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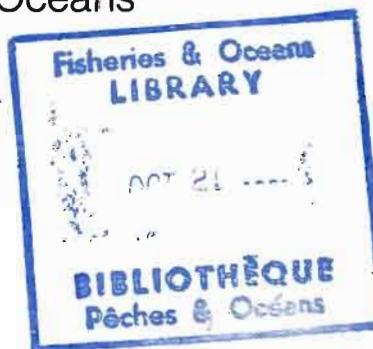


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## Review of the 1986-87 British Columbia Herring Fishery and Spawn Abundance

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HERRING FISHERY AND SPAWN ABUNDANCE

by

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ABSTRACT

Chalmers, D.D. 1989. Review of the 1986-87 British Columbia herring fishery and spawn abundance. Can. Ind. Rep. Fish. Aquat. Sci. No. 196: 91p.

During the 1986-87 fishing season in British Columbia herring were fished for food and bait from November 10 to December 12, 1986, sac-roe from March 9 to April 2, 1987 and spawn on kelp during April, 1987.

The total food and bait catch was 791.3 tons. The total sac-roe catch was 38,790 tons and had a landed value of 91.3 million dollars.

There were 28 spawn on kelp licences issued for a total production of 438,623 pounds.

The spawn area index coast wide was 30.5 million S.A.I. and was equal to the 1986 level of 30.6 million S.A.I.

RÉSUMÉ

Les activités de la saison de pêche du hareng de 1986-1987 de la Colombie-Britannique ont été réparties de la façon suivante: pêche à des fins de consommation et pêche d'appâts, du 10 novembre au 12 décembre 1986; pêche des harengs rogués, du 9 mars au 2 avril, et pêche des oeufs sur varech en avril.

Les prises totales de la pêche pour fins de consommation et obtention d'appâts ont été de 791,3 tonnes. Celles des harengs rogués ont atteint 28 790 tonnes pour une valeur au débarquement de 91,3 millions de dollars.

Au total, 28 permis de récolte d'oeufs sur varech ont été délivrés et la production totale s'est élevée à 438 623 livres.

L'indice de la superficie de frai à l'échelle de la côte a été de 30,5 millions, soit une valeur semblable à celle de 1986 où l'indice a atteint 30,6 millions.

## INTRODUCTION

Pacific Herring (*Clupea harengus pallasii*) migrate in-shore 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 high, while the second is a roe fishery and occurs just prior to spawning when gonad development is near maximum.

Herring spawn in the inter-tidal and sub-tidal zones depositing their eggs on vegetation and rock 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 the Department of Fisheries. 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 overall herring abundance and age class strength. These data are also used to forecast the amount of herring that will return to spawn during the forthcoming year (Haist, et al, 1986).

These forecasts, along with biological and management implications are used to establish fishing quotas for each fishery.

## METHODS

The major source of information for the roe fishery portion of this publication is extracted from a field Record of Management Strategies (RMS) and for the food and bait fishery and spawn on kelp fishery from in-house memoranda written by fishery officers. The RMS reports for each management area provide hydroacoustic abundance estimates and roe yield information as well as a day to day account of management strategies used to manage the roe herring fisheries in each area.

On the grounds 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 was obtained from annual spawn reports compiled by Fisheries 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 percent of vegetation coverage.

## SURVEY METHODS

During 1987, Fishery Officers collected spawn data using two methods

### 1. Surface Survey

The traditional method has been the standard surface based survey. This type of survey requires field staff to estimate the area of spawn, layers of

eggs, and percentage of bare area by pacing it out at low tide while making visual observations. For sub-tidal spawns, a boat is used along with a viewing box to increase visibility. In some cases, observations are made by snorkeling or towing a diver with a snorkel. In locations where the spawn extends to depths below visibility from the surface, a grapple or raking apparatus is used to determine the presence of spawn and collect vegetation samples to estimate egg density. The dimensions of the spawnings are plotted on larger scale marine charts or shoreline vegetation maps made from aerial photographs (eg. Haegel and Hamey, 1979).

The traditional method has been unreliable in areas where spawnings are deep and vegetation sparse or spotty. In addition the effort tends to be inconsistent from year to year or area to area depending on manpower and vessel availability. The inconsistency is modified somewhat by having the surveyor report on the techniques employed, the effort expended and information on environmental conditions (eg. tide, water turbidity, weather).

## 2. Dive Survey

The second method utilizes scuba gear to dive and assess the spawn. There are currently two types of diving surveys in use.

### Comprehensive Dive Survey

A comprehensive diving survey has been developed and used by researchers at the Pacific Biological Station over the past decade (Schweigert et al, 1985).

This is a very intensive type of survey and requires a considerable commitment in terms of dollars, manpower and time. The method employs a rigid and time consuming sampling design but provides accurate and consistent estimates of spawn depositions over time.

After several years of comprehensive surveys it was clear that the dive survey data was more accurate than that collected from the surface surveys mainly because the width and bare areas of spawn deposited sub-tidally could be more accurately assessed.

### Fishery Officer Dive Survey (FODS).

Because of the high costs of comprehensive surveys, a modified diving survey was developed and used on the West Coast Vancouver Island and Strait of Georgia in 1987. This type of survey utilized Fishery Officers trained in scuba and either Patrol Vessels or Roe Herring Charter vessels as dive platforms. The methodology is similar to the comprehensive survey but eliminates the sampling segment. This not only saves time in surveying the transect but also eliminates having to process the samples which were usually done in the evening aboard the dive vessel. The FODS survey can best be described as a means of improving the surface survey data by providing more accurate information on widths, average layers and bare areas of spawn.

Prior to 1987 all spawnings were surveyed using the traditional surface methods. Spawn data from these surveys were converted to a standard measurement (standard square meters at medium intensity) so that spawnings

could be compared from area to area and year to year (Chalmers 1988). With the development of dive surveys, dual surface and dive surveys were conducted in several areas and dive information on widths of spawn, percentage vegetation cover and layers of eggs were used to supplement data collected by the shore based surface surveys.

In 1987 dual surveys were conducted in the Queen Charlotte Islands, surface surveys were done in the Prince Rupert and Central Coast areas and most major spawns in the Strait of Georgia and on the West Coast of Vancouver Island were measured using the FODS method.

Using different survey methods in different areas has resulted in a few problems. The most critical of these being the validity of making comparisons of historical estimates of standard square meters from surface surveys and those from dive surveys. In order to minimize confusion resulting from making invalid comparisons of standard square meters by the two types of surveys and yet still provide a method to permit comparisons where appropriate a new spawn index was developed. This new index, called the Spawn Area Index (SAI) is calculated by multiplying the spawn length times the width times the average egg layers times percent bare area. For dive survey data the spawn width is the average length of all transects within the spawn and percent cover is averaged over all quadrat observations in the spawn. For both surface surveys and quadrat observations, average egg layers are estimated by weighting layers of eggs for each vegetation type by the relative proportions of each vegetation. Tables 13 and 14 provide a time series of spawn data for the years 1983-1987. Areas where dive survey data has been used have been asterisked.

### **1986 FOOD AND BAIT FISHERY**

In October 1986 guidelines for the Open Food and Bait Herring Fishery were issued to Industry (Appendix 1). The total quota for this fishery was 325 tons and of this 75 tons were allocated to the North Coast and 250 tons to the South Coast.

In the North Coast, processing companies were surveyed to determine the Food and Bait requirements and licenses were issued to fishermen on request. Due to the low demand for this type of product, only one 50 ton licence was issued and the total catch for this licence was 41.3 tons. Fishing took place in Area 5-11, near Freeman Passage.

In the South Coast five 50 ton licenses were allocated to fishermen by means of a lottery draw. One of these licenses was to be fished in Johnstone Strait (Area 13) and the other 4 in lower Georgia Straits (Area 17 & 18).

The fishery in Johnstone Strait took place in Deep Water Bay and the catch was 50 tons.

In the lower Georgia Strait, all fishing took place between November 6-28, in Area 18-4 Swanson Channel and Area 18-5 Plumper Sound. Fish were mixed in size and many juveniles were present in the catches. Several sets had

to be released before fish of the desired size could be obtained. All four 50 ton licenses were filled.

There was an additional allocation of 500 tons to a local processor who specializes in secondary processed herring products (Pickled Herring, Roll Mops, Kippers, etc.) for the domestic market. These fish were also caught in the same locations as the other 200 tons. Vessels catching the fish were also restricted to 50 ton limits and were not eligible to participate in the open Food and Bait fishery.

### 1987 ROE HERRING

In November 1986, guidelines for the 1987 Roe Herring Fishery were issued to industry (Appendix 2). These guidelines detail the area licencing system, management plans, catch quotas and regulation for the 1987 fishery.

Five separate licenced areas were established for the 1987 season: Queen Charlotte Islands, Prince Rupert, Central Coast, Strait of Georgia, and West Coast Vancouver Island. Each of these areas was assigned a fixed catch quota prior to the fishing season and holders of roe herring licenses were required to choose one of the areas in which to fish. The quotas are adjusted annually depending on forecast run for the next year, as well as management considerations such as catchability of the fish and gear allocation between seines and gillnets. The five areas and the distribution of licenced gear by area for 1987 are shown in Table 1.

For the 1987 fishing season a total of 30,449 tons were identified as the quota for roe herring and by regulation was divided between the seine and gillnet sectors on a 55/45 % basis (Table 2).

The actual 1987 roe herring catches are given in Table 3 (Hailed catch) and Table 4 (Preliminary sales slips data).

The annual roe herring catches by statistical area and gear type for the years 1982-87 are shown in Table 5 through 9. The 1987 herring fishery boundaries are shown in Figures 1-14 and the statistical areas in British Columbia are shown in figures 15-16.

One of the major advantages of using an annually adjusted fixed quota is that managers can set up fisheries on the first available stock of suitable mature fish thus provide 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 and hence higher profitability 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 generally within 10-15% of the final sales slip data compiled from company landing slips.

The field hailed figures are used throughout the text because they are the ones that are used to determine whether or not the quota has been realized

and if the fishery should be closed or remain open. Moreover, sales slip information is not available until late in the year.

In summary, the 1987 roe herring fishery accounted for a coast wide catch of 38,790 tons (Sales slip data). Of this total 1,896 tons were caught in the Queen Charlotte Islands, 6,121 tons in the Prince Rupert area, 3,601 tons in the Central Coast, 10,027 tons in the Strait of Georgia and 17,145 tons on the West Coast Vancouver Island.

The landed value of this fishery was about 91 million dollars and compares with 39.24 million dollars in 1986 when 15,681 tons were caught and 35.49 million dollars in 1985 when 25,691 tons were caught.

A review of the 1987 in-season stock assessment and resultant fisheries in each area is presented below.

### **Queen Charlotte Islands (Areas 1, 2E, 2W)**

#### Area 2E Assessment

The assessment program on the east coast of the Queen Charlotte Islands began on February 5 with the F.P.V. Arrow Post sounding throughout the lower portion of Area 2 East. No appreciable amount of herring were found until February 21, when 1,500 tons were located in Sedgwick Bay. Stock estimates increased to 4,000-6,000 tons between February 24 - March 1, then increased further to a maximum tonnage estimate of 10,500 tons on March 4. From March 6-24, total stock estimates for the East Coast areas ranged between 6,000-8,000 tons then declined to 3,500-4,500 tons from March 25 - April 1. There was a slight increase up to 6,000-8,000 tons and stocks remained at this level until the end of the sounding program on March 7.

In Skincuttle Inlet, very few fish were detected from the start of the sounding program until March 21 when 2,500-3,000 tons were observed, even though a major spawning occurred in Huston Inlet between March 8-12. Despite sounding on a fairly regular basis throughout the Skincuttle/Poole Inlet areas, only a few scattered schools were ever found.

Spawning began in Poole Inlet on March 18 and as it increased in size acoustic stock estimates in Skincuttle declined to only 50 tons by March 27. Due to the low acoustic tonnage estimates for Skincuttle during the assessment period, only one roe test set was made. This test was done in Poole Inlet on March 26 and had a roe maturity of 12% and average fish length of 232 mm.

In Upper Juan Perez Sound, which covers the area between Werner Point north to Darwin Sound, very few fish were seen until February 21 when 1,500 tons were located in Sedgwick Bay. The estimate remained the same until February 25 when 3,000-4,000 tons were sounded between the Bischof Islands and Sedgwick Point.

These fish were concentrated along the western shore in Sedgwick Bay. This was felt to be a better than normal showing of fish for this area at this time. Stock estimates remained the same until March 5 when 7,000 tons were sounded in three locations; Sedgwick Bay -3,000 tons, Lower Darwin Sound from Richardson Point to Shuttle Island -1,500 tons and around the Reefs near Murchison Island/Faraday Island -2,500 tons.

After March 5 these stocks began to decline and at the same time were increasing in the Lower Juan Perez Island areas so that it appeared they were moving down. On March 6, soundings could only locate 4,500 tons and from March 9-22 ranged from 200-2,500 tons, declining further to 50-500 tons between March 23 - April 7.

There were three test sets made at Upper Juan Perez in Sedgwick Bay where the main concentrations occurred. These fish were slightly smaller than the fish tested in Lower Juan Perez and the average size ranged from 218-225 mm.

The first test was taken on March 17 and had a roe maturity of 6%. The next two tests were made on March 31 and April 1 and had roe maturities of 12.5% and 14.9% respectively. It was noted during the later tests that both the male and female gonads were very ripe and close to maximum maturity.

In Lower Juan Perez Sound which covers the area from Werner Point south to Dolomite Narrows, only a few scattered schools totalling 10-30 tons were found up to March 2 when 1,000 tons were sounded near All Alone Stone. These fish were in about a dozen schools ranging in size from 80- 100 tons each. Stocks began increasing and by March 5 estimates had risen to 2,000-3,000 tons. These fish were showing after dark in large fast moving schools off the bluffs along Huxley Island.

By March 10, sounding estimates had increased to 4,600 tons and of this, 1,500 tons were located between Monument Rock and All Alone Stone, 2,000 tons off Werner Bay, 700 tons along the West side of Huxley Island and 400 tons off Newberry point. A roe test on the fish along Huxley Island indicated a roe maturity of 5.7% and average fish size of 233 mm. By March 17, total stock estimates for Lower Juan Perez Sound had reached 5,000 tons. These fish were scattered throughout the area with 1,700 tons between Dolomite Narrows and Section Island, 2,000 tons from Section Island to Newberry Point, 1,000 tons from Arakun Islands to Monument Rocks and 300 tons off Werner Bay.

On March 18, two test sets were made, one off Section Island and another off Monument Rocks and yielded 12.4% & 10.9% respectively. Because of the amount of fish in the area and high roe maturities, the fishing fleet was put on 24 hour notification. This meant that a fishery could take place anytime after 24 hours from the time of notification which was announced to the fleet at 1015 hrs March 18.

On March 20, the day of the seine fishery, two separate bodies of fish were sounded in Lower Juan Perez. One body of 2,500 tons was located in Burnaby Straits between Park Island and Dolomite Narrows, and the other body of 3,000 tons was located between the bluffs along Huxley Island and Newberry Point. Two roe tests were made, one off Park Island resulted in a roe maturity of 12.3% and the other test off Kat Island resulted in a roe maturity of 11.6%. It was noted that in both tests there were some spawned out fish and concern was expressed that these may be from the spawning that was currently happening in Poole Inlet. It was believed that if the seine fishery was held off much longer, roe maturities would decline due to an increase in the number of spawned out fish in the area. On March 21, the day after the

fishery the fish were scattered throughout the Burnaby Narrows area and it was difficult to obtain a good sounding estimate.

Between March 22 - April 1, acoustic tonnage estimates were around 3,000 tons. This increased slightly to 4,000-6,000 tons April 2, until the end of the Sounding program.

In Cumshewa Inlet, Selwyn Inlet and Atli Inlet, intermittent sounding surveys were carried out throughout the season. The maximum tonnage estimated for Cumshewa Inlet was between March 28 - April 3 when 350 tons were sounded. In Selwyn Inlet, 200 tons were sounded between February 28 - March 26. This increased to 1,000 tons by April 3 and to a maximum of 1,500 tons on April 7. Atli Inlet had 1,000 tons between March 3-16 then dropped to 200 tons on March 21.

### Area 2E Fishery

#### Seine

On March 20, a seine fishery was conducted in Lower Juan Perez Sound. There were only 30 seines licenced in this area and the fishery opened at 0902 hours in sub-area 2-13 (Figure 3).

At the time of the opening there were estimated to be 2,500 tons of herring in the sub-area. Roe testing indicated maturities of 11-13%. Fishing was very slow as fish were broken up in small scattered fast moving schools.

By 1140 hrs, 965 tons of the 1,555 ton quota had been hauled. The fishery closed at 1421 hrs and the final hauled catch was 2,061 tons. The total length of the fishery was 5 hours 9 minutes. Hauled catches ranged from a low of 1 ton to a high of 230 tons and the average catch for the 30 licenced vessels was 69 tons. There were 13 vessels that did not haul any catch. Roe maturities ranged from 8.4%-15% with an average of 12.7%.

### **Prince Rupert (Areas 3 - 5)**

#### Area 3 - 4 Assessment

The stock assessment program began on March 2, but due to poor weather conditions in early March very little sounding effort was made at this time.

In the upper portion of Area 3 which extends from Work Channel to Nasoga Gulf and includes Emma Pass, Wales Pass, Steamer Pass, Boston Rocks and Sommerville Bay, very few fish were seen until March 11-12 when 600 tons were sounded in Wales Pass, 500 tons in Emma Pass and 800 tons in Work Channel. Generally, fish tend to show up in these areas first then move down towards Port Simpson and into Big Bay to spawn.

By March 19 a peak tonnage of 2,800 tons was sounded in these areas. Of this total, 1,100 tons were sounded in around Boston Rocks, 900 tons in Emma Pass and the rest was in scattered schools in Wales Pass and around Truro Island and Hogan Islands. At this time, fish began moving down towards Port Simpson and Big Bay and the sounding effort was concentrated in these lower areas.

In the Haida Bay/Stuman Bay area, fish began showing up on March 12 and 2,200 tons were sounded in Stuman Bay and 600 tons in Haida Bay. A spawning began on March 14 in Stuman Bay and was the earliest spawn on record since 1948. The average date for spawning in this area is April 2.

Stocks began building as fish moved down from above and estimates were up to 3,500-4,000 tons by March 16. Two roe tests were made in Stuman Bay on this day and showed a roe maturity of 1% and average size of 216 mm. Peak tonnage estimates in the Port Simpson area was on March 19 when 9,700 tons were sounded with most of it in Haida Bay -3700 tons and Stuman Bay -3000 tons. The rest of the fish were scattered throughout the area in lesser concentrations.

Over the next few days, stocks decreased as they began moving down towards Big Bay. Another roe test made in Stuman Bay on March 21 still indicated less than 1% roe maturity. By March 23, only a few small scratches were found and sounding effort was moved south to the Pearl Harbour/Big Bay area.

In the lower portion of Area 3 and upper part of Area 4, which extends from Cunningham Pass down to Duncan Bay and includes Pearl Harbour and Big Bay, very few fish were sounded until March 17 when 1,000 tons were located in Cunningham Pass. Stocks began building as fish moved down from above and by March 20 were estimated at 7,500 tons. These fish were concentrated in Pearl Harbour and Big Bay. This was the peak sounding estimate for this area. A test set in Pearl Harbour on this day indicated a roe maturity of 6.27% and average size of 216 mm.

On March 21, a spawning began off Fortune Point on the bottom end of Finlayson Island. A test set in Big Bay averaged 9% roe maturity and on March 22 spawning began in Big Bay. Another roe test on this day in Pearl Harbour had a roe yield of 4%, with several spawned out fish or slinks in each test made. Stock estimates quickly declined as fish moved towards the beach and made assessment difficult.

On March 23, there was a good showing of fish behind the spawn and one roe test off Simpson Point and another in Pearl Harbour had roe yields of 10.8%. There were three gillnet test sets made in the morning of March 23, one at Trenham Point which had a roe yield of 8.9% and was high on males, another in an active spawning at West Base Point 11.7%, slightly high on males and the third off Reeks Point in spawn 12.7%. In the afternoon, more gillnet tests were made, one ahead of the spawn at Trenham point -12.8%, another at Finlayson Island -12.2% and one at Salmon Bight -10.2%. With the spawn at the head and along the south shore of Big Bay progressing southward to Tree Bluff, and another spawn starting behind Swallow Island, a fishery was announced for the next day on March 24.

On March 30, sounding between Tree Bluff and Cunningham Pass showed a total tonnage of 3,000 tons, but a test off Mist Island indicated some smaller fish (20.6cm.) in the area with low roe yields averaging 10.6%. Another test made off the top of Finlayson Island also indicated small fish averaging 204 mm and roe maturities of 10.6%. Due to increased spawning activity throughout the Pearl Harbour/Big Bay area, and difficulty in assessing stocks, the

sounding effort was moved to North Porcher Island in hopes of finding enough fish for the remainder of the gillnet quota.

On April 1, sounding in North Porcher Inlet area could only locate 300 tons in Hunter Inlet and another 300 tons off Island Point, although 1,500 tons had been reported in the area a few days earlier. Spawning on North Porcher was just beginning at this time.

#### Area 4 Fishery

##### Gillnet

There were a total of four gillnet openings in this area.

The first fishery took place on March 24 between 0800-1600 hrs in sub-areas 4-5, 4-7, 4-8 and 4-14 (Figure 4). Total length of this opening was 8 hours. Although there were 507 gillnets licenced for this area, only 338 were counted at the opening.

Fishing was very slow and by the closure only 2,658 tons had been hauled. This left 1,642 tons of the 4,300 ton quota remaining for the next day. Roe tests from this fishery ranged from 10-15% with higher tests coming in the afternoon.

The second opening took place on March 25 between 0730-1330 hrs (Figure 4). Total length of this opening was 6 hours. The same sub- areas as the first fishery were opened (4-5,4-7,4-8,& 4-14). By opening time the weather had deteriorated with winds blowing SE 20 -30 mph. The high winds continued throughout the fishery and by the closure only 503 tons had been hauled.

Spawning in the area began to slow down and by March 27 ceased completely. Over the next few days any spawnings that did occur were small and localized with very few fish showing.

Gillnet test sets indicated low maturities ranging from 9.7-10.7 % and were high on males. By March 29, winds began diminishing and there was a good spawning in progress near White Cliffs which progressed in intensity towards Haycock and South Islands. Four gillnet tests off Burnt Cliff Island, Otter Anchorage, South Island and Haycock Island yielded 12.5%, 14.5%, 13.0% and 11.8% respectively.

On March 29 between 1000-1800 hrs, sub-areas 3-4,4-5,4-6,4-7,4-8 and 4-14 opened to gillnet fishing (Figure 4). Total length of opening was 10 hours. It had been originally anticipated that the fishery would close at 1200 hrs, but fishing was very slow due to a high percentage of small fish that, for the most part passed through the gillnets and by 1100 hrs, only 237 tons had been hauled for this opening.

The total hauled catch for the three openings was 701 tons and meant that there was still a short fall of 438 tons from the 4,300 ton quota. Since there seemed to be no further opportunities for fisheries in these areas, other locations were looked at.

On March 28, a spawning had begun on North Porcher Island in Hunts Inlet and by April 2 had expanded to sufficient size to warrant a fishery. Gillnet tests in Hunts Inlet ranged between 14 -16% prior to the fishery.

On April 2 between 1000-1330 hrs, sub-area 4-9 opened (Figure 5). Total length of opening was 3 hours & 30 mins. The hailed catch for this fishery was 607 tons and brought the total catch for the four fisheries to 4,469 tons.

#### Area 5 Assessment

Stock assessment began on March 2 but typical with the past several years no sizeable body of fish was located until later in the month. On March 18, 500 tons were sounded in Willis Bay and a roe test yielded less than 1% and an average size of 208 mm. This estimate was upgraded to 1,500 tons the next day and an additional 500 tons were sounded inside Kitkatla Inlet off the bottom end of Gurd Island.

By March 23 stock estimates were up to 3,500 tons. Most of these fish were outside of Kitkatla Inlet with one large body of 2,000 tons located off Viscount Point, another 400 tons around Shakes Island, 500 tons off False Cone in the Prager Islands and 600 tons inside on the east side of Gurd island. The total sounding at this time was one of the best on record for fish located outside the Inlet.

Fish began moving into the Inlet in small schools and by March 27 sounding estimates in Kitkatla itself had increased to 2,500 tons.

Most of these fish were situated between Dries Inlet and Serpentine Inlet. Two roe tests, one off the Gravel Pit and one in Dries Inlet yielded 11% with very few #2 and #3 condition roes in the sample.

At this time it was felt that there was good potential for a fishery but after meeting with industry representatives it was decided that better quality roe could be obtained if the fishery was delayed for at least one more day.

Southeast gales hampered sounding efforts over the next few days, however by March 29, stock estimates had increased to 7,500 tons. This was the largest amount of fish sounded in Kitkatla prior to a fishery in recent years. South East winds continued to blow making it difficult to sound or obtain samples for roe tests.

On March 30, a sample was taken on fish off the Gravel Pit and had a roe yield of 12% and average size of 215 mm. This test was considerably better than one taken the same place a few days earlier that had roe yields of 10% and average size of 202 mm.

On March 31, stock estimates were still thought to be about 7,500 tons and a roe test off Robert Island indicated a roe maturity of 12.3%. Industry representatives looked at the roe and felt it wouldn't get better so a fishery was set up for this day.

## Area 5 Fishery

### Seine

There were a total of three seine openings in this area. The first fishery took place on March 31 between 1118-1908 hrs in Sub- area 5-4 and 5-9 (Figure 6). Total length of this opening was 7 hours 50 mins with all 32 licenced seines taking part. The fishery started off very slow with only six sets in the water during the first half-hour. Fishing remained slow and there were many water hauls. By late afternoon it became obvious that the quota would not be taken unless more area was opened so at 1816 hrs, sub-area 5-5 South of a line 1/2 mile north of Snass Point was opened (5-5A, Fig. 6), and at 1845 hrs the remainder of the sub-area was opened. There were no sets made and no fish could be located in the newly opened area. The hailed catch for this opening was 819 tons.

The second opening took place on April 1 between 1003-1009 hrs in Sub-area 5-4A (Figure 5). Total length of opening was 6 minutes. At the closure, there were 23 sets in the water and it was felt that the catch would be enough to complete the remaining 870 tons of the quota. After all the hauls were in, only 578 tons had been caught still leaving 303 tons left on the quota.

The third opening took place the same day, April 1, between 1300 -1308 hrs in Sub-area 5-4 (Figure 5). Total length of opening was 7 minutes 30 seconds. The hailed catch was 595 tons bringing the total catch for the three fisheries to 2,118 tons. Of the 32 seines licenced for this area 31 made catches ranging from 5-375 tons.

## **Central Coast (Areas 6 - 10)**

### Area 6 - 10 Assessment

The assessment program in area 6 began on March 2 when 150 tons were located in Kitasu Bay. By March 10, the estimate had increased to 1,500 tons and a roe seine test on this day indicated an average fish length of 219 mm and roe maturity of 0%. No other stock had been located in Area 6 up at this time. On March 13, sounding estimates for Area 6 increased to 2,600 tons with an additional 800 tons being located in the Wilby Point/Larkin Point area and 300 tons in Thistle Passage.

On March 18-19, 1,500 tons were located in Weeteam Bay but this estimate decreased to 1,000 tons on March 20 and down to 125 tons by March 23 where it remained at until the end of the sounding program.

Stock estimates in Kitasu Bay reach a maximum of 4,000 tons on March 22 and varied from 1,250-3,500 tons between March 23 and March 28 when the last sounding for the area took place. Roe tests made in Kitasu Bay on March 19 indicated an average fish length of 215 mm and roe yield of 0.5% and another test in the same location on March 23 yielded 9% roe maturity and 215 mm average fish length. Although there were no sounding estimates made in Area 6 after March 28, one further test set was made in Kitasu Bay on March 29 the day before the gillnet fishery. Roe maturities for this test was 10.7% and average fish length was 213 mm.

Stock assessment began on March 2 in Area 7 and total estimate for the area was 2,800 tons. Most of these fish were located in Dundivan Inlet where 2,500 tons were sounded. The only other fish located at this time was 200 tons in Berry Inlet and 100 tons in Seaforth Channel.

Stock estimates increased rapidly as more areas were sounded and by March 6 total estimate for the area was 8,900 tons. This included 5,200 tons in Waskesiu Pass, 1,400 tons in Dundivan Inlet and 1,000 tons in Kildidit Sound. Additional small tonnages were found scattered throughout the area.

On March 7, sounding increased to 12,000 tons as fish moved into Seaforth Channel and Dundivan Inlet.

Stocks in Seaforth Channel increased from 100 tons on March 6 to 1,200 tons on March 7 and in Dundivan Inlet from 1,400 tons to 3,000 tons during the same period. Roe testing throughout Area 7 up to this time indicated 0% roe maturities and an average fish length of 204-229 mm.

By March 11, stocks had increased to 16,500 tons and then to a peak estimate of 17,850 tons on March 14. By this time, fish were located in most of the major holding areas and included 2,500 tons in Lower Finlayson Channel, 1,500 tons in East Higgins Pass, 700 tons in Powell Anchorage, 1,000 tons in Berry Inlet, 4,200 tons in Seaforth Channel, 1,200 tons in Boddy Pass/Joassa Channel, 2,000 tons in Thompson Bay, 1,000 tons in Waskesiu Pass and 1,500 tons in Kildidit Sound.

The 3,000 tons that had been sounded in Dundivan Inlet previously could not be located at this time, but stock estimates in Seaforth Channel increased from 1,000 tons on March 11 to 4,200 tons on March 12 so it was assumed the fish moved out into the Seaforth area.

Roe tests throughout the area remained low with most locations testing at 0%. One test in Stryker Bay on March 13 indicated a roe maturity of 2.5% and average length of 222 mm. Fish size remained fairly consistent throughout the testing program ranging between 205-234 mm in length. One test in Klemtu Pass on March 10 and another one in the McNaughton Group on March 18 only averaged 195 mm but both test had quite a few juveniles mixed in.

Between March 15-20, stocks estimates declined slightly and ranged from 12-16,000 tons. Roe maturities finally began to increase with a roe test on March 16 in Powell Anchorage yielding 5% and another test in Cultus Sound on March 17 indicating 10%.

A further decline in stocks occurred on March 21 with estimates going from 13,000 tons on March 20 to 9,500 tons on March 21. Between March 21-28, stock estimates for Area 7 ranged from 6,500-9,500 tons. During this time, a roe test in Stryker Bay yielded 13.4% maturity and another one in Spiller Channel on March 23 yielded 14.1% maturity.

Although roe maturities were high, not enough fish could be located to warrant a fishery in either place since only 1,000 tons were sounded in Spiller Channel and 1,750 tons estimated in Stryker Bay. Two roe tests on March 24, one off Dennison Point in Seaforth Channel and the other in Dundivan

Inlet yielded 15.4% and 12.7% roe maturity respectively. At the time stock estimates for Seaforth/Dundivan totalled 3,000 tons and it was felt there were enough fish in the location to have a fishery. Preparations were made for a seine fishery on March 25.

The Sounding program effectively ended on March 28 since most assessment vessels concentrated on setting up the anticipated gillnet fishery.

A small spawning started in Stryker Bay on March 25 and by the next day spawnings began in Spiller Channel (Near Neekis), Idol Point and in Kildidt Sound.

Although some stock assessments did occur in Areas 8, 9 and 10, the only place any appreciable amount of herring was located was in Kwakshua Channel where 4,000 tons were Sounded on March 4. This was the maximum tonnage estimated for the area, and remained at this level until March 12 when only 700 tons could be located. Fish moved back into the area on March 13 and 3,250 tons were sounded.

Stocks declined to 2,500 tons on March 19-20, 1,000 tons March 23 -24 and then to 800 tons March 27-28 at which time the assessment program ended. Roe tests were made on March 4, 10, 19 and April 8 in Kwakshua with 0% roe maturity on all tests. The only other fish sounded in the area was 600 tons in Illahie/Kwakume, however there were no roe test made on these fish.

#### Area 6-7 Fishery

##### Gillnets

There were 104 gillnets licenced for this area, but only 100 could be accounted for during the fishery. The fishery opened on March 30 between 0900-1800 hrs in Sub-areas 6-18, 7-9, and 7-18 (Figures 7-9). Total length of the opening was 9 hours. Fishing was fairly consistent in Powell Anchorage and Stryker Bay, but was slower in Kitasu Bay.

In Kitasu Bay, 60 gillnets fished for a hailed catch of 373 tons, in Powell Anchorage 17 gillnets hailed a catch of 396 tons and in Stryker Bay, 17 gillnets hailed a catch of 218 tons. Roe yields ranged between 12-17% and the total catch was 979 tons.

##### Seine

The seine fishery took place on March 25 between 1216-1740 hrs in Sub-area 7-12 and 7-13 (Figure 10). The total length of opening was 5 hours 24 mins. There were 49 vessels licenced for this fishery and 38 boats hailed catches ranging from 3-200 tons. The fishery was very slow during most of the opening, however just before the closure 15 vessels made sets and there was concern that the quota may have been exceeded. As it turned out the final hailed catch was 2,673 tons just slightly below the 2,861 ton quota. Roe tests taken from the fishery were excellent ranging from 12-16.8% with an average of 14.1%.

## **Strait of Georgia (Area 13 - 20)**

### Area 13 Assessment

The first assessment in this area was on February 26 when 400 tons were sounded in Hoskins Channel and 500 tons were found off Francisco Point. There was no major build up of stocks in this area until March 10 when 4,100 tons were sounded. Of this total, 2,500 tons were in Hoskins Channel, 1,200 tons off Francisco Point and 400 tons off Cortes Island.

A test set on March 10 at off Heriot Island indicated a roe maturity of 3.6% and average fish length of 195 mm.

On March 11, stock estimates for Area 13 increased to 7,000 tons, and was the maximum amount sounded in this area. At this time, there were 3,500 tons in Hoskins Channel and 3,500 tons off Francisco Point. Two roe tests, one off Rebecca Spit and the other off Breton Island had roe maturities of 4.3 and 6.1% respectively. Another roe test on March 12 taken off Heriot Island had a roe yield of 6.9% and was the highest roe percentage tested in this area. By March 16, stocks had moved out of the area and only 800- 1000 tons could be located. There was a spawning that started on this morning between Rebecca Spit and Francisco Point.

### Area 14 Assessment

Stock assessment in this area began on February 23 when 2,500 tons were sounded in Lower Baynes Sound. Stock estimates increased to 6,400 tons the next day as a more complete sounding survey was carried out. At this time, there were 6,000 tons in Lower Baynes Sound and 400 tons in Lambert Channel off Chrome Island. Over the next few days, sounding estimates remained similar with most of the fish holding in the deep hole in Lower Baynes Sound. Daily roe testing showed no increase in roe maturity and all tests were 0%.

By March 3, fish began moving out of Lower Baynes Sound and into Lambert Channel. Stock estimates on this day showed 3,500 tons in Baynes Sound and 4,000 tons off Chrome Island. A roe test off Shingle Spit indicated a maturity of 5.3% and average length of 210 mm. This was the highest roe test so far in this area. South East gales hampered assessment over the next few days but by March 7 the winds had died down and at this time 8,100 tons were estimated for the area. Of this total, 7,100 tons were situated in Lambert channel and 1,000 tons were between French Creek and Northwest Bay. This was the maximum tonnage sounded in Area 14 this year.

On March 5, spawning had begun on the top end of Hornby Island at Shields Point and Manning Point. At this time, it was felt that although this was not a major spawn, it was something more than "spot" spawnings. Spawnings continued and on March 6 started up just south of Phipps Point and on both sides of Collishaw Bluffs. As a result of the mixing of spawned out fish and mature pre-spawning fish, roe tests decreased substantially. A roe test on March 7 off Shingle Spit only had a maturity of 2.8%, but contained 21 spawned out fish in the sample. Another test taken off Phipps point had a roe maturity of 8.8% and was the highest for any test taken in this area.

At this time, it was felt that a seine fishery would be very unlikely in Area 14 because of this mixing of fish.

Gillnet tests taken on March 9 along the east coast of Denman island ranged between 10.8-13.3% while spawning continued at Shields Bay, Whaling Station Bay, Downs Point and Collishaw Bluffs.

From March 11-16, sounding estimates ranged between 3-4,000 tons. There was no assessment carried out after March 16.

#### Area 14 Fishery

##### Gillnet

There were three separate openings for the 507 licenced gillnets in Area 14.

The first opening took place on March 9 between 1030-1800 hrs in sub-areas 14-7, 14-9, 14-10, 14-11 (Figure 11). Total length of opening was 7 hours, 30 mm and 507 gillnets hauled a catch of 1,625 tons.

Just prior to this fishery three gillnet tests were taken along the east coast of Denman Island and had roe maturities of 11.8, 13.8 and 10.8%.

At the opening most of the fleet was situated between Shields Point and Tralee Point with lesser concentrations near Collishaw and Shingle Spit. Fishing was very slow throughout the day and this was mainly due to the high winds making it difficult to set and retrieve nets. Several punts were swamped during the fishery which closed on schedule at 1800 hrs with an announcement of a possible fishery the next morning.

The next morning the winds were still blowing strong South-East and the opening was cancelled. At this time there was also some concern expressed by company representatives that the roe was not yet fully mature.

The next fishery did not take place until March 17 and was scheduled to open simultaneously with a fishery in Area 17.

On March 17, between 0800-1700 hrs, sub-area 14-7, 14-9, 14-10 and 14-11 opened (Figure 12). The total length of opening was 9 hrs. and 130 gillnets hauled a catch of 300 tons.

The third opening took place on March 18 between 0800-2000 hrs in sub-areas 14-1, 14-4, 14-5, 14-7, 14-9, 14-10 and 14-11 (Figure 12). Total length of opening was 12 hrs. and 71 gillnets hauled a catch of 492.

The total catch for the three openings in Area 14 was 2,417 tons. Roe maturities for the fisheries were generally very good ranging from a low of 10% to a high of 14.5%.

#### Area 15 Assessment

The assessment program began on February 24. There was a limited amount of sounding the first day and only 1,400 tons were located. This estimate was increased to 4,000 tons by the next day as more areas were

sounded. Roe test on February 24 near the Westview Docks had a maturity of 0% and average fish length of 207 mm.

On February 28, the fish disappeared and only 275 tons were found. This was not a unusual situation for this area. The next day the fish were back and 3,650 tons were sounded. The maximum tonnage estimated for this area was 7,700 tons on March 4. At this time there were 5,500 tons between Black Point and Scotch Fir Point, 1,500 tons between Myrtle Rock and Black Point and 700 tons between Westview Dock and Myrtle Rocks. Roe tests throughout the area had shown no increase in roe maturity and all tests were at 0%. Average fish length ranged between 201-212 mm. By March 6, roe maturities began increasing and one test off Black Point was 3.2% and another one of the "Hulks" at Powell River Mill was at 2.4%

On March 8, stock estimates were at 5,500 tons and all the fish were located between Sliammon and Myrtle Rocks. Roe tests taken off Grief Point and Myrtle Rocks were very low, averaging 0.5-1.1% and each test had 5-6 spawned out fish in it. In addition to the low percentage and incidence of spawned out fish, the average fish size decreased to 198 mm and caused concern about the potential for a seine fishery in this area. It was thought that the spawned out fish could have been coming from a small spawning that had begun in Scuttle Bay on March, 8.

Over the next few days sounding estimates ranged from a low of 400 tons on March 10 to a high of 1,100 on March 13. Two test sets on March 13, one near Powell River Mill and the other at Scuttle Bay, had roe maturities of 9.3% and 11.0% respectively. Most of the fish at this time were located in shallow water near Scuttle Bay. Because of these relatively high maturities the seine fleet was alerted of a possible short notice fishery the next morning.

On March 14, three test sets were made on, off Sliammon had a roe test of 1.21% with 67 spawned out fish, another off Atrevida Reef had a maturity of 8.6%, 6 spawned out fish and a third test off Mystery Reef had a maturity of 10.9% and no spawned out fish. Another test set in the morning of March 15 had a maturity of 11.08% and included 7 spawned out fish.

There was very little assessment carried out in this area after the last seine fishery as most vessels were concentrated in getting a gillnet fishery under way in areas 17 and 14.

### Area 15 Fishery

#### Seine

There were 33 seine vessels licenced for this area and all seiners participated in the two openings that took place.

The first fishery took place on March 14 between 1403-2000 hrs in sub-area 15-2 (Figure 13). The total length of opening was 5 hours & 57 mins. and the 33 licenced vessels hauled a catch of 2,282 tons. Individual catches ranged between 20-400 tons and there were seven vessels that did not catch any fish.

The second fishery took place on March 15 between 0802-1115 hrs, also in sub-area 15-2 (Figure 13). Total length of this fishery was 3 hours & 13 mins. and the hauled catch was 1,150 tons. Individual catches ranged between 10-200 tons with 15 vessels not catching any fish.

The total hauled catch from both fisheries was 3,432 tons which was 504 tons over the 2,928 ton quota. Roe yields ranged from less than 9% to 12%.

#### Area 17 Assessment

In area 17 the main concentration of fish throughout the assessment period was in Northumberland Channel and was generally in one large school situated between the Rock Bluffs on Gabriola Island and Harmac Mill. This was unusual in that traditionally the fish in this area hold in Stuart Channel, Trincomali Channel or Plumper Sound.

On January 27, an assessment of the area by Department vessels estimated 15,000 tons in this location and when the sounding and sampling program got under way on February 23 the estimates were still the same. Test sets on these fish indicated a roe maturity of 0% and average fish size ranging from 183-209 mm. Between February 26 - March 2, stock estimates for this area increased to 20,000 tons and up to a maximum of 25,000-30,000 tons on March 3. Roe maturity was still below 1% during this time.

From March 4- 15, stocks ranged from 10,000-15,000 tons, with most daily estimates between 10,000-15,000 tons. A roe test on March 5 had a maturity of 5.4% and was the highest roe yield tested from fish in this location. Prior to March 10 the low roe yields were a result of immature roe in the tests but after March 10 a high incidence of spawned out fish in the tests, most likely from spawnings around Hornby Island, kept the roe maturity tests low. One test on March 10 contained 13 mature roes, 9 immature and 53 spawned out fish. The average size of fish in this area varied considerably and ranged from 187-213 mm.

In other locations 1,000 ton was sounded between Dorcas Point and Schooner Point on February 24. These fish moved around to outer Nanoose on February 25 then disappeared. Between February 26 - March 13 only scattered schools totalling 100-400 tons were seen anywhere between Blunden Point and Dorcas Point. Roe tests were low, ranging from 0-5.8%. On March 14, 700 tons were sounded in outer Nanoose and a roe test indicated 11.1% maturity. These fish were gone by the next morning.

In the southern portion of area 17, which runs from Dodds Narrows to lower Trincomali Channel, very few fish were found throughout the assessment period.

On March 2-3, there were 1,200 tons located in lower Tincomali Channel and 500 tons in upper Stuart Channel.

Between March 4-14 very few fish were sounded and stock estimates ranged from 0-500 tons.

On March 14, 2,500 tons were sounded in Tricomali and a further 2,000 tons were sounded in upper Stuart Channel. The estimate for upper Stuart Channel was increased to 3,500-4,000 tons on March 16 the day before the

gillnet fishery. Roe maturities throughout the lower portion of Area 17 were very low and never reach more than 6.5%. Fish size was generally small and ranged between 183-210 mm.

In Area 18 there were 1,000-1,700 tons located in Plumper Sound between February 26 - March 1, but by March 2, the fish moved out and only a few schools totalling 100-300 tons were seen over the next few days. There were no fish located in the area after March 7.

### Area 17 Fishery

#### Gillnet

There were two separate openings in Area 17. The first one took place on March 17 between 0800-1700 hrs, in sub-areas 17-4, 17-5 and a portion of 17-16 (Figure 14). Total length of this opening was 9 hrs and 371 gillnets hauled a catch of 1,644 tons.

Fishing was generally very slow and spotty and the fleet was spread out from Round Island to Sharpe Point. By 1300 hrs the average catch per net was 3.1 tons for a total estimated catch of 1,150 tons. Fishing continued to be slow in the afternoon and at 1400 hrs a 1 hour extension to the original 1600 hrs closure time was announced. At the 1700 hrs closure there was still 2,400 tons remaining on the Strait of Georgia quota.

The second opening took place on March 18, between 1800-2000 hrs in sub-areas 17-4, 17-5, 17-16 (Figure 14). Total length of opening was 12 hrs. There were 430 gillnets at the opening and they hauled a catch of 2,579 tons. Fishing was once again very slow throughout the day and the fleet was spread out along the Vancouver Island shoreline from Dodds Narrows to Sharpe Point. By 1000 hrs the average catch per net was only 1 ton for a total estimated catch of 430 tons.

Because of the slow fishing, the original closure time of 1300 hrs was extended to 1600 hrs and at 1430 hrs another announcement was made extending the fishery to 1830 hrs. At this time the average catch per net was 2.7 tons bringing the total catch to 1,200 tons. By 1600 hrs fishing had dropped off considerably so at 1700 hrs a final extension to 2000 hrs was announced. Fishing picked up during the last hour just at dark and the hauls at the closure showed an average catch per net of 5.2 tons for a total catch of 2,579 ton.

### **West Coast Vancouver Island (Areas 23-27)**

#### Area 23 Assessment

The assessment program commenced on February 23 with some limited sounding in Newcombe Channel and Macoah Pass. Several small schools were found scattered throughout the area.

By February 24, stock estimates had increased to 5-6,000 tons for the Barkley Sound area. At this time there were 3-4,000 tons located in Sechart Channel, 500 tons in Peacock Channel and 1,000 tons in around Chrow Island. A test set in Peacock on February 24 and another one on February 25 in Sechart

Channel indicated 0% roe maturity. Average size of fish for these tests were 216 mm in Peacock Channel and 206 mm in Sechart.

Stocks in the Chow Island/Forbes Island area increased over the next few days and by February 26 were estimated to be at 4,500 tons. A roe test off Chow Island yielded 0% maturity and average length of 223 mm.

At this same time, soundings in Sechart Channel and Peacock Channel indicated a build up of stocks and estimates were increased to 6,000 tons. This brought the total stock estimated for Barkley to 10-11,000 tons.

By February 28 the stocks in Chow Island had increased to 6,000 tons with an additional 1,500 tons off Forbes Island and 500 tons in Mayne Bay. The fish in Sechart Channel had decreased to 2,500 and there were no fish found in Peacock Channel at this time.

On March 1, a roe test on the Chow Island fish averaged 2.5% and an average size of 220 mm. Sounding on this day in Imperial Eagle Channel located 6-8,000 tons between Swale Rock and Effingham Island. These fish were mainly concentrated off the Gibraltar Island shore in large dense schools. This brought the total stock estimate for Barkley Sound to 15,000 tons and was the maximum estimated for this area.

On March 3, strong south east gales began blowing making sounding in both the Imperial Eagle Channel and Chow Islands area very difficult. The fish were in scattered deep fast moving schools. These winds continued over the next few days and hampered sounding throughout the area.

On March 5, a roe test off Beg Island averaged 7% roe maturity. There was 2,000 tons estimated between Chow Island and Beg Island at this time but this was felt to be conservative because of the difficulty of sounding in the poor sea conditions caused by high winds.

On March 6, two roe tests in Imperial Eagle Channel, one off Folger Island and the other off Sanford Island yielded 8.1% and 12.6% roe maturity respectively. Another roe test off Gibraltar Island the next day average 12% maturity.

At a fishermen advisors meeting on March 7, it was recommended that no fishing take place in the open waters of Imperial Eagle Channel or between Chow Island and Forbes Island. It was felt that the large waves caused by the high winds would make it too dangerous.

On March 10, soundings throughout Sechart Channel and down Imperial Eagle Channel to Folger island located very few fish. The wind was still blowing strong South East and this hampered assessment. During the evening fish began to show along the shore between Chow Island and Forbes Island and were estimated to be around 3-4,000 tons. Roe tests indicated a maturity of 10-11.3%.

On the morning of March 11 around 1000 hrs, several schools began showing up between David Island and St. Ines Island and by early afternoon there were numerous schools throughout the Macoah Passage - Stopper Island area. A roe

test taken off Cabbage Rocks indicated a maturity of 13.3% and another test off Brabant Islands in Peacock Channel had a roe maturity of 13.8%. Fish size ranged between 208 mm and 218 mm.

At this time, it was felt that there was a minimum of 3-5,000 tons in this area and that there was a good potential for a fishery. The movement of fish into the Macoah Passage/Stopper Island area was a normal pattern just prior to spawning.

At 2000 hrs, a fishermen advisory meeting was held at the request of the advisors. There was concern voiced that there was not enough stocks in the area to realize the 7,700 ton quota and that a fishery should not be rushed. It was agreed that at least 5,000 tons had to be sounded in the fishing area before a fishery would take place. Several fishermen agreed to assist in sounding the next morning.

On March 12, sounding began at 0400 hrs. Fish began showing up by 0920 hours and at this time, 3,000 tons were located between Chow Island and Toquart Bay. Stock estimates increased rapidly as large schools began showing in Macoah Passage and in Mayne Bay and by 1000 hours estimates had increased to 7,000 tons. At this time, the fleet was notified that a fishery would be taking place this day.

#### Area 23 Fishery

##### Seine

There were 96 seine vessels licenced for this area, and on March 12, between 1201-1456 hrs sub-areas 23-9 and 23-10 were opened (Figure 15). The total length of opening was 2 hrs 55 min. The final hailed catch of 15,143 tons was over double the 7,703 ton quota, and was a direct result of under estimating the tonnage of fish in the area before the fishery and underhailing of large catches by fishermen. The fish were very heavy in the seines and fishermen were unable to accurately assess their catches. In numerous instances initial hails of 50-100 tons turned out to be a final hail of 300-500 tons. One vessel had a final hailed catch of over 1000 tons and was the largest single set made in the history of the roe herring fishery.

Another factor that led to the large catch was that the fish were concentrated in the shallow water of Toquart and Mayne Bay. This meant that the nets were sitting on the bottom and the fish could not escape. If these large catches had taken place in deeper water the fish would have sounded and split the nets and the catch would have been considerably lower.

The roe yields were very good ranging from 12-14%.

#### Area 24 Assessment

Stock assessment in this area was minimal due to a lack of assessment vessels. The charter seine boat began on February 23, but was required to move to Area 23 on March 4 to assist in the assessment and seine fishery. This meant only one vessel was left in the area, a Departmental vessel which had limited sounding capabilities.

On February 27, one of the commercial fishing companies aircraft reported a major spawning in Hesquiat Harbour. Tonnage estimates given through this observation was 2000 tons. In addition to this estimate, the charter test vessel located a further 500-700 tons in Miller Channel and 800-1000 tons in Sydney Inlet. A test set in Miller Channel on February 28 had a roe maturity of 0% and average fish size of 227 mm and another test made in Sydney also had 0% maturity with an average fish length of 220 mm.

On March 2, 1,000 tons were located in Miller Channel and a test indicated a roe yield of 3% and average fish size of 231 mm. No further testing was done in Area 24.

Throughout the sounding program fish were found in small scattered schools and no major body of fish was seen in the entire area.

Total stock estimate on March 8 was 1,000 tons, but this did not include the 2000 tons that was estimated by the aircraft. No further sounding was done in the area after March 12.

#### Area 25 Assessment

The assessment program began on February 21 and was mainly concentrated in the Esperanza/Nuchatlitz areas.

On February 22 2,000-2,500 tons were located in Port Langford. These fish were tested on February 24 and had a roe maturity of 9.0% and average length of 216 mm. By February 27, stock estimates had increased to 2,500-3,200 tons and most of these fish were located off Nuchatlitz Reef. A roe test on the 2-3,000 tons in this location indicated a maturity of 11.5% and average length of 224 mm.

Stock levels remained the same over the next few days. On February 28, a roe test taken off Flower Island in Esperanza Inlet averaged 14.1% however, there were only 3-400 tons in the Inlet at this time. Through discussion with Industry and Fisheries Staff it was felt that although the roe yields were abnormally high for this time of the year, neither the males or females appeared ready for spawning.

Another gillnet test in Port Langford on March 2 averaged 13.2% maturity. Fish at this time were spreading out along the western shore tight to the beach.

By March 3, stock estimates had increased to 2,900-3,800 tons and fish were moving in and out of Port Langford on the tide.

Over the next few days, storm force winds were blowing and assessment was limited to the protected inside waters. On March 8, there was a major movement of fish into Inner Nuchatlitz and Rosa Harbour, and a light spawning commenced along the western shore of Port Langford. Two gillnet tests made in Inner Nuchatlitz averaged 7.5 and 9.5% but both tests were high on males.

By March 9, total stock estimates reached a peak of 4,500-5,300 tons and of this 1,500-2,000 tons were in Inner Nuchatlitz, 500- 800 tons in Louie Bay (Estimated by aircraft) and 2,500 tons were in Port Langford.

Gillnet tests in Port Langford ranged between 10-13% with some spawned out fish in the test. One gillnet test set conduct in Inner Nuchatlitz had a roe maturity of 12-13%.

By March 10, the spawn had extended to the top end and along the east side of Port Langford. Eight gillnet test sets made throughout the day in Port Langford ranged from 8-16%.

A fishery was announced for March 11, but had to be delayed due to storm warnings. In the early morning of March 12, gale warnings continued with winds South East 20-25 mph.

Soundings in Port Langford indicated the fish had dispersed and a report from one of the fishermen advisors indicated large bodies of fish moving around to Outer Nuchatlitz.

After the fishery on March 12, very little stock assessment was carried out since the test vessel was required to assess Klaskish Inlet/Winter Harbour and the patrol vessels were involved in spawn assessment.

In Nootka Sound, the assessment program was very sporadic because the limited number of sounding vessels available were required for the Esperanza gillnet fishery.

On February 22, 500 tons were observed between Nootka Light and Marvinas Bay. The next assessment in Nootka Sound was on March 1. Very few fish were observed in the area. There was one school of 100 tons off Saavadra Island and another 100 ton school off Nootka Light. A test set off the Light had a roe maturity of less than 1% and average size of 206 mm. There were also a few small schools in Zuciarte Channel totalling 50 tons. There was no further assessment in this area.

### Area 25 Fishery

#### Gillnet

By March 10, spawning had spread to the top end and east side of Port Langford. At this time the majority of fish were located in Port Langford and around Ensanada Island and roe tests throughout Port Langford averaged 12.4%. In addition gillnet testing in Inner Nuchatlitz averaged 12.3% so a fishery was announced for the morning of March 11. The next morning, however, the weather service issued a storm warning so an announcement was made delaying the fishery until March 12 pending weather. At 0445 hrs on the morning of March 12, the storm warning had been reduced to gale warnings and the winds were calm with moderate seas.

The fishery opened for the 212 licenced gillnetters at 0800 hrs on March 12 in Sub-area 25-13 (Figure 16). There were 182 gillnet punts counted at the opening, and the major fishing locations were Port Langford, Outer Nuchatlitz and Inner Nuchatlitz. There was heavy fishing throughout the area for the first 2-3 hours and by 1030 hrs the punt average was 3.17 tons for a hailed

catch of 578 tons. Roe tests in Outer Nuchatlitz and Inner Nuchatlitz averaged 14.5%, and a test off Colwood Rocks averaged 16%. Fishing in Port Langford dropped off after 1030 hours and the gear began moving to Outer Nuchatlitz where catches remained high. The sea conditions in Outer Nuchatlitz were very rough and several loaded skiffs were sunk.

By 1630 hrs, punt averages were at 8.48 tons and the hailed catch was 1,544 tons. At this time, the projected catch for a 1800 hr closure was 1,600-1,700 tons leaving 960 tons of the quota left to catch.

The fishery closed at 1815 hrs with an announcement that another opening would take place on March 13 in order to take what was left of the quota.

Early next morning after all the packer hauls had been collected, it was realized that the catch was 2,810 tons, slightly over the quota and so an announcement was made closing the area for the balance of the season. Total length of opening was 10 hours and 19 mins.

#### Area 27 Assessment

There was no stock assessment carried out in this area until March 14 when the charter test vessel arrived from Area 25. At this time, a major spawn was in progress along the southern shore of Klaskish Inlet. Spawn on kelp operators working in the area estimated that 1,000-2,000 tons had been in this location prior to spawning. A roe test taken from inside McDougal Island had a maturity of 16.1% and average fish length of 229 mm. The test boat sounded Klaskish Inlet, but could find no fish.

On March 17, 1,000 tons were located in Winter Harbour and a test set indicated a roe maturity of 12.4% and average length of 219 mm. The assessment program ended on March 18.

#### **SPAWN-ON-KELP**

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 16,000 lbs. of processed product.

Guidelines for the spawn-on-kelp fishery were issued to industry in February 1987, (Appendix 4). These guidelines detail the licencing requirements and inspection guidelines for the 1987 fishery.

Preliminary production figures for 1987 indicate that a total of 438,623 lbs. of product were harvested coastwide. This represents an average production of 15,665 lbs. per licence. The 1987 total compares with 330,407 lbs. in 1986, 358,868 lbs. in 1985 and 375,692 lbs. in 1984. The distribution of licences and amount of production by area in 1987 was as follows:

1. Queen Charlotte Islands	11 licences	191,515
2. North Coast	8 licences	116,198
3. Central Coast	5 licences	78,183
4. West Coast Vancouver Is.	4 licences	52,727

### 1987 HERRING SPAWN SUMMARY

In 1987 the coast wide spawn index was 30,785 SAI. (Spawn Area Index). This was up slightly from both the 1986 level of 30,619 SAI., and the 1983-1987 average of 30,467 SAI.

The 15,056 SAI. recorded North of Cape Caution was a 23% improvement from the 12,232 SAI. recorded in 1986. The largest increases in the SAI. were from the east coast of the Queen Charlotte Islands and the Prince Rupert district.

In the South Coast, a total of 15,729 SAI. was recorded and represented a 14% decrease from the 1986 level of 18,386 SAI. The areas in which the greatest decreases occurred were, Areas 14-15 in the Strait of Georgia and Area 23 in the West Coast of Vancouver Island. Individual spawnings are detailed in Table 13. The following is a summary of spawnings by district.

#### Queen Charlotte Islands (Areas 2E,2W)

On the Queen Charlotte Islands the 1,622 SAI. recorded in 1987 was a 47% improvement from 1986 when 1,104 SAI. was recorded. It is felt however that this increase may be artificial and more a result of having dual diver and surface surveys carried out in the East Coast this year than an actual increase in spawn. Diving surveys increase the awareness of deeper spawnings that may normally be missed in years when only surface surveys are conducted.

There was a total of 166.2 SAI. recorded on the west coast of the Queen Charlottes and of this 134.6 SAI. was recorded in Port Louis; 17.0 SAI. recorded in Louscoose Inlet and 14.9 SAI. recorded in Inskip Channel.

On the east coast of Queen Charlotte Islands, the spawn index increased from 945.6 SAI. in 1986 to 1,455.6 SAI. in 1987. However as mentioned earlier this increase is probably due to an increased awareness of deeper spawning because of the diver surveys than an actual increase in spawn deposition. The 1987 level is still considerably lower than the 1983- 1987 average of 2,268 SAI.

In Area 2E major spawnings took place in Huxley Island - 405.9 SAI, Huston Inlet - 343.9 SAI, Poole Inlet - 160.3 SAI, Section Cove - 158.0 SAI, and on the north portion of Burnaby Island - 116.0 SAI.

Minor spawnings occurred in both Cumshewa Inlet and Skidegate Inlet.

#### Prince Rupert (Areas 3-5)

The 1987 spawn area index for the Prince Rupert area was 9,709.7 SAI. and represents a 29% increase over the 7,516.9 SAI. recorded in 1986. The 1987 SAI. was almost up to the record level of 9,891.5 SAI. recorded in 1985. Spawning in all these areas showed considerable increases over last year.

In Area 3 the index was 554.1 SAI. and of this 334.3 SAI. was recorded in Stuman Bay, 109.2 SAI. in Cunningham Pass and 110.5 SAI. between Flewin Point and Grassy Point.

Spawnings in Area 4 remain at record levels with a total of 7,140.1 SAI. recorded in 1987. The 1983-1987 average for this area is 5,986.9 SAI. In the upper portion of Area 4 the major spawning locations were in and around Big Bay -1180.6 SAI. around Burnt Cliff Island -892.8 SAI. between Tree Bluff and Simpson Point - 821.3 SAI. and Pearl Harbour - 654.2 SAI.

In the southern portion of Area 4 there was a total of 2,881.0 SAI. recorded along the North Porcher Island shoreline.

In Area 5 the 2,015.5 SAI. recorded in 1987 was up considerably from the 1986 level of 1,252.8 SAI. and was almost at the record 1985 level of 2,161.5 SAI. The major spawning locations were around Snass Point - 722.2 SAI. and along the North Shore of Kitkatla Inlet just east of Kitkatla Creek -673.2 SAI.

Other significant spawnings occurred around Ness Islands -311.4 SAI., along Porcher Peninsula -174.4 SAI. and around Tangent Island -101.8 SAI.

#### **Central Coast (Areas 6-10)**

The spawn area index for the Central Coast was 3,724.1 SAI. and was above both the 1986 level of 3,611.7 SAI. and the 1983-1987 average of 3,462.0 SAI.

In the Upper Central Region (Area 6) the index was 1,599.8 SAI. and although down slightly from the 1986 level of 1,604.7 SAI. it was still well above the 1983-1987 average of 1,354.0 SAI. The major spawnings in Area 6 took place in Kitasu Bay/Parsons Anchorage -882.0 SAI. and Weeteam Bay -622.3 SAI.

There were also smaller spawnings in Bishop Bay - 62.7 SAI., Thistle Pass -14.6 SAI. Surf Inlet - 11.71 SAI. and Douglas Channel /Gil Island 6.4 SAI.

In the Lower Central Areas (Areas 7-10) a total of 2,124.3 SAI. was recorded in 1987. This compares with 1986 when 2,007.0 SAI. was recorded and the 1983-1987 average of 2,108.0 SAI. Most of the spawning took place in Area 7 where 1,431.6 SAI. was recorded. This represents 38% of the total spawn index for the Central Coast Areas.

The largest spawning in Area 7 occurred in Spiller Channel/Don Lagoon - 655.0 SAI., Stryker Bay/Thompson Bay - 320.0 SAI. Norman Morrison Bay/Kynumpt Harbour - 209.2 SAI. and Powell Anchorage Cecilia Island/Berry Inlet - 163.49 SAI. Smaller spawnings took place in Dundivan Inlet (Lockhart Bay) - 44.66 SAI. and East Higgins Pass - 38.5 SAI.

In Area 8 there was a total of 442.3 SAI. recorded. This was well above last year when only 196.4 SAI. was recorded and the 1983 -1987 average of 366.5 SAI. The largest spawning in this area was in Warrior Cove in Fitzhugh Sound where 154.9 SAI. was recorded. Other spawning took place in Kwakume Inlet -88.05 SAI., North Bentick Arm -58.74 SAI., and Pruth Bay in Kwakshua Channel -8.97 SAI.

In Areas 9-10 a total of 250.4 SAI. was recorded. In Area 9 spawning increased from 87.2 SAI. in 1986 to 209.0 SAI. in 1987, Area 10 spawn dropped dramatically from 350.7 SAI. in 1986, to only 41.4 SAI. in 1987. Most of the spawning took place near the head of Rivers Inlet where 206.8 SAI. was recorded.

### **Georgia Strait/Johnstone Strait (Areas 11-20)**

#### Upper East Coast (Areas 11-12)

The 267.4 SAI. recorded in Areas 11-12 this year was down from the 280.5 SAI. recorded in 1986. In Area 11 spawning was confirmed to two locations near the head of Nugent Sound.

In Area 12 the largest spawning took place in Beaver Harbour where 146.0 SAI. was recorded. In addition there was 65.4 SAI. recorded in Knight Inlet, 47.1 SAI. recorded in Wakeman Sound and 4.0 SAI. recorded in Kingcome Inlet.

#### Middle East Coast (Areas 13-16)

There was a total of 6,136.9 SAI. recorded in the Middle East Coast areas in 1987 and is a 38% reduction from the 9,903.0 SAI. recorded in 1986.

In Area 13 there was an increase in spawn with 61.1 SAI. being recorded. This compares with the 7.7 SAI. recorded in 1986. However spawning is still well below the 1983-1987 average of 329.3 SAI. Most of this spawn was deposited along the eastern shoreline of Quadra Island south of Drew Harbour -40.3 SAI. There was also 17.5 SAI. recorded in Waddington Harbour and 3.1 SAI. recorded in Deepwater Bay.

In Area 14 spawn was down this year with only 5861.1 SAI. recorded. This compares with the 3,090.8 SAI. and 8,977.7 SAI. recorded in 1985 and 1986 respectively. It should be noted that diving surveys were conducted in Area 14 during the years 1985 - 1987. This means that direct comparisons of the spawn index between these years can be made. Prior to 1985 the spawnings were surveyed using the surface methods so that comparisons between spawnings in 1985-1987 and the years prior are not valid. This will be true for all areas asterisked in Table 12.

Most of the spawning in Area 14 this year occurred around Hornby Island. There was a total of 4,912.6 SAI. recorded between Collishaw Point on the north end and around the eastern shore to Norman Point on the south end of the island. There was only 215.13 SAI. recorded on Denman Island, and a total of 726.6 SAI. recorded between Little Qualicum River and Englishman River.

In Area 15 only 212.8 SAI. was recorded and of this 190.1 SAI. was on Savary Island. The only other spawnings in this area were in Scuttle Bay 13.7 SAI. and Albion Point 9.0 SAI. This year spawn was one of the lowest on

record and compares with the 1986 spawn of 917.6 SAI. and the 1983-87 average of 1,081.7 SAI.

In Area 16 there was only 1.9 SAI. recorded, however this is the first spawning in the area since 1982 when 27.0 SAI. was recorded. Spawning took place in Bargain Bay, Porpoise Bay and Irvines Landing.

#### Lower East Coast (Areas 17-20)

Total spawning in the lower east coast was 1,836.3 SAI. and all spawning took place in Area 17. The majority of spawn occurred between Boat Harbour and Kulleet Bay in Stuart Channel. There was a small spawn of 32.37 SAI. recorded on Blunden Point but there was no spawning observed in Nanoose Bay which in past years has been a major spawn location.

#### West Coast Vancouver Island (Area 23-27)

##### Lower West Coast (Area 23-24)

Spawnings in the Lower West Coast were down slightly from 1986 with 5,048.9 SAI. being recorded. In Area 23 spawn was down over the previous year by 47% with only 2,487.7 SAI. recorded compared to the 4,710.1 SAI. recorded in 1986. The major spawnings in Area 23 occurred between Two Rivers and the Stopper Islands. This area has traditionally been the prime spawning location in Barkley Sound. There was a considerable amount of deep spawning down to 60 feet especially off Two Rivers in Newcome Channel. At this depth the spawn was deposited mostly on the rock.

There was also a fairly good spawn in Ucluelet Harbour between Spring Cove and Francis Island.

It should be noted that similar to Area 14 in the Strait of Georgia, spawning in Barkley Sound have been measured by divers since 1985 and therefore direct comparisons between the years 1985 -1987 and previous years should not be made.

While spawnings in Barkley Sound were down considerably this year, there was a dramatic increase in spawn in Area 24. The spawn index went from 567.0 SAI. in 1986 to 2,561.2 SAI. in 1987, an increase of almost 500%. This increase is tempered somewhat by the fact that in 1987 there was a dive survey conducted in Hesquiat Harbour where 813.9 SAI. was recorded, where as there has been no surveys in Hesquiat the past few years. However in the lower portion of Area 24, Clayoquot Sound surface surveys have been conducted in a very consistent manner over the past years and the surface survey index of 1,747.3 SAI. measured in lower Area 24 can be directly compared to the 1986 level of 567.0 SAI. The major spawnings took place on Yellow Bank - 538.9 SAI. Epper Pass - 363.0 SAI., McIntosh Bay - 213.7 SAI. and Whitesand Cove - 209.1 SAI. There was also a good spawning in Matilda Inlet where 838 SAI. was recorded.

Upper West Coast (Areas 25-27)

In Area 25 the 1,549.1 SAI. recorded this year was an improvement over the 1,210.8 SAI. recorded in 1986 and well above the 1983-1987 average of 974.8 SAI. Most of the spawning in this area occurred in Esperanza Inlet with 1,180.5 SAI. recorded. The major spawn locations were, Outer Nuchatlitz - 550.83 SAI., Inner Nuchatlitz - 424.2 SAI. and Port Langford - 149.9.SAI.

In Nootka Sound there was 368.6 SAI. of spawn recorded in McKay Passage and east of Gertrudis Cove. There was no spawning in Nootka Sound in 1986.

In Area 27 surface surveys were carried out in Winter Harbour and the spawn index was 321.4 SAI. This compares with the 293.5 SAI. recorded in 1986.

A dive survey was carried out in Klaskish Inlet this year and 569.4 SAI. was recorded. There have been no surveys in Klaskish Inlet over the past few years so there is nothing to relate this years spawn with.

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TABLE 1 - Distribution of Licenced Gear by Type and Roe Herring Area, 1987

Roe Herring Area	Seines	Gillnets
Area 1 - Queen Charlotte Islands	30	-
Area 2 - Prince Rupert	32	507
Area 3 - Central Coast	49	104
Area 4 - Strait of Georgia	33	504
Area 5 - West Coast Vancouver Is.	96	212
Total	240	1327

\* Seine total does not include 12 chartered seiners.

TABLE 2 - Roe Herring Quotas (Tons) by Roe Herring Area, 1987

Roe Herring Area	Seines	Gillnets	Total
Area 1 - Queen Charlotte Islands	1555	-	1555
Area 2 - Prince Rupert	1700	4300	6000
Area 3 - Central Coast	2861	800	3661
Area 4 - Strait of Georgia	2928	5942	8870
Area 5 - West Coast Vancouver Is.	7703	2660	10363
Total	16747	13702	30449
Target Catch Division	55%	45%	

TABLE 3 - Hailed Catches (Tons) by Gear and Roe Herring Area, 1987

Roe Herring Area	Seines	Gillnets	Total
Area 1 - Queen Charlotte Islands	2061	-	2061
Area 2 - Prince Rupert	2118	4469	6587
Area 3 - Central Coast	2673	979	3652
Area 4 - Strait of Georgia	3432	6640	10072
Area 5 - West Coast Vancouver Is.	15143	2810	17953
Total	25427	14898	40325
Achieved Catch Division	63%	37%	

TABLE 4 - Sales Slip Data (Tons) by Roe Herring Area, 1987 \* Preliminary Sales Slip Data

Roe Herring Area	Seines	Gillnets	Total
Area 1 - Queen Charlotte Islands	1896	-	1896
Area 2 - Prince Rupert	1665	4456	6121
Area 3 - Central Coast	2583	1018	3601
Area 4 - Strait of Georgia	3429	6598	10027
Area 5 - West Coast Vancouver Is.	14447	2698	17145
Total	24020	14770	38790 **

\*\* Note: Does Not Include 1549.7

Tons Caught By Roe Charter Vessels 62% 38%

Table 5 - Hailed Roe Herring Catch (Tons) Area 1 (Queen Charlotte Islands) by Statistical Area and Gear Type, 1983 - 1987

Hailed Catch (Tons) by Statistical Area					
Year	Gear	2E	2W	Total	TOTAL for year
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	
1986	SN	3143	-	3143	4067
	GN	924	-	924	
1987	SN	2061	-	2061	2061
	GN	-	-	-	

Table 6 - Hailed Roe Herring Catch (Tons) Area 2 (North Coast) by Statistical Area and Gear Type, 1983 - 1987

Hailed Catch (Tons) by Statistical Area						
Year	Gear	3	4	5	Total	TOTAL for year
1983	SN	-	-	-	-	-
	GN	-	-	-	-	-
1984	SN	-	-	1835	1835	4043
	GN	-	2208	-	2208	
1985	SN	-	-	3007	3007	
	GN	-	3813	-	3813	
1986	SN	-	-	3606	3606	8606
	GN	-	5000	-	5000	
1987	SN	-	-	2118	2118	2118
	GN	---- 4469 ----		-	0	

Table 7 - Hailed Roe Herring Catch (Tons) Area 3 (Central Coast) by Statistical Area and Gear Type, 1983 - 1987

Hailed Catch (Tons) by Statistical Area						
Year	Gear	6	7	8	Total	TOTAL for year
1983	SN	-	2200	-	2200	6200
	GN	2500	1500	-	4000	
1984	SN	3910	-	-	3910	7758
	GN	3848	-	-	3848	
1985	SN	-	3045	-	3045	5307
	GN	-	2262	-	2262	
1986	SN	2112	-	-	2112	3207
	GN	-----1095-----		-	1095	
1987	SN	-----2673-----		-	2673	3652
	GN	-----979-----		-	979	

Table 8 - Hailed Roe Herring Catch (Tons) Area 4 (Strait of Georgia) by Statistical Area and Gear Type, 1983 - 1987

Hailed Catch (Tons) by Statistical Area						
Year	Gear	14	15	17	Total	TOTAL for year
1983	SN	1600	3200	1800	4800	13633
	GN	8833	-	-	8833	
1984	SN	-	4438	-	4438	12763
	GN	8325	-	-	8325	
1985	SN	2879	-	-	2879	6565
	GN	3686	-	-	3686	
1986	SN	-	-	-	-	-
	GN	-	-	-	-	
1987	SN	-	3432	-	3432	10072
	GN	2417	-	4223	6640	

Table 9 - Hailed Roe Herring Catch (Tons) Area 5 (W.C.V.I) by Statistical Area and Gear Type, 1983 - 1987

Hailed Catch (Tons) by Statistical Area						
Year	Gear	23	25	27	Total	TOTAL for year
1983	SN	5100	-	-	5100	7740
	GN	-	2450	190	2640	
1984	SN	6000	-	-	6000	7226
	GN	-	1026	200	1226	
1985	SN	-	-	-	-	-
	GN	-	-	-	-	
1986	SN	-	-	-	-	-
	GN	-	-	-	-	
1987	SN	15143	-	-	15143	17953
	GN	-	2810	-	2810	

TABLE 10 - Landed Weight and value of British Columbia Roe Herring Catches 1980-1987 (Sales Slip Data - does not include Roe Herring charter payment or seized fish)

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	27.91
1983	39,058	48.91
1984	34,315	34.30
1985	25,691	35.49
1986	15,681	39.24
1987	38,790	91.33 **

\* - Estimated value based on average price paid for seine and gillnet fish.

\*\* - Preliminary estimate

TABLE 11 - Spawn area index (length \* width \* percent cover \* layers) for the Northern Coastal waters of British Columbia from 1981 to 1987 by herring Sub-district and Statistical Area.

AREA	SPAWNING YEARS							5 YR AVG.
	1981	1982	1983	1984	1985	1986	1987	
QUEEN CHARLOTTE ISLANDS								
1	111.6	245.2	4.2	0.0	674.1	0.0	0.0	135.7
2E	3487.2	2903.2	2420.6	3879.8	2639.1	945.6	1455.6	2268.1
2W	527.6	1402.5	1291.5	485.0	305.5	158.7	166.5	481.4
TOTAL	4126.4	4550.9	3716.3	4364.8	3618.7	1104.3	1622.1	2885.2
NORTHERN								
3	845.9	72.4	129.2	220.9	67.5	17.4	554.1	197.8
4	1390.3	2157.7	4596.0	4289.3	7662.5	6246.7	7140.1	5986.9
5	997.1	952.4	2497.0	1080.0	2161.5	1252.8	2015.5	1801.4
TOTAL	3233.3	3182.5	7222.2	5590.2	9891.5	7516.9	9709.7	7986.1
UPPER CENTRAL								
6	1208.4	1017.8	1522.2	988.9	1054.2	1604.7	1599.8	1354.0
TOTAL	1208.4	1017.8	1522.2	988.9	1054.2	1604.7	1599.8	1354.0
LOWER CENTRAL								
7	2307.8	3396.5	2724.1	1134.7	736.9	1372.7	1431.6	1480.0
8	447.2	497.7	434.3	452.1	307.5	196.4	442.3	366.5
9	10.2	124.1	28.3	8.4	24.8	87.2	209.0	71.5
10	40.3	431.9	118.3	342.6	97.2	350.7	41.4	190.0
TOTAL	2805.5	4450.2	3305.0	1937.8	1166.4	2007.0	2124.3	2108.1
TOTAL NORTH COAST								
	11373.6	13201.4	15765.7	12881.7	15730.8	12232.9	15055.9	14333.4

TABLE 12

Spawn area index (length \* width \* percent cover \* layers) for the Southern Coastal waters of British Columbia from 1981 to 1987 by herring Sub-district and Statistical Area.

AREA	SPAWNING YEARS						5 YR AVG.	
	1981	1982	1983	1984	1985	1986	1987	1983-87
UPPER EAST COAST								
11	2.2	0.0	6.2	1.6	0.0	16.3	4.9	5.8
12	552.4	319.9	153.0	507.2	251.2	264.2	262.5	287.6
TOTAL	554.6	319.9	159.2	508.8	251.2	280.5	267.4	293.4
MIDDLE EAST COAST								
13	650.6	1196.7	1560.5	17.2	0.1	7.7	61.1	329.3
14	5308.9	17219.9	7375.3	1941.6	3090.8 *	8977.7 *	5861.1 *	5449.3
15	2597.2	2843.1	1373.8	2353.5	551.0	917.6	212.8	1081.7
16	1.1	27.0	0.0	0.0	0.0	0.0	1.9	0.4
TOTAL	8557.8	21286.7	10309.6	4312.3	3641.9	9903.0	6136.9	6860.7
LOWER EAST COAST								
17	2856.9	5847.3	5012.2	2639.9	447.1	1373.9	1836.3 *	2261.9
18	319.4	82.3	15.0	0.0	0.0	47.6	0.0	12.5
TOTAL	3176.3	5929.6	5027.2	2639.9	447.1 *	1421.5 *	1836.3 *	2274.4
LOWER WEST COAST								
23	1126.5	789.7	2376.6	673.4	3066.4 *	4710.1 *	2487.7 *	2662.8
24	5074.8	497.4	535.9	3054.5	1746.2	567.0	2561.2 *	1693.0
TOTAL	6201.3	1287.1	2912.5	3727.9	4812.6	5277.1	5048.9	4355.8
UPPER WEST COAST								
25	1719.0	1813.0	1326.8	350.7	436.6	1210.8	1549.1	974.8
27	2789.3	2104.9	3888.3	747.1	1049.0	293.5	890.7 *	1373.7
TOTAL	4508.3	3917.9	5215.1	1097.8	1485.6	1504.3	2439.8	2348.5
SOUTHERN MAINLAND								
29	0.0	0.0	0.0	6.2	0.0	0.0	0.0	1.2
TOTAL	0.0	0.0	0.0	6.2	0.0	0.0	0.0	1.2
TOTAL SOUTH COAST								
	22998.3	32741.2	23623.6	12292.9	10638.4	18386.4	15729.3	16134.1
TOTAL COASTWIDE								
	34371.9	45942.6	39389.3	25174.6	26369.2 *	30619.3 *	30785.2 *	30467.5

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 2W, WEST COAST Q.C.I.							
SURFACE SPAWN SURVEY							
INSKIP CHANNEL	08/04	08/04	900	2.	0.50	70.	0.63
INSKIP CHANNEL	08/04	08/04	1250	7.	1.00	90.	7.88
INSKIP CHANNEL	08/04	08/04	450	6.	1.00	90.	2.43
INSKIP CHANNEL	08/04	08/04	1100	4.	1.00	90.	3.96
LOUSCOONE INLET	06/04	06/04	45	5.	0.50	60.	0.07
LOUSCOONE INLET	16/03	16/03	360	18.	1.00	50.	3.24
LOUSCOONE INLET	16/03	16/03	1500	15.	1.00	50.	11.25
LOUSCOONE INLET	16/03	16/03	700	14.	0.50	50.	2.45
PORT LOUIS	18/03	21/03	1400	15.	1.00	70.	14.70
PORT LOUIS	18/03	21/03	1400	6.	1.00	90.	7.56
PORT LOUIS	18/03	21/03	400	300.	0.50	40.	24.00
PORT LOUIS	18/03	21/03	3500	15.	2.00	80.	84.00
PORT LOUIS	18/03	21/03	400	6.	2.00	85.	4.08
PORT LOUIS	18/03	21/03	100	6.	0.50	90.	0.27
SURFACE SURVEY AREA TOTAL			13505				166.51

STATISTICAL AREA: 2E, EAST COAST Q.C.I.

SURFACE SPAWN SURVEY							
ALDER ISLAND	28/03	30/03	500	30.	0.50	40.	3.00
ALDER ISLAND	14/04	17/04	100	35.	2.70	90.	8.50
ALDER ISLAND	14/04	17/04	60	25.	1.90	80.	2.28
ALDER ISLAND	14/04	17/04	80	20.	2.80	80.	3.58
ALDER ISLAND	14/04	17/04	30	5.	2.00	20.	0.06
ALDER ISLAND	14/04	17/04	400	20.	1.00	50.	4.00
BEATTIE ANCHORAGE	16/04	18/04	550	12.	2.50	95.	15.68
BEATTIE ANCHORAGE	16/04	18/04	120	8.	2.45	95.	2.23
BEATTIE ANCHORAGE	16/04	18/04	500	6.	2.00	95.	5.70
BURNABY ISLAND NORTH	14/04	17/04	220	4.	3.35	90.	2.65
BURNABY ISLAND NORTH	14/04	17/04	200	25.	2.85	90.	12.83
BURNABY ISLAND NORTH	14/04	17/04	800	10.	3.25	100.	26.00
BURNABY ISLAND NORTH	14/04	17/04	400	10.	2.88	100.	11.50
BURNABY ISLAND NORTH	14/04	17/04	450	25.	4.40	90.	44.55
BURNABY ISLAND NORTH	14/04	17/04	250	10.	1.95	100.	4.88
BURNABY ISLAND NORTH	14/04	17/04	250	5.	2.00	100.	2.50
BURNABY ISLAND NORTH	14/04	17/04	550	25.	0.95	85.	11.10
CONGLOMERATE POINT	02/04	02/04	5000	12.	1.70	90.	91.80
HAIDA POINT	20/04	20/04	500	12.	1.45	60.	5.22

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 2E, EAST COAST Q.C.I. CONTINUED							
SURFACE SPAWN SURVEY							
Haida Point	20/04	20/04	200	12.	2.48	64.	3.80
HUSTON INLET	07/03	08/03	120	25.	1.11	65.	2.15
HUSTON INLET	08/03	10/03	2000	25.	2.88	80.	115.00
HUSTON INLET	07/03	08/03	350	15.	1.85	80.	7.77
HUSTON INLET	07/03	08/03	320	25.	2.00	65.	10.40
HUSTON INLET	07/03	08/03	200	20.	1.35	80.	4.32
HUSTON INLET	07/03	08/03	550	30.	2.00	70.	23.10
HUSTON INLET	07/03	08/03	140	15.	0.50	60.	0.63
HUSTON INLET	14/03	17/03	750	20.	0.79	90.	10.60
HUSTON INLET	07/03	08/03	100	15.	0.87	65.	0.84
HUSTON INLET	14/03	17/03	1500	20.	1.92	85.	48.96
HUSTON INLET	07/03	08/03	225	25.	2.45	55.	7.58
HUSTON INLET	07/03	08/03	350	25.	3.10	80.	21.70
HUSTON INLET	07/03	08/03	80	15.	1.60	80.	1.54
HUSTON INLET	07/03	08/03	320	25.	2.60	80.	16.64
HUSTON INLET	07/03	08/03	320	50.	1.77	70.	19.88
HUSTON INLET	13/03	15/03	1100	40.	1.71	70.	52.82
HUXLEY ISLAND	14/04	16/04	250	15.	3.75	95.	13.36
HUXLEY ISLAND	14/04	16/04	400	8.	3.55	70.	7.95
HUXLEY ISLAND	14/04	16/04	225	20.	3.95	85.	15.11
HUXLEY ISLAND	14/04	16/04	375	40.	7.60	25.	28.50
HUXLEY ISLAND	14/04	16/04	300	5.	2.65	80.	3.18
HUXLEY ISLAND	14/04	16/04	350	6.	3.90	100.	8.19
HUXLEY ISLAND	14/04	16/04	150	15.	3.10	70.	4.88
HUXLEY ISLAND	14/04	16/04	475	30.	5.15	85.	62.38
HUXLEY ISLAND	14/04	16/04	150	10.	10.00	50.	7.50
HUXLEY ISLAND	14/04	16/04	300	4.	3.70	100.	4.44
HUXLEY ISLAND	14/04	16/04	700	50.	4.50	90.	141.75
HUXLEY ISLAND	14/04	16/04	220	15.	3.75	60.	7.43
HUXLEY ISLAND	14/04	16/04	320	10.	1.90	100.	6.08
HUXLEY ISLAND	14/04	16/04	400	15.	2.70	100.	16.20
HUXLEY ISLAND	14/04	16/04	200	35.	3.90	100.	27.30
HUXLEY ISLAND	14/04	16/04	150	25.	4.75	90.	16.03
HUXLEY ISLAND	14/04	16/04	300	8.	3.25	80.	6.24
HUXLEY ISLAND	14/04	16/04	200	20.	4.90	90.	17.64
HUXLEY ISLAND	14/04	16/04	200	10.	3.55	90.	6.39
HUXLEY ISLAND	14/04	16/04	150	10.	4.50	80.	5.40
IMAGE POINT	20/04	20/04	200	14.	1.71	72.	3.45
KILMINGTON POINT	18/04	20/04	1650	1.	0.82	35.	0.47
KILMINGTON POINT	18/04	20/04	980	2.	0.34	80.	0.53
KWUNA POINT	22/03	23/03	400	25.	2.00	60.	12.00
LOUISE NARROWS	18/04	20/04	80	20.	0.36	70.	0.40
LOUISE NARROWS	18/04	20/04	100	3.	1.59	100.	0.48

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Start	Spawn Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 2E, EAST COAST Q.C.I. CONTINUED							
SURFACE SPAWN SURVEY							
LOUISE NARROWS	18/04	20/04	50	3.	0.35	80.	0.04
MAUDE ISLAND	04/06	04/06	25	8.	0.19	30.	0.01
MAUDE ISLAND	04/06	04/06	85	45.	0.13	15.	0.07
MAUDE ISLAND	04/06	04/06	50	30.	0.12	15.	0.03
ONWARD POINT	10/05	10/05	100	15.	1.02	60.	0.92
POOLE INLET	18/03	21/03	200	30.	4.40	90.	23.76
POOLE INLET	20/03	22/03	500	30.	2.60	75.	29.25
POOLE INLET	22/03	24/03	60	10.	1.50	50.	0.45
POOLE INLET	22/03	24/03	900	10.	2.53	85.	19.32
POOLE INLET	18/03	21/03	1000	15.	4.44	40.	26.64
POOLE INLET	18/03	21/03	1400	10.	0.48	40.	2.72
POOLE INLET	18/03	21/03	500	30.	7.75	50.	58.13
REBECCA POINT	23/03	24/03	450	30.	1.45	50.	9.79
REBECCA POINT	22/03	24/03	400	40.	1.38	70.	15.40
REBECCA POINT	22/03	24/03	500	35.	1.83	70.	22.36
REBECCA POINT	23/03	24/03	500	10.	2.80	80.	11.20
SECTION COVE	05/04	18/05	250	25.	4.60	90.	25.88
SECTION COVE	05/04	18/05	437	38.	1.50	70.	17.44
SECTION COVE	05/04	18/05	210	20.	2.90	90.	10.96
SECTION COVE	05/04	18/05	273	38.	1.50	60.	9.34
SECTION COVE	05/04	18/05	875	38.	3.55	80.	94.43
SEDGWICK BAY	16/04	17/04	650	10.	2.17	90.	12.72
SEDGWICK BAY	16/04	17/04	220	8.	2.75	90.	4.36
SEDGWICK BAY	16/04	17/04	350	7.	0.30	100.	0.74
SEDGWICK BAY	16/04	17/04	210	4.	0.95	85.	0.68
SEDGWICK BAY	16/04	17/04	150	8.	0.95	90.	1.03
SELWYN INLET	18/04	20/04	1100	10.	0.94	60.	6.20
SELWYN INLET	18/04	20/04	400	4.	1.63	100.	2.61
SKIDEGATE INLET	22/03	23/03	500	20.	0.30	50.	1.50
SKIDEGATE INLET	22/03	23/03	400	20.	0.30	40.	0.96
SKIDEGATE INLET	22/03	23/03	200	20.	0.30	50.	0.60
SKIDEGATE VILLAGE	20/04	20/04	100	10.	0.50	70.	0.35
SMITH POINT	20/04	20/04	600	12.	0.50	54.	1.94
TRANSIT ISLAND	06/06	07/06	15	5.	0.50	70.	0.03
TRANSIT ISLAND	06/06	07/06	40	15.	1.50	80.	0.72
TRAYNOR CREEK	18/04	20/04	625	4.	1.28	100.	3.20
TRAYNOR CREEK	18/04	20/04	2250	10.	0.57	80.	10.26
TRAYNOR CREEK	18/04	20/04	120	4.	1.00	100.	0.48
VILLAGE BAY (ROONEY BAY)	01/05	01/05	200	20.	0.10	5.	0.02
SURFACE SURVEY AREA TOTAL			45705				1455.59

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Start	Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 3, NASS							
SURFACE SPAWN SURVEY							
CUNNINGHAM PASS	03/04	06/04	265	5.	2.70	90.	3.22
CUNNINGHAM PASS	02/04	04/04	75	25.	4.00	85.	6.38
CUNNINGHAM PASS	21/04	21/04	200	15.	1.60	90.	4.32
CUNNINGHAM PASS	21/04	21/04	500	20.	1.51	85.	12.84
CUNNINGHAM PASS	03/04	05/04	275	3.	0.90	100.	0.74
CUNNINGHAM PASS	21/04	21/04	200	10.	0.90	80.	1.44
CUNNINGHAM PASS	03/04	06/04	100	30.	6.50	90.	17.55
FLEWIN POINT	18/03	20/03	1000	20.	4.10	90.	73.80
GRASSY POINT	17/03	19/03	1400	15.	2.50	70.	36.75
HOOK POINT	03/04	06/04	200	30.	6.50	90.	35.10
REDCLIFF POINT	02/04	03/04	420	7.	2.50	100.	7.35
REDCLIFF POINT	29/03	01/04	1025	10.	2.20	90.	20.30
STUMAUN BAY	15/03	17/03	540	30.	2.15	80.	27.86
STUMAUN BAY	17/03	19/03	1900	30.	1.85	60.	63.27
STUMAUN BAY	15/03	17/03	360	30.	2.00	80.	17.28
STUMAUN BAY	17/03	19/03	300	100.	3.50	50.	52.50
STUMAUN BAY	16/03	18/03	350	2.	3.00	80.	1.68
STUMAUN BAY	18/03	20/03	180	15.	0.78	65.	1.37
STUMAUN BAY	14/03	17/03	1260	60.	0.30	50.	11.34
STUMAUN BAY	14/03	15/03	180	30.	0.90	95.	4.62
STUMAUN BAY	17/03	19/03	300	100.	3.50	100.	105.00
STUMAUN BAY	15/03	16/03	70	3.	2.00	100.	0.42
STUMAUN BAY	17/03	18/03	1300	15.	1.55	35.	10.58
STUMAUN BAY	15/03	17/03	280	40.	1.88	80.	16.80
STUMAUN BAY	16/03	18/03	300	40.	2.00	90.	21.60
SURFACE SURVEY AREA TOTAL			12980				554.10

STATISTICAL AREA: 4, SKEENA

SURFACE SPAWN SURVEY							
BARRETT ISLAND	03/04	08/04	550	275.	3.30	90.	449.21
BARRETT ISLAND	04/04	08/04	275	10.	1.00	70.	1.92
BIG BAY	23/03	26/03	75	50.	4.00	90.	13.50
BIG BAY	23/03	26/03	360	230.	0.50	40.	16.56
BIG BAY	25/03	01/04	740	50.	2.80	70.	72.52
BIG BAY	24/03	29/03	555	50.	3.30	90.	82.42
BIG BAY	24/03	30/03	740	50.	4.50	90.	149.85
BIG BAY	24/03	29/03	555	150.	1.40	30.	34.97

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date		Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
	Start	End					
STATISTICAL AREA: 4, SKEENA			CONTINUED				
SURFACE SPAWN SURVEY							
ISLAND POINT	04/04	06/04	200	40.	5.60	90.	40.32
ISLAND POINT	05/04	07/04	1000	100.	3.00	70.	210.00
ISLAND POINT	30/03	01/04	100	10.	1.40	60.	0.84
ISLAND POINT	05/04	07/04	200	25.	2.40	80.	9.60
ISLAND POINT	31/03	03/04	300	25.	5.00	95.	35.63
ISLAND POINT	05/04	07/04	200	10.	2.00	100.	4.00
ISLAND POINT	29/03	31/03	50	50.	1.00	80.	2.00
ISLAND POINT	29/03	31/03	100	20.	2.00	100.	4.00
MIST ISLAND	02/04	04/04	180	100.	4.75	90.	76.95
MIST ISLAND	02/04	04/04	200	10.	1.40	75.	2.10
MIST ISLAND	02/04	04/04	370	25.	7.50	100.	69.38
OTTER ANCHORAGE	03/05	03/05	500	100.	0.77	65.	25.03
OTTER ANCHORAGE	28/03	01/04	250	30.	4.00	100.	30.00
PEARL HARBOUR	27/03	01/04	500	100.	4.60	85.	195.50
PEARL HARBOUR	28/03	01/04	625	20.	3.70	75.	34.69
PEARL HARBOUR	27/03	01/04	250	10.	3.10	90.	6.98
PEARL HARBOUR	27/03	02/04	500	40.	4.10	65.	53.30
PEARL HARBOUR	27/03	01/04	70	30.	4.00	100.	8.40
PEARL HARBOUR	28/03	01/04	330	20.	0.30	60.	1.19
PEARL HARBOUR	27/03	02/04	500	75.	6.00	90.	202.50
PEARL HARBOUR	28/03	02/04	500	50.	3.00	90.	67.50
PEARL HARBOUR	28/03	01/04	40	10.	6.00	100.	2.40
PORCHER ISLAND NORTH	03/04	06/04	900	200.	1.25	50.	112.50
PORCHER ISLAND NORTH	02/04	07/04	270	280.	3.50	90.	238.14
PORCHER ISLAND NORTH	02/04	06/04	370	50.	1.18	70.	15.22
PORCHER ISLAND NORTH	01/04	07/04	180	270.	3.32	90.	145.44
PORCHER ISLAND NORTH	03/04	06/04	900	10.	1.60	90.	12.96
REEKS POINT	22/03	25/03	554	25.	5.60	90.	69.80
REEKS POINT	22/03	25/03	370	50.	5.45	90.	90.74
REFUGE BAY	05/04	08/04	270	270.	3.00	90.	196.83
REFUGE BAY	05/04	08/04	750	30.	3.20	90.	64.80
SALMON BIGHT	23/03	26/03	300	100.	0.50	70.	10.50
SALMON BIGHT	23/03	26/03	1280	100.	3.00	90.	345.60
SHATTOCK POINT	24/03	27/03	150	200.	1.02	90.	27.54
SHATTOCK POINT	23/03	26/03	1100	50.	1.77	80.	78.10
SIMPSON POINT	22/03	25/03	370	25.	4.60	75.	31.91
SIMPSON POINT	22/03	25/03	460	100.	2.97	85.	116.32
SIMPSON POINT	22/03	25/03	320	200.	0.30	70.	13.44
SIMPSON POINT	22/03	25/03	750	180.	3.00	80.	324.00
SWALLOW ISLAND	23/03	26/03	275	50.	0.80	80.	8.80
SWALLOW ISLAND	23/03	26/03	550	50.	1.85	90.	45.79
TABLE POINT	05/04	08/04	270	270.	2.68	95.	185.26
TREE BLUFF	23/03	25/03	900	250.	1.15	75.	194.06

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 4, SKEENA		CONTINUED					
SURFACE SPAWN SURVEY							
BIG BAY	22/03	25/03	270	365.	4.00	100.	394.20
BIG BAY	28/03	03/04	220	100.	2.33	70.	35.81
BIG BAY	24/03	27/03	645	75.	3.00	75.	108.84
BIG BAY	28/03	03/04	275	100.	2.90	80.	63.80
BIG BAY	24/03	27/03	645	75.	0.55	75.	19.95
BIG BAY	22/03	26/03	365	365.	0.30	70.	27.98
BURNT CLIFF ISLAND	28/03	03/04	550	200.	2.00	95.	209.00
BURNT CLIFF ISLAND	28/03	03/04	900	150.	3.90	95.	500.17
BURNT CLIFF ISLAND	28/03	03/04	450	50.	2.50	100.	56.25
BURNT CLIFF ISLAND	28/03	03/04	650	175.	1.40	80.	127.40
CHISMORE PASSAGE	04/05	04/05	375	15.	1.32	50.	3.70
CREAK ISLANDS	01/04	05/04	550	10.	3.10	75.	12.79
CREAK ISLANDS	01/04	09/04	550	15.	3.90	90.	28.96
CREAK ISLANDS	01/04	07/04	550	15.	1.95	90.	14.48
CREAK ISLANDS	01/04	06/04	500	15.	3.40	90.	22.95
CREAK ISLANDS	01/04	07/04	350	350.	2.00	75.	183.75
CREAK POINT	01/04	05/04	6000	20.	3.10	90.	334.80
FLAT TOP ISLETS	29/03	03/04	350	10.	2.30	70.	5.64
FLAT TOP ISLETS	30/03	02/04	550	10.	2.60	100.	14.30
FLAT TOP ISLETS	28/03	03/04	725	15.	4.50	80.	39.15
FLAT TOP ISLETS	02/04	04/04	730	10.	3.10	100.	22.63
FORTUNE POINT	21/03	24/03	150	50.	3.40	90.	22.95
FORTUNE POINT	21/03	24/03	240	40.	8.00	100.	76.80
FORTUNE POINT	21/03	24/03	550	15.	3.20	70.	18.48
FORTUNE POINT	21/03	24/03	640	10.	1.60	70.	7.17
FORTUNE POINT	21/03	24/03	165	10.	1.00	40.	0.66
FORTUNE POINT	21/03	24/03	150	20.	5.45	100.	16.35
GORDON POINT	21/04	21/04	250	10.	1.06	90.	2.39
GORDON POINT	21/04	21/04	500	15.	0.90	85.	5.74
HUNT INLET	31/03	04/04	370	200.	3.20	90.	213.45
HUNT INLET	31/03	04/04	460	10.	1.25	80.	4.60
HUNT INLET	04/04	06/04	600	10.	2.00	90.	10.80
HUNT INLET	31/03	04/04	460	20.	3.30	80.	24.29
HUNT INLET	04/04	06/04	550	20.	1.50	70.	11.55
HUNT INLET	31/03	04/04	50	15.	10.00	100.	7.50
ISLAND POINT	28/03	02/04	200	200.	1.80	95.	68.40
ISLAND POINT	28/03	01/04	50	20.	4.00	90.	3.60
ISLAND POINT	04/04	06/04	500	5.	1.90	100.	4.75
ISLAND POINT	30/03	03/04	20	20.	2.00	100.	0.80
ISLAND POINT	28/03	01/04	100	3.	1.80	90.	0.49
ISLAND POINT	28/03	01/04	100	5.	3.40	90.	1.53
ISLAND POINT	31/03	03/04	100	50.	0.75	90.	3.38
ISLAND POINT	28/03	03/04	300	5.	1.30	90.	1.76

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
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STATISTICAL AREA: 4, SKEENA

CONTINUED

SURFACE SPAWN SURVEY

TREE BLUFF	23/03	25/03	200	20.	1.00	20.	0.80
TREE BLUFF	23/03	25/03	555	350.	0.45	80.	69.15
TRENHAM POINT	23/03	25/03	400	80.	0.30	90.	8.64
TRENHAM POINT	23/03	25/03	580	20.	3.00	100.	34.80
TRENHAM POINT	23/03	25/03	450	30.	2.83	100.	38.14
TRENHAM POINT	22/03	25/03	100	25.	0.90	80.	1.80
TRENHAM POINT	22/03	25/03	370	10.	0.95	80.	2.81
TRENHAM POINT	22/03	25/03	100	50.	4.00	95.	19.00

SURFACE SURVEY AREA TOTAL

47564

7140.09

STATISTICAL AREA: 5, GRENVILLE-PRINCIPE

SURFACE SPAWN SURVEY

FREEMAN HARBOUR	03/04	03/04	100	3.	1.00	90.	0.27
KITKATLA INLET N. SHORE	02/04	08/04	165	20.	3.00	90.	8.91
KITKATLA INLET N. SHORE	02/04	08/04	25	2.	1.00	100.	0.05
KITKATLA INLET N. SHORE	02/04	08/04	400	100.	4.30	90.	154.80
KITKATLA INLET N. SHORE	02/04	08/04	900	15.	7.00	100.	94.50
KITKATLA INLET N. SHORE	02/04	08/04	300	15.	4.90	90.	19.84
KITKATLA INLET N. SHORE	02/04	08/04	365	10.	2.80	85.	8.69
KITKATLA INLET N. SHORE	03/04	06/04	275	10.	4.67	90.	11.57
KITKATLA INLET N. SHORE	02/04	08/04	100	50.	3.60	50.	9.00
KITKATLA INLET N. SHORE	02/04	08/04	450	20.	2.30	80.	16.56
KITKATLA INLET N. SHORE	02/04	08/04	585	15.	6.10	85.	45.50
KITKATLA INLET N. SHORE	02/04	08/04	125	25.	5.75	90.	16.17
KITKATLA INLET N. SHORE	02/04	08/04	140	15.	5.30	90.	10.02
KITKATLA INLET N. SHORE	02/04	08/04	30	30.	4.40	80.	3.17
KITKATLA INLET N. SHORE	02/04	08/04	250	20.	3.20	80.	12.80
KITKATLA INLET N. SHORE	02/04	08/04	380	200.	4.30	80.	261.44
MARKLE PASS	19/04	20/04	850	3.	1.00	80.	2.04
MARKLE PASS	19/04	20/04	1000	2.	2.90	90.	5.22
NESS ISLANDS	02/04	08/04	1850	15.	1.00	90.	24.98
NESS ISLANDS	02/04	08/04	730	10.	2.40	75.	13.14
NESS ISLANDS	09/04	10/04	180	40.	4.30	90.	27.86
NESS ISLANDS	09/04	10/04	350	180.	4.00	85.	214.20
NESS ISLANDS	09/04	10/04	950	10.	3.30	100.	31.35
NUBBLE POINT	17/04	18/04	150	10.	1.35	75.	1.52
NUBBLE POINT	17/04	18/04	3000	5.	1.60	90.	21.60

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
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STATISTICAL AREA: 5, GRENVILLE-PRINCIPE CONTINUED

SURFACE SPAWN SURVEY

NUBBLE POINT	17/04	18/04	250	15.	0.63	50.	1.17
PORCHER PENINSULA	05/04	07/04	370	150.	1.25	80.	55.50
PORCHER PENINSULA	05/04	07/04	650	15.	5.55	90.	48.70
PORCHER PENINSULA	05/04	07/04	1000	15.	4.70	85.	59.93
PORCHER PENINSULA	05/04	07/04	500	25.	0.71	75.	6.66
ROBERT ISLAND	09/04	10/04	60	20.	3.00	100.	3.60
ROBERT ISLAND	09/04	10/04	100	10.	1.57	50.	0.78
SNASS POINT	03/04	06/04	650	75.	3.70	95.	171.36
SNASS POINT	02/04	08/04	450	25.	4.90	75.	41.34
SNASS POINT	02/04	08/04	125	10.	1.85	100.	2.31
SNASS POINT	03/04	06/04	750	50.	4.00	100.	150.00
SNASS POINT	03/04	06/04	565	100.	4.40	95.	236.17
SNASS POINT	03/04	06/04	280	75.	5.70	100.	119.70
SNASS POINT	02/04	08/04	40	20.	3.20	50.	1.28
TANGENT ISLAND	19/04	20/04	300	15.	5.60	90.	22.68
TANGENT ISLAND	19/04	20/04	125	20.	6.75	90.	15.19
TANGENT ISLAND	19/04	20/04	1500	5.	3.70	95.	26.36
TANGENT ISLAND	19/04	20/04	150	6.	3.00	75.	2.03
TANGENT ISLAND	19/04	20/04	200	25.	3.80	95.	18.05
TANGENT ISLAND	19/04	20/04	800	8.	2.15	95.	13.07
TANGENT ISLAND	19/04	20/04	500	5.	1.95	90.	4.39

SURFACE SURVEY AREA TOTAL

23015

2015.46

STATISTICAL AREA: 6, BUTEDALE

SURFACE SPAWN SURVEY

ARCHER ISLETS	23/03	25/03	100	8.	2.35	90.	1.69
ARRIAGA ISLANDS	15/03	18/03	200	25.	6.10	90.	27.45
ARRIAGA ISLANDS	15/03	18/03	300	25.	2.98	70.	15.62
ARRIAGA ISLANDS	15/03	18/03	100	10.	6.10	90.	5.49
BENT HARBOR	18/03	20/03	150	8.	4.25	80.	4.08
BENT HARBOR	18/03	20/03	325	50.	5.00	85.	69.06
BENT HARBOR	18/03	20/03	125	25.	2.67	50.	4.18
BENT HARBOR	15/03	18/03	450	10.	4.35	85.	16.64
BENT HARBOR	17/03	19/03	350	40.	2.85	80.	31.92
BENT HARBOR	15/03	18/03	525	75.	4.35	85.	145.59
BENT HARBOR	17/03	19/03	300	10.	2.85	80.	6.84
BISHOP BAY	19/04	20/04	1600	20.	4.90	40.	62.72

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 6, BUTEDALE			CONTINUED				
SURFACE SPAWN SURVEY							
DOUGLAS CHANNEL	01/05	03/05	3000	2.	2.00	30.	3.60
GIL ISLAND	24/05	25/05	550	3.	2.40	70.	2.77
HARRIS LAGOON +	15/03	17/03	75	25.	2.90	50.	2.72
KITASU BAY	29/03	31/03	825	15.	2.22	70.	19.27
KITASU BAY	28/03	30/03	1350	15.	3.88	90.	70.62
KITASU BAY	29/03	30/03	200	15.	2.00	50.	3.00
KITASU BAY	31/03	03/04	825	20.	2.17	75.	26.92
KITASU BAY	29/03	30/03	900	25.	1.65	40.	14.85
MARVIN ISLANDS	29/03	31/03	950	25.	1.60	75.	28.50
MARVIN ISLANDS	29/03	31/03	450	25.	3.63	85.	34.66
NOBLE LAGOON	23/03	25/03	150	25.	5.00	70.	13.13
NOBLE LAGOON	23/03	25/03	250	75.	2.92	75.	41.13
NOBLE LAGOON	23/03	25/03	100	5.	1.95	90.	0.88
OSMENT INLET	05/04	06/04	250	50.	1.70	60.	12.75
OSMENT INLET	06/04	07/04	125	10.	1.88	80.	1.88
OSMENT INLET	05/04	06/04	550	15.	1.95	80.	12.87
PARSONS ANCHORAGE	26/03	29/03	300	100.	3.55	65.	69.23
PARSONS ANCHORAGE	26/03	29/03	800	55.	3.33	90.	131.67
PARSONS ANCHORAGE	26/03	29/03	600	50.	4.85	95.	138.23
PARSONS ANCHORAGE	26/03	29/03	850	65.	3.60	95.	188.96
PARSONS ANCHORAGE	26/03	29/03	300	60.	4.55	90.	73.71
SURF INLET	01/05	01/05	1295	4.	2.03	80.	8.39
SURF INLET	01/05	01/05	740	3.	1.20	70.	1.86
SURF INLET	01/05	01/05	463	4.	1.58	50.	1.46
THISTLE PASSAGE	25/04	27/04	1850	2.	1.80	50.	3.33
THISTLE PASSAGE	25/04	27/04	1480	3.	2.15	60.	5.73
THISTLE PASSAGE	25/04	27/04	1110	3.	2.23	75.	5.56
THISTLETON ISLANDS	19/03	19/03	30	25.	1.30	70.	0.68
THISTLETON ISLANDS	17/03	19/03	450	20.	3.25	80.	23.40
THISTLETON ISLANDS	18/03	18/03	50	5.	0.80	90.	0.18
THISTLETON ISLANDS	18/03	19/03	500	8.	1.90	80.	6.08
WEETEEAM BAY	24/03	26/03	400	30.	1.85	80.	17.76
WEETEEAM BAY	15/03	17/03	300	10.	1.18	80.	2.82
WEETEEAM BAY	15/03	17/03	125	30.	1.38	60.	3.09
WEETEEAM BAY	22/03	24/03	1000	15.	2.20	85.	28.05
WEETEEAM BAY	15/03	17/03	100	25.	3.25	75.	6.09
WEETEEAM BAY	15/03	17/03	250	15.	3.25	75.	9.14
WEETEEAM BAY	24/03	26/03	350	50.	2.50	75.	32.81
WEETEEAM BAY	15/03	17/03	225	10.	3.13	90.	6.33
WEETEEAM BAY	19/03	21/03	275	40.	3.05	75.	25.16
WEETEEAM BAY	15/03	17/03	450	8.	2.30	90.	7.45
WEETEEAM BAY	15/03	17/03	50	50.	1.13	60.	1.69
WEETEEAM BAY	15/03	17/03	125	10.	2.00	90.	2.25

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Start	Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 6, BUTEDALE		CONTINUED					
SURFACE SPAWN SURVEY							
WEETEEAM BAY	24/03	26/03	250	20.	2.28	75.	8.53
WEETEEAM BAY	15/03	17/03	175	8.	0.61	80.	0.68
WEETEEAM BAY	23/03	25/03	300	12.	2.42	85.	7.42
WEETEEAM BAY	25/03	27/03	400	15.	2.80	75.	12.60
WEETEEAM BAY	24/03	26/03	175	40.	1.55	75.	8.14
WEETEEAM BAY	24/03	26/03	600	10.	1.90	90.	10.26
WEETEEAM BAY	15/03	17/03	125	10.	1.13	60.	0.84
WEETEEAM BAY	15/03	17/03	1100	15.	1.38	60.	13.61
WEETEEAM BAY	24/03	25/03	75	10.	1.40	80.	0.84
WILBY POINT	04/04	07/04	225	20.	4.05	90.	16.40
WILBY POINT	01/04	02/04	650	5.	0.97	80.	2.54
WILBY POINT	30/03	31/03	1275	15.	2.35	75.	33.71
WILBY POINT	31/03	01/04	1050	5.	0.72	60.	2.27
SURFACE SURVEY AREA TOTAL			35943		1599.77		

STATISTICAL AREA: 7, BELLA BELLA

SURFACE SPAWN SURVEY							
BEND PT.	29/03	31/03	400	3.	0.50	30.	0.18
BEND PT.	29/03	31/03	400	25.	2.08	70.	14.52
BERRY INLET	29/03	30/03	20	3.	1.00	90.	0.05
BERRY INLET	29/03	30/03	40	40.	6.00	80.	7.68
BERRY INLET	29/03	30/03	1000	7.	0.85	50.	2.97
BERRY INLET	29/03	30/03	50	20.	0.97	75.	0.73
CECILIA ISLAND	29/03	29/03	950	5.	1.05	90.	4.49
CECILIA ISLAND	29/03	29/03	600	10.	2.00	95.	11.40
DON LAGOON +	12/04	12/04	50	40.	1.10	70.	1.54
DON LAGOON +	12/04	12/04	200	10.	1.90	70.	2.66
DON LAGOON +	12/04	12/04	100	40.	4.20	80.	13.44
DON LAGOON +	12/04	12/04	250	25.	2.85	80.	14.25
DON LAGOON +	12/04	12/04	1000	5.	0.95	50.	2.38
DON LAGOON +	12/04	12/04	250	30.	3.13	80.	18.75
DON LAGOON +	12/04	12/04	250	100.	0.50	60.	7.50
DON LAGOON +	12/04	12/04	1000	5.	1.90	50.	4.75
EAST HIGGINS PASS	30/03	02/04	650	20.	1.85	50.	12.03
EAST HIGGINS PASS	30/03	02/04	600	15.	1.08	85.	8.22
EAST HIGGINS PASS	30/03	02/04	100	40.	0.50	20.	0.40
EAST HIGGINS PASS	30/03	02/04	700	30.	1.70	50.	17.85

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 7, BELLA BELLA		CONTINUED					
SURFACE SPAWN SURVEY							
IVORY ISLAND	27/03	02/04	200	100.	1.00	50.	10.00
IVORY ISLAND	27/03	02/04	150	30.	0.85	60.	2.30
IVORY ISLAND	27/03	02/04	60	40.	1.30	50.	1.56
IVORY ISLAND	27/03	02/04	60	40.	2.85	75.	5.13
IVORY ISLAND	27/03	02/04	100	40.	1.70	50.	3.40
KING COVE	29/03	31/03	400	20.	0.55	60.	2.64
KYNUMPT HARBOUR	03/04	03/04	400	30.	2.80	50.	16.80
KYNUMPT HARBOUR	02/04	02/04	150	10.	4.33	70.	4.54
KYNUMPT HARBOUR	02/04	02/04	300	20.	1.53	50.	4.58
KYNUMPT HARBOUR	03/04	03/04	1300	20.	0.70	50.	9.10
KYNUMPT HARBOUR	02/04	02/04	40	5.	0.85	70.	0.12
LITTLE THOMPSON BAY	02/04	02/04	20	3.	1.90	90.	0.10
LITTLE THOMPSON BAY	02/04	02/04	600	3.	1.42	80.	2.05
LITTLE THOMPSON BAY	07/04	07/04	220	15.	0.93	80.	2.44
LITTLE THOMPSON BAY	07/04	07/04	20	20.	0.30	70.	0.08
LITTLE THOMPSON BAY	02/04	02/04	50	20.	1.75	90.	1.58
LOCKHART BAY	08/04	08/04	50	2.	1.50	90.	0.14
LOCKHART BAY	01/04	09/04	300	25.	1.90	70.	9.98
LOCKHART BAY	08/04	08/04	100	3.	1.25	80.	0.30
LOCKHART BAY	01/04	09/04	100	10.	3.25	75.	2.44
LOCKHART BAY	01/04	09/04	150	50.	2.28	70.	11.94
LOCKHART BAY	08/04	08/04	100	2.	2.00	85.	0.34
LOCKHART BAY	08/04	08/04	50	5.	0.95	60.	0.14
LOCKHART BAY	08/04	08/04	25	4.	3.60	90.	0.32
LOCKHART BAY	08/04	08/04	30	3.	2.00	95.	0.17
LOCKHART BAY	01/04	09/04	450	10.	3.03	60.	8.17
LOCKHART BAY	01/04	09/04	250	15.	3.18	90.	10.72
LOUISA COVE	17/04	17/04	50	5.	0.50	75.	0.09
LOUISE CHANNEL	12/04	13/04	1100	60.	1.35	90.	80.19
LOUISE CHANNEL	12/04	12/04	150	20.	6.50	40.	7.80
LOUISE CHANNEL	12/04	13/04	900	60.	1.67	75.	67.84
NORMAN MORRISON BAY	09/04	09/04	800	3.	0.55	50.	0.66
NORMAN MORRISON BAY	09/04	09/04	400	25.	1.45	50.	7.25
NORMAN MORRISON BAY	03/04	07/04	200	75.	2.90	80.	34.80
NORMAN MORRISON BAY	03/04	07/04	200	30.	2.10	80.	10.08
NORMAN MORRISON BAY	03/04	07/04	75	25.	2.80	80.	4.20
NORMAN MORRISON BAY	03/04	07/04	600	25.	1.30	75.	14.63
NORMAN MORRISON BAY	03/04	07/04	200	20.	1.30	65.	3.38
NORMAN MORRISON BAY	03/04	07/04	400	20.	1.45	70.	8.12
NORMAN MORRISON BAY	09/04	09/04	250	20.	0.95	70.	3.33
NORMAN MORRISON BAY	09/04	09/04	1300	20.	0.65	50.	8.45
NORMAN MORRISON BAY	09/04	09/04	80	40.	2.80	90.	8.06
NORMAN MORRISON BAY	03/04	07/04	400	7.	1.30	70.	2.55

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 7, BELLA BELLA		CONTINUED					
SURFACE SPAWN SURVEY							
NORMAN MORRISON BAY	09/04	09/04	200	30.	1.88	70.	7.88
NORMAN MORRISON BAY	09/04	09/04	300	40.	1.90	80.	18.24
NORMAN MORRISON BAY	03/04	07/04	75	50.	3.00	70.	7.88
ODIN COVE	01/04	01/04	800	20.	2.40	90.	34.56
PORT BLACKNEY	31/03	01/04	100	20.	0.80	75.	1.20
PORT BLACKNEY	31/03	01/04	10	10.	0.90	90.	0.08
PORT BLACKNEY	31/03	01/04	400	20.	0.70	70.	3.92
PORT BLACKNEY	31/03	01/04	800	30.	2.98	80.	57.12
POTTS ISLAND	12/04	12/04	50	20.	6.38	75.	4.78
POTTS ISLAND	12/04	12/04	120	25.	6.40	80.	15.36
SPILLER CHANNEL	01/04	01/04	800	4.	4.70	90.	13.54
SPILLER CHANNEL	02/04	02/04	4500	8.	4.34	85.	132.80
SPILLER CHANNEL	01/04	01/04	500	100.	4.00	70.	140.00
SPILLER CHANNEL	25/03	25/03	200	3.	1.00	70.	0.42
SPILLER CHANNEL	25/03	25/03	300	10.	1.45	50.	2.17
SPILLER CHANNEL	02/04	02/04	700	25.	3.55	85.	52.81
SPILLER CHANNEL	27/03	27/03	200	8.	5.80	100.	9.28
SPILLER CHANNEL	01/04	01/04	3000	10.	5.60	100.	168.00
SPILLER CHANNEL	01/04	01/04	1000	10.	4.65	95.	44.17
SPILLER CHANNEL	01/04	01/04	600	8.	3.80	90.	16.42
SPILLER CHANNEL	27/03	27/03	600	4.	2.60	80.	4.99
SPILLER CHANNEL	27/03	27/03	150	8.	5.20	95.	5.93
STRYKER BAY	20/04	22/04	150	10.	2.85	80.	3.42
STRYKER BAY	28/03	04/04	900	25.	1.25	70.	19.69
STRYKER BAY	20/04	22/04	300	5.	1.07	75.	1.20
STRYKER BAY	28/03	09/04	50	50.	0.63	90.	1.42
STRYKER BAY	20/04	22/04	100	5.	0.65	60.	0.20
STRYKER BAY	10/04	12/04	700	25.	1.90	80.	26.60
STRYKER BAY	10/04	12/04	1200	20.	2.20	60.	31.68
STRYKER BAY	28/03	04/04	1100	10.	0.63	70.	4.81
STRYKER BAY	20/04	22/04	150	5.	0.60	80.	0.36
STRYKER BAY	28/03	04/04	40	20.	0.50	80.	0.32
STRYKER BAY	28/03	09/04	900	75.	0.79	90.	47.99
WATCH ISLAND	29/03	29/03	700	7.	1.53	100.	7.50
WATCH ISLAND	29/03	29/03	250	3.	1.35	90.	0.91
WATCH ISLAND	29/03	29/03	325	6.	1.30	100.	2.54
WATCH ISLAND	29/03	29/03	250	4.	0.91	100.	0.91
WATCH ISLAND	29/03	29/03	1700	8.	1.70	95.	21.96
WATCH ISLAND	29/03	29/03	100	4.	0.75	100.	0.30
SURFACE SURVEY AREA TOTAL			45710				1431.65

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
=====							
STATISTICAL AREA: 8, BELLA COOLA							
SURFACE SPAWN SURVEY							
BURKE CHANNEL	05/06	05/06	9300	2.	2.73	100.	50.69
BURKE CHANNEL	05/06	05/06	9300	3.	2.73	100.	76.03
ILLAHIE INLET	30/03	01/04	1372	2.	2.00	90.	4.94
KWAKUME INLET	30/03	01/04	1463	3.	2.90	90.	11.46
KWAKUME INLET	30/03	01/04	1829	3.	2.50	85.	11.66
KWAKUME INLET	30/03	01/04	914	9.	3.00	85.	20.98
KWAKUME INLET	30/03	01/04	1829	3.	3.65	90.	18.02
KWAKUME INLET	30/03	01/04	1372	3.	5.10	85.	17.84
KWAKUME INLET	30/03	01/04	1737	3.	1.73	90.	8.09
NORTH BENTINCK ARM	17/03	20/03	2150	2.	0.71	60.	1.83
NORTH BENTINCK ARM	14/03	17/03	1000	3.	1.26	90.	3.40
NORTH BENTINCK ARM	20/03	21/03	600	3.	0.58	40.	0.42
NORTH BENTINCK ARM	17/03	20/03	1100	1.	0.30	50.	0.17
NORTH BENTINCK ARM	20/03	21/03	2900	4.	1.00	80.	9.28
NORTH BENTINCK ARM	14/03	17/03	1000	3.	1.50	95.	4.28
NORTH BENTINCK ARM	17/03	20/03	750	6.	1.35	90.	5.47
NORTH BENTINCK ARM	17/03	20/03	1500	4.	0.91	75.	4.09
NORTH BENTINCK ARM	20/03	21/03	500	2.	0.88	70.	0.62
NORTH BENTINCK ARM	20/03	21/03	900	2.	0.64	50.	0.58
NORTH BENTINCK ARM	20/03	21/03	900	2.	0.18	30.	0.10
NORTH BENTINCK ARM	14/03	17/03	350	5.	0.55	50.	0.48
NORTH BENTINCK ARM	17/03	20/03	600	3.	1.00	80.	1.44
NORTH BENTINCK ARM	14/03	17/03	1200	2.	2.05	90.	4.43
NORTH BENTINCK ARM	14/03	17/03	300	4.	0.38	20.	0.09
NORTH BENTINCK ARM	20/03	21/03	1500	2.	0.44	50.	0.66
NORTH BENTINCK ARM	20/03	21/03	500	3.	0.10	50.	0.08
NORTH BENTINCK ARM	20/03	21/03	950	3.	0.42	30.	0.36
NORTH BENTINCK ARM	20/03	21/03	250	4.	1.25	80.	1.00
NORTH BENTINCK ARM	14/03	17/03	1250	1.	0.50	60.	0.38
NORTH BENTINCK ARM	14/03	17/03	150	5.	1.30	85.	0.83
NORTH BENTINCK ARM	17/03	20/03	550	1.	0.50	30.	0.08
NORTH BENTINCK ARM	17/03	20/03	550	2.	1.64	50.	0.90
NORTH BENTINCK ARM	20/03	21/03	1600	5.	0.64	80.	4.10
NORTH BENTINCK ARM	14/03	17/03	100	10.	0.92	90.	0.83
NORTH BENTINCK ARM	17/03	20/03	15	7.	1.00	80.	0.08
NORTH BENTINCK ARM	17/03	20/03	6100	2.	0.92	70.	7.86
NORTH BENTINCK ARM	17/03	20/03	800	5.	1.36	90.	4.90
PRUTH BAY	31/03	02/04	732	2.	0.95	80.	1.11
PRUTH BAY	31/03	02/04	366	2.	1.30	85.	0.81
PRUTH BAY	31/03	02/04	183	55.	1.00	70.	7.05

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 8, BELLA COOLA			CONTINUED				
SURFACE SPAWN SURVEY							
WARRIOR COVE	28/03	02/04	732	3.	3.10	85.	5.79
WARRIOR COVE	28/03	02/04	183	9.	5.00	90.	7.41
WARRIOR COVE	28/03	02/04	27	5.	3.30	90.	0.40
WARRIOR COVE	28/03	02/04	183	137.	6.00	90.	135.38
WARRIOR COVE	28/03	02/04	732	3.	3.20	85.	5.97
SURFACE SURVEY AREA TOTAL			62319		442.33		
STATISTICAL AREA: 9, RIVERS INLET							
SURFACE SPAWN SURVEY							
KILBELLA BAY	20/03	22/03	500	2.	0.50	100.	0.50
KILBELLA BAY	14/03	16/03	475	2.	0.30	100.	0.28
KILBELLA BAY	15/03	18/03	1500	2.	0.50	100.	1.50
RIVERS INLET-HEAD	10/03	13/03	3200	2.	0.50	100.	3.20
RIVERS INLET-HEAD	10/03	13/03	3100	2.	0.50	100.	3.10
RIVERS INLET-HEAD	10/03	13/03	900	350.	0.50	50.	78.75
RIVERS INLET-HEAD	10/03	13/03	200	250.	1.00	100.	50.00
RIVERS INLET-HEAD	14/03	16/03	4200	2.	0.50	100.	4.20
RIVERS INLET-HEAD	10/03	13/03	300	100.	0.50	75.	11.25
RIVERS INLET-HEAD	10/03	13/03	900	250.	0.50	50.	56.25
SURFACE SURVEY AREA TOTAL			15275		209.04		
STATISTICAL AREA: 10, SMITH INLET							
SURFACE SPAWN SURVEY							
ANCHOR BIGHT	28/03	31/03	1000	6.	2.65	90.	14.31
GNARLED ISLETS	28/03	31/03	1200	3.	1.85	90.	5.99
INDIAN ISLAND (NORTH)	28/03	31/03	1600	4.	1.73	85.	9.38
INDIAN ISLAND (SOUTH)	28/03	31/03	500	4.	1.90	80.	3.04
LEROY BAY	27/03	31/03	1200	4.	2.00	90.	8.64
SURFACE SURVEY AREA TOTAL			5500		41.37		

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
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STATISTICAL AREA: 11, SEYMOUR-BELIZE

SURFACE SPAWN SURVEY

NUGENT SOUND	30/03	01/04	200	3.	0.50	70.	0.21
NUGENT SOUND	30/03	01/04	730	1.	0.50	60.	0.22
NUGENT SOUND	18/04	19/04	1400	1.	3.25	90.	4.09
NUGENT SOUND	30/03	01/04	250	5.	0.50	50.	0.31
NUGENT SOUND	30/03	01/04	135	2.	0.50	30.	0.04

SURFACE SURVEY AREA TOTAL 2715 4.88

STATISTICAL AREA: 12, ALERT BAY

SURFACE SPAWN SURVEY

AHNUHATI POINT	26/03	27/03	150	2.	2.50	90.	0.68
AHNUHATI POINT	26/03	27/03	25	3.	1.50	90.	0.10
AHNUHATI POINT	26/03	27/03	200	2.	2.95	95.	1.12
FORT RUPERT (BEAVER HR.)	21/03	22/03	185	35.	1.68	100.	10.85
FORT RUPERT (BEAVER HR.)	21/03	22/03	185	20.	1.50	50.	2.78
FORT RUPERT (BEAVER HR.)	21/03	22/03	850	15.	1.41	90.	16.24
FORT RUPERT (BEAVER HR.)	21/03	22/03	375	25.	1.60	100.	15.00
FORT RUPERT (BEAVER HR.)	21/03	22/03	900	25.	1.00	60.	13.50
FORT RUPERT (BEAVER HR.)	21/03	22/03	185	10.	1.50	40.	1.11
FORT RUPERT (BEAVER HR.)	21/03	22/03	325	20.	1.50	80.	7.80
FORT RUPERT (BEAVER HR.)	21/03	22/03	1500	75.	1.00	70.	78.75
KINGCOME INLET	20/03	02/04	640	2.	0.30	80.	0.31
KINGCOME INLET	20/03	02/04	367	1.	0.30	80.	0.09
KINGCOME INLET	20/03	02/04	914	1.	0.50	80.	0.37
KINGCOME INLET	22/03	02/04	1500	2.	0.40	50.	0.60
KINGCOME INLET	20/03	02/04	1097	3.	1.00	80.	2.63
KNIGHT INLET	26/03	30/03	1100	2.	0.80	75.	1.32
KNIGHT INLET	20/03	30/03	5000	1.	0.80	85.	3.40
KNIGHT INLET	26/03	30/03	900	1.	0.80	80.	0.58
KNIGHT INLET	20/03	02/04	1750	1.	0.40	85.	0.60
KNIGHT INLET	20/03	30/03	1750	1.	0.40	80.	0.56
KNIGHT INLET	20/03	30/04	1000	1.	0.80	85.	0.68
KNIGHT INLET	20/03	30/03	1250	1.	2.20	95.	2.61
KNIGHT INLET	26/03	30/03	1400	3.	2.35	80.	7.90
KNIGHT INLET	20/03	30/03	3500	1.	0.81	95.	2.69
KNIGHT INLET	20/03	02/04	6500	1.	1.50	85.	8.29
KNIGHT INLET	20/03	30/03	5750	1.	1.00	80.	4.60
KNIGHT INLET	26/03	30/03	300	30.	1.50	80.	10.80
KNIGHT INLET	26/03	30/03	4400	3.	1.70	80.	17.95

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Start	Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 12, ALERT BAY			CONTINUED				
SURFACE SPAWN SURVEY							
KNIGHT INLET	20/03	30/03	1250	1.	1.50	80.	1.50
WAKEMAN SOUND	14/03	20/03	2900	2.	1.00	60.	3.48
WAKEMAN SOUND	14/03	20/03	95	3.	3.00	90.	0.77
WAKEMAN SOUND	14/03	20/03	1800	1.	0.50	75.	0.68
WAKEMAN SOUND	14/03	20/03	300	2.	2.00	95.	1.14
WAKEMAN SOUND	14/03	19/03	700	3.	1.00	60.	1.26
WAKEMAN SOUND	14/03	20/03	1500	2.	1.95	80.	4.68
WAKEMAN SOUND	14/03	19/03	600	1.	1.00	55.	0.33
WAKEMAN SOUND	14/03	20/03	350	2.	2.00	95.	1.33
WAKEMAN SOUND	14/03	20/03	100	3.	3.00	90.	0.81
WAKEMAN SOUND	14/03	20/03	30	2.	2.00	95.	0.11
WAKEMAN SOUND	14/03	20/03	3200	3.	1.00	95.	9.12
WAKEMAN SOUND	14/03	19/03	700	8.	1.00	70.	3.92
WAKEMAN SOUND	14/03	19/03	800	1.	1.00	60.	0.48
WAKEMAN SOUND	14/03	20/03	3500	3.	1.90	85.	16.96
WAKEMAN SOUND	14/03	19/03	1400	1.	1.95	75.	2.05
SURFACE SURVEY AREA TOTAL			63223				262.49
STATISTICAL AREA: 13, QUATHIASKI							
SURFACE SPAWN SURVEY							
DEEPWATER BAY	24/03	26/03	48	8.	8.00	100.	3.07
QUADRA ISLAND EAST	18/03	20/03	3540	12.	3.00	20.	25.49
QUADRA ISLAND EAST	18/03	20/03	150	30.	2.26	60.	6.10
QUADRA ISLAND EAST	18/03	20/03	606	18.	2.67	30.	8.74
SOUTHGATE RIVER	19/03	26/03	200	3.	0.50	60.	0.18
WADDINGTON HARBOUR	19/03	26/03	1600	2.	0.50	80.	1.28
WADDINGTON HARBOUR	19/03	26/03	2400	15.	0.50	90.	16.20
SURFACE SURVEY AREA TOTAL			8544				61.06
STATISTICAL AREA: 14, COMOX							
SURFACE SPAWN SURVEY							
CHROME ISLAND	29/03	30/03	425	10.	2.27	70.	6.75
SURFACE SURVEY AREA TOTAL			425				6.75

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date		Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
	Start	End					
STATISTICAL AREA: 14, COMOX			CONTINUED				
DIVE SPAWN SURVEY							
CAPE GUMEY	14/03	17/03	2100	85.00	1.13	60.56	122.41
COLLISHAW POINT	05/03	10/03	5000	237.00	3.06	61.19	2220.31
DUNLOP POINT	10/03	17/03	3600	282.00	2.33	76.50	1805.96
ENGLISHMAN RIVER	18/03	18/03	4200	89.40	0.27	22.81	22.98
FILLONGLEY PARK	18/03	18/03	2600	311.00	0.62	42.86	215.13
LITTLE QUALICUM RIVER	18/03	18/03	2500	151.33	1.18	43.10	192.62
NORMAN POINT	08/03	16/03	3600	83.67	1.51	59.71	271.30
PARKSVILLE BAY	18/03	18/03	3200	153.25	1.82	46.46	414.46
PHIPPS POINT	06/03	12/03	1500	74.00	1.29	11.67	16.75
QUALICUM BEACH	18/03	18/03	7000	141.00	0.42	23.09	96.53
TRALEE POINT	07/03	11/03	5600	78.83	1.24	61.98	338.90
TRIBUNE BAY	15/03	17/03	3600	37.25	1.26	49.41	83.77
TRIBUNE BAY	15/03	17/03	1100	100.00	0.25	25.00	6.88
WHALEBONE POINT	18/03	18/03	3800	40.00	0.66	45.94	46.32
DIVE SURVEY AREA TOTAL			49400				5854.32
STATISTICAL AREA: 15, WESTVIEW							
SURFACE SPAWN SURVEY							
ALBION POINT	01/03	02/03	300	10.	1.00	100.	3.00
ALBION POINT	28/02	02/03	600	10.	1.00	100.	6.00
SAVARY ISLAND	13/03	15/03	2400	40.	2.20	90.	190.08
SCUTTLE BAY	08/03	10/03	1200	6.	2.00	95.	13.68
SURFACE SURVEY AREA TOTAL			4500				212.76
STATISTICAL AREA: 16, PENDER HARBOUR							
SURFACE SPAWN SURVEY							
BARGAIN BAY	02/03	02/03	50	1.	0.77	60.	0.02
BARGAIN BAY	14/03	14/03	80	1.	0.50	60.	0.02
BARGAIN BAY	02/03	02/03	40	2.	0.88	80.	0.06
BARGAIN BAY	14/03	14/03	10	10.	1.00	75.	0.08
BARGAIN BAY	02/03	02/03	25	1.	0.50	100.	0.01
IRVINES LANDING	19/03	19/03	15	1.	0.50	75.	0.01
PORPOISE BAY	08/04	09/04	350	3.	0.80	50.	0.42
PORPOISE BAY	08/04	09/04	1	1.	1.50	100.	0.00
PORPOISE BAY	08/04	09/04	200	5.	1.50	85.	1.27
SURFACE SURVEY AREA TOTAL			771				1.89

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 17, NANAIMO							
SURFACE SPAWN SURVEY							
BLUNDEN POINT	10/04	10/04	1700	15.	0.44	80.	8.98
BLUNDEN POINT	18/03	18/03	2100	10.	1.20	90.	22.68
BLUNDEN POINT	18/03	18/03	50	20.	1.79	40.	0.71
FRASER POINT	04/04	08/04	1200	5.	1.92	60.	6.89
FRASER POINT	04/04	08/04	1000	5.	2.53	75.	9.49
SURFACE SURVEY AREA TOTAL			6050				48.75
DIVE SPAWN SURVEY							
BOAT HARBOUR	15/03	21/03	4200	91.14	3.42	20.15	263.63
COFFIN POINT (IS.)	15/03	21/03	4100	84.50	3.41	28.35	335.15
KULLEET BAY	15/03	21/03	6000	66.64	2.90	41.66	482.31
MUDGE ISLAND	13/03	17/03	2100	22.00	2.84	27.94	36.69
YELLOW POINT	15/03	21/03	4400	73.86	3.64	25.68	303.75
YELLOW PT. (NORTH)	15/03	21/03	4400	66.50	2.53	49.37	365.99
DIVE SURVEY AREA TOTAL			25200				1787.52
STATISTICAL AREA: 23, BARKLEY SOUND							
SURFACE SPAWN SURVEY							
GRAPPLER INLET	07/04	07/04	30	25.	1.36	50.	0.51
SURFACE SURVEY AREA TOTAL			30				0.51
DIVE SPAWN SURVEY							
DAVID ISLAND	19/03	24/03	900	20.00	1.61	15.00	4.33
FOOD ISLETS	19/03	24/03	3565	346.00	1.19	31.31	460.47
FORBES ISLAND	19/03	24/03	1500	52.25	4.05	31.69	100.68
FRANCIS ISLAND	22/03	29/03	175	77.00	2.57	37.67	13.03
LARKIN ISLAND	19/03	24/03	1210	156.50	2.85	7.53	40.62
MACOAH PASSAGE	19/03	24/03	1430	53.67	1.77	37.69	51.09
MAGGIE RIVER	19/03	24/03	1645	53.20	3.48	51.48	156.71
OTTAWAY ISLET	19/03	24/03	600	128.50	3.65	23.93	67.27
SPILLING ISLET	19/03	24/03	1550	63.00	3.28	15.35	49.08
SPRING COVE	22/03	29/03	1400	107.67	1.54	23.79	55.08
STOPPER ISLANDS	19/03	24/03	2020	65.67	1.55	12.38	25.38
STUART BAY	22/03	29/03	1510	142.75	2.53	22.76	123.95
TWO RIVERS +	19/03	24/03	4735	325.67	2.15	34.93	1159.61
UCLUELET	22/03	29/03	2900	81.80	1.80	42.10	179.93
DIVE SURVEY AREA TOTAL			25140				2487.23

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
=====							
STATISTICAL AREA: 24, CLAYOQUOT SOUND							
SURFACE SPAWN SURVEY							
AHOUSAT	24/03	26/03	440	45.	6.00	75.	89.10
AHOUSAT	24/03	26/03	140	35.	1.00	70.	3.43
ELBOW BANK	26/03	28/03	200	100.	2.00	70.	28.00
ELBOW BANK	27/03	29/03	550	375.	0.30	40.	24.75
ELBOW BANK	27/03	29/03	550	250.	1.50	40.	82.50
ELBOW BANK	27/03	29/03	250	25.	3.00	80.	15.00
ELBOW BANK	27/03	29/03	925	440.	0.10	70.	28.49
EPPER PASS	26/03	27/03	50	10.	3.00	100.	1.50
EPPER PASS	26/03	27/03	20	2.	1.00	100.	0.04
EPPER PASS	26/03	27/03	25	3.	5.00	100.	0.38
EPPER PASS	26/03	27/03	375	120.	6.00	80.	216.00
EPPER PASS	26/03	27/03	140	6.	7.60	100.	6.38
EPPER PASS	26/03	27/03	110	7.	6.00	75.	3.46
EPPER PASS	26/03	27/03	20	8.	4.00	75.	0.48
EPPER PASS	26/03	27/03	60	15.	8.00	80.	5.76
EPPER PASS	26/03	27/03	25	2.	6.70	100.	0.34
EPPER PASS	26/03	27/03	140	10.	4.92	80.	5.51
EPPER PASS	26/03	27/03	75	20.	6.00	75.	6.75
EPPER PASS	26/03	27/03	25	5.	6.00	100.	0.75
EPPER PASS	26/03	27/03	100	3.	4.10	100.	1.23
EPPER PASS	26/03	27/03	190	115.	6.50	80.	113.62
EPPER PASS	26/03	27/03	25	4.	7.60	100.	0.76
KRAAN ISLAND	26/03	27/03	35	10.	4.00	75.	1.05
KRAAN ISLAND	26/03	27/03	110	10.	3.60	100.	3.96
KRAAN ISLAND	26/03	27/03	60	60.	6.00	90.	19.44
KRAAN ISLAND	26/03	27/03	25	3.	6.50	100.	0.49
KRAAN ISLAND	26/03	27/03	110	10.	2.30	100.	2.53
MATILDA INLET	21/03	25/03	250	5.	2.20	60.	1.65
MATILDA INLET	21/03	25/03	100	5.	2.90	60.	0.87
MATILDA INLET	21/03	25/03	400	20.	2.40	60.	11.52
MATILDA INLET	21/03	25/03	250	20.	4.40	60.	13.20
MATILDA INLET	21/03	25/03	150	5.	3.30	90.	2.23
MATILDA INLET	21/03	25/03	500	30.	3.80	90.	51.30
MATILDA INLET	21/03	25/03	300	5.	2.90	70.	3.05
MCINTOSH BAY	27/03	29/03	200	30.	2.00	50.	6.00
MCINTOSH BAY	27/03	29/03	250	25.	3.00	25.	4.69
MCINTOSH BAY	27/03	29/03	300	300.	3.00	80.	216.00
MCINTOSH BAY	27/03	29/03	100	50.	2.00	50.	5.00
ROBERT POINT	27/03	28/03	150	12.	3.00	100.	5.40
ROBERT POINT	27/03	28/03	60	18.	1.50	100.	1.62
ROBERT POINT	27/03	28/03	45	4.	2.00	90.	0.32
ROBERT POINT	27/03	28/03	20	2.	2.00	100.	0.08
ROBERT POINT	27/03	28/03	80	7.	2.00	100.	1.12
ROBERT POINT	27/03	28/03	18	2.	2.00	100.	0.07
ROBERT POINT	27/03	28/03	8	8.	5.00	100.	0.32
ROBERT POINT	27/03	28/03	40	12.	1.50	100.	0.72
ROBERT POINT	27/03	28/03	40	10.	2.00	100.	0.80

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
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STATISTICAL AREA: 24, CLAYOQUOT SOUND CONTINUED

SURFACE SPAWN SURVEY

ROBERT POINT	27/03	28/03	35	4.	2.70	100.	0.38
ROBERT POINT	27/03	28/03	140	40.	1.00	75.	4.20
SARANAC ISLAND	22/03	23/03	10	3.	2.00	100.	0.06
SARANAC ISLAND	22/03	23/03	35	12.	2.00	100.	0.84
SARANAC ISLAND	22/03	23/03	18	12.	2.00	100.	0.43
SARANAC ISLAND	30/03	01/04	180	25.	1.56	15.	1.06
SARANAC ISLAND	22/03	23/03	115	20.	2.00	100.	4.60
WHITESAND COVE	25/03	28/03	30	3.	2.00	100.	0.18
WHITESAND COVE	25/03	28/03	40	4.	5.00	100.	0.80
WHITESAND COVE	25/03	28/03	25	2.	5.00	100.	0.25
WHITESAND COVE	25/03	28/03	280	200.	6.00	40.	134.40
WHITESAND COVE	25/03	28/03	250	60.	7.00	70.	73.50
YELLOW BANK	27/03	29/03	370	270.	0.50	70.	34.97
YELLOW BANK	27/03	29/03	550	370.	3.00	75.	457.88
YELLOW BANK	27/03	29/03	240	240.	1.00	80.	46.08

SURFACE SURVEY AREA TOTAL 10354 1747.27

DIVE SPAWN SURVEY

ANTONS SPIT	16/03	20/03	4000	435.50	1.37	28.02	668.96
HESQUIAT HARBOUR	16/03	20/03	2000	240.00	1.47	20.58	144.96

DIVE SURVEY AREA TOTAL 6000 813.92

STATISTICAL AREA: 25, NOOTKA SOUND

SURFACE SPAWN SURVEY

FRIENDLY COVE	25/03	28/03	600	65.	5.43	90.	190.77
FRIENDLY COVE	25/03	28/03	50	15.	3.50	100.	2.63
INNER NUCHATLITZ	28/03	29/03	260	80.	1.83	40.	15.23
INNER NUCHATLITZ	12/03	15/03	180	30.	0.50	100.	2.70
INNER NUCHATLITZ	12/03	15/03	160	20.	2.00	50.	3.20
INNER NUCHATLITZ	12/03	15/03	260	30.	0.50	100.	3.90
INNER NUCHATLITZ	13/03	15/03	350	30.	0.50	100.	5.25
INNER NUCHATLITZ	12/03	15/03	470	300.	1.30	70.	128.31
INNER NUCHATLITZ	12/03	15/03	830	400.	1.00	80.	265.60
LOUIE BAY	11/03	12/03	183	122.	1.50	50.	16.74
MCKAY PASSAGE	26/03	28/03	120	15.	1.53	90.	2.48
MCKAY PASSAGE	26/03	28/03	100	50.	4.07	70.	14.23
OUTER NUCHATLITZ	12/03	15/03	240	70.	2.10	70.	24.70
OUTER NUCHATLITZ	12/03	15/03	520	200.	1.36	70.	99.01
OUTER NUCHATLITZ	12/03	15/03	160	70.	1.00	50.	5.60
OUTER NUCHATLITZ	12/03	15/03	920	220.	1.10	60.	133.58
OUTER NUCHATLITZ	12/03	15/03	210	100.	0.88	100.	18.38
OUTER NUCHATLITZ	12/03	15/03	260	110.	2.00	50.	28.60

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Date Start	End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
STATISTICAL AREA: 25, NOOTKA SOUND			CONTINUED				
SURFACE SPAWN SURVEY							
OUTER NUCHATLITZ	12/03	15/03	350	130.	0.82	100.	37.31
OUTER NUCHATLITZ	12/03	15/03	140	70.	0.96	50.	4.73
OUTER NUCHATLITZ	12/03	13/03	150	60.	0.30	50.	1.35
OUTER NUCHATLITZ	12/03	15/03	220	100.	1.30	50.	14.30
OUTER NUCHATLITZ	12/03	13/03	160	100.	0.30	60.	2.88
OUTER NUCHATLITZ	12/03	15/03	600	220.	1.41	70.	129.82
OUTER NUCHATLITZ	12/03	13/03	130	45.	1.50	50.	4.39
OUTER NUCHATLITZ	12/03	15/03	170	150.	1.60	60.	24.48
OUTER NUCHATLITZ	12/03	15/03	170	60.	1.00	70.	7.14
OUTER NUCHATLITZ	12/03	12/03	260	160.	0.70	50.	14.56
PORT LANGFORD	10/03	12/03	110	25.	1.00	80.	2.20
PORT LANGFORD	10/03	12/03	120	65.	4.60	50.	17.94
PORT LANGFORD	10/03	12/03	425	25.	2.90	80.	24.65
PORT LANGFORD	10/03	12/03	90	30.	1.50	60.	2.43
PORT LANGFORD	09/03	12/03	180	40.	4.10	20.	5.90
PORT LANGFORD	08/03	12/03	2200	25.	2.20	80.	96.80
ROSA HARBOUR	28/03	29/03	370	60.	0.30	50.	3.33
ROSA HARBOUR	28/03	29/03	480	30.	2.90	85.	35.50
SAN MIGUEL ISLANDS	25/03	28/03	80	35.	2.96	100.	8.29
SANTA GERTRUDIS COVE	26/03	28/03	50	20.	3.50	60.	2.10
SANTA GERTRUDIS COVE	26/03	28/03	270	70.	12.00	60.	136.08
SANTA GERTRUDIS COVE	26/03	28/03	160	15.	10.00	50.	12.00
SURFACE SURVEY AREA TOTAL			12758				1549.07
STATISTICAL AREA: 27, QUATSINO SOUND							
SURFACE SPAWN SURVEY							
HAZARD POINT	28/03	31/03	2200	100.	0.90	40.	79.20
HAZARD POINT	28/03	29/03	725	80.	2.40	60.	83.52
HAZARD POINT	28/03	29/03	1200	40.	2.55	80.	97.92
LEESON HARBOUR	01/04	05/04	60	2.	3.58	70.	0.30
LEESON HARBOUR	27/03	27/03	1000	30.	0.86	50.	12.90
LEESON HARBOUR	28/03	29/03	1100	40.	1.80	60.	47.52
SURFACE SURVEY AREA TOTAL			6285				321.36
DIVE SPAWN SURVEY							
KLASKISH ANCHORAGE	10/03	17/03	2620	28.60	4.16	36.67	114.22
KLASKISH BASIN	10/03	17/03	1240	19.75	2.11	55.72	28.78
KLASKISH INLET N. SHORE	10/03	17/03	3300	27.80	3.13	54.16	155.57
KLASKISH INLET S. SHORE	10/03	17/03	2275	80.83	2.82	46.89	243.13
MCDUGAL ISLAND	10/03	17/03	1300	31.25	2.26	30.12	27.66
DIVE SURVEY AREA TOTAL			10735				569.36

HERRING SPAWNING SUMMARY TABLE FOR 1987

Spawning Ground	Spawn Start	Date End	Length (m)	Avg.Width (m)	Avg. Layers	% Cover	Spawn Area Index
=====							
STATISTICAL AREA: 29, FRASER RIVER							
SURFACE SPAWN SURVEY							
	07/03	07/03	1646	46.	0.10	100.	7.57
	07/03	07/03	549	68.	0.40	100.	14.93
SURFACE SURVEY AREA TOTAL			2195				22.50

Appendix 1.

OCTOBER, 1986

**GUIDELINES FOR THE 1986 OPEN HERRING FOOD AND BAIT FISHERY**

The 1986 Food and Bait fishing season will commence on or after November 10th, and terminate on or about December 12th, 1986. Opening dates for specific areas will be as described as a condition of the licence.

**INTENDED USE**

Herring caught in the Open Food and Bait fishery is intended to satisfy the bait requirements of domestic commercial fishermen and to provide a small quantity of herring to firms wanting to engage in secondary processing of food herring products.

**ENTRY AND LICENSING REQUIREMENTS**

A. North of Cape Caution

1. A total of 75 tons will be allocated to processing companies in the North Coast. Each company participating in the fishery will identify one or more boats to fish their allocation.

B. South of Cape Caution

1. A total of 250 tons will be allocated to fisherman by means of a lottery. The 250 tons allocation will be split between Johnstone Strait and the Strait of Georgia as follows:
  - a) Johnstone Strait (Area 13): 50 tons
  - b) Strait of Georgia (Area 17 and 18): 200 tons
2. The 250 tons allocated to the Open Food and Bait Fishery south of Cape Caution will be issued in the Strait of Georgia.
3. Each interested vessel owner/operator may submit an application to fish only one area. Lottery application will be available only at the Vancouver Office, commencing on October 30th, 1986, and terminating at 2:00 p.m. on November 10th, 1986. The draw will be conducted by an Industry representative on November 10th, 1986. The draw will be conducted by an Industry representative on November 10th, 1986, in Vancouver, and Industry will be notified of qualifying vessels via the telex. These licences are non-transferable.

4. Each vessel may be entered on one application only.
5. Food and Bait Herring Fishing Licences will be issued to vessel owners under the following conditions.
  - a) Each vessel or owner must have a valid "A" seine, "H", or "T" licence.
  - b) All fishing vessels catching, transporting or delivering herring during the 1986 Open Food and Bait Fishery may be subject to inspection of the fish hold and refrigeration system prior to issuance of a licence.
  - c) All vessels engaged in the 1986 Open Food and Bait Fishery must use a Properly functioning R.S.W. or C.S.W. system.

#### ADMINISTRATION AND REGULATION OF THE FISHERY

Section 12 of the B.C. Fish Inspection Regulations 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 discontinued 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 25mm (1") extension measure.
2. Licences may be withdrawn in the event that small damaged or unsuitable fish are being spilled, or if substantial incidental catches of salmon occur.
3. No vessel will be licensed to catch, have on board, or deliver more than 50 tons of herring. In the event more than 50 tons are delivered, a relinquishment of the excess herring will be made directly to the Crown.
4. Vessels must hail catch tonnage that is taken aboard to designated patrol vessel prior to leaving the fishing grounds.
5. All deliveries must be offloaded within 18 hours of capture. The onus is on the vessel master to clear the plants for reserved offloading.
6. 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.

APPLICATION

OCTOBER, 1986

1986 OPEN HERRING FOOD AND BAIT FISHERY  
BOAT QUOTA LOTTERY SYSTEM

I, \_\_\_\_\_, the owner/operator of the herring fishing vessel \_\_\_\_\_, Type Licence (i.e. "A" , "H" or "T") \_\_\_\_\_ and CFV # \_\_\_\_\_, submit application to enter the 1986 Herring Food Bait 50 ton boat quota lottery system.

ENTRY DETAILS

1. Food and Bait fishing licence will be issued to 5 vessels in the 1986 Fishery:  
Four vessels will be allotted 50 ton quotas to be taken in the lower East Coast Sub-District (Areas 17 and 18) and one vessel will be allocated 50 tons to be taken in Johnstone Strait (Area 13)
2. All entries must be received at the Vancouver office not later than 2:00 p.m. on November 10, 1986.
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 and use function R.S.W. or C.S.W. systems.
  - c) Each vessel may only be entered once, therefore;

Check one box only:

- |                      |                        |
|----------------------|------------------------|
| A. Johnstone Strait  | (1 boat to be chosen)  |
| B. Strait of Georgia | (4 boats to be chosen) |

Fisheries Branch  
South Coast Division  
3225 Stephenson Pt. Rd.  
Nanaimo, B.C. V9T 1K3  
(604) 756-7270

Your file / Votre référence

Our file / Notre référence

Dear Sir/Madam

The attached Roe Herring Fishery Management Plans identify an allocation of surplus stocks for the 1987 Roe Herring Fishery at 30,449 short tons. This quota will be allocated to licensed seiners and gillnetters by attempting to achieve 55 % (16,747 tons) of the total to seines and 45 % (13,702 tons) to gillnetters. Some important changes from 1986 will be explained in detail in the attached plan. However, briefly, they are:

1. Roe herring fisheries will be in 5 areas for seiners and 4 areas for gillnetters, as follows:

<u>LICENCE AREA</u>	<u>SEINE QUOTA</u> (IDEAL NO.GEARS)	<u>GILLNET QUOTA</u> (IDEAL NO.GEARS)
Q.C.I.	1555 (22)	
Pr. Rupert	1700 (25)	4300 (416)
Central	2861 (41)	800 (78)
St. of Georgia	2928 (42)	5942 (576)
W.C.V.I.	7703 (110)	2660 (257)

2. When applying for licences, gillnetters do not have to designate a specific skiff. The system in 1987 will allow gillnet fishermen to place a roe herring licence plate on any inspected skiff prior to engaging in the fishery.

Please be reminded that as in 1986, area selections will be made on the application itself and changes of areas on the application will be allowed up to January 15, 1987, the application deadline. No licences will be issued over the counter in 1987. All applications will be processed and licences issued after January 15, 1987.

Information that may help fishermen choose their fishing areas, such as historical catch and spawn data is enclosed. The Department will telex up-to-date tallies of application numbers by area as we receive them.

If additional information is required, please contact: Lloyd Webb, 666-0207 (Vancouver); Eric Kremer, 666-6931 (Vancouver); Paul Sprout, 624-9371 (Pr. Rupert); Larry Duke, 754-0211 (Nanaimo).

Yours truly,

G.E. Jones  
Director  
Field Services Branch

GUIDELINES FOR THE 1987 ROE HERRING FISHERY  
NOVEMBER 1986

An area Licensing System in the roe herring fishery will be implemented for the 1987 season. Important changes are outlined below. The total catch quota based on a fixed exploitation rate of returning harvestable stocks is 30,449 tons. The allocation of this catch to area and gear type follows.

If recruitment is more or less than predicted the predetermined 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.

CATCH QUOTA BY GEAR TYPE AND AREA (SHORT TONS)

<u>Licence Area</u>	<u>Seine</u>	<u>Gillnet</u>	<u>Total</u>
Queen Charlotte Islands	1555		1555
Prince Rupert	1700	4300	6000
Central Coast	2861	800	3661
Strait of Georgia	2928	5942	8870
West Coast Vancouver Island	7703	2660	10363
	-----	-----	-----
	16747(55%)	13702(45%)	30449

1. Stocks will be monitored in all major fishing area and opening will be declared when warranted up to the limit of each licence areas gear quota.
2. South of Cape Caution no openings are anticipated in the Johnstone Strait area.
3. No openings are anticipated on the West Coast of the Queen Charlotte Islands due to low forecasts for 1987.
4. This is a general outline of the 1987 Herring Management Plan only, and does not supersede the appropriate Fisheries Regulation.

ADMINISTRATION OF THE 1987 ROE HERRING FISHERY

1. The 55%/45% seine:gillnet catch division will apply in the 1987 fishery on an overall coast wide 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 gillnet or seine vessels if they are for different areas. The D.F.O. 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. Vessels transferring catches form 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 on channels 78A VHF and 2318 HF; however, the precise opening time will occur within the time period previously set out. This opening announcement will be made on channel 79B VHF.
8. Gillnet fishery openings will be announced as far in advance as possible.
9. Notice of closure 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 made to broadcast to the fleet anticipated times to fulfilment 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 licensed for the given area and the licensed 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.

12. The seine fleet is requested to avoid excessive disturbance of herring caused by vessels running back and forth over schools prior to openings. In some cases specific requests to stay off particular areas will be broadcast from patrol vessels and fishermen will be expected to comply.
13. Gillnet fishermen may use the net drum on their salmon fishing vessel to pull their roe herring gillnets across their punts, provided:
  - the punt is properly licensed for roe herring for the appropriate area;
  - all persons aboard the vessel engaged in the operation hold valid personal commercial fishing licences.

#### ROE HERRING GILLNET FISHERY REGULATIONS

1. No person shall use more than one section of herring gillnet. No person shall use a gillnet that is greater than 135m in length.
2. No person shall use a gillnet containing more than 100 meshes in depth, the mesh size of which is less than 57 mm (2.25 inches) and not greater than 64 mm (2.5 inches).
3. Shaker panels shall not exceed a depth of 2 m with a mesh size not less than 150 mm (6 inches).
4. Gillnets must be marked on both ends with buoys not less than 125 cm in circumference, and be of similar colour.
5. Gillnet fishermen must attach a gillnet licence decal to one end of his gillnet. A gillnet licence net decal shall:
  - (a) be issued to the applicant with his herring roe licence;
  - (b) be valid only for the licence with which it was issued, and
  - (c) be clearly visible and at least 30 cm above the surface of the water.
6. When fishing with gillnets, no person shall leave any anchors, buoys or lines in the water during any closed time.
7. In fishing for roe herring from a punt, or while having roe herring aboard a punt, no person shall use or carry a greater length or depth of net in a hung condition than is permitted by the Pacific Herring Fishery Regulations. It should be

noted that extra net may be carried on accommodation vessels or motherships.

### ROE HERRING SEINE FISHERY REGULATIONS

A herring purse seine shall not be greater than 500 m (275 fathoms) in length, and mesh size not less than 25 mm (1 inch) extension measure.

### LICENCE REQUIREMENTS FOR THE ROE HERRING FISHERY

#### 1. AREA CHOICE

- A. The preliminary area choice system has been set aside for the 1987 licence year. The area marked on the licence application will be a final choice. Applications which are submitted without an area election will not be considered complete. Completed applications must be received or post marked no later than January 15.
- B. Area sections will be posted daily as applications are received and the area choice recorded. Licence holders may request to change their area choice up to January 15. Changes may be requested by writing to the Licence Division office in Vancouver.
- C. No Changes to area elections will be accepted after January 15, 1987

#### 2. APPLICATIONS

- A. Applications and fees for 1987 roe herring licences must be received or postmarked no later than January 15, 1987. Applications may be delivered or mailed to either the Vancouver or Prince Rupert Licence Division office.
- B. Applications will not be processed over-the-counter this year. Applications will be processed after January 15 deadline and arrangements may be made (on the form provided for this purpose), to have your licence mailed or picked-up at either our Vancouver or Prince Rupert office. If you wish to pick up your licence, please provide us with a telephone number where we may contact you when the licence is ready.

#### 3. GILLNET LICENSING

Changes are being made for the licensing of the roe herring gillnet fleet this year. These changes will put more

emphasis on the roe herring licence decals, for the net and the skiff.

Beginning in 1987, C.F.V. plates will no longer be required for skiffs used only in the roe fishery. All C.F.V. plates issued for these vessels are being recalled and may be returned to any departmental office in the Pacific Region. This includes District and Sub-District offices. Note: Skiffs which are also licensed in the "C" category, (these have been issued two C.F.V. plates) should not return their plates, these should be left on the skiff.

In place of the C.F.V. plate a roe herring gillnet licence holder will be issued a new roe herring gillnet licence plate. The 1987 gillnet licence decal (large decal) must be affixed to the plate. The licence holder may fasten the plate to any skiff he chooses, (whether the skiff is also issued a "C" licence or not), subject to the following conditions:

- A. The skiff must be registered or licensed with Department of Transport (D.O.T.) and the D.O.T. # clearly marked on the skiff. (This is normally a number starting with 13K or 6K, etc.). This is not a new requirement and all gillnet skiffs should already be displaying a D.O.T. number.
- B. The skiff must meet all fish hold inspection standards. car top or smaller skiffs not suitable for the roe fishery may not be used.
- C. The roe herring licence plate with the decal affixed to it, must be securely attached to the skiff.
- D. Only one licence, per skiff, per area will be permitted. This means that each roe herring licence in an area must be fished by a different skiff. Doubling up licences in the same area is still not permitted.
- E. The licence plate must be attached to the skiff prior to the fishery, and must remain attached until after the fish have off-loaded from the skiff.

As in previous years, a net decal (smaller decal) will be issued along with the skiff decal. The net decal must be affixed to the scotchman or buoy at one end of the net. The same end should be marked with a flag to show where the decal may be found.

The skiff which pulls the net must have the matching number decal and gillnet licence plate attached to it.

The purpose of these changes is to reduce the number of markings and numbers required for gillnet skiffs and to allow fishermen more flexibility in choosing a skiff. To repeat: the only markings required for skiffs which fish only roe herring are:

1. The D.O.T. number
2. The roe herring gillnet licence plate with the licence decal affixed to it.

All skiffs must have passed fish hold inspection. C.F.V. number plates are not required unless the skiff is also licensed in another category. Plates which are not required must be returned to the Department.

NOTE: Inspection requirements for gillnet skiffs. All gillnet skiffs should provide standing areas for and aft to prevent the fishermen from standing in the herring. Fuel storage areas must be separated from fish storage areas with watertight bulkheads or raised ridges and should drain overboard. Most older skiffs have holes in the aluminum dividers and drain water and blood to the aft standing area where a self-bailer is located. New skiffs should have separate bailers for this standing area and the forward part of the skiff as added protection against contamination will be provided by a water tight bulkhead at this point.

This change is expected to simplify licensing requirements for the gillnet fleet. Suggestions or comments about this change or other licensing requirements are welcome.

#### 4. SEINE LICENSING

- A. Each holder of a roe herring seine licence must designate, upon application for his licence, the vessel he intends to use in the 1987 roe herring seine fishery. If a vessel formerly used is not longer licensed for use in any fishery, the licence holder must return the C.F.V. plates issued to that vessel. C.F.V. plates should be returned along with the licence application designating a different vessel for the 1987 fishery.
- B. After the 1987 application is delivered to the Department a request to change the designated seine vessel may be considered if the request is received by January 15, 1987. No changes to designated seine vessels will be approved between January 16th, 1987  
30th, 1987.
- C. One decal will be issued with each roe herring seine

licence. It is to be affixed to the starboard side of the wheel house or hull prior to the vessel engaging in fishing.

**5. REPLACEMENT DECALS**

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 decal will be designated by an "R" and will be for the same area as the decal which was lost. It is to be affixed as described.

**6. OPERATION OF ROE HERRING VESSELS**

For the 1987 roe herring season, a licence holder may allow his licence to be operated by another person. Where an Indian has been issued a roe herring licence, an Indian must be on board the licensed vessel while it is engaged in the roe herring fishery.

**7. REPORTING OF CATCH**

Catch by roe herring gillnet skiffs is to be reported under the licence number.

Seine catch can continue to be reported under the C.F.V. # fo the catching vessel, although the addition of the licence number to the sales slip will also be helpful.

Government of Canada  
Fisheries and Oceans

Gouvernement du Canada 69 -  
Pêches et Océans

Fisheries Branch  
South Coast Division  
3225 Stephenson Pt. Rd.  
Nanaimo, B.C. V9T 1K3  
(604) 756-7270

Your file    Votre référence

Our file    Notre référence

### Appendix 3

Dear Herring Spawn on Kelp Licence Holder:

Please find enclosed a copy of the 1987 Herring Spawn-On-Kelp Fishery Plan. This Plan was developed by considering resource allocation between major users of the resource, and by doing this a total of about 2,150 tons or about 6% of fishable stocks was allocated to the Spawn-On-Kelp fishery.

Two important changes that are detailed in the Plan are the increase in your quota from 6 tons in 1986 to 8 tons in 1987, the dockside landed weight system (instead of through plant weights) and the supplying of numbered decals for each licence holder for their buckets of processed product.

I would like to take this opportunity to wish you a safe and prosperous 1987 fishery.

Yours truly,

G.E. Jones  
Director  
Fisheries Branch

Encl:

## 1987 SPAWN ON KELP FISHERY PLANS

### 1. GENERAL INFORMATION

Each year the spawn-on-Kelp Licence Holders Committee meets with DFO representatives to discuss management concerns. In 1984, spawn-on-kelp fishery representatives were appointed to the Herring Industry Advisory Board, so that concerns of licence holders are brought to the attention of both Industry and Fishery Managers.

Since 1979 there have been 28 spawn-on-kelp licences (J licence category issued annually). The licence which is not transferable, is issued to a person or Native Band and authorizes the holder to harvest a certain quantity of spawn-on-kelp; since 1980 all licences authorize harvest of 8 short tons, excepting 1986 when overall low stock size necessitated a 6 ton quota.

Since forecasted stocks have returned to 1985 levels, the 8 ton quota will be in effect in 1987. Production in excess of each fishermens' annual quota will be released by the licence holder using the attached "relinquishment of Claim" form (Attachment 5) and will be sold later by Crown Assets. The grade of product released is to be in the same proportion as the grade mix in the total production for the licence holder. It is the intent of D.F.O. to implement dockside drained weight in 1987. Details are specified in licence conditions.

### 2. LICENSING REQUIREMENTS

Persons who were issued a category "J" licence in 1986 may apply for issue of a 1987 "J" licence. Issuance of a licence is based upon compliance with the Terms and Conditions of the previous years licence and Licence Division requirements. The licence holder shall complete and submit the application specifying the desired area of operation, persons employed and vessels used in the operation. Any registered commercial fishing vessel may be used in the fishing operation, except that category "D" vessels may engage in transport only. All vessels used must have a 1987 commercial fishing licence and approved Fish Hold Inspection. The licence fees remain the same at \$10.00 for Native Indians and \$ 2000.00 for Non-Natives.

Marking of spawn-on-kelp ponds, and removal of buoys, lines or other material used for fishing are required as part of

the regulations. Licence holders are requested to remove pond frames from the water prior to June 30.

Once an application (Attachment 1) has been processed, the spawn-on-kelp licence (Attachment 2) is sent to the Fishery Officer in the appropriate district and must be picked up by the applicant. In 1987 there will be no "J" tabs issued, however, the "J" licence that is issued should be kept at the production site at all times while spawn-on-kelp is being harvested. Commencement of the fishery will be specified by fishery officer. Termination of the spawn-on-kelp fishing season will be May 31, 1987.

3. LICENCE DISTRIBUTION AND HERRING ALLOCATION

In 1987, a total of 2,150 tons of herring is allocated to the spawn-on-kelp fishery. The distribution of licences and herring allocation for each area is represented in Table 1.

TABLE 1

<u>Area</u>	<u>Number of Licences</u>	<u>Herring Allocations(tons)</u>
Q.C.I. (Areas 1-2)	11	775
Prince Rupert (Areas 3-5)	8	800
Central Coast (Areas 6-10)	5	435
Strait of Georgia (Areas 11-18, 28)	0	0
West Coast V.I.	4	140
TOTAL	28	2,150

NOTE: An allocation is made for each Area by estimating the quantity of herring that will be used in the spawn-on-kelp fishery. For each closed impoundment 100 tons are allocated and for open ponds (most common in the Q.C.I. area) 35 tons are allocated.

4. INSPECTION GUIDELINES

To ensure quality, all herring spawn-on-kelp harvesters and companies processing spawn-on-kelp must adhere to the following requirements:

- (a) All herring spawn-on-kelp must be shipped to, graded , packed, labelled and exported from establishments possessing valid federal Certificates of Registration sa fish processing plants.
- (b) Containers must be used to collect and hold spawn-on-kelp during harvesting and to transport it to the processing plants. These should be constructed of approved materials: that is, fibreglass, plastic or aluminum. They must also be fitted with rigid covers when holding product outdoors, to protect the product from weather and contamination. Any alternative proposal must be cleared by the local inspection officer.
- (c) During the holding and transporting period the product should be kept chilled to prevent quality loss.
- (d) All boats used for transporting herring spawn-on-kelp must have valid commercial fishing vessel licences and have passed boat inspection.
- (e) For export of the product from registered processing plants, square plastic pails with tight fitting lids appear to be the most acceptable. These cause minimal damage to the product. Used wooden barrels are not acceptable.
- (f) Export containers must be properly labelled to show the name of the product, the weight and the processor or distributor. The containers must also show the date on which the product was packed so that if there are any problems, lots can be segregated without having to hold or delay the entire shipment. The licence number of the permit holder must also appear on the label.
- (g) Product certification is requirement of the Pacific Herring Fishery Regulations and all shipments must be accompanied by an export certificate issued by an Inspection Officer before the goods leave the registered plant.

When the lot is ready for inspection, application in writing must be made to any of the following:

Mr. Wayne Holmes  
Fish Inspection Laboratory  
Dept. of Fisheries and Oceans  
St. 5-1537 Hillside Avenue  
VICTORIA, B.C. V8T 4Y2

Mr. Dale Paterson  
Fish Inspection Laboratory  
Dept. of Fisheries and Oceans  
2250 South Boundary Road  
BURNABY, B.C. V5M 4L9

**CATEGORY J LICENCE NO.**

**SCHEDULE A**

THIS SCHEDULE TO BE FULLY COMPLETED BY A FISHERY OFFICER

1. Commencement date of ponding operation                      May 31, 1987
2. Termination of ponding operation
3. Date on which herring is authorized to  
be taken for impoundment
4. Number of enclosures permitted  
Type of enclosures permitted

Marking of enclosures required

Enclosure construction requirements

5. Geographic area and location of fishing for herring
6. Geographic area and location of enclosures (ponding operation)
7. Enclosures to be dismantled by  
date

signature of Fishery Officer                      Office                      date

signature of Licence Holder                      date

DEPARTMENT OF FISHERIES AND OCEANS

FILE:

RELINQUISHMENT OF CLAIM

NAME: ADDRESS: PROVINCE: TELEPHONE:

BY THESE PRESENTS, ON MY BEHALF OR ON THE BEHALF OF MY HEIRS, EXECUTORS OR ADMINISTRATOR RELEASE FOREVER THE GOVERNMENT OF CANADA AND THE DEPARTMENT OF FISHERIES AND OCEANS FROM ALL MANNER OF ACTIONS, CLAIMS, SUITS OR DEMANDS IN ANY WAY AND DECLARE BEING FULLY SATISFIED WITH THE ACTION TAKEN AND THE SETTLEMENT OF THE FOLLOWING:

DESCRIPTION

Witness

Signature

Date

Date

SALES SLIP REPORT LOG FOR SPAWN-ON-KELP LICENCE HOLDERS

1987

1. Licence Holders Name: Licence No.  
Mailing address:  
  
Telephone No.
2. Statistical Area  
Location of Impoundment/Ponds
3. Did you operate in a pool?    YES NO  
If YES, what is the name(s) of licence holder(s) with whom  
you operated?
4. Harvested weight (lbs) of product:  

	No. of Pails	Weight(lbs)	Value/lb.(\$)
Grade 1			
Grade 2			
Grade 3			
Grade 4			
Grade 5			
Grade 6			
Grade 7			
Grade 8			
5. Is the final value of the product?    YES NO  
If NO, when do you expect a final price settlement?
6. Type of operation - OPEN POND or IMPOUNDMENT  
If both types of operation are used, what % was produced by  
each method?                      OPEN POND                      %                      IMPOUNDMENT                      %
7. Name of Processing Company  
Address:  
Name of Contact Telephone No.
8. Name of Company sold to  
Address:  
Name of Contact Telephone No.

THIS FORM COMPLETED BY:

(name)

(signature)

(date)

COMPLETE AND RETURN THIS FORM TO: Lloyd Webb Herring Coordinator  
1090 W.Pender St., Vancouver, BC V6E 2P1

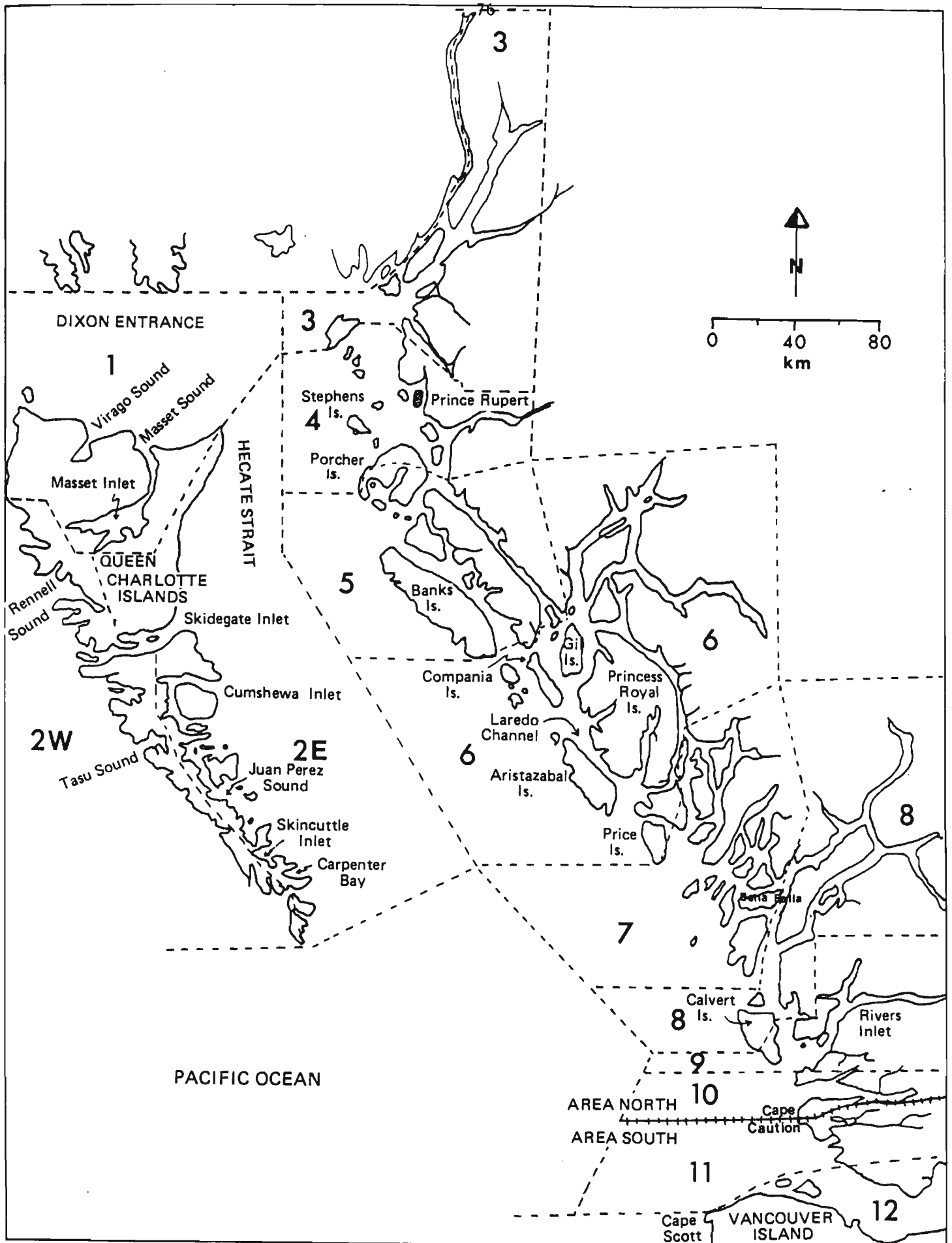


Fig. 1. Location of Statistical Areas in northern B.C.

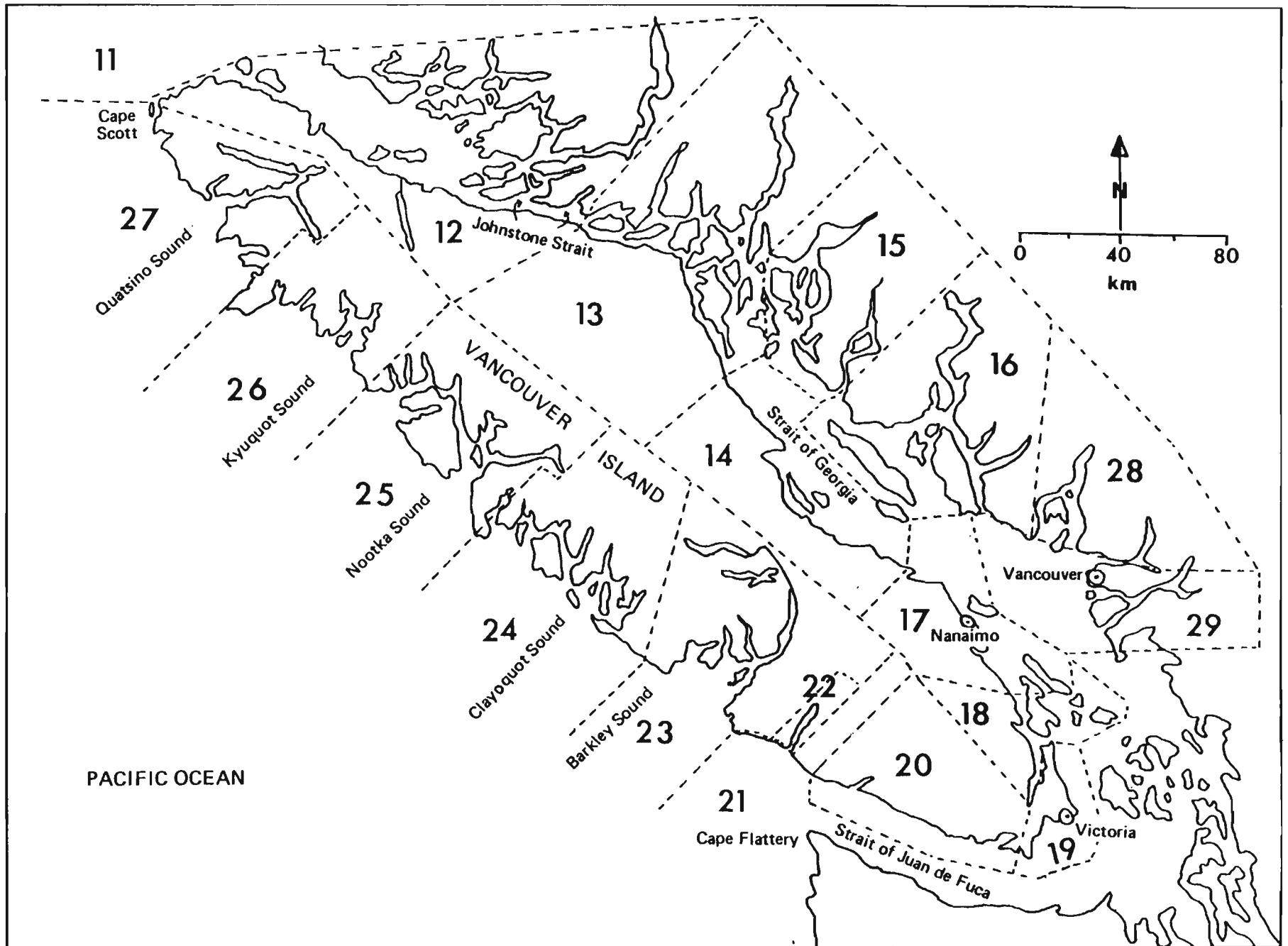


Fig. 2. Location of Statistical Areas in southern B.C.

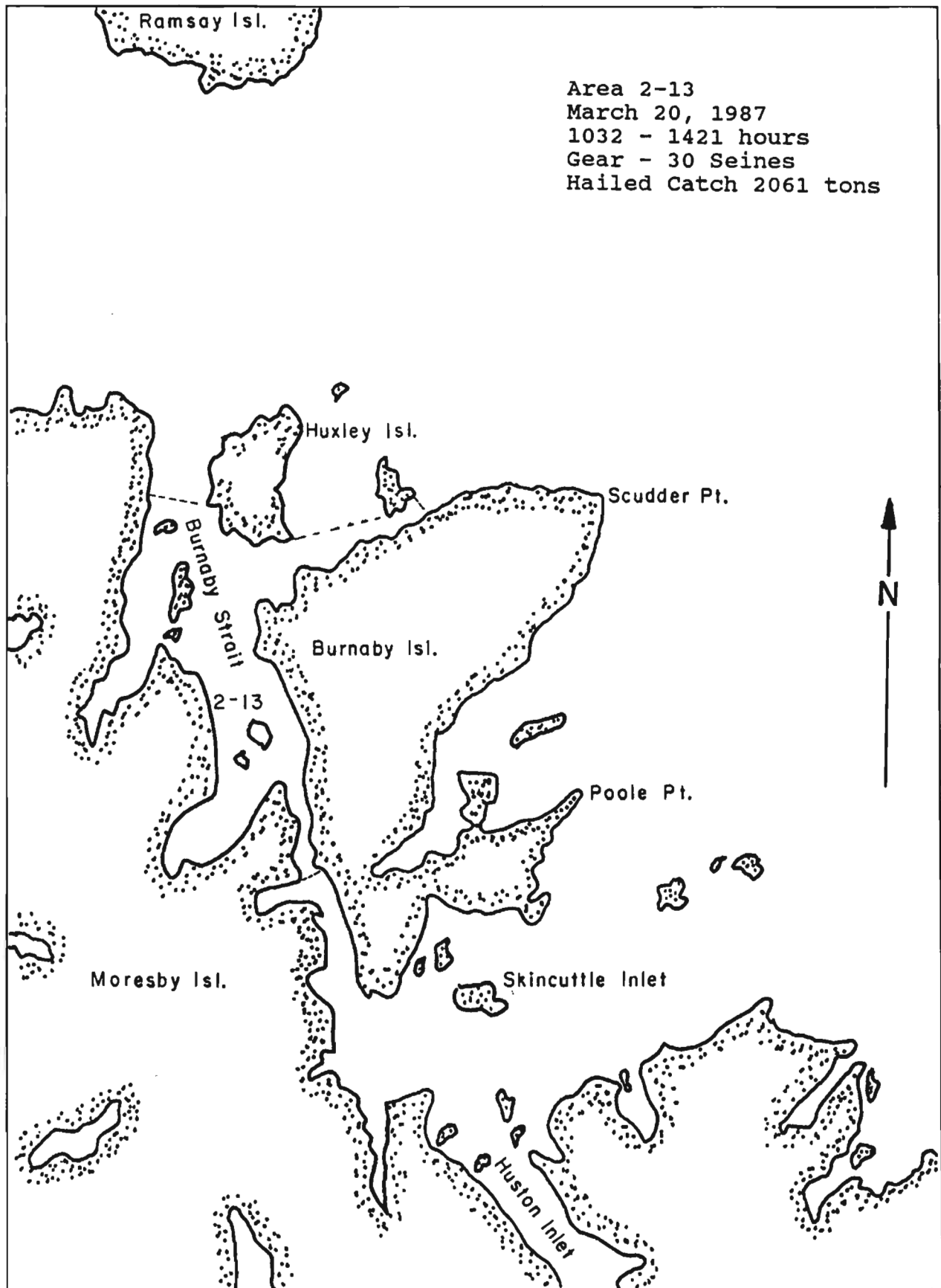


Fig. 3 Roe herring fishing boundaries and hauled catches by gear type in Area 2E, 1987.

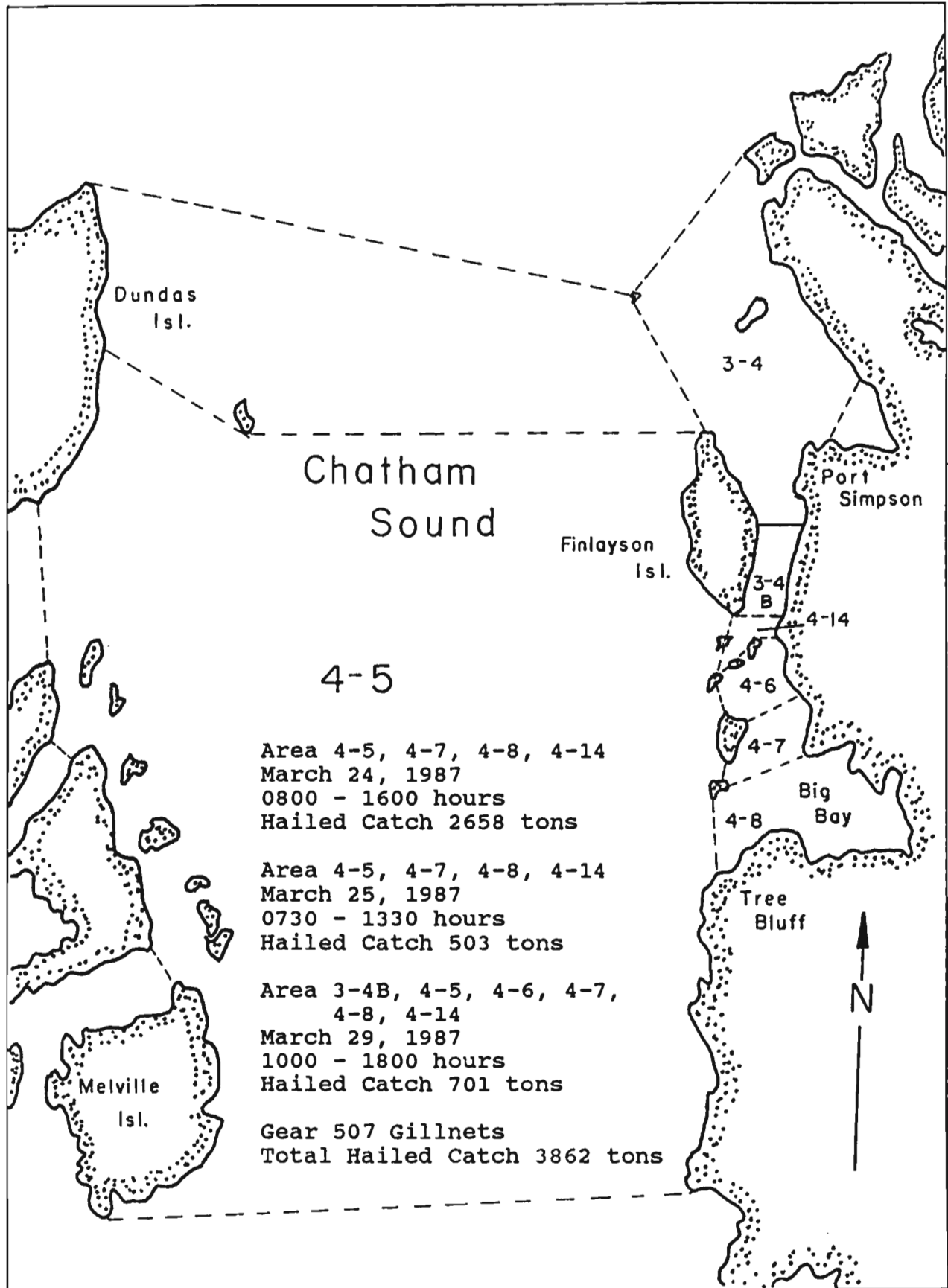


Fig. 4 Roe herring fishing boundaries and hauled catches by gear type in Area 3-4, 1987.

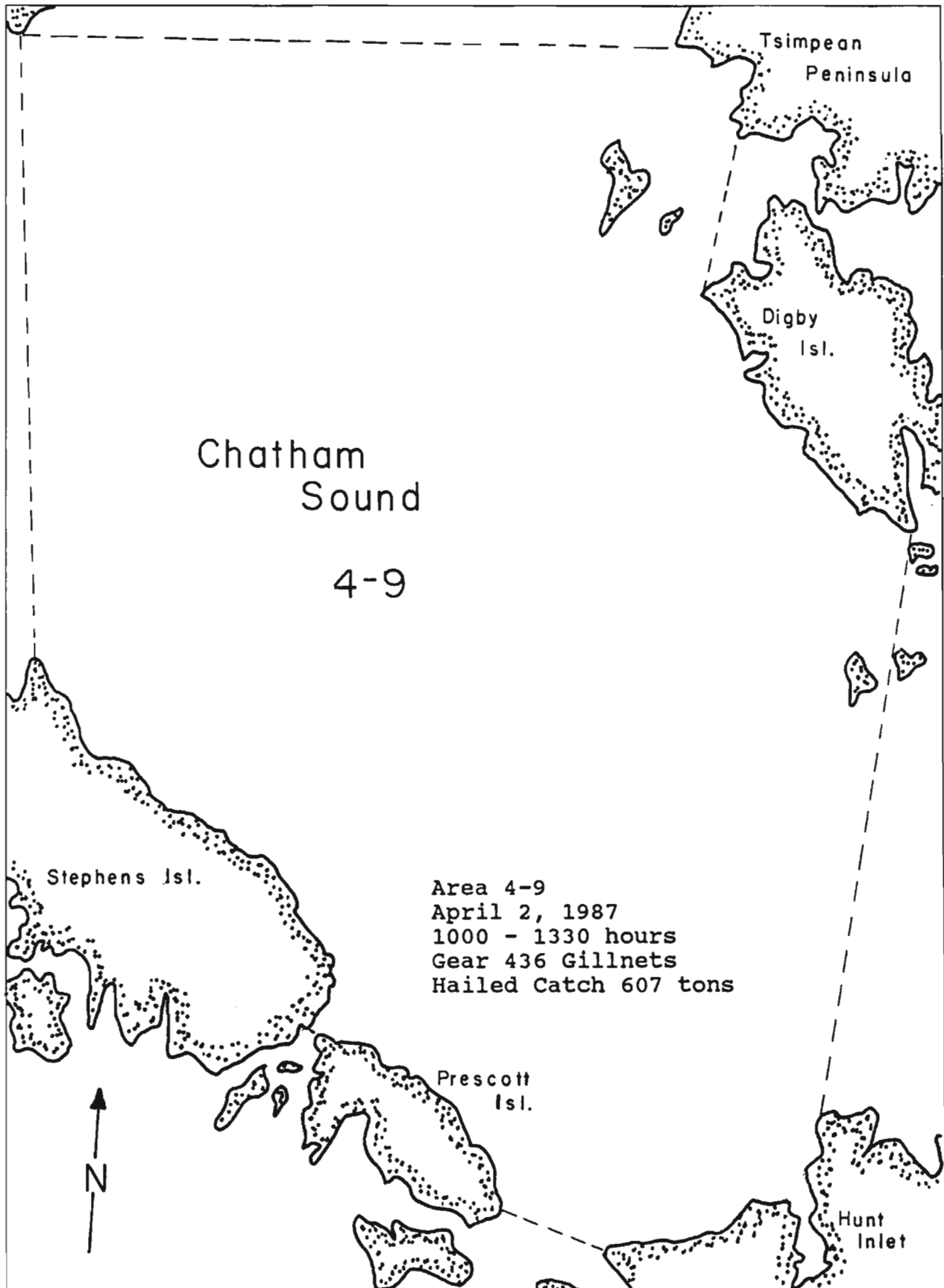


Fig. 5 Roe herring fishing boundaries and hauled catches by gear type in Area 4, 1987.

Fig. 6 Roe herring fishing boundaries and hailed catches by gear type in Area 5, 1987.

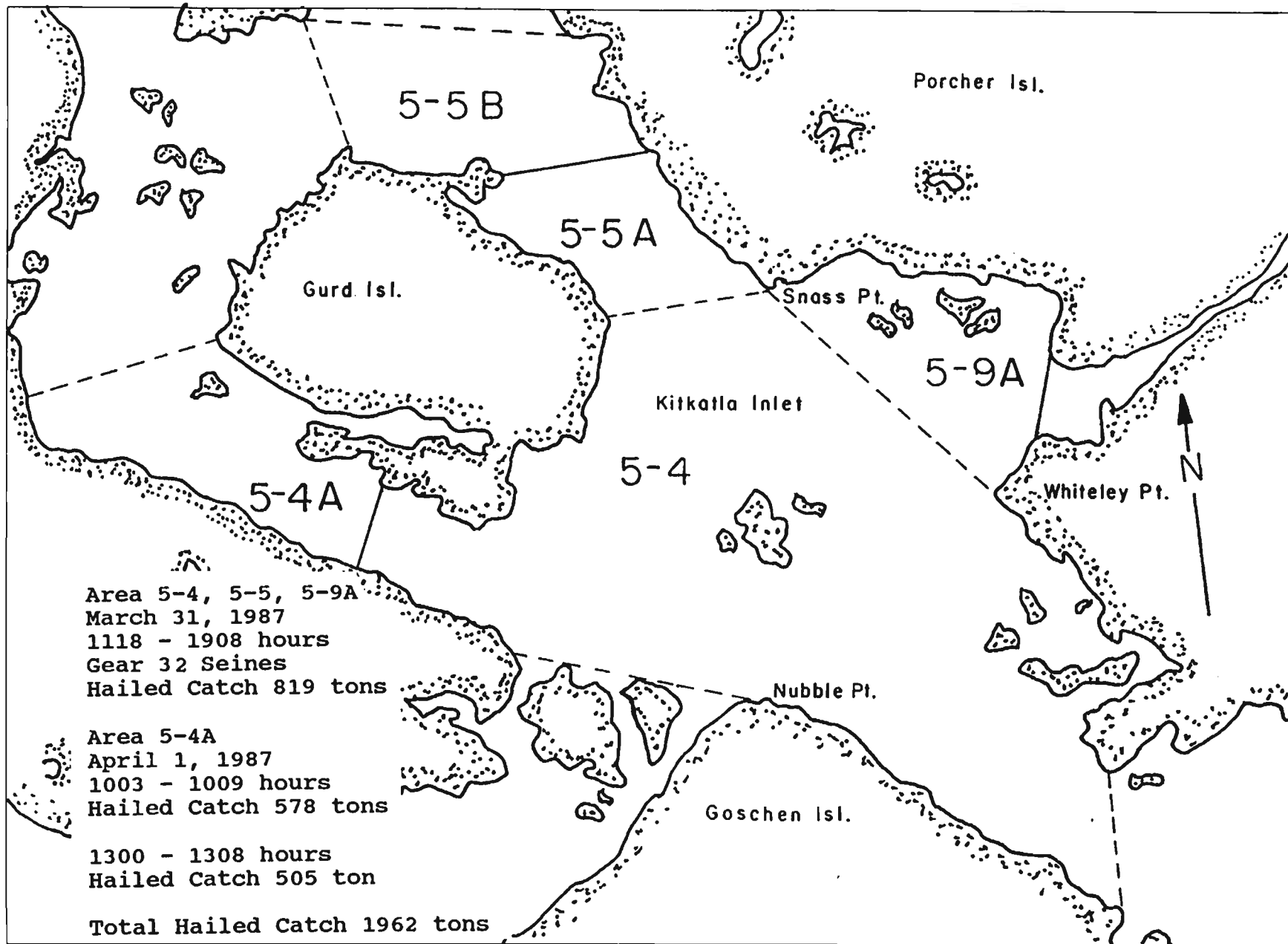
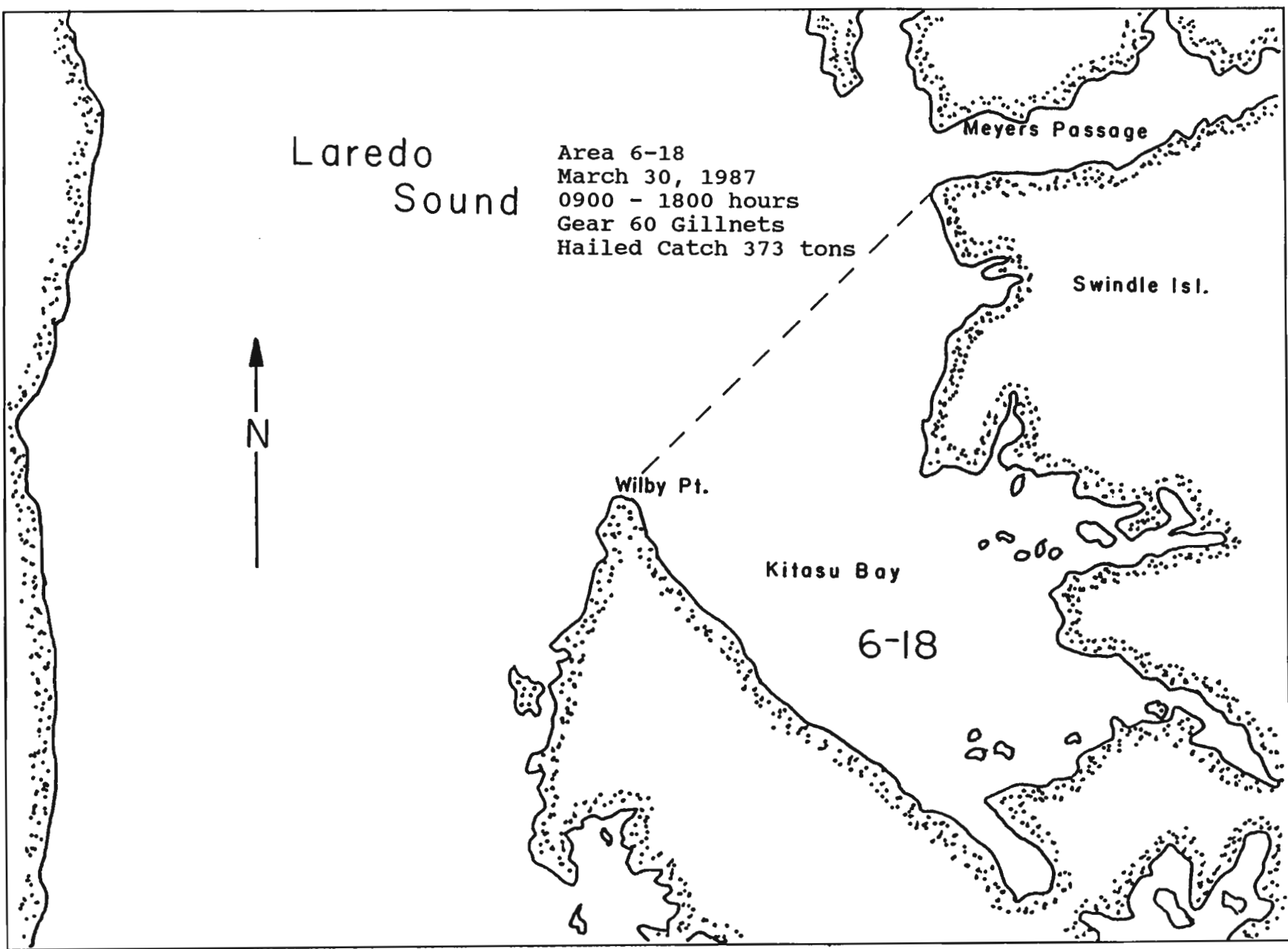


Fig. 7 Roe herring fishing boundaries and hailed catches by gear type in Area 6, 1987.



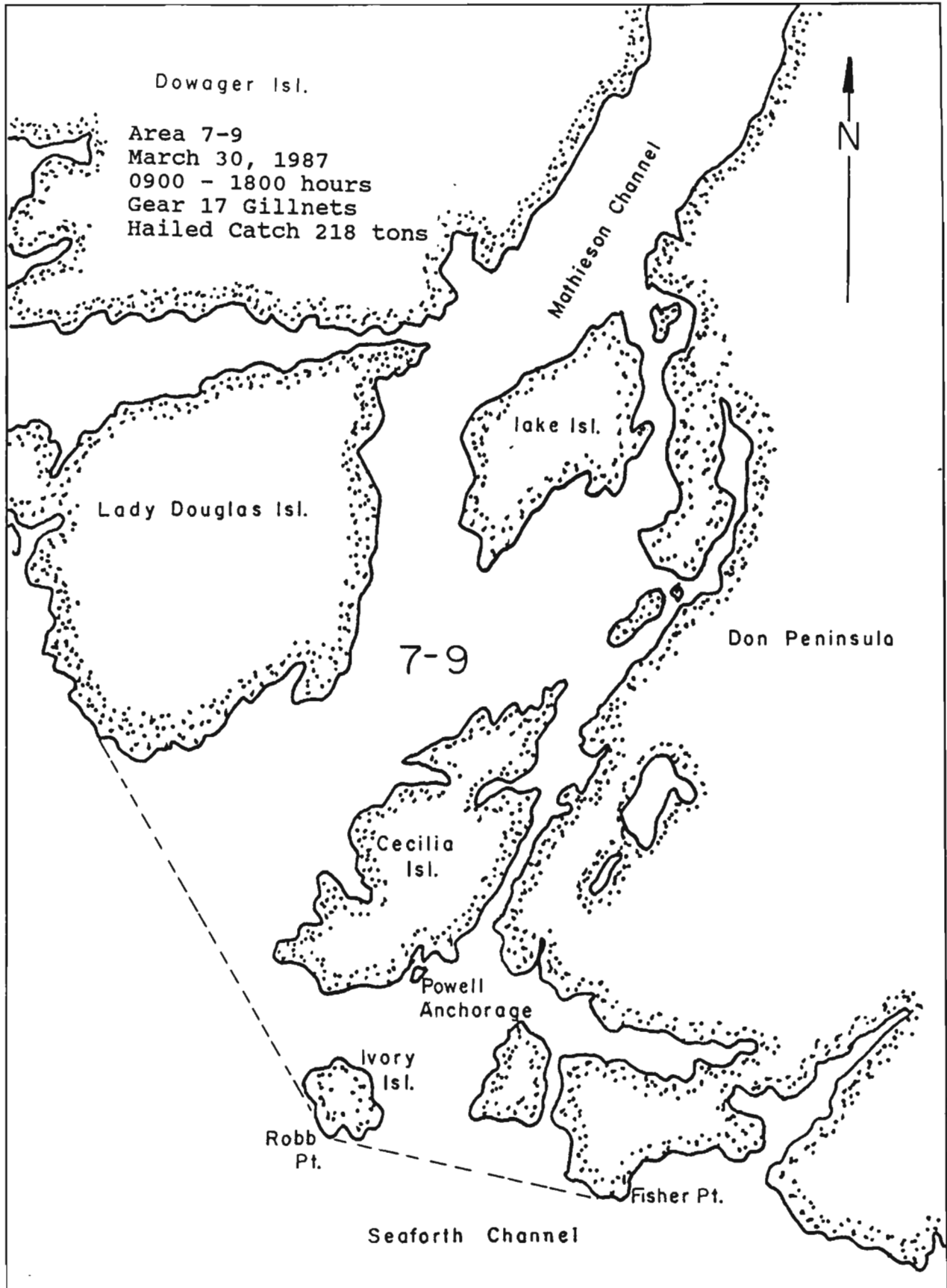


Fig. 8 Roe herring fishing boundaries and hailed catches by gear type in Area 7, 1987.

Fig. 9  
Roe herring fishing boundaries and hailed catches by gear type in Area 7, 1987.

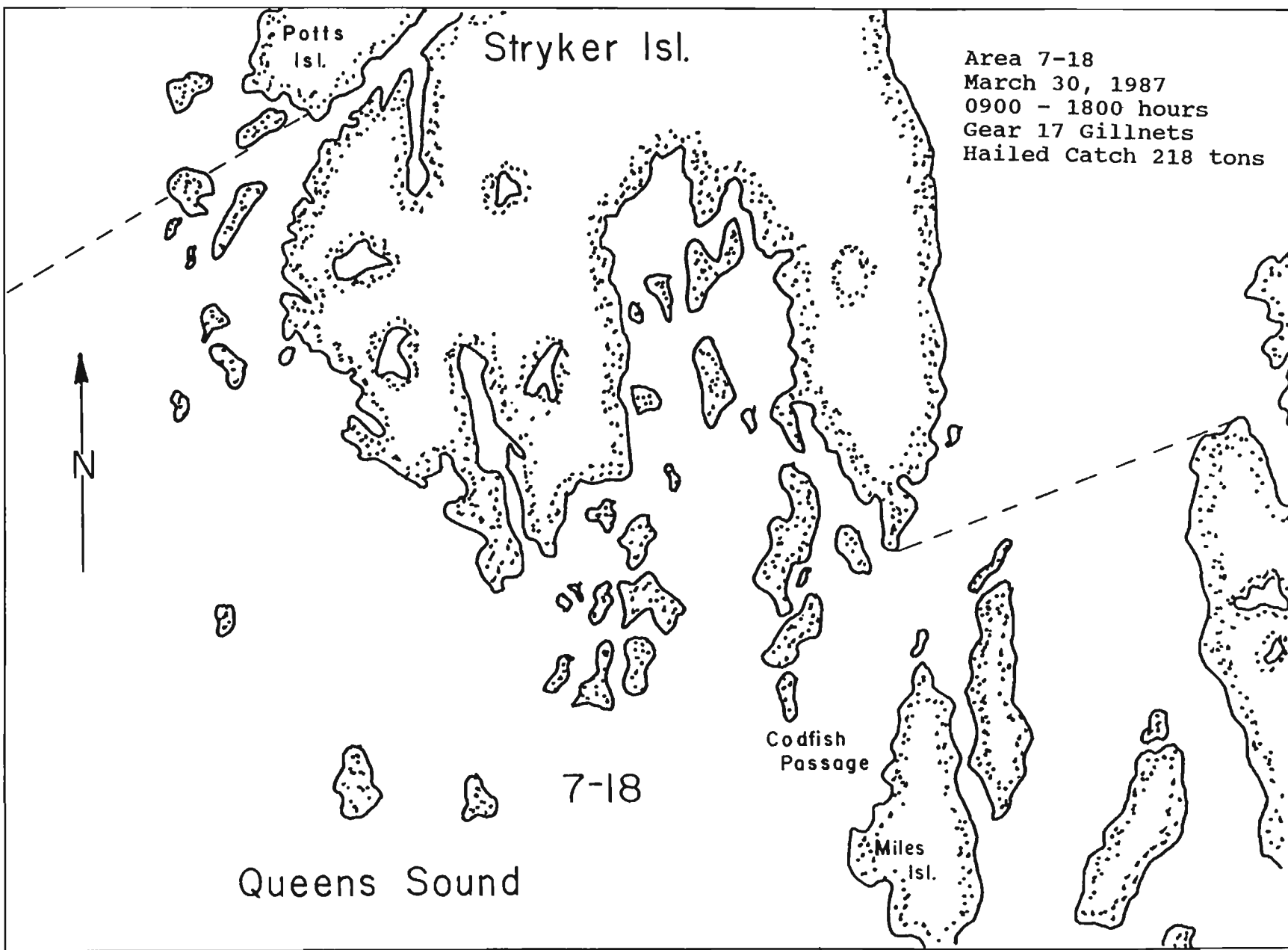
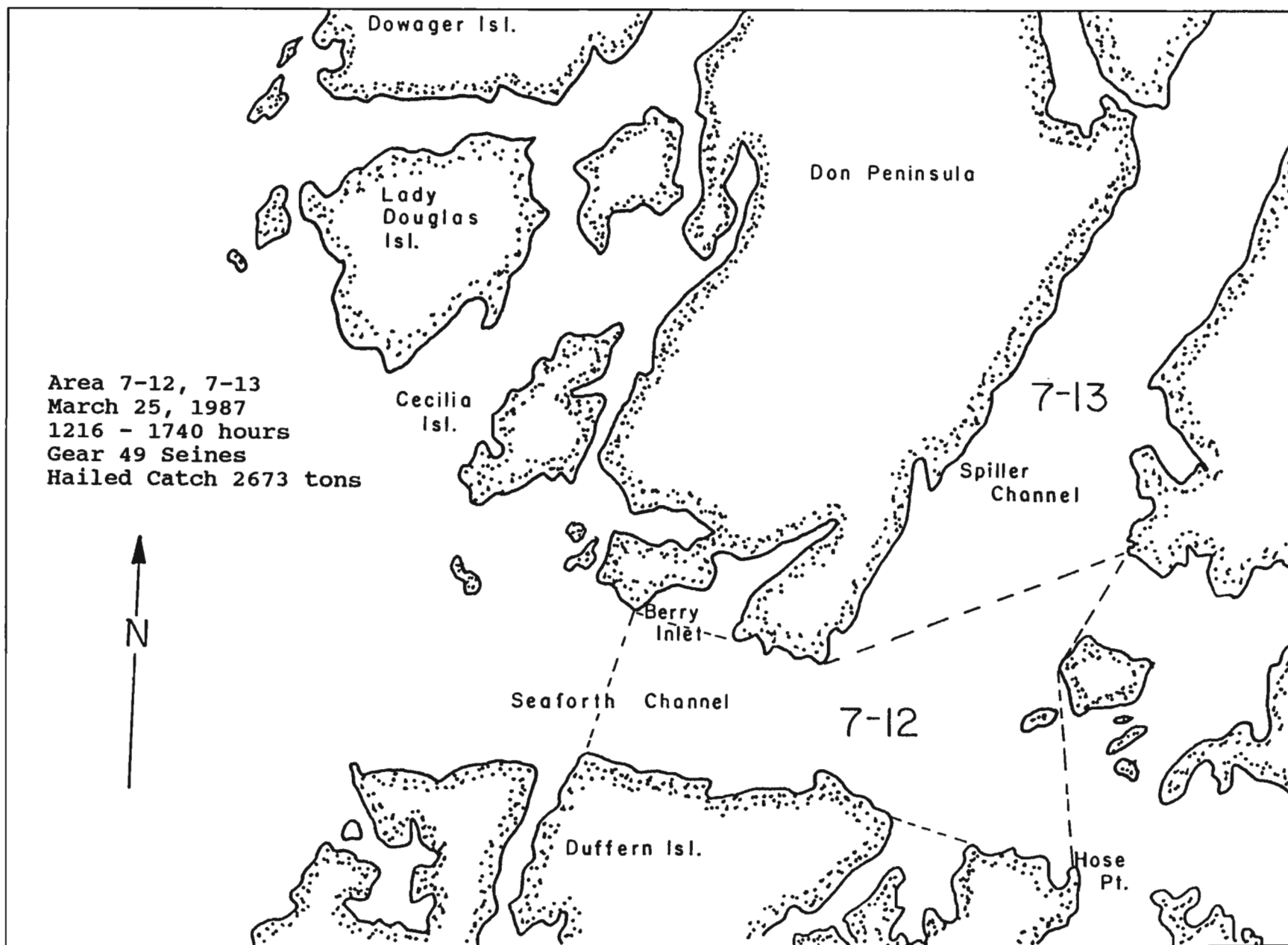


Fig. 10 Roe herring fishing boundaries and hailed catches by gear type in Area 7, 1987.



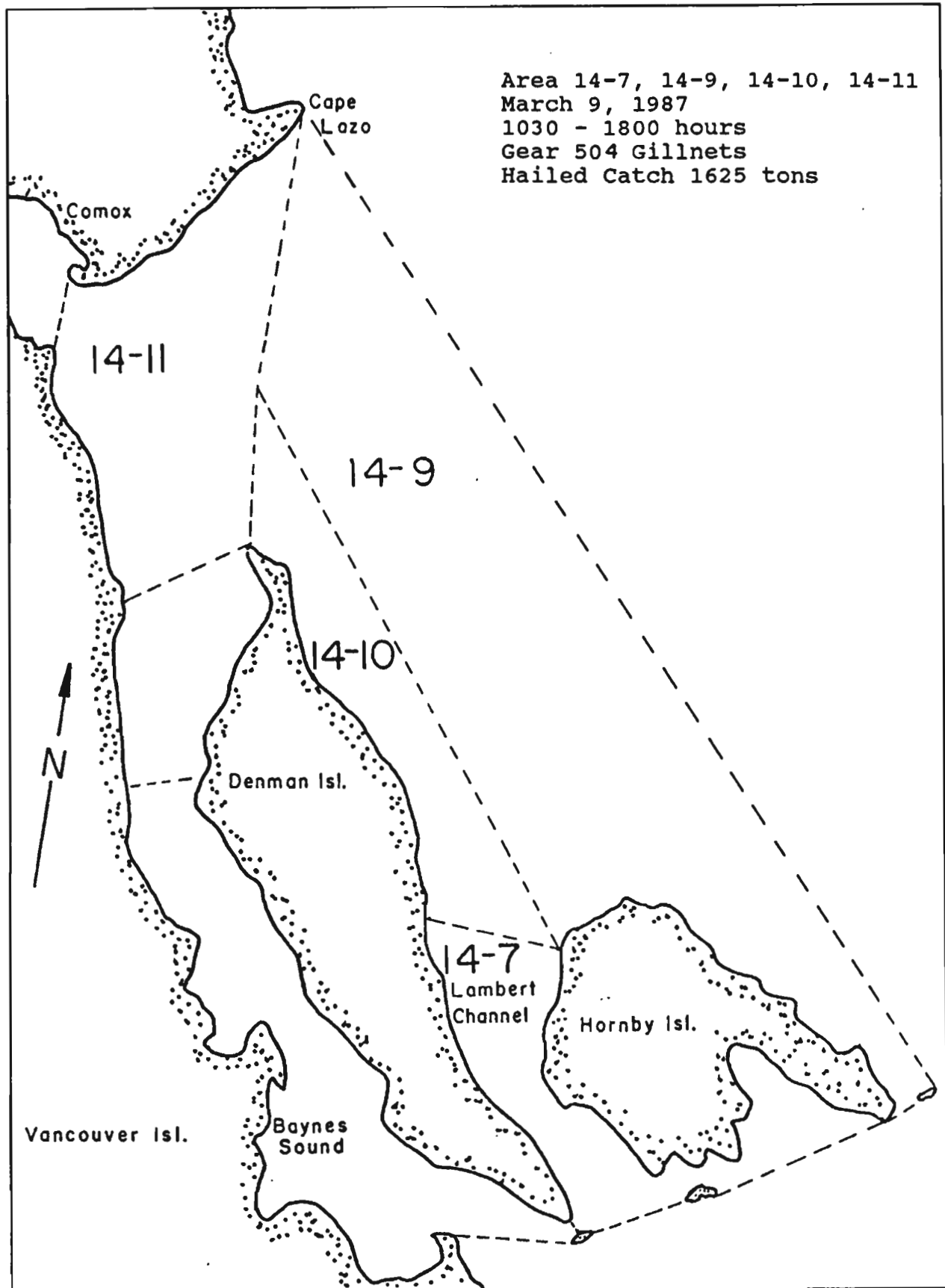


Fig. 11 Roe herring fishing boundaries and hauled catches by gear type in Area 14, 1987.

Fig. 12 Roe herring fishing boundaries and hauled catches by gear type in Area 14, 1987.

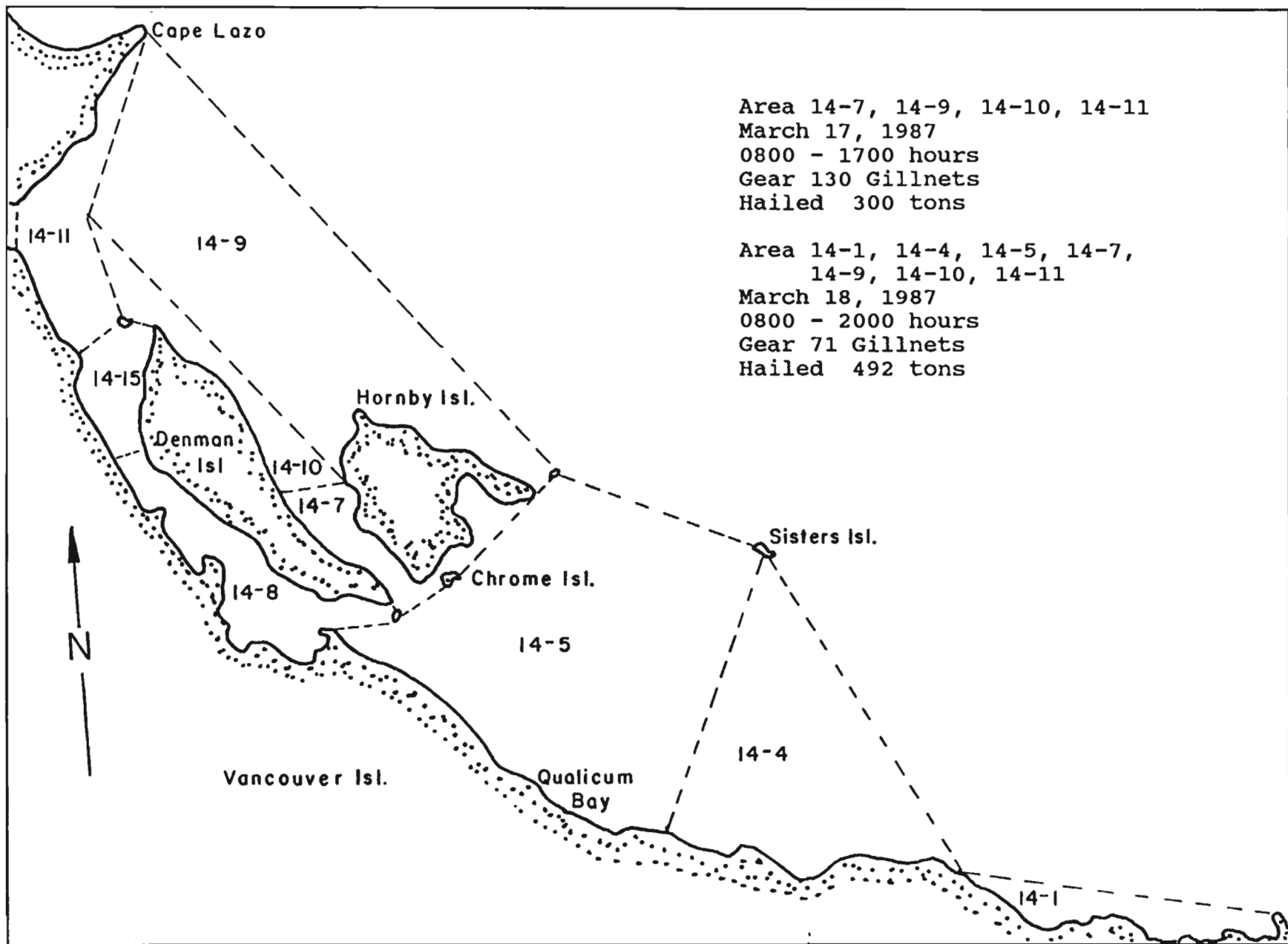
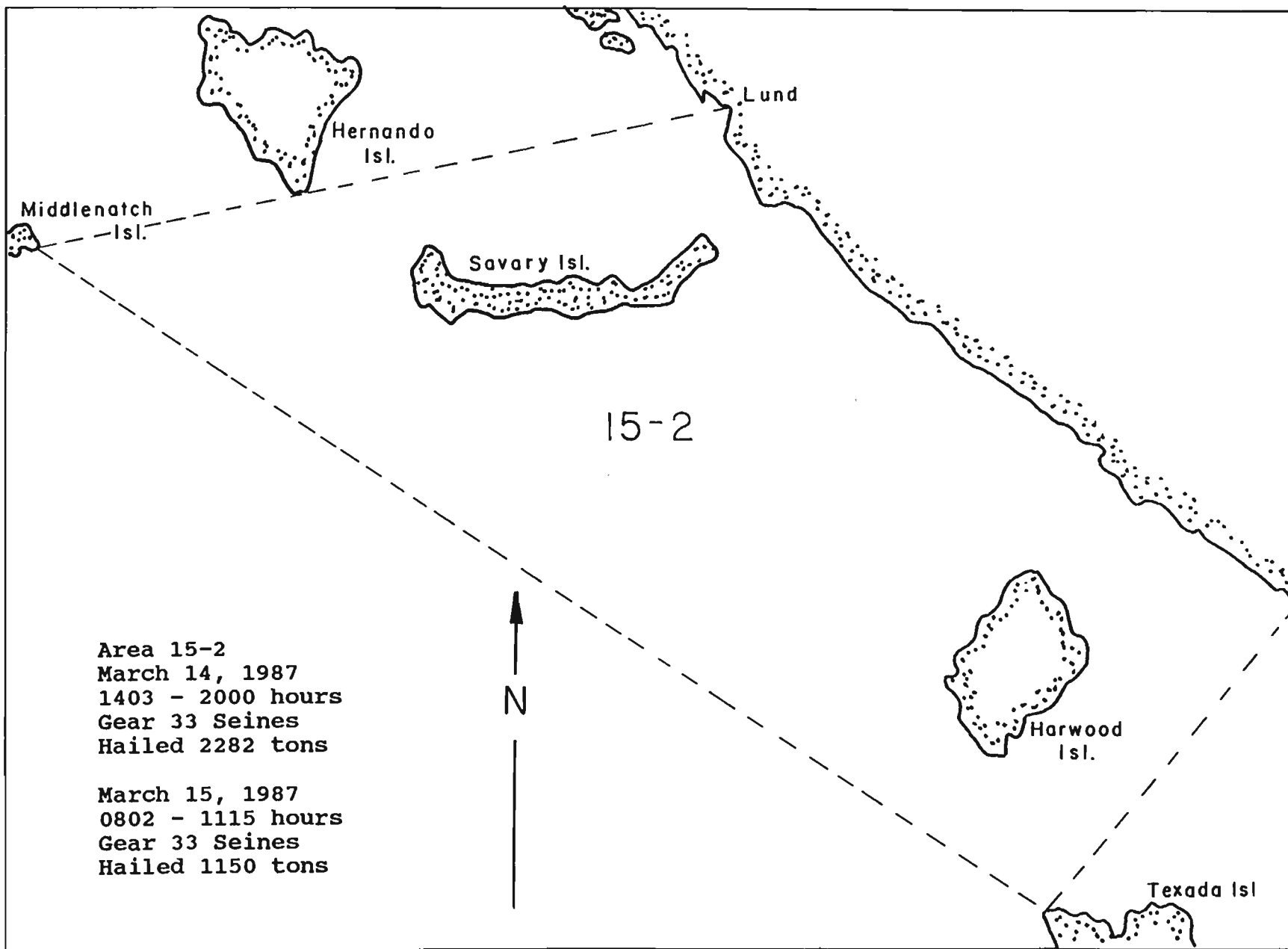


Fig. 13 Roe herring fishing boundaries and hauled catches by gear type in Area 15, 1987.



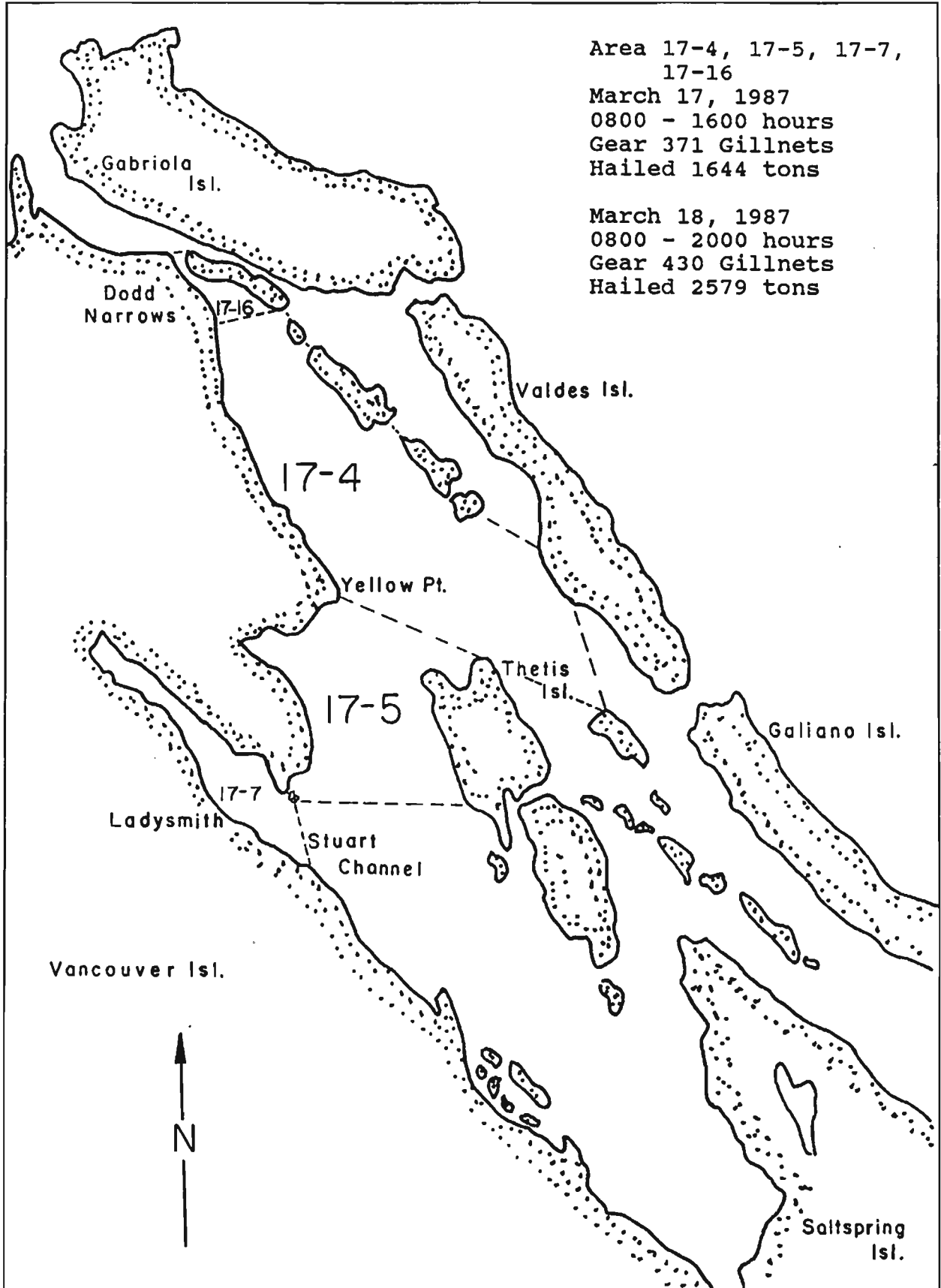


Fig. 14 Roe herring fishing boundaries and hauled catches by gear type in Area 17, 1987.

Fig. 15 Roe herring fishing boundaries and hailed catches by gear type in Area 23, 1987.

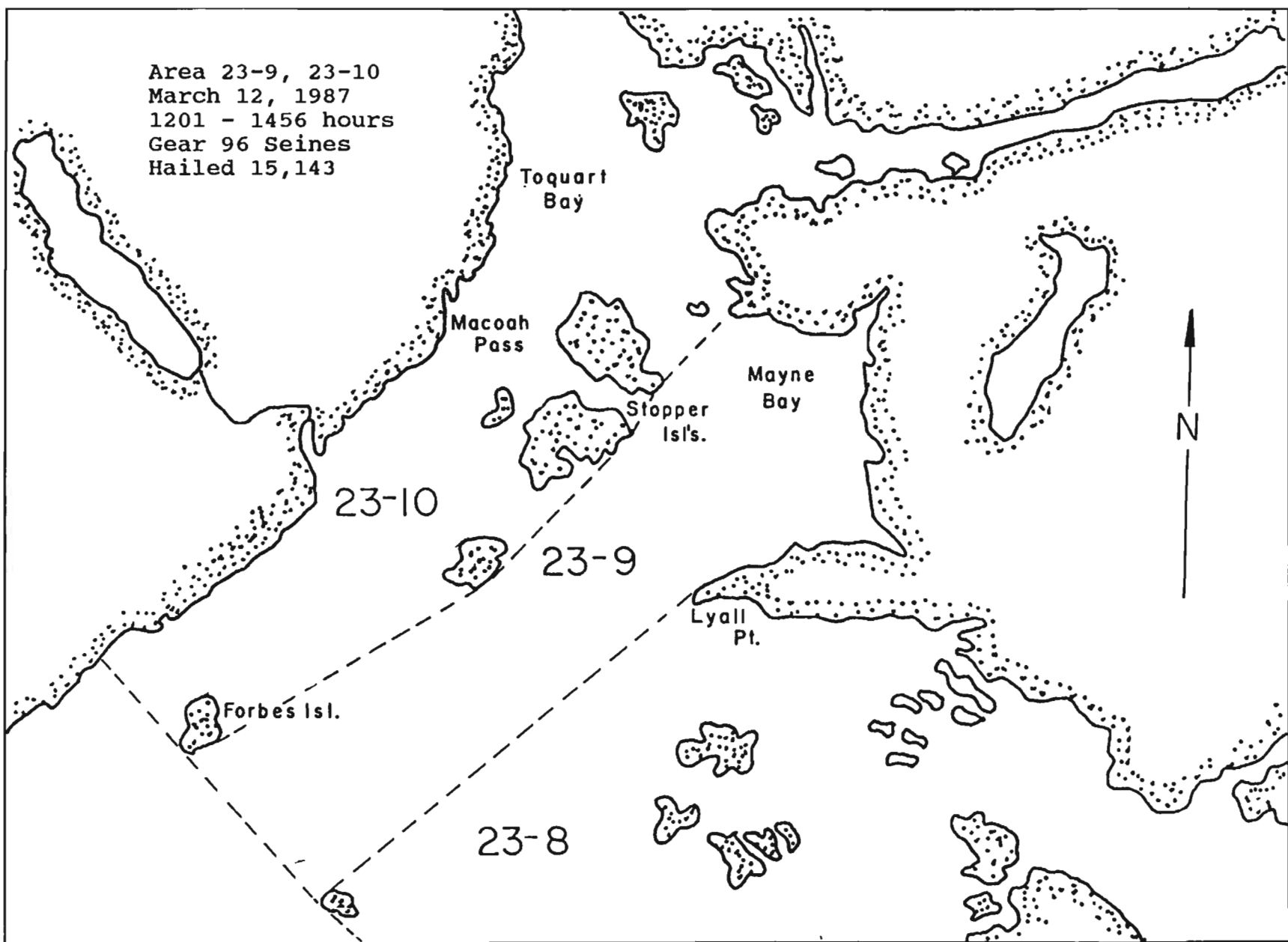


Fig. 16 Roe herring fishing boundaries and hailed catches by gear type in Area 25, 1987.

