SOUTHEAST ALASKA/YAKUTAT

ANNUAL HERRING RESEARCH REPORT,

1998/1999 SEASON

by

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ABSTRACT

Pacific herring, *Clupea pallasi*, support a number of commercial fisheries and is an important food fish in Southeast Alaska. During the 1998/1999 season winter bait fisheries occurred in Craig, Hobart Bay/Port Houghton, Ernest Sound, and Tenakee Inlet. Additionally, gillnet sac roe fisheries were conducted in Seymour Canal and Hobart Bay/Port Houghton, where harvests totaled 706 and 506 tons, respectively. There was no spring gillnet sac roe harvest from the Kah Shakes/Cat Island area in 1999 due to poor return of spawning biomass. A seine sac roe harvest occurred in Sitka totaling 9,136 tons. Test fisheries occurred in Sitka Sound, West Behm Canal, and the Hobart Bay/Port Houghton areas. Spawn-on-kelp fisheries occurred in Craig and Hoonah Sound in 1999. Additionally, an experimental open platform spawn-on-kelp fishery occurred in Sitka Sound for the second year in a row. The total exvessel value of the region's commercial herring fisheries was estimated at $6,962,095. Approximately 7,212 herring were sampled for age and growth analysis from the major stocks. Recruitment of the 1996 year class was marginal to low in most stocks, and four, five, and six-year olds generally were predominant. In Sitka Sound, four and five-year olds dominated the population. Spawn deposition surveys to compute spawning biomass were conducted on eight spawning stocks for a total escapement estimate of 88,242 tons for the stocks surveyed. A series of aerial and skiff spawning ground surveys conducted on those, and smaller stocks, documented a total of 168 nautical miles of beach receiving spawn in Southeast Alaska. Eighteen paired herring spawn-on-kelp samples were collected by department divers from the spawning ground egg deposition surveys. The samples were analyzed in the laboratory to calibrate individual diver visual estimates. Substrate-specific visual estimate correction factors for individual divers used in 1999 ranged from 0.71 to 2.61.

INTRODUCTION

The Alaska Department of Fish and Game's herring research project was initiated in 1971 in response to greater demands on the resource by the commercial bait and developing sac roe fisheries. The goal of this project is to provide the biological data necessary for the scientific management of the region's herring stocks. Current program project objectives are to monitor spawning populations through age and growth analysis and spawn deposition studies on an annual basis. Project personnel conduct aerial and skiff surveys to document spawning activities and assist in the inseason management of the commercial fisheries throughout the region (Figure 1). Summaries of all herring commercial fisheries in Southeast Alaska for 1999 are included (Table 1).

COMMERCIAL FISHERIES

Management Strategy

The following management plan was in place for the 1999 Southeast Alaska commercial herring fisheries. It was formalized at the January 1994 Board of Fisheries meeting.

5 AAC 27.190. HERRING MANAGEMENT PLAN FOR STATISTICAL AREA A. For the management of herring fisheries in Statistical Area A, the department:

(1) shall identify stocks of herring on a spawning area basis;
(2) shall establish minimum spawning biomass thresholds below which fishing will not be allowed;
(3) shall assess the abundance of mature herring for each stock before allowing fishing to occur;
(4) except as provided elsewhere, may allow a harvest of herring at an exploitation rate between 10 percent and 20 percent of the estimated spawning biomass when that biomass is above the minimum threshold level;
(5) may identify and consider sources of mortality in setting harvest guidelines;
(6) by emergency order, may modify fishing periods to minimize incidental mortalities during commercial fisheries.

A "threshold level" is the minimum herring biomass needed to ensure sustained yield and maintain biological productivity. Threshold levels have been established for each of the winter bait, sac roe, and spawn-on-kelp pound spawning stocks. Threshold levels are based on all available stock performance data and may be evaluated and revised over time. Current threshold levels vary from 1,000 to 20,000 tons for the major sac roe, winter bait, and pound fishery stocks.

Herring stocks with a spawning biomass of less than 2,000 tons, of which there are many, are not considered for harvesting in either the Southeast Alaska winter bait or sac roe fisheries. Under the current approach for setting seasonal harvest limits, herring stocks of 2,000 tons of adult fish would allow for an annual harvest of 200 tons of herring. The region's current management capability prevents successful management of the winter bait or sac roe fisheries for harvests of less than 200 tons. The exception is the Yakutat area, where the spawning threshold for a winter bait fishery is 1,000 tons.

Methods and Procedures

Age Structured Analysis

Beginning in 1994, the department modified the primary method of forecasting herring abundance for major spawning stocks in Southeast Alaska. Age structured analysis (ASA), which relies on a time series of herring population assessment data, was used to forecast herring biomass for those stocks with significant historical data. Age structured analysis uses field survey estimates of catch-at-age, fishery and cast net age composition, weight-at-age, spawn deposition, and fecundity at weight to yield model estimates of annual recruitment, maturity, fishery selectivity and natural mortality. In combination, these estimates account for inter-annual gains and losses in biomass and allow forecasting of probable biomass for the forthcoming year. This method was used to forecast the 1999 spawning biomass returns for Kah Shakes/Cat Island, Craig, Sitka Sound, and Seymour Canal.

Test Fisheries

A test fishery was conducted in January in the Sitka Sound area. The purpose of this test fishery was to improve the current ASA biomass forecast with updated information on age composition and weight-at-age for the Sitka herring population. Samples from purse seine gear indicated that there had been a general decrease in the estimated weights of most age classes, as compared to 1998 samples. Age structures of sampled fish revealed strong representation of two, three and four-year-old age classes, compromising 85% of the age composition. Average weights ranged from 43 grams for age-2 fish, to 185 grams for age-8+ fish. Funds were generated from the test fishery and were used to manage the Sitka Sound sac roe fishery.

In Sitka Sound an experimental open-platform spawn on kelp test fishery was conducted to evaluate the impact and feasibility of this type of harvest gear. A total of 21.6 tons of spawn-on-kelp product was harvested and sold to generate funds for fishery research and management of the stock.

A test fishery was conducted during April 20–21 on herring stocks in the Hobart Bay/Port Houghton area. The test fishery was designed to obtain funds to be used for management and research of stocks located throughout the Petersburg-Wrangell management area. A total of 38.4 tons of herring was harvested for sac roe.

A test fishery was also conducted in April in West Behm Canal near Ketchikan. The primary purpose of this test fishery program was to obtain data on age structure, spawn timing, and abundance of the herring spawning population in the West Behm Canal area. Revenues generated from this test fish program will be used to defray costs for managing and assessing herring populations in the Ketchikan area. A total of 29.9 tons of herring were harvested for sac roe.

Sac Roe Fisheries

Commercial sac roe fisheries were conducted in the, Sitka Sound, Seymour Canal, and Hobart Bay/Port Houghton areas during 1999 (Figure 2). Harvest in the commercial gillnet areas included, 706 tons from

Seymour Canal and 506 tons from Hobart Bay/Port Houghton. A commercial seine harvest occurred in the Sitka Sound area, where 9,136 tons of herring were harvested for sac roe (Table 1).

Winter Bait Fisheries

Winter food and bait fisheries were conducted near Craig, Hobart Bay/Port Houghton, Ernest Sound, and Tenakee Inlet (Figure 3). Quality, size, concentration of stocks, and market conditions were limiting factors during the 1998/1999 season. Herring were harvested from Tenakee Inlet, where 835 tons were taken. Due to fewer than three participants in Craig and Ernest Sound fisheries, harvest data is confidential. No herring were taken from the Hobart Bay/Port Houghton bait fishery.

Spawn-on-Kelp Pound Fisheries

A spawn-on-Kelp fishery was conducted in Craig during 1999, where 15% of the established quota is allocated to the spawn-on-kelp fisheries, while 85% was allocated to the winter food and bait commercial fisheries. The total spawn-on-kelp harvest from Craig was 36.0 tons. A spawn-on-kelp fishery also took place in Hoonah, where 72 tons of product were harvested (Figure 4).

Results and Discussion

Sac Roe Fisheries

Sitka Sound

Aerial spawning ground surveys commenced on March 10 and continued through April 26. The guideline harvest level (GHL) for the 1999 Sitka sac roe fishery was set at 8,476 tons, based on a mature spawning biomass forecast of 43,602 tons and a harvest rate of 19.4%. The biomass forecast was based on a population model for the Sitka Sound herring stock updated with weight-at-age information from a test fishery conducted by the department in Eastern Channel during January, 1999. The fishery was opened to competitive harvest on March 22, 1999 and on March 24, 1999. The remaining quota was harvested through a cooperative agreement among permit holders and was completed on March 27, 1999. The total harvest was 9,136 tons. Average roe percent was 10.7%. Processors paid a base price of approximately $535 per ton for sac roe herring, which produced an exvessel value of $1,340,000.

Hobart Bay-Port Houghton

Results from 1998 surveys of the Hobart Bay/Port Houghton area produced a forecast biomass of 3,767 tons. This resulted in an 11.8% harvest rate and a quota of 443 tons. There was no harvest during the bait fishery, leaving the entire quota available for sac roe harvest. The fishery was opened on April 26, 1999 for three hours to 56 permit holders. During the fishery, 506 tons of herring were landed with an average roe percent of 11.8. Processors paid a price of approximately $480 a ton, giving the fishery an exvessel value of $242,880.

Seymour Canal

Results from 1998 surveys of the Seymour Canal area produced a forecast biomass of 5,188 tons. This resulted in an 11.5% harvest rate and a quota of 595 tons. The fishery was opened on April 30, 1999 and closed on May 1, 1999. During the fishery 706 tons of herring were landed and 85 boats participated. Processors paid a price of approximately $500 a ton, giving the fishery an exvessel value of $353,000.

Winter Bait Fisheries

Craig

The Craig herring spawning biomass forecast of 6,951 tons allowed for a bait quota of 749 tons for the traditional areas of Boca de Finas and Meares Passage. The fishery in the Craig area was open between October 14, 1998 and January 28, 1999. Due to fewer than three participants harvest data is confidential.

Hobart Bay/Port Houghton

The Hobart Bay/Port Houghton winter food and bait fishery was opened on October 14, 1998 east of a line from Cape Fanshaw to Five Finger Light to McDonald Rock Buoy to Pt. League and closed by regulation on February 28, 1999. The Port Houghton/Hobart Bay area spawning biomass forecast of 3,767 tons allowed for an 11.8% harvest rate producing a quota of 443 tons of herring. There was no harvest during this fishery.

Tenakee Inlet

The Tenakee Inlet winter food and bait fishery was opened on October 14, 1998 and closed on February 28, 1999. The Tenakee Inlet area spawning biomass forecast was 7,765 tons. The quota was set at 1,023 tons, a target exploitation rate of 13.2%. There was 835 tons of herring harvested, with an exvessel value of $250,500.

Spawn-on-Kelp Pound Fisheries

Craig

There are two spawn-on-kelp pound fisheries in Southeast Alaska, Craig and Hoonah Sound. The spawn-on-kelp fishery for the Craig area was initiated in the spring of 1992. The harvest limit was established at 15% of the total guideline harvest level for the Craig stock, plus the unharvested portion of the bait quota, totaling 650 tons. On December 16, 1998, Craig herring pound application forms became available in ADF&G offices with a January 31, 1999 deadline. Allocations of blades of *Macrocystis* kelp were issued in the following manner: 155 blades for single permit closed pounds, 235 blades for multiple permit closed pounds, 470 blades for single permit open pounds and 520 blades for multiple permit open pounds. No herring was allocated due to Board of Fish action. Effective 1200 hours, March 17, 1998 the department opened seining for the introduction of herring into the pounds. Participants were allowed to harvest herring between 0500 hours and 1700 hours each day until it closed at 2000 hours, April 21, 1998.

Harvesting of product began on April 12, with 102 individuals harvesting spawn on kelp. There were 36.0 tons of product harvested from the fishery. Three companies bought product at an average price of $2.96/pound, giving the fishery an exvessel value of $213,286. All pounds were required to be removed from the water by May 29, 1999.

Hoonah Sound

The spawning biomass forecast for Hoonah Sound was 4,548 and the fishery was opened in 1999. A guideline harvest level of 778 tons was established for the fishery. This was based on a 17.1% harvest rate of the projected 1999 mature spawning biomass. The spawn-on-kelp (SOK) harvest objective for 1999 was 62 tons (12.5 tons of herring per ton of spawn-on-kelp product). The total harvest of SOK in this year's fishery was 72 tons for an estimated total exvessel value of $1,005,529. Eighty-six permit holders made landings.

AGE AND GROWTH ANALYSIS

Methods and Procedures

Herring samples were collected during research surveys, aerial surveys, and the commercial fisheries from stocks located throughout Southeast Alaska (Figure 5). Collection gear varied with location, but included purse seines, cast nets, and gillnets. Cast nets were used when fish were in shallow water during spawning. Sampling was conducted on the spawning grounds and in pre-spawning areas. Herring sampled from the commercial fisheries were collected from individual fishers or tenders on the fishing grounds. The times and geographic locations of collection were recorded. The target collection goal was at least 420 fish from each commercial fishery and each spawning location. All samples were either processed fresh or frozen for examination and collection of scales in the laboratory.

After thawing in the laboratory, the standard length (mm) of each fish, (tip of snout to posterior margin of the hypural plate) was measured on a caliper measuring board. Fish were weighed on an electronic balance to the nearest whole gram.

A scale was removed from each fish for age analysis. The preferred location is on the left side, two rows above the lateral line, anterior to the dorsal fin or beneath the left pectoral fin. Scales were cleaned and dipped in a solution of 10% mucilage glue and water and placed unsculptured side down on glass slides. Aging was conducted using a dissecting microscope and varying the light source for optimum image of the annuli. Scale reading results were spot-checked by a second reader for age verification. The fish were assigned an anniversary date for each completed growing season. All samples were collected before growth resumed in the spring. For example, if a herring hatched in the spring of 1991 and was collected in the fall of 1992, two growing seasons had occurred (age 2). If the herring had been collected in the spring of 1993 before growth had resumed, it was also recorded as age 2.

In order to provide real-time age frequency analysis either prior to or during a commercial fishery, some sampling was conducted onboard department research vessels. This enabled department personnel to provide the commercial fishing fleet and processors with timely age, length, and weight information.

Results and Discussion

A total of 7,212 herring were aged, sexed, weighed, and measured for length. Samples were taken from Kah Shakes/Cat Island, West Behm, Ernest Sound, Hobart Bay/Port Houghton, Craig, Sitka Sound, Hoonah Sound, Seymour Canal, Tenakee Inlet, Lynn Canal, and Port Camden. Spawning populations in the Seymour Canal, Tenakee Inlet, Hoonah Sound, and Hobart Bay/Port Houghton areas had a dominant six-year-old age class (Figure 6). A large proportion of six-year-old herring were also observed in Lynn Canal cast net samples, however 4 and 5-year-old fish were also predominant. Four and five-year olds were the most prevalent age classes in Sitka Sound. Other stocks (Kah Shakes/Cat Island, West Behm Canal, Craig, and Ernest Sound were not characterized by a single, strong year class, but rather more even representation among ages groups. Port Camden samples contained evidence of strong 3-year-old recruitment in 1999. Summaries of age, weight, and length samples completed during 1999 are included in Appendix A.

SPAWN DEPOSITION SURVEYS

Methods and Procedures

The spawn deposition survey technique for estimating numbers of herring eggs by spawning area has been used in Southeast Alaska since 1976. The goal of the spawn deposition survey is to compute the total number of eggs within a defined spawning area. This estimate of total egg numbers is converted into a spawning population biomass estimate directly through use of an egg to biomass conversion factor or used as a key element in ASA.

A series of aerial and vessel surveys were conducted to document the occurrence of spawning activities at sites during the spring spawning period, document spawn timing, and provide an index of abundance in terms of nautical miles of beach receiving herring spawn. The presence of eggs on intertidal kelp, milt present in the water, herring schools, and bird and sea mammal activity are all important indicators of herring and spawn abundance.

The basic field sampling procedure entails 2-person scuba teams swimming along line transects and recording visual estimates of the number of eggs within a square, 0.10 m^2 sampling frame placed on the bottom at a fixed 5-meter distance along the transects. Because the frames (i.e. samples) are spaced equidistantly along transects, the record of the number of frames along a transect is also used to compute transect length. Along each transect, Diver 1 swims the specified inter-frame distance and places the frame on the bottom in a haphazard fashion (i.e. to minimize or avoid bias). Diver 2 then visually

estimates the number of eggs within the frame boundary and records the number of eggs within the frame on a preprinted data form carried by Diver 2. Diver 2 records the sequential number of the sample along with data on depth, substrate, and vegetation type (Tables 2 and 3). If time and conditions allow, Diver 1 also estimates the number of eggs for comparison with Diver 2's estimates and as a training exercise for Diver 1.

Starting points for transects in the control area are located randomly along the shore in areas where aerial or skiff surveys indicated probable spawn deposition. Transects are oriented perpendicular to the shoreline. Transects extend from the intertidal to either 15 meters of depth or until no further egg deposition is observed. Transects are extended above the waterline as far as egg deposition occurs. Dives are limited to 15 meters because deeper dives severely limit total bottom time for scuba divers and pose safety risks when done repetitively over several days. In addition, little if any herring egg deposition normally occurs deeper than 15 meters. The number of transects for any spawning site is estimated from previous surveys to achieve a statistical objective of producing an estimate of mean egg density with a standard error within +/- 20% of the mean. Practical considerations due to weather or vessel scheduling can result in a fewer number of transects.

Visual Estimate Correction

Since visual estimates rather than actual counts of eggs within the sampling frame are recorded, measurement error occurs. To minimize the influence of measurement error on final estimates of total egg deposition, diver-specific correction coefficients (h_i) are used to adjust estimates of egg density. Correction coefficients are estimated by visually estimating the number of eggs within a sampling frame and then collecting all of the eggs within the frame for later enumeration. To collect the eggs, divers either remove them from the substrate (e.g., rock) or collect the vegetation (e.g., kelp) for later removal of the eggs.

Estimates of Total Egg Deposition

Total egg deposition for a particular spawning ground (t_i) is estimated as:

$$t_i = a_i \bar{d}_i, \tag{1}$$

where a_i is the estimated total area (m^2) on which eggs have been deposited and $\bar{d}_i$ is the estimated mean density of eggs (eggs/m^2) at spawning area i. The total area on which eggs have been deposited (a_i) is estimated as:

$$a_i = l_i \bar{w}_i, \tag{2}$$

where l_i is the total meters of shoreline receiving spawn (determined from aerial and skiff surveys) and $\bar{w}_i$ is the mean length of transects conducted at spawning area i.

The mean density of eggs/m^2 at area *i* ($\bar{d}_i$) is estimated as:

$$\bar{d}_i = \left[\frac{\sum v_{hij} c_{hk}}{\sum m_{ji}} \right]^{-0.1}, \qquad (3)$$

where v_{hij} is the visual estimate of egg numbers by diver *h*, at area *i*, quadrant *j*. The c_{hk} term refers to a diver-specific correction coefficient to adjust visual estimates made by diver *h* for substrate *k*, and m_{ij} is the number of quadrants visually estimated at area *i*. Divers visually estimate egg density within 0.1 m quadrants. The -0.1 exponent expands the mean density from a 0.1 m^2 to a 1.0 m^2 unit basis. Diver-specific correction factors (c_h) are estimated as:

$$c_h = \frac{\bar{k}_h}{\bar{v}_h} \qquad (4)$$

where $\bar{v}_h$ is the mean visual estimate of egg numbers for diver *h* and $\bar{k}_h$ is the mean laboratory count of egg samples collected from substrate specific quadrants visually estimated by diver *h*.

Spawning Biomass Estimation

The total number of eggs per spawning area is a key element used in forecasting herring spawning biomass. The estimate is calculated by an age and weight specific fecundity for the four ASA areas, or an overall egg to biomass calculation based on the fecundity to weight relationship from the closest ASA spawning stock. Based on fecundity sampling conducted during the spawn of 1996 (1998 for Sitka) the specific age to biomass relationships used for the non-ASA areas were:

$$b = \frac{t}{L * EggConversionFactor} \qquad (5)$$

Where:

b = estimated total spawning biomass.
L = egg loss correction factor (=0.9) that accounts for an estimated 10% egg mortality between the time eggs are deposited and spawn deposition surveys are conducted.
ECF = 91,654,735 eggs per ton Kah Shakes/Cat Island (West Behm, Ship Is., Ernest Sound)
95,464,357 eggs per ton Craig
100,878,673 eggs per ton Seymour Canal (Farragut, Hobart/Houghton)
102,567,376 eggs per ton Sitka (Hoonah Sound, Tenakee Inlet)

Results and Discussion

Comprehensive spawning ground egg deposition surveys utilizing scuba were conducted in the KahShakes/Cat Island, West Behm Canal, Craig, Hobart Bay/Port Houghton, Seymour Canal, Sitka Sound, Tenakee Inlet, and Hoonah Sound areas in 1999. Length and width of spawn, egg density, and resultant escapements derived from egg to biomass conversions are summarized for these areas (Table 4). The first survey was initiated in Sitka Sound on April 7, and the last was completed in Seymour Canal on May 12. The surveys documented a total escapement for these areas of 88,242 tons. Maps of the spawning area, transect locations, and individual transect data are presented in Appendix B. Recorded logs of spawning activity from aerial and skiff surveys conducted between early March and late May, documenting spawning in each of the major spawning areas, are presented in Appendix C. Spawn locations, transect locations, and transect coordinates are presented in Appendix D. The total spawn for Southeast Alaska was 168 nautical miles.

Kah Shakes/Cat Island

In the Cat Island and Kah Shakes areas, 6.4 nautical miles of beach received herring spawn between March 30 and April 4. The Cat Island spawn survey was conducted April 14–15, 1999. Fifteen transects were selected at random in 1999. The average transect length (21 transects) was 212 meters with an average egg density of 74,736 eggs per square meter. The resultant escapement was 2,287 tons.

West Behm Canal

In West Behm Canal 25.6 nautical miles of spawn were recorded from April 2–9. See Appendix D for distribution of spawn. Twenty-two randomly selected transects were completed during the spawn deposition survey during April 16-17. The average length was 79 meters with an average egg density of 325,432 eggs per square meter, resulting in an escapement of 13,465 tons.

Craig

Spawning was first documented on March 24 around Fish Egg Island. Active spawning continued through April 17 and was centered around Fish Egg Island and Wadleigh Island. A total of 15.4 nautical miles of spawn were observed in 1999 for the Craig area. The spawn deposition survey had 22 transects with an average length of 81 meters, average density of 218,678 eggs per square meter, and a 5,873 ton escapement.

Hobart Bay/Port Houghton

Active spawning began in Hobart Bay on April 26 and lasted through April 30. Spawn was recorded in Port Houghton on April 27 and ended on April 30. A total of 20 transects were completed April 4–5, with an average transect length of 119 meters, and an average density of 97,073 eggs per square meter. The estimate of escapement for the Hobart/Houghton area was 4,510 tons

Seymour Canal

Aerial surveys were initiated on April 14 with a small active spawn recorded on April 25 on Faust Island. Major spawning occurred April 28–30 from Rock Garden to Sorethumb. The spawn deposition survey was conducted on May 11–12, when 24 randomly selected transects were examined. This survey produced a 3,225 ton escapement (16.8 n miles, 110 meters transect length, and 85,377 eggs per square meter density).

Tenakee Inlet

Aerial Surveys commenced in Tenakee Inlet on April 16, with spawn beginning on April 25 and ending April 28. Peak spawning occurred on April 27, when continuous spawning was recorded between Basket Bay and Trap Bay. A total of 11.0 nautical miles of spawn were recorded. Spawn deposition surveys were conducted during May 7–8 with the completion of 16 randomly selected transects. The average length was 135 meters with an average density of 319,271 eggs per square meter. The escapement was determined to be 9,734 tons.

Sitka

Aerial surveys began on March 10 in the Sitka area. On March 22, six-tenths of a mile active spawn was recorded at Watson Point. Major spawning began on March 25 with active spawn at Crescent, Jamestown, and Thimbleberry Bays, Japonski, Middle, Crow, Apple, and Battery Islands and the Halibut Point Road system. Spawning continued until April 22. The total spawn recorded was 59.5 nautical miles. The spawn deposition surveys were conducted on April 7–9. A total of 29 transects completed in the Sitka Sound area. The average length was 90 meters and average density was 418,209 eggs per square meter resulting in an escapement of 44,845 tons.

Hoonah Sound

A total of 13.8 nautical miles of herring spawn were recorded in Hoonah Sound in 1999. The spawn occurred during April 27–May 5, in the traditional areas of Emmons Island, Vixen Islands, and the Chichagof shore between Fick Cove and Rodgers Point. Aerial surveys were conducted from April 9 to May 5 with spawn deposition surveys conducted on May 9. A total of 16 randomly selected transects were completed. The average transect length was 104 meters with a density of 146,161 eggs per square meter. The resultant escapement estimate was 4,304 tons.

Lisianski Inlet

Aerial surveys of Lisianski Inlet and Lisianski Strait were conducted from April 26 to May 3. Total beach with spawn was 1.5 nautical miles. No spawn deposition survey was conducted in this area in 1999.

Lynn Canal

Aerial surveys of Lynn Canal and Auke Bay began on April 14 and ended May 17. Spawning began on May 7 when approximately 5 nautical miles of spawn were observed on the north side of Cascade Point

near Berners Bay. Active spawning dissipated until May 10. Consequently, no spawn deposition survey was conducted in Lynn Canal in 1999.

Other Areas

Small amounts of herring spawn was noted in the following areas during aerial surveys of other areas during 1999 (Appendix C): Oliver Inlet, Kassan Bay, Farragut Bay, and Ernest Sound. However, the total spawn of 5.75 nm for these areas was negligible compared to the total of 168 nm for all of Southeast Alaska.

DIVER VISUAL ESTIMATION CALIBRATION

Methods and Procedures

Samples of substrate with eggs were collected during the spawn deposition surveys for enumeration at the laboratory in Ketchikan to verify visual density estimates. The objective of this phase of the project is to determine a diver substrate-specific calibration factor that is used to adjust visual egg density estimates for individual divers each year.

A 0.1 square meter sample with vegetation and eggs was collected in small sample bags (approximately 2-liter capacity) during the spawn deposition surveys. These kelp and egg samples were transferred from the diver's bag to 4-liter (1 gallon) size, water-tight zip lock bags, salted (NaCl) and preserved in 100% salt brine solution. Detailed procedures for determining egg densities from collected samples are discussed in the 1993 Annual Report, RIR IJ93-19.

Results and Discussion

A total of 18 visually estimated and laboratory counted samples of vegetation with eggs were enumerated in 1999 (Table 5). A summary of correction ratios by diver and substrate for all samples taken since 1982 has total correction ratios that range from 0.71 to 2.61 of the visual estimates (Table 6). The lack of individual diver effects is attributed to the training and experience of the divers. The correction ratios are used in the spawn deposition surveys to adjust the total visual estimates of each diver before summing the total eggs in the survey area.

EXPERIMENTAL OPEN PLATFORM SPAWN-ON-KELP STUDY

At the January 1997 meeting of the Alaska Board of Fisheries, a regulatory change was proposed to allow Sitka Sound sac roe purse seine permit holders the option of fishing open platforms to harvest herring spawn on kelp (SOK). To understand the implications of adopting such a proposal, the board asked the department to conduct an experimental open platform herring spawn-on-kelp fishery in Sitka Sound. The purposes of this experimental test fishery were to 1) answer outstanding fishery research, management and economic questions, 2) develop a proposed management plan, and 3) generate revenue to fund the department's monitoring and management planning costs.

1999 was the second year that the open platform experimental fishery was conducted in Sitka Sound. Approximately 20.6 tons of spawn on kelp was harvested from the platforms, with an exvessel value of $227,965. A department report detailing this experimental fishery is in progress.

Table 1. Summary of 1998/1999 season herring fisheries.

WINTER FOOD AND BAIT FISHERY

Opening	Closing	Area	District	Forecast 1997 (tons)	Target Exploitation Rate (%)	Quota (tons)	Harvest[a] (tons)	Exvessel value[a]
14-Oct-98	28-Feb-99	Craig	3/4	6,951	6.5	450	--	--
14-Oct-98	28-Feb-99	Hobart Bay/Port Houghton	10	3,767	11.8	443	0	$0
14-Oct-98	28-Feb-99	Ernest Sound	7	5,381	12.3	662	--	--
14-Oct-98	28-Feb-99	Tenakee Inlet	12	7,765	13.2	1,023	835	$250,500
Total				23,864		2,578	835	$250,500

SAC ROE FISHERY

Opening	Closing	Area	District	Gear	Forecast 1997 (tons)	Target Exploitation Rate (%)	Quota (tons)	Harvest (tons)	Roe % Fishery	Exvessel value
22-Mar-99	27-Mar-99	Sitka Sound	13	Seine	43,602	19.4	8,476	9,136	10.7	$4,896,900
30-Apr-99	1-May-99	Seymour Canal	11	Gillnet	5,188	11.5	595	706	12.5	$353,000
26-Apr-99	26-Apr-99	Hobart Bay/Port Houghton	10	Gillnet	3,767	11.8	443	506	11.8	$242,880
--	--	Kah Shakes/Cat Island	1	Gillnet	8124	10.7	870	--	--	--
Total					52,557		9,514	10,348		$5,492,780

TEST FISHERIES

Opening	Closing	Area	District	Forecast 1997 (tons)	Target (tons)	Harvest (tons herring)	Harvest[b] (tons SOK)	Roe % Fishery	Exvessel value
11-Jan-99	15-Jan-99	Sitka Sound test fishery	13	43,602	100	104	--	(bait)	$20,700
--	--	Sitka Sound Open Platform	13	43,602	--	--	21.6	(SOK)	$227,965
4-Apr-99	4-Apr-99	West Behm Canal	1	15,968	30	29.9	--	15.4	$13,398
20-Apr-99	21-Apr-99	Hobart Bay/Port Houghton	10	3,767	35	38.4	--	12.6	$13,866
Total				106,939	165	172.3	21.6		$275,929

SPAWN-ON-KELP FISHERY

Opening	Closing	Area	District	Gear	Forecast 1997 (tons)	Quota[b] (tons herring)	Harvest[c] (tons)	Exvessel value
17-Mar-99	21-Apr-99	Craig	3	Pound	6,951	650	36.0	$213,286
6-Apr-99	30-Apr-99	Hoonah Sound	13	Pound	4,548	778	72.0	$1,005,529
Total					11,499	1,428	108.0	$1,218,815

[a] Data considered confidential with fewer than three participants.
[b] For the Craig area, includes 348 ton carry-over from unharvested bait quota.
[c] Harvest represented in tons of spawn-on-kelp product.

Table 2. Key to vegetative substrate types used for herring spawn deposition survey.

Code	Expanded code	Species included	Latin names
AGM	Agarum	Sieve kelp	*Agarum clathratum*
ALA	Alaria	Ribbon kelps	*Alaria marginata, A. nana, A. fistulosa*
ELG	Eel grass	Eel grass, surfgrasses	*Zostera marina, Phyllospadix serrulatus, P. scouleri*
FIL	Filamentous algae	Sea hair	*Enteromorpha intestinalis*
FIR	Fir kelp	Black pine, Oregon pine (red algae)	*Neorhodomela larix, N.oregona*
FUC	Fucus	Rockweed	*Fucus gardneri*
HIR	Hair kelp	Witch's hair, stringy acid kelp	*Desmarestia aculeata, D. viridis*
LAM	Laminaria	split kelp, sugar kelp, suction-cup kelp	*Laminaria bongardiana, L. saccharina, L. yezoensis (when isolated and identifiable)*
LBK	Large Brown Kelps	Five-ribbed kelp, three-ribbed kelp, split kelp, sugar kelp, sea spatula, sieve kelp, ribbon kelp	*Costaria costata, Cymathere triplicata, Laminaria spp., Pleurophycus gardneri, Agarum, Alaria spp.*
MAC	Macrocystis	Small perennial kelp	*Macrocystis sp.*
NER	Nereocystis	Bull kelp	*Nereocystis leutkeana*
RED	Red algae	All red leafy algae (red ribbons, red blades, red sea cabbage, Turkish washcloth)	*Palmaria mollis, P. hecatensis, P. callophylloides, Dilsea californica, Neodilsea borealis, Mastocarpus papillatus, Turnerella mertensiana*
ULV	Ulva	Sea lettuce	*Ulva fenestrata, Ulvaria obscura*
COR	Coralline algae	Coral seaweeds (red algae)	*Bossiella, Corallina, Serraticardia*

Table 3. Key to bottom types used for herring spawn deposition survey.

Code	Expanded code	Definition
RCK	Bedrock	Various rocky substrates > 1 meter in diameter
BLD	Boulder	Substrate between 25 cm and 1 meter
CBL	Cobble	Substrate between 6 cm and 25 cm
GVL	Gravel	Substrate between 0.4 cm and 6 cm
SND	Sand	Clearly separate grains of < 0.4 cm
MUD	Mud	Soft, paste-like material
SIL	Silt	Fine organic dusting (very rarely used)
BAR	Barnacle	Area primarily covered with barnacles
SHL	Shell	Area primarily covered with whole or crushed shells
MUS	Mussels	Area primarily covered with mussels
WDY	Woody debris	Any submerged bark, logs, branches or root systems

Table 4. Southeast Alaska herring spawn deposition survey results, 1999.

KAH SHAKES/CAT ISLAND SPAWN DEPOSITION, 1999

Number of transects	15.0						
Number of estimates	635.0						
Corrected sum of estimates by diver		579.7	269.0	1,361.2	1,009.7	395.0	1,131.1
Total number of eggs/ .1 meter quadrant (1,000s)	4,745.7						
Average length of transects in meters	211.7	(total samples*5meters/total [15] transects					
Lineal meters of shoreline receiving spawn	11,926.9	(6.44 nautical miles of shore*1,852meters/nmile)					
Area of survey in square meters	2,524,522.9	(length of shoreline*average width of transects)					
Average density of quadrant samples (1,000s)	7.5	(total eggs [1,000s]/total number of observations)					
Average density of eggs per square meter	74,736.1	(average .1 meter quadrant sample* 1,000 eggs*10 meters)					
Total number of eggs in survey area	188,672,904,028.0	(total survey area in meters * total eggs per meter)					
Unadjusted escapement in tons	2,058.5	(total number of eggs / 91,654,735 eggs per ton of spawners)					
Corrected escapement using 10% egg loss	2,287.2	(adjustment to account for 10% egg loss prior to survey)					

CRAIG SPAWN DEPOSITION, 1999

Number of transects	22.0						
Number of estimates	356.0						
Corrected sum of estimates by diver		5,442.6	16.4	535.1	696.5	1,094.3	
Total number of eggs/ .1 meter quadrant (1,000s)	7,784.9						
Average length of transects in meters	80.9	(total samples * 5 meters/total [22] transects					
Lineal meters of shoreline receiving spawn	28,520.8	(15.4 nautical miles of shore*1852meters/nmile)					
Area of survey in square meters	2,307,592.0	(length of shoreline * average width of transects)					
Average density of quadrant samples (1,000s)	21.9	(total eggs [1,000s]/total number of observations)					
Average density of eggs per square meter	218,678.1	(average .1 meter quadrant sample * 1,000 eggs * 10 meters)					
Total number of eggs in survey area	504,619,798,300.0	(total survey area in meters * total eggs per meter)					
Unadjusted escapement in tons	5,285.9	(total number of eggs / 95,464,357 eggs per ton of spawners)					
Corrected escapement using 10% egg loss	5,873.3	(adjustment to account for 10% egg loss prior to survey)					

-continued-

Table 4. (page 2 of 4)

WEST BEHM CANAL SPAWN DEPOSITION, 1999

Number of transects	22.0						
Number of estimates	346.0						
Corrected sum of estimates by diver		1,378.2	1,750.9	809.3	861.0	5,409.9	1050.74
Total number of eggs/ .1 meter quadrant (1,000s)	11,259.9						
Average length of transects in meters	78.6	(total samples*5meters/total [22] transects					
Lineal meters of shoreline receiving spawn	47,356.0	(25.6 nautical miles of shore*1,852meters/nmile)					
Area of survey in square meters	3,723,875.0	(length of shoreline*average width of transects)					
Average density of quadrant samples (1,000s)	32.5	(total eggs [1,000s]/total number of observations)					
Average density of eggs per square meter	325,432.0	(average .1 meter quadrant sample* 1,000 eggs*10 meters)					
Total number of eggs in survey area	1,211,866,375,065.0	(total survey area in meters * total eggs per meter)					
Unadjusted escapement in tons	12,464.0	(total number of eggs / 100,000,000 eggs per ton of spawners)					
Corrected escapement using 10% egg loss	13,465.0	(adjustment to account for 10% egg loss prior to survey)					

HOBART BAY/PORT HOUGHTON SPAWN DEPOSITION, 1999

Number of transects	20.0						
Number of estimates	477.0						
Corrected sum of estimates by diver		412.6	761.9	1,990.3	326.8	4.5	1,134.4
Total number of eggs/ .1 meter quadrant (1,000s)	4,630.4						
Average length of transects in meters	119.3	(total samples*5meters/total [20] transects					
Lineal meters of shoreline receiving spawn	35,373.2	(19.1 nautical miles of shore*1852meters/nmile)					
Area of survey in square meters	4,218,254.2	(length of shoreline*average width of transects)					
Average density of quadrant samples (1,000s)	9.7	(total eggs [1,000s]/total number of observations)					
Average density of eggs per square meter	97,073.2	(average .1 meter^2 quadrant sample* 1,000 eggs*10)					
Total number of eggs in survey area	409,479,287,048.2	(total survey area in meters * total eggs per meter)					
Unadjusted escapement in tons	4,059.1	(total number of eggs / 100,878,673 eggs per ton of spawners)					
Corrected escapement using 10% egg loss	4,510.1	(adjustment to account for 10% egg loss prior to survey)					

-continued-

Table 4. (page 3 of 4)

HOONAH SOUND SPAWN DEPOSITION, 1999

Number of transects	16.0					
Number of estimates	333.0					
Corrected sum of estimates by diver		880.6	1,642.4	408.7	1,266.8	668.8
Total number of eggs/ .1 meter quadrant (1,000s)	4,867.2					
Average length of transects in meters	104.1	(total samples*5meters/total [16] transects				
Lineal meters of shoreline receiving spawn	25,465.0	(13.8 nautical miles of shore*1852meters/nmile)				
Area of survey in square meters	2,649,951.6	(length of shoreline*average width of transects)				
Average density of quadrant samples (1,000s)	14.6	(total eggs [1,000s]/total number of observations)				
Average density of eggs per square meter	146,161.3	(average .1 meter quadrant sample* 1,000 eggs*10 meters)				
Total number of eggs in survey area	387,320,262,656.3	(total survey area in meters * total eggs per meter)				
Unadjusted escapement in tons	3,873.2	(total number of eggs / 100,000,000 eggs per ton of spawners)				
Corrected escapement using 10% egg loss	4,303.6	(adjustment to account for 10% egg loss prior to survey)				

SITKA SOUND SPAWN DEPOSITION, 1999

Number of transects	29.0					
Number of estimates	521.0					
Corrected sum of estimates by diver		7,011.6	5,198.4	5,579.1	3,999.6	
Total number of eggs/ .1 meter quadrant (1,000s)	21,788.7					
Average length of transects in meters	89.8	(total samples*5meters/total [29] transects				
Lineal meters of shoreline receiving spawn	110,194.0	(59.5 nautical miles of shore*1852meters/nmile)				
Area of survey in square meters	9,898,461.0	(length of shoreline*average width of transects)				
Average density of quadrant samples (1,000s)	41.8	(total eggs [1,000s]/total number of observations)				
Average density of eggs per square meter	418,209.4	(average .1 meter quadrant sample* 1,000 eggs*10 meters)				
Total number of eggs in survey area	4,139,629,499,551.7	(total survey area in meters * total eggs per meter)				
Unadjusted escapement in tons	40,360.1	(total number of eggs / 102567376 eggs per ton of spawners)				
Corrected escapement using 10% egg loss	44,844.6	(adjustment to account for 10% egg loss prior to survey)				

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Table 4. (page 4 of 4)

TENAKEE INLET SPAWN DEPOSITION, 1999

Number of transects	16.0						
Number of estimates	431.0						
Corrected sum of estimates by diver		832.4	1,280.3	3,283.8	1,115.4	3,703.6	3,545.1
Total number of eggs/ .1 meter quadrant (1,000s)	13,760.6						
Average length of transects in meters	134.7	(total samples*5meters/total [16] transects					
Lineal meters of shoreline receiving spawn	20,372.0	(11 nautical miles of shore*1852meters/nmile)					
Area of survey in square meters	2,743,853.8	(length of shoreline*average width of transects)					
Average density of quadrant samples (1,000s)	31.9	(total eggs [1,000s]/total number of observations)					
Average density of eggs per square meter	319,270.8	(average .1 meter quadrant sample* 1,000 eggs*10 meters)					
Total number of eggs in survey area	876,032,287,625.0	(total survey area in meters * total eggs per meter)					
Unadjusted escapement in tons	8,760.3	(total number of eggs / 100,000,000 eggs per ton of spawners)					
Corrected escapement using 10% egg loss	9,733.7	(adjustment to account for 10% egg loss prior to survey)					

SEYMOUR CANAL SPAWN DEPOSITION, 1999

Number of transects	24.0					
Number of estimates	529.0					
Corrected sum of estimates by diver		1,134.2	1,606.3	1,270.7	126.2	379.1
Total number of eggs/ .1 meter quadrant (1,000s)	4,516.5					
Average length of transects in meters	110.2	(total samples*5meters/total [24] transects				
Lineal meters of shoreline receiving spawn	31,113.6	(16.8 nautical miles of shore*1852meters/nmile)				
Area of survey in square meters	3,428,978.0	(length of shoreline*average width of transects)				
Average density of quadrant samples (1,000s)	8.5	(total eggs [1,000s]/total number of observations)				
Average density of eggs per square meter	85,377.1	(average .1 meter quadrant sample* 1,000 eggs*10 meters)				
Total number of eggs in survey area	292,756,289,000.0	(total survey area in meters * total eggs per meter)				
Unadjusted escapement in tons	2,902.1	(total number of eggs / 100878673 eggs per ton of spawners)				
Corrected escapement using 10% egg loss	3,224.5	(adjustment to account for 10% egg loss prior to survey)				

Table 5. Individual spawn deposition diver calibration estimates, 1999.

Date	Area	Observer[a] Visual Estimates (in thousands)				Substrate[b]	Egg Vol. (mL)	Average Eggs/ml	Egg Loss	Lab Estimate
		KH	MP	DG	BD					
08-Apr-99	Sitka Sound	60,000	160,000	100,000	50,000	ELG	620	118	1,000	74,160
08-Apr-99	Sitka Sound	200,000		120,000		LBK	1,280	184	3,500	239,020
08-Apr-99	Sitka Sound	120,000	300,000	300,000	300,000	ELG	1,810	143	4,000	262,830
08-Apr-99	Sitka Sound	400,000	320,000	250,000	260,000	HIR	2,420	200	2,000	486,000
09-Apr-99	Sitka Sound	35,000		30,000	45,000	LBK	360	155	500	56,300
09-Apr-99	Sitka Sound	50,000		110,000	35,000	FUC	840	140	1,000	118,600
09-Apr-99	Sitka Sound	230,000		240,000	220,000	LBK	1,405	167	3,000	237,635
16-Apr-99	West Behm Canal	50,000				LBK	330	250	500	83,000
16-Apr-99	West Behm Canal		35,000			LAM	330	250	500	83,000
16-Apr-99	West Behm Canal	140,000	180,000			FUC	1,360	143	1,000	195,480
16-Apr-99	West Behm Canal	150,000	160,000			FUC	1,440	211	2,000	305,840
16-Apr-99	West Behm Canal	400,000	200,000			HIR	1,900	155	1,000	295,500
16-Apr-99	West Behm Canal	250,000	260,000			FIR	1,920	134	2,000	259,280
16-Apr-99	West Behm Canal	400,000	400,000			HIR	2,260	191	2,000	433,660
16-Apr-99	West Behm Canal	170,000	100,000			LBK	3,660	101	2,000	371,660
20-Apr-99	Craig	85,000	200,000			ELG	780	225	1,000	176,500
08-May-99	Tenakee Inlet	18,000		60,000		FUC	420	118	2,500	52,060
08-May-99	Tenakee Inlet	425,000		280,000		HIR	1,810	184	1,500	334,540
08-May-99	Tenakee Inlet	550,000		800,000		HIR	4,240	155	7,000	664,200

[a] Observers: KH (Kyle Hebert), MP (Marc Pritchett), DG (Dave Gordon), BD (Bill Davidson).

[b] See Table 5 for code definitions.

Table 6. Diver calibration ratios (lab:visual)[a], 1998, based on data from 1982-1988 and 1993-1999.

	Substrate				
Estimator	Eel Grass	Fucus	Hair Kelp	Large Brown Kelp	Other[b]
Bergmann (WB)	0.77	1.24	1.20	0.89	1.10
Davidson (BD)	1.26	1.52	1.41	1.17	0.93
Doherty (PD)	1.29	1.00	1.21	1.20	1.31
Gordon (DG)	1.09	1.41	1.24	1.42	1.02
Hebert (KH)	1.94	1.46	1.03	1.12	1.09
Koeneman (TK)	0.77	0.71	0.95	0.98	0.97
Larson (RL)	1.09	1.08	1.28	1.12	1.09
Lynch (BL)	1.18	1.76	1.30	1.46	1.15
Muir (JM)	1.24	1.13	1.24	0.85	1.03
Pritchett (MP)	1.01	1.37	1.13	2.61	0.76
Walker (SW)	1.26	1.25	1.28	1.12	0.79

[a] Overall ratio weighted by the annual sample size.

[b] All other substrate types.

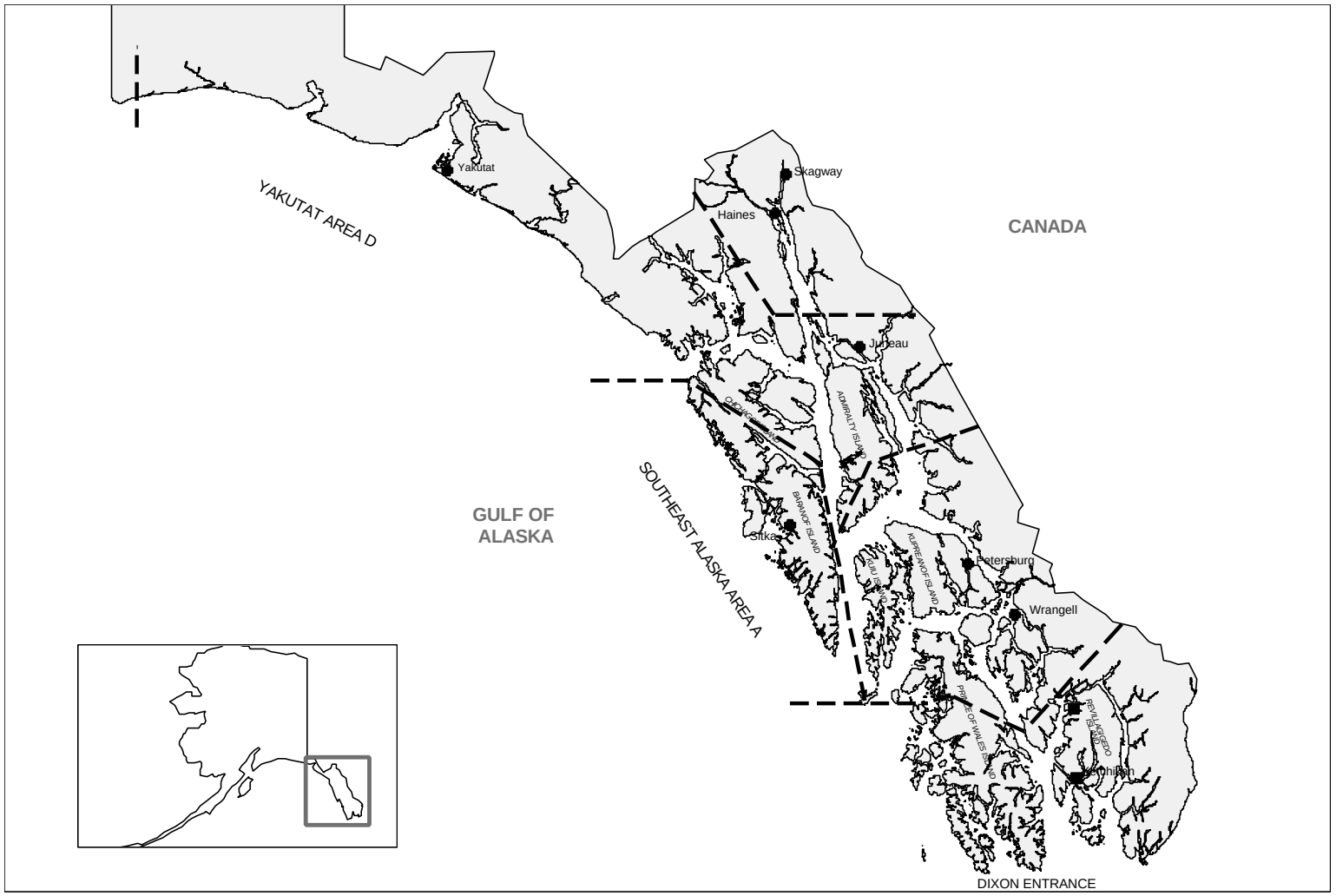

Figure 1. Southeast Alaska Region (Region 1) herring registration areas (Southeast Alaska Area A and Yakutat Area D) and management area boundaries.

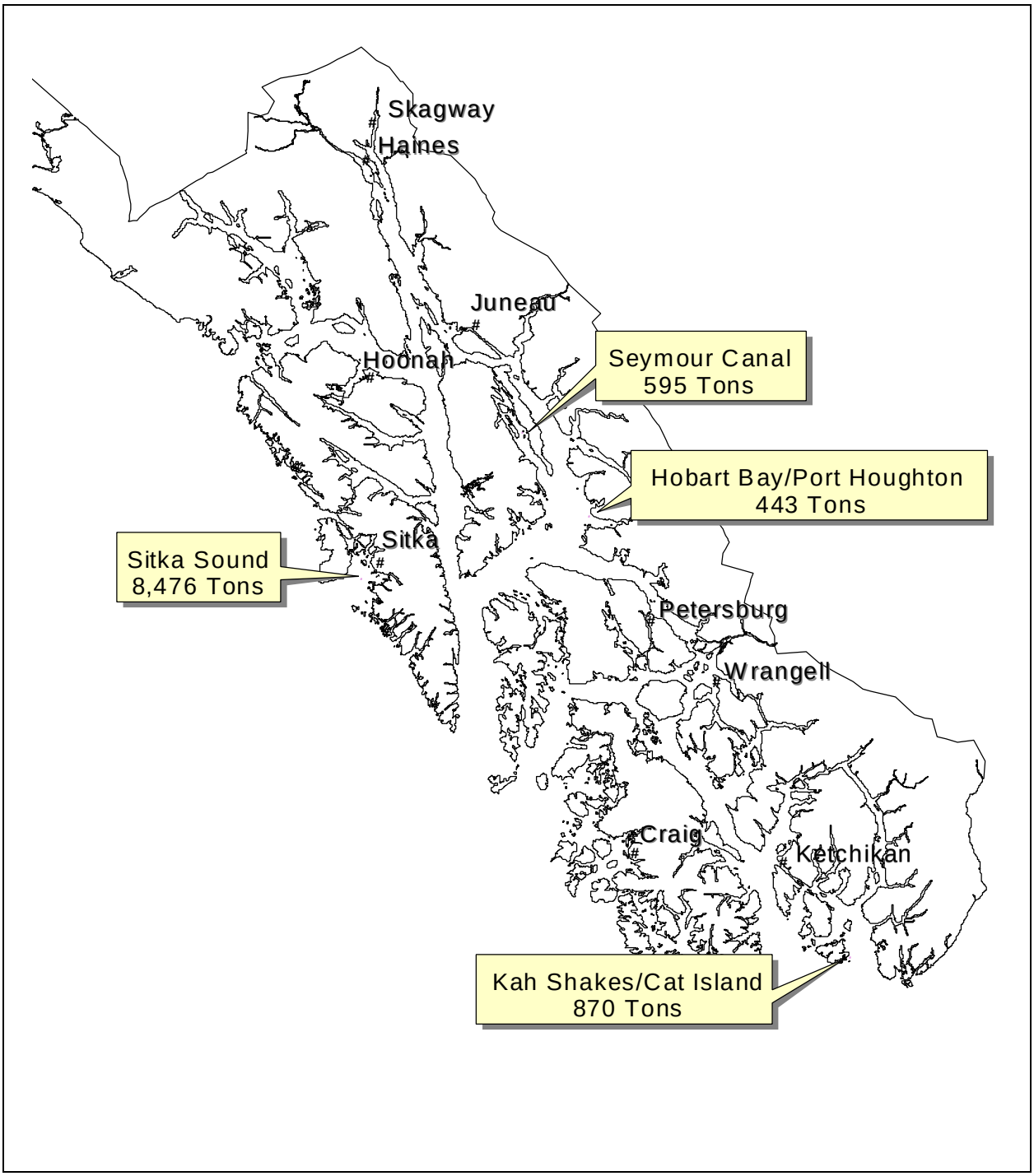

Figure 2. Sac roe areas with quotas, 1999.

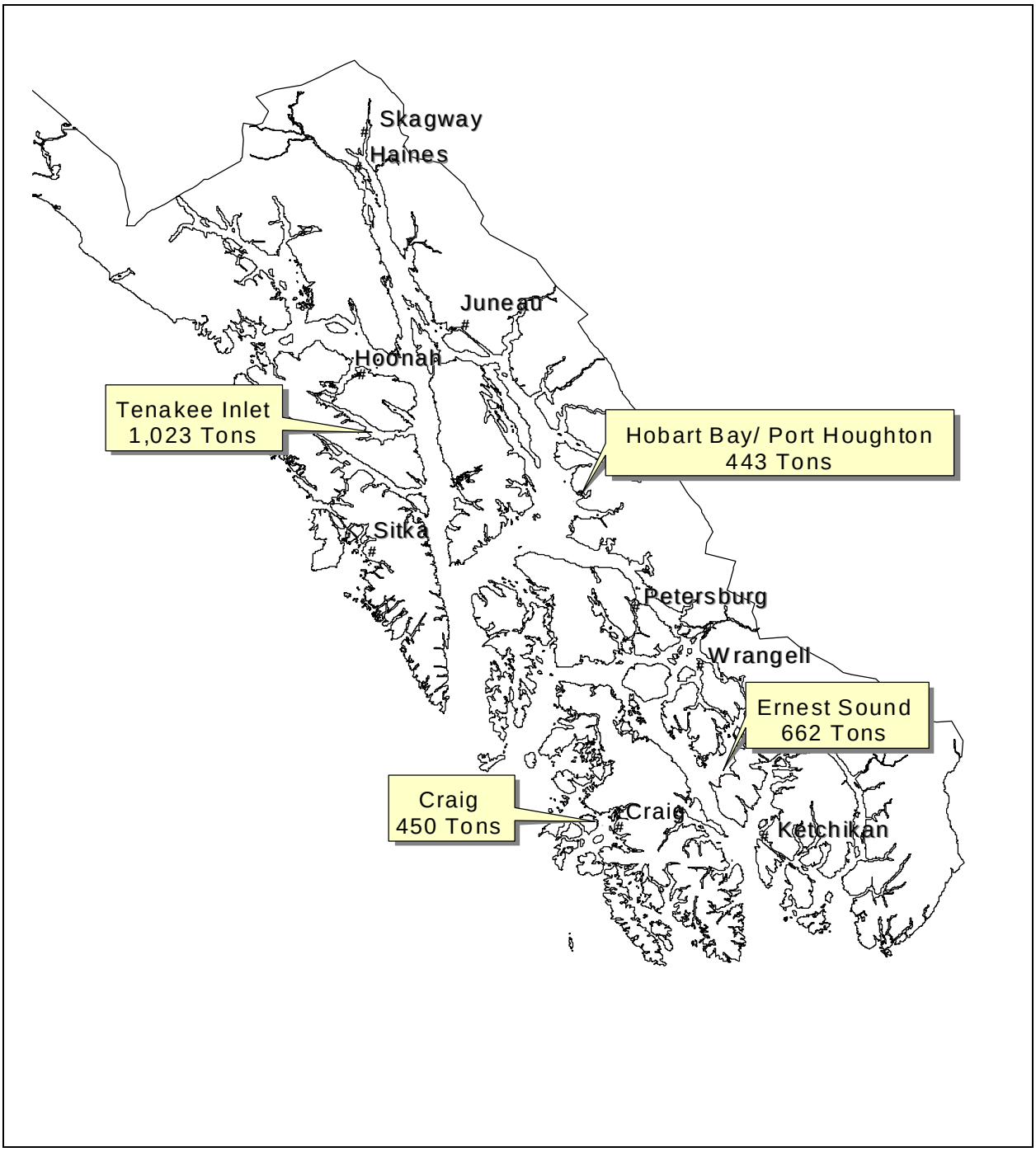

Figure 3. Food and bait fishing areas and quotas, 1999.

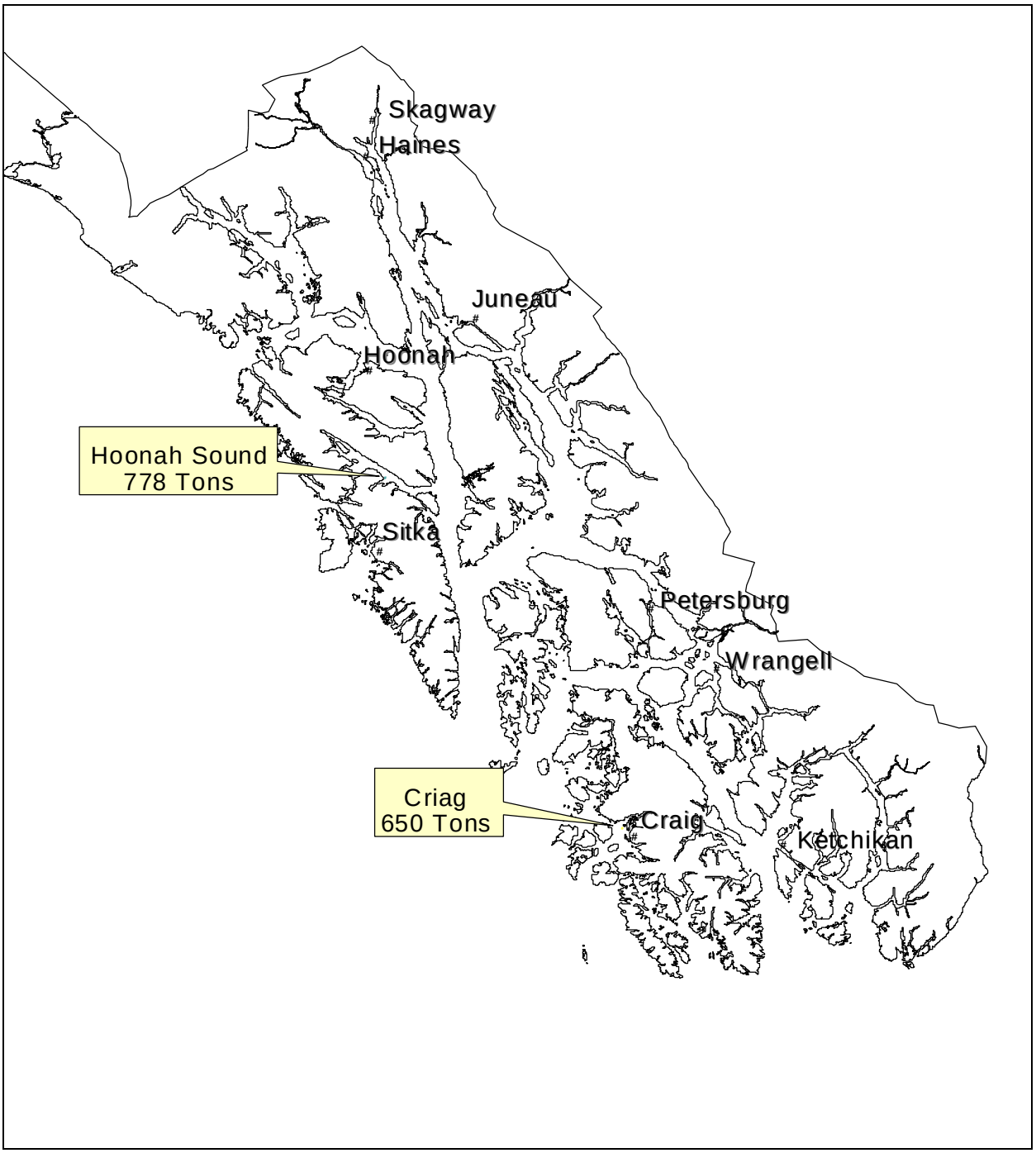

Figure 4. Spawn-on-kelp pound fishing areas with herring quotas, 1999.

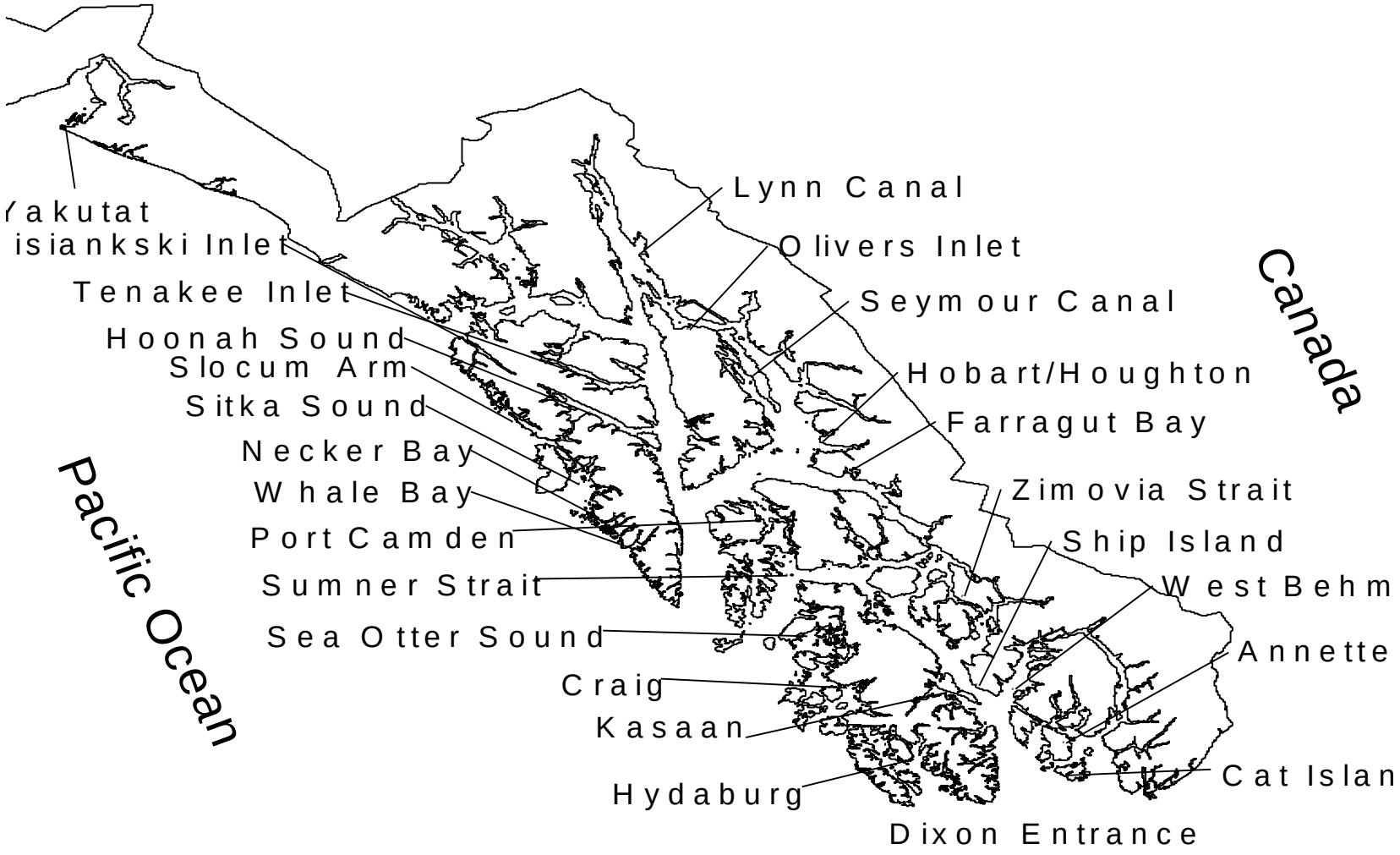

Figure 5. Major Southeast Alaska herring spawn stocks and AWL study areas, 1999.

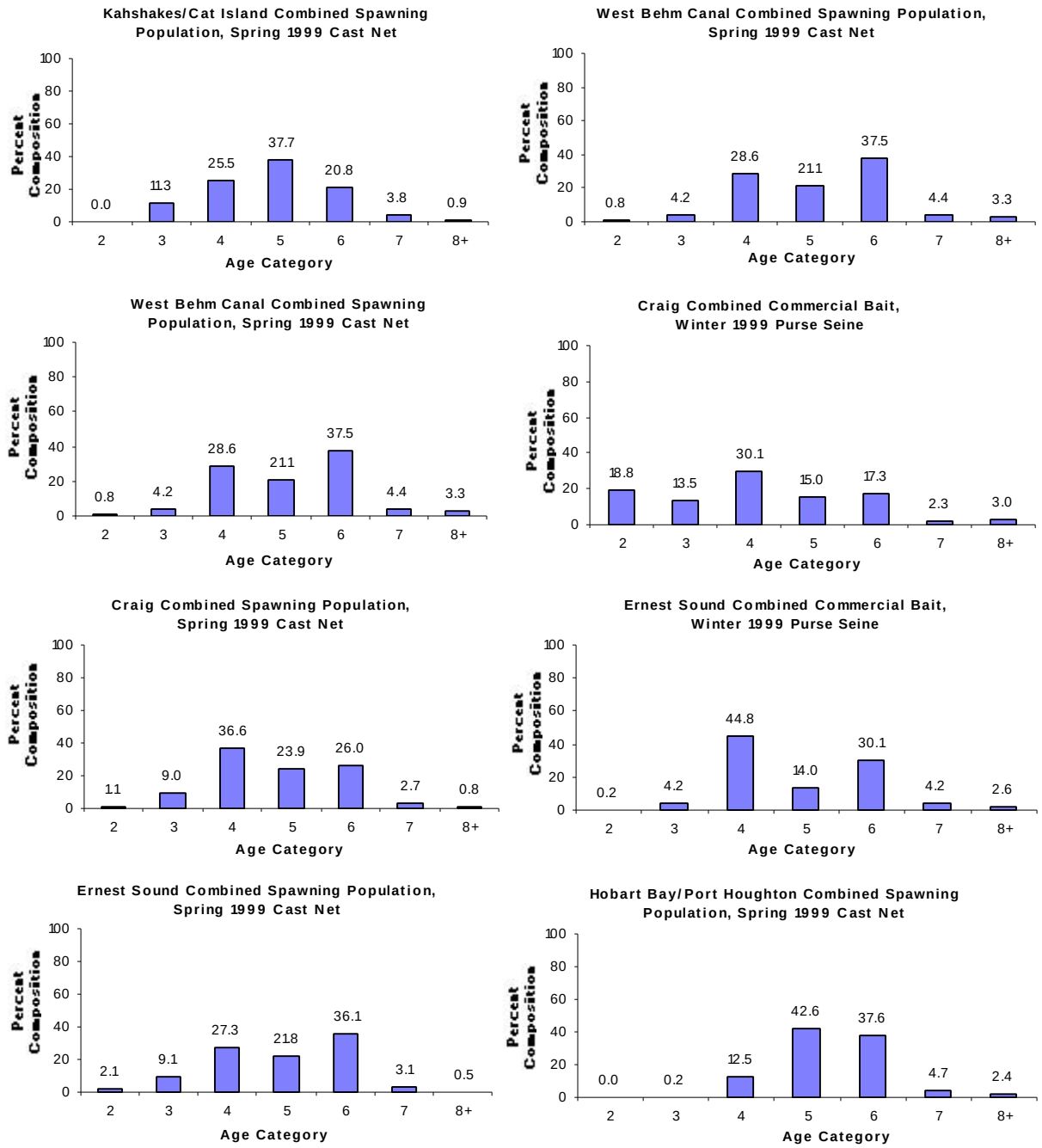

Figure 6. Herring age composition of major stocks in Southeast Alaska, by stock, fishery and gear type, 1999.

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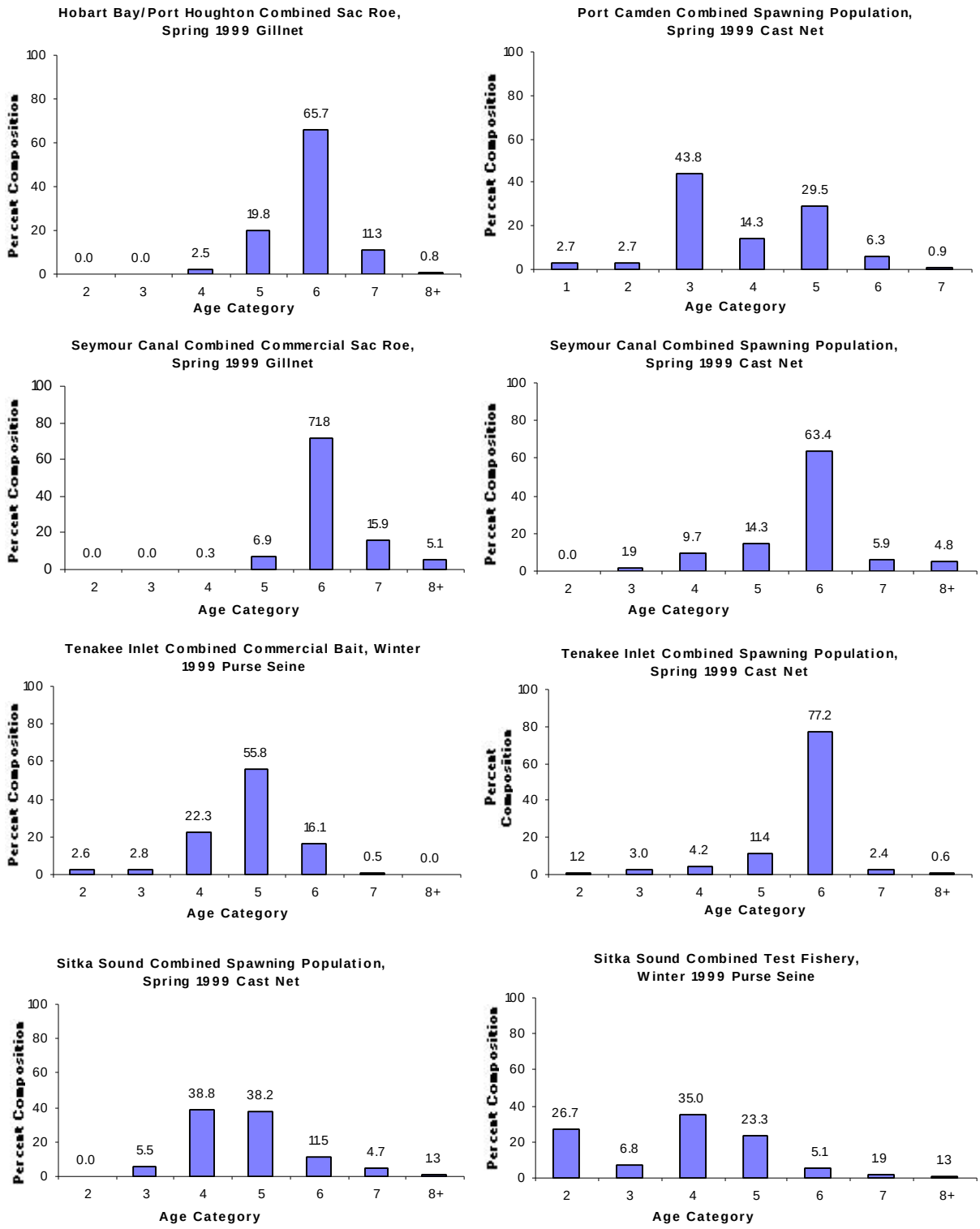

Figure 6. (page 2 of 3)

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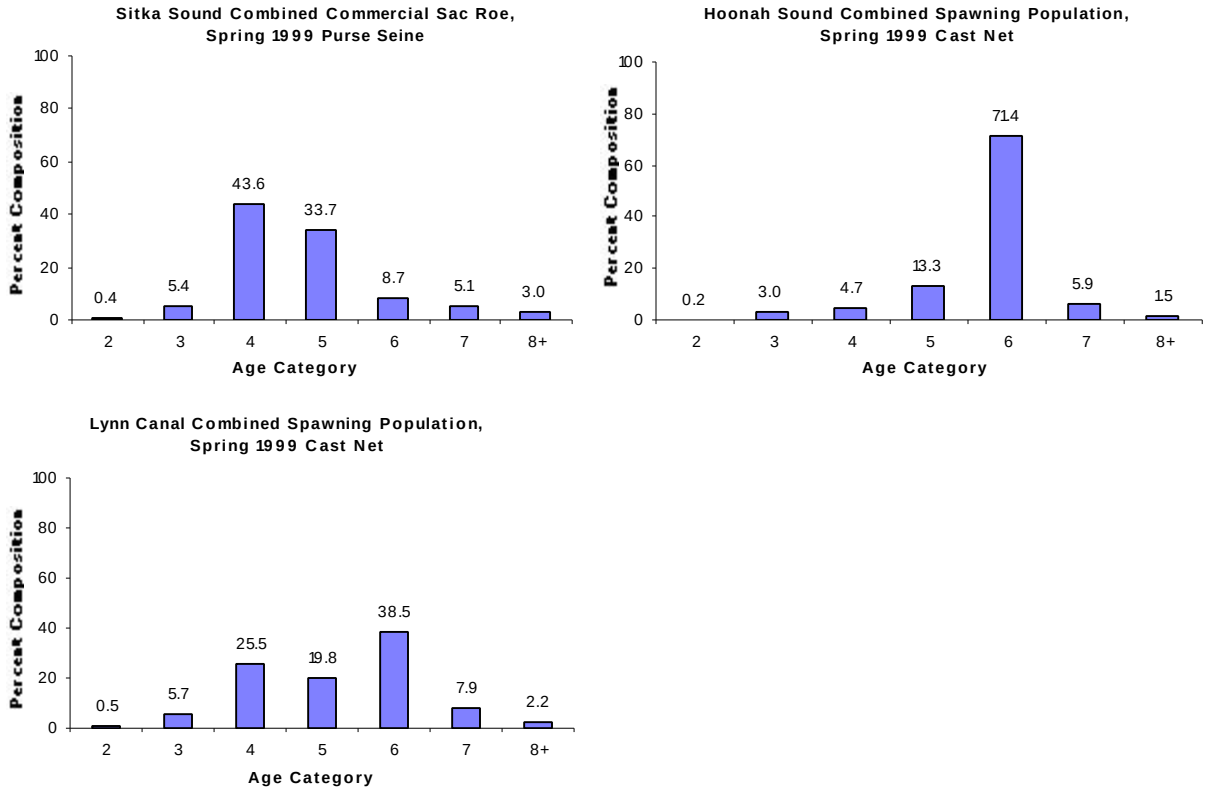

Figure 6. (page 3 of 3)

APPENDIX

Appendix A. Summarized age, length, weight and gender data for major herring stocks in Southeast Alaska, 1999.

Kah Shakes/Cat Island 1999

Fripo Island Spawning Ground Survey March 31, 1999 Cast Net Active Spawn Pre-fishery

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	162.8	181.1	192.0	195.8	210.5	213.0	187.6
Average Weight (g)	n/a	57.4	80.4	95.7	103.4	134.0	138.0	90.9
Count of Age Category	0.0	12.0	27.0	40.0	22.0	4.0	1.0	106.0
Percent Age Composition	0.0%	11.3%	25.5%	37.7%	20.8%	3.8%	0.9%	100.0%
Percent Female	n/a	41.7%	40.7%	50.0%	31.8%	50.0%	0.0%	42.5%
Percent Male	n/a	58.3%	59.3%	50.0%	68.2%	50.0%	100.0%	57.5%

Survey Pt. Spawning Ground Survey April 5, 1999 Cast Net Active Spawn

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	129.0	156.0	184.7	187.4	190.9	190.0	212.3	187.1
Average Weight (g)	23.0	45.5	80.1	82.6	96.6	90.0	119.3	86.7
Count of Age Category	1.0	2.0	19.0	14.0	23.0	1.0	3.0	63.0
Percent Age Composition	1.6%	3.2%	30.2%	22.2%	36.5%	1.6%	4.8%	100.0%
Percent Female	0.0%	100.0%	47.4%	50.0%	60.9%	100.0%	66.7%	55.6%
Percent Male	100.0%	0.0%	52.6%	50.0%	39.1%	0.0%	33.3%	44.4%

W. Benton Is. Spawning Ground Survey April 6, 1999 Cast Net Active Spawn

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	170.0	179.1	180.5	192.3	191.0	169.0	183.3
Average Weight (g)	n/a	65.3	84.2	83.8	97.1	93.5	60.0	87.1
Count of Age Category	0.0	3.0	23.0	10.0	18.0	2.0	1.0	57.0
Percent Age Composition	0.0%	5.3%	40.4%	17.5%	31.6%	3.5%	1.8%	100.0%
Percent Female	n/a	0.0%	34.8%	70.0%	44.4%	100.0%	100.0%	45.6%
Percent Male	n/a	100.0%	65.2%	30.0%	55.6%	0.0%	0.0%	54.4%

Pup Is. Spawning Ground Survey April 7, 1999 Cast Net Active Spawn

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	158.0	173.0	175.8	195.2	199.0	210.5	188.1
Average Weight (g)	n/a	48.0	68.3	77.9	98.3	104.0	122.0	90.1
Count of Age Category	0.0	1.0	10.0	11.0	24.0	5.0	4.0	55.0
Percent Age Composition	0.0%	1.8%	18.2%	20.0%	43.6%	9.1%	7.3%	100.0%
Percent Female	n/a	0.0%	20.0%	54.5%	58.3%	40.0%	50.0%	47.3%
Percent Male	n/a	0.0%	50.0%	36.4%	37.5%	60.0%	50.0%	41.8%
Percent Unknown	n/a	100.0%	30.0%	9.1%	4.2%	0.0%	0.0%	10.9%

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Craig 1999

Mearse Pass Commercial Bait January 8, 1999 Purse Seine

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	145.0	166.9	174.8	196.5	198.7	210.3	183.3	174.4
Average Weight (g)	40.2	65.4	82.4	112.6	119.5	146.7	93.7	81.6
Count of Age Category	25.0	18.0	24.0	14.0	17.0	3.0	3.0	104.0
Percent Age Composition	24.0%	17.3%	23.1%	13.5%	16.3%	2.9%	2.9%	100.0%
Percent Female	20.0%	44.4%	66.7%	50.0%	64.7%	33.3%	33.3%	47.1%
Percent Male	68.0%	55.6%	29.2%	50.0%	35.3%	66.7%	66.7%	49.0%
Percent Unknown	12.0%	0.0%	4.2%	0.0%	0.0%	0.0%	0.0%	3.8%

Craig Combined Commercial Bait Winter, 1998 Purse Seine

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	145.0	166.9	173.5	192.8	197.7	210.3	183.5	175.5
Average Weight (g)	40.2	65.4	82.8	106.1	117.6	146.7	93.0	83.7
Count of Age Category	25.0	18.0	40.0	20.0	23.0	3.0	4.0	133.0
Percent Age Composition	18.8%	13.5%	30.1%	15.0%	17.3%	2.3%	3.0%	100.0%
Percent Female	20.0%	44.4%	40.0%	35.0%	47.8%	33.3%	25.0%	36.8%
Percent Male	68.0%	55.6%	57.5%	65.0%	52.2%	66.7%	75.0%	60.2%
Percent Unknown	12.0%	0.0%	2.5%	0.0%	0.0%	0.0%	0.0%	3.0%

N. Fish Egg Island Spawning Ground Survey March 25, 1999 Cast Net Active

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	176.3	179.7	191.0	197.7	216.0	n/a	186.4
Average Weight (g)	n/a	77.7	82.1	94.0	111.7	125.0	n/a	91.6
Count of Age Category	0.0	6.0	37.0	16.0	18.0	1.0	0.0	78.0
Percent Age Composition	0.0%	7.7%	47.4%	20.5%	23.1%	1.3%	0.0%	100.0%
Percent Female	n/a	50.0%	43.2%	50.0%	38.9%	0.0%	n/a	43.6%
Percent Male	n/a	50.0%	56.8%	50.0%	61.1%	100.0%	n/a	56.4%

Alberto Island Spawning Ground Survey April 12, 1999 Cast Net Active Spawn

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	148.0	159.3	181.4	190.6	190.9	202.7	n/a	181.5
Average Weight (g)	36.0	52.3	76.1	92.3	94.8	115.0	n/a	79.6
Count of Age Category	1.0	15.0	33.0	17.0	16.0	3.0	0.0	85.0
Percent Age Composition	1.2%	17.6%	38.8%	20.0%	18.8%	3.5%	0.0%	100.0%
Percent Female	0.0%	33.3%	48.5%	47.1%	37.5%	33.3%	n/a	42.4%
Percent Male	100.0%	66.7%	51.5%	52.9%	62.5%	66.7%	n/a	57.6%

N.E. Coronados Is. Spawning Ground Survey April 13, 1999 Cast Net Active Spawn

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	170.0	184.3	180.8	197.9	n/a	215.0	190.1
Average Weight (g)	n/a	64.0	85.2	84.0	111.9	n/a	130.0	97.6
Count of Age Category	0.0	1.0	6.0	6.0	11.0	0.0	1.0	25.0
Percent Age Composition	0.0%	4.0%	24.0%	24.0%	44.0%	0.0%	4.0%	100.0%
Percent Female	n/a	100.0%	33.3%	0.0%	45.5%	0.0%	0.0%	32.0%
Percent Male	n/a	0.0%	66.7%	100.0%	54.5%	0.0%	100.0%	68.0%

Ernest Sound 1999

Deer Island Commercial Bait January 5, 1999 Purse Seine

Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	123.0	153.7	162.3	174.0	176.4	194.8	208.0	169.6
Average Weight (g)	27.0	51.7	63.6	81.0	83.1	112.4	142.0	74.4
Count of Age Category	1.0	9.0	79.0	25.0	49.0	8.0	3.0	174.0
Percent Age Composition	0.6%	5.2%	45.4%	14.4%	28.2%	4.6%	1.7%	100.0%
Percent Female	0.0%	33.3%	46.8%	40.0%	42.9%	25.0%	66.7%	43.1%
Percent Male	100.0%	66.7%	53.2%	60.0%	57.1%	75.0%	33.3%	56.9%

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Ernest Sound Commercial Bait Winter, 1998 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	123.0	156.9	164.3	174.8	178.5	189.4	202.1	171.6
Average Weight (g)	27.0	54.6	63.9	79.5	85.2	101.7	125.8	75.1
Count of Age Category	1.0	18.0	192.0	60.0	129.0	18.0	11.0	429.0
Percent Age Composition	0.2%	4.2%	44.8%	14.0%	30.1%	4.2%	2.6%	100.0%
Percent Female	0.0%	38.9%	43.2%	36.7%	48.1%	27.8%	54.5%	43.1%
Percent Male	100.0%	61.1%	55.7%	63.3%	51.9%	72.2%	45.5%	56.4%
Percent Unknown	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.5%
Union Sample #2 Spawning Ground Survey April 8, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	137.8	153.5	157.9	167.8	173.7	202.0	160.0	162.6
Average Weight (g)	30.8	47.6	50.2	57.7	65.2	107.7	48.0	55.0
Count of Age Category	5.0	19.0	33.0	18.0	22.0	3.0	1.0	101.0
Percent Age Composition	5.0%	18.8%	32.7%	17.8%	21.8%	3.0%	1.0%	100.0%
Percent Female	20.0%	47.4%	42.4%	44.4%	50.0%	33.3%	100.0%	44.6%
Percent Male	80.0%	52.6%	57.6%	55.6%	50.0%	66.7%	0.0%	55.4%
Vixen Sample #4 Spawning Ground Survey April 8, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	152.2	164.4	178.0	178.2	187.5	n/a	172.9
Average Weight (g)	n/a	43.7	53.7	67.3	71.5	79.7	n/a	64.1
Count of Age Category	0.0	9.0	29.0	24.0	43.0	6.0	0.0	111.0
Percent Age Composition	0.0%	8.1%	26.1%	21.6%	38.7%	5.4%	0.0%	100.0%
Percent Female	n/a	11.1%	13.8%	62.5%	34.9%	33.3%	0.0%	33.3%
Percent Male	n/a	88.9%	86.2%	37.5%	65.1%	66.7%	0.0%	66.7%
Hobart Bay/Port Houghton 1999								
Hobart/Houghton #1 Commercial Sac-roe April 26, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	199.0	204.6	205.5	214.9	230.0	206.8
Average Weight (g)	n/a	n/a	112.7	121.5	120.4	136.9	133.0	123.1
Count of Age Category	0.0	0.0	9.0	19.0	80.0	24.0	1.0	133.0
Percent Age Composition	0.0%	0.0%	6.8%	14.3%	60.2%	18.0%	0.8%	100.0%
Percent Female	n/a	n/a	77.8%	47.4%	46.3%	50.0%	0.0%	48.9%
Percent Male	n/a	n/a	22.2%	52.6%	53.8%	50.0%	100.0%	51.1%
Hobart/Houghton #3 Commercial Sac-roe April 26, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	n/a	200.0	206.7	222.6	230.5	206.6
Average Weight (g)	n/a	n/a	n/a	119.9	125.9	153.0	163.0	127.0
Count of Age Category	0.0	0.0	0.0	28.0	77.0	8.0	2.0	115.0
Percent Age Composition	0.0%	0.0%	0.0%	24.3%	67.0%	7.0%	1.7%	100.0%
Percent Female	n/a	n/a	0.0%	35.7%	46.8%	37.5%	0.0%	42.6%
Percent Male	n/a	n/a	0.0%	64.3%	53.2%	62.5%	100.0%	57.4%
Hobart/Houghton #1 Pre-fishery Spawning Ground Survey April 26, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	147.0	184.9	197.2	200.7	200.0	214.0	196.5
Average Weight (g)	n/a	40.0	83.2	100.2	109.1	109.7	154.5	101.3
Count of Age Category	0.0	1.0	28.0	74.0	66.0	3.0	2.0	174.0
Percent Age Composition	0.0%	0.6%	16.1%	42.5%	37.9%	1.7%	1.1%	100.0%
Percent Female	n/a	0.0%	42.9%	43.2%	53.0%	33.3%	50.0%	46.6%
Percent Male	n/a	100.0%	57.1%	56.8%	47.0%	66.7%	50.0%	53.4%

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Hobart/Houghton #3 Pre-fishery Spawning Ground Survey April 26, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	191.1	201.6	204.9	211.3	222.4	204.4
Average Weight (g)	n/a	n/a	98.4	123.0	129.4	141.3	165.3	128.2
Count of Age Category	0.0	0.0	10.0	32.0	38.0	12.0	7.0	99.0
Percent Age Composition	0.0%	0.0%	10.1%	32.3%	38.4%	12.1%	7.1%	100.0%
Percent Female	n/a	n/a	60.0%	50.0%	39.5%	41.7%	42.9%	45.5%
Percent Male	n/a	n/a	40.0%	50.0%	60.5%	58.3%	57.1%	54.5%
Port Camden 1999								
Port Camden Spawning Ground Survey May 3, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	150.3	160.7	168.5	174.2	187.4	181.7	223.0	175.5
Average Weight (g)	42.3	52.3	62.0	72.6	93.8	82.6	126.0	74.0
Count of Age Category	3.0	3.0	49.0	16.0	33.0	7.0	1.0	112.0
Percent Age Composition	2.7%	2.7%	43.8%	14.3%	29.5%	6.3%	0.9%	100.0%
Percent Female	33.3%	0.0%	42.9%	62.5%	60.6%	28.6%	0.0%	48.2%
Percent Male	66.7%	100.0%	57.1%	37.5%	39.4%	71.4%	100.0%	51.8%
Swimming Pool #3 Spawning Ground Survey April 29, 1999 Cast Net Active Spawn Pre-fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	172.0	173.1	172.9	184.4	193.0	198.0	182.0
Average Weight (g)	n/a	64.0	74.3	67.0	91.8	102.2	116.0	86.4
Count of Age Category	0.0	1.0	7.0	9.0	29.0	6.0	1.0	53.0
Percent Age Composition	0.0%	1.9%	13.2%	17.0%	54.7%	11.3%	1.9%	100.0%
Percent Female	n/a	0.0%	14.3%	11.1%	31.0%	50.0%	100.0%	28.3%
Percent Male	n/a	100.0%	85.7%	88.9%	69.0%	50.0%	0.0%	71.7%
Seymour Canal #1 Spawning Ground Survey April 30, 1999 Cast Net Active Spawn Pre-fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	168.7	176.8	182.6	186.4	191.3	206.4	186.0
Average Weight (g)	n/a	64.3	73.3	79.5	90.1	100.8	131.9	89.5
Count of Age Category	0.0	3.0	13.0	15.0	90.0	4.0	8.0	133.0
Percent Age Composition	0.0%	2.3%	9.8%	11.3%	67.7%	3.0%	6.0%	100.0%
Percent Female	n/a	33.3%	30.8%	20.0%	35.6%	0.0%	62.5%	33.8%
Percent Male	n/a	66.7%	69.2%	80.0%	64.4%	100.0%	37.5%	66.2%
Seymour Canal Commercial Sac Roe #1 April 30, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	n/a	192.3	198.3	201.4	208.0	199.1
Average Weight (g)	n/a	n/a	n/a	107.7	111.5	115.1	116.0	112.1
Count of Age Category	0.0	0.0	0.0	3.0	45.0	9.0	4.0	61.0
Percent Age Composition	0.0%	0.0%	0.0%	4.9%	73.8%	14.8%	6.6%	100.0%
Percent Female	n/a	n/a	n/a	33.3%	53.3%	77.8%	25.0%	54.1%
Percent Male	n/a	n/a	n/a	66.7%	46.7%	22.2%	75.0%	45.9%
Seymour Canal Commercial Sac Roe #3 May 1, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	n/a	197.1	201.6	212.2	203.6	203.5
Average Weight (g)	n/a	n/a	n/a	111.0	120.9	140.4	129.0	124.6
Count of Age Category	0.0	0.0	0.0	7.0	66.0	20.0	5.0	98.0
Percent Age Composition	0.0%	0.0%	0.0%	7.1%	67.3%	20.4%	5.1%	100.0%
Percent Female	n/a	n/a	n/a	71.4%	66.7%	65.0%	60.0%	66.3%
Percent Male	n/a	n/a	n/a	28.6%	33.3%	35.0%	40.0%	33.7%

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Seymour Canal Combined Commercial Sac Roe Spring, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	185.0	195.5	200.5	208.4	209.7	201.9
Average Weight (g)	n/a	n/a	91.0	108.8	118.8	133.4	131.5	121.0
Count of Age Category	0.0	0.0	1.0	23.0	239.0	53.0	17.0	333.0
Percent Age Composition	0.0%	0.0%	0.3%	6.9%	71.8%	15.9%	5.1%	100.0%
Percent Female	n/a	n/a	0.0%	47.8%	59.8%	66.0%	52.9%	59.5%
Percent Male	n/a	n/a	100.0%	52.2%	40.2%	34.0%	47.1%	40.5%
Tenakee Inlet Commercial Bait November 7, 1998 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	178.3	187.8	186.0	185.5	n/a	n/a	186.3
Average Weight (g)	n/a	86.7	97.2	98.3	107.5	n/a	n/a	97.7
Count of Age Category	0.0	3.0	27.0	47.0	2.0	0.0	0.0	79.0
Percent Age Composition	0.0%	3.8%	34.2%	59.5%	2.5%	0.0%	0.0%	100.0%
Percent Female	n/a	66.7%	48.1%	51.1%	0.0%	0.0%	0.0%	49.4%
Percent Male	n/a	33.3%	51.9%	48.9%	100.0%	0.0%	0.0%	50.6%
Tenakee Inlet Commercial Bait November 17, 1998 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	151.5	185.3	192.2	191.1	192.0	n/a	189.8
Average Weight (g)	n/a	52.0	98.4	108.6	107.3	109.5	n/a	105.2
Count of Age Category	0.0	2.0	20.0	34.0	59.0	2.0	0.0	117.0
Percent Age Composition	0.0%	1.7%	17.1%	29.1%	50.4%	1.7%	0.0%	100.0%
Percent Female	n/a	50.0%	80.0%	76.5%	78.0%	100.0%	0.0%	77.8%
Percent Male	n/a	50.0%	20.0%	23.5%	22.0%	0.0%	0.0%	22.2%
East of Trap Bay Spawning Ground Survey April 27, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	148.0	166.7	188.5	193.9	194.3	n/a	191.6
Average Weight (g)	n/a	44.0	58.3	81.5	92.8	91.3	n/a	89.3
Count of Age Category	0.0	2.0	3.0	15.0	85.0	4.0	0.0	109.0
Percent Age Composition	0.0%	1.8%	2.8%	13.8%	78.0%	3.7%	0.0%	100.0%
Percent Female	n/a	100.0%	66.7%	26.7%	40.0%	50.0%	0.0%	40.4%
Percent Male	n/a	0.0%	33.3%	73.3%	60.0%	50.0%	0.0%	59.6%
Tenakee Inlet Combined Commercial Bait Winter, 1998 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	160.9	175.0	186.1	186.9	190.9	192.0	n/a	187.6
Average Weight (g)	61.5	79.5	100.1	102.7	107.5	109.5	n/a	97.0
Count of Age Category	10.0	11.0	87.0	218.0	63.0	2.0	0.0	558.0
Percent Age Composition	1.8%	2.0%	15.6%	39.1%	11.3%	0.4%	0.0%	100.0%
Percent Female	70.0%	54.5%	52.9%	50.5%	74.6%	100.0%	n/a	39.1%
Percent Male	30.0%	45.5%	47.1%	49.5%	25.4%	0.0%	n/a	31.0%
Eastern Channel Test Fishery #2 January 11, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	151.3	167.3	195.2	201.8	218.0	n/a	n/a	168.7
Average Weight (g)	44.6	67.0	106.5	117.5	147.0	n/a	n/a	69.3
Count of Age Category	51.0	7.0	22.0	8.0	1.0	0.0	0.0	89.0
Percent Age Composition	57.3%	7.9%	24.7%	9.0%	1.1%	0.0%	0.0%	100.0%
Percent Female	39.2%	57.1%	54.5%	50.0%	0.0%	n/a	n/a	44.9%
Percent Male	33.3%	42.9%	45.5%	50.0%	100.0%	n/a	n/a	39.3%
Percent Unknown	27.5%	0.0%	0.0%	0.0%	0.0%	n/a	n/a	15.7%

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Eastern Channel Test Fishery #2 January 14, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	151.2	160.8	191.1	202.5	195.0	204.0	n/a	169.4
Average Weight (g)	43.7	55.6	102.0	117.1	107.0	118.0	n/a	69.8
Count of Age Category	56.0	19.0	35.0	11.0	1.0	1.0	0.0	123.0
Percent Age Composition	45.5%	15.4%	28.5%	8.9%	0.8%	0.8%	0.0%	100.0%
Percent Female	46.4%	52.6%	54.3%	45.5%	0.0%	0.0%	n/a	48.8%
Percent Male	35.7%	26.3%	45.7%	54.5%	100.0%	100.0%	n/a	39.8%
Percent Unknown	17.9%	21.1%	0.0%	0.0%	0.0%	0.0%	n/a	11.4%
Sitka Sound Combined Test Fishery Winter, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	150.6	168.3	194.5	206.9	214.6	213.5	233.1	185.8
Average Weight (g)	43.2	65.9	104.2	131.6	148.3	145.8	185.0	95.8
Count of Age Category	141.0	36.0	185.0	123.0	27.0	10.0	7.0	529.0
Percent Age Composition	26.7%	6.8%	35.0%	23.3%	5.1%	1.9%	1.3%	100.0%
Percent Female	46.8%	50.0%	47.0%	43.9%	33.3%	50.0%	42.9%	45.7%
Percent Male	36.2%	38.9%	50.8%	55.3%	66.7%	50.0%	57.1%	48.0%
Percent Unknown	17.0%	11.1%	2.2%	0.8%	0.0%	0.0%	0.0%	6.2%
Watson Point Spawning Ground Survey March 23, 1999 Cast Net Active Spawn Post-fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	186.0	199.1	208.9	215.4	231.0	n/a	207.3
Average Weight (g)	n/a	82.5	103.1	131.1	137.6	184.8	n/a	124.8
Count of Age Category	0.0	2.0	27.0	36.0	11.0	5.0	0.0	81.0
Percent Age Composition	0.0%	2.5%	33.3%	44.4%	13.6%	6.2%	0.0%	100.0%
Percent Female	n/a	100.0%	37.0%	50.0%	63.6%	40.0%	n/a	48.1%
Percent Male	n/a	0.0%	63.0%	50.0%	36.4%	60.0%	n/a	51.9%
Starrigavin Commercial Sac Roe March 24, 1999 Purse Seine Pre-spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	191.0	193.2	201.6	211.8	220.3	228.5	236.1	207.9
Average Weight (g)	84.0	95.4	109.3	131.9	151.0	161.3	182.1	122.9
Count of Age Category	2.0	16.0	123.0	74.0	21.0	14.0	7.0	257.0
Percent Age Composition	0.8%	6.2%	47.9%	28.8%	8.2%	5.4%	2.7%	100.0%
Percent Female	0.0%	31.3%	48.8%	55.4%	66.7%	21.4%	42.9%	49.0%
Percent Male	100.0%	68.8%	51.2%	44.6%	33.3%	78.6%	57.1%	51.0%
Whiting Harbor Spawning Ground Survey March 25, 1999 Cast Net Active Spawn Post-fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	178.0	197.5	210.3	219.8	234.6	241.0	206.0
Average Weight (g)	n/a	75.0	99.7	121.0	147.4	179.2	150.0	115.6
Count of Age Category	0.0	2.0	48.0	38.0	9.0	5.0	1.0	103.0
Percent Age Composition	0.0%	1.9%	46.6%	36.9%	8.7%	4.9%	1.0%	100.0%
Percent Female	n/a	0.0%	37.5%	52.6%	66.7%	20.0%	100.0%	44.7%
Percent Male	n/a	100.0%	62.5%	47.4%	33.3%	80.0%	0.0%	55.3%
Galakin Island Spawning Ground Survey March 25, 1999 Cast Net Active Spawn Post Fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	172.0	197.5	207.0	221.5	229.3	236.3	208.9
Average Weight (g)	n/a	68.0	97.9	117.4	136.0	167.3	164.0	119.8
Count of Age Category	0.0	1.0	12.0	11.0	4.0	3.0	3.0	34.0
Percent Age Composition	0.0%	2.9%	35.3%	32.4%	11.8%	8.8%	8.8%	100.0%
Percent Female	n/a	100.0%	58.3%	63.6%	50.0%	33.3%	33.3%	55.9%
Percent Male	n/a	0.0%	41.7%	36.4%	50.0%	66.7%	66.7%	44.1%

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Sitka Sound Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	176.0	193.9	205.1	209.2	226.3	232.7	201.0
Average Weight (g)	n/a	69.9	94.6	115.6	123.5	162.2	163.4	108.7
Count of Age Category	0.0	29.0	205.0	202.0	61.0	25.0	7.0	529.0
Percent Age Composition	0.0%	5.5%	38.8%	38.2%	11.5%	4.7%	1.3%	100.0%
Percent Female	n/a	48.3%	42.0%	51.0%	42.6%	44.0%	57.1%	46.1%
Percent Male	n/a	51.7%	58.0%	49.0%	57.4%	56.0%	42.9%	53.9%
East of Fick #1 Spawning Ground Survey April 30, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	173.3	188.0	190.7	194.0	n/a	n/a	192.5
Average Weight (g)	n/a	62.7	91.5	92.7	101.3	n/a	n/a	98.5
Count of Age Category	0.0	3.0	2.0	3.0	49.0	0.0	0.0	57.0
Percent Age Composition	0.0%	5.3%	3.5%	5.3%	86.0%	0.0%	0.0%	100.0%
Percent Female	n/a	33.3%	0.0%	0.0%	42.9%	0.0%	0.0%	38.6%
Percent Male	n/a	66.7%	100.0%	100.0%	57.1%	0.0%	0.0%	61.4%
East Vixen Spawning Ground Survey April 30, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	178.8	179.0	186.8	195.2	209.8	206.0	192.5
Average Weight (g)	n/a	72.0	74.4	89.4	100.7	137.6	132.0	97.5
Count of Age Category	0.0	5.0	9.0	10.0	55.0	5.0	1.0	85.0
Percent Age Composition	0.0%	5.9%	10.6%	11.8%	64.7%	5.9%	1.2%	100.0%
Percent Female	n/a	100.0%	55.6%	70.0%	74.5%	40.0%	100.0%	71.8%
Percent Male	n/a	0.0%	44.4%	30.0%	25.5%	60.0%	0.0%	28.2%
Hoonah Sound Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	145.0	169.9	181.4	192.3	196.8	201.7	211.1	195.1
Average Weight (g)	45.0	62.0	78.0	94.0	103.2	114.5	133.3	100.6
Count of Age Category	1.0	14.0	22.0	63.0	337.0	28.0	7.0	472.0
Percent Age Composition	1.2%	3.0%	4.2%	11.4%	77.2%	2.4%	0.6%	100.0%
Percent Female	0.0%	64.3%	36.4%	39.7%	43.0%	32.1%	57.1%	42.4%
Percent Male	100.0%	35.7%	63.6%	60.3%	57.0%	67.9%	42.9%	57.6%
N. of Sawmill Cr. #2 Spawning Ground Survey May 7, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	157.3	171.1	180.2	183.1	200.0	197.3	179.9
Average Weight (g)	n/a	51.9	63.2	76.2	89.8	113.9	110.0	80.7
Count of Age Category	0.0	7.0	48.0	44.0	76.0	14.0	3.0	192.0
Percent Age Composition	0.0%	3.6%	25.0%	22.9%	39.6%	7.3%	1.6%	100.0%
Percent Female	n/a	42.9%	35.4%	22.7%	36.8%	35.7%	100.0%	34.4%
Percent Male	n/a	57.1%	64.6%	77.3%	63.2%	64.3%	0.0%	65.6%
West Behm Canal 1999								
Danger Island Spawning Ground Survey April 5, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	162.0	177.6	186.6	195.4	205.0	203.0	188.3
Average Weight (g)	n/a	45.0	70.9	89.1	96.2	135.3	117.0	89.1
Count of Age Category	0.0	2.0	15.0	10.0	21.0	4.0	1.0	53.0
Percent Age Composition	0.0%	3.8%	28.3%	18.9%	39.6%	7.5%	1.9%	100.0%
Percent Female	n/a	50.0%	33.3%	50.0%	33.3%	25.0%	0.0%	35.8%
Percent Male	n/a	50.0%	66.7%	50.0%	66.7%	75.0%	100.0%	64.2%

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Knudson Cove Spawning Ground Survey April 6, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	131.0	165.9	175.4	181.6	191.2	215.5	n/a	180.9
Average Weight (g)	30.5	60.6	70.7	82.9	96.2	134.5	n/a	81.8
Count of Age Category	2.0	7.0	14.0	12.0	20.0	2.0	0.0	57.0
Percent Age Composition	3.5%	12.3%	24.6%	21.1%	35.1%	3.5%	0.0%	100.0%
Percent Female	50.0%	42.9%	42.9%	25.0%	30.0%	0.0%	n/a	33.3%
Percent Male	50.0%	57.1%	57.1%	75.0%	70.0%	100.0%	n/a	66.7%
N. Middle Helm Bay Spawning Ground Survey April 7, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	179.0	187.9	194.3	204.5	212.3	189.2
Average Weight (g)	n/a	n/a	71.8	85.3	90.9	104.5	115.7	85.3
Count of Age Category	0.0	0.0	22.0	19.0	29.0	2.0	3.0	75.0
Percent Age Composition	0.0%	0.0%	29.3%	25.3%	38.7%	2.7%	4.0%	100.0%
Percent Female	n/a	n/a	22.7%	57.9%	48.3%	100.0%	33.3%	44.0%
Percent Male	n/a	n/a	77.3%	42.1%	51.7%	0.0%	66.7%	56.0%
West Behm Canal Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	130.3	164.3	178.8	183.9	193.3	201.7	207.3	186.3
Average Weight (g)	28.0	56.6	75.5	83.7	95.6	113.5	114.2	86.6
Count of Age Category	3.0	15.0	103.0	76.0	135.0	16.0	12.0	360.0
Percent Age Composition	0.8%	4.2%	28.6%	21.1%	37.5%	4.4%	3.3%	100.0%
Percent Female	33.3%	40.0%	34.0%	51.3%	46.7%	50.0%	50.0%	43.9%
Percent Male	66.7%	53.3%	63.1%	47.4%	52.6%	50.0%	50.0%	54.4%
Percent Unknown	0.0%	6.7%	2.9%	1.3%	0.7%	0.0%	0.0%	1.7%
Bocas De Finas Commercial Bait January 21, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	171.4	184.0	195.0	n/a	184.0	179.3
Average Weight (g)	n/a	n/a	83.5	90.8	112.2	n/a	91.0	91.2
Count of Age Category	0.0	0.0	16.0	6.0	6.0	0.0	1.0	29.0
Percent Age Composition	0.0%	0.0%	55.2%	20.7%	20.7%	0.0%	3.4%	100.0%
Percent Female	n/a	n/a	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Percent Male	n/a	n/a	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%
S.W. Fish Egg Island Spawning Ground Survey March 24, 1999 Cast Net Active								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	175.5	180.2	193.7	198.1	212.7	n/a	191.7
Average Weight (g)	n/a	64.0	73.8	93.4	108.6	148.3	n/a	95.6
Count of Age Category	0.0	2.0	13.0	9.0	16.0	3.0	0.0	43.0
Percent Age Composition	0.0%	4.7%	30.2%	20.9%	37.2%	7.0%	0.0%	100.0%
Percent Female	n/a	0.0%	69.2%	33.3%	56.3%	33.3%	n/a	51.2%
Percent Male	n/a	100.0%	30.8%	66.7%	43.8%	66.7%	n/a	48.8%
S.E. Fish Egg Island Spawning Ground Survey March 26, 1999 Cast Net Active								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	167.5	185.4	192.3	201.5	212.0	n/a	191.7
Average Weight (g)	n/a	65.0	90.5	98.4	114.3	165.0	n/a	99.6
Count of Age Category	0.0	2.0	16.0	24.0	12.0	1.0	0.0	55.0
Percent Age Composition	0.0%	3.6%	29.1%	43.6%	21.8%	1.8%	0.0%	100.0%
Percent Female	n/a	0.0%	62.5%	41.7%	58.3%	100.0%	n/a	50.9%
Percent Male	n/a	100.0%	37.5%	58.3%	41.7%	0.0%	n/a	49.1%

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N. Doghouse Island Spawning Ground Survey April 13, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	149.7	165.8	180.5	186.1	200.2	188.5	227.0	185.9
Average Weight (g)	41.7	52.4	78.5	79.3	99.2	81.5	142.0	82.3
Count of Age Category	3.0	8.0	33.0	18.0	25.0	2.0	2.0	91.0
Percent Age Composition	3.3%	8.8%	36.3%	19.8%	27.5%	2.2%	2.2%	100.0%
Percent Female	100.0%	50.0%	39.4%	33.3%	28.0%	50.0%	0.0%	37.4%
Percent Male	0.0%	50.0%	60.6%	66.7%	72.0%	50.0%	100.0%	62.6%
Craig Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	149.3	165.6	181.2	189.9	197.8	205.1	223.0	186.8
Average Weight (g)	40.3	58.6	80.1	91.2	105.6	124.3	138.0	88.7
Count of Age Category	4.0	34.0	138.0	90.0	98.0	10.0	3.0	377.0
Percent Age Composition	1.1%	9.0%	36.6%	23.9%	26.0%	2.7%	0.8%	100.0%
Percent Female	75.0%	38.2%	47.8%	38.9%	41.8%	40.0%	0.0%	43.0%
Percent Male	25.0%	61.8%	52.2%	61.1%	58.2%	60.0%	100.0%	57.0%
Deer Island Commercial Bait January 18, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	160.2	165.7	175.3	179.7	185.2	199.9	171.6
Average Weight (g)	n/a	57.6	64.0	78.3	86.5	93.1	119.8	75.1
Count of Age Category	0.0	9.0	113.0	35.0	80.0	10.0	8.0	429.0
Percent Age Composition	0.0%	2.1%	26.3%	8.2%	18.6%	2.3%	1.9%	100.0%
Percent Female	n/a	44.4%	40.7%	34.3%	51.3%	30.0%	50.0%	43.1%
Percent Male	n/a	55.6%	57.5%	65.7%	48.8%	70.0%	50.0%	56.4%
Percent Unknown	n/a	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.5%
Union Sample #1 Spawning Ground Survey April 8, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	157.0	163.3	176.4	178.1	n/a	210.0	172.2
Average Weight (g)	n/a	49.7	52.2	64.6	68.4	n/a	117.0	61.9
Count of Age Category	0.0	7.0	26.0	27.0	32.0	0.0	1.0	93.0
Percent Age Composition	0.0%	7.5%	28.0%	29.0%	34.4%	0.0%	1.1%	100.0%
Percent Female	n/a	14.3%	23.1%	18.5%	28.1%	0.0%	0.0%	22.6%
Percent Male	n/a	85.7%	76.9%	81.5%	71.9%	0.0%	100.0%	77.4%
Vixen Sample #3 Spawning Ground Survey April 8, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	149.0	n/a	163.1	172.5	175.2	200.0	n/a	172.1
Average Weight (g)	33.3	n/a	51.6	59.9	65.0	102.0	n/a	61.4
Count of Age Category	3.0	0.0	17.0	15.0	42.0	3.0	0.0	80.0
Percent Age Composition	3.8%	0.0%	21.3%	18.8%	52.5%	3.8%	0.0%	100.0%
Percent Female	0.0%	n/a	35.3%	33.3%	42.9%	33.3%	n/a	37.5%
Percent Male	100.0%	n/a	64.7%	66.7%	57.1%	66.7%	n/a	62.5%
Ernest Sound Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	142.0	153.9	161.9	174.3	176.5	194.3	185.0	169.9
Average Weight (g)	31.8	47.0	51.9	63.1	67.8	92.3	82.5	60.6
Count of Age Category	8.0	35.0	105.0	84.0	139.0	12.0	2.0	385.0
Percent Age Composition	2.1%	9.1%	27.3%	21.8%	36.1%	3.1%	0.5%	100.0%
Percent Female	12.5%	31.4%	28.6%	39.3%	38.1%	33.3%	50.0%	34.5%
Percent Male	87.5%	68.6%	71.4%	60.7%	61.9%	66.7%	50.0%	65.5%

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Hobart/Houghton #2 Commercial Sac-roe April 26, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	n/a	202.6	208.3	217.6	n/a	207.8
Average Weight (g)	n/a	n/a	n/a	117.9	125.1	147.2	n/a	125.3
Count of Age Category	0.0	0.0	0.0	25.0	82.0	9.0	0.0	116.0
Percent Age Composition	0.0%	0.0%	0.0%	21.6%	70.7%	7.8%	0.0%	100.0%
Percent Female	n/a	n/a	n/a	48.0%	40.2%	77.8%	n/a	44.8%
Percent Male	n/a	n/a	n/a	52.0%	59.8%	22.2%	n/a	55.2%
Hobart Bay/Port Houghton Combined Commercial Sac Roe Spring, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	199.0	202.1	206.8	217.0	230.3	207.0
Average Weight (g)	n/a	n/a	112.7	119.7	123.8	142.3	153.0	125.0
Count of Age Category	0.0	0.0	9.0	72.0	239.0	41.0	3.0	364.0
Percent Age Composition	0.0%	0.0%	2.5%	19.8%	65.7%	11.3%	0.8%	100.0%
Percent Female	n/a	n/a	77.8%	43.1%	44.4%	53.7%	0.0%	45.6%
Percent Male	n/a	n/a	22.2%	56.9%	55.6%	46.3%	100.0%	54.4%
Hobart/Houghton #2 Pre-fishery Spawning Ground Survey April 26, 99 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	190.4	199.0	205.3	217.6	226.0	201.3
Average Weight (g)	n/a	n/a	99.1	118.8	127.1	161.0	164.0	121.6
Count of Age Category	0.0	0.0	15.0	74.0	55.0	5.0	1.0	150.0
Percent Age Composition	0.0%	0.0%	10.0%	49.3%	36.7%	3.3%	0.7%	100.0%
Percent Female	n/a	n/a	40.0%	51.4%	38.2%	80.0%	100.0%	46.7%
Percent Male	n/a	n/a	60.0%	48.6%	61.8%	20.0%	0.0%	53.3%
Hobart Bay/Port Houghton Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	147.0	187.6	198.7	203.3	211.2	221.1	200.0
Average Weight (g)	n/a	40.0	90.6	111.9	120.2	141.5	163.0	114.8
Count of Age Category	0.0	1.0	53.0	180.0	159.0	20.0	10.0	423.0
Percent Age Composition	0.0%	0.2%	12.5%	42.6%	37.6%	4.7%	2.4%	100.0%
Percent Female	n/a	0.0%	45.3%	47.8%	44.7%	50.0%	50.0%	46.3%
Percent Male	n/a	100.0%	54.7%	52.2%	55.3%	50.0%	50.0%	53.7%
Seymour Canal 1999								
Rock Garden #2 Spawning Ground Survey April 29, 1999 Cast Net Active Spawn Pre-fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	164.3	172.7	181.4	183.5	192.8	198.3	183.0
Average Weight (g)	n/a	56.7	66.3	75.7	78.4	96.0	101.3	78.5
Count of Age Category	0.0	3.0	16.0	29.0	92.0	11.0	7.0	158.0
Percent Age Composition	0.0%	1.9%	10.1%	18.4%	58.2%	7.0%	4.4%	100.0%
Percent Female	n/a	33.3%	37.5%	44.8%	45.7%	63.6%	71.4%	46.8%
Percent Male	n/a	66.7%	62.5%	55.2%	54.3%	36.4%	28.6%	53.2%
Sore Thumb #4 Spawning Ground Survey April 29, 1999 Cast Net Active Spawn Pre-fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	163.0	166.0	177.6	183.7	208.8	199.5	183.9
Average Weight (g)	n/a	55.0	60.6	72.7	81.3	119.8	115.5	82.6
Count of Age Category	0.0	1.0	5.0	7.0	56.0	4.0	4.0	77.0
Percent Age Composition	0.0%	1.3%	6.5%	9.1%	72.7%	5.2%	5.2%	100.0%
Percent Female	n/a	100.0%	60.0%	42.9%	21.4%	50.0%	50.0%	29.9%
Percent Male	n/a	0.0%	40.0%	57.1%	78.6%	50.0%	50.0%	70.1%

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Seymour Canal Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	166.8	173.3	180.0	184.6	195.2	201.8	184.0
Average Weight (g)	n/a	60.3	69.2	75.0	84.4	102.0	117.1	83.7
Count of Age Category	0.0	8.0	41.0	60.0	267.0	25.0	20.0	421.0
Percent Age Composition	0.0%	1.9%	9.7%	14.3%	63.4%	5.9%	4.8%	100.0%
Percent Female	n/a	37.5%	34.1%	33.3%	35.6%	48.0%	65.0%	37.3%
Percent Male	n/a	62.5%	65.9%	66.7%	64.4%	52.0%	35.0%	62.7%
Seymour Canal Commercial Sac Roe #2 April 30, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	185.0	193.1	200.2	207.4	216.5	201.1
Average Weight (g)	n/a	n/a	91.0	104.1	120.4	134.6	137.8	121.3
Count of Age Category	0.0	0.0	1.0	9.0	71.0	14.0	4.0	99.0
Percent Age Composition	0.0%	0.0%	1.0%	9.1%	71.7%	14.1%	4.0%	100.0%
Percent Female	n/a	n/a	0.0%	44.4%	57.7%	64.3%	50.0%	56.6%
Percent Male	n/a	n/a	100.0%	55.6%	42.3%	35.7%	50.0%	43.4%
Seymour Canal Commercial Sac Roe #4 May 1, 1999 Gillnet								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	n/a	200.3	201.5	208.7	212.3	202.9
Average Weight (g)	n/a	n/a	n/a	116.5	120.2	134.2	144.0	123.1
Count of Age Category	0.0	0.0	0.0	4.0	57.0	10.0	4.0	75.0
Percent Age Composition	0.0%	0.0%	0.0%	5.3%	76.0%	13.3%	5.3%	100.0%
Percent Female	n/a	n/a	n/a	25.0%	59.6%	60.0%	75.0%	58.7%
Percent Male	n/a	n/a	n/a	75.0%	40.4%	40.0%	25.0%	41.3%
Tenakee Inlet 1999								
Tenakee Inlet Commercial Bait November 5, 1998 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	160.9	185.0	180.3	186.1	190.0	n/a	n/a	182.3
Average Weight (g)	61.5	89.3	97.5	99.4	113.5	n/a	n/a	95.1
Count of Age Category	10.0	4.0	22.0	62.0	2.0	0.0	0.0	100.0
Percent Age Composition	10.0%	4.0%	22.0%	62.0%	2.0%	0.0%	0.0%	100.0%
Percent Female	70.0%	75.0%	36.4%	50.0%	50.0%	n/a	n/a	50.0%
Percent Male	30.0%	25.0%	63.6%	50.0%	50.0%	n/a	n/a	50.0%
Tenakee Inlet Commercial Bait November 9, 1998 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	173.5	191.7	185.7	n/a	n/a	n/a	186.6
Average Weight (g)	n/a	77.0	109.5	105.5	n/a	n/a	n/a	105.7
Count of Age Category	0.0	2.0	18.0	75.0	0.0	0.0	0.0	95.0
Percent Age Composition	0.0%	2.1%	18.9%	78.9%	0.0%	0.0%	0.0%	100.0%
Percent Female	n/a	0.0%	50.0%	38.7%	n/a	n/a	n/a	40.0%
Percent Male	n/a	100.0%	50.0%	61.3%	n/a	n/a	n/a	60.0%
Tenakee Inlet Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	154.5	154.8	168.9	189.1	193.8	194.3	193.0	190.6
Average Weight (g)	47.5	47.8	58.1	82.5	91.4	91.3	87.0	87.1
Count of Age Category	2.0	5.0	7.0	19.0	129.0	4.0	1.0	167.0
Percent Age Composition	1.2%	3.0%	4.2%	11.4%	77.2%	2.4%	0.6%	100.0%
Percent Female	100.0%	60.0%	57.1%	26.3%	44.2%	50.0%	100.0%	44.3%
Percent Male	0.0%	40.0%	42.9%	73.7%	55.8%	50.0%	0.0%	55.7%

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Trap Bay Spawning Ground Survey April 28, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	154.5	159.3	170.5	191.3	193.5	n/a	193.0	188.7
Average Weight (g)	47.5	50.3	58.0	86.3	88.7	n/a	87.0	83.0
Count of Age Category	2.0	3.0	4.0	4.0	44.0	0.0	1.0	58.0
Percent Age Composition	3.4%	5.2%	6.9%	6.9%	75.9%	0.0%	1.7%	100.0%
Percent Female	100.0%	33.3%	50.0%	25.0%	52.3%	n/a	100.0%	51.7%
Percent Male	0.0%	66.7%	50.0%	75.0%	47.7%	n/a	0.0%	48.3%
Sitka Sound 1999								
Eastern Channel #1 Test Fishery January 11, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	146.9	183.3	192.2	206.2	210.1	n/a	230.7	188.2
Average Weight (g)	40.3	87.3	100.8	131.5	147.5	n/a	186.3	101.4
Count of Age Category	28.0	4.0	44.0	39.0	8.0	0.0	3.0	126.0
Percent Age Composition	22.2%	3.2%	34.9%	31.0%	6.3%	0.0%	2.4%	100.0%
Percent Female	53.6%	25.0%	40.9%	48.7%	25.0%	n/a	33.3%	44.4%
Percent Male	46.4%	75.0%	59.1%	51.3%	75.0%	n/a	66.7%	55.6%
Eastern Channel Test Fishery #1 January 14, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	199.6	204.8	216.7	216.8	n/a	207.1
Average Weight (g)	n/a	n/a	110.1	140.7	154.0	162.3	n/a	135.9
Count of Age Category	0.0	0.0	10.0	9.0	6.0	4.0	0.0	29.0
Percent Age Composition	0.0%	0.0%	34.5%	31.0%	20.7%	13.8%	0.0%	100.0%
Percent Female	n/a	n/a	80.0%	44.4%	33.3%	50.0%	n/a	55.2%
Percent Male	n/a	n/a	20.0%	55.6%	66.7%	50.0%	n/a	44.8%
Eastern Channel Test Fishery January 15, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	156.0	183.3	196.5	209.3	218.1	212.8	235.0	201.9
Average Weight (g)	41.0	83.3	105.7	135.1	149.7	138.2	184.0	118.5
Count of Age Category	6.0	6.0	74.0	56.0	11.0	5.0	4.0	162.0
Percent Age Composition	3.7%	3.7%	45.7%	34.6%	6.8%	3.1%	2.5%	100.0%
Percent Female	83.3%	50.0%	40.5%	39.3%	45.5%	60.0%	50.0%	43.2%
Percent Male	16.7%	50.0%	54.1%	58.9%	54.5%	40.0%	50.0%	53.7%
Percent Unknown	0.0%	0.0%	5.4%	1.8%	0.0%	0.0%	0.0%	3.1%
Sitka-Starrigavin Commercial Sac Roe March 22, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	170.0	200.0	202.8	213.2	219.7	226.5	235.8	210.4
Average Weight (g)	56.0	106.5	112.5	137.2	147.8	160.1	187.0	129.5
Count of Age Category	1.0	2.0	56.0	43.0	15.0	8.0	4.0	129.0
Percent Age Composition	0.8%	1.6%	43.4%	33.3%	11.6%	6.2%	3.1%	100.0%
Percent Female	0.0%	0.0%	42.9%	65.1%	60.0%	12.5%	75.0%	50.4%
Percent Male	100.0%	100.0%	57.1%	34.9%	40.0%	87.5%	25.0%	49.6%
Promisla Bay Commercial Sac Roe March 24, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	190.6	199.3	206.0	217.9	228.8	237.6	205.3
Average Weight (g)	n/a	93.3	107.9	124.9	148.0	166.3	185.9	121.6
Count of Age Category	0.0	18.0	112.0	108.0	22.0	12.0	9.0	281.0
Percent Age Composition	0.0%	6.4%	39.9%	38.4%	7.8%	4.3%	3.2%	100.0%
Percent Female	n/a	44.4%	49.1%	35.2%	63.6%	33.3%	33.3%	43.4%
Percent Male	n/a	55.6%	50.9%	64.8%	36.4%	66.7%	66.7%	56.6%

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Sitka Sound Combined Commercial Sac Roe Spring, 1999 Purse Seine								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	184.0	192.3	200.9	209.3	219.2	228.1	236.7	207.3
Average Weight (g)	74.7	95.0	109.3	129.5	149.0	162.8	184.8	123.7
Count of Age Category	3.0	36.0	291.0	225.0	58.0	34.0	20.0	667.0
Percent Age Composition	0.4%	5.4%	43.6%	33.7%	8.7%	5.1%	3.0%	100.0%
Percent Female	0.0%	36.1%	47.8%	47.6%	63.8%	23.5%	45.0%	46.9%
Percent Male	100.0%	63.9%	52.2%	52.4%	36.2%	76.5%	55.0%	53.1%
Harris Island Spawning Ground Survey March 25, 1999 Cast Net Active Spawn Post-fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	187.3	192.2	206.1	214.1	224.4	234.0	200.3
Average Weight (g)	n/a	84.7	94.5	121.7	128.3	145.2	184.0	109.1
Count of Age Category	0.0	3.0	49.0	32.0	7.0	5.0	1.0	97.0
Percent Age Composition	0.0%	3.1%	50.5%	33.0%	7.2%	5.2%	1.0%	100.0%
Percent Female	n/a	33.3%	40.8%	59.4%	14.3%	60.0%	100.0%	46.4%
Percent Male	n/a	66.7%	59.2%	40.6%	85.7%	40.0%	0.0%	53.6%
E. Middle Island Spawning Ground Survey March 27, 99 Cast Net Active Spawn Post Fishery								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	187.7	195.8	208.2	215.3	225.7	232.0	202.9
Average Weight (g)	n/a	77.8	91.7	111.8	122.3	157.3	180.0	103.8
Count of Age Category	0.0	9.0	42.0	45.0	8.0	3.0	1.0	108.0
Percent Age Composition	0.0%	8.3%	38.9%	41.7%	7.4%	2.8%	0.9%	100.0%
Percent Female	n/a	55.6%	47.6%	42.2%	37.5%	66.7%	100.0%	46.3%
Percent Male	n/a	44.4%	52.4%	57.8%	62.5%	33.3%	0.0%	53.7%
Hoonah Sound 1999								
Pt. Reynard Spawning Ground Survey April 27, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	155.0	189.7	192.6	197.7	191.7	n/a	196.0
Average Weight (g)	n/a	49.0	82.7	91.1	102.7	99.0	n/a	99.8
Count of Age Category	0.0	1.0	3.0	9.0	62.0	3.0	0.0	78.0
Percent Age Composition	0.0%	1.3%	3.8%	11.5%	79.5%	3.8%	0.0%	100.0%
Percent Female	n/a	0.0%	0.0%	0.0%	17.7%	0.0%	n/a	14.1%
Percent Male	n/a	100.0%	100.0%	100.0%	82.3%	100.0%	n/a	85.9%
E. of Fick #2 Spawning Ground Survey April 30, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	145.0	161.8	189.6	189.0	195.0	202.0	210.5	192.7
Average Weight (g)	45.0	54.2	89.0	88.4	98.1	111.2	125.5	95.4
Count of Age Category	1.0	5.0	5.0	11.0	61.0	9.0	2.0	94.0
Percent Age Composition	1.1%	5.3%	5.3%	11.7%	64.9%	9.6%	2.1%	100.0%
Percent Female	0.0%	60.0%	20.0%	63.6%	37.7%	44.4%	50.0%	41.5%
Percent Male	100.0%	40.0%	80.0%	36.4%	62.3%	55.6%	50.0%	58.5%
Rodgers Pt. Spawning Ground Survey May 1, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	n/a	n/a	162.3	195.4	199.3	200.5	212.8	198.3
Average Weight (g)	n/a	n/a	57.0	98.7	108.4	110.9	137.5	106.5
Count of Age Category	0.0	0.0	3.0	30.0	110.0	11.0	4.0	158.0
Percent Age Composition	0.0%	0.0%	1.9%	19.0%	69.6%	7.0%	2.5%	100.0%
Percent Female	n/a	n/a	66.7%	36.7%	44.5%	27.3%	50.0%	42.4%
Percent Male	n/a	n/a	33.3%	63.3%	55.5%	72.7%	50.0%	57.6%

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Lynn Canal 1999								
N. of Sawmill Cr. #1 Spawning Ground Survey May 7, 1999 Cast Net Active Spawn								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	145.0	161.1	172.5	181.0	183.4	199.9	207.6	180.1
Average Weight (g)	56.0	53.6	65.9	77.1	84.5	108.9	115.6	78.6
Count of Age Category	2.0	14.0	46.0	29.0	66.0	15.0	5.0	177.0
Percent Age Composition	1.1%	7.9%	26.0%	16.4%	37.3%	8.5%	2.8%	100.0%
Percent Female	100.0%	14.3%	28.3%	27.6%	48.5%	40.0%	40.0%	36.7%
Percent Male	0.0%	85.7%	71.7%	72.4%	51.5%	60.0%	60.0%	63.3%
Lynn Canal Combined Spawning Ground Survey Spring, 1999 Cast Net								
Age Category	2	3	4	5	6	7	8+	Total
Average Length (mm)	145.0	159.9	171.8	180.5	183.2	200.0	203.8	180.0
Average Weight (g)	56.0	53.0	64.5	76.6	87.4	111.3	113.5	79.7
Count of Age Category	2.0	21.0	94.0	73.0	142.0	29.0	8.0	369.0
Percent Age Composition	0.5%	5.7%	25.5%	19.8%	38.5%	7.9%	2.2%	100.0%
Percent Female	100.0%	23.8%	31.9%	24.7%	42.3%	37.9%	62.5%	35.5%
Percent Male	0.0%	76.2%	68.1%	75.3%	57.7%	62.1%	37.5%	64.5%

Appendix B. Hobart Bay/Port Houghton spawn deposition survey.

Dates: May 4 & 5, 1999.
Divers: RL (Robert Larson), KH (Kyle Hebert), WB (William Bergmann), TK (Tim Koeneman), DG (Dave Gordon), BL (Brian Lynch)

Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected	Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected
1	5	-4	cbl		20						21.8								7	snd					0						0		
		-1	cbl		0						0								6	snd					0						0		
		1	snd	elg	1						1.09								5	snd	fil				0						0		
		2	snd	elg	1						1.09								4	snd	fil				0						0		
		2	snd	elg	1						1.09								4	snd	fil				0						0		
		3	snd	elg	1						1.09								4	snd					0						0		
		4	snd	elg	1						1.09								5	snd					0						0		
		5	mud	elg	0						0								5	snd					0						0		
		6	mud	elg	0						0								6	snd					0						0		
		8	mud	elg	0						0								7	snd					0						0		
		10	mud	lam	0						0								7	snd					0						0		
		12	mud		0						0								7	snd					0						0		
		13	mud	agm	0						0						5	5	-5	rck	fuc					0						0	
		17	mud	agm	0						0								-5	rck	fuc					0						0	
2	5	-7	bld		0						0								-4	rck	fuc					0						0	
		-7	bld	fuc	1						1.08								-3	bld	fuc					0						0	
		-6	cbl	fuc	50						54								-2	bld	fuc					0						0	
		-4	gvl	fuc	25						27								-2	bld						0						0	
		-3	gvl	fuc	5						5.4								-2	rck						0						0	
		-2	gvl	fil	0						0								-2	rck						0						0	
		-2	snd	ulv	0						0								-1	bld						0						0	
		-2	gvl	ala	0						0								0	bld						0						0	
		-1	cbl	ala	0						0								1	bld						0						0	
		-2	rck	ulv	0						0								1	bld	fuc					1						1.41	
		0	snd			0						0							1	bld	ala					1						1.02	
		1	snd	fuc		0						0							2	bld	ala					1						1.02	
		1	snd			0						0							2	rck	ala					1						1.02	
		1	snd			0						0							3	rck	ala					0						0	
		1	snd			0						0							3	rck						0						0	
		1	snd	elg		0						0							7	snd						0						0	
		2	snd			0						0							7	snd						0						0	
		2	snd			0						0							8	snd						0						0	
		3	snd			0						0							9	snd						0						0	
		4	snd	elg		0						0							10	snd						0						0	
		8	snd			0						0							11	snd						0						0	
		17	snd			0						0							11	snd						0						0	
3	5	-5	cbl	fuc			0						0						12	snd						0						0	
		0	snd				0						0						13	snd						0						0	
		1	snd				0						0						15	snd						0						0	
		2	snd				0						0						16	snd						0						0	
		2	snd				0						0						16	snd	lam					0						0	
		2	snd	elg			0						0						17	snd						0						0	
		2	snd	elg			1						0.77				6	5	-8	bld							0						0
		3	snd				0						0						-5	rck							0						0
		3	snd				0						0						-5	rck	fuc						0						0
		4	snd	elg			0						0						-4	rck	fir						15						17.25
		4	snd				0						0						-4	rck	fuc						5						8.8
		6	snd				0						0						-2	rck	fir						2						2.3
		12	snd				0						0						0	bld							0						0

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Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected	Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected
4	5	-3	bld					0						0					-1	rck	ala						0						0
		-1	gvl	fuc				20						14.2					-1	rck							0						0
		0	cbl	fil				30						29.1					2	rck	fir						0						0
		2	bld	ala				10						9.7					4	rck							0						0
		3	rck	fil				0						0					4	bld	ala						0						0
		4	rck					0						0					5	bld	ala						1						1.15
		5	bld	lbk				0						0					5	bld	ala						1						1.15
		6	bld	agm				0						0					6	bld	ala						1						1.15
		6	cbl					0						0					6	bld	ala						1						1.15
		7	cbl	fil				0						0					8	bld	hir						1						1.3
		7	snd	hir				1						0.95					7	bld	hir						1						1.3
		8	bld							0						0			2	bld	lbk			12						10.68			
		8	bld	hir						1						1.3			4	rck	lbk			15						13.35			
		8	bld	hir						2						2.6			3	rck	lbk			20						17.8			
		9	bld	ala						0						0			5	bld	lbk			25						22.25			
		9	bld	hir						1						1.3			5	bld	lbk			5						4.45			
		10	bld	hir						1						1.3			6	bld	lbk			2						1.78			
		10	bld							0						0			7	bld	lbk			0						0			
		10	bld	ala						0						0			8	bld	lbk			0						0			
		11	bld	ala						0						0			8	bld	lbk			0						0			
		11	cbl	hir						0						0			9	cbl	lbk			0						0			
		11	bld	ala						0						0	9	5	-17	bld	fuc			1						1.24			
		11	bld	ala						2						2.3			-9	bld	fuc			80						99.2			
		11	bld	ala						1						1.15			-8	bld	fuc			50						62			
		11	bld	ala						0						0			-6	bld	fuc			5						6.2			
		11	gvl	ala						0						0			-5	rck	fir			1						1.1			
		11	bld	ala						0						0			-5	rck				0						0			
		11	bld	hir						2						2.6			-4	rck	fir			0						0			
		11	bld	hir						0						0			-3	rck	fir			0						0			
		9	rck							0						0			-2	rck	ulv			7						7.7			
		9	bld							0						0			-3	rck	fuc			60						74.4			
		8	rck							0						0			-2	rck	ulv			1						1.1			
		2	rck							0						0			-2	rck	ulv			1						1.1			
		-3	bar							0						0			0	rck	fir			1						1.1			
		-1	rck							0						0			0	rck	fir			10						11			
		2	rck							0						0			0	rck	fir			0						0			
		4	rck	agm						0						0			0	rck	fir			0						0			
		8	rck	agm						0						0			1	rck	cor			1						1.1			
		19	rck							0						0			2	rck	lbk			2						1.78			
7	5	-8	rck							0						0			5	rck	lbk			1						0.89			
		-7	rck	fuc						0						0			7	rck	lbk			4						3.56			
		-7	rck	fuc						0						0			5	rck	lbk			0						0			
		-4	bld							0						0			8	rck	lbk			1						0.89			
		-4	rck							0						0			8	snd				0						0			
		-4	rck	fuc						0						0			8	snd				0						0			
		-4	rck	fir						0						0			10	snd				0						0			
		-3	bld							0						0	10	5	-14	rck	fuc		80					116.8					
		-3	rck							0						0			-10	rck	fuc		80					116.8					
		-3	rck							0						0			-8	rck	fuc		20					29.2					
		-3	rck	red						0						0			-5	rck	fuc		15					21.9					
		-3	rck							0						0			-3	rck	ulv		0					0					
		-3	rck	fir						0						0			0	rck	red		0					0					
		3	rck	ala						0						0			3	rck	lam	90						98.1					
		6	rck	lbk						0						0			5	rck	agm	80						87.2					

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Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected	Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected
		9	rck	ala						0						0			8	snd	lam	5						5.45					
		10	bld	agm						0						0			12	snd	lbk	2						2.24					
		11	rck	lbk						0						0			15	snd	lbk	3						3.36					
		12	bld	agm						0						0			20	snd	lbk	0						0					
		12	bld	agm						0						0			23	mud		0						0					
		13	bld	agm						0						0	11	5	-9	bld		0						0					
		14	bld	hir						0						0			-7	cbl	fuc	35						37.8					
		15	bld							0						0			-5	cbl	fuc	30						32.4					
		15	bld	agm						0						0			-3	bld	fuc	4						4.32					
		18	bld	agm						0						0			0	cbl	ala	0						0					
		24	snd	agm						0						0			2	cbl	red				0						0		
		27	snd							0						0			4	bld	lam				2						1.94		
8	5	-10	rck				0						0						6	bld	lam				10						9.7		
		-6	bar				0						0						7	snd	lam				8						7.76		
		-4	rck	fuc			110						136.4						7	snd	hir				180						171		
		-4	rck	ulv			0						0						8	snd	lam				30						29.1		
		-3	rck	fir			1						1.1						9	snd	lam				5						4.85		
		-1	rck	fir			20						22						10	snd	lam				10						9.7		
		0	rck	red			15						16.5						12	snd	lam				15						14.55		
		1	bld	red			0						0						12	rck	lam				25						24.25		
		15	rck	lam				0						0					17	snd	lbk			0						0			
		15	rck	agm				0						0					18	snd				0						0			
		20	rck	lam				0						0					18	snd				0						0			
		22	shl	lam				0						0					18	snd	hir			0						0			
12	5	-9	gvl							0						0			19	snd	lbk			1						0.89			
		-6	cbl	fuc						0						0			19	snd				0						0			
		-4	cbl	ulv						0						0			19	snd	lbk			0						0			
		-1	cbl							0						0			18	rck	lbk			0						0			
		1	snd							0						0			18	rck	lbk			0						0			
		3	cbl							0						0			18	snd	lbk			0						0			
		4	snd	elg						0						0			19	snd	hir			0						0			
		5	snd	elg						20						23.6			19	snd	lbk			0						0			
		5	snd	elg						30						35.4			17	rck	lbk			0						0			
		4	snd	elg						35						41.3			17	rck	lam			0						0			
		5	snd	elg						2						2.36			18	snd	agm			0						0			
		4	snd	fuc						5						8.8			17	rck	lbk			0						0			
		4	snd	elg						15						17.7			18	rck	lbk			0						0			
		4	snd	elg						30						35.4			15	rck	lbk			0						0			
		5	snd	elg						20						23.6			20	rck	lbk			0						0			
		6	snd	elg						0						0			23	snd				0						0			
		6	snd							0						0	14	5	-9	rck	fir		0						0			
		6	snd	lbk						1						1.46			-5	bld			0						0			
		6	snd	hir						5						6.5			-4	bld	fuc		0						0			
		5	bld	lbk						2						2.92			-3	bld	fuc		0						0			
		5	snd							0						0			-3	bld			0						0			
		4	bld	lbk						0						0			-1	cbl	ala		0						0			
		4	snd							0						0			0	cbl	ala		0						0			
		4	snd							0						0			0	rck	ala		0						0			
		4	snd							0						0			4	rck	lam		15						16.35			
		1	rck	lbk						0						0			5	bld	ala		25						27.25			
		2	snd							0						0			6	bld	hir		175						180.25			
		2	snd	elg						80						94.4			0	rck	ala		0						0			

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Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected	Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected
		2	snd	elg						120						141.6			6	rck	lam		2						2.18				
		2	snd	hir						300						390			8	rck	lam		15						16.35				
		2	snd	elg						120						141.6			8	rck	lam		1						1.09				
		3	snd	elg						1						1.18			7	rck	lam		1						1.09				
13	5	-9	bld				0						0						8	rck	hir		40						41.2				
		-7	cbl	fuc			45						55.8						11	rck	agm		0						0				
		-5	bld				3						3.3						12	rck	agm		0						0				
		-4	bld	fuc			0						0						14	shl	fil		0						0				
		-1	bld	fir			3						3.3						15	rck	agm		0						0				
		2	gvl	hir			160						192						19	rck	agm		0						0				
		3	snd	elg			90						69.3				15	5	-6	rck	fuc	0						0					
		5	snd				0						0						1	bld		0						0					
		5	snd	elg			50						38.5						4	rck	hir	5						6.4					
		5	snd	elg			30						23.1						8	rck	lbk	2						2.24					
		6	snd	elg			50						38.5						11	bld	lbk	2						2.24					
		6	snd	elg			30						23.1						12	bld	lbk	1						1.12					
		7	snd	elg			15						11.55						12	rck	hir	10						12.8					
		8	snd	elg			2						1.54						12	rck	lam	1						1.09					
		9	snd	elg			2						1.54						17	rck	lam	1						1.09					
		10	snd	elg			1						0.77						21	mud	lam	0						0					
		11	snd	elg			1						0.77						23	mud	lam	0						0					
		11	snd	elg			0						0						24	mud	hir	0						0					
		12	snd	elg			0						0						25	mud	0	0						0					
		13	snd	elg			0						0				16	5	-5	bld							0						0
		14	snd				0						0						-2	bld							0						0
		14	snd				0						0						-5	bld							0						0
		15	snd				0						0						-1	bld							0						0
		15	snd				0						0						1	bld							0						0
		16	snd				0						0						3	bld							0						0
		16	snd				0						0						0	rck							0						0
		17	snd				0						0						0	rck							0						0
		-1	rck							0						0			-8	rck							0						0
		-1	rck	ala						0						0			-7	rck	red						0						0
		0	rck	ala						0						0			-6	rck							0						0
		2	rck							0						0			-7	rck							0						0
		2	rck							0						0			-2	rck	lbk						0						0
		4	rck	lam						0						0			12	rck							0						0
		6	rck	lam						0						0			18	rck	lbk						0						0
		7	rck	lam						100						115			23	snd							0						0
		13	gvl	lam						1						1.15	20	5	-12	rck	fuc	0						0					
		14	gvl	lam						1						1.15			-7	cbl		0						0					
		15	rck	agm						1						1.15			-5	cbl	ulv	0						0					
		15	rck	lam						0						0			-4	gvl		0						0					
		17	rck	hir						0						0			-3	gvl	red	0						0					
		19	bld	hir						0						0			-2	gvl	red	0						0					
		20	cbl	hir						0						0			-2	snd		0						0					
		22	cbl	lam						0						0			-1	snd	red	0						0					
17	5	-10	bar			0						0							-1	snd	ulv	0						0					
		1	rck	lbk		60						67.2							-1	snd	fil	0						0					
		8	rck	agm		20						21.8							0	snd	red	0						0					
		10	rck	agm		4						4.36							0	snd	red	0						0					

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Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected	Transect no.	Increment	MLLW depth	Bottom type	Vegetation type	RL eye	KH eye	WB eye	TK eye	DG eye	BL eye	RL corrected	KH corrected	WB corrected	TK corrected	DG corrected	BL corrected
		11	rck	agm		90						98.1							0	snd	red	0						0					
		13	snd	red		0						0							0	snd	ulv	0						0					
		13	snd	red		0						0							0	gvl	lbk	0						0					
		13	snd	fil		0						0							0	gvl	agm	0						0					
		13	snd	fil		0						0							0	gvl	ala	0						0					
		13	snd	ala		0						0							0	gvl	agm	0						0					
		14	snd	ala		0						0							1	gvl	ala	0						0					
		15	snd	fil		0						0							0	gvl		0						0					
18	5	-2	snd	elg			0						0						0	gvl	ala	0						0					
		-2	snd	elg			2						1.54						1	gvl	ulv	0						0					
		-1	snd	elg			7						5.39						1	snd		0						0					
		-1	snd	elg			60						46.2						1	gvl	hir	0						0					
		-1	snd	elg			90						69.3						1	gvl	hir	0						0					
		0	snd	elg			120						92.4						2	gvl	ulv	0						0					
		0	snd	elg			120						92.4						2	gvl	hir	0						0					
		1	snd	elg			180						138.6						2	gvl	red	0						0					
		1	snd	elg			100						77						2	gvl	hir	0						0					
		2	snd	elg			80						61.6						3	gvl	hir	0						0					
		3	snd	elg			120						92.4						3	gvl	lbk	0						0					
		3	snd	elg			120						92.4						4	gvl	lbk	0						0					
		4	snd	elg			50						38.5						4	snd		0						0					
		5	snd	elg			120						92.4						4	gvl		0						0					
		6	snd	elg			25						19.25																				
		7	snd	elg			45						34.65																				
		8	snd	elg			60						46.2																				
		9	snd	elg			5						3.85																				
		10	snd	elg			1						0.77																				
		10	snd				0						0																				
		11	snd				0						0																				
		12	snd				0						0																				
		13	snd				0						0																				
		14	snd				0						0																				
		16	snd				0						0																				
		17	snd				0						0																				
		21	snd				0						0																				
		22	sil				0						0																				
19	5	-17	rck	fuc						0						0																	
		-15	rck	fuc						0						0																	
		-14	rck	fuc						0						0																	
		-11	rck							0						0																	
		-11	rck							0						0																	
		-10	rck							0						0																	
		-9	rck	fuc						0						0																	

Appendix C. Aerial and skiff herring spawn surveys in Southeast, Alaska, 1999.

Note: Days when active spawn are observed have "spawn" bolded.

Craig

3-17-99 AJL Birds Shelter Cove.

3-22-99 SBW 50 sea lions northwest of Clam Island. 33 sea lions northwest of Fish Egg Island.

3-23-99 SBW Schools of herring south and southeast of Fish Egg Island. 30 sea lions north of Fish Egg Island. 20 sea lions south end of Fish Egg Island. Birds southwest side of Fish Egg Island.

3-24-99 PSD 40 sea lions north of Cole Island. 70 sea lions northwest of Fish Egg Island. 75 sea lions south of Fish Egg Island. Herring schools south of Cole Island. Spot **spawn** southeast of Fish Egg Island. 2 ½ miles **spawn** west and southwest side of Fish Egg Island.

3-25-99 EDH, SBW 2 ½ miles of **spawn** west side of Fish egg island. 1 mile of **spawn** southeast of Fish Egg Island. (skiff)

3-26-99 EDH 2 ½ miles **spawn** south west side of Fish Egg Is. 2 miles **spawn** northwest of Fish Egg Island. Herring east side of Abbess Is.

3-27-99 SBW 6 miles **spawn** southeast side to north side of Egg Island. 100 sea lions each north of Fish Egg and southwest of Fish Egg. 25 sea lions south of Alberto Is.

3-28-99 EDH, SBW Spots of herring east side of Fish Egg Is. 115 sea lions east of Fish Egg Is.

3-29-99 EDH No active spawn observed. 1 school herring and birds w of Blanquizal Is. 4 schools herring east side of Fish Egg Island. 30 sea lions n of Fish Egg Is. 17 sea lions Wadleigh Rocks. Birds west of Cornado Is. Birds west of Fern Pt.

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3-30-99 EDH No active spawn. Herring schools south of Craig, south of Cole Island. 108 sea lions south of Fish Egg island.
3-31-99 EDH No active spawn
4-02-99 EDH No active spawn. 70 sea lions and 2 whales southeast Fish Egg Island. Sea lions west of Abbess Island. Birds and 2 sea lions southwest of Abbess Is. 16 sea lions s of Entrance Pt.
4-03-99 EDH No activity. (Skiff)
4-04-99 EDH (Skiff) Birds northwest of Fish Egg Is. Birds, whales, sea lions west of Abbess Island. 3 whales Witness.
4-05-99 EDH Birds North, east, and south Fish Egg Is.
4-06-99 EDH (skiff) Deep herring west of Alberto Is and Klawock Inlet. Sea lions north of The Witnesses, south of Abbess Island, Entrance Pt. Wale east of Cruz Islands
4-07-99 EDH (Skiff) 2 schools of herring north and east of Clam Is.
4-08-99 EDH (aerial) Birds, small schools of herring south end of Fish Egg Is. Sea lions south of Abbess Is, Wadleigh Rock and Clam Is. Small area active **spawn** Pt Ildefonso, 2 sea lions. Birds, sea lions west of Alberto Reef.
4-09-99 EDH(Ariel) 1/4 mile **spawn** south of Clam Island. Several sea lions south of Entrance Point.
4-10-99 EDH Sea lions north of Ballena Islands. 20 seal lions south of Klawock Reef, 50 Sea lions south of Entrance Point, 1/4 mile of **spawn** inside the Alberto Islands.
4-12-99 EDH. 1 mile of **spawn** around the middle Alberto Islands. 80 sea lions south of Entrance Point along with 1 whale.
4-13-99 EDH. 1 mile of **spawn** around the Coronado Islands. Birds and sea lions around Cole Island. 2.5 miles of **spawn** around the Alberto Islands and south. Sea lions around Klawock Reef.
4-14-99 Dave Doyon. 1/2 mile of **spawn** around Clam Island, 1.5 miles of **spawn** all around the Alberto Islands. 1/2 mile of **spawn** on the north end of Abbess Island.
4-15-99 EDH. 3/4 mile of **spawn** on the northeast side of Fish Egg Island. 25 sea lions also around Cole Island. Sea lions around Clam Island.
4-16-99 EDH. Herring and sea lions around Cape Suspiro. 1 mile of **spawn** on the northeast side of Fish Egg Island. Sea lions north of the Ballena Islands. 1.5 miles of **spawn** around Clam Island, north of Entrance Point, the outer Alberto Island and north of the Alberto Islands. 1/4 mile **spawn** north of Sombrero Island.
4-17-99 EDH. 1/2 mile of **spawn** in the northern Coronados Island. 1/4 mile of **spawn** in the northeast side of Fish Egg island. Spot **spawn**s north of Entrance Point, and north of the Albertos.
4-18-99 EDH. No active spawn seen.

Kasaan
4-2-99 DD 2 miles **spawn** on Sandy Point

Kah Shakes
3-13-99 PSD 3 sea lions northeast Middy Pt, Ham Island northeast Middy Pt, Ham Island. 1 sea lion west of Cat Island. 29 sea lions west side of Mary Island.
3-17-99 AJL 19 sea lions west of Beaver Creek, Mary Island. Whale northwest of Mary Island. Birds west side of Mary Island. 20 sea lions southeast of Mary Island. 3 sea lions northeast of Edge Point, Mary Island. 3 sea lions south of Edge Point, Mary Island. 10 sea lions west side of Cat Island. Birds east side of DeLong Islands. Birds west of Kah Shakes Point.

3-21-99 PSD 3 Test gillnets west of Crab Bay. 6 sea lions southwest side of Annette Island. 6 sea lions north side of Mary Island. 15 sea lions northwest of Mary Island. 9 sea lions west of Edge Point, Mary Island. 2 sea lions southwest of Cat Island. 3 sea lions west of Kah Shakes Cove.

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3-25-99 PSD Herring north side of Ham Island. Herring northeast of Crab Bay, Annette Island. 10 sea lions west of Crab Bay. 6 sea lions northwest of Mary Island. (No Kah Shake survey due to weather.)

3-28-99 PSD 1 mile of **spawn** Middy Point south on shore of Ham Island. 50 sea lions south of Ham Island. 12 sea lions west of Kwain Bay, Annette Island. 10 Sea lions south west side of Annette Island. 6 sea lions west of Customhouse Cove, Annette Island. 8 sea lions northwest of Village Island. 12 sea lions east of Cat Island, Cat Passage.

3-29-99 PSD 1 mile of **spawn** south shore of Ham Island. 35 sea lions south of Ham Island. 10 sea lions southwest of Ham Island. 5 sea lions northeast side of Annette Island. 23 sea lions east side of Crab Bay, Annette Island. 6 sea lions southeast side of Annette Island. 3 herring schools southwest side of Mary Island. 30 sea lions southwest of Mary Island. 3 sea lions north of Cat Island.

3-30-99 PSD 1 mile of **spawn** south and southwest shore of Ham Island. 10 sea lions south of Middy Point, Ham Island. 1 ½ miles **spawn** on shore north of Crab Bay, Annette Island. ½ mile **spawn** north end of Kwain Bay, Annette Island. 3 schools Herring southwest side of Mary Island. Herring east of Lane Island. Small amounts of **spawn** west side of Lane Is. Small amount of **spawn** east side of Cat Island. Herring east side of Village Island. 12 sea lions west of Village Island. 30 sea lions south of Village Island. (No Kay Shakes Survey)

3-31-99 BLL, PSD (0830) Scoters south end of Ham Island. 4 ½ miles **spawn** shore of Annette Island north and south of Crab Bay. (Birds throughout **spawn**) 21 sea lions southeast side of Annette Island. 3 schools of herring southwest side of Mary Island. 3 sea lions southwest side of Mary Island. Small amounts of **spawn** of Lane and Fripo Islands. 30 sea lions near Bird Island west of Cat Island. 3 miles of **spawn** east and south of Kah Shakes Cove.

3-31-99 PSD (1330) 2 schools herring southwest shore of Mary Island. Birds off shore south of Edge Point, Mary Island. Small amounts of **spawn** north and south shores of Fripo Island. 40 sea lions west of Cat Island. 20 sea lions southwest of Cat Island. 11 sea lions west of Fish Island. 10 sea lions northwest of Dog Island. Several spots of **spawn** west and south of Kay Shakes Cove.

4-01-99 PSD ½ mile **spawn** southeast side of Mary Island. 1 miles **spawn** around Fripo Island. Spot of **spawn** offshore south of Fripo Island. 6 sea lions southwest of Cat Island. 1 mile **spawn** south of Kay Shakes Cove. ¾ mile of **spawn** west of Kay Shakes Cove.

4-02-99 PSD ½ mile **spawn** north of Crab Bay, Annette Island. ½ mile **spawn** southeast Annette Island. Small amount of **spawn** east side of Mary Island. 6 sea lions southeast of Mary Island. 5 sea lions east of Lane Island. 60 sea lions north of Bird Island. 10 sea lions east side of Cat Island.

4-03-99 PSD 2 miles **spawn** east side of Ham Island. Small amounts of **spawn** north of Crab Bay, Annette Island. 2 miles **spawn** Kwain Bay area, Annette Island. 100 sea lions east of Crab Bay, Annette Island. 2 ½ miles **spawn** south side of Mary Island. 20 sea lions northeast of Cat Island. 1 mile **spawn** north of Annette Point, Annette Island.

4-04-99 PSD Small amount of **spawn** north of Annette Point, Annette Island. 1 mile **spawn** southeast side of Mary Island and small amount **spawn** north of Edge Point, Mary Island.

4-05-99 BLL-RCL 10 sea lions southeast side of Annette Island. 3 sea lions south of Edge Point, Mary Island. 1 ton herring school west of Quadra Point.

4-06-99 BLL-RCL No spawn or fish observed. 1 dead whale at Alava Point.

4-07-99 BLL-BCL Birds on old **spawn** Lane and Fripo Islands, east side of Cat Island, southeast of Kah Shakes Cove. 5 sea lions northwest side of Dog Island.

4-08-99 SBW Sea lion southeast side of Annette Island. 10 sea lions northwest side of Cat Island. 10 sea lions south of Village Island.

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4-09-99 SBW 2 sea lions southwest side of Cat Island. Possible small amount of **spawn** Grave Point, Duke Island. (note, poor visibility)
4-10-99 PSD 30 sea lions and 2 gray whales north of Crab Bay, Annette Island.
4-12-99 LW Birds west side of Mary Island. Birds-Sea lions north end of Cat Island. Birds west of Bullhead Cove.

West Behm Canal

4-02-99 PSD Small amount of Herring northwest of Betton Island. 5 sea lions north of Betton Island. 3 sea lions southeast of Betton Island. 30 sea lions near Survey Point. Small amount of **spawn** at Pt. Higgins.
4-03-99 PSD Spots of **spawn** Pond Reef, and Pt Higgins. Sea lions north of Pond Reef. 4 miles **spawn** Pt Francis to Helm Point.
4-04-9 PSD 7 miles **spawn** from Mud Bay north. ½ mile **spawn** south shore of Betton Is. 30 sea lions NW of Tatoosh Is. 30 sea lions off of Pt Higgins. 2 miles **spawn** Pt Francis. 1 mile **spawn** Helm Pt. Small amount of **spawn** Pt. Francis.
4-05-99 SBW 4 miles **spawn** staggered from 1 mile north of Refuge Cove to 1 mile north of Pond Reef. ½ mile **spawn** around Danger Island. 1 mile **spawn** south end of Betton and Pup Islands. 2 miles **spawn** Pt Higgins to Knudson Cove. Spots of **spawn** Pt Francis. 2 miles **spawn** around Helm Pt. 1 mile **spawn** N of Smugglers Cove. 1 mile **spawn** Pt Francis south.
4-06-99 SBW 4 miles **spawn** staggered from Refuge Cove to just north of Pong Reef. ½ mile of **spawn** around Danger Island. Small **spawn** Tatoosh Islands, small spots of **spawn** Pt Higgins north to Knudson Cove, and northeast of Pup Island. ¾ mile **spawn** southwest Betton Island. Small spots of **spawn** Pt Francis. 1 mile **spawn** south of Pt. Francis and spots of **spawn** at Port Stewart.
4-07-99 SBW 3 miles **spawn** Mud Bay to 1 mile north of Totem Bight. Spot of **spawn** Pt Higgins. 50 sea lions Pond Reef. 10 sea lions Tatoosh Islands. 1 ½ mile **spawn** south end of Betton and Pup Islands. 1 mile **spawn** 1 mile north of Helm Pt. 1 ½ mile **spawn** Vallenar Pt north. Small amounts of **spawn** Knudson Cove, Tatoosh Islands, northeast of Grant Island. 4 sea lions Pt Francis.
4-09-99 SBW Tiny **spawn** Totem Bight. ½ mile **spawn** southeast of Vallenar Pt. 1 mile **spawn** Knudson Cove north.

Hobart Bay

4-9-99 No fish or spawn; 78 SL; few birds no whales.
4-12-99 Flown by Doug Reimer; No fish or spawn; No change in mammals.
4-14-99 No fish or spawn; 124 SL; few birds no whales.
4-16-99 No fish or spawn; 101 SL; 1 whale. Done by Andy McGregor.
4-18-99 One deep schl N of Sunset Cove; 195 SL; 2 whales.
4-20-99 No fish or spawn; 185 SL; 2 whales; increase in birds.
4-22-99 One deep schl N of Sunset Cove; 217 SL; birds increasing
4-23-99 One lg, deep schl S. of log dump; 120 SL; 2 whales; birds increasing
4-24-99 7 schls on beach N.of Entrance Is & @ Herring Lagoon; 113 SL; 2 whales Gillnet sample taken 10% roe, 120.5g, high male count
4-25-99 Many lg schls N of and around Herring Lagoon; 179 SL; many birds Announced @ 09:00 that 2-hr notice in effect @ 06:00
4-26-99 0.5 mi **spawn** N and S of Entrance Is. Many lg schls leading S. of Entrance and all along shore N. of Hobart; 121 SL; 2 whales; many birds

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4-27-99 1.8 mi **spawn**. Very large schls in and around Herring Lagoon. **Spawn** increasing between Foul Pt. and Hobart Pt. Fishery opened at 3:00 p.m. Closure at 5:00 PM with 1 hr grace period. Total catch 550 tons.
4-28-99 4.1 mi. active **spawn** Pt. Hobart and Herring Lagoon and Sunset Cove and north. 145 SL; 1 grey whale; many birds
4-29-99 1.1 mi active **spawn** @ Rockpile->North; 0.4 mi light **spawn** @ Pt. Hobart; 80 SL; large numbers of birds
4-30-99 4 spot **spawn**s N. of Hobart; 1 schl W. of Pt. Windham 113 SL; large number of birds
5-1-99 No fish or spawn; 10 SL; Large number of birds.

Port Houghton
4-9-99 No fish or spawn; 25 SL; few birds no whales
4-12-99 Flown by Doug Reimer; No fish or spawn; No change in mammals
4-14-99 No fish or spawn; 8 SL away from Walker I.; few birds no whales
4-16-99 No fish or spawn; 5 SL; few birds no whales: Flown by Andy McGregor
4-18-99 No fish or spawn; 7 SL; few birds no whales
4-20-99 No fish or spawn; 21 SL; few birds, no whales
4-22-99 No fish or spawn; 2 SL; few birds, no whales
4-23-99 No fish or spawn; 1 SL; few birds, no whales
4-24-99 No fish or spawn; 3 SL; few birds, no whales
4-25-99 No fish or spawn; 1 SL 1,000 scoters, no whales
4-26-99 No fish or spawn; 1 SL, few birds, no whales
4-27-99 2.5 N. mi active schls leading in and around **spawn**; 2000+ birds; Fishery opened at 3:00 p.m. Closed at 5:00 p.m. w-1 hr grace period. 550 ton total harvest 1.5 N. mi. active **spawn**, A few schls around **spawn**; 30 SL; 2500 scoters, 500 gulls
4-29-99 2.4 N. mi. active **spawn** no fish; 1 SL; 5000 scoters, 5000 gulls
4-30-99 .75 N. mi. active **spawn**, no fish; 42 SL;8000 scoters, 4200 gulls
5-1-99 No fish or spawn; 0 SL; 5500 scoters, 5000 gulls.

Farragut Bay
4-9-99 No fish or spawn; 2 SL
4-12-99 No fish or spawn; 0 SL
4-14-99 No fish or spawn; 9 SL
4-18-99 No fish or spawn;0SL; few birds
4-20-99 1 sml schl inside Reid Is; 34 SL; few birds
4-22-99 No fish or spawn; 12 SL; few birds but increasing
4-23-99 No fish or spawn; 0 SL; few birds
4-24-99 No fish or spawn; 8 SL; few birds but increasing
4-25-99 No fish or spawn; 0 SL
4-27-99 Several large schls from outside Bay Pt. to N. Arm head
4-28-99 0.75 N. mi. active **spawn** @ Bay Pt. several schls Bay Pt. To N. Arm head; 3000 gulls
4-29-99 Old milt N. of Bay Pt.
4-30-99 11 schls West of Bay Pt.; 30SL; 3,700 gulls, 1,000 scoters
5-1-99 0.3 mi. active **spawn** at Bay Pt.; 10SL; 4,000 gulls; 1,500 scotes
5-2-99 No fish or spawn; 3,000 gulls; 3,000 scoters

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Ernest Sound

4-5-99 Two small spot **spawn**s 1-2 mile E. of Vixen Hbr.;32SL; 200 birds
4-7-99 1 mi. active **spawn** in front of and east of Vixen Hbr; 75SL; 600 birds
4-8-99 .25 mi active **spawn** @ Vixen Hbr and .75 mi active **spawn** on S. shore inside Sunshine Is 69SL; 1,300 birds
4-9-99 No fish or spawn; 26SL; 2,500 gulls on old **spawn**.
4-13-99 No fish or spawn; 12SL; numerous gulls on old **spawn**--Dave Doyon survey.
4-15-99 No fish or spawn; numerous scoters--Dave Doyon survey.
4-16-99 No fish or spawn; numerous scoters; 500 gulls on old **spawn**--Dave Doyon survey
4-19-99 No fish or spawn; no marine mammals.--Taquan air observation
4-21-99 No fish or spawn; no marine mammals.--Taquan air observation

Ship Island Shoreline

4-5-99 No fish or spawn
4-7-99 No fish or spawn
4-8-99 No fish or spawn; 200 gulls on rock N. of Ship Is.
4-9-99 No fish or spawn; 1SL; 300 gulls on rock N. of Ship Is.
4-15-99 No fish or spawn; 16SL.--Dave Doyon survey
4-19-99 No fish or spawn; no marine mammals.--Taquan air observation
4-21-99 No fish or spawn; no marine mammals.--Taquan air observation

Port Camden

4-26-99 No fish or spawn
5-2-99 0.2 miles active at Pt. Camden.

Sitka Sound

3-10-99 No herring or spawn seen. 176 sea lions in northern Sitka Sound, 70 sea lions in the southern areas of Sitka Sound and 530 sea lions at Vitskari Rocks. Haulout rocks near Biorka Island had an estimated 900 sea lions. The nearshore areas from Nakwasina to the breakwater were quiet with only a few sea lions noted.
3-12-99 No herring or spawn seen. Sea lion distribution essentially unchanged from the previous survey.
3-14-99 No herring or spawn seen. Sea lions are beginning to move into the areas north of Middle Island, Eastern Bay, and the south entrance to Olga Strait. Good numbers of sea lions also seen along the rocks to the west and south of Middle Island. Surveyed south to Cape Burunof.
3-15-99 No herring or spawn seen. Little change from yesterday's survey except for a group of 55 seas lions moved in along the east side of Middle Island. Surveyed south to Eastern Channel.
3-16-99 No herring or spawn seen. Good concentration of sea lions in Eastern Bay (100), east of the Gavanski Islands (85) and east of Middle Island (65). Twenty sea lions off Halibut Point and a few off Harbor Point. Eastern Channel was very quiet. Surveyed south to Cape Burunof.
3-17-99 No spawn was observed. Several large schools of herring were seen in Hayward Strait, in Nakwasina Passage, a couple schools east of Neva Point, and a school was seen in Eastern Bay. Good concentrations of sea lions were seen near Neva Point, in Promisla and Eastern Bays as well as 200 seen off Inner Point. Surveyed south to Cape Burunof.
3-18-99 No spawn was observed. Sea lions were still concentrated in the area to the south of Olga Strait, in Eastern Bay, the north side of Middle and Crow Island and a group of 30 sea lions were seen to the west of the Magoon Islands. Schools of herring continue to be seen in Nakwasina Passage. Still quiet in Eastern Channel. Surveyed south to Cape Burunof.

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3-19-99 Weather conditions poor. No spawn was observed. Sea lions distributed much like yesterday. Herring schools still visible in Nakwasina Passage. Only surveyed north of Sitka due to weather. [Note: Fishery on 2-hr. notice today at 8:00 a.m.]

3-20-99 No spawn was observed. Most of the sea lions were concentrated around the Gavanski and Siginaka Islands and north of Middle and Crow Islands. Sea lions still present west of the Magoon Islands. Otherwise very quiet with little activity south of Sitka. Surveyed south to Eastern Channel. A second aerial survey was conducted in the afternoon and showed little change from the morning survey. Surveyed to Povorotni Point.

3-21-99 No spawn was observed. Most of the sea lions were concentrated between the Siginaka Islands and Lisianksi Peninsula. A small volume of herring was seen off Neva Island and outside of the Breakwater. Surveyed south to Cape Burunof. A second flight was conducted in the afternoon with very little change noted.

3-22-99 Active **spawn** – 0.6 nm at Watson Point and a spot on Indian River flat. No other **spawn** was observed. A herring school was observed in Promisla Bay. Sea Lions and whales north of Middle Island. Surveyed south to Cape Brurnof. [Note: Fishery open 13:30-14:30; 4,252 ton harvested]

3-23-99 Active **spawn** – 3.0 nm from Cascade Creek to Halibut Point, 0.2 nm on north Kasiana and a small spot on Middle Island and Indian River flat. A large "mud stir" was seen in south Crow Pass. Surveyed south to Cape Burunof.

3-24-99 Active **spawn** 7.2 nm north of the O'Connell Bridge and 4.0 nm south of the Bridge. Areas receiving **spawn** included Kasiana Island, south Middle Island, Crow Island, Halibut Point to Thompson Harbor, Crescent Bay and Jamestown Bay. One herring school was observed in Promisla Bay. Surveyed south to Cape Burunof. [Note: Fishery open 1:15-1:35; 4,011 tons harvested]

3-25-99 Areas of active **spawn** included, Crescent, Jamestown, and Thimbleberry Bays, Japonski, Middle, Crow, Apple and Battery Islands and the Halibut Point Road system. Surveyed south to Cape Burunof. Total active **spawn** 24 nm with 10.5 nm south and 13.5 nm north of the Bridge.

3-26-99 The first **spawn** south of Eastern Channel on Biodarkin Island and a spot on Silver Point. Other areas of active **spawn** include east of Entry Point, Thimbleberry Bay, Jamestown and Crescent Bay, Whale and Galankin Island, Japonski Island, Middle, Crow, Gagarin, Kasiana, Apple and Chaichi Islands, and Little Gavanski Island. **Spawn** on the Halibut Point Road system dissipating with good **spawn** in Starrigavin Bay and Mosquito Cove. Surveyed south to Cape Burunof . Total active **spawn** 21.4 nm with 9.5 nm south and 12.1 nm north of the Bridge.

3-27-99 A total of 23.2 nm of active **spawn** in the same areas as yesterday with **spawn** expanding on Silver Point, in Aleutkina Bay, on the Lisianski Peninsula, Katlian Bay and Little Gavanski Island. **Spawn** dissipating in Crescent Bay. Surveyed south to Aleutkina Bay. Total active **spawn** of 6.5 nm south and 16.7 nm north of the Bridge.

3-28-99 New **spawn** in Promisla Bay and at Brent's Beach. **Spawn** continuing to expand in Aleutkina Bay, Silver Point, Lisianski Peninsula and Katlian Bay. **Spawn** dissipating in the other areas. Surveyed to Povorotni Point. Total active **spawn** of 4.8 nm south and 9.0 nm north of the Bridge.

3-29-99 **Spawn** continuing to expand in Promisla and Eastern Bays, and at Brent's Beach . Also continuing along the Lisianski Peninsula, in Katlian Bay and on the Gavanski Islands. **Spawn** still going strong in the Aleutkina Bay area. **Spawn** diminishing elsewhere. Surveyed south to Windy Pass. Total active **spawn** of 7.3 nm north and 4.2 nm south of the Bridge.

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3-30-99 **Spawn** continuing in Promisla and Eastern Bays, on Big Gavanski Islands, in Katlian Bay, the Causeaway, Brent's Beach and Aleutkina Bay. A small **spawn** developing at Sukoi Point in Salisbury Sound. Surveyed south to Povorotni Point. Total active **spawn** 9.0 nm.

3-31-99 **Spawn** continuing at Brent's Beach, and in Promisla and Eastern Bays. **Spawn** expanding some at Sukoi Point. Small **spawns** continuing in Whiting Harbor, Silver Point and in Aleutkina Bay. Surveyed south to Windy Pass. Total active **spawn** 2.5 nm.

4-1-99 Only surveyed to the Eastern Channel and Aleutkina Bay area due to high winds. No **spawn** was noted.

4-2-99 Surveyed Salisbury Sound to Windy Pass. 0.6 nm of active **spawn** at Sukoi Point. Otherwise quiet in all other areas.

4-3-99 Surveyed Salisbury Sound to Windy Pass and Shelikof Bay. No spawn was seen. All areas were quiet with a few sea lion in Crow Pass.

4-5-99 Surveyed Salisbury Sound to Windy Pass. No spawn was seen. One small school of herring in Leesofskia Bay and 4 sea lion at Dorothy Narrows.

4-9-99 Nothing seen in Sitka Sound.

4-12-99 8 sea lions were scattered in Windy Pass and a few sea lions in St. John Bay but otherwise quiet in Sitka Sounds.

4-13-99 Surveyed south of Sitka to Whale Bay. A few sea lions inside Silver Bay as well as birds on the shore in an area where **spawn** was reported by a member of the public. There was 10 sea lions as well as birds at the mouth of Camp Coogan. 2 groups of sea lions were also seen south of Long Island. A few sea lions were scattered in the Dorothy Narrows and Windy Pass area. A small area of dissipating milt on the northeast side of Dorothy.

4-14-99 A few sea lions continue to be scattered in the Windy Pass area.

4-16-99 A school of herring was seen off Camp Coogan. Not much seen in windy pass except for birds concentrated of Seven Fathom Bay. Silver Bay and areas to the south of Sitka to Cape Burunof were surveyed by skiff. Fresh deposition was found and mapped in Silver Bay (0.3 nm) as well as in the Camp Coogan area (0.4 nm).

4-17-99 Surveyed Sitka Sound south to Windy Pass. 1.0 nm of active **spawn** in Jamestown and Thimbleberry Bays. Also several schools of herring were seen in Silver Bay between the pulp mill and Bear Cove. In Windy Pass several small schools were seen and a spot **spawn** was noted just north of Dorothy Narrows.

4-18-99 Surveyed Windy Pass to Hoonah Sound. **Spawn** continuing in Jamestown and Thimbleberry Bays but beginning to weaken and dissipate. Small areas of active **spawn** at Long Island, Pirates Cove, Redoubt Bay, and in Herring Cove near Dorothy Narrows.

4-19-99 Skiff surveyed Silver Bay and areas south of Sitka to Cape Burunof. Additional fresh deposition was mapped near Camp Coogan and a small area on the west shore of Samsing Cove. Lots of birds on the southern shore of Aleutkina Bay and fresh but very light deposition was noted there. No active spawn seen.

4-20-99 Landed and mapped fresh deposition in Seven Fathom Bay amounting to 0.3 nm. No active spawn seen in Sitka Sound.

4-21-99 A light **spawn** was seen on the Indian River flat and a small **spawn** at Long Island.

4-22-99 Surveyed south to Windy Pass. Active **spawn** in Pirates Cove (0.2 nm) and a spot in Dorothy Narrows. No other activity noted elsewhere. Two spot **spawn**s on Mertz Island in Sitka Sound. A light **spawn** was seen on the Indian River flat and a small **spawn** at Long Island.

4-26-99 Two spot spawns on Mertz Island in Sitka Sound.

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Hoonah Sound/Peril Strait

4-9-99 Surveyed south to Windy Pass and north to Hoonah Sound. In Hoonah Sound two groups totaling 35 sea lions were seen near Finger River. Another 6 sea lions scattered between Poison Cove and Deep Bay.

4-12-99 Surveyed south to Windy Pass and north to Hoonah Sound. In Hoonah Sound there were 70 sea lions in several groups near False Island, 25 sea lions off Broad Island, 30 sea lions off Finger River, 16 sea lions off Vixen Island and 2 sea lions off Emmons Point.

4-14-99 Surveyed Windy Pass to Hoonah Sound in poor weather conditions In Hoonah Sound a few sea lions were seen on the south side of Emmons Island. Otherwise nothing else seen.

4-16-99 Surveyed Windy Pass to Hoonah Sound. A total of 70 sea lions were seen during the Hoonah Sound survey with numbers increasing slightly in the traditional spawn areas.

4-18-99 Surveyed Windy Pass to Hoonah Sound. In Hoonah Sound gusty wind conditions resulted nothing being seen.

4-20-99 Surveyed Windy Pass to Hoonah Sound In Hoonah Sound sea lion activity has increased in the traditional spawn areas with 90 sea lions along the north shore of Emmons and Vixen Islands. 20 sea lions were seen at Pederson Point and another 15 sea lions at Finger River. No herring or spawn seen.

4-21-99 Surveyed Eastern Channel and Hoonah Sound. In Hoonah Sound sea lion numbers continue to increase in the Emmons and Vixen Islands area with 130 sea lions off Emmons Point. Another 30 sea lions off Finger River. No herring or spawn seen.

4-23-99 Surveyed Hoonah Sound. There were 145 sea lions in the Vixen-Emmons area. One school of herring and 8 sea lions were seen off Finger River. No spawn.

4-25-99 Surveyed Hoonah Sound. There were 123 sea lions around Vixen-Emmons, 30 off Finger River and 10 off Fick Cove. No herring or spawn seen.

4-26-99 Surveyed Hoonah Sound, Lisianski Inlet, West Chichagof, Shelikof Bay, and Sitka Sound to Povorotni Point. Sea lion distribution pretty much the same. Large schools of herring in South Arm along the Moser Island shoreline amounting to hundreds of tons. Also several schools from Fick Cove to Rodgers Point totaling an estimated 1,000 tons

4-27-99 Surveyed Hoonah Sound. Most of the flight was at less than 300 feet due to low cloud cover. Many large schools of herring on the Moser Island shore in South Arm from White Cliff to the cabin. Active **spawn** at Point Reynard (0.5 nm). No herring or **spawn** seen elsewhere.

4-28-99 Surveyed Hoonah Sound. ½ mile of **spawn** continuing at Point Reynard. Numerous schools along the Moser Island shoreline in South Arm. Several schools along the Chichagof shore west of Emmons Island. Large number of sea lions off Rodgers Point. Several stringers of herring east of Finger River.

4-29-99 Surveyed Hoonah Sound. Schools on the beach from Fick Cove to Rodgers Point, on north Emmons Island, on Vixen Island and east of Finger River. A dissipating **spawn** on Vixen Island.

4-30-99 Surveyed Hoonah Sound. Active **spawn** at Douglas Bay and Point Reynard (1.2 nm), east of Fick Cove (1.9 nm), on Vixen Island (0.6 nm), and on Emmons Island (1.1 nm). Schools of herring scattered throughout the South Arm, at White Cliff, and at Pederson Point. Total active **spawn** – 4.9 nm.

5-1-99 Surveyed Hoonah Sound and Lisianski Point. Active **spawn** at White Cliff and along the reefs to the northeast of White Cliff. Most of the shoreline from Fick Cove to Rodgers Point has active **spawn**, the north shore of Vixen Island, and the southwest and east shore of Emmons Island for a total of 7.7 nm of active **spawn**. Total accumulative **spawn** to date 10.9 nm.

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5-2-99 Surveyed Hoonah Sound and attempted to survey Lisianski but could not due to fog. **Spawn** subsided in most areas with spots continuing on south Moser Island, Vixen Island, and Emmons Island. A 1-3 nm of new **spawn** east of Finger River. Skiff surveyed the South Arm adding 1.5 nm of **spawn** shoreline at Point Reynard, Douglas Bay and near Fick Cove.

5-3-99 Surveyed Hoonah Sound and Lisianski Inlet. ½ mile active east of Finger River, and some light **spawn**s on Emmons Spit and east of Fick Cove.

5-4-99 Surveyed Hoonah Sound. Squally weather in upper Hoonah Sound. Only activity was a small active **spawn** east side of Oly Creek flat.

5-5-99 Surveyed north Sitka Sound and Hoonah Sound. A small **spawn** (0.13 nm) in Nakwasina Passage north of Duck Creek. In Hoonah Sound two spot **spawn**s east of Finger River and possibly a light dissipating **spawn** at Point Elizabeth. Could be silt stirred up by wave action. **Last survey of the season**.

Lisianski Inlet, Lisianski Strait and West Chichagof

4-26-99 Lisianski Inlet and Strait were very quiet with one sea lion observed.

5-1-99 Lisianski Inlet had 1.5 nm of active **spawn** at Phonograph Creek.

5-3-99 In Lisianski Inlet no herring or predators were seen.

Whale and Necker Bay

4-13-99 No herring or herring predators noted in Whale or Necker Bays.

4-22-99 Attempted to fly to Whale and Necker Bays and aborted due to weather.

Lynn Canal
Total miles of spawn: 7 Nautical miles
Spawning dates: 5/7 – 5/10
Peak spawning: 5/7

4-14-99 Haines Air seat fare w/ McGregor. 8am. Low clouds and rain; visibility poor. No predators seen except approx. 50 sea lions on Benjamin Island.

4-25-99 61Z w/ McGregor. 11am. High tide. No herring or spawn seen. No predators except on.

4-27-99 61Z w-/ Farrington. Noon. Sunny. High tide with heavy algal bloom; visibility fair. No spawn seen. Small schools of herring seen in Berners Bay (7), Mab Island (2), and Auke Bay (5).

5-2-99 61Z w/ McGregor. 9:50-10:25 am. Low clouds and snow flurries. Brown water. Fair visibility. No fish or spawn. No birds. Sea lions on eastern shore of Berners Bay.

5-4-99 61Z w/ McGregor. 9-10am. Low tide. Excellent visibility. No spawn seen, but herring lining the beach north of Sawmill Cr. Too spooky for cast net. Predators mostly absent.

5-5-99 61Z w/ McGregor. Excellent visibility. Schools of herring seen in Tee Harbor (3), Breadline, and Berners Bay (5). Only one school lining the beach above Sawmill Cr.

5-7-99 61Z w/ McGregor. 10-11am. 1 hour before low tide. Approx. 5 nautical miles of **spawn** seen from Cascade Pt north about to USFS cabin on East shore of Berners Bay. 2 buckets of cast net samples taken about 1 mile north of Sawmill Cr.

5-8-99 61Z w/ McGregor. Noon. Excellent visibility. Low tide. Several spot **spawns** ongoing but major **spawn** is over. Birds lining the entire beach where **spawn** occurred yesterday.

5-10-99 61Z w/ McGregor. Noon – 1pm. Herring in shallow in South Bridget Cove. Major bird activity along Bridget reef. Landed plane but saw no eggs. Possible spot **spawn** in Berners Bay just south of USFS cabin.

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5-13-99 61Z w/ McGregor. 7am. Excellent visibility. Low tide. No herring seen except a couple of small schools in Auke Bay. 1 whale inside Berners Bay. Birds concentrated on shoreline on East side of Berners Bay. Final aerial survey.

5-17-99 McGregor ;and Farrington w/ Workskiff. 7am. Low low tide. Egg deposition survey from skiff –single layer of eggs in a narrow band (3/4 vertical feet of tidal range) nearly contiguous from the mouth of Echo Cove to the beginning of the rock wall (USFS cabin location). Lots of birds sitting on egg deposition and eating eggs – especially near Echo Cove. Locations with hair kelp had better spawn than the rest, and seemed to be sub-tidal and out of reach of birds. Final survey.

Seymour Canal
Total miles of spawn: 18 Statute miles
Spawning dates: 4-28 – 5-5
Peak spawning: 4-29

4-14-99 15V w/ Lynch. 8:40 am. Excellent visibility. 2 hours past low tide. No herring or spawn seen. Predators: 6 whales near Faust I. And 180 sea lions in lower Seymour.

4-16-99 61Z w/ McGregor. 9am. Visibility fair. Low tide. No herring or spawn. 149 sea lions mostly between Sorefinger and Blackjack, 4 whales off Sorefinger.

4-18-99 15V w/ Lynch. 11 am. 2 hours past low tide. No herring or spawn. 113 sea lions spread along beaches north of Blackjack. 1 whale seen.

4-20-99 61Z w/ McGregor. 11am. Visibility fair in low clouds and rain. Low tide. No herring or spawn. 128 sea lions and 6 whales mostly between Sorefinger and Blackjack.

4-23-99 61Z w/ McGregor. 1:30 pm. Visibility poor – gusty winds and chop on water. 1 hour before low tide. No herring or spawn. 136 sea lions and 3 whales seen.

4-25-99 61Z w/ McGregor. 10:00 am. 1.5 hour before high tide. No fish seen, but small spot **spawn** on small island north of Faust I. Sea lions present at **spawn**. 219 sea lions seen, mostly between Sorethumb and Blackjack. 7 whales seen.

4-26-99 61Z w/ Farrington. Am. Half tide. Sunny w- some clouds. Very good visibility. 120 sea lions seen with 9 whales.

4-27-99 61Z w/ Farrington. Am. Half tide. Sunny, no wind. Excellent visibility. 135 sea lions seen with 12 whales.

4-27-99 R-V Sundance. 8-10:30 am. Sonar survey reveals 14 good-sized schools of herring between Sorefinger and Pt Hugh. Most are topping off at 18-20 fathoms.

4-28-99 61Z w/ McGregor. 10:00 am. Half tide. Schools of fish near Sorethumb Cove and 0.5 mile of **spawn** at Rock Garden.

4-28-99 61Z w/ McGregor. 2 – 3:00 p.m. Past high tide. Approx. 0.75 mile of **spawn** at Rock Garden and 0.25 mile of fish leading the beach south of the **spawn**. 3 nice balls in shallows near Twin I.

4-29-99 McGregor and Farrington from work skiff. 6 am. Approx. 2.75 miles of **spawn** with spot **spawn**s active at either end. Cast net sample taken – 1 bucket – between Sorethumb and the RockGarden. Fish metered in a narrow band near shoreline, in 10 –30 feet of water. Cast net samples taken later in the day from (1) Rock Garden and (2) Swimming Pool.

4-29-99 15V w/ McGregor and Bergman. 10:30 am. 4 miles of **spawn**. Bergman reports on way back to Petersburg - 1 school on the beach in Blackjack Cove.

-continued-

4-30-99 61Z w/ McGregor. 5:45am. **Spawn** has subsided north of Twin I., but is active and mostly solid from about 1 mile south of Twin I to about 0.5 mile south of the district boundary. Small schools seen in Sorethumb Cove (5), Rockgarden (2), and a string on the beach in the cove at Twin I. Scott Kelley and Clyde Andrews take 1 bucket of cast net samples from Blackjack Cove area.

4-30-99 McGregor and Petersburg Department pilot. 11:25 am. Developing spot **spawns** south of the district boundary. Schools are moving into Sorethumb Cove and some along the Pt Hugh shoreline, but they are flighty.

5-2-99 61Z w/ McGregor. a.m. 15 knot winds and rain. No spawn or herring seen. Sea lions from Blackjack Cove to Pt Hugh. Many gulls feeding on eggs south of Twin I.

5-3-99 61Z w/ McGregor. 10:45 – 11:00 am. 1 hour past low tide. Good visibility. No spawn seen. Tremendous whale surface feeding inside Dorn I, along with 3 schools of herring on surface with birds actively feeding.

5-4-99 61Z w/ McGregor. 11:40 am. 2 hour past low tide. Fair visibility in low clouds and snow showers. Approx. 7 miles of **spawn** from Winning Cove south to #9 Rock.

5-5-99 61Z w/ Farrington. 10:20 am. Sunshine with high overcast. Water rippled and with brown algae. Visibility good. Approx. 1 mile of **spawn** with fish along the beach between #9 Rock and Sorefinger Cove. Couldn't get cast net samples from plane due to wind. In Sorefinger Cove, spotted a mound of dead herring underwater below low tide line – from one of two nets on beach at end of fishery?

5-7-99 61Z w/ McGregor. 12:50 p.m. 1 hour past low tide. No herring or spawn seen. Birds lining beaches of old spawn. Final survey.

5-11-99 61Z w/ Farrington. 6:00 p.m. Near low tide. Returning from egg deposition surveys conducted from R-V Sundance. One small spot **spawn** in cove on inside of Dorn I – Petaja thinks it could be clam **spawn**.

Oliver Inlet
Total miles of spawn: 0.75 Statute miles
Spawning dates: 4-25 – 4-26
Peak spawning: 4-26

4-16-99 61Z w/ McGregor. 8:45 am. Low tide. Good visibility. No activity of any kind.

4-20-99 61Z w/ McGregor. 10:35 am. Low tide. Visibility fair in low clouds and rain. 1 ball of herring inside the inlet.

4-23-99 61Z w/ McGregor. 1:20 p.m. Near low tide. Visibility poor. No fish or spawn seen.

4-25-99 61Z w/ McGregor. 10:45 am. High tide. Spot **spawns** underway between mouth of inlet and reef to the west. Schools seen outside of **spawn**. Birds lining the beach to the east of the mouth of the inlet – perhaps on old **spawn**?

4-26-99 61Z w/ Farrington. AM. Half tide. Sunny w- some broken clouds. Active spot **spawns** on outside of inlet on the reef, fish leading the beach nearby. 8 herring balls seen inside inlet, mostly near head of inlet.

4-27-99 61Z w/ Farrington. Late a.m. High tide with brown algal bloom pushed in from Stephens. No herring or spawn.

4-28-99 61Z w/ McGregor. Low clouds and snow showers. No spawn and no fish.

5-3-99 61Z w/ McGregor. 11:30 am. Good visibility. No spawn and no fish.

5-11-99 61Z w/ Farrington. 6:00 p.m. Near low tide. Returning from egg deposition surveys conducted from R/V Sundance. 7 small herring balls seen inside near middle and head of inlet.

-continued-

Taku Harbor
Not Surveyed

Tenakee
Total miles of spawn: 10.5 Statute miles
Spawning dates: 4-25 – 4-28
Peak spawning: 4-27

4-16-99 61Z w/ McGregor. 11-11:30 am. Mid tide. Excellent visibility. 28 sea lions and 1 whale seen on outside near Basket Bay. 175 sea lions and 4 whales seen on inside between Kadashan and East Pt.

4-20-99 61Z w/ McGregor. noon - 1:00 p.m. Visibility OK in drizzle. No herring or spawn seen, but approx. 1 mile of shoreline with light egg deposition as noted by landing and walking the beach. Likely occurred 4-18 or 4-19. Heavy predator concentrations between Corner Bay and Crab Bay, including 11 whales and 93 sea lions.

4-22-99 61Z w/ McGregor. 9-9:30 am. Mid tide. Overcast and windy, visibility poor. No herring or spawn seen. Fewer predators but still concentrated between Crab Bay and Kadashan (73 sea lions and 1 whale), with 17 sea lions on the outside.

4-23-99 61Z w/ McGregor. 2:30-3:00 p.m. Low tide. Good visibility. No spawn but 1 nice school seen in shallows near Kadashan. Definite increase in predators feeding near shore between Trap Bay and Crab Bay. Totals seen were 135 sea lions and 12 whales.

4-25-99 61Z w/ McGregor. 9:00 am. Incoming tide. Good visibility. Predators concentrated from Corner Bay on out. 2 schools of herring in shallows near S. Passage Pt. 100 yards of active **spawn** just south of S. Passage Pt.

4-26-99 61Z w/ Farrington. a.m. Sunshine with some clouds. Mid tide. Very good visibility. Approx. 3.5 miles of active **spawn** between Basket Bay and S. Passage Pt. With some fish leading the beach.

4-27-99 61Z w/ Farrington. 8 a.m. Foggy w- sunshine trying to lift the fog. A little past low tide - good visibility. Nearly continuous **spawn** from Basket Bay to Trap Bay with some very active spots. Cast net 1 bucket of fish from near Trap Bay.

4-28-99 61Z w/ McGregor. 7:45 - 9:00 am. 1 hour after low tide. **Spawn** essentially over on the outside. Active **spawn** from S. Passage Pt. to just west of creek south of Trap Bay. Cast net sample taken at Trap Bay.

5-3-99 61Z w/ McGregor. 9:30 – 10:00 am. Low tide. Sunny and calm. No herring or spawn seen. Final survey.

Port Frederick
Total miles of spawn: 0 Statute miles
Spawning dates: Peak spawning:

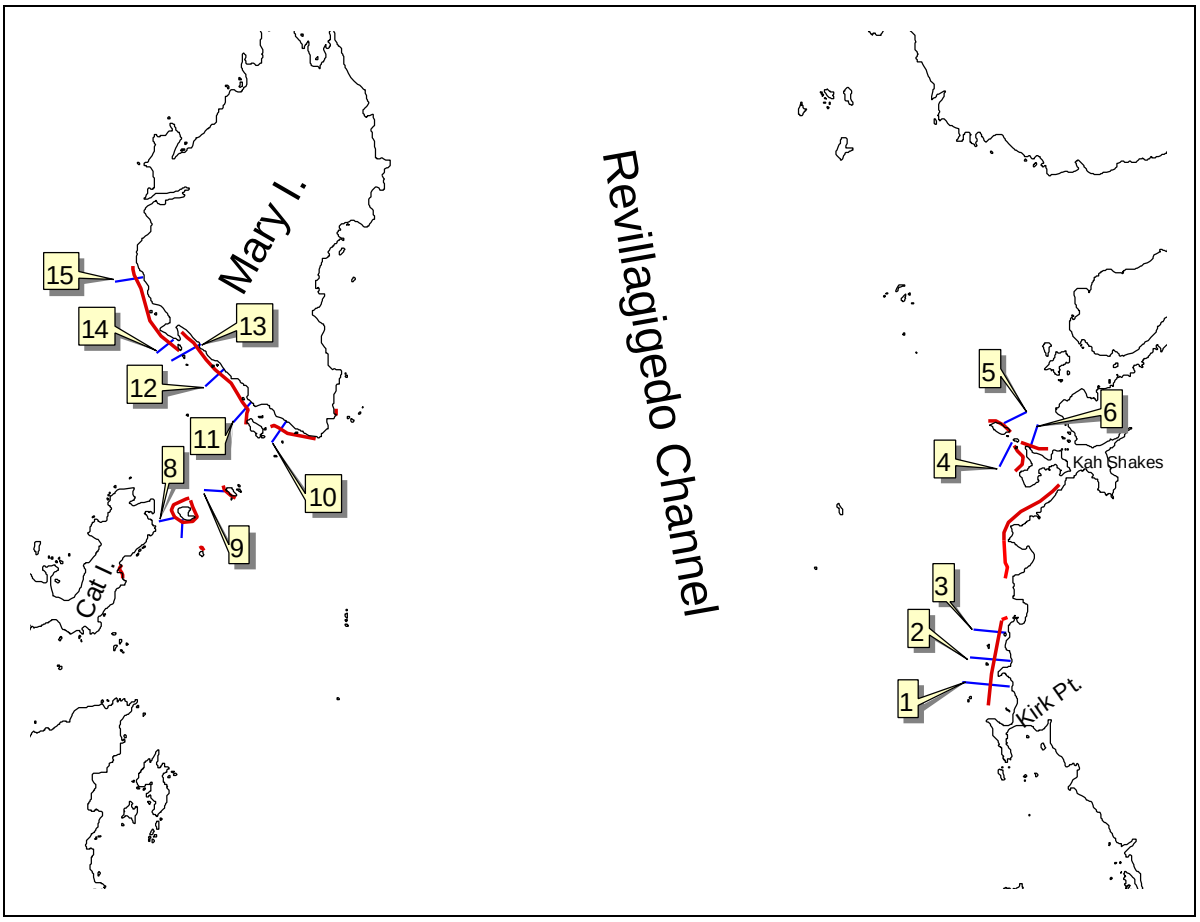
5-4-99 61Z w/ McGregor. 10:30 am. Low tide. Overcast - visibility fair. 2 whales and 2 schools of herring seen near Long I.

5-7-99 61Z w/ McGregor. 11:50 am. Low tide. Visibility poor in wind and clouds. 2 schools in Hoonah boat harbor, and several schools between Long I. and town.

5-10-99 61Z w/ McGregor. 1:30 – 2:00 p.m. Schools around Long I. in shallows. Huge school directly off Whitestone Logging log transfer facility. No **spawn** seen. Small schools in upper inlet.

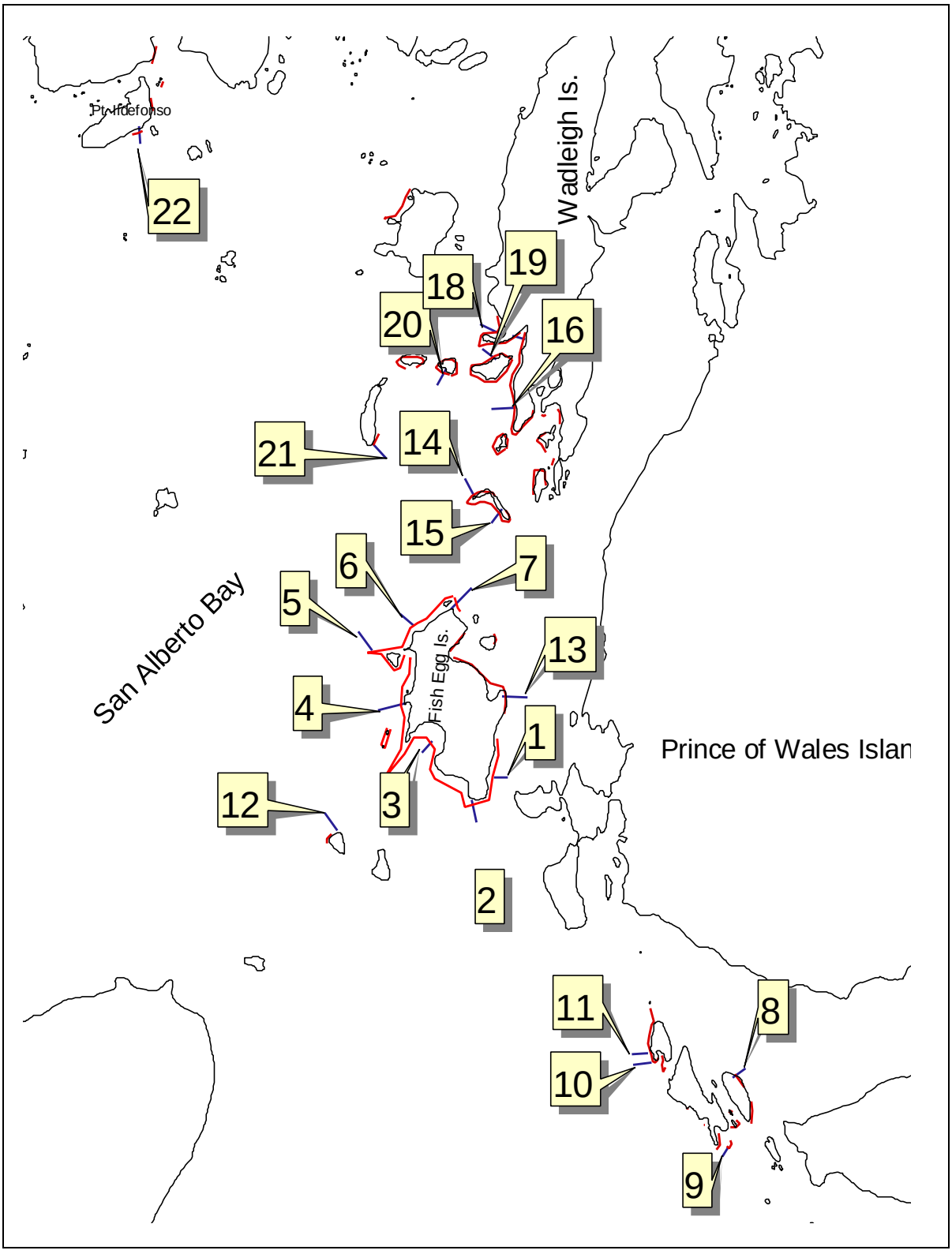
Idaho Inlet
Not surveyed.
Port Althorp
Not surveyed.

Appendix D. Locations of herring spawn and transects used during spawn deposition surveys in 1999.



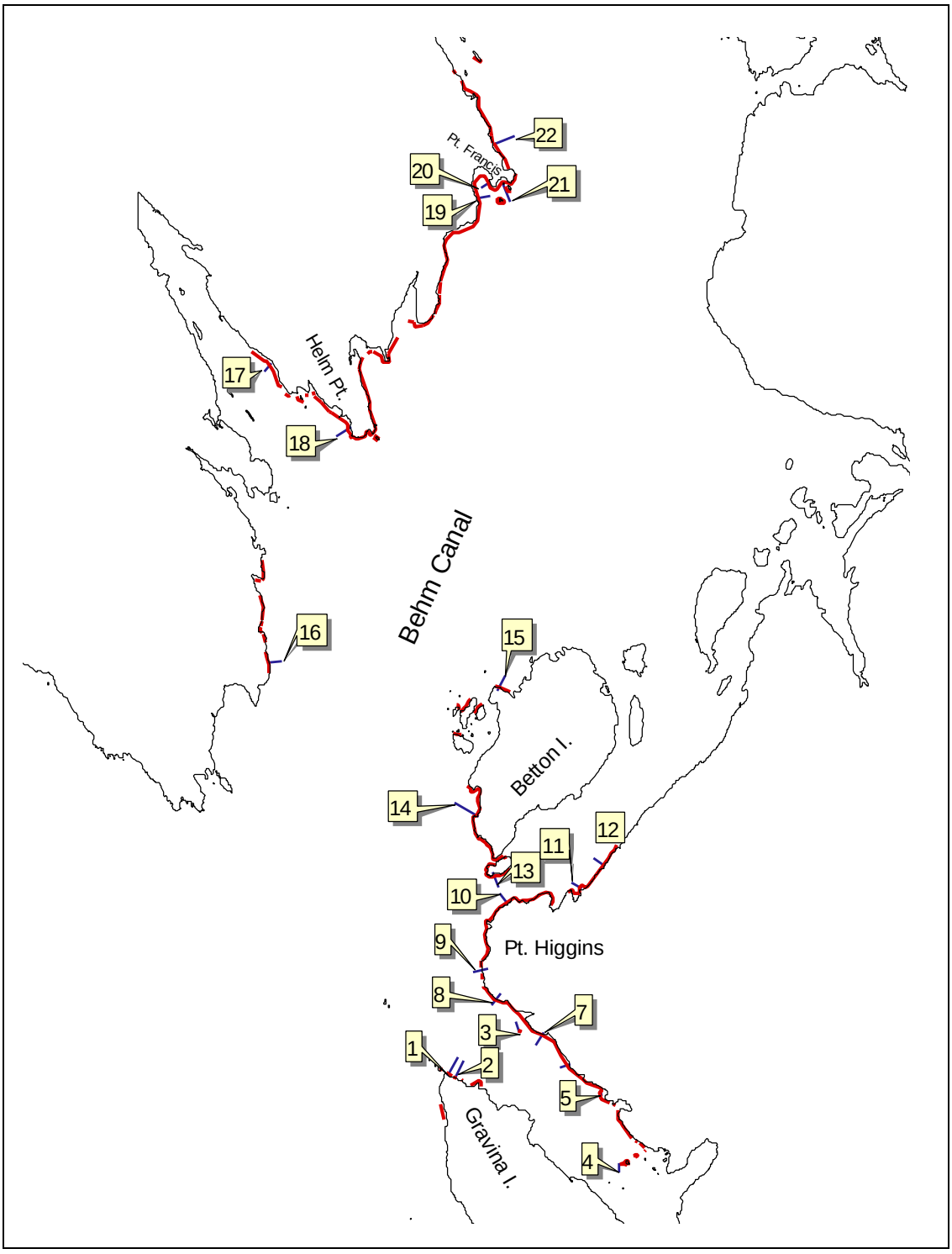
Kah Shakes/Cat Island spawning population.

Spawning Stock	Transect Number	Latitude	Longitude
Kah Shakes/Cat Island	1	55.005163	-131.011445
	2	55.008762	-131.010156
	3	55.013446	-131.009554
	4	55.04344	-131.00594
	5	55.045918	-131.007834
	6	55.04285	-131.0013
	7	55.030794	-131.23231
	8	55.031198	-131.2348
	9	55.03574	-131.22088
	10	55.046017	-131.20454
	11	55.04871	-131.21405
	12	55.05443	-131.22124
	13	55.058427	-131.227753
	14	55.0592	-131.23419
	15	55.06903	-131.244002



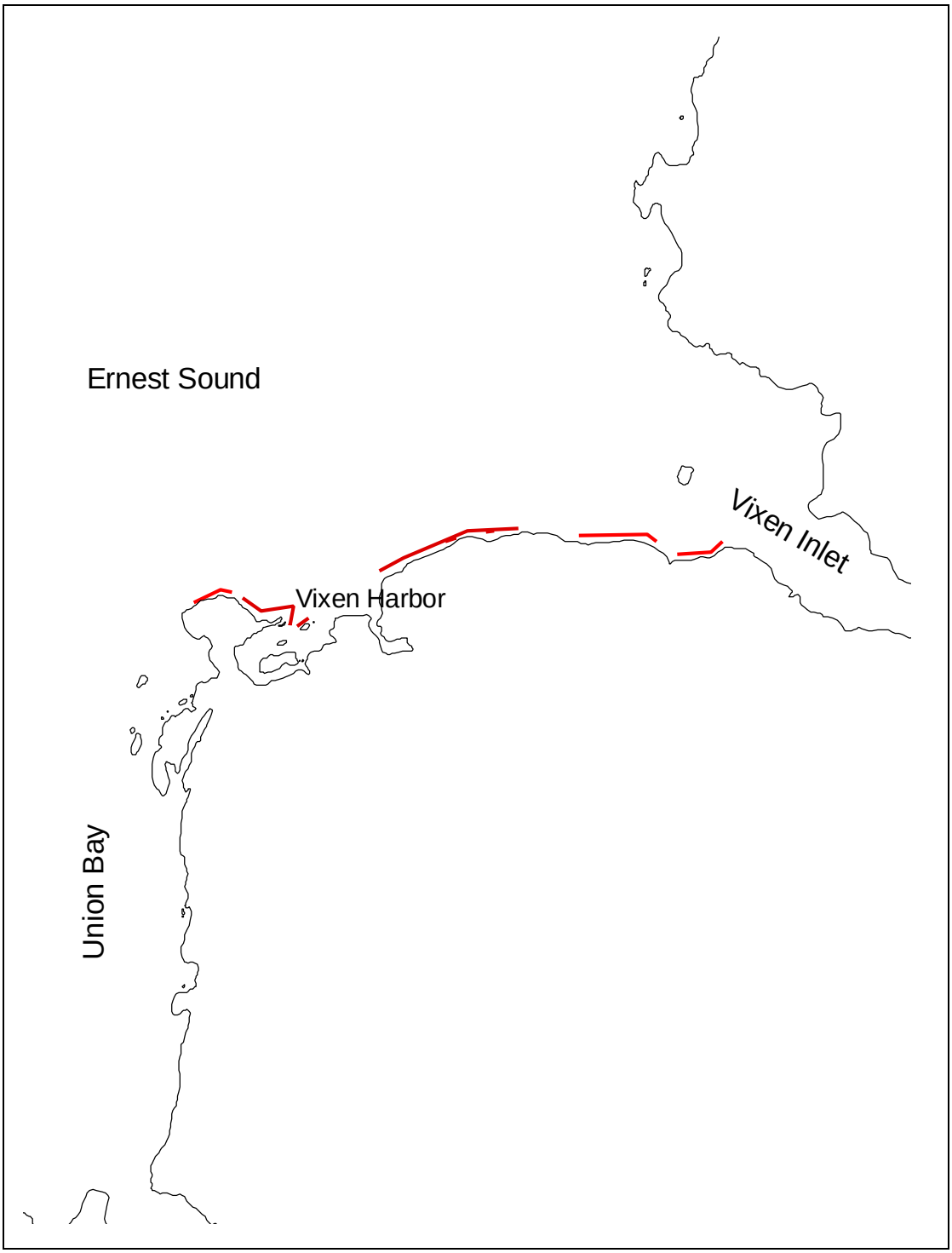
Craig spawning population.

Spawning	Stock	Latitude	Longitude
Craig	1	55.4795	-133.16005
	2	55.47568	-133.16572
	3	55.484483	-133.176083
	4	55.489767	-133.183683
	5	55.497717	-133.192033
	6	55.501383	-133.181067
	7	55.50405	-133.17027
	8	55.43743	-133.0997
	9	55.4273	-133.10139
	10	55.43926	-133.12073
	11	55.44066	-133.12151
	12	55.47265	-133.20166
	13	55.491	-133.15685
	14	55.51978	-133.16639
	15	55.516981	-133.159449
	16	55.5316	-133.15641
	17	55.54156	-133.15319
	18	55.54228	-133.15936
	19	55.53893	-133.1613
	20	55.5369	-133.17324
	21	55.52646	-133.19091
	22	55.57082	-133.25054

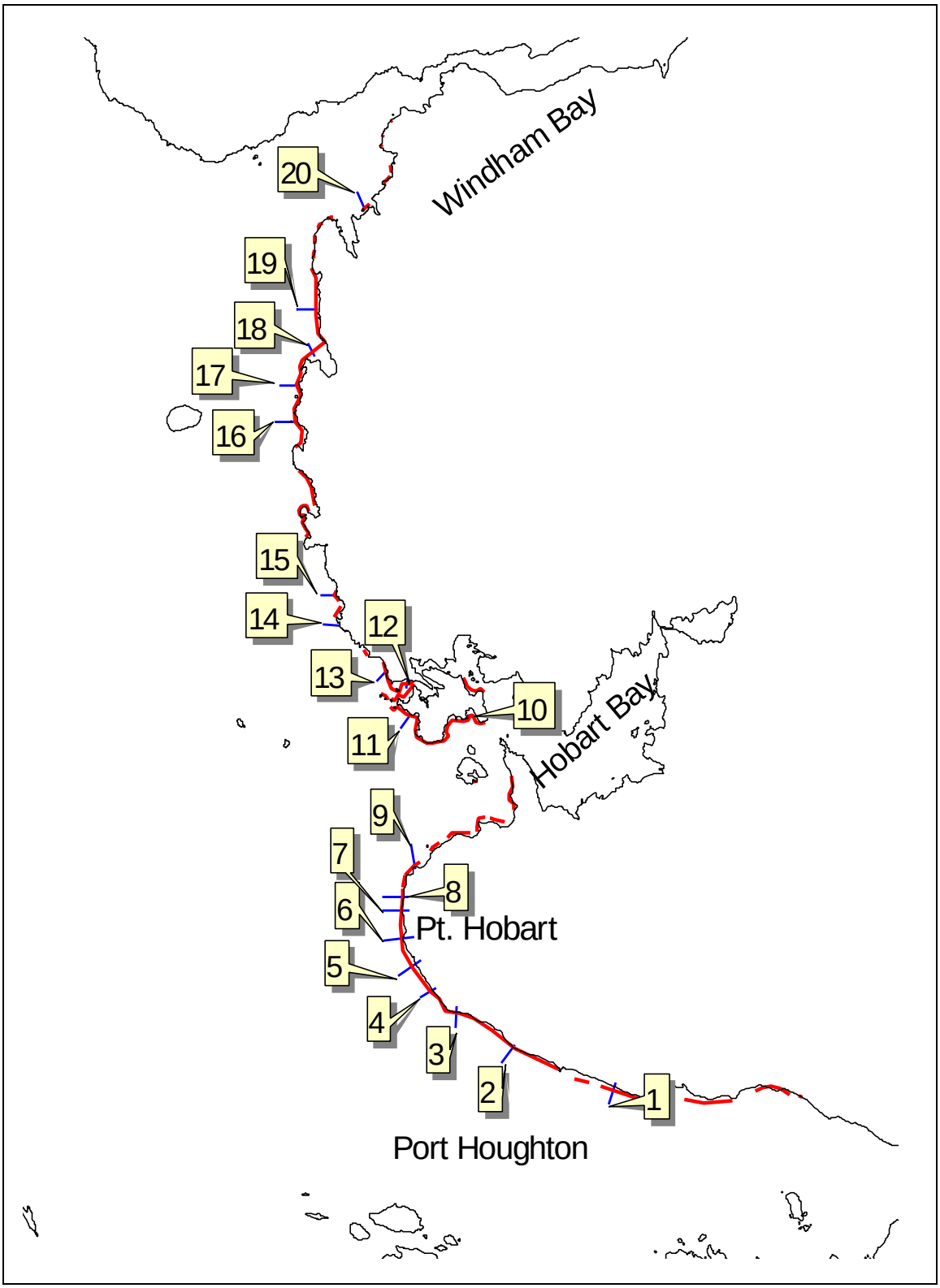


West Behm Canal spawning population.

Spawning Stock	Transect Number	Latitude	Longitude
West Behm Canal	1	55.42622	-131.8492
	2	55.42558	-131.84591
	3	55.43789	-131.81506
	4	55.40132	-131.76655
	5	55.42078	-131.77468
	6	55.4288	-131.79133
	7	55.43563	-131.8051
	8	55.44635	-131.82654
	9	55.45425	-131.83404
	10	55.4731	-131.82151
	11	55.47702	-131.78593
	12	55.48323	-131.77368
	13	55.48102	-131.8278
	14	55.49695	-131.83569
	15	55.53207	-131.825
	16	55.53864	-131.9378
	17	55.61992	-131.93676
	18	55.60198	-131.89835
	19	55.66443	-131.8352
	20	55.66904	-131.83019
	21	55.669	-131.8236
	22	55.67912	-131.82768

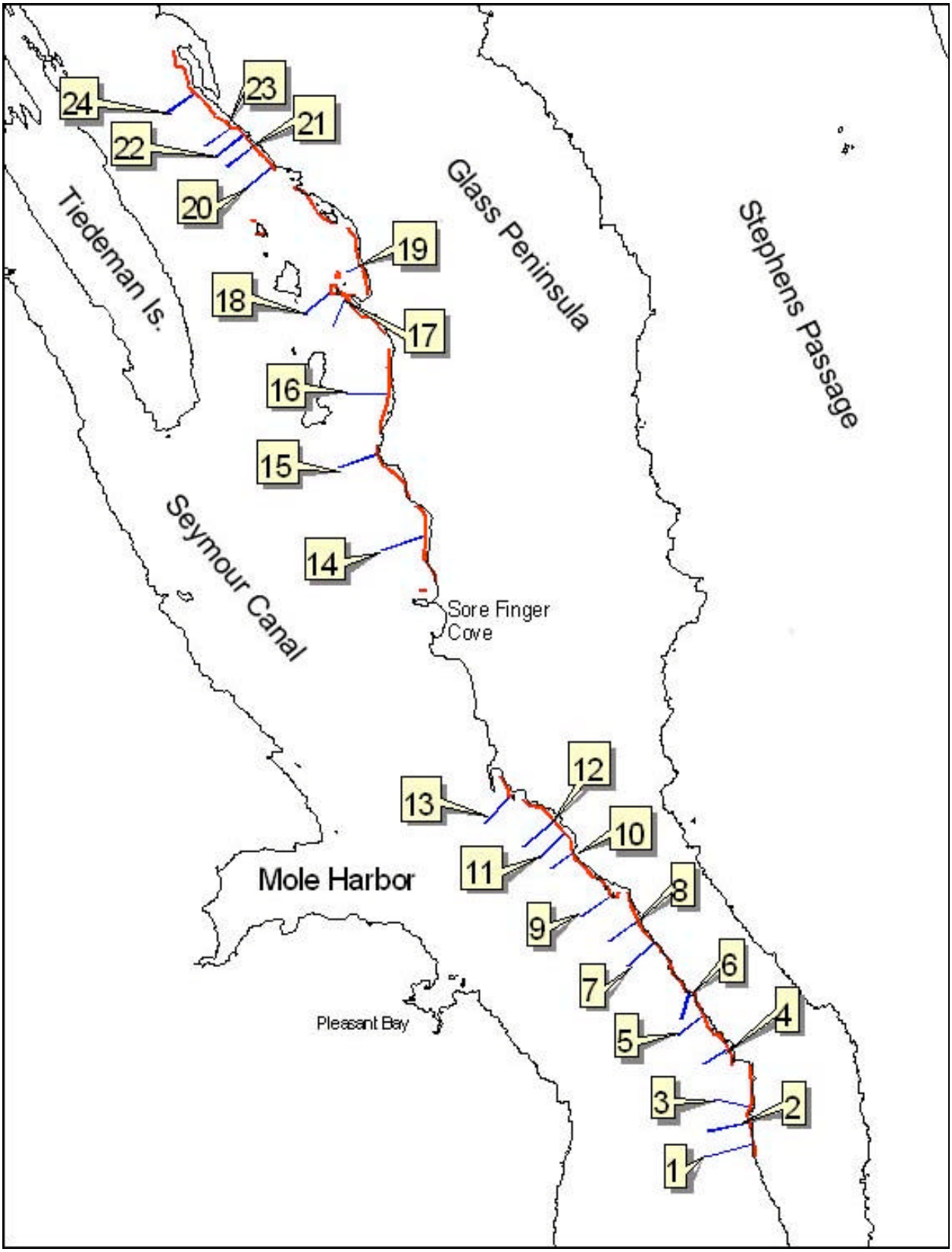


Ernest Sound spawning population.



Hobart Bay/Port Houghton spawning population.

Spawning Stock	Transect Number	Latitude	Longitude
Hobart/Houghton	1	57.33598	-133.37208
	2	57.34541	-133.42195
	3	57.3542	-133.44789
	4	57.3595	-133.46106
	5	57.365201	-133.46936
	6	57.372483	-133.474617
	7	57.379633	-133.474833
	8	57.382533	-133.474133
	9	57.390317	-133.468206
	10	57.42659	-133.4427
	11	57.42696	-133.47051
	12	57.43492	-133.47163
	13	57.43719	-133.4827
	14	57.44931	-133.50563
	15	57.45684	-133.50633
	16	57.49903	-133.52594
	17	57.50758	-133.52431
	18	57.51545	-133.51745
	19	57.5264	-133.51693
	20	57.55123	-133.4931



Seymour Canal spawning population.

Spawning Stock	Transect Number	Latitude	Longitude
Seymour Canal	1	57.6047	-133.85536
	2	57.61003	-133.8558
	3	57.61363	-133.85541
	4	57.62697	-133.866196
	5	57.63481	-133.87756
	6	57.6402	-133.88493
	7	57.65178	-133.89976
	8	57.65739	-133.90667
	9	57.6626	-133.91779
	10	57.67304	-133.93532
	11	57.67629	-133.93975
	12	57.68057	-133.94294
	13	57.68533	-133.96201
	14	57.747656	-134.000805
	15	57.7665	-134.02143
	16	57.7798	-134.01748
	17	57.80215	-134.03516
	18	57.803558	-134.042946
	19	57.82954	-134.0291
	20	57.833	-134.06932
	21	57.837	-134.07481
	22	57.840128	-134.08221
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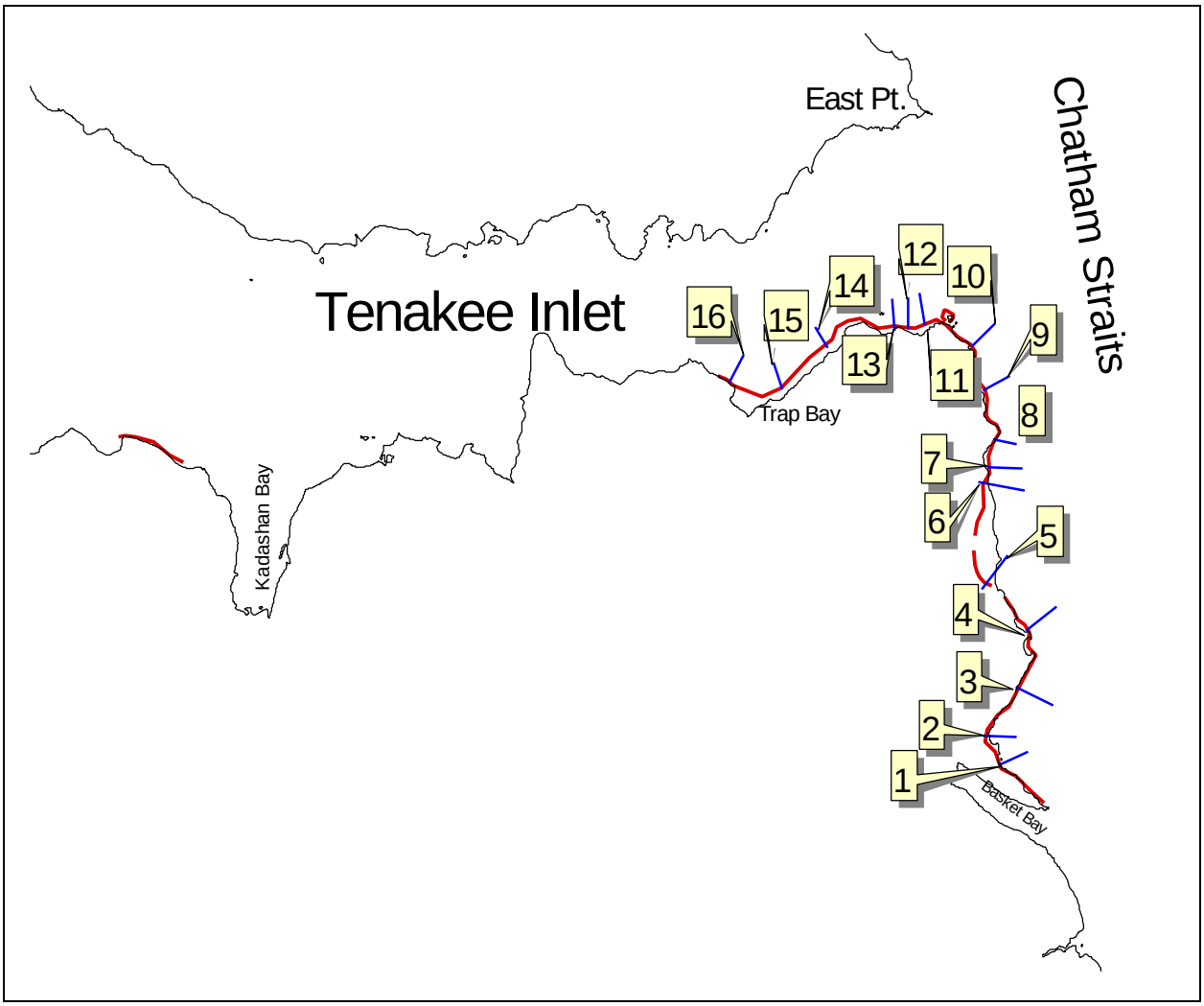
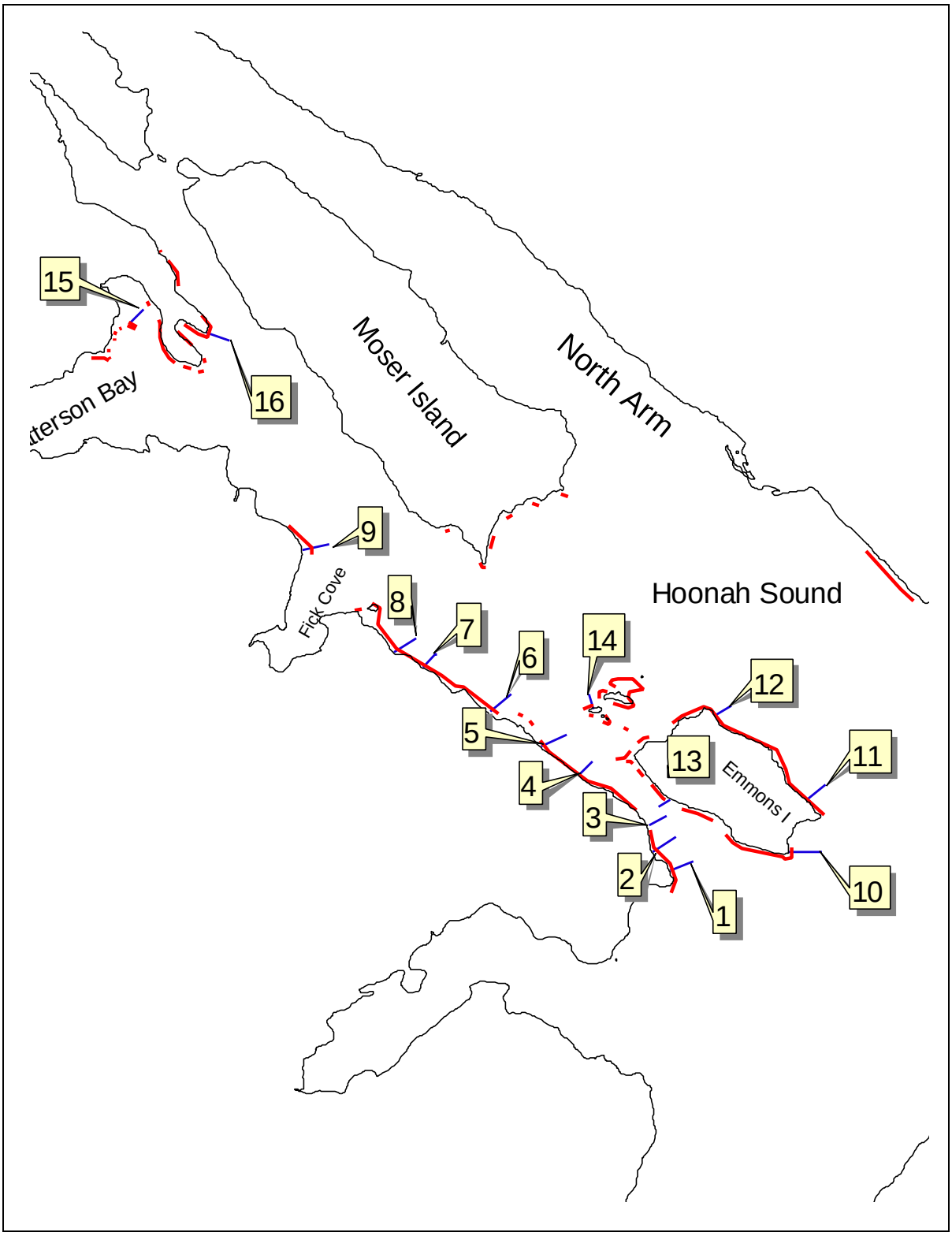
	24	57.84996	-134.0991



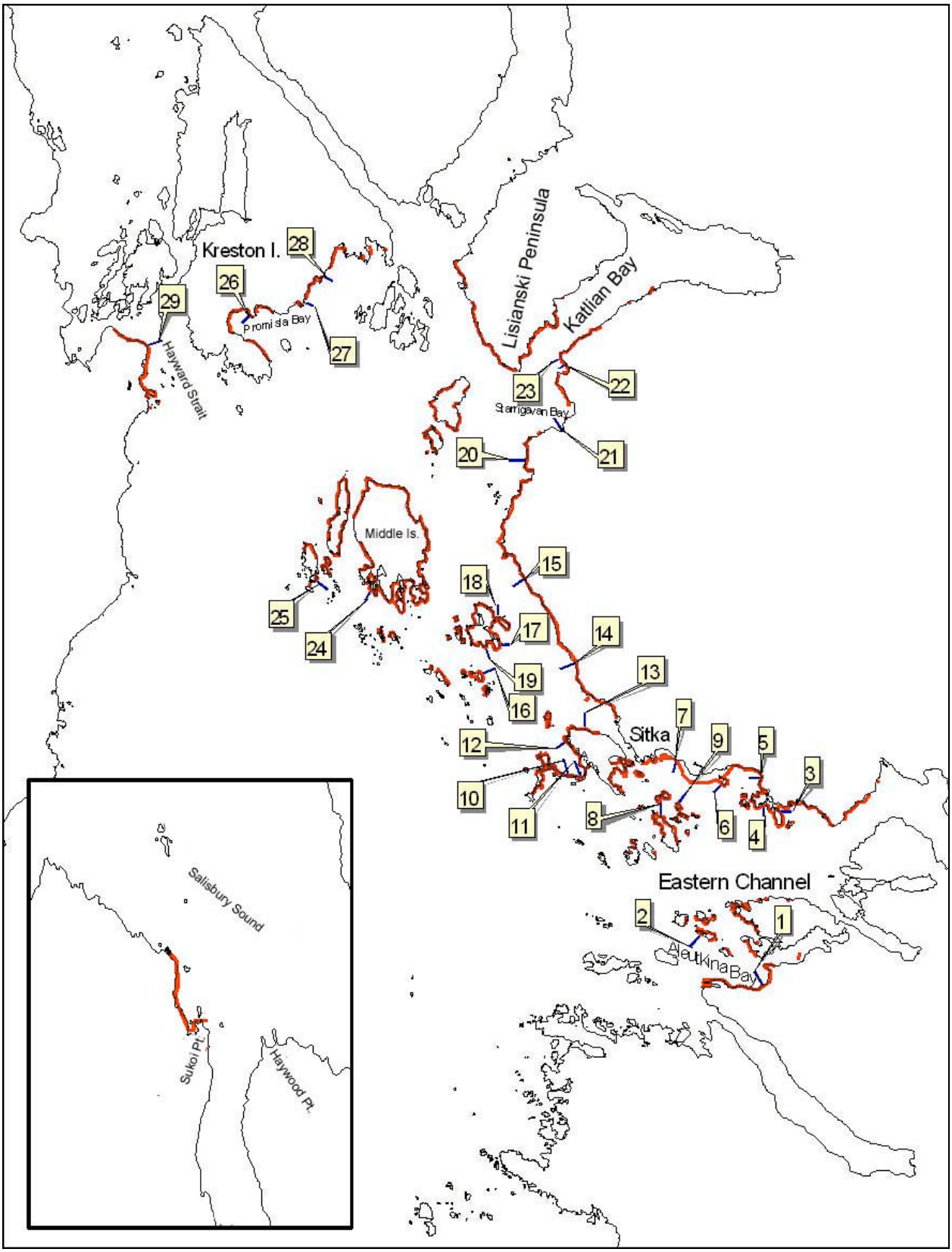
Tenakee Inlet spawning population.

Spawning Stock	Transect Number	Latitude	Longitude
Tenakee Inlet	1	57.67207	-134.91833
	2	57.67623	-134.92195
	3	57.68804	-134.91035
	4	57.69928	-134.9064
	5	57.70863	-134.92543
	6	57.739656	-134.928215
	7	57.7326	-134.92308
	8	57.73831	-134.92088
	9	57.748365	-134.926505
	10	57.75762	-134.9306
	11	57.76132	-134.94939
	12	57.76143	-134.95649
	13	57.761	-134.9626
	14	57.75662	-134.9892
	15	57.74813	-135.00745
	16	57.75078	-134.02861



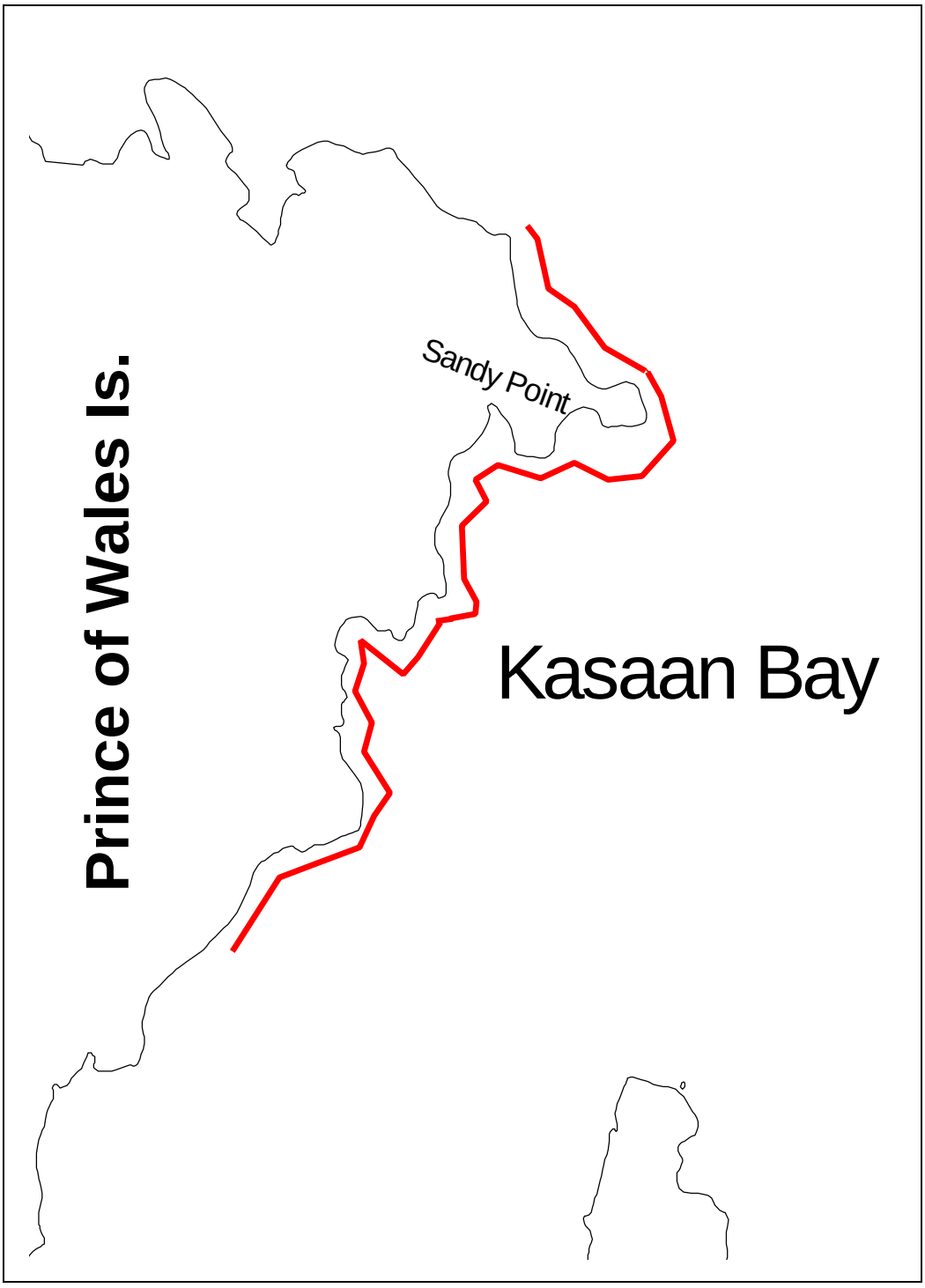
Hoonah Sound spawning population.

Spawning Stock	Transect Number	Latitude	Longitude
Hoonah Sound	1	57.58562	-135.55898
	2	57.5894	-135.56318
	3	57.5936	-135.56649
	4	57.60229	-135.58911
	5	57.60748	-135.59986
	6	57.61387	-135.6166
	7	57.62109	-135.63924
	9	57.6412	-135.67583
	10	57.58843	-135.5201
	11	57.59805	-135.51498
	12	57.61236	-135.54488
	13	57.59776	-135.56073
	14	57.61428	-135.58516
	15	57.68077	-135.73429
	16	57.67881	-135.70935

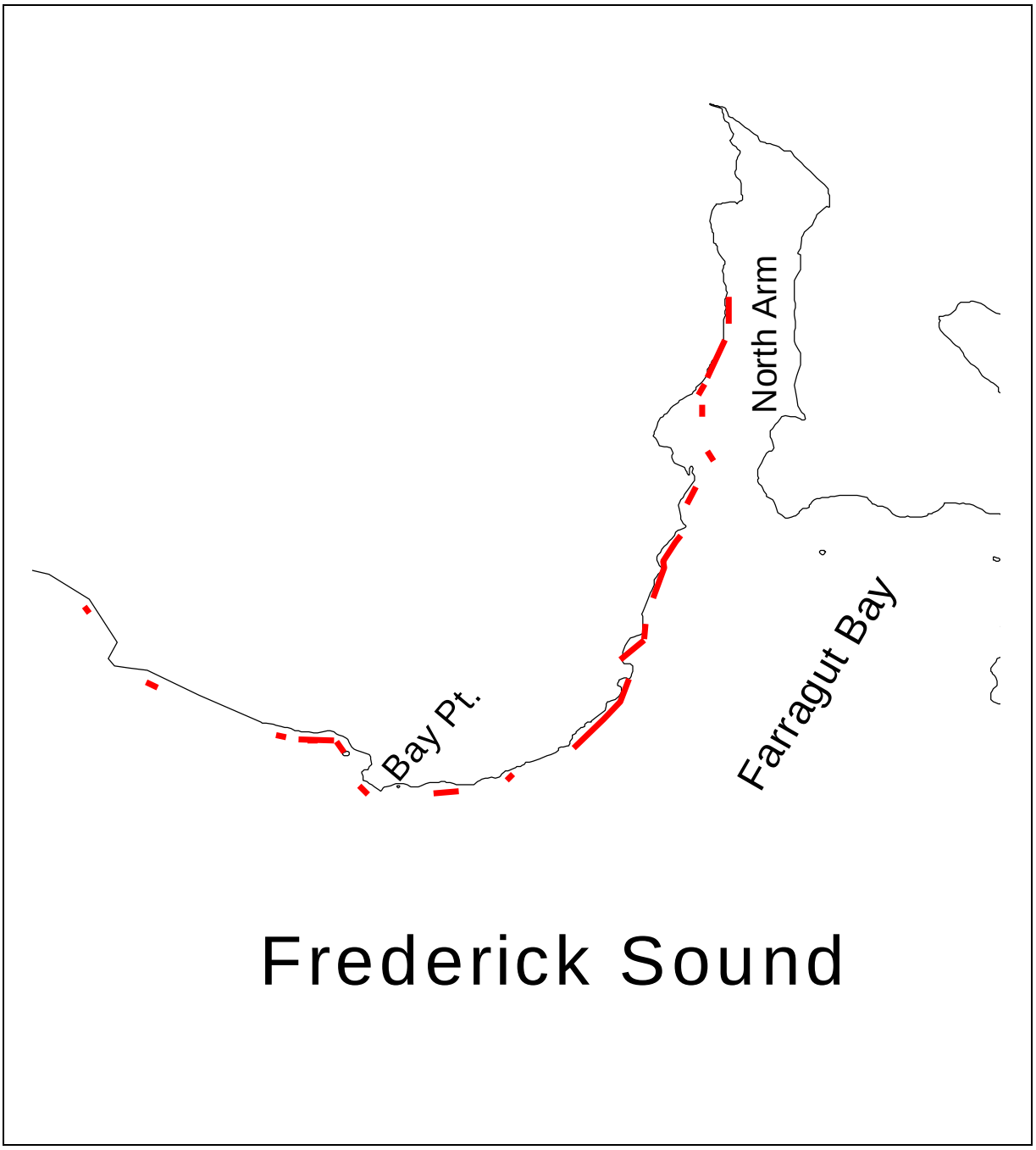


Sitka Sound spawning population.

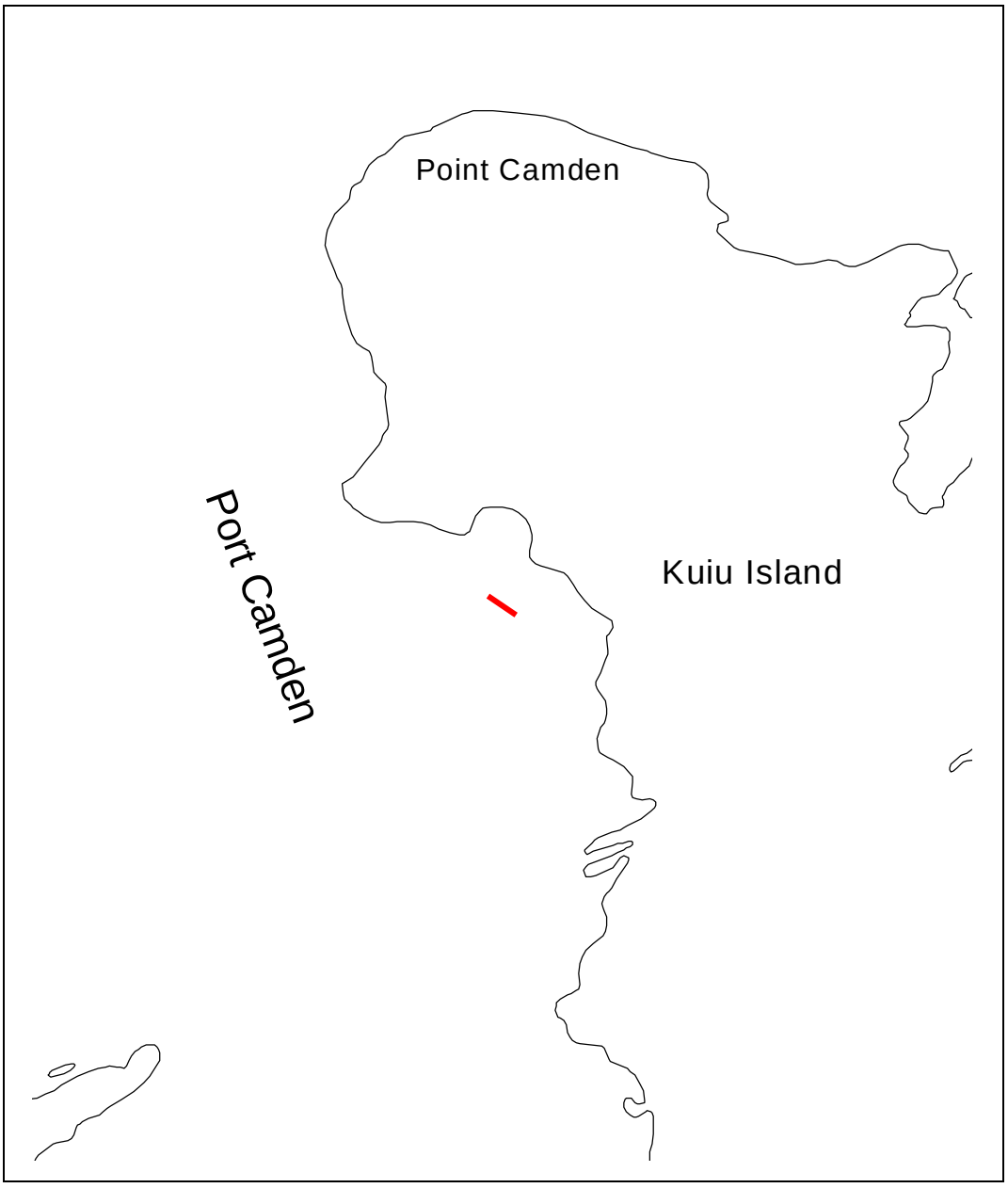
Spawning Stock	Transect Number	Latitude	Longitude
Sitka Sound	1	56.994333	-135.284833
	2	57.004667	-135.313833
	3	57.035617	-135.276083
	4	57.037267	-135.283817
	5	57.04375	-135.284633
	6	57.042517	-135.302233
	7	57.048	-135.323667
	8	57.035333	-135.330167
	9	57.03795	-135.32255
	10	57.044833	-135.372667
	11	57.044233	-135.366883
	12	57.052883	-135.373217
	13	57.056333	-135.364667
	14	57.071667	-135.37
	15	57.092167	-135.382333
	16	57.069333	-135.411333
	17	57.076367	-135.403333
	18	57.083217	-135.404117
	19	57.075135	-135.4095
	20	57.121167	-135.391333
	21	57.1285	-135.375833
	22	57.1455	-135.376
	23	57.144833	-135.373333
	24	57.0896	-135.46195
	25	57.0921	-135.486917
	26	57.156167	-135.517167
	27	57.159333	-135.491833
	28	57.165867	-135.483867
	29	57.14915	-135.563517



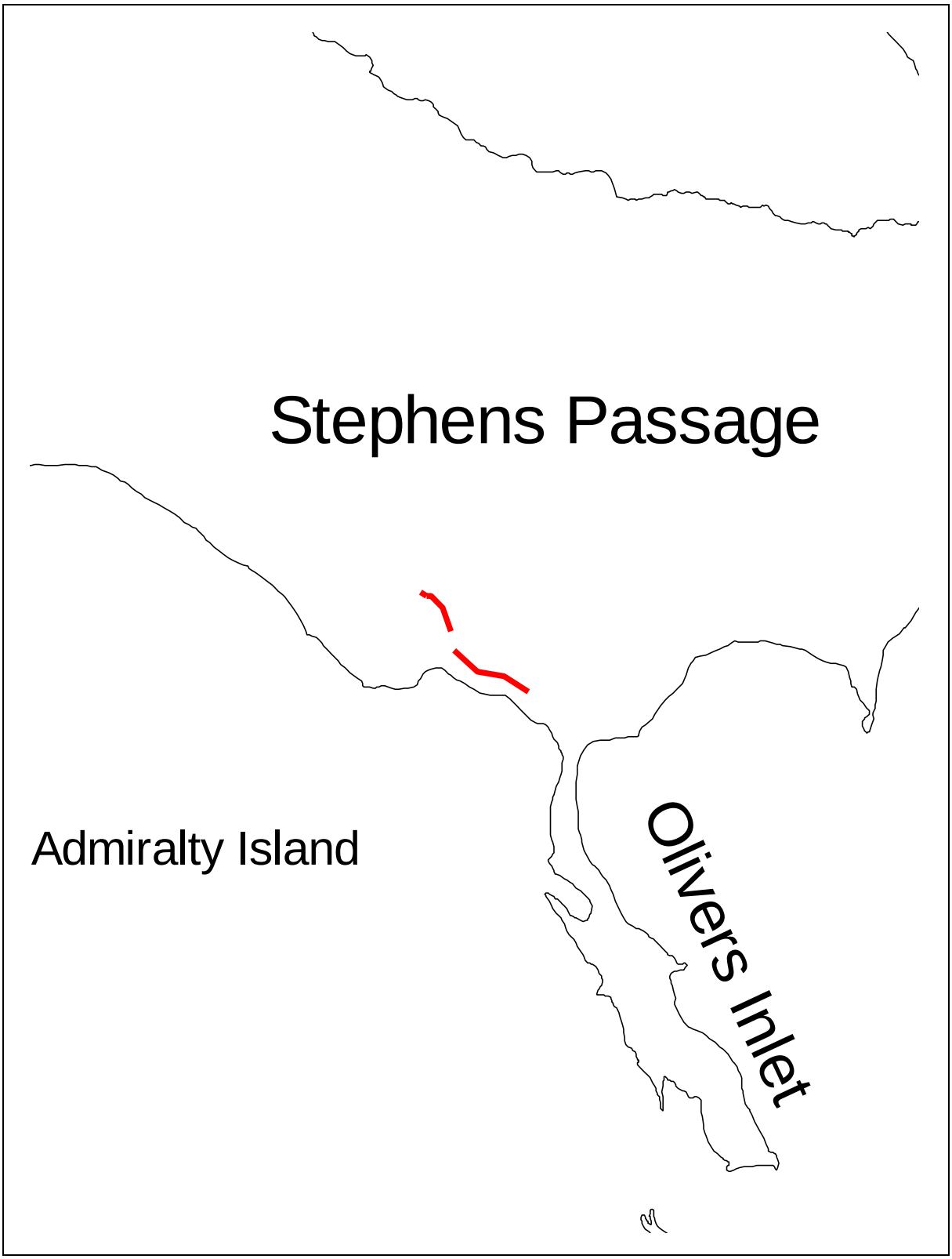
Kasaan Bay spawning population.



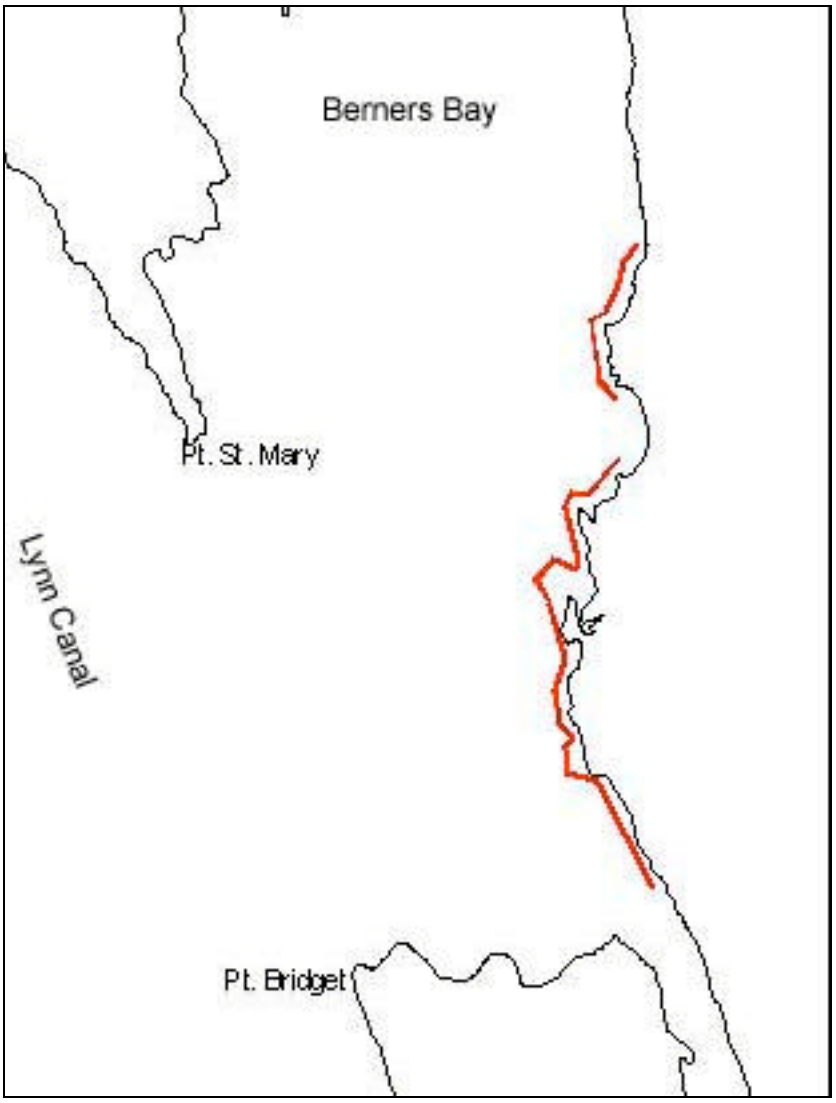
Faragut Bay spawning population.



Port Camden spawning population.



Oliver Inlet spawning population.



Berners Bay spawning population.

Lisianski Inlet spawning population.

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