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2022 Southeast Alaska Herring Sac Roe Fishery Management Plan

by

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February 2022

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)

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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2022 SOUTHEAST ALASKA HERRING SAC ROE FISHERY MANAGEMENT PLAN

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ABSTRACT

This report describes the Southeast Alaska herring sac roe fishery regulations, fishing areas, guideline harvest levels, and management intentions for 2022. Management plans for the 2022 herring sac roe purse seine and set gillnet fisheries are reviewed, including procedures for announcing fishery openings and closures, vessel registration, and harvest reporting requirements. A review of herring stock status is presented by spawning area. Alaska Department of Fish and Game management contacts are listed.

Keywords: 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 and pound spawn-on-kelp fisheries. This management plan provides an overview of the 2022 herring sac roe fisheries for Southeast Alaska including expected harvest levels and management strategy. A combined management plan for the northern and southern Southeast Alaska herring pound spawn-on-kelp fisheries is available as a separate publication at local department area offices and on the Alaska Department of Fish and Game's (department) web site.

Southeast Alaska herring are commercially harvested for sac roe by purse seine and set gillnet gear types, both of which are included in the limited entry system. There are currently 5 herring sac roe fishing areas in Southeast Alaska consisting of 1 purse seine area and 4 set gillnet areas. During the 2003 Alaska Board of Fisheries (BOF) Southeast and Yakutat Finfish meeting, the board adopted a new herring sac roe fishery for West Behm Canal (Sections 1-E and 1-F) that was to operate on alternating years for purse seine and set gillnet gear. During the 2012 BOF Southeast and Yakutat Finfish meeting, the board changed the West Behm Canal herring sac roe fishery to be exclusively a set gillnet fishery. During the 2018 BOF Southeast and Yakutat meeting, the board rescinded provisions allowing for the Lynn Canal purse seine fishery that had not opened since 1982. Herring sac roe fishing areas are shown in Figure 1.

In 2021, 15,578 tons of herring were harvested in the Sitka Sound herring sac roe fishery. This was the only commercial herring sac roe harvest in Southeast Alaska in 2021. The 2022 herring sac roe harvest is anticipated to be substantially less than the 45,164 tons available for harvest and will likely be similar to the 2021 harvest.

REGULATIONS

Commercial herring fishing regulations are included in the Alaska Department of Fish and Game's 2020–2021 Statewide Commercial Herring Fishing Regulations pamphlet. Copies of the pamphlet may be obtained at any department office. Management plans which apply harvest in the herring 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, the Federal Subsistence Board have closed waters to commercial herring fishing in an area known as the Makhnati Island federal waters since April 1, 2015 (Figure 4).

Department 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 the department prior to commencing those activities and must make daily reports of herring purchased from fishermen as specified by a local representative of the department (5 AAC 27.162 [a]). The department 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 there must be a separate fish ticket for each delivery to a tender before the tender leaves the fishing grounds. 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 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 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 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 Alaska Department of Fish and Game emergency order (EO). Fishery announcements will be 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 desired harvest levels.

The department will monitor herring distribution, abundance, and quality 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. The department will try to give the industry a 36-hour notice 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 advisory announcement. However, if spawning is either earlier or heavier than anticipated, and waiting 36 hours could result in loss of fishing opportunity, notice will be less than 36 hours.

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" section 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 (Hebert 2020). 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, the department 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, the department 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 6 times the threshold level.

The percent harvest rate for any multiple of the threshold level from 1 to 6 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 applies to the Sitka Sound herring sac roe fishery based on BOF actions taken at the 1997 and 2009 Southeast and Yakutat Finfish meetings. The minimum harvest rate for the Sitka Sound herring sac roe fishery 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. For the Sitka fishery, the harvest rate is calculated using the following formula (Figure 3):

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

ROE QUALITY

Herring sac roe fisheries are managed in compliance with regulation 5 AAC 27.059 *Management guidelines for commercial herring sac roe fisheries*. This regulation establishes guidelines that allow for the department to manage herring 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 4 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 herring 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 in state waters. From 2000 through 2014, and from 2016 through 2021, the minimum threshold level was not reached in state managed waters and a fishery was not permitted. In 2015, 11.9 nautical miles (nmi) of spawn was documented, and a herring spawn deposition dive survey was conducted. The post spawning biomass was above the minimum threshold but, given that very few herring had been observed since 1998 with little biological information collected over that time frame, no formal forecast was completed, and no fishery was scheduled for 2016. Since 2015, herring spawn observed in state waters has been highly variable ranging from 1.2 nmi in 2018 to 11.9 nmi in 2016.

In 2021, there was 7.9 nmi of herring spawn observed in state waters in the Revilla Channel area. A spawn deposition was conducted but a formal forecast was not developed for the 2021/22 season, therefore, a sac roe herring fishery will not take place in 2022. The spawn deposition estimate in 2021 was 4,502 tons.

In 2022, the department will monitor the Revilla Channel stock through the duration of historical spawn timing. If enough spawn is documented and funding allows, the department may conduct a spawn deposition survey.

WEST BEHM CANAL

A herring 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 set gillnet gear. In 2004, a fishery was announced but due to inseason concerns over the low abundance of herring observed in West Behm Canal, the fishery was not opened. From 2005 to 2010, the threshold was not met, and no fisheries occurred. A set gillnet fishery occurred in 2011 but was unsuccessful due to the the majority of spawning activity occurring in closed waters. In 2012, threshold was met, and a fishery was set to occur, but due to inseason concern over low abundance of herring observed in the West Behm Canal area, the fishery did not open (Table 2). 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 herring sac roe fishery to be exclusively a set gillnet fishery. From 2013 through 2021, the threshold has not been met, and no fisheries have occurred.

Aerial surveys conducted in 2021 documented 8.2 nmi of spawn in West Behm Canal. A spawn deposition survey did not occur, therefore a biomass forecast was not developed.

In 2022, the department will monitor the West Behm Canal herring stock through the duration of its historical spawn timing. If enough spawn is documented, the department may conduct a spawn deposition survey dependent on funding and vessel availability.

SEYMOUR CANAL

Set gillnet fisheries have occurred intermittently in Seymour Canal (Section 11-D) since the fishery was changed from purse seine to set gillnet in 1980. Annual landings during years fished by set 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 2022 forecast for Seymour Canal herring. Approximately 3.1 nmi of spawn was observed in 2021 and a spawn deposition survey was not conducted as the spawn observed was limited in extent and duration. The Seymour Canal set gillnet herring fishery will not be opened in 2022.

In 2022, the department will monitor the Seymour Canal herring stock through the duration of historical spawn timing. If enough spawn is documented and funding allows, the department may conduct a spawn deposition survey.

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 herring sac roe gillnet fishery (5 AAC 27.160 [f]). Since the inception of the herring 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 herring sac roe fishery (Table 2). Herring biomass estimates did not meet the minimum threshold to allow fisheries in 2001–2004, 2006, 2007, and 2011–2021.

In 2021, 13 aerial surveys were conducted, 3.5 nmi of herring spawn was observed in Hobart Bay, another 0.5 nmi was observed in Port Houghton, no herring or spawn were observed in Windham Bay. A spawn deposition survey was not conducted as the spawn observed in 2021 was limited in extent and duration. Therefore, no biomass forecast was developed for 2022. In 2022, the department will monitor Hobart/Houghton stock through the duration of historical spawn timing. If enough spawn is documented and funding allows, the department may conduct a spawn deposition survey.

PURSE SEINE FISHERIES

Until 2018, there were 2 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 Table 3.

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 spring of 2021, the biomass of mature herring returning to Sitka Sound was estimated by the ASA model to be 245,302 tons which was above the 210,453 tons forecasted to return. The 2022 ASA forecast of mature herring biomass is 225,820 tons. The final GHL for the 2022 Sitka Sound herring fishery is 45,164 tons. This GHL is based on a 20% harvest rate. No reductions have been made to the GHL as was done in the previous 2 years to buffer against uncertainty surrounding the extremely large and partially mature 2016-year class. The consistent estimates of this large year class produced by observation and modeling for the past 3 years has reduced the department's concerns about uncertainty of the size of the cohort and thus a reduction to the 2022 GHL was not warranted. The forecasted age composition for Sitka Sound is 6% age-3, 26% age-4, 2% age-5, 59% age-6, 3% age-7, and 4% age-8+.

Herring distribution and roe quality will be monitored prior to and during fishing periods. Monitoring methods for 2022 will include aerial surveys, vessel sonar surveys, and test fishing. In 2022, the department will coordinate with industry vessels to conduct test fishing as necessary to determine the size of the herring and 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 specific areas open to fishing will depend, in part, on the distribution of herring, the need to provide a reasonable opportunity for subsistence harvesters, and to provide for a fishery that will harvest good quality herring.

There is currently no agreement between the department and industry on the harvest strategy (i.e., competitive or noncompetitive fishery) for the 2022 fishery. Limitations on processing and tending capacity will require multiple openings to harvest this season's GHL. The total daily processing capacities for the 2022 season will not be determined until immediately prior to the fishery though it is expected to be around 2,000 tons per day. 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.

In March 2022, the department will hold a 2-hour notice meeting immediately prior to the fishery for reviewing the general guidelines and expectations, enforcement issues, and United States Coast Guard (USCG) safety concerns for the fishery. Additionally, at this meeting the department will review and discuss the herring assessment program, the results of the department's 2021 surveys and sampling, the 2022 forecast, and the harvest estimates for the 2021 herring roe on branch subsistence fishery. Due to COVID-19 concerns this meeting will be held virtually. Details for this meeting will be announced through the department's advisory announcement system.

In recent years, the 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.

SUBSISTENCE OPPORTUNITY

The department will continue to manage the commercial sac roe fishery consistent with 5 AAC 27.195 and will ensure that the basis's of its management decisions are appropriately documented. The regulation requires that the department distribute the commercial harvest by fishing time and area if it determines that doing so is necessary to ensure a reasonable opportunity for subsistence users to harvest the amount of herring spawn necessary for subsistence uses. Additionally, the regulation requires that the department consider the quality and quantity of herring spawn on branches, kelp, and seaweed, as well as herring sac roe when making management decisions regarding the subsistence herring spawn and commercial sac roe fisheries in Sitka Sound.

The department has implemented 5 AAC 27.195 in the past by, among other management measures, observing the closure of the most commonly utilized traditional subsistence fishing areas to commercial fishing, directing commercial openings farther away from the closed areas when deemed necessary, assessing the amount of herring biomass returning to Sitka Sound during the fishing season, sampling herring inseason for size, sex, and maturity to direct the commercial fishery away from unmarketable fish, and implementing a more conservative harvest rate strategy in the commercial fishery. The department will continue to review and analyze whether these measures are adequate in providing for reasonable opportunity for subsistence users to harvest an amount of herring spawn necessary for subsistence, or if additional actions are warranted given the size and inseason distribution of the forecasted herring biomass. The department will document its decisions in a manner that —consistent with public records laws, regulations, and departmental confidentiality and privilege obligations— will permit third-party review.

Closed waters in Sitka Sound encompass approximately 16.5 square nmi and encompass the core subsistence area (Figure 4; Sill and Lemons 2021). In 2012, the board established 10 square nmi of closed waters for the Sitka Sound commercial herring sac roe fishery for the purpose of reducing conflict between commercial and subsistence users and to ensure reasonable opportunity for subsistence users to harvest the amount necessary for subsistence. In 2018, the board expanded these closed waters by approximately 6.5 square nmi. If inseason surveys show that herring are abundant within or near the waters closed to the commercial sac roe fishery, the likelihood of herring spawning in the closed area is increased, and the department will take such data into consideration when making management decisions consistent with 5 AAC 27.195.

The conservative nature of the harvest rate strategy (i.e., combination of sliding scale harvest rate and threshold) ensures that a substantial portion of the spawning biomass of herring is left unharvested and increases the likelihood that subsistence harvesters have a reasonable opportunity to harvest quality herring spawn. Because the harvest rate strategy becomes more conservative the closer the herring biomass is to the threshold, more protection is given to the herring stock and therefore to subsistence harvesters' reasonable opportunity when the herring stock size is smaller. The harvest rate strategy was first implemented in Sitka Sound in 1983. Specific harvest rate and threshold values were established in 1998 and revised in 2009 (Hebert 2021). Sitka Sound's harvest rate strategy has been considered conservative not only because an analysis determined that a fixed 20% harvest rate was sustainable at any stock level that is above a threshold based on 25% of unfished biomass, but also because, as an extra precaution, it reduces the harvest rate on a sliding scale to 12% as the stock nears the threshold. The threshold, based on 25% of unfished biomass, was estimated to be 16,759 tons in 1998; however, to address subsistence concerns the board established a threshold of 20,000 tons, which was 30% of unfished biomass. Due to additional concerns expressed by subsistence users, the board raised the threshold again in 2012 to 25,000 tons (37% unfished biomass). Within this overarching harvest threshold and harvest level framework, the department will make time and area adjustments in the commercial fishery to maximize the quality of the herring, to avoid harvest beyond daily targets, and to prevent exceeding the established GHL.

If the department determines that either a reasonable opportunity in the subsistence roe fishery will not be achieved through the implementation of existing regulations or that commercial activity will not permit adequate quality and quantity of subsistence roe harvest, then the department will make those adjustments in fishing time and area for the commercial fishery that it believes will provide a reasonable opportunity for the subsistence harvest of quality roe on branch, kelp, or

seaweed. The department will meet these management directives, in part, by seeking out commercial harvest opportunities that are farthest from the waters closed to the commercial fishery that encompass core subsistence fishing areas. For example, if multiple commercial harvest opportunities are identified, the department will prioritize commercial harvest opportunities farthest from the commercial closed waters. Additionally, the department will implement discrete area closures in the vicinity of active herring spawn where it is evident there are subsistence roe on branch sets. The intent of these strategies is to reduce chances of disturbing herring schools located close to core subsistence harvest areas, to increase chances of herring spawning in those areas, and to increase the likelihood of quality of eggs on subsistence substrates such as hemlock branches. As noted above, the department will document its management decisions consistent with Alaska law, regulations, and department policies.

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LIST OF CONTACTS

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TABLES AND FIGURES

Table 1.–Southeast Alaska gillnet herring sac roe fisheries information summary for Seymour Canal and Revilla Channel, 1976–2021.

	Seymour Canal[a]				Revilla Channel[c]			
Year	GHL (tons)	Harvest(tons)[b]	Date 2-Hour Notice	Opening Dates	GHL (tons)	Harvest (tons)[d]	Date 2-Hour	Opening Dates
1976	200	194	–	9-May	300	494	23-March	2-April
1977	500	485	4-May	9-May	800	776	29-March	1-April
1978	500	729	2-May	8-May	680	171	26-March	4-April
1979	250	269	3-May	3-May	585	524	28-March	29-March
1980	0	No Fishery	NA	NA	1,100	1,149	25-March	25-March
1981	600	615	28-April	28-April	1,550	1,871	20-March	20-March
1982	0	No Fishery	NA	NA	1,700	2,319	20-March	26-March
1983	0	No Fishery	NA	NA	2,500	3,113	23-March	24-March
1984	375	499	20-April	26-April	2,100	2,177	20-March	29-March
1985	0	No Fishery	NA	NA	2,300	2,159	28-March	29-March
1986	300	392	5-May	10-May	1,100	1,530	29-March	31-March
1987	419	302	1-May	5–6-May	1,200	1,452	24-March	26,27-March
1988	530	586	20-April	26-April–1-May	953	1,145	24-March	25-March
1989	332	541	21-April	28-April	647	595	20-March	20,21-March
1990	312	359	21-April	28–29-April	0	No Fishery	NA	NA
1991	0	No Fishery	NA	NA	680	660	28-March	8–11-April
1992	0	No Fishery	NA	NA	1,200	1,246	1-April	3-April
1993	0	No Fishery	NA	NA	717	737	31-March	10-April
1994	368	374	28-April	29-April	880	730	9-April	9,11-April
1995	316	319	30-April	14-May	630	610	11-April	12-April
1996	0	No Fishery	NA	NA	871	601	8-April	10-April
1997	0	No Fishery	NA	NA	912	1,159	6-April	6-April
1998	633	585	30-April	1–4-May	620	616	1-April	1-April
1999	595	706	30-April	30-April	870	0	NA	NA
2000	346	389	3-May	5-May	ND	No Fishery	NA	NA
2001	474	620	6-May	11–12-May	ND	No Fishery	NA	NA
2002	1,096	1,066	12-May	16–17-May	ND	No Fishery	NA	NA
2003	1,712	1,519	28-April	29-April–2-May	ND	No Fishery	NA	NA
2004	838	804	1-May	3-May	ND	No Fishery	NA	NA
2005	894	945	26-April	1-May	ND	No Fishery	NA	NA

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Table 1.–Page 2 of 2.

	Seymour Canal[a]				Revilla Channel[c]			
Year	GHL (tons)	Harvest(tons)[b]	Date 2-Hour Notice	Opening Dates	GHL (tons)	Harvest (tons)[d]	Date 2-Hour Notice	Opening Dates
2006	1,508	1,187	28-Apr	4–7-May	ND	No Fishery	NA	NA
2007	1,292	1,219	8-May	13–14-May	ND	No Fishery	NA	NA
2008	1,205	1,208	6-May	10–11-May	ND	No Fishery	NA	NA
2009	1,471	866	29-Apr	30-April–2-May	ND	No Fishery	NA	NA
2010	657	710	24-Apr	24–25-April	ND	No Fishery	NA	NA
2011	835	Confidential	25-Apr	26-April	ND	No Fishery	NA	NA
2012	1,287	0	23-Apr	NA	ND	No Fishery	NA	NA
2013	1,014	649	6-May	8–11-May	ND	No Fishery	NA	NA
2014	772	Confidential	30-Apr	30-April–9-May	ND	No Fishery	NA	NA
2015	0	No Fishery	NA	NA	ND	No Fishery	NA	NA
2016	584	No Fishery	NA	NA	ND	No Fishery	NA	NA
2017	ND	No Fishery	NA	NA	ND	No Fishery	NA	NA
2018	ND	No Fishery	NA	NA	ND	No Fishery	NA	NA
2019	ND	No Fishery	NA	NA	ND	No Fishery	NA	NA
2020	ND	No Fishery	NA	NA	ND	No Fishery	NA	NA
2021	ND	No Fishery	NA	NA	ND	No Fishery	NA	NA

Note: ND identifies where no data was available, and NA identifies where it was not applicable due to no fishery occurring.

[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 herring sac roe fisheries information summary for Hobart/Houghton and West Behm Canal, 1977–2021.

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		Hobart/Houghton				West Behm Canal			
		Harvest (Tons)[b]							
Year	GHL (tons)[a]	Bait	Roe	Date 2-Hour Notice Effective	Opening Dates Bait/Sac Roe	GHL (tons)	Harvest (tons)	Date 2-Hour Notice Effective	Opening Dates
1977	ND	40	NA	NA	1-Oct	–	–	–	–
1978	ND	No Fishery	–	NA	NA	–	–	–	–
1979	ND	No Fishery	–	NA	NA	–	–	–	–
1980	ND	No Fishery	–	NA	NA	–	–	–	–
1981	ND	No Fishery	–	NA	NA	–	–	–	–
1982	ND	No Fishery	–	NA	NA	–	–	–	–
1983	ND	No Fishery	–	NA	NA	–	–	–	–
1984	ND	No Fishery	–	NA	NA	–	–	–	–
1985	ND	No Fishery	–	NA	NA	–	–	–	–
1986	ND	No Fishery	–	NA	NA	–	–	–	–
1987	ND	No Fishery	–	NA	NA	–	–	–	–
1988	ND	No Fishery	–	NA	NA	–	–	–	–
1989	ND	No Fishery	–	NA	NA	–	–	–	–
1990	ND	No Fishery	–	NA	NA	–	–	–	–
1991	ND	No Fishery	–	NA	NA	–	–	–	–
1992	200	0	–	–	13-Jan, 92	–	–	–	–
1993	500	0	–	–	12-Jan, 93	–	–	–	–
1994	230	140	–	–	17-Oct, 93	–	–	–	–
1995	250	229	–	–	1-Oct, 94	–	–	–	–
1996	700	230	–	–	15-Oct, 95	–	–	–	–
1997	550	104	442	19-April	1-Oct, 96–28–Apr, 97	–	–	–	–
1998	260	0	351	19-April	1-Oct, 97–20–Apr, 98	–	–	–	–

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Table 2.–Page 2 of 2

Year	Hobart/Houghton GHL (tons)[a]	Harvest (Tons)[b] Bait	Harvest (Tons)[b] Roe	Date 2-Hour Notice Effective	Opening Dates Bait/Sac Roe	West Behm Canal GHL (tons)	Harvest (tons)	Date 2-Hour Notice Effective	Opening Dates
1999	436	0	506	25-April	14-Oct, 98–26-Apr, 99	–	–	–	–
2000	418	432	0	NA	19-Dec, 99–28-Feb, 00	–	–	–	–
2001	0	No Fishery	No Fishery	NA	NA	–	–	–	–
2002	0	No Fishery	No Fishery	NA	NA	–	–	–	–
2003	0	No Fishery	No Fishery	NA	NA	Fishery set for 2004 by Board of Fisheries			
2004	0	No Fishery	No Fishery	NA	NA	940	No Fishery	NA	NA
2005	223	0	204	24-April	24-April	0	No Fishery	NA	NA
2006	0	No Fishery	No Fishery	NA	NA	0	No Fishery	NA	NA
2007	0	No Fishery	No Fishery	NA	NA	0	No Fishery	NA	NA
2008	462	0	302	2-May	8–9-May	0	No Fishery	NA	NA
2009	376	0	341	22-April	2–3-May	ND	No Fishery	NA	NA
2010	345	0	302	22-April	23–24-April	0	No Fishery	NA	NA
2011	0	No Fishery	No Fishery	NA	NA	1,276	confidential	11-April	11–14-April
2012	0	No Fishery	No Fishery	NA	NA	758	No Fishery	5-April	No Fishery
2013	0	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA
2014	0	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA
2015	0	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA
2016	ND	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA
2017	ND	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA
2018	ND	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA
2019	ND	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA
2020	ND	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA
2021	ND	No Fishery	No Fishery	NA	NA	ND	No Fishery	NA	NA

Note: En dashes indicate regulatory framework for a fishery had not been established or had been rescinded; ND identifies where no data was available, and NA identifies where it was not applicable due to a fishery not occurring.

[a] Hobart/Houghton was opened to herring sac roe set gillnet fishing in 1997.

[b] Hobart/Houghton gillnet quota is the portion of GHL left after the winter bait fishery is completed.

Table 3.–Southeast Alaska purse seine sac roe herring fisheries information summary, 1976–2021.

	Juneau-Lynn Canal[a]						Sitka Sound			
		Harvest (tons) by Gear Type[c]		Date 2-Hour Notice Was Effective	Opening Dates by Gear Type					
Year	GHL (tons)[b]	Seine	Gillnet		Seine	Gillnet	GHL (tons)	Harvest (tons)[d]	Date 2-Hour Notice Was Effective	Opening Dates
1976	650	432	124	NA	26-April	29-April	780	800	10-April	16-April
1977	875	709	211	NA	19-April	20-April	0	No Fishery	NA	NA
1978	820	602	363	19-April	20-April	21-April	250	234	4-April	5-April
1979	120	No Fishery	No Fishery	NA	NA	NA	2,800	2,255	7-April	12-April
1980	600	975	–	13-April	26-April	–	4,000	4,445	4-April	4, 5-April
1981	725	775	–	17-April	23-April	–	3,000	3,506	23-March	24, 26-March
1982	400	551	–	30-April	30-April	–	3,000	4,363	26-March	30-March
1983	0	NA	–	NA	NA	–	5,500	5,450	23-March	26, 29-March
1984	0	NA	–	NA	NA	–	5,000	5,830	22-March	26–28-March
1985	ND	NA	–	NA	NA	–	7,700	7,475	24-March	29-March, 1, 5-April
1986	0	NA	–	NA	NA	–	5,029	5,442	28-March	2, 8-April
1987	0	NA	–	NA	NA	–	3,600	4,216	23-March	31-March
1988	0	NA	–	NA	NA	–	9,200	9,390	25-March	4–14-April
1989	ND	NA	–	NA	NA	–	11,700	11,714	23-March	31-March–8-April
1990	ND	NA	–	NA	NA	–	4,150	3,804	4-April	5, 6-April
1991	0	NA	–	NA	NA	–	3,200	1,838	29-March	10–13-April
1992	ND	NA	–	NA	NA	–	3,356	5,368	30-March	6-April
1993	ND	NA	–	NA	NA	–	9,700	10,186	26-March	27-March– 3-April
1994	ND	NA	–	NA	NA	–	4,432	4,758	28-March	29, 31-March
1995	ND	NA	–	NA	NA	–	2,609	2,908	23-March	25, 27-March
1996	ND	NA	–	NA	NA	–	8,144	8,144	23-March	23-March, 31-March–8-April
1997	ND	NA	–	NA	NA	–	10,900	11,147	18-March	18–23-March
1998	ND	NA	–	NA	NA	–	6,900	6,638	16-March	16, 18, 19-March

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Table 3.–Page 2 of 2.

Year	Juneau-Lynn Canal[a]				Sitka Sound			
	GHL (tons)[b]	Harvest (tons)[c]	Date 2-Hour Notice Was Effective	Opening Dates	GHL (tons)	Harvest (tons)[d]	Date 2-Hour Notice Was Effective	Opening Dates
1999	ND	NA	NA	NA	8,476	9,218	19-March	22, 24, 26, 27-March
2000	ND	NA	NA	NA	5,120	4,630	13-March	19, 22-March
2001	ND	NA	NA	NA	10,597	11,972	15-March	22, 26, 27-March
2002	ND	NA	NA	NA	11,042	9,788	25-March	27,29,31-March, 2,12–15-April
2003	ND	NA	NA	NA	6,969	7,050	20-March	22, 23, 26-March
2004	0	NA	NA	NA	10,618	10,492	19-March	21, 25, 27-March
2005	0	NA	NA	NA	11,192	11,366	20-March	23, 25, 27–29-March
2006	0	NA	NA	NA	10,412	9,967	23-March	24, 26, 27, 29-March
2007	0	NA	NA	NA	11,904	11,571	24-March	26, 30-March, 1, 3-April
2008	0	NA	NA	NA	14,723	14,386	24-March	25, 26, 31-March
2009	0	NA	NA	NA	14,508	14,776	22-March	22, 24, 28, 31-March, 1-April
2010	145	No Fishery	NA	NA	18,293	17,602	19-March	24, 27, 30-March, 2-April
2011	ND	NA	NA	NA	19,490	19,419	28-March	31-March, 1,4,7,9-April
2012	0	NA	NA	NA	28,829	13,232	27-March	31-March, 2, 7-April
2013	3,030	No Fishery	NA	NA	11,549	5,688	25-March	27, 28, 30-March, 3-April
2014	0	NA	NA	NA	16,333	16,957	20-March	20, 23, 26, 29-March
2015	0	NA	NA	NA	8,712	8,756	18-March	18–25-March
2016	ND	NA	NA	NA	14,941	9,769	17-March	17, 19, 23-March
2017	ND	NA	NA	NA	14,649	13,923	17-March	19, 22, 25, 27, 28-March
2018[e]	–	–	–	–	11,128	2,926	20-March	25, 26-March
2019	–	–	–	–	12,869	0	15-March	No Fishery
2020	–	–	–	–	25,824	0	NA	No Fishery
2021	–	–	–	–	33,304	15,578	20-March	27-March–9-April

Note: En dashes indicate regulatory framework for a fishery had not been established or had been rescinded; ND identifies where no data was available, and NA identifies where it was not applicable due to a fishery not occurring.

[a] The Juneau-Lynn Canal fishery was seine, gillnet and bait pound area prior to 1980. Alaska Board of Fisheries rescinded provisions for gillnet in 1979.

[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.

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

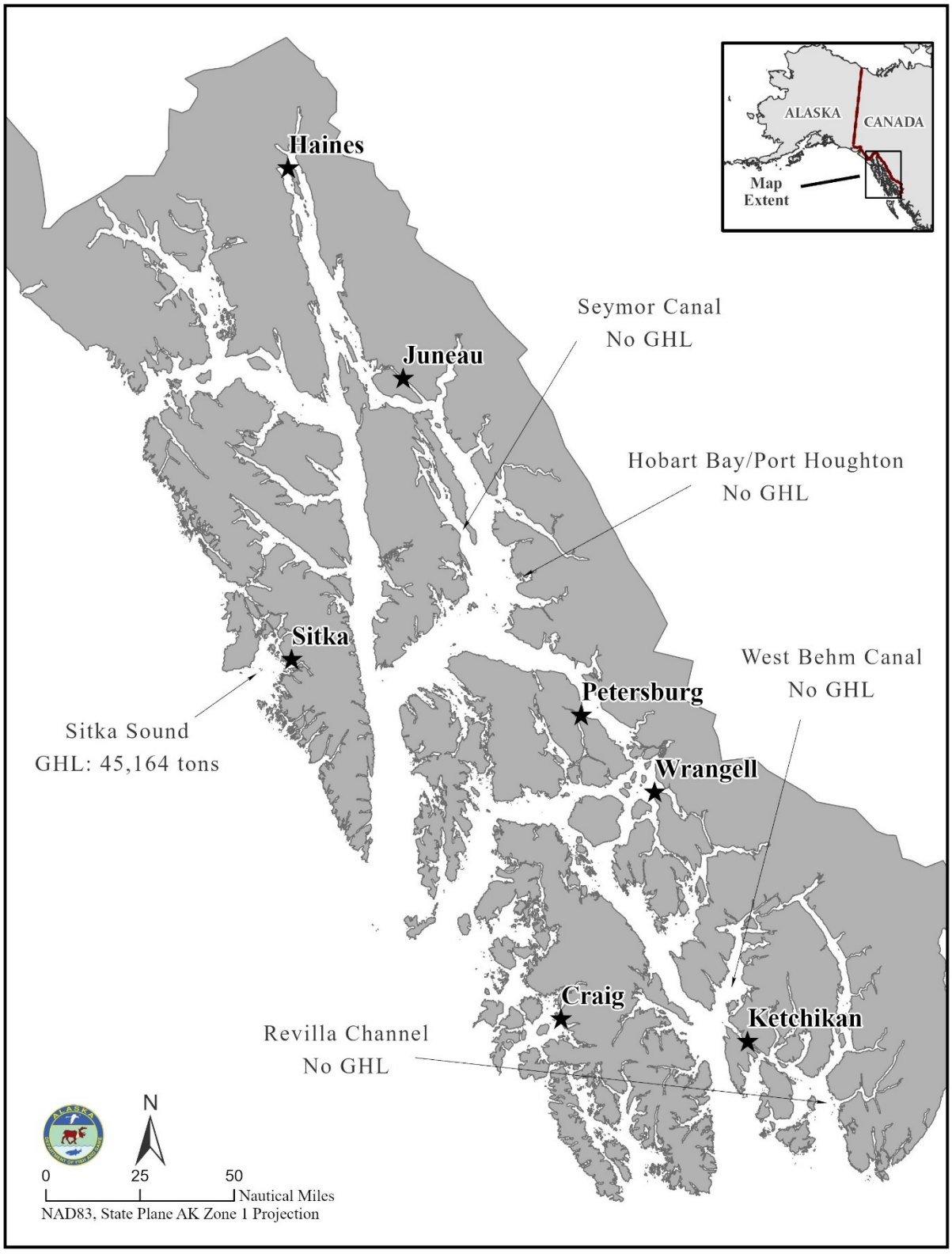

Figure 1.–Southeast Alaska sac roe herring areas and guideline harvest levels for 2022.

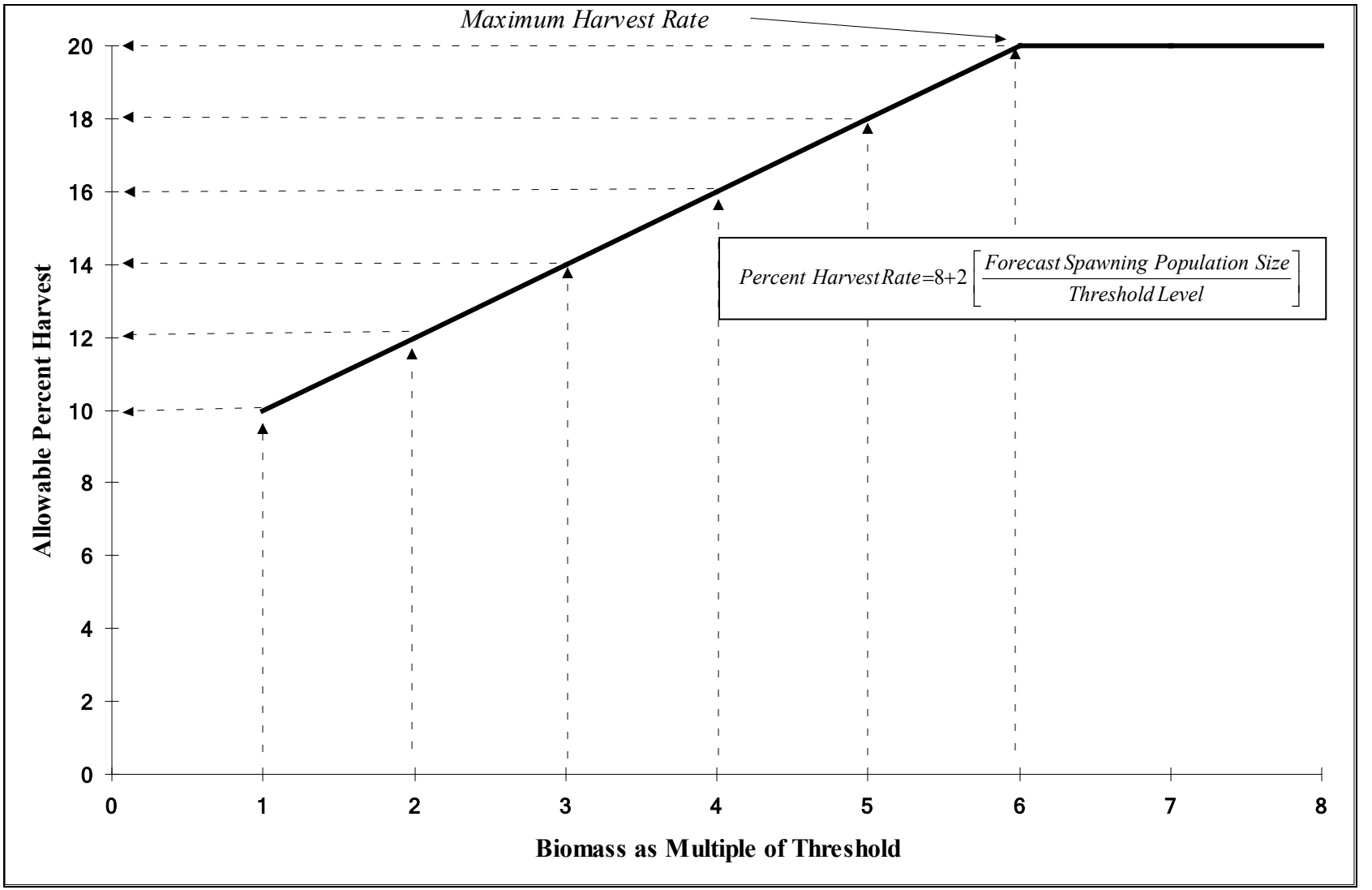

Figure 2.–Generalized harvest strategy for Southeast Alaska herring (excluding Sitka Sound). The allowable percent annual harvest is plotted against the estimated biomass of mature herring expressed as a multiple of the established harvest threshold level.

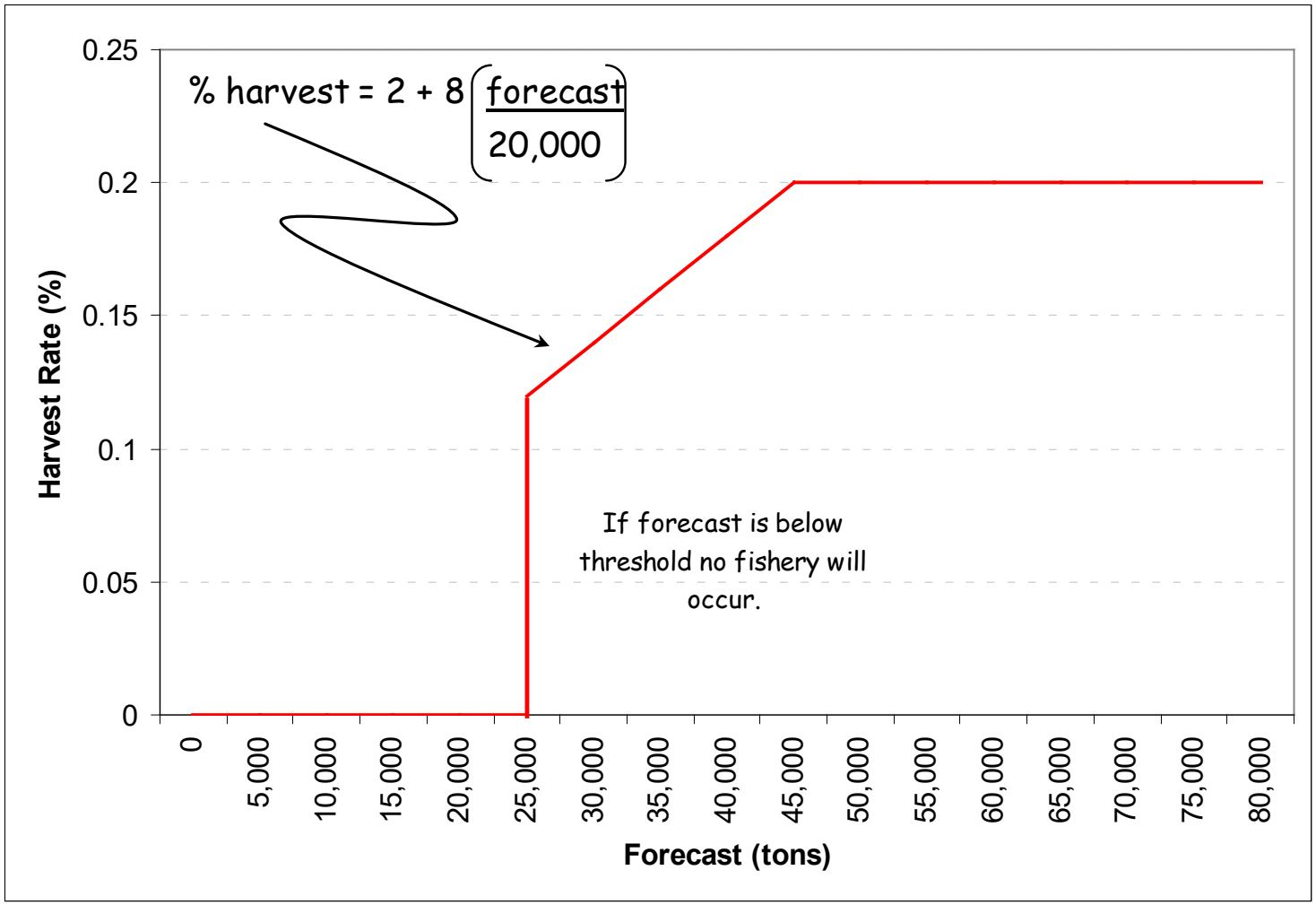

Figure 3.–Harvest rate and formula for Sitka Sound under 25,000-ton minimum threshold level (5 AAC 27.160 [g]).

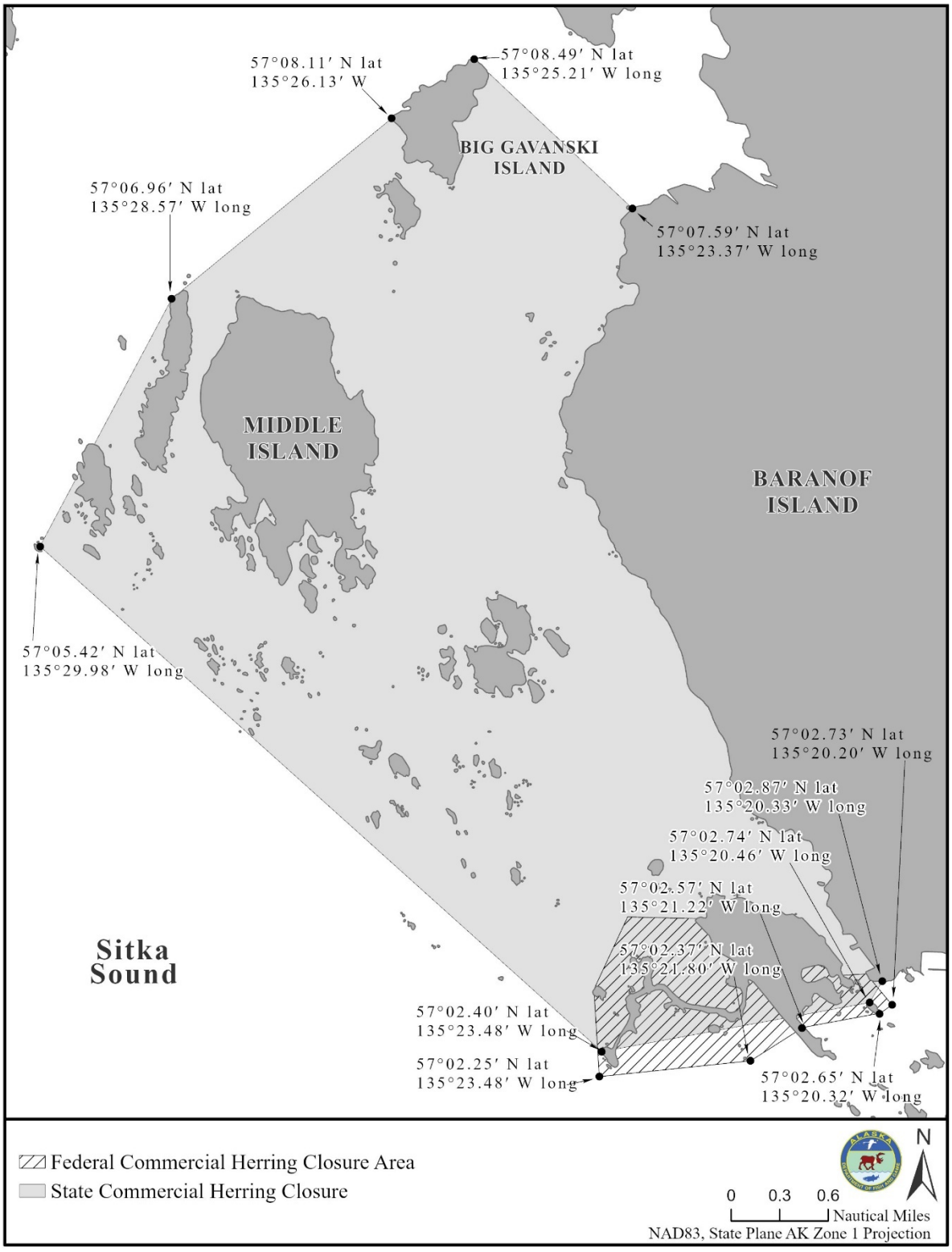

Figure 4.–Map showing area in Sitka Sound closed to commercial herring harvest.