1989 SEYMOUR CANAL SAC ROE HERRING FISHERY

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INTRODUCTION

Background

Seymour Canal is located between the Glass Peninsula and the main body of Admiralty Island about 60 miles northwest of Petersburg in Southeast Alaska (Figure 1). Seymour Canal includes commercial fishing regulatory section 11-D and the northwest part of District 10. A summary of the history of the fishery and the evolution of existing management can be found in Regional Informational Report No. 1J89-18.

Management History

Since the Seymour Canal roe herring fishery began in the early 1970's, several methods have been used to determine the opening day of the fishery. In the early years the fishery opened on a set date and a few fishermen harvested the fish over a week or two. Roe percentage, which is the weight of mature roe in a sample of herring compared to the total weight of the sample, was not very important. Later, Japanese technicians determined the roe percentage and when it had reached a level that the industry deemed acceptable, initially 8% mature roe and in later years, 10%, the department announced it was ready to open the fishery. The fishermen then voted, and when a majority of them were in favor of fishing, the department opened the season.

In the late 1970s, the department determined the opening day based upon the roe percentage. When the percentage was over 10% and spawning appeared imminent, the fishery was opened. In the 1980s, the increased demand for prime quality roe prompted the department to base the openings primarily on the initial spawn. This was the method still used in 1989. It provided the industry with the best quality product while giving the department a specific key for opening the fishery.

The fleet was on two-hour notice for seven days during 1989 before the first spawn was observed on April 28. The spawning was observed by an industry pilot at 10:00 a.m.; a skiff survey minutes later documented 10 small areas of spawn, and department staff held a short strategy meeting aboard its vessel, the *R\V Steller*. It was agreed that the two primary requirements for opening the fishery, good roe quality and the beginning of a potentially major spawning, had been satisfied. At 10:45 a.m., it was announced that the fishery would open at 1:00 p.m., and the general area of the opening was described. At 11:40 a.m. it was announced that the shoreline between Black Jack Cove and Sore Thumb Cove would be opened. The *R\V Steller* was anchored near the middle of the area at Twin Islands, and one skiff with ADF & G observers went north, and one went south. The fishery opened with sunny skies, no wind, three spotter planes, 104 boats, and 17 tenders form three companies ready to buy fish. The fishery progressed

very quickly on the incoming tide, with the best catches around the Rock Garden and Black Jack Cove. The initial catch estimates made at 1:30 p.m. indicated a catch rate of 1.0 to 1.5 tons per hour. At 2:00 p.m., it was estimated there were 150 to 200 tons of herring in the boats and nets. The decision to close the fishery was made at 2:18 for a 2:30 p.m. closure. Catches were extremely good during the one hour grace period, and the tenders eventually checked out with a reported catch of 548 tons. The catch rate of 356 tons/hour was twice as high as any previous catch rate in Seymour Canal.

In retrospect, the fishery is becoming so effective that if the initial catch rate estimates are in the 1-2 ton per hour range, and the quota is less than 400 tons, the total time that the nets are allowed in the water must not exceed two hours. Initial catch estimates must be made within 30 minutes if a one-hour grace period is in effect. The other option is to open for several short openings of less than one hour. However, this could extend the fishery over several days unless the first opening occurred in the morning. An aerial survey that coincides with the initial catch estimates should also be conducted to provide additional information of the progress of the fishery.

STOCK ASSESSMENT

Trawling

Mid-water trawling for herring size and maturity samples was conducted on April 17. Two tows were conducted near the Rock Garden. The net was fouled on the first tow; however, the second tow yielded approximately 200 lbs. in a few minutes.

Acoustical Surveys

Acoustical surveys were conducted from the *R\V Steller* on April 17, 18, 24, 25, 27, and May 5, 6, 15, 17 and 18, using a Furuno CH-12 sonar and a Ross 200A fine line chart recorder. Staff conducted an acoustical survey on April 20 using a Wesmar sonar and a Ross 200A fine line chart recorder.

Skiff Surveys

Skiff surveys were made from a 16-foot Boston Whaler or an 18-foot aluminum skiff. Surveys were conducted from April 21 through April 29, May 1 through May 6, and from May 14 through May 18. These surveys usually covered the area between Pt. Hugh and Dorn Island. Occasionally, the area from Pt. Hugh to Pt. Hugh Light was searched. Observations of herring milt, schools of herring, and whales were noted.

Aerial Surveys

Aerial surveys were made by the department from April 19 through May 2, May 5 through May 13, May 15, 18, 21, and June 6 (Table 1). The areas between Dorn Island and Pt. Hugh, and north along the east side of the Glass Peninsula to the latitude of the pass at Twin Islands were surveyed each time. Other areas north to the head of the canal, and the west side of the canal to the Big Bend, were surveyed occasionally. Schools of herring, herring spawn, whales, sea lions, concentrations of birds, and concentrations of fishing vessels were recorded during these surveys.

Stock Estimation

An estimate of stock size was made on April 25 of 5,000,000 to 7,000,000 lbs. of herring. This was the only day that the herring were in a position where all of the fish near the spawning grounds could be estimated. The estimate was based upon information gathered from acoustical and aerial surveys.

SAMPLING

Cast Nets

Cast nets were used to capture spawning fish. The nets were 6-8 ft in diameter.

Size Sampling

Length-frequency sampling was conducted to determine the amount of recruitment into the stock. Samples were taken from the areas of active spawning (Table 2). Figure 2 shows the age classes of the herring as determined in the laboratory post-season. No major year class is dominating the population. Figure 3 depicts the decrease in size of spawning herring as the season progressed.

Maturity Sampling

Samples of herring (10-40 kg) were analyzed by industry technicians for roe maturity. The results are shown in Table 3. Each fish was sexed, with the females categorized into three classes: very immature fish with white eggs, immature fish which were not quite mature enough to spawn, and those that were ready to spawn. No spawnouts were caught in these pre-fishery samples. A total of 33 samples comprised of 5,229 herring were analyzed. The highest mature roe percentages were obtained with the largest nets (2 1/4 inch stretched-mesh), and the lowest roe percentages were obtained with cast nets and dip nets (Figure 4). The fish caught with the 2 1/4 inch gear averaged 13g heavier than the fish caught in 2 1/8 inch gear (Figure 5), and 8% more of them were females.

Predators

Large numbers of eagles, sea gulls and scoters feed upon the spawning herring or the eggs they deposit. Dall porpoises, harbor seals, Steller sea lions and humpback whales (Table 4) also prey upon them. Considerably fewer scoters and gulls appeared at Seymour Canal than in previous years. Surveys of the Hobart Bay spawn indicated that large numbers of birds were there, possibly accounting for the fewer than normal numbers of birds in Seymour Canal. All of the predator numbers appeared to peak considerably earlier than the peak spawn. The maximum numbers of predators observed were seven humpback whales, 98 sea lions, 3,000 scoters and 2,000 gulls.

SPAWN

Herring Spawn Observed From Skiffs And Planes

Milt was initially observed at 10:00 a.m. on April 28 in several spots between Twin Islands and Black Jack Cove. A total of 7.82 nautical miles or 9.0 statute miles of spawn was documented through May 18 (Table 1). Graphs depicting cumulative miles of spawn and daily miles of spawn since 1985 are shown in Figures 6 and 7.

Herring Spawn Observed While Scuba Diving

SCUBA divers conducted 38 transects to assess the width and density of the deposited herring eggs. No herring eggs were observed on seven of the transects and these transects were not used in calculating the quantity of spawning herring. Transects were located at 1/4 mile intervals between Pt. Hugh and Sore Thumb Cove (Figure 8). Assuming that 10% of the eggs were lost to predators, wave action, and other natural causes prior to diving, 693,000 lbs. of herring spawned per statute mile, for a total spawning population of 6,230,000 lbs.

1989 MANAGEMENT SUMMARY

The 1988 egg deposition surveys indicated 6,550,000 lbs. of herring spawned in Seymour Canal (Table 5). Based upon Board of Fisheries approved guidelines, this biomass level allowed a 1989 harvest rate of 10.14%, which represented a guideline harvest level of 332 tons of herring. The 1989 fishery harvested 547 tons of herring (Table 6) with an estimated roe percentage of 12.67%. The reported price for Seymour Canal herring was $1,000 per ton, with $100 per percentage point above 10%, making the average ton of herring worth $1,300. The exvessel value of the fishery was approximately $708,000.

CONCLUSIONS

The 1989 Seymour Canal herring sac roe fishery was held on April 28. The harvest of 547 tons was 65% above the guideline harvest level of 332 tons, and it was 15% of the Seymour Canal spawning population. This was the third highest gill net harvest and above the average harvest of 473 tons (Figure 9). The catch rate of 365 tons per hour during the 1.5 hour open period was twice as high as any previous catch rate and it resulted in the shortest fishery ever held. The number of gillnetters was as high as the previous peak of 104 vessels in 1984 (Table 7). Linear miles of spawn (9.0) and spawning escapement (6,230,000 lbs.) were near the average since this gill net fishery began. No major year class entered the fishery; however, population sampling indicated the second highest percentage of three-year-old fish (25%) on record. Thirty-one dive transects were made to determine the estimated escapement biomass of 6,230,000 lbs. (3,115 tons). This is above the 6,000,000 lb. spawning threshold limit, and it will enable a fishery of just over 300 tons in 1990.

SUMMARY OF THE 1989 SEYMOUR CANAL DAILY LOG

April 11: No herring; three whales and three sea lions were observed during the first aerial survey.

April 14: Two small schools and 52 sea lions were observed.

April 17: The *R\V Steller* arrived. Nine schools were observed around the Rock Garden. A trawl sample indicated 60% of the fish were ripe.

April 18: Thirteen schools were observed from the *R\V Steller*. The trawl sample consisted of 9.9% mature roe.

April 19: One school of needlefish was observed near Pt. Hugh. It was announced the fishery would go on two-hour notice on April 21.

April 20: Eight major schools were observed from the *R/V Polaris* between Twin Islands and the new slide north of Sore Thumb Cove. The tops of the schools ranged from 7 to 12 fathoms below the surface.

April 21: In the evening the herring moved into the shallow waters from Cypress Rock north, and from Black Jack Cove south. The two-hour notice for the fishery went into effect at noon. Samples ranged from 10 to 15% mature roe.

April 22: Herring were concentrated around Pt. Hugh and north of Sore Finger Cove. A total of 95 boats were registered. Early morning survey flights began.

April 23: Herring were schooled in thick bands along the shoreline for the first time, mostly between Twin Islands and Black Jack Cove.

April 24: Herring were schooled in large concentrations along the shoreline in the Black Jack Cove area. They began feeding on krill in Sore Finger Cove during the evening. This was the fifth day of hot, sunny weather.

April 25: Sampling of the stocks along the shoreline indicated the percentage of mature roe remained large and there were very few immature fish. Fish were schooled along about 80% of the shoreline between the district boundary and No. 9 Rock. Visibility was excellent and, based upon aerial surveys and vessel surveys, 5,000,000 to 7,000,000 lbs. of herring were in the area.

April 26: Mature roe percentages were high in all but one the sample. The evening radio schedule, during which the management of the fishery was discussed with members of the fishing fleet, became very lengthy.

April 27: The fish were mostly south of Sore Thumb Cove and moved further south during the day. A small area of milt was observed at 5:00 p.m. by the Nelbro pilot.

April 28: About half as many fish were observed on the beach as yesterday. Several small areas of spawn occurred between Black Jack Cove and Twin Islands at 10:00 a.m. It was announced at 10:45 a.m. that the fishery would open at 1:00 p.m. and be centered around Twin Islands. It was hot, sunny, and calm. There were 104 gillnet vessels registered; 17 tenders with 3 planes from 5 companies were on the grounds to support them. Sore Thumb Cove to Black Jack Cove was opened. The number of fishing vessels was about evenly split north and south of Twin Islands. One crew covered the fishing fleet north of Twin Islands and one covered it south. Catches were initially quite large with 150 to 200 tons harvested by 2:00 p.m. The fishery was closed at 2:30 p.m. and fishermen had one hour to retrieve their nets. During an aerial survey completed at 2:18 p.m., it was estimated that the catch would be between 450 and 500 tons once the one hour grace period was over. Catches continued to be extremely good during the grace period. At 3:30 p.m. it was estimated that the harvest would be between 500 and 600 tons. A total of 548 tons of fish were aboard tenders which left the area. A few small areas of spawn were observed during the fishery.

April 29: Several small areas of milt were observed near Sore Finger Cove. Fish were schooled mostly around the Rock Garden and south of Twin Islands.

April 30: No spawning occurred. Fish were schooled along the shoreline south of Twin Islands and north of the Rock Garden.

May 1: A few hundred yards of spawn occurred just south of Twin Islands.

May 2: It was still sunny and there was no spawning.

May 3: No spawning occurred. During a beach survey, eggs were observed south of Twin Islands only.

May 4: No spawning occurred. Pybus and Gambier Bays were surveyed using the skiff but no spawn was found.

May 5: The first significant spawn of about two miles began prior to 5:00 a.m. south of Black Jack Cove. More fish were observed along the shoreline than any day since April 29. Hobart Bay was surveyed using the skiff and 1.4 miles of spawn were documented. The weather changed and it rained for the first time since the fishery went on two-hour notice.

May 6: No spawn was observed. Schools were still laying off of Pt. Hugh.

May 7 & May 8: Very few fish were along the shoreline. No spawning occurred.

May 9: More fish began schooling along the shoreline again, but no spawning occurred.

May 10: Several small areas of spawn were observed near the Swimming Pool.

May 11: About a mile of spawn was observed near Black Jack Cove.

May 12: About 3.7 miles of spawn was observed in the vicinity of Black Jack Cove.

May 13: The largest spawn of the season, 4.7 miles, this was also in the vicinity of Black Jack Cove.

May 14: About 2.5 miles of spawn was observed near Twin Islands.

May 15: Department divers began SCUBA diving to determine the egg deposition. The first spawning occurred near the Rock Garden.

May 16: High winds and rough seas prevented diving and no spawning occurred.

May 17: SCUBA diving was completed with 38 transects, made at 1/4 mile intervals. An estimate from the 31 transects indicated that the spawning biomass was about equal to the 6,000,000 lb. threshold necessary to have a fishery in 1990. A half mile of spawning occurred in Sore Thumb Cove.

May 18: Sore Thumb Cove was the site of the last spawn of the season.

May 20, 21, & June 6: Aerial surveys were conducted, but no new spawn was observed. No eggs were observed on the beach during the June 6 survey.

1989 SEYMOUR CANAL LOG

April 11: The first aerial survey of the Seymour Canal herring spawning grounds was conducted. Three whales and six sea lions were observed.

April 14: Another aerial survey was flown and two small balls of herring were observed by the new slide just north of Sore Thumb Cove. A total of 52 sea lions were in the area.

April 17: Bergmann and Larson chartered a Cessna 180 to Seymour Canal and boarded the *R\V Steller* on its return from the Sitka dive surveys. The area between Pt. Hugh and Sore Finger Cove was searched for herring using the Furuno CH-12 sonar, and the larger schools were recorded on the Ross 200-A Fineline recording fathometer. Nine schools of herring were observed and most of these were near the Rock Garden with only one south of Twin Islands. The first tow with the mid-water trawl was fouled when one of the trawl balls tangled with the foot rope chain and about 20 herring were caught. The second tow was stopped after a few minutes because of the large volume of fish observed entering the net. Several hundred pounds of herring were caught. A length, sex, maturity sample had the highest roe percentage of any sample harvested with a trawl ever taken in Seymour Canal. There were 44 female herring in the sample and 25 of them were mature.

April 18: The shoreline from Southeast Anchorage to Pt. Hugh was surveyed using the *R\V Steller*, and 13 schools were recorded on the fathometer. Some of the herring caught while trawling were flown to Petersburg Fisheries Inc. and sampling indicated they were 9.9% mature roe.

April 19: No fish were observed near the beach during an aerial survey. One school which appeared to be needlefish was located near Pt. Hugh. It was announced that the fishery would go on two-hour notice on April 21.

April 20: No fish were observed near the beach during an aerial survey, Timothy and Lynch ran the 19' aluminum skiff from Petersburg to Seymour Canal because the *R/V Polaris* was delayed leaving Juneau. They met the *R/V Polaris* at Black Jack Cove at 4:00 p.m. and conducted acoustical surveys to Sore Finger Cove. Eight large schools of herring were observed from south of Twin Islands to the new landslide north of Sore Thumb Cove. The tops of the schools ranged from 7 to 12 fathoms below the surface.

April 21: No herring were observed near the beach during the early morning skiff survey. One school was observed off Sore Thumb Cove; most of the bird and sea lion activity was in the Rock Garden-Twin Island area. The first herring were observed near the beach during an aerial survey at 10:30 a.m., about halfway through the flood tide. Two schools were observed south of the District Boundary and one was on the north point of Sore Finger Cove. The fishing went on two-hour notice at noon. By 4:00 p.m. major concentrations of fish were schooled along the beach from Cypress Rock north and from Black Jack Cove to just east of Pt. Hugh. Gill net and cast net samples from four different areas ranged from 10.2 to 15%.

April 22: During the morning skiff survey, the fish near the beach were observed mostly around Pt. Hugh with a few schools north of Sore Finger Cove. DeJong arrived from Sitka and Larson arrived from Petersburg. Larson observed clam spawn at Pt. Hugh that had also been observed from the skiff. A total of 95 boats were registered. Samples ranged between 11.9 and 12.8%. Radio announcements giving updates on the samples and flight observations were given each day at 7:30 a.m., 11:00 a.m., 3:00 p.m., and 9:30 p.m.

April 23: It was another day with beautiful weather and still no spawn occurred. Samples had good mature roe percentages ranging from 9.4 to 13.4%. Very few immature fish were in any of the five samples taken. The fish were schooled in thick bands near the shoreline for the first time. The schools were concentrated between Twin Islands and Black Jack Cove during the afternoon flight. Lynch left for Vancouver. Spawning started in Farragut Bay during the late afternoon between the North Arm and Francis Anchorage.

April 24: The weather continued to be hot and sunny and still spawning had not begun. Herring were schooled near the beach. Intense spawning occurred at the mouth of the north arm of Farragut Bay. The *R/V Polaris* left the grounds at 12:30 p.m. and the *R\V Steller* arrived from Petersburg at 3:30 p.m. Aerial surveys were flown at 6:00 a.m., 9:00 a.m., 1:00 p.m., and 5:00 p.m. Gambier Bay, Pybus Bay, and Port Camden were also flown. No spawning was observed anywhere. In the evening the herring began feeding heavily on krill in Sore Finger Cove.

April 25: The 6:00 a.m. survey was flown over both sides of the Glass Peninsula south of Glass Point and Faust Island. Fewer fish were observed near the beach than during the previous evening's flight. Herring were near the beach around Black Jack Cove and a few schools were observed in the area north of Sore Finger Cove and at Twin Islands. No spawn was occurring and test sets were made in each of the areas. Roe percentages of mature herring remained high with almost no immature fish. Spawning started in Lynn Canal and Tenakee Inlet and continued at Farragut Bay. A 100-yard spawn was observed at Sunset Island. It was another hot, sunny day and fish began schooling in concentrations leading along the shallow waters in even greater numbers than on April 24. About 80% of the beach between the District Boundary and No. 9 Rock had fish schooled along it. The *R\V Steller* was used to search the deep

water and most of the schools were very small--two to four fathom in size and they were located in the top ten fathoms of the water column. The two medium-sized schools encountered were laying close to shore and they top well at six fathoms below the surface. This was some of the best visibility ever encountered with the majority of fish on the beach. Based upon aerial and vessel surveys, an estimated 5,000,000 to 7,000,000 lbs. of spawning herring were in Seymour Canal.

April 26: No spawning was observed. Three samples were taken and mature roe percentages were high except for one sample with 5.5% immature roe and 8.8% mature roe. The evening radio discussion with members of the fishing fleet was getting long. The main concerns expressed by the fishermen were: "Why weren't they fishing since the mature roe percentages were so good?" "Was there a new unexploited area where they could gillnet sac roe herring?" "Would the department oppose increasing the minimum mesh restriction to 2 1/4 inches since that size of gillnet gets a better roe percentage?" "What could they do so they didn't have to spend as much time out on the fishing grounds waiting for the season to open?" The responses were: The department was waiting for spawning to begin since mature roe percentages should increase until then and there were still immature fish in the test samples. Also, waiting for spawning before opening the season removes the staff from making a decision which does not have a biological basis. When the purse seine herring fishery operated in Seymour Canal the staff realized it was a pivotal fishery and many of the people involved would like to get it over quickly so they could go to another fishery. There are no large, unutilized stocks of herring in Southeast Alaska of which the department is aware. All the stocks are either in a specific spring fishery or were winter bait fisheries since that is the fishery that originally existed throughout Southeast. The department originally opposed larger mesh size in Seymour Canal because of the slower growth of these fish. When gillnetting began in Seymour Canal, the older age classes of fish (7+) were eliminated for two to three years, and we do not want to eliminate a major portion of the genetic pool from the spawning stock. However, more recently 10 to 25% of the population consisted of the older age classes. The department probably would not oppose a 2 1/4 inch minimum mesh size but that would need to be confirmed with the herring research biologist. The staff would not oppose shortening the prefishery notice to 12 hours if the fleet wanted to petition the Board of Fisheries. The existing 36-hour notice is not a regulation but it has been in effect for so many years that the staff would need to get Board approval before it could be changed. The shorter notice might give an advantage to the fishermen who live close to the gill net areas.

April 27: Aerial, skiff, and vessel surveys were conducted in the morning and herring were concentrated between the District Boundary and Sore Thumb Cove. Later in the day, fish decreased south of the Rock Garden and increased around Pt. Hugh. At 5:00 p.m. the Nelbro pilot observed a small amount of milt north of the landslide. When it was surveyed at 5:15 p.m., using the skiff, there were some herring near two small areas of milt about 20 feet across that connected

with a streak of milt about 100 feet long. The spawn dissipated by 6:00 p.m. No spawn was observed during flights made later in the evening.

April 28: No spawn was observed during the early morning flight and the fish had moved into deeper water. Only about half as many fish were observed compared to the previous mornings flight. It was another hot, sunny day. Several small areas of spawn were observed between Black Jack Cove and Twin Islands at about 10:00 a.m. Ten small areas of milt were documented during a survey from a skiff. It was announced at 10:45 a.m. that the fishery would begin at 1:00 p.m. and be open within a mile on either side of Twin Islands. At 11:40 a.m. an announcement was made that the area between Sore Thumb Cove and Black Jack Cove would be open. The *R\V Steller* anchored at Twin Islands. Larson, DeJong, and Tyson went south in one skiff and Lynch and Timothy went north in the other skiff. The regulatory markers were installed and the crews counted 57 boats south of Twin Islands and 47 north of there. The regulations governing the fishery were announced over channel 10 VHF. Time checks were given every 15 minutes beginning at noon and also every minute starting 5 minutes before the opening. During the final minute time checks were given at 45, 30, and 15 seconds and a countdown was given with 10 seconds to go. The fishery opened with sunny skies, no wind, and excellent fish spotting weather. Three planes were flying for three of the four companies that were represented on the grounds. A total of 17 tenders and 102 fishing vessels were registered. Three of the tenders were fishermen who were going to transport their catch to town since there was no tender present from their company. The fishery progressed quickly with the best fishing in the Rock Garden and around Black Jack Cove. The estimates from the skiff crews at 1:35 p.m. indicated catch rates of 1 ton per hour on the south side and 1.5 tons per hour on the north side. At 1:50 p.m. the highest catch rates on the south end indicated 1.5 tons on the skiffs and in the nets, while the lowest catches in that area reported at 1:55 p.m. were 1/2 ton per boat. Meanwhile, the best catches on the north side at 1:50 p.m. were 2 1/2 tons per boat. At 2:00 p.m. it was estimated that there were 150 to 200 tons of herring in the boats and nets. A brief aerial survey was made at 2:10 p.m. to get a view of the instantaneous catch rates. The decision to close the fishery was announced at 2:18 p.m. with a 2:30 p.m. closure. It was estimated during the aerial survey that the catch would be between 450 and 500 tons. At the close of the fishery, an estimated 2 1/2 to 3 tons per boat were caught in the first 1 1/2 hours. Catches were high during the one-hour grace period, and almost all of the boats did not begin pulling their nets until half way through the one-hour grace period. The estimated catch was between 500 and 600 tons when the grace period ended. There were a few small areas of spawn during the fishery, but no spawning was observed after the fishery closed. Tenders were checked out of the area until 3:30 a.m. on April 29. The on-the-grounds harvest was reported at 548 tons.

April 29: During aerial and skiff surveys, no new spawn was observed. Several small areas of milt were observed near Sore Finger Cove and inside Cypress Rock, but no eggs were found there during subsequent skiff surveys at low tide. The fish were schooled primarily around the

Rock Garden and along the shoreline south of Twin Islands. The *R\V Steller* left the area at 4:00 p.m. for Peril Straits. Timothy departed.

April 30: No spawning was observed during the aerial survey. Fish were schooled along the shoreline south of Twin Islands and also north of the Rock Garden to No. 9 Rock. Dive surveys were done on 16 transects in Hoonah Sound, and the *R\V Steller* returned to Seymour Canal with Bergmann and Lynch aboard.

May 1: The shoreline was surveyed by skiff just after daybreak and a few hundred yards of spawn were occurring south of Twin Islands. The spawn did not expand, and no additional spawns were observed.

May 2: No spawn was observed during the early morning survey or the late evening flight which covered the west side of the Glass Peninsula from the head to Pt. Hugh and the east side of the canal from Big Bend to Buck Island. Fewer fish were observed than the previous day.

May 3: The beach was checked for eggs during the morning survey and they were only found south of Twin Island. The first new growth of nereocystic kelp was observed at low tide.

May 4: No spawn was observed in Seymour Canal. The survey crew used the skiff to go to Pybus Bay to check for spawn. A sample of pre-spawning fish, which were slightly larger than Seymour Canal herring, were caught in Donkey Bay. No spawn was observed during the low tide survey in the main arm, Donkey Bay, and Cannery Cove. The north shore of Gambier Bay was searched and no eggs were found. The schools of herring observed in Gambier Bay appeared to be one-year olds. The PFI pilot flew over Seymour Canal at noon and didn't see any spawn.

May 5: A survey of the shoreline was conducted at 5:00 a.m. on the way to SCUBA dive on spawn at Farragut Bay. Spawning was occurring approximately 1.5 miles south of the District Boundary, so the crew stayed in Seymour Canal. By mid morning, most of the spawn had dissipated and only one intense spawn was occurring about one mile south of the District Boundary. More fish were observed today than any day since April 29. The schools of fish were divided between two areas with fish from the District Boundary south and from the Rock Garden north with a few schools between. Small areas of spawn continued to occur south of the District Boundary until dusk. The crew took the skiff to Hobart Bay and mapped 1.4 miles of spawn during the minus tide. The weather changed and it rained for the first time since the fishery started.

May 6: The *R\V Steller* departed Seymour Canal at 6:00 a.m. after surveys were completed and no spawning was observed. Schools of herring were still laying off the tip of Pt. Hugh.

May 7
& May 8: Very few fish were observed along the shoreline during aerial surveys. No spawn occurred.

May 9: Large numbers of fish were again schooled along the shoreline but no spawn was observed.

May 10: Several small amounts of milt were observed near the Swimming Pool.

May 11: About a mile of spawn occurred around Black Jack Cove. Aerial surveys were usually also conducted by the PFI pilot and these flights were coordinated with the department so they didn't overlap.

May 12: A total of 3.7 statute miles of spawn were observed. It was concentrated in the vicinity of Black Jack Cove.

May 13: Peak spawning occurred with 4.7 miles mapped in the same area as the previous two days.

May 14: Bergmann returned by skiff from Petersburg to map the spawn and obtain samples of the spawning fish. About 1.3 miles of spawn was observed, plus the eggs observed while diving on May 15 and 17 which were adjacent to this spawn were assumed to have occurred today. The *R\V Steller* arrived at dusk from Lizianski Inlet.

May 15: SCUBA assessments of the spawn began with the oldest eggs which were between the Swimming Pool and Twin Islands. The first spawn occurred in the Rock Garden.

May 16: It was too rough to dive. No additional spawn was observed.

May 17: SCUBA Diving was completed with 38 transects made at 1/4 mile intervals. Eggs were observed on 31 transects and these were used to calculate the spawning populations. Field estimates indicated the biomass would be extremely close to the 6,000,000 lb. threshold necessary for having a fishery in 1990. A half mile of spawn occurred in Sore Thumb Cove.

May 18: Light spawning was still occurring on the east side of Sore Thumb Cove. This was the last spawn observed. Nine statute miles of spawn had been recorded between Sore Thumb Cove and Pt. Hugh.

May 20, 21
& June 6: Additional aerial surveys were conducted and no new spawn was observed. During the June 6 survey, there was no sign of herring eggs on the beach.

Table 1. Seymour Canal herring spawn surveys, 1989.

Date	Miles of Spawn	Cumulative Miles	Aerial Survey in Military Time	Other Survey Methods
17-April	0.0	0.0		Steller
18-April	0.0	0.0		Steller
19-April	0.0	0.0	1000	
20-April	0.0	0.0	1500	Polaris
21-April	0.0	0.0	1030, 1330, 1630	Polaris/Skiff
22-April	0.0	0.0	0600, 0800, 1300, 1700	Polaris/Skiff
23-April	0.0	0.0	0600, 1300, 1430	Polaris/Skiff
24-April	0.0	0.0	0600, 1600	Polaris/Skiff
25-April	0.0	0.0	0600, 1000, 1400	Steller/Skiff
26-April	0.0	0.0	0600, 1800	Steller/Skiff
27-April	Spot	0.0	0600, 1200, 1530, 1800	Steller/Skiff
28-April	0.2	0.2	0600, 1030, 1500	Steller/Skiff
29-April	0.0	0.2	0900, 1200, 1530	Steller/Skiff
30-April	0.0	0.2	1030, 1700	
01-May	Spot	0.2	1330	Steller/Skiff
02-May	0.0	0.2	1900	Steller/Skiff
03-May	0.0	0.2		Steller/Skiff
04-May	0.0	0.2		Steller/Skiff
05-May	2.0	2.2	1000	Steller/Skiff
06-May	0.0	2.2	1500	Steller/Skiff
07-May	0.0	2.2	0900	
08-May	0.0	2.2	1030	
09-May	0.0	2.2	1300	
10-May	Spot	2.2	1100	
11-May	1.1	3.0	1300	
12-May	3.7	4.3	1130, 1430	
13-May	4.7	5.9	1430	
14-May	2.5	8.2		1.2 from SCUBA
15-May	0.3	8.5	1730	Steller/Skiff
16-May	0.0	8.5		Steller/Skiff
17-May	0.5	9.0		Steller/Skiff
18-May	0.1	9.0	1530	Steller/Skiff
20-May	0.0	9.0	0800	
21-May	0.0	9.0	0900	
06-June	0.0	9.0	1000	

Table 2. Seymour Canal 1989 on-the-grounds length samples.

Date	Gear	Location	Fish Activity	Sample Size (# of Fish)	Number of Fish Standard Length* <155mm	155->170mm	170->185mm	185->200mm	200->215mm	>215mm
17-April	Trawl	Rock Garden	Feeding	98	0	1	4	27	37	29
21-April	Throw Net	Pt. Hugh	Feeding	98	1	3	7	20	43	24
22-April	Throw Net	Pt. Hugh	Feeding	99	1	5	10	32	33	18
22-April	Throw Net	Black Jack	Feeding	101	2	9	7	37	36	10
23-April	Throw Net	1 Mile South Black Jack	Feeding	85	2	6	3	28	37	9
23-April	Throw Net	1 Mile South Twin Islands	Feeding	88	2	3	14	30	27	12
25-April	Throw Net	Rock Garden	Feeding	76	2	11	9	31	17	6
27-April	Throw Net	Sore Thumb	Feeding	117	2	2	9	25	51	28
29-April	Throw Net	Twin Islands	Feeding	106	3	5	8	35	34	21
29-April	Throw Net	Swimming Pool	Feeding	138	4	12	13	38	48	23
01-May	Throw Net	Twin Islands	Spawning	53	11	6	5	13	12	6
02-May	Throw Net	Twin Islands	Spawning	58	6	6	2	21	21	2
03-May	Throw Net	1/2 Mile South Twin Islands	Feeding	64	2	6	5	18	15	20
03-May	Throw Net	1 Mile South Twin Islands	Feeding	87	5	12	7	27	30	6
05-May	Throw Net	Dist. Boundary	Spawning	197	3	5	14	47	88	40
14-May	Throw Net	1 Mile South Twin Islands	Spawning	101	3	9	21	26	27	15
14-May	Throw Net	Twin Islands	Spawning	102	8	14	14	22	28	16
15-May	Throw Net	Rock Garden	Spawning	100	3	10	14	40	24	9
17-May	Throw Net	Sore Thumb	Spawning	99	26	16	27	17	10	3
	Total			1,867	86	141	193	534	618	297
	Total April 17 through April 27			762	12	40	63	230	281	136
	Total April 29 through May 5			703	34	52	54	199	248	118
	Total May 14 through May 17			402	40	49	76	105	89	43

* Measured from the tip of the nose to the end of the hypural plate.

Table 3. Seymour Canal on-the-grounds maturity samples.

Date	Gear	Mesh Size In Inches	Vessel Name	Sample Size in Kilos	Sample Location	Number Males	Number Mature Females	Number Immature Females	Roe % Mature Females	Roe % Immature Females	Number Spawned Out	% of Females In Sample	% of Females Mature	Total Number Sampled	Average Weight Grams
17-Apr	Trawl		Steller	41	Rock Garden	146	127	44	9.9		0	54	74	317	126
21-Apr	Gill Net	2 1/4	Roe Boat	40	Black Jack Cove	96	157	7	14.7	0.7	0	63	96	260	154
21-Apr	Gill Net	2 1/8	Walroon	40	Sore Finger	156	125	17	10.8	1.0	0	48	88	298	134
21-Apr	Gill Net	2 1/8	Spirit	20	Anch. N Sore Finger	51	80	4	15.0	0.4	0	62	95	135	148
21-Apr	Throw Net		ADF&G	20	Pt. Hugh	84	65	4	10.2	0.4	0	4.5	94	153	131
21-Apr	Throw Net		ADF&G	10	Black Jack Cove	36	34	7	11.0	2.1	0	53	83	77	130
22-Apr	Gill Net	2 1/8	Laurier	30	Sore Finger Cove	95	106	8	11.9	1.0	0	55	93	209	144
22-Apr	Gill Net	2 1/8	Monica Ann	30	#9 Rock	97	101	8	12.0	0.8	0	53	93	206	146
22-Apr	Gill Net	2 1/8	Condor	30	Pt. Hugh	99	107	1	12.8	0.1	0	52	99	207	145
23-Apr	Gill Net	2 1/8	Condor	30	Black Jack Cove	117	94	2	11.0	0.9	0	45	98	213	141
23-Apr	Gill Net	2 1/8	Garnet	10	Twin Islands	31	37	2	13.4	0.7	0	56	95	70	143
23-Apr	Gill Net	2 1/8	Garnet	10	1/2 Mi. S. Twin Is.	44	39	1	9.4		0	48	98	84	119
23-Apr	Gill Net	2 1/8	7 C's	10	Swimming Pool	39	32	2	11.3	0.7	0	47	94	73	137
23-Apr	Gill Net	2 1/8	7 C's	10	Dist. Boundary	36	30	7	9.6	1.1	0	51	81	73	137
24-Apr	Gill Net	2 1/8	Spirit	30	Twin Islands	71	126	1	14.8	0.1	0	64	99	198	152
24-Apr	Gill Net	2 1/8	Spirit	20	Sore Thumb Cove	63	64	7	11.5	1.4	0	53	90	134	149
24-Apr	Gill Net	2 1/8	Bessie B	30	#9 Rock	123	89	1	10.3	0.2	0	42	99	213	141
24-Apr	Gill Net	2 1/4	Spirit	30	Rock Garden	78	112	8	14.9	0.9	0	61	93	198	152
24-Apr	Gill Net	2 1/8	Sisyphus	10	Cypress Rock	39	37	3	10.0	1.0	0	51	93	79	127
24-Apr	Dip Net		Fidgidland	20	Sore Finger	81	70	6	10.7	0.7	0	48	92	157	157
24-Apr	Throw Net		ADF&G	10	Twin Islands	44	36	1	11.0	0.4	0	46	97	81	123
25-Apr	Gill Net	2 1/4	Jaleo	30	1 Mi. S Dist. Bound.	84	104	0	14.4	0.0	0	55	100	188	160
25-Apr	Gill Net	2 1/4	Spirit	30	Twin Islands	77	112	0	14.9	0.0	0	59	100	189	159
25-Apr	Gill Net	2 1/8	T. Michell	20	#9 Rock	93	73	5	9.9	0.6	0	46	94	171	117
26-Apr	Gill Net	2 1/4	Roe Boat	30	Rock Garden	93	101	7	11.9	0.7	0	54	94	201	149
26-Apr	Gill Net	2 1/4	Spirit	30	Black Jack	74	121	7	14.5	0.9	0	63	95	202	149
26-Apr	Gill Net	2 1/8	Miss Jill	10	N of Sore Thumb	29	38	18	8.8	5.5	0	66	68	85	118
27-Apr	Gill Net	2 1/4	Walroon	30	Sore Thumb Cove	76	136	7	15.7	0.7	0	65	95	219	137
27-Apr	Gill Net	2 1/4	Walroon	10	Rock Garden	33	36	1	12.7	0.4		53	97	70	143
27-Apr	Gill Net	2 1/8	Condor	10	Black Jack Cove	35	38	0	12.8	0.0	0	52	100	73	137
27-Apr	Gill Net	2 1/8	Condor	10	1 Mi. S Twin Is.	37	37	1	12.7	0.2	0	51	97	75	133
27-Apr	Gill Net	2 1/4	Spirit	10	N of Sore Thumb	30	39	1	13.5	0.2	0	27	98	70	143
27-Apr	Throw Net		ADF&G	30	Sore Thumb Cove	131	116	4	116	0.3	0	48	97	251	120
	Total 32 Samples			731		2,418	2,619	192						5,229	
	Average Throw/Dip Net			18		75	64	4	10.9	0.8	0	48	94	144	125
	Average 2 1/8 Gill Net			20		70	70	5	11.5	0.9	0	52	93	144	139
	Average 2 1/4 Gill Net			27		71	102	4	14.1	0.5	0	60	96	177	152

Table 4. Observations of predators, 1989. Counts of humpback whales, sea lions, scoters, and seagulls.

Survey Date	Whales	Sea Lions	Scoters	Seagulls	Comments
11-Apr-89	3	6			
14-Apr-89	0	52	0	0	
17-Apr-89	1	61	100	100	Steller arrived and trawled
18-Apr-89	6				Steller left for Petersburg
19-Apr-89	0	75			
20-Apr-89	1	30			Polaris arrived
21-Apr-89	4	65		300	
22-Apr-89	5	98	300	500	
23-Apr-89	4	58			
24-Apr-89	0	30			Polaris departed, Steller returned
25-Apr-89	4	60	200	500	
26-Apr-89	3	69	500		
27-Apr-89	7	37			First spot spawn - no eggs
28-Apr-89	1	20	1,000		Fishery/first spawn and eggs
29-Apr-89	0				Steller left to Peril Strait
30-Apr-89	0	48	3,000		
01-May-89	1	53			Spot spawn, Steller return
02-May-89	0		2,000	2,000	
03-May-89	2				
04-May-89	0				
05-May-89	5		2,500		First significant spawn
06-May-89	0				Steller left for Petersburg
07-May-89	1				
08-May-89	0	22	1,500		
09-May-89	2				
10-May-89		35			
11-May-89	2				Major spawn began
12-May-89	5				
13-May-89	0				Steller returned 5/14
14-May-89	0				Major spawn ended
15-May-89	1				Diving began
16-May-89					
17-May-89	1	15			Diving ended
18-May-89	0	10	3,000		Steller left for Petersburg
20-May-89	0	2			Last spawn 5/18
21-May-89	1	7			
06-Jun-89	0	0	2,000	0	No sign of spawn
Maximum	7	98	3,000	2,000	

Note: Surveys are generally more affected by whether or not the observer records sightings than the presence or absence of the birds or marine mammals. However, peak numbers are probably representative of the population present. Large numbers of scoters were observed at Hobart Bay. This may account for the significant decline in scoters compared to previous years.

Counts are mostly from aerial surveys, occasionally skiff and vessel counts were used.

Table 5. Annual Seymour Canal roe herring age composition, harvest, escapement, and egg density.

Year	Age II	III	IV	V	VI	VII	VIII & +	Total Percent	N =	Gear	Assessment Method	Biomass Estimate	Escapement (Million of Pounds)	Egg Density (Millions of Eggs Per Square Meter)	Harvest (Millions of Pounds)
1976	0.0	0.0	7.7	18.2	12.5	11.8	49.8	100.0	313	PSeine	Acoust	4.00	3.5		0.50
1977	0.0	0.0	5.0	8.0	38.0	12.0	38.0	101.0	110	PSeine	Acoust	8.23	7.3		0.96
1978	0.5	8.0	17.0	15.0	8.0	18.0	33.0	99.5	206	PSeine	Egg Den	1.05	1.1	0.89	1.57
1979	0.0	3.9	14.5	19.0	7.8	4.5	50.3	100.0	179	PSeine	Acoust	5.00	4.5		0.53
1980	0.0	53.0	25.0	11.0	3.0	8.0	0.0	100.0	95	GillNet	Egg Den	11.39	11.4	1.10	0.00
1981	0.0	6.0	72.0	18.0	2.0	2.0	0.0	100.0	231	GillNet	Egg Den	3.10	3.1	0.32	1.50
1982	0.0	1.0	16.0	73.0	9.0	1.0	0.0	100.0	188	GillNet	Egg Den	2.68	2.7	0.38	0.00
1983	0.0	11.2	9.8	35.0	39.8	3.4	0.8	100.0	667	GillNet	Egg Den	8.03	8.0	0.38	0.00
1984	0.0	18.0	11.0	10.0	28.0	30.0	3.0	100.0	640	GillNet	Egg Den	3.90	3.9	0.18	1.03
1985	0.0	5.0	35.0	19.0	15.0	16.0	11.0	101.0	688	GillNet	Egg Den	6.00	6.0	0.44	0.0
1986	0.0	6.0	11.2	47.5	17.0	11.0	7.5	100.2	490	GillNet	Egg Den	7.9	7.9	0.36	0.68
1987	0.0	6.2	12.6	27.5	30.9	14.7	8.0	99.9	934	GillNet	Egg Den	9.55	9.6	0.64	0.61
1988	0.0	1.6	16.0	14.0	27.2	25.0	16.4	100.2	608	GillNet	Egg Den	6.5	6.5	0.36	1.17
1989	3.0	25.0	10.0	24.0	25.0	11.0	2.0	100.0	361	GillNet	Egg Den	6.23	6.23	0.61	1.09

Table 6. Seymour Canal sac roe herring annual harvesting and spawning data.

Year	Quota (Tons)	Harvest (Tons)	Roe Percent	2-Hour Notice in Effect	Fishing Dates	Total Hours Open	Harvest in Tons/ Hour	Time Allowed to Closure (Min.)	Number of Boats	First Fish on the Beach	Date of First Spawn	Date of Peak Spawn	Statute Miles of Spawn
1971	-	35	-	-	4/19	-	-	-	-	-	-	-	3.0
1972	300	495	-	-	5/1	-	-	-	-	-	-	5/10	-
1973	500	506	10.5	-	4/30	-	84	-	-	-	-	-	-
1974	800	904	-	-	5/3 & 5/5	7.0	129	-	20	-	-	-	-
1975	None	-	-	-	-	-	-	-	-	-	-	5/10	4.5
1976	-	194	13.1	-	5/9	5.5	35	-	20	-	5/5	5/16	3.2
1977	475	485	11.8	-	5/9	3.5	139	-	24/29	5/6	5/8	-	2.5
1978	500	729	8	-	5/8 & 5/9	14.0	52	-	29/42	5/4	5/8	5/10	3.3
1979	250	268	10.6	-	5/3	4.4	61	-	10/38	4/28	5/2	-	1.1
1980	None	-	-	-	-	-	-	-	-	-	5/9	-	4.5
1981	600	618	12.1	4/28	4/28	47.5	13	120	90	4/24	4/27	-	4.5
1982	None	-	-	-	-	-	-	-	-	5/6	5/15	5/18	4.0
1983	None	-	-	-	-	-	-	-	-	-	5/1	5/7	12.0
1984	375	518	12.7	4/20	4/26	7.8	66	49	104	4/19	4/25	4/29	10.2
1985	None	-	-	-	-	-	-	-	-	-	4/30	5/6	9.0
1986	300	339	12.2	5/5	5/10	1.8	188	15	86	4/29	5/6	5/11	13.5
1987	400	302	12.8	5/1	5/6	2.0	151	11	89	4/28	4/30	5/8	12.6
1988	534	586	13.3	4/26	4/26 to 5/1	104.5	6	58	96	4/24	4/24	4/25	19.0
1989	332	547	12.7	4/21	4/28	1.5	365	12	104	4/21	4/28	5/13	9.0
Average 1981-89	424	485	12.6	4/27	5/1	27.5	18	44	95	4/26	5/1	5/7	10.4

Note:
1977 - Quota was a range from 450 to 500 tons
1977 - Seine boat numbers indicate boats catching fish vs total boats fishing
1980 - Seymour Canal changed from a seine area to a gill net area
1981 - Only year 100 fathoms of gear and a four-hour grace period were allowed
1984 - Beginning of the 50 fathom gear limit
1984 - Only year a two-hour grace period was allowed
1986 - Beginning of the one-hour grace period

Table 7. Seymour Canal registration and buoy stickers, 1989.

Name	Permit Number	Original Sticker Numbers	Replacement Sticker Numbers	ADF&G Number	Date of Registration	Capacity In Tons	Fishing Vessel Name
Alan Almquist	G34A52808C	031,032		48524	04/24	20	Reverie
Al Anderson	G34A52802X	117,118		27684	04/21	8	Sysafhus
Paul Arrington	G34A65436L	051,052	319,320	50919	04/21	10	Indian Summer
Ingvald Ask	G34A52809U	131,132		45644	04/21	5	
Eldon C. Atkinson	G34A52820JT	230,231		56131	04/21	10	Miss Mindy
Al Babboni	G34A52811E	240,241		48279	01/22	7	
Arnold Bahke	G34A653991	097,098	331,332	32746	04/20	8	
Harold Bailey	G34A65051B	007,008		32793	04/20	5	Miss Christy
Russell Bartoo	G34A52834B	165,166	345,346	48538	04/22		
William Baines	G34A52812V	053,054	316,317	33977	04/21	15	Etika
Gary Baxter	G34A65387A	173,174	260,349	53507	04/22	8	
Randy Baxter	G34A52806R	213,214		48487	04/21	15	
James Becker	G34A65028F	234,235		32770	07/21	15	
Don Belcher	G34A65174I	149,150	323,324	43528	04/21		
Dale Bosworth	G34A65448K	093,094		50956	04/22	12	Yasha
Ron Buschmann	G34A65070F	045,046	301	57413	04/20	6	
Richard T. Carr	G34A65476S	125,126		31399	04/21	16	Nancy C
Rick D. Carr	G34A52835S	242,243		24695	04/22	12	Carrie C
Charles Clement	G34A65389K	015,016		27397	04/21	6	Seven C's
Karl Cook	G34A65422K	029,030	303,304	43801	04/20	10	Andrea J
Carl Crome	G34A64962V	003,004		27865	04/20	18	Lara Lee
Jerome Dahl	G34A65048A	093,094	326,327	50956	04/21		
Barbara Despain	G34A6533A	163,164		50956	04/22	12	
Robert Dickinson	G45A65383G	195,196		50645	04/21	8	Quadra
Robert Dolan	G34A65042V	037,038		51907	04/20		
John Ducken	G34A52828X	201,202		45586	04/21	15	
Irving Dundas	G34A52813N	083,084		00812	04/20	10	Kristine
Robert Earl	G34A65032X	169,170		52015	04/21		
John Eide	G34A52831Z	215,216		36570	04/21	20	
John Elding	G34A65047I	189,190		48453	04/21		
John Emde	G34A65395N	005,006		48309	04/20	15	Bessie B
Steve Enge	G34A65094V	089,090		48144	04/21	20	Garnet
Arnold Enge	G34A65161I	069,070		27654	04/21	9	Moon Shadow
Susan Erickson	G34A64948F	129,130		31452	04/21	10	
Jeffery Golden	G34A65489S	127,128	343,344	31065	04/22		
Gale Good	G34A65077B	017,018	314,315	27570	04/21	8	Misty Dawn
David Goth	G34A65537E	041,042	340	57722	04/21	10	Silver Dollar
Dean Graham	G34A653861	181,182		50882	04/21	16	No Problem
Frank Gray	G34A52810G	226,227		56145	04/21		
Richard Gregg	G34A65049R	113,114	217,218	32690	04/21	6	Sunrise
Roger Gregg	G34A65031G	111,112		24675	04/20	6	Sunrise
Tony Guggenbickler	G34A65472Z	115,116	337	43326	04/21	12	Judy
Charles Haines	G34A65461J	220,221		43427	04/21	12	Dugale
Jill Haines	G34A65450S	222,223		55451	04/21	14	Pac-Man
Sven Halstensen	G34A65475B	043,044	307,308	55939	04/20		Lizzy B
Ole Haynes	G34A65419J	238,239		31048	04/22	10	
Janet Haynes	G34A65173F	191,192		56794	04/21	25	Prime Time
George Higgins	G34A65158H	061,062	335,336	40117	04/21	15	Harlequin
Richard Hofmann	G34A52803PT	019,020	302	32475	04/20	3	Silver Fox
Michael Holm	G34A65162A	035,036		54918	04/21	20	Intrepid
Hans Holum	G34A65463S	141,142		32656	04/21	6	Keno
Richard Hudson	G34A65449C	047,048	321,322	39044	04/21	8	

--Continued--

Table 7. (Page 2 of 2.)

Name	Permit Number	Original Sticker Numbers	Replacement Sticker Numbers	ADF&G Number	Date of Registration	Capacity In Tons	Fishing Vessel Name
Gilbert Hudson	G34A65625F	055,056	318	31347	04/21		
Glenn Johnson	G34A52830H	185,186		45855	04/21	15	Riverview
Bob Johnson	G34A52800N	095,096	313	31398	04/21	10	
Peter Johnson	G34A65473Q	081,082		31886	04/21	10	Dividend
Patti Karuza	G34A64964G	209,210		55662	04/21	16	Azarel
Frank Klepser	G34A65088Q	049,050		32797	04/21	8	Miss Kris
Dave Klepser	G34A650980	153,154		30340	04/21	15	Starfire
John Knight	G34A65481F	033,034	328	31757	04/21	10	Starship
Howard Koerth	G34A65479V	179,180		43429	04/21	22	Sea Drifter
Ernest Kohlhasr	G34A66514G	236,237		58034	04/21		
Jim Larson	G34A65421R	155,156		32636	04/20	10	
Leonard Leach	G34A650891	001,002		50856	04/21	20	
Ted Lewis	G34A65209S	011,012		31294	04/20	15	Garnet Lee
Rocky Littleton	G34A649671	135,136		31441	04/20		Darcy
Loren Lundquist	G34A65406J	187,188		31430	04/21	8	Loren's Limo
David Martin	G34A64965X	105,106		28951	04/21	11	Condor
Morris Mattson	G34A65093G	079,080		45591	04/21	12	Roe Boat
Nevin May	G34A65355W	137,138		48476	04/21	7	
Sandra Meeks	G34A65059D	025,026		48662	04/22	15	
George P. Oday	G34A656546	073,074		57698	04/21	20	
Dennis O'Neil	G34A65412M	133,134		43300	04/20	8	Vulcan
John Pasquan	G34A65511E	077,078		53969	04/21	15	
Tony Peckaric	G34A65391S	205,206		45571	04/21	12	Turkey Buzzard
Mark A. Pennylegion	G34A52836L	228,229		56131	04/21		
Ken Pentula	G34A65042V	109,110		13993	04/21	8	
Fred Pfundt	G34A65079L	101,102	309,310	31360	04/21	9	
Warren Phillips	G34A52807KT	199,200		24606	04/21		Tom Cat
Darrel Pope	G34A52825V	067,068	333,334	21478	04/21	9	Superfly
James Porter	G34A65382N	087,088		36592	04/21	8	Miss Mindy
Joseph Princen	G34A65474J	103,104		46207	04/21	15	Little Rabbit
Larry Reed	G34A64966P	224,225		53285	04/21	12	Night Crawler
Darrel Reeve Sr.	G34A52816P	009,010	305,306	00811	04/20	7	Monica Ann
Paul Reskusich	G34A65420A	207,208		55591	04/21	6	High Noon
Mark Saldi	G34A65057G	021,022	311,312	48859	04/21	10	
Michael L. Sather	G34A52827GT	193,194		55747	04/21		
Amy Schams	G34A65163R	197,198		57192	04/21	15	Masterpiece
Mike Schwartz	G34A65171G	107,108		32241	04/22	7	Flight
Brenda See	G34A65104X	121,122		43611	04/21	10	Jill
Monique Sicard	G34A65080C	232,233		26604	04/21		
Jev Sheldon	G34A650211			56205	04/24		
Ralph Sorensen	G34A65384X	203,204		36412	04/21		
Richard Sturgill	G34A52823L	183,184		45892	04/21	20	Anna E
Adele Swanson	G34A65465E	338,339		43512	04/21	6	
Steve Thynes	G34A64963N	027,028		23332	04/20	10	Laurier
Martin Vanslagen	G34A538171	161,162	347,348	55601	04/22	15	Trehia Michell
Jenelle Varila	G34A52819R	123,124		45807	04/21		
Joyce Veazey	G34A52824E	211,212		48470	04/21		Istanasih
Jerry Welch	G34A65155F	071,072		45763	04/21	12	Wabbit
Todd Welch	G34A65608L	023,024		33326	04/21		North Shore
Charles Wills	G34A65381V	085,086	329,330	36363	04/21	10	Puffin
Thomas Wirtzfeld	G34A65160P	147,148	328	32801	04/21	12	Kimberly Lynn
Stan Wood	G34A65078S	039,040	219	22776	04/21		

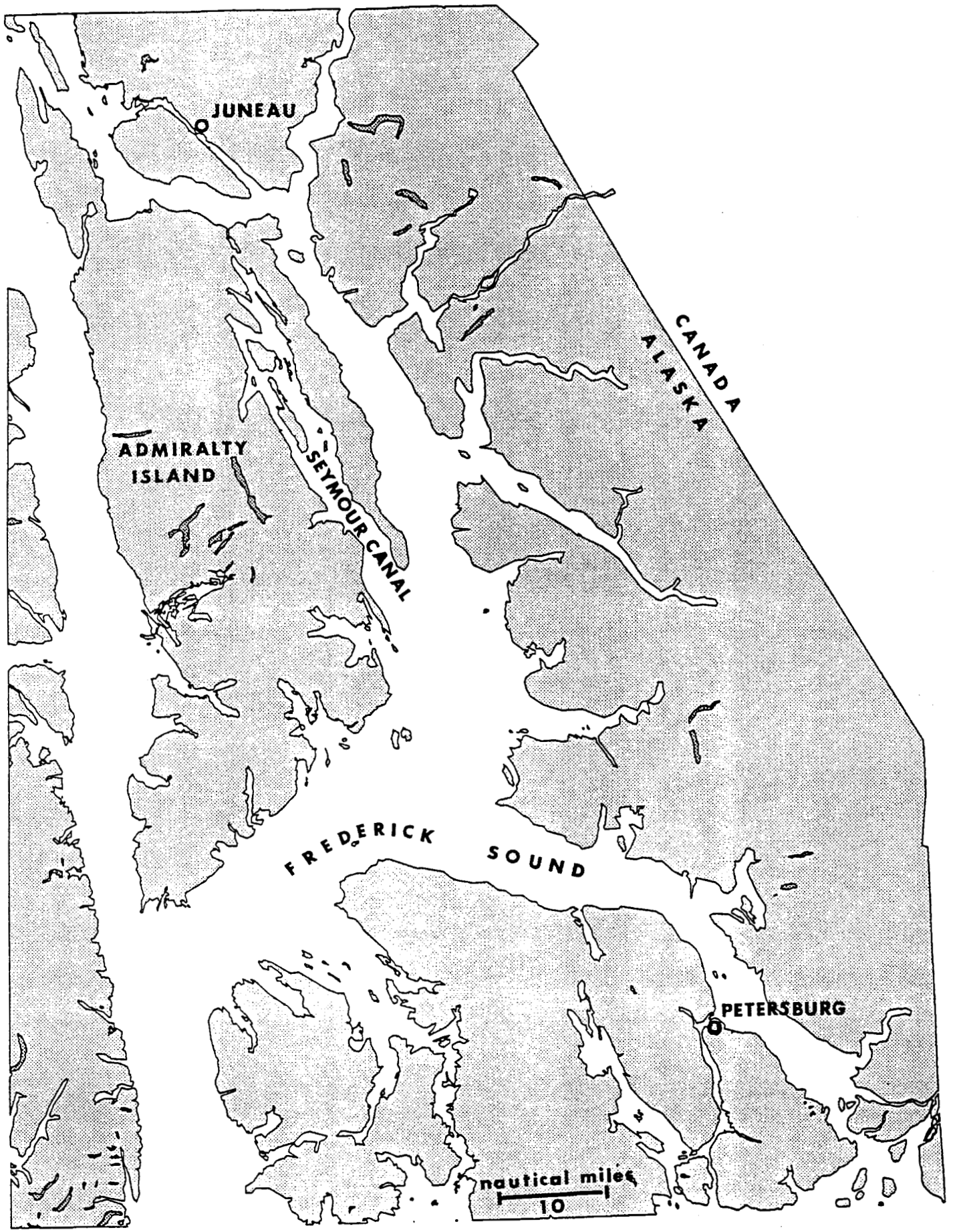
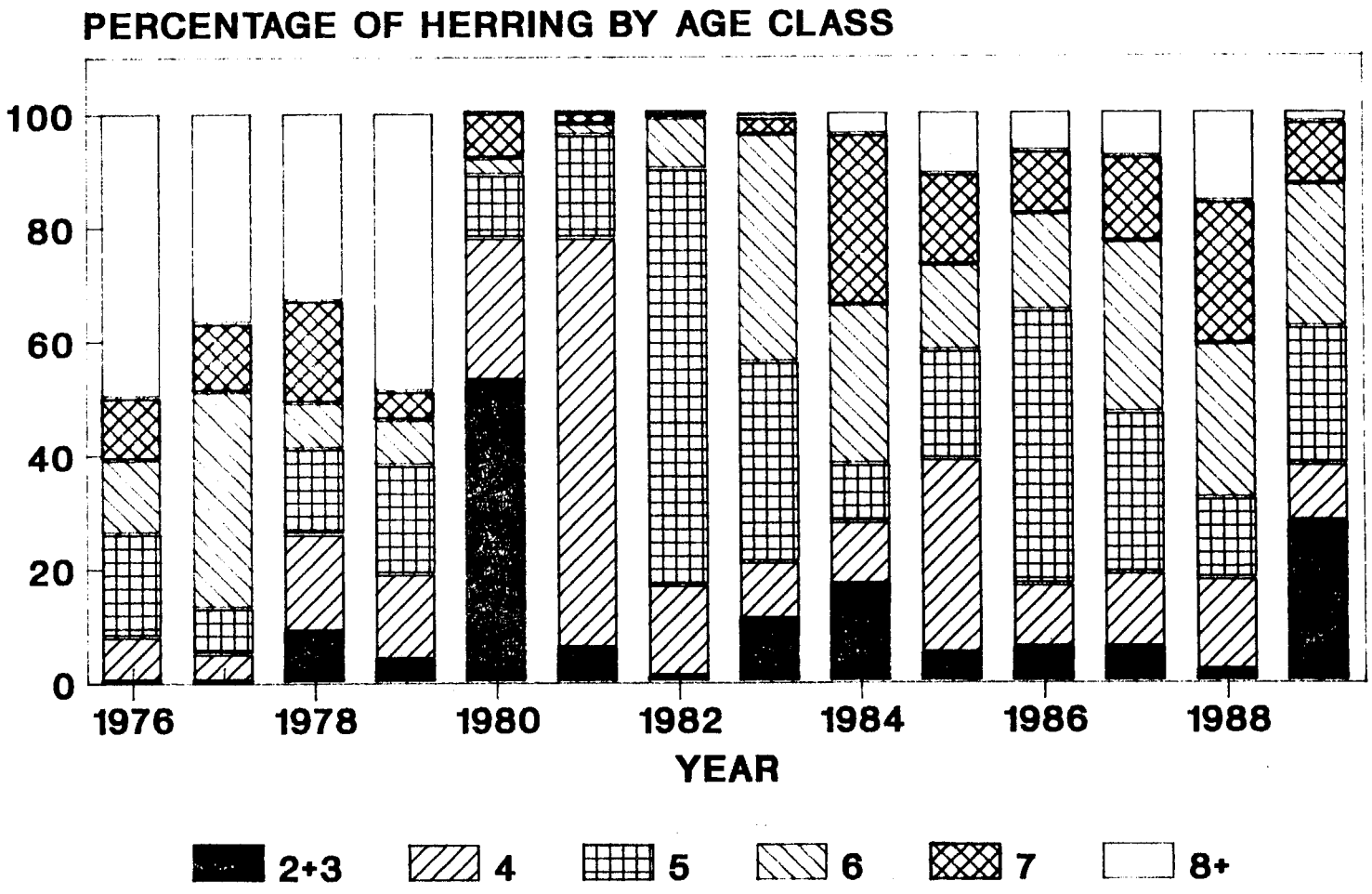


Figure 1. Location of Seymour Canal.



89h:syhistry:syhage89

Figure 2. Seymour Canal herring age analysis, 1976-1989.

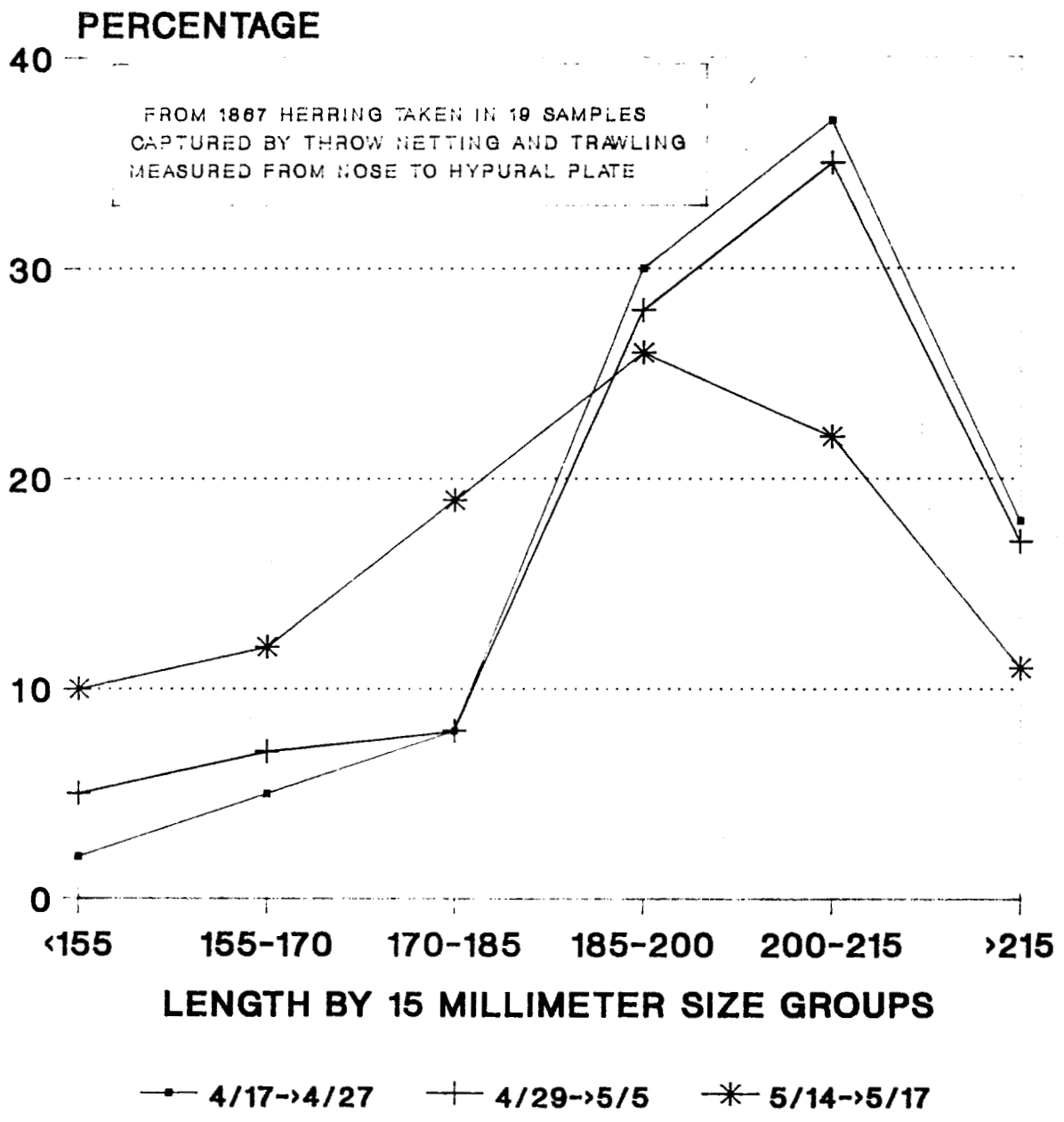


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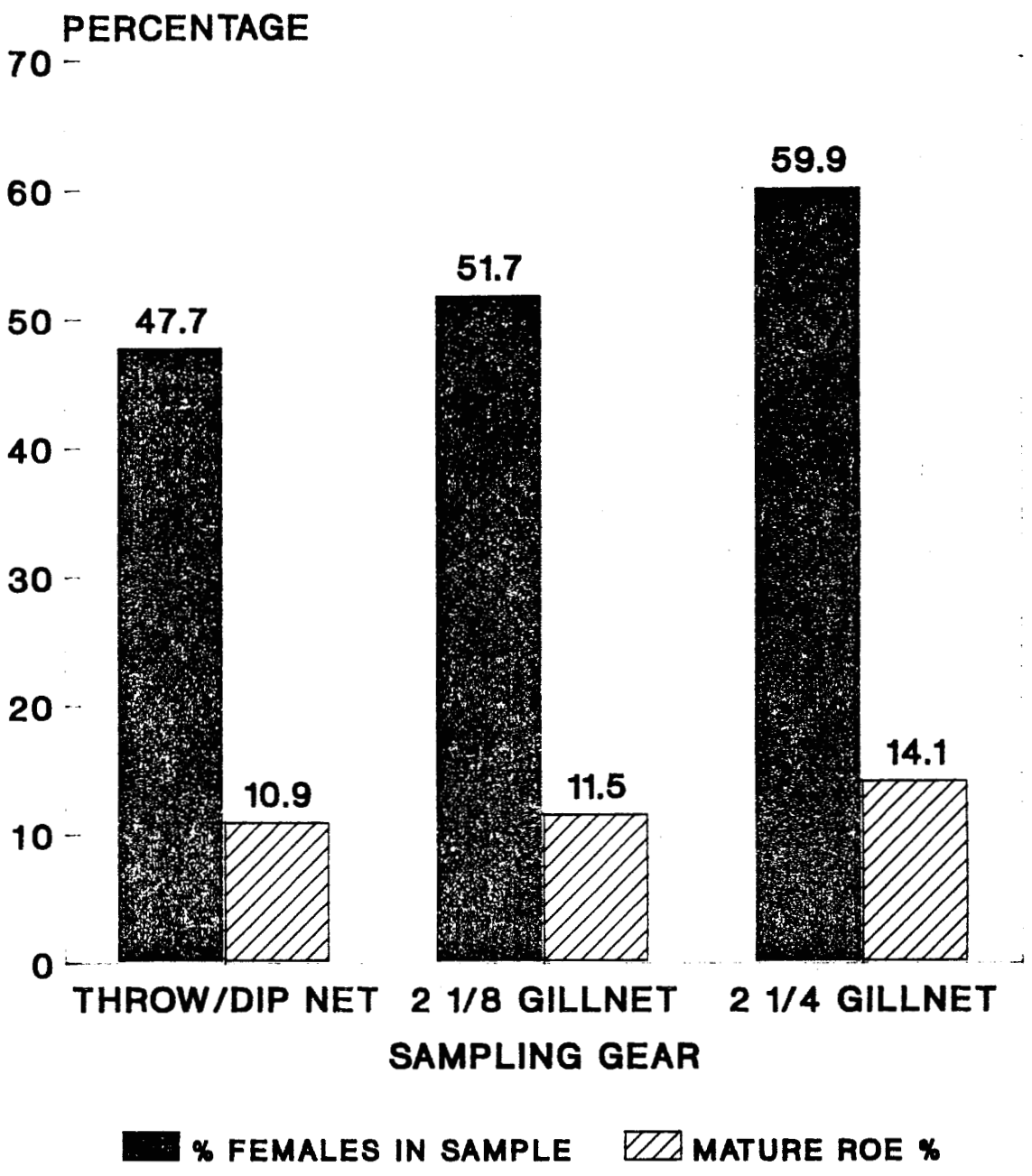
Figure 3. 1989 Seymour Canal herring lengths.



h89:ay89amp:ay89prot

Figure 4. Seymour Canal 1989 roe % and % females.

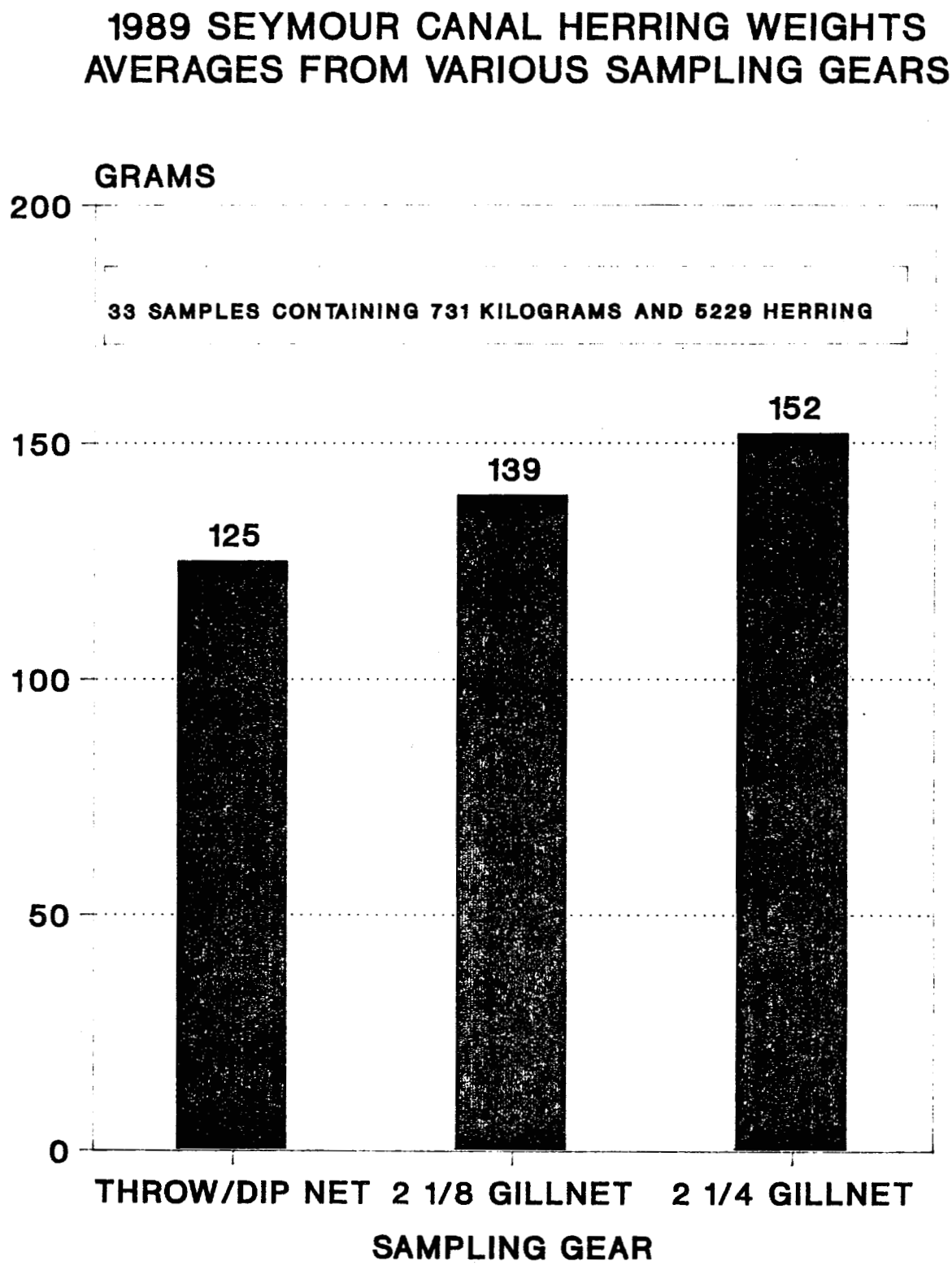


Figure 5. Seymour Canal 1989 average weights with different sampling gear.

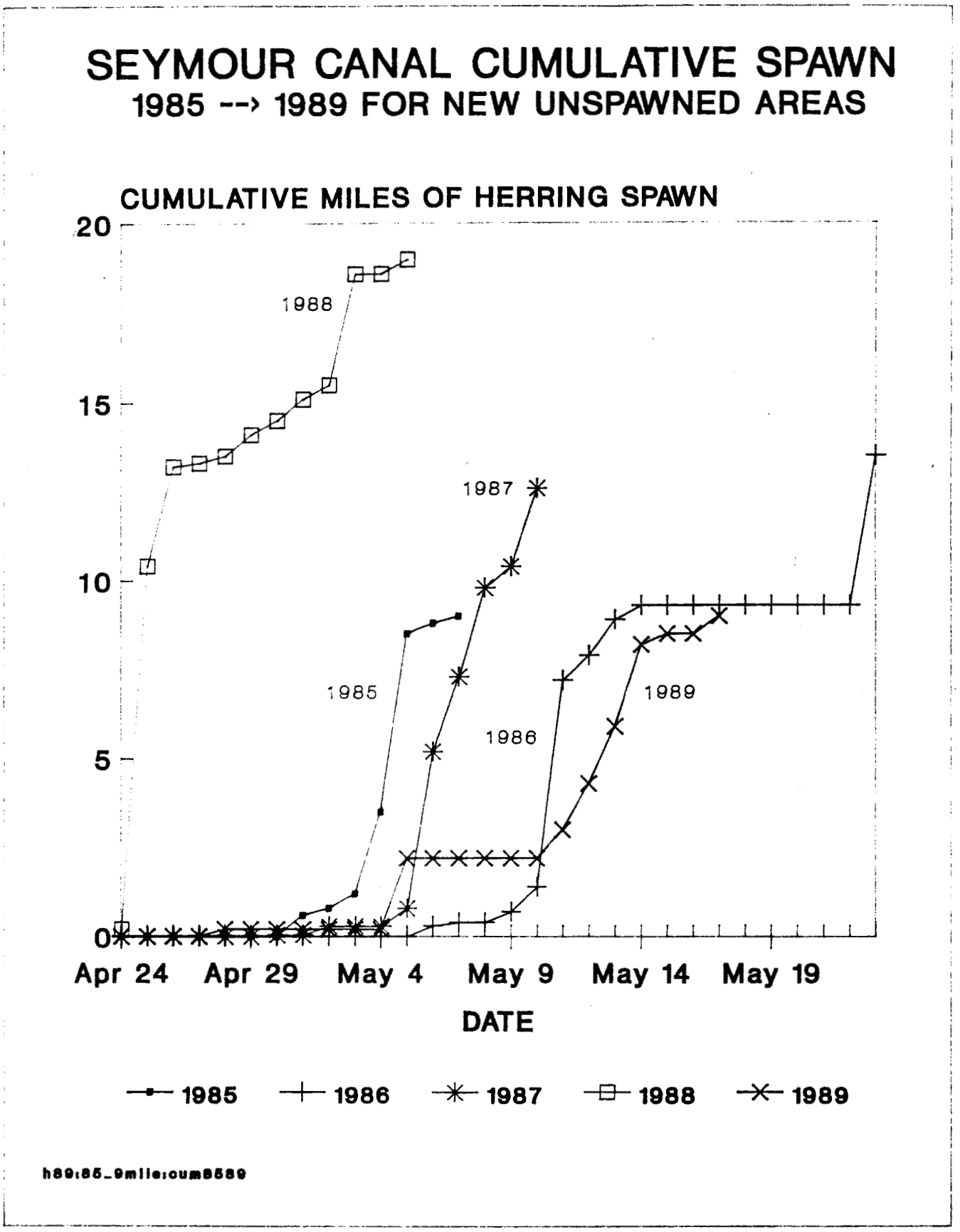


Figure 6. Seymour Canal 1985 to 1989 cumulative miles of spawn observed.

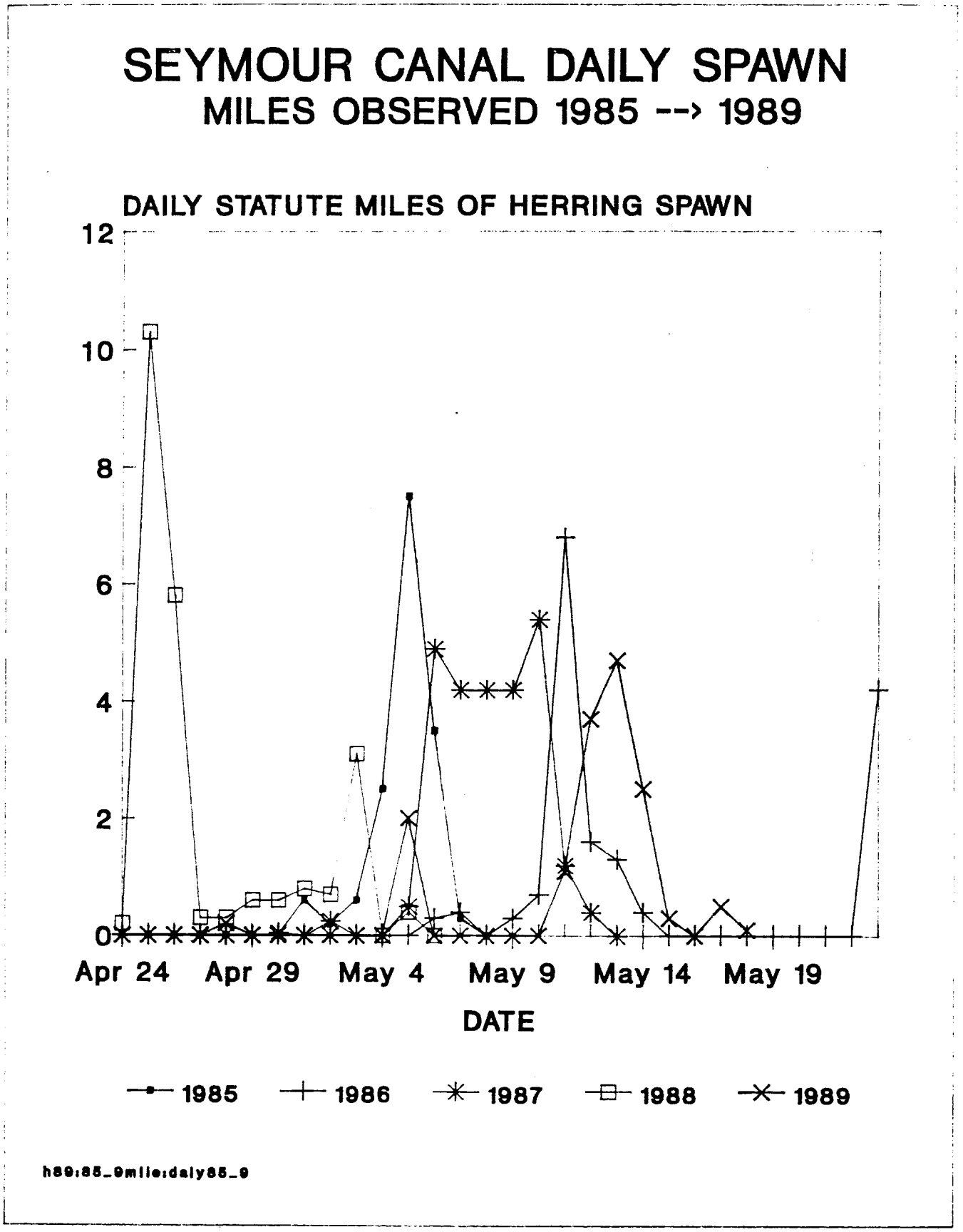


Figure 7. Seymour Canal 1985 to 1989 daily miles of spawn observed.

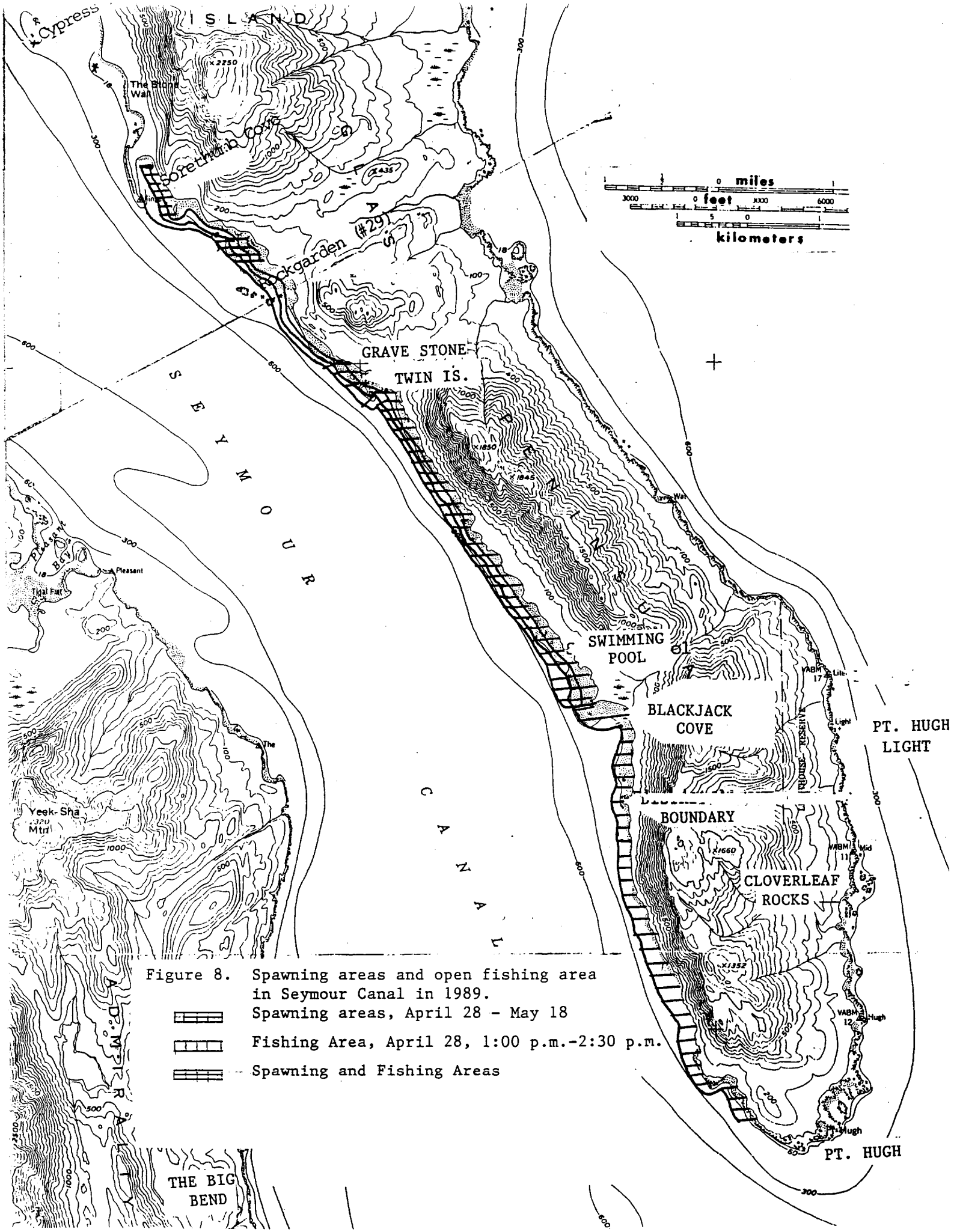


Figure 8. Spawning areas and open fishing area in Seymour Canal in 1989.

Spawning areas, April 28 - May 18

Fishing Area, April 28, 1:00 p.m.-2:30 p.m.

Spawning and Fishing Areas

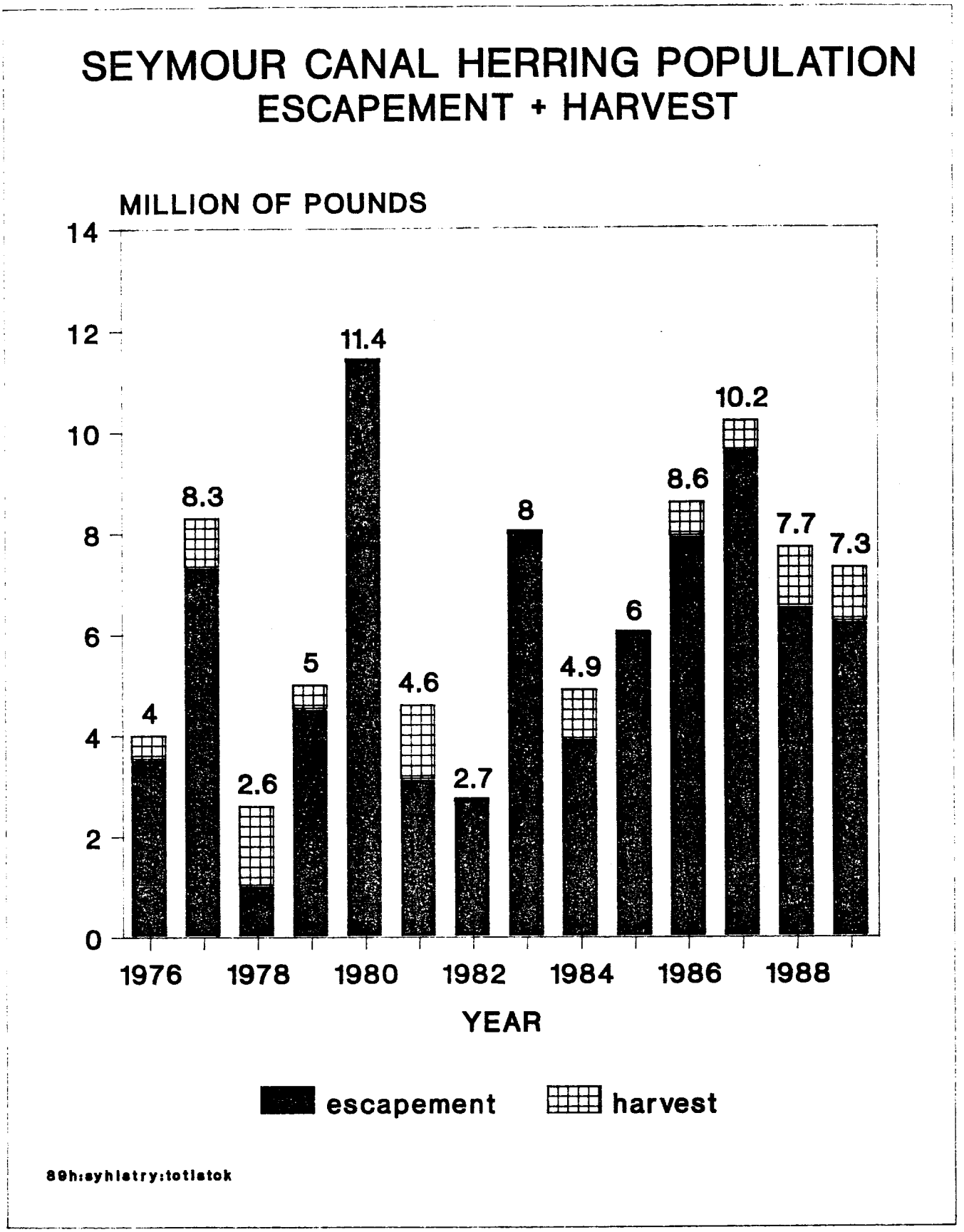


Figure 9. Seymour Canal herring population, escapement and harvest.