

Fishery Management Report No. 13-40

**2011 and 2012 Southeast Alaska Commercial
Herring Fishery Annual Management Report**

by

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October 2013

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



Symbols and Abbreviations

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

FISHERY MANAGEMENT REPORT NO. 13-50

**2011 AND 2012 SOUTHEAST ALASKA COMMERCIAL HERRING
FISHERY ANNUAL MANAGEMENT REPORT**

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October 2013

The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.adfg.alaska.gov/sf/publications/>. This publication has undergone regional peer review.

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This document should be cited as:

Davidson, B., D. Gordon, D. Harris, T. Thynes, and S. Walker. 2013. 2011 and 2012 Southeast Alaska commercial herring fishery annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 13-40, Anchorage.

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ABSTRACT

The State of Alaska manages herring stocks throughout the Southeast Alaska region to provide for harvests in both subsistence and commercial fisheries. Fisheries are allowed when herring stocks have met threshold levels of abundance and in accordance with harvest rate policies adopted by the Alaska Board of Fisheries. Commercial herring fisheries include set gillnet and purse seine sac roe fisheries, spawn-on-kelp pound fisheries, winter food and bait fisheries, and fresh bait pound fisheries. Sac roe and spawn-on-kelp fisheries are regulated as limited entry fisheries. This report reviews management activities and actions taken to provide for these fisheries during the 2010/2011 and 2011/2012 winter food and bait and bait pound seasons and the spring 2011 and 2012 sac roe and spawn-on-kelp seasons. Prior to the 2009 season herring annual management report, management summaries were included in triennial reports to the Alaska Board of Fisheries which focused on herring stock assessments.

Key words: Southeast Alaska, 2011 season, 2012 season, 2010/2011 season, 2011/2012 season, commercial fisheries, subsistence fisheries, Pacific herring (*Clupea pallasai*), exvessel value, herring purse seine, herring set gillnet, herring pound, spawn on kelp, winter food and bait, herring live bait pound, Annual Management Report

INTRODUCTION

This report continues a series of annual management reports to summarize commercial herring fisheries within the Southeast Alaska region. The 3 major types of commercial herring fisheries include winter food and bait, sac roe, and spawn on kelp (SOK). This report summarizes the 2010/2011 and 2011/2012 seasons winter bait and bait pound fisheries and the 2011 and 2012 spring seasons sac roe and SOK fisheries. To provide context for the management summaries a synopsis of the regulatory framework and historical overviews are included for each current fishery. Although the department has included management summaries in past reports to the Alaska Board of Fisheries (BOF), those reports have primarily focused on providing summary stock status information. In contrast this report is intended to provide a more detailed annual review of the fisheries from the perspective of the Area Management Biologists who are responsible to prosecute the fisheries based on current regulations, size, and composition of returns, herring behavior, participation levels, and changing market conditions.

REGIONAL OVERVIEW

All commercial herring fisheries are managed according to the *Herring Management Plan for Southeastern Alaska* (5AAC 27.190). This plan requires the department to: a) identify herring stocks on a spawning area basis, b) establish spawning biomass thresholds below which no fishing will occur, c) assess the abundance of mature spawning herring before allowing fishing, d) allow harvest rates of 10%–20% of the estimated spawning biomass above the threshold, e) consider sources of herring mortality when setting guideline harvest levels (GHL), and f) modify fishing periods to minimize incidental mortality during fisheries. Threshold levels for various herring stocks are shown in Table 1.

In Southeast Alaska during the 2010/2011 and 2011/2012 seasons, commercial fisheries within state waters took place on 6 herring stocks including Sitka Sound, Seymour Canal, Hoonah Sound, Ernest Sound, Craig-Klawock, and West Behm Canal. Within the geographic region but outside of state jurisdiction an additional fishery took place within waters of the Annette Island Reservation. Age-structured analysis (ASA) models provided the basis for forecast returns to Craig-Klawock, Sitka Sound, and Seymour Canal. Biomass accounting methodology was used to forecast returns to Hoonah Sound, Hobart Bay/Port Houghton, Ernest Sound, and West Behm Canal. In recent years fisheries have occurred in Hobart Bay/Port Houghton and Tenakee Inlet,

however no fisheries occurred in these areas during the 2010/2011 and 2011/2012 seasons because stock forecasts were below threshold levels.

For the 2010/2011 and 2011/2012 seasons, the total regional harvest by common property winter food and bait fisheries is confidential because less than 3 permit holders participated in the fishery. Harvest and value in the winter food and bait fishery have been relatively stable for the past 10 years with an average harvest of 613 tons and fishermen receiving on average around \$320/ton. The total regional harvest for gillnet sac roe fisheries in 2011 is confidential but was below the recent 10-year average of 1,130 tons. In 2012 a GHF was established for the Seymour Canal fishery with processors and permit holders on the grounds to participate but no gillnet sac roe harvest occurred, making 2012 the first season since the early 1970s that there was no harvest in this fishery. Details of the 2012 Seymour Canal fishery are provided in the drift gillnet sac roe section of this report. The total regional harvests for purse seine sac roe fisheries were 19,419 tons in 2011 and 13,231 tons in 2012. This compares to the recent 10-year average harvest of 13,000 tons. The estimated exvessel value of the purse seine sac roe fishery in 2011 was \$5.2 million and in 2012, though prices are not yet finalized, the minimum exvessel value was \$8.5 million. The total regional harvest of SOK product in 2011 was 264 tons with an exvessel value of \$2.5 million and in 2012, 285 tons was harvested with an exvessel value of \$6.2 million. The total SE Alaska herring and herring SOK harvest in 2011 was 20,713 tons with an exvessel value of approximately \$8.0 million and in 2012 the total harvest was 14,068 tons with an exvessel value of approximately \$14.9 million.

Other stocks were only observed by aerial surveys and on that basis were considered to be below threshold. In 2011 and 2012 fishery managers observed herring spawning in various additional locations that are not associated with fisheries including: Port Frederick, Excursion Inlet, Port Camden, Stephens Passage, Bradfield Canal, Pat's Creek, Eastern Passage, Farragut Bay, Kassin Bay, Sea Otter Sound, East Behm Canal, and Chilkoot Inlet. Spawning was reported in other areas by the public but not directly observed by the department.

WINTER FOOD AND BAIT FISHERIES

REGULATORY FRAMEWORK

Gear, Seasons, Permits and Areas

The Southeast Alaska winter food and bait herring fishery is an open access fishery. The season provided in regulation (5AAC 27.110) is from October 1 through February 28, however, fisheries are opened only during periods established by emergency order. In recent years the fishery has opened during the first week of December, though the 2011/2012 season opened November 25. Product quality, based on oil content of herring, peaks in mid-winter, and December timing has worked for the department to complete forecasting for each stock. Harvest is allowed by regulation (5AAC 27.110) in Districts 1–10, 12, 14, and 16 and Sections 11-B, 11-C, 13-A, 13-B south of Aspid Cape, and 15-A, except for areas managed for purse seine and set gillnet sac roe fisheries and in designated closed waters. Lawful gear for the fishery includes purse seine and gillnet, however only purse seine gear has been used in the fishery. Purse seines may be 200 fathoms in length and 1,700 meshes in depth, except that in Section 12-A a depth of 2,125 meshes may be allowed by emergency order. The food and bait herring fishery is managed using permits issued by the department (5AAC 27.179). The permit specifies a date when an individual can begin fishing, during a 14-day period after the permit was issued. In addition the

permit can specify harvest limits, open areas, reporting requirements, or other conditions necessary for conservation and management of the resource. Permits are used by the department to determine if on-the-grounds management is necessary, for reporting procedures to track progress of harvests, to obtain more detailed information if needed via logbooks, and to ensure sufficient biological sampling is done to monitor herring age-weight-length (AWL) in the harvest.

Allocations

Since winter food and bait fisheries have not consistently harvested all of the available GHLS during recent years, the BOF has established allocations of herring GHLS by area to include multiple uses. These allocations were made to continue to provide for bait harvests, but also to allow for the economic development of higher valued fisheries. Each of the 4 areas that have been used for winter food and bait harvests during recent years is provided with an allocation scheme that changes over the course of the season.

For the Craig/Klawock fishery in Section 3-B 60% of the GHL is allocated for the bait fishery and 40% is allocated to the SOK pound fishery. Any portion of the guideline harvest level not taken during the winter food and bait season, which closes February 28, is added to the GHL for the SOK pound fishery for that season, which is announced by March 15.

For the Ernest Sound fishery in District 7 the GHL is initially allocated to provide 10% for the bait pound fishery and 90% for the winter food and bait fishery. If there are no active bait pounds by March 15, then any remaining GHLS from both the bait pound fishery and the winter food and bait fishery are re-allocated to the SOK pound fishery for that season as long as the remaining GHL is greater than 50 tons.

For the Hobart Bay/Port Houghton fishery in District 10 the GHL is initially allocated to the winter food and bait fishery, and any portion of the GHL not taken by the close of the season is allocated to the set gillnet sac roe herring fishery.

For the Tenakee Inlet fishery in District 12 the GHL is initially allocated to provide 10% for the bait pound fishery and 90% for the winter food and bait fishery. If there are no active bait pounds by March 15, then any remaining GHLS from both the bait pound fishery and the winter food and bait fishery are re-allocated to the SOK pound fishery for that season as long as the remaining GHL is greater than 50 tons.

HISTORICAL SUMMARY OF WINTER FOOD AND BAIT FISHERIES

Regional Overview

Historical harvest records for winter food and bait herring fisheries are presented in Table 2 for the 44-year period from 1968/1969 through the 2011/2012 seasons. Shown are harvests from the 4 currently managed fisheries and also the combined harvests from other fisheries. Herring have been harvested from overwintering aggregations throughout the region. "Other areas" where cumulative harvests have exceeded 1 million pounds (500 tons) include: Revilla Channel, Tongass Narrows, Thorne Arm, and Behm Canal in District 1, Sea Otter Sound in District 3, Wrangell Narrows in District 6, Zimovia Strait in District 7, Keku Strait, Port Camden, and Tebenkof Bay in District 9, Seymour Canal and Auke Bay in District 11, and Necker Bay, Sitka Sound, Slocum Arm, Lisianski Strait, and Lisianski Inlet in District 13. Over the course of this period markets and harvests for bait herring from Southeast Alaska have declined due to the

lower cost and availability of herring from the East Coast and the substitution of squid for herring as bait. As fisheries were developed for herring sac roe and herring SOK, many stocks which formerly supported bait fisheries were re-allocated by the BOF to provide for fisheries of greater economic value. With growing demand, management policy has also changed. The Herring Management Plan for Southeastern Alaska was adopted in 1994. The management plan shifted harvest policy from targeting widely dispersed overwintering herring concentrations to management based strictly on spawning area populations. Based on this management plan recent fisheries have been limited to specific spawning populations. Fishery quotas are now based on assessment surveys from those areas and on the threshold-harvest rate policy in regulation. During recent years common property bait fisheries have been provided in 4 areas: the Craig area in Districts 3 and 4, Ernest Sound in District 7, the Hobart/Houghton area in District 10, and Tenakee Inlet in District 12. The harvestable surplus for each of these stocks is now seasonally allocated to winter food and bait and fresh bait pound for Districts 7 and 12, and following the winter food and bait season to either sac roe or to SOK fisheries pending available GHl.

Table 3 presents a summary of thresholds, forecasts, total GHl, and winter food and bait fishery GHl by area for the past 8 seasons.

Craig/Klawock Fishery

Herring have been harvested for food and bait since the 1973/1974 season in the Craig/Klawock area (Section 3-B). There has been harvest in all but 4 seasons since 1973 and every year since 1985. Since the 1973/1974 season the average GHl has been 1,083 tons with an average annual harvest of 608 tons. Peak fishing activity occurred from the 1987/1988 through the 1991/1992 season with an average GHl of 2,441 tons and an average harvest of 2,512 tons. Effort has significantly dropped in recent years with only 3 permits making landings in the 2011/2012 season, down from a high of 28 permits during the 1991/1992 season.

Ernest Sound Fishery

Winter food and bait herring fisheries have occurred intermittently since 1969 in the Ernest Sound area of District 7. The major fishery in District 7 primarily occurred near Deer Island throughout the 1970s with an average harvest of 500 tons. The fishery was then closed until the 1992/1993 season. It was reopened for 5 seasons between 1992 and 1999 and less than 25% of the available GHl was harvested with an average of 88 tons per season. District 7 was reopened in the 2003/2004 and 2006/2007–2010/2011 seasons for an average harvest during these 6 seasons of 240 tons. The 2011/2012 season was the seventh season the fishery has opened since the 1998/1999 season.

Hobart Bay/Port Houghton Fishery

In District 10, herring have been harvested periodically for food and bait since the 1973/1974 season in the Hobart Bay/Port Houghton area. From 1991 through 1997, the winter food and bait fishery harvested an average of 34% of the available GHls. Peak fishing activity occurred during the 1993/1994–1996/1997 seasons with an average harvest of 176 tons. Herring were last harvested for food and bait during the 1999/2000 season when 432 tons were harvested. Available GHls remained unharvested during the 2004/2005 and 2006/2007–2009/2010 seasons. Subsequently, the mature biomass has failed to meet threshold for the 2010/2011 and 2011/2012 seasons.

Tenakee Inlet Fishery

Tenakee Inlet has a long history of herring harvest. Prior to 1965, District 12 was open from June 15 through December 31 and a large reduction fishery quota of 19,000 tons was in effect for the combined area of Districts 9, 11, 12, and 13. Herring reduction fisheries ended in 1965 and no herring harvest occurred in Tenakee Inlet or any part of District 12 until 1972/1973, a period of 8 years. The present Tenakee Inlet winter food and bait fishery evolved after Southeast Alaska regulations were revamped in 1970. Changes in regulation resulted from an increasing demand to harvest spawning herring for the sac roe market which started in the late 1960s to early 1970s. These herring sac roe fisheries have been tightly controlled through the establishment of thresholds and quotas. Since processors with herring markets for food and bait did not want to take away from the more valuable but very limited sac roe quotas, winter food and bait areas were established apart from areas fished for sac roe. Winter food and bait harvests have taken place in Tenakee Inlet since the early 1970s. Historical spawn or stock assessment information prior to 1978 is not available. It is presumed that the stock was not very sizable until the 1980s as it would have been recognized in earlier literature or observed and recorded. The Tenakee spawning stock experienced high abundance in the 1980s followed by a decline. No harvest was allowed during the 1990/1991–1995/1996 seasons because the biomass was below threshold. A very large increase in the spawning biomass was observed in 1996 and a conservative fishery was re-introduced in the winter of 1996–1997 when the quota was set at 300 tons for a very conservative 2.8% exploitation rate. The biomass peaked in the 1998/1999 season with a GHF of 1,023 tons, and then declined through the 2004/2005 season. No harvest was allowed during the 2005/2006–2007/2008 seasons because the biomass was again below threshold. An increase in the biomass allowed for fisheries in the 2008/2009 and 2009/2010 seasons but biomass fell below threshold for the 2010/2011 and 2011/2012 seasons. In the early 2000s winter food and bait fishermen had difficulty harvesting the Tenakee quota primarily due to over-wintering herring remaining at depths not accessible to traditional seine gear but interest also declined due to weak herring bait markets. Herring fishermen successfully petitioned the BOF in 2006 to allow a seine depth of 2,125 meshes instead of 1,700 meshes. The new regulation applies only to Section 12-A (Tenakee Inlet).

Biomass estimates for the Tenakee Inlet herring population were determined from hydroacoustic surveys from 1979 to 1986, and from spawn deposition surveys from 1987 to present. Since the 1978/1979 season, herring biomass estimates have resulted in harvest quotas in 23 of the past 34 years with GHF's ranging from 200–1,700 tons.

Beginning in 2003 the BOF adopted regulations allowing any unharvested quota from the winter food and bait fishery to roll over to a newly created SOK fishery. Details relating to that fishery are given in the SOK section of this report.

Slocum Arm

Slocum Arm lies within Section 13-A, a designated winter food and bait area. Slocum Arm has been fished only 5 seasons and 4 of those seasons were consecutive from 1974/1975 to 1977/1978 and then was fished once more during the 1987/1988 season. The average harvest for these 5 seasons was 171 tons. The department has conducted aerial surveys of the Slocum Arm area opportunistically over the years. Since 2003, spawn in excess of 5 nmi has been recorded in 3 years: 2003, 2005, and 2012. In 2012, 7.0 nmi of spawn was recorded and the department conducted the first spawn deposition survey ever conducted in the area. The estimated spawning

biomass was approximately 11,000 tons making Slocum Arm the third largest spawning aggregation in Southeast Alaska in 2012. Future winter food and bait fisheries will be predicated on continued documentation of spawn through aerial and spawn deposition surveys and obtaining the necessary AWL samples to provide a forecast.

2010/2011 WINTER FOOD AND BAIT FISHERY

Craig/Klawock

The Craig/Klawock (Section 3-B) total GHL for 2010/2011 was initially published as 1,901 tons. This GHL was based on a 13.6% harvest rate on an ASA forecast of mature spawning biomass of 13,980 tons. In Section 3-B the harvest limit for the bait fisheries is 60% of the GHL and the harvest limit for the SOK fishery is 40% of the GHL. The bait fishery GHL for 2010/2011 was 1,140 tons. Due to issues with scale aging, this forecast and GHL was later modified prior to the SOK fishery in March, 2011.

The food and bait fishery opened in the Craig/Klawock area on December 1, 2010, and closed by regulation on February 28, 2011. Harvest information for the 2010/2011 winter food and bait fishery is confidential with less than 3 permit holders making landings.

Ernest Sound

The preliminary 2010/2011 GHL for Ernest Sound (District 7) herring stock was 529 tons and was based on a 2,500 ton minimum threshold, a mature spawning biomass forecast of 4,543 tons, and a harvest rate of 11.6%. The forecast predicted the spawning stock would be comprised primarily of age-5 herring. The winter food and bait fishery was allocated 476 tons with 53 tons allocated to the bait pound fishery. The 2010/2011 preliminary biomass forecast for District 7 was recalculated in February 2011 due to changes caused by re-aging of herring. The 2011 re-aged forecast for Ernest Sound was 5,080 tons. This changed the available GHL for the fishery to 613 tons based on a 12.1% harvest rate. The re-aged data also suggested the stock would consist primarily of age-4 herring. The 2010/2011 winter food and bait fishery received minimal effort with less than 3 vessels harvesting herring and harvest numbers remain confidential. No bait pound herring harvest occurred.

Hobart Bay/Port Houghton

The 2010/2011 Hobart Bay/Port Houghton (District 10) forecast of mature spawning biomass was 253 tons, which was well below the threshold of 2,000 tons that allows for a fishery.

Tenakee Inlet

The Tenakee Inlet (Section 12-A) fishery was not opened for the 2010/2011 season. In the spring of 2010 approximately 2.6 nmi of herring spawn was documented for the Tenakee herring spawning population, well below the 10-year average of 9.3 nmi of documented spawn. Aerial spawn surveys and spawn deposition dive surveys conducted in 2010 suggest a continuing decrease in spawning biomass. Based on the small amount of spawn documented in 2010, it was assumed there would be no available GHL for commercial fisheries in 2011 so no forecast was generated.

2010/2011 Regional Summary

With less than 3 vessels participating in the fishery regionally, harvest information is confidential.

2011/2012 WINTER FOOD AND BAIT FISHERY

Craig/Klawock

The Section 3-B (Craig) total GHL for 2011/2012 was 6,847 tons. This GHL was based on an ASA forecast of mature spawning biomass for the Craig/Klawock herring stock of 34,235 tons. Based on a 20% harvest rate, 6,847 tons were available for commercial harvest. In Section 3-B, the harvest limit for bait fisheries is 60% of the total GHL, and the harvest limit for the SOK fishery is 40% of the total GHL. The bait GHL for 2011/2012 was therefore 4,108 tons.

The food and bait fishery opened in the Craig/Klawock area on December 1, 2011 and closed by regulation on February 28, 2012. During the 2011/2012 winter food and bait fishery 3 permit holders harvested 309 tons of the 4,108 ton GHL. Total ex-vessel value for the fishery was \$113,784.

Ernest Sound

The 2011/2012 GHL for the Ernest Sound (District 7) herring stock was 272 tons. This was based on a 2,500 ton minimum threshold, a forecast of 2,682 tons for mature spawning biomass, and a harvest rate of 10.1%. The forecast predicted the spawning stock would be comprised primarily of age-4 and -5 herring. The winter food and bait fishery was allocated 245 tons while the remaining 27 tons was allocated to the bait pound fishery. The 2011/2012 winter food and bait fishery received minimal effort with less than 3 vessels participating in the fishery and harvest numbers remain confidential. There were no participants in the bait pound fishery.

Hobart Bay/Port Houghton

The 2011/2012 Hobart Bay/Port Houghton (District 10) forecast of 599 tons was well below the 2,000 ton threshold. Therefore, no fisheries occurred in the Hobart Bay/Port Houghton area.

Tenakee Inlet

The 2011/2012 Tenakee Inlet (Section 12-A) fishery was not opened. In the spring of 2011 approximately 1.0 nmi of herring spawn was documented for the Tenakee herring spawning population, well below the 10-year average of 8.2 nmi of documented spawn. Spawn deposition dive surveys were not conducted in 2011. It was assumed that the biomass was well below threshold and there would be no available GHL for commercial fisheries in 2012. Total documented spawn in the spring of 2012 was 4.6 nmi.

2011/2012 Regional Summary

Regional harvests in the 2011/2012 winter food and bait fishery remain confidential since less than 3 vessels participated in the Ernest Sound fishery. Regional herring bait fisheries continue to be important in supporting regional longline and shellfish fisheries.

DRIFT GILLNET SAC ROE FISHERIES

REGULATORY FRAMEWORK

Limited Entry

The Southeast Alaska set gillnet herring fishery is managed under a limited entry program administered by Commercial Fisheries Entry Commission (CFEC). There are 111 permanent limited-entry permits and no interim-entry permits (CFEC website www.cfec.state.ak.us/)

[fishery_statistics/permits.htm](#)). The most recent market value of permits for the fishery is \$13,000, down from \$16,000 in 2011.

Gear, Seasons and Area

A brief summary of required gear is as follows: Statewide gillnet regulations specify mesh not less than 2 1/8" or greater than 2 1/2" (5AAC 27.050 (c)). In the Southeast Alaska Region gillnets must be set with an anchor at both ends and buoyed and marked at both ends. Buoy tags issued by ADF&G each season are also required on buoys at both ends of the net (5AAC 27.131 (g)). Gillnets are limited to 50 fathoms in length and 120 meshes in depth (5AAC 27.131 (a) and (e)). Provisions adopted at the 2006 BOF meeting in Ketchikan allow 2 CFEC permit holders to jointly operate a 75 fathom net provided both are aboard and with specified marking (5AAC 27.131 (i)). To prevent confusion, all permit holders wishing to register as "dual permit holders" were required to do so aboard the state vessel on the fishing grounds. Until 2011, regulation provided a mesh requirement for the West Behm Canal (Sections 1-E and 1-F) fishery specifying a minimum mesh size of 2 1/4". However, in October 2010 the BOF accepted an emergency petition and took action to repeal the special mesh requirement for the West Behm Canal fishery, so statewide mesh restrictions would apply for the 2011 season in West Behm Canal. Regulations provide for a 1-hour grace period to remove gear from the water after a fishery closing time is announced.

Set gillnet sac roe herring fisheries are provided in 4 locations under 5AAC 27.110 under seasons established by emergency order. The Kah Shakes fishery is located in Section 1-F north of Form Point to Foggy Point and south and east of Point Sykes to Twin Island Light. The West Behm fishery is located in Section 1-E and in Section 1-F north of Vallendar Point with closed waters in Clover Pass, Tongass Narrows, Moser Bay, and Naha Bay. The Hobart Houghton fishery is located in District 10 east of a line from Cape Fanshaw to Five Finger Light to McDonald Rock Buoy to Point League. The Seymour Canal fishery is located in Section 11-D, and in recent years the fishery has been expanded to adjacent areas of the Glass Peninsula in Section 11-C by emergency order.

5 AAC 27.162 specifies buyer and tender registration and reporting requirements needed to provide for an orderly fishery.

Allocation

Inseason allocation regulations adopted by the BOF for each current fishery are as follows:

For West Behm Canal, Section 1-E, 10% of the available GHF is for bait pound harvest and 90% is available for sac roe harvest. A management plan for the West Behm fishery provides for alternate-year access for either set gillnet or purse seine when a GHF is provided (5AAC 27.197).

For Kah Shakes in Section 1-F, the allocation is entirely available for the set gillnet sac roe fishery.

For Hobart/Houghton in District 10 the GHF is available for winter food and bait until the bait fishery closes by regulation on February 28. All of the GHF not harvested in the winter food and bait fishery is re-allocated to the set gillnet sac roe fishery,

For Seymour Canal in Section 11-D the GHF is entirely available for the set gillnet sac roe fishery.

HISTORICAL SUMMARY OF THE SET GILLNET SAC ROE FISHERY

Historical harvest records and participation levels for the gillnet sac roe herring fisheries are presented in Table 4 from the spring 1976 through spring 2012 seasons. The largest gillnet sac roe harvest was 3,146 tons in 1984 and harvests above 2,000 tons only occurred during the 6-year period from 1981–1986. The long term average harvest in the gillnet sac roe fishery is 1,226 tons. Historically, the largest harvests were from the Kah Shakes fishery in Revilla Channel south of Ketchikan with average harvests during years fished of 1,174 tons and average participation by 108 permits. This fishery occurred every season except 1990 during the period 1976–1998. In 1999 a GHL of 870 tons was established, but due to lack of herring present in state managed marine waters, the fishery was not opened and no herring were harvested. No fishery and little herring spawning has occurred in Revilla Channel since 1998, although drift gillnet fisheries have continued annually nearby within the Annette Island Reservation to the west of Revilla Channel.

Seymour Canal was re-allocated from combined purse seine and drift gillnet to drift gillnet only sac roe fishery in 1980 (Tables 4 and 5). Gillnet fisheries have occurred from the spring of 1981 intermittently through 2012, with average harvests during years fished of 674 tons and average participation by 71 permits. During recent years the fishery has occurred annually since 1998 with the exception of 2012. During the most recent 10-year period harvests have averaged 870 tons, with an average of 59 fishermen participating. In 2012, a GHL was established for Seymour Canal, however no harvest occurred making this the first season since 1976 that there was no harvest in the gillnet sac roe fishery. The reason no harvest occurred in 2012 is explained later in this report.

Hobart Bay/Port Houghton was formerly a winter food and bait area but GHLS in the area were not consistently taken by this fishery. In 1997 the fishery was changed by the BOF to include a sac roe gillnet fishery with a GHL based on the remaining GHL not harvested in the food and bait fishery by the end of the season on February 28. Sac roe harvests have occurred in the Hobart/Houghton area intermittently over the past 16-year period 1997-2012. For years the fishery has been opened the average harvest was 350 tons.

The West Behm Canal area was re-allocated by the BOF in 2003 from a bait area to an alternate-year set gillnet or seine sac roe fishery, with allowance for a bait pound fishery on 10% of the available GHL. A GHL of 1,042 tons was available for a gillnet fishery in the spring of 2004, however based on management concerns over insufficient spawning biomass in the area the fishery was not opened and no herring were harvested. The spawning biomass remained below threshold levels through the 2010 season. In 2011 the forecast biomass was again above threshold and a 1,276-ton GHL was established for the gillnet sac roe fishery. The majority of the biomass spawned in closed waters and only a small amount of herring was harvested. The stock was above threshold again in 2012 and a GHL was established for harvest in the purse seine fishery.

Some limited gillnet harvest occurred in Lynn Canal in the late 1970s in addition to seine harvest (Table 5). The area was re-allocated to seine harvest only in 1980, but the area has not been opened to fishing since 1982.

2011 GILLNET SAC ROE FISHERIES

Hobart Bay/Port Houghton and Kah Shakes were below biomass thresholds needed for fisheries to occur.

Seymour Canal

The 2011 spawning biomass forecast for Seymour Canal (District 11) was 6,697 tons, sufficient to allow a GHF of 835 tons for the gillnet fishery. The advance notice of placing the Seymour Canal gillnet sac-roe fishery on 2-hour notice was issued on April 25 after developing spawn was observed on an aerial survey and was effective 6:00 p.m., April 26. Shortly after the arrival of management staff on the grounds at approximately 6:00 p.m., April 26, managers and industry decided to open the fishery at 7:00 p.m., 1 hour prior to the earliest time stated in the initial news release for the fishery to open. The decision was acceptable to all parties as the 1 participating processor and all but 1 participating permit holders were present. Because the single participating processor wanted to harvest less than a third of the GHF, management staff did not remain on the grounds throughout the entire fishery. After assuring all regulatory requirements were met and adequate samples of the commercial harvest were obtained, staff left the grounds. Once the processor's tenders were filled to their desired capacity, industry left the grounds as well, and no further harvest was reported. The area remained open until May 11 when the spawn event was confirmed to be over. The total harvest and value is confidential because only 1 processor participated in the fishery.

West Behm Canal

The forecast of mature herring biomass for West Behm Canal (Section 1-E) in 2011 was 11,864 tons. A GHF of 1,418 tons was set for 2011, of which 141 tons were allocated to the bait pound fishery leaving 1,276 tons to be harvested in the gillnet sac roe fishery. A set gillnet fishery occurred on April 11, however it was unsuccessful because the majority of the biomass spawned in closed waters.

ADF&G staff conducted 19 aerial surveys between March 18 and April 14. They observed a buildup of herring in the Vallenar Bay and Clover Passage area beginning in early April. This buildup was monitored by aerial surveys and sonar aboard the R/V *Medeia* which was in West Behm Canal April 2–April 13. Herring spawn was first observed on April 7 when 12-hour notice was announced. On April 8, the fishery was placed on 2-hour notice. When more extensive spawning activity started on April 10 the fishery was opened at 10:30 a.m., April 11. Herring spawn was documented in Vallenar Bay and Bond Bay, areas open to commercial fishing, but the majority of spawn occurred in waters closed to commercial fishing, including Clover Pass and the north end of Tongass Narrows. Very little effort took place during this fishery and the harvest information remains confidential as only 1 processor participated.

2012 GILLNET SAC ROE FISHERIES

West Behm Canal (Section 1-E) Management Plan provides for purse seine and gillnet sac roe fisheries in alternate years and 2012 was a seine year.

Seymour Canal

The 2012 spawning biomass forecast for Seymour Canal was 9,135 tons, sufficient to allow a GHF of 1,287 tons for the gillnet fishery. The advance notice of placing the Seymour Canal

gillnet sac-roe fishery on 2-hour notice was issued on April 23 after increasing numbers of predators had been observed for a week and spawn was observed in nearby Hobart Bay on April 21 and 22. Historically, spawning in Seymour Canal usually occurs shortly after spawn is observed in Hobart Bay. ADF&G staff arrived on the grounds on the R/V *Medeia* early in the evening of April 23. Skiff, sonar, and aerial surveys were conducted daily to monitor herring behavior and location. An intense spot spawn was observed on April 27, and 2 other small, light spawns were observed on May 5. Beginning May 6, spawning began along the western Glass Peninsula shoreline and active spawn was documented daily through May 12, usually a mile or less per day. Observations from the department's aerial, skiff, and sonar surveys as well as observations and test sampling results from industry were shared and discussed with fishermen and processors on an ongoing basis. It was agreed by all that the observed spawn was never accompanied by an adequate volume of herring to support a viable commercial fishery, and the daily decision to not open the fishery was supported by the processors and fishermen on the grounds. On Thursday, May 10, staff left the grounds assuming little spawning activity would occur during the forecast gale. However, an industry pilot reported 3 miles of active spawn, the peak of the 2012 spawn event, on May 11. Gale force winds and seas in the area of the spawn prevented any opportunity for fishing due to safety concerns. On May 12 the weather abated and Juneau management staff joined the R/V *Kestrel*, which had arrived on the grounds to conduct spawn deposition dive surveys on the evening of May 11. Again, fishermen, processors and the department agreed that insufficient volumes of fish were present for a viable commercial fishery, and the remaining fishing boats and tenders soon left the grounds without a fishery being prosecuted.

PURSE SEINE SAC ROE FISHERY

REGULATORY FRAMEWORK

Limited Entry

The Southeast Alaska purse seine herring sac roe fishery is managed under a limited entry program administered by CFEC. There are 46 permanent limited-entry permits and 4 interim-entry permits for a total of 50 permit holders (CFEC website www.cfec.state.ak.us/fishery_statistics/permits.htm). Recently the market value of permits for the fishery was \$394,000, down from a historically high value of \$540,000 in 2011.

Gear, Seasons, and Area

Allowable purse seine gear in Southeast Alaska may be up to 200 fathoms in length and 1,700 meshes in depth (5AAC 27.132). Statewide regulations for sac roe fisheries allow for management to enhance the value of landed product by setting fishing periods when sampling has demonstrated that roe content is maximal, when size of herring is maximal, and to minimize the harvest of recruit-sized herring (5AAC 27.059). Seine fishing seasons in the sac roe fishery are provided only by emergency order (5AAC 27.110). Regulations provide for one area where purse seine and set gillnet gear alternate between seasons and 2 exclusive purse seine areas. Seining alternates with gillnetting in the West Behm Canal fishery in Section 1-E and Section 1-F north of Vallenar Point with waters of Clover Pass and Tongass Narrows closed (5AAC 27.110 (b) and 5AAC 27.150 (h)). Seining is provided in the Lynn Canal fishery in Section 11-A north of the Shrine of St. Terese and in Sections 15-B and 15-C (5AAC 27.110 (b)). Seining is provided in Sitka Sound in Section 13-B north of the latitude of Aspid Cape. In 2009 the BOF

clarified regulations to include fishing in Salisbury Sound in Section 13-A south of Point Kakul (5AAC 27.110 (b)).

Sitka Management Plan and Harvest Rate Policy

In addition to the Herring Management Plan for Southeastern Alaska Area (5AAC 27.190), the Sitka Sound herring fishery is managed according to Sitka Sound Commercial Sac Roe Herring Fishery Management Plan (5AAC 27.195) to distribute the commercial harvest by fishing time and area if the department determines that it is necessary to ensure that subsistence users have a reasonable opportunity to harvest the amount of herring spawn necessary for subsistence uses specified in (5AAC 01.716 (b)). In 2009 the BOF increased the Amount Necessary for Subsistence finding from 105,000–158,000 pounds to 136,000–227,000 pounds.

Prior to the 2010/2011 season the harvest rate for the Sitka Sound sac roe herring fishery was between 10% and 20% when the spawning biomass exceeded 20,000 tons. In 2009 the BOF modified the minimum threshold size for a fishery to 25,000 tons and changed the minimum harvest rate at minimum threshold to 12% (5AAC 27.160 (g)). The newly adopted regulations were in effect beginning with the 2010 fishery.

Buyer and Tender Requirements

Regulations address Buyer and Tender Reporting Requirements for the Sac Roe Herring Fishery in the Southeastern Alaska Area (5AAC 27.162). In summary this regulation ensures that buyers or their agents before each season provide the department information concerning daily processing capacity and tending vessels, provide daily inseason reports of herring purchased, submit accurate fish tickets with final weights and roe percentages within 10 days after the season, provide on-the-grounds estimates of weight purchased and roe percentages on fish tickets when requested by a fisherman, specifies that separate fish tickets are required for each separate delivery, and specifies that copies of fish tickets accompany deliveries to the point of landing.

Allocation

The West Behm Canal herring stock is allocated to provide 10% of the GHL to the herring bait pound fishery and 90% to the sac roe fisheries. When thresholds are met, the sac roe fishery is alternated between set gillnet and purse seine fisheries on successive years according to 5 AAC 27.197. This regulation provides for equal allocation of the guideline harvest level among CFEC permit holders. At the 2012 BOF meeting the West Behm Canal commercial herring fishery was changed from an alternating purse seine/gillnet fishery to a gillnet sac roe fishery only, while retaining the allocation of 10% of the GHL for the bait pound fishery. This change will not be in effect until the 2013 season.

The Lynn Canal fishery is allocated only to the purse seine sac roe fishery.

The Sitka Sound fishery is allocated to the purse seine sac roe fishery, with up to 100 tons of the GHL provided for the bait pound fishery (5AAC 27.160 (b) (2)).

HISTORICAL SUMMARY OF THE PURSE SEINE SAC ROE FISHERY

Lynn Canal and Seymour Canal

The first recorded harvest from Lynn Canal occurred in 1943 but it is believed unrecorded harvests occurred earlier. On average, 200–300 tons of herring were taken annually in herring pounds at Indian Cove, Auke Bay, and Tee Harbor from 1943 to 1967. These herring were sold

live and frozen for use as bait in commercial troll, crab, and groundfish fisheries. In the late 1960s and early 1970s most of the herring pound harvest was sold to Japan in the lucrative sac roe market. Harvests subsequently increased averaging close to 500 tons from 1968 to 1971. A purse seine fishery targeting sac roe product began in 1972, and in 1976 the BOF allocated 25% of the quota to the gillnet fleet. Herring harvests in Lynn Canal increased again in the 1970s averaging 700 tons from 1972 to 1978. No fishery was allowed in 1979 because the threshold biomass level was not reached. Then, through the BOF in 1980 the gillnet and purse seine gear groups agreed to assign 100% of the Lynn Canal harvest quota to the seiners and 100% of the Seymour Canal harvest quota to the gillnetters. Relatively large harvests occurred again in 1980–1982 averaging 760 tons. Since the last fishery in 1982, no commercial fishing has been allowed on this spawning stock because the biomass has remained below threshold level. Harvest records for the 2 gear types, seine and gillnet, are shown in Table 5.

Based on the Lynn Canal herring population decline in the late 70s and early 80s, perceived threats to habitat from planned development, and citing inadequacy of existing regulatory mechanisms, the Juneau Group of the Sierra Club petitioned the National Marine Fisheries Service on April 2, 2007 to list the Lynn Canal distinct population segment of Pacific herring as a threatened or endangered species under the Endangered Species Act. The National Marine Fisheries Service found the petition presented substantial scientific and commercial information and therefore initiated a review of the Lynn Canal herring population. The Biological Review Team issued a report in March 2008 concluding the Pacific herring in Lynn Canal are not a distinct population segment as defined by the ESA. Therefore the petition was denied and no risk analysis was initiated.

Sitka Sound

In the early 1960s the herring population in Sitka Sound was managed for bait harvest. For a 5-year period, from 1964 through 1968, there was also a commercial fishery that harvested wild kelp with herring spawn. The first harvest of herring for sac roe occurred in Sitka Sound in 1969, and sac roe harvests were also reported from various locations throughout the region beginning in the early 1970s. Spring season harvests in Sitka Sound from 1969 to 1978 averaged 664 tons, and landings initially were a mixture of sac roe and bait deliveries (Table 7). Average documented spawn during this period was 11.5 miles. In 1977 the purse seine herring roe fishery was placed under limited entry with 38 permanent and 21 interim permits issued. Also in 1977, to protect the herring stock from excessive harvest pressure, a threshold harvest policy was implemented requiring documentation of 6,000 tons of herring before fisheries would be conducted. During the first year of limited entry no fishery was conducted because hydroacoustic assessments estimated only 5,650 tons of herring were present. A small fishery at a conservative 5% harvest rate was conducted in 1978 on a GHL of 250 tons with a harvest of 234 tons despite downward adjustment of the forecast biomass below threshold to 4,500 tons based on observations of high numbers of age-2&3 herring. In 1979 the Sitka Sound herring population increased substantially with a forecast biomass of 20,000 tons, and a GHL of 2,000 tons. The harvest was 2,600 tons, and spawning increased to 41 nmi. Based on an average price of \$2,188/ton the 48 participating fishermen in 1979 produced a total exvessel value of \$5.6 million, and earned \$117,000 per permit (Table 8). Since the 1978 season the Sitka Sound herring sac roe fishery has been conducted annually for 34 consecutive years.

Stock assessment methods, approaches to management, and regulations have been changed throughout the history of the fishery. Discussions of harvest rate policy by the Sitka Advisory

Committee led to acceptance of a 10% harvest rate in 1979, and in 1983 the Sitka Advisory Committee developed a harvest rate policy of 10–20% based on 2% increments in harvest for each multiple of a 7,500 ton fishery threshold. The stock was evaluated each year by the department using hydroacoustic estimates from 1971 to 1980. Spawn deposition dive surveys first began in 1976 and were primarily used to evaluate the size of the spawning stock from 1981 to 1993. Beginning 1994 the department incorporated data from spawn surveys along with herring age information into an age-structured-analysis model which was used as a basis for forecasting returns and establishing quotas. As the herring stock increased over the years, harvests increased, as well as public concerns. In 1997 a new threshold and harvest rate policy was adopted by the BOF establishing a 20,000 ton threshold for a 10% harvest rate and increasing to a 20% harvest rate at 45,000 tons. Following the 2001 season, due to concerns expressed by subsistence users about potential impact of the commercial harvest on subsistence uses, a management plan was developed incorporating the goal of harvest distribution into fishery management. From 2002 to 2009 a memorandum of agreement (MOA) between ADF&G and the Sitka Tribe of Alaska was in place to facilitate collaborative efforts in consideration of subsistence uses of herring. Sac roe fishery participants began to question provisions within the MOA that provided the Sitka Tribe of Alaska privileged access to information and to management biologists inseason that was not available to other participants in the fishery. Consequently, the MOA was cancelled by the department in 2009. In 2009 the BOF increased the harvest threshold level to 25,000 tons and the minimum harvest rate to 12%.

Harvests in the Sitka Sound sac roe herring fishery have averaged 8,400 tons from 1979 through 2012 (Table 8). The estimated pre-harvest mature spawning biomass has averaged 62,600 tons over this time period, for an overall average harvest rate of 13%. Since early in the history of the fishery openings have been carefully planned and located in order to maximize roe content and overall value of the product. The fishery is a competitive fishery although voluntary, cooperative-style fisheries have been used to harvest the entire GHL (1988, 1989, 1991, 1993) or portions of the GHL (1996, 1999, 2002, 2005, 2006, 2007). When used to harvest the entire GHL this management approach was used to maximize roe recovery and quality when considered necessary; during years when only part of the GHL was taken cooperative fisheries were used to provide access to small remainders of the season's GHL to avoid exceeding the GHL. Over the recent 5-year period 2008–2012, the estimated pre-harvest mature spawning biomass has averaged 105,000 tons and the harvest has averaged 15,900 tons. With larger seasonal GHLs during recent years the fishery has been managed by providing for multiple openings to accommodate freezing capacity and to maximize the quality of frozen product. Since 2002 the fishery has been managed to provide for dispersal of open fishing periods by time and area in order to minimize perceived impacts on the subsistence harvest. Under limited entry status participation by fishing vessels has been consistent at 49–52 fishing vessels annually. As of the 2012 season, there were 47 permanent permits and only one remaining interim use permit eligible to participate in the fishery. Vessels supporting the fishery as tenders have averaged 85 since 1979 and have linked the fishery to processing at ports throughout Southeast Alaska and into British Columbia when necessary. The exvessel value of the fishery has averaged \$5.2 million since 1979 and \$9.5 million over the recent 5-year period from 2008 to 2012.

2011 SITKA SOUND FISHERY

Fishery Summary

The forecast biomass of mature herring returning to Sitka Sound in the spring of 2011 was 97,449 tons and, based on a 20% harvest rate the GHL was 19,490 tons (Table 6).

A total of 48 permit holders and 7 buying companies (6 domestic and 1 Canadian processor) participated in the fishery and harvested 19,419 tons of herring with average mature roe content of 13.3 % (Table 9). In late January and early February, the department harvested 60 tons of bait herring as part of its winter test fishery program to gather winter AWL data. A total of 60 tons were harvested under permit for personal use bait. Total herring harvested for sac roe and bait in 2011 was 19,539 tons. In 2011, the final price for Sitka sac roe herring was around \$200/ton for 10% roe herring. Applying the 13.3% overall roe recovery for the fishery results in \$266/ton for a total estimated exvessel value of \$ 5.17 million. Additionally, it is estimated that approximately \$3.4 million was paid for tendering services at \$175/ton.

Sitka Sound Sac Roe Fishery Management Plan and Strategy

The department announced the final 2011 GHL of 19,490 on December 8, 2010. In March the department issued the 2011 Southeast Alaska Sac Roe Herring Fishery Management Plan as Regional Information Report 1J11-02. A pre-season meeting concerning Southeast Alaska herring sac roe fisheries was held between fishermen, processors, Sitka Tribe of Alaska representatives, and the department on February 23, 2011, at the NSRAA conference room in Sitka. Discussions at the pre-season meeting included a review of stock status, a review of the subsistence fishery, sac roe fishery management logistics, enforcement issues and development of a strategy to harvest the GHL in Sitka. Discussion concerning harvest strategy led to an interim plan to provide for 5 competitive fishery openings with at least 1 day off between openings to allow for processing.

On March 27 at 9:00 a.m. a general pre-fishery meeting was held in Sitka at the Centennial Building. This meeting is held each season immediately prior to the fishery going on 2-hour notice to ensure that all fishery participants are fully aware of requirements and plans for a coordinated fishery. By the time of this meeting the department processor registrations indicated that the total daily freezing capacity was around 2,100 tons/day including Canadian processors. Tendering capacity registered at that time was 7,700 tons by 78 vessels. In consideration of registered capacities, an adaptive harvest approach would be utilized, with 5 openings remaining in place as the interim plan.

Inseason Fishery Management

The department conducted the first aerial survey of the 2011 season on March 14. No herring were seen. All areas to the south of Sitka were quiet except for a few sea lions off Vitskari Rocks and inside of Silver Bay. North of Sitka there were a number of sea lions scattered from inside of Katlian Bay, along the shoreline from Lisianski Point to Dog Point, and off of Crosswise Island in Nakwasina Sound. Sea lions were also seen in Eastern Bay and in Hayward Strait. Additionally, 6 whales were seen off Halibut Point. In Salisbury Sound there was a large group of sea lions and 6 whales near the mouth of St. John Baptist Bay. The evening of March 15 a personal use bait harvest was sampled and resulted in 0.1% mature roe, 12.9% immature roe and 147 g average weight.

The next aerial survey occurred on March 16. No herring was seen and no significant change in herring predator distribution was noted. Changes were noted during an aerial survey on March 18 including a significant reduction of sea lions and whales in lower Salisbury Sound though 4 whales and heavy bird activity were seen north of Scraggy Island. South of Sitka there was an increase of bird activity in Eastern Channel area. Two seine boats attempted to obtain a sample on March 18 but were unsuccessful. Test samples taken on March 19, March 20, and March 22 all showed very low mature roe percentages.

On March 25, 3 test samples were taken with mature roe ranging from 4.5% to 9.5% and average weights of 163 to 174 g. With the increasing mature roe percentages it was announced the afternoon of March 25 that the fishery would go on 2-hour notice effective 8:00 a.m., March 28. The R/V *Kestrel* made a cursory survey of Salisbury Sound the evening of March 27, while transiting to Sitka and found several large schools between Scraggy Island and St. John Baptist Bay. The March 28 morning vessel survey found scattered herring schools from Old Sitka Rocks to Harbor Point, east of the Siginaka Islands, in the Promisla Bay area, and the north side of Crow Pass. The aerial survey found herring visible in shallower waters east of Middle Island, the south side of the airport causeway, Aleutkina Bay, and Thimbleberry Bay. Five test samples taken on March 28 had mixed results with mature roe ranging from 8.9% to 11.8%. It was announced at 2:00 p.m. that there would be no fishery.

During a vessel sonar survey on March 29 a large volume of herring consisting of numerous large schools was found along the Kruzof Island shoreline from Inner Point and continuing south for approximately 2 nmi. Weather did not allow for a sample to be taken from these herring. Approximately 20 whales were also seen in the vicinity. Two samples were taken north of town and 2 samples were taken south of town showing improving mature roe ranging from 10.8% to 12.4%, however, herring aggregations were not sufficient to prosecute a fishery.

On March 30, poor weather only allowed for a brief aerial survey to look for the development of spawn and no spawn was seen. Four test samples were taken ranging from 9.8% to 12.1% mature roe. A large volume of herring was seen in Promisla Bay during the vessel survey. A sample taken from Promisla Bay showed 11.8% mature roe, however, high female count, high immaturity (1.8%), and limited distribution of fish discouraged consideration of a fishery. There were a number of reports from industry spotter pilots of herring leading the beach along Halibut Point Road, though the vessel survey was unable to identify any significant volume in the waters offshore.

On March 31, a seine vessel surveyed the area north of Vitskari Rocks and reported a large volume of herring in the area. The R/V *Kestrel* found significant concentrations of herring along Halibut Point on up to Harbor Point but much of the biomass was in deeper waters and a test sample from south of Halibut Point indicated presence of small herring with only 7.9% mature roe. Three test samples taken from areas north of Middle Island and up into Eastern Bay resulted in mature roe recoveries of 11.7% to 14.2%. The vessel survey found a very high concentration of herring in Promisla Bay, and scattered large schools in Eastern Bay and along the western side of the Siginaka Islands. With high mature roe samples and a good volume of herring it was announced at 11:40 a.m. that a fishery would occur at 1:40 p.m. with no set closure time in an area of Sitka Sound north of Middle Island described as: north of 57°06.40' N. latitude, south of 57°10.63' N. latitude, east of 135°30.30' W. longitude, and west of a line from the northeasternmost tip of Middle Island to the southernmost Border Rock to the Big Gavanski Island Light to the Lisianski Point Light. This line excluded the high concentration of herring

seen in Promisla Bay. About 1 hour into the opening it was becoming evident that there was less volume in the open area than anticipated and catch rates were low. The R/V *Kestrel* continued to survey areas adjacent to the open area in hopes of finding additional volume to expand the open area. With the exception of the high volume in Promisla Bay, no significant volume of herring was found. The fishery remained open until 6:20 p.m., and the final harvest was 1,556 tons, with roe recovery of 13.3% (Table 9).

With the relatively small harvest the day before, surveying and test fishing resumed on April 1 to identify an opportunity to hold another fishery. The R/V *Kestrel* began surveying south of Sitka in the Eastern Channel area and found a large volume of herring on the west and south sides of Galankin Island with scattered smaller schools in Crescent Bay. Two samples were taken from the area, with one from near Galankin Island resulting in 13.0% mature roe and 153 g average weight, and a second from the middle of Eastern Channel that resulted in only 4.9% mature roe, 0.1% immature roe and 26% female. The second sample was thought to come from an isolated school that was not representative of the larger biomass. With ample volume and the potential for high roe recovery it was announced at 11:40 a.m. that the fishery would open at 1:40 p.m. with no set closure time in the Crescent Bay and Eastern Channel area described as the waters of Sitka Sound north of 57°00.00' N. latitude, east of 135°23.34' W. longitude, west of 135°18.02' W. longitude, and south of the Causeway, Japonski Island, Baranof Island, and the O'Connell Bridge. The fishery was closed at 2:50 p.m. with approximately 10 minutes advanced warning of the closure. The final harvest was 5,254 tons with overall mature roe recovery of 12.5%. It was announced later that evening that no fishery would occur until at least April 4 to allow time for processing the harvest.

On April 3, it was apparent that the herring biomass was centered on the south side of Sitka and the first spot spawn was recorded on the Crescent Harbor breakwater near Sheldon Jackson. On April 4, the spawn had expanded to about 0.1 nmi. The vessel survey on April 4 found a large volume of herring in Crescent Bay as well as a significant volume continuing to stage in the channel west of Galankin Island. A test sample from Crescent Bay yielded 13.0% mature roe and 0.1% immature roe and a second sample near Samsing Cove resulted in 14.2% mature roe and 0.0% immature roe. At 11:00 a.m., it was announced that a fishery would occur at 1:00 p.m. with no set closure time in an area described as the waters of Sitka Sound south of 57°02.17' N. latitude, east of 135°23.17' W. longitude, west of 135°17.21' W. longitude and north of the Baranof Island shoreline east of Cape Burunof except that all waters of Aleutkina Bay and Leesoffskaia Bay would be open and Deep Inlet would be closed east of 135°18.16' W. longitude. The fishery was closed at 1:50 p.m. with 5 minutes advanced warning of the closure time. The harvest from the opening was 5,173 tons with mature roe recovery of 13.8%. To allow for processing of the harvest another fishery was not anticipated until April 7.

On April 5, spawning had expanded to 0.6 nmi in Crescent Bay and spawning was beginning in Salisbury Sound where 2.1 nmi of spawn was recorded east of the Kane Islands. By April 6 spawning in Salisbury Sound had expanded to 2.4 nmi and spawning in Crescent Bay had expanded to 1.4 nmi. By April 7, processors were ready to harvest more fish. The preliminary inseason harvest estimate from the 3 previous openings was approximately 12,400 tons leaving approximately 7,100 tons of the GHL.

An aerial survey on April 7 showed spawning was continuing to expand in Salisbury Sound (4.7 nmi) and in Crescent Bay (2.5 nmi). The R/V *Kestrel* started the morning by surveying areas on the north side of Sitka finding only scattered smaller schools from the Breakwater to

Starrigavin Bay. Transitioning to the Eastern Channel area, large concentrations of herring continued to be staged in Crescent Bay and near Galankin Island. Two test samples from the Eastern Channel area continued to show high mature roe content. At 1:25 p.m., it was announced that a fishery would occur at 3:45 p.m. in an area described as the waters of Sitka Sound south of a line from the southernmost tip of Guertin Island to the Rocky Patch Light at 57°01.71' N. latitude, 135°18.40' W. longitude to a point due west at 57°01.71' N. latitude, 135°23.24' W. longitude, east of 135°23.24' W. longitude, west of 135°13.53' W. longitude, and north of the Baranof Island shoreline east of Cape Burunof except that all waters of Deep Inlet were closed east of 135°18.24' W. longitude. The fishery was closed at 4:55 p.m. with 6 minutes advanced warning of the closure time. The total harvest from the opening was 4,159 tons with overall mature roe recovery of 15.0%. With this level of harvest the next potential opening was not anticipated until April 9. Approximately 3,000 tons of herring remained of the GHL with the expectation of achieving that harvest in one more opening.

With the large harvest and weaker market conditions for sac roe, several of the participating processors indicated they were imposing a restriction on their fishermen to harvest only an amount equivalent to the sum of their boats equal share of the remaining GHL. The department contacted all of the processors to determine if all of the processors were taking the same approach since this would reduce concerns in managing the harvest in order to not exceed the GHL and possibly allow for a larger area to fish. However, 1 processor indicated that they were not imposing restrictions on the harvest level of their vessel. Another processor had reported that their boats would not be participating at all.

On April 9 spawning continued to expand in the Crescent Bay area with 6.0 nmi. The aerial survey found areas in the northern portion of Sitka Sound relatively quiet with no spawn occurring north of the Breakwater. Salisbury Sound had 2.6 nmi of spawn mostly at the mouth of Sukoi Inlet. The vessel survey continued to find a large volume of herring west of Galankin Island. Moderately dense layers of herring were seen off Jamestown Bay, Thimbleberry Bay and along the shoreline outside of Camp Coogan. A spotter pilot identified a moderate volume of herring near the Taigud Islands in Redoubt Bay, as well. A test sample from Redoubt Bay resulted in 10.7% mature roe, 0.1% immature roe, and 44% female. Another sample from Silver Bay had 10.9% mature roe 0.0% immature roe and 42% female. Outside of the large aggregation near Galankin Island, the vessel survey was not able to identify another concentration of herring and it was becoming unclear whether there was sufficient volume in the Eastern Channel area to harvest the remaining GHL. Other vessels surveying the area believed that there was sufficient volume with additional herring seen in Silver Bay. At 2:10 p.m. it was announced that a fishery would occur in the Eastern Channel area at 4:10 p.m. with no set closure time in an area described as the waters of Sitka Sound south of a line from Entry Point Light to Rocky Patch Light at 57°01.72' N. latitude, 135°18.41' W. longitude to the southernmost tip of Galankin Island at 57°01.55' N. latitude, 135°19.37' to a point due west at 57°01.55' N. latitude, 135°23.24' W. longitude, then east of 135°23.24' W. longitude, west of 135°13.51' W. longitude, and north of the Baranof Island shoreline east of Cape Burunof including all waters of Deep Inlet. The fishery was closed at 6:55 p.m. with 5 minutes advanced warning of closure time. The total harvest from the opening was 3,277 tons with overall roe recovery of 12.8% and the fishery was closed for the season.

The final harvest for the fishery as reported on fish tickets was 19,419 tons with an overall mature roe recovery of 13.3% (Table 8). The total fishing time for the season was 11.0 hours (Table 9).

2012 SITKA SOUND FISHERY

Fishery Summary

The forecast biomass of mature herring returning to Sitka Sound in the spring of 2012 was 144,143 tons and based on a 20% harvest rate the guideline harvest level (GHL) was 28,829 tons (Table 6).

A total of 48 permit holders and 7 buying companies participated in the fishery and harvested 13,231 tons of herring with average mature roe content of 11.9 % (Table 8). This final harvest was 46% of the established GHL. In early February, the department harvested 60 tons of bait herring as part of its winter test fishery program to gather winter AWL data. A total of 17 tons were harvested under permit for personal use bait. Total herring harvested in 2012 was 13,308 tons. This season, processors reportedly paid \$500–575/ton plus points for roe recovery over 10%. With the average roe recovery for the fishery at 11.9%, the price would be \$595-685/ton for an overall exvessel value of approximately \$7.9-\$9.1 million. Additionally, it is estimated that approximately \$2.3 million was paid for tendering services at \$175/ton.

Sitka Sound Sac Roe Fishery Management Plan and Strategy

The department announced the 2012 GHL of 28,829 on December 15, 2011. In March the department issued the 2013 Southeast Alaska Sac Roe Herring Fishery Management Plan as Regional Information Report 1J12-02. A pre-season meeting concerning Southeast Alaska herring sac roe fisheries was held between fishermen, processors, subsistence representatives and the department the evening of February 24, 2012, at the Ted Ferry Building in Ketchikan where the Southeast Alaska Finfish BOF meeting was occurring.

Discussions at the pre-season meeting included a review of stock status, a review of the subsistence fishery, sac roe fishery management logistics, enforcement issues and development of a strategy to harvest the GHL in Sitka. Discussion concerning harvest strategy led to an interim plan to provide for 6 competitive fishery openings with at least 1 day off between openings.

On March 25 at 2:00 p.m., a general pre-fishery meeting was held in Sitka at the Centennial Building. This meeting is held each season immediately prior to the fishery going on 2-hour notice to ensure that all fishery participants are fully aware of requirements and plans for a coordinated fishery. At the time of this meeting, processor registrations indicated a total daily freezing capacity of around 2,100 tons/day including Canadian processors was available for the fishery. Tender capacity registered at that time was 9,430 tons by 91 vessels. In addition, permit holders registered fishing vessel capacity of 1,275 tons. In consideration of registered capacities, an adaptive harvest approach would be utilized, with 6 openings remaining in place as the interim plan.

Inseason Fishery Management

The department conducted the first aerial survey of the 2012 season on March 13. No herring were seen. Predator activity in areas to the south of Sitka was characterized as minimal bird and sea lion activity. North of Sitka there were a few sea lions in the area around Harbor Point and

eastern shorelines of Big Gavanski Island and Middle Island, a large number of sea lions were seen in the outer portions of Katlian Bay and sea lions were also seen in Eastern Bay and Hayward Strait. Eight whales were seen scattered in the area from Halibut Point to the mouth of Katlian Bay and 2 whales were seen in Eastern Bay. In Salisbury Sound there were 25 sea lions scattered between Kane Island and St. John Baptist Bay and 2 whales were seen north of Kane Island.

The evening of March 15 a personal use bait harvest was sampled and resulted in 0.1% mature roe, 12.9% immature roe and 147 g average weight.

The next aerial survey occurred on March 19. Herring predators continued to be scattered throughout the northern areas of Sitka Sound. Approximately 280 sea lions and 23 whales were seen during the survey with the highest concentrations seen near Old Sitka Rocks and to the north along the Lisianski Peninsula. Ten whales were seen scattered in the area from Guide Island to Vitskari Rocks and 1 whale was seen near Makhnati Island. South of Sitka there were few herring predators observed except for approximately 40 sea lions seen in Silver Bay. A vessel made an effort to take a test sample but reported that the herring schools were holding in deeper waters and unavailable to seine gear.

An aerial survey on March 21 again found sea lions and whales concentrated in the area between Old Sitka Rocks and Dog Point with few herring predators seen outside of this area. In Salisbury Sound there were scattered small groups of sea lions from Kane Islands to St. John Baptist Bay. With the exception of Silver Bay there was no other notable concentration of herring predators observed south of Sitka. A test sample taken near Old Sitka Rocks resulted in 2.5% mature roe, 10.8% immature roe, 161 g average weight and 59% female.

On March 23, sea lions and whales continued to be concentrated in the area between the islands and Baranof Island shoreline from Halibut Point to Dog Point with additional sea lions scattered among the islands in the eastern portion of Sitka Sound. South of Sitka, in Silver Bay, there were 55 sea lions scattered along the south shoreline from the entrance to Bear Cove and 3 whales were near Entry Point. In the middle of Sitka Sound 6 whales were observed between Bieli Rock and Guide Island and 1 whale was north of Vitskari Rocks. There was little activity in the southern reaches of Salisbury Sound, though several whales were seen offshore south of Klokachef Island. A test sample was taken near Halibut Point and resulted in 8.2% mature roe, 4.9% immature roe, 165 g average weight, and 54% female.

On March 24, there was little change to the distribution of herring predators. A test sample taken near Old Sitka Rocks resulted in 6.4% mature roe, 5.7% immature roe, 154 g average weight, and 52% female.

On March 25, an aerial survey covered Sitka Sound from Cape Burunof to Salisbury Sound. Sea lions and whales continued to be seen in distribution similar to the past several days. No herring or spawn were seen. With increasing roe percentages seen in the previous day's sample and the anticipation that roe maturity would quickly increase over the next 2 to 3 days it was announced that the Sitka Sound sac roe herring fishery would be on 2-hour notice effective 11:00 a.m., Tuesday, March 27.

On March 26, an aerial survey covered Sitka Sound north of Cape Burunof. In northern Sitka Sound there was no substantial change in the distribution of sea lions and whales. An increase in the number of sea lions was noted along the Kruzof Island shoreline near Inner Point. South of

Sitka, a concentration of sea lions continued to be present in Silver Bay. Test samples were taken from 2 locations, Aleutkina Bay and Halibut Point, with 7.9% and 8.9% mature roe respectively.

On March 27, an aerial survey covered Sitka Sound north of Windy Passage. Herring predators were well distributed throughout the sound with significant concentrations observed east of Middle and Kasiana Islands, north of Inner Point, in Nakwasina Sound, in Katlian Bay and south of Sitka in Silver Bay. No test samples were taken.

The R/V *Kestrel* arrived on March 27 and conducted a sonar survey in the afternoon. The sonar found significant concentrations of herring off Mountain Point and between Halibut Point and Lisianski Point. Smaller concentrations were also noted in the Eastern Bay area and around Kasiana Island.

On March 28, an aerial survey covered Sitka Sound north of Cape Burunof. In northern Sitka Sound concentrations of sea lions and whales continued to be seen in the area between the islands and the Baranof Island shoreline from the north end of Kasiana Island to the entrance of Nakwasina Sound. Within this area, higher numbers of sea lions and whales were seen between Halibut Point and Middle Island. There were 40 sea lions and 2 whales off Inner Point. Smaller groups of sea lions and a number of whales were widely distributed around northern Sitka Sound. The R/V *Kestrel* surveyed the northern Sitka Sound area and found a large volume of herring between Halibut Point and Middle Island. Most of this volume was holding in deeper waters with scattered large schools breaking off toward the surface. Another large volume of herring was observed on the bottom in deep waters in the middle of Sitka Sound west of Gagarin Island. A number of large schools were observed in waters 25–40 fathoms deep just north of Inner Point and there were a number of scattered moderate size schools observed along the Lisianski Peninsula. Test samples for mature roe content were taken at Promisla Bay (9.2%), north of Inner Point (9.9%), Dog Point (8.1%), and Inner Point (10.9%).

On March 29 there was no significant change to the distribution of sea lions and whales. The R/V *Kestrel* surveyed north Sitka Sound and found significant concentrations of herring east of Middle Island, off Dog Point, and just north of Inner Point. Test samples were taken from East Middle Island and Inner Point with 8.4% and 5.9% mature roe, respectively. Both samples had low female counts.

On March 30, an aerial survey found sea lions and whales were distributed in a similar pattern to the previous day, with the greatest concentration seen between Halibut Point and Middle Island. At Inner Point there was a substantial increase in the number of sea lions from the day before. There were also 6 whales near Inner Point. The R/V *Kestrel* surveyed portions of northern Sitka Sound and Salisbury Sound. A very large volume of herring continued to reside in the area between Halibut Point and Middle Island. Most of this volume was holding in deeper waters with scattered large schools breaking off toward the surface. In Salisbury Sound there were a number of large schools scattered throughout the area from St. John Baptist Bay to Kane Island. Waters north of Kane Island were not surveyed. A permit holder reported spawning developing on north Middle Island. The R/V *Kestrel* transited to Middle Island from Salisbury Sound and found light spawning on the northwestern corner of Middle Island. A survey of waters adjacent to the spawn found only a small volume of herring in the area. Two test samples were taken from lower Salisbury Sound and St. John Baptist Bay with mature roe of 7.2% and 8.0%.

On March 31, an aerial survey covered Sitka Sound north of Cape Burunof and Salisbury Sound. In northern Sitka Sound concentrations of sea lions and whales continued to be seen in the area

between the islands and the Baranof Island shoreline from the north of Kasiana Island to the entrance of Nakwasina Sound. Within this area the higher numbers of sea lions and whales were seen between Halibut Point and Middle Island. A large number of sea lions continued to be staged near Inner Point. There were a number of whales scattered throughout the open waters between Inner Point and Crow Island, and 3 whales were seen near the Chaichei Islands. In Salisbury Sound there was a significant increase in sea lions and whale activity from Kane Islands into St. John Baptist Bay. The first recorded spawn was observed totaling 1.4 nmi primarily on Middle and Crow Islands. The R/V *Kestrel* extensively surveyed northern Sitka Sound and found scattered schools north of the breakwater, and a continuous band of herring was seen from the surface to a depth of 20 fathoms along the southeast side of Middle Island with the band narrowing to a depth of 10 fathoms and continuing around the north end of Middle Island. Scattered schools were seen in Eastern and Promisla Bays, and in Hayward Strait a substantial concentration of herring was seen between Guide Island and Rob Point. Test samples for mature roe content were taken at Promisla Bay (13.6%), N. Crow Pass (11.9%), and W. Big Gavanski Island (10.9%), and a sample that was taken near Guide Island was worked up on the grounds with 3 subsamples having roe recovery ranging from 11 to 16% indicating very good quality fish. Based on samples showing good quality herring in the areas north of Middle Island and Hayward Strait and a good volume of herring in the area, it was announced at 12:30 p.m. that a fishery would occur in the area at 2:30 p.m. The fishery was opened in the northwest portion of Sitka Sound that included waters of Hayward Strait, Promisla Bay, and Eastern Bay north of 57°06.02' N. latitude, south of 57°10.01' N. latitude, and west of a line from the northernmost tip of Crow Island to the northernmost tip of the Siginaka Island group to the Krestof Island shoreline. The fishery opened at 2:30 p.m. and closed at 5:56 p.m. The final harvest for the opening was 4,501 tons with an average of 13.7% mature roe.

There were no plans for a fishery on April 1 to allow for processing and rotation of tenders from the previous day's harvest. On April 1, an aerial survey covered Sitka Sound north of Dorothy Narrows to Hayward Strait. Concentrations of herring predators were observed along the Kruzof Island shore south of Mountain Point, along the south shore of Gagarin Island, and north of the Eliason Harbor Breakwater. During the aerial survey 8.8 nmi of active spawn was mapped, primarily around Middle, Crow and Gagarin Islands. Due to the rapidly expanding spawn it was announced during the 4:00 p.m. radio update that the fleet should be prepared for a possible opening the following day.

On April 2, an aerial survey covered Sitka Sound north of Cape Burunof to Krestof Sound. Spotting conditions were poor with overcast skies, intermittent rain and winds east 25–30 knots. During the brief aerial survey a total of 17.4 nmi of active spawn was recorded broadly distributed throughout northern Sitka Sound. Predator activity was not noted due to the poor flying conditions.

With the continued rapid expansion of spawning it was clear that opportunities to harvest good quality roe herring were quickly becoming limited. The R/V *Kestrel* was finding a substantial volume of herring in the passages of Hayward Strait and there was significant spawning beginning to develop in the Hayward Strait area. A single test sample was taken in Hayward Strait that resulted in 11.4% mature roe. The sample was taken adjacent to the herring spawn and no spawn-outs were seen in the sample. Given the continued presence of good quality herring and adequate volume, it was announced at 9:30 a.m. that a fishery would occur at 11:30 a.m. in the Hayward Strait area. The fishery was opened in the northwest portion of Sitka Sound that

included the waters of Hayward Strait and Krestof Sound north of 57°06.02' N. latitude, south of 57°13.00' N. latitude, and west of a line from the northernmost tip of Crow Island to Kresta Point. The fishery opened at 11:30 a.m. and closed at 4:40 p.m. The final harvest reported on fish tickets was 5,180 tons with an average of 11.6% mature roe.

Given the large harvest no fishery was planned for April 3. On April 3, an aerial survey covered Sitka Sound north of Cape Burunof to Salisbury Sound. A total of 20.8 nmi of active spawn was recorded broadly distributed throughout northern Sitka Sound. Predator concentrations were noted in Salisbury Sound, east of Inner Point, and south of the bridge. Herring Schools were observed in Hayward Strait. No vessel survey was conducted on April 3.

On April 4, an aerial survey covered Sitka Sound north of Cape Burunof to Salisbury Sound. A total of 14.1 nmi of active spawn was recorded broadly distributed throughout northern Sitka Sound. Predator concentrations were noted in Salisbury Sound, south of Fred's Creek, and south of the bridge. Herring Schools were also observed in Hayward Strait. The R/V *Kestrel* surveyed Salisbury Sound and portions of northern Sitka Sound. No significant volume of herring was found in Sitka Sound during the survey. In Salisbury Sound there were a number of large schools scattered throughout the area from St. John Baptist Bay to Kane Island. Waters north of Kane Island were not surveyed. Two test samples were taken from Salisbury Sound resulting in 9.5% mature roe and 6.5% mature roe.

On April 5, an aerial survey covered Sitka Sound north of Cape Burunof to Krestof Sound. A total of 4.9 nmi of active spawn was recorded along sections of shoreline scattered throughout northern Sitka Sound. Two samples were picked up by airplane from Salisbury Sound that resulted in 9.5% and 7.7% mature roe similar to the previous day. The R/V *Kestrel* made an extensive survey of Sitka Sound covering most areas north of Cape Burunof. An extensive layer of herring was seen in deeper waters east of Middle Island. No other substantial volume of herring was seen during the survey.

On April 6, an aerial survey covered Sitka Sound north of Cape Burunof to Krestof Sound. A total of 2.0 nmi of active spawn was mapped mostly along Halibut Point Road and in Hayward Strait. Predator concentrations were noted south of the Magoun Islands, east of Middle Island and South of Dorothy Narrows. Herring schools were observed near Inner Point and Shoals Point. The vessel survey covered north Sitka Sound and Salisbury Sound, finding a substantial volume of herring in the waters east of Middle Island mostly in deeper waters from 25 to 45 fathoms. Herring schools were also found in deeper waters east of Big Gavanski Island and north of Crow Pass with less dense schools continuing into open waters to the north toward Eastern Bay. In Salisbury Sound there were numerous schools scattered throughout the area from well inside St. John Baptist Bay to just past Gilmer Cove. A test sample was taken northeast of Middle Island that consisted of small herring and only 2.7% mature roe. During the afternoon radio update, plans were made to have 2 seine vessels sample in Salisbury Sound early in the morning and the samples would be flown back to Sitka.

On April 7, an aerial survey covered Sitka Sound north of Cape Burunof to Salisbury Sound. The aerial survey found only isolated areas of active spawn totaling 1.1 nmi in the Hayward Strait area. While transiting to Salisbury Sound the R/V *Kestrel* continued to see a substantial volume of herring in deeper waters east of Middle Island. An extensive mid-water layer of herring was also seen north of Middle Island. A seine vessel that had traveled to Salisbury Sound the previous evening reported seeing a substantial volume of herring moving south through Neva

Strait. The R/V *Kestrel* surveyed Salisbury Sound and it appeared that less fish were in the area than the previous survey but there was still a sufficient volume of herring to conduct a fishery if samples showed good quality roe. Two samples were taken in Salisbury Sound and flown to Sitka that resulted in 10.4% and 11.1% mature roe. With low immaturity in both samples, waiting until the following day was unlikely to improve roe recovery.

At 11:15 a.m., April 7, it was announced that a fishery would occur in Salisbury Sound and Krestof Sound at 2:15 p.m. Three-hour advanced warning was given to allow participants more time to get to Salisbury Sound. The area opened included the waters of Krestof Sound north of 57°10.00' N. latitude, Neva Strait, and Salisbury Sound south of 57°21.75' N. latitude and east of 135°43.81' W. longitude. The fishery was opened from 2:15 p.m. until 5:30 p.m. harvesting an estimated 3,700 tons. Final harvest from fish tickets was 3,551 tons with an average of 10.1% mature roe.

On April 8, an aerial survey covered Sitka Sound north of West Crawfish Inlet to Salisbury Sound. Total active spawn was 1.2 nmi mapped in Starrigavin Bay and Hayward Strait. Herring schools were observed in Windy Passage and in Hayward Strait. Herring predators continued to be broadly distributed in Sitka Sound, Windy Passage and in Salisbury Sound. With the previous day's harvest no fishery was planned for April 8 so no vessel survey was conducted.

On April 9, an aerial survey covered Sitka Sound north of West Crawfish Inlet to Salisbury Sound. Total active spawn was 5.5 nmi mapped in Starrigavin Bay, Hayward Strait and Windy Passage. Herring Schools were observed in Windy Passage and in Hayward Strait. Herring predators continue to be broadly distributed in Sitka Sound, Windy Passage and in Salisbury Sound. The R/V *Kestrel* surveyed Sitka Sound and continued to find layers of herring schools in deeper water on the east and north sides of Middle Island and west of Crow Island. In the late morning the R/V *Kestrel* transited to the Windy Passage area based on spotter observations of herring schools in the area. Smaller scattered schools of herring were found in Windy Passage as well as some deeper layers of herring in the outer part of West Crawfish Inlet. A second aerial survey occurred in the Windy Passage area and a large body of herring was seen in Presidents Bay. A vessel survey confirmed a large volume of herring in Presidents Bay and a seine boat made a set to take a sample. The sample consisted entirely of small immature herring, estimated at 80 g average weight and was not brought back to Sitka for workup. It was announced shortly after the sample was taken that no fishery would occur that day.

On April 10, an aerial survey covered Sitka Sound north of West Crawfish Inlet to Salisbury Sound. Total active spawn was 4.0 nmi mapped in Salisbury Sound, Neva Strait, Hayward Strait and Windy Passage. A vessel survey of northern Sitka Sound continued to find a substantial layer of herring holding in deeper waters off the east side of Middle Island. A thinner but more continuous layer was observed north of Middle Island and west of Crow Island. No attempts were made to obtain a sample since the herring were holding in deeper waters. With the major spawning event appearing to be past, the department made a gross calculation of the potential biomass that had spawned up to this time. Using the average biomass of herring per nmi of spawn of 1,560 tons for the period 2002-2011 and the cumulative shoreline to date of 47 nmi of spawn, it was calculated that approximately 73,320 tons of herring had spawned. The total harvest from the 3 openings was 13,700 tons which gave an estimated harvest rate of 16% of the total return. The fleet was informed that a substantial biomass of pre-spawning herring would have to be found before another harvesting opportunity would be allowed.

On April 11, active spawning was diminishing quickly and a total of 0.6 nmi of active spawn was mapped in Salisbury Sound and Neva Strait. An additional 9.9 nmi of shoreline was added to the cumulative mileage through mapping of eggs on the beach at low tide where milt had not been mapped during previous aerial surveys. This brought the total cumulative to 55.4 nmi of shoreline. The vessel survey continued to find an extensive layer of herring along the east side of Middle Island, east of the Gavanski Islands, east of the Siginaka Islands, west of the Gavanski Islands, and west of Crow Island. Though it was suspected that these herring were not pre-spawning herring it was necessary to obtain a sample for confirmation. It was not possible to get a sample with a seine net due to the depth of the schools. The department attempted to use a small heavily weighted gillnet to capture the herring in deeper waters but was unsuccessful. A permit holder volunteered to make a set in the late evening when herring were more likely to be nearer the surface. The seiner was successful at obtaining a sample at around 10:00 p.m. east of Middle Island and the fish were determined to be spawned-out herring. This sample confirmed that the extensive volume of herring seen layered throughout the northwestern areas of Sitka Sound were not pre-spawning herring. An aerial survey conducted the morning of April 12 revealed only spot spawning in Salisbury Sound and very few whales were seen during the survey. With no other indications of a substantial volume of pre-spawning herring in Sitka Sound it was announced at 11:00 a.m. that the Sitka Sound herring sac roe fishery was closed for the season. The final harvest for the fishery as reported on fish tickets was 13,231 tons from 3 openings with an overall mature roe recovery of 11.9% (Table 9).

2012 WEST BEHM CANAL SAC ROE FISHERY

The forecast of mature herring biomass for West Behm Canal in 2012 was 7,915 tons. This allowed for a 10.6% harvest rate for a total GHL of 842 tons. With 84 tons set aside for the bait pound fishery, the remaining 758 tons would be harvested with purse seine gear. During the 2012 season no herring were harvested. For the 2012 herring season in West Behm Canal, limited herring activity in waters open to commercial fishing and late timing in the Sitka Sound purse seine fishery kept most of the purse seine permit holders in Sitka during the time that herring were available in West Behm Canal. The department began monitoring West Behm Canal via aerial and skiff surveys starting on March 28th, and continued through mid-April. The spawning activity began on April 4 and continued through April 10. Herring presence and predator activity remained low throughout the season. While there was some interest from permit holders, they remained in Sitka due to the long duration of the Sitka Sound sac roe purse seine fishery. The purse seine fishery went on 2-hour notice at noon April 5 and closed on April 12, 2012. No vessels registered to take part in the fishery and no herring were harvested. At no time during the spawning event in West Behm Canal was there a large buildup of mature herring in the area open for commercial fishing. The season ended with 7.3 nmi of spawn mapped.

POUND SPAWN ON KELP FISHERIES

REGULATORY FRAMEWORK

Limited Entry

The Southeast Alaska herring pound SOK fisheries are managed under a limited entry program administered by CFEC. There are separate programs for northern Southeast Alaska and for southern Southeast Alaska. For northern Southeast Alaska (including fisheries in Hoonah Sound

and Tenakee Inlet) there are 111 permanent permits. The most recent market value of permits for the fishery is \$45,500. For southern Southeast Alaska (including fisheries in Craig/Klawock and Ernest Sound) there are a total of 170 permanent permits. The most recent market value of permits for the fishery is \$23,000. (CFEC website www.cfec.state.ak.us/fishery_statistics/permits.htm).

Gear Seasons and Area

The gear allowed for impoundment of herring during the SOK fisheries consists of a floating rectangular frame structure with a suspended net limited to 1½-inch maximum mesh. The surface opening of the net can vary from 400 to 800 square feet with net depth adjusted for a maximum volume of 12,000 cubic feet. In Northern Southeast Alaska 2 fisheries occur in defined waters of Section 13-C in Hoonah Sound and Section 12-A in Tenakee Inlet. Southern Southeast Alaska's 2 fisheries occur in defined waters of section 3-B west of Craig and in District 7 in Ernest Sound. Northern Southeast seasons open for capture of herring by purse seine gear by regulation on April 6. In Southern Southeast the Craig season opens by regulation on March 17, and Ernest Sound opens on April 1. Fisheries are closed by emergency order when necessary.

Fishery Management Plan

Herring SOK pound fisheries are managed according to a detailed management plan in regulation (5AAC 27.185). Additional information concerning fishery conduct, management, and stock status is updated annually and compiled into a management plan published as a Regional Information Report.

The regulatory management plan presents kelp allocation schedules for each fishery. The fisheries are managed to stay within the herring harvest guideline each season by restricting permit holders to specific numbers of kelp blades that may be fished. From low to high GHLS: no fishing is allowed at low GHLS; open pounding is encouraged by providing for greater kelp allocations than in closed pounds; 2 or 3 permit holders are encouraged to share production from herring placed into a pound at intermediate GHLS; and maximum kelp allocations are allowed for each permit holder individually operating a single closed pound when a sufficiently high GHLS is provided. This incentive-based approach has reduced the total amount of herring captured and placed into pounds during times when only limited GHLS can be provided based on the forecast return and consistent with the regional harvest rate policy.

The management plan also specifies: pound and kelp marking requirements, requires permit holders to be present during times of active fishing, allows live holding of herring in pounds for a maximum of 6 days, prohibits additions of herring to a pound after a maximum of 4 days or after harvesting of product, requires webbing with spawn attached to remain in place for 4 weeks to allow herring eggs to hatch, provides times when gear must be removed from the grounds following the fishery, and requires each permit holder's product to be kept separate until product is weighed and graded.

Buyer and Tender Reporting Requirements

Provisions are in place for providing weights and numbers of blades harvested and status of brining or salting at the time of delivery to a buyer on a fish ticket. To accommodate the department in obtaining accurate, drained weights of product, provisions are in place to provide estimated product weights upon initial delivery and to later provide accurate drained weights and grades as soon as that information is available.

Allocations

In Section 3-B, 60% of the GHL is allocated to the winter bait fishery and 40% of the GHL is allocated to the SOK fishery. Any unharvested remainder of the GHL after the winter bait fishery closes on February 28 is re-allocated to the SOK fishery. The department has the authority to open any area for up to 100 tons to provide for a bait pound fishery (5 AAC 27.170).

In District 7, 10% of the GHL is allocated to the bait pound fishery and 90% is initially allocated to the winter bait fishery. Any unharvested remainder of the GHL after the winter bait fishery closes February 28 and any remainder of the bait pound GHL by March 15 is re-allocated to the SOK fishery. If the SOK fishery GHL is not harvested then any remaining GHL may be re-allocated to the bait pound fishery.

In District 12, 10% of the GHL is allocated to the bait pound fishery and 90% is initially allocated to the winter bait fishery. Any unharvested remainder of the GHL after the winter bait fishery closes February 28 and any remainder of the bait pound GHL by March 15 are re-allocated to the SOK fishery. If the SOK fishery GHL is not harvested then any remaining GHL may be re-allocated back to the bait pound fishery.

In Section 13-C, the entire GHL is allocated to the SOK fishery. If there is unharvested GHL after the SOK fishery then that GHL may be reallocated to the bait pound fishery.

HISTORICAL SUMMARY

Herring pound SOK fisheries began in 1990 in the Hoonah Sound area of Section 13-C after adoption of initial regulations by the BOF in 1989. The Sitka Fish and Game Advisory Committee had been advocating a new SOK fishery in the Sitka area to provide for economic development. Sitka Sound was initially proposed as a suitable location, but was rejected by the BOF since the herring stock was fully allocated to the sac roe fishery. Hoonah Sound was accepted since only sporadic bait harvests had occurred from that location. The department adapted a management approach for the fishery based upon a recently implemented fishery in Prince William Sound, with consideration to the much smaller size of the herring stock in Hoonah Sound.

The Craig-Klawock SOK fishery in Section 3-B began in 1992 following collaborative efforts between the native village corporations Shan-Seet, Klawock-Heenya, and the department, and action by the BOF. Since the Craig herring stock had a long and still-active history of use by the winter food and bait fishery, the new SOK fishery was initially based on unutilized GHL. In 1993 provisions were in place to ensure a SOK fishery would occur by allocating the Craig GHL 85% bait and 15% SOK, with provisions to add unharvested bait GHL at the close of the bait season to the SOK GHL. In 1998 the shared allocation formula changed to 60% bait and 40% SOK. Regulations for the Craig fishery are unique since they include a closed area intended to avoid any potential conflicts with the long standing subsistence SOK fishery at Fish Egg Island.

Both Hoonah Sound and Craig-Klawock started out with relatively high levels of effort. Many fishermen participated each season, purchased gear, and worked to develop successful fishing techniques. Following petitions from fishermen, CFEC granted limited entry status in January, 1995. Two separate limited entry fisheries were established, currently with 111 permits in Northern Southeast and 170 permits in Southern Southeast areas.

The fishery developed under the authority of a commissioner's permit issued to all participants each season from 1990 through 2000. Following BOF action in February 2000 former permit stipulations including kelp allocation schedules were incorporated into a detailed management plan in regulation which was in effect beginning with the 2001 season.

In January 2003, faced with several proposals for additional new SOK fisheries, and patterns of unharvested quotas and declining herring use in the winter food and bait fishery, the BOF allocated bait GHLS not harvested by the close of the winter season to new fisheries in Ernest Sound in District 7 and in Tenakee Inlet in District 12. Based on existing CFEC regulations, only SSE permit holders were eligible for District 7 and only NSE permit holders were eligible for District 12. With the option for permit holders to fish 2 or more SOK fisheries depending on their permit status, BOF regulations were adopted to ensure permit holders would complete fishing activities in 1 area before engaging in fishing another area.

Data summarizing SOK fisheries in the Southeast Alaska region is presented for the Region and for Northern Southeast in Table 10, and for Southern Southeast in Table 11.

The fishery in Hoonah Sound has now been conducted annually over a 20-year period, with the exception of 1996 when forecast returns were below the 1,000 ton threshold. The herring stock rebounded sharply after the 1996 season following a large herring recruitment event. The number of permit holders making landings has averaged 97 since the inception of the fishery. Participation each year is usually at or near the level of permit eligibility; however, usually not all participants are successful at capturing herring or producing marketable product. Exvessel value for the fishery has averaged \$1.6 million annually. For the first 6 years of the fishery, kelp allocations were set between 100 and 240 blades in order to meet a pre-determined 150-ton herring quota and 11–12 ton “SOK product harvest quotas” set in regulation. At these relatively low kelp allocation levels, fishermen selected the largest possible blades of kelp and attempted to maximize thickness of herring spawn on the blades. The goal was to maximize revenue by maximum production of “Jumbo-grade” product. Based on limited studies of the amount of herring impounded the fixed 150-ton GHLS was likely being exceeded. Although herring are released alive in this fishery, the department was concerned that excessive crowding could de-scale herring and increase mortality or cause an epizootic harmful to the stock. Beginning in 1997 herring harvest quotas were set based on forecast abundance and kelp allocations were liberalized. In response, production of SOK product increased and prices declined. In 2001 harvest quotas for the amount of product that could be produced were eliminated. In 2003 kelp allocation schedules were structured to encourage maximum use of kelp for individuals sharing herring pounds at intermediate GHLS in order to constrain the harvest and utilization of herring by the fishery to the herring GHLS set for the stock. With a larger GHLS in 2002 fishermen successfully deployed 1,000 blades of kelp in a typical single-operated 20'x20'x30'-deep herring impoundment. In 2002, 2003, 2004, and 2006 the fishery exvessel value increased to around \$2.0 million annually. Following the record level regional production in 2004 of 440 tons of SOK product, prices fell to around \$3/lb in 2005. In 2007 and 2008, in part due to production declines in British Columbia, Canada, Hoonah Sound became the price-setting fishery and exvessel value increased again to \$4.5 million and \$5.2 million based on \$14/lb product in 2007 and \$11.50/lb product in 2008. In 2009, due to a combination of regional overproduction and the economic recession, prices fell to around \$5/lb and the Hoonah Sound fishery returned to an exvessel value of \$2.3 million, for an average of around \$23,000 per permit holder. These lower prices persisted through the 2011 season. In 2012, with lower inventories of SOK product in

Japan, prices increased substantially averaging \$10.81/pound resulting in an exvessel value for the fishery of \$4.0 million. After 22 years of the fishery, fishermen have developed effective techniques for consistent production of a high-quality product, and there is general recognition that income from the fishery in large part depends on supply and demand in the limited Japanese market. The Hoonah Sound spawning stock had been at historically high levels for the period 2008-2011, but in 2012, a sharp decline in the spawning biomass was observed resulting in the lowest spawning biomass estimate since 1996.

The Craig-Klawock fishery has been continuous for 19 years, with landings during all years but 2000. In that year herring moved quickly through areas that are open for commercial fishing, and most of the seine vessels, which also participate in the Sitka sac-roë fishery arrived too late, so no fishermen were successful. The number of permit holders making landings has averaged 105 since the inception of the fishery. Participation in the Craig-Klawock fishery has averaged only 46% of the permits eligible to participate under the limited entry program for the Southern Southeast area. Reasons for the relatively lower participation level compared with the Hoonah Sound fishery have been related to more limited numbers of seine boats to support cooperative groups of fishermen on the grounds, and reduced access to herring since the primary spawning location for this herring stock is within waters closed by regulation. Exvessel value for the fishery has averaged \$707,000 since the onset of the fishery.

The Tenakee Inlet fishery was established in 2003 by the BOF to provide an opportunity to harvest un-utilized herring following the winter food and bait fishery. Due to low demand and prices for bait herring, the Tenakee stock had unharvested GHL in 5 of the 6 years prior to the SOK fishery being established. The fishery was open in the spring of 2003 when the remaining unharvested bait and bait pound GHL was above the 50 and 100 ton levels necessary for open and closed SOK pound fisheries. The fisheries were closed 2006–2008 since the stock was below the 3,000-ton threshold, but was open again in 2009 when available GHL allowed. During years with a fishery the average number of permit holders making landings has been 80, and average exvessel value has been \$658,000. Since Northern Southeast SOK permit holders may participate in both the Hoonah Sound and Tenakee Inlet fisheries, most attempt to complete their harvest in Hoonah Sound in time to participate in the Tenakee fishery. With little or no time available between the fisheries, most fishermen harvest enough kelp for both fisheries prior to the Hoonah Sound fishery. Considering the substantially overlapping timing of herring spawns in Hoonah Sound and Tenakee Inlet, it is remarkable that nearly 80% of the fishermen successful at Hoonah Sound have also participated in the Tenakee fishery during those years when the fishery has occurred.

At the same time that the Tenakee Inlet fishery was established in 2003, the Ernest Sound fishery was established to provide an additional opportunity for SSE permit holders to utilize unharvested food and bait GHL. There have been fisheries in 4 of 8 years since the fishery first took place in 2004. Effort was moderate during the initial year with 64 permit holders making landings. The fishery was closed 2005–2007 since the stock was below the 2,500-ton threshold. After the fishery re-opened in 2008 and 2009, only 13 permit holders made landings in 2008 and 4 permit holders made landings in 2009. The remaining GHL after the food and bait fishery was below the 50 ton threshold needed to allow a SOK fishery in 2010. The SOK fishery re-opened in 2011 with no participation. Many active fishermen in the SSE fishery also hold permits for NSE and following the Craig fishery they typically elect to travel directly to the more established

Hoonah Sound fishery. In 2012, remaining GHL after the food and bait harvest was again below the 50 ton threshold needed to allow a SOK fishery.

2011 SPAWN ON KELP FISHERIES

Craig/Klawock

The GHL for the 2011 spawn-on-kelp in pounds fishery allowed the allocation of the maximum number of kelp blades for the fishery. The spawning biomass forecast for the 2010/2011 Craig/Klawock herring stock was 17,886 tons. This forecast was based on a revised model due to re-aging of scales and is different than what was originally published for the winter bait fishery on November 23, 2010. Based on a 15.2% harvest rate, 2,710 tons were available for commercial harvest. Since 40% of the total GHL is set aside for the spawn-on-kelp in pounds fishery, the GHL was assured to be at least 1,048 tons. The remainder of the winter food and bait fishery was added to this total after the fishery closed on February 28, 2011, however since the harvest in the food and bait fishery was confidential the total GHL is not public.

Based on the GHL of more than 1,048 tons of herring, kelp allocation for the 2011 season for the Craig/Klawock pound fishery was the maximum amount allowed as follows:

- 600 blades of kelp for a single closed pound,
- 750 blades of kelp for each permit holder in a double permit closed pound,
- 1,125 blades of kelp for each permit holder in a multiple permit closed pound.

The 2011 Craig/Klawock fishery was open by regulation to purse seining for herring at 12:00 noon Thursday, March 17. Purse seining in Section 3-B was open on a continuous basis.

The first herring spawn was documented by the department in the Craig/Klawock area on the west shore of Fish Egg Island Friday, April 1. The spawn around Fish Egg Island grew in intensity and continued throughout the spawning period spreading north to the Alberto Islands. The first herring were placed into pound structures on the evening of Friday, April 1. The spawn continued until April 7 and was concentrated around Fish Egg Island, but included Clam Island, Wadleigh Island, and the Alberto Islands. Total spawn mapped in the Craig/Klawock area was 14.8 miles.

Fishermen harvested a total of 43,600 blades of kelp for a total of 9,200 pounds of *Macrocystis* kelp. 52 permit holders landed a total of 233,324 pounds of product from 19 single-closed pounds, and 15 double-closed pounds, for a total value of \$728,147 or an average of \$14,003 per permit. Average price per pound of product in the 2011 Craig SOK fishery was \$5.13.

Hoonah Sound

In 2011, a GHL of 3,015 tons of herring was established for the SOK fishery in Hoonah Sound. This GHL was based on a 20% harvest rate on a mature spawning biomass of 15,073 tons, forecast to return. Regulations provide for specific kelp allocations based on a range within which the GHL falls. This season's GHL allowed for a maximum kelp allocation of 2,000 blades for single-permit closed pound, 3,000 blades/permit for double-permit closed pound, and 1,500 blades/permit for triple-permit closed pound. Open pound operators were allowed 2,300 blades/permit, regardless of the number of permits using the same pound structure. This season there were 86 single-permit closed pounds, 2 double-permit closed pounds and for the third consecutive year experimental gear permits were issued to 2 permit holders to use 1 pound equal

to the volume of 2 single pounds combined. A total of 89 permit-holders reported landings totaling 387,496 pounds of SOK. The average price was \$4.70/pound for a total exvessel value of \$1,820,952.

By regulation the area opens April 6 to the capture and transfer of herring to pounds. The first aerial survey of Hoonah Sound was conducted April 15 showing herring predator activity broadly distributed around the Hoonah Sound Area. Additionally, several large schools of herring were observed between Fick Cove and Patterson Bay. Significant numbers of sea lions were first observed on the traditional spawning grounds on April 19. On April 20 the first herring spawn was observed on Elovoi Island, Krugloi Island, and Ford Rock totaling 0.5 nmi.

ADF&G management staff arrived on the grounds the afternoon of April 22 aboard the R/V *Kittiwake III*. All fishermen were present on the grounds by April 20. Fishermen began capturing herring and stocking pounds on the evening of April 20 with fishing activity peaking on April 22. By April 21, 86 of 91 pounds on the grounds were stocked with herring and fishermen continued to add fish to pounds until April 25. Several permit holder groups were unable to capture adequate herring to stock their pounds. Spawning peaked on April 22 with 5.8 nmi and the last day of spawning was May 5.

Harvesting of SOK product began on April 27 and continued through April 29. A total of 89 permit holders made landings totaling 387,496 pounds (193.7 tons) of SOK. The quality of the 2011 harvest, as measured by grade (thickness of the product) was significantly lower, by proportion, compared to 2010. In 2011, 27% of the total harvest was grade-one or better, compared to 57% in 2010. The average price/pound paid to fishermen in 2011 was \$4.70, compared to \$4.44 in 2010, \$4.97 in 2009, \$11.47 in 2008, and \$14.09 in 2007. The sharp decline in average price beginning in 2009 was largely attributed to an over-supplied market though lower grade product has also contributed to the decline. The total SEAK production in 2011 was 527,438 pounds, down 35% from the 2010 harvest of 814,039 pounds.

The harvest of *Macrocystis* kelp is allowed in Districts 3–13 by permit, with specified areas closed to protect herring spawning habitat. Traditionally, Section 13-B has been closed to the harvest of kelp in all waters north of the latitude of Rachek Island and east of a line from Shoals Point to the northernmost tip of Legma Island to Rachek Island. With little spawning observed in areas of high abundance of *Macrocystis* kelp south of Sitka Sound, specifically Redoubt and Kanga Bays, the department opened Section 13-B in all waters south of a line from Povorotni Point, to a point offshore at 56°57.19' N. lat., 135°35.01' W. long., to the southernmost tip of Shoals Point. Allowing additional areas for harvesting kelp would contribute to dispersing the kelp harvest and allow participants greater opportunity to find quality kelp. To support the Hoonah Sound SOK fishery a total of 169,900 *Macrocystis* kelp blades were harvested in 2011 and 152,441 were actually fished in pounds. The *Macrocystis* harvest by district was 127,300 blades in District 3 and 42,600 blades in District 13.

Weather during the 2011 fishery was generally good with high overcast and mild winds for the majority of the fishery.

Tenakee Inlet

With time constraints on biometric staff due to the discovery of age data inconsistencies in recent years necessitating the re-aging and analysis of commercially important stocks, no forecast was

generated for Tenakee Inlet. Due to the small amount of spawn documented in 2010, it was assumed that the returning mature biomass in 2011 would be below threshold.

Ernest Sound

The 2010/2011 re-aged biomass forecast for District 7 was 5,080 tons, comprised primarily of age-4 herring. Applying a 12.1% harvest rate resulted in a GHF of 613 tons. The GHF remaining after the winter fisheries allowed for a SOK pound fishery with kelp blade allocations in the 100-299 ton range. This GHF range allowed for a maximum kelp allocation of 200 blades for single-permit closed pound, 400 blades for double-permit closed pound, and 500 blades for triple-permit closed pound.

The Ernest Sound area was monitored both by aerial surveys and skiff surveys beginning April 4. The surveys occurred on a daily basis from April 11 until April 22. Fishery managers arrived on the grounds to monitor fishery progress on April 12 following reports of spot spawn from industry pilots and observations of predators in the primary pounding area during prior aerial surveys. The first active spawn was observed on April 17. Active herring spawning continued until April 19 with the peak spawning occurring on April 18. The majority of the spawning activity occurred along the north shore of Vixen Inlet and from Vixen Inlet to Emerald Bay. Total mileage of spawn was 8.1 nmi. Spawn deposition surveys were completed on April 24. Although Ernest Sound was open to SOK harvest, no active pounds were fished.

2012 SPAWN ON KELP FISHERIES

Craig-Klawock

The GHF for the 2012 SOK in pounds fishery was large enough to allocate the maximum number of kelp blades for the fishery. The spawning biomass forecast for the 2011/2012 Craig/Klawock herring stock was 34,235 tons. Based on a 20% harvest rate 6,847 tons were available for commercial harvest. By regulation the 3,799 tons of herring not harvested during the winter food and bait fishery were added to the spawn-on kelp pound fishery. Thus a total of 6,538 tons of herring were available for harvest in the 2012 Craig/Klawock SOK pound fishery.

Based on the GHF of 6,538 tons of herring, the kelp allocation for the 2012 season for the Craig/Klawock pound fishery was the maximum amount allowed as follows:

- 600 blades of kelp for a single closed pound,
- 750 blades of kelp for each permit holder in a double permit closed pound,
- 1,125 blades of kelp for each permit holder in a multiple permit closed pound.

The 2012 Craig/Klawock herring pound fishery was open by regulation to purse seining for herring at 12:00 noon Saturday, March 17th, 2012. Purse seining in Section 3-B was open on a continuous basis.

The first spawn was documented by the department in the Craig/Klawock area on the Ballenas Islands on March 31. This spawn event did not expand and on April 4 a spawning event began on the western shore of Wadleigh Island. The Wadleigh Island spawn spread to Abbess and the Alberto Islands on April 5, and continued through April 8. Total spawn mapped in the Craig/Klawock area was 14.9 miles.

Fishermen harvested a total of 50,755 blades of kelp for a total of 10,659 pounds of *Macrocystis* kelp. Sixty-four permit holders landed a total of 196,352 pounds of product from 7 single-closed pounds, 27 double-closed pounds, and 1 triple-closed pound, for a total value of \$2,099,002 or an average of \$32,795 per permit. Average price per pound of product in the 2012 Craig SOK fishery was \$10.69.

Hoonah Sound

In 2012, a GHL of 2,139 tons of herring was established for the SOK fishery in Hoonah Sound. This was based on a 20% harvest rate on a mature spawning biomass of 10,696 tons forecast to return in 2012. Regulations provide for specific kelp allocations based on a range, within which the GHL falls. This season's GHL allowed for a maximum kelp allocation of 2,000 blades for single-permit closed pound, 3,000 blades/permit for double-permit closed pound, and 1,500 blades/permit for triple-permit closed pound. Open pound operators were allowed 2,300 blades/permit, regardless of the number of permits using the same pound structure. This season there were 83 single-permit closed pounds and 8 permit holders operated 4 experimental double-permit closed pounds, which were basically double pounds equal to the volume of 2 single pounds combined. Open pounds have not been used in the fishery since 2004. A total of 73 permit holders reported landings totaling 372,940 pounds of SOK. The average price was \$10.81/pound for a total exvessel value of \$4,033,078.

By regulation the area opens April 6 to the capture and transfer of herring to pounds. The first aerial survey of Hoonah Sound was conducted April 13 and sea lions were observed scattered broadly throughout the Hoonah Sound area. Whales were concentrated in the waters north of Ford Rock. No herring or herring spawn was observed. Additional surveys were conducted on April 15, 17, 18, and 19 with very little change in predator distribution. On April 20 the first herring spawn was observed on Emmons Island, and on the Chichigof Island shore south of Fick Cove, totaling 0.6 nmi. On April 21 and 22, no active herring spawn was observed. On April 23, herring spawn was observed on the Chichigof shoreline south of Fick Cove. Total active spawn was 0.5 nmi. Additionally 4.2 nmi of spawn was mapped on the Chichigof Island shore, and Emmons and Vixen Islands during a skiff survey earlier in the day. Based on fisherman observations peak spawn likely occurred on the evening of April 22.

Fishery managers arrived on the grounds the afternoon of April 21 aboard the R/V *Kittiwake III*. All fishermen were present on the grounds by April 17. Fishermen began capturing herring and stocking pounds on the evening of April 19 with fishing activity peaking on April 21. By April 21, 71 of 87 pounds on the grounds had been stocked with herring though some of those pounds were minimally stocked. Fishermen continued looking for additional fish until April 23 however many of the fishermen struggled to find enough herring to fill their pounds. On April 23, with only about 1 nmi of active spawning observed by department staff during aerial surveys and no indications of a biomass of prespawning herring in the vicinity it was apparent that the spawning biomass in Hoonah Sound was well below forecast.

Harvesting of SOK product began on April 25 and continued through April 28. A total of 73 permit holders made landings totaling 372,940 pounds (186 tons) of SOK. The quality of the 2012 harvest, as measured by grade (thickness of the product) was slightly higher, by proportion, compared to 2011. In 2012, 39% of the total harvest was grade-one or better, compared to 27% in 2011. The average price/pound paid to fishermen in 2012 was \$10.81, a substantial increase from the average of \$4.70/pound paid during the previous 3 seasons, 2009–2011. The total

SEAK production in 2012 was 372,940 pounds, down 4% from the 2011 harvest of 387,496 pounds.

The harvest of *Macrocystis* kelp is allowed in Districts 3–13 by permit, with specified areas closed to protect herring spawning habitat. Traditionally, Section 13-B has been closed to the harvest of kelp in all waters north of the latitude of Rachek Island and east of a line from Shoals Point to the northernmost tip of Legma Island to Rachek Island. With little spawning observed in areas of high abundance of *Macrocystis* kelp south of Sitka Sound, specifically Redoubt and Kanga Bays, the department opened Section 13-B in all waters south of a line from Povorotni Point, to a point offshore at 56°57.19' N. lat., 135°35.01' W. long., to the southernmost tip of Shoals Point. Allowing additional areas for harvesting kelp would contribute to dispersing the kelp harvest and allow participants greater opportunity to find good quality kelp. In 2012, a total of 155,100 *Macrocystis* kelp blades were harvested and 137,345 were actually fished in pounds. The *Macrocystis* harvest by area was 109,100 blades in District 3, and 46,000 blades in District 13.

Weather during the 2012 fishery was generally good with high overcast and mild winds for the majority of the fishery.

Tenakee Inlet

Due to the very small amount of spawn documented in 2011, lack of spawn samples and no dive assessment of the spawn, it was assumed the stock was below forecast and there would be no available GHL for commercial fisheries in 2012.

Ernest Sound

The 2012 GHL for the District 7 herring stock was 272 tons based on a 2,500 ton threshold, a forecast of mature spawning biomass of 2,682 tons, and a harvest rate of 10.1%. The forecast indicated the spawning stock would be comprised primarily of age-4 and age-5 herring. The winter food and bait fishery was allocated 245 tons while the remaining 27 tons was allocated to the bait pound fishery. The majority of the GHL was harvested in the winter food and bait fishery. The remaining GHL was less than 50 tons, which did not allow for a SOK fishery.

The Ernest Sound area was monitored both by aerial surveys and skiff surveys beginning April 9. The area was monitored on a daily basis until April 24 with a final survey conducted on April 25. The first active spawn was observed on April 16 in several locations including Vixen Point, Deer Island, and Onslow Island. Active herring spawning continued until April 22 with the peak day of spawning occurring on April 19. The majority of the spawning activity occurred along the north shore of Vixen Inlet and from Vixen Inlet to Emerald Bay. Total mileage of spawn in the area, for the season, was 8.9 nmi. Spawn deposition surveys were completed on April 24.

MISCELLANEOUS HARVESTS

TEST FISHERIES

The department periodically conducts herring test fisheries in order to provide stock assessment data and to provide additional revenues to cover management costs. Test fisheries are limited by receipt authority which is annually authorized by the Alaska legislature, then allocated by the department throughout the state to various fisheries. Implementation of test fisheries is guided by department policy. In the Southeast region test fishing is carried out by contract between the

department and a commercial fisherman or processing company following public solicitation for competitive bids.

In 2011 and 2012 a test fishery for winter bait herring occurred in Sitka Sound harvesting 60 tons each year. This annual test fishery provides herring size-at-age information which is used by the department in converting forecast numbers-at-age derived from the age structured analysis model into updated tonnages used for establishing the seasonal GHL and harvests. No other test fisheries were conducted during these 2 years.

BAIT POUND FISHERIES

Regulations allow for commercial impoundment of herring for live bait sales or for production of tray packs for sport fishing bait. Allocations of herring for these purposes were revised by the BOF in 2003. Since that time there have been minimal harvests for bait pound fisheries, and no successful, ongoing commercial enterprises have developed. There were no bait pound harvests or permits issued during the 2010/2011 and 2011/2012 seasons.

PERSONAL BAIT HARVEST

Regulations allow for the harvest of herring by commercial fishing permit holders to provide for bait. Harvests over 1 ton require a harvest reporting permit issued by the department. Harvested product must remain separated from commercial harvests, and harvests are not allowed to be sold or enter into commerce. During the 2010/2011 season personal use bait harvests totaled 49 tons and during the 2011/2012 season it was 17 tons.

TABLES

Table 1.—Herring spawning threshold levels for major herring stocks in Southeast Alaska.

District	Area	Threshold Level (tons)
1	Tongass Narrows-George and Carroll Inlets	3,500
1	Kah Shakes-Cat Island	6,000
1	West Behm Canal	6,000
3	Craig-Klawock	5,000
7	Ernest Sound	2,500
7	Anita Bay	2,500
9	Port Camden	2,500
10	Hobart Bay-Port Houghton	2,000
11	Seymour Canal	3,000
12	Tenakee Inlet	3,000
13	Hoonah Sound	1,000
13	Lisianski Inlet	2,500
13	Sitka Sound-Salisbury Sound ^a	25,000
15	Lynn Canal	5,000

^a The Sitka Sound threshold was changed from 20,000 to 25,000 tons by BOF in February 2009.

Table 2.—Historical herring winter food and bait fishery harvests in tons for Craig, Ernest Sound, Hobart/Houghton and Tenakee Inlet, and combined other areas for the 1968–1969 through the 2011–2012 seasons.

Season	Seasonal Harvest by Area in tons					Region Totals	
	Craig	Ernest Sound	Hobart/Houghton	Tenakee Inlet	Other Areas	Total	Fishermen
Oct 1968–Sep 1969	-	-	-	-	1,483	1,483	5
Oct 1969–Sep 1970	-	confidential	-	-	2,765	2,782	7
Oct 1970–Sep 1971	-	confidential	-	-	3,215	3,422	11
Oct 1971–Sep 1972	-	967	-	-	2,486	3,453	10
Oct 1972–Sep 1973	-	confidential	-	confidential	4,290	5,271	23
Oct 1973–Sep 1974	-	535	341	confidential	5,960	6,997	25
Oct 1974–Sep 1975	286	593	96	501	5,875	7,352	33
Oct 1975–Sep 1976	225	708	-	confidential	5,409	6,400	39
Oct 1976–Sep 1977	622	1,037	40	confidential	4,759	6,526	16
Oct 1977–Sep 1978	confidential	447	-	confidential	3,704	4,228	18
Oct 1978–Sep 1979	-	-	-	-	3,296	3,296	15
Oct 1979–Sep 1980	218	-	-	504	2,072	2,794	19
Oct 1980–Sep 1981	-	-	-	847	886	1,733	23
Oct 1981–Sep 1982	608	-	-	687	209	1,504	19
Oct 1982–Sep 1983	139	-	-	749	219	1,107	14
Oct 1983–Sep 1984	-	-	-	619	confidential	678	11
Oct 1984–Sep 1985	-	-	-	1,406	-	1,406	15
Oct 1985–Sep 1986	354	-	-	2,040	-	2,393	18
Oct 1986–Sep 1987	1,231	-	-	1,275	confidential	2,527	21
Oct 1987–Sep 1988	2,014	-	-	1,577	538	4,129	33
Oct 1988–Sep 1989	1,757	-	-	655	887	3,299	31
Oct 1989–Sep 1990	3,221	-	-	595	27	3,843	26
Oct 1990–Sep 1991	3,273	-	-	-	-	3,273	28
Oct 1991–Sep 1992	2,294	-	-	-	353	2,647	29
Oct 1992–Sep 1993	623	confidential	-	-	415	1,046	15
Oct 1993–Sep 1994	636	-	confidential	-	confidential	879	8
Oct 1994–Sep 1995	confidential	confidential	229	-	-	464	6
Oct 1995–Sep 1996	confidential	confidential	230	-	-	455	6
Oct 1996–Sep 1997	517	confidential	confidential	98	-	726	7
Oct 1997–Sep 1998	confidential	-	-	586	-	840	6

-continued-

Table 2.–continued (page 2 of 2.)

Season	Seasonal Harvest by Area in tons					Region Totals	
	Craig	Ernest Sound	Hobart/Houghton	Tenakee Inlet	Other Areas	Total	Fishermen
Oct 1998–Sept 1999	confidential	confidential	-	835	-	1,034	6
Oct 1999–Sept 2000	confidential	-	432	340	-	1,119	8
Oct 2000–Sept 2001	confidential	-	-	775	confidential	922	7
Oct 2001–Sept 2002	confidential	-	-	355	-	447	6
Oct 2002–Sept 2003	confidential	-	-	confidential	-	469	3
Oct 2003–Sept 2004	confidential	confidential	-	confidential	-	confidential	confidential
Oct 2004–Sept 2005	confidential	-	-	-	-	confidential	confidential
Oct 2005–Sept 2006	confidential	-	-	-	-	confidential	confidential
Oct 2006–Sept 2007	confidential	-	-	-	-	confidential	confidential
Oct 2007–Sept 2008	393	confidential	-	-	-	confidential	confidential
Oct 2008–Sept 2009	143	confidential	-	254	-	804	4
Oct 2009–Sept 2010	confidential	confidential	-	confidential	-	917	4
Oct 2010–Sept 2011	confidential	confidential	-	-	-	confidential	confidential
Oct 2011–Sept 2012	309	confidential	-	-	-	confidential	3
Avg. 68/69–11/12	608	167	37	595	1,116	2,267	14
Avg. 02/03–11/12	312	144	0	274	0	613	3

Note: Harvest and effort data is reported as confidential when fewer than 3 fishermen or processors participated during any given season. When multiple fisheries can be combined to exceed these numbers then summary information is provided. Recent year trends in the winter bait fishery have been for very low levels of participation.

Table 3.–Winter food and bait herring fishery thresholds, forecasts, and guideline harvest levels in tons, 2004–2005 through 2011–2012 seasons.

Area	Season	2011-2012	2010-2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005
Craig	Threshold	5,000	5,000	5,000	5,000 ^a	5,000	5,000	5,000	5,000
	Forecast	34,235	13,980	14,870	n/a	14,213	13,768	14,262	15,577
	Total GHL	6,847	1,901	2,074	1,945	1,945	1,860	1,955	2,217
	Bait GHL	4,108	1,140	1,244	1,167	1,167	1,116	1,173	1,330
Ernest Sound	Threshold	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
	Forecast	2,682	4,543	2,879	4,545	9,060	1,955	2,284	1,906
	Total GHL	272	529	297	529	1,382	0	0	0
	Bait GHL	245	476	267	476	1,244	0	0	0
Hobart/ Houghton	Threshold	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
	Forecast	599	253	3,110	3,324	3,884	754	864	2,189
	Bait GHL	0	0	345	376	462	0	0	223
Tenakee Inlet	Threshold	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
	Forecast	n/a ^b	n/a	5,109	6,931	n/a	n/a	2,238	4,362
	Total GHL	0	0	583	875	0	0	0	476
	Bait GHL	0	0	525	788	0	0	0	428

^a The 2008–2009 GHL for the Craig fishery was rolled over from the previous season since an ASA model run was not completed this year.

^b “n/a” indicates that a forecast was not made for that season.

Table 4.–Herring set gillnet sac roe fishery harvests in tons and effort, 1976 through 2012 seasons.

Season	Hobart/Houghton		Kah Shakes/Cat I.		Seymour Canal		Other	Total
	tons	permits	tons	permits	tons	permits	tons	tons
1976	-	-	494	76	-	-	283	777
1977	-	-	776	106	-	-	211	987
1978	-	-	171	114	-	-	367	538
1979	-	-	524	90	-	-	-	524
1980	-	-	1,149	112	-	-	-	1,149
1981	-	-	1,871	111	615	98	-	2,486
1982	-	-	2,319	116	-	-	-	2,319
1983	-	-	3,113	122	-	-	33	3,146
1984	-	-	2,177	126	499	101	-	2,676
1985	-	-	2,159	120	-	-	-	2,159
1986	-	-	1,530	117	392	84	-	1,922
1987	-	-	1,452	117	302	88	-	1,754
1988	-	-	1,145	119	586	97	-	1,732
1989	-	-	595	85	541	103	-	1,136
1990	-	-	-	-	359	70	-	359
1991	-	-	660	84	-	-	-	660
1992	-	-	1,246	113	-	-	-	1,246
1993	-	-	737	102	-	-	-	737
1994	-	-	730	118	374	95	-	1,105
1995	-	-	610	112	319	88	-	929
1996	-	-	601	121	-	-	-	601
1997	442	87	1,159	112	-	-	28	1,629
1998	351	53	616	84	585	72	-	1,552
1999	506	89	-	-	706	86	-	1,213
2000	-	-	-	-	389	43	-	389
2001	-	-	-	-	620	54	-	620
2002	-	-	-	-	1,066	62	-	1,066
2003	-	-	-	-	1,519	76	-	1,519
2004	-	-	-	-	804	85	-	804
2005	204	48	-	-	945	61	-	1,150
2006	-	-	-	-	1,187	39	-	1,187
2007	-	-	-	-	1,219	44	-	1,219
2008	306	59	-	-	1,208	60	-	1,510
2009	341	62	-	-	866	73	-	1,208
2010	302	47	-	-	710	54	-	1,013
2011	-	-	-	-	*	*	*	*
2012	-	-	-	-	-	-	-	-
Avg. 1976–2012	70	64	698	108	701	74	27	1,226
Avg. 2003–2012	115	54	-	-	979	61	-	997
Avg.– years fished	350	64	1,174	108	703	71	185	1,260

* Confidential data.

Table 5.–Sac roe fishery historical seine and gillnet harvests for Lynn Canal and Seymour Canal.

Year	Lynn Canal ^a			Seymour Canal ^b		
	GHL	Gillnet	Seine	GHL	Gillnet	Seine
1973		-	301		-	-
1974		confidential	319		confidential	901
1975		confidential	556		-	-
1976	750	124	433	200	-	194
1977	875	211	709	500	-	485
1978	500	363	603	500	-	729
1979	0	-	-	250	-	269
1980	600	-	976	0	-	-
1981	725	-	775	600	615	-
1982	375	-	551	0	-	-

^a There have been no further harvests in Lynn Canal since 1982, although it continues to be managed to provide a seine fishery if the stock returns above threshold.

^b There have been no further seine harvests in Seymour Canal since 1979. Historical gillnet harvests for Seymour Canal to present are shown in Table 4.

Table 6.–Sac Roe herring fishery thresholds, forecasts and GHLs in tons, 2006 through 2012 seasons.

Area	Season	2012	2011	2010	2009	2008	2007	2006
Kah Shakes gillnet	Threshold	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Forecast	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total GHL	0	0	0	0	0	0	0
West Behm seine/gillnet	Threshold	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Forecast	7,915	11,864	3,805	3,178	2,531	992	1,033
	Total GHL	842	1,418	0	0	0	0	0
Hobart/ Houghton gillnet	Threshold	2,000	2,000	2,000	2,000	2,000	2,000	2,000
	Forecast	599	253	3,110	3,324	3,884	754	864
	Sac Roe GHL	0	0	345	376	462	0	0
Seymour Canal gillnet	Threshold	3,000	3,000	3,000	3,000	3,000	3,000	3,000
	Forecast	9,135	6,697	5,602	10,023	8,721	9,157	10,193
	Total GHL	1,287	835	657	1,471	1,205	1,292	1,508
Lynn Canal seine	Threshold	5,000	5,000	5,000	5,000	5,000	5,000	5,000
	Forecast	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total GHL	0	0	0	0	0	0	0
Sitka Sound seine	Threshold	25,000	25,000	25,000	20,000	20,000	20,000	20,000
	Forecast	144,143	97,490	91,467	72,521	87,715	59,519	52,059
	Total GHL	28,829	19,490	18,293	14,504	14,723	11,904	10,412

Table 7.–Summary of Sitka Sound herring sac roe fishery during developing years, 1969–1978.

Year	Hydroacoustic Biomass Estimate	GHL (tons) ^a	Sac Roe Harvest (tons) ^b	Roe %	Nautical Miles Spawn	Spawn Biomass (tons) ^c	Total Run (tons) ^d
1969	-	-	575	-	15.0	6,850	7,425
1970	-	750	703	10.0	11.3	5,150	5,302
1971	-	750	746	8.3	9.5	4,798	5,076
1972	-	600	666	-	14.0	7,620	8,223
1973	-	600	614	8.5	10.0	5,645	6,182
1974	-	600	712	12.0	10.0	5,645	6,357
1975	6,400	550	1,490	11.0	8.0	4,516	6,000
1976	7,300	730	795	10.2	13.0	3,477	4,272
1977	5,650	0	0	-	11.0	5,904	5,904
1978	4,500	250	234	11.0	13.0	3,850	4,088
Average	5,963	537	654	10.1	11.5	5,346	5,883

^a GHL for Sitka Sound, primarily for sac roe. In 1973 an additional 150 tons was provided for bait harvest in eastern Sitka Sound. In 1974 an additional 50 tons was provided for bait in eastern Sitka Sound.

^b Includes sac roe harvests in Sitka Sound during spring spawning weeks, but deliveries may include either sac roe or bait in earlier years.

^c Spawn biomass estimates are shown based on 2008 ASA model hindcasts and estimated spawn deposition based on spawn mileage.

^d Total run equals harvest plus spawn biomass.

Table 8.—Summary of Sitka Sound herring sac roe fishery, 1979–2012.

Year	Forecast Biomass (tons)	GHL (tons)	Sac Roe Harvest (tons)	Roe %	Nautical Miles Spawn	Spawn Biomass (tons) ^a	Total Run (tons) ^a	Exvessel \$ Value (millions) ^b
1979	20,300	2,000	2,559	9.3	41.0	23,144	25,703	\$5.60
1980	39,500	4,000	4,445	10.8	63.0	41,386	45,831	\$2.15
1981	27,000	3,000	3,506	11.0	60.0	42,806	46,312	\$2.38
1982	30,000	3,000	4,363	11.7	40.8	28,499	32,862	\$3.20
1983	32,850	5,500	5,416	11.1	68.0	33,749	39,165	\$5.03
1984	30,550	5,000	5,830	11.1	65.0	41,116	46,946	\$3.73
1985	38,500	7,700	7,475	11.3	60.5	33,437	40,912	\$7.88
1986	30,950	5,029	5,443	11.9	51.6	27,087	32,530	\$7.41
1987	24,750	3,600	4,216	9.9	86.0	45,172	49,388	\$4.40
1988	46,050	9,200	9,390	9.5	104.0	55,516	64,906	\$4.17
1989	58,500	11,700	11,831	9.4	65.5	33,279	45,110	\$1.18
1990	27,200	4,150	3,804	10.6	39.1	23,276	27,080	\$7.95
1991	22,750	3,200	1,838	8.9	44.5	30,769	32,607	\$0.21
1992	23,450	3,356	5,368	9.4	72.5	46,831	52,199	\$1.37
1993	48,500	9,700	10,186	10.7	55.3	25,945	36,131	\$3.48
1994	28,450	4,432	4,758	11.0	58.1	17,823	22,581	\$3.63
1995	19,700	2,609	2,908	11.8	37.3	28,471	31,379	\$3.93
1996	42,265	8,144	8,144	9.6	45.6	31,677	39,821	\$14.35
1997	54,500	10,900	11,147	11.5	41.0	36,273	47,420	\$4.73
1998	39,200	6,900	6,638	10.2	64.5	43,388	50,026	\$1.65
1999	43,600	8,476	9,217	10.7	59.5	49,722	58,939	\$4.91
2000	33,365	5,120	4,630	9.9	54.5	53,325	57,955	\$2.67
2001	52,985	10,597	11,974	11.3	61.0	53,273	65,247	\$5.79
2002	55,209	11,042	9,788	10.9	42.6	57,078	66,866	\$4.44
2003	39,378	6,969	7,051	10.7	47.1	71,421	78,472	\$3.20
2004	53,088	10,618	10,490	10.8	79.8	88,333	98,823	\$5.16
2005	55,962	11,192	11,366	11.5	39.5	83,959	95,326	\$6.12
2006	52,059	10,412	9,967	10.5	57.4	77,448	87,415	\$2.64
2007	59,519	11,904	11,571	11.4	50.2	80,544	92,115	\$5.70
2008	87,715	14,723	14,386	11.5	55.3	89,699	104,085	\$8.90
2009	72,521	14,504	14,776	11.8	65.6	102,777	117,553	\$12.70
2010	91,467	18,293	17,874	12.5	87.7	96,215	114,089	\$12.10
2011	97,449	19,490	19,429	13.3	78.3	88,087	107,516	\$5.17
2012	144,143	28,829	13,231	11.8	55.9	68,440	81,671	\$8.50
Avg. 79-12	47,748	8,685	8,383	10.9	58.8	51,470	59,852	\$5.19
Avg. 08-12	98,659	19,168	15,939	12.2	68.6	89,044	104,983	\$9.47

^a Spawning biomass estimates are hindcast from 2012 ASA model run.

^b 2012 exvessel value is preliminary.

Table 9.—Summary of 2011 and 2012 Sitka Sound sac roe herring harvest.

Date	Area	Fishing Time	Harvest (tons)	Roe %
2011				
31-Mar	N Middle I/Eastern Bay	4 h, 40 min	1,556	13.3%
1-Apr	Crescent Bay	1 h, 10 min	5,254	12.5%
4-Apr	Eastern Channel	55 min	5,174	13.8%
7-Apr	Eastern Channel	1 h, 30 min	4,159	15.0%
9-Apr	Eastern Channel/Silver Bay	2 h, 45 min	3,277	12.8%
2011 Total		11 h, 0 min	19,419	13.3%
2012				
31-Mar	Hayward Strait	3 h, 21 min	4,501	13.7%
2-Apr	Hayward Strait	5 h, 10 min	5,180	11.6%
7-Apr	Salisbury Sound	3 h, 15 min	3,551	10.1%
2012 Total		11 h, 51 min	13,232	11.9%

Table 10.—Historical summary of northern Southeast herring spawn-on-kelp fisheries and total regional harvests and values, 1990–2012.

Year	Hoonah Sound				Tenakee Inlet ^a				SE Region Total SOK		
	Herring GHL (tons)	SOK Harvest (tons)	Permit Holders Landing	Fishery Exvessel Value	Herring GHL (tons)	Herring GHL for SOK	SOK Harvest (tons)	Permit Holders Landing	Fishery Exvessel Value	SOK Harvest (tons)	Fishery Exvessel Value
1990	150	12.0	99	\$ 201,348	a	a	a	a	a	12.0	\$ 201,348
1991	150	13.6	83	\$ 193,715	a	a	a	a	a	13.6	\$ 193,715
1992	150	23.1	108	\$ 453,152	a	a	a	a	a	48.8	\$ 633,152
1993	150	14.8	64	\$ 542,080	a	a	a	a	a	20.1	\$ 589,962
1994	150	33.3	110	\$ 1,683,396	a	a	a	a	a	50.1	\$ 2,047,595
1995	150	28.7	125	\$ 1,175,460	a	a	a	a	a	54.1	\$ 2,175,460
1996	-	-	-	-	a	a	a	a	a	37.6	\$ 1,490,000
1997	1,421	64.3	125	\$ 920,000	a	a	a	a	a	86.2	\$ 1,190,306
1998	700	85.6	115	\$ 1,000,000	a	a	a	a	a	109.1	\$ 1,152,203
1999	778	93.8	86	\$ 1,005,529	a	a	a	a	a	129.8	\$ 1,217,650
2000	359	36.0	84	\$ 587,568	a	a	a	a	a	36.0	\$ 587,568
2001	366	66.2	87	\$ 1,005,997	a	a	a	a	a	93.1	\$ 1,152,856
2002	1,264	136.6	98	\$ 2,000,000	a	a	a	a	a	178.3	\$ 2,218,700
2003	427	141.6	108	\$ 1,929,286	528	180	47.6	59	\$ 580,500	258.4	\$ 2,932,786
2004	1,207	236.1	107	\$ 2,071,347	399	360	98.7	85	\$ 981,464	440.2	\$ 3,748,355
2005	728	181.7	94	\$ 1,117,568	476	476	93.7	91	\$ 512,900	393.6	\$ 2,234,191
2006	669	162.1	79	\$ 1,943,422	-	-	-	-	-	191.1	\$ 2,241,997
2007	681	159.4	91	\$ 4,491,071	-	-	-	-	-	203.9	\$ 5,578,603
2008	2,238	228.1	101	\$ 5,221,568	-	-	-	-	-	386.5	\$ 8,490,751
2009	2,238	234.7	101	\$ 2,332,514	875	621	64.1	83	\$ 558,900	438.5	\$ 4,280,698
2010	3,182	290.4	101	\$ 2,580,517	583	<100	0	-	-	407.1	\$ 3,465,232
2011	3,015	193.7	89	\$ 1,820,952	-	-	-	-	-	263.7	\$ 2,478,958
2012	2,139	186.5	73	\$ 4,033,078	-	-	-	-	-	284.7	\$ 6,155,333
Avg. ^b	969	119.2	98	\$ 1,622,777	572	409	76	80	\$ 658,441	170.9	\$ 2,642,964

^a Tenakee Inlet SOK fishery was established by the BOF in 2003.

^b Average includes only years when fishery was opened.

Table 11.—Historical summary of the southern Southeast spawn-on-kelp fisheries, 1992–2012.

Year	Craig-Klawock					Ernest Sound ^a				
	Herring GHL (tons)	Herring GHL for SOK	SOK Harvest (tons)	Permit Holders Landing	Fishery Exvessel Value	Herring GHL (tons)	Herring GHL for SOK	SOK Harvest (tons)	Permit Holders Landing	Fishery Exvessel Value
1992	2,684	403	25.7	227	\$ 180,000	a	a	a	a	a
1993	1,602	240	5.3	21	\$ 47,882	a	a	a	a	a
1994	895	135	16.8	84	\$ 364,199	a	a	a	a	a
1995	725	109	25.4	146	\$ 1,000,000	a	a	a	a	a
1996	658	100	37.6	154	\$ 1,490,000	a	a	a	a	a
1997	715	200	21.9	143	\$ 270,306	a	a	a	a	a
1998	755	500	23.5	148	\$ 152,203	a	a	a	a	a
1999	750	650	36.0	103	\$ 212,121	a	a	a	a	a
2000	626	280	0	0	0	a	a	a	a	a
2001	1,058	914	26.9	51	\$ 146,859	a	a	a	a	a
2002	952	852	41.7	89	\$ 218,700	a	a	a	a	a
2003	630	528	69.2	118	\$ 423,000	a	a	a	a	a
2004	1,754	1,579	49.3	95	\$ 325,000	875	831	56.1	64	\$ 370,544
2005	2,217	1,667	118.2	70	\$ 603,723	-	-	-	-	-
2006	1,955	1,266	29.0	34	\$ 298,575	-	-	-	-	-
2007	1,860	1,284	44.5	47	\$ 1,087,532	-	-	-	-	-
2008	1,945	1,380	148.5	122	\$ 3,066,788	1,382	700	9.8	13	\$ 202,395
2009	1,945	1,802	137.3	137	\$ 1,256,777	476	300	2.5	4	\$ 24,423
2010	2,074	1,953	116.7	107	\$ 884,715	297	-	-	-	-
2011	1,901	1,084	70.0	52	\$728,147	613	100–299	0	0	0
2012	6,847	6,536	98.2	64	\$2,099,002	272	-	-	-	-
Avg. ^b	1,645	1,117	54.4	96	\$ 707,406	653	507	17.1	20	\$ 149,340

^a Ernest Sound SOK fishery was established by the BOF in 2003; fishery first took place in 2004.

^b Average includes only years when fishery was opened.