

2019 Southeast Alaska Sac Roe Herring Fishery Management Plan

by

Troy Thynes

Eric Coonradt

Dave Harris

and

Scott Walker

March 2019

Alaska Department of Fish and Game

Division of Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the *Système International d'Unités* (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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

REGIONAL INFORMATION REPORT NO.1J19-01

**2019 SOUTHEAST ALASKA SAC ROE HERRING FISHERY
MANAGEMENT PLAN**

by

Troy Thynes

Alaska Department of Fish and Game, Division of Commercial Fisheries, Petersburg

Eric Coonradt

Alaska Department of Fish and Game, Division of Commercial Fisheries, Sitka

Dave Harris

Alaska Department of Fish and Game, Division of Commercial Fisheries, Douglas

and

Scott Walker

Alaska Department of Fish and Game, Division of Commercial Fisheries, Ketchikan

Alaska Department of Fish and Game
Division of Commercial Fisheries, Publications Section
802 3rd St., Douglas, Alaska, 99824-0020

March 2019

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.adfg.alaska.gov/sf/publications/>

Troy Thynes
Alaska Department of Fish and Game, Division of Commercial Fisheries,
16 Sing Lee Alley, PO Box 667
Petersburg, AK 99833 USA

Eric Coonradt
Alaska Department of Fish and Game, Division of Commercial Fisheries,
304 Lake St. Rm. 103
Sitka, AK 99835 USA

Dave Harris
Alaska Department of Fish and Game, Division of Commercial Fisheries,
802 3rd St.,
Douglas, AK. 99811-0024 USA

and

Scott Walker
Alaska Department of Fish and Game, Division of Commercial Fisheries,
2039 Sea level Drive Suite 205,
Ketchikan, AK 99901, USA

This document should be cited as follows:

Thynes, T., E. Coonradt, D. Harris, and S. Walker. 2019. 2019 Southeast Alaska sac roe herring Fishery Management Plan. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J19-01, Douglas.

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility please write:

ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK 99811-5526

U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042, Arlington, VA 22203

Office of Equal Opportunity, U.S. Department of the Interior, 1849 C Street NW MS 5230, Washington DC 20240

The department's ADA Coordinator can be reached via phone at the following numbers:

(VOICE) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648,

(Juneau TDD) 907-465-3646, or (FAX) 907-465-6078

For information on alternative formats and questions on this publication, please contact:

ADF&G, Division of Sport Fish, Research and Technical Services, 333 Raspberry Rd, Anchorage AK 99518 (907) 267-2375

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
ABSTRACT.....	1
INTRODUCTION.....	1
REGULATIONS.....	1
Vessel Check-In, Check-Out, and Reporting Procedure.....	2
Reporting Procedures for Floating Fish Processors.....	2
ANNOUNCEMENT OF OPENINGS AND CLOSURES.....	2
MANAGEMENT STRATEGY.....	2
Sliding Scale Harvest Rate.....	4
Roe Quality.....	4
GILLNET FISHERIES.....	4
Revilla Channel.....	5
West Behm Canal.....	5
Seymour Canal.....	5
Hobart/Houghton.....	6
PURSE SEINE FISHERIES.....	6
Sitka Sound.....	6
REFERENCES CITED.....	8
LIST OF CONTACTS.....	9
TABLES AND FIGURES.....	11

LIST OF TABLES

Table		Page
1.	Southeast Alaska gillnet sac roe herring fisheries information summary for Seymour Canal and Revilla Channel, 1976–2018.....	12
2.	Southeast Alaska gillnet sac roe herring fisheries information summary for Hobart-Houghton and West Behm Canal, 1977–2018.	14
3.	Southeast Alaska purse seine sac roe herring fisheries information summary, 1976–2018.	16

LIST OF FIGURES

Figure		Page
1.	Southeast Alaska sac roe herring areas and Guideline Harvest Levels for 2019.....	18
2.	Generalized harvest strategy for Southeast Alaska herring (excluding Sitka Sound)..	19
3.	Harvest rate and formula for Sitka Sound under 25,000-ton minimum threshold level.....	20
4.	Map showing area in Sitka Sound closed to commercial herring harvest beginning 2018.	21

ABSTRACT

This report describes the Southeast Alaska herring sac roe fishery regulations, fishing areas, and Guideline Harvest Levels for 2019. Management plans for the 2019 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. This management plan provides an overview of the 2019 sac roe herring fisheries for Southeast Alaska including expected harvest levels and management strategy. A combined management plan for the northern and southern Southeast Alaska spawn-on-kelp pound fisheries is available as a separate publication at local department area offices and on the Alaska Department of Fish and Game (ADF&G) web site.

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 five sac roe herring fishing areas in Southeast Alaska consisting of one exclusive purse seine area and four exclusive gillnet areas. During the 2003 Alaska Board of Fisheries (BOF) Southeast and Yakutat Finfish meeting, the board adopted a new sac roe fishery for West Behm Canal (Sections 1-E and 1-F) that was to operate on alternating years for purse seine and gillnet gear. During the 2012 BOF Southeast and Yakutat Finfish meeting, the board changed the West Behm Canal sac roe fishery to be exclusively a set gillnet fishery. During the 2018 BOF Southeast and Yakutat meeting, the board rescinded provisions for the Lynn Canal purse seine fishery that had not opened since 1982. Sac roe fishing areas are shown in Figure 1.

Approximately 2,900 tons of herring were harvested in commercial sac roe herring fisheries conducted in Southeast Alaska during 2018. A harvest of approximately 12,900 tons is anticipated for the 2018 fishing season.

REGULATIONS

Commercial herring fishing regulations are included in the ADF&G 2019–21 Statewide Commercial Herring Fishing Regulations pamphlet. Copies of the pamphlet may be obtained at any department office. Management plans which apply to the herring harvest in the sac roe fisheries include: *Management guidelines for commercial herring sac roe fisheries* (5 AAC 27.059), *Waters closed to herring fishing in Southeastern Alaska Area* (5 AAC 27.150), *Herring Management Plan for Southeastern Alaska Area* (5 AAC 27.190), *Sitka Sound commercial sac roe herring fishery* (5 AAC 27.195), and *Sections 1-E and 1-F commercial sac roe herring fishery* (5 AAC 27.197).

Additionally, in January 2015, the Federal Subsistence Board closed waters to commercial herring fishing in an area known as the Makhnati Island federal waters (Figure 4). This closure went into effect on April 1, 2015.

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

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

Buyers or buyers' agents must register all vessels employed in transporting and processing herring with ADF&G prior to commencing those activities and must make daily reports of herring purchased from fishermen as specified by a local representative of ADF&G [5 AAC 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 Commercial Fisheries Entry Commission (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 ADF&G 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 the department within 10 days after the termination of buying operations, unless otherwise specified by the department [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 ADF&G 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 ADF&G emergency order (EO). Fishery announcements will be issued through normal news release channels and on the fishing grounds over VHF radio for the set gillnet sac roe fisheries. EOs concerning the Sitka Sound seine sac roe fishery are only announced over 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. Based on discussions at the preseason meeting, fisheries will be placed on short notice prior to the first opening. The short notice may be 1–2 hours at the discretion of the department. During the Sitka fishery, the department will try to give the industry a 36-hour warning of the time that the fishery goes on short notice. Announcement of the time that short notice goes into effect will be made by a department 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 notice will not be given.

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 5 AAC 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
Sitka Sound	25,000 tons
Hobart/Houghton	2,000 tons
West Behm Canal	6,000 tons

A variety 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 by 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 time series of estimated total egg deposition, spawner-age composition, catch-age composition, weight-at-age, and harvest. Estimates of fecundity are also included in the model. The method applies estimates of recruitment, growth, maturation, and natural mortality to an estimate of spawning biomass from one year to forecast biomass for the next year. The ASA model was 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 was 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 estimated from ASA modeling of other stocks in the region. The median historical proportion of mature age-3 herring for each stock is used to forecast age-3 recruitment to the spawning biomass. The sac roe fishery areas for which the BA method is currently used to forecast herring abundance include West Behm Canal and Hobart/Houghton.

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 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:

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

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

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

Based on BOF action during the 2009 Southeast and Yakutat Finfish 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, the department 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 four set gillnet sac roe fishing areas in Southeast Alaska: the Revilla Channel fishery in regulatory Section 1-F, the West Behm Canal fishery in Sections 1-E and 1-F, the Seymour

Canal fishery in Section 11-D, and the Hobart-Houghton fishery in District 10. A summary of historical harvest and fishing time information for each fishery is shown in Tables 1 and 2.

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 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. From 2000 through 2018, the minimum threshold level was not reached in state managed waters and no fishery was permitted.

In 2018, there were approximately 1.1 nmi of herring spawn observed in state waters in the Revilla Channel area. No spawn deposition dive survey was conducted due to the lack of funding. Therefore, the department did not produce a 2019 forecast and no sac roe herring fishery will take place in 2019.

The department will be conducting surveys of Revilla Channel herring during the upcoming spawning event in 2019.

WEST BEHM CANAL

A sac roe fishery was established in West Behm Canal (Sections 1-E and 1-F) in 2003 by the BOF that was to operate on alternating years for purse seine and gillnet gear.

In 2004, a fishery was announced but due to inseason concerns over the lack of herring in West Behm Canal, the fishery was not opened, and no herring were harvested.

From 2005 to 2010, the threshold was not met, and no fishery occurred. A gillnet fishery occurred in 2011 but was unsuccessful because the majority of herring spawning activity took place in closed waters.

A fishery was announced in 2012, but due to inseason concern over lack of herring in West Behm Canal, there was no fishery, and no herring were harvested. The actual spawning biomass observed in 2012 was 2,134 tons. During the 2012 BOF Southeast and Yakutat Finfish meeting, the board changed the West Behm Canal sac roe fishery to be exclusively a set gillnet fishery.

From 2013 to 2018, the threshold was not met, and no fishery occurred.

Surveys conducted in 2018 documented 2.9 nmi of spawn in West Behm Canal. No spawn deposition dive survey was conducted in 2018 due to lack of funding. The department will be conducting aerial surveys of the West Behm Canal area in 2019.

SEYMOUR CANAL

Set gillnet fisheries have occurred intermittently in Seymour Canal (Section 11-D) since the fishery was changed from seine to gillnet 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).

It was not possible to determine a 2019 forecast for Seymour Canal herring. The spawn observed in 2018 was very limited in extent and duration and no spawn deposition dive surveys were conducted. The Seymour Canal set gillnet herring fishery will not be opened in 2019.

ADF&G plans to monitor and document the Seymour Canal spawn event in spring 2019 but is not planning further stock assessments at this time.

HOBART/HOUGHTON

In January 1997, the BOF adopted regulations that allocate 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 the sac roe fishery, harvests have occurred in 1997–1999, 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 2). Herring biomass estimates were not large enough to allow fisheries in 2001–2004, 2006, 2007, and 2011–2016. Herring spawn was not documented in 2016.

In 2018, 6 aerial surveys were conducted, minimal herring spawn was observed, and a spawn deposition survey of Hobart Bay/Port Houghton was not conducted. Therefore, no biomass forecast was developed for 2019. In 2019, the department will monitor Hobart Bay/Port Houghton stock through the duration of historical spawn timing. If enough spawn is documented, the department may conduct a spawn deposition survey.

PURSE SEINE FISHERIES

Until 2018, there were two exclusive purse seine herring sac roe areas in Southeast Alaska: Lynn Canal and Sitka Sound. During the January 2018 BOF Southeast and Yakutat meeting, the board rescinded provisions for the Lynn Canal purse seine fishery that had not been opened since 1982. Summaries of harvest and fishing time information for each fishery are shown in Tables 1 and 2.

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 in Salisbury Sound.

In the spring of 2018, the biomass of mature herring returning to Sitka Sound prior to the fishery was estimated by the ASA model to be 55,637 tons which was below the 59,257 tons forecasted to return. The final guideline harvest level (GHL) for the 2019 Sitka Sound herring fishery will be 12,869 tons. This is based on a 20% harvest rate of a forecast mature biomass of 64,343 tons. No herring will be harvested in the winter bait test fishery in the winter of 2018–19. The forecast indicates that the spawning stock will consist of 12% age-3, 43% age-4, 21% age-5, 2% age-6, 18% age-7, and 4% age-8+ fish.

Herring distribution and roe quality will be monitored prior to and during the fishing periods. Monitoring methods for 2019 will include aerial surveys, vessel sonar surveys, and test fishing. In 2019, ADF&G will coordinate with industry vessels to conduct test fishing as necessary to determine roe quality. Prior to making test sets, the identified test boats will contact department 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.

In 2018, the BOF modified 5 AAC 27.150(a)(4) and expanded the commercial fishery closed waters in Sitka Sound (Figure 4). The expansion of the closed waters is intended to reduce

perceived conflict of commercial harvest with the subsistence harvest of herring roe-on-branch. ADF&G will continue 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.*

Beginning with the 2002 season, in lieu of using a permit system to estimate the subsistence herring roe harvest, the Sitka Tribe of Alaska 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” 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 location of the subsistence harvest and would indicate whether the amount reasonably necessary for subsistence had been successfully harvested. For the period 2002–2016, the subsistence roe harvest estimate has ranged from 71,936 to 381,226 pounds and averaged 150,729 pounds. Overall subsistence harvest amounts are influenced by the amount of harvest effort and the quality of spawn in accessible locations (Sill and Cunningham 2017, Shewmake 2013), where the quality of spawn is influenced by timing duration, location and weather (Shewmake 2013). Conflicts with a work schedule and sharing from others have consistently been the most common reasons given for not participating in the harvest (Sill and Cunningham 2017) and could explain the low participation reported in recent surveys. Mean consecutive spawning days in the Sitka Sound subsistence use areas (duration) including the traditional core subsistence use area (Figure 4) can be a reasonably good predictor of harvest success in some years (Shewmake 2013). One way to gain insight into spawn quality is considering yearly changes in the average weight of a wetlock box of spawn on branches, but until more work is done to identify other factors potentially affecting weights, year-to-year variations cannot be taken as an accurate indicator of herring spawn densities (Sill and Cunningham 2017). In future years the variations in spawn density and identifying accurate ways to track and correlate density with the subsistence harvest will be explored (Sill and Cunningham 2017). The results of harvest monitoring for the 2017, 2018, and 2019 seasons are not available. The amount necessary for subsistence is a range of 136,000–227,000 pounds.

Limitations on processing capacity will require multiple openings to harvest this season’s GHL and depending on the amount of harvest on any given day, it will be necessary to provide one or more days between harvesting opportunities to ensure processing capacity is available. The total daily processing capacities for the 2019 season will not be determined until immediately prior to the fishery though it is expected to be around 2,000 tons per day.

ADF&G has not been in contact with processors to discuss strategies for harvesting this season’s GHL. The department is planning to hold that discussion at the 2-hour notice meeting. There is no agreement on this year’s harvest strategy, whether in a competitive or noncompetitive style fishery, and the department will adjust as needed. It will be necessary to remain flexible and adapt specific opening target harvest levels in consideration of inseason assessment of herring distribution and quality, progress of the spawn, changes in available processing and tendering capacity, and input from industry representatives. A general prefishery meeting will be held in Sitka immediately prior to the fishery for reviewing the guidelines and expectations for this year’s noncompetitive fishery, enforcement issues, and Coast Guard safety concerns for the fishery.

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 (907) 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.

REFERENCES CITED

- Shewmake, J. W. 2013 Spatial Resilience and the Incorporation of Traditional Ecological Knowledge in Mapping Sitka Herring. University of Alaska, Fairbanks. Fairbanks, AK. Masters Thesis.
- Sill, L. A., and M. Cunningham. 2017. The Subsistence Harvest of Pacific Herring Spawn in Sitka Sound Alaska, 2016. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 435, Douglas.

LIST OF CONTACTS

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

Lowell Fair Region I Supervisor Douglas Regional Office	P.O. Box 110024 Douglas, Alaska 99811 (907) 465-4250
Dan Gray Region I Management Coordinator Sitka Area Office	304 Lake St. Rm. 103 Sitka, Alaska 99835 (907) 747-6688
Dave Harris and Scott Forbes Area Management Biologists Douglas Regional Office	P.O. Box 110024 Douglas, Alaska 99811 (907) 465-4250
Kyle Hebert Herring Research Biologist Douglas Regional Office	P.O. Box 110024 Douglas, Alaska 99811 (907) 465-4250
Scott Walker, Justin Breese, and Bo Meredith Area Management Biologists Ketchikan Area Office	2030 Sea Level Dr., Suite 205 Ketchikan, Alaska 99901 (907) 255-5195
Troy Thynes and Kevin Clark Area Management Biologists Petersburg Area Office	P.O. Box 667 Petersburg, Alaska 99833 (907) 772-3801
Eric Coonradt and Aaron Dupuis Area Management Biologists Sitka Area Office	304 Lake St. Rm. 103 Sitka, Alaska 99835 (907) 747-6688
Tom Kowalske Assistant Area Management Biologist Wrangell Area Office	P.O. Box 200 Wrangell, Alaska 99929 (907) 874-3822

TABLES AND FIGURES

Table 1.–Southeast Alaska gillnet sac roe herring fisheries information summary for Seymour Canal and Revilla Channel, 1976–2018.

Year	Seymour Canal ^a				Revilla Channel			
	Guideline Harvest	Harvest (Tons) ^b	Date 2-Hour Notice	Opening Dates	Guideline	Harvest	Date 2-	Opening Dates
1976	200	194	–	9-May	300	494	23-Mar	2-Apr
1977	500	485	4-May	9-May	800	776	29-Mar	1-Apr
1978	500	729	2-May	8-May	680	171	26-Mar	4-Apr
1979	250	269	3-May	3-May	585	524	28-Mar	29-Mar
1980	–	–	No Fishery	–	1,100	1,149	25-Mar	25-Mar
1981	600	615	28-Apr	28-Apr	1,550	1,871	20-Mar	20-Mar
1982	–	–	No Fishery	–	1,700	2,319	20-Mar	26-Mar
1983	–	–	No Fishery	–	2,500	3,113	23-Mar	24-Mar
1984	375	499	20-Apr	26-Apr	2,100	2,177	20-Mar	29-Mar
1985	–	–	No Fishery	–	2,300	2,159	28-Mar	29-Mar
1986	300	392	5-May	10-May	1,100	1,530	29-Mar	31-Mar
1987	419	302	1-May	5-May-06	1,200	1,452	24-Mar	26-Mar-27
1988	530	586	20-Apr	April 26–May 1	953	1,145	24-Mar	25-Mar
1989	332	541	21-Apr	28-Apr	647	595	20-Mar	20-Mar-21
1990	312	359	21-Apr	April 28–29	–	–	–	–
1991	–	–	No Fishery	–	680	660	28-Mar	April 8–11
1992	–	–	No Fishery	–	1,200	1,246	1-Apr	3-Apr
1993	–	–	No Fishery	–	717	737	31-Mar	10-Apr
1994	368	374	28-Apr	29-Apr	880	730	9-Apr	April 9,11
1995	316	319	30-Apr	14-May	630	610	11-Apr	12-Apr
1996	–	–	No Fishery	–	871	601	8-Apr	10-Apr
1997	–	–	No Fishery	–	912	1,159	6-Apr	6-Apr
1998	633	585	30-Apr	May 1–4	620	616	1-Apr	1-Apr-02
1999	595	706	30-Apr	30-Apr	870	0	No	Fishery Not Opened
2000	346	389	3-May	5-May	0	0	No	Fishery Not Opened
2001	474	620	6-May	May 11–12	0	0	No	Fishery Not Opened
2002	1,096	1,066	12-May	May 16–17	0	0	No	Fishery Not Opened
2003	1,712	1,519	28-Apr	Apr 29–May 2	0	0	No	Fishery Not Opened
2004	838	804	1-May	3-May	0	0	No	Fishery Not Opened
2005	894	945	26-Apr	1-May	0	0	No	Fishery Not Opened
2006	1,508	1,187	28-Apr	May 4–7	0	0	No	Fishery Not Opened
2007	1,292	1,219	8-May	May 13–14	0	0	No	Fishery Not Opened

-continued-

Table 1.–continued (Page 2 of 2).

Year	Seymour Canal ^a				Revilla Channel			
	Guideline	Harvest (Tons) ^b	Date 2-Hour Notice	Opening Dates	Guideline	Harvest	Date 2-	Opening Dates
2008	1,205	1,208	6-May	May 10–11	0	0	No	Fishery Not Opened
2009	1,471	866	29-Apr	April 30–May 2	0	0	No	Fishery Not Opened
2010	657	710	24-Apr	April 24–25	0	0	No	Fishery Not Opened
2011	835	Confidential	25-Apr	April 26	0	0	No	Fishery Not Opened
2012	1,287	0	23-Apr	Fishery Not Opened	0	0	No	Fishery Not Opened
2013	1,014	649	6-May	May 8–11	0	0	No	Fishery Not Opened
2014	772	Confidential	30-Apr	April 30-May 9	0	0	No	Fishery Not Opened
2015	–	–	No Fishery	–	0	0	No	Fishery Not Opened
2016	5,113	–	No Fishery	–	0	0	No	Fishery Not Opened
2017	–	–	No Fishery	–	0	0	No	Fishery Not Opened
2018	–	–	No Fishery	–	0	0	No	Fishery Not Opened

^a Seymour Canal was a purse seine fishing area prior to 1980.

^b Seymour Canal harvest includes all herring for sac roe including confiscated and test fishery catch.

^c Revilla Channel GHL reduced by 150 tons as an allocation for the Annette Island sac roe harvest in 1993 and 1994.

^d Revilla Channel harvest includes all herring for sac roe based on IFDB query March, 2007.

Table 2.–Southeast Alaska gillnet sac roe herring fisheries information summary for Hobart-Houghton and West Behm Canal, 1977–2018.

Year	<u>Hobart-Houghton</u>					<u>West Behm Canal</u>			
	Guideline Harvest Level (Tons) ^a	Harvest (Tons) ^b		Date 2-Hour Notice Effective	Opening Dates Bait/Sac Roe	Guideline Harvest Level (Tons)	Harvest (Tons)	Date 2-Hour Notice Effective	Opening Dates
1977	0	40	0	–	October 1	–	–	–	–
1978	0	0	0	–	Fishery Not Opened	–	–	–	–
1979	0	0	0	–	Fishery Not Opened	–	–	–	–
1980	0	0	0	–	Fishery Not Opened	–	–	–	–
1981	0	0	0	–	Fishery Not Opened	–	–	–	–
1982	0	0	0	–	Fishery Not Opened	–	–	–	–
1983	0	0	0	–	Fishery Not Opened	–	–	–	–
1984	0	0	0	–	Fishery Not Opened	–	–	–	–
1985	0	0	0	–	Fishery Not Opened	–	–	–	–
1986	0	0	0	–	Fishery Not Opened	–	–	–	–
1987	0	0	0	–	Fishery Not Opened	–	–	–	–
1988	0	0	0	–	Fishery Not Opened	–	–	–	–
1989	0	0	0	–	Fishery Not Opened	–	–	–	–
1990	0	0	0	–	Fishery Not Opened	–	–	–	–
1991	0	0	0	–	Fishery Not Opened	–	–	–	–
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 19–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 Opened

-continued-

Table 2.–Page 2 of 2.

Year	Hobart-Houghton					West Behm Canal			
	Guideline Harvest Level (Tons) ^a	Harvest (Tons) ^b		Date 2-Hour Notice Effective	Opening Dates Bait/Sac Roe	Guideline Harvest Level (Tons)	Harvest (Tons)	Date 2-Hour Notice Effective	Opening Dates
2005	223	0	204	April 24	April 24	0	0	No Fishery	Fishery Not Opened
2006	0	0	0	No Fishery	Fishery Not Opened	0	0	No Fishery	Fishery Not Opened
2007	0	0	0	No Fishery	Fishery Not Opened	0	0	No Fishery	Fishery Not Opened
2008	462	0	302	May 2	May 8–May 9	0	0	No Fishery	Fishery Not Opened
2009	376	0	341	April 29	May 2–May 3	0	0	No Fishery	Fishery Not Opened
2010	345	0	302	April 22	April 23–April 24	0	0	No Fishery	Fishery Not Opened
2011	0	0	0	No Fishery	Fishery Not Opened	1,276	confidential	April 11	April 11–April 14
2012	0	0	0	No Fishery	Fishery Not Opened	758	0	April 5	Fishery Canceled
2013	0	0	0	No Fishery	Fishery Not Opened	0	0	0	Fishery Not Opened
2014	0	0	0	No Fishery	Fishery Not Opened	0	0	0	Fishery Not Opened
2015	0	0	0	No Fishery	Fishery Not Opened	0	0	0	Fishery Not Opened
2016	0	0	0	No Fishery	Fishery Not Opened	0	0	0	Fishery Not Opened
2017	0	0	0	No Fishery	Fishery Not Opened	0	0	0	Fishery Not Opened
2018	0	0	0	No Fishery	Fishery Not Opened	0	0	0	Fishery Not Opened

^a Hobart Bay was opened to Gillnet Sac Roe Fishing in 1997.

^b Hobart-Houghton gillnet quota is the portion of GHIL left after the winter bait fishery is completed.

Table 3.–Southeast Alaska purse seine sac roe herring fisheries information summary, 1976–2018.

Year	Juneau-Lynn Canal ^a						Sitka Sound			
	Guideline Harvest Level (Tons) ^b	Harvest (Tons) by Gear Type ^c		Date 2-Hour Notice Was Effective	Opening Dates by Gear Type		Guideline Harvest Level (Tons)	Harvest (Tons) ^d	Date 2-Hour Notice Was Effective	Opening Dates
		Seine	Gillnet		Seine	Gillnet				
1976	650	432	124	–	April 26	April 29	780	800	April 10	April 16
1977	875	709	211	–	April 19	April 20	–	–	Fishery Not Open	–
1978	820	602	363	April 19	April 20	April 21	250	175	April 4	April 5
1979	120	0	0	Fishery Not Open	–	–	2,000	2,559	April 7	April 12
1980	600	975	0	April 13	April 26	–	4,000	4,385	April 4	April 4, 5
1981	725	775	0	April 17	April 23	–	2,700	3,506	March 23	March 24, 26
1982	400	551	0	April 30	April 30	–	3,000	4,445	March 26	March 30
1983	0	0	0	Fishery Not Open	–	–	5,500	5,449	March 23	March 26, 29
1984	0	0	0	Fishery Not Open	–	–	5,000	5,771	March 22	March 26, 27, 28
1985	0	0	0	Fishery Not Open	–	–	7,700	7,475	March 24	March 29, April 1, 5
1986	0	0	0	Fishery Not Open	–	–	5,029	5,443	March 28	April 2, 8
1987	0	0	0	Fishery Not Open	–	–	3,600	4,216	March 23	March 31
1988	0	0	0	Fishery Not Open	–	–	9,200	9,390	March 25	April 4–14
1989	0	0	0	Fishery Not Open	–	–	11,700	11,714	March 23	March 31–April 8
1990	0	0	0	Fishery Not Open	–	–	4,146	3,804	April 4	April 5, 6
1991	0	0	0	Fishery Not Open	–	–	3,200	1,838	March 29	April 10–April 13
1992	0	0	0	Fishery Not Open	–	–	3,356	5,368	March 30	April 6
1993	0	0	0	Fishery Not Open	–	–	9,691	10,186	March 26	March 27–April 3
1994	0	0	0	Fishery Not Open	–	–	4,432	4,758	March 28	March 29, 31
1995	0	0	0	Fishery Not Open	–	–	2,609	2,908	March 23	March 25, 27
1996	0	0	0	Fishery Not Open	–	–	8,144	8,144	March 23	March 23, March 31–Apr. 9

-continued-

Table 3.–Page 2 of 2.

Year	Juneau-Lynn Canal ^a				Sitka Sound			
	Guideline Harvest Level (Tons) ^b	Harvest (Tons) ^c	Date 2-Hour Notice Was Effective	Opening Dates	Guideline Harvest Level (Tons)	Harvest (Tons) ^d	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 2,12–15
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	17,602	March 19	March 24, 27, 30, April 2
2011	–	–	Fishery Not Open	–	19,490	19,419	March 28	March 31, April 1,4,7,9
2012	–	–	Fishery Not Open	–	28,829	13,231	March 27	March 31, April 2, 7
2013	–	–	Fishery Not Open	–	11,549	5,688	March 25	March 27, 28, 30, April 3
2014	–	–	Fishery Not Open	–	16,333	16,957	March 20	March 20, 23, 26, 29
2015	–	–	Fishery Not Open	–	8,712	8,756	March 18	March 18–25
2016	–	–	Fishery Not Open	–	14,941	9,769	March 17	March 17–23
2017	–	–	Fishery Not Open	–	14,649	13,923	March 17	March 19, 22, 25, 27, 28
2018 ^e	–	–	Closed	–	11,128	2,980	March 20	March 25, 26

^a The Juneau-Lynn Canal fishery was seine, gillnet and bait pound area prior to 1980.

^b The Lynn Canal GHL includes combined seine, gillnet, and bait pound from 1976 to 1978, bait pound for 1979, and seine and bait pound for 1980–1982. The GHL for 1977 was estimated.

^c The Lynn Canal harvest includes all herring for sac roe, by gear based on IFDB query March, 2007. Bait pound harvests are confidential, so are not included.

^d The Sitka harvest includes all herring for sac roe including confiscated catch and test fishery harvest.

^e The Alaska Board of Fisheries rescinded provisions for the Juneau/Lynn Canal fisheries in 2018.

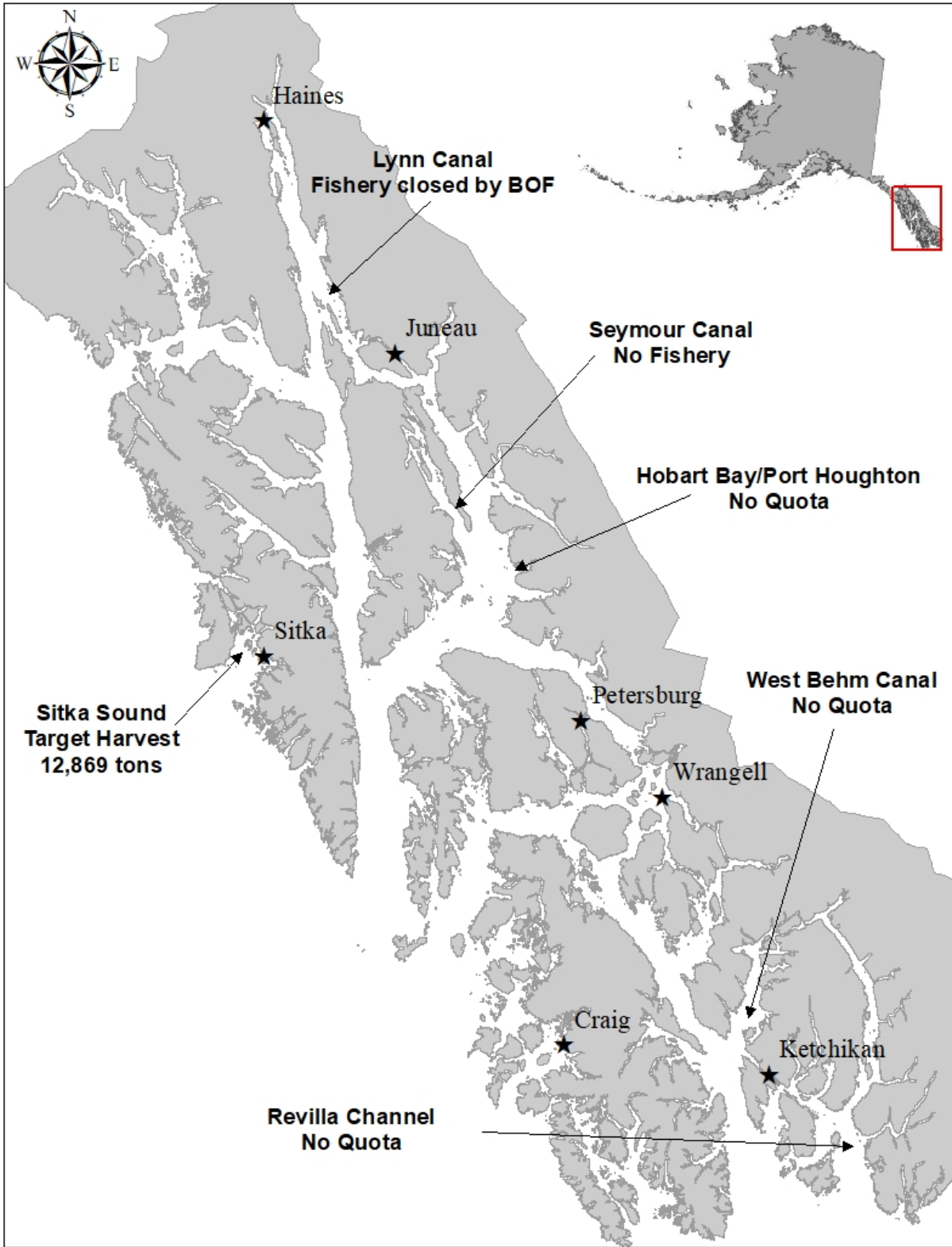


Figure 1.—Southeast Alaska sac roe herring areas and Guideline Harvest Levels for 2019.

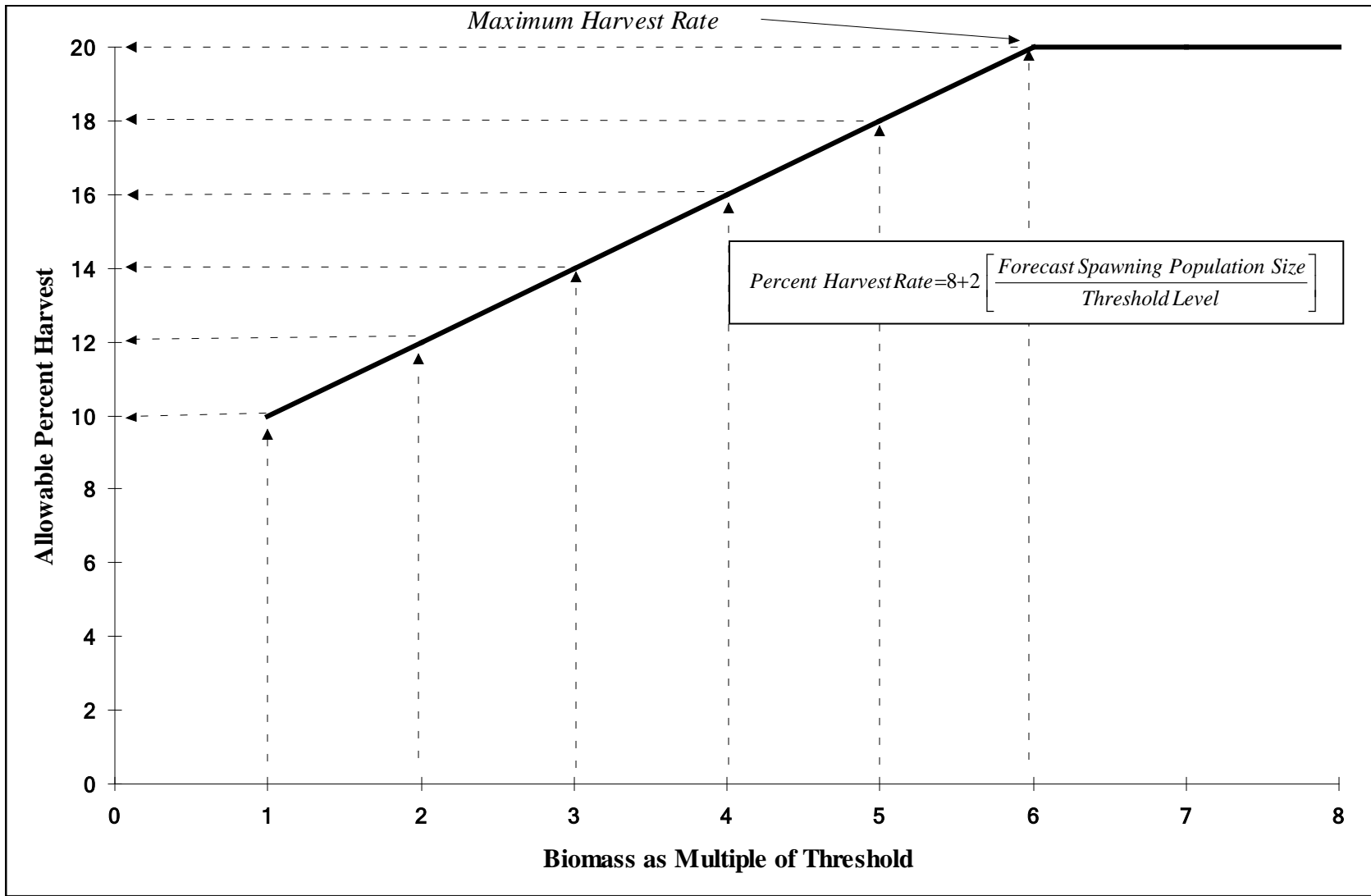


Figure 2.—Generalized harvest strategy for Southeast Alaska herring (excluding Sitka Sound). The allowable percent annual harvest is plotted against the estimated biomass of mature herring expressed as a multiple of the established harvest threshold level.

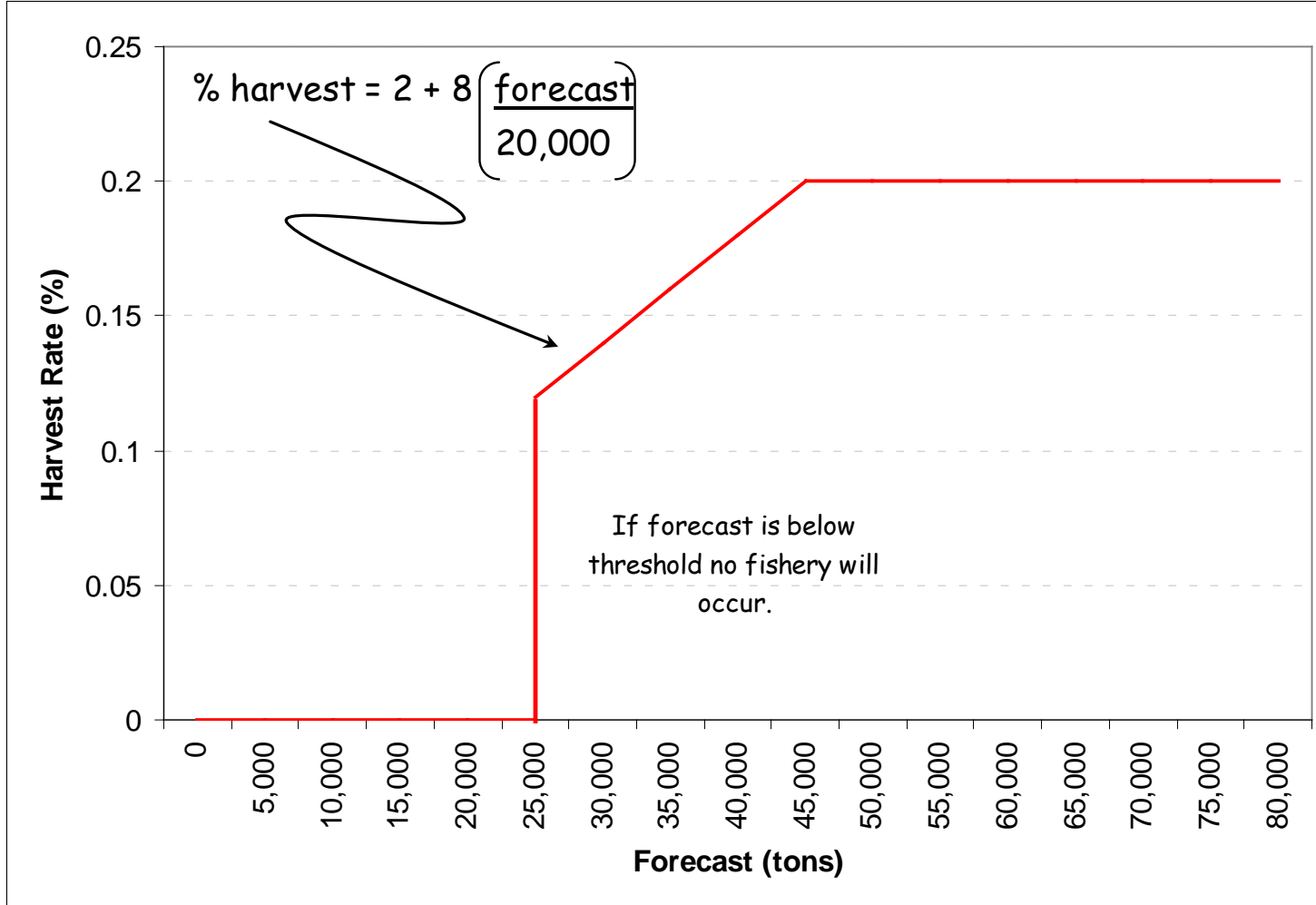


Figure 3.—Harvest rate and formula for Sitka Sound under 25,000-ton minimum threshold level [5 AAC 27.160 (g)].

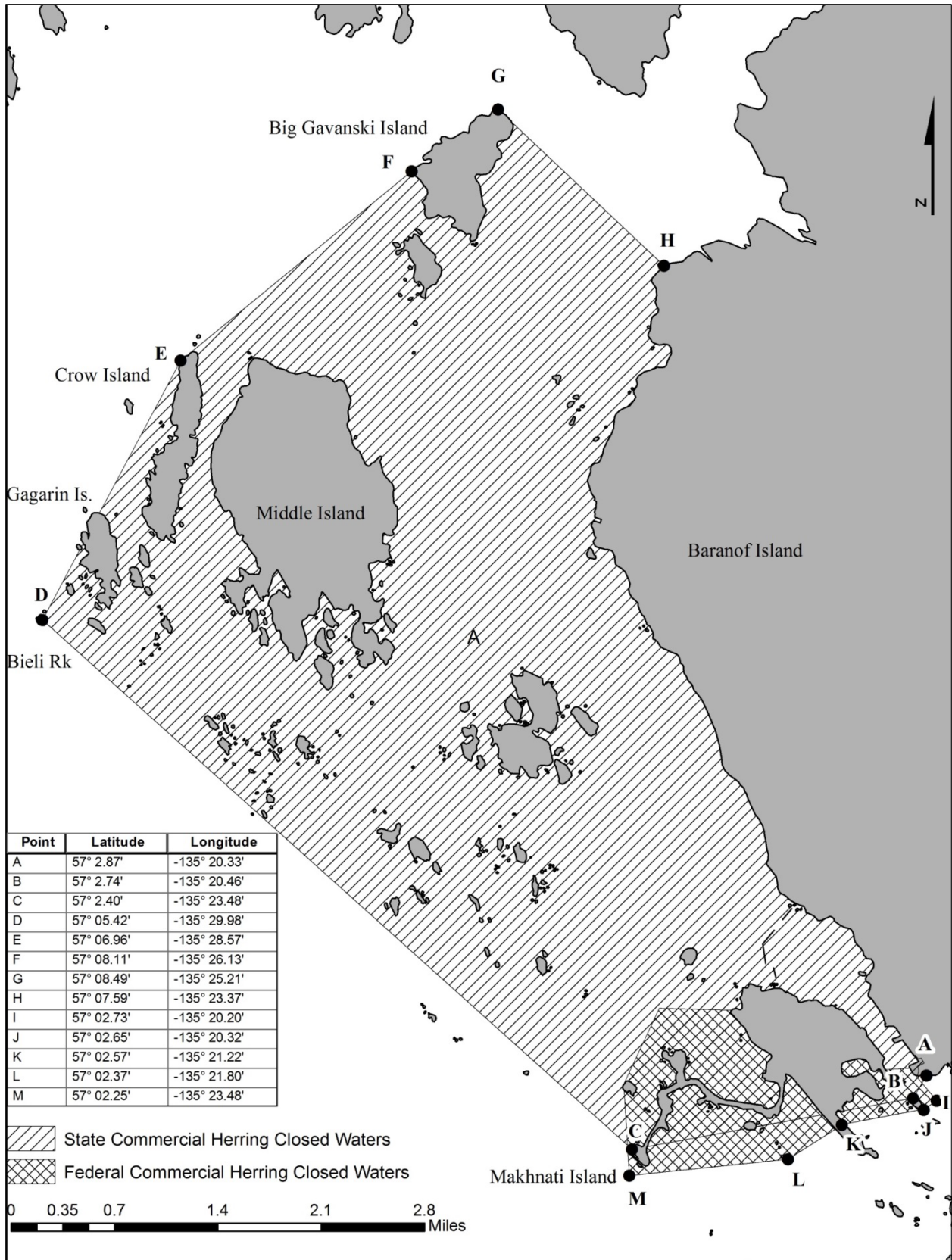


Figure 4.—Map showing area in Sitka Sound closed to commercial herring harvest beginning 2018.