fisheries.

SLIDING SCALE HARVEST RATE

The allowable harvest is based on a graduated scale that allows for higher harvest rates as a herring population increases relative to the threshold level. This approach maintains annual harvest rates between 10% and 20% of the forecast spawning stock if the forecasted biomass is greater than established threshold levels. When the spawning stock biomass is at the minimum threshold level, a 10% harvest is allowed. The allowable harvest increases an additional 2% for every spawning stock biomass increase of an amount equal to the threshold level and reaches a maximum of 20% when the population is six-times the threshold level.

The percent harvest rate for any multiple of the threshold level from one to six can be estimated from Figure 2, or by performing the following calculation:

$$Percent\ Harvest\ Rate = 8 + 2\left[\frac{Forecast\ Spawning\ Population\ Size}{Threshold\ Level}\right] \qquad (1)$$

An exception to the harvest rate formula now applies to the Sitka Sound sac roe herring fishery based on Board of Fisheries actions taken at the 1997 and 2009 meetings. For the Sitka fishery, the harvest rate is calculated using the following formula (Figure 3):

$$Percent\ Harvest\ Rate = 2 + 8\left[\frac{Forecast\ Spawning\ Population\ Size}{20{,}000}\right] \qquad (2)$$

Based on Board action during the 2009 meeting, the minimum harvest rate is 12%, the maximum harvest rate remains at 20%, and the minimum biomass threshold necessary to provide a commercial fishery was increased from 20,000 to 25,000 tons.

ROE QUALITY

Sac roe herring fisheries are managed in compliance with regulation 5 AAC 27.059 MANAGEMENT GUIDELINES FOR COMMERCIAL HERRING SAC ROE FISHERIES. This regulation outlines ways ADF&G can manage sac roe fisheries to enhance value. To determine the best time to fish, ADF&G samples prespawning herring populations in cooperation with harvesters and trained industry technicians. All test-fishing activities must be authorized by department biologists on the fishing grounds.

GILLNET FISHERIES

There are three exclusive set gillnet sac roe fishing areas in Southeast Alaska: the Revilla Channel fishery in regulatory Section 1-F, the Seymour Canal fishery in Section 11-D, and the Hobart-Houghton fishery in District 10. During the 2003 Alaska Board of Fisheries meeting in Sitka the board adopted a new sac roe gillnet fishery for West Behm Canal (Section 1-E and 1 F). The new gillnet fishery will operate on alternate years with a purse seine sac roe fishery. A summary of historical harvest and fishing time information for each fishery is shown in Table 1. Gillnetters are reminded that regulations require identification tags, issued by ADF&G, to be placed on one buoy at each end of a herring set gillnet [5 AAC 27.131 (g)].

REVILLA CHANNEL

Set gillnet sac roe fisheries have occurred in the Revilla Channel area (Section 1-F) in state managed waters from 1976 to 1998 (Table 1). Seasonal landings have ranged from a low of 171 tons in 1978 to a high of 3,113 tons in 1983. In 1990, and from 2000 through 2010, the minimum threshold level was not reached in state managed waters and no fishery was permitted. In 1999, a Guideline Harvest Level (GHL) of 870 tons was established. However, due to on-grounds concern over the lack of herring located in state managed waters, the fishery was not opened and no herring were harvested.

In 2010, there was no herring spawn was observed in the Kah Shakes/Cat Island area. Therefore, no sac roe herring fishery will take place in 2011. ADF&G, however, will continue to monitor the status of the Revilla Channel herring both in state managed waters and around Annette Island. Spawning will be mapped, samples will be taken for age class distribution, and dive surveys will be conducted in state managed waters to estimate the spawning biomass. The population estimate determined in 2011 will be used to set the harvest level for 2012.

WEST BEHM CANAL

The Alaska Board of Fisheries passed regulations in January 2003 to open the West Behm Canal area (Section 1-E and portions of Section 1-F) for sac roe herring fishing and bait pound operation. Elements of the commercial herring fishery plan include:

1. Annual, alternating fishing schedule between set gillnet and purse seine gear in years which the threshold level is met with the first fishery being set gillnet;
2. A cooperative purse seine fishery in years when the purse seine fishing gear is allowed;
3. Closed waters in Clover Passage and Tongass Narrows, and;

4. The establishment of a bait pound fishery, which is allocated 10% of the GHL for the West Behm Canal spawning population (5AAC 27.160 (b)(4)).

The 2004 BA forecast of mature spawning biomass for the West Behm Canal herring population was 9,366 tons, establishing a GHL of 1,042 tons. This GHL included 940 tons for the sac roe herring fishery and 102 tons for the bait pound fishery. However, due to on-grounds concerns over the lack of herring in West Behm Canal, the fishery was not opened and no herring were harvested. The actual spawning biomass observed in 2004 was 443 tons, substantially lower than the forecast.

The 2011 BA forecast for West Behm Canal is 11,864 tons, which is above the threshold level of 6,000 tons allowing a gillnet sac roe herring fishery in West Behm Canal for 2011. This will be the second time that the forecast has been above the established forecast in West Behm Canal since this fishery has been established. This forecast gives a GHL of 1,418 tons. By regulation (5 AAC 27.160), 10 percent of the GHL is allocated to the bait pound fishery on an annual basis. Therefore, the GHL for the West Behm Canal sac roe fishery is reduced by 141 tons and will be managed for a **GHL of 1,276 tons**. The forecast indicates the spawning stock will consist of 23% age-3, 57% age-4, 7% age-5, 4% age-6, 8% age-7 and 2% age-8+.

This forecast and GHL has been revised since the original news release was issued for West Behm on November 5, 2010. The new forecast and GHL is based on a re-assessment of the biomass accounting model due to re-aging of herring scales. Based on a recent review of the department's herring scale aging methodologies, the department discovered inconsistencies in methods in aging herring using scales. This discovery brought into question the reliability of age estimates back to 1999. The department re-aged archived scale samples taken from West Behm Canal and other stocks and re-forecasted the biomass for 2011. Based on information in addition to aging data, the West Behm Canal herring stock is forecast as among the highest levels since the department began monitoring the stock. Herring abundance is estimated, in part, using aerial surveys designed to map spawning locations and record the length of shoreline with spawn, followed by dive surveys which estimate the density of eggs and the average width of the spawn.

Spawning dates for the West Behm Canal gillnet fishery have ranged from April 2 to April 26. Department personnel will begin to monitor the West Behm Canal area in late-March. Initially, monitoring will be limited to aerial and skiff surveys. Depending on observed herring activity, vessels with department personnel will be on the fishing grounds during the first week of April.

Set gillnet buoy stickers must be obtained and placed on buoys prior to fishing. Identification stickers will be available free of charge from the Douglas, Petersburg, and Ketchikan Fish and Game offices prior to the time that an ADF&G's vessel is on the fishing grounds in West Behm Canal; thereafter, identification stickers can only be obtained from the ADF&G's vessel. After the West Behm Canal fishery, stickers will again be available in Fish and Game offices until a state vessel is on the grounds in the Seymour Canal area. The stickers will only be issued to valid permit holders and proper picture identification will be required. If during the course of the fishery a buoy sticker is lost, a replacement sticker must be obtained from ADF&G before fishing is resumed. Buoy stickers issued for the West Behm Canal fishery are also valid for the Seymour Canal fishery. Fishermen who have registered must check in with ADF&G upon reaching the Seymour Canal fishing area.

Legal gear is one 50-fathom net, except as noted under 5 AAC 27.131.(i) for persons fishing 2 permits on board which allows for one net not exceeding 75 fathoms. Gillnets must be anchored and buoyed on each end.

The minimum mesh size for the West Behm Canal fishery in 2011 will be based on statewide regulation which is 2 1/8 inches stretched mesh and not greater than 2 ½ inches stretched mesh (5 AAC 27.050 (c)). The maximum depth may not exceed 120 meshes (5 AAC 27.131 (e)). Regulation 5 AAC 27.131 (f) which had established a larger minimum mesh size in Sections 1-E and 1-F is being **repealed** for the 2011 season following action by the Alaska Board of Fisheries on an emergency petition at its February 20–March 5, 2011 meeting in Anchorage. The board has delegated authority to the ADF&G commissioner to write an emergency regulation that will be in effect for the 2011 season. The board can consider proposals that could make this change a permanent measure at its next regular SE finfish meeting scheduled for February 24–March 4, 2012 in Ketchikan.

Regulations require a one-hour grace period for nets to be removed from the water following the announced closure time. No gillnet may be reset after the closure time. Additionally, ADF&G has been given the authority to open the fishery for one hour or less without a grace period. An opening of this nature could occur if, after the initial opening, a small but manageable amount of herring is left on the GHL. The department will announce if a grace period will not be allowed due to an opening of one hour or less.

SEYMOUR CANAL

Set gillnet fisheries have occurred intermittently in Seymour Canal (Section 11-D) since the fishery was changed from a seine area to a gillnet area in 1980. Annual landings during years fished by gillnets have ranged from a low of 302 tons in 1987 to a high of 1,519 tons in 2003 (Table 1).

The 2011 ASA forecast of the mature spawning biomass for the Seymour Canal herring stock is 6,697 tons. Using the sliding scale harvest rate, this biomass allows a harvest rate of 12.5% of the population and a **GHL of 835 tons** for the 2011 fishing season. The forecast indicates that the spawning stock will consist of 12% age-3, 30% age-4, 7% age-5, 26% age-6, 18% age-7, and 8% age-8+..

Opening dates for the Seymour Canal gillnet fishery have ranged from April 24 (in 2010) to May 16 (in 2002). Since 1980, spawning has started as early as April 19 and as late as May 15. Department personnel will begin to monitor the Seymour Canal area in mid-April. Initially, monitoring will be limited to aerial surveys. Depending on observed herring activity, vessels with department personnel will be on the fishing grounds by late April or early May.

Set gillnet buoy stickers must be obtained and placed on buoys prior to fishing. Identification stickers will be available free of charge from the Douglas, Petersburg, and Ketchikan Fish and Game offices prior to the time that ADF&G's vessel is on the fishing grounds; thereafter, identification stickers can only be obtained from ADF&G's vessel. The stickers will only be issued to valid permit holders and proper picture identification will be required. If during the course of the fishery a buoy sticker is lost, a replacement sticker must be obtained from ADF&G before fishing is resumed. Buoy stickers issued for the West Behm Canal fishery are also valid for the Seymour Canal fishery. Fishermen who have registered must check in with ADF&G upon reaching the Seymour Canal fishing area.

Legal gear is one 50-fathom net, except as noted under 5 AAC 27.131.(i) for persons fishing 2 permits on board which allows for one net not exceeding 75 fathoms. Gillnets must be anchored and buoyed on each end. The minimum mesh size is 2 1/8 inches stretched mesh and not greater than 2 ½ inches stretched mesh with a maximum depth of 120 meshes.

Regulations require a one-hour grace period for nets to be removed from the water following the announced closure time. No gillnet may be reset after the closure time. Additionally, ADF&G has been given the authority to open the fishery for one hour or less without a grace period. An opening of this nature could occur if, after the initial opening, a small but manageable amount of herring is left on the GHL. The department will announce if a grace period will not be allowed due to an opening of one hour or less.

HOBART/HOUGHTON

In January 1997, the Alaska Board of Fisheries adopted regulations that allocates unharvested GHL from the District 10 (Hobart/Houghton) winter food and bait fishery to the sac roe gillnet fishery [5 AAC 27.160 (f)]. Since the inception of sac roe fishery harvests have occurred in 1997 through 1999, 2005, 2008, 2009, and 2010. In 2000, the entire GHL was harvested during the winter bait fishery and no surplus GHL was available for the sac roe fishery (Table 1). Herring biomass estimates were not large enough to allow for fisheries in 2001 through 2004, 2006, and 2007.

The 2011 BA forecast of mature spawning biomass for the Hobart/Houghton herring spawning stock is 253 tons, well below the 2000 ton threshold to allow for a fishery. The department will monitor and document the spawning biomass to set quotas for 2012.

PURSE SEINE FISHERIES

There are two exclusive purse seine herring sac roe areas in Southeast Alaska: Lynn Canal and Sitka Sound. Commercial fishing will be allowed only in Sitka Sound during the 2011 season. A summary of harvest and fishing time information for each fishery is shown in Table 2. During the 2003 Alaska Board of Fisheries meeting in Sitka, the board adopted a new sac roe purse seine fishery for West Behm Canal. The new seine fishery will operate on alternate years with a gillnet sac roe fishery in years when the threshold level is met.

LYNN CANAL

The Lynn Canal herring sac roe fishing area encompasses regulatory Sections 15-B, 15-C, and that portion of Section 11-A north of the Shrine of St. Therese.

Although the Lynn Canal fishery has not been open since 1982, ADFG continues to monitor this stock closely through aerial, skiff, and dive surveys. Additional funding from Coeur Alaska for monitoring this herring population became available in 2004--2009 through mitigation of the Kensington Gold Mine in Berners Bay and development of a dock at Cascade Point. This funding, in part, went to supporting herring spawn deposition dive surveys beginning in 2004 which enabled the department to more accurately estimate the mature spawning biomass. Aerial and on-the-grounds surveys conducted in Lynn Canal during the spring of 2010 documented 8.3 nautical miles of spawn. A spawn deposition survey was conducted May 12-13 leading to a mature spawning biomass estimate of 5,994 tons (based on spawn deposition only). This is the first time the Lynn Canal herring spawning population has been above its established threshold level of 5,000 tons since 1981. ADFG did not conduct a 2011 forecast for the Lynn Canal

spawning population because: 1) the long time series of observed production has been well below threshold and 2) observed spawn deposition estimates have fluctuated widely in the last 7 years with a low of 231 tons in 2005, only 509 tons in 2008, to a recent high of 5,994 tons in 2010. A forecast will be completed next year if the spawn deposition estimate is above threshold. The fishery will not open in 2011.

WEST BEHM CANAL

The Alaska Board of Fisheries passed regulations in January 2003 to open the West Behm Canal area (Section 1-E and portions of Section 1-F) for sac roe herring fishing and bait pound operation. Elements of the commercial herring fishery plan include:

1. Annual, alternating fishing schedule between set gillnet and purse seine gear in years which the threshold level is met with the first fishery being set gillnet;
2. A cooperative purse seine fishery in years when the purse seine fishing gear is allowed;
3. Closed waters in Clover Passage and Tongass Narrows, and;
4. The establishment of a bait pound fishery, which is allocated 10% of the GHL for the West Behm Canal spawning population (5AAC 27.160 (b)(4)).

The 2011 BA forecast for West Behm Canal is 11,864 tons, which is above the threshold level of 6,000 tons allowing a gillnet sac roe herring fishery in West Behm Canal for 2011. This will be the second time that the forecast has been above the established forecast in West Behm Canal since this fishery has been established. This forecast gives a GHL of 1,418 tons. By regulation (5 AAC 27.197 (a)(1)), the fishery will be opened as a gillnet sac roe fishery. If a gillnet fishery takes place in West Behm Canal in 2011, and the West Behm Canal population is forecasted above threshold in 2012, than a fishery will be allocated to Purse Seine gear in 2012.

SITKA SOUND

The Sitka Sound sac roe fishing area encompasses the waters of Section 13-B north of the latitude of Aspid Cape and in Section 13-A south of the latitude of Point Kakul (Salisbury Sound).

An ASA model has been used to forecast the mature herring biomass in Sitka Sound since 1993. Inconsistencies discovered in November, 2010, in methods used to age scales since 1999 compared to methods used prior to 1999 brought into question the reliability of herring ages needed to run an ASA model to forecast the 2011 Sitka Sound return. It was determined that it would be necessary to re-age the large number of archived herring scales from cast net and commercial samples taken since 1999 to use the ASA model. This determination affected not only Sitka Sound samples but aging samples from all spawning stocks in Southeast Alaska. Industry's needs for preparation time for upcoming fisheries demands that forecasts be provided several months in advance of the fishery. Because it was not possible to re-age all post-1998 samples and still provide adequate time for industry planning, it was concluded that 2010 cast net scale samples would be re-aged and the biomass accounting method would be used for the 2011 Sitka Sound forecast. The biomass accounting method requires age data from 2010 alone, along with reliable estimates of survival, maturation and recruitment, rather than the long time-series of age data required for the ASA model. The 2010 spawn deposition estimate, along with re-aged 2010 cast net samples, provide the reliable estimate of the 2010 post-fishery herring spawning population needed for biomass accounting. The most reliable estimates of survival, maturation,

and recruitment needed to complete a biomass accounting forecast were estimated from the 1998 ASA model run. The estimate of survival used was 55% and the percent of each age estimated as mature were 23% of age-3, 71% of age-4, 95% of age-5, 99% of age-6 and 100% of age-7 and greater. The biomass accounting forecast of 2011 mature spawning biomass for Sitka Sound is 97,449 tons. At a 20% harvest rate, the GHL for the 2011 sac roe herring fishery is **19,490 tons**. The forecast indicates that the spawning stock will consist of 5% age-3, 20% age-4, 21% age-5, 26% age-6, 15% age-7, and 14% age-8+ fish.

Herring distribution and roe quality will be monitored prior to and during the fishing periods. Monitoring methods for 2011 will include aerial surveys, vessel sonar surveys, and test fishing. In 2011, ADF&G will continue to coordinate the test boat program through a fisherman-coordinator who will assign daily test fishing boats requested by ADF&G. Prior to making test sets, the identified test boats will contact ADF&G biologists on the grounds to monitor set locations and to plan for transport of herring samples to a central location for analysis by industry technicians. The areas open to fishing will depend on the distribution of herring, the need to provide for a fishery that will harvest good quality herring, and the need to provide a reasonable opportunity for subsistence.

The department intends to manage the commercial sac roe fishery in consideration of the subsistence fishery by dispersing the commercial harvest consistent with 5 AAC 27.195. SITKA SOUND COMMERCIAL SAC ROE HERRING FISHERY MANAGEMENT PLAN. To the extent that the commercial harvest can affect subsistence opportunities the department is determined to act on opportunities for openings outside of the high use subsistence areas as they arise and limit harvest in the highest frequency spawning area along the Halibut Point Road shoreline in proportion to historical use patterns established by past commercial competitive fisheries. The department recognizes that fishing within the high use subsistence area may be necessary in order to provide an opportunity for the commercial fishery to harvest and to reach the season's GHL.

In lieu of using a permit system to estimate the subsistence herring roe harvest, beginning with the 2002 season, the STA and ADF&G Subsistence Division have worked collaboratively to develop a methodology using a household survey to estimate harvest. Following each season, the Sitka Tribe of Alaska conducts a "census" type survey whereby all known participants in the subsistence fishery are contacted to determine the results of the subsistence harvest. The list of participants is changed each season to reflect newly identified participants and to remove past participants who have either moved or passed away. The survey information is used to determine the amount and quality of the subsistence harvest, and would indicate whether the amount reasonably necessary for subsistence had been successfully harvested. For the period 2002–2008 the subsistence roe harvest estimate has ranged from 71,936 to 381,226 pounds and averaged 181,329 pounds. The 2009 and 2010 season subsistence harvest estimates have not yet been finalized. The amount necessary for subsistence was increased by the Board of Fisheries from a range of 105,000–158,000 pounds to a range of 136,000–227,000 pounds effective for the 2010 season.

ADF&G held a Southeast Alaska sac roe fisheries pre-season planning meeting in Sitka on February 23, 2011. There was general agreement that the harvest strategy would be to harvest this season's GHL in five or six openings targeting 3,000–4,000 tons per opening. The number of days between openings is to be determined inseason based available processing capacities, and the immediacy or progression of spawning. This will serve as a general plan of approach for the

2011 fishery. It will be necessary to remain flexible and adapt specific opening target harvest levels in consideration of in-season assessment of herring distribution and quality, changes in available processing and tendering capacity, input from industry representatives, and dispersing the harvest by time and area away from traditional subsistence harvesting areas. A general pre-fishery meeting immediately prior to the fishery will be held in Sitka when the fishery is being placed on 2-hour notice.

In recent years the United States Coast Guard (USCG) has been closely monitoring fishery openings for violations of "Rules of the Road" during the conduct of the fishery. For further information regarding the application of "Rules of the Road" during the conduct of the fishery, contact the USCG Marine Safety Detachment at 966-5454.

The Magnuson-Stevens Fishery Conservation and Management Act restricts the use of foreign vessels outside of internal waters and the port of Sitka. Fishery openings outside of internal waters and the port of Sitka are possible. Operators of foreign vessels wanting to participate in the Sitka Sound herring sac roe fishery are encouraged to contact the National Marine Fisheries Service at (907) 747-6940 for more details.

LIST OF MANAGEMENT CONTACTS

The following ADF&G, Division of Commercial Fisheries personnel may be contacted regarding this management plan:

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TABLES AND FIGURES

Table 1.–Southeast Alaska gillnet sac roe herring fisheries information summary, 1976–2010.

Year	Seymour Canal[a]				Revilla Channel			
	Guideline Harvest Level (Tons)	Catch[b] (Tons)	Date 2-Hour Notice Effective	Opening Dates	Guideline Harvest Level (Tons)	Catch[c] (Tons)	Date 2-Hour Notice Effective	Opening Dates
1976	200	195		May 9	300	494	March 23	April 2
1977	500	485	May 4	May 9	800	776	March 29	April 1
1978	500	729	May 2	May 8	680	171	March 26	April 4
1979	250	269	May 3	May 3	585	524	March 28	March 29
1980	--	--	Fishery Not Open	--	1,100	1,149	March 25	March 25
1981	600	615	April 28	April 28	1,550	1,871	March 20	March 20
1982	--	--	Fishery Not Open	--	1,700	2,319	March 20	March 26
1983	--	--	Fishery Not Open	--	2,500	3,113	March 23	March 24
1984	375	499	April 20	April 26	2,100	2,177	March 20	March 29
1985	--	--	Fishery Not Open	--	2,300	2,159	March 28	March 29
1986	300	392	May 5	May 10	1,100	1,530	March 29	March 31
1987	419	302	May 1	May 5, 6	1,200	1,452	March 24	March 26, 27
1988	530	586	April 20	April 26–May 1	953	1,145	March 24	March 25
1989	332	547	April 21	April 28	647	595	March 20	March 20, 21
1990	312	359	April 21	April 28–29	--	--	--	--
1991	--	--	Fishery Not Open	--	680	660	March 28	April 8–11
1992	--	--	Fishery Not Open	--	1,200	1,246	April 1	April 3
1993	--	--	Fishery Not Open	--	717[d]	737	March 31	April 10
1994	368	374	April 28	April 29	880[d]	730	April 9	April 9,11
1995	316	319	April 30	May 14	630	610	April 11	April 12
1996	--	--	Fishery Not Open	--	871	601	April 8	April 10
1997	--	--	Fishery Not Open	--	912	1,159	April 6	April 6
1998	633	585	April 30	May 1–4	620	616	April 1	April 1, 2
1999	595	706	April 30	April 30	870	0	No Fishery	Fishery Not Opened
2000	346	421	May 3	May 5	0	0	No Fishery	Fishery Not Opened
2001	474	620	May 6	May 11–12	0	0	No Fishery	Fishery Not Opened
2002	1,096	1,066	May 12	May 16–17	0	0	No Fishery	Fishery Not Opened
2003	1,712	1,519	Apr 28	Apr 29–May 2	0	0	No Fishery	Fishery Not Opened
2004	838	804	May 1	May 3	0	0	No Fishery	Fishery Not Opened
2005	894	945	April 26	May 1	0	0	No Fishery	Fishery Not Opened
2006	1,508	1,187	April 28	May 4–7	0	0	No Fishery	Fishery Not Opened
2007	1,292	1,107	May 8	May 13–14	0	0	No Fishery	Fishery Not Opened
2008	1,205	1,208	May 6	May 10–11	0	0	No Fishery	Fishery Not Opened
2009	1,471	866	April 29	April 30-May	0	0	No Fishery	Fishery Not Opened
2010	657	711	April 24	April 24-25				

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Table 1.–Continued (page 2 of 2)

	Hobart-Houghton					West Behm Canal			
Year	Guideline Harvest Level (Tons)[e]	Catch (Tons)[f] Bait	Catch (Tons)[f] Sac Roe	Date 2-Hour Notice Effective	Opening Dates Bait/Sac Roe	Guideline Harvest Level (Tons)	Catch (Tons)	Date 2-Hour Notice Effective	Opening Dates
1977	0	40	0	--	October 1	--	--	--	--
1978	0	0	0	--	Fishery Not Open	--	--	--	--
1979	0	0	0	--	Fishery Not Open	--	--	--	--
1980	0	0	0	--	Fishery Not Open	--	--	--	--
1981	0	0	0	--	Fishery Not Open	--	--	--	--
1982	0	0	0	--	Fishery Not Open	--	--	--	--
1983	0	0	0	--	Fishery Not Open	--	--	--	--
1984	0	0	0	--	Fishery Not Open	--	--	--	--
1985	0	0	0	--	Fishery Not Open	--	--	--	--
1986	0	0	0	--	Fishery Not Open	--	--	--	--
1987	0	0	0	--	Fishery Not Open	--	--	--	--
1988	0	0	0	--	Fishery Not Open	--	--	--	--
1989	0	0	0	--	Fishery Not Open	--	--	--	--
1990	0	0	0	--	Fishery Not Open	--	--	--	--
1991	0	0	0	--	Fishery Not Open	--	--	--	--
1992	200	0	0	--	January 13, 1992	--	--	--	--
1993	500	0	0	--	January 12, 1993	--	--	--	--
1994	230	140	0	--	October 17, 1993	--	--	--	--
1995	250	229	0	--	October 1, 1994	--	--	--	--
1996	700	230	0	--	October 15, 1995	--	--	--	--
1997	550	104	442	April 19	October 1, 1996–April 28	--	--	--	--
1998	260	0	351	April 19	October 1,1997–April 20	--	--	--	--
1999	436	0	506	April 25	October 14, 1998–April 26	--	--	--	--
2000	418	432	0	No Fishery	December 1, 1999–February 28	--	--	--	--
2001	0	0	0	No Fishery	Fishery Not Opened	--	--	--	--
2002	0	0	0	No Fishery	Fishery Not Opened	--	--	--	--
2003	0	0	0	No Fishery	Fishery Not Opened	First fishery set for 2004 by Board of Fisheries			
2004	0	0	0	No Fishery	Fishery Not Opened	940	0	No Fishery	Fishery Not
2005	223	0	204	April 24	April 24	0	0	No Fishery	Fishery Not
2006	0	0	0	No Fishery	Fishery Not Opened	0	0	No Fishery	Fishery Not
2007	0	0	0	No Fishery	Fishery Not Opened	0	0	No Fishery	Fishery Not
2008	462	0	302	May 2	May 8–May 9	0	0	No Fishery	Fishery Not
2009	376	0	341	April 29	May 2-May 3	0	0	No Fishery	Fishery Not
2010	345	0	302	April 22	April 23-April 24				

[a] Seymour Canal was a purse seine fishing area prior to 1980. [b] Seymour Canal Catch includes all herring for sac roe including confiscated and test fishery catch based on IFDB

[c] Revilla Channel Catch includes all herring for sac roe based on IFDB query March, 2007. [d] Revilla Channel GHL reduced by 150 tons as an allocation for the Annette Island sac r

[e] Hobart Bay was opened to Gillnet Sac Roe Fishing in 1997. Gillnet quota is the portion left after the winter bait fishery is completed.

Table 2.–Southeast Alaska purse seine sac roe herring fisheries information summary, 1976–2010.

Year	Juneau[a]-Lynn Canal						Sitka Sound			
	Guideline Harvest Level (Tons)	Catch[b] (Tons) by Gear Type		Date 2-Hour Notice Was Effective	Opening Dates by Gear Type		Guideline Harvest Level (Tons)	Catch (Tons)[c]	Date 2-Hour Notice Was Effective	Opening Dates
		Seine	Gillnet		Seine	Gillnet				
1976	750	432	124	--	April 26	April 29	780	800	April 10	April 16
1977	875	709	211	--	April 19	April 20	--	--	Fishery Not Open	--
1978	500	602	363	April 19	April 20	April 21	250	175	April 4	April 5
1979	--	--	--	Fishery Not Open	--	--	2,000	2,559	April 7	April 12
1980	600	975	--	April 13	April 26	--	4,000	4,385	April 4	April 4, 5
1981	725	775	--	April 17	April 23	--	2,700	3,506	March 23	March 24, 26
1982	375	551	--	April 30	April 30	--	3,000	4,445	March 26	March 30
1983	--	--	--	Fishery Not Open	--	--	5,500	5,449	March 23	March 26, 29
1984	--	--	--	Fishery Not Open	--	--	5,000	5,771	March 22	March 26, 27, 28
1985	--	--	--	Fishery Not Open	--	--	7,700	7,475	March 24	March 29, April 1, 5
1986	--	--	--	Fishery Not Open	--	--	5,029	5,443	March 28	April 2, 8
1987	--	--	--	Fishery Not Open	--	--	3,600	4,216	March 23	March 31
1988	--	--	--	Fishery Not Open	--	--	9,200	9,390	March 25	April 4–14
1989	--	--	--	Fishery Not Open	--	--	11,700	11,714	March 23	March 31–April 8
1990	--	--	--	Fishery Not Open	--	--	4,146	3,804	April 4	April 5, 6
1991	--	--	--	Fishery Not Open	--	--	3,200	1,838	March 29	April 10–April 13
1992	--	--	--	Fishery Not Open	--	--	3,356	5,368	March 30	April 6
1993	--	--	--	Fishery Not Open	--	--	9,691	10,186	March 26	March 27–April 3
1994	--	--	--	Fishery Not Open	--	--	4,432	4,758	March 28	March 29, 31
1995	--	--	--	Fishery Not Open	--	--	2,609	2,908	March 23	March 25, 27
1996	--	--	--	Fishery Not Open	--	--	8,144	8,144	March 23	March 23, March 31–Apr. 9

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Table 2–Continued (page 2 of 2)

Year	Juneau[a]-Lynn Canal				Sitka Sound			
	Guideline Harvest Level (Tons)	Catch[b] (Tons)	Date 2-Hour Notice Was Effective	Opening Dates	Guideline Harvest Level (Tons)	Catch[c] (Tons)	Date 2-Hour Notice Was Effective	Opening Dates
1997	--	--	Fishery Not Open	--	10,900	11,147	March 18	March 18–23
1998	--	--	Fishery Not Open	--	6,900	6,638	March 16	March 16, 18, 19
1999	--	--	Fishery Not Open	--	8,476	9,218	March 19	March 22, 24, 26–27
2000	--	--	Fishery Not Open	--	5,120	4,675	March 13	March 19, 22
2001	--	--	Fishery Not Open	--	10,597	12,034	March 15	March 22, 26, 27
2002	--	--	Fishery Not Open	--	11,042	9,885	March 25	March 27, 29, 31, April 2, April 12–15
2003	--	--	Fishery Not Open	--	6,969	7,069	March 20	March 22, 23, 26
2004	--	--	Fishery Not Open	--	10,618	10, 569	March 19	March 21, 25, 27
2005	--	--	Fishery Not Open	--	11,192	11, 425	March 20	March 23, 25, 27–29
2006	--	--	Fishery Not Open	--	10,412	9,967	March 23	March 24, 26, 27, 29
2007	--	--	Fishery Not Open	--	11,904	11,571	March 24	March 26, 30, April 1, 3
2008	--	--	Fishery Not Open	--	14,723	14,412	March 24	March 25, 26, 31
2009	--	--	Fishery Not Open	--	14,508	14,776	March 22	March 22, 24, 28, 31 April 1
2010	--	--	Fishery Not Open	--	18,293	18,033	March 19	March 24, 27, 30, April 2

[a] The Juneau-Lynn Canal fishery was both a gillnet and seine area prior to 1980.

[b] The Lynn Canal Catch includes all herring for sac roe, by gear based on IFDB query March, 2007.

[c] The Sitka catch includes all herring for sac roe including confiscated catch and test fishery harvest based on IFDB query March, 2011.

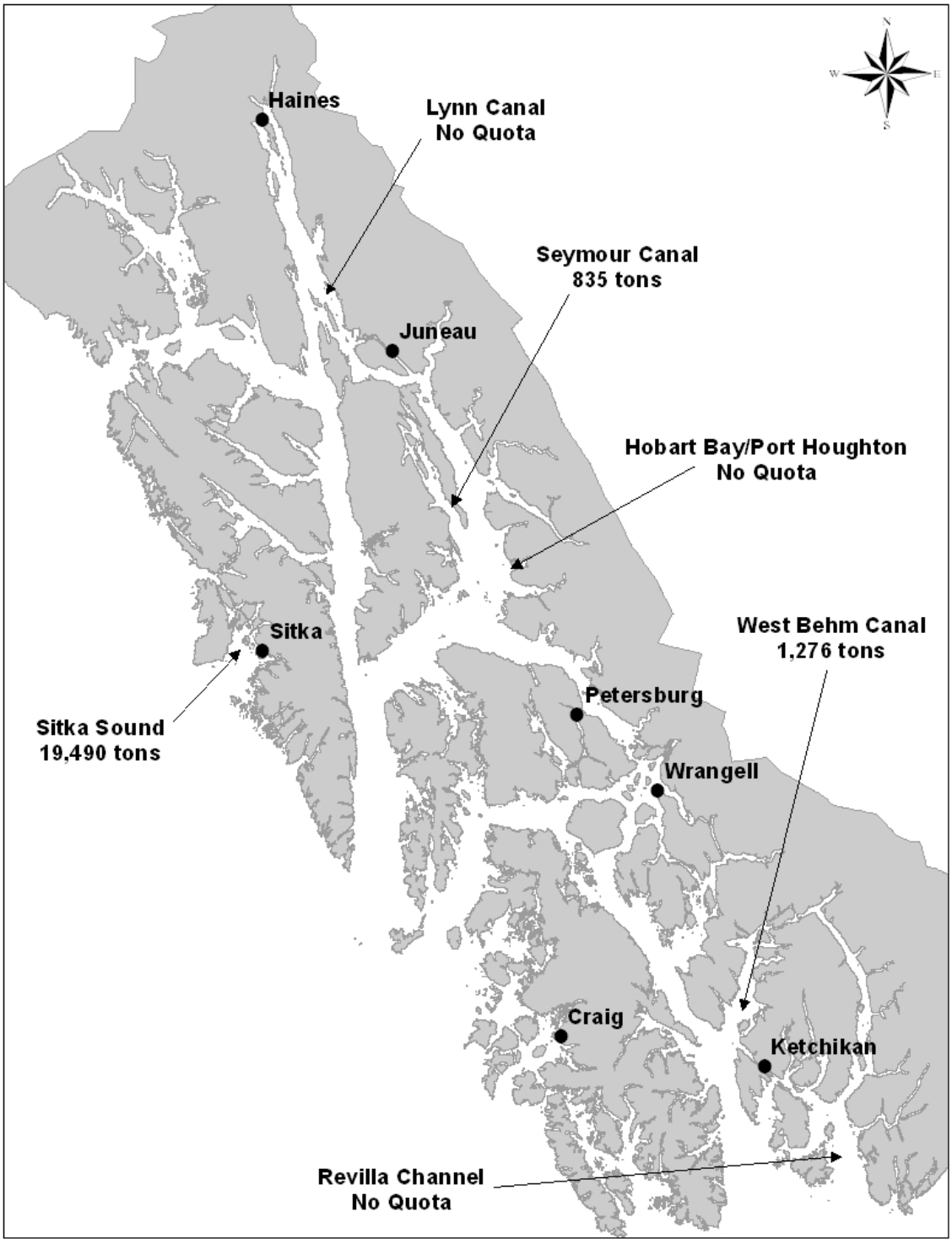

Figure 1.–Southeast Alaska sac roe herring areas and Guideline Harvest Levels for 2011.

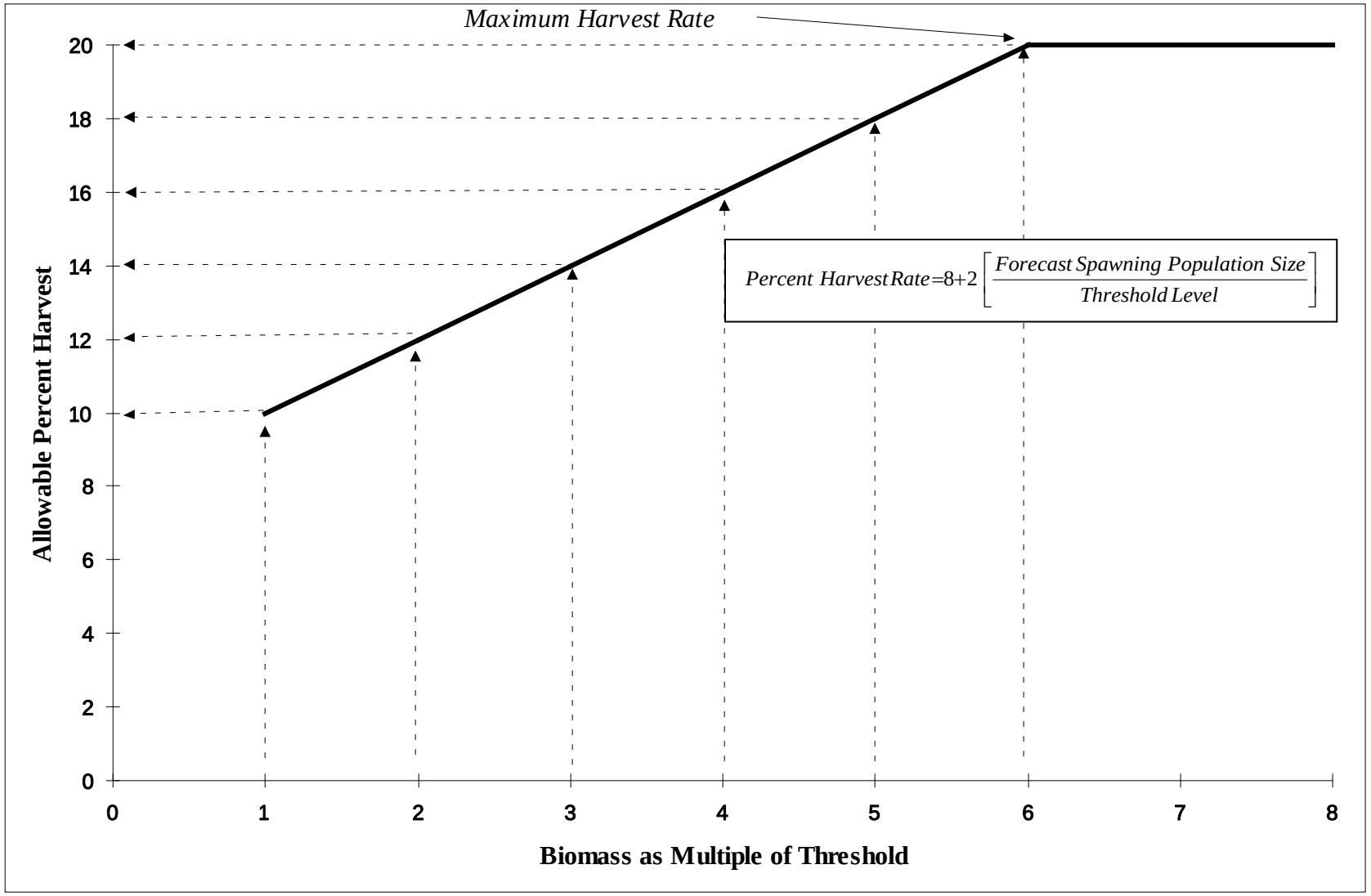

Figure 2.–Generalized harvest strategy for Southeast Alaska herring (excluding Sitka Sound). The allowable percent annual harvest is plotted against the estimated biomass of mature herring expressed as a multiple of the established harvest threshold level.

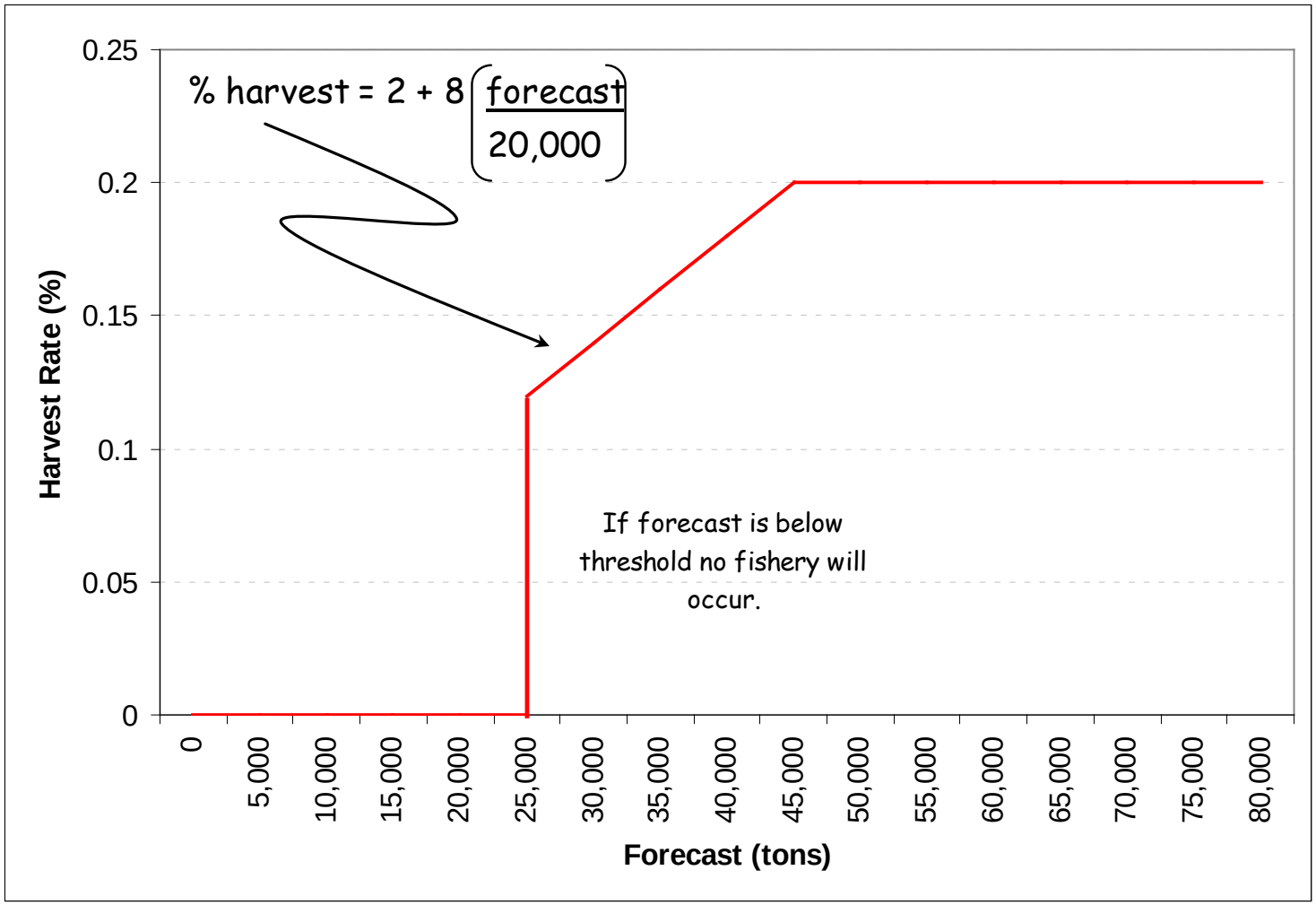

Figure 3.–Harvest rate and formula for Sitka Sound under 25,000 ton minimum threshold level [5 AAC 27.160 (g)].