Fishery Management Report No. 24-33

Southeast Alaska–Yakutat Management Area Herring Fisheries Management Report, 2020–2023

by

Kyle Hebert

December 2024

Alaska Department of Fish and Game **Divisions of Sport Fish and 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

FISHERY MANAGEMENT REPORT NO. 24-33

SOUTHEAST ALASKA–YAKUTAT MANAGEMENT AREA HERRING FISHERIES MANAGEMENT REPORT, 2020–2023

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ABSTRACT

Pacific herring in Southeast Alaska and Yakutat are harvested for subsistence, personal use, and commercial purposes. Subsistence products include whole herring and spawn on branches or kelp; commercial fisheries occur for food/bait, sac roe, and spawn on kelp. At times, the Alaska Department of Fish and Game conducts test fisheries for research and cost recovery. Commercial fisheries account for most harvest, which peaked during the reduction fishery in 1929/30 with 78,749 tons. Large-scale reduction fisheries operated during the 1890s through 1967. A winter bait fishery has generally occurred every year since the beginning of the 20th century. The sac roe fishery became the dominant fishery beginning in 1971. A wild spawn-on-kelp fishery occurred between 1963 and 1969, with a closed pound fishery authorized by the Alaska Board of Fisheries beginning in 1990. The management strategy for herring combines a sliding-scale harvest rate and minimum biomass threshold to determine allowable harvest levels. Harvest rates may be set between 10% and 20% of forecasted mature biomass when above threshold, except in Sitka Sound where harvest rates may be set between 12% and 20%.

Keywords: commercial herring harvest, commercial bait, commercial sac roe, commercial spawn on kelp, subsistence, personal use fisheries, Southeast Alaska, Yakutat

INTRODUCTION

The focus of this report is historical harvests and management actions for commercial herring fisheries in Southeast Alaska and Yakutat (Region I) through the 2022/23 season. The Southeast Alaska Region is a composite of 2 registration areas. Area A, the Southeast Alaska area, encompasses the waters south of Cape Fairweather and north of the International Boundary at Dixon Entrance. Area D, the Yakutat area, extends west from Cape Fairweather to Cape Suckling (Figure 1). Commercial winter bait, sac roe, spawn-on-kelp, and bait pound fisheries occur in only the Southeast Alaska area. Pound fisheries are any fishery that captures herring, typically with a purse seine, and temporarily holds the fish alive in impoundments or "pounds" until herring or eggs are harvested or released. The commercial fishing season is generally defined as October 1 through September 30, the winter food and bait fishery season is from October 1 through February 28, and fisheries for sac roe or spawn on kelp are opened by emergency order only. Only a winter bait season is provided by regulation in the Yakutat area. In addition, both subsistence and personal use harvesting of herring and herring eggs on various substrates such as branches, kelp, and other seaweed occur in both areas.

HISTORY OF THE HERRING FISHERY

Pacific herring *Clupea pallasii* spawning stocks are found throughout Southeast Alaska, varying greatly in size and productivity. In general, herring stocks that spawn in the outer coastal areas are larger and appear to be more stable than those spawning in inside waters. Subsistence uses of herring and herring eggs by Alaska Natives have existed in Southeast Alaska for thousands of years and herring have held a great deal of cultural importance (Sill and Lemons 2020). Beginning in the 1880s, herring were first commercially harvested for salting operations. From the 1890s to the mid-1960s, commercial catch was used primarily to supply herring for reduction to meal and oil. The reduction fishery occurred on mixed aggregates of herring that were feeding during the summer months. The reduction fishery peaked during the 1920s and 1930s when annual harvests commonly exceeded 50,000 tons (Table 1). The reduction industry was phased out in the mid-1960s due to a decline in herring abundance and the development of the Peruvian anchovy reduction industry.

Southeast Alaska herring have historically supplied bait for Alaska commercial longline and pot fisheries. This harvest occurs on discrete wintering schools in major bays and inlets during the fall and winter months, a time when bait quality is best. All the bait harvest is taken by purse seine

gear. Relatively small quantities of herring have been harvested for fresh bait pounds. Existing regulations provide for a tray pack bait fishery designed to produce a sport and commercial troll bait product; however, very little harvest has occurred for this purpose in recent years.

Currently, most of the annual herring harvest is taken in the spring commercial sac roe fishery, which developed in the early 1970s (Table 2). The sac roe fishery takes herring immediately prior to and during the first stages of spawning when egg maturity is highest, using either purse seines or gillnets. Each gear type requires a separate limited entry commercial fishing permit. A commercial wild spawn-on-kelp fishery occurred during the 1960s; however, this fishery was phased out in 1969. A commercial herring spawn-on-kelp pound fishery was approved by the Alaska Board of Fisheries (BOF) beginning in the spring of 1990 in Hoonah Sound. In 1992, the BOF created another commercial spawn-on-kelp pound fishery for the Craig/Klawock area, and in 2003 the BOF created spawn-on-kelp pound fisheries in Ernest Sound and Tenakee Inlet.

Herring continue to be important for subsistence and personal use. Traditional subsistence and personal use catches have included herring, spawn on branches, and spawn on kelp. Only spawn-on-kelp harvest requires a permit. There is no closed season, and a wide range of gear types may be used.

The commercial utilization of Southeast Alaska herring resources has been historically controversial, and that remains true today. Although subsistence and personal use harvests constitute a minor portion of the total annual take, they are considered very important to the lifestyle and culture of residents. Commercial harvesting is perceived by much of the public to have a large impact on the local availability of herring and herring spawn, because herring are important prey for many marine animals. Healthy herring populations are generally viewed as necessary for ensuring healthy populations of predatory fish (e.g., salmon and halibut), other marine life (e.g., marine birds), and several species of marine mammals (e.g., whales and sea lions).

MANAGEMENT STRATEGY

The following management plan forms the regulatory basis for all Southeast Alaska commercial herring fisheries and was formalized at the January 1994 BOF meeting.

5 AAC 27.190. *Herring Management Plan for Southeastern Alaska Area*

For the management of herring fisheries in the Southeastern Alaska Area, the Alaska Department of Fish and Game (ADF&G)

(1) shall identify stocks of herring on a spawning area basis;

(2) shall establish minimum spawning biomass thresholds below which fishing will not be allowed;

(3) shall assess the abundance of mature herring for each stock before allowing fishing to occur;

(4) except as provided elsewhere, may allow a harvest of herring at an exploitation rate between 10 percent and 20 percent of the estimated spawning biomass when that biomass is above the minimum threshold level;

(5) may identify and consider sources of mortality in setting harvest guidelines; and

(6) by emergency order, may modify fishing periods to minimize incidental mortalities during commercial fisheries.

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

A *threshold level* is the minimum mature herring biomass needed to allow sustained yield and maintain biological productivity, and below which commercial fisheries are not allowed. Threshold levels have been established for each of the winter bait, sac roe, and spawn-on-kelp pound spawning stocks. Threshold levels are based on all available data and may be evaluated and revised over time. Current threshold levels in Southeast Alaska (i.e., not including Yakutat) vary from 2,000 to 25,000 tons of mature herring for the commercial sac roe, winter bait, and spawn-on-kelp fisheries (Table 3).

For most stocks in the region, threshold levels were determined based on historical biomass levels and the minimum guideline harvest level (GHL) for which a commercial fishery could be reliably managed. For some stocks, threshold levels were set at 25%—or more—of the estimated unfished (pristine) biomass, as estimated using computer simulations. These stocks include Sitka Sound, Tenekee Inlet, and West Behm Canal. Threshold levels for all stocks were not set using 25% of pristine biomass because of inadequate data time series or higher analytical priorities. In 1997, ADF&G conducted an analysis for Sitka Sound that estimated 25% of pristine biomass to be 16,800 tons. To acknowledge concerns raised for subsistence needs, the BOF chose to set the threshold at 20,000 tons rather than 16,800 tons. In 2009, the BOF further increased the threshold to 5,000 tons in response to additional concerns for subsistence needs. Sitka Sound is the only stock for which the threshold is codified in regulation.

Herring spawning stocks with a biomass of fewer than 2,000 tons are not considered for harvesting in the Southeast Alaska winter bait, sac roe, or spawn-on-kelp fisheries. Under the current approach for setting seasonal harvest limits, herring spawning stocks of 2,000 tons of adult fish would allow for an annual harvest of 200 tons of herring. Reliably managing for GHLs below this level would be difficult because the number of fishery permit holders—and thus fishing effort levels—could be too high. The exception is the Yakutat winter bait fishery (outside of Yakutat Bay, and closed to commercial herring fishing), where the spawning threshold is 1,000 tons, and lower effort would be expected.

ALLOWABLE HARVEST RATES

Annual harvest limits are based on a graduated scale that allows for higher harvest rates as the forecasted mature herring population increases relative to the threshold level (Figure 2). The approach allows for an annual harvest rate of 10–20% (for Sitka Sound 12–20%) when the forecasted spawning biomass is at or above established threshold levels. No commercial harvest is allowed if the forecasted spawning biomass is less than the threshold. For all areas except Sitka Sound, when the forecasted spawning biomass is at the threshold level, a 10% harvest is allowed and the harvest rate increases 2% for each increase in spawning biomass of an amount equal to the threshold level. The harvest rate reaches a maximum of 20% when the stock is 6 times the threshold level. For Sitka Sound, when the spawning stock is forecasted to be at the threshold of 25,000 tons, the allowable harvest rate is 12%; this increases by 8% with each increase in spawning biomass of an amount equal to the threshold level. This results in a maximum harvest rate of 20% when the forecasted spawning biomass is twice the threshold. A more rapidly increasing graduated harvest rate was established for Sitka Sound to reduce impacts to the commercial fishery when the BOF increased the threshold from 7,500 to 20,000 tons in 1997. Although allowable harvest rates are applied to forecasted biomass to calculate GHLs, fishery managers have the discretion to reduce

harvest levels inseason if warranted, such as when observations of herring abundance do not appear to meet forecast expectations.

In Southeast Alaska and Yakutat, the maximum allowable harvest rate is 20%, which was based on a study that used computer simulations with data of Pacific herring from Prince William Sound and from the eastern Bering Sea (Zheng et al. 1993). The study compared how populations would respond to a wide range of harvest rate and biomass threshold combinations. Harvest rates and threshold levels need to be considered jointly; with higher harvest rates, higher thresholds are necessary to protect populations. To minimize the risk of population collapse, maximize yield, minimize variation in yield, and maintain the maximum 20% harvest rate that had been used historically, the study recommended an optimal threshold range of 15–25% of the estimated average unfished biomass (i.e., the biomass prior to substantial exploitation of a population). Considering these goals together resulted in much lower exploitation rates than those under maximum sustainable yield, with much less annual variation and much lower probability of population collapse and fishery closures. Additionally, because a single-species model was used for this analysis, which did not consider interactions between species, the use of the upper value (25%) in the threshold range was recommended as a precaution for the ecosystem. For some Southeast Alaska herring stocks (Sitka Sound, West Behm Canal, and Tenakee Inlet), thresholds were based on a minimum of 25% of estimated unfished biomass, whereas thresholds for all others were set based on historical fished biomass levels because a threshold analysis has not been conducted.

The current harvest rate strategy (i.e., the combination of sliding scale harvest rate and threshold) has been considered conservative for herring stocks in Southeast Alaska and was first implemented in 1983. For the Sitka herring population, the specific harvest rate and threshold values were revised and implemented in 1998 and in 2009. The maximum harvest rate allowed under the harvest rate strategy used for Sitka and all other Southeast Alaska herring stocks is consistent with most other herring fisheries in Alaska and along the west coast of North America. This harvest rate strategy has been considered conservative, in part because although analysis determined that a fixed 20% harvest rate was sustainable at any stock level above threshold, the inclusion of a sliding scale reduces the harvest rate to 10% as stocks near the threshold. However, more recent research in British Columbia and elsewhere suggests that harvest rates and threshold levels may need to be reevaluated to better avoid states of low biomass and low productivity, and to allow populations to recover from such states (Clearly et al. 2010). In particular, research indicates that harvest rates of 20% may not be effective at allowing stocks in low-productivity states to rebuild, and that thresholds in British Columbia should be set high enough so that the probability of the population falling below 30% of pristine biomass is low (Clearly et al. 2010).

Despite a consistent harvest rate strategy, herring populations in Southeast Alaska have experienced periods of level, increasing, and decreasing abundance. For instance, the spawning biomass in Sitka was stable from 1980 to 1994 under a mean exploitation rate (i.e., realized from harvest; not a target) of 15%; increased from 1995 to 2009 under a mean exploitation rate of 14%; and decreased from 2010 to 2017 under a mean exploitation rate of 17%. The exploitation rate in the latter period would have been about 21% if the GHL had been achieved for all years. The target harvest rate in the latter 2 periods was 20%. Considering the similarity of the exploitation rates over the 3 periods, the population underwent large fluctuations. It is probable that changes in ocean conditions played a significant role affecting population growth. Similar increases in the mid-1990s and decreases in the mid- to-late 2000s in Craig and Seymour Canal also suggest that large-

scale environmental conditions have influenced these herring populations. In recent years, several populations in Southeast Alaska have declined. The sustained increases observed between the mid-1990s and approximately 2011 suggest that the current harvest rate strategy did not constrain population growth, at least under the ocean conditions during those years. However, as ocean conditions continue to change, population growth patterns may not be the same as previously observed.

In general, herring populations may sustain higher harvest rates than longer-lived, slower-maturing species like sablefish or lingcod because their more frequent recruitment pulses and short lifespans allow populations to rebound more quickly when stocks are at low levels. However, precaution is necessary; environmental influences can force populations to lower stock size equilibria prematurely and with increasing frequency when there is harvest pressure. In addition, the consequences of low herring abundance may be widespread due to their key role in the ecosystem and importance to users of the resource.

Current allowable harvest levels were based on models that included average total natural mortality of herring over time, and therefore account for predation of herring by fish, marine mammals, and birds. The model that is used to estimate herring population levels does not break out natural mortality by specific predators because the quality of predator data is insufficient and modeling total natural mortality is probably more accurate than what could be obtained by separating into components attributable to predator species. Allowable harvest levels do not factor in changes to herring mortality that are caused by phenomena in the forecast year that are outside of historical patterns, such as sudden or unusual large influxes of new predators or reductions in prey items due to extreme ocean temperatures.

Most fishery scientists agree that herring and forage fish in general are important links in marine food webs, serving as prey for many species. Many people have raised concerns that commercial fisheries may have negative impacts on both predators of herring and the marine ecosystem if prudent and conservative fisheries management is not exercised. Scientists have reviewed forage fish harvest rate strategies as they pertain to the entire ecosystem and recommended that harvest rates for forage fish be limited to 50% of F_{MSY} (fishing mortality rate to maintain maximum sustainable yield) and that minimum biomass thresholds for fishing should be at least 40% pristine biomass to maintain adequate forage for other species (Pikitch et al. 2012). However, other scientists disagree and have countered that the studies behind these recommendations greatly overstate the impact on predators caused by fishing on forage fish (Hilborn et al. 2017). Nonetheless, there is general agreement that great care must be taken with commercial exploitation of forage fish to prevent unintended negative consequences to other marine species.

STOCK ASSESSMENT

Historically, there have been 2 direct observation methods for estimating herring biomass in Southeast Alaska: (1) egg deposition dive surveys and (2) vessel hydroacoustic surveys. When egg deposition surveys are used, the biomass estimate is based on data only from mature herring that spawned that season. Hydroacoustic surveys have not been used for comprehensive estimates of biomass since the 1993/94 season; the method is thought to be less reliable than egg deposition estimation, partly due to the difficulty differentiating between mature and immature herring. Beginning in 1994, ADF&G modified the primary method of forecasting herring abundance for major spawning aggregates in Southeast Alaska. Age-structured analysis (ASA), which relies on a time series of herring stock assessment data, was used to estimate and forecast herring biomass

for those spawning stocks with adequate historical data (Kah Shakes/Cat Island, Craig, Sitka Sound, Tenakee Inlet, and Seymour Canal). The ASA method has also been used to forecast spawning herring biomass in Southcentral Alaska, the Eastern Bering Sea, and British Columbia. Different forms of ASA models are also integral parts of the biomass assessment for most groundfish stocks in the Bering Sea and the Gulf of Alaska. The ASA method uses estimates of recruitment, age, growth, maturation, natural mortality, weight-at-age, spawning escapement, and catch to forecast herring abundance. Age and growth information is obtained by samples collected from test fishing, commercial harvests, midwater trawling (ADF&G survey), and sampling on the spawning grounds by ADF&G. Forecasts for herring in areas in Southeast Alaska where ASA modeling is not conducted have been computed using a biomass accounting method. This method applies estimates of growth and mortality from nearby stocks that are assessed with ASA models to the observed spawning biomass and age composition from the current year to produce a 1-year biomass forecast.

RECENT COMMERCIAL SEASON SUMMARIES

2020/21 SEASON SUMMARY

The 2020/2021 season commercial herring catch totaled approximately 19,393 tons of herring and herring equivalents (for spawn-on-kelp fisheries where herring are not landed but there is assumed mortality; Tables 1 and 2). The catch included 540 tons of winter bait herring, 15,578 tons of sac roe herring, and 262 tons of spawn on kelp (estimated at 3,275 tons of herring captured in spawn-on-kelp fisheries, based on an estimated ratio of 12.5 tons of herring per 1 ton of spawn-on-kelp product; Morstad and Baker 1995). Herring experience mortality during commercial spawn-on-kelp fisheries, either immediate or delayed, resulting from handling during capture and impoundment. Although herring are released from pounds after spawn-on-kelp fisheries, for stock assessment purposes a mortality rate of 75% is assumed. There were no herring caught in test fisheries conducted this season.

2020/21 Winter Food and Bait Fishery

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

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

Only 1 area was identified as having harvestable quantities of bait herring during the 2020/21 winter season: the Craig/Klawock area (Figure 3) with a bait GHL of 11,674 tons. This area was open to the commercial harvest of herring on October 1, 2020, and closed by regulation on February 28, 2021. A total of 540 tons of bait was harvested from this area (Table 4). No other bait areas were opened during the 2020/21 season because forecasts were not completed due to minimal observed spawn, or surveys were not conducted due to budgetary constraints.

2020/21 Test Fisheries

No test fisheries were conducted in Southeast Alaska during the 2020/21 season.

2020/21 Sac Roe Fishery

There was 1 sac roe fishery this season, in Sitka Sound, where catch totaled 15,578 tons (Table 5). Fisheries in other areas (Figure 4) were not conducted because forecasts were not completed due to minimal spawn observed, or surveys were not conducted due to budgetary constraints. The other sac roe areas include Seymour Canal, Kah Shakes/Cat Island, West Behm, and Hobart/Houghton.

2020/21 Herring Pound Fisheries

There are 3 types of herring impoundment or *pound* fisheries in Southeast Alaska: tray pack bait, fresh bait, and spawn on kelp. The tray pack pound fishery was created in 1979 when the BOF allocated a harvest of up to 100 tons. Fresh bait pounds have historically been allowed by regulation under a permit system in several areas (Figure 5). The conduct and management of the fresh bait and tray pack pound fisheries are essentially the same in that herring are impounded in net pens for a period of time to be sold as bait and both require a commissioner's permit. During the 2003 BOF meeting, the 2 fisheries were combined under 1 management plan, 5 AAC 27.180 and 5 AAC 27.160(b). There has been no participation or harvest in either of the fresh bait pound fisheries since the 2004/05 season (Table 6).

There are 4 spawn-on-kelp pound fisheries in Southeast Alaska, divided into 2 limited entry permit areas: Craig/Klawock and Ernest Sound in the Southern Southeast permit area (defined as Districts 1–8), and Hoonah Sound and Tenakee Inlet in the Northern Southeast permit area (defined as Districts 9–16; Figure 6). The commercial spawn-on-kelp pound fishery for the Craig/Klawock area was first conducted in the spring of 1992. The total herring GHL is shared with the bait fishery with 60% allocated to the bait fishery and 40% (plus any remaining bait allocation) allocated to the spawn-on-kelp fishery. The 60:40 allocation split was enacted in the 1997/98 season due to BOF action (at the January 1997 meeting) that changed the previous allocation of 85% for bait and 15% for spawn on kelp. The Hoonah Sound spawn-on-kelp fishery began in 1990 and is allocated 100% of the allowable commercial harvest.

During the BOF meeting in January 2003, 2 new herring spawn-on-kelp fisheries were created in Southeast Alaska: District 7 (Ernest Sound) and Section 12-A (Tenakee Inlet). The Ernest Sound fishery is considered part of the Southern Southeast spawn-on-kelp limited entry fishery, and Tenakee Inlet is considered part of the Northern Southeast spawn-on-kelp limited entry fishery. In both Ernest Sound and Tenakee Inlet, the spawn-on-kelp fishery is allocated any remaining GHL that is not harvested by the winter food and bait fishery or the bait pound fishery.

At past BOF meetings, proposals have been submitted requesting the creation of a spawn-on-kelp fishery in the Sitka Sound area. Currently, this stock is fully allocated to the sac roe purse seine fishery, and limited entry permits are authorized by the Commercial Fisheries Entry Commission (CFEC). However, because Sitka Sound falls within the area defined for Northern spawn-on-kelp fisheries, only holders of Northern spawn-on-kelp fishery permits would be eligible for a spawn-on-kelp fishery in Sitka Sound. The authority to modify eligibility rests with CFEC.

For the 2020/21 season, the only spawn-on-kelp fishery to open was for the Craig/Klawock area, where the allocation of herring was 18,916 tons (7,782 tons or 40% of the total area GHL of 19,456 tons, plus unharvested bait allocation of 11,134 tons). A total of 80 closed pounds (29 single, 48 double, and 3 triple permit) with herring were added during the 2020/21 season. The landings of spawn-on-kelp product totaled 262 tons (Table 7).

2021/22 SEASON SUMMARY

The 2021/2022 season commercial herring catch totaled approximately 27,907 tons of herring and herring equivalents (for spawn-on-kelp fisheries where herring are not landed but there is assumed mortality; Tables 1 and 2). The catch included 398 tons of winter bait herring, 25,090 tons of sac roe herring, and 194 tons of spawn on kelp (estimated at 2,419 tons of herring captured for spawn on kelp based on an estimated ratio of 12.5 tons of herring per 1 ton of spawn-on-kelp product; Morstad and Baker 1995). Herring mortality, either immediate or delayed, can occur from handling during capture and impoundment. Although herring are released from pounds after spawn-on-kelp fisheries, a mortality rate of 75% is assumed for stock assessment purposes. There was no sac roe herring harvested this season. There were no test fisheries conducted this season.

2021/22 Winter Food and Bait Fishery

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

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

Only 1 area was identified as having a harvestable surplus of bait herring during the 2021/22 winter season: the Craig/Klawock area (Figure 3) with a bait GHL of 7,590 tons. This area was open to the commercial harvest of herring on October 1, 2021, and closed by regulation on February 28, 2022. A total of 398 tons of bait was harvested from this area (Table 4). No other bait areas were opened during the 2021/22 season because forecasts were not completed due to minimal spawn observed or surveys were not conducted due to budgetary constraints.

2021/22 Test Fisheries

There were no test fisheries conducted in Southeast Alaska during the 2021/22 season.

2021/22 Sac Roe Fishery

There was 1 sac roe fishery this season in Sitka Sound, where catch totaled 25,090 tons (Table 5). Fisheries in other areas (Figure 4) were not conducted because forecasts were not completed due to minimal spawn observed or surveys were not conducted due to budgetary constraints. The other sac roe areas include Seymour Canal, Kah Shakes/Cat Island, West Behm, and Hobart/Houghton.

2021/22 Herring Pound Fisheries

For the 2021/22 season, the only spawn-on-kelp fishery to open was in the Craig/Klawock area, where the allocation was set at 12,252 tons (5,060 tons or 40% of the total area GHL of 12,650 tons, plus unharvested bait allocation of 7,192 tons). There were a total of 60 closed pounds (5 single permits, 51 double, and 4 triple) with herring on the grounds during the 2021/22 season. The landings of spawn-on-kelp product totaled 194 tons (Table 7).

2022/23 SEASON SUMMARY

The 2022/2023 season commercial herring catch totaled approximately 12,763 tons of herring and herring equivalents (for spawn-on-kelp fisheries where herring are not landed but there is assumed

mortality; Tables 1 and 2). The catch included 742 tons of winter bait herring, 10,199 tons of sac roe herring, and 128 tons of spawn on kelp. An estimated 1,598 tons of herring was captured in spawn-on-kelp fisheries, based on an estimated ratio of 12.5 tons of herring per 1 ton of spawn-on-kelp product (Morstad and Baker 1995). Although herring are released from pounds after spawn-on-kelp fisheries, for stock assessment purposes a mortality rate of 75% is assumed. There was 1 test fishery conducted this season, in Sitka Sound, where 224 tons of winter bait were landed.

2022/23 Winter Food and Bait Fishery

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

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

Only 1 area was identified as having harvestable quantities of bait herring during the 2022/23 winter season: the Craig/Klawock area (Figure 3) with a bait GHL of 4,657 tons. This area was open to the commercial harvest of herring on October 1, 2022, and closed by regulation February 28, 2023. A total of 742 tons of bait was harvested from this area (Table 4). No other bait areas were opened during the 2022/23 season because forecasts were not completed due to minimal spawn observed, or surveys were not conducted due to budgetary constraints.

2022/23 Test Fisheries

There was 1 test fishery conducted this season, in Sitka Sound, where 224 tons of winter bait were landed.

2022/23 Sac Roe Fishery

There was 1 sac roe fishery this season, in Sitka Sound, where catch totaled 10,199 tons (Table 5). Fisheries in other areas (Figure 4) were not conducted because forecasts were not completed due to minimal spawn observed or surveys were not conducted due to budgetary constraints. The other sac roe areas include Seymour Canal, Kah Shakes/Cat Island, West Behm, and Hobart/Houghton.

2022/23 Herring Pound Fisheries

For the 2022/23 season, the only spawn-on-kelp fishery to open was for the Craig/Klawock area, where the allocation was set at 7,019 tons (40% of the total area GHL of 7,761 tons, plus unharvested bait allocation of 3,915 tons). There were a total of 41 closed pounds (5 triple permits, 33 double, and 3 single) with herring on the grounds during the 2022/23 season. The landings of spawn-on-kelp product totaled 127.8 tons (Table 7).

WILD HERRING SPAWN-ON-KELP FISHERY

The harvest of wild herring spawn on kelp has occurred traditionally throughout the region. The Southeast Alaska fishery is regulated solely through issuing subsistence spawn-on-kelp permits at local ADF&G offices, but no permit is required for the Yakutat area. The permits specify times, areas, and amounts of spawn on kelp allowed. The annual possession limit for herring spawn on kelp is 32 lb for an individual or 158 lb for a household of 2 or more persons. Additional permits for herring spawn on kelp above the annual possession limit are allowed at the discretion of

ADF&G. Subsistence spawn-on-kelp harvests generally occur in March and April in or near Craig, Hydaburg, Ketchikan, and Sitka, where major herring spawning populations are found (Figure 7). *Macrocystis* kelp is the preferred species of kelp. Harvest and effort levels are found in Table 8.

HISTORICAL VALUE

Exvessel value data for Southeast Alaska herring fisheries was obtained from the CFEC website at http://www.cfec.state.ak.us/bit/mnuherr.htm for 1977–2023. Data for 2023 from CFEC is not yet available but estimates of fishery value have been made using landings and average price per pound. Data is not inflation adjusted. Questions, definitions, and additional information concerning exvessel value may be directed to the above website and CFEC, and it is reproduced here for convenience (Table 9). CFEC data is collected and recorded on a calendar-year basis. Consequently, winter bait fishery values represent an estimate of the values of the fishery, rather than from the actual fishery season, which crosses calendar years.

From 1995 (when all present fishery types became developed) through 2020, the combined total commercial exvessel values have ranged from a low of $2,189,000 in 2015 to a high of $21,002,000 in 2008. Generally, the largest percentage of the total value occurs in the seine sac roe fishery (Table 9).

CURRENT STOCK STATUS AND OUTLOOK

Herring biomass is currently at very high levels for 2 stocks (Sitka and Craig) and at relatively low or moderate levels for all other stocks. Southeast Alaska herring populations were generally in a period of growth from the late 1990s to approximately 2011, then declined until 2019 when a large recruitment event caused an upswing in biomass, particularly in the Sitka and Craig spawning areas. The large recruitment was also observed in several other stocks and across the Gulf of Alaska (e.g., Prince William Sound and Kodiak). The large recruit year class observed in 2019 matured in 2020 and 2021 and has persisted as a dominant year class through 2023, resulting in several years of high spawning biomass in Sitka and Craig. For other spawning areas in Southeast Alaska, only the occasional collection of data has been conducted for egg deposition and age/size, leaving an incomplete picture of regional herring abundance level. However, continued aerial surveys to monitor the extent of spawn suggest that most other stocks remain at relatively low levels. A more complete review of herring stock status through 2020 is provided in Hebert (2020).

Beginning in 2016, ADF&G substantially reduced its herring stock assessment program because of state funding cuts; this coincided with a downturn in spawning levels for stocks found in inside waters. The annual surveys that had been conducted for many years to estimate spawning biomass and age composition, have been suspended for most areas except Sitka Sound and Craig. Occasional complete stock assessments of other areas have been conducted when aerial surveys indicate spawning levels appear high enough to warrant complete stock assessments. Although aerial surveys may be continued in some other areas as budgets allow, these will be conducted to continue monitoring herring stocks at a basic level. ADF&G does not intend to complete full stock assessments or open commercial fisheries without indications that suggest biomass has grown substantially.

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TABLES AND FIGURES

Table 1.–Southeast Alaska herring harvests in tons, 1900/01 to 2022/23.

Season	Total harvest[a,b]	Season	Total harvest[a,b]	Season	Total harvest[a,b]	Season	Total harvest[a,b]
1900/01	1,194	1931/32	44,857	1962/63	16,937	1993/94	7,519
1901/02	1,250	1932/33	49,786	1963/64	15,603	1994/95	5,107
1902/03	812	1933/34	61,588	1964/65	23,354	1995/96	9,854
1903/04	1,494	1934/35	66,842	1965/66	12,156	1996/97	14,729
1904/05	1,521	1935/36	58,155	1966/67	5,340	1997/98	10,548
1905/06	1,309	1936/37	36,713	1967/68	3,025	1998/99	12,985
1906/07	1,005	1937/38	50,334	1968/69	1,816	1999/00	6,504
1907/08	1,382	1938/39	22,356	1969/70	2,901	2000/01	14,644
1908/09	1,711	1939/40	20,028	1970/71	5,199	2001/02	13,671
1909/10	1,075	1940/41	3,137	1971/72	4,298	2002/03	11,949
1910/11	6,867	1941/42	6,230	1972/73	6,307	2003/04	17,127
1911/12	12,057	1942/43	3,691	1973/74	8,130	2004/05	18,411
1912/13	16,067	1943/44	6,235	1974/75	8,348	2005/06	14,287
1913/14	13,496	1944/45	16,801	1975/76	8,109	2006/07	16,014
1914/15	8,318	1945/46	24,126	1976/77	8,653	2007/08	21,520
1915/16	6,964	1946/47	37,564	1977/78	6,156	2008/09	22,330
1916/17	11,194	1947/48	41,829	1978/79	6,568	2009/10	24,778
1917/18	12,445	1948/49	16,125	1979/80	9,259	2010/11	[c]
1918/19	17,825	1949/50	14,279	1980/81	8,395	2011/12	17,407
1919/20	10,962	1950/51	13,411	1981/82	8,758	2012/13	8,922
1920/21	16,452	1951/52	10,652	1982/83	9,717	2013/14	17,023
1921/22	6,012	1952/53	16,020	1983/84	9,195	2014/15	8,809
1922/23	16,950	1953/54	12,435	1984/85	11,079	2015/16	9,969
1923/24	21,240	1954/55	6,446	1985/86	9,791	2016/17	15,457
1924/25	29,395	1955/56	11,368	1986/87	8,369	2017/18	6,253
1925/26	57,782	1956/57	22,819	1987/88	15,144	2018/19	3,520
1926/27	73,843	1957/58	24,745	1988/89	16,073	2019/20	4,445
1927/28	45,310	1958/59	38,797	1989/90	8,221	2020/21	19,393
1928/29	53,007	1959/60	49,866	1990/91	6,018	2021/22	27,907
1929/30	78,749	1960/61	38,906	1991/92	9,975	2022/23	12,763
1930/31	70,855	1961/62	24,709	1992/93	12,221		

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

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

[c] When number of permits or processors is fewer than 3, information is considered confidential.

Table 2.–Southeast Alaska annual herring catch (tons) by fishery, 1960/61 through 2022/23 seasons.

Season	Reduction	Winter bait	Spawn on kelp[a]	Sac roe	Test[b]	Bait pound	Total[b]
1960/61	36,790	2,116	–	–	–	–	38,906
1961/62	22,869	1,840	–	–	–	–	24,709
1962/63	13,765	3,172	22	–	–	–	16,937
1963/64	13,539	2,064	100	–	–	–	15,603
1964/65	21,397	1,957	199	–	–	–	23,354
1965/66	10,062	2,094	234	–	–	–	12,156
1966/67	2,918	2,422	330	–	–	–	5,340
1967/68	–	3,025	189	–	–	–	3,025
1968/69	–	1,816	36	–	–	–	1,816
1969/70	–	2,644	–	–	–	257	2,901
1970/71	–	3,324	–	1,221	–	654	5,199
1971/72	–	2,045	–	1,822	–	431	4,298
1972/73	–	3,954	–	2,353	–	0	6,307
1973/74	–	5,856	–	2,201	–	73	8,130
1974/75	–	5,910	–	2,295	–	143	8,348
1975/76	–	5,688	–	2,254	–	167	8,109
1976/77	–	6,409	–	2,231	–	13	8,653
1977/78	–	4,042	–	2,088	–	26	6,156
1978/79	–	3,485	–	3,052	–	31	6,568
1979/80	–	2,717	–	6,500	–	42	9,259
1980/81	–	1,671	–	6,722	–	2	8,395
1981/82	–	1,530	–	7,193	–	35	8,758
1982/83	–	1,030	–	8,666	–	21	9,717
1983/84	–	620	–	8,530	–	45	9,195
1984/85	–	1,406	–	9,636	–	37	11,079
1985/86	–	2,442	–	7,318	–	31	9,791
1986/87	–	2,347	–	5,957	–	65	8,369
1987/88	–	4,016	–	11,063	–	65	15,144
1988/89	–	3,155	–	12,853	–	65	16,073
1989/90	–	3,843	12	4,163	–	65	8,221
1990/91	–	3,273	13	2,498	–	81	6,018
1991/92	–	2,719	49	6,614	–	32	9,975
1992/93	–	1,052	20	10,923	–	[c]	12,221
1993/94	–	879	49	5,889	136	0	7,519
1994/95	–	464	54	3,853	110	0	5,107
1995/96	–	484	37	8,749	155	0	9,854
1996/97	–	727	88	12,726	176	0	14,729

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Table 2.–Page 2 of 2.

Season	Reduction	Winter bait	Spawn on kelp[a]	Sac roe	Test[b]	Bait pound	Total[b]
1997/98	–	840	108	8,191	162	0	10,548
1998/99	–	1,033	108	10,430	172	0	12,985
1999/00	–	926	36	5,019	109	[c]	6,504
2000/01	–	775	92	12,592	124	0	14,644
2001/02	–	355	172	10,854	306	7	13,671
2002/03	–	[c]	263	8,569	87	1	11,949
2003/04	–	[c]	447	11,296	231	7	17,127
2004/05	–	553	392	12,515	440	[c]	18,411
2005/06	–	689	191	11,154	55	0	14,287
2006/07	–	576	204	12,790	99	0	16,014
2007/08	–	655	387	15,900	134	0	21,520
2008/09	–	804	439	15,984	60	0	22,330
2009/10	–	1,021	407	18,614	55	0	24,778
2010/11	–	670	264	[c]	60	0	[c]
2011/12	–	552	285	13,232	60	0	17,407
2012/13	–	[c]	202	6,337	60	0	8,922
2013/14	–	[c]	[c]	16,957	66	0	17,023
2014/15	–	964	[c]	8,756	53	0	8,809
2015/16	–	[c]	[c]	9,769	200	0	9,969
2016/17	–	527	70	13,923	133	0	15,457
2017/18	–	710	205	2,926	54	0	6,253
2018/19	–	995	202	0	0	0	3,520
2019/20	–	896	284	0	0	0	4,445
2020/21	–	540	262	15,578	0	0	19,393
2021/22	–	398	194	25,090	0	0	27,907
2022/23	–	742	128	10,199	224	0	12,763

Note: Dashes indicate years when no fishery took place.

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

[b] Includes spawn-on-kelp product converted to herring equivalents at 12.5-to-1 ratio; does not include confidential values.

[c] When number of permits or processors is fewer than 3, information is considered confidential.

Table 3.–Herring spawning threshold levels for major herring stocks in Southeast Alaska and Yakutat.

Area	Threshold level (tons)
Hoonah Sound	2,000
Yakutat Bay	1,000
Ernest Sound	2,500
Anita Bay	2,500
Port Camden	2,500
Hobart Bay/Port Houghton	2,000
Lisianski Inlet	2,500
Seymour Canal	3,000
Tenakee Inlet	3,000
Tongass Narrows and George and Carroll Inlets	3,500
Craig/Klawock	5,000
Kah Shakes and Cat Island	6,000
Lynn Canal	5,000
Sitka Sound	25,000
West Behm Canal	6,000
Other aggregates not included above	2,000

Table 4.–Southeast Alaska winter food and bait herring harvest in tons, by fishing area, and season, 1982/83 through 2022/23 seasons.

Season	Craig/ Klawock	Anita Bay	Ernest Sound	Hobart Bay/ Houghton	Port Camden	Tenakee Inlet	Lisianski Inlet	Whale/ Necker Bay	Scow Bay	Slocum Arm	Total
1982/83	140	124	Not open	Not open	0	749	0	0	17	0	1,030
1983/84	0	Not open	Not open	Not open	42	619	0	0	0	0	661
1984/85	0	Not open	Not open	Not open	0	1,406	0	0	0	0	1,406
1985/86	302	Not open	Not open	Not open	0	2,040	0	0	0	0	2,342
1986/87	1,231	Not open	Not open	Not open	0	1,275	0	0	0	0	2,506
1987/88	2,014	Not open	Not open	Not open	0	1,577	280	0	0	257	4,128
1988/89	1,730	Not open	Not open	Not open	0	655	770	0	0	0	3,155
1989/90	3,221	Not open	Not open	Not open	0	595	27	0	0	0	3,843
1990/91	3,272	Not open	Not open	Not open	0	Not open	0	0	0	0	3,272
1991/92	2,295	Not open	Not open	0	0	Not open	353	0	0	0	2,648
1992/93	629	Not open	8	0	0	Not open	239	176	0	0	1,052
1993/94	636	Not open	Not open	140	0	Not open	0	103	0	0	879
1994/95	124	Not open	111	229	0	Not open	0	0	0	0	464
1995/96	34	Not open	220	230	0	Not open	0	0	0	0	264
1996/97	525	Not open	6	104	0	98	0	0	0	0	727
1997/98	254	Not open	Not open	0	0	586	0	0	0	0	840
1998/99	102	Not open	96	0	0	835	0	0	0	0	1,033
1999/00	[a]	Not open	Not open	432	0	494	0	0	0	0	926
2000/01	[a]	Not open	Not open	Not open	0	775	0	0	0	0	775
2001/02	[a]	Not open	Not open	Not open	0	355	0	0	0	0	355
2002/03	[a]	Not open	Not open	Not open	0	[a]	0	0	0	0	[a]
2003/04	[a]	Not open	[a]	Not open	0	[a]	0	0	0	0	[a]
2004/05	553	Not open	Not open	0	0	0	0	0	0	0	553
2005/06	689	Not open	Not open	Not open	0	Not open	0	0	0	0	689

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Table 4.–Page 2 of 2.

Season	Craig/ Klawock	Anita Bay	Ernest Sound	Hobart Bay/ Houghton	Port Camden	Tenakee Inlet	Lisianski Inlet	Whale/ Necker Bay	Scow Bay	Slocum Arm	Total
2006/07	576	Not open	Not open	Not open	0	Not open	0	0	0	0	576
2007/08	565	Not open	[a]	0	0	Not open	0	0	0	0	[a]
2008/09	143	Not open	[a]	0	0	[a]	0	0	0	0	804
2009/10	[a]	Not open	[a]	0	0	[a]	0	0	0	0	1,021
2010/11	[a]	Not open	[a]	Not open	0	Not open	0	0	0	0	670
2011/12	309	Not open	[a]	Not open	0	Not open	0	0	0	0	[a]
2012/13	[a]	Not open	[a]	Not open	0	Not open	0	0	0	0	539
2013/14	[a]	Not open	[a]	Not open	0	[a]	0	0	0	0	827
2014/15	964	Not open	Not open	Not open	0	Not open	0	0	0	0	964
2015/16	[a]	Not open	Not open	Not open	0	Not open	0	0	0	0	[a]
2016/17	527	Not open	Not open	Not open	0	Not open	0	0	0	0	527
2017/18	710	Not open	Not open	Not open	0	Not open	0	0	0	0	710
2018/19	995	Not open	Not open	Not open	0	Not open	0	0	0	0	995
2019/20	896	Not open	Not open	Not open	0	Not open	0	0	0	0	896
2020/21	540	Not open	Not open	Not open	0	Not open	0	0	0	0	540
2021/22	398	Not open	Not open	Not open	0	Not open	0	0	0	0	398
2022/23	742	Not open	Not open	Not open	0	Not open	0	0	0	0	742

[a] When number of permits or processors is fewer than 3, information is considered confidential.

Table 5.–Annual Southeast Alaska sac roe herring harvest by area, in tons, 1970/71 through 2022/23 seasons.

Season	Sitka Sound	Lynn Canal	Seymour Canal	Revillagigedo Channel	Other areas	All areas
1970/71	278	688	35	–	220[a]	1,221
1971/72	602	524	495	–	201[b]	1,822
1972/73	597	798	506	–	452[c]	2,353
1973/74	681	396	904	–	Not open	2,201
1974/75	1,517	558	Not open	–	Not open	2,295
1975/76	800	630	195	426	203[d]	2,254
1976/77	0	926	485	820	Not open	2,231
1977/78	234	954	729	171	Not open	2,088
1978/79	2,255	Not open	269	528	Not open	3,052
1979/80	4,445	975	Not open	1,140	Not open	6,560
1980/81	3,506	761	615	1,840	Not open	6,722
1981/82	4,363	551	Not open	2,279	Not open	7,193
1982/83	5,450	Not open	Not open	3,250	Not open	8,700
1983/84	5,830	Not open	518	2,182	Not open	8,530
1984/85	7,475	Not open	Not open	2,161	Not open	9,636
1985/86	5,442	Not open	339	1,537	Not open	7,318
1986/87	4,216	Not open	302	1,439	Not open	5,957
1987/88	9,390	Not open	586	1,087	Not open	11,063
1988/89	11,714	Not open	547	592	Not open	12,853
1989/90	3,804	Not open	359	0	Not open	4,163
1990/91	1,838	Not open	Not open	660	Not open	2,498
1991/92	5,368	Not open	Not open	1,246	Not open	6,614
1992/93	10,186	Not open	Not open	737	Not open	10,923
1993/94	4,758	Not open	382	749	Not open	5,889
1994/95	2,908	Not open	319	626	Not open	3,853
1995/96	8,144	Not open	Not open	605	Not open	8,749
1996/97	11,147	Not open	Not open	1,137	442[e]	12,726
1997/98	6,638	Not open	586	616	351[e]	8,191
1998/99	9,218	Not open	706	0	506[e]	10,430
1999/00	4,630	Not open	389	Not open	Not open	5,019
2000/01	11,972	Not open	620	Not open	Not open	12,592
2001/02	9,788	Not open	1,066	Not open	Not open	10,854
2002/03	7,050	Not open	1,519	Not open	Not open	8,569
2003/04	10,492	Not open	804	Not open	Not open	11,296
2004/05	11,366	Not open	945	Not open	204[e]	12,515
2005/06	9,967	Not open	1,187	Not open	Not open	11,154

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Table 5.–Page 2 of 2.

Season	Sitka Sound	Lynn Canal	Seymour Canal	Revillagigedo Channel	Other areas	All areas
2006/07	11,571	Not open	1,219	Not open	Not open	12,790
2007/08	14,386	Not open	1,208	Not open	306[e]	15,900
2008/09	14,776	Not open	867	Not open	341[e]	15,984
2009/10	17,602	Not open	710	Not open	302[e]	18,614
2010/11	19,419	Not open	[f]	Not open	[f,g]	[f]
2011/12	13,232	Not open	0	Not open	Not open	13,232
2012/13	5,688	Not open	649	Not open	Not open	6,337
2013/14	16,957	Not open	447	Not open	Not open	17,404
2014/15	8,756	Not open	Not open	Not open	Not open	8,756
2015/16	9,769	Not open	Not open	Not open	Not open	9,769
2016/17	13,923	Not open	Not open	Not open	Not open	13,923
2017/18	2,926	Not open	Not open	Not open	Not open	2,926
2018/19	Not open	[h]	Not open	Not open	Not open	0
2019/20	Not open	[h]	Not open	Not open	Not open	0
2020/21	15,578	[h]	Not open	Not open	Not open	15,578
2021/22	25,090	[h]	Not open	Not open	Not open	25,090
2022/23	10,199	[h]	Not open	Not open	Not open	10,199

Note: En dashes indicate years when no fishery took place.

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

[b] Lisianski Inlet.

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

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

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

[f] When number of permits or processors is fewer than 3, information is considered confidential.

[g] West Behm Canal commercial sac roe gillnet fishery harvest.

[h] Commercial fishery removed from regulations in 2018.

Table 6.–Fresh herring bait pound harvests in tons by area, 1982/83 through 2022/23 seasons.

Season	Scow Bay	Farragut Bay	Sitka Sound	Lynn Canal	Lisianski Inlet	West Behm Canal	Tenakee Inlet	Total harvest
1969/70	0	17	0	240	0	0	0	257
1970/71	0	0	0	654	0	0	0	654
1971/72	0	0	0	431	0	0	0	431
1972/73	0	0	0	0	0	0	0	0
1973/74	0	0	0	73	0	0	0	73
1974/75	0	55	0	88	0	0	0	143
1975/76	0	93	0	74	0	0	0	167
1976/77	0	13	0	0	0	0	0	13
1977/78	12	14	0	0	0	0	0	26
1978/79	20	0	0	11	0	0	0	31
1979/80	25	17	0	0	0	0	0	42
1980/81	0	0	0	2	0	0	0	2
1981/82	17	0	8	0	0	0	10	35
1982/83	7	14	0[a]	0	0	0	0	21
1983/84	0	10	35	0	0	0	0	45
1984/85	0	4	33	0	0	0	0	37
1985/86	0	5	26	0	0	0	0	31
1986/87	0	3	62	0	0	0	0	65
1987/88	0	0	17	0	0	0	0	17
1988/89	0	0	66	0	0[a]	0	0	66
1989/90	0	0	38	0	0	0	0	38
1990/91	0	16	65	0	0	0	0	81
1991/92	0	15	17	0	0	0	0	32
1992/93	0	0	[b]	0	0	0	0	[b]
1993/94	0	0	[b]	0	0	0	0	[b]
1994/95	0	0	0	0	0	0	0	0
1995/96	0	0	0	0	0	0	0	0
1996/97	0	Not open	0	0	0	0	0	0
1997/98	0	Not open	0	0	0	0	0	0
1998/99	0	Not open	0	0	0	0	0	0
1999/00	0	Not open	[b]	0	0	0	0	[b]
2000/01	0	Not open	0	0	0	0	0	0
2001/02	0	Not open	7	0	0	0	0	7
2002/03	0	Not open	[b]	0	0	1	0	1
2003/04	0	Not open	7	Not open	0	Not open	Not open	7
2004/05	0	Not open	[b]	Not open	0	Not open	Not open	[b]

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Table 6.–Page 2 of 2.

Season	Scow Bay	Farragut Bay	Sitka Sound	Lynn Canal	Lisianski Inlet	West Behm Canal	Tenakee Inlet	Total harvest
2005/06	0	Not open	0	Not open	0	Not open	Not open	0
2006/07	0	Not open	0	Not open	0	Not open	Not open	0
2007/08	0	Not open	0	Not open	0	Not open	Not open	0
2008/09	0	Not open	0	Not open	0	Not open	0	0
2009/10	0	Not open	0	Not open	0	Not open	0	0
2010/11	0	Not open	0	Not open	0	Not open	Not open	0
2011/12	0	Not open	0	Not open	0	Not open	Not open	0
2012/13	0	Not open	0	Not open	0	Not open	Not open	0
2013/14	0	Not open	0	Not open	0	Not open	0	0
2014/15	0	Not open	0	Not open	0	Not open	Not open	0
2015/16	0	Not open	0	Not open	0	Not open	Not open	0
2016/17	0	Not open	0	Not open	0	Not open	Not open	0
2017/18	0	Not open	0	Not open	0	Not open	Not open	0
2018/19	0	Not open	0	Not open	0	Not open	Not open	0
2019/20	0	Not open	0	Not open	0	Not open	Not open	0
2020/21	0	Not open	0	Not open	0	Not open	Not open	0
2021/22	0	Not open	0	Not open	0	Not open	Not open	0
2022/23	0	Not open	0	Not open	0	Not open	Not open	0

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

[b] When number of permits or processors is fewer than 3, information is considered confidential.

Table 7.–Herring spawn-on-kelp pound fishery in tons of product, 1989/90 through 2022/23 seasons.

Season	Craig/Klawock	Hoonah Sound	Ernest Sound	Tenakee Inlet	Total
1989/90	–	11.9	–	–	11.9
1990/91	–	13.2	–	–	13.2
1991/92	25.7	23.1	–	–	48.8
1992/93	5.7	14.0	–	–	19.7
1993/94	16.5	32.7	–	–	49.2
1994/95	25.4	29.0	–	–	54.4
1995/96	37.2	0	–	–	37.2
1996/97	23.0	65.0	–	–	88.0
1997/98	22.4	86.0	–	–	108.4
1998/99	36.0	71.6	–	–	107.6
1999/00	0.0[a]	35.7	–	–	35.7
2000/01	27.2	66.2	–	–	93.4
2001/02	41.7	136.6	–	–	178.3
2002/03	69.2	146.6	No quota	47.6	263.4
2003/04	49.3	243.3	56.1	98.7	447.4
2004/05	115.2	183.3	No quota	93.7	392.2
2005/06	29.0	162.1	No quota	No quota	191.1
2006/07	44.5	159.4	No quota	No quota	203.9
2007/08	148.5	228.1	9.8	No quota	386.5
2008/09	137.3	234.7	2.5	64.1	438.5
2009/10	116.7	290.4	No quota	No quota	407.0
2010/11	70.0	193.7	No quota	No quota	263.7
2011/12	98.0	187.0	No quota	No quota	285.0
2012/13	138.0	0	65.0	No quota	203.0
2013/14	[b]	No quota	[b]	[b]	472.0
2015/16	[b]	No quota	No quota	No quota	[b]
2016/17	69.9	No quota	No quota	No quota	69.9
2017/18	205.0	No quota	No quota	No quota	205.0
2018/19	202.0	No quota	No quota	No quota	202.0
2019/20	283.9	No quota	No quota	No quota	283.9
2020/21	262.0	No quota	No quota	No quota	262.0
2021/22	193.5	No quota	No quota	No quota	193.5
2022/23	127.8	No quota	No quota	No quota	127.8

Note: Dashes indicate years when no fishery took place.

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

[b] When number of permits or processors is fewer than 3, information is confidential.

Table 8.–Herring spawn-on-kelp subsistence estimated harvest (lb), 1965–2023.

	Craig/Klawock		Revilla Channel		Hydaburg		West Behm		Sitka	
Year[a]	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
1966	145	5,200	–	–	[b]	[b]	–	–	–	–
1967	201	3,368	–	–	[b]	[b]	–	–	–	–
1968	130	2,260	–	–	[b]	[b]	–	–	–	–
1969	80	2,858	–	–	[b]	[b]	–	–	–	–
1970	103	3,213	–	–	[b]	[b]	–	–	–	–
1971	81	2,643	–	–	[b]	[b]	–	–	–	–
1972	102	4,250	–	–	[b]	[b]	–	–	–	–
1973	31	1,209	–	–	[b]	[b]	–	–	–	–
1974	159	3,087	–	–	[b]	[b]	–	–	–	–
1975	92	1,640	–	–	[b]	[b]	–	–	–	–
1976	54	1,728	–	–	[b]	[b]	–	–	–	–
1977	34	352	–	–	[b]	[b]	–	–	–	–
1978	109	3,521	11	122	[b]	[b]	–	–	–	–
1979	102	1,268	16	0	[b]	[b]	–	–	–	–
1980	123	3,721	19	75	[b]	[b]	–	–	–	–
1981	157	6,148	6	12	[b]	[b]	–	–	–	–
1982	187	5,485	30	205	[b]	[b]	–	–	–	–
1983	309	5,945	33	75	[b]	[b]	–	–	–	–
1984	261	4,972	14	50	[b]	[b]	–	–	–	–
1985	233	9,553	19	0	[b]	[b]	–	–	71	2,512
1986	241	5,565	5	0	[b]	[b]	–	–	90	3,580
1987	231	15,038	5	0	32	50	–	–	58	5,351
1988	195	6,354	6	68	7	40	–	–	74	3,654
1989	221	11,699	10	0	[b]	[b]	–	–	50	647
1990	245	10,158	7	0	[b]	[b]	–	–	71	3,644
1991	267	12,627	5	60	2	20	–	–	75	4,967
1993	296	4,490	8	0	–	–	2	180	40	3,743
1994	280	3,739	9	0	13	0	–	–	81	2,394

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Table 8.–Page 2 of 3.

	Craig/Klawock		Revilla Channel		Hydaburg		West Behm		Sitka	
Year[a]	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
1995	199	3,414	3	0	1	32	–	–	57	1,761
1996	261	11,500	5	0	1	0	–	–	100	4,550
1997	226	9,316	3	106	–	–	–	–	86	3,334
1998	213	5,815	–	–	3	0	–	–	60	2,155
1999	185	6,770	1	40	–	–	1	50	58	2,519
2000	116	1,749	–	–	–	–	–	–	47	2,580
2001	113	3,014	–	–	5	0	–	–	52	805
2002	123	2,619	1	0	2	50	2	0	47	3,586
2003	144	6,735	2	0	–	–	2	0	40	2,511
2004	92	3,411	6	0	3	0	7	0	52	7,208
2005	140	6,281	3	0	–	–	1	0	41	1,500
2006	92	5,414	–	–	–	–	–	–	32	3,293
2007	109	2,605	–	–	–	–	–	–	42	2,117
2008	117	3,431	–	–	–	–	–	–	41	1,734
2009	132	5,090	–	–	–	–	–	–	67	3,869
2010	106	3,644	–	–	–	–	1	0	60	5,301
2011	129	6,627	–	–	–	–	–	–	55	2,740
2012	85	2,887	–	–	–	–	–	–	61	2,075
2013	122	4,266	–	–	–	–	–	–	37	2,190
2014	115	3,583	–	–	–	–	1	10	42	2,042
2015	88	2,444	1	5	–	–	–	–	46	1,924
2016	110	4,455	1	2	–	–	–	–	32	1,585
2017	73	2,614	–	–	–	–	–	–	36	1,523
2018	83	1,488	2	7	–	–	1	1	40	1,668
2019	84	2,305	–	–	–	–	–	–	45	2,285
2020	78	1,334	–	–	–	–	–	–	40	1,432

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	Craig/Klawock		Revilla Channel		Hydaburg		West Behm		Sitka	
Year[a]	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
2021	50	1,570	–	–	–	–	–	–	42	2,667
2022	78	1,767	–	–	–	–	–	–	39	5,097
2023	45	1,210	1	5	–	–	–	–	61	4,271

Note: Dashes indicate years when no permits were issued. *Permits* depicts permits issued only (i.e., not returned), and *Harvest* depicts harvest reported only from returned permits, which underestimates actual harvest.

[a] Year corresponds to the spring of commercial fishing seasons (e.g., 2023 means spring of 2022/23 season).

[b] Years when permits were issued jointly for Craig/Klawock and Hydaburg.

Table 9.–Southeast Alaska commercial herring fisheries exvessel value (in thousands), 1977–2023, by calendar year.

Year	Winter bait	Seine sac roe	Gillnet sac roe	Spawn on kelp Southern	Spawn on kelp Northern	Total[a]
1977	$507	$695	–	–	–	$1,202
1978	–	$1,422	–	–	–	$1,422
1979	–	$9,052	–	–	–	$9,052
1980	–	$2,132	$312	–	–	$2,444
1981	$343	$2,376	$1,246	–	–	$3,965
1982	$558	$1,663	$602	–	–	$2,823
1983	$166	$5,032	$2,949	–	–	$8,147
1984	$128	$3,729	$2,327	–	–	$6,184
1985	$321	$7,883	$3,186	–	–	$11,390
1986	$548	$7,413	$2,636	–	–	$10,597
1987	$586	$4,396	$2,547	–	–	$7,529
1988	$1,010	$4,169	$3,108	–	–	$8,287
1989	$900	$1,182	$1,379	–	–	$3,461
1990	$1,030	$1,950	$260	–	$199	$3,439
1991	$916	$206	$624	–	$226	$1,972
1992	$720	$1,373	$1,777	–	$529	$4,399
1993	$471	$3,484	$1,300	–	$417	$5,672
1994	$125	$3,626	$1,768	–	$1,823	$7,342
1995	$147	$3,933	$1,864	$999	$1,476	$8,419
1996	–	$14,350	$1,665	$1,328	[b]	$17,343
1997	$175	$4,726	$990	$282	$1,082	$7,255
1998	$526	$1,646	$613	$69	$169	$3,023
1999	$397	$4,906	$713	$374	$1,244	$7,634
2000	$236	$2,667	$226	–	$596	$3,725
2001	$131	$5,794	$254	$342	$1,017	$7,538
2002	$110	$4,441	$614	$352	$1,733	$7,250
2003	[b]	$3,201	$784	$759	$2,288	$7,032
2004	[b]	$5,162	$497	$653	$2,880	$9,192
2005	[b]	$6,118	$408	$625	$1,566	$9,192
2006	[b]	$2,645	$389	$289	$2,013	$9,192
2007	[b]	$5,693	$570	$1,090	$4,491	$9,192
2008	$232	$10,732	$1,426	$3,493	$5,119	$21,002
2009	[b]	$12,678	$1,064	$1,277	$2,890	$17,909
2010	[b]	$12,146	$546	$756	$2,256	$15,704
2011	[b]	$3,961	$64	$718	$1,814	$6,557
2012	[b]	$8,865	$0	$2,013	$4,089	$14,967
2013	[b]	$4,436	$441	$4,853	$0	$9,730
2014	[b]	$3,052	[b]	[b]	[b]	$4,361
2015	[b]	$2,189	–	[b]	$0	$2,189
2016	[b]	$2,266	–	[b]	$0	$2,266
2017	[b]	$4,276	–	$933	$0	$5,209
2018	[b]	$1,127	–	$2,519	$0	$3,646
2019[c]	$383	$0	–	$2,450	$0	$2,788
2020[d]	[b]	$0	–	$2,817	$0	$2,817

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Table 9.–Page 2 of 2.

Year	Winter bait	Seine sac roe	Gillnet sac roe	Spawn on kelp Southern	Spawn on kelp Northern	Total[a]
2021	[b]	$3,950	–	$1,747	–	$5,697
2022	[b]	$6,140	–	$2,119	–	$8,259
2023[d]	[b]	$3,060	–	$1,950	–	$5,010
10-yr avg (2014–2023)	–	$2,606	$53	$2,076	$1,156	$4,224
5-yr avg (2019–2023)	–	$2,630	–	$2,217	–	$4,914

Source: Exvessel value data from http://www.cfec.state.ak.us/bit/mnuherr.htm.

Note: Dashes indicate years when no fishery took place.

[a] Confidential data not included in totals, except for 2014.

[b] When number of permits or processors is fewer than 3, information is confidential.

[c] Preliminary data from Commercial Fisheries Entry Commission (CFEC).

[d] Preliminary ADF&G estimates based on fish tickets.

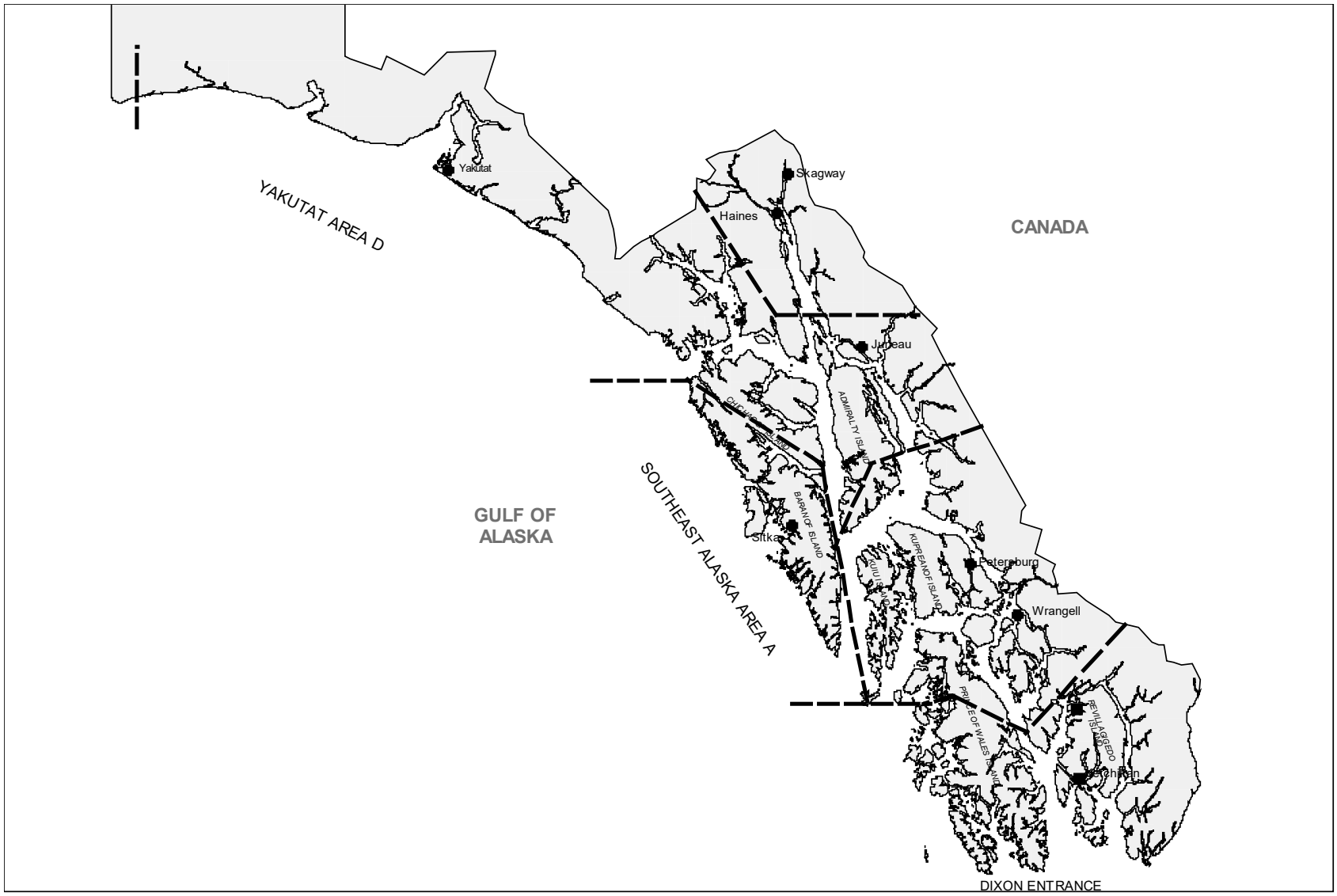

Figure 1.–Southeast Alaska Region (Region 1) herring registration areas (Southeast Alaska Area A and Yakutat Area D) and management area boundaries.

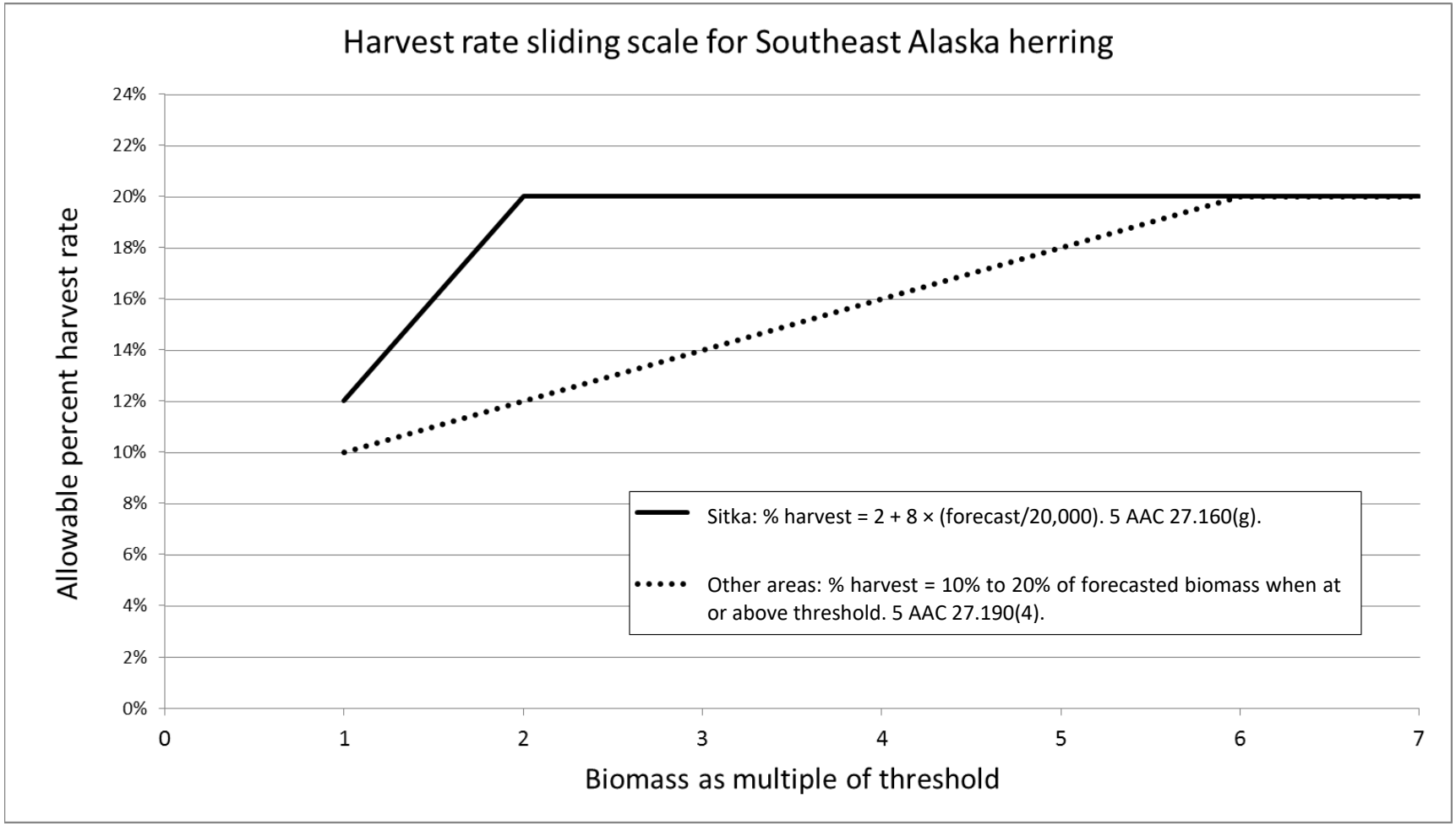

Figure 2.–Generalized harvest strategy for Southeast Alaska and Yakutat herring showing allowable percent annual exploitation rate as related to estimated biomass of mature herring, expressed as a multiple of the threshold level. No fishery occurs if below threshold and the maximum harvest rate is 20%.

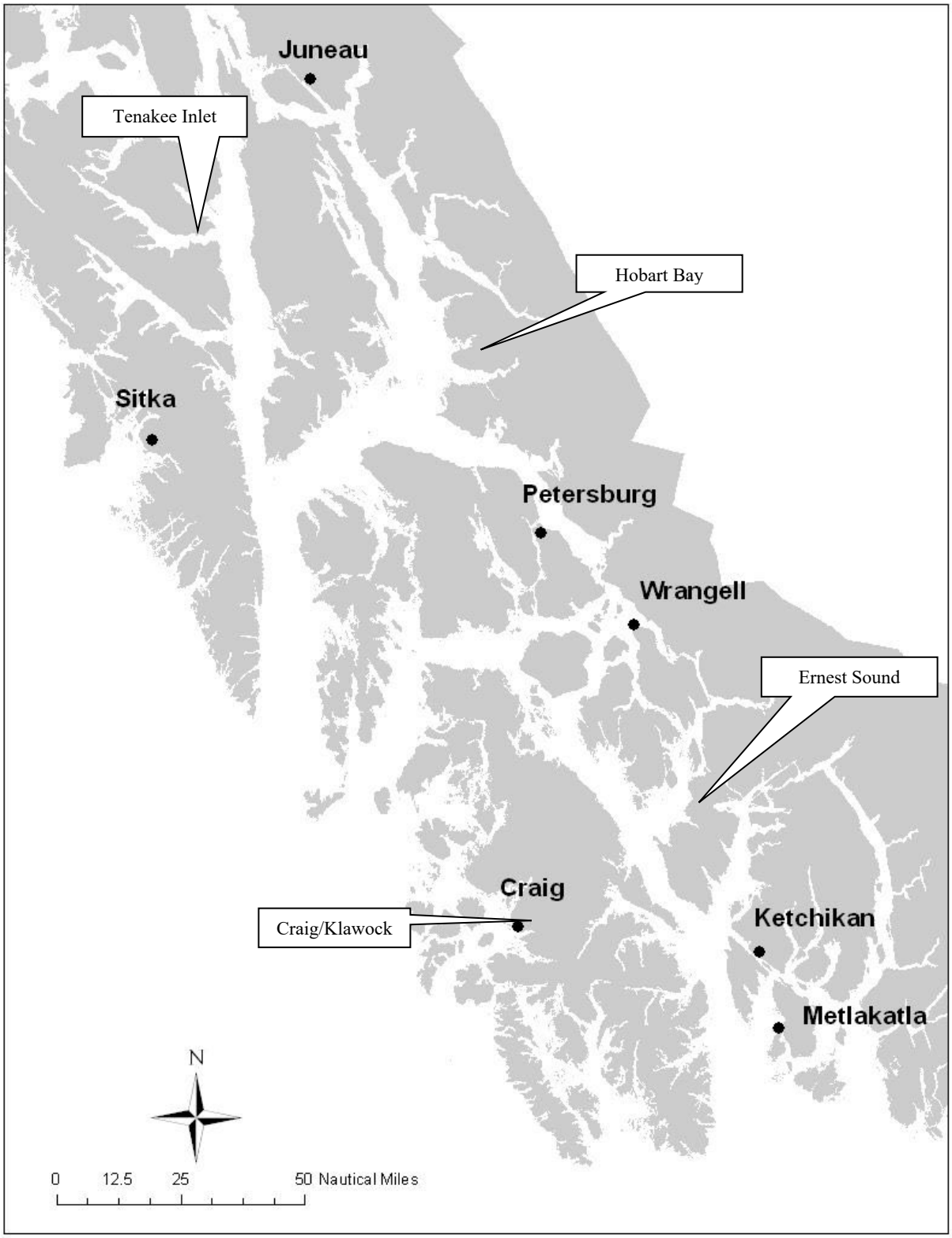

Figure 3.–Herring food and bait commercial fishing areas in Southeast Alaska.

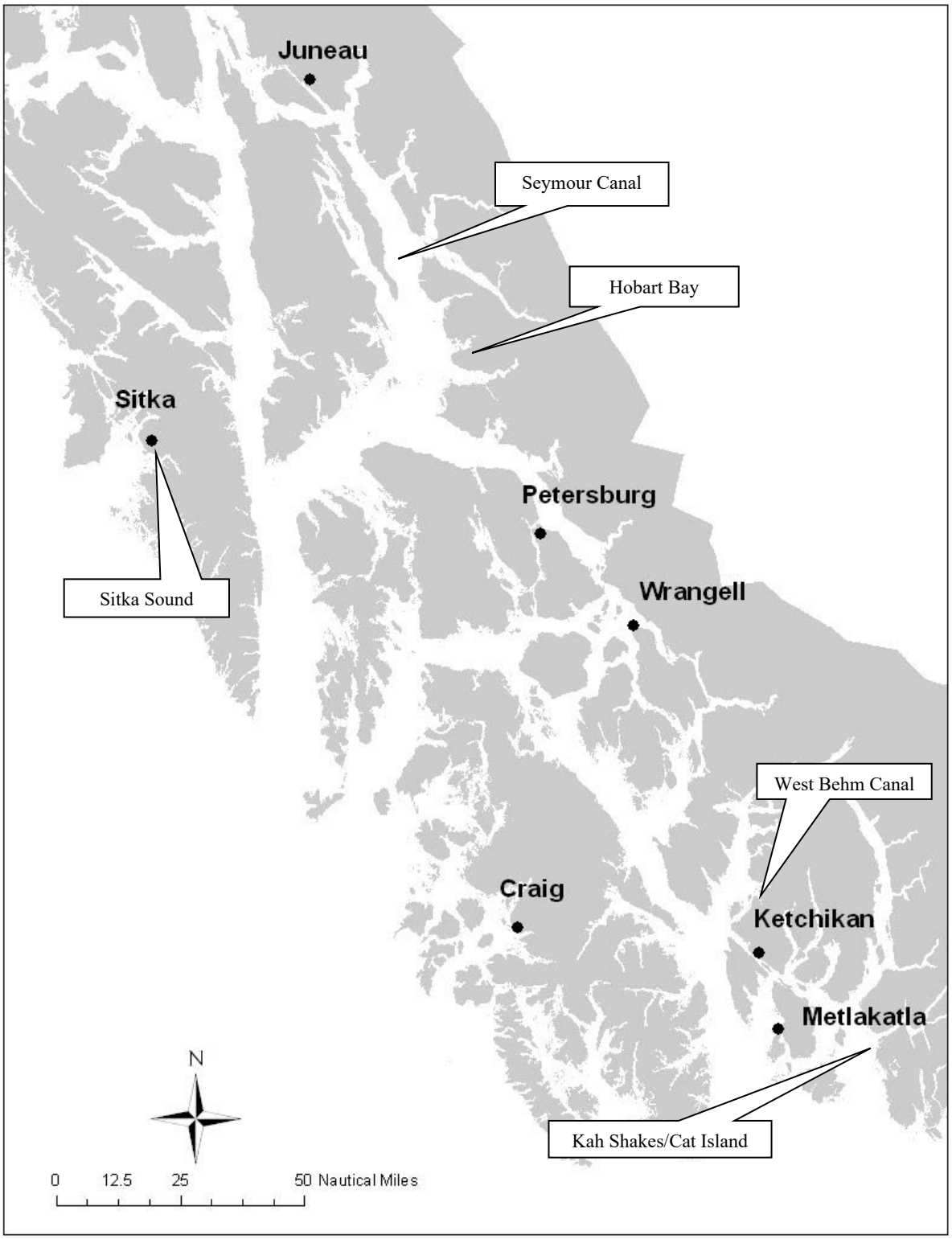

Figure 4.–Herring sac roe commercial fishing areas in Southeast Alaska.

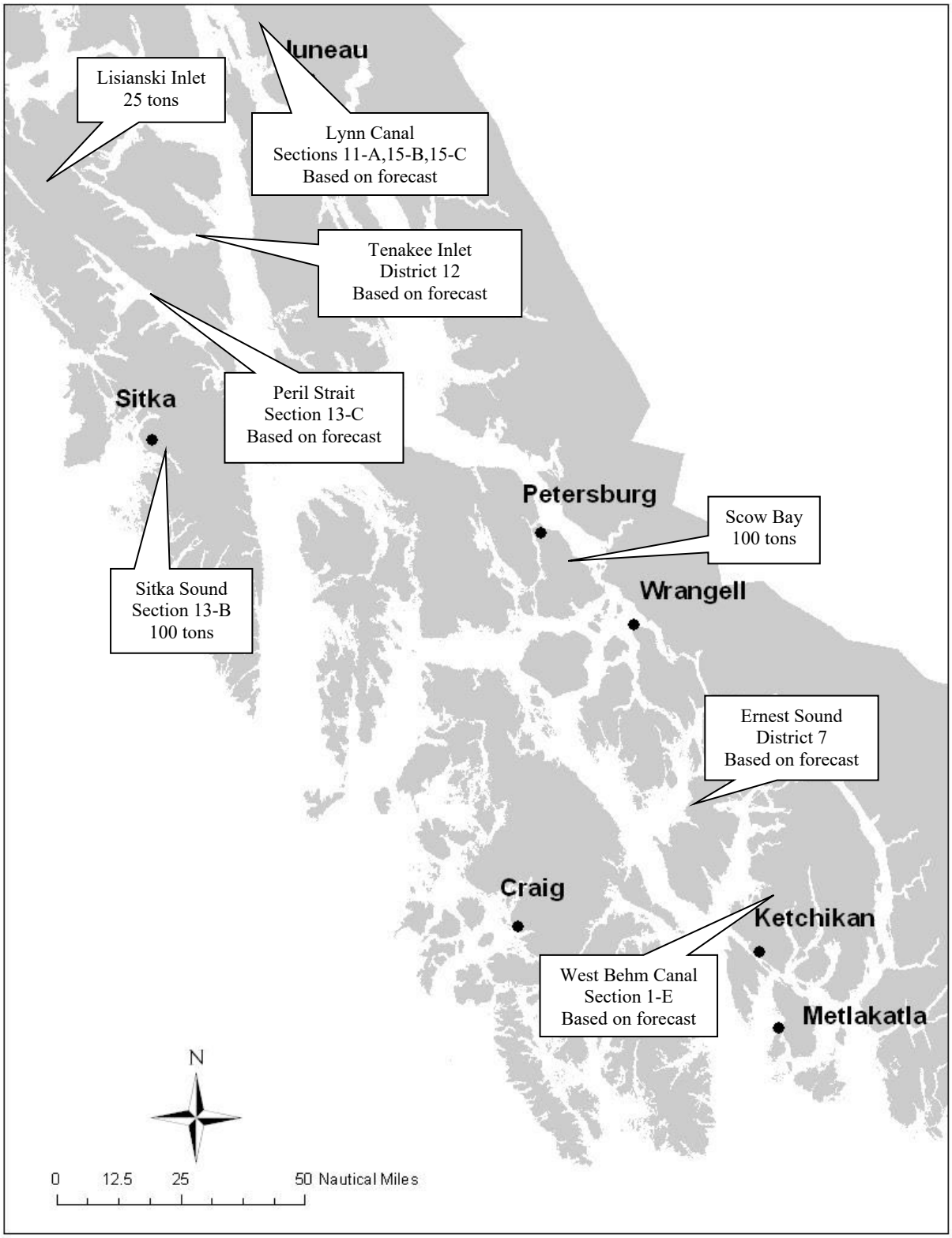

Figure 5.–Herring fresh bait pound commercial fishing areas in Southeast Alaska, and guideline harvest levels.

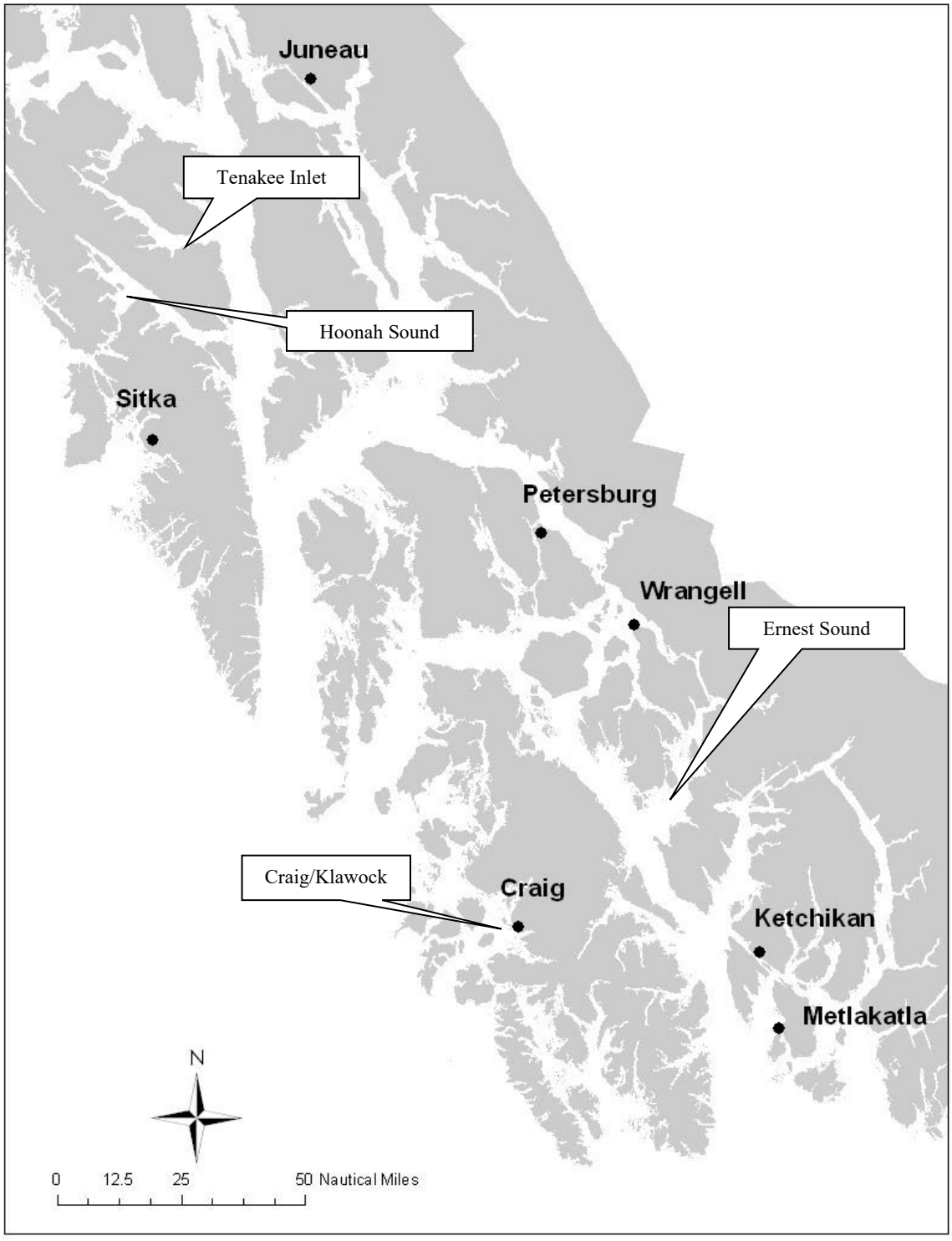

Figure 6.–Herring spawn-on-kelp commercial fishing areas in Southeast Alaska.

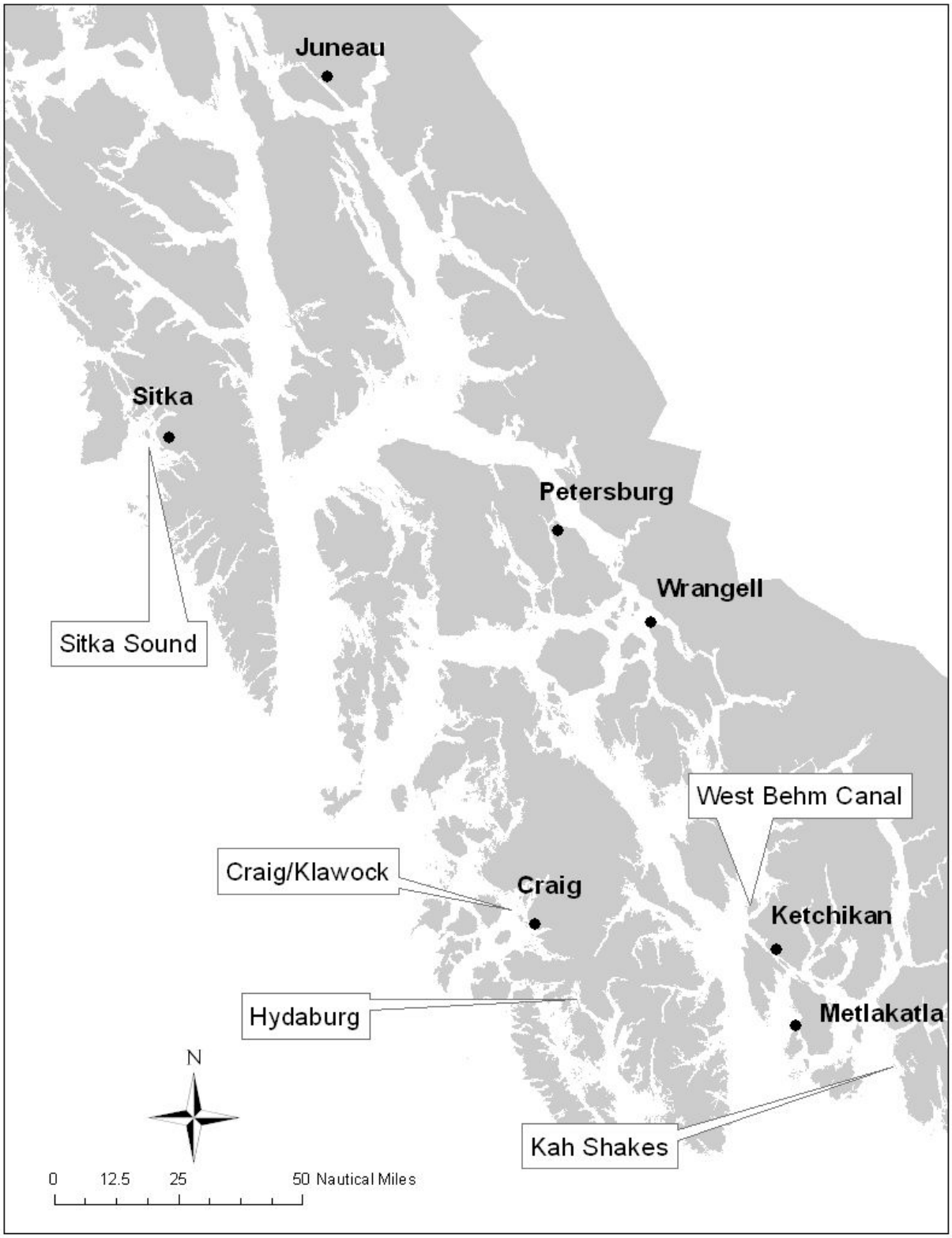

Figure 7.–Major Southeast Alaska spawn-on-kelp subsistence fishery areas.