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PACIFIC HERRING (*Clupea harengus pallasi*) HARVEST STATISTICS, HYDROACOUSTICAL SURVEYS, AGE, WEIGHT, AND LENGTH ANALYSIS, AND SPAWNING GROUND SURVEYS FOR SOUTHEASTERN ALASKA, 1980-1983

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June 1987

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Don W. Collinsworth
Commissioner

ADF&G TECHNICAL DATA REPORTS

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Data presented in these reports is intended to be final, however, some revisions may occasionally be necessary. Minor revision will be made via errata sheets. Major revisions will be made in the form of revised reports.

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ABSTRACT

Harvests are shown for the Southeastern Alaska herring *(Clupea harengus pallasi)* fisheries since 1900 with data emphasis on the fishing seasons of 1981, 1982, and 1983. Harvest by area, time, and commercial gear for sac roe herring and winter food and bait fisheries is presented. Hydroacoustic surveys are summarized with results of computer analyzed biomass reported for years 1981, 1982, and 1983. An analysis of Southeastern Alaska herring age and growth is summarized for years 1981, 1982, and 1983. Samples were collected and analyzed from the commercial catch, mid-water trawling, experimental gillnetting, and small scale purse seining. Laboratory analysis includes length, weight, age, and sex data from major stocks in Southeastern Alaska.

The present commercial interest, especially in herring sac roe, has justified study of major herring spawning areas. Specifically, the baseline information collected is used to assess herring escapement, and to document spawning ground conditions. Total biomass of herring can be computed from estimates of egg densities combined with the area receiving spawn. A percentage of the estimated biomass can then be used as a harvest level for the fishery. A large variation in density was observed as the result of the extent of egg deposition and available substrate. The spawning ground assessment function is the most important segment of the project. Management strategy is to maintain a certain level of mature herring biomass (established threshold escapement per stock). This level is designed to protect the stock from sharp reductions due to recruitment failure and to maintain abundance levels adequate to supply forage for commercially important predator species such as salmon. A harvest strategy developed in 1983 provides for a varied annual harvest rate from 10% to 20% when stocks satisfy an established threshold level.

KEY WORDS: Pacific herring, *Clupea harengus pallasi*, harvest, gear, hydroacoustical surveys, biomass, spawning ground assessment.

INTRODUCTION

Abundance of herring *(Clupea harengus pallasi)* in Southeastern Alaska exhibits wide fluctuations from year to year. In order to monitor these changes a data base reflecting abundance, commercial harvest, age structure, and spawning success is required to manage the resource.

The goal of this project is to provide biological data necessary for the scientific management of herring stocks by the Alaska Department of Fish and Game (ADF&G) throughout Southeastern Alaska. Tasks required to accomplish this goal are as follows:

1. Conduct and evaluate hydroacoustical assessments of major herring stocks in Southeastern Alaska with emphasis on the months of November and February.

2. Conduct biological sampling in Southeastern Alaska for age and growth analysis an as indicator of stock condition.

3. Develop, conduct, and evaluate spawning ground studies to provide life history information and spawner numbers to use as a comparison to hydroacoustical estimates and as a basis for quotas where reliable acoustical estimates cannot be made.

4. Assist inseason management etc. of herring bait and sac roe fisheries.

This report covers, specifically, the period 1 September 1980 through 30 June 1983.

MANAGEMENT STRATEGY

The goal of Southeastern Alaska herring management is to assure a minimum level of spawning biomass (established threshold escapement per stock). This level is assumed to protect the stocks from sharp reductions because of recruitment failure and to maintain abundance levels adequate to supply forage for commercially important predator species such as salmon. Harvest rates are set at a conservative level to build herring stocks to an overall higher level than documented in the 1970s. The Department is also responsible to providing the highest quality commercial product possible.

The Alaska Board of Fisheries has provided the Department of Fish and Game with the following directives:

1. Minimize the harvest of immature herring.

2. Harvest herring stocks between the 10% and 20% annual level.

A stock is defined as a concentration of herring occupying the same distinct fishing ground during the fishing season over a succession of years. These concentrations are managed as fishing units.

Established threshold escapements have been determined for each identified stock. Only sexually mature herring are considered for the desired threshold escapement. Age four herring are assumed mature.

Some age three herring are mature but the proportion varies with time and area. Mid-water trawling, commercial pre-fishery samples, and commercial fishery samples provide data on age structure of various stocks.

Commercial yield strategies used in herring management world wide have shifted from a maximum yield basis to those which recognize the importance of maintaining a certain level of spawning biomass. It is generally recognized that herring cannot be managed on a sustained yield basis, and maximum sustained yield should only be used as a general guide (Melteff and Wespestad 1980).

The Department has just begun addressing optimum escapement. Obviously, egg density is a good criteria to establish desired levels; however, the potential expansion of spawning area with increased numbers of spawners is unknown. Canadian biologist working in the North Pacific suggest a 25% immigration between stocks. In Southeastern Alaska, we have documented general consistent areas of spawning concentrations. A threshold level, as opposed to optimum escapement, has been determined as a starting point based on available information. This threshold level is subject to change as new data become available.

Harvest levels are set at a percentage of the mature herring biomass available only when the desired escapement threshold is satisfied. The percentage rate is applied to abundance estimates determined from acoustical estimates and/or spawning ground estimates back-calculated from the number of eggs deposited from the previous years escapement.

The harvest rate determination used in 1983 is illustrated in Figure 1. Initial threshold levels for defined stocks is shown in Figure 2. This strategy provides for a varied annual harvest rate of from 10% to 20% when stocks satisfy the established threshold level. The percent harvest depends upon the proportion of the biomass above the threshold.

This strategy provides: 1) A predicted harvest level; 2) an accelerated harvest rates when stocks are at high levels; 3) a uniform 10% to 20% annual harvest; and 4) a minimum harvest of small, immature herring.

Stock performance, as illustrated in Figured 3-6 for the major sac roe areas, will test the effectiveness of the established thresholds.

HARVEST INFORMATION

The herring fisheries in Southeastern Alaska consist of five distinct types of fisheries. Three of these are commercial: the winter food and bait fishery, the sac roe fishery, and the pound fisheries. The other two are personal use and subsistence. The total commercial harvest for Southeastern Alaska is given in Table 1 from 1900 to 1982. Trends of harvest can be evaluated over the long term.

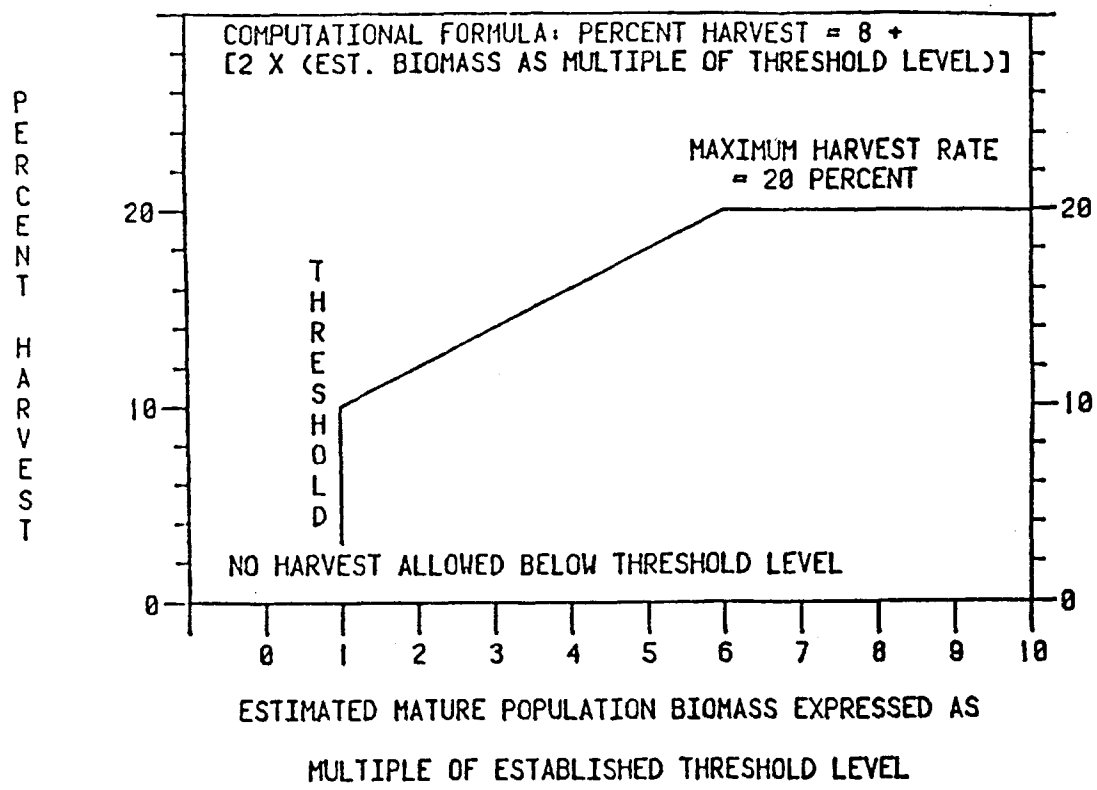

Figure 1. Generalized harvest strategy for Southeastern Alaska herring stocks showing allowable percent annual harvest related to estimated biomass of mature stock expressed as a multiple of the established harvest threshold level (ADF&G 1/83).

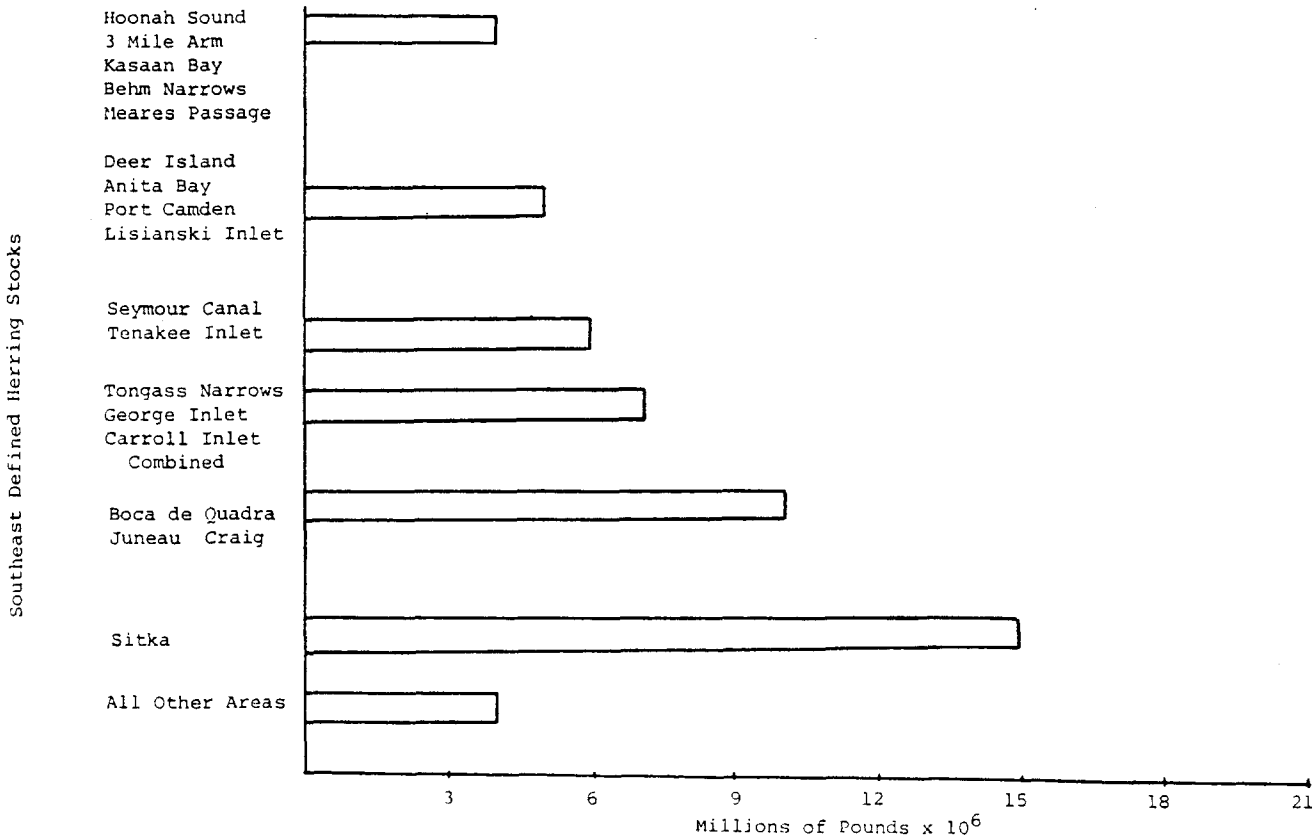

Figure 2. Threshold escapement levels for Southeastern Alaska herring stocks.

Table 1. Southeastern Alaska herring catches by season[1] in pounds x 1000, 1900-1982.

Year	Total Catch	Year	Total Catch
1900	2,388	1941	12,460
1901	2,500	1942	7,382
1902	1,624	1943	12,470
1903	2,988	1944	33,602
1904	3,042	1945	48,252
1905	2,618	1946	75,128
1906	2,010	1947	83,658
1907	2,764	1948	32,250
1908	3,422	1949	28,558
1909	2,150	1950	26,822
1910	13,734	1951	21,304
1911	24,114	1952	32,040
1912	32,134	1953	24,870
1913	26,992	1954	12,892
1914	16,636	1955	22,736
1915	13,928	1956	45,638
1916	22,388	1957	49,490
1917	24,890	1958	77,594
1918	35,650	1959	99,732
1919	21,924	1960	77,812
1920	32,904	1961	49,418
1921	12,024	1962	33,874
1922	33,900	1963	31,212
1923	58,790	1964	46,698
1924	58,790	1965	24,318
1925	115,564	1966	10,680
1926	147,686	1967	6,050
1927	90,620	1968	3,632
1928	106,014	1969	7,364
1929	157,498	1970	6,648
1930	141,710	1971	8,414
1931	89,714	1972	11,827
1932	99,572	1973	12,536
1933	123,176	1974	15,944
1934	133,684	1975	16,195
1935	116,310	1976	17,297
1936	73,426	1977	12,106
1937	100,668	1978	13,050
1938	44,712	1979	18,408
1939	40,056	1980	16,700
1940	6,274	1981	16,600
		1982	19,700

[1]Catch includes total season catch although referenced as only one year. Example: 1976 year would include season's catch from October 1976 through May 1977.

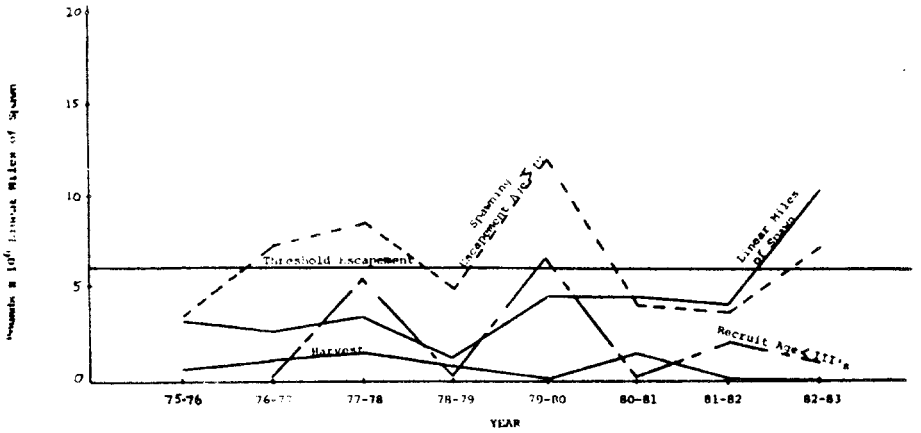

Figure 3. Seymour Canal herring stock performance, 1976-1983.

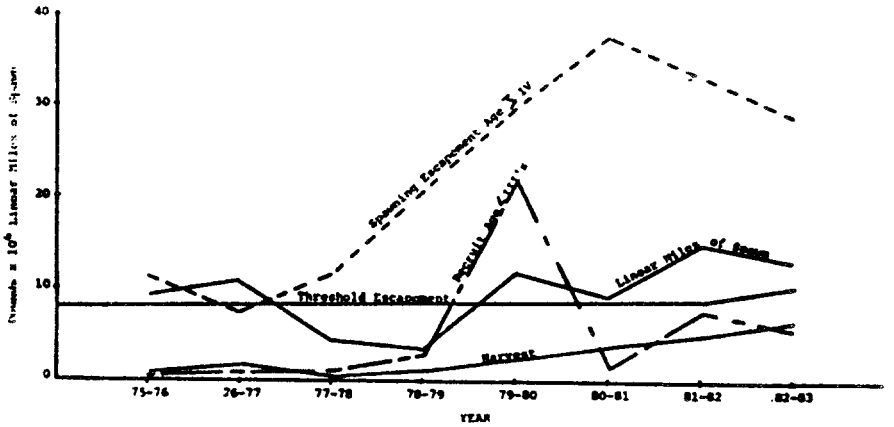

Figure 4. Boca de Quadra herring stock performance, 1976-1983.

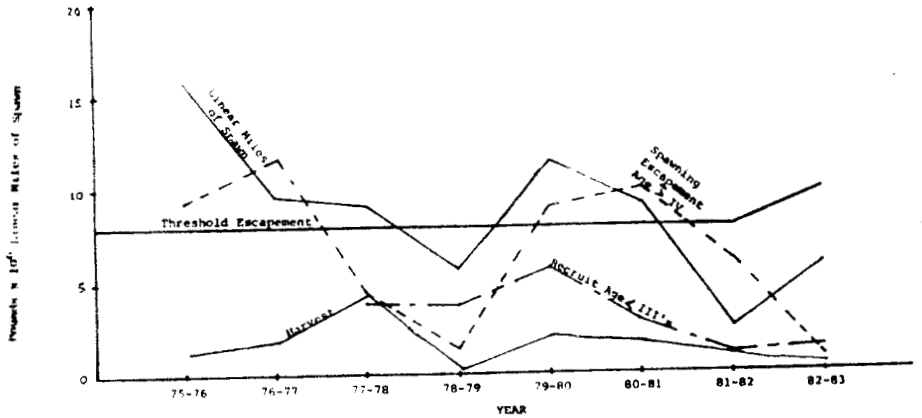

Figure 5. Juneau herring stock performance, 1976-1983.

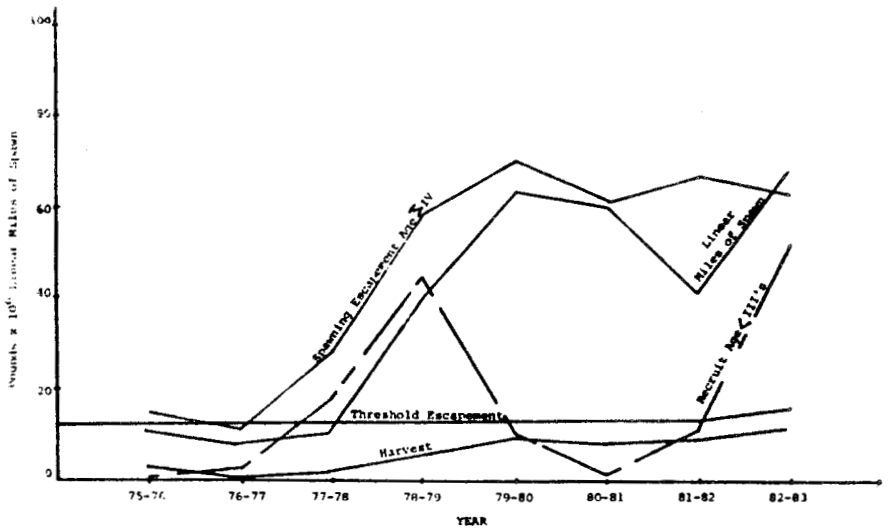

Figure 6. Sitka Sound herring stock performance, 1976-1983.

The subsistence fishery is the smallest of the five. It occurs throughout the region for both herring and herring spawn.

The personal use fishery occurs when commercial fishermen harvest their own bait for crabbing, trolling, and longlining. This fishery is conducted mainly by purse seiners for halibut and black cod bait in Wrangell Narrows, which is adjacent to Petersburg. The average harvest has been approximately 80 tons per year since it began in 1978. The personal use fishery began because high bait prices and a desire for high quality bait. Recent declines in the crab and halibut seasons have stabilized the demand in this fishery.

The smallest commercial fishery is the pound. There are two types of herring pound fisheries in Southeastern Alaska: Fresh bait pounds and frozen tray-pack pounds. These fisheries usually require a purse seiner to capture the herring and move them to a pound, although sometimes "leads" are used to guide the fish to the pound as they move along the shore. The pound is typically a rectangular log enclosure with a suspended net or wire mesh. In the case of fresh bait pounds, the fish are held and sold to individual fishermen. Fresh bait pound areas are Tee Harbor, Indian Cove, Farragut Bay, and Wrangell Narrows. Catch quotas are 60 tons for Tee Harbor and Indian Cove, and 100 tons for Farragut Bay and Wrangell Narrows. The total pound harvest in these four areas has been only 58 tons from 1978 to 1983.

The froze tray-pack pound fishery was created in 1979. All districts in the region were assigned 100 ton quotas. The fishery was created to enable a frozen tray-pack processor to initiate a new fishery. This fishery has only harvested a total of 50 tons since its inception.

The winter food and bait fishery occurs on specific winter herring stocks throughout Southeastern Alaska. The location of winter stocks is presented in Figure 7. The fishery is open to seiners, trawlers, and gillnetters, though seining has provided the major harvest. Declining stocks and lack of commercial markets have caused the harvest to drop significantly since the 1976-1977 season. This degree in annual harvest is shown in Figure 8.

Both seiners and set gillnetters participate, under limited entry, in the sac roe fishery in Southeastern Alaska. The two gear types are segregated and each presently has two major harvest areas. Kah Shakes Bay area and Seymour Canal are designated as set gillnet areas with Sitka and Lynn Canal allocated to purse seines. One hundred and thirty-three fishermen with limited entry gillnet permits commercially harvest the herring stocks located at Kah Shakes, Three Mile Arm, Kasaan Bay, Peril Straits, and Seymour Canal. These areas are illustrated in Figure 9. Fifty-one fishermen with limited entry purse seine permits commercially harvest the herring stocks located near Sitka and Juneau. The harvest of the sac roe fishery has increased over the three years reported and has increased significantly over the past ten years (Figure 10). Market conditions have remained good, concurrent with increasing stock abundance at Boca de Quadra and Sitka.

Specifics, including area, assessments, quotas, harvests, timing, and effort, are summarized in Tables 2, 3, 4, 5, and 6 for the 1980-1981, 1981-1982, and 1982-1983 fishing seasons.

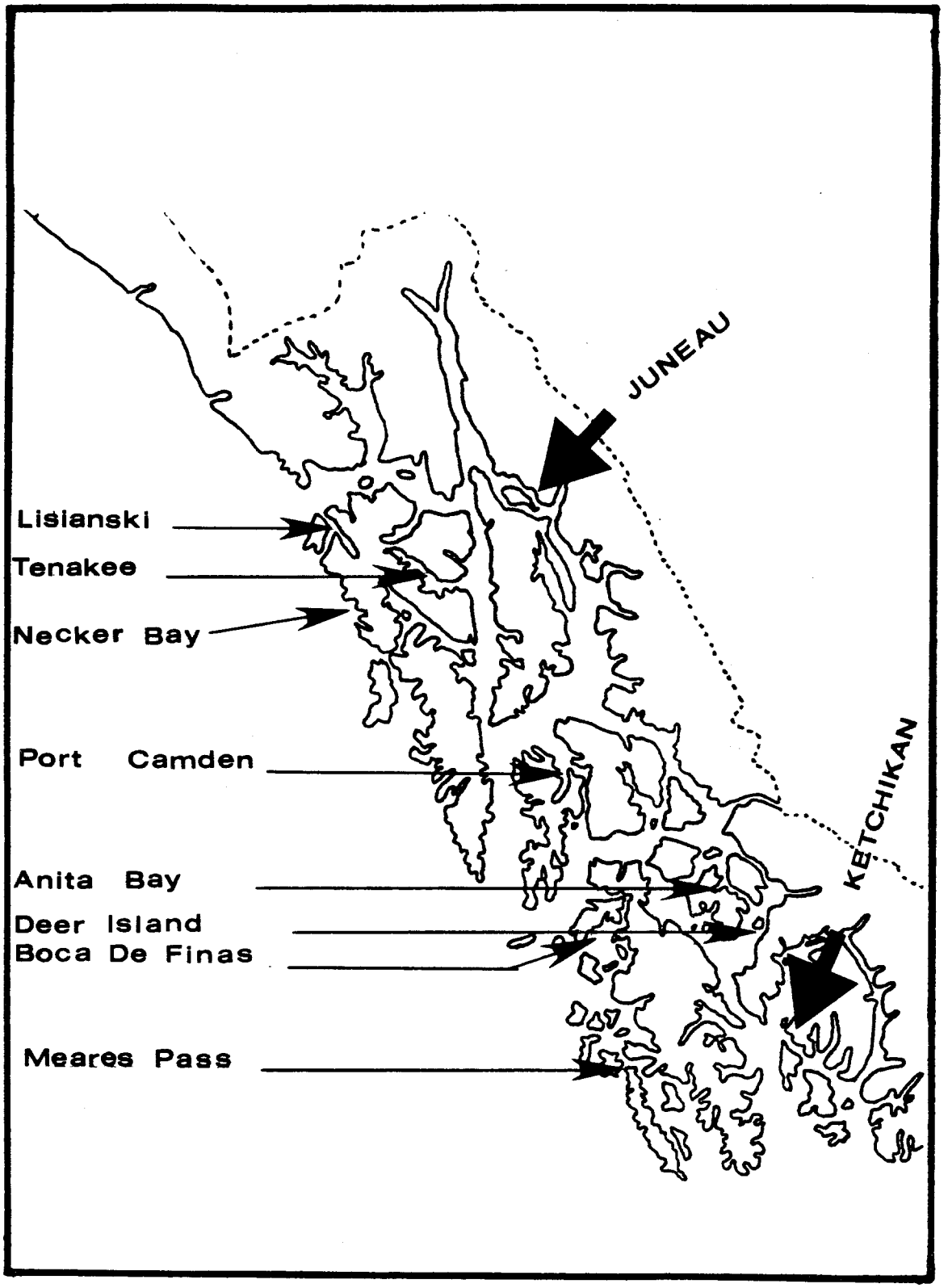

Figure 7. Location of major winter herring stocks in Southeastern Alaska, 1980 to 1983.

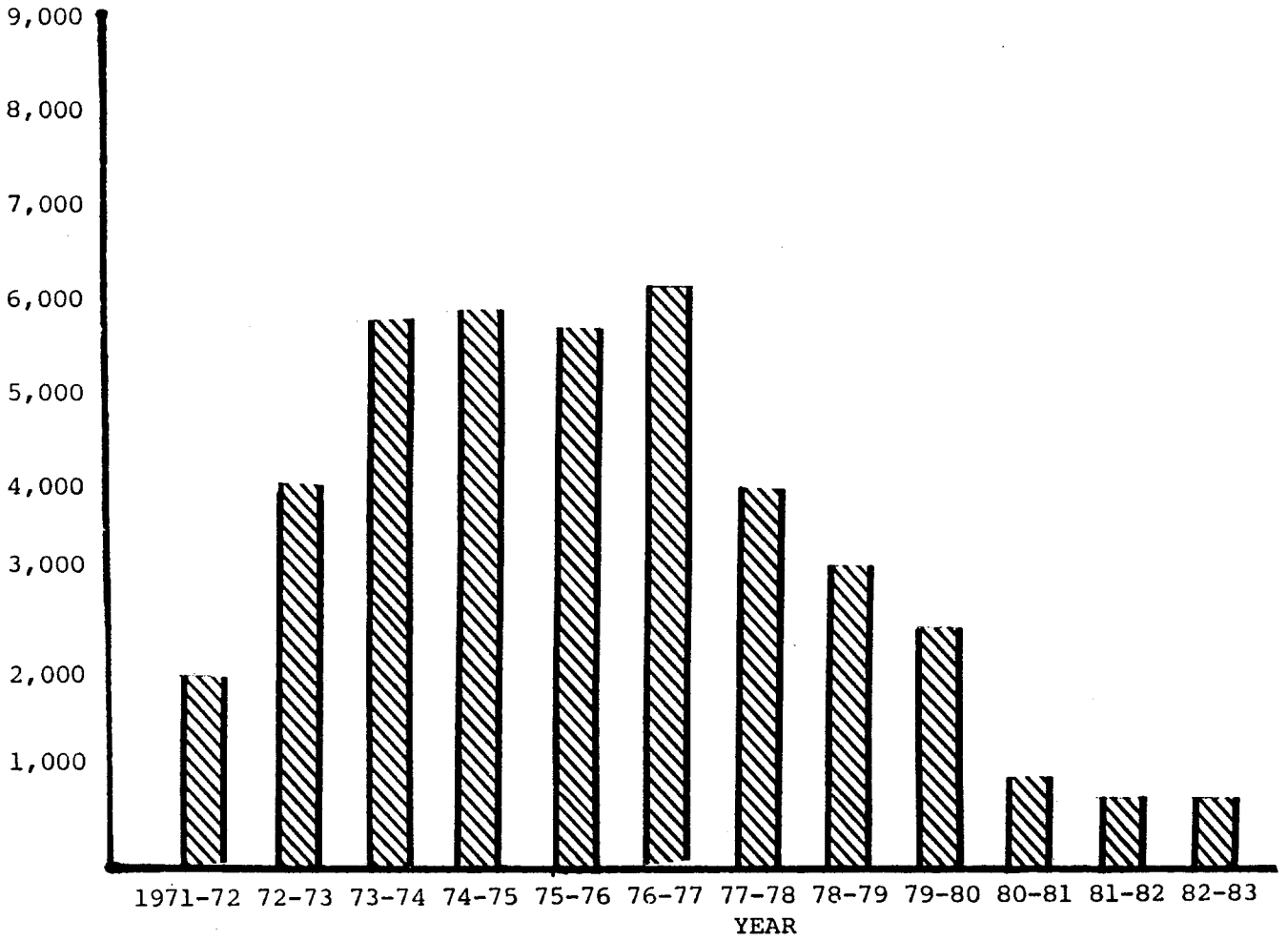

Figure 8. Southeastern Alaska winter food and bait herring harvest, 1971 through 1983.

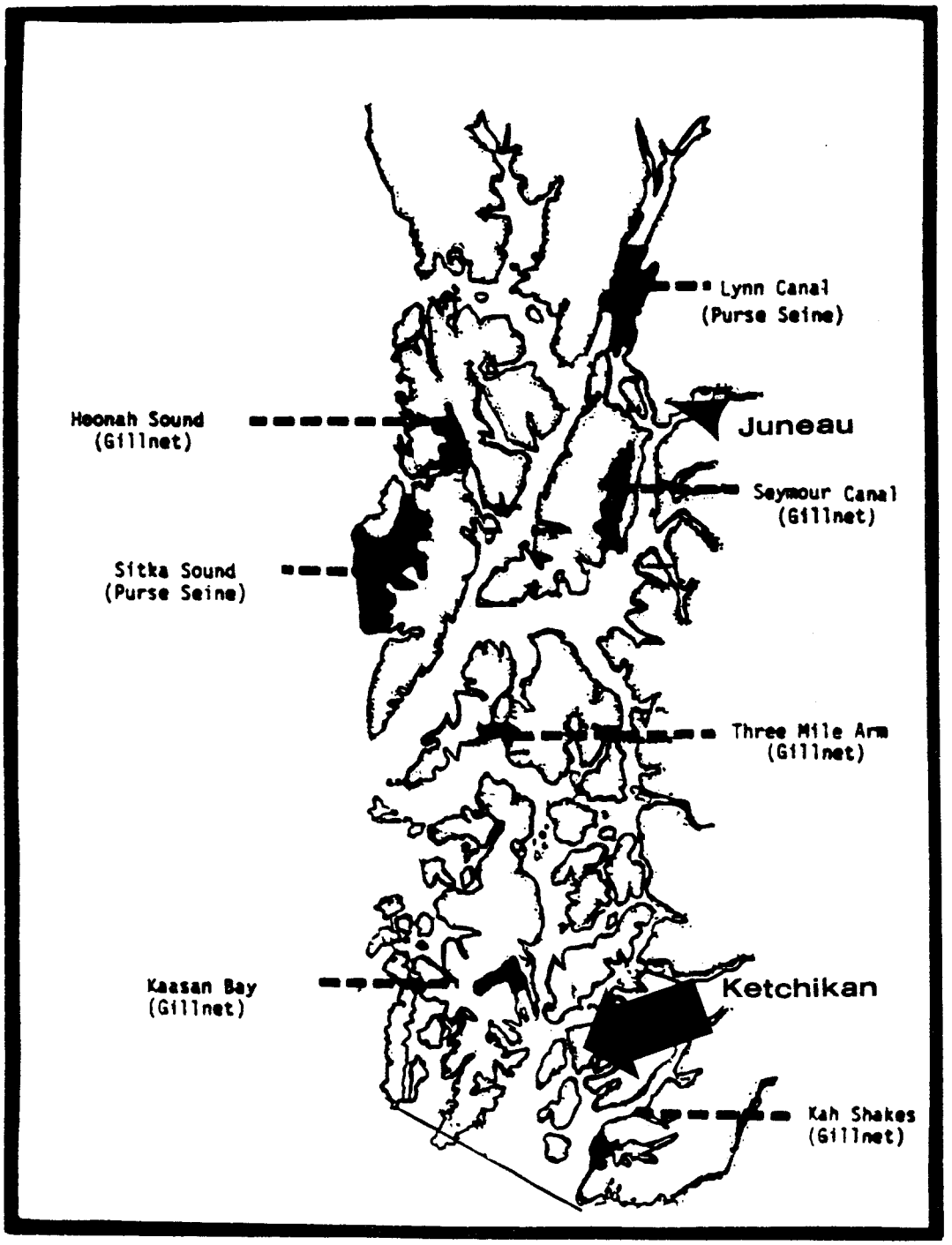

Figure 9. Southeastern Alaska sac roe fishing areas.

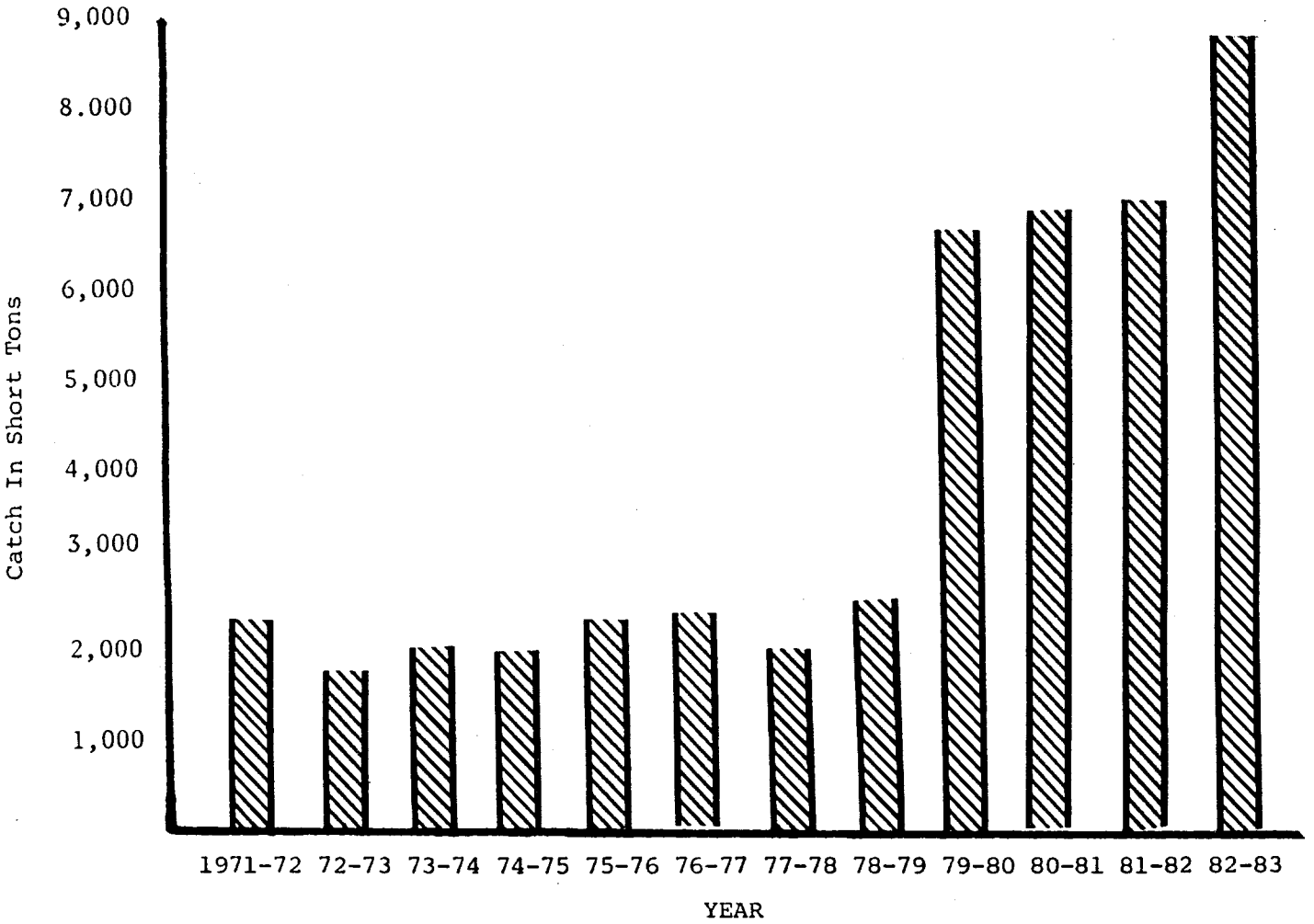

Figure 10. Southeastern Alaska herring sac roe harvest, 1971 through 1983.

Table 2. Summary of the 1980-81 season's herring fishery by areas.

Bait Fishery

Date	District	Area	x 10^6 pounds Assessment	x 10^6 pounds Quota	x 10^6 pounds Harvest	Percent Harvest	Number of Boats
1/27/81	3	El Capitan Passage	8.8 (acoustical)	.4	.8	9	5
1/27/81	9	Port Camden	8.0 (acoustical)	.8	.26	3	11
1/27/81	12	Tenakee Inlet	4.0 (visual)	.4	.67	17	5
1/27/81	13	South of Goddard Hot Springs north of Point Lauder	3.0 (visual)	.3	.27	9	2
2/24/81	12	Tenakee Inlet	15.0 (acoustical)	.8	.98	7	12
2/24/81	13	South of Goddard Hot Springs north of Point Lauder	6.0	.3	.26	4	1

Sac Roe Fishery

Date	District	Area	Gear	x 10^6 pounds Assessment Pre-Spawn	Post spawn	Quota x 10^6 pounds	Harvest x 10^6 pounds	Percent Pre-Spawn	Harvest Post spawn	Number of Boats
March 20-26	1	Kah Shakes	Gillnet	31 (spawn deposition)	32	3.1	3.68	12	12	90
March 24 & 26	13	Sitka Sound	Seine	54 (acoustical)	-	5.4	7.01	13	-	48
April 28-30	15	Lynn Canal	Seine	14.5 (acoustical & visual)	-	1.45	1.55	11	-	49
April 28-30	11	Seymour Canal	Gillnet	12 (spawn deposition)	5.3	1.2	1.24	10	19	90

Table 3. Summary of 1981-1982 season's herring fishery by area.

WINTER BAIT FISHERY

Date	District	Area	x 10^6 pounds Assessment	x 10^6 pounds Quota	x 10^6 pounds Harvest	Percent Harvest
1/17/82	7	Anita Bay	8.3	.8	-0-	-0-
1/17/82	12	Tenakee	13.3	.65	.65	10
1/17/82	9	Port Camden	9.3	.90	-0-	-0-
1/17/82	3	Tonowek	10.3	1.00	.77	7
1/17/82	3	Meares Passage	4.4	.4	.54	12.3
1/17/82	13	Necker Bay	-	.2	.16	-
1/17/82	16	Yakutat	-	.6	.28	-

SAC ROE FISHERY

Date	District	Area	Gear	x 10^6 pounds Assessment Pre-Spawn	Assessment Post-Spawn	x 10^6 pounds Quota	Harvest x 10^6 pounds	Percent Pre-Spawn	Harvest Post-Spawn
March 26-31	1	Kah Shakes	Gillnet	34	38	3.4	4.6	13.5%	12%
March 30	13	Sitka	Purse Seine	60.0	74.3	6.0	8.6	14.3%	11.6%
April	15	Lynn Canal	Purse Seine	8.0	-	.75	1.0	12.5%	-

Table 4. Summary of 1982-1983 season's herring fishery by area.

WINTER BAIT FISHERY

Opening Date	District	Area	x 10^6 pounds Assessment	x 10^6 pounds Quota	x 10^6 pounds Harvest	Percent Harvest
10/82	16	Yakutat	NA	.40	.20	NA
11/83 and 1/83	12	Tenakee	14.0	1.80	1.50	10%
11/82	9	Port Camden	6.9	.35	.08	1%
11/82	7	Anita Bay	1.6	.36	.25	3%
11/82	3	Boca de Finas	10.0	.50	.28	3%
11/82	3	Meares Passage	4.2	.02	-0-	-0-

Sac Roe Fishery

Opening Date	District	Area	Gear	x 10^6 pounds Assessment Pre-Spawn	x 10^6 pounds Quota	Harvest x 10^6 pounds	Percent Harvest Pre-Spawn
March 26 and 26	13	Sitka	Purse Seine	66.0	11.0	10.9	16.0%
March 24 thru 25	1	Kah Shakes	Gillnet	34.0	5.0	6.5	19.0%

Table 5. Southeastern Alaska herring harvest by fishing season and month, all gear included. Catches shown in pounds.

WINTER FOOD AND BAIT HERRING

Year	September	October	November	December	January	February	March	Total
71-72	12,000	12,200	716,000	551,000	583,400	560,200	1,655,600	4,090,400
72-73	1,800	504,800	748,600	1,173,600	1,694,600	2,349,000	1,435,600	7,988,000
73-74	197,600	1,783,400	2,790,000	1,438,400	1,838,600	3,595,800	68,000	8,511,800
74-75		2,306,400	3,422,200	2,569,000	1,174,800	1,330,600	1,017,800	11,820,800
75-76		2,871,800	3,650,800	812,000	1,558,000	2,153,800	329,800	11,376,200
76-77		1,560,000	4,391,400	2,948,600	2,044,600	1,874,200	-0-	12,818,800
77-78		2,898,800	1,597,200	730,600	1,078,000	1,780,000	-0-	8,084,600
78-79		-0-	4,788,000	-0-	-0-	2,182,000	-0-	6,970,000
79-80		3,262,000	-0-	2,176,000	-0-	-0-	-0-	5,438,000
80-81		-0-	-0-	-0-	2,012,000	1,240,000	-0-	3,252,000
81-82		-0-	180,000	-0-	2,800,000	80,000	-0-	3,060,000
82-83		196,000	1,102,000	-0-	-0-	1,040,000	-0-	2,338,000

Sac Roe Fishery

Year	March	April	May	Total	Grand Total
71-72	-0-	2,268,200	2,055,200	4,323,400	8,413,800
72-73	-0-	3,456,000	563,400	3,919,400	11,827,400
73-74	-0-	2,303,700	1,722,000	4,025,700	12,537,500
74-75	-0-	3,838,000	285,600	4,123,600	15,944,400
75-76	-0-	3,878,000	940,600	4,819,200	16,195,400
76-77	-0-	3,400,600	1,038,000	4,478,600	17,297,400
77-78	-0-	2,811,000	1,210,000	4,021,000	12,105,600
78-79	-0-	5,550,000	530,000	6,080,000	13,050,000
79-80	-0-	12,970,000	-0-	12,970,000	18,408,000
80-81	10,692,000	2,788,000	-0-	13,480,000	16,732,000
81-82	13,200,000	1,000,000	-0-	14,200,000	17,260,000
82-83	17,426,000	-0-	-0-	17,426,000	19,764,000

Table 6. Summary of harvest information, 1980-81, 1981-82, and 1982-83 seasons.

Winter Food and Bait Fishery	1980-81	1981-82	1982-83
Harvest purse seines 10^6 pounds.	3.2	2.4	2.3
Stock assessment 10^6 pounds.	44.8	45.6	36.7
Percent harvest of stock assessment.	7.0	5.0	6.0
Value to fishermen in dollars.	300,000	282,000	233,000
Spring Sac Roe Fisheries			
Harvest (51 limited entry purse seines)	8.6	9.6	10.9
and percent roe mature	11.0	11.7	11.1
Harvest (133 limited entry gillnets)	4.9	4.6	6.5
and percent roe mature	11.9	15.0	12.5
Percent harvest by gillnets.	36.0	32.0	37.0
Total sac roe harvest 10^6 pounds.	13.5	14.2	17.4
Stock assessment 10^6 pounds.	111.5	112.3	100.0
Percent harvest of stock assessment.	12.0	12.0	17.4
Value to fishermen in dollars.	2,690,500	4,985,000	8,061,212
Total			
Total herring harvest 10^6 pounds.	16.7	16.6	19.7
Total stock assessment 10^6 pounds.	150.6	157.9	136.7
Percent harvest of stock assessment.	11.0	10.0	14.0
Total value to fishermen in dollars.	2,990,500	5,267,000	8,295,512

HYDROACOUSTICAL SURVEYS

Hydroacoustical survey results for the 1980-81, 1981-82, 1982-83 seasons are shown in Table 7. Individual surveys describing the survey method and showing the location are grouped by area and year and are presented in Appendix I. The acoustical equipment and computer analysis are described by Nunnallee (1974), and Moberly and Thorne (1974). Operation and calibration of equipment is described by Mattie (1975) and Blankenbeckler (1976, 1978, and 1982b).

The acoustical equipment and field calibration unit was similar to that described by Blankenbeckler (1982b). Analysis of the data to compute biomass was conducted under contract by the Fisheries Research Institute of the University of Washington using a digital integration system. Technical support was provided under a service contract with MARO Engineering of Seattle, Washington.

Mid-water trawling was conducted in conjunction with acoustical surveys to document species and provide age, weight, and length data.

An on-board integrator was tested at Tenakee Inlet during the reporting period. The integrator could be added to the present system, thus eliminating the time required to analyze magnetic tapes.

AGE, WEIGHT, AND LENGTH ANALYSIS

Age, weight, and length sampling was a follow-up of sampling by Blankenbeckler and Larson (1982c). Herring samples for age and growth analysis were collected by either sampling the commercial catch, department trawling, variable mesh gillnets, or with a small project purse seine on the spawning grounds. The commercial catch was sampled either on the grounds from several sets, or at the processor, from tenders. The trawl samples were obtained by the State Fish and Game research vessel STELLER. These samples were generally from more than one drag on a herring concentration. When the variable mesh gillnet was used, it was set for a very short period to help prevent saturation of any particular mesh size. When possible, repeated sets were made until a sufficient sample was obtained. The small project purse seine was utilized when fish were in the shallows during spawning. Samples for age and growth analysis were taken from several sets, and separated either spatially or chronologically whenever possible. All fish were either processed fresh or frozen for later examination in the laboratory. In 1983, a target of 600 herring for each stock and commercial fishery was set as a goal, following a statewide herring sampling standard.

In the laboratory, herring were thawed immediately prior to examination. The standard length of each fish, from the tip of the snout to the distal end of caudal peduncle, was recorded to the nearest whole millimeter on a caliper measuring board. The weight was taken from an electronic balance to the nearest whole gram.

Table 7. Acoustical estimates by area 1980-81, 1981-82, and 1982-83 seasons.

Area	Date	Run	Area $m^2 \times 10^6$	Pounds $lbs./m^2$	Biomass[1] Biomass $\times 10^6$ Computer	Visual
Ketchikan Area						
Bell Arm	11/22/80					<1.00
Anchor Pass	11/22/80					1.00
Spacious Bay	02/05/81	1	1.46	.27	.39	
Burroughs Bay	02/06/81					1.00
Spacious Bay	12/06/82					<1.00
Traitors Cove	12/07/82					1.50
George Inlet	12/14/82					1.00
Tongass Narrows	12/16/82					<1.00
Boca de Quadra	03/19/83	1	5.79	1.40	8.10	
West Coast Prince of Wales						
Meares Pass	12/05/80	1	4.61	.17	.78	
Hub Rocks	12/07/80	1	1.44	6.10	8.80	
Tuxekan Pass	01/28/81	1	1.69	1.90	3.22	
El Capitan	01/29/81	1	.40	3.30	1.31	
El Capitan	01/29/81	2	1.02	1.80	1.83	
Tonowek Bay	12/04/81	1	8.37	.73	6.11	
Tonowek Bay	12/04/81	2	12.71	.18	2.29	
Tonowek Bay	12/04/81	3	7.55	.54	4.08	
Tonowek Bay	12/05/81	1	6.31	1.63	10.29	
Meares Pass	12/06/81	1	3.17	1.89	5.99	
Meares Pass	12/06/81	2	1.56	1.72	2.69	
Meares Pass	12/06/81	3	1.11	3.89	4.44	
Hub Rock	12/07/81	1	.84	1.44	1.21	
Hub Rock	12/07/81	2	.84	2.13	1.80	
Hub Rock	12/07/81	3	.84	1.28	1.08	
Meares Pass	11/02/82	1	1.74	.12	.21	
Meares Pass	11/03/82	2	3.77	.23	.94	
Trocadero	02/17/82					5.00
Boca de Finas	02/18/82					2.00
El Capitan	02/19/82					1.00
Anita Bay						
Anita Bay	10/12/80	1	12.22	.32	3.90	
Anita Bay	10/12/80	2	12.22	.22	2.70	
Anita Bay	11/20/80	1	13.63	.34	4.60	
Anita Bay	11/02/81	1	11.49	.10	1.15	
Anita Bay	11/03/81	1	8.06	.28	2.26	
Anita Bay	11/04/81	1	7.46	1.11	8.28	
Anita Bay	10/29/82	1	7.25	.22	1.59	
Anita Bay	10/29/82	2	3.94	.25	.99	
Anita Bay	12/22/82	1	8.75	.04	.35	

Area	Date	Run	Area $m^2 \times 10^6$	Pounds $lbs./m^2$	Biomass Biomass $\times 10^6$ Computer	Visual
Deer Island						
Deer Island	10/11/80	1				1.00
Deer Island	11/04/81	1	1.97	.15	.30	
Deer Island	11/04/81	2	2.57	.32	.82	
Deer Island	11/05/81	1	1.76	.22	.39	
Deer Island	02/04/82	1	1.37	.23	.32	
Port Camden						
Port Camden	10/14/80	1	10.60	1.22	12.80	
Port Camden	10/14/80	2	3.61	.65	2.30	
Port Camden	10/14/80	3	6.35	1.48	9.40	
Port Camden	11/08/80	1	7.11	1.14	8.10	
Port Camden	11/08/80	2	5.96	.91	5.40	
Port Camden	11/16/81	1	5.91	1.07	6.32	
Port Camden	11/16/81	2	6.17	1.16	7.16	
Port Camden	11/17/81	1	5.85	1.59	9.31	
Port Camden	11/18/81	1	6.36	.56	3.56	
Port Camden	11/18/81	2	5.41	1.71	9.26	
Port Camden	10/30/82	1	7.22	.82	5.92	
Port Camden	10/31/82	1	5.28	2.47	13.00	
Port Camden	11/01/82	1	6.20	1.35	8.36	
Tenakee Inlet						
Tenakee Inlet	10/16/80					3.50
Tenakee Inlet	11/16/80					3.50
Tenakee Inlet	01/27/81	1	4.84	2.30	11.12	
Tenakee Inlet	01/27/81	2	3.13	3.60	11.26	
Tenakee Inlet	11/18/81	1	12.09	.37	4.47	
Tenakee Inlet	11/19/81	1	4.00	.18	.72	
Tenakee Inlet	11/19/81	2	5.56	.11	.61	
Tenakee Inlet	12/18/81	1	3.84	.44	1.69	
Tenakee Inlet	12/18/81	2	10.52	.83	8.74	
Tenakee Inlet	11/13/82	1	12.32	1.41	17.37	
Tenakee Inlet	11/13/82	2	12.32	.83	10.22	
Tenakee Inlet	11/14/82	1	12.32	1.44	17.74	
Tenakee Inlet	01/28/83	1	14.79	.60	8.87	
Tenakee Inlet	01/29/83	1	17.45	.22	3.84	
Tenakee Inlet	01/29/83	2	17.45	.11	1.92	
Seymour						
Seymour	04/20/82	1	2.62	1.00	2.62	
Seymour	04/20/82	2	2.01	.70	2.11	

-Continued-

Table 7. Acoustical estimates by area 1980-81, 1981-82, and 1982-83 seasons (continued).

Area	Date	Run	Area $m^2 \times 10^6$	Pounds $lbs./m^2$	Biomass Biomass x 10^6 Computer	Visual
Sitka						
Outside Baranoff						
Whale Bay	11/13/80					1.00
Necker Bay	02/13/81	1	1.50	.12	.18	
Crawfish	02/14/81	1	1.93	.36	.69	
Whale Bay	02/14/81					1.50
Necker Bay	12/09/81	1	.51	1.12	.53	
Necker Bay	12/09/81	2	.51	.40	.21	
Sitka Sound						
Olga Strait	01/05/81	1			13.81	
Olga Strait	11/12/80					2.00
Black Can	01/13/81	1	2.27	.03	.07	
Olga Strait	01/14/81	1	2.41	5.75	13.87	
Olga Strait	01/14/81	2	2.41	5.84	14.08	
Sitka Rocks	01/14/81	1	3.41	7.77	23.08	
Olga Strait	01/13/81	1	2.57	10.90	28.04	
Black Can	01/15/81	1	3.79	7.07	26.83	
Olga Strait	01/15/81	1	3.00	4.60	13.81	
Eastern Channel	03/04/81	1	5.05	2.60	13.13	
Eastern Channel	03/12/81	1	1.51	10.30	15.57	
Katlian	11/13/81	1	1.03	.66	.68	
Old Sitka Rocks	12/07/81	1	2.48	1.20	3.22	
Katlian	01/27/82	1	2.68	.55	1.47	
Olga Strait	01/28/82	1	1.46	3.03	4.42	
Katlian	01/28/82	2	1.82	.78	1.42	
Olga Strait	02/08/82	1	1.41	1.72	2.43	
Olga Strait	02/10/82	1	1.04	5.94	6.18	
Olga Strait	02/16/82	1	1.04	5.52	6.03	
Olga Strait	02/23/82	1	.64	4.70	3.02	
Olga Strait	02/23/82	2	.64	5.60	3.60	
Eastern Channel	03/05/82	1	6.86	.71	4.86	
Eastern Channel	03/05/82	2	7.82	1.07	8.37	
Eastern Channel	03/08/82	1	2.92	3.50	10.20	
Katlian	03/23/82	1	2.10	1.10	2.31	
Old Sitka Rocks	02/16/83	1	2.30	11.20	25.81	
Juneau						
Fritz Cove	01/18/81	1	1.82	1.60	2.92	
Fritz Cove	01/18/81	2	2.13	2.20	4.69	
Fritz Cove	01/18/81	3	2.45	1.70	4.17	
Fritz Cove	03/10/81	1	2.44	2.50	6.10	
Fritz Cove	03/10/81	2	2.13	3.60	7.60	
Fritz Cove	03/11/81	3	2.63	3.30	8.60	
Fritz Cove	03/11/81	4	2.87	2.90	8.30	
Fritz Cove	02/18/82	1	1.63	1.25	2.04	
Fritz Cove	02/18/82	2	1.92	1.06	2.03	
Fritz Cove	02/19/82	1	2.08	1.42	2.95	
Fritz Cove	02/19/82	2	1.35	1.23	1.66	
Stephens Pass	02/25/83	1	5.16	.70	3.61	
Idaho Inlet						
Idaho Inlet	12/16/80	1	.99	6.90	6.80	
Idaho Inlet	11/17/81	1	3.73	.47	1.75	
Port Althorp						
Port Althorp	11/16/81	1	.81	.25	.20	
Port Althorp	11/16/81	2	.51	.09	.05	
Lisianski Inlet						
Lisianski Inlet	11/09/80	1	8.18	.15	1.20	
Lisianski Strait	12/17/80	1	.81	6.20	5.00	
Lisianski Strait	11/15/81	1	5.84	.13	.76	
Stag Bay	11/15/81	1	1.07	.14	.15	
Lisianski Strait	12/14/81	1	5.52	.34	1.88	
Stag Bay	12/15/81	1	.87	.55	.48	
Lisianski Strait	12/15/81	1	4.71	.40	1.88	
Lisianski Strait	11/16/82	1	5.60	.38	2.13	

[1] Biomass either estimated by computer analysis or an observer visual estimate where herring distributed either shallow, on the bottom, near shore, or moving preventing transect survey techniques.

Sex was determined by dissection, and a readable (non-regenerated) scale was selected from a preferred area above the lateral line and below the front of the dorsal fin for age determination.

Scales were cleaned and dipped in a solution of 10% mucilage glue and water and placed unsculptured side down for permanent mounting on glass slides. Aging was conducted using a dissecting microscope, varying the light source for optimum image of annuli. Scale reading results were spot-checked by a second reader for verification. The fish were assigned year of growth for each complete growing season. All samples collected were taken before growth had resumed in the spring. For example, if a herring was hatched in the spring of 1980 and collected in the fall of 1981, two growing seasons had occurred (age two). If the herring had been collected in the spring of 1982 (before growth had resumed), it was still recorded as age two. All scales and original data are on file and available for review upon request.

In order to obtain rapid age frequency analysis, a field method utilizing plastic mylars was used. Approximately 100 herring were placed on a mylar sheet and standard lengths were marked with a soft lead pencil. By calculating lengths versus ages from previous analyses an overlay was prepared. This served as a rapid means of evaluating recruitment. An example of a mylar overlay is illustrated in Figure 11. The original mylars are on file in the Ketchikan office.

The results of the AWL analysis is summarized by year and by district in Appendix II. The format includes area, date of capture, district, gear, the age class present, number of individuals, mean length, and standard deviation, and percent composition of each age class. The sex ratio of the samples is also included when available.

SPAWNING GROUND SURVEYS

Comprehensive diver surveys including methods were follow-up studies of investigations initiated and reported by Blankenbeckler (1976, 1977) and Blankenbeckler and Larson (1982a).

Results

The following baseline diver survey data for Boca de Quadra, Sitka, Seymour Canal, Juneau, and Hoonah Sound is summarized in Table 8.

1. Year data collected.

2. Spawning period.

   Time in which active spawning was observed from aerial and/or skiff surveys.

3. Sampling time.

   Period in which comprehensive diving surveys were conducted.

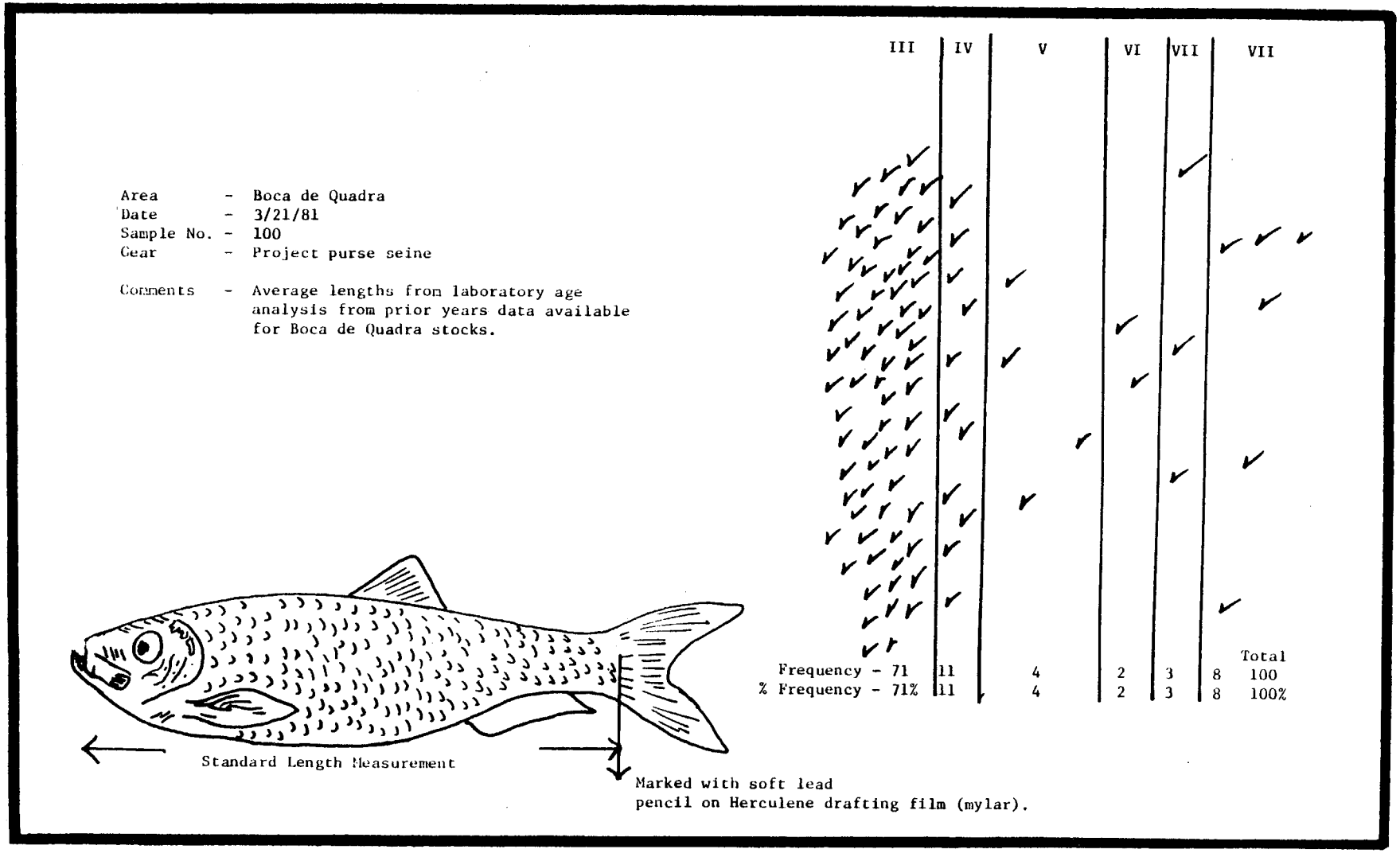

Figure 11. Illustration of mylar field method of age analysis.

Table 8. Summary of diver surveys conducted 1976 to 1983 in Southeastern Alaska.

Area	Year	Spawning Time	Sampling Time	Length nautical miles of beach receiving spawn	Average width of spawn off beach (m)	Average density of spawn in egg/m^2	Egg loss factor percent	Escapement in lbs. & Kg. x 10^6	[1] Escapement per nautical mile in lbs. & Kg. x 10^6	Harvest in lbs. & Kg. x 10^6	Percent harvest of biomass	Temp. range during incubation (°F)	Depth Spawn observed in meters
Quadra	1976	3/10-4/04	4/13-4/24	9.50	60.00	377,020.00	25	10.81/ 4.94	1.13/ .51	.85/ .39	7.00	41-42	3.66-(- 4.87)
	1977	2/29-4/04	4/13-4/19	11.30	54.50	225,280.00	25	6.85/ 3.11	.60/ .27	1.66/ .75	19.00	44-46	3.66-(- 7.92)
	1978	4/01-4/05	4/10-4/11	4.50	137.00	441,424.00	25	13.44/ 6.10	2.98/1.35	.33/ .16	2.00	42-45	3.96-(- 4.57)
	1979	3/27-4/04	4/09-4/12	3.80	192.00	687,700.00	25	24.78/11.24	6.52/2.96	1.00/ .45	3.00	46-46	3.66-(- 7.92)
	1980	3/23-4/03	4/07-4/11	12.50	77.00	676,467.00	25	32.16/14.59	2.57/1.17	2.20/1.00	6.00	44-45	3.66-(-10.97)
	1981	3/19-4/16	4/01-4/04	10.00	80.70	978,809.00	25	39.01/17.69	3.90/1.77	3.68/1.67	8.00	47-47	3.04-(-10.97)
	1982	3/18-4/05	4/04-4/18	15.50	68.70	619,345.00	25	32.57/14.77	2.10/ .95	4.30/1.95	11.00	43-50	3.04-(- 8.53)
	1983	3/23-4/07	4/05-4/11	14.65	128.00	296,300.00	25	27.44/12.45	1.87/ .85	6.50/2.95	19.00	46-47	3.04-(- 9.44)
Sitka	1976	4/14-4/20	5/01-5/06	10.00	36.00	319,487.00	25	5.68/ 2.58	.56/ .25	1.60/ .73	21.00	44-48	2.43-(- 7.92)
	1977	4/13-4/19	4/26-4/28	6.00	42.70	556,670.00	25	7.04/ 3.19	1.17/ .53	-	0.00	44-48	3.35-(- 6.09)
	1978	4/03-4/13	4/18-4/21	9.80	26.20	506,384.00	25	6.42/ 2.91	.65/ .29	.35/ .16	5.00	40-45	3.66-(-11.57)
	1979	4/14-4/24	-	31.00	-	-	-	-	-	4.50/2.04	-	-	-
	1980	4/04-4/10	-	49.00	-	-	-	[2] -	-	8.77/3.98	-	-	-
	1981	3/28-5/05	4/10-4/11	60.00	-	-	-	60.00/27.22	1.00/ .45	7.01/3.18	10.00	-	-
	1982	3/24-4/16	4/13-4/22	40.80	40.00	884,870.00	25	71.32/32.35	1.74/ .79	8.60/3.90	10.00	42-44	1.83-(-10.05)
	1983	3/21-4/17	4/13-4/17	60.00	37.00	498,300.00	25	54.63/24.78	.91/ .41	9.00/4.08	13.00	44-45	1.83-(-11.57)
	1983	4/17-4/24	4/29	8.00	7.85	388,300.00	25	1.20/ .00	.15/ .00	-	-	-	-
Seymour	1978	5/09-5/12	5/14-5/16	2.90	8.30	887,114.00	25	1.05/ .48	.36/ .16	1.57/ .71	.59	44-47	3.66-(- 2.74)
	1980	5/10-5/12	5/15-5/16	3.90	53.80	1,098,800.00	25	11.39/5.17	2.92/1.32	.00/ .00	.00	45-45	2.43-(- 6.09)
	1981	5/09-5/11	5/14-5/15	3.90	48.88	321,800.00	25	3.04/4.38	.77/ .35	1.50/ .68	.33	44-48	3.04-(- 5.48)
	1982	5/15-5/18	5/24-5/25	3.47	41.00	381,730.00	25	2.68/1.22	.77/ .35	.00/ .00	.00	44-44	2.43-(- 7.61)
	1983	5/06-5/11	5/09-5/11	9.14	46.66	381,292.00	25	8.03/4.37	.87/ .39	.00/ .00	.00	44-49	3.04-(- 9.14)
Juneau	1978	4/24-4/27	5/02-5/04	8.00	27.50	230,709.00	25	2.51/1.13	.31/ .14	2.00/ .91	.17	42-46	3.66-(- 6.09)
	1980	-	5/13-5/15	5.50	38.63	874,238.00	25	9.17/4.16	1.66/ .75	2.00/ .91	.17	42-46	3.04-(- 7.61)
	1983	4/24-4/26	5/06	6.00	20.00	117,000.00	25/50	69.31/1.04.47	.11/ .05	.00/ .00	.00	45-45	3.04-(-.9.41)
Hoonah Sound	1981	4/30-5/01	5/04	2.25	30.00	570,000.00	25	1.9/ .86	.84/ .38	.00/ .00	.00	-	-

[1] Escapements standardized. Calculations computed 1.0 x 10^8 eggs = 2,000 pounds or 907.2 kilograms.
[2] Data limited, satisified at least 1 x 10^6 pounds/linear mile or 60 x 10^6 pounds biomass.

4. Nautical miles of beach receiving spawn.

   a. Documents extent of spawning related to nautical miles of beach utilized as determined from the air and/or skiff surveys.

   b. A summary of nautical miles of beach receiving spawn for all areas surveyed in Southeastern Alaska is shown in Table 9.

   c. Location of comprehensive studies including sampling transects is illustrated in Appendix III-XIII.

5. Average width of spawn.

   Documents average width of spawn perpendicular to the beach expressed in meters.

6. Average density of spawn.

   a. Documents the average density or number of eggs per square meter of area receiving spawn.

   b. The density figure is computed using visual egg estimates and collected egg and substrate samples taken from a transect sampling frame.

   c. Visual estimates are adjusted by a correction factor calculated from egg samples that are analyzed in the laboratory.

7. Egg loss factor.

   At the beginning of this research it was evident that a loss of eggs was occurring between the time of deposition and the time of actual sampling. The egg loss resulted mainly from bird predation and/or storm action. No sampling was conducted to precisely account for the loss for the years studied. To account for this loss a literature review was initiated. The review revealed that egg mortality has been estimated as high as 70-80% in British Columbia (Outram 1961) and 25-40% in Southeastern Alaska (Montgomery 1958). All literature reviewed showed considerable variation, and studies were all conducted in the intertidal area normally exposed during tidal fluctuations. From this review it was evident that a factor was justified. Sampling was conducted prior to hatching so it was apparent that a high mortality was not appropriate because only a proportion of the total egg mortality would have occurred. A 25% egg loss factor seemed appropriate and was chosen as a standard.

8. Escapement computed from egg densities.

   a. A total number of eggs is calculated from the following formula.

Table 9. Nautical miles of beach receiving herring spawn by area, 1953 to 1983, in Southeastern Alaska.

LOCATION	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	Ave.
CRAIG	12.2		11.7	13.6	11.6	11.5	12.6	3.5			11.5	11.2	12.3	14.2	12.4	3.2		11.7	4.5	7.5	7.1			7.0	2.8	3.5	1.0	1.0	6.4	7.5	6.0	5.0	8.17
KAH SHAKES - Boca de Quadra SHORE NAKAT			7.9	9.2	3.4	2.5	5.7	7.0											0.5			6.0	11.0	9.5	11.3	4.5	3.8	12.5	10.0	15.4	14.7	11.3	8.6
CLEVELAND PENN. BEHM CANAL			5.9	6.4	3.5	5.9	7.8	5.5										2.0	3.0		1.0	2.0	1.0		3.2	.5	3.4	2.5	1.5	1.0	1.0	3.5	3.2
ERNEST SOUND ROCKY BAY				7.5	2.6														3.0				3.0	3.0	N/A	2.0	4.0	3.5	-	N/A	-	4.5	3.3
AUKE BAY LYNN CANAL	8.2	9.4	12.2	10.0	28.1	24.1	10.8	12.9										11.5		8.5	10.6	13.2	10.9	15.9	9.7	8.0	5.7	9.8	9.2	2.5	6.0	2.6	10.9
SITKA SOUND TO DOROTHY NARROWS				Includes all of Sitka Area 100.0	79.8	92.8	45.9	44.5				19.2	20.8	23.0	15.0	16.5	15.0	11.3	8.5	13.5	10.0	10.0	8.0	13.0	10.7	12.5	41.0	63.0	60.0	40.8	68.0	6.5	33.5
SEYMOUR CANAL																			3.0				4.5	3.2	2.5	2.9	1.0	3.9	3.9	3.5	9.1	8.9	4.2
HYDABURG McFARLAND IS.												8.0	9.0	7.8	5.0	4.5			4.0	1.8	0.7			N/A	0.7	.5	2.0	1.0	4.0	4.3	2.3	3.3	3.7
KWAIN BAY HAM ISLAND																			3.0				3.0	3.0	3.2	.1	.1	2.3	2.5	.1	6.0	2.75	2.4
KASAAN BAY																			4.0	1.0	1.0	1.0	1.0	4.0	2.5	.1	1.0	.5	1.0	-	.1	2.8	1.5
HOOD & CHAIK BAY																			1.5	10.0	2.0	1.7	3.4	2.3	1.7	1.7		1.0					2.8
GAMBLER BAY																			0.5														.5
SKAGWAY HARBOR																			1.0														1.6
DAVIDSON IN./ MARBLE ISLAND																				1.0	1.0	1.0	1.0						.3	N/A	-	1.0	.89
THREE MILE ARM LOWER ROCKY PASS																								.1	2.5	.4	1.5	5.3	.3	.8	.2		1.4
PORT CAMDEN																								5.3	0.3	.2	.8	3.3	.1	-	-		1.7
TENAKEE INLET																								-	-	3.0	5.2	3.5	9.6	11.6	10.0	10.0	7.6
PORT ALTHORP																										2.3	1.0						1.7
LISIANSKI INLET																								1.3	.8	1.4	1.0	.6	2.5	N/A	.1	1.0	1.0
PERIL STRAITS																				8.0	2.0	1.0		1.0	3.5	5.3	.5	0	2.3	1.5	.6	3.0	3.6
PORT FREDERICK																										1.1		1.5					1.3

$T = A \times D$

where: T = Total eggs.
A = Area of spawn in square meters.
D = Density or number of eggs per square meter.

b. Conversion of total eggs to biomass is calculated by assuming 1.0×10^8 eggs represent 2,000 pounds or 907.2 kilograms of herring spawners. This biomass is then corrected by applying an egg loss factor.

c. Example calculation, Quadra 1981.

Length of spawn (L) = 10 nautical miles (1 nautical mile = 1,852 m)

Width of spawn (W) = 80.7 meters
Average density ($\bar{D}$) = 978,809 eggs/m^2

Total eggs = 18,520 meters (L) x 80.7 meters (W) = 1,494,564 m^2 = area of spawn (A) x 978,809 ($\bar{D}$) = <u>$1,463 \times 10^9$ eggs</u>.

Assume 1.0×10^8 eggs = 2,000 pounds or 907.2 kilograms. $1,463 \times 10^9$ egg (TE) ÷ 1.0×10^8 = 14,630 tons x 2,000 lbs/ton = 29,260,000 pounds escapement (no egg loss factor).

Apply 25% egg loss factor. 29,260,000 lbs ÷ .75 = <u>39.01×10^6 pounds escapement</u>.

9. Escapement per nautical mile.

Reflects the biomass per nautical mile of beach receiving spawn.

10. Commercial harvest.

Harvest of herring from commercial gillnets and/or purse seiners from the spawning grounds.

11. Percent harvest of biomass.

This figure reflects the percentage of the available biomass harvested by the commercial fishery on the spawning grounds.

12. Temperature range during spawning.

Documents temperature (^oF) observed during the sampling time or egg incubation period.

13. Depth preference for spawning.

Observed egg deposition, referenced to tide level.

The following specialized diver survey data for Southeastern Alaska spawning grounds is summarized.

Herring Spawning Substrate Analysis

Substrate type and tidal preference related to herring spawning is illustrated in Figure 12. It should be noted that the vegetation identified is not complete but serves for general documentation.

Results

The following baseline data for Sitka, Boca de Quadra, Seymour Canal, and Juneau spawning areas is summarized in Table 10.

1. Area studied.
2. Year studied.
3. Percent of total eggs observed sub-tidally, e.g., below -3′ tide.
4. Average egg density per m^2 observed sub-tidally.
5. Percent of total eggs observed intertidally.
6. Average egg density per m^2 observed intertidally.
7. Percent of total eggs observed by substrate types.
8. Percent of total eggs observed as unattached to no substrate (loose).
9. Average egg density per m^2 by substrate type.

Visual Estimation Analysis to Determine Egg Density

Visual estimates were tested for accuracy to evaluate as a rapid method of assessing herring spawn deposition. Visual estimates were compared to actual laboratory counts. Comparisons are summarized by years tested, and observers, in Table 11. Correction factor analysis based on accuracy was calculated for total observations for Blankenbeckler and Larson in Table 12. Other observers were not used in the correction due to a low number of samples that resulted in poor precision. The precision for Blankenbeckler and Larson was similar. The visual estimates became closer to the true value with experience and percent accuracy around the mean also improved. At 90% the precision was $\pm$ 10-20% for all years by both observers. By working up the laboratory samples from year to year, both observers became aware of the true value, but the percent error did not improve dramatically.

Fecundity Versus Length-Weight Analysis

The fecundity and average weight of herring are important components in calculating biomass from the estimated number of eggs deposited. Analysis of data was conducted to determine the difference in calculated biomass based on varied sizes of herring spawners. Average weight of herring and fecundity was calculated for each stock examined to determine parameters to back calculate pounds of spawners required to produce a certain number of eggs deposited. This would require estimating eggs per female each year which is costly and

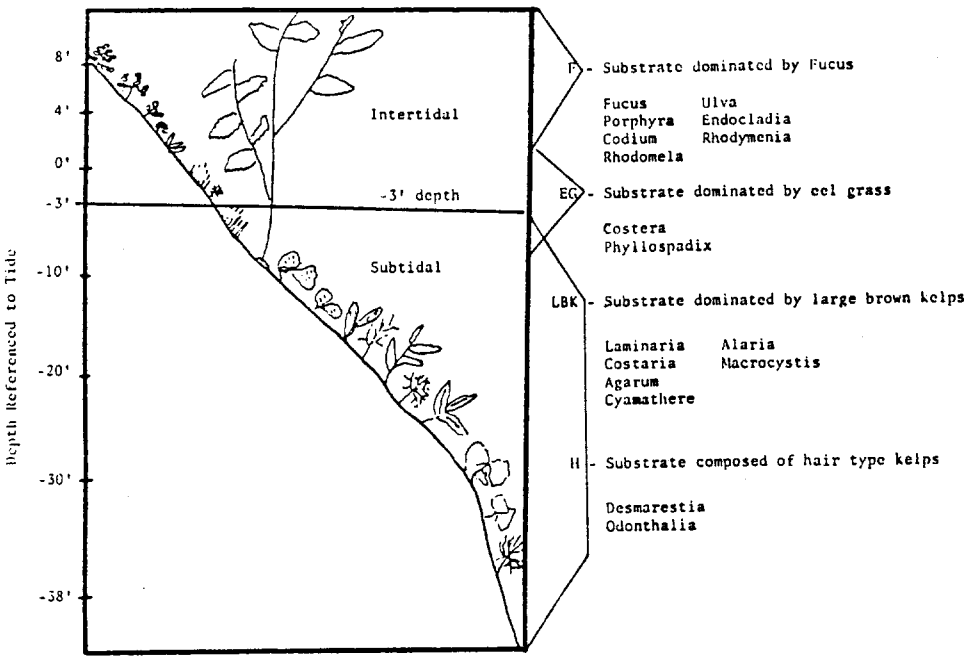

Figure 12. Typical substrate, profile, Southeastern Alaska spawning areas.

Table 10. Substrate analysis for spawning grounds surveyed 1981, 1982, and 1983, Southeastern Alaska.

		Subtidal 1/		Intertidal		Substrate Types F		EG		LBK		H		Loose 2/
Area	Year	% of Total Eggs	Ave. Density M^2 x 1000	% of Total Eggs	Ave. Density M^2 x 1000	% of Total Eggs	Ave. Density M^2 x 1000	% of Total Eggs	Ave. Density M^2 x 1000	% of Total Eggs	Ave. Density M^2 x 1000	% of Total Eggs	Ave. Density M^2 x 1000	% of Total Eggs
Sitka	1982	38	748	62	959	32	737	29	1303	29	591	9	1191	2
Sitka	1983	66	496	34	508	19	433	11	524	45	425	22	859	3
Quadra	1981	66	953	34	1023	19	510	37	728	29	694	14	2992	1
Quadra	1982	30	682	70	601	40	694	20	627	35	564	3	659	3
Quadra	1983	68	312	32	270	30	261	41	368	16	204	11	304	2
Seymour	1981	55	331	45	316	42	306	6	253	45	343	7	300	0
Seymour	1982	16	248	84	408	80	439	3	124	14	169	1	12	2
Seymour	1983	35	244	65	457	56	414	3	465	40	340	1	119	1
Juneau	1983	58	93	42	152	23	101	-0-	-0-	73	127	3	44	1

1/ Subtital is defined as below the -3 foot tide level.

2/ Loose eggs are defined as eggs attached to no substrate.

Table 11. Visual versus laboratory egg count analysis by observer for 1981-82 and 1982-83.

Observer	Year	Paired Observation Sample Number	Average Percent Accurate	Standard Deviation	Standard Error	T-Test Confidence Limit	T-Test Confidence Interval
Blankenbeckler	1981	35	.62	.39	.07	.62 ± .12 or 19%	90%
	1982	41	1.06	.54	.08	1.06 ± .13 or 12%	90%
	1983	56	1.22	.65	.09	1.22 ± .15 or 12%	90%
Larson	1981	36	.70	.57	.10	.70 ± .17 or 24%	90%
	1982	25	1.09	.50	.10	1.09 ± .17 or 16%	90%
	1983	61	1.05	.61	.08	1.05 ± .13 or 12%	90%
Bergmann	1982	24	1.38	.73	.15	1.38 ± .26 or 19%	90%
	1983	18	1.30	.97	.23	1.30 ± .40 or 31%	90%
DeJong	1982	12	1.20	.54	.16	1.20 ± .29 or 24%	90%
Minicucci	1983	8	1.33	1.31	.46	1.33 ± .87 or 65%	90%
Koeneman	1983	22	.91	.38	.08	.91 ± .14 or 15%	90%

Table 12. Visual versus laboratory egg count analysis stratified by egg density and substrate type by observer for 1981-82 and 1982-83.

Observer	Stratified Zone [1]	Year	Number	$\bar{x}$ Accuracy Factor	Standard Deviation	Standard Error	T-Test Confidence Limit	T-Test Confidence Interval
Blankenbeckler	F.	1981	7	.67	.75	.28	.67 ± .54 (81%)	90%
	EG.	1981	15	.54	.22	.06	.54 ± .11 (20%)	90%
	LBK.	1981	11	.68	.36	.11	.68 ± .20 (29%)	90%
	H.	1981	2	.57	.10	.24	.57 ± 1.52 (267%)	90%
	≤ 50K	1981	5	.48	.18	.08	.48 ± .15 (31%)	90%
	51→150K	1981	22	.65	.46	.10	.65 ± .17 (26%)	90%
	F.	1982	8	.91	.25	.09	.09 ± .17 (19%)	90%
	EG.	1982	10	1.38	.78	.25	1.38 ± .46 (33%)	90%
	LBK.	1982	15	1.09	.51	.13	1.09 ± .23 (21%)	90%
	H.	1982	8	.76	.19	.07	.76 ± .13 (17%)	90%
	≤ 50K	1982	10	.91	.45	0.14	.91 ± .26 (29%)	90%
	51→150K	1982	13	.88	.26	.07	.88 ± .12 (14%)	90%
	151K→250K	1982	5	.95	.07	0.03	.95 ± .06 (6%)	90%
	250K	1982	7	1.87	.74	.28	1.87 ± .54 (29%)	90%
	F.	1983	14	1.24	.69	.18	1.24 ± .32 (26%)	90%
	EG.	1983	13	1.03	.37	.10	1.03 ± .18 (17%)	90%
	LBK.	1983	19	1.29	.59	.14	1.29 ± .24 (19%)	90%
	H.	1983	10	1.33	.99	.31	1.33 ± .57 (43%)	90%
	≤ 50K	1983	18	1.23	.61	.14	1.23 ± .24 (20%)	90%
	51→150K	1983	22	1.33	.84	.18	1.33 ± .31 (23%)	90%
	151→250K	1983	12	1.02	.30	.09	1.02 ± .61 (16%)	90%
	> 250K	1983	4	1.18	.44	.22	1.18 ± .52 (44%)	90%
Larson	F.	1981	4	.40	.13	.07	.40 ± .16 (35%)	90%
	EG.	1981	14	.52	.26	.07	.52 ± .12 (23%	90%
	LBK.	1981	15	.86	.64	.17	.86 ± .30 (35%)	90%
	H.	1981	3	1.16	1.16	.67	1.16 ± 1.95 (168%)	90%
	≤ 50K	1981	8	.52	.17	.06	.52 ± .11 (21%)	90%
	51→150K	1981	19	.54	.32	.07	.54 ± .12 (22%)	90%
	151→250K	1981	3	.60	.27	.16	.60 ± .47 (48%)	90%
	> 250K	1981	6	1.50	.94	.38	1.50 ± .77 (51%)	90%
	F.	1982	10	.90	.27	.09	.90 ± .16 (18%)	90%
	EG.	1982	8	1.30	.53	0.19	1.30 ± .36 (28%)	90%
	LBK.	1982	6	1.16	.72	.29	1.16 ± .58 (50%)	90%
	≤ 50K	1982	6	.94	.24	.10	.94 ± .20 (21%)	90%
	51→150K	1982	9	1.16	.72	.24	1.16 ± .45 (39%)	90%
	151→250K	1982	6	1.16	.32	.13	1.16 ± .26 (22%)	90%
	F.	1983	20	1.17	.52	.12	1.17 ± .21 (18%)	90%
	EG.	1983	17	.98	.52	.13	.98 ± .23 (23%)	90%
	LBK.	1983	11	.90	.36	.11	.90 ± .20 (22%)	90%
	H.	1983	9	.93	.72	.21	.93 ± .15 (48%)	90%
	≤ 50K	1983	31	1.01	.52	.09	1.01 ± .15 (15%)	90%
	51-150K	1983	18	1.15	.82	.19	1.15 ± .33 (29%)	90%
	151→250K	1983	10	1.12	.52	.16	1.12 ± .29 (26%)	90%
	> 250K	1983	2	.61	.08	.06	.61 ± .38 (62%)	90%

[1] Vegetative Zone
F -included upper intertidal (kelp dominated by *Fucus*
EG -Eel grass (mid-tidal)
LBK -included mid and lower large brown kelps
H -includes lower tidal hair type kelps
Density Zone
≤50 - equal to or less than 50,000 eggs per sample (1/10 m^2)
51-150 K - 51,000 to 150,000 eggs per sample
151-250 K -151,000 to 250,000 eggs per sample
>250 K -greater than 250,000 eggs per sample

difficult with personnel and budget constraints. An analysis of historic data relating fecundity to herring weight was analyzed to see if a standard could be applied without sampling each year. This analysis evaluates the use of a standard (1.0×10^8 egg equal 1 ton or 2,000 lbs of required spawners) similar to British Columbia calculations (Haegele 1981).

The data analyzed in Table 13 summarizes the following:

1. Length-weight relationship based on 1,500 samples for 1981-82-83, calculated from a regression analysis with a r^2 value of .89.

2. Fecundity relationship based on average fecundity, stratified by length categories, from 515 samples from various areas throughout Southeastern Alaska.

3. Biomass calculation for constant egg number for various sizes of herring with corresponding fecundities.

Herring spawners range in standard length in Southeastern Alaska from 190 to 230 millimeters. The average fecundity for that length range results in 1.0×10^8 eggs representing 2,057 pounds. The range based on 10 mm length fecundity average is 1,984 to 2,040 pounds. This data supports the use of a standard 1.0×10^8 eggs representing 2,000 pounds of spawners for Southeastern Alaska herring.

SUMMARY OF RESULTS

1. Markets and harvests of the winter bait and food fishery have declined, while the sac roe fishery has increased significantly over the past ten years.

2. Harvest from subsistence use, personal use, pound fisheries, and frozen tray-pack is insignificant compared to the winter bait and spring sac roe fisheries.

3. Acoustical estimates provide abundance index data on certain stocks in Southeastern Alaska where herring concentrate in traditional wintering areas.

4. Hydroacoustical surveys including mid-water trawling are most valuable when supported by AWL and spawning ground data.

5. AWL data improved with increase of sample size to a minimum of 600 herring per stock and commercial harvest in 1983 followed statewide policy.

6. Herring length measurements plotted on plastic mylars provide a fast field method of assessing recruitment.

7. Subtidal spawning provides for a significant portion of eggs deposited (>50%).

Table 13. Southeastern Alaska herring length, weight, and fecundity data.

Length (SL mm)	Weight 1/ Pounds/Grams	2/ Fecundity	Number	1.0 x 10^8 Eggs = Pounds/Kilograms 3/
230.00	.36 / 163.63	36,292	168	1,983.90 / 899.90
225.00	.34 / 154.54			
220.00	.32 / 145.45			
215.00	.30 / 136.36	29,415	84	2,039.77 / 925.24
210.00	.28 / 127.27			
205.00	.27 / 122.72	24,911	54	2,167.72 / 983.28
200.00	.25 / 113.63			
195.00	.23 / 104.54	22,585	177	2,036.75 / 923.87
190.00	.21 / 95.45			
185.00	.19 / 86.36			
180.00	.18 / 81.81	14,708	35	2,447.65 / 1,110.25

1/ N = 1500 for years 81, 82, and 83; linear regression $r^2 = .89$; equation $\bar{y}x$ = 1.678 + (-220.87). Regression analysis results in low r^2 values compared to fecundity.

2/ Average fecundity stratified by 10 mm length intervals. Data 1970-71-72 five areas Southeast Alaska.

3/ British Columbia standard x 10^8 eggs = 1 ton or 2,000 lbs. or 907.2 kg (Haegele 1981).

8. Utilization of spawning substrate for the reporting period was as follows:

Quadra	-	Average density 649,000 eggs per meter^2
Sitka	-	Average density 622,000 eggs per meter^2
Seymour	-	Average density 274,000 eggs per meter^2
Juneau	-	Average density 93,000 eggs per meter^2

Available substrate was not utilized by spawning herring in Seymour or Juneau areas, resulting in low egg densities.

9. The Quadra spawning grounds consistently have the highest biomass of herring spawners per nautical mile of beach receiving spawn. The high value is a result of offshore kelp beds combined with good egg densities.

10. Visual estimates of egg densities continue to result in acceptable accuracy when compared to samples collected and counted in the laboratory.

11. The standard of 1×10^8 eggs representing 2,000 pounds, or 907.2 kilograms, of required spawners is realistic for fecundity analysis.

12. Harvest rate strategies for the winter bait and the spring sac roe fisheries, refined in 1983, resulted in a variable rate between 10% and 20% based on established thresholds for each recognized stock.

13. Established threshold values will be evaluated by stock performance over time.

RECOMMENDATIONS

1. Continue hydroacoustical surveys and AWL analysis at the established levels.

2. Accelerate studies related to spawning ground research.

   a. Relate to established threshold levels.

   b. Expand to stocks where no data is available.

   c. Continue in-depth statistical analysis of spawning ground data.

   d. Evaluate the egg loss factor.

   e. Expanded aerial surveys for documentation of spawn deposition.

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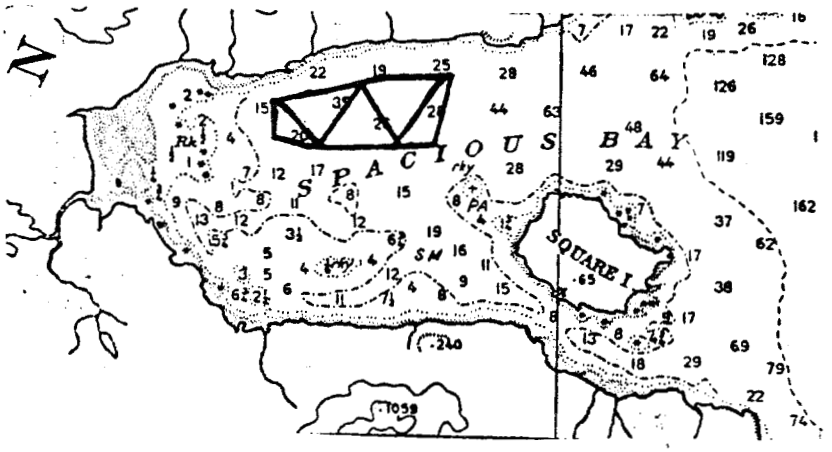
APPENDIX I

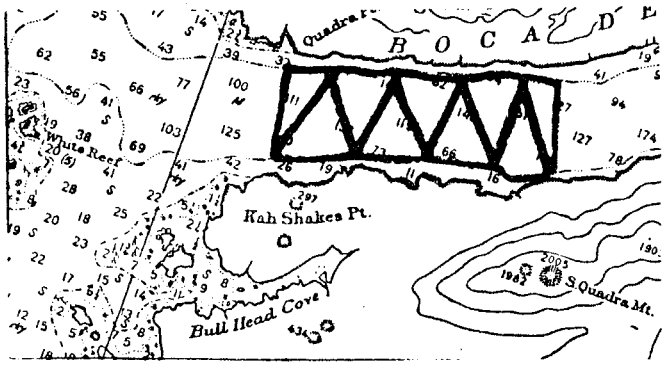
Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83.

Area Spacious Bay Date 2/5/81 Vessel Sundance
Run #1 Gain 5.5 Atten. -12dB Operators Larson-Doherty
Survey Time 1452 - 1513 hrs. Chart 17403
Biomass .39 x 10^6 pounds

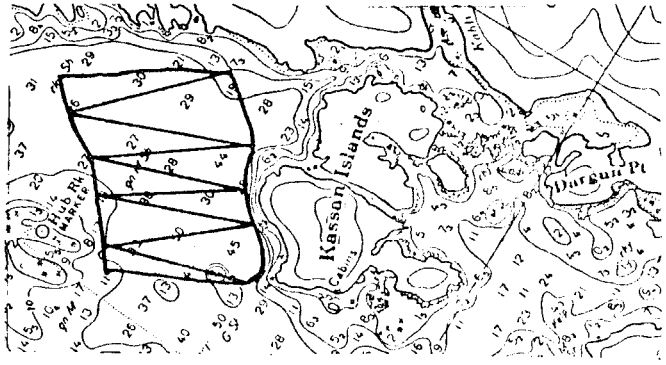


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

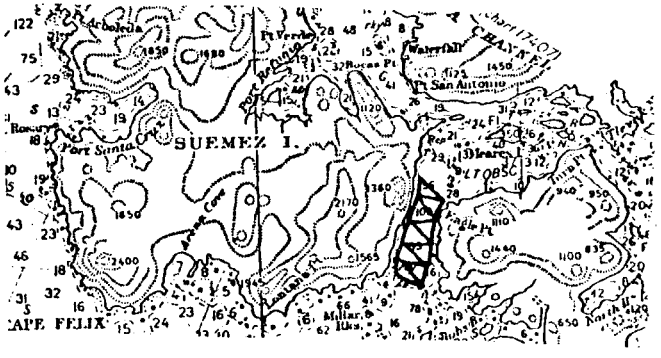
Area Boca de Quadra Date 3/19/83 Vessel Sundance
Run #1 Gain 5.0 Atten. -12dB Operators Larson
Survey Time 1548 - 1641 hrs. Chart 17434
Biomass 8.10 x 10^6 pounds



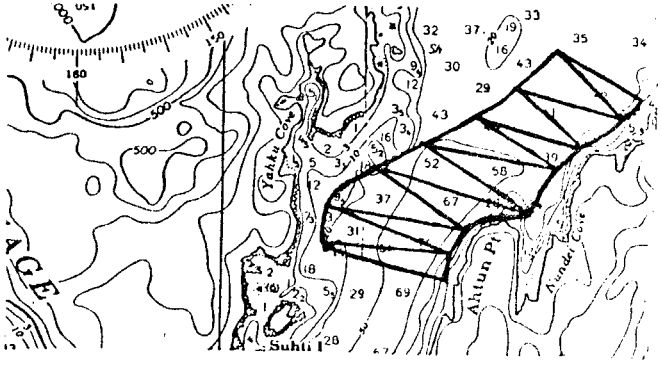
Area Hub Rock Date 12/7/80 Vessel Steller
Run #1 Gain 5.0 Atten. -12dB Operators Blank-Larson
Survey Time 1337 - 1402 hrs. Chart 17422
Biomass 8.80 x 10^6 pounds



Area Mears Passage Date 12/5/80 Vessel Steller
Run #1 Gain 7.0 Atten. -12dB Operators Blank-Larson
Survey Time 1800 - 1825 Chart 17400
Biomass .78 x 10^6 pounds

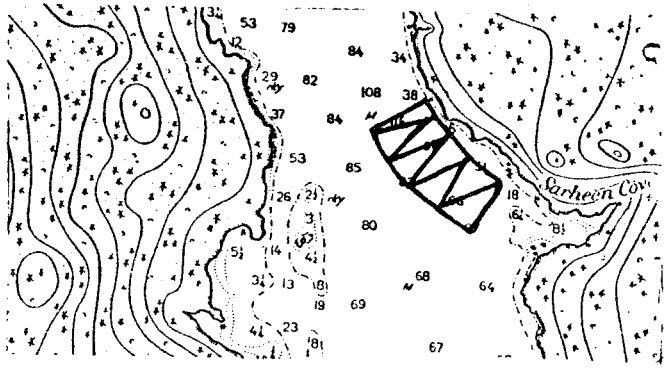


Area Tuxekan Passage Date 1/28/81 Vessel Sundance
Run #1 Gain 4.0 Atten. -12dB Operators Francisco-Doherty
Survey Time 1720 - 1740 hrs. Chart 17422
Biomass 3.22 x 10^6 pounds

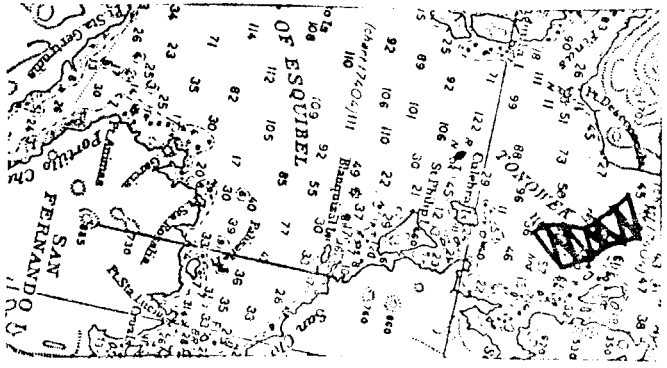


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

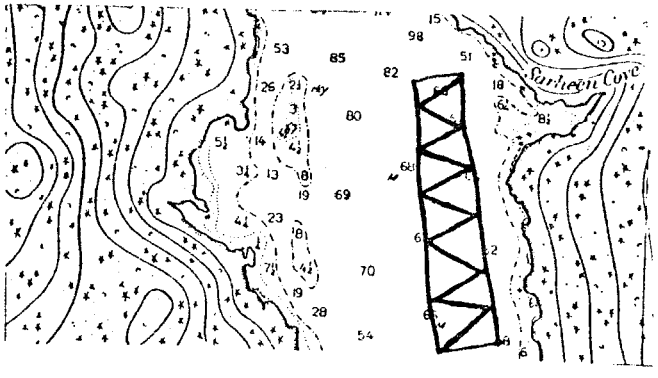
Area El Capitan Date 1/29/81 Vessel Sundance
Run #1 Gain 4.0 Atten. -12dB Operators Francisco-Doherty
Survey Time 1700 - 1720 hrs. Chart 17387
Biomass 1.31 x 10^6 pounds



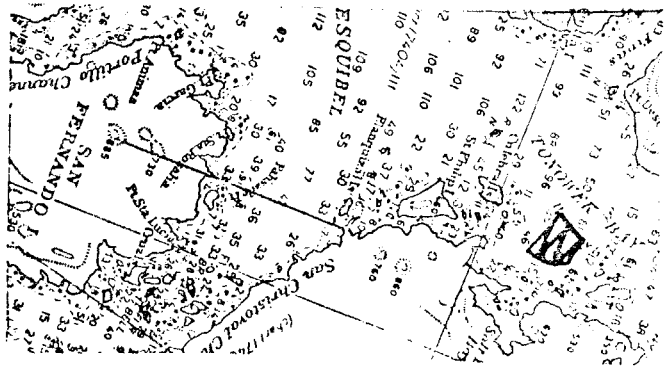
Area Tonowek Bay Date 12/4/81 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Larson
Survey Time 1340 - 1441 hrs. Chart 17400
Biomass 6.11 x 10^6 pounds



Area El Capitan Date 1/29/81 Vessel Sundance
Run #2 Gain 4.0 Atten. -12dB Operators Francisco-Doherty
Survey Time 1725 - 1745 hrs. Chart 17387
Biomass 1.83 x 10^6 pounds

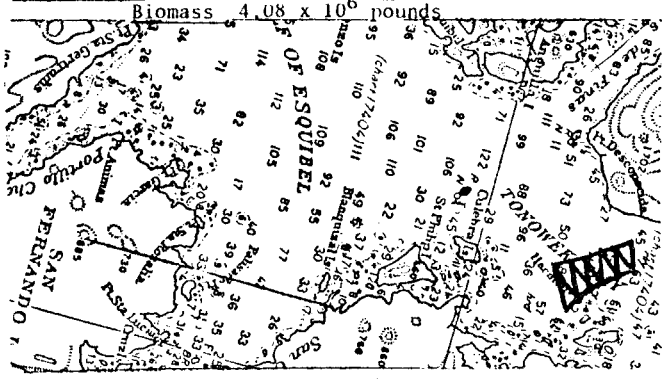


Area Tonowek Bay Date 12/4/81 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Larson
Survey Time 1448 - 1556 hrs. Chart 17400
Biomass 2.29 x 10^6 pounds

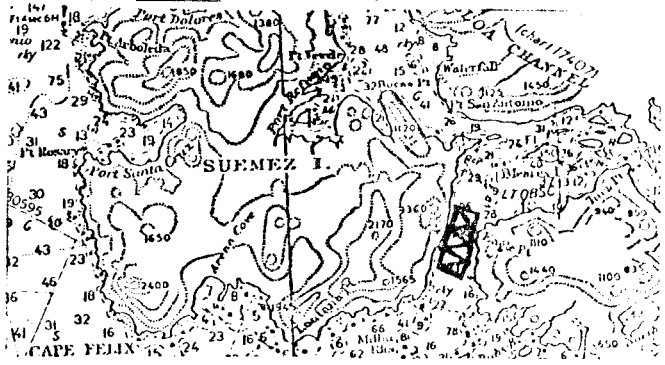


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

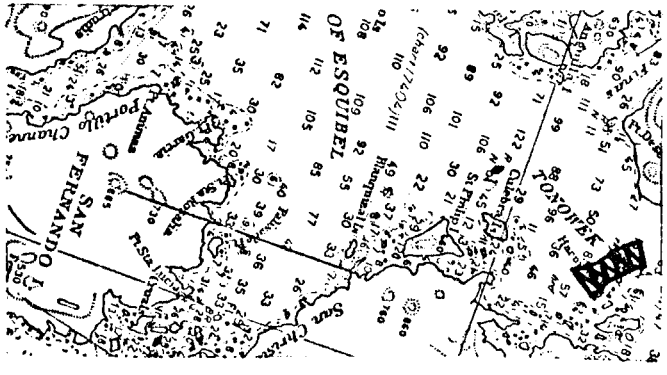
Area Tonowek Bay Date 12/4/81 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Larson
Survey Time 1620 - 1731 hrs. Chart 17400
Biomass 4.08 x 10^6 pounds



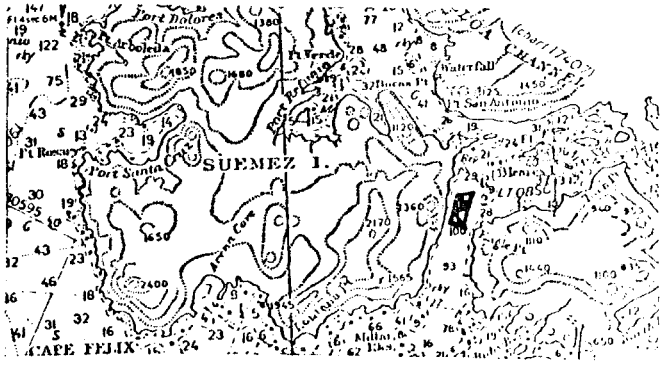
Area Mears Passage Date 12/6/81 Vessel Steller
Run #1 Gain 5.5 Atten. -12dB Operators Blank-Larson
Survey Time 1515 - 1532 hrs. Chart 17400
Biomass 5.99 x 10^6 pounds



Area Tonowek Bay Date 12/5/81 Vessel Steller
Run #1 Gain 5.75 Atten. -12dB Operators Blank-Larson
Survey Time 1505 - 1551 hrs. Chart 17400
Biomass 10.29 x 10^6 pounds



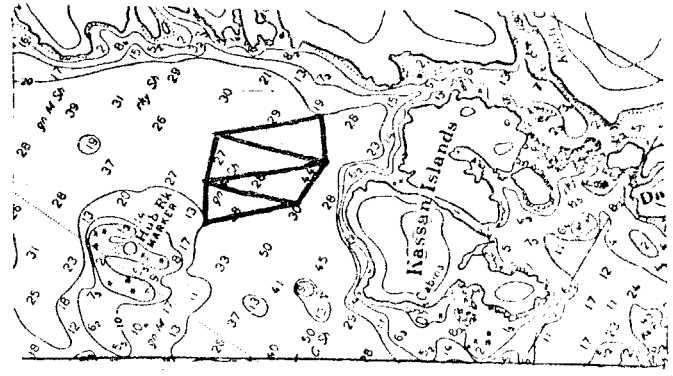
Area Mears Passage Date 12/6/81 Vessel Steller
Run #2 Gain 5.5 Atten. -12dB Operators Blank-Larson
Survey Time 1544 - 1603 hrs. Chart 17400
Biomass 2.69 x 10^6 pounds



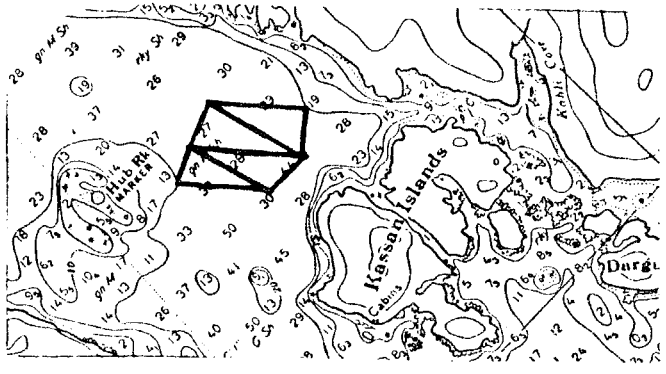
Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

Area Mears Passage Date 12/6/81 Vessel Steller
Run # 3 Gain 6.0 Atten. -12dB Operators Blank-Larson
Survey Time 1613 - 1626 hrs. Chart 17400
Biomass 4.44 x 10^6 pounds

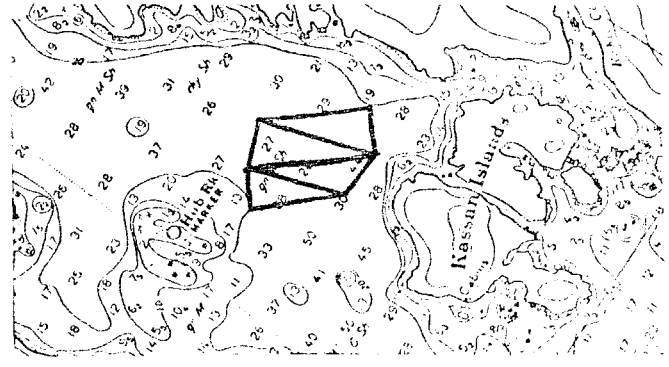
Area Hub Rock Date 12/7/81 Vessel Steller
Run #2 Gain 4.75 Atten. -12dB Operators Blank-Larson
Survey Time 1422 - 1438 hrs. Chart 17422
Biomass 1.80 x 10^6 pounds



Area Hub Rock Date 12/7/81 Vessel Steller
Run #1 Gain 5.25 Atten. -12dB Operators Blank-Larson
Survey Time 1359 - 1416 hrs. Chart 17422
Biomass 1.21 x 10^6 pounds

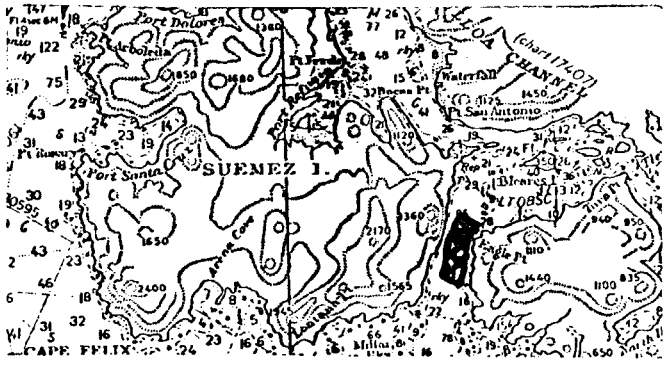


Area Hub Rock Date 12/7/81 Vessel Steller
Run #1 Gain 4.5 Atten. -12dB Operators Blank-Larson
Survey Time 1444 - 1502 hrs. Chart 17422
Biomass 1.08 x 10^6 pounds

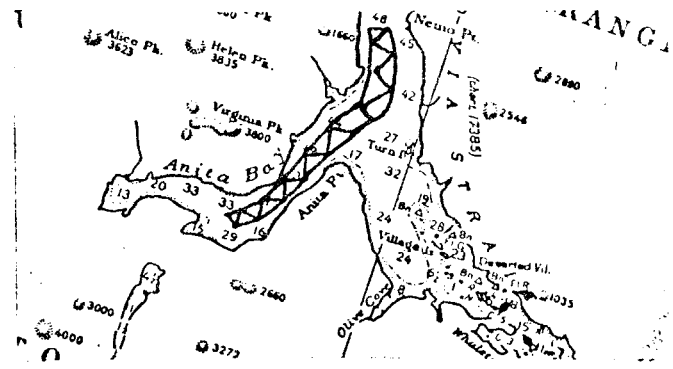


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

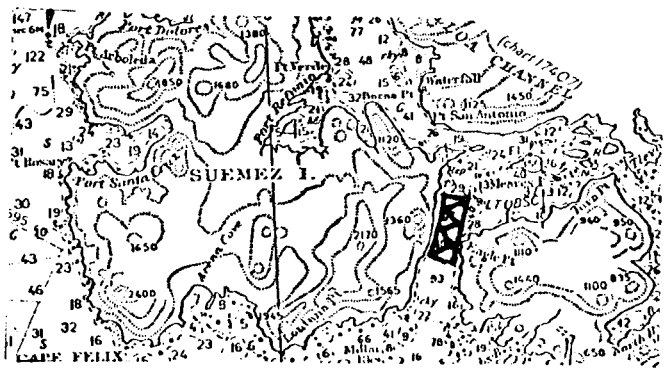
Area Meares Passage Date 11/2/82 Vessel Sundance
Run #1 Gain 6.0 Atten. -12dB Operators Larson-Doherty-House
Survey Time 1533 - 1602 hrs. Chart 17400
Biomass .21 x 10^6 pounds



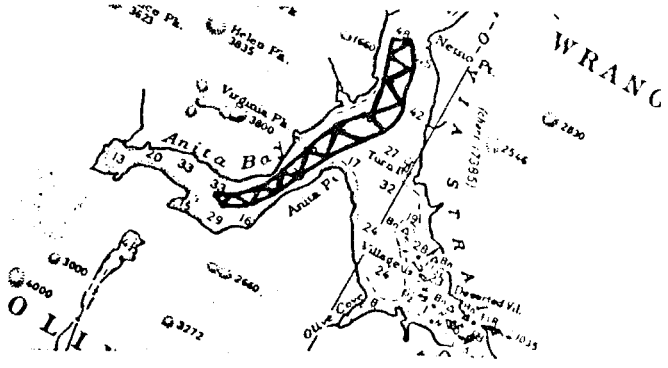
Area Anita Bay Date 10/12/80 Vessel Kittiwake
Run #1 Gain 5.5 Atten. -12dB Operators Blank-Larson
Survey Time 1621 - 1723 hrs. Chart 17360
Biomass 3.90 x 10^6 pounds



Area Meares Passage Date 11/3/82 Vessel Sundance
Run #2 Gain 6.0 Atten. -12dB Operators Larson-House-Doherty
Survey Time 1611 - 1653 hrs. Chart 17400
Biomass .94 x 10^6 pounds

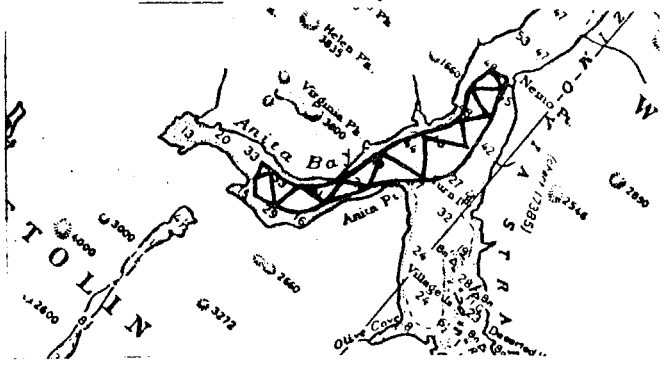


Area Anita Bay Date 10/12/80 Vessel Kittiwake
Run #2 Gain 5.5 Atten. -12dB Operators Blank-Larson
Survey Time 1752 - 1901 hrs. Chart 17360
Biomass 2.70 x 10^6 pounds

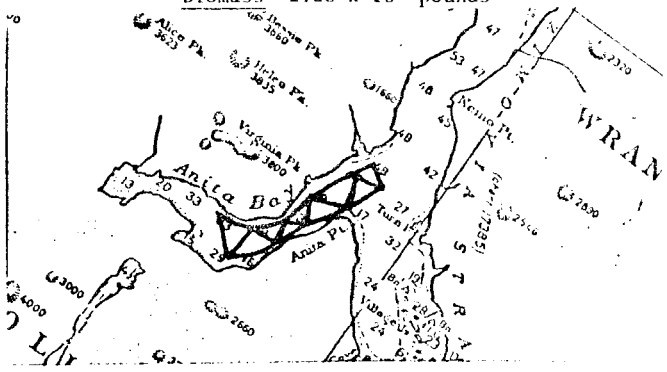


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

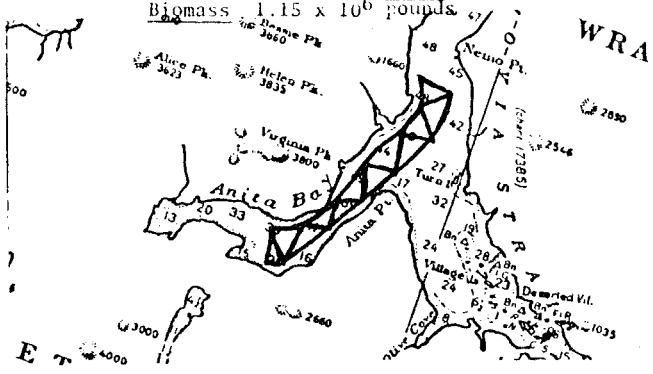
Area Anita Bay Date 11/20/80 Vessel Steller
Run #1 Gain 6.5 Atten. -12dB Operators Larson-Westlund
Survey Time 0939 - 1638 hrs. Chart 17360
Biomass 4.60 x 10^6 pounds



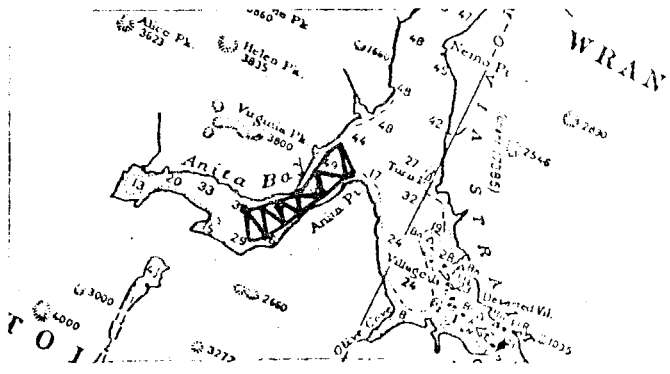
Area Anita Bay Date 11/3/81 Vessel Steller
Run #1 Gain 5.5 Atten. -12dB Operators Blank-Bergmann
Survey Time 1627 - 1706 hrs. Chart 17360
Biomass 2.26 x 10^6 pounds



Area Anita Bay Date 11/2/81 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Larson
Survey Time 1625 - 1722 hrs. Chart 17360
Biomass 1.15 x 10^6 pounds

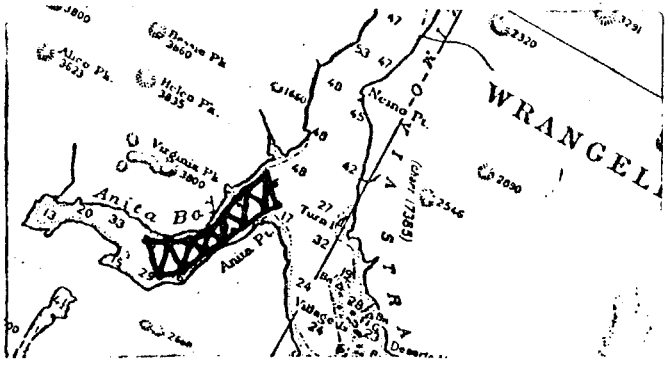


Area Anita Bay Date 11/4/81 Vessel Steller
Run #1 Gain 5.0 Atten. -12dB Operators Larson-Bergmann
Survey Time 0906 - 0944 hrs. Chart 17360
Biomass 8.28 x 10^6 pounds

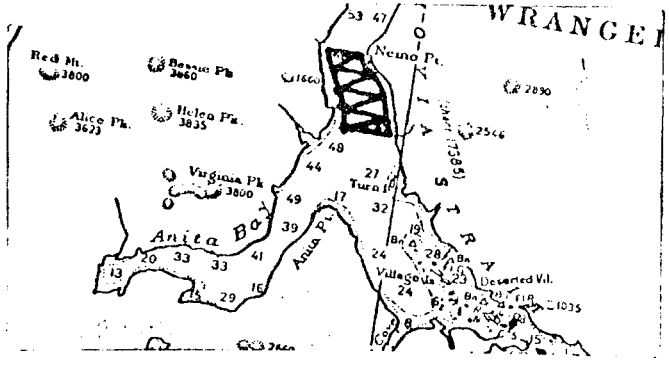


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

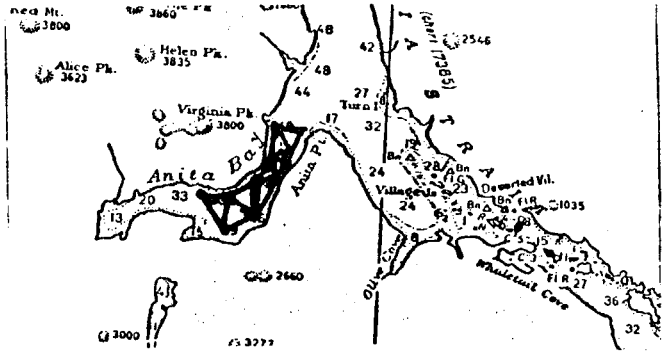
Area Anita Bay Date 10/29/82 Vessel Steller
Run #1 Gain 5.3 Atten. -12dB Operators Blank-Schonberg
Survey Time 1437 - 1531 hrs. Chart 17360
Biomass 1.59 x 10^6 pounds



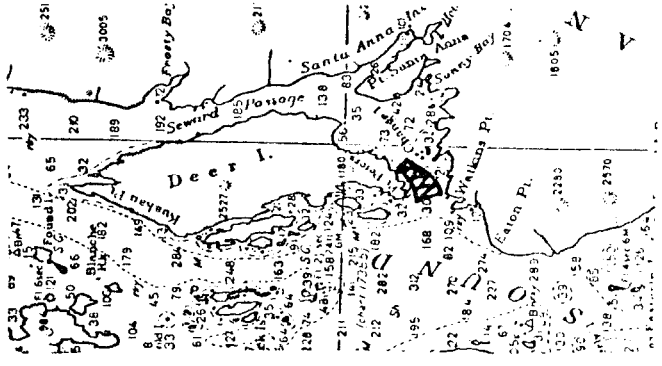
Area Anita Bay Date 12/22/82 Vessel Sundance
Run #1 Gain 6.0 Atten. -12dB Operators Larson
Survey Time 1053 - 1135 hrs. Chart 17360
Biomass .35 x 10^6 lbs.



Area Anita Bay Date 10/29/82 Vessel Steller
Run #2 Gain 5.5 Atten. -12dB Operators Blank-Shonberg
Survey Time 1553 - 1631 hrs. Chart 17360
Biomass .99 x 10^6 pounds

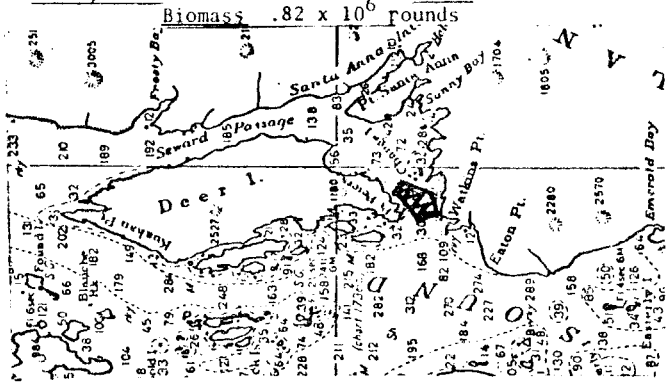


Area Deer Island Date 11/4/81 Vessel Steller
Run #1 Gain 6.0 Atten. - 12dB Operators Larson-Bergmann
Survey Time 1301 - 1324 hrs. Chart 17360
Biomass .30 x 10^6 pounds

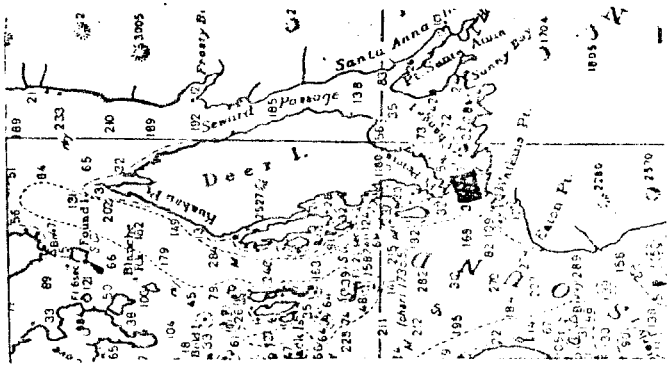


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

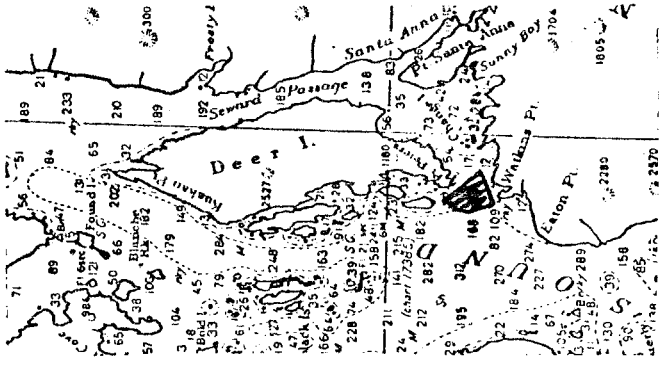
Area Deer Island Date 11/4/81 Vessel Steller
Run #2 Gain 6.0 Atten. -12dB Operators Larson-Bergmann
Survey Time 1333 - 1401 hrs. Chart 17360
Biomass .82 x 10^6 pounds



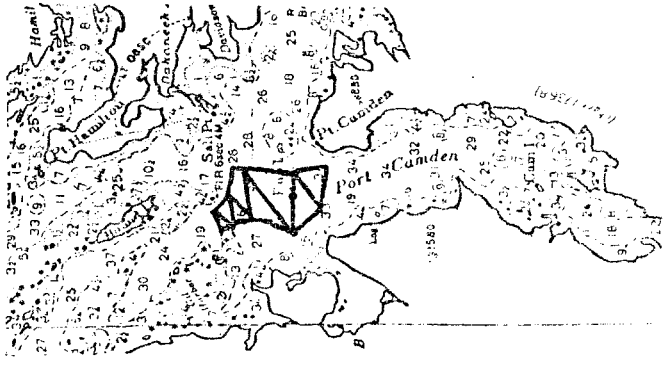
Area Deer Island Date 2/4/82 Vessel Steller
Run #1 Gain 6.5 Atten. -12dB Operators Timothy-Schonberg
Survey Time 0846 - 0915 hrs. Chart 17360
Biomass .32 x 10^6 pounds



Area Deer Island Date 11/5/81 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Larson-Bergmann
Survey Time 0913 - 0954 hrs. Chart 17360
Biomass .39 x 10^6 pounds

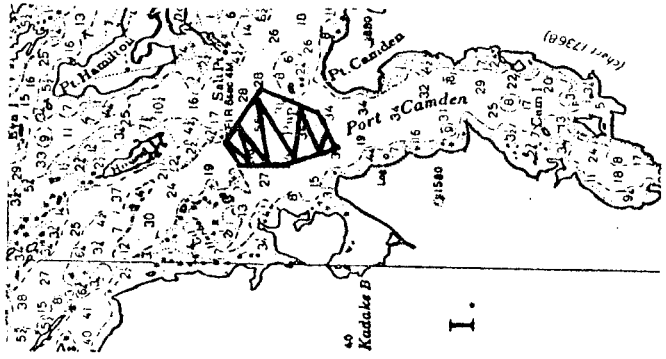


Area Port Camden Date 10/14/80 Vessel Kittiwake
Run #1 Gain 5.0 Atten. -12dB Operators Blank-Larson
Survey Time 1014 - 1058 hrs. Chart 17360
Biomass 12.80 x 10^6 pounds

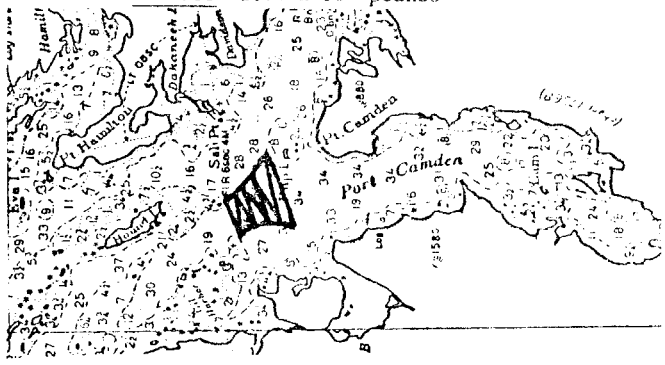


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

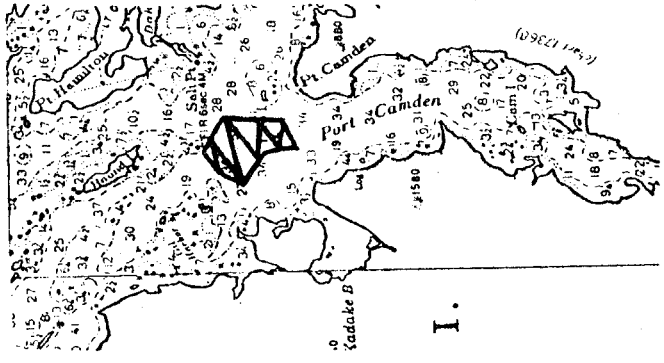
Area Port Camden Date 11/8/80 Vessel Steller
Run #1 Gain 5.5 Atten. -12dB Operators Larson-Westlund
Survey Time 1407 - 1453 hrs. Chart 17360
Biomass 8.10 x 10^6 pounds



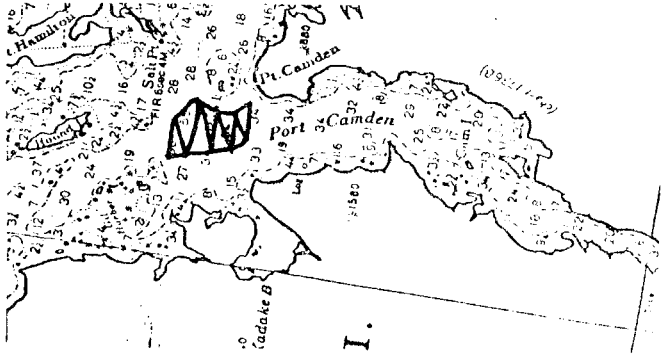
Area Port Camden Date 10/14/80 Vessel Kittiwake
Run #2 Gain 5.0 Atten. -12dB Operators Blank-Larson
Survey Time 1117 - 1159 hrs. Chart 17360
Biomass 2.30 x 10^6 pounds



Area Port Camden Date 11/8/80 Vessel Steller
Run #2 Gain 5.5 Atten. -12dB Operators Larson-Westlund
Survey Time 1500 - 1536 hrs. Chart 17360
Biomass 5.40 x 10^6 pounds

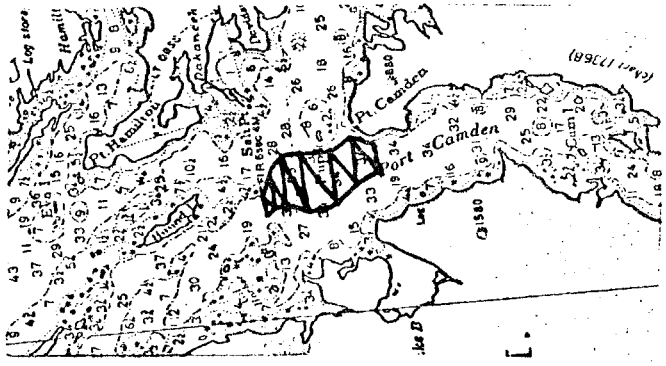


Area Port Camden Date 10/14/80 Vessel Kittiwake
Run #3 Gain 5 Atten. -12dB Operators Blank-Larson
Survey Time 1212 - 1310 hrs. Chart 17360
Biomass 9.40 x 10^6 pounds

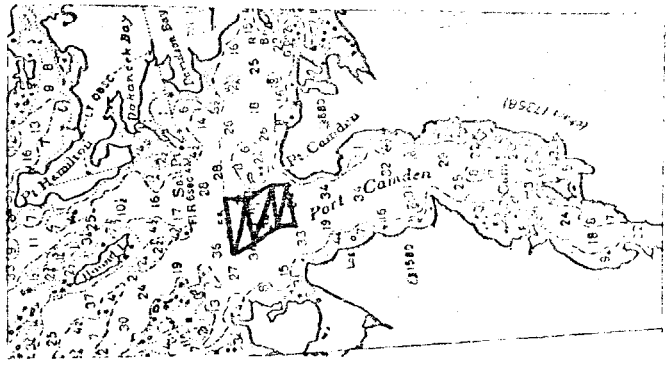


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

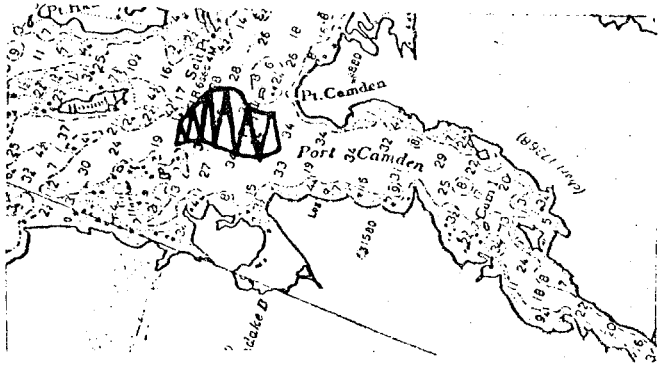
Area Port Camden Date 11/16/81 Vessel Steller
Run #1 Gain 4.0 Atten. -12dB Operators Larson
Survey Time 1430 - 1541 hrs. Chart 17360
Biomass 6.32 x 10^6 pounds



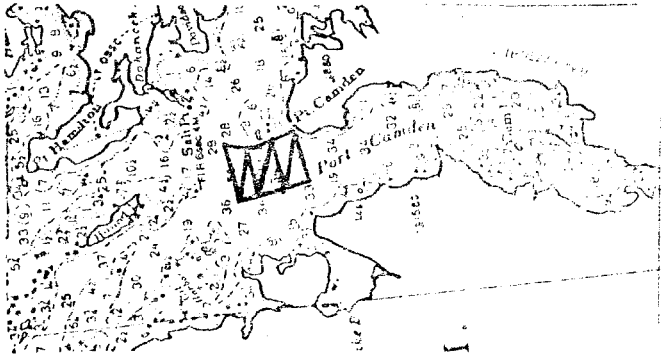
Area Port Camden Date 11/17/81 Vessel Steller
Run #1 Gain 4.5 Atten. -12dB Operators Larson
Survey Time 1721 - 1808 hrs. Chart 17360
Biomass 9.31 x 10^6 pounds



Area Port Camden Date 11/16/81 Vessel Steller
Run #2 Gain 5.0 Atten. -12dB Operators Larson
Survey Time 1555 - 1708 hrs. Chart 17360
Biomass 7.16 x 10^6 pounds

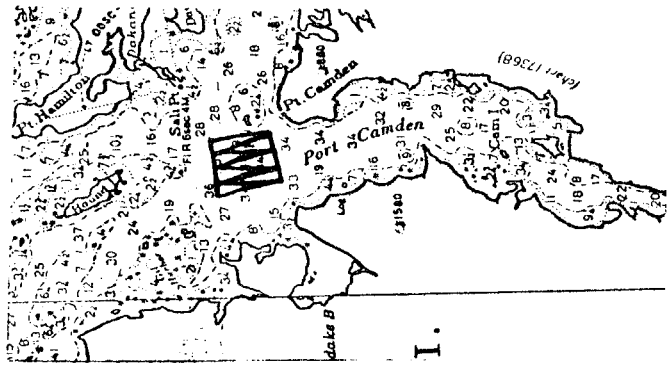


Area Port Camden Date 11/18/81 Vessel Steller
Run #1 Gain 3.5 Atten. -12dB Operators Larson
Survey Time 1507 - 1600 hrs. Chart 17360
Biomass 3.56 x 10^6 pounds

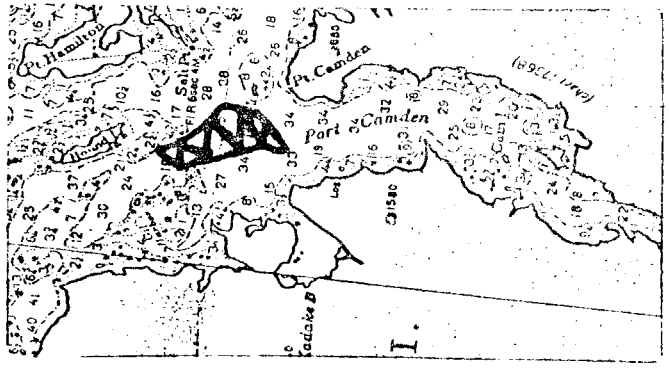


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

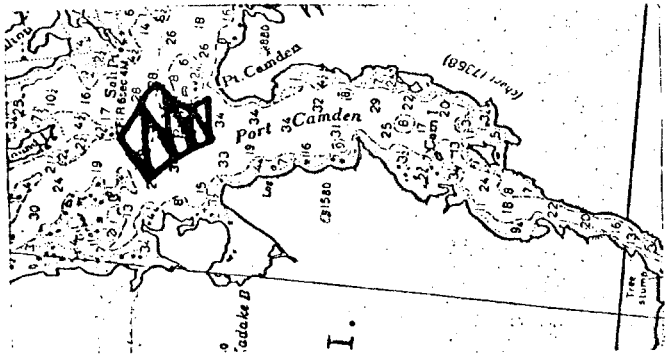
Area Port Camden Date 11/18/81 Vessel Steller
Run #2 Gain 4.0 Atten. -12dB Operators Larson
Survey Time 1643 - 1741 hrs. Chart 17360
Biomass 9.26 x 10^6 pounds



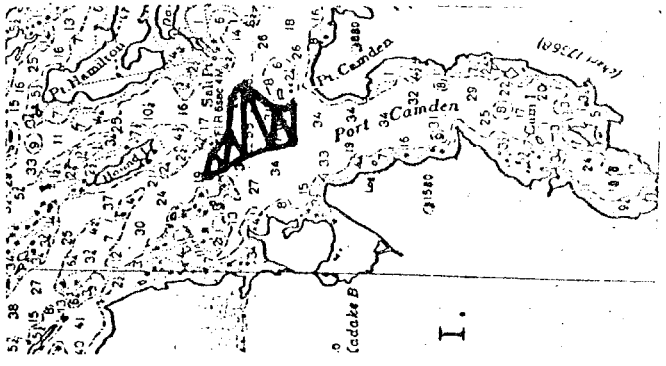
Area Port Camden Date 10/31/82 Vessel Steller
Run #1 Gain 5.5 Atten. -12dB Operators Blank-Schonberg
Survey Time 1641 - 1722 hrs. Chart 17360
Biomass 13.0 x 10^6 pounds



Area Port Camden Date 10/30/82 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Shonberg
Survey Time 1746 - 1838 hrs. Chart 17360
Biomass 5.92 x 10^6 pounds

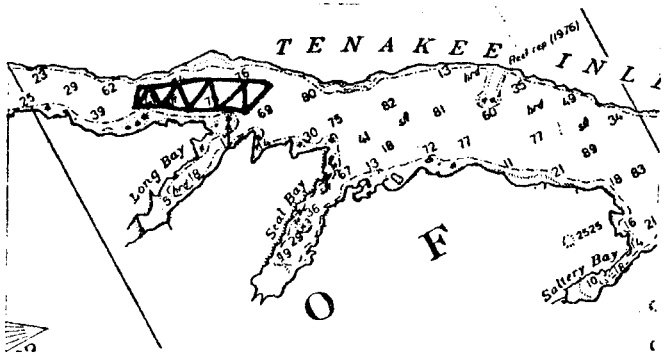


Area Port Camden Date 11/1/82 Vessel Steller
Run #1 Gain 5.0 Atten. -12dB Operators Blank-Schonberg
Survey Time 1453 - 1546 hrs. Chart 17360
Biomass 8.36 x 10^6 pounds

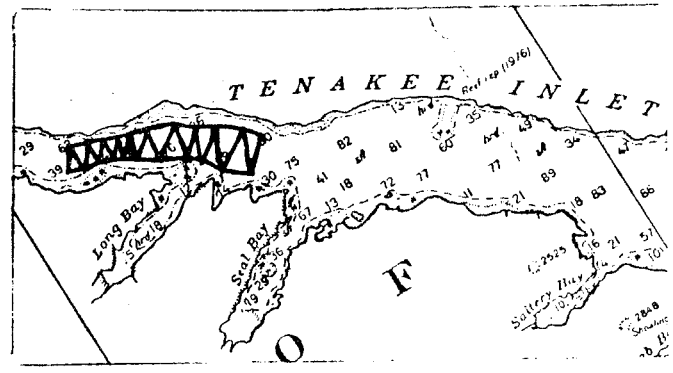


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

Area Tenakee Inlet Date 1/27/81 Vessel Auklet
Run #1 Gain 5.7 Atten. -12dB Operators Muir-Ingledue
Survey Time 1755 - 1236 hrs. Chart 17300
Biomass 11.12 x 10^6 pounds

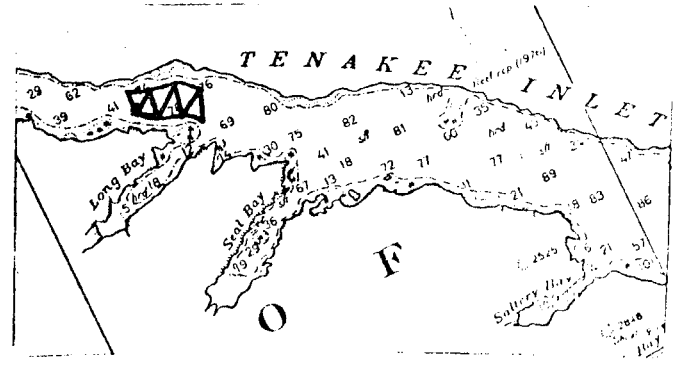


Area Tenakee Inlet Date 11/18/81 Vessel Steller
Run #1 Gain 5.0 Atten. -12dB Operators Blank-DeJong
Survey Time 1509 - 1626 hrs. Chart 17300
Biomass 4.47 x 10^6 pounds



Area Tenakee Inlet Date 1/27/81 Vessel Auklet
Run #2 Gain 5.7 Atten. -12dB Operators Muir-Ingledue
Survey Time 1243 - 1322 hrs. Chart 17300
Biomass 11.26 x 10^6 pounds

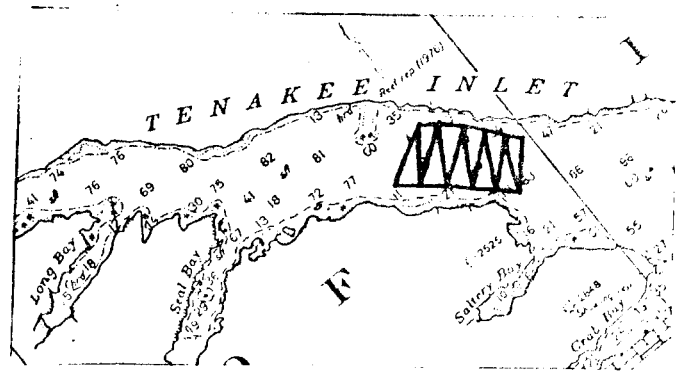
Area Tenakee Inlet Date 11/19/81 Vessel Auklet
Run #1 Gain 6.0 Atten. -12dB Operators Blank-DeJong
Survey Time 15-6 - 1530 hrs. Chart 17300
Biomass .72 x 10^6 pounds



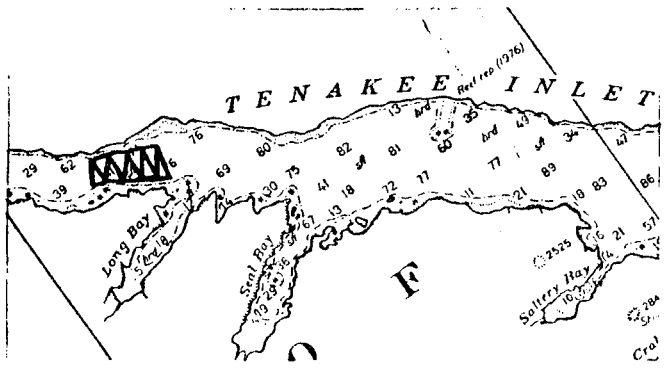
Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

Area Tenakee Inlet Date 11/19/81 Vessel Auklet
Run #2 Gain 6.0 Atten. -12dB Operators Blank-DeJong
Survey Time 1533 - 1630 hrs. Chart 17300
Biomass .61 x 10^6 pounds

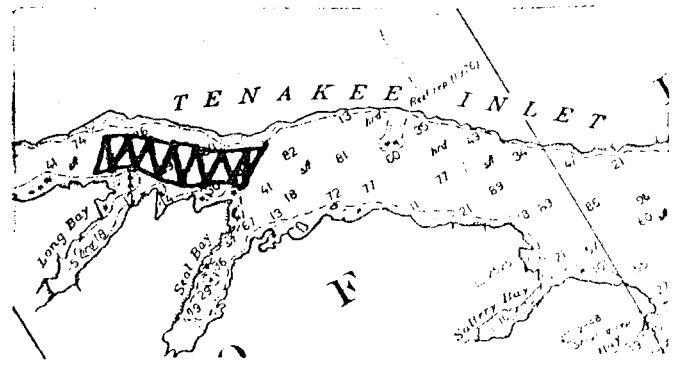
Area Tenakee Inlet Date 12/18/81 Vessel Steller
Run #2 Gain 5.25 Atten. -12dB Operators Larson-Muir
Survey Time 1602 - 1723 hrs. Chart 17300
Biomass 8.74 x 10^6 pounds



Area Tenakee Inlet Date 12/18/81 Vessel Steller
Run #1 Gain 5.75 Atten. -12dB Operators Larson-Muir
Survey Time 1436 - 1513 hrs. Chart 17300
Biomass 1.69 x 10^6 pounds

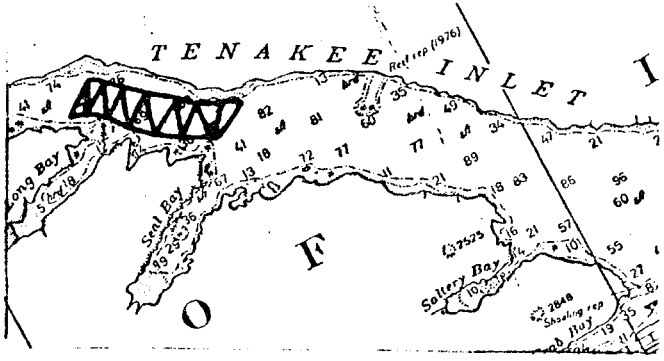


Area Tenakee Inlet Date 11/13/82 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Larson
Survey Time 1341 - 1506 hrs. Chart 17320
Biomass 17.37 x 10^6 pounds

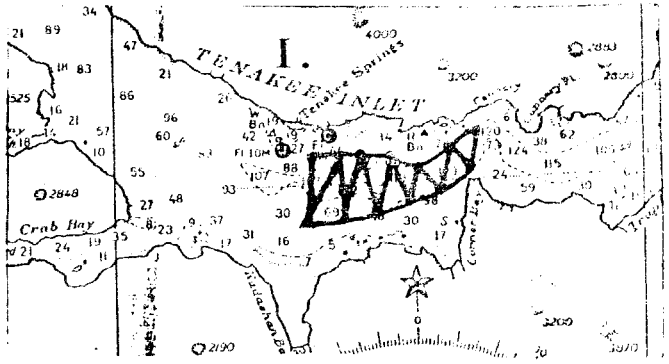


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

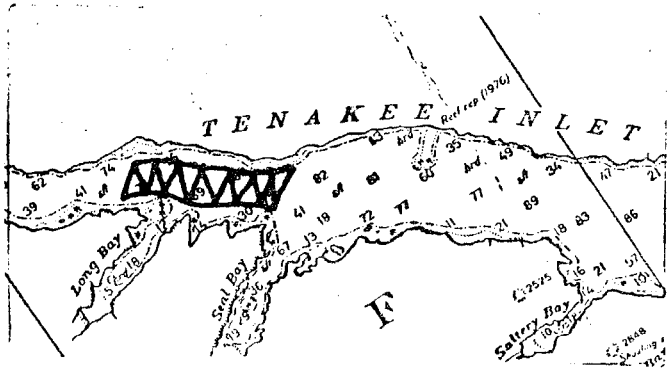
Area Tenakee Inlet Date 11/13/82 Vessel Steller
Run #2 Gain 6.0 Atten. -12dB Operators Blank-Larson
Survey Time 1539 - 1658 hrs. Chart 17320
Biomass 10.22 x 10^6 pounds



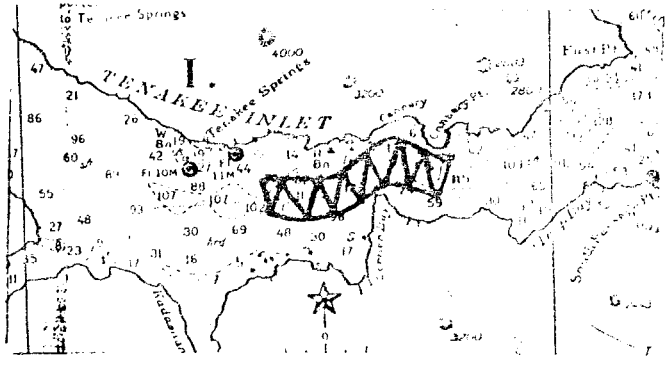
Area Tenakee Inlet Date 1/28/83 Vessel Kittiwake
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Gaudet
Survey Time 1630 - 1731 hrs. Chart 17320
Biomass 8.87 x 10^6 pounds



Area Tenakee Inlet Date 11/14/82 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Larson
Survey Time 1552 - 1714 hrs. Chart 17320
Biomass 17.74 x 10^6 pounds

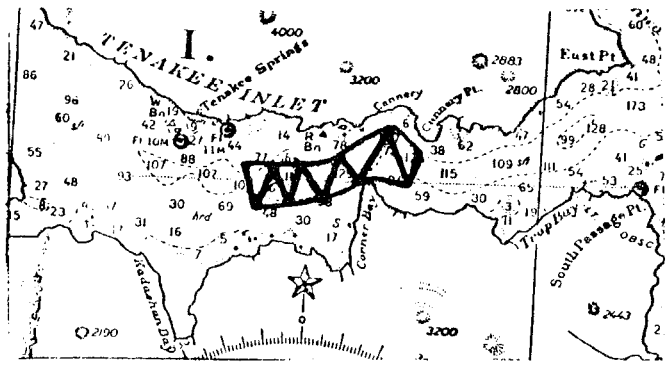


Area Tenakee Inlet Date 1/29/83 Vessel Kittiwake
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Gaudet
Survey Time 114 - 1280 hrs. Chart 17320
Biomass 3.84 x 10^6 pounds



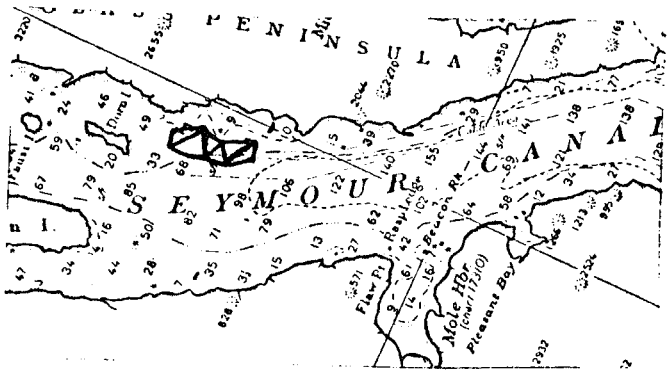
Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

Area Tenakee Inlet Date 1/29/83 Vessel Kittiwake
Run #2 Gain 6.0 Atten. -12dB Operators Blank-Gaudet
Survey Time 1337 - 1451 hrs. Chart 17320
Biomass 1.92 x 10^6 pounds

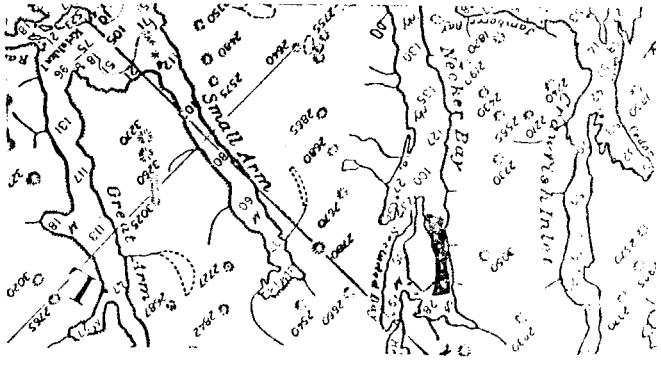


Area Seymour Canal Date 4/20/82 Vessel Steller
Run #2 Gain 5.7 Atten. -12dB Operators Timothy-Schonberg
Survey Time 2042 - 2119 hrs. Chart 17360
Biomass 2.11 x 10^6 pounds

Area Seymour Canal Date 4/20/82 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Timothy-Schonberg
Survey Time 2017 - 2038 hrs. Chart 17360
Biomass 2.62 x 10^6 pounds

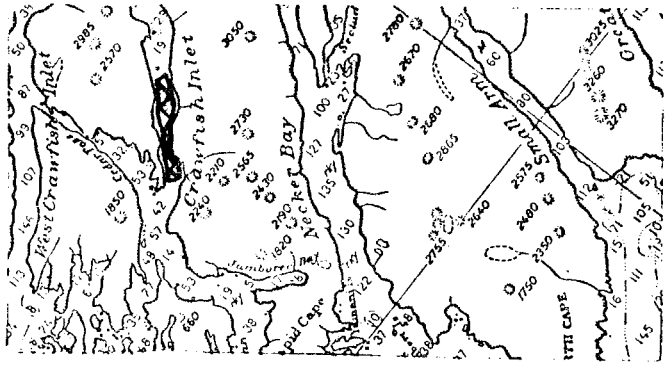


Area Necker Bay Date 2/13/81 Vessel Sundance
Run #1 Gain 6.0 Atten. -12dB Operator Larson
Survey Time 1906 - 1932 hrs. Chart 17320
Biomass .18 x 10^6 pounds

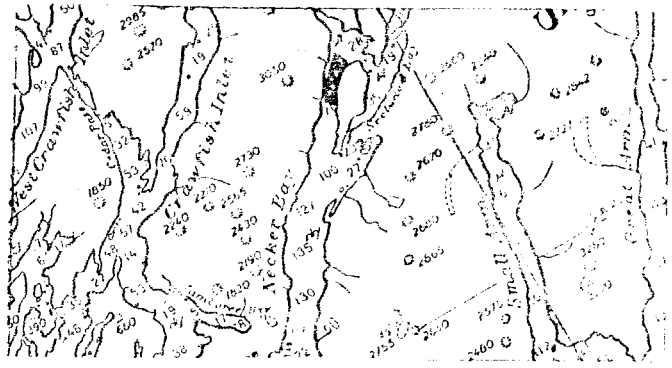


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

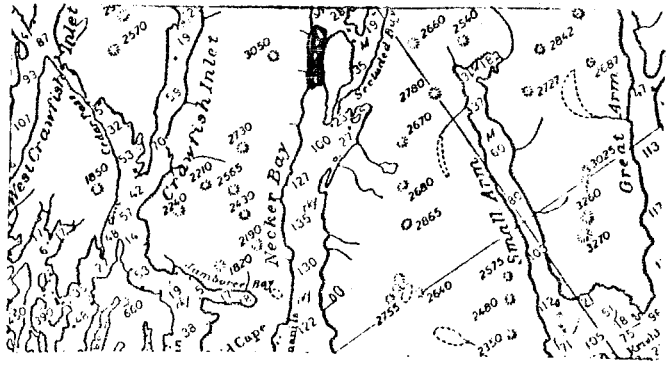
Area Crawfish Inlet Date 2/14/81 Vessel Sundance
Run #1 Gain 6.0 Atten. -12dB Operator Larson
Survey Time 1820 - 1847 hrs. Chart 17320
Biomass .69 x 10^6 pounds



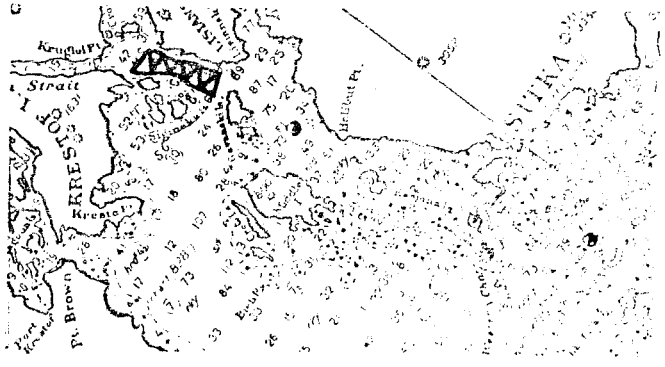
Area Necker Bay Date 12/9/81 Vessel Auklet
Run #2 Gain 5.0 Atten. -12dB Operator DeJong
Survey Time 1757 - 1812 hrs. Chart 17320
Biomass .21 x 10^6 pounds



Area Necker Bay Date 12/9/81 Vessel Auklet
Run #1 Gain 6.0 Atten. -12dB Operator DeJong
Survey Time 1735 - 1750 hrs. Chart 17320
Biomass .58 x 10^6 pounds

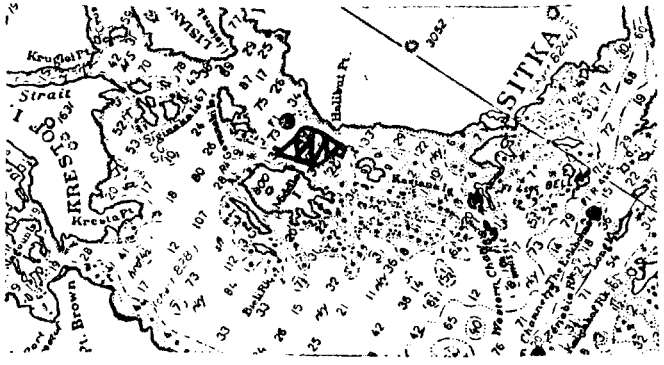


Area Olga Straits Date 1/5/81 Vessel Steller
Run #1 Gain 4.5 Atten. -12dB Operator Blank-
Survey Time 1554 - 1624 hrs. Chart 17320
Biomass 13.81 x 10^6 pounds

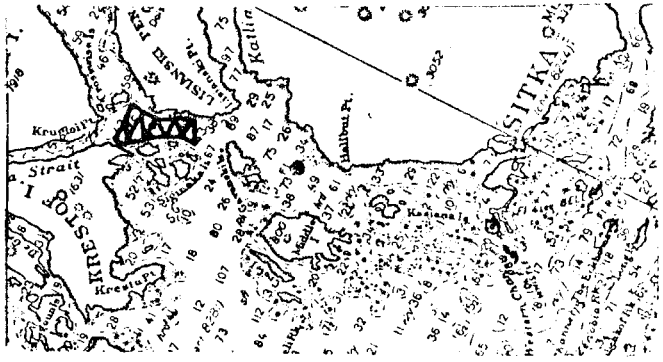


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

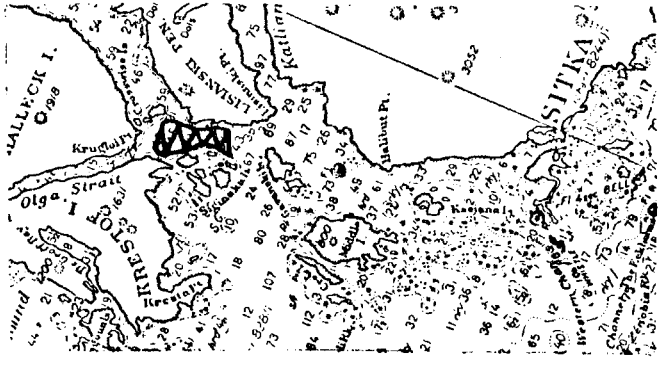
Area Black Can, Sitka Rocks Date 1/13/81 Vessel Steller
Run #1 Gain 8.0 Atten. -12dB Operator Blank-
Survey Time 1746 - 1821 hrs. Chart 17320
Biomass .07 x 10^6 pounds



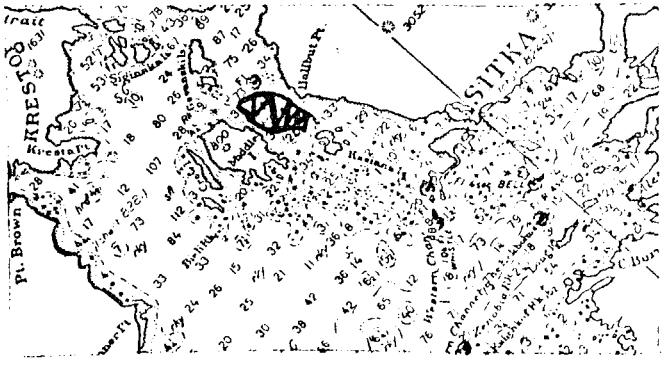
Area Olga Strait Date 1/14/81 Vessel Steller
Run #2 Gain 4.5 Atten.-12dB Operator Blank-
Survey Time 1608 - 1637 hrs. Chart 17320
Biomass 14.08 x 10^6 pounds



Area Olga Straits Date 1/14/81 Vessel Steller
Run #1 Gain 4.5 Atten. -12dB Operator Blank-
Survey Time 1529 - 1559 hrs. Chart 17320
Biomass 14.08 x 10^6 pounds

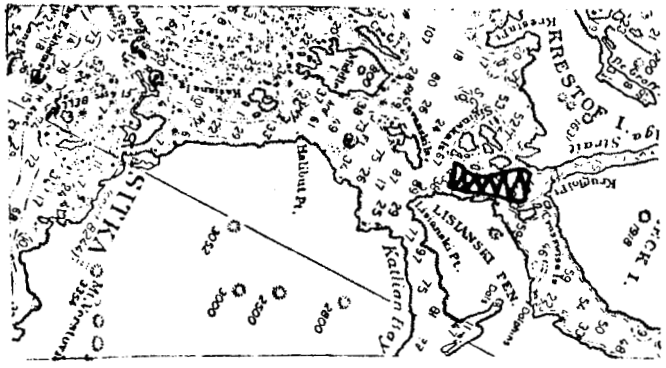


Area Blank Can, Sitka Rocks Date 1/14/81 Vessel Steller
Run #1 Gain 4.7 Atten. -12dB Operator Blank-
Survey Time 1700 - 1742 hrs. Chart 17320
Biomass 23.08 x 10^6 pounds

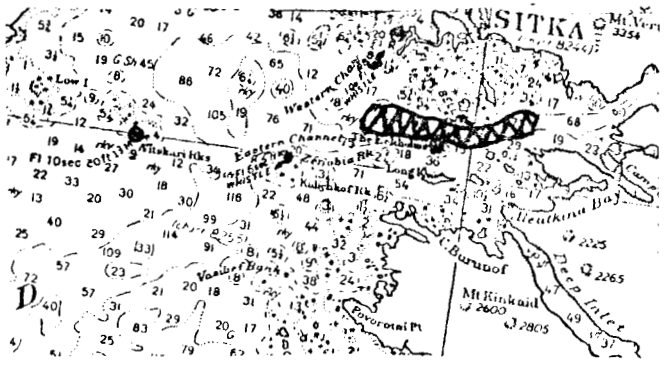


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

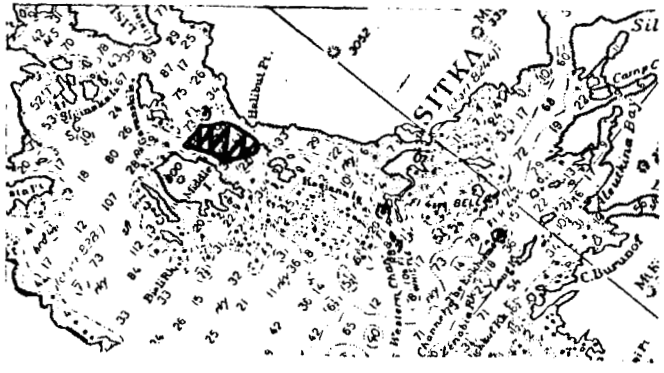
Area Olga Straits Date 1/13/81 Vessel Steller
Run #1 Gain 4.5 Atten. -12dB Operator Blank-
Survey Time 1702 - 1738 hrs. Chart 17320
Biomass 28.04 x 10^6 pounds



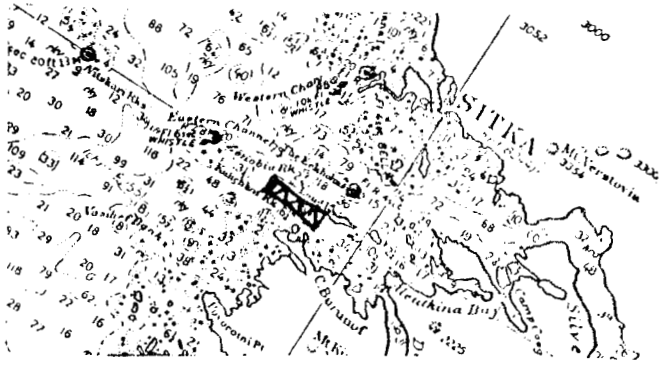
Area Eastern Channel Date 3/4/81 Vessel Auklet
Run #1 Gain 4.0 Atten. -12db Operators DeJong
Survey Time 1942 - 2039 hrs. Chart 17320
Biomass 13.13 x 10^6 pounds



Area Black Can, Old Sitka Rocks Date 1/15/81 Vessel Steller
Run #1 Gain 4.7 Atten. -12dB Operator Blank-
Survey Time 1701 - 1744 hrs. Chart 17320
Biomass 26.83 x 10^6 pounds

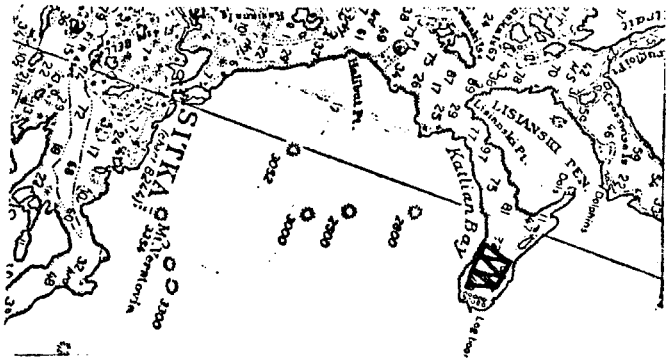


Area Eastern Channel Date 3/12/81 Vessel Auklet
Run #1 Gain 4.0 Atten. -12dB Operators Larson-DeJong
Survey Time 1955 - 2016 hrs. Chart 17320
Biomass 15.57 x 10^6 pounds

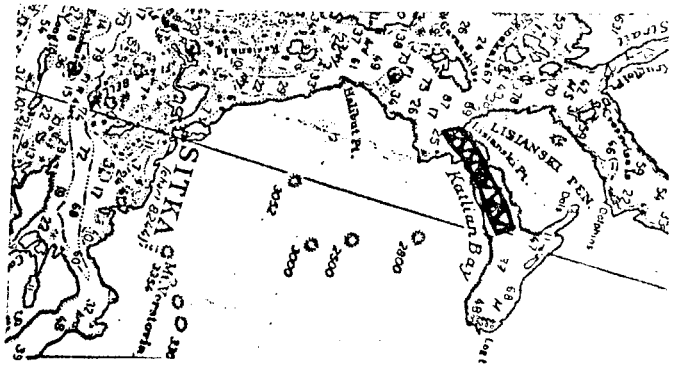


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

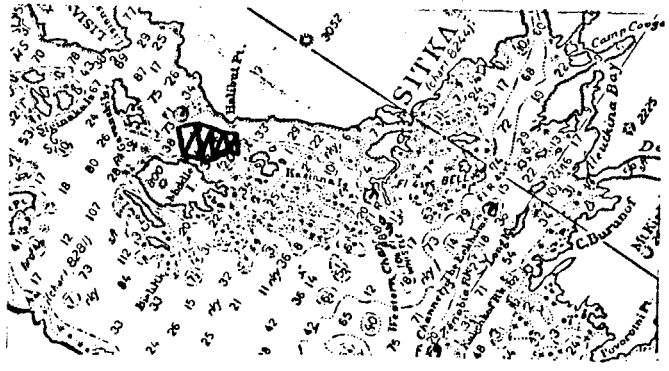
Area Katlian Bay Date 11/13/81 Vessel Auklet
Run #1 Gain 5.0 Atten. -12dB Operators Blank-DeJong
Survey Time 1510 - 1535 hrs. Chart 17320
Biomass .68 x 10^6 pounds



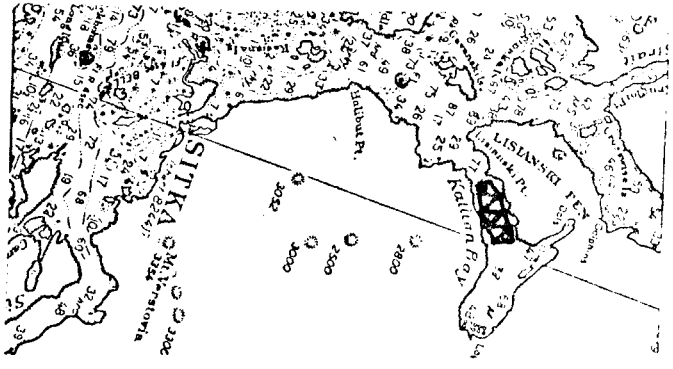
Area Katlian Bay Date 1/27/82 Vessel Auklet
Run #1 Gain 4.0 Atten. -12dB Operator Larson
Survey Time 1354 - 1435 hrs. Chart 17320
Biomass 1.47 x 10^6 pounds



Area Black Can, Sitka Rocks Date 12/7/81 Vessel Auklet
Run #1 Gain 4.5 Atten. -12dB Operator DeJong
Survey Time 1700 - 1740 hrs. Chart 17320
Biomass 3.22 x 10^6 pounds

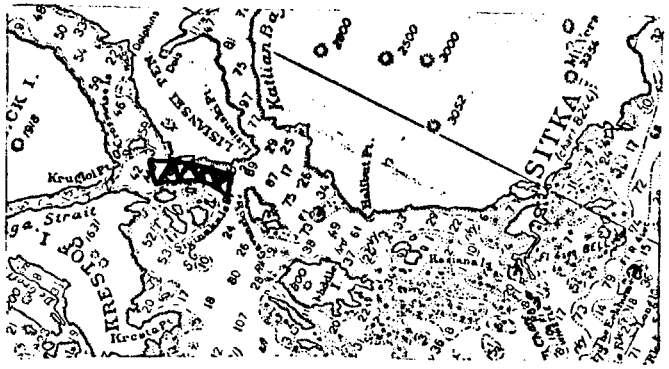


Area Katlian Bay Date 1/28/82 Vessel Auklet
Run #2 Gain 5.5 Atten. -12dB Operator Larson
Survey Time 1718 - 1743 hrs. Chart 17320
Biomass 1.42 x 10^6 pounds

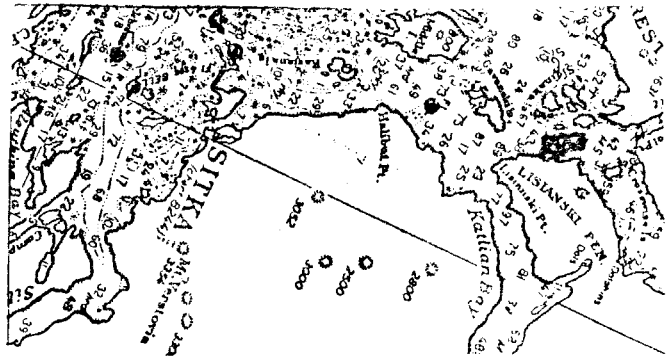


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

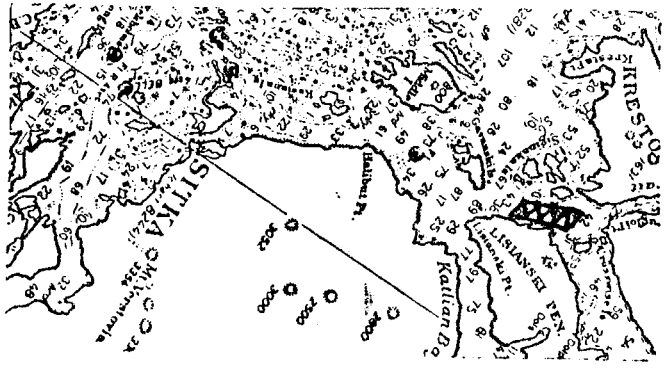
Area Olga Straits Date 1/28/82 Vessel Auklet
Run #1 Gain Atten. -12dB Operator Larson
Survey Time 1625 - 1643 hrs. Chart 17320
Biomass 4.42 x 10^6 pounds



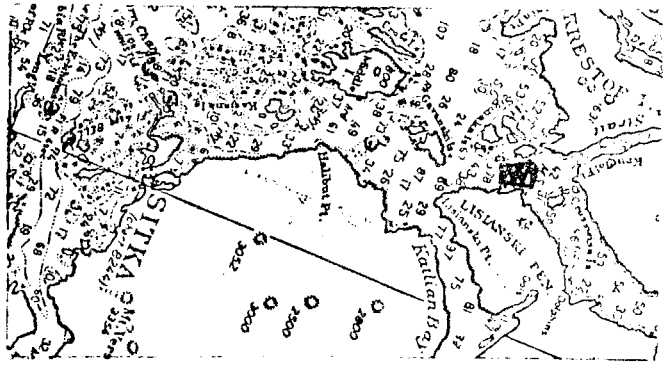
Area Olga Straits Date 2/10/82 Vessel Auklet
Run #1 Gain 4.0 Atten. -12dB Operator DeJong
Survey Time 1810 - 1843 hrs. Chart 17320
Biomass 6.18 x 10^6 pounds



Area Olga Straits Date 2/8/82 Vessel Auklet
Run #1 Gain 5.5 Atten. -12dB Operator DeJong
Survey Time 1142 - 1217 hrs. Chart 17320
Biomass 2.43 x 10^6 pounds

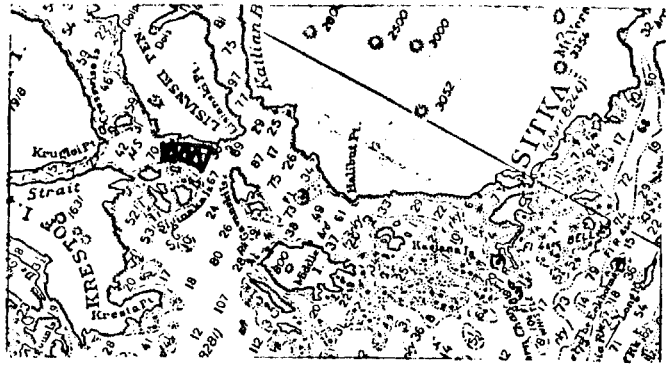


Area Olga Straits Date 2/16/82 Vessel Auklet
Run #1 Gain 4.0 Atten. -12dB Operator DeJong
Survey Time 1847 - 1913 hrs. Chart 17320
Biomass 6.03 x 10^6 pounds

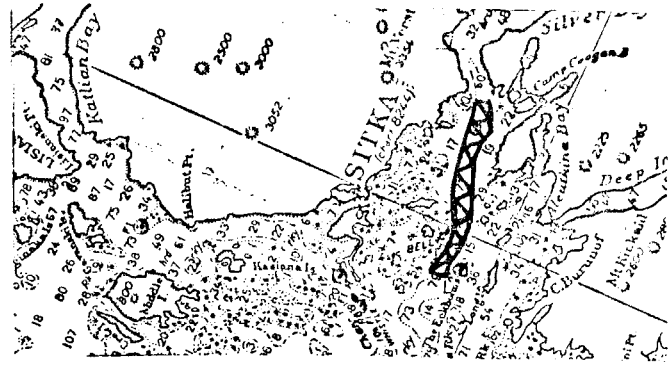


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

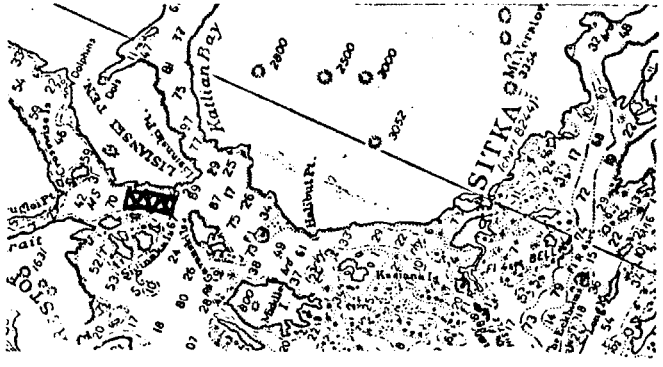
Area Olga Straits Date 2/23/82 Vessel Auklet
Run #1 Gain 4.0 Atten. -12dB Operator Larson
Survey Time 1807 - 1825 hrs. Chart 17320
Biomass 3.02 x 10^6 pounds



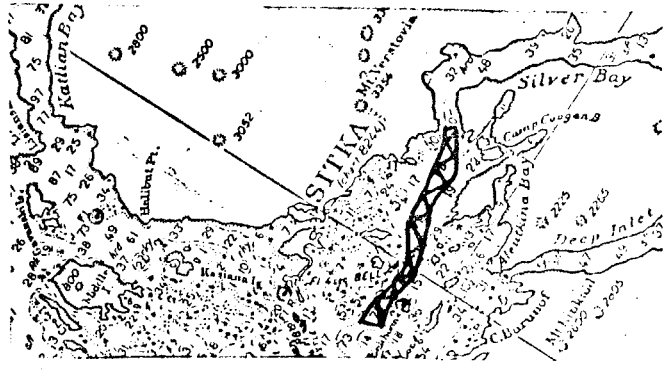
Area Eastern Channel Date 3/5/82 Vessel Steller
Run #1 Gain 6.0 Atten. -12dB Operators Blank-Larson
Survey Time 1147 - 1254 hrs. Chart 17320
Biomass 4.87 x 10^6 pounds



Area Olga Straits Date 2/23/82 Vessel Auklet
Run #2 Gain 4.0 Atten. -12dB Operator Larson
Survey Time 1831 - 1844 hrs. Chart 17320
Biomass 3.60 x 10^6 pounds

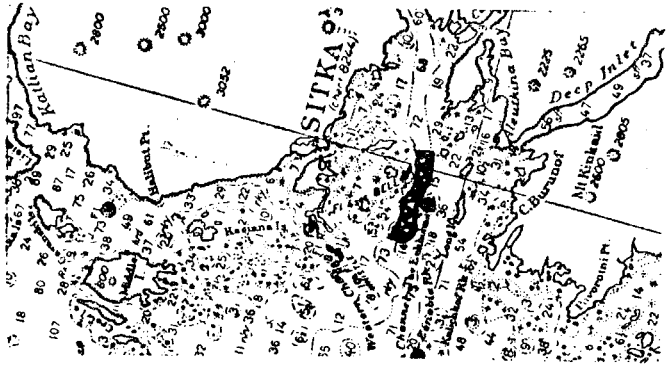


Area Eastern Channel Date 3/5/82 Vessel Steller
Run #2 Gain 6.0 Atten.-12dB Operators Blank-Larson
Survey Time 1355 - 1451 hrs. Chart 17320
Biomass 8.37 x 10^6 pounds

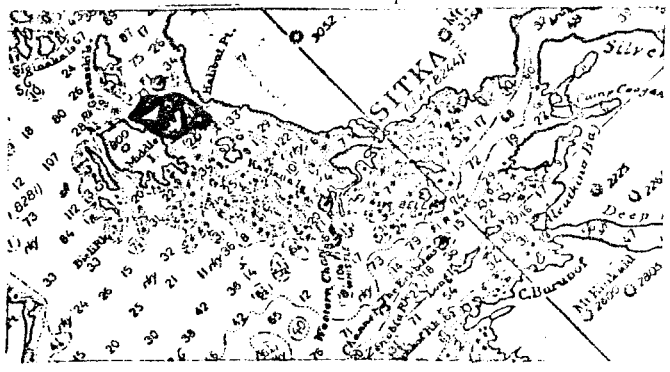


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

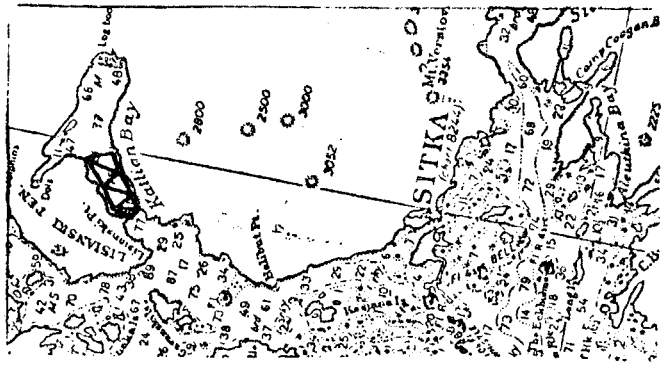
Area Eastern Channel Date 3/8/82 Vessel Auklet
Run #1 Gain 4.0 Atten. -12dB Operator DeJong
Survey Time 1540 - 1638 hrs. Chart 17320
Biomass 10.20 x 10^6 pounds



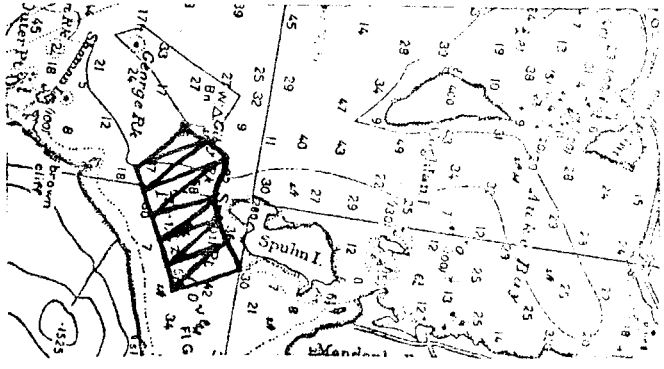
Area Old Sitka Rocks Date 2/16/83 Vessel Steller
Run #1 Gain 4.4 Atten. -12dB Operators Blank-
Survey Time 1638 - 1721 hrs. Chart 17320
Biomass 25.81 x 10^6 pounds



Area Katlian Bay Date 3/23/82 Vessel Auklet
Run #1 Gain 5.5 Atten. -12dB Operator Larson
Survey Time 1559 - 1632 hrs. Chart 17320
Biomass 2.31 x 10^6 pounds

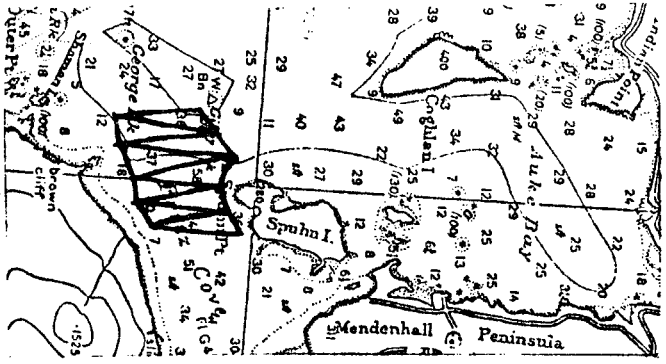


Area Fritz Cove Date 1/18/81 Vessel Steller
Run #1 Gain 5.5 Atten. -12dB Operator Blank-
Survey Time 1140 - 1215 hrs. Chart 17316
Biomass 2.92 x 10^6 pounds

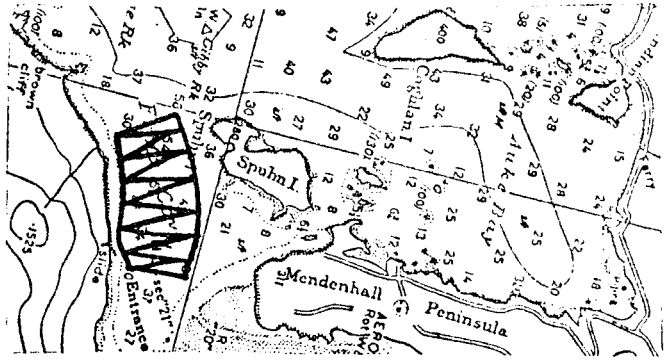


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

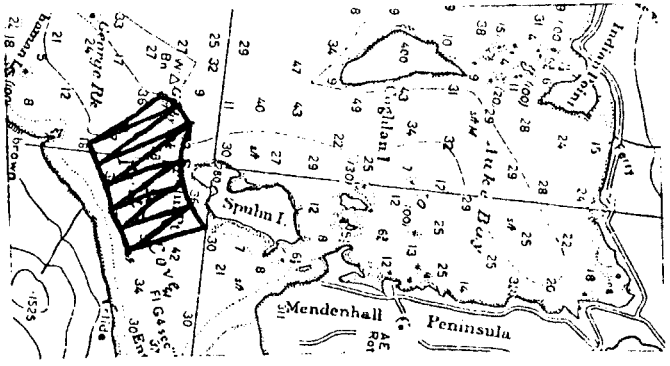
Area Fritz Cove Date 1/18/81 Vessel Steller
Run #2 Gain 5.0 Atten. -12dB Operator Blank-
Survey Time 1228 - 1258 hrs. Chart 17316
Biomass 4.69 x 10^6 pounds



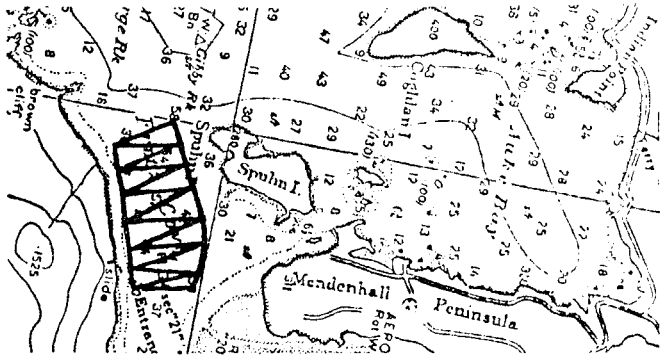
Area Fritz Cove Date 3/10/81 Vessel Kittiwake
Run #1 Gain 4.5 Atten. -12dB Operator Ingledue
Survey Time 1840 - 1920 hrs. Chart 17316
Biomass 6.1 x 10^6 pounds



Area Fritz Cove Date 1/18/81 Vessel Steller
Run #3 Gain 5.5 Atten. -12dB Operator Blank-
Survey Time 1321 - 1407 hrs. Chart 17316
Biomass 4.17 x 10^6 pounds

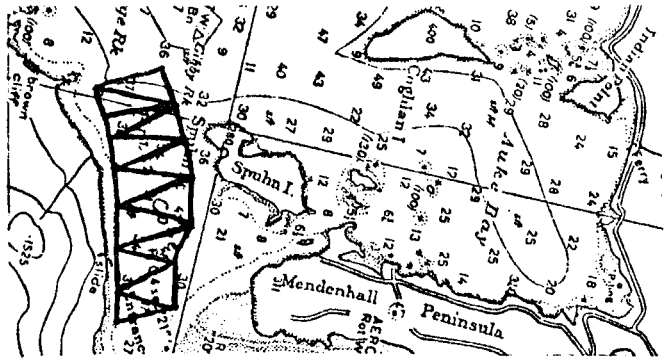


Area Fritz Cove Date 3/10/81 Vessel Kittiwake
Run #2 Gain 4.5 Atten. -12dB Operator Ingledue
Survey Time 1926 - 1946 hrs. Chart 17316
Biomass 7.60 x 10^6 pounds

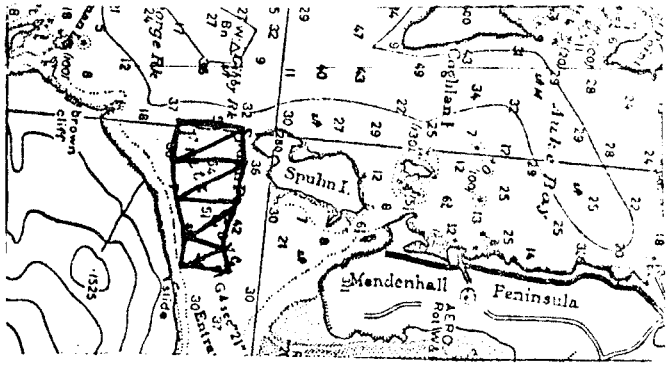


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

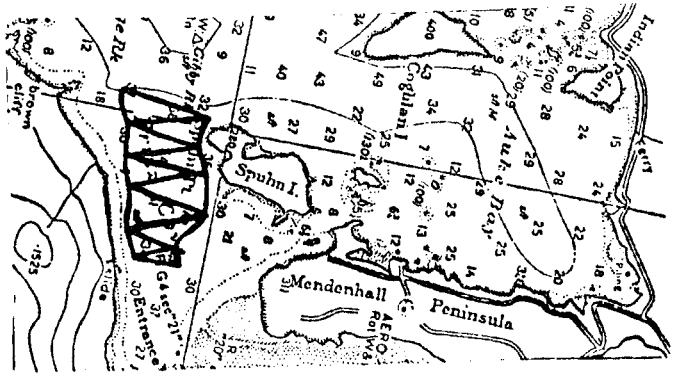
Area Fritz Cove Date 3/11/81 Vessel Kittiwake
Runs 3 & 4 Gain 4.4 Atten. -12dB Operator Ingledue
Survey Time 0738 - 0833 hrs. - 0836 0 0904 hrs. Chart 17316
Biomass #3 8.60 x 10^6 pounds #4 8.30 x 10^6 pounds



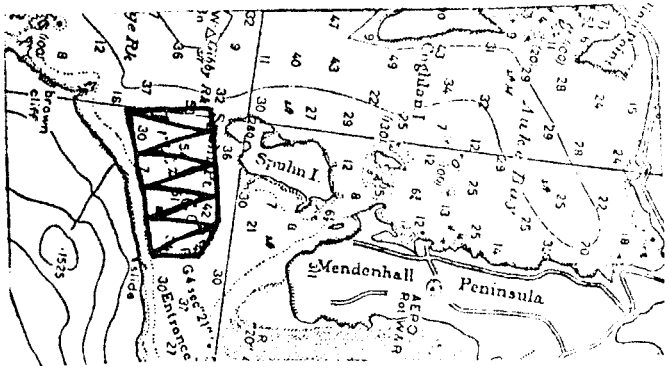
Area Fritz Cove Date 2/18/82 Vessel Kittiwake
Run #2 Gain 5.6 Atten. -12dB Operators Muir-Imamura
Survey Time 1820 - 1845 hrs. Chart 17316
Biomass 2.03 x 10^6 pounds



Area Fritz Cove Date 2/18/82 Vessel Kittiwake
Run #1 Gain 5.8 Atten. -12dB Operators Muir-Imamura
Survey Time 1717 - 1748 hrs. Chart 17316
Biomass 2.04 x 10^6 pounds

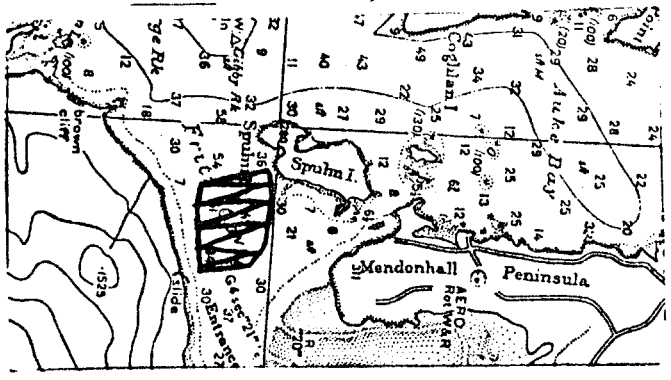


Area Fritz Cove Date 2/19/82 Vessel Kittiwake
Run #1 Gain 5.1 Atten. -12dB Operator Ingledue
Survey Time 1819 - 1846 hrs. Chart 17316
Biomass 2.95 x 10^6 pounds

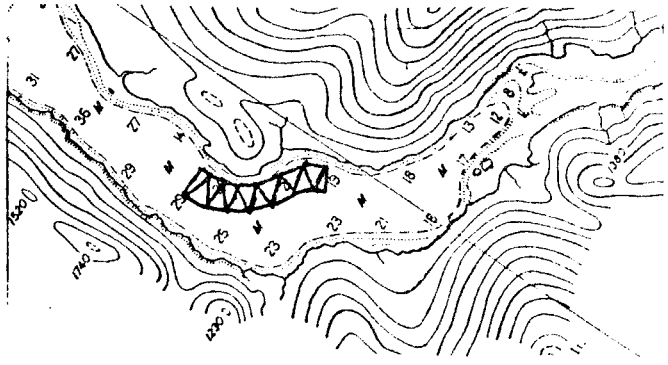


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

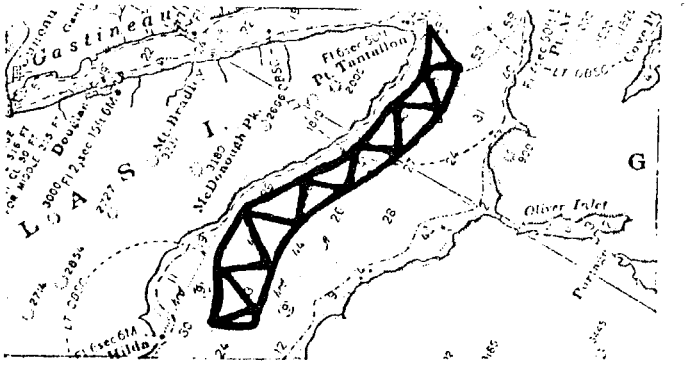
Area Fritz Cove Date 2/19/82 Vessel Kittiwake
Run #2 Gain 5.2 Atten. -12dB Operator Ingledu
Survey Time 1850 - 1907 hrs. Chart 17316
Biomass 1.66 x 10^6 pounds



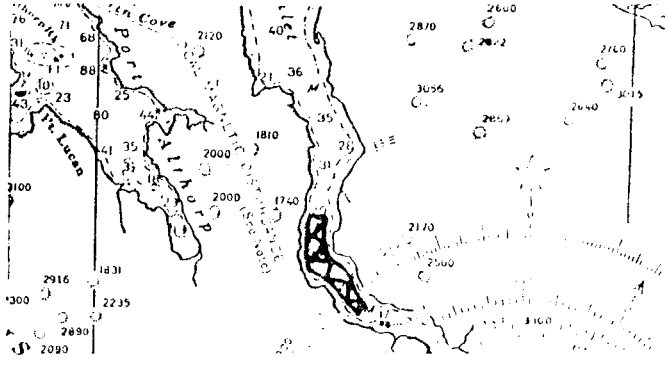
Area Idaho Inlet Date 12/6/80 Vessel Auklet
Run #1 Gain 5.2 Atten. -12dB Operators Larson
Survey Time 1340 - 1400 hrs. Chart 17302
Biomass 6.80 d 10^6 pounds



Area Stephens Passage Date 2/25/3 Vessel Kittiwake
Run #1 Gain 5.0 Atten. -12dB Operators Ingledue
Survey Time 1851 - 1938 hrs. Chart 17300
Biomass 3.61 x 10^6 pounds

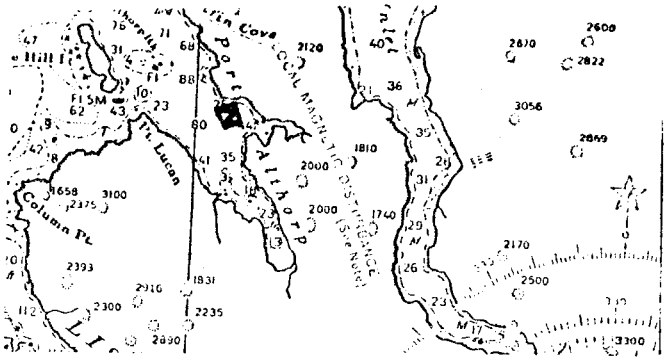


Area Idaho Inlet Date 11/16/81 Vessel Auklet
Run #1 Gain 5.0 Atten. -12dB Operators Blank-DeJong
Survey Time 1733 - 1757 hrs. Chart 17302
Biomass 1.75 x 10^6 pounds

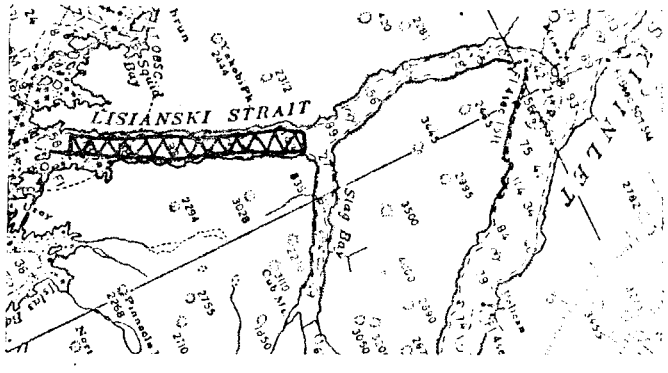


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

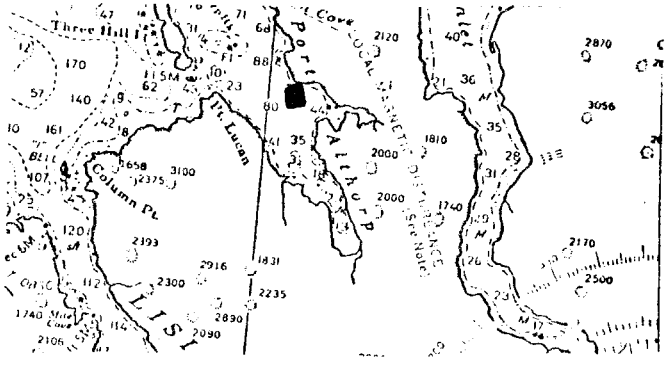
Area Port Althorp Date 11/16/81 Vessel Auklet
Run #1 Gain 5.0 Atten. -12dB Operators Blank-DeJong
Survey Time 1212 - 1228 hrs. Chart 17302
Biomass .20 x 10^6 pounds



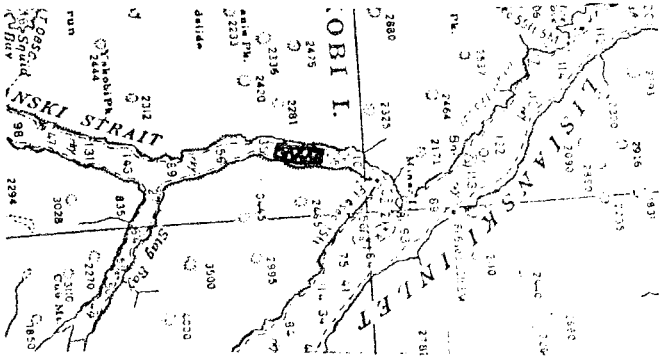
Area Lisianski Straits Date 11/9/80 Vessel Kittiwake
Run #1 Gain 6.0 Atten. -12dB Operator Blank-
Survey Time 1914 - 2012 hrs. Chart 17300
Biomass 1.20 x 10^6 pounds



Area Port Althorp Date 11/16/81 Vessel Auklet
Run #2 Gain 5.0 Atten. -12dB Operators Blank-DeJong
Survey Time 1232 - 1246 hrs. Chart 17302
Biomass .05 x 10^6 pounds

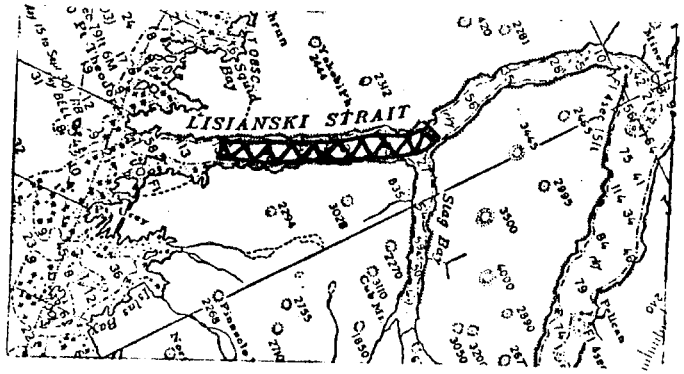


Area Lisianski Straits Date 12/17/80 Vessel Auklet
Run #1 Gain 5.4 Atten. -12dB Operator Muir
Survey Time 2020 - 2056 hrs. Chart 17300
Biomass 5.0 x 10^6 pounds

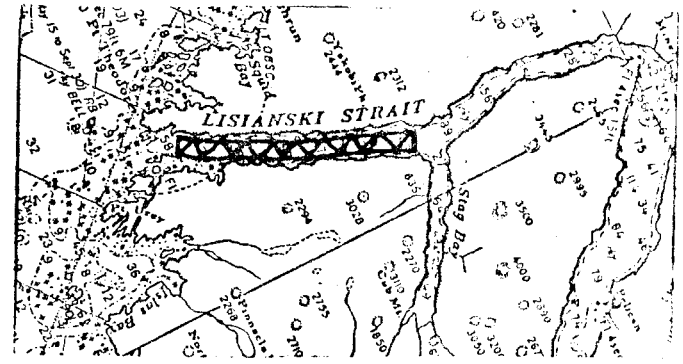


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

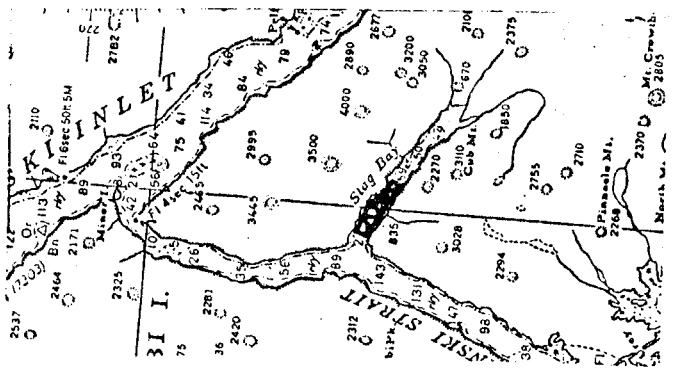
Area Lisianski Straits Date 11/15/81 Vessel Auklet
Run #1 Gain 7.5 Atten. -12dB Operators Blank-DeJong
Survey Time 1624 - 1655 hrs. Chart 17302
Biomass .76 x 10^6 pounds



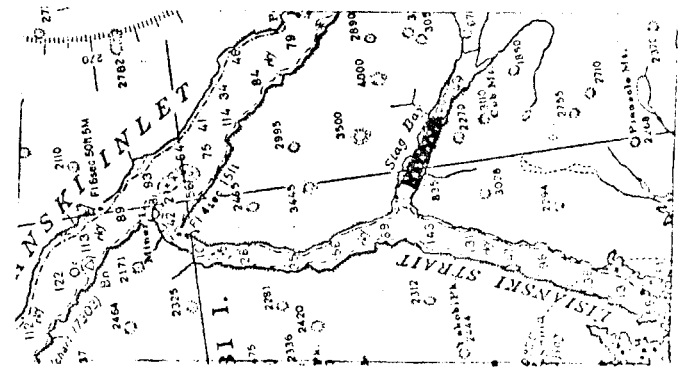
Area Lisianski Straits Date 12/14/81 Vessel Auklet
Run #2 Gain 6.0 Atten. -12dB Operator DeJong
Survey Time 1730 - 1812 hrs. Chart 17302
Biomass 1.88 x 10^6 pounds



Area Stag Bay Date 11/15/81 Vessel Auklet
Run #1 Gain 6.0 Atten. -12dB Operators Blank-DeJong
Survey Time 1710 - 1721 hrs. Chart 17302
Biomass .15 x 10^6 pounds

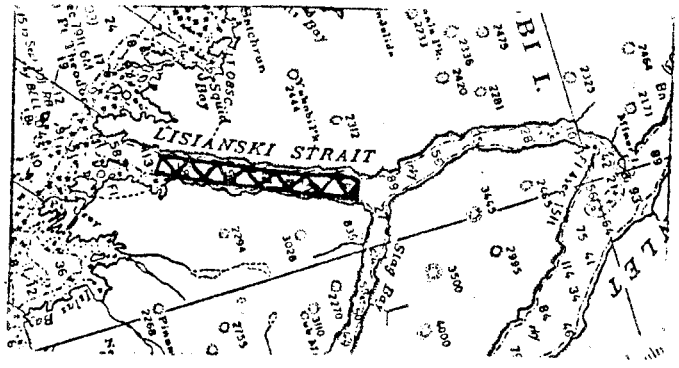


Area Stag Bay Date 12/15/81 Vessel Auklet
Run #1 Gain 6.0 Atten. -12dB Operator DeJong
Survey Time 1630 - 1653 hrs. Chart 17302
Biomass .48 x 10^6 pounds

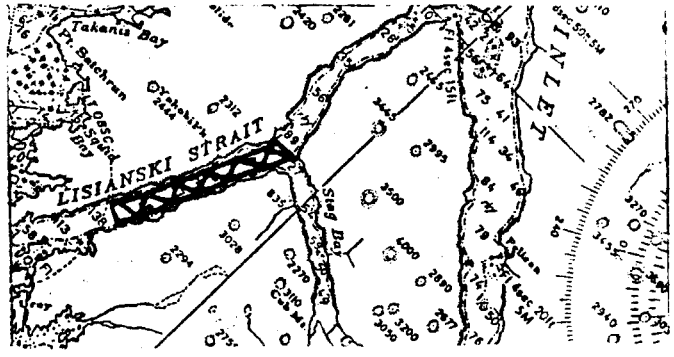


Appendix I. Hydroacoustical surveys by location, method, and year, 1980-81, 1981-82, and 1982-83 (continued).

Area Lisianski Straits Date 12/15/81 Vessel Auklet
Run #1 Gain 6.0 Atten. -12dB Operator DeJong
Survey Time 1705 - 1808 hrs. Chart 17302
Biomass 1.88 x 10^6 pounds



Area Lisianski Straits Date 11/16/82 Vessel Steller
Run #1 Gain 7.0 Atten. -12dB Operators Blank-Larson
Survey Time 1721 - 1800 hrs. Chart 17302
Biomass 2.13 x 10^6 pounds



APPENDIX II

Appendix II. Summaries of age, weight, and length data by year and by district.

Area Quadra - East Side Foggy Bay Date 3/23/81

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	16	212.13	10.81	153.63	27.09	28
IV	24	212.13	10.41	151.13	18.85	41
V	7	226.29	5.77	181.57	17.69	12
VI	8	227.25	4.98	183.00	25.01	14
VII	2	256.00	1.41	169.50	9.19	3
VIII	1	240	-	185	-	2
IX						
X						
Total	58	x̄=217.23		x̄=161.11		100

Total Sample Sex Ratio: 56% Male N= 64

Area Quadra - Kah Shakes Date 3/23/81

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	38	208.2	9.5	137.71	14.05	40
V	19	223.4	6.7	154.68	16.77	20
VI	24	227.9	8.2	161.50	20.21	25
VII	10	230.7	8.8	175.50	28.65	10
VIII	2	244.5	.70	176.50	4.95	2
IX	3	235	5.5	187.00	18.03	3
X	0					0
Total	96	x̄=220.07		x̄=153.30		100

Total Sample Sex Ratio: 45% Male N = 110

Area Quadra - Kah Shakes Is. Date 3/31/81

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	4	176	12.6	64.75	18.34	4
IV	83	187.1	9.7	78.53	14.06	83
V	7	209.8	15.0	113.57	29.11	7
VI	4	226.5	9.9	134.50	25.05	4
VII	1	234	-	159	-	1
VIII	0					0
IX	1	238	-	121	-	1
X	0					0
Total	100	x̄=190.80		x̄=83.90		100

Total Sample Sex Ratio: 55% Male N = 208

Area Quadra - Kirk Point Date 3/21/81

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	16	206.75	5.16	125.88	9.32	32
V	14	125.29	7.75	134.93	14.06	28
VI	10	216.20	7.80	143.40	13.15	20
VII	2	225.5	6.36	171.00	15.56	4
VIII	4	228.5	6.24	146.50	12.40	8
IX	3	232.33	-	160.00	6.24	6
X	1	234	-	168	-	2
Total	50	x̄=215.60		x̄=138.26		100

Total Sample Sex Ratio: Unknown

Area Quadra - Kirk Point Date 3/21/81

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	26	205.4	8.3	130.92	20.24	52
V	9	215.7	12.08	149.11	23.45	18
VI	9	221.6	6.08	150.44	13.56	18
VII	5	220.6	4.3	148.60	5.27	10
VIII	1	223	-	172		2
IX	0					0
X	0					0
Total	50	x̄=212.24		x̄=140.30		100

Total Sample Sex Ratio: Unknown

Area Quadra - Kirk Point Date 3/21/81

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	26	205.4	8.3	130.92	20.24	52
V	9	215.7	12.08	149.11	23.45	18
VI	9	221.6	6.08	150.44	13.56	18
VII	5	220.6	4.03	148.60	5.27	10
VIII	1	233	-	172	-	0
IX	0					0
X	0					0
Total	50	x̄=212.24		x̄=140.30		100

Total Sample Sex Ratio: Unknown

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Quadra - Kah Shakes Is. Date 3/31/81

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	4	176	12.6	64.75	18.34	4
IV	83	187.1	9.7	78.53	14.06	83
V	7	209.8	15.0	113.57	29.11	7
VI	4	226.5	9.9	134.50	25.05	4
VII	1	234	-	159	-	1
VIII	0					0
IX	1	238	-	121	-	1
X	0					0
Total	100	x̄=190.80		x̄=83.90		100

Total Sample Sex Ratio: 53% Male N = 208

Area Quadra - Kah Shakes Pt. Date 3/31/81

District 101-23 Gear Seine #2

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	3	177	8.1	68.0	4.58	3
IV	88	189.2	9.8	90.49	17.03	88
V	2	205.5	.7	111.0	5.66	2
VI	5	225	6.4	150.60	23.08	5
VII	1	206	-	114	-	1
VIII	0					0
IX	1	231	-	199	-	0
X	0					0
Total	100	x̄=191.54		x̄=93.75		100

Total Sample Sex Ratio: 56% Male N = 200

Area Quadra/Kah Shakes - Kirk Point Date 3/31/81

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	3	175.67	9.50	62.00	7.00	3
IV	87	189.43	9.42	80.34	12.46	86
V	7	204.43	14.73	108.29	22.35	7
VI	3	226.67	1.53	148.00	35.51	3
VII						
VIII						
IX						
X	1	244.00	-	148.00	-	1
Total	101	x̄=191.71		x̄=84.41		100

Total Sample Sex Ratio: 54% Male N = 101

Area Quadra 1/4 mi. S. Kah Shakes Date 3/20/82

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	6	95.0	7.0	94.0	13.0	13
IV	7	201.5	5.5	101.8	11.2	15
V	30	211.7	5.5	119.8	12.0	63
VI	5	222.0	8.0	142.4	28.0	10
VII	0					0
VIII	0					0
IX						
X						
Total	48	x̄=209.2		x̄=114.5		101

Total Sample Sex Ratio: 50% Male

Area Quadra 1/4 mi. S. Kah Shakes Date 3/20/82

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	2	220.5	10.6	150.5	10.6	3
V	49	221.7	7.8	145.9	16.2	73
VI	16	223.5	6.3	162.8	18.1	24
VII	0					0
VIII	0					0
IX						
X						
Total	67	x̄=224.48		x̄150.1		100

Total Sample Sex Ratio: 31% Male

Area Quadra - Kah Shakes Date 3/22/82

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	18	207.56	8.87	138.3	13	
V	60	212.62	9.2	149.98	16.96	64
VI	12	224.67	13.52	176.08	28.12	13
VII	4	226.0	2.45	179.75	22.84	4
VIII						
IX						
X						
Total	94	x̄=213.76		x̄=151.10		100

Total Sample Sex Ratio: 44% Male

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Quadra - Slate Island Date 3/26/82

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	24	182.3	8.07	76	11.6	24
IV	10	184.7	6.68	82.3	16.0	10
V	61	202.9	10.89	114.7	21.4	62
VI	3	211.6	12.58	129	12.2	3
VII						
VIII						
IX						
X						
Total	98	$\bar{x}$=196.25		$\bar{x}$102.3		100

Total Sample Sex Ratio: 70% Male

Area Quadra - Slate Island Date 3/26/82

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV						
V	76	205.11	8.58	144.8	17.5	83
VI	12	208.92	9.92	152.0	22.8	12
VII	5	222.40	6.35	196.0	36.9	5
VIII						
IX						
X						
Total	93	$\bar{x}$=206.53		$\bar{x}$=148.48		100

Total Sample Sex Ratio: 31% Male

Area Quadra - Slate Island Date 3/26/82

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	26	188.4	6.16	74.4	8	26
IV	9	199.6	10.32	89.1	11.78	9
V	62	208.5	10.77	105.2	21.57	63
VI	2	255	-	124.5	24.75	2
VII	0					0
VIII	0					0
IX						
X						
Total	99	$\bar{x}$=202.75		$\bar{x}$=96.04		100

Total Sample Sex Ratio: 60% Male

Area Quadra S. Kah Shakes Cove Date 3/22/82

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	16	186.1	9.33	78.4	10.94	16
IV	15	199.1	11.39	92.2	18.21	15
V	56	212.8	8.5	121.3	19.04	57
VI	10	227.3	14.95	152.3	29.56	10
VII	1	258	-	182	-	1
VIII	1	248		187	-	1
IX						
X						
Total	99	$\bar{x}$=208.48		$\bar{x}$=114.37		100

Total Sample Sex Ratio: 52%

Area Quadra/Kah Shakes - Slate Is. Date 3/26/82

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	25	177.04	6.82	78.52	11.84	27
IV	15	189.87	8.02	98.47	16.20	16
V	52	194.56	6.34	107.02	15.43	57
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	92	$\bar{x}$=189.03		$\bar{x}$=97.88		

Total Sample Sex Ratio: 55% Male

Area Quadra/Kah Shakes - Slate Is. Date 3/28/82

District 101-23 Gear Commercial Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	1	204	-	131	-	1
IV	4	204.50	4.20	132.25	20.69	4
V	67	210.64	9.42	145.16	23.04	66
VI	16	216.63	6.18	155.06	18.35	16
VII	9	233.67	5.94	189.89	24.42	9
VIII	3	256.33	5.21	189.00	17.52	3
IX	1	239	-	184	-	1
X	0					0
Total	101	$\bar{x}$=214.38		$\bar{x}$=151.75		100

Total Sample Sex Ratio: 46% Male

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Quadra - Very Inlet Date 3/30/82

District 101-23 Gear Dipnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	12	197.4	7.10	84.8	8.09	13
IV	10	208.1	5.53	97.4	12.41	11
V	65	216.6	9.48	121.5	20.52	73
VI	1	235	-	162	-	1
VII	1	235	-	165	-	1
VIII	0					0
IX						
X						
Total	89	x̄=213.47		x̄=114.79		99

Total Sample Sex Ratio: 66% Male

Area Quadra - Very Inlet Date 3/30/82

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	12	201.92	6.11	135.75	17.43	13
V	70	210.73	7.14	155.74	16.77	79
VI	4	219.25	9.46	177.25	19.62	4
VII	3	211.33	9.61	170.33	8.39	3
VIII						
IX						
X						
Total	89	x̄=209.95		x̄=154.5		99

Total Sample Sex Ratio: 33% Male

Area Quadra - Very Inlet Date 4/5/82

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	23	189.2	8.08	78.2	8.94	0
IV	13	200.0	6.37	87.1	10.39	23
V	55	207.0	9.33	102.0	13.73	56
VI	4	228.7	7.80	149.75	20.16	4
VII	2	225.5	7.78	129.5	26.16	2
VIII	2	239.0	9.90	138.0	21.21	2
IX	0					0
X	0					0
Total	99	x̄=203.8		x̄=97.73		100

Total Sample Sex Ratio: 66% Male

Area Quadra - Kirk Point Date 3/22/83

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	160	-	56	-	1
III	33	180.27	7.67	77.36	13.92	18
IV	51	191.31	7.00	94.53	15.66	28
V	13	197.46	6.75	103.00	16.04	7
VI	78	205.36	8.58	123.74	25.33	43
VII	3	228.67	12.66	186.00	34.77	2
VIII	2	232.50	10.61	156.50	20.51	1
IX	0					0
X	0					0
Total	181	x̄=196.69		x̄=106.58		100

Total Sample Sex Ratio: 51% Male N = 183 23% undeterminant

Area Quadra - Kirk Point Date 3/22/83

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	19	183.26	6.87	76.58	10.62	15
IV	40	192.00	5.56	93.90	13.83	31
V	15	204.33	8.27	109.67	12.89	11
VI	52	209.02	8.97	120.98	18.08	40
VII	2	216.50	16.26	158.50	48.79	2
VIII	1	253		211		1
IX	0					0
X	2	235.5	14.85	167.00	43.84	2
Total	131	x̄=200		x̄=106.94		102

Total Sample Sex Ratio: 72% Male N = 132

Area Quadra - Very Inlet Date 3/23/83

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	37	179.43	7.39	69.49	9.25	23
IV	36	193.50	8.81	90.08	14.58	23
V	21	205.52	7.88	111.29	16.74	13
VI	63	206.89	8.17	112.05	16.97	40
VII	1	232	-	149	-	1
VIII	0					0
IX	0					0
X	0					0
Total	158	x̄=197.39		x̄=97.74		100

Total Sample Sex Ratio: 50% Male N = 160

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	13	185.4	12.55	92.08	20.96	13
IV	27	195.7	6.22	116.33	16.44	27
V	15	204.9	9.21	137.47	23.59	15
VI	44	209.3	10.41	149.05	30.82	44
VII	2	217.00	8.49	144.50	9.19	2
VIII	0					0
IX	0					0
X	0					0
Total	101	x̄=202.09		x̄=131.16		101

Total Sample Sex Ratio: 48% Male N = 101

Area Quadra - Slate Island Date 3/23/83

District 101-23 Gear Dipnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	11	180.27	5.62	86.18	8.87	13
IV	14	194.86	8.25	116.57	19.03	18
V	13	209.62	10.00	141.08	20.59	17
VI	38	212.71	8.30	149.08	20.74	49
VII	2	224.50	30.41	202.00	94.75	3
VIII	0					0
IX	0					0
X	0					0
Total	78	x̄=204.72		x̄=134.40		101

Total Sample Sex Ratio: 46% Male N = 80

Area Quadra - S. Bight Kirk Pt. Date 3/23/83

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	175.00	8.19	68.00	18.38	2
III	11	183.27	5.16	76.45	23.35	9
IV	23	197.48	7.33	112.35	17.68	18
V	26	203.81	6.70	124.23	15.31	21
VI	63	208.14	8.21	135.05	26.37	50
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	125	x̄=202.56		x̄=122.39		100

Total Sample Sex Ratio: Unknown N = 127

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	11	184.64	10.57	97.64	15.34	8
IV	28	193.14	9.63	113.93	18.53	21
V	15	205.2	8.41	139.87	22.76	11
VI	77	207.0	8.09	141.88	18.19	57
VII	2	212.5	6.36	148.00	18.38	1
VIII	1	236	-	191	-	1
IX	0					0
X	0					0
Total	134	x̄=202.37		x̄=132.64		99

Total Sample Sex Ratio: 64% Male N = 135

Area Quadra - Kah Shakes Date 3/25/83

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	13	203.85	6.90	132.23	9.84	10
V	35	209.03	5.94	147.43	13.02	28
VI	75	213.99	8.50	153.17	19.18	60
VII	1	235.00	-	164.0	-	1
VIII						
IX						
X						
Total	124	x̄=211.70		x̄=149.44		99

Total Sample Sex Ratio: 44% Male N = 126

Area Quadra - Kah Shakes Date 3/25/83

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	7	202.0	6.00	129.14	10.19	6
V	32	210.25	6.18	144.28	12.79	28
VI	68	216.24	8.40	155.87	17.09	60
VII	3	226.0	2.65	177.00	5.20	2
VIII	2	230.5	23.33	182.50	64.35	2
IX	1	240.0	-	188.00	-	1
X						
Total	113	x̄=214.38		x̄=152.25		100

Total Sample Sex Ratio: 50% Male Unknown

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Quadra - Slate Island Date 4/7/83

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	21	146.5	12.50	41.00	15.05	11
III	44	171.7	12.73	71.34	19.30	23
IV	60	186.9	12.97	93.52	22.82	31
V	22	199.0	13.22	119.95	29.25	11
VI	40	207.7	9.99	135.68	23.39	21
VII	4	207.5	7.14	146.75	14.93	2
VIII	1	210	-	182	-	1
IX	1	225	-	178	-	1
X	1	245	-	258	-	1
Total	192	$\bar{x}$=187.72		$\bar{x}$= 98.35		102

Total Sample Sex Ratio: 64% Male N = 196

Area Quadra - Kah Shakes Date 3/25/83

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	11	208.36	6.87	142.36	20.99	11
V	34	210.25	9.10	144.15	15.39	33
VI	55	213.89	7.69	154.49	17.98	53
VII	3	230.0	6.24	-	-	3
VIII						
IX						
X						
Total	103	$\bar{x}$=212.57		$\bar{x}$=149.48		100

Total Sample Sex Ratio: 57% Male N = 105

Area Tongass Narrows Date 12/4/80

District 101-47 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	149	-	42	-	1
III	20	170.95	10.95	73.80	14.35	19
IV	64	188.75	10.96	101.55	18.38	62
V	8	207.00	10.38	129.25	20.33	8
VI	5	209.60	10.60	142.00	30.10	5
VII	3	210.67	9.29	161.33	9.87	3
VIII	2	230.00	16.97	172.50	45.96	2
IX	1	242	-	183	-	1
X	0			0		0
Total	104	$\bar{x}$=189.29		$\bar{x}$=105.59		101

Total Sample Sex Ratio: 57% Male N = 105

Area Quadra - Kah Shakes Date 3/25/83

District 101-23 Gear Commercial Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	7	205.43	8.64	137.14	20.15	7
V	29	211.34	8.30	152.76	16.92	28
VI	62	212.48	8.16	150.85	17.08	61
VII	2	213.00	1.41	156.50	3.54	2
VIII						
IX						
X	2	242.00	1.41	220.50	26.15	2
Total	102	$\bar{x}$=212.26		$\bar{x}$=151.93		100

Total Sample Sex Ratio: 51% Male N = 104

Area Smeaton Bay Date 11/24/80

District 101-55 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	103	118.3	7.97	20.37	4.84	98
III	2	129.0	11.31	30.50	10.61	2
IV	0					0
V	0					0
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	105	$\bar{x}$=118.50		$\bar{x}$= 20.56		100

Total Sample Sex Ratio: Unknown

Area Quadra - Slate Island Date 4/7/83

District 101-23 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	10	154.40	8.96	55.40	12.51	6
III	65	175.97	9.17	82.88	14.87	38
IV	45	192.00	6.73	103.71	17.33	26
V	12	199.58	13.83	123.33	26.36	7
VI	39	207.28	9.64	134.56	23.51	23
VII	1	222	-	150	-	1
VIII	1	235	-	241	-	1
IX	0					0
X	0					0
Total	173	$\bar{x}$=188.20		$\bar{x}$=102.47		102

Total Sample Sex Ratio: 55% Male N = 173

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Hydaburg - Kelloge Pt. Date 4/24/81

District 103-10 Gear Varimesh Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	10	167.8	2.82	55.10	4.01	20
IV	17	175.6	10.46	62.76	12.57	34
V	2	217.0	4.24	162.00	14.14	4
VI	5	253.2	3.63	197.80	29.51	10
VII	3	250.3	8.33	181.00	4.58	6
VIII	2	231.0	-	174.50	10.61	4
IX	2	243.5	15.44	215.50	57.28	4
X	9	243.8	7.80	185.00	19.75	18
Total	50	x̄=201.95		x̄=118.38		100

Total Sample Sex Ratio: 74% Male

Area Meares Pass Date 12/5/80

District 103-50 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	33	152.97	7.54	48.03	9.77	37
III	16	160.06	14.57	57.44	22.58	18
IV	32	188.25	9.25	104.25	24.01	36
V	8	193.8	3.8	108.75	7.50	9
VI	0					0
VII	1	234	-	198	-	1
VIII	0					0
IX	0					0
X	0					0
Total	90	x̄=171.30		x̄= 74.56		101

Total Sample Sex Ratio: 37% Male Unknown

Area Meares Pass Date 12/6/81

District 103-50 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	5	183.2	7.69	83.20	15.59	5
IV	28	199.6	8.02	116.82	17.26	30
V	50	213.5	7.30	148.28	17.85	54
VI	7	232.5	10.6	172.86	26.05	8
VII	1	230	-	193	-	1
VIII	1	245	-	210	-	1
IX	0					0
X	0					0
Total	92	x̄=209.59		x̄=138.20		99

Total Sample Sex Ratio: Unknown

Area Meares Pass Date 12/11/83

District 103-50 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	14	150.61	11.23	46.61	15.73	8
III	101	176.44	9.45	80.54	18.03	58
IV	11	190.27	10.21	100.42	13.36	6
V	19	206.63	10.96	134.89	21.87	11
VI	17	211.53	7.62	142.71	15.19	10
VII	9	218.56	5.30	163.56	11.18	5
VIII	2	227.0	9.90	168.0	9.90	1
IX						
X						
Total	173	x̄=184.77		x̄= 96.47		99

Total Sample Sex Ratio: 46% Male 6% Unknown

Area Craig Date 5/20/81

District 103-60 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	86	195.33	8.77	105.10	16.57	86
V	5	213.60	12.18	131.80	20.19	5
VI	4	218.7	5.68	112.75	6.60	4
VII	4	233.5	2.00	188.25	24.60	4
VIII	0					0
IX	0					0
X	0					0
Total	99	x̄=196.72		x̄=111.74		99

Total Sample Sex Ratio: 64% Male N = 100

Area Tonowek Date 12/5/81

District 103-80 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	3	185.33	0.58	86.00	8.72	3
IV	29	192.00	8.77	117.28	24.14	32
V	54	207.80	8.18	137.67	19.81	60
VI	3	224.33	8.14	177.00	22.61	3
VII	1	230	-	193	-	1
VIII	0					0
IX	0					0
X	0					0
Total	90	x̄=202.76		x̄=131.50		99

Total Sample Sex Ratio: Unknown

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Hydaburg - Kellogg Pt. Date 4/24/81

District 103-40 Gear Varimesh Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	10	167.8	2.82	55.10	4.01	20
IV	17	175.6	10.46	62.76	12.57	34
V	2	217.0	4.24	162.00	14.14	4
VI	5	233.2	3.63	197.80	29.51	10
VII	3	250.3	8.33	181.00	4.58	6
VIII	2	231.0	-	174.50	10.61	4
IX	2	243.5	13.44	215.50	57.28	4
X	9	243.8	7.80	185.00	19.75	18
Total	50	x̄=201.95		x̄=118.38		100

Total Sample Sex Ratio: 74% Male

Area Meares Pass Date 12/5/80

District 103-50 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	33	152.97	7.54	48.03	9.77	37
III	16	160.06	14.57	57.44	22.58	18
IV	32	188.25	9.25	104.25	24.01	36
V	8	193.8	3.8	108.75	7.50	9
VI	0					0
VII	1	234	-	198	-	1
VIII	0					0
IX	0					0
X	0					0
Total	90	x̄=171.30		x̄= 74.56		101

Total Sample Sex Ratio: 57% Male Unknown

Area Meares Pass Date 12/6/81

District 103-50 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	5	183.2	7.69	83.20	15.59	5
IV	28	199.6	8.02	116.82	17.26	30
V	50	213.5	7.30	148.28	17.85	54
VI	7	232.5	10.6	172.86	26.05	8
VII	1	230	-	193	-	1
VIII	1	245	-	210	-	1
IX	0					0
X	0					0
Total	92	x̄=209.59		x̄=138.20		99

Total Sample Sex Ratio: Unknown

Area Meares Pass Date 12/11/85

District 103-50 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	14	150.64	14.25	46.64	15.75	8
III	101	176.44	9.45	80.54	18.05	58
IV	11	190.27	10.21	100.42	13.36	6
V	19	206.63	10.96	134.89	21.87	11
VI	17	211.53	7.62	142.71	15.19	10
VII	9	218.56	5.50	165.56	11.48	5
VIII	2	227.0	9.90	168.0	9.90	1
IX						
X						
Total	173	x̄=184.77		x̄= 96.47		99

Total Sample Sex Ratio: 46% Male 6% Unknown

Area Craig Date 3/20/81

District 103-60 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	86	193.33	8.77	105.10	16.57	86
V	5	213.60	12.18	151.80	20.19	5
VI	4	218.7	5.68	142.75	6.60	4
VII	4	233.5	2.00	188.25	24.60	4
VIII	0					0
IX	0					0
X	0					0
Total	99	x̄=196.72		x̄=111.74		99

Total Sample Sex Ratio: 64% Male N = 100

Area Tonowek Date 12/5/81

District 103-80 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	3	185.33	0.58	86.00	8.72	3
IV	29	192.00	8.77	117.28	21.14	32
V	54	207.80	8.18	137.67	19.81	60
VI	3	224.33	8.14	177.00	22.61	3
VII	1	230	-	193	-	1
VIII	0					0
IX	0					0
X	0					0
Total	90	x̄=202.76		x̄=131.30		99

Total Sample Sex Ratio: Unknown

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Boca de Linas — Date 12/15/83

District 105-80 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	22	153.14	7.69	50.05	9.94	9
III	189	166.21	8.73	68.86	12.27	81
IV	8	176.38	9.59	82.00	16.25	3
V	3	194.67	13.61	104.00	15.72	1
VI	7	197.43	12.79	119.00	24.33	3
VII	5	190.40	12.58	90.60	48.59	2
VIII	0					0
IX	0					0
X	0					0
Total	234	x̄=167.14		x̄= 69.96		99

Total Sample Sex Ratio: 47% Male 2% Unknown

Area Hub Rock — Date 12/7/81

District 103-90 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	161.50	9.19	59.50	7.78	2
III	9	171.33	7.33	72.67	10.78	9
IV	33	172.42	28.42	81.36	12.05	34
V	40	190.40	9.13	103.33	18.89	42
VI	11	201.55	10.32	124.00	17.57	11
VII	1	215	-	143	-	1
VIII						
IX						
X						
Total	96	x̄=183.36		x̄= 94.77		99

Total Sample Sex Ratio: Unknown

Area El Capitan Pass — Date 12/7/80

District 103-90 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	7	155.6	6.83	53.29	5.50	7
III	17	155.0	11.73	56.06	16.20	16
IV	69	172.0	11.02	75.80	19.05	66
V	11	185.5	13.08	95.36	18.72	11
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	101	x̄=168.20		x̄= 71.78		100

Total Sample Sex Ratio: 43% Male

Area Anita Bay — Date 11/20/80

District 107-30 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	6	135.00	11.14	33.33	9.61	7
III	6	151.33	14.92	46.17	17.69	10
IV	21	167.86	8.79	67.33	12.07	29
V	12	186.25	18.63	91.67	31.54	16
VI	7	196.00	13.88	110.29	23.69	10
VII	4	219.76	16.24	140.25	29.71	5
VIII	9	211.00	11.42	125.44	18.29	12
IX	8	224.25	7.19	147.00	13.49	11
X	0	-				0
Total	73	x̄=183.86		x̄= 90.75		100

Total Sample Sex Ratio: 60% Males

Area Tuxekan Passage — Date 4/28/81

District 103-90 — Gear Varimesh Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	158.0	5.6	48.50	6.36	2
III	7	159.7	6.2	52.57	5.29	8
IV	67	162.7	6.6	54.61	7.05	80
V	4	182.50	27.92	97.25	63.39	6
VI	0					0
VII	1	222	-	216	-	1
VIII	0					0
IX	0					0
X	2	233.50	14.85	177.50	13.44	2
Total	83	x̄=165.71		x̄= 61.25		99

Total Sample Sex Ratio: 57% Male

Area Anita Bay — Date 11/3/81

District 107-30 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	17	168.06	5.24	68.00	7.25	18
IV	40	173.70	5.35	73.40	9.00	42
V	26	188.73	14.97	92.69	20.89	27
VI	7	199.86	20.34	107.43	32.85	7
VII	3	220.00	10.00	131.00	14.73	3
VIII	2	242.50	31.82	131.00	21.04	2
IX	0					0
X						
Total	95	x̄=181.64		x̄= 83.25		99

Total Sample Sex Ratio:

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Anita Bay — Date 10/21/82

District 107-30 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	156.5	2.12	45.0	4.24	2
III	14	179.5	6.88	73.0	11.33	15
IV	15	186.9	5.54	86.4	10.47	16
V	19	192.2	10.56	101.0	16.94	20
VI	32	199.9	15.66	109.0	19.58	34
VII	6	225.1	9.52	160.5	24.64	6
VIII	5	233.2	5.63	161.8	16.71	5
IX	1	225	-	174	-	1
X	0					0
Total	94	x̄=195.95		x̄=103.84		100

Total Sample Sex Ratio: 53% Male

Area Anita Bay — Date 10/21/82

District 107-30 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	71	149.0	8.25	41.1	8.05	89
III	6	159.5	13.22	51.6	13.85	8
IV	2	183.0	9.9	88.5	7.78	2
V	1	225.0	-	77.0	-	1
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	80	x̄=151.59		x̄= 43.52		100

Total Sample Sex Ratio: Unknown

Area Scow Bay — Date 11/1/80

District 106-44 — Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	3	170.00	5.00	86.67	13.43	3
IV	71	184.08	10.82	100.96	19.41	72
V	17	197.94	10.13	133.94	20.77	17
VI	4	202.50	6.45	139.25	3.86	4
VII	2	225.00	7.07	139.00	31.11	2
VIII						
IX	1	223.00	-	193.00	-	1
X						
Total	98	x̄=188.04		x̄=109.52		100

Total Sample Sex Ratio: 50% Male Unknown

Area Scow Bay — Date 9/29/81

District 106-44 — Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
III	3	179.00	9.64	98.33	18.93	3
IV	9	181.11	4.70	94.56	7.83	9
V	54	188.63	12.34	115.70	25.18	54
VI	21	203.00	10.60	141.38	24.06	21
VII	4	213.75	4.79	173.00	14.81	4
VIII	4	210.50	8.23	160.50	17.10	4
IX	2	200.00	14.14	129.00	26.87	2
XIV	2	270.00	-	324.00	41.01	2
XV	1	275.00	-	324.00	-	1
Total	100	x̄=195.28		x̄=129.27		100

Total Sample Sex Ratio:

Area Scow Bay — Date 11/18/81

District 106-41 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	28	123.93	7.98	28.61	5.50	29
III	15	144.53	6.10	49.33	8.67	16
IV	48	148.83	6.63	54.58	7.35	51
V	4	164.75	9.22	76.00	12.99	4
VI						
VII						
VIII						
IX						
X						
Total	95	x̄=141.48		x̄= 47.00		100

Total Sample Sex Ratio: Unknown

Area Scow Bay — Date 5/6/82

District 106-44 — Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
IV	9	191.8	16.66	82.0	21.94	9
V	45	206.0	15.24	100.3	25.70	45
VI	18	220.1	16.29	129.2	26.20	18
VII	12	229.7	10.06	132.4	19.70	12
VIII	8	241.2	14.88	160.5	17.88	8
IX	3	241.6	10.41	180.3	44.09	3
X	3	251.6	12.58	204.0	53.69	3
XV	1	265.0	-	215.0	-	1
Total	99	x̄=216.08		x̄=119.37		100

Total Sample Sex Ratio: 50% Male

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Port Camden — Date 11/8/80

District 109-42 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	28	132.11	11.68	34.36	8.45	47
III	19	161.89	10.42	67.37	10.84	32
IV	10	180.20	10.34	80.50	31.87	17
V	2	195.50	0.71	106.50	6.36	3
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	59	$\bar{x}$=152.00		$\bar{x}$= 55.26		99

Total Sample Sex Ratio:

Area Port Camden — Date 11/8/80

District 109-42 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	16	169.38	9.19	69.63	11.68	29
IV	37	183.95	11.42	92.78	18.03	66
V	3	212	6.56	144.67	5.51	5
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	56	$\bar{x}$=181.29		$\bar{x}$= 88.95		100

Total Sample Sex Ratio:

Area Port Camden — Date 11/17/81

District 109-42 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	6	170.1	3.5	78.17	5.49	6
IV	12	181.6	8.6	92.58	16.82	12
V	53	197.81	11.73	119.66	22.98	55
VI	11	207.9	12.1	139.45	28.20	11
VII	6	223	6.7	176.67	11.83	6
VIII	0					0
IX	1	223	-	162	-	1
X	8	248.5	17.3	222.38	50.01	8
Total	97	$\bar{x}$=201.23		$\bar{x}$=128.31		99

Total Sample Sex Ratio: 50% Male

Area Port Camden — Date 11/18/81

District 109-42 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	3	180	18.03	85.00	20.42	3
IV	25	186.72	9.95	103.68	18.65	26
V	48	199.8	11.2	129.88	26.51	50
VI	14	212.62	9.43	163.77	25.52	15
VII	2	222.5	3.5	195.0	12.73	2
VIII	3	245	5.0	233.67	12.86	3
IX	1	245	-	237	-	1
X	0					0
Total	96	$\bar{x}$=200.0		$\bar{x}$=132.31		100

Total Sample Sex Ratio:

Area Port Camden — Date 11/18/81

District 109-42 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	2	174	5.6	81.0	4.24	2
IV	8	183	4.1	93.13	7,94	9
V	56	204	10.7	136.7	23.43	64
VI	15	212.0	12.93	149.47	23.98	17
VII	1	210	-	163	-	1
VIII	1	220	-	164	-	1
IX	2	233	12.02	199.0	48.08	2
X	2	262.5	3.5	251.5	14.85	2
Total	87	$\bar{x}$=205.02		$\bar{x}$=138.3		98

Total Sample Sex Ratio: 43% Male

Area Seymour Canal - Windfall Harbor — Date 4/16/81

District 111-15 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	3	133	1.7	26.67	2.08	3
III	18	140.4	6.15	36.44	5.10	18
IV	75	152.7	11.0	47.07	11.61	75
V	4	168.7	3.4	67.0	7.0	4
VI	0					0
VII	0					0
VIII	0					0
Total	100	$\bar{x}$=150.54		45.12		100

Total Sample Sex Ratio:

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Seymour Canal - Bay north of Sore Finger Date 4/29/81

District 111-11 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	11	158.45	11.72	56.27	10.58	8
IV	87	176.39	10.96	81.18	18.88	66
V	29	188.90	11.67	102.86	22.60	22
VI	2	190.00	7.07	99.50	14.85	2
VII	2	224.00	4.24	179.00	13.38	2
VIII						
IX						
X						
Total	131	x̄=178.59		x̄=85.66		100

Total Sample Sex Ratio: 54% Male N = 136

Area Seymour Canal Date 4/29/81

District 111-11 Gear Gillnet #29 Rock Commercial Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	10	188.9	9.01	101.30	20.00	12
V	19	209.3	9.11	139.05	17.06	23
VI	14	216.6	5.50	153.57	12.29	17
VII	9	218.2	7.90	167.33	16.32	11
VIII	7	226.9	6.01	173.00	11.70	8
IX	9	216.7	12.44	156.56	25.69	11
X +	15	230.8	12.35	190.47	26.89	18
Total	83	x̄=215.21		x̄=154.07		100

Total Sample Sex Ratio: 41% Male

Area Seymour Canal - Sore Finger Cove Date 4/29/81

District 111-11 Gear Gillnet Commercial Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	1	205	-	137	-	2
V	13	211.8	8.3	151.08	16.68	29
VI	11	215.7	6.99	161.36	15.86	24
VII	6	214.0	10.6	152.83	19.05	13
VIII	5	221.4	4.8	170.20	11.63	11
IX	3	219.0	4.3	165.67	10.12	7
X +	6	220.3	11.4	169.33	18.34	13
Total	45	x̄=215.58		x̄=159.04		99

Total Sample Sex Ratio: 51% Male N = 45

Area Seymour Canal Date 4/30/81

District 111-11 Gear Seine #29 Rock

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	5	164.4	7.5	58.60	11.08	5
IV	78	178.1	12.26	76.73	18.33	78
V	14	190.0	9.93	96.29	15.94	14
VI	1	195	-	103	-	1
VII	2	198.0	22.63	112.5	28.99	2
VIII	0					0
IX	0					0
X	0					0
Total	100	x̄=179.65		x̄=79.54		100

Total Sample Sex Ratio:

Area Seymour Canal - Sore Finger Cove Date 4/21/82

District 111-11 Gear Stellar - Trawl #3

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	11	180.18	7.35	65.73	10.96	11
V	75	190.83	13.87	83.85	22.16	75
VI	13	195.92	12.19	100.62	38.64	13
VII	1	230	-	160.0	-	1
VIII						
IX						
X						
Total	100	x̄=190.70		x̄=85.50		100

Total Sample Sex Ratio: 55% Male N = 100

Area Seymour Canal Date 5/6/82

District 111-14 Gear Trawl #1 #9 Rock

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	2	179.5	21.92	69.5	26.16	2
IV	19	173.2	10.35	62.79	15.09	22
V	62	187.0	14.98	80.84	21.99	70
VI	4	201.5	20.07	104.75	33.26	5
VII	0					0
VIII	0					0
IX	1	220	-	132	-	0
X	0					0
Total	88	x̄=184.88		x̄=78.35		100

Total Sample Sex Ratio: 61 Male N = 90

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Seymour Canal - Bay north of Sore Finger Date 4/29/81

District 111-11 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	11	158.45	11.72	56.27	10.58	8
IV	87	176.59	10.96	81.18	18.88	66
V	29	188.90	11.67	102.86	22.60	22
VI	2	190.00	7.07	99.50	14.85	2
VII	2	221.00	4.24	179.00	15.38	2
VIII						
IX						
X						
Total	131	x̄=178.59		x̄=85.66		100

Total Sample Sex Ratio: 54% Male N = 136

Area Seymour Canal Date 4/29/81

District 111-11 Gear Gillnet #29 Rock Commercial Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	10	188.9	9.01	101.30	20.00	12
V	19	209.3	9.11	139.05	17.06	23
VI	14	216.6	5.50	153.57	12.29	17
VII	9	218.2	7.90	167.33	16.32	11
VIII	7	226.9	6.01	173.00	11.70	8
IX	9	216.7	12.41	156.56	25.69	11
X +	15	230.8	12.35	190.47	26.89	18
Total	83	x̄=215.21		x̄=154.07		100

Total Sample Sex Ratio: 41% Male

Area Seymour Canal - Sore Finger Cove Date 4/29/81

District 111-11 Gear Gillnet Commercial Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	1	205	-	137	-	2
V	13	211.8	8.3	151.08	16.68	29
VI	11	215.7	6.99	161.36	15.86	24
VII	6	214.0	10.6	152.83	19.05	13
VIII	5	221.4	1.8	170.20	11.63	11
IX	3	219.0	4.3	165.67	10.12	7
X +	6	220.3	11.4	169.33	18.31	13
Total	45	x̄=215.58		x̄=159.01		99

Total Sample Sex Ratio: 51% Male N = 45

Area Seymour Canal Date 4/30/81

District 111-11 Gear Seine #29 Rock

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	5	164.4	7.5	58.60	11.08	5
IV	78	178.1	12.26	76.73	18.33	78
V	14	190.0	9.93	96.29	15.91	14
VI	1	195	-	103	-	1
VII	2	198.0	22.63	112.5	28.99	2
VIII	0					0
IX	0					0
X	0					0
Total	100	x̄=179.65		x̄=79.54		100

Total Sample Sex Ratio:

Area Seymour Canal - Sore Finger Cove Date 4/21/82

District 111-11 Gear Stellar - Trawl #3

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	11	180.18	7.35	65.73	10.96	11
V	75	190.83	13.87	83.85	22.16	75
VI	13	195.92	12.19	100.62	38.64	13
VII	1	230	-	160.0	-	1
VIII						
IX						
X						
Total	100	x̄=190.70		x̄=85.50		100

Total Sample Sex Ratio: 55% Male N = 100

Area Seymour Canal Date 5/6/82

District 111-14 Gear Trawl #1 #9 Rock

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	2	179.5	21.92	69.5	26.16	2
IV	19	173.2	10.35	62.79	15.09	22
V	62	187.0	14.98	80.84	21.99	70
VI	4	201.5	20.07	104.75	33.26	5
VII	0					0
VIII	0					0
IX	1	220	-	132	-	0
X	0					0
Total	88	x̄=184.88		x̄=78.35		100

Total Sample Sex Ratio: 61 Male N = 90

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Seymour Canal - Black Jack Cove Date 5/1/83

District 111-11 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	20	169.35	9.75	68.61	12.53	12
IV	4	176.00	8.98	78.00	15.73	2
V	15	181.58	6.92	90.54	8.23	8
VI	111	186.51	10.78	102.72	21.97	70
VII	15	197.51	17.36	117.69	30.17	
VIII						
IX						
X						
Total	161	x̄=186.0		x̄=98.18		100

Total Sample Sex Ratio: 54% Male N = 169

Area Seymour Canal Date 5/1/83

District 111-11 Gear Seine #9 Rock

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	154	-	54	-	1
III	32	166.34	10.61	69.22	15.95	20
IV	4	185.00	6.68	97.25	22.97	2
V	18	175.17	7.14	78.78	13.03	11
VI	96	182.56	13.92	94.49	23.69	59
VII	13	195.15	13.68	113.62	28.95	8
VIII	0					0
IX						
X						
Total	164	x̄=176.20		x̄=87.57		101

Total Sample Sex Ratio: 72% Male N = 164

Area Seymour Canal Date 5/05/83

District 111-11 Gear Trawl #3

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	27	167.59	10.95	65.8	13.25	15
IV	11	171.36	10.67	72.0	11.67	6
V	21	175.67	9.90	79.3	22.81	11
VI	123	182.36	9.89	90.35	20.25	67
VII	2	178.50	12.02	86.0	19.79	1
VIII	0					0
IX	0					0
X						
Total	184	x̄=178.73		x̄=84.11		100

Total Sample Sex Ratio: 62% Male N = 185

Area Seymour Canal Date 5/6/82

District 111-11 Gear Trawl - Sample #2

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	4	161.7	8.26	37.5	15.42	5
IV	13	168.1	10.61	56.92	12.38	16
V	61	185.3	12.67	73.49	18.18	77
VI						
VII						
VIII	1	205.0	-	117.0	-	1
IX						
X						
Total	79	x̄=180.13		x̄=70.0		100

Total Sample Sex Ratio:

Area Seymour Canal - Sore Thumb Date 4/12/83

District 111-11 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	145.0	-	33.0	-	1
III	19	168.58	10.65	65.74	13.37	13
IV	9	173.22	11.90	74.33	14.56	6
V	17	171.65	6.91	75.65	9.93	12
VI	90	182.01	9.66	85.80	15.81	64
VII	5	193.40	5.73	105.00	9.38	4
VIII						
IX						
X						
Total	141	x̄=178.91		x̄=81.45		100

Total Sample Sex Ratio: 47% Male N = 141

Area 1 mile north of Seymour Canal-Black Jack Cove Date 5/1/83

District 111-11 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	21	171.81	9.33	71.57	13.94	14
IV	4	179.50	8.50	84.00	18.35	3
V	8	186.25	12.56	104.13	27.88	5
VI	104	187.89	12.00	103.47	22.07	69
VII	13	192.92	13.93	107.94	27.88	9
VIII	0					0
IX	1	191	-	106	-	1
X	0					0
Total	151	x̄=185.80		x̄=98.95		101

Total Sample Sex Ratio: 37% Male N = 156

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Juneau - Auke Bay Date 6/5/80

District 111-50 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	152	-	50	-	1
III	59	165.25	13.4	61.07	12.68	59
IV	35	176.86	14.9	75.69	19.19	35
V	4	193.50	24.08	89.00	30.52	4
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	99	$\bar{x}$=170.36		$\bar{x}$=67.26		99

Total Sample Sex Ratio:

Area Juneau - Fritz Cove Date 1/18/81

District 111-50 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	3	140.0	16.6	33.00	27.62	3
III	2	155.0	9.8	51.00	8.49	2
IV	25	177.6	9.7	84.96	16.06	28
V	30	195.1	10.7	113.97	22.15	33
VI	7	210.4	12.8	114.14	30.21	8
VII	8	222.38	11.30	171.00	12.21	9
VIII	10	232.4	9.2	201.10	26.90	11
IX	2	249.5	9.1	225.50	7.78	2
X	2	243.0	11.3	224.5	53.03	2
Total	90	$\bar{x}$=195.38		$\bar{x}$=122.58		98

Total Sample Sex Ratio:

Area Juneau - Gastineau Channel Date 1/19/81

District 111-40 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	78	-	6	-	1
III	5	138.2	23.0	26.60	23.19	5
IV	66	163.68	12.32	64.89	16.74	67
V	6	175.3	10.9	82.00	15.85	6
VI						
VII						
VIII						
IX						
X						
Total	99	$\bar{x}$=161.75		$\bar{x}$=62.77		100

Total Sample Sex Ratio:

Area Juneau - Auke NU Cove Date 5/6/81

District 111-50 Gear Dipnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	11	161.6	13.3	54.00	11.38	11
IV	65	166.7	12.7	59.43	17.40	65
V	20	180.7	13.9	78.70	26.44	20
VI	4	196.7	12.2	89.75	18.19	4
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	100	170.14		63.90		100

Total Sample Sex Ratio: 57% Male

Area Juneau - Auke NU Cove Date 5/8/81

District 111-50 Gear Dipnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	5	138.20	11.78	33.00	6.67	3
III	30	154.89	10.48	48.64	12.16	20
IV	118	165.50	19.71	63.71	18.07	65
V	20	183.50	18.42	90.50	28.34	11
VI	2	210.00	7.07	135.00	14.14	1
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	100	$\bar{x}$=165		$\bar{x}$=63.61		100

Total Sample Sex Ratio: 56% Male

Area Gastineau Channel Date 1/14/82

District 111-40 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
I	10	-	-	-	-	9
II	12	14.55	11.27	39.2	10.08	11
III	7	170.1	12.88	65.4	15.52	6
IV	21	178.4	9.3	79.6	22.5	19
V	47	187.7	8.36	90.4	12.42	43
VI	12	197.7	12.49	104.9	17.38	11
VII	1	216	-	141	-	1
VIII+	0					0
IX						
X						
Total	110	$\bar{x}$=180.93*		$\bar{x}$=82.48*		100

Total Sample Sex Ratio: 46% Male *not including age 1 fish

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Juneau — Date 5/ /82

District 115-10 — Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	4	192	11.52	77.0	10.68	4
V	65	202	10.42	98.6	17.70	61
VI	30	211.5	14.77	112.9	24.89	28
VII	4	220.0	7.48	135.5	20.65	4
VIII	1	255	-	179	-	1
IX	1	248	-	188	-	1
X	1	253	-	221	-	-
Total	106	$\bar{x}$=206.55		$\bar{x}$=105.98		100

Total Sample Sex Ratio: 47% Male N = 106

Area Juneau — Date 5/ /82

District 115-10 — Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0	-	-	-	-	0
III	10	185.4	7.66	74.5	10.43	9
IV	7	199.8	6.89	93.7	14.47	7
V	53	202.7	10.42	101.3	18.64	50
VI	31	207.5	12.06	111.5	23.21	29
VII	3	218.3	12.58	137.3	29.26	3
VIII	2	252.5	3.54	190.0	0	2
IX	0					0
X	0					0
Total	106	$\bar{x}$=205.66		$\bar{x}$=104.28		100

Total Sample Sex Ratio: 47% Male

Area Juneau - Auke Bay — Date 4/ /83

District 111-50 — Gear Test Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
III	2	177.5	10.61	84.0	24.04	2
IV	2	182.5	17.68	81.5	23.33	2
V	10	203.0	5.40	117.20	6.29	9
VI	60	208.16	9.41	130.45	23.39	51
VII	26	213.81	8.80	140.77	27.79	22
VIII	10	232.7	11.89	185.60	24.96	9
IX	2	246.5	2.12	197.0	2.83	2
X	3	250.0	11.36	200.0	22.34	3
XI	1	246.0	-	256.0	-	1
XII	1	252.0	-	225.0	-	1
Total	117	212.87		139.5		102

Total Sample Sex Ratio: 58% Male N = 120

Area Juneau - Auke Bay — Date 4/ /83

District 111-50 — Gear Test Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
IV	6	165.83	10.03	61.0	21.77	5
V	11	197.27	8.44	104.18	11.90	10
VI	54	207.35	9.33	125.52	21.49	48
VII	33	219.00	10.25	147.52	25.92	29
VIII	2	214.50	.71	150.00	24.04	2
IX	2	242.50	10.61	195.00	26.87	2
X	2	230.50	5.54	168.50	6.36	2
XI	1	239.0	-	204.0	-	1
XII	1	253.0	-	215.0	-	1
Total	112	$\bar{x}$=209.43		$\bar{x}$=132.22		100

Total Sample Sex Ratio: 65% Male N = 113

Area Juneau - Auke Bay — Date 4/ /83

District 111-50 — Gear Test Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	5	140.4	5.68	33.80	6.65	3
III	67	164.9	10.88	60.80	12.46	43
IV	18	170.7	8.88	69.0	11.20	12
V	11	183.9	11.65	88.60	20.45	7
VI	46	184.2	9.36	91.87	16.16	30
VII	6	190.5	7.89	106.17	15.35	4
VIII	2	197.0	21.0	121	41.0	1
IX						
X						
Total	155	$\bar{x}$=173.18		$\bar{x}$=78.85		100

Total Sample Sex Ratio: 62% Male N = 155

Area Juneau - Middle Inner Point — Date 4/14/83

District 111-40 — Gear Steller Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	90	113.41	9.41	28.59	6.83	51
III	72	158.14	8.50	53.61	9.93	41
IV	4	168.0	12.36	63.25	11.76	2
V	2	175.50	3.54	79.50	3.54	1
VI	6	173.67	8.80	74.33	11.15	3
VII	2	208.50	4.95	134.50	7.78	1
VIII						
IX						
X						
Total	176	147.02		42.95		99

Total Sample Sex Ratio:

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Juneau - Middle Inner Pt. Date 4/14/83

District 111-40 Gear Trawl - Steller

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	67	136.10	9.19	29.75	6.68	52
III	61	155.23	8.83	47.64	9.05	47
IV	1	154	-	47	-	1
V	0					0
VI	1	166	-	67	-	1
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	130	$\bar{x}$=145.44		$\bar{x}$=38.56		101

Total Sample Sex Ratio:

Area Juneau - Lynn Canal Cove Sunset Date 4/15/83

District 115-10 Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	6	111.3	9.9	33.5	5.9	6
III	38	165.5	9.7	63.3	12.7	35
IV	9	182.0	12.8	88.7	20.5	8
V	7	192.0	10.4	103.7	13.7	6
VI	30	199.2	9.7	121.7	22.8	28
VII	18	201.7	9.7	136.4	21.7	17
VIII	1	225.0	-	172.0	-	1
IX						
X						
Total	109	$\bar{x}$=183.36		$\bar{x}$=95.49		100

Total Sample Sex Ratio: 64% Male N = 118

Area Juneau - Lynn Canal Cove Sunset Date 4/15/83

District 115-10 Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	139.00	17.68	37.00	15.56	2
III	36	165.63	9.53	65.02	11.04	38
IV	4	171.75	14.97	79.25	19.40	3
V	8	189.13	7.83	105.63	21.15	7
VI	43	199.33	8.98	128.12	20.25	36
VII	16	205.88	14.72	139.56	31.54	13
VIII	2	221.50	12.02	162.50	10.61	2
IX	0					0
X	0					0
Total	121	$\bar{x}$=184.90		$\bar{x}$=101.60		101

Total Sample Sex Ratio: 60% Male N = 127

Area Juneau - Bridget Cove Date 5/26/83

District 115-10 Gear Variable Mesh Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	1	185.0	-	85	-	1
IV	4	180.5	9.2	88	19.30	3
V	62	190.0	7.7	100.4	14.87	46
VI	60	198.1	9.8	112.9	18.25	44
VII	6	204.6	11.2	123.0	7.0	4
VIII	2	216	-	148.5	6.36	1
IX						
X						
Total	135	$\bar{x}$=194.27		$\bar{x}$=107		100

Total Sample Sex Ratio: 50% Male N = 135

Area Tenakee Inlet - Long Bay Date 11/9/80

District 112-47 Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	8	184.0	7.05	95.25	16.9	9
V	69	198.84	9.53	122.59	19.67	78
VI	10	206.10	13.11	135.6	32.27	11
VII	0					0
VIII	1	240	-	225	-	1
IX	0					0
X	0					0
Total	88	198.79		122.72		99

Total Sample Sex Ratio: 50% Male

Area Tenakee Inlet Date 11/19/81

District 112-45 Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	46	145	9.3	42.93	9.68	87
III	7	155	7.9	53.71	8.94	13
IV	0					0
V	0					0
VI	0					0
VII	0					0
VIII	0					0
IX						
X						
Total	53	$\bar{x}$=146.52		$\bar{x}$=44.55		100

Total Sample Sex Ratio: Indeterminant

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Tenakee Inlet — Date 11/19/81

District 112-45 — Gear Trawl #2

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	74	147	9.4	44.01	9.51	76
III	20	152	10.7	47.25	9.85	21
IV	2	184	8.5	92.00	8.49	2
V	1	185	-	80.00	-	1
VI	0					0
VII	0					0
VIII+	0					0
IX						
X						
Total	97	x̄=149.19		x̄=46.04		100

Total Sample Sex Ratio: 50% Male

Area Tenakee Inlet — Date 12/17/81

District 112-45 — Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	0					0
IV	6	192.50	9.54	96.17	15.77	7
V	54	207.15	7.55	129.65	15.08	64
VI	24	208.75	7.09	134.92	14.66	29
VII	0					0
VIII	0					0
IX						
X						
Total	84	206.65		128.76		100

Total Sample Sex Ratio: 50% Male

Area Tenakee Inlet — Date 11/3/82

District 112-45 — Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	8	189.6	9.77	86.2	13.82	11
IV	7	195.4	11.34	97.7	20.56	9
V	3	207.0	11.27	119.3	25.70	4
VI	21	220.8	11.02	152.3	19.29	28
VII	36	220.4	9.32	145.6	21.89	47
VIII	1	238.0	-	187.0	-	1
IX						
X						
Total	78	x̄=214.67		x̄=136.29		100

Total Sample Sex Ratio: 49% Male N = 78

Area Tenakee Inlet Long Bay (Bet. Seal & [illegible]) — Date 11/13/82

District 112-45 — Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	15	184.27	7.49	85.73	14.56	20
IV	1	185.0	-	98.00		1
V	4	184.75	17.17	98.75	33.86	5
VI	15	201.07	8.61	152.47	17.38	20
VII	38	206.21	8.96	136.82	20.12	50
VIII	3	217.33	11.68	173.00	18.08	4
IX						
X						
Total	76	x̄=182.74		x̄=124.79		100

Total Sample Sex Ratio: 49% Male N = 78

Area Tenakee Inlet — Date 11/14/82

District 111-45 — Gear Trawl #1 - Steller

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	7	159.71	5.82	43.00	4.32	8
III	64	182.30	5.90	70.14	9.18	69
IV	11	188.55	7.03	77.00	8.73	12
V	1	185	-	81	-	1
VI	5	205.20	8.79	96.00	12.08	5
VII	5	206.00	14.32	107.00	32.79	5
VIII	0					0
IX	0					0
X	0					0
Total	93	x̄=185.77		x̄=72.40		100

Total Sample Sex Ratio: 53% Male

Area West Crawfish - Shamrock Bay — Date 3/14/80

District 113-32 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	14	145.71	6.08	38.29	5.86	40
III	16	166.13	10.20	59.63	11.94	46
IV	3	179.33	13.65	86.67	17.01	9
V	2	184.00	1.41	88.50	12.02	6
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	35	x̄=160.11		x̄=55.06		101

Total Sample Sex Ratio: 43% Male

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area West Crawfish — Date 2/27/81

District 113-32 — Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	31	159.77	9.19	50.74	10.60	31
III	20	174.10	8.45	70.90	13.10	20
IV	19	183.79	5.71	78.47	27.08	19
V	25	193.92	7.45	103.56	10.51	25
VI	4	192.25	10.21	95.00	18.83	4
VII	1	227	-	181	-	1
VIII						
IX						
X						
Total	100	$\bar{x}$=177.71		$\bar{x}$=76.32		100

Total Sample Sex Ratio: 59% Male

Area West Crawfish - Extreme Head — Date 2/28/81

District 113-32 — Gear Commercial Fishery (100 ton set)

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	58	149.98	20.19	43.62	7.56	60
III	15	166.13	9.51	61.87	14.60	15
IV	5	175.40	10.40	81.20	25.19	5
V	14	195.20	12.2	112.43	23.60	14
VI	5	204.6	11.1	131.00	13.44	5
VII						
VIII						
IX						
X						
Total	97	$\bar{x}$163.13		$\bar{x}$=62.81		99

Total Sample Sex Ratio:

Area Sitka - Necker Bay — Date 1/25/82

District 113-34 — Gear Commercial Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	11	181.27	9.78	74.27	11.58	10
IV	5	193.80	2.68	94.00	2.92	5
V	13	198.69	10.38	102.77	12.92	12
VI	23	212.26	10.55	129.74	20.76	21
VII	18	222.22	10.83	150.11	24.27	17
VIII	25	229.92	7.56	157.68	20.91	23
IX	6	238.33	5.43	175.00	16.52	6
X	6	239.67	6.28	167.83	15.28	6
Total	107	$\bar{x}$=215.36		$\bar{x}$=133.71		100

Total Sample Sex Ratio: 54% Male N = 107

Area Sitka - Olga Straits — Date 11/12/80

District 113-41 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	3	176.3	12.2	77.00	6.93	3
IV	20	185.8	7.2	94.40	11.42	22
V	58	199.4	10.1	122.02	20.31	62
VI	11	212.8	6.1	140.00	17.04	12
VII	1	225	-	186	-	1
VIII						
IX						
X						
Total	93	$\bar{x}$=197.57		$\bar{x}$=117.44		100

Total Sample Sex Ratio:

Area Sitka - Outside Middle Is. — Date 2/11/81

District 113-41 — Gear Trawl

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	1	196	-	92	-	1
IV	25	193.2	6.7	97.08	11.75	27
V	58	201.7	11.3	116.48	19.57	62
VI	9	205.0	8.5	120.00	11.04	10
VII	1	213	-	121	-	1
VIII	0					0
IX	0					0
X	0					0
Total	94	$\bar{x}$=201.67		$\bar{x}$=111.45		101

Total Sample Sex Ratio:

Area Sitka - Redoubt Bay — Date 3/20/81

District 113-41 — Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
I	4	147.5	6.4	36.25	2.22	4
II	67	157.3	6.0	47.25	7.72	67
III	24	163.5	8.0	56.46	10.48	24
IV	5	171.4	8.2	66.60	15.50	5
V	0					0
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X						
Total	100	$\bar{x}$=159.1		$\bar{x}$=49.99		100

Total Sample Sex Ratio:

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Sitka - Goddard Hot Springs Date 3/24/81

District 113-31 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III						
IV	10	196.20	6.78	101.30	13.96	8
V	86	205.60	8.44	120.85	19.73	72
VI	22	209.91	10.23	131.05	21.03	18
VII	2	214.50	9.19	135.50	23.33	2
VIII						
IX						
X						
Total	120	205.76		121.34		100

Total Sample Sex Ratio: 47% Male N = 144

Area Sitka - Olga Straits Date 3/4/82

District 113-41 Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	5	165.2	12.54	48.4	12.07	5
III	11	180.4	9.36	72.6	12.62	11
IV	3	196.0	7.00	97.0	14.93	3
V	15	208.1	10.96	119.3	21.97	15
VI	64	215.4	10.3	12.75	20.7	64
VII	2	219.5	4.95	138.5	.71	2
VIII+	0					0
IX						
X						
Total	100	$\bar{x}$ 207		$\bar{x}$=116		100

Total Sample Sex Ratio:

Area Sitka - Katlian Bay Date 3/4/82

District 113-44 Gear Trawl #2

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	6	155-7	15.73	43.7	12.60	5
III	13	184.1	13.51	79.4	17.55	11
IV	2	208.0	5.66	112.0	4.24	2
V	29	204.2	9.56	110.9	19.28	24
VI	63	213.1	11.47	129.6	21.3	53
VII	5	220.4	15.52	130.2	34.14	4
VIII+	2	246.5	9.19	215.0	8.49	2
IX						
X						
Total	120	$\bar{x}$=206		$\bar{x}$=117		101

Total Sample Sex Ratio: 51% Male

Area Sitka - Eastern Channel Date 3/5/82

District 113-41 Gear Trawl #2

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	116.0	1.41	58.0	2.83	2
III	11	193.6	9.10	89.8	14.18	11
IV	1	205	-	98	-	1
V	18	215.8	8.74	129.2	17.33	19
VI	54	222.3	8.86	146.9	18.56	56
VII	8	227.8	9.36	154.8	14.56	8
VIII+	2	257.5	3.54	165.0	19.80	2
IX						
X						
Total	96	$\bar{x}$=217		$\bar{x}$=136		99

Total Sample Sex Ratio: 41% Male

Area Sitka - Eastern Channel Date 3/5/82

District 113-41 Gear Trawl #3

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	3	169.0	2.65	55.7	4.93	2
III	18	189.5	5.76	84.2	10.65	13
IV	0					0
V	34	216.0	10.66	131.9	19.25	24
VI	82	217.9	8.69	131.1	23.35	57
VII	6	217.5	15.69	135.2	27.74	4
VIII	0					0
IX						
X						
Total	143	$\bar{x}$=212.8		$\bar{x}$=124.0		100

Total Sample Sex Ratio: 67% Male

Area Sitka - Halibut Point Date 3/30/82

District 113-41 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	7	164.00	5.26	49.57	6.68	9
III	14	182.36	9.51	74.64	14.05	18
IV	2	193.00	2.83	87.00	1.41	3
V	10	204.70	11.69	113.60	20.83	13
VI	10	211.34	11.48	128.00	23.25	44
VII	12	222.25	8.72	149.08	25.84	15
VIII						
IX						
X						
Total	80	$\bar{x}$=202.47		$\bar{x}$=112.14		102

Total Sample Sex Ratio: 45% Male N = 121

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Sitka - Silver Bay Date 1/19/83

District 113-55 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	46	180.7	7.56	84.4	13.96	58
IV	7	187.2	9.69	98.0	16.5	9
V	1	226	-	161	-	1
VI	5	215.4	8.59	153.4	25.7	6
VII	16	217.8	7.69	168.0	17.7	20
VIII	3	218.0	10.58	162.0	36.0	4
IX	1	232	-	183	-	1
X	0					0
Total	79	x̄=195.6		x̄=112.4		99

Total Sample Sex Ratio: 49% Male N = 79

Area Sitka - Old Sitka Rocks Date 2/16/83

District 113-41 Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	56	175.0	7.72	74.0	13.55	59
IV	16	184.0	5.42	91.3	13.47	17
V	0					0
VI	6	206.3	11.86	131.5	23.70	6
VII	14	209.6	7.35	146.0	18.96	15
VIII	2	219.5	6.36	161.0	18.38	2
IX	1	222	-	177	-	1
X	0					0
Total	95	x̄=185.02		x̄=94.07		100

Total Sample Sex Ratio: 53% Male N = 95

Area Sitka - Halibut Point Date 3/18/83

District 113-41 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	141	-	-	-	2
III	22	179.09	7.82	-	-	51
IV	6	201.17	8.52	-	-	14
V	2	200.50	7.78	-	-	5
VI	1	204	-	-	-	2
VII	10	208.70	13.98	-	-	23
VIII	1	207.0	-	-	-	2
IX						
X						
Total	43	x̄=190.40				99

Total Sample Sex Ratio: 50% Male N = 50

Area Sitka Date 3/19/83

District 113-41 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	155	8.49	-	-	4
III	24	186.9	8.22	-	-	53
IV	2	196.0	8.49	-	-	4
V	2	201.0	11.31	-	-	4
VI	3	215.0	11.00	-	-	7
VII	12	227.8	9.89	-	-	27
VIII+	0					0
IX						
X						
Total	45	x̄=216.0	x̄=22.47			99

Total Sample Sex Ratio: 42% Male N = 50

Area Sitka - Redoubt Bay Date 3/26/83

District 113-41 Gear Commercial Fishery

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	43	186.33	6.69	85.79	17.97	36
IV	11	199.00	5.95	112.36	12.06	9
V	1	205.00	-	127.00	-	1
VI	12	212.92	9.41	134.33	21.62	10
VII	48	223.15	6.85	165.92	21.69	40
VIII	4	226.25	8.66	163.50	16.84	3
IX						
X						
Total	119	x̄=206.53		x̄=128.84		99

Total Sample Sex Ratio: 55% Male N = 120 Regenerate = 1

Area Sitka - Redoubt Bay #1 Date 3/26/83

District 113-41 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	47	187.79	7.16	93.85	13.51	46
IV	6	201.17	5.58	117.67	10.93	6
V	2	198.00	5.66	105.50	.71	2
VI	9	211.78	8.87	143.56	23.85	9
VII	36	222.42	7.63	165.75	23.61	35
VIII	1	232.00	-	186.00	-	1
IX	1	239.00	-	209.00	-	1
X						
Total	102	x̄=201.05		x̄=127.27		100

Total Sample Sex Ratio: 44% Male N = 103 Regenerate = 1

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Sitka - Redoubt Bay #3 Date 3/26/83

District 113-41 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	38	188.53	6.28	89.74	13.12	36
IV	5	195.40	4.77	103.20	7.09	5
V	3	201.33	2.31	111.33	15.95	3
VI	10	216.10	9.48	142.70	25.97	10
VII	43	221.37	9.63	159.60	24.57	41
VIII	4	250.00	10.23	175.00	26.85	4
IX	1	245.00	-	237.00	-	1
X	1	245.00	-	219.00	-	1
Total	105	x̄=207.95		x̄=130.53		101

Total Sample Sex Ratio: 55% Male N = 106 Regenerate = 1

Area Sitka - Redoubt Bay Date 3/26/83

District 113-41 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	165	-	48	-	1
III	44	182.89	7.72	80.75	17.71	42
IV	9	198.22	4.68	114.78	6.80	8
V	2	212.25	11.31	148.00	9.90	2
VI	8	219.25	4.50	164.38	15.39	8
VII	37	219.32	8.19	165.81	25.74	35
VIII	5	250.40	5.13	179.60	23.36	5
IX	0					0
X	0					0
Total	106	202.27		125.26		100

Total Sample Sex Ratio: 48% Male N = 113

Area Sitka Sound - Redoubt Bay Date 3/29/83

District 113-41 Gear Phillips Cold Storage

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	35	187.25	5.47	91.78	11.07	37
IV	1	199.00	-	117.00	-	1
V	3	203.67	5.51	112.00	9.64	3
VI	4	211.50	9.26	144.00	27.36	4
VII	52	220.65	7.84	160.47	28.78	53
VIII	2	227.50	10.61	158.50	.71	2
IX						
X						
Total	98	x̄=207.41		x̄=132.87		100

Total Sample Sex Ratio: 41% Male N = 101 Regenerate = 3

Area Sitka - Long Island Date 4/5/83

District 113-41 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	4	163.8	3.10	-	-	8
III	42	179.8	8.89	-	-	86
IV	0					0
V	0					0
VI	0					0
VII	3	215.7	3.06	-	-	6
VIII	0					0
IX						
X						
Total	49	x̄=181.3				100

Total Sample Sex Ratio: 40% Male N = 50 Regenerate = 1

Area Sitka - Galanikin Island Date 4/5/83

District 113-34 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	169	-	-	-	2
III	45	179.2	7.92	-	-	94
IV	1	195	-	-	-	2
V	0					0
VI	0					0
VII	1	199	-	-	-	2
VIII+	0					0
IX						
X						
Total	48	x̄=181.0				100

Total Sample Sex Ratio: 60% Male N = 50 Regenerate = 2

Area Sitka - Galanikin Island Date 4/5/83

District 113-41 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	178.5	.71	-	-	4
III	39	180.4	8.11	-	-	85
IV	2	177	4.24	-	-	4
V	1	203	-	-	-	2
VI	1	213	-	-	-	2
VII	1	217	-	-	-	2
VIII	0					0
IX						
X						
Total	46	x̄=182.9				99

Total Sample Sex Ratio: 66% Male N = 50 Regenerate = 4

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Sitka - Samsing Cove Date 4/5/83

District 113-41 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	151	-	-	-	2
III	40	174.6	26.53	-	-	83
IV	4	190.5	11.2	-	-	8
V	0					0
VI	0					0
VII	3	226.7	15.57			
VIII+	0					0
IX						
X						
Total	48	x̄=178.9				99

Total Sample Sex Ratio: 48% Male N = 50 Regenerate = 2

Area Sitka - Pirates Cove Date 4/5/83

District 113-41 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	159	-	-	-	2
III	37	180.0	5.8	-	-	84
IV	2	197.5	13.44	-	-	5
V	0					0
VI	0					0
VII	4	221.0	15.51	-	-	9
VIII	0					0
IX						
X						
Total	44	x̄=186.5				100

Total Sample Sex Ratio: 56% Male N = 50 Regenerate = 6

Area Sitka - Pirate Cove Date 4/5/83

District 113-41 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	43	180.6	7.26	-	-	90
IV	1	175	-	-	-	2
V	0					0
VI	0					0
VII	4	215.0	18.83	-	-	8
VIII+	0					0
IX						
X						
Total	48	x̄=184.7				100

Total Sample Sex Ratio: 50% Male Regenerate = 2

Area Sitka - Proposed Boat Hbr. Date 4/7/83

District 113-41 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	42	175.98	11.94	-	-	95
IV	2	185.50	.71	-	-	5
V	0					0
VI	0					0
VII	0					0
VIII+	0					0
IX						
X						
Total	44	x̄=179.34				100

Total Sample Sex Ratio: 44% Male N = 50 Regenerate = 6

Area Sitka - Starrigavin Bay Date 4/7/83

District 113-41 Gear Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	41	175.9	8.0	-	-	91
IV	2	184.5	4.95	-	-	4
V	0					0
VI	0					0
VII	2	220.0	15.56	-	-	0
VIII+	0					0
IX						
X						
Total	45	x̄=180.2				100

Total Sample Sex Ratio: 58% Male N = 50 Regenerate = 5

Area Sitka - Dog Point Date 4/7/83

District 113-41 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	1	151	-	-	-	2
III	29	177.4	7.8	-	-	71
IV	3	199.7	11.5	-	-	7
V	0					0
VI	2	216	7.07	-	-	5
VII	6	222.2	6.43	-	-	15
VIII+	0					0
IX						
X						
Total	41	x̄=190.6				100

Total Sample Sex Ratio: 40% Male N = 50 Regenerate 9

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Sitka - Cannon Island Date 4/41/83

District 115-11 Gear Purse Seine

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	45	178.9	8.48	-	-	98
IV	1	176	-	-	-	2
V	0					0
VI	0					0
VII	0					0
VIII+	0					0
IX						
X						
Total	46	x̄=178.1				100

Total Sample Sex Ratio: 58% Male N = 50 Regenerate = 4

Area Peril Strait - Emmons Is. Date 5/1/81

District 115-55 Gear Varimesh Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	1	161	-	63	-	1
IV	51	180.22	10.43	82.35	20.09	42
V	49	195.91	11.98	112.39	23.90	40
VI	9	204.89	10.68	133.44	15.25	7
VII	2	225.50	9.19	174.0	35.36	2
VIII	4	231.25	8.54	192.0	47.64	3
IX	4	221.75	7.68	165.75	15.37	3
X	1	240	-	216	-	1
XI	1	251	-	252	-	1
Total	122	x̄=195.05		x̄=108.34		100

Total Sample Sex Ratio: 15% Male

Area Lisianski Straits Date 11/10/80

District 113-97 Gear Trawl #2

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	2	161.5	3.5	56.0	5.66	2
III	2	165.0	14.1	61.0	18.38	2
IV	19	181.1	8.2	93.37	13.75	18
V	61	188.1	7.3	101.84	14.15	59
VI	17	192.8	7.8	111.18	16.93	17
VII	0					0
VIII	2	209.5	2.1	148.00	4.24	2
IX	0					0
X	0					0
Total	103	x̄=187.09		x̄=101.03		100

Total Sample Sex Ratio:

Area Lisianski Straits Date 11/20/81

District 113-97 Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	7	158.4	6.8	52.0	6.76	8
III	16	173.2	6.62	73.06	10.56	17
IV	11	180.1	9.2	88.36	13.24	12
V	29	190.2	5.4	101.66	9.03	31
VI	28	198.2	5.9	110.18	11.35	30
VII	2	204.0	1.4	114.00	2.84	2
VIII	0					0
IX	0					0
X	0					0
Total	93	x̄=186.39		x̄=94.26		100

Total Sample Sex Ratio:

Area Lisianski Inlet Date 11/21/81

District 113-97 Gear Trawl #2

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	76	142.5	8.07	37.59	6.75	97
III	2	164.5	3.50	55.00	-	3
IV	0					0
V	0					0
VI	0					0
VII	0					0
VIII	0					0
IX	0					0
X	0					0
Total	78	x̄=143.06		x̄=38.04		100

Total Sample Sex Ratio: 50% Male N = 80

Area Lisianski Inlet - Phonograph Creek Date 4/24/81

District 113-95 Gear Varimesh Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	9	154.33	4.06	47.56	5.59	10
III	12	159.33	5.68	54.92	6.53	13
IV	4	185.00	3.37	78.50	10.34	4
V	44	198.00	9.52	107.39	15.22	47
VI	19	206.32	9.79	121.05	17.51	20
VII	6	213.33	8.24	138.50	25.85	6
VIII						
IX						
X						
Total	94	x̄=190.99		x̄=98.10		100

Total Sample Sex Ratio: 73% Male N = 105

-Continued-

Appendix II. Summaries of age, weight, and length data by year and by district (continued).

Area Lisianski Inlet - Phonograph Creek Date 4/27/81

District 113-95 Gear Varimesh Gillnet

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	18	155.0	4.75	45.33	3.97	20
III	10	158.20	4.61	48.00	5.40	11
IV	5	175.40	13.24	68.40	8.73	6
V	35	194.09	10.48	96.09	12.43	39
VI	20	196.60	8.55	102.20	17.95	22
VII						
VIII	1	203.0	-	110	-	<1
IX						
X						
Total	89	$\bar{x}$=181.36		$\bar{x}$=80.39		100

Total Sample Sex Ratio: 22% Male N = 90 Regenerate = 161/149

Area Lisianski Straits Date 11/16/82

District 113-97 Gear Trawl #1

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II						
III	74	185.45	8.70	69.22	10.48	74
IV	13	190.15	8.23	73.08	10.04	13
V	5	204.0	4.95	92.60	6.66	5
VI	7	210.0	8.16	111.29	-	7
VII	1	205.0	-	103.0	-	1
VIII						
IX						
X						
Total	100	$\bar{x}$=188.90		$\bar{x}$=80.17		100

Total Sample Sex Ratio:

Area Idaho Inlet Date 11/15/82

District 114-40 Gear Hook and Line

Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	22	125.2	9.12	21.7	5.5	47
III	24	148.6	10.82	43.5	12.7	51
IV	1	158.0	-	51	-	2
V						
VI						
VII						
VIII						
IX						
X						
Total	47	$\bar{x}$=137.8		$\bar{x}$=33.4		100

Total Sample Sex Ratio:

Area Yakutat Bay Date 10/16/82

District 183-10 Gear Seine

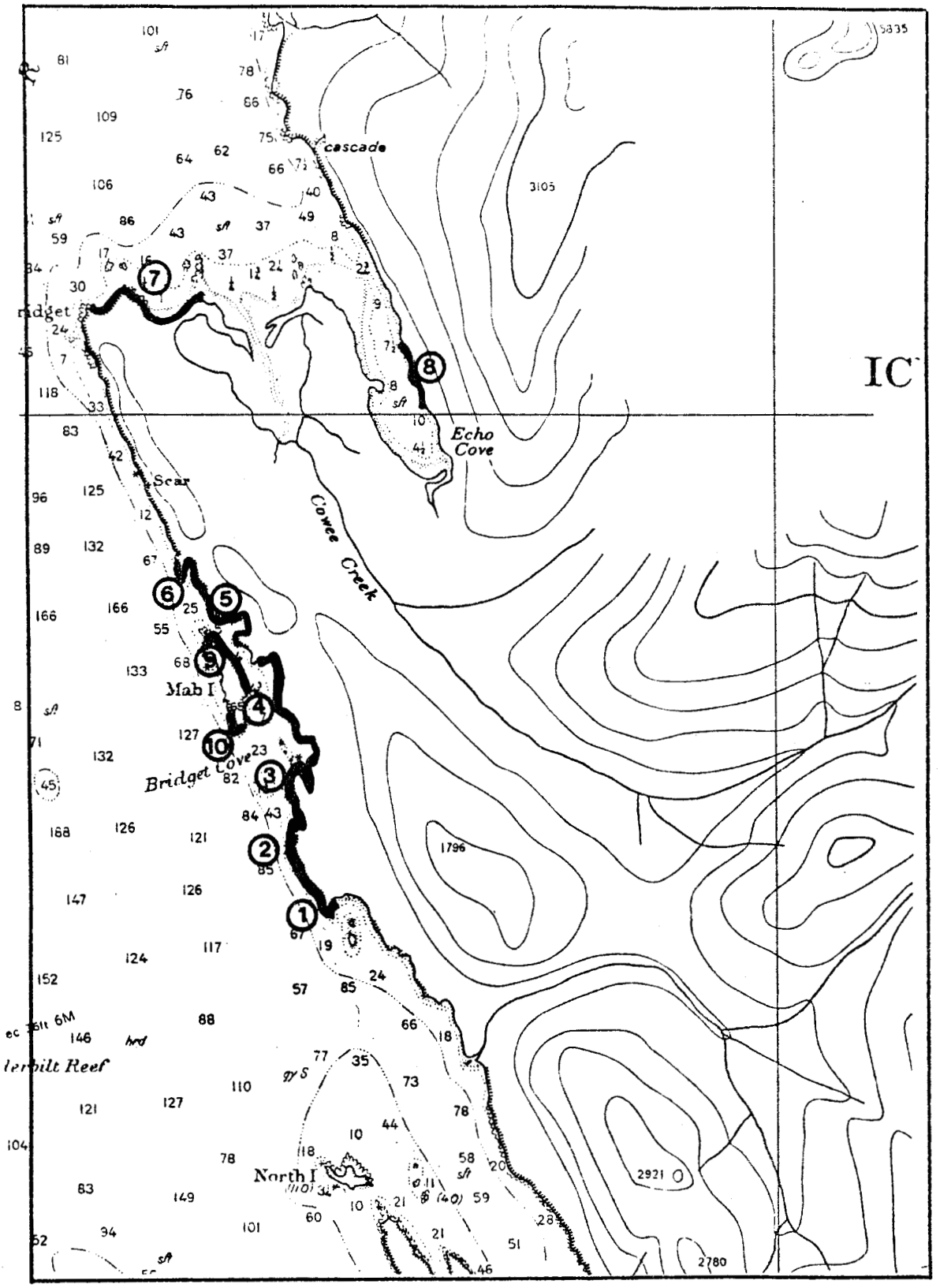
Age Class	Number	Mean Standard Length mm	Standard Deviation	Mean Weight g.	Standard Deviation	Percent Composition
II	0					0
III	8	172.63	12.39	75.63	16.89	8
IV	22	179.18	9.72	87.50	17.12	22
V	49	183.59	15.04	100.86	18.93	48
VI	21	187.19	20.79	114.90	18.35	21
VII	1	205	-	118	-	1
VIII	1	215	-	156	-	1
IX						
X						
Total	102	$\bar{x}$=183.04		$\bar{x}$=99.60		101

Total Sample Sex Ratio:

APPENDIX III

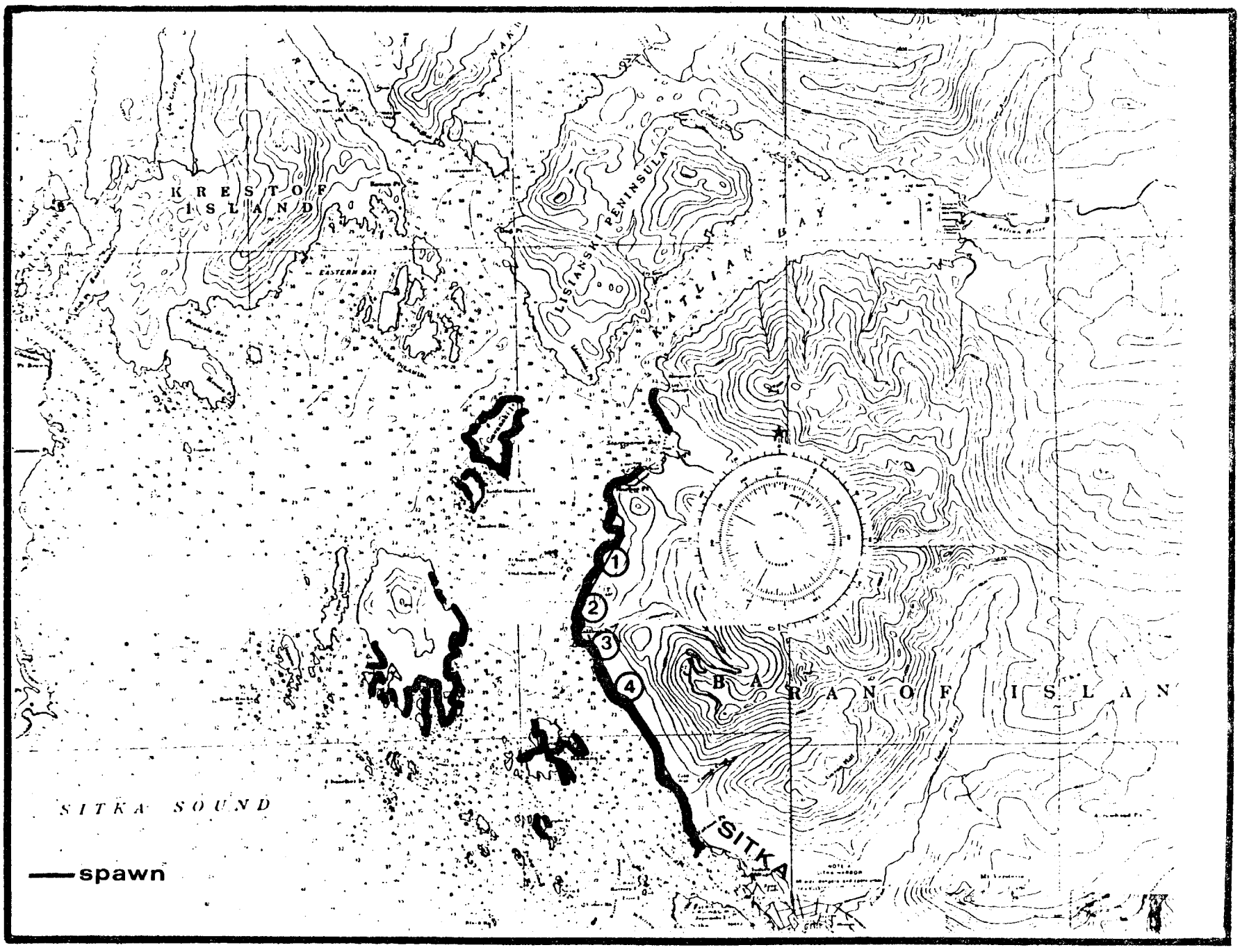
Appendix III. Sampling areas surveyed by divers at Emmons Island, 1981.

APPENDIX IV

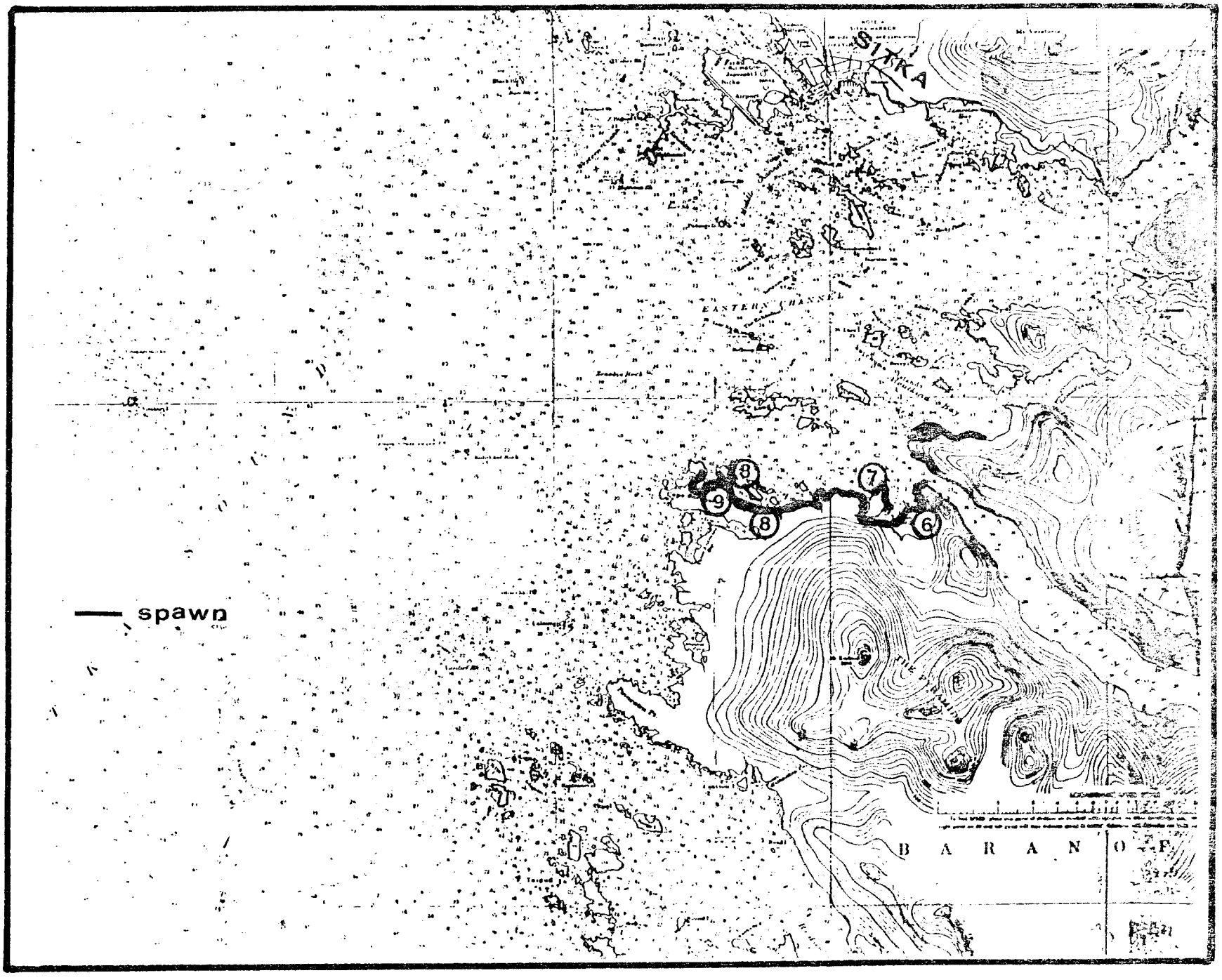


Appendix IV. Sampling areas surveyed by divers, Juneau area, 1983.

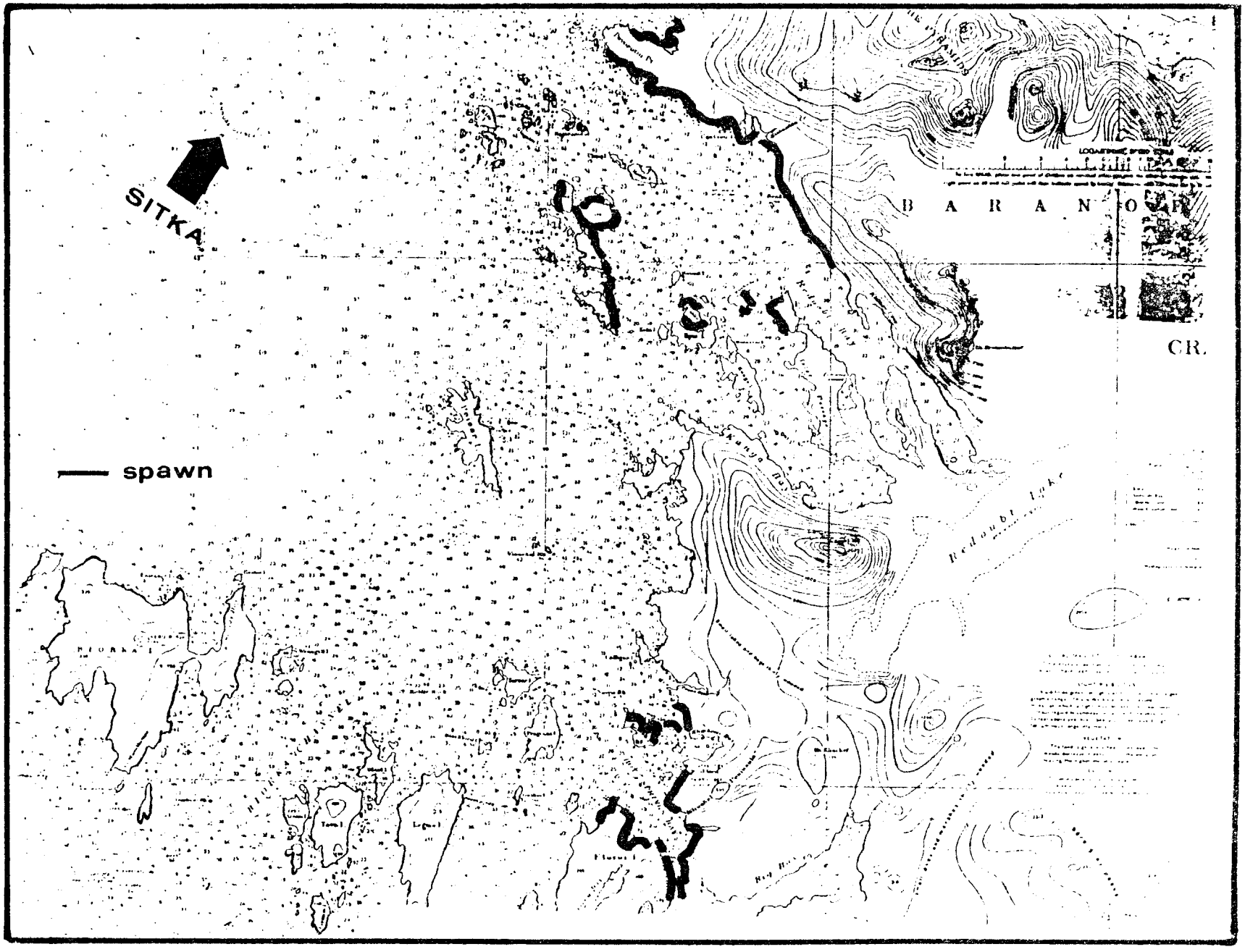
APPENDIX V



Appendix V. Sampling areas surveyed by divers, Sitka, 1981.

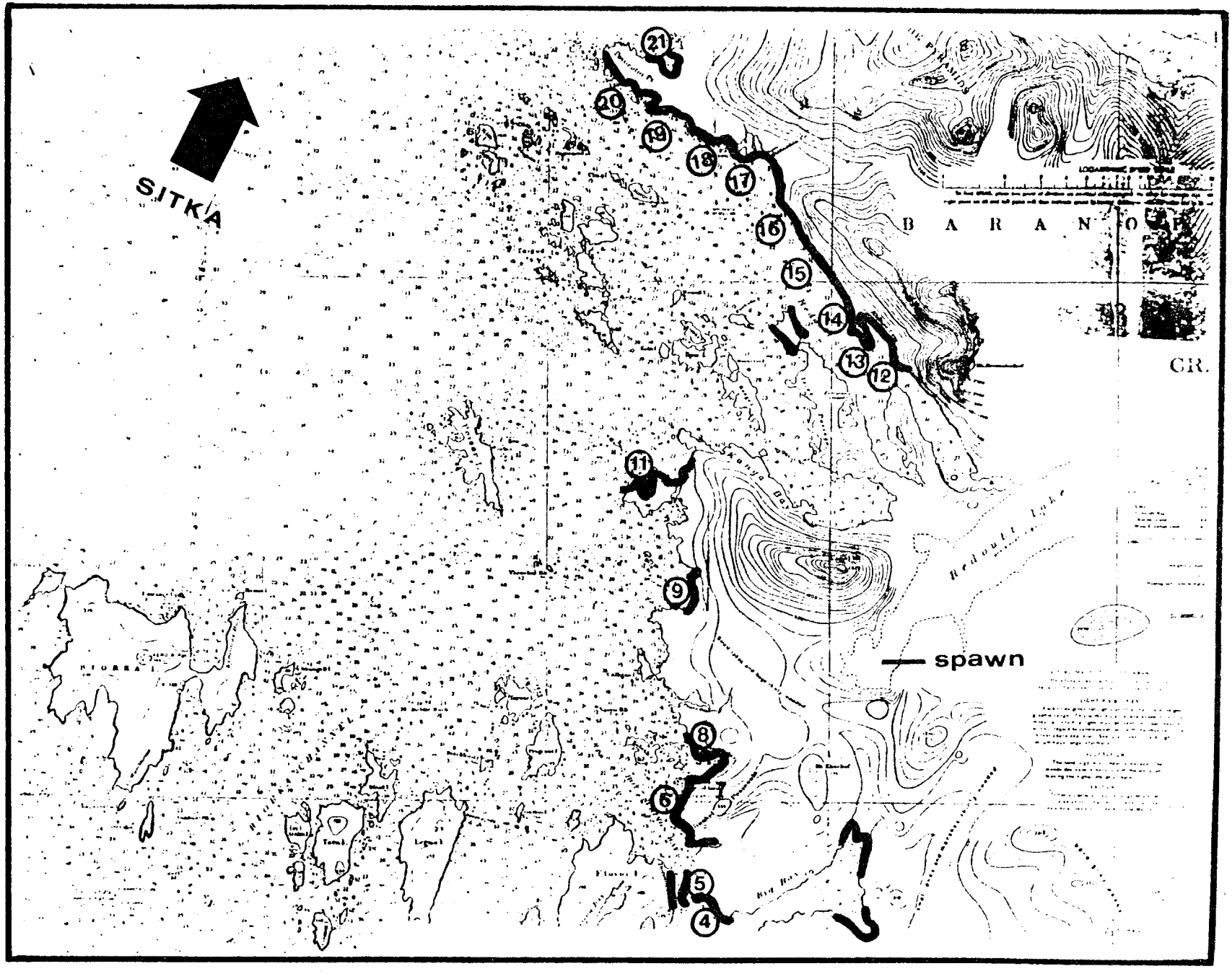


Appendix V. Sampling areas surveyed by divers, Sitka, 1981 (continued).

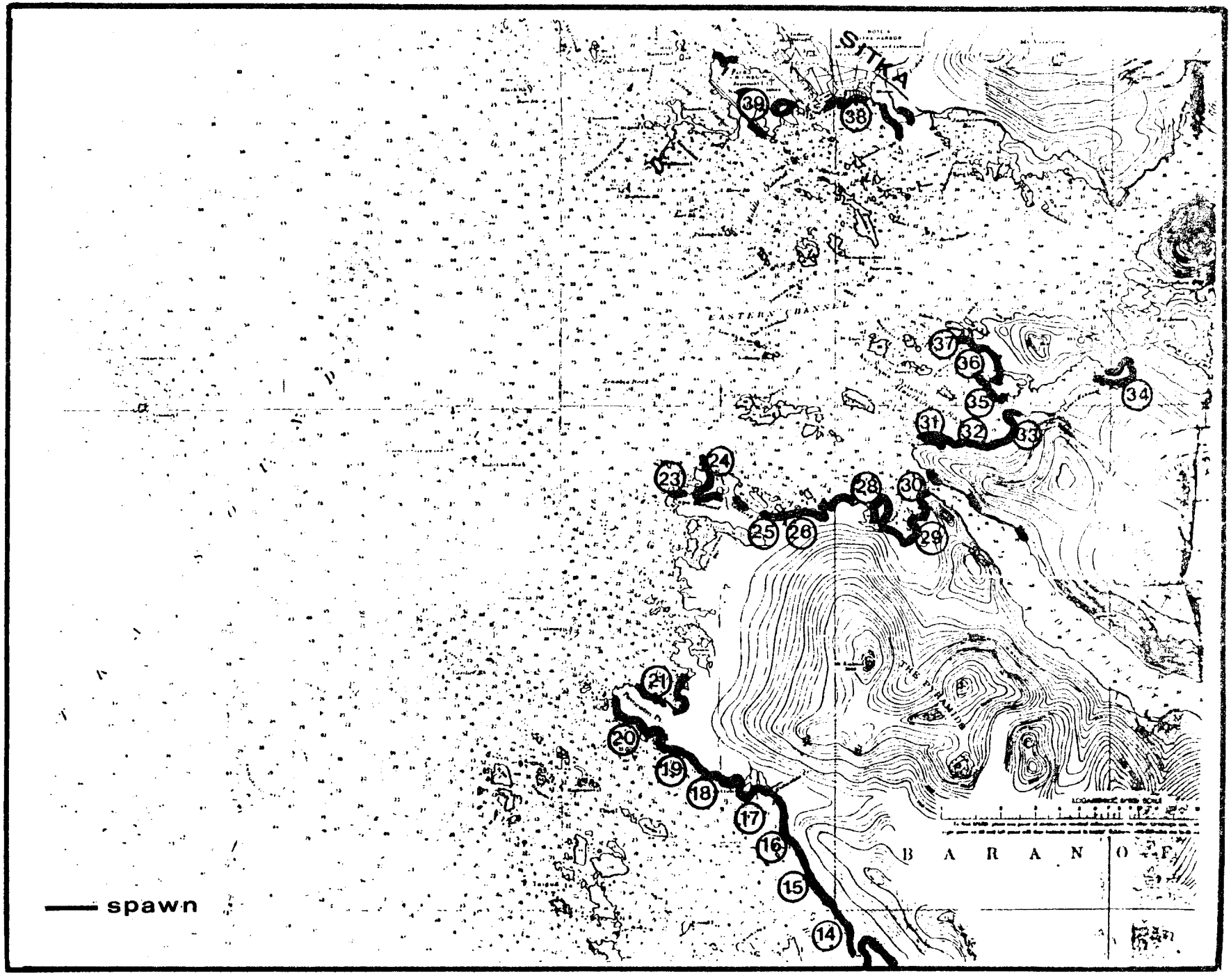


Appendix V. Sampling areas surveyed by divers, Sitka, 1981 (continued).

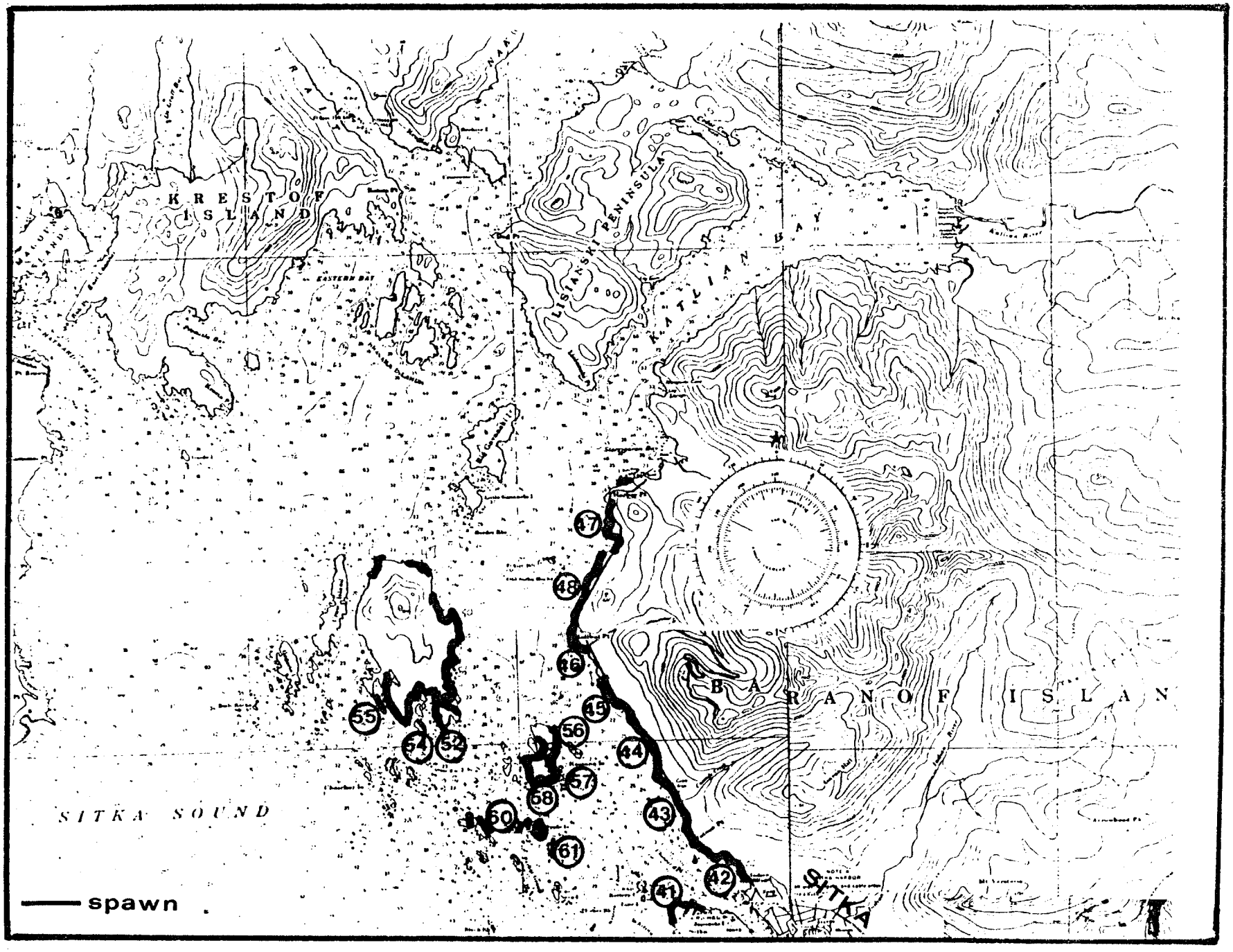
APPENDIX VI



Appendix VI. Sampling areas surveyed by divers, Sitka area, 1982.

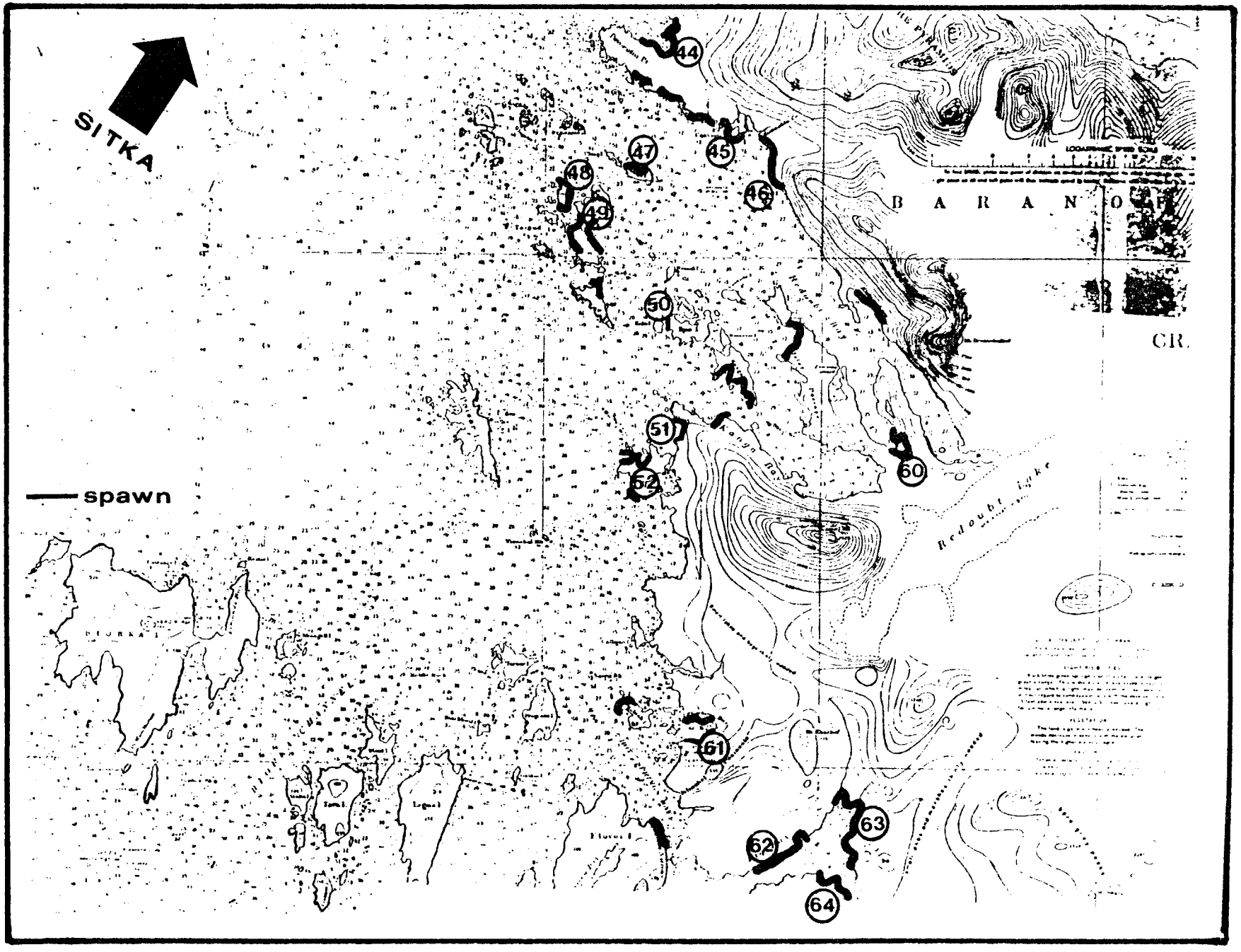


Appendix VI. Sampling areas surveyed by divers, Sitka area, 1982 (continued).

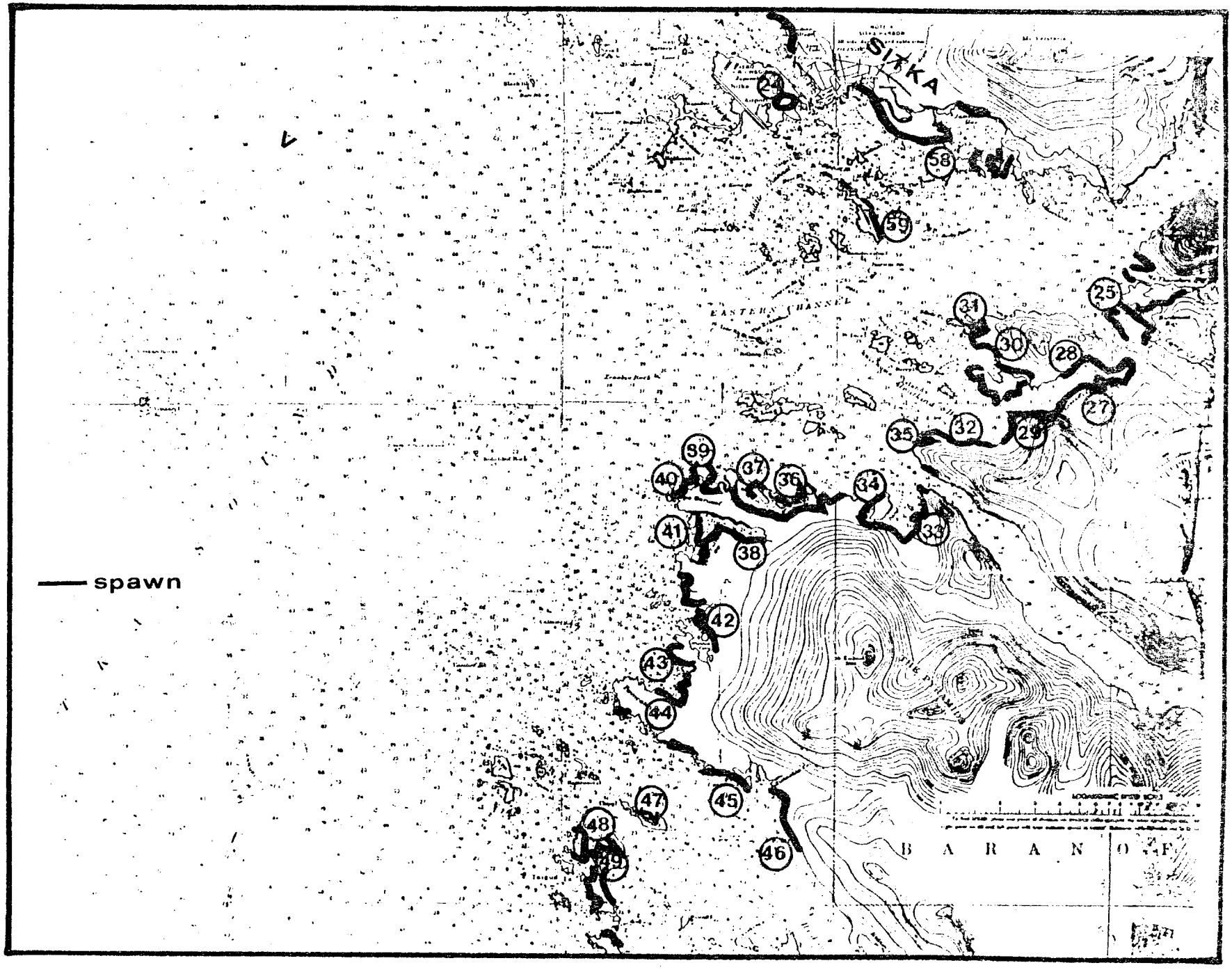


Appendix VI. Sampling areas surveyed by divers, Sitka area, 1982 (continued).

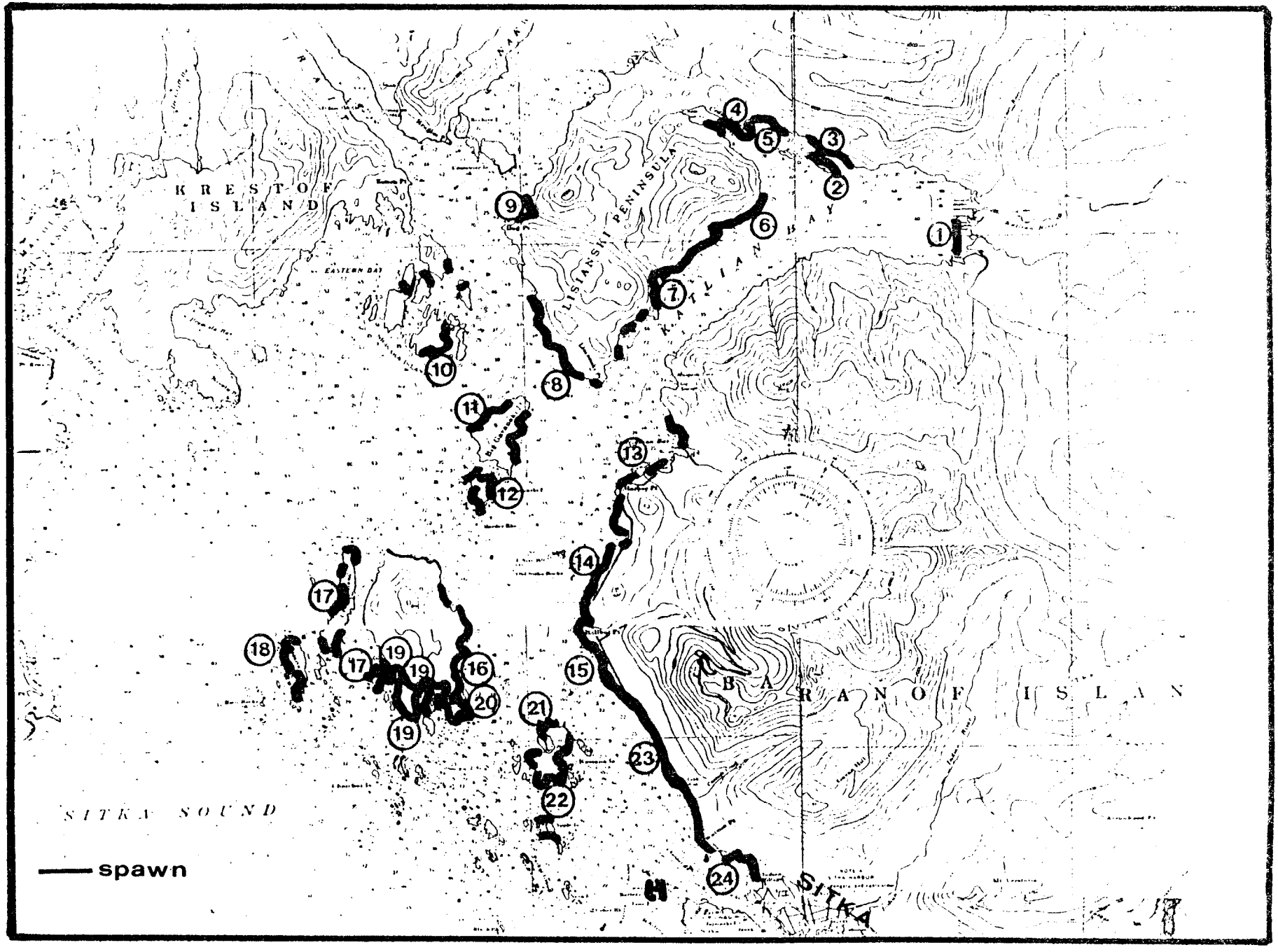
APPENDIX VII



Appendix VII. Sampling areas surveyed by divers, Sitka area, 1983.

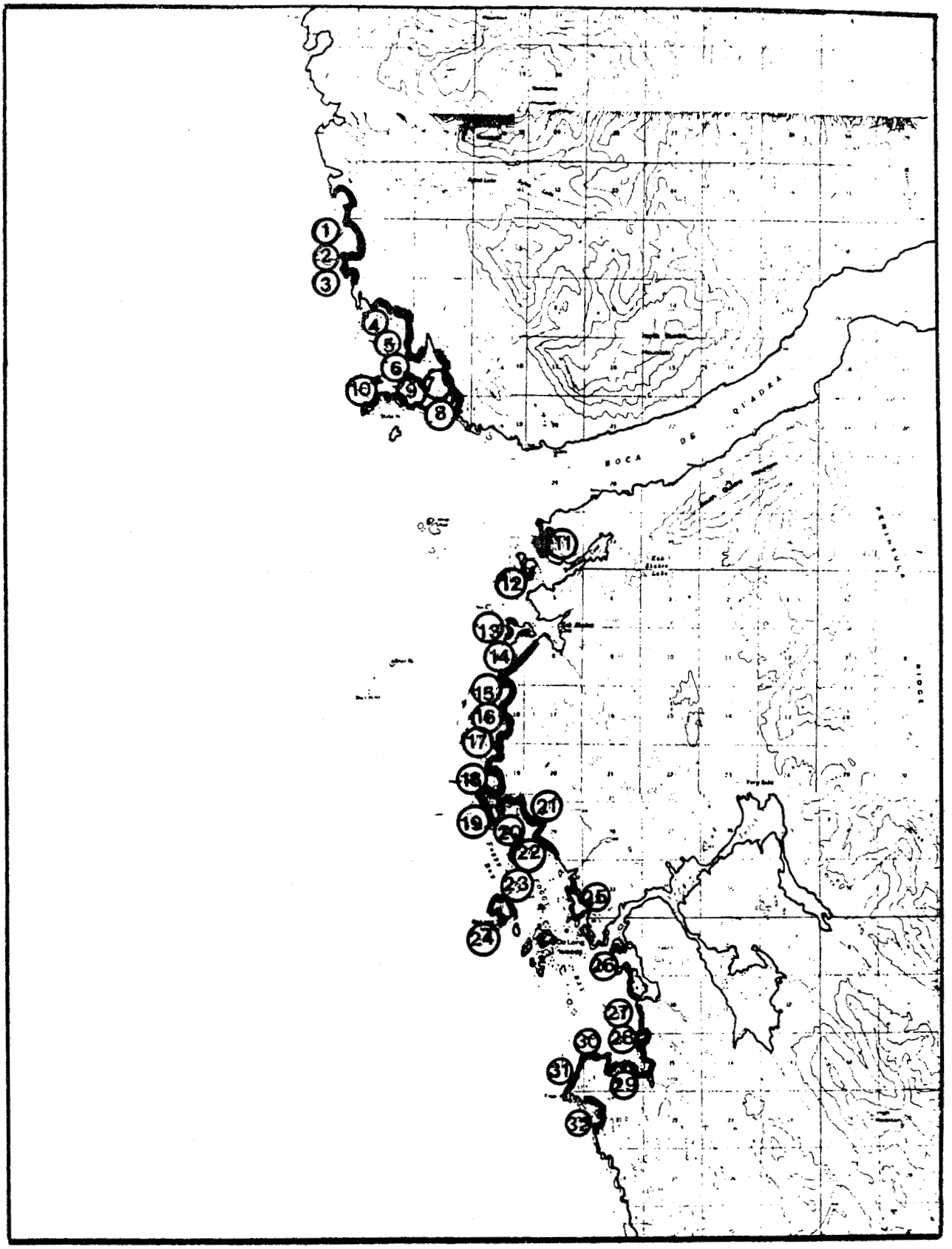


Appendix VII. Sampling areas surveyed by divers, Sitka area, 1983 (continued).



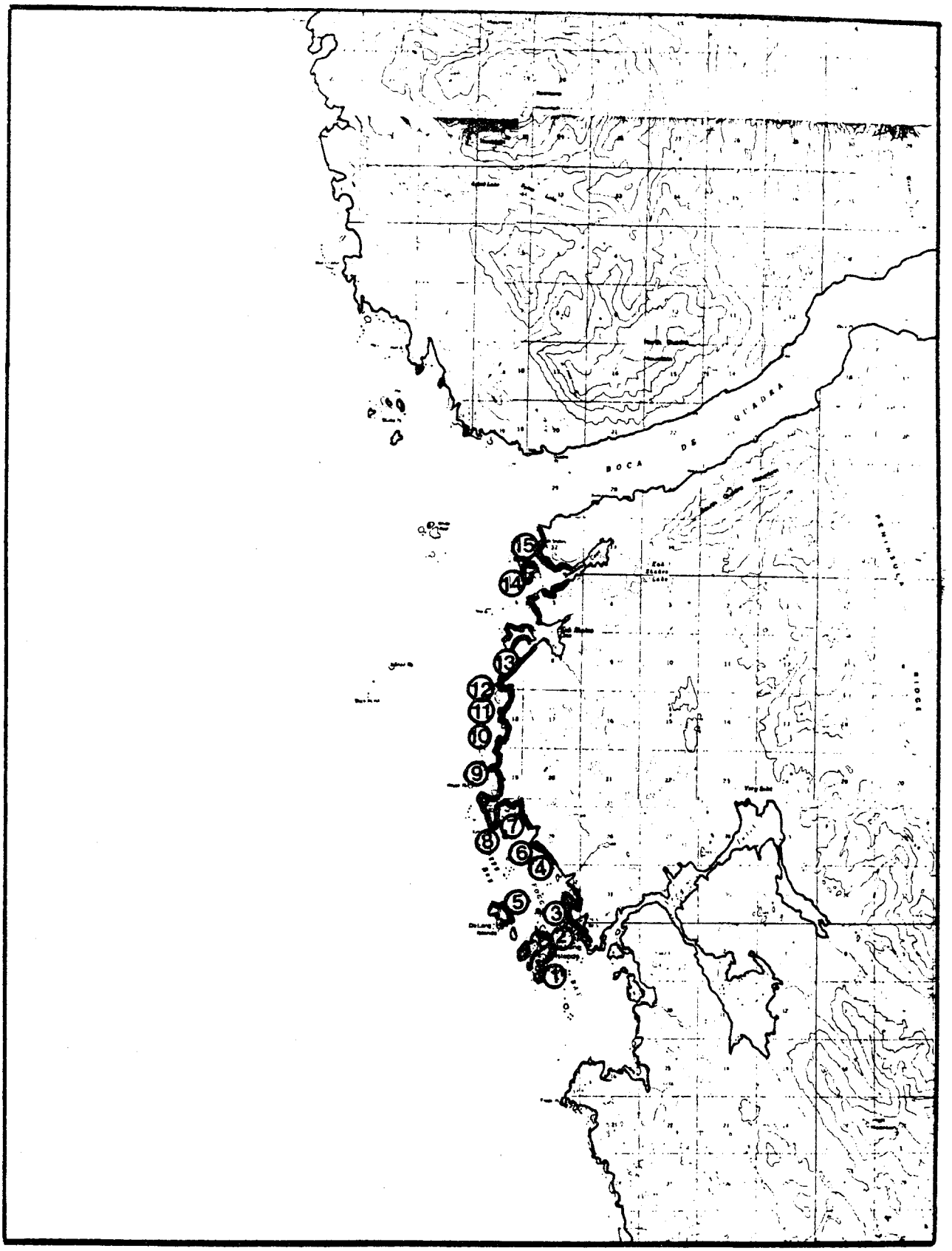
Appendix VII. Sampling areas surveyed by divers, Sitka area, 1983 (continued).

APPENDIX VIII



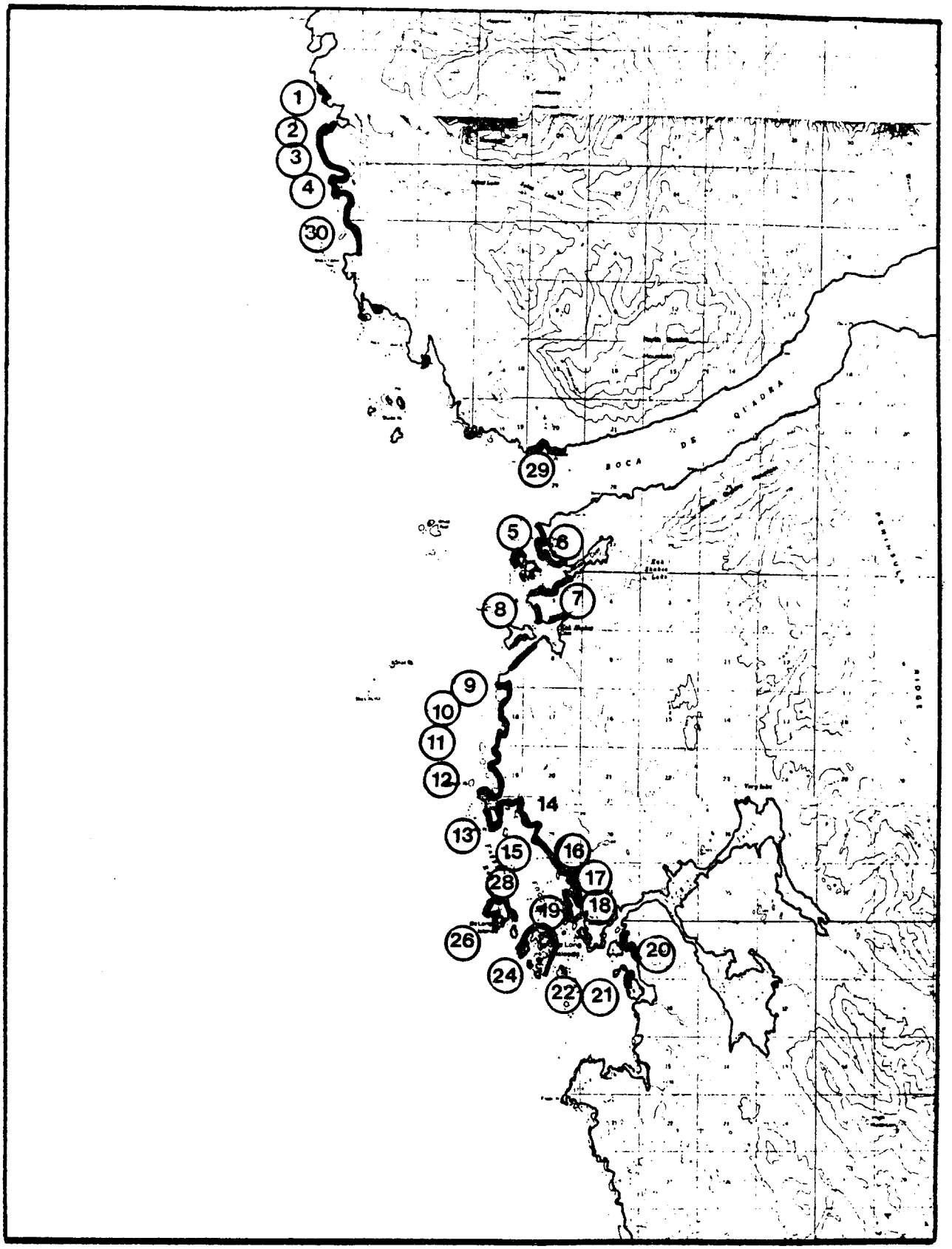
Appendix VIII. Sampling areas surveyed by divers, Boca de Quadra area, 1981.

APPENDIX IX



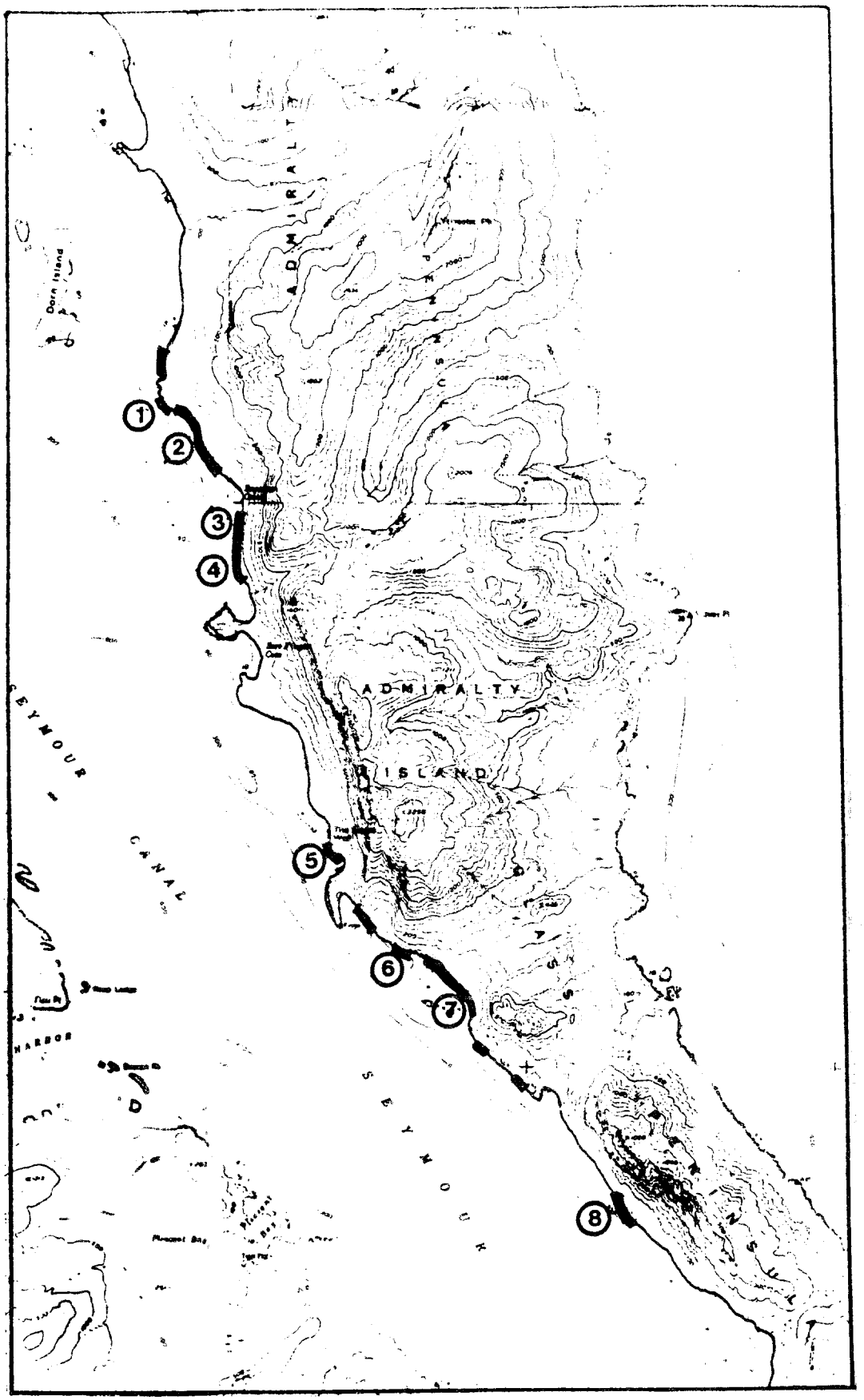
Appendix IX. Sampling areas surveyed by divers, Boca de Quadra area, 1982.

APPENDIX X



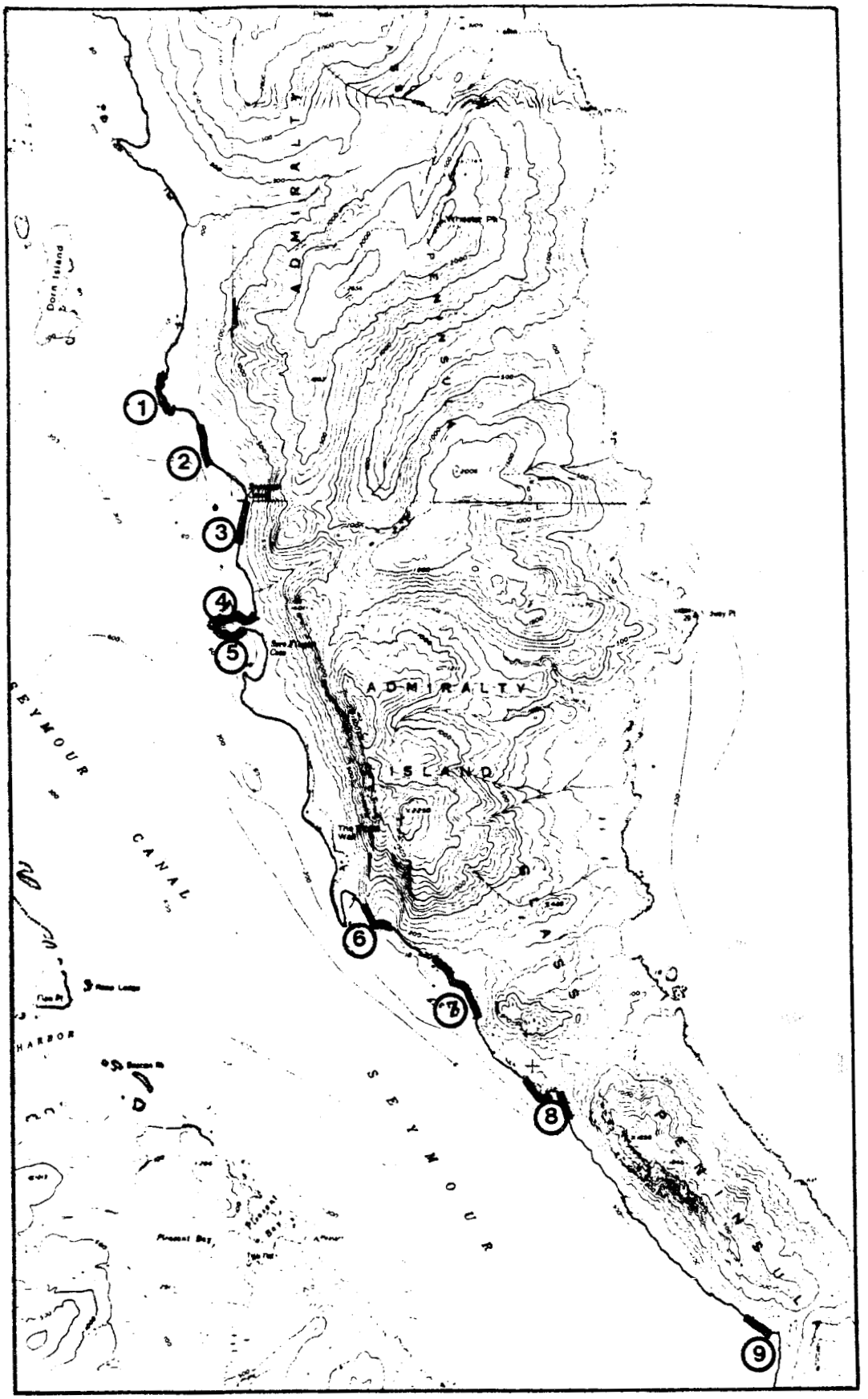
Appendix X. Sampling areas surveyed by divers, Boca de Quadra area, 1983.

APPENDIX XI



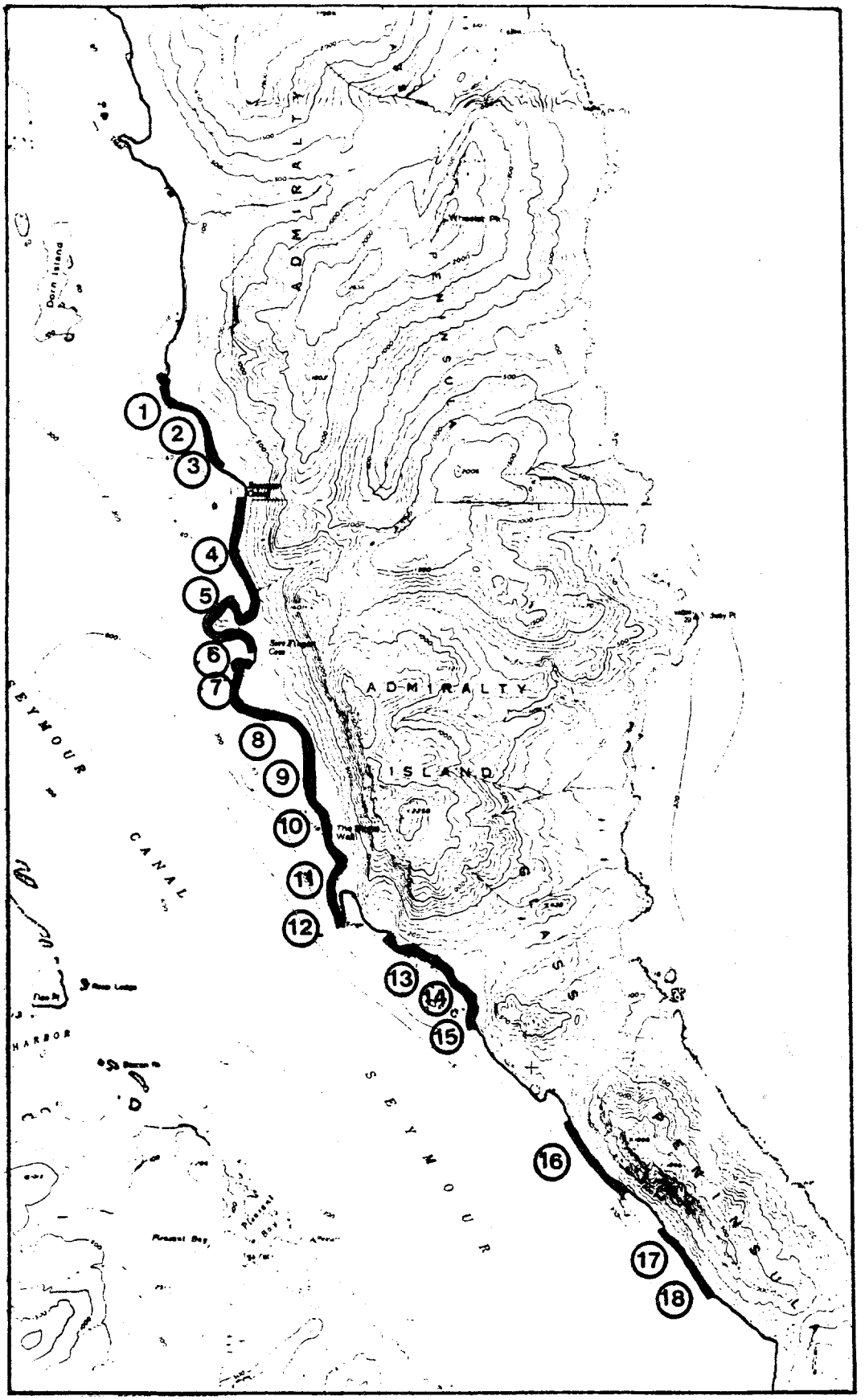
Appendix XI. Sampling areas surveyed by divers, Seymour Canal, 1981.

APPENDIX XII



Appendix XII. Sampling areas surveyed by divers, Seymour Canal, 1982.

APPENDIX XIII



Appendix XIII. Sampling areas surveyed by divers, Seymour Canal, 1983.

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