Copy 2

Review of the 1984-85 British Columbia Herring Fishery and Spawn Abundance

D.D. Chalmers

Department of Fisheries and Oceans
Field Services Branch
3225 Stephenson Point Road
Nanaimo, British Columbia V9T 1K3

September 1986

Canadian Industry Report of Fisheries and Aquatic Sciences No. 173

Fisheries and Oceans | Pêches et Océans

Canada

Canadian Industry Report of Fisheries and Aquatic Sciences

Industry reports contain the results of research and development useful to industry for either immediate or future application. They are directed primarily toward individuals in the primary and secondary sectors of the fishing and marine industries. No restriction is placed on subject matter and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Industry reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report is abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1–91 in this series were issued as Project Reports of the Industrial Development Branch, Technical Reports of the Industrial Development Branch, and Technical Reports of the Fisherman's Service Branch. Numbers 92–110 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Industry Reports. The current series name was changed with report number 111.

Industry reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport canadien à l'industrie sur les sciences halieutiques et aquatiques

Les rapports à l'industrie contiennent les résultats des activités de recherche et de développement qui peuvent être utiles à l'industrie pour des applications immédiates ou futures. Ils sont surtout destinés aux membres des secteurs primaire et secondaire de l'industrie des pêches et de la mer. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports à l'industrie peuvent être cités comme des publications complètes. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports à l'industrie sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1 à 91 de cette série ont été publiés à titre de rapports sur les travaux de la Direction du développement industriel, de rapports techniques de la Direction du développement industriel, et de rapports techniques de la Direction des services aux pêcheurs. Les numéros 92 à 110 sont parus à titre de rapports à l'industrie du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 111.

Les rapports à l'industrie sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

SCOTIA-FUNDY REGIONAL LIBRARY
NOV 24 1986
FISHERIES & OCEANS CANADA

Canadian Industry Report of
Fisheries and Aquatic Sciences 173

September 1986

REVIEW OF THE 1984-85 BRITISH COLUMBIA HERRING FISHERY AND SPAWN ABUNDANCE

by

D.D. Chalmers

Department of Fisheries and Oceans
Field Services Branch
3225 Stephenson Point Road
Nanaimo, B.C. V9T 1K3

© Minister of Supply and Services Canada 1986
Cat. No. FS 97/14/173 ISSN 0704 - 3694

Correct citation for this publication:

Chalmers, D.D. 1986. Review of the 1984-85 British Columbia herring fishery and spawn abundance. Can. Ind. Rep. Fish. Aquat. Sci.173 : 65 p.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES

LIST OF APPENDICES

ABSTRACT

Chalmers, D.D. 1986. Review of the 1984-1985 British Columbia herring fishery and spawn abundance. Can. Ind. Rep. Fish. Aquat. Sci. 173 : 65 p.

During the 1984-85 fishing season in British Columbia, herring were fished for food and bait from October 1 to December 9, 1984 and for roe from March 6 to April 1, 1985. The total food and bait catch was 860 metric tonnes. The total roe herring catch was 25,692 tons with a landed value of 35.5 million. There were 28 spawn-on-kelp licences issued for a total production of 162,781.6 kg. The 9.7 million standard square meters of spawn recorded coastwide represented a 35% decrease from the 1980-84 average of 15.0 million.

RÉSUMÉ

Chalmers, D.D. 1986. Review of the 1984-1985 British Columbia herring fishery and spawn abundance. Can. Ind. Rep. Fish. Aquat. Sci. 173 : 65 p.

Au cours de la saison de pêche 1984-85 en Colombie-Britannique, le hareng a été pêche comme nourriture et appât du 1er octobre au 9 décombre 1984 et pour la rogue du 6 mars au 1er avril 1985. Les prises de hareng de consommation et d'appat totalisaient 860 tm tandis que les captures totales de hareng rogué s'élevaient à 25,692 t, dont la valeur au débarquement se chiffrait à $35.5 millions. La production totale, tireé de 28 permis d'exploitation des oeufs sur varech, s'élevait à 163 tm. Sur tout le littoral, la rogue couvrait 9,7 millions de mètres carrés, soit une basse de 35% par rapport à la moyenne de 15,0 million observée en 1980-1984.

INTRODUCTION

Pacific herring (Clupea harengus pallasi) migrate inshore from offshore feeding areas in the early fall and winter and hold in sheltered bays and inlets in preparation for spawning in late winter and early spring.

It is during these times that they are subjected to two major commercial fisheries. The first one, a food and bait fishery, takes place in November and December when the fat content is highest, while the second is a roe fishery and occurs just prior to spawning when gonad development nears maximum.

Herring spawn in the intertidal and subtidal zones depositing their eggs on vegetation and rock substrates between depths of about 1.5 m above 0 tide level and 18 m below 0 tide level (Humphreys and Hourston 1978). Once the herring have deposited their eggs, measurements of individual spawnings are made by Fisheries staff. Since the amount of spawn deposited is directly related to the number of spawners, this information, when coupled with data on catch and age composition enables estimates to be made of the total number of fish present at the beginning of the season, the proportion taken by the fishery and the strengths of the various year classes. These data are also used to forecast the amount of herring that will return to spawn during the forthcoming year (Haist et al. 1985).

These forecasts, along with biological and management implications, are used to establish fishing quotas for each of the various fishing licence areas (Table 4).

METHODS

The information for the fishery portion of this publication is extracted from the Record of Management Strategies reports. These in-house reports are written on a daily basis in each management area (i.e. Queen Charlotte Islands, Prince Rupert, Central Coast, Strait of Georgia and W.C.V.I.) and provide a written record of the stock assessment program, a review of the seine and/or gillnet fisheries, the management strategies used, and the reasons and considerations affecting various management decisions.

Tonnage estimates of stocks are determined acoustically using echo sounders and are subjective interpretations based on past experience of the charter vessel masters, patrol vessel masters and Fishery Officers.

Spawn data were obtained from annual spawn reports compiled by the Department of Fisheries and Oceans (DFO) field staff. These reports document timing and location of individual spawnings as well as length and width of spawn depositions, average layers of eggs on each type of substrate utilized and percentage of vegetation cover.

Field staff measure spawn patches at low tide by pacing them out and plotting the area on large scale charts or shoreline vegetation maps made from aerial photographs (e.g. Haegele and Hamey 1979). In order to determine the extent of subtidal depositions, a raking apparatus is dragged along the bottom to catch

pieces of vegetation along with whatever eggs are attached. This method has been unreliable in areas where the vegetation is sparce or spotty; therefore, whenever possible, spawns are surveyed by divers using snorkles or SCUBA gear.

For this report, spawn data are converted to a standard measurement (standard square meters at medium intensity - SSM) so that spawnings can be compared from area-to-area and year-to-year. Standard square meters are calculated by multiplying the length of deposition by the width, times a weighting factor based on intensity of egg deposition (Table 1), times the percentage of the spawn area containing vegetation.

In past years, spawnings have been assigned to the various intensity categories in the field. This tended to be very subjective and was based on the overall impressions of the thickness of the spawn and the observers' memory of past years' spawnings. This approach resulted in considerable inconsistencies in the data. In order to overcome this problem, a method was developed whereby the intensity factor was based on the actual layers of eggs deposited on the various types of vegetation (Table 2).

An example of calculating the standard square meters of spawn in an area would be:

> A deposition of 600 meters by 15 meters at an average thickness of 4 egg layers on brown algae with 60% vegetation cover is 600 x 15 x 1.4 x 0.6 = 7,560 SSM.

These numbers often become large and unwieldy for extensive spawnings, so they are converted to a base unit of 1,000 square meters; thus 7,560 SSM become 7.56 k SSM.

In this report, the food and bait fishery quotas and catches are expressed in metric tonnes (1 tonne = 1000 kg). This fishery is small and was easy to monitor in metric units. The roe herring fishery quotas and catches (hailed and sales slip data) are expressed in short tons (1 ton = 2000 lb) since conversion to metric units would have been very time-consuming given the large number of participating vessels and large catches.

1984 FOOD AND BAIT FISHERY

The Total Allowable Catch (T.A.C.) for the 1984 food and bait fishery was 1,000 tonnes, which reflected the continuing poor market value for food and bait products. This T.A.C. was supported by the Herring Industry Advisory Board and was designed to fulfill domestic food requirements (i.e. fillets, roll mops, salted) as well as local commercial bait requirements.

Guidelines for the 1984 food and bait fishery were issued to Industry in September. These guidelines provide information on export, entry and licencing

Table 1. Herring spawn intensity categories and weighting factors used to calculate standard square meters (SSM).

Intensity	Very Light (VL)	Very light Light (VLL)	Light (L)	Light Medium (LM)	Medium (M)	Medium Heavy (MH)	Heavy (H)	Heavy Very Heavy (HVH)	Very Heavy (VH)
Weighting Factor	0.05	0.2	0.4	0.65	1.0	1.4	1.9	2.4	3.0

Table 2. Conversion from layers of eggs to intensity categories (from Haegele et al. 1979).

	Layers of Eggs								
Stringy (Grasses, brown algae, stringy reds)	< 0.25	0.5	1.0	2.0	3.0	4.0	6.0	7.0	7.8
Leafy (Rock weed, kelp, leaf reds)	< 0.25	0.5	1.0	1.5	2.0	2.5	3.0	7.5	7.4
Intensity	Very Light (VL)	Very light Light (VLL)	Light (L)	Light Medium (LM)	Medium (M)	Medium Heavy (MH)	Heavy (H)	Heavy Very Heavy (HVH)	Very Heavy (VH)

requirements, as well as current regulations and proposed fishing patterns (Appendix 1).

The 1,000 tonnes were sub-divided on a coastwide basis, with 250 tonnes allocated to the North Coast (Areas 3, 4, 5), 250 tonnes to Johnstone Strait (Area 13) and 500 tonnes to lower Strait of Georgia (Area 17).

As in the last two years, individual 50-tonne vessel quotas were established and vessels were chosen by random lottery draw. Any vessel with an "A" seine, "H" seine or "T" trawl licence was eligible for the draw.

Applications for each area (North Coast, Johnstone Strait and lower Strait of Georgia) were invited, and vessels selected for a particular area were not allowed to fish in the other two areas.

Of the 20 vessels licenced to fish, 19 participated, for a total catch of 860 tonnes. This represents 86.0% of the T.A.C. Preliminary estimates of the landed value for this fishery amounted to $270,000 indicating an increase over the 1983 fishery when 780.5 tonnes were caught for a value of $225,000.

NORTH COAST

Areas 3 - 5

The northern sub-district was opened by public notice on October 1, 1984, and was closed December 9, 1984. All fishing took place in the top portion of Area 5, lower portion of Area 4 and near Bonilla Rock. The fishery was hampered by poor weather conditions and frequency of small fish in the sets. Only four of the five licenced vessels delivered fish, for a total hailed catch of 136 tonnes.

SOUTH COAST

Johnstone Strait, Area 13

The lower portion of Area 13 in the vicinity of Deepwater Bay opened by public notice on October 23, 1984 and closed November 19, 1984. All five licenced vessels participated and hailed a catch of 226 tonnes.

Lower Strait of Georgia, Area 17

On November 7, at 12:00, sub-areas 17-3, 17-4 and the northern portion of 17-2 opened by public notice and closed midnight December 3. Ten vessels licenced to fish in this area participated. A total of 498 tonnes of herring were taken. The fishery proceeded slowly due to the inaccessibility of desirable sized fish which were too deep for capture by seine nets. Sea lions also contributed to the difficulty in completing seine sets.

1985 ROE HERRING FISHERY

Guidelines for the 1985 roe herring fishery were issued in October 1984

(Appendix 2). These guidelines detail the current area licencing scheme, management plans, catch quotas and regulations for the fishery.

Due to the poor returns forecasted for the west coast of Vancouver Island, and subsequent closure to roe herring fishing, a revised area licencing system was implemented for the 1985 season.

Four separate licenced areas were established and catch quotas assigned to each area. These catch quotas are assigned prior to the fishing season and holders of roe herring licences are required to choose one of the areas in which to fish. Quotas can be adjusted annually depending on the escapement during the past year, the forecasted run for the next year, as well as such management considerations as catchability of the fish and seine/gillnet gear splits.

One of the major advantages of using an annually adjusted quota is that managers can set up fisheries on the first available stock of suitable maturity and also provide for a more orderly fishery. In addition, in many areas of the coast it is the older, larger herring which spawn first, and fishing these early spawners can provide higher roe yields to the Industry.

In-season catch estimates are obtained from individual fishermen who are required to hail their catches prior to leaving the grounds. These figures are fairly accurate and generally within 10-15% of the final sales slip data compiled from company landing slips.

Hailed catches are used throughout the text because they are the ones used to determine whether or not the quota has been realized and if the fishery should be closed or remain open. Additionally, sales slip information is not available until late in the year.

The four areas and the distribution of licenced gear by area for 1985 are shown in Table 3. The roe herring quotas for each licenced area are shown in Table 4. As in past years, the total quota for 1985 was set to provide for a 55%:45% seine/gillnet catch division coastwide (Table 4). The actual 1985 roe herring catches are given in Table 5 (hailed catches) and Table 6 (sales slip data). The annual (1982-1985) roe herring catches by Statistical Area and gear type are shown for each licenced fishing area (Queen Charlotte Islands, Prince Rupert, Central Coast and Strait of Georgia) in Tables 7-10 respectively. Statistical Areas in British Columbia are shown in Figure 1, and the 1985 roe herring fishing boundaries in Figures 2-6. All figures are appended at the end of the report.

Briefly, the 1985 roe herring fishery accounted for a coastwide catch of 25,692 tons (sales slip data). Of this total, 6,537 tons were caught in Area A (Queen Charlotte Islands), 6,915 tons in Area B (Prince Rupert), 5,447 tons in Area C (Central Coast) and 6,793 tons in Area D (Strait of Georgia) (Table 6). The landed value of the roe herring catch in 1985 was approximately 35.5 million dollars. This compares with 34.3 million in 1984 when 34,315 tons were caught, and 47.9 million in 1983 when 40,236 tons were caught (Table 11).

A summary of the 1985 in-season stock assessment and resultant fisheries in each area is presented below.

Table 3. Distribution of licenced gear by gear type and roe herring area, B.C., 1985.

Roe Herring Area	Numbers of Licenced Seines	Gillnets
Area A - Queen Charlotte Islands	90	163
Area B - Prince Rupert	56	445
Area C - Central Coast	47	281
Area D - Strait of Georgia	48	432
Total	241 [a]	1321

[a] Seine total does not include 11 chartered seiners.

Table 4. Roe herring quotas (tons) by roe herring area, B.C., 1985.

Roe Herring Area	Roe Herring Quotas (tons) Seines	Gillnets	Total
Area A - Queen Charlotte Islands	4453	1058	5511
Area B - Prince Rupert	2205	3307	5512
Area C - Central Coast	2535	1984	4519
Area D - Strait of Georgia	2205	2976	5181
Total	11398	9325	20723
Target Catch Division	55%	45%	

Table 5. Hailed catches (tons) by gear type and roe herring area, B.C., 1985.

Roe Herring Area	Hailed Catches (tons) Seines	Gillnets	Total
Area A - Queen Charlotte Islands	4825	1558	6383
Area B - Prince Rupert	3007	3813	6820
Area C - Central Coast	3045	2262	5307
Area D - Strait of Georgia	2879	3686	6565
Total	13756	11319	25075
Achieved Catch Division	55%	45%	

Table 6. Sales slip data (tons) by roe herring area, B.C., 1985.

Roe Herring Area	Sales Slip Data (tons) Seines	Gillnets	Total
Area A - Queen Charlotte Islands	4915	1622	6537
Area B - Prince Rupert	3086	3829	6915
Area C - Central Coast	3038	2409	5447
Area D - Strait of Georgia	2915	3878	6793
Total	13954	11738	25692
Achieved Catch Division	54%	46%	

Table 7. Hailed roe herring catches (tons) in Fishing Area A (Queen Charlotte Islands) by Statistical Area and gear type, B.C., 1982 - 1985.

		Hailed Catch (Tons) by Statistical Area				
Year	Gear[a]	1	2E	2W	Total Area A	TOTAL FOR YEAR (SN + GN)
1982	SN	-	2785	1297	4082	5623
	GN	-	1541	-	1541	
1983	SN	-	5030	1470	6500	7600
	GN	-	1100	-	1100	
1984	SN	-	5100	-	5100	5691
	GN	-	591	-	591	
1985	SN	-	4825	-	4825	6383
	GN	-	1558	-	1558	

[a] SN - seine, GN - gillnet.

Table 8. Hailed roe herring catches (tons) in Fishing Area B (Prince Rupert) by Statistical Area and gear type, B.C., 1982 - 1985.

		Hailed Catch (Tons) by Statistical Area				
Year	Gear[a]	3	4	5	Total Area B	TOTAL FOR YEAR (SN + GN)
1982	SN	-	-	-	-	-
	GN	-	-	-	-	-
1983	SN	-	-	-	-	-
	GN	-	-	-	-	-
1984	SN	-	-	1835	1835	4043
	GN	-	2208	-	2208	
1985	SN	-	-	3007	3007	6820
	GN	-	3813	-	3813	

[a] SN - seine, GN - gillnet.

Table 9. Hailed roe herring catches (tons) in Fishing Area C (Central Coast) by Statistical Area and gear type, B.C., 1982 - 1985.

Year	Gear [a]	Hailed Catch (Tons) by Statistical Area 6	7	8	Total Area C	TOTAL FOR YEAR (SN + GN)
1982	SN	-	2625	-	2625	6800
	GN	407	3768	-	4175	
1983	SN	-	2200	-	2200	6200
	GN	2500	1500	-	4000	
1984	SN	3886		-	3886	7734
	GN	3848		-	3848	
1985	SN	-	3045	-	3045	5307
	GN	-	2262	-	2262	

[a] SN - seine, GN - gillnet.

Table 10. Hailed roe herring catches (tons) in Fishing Area D (Strait of Georgia) by Statistical Area and gear type, B.C., 1982 - 1985.

Year	Gear [a]	Hailed Catch (Tons) by Statistical Area 14	15	17	Total Area D	TOTAL FOR YEAR (SN + GN)
1982	SN	-	-	3400	3400	9400
	GN	6000	-	-	6000	
1983	SN	1600	3200	1800	6600	15433
	GN	8833	-	-	8833	
1984	SN	-	4438	-	4438	12763
	GN	8325	-	-	8325	
1985	SN	2879	-	-	2879	6565
	GN	3686	-	-	3686	

[a] SN - seine, GN - gillnet.

Table 11. Landed weight and value of British Columbia roe herring catches 1979 - 1985 (sales slip data).

Year	Landed Weight (tons)	Landed Value ($ Million)
1979	42,807	120.86
1980	19,330	22.06
1981	32,087	34.68
1982	29,593	27.01
1983	40,236	47.91
1984	34,315	34.30
1985	25,692	35.49[a]

[a] Estimated value based on average price paid for seine and gillnet fish in 1985.

QUEEN CHARLOTTE ISLANDS (AREAS 1, 2E, 2W)

Area 2E - Assessment

Preliminary stock assessment on the east coast of the Queen Charlotte Islands began in the Juan Perez-Skincuttle Inlet areas on February 1. There were, however, no significant amounts of herring located until February 24 - 25 when 3,000 - 4,000 tons were observed in Skincuttle Inlet between Slug Islets and Deluge Point, and 5,000 tons in Atli Inlet along the Ustas Point shoreline.

On March 1, three schools totalling 1,500 - 2,000 tons were located in Werner Bay and only 400 - 500 tons could be found in Skincuttle Inlet. The fish were in small, broken schools in close proximity to Slug Islets.

By March 5, total stock estimate for the lower Juan Perez - Skincuttle Inlet area was 8,000 - 9,000 tons. This included 3,000 - 3,500 in the vicinity of All-Alone-Stone, 1,200 tons near Bush Rocks, 1,000 tons off Slug Islets and 3,000 - 3,500 tons in Atli Inlet. A roe test on the Atli Inlet fish taken on March 6 indicated a roe maturity of 0%.

On March 7, 4,000 tons were sounded in lower Juan Perez Sound around the Newberry Point - Huxley Island areas and 2,000 - 3,000 tons were located in Skincuttle Inlet. A roe test taken off Slug Islets yielded 10.9% roe maturity.

Stocks increased overnight and on March 8, 5,000 tons were sounded off Huxley Island and 6,000 - 7,000 tons were sounded in Skincuttle Inlet. A roe test taken off Huxley Island tested at 1% roe maturity and another test taken off the Copper Island in Skincuttle Inlet indicated 5% roe maturity. Two further roe tests made on March 9, one in Huston Inlet and one off Elswa Rock, yielded 10.0% and 9.3% roe maturities respectively.

On March 10, 3,500 tons were located in Huston Inlet and were tested at 10.5% roe maturity. Additionally, 1,500 tons were sounded off east Bolkus Island and these tested at 14.4% roe maturity. In addition, several schools were observed by aircraft along the east shore of Bag Harbour, moving into the shallows.

Although assessments on March 11, the day of the seine fishery, indicated only 2,500 - 3,000 tons in Huston Inlet, it was felt by DFO staff that the 7,000 tons observed earlier were still in the area.

The majority of fish seen on this day were in small schools on the bottom and were difficult to assess. Roe tests on fish off Bush Rocks and the head of Huston Inlet yielded 12.6% and 12.8%, respectively.

On March 12, the day following the seine fishery, 3,000 - 4,000 tons were located in shallow water at the head of Huston Inlet and 1,500 - 2,000 tons were sounded off Bush Rocks.

An additional 2,000 - 3,000 tons were located between All-Alone-Stone and Park Island in Juan Perez and these tested at 5.8% roe maturity.

Stocks in Skincuttle Inlet were assessed at 2,000 - 3,000 tons between March 14 and 18 and then increased to 6,000 - 7,000 tons on March 19, while in the lower Juan Perez area they ranged around 800 - 1,500 tons between March 15 - 23 with roe maturities around 8 - 9.5%.

On March 24 an estimated 4,000 - 5,000 tons moved into the Sedgewick Bay area and were tested for a roe maturity of 11.8%. There was some thought that these may be new fish moving into the area because the size frequency of these fish (average length range 21.6 - 22.3 cm) differed from that of fish sampled in lower Juan Perez (average length range 22.6 - 23.5 cm).

Echo sounding in Skincuttle Inlet at this time estimated 6,000 - 7,000 tons still in the area with the main concentrations in Swan Bay, Bag Harbour and Jedway Bay.

Very little assessment work was carried out over the next few days due to the gillnet fishery opening, but on March 28, approximately 1,000 tons were located in Bag Harbour and 100 - 150 tons were located in Huston Inlet.

On March 29, spawning began in Skincuttle Inlet and in lower Juan Perez Sound.

Area 2E - Fishery

Seines: A portion of management sub-area 2-15 in Skincuttle Inlet was opened to fishing by means of seines at 12:13 March 11 and closed at 18:02 the same day. Total length of opening was 5 h 49 min. Most vessels were able to make more than one set. However, the fish proved to be very fast and difficult to catch, and only 62% of the 90 licenced vessels were able to catch fish. The hailed catches ranged from a low of 10 tons to a high of 220 tons and roe percentages were reported to be very good, averaging 12-16%. Total hailed catch was 4,825 tons. The quota for this fishery was 4,453 tons.

Gillnets: Management sub-area 2-16 opened at in 23:30 March 25 and closed at 13:15 March 26. Total length of opening was 13 h 45 min.

Approximately 125 of the 163 licenced skiffs participated in the fishery; this was due to a number of double licenced skiffs moving to Area 3 in anticipation of a fishery in Port Simpson.

Fishing was very slow throughout the night and punt average at 01:30 was less than 1 ton.

Roe tests made on some early landings indicated 12-13.5% maturity with a high incidence of males. By 07:30 the punt averages increased to 2.9 tons and at 11:30 were at 8 tons. Fishing became very heavy just prior to closure and several nets were still in the water after the closure.

Roe tests made at the end of the fishery indicated roe yields of 13.5-13.75% and total hailed catch for the fishery was 1,558 tons. The quota for this fishery was 1,058 tons.

PRINCE RUPERT (AREAS 3 - 5)

Areas 3 - 4 - Assessment

The assessment program commenced on March 4 but no herring were seen until the next day when 500 - 1000 tons were located off China Hat (Truro Island) near Sommerville Bay. By March 6, stock estimates increased to 1800 - 2500 tons with the major concentrations in Sommerville Bay (2000 - 3000 tons), Union Inlet (300 - 400 tons),and Boston Rocks (500 tons). By March 12, assessments indicated a total stock of 2800 tons with 1200 tons situated in Emma Pass/Union Inlet and 1500 tons off Hogan Island. This estimate was further increased to 3,850 tons on March 13, when the estimate for Emma Pass/Union Inlet was changed to 2000 tons.

Stocks remained the same over the next few days and fish were observed moving down into the Cunningham Pass area. Sounding along the 50 fm edge near the top and outside of Finlayson Island located only one school of about 25 - 30 tons.

A test set conducted on March 15 in Cunningham Pass indicated a roe maturity of less than 1% and average fish size of 20.3 cm.

By March 17, stock estimates had increased to 4600-5200 tons and the largest concentrations of fish were located between Haida Bay and Bernie Island (2500 - 2700 tons) and Boston Rock (750 - 850 tons).

The next major increase in abundance occurred on March 21 when a total of 6100 - 6500 tons were estimated for Areas 3 and 4. Of this, 600-800 were located off Hogan Island, 1500 tons in Haida Bay, 1000 tons in Stuman Bay, 2300 - 2400 tons in Cunningham Pass and 700 - 800 tons on the outside of Finlayson Island along the 50 fm edge.

One test set on March 20 in Haida Bay indicated a roe maturity of 3% and two further tests made on March 21 in Cunningham Pass and Grassy Point averaged 7% each.

By March 24, total stock estimate for the area was 6100 - 7600 tons and included 1600 - 1800 tons in Haida Bay/Bernie Island, 300 - 500 tons in Stuman Bay, 1500 - 1800 in Cunningham Pass and 2700 - 3500 tons in Pearl Harbour/Big Bay.

Two test sets made in Cunningham Pass, one at 09:10 and the other at 13:21 indicated roe maturities of 8.0% and 8.3% respectively.

While the fish took a normal migration route this year down Cunningham Pass into Pearl Harbour, the 8% roe maturity of fish tested in Pearl Harbour was lower than expected. Normally, fish in the Pearl Harbour/Big Bay area have around 10-12% or greater roe maturity.

On March 25, a spawning commenced at the bottom end of Burnt Cliff Island and Big Bay. In addition, large schools of herring were observed tight to the beach along the north side of Big Bay and outside of Burnt Cliff and Pearl Harbour.

No assessment took place on March 26 due to the gillnet fishery opening, but on March 27, 400 - 5000 tons were observed along the 50 fm edge between Tree Bluff and Hodgson Reef and a further 2000 tons were seen in Cunningham Pass.

Area 4 - Fishery

Gillnets: A gillnet fishery took place in sub-areas 4-5, 4-6, 4-7, 4-8 and 4-14 between 14:00 March 26 and 12:00 March 28. Total length of opening was 46 h.

Approximately 280 of the 445 licenced skiffs were present at the opening and the total gear count throughout the fishery ranged between 240 - 290 skiffs.

The first hails came in at 16:00. A total of 103 skiffs were checked for an average catch of 2.95 tons. Roe tests conducted on these early sets ranged between 14.5-16%.

By 20:15, catch averages increased to 4.26 tons/skiff and total catch was estimated at 1,234 tons.

Fishing slowed during the evening and by 07:30 March 27 skiff averages were 6.52 tons for a total catch of 1,891 tons. Roe percentages were mainly in the 13-15% range. Fishing remained slow throughout the day and by 20:00 total catch was 2,508 tons.

Fishing started to pick up at 03:00 March 28 with some shakes up to 2 tons, and by 08:00 punt averages were up to 10.8 tons for a total catch of 3,210 tons.

By the time the 12:00 closure was announced, fishing had dropped off and skiffs were reported to be leaving for the Central Coast. Total hailed catch for the fishery was 3,813 tons. The quota for this fishery was 3,307 tons.

Area 5 - Assessment

The assessment program in Kitkatla Inlet began on March 5, but no significant abundance of herring was located until March 21 when 300 - 400 tons were sounded off the west side of Gurd Island, 100 tons were found tight to the beach near Freeman Pass and 100 - 200 tons were located near Winter Rocks. A light skim that was showing consistently off Snass Point was tested on March 17 and found to be juvenile herring with a size range of 7.5 - 14.0 cm.

On March 22, sounding between Clam Shell Island and Freeman Pass on the west side of Gurd Island produced only a few scratches of herring. It was felt that these fish had moved over to the east side of the island where numerous schools were found at the mouth of Serpentine Inlet. A test set made off Gurd Point yielded a roe maturity of 10.75% and average length of 20.4 cm.

Stocks appeared to be increasing and by the next day the total estimate for the area was 1,500 - 2,000 tons, the most fish observed so far. This estimate included 400 - 500 tons between Billy Island and Chief Point, and 400 - 500 tons inside Freeman Pass, but did not include a large body of fish located on the bottom in Beaver Pass.

A test set on March 26 near Robert Island on 150 tons indicated 13.5% roe maturity and average length of 21.0 cm. This was, however, the only school that could be located between Clam Shell Bay and Freeman Pass.

Another test on 100 tons was made on March 27 off Serpentine Inlet and indicated a roe maturity of 13.0%. These fish were larger than those tested earlier and averaged 21.6 cm.

Total stock estimate on March 28, the day of the seine fishery opening, was thought to be in excess of 2,000 tons and included 400-500 tons at the entrance to Freeman Pass, 300 - 400 tons off Winter Rocks and 500+ tons between the Gravel Pit and Freeman Pass.

After the fishery, sounding was curtailed due to strong southeast winds, but on March 31 stock estimate for the Inlet was 2,000 - 3,000 tons with indications of newer, less mature fish moving into the inlet.

Area 5 - Fishery

Seines: On March 28 between 10:50 and 13:32, sub-areas 5-4, 5-5 and 5-8 in the Kitkatla Inlet opened for seine fishing. Total length of opening was 2 h 42 min. A compliance boundary was established in sub-area 5-4 between Whiteley Point and Nubble Point in order to keep the fleet within a manageable area and give the unlicenced boats an area to go to that was reasonably close to the fishery.

Fishing was initially very slow with several early sets being water hauls, but as the herring started moving off the beach the sets improved. The fleet was concentrated mainly in three areas: mouth of Freeman Pass, below the Gravel Pit and mouth of Serpentine Inlet.

All 56 licenced seines participated in the fishery. Hailed catches ranged between a low of 5 tons and a high of 360 tons with roe percentages of 10-13%. Total hailed catch for the fishery was 3,007 tons. The quota for this fishery was 2,205 tons.

CENTRAL COAST - (AREAS 6 - 10)

Area 6 - Assessment

The stock assessment program began on March 1; however, no significant abundance of fish was located until March 6, when 1500 tons were sounded in Kitasu Bay.

Stock estimates in Area 6 remained fairly consistent over the course of the sounding program and ranged from a low of 750-1000 tons on March 10 to a high of 3800-4400 tons on March 28.

Poor weather conditions hampered the sounding program throughout the assessment period and it was difficult to obtain consistent stock estimates for the area.

In Kitasu Bay, a seine test on March 6 indicated a roe maturity of 2% and average length of 21.4 cm.

No further testing was conducted at this location until March 14 when a test on the 600-800 tons estimated to be in the area indicated a roe maturity of 7.3%.

Two further tests made on March 23 and 24 indicated roe maturities of 11.0% and 10.3% respectively. The average size of fish in both tests was 21.5 cm.

The maximum tonnage of fish recorded for Kitasu Bay was 2000-2300 tons estimated on March 26.

Weeteeam Bay stocks also remained fairly consistent, although somewhat lower than Kitasu Bay.

The first recorded estimate for Weeteeam Bay was on March 8 when 700-900 tons were sounded. Estimates remained at this level until March 28 when 2000 tons were sounded. No seine tests were made on herring holding in Weeteeam Bay.

The only other location in Area 6 where herring were recorded was in West Higgins Pass. On March 11, 150 - 200 tons were sounded but the fish disappeared on March 14 and only a few very small schools could be located until March 23 when 400 - 500 tons were sounded.

No further soundings were made at this location after March 29.

The gillnet fishery conducted in Area 6 is discussed in a later section (see Areas 6 - 8 - Fishery).

Area 7 - Assessment

Similar to the assessments made in Area 6, total stock estimates for Area 7 remained fairly consistent throughout the sounding program and ranged from a low of 1700 - 2200 tons on March 2 to a high of 6300 - 6900 tons on March 25.
The major concentrations of fish and maximum tonnages recorded for each area were as follows:

Dundivan Inlet	1000 - 1500 tons	March 6
Spiller Channel	2500 - 3000 tons	March 11
Boddy Pass/Joassa Channel	1000 - 1400 tons	March 15
East Higgins Pass	2000 - 2500 tons	March 20
Thompson Bay/Houghton Island	1400 - 1700 tons	March 22
Powell Anchorage	2000 tons	March 24
Waskesiu Pass	1000 - 1500 tons	March 25

On March 2, total stock estimate for Area 7 was 1700-2200 tons, and the fish were located mainly in the Boddy Pass/Joassa Channel and west Waskesiu Pass. By March 6, this estimate was increased to 3100 - 3800 tons with the major concentrations reported in Dundivan Inlet (1000 tons), Boddy Pass/Joassa Channel (1000 tons) and Waskesiu Pass (800-900 tons).

On March 10, approximately 2000 - 2500 tons were located in Spiller Channel. This was a dramatic increase from the 300 - 600 tons that were estimated for this area during March 6 - 9. A seine test made outside Neekis Inlet on March 10 indicated a roe maturity of 15.8% and average size of 21.8 cm. Another test made the same day in Neekis Bay yielded a roe maturity of 12.2%

Between March 1 - 7, roe testing in all locations indicated maturities of less than 2% and a fish size range of 20.4 - 22.0 cm. On March 10, the fish in Spiller Channel were tested for a maturity of 12.2 - 15% and were generally very large, averaging 21.9 cm.

By March 17, fish holding in Dundivan Inlet, Boddy Narrows and East Higgans Pass all had roe maturities in the 11.7 - 13.8% range.

On March 19, fish tested in Powell Anchorage had a roe maturity of 15.0% and tests made next day in Dundivan Inlet and Waskesiu Pass indicated a 13.3% roe maturity.

These maturities remained high until the end of the assessment period on March 26.

Areas 6 - 8 - Fishery

Seines: On March 11 between 13:10 and 18:07, a seine fishery took place in Spiller Channel, sub-area 7-14. A compliance boundary was put into effect 1.6 km south of Neekis Inlet in order to segregate fish that were tested at a low maturity. The total length of the opening was 4 h 57 min.

Of the 47 seines licenced for the area only 43 participated. A total of 29 seines hailed catches ranging between 10 and 275 tons, for a total hailed catch of 3,045 tons. Roe testing on catches indicated maturities between 11 and 14%. The quota for this fishery was 2,535 tons.

Gillnets: On March 31 between 10:30 and 18:00, the following Central Coast sub-areas were opened for gillnet fishing: 6-13 (Weeteeam Bay), 6-18 (Kitasu Bay), 7-9 (Powell Anchorage), 7-13 (Spiller Channel), 7-22 (Dundivan Inlet), 7-19 (Thompson Bay), 7-20 (Waskesiu Pass), 7-21 (Houghton Island) and 8-2 (Kwakshua Channel). The total length of opening was 7 h 30 min.

High winds were prevalent throughout this fishery and there was concern about whether or not the area should be opened. The concerns were discussed with fishermen and there was agreement that the opening should go ahead; most fishermen had reached the locations they intended to fish and a delay in opening might mean lost fishing opportunities since active spawning was underway in most areas.

Of the 281 gillnets that were licenced for this area, only 253 were accounted for on the grounds. A total of 987 tons were hailed for this opening.

The same areas were opened April 1 the next day between 09:00 and 18:00. Total length of this opening was 9 h.

Fishing was very slow during the morning and early afternoon in most locations but picked up significantly by about 15:00, and the gillnet quota was realized by the 18:00 closure.

The hailed catch for the second day of fishing was 1,365 tons bringing the total hailed catch for the area to 2,262 tons. Roe yields for the two openings averaged 12-15%. The quota for this fishery was 1,984 tons.

STRAIT OF GEORGIA (AREAS 13 - 20)

The Strait of Georgia roe herring assessment program was characterized by a preponderance of 2- and 3-yr old fish this year which made it difficult to obtain large,high quality roe.

Predicted forecasts for the 1985 season were for low stock abundance and the hydroacoustic assessment seems to bear this out.

Area 14 - Assessment

Test fishing and assessment began on February 20, but sounding throughout the Deep Bay - Cape Lazo area failed to locate any appreciable amount of herring, until February 25 when 3000 - 4000 tons were observed in lower Lambert Channel. A test set made during the evening of February 25 indicated a roe maturity of 3.53% and average size of 20.0 cm.

Another test taken the same evening off Chrome Island yielded 1.5% roe maturity and the fish were very small, averaging 17.9 cm. The assessment program was hampered by strong southeast winds, making it difficult to obtain continuous stock estimates.

By February 28, total stock estimate for Area 14 was 8000 - 8500 tons, which included 5000 tons between Lambert Channel - Cape Lazo, and 3000 - 3500 tons in lower Baynes Sound. A roe test made on February 28 off Fords Cove in Lambert Channel yielded a roe maturity of 7.4% and average size of 18.97 cm. Another test off Repulse Spit in Baynes Sound indicated a roe maturity of 7.0% and average length of 19.9 cm.

The fish in lower Baynes Sound remained at the 3000 - 5000 ton level throughout the assessment period and the maximum roe maturity tested was 8.7% on March 4. These fish would hold in the deep hole off Deep Bay during the day and move towards the surface at dusk then into the beach after dark. This movement was reversed during the early morning hours. At no time was there any potential for a fishery on this stock due to the small size and low maturities.

On March 1, 2500 tons were located in Lambert Channel and 3000 - 4000 tons along the shoreline between Chrome Island and Qualicum Bay. These fish had been tested during the afternoon and evening of February 28 and indicated roe maturities of 7.5% and 2.65% respectively. An additional 500 - 600 tons were sounded in Tribune Bay.

During the morning of March 2, 2000 tons were estimated for lower Lambert Channel. Tests made during the evening of March 1 and morning of March 2 indicated roe maturities of 8.7%. A further 1500 tons were located along the east side of Denman Island and a test off Komass Bluffs indicated roe maturities of 9.6%.

The fish that had been sounded off Qualicum the previous day could not be relocated at this time. By the afternoon of March 2, the day of the seine fishery opening, 4000 - 5000 tons were estimated for lower Lambert Channel and on March 3, 1000 tons were located in Tribune Bay. These fish were tested for a 9.2% roe maturity. Two further tests taken during the morning, one off Comox Bar and one off Komas Bluff yielded roe maturities of 6.2% and 8.9% respectively. There was a small spot spawning observed off Fillongley Park this day.

During the early morning hours of March 6, approximately 3000 tons were located off the top end of Hornby Island and a test made off Collishaw Point indicated a 10.1% roe maturity and average size of 20.1 cm. Another test made at 14:15 off Sandy Islets yielded a roe maturity of 13.1% and average length of 21.2 cm. Small spot spawnings were commencing between Fillongley Park and Komas Bluff, and by March 9 had expanded to all along the east shore of Denman Island.

Areas 14 - Fishery

Seines: On March 6 between 16:15 and 20:25, sub-areas 14-9 and 14-10 off Denman Island opened to seine fishing. Total length of opening was 4 h 10 min. All of the 48 licenced seines participated in the fishery and 41 caught fish for a total hailed catch of 2,879 tons. Individual catches ranged from 5 to 165 tons, and roe maturities averaged 6.6 - 9.4%. The quota for this fishery was 2,205 tons.

Gillnets: On March 8 between 09:00and 17:00, sub-areas 14-7 and 14-10 opened to gillnet fishing. Total length of opening was 8 h. Initially the fishery was scheduled to close at 14:00 but by 11:00 skiff averages were only 1 - 1.5 tons for a total estimated catch of 550 tons. It was therefore decided to extend the opening until 17:00. It was felt that there would still be enough of the quota left to conduct another fishery the next day. The hailed catch for this opening was 1,820 tons. A second opening took place on March 9 between 09:00 and 13:00 in sub-areas 14-7 and 14-10. The hailed catch for this opening was 1,866 tons bringing the total hailed catch for the 2 days to 3,686 tons. All 432 licenced gillnets operated during the 2-day fishery. The quota for this fishery was 2,976 tons.

Area 15 - Assessment

The herring sampled this year in Area 15 tended to be very small with a size range mostly between 18.5 and 19.5 cm. This resulted in low roe percentages throughout the area. Prior to March 1, roe tests were 0%; one exception was a test taken off Savary Island on February 28 yielding 5.6%. After March 1, roe tests generally ranged between 5 and 7%. The maximum roe maturity tested this year was 9.1% off Savary Island.

Tonnage estimates varied between 3000 - 5000 tons and the major concentrations of fish occurred between Savary Island - Dinner Rocks, Atrevida Reefs, off the Hulks at Powell River and Myrtle Rocks.

The fish tended to be very fast and proved difficult to catch on occasion. The strong southeast winds prevalent throughout the Strait of Georgia this year also contributed to limiting sounding and testing.

Several samples taken in the Lund area all indicated juvenile herring. Total tonnage estimate for these fish was 500 - 800 tons.

No roe herring fishery was conducted in Area 15.

Areas 17 - 18 - Assessment

Stocks in the northern portion of Area 17 - Dodds Narrows to Nanoose Bay, were concentrated in two main locations: Northumberland Channel and off Maude Island outside of Nanoose Bay.

Initial sounding on February 21 indicated 3000 tons situated between Icarus Point and the entrance of Nanoose Bay. A further 800 - 1000 tons were located in Northumberland Channel.

Both locations were tested at 0% roe maturity.

Over the course of the next week, the stocks outside Nanoose fluctuated between 500 tons February 23, 2000 - 3000 tons February 24, 1000 tons March 1 and 1500 tons March 2. On March 2, these fish were observed moving out towards Schooner Cove and then up to Mistaken Island, outside Northwest Bay.

Although constant monitoring of the Nanoose area was maintained, only a few scattered schools were seen in the area after March 2.

Stocks in the southern portion of Area 17 exhibited a considerable amount of movement between Stuart Channel, Phylades Channel and Trincomali Channel.

Sounding on February 21 located 3000 tons between Porlier Pass and Walker Rock, and 1000 tons in Plumper Sound. Testing indicated a 0% roe maturity and mixed size fish. By February 24, the Porlier Pass estimate was increased to 8000 tons and the fish in Plumper Sound had moved out of the area.

Total stocks in Areas 17 and 18 were generally in the 5000 - 8000 ton range, but reached a peak on March 3 when total estimate for the two areas was 12,000 - 15,000 tons. Of this total, 3000 tons were located between Ladysmith-Chemainus, 1500 tons between Kuleet Bay - Boat Harbour, 800 tons in Porlier Pass, 4000 - 6000 tons in lower Trincomali Channel, 3000 tons in Swanson Channel and 600 tons in Fulford Harbour.

Length frequency samples indicated a very mixed stock with size range of 17.1 - 21.5 cm. Some samples contained a high proportion of juveniles.

No sampling took place between March 2 - 6 due to the test vessel being required for the fishery in Area 14.

On March 7, 300 tons were observed in Phylades Channel and a test just off Gabriola Pass yielded 9.25% roe maturity.

No roe herring fishery was conducted in Areas 17 - 18.

1985 SPAWN-ON-KELP FISHERY

Spawn-on-kelp harvesting has been permitted by regulation in British Columbia since 1975. At present, 28 licences are issued on an annual basis to either individuals or Native Indian Bands, and each licence authorizes the production of 7,250 kg of processed product.

Until 1983, the method used to obtain the product involved seining sexually mature herring, towing them to a sheltered bay and releasing them into floating pens. These floating pens were constructed from log frames from which seine web was suspended to form an enclosure. The pond frames were anchored to the bottom and/or tied to the shore. Good quality kelp (Macrocystis integrifolia) was harvested from nearby locations and approximately 2 m lengths of kelp were tied to weighted lines which were then suspended in the ponds. Once the herring have spawned on the kelp (1 - 10 days) the product was harvested and sent to processing plants in totes.

The 1982 spawn-on-kelp fishery in the Queen Charlotte Islands and northern B.C. coast was documented in detail by Shields and Kingston (1982). The study revealed two major problems with this type of fishery. The first was that a high rate of mortality occurred in the impounded herring, and the second was that in 12 out of 18 ponds observed, the percentage of spawned out females was never greater than 50%.

These findings resulted in a considerable amount of concern about the biological integrity and efficiency of this fishery and led to the development of the "open ponding" method now being used mainly in the Queen Charlotte Islands. This method, described in detail by Shields and Watson (1983), basically involves suspending kelp fronds in an area where active spawning is in progress. This method has two advantages: there is no handling of the herring, which eliminates injury or mortality, and almost all the herring are believed to spawn since spawning occurs in a natural state.

Preliminary production figures for 1985 indicate that altogether 162,781.63 kg of product were harvested coastwide. This represents an average production of 5,813.63 kg per licence. The 1985 total compares with 170,413 kg in 1984, 224,724 kg in 1983 and 174,810 kg in 1982. The distribution of licences and amount of production by area in 1985 was as follows:

1.	Queen Charlotte Islands	11 licences	67,338.34 kg of product
2.	North Coast	8 licences	47,458.05 kg of product

3.	Central Coast	4 licences	23,328.78 kg of product
4.	West Coast Vancouver Island	2 licences	12,729.1 kg of product
5.	Georgia Strait/Johnstone Strait	3 licences	11,917.38 kg of product

The open pond method was used by all licence holders on the Queen Charlotte Islands, one on the Central Coast and two on the West Coast of Vancouver Island, while closed ponds were used by the remainding licence holders.

1985 HERRING SPAWN SUMMARY

A total of 9.7 million SSM of spawn were recorded for the B.C. coastline during 1985 (Table 13). This represents a slight a decrease from the 9.5 million SSM recorded for 1984 and is well below the 5-yr (1980-84) average of 15.0 million and the 10-yr (1975-84) average of 17.6 million (Table 13).

North of Cape Caution, both the Queen Charlotte Islands and Central Coast areas exhibited declines while the Port Simpson/Porcher Islands showed large increases (Table 12).

In the South Coast, all areas in the Strait of Georgia showed dramatic decreases while on the West Coast of Vancouver Island moderate increases occurred (Table 13).

Individual spawnings are listed in Table 14 presented at the end of the text.

The following is a summary of spawning by district.

QUEEN CHARLOTTE ISLANDS (AREAS 1, 2E, 2W)

A total of 1,452.7 k SSM of spawn were recorded for the Queen Charlotte Islands during 1985; this represents a 22.7% reduction from the 1,878.5 k SSM recorded in 1984.

In Area 1, a total of 269.6 k SSM of spawn was recorded in 1985. Although this is slightly above the 10-yr average of 242.1 k SSM, the area has had poor spawn survey coverage over the past few years and therefore it is difficult to compare this year's amount of spawn with the 5-yr and 10-yr averages.

In Area 2E, the 1,059.0 k SSM recorded represent a 37% reduction from the 1,669.7 k SSM recorded in 1984 and are below the 1980-84 average of 1,345 k SSM. The majority of the Area 2E spawning took place in Skincuttle Inlet where 502.82 k SSM of spawn were recorded representing 47% of the total east coast deposition.

A major spawning took place in Sedgwick Bay where 78.62 k SSM of spawn were recorded.

Cumshewa Inlet spawn declined slightly, decreasing from 55.88 k SSM in 1984 to 40.06 k SSM in 1985.

Table 12. Annual deposition of herring spawn (sq.m. x 1000 at a medium standard intensity) in northern British Columbia by herring sub-district and Statistical Area, 1980 - 1985.

	Spawning Years						5-yr Avg	10-yr Avg
AREA	1980	1981	1982	1983	1984	1985	1980-1984	1975-1984
Queen Charlotte Is.								
1	48.0	12.1	110.9	1.5	-	269.6	34.5	242.1
2E	755.6	2058.8	1224.0	1020.7	1669.7	1059.0	1345.8	925.6
2W	175.2	248.6	550.8	556.2	208.9	124.1	347.9	285.9
Total	978.8	2319.4	1885.7	1578.4	1878.5	1452.7	1728.2	1453.6
Northern								
3	161.1	431.0	28.2	49.1	77.4	23.8	149.4	170.6
4	288.2	667.4	727.1	1765.6	1604.2	2643.2	1010.5	791.8
5	666.8	607.5	359.8	864.1	429.2	993.9	585.5	584.8
Total	1116.1	1705.9	1115.1	2678.8	2110.8	3660.9	1745.3	1547.2
Upper Central								
6	419.7	571.2	424.1	660.9	396.7	442.3	494.5	318.6
Total	419.7	571.2	424.1	660.9	396.7	442.3	494.5	318.6
Lower Central								
7	1186.8	1435.7	1546.5	1062.1	448.0	322.8	1135.8	843.2
8	245.7	197.1	190.4	168.5	174.6	105.0	195.3	208.2
9	20.4	3.2	54.0	11.3	3.3	11.3	18.5	55.8
10	75.2	16.7	181.8	54.2	144.9	42.8	94.6	58.1
Total	1528.1	1652.7	1972.7	1296.2	770.9	481.9	1444.1	1165.4
TOTAL NORTH COAST	4042.7	6249.2	5397.6	6214.3	5156.9	6037.7	5412.1	4484.8

Table 13. Annual deposition of herring spawn (sq.m. x 1000 at a medium standard intensity) in southern British Columbia by herring sub-district and Statistical Area, 1980 - 1985.

AREA	Spawning Years 1980	1981	1982	1983	1984	1985	5-yr Avg 1980-1984	10-yr Avg 1975-1984
Upper East Coast								
11	2.0	1.0	-	3.0	0.9	-	1.4	3.6
12	387.5	298.8	169.8	72.1	205.8	128.9	226.8	417.6
Total	389.5	299.8	169.8	75.1	206.7	128.9	228.2	421.2
Middle East Coast								
13	140.2	87.7	480.9	617.2	5.8	0.1	266.3	201.0
14	5752.6	2435.1	6229.7	3325.8	616.1	430.8	3671.9	5309.1
15	247.4	930.0	1235.4	537.5	738.3	217.8	737.7	1205.8
16	12.4	0.1	10.8	-	-	-	4.7	16.6
Total	6152.6	3452.9	7956.8	4480.5	1360.1	648.6	4680.6	6732.5
Lower East Coast								
17	2180.9	521.0	2174.4	1819.7	959.2	166.3	1531.0	1559.5
18	116.8	124.0	37.4	7.5	-	-	57.1	159.5
19	-	-	-	-	-	-	0.0	0.0
20	-	-	-	-	-	-	0.0	0.0
Total	2297.7	645.0	2211.7	1827.2	959.2	166.3	1588.2	1719.0
Lower West Coast								
22	-	-	-	-	-	-	0.0	0.0
23	731.9	501.5	291.9	928.1	286.2	1495.1	547.9	1074.4
24	1543.4	1461.8	168.7	181.4	1107.7	636.1	892.6	1303.2
Total	2275.3	1963.3	460.6	1109.5	1393.9	2131.2	1440.5	2377.6
Upper West Coast								
25	311.3	735.2	720.5	561.2	160.8	170.7	497.8	878.6
26	-	-	-	-	-	-	0.0	10.4
27	2248.8	1307.9	722.3	1378.7	293.1	374.8	1190.2	923.2
Total	2560.1	2043.1	1442.8	1939.8	453.9	545.5	1687.9	1812.1
Southern Mainland								
28	-	-	-	-	-	-	0.0	0.0
29	0.1	-	-	-	3.1	-	0.6	42.6
Total	0.1	0.0	0.0	0.0	3.1	0.0	0.6	42.6
TOTAL SOUTH COAST	13675.3	8404.0	12241.7	9432.1	4376.9	3620.5	9626.0	13105.0
TOTAL COASTWIDE	17718.0	14653.3	17639.3	15646.3	9533.8	9658.2	15038.1	17589.8

Area 2W spawn continued to decline with only 124.1 k SSM recorded in 1985 compared with the 208.9 k SSM recorded in 1984 and the 1980-84 average of 347.9 k SSM. The largest spawning on the west coast took place in Port Louie where 44.0 k SSM were recorded. Additionally, 37.1 k SSM were recorded in Inskip, 23.0 k SSM in Louscoon and 19.69 k SSM in Shields Bay.

NORTH COAST (AREAS 3, 4 and 5)

The North Coast spawning was the largest on record with a total of 3,660.9 k SSM recorded. This compares with 2,110.8 k SSM recorded in 1984 and the 1980-84 average of 1,745.3 k SSM.

Area 3 spawnings were well below average with only 23.8 k SSM recorded.

The majority of the spawn deposited in this district was in Area 4, specifically in the Pearl Harbour - Big Bay locations. A total of 2,643.2 k SSM were recorded, which represents 72.2% of the spawn for the district.

Spawning in Area 5 (Kitkatla Inlet) increased from 429.2 k SSM in 1984 to 993.9 k SSM this year and is above the 1980-84 average of 585.5 k SSM.

CENTRAL COAST (AREAS 6 - 10)

The downward trend in spawn deposition in the Central Coast continued into 1985. A total of 924.2 k SSM of spawn were recorded compared with 1,167.6 k SSM recorded in 1984. The upper central region (Area 6) showed a slight increase this year from 396.71 k SSM in 1984 to 442.3 k SSM in 1985; however, the spawn was still below the 1980-84 average of 494.5 k SSM. The major spawns occurred in Parsons Anchorage (160.4 k SSM), Osment Islet (153.4 k SSM) and Weeteeam Bay (41.8 k SSM).

In the lower central region (Areas 7-10) spawnings declined by 37.5%, dropping from 770.9 k SSM in 1984 to 481.9 k SSM in 1985.

The 322.8 k SSM recorded in Area 7 in 1985 was below the 1984 level of 448.0 SSM and well below the 1980-84 average of 1,135.8 k SSM. The major spawnings in Area 7 occurred in east Higgans Pass (93.8 k SSM), Spiller Channel (63.8 k SSM), Waskesiu Pass (42.6 k SSM), Little Thompson Bay (31.5 k SSM) and Dundivan Inlet (21.5 k SSM).

In Area 8, the major spawns took place in Kwakshua Channel (45.8 k SSM) and Pruth Bay (30.3 k SSM).

GEORGIA STRAIT/JOHNSTONE STRAIT (AREAS 11 - 20)

Upper East Coast (Areas 11 - 12)

No spawn was recorded for Area 11 this year, mainly due to lack of manpower and operational days during the spawning season.

In Area 12, 128.9 k SSM were recorded and of this total, 104.4 k SSM were recorded in Knights Inlet. Spawnings in Wakeman Sound decreased from 26.9 k SSM in 1984 to 14.4 k SSM this year.

Middle East Coast (Areas 13 - 16)

Spawnings in the middle east coast sub-districts declined drastically over the past few years. The 648.6 k SSM recorded for 1985 compares with 1,360.1 k SSM in 1984, 4,480.5 k SSM in 1983 and 7,956.8 k SSM in 1982. The 1980-84 average was 4,680.6 k SSM.

Spawnings in Area 13 were almost negligible with only a very light spawn occurring in Deepwater Bay.

In Area 14, spawnings declined from 616.1 k SSM in 1984 to 430.8 k SSM in 1985. Most of this spawning occurred in Lambert Channel along the Fillongley Park/Komas Bluff areas and along the Qualicum Beach shoreline.

Area 15 showed the greatest decrease from 738.3 k SSM in 1984 to 217.8 k SSM this year. Of the spawnings in this area, 80% occurred around Harwood Island with the next largest spawnings taking place around Savary Island (13%) and Atrevida Reef (4%).

There was no spawn recorded for Area 16 this year. The last time any spawning was deposited in this area was 1982 when 10.8 k SSM were recorded.

Lower East Coast (Areas 17 - 20)

The lower east coast sub-districts had a total of 166.3 k SSM of spawn recorded this year, all of it in the lower portion of Area 17. Of this total, 85% were located between Kulleet Bay and Ladysmith Harbour. There was no spawning recorded in Nanoose this year.

In Area 18, a very light spawning occurred in Annette Inlet. It was, however, so sparse as to be almost negligible.

WEST COAST VANCOUVER ISLAND (Areas 23 - 27)

Lower West Coast (Areas 22 - 24)

A total of 2,131.2 k SSM of spawn were recorded for the lower west coast areas. This represents an increase over the 1,393.9 k SSM recorded in 1984.

In Area 23 (Barkley Sound), the dramatic increase in spawn recorded is misleading and does not represent as large an increase as indicated. The total of 1,495.1 k SSM of spawn recorded for this area is due more to an increased awareness of the actual widths of spawnings by Fishery Officers conducting shore-based surveys, particularly in Macoha Pass, than from an increase in spawn deposition.

The reason for the increased awareness stems from a 1982 study in Barkley Sound which compared herring stock estimates using diver surveys and shore-based surveys (Haegele and Schweigert 1984a). In that study, the shore-based survey found only 6% of the spawn located by divers. It appears that while the lengths of the spawnings have always been fairly close to those found by divers, the

greatest discrepancy has been in the measurement of the spawning widths. As the field staff conducting the shore-based surveys became more aware of the deeper spawnings they were able to focus more effort into better delineating the actual widths of the spawn.

Thus in 1984 and 1985, the shore-based surveys found 37% and 84% respectively of the spawn located by divers (Haegele and Schweigert 1984b, MS 1986) indicating that shore-based surveys have become more accurate in recent years.

An additional factor this year was that spawning tended to be more shallow than in past years, thus making it easier to determine spawn area widths (C.W. Haegele, pers. comm.).

A joint Field Services/Resource Services diver survey (Haegele and Schweigert MS 1986) conducted in the area in 1985 indicated a slight improvement in spawning over last year but nothing as dramatic as shown by the traditional shore-based survey conducted concurrently.

In Area 24, the 636.1 k SSM recorded were well below the 1,107.7 k SSM recorded in 1984 and below the 1980-84 average of 892.6 k SSM. Major spawnings in this area occurred around Vargas Island (314.9 k SSM), Elbow Bank (201.5 k SSM), Hesquiate Harbour (79.4 k SSM) and Stubbs Island (32.8 k SSM).

Upper West Coast (Areas 25 - 27)

Spawnings in the upper west coast remained very low this year with only 545.5 k SSM recorded. Although this is a slight increase from the 453.9 k SSM recorded in 1984, it is still well below the 1980-84 average of 1,687.9 k SSM.

In Nootka Sound, a very small spawning occurred in Friendly Cove while in Esperanza the majority of the spawn was deposited in inner Nuchatlitz (151.9 k SSM).

In Area 27, 372.5 k SSM were recorded in Klashkish Inlet and the remaining 2.3 k SSM in the Winter Harbour area.

Table 14. Herring spawn summary tables with location, date and size of individual herring spawnings, B.C., 1985.

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 1, NORTH COAST Q.C.I.							
DINAN BAY	18/06	21/06	914	9	2	0.40	0.99
DINAN BAY	18/06	21/06	91	1	2	0.40	0.01
McCLINTON BAY	18/06	21/06	1372	3	2	0.40	0.49
McCLINTON BAY	18/06	21/06	549	2	2	0.40	0.13
McCLINTON BAY	18/06	21/06	18	18	2	0.40	0.04
MUTUS ISLAND	18/06	21/06	1829	732	3	0.50	267.77
MUTUS ISLAND	18/06	21/06	274	2	2	0.40	0.07
MUTUS ISLAND	18/06	21/06	274	2	2	0.40	0.07
MUTUS ISLAND	18/06	21/06	37	2	2	0.40	0.01
MUTUS ISLAND	18/06	21/06	274	2	2	0.40	0.07
AREA TOTAL			5632.				269.63
AREA: 2W, WEST COAST Q.C.I.							
DAWSON HARBOUR	12/04	12/04	200	7	2	0.00	0.28
INSKIP CHANNEL	01/04	03/04	2200	8	4	0.20	9.15
INSKIP CHANNEL	03/04	05/04	1000	8	4	0.00	5.20
INSKIP CHANNEL	03/04	05/04	5000	7	4	0.00	32.75
LOUSCOONE INLET	17/03	17/03	3500	20	3	0.20	22.40
LOUSCOONE INLET	17/03	17/03	1200	5	2	0.50	0.60
PORT LOUIS	19/03	21/03	2200	5	3	0.25	3.30
PORT LOUIS	19/03	21/03	200	120	4	0.10	17.55
PORT LOUIS	19/03	21/03	1700	10	3	0.25	5.10
PORT LOUIS	19/03	21/03	350	15	4	0.00	3.41
PORT LOUIS	19/03	21/03	250	10	4	0.20	1.30
PORT LOUIS	19/03	21/03	1700	10	3	0.10	6.12
PORT LOUIS	19/03	21/03	1100	5	4	0.10	3.22
PORT LOUIS	19/03	21/03	600	5	3	0.10	1.08
PORT LOUIS	19/03	21/03	500	10	4	0.10	2.92
SHIELDS BAY	04/04	04/04	1200	8	4	0.00	6.24
SHIELDS BAY	04/04	04/04	700	10	3	0.00	2.80
SHIELDS BAY	04/04	04/04	900	10	4	0.00	5.85
SHIELDS BAY	04/04	04/04	1000	12	3	0.00	4.80
AREA TOTAL			25500.				124.08
AREA: 2E, EAST COAST Q.C.I.							
ALDER ISLAND	01/04	05/04	1645	10	3	0.50	3.29

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SG. M. (1000'S)	PAGE 2
AREA: 2E, EAST COAST G.C.I. CONTINUED								
BURNABY ISLAND	24/03	24/03	80	15	4	0.30	0.55	
CONGLOMERATE PT.	05/04	06/04	150	20	3	0.10	1.08	
CONGLOMERATE PT.	05/04	06/04	100	15	2	0.15	0.26	
CUMSHEWA INLET	05/04	06/04	300	20	2	0.20	0.96	
CUMSHEWA INLET	05/04	06/04	600	7	4	0.15	2.32	
CUMSHEWA INLET	05/04	06/04	165	9	2	0.60	0.12	
CUMSHEWA INLET	05/04	06/04	200	25	2	0.50	0.50	
CUMSHEWA INLET	05/04	06/04	500	30	6	0.10	18.90	
CUMSHEWA INLET	05/04	06/04	600	10	5	0.20	4.80	
CUMSHEWA INLET	05/04	06/04	385	5	2	0.80	0.08	
CUMSHEWA INLET	05/04	06/04	1600	20	3	0.15	10.88	
CUMSHEWA INLET	05/04	06/04	200	50	2	0.25	1.50	
GRASSY IS.(GILLATT IS.)	30/05	30/05	100	10	3	0.05	0.36	
HARRIET HARBOUR	01/04	06/04	1200	40	7	0.30	63.84	
HUSTON INLET	30/03	02/04	1200	20	7	0.30	31.92	
HUSTON INLET	30/03	02/04	1880	30	7	0.15	91.09	
HUSTON INLET	30/03	02/04	1890	30	6	0.10	71.44	
HUSTON INLET	30/03	02/04	1460	40	6	0.15	69.50	
HUSTON INLET	30/03	02/04	940	20	7	0.40	21.43	
HUSTON INLET	30/03	02/04	2300	20	6	0.70	19.32	
HUSTON INLET	30/03	02/04	1150	20	4	0.20	11.96	
HUSTON INLET	30/03	02/04	640	20	6	0.30	12.54	
JEDWAY	01/04	06/04	550	20	6	0.50	7.70	
JEDWAY	01/04	06/04	90	25	3	0.15	0.76	
JEDWAY	01/04	06/04	180	15	4	0.20	1.40	
JEDWAY	01/04	06/04	40	20	7	0.00	1.52	
JEDWAY	01/04	06/04	550	20	7	0.00	20.90	
JEDWAY	01/04	06/04	100	20	2	0.20	0.32	
JEDWAY	01/04	06/04	300	20	5	0.30	4.20	
JEDWAY	01/04	06/04	100	20	7	0.10	3.42	
JEDWAY	01/04	06/04	180	20	7	0.05	6.50	
JEDWAY	01/04	06/04	1830	40	7	0.20	111.26	
JEDWAY	01/04	06/04	730	20	6	0.30	14.31	
JEDWAY	01/04	06/04	180	10	5	0.50	0.90	
JEDWAY	01/04	06/04	180	20	2	0.40	0.43	
MAUDE ISLAND	16/05	17/05	75	15	2	0.00	0.22	
MAUDE ISLAND	16/05	17/05	200	5	5	0.05	0.95	
MAUDE ISLAND	16/05	17/05	75	25	2	0.70	0.11	
MAUDE ISLAND	16/05	17/05	20	10	3	0.10	0.07	
SCUDDER POINT	01/04	05/04	915	10	5	0.30	6.40	
SCUDDER POINT	01/04	05/04	640	5	3	0.50	0.64	
SCUDDER POINT	01/04	05/04	460	20	5	0.50	4.60	
SCUDDER POINT	01/04	05/04	915	45	6	0.15	49.00	
SCUDDER POINT	01/04	05/04	640	35	6	0.60	12.54	
SCUDDER POINT	01/04	05/04	180	60	6	0.10	13.61	
SCUDDER POINT	01/04	05/04	1830	30	7	0.20	83.45	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 3
AREA: 2E, EAST COAST Q.C.I. CONTINUED								
SECTION COVE	29/03	03/04	200	20	3	0.45	0.88	
SECTION COVE	06/04	07/04	200	10	5	0.00	2.00	
SECTION COVE	06/04	07/04	130	10	5	0.20	1.04	
SECTION COVE	29/03	03/04	200	40	3	0.20	2.56	
SECTION COVE	29/03	03/04	600	80	3	0.50	9.60	
SECTION COVE	07/04	07/04	610	10	5	0.30	4.27	
SECTION COVE	07/04	07/04	375	7	3	0.40	0.63	
SECTION COVE	07/04	07/04	10	10	9	0.30	0.21	
SECTION COVE	29/03	03/04	650	30	5	0.60	7.80	
SECTION COVE	29/03	03/04	625	70	4	0.20	22.75	
SEDGWICK BAY	06/04	07/04	600	5	3	0.20	0.96	
SEDGWICK BAY	06/04	07/04	1000	15	5	0.05	14.25	
SEDGWICK BAY	06/04	07/04	200	5	2	0.50	0.10	
SEDGWICK BAY	06/04	07/04	400	15	5	0.05	5.70	
SEDGWICK BAY	06/04	07/04	3200	20	5	0.10	57.60	
SELWYN INLET	15/04	17/04	2560	7	3	0.05	6.81	
SELWYN INLET	15/04	17/04	1060	10	6	0.05	14.10	
SELWYN INLET	15/04	17/04	1630	75	5	0.05	116.14	
TREE IS. (JEWELL IS.)	16/05	19/05	150	5	4	0.00	0.49	
TREE IS. (JEWELL IS.)	16/05	19/05	125	5	3	0.00	0.25	
TREE IS. (JEWELL IS.)	16/05	19/05	200	20	5	0.15	3.40	
TREE IS. (JEWELL IS.)	16/05	19/05	50	10	3	0.00	0.20	
TREE IS. (JEWELL IS.)	16/05	19/05	100	10	5	0.25	0.75	
TREE IS. (JEWELL IS.)	16/05	19/05	100	25	6	0.25	2.63	
AREA TOTAL			45220.				1058.99	
AREA: 3, NASS								
CUNNINGHAM PASS	29/03	02/04	60	10	7	0.00	1.14	
CUNNINGHAM PASS	29/03	02/04	100	10	9	0.00	3.00	
CUNNINGHAM PASS	29/03	02/04	150	25	5	0.00	3.75	
CUNNINGHAM PASS	29/03	02/04	150	50	5	0.00	7.50	
CUNNINGHAM PASS	29/03	02/04	35	15	3	0.00	0.21	
CUNNINGHAM PASS	29/03	02/04	70	20	3	0.00	0.56	
CUNNINGHAM PASS	29/03	02/04	100	40	7	0.00	7.60	
STUMAUN BAY	26/03	26/03	25	10	2	0.00	0.05	
AREA TOTAL			690.				23.81	
AREA: 4, SKEENA								
BIG BAY	27/03	31/03	150	100	5	0.05	14.25	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 4
AREA: 4, SKEENA	CONTINUED							
BIG BAY	27/03	31/03	480	100	5	0.15	40.80	
BIG BAY	27/03	31/03	600	350	5	0.05	199.50	
BIG BAY	27/03	31/03	350	200	5	0.00	70.00	
BIG BAY	27/03	31/03	150	30	4	0.50	1.46	
BIG BAY	26/03	30/03	200	60	5	0.10	10.80	
BIG BAY	26/03	29/03	300	200	4	0.25	29.25	
BIG BAY	27/03	31/03	320	100	5	0.50	16.00	
BIG BAY	27/03	31/03	150	25	4	0.30	1.71	
BIG BAY	27/03	31/03	650	20	2	0.60	1.04	
BIG BAY	26/03	30/03	100	13	4	0.10	0.76	
BIG BAY	26/03	30/03	200	40	5	0.25	6.00	
BIG BAY	26/03	30/03	500	600	4	0.25	146.25	
BIG BAY	26/03	29/03	300	10	2	0.50	0.30	
BIG BAY	26/03	29/03	300	40	3	0.15	4.08	
BIG BAY	26/03	29/03	350	20	6	0.50	4.90	
BIG BAY	26/03	30/03	200	25	5	0.50	2.50	
BIG BAY	27/03	31/03	350	50	6	0.00	24.50	
BIG BAY	27/03	31/03	1100	25	2	0.50	2.75	
BIG BAY	26/03	29/03	350	150	5	0.20	42.00	
BIG BAY	27/03	31/03	500	200	6	0.15	119.00	
BIG BAY	27/03	31/03	800	100	5	0.15	68.00	
BIG BAY	27/03	31/03	320	200	4	0.30	29.12	
BIG BAY	26/03	29/03	450	35	5	0.50	7.88	
BIG BAY	26/03	30/03	500	300	2	0.50	15.00	
BIG BAY	26/03	29/03	300	185	5	0.20	44.40	
BIG BAY	26/03	30/03	100	25	2	0.25	0.38	
BIG BAY	26/03	30/03	320	25	5	0.25	6.00	
BIG BAY	26/03	30/03	1100	50	5	0.20	44.00	
BIG BAY	26/03	30/03	320	100	2	0.50	3.20	
BIG BAY	27/03	31/03	100	50	5	0.10	4.50	
BURNT CLIFF ISLAND	26/03	30/03	100	5	3	0.00	0.20	
BURNT CLIFF ISLAND	25/03	29/03	183	32	5	0.00	5.86	
BURNT CLIFF ISLAND	26/03	30/03	300	50	6	0.00	21.00	
BURNT CLIFF ISLAND	26/03	30/03	731	14	6	0.10	12.89	
BURNT CLIFF ISLAND	25/03	29/03	686	274	7	0.05	339.27	
BURNT CLIFF ISLAND	26/03	29/03	503	14	5	0.15	5.99	
BURNT CLIFF ISLAND	26/03	30/03	150	20	3	0.60	0.48	
BURNT CLIFF ISLAND	25/03	29/03	640	137	5	0.00	87.68	
BURNT CLIFF ISLAND	26/03	30/03	343	91	6	0.10	39.33	
DUNCAN BAY	21/04	22/04	1000	200	2	0.50	20.00	
DUNCAN BAY	04/04	07/04	1650	100	6	0.30	161.70	
DUNCAN BAY	04/04	07/04	1450	100	6	0.20	162.40	
HAYCOCK ISLAND	25/03	29/03	46	46	7	0.00	4.02	
HUNT INLET	07/04	12/04	100	20	4	0.20	1.04	
HUNT INLET	07/04	12/04	40	10	6	0.00	0.56	
HUNT INLET	07/04	12/04	400	15	4	0.10	3.5[illegible]	
HUNT INLET	07/04	12/04	50	10	8	0.00	1.20	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 5
AREA: 4, SKEENA	CONTINUED							
HUNT INLET	07/04	12/04	700	25	7	0.10	29.92	
ISLAND POINT	08/04	12/04	300	25	6	0.10	9.45	
ISLAND POINT	07/04	12/04	10	5	5	0.20	0.04	
ISLAND POINT	07/04	12/04	50	10	3	0.20	0.16	
ISLAND POINT	07/04	12/04	100	20	8	0.10	4.32	
ISLAND POINT	07/04	12/04	100	50	6	0.20	5.60	
ISLAND POINT	07/04	12/04	50	30	5	0.00	1.50	
ISLAND POINT	07/04	12/04	70	10	7	0.00	1.33	
ISLAND POINT	07/04	12/04	30	5	3	0.10	0.05	
ISLAND POINT	09/04	12/04	500	20	7	0.20	15.20	
ISLAND POINT	07/04	12/04	40	5	4	0.70	0.04	
ISLAND POINT	07/04	12/04	180	50	8	0.30	15.12	
ISLAND POINT	08/04	12/04	150	75	8	0.25	20.25	
ISLAND POINT	07/04	12/04	150	10	6	0.10	1.89	
ISLAND POINT	07/04	12/04	150	150	7	0.30	29.92	
ISLAND POINT	07/04	12/04	300	50	7	0.60	11.40	
ISLAND POINT	07/04	12/04	100	15	6	0.05	1.99	
ISLAND POINT	07/04	12/04	300	50	8	0.30	25.20	
ISLAND POINT	09/04	12/04	400	15	5	0.10	5.40	
METLAKATLA VILLAGE	08/04	09/04	732	46	2	0.10	6.06	
METLAKATLA VILLAGE	06/04	09/04	777	137	6	0.00	149.03	
OTTER ANCHORAGE	27/03	01/04	425	20	6	0.10	10.71	
PEARL HARBOUR	26/03	30/03	225	20	4	0.00	2.92	
PEARL HARBOUR	26/03	30/03	500	30	6	0.00	21.00	
PEARL HARBOUR	26/03	30/03	300	10	2	0.40	0.36	
PEARL HARBOUR	26/03	30/03	200	40	6	0.40	6.72	
PEARL HARBOUR	26/03	30/03	100	15	2	0.60	0.12	
PEARL HARBOUR	26/03	30/03	200	30	6	0.00	8.40	
PEARL HARBOUR	26/03	30/03	100	100	7	0.00	19.00	
PEARL HARBOUR	26/03	30/03	50	10	7	0.00	0.95	
PEARL HARBOUR	26/03	30/03	20	5	3	0.00	0.04	
PEARL HARBOUR	26/03	30/03	150	5	3	0.00	0.30	
PEARL HARBOUR	28/03	30/03	100	10	4	0.60	0.26	
PEARL HARBOUR	28/03	30/03	400	10	5	0.40	2.40	
PEARL HARBOUR	26/03	30/03	50	5	3	0.00	0.10	
PEARL HARBOUR	26/03	30/03	100	60	2	0.75	0.30	
PEARL HARBOUR	26/03	30/03	1200	75	6	0.00	126.00	
PEARL HARBOUR	26/03	30/03	70	10	7	0.00	1.33	
PEARL HARBOUR	28/03	30/03	200	30	7	0.00	11.40	
PEARL HARBOUR	26/03	30/03	75	25	4	0.00	1.22	
PEARL HARBOUR	26/03	30/03	200	75	2	0.50	1.50	
PEARL HARBOUR	26/03	30/03	100	5	5	0.20	0.40	
REEKS POINT	26/03	31/03	260	90	2	0.30	3.28	
REEKS POINT	26/03	31/03	400	50	6	0.50	14.00	
REEKS POINT	27/03	31/03	65	25	5	0.10	1.46	
REEKS POINT	26/03	31/03	120	20	3	0.05	0.91	
REEKS POINT	26/03	31/03	50	20	4	0.50	0.32	
REEKS POINT	26/03	31/03	105	20	5	0.30	1.47	
REEKS POINT	26/03	31/03	500	20	2	0.60	0.80	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 6
AREA: 4, SKEENA	CONTINUED							
REEKS POINT	26/03	31/03	250	100	5	0.80	5.00	
REEKS POINT	26/03	31/03	50	25	3	0.30	0.35	
REEKS POINT	26/03	31/03	200	30	3	0.50	1.20	
SIMPSON POINT	27/03	31/03	30	10	5	0.00	0.30	
SIMPSON POINT	27/03	31/03	25	15	5	0.30	0.26	
SIMPSON POINT	27/03	31/03	100	20	5	0.50	1.00	
SLIPPERY ROCK	29/03	02/04	100	50	4	0.30	2.27	
SLIPPERY ROCK	29/03	02/04	85	50	3	0.10	1.53	
SLIPPERY ROCK	29/03	02/04	350	20	5	0.20	5.60	
SLIPPERY ROCK	29/03	02/04	20	20	3	0.30	0.11	
SOUTH ISLAND	26/03	29/03	274	9	5	0.00	2.47	
SOUTH ISLAND	26/03	29/03	229	18	4	0.10	2.41	
SOUTH ISLAND	26/03	29/03	137	46	3	0.65	0.88	
SOUTH ISLAND	25/03	29/03	320	137	7	0.00	83.30	
TREE BLUFF	29/03	02/04	450	300	2	0.80	5.40	
TREE BLUFF	29/03	02/04	700	350	3	0.15	83.30	
TREE BLUFF	29/03	02/04	150	25	3	0.30	1.05	
TREE BLUFF	29/03	02/04	300	75	2	0.25	3.38	
TREE BLUFF	29/03	02/04	100	30	4	0.20	1.56	
TREE BLUFF	29/03	02/04	300	50	5	0.15	12.75	
TREE BLUFF	29/03	02/04	150	30	5	0.50	2.25	
TREE BLUFF	29/03	02/04	200	30	4	0.20	3.12	
TREE BLUFF	29/03	02/04	300	50	2	0.00	3.00	
TREE BLUFF	29/03	02/04	120	50	5	0.50	3.00	
TREE BLUFF	29/03	02/04	150	75	4	0.75	1.83	
TRENHAM POINT	28/03	01/04	100	10	3	0.40	0.24	
TRENHAM POINT	28/03	01/04	100	50	4	0.30	2.27	
TRENHAM POINT	28/03	01/04	75	20	4	0.30	0.68	
TRENHAM POINT	28/03	01/04	150	10	4	0.80	0.19	
TRENHAM POINT	28/03	01/04	75	50	5	0.40	2.25	
TRENHAM POINT	28/03	01/04	75	10	3	0.40	0.18	
TUGWELL ISLAND	11/04	12/04	1000	20	2	0.20	3.20	
TUGWELL ISLAND	11/04	12/04	500	30	4	0.20	7.80	
AREA TOTAL			38901.				2643.16	
AREA: 5, GRENVILLE-PRINCIPE								
CAPE GEORGE	09/04	11/04	100	50	5	0.30	3.50	
DRIES INLET	18/03	19/03	2400	100	2	0.75	12.00	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 7
AREA: 5, GRENVILLE-PRINCIPE CONTINUED								
DRIES INLET	18/03	19/03	3100	25	2	0.75	3.88	
FREEMAN PASSAGE	04/04	09/04	400	5	4	0.30	0.91	
FREEMAN PASSAGE	04/04	09/04	400	30	5	0.10	10.80	
FREEMAN PASSAGE	09/04	11/04	200	15	8	0.10	6.48	
FREEMAN PASSAGE	09/04	11/04	400	5	4	0.50	0.65	
FREEMAN PASSAGE	09/04	11/04	150	3	5	0.00	0.45	
FREEMAN PASSAGE	09/04	11/04	100	40	6	0.30	3.92	
FREEMAN PASSAGE	04/04	09/04	100	30	7	0.10	5.13	
FREEMAN PASSAGE	04/04	09/04	180	50	6	0.20	10.08	
FREEMAN PASSAGE	09/04	11/04	200	20	7	0.10	6.84	
FREEMAN PASSAGE	09/04	11/04	350	3	7	0.00	2.00	
FREEMAN PASSAGE	09/04	11/04	200	75	6	0.00	21.00	
FREEMAN PASSAGE	09/04	11/04	100	5	3	0.20	0.16	
FREEMAN PASSAGE	04/04	09/04	100	25	6	0.10	3.15	
GOSCHEN ISLAND	09/04	11/04	250	20	9	0.00	159.96	*
GOSCHEN ISLAND	09/04	11/04	400	75	9	0.20	72.00	
GOSCHEN ISLAND	09/04	11/04	300	100	9	0.10	81.00	
GOSCHEN ISLAND	09/04	11/04	300	20	7	0.20	9.12	
JOACHIM SPIT	04/04	09/04	120	25	9	0.00	79.95	*
JOACHIM SPIT	04/04	09/04	1900	40	6	0.65	37.24	
JOACHIM SPIT	04/04	09/04	100	10	9	0.00	31.98	*
JOACHIM SPIT	04/04	09/04	200	10	5	0.50	1.00	
JOACHIM SPIT	04/04	09/04	100	50	9	0.00	106.65	*
JOACHIM SPIT	04/04	09/04	120	25	9	0.00	79.95	*
NESS ISLANDS	24/03	24/03	90	15	1	0.85	0.01	
OVAL POINT	09/04	11/04	775	375	5	0.30	203.44	
OVAL POINT	09/04	11/04	375	100	4	0.30	17.06	
WILSON INLET	13/04	15/04	200	25	5	0.20	4.00	
WILSON INLET	13/04	15/04	400	30	3	0.10	4.32	
WILSON INLET	13/04	15/04	200	100	3	0.50	4.00	
WILSON INLET	13/04	15/04	400	10	5	0.10	3.60	
WILSON INLET	13/04	15/04	100	25	4	0.40	0.98	
WILSON INLET	13/04	15/04	200	10	3	0.20	0.64	
WILSON INLET	13/04	15/04	250	10	3	0.05	0.95	
WILSON INLET	13/04	15/04	200	5	4	0.20	0.52	
WILSON INLET	13/04	15/04	75	50	5	0.05	3.56	
WILSON INLET	13/04	15/04	50	30	5	0.30	1.05	
AREA TOTAL			15585.				993.92	

* - Windrow spawns, conversion to SSM uses different formula.

AREA: 6, BUTEDALE							
BENT HARBOR	28/03	30/03	1300	10	3	0.50	2.60

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 8
AREA: 6, BUTEDALE	CONTINUED							
BIL ISLAND	24/05	01/06	3200	10	5	0.15	27.20	
BIL ISLAND	24/05	01/06	2400	10	6	0.25	25.20	
HAWKESBURY ISLAND	15/05	25/05	800	3	4	0.20	1.25	
HAWKESBURY ISLAND	15/05	25/05	800	3	4	0.20	1.25	
HAWKESBURY ISLAND	15/05	25/05	2400	3	4	0.25	3.51	
JAMIESON POINT	06/04	08/04	350	10	5	0.10	3.15	
JAMIESON POINT	06/04	08/04	300	10	4	0.15	1.66	
JAMIESON POINT	06/04	08/04	150	10	5	0.10	1.35	
KETTLE INLET	13/02	13/02	20	5	2	0.00	0.02	
KETTLE INLET	13/02	13/02	20	5	2	0.00	0.02	
KETTLE INLET	13/02	13/02	20	5	2	0.00	0.02	
OSMENT INLET	06/04	08/04	500	15	5	0.10	6.75	
OSMENT INLET	06/04	08/04	350	10	5	0.10	3.15	
OSMENT INLET	29/03	03/04	2400	35	7	0.30	111.72	
OSMENT INLET	06/04	08/04	200	5	4	0.10	0.58	
OSMENT INLET	26/03	30/03	300	50	6	0.10	18.90	
OSMENT INLET	06/04	08/04	350	10	5	0.10	3.15	
OSMENT INLET	06/04	08/04	200	5	5	0.10	0.90	
OSMENT INLET	06/04	08/04	600	10	5	0.20	4.80	
OSMENT INLET	06/04	08/04	300	10	5	0.15	2.55	
OSMENT INLET	01/04	04/04	700	5	4	0.60	0.91	
PARSONS ANCHORAGE	02/04	04/04	1350	15	5	0.20	16.20	
PARSONS ANCHORAGE	30/03	02/04	500	15	7	0.25	10.69	
PARSONS ANCHORAGE	25/03	30/03	900	12	5	0.25	8.10	
PARSONS ANCHORAGE	30/03	02/04	600	35	7	0.10	35.91	
PARSONS ANCHORAGE	30/03	02/04	950	75	5	0.20	57.00	
PARSONS ANCHORAGE	02/04	04/04	150	10	4	0.25	0.73	
PARSONS ANCHORAGE	02/04	04/04	3000	20	4	0.40	23.40	
PARSONS ANCHORAGE	30/03	02/04	400	20	6	0.25	8.40	
PRIOR PASSAGE	27/03	30/03	150	50	4	0.25	3.66	
PRIOR PASSAGE	27/03	30/03	900	15	4	0.25	6.58	
WEETEEAM BAY	14/03	14/03	100	7	2	0.25	0.11	
WEETEEAM BAY	12/03	12/03	250	4	4	0.10	0.58	
WEETEEAM BAY	28/03	30/03	300	25	5	0.25	5.63	
WEETEEAM BAY	12/03	12/03	400	7	3	0.25	0.84	
WEETEEAM BAY	14/03	14/03	400	7	3	0.20	0.90	
WEETEEAM BAY	12/03	12/03	100	4	3	0.10	0.14	
WEETEEAM BAY	12/03	12/03	65	4	3	0.10	0.09	
WEETEEAM BAY	12/03	12/03	300	250	3	0.30	21.00	
WEETEEAM BAY	12/03	12/03	230	7	3	0.20	0.52	
WEETEEAM BAY	14/03	14/03	30	3	3	0.20	0.03	
WEETEEAM BAY	28/03	31/03	1200	20	5	0.50	12.00	
WILBY POINT	02/04	02/04	700	20	4	0.40	5.46	
WILBY POINT	04/04	05/04	200	5	4	0.50	0.32	
WILBY POINT	04/04	05/04	1300	8	4	0.50	3.38	

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD. SQ. M. (1000'S)	PAGE 9
AREA: 6, BUTEDALE	CONTINUED							
AREA TOTAL			32135.				442.30	
AREA: 7, BELLA BELLA								
CECILIA ISLAND	30/03	03/04	80	10	1	0.80	0.01	
CECILIA ISLAND	30/03	03/04	300	10	3	0.60	0.48	
DON LAGOON +	02/04	04/04	900	8	3	0.10	2.59	
DON LAGOON +	02/04	04/04	300	3	3	0.50	0.18	
DON LAGOON +	02/04	04/04	50	6	5	0.25	0.23	
DON LAGOON +	02/04	04/04	300	3	3	0.00	0.36	
DON LAGOON +	02/04	04/04	400	2	3	0.00	0.32	
DUNDIVAN INLET	02/04	06/04	40	4	3	0.00	0.06	
DUNDIVAN INLET	02/04	06/04	100	4	3	0.00	0.16	
DUNDIVAN INLET	02/04	06/04	250	3	2	0.55	0.07	
DUNDIVAN INLET	02/04	06/04	225	4	3	0.00	0.36	
DUNDIVAN INLET	02/04	06/04	650	3	2	0.00	0.39	
DUNDIVAN INLET	02/04	06/04	250	3	3	0.00	0.30	
DUNDIVAN INLET	02/04	06/04	350	4	3	0.00	0.56	
DUNDIVAN INLET	02/04	06/04	40	30	3	0.10	0.43	
DUNDIVAN INLET	02/04	06/04	300	4	3	0.00	0.48	
DUNDIVAN INLET	02/04	06/04	300	5	2	0.15	0.26	
DUNDIVAN INLET	02/04	06/04	300	4	3	0.00	0.48	
DUNDIVAN INLET	02/04	06/04	150	100	3	0.00	6.00	
DUNDIVAN INLET	02/04	06/04	175	50	3	0.00	3.50	
DUNDIVAN INLET	28/03	31/03	150	50	3	0.00	3.00	
DUNDIVAN INLET	02/04	06/04	150	3	2	0.25	0.07	
DUNDIVAN INLET	02/04	06/04	425	7	4	0.00	1.93	
DUNDIVAN INLET	02/04	06/04	500	7	3	0.00	1.40	
DUNDIVAN INLET	02/04	06/04	600	4	3	0.00	0.96	
DUNDIVAN INLET	02/04	06/04	600	3	3	0.00	0.72	
EAST HIGGINS PASS	06/04	09/04	400	50	7	0.20	30.40	
EAST HIGGINS PASS	06/04	09/04	800	15	5	0.10	10.80	
EAST HIGGINS PASS	06/04	09/04	530	20	5	0.10	9.54	
EAST HIGGINS PASS	10/04	10/04	500	10	4	0.10	2.92	
EAST HIGGINS PASS	06/04	09/04	2300	10	5	0.10	20.70	
EAST HIGGINS PASS	06/04	09/04	25	10	6	0.10	0.31	
EAST HIGGINS PASS	06/04	09/04	250	15	4	0.10	2.19	
EAST HIGGINS PASS	06/04	09/04	600	15	6	0.10	11.34	
EAST HIGGINS PASS	06/04	09/04	350	20	5	0.20	5.60	

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 10
AREA: 7, BELLA BELLA	CONTINUED							
BALE PASSAGE	02/04	06/04	50	20	5	0.40	0.60	
BALE PASSAGE	02/04	06/04	250	15	2	0.40	0.45	
HOUGHTON ISLANDS	05/04	05/04	25	4	2	0.70	0.01	
HOUGHTON ISLANDS	05/04	05/04	30	10	5	0.25	0.23	
IVORY ISLAND	30/03	30/03	50	50	3	0.20	0.80	
LITTLE THOMPSON BAY	06/04	09/04	150	4	2	0.20	0.10	
LITTLE THOMPSON BAY	04/04	04/04	200	30	2	0.00	1.20	
LITTLE THOMPSON BAY	06/04	09/04	20	5	3	0.25	0.03	
LITTLE THOMPSON BAY	26/03	28/03	60	15	5	0.30	0.63	
LITTLE THOMPSON BAY	04/04	04/04	30	20	2	0.00	0.12	
LITTLE THOMPSON BAY	06/04	09/04	100	2	2	0.20	0.03	
LITTLE THOMPSON BAY	06/04	09/04	250	4	2	0.20	0.16	
LITTLE THOMPSON BAY	01/04	01/04	30	40	6	0.00	1.68	
LITTLE THOMPSON BAY	28/03	04/04	425	150	3	0.00	25.50	
LITTLE THOMPSON BAY	26/03	28/03	20	2	4	0.00	0.03	
LITTLE THOMPSON BAY	06/04	09/04	2200	2	2	0.50	0.44	
LITTLE THOMPSON BAY	01/04	01/04	40	30	3	0.00	0.48	
LITTLE THOMPSON BAY	06/04	09/04	650	3	2	0.20	0.31	
NORMAN MORRISON BAY	05/04	05/04	400	4	5	0.25	1.20	
NORMAN MORRISON BAY	05/04	05/04	150	2	2	0.50	0.03	
NORMAN MORRISON BAY	05/04	05/04	20	10	2	0.00	0.04	
NORMAN MORRISON BAY	05/04	05/04	175	5	2	0.25	0.13	
NORMAN MORRISON BAY	05/04	05/04	75	15	3	0.50	0.22	
NORMAN MORRISON BAY	05/04	05/04	50	10	2	0.50	0.05	
NORMAN MORRISON BAY	05/04	05/04	450	2	2	0.75	0.05	
POWELL ANCHORAGE	01/04	04/04	100	10	3	0.20	0.32	
POWELL ANCHORAGE	01/04	04/04	1000	5	2	0.50	0.50	
POWELL ANCHORAGE	01/04	04/04	800	3	2	0.80	0.10	
POWELL ANCHORAGE	01/04	04/04	4000	4	3	0.50	3.20	
POWELL ANCHORAGE	01/04	04/04	80	20	7	0.10	2.74	
POWELL ANCHORAGE	01/04	04/04	150	3	3	0.30	0.13	
POWELL ANCHORAGE	01/04	04/04	100	2	1	0.30	0.01	
POWELL ANCHORAGE	01/04	04/04	2700	4	2	0.50	1.08	
PRINCESS ALICE ISLAND	24/03	24/03	20	10	2	0.25	0.03	
PRINCESS ALICE ISLAND	24/03	24/03	60	3	2	0.30	0.03	
PRINCESS ALICE ISLAND	24/03	24/03	100	2	3	0.50	0.04	
PRINCESS ALICE ISLAND	03/04	05/04	200	150	5	0.00	30.00	
PRINCESS ALICE ISLAND	24/03	24/03	30	2	2	0.50	0.01	
PRINCESS ALICE ISLAND	24/03	24/03	50	3	3	0.60	0.02	
PRINCESS ALICE ISLAND	03/04	05/04	280	20	5	0.00	5.60	
SPIDER ANCHORAGE	23/03	23/03	150	5	3	0.20	0.24	
SPIDER ANCHORAGE	23/03	23/03	100	2	3	0.30	0.06	
SPIDER ANCHORAGE	23/03	23/03	300	10	3	0.50	0.60	
SPILLER CHANNEL	28/03	01/04	900	10	4	0.25	4.39	
SPILLER CHANNEL	30/03	30/03	800	10	3	0.25	2.40	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 11
AREA: 7, BELLA BELLA	CONTINUED							
SPILLER CHANNEL	12/03	12/03	300	3	3	0.10	0.32	
SPILLER CHANNEL	02/04	05/04	400	75	3	0.55	5.40	
SPILLER CHANNEL	12/03	12/03	1100	4	3	0.25	1.32	
SPILLER CHANNEL	30/03	03/04	800	10	3	0.25	2.40	
SPILLER CHANNEL	28/03	01/04	1500	4	5	0.00	6.00	
SPILLER CHANNEL	02/04	05/04	100	10	3	0.75	0.10	
SPILLER CHANNEL	28/03	01/04	700	2	3	0.50	0.28	
SPILLER CHANNEL	02/04	02/04	400	6	3	0.10	0.86	
SPILLER CHANNEL	12/03	12/03	1000	3	3	0.20	0.96	
SPILLER CHANNEL	31/03	03/04	300	10	3	0.25	0.90	
SPILLER CHANNEL	03/04	03/04	300	3	5	0.10	0.81	
SPILLER CHANNEL	03/04	03/04	1100	3	5	0.10	2.97	
SPILLER CHANNEL	02/04	05/04	75	3	2	0.40	0.03	
SPILLER CHANNEL	28/03	01/04	700	3	3	0.50	0.42	
SPILLER CHANNEL	30/03	03/04	500	20	5	0.10	9.00	
SPILLER CHANNEL	02/04	05/04	150	3	5	0.75	0.11	
SPILLER CHANNEL	31/03	03/04	200	2	3	0.50	0.08	
SPILLER CHANNEL	28/03	01/04	600	10	4	0.20	3.12	
SPILLER CHANNEL	02/04	05/04	100	2	3	0.80	0.02	
SPILLER CHANNEL	28/03	01/04	500	3	4	0.10	0.88	
SPILLER CHANNEL	31/03	03/04	500	2	3	0.50	0.20	
SPILLER CHANNEL	12/03	12/03	500	4	3	0.10	0.72	
SPILLER CHANNEL	31/03	03/04	1000	3	3	0.25	0.90	
SPILLER CHANNEL	31/03	03/04	300	10	4	0.20	1.56	
SPILLER CHANNEL	31/03	03/04	200	3	4	0.10	0.35	
SPILLER CHANNEL	31/03	03/04	1100	3	4	0.10	1.93	
SPILLER CHANNEL	02/04	05/04	175	5	3	0.50	0.17	
SPILLER CHANNEL	31/03	03/04	300	2	4	0.00	0.39	
SPILLER CHANNEL	31/03	03/04	800	3	3	0.50	0.48	
SPILLER CHANNEL	31/03	03/04	900	3	5	0.00	2.70	
SPILLER CHANNEL	02/04	05/04	175	50	3	0.40	2.10	
SPILLER CHANNEL	28/03	01/04	1000	3	3	0.20	0.96	
SPILLER CHANNEL	12/03	12/03	500	5	5	0.00	2.50	
SPILLER CHANNEL	02/04	05/04	150	3	2	0.50	0.05	
SPILLER CHANNEL	31/03	03/04	800	3	4	0.10	1.40	
SPILLER CHANNEL	31/03	03/04	300	2	3	0.20	0.19	
SPILLER CHANNEL	31/03	03/04	1200	3	3	0.25	1.08	
SPILLER CHANNEL	28/03	01/04	300	10	6	0.20	3.36	
STRYKER BAY	29/04	04/04	50	20	2	0.00	0.20	
STRYKER BAY	29/04	04/04	250	80	3	0.00	8.00	
STRYKER BAY	29/04	04/04	150	3	1	0.00	0.02	
STRYKER BAY	29/04	04/04	370	370	1	0.50	3.42	
STRYKER BAY	29/04	04/04	50	3	3	0.00	0.06	
WASKESIU PASS	29/04	06/04	520	3	2	0.00	0.31	
WASKESIU PASS	02/04	06/04	800	20	5	0.00	16.00	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SO. M. (1000'S)	PAGE 12
AREA: 7, BELLA BELLA	CONTINUED							
WASKESIU PASS	02/04	06/04	930	10	4	0.00	6.05	
WASKESIU PASS	07/04	09/04	500	80	3	0.50	8.00	
WASKESIU PASS	02/04	06/04	460	3	3	0.00	0.55	
WASKESIU PASS	02/04	06/04	90	45	8	0.00	9.72	
WASKESIU PASS	02/04	06/04	200	7	3	0.00	0.56	
WASKESIU PASS	07/04	09/04	200	20	3	0.50	0.80	
WASKESIU PASS	02/04	06/04	250	6	3	0.00	0.60	
WATCH ISLAND	01/04	04/04	450	4	2	0.40	0.22	
WATCH ISLAND	01/04	04/04	100	80	2	0.50	0.80	
WATCH ISLAND	01/04	04/04	60	30	3	0.60	0.29	
WATCH ISLAND	01/04	04/04	50	30	2	0.10	0.27	
WATCH ISLAND	01/04	04/04	250	10	2	0.40	0.30	
WATCH ISLAND	01/04	04/04	150	60	3	0.20	2.86	
WATCH ISLAND	01/04	04/04	300	50	2	0.50	1.50	
WATCH ISLAND	01/04	04/04	300	20	1	0.80	0.06	
WATCH ISLAND	01/04	04/04	450	50	1	0.90	0.11	
AREA TOTAL			59415.				382.84	
AREA: 8, BELLA COOLA								
BURKE CHANNEL	07/06	07/06	45	1	3	0.20	0.01	
BURKE CHANNEL	07/06	07/06	615	4	1	0.60	0.05	
BURKE CHANNEL	07/06	07/06	720	4	1	0.60	0.06	
BURKE CHANNEL	07/06	07/06	805	1	4	0.25	0.39	
BURKE CHANNEL	07/06	07/06	185	2	4	0.05	0.23	
BURKE CHANNEL	07/06	07/06	30	2	7	0.05	0.11	
BURKE CHANNEL	07/06	07/06	72	1	7	0.60	0.05	
BURKE CHANNEL	07/06	07/06	76	1	7	0.05	0.14	
BURKE CHANNEL	07/06	07/06	1740	4	1	0.80	0.07	
BURKE CHANNEL	07/06	07/06	2250	4	4	0.20	4.68	
BURKE CHANNEL	07/06	07/06	76	1	7	0.25	0.11	
BURKE CHANNEL	07/06	07/06	3380	4	2	0.60	1.08	
FITZ HUGH SOUND	30/03	04/04	27	9	7	0.30	0.32	
FITZ HUGH SOUND	30/03	04/04	732	3	5	0.10	1.98	
FITZ HUGH SOUND	30/03	04/04	1006	3	5	0.10	2.72	
FITZ HUGH SOUND	30/03	04/04	46	5	2	0.50	0.02	
FITZ HUGH SOUND	30/03	04/04	549	3	5	0.10	1.48	
ILLAHIE INLET	29/03	04/04	23	27	7	0.40	0.71	
ILLAHIE INLET	29/03	04/04	685	4	5	0.30	1.92	

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 8, BELLA COOLA	CONTINUED						
ILLAHIE INLET	29/03	04/04	14	18	7	0.30	0.34
KEITH ANCHORAGE	29/03	01/04	37	5	3	0.30	0.05
KEITH ANCHORAGE	29/03	01/04	137	18	7	0.05	4.45
KEITH ANCHORAGE	29/03	01/04	457	3	4	0.10	0.80
KEITH ANCHORAGE	29/03	01/04	73	5	2	0.40	0.04
KWAKSHUA CHANNEL	29/03	01/04	275	3	5	0.15	0.70
KWAKSHUA CHANNEL	29/03	01/04	69	14	6	0.15	1.15
KWAKSHUA CHANNEL	28/03	31/03	229	3	6	0.15	0.82
KWAKSHUA CHANNEL	31/03	01/04	55	9	5	0.00	0.50
KWAKSHUA CHANNEL	28/03	31/03	15	10	7	0.00	0.28
KWAKSHUA CHANNEL	28/03	31/03	165	4	6	0.40	0.55
KWAKSHUA CHANNEL	28/03	31/03	137	3	4	0.35	0.17
KWAKSHUA CHANNEL	28/03	31/03	32	18	7	0.10	0.98
KWAKSHUA CHANNEL	28/03	31/03	165	4	6	0.40	0.55
KWAKSHUA CHANNEL	29/03	01/04	320	73	7	0.10	39.95
KWAKSHUA CHANNEL	28/03	31/03	46	2	7	0.10	0.16
KUAKUME INLET	30/03	04/04	732	3	6	0.10	2.77
KUAKUME INLET	30/03	04/04	91	2	4	0.10	0.11
KUAKUME INLET	30/03	04/04	229	3	5	0.10	0.62
KUAKUME INLET	30/03	04/04	320	3	4	0.10	0.56
KUAKUME INLET	30/03	04/04	1097	3	5	0.10	2.96
PRUTH BAY	29/03	29/03	320	73	6	0.15	27.80
PRUTH BAY	23/04	29/03	69	14	6	0.10	1.22
PRUTH BAY	23/04	29/03	180	5	3	0.20	0.29
PRUTH BAY	29/03	01/04	91	18	4	0.30	0.75
PRUTH BAY	29/03	01/04	183	3	4	0.30	0.25
AREA TOTAL			18600.				104.95
AREA: 9, RIVERS INLET							
KILBELLA BAY	15/03	17/03	3700	4	3	0.15	5.03
KILBELLA BAY	16/03	17/03	700	2	2	0.30	0.20
RIVERS INLET-HEAD	17/03	17/03	3800	3	2	0.20	1.82
RIVERS INLET-HEAD	09/03	15/03	600	35	2	0.40	2.52
RIVERS INLET-HEAD	15/03	17/03	400	30	2	0.45	1.32
SHOTBOLT BAY	17/03	17/03	1500	2	2	0.30	0.42
AREA TOTAL			10700.				11.31

PAGE 13

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 10, SMITH INLET							
INDIAN ISLAND	30/03	30/03	1000	40	4	0.15	22.10
INDIAN ISLAND	01/04	01/04	250	6	5	0.20	1.20
INDIAN ISLAND	01/04	01/04	1050	15	5	0.25	11.81
INDIAN ISLAND	05/04	06/04	1100	5	5	0.25	4.13
LEROY BAY	30/03	30/03	300	15	4	0.20	2.34
LEROY BAY	30/03	30/03	200	15	4	0.40	1.17
AREA TOTAL			3900.				42.75
AREA: 12, ALERT BAY							
AHNUHATI POINT	02/04	02/04	3100	2	3	0.90	0.25
AHNUHATI POINT	02/04	02/04	800	2	3	0.75	0.16
AXE POINT	18/03	18/03	1000	2	3	0.30	0.56
BEWARE PASSAGE	01/04	02/04	250	2	3	0.65	0.07
FORT RUPERT (BEAVER HR)	20/03	27/03	100	5	2	0.50	0.05
FORT RUPERT (BEAVER HR)	20/03	27/03	1400	15	3	0.20	6.72
FRANKLIN FLATS +	19/03	19/03	6112	2	3	0.30	3.42
FRANKLIN FLATS +	19/03	19/03	5000	2	3	0.30	2.80
GLACIER BAY +	04/04	07/04	6200	6	3	0.75	3.72
GLACIER BAY +	04/04	07/04	6700	4	4	0.50	8.71
GLACIER BAY +	18/03	18/03	4000	3	3	0.30	3.36
GLACIER BAY +	04/04	07/04	2400	6	5	0.20	11.52
GLACIER BAY +	18/03	18/03	2000	20	7	0.10	68.40
GLACIER BAY +	18/03	18/03	200	7	3	0.20	0.45
HARDY BAY	06/04	08/04	600	15	2	0.10	1.62
KENNETH PASSAGE	09/04	11/04	450	3	5	0.25	1.01
KENNETH PASSAGE	09/04	11/04	500	2	3	0.40	0.24
KENNETH PASSAGE	09/04	11/04	130	2	3	0.80	0.02
KNIGHT INLET	08/03	08/03	400	1	3	0.30	0.11
OBRIEN BAY	05/04	08/04	200	7	3	0.85	0.08
SIMOOM SOUND-W GILFORD I	05/04	08/04	100	6	4	0.20	0.31
WAHSHIHLAS BAY	08/03	08/03	1000	3	3	0.20	0.96
WAKEMAN SOUND	20/03	20/03	7200	2	3	0.30	4.03
WAKEMAN SOUND	18/03	18/03	1852	4	3	0.30	2.07

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 15
AREA: 12, ALERT BAY	CONTINUED							
WAKEMAN SOUND	08/03	10/03	2775	4	3	0.20	3.33	
WAKEMAN SOUND	08/03	10/03	3700	4	3	0.20	4.74	
AREA TOTAL			58169.				128.94	
AREA: 13, QUATHIASKI								
DEEPWATER BAY	07/04	07/04	650	1	2	0.60	0.05	
AREA TOTAL			650.				0.05	
AREA: 14, COMOX								
BIG QUALICUM RIVER	27/03	27/03	700	200	5	0.40	84.00	
BIG QUALICUM RIVER	27/03	27/03	500	200	4	0.40	39.00	
BOYLE POINT	07/03	11/03	800	5	2	0.80	0.16	
BOYLE POINT	07/03	11/03	1400	5	2	0.90	0.14	
FILLONGLEY PARK	07/03	11/03	1000	10	3	0.40	2.40	
FILLONGLEY PARK	07/03	11/03	1400	10	3	0.50	2.80	
FILLONGLEY PARK	07/03	11/03	3000	150	2	0.40	54.00	
FILLONGLEY PARK	07/03	11/03	800	40	3	0.40	7.68	
KOMAS BLUFF	07/03	11/03	2500	100	3	0.60	40.00	
KOMAS BLUFF	07/03	11/03	1200	100	3	0.30	33.60	
KOMAS BLUFF	07/03	11/03	2000	60	3	0.50	24.00	
LITTLE QUALICUM RIVER	27/03	27/03	700	100	3	0.40	16.80	
LITTLE QUALICUM RIVER	27/03	27/03	800	50	3	0.50	8.00	
LITTLE QUALICUM RIVER	27/03	27/03	600	200	5	0.10	108.00	
PHIPPS POINT	10/03	10/03	100	20	2	0.15	0.34	
QUALICUM BEACH	31/03	31/03	500	10	3	0.10	1.80	
QUALICUM BEACH	31/03	31/03	300	50	2	0.90	0.30	
SHINGLE SPIT	23/03	23/03	350	25	2	0.90	0.18	
WHALEBONE POINT	07/03	11/03	2100	15	3	0.40	7.56	
AREA TOTAL			20750.				430.75	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 16
AREA: 15, WESTVIEW								
ATREVIDA REEF	08/03	12/03	200	25	5	0.30	3.50	
ATREVIDA REEF	08/03	12/03	300	20	3	0.20	1.92	
ATREVIDA REEF	08/03	12/03	800	20	2	0.45	1.76	
ATREVIDA REEF	08/03	12/03	500	10	3	0.50	1.00	
ATREVIDA REEF	08/03	12/03	600	20	2	0.60	0.96	
EMMONDS BEACH	13/03	13/03	350	20	2	0.50	0.70	
HARWOOD ISLAND	06/03	09/03	300	20	4	0.10	3.51	
HARWOOD ISLAND	06/03	09/03	1000	30	5	0.10	27.00	
HARWOOD ISLAND	06/03	09/03	600	50	5	0.10	27.00	
HARWOOD ISLAND	06/03	09/03	400	200	4	0.25	39.00	
HARWOOD ISLAND	06/03	09/03	800	200	4	0.25	78.00	
SAVARY ISLAND	08/03	08/03	900	100	3	0.50	18.00	
SAVARY ISLAND	08/03	08/03	500	200	2	0.50	10.00	
SCUTTLE BAY	13/03	13/03	500	30	2	0.40	1.80	
SCUTTLE BAY	13/03	13/03	200	25	3	0.45	1.10	
SCUTTLE BAY	13/03	13/03	350	25	2	0.60	0.70	
SCUTTLE BAY	13/03	13/03	850	20	2	0.45	1.87	
AREA TOTAL			9150.				217.82	
AREA: 17, NANAIMO								
CRESCENT POINT	31/03	31/03	400	5	5	0.00	2.00	
CRESCENT POINT	29/03	30/03	700	3	4	0.00	1.37	
FALSE NARROWS	28/03	29/03	300	15	4	0.00	2.92	
FLAT TOP ISLANDS	29/03	30/03	100	10	5	0.00	1.00	
FLAT TOP ISLANDS	29/03	30/03	300	6	5	0.00	1.80	
FRASER POINT	02/04	03/04	1600	10	4	0.00	10.40	
KULLEET BAY	02/04	03/04	850	10	4	0.00	5.53	
KULLEET BAY	14/03	14/03	200	50	2	0.00	2.00	
KULLEET BAY	01/04	03/04	1500	15	4	0.00	14.62	
KULLEET BAY	03/04	04/04	1450	8	4	0.00	7.54	
KULLEET BAY	02/04	03/04	800	20	4	0.00	10.40	
KULLEET BAY	01/04	03/04	900	30	4	0.00	17.55	
KULLEET BAY	01/04	03/04	300	60	3	0.00	7.20	

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 17
AREA: 17, NANAIMO	CONTINUED							
KULLEET BAY	01/04	03/04	300	20	4	0.00	3.90	
LADYSMITH HARBOUR	01/04	02/04	1350	25	5	0.00	33.75	
SHARP POINT	28/03	02/04	1100	12	5	0.00	13.20	
SHARP POINT	31/03	01/04	500	12	3	0.00	2.40	
SHARP POINT	30/03	02/04	500	10	5	0.00	5.00	
SHARP POINT	30/03	02/04	750	5	4	0.00	2.44	
SHARP POINT	30/03	02/04	700	30	2	0.00	4.20	
SHARP POINT	29/03	03/04	1500	8	4	0.00	7.80	
SHARP POINT	30/03	02/04	500	15	3	0.00	3.00	
SHARP POINT	28/03	02/04	400	8	4	0.00	2.08	
YELLOW POINT	03/04	04/04	1750	6	3	0.00	4.20	
AREA TOTAL			18750.				166.30	
AREA: 18, COWICHAN								
ANNETTE INLET	09/03	09/03	1300	200	0	0.00	0.00	
ANNETTE INLET	09/03	09/03	400	100	0	0.00	0.00	
ANNETTE INLET	09/03	09/03	150	50	0	0.00	0.00	
ANNETTE INLET	09/03	09/03	200	50	0	0.00	0.00	
SELBY COVE	03/03	03/03	550	50	0	0.00	0.00	
AREA TOTAL			2600.				0.00	
AREA: 23, BARKLEY SOUND								
BEG ISLANDS	27/02	27/02	400	10	4	0.50	1.30	
BEG ISLANDS	27/02	27/02	100	20	2	0.50	0.20	
CONGREVE ISLAND	31/02	02/04	1300	25	9	0.00	97.50	
CONGREVE ISLAND	31/02	02/04	1600	25	7	0.00	76.00	
CONGREVE ISLAND	31/02	02/04	100	25	3	0.00	1.00	
CONGREVE ISLAND	31/02	02/04	450	25	6	0.00	15.75	
CONGREVE ISLAND	31/02	02/04	75	25	7	0.00	3.56	
FORBES ISLAND	28/02	01/03	520	20	6	0.40	8.74	
FORBES ISLAND	28/02	01/03	50	20	2	0.30	0.14	

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	DATE SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 18
AREA: 23, BARKLEY SOUND	CONTINUED							
ITATSOO CREEK	27/02	27/02	100	75	7	0.10	12.82	
ITATSOO CREEK	27/02	27/02	100	20	6	0.00	2.80	
ITATSOO CREEK	27/02	27/02	300	7	4	0.25	1.02	
ITATSOO CREEK	27/02	27/02	200	10	3	0.35	0.52	
ITATSOO CREEK	27/02	27/02	200	8	4	0.25	0.78	
ITATSOO CREEK	27/02	27/02	150	10	6	0.30	1.47	
MACOAH PASSAGE	31/03	31/03	150	50	1	0.00	0.38	
MACOAH PASSAGE	27/02	01/03	100	350	9	0.35	68.25	
MACOAH PASSAGE	28/02	01/03	760	50	2	0.55	3.42	
MACOAH PASSAGE	27/02	01/03	460	125	5	0.25	43.13	
MACOAH PASSAGE	27/02	01/03	190	125	4	0.20	12.35	
MACOAH PASSAGE	27/02	01/03	325	120	4	0.60	10.14	
MACOAH PASSAGE	27/02	01/03	400	100	4	0.40	15.60	
MACOAH PASSAGE	28/02	01/03	50	50	2	0.30	0.35	
MACOAH PASSAGE	28/02	01/03	280	20	2	0.50	0.56	
MACOAH PASSAGE	27/02	01/03	300	200	2	0.35	7.80	
MACOAH PASSAGE	31/03	31/03	1600	20	3	0.00	12.80	
MACOAH PASSAGE	27/02	01/03	90	150	4	0.40	5.26	
MACOAH PASSAGE	27/02	01/03	150	150	3	0.40	5.40	
MACOAH PASSAGE	31/03	31/03	1030	20	5	0.00	20.60	
MACOAH PASSAGE	27/02	01/03	225	200	4	0.35	19.01	
MACOAH PASSAGE	28/02	01/03	100	50	4	0.35	2.11	
MACOAH PASSAGE	28/02	01/03	95	30	5	0.70	0.86	
MACOAH PASSAGE	27/02	01/03	300	650	2	0.50	19.50	
MACOAH PASSAGE	27/02	01/03	325	150	3	0.40	11.70	
MACOAH PASSAGE	27/02	01/03	450	400	3	0.40	43.20	
MACOAH PASSAGE	28/02	01/03	260	100	4	0.25	12.68	
MACOAH PASSAGE	27/02	01/03	60	150	3	0.60	1.44	
MACOAH PASSAGE	28/02	01/03	140	75	5	0.30	7.35	
MACOAH PASSAGE	28/02	01/03	250	50	2	0.30	1.75	
MACOAH PASSAGE	27/02	01/03	425	400	4	0.35	71.82	
MACOAH PASSAGE	27/02	01/03	150	200	4	0.25	14.63	
MACOAH PASSAGE	31/03	31/03	275	10	2	0.00	0.55	
NEWCOMBE CHANNEL	27/02	27/02	525	800	5	0.50	210.00	
NEWCOMBE CHANNEL	27/02	27/02	450	50	2	0.30	3.15	
NEWCOMBE CHANNEL	27/02	27/02	525	500	5	0.50	131.25	
NEWCOMBE CHANNEL	27/02	27/02	525	500	5	0.50	131.25	
NEWCOMBE CHANNEL	27/02	27/02	525	750	5	0.50	196.88	
TWO RIVERS +	27/02	01/03	250	350	3	0.50	17.50	
TWO RIVERS +	27/02	01/03	250	200	6	0.40	42.00	
TWO RIVERS +	27/02	01/03	250	200	4	0.50	16.25	
TWO RIVERS +	27/02	01/03	250	400	2	0.60	8.00	
TWO RIVERS +	27/02	01/03	250	300	7	0.50	71.25	
TWO RIVERS +	27/02	01/03	250	450	3	0.50	22.50	
UCLUELET	28/02	01/03	190	10	2	0.40	0.23	

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 19
AREA: 23, BARKLEY SOUND	CONTINUED							
UCLUELET	28/02	01/03	150	25	5	0.50	1.88	
UCLUELET	28/02	01/03	175	5	2	0.20	0.14	
UCLUELET	28/02	01/03	120	5	2	0.20	0.10	
UCLUELET	28/02	01/03	60	20	3	0.60	0.19	
UCLUELET	28/02	01/03	250	100	3	0.40	6.00	
UCLUELET	28/02	01/03	175	10	2	0.50	0.17	
UCLUELET	28/02	01/03	210	10	3	0.80	0.17	
AREA TOTAL			19965.				1495.14	
AREA: 24, CLAYOQUOT SOUND								
ANTONS SPIT	08/03	08/03	274	82	4	0.5	7.3	
ANTONS SPIT	08/03	08/03	45	13	4	0.25	0.29	
ANTONS SPIT	08/03	08/03	114	27	4	0.3	1.4	
ANTONS SPIT	08/03	08/03	91	27	3	0.1	0.88	
ANTONS SPIT	08/03	08/03	91	27	4	0.5	0.8	
ANTONS SPIT	08/03	08/03	457	91	4	0.5	13.52	
ANTONS SPIT	08/03	08/03	274	91	3	0.25	7.48	
ELBOW BANK	09/03	09/03	180	90	6	0	22.68	
ELBOW BANK	09/03	09/03	380	120	5	0.2	36.48	
ELBOW BANK	09/03	09/03	480	70	3	0.7	4.03	
ELBOW BANK	09/03	09/03	355	130	5	0.15	39.23	
ELBOW BANK	09/03	09/03	480	20	5	0.1	8.64	
ELBOW BANK	09/03	09/03	1300	365	3	0.6	75.92	
ELBOW BANK	09/03	09/03	430	45	5	0.25	14.51	
HECATE BAY	09/03	09/03	26	23	2	0.25	0.09	
HECATE BAY	09/03	09/03	55	45	2	0.25	0.37	
HECATE BAY	09/03	09/03	45	27	2	0.2	0.19	
HECATE BAY	09/03	09/03	18	18	2	0	0.06	
HECATE BAY	09/03	09/03	114	36	3	0.2	1.31	
HECATE BAY	09/03	09/03	183	45	3	0.2	2.64	
HESQUIAT HARBOUR	08/03	08/03	200	200	4	0	26	
HESQUIAT HARBOUR	08/03	08/03	100	40	4	0	2.6	
HESQUIAT HARBOUR	08/03	08/03	100	75	4	0	4.88	
HESQUIAT HARBOUR	08/03	08/03	200	100	4	0	13	
HOT SPRINGS COVE	10/03	10/03	68	36	5	0.5	1.22	
HOT SPRINGS COVE	10/03	10/03	91	45	4	0.3	1.86	
KAKAWIS	07/03	07/03	114	45	0	0	0	
KAKAWIS	07/03	07/03	46	27	4	0.7	0.24	

Table 14. (con'd).

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SC. M. (1000'S)	PAGE 20
AREA: 24, CLAYOQUOT SOUND	CONTINUED							
RITCHIE BAY	23/03	23/03	183	3	2	0.25	0.08	
RITCHIE BAY	23/03	23/03	23	14	3	0.15	0.11	
RITCHIE BAY	23/03	23/03	137	10	3	0.20	0.44	
RITCHIE BAY	23/03	23/03	64	13	2	0.20	0.13	
STUBBS ISLAND	08/03	08/03	150	27	3	0.20	1.30	
STUBBS ISLAND	08/03	08/03	244	92	3	0.10	8.08	
STUBBS ISLAND	08/03	08/03	425	275	2	0.00	23.38	
VARGAS ISLAND	07/03	07/03	275	90	3	0.50	4.95	
VARGAS ISLAND	07/03	07/03	457	183	4	0.20	43.49	
VARGAS ISLAND	07/03	07/03	915	228	6	0.25	219.05	
VARGAS ISLAND	07/03	07/03	457	228	4	0.30	47.41	
VARGAS ISLAND	07/03	07/03	122	1	2	0.75	0.01	
AREA TOTAL			9763.				636.05	
AREA: 25, NOOTKA SOUND								
FRIENDLY COVE	20/03	21/03	366	46	1	0.25	0.63	
NUCHATLITZ INLET	19/03	27/03	247	46	4	0.00	7.39	
NUCHATLITZ INLET	19/03	27/03	27	23	4	0.00	0.40	
NUCHATLITZ INLET	19/03	27/03	91	55	4	0.00	3.25	
NUCHATLITZ INLET	19/03	27/03	485	292	3	0.20	45.32	
NUCHATLITZ INLET	19/03	27/03	119	73	4	0.00	5.65	
NUCHATLITZ INLET	19/03	27/03	238	155	3	0.75	3.69	
NUCHATLITZ INLET	19/03	27/03	759	329	3	0.20	79.91	
NUCHATLITZ INLET	19/03	27/03	302	27	4	0.00	5.30	
NUCHATLITZ INLET	19/03	27/03	73	36	2	0.00	0.53	
OUTER NUCHATLITZ	26/03	27/03	229	22	2	0.50	0.50	
OUTER NUCHATLITZ	26/03	27/03	246	14	3	0.30	0.96	
OUTER NUCHATLITZ	26/03	27/03	27	9	2	0.00	0.05	
OUTER NUCHATLITZ	28/03	29/03	210	46	3	0.20	3.09	
OUTER NUCHATLITZ	28/03	29/03	137	46	5	0.00	6.30	
OUTER NUCHATLITZ	28/03	29/03	548	37	3	0.20	6.49	
ROSA HARBOUR	28/03	28/03	110	55	3	0.50	1.21	
AREA TOTAL			4214.				170.67	

Table 14. (con'd).

SPAWNING GROUND	DATE SPAWNED START	DATE SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)	PAGE 21
AREA: 27, QUATSINO SOUND								
DENAD CREEK	08/03	08/03	50	10	4	0.00	0.32	
BALATO CREEK	08/03	08/03	50	10	4	0.00	0.32	
GREENWOOD POINT	08/03	08/03	50	10	4	0.00	0.32	
HAZARD POINT	08/03	08/03	50	10	4	0.00	0.32	
KLASKISH INLET	09/03	09/03	250	250	6	0.00	87.50	
KLASKISH INLET	09/03	09/03	3000	100	4	0.00	195.00	
KLASKISH INLET	09/03	09/03	300	200	5	0.00	60.00	
KLASKISH INLET	09/03	09/03	200	150	5	0.00	30.00	
WEDEL ISLAND	08/03	08/03	50	10	4	0.00	0.32	
WINTER HARBOUR	08/03	08/03	50	10	4	0.00	0.32	
WINTER HARBOUR	08/03	08/03	50	10	4	0.00	0.32	
AREA TOTAL			4100.				374.74	

ACKNOWLEDGEMENTS

The author wishes to thank Lloyd Webb and Bob Armstrong for critically reviewing the manuscript, Milja Salapure and the staff of SEP Information Processing Center for typing, and Alice Fedorenko for drafting the figures, editing and preparing the manuscript for publication.

REFERENCES

Haegele, C.W. and M.J. Hamey. 1979. Shoreline vegetation on herring spawning grounds in Clayoquot Sound. Fish. Mar. Serv. MS Rep. 1536: 39 p.

_____, A.S. Hourston, R.D. Humphreys and D.C. Miller. 1979. Eggs per unit area in British Columbia herring spawn depositions. Fish. Mar. Serv. Tech. Rep. 894: 30 p.

_____ and J.F. Schweigert. 1984a. Herring stock estimates from a diving survey of spawn in Barkley Sound in 1982, with comparisons to other estimates. Can. MS Rep. Fish. Aquat. Sci. 1978: 33 p.

_____ and J.F. Schweigert. 1984b. Herring stock estimates from diving surveys of spawn for the West Coast of Vancouver Island in 1984. Can. MS Rep. Fish. Aquat. Sci. 1837: 40 p.

_____ and J.F. Schweigert. MS 1986. Herring stock estimates from diving surveys of spawn for the West Coast of Vancouver Island in 1985. Can. MS Rep. Fish. Aquat. Sci. (in preparation).

Haist, V., M. Stocker and J.F. Schweigert. 1985. Stock assessments for British Columbia herring in 1984 and forecasts of the potential catch in 1985. Can. Tech. Rep. Fish. Aquat. Sci. 1365: 53 p.

Humphreys, R.D. and A.S. Hourston. 1978. British Columbia herring spawn deposition survey manual. Fish. Mar. Serv. Misc. Spec. Publ. 38: 40 p.

Shields, T.L. and G. Kingston. 1982. Herring impoundment and spawn on kelp production in British Columbia. Archipelago Marine Research. Rep. submitted to DFO Pacific Region. 57 p.

_____ and J. Watson. 1983. Spawn on kelp production using open ponds in the Queen Charlotte Islands. Archipelago Marine Research. Rep. submitted to DFO Pacific Region. 46 p.

Appendix 1. Guidelines for the 1984 herring food and bait fishery, B.C., September 1984.

TO: FISHERMEN & FISH PROCESSORS

RE: GUIDELINES FOR THE 1984 BRITISH COLUMBIA FOOD AND BAIT HERRING FISHERY

Consultation with the Herring Industry Advisory Board on August 26th, 1984, indicated that a small Food & Bait Herring Fishery in the fall of 1984, in the order of 1000 tonnes, would be desired. The industry is interested in applying most of the available herring catch to the more economically viable Roe Herring Fishery, but recognized the importance of this small allotment to some parts of the fishing/processing industry.

As in 1983, the vessel quota system, distributed by lottery, was recommended by the advisors. I think the attached Guidelines describe the best possible way to carry out this small fishery.

Yours very truly,

C.W. Shinners
Director-General
Pacific Region

SEPTEMBER 1984

GUIDELINES FOR THE 1984 HERRING FOOD & BAIT FISHERY

The 1984 Food & Bait fishing season will commence on or after October 1st, and terminate on or about December 9th, 1984. Opening dates for specific areas will be as described in this Bulletin under "Proposed Fishing Patterns". Separate fisheries for commercial food and bait WILL NOT be conducted this year except for special personal use, three tonne licences and traditional bait pond licences.

EXPORT REQUIREMENTS

The Pacific Herring Fishery Regulations prohibit the export of herring from the Province unless it is canned, salted, pickled or frozen, and has been inspected by an Inspector designated under Section 17 of the Fisheries Inspection Act. This means that the export of fresh herring, including the temporary export of herring for freezing and storage, will not be permitted.

ENTRY & LICENCING REQUIREMENTS

1. Food & Bait fishing licences in this 1984 fishery will be issued to only 20 vessels in 1984 as follows:

   a) North of Cape Caution:

   Five vessels will be allocated 50 tonne (55 short tons) vessel quotas.

   b) Johnstone Strait (Area 13):

   Five vessels will be allotted 50 tonne (55 short tons) vessel quotas.

   c) Strait of Georgia:

   Ten vessels will be allotted 50 tonne (55 short tons) vessel quotas.

2. The means of selecting the 20 vessels will be by lottery. Each interested vessel owner/operator may submit his application to fish in only one of a), b) or c) above. Lottery applications will be available only at the Prince Rupert and Vancouver Offices, commencing on September 14th, 1984, and terminating at 2:00 pm on September 26th, 1984. The draw will be conducted by Industry on September 27th, 1984, in Vancouver, and the Industry will be notified of qualifying vessels via the telex. These licences are non-transferable.

3. Each vessel may only be entered on one application.

4. Food & Bait Herring Fishing Licences will have to be issued to vessel owners under the following conditions at Prince Rupert and Vancouver after September 27th, 1984:

a) Each vessel or owner must have a valid "A" seine, "H" seine or "T" licence.

b) All fishing vessels catching, transporting or delivering herring during the 1984 Food & Bait Herring Fishery will be subject to inspection of the fish hold and refrigeration system, where applicable, prior to issuance of a licence.

c) All vessels engaged in the 1984 Food & Bait Herring Fishery must use a properly functioning R.S.W. or C.S.W. system.

ADMINISTRATION & REGULATION OF THE FISHERY

Section 12 of the B.C. Fish Inspection Regulation states: "where fresh herring are destined for human consumption, processing, other than by icing or chilling, shall commence within 24 hours of delivery (offloading) at the processing establishment, and shall not be discounted until the fish has been preserved to a degree which ensures maximum quality of the end product".

1. A herring purse seine must not exceed 500 m (275 fathoms) in length and the mesh size shall not be less than 25 mm (1") extension measure.

2. Notice of openings will provide sufficient time for all licenced vessels to participate. An officer aboard a designated management patrol vessel will open and close South Coast areas using 2318 (HF) and Channel 78A (VHF).

3. Closures will be made in the event that small, damaged or unsuitable fish are being spilled, or if substantial incidental catches of salmon occur.

4. No vessel will be permitted to catch, have on board, or deliver more than 50 tonnes of herring.

5. Vessel must hail catch tonnage that is taken aboard to a designated patrol vessel prior to leaving the fishing grounds.

6. All deliveries must be offloaded within 18 hours of capture. The onus is on the vessel master to clear with plants for reserved offloading.

7. Loads will be subject to consistent monitoring for quality. Failure to comply with any of the conditions of the licence may result in cancellation of this licence and possible cancellation of other future fishing privileges.

8. Seizure of catch, fishing vessel, and fishing gear, may occur if it is found that any of the conditions of the Special Food & Bait Fishing Licence, issued under the Pacific Herring Fishery Regulations (Section 18 (2).) are violated:

   a) the commencement and termination dates;
   b) the location of the fishery;
   c) the identity of the fishing vessel;

d) the type of gear to be used;
e) the quantity of fish that may be caught, held on board, and delivered, and
f) the means of handling and storing the catch.

9. The mesh size of a trawl net cod end should not be less than 25 mm (1") extension measure.

PROPOSED FISHING PATTERNS

1. NORTH COAST:

Total catch anticipated 250 tonnes.

A. Queen Charlotte Islands Sub-District (Areas 1, 2E & 2W:

A portion of Area 1 will open for licence holders by Public Notice on October 1st, 1984.

B. Northern Sub-District (Areas 3, 4 & 5)

Open by Public Notice for licence holders on October 1st, 1984.

C. Central Coast Sub-District (Areas 6, 7, 8, 9, & 10):

No anticipated openings.

2. SOUTH COAST:

Total maximum catch anticipated 750 tonnes.

A. Johnstone Strait, North (Areas 11 & 12)

No anticipated openings.

B. Johnstone Strait, South (Area 13):

The lower portion of Area 13 in the vicinity of Okisollo Channel - Deepwater Bay will open by Public Notice for licence holders on or after October 1st, 1984, subject to availability of herring and absence of chum salmon stocks. (250 tonnes allotted catch).

C. Strait of Georgia (Areas 17 & 18):

Portions of the lower east coast will open on or after October 1st, 1984, for licence holders by Public Notice subject to herring stock assessment and incidental catches of salmon. (500 tonnes allotted catch).

D. West Coast of Vancouver Island (Areas 22 - 27):

No anticipated openings.

APPLICATION SEPTEMBER 1984

1984 HERRING FOOD & BAIT FISHERY

BOAT QUOTA LOTTERY SYSTEM

I, _____, the owner/operator of the herring fishing vessel _____, Type of Licence (ie: "A", "H" or "T") _____ and CFV #_____, submit application to enter the 1984 Herring Food and Bait 50 tonne boat quota lottery system.

Entry Details

1. Food & Bait fishing licence will be issued to 20 vessels in the 1984 Fishery:

   a) Five vessels will be allotted 50 tonne quotas in the North (Areas 1 - 5). Vessels are required to catch and deliver in the North.

   b) Five vessels will be allotted 50 tonne quotas in the Middle East Coast Sub-District (Area 13). Vessels are required to catch and deliver in the South.

   c) Ten vessels will be allotted 50 tonne quotas in the Lower East Coast Sub-District (Areas 17 & 18). Vessels are required to catch and deliver in the South.

2. All entries must be received at the Prince Rupert or Vancouver Offices no later than 2:00 pm on September 26th, 1984, to be eligible.

3. Licences for this fishery are non-transferable between vessels.

4. Each applicant must meet the following entry criteria:

   a) Each applicant must have a valid "A" seine, "T" or "H" seine licence.

   b) All vessels must have R.S.W. or C.S.W. systems.

   c) Each vessel may only be entered on one application.

CHECK ONE BOX ONLY

A. North of Cape Caution ☐ (5 boats to be chosen)

B. Johnstone Strait ☐ (5 boats to be chosen)

B. Strait of Georgia ☐ (10 boats to be chosen)

INVALID IF MORE THAN ONE BOX IS CHECKED

SIGNED: _____

DATE: _____

EXAMPLE

DEPARTMENT OF FISHERIES & OCEANS

FOOD & BAIT
HERRING FISHING LICENCE

PERSUANT TO SECTION 18 of the PACIFIC HERRING REGULATIONS, permission is hereby granted to _____ to fish for food and bait herring during the 19__ season, subject to the following conditions:

(1) All fishing and transport of herring must be conducted by the vessel: _____CFV No: _____

(2) Type of fishing gear to be used _____

(3) This licence is issued under the authority of the Minister of Fisheries and is not transferable.

(4) The designated vessel must use a properly functioning RSW or CSW system to chill the catch.

(5) Commencement and termination dates for the 19__ Food & Bait Fishery will be by Public Notice.

(6) No vessel shall be permitted to catch, have on board or deliver more than 50 tonnes of herring for the 19__ season. Any catch tonnage that is in excess of 50 tonnes may be put aboard another fishing vessel on the fishing grounds, providing the vessel owner and vessel have a valid 19__ Food & Bait Herring Licence.

(7) Before fishing vessels leave the grounds with herring aboard, the vessel master must hail his catch and destination to a designated patrol vessel. All herring must be caught and delivered _____ of Cape Caution.

(8) All fish must be delivered and offloaded with 18 hours of capture. The onus is on the vessel masters to reserve unloading facilities with plants.

(9) All herring harvested under the terms of this licence are subject to inspection whether delivered to a registered fish processing plant or sold at dockside.

(10) The licence holder must have this licence on board the licenced fishing vessel at all times when fishing for herring or transporting herring to the processing plant, and produce this licence on request of a fishery officer or fishery guardian.

(11) The Regional Director or a fishery officer may order cessation of herring fishing at any time if necessary for conservation purposes.

(12) Failure to comply with any of the conditions of this licence will result in immediate seizure of catch, fishing vessel and fishing gear. Additionally, the leave may be cancelled and future fishing privileges suspended after court rulings.

SIGNATURE OF LICENCE HOLDER

_____
This licence is not valid unless signed by the licence holder.

_____
Date of Issuance

_____
Issuing Officer

DISTRIBUTION:

1. White Copy - Licence Holder
2. Yellow Copy - Herring Co-ordinator
3. Pink - Issuing Officer

Appendix 2. Guidelines for the 1985 roe herring fishery, B.C., October 1984*.

A revised Area Licensing System in the roe herring fishery will be implemented for the 1985 season. Four separate licencing areas have been defined:

1.	Queen Charlotte Islands	(Areas 1 and 2)
2.	Prince Rupert	(Areas 3 to 5)
3.	Central Coast	(Areas 6 to 11)
4.	Strait of Georgia	(Areas 12 to 20)

Several important changes in the Area Licencing Program will be detailed below. The total catch quota for the 1985 roe herring fishery is 20,724 short tons (18,800 metric tonnes). The anticipated allocation of this catch to area and gear type will also be detailed in the following section.

MANAGEMENT PLAN FOR THE 1985 ROE HERRING FISHERY

The fishery in 1985 will be based on a predetermined catch or quota. The basis for this system is a fixed exploitation level of returning stocks.

If recruitment is more or less than predicted, the predetermined catch or quota will not be adjusted in the current year. Accordingly, catch adjustments will be made the following year after escapement measurements and other stock status information is analyzed.

Quota levels for the 1985 season by licence area and gear type are as follows:

CATCH QUOTAS (Short Tons)

LICENCE AREA		SEINE	GILLNET	TOTAL
A.	Q.C.I.	4,453	1,058	5,511
B.	Prince Rupert	2,205	3,307	5,512
C.	Central	2,535	1,984	4,519
D.	Strait of Georgia	2,205	2,976	5,181
	Total Coast:	11,398 (55%)	9,325 (45%)	20,723

1. Stock will be monitored in all major fishing areas and openings will be declared when warranted up to the limit of each licence area's gear quota.

2. South of Cape Caution no openings are anticipated in the Johnstone Strait area. It is anticipated that fishing areas in the Strait of Georgia will open around late February or early March. Prior to February 25th, twenty-four hours notice will be given to the fleet of any openings. Attempts may be made to mount a gillnet fishery at Yellow Pt. (Area 17). Generally, spawn commences around mid-March in this location.

3. No openings are anticipated on the West Coast of the Queen Charlotte Islands due to low forecasts in 1985.

* This is a general outline of the 1985 Herring Management Plan only, and does not supercede the appropriate Fishery Regulations.

I. ADMINISTRATION OF THE 1985 ROE HERRING FISHERY:

1. The 55%/45% seine:gillnet catch division will apply in the 1985 fishery on an overall coastwide basis.

2. The Department will retain the one net per punt restriction for gillnets for the 1985 season.

3. More than one licence may be assigned to either gillnets or seine vessels if they are for different areas. The DFO considers this practice a "business risk" given that our policy is to maximize roe yields in each fishery (see Section 6).

4. Fishery Officers will ensure that sensitive herring spawning areas are protected from gear damage by establishing shallow water net boundaries inside which no fishing shall take place.

5. Vessel transferring catches from hold to hold must stand off the spawning grounds in areas designated as gurry grounds by the Fishery Officer, according to Section 43 of the Fisheries Act.

6. The Department will continue its policy of attempting to achieve the best percentage of roe recovery compatible with sound conservation principles. Generally the roe yield minimum standard for openings is 10%; however, the roe yield for the opening for seines in the Strait of Georgia may be based on a minimum of 9%.

7. The precise opening time for seines will not be announced in advance. A time period in which the opening will occur will be announced; however, the precise opening time will occur within the time period previously set out. No further sets may be made beyond the stated closed time announced by the Fishery Officer. Openings will be broadcast over the radio telephone on 2318 (HF) and Channel 78A (VHF) with no further advance warning.

8. Gillnet fishery openings will be announced as far in advance as possible.

9. Notice of closures will be as short as required for conservation purposes. For gillnet closures, enough notice will be given to provide reasonable opportunity for fishermen to remove their fishing gear from the water.

10. An attempt will be make to broadcast to the fleet anticipated times to fulfillment of expected catch quotas for an area to prevent vessels from travelling unnecessarily to areas that would probably close before they arrived.

11. Fishermen not licenced for the given area and the licenced packer vessel fleet must stand off fishing areas as designated by a Fishery Officer. No compliance may result in a loss of fishing opportunities or prosecution.

FOLLOWING SUBMISSION OF AN AREA CHOICE FORM, AND PRIOR TO JANUARY 15th, 1985, LICENCE HOLDERS MAY CHANGE THEIR AREA CHOICE BY:

a) Submitting a letter to the Licencing Section in Vancouver or Prince Rupert before the licence certificate is issued;

b) Personally completing amended Area Choice Form as follows:

Following submission of initial choices for herring fishing areas by December 15th, 1984, any areas which have 5% more than the ideal figure will be left open for changes to areas with less than the ideal figure. (see Guidelines Table III, Appendix p.59).

On January 8th, 1985, any areas which are at the ideal distribution figure will close to all changes. For a period of one week only (January 8th to 15th) those areas which are over the ideal figure by 5% or more will be open for changes on a first come first serve basis. Once the ideal figure is reached in any of these areas, it will close immediately and no further changes to or from that area will be permitted. All final choices on area must be made by January 15th, 1985 - no changes will be accepted after that date.

c) Indicating their change in Area selection on their renewal application.

NO CHANGES TO AREA SELECTIONS WILL BE ACCEPTED AFTER JANUARY 15TH, 1985, OR EARLIER IF THE 1985 LICENCE HAS BEEN ISSUED.

II. APPLICATIONS:

A. Each holder of a roe herring licence or his assignee must designate, upon application for his licence, the vessel he intends to use in the 1985 roe herring fishery. If a vessel formerly used is no longer licenced for use in any fishery, the licence holder must return the C.F.V. plates issued to that vessel. C.F.V. plates, where applicable, should be returned along with the herring roe fishing licence application. Two roe herring area licences of the same gear type may be assigned to one vessel if they are for different areas.

B. Once the licence renewal application is submitted for processing, changes in vessel designations can only be considered before January 15th, 1985, and if they are made on a vessel redesignation form, signed by the licence holder and accompanied by the required documentation.

C. NO CHANGES IN VESSEL DESIGNATION WILL BE APPROVED BETWEEN JANUARY 16TH, 1985 AND APRIL 30TH, 1985.

D. APPLICATIONS AND FEES FOR 1985 ROE HERRING LICENCES MUST BE RECEIVED OR POSTMARKED NO LATER THAN JANUARY 15TH, 1985. LICENCES WILL BE ISSUED FROM BOTH THE VANCOUVER AND PRINCE RUPERT LICENCE OFFICES.

III. RESTRICTIONS:

A. Vessels used in the roe herring fishery must be designated on the roe herring licence. For the 1985 roe herring season, a licence holder may allow his licence to be operated by another person. Where an Indian has been issued a licence to operate a vessel in fishing for roe herring, no person except an Indian may fish that licence.

B. On gillnet skiffs the vessel Area Licence tab must be displayed on the C.F.V. plate which is to be affixed to the transom.

C. On seine vessels the Area Licence Decal must be mounted on the starboard side of the hull or wheelhouse. At the request of Industry, an area pennant will be issued with each seine licence. This pennant should be displayed prior to and during fishing operations.

D. Declarations for lost decals will be taken by Fishery Officers on the fishing grounds prior to an area opening, and for a fee of $10.00 a replacement decal may be issued by an Officer after being satisfied as to the loss. The replacement will be (designated by an "R") for that area and is to be affixed as described.

1985 ROE FISHERY

TABLE I: 1985 AVERAGE CATCH FOR SEINES

$$\frac{\text{TOTAL SEINE QUOTA - METRIC TONNES}}{\text{NUMBER LICENCED SEINERS}} = \frac{10340}{*241} = 42.9 \text{ TONNES (47.3 short tons)}$$

* DOES NOT INCLUDE 11 CHARTERED SEINERS

TABLE II: 1985 AVERAGE CATCH FOR GILLNETS

$$\frac{\text{TOTAL GILLNET QUOTA - METRIC TONNES}}{\text{NUMBER OF LICENCED GILLNETS}} = \frac{8460}{1326} = 6.4 \text{ TONNES (7.0 short tons)}$$

TABLE III: IDEAL DISTRIBUTION OF GEARS BASED ON AVERAGE CATCH FOR EACH GEAR IN THE FOUR LICENCE AREAS IN 1985 (METRIC TONNES)

	LICENCE AREA	SEINE QUOTA (IDEAL NO. GEARS)	GILLNET QUOTA (IDEAL NO.GEARS)
1.	Q.C.I.	4040 (94)	960 (151)
2.	PR. RUPERT	2000 (47)	3000 (470)
3.	CENTRAL	2300 (53)	1800 (282)
4.	ST. OF GEORGIA	2000 (47)	2700 (423)
		10340 (241)	8460 (1326)

TABLE IV: ROE HERRING FIXED QUOTAS - METRIC TONNES (SHORT TONS)

	1984	1985
QUEEN CHARLOTTE ISLANDS	4,600 (5070)	5,000 (5512)
PRINCE RUPERT	4,000 (4409)	5,000 (5512)
CENTRAL	6,600 (7275)	4,100 (4519)
GULF	11,600 (12786)	4,700 (5181)
W.C.V.I.	4,500 (4960)	- (-)
ALL COAST	31,300 (34501)	18,800 (20724)

CONVERSIONS:

METRIC TONNES x 1.1023 = SHORT TONS

SHORT TONS x 0.90718 = METRIC TONNES

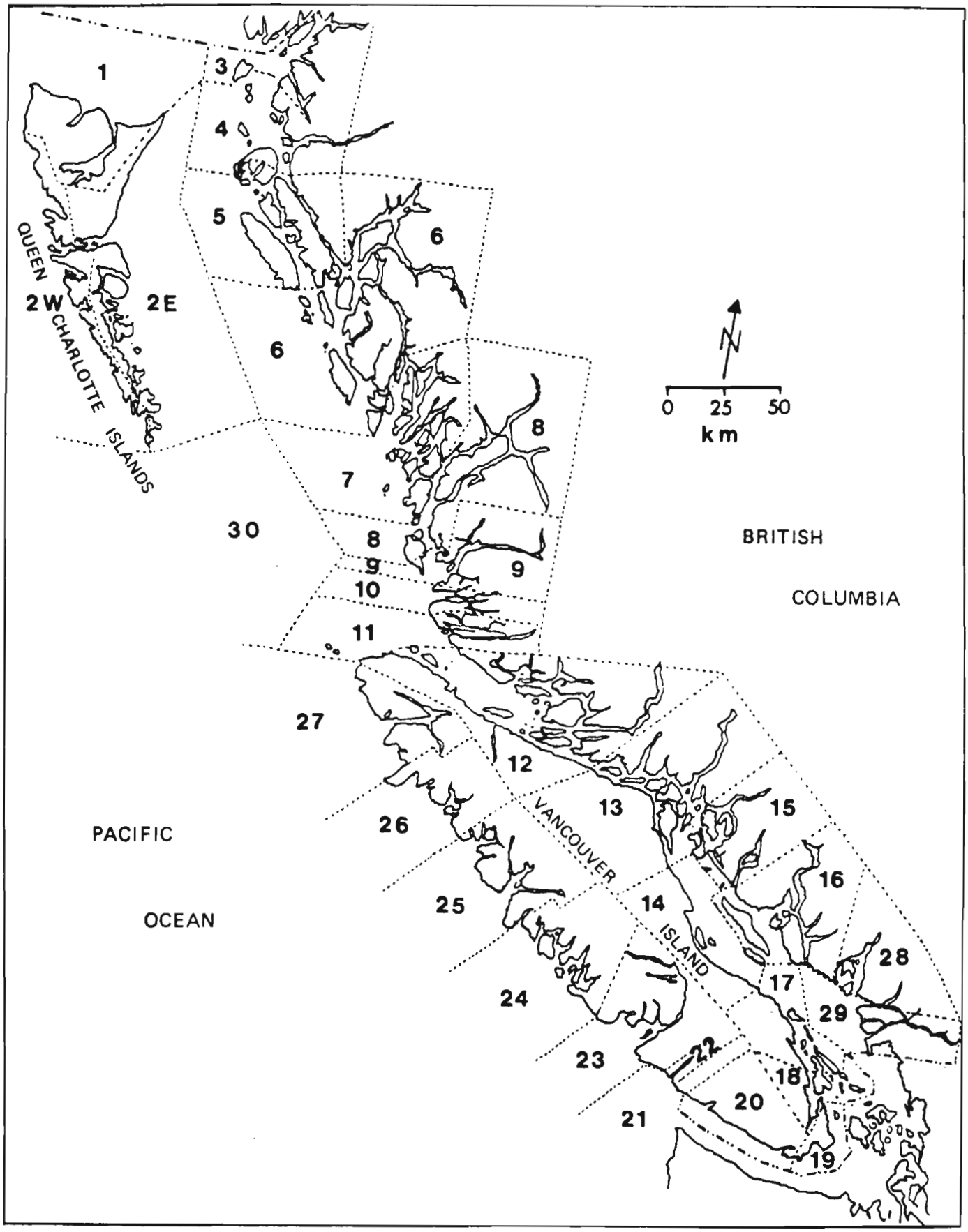

Fig. 1. Location of Statistical Areas in British Columbia.

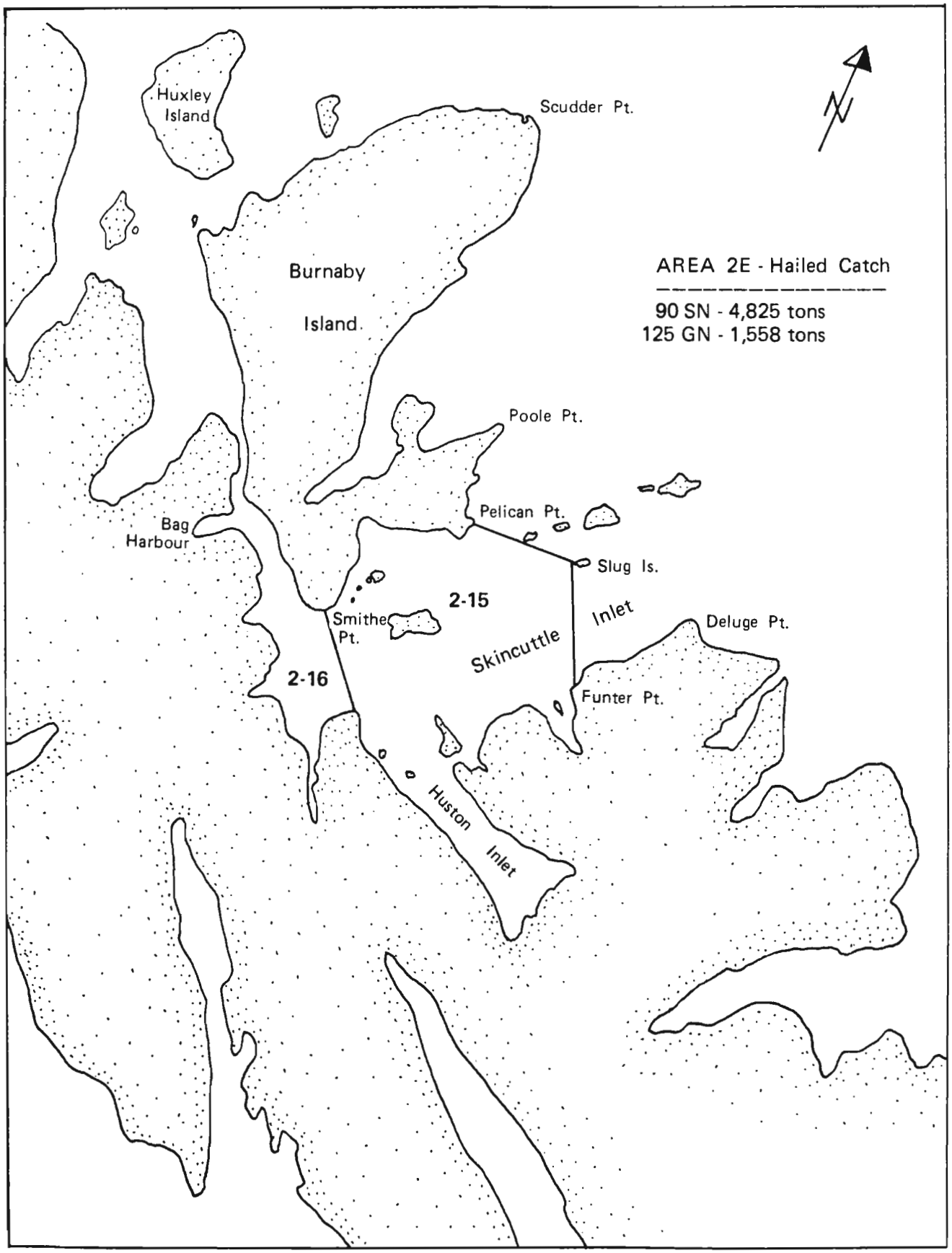

Fig. 2. Roe herring fishing boundaries and hailed catches by gear type in Area 2E, 1985.

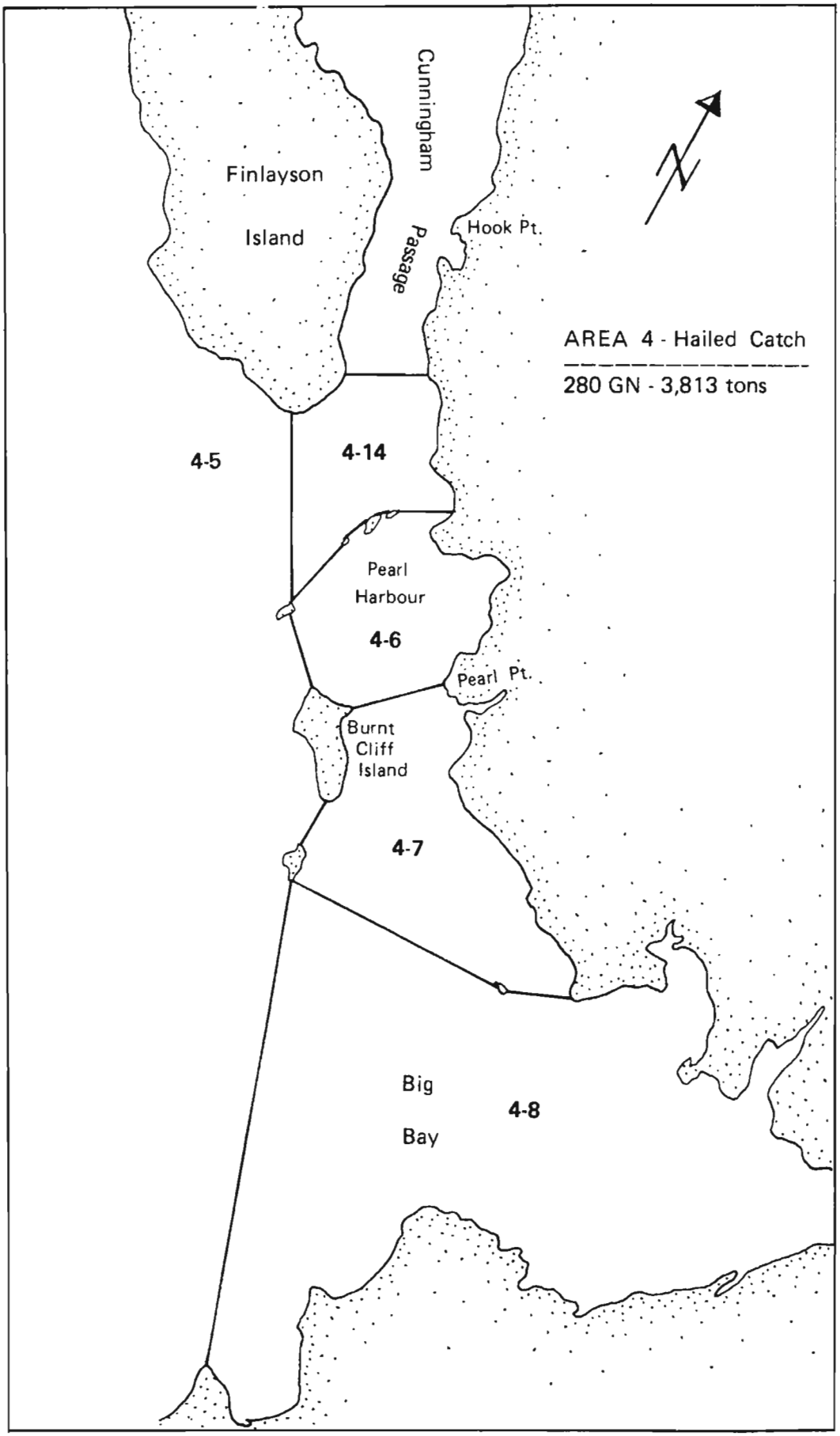

Fig. 3. Roe herring fishing boundaries and hailed catches by gear type in Area 4, 1985.

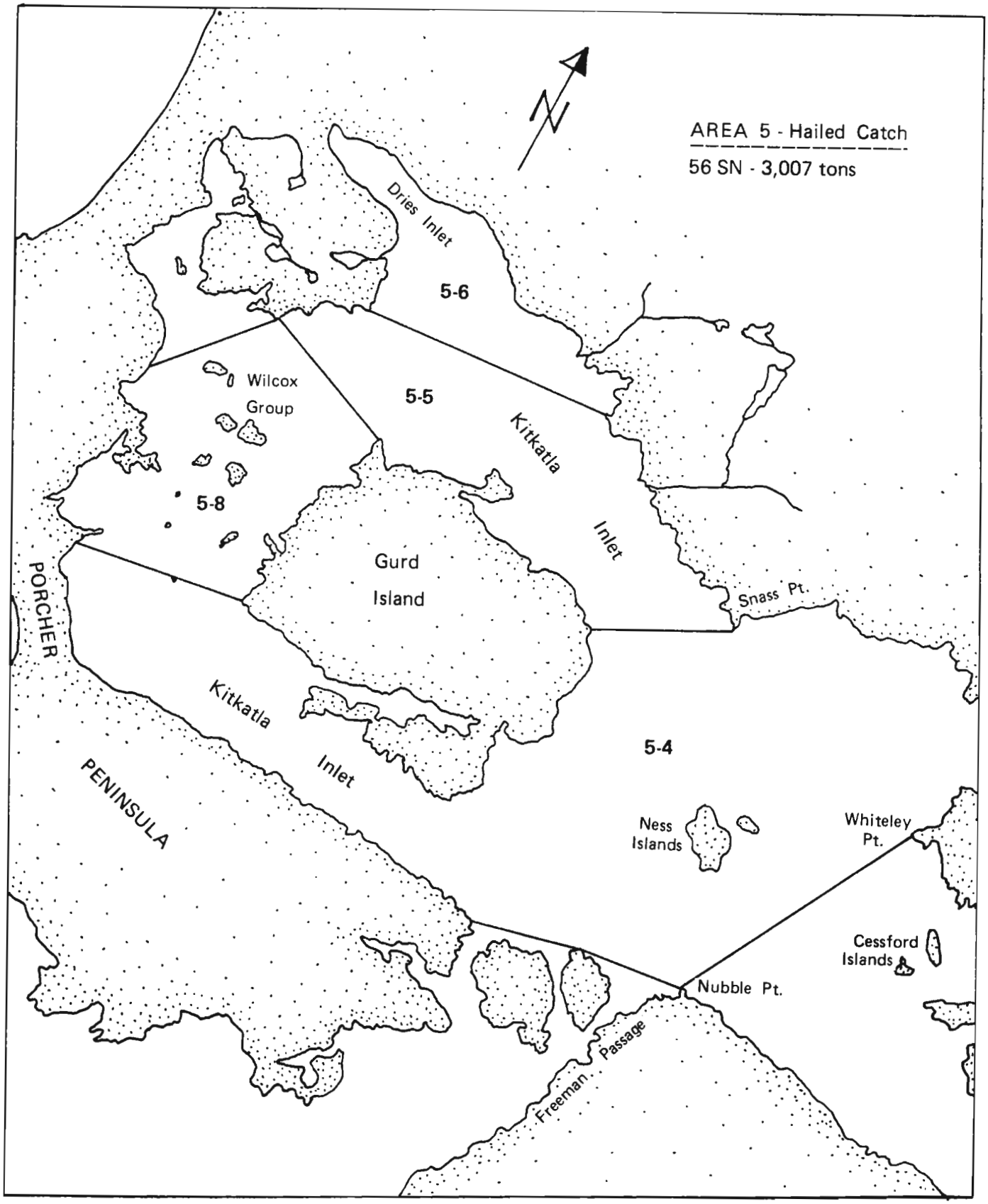

Fig. 4. Roe herring fishing boundaries and hailed catches by gear type in Area 5, 1985.

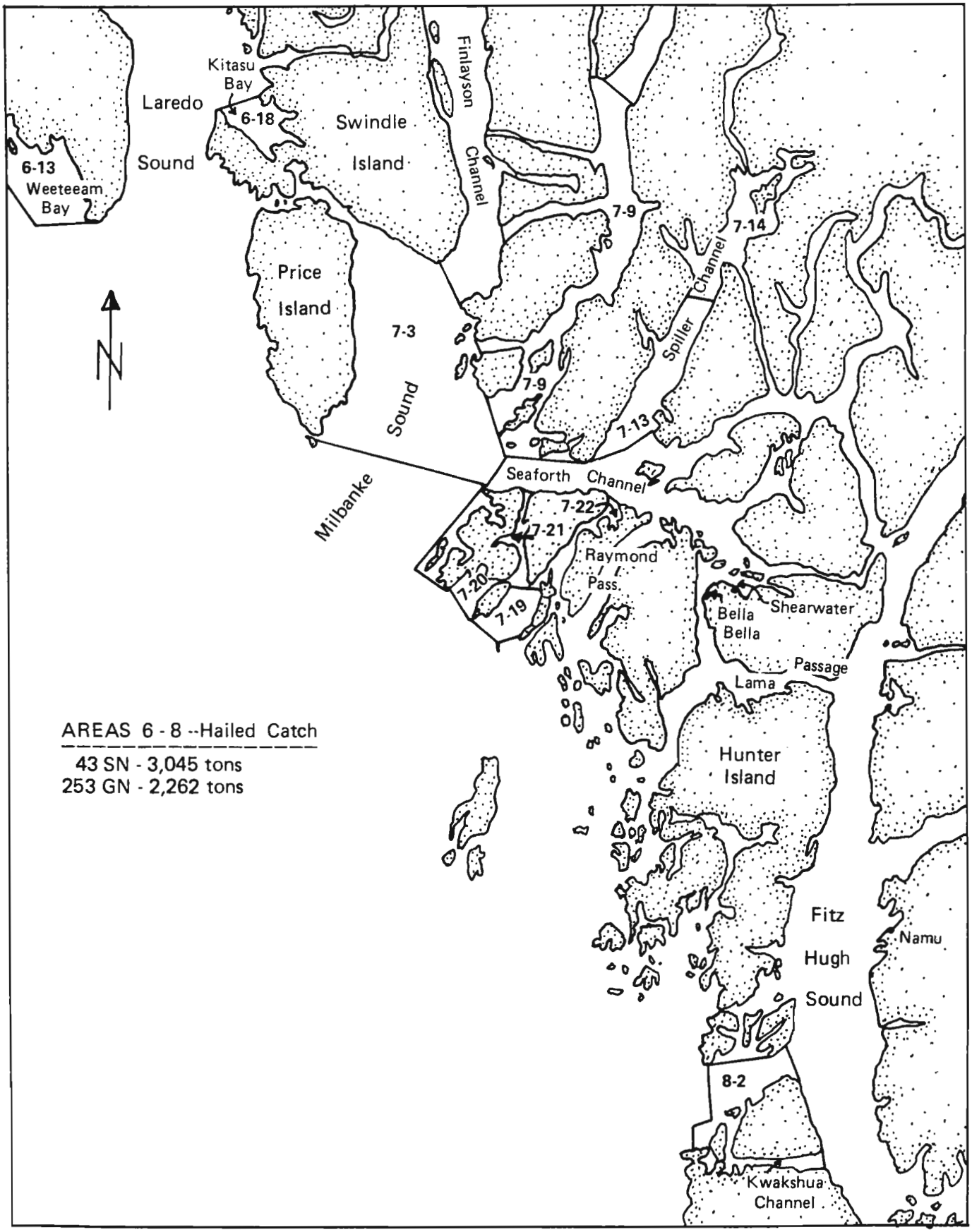

Fig. 5. Roe herring fishing boundaries and hailed catches by gear type in Areas 6 - 8, 1985.

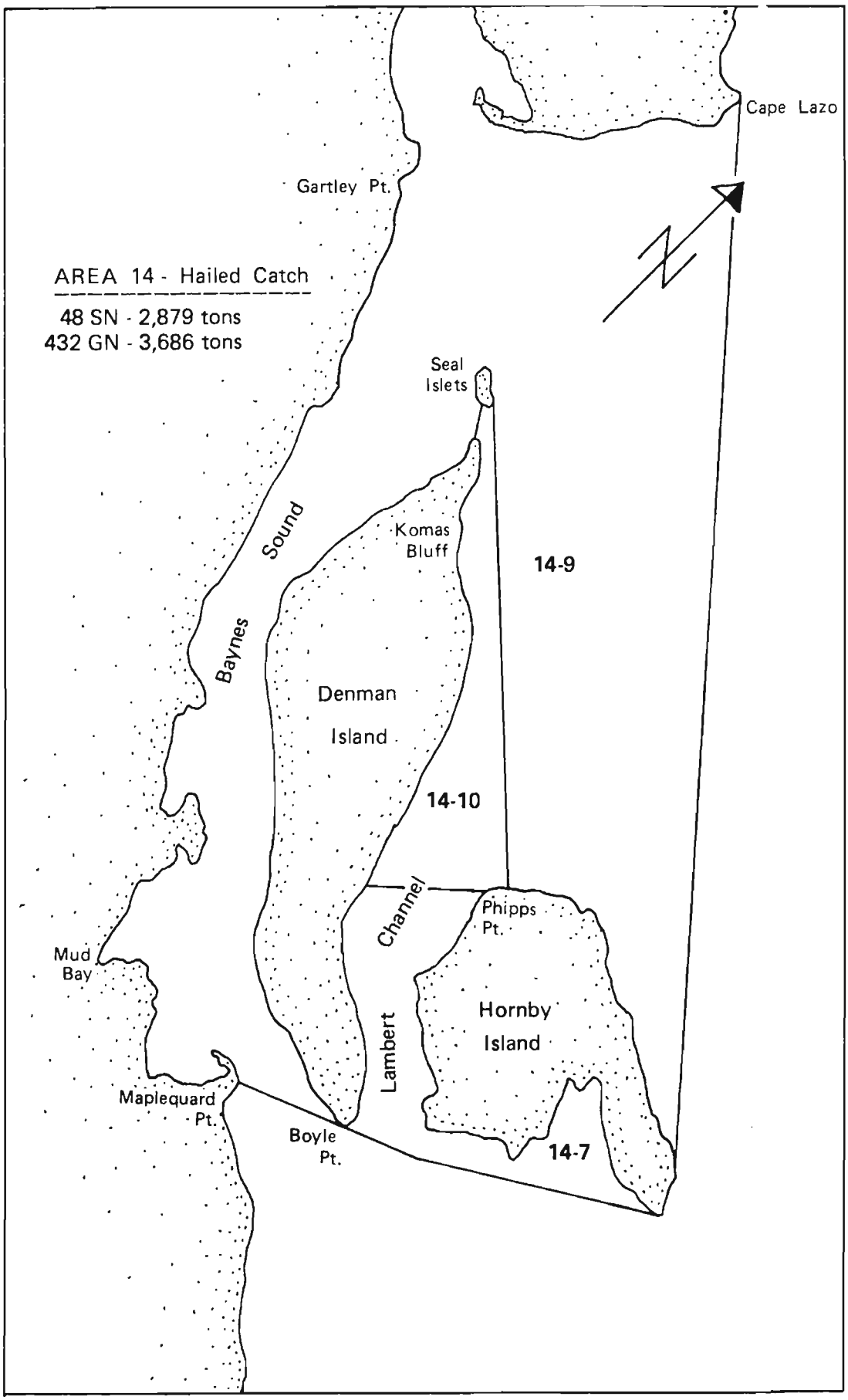

Fig. 6. Roe herring fishing boundaries and hailed catches by gear type in Area 14, 1985.