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A Summary of Sablefish Tagging and Biological Studies Conducted During 1979 by the Pacific Biological Station

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A SUMMARY OF SABLEFISH TAGGING AND BIOLOGICAL
STUDIES CONDUCTED DURING 1979 BY THE
PACIFIC BIOLOGICAL STATION

by

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ABSTRACT

Beamish, R. J., C. Houle, and R. Scarsbrook. 1980. A summary of sablefish tagging and biological studies conducted during 1979 by the Pacific Biological Station. Can. MS Rep. Fish. Aquat. Sci. 1588: 194 p.

During 1979, 15,731 sablefish were tagged off the west coasts of the Queen Charlotte Islands and Vancouver Island in May, June and August. In October and November 1979, 25,471 juvenile sablefish were tagged and released in Hecate Strait and Queen Charlotte Sound. A small sample of 26 juveniles that were captured in Queen Charlotte Sound in September and maintained in captivity at the Pacific Biological Station were tagged and released into Departure Bay in the Strait of Georgia in December 1979.

Exploratory trapping in deepwater off the Queen Charlotte Islands did not result in capture of sablefish at depths greater than 1830 m.

Preliminary estimates of age and size composition of the blackcod off Vancouver Island indicated that after age 5 growth is reduced. The sizes of mature fish of similar ages are extremely variable and it appears that some coastal areas contain stocks of slow-growing individuals. In one sample the average age was 19.5 yr for males and less than 1% of the males aged were larger than 70 cm. Females were larger but had a similar age distribution. Fifty-eight percent of females were larger than 70 cm and the average age was 21 yr. Age estimates and length frequency analysis confirmed that most of the juveniles tagged were completing their third year of growth (age 2⁺) and were part of a strong 1977 year-class.

By the end of 1979, 2,385 tagged fish had been recovered from all releases starting in 1977. Eighty percent had been recovered less than 50 km from the release area and 7% were recovered at distances greater than 200 km from the release area. The total percent of blackcod recovered at distances greater than 200 km from the release area increased in 1979. Detailed analysis of recoveries off the Queen Charlotte Islands throughout the year show that some blackcod remain in the vicinity of the release area all year, many within a few km. Until the numbers of recoveries in each area have been adjusted for fishing effort, it is not possible to assess the importance of recoveries made at some distance from the release area, relative to the recoveries made in the release area. Because blackcod appear to be long-lived final conclusions about the distance blackcod move should not be made for at least 10 years after tagging.

RÉSUMÉ

Beamish, R. J., C. Houle, and R. Scarsbrook. 1980. A summary of sablefish tagging and biological studies conducted during 1979 by the Pacific Biological Station. Can. MS Rep. Fish. Aquat. Sci. 1588: 194 p.

En 1979, on a étiqueté 15 731 morues charbonnières au large de la côte ouest des îles Reine-Charlotte et de l'île Vancouver, en mai, juin et août. En octobre et novembre 1979, 25 471 morues charbonnières juvéniles ont été étiquetées et relâchées dans le détroit d'Hécate et le bassin Reine-Charlotte. Un petit échantillon de 26 morues juvéniles que l'on avait capturées en septembre dans le bassin Reine-Charlotte et gardées en captivité à la Station de biologie du Pacifique a été étiqueté et relâché dans la baie Departure du détroit de Géorgie en décembre 1979.

Lors d'une pêche expérimentale à la trappe dans les eaux profondes au large des îles Reine-Charlotte, on n'a capturé aucune morue charbonnière à des profondeurs dépassant 1 830 m.

D'après les données préliminaires sur la composition par âge et par taille du stock de morue charbonnière au large de l'île Vancouver, la croissance après 5 ans est limitée. La taille des poissons adultes de même âge varie considérablement et il semble que certaines eaux côtières abritent des stocks à croissance lente. Dans un échantillon, l'âge moyen était de 19,5 ans pour les mâles, et moins de un pour cent des mâles dont on a pu déterminer l'âge mesuraient plus de 70 cm. Les femelles sont plus grandes, mais leur répartition par âge est similaire. Cinquante-huit pour cent des femelles mesuraient plus de 70 cm, et leur âge moyen était de 21 ans. Les évaluations d'âge et l'analyse de la fréquence de taille ont confirmé que la plupart des juvéniles étiquetés achevaient leur troisième année de croissance (2 ans⁺) et appartenaient à la classe imposante de 1977.

A la fin de 1979, on avait récupéré 2 385 des poissons étiquetés et relâchés depuis 1977. Quatre-vingt pour cent ont été récupérés à moins de 50 km de l'endroit où on les avait relâchés, tandis que sept pour cent ont été repris à plus de 200 km. Le pourcentage total de morues charbonnières récupérées à plus de 200 km de l'endroit où elles avaient été relâchées a augmenté en 1979. D'après une analyse détaillée des spécimens récupérés au large des îles Reine-Charlotte au cours de l'année, il semble que certaines morues charbonnières restent à proximité de l'endroit où elles ont été relâchées pendant toute l'année, et bon nombre d'entre elles dans un rayon de quelques kilomètres. Tant qu'on n'aura pas rajusté le nombre de spécimens récupérés dans chaque secteur selon l'effort de pêche, il sera impossible d'évaluer l'importance des poissons récupérés à une certaine distance de la zone où ils ont été relâchés par rapport à ceux récupérés dans la zone même. Comme la morue charbonnière vit assez longtemps, il faudra attendre au moins dix ans après l'étiquetage pour tirer des conclusions finales sur ses déplacements.

INTRODUCTION

This is the third report describing the results of the sablefish (*Anoplopoma fimbria*) tagging program. The first two reports summarized results of tagging studies conducted during 1977 and tagging and exploratory trapping studies conducted during 1978 (Beamish et al. 1978, 1979). This report describes the number and location of sablefish tagged in 1979 and summarizes recovery information to December 31, 1979. It is our intention to publish these reports for each year that fish are tagged.

The report also contains results of the second exploratory trapping study; preliminary results of studies designed to validate the method of age determinations; preliminary results of age and growth studies based on tagging and age determinations; and some observations on growth and mortality of juvenile and adult sablefish that were kept in a large tank as a control for the tagging and oxytetracycline injection studies.

As in previous years, the primary objective of the tagging program was to examine the movement of tagged adult fish in order to identify stock units. During 1979 it was possible to tag juvenile sablefish from Queen Charlotte Sound and Hecate Strait. Fish were tagged in these "inside waters" in an attempt to identify the offshore areas west of Vancouver Island, Queen Charlotte Sound and the Queen Charlotte Islands that might receive these recruits.

FISHING METHODS

Adult sablefish were tagged along the west coasts of Vancouver Island in May and the Queen Charlotte Islands in June. Fish were captured using collapsible rectangular wire traps of approximately 85 cm x 85 cm x 2.4 m long. Each trap had two tunnels and was baited with approximately 5 kg of frozen herring. Three strings of traps were set and hauled each day. Two strings contained 15 traps and the third string had 30 traps. On occasion traps were in the water for more than 24 h but most soaktimes were less than 24 h as in previous cruises. The soaktime of less than 24 h was chosen for convenience and not for the quantity of fish obtained. The depth of the set was estimated by averaging a series of depths recorded on the echo sounder during the set.

In the October cruise to Hecate Strait and Queen Charlotte Sound, a Nor-Eastern bottom trawl with a 27 m headline, 55 m footrope, 37 m sweep lines and a 13 cm codend with a 2.2 cm liner was used. In the November cruise to the same areas, a Skagen bottom trawl with 73 m sweep lines and a 9 cm codend with a 2.5 cm liner was used. Sets were approximately 30 min long but ranged from 12-47 min at depths ranging from 72-162 m. The codend was emptied on deck and juvenile blackcod were transferred by hand into 1,200 L holding tanks on deck that had a continuous flow of saltwater. Except for the occasional catches that contained large numbers of dogfish or Dover sole, almost all blackcod were in good condition. For example, 3,909

fish in lots of 300-400 were held in recovery tanks for 1/2 to 3 h and only 30 of the 3,909 or 0.8% died. On another occasion 41 blackcod were held for 12 h with no mortality.

TAGGING METHODS

The primary tag used continued to be the Floy FD-68 anchor tag. As in previous years, approximately 10% of the fish were tagged with a "suture" tag (White and Beamish 1972). The suture tag is believed to be more permanent than the anchor tag, thus it is expected that the use of two tags on 10% of the fish will provide some estimate of loss of the primary tag. Only 10% received the suture tag because the application takes considerably longer than the anchor tag (Appendix 1). The suture tag should be tied so that the monofilament just pinches the flesh. Laboratory studies and recovered fish have confirmed that as the sablefish grows the flesh will grow over the monofilament which becomes embedded in the tissue, forming a firm anchor for the label.

When caught in traps fish were transferred directly into a 3,000 L holding tank. A constant flow of seawater was maintained in the holding tank. Fish were transferred to a second 1,200 L holding tank if they appeared overcrowded. Each fish was netted from the holding tank and placed on a measuring board. No anaesthetic was used. The person dipping the fish also spread the tail, determined the fork length and held the tail so that the fish did not jump while being tagged. Records were kept on the general condition of the fish, noticeable injuries and any problems with the tag. All fish were released over the side immediately after tagging. The majority of fish released sounded immediately and were out of sight within seconds. No fish were injected with oxytetracycline during 1979.

Trawl-caught juvenile sablefish were anaesthetized prior to tagging using MS222 (ethyl m-amino-benzoate methane sulfonate). The response to anaesthetic was monitored and fresh seawater was added to the anaesthetic tank if the opercular movements of the fish were thought to be excessively reduced. Fish were tagged with either anchor tags or suture tags. No fish received two tags or injections with oxytetracycline. Fish were held in recovery tanks prior to release if they had not recovered from the anaesthetic by the end of the tagging operation.

EXPERIMENTAL TRAPPING AND GILLNETTING

The experimental trapping survey conducted in 1978 was repeated in August 1979 in the same area off Tasu Sound. Sets were made at depths ranging from 200-3500 m. A special groundline, 2.2 cm in diameter and approximately 7,315 m long with 145 m between beackets was used for all sets to reduce the possibility of parting the rope when the gear was fouled. Korean style, conical traps were used with 11.4 cm stretched mesh web and 8.9 cm stretched mesh web in the tunnel. The dimensions of the traps were

152 cm diameter base, 91 cm diameter top and 76 cm deep. In water deeper than 1000 m, approximately 10 traps were set on each string and in shallower water 20 traps were attached to the string. In all sets except 2, the tunnel was held open by 24-h time-release links which separate after approximately 24 h in saltwater causing the tunnel to collapse. The 2 sets in deeper water that did not have time-release links were each left for 48 h. During the cruise, 8 traps were baited and set with collapsed tunnels to determine if these traps would actually catch fish.

In addition to trapping in deepwater, sunken gillnets were set in shallower water to examine the stomach contents of sablefish. Samples of fish for stomach content examination were not taken from traps because it was possible that sablefish would not be attracted to traps if they had recently eaten. Each gillnet was 90 m long, 25 meshes deep and with a stretched mesh size of either 14 cm (5 1/2 in) or 15 cm (6 in). Each set, except one, consisted of a 14 cm net attached to a 15 cm net. The buoy line and nets were set off the stern with the vessel moving ahead at the slowest possible speed. Buoy lines were attached to the bridles at each end of the combined nets and lead "cannon balls" were used to weight the net at the bridles. Nets were hauled back using a net drum and usually came back with cork line and lead line well spread apart, indicating that they were probably "fishing" when on bottom. Nets were set on bottom at depths ranging from 640-732 m for 3.0-18.5 h.

SAMPLING METHODS

All tagged sablefish were measured for fork length to the nearest centimetre. Dead sablefish from the traps were also measured for fork length and if time permitted sex and maturity were determined. All sablefish caught in the sunken gillnets and some juvenile sablefish caught in bottom trawls were measured for fork length to the nearest cm and examined for sex, maturity and stomach contents (macroscopic examination only). Otoliths were also collected for age determination. A number of the juvenile fish were weighed on an electronic integrating balance, some after dying on the deck and some after being anaesthetized with MS222. The balance was calibrated before and after use with standard weights. A sample of 59 adult blackcod was saved for another study to identify parasites.

All recovered tagged sablefish were measured for fork length to the nearest centimetre, examined for sex, maturity, stomach contents, abnormal tag wounds or other injuries, and sampled for otoliths. Most recovered fish were previously frozen before measurements of length were taken.

In early 1980 a series of measurement experiments was conducted to estimate the errors associated with reading and recording lengths and to determine the change in length after blackcod were frozen and thawed. A sample of 50 blackcod was selected to represent a wide range of sizes and anaesthetized in MS222 until movement ceased. The dead blackcod were measured for length and weight, tagged and stored on deck. A second length and weight measurement was taken within an hour and the blackcod were frozen for 1 week. The frozen blackcod were brought back to the laboratory, thawed, and measured and weighed.

An estimate of routine measurement error was also made by comparing measurements of fish before and after tagging. During routine tagging procedures, lengths were recorded prior to applying the tag and for approximately every 10th fish the recorder would request a second length measurement be made after the tag was applied. A comparison of the first 100 duplicate measurements from one cruise has been included in this report.

Age was determined from broken, polished and burnt otoliths as described in Beamish and Chilton (1980). Although the method has not been validated, the preliminary observations of otoliths from fish injected with oxytetracycline, the slow growth of most tagged fish and the size of "known age" tagged fish, recaptured after 8 or 9 yr, indicate that the estimates of age are probably a reasonable approximation of true age.

A list of fishes and major invertebrates captured during the cruises is presented in Table 1. The common names used are those found in Hart (1973). Unusual specimens of brotulids and eelpouts found in the deep water trapping were sent to A. Peden of the B.C. Provincial Museum for identification. All rattails and Pacific flatnoses were sexed, measured for fork length to the nearest cm if the tail was complete and sampled for otoliths. A sample of 139 Sebastes aleutianus from shallow trapline sets off the west coast of the Queen Charlotte Islands was measured for fork length to the nearest cm and examined for sex and maturity. Otoliths were collected for age determination. Large amphipods retained in the bait bags in the deep water sets were sent to E. Bousfield of the National Museums, Canada for identification.

The time of setting and the water and wind conditions were recorded for each set but have not been included in this report.

OXYTETRACYCLINE DOSAGE STUDIES

Twice in May 1979 and once in June 1979 approximately 60 adult sablefish captured at normal fishing depths close to Ucluelet were transported to shore in the vessel holds and in live tanks on deck. The fish were then transferred to holding tanks on trucks and brought across Vancouver Island to a 92,000 L tank at the Pacific Biological Station. These adult fish were held to study the effect of the tagging and oxytetracycline injections on growth and survival. One third of the fish that survived the trip to the Pacific Biological Station were tagged in the routine manner and received an injection of 100 mg oxytetracycline/kg of body weight into the peritoneal cavity (see Beamish et al. 1978). One third were tagged and given the same volume of oxytetracycline diluted with saline to produce 1/4 of the concentration (25 mg/kg of body weight) and one third were tagged and not injected. On December 13, 1979 and on April 16, 1980 all adults in the tank were measured and weighed.

Juvenile sablefish were captured in Hecate Strait and Queen Charlotte Sound during September, October, and November using bottom trawls. In September, the sablefish were caught incidentally during a

rockfish survey and approximately 110 were kept in one of the holds with circulating, upwelling chilled seawater and about 20 were kept in a 700 L tank on deck with flowing seawater. They were transported to the 92,000 L tank at the Pacific Biological Station. On December 13, 1979, the 106 juveniles in the tank were measured, weighed and tagged. Of these 106 fish, 20 were tagged with suture tags and injected with the dose of oxytetracycline used for tagging experiments in 1977 and 1978 (100 mg/kg body weight, Beamish et al. 1978); 20 were tagged with suture tags and injected with the same volume of oxytetracycline diluted with saline to produce 25% of the concentration (25 mg/kg body weight); 20 were tagged with suture tags and received no injections; and 20 were tagged with anchor tags and received no injections. The remaining 26 juveniles were tagged with suture tags and released into Departure Bay. On April 16 and July 16, 1980 all juvenile sablefish were measured and weighed.

Seawater of ambient temperature from Departure Bay was piped into the tank. No attempt was made to regulate the light cycle, but 1/2 of the tank was covered with black plastic to provide some dark areas and lights in the room were turned out at 18:00 h each day. No treatment of any kind was provided for disease or injury. All fish were fed frozen herring and pelleted moist fish food approximately once a week. Sufficient herring was added to the tank so that after about 30 min some remained uneaten on the bottom of the tank.

RESULTS AND DISCUSSION

TAGS

A total of 9,111 sablefish were tagged in May off the west coast of Vancouver Island; 6,339 off the west coast of the Queen Charlotte Islands in June; 281 off the west coast of the Queen Charlotte Islands in August; 12,986 juveniles in Queen Charlotte Sound and Hecate Strait in October and 12,485 juveniles in these same areas in November (Table 2, Fig. 1, 2, 3, 4). A small sample of 26 juveniles captured in Queen Charlotte Sound in September and held at the Pacific Biological Station was tagged with suture tags and released into the Strait of Georgia at Departure Bay in December 1979. The total number of sablefish tagged during 1979 was 41,228 of which 25,471 were juveniles tagged in Hecate Strait and Queen Charlotte Sound. A total of 1,416 or 9.2% of the fish tagged off the west coast of Vancouver and Queen Charlotte Islands received anchor and suture tags and 157 fish received suture tags only. Juvenile sablefish in Queen Charlotte Sound and Hecate Strait were not double tagged. Of the 25,471 fish tagged 4,516 or 17.7% received the suture tag. At least 67 tagged fish were observed to have been killed by birds but these 67 fish have not been subtracted from the number of tagged fish released.

The tag numbers used for each set are recorded in Appendix 2.

OFFSHORE CATCH

The mean catch rate (CPUE) was higher off Vancouver Island (12.8 fish/trap/24 h) than off the Queen Charlotte Islands (9.2 fish/trap/24 h) (Tables 3, 4). However, the average size of blackcod off Vancouver Island was 61 cm (or approximately 2.5 kg; Fig. 5A) compared to 67 cm (approximately 3.5 kg) found off the Queen Charlotte Islands indicating that the catch rate if expressed as average weight per trap per 24 h, would be almost identical for the two areas.

Sets off the Queen Charlotte Islands were made in a depth range of 420-914 m (Table 4), compared to the sets off Vancouver Island that were made in depths less than 100 m to depths of 2,030 m. No blackcod were caught in the 33 traps that were set off Vancouver Island at depths shallower than 100 m or in the 9 traps set at approximately 2,000 m (Table 3). Catch rates of almost double the average were obtained off Vancouver Island in the 10 traps set at about 900 m and about average catch rates were made for the 12 traps set at about 1,200 m (Table 3). While fluctuations in catch rates were common for similar depths, it appears that the best catches in both areas occurred at depths ranging from 550-750 m.

A wide range of other fishes, including Pacific halibut, and invertebrates were caught in the traps (Table 1). The average percent of other species relative to blackcod was higher off the Queen Charlotte Islands (4.4%) than off Vancouver Island (1.3%) (Tables 3, 4) but was relatively low in both areas.

As in previous cruises, the lengths and sex of species of rattails in the catch were recorded. Coryphaenoides armatus ranged from 35-79 cm and females were larger and more abundant. C. acrolepis ranged from 43-83 cm and more females than males were present in the catch. Few rattails were found off Vancouver Island. Length frequencies of sampled rattails are presented in Appendix 4.

LENGTH, WEIGHT, SEX AND AGE COMPOSITION OF SABLEFISH FROM "OFFSHORE" AND FROM "INSIDE WATERS"

A total of 42,584 blackcod was sampled for length from the two "offshore" tagging cruises in May and June, the exploratory trapping cruise in August and the two juvenile tagging cruises in Queen Charlotte Sound and Hecate Strait in October and November (Table 5, Fig. 6, Appendix 3). 1,498 sablefish were examined for sex, 1,220 of these for maturity and 1,149 of these were sampled for otoliths. A small sample of 395 juveniles from Hecate Strait and Queen Charlotte Sound and 79 adults from the west coast of the Queen Charlotte Islands in August were examined for stomach contents. Weights were taken for 246 juveniles.

The length frequency distribution of blackcod found off Vancouver Island was highly skewed to the left (Fig. 6A). In the sample taken there were slightly more males than females (54% males) and less than 1% of the

males were larger than 70 cm whereas 58% of the females were larger than 70 cm (Fig. 7) as reported in previous studies (Beamish et al. 1979). The mean length of the males was 55.7 cm compared to 67.0 cm for the females. The mean length of 61.0 cm for all fish caught was smaller than the mean length of 66.8 cm for the catch off the west coast of the Queen Charlotte Islands. No sample was collected in the Queen Charlotte Islands in 1979 but in 1977 a large sample from a commercial catch had only 29% males. Fish found off the Queen Charlotte Islands are also older than those found off Vancouver Island (unpublished data). The differences in mean lengths of the total sample from these two areas may arise in part from differences in the sex composition and in part from differences in age composition. The mean length of 66.8 cm for the catch off the Queen Charlotte Islands was slightly lower than the mean lengths of 68.5 cm and 69.8 cm found in tagging operations during 1978 and 1977, respectively (Beamish et al. 1978, 1979). The mean length of 61.0 cm for the sample collected off Vancouver Island is much smaller than the mean of 68.6 cm found in 1978 (Beamish et al. 1979) but similar to the mean length of 62.8 cm found in 1977 (Beamish et al. 1978) indicating that some variation in sizes and sex composition occurs off the west coast of Vancouver Island. These differences may indicate that discrete stocks of slower growing fish are present in this area.

The mean length of fish caught during the exploratory trapping cruise was 71.0 cm (Fig. 6C), slightly larger than observed for the tagging cruise in the same area (Fig. 6B) and similar to the length of 73.3 cm observed during the exploratory trapping charter in 1978 (Beamish et al. 1979). The distribution of sizes of gillnet-caught fish was similar to trap-caught.

The major mode for the length frequency distributions from the two juvenile tagging cruises was 44 cm (Fig. 6D, 6E). In the November cruise a smaller second mode appeared at 30 cm (Fig. 6E). In the October sample a small number of fish were found in the 20 cm range (Fig. 6D; Appendix 3, Table 7) and it is believed these fish are from the same year-class as the 30 cm mode seen in November. Previous studies (Fig. 8) have shown that age 0 sablefish are approximately 30 cm in the fall of the year, thus the mode at 30 cm probably represents blackcod that are age 0⁺ or almost finished their first year of growth. The mode at 44 cm according to Fig. 8 represents fish age 2⁺ or just completing their third year of growth. The average length of age 2⁺ juvenile females was 44.8 cm (Table 6) and was significantly greater (*t* test $p < 0.05$) than the average length of 2⁺ males (43.4 cm). while the sample size is small it does appear that differences in the rate of growth of males and females may begin while they are still immature. The 565 juveniles sampled for sex contained 52% males and 48% females (Fig. 9).

The sample of 857 adults obtained off Vancouver Island contained 54% males and 46% females (Fig. 7). The gillnet sample from the Queen Charlotte Islands contained a similar percentage of males and females but cannot be considered representative. The mesh sizes will select fish and because there is a relationship between size and sex composition any size selection will bias the observed sex ratio.

Juveniles ranged in weight from 165 g to approximately 1,755 g (Fig. 5B). The mean weight of the fish estimated to be age 0⁺, 1⁺, 2⁺, and

3⁺ in November was 240 g, 550 g, 740 g, and 960 g, respectively (Fig. 5B, Table 6).

EXPLORATORY TRAPPING AND GILLNETTING

The exploratory trapping studies conducted in 1978 (Beamish et al. 1979) were repeated in the same locations in 1979 (Fig. 3). A total of 18 sets were made at depths ranging from 201-3475 m (Table 7). Catch rates cannot be compared with rates observed in 1978 since Korean style traps were used in 1979 and the North American style rectangular traps were used in 1978. Catch rates at depths of 500-900 m that are normally fished by commercial fishermen were considered to be about average. No blackcod were found at depths greater than 1,830 m and catch rates at depths greater than 1,100 m were low. During the exploratory trapping cruise in October 1978, blackcod were found at depths ranging from 1,830-2,740 m (Beamish et al. 1979). The catch in October 1978 was almost all females (82%) thus it is possible that the failure to catch blackcod in August 1979 may be related to a seasonal movement of some females, and perhaps some males, into deeper water.

The two sets of 9 and 10 traps that were left in deeper water for 50 and 44 h, respectively, without 24-h release mechanisms did not capture blackcod, indicating that the length of set was probably not an important factor relating to the absence of blackcod in the deepwater sets.

During the cruise 8 traps were set with bait but with the tunnel collapsed. After 24 h, 5 of the traps contained an average of 2 blackcod per trap indicating that the collapse of the tunnel after 24 h may not prevent all blackcod from entering the Korean style traps. The 24-h soak-time remains a valid estimate of soaktime since all but one string were retrieved 24.5-29.0 h after setting.

Gillnets were set at 5 depths ranging from 640-732 m resulting in a total catch of 79 blackcod. About 3 times more fish were obtained with the 14 cm mesh than with the 15 cm mesh, however as would be expected, fish caught in the 14 cm mesh were smaller (Table 8). When weights estimated from Fig. 5A are used to estimate the average weight of the catches, the total catch from the 14 cm mesh (207 kg) was about double the total weight (116 kg) from the 15 cm mesh. Mean catch rates for each mesh size were extrapolated for a 24-h period and these rates (Table 8) were similar to catch rates observed for a single trap set for 24 h in the same area (Table 4). It is unknown if gillnets would continue to fish at the same rate for a 24-h period but it is suspected that catch rates would decline as the nets became saturated.

AGE AND GROWTH

During 1978 and 1979, 53 fish were recovered that were tagged, injected and released in the fall of 1977 and 307 were recovered that were

tagged, injected and released in 1978 (Table 9). Not all otoliths recovered from these fish have been examined but of those that have, most have an oxytetracycline mark. Because most fish had grown very little during the release period, the mark was frequently near the edge of the otolith. A few fish such as a 62-cm male marked and released off the west coast of Vancouver Island in September 1977 and recovered September 1979 at a length of 69 cm and an age of 7⁺ did show that 2 opaque zones had formed in the 2 years prior to recapture. Another 53-cm male released in September 1977 off the west coast of Vancouver Island and recovered at a length of 53 cm in September 1979 did not show the oxytetracycline mark on the exterior otolith's surface but it was visible on the interior surface when viewed in cross section. The fish was aged as 16⁺ years when recaptured and while no apparent change in length occurred, 2 closely spaced opaque zones could be identified as having formed after the oxytetracycline mark was formed.

Preliminary studies using these oxytetracycline injected fish and "known age" fish from another study (Kennedy and Smith 1972) indicate that the age determination technique does provide accurate ages (Beamish and Chilton 1980). Final conclusions will not be made for several years since fish of all ages that have been at liberty for four or five years after marking are needed to provide a clearer identification of the number of annuli that have formed beyond the oxytetracycline mark.

During 1979, 2 samples of juvenile sablefish were examined for age composition. One sample of 100 fish collected in September in Queen Charlotte Sound consisted of age 2⁺ individuals or fish from the 1977 year-class (Table 6). Fish in this sample that were age 2⁺ averaged 41.5 cm in length. The average length of males and females could not be determined since the sex of the individuals was not identified. A small number of age 1 and age 3 fish were found but because annuli from otoliths from juveniles were difficult to identify it is believed that at least some of the age 1 and age 3 determinations were in error.

In November a sample of 99 juveniles from Queen Charlotte Sound and 466 juveniles from Hecate Strait was obtained. Since the length frequency relationships from the two areas were almost identical the data were combined. This sample contained 2 size modes at 30 and 44 cm (Fig. 9) that corresponded to age estimates of 0⁺, the 1979 year-class and age 2⁺, the 1977 year-class (Table 6). The mean size of the age 2⁺ fish was 2.2 cm larger than observed in the September sample. The growth curves in Fig. 10 were constructed from the mean lengths for each age for each of the length frequency samples collected for the 1977 year-class (Fig. 8). An estimated data point of 1.0 cm on March 1, 1977 was added to complete the curve. It is evident from Fig. 10 that the rate of growth between September and November 1979 for the aged samples is consistent with observed length frequency changes.

The sample of adult sablefish captured in May off Vancouver Island contained fish ranging in age from 4-46 years (Fig. 11). The average age of the sample was 20.2 years. The average age of males (19.5 years) was similar to the average age of females (21 years).

Growth curves were constructed for males and females using ages that were obtained from otoliths with easily identified annuli (sure)

(Fig. 12) and all otoliths that were not considered difficult to interpret (Fig. 13). Growth curves were similar for both treatments. A von Bertalanffy growth curve was fitted separately to the male and female age-length data (Fig. 13). Three data points were added to fit the curve. Length at age zero was considered to be 1 cm. A length at age 1 and age 3 were obtained by considering that age 0⁺ and age 2⁺ fish sampled in November had completed most of the year's growth and could be considered to be age 1 and age 3, respectively. The von Bertalanffy constants L_{∞} , k , and t_0 were 69.5 cm, 0.19 and -0.99, respectively for females and 56.0 cm, 0.43 and -0.22, respectively for males. Unpublished data indicates that fish from the area where this sample was taken (west coast of Vancouver Island) are smaller than fish from other areas and these constants do not appear to be representative of most stocks on the coast.

STOMACH ANALYSIS

A sample of 78 fish was examined from the gillnet catches off the Queen Charlotte Islands. 395 juveniles were sampled from the November tagging cruise by selecting a random sample of approximately 45 fish (one tub) from sets 29, 31, 33, 34, 35, 37, 38, 39, and 43 (Fig. 4).

Almost one half of the fish examined from the west coast of the Queen Charlotte Islands had empty stomachs (Table 10). Of the 38 fish that contained food items, 76% of the items were fish remains that appeared to be mostly rockfish and 9% jellyfish. The average volume of stomach contents for those fish that contained food items was 22 cc and for all fish, the average volume was 11 cc.

The percentage of juveniles with empty stomachs was 33% (Table 11). Again, the major food item was fish remains (67%) but this time the most prevalent species was herring. The average volume of stomach contents of all fish was 2.3 cc or 3.4 cc if only those fish with food items were considered.

The estimated amount of discards of juvenile blackcod in the trawl fishery in 1979 was approximately 4,000 t (unpublished data, Groundfish Program) in the size range of the 1977 year class (Fig. 8). If the amount of discards of these 1977 year-class blackcod are indicative of the stock size then it appears that there has been a large number of these fish in the Queen Charlotte Sound and Hecate Strait areas for several years. If fish are a major component of the diet then it is apparent that the 1977 year-class could have been an important predator on commercially important species such as herring and possibly young salmon.

TAG RECOVERIES

A total of 37,296 adult blackcod have been tagged and released from July 1977 to December 1979 in areas off Vancouver Island, Queen

Charlotte Sound and Queen Charlotte Islands (Table 12). By the end of December 1979, 2,382 or 6.4% have been recovered. During the fall of 1979, 25,497 juveniles were tagged in Hecate Strait, Queen Charlotte Sound and Departure Bay. None had been recaptured in outside waters by the end of December 1979 and 3 had been recaptured in inside waters.

Of the 5,159 fish tagged off the Queen Charlotte Islands in July 1977, none of which received an injection of oxytetracycline, 132 or 2.6% were recovered in 1977, 623 or 12.4% were recovered in 1978 and 216 or 4.9% were recovered in 1979 (Table 13). The 5,506 fish tagged off the west coast of Vancouver Island in 1977 were injected with oxytetracycline and were subjected to rather inconsistent fishing procedures (Beamish et al. 1978). Recoveries in 1977 totalled 6 or 0.1%. In 1978, 12 more were recovered or 0.2% and in 1979, 36 or 0.6% were recovered (Table 13). In 1978 off Vancouver Island and Queen Charlotte Sound 5,465 fish were tagged, injected with oxytetracycline and released. During 1978, 19 or 0.3% were recaptured and in 1979, 148 or 2.7% were recaptured (Table 13).

In 1978, 5,287 fish were tagged and released in May off the Queen Charlotte Islands and 209 or 3.9% were recovered during the year. A small number of these releases (847) were not injected. When these fish are separated from the totals, only 63 of the injected fish or 1.4% were recovered in 1978 compared to 145 or 17.1% of the uninjected fish (Beamish et al. 1979). In 1979, 152 or 2.9% were recovered. Of these 77 or 1.8% were previously injected and 75 or 10.7% were not injected. The lower percentage of injected fish recovered (3.2% total for 1978 and 1979, Table 9) appears to indicate that the injected fish suffered a higher mortality after release. However, the percentage of uninjected fish recovered (26.0% for 1978 and 1979) is high relative to the average recovery rate of 14.6% of uninjected fish released in the same area in 1977 and recovered during 1977 and 1978. This may indicate that recovery percentages must be standardized for effort before the real differences can be compared. Thus while some increase in mortality appears to be associated with the injections of oxytetracycline, it is difficult at this time to assess the degree of increased mortality involved.

During 1979, 6,339 fish were tagged and released off the west coast of the Queen Charlotte Islands and 460 or 7.3% were recovered by the end of December. A total of 9,111 fish were released off the west coast of Vancouver Island and 331 or 3.6% were recovered by the end of December (Table 13). No fish were injected during the 1979 tagging operations.

In laboratory experiments designed to examine the effect of oxytetracycline injections on growth and mortality, most mortalities occurred in the first week following introduction into the holding tank. Before April 16, 1980 there was no difference in survival of any of the lots of adult fish receiving the oxytetracycline injections compared to the control (Table 14).

While most fish commenced feeding within a week of introduction to the tank, it appeared that the surviving fish that received the full dose might not have grown as much as the fish from the other two lots (Table 15). The sample size is small and fish were not sexed. It is possible that the lot receiving the full dose contained more males but this will not be known until the experiment is terminated.

No mortalities of juveniles that received the various oxytetracycline injections occurred from December 13 until July 16. On April 16 and July 16 all fish were weighed and measured. There was a difference in juvenile mean lengths on April 16 and July 16 between the fish receiving the full dose and all the fish receiving no dose but the fish receiving the full dose were slightly smaller at the beginning of the experiment (Table 16). While the growth increments were greatly reduced over the next sample period (note the first period is one month longer than the second) the fish receiving no dose continued to increase in size at a faster rate than those receiving the full dose. However, the mean monthly measurements in length were approximately 50% less in the second period indicating a major reduction in growth had occurred in all fish. Because of the magnitude of this change in growth rate the experiment is being continued and final conclusions about effects of dosage levels on rates of growth should not be made at this time. If there is an effect on growth rate it is noteworthy that the fish receiving the full dose have grown 10.5 cm in 7 months and there have been no mortalities in any experiment.

It appears that the dose of oxytetracycline used in the laboratory experiments had no short term lethal effects, at least under the conditions tested. The mortalities observed with the adults most probably resulted from handling and transportation since none of the juveniles died that were left for several months prior to receiving the injections and there was no difference in mortalities of adults among the three lots tested. In the ocean it is possible that increased mortalities result from other effects such as pressure changes and it is anticipated that some additional field studies will be undertaken in the future.

Analysis of tag returns is complicated by variations in effort and by an apparent higher mortality of fish that were injected with oxytetracycline. Adjustments for fishing effort may indicate that the percentage of recoveries in some areas should be higher or lower. It is difficult to compare relative recovery rates until foreign and domestic fishing effort can be standardized, thus the recoveries only indicate the number of recoveries for each cruise and not relative recovery rates among areas.

Approximately 10% of the fish tagged received a second suture tag. In 1978, it was estimated that about 5.6% of the primary or anchor tags had been lost. By the end of 1979, 220 fish that had been double tagged in all years were recaptured and 12 or 5.5% had lost the primary tag (Table 12). At present there is no evidence to suggest that loss of the primary tag increased with time and it may be that most of the loss occurs shortly after release.

Unfortunately, some of the suture tags were not tied as indicated in Appendix 1. Some were tied too loose while others did not use two knots and thus did not have the monofilament knotted to the flesh. The number of incorrectly applied tags is unknown and the effect is unknown at this time. Some of the fish that were recovered with the tag tied incorrectly, had one to two cm wounds where the monofilament entered the flesh presumably caused by the motion of the tag as the fish swims. Most fish that were tagged correctly did not have open wounds in the vicinity of the monofilament.

Tag loss also occurred in the experiment to examine the effects of injections of oxytetracycline on adult blackcod. After 7 months in the 92,000 L tank, 6 fish or 17% of the fish had lost the anchor tag. The rather high loss of tags may be related to the rapid growth of the fish or possibly to tags being pulled out by other fish. Experiments in the laboratory are continuing in order to examine the causes of tag loss since it appears that loss of the anchor tag could be an important error when recovery rates are examined over a number of years.

Since 9.3% of the fish released off the west coasts of Vancouver and Queen Charlotte Islands had double tags, and 9.2% of the recoveries to date had double tags, there does not appear to be increased mortality associated with double tagging.

Movement of tagged fish has been examined by estimating the number of fish recaptured throughout the year that have moved less than 50 km, 50-200 km and greater than 200 km from the release area. The percentage recovered outside the release areas off Queen Charlotte and Vancouver Islands appears to increase each year (Tables 17, 18). However, some blackcod continue to be recovered very close to the original set where they were captured and released. Recoveries from one tagging cruise over a period of 2 1/2 years show a high and constant percent of recoveries in the immediate vicinity of the original set (Fig. 14; Table 19). While the possibility of a slow long-term movement out of the release areas appears real, the possible effect of increased reporting and the increased Canadian fishing effort in other areas, particularly off Vancouver Island, must be considered before final conclusions are made. It also is important to wait for several more years since blackcod are long-lived and after the first few years of release the extent of long-term movements should not be assessed. Certainly there is no evidence that blackcod undergo extensive short-term movements.

Recoveries were made throughout the year (Table 20) indicating that some blackcod remain in the release area all year. An estimate of the percentage of blackcod that remain in the area cannot be made until recoveries are adjusted for fishing effort.

Blackcod tagged in the Canadian zone have been recovered from Point Arena, California to Shumagin Island in the Gulf of Alaska (Fig. 15). The greatest distance migrated was 2,539 km in 793 days from Queen Charlotte Islands to Unalaska Island in the Aleutian Chain. One blackcod tagged off Clayoquot Sound in May 1979 was recovered 59 days later off central Oregon, a distance of 550 km, indicating net movements can be at least 9 km per day. A total of 79 fish have been recovered in the Gulf of Alaska and 19 off the Washington, Oregon and California coasts.

GROWTH OF TAGGED BLACKCOD

There has been very little mean positive growth of recovered tagged blackcod (Table 21). The reasons for the net negative change in length are unclear at present but several factors are involved. Measurement

errors undoubtedly exist but no difference in mean lengths was observed when length measurements were repeated for approximately every tenth fish during tagging operations or when a sample of 50 dead fish was measured, tagged and remeasured (Table 22). The results of these experiments indicate that errors probably occur equally on either side of a particular mean length and in large samples the net error is negligible. In a sample of 100 fish it was found that there was no difference (Table 22). Because most recovered fish were measured after freezing it might be expected that shrinkage during freezing accounts for part of the observed net decrease in length. A sample of 50 fish that were measured before and after freezing decreased significantly (t test $p < 0.05$) by 0.5 cm in mean length (Table 23). When lengths of recovered fish were measured immediately after recovery, without freezing, there was a trend to some positive growth with time suggesting that handling and freezing contributed to some of the apparent decrease in growth (Table 21). Lengths of unfrozen recovered fish were examined for each sex and the average growth when there was comparable data was not different by more than 0.1 cm. The measurement errors and the loss to shrinkage resulting from freezing results in an apparent mean negative growth (because adult sablefish grow so slowly). The possibility that the decrease in size for some individuals is real should not be totally discounted since decreases in length do occur for some fishes such as lamprey (Beamish 1980) and minimal or no annual increase in length have been observed for mature, tagged white suckers (Beamish 1973).

It is possible that the tagging operation exerts considerable stress on the fish which results in poor growth following marking or the mark in some way interferes with the ability of the fish to catch normal food items. However, because tagged fish in the laboratory fed and grew actively, the tagging operation did not appear to cause any long-term physiological interference with growth.

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Table 1. Numbers of species other than sablefish captured in traps.

Species	West coast of Vancouver Island	West coast of the Queen Charlotte Islands
Hagfish	present	present
Spiny dogfish	2	-
Deepsea skate	1	-
Ratfish	3	-
Pacific viperfish	-	1
Myctophid	1	-
Pacific flatnose	3	23
Pacific cod	3	-
Roughscale rattail	-	33
Filamented rattail	11	19
Pectoral rattail	-	12
<u>Coryphaenoides armatus</u>	-	69
Rattails (discarded)	10	7
<u>Sebastes aleutianus</u>	-	196
<u>S. babcocki</u>	8	20
<u>S. borealis</u>	3	53
<u>S. pinniger</u>	1	-
<u>S. ruberrimus</u>	-	4
<u>Sebastolobus alascanus</u>	24	28
Rockfishes (discarded)	-	14
Skilfish	-	1
Lingcod	20	4
Snailfish	4	1
Arrowtooth flounder	12	6
Pacific halibut	5	2
Dover sole	27	3
<u>Parabassioigigas grandis</u>	-	7
Unidentified eelpouts	-	9
- (2 species)		
Crabs		
<u>Chionoecetes</u> (2 sp.)	611	135
<u>Lithodes couesi</u>	1	1
<u>Paralomis verilli</u>	-	23
Box crab	-	1
Octopus	3	5
Amphipods		
<u>Eurythenes gryllus</u>	-	present
<u>Eurythenes fusiformis</u>	-	present
<u>Paracallisoma coecum</u>	-	present
<u>Orchomene</u> sp.	-	present

Table 2. Numbers of sablefish tagged and released in 1979.

Location	Month	Anchor tag only	Anchor tag plus suture tag	Suture tag only	Total
West coast of Vancouver Island	May	8,243	750	118	9,111
West coast of the Queen Charlotte Is.	June	5,634	666	39	6,339
West coast of the Queen Charlotte Is.	August	281			281
Hecate Strait-Queen Charlotte Sound	October	10,770		2,216	12,986
Hecate Strait-Queen Charlotte Sound	November	10,185		2,300	12,485
Departure Bay, Strait of Georgia	December			26	26
Total		35,113	1,416	4,699	41,228

Table 3. Catch statistics for all trapline sets off the west coast of Vancouver Island, May 1-28, 1979.

Set no.	Depth range (m)	No. of traps	Soaktime (h)	Catch of sablefish	CPUE (no./ trap/24 h)	Mean length (cm)	Incidental fish catch	% of total fish catch
1	457-768	29	16.0	260	13.4	66.0	3	1.2
2	622-658	14	19.5	339	29.8	62.1	0	0
3	402-622	15	20.0	200	16.0	66.2	3	1.5
4	549-622	29	18.5	280	12.5	61.8	6	2.1
5	603-695	14	19.5	192	16.9	61.3	3	1.5
6	549-585	14	19.0	188	17.0	59.8	9	4.6
7	640-805	29	23.5	377	13.3	57.9	3	0.8
8	603-658	14	23.5	164	12.0	60.7	4	2.4
9	622-658	14	23.5	191	13.9	62.7	0	0
10	622-805	29	44.5	413	7.7	59.6	1	0.2
11	640	14	46.0	208	7.8	61.8	3	1.4
12	585-640	14	46.5	316	11.6	63.9	0	0
13	713-768	30	17.0	439	20.7	58.3	0	0
14	585-732	13	18.0	263	27.0	62.0	3	1.1
15	493-585	14	20.0	166	14.2	62.3	2	1.2
16	622-640	31	20.0	900	34.8	56.7	1	0.1
17	640-732	13	20.5	312	28.1	56.6	0	0
18	603-640	14	44.5	250	9.6	60.8	0	0
19	420-658	31	51.5	679	10.2	57.3	1	0.1
20	732	13	69.5	331	8.8	58.3	0	0
21	640	13	14.0	131	17.3	60.3	0	0
22	658-713	29	65.0	537	6.8	58.0	1	0.2

Table 3 (cont'd)

Set no.	Depth range (m)	No. of traps	Soaktime (h)	Catch of sablefish	CPUE (no./ trap/24 h)	Mean length (cm)	Incidental fish catch	% of total fish catch
23	549-695	15	11.0	184	26.8	63.4	0	0
24	585-805	12	21.0	101	9.6	64.5	1	1.0
25	914-933	10	22.0	224	24.4	61.4	1	0.4
26	732-896	30	17.0	488	23.0	62.1	2	0.4
27	786-805	12	20.5	152	14.8	64.6	1	0.7
28	512-549	14	21.0	146	11.9	63.4	6	3.9
29	219-549	34	20.5	309	10.6	69.0	18	5.5
30	603-695	14	23.0	145	10.8	64.5	1	0.7
31	585-805	12	23.5	167	14.2	61.3	0	0
32	512-530	33	38.5	656	12.4	68.0	1	0.2
33	732-823	12	24.5	248	20.2	56.2	4	1.6
34	786-823	12	39.5	179	9.1	57.2	1	0.6
35	1,920-2,030	9	44.0	0	0	-	15	100.0
36	1,170-1,280	6	41.5	63	6.1	67.3	5	7.4
37	1,134-1,244	6	28.0	108	15.4	63.0	11	9.2
38	365-457	14	9.5	48	8.7	-	0	0
39	86	20	13.5	0	0	-	7	100.0
40	84-87	13	15.5	0	0	-	19	100.0
Total	-	708	1,094.0	10,354	-	-	136	-
Range	84-2,030	6-34	9.5-69.5	0-900	0-34.9	56.2-69.0	0-19	0-100.0
Mean	-	17.7	27.4	258.9	12.8	61.0	3.4	1.3

Table 4. Catch statistics for all trapline sets off the west coast of the Queen Charlotte Islands, May 31-June 16, 1979 plus one set off the west coast of Vancouver Island, June 16, 1979.

Set no.	Depth range (m)	No. of traps	Soaktime (h)	Catch of sablefish	CPUE (no./ trap/24 h)	Mean length (cm)	Incidental fish catch	% of total fish catch
1	439-695	14	18.5	132	12.2	64.5	0	0
2	475-658	14	19.0	151	13.6	66.9	2	1.3
3	512-658	31	21.0	116	4.3	66.4	1	0.9
4	438-622	14	21.5	86	6.9	65.3	14	14.0
5	457-603	14	23.0	177	13.2	67.1	31	14.9
6	420-914	30	37.5	270	5.8	69.1	9	3.2
7	549-640	14	24.5	246	17.2	67.8	1	0.4
8	640	14	25.0	110	7.5	67.0	0	0
9	603-713	30	16.5	305	14.8	67.6	2	0.7
10	658-695	14	17.5	179	17.5	66.8	0	0
11	603-658	14	18.5	161	14.9	64.4	0	0
12	658-786	30	44.5	~267	~4.8	67.1	0	0
13	622-658	14	44.0	123	4.8	66.4	2	1.6
14	549-640	14	44.5	194	7.5	67.5	2	1.0
15	585-695	30	19.0	342	14.4	66.3	1	0.3
16	549-622	14	19.5	103	9.1	67.6	4	3.7
17	549-658	14	19.5	275	24.2	64.3	1	0.4
18	640-713	30	26.5	251	7.6	66.4	4	1.6
19	530-658	14	44.0	217	8.5	66.6	2	0.9
20	549-695	14	44.5	~323	~12.4	66.1	10	~3.1
21	530-732	30	23.5	257	8.7	70.5	9	3.4

Table 4 (cont'd)

Set no.	Depth range (m)	No. of traps	Soaktime (h)	Catch of sablefish	CPUE (no./ trap/24 h)	Mean length (cm)	Incidental fish catch	% of total fish catch
22	512-622	14	40.0	100	4.3	68.2	2	2.0
23	493-512	14	41.5	137	5.6	69.7	93	40.6
24	512-640	29	41.0	~500	~10.1	67.2	26	~4.9
25	549-914	14	21.0	226	18.4	65.5	1	0.4
26	475-640	14	22.5	99	7.5	67.3	50	33.6
27	512-677	29	23.0	134	4.8	63.9	4	3.0
28	512-622	14	20.0	44	3.8	64.9	7	13.7
29	603-713	14	20.5	177	14.8	66.6	1	0.6
30	549-658	29	19.0	137	6.0	67.9	0	0
31	475-677	14	20.0	83	7.1	69.1	14	14.4
32	658-768	13	20.5	270	24.3	66.0	0	0
33	695-768	29	20.0	276	11.4	64.4	2	0.7
Total	-	634	881.0	6,468	-	-	295	-
Range	420-914	13-31	16.5-44.5	44-500	3.8-24.3	63.9-70.5	0-93	0-40.6
Mean	-	19.2	26.7	196.0	9.2	66.8	8.9	4.4
34	549-640	21	10.0	~220	25.0		0	0

Table 5. Summary of sablefish sampled on tagging cruises, 1979.

Cruise	Length	Weight	Sex		Maturity	Stomach contents	Otoliths
			M	F			
West coast of Vancouver Island (SEAPAK, May)	9,954		466	391	857		857
West coast of the Queen Charlotte Islands (SEAPAK, May-June)	6,320						
West Coast of the Queen Charlotte Islands (EASTWARD HO, August)	425 ^a		40	36	78	78	78
Queen Charlotte Sound- Hecate Strait (BLUE WATERS, October)	12,850						
Queen Charlotte Sound- Hecate Strait (SOUTHWARD HO, November)	13,035	246	296	269	284	395	213
Total for year	42,584	246	802	696	1,220	474	1,149

^a59 sablefish brought back frozen to Pacific Biological Station for parasite studies.

Table 6. Mean length (cm) of each age class of juvenile sablefish caught in Hecate Strait and Queen Charlotte Sound in 1979. (Sample size is in parentheses.)

Age	Male	Female	Male & Female
September			
1			37.0(4)
2			41.5(86)
3			42.7(10)
November			
0	29.4(5)	30.7(7)	30.2(12)
1	40.2(6)	39.3(8)	39.7(14)
2	43.4(79)	44.8(65)	43.7(145)
3	45.6(7)	49.0(10)	47.6(17)

Table 7. Catch statistics for all trapline sets off the West coast of the Queen Charlotte Islands, August 10-30, 1979.

Set No.	Depth range (m)	No. of traps	Soaktime (hr)	Catch of sablefish	CPUE (nos/trap/24 hr)	Mean length (cm)	Incidental fish catch	% of total fish catch
1	220-402	20 ^a	24.0	38	1.9	66.3	13	25.5
2	768-1097	20 ^a	24.0	160	8.0	72.4	8	4.8
3	1829	10	24.0	4	0.4	76.0	14	77.8
4	1756-1829	10	24.0	3	0.3	-	20	87.0
5	2816-2852	15	24.0	0	0	-	18	100.0
6	2889	15	24.0	0	0	-	27	100.0
7	3475	10	24.0	0	0	-	7	100.0
8	3456	9	24.0	0	0	-	8	100.0
9	3475	10	24.0	0	0	-	11	100.0
10	3475	10	24.0	0	0	-	5	100.0
11	2743-2926	10	24.0	0	0	-	10	100.0
12	2889	10	24.0	0	0	-	10	100.0
13	1737-1756	10	24.0	0	0	-	5	100.0
14	1810-1829	10	24.0	0	0	-	13	100.0
15	914	18 ^a	24.0	133	7.4	70.7	0	0.0
16	201-237	20 ^a	24.0	9	0.5	52.6	30	76.9
17	2780	9	50.0	0	0	-	12	100.0
18	2926	10	43.5	0	0	-	3	100.0
Total	-	226	477.5	347	-	-	214	-
Range	201-3475	9-20	24-50	0-160	-	52.6-76.0	0-30	0-100
Mean	-	12.6	26.5	19.3	-	70.6	11.9	81.8

^aTwo traps set with tunnels collapsed.

Table 8. Catch statistics for all sunken gillnet sets off the west coast of the Queen Charlotte Islands, August 1979.

Set No.	Depth range (m)	Soaktime (h)	Catch of sablefish	CPUE (catch/24 h)	Mean length (cm)	Incidental fish catch	% of total fish catch
14 cm mesh							
1	732	3.0	13	104.0	66.1	0	0
2	640	15.75	14	21.3	68.1	25	64.1
3	695	18.5	23	29.8	68.5	2	8.0
4	732	7.0	4	13.7	68.3	5	55.6
5	658	10.5	3	6.9	67.7	1	25.0
Total	-	54.75	57	-	-	33	-
Range	640-732	3.0-18.5	3-23	6.9-104.0	-	0-25	0-64.1
Mean	-	10.95	11.4	24.99	67.8	6.6	36.7
15 cm mesh							
2	640	15.75	1	1.5	70.0	6	85.7
3	695	18.5	13	16.9	73.9	16	55.2
4	732	7.0	1	3.4	85.0	2	66.7
5	658	10.5	7	16.0	77.4	1	12.5
Total	-	51.75	22	-	-	25	-
Range	640-732	7.0-18.5	1-13	1.5-16.9	-	1-16	12.5-85.7
Mean	-	12.94	5.5	10.2	75.4	6.3	53.2

Table 9. Releases and recaptures of tagged adult sablefish with respect to oxytetracycline injections.

Area released	Date	Number released		Number recaptured (%) ^a	
		Injected	Normal	Injected	Normal
Queen Charlotte Islands	July 1977	-	5,159	-	971(18.8)
	May 1978	4,440 ^b	847	140(3.2) ^c	220(26.0)
	October 1978	-	122	-	15(12.3)
	June 1979	-	6,339	-	460(7.3)
	August 1979	-	281	-	1(0.4)
Vancouver Island	September 1977	5,280	226	53(1.0)	1(0.4)
Vancouver Island-Queen Charlotte Sound	June 1978	5,463	2	167(3.0)	0
Vancouver Island	May 1979	-	9,111	-	331(3.6)

^aDoes not include 23 fish with unknown release date.

^bIncludes 77 fish recaptured from July 1977 releases.

^cIncludes 10 of the 77 recaptures caught for the second time.

Table 10. Stomach contents of adult sablefish captured in sunken gillnets, August 1979^a.

Food items	Volume (cc)	%
Rockfish	500	61
Unidentified fish	119	15
Myctophid	5	1
Jellyfish	75	9
Crab	15	2
Squid remains	31	4
Shrimp remains	27	3
Kelp	3	<1
Unidentified	36	4
Inorganic material	7	1
Total	818	100

^a78 fish were examined and 38 of these had empty stomachs.

Table 11. Stomach contents of juvenile sablefish captured in bottom trawls, November 1979^a.

Food items	Volume (cc)	%
Herring	340	26
Pollock	25	2
Unidentified fish	530	40
Euphausiids	178	13
Unidentified crabs & shrimp	63	5
Squid	13	<1
Brittle stars	10	<1
Inorganic material	3	<1
Unidentified invertebrates	102	8
Unidentified matter	65	5
Total	1,329	100

^a395 fish were examined and 130 of these had empty stomachs.

Table 12. Summary of sablefish tagging effort in Canadian waters from 1977 to 1979 including all recoveries until December 31, 1979.

Release area and date	No. of fish released with anchor tag (with or without additional suture tag)	No. of fish released with suture tag only	Total no. of fish tagged	No. (%) of fish double- tagged
Queen Charlotte Islands - July 1977	5,159	0	5,159	511(9.9)
Vancouver Island - September 1977	5,506	0	5,506	509(9.2)
Queen Charlotte Islands - May 1978	5,287	0	5,287	520(9.8)
Vancouver Island-Queen Charlotte Sound - June 1978	5,465	0	5,465	532(9.7)
Queen Charlotte Islands - October 1978	122	0	122	0
Vancouver Island - May 1979	8,993	118	9,111	750(8.3)
Queen Charlotte Islands - June 1979	6,300	39	6,339	666(10.6)
Queen Charlotte Islands - August 1979	281	0	281	0
Queen Charlotte Sound-Hecate Strait - October 1979	10,770	2,216	12,986	0
Queen Charlotte Sound-Hecate Strait - November 1979	10,185	2,300	12,485	0
Departure Bay - December 1979	0	26	26	0
Total	58,068	4,699	62,767	3,488(6.0)

Table 12 (cont'd)

Release area and date	No. (%) of tagged fish recovered	No. (%) of double-tagged fish recovered	No. (%) of double-tagged fish recovered with suture but without anchor tags	Maximum time at sea (days)
Queen Charlotte Islands - July 1977	971(18.8)	96(9.9)	5(5.2)	876
Vancouver Island - September 1977	54(1.0)	5(9.2)	0	806
Queen Charlotte Islands - May 1978	360(6.8)	21(5.8)	1(4.8)	557
Vancouver Island-Queen Charlotte Sound - June 1978	167(3.0)	10(6.0)	0	506
Queen Charlotte Islands - October 1978	15(12.3)	0	0	313
Vancouver Island - May 1979	331(3.6)	30(9.1)	2(6.7)	210
Queen Charlotte Islands - June 1979	460(7.3)	58(12.6)	4(6.9)	182
Queen Charlotte Islands - August 1979	1(0.4)	0	0	79
Queen Charlotte Sound-Hecate Strait - October 1979	3(.02)	0	0	12
Queen Charlotte Sound-Hecate Strait - November 1979	0	0	0	-
Departure Bay - December 1979	0	0	0	-
Total	2,385 ^a (4.1)	220(9.2)	12(5.5)	-

Table 12 (cont'd)

Release area and date	Minimum distance travelled ^b (%)			Maximum distance travelled (km)	Mean distance travelled (km)
	<50 km	50-200 km	>200 km		
Queen Charlotte Islands - July 1977	775(80)	122(13)	70(7)	2,539	41
Vancouver Island - September 1977	26(52)	15(30)	9(18)	2,001	93
Queen Charlotte Islands - May 1978	295(82)	48(13)	16(4)	1,622	25
Vancouver Island-Queen Charlotte Sound - June 1978	122(78)	13(8)	21(13)	2,113	57
Queen Charlotte Islands - October 1978	7(64)	3(28)	1(9)	315	22
Vancouver Island - May 1979	268(84)	30(9)	21(7)	541	23
Queen Charlotte Islands - June 1979	364(81)	64(14)	19(4)	1,279	27
Queen Charlotte Islands - August 1979	1(100)	-	-	2	-
Queen Charlotte Sound-Hecate Strait - October 1979	3(100)	-	-	11	-
Queen Charlotte Sound-Hecate Strait - November 1979	-	-	-	-	-
Departure Bay - December 1979	-	-	-	-	-
Total	1,861(80)	295(13)	157(7)	-	-

^aIncludes 23 fish of unknown release area.

^bDoes not include fish of unknown recapture location.

Table 13. Annual sablefish tag recoveries by major areas, 1977-1979.

Year of release Year of recovery	1977 1977		1977 1978	
Location ^a	Q.C.I.	V.I.	Q.C.I.	V.I.
No. of tags at large	5,159 ^b	5,506 ^b	5,027	5,500
No. (%) of tags at large with additional suture tag	511(9.9)	509(9.2)	500(9.9)	508(9.2)
No. (%) of tags recovered	132(2.6)	6(0.1)	623(12.4)	12(0.2)
No. (%) of tags recovered with additional suture tag	11(8.3)	1(16.7)	61(9.8)	0
No. (%) of total recoveries with only additional suture tag remaining	2(18.2)	0	3(4.9)	0

Year of release Year of recovery	1977 1979		1978 1978		
Location ^a	Q.C.I.	V.I.	Q.C.I.	V.I.-Q.C.S.	Q.C.S.-deep
No. of tags at large	4,404	5,488	5,287 ^{b,c}	5,465 ^b	122 ^b
No. (%) of tags at large with additional suture tag	439(10.0)	508(9.3)	520(9.8)	532(9.7)	0
No. (%) of tags recovered	216(4.9)	36(0.6)	209(3.9) ^d	19(0.3)	0
No. (%) of tags recovered with additional suture tag	24(11.1)	4(11.1)	8(3.8)	1(5.3)	0
No. (%) of total recoveries with only additional suture tag remaining	1(4.2)	0	0	0	0

Table 13 (cont'd)

Year of release	1978			1979		
Year of recovery	1979			1979		
Location ^a	Q.C.I.	V.I.-Q.C.S.	Q.C.I.-deep	V.I.	Q.C.I.	Q.C.I.-deep
No. of tags at large	5,078	5,446	122	9,111 ^b	6,339 ^b	283 ^b
No. (%) of tags at large with additional suture tag	512(10.1)	531(9.8)	0	750(8.3)	666(10.6)	0
No. (%) of tags recovered	151(3.0)	148(2.7)	15(12.3)	331(3.6)	460(7.3)	1(.4)
No. (%) of tags recovered with additional suture tag	13(8.6)	9(6.1)	0	28(8.5)	58(12.6)	0
No. (%) of total recoveries with only additional suture tag remaining	1(7.7)	0	0	2(7.1)	4(6.9)	0

^aLocation abbreviations: Q.C.I.-Queen Charlotte Islands; V.I.-Vancouver Island; Q.C.S.-Queen Charlotte Sound.

^bTotal number of tags released.

^cIncludes 77 fish recaptured from 1977, Q.C.I. tagging cruise.

^dIncludes 10 of the 77 recaptures caught for the second time.

Table 14. Summary of tank experiment to examine the effects of oxytetracycline injections on the survival of adult sablefish.

	Full dose	1/4 dose	No dose
Sample size	34	34	36
Number surviving after 7 days in tank	16	16	20
Number surviving after 14 days in tank	12	12	17
Number surviving to December 13, 1979	11	12	12
Number surviving to April 16, 1980	11	10	12

Table 15. Mean length increments (cm) for adult sablefish injected with two different concentrations of oxytetracycline^a.

Size range (cm)	Full dose		1/4 dose		No dose	
	No.	Average increase	No.	Average increase	No.	Average increase
May 11-December 13						
<60	1	9	0	-	2	10.5
60-69	5	3.2	6	6.2	3	5.0
70-79	4	1.5	3	3.7	4	3.8
December 13-April 16						
<60	1	2.4	0	-	2	4.9
60-69	5	1.8	5	2.0	3	2.1
70-79	4	0.8	2	1.8	3	1.9

^aDue to tag loss not all surviving fish are included.

Table 16. Growth of juvenile sablefish receiving two different concentrations of oxytetracycline compared to controls.

	Full dose	1/4 dose	No dose	No dose
December 13, 1979 - April 16, 1980 (4 Months)				
Sample size ^a	20	20	19	20
Mean length (cm) ^b	55.7	57.9	58.0	57.8
Mean length increment	7.6	8.5	9.1	8.6
Mean weight (g) ^b	2,250	2,550	2,470	2,610
Mean weight increment	940	1,160	1,265	1,090
April 16, 1980 - July 16, 1980 (3 Months)				
Sample size ^a	18	20	19	17
Mean length (cm) ^c	58.6	60.6	61.7	61.6
Mean length increment	2.9	2.7	3.7	3.8
Mean weight (g) ^c	2,480	2,860	2,880	3,160
Mean weight increment	230	210	410	550

^aBecause of tag loss not all fish are included.

^bMeasurements made on April 16, 1980.

^cMeasurements made on July 16, 1980.

Table 17. Percent of yearly recoveries of sablefish at various distances from release areas off the west coast of the Queen Charlotte Islands.

Tagging year	Recovery year	Total numbers recovered	% recoveries from release area					
			<50 km	(no.)	50-200 km	(no.)	>200 km	(no.)
1977	1977	132	89.4	(118)	8.3	(11)	2.3	(3)
	1978	622	86.5	(538)	9.5	(59)	4.0	(25)
	1979	206	54.9	(113)	24.8	(51)	20.4	(42)
1978	1978	208	91.3	(190)	8.2	(17)	0.5	(1)
	1979	146	69.2	(101)	20.5	(30)	10.3	(15)
1979	1979	441	81.4	(359)	14.3	(63)	4.3	(19)

Table 18. Percent of yearly recoveries of sablefish at various distances from release areas off the west coast of Vancouver Island.

Tagging year	Recovery year	Total numbers recovered	% recoveries from release area					
			<50 km	(no.)	50-200 km	(no.)	>200 km	(no.)
1977	1977	6	66.7	(4)	33.3	(2)	0	(0)
	1978	11	36.4	(4)	63.6	(7)	0	(0)
	1979	32	56.2	(18)	18.8	(6)	25.0	(8)
1978	1978	19	79.0	(15)	10.5	(2)	10.5	(2)
	1979	137	78.1	(107)	8.0	(11)	13.9	(19)
1979	1979	319	84.0	(268)	9.4	(30)	6.6	(21)

Table 19. Recoveries of sablefish from exact release areas off the west coast of the Queen Charlotte Islands in July 1977 (Fig. 14).

Release location (Fig. 14)	Total no. released	No. recovered		No. (%) recovered within 20 km of release location		Total no. and % recovered, 1977-1979	
		1977-1978	1979	1977-1978	1979	No.	%
A	191	28	4	14(50)	2(50)	32	16.8
B	176	27	13	14(52)	9(69)	40	22.7
C	367	36	15	26(72)	6(40)	51	13.9
D	195	39	6	20(51)	4(67)	45	23.1
E	241	30	7	13(43)	3(43)	37	15.4
F	287	24	15	12(50)	10(67)	39	13.6
G	251	27	11	11(41)	8(73)	38	15.1
H	227	32	15	7(22)	13(87)	47	20.7
I	332	35	14	19(54)	6(43)	49	14.8
J	232	28	7	20(71)	2(29)	35	15.1
K	406	63	14	49(78)	6(43)	77	19.0
L	503	69	14	51(75)	10(72)	83	16.5
M	298	53	11	43(81)	7(64)	64	21.5
N	383	39	15	31(79)	10(67)	54	14.1
O	252	41	8	35(85)	10(80)	49	19.4
P	304	68	10	62(90)	7(70)	78	25.6
Q	294	50	13	38(76)	16(81)	63	21.4
R	230	62	15	51(82)	6(40)	77	33.5
Total	5,159	751	207	516(64)	134(60)	958	18.6

Table 20. Monthly recoveries of sablefish at various distances from release areas for each tagging cruise, 1977-1979.

[illegible]

1977

(A) Queen Charlotte Islands - July 1977

<50 km	66	35	16	1	0
50-200 km	0	3	8	0	0
>200 km	0	2	0	1	0
Total	66	40	24	2	0

(B) Vancouver Island - September 1977

<50 km	0	1	3
50-200 km	0	1	1
>200 km	0	0	0
Total	0	2	4

1978

(A) Queen Charlotte Islands - July 1977

<50 km	0	5	125	106	0	106	60	67	65	4
50-200 km	1	0	5	13	2	5	6	5	22	0
>200 km	0	7	7	4	0	3	2	2	0	0
Total	1	12	137	123	2	114	68	74	87	4

(B) Vancouver Island - September 1977

<50 km	0	0	0	0	1	0	0	0	2	1	0	0
50–200 km	1	0	0	0	4	0	0	1	1	0	0	0
>200 km	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	5	0	0	2 ^a	3	1	0	0

(C) Queen Charlotte Islands - May 1978

<50 km	3	0	50	55	43	37	2
50-200 km	3	0	7	4	0	3	0
>200 km	0	0	0	1	0	0	0
Total	6	0	57	60	43	40	2

(D) Vancouver Island-Queen Charlotte Sound - June 1978

<50 km	0	0	5	3	0	7
50-200 km	0	0	0	1	0	1
>200 km	0	0	1	0	0	1
Total	0	0	6	4	0	9

(E) Queen Charlotte Islands - October 1978

<50 km	0	0
50–200 km	0	0
>200 km	0	0
Total	0	0

Table 20 (cont'd)

Distance from release area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1979												
(A) <u>Queen Charlotte Islands - July 1977</u>												
<50 km	22	8	17	18	9	26	10	0	1	0	2	0
50-200 km	1	2	1	3	2	5	8	7	8	3	9	2
>200 km	2	0	2	3	5	14	5	3	4	3	1	0
Total	25	10	20	24	16	45	23	10	13	6	12	2
(B) <u>Vancouver Island - September 1977</u>												
<50 km	0	0	0	0		2	0	5	8	0	1	2
50-200 km	1	0	0	0		1	0	1	1	1	1	0
>200 km	0	0	2	0		2	2	1	1	0	0	0
Total	1	0	0	0	4 ^a	6 ^a	2	7	10	1	2	2
(C) <u>Queen Charlotte Islands - May 1978</u>												
<50 km	19	7	10	7	9	15	21	2	5	0	3	3
50-200 km	0	1	1	2	1	6	5	8	3	1	1	1
>200 km	2	0	0	0	4	3	4	0	0	2	0	0
Total	21	8	11	9	14	24	30	10	8	3	4	4
(D) <u>Vancouver Island-Queen Charlotte Sound - June 1978</u>												
<50 km			2		51	6	17	25	3	0	3	0
50-200 km			2		0	6	1	1	1	0	0	0
>200 km			0		2	3	5	3	2	1	3	0
Total			4	1 ^a	53	15	23	29	6	1	6	0
(E) <u>Queen Charlotte Islands - October 1978</u>												
<50 km			2	3	0	1	0		0			
50-200 km			0	0	0	0	2		1			
>200 km			0	0	1	0	0		0			
Total			2	6 ^a	1	1	2	2 ^a	1			
(F) <u>Vancouver Island - May 1979</u>												
<50 km					0	10	13	89	56	29	24	47
50-200 km					4	3	2	2	6	0	13	0
>200 km					0	5	11	2	1	0	2	0
Total					4	18	26	99 ^a	63	29	39	47

Table 20 (cont'd)

Distance from release area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1979 (cont'd)												
(G) <u>Queen Charlotte Islands - June 1979</u>												
<50 km						6	200	84	25	4	40	
50-200 km						0	9	19	13	5	17	
>200 km						1	1	6	7	2	2	
Total						7	210	109	45	11	59	
(H) <u>Queen Charlotte Islands - August 1979</u>												
<50 km										1		
50-200 km										0		
>200 km										0		
Total										1		

^aIncludes fish of unknown recapture location.

Table 21. Average growth of recovered sablefish.

Years after tagging ^a	All recovered sablefish			Only sablefish measured by fisheries staff within one hour of recovery		
	Average growth (cm)	S.D.	n	Average growth (cm)	S.D.	n
0	-0.6	1.3	187	-0.1	0.9	15
0.5	-0.5	1.1	734	-0.2	0.9	112
1	-0.5	1.4	589	+0.3	1.6	77
1.5	-0.6	1.5	334	+0.2	1.5	16
2	-0.3	1.4	51	+0.7	1.6	9
2.5	-0.7	1.1	16	+0.0	1.4	2

^aOne growing season is assumed to be from May 1 to September 30. A tagged fish has completed 0.5 of a growing season after any 2.5 month period between May 1 and September 30.

Table 22. Estimates of precision of sablefish length measurements.

	Mean length (cm)		Mean change
	First reading	Second reading	
Repeat measurements of live fish during tagging (100 fish)	65.6	65.5	0.1
Repeat measurements of dead fish (50 fish)	66.5	66.5	0.0
Measurement of live fish remeasured after death (100 fish)	64.1 (live)	64.3 (dead)	0.2

Table 23. Changes in length and weight of sablefish after freezing for one week (50 fish).

	Fresh	Frozen and thawed	Mean change
Mean length (cm)	66.5	66.0	0.5
Mean weight (g)	2,926	2,836	90

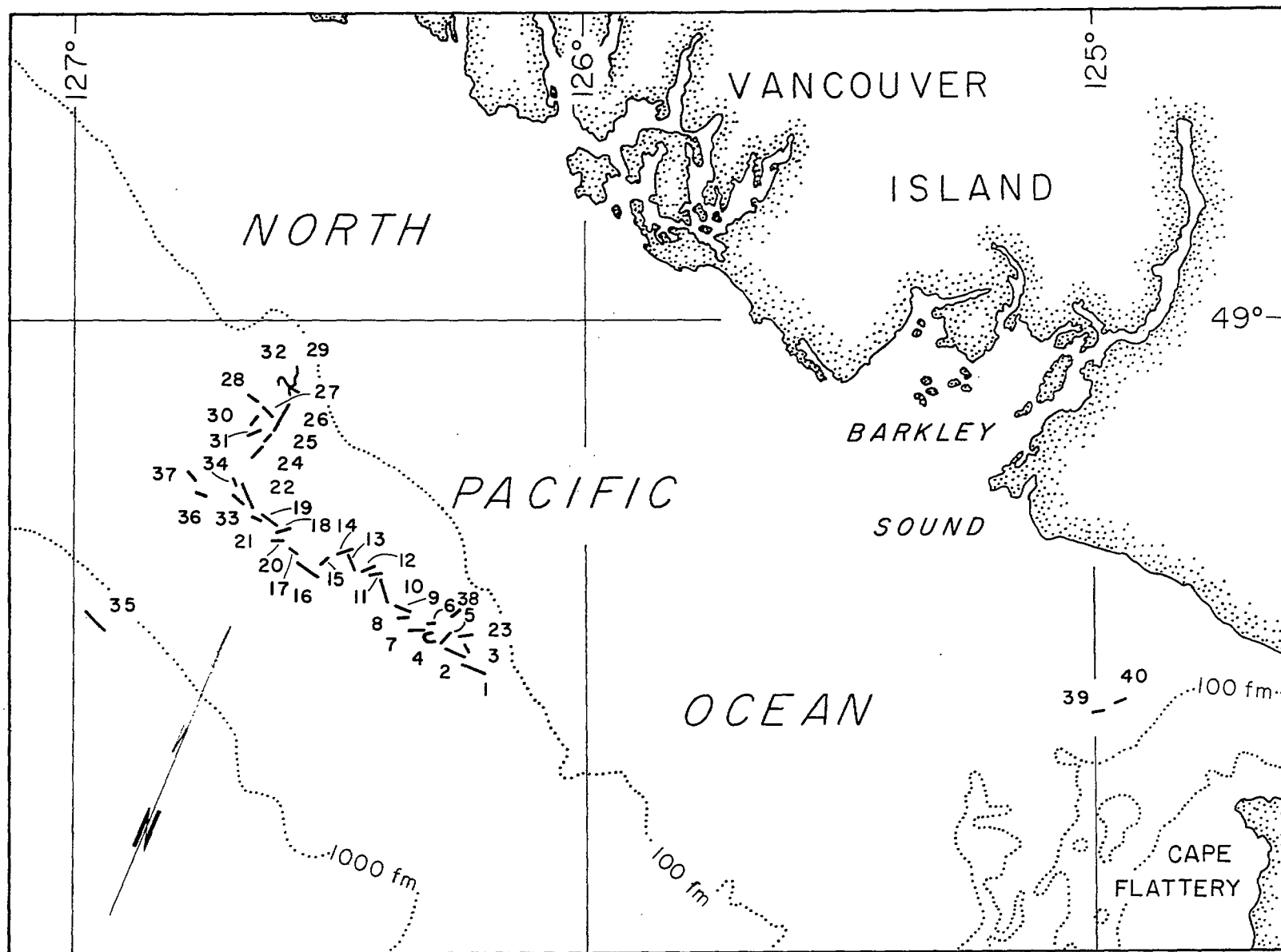


Fig. 1. Set locations off the west coast of Vancouver Island, May 1979.

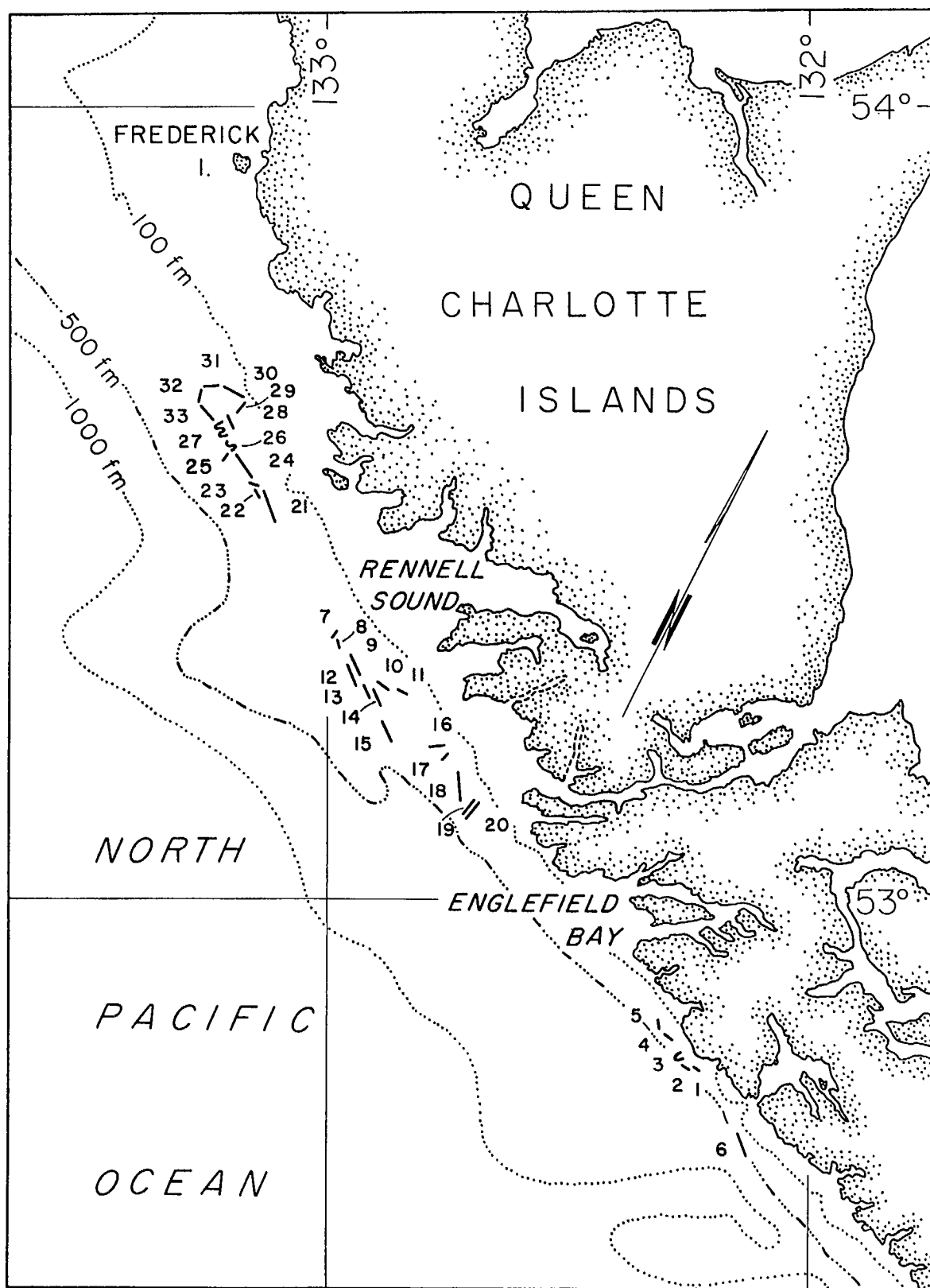


Fig. 2. Set locations off the west coast of the Queen Charlotte Islands, June 1979.

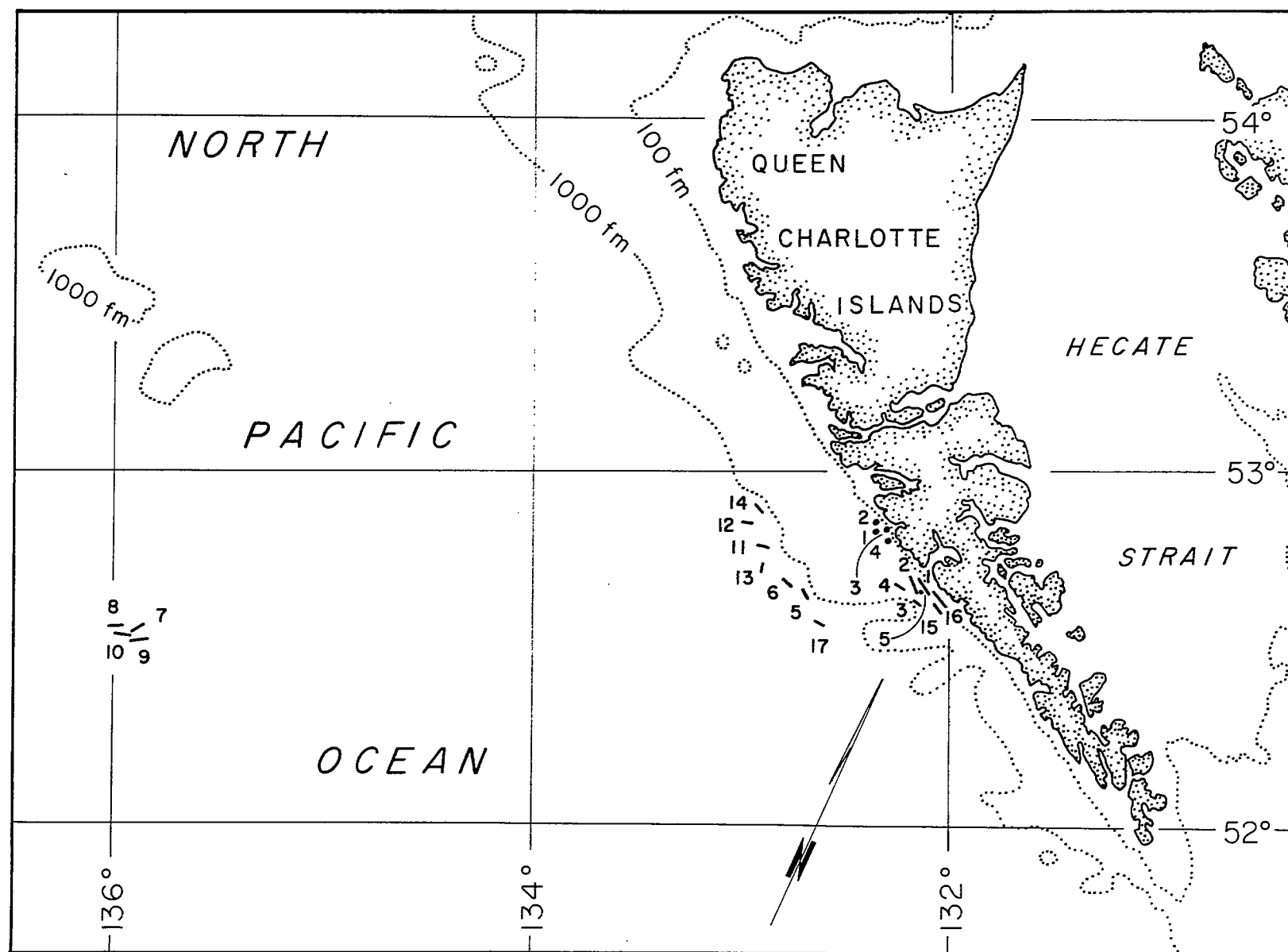


Fig. 3. Set locations off the Queen Charlotte Islands, August 1979: sunken gillnet sets 1-5 represented by dots, trapline sets 1-17 represented by dashes.

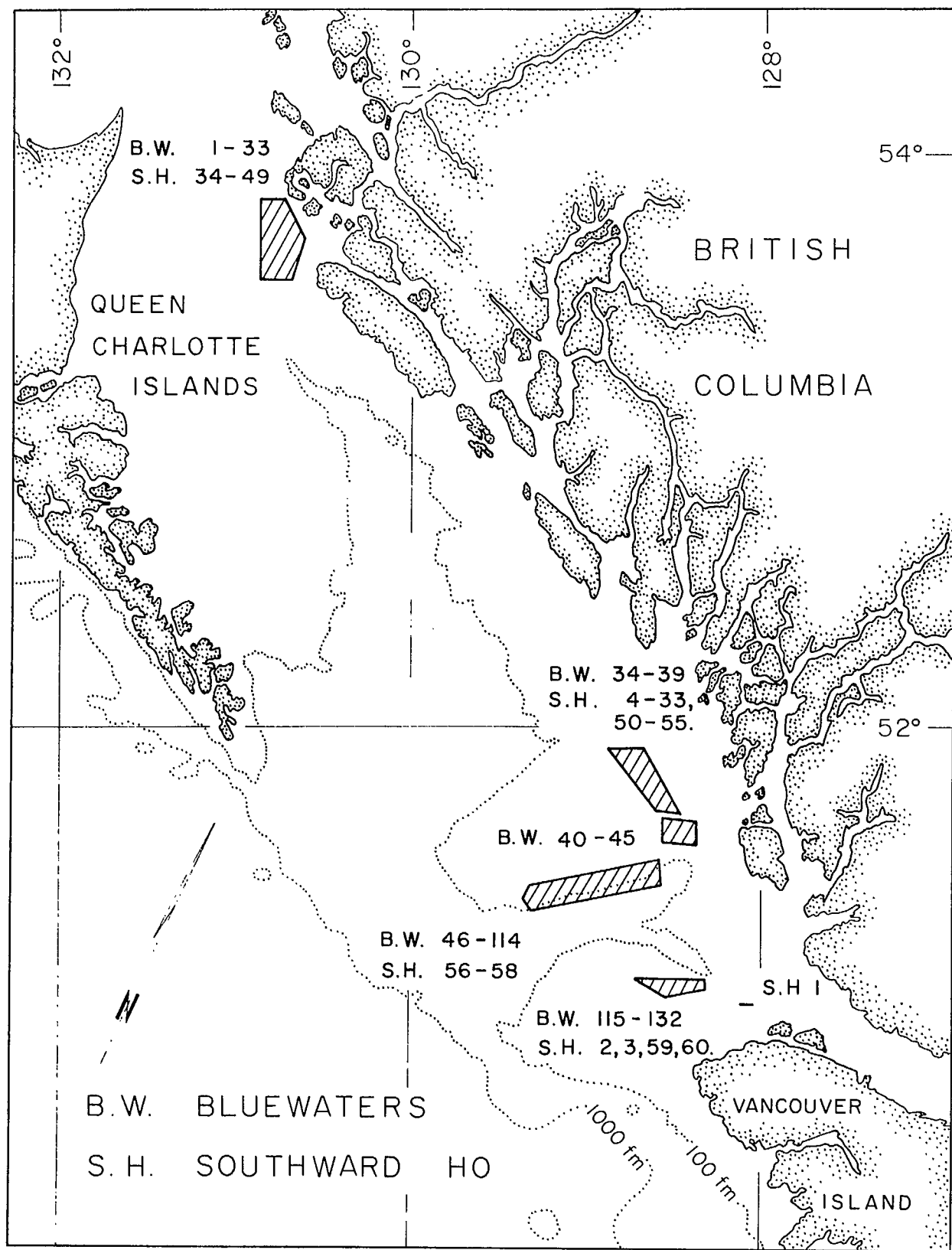


Fig. 4. Combined set locations for the bottom trawl sets made in October and November 1979, aboard the vessels SOUTHWARD HO and BLUE WATERS.

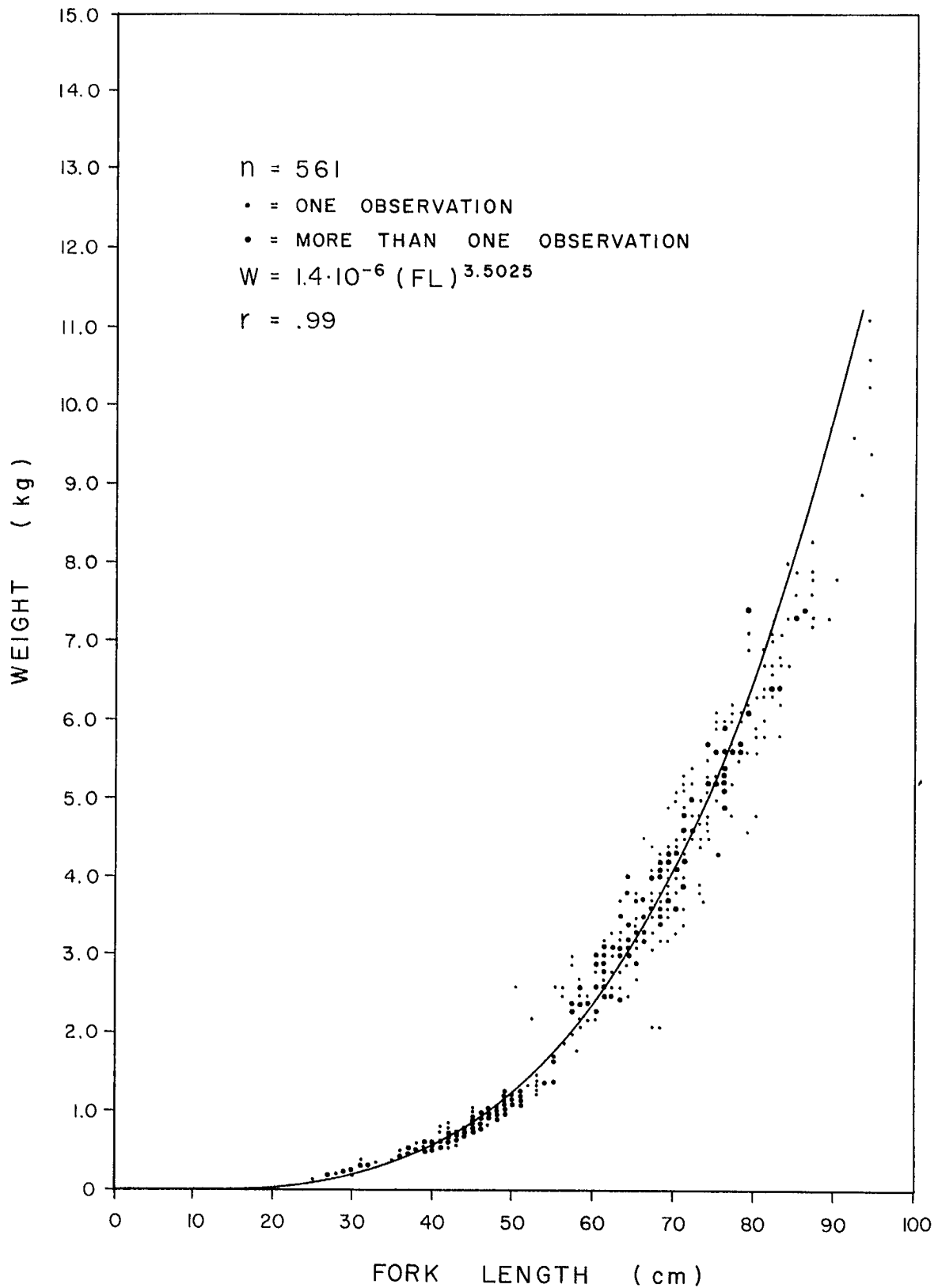


Fig. 5A. Relationships between fork length and round weight for sablefish: trawl-caught juvenile sablefish from Queen Charlotte Sd. and Hecate St. combined with trawl-caught sablefish from the west coast of the Queen Charlotte Islands.

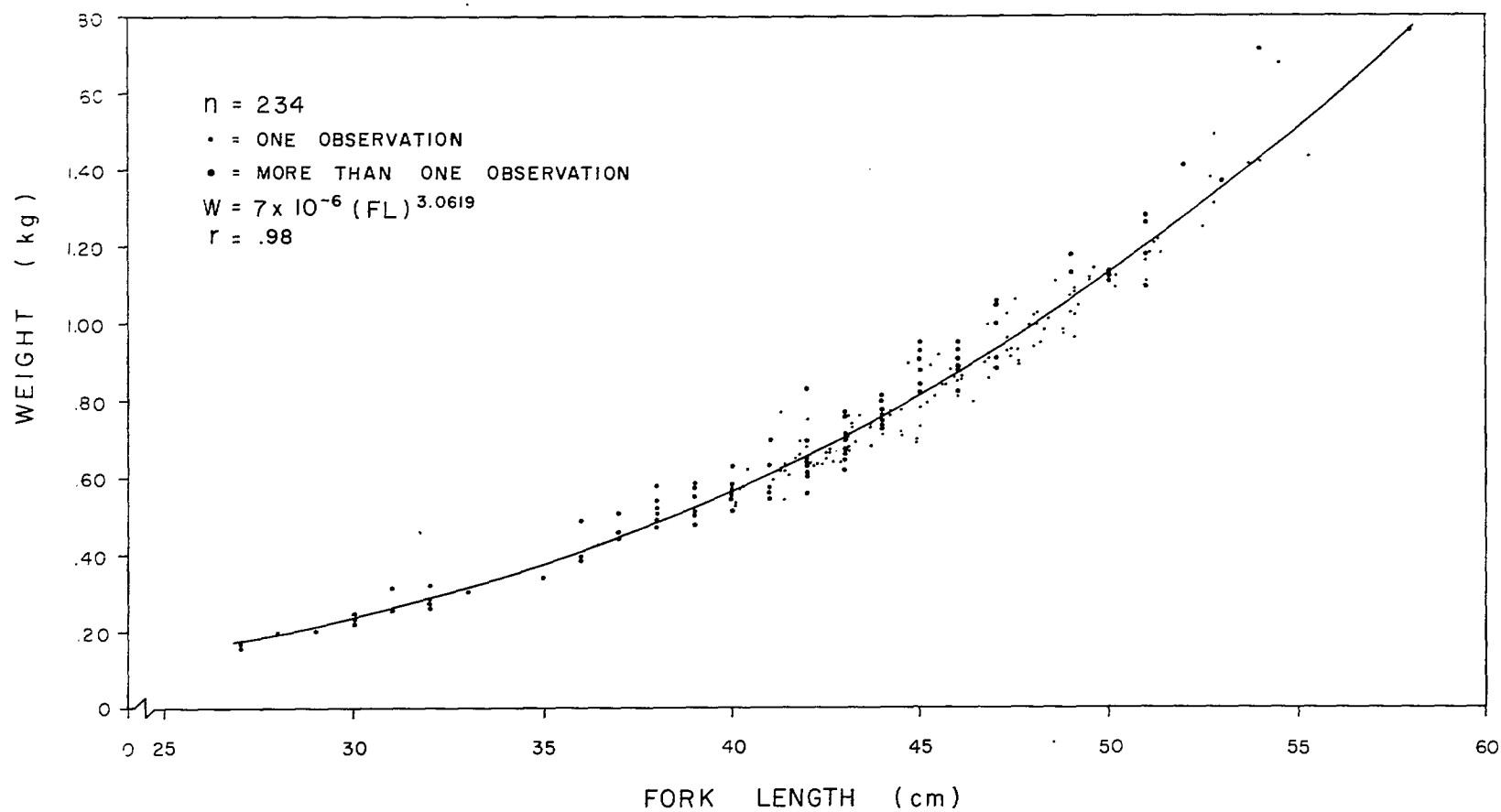


Fig. 5B. Relationships between fork length and round weight for sablefish: trawl-caught juvenile sablefish from Queen Charlotte Sound and Hecate Strait.

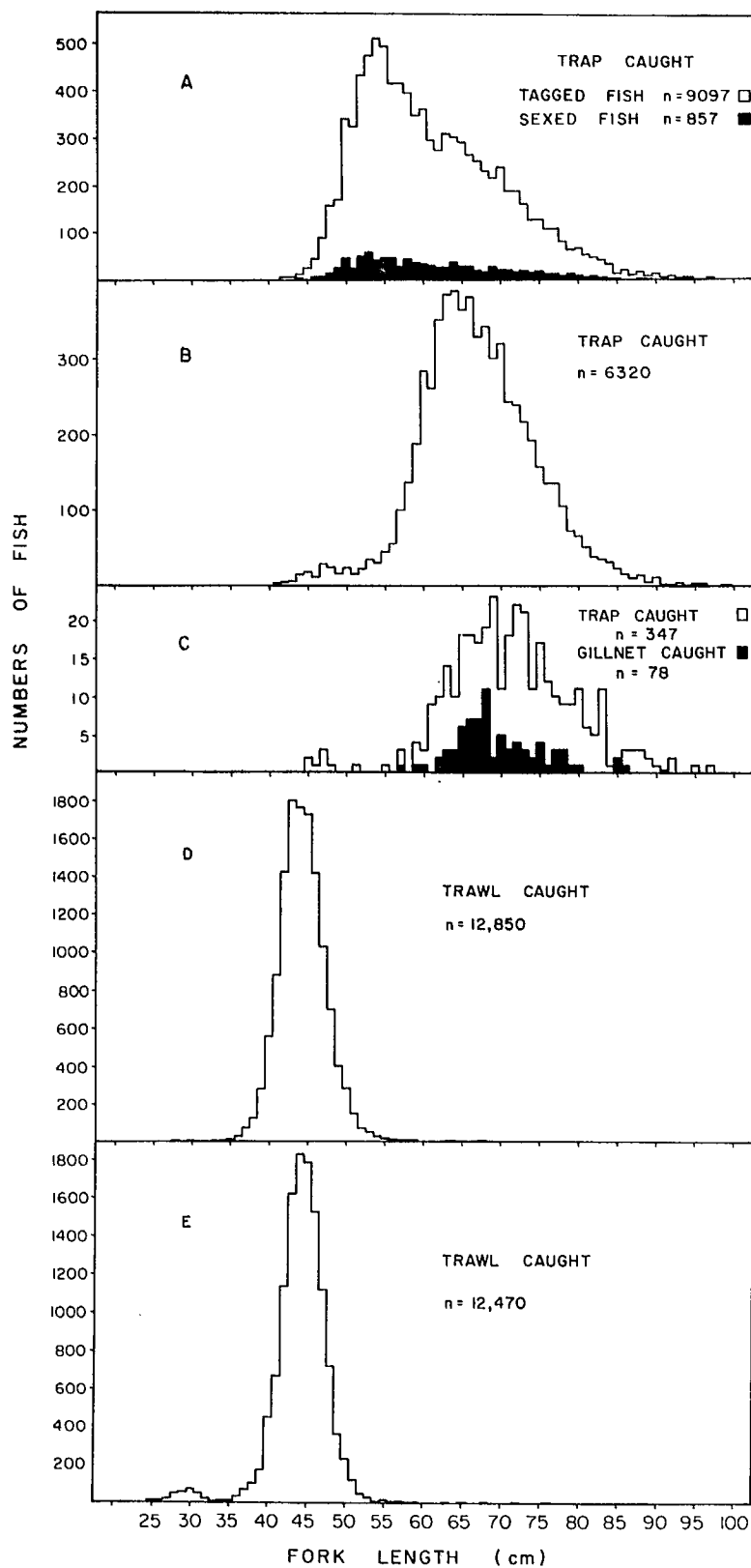


Fig. 6. Length frequencies of sablefish caught during tagging cruises in 1979. A. West coast of Vancouver Is., May; B. West coast of the Queen Charlotte Is., June; C. West coast of the Queen Charlotte Is., August; D. Queen Charlotte Sd.-Hecate St., October; and E. Queen Charlotte Sd.-Hecate St., November.

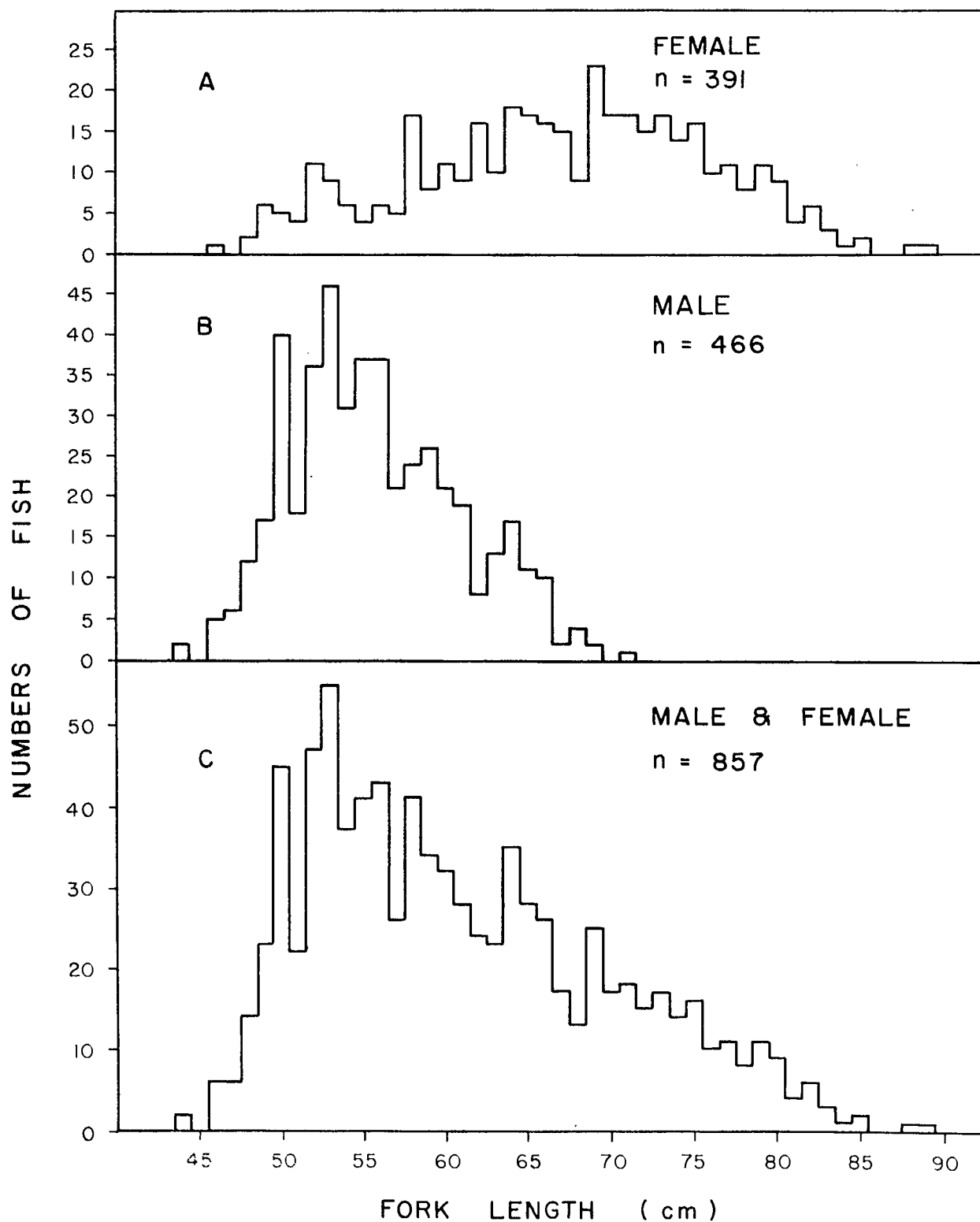


Fig. 7. Length-sex frequency of sablefish caught off the west coast of Vancouver Island, May 1979.

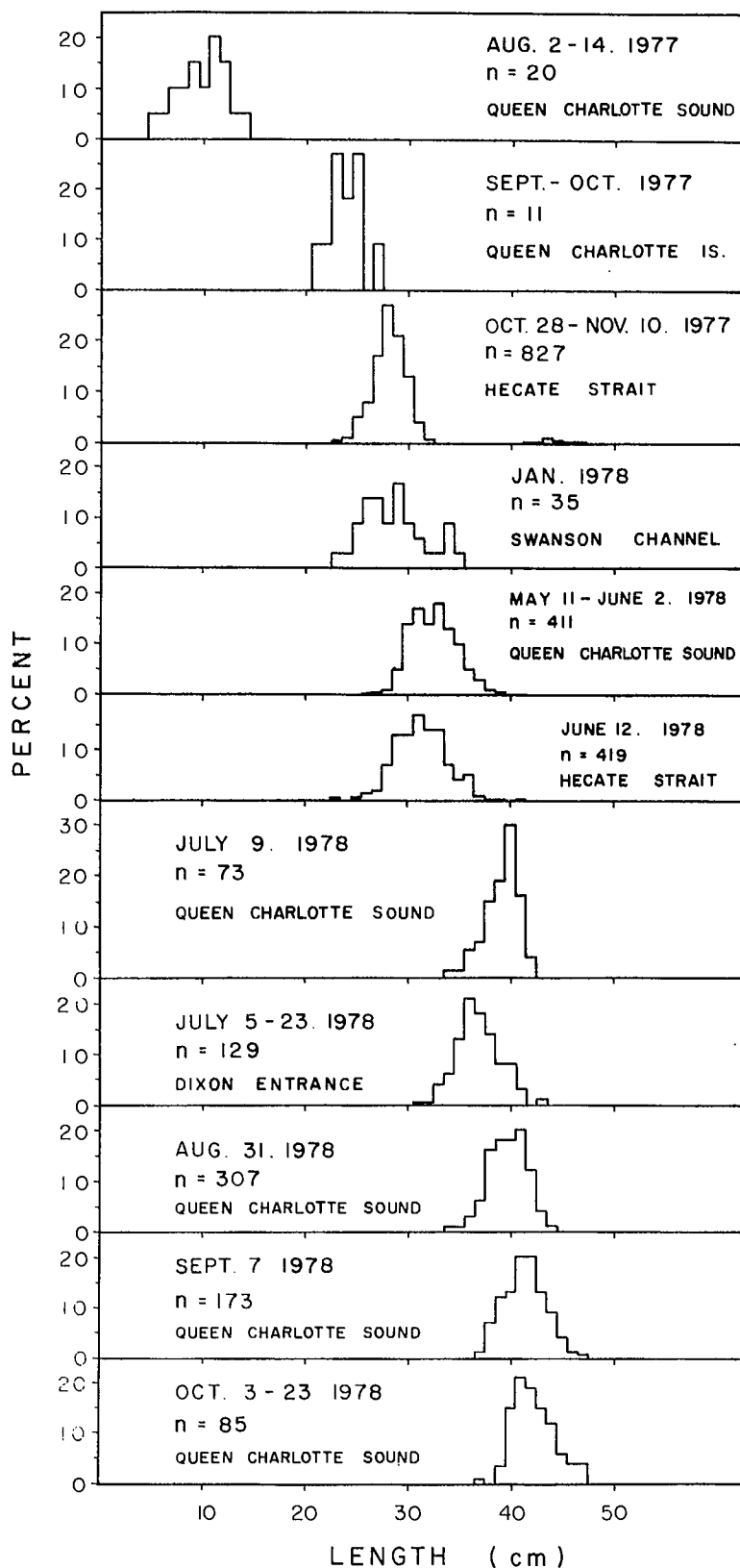


Fig. 8. Length frequencies of the 1977 year-class between August 1977 and February 1980.

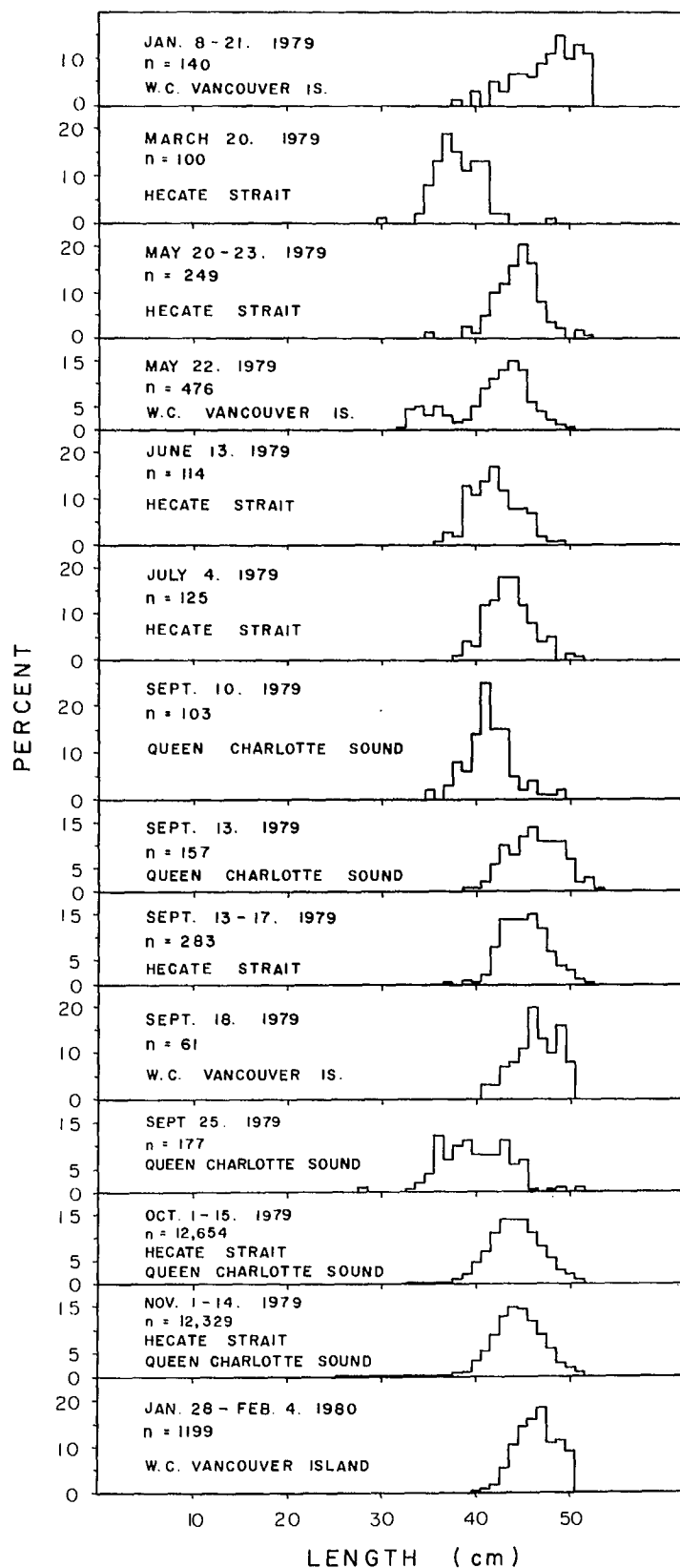


Fig. 8. (cont'd).

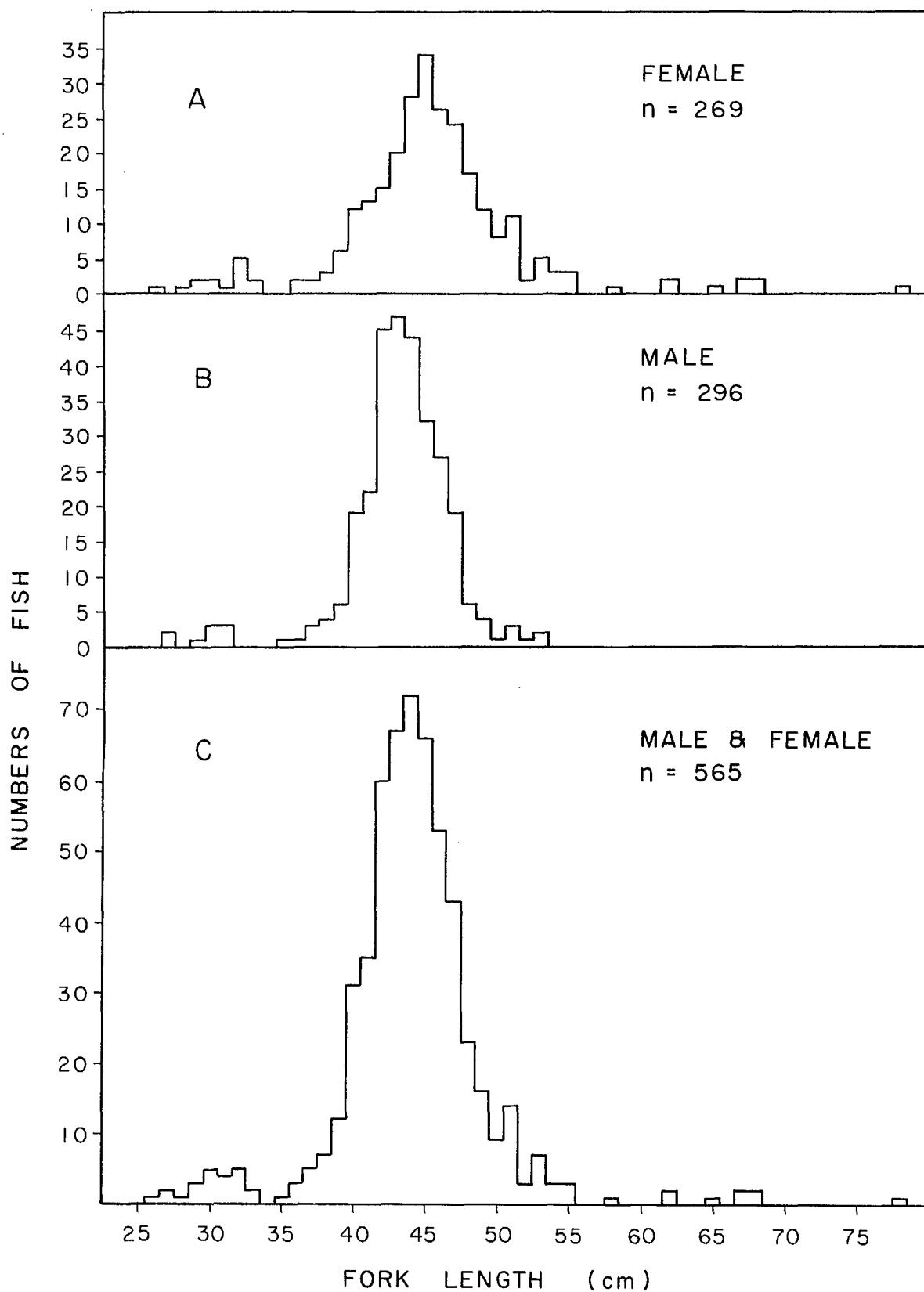


Fig. 9. Length-sex frequency of sablefish caught in Queen Charlotte Sound and Hecate Strait, November 1979.

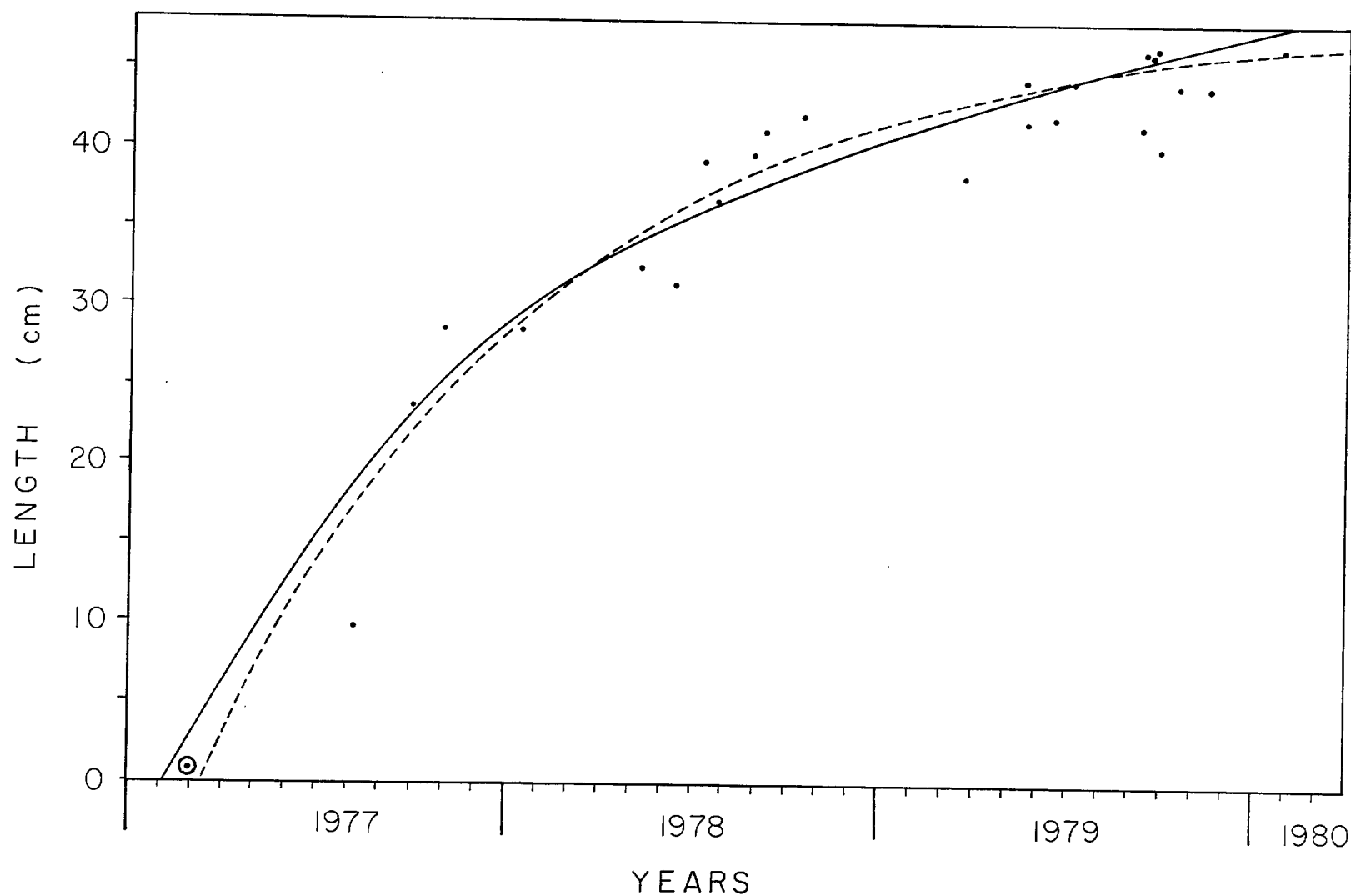


Fig. 10. Growth curves of young sablefish as determined by the mean lengths of the 1977 year-class at various times of the year. The curve represented by a solid line was fitted by eye and the curve represented by a dashed line was derived from the von Bertalanffy growth equation $L_t = 481 (1 - e^{-0.091 (t - 0.325)})$ with length in mm and time in months.

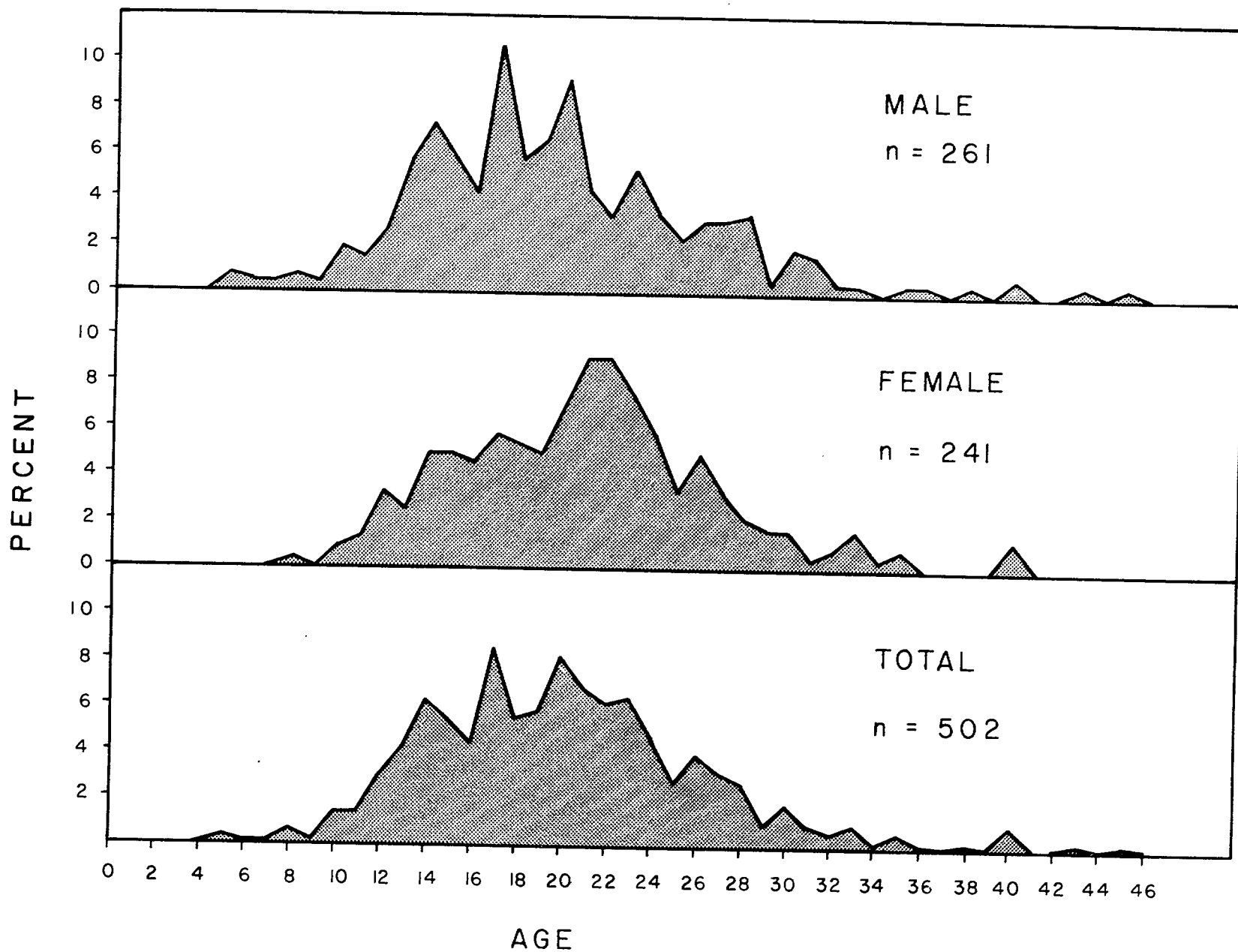


Fig. 11. Age composition of trap-caught sablefish from the west coast of Vancouver Island, May 1979. Only age readings of average or sure ratings are included.

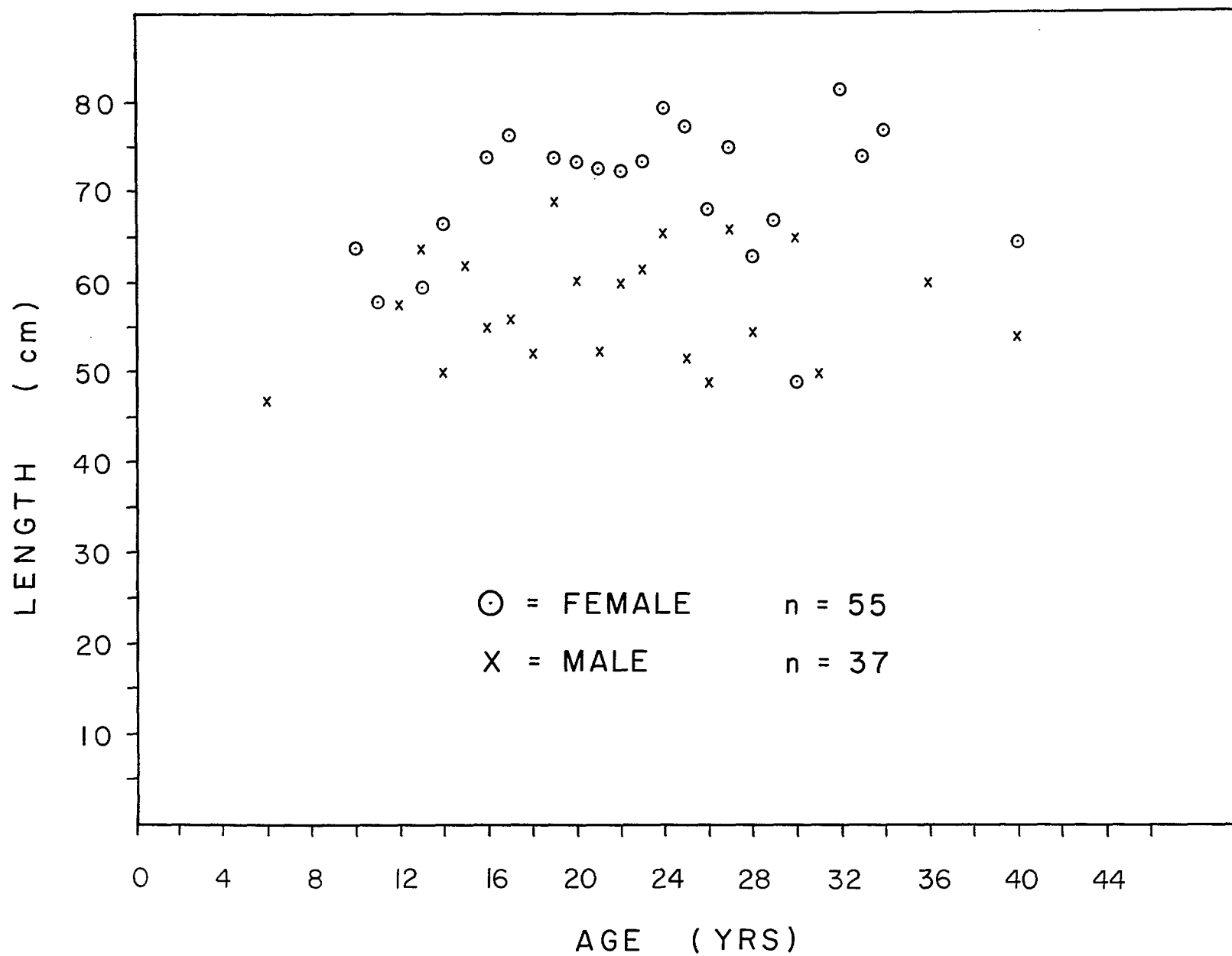


Fig. 12. Mean lengths at age for trap-caught sablefish off the west coast of Vancouver Island, May 1979. Only age readings of sure ratings are included.

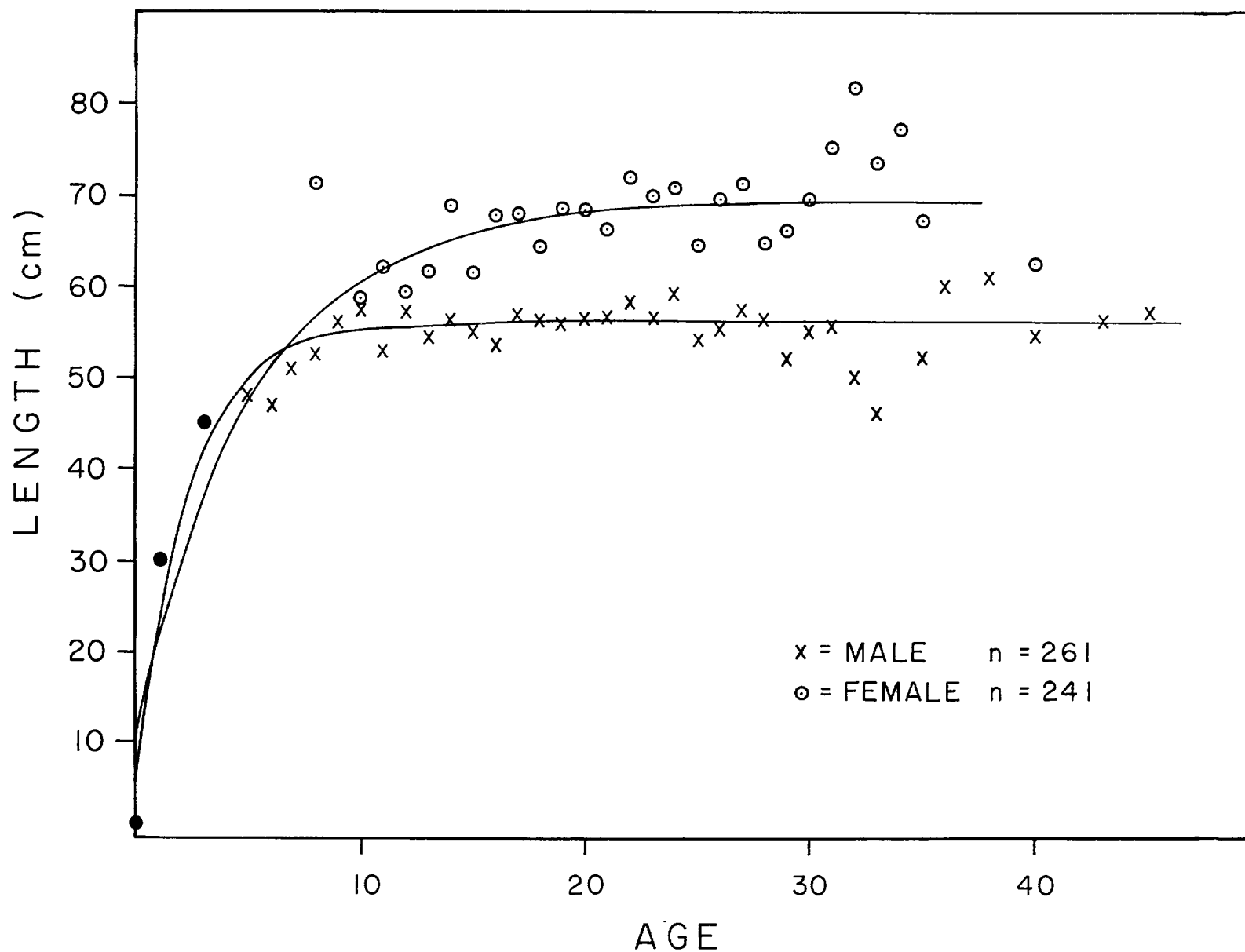


Fig. 13. Von Bertalanffy growth curve for trap-caught sablefish off the west coast of Vancouver Island, May 1979. Only age readings of average or sure rating are included.

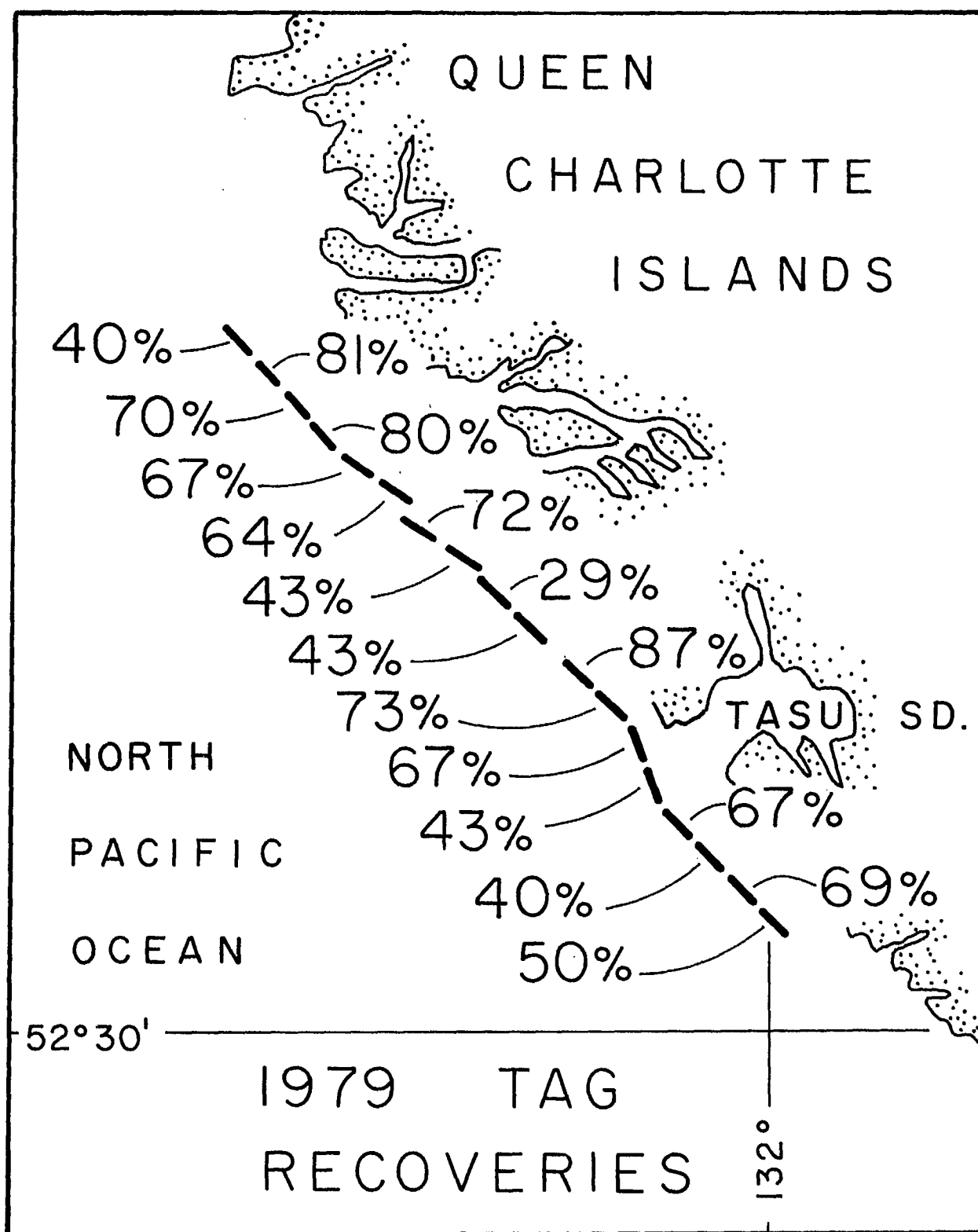


Fig. 14. Per cent of 1979 tag recoveries made within 20 km of the original release area. Release areas begin at bottom right and are labelled A to R (See Table 19).

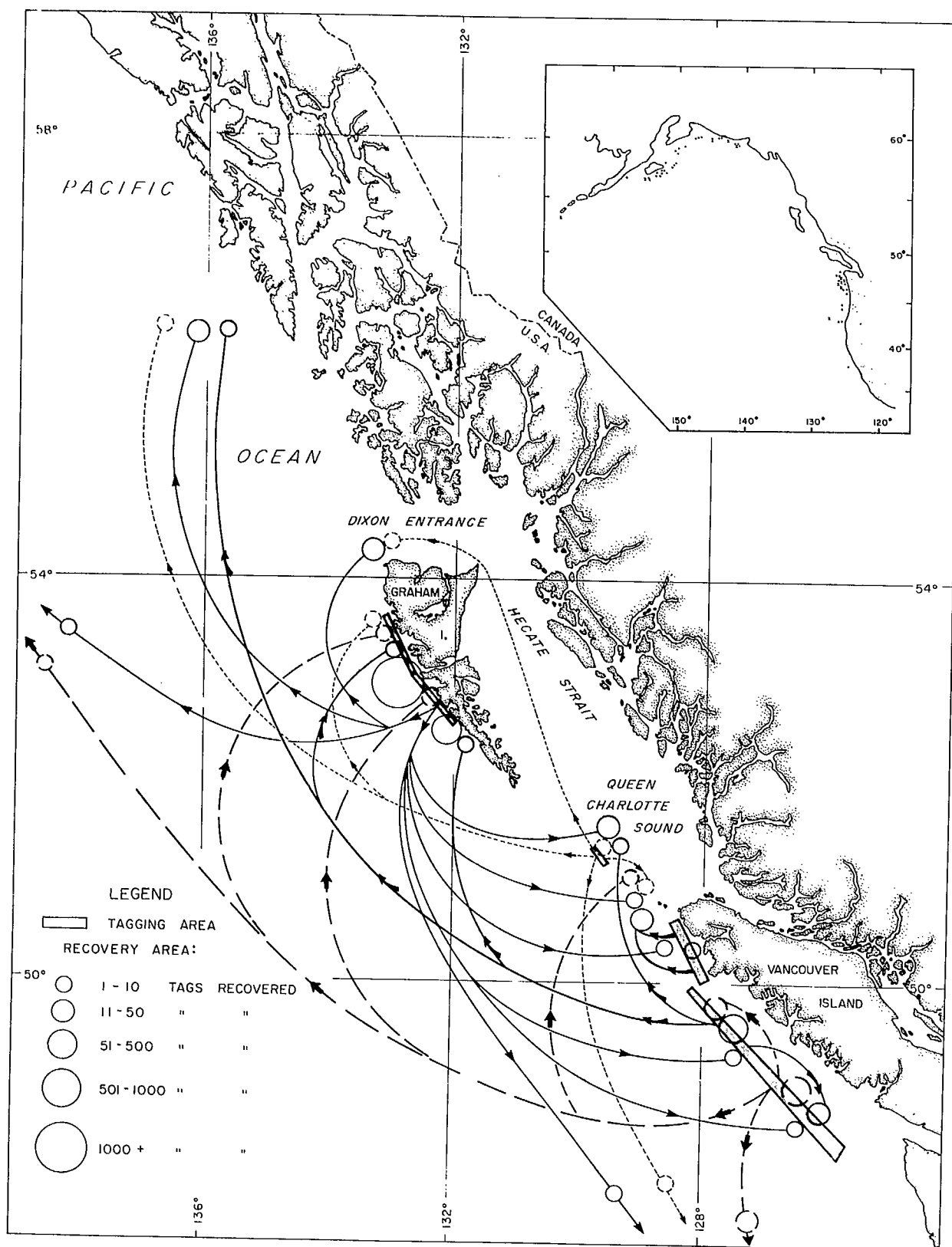


Fig. 15. Recoveries until December 31, 1979 of sablefish tags released from indicated tagging areas in 1977, 1978, and 1979. (For insert: dots refer to tag recoveries from closest release area, crosses refer to tag recoveries from more distant release areas.) This figure is intended to show the complexity of movement.

APPENDIX 1

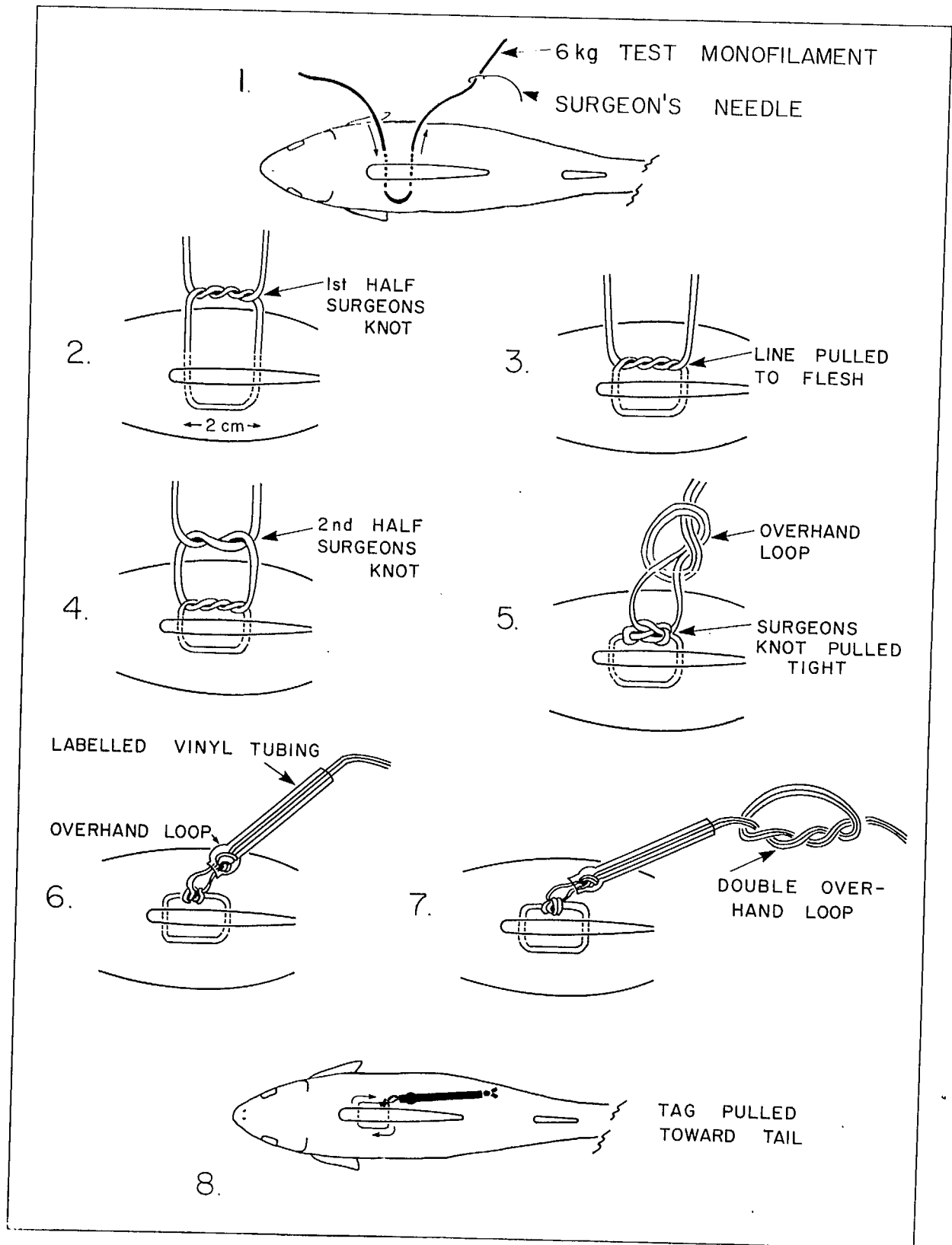
Appendix I. Tagging procedure for the White and Beamish (1972) suture tag.

Monofilament line is sewn (using a surgeon's curved needle) into the flesh under the dorsal fin rays, through the skin on the opposite side, then back through the flesh to the original side, approximately 2 cm from the initial insertion point (Appendix Fig. 1(1)). It is usually necessary to use needlenose pliers to push the needle through the skin. The two strands of line are tied in 2 knots as illustrated in Appendix Fig. 1 (2, 3, 4). The monofilament should be taut against the skin, but not pinching. A second knot is made to hold the label in place (Appendix Fig. 1(5)). The distance between the first and second knot should be approximately 3 cm.

The labelled vinyl tubing is threaded over the strands and over the second knot approximately 0.5 cm (Appendix Fig. 1(6)) or such that there is a length of monofilament between the first knot and the bottom of the tubing sufficient to allow growth over the first knot without covering the label. A third knot is tied at the end of the tubing (Appendix Fig. 1(7)), the strands are cut close to this knot (and heat-sealed if possible). The whole tag is turned to lie along the body as much as possible (Appendix Fig. 1(8)). With time the flesh will grow over the monofilament line that is against the skin.

The following materials are presently in use for the application of this tag:

- a) 6 kg test Stren^R (Dupont Canada) clear fluorescent monofilament line.
- b) (Ingram & Bell Ltd. Toronto) regular stainless steel surgeon's 3/8" circular full-curved needles with cutting edge (made in Reddith, England).
- c) Flow Mfg. Co. FT-4 #20 yellow vinyl tubing with applied label 5.0 cm in length.



Appendix Fig. 1. Application of the White and Beamish (1972) suture tag.

APPENDIX 2

Appendix 2. Table 1. Numbers and identification of tags on sablefish released at different locations off the west coast of Vancouver Island, May 1979^a.

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals		
			Identification no. B77- ^b	No. released	Identification no. B77- ^b	No. released with double tags	Anchor tags	Suture tags only	Anchor & suture tags
May 2	1	~40 mi S.W. Amphitrite Pt.	27788-28043	256			256		
	2	"	28044-28383	337			593		
	3	"	28384-28582	199	12110-12159	47	792		47
May 3	4	"	28583-28860	278	12160-12194	35	1,070		82
	5	"	28861-29052	191	12195-12217	23	1,261		105
	6	"	29053-29238	186	12218-12259	42	1,447		147
May 4	7	"	29239-29617	377	12260-12281	22	1,824		169
	8	"	29618-29779	162	12282-12309	28	1,986		197
	9	"	29780-29966	187	12310-12329	20	2,173		217
May 6	10	"	29967-30377	411	12330-12348	18	2,584		235
	11	"	30378-30585	207	12349-12351	3	2,791		238
	12	"	30586-30899	313	12352-12353	2	3,104		240

Appendix 2. Table 1 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals		
			Identification no. B77-b	No. released	Identification no. B77-b	No. released with double tags	Anchor tags	Suture tags only	Anchor & suture tags
May 7	13	~40 mi S.W. Amphitrite Pt.	30900-31388	438			3,542		240
	14	"	31389-31649	260			3,802		240
	15	"	31650-31816	166	12354-12370	17	3,968		257
May 8	16	"	31817-32716	897	12372-12430	59	4,865		316
	17	"	32717-33024	308	12431-12438	8	5,173		324
May 10	18	"	33025-33275	249	12439-12466	28	5,422		352
	19	"	33276-33954	676	12467-12473	7	6,098		359
May 13	22	"	33955-34350 34375-34512	533	12474-12556	83	6,631		442
May 14	24	"	34513-34612	100	12557-12601	45	6,731		487
	25	"	34613-34836	224	12602-12658	57	6,955		544
	26	"	34837-34999 46075-46399	488	12659-12730	72	7,443		616

Appendix 2. Table 1 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals		
			Identification no. B77- ^b	No. released	Identification no. B77- ^b	No. released with double tags	Anchor tags	Suture tags only	Anchor & suture tags
May 15	27	~40 mi S.W. Amphitrite Pt.	46400-46552	152	12731-12758 12761	29	7,595		645
	28	"	46553-46697	145	12759-12760 12762-12809	50	7,740		695
	29	"	46698-47000	302	12810-12859	49	8,042		744
May 17	32	"	47001-47574	574	12860-12883	24	8,616	18	750
	33	"	47575-47649	75	12884-12959	76	8,691	94	750
May 18	34	"	47650-47804	155	12960-12983	24	8,846	118	750
May 19	36	"	47805-47867	63			8,909		
	37	"	47868-47933	84			8,993		

^aBirds were observed to kill 67 tagged fish - these have not been deleted from the totals.

^bIdentification numbers include some unused tags.

Appendix 2. Table 2. Numbers and identification of tags on sablefish released at different locations off the west coast of the Queen Charlotte Islands, June 1979.

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals		
			Identification no. B77-a	No. released	Identification no. B77-a	No. released with double tags	Anchor tags	Suture tags only	Anchor & suture tags
June 1	1	Off Chads Pt.	47988-48118	131	12985-12997	13	131		13
	2	"	48119-48269	151	12998-12999	2	282		15
	3	"	48270-48385	116	13000-13041	40	398		55
June 2	4	Off Kootenay Pt.	48386-48470	85	13042-13062	20	483		75
	5	"	48471-48644	173	13063-13067	5	656		80
June 3	6	Off Tasu Sound	48645-48908	264	13068-13077	10	920		90
	7	Off Rennell Sd.	48909-48999 50000-50152	244			1,164		90
	8	"	50153-50260	108			1,272		90
June 4	9	Off Kano Inlet	50261-50565	305	13078-13098	21	1,577		111
	10	"	50566-50744	179	13099-13115	17	1,756		128
	11	"	50745-50902	158	13116-13124	9	1,914		137

Appendix 2. Table 2 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals		
			Identification no. B77-a	No. released	Identification no. B77-a	No. released with double tags	Anchor tags	Suture tags only	Anchor & suture tags
June 6	12	Off Kano Inlet	50903-51148	246	13125-13177	52	2,160		189
	13	"	51149-51271	123	13178-13200	23	2,283		212
	14	"	51272-51463	191	13201-13227	27	2,474		239
June 7	15	Off Cartwright Sound	51464-51805	342	13228-13270	43	2,816		282
	16	"	51806-51907	102	13271-13291	21	2,918		303
	17	"	51908-52181	274	13292-13309	18	3,192		321
June 8	18	"	52182-52430	249	13310-13317	8	3,441	1	329
June 9	19	"	52431-52574 52600-52670	215	13318-13326	9	3,656	2	338
	20	"	52575-52599 52671-52883	238	13327-13359	33	3,894	25	371
	21	Hippa Island	52884-53139	256	13360-13435	76	4,150		447

Appendix 2. Table 2 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals		
			Identification no. B77-a	No. released	Identification no. B77-a	No. released with double tags	Anchor tags	Suture tags only	Anchor & suture tags
June 11	22	Hippa Island	53140-53234	95	13436-13461	26	4,245		473
	23	"	53235-53369	135	13462-13479	18	4,380		491
	24	"	53370-53864	494			4,874		491
June 12	25	Off Athlow Bay	53865-54088	224			5,098		491
	26	"	54089-54186	98	13480-13517	38	5,196		529
	27	"	54187-54316	130	13518-13523	6	5,326	28	535
June 13	28	"	54317-54360	44	13524-13548	25	5,370		560
	29	"	54361-54537	177	13549-13572	24	5,547		584
	30	"	54538-54674	137	13573-13649	77	5,684		661
June 14	31	"	54675-54757	83	13650-13651	2	5,767		663
	32	"	54758-55023	266	13652-13654	3	6,033	31	666
	33	"	55024-55290	267	13655-13662		6,300	39	666

^aIdentification numbers include some unused tags.

Appendix 2. Table 3. Numbers and identification of tags on sablefish released at different locations off the west coast of the Queen Charlotte Islands, August 1979.

Release date	Set no.	Location	Anchor tags		
			Identification no. B77-a	No. released	Cumulative Total
Aug. 13	1	Off Tasu Sound	49000-49033	34	34
	2	"	49034-49194	159	193
Aug. 14	3	"	49195-49198	4	197
Aug. 15	4	"	49199-49201	3	200
Aug. 24	15	"	49202-49283	81	281

^aIdentification numbers include some unused tags.

Appendix 2. Table 4. Numbers and identification of tags on sablefish released at different locations in Hecate Strait and Queen Charlotte Sound, October 1979.

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 1	1	4 mi W. Goschen Is.			13664-13710	41		41
	2,3,4	8 mi S.W. Goschen Is.			13711-13817	106		147
	5,6	"	49284-49449	166			166	
	7	"	49450-49724	274	13818-13877	59	440	206
	8	White Rocks			13878-13892	15		221
	9	"			13893-13896	4		225
	10	"			13897-13925	28		253
	11	"	49725-49772	43			483	
	12	"			13926-13933	8		261
Oct. 2	13,14, 15	"	49773-49974	200	13934-13989	56	683	317
	16	"	49975-49999 55291-55571	281	13990-14033	43	964	360

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 2	17,18,							
	19	White Rocks	55572-55693	119	14034-14062	27	1,083	387
	20	"			14063-14082	20		407
	21	"	55694-55706	12	14083-14097	15	1,095	422
	22	"	55707-55742	36	14098-14108	11	1,131	433
	23,24	"	55743-56185	428	14109-14146	38	1,559	471
Oct. 4	25	"	56186-56545	347	14147-14193	47	1,906	518
	26	"	56546-56895	340	14194-14230	37	2,246	555
	27	"	56896-57279	372	14231-14276	44	2,618	599
	28	"	57280-57531	249	14277-14305	29	2,867	628
	29	"	57531-57616	85	14306-14316	11	2,952	639
	30	"	57617-57838	218	14317-14345	29	3,170	668

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 4	31	White Rocks	57839-57869	30	14346-14350	5	3,200	673
	32	"	57870-58045	172	14351-14378	28	3,372	701
	33	"	58046-58170	121	14379-14396	18	3,493	719
Oct. 7	34	N.E. edge of Goose Is. Ground	58171	1	14397	1	3,494	720
	35	"	58172-58182	8	14398-14399	2	3,502	722
	36	"			14400-14403	4		726
	37	"	58183-58186	4	14404-14405	2	3,506	728
	38	"			14406-14409	4		732
	39	"	58187-58191	5	14410-14411	2	3,511	734
	40	"	58192-58239	47	14412-14423	12	3,558	746
	41	"	58240-58521	264	14424-14456	33	3,822	779

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 7	42	N.E. edge of Goose Is. Ground			14457-14461	5	3,822	784
	43	"	58522-58620 58622	95			3,917	
	44	"	58621 58623-58820	181	14462-14484	23	4,098	807
	45	"	58821-58861	38			4,136	
Oct. 8	46	S.E. edge of Goose Is. Ground	58862-48934	69	14485-14491	7	4,205	814
	47	"	58935-59117	171	14492-14508	17	4,376	831
	48	"	59118-59236	113	14509-14521	13	4,489	844
	49	"	59237-59324	78	14522-14534	13	4,567	857
	50	"	59325-59368	47	14535-14542	8	4,614	865
	51	"	59369-59475	107	14543-14562	20	4,721	885
	52	"	59476-59526	51	14563-14572	10	4,772	895

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 8	53	S.E. edge of Goose Is. Ground	59527-59743	215	14573-14626	53	4,987	948
	54	"	59744-59919	175	14627-14634	8	5,162	956
	55	"	59920-60204	283	14635-14664	29	5,445	985
Oct. 9	57	"			14665-14673	9		994
	58	"			14674-14701	27		1,021
	59	"			14702-14708	7		1,028
	60	"	60205-60274	70	14709-14717	9	5,515	1,037
	61	"	60275-60430	157	14718-14738	19	5,672	1,056
	62	"	60431-60589	157	14739-14760	21	5,829	1,077
	63	"	60590-60676	84	14761-14769	9	5,913	1,086
	64	"	60677-60805	127	14770-14784	15	6,040	1,101

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 9	65	S.E. edge of Goose Is. Ground	60806-61065	257	14785-14812	28	6,297	1,129
	66	"	61066-61229	163	14813-14825	13	6,460	1,142
	67	"	61230-61270	41	14826-14830	5	6,501	1,147
	68	"	61271-61292	22			6,523	
Oct. 10	69	"			14831-14850	20		1,167
	70	"	61293-61481	188	14851-14865	15	6,711	1,182
	71	"	61482-61572	91	14866-14874	9	6,802	1,191
	72	"	61573-61691	118	14875-14886	12	6,920	1,203
	73	"	61692-61695	4			6,924	
	74	"	61696-61796	101	14887-14899	13	7,025	1,216
	75	"	61797-61824	28	14900-14938	38	7,053	1,254

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 10	76	S.E. edge of Goose Is. Ground			14939	1		1,255
	77	"			14940-14951	12		1,267
	78	"	61825-61841	17	14952-14993	42	7,070	1,309
	79	"	61842-61920	79	14994-15025	32	7,149	1,341
	80	"	61921-61947	27			7,176	
Oct. 11	81	"			15026-15052	24		1,365
	82	"	61948-62026	79	15053-15078	26	7,255	1,391
	83	"	62027-62144	118	15079-15088	10	7,373	1,401
	84	"	62145-62484	339	15089-15109	21	7,712	1,422
	85	"	62485-62666	180	15110-15125	16	7,892	1,438
	86	"	62667-62704	38	15126-15164	39	7,930	1,477

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 11	87	S.E. edge of Goose Is. Ground	62705-62736	32	15165-15206	41	7,962	1,518
	88	"	62737-62932	194	15207-15225	19	8,156	1,537
	89	"	62933-63093	159	15226-15239	14	8,315	1,551
	90	"	63094-63124	31	15240-15244	4	8,346	1,555
	91	"	63125-63129	5	15245-15252	7	8,351	1,562
Oct. 12	92	"	63130-63183	52			8,403	
	93	"			15253-15311	59		1,621
	94	"	63184-63240	54			8,457	
	95	"			15312-15363	51		1,672
	96	"	63241-63287	46			8,503	
	97	"			15364-15404	41		1,713

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 12	98	S.E. edge of Goose Is. Ground			15405-15450	46		1,759
	99	"	63288-63698	402	15451-15465	15	8,905	1,774
	100	"	63699-63749	51	15466-15484	19	8,956	1,793
	101	"	63750-63822	72			9,028	
	102	"	63823-64114	291	15485-15511	27	9,319	1,820
	103	"	64115-64147	33			9,352	
Oct. 13	104	"			15512-15563	51		1,871
	105	"			15564-15594	31		1,902
	106	"	64148-64300	153	15595-15609	15	9,505	1,917
	107	"	64301-64382	82			9,587	
	108	"			15610-15645	35		1,952

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 13	109	S.E. edge of Goose Is. Ground	64383-64387	4	15646-15700	55	9,591	2,007
	110	"	64388-64459	72			9,663	
	111	"	64460-64514	53	15701-15739	39	9,716	2,046
	112	"	64515-64530	16			9,732	
	113	"	64531-64562	32			9,764	
	114	"	64563-64590	28			9,792	
Oct. 14	115	Cape Scott Spit			15740-15747	8		2,054
	116	"			15748-15792	44		2,098
	117	"	64591-64606	15			9,807	
	118	"	64607-64754	148			9,955	
	119	"			15793-15820	27		2,125
	120	"	64755-64856	102			10,057	
	121	"	64857-64974	118	15821-15854	34	10,175	2,159

Appendix 2. Table 4 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Oct. 15	122	Cape Scott Spit			15855-15866	12		2,171
	123	"			15867-15880	14		2,185
	124	"	64975-65093	118			10,293	
	125	"	65094-65252	159			10,452	
	126	"	65253-65343	91			10,543	
	127	"	65344-65425	82			10,625	
	128	"	65426-65462	37	15881-15912	31	10,662	2,216
	129	"	65463-65482	20			10,682	
	130	"	65483-65494	12			10,694	
	131	"	65495-65537	43			10,737	
	132	"	65538-65570	33			10,770	

^aIdentification numbers include some unused tags.

Appendix 2. Table 5. Numbers and identification of tags on sablefish released at different locations in Hecate Strait and Queen Charlotte Sound, November 1979.

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Nov. 1	2	Cape Scott Spit			15913-15932	19		19
	3	"			15933-15943	11		30
Nov. 2	4	N.W. corner of Goose Is. Ground	65575-65804	223	15944-15952	9	223	39
	5	"			15953-15975	23		62
	6	"	65805-65999 86000-86133	319	15976-15999 66000-66013	37	542	99
	7	"	86134-86298	161	66015-66022	7	703	106
	8	"	86299-86807	496			1,199	
	9	"	86808-87424	603			1,802	
Nov. 3	10	"			66025-66041	17		123
	11	"	87425-87611	183	66042-66065	24	1,985	147
	12	"			66023-66024 66066-66110	46		193

Appendix 2. Table 5 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Nov. 3	13	N.W. corner of Goose Is. Ground	87612-87874	255			2,240	
	14,15	"	87875-87899	22	66111-66172	60	2,262	253
	16	"	87900-87985	80			2,342	
	17	"	87986-88680	678			3,020	
Nov. 4	18	"	88682-88759	75	66173-66194	22	3,095	275
	19	"	88760-88815	55			3,150	
	20	"	88816-88899	83	66196-66230	35	3,233	310
	21	"	88900-89316	410			3,643	
	22	"	89317-89564	239			3,882	
	23,24	"	89565-90149	577	66231-66249	19	4,459	329
	25	"	90150-90460	304			4,763	

Appendix 2. Table 5 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Nov. 5	26,27,28	N.W. corner of Goose Is. Ground			66250-66350	100		429
	29-32	"	90461-90555	92	66351-66576	220	4,855	649
Nov. 6	34	White Rocks			66577-66599	23		672
	35	"	90556-90723	163			5,018	
	36	"	90724-91249	619			5,637	
	37	"	91354-92106	714			6,351	
	38,39	"	92107-93721	1,594			7,945	
Nov. 7	40	"	93722-94024	311			8,256	
	41	"	94044-94724	676			8,932	
	42	"	94725-95410	675			9,607	
Nov. 8	43	"	95411-95999	578			10,185	

Appendix 2. Table 5 (cont'd)

Release date	Set no.	Location	Anchor tags		Suture tags		Cumulative totals	
			Identification no. B77-a	No. released	Identification no. B77-a	No. released	Anchor tags	Suture tags
Nov. 9	45	White Rocks			66600-66797	195		867
	46	"			66798-66999	197		1,064
Nov. 10	47	"			67000-67218	213		1,277
	48,49	"			67219-67413	192		1,469
Nov. 11	50	N.W. Corner of Goose Is. Ground			67414-67429	15		1,484
	51	"			67430-67441	12		1,496
	52	"			67442-67478	37		1,533
	53	"			67479-67654	174		1,707
	54	N.E. Corner of Goose Is. Ground			67655-67713	58		1,765
	55	"			67714-67802	85		1,850
Nov. 12	56	S.E. Corner of Goose Is. Ground			67803-67857	55		1,905
	57	"			67858-68088	227		2,132
	58	"			68089-68212	122		2,254
Nov. 13	59,60	Cape Scott Spit			68213-68259	46		2,300

^aIdentification numbers include some unused tags.

Appendix 2. Table 6. Numbers and identification of tags on sablefish released in Departure Bay, Strait of Georgia, December 1979^a.

Release date	Location	Suture tags	
		Identification no. B77-	No. released
Dec. 13	Departure Bay	68322-68347	26

^aCaptured in Queen Charlotte Sound on September 26, 1979.

APPENDIX 3

Appendix 3. Table 1. Length frequency of sablefish tagged off the west coast of Vancouver Island, May 1979.

Fork length (cm)	Set no.								
	1	2	3	4	5	6	7	8	9
42	1	1							
43				1		1			
44									
45				2					
46		1			2	1	3		
47		2	1	1	1		3	1	1
48	1	1	2	1		3	10	2	
49		4		2	2	3	5		
50	1	3		7	6	3	16	10	6
51		8	2	5	4	4	18	3	11
52	2	16	1	14	7	7	17	3	6
53	6	12	1	15	5	4	43	6	9
54	4	14		13	13	9	31	14	11
55	6	22	5	11	8	13	38	11	9
56	5	13	3	7	8	15	25	11	14
57	7	13	4	15	15	10	26	15	6
58	9	28	12	15	11	12	10	6	7
59	18	11	10	14	11	15	13	10	7
60	12	7	7	13	9	12	15	5	9
61	10	20	10	12	8	10	8	4	3
62	13	12	14	14	8	8	10	6	4
63	13	13	8	11	10	11	9	10	3
64	17	27	8	16	9	9	4	2	7
65	14	6	14	8	5	7	12	5	7
66	9	14	9	4	6	3	8	2	6
67	10	9	8	4	2	4	7	3	7
68	11	7	4	10	7	4	5	1	3
69	13	5	11	8	5	4	5	3	5

Appendix 3. Table 1 (cont'd)

Fork length (cm)	Set no.								
	1	2	3	4	5	6	7	8	9
70	12	8	14	8	5		9	4	7
71	4	3	5	11	3	1	4	2	7
72	5	10	10	7	4	3	4	6	3
73	6	11	7	2	1	2	2	3	1
74	10	10	2	2		2	3	1	4
75	2	9	4	3	3	1	3	3	5
76	5	3	2	3	2		3		1
77	4	1	4	2	3	1	1		4
78	4	1	3	2		1	4	1	
79	3	1	1	4	2		2	1	
80	2	3	3	2	1			1	3
81	2		2	2	2	1	1	3	1
82		3	4	1	1	1		1	3
83	3			2					1
84	4	2	1					1	3
85	2								
86		1		2					
87	1	1		1				1	1
88	2		1						1
89					1				
90	1		1					1	
91						1			
92	1	1							
93			1						
94	1								
95									
96									
97					1				
Total	256	337	199	277	191	186	377	162	186

Appendix 3. Table 1 (cont'd)

Fork length (cm)	Set no.								
	10	11	12	13	14	15	16	17	18
42	1								
43				1			1		
44							5		1
45	1				1		1	4	1
46	2						11	3	2
47	2	1		2		2	26	5	1
48	4	5	2	5	2	1	34	20	6
49	4	1	2	12	4		47	12	6
50	13	9	6	24	4	1	85	19	8
51	18	7	9	23	4	3	49	28	6
52	33	6	8	28	10	4	75	25	12
53	29	15	15	20	10	2	68	13	16
54	35	10	20	40	11	9	65	21	16
55	24	6	20	38	17	9	35	13	9
56	29	7	7	26	13	12	30	23	9
57	21	13	11	30	14	13	36	13	11
58	22	10	17	20	9	11	34	11	7
59	18	7	15	27	6	8	30	4	6
60	11	12	13	15	16	4	29	10	11
61	10	5	9	7	9	7	29	8	7
62	8	7	8	10	9	8	15	8	12
63	10	2	9	7	13	7	23	8	11
64	9	8	5	14	12	6	22	10	6
65	13	5	8	12	10	9	16	8	13
66	5	12	9	13	13	6	18	4	12
67	10	4	11	2	12	4	15	3	7
68	10	6	10	14	11	5	11	8	7
69	7	5	9	4	7	2	13	1	4

Appendix 3. Table 1 (cont'd)

Fork length (cm)	Set no.								
	10	11	12	13	14	15	16	17	18
70	4	3	10	4	7	5	10	4	7
71	14	5	7	8	3	7	7	3	3
72	7	8	6	6	4	3	6	1	3
73	3	6	8	6	6	5	9	3	4
74	4	4	5	5	4	1	8	2	6
75	5	1	4	4	3	1	6	2	3
76	7	5	8	5	4		2	2	3
77	2	5	6	2		2	7	5	2
78	1	2	7	1	3	1	4	2	5
79	1	1	3	2	4		3		2
80	3		4		1	2	2		
81	4	1	8				3		2
82	1		2			2	1		
83	2	1	2		1	3	1		1
84	1		4	1	1		1		
85									
86	2		1						
87			1						
88	1	1	1			1	1		
89			1		1		1		
90		1	2						
91									1
92									
93									
94									
95									
96									
97									
Total	411	207	313	438	259	166	895	306	249

Appendix 3. Table 1 (cont'd)

Fork length (cm)	Set no.								
	19	22	24	25	26	27	28	29	32
42	1								
43									
44	2		1						
45	7	4			1				
46	10	3							1
47	16	10		1	4				
48	21	23	2		2	1			
49	27	21	1	2	4	1		1	
50	38	41	2	5	10	3			
51	34	38		7	11	4	2		1
52	50	34	4	9	18	4	2		2
53	49	42	4	10	31	4	6	2	6
54	49	24	7	14	27	11	6	2	5
55	46	37	1	17	35	4	2	2	16
56	35	18	4	11	29	10	7	1	7
57	32	21	4	12	21	5	7	5	9
58	22	14	2	11	28	10	5	5	23
59	20	10	1	10	22	5	7	8	16
60	27	18	3	15	13	7	8	14	29
61	13	17	3	7	10	3	14	8	24
62	13	12	4	3	13	7	7	9	17
63	13	12	3	10	20	5	10	15	34
64	15	12	1	5	8	3	4	18	31
65	14	9	5	7	21	3	5	25	20
66	16	11	6	9	9	6	6	8	28
67	17	13	4	2	20	4	12	16	23
68	8	11	3	10	14	1	4	11	19
69	11	6	5	7	7	7	4	16	24

Appendix 3. Table 1 (cont'd)

Fork length (cm)	Set no.								
	19	22	24	25	26	27	28	29	32
70	13	13	2	8	14	2	5	16	36
71	10	6	4	6	13		6	16	24
72	5	10	5	4	10	3	1	13	29
73	10	5	1	3	8	2	2	13	25
74	4	5		2	7	1	1	9	17
75	12	3	2	5	5	4	2	8	21
76	4	7	2	4	8	4	1	10	10
77	4	3	3	1	14	2	1	7	20
78	1	2	2	3	3	4	3	11	8
79		5	1	1	5	2	1	2	9
80	2	1	1		7	5	1	10	10
81		3	4		3		1	4	8
82	1	1	1		3	7		2	9
83		1	1	2	2	1	1	6	7
84	1	3			1	1	1	2	3
85	1	1	1		1			1	4
86		1			3	2		2	4
87					2				1
88				1		1			4
89									1
90								2	2
91								2	
92					1				3
93									1
94						2			
95									
96									
97									
Total	674	531	100	224	488	151	145	302	591

Appendix 3. Table 1 (cont'd)

Fork length (cm)	Set no.				Total
	33	34	36	37	
42					4
43		1			5
44					9
45					22
46	2	1			42
47	4	2			86
48	4	4			156
49	2	6			169
50	8	9			337
51	12	12			323
52	16	13		3	429
53	11	12		3	469
54	9	14		3	507
55	18	15		3	490
56	11	15	3	4	412
57	13	7		3	412
58	4	14		4	393
59	6	6	1	4	346
60	1	7	4	3	359
61	3	3	6	9	296
62	4	3	4	3	273
63	2	2	2	2	308
64	4	3	4	3	302
65	3	2	2	2	290
66	1	6	3	2	264
67	2	2	4	9	250
68	1	5	4	5	230
69	1	3	5	9	216

Appendix 3. Table 1 (cont'd)

Fork length (cm)	Set no.				Total
	33	34	36	37	
70	2	1	4	1	238
71	1	2		2	187
72	1	2	5	2	186
73	1	2	2	1	160
74	1	2	2	2	126
75		1	1	1	127
76			2		107
77			1		107
78					79
79	1	1	2	1	61
80					64
81					55
82		1			45
83			2		40
84					31
85	1				12
86					18
87					9
88					15
89					5
90					10
91					4
92					6
93					2
94					3
95					
96					
97					1
Total	150	179	63	84	9,097

Appendix 3. Table 2. Length frequency of sablefish sampled during the tagging cruise off the west coast of Vancouver Island, May 1979.

Fork. length (cm)	Set no.											
	20			21			23			30		
	M	F	T	M	F	T	M	F	T	M	F	T
44	1	-	1	1	-	1						
45												
46	5	-	5	-	1	1						
47	4	-	4	1	-	1	1	-	1			
48	8	-	8	2	2	4						
49	12	6	18	3	-	3						
50	31	5	36	5	-	5				1	-	1
51	11	4	15	1	-	1	1	-	1	2	-	2
52	16	2	18	9	2	11	-	4	4	4	-	4
53	21	6	27	7	-	7	2	-	2	7	-	7
54	21	2	23	3	1	4	2	3	5	2	-	2
55	13	3	16	3	1	4	3	-	3	6	-	6
56	12	1	13	5	1	6	3	1	4	6	1	7
57	3	1	4	1	1	2	5	1	6	6	2	8
58	5	8	13	4	1	5	7	3	10	5	1	6
59	5	5	10				3	2	5	7	1	8
60	3	1	4	5	4	9	4	1	5	2	2	4
61	2	4	6	3	3	6	4	2	6	6	-	6
62	3	4	7	-	3	3	3	2	5	1	3	4
63	1	1	2	2	2	4	3	3	6	2	4	6
64	4	5	9	2	2	4	1	2	3	7	4	11
65	1	8	9	3	3	6	-	-	-	4	5	9
66	-	9	9	-	2	2	3	2	5	5	1	6
67	1	5	6	1	1	2	-	5	5	-	3	3
68	1	4	5	1	1	2	-	-	-	1	2	3
69	1	9	10	-	2	2	-	1	1	1	3	4
70	-	8	8	-	3	3	-	3	3	-	2	2
71	-	4	4	-	2	2	-	3	3	1	2	3
72	-	4	4	-	1	1	-	6	6	-	1	1
73	-	5	5	-	4	4	-	1	1	-	5	5

Appendix 3. Table 2 (cont'd)

Fork length (cm)	Set no.											
	20			21			23			30		
	M	F	T	M	F	T	M	F	T	M	F	T
74	-	2	2	-	2	2	-	1	1	-	4	4
75	-	5	5	-	1	1	-	4	4	-	3	3
76	-	2	2	-	3	3	-	1	1	-	3	3
77	-	2	2	-	5	5	-	3	3	-	1	1
78	-	3	3				-	2	2	-	3	3
79	-	2	2				-	1	1	-	5	5
80	-	4	4	-	1	1	-	2	2	-	1	1
81	-	1	1									
82							-	1	1	-	3	3
83	-	2	2							-	1	1
84										-	1	1
85	-	1	1							-	1	1
86												
87												
88												
89	-	1	1							-	1	1
Total	185	139	324	62	55	117	45	60	105	76	69	145

Appendix 3. Table 2 (cont'd)

Fork length (cm)	Set no.					
	31			Total		
	M	F	T	M	F	T
44				2	-	2
45						
46				5	1	6
47				6	-	6
48	2	-	2	12	2	14
49	2	-	2	17	6	23
50	3	-	3	40	5	45
51	3	-	3	18	4	22
52	7	3	10	36	11	47
53	9	3	12	46	9	55
54	3	-	3	31	6	37
55	12	-	12	37	4	41
56	11	2	13	37	6	43
57	6	-	6	21	5	26
58	3	4	7	24	17	41
59	11	-	11	26	8	34
60	7	3	10	21	11	32
61	4	-	4	19	9	28
62	1	4	5	8	16	24
63	5	-	5	13	10	23
64	3	5	8	17	18	35
65	3	1	4	11	17	28
66	2	2	4	10	16	26
67	-	1	1	2	15	17
68	1	2	3	4	9	13
69	-	8	8	2	23	25
70	-	1	1	-	17	17
71	-	6	6	1	17	18
72	-	3	3	-	15	15
73	-	2	2	-	17	17

Appendix 3. Table 2 (cont'd)

Fork length (cm)	Set no.					
	31			Total		
	M	F	T	M	F	T
74	-	5	5	-	14	14
75	-	3	3	-	16	16
76	-	1	1	-	10	10
77				-	11	11
78				-	8	8
79	-	3	3	-	11	11
80	-	1	1	-	9	9
81	-	3	3	-	4	4
82	-	2	2	-	6	6
83				-	3	3
84				-	1	1
85				-	2	2
86						
87						
88				-	1	1
89				-	1	1
Total	98	68	166	466	391	857

Appendix 3. Table 3. Length frequency of sablefish tagged off the west coast of the Queen Charlotte Islands, June 1979.

Fork length (cm)	Set no.							
	1	2	3	4	5	6	7	8
40								
41								
42				1				
43	1	1				1		
44	3	4	1			2		
45		4	1	2		1	1	
46			1					
47	1		1			2	2	
48	3	1	1					
49	2	1		1		2	1	
50	4	1	1			1	1	
51	3	1	1			1		
52	2	1		1		3	1	
53	2	3	2	5		1		1
54	3		2			1		
55	2		1	2	1			
56	2	1	2	2	5	1	3	3
57	2	1	3	1	5	2	3	1
58	5	2	3	2	9	3	4	6
59	4	1	2	3	3	9	8	1
60	4	9	6	5	11	7	7	6
61	1	2	3	4	9	5	8	5
62	4	4	6	5	9	8	11	4
63	5	10	5	3	10	10	15	7
64	7	12	4	5	9	7	15	6
65	7	3	6	1	8	7	14	7
66	5	7	4	2	10	7	16	6
67	4	4	2	2	11	14	16	8
68	3	4	6	3	10	13	17	5
69	3	8	8	1	6	16	5	4

Appendix 3. Table 3 (cont'd)

Fork length (cm)	Set no.							
	1	2	3	4	5	6	7	8
70	6	5		7	8	15	16	5
71	8	8	6	4	1	15	5	4
72	9	9	5	4	5	24	13	9
73	5	5	7	2	7	15	11	8
74	6	8	7	5	7	6	10	2
75		5	6	2	6	15	10	
76	4	10	3	1	7	10	3	2
77	5	3	1	3	2	7	7	2
78	1	5	3	2	5	7	2	2
79	1	1	1		1	4	7	1
80	2	1	2	2		3	3	1
81		1	1	1	2	9	1	
82	1				2	3	3	
83		1	1	1		1	2	
84	1	1				3		1
85		1	1		1	1	1	
86					2			1
87		1					1	
88								
89							1	
90		1						
91					1			
92								
93								
94								
95								
96								
97								
98								
99						1		
100						1		
Total	131	151	116	85	173	264	244	108

Appendix 3. Table 3 (cont'd)

Fork length (cm)	Set no.								
	9	10	11	12	13	14	15	16	17
40									
41	1		1						1
42			1						2
43			1						2
44			2						2
45		1	2						5
46		1							5
47		1	4						2
48		1	3						8
49	1								3
50	1	1	2						3
51	2								2
52			1					1	3
53			2	1			1		2
54	1	1	1	2	2		2		2
55	1		3	3	2		5		1
56	1	1	1		1		2		4
57	4	1	1	6	4	3	2	3	3
58	5	3	2	5	2	8	11	2	14
59	7	4	4	7	6	5	19	2	11
60	13	7	8	8	5	9	19	5	12
61	12	5	8	7	4	10	19	3	11
62	24	10	3	21	13	7	22	5	12
63	22	14	9	14	3	15	13	6	10
64	15	11	9	17	3	9	31	10	17
65	9	11	7	18	8	17	25	4	9
66	26	10	14	19	9	12	22	10	13
67	12	16	8	14	10	8	17	6	8
68	19	13	10	16	10	14	26	6	10
69	14	18	9	7	11	11	13	6	13

Appendix 3. Table 3 (cont'd)

Fork length (cm)	Set no.								
	9	10	11	12	13	14	15	16	17
70	17	7	6	11	7	16	18	3	11
71	12	6	9	14	4	4	10	6	10
72	18	3	3	6	5	5	12	2	5
73	13	7	4	12	1	8	10	2	6
74	12	3	6	9	4	7	8	6	11
75	11	6	4	7	1	3	4	3	6
76	5	3	2	5		3	6	1	4
77	5	4	5	3		4	8	3	6
78	2	2		3		3	5	1	7
79	1	1	2	3	1		4	1	2
80	3			2	1	1	2		5
81	3	3		1	1	1	3		2
82	1	1			1	4	1		2
83	4		1		2		1	1	2
84	1	1		1		2		3	
85	3				1	2		1	2
86	1	1		2					
87	2								1
88	1			1			1		
89					1				
90									
91									
92									
93				1					
94									
95						1			
96									
97									
98									
99									
100									
Total	305	178	158	246	123	192	342	102	272

Appendix 3. Table 3 (cont'd)

Fork length (cm)	Set no.								
	18	19	20	21	22	23	24	25	26
40									
41			1						
42	1		1						
43			1						
44	2	2	1						
45	2		3						
46			5						
47	4	1	6						
48	3	1	1						
49	1	1	4						
50	1	1	2		2				
51	1	1	1				1	1	
52	1	1	4				1		
53	1	2	2	1				1	
54	1		2	1	1		2	2	
55	3	5	1	1	1	1	1	1	
56	4		2	2			5	3	1
57	5	7	10	3	1		7	5	4
58	3	4	6	1		2	10	2	2
59	5	9	8	4	3	3	12	7	5
60	8	11	12	11	5	1	21	13	4
61	10	2	11	2	5	5	20	16	4
62	8	8	12	10	4	7	29	18	9
63	16	17	7	7	5	6	35	22	10
64	15	17	11	10	4	6	33	12	8
65	18	12	12	11	3	8	51	12	4
66	13	21	4	15	8	8	36	9	2
67	17	9	8	16	7	5	20	12	4
68	5	10	9	16	4	4	26	13	3
69	11	7	11	15	5	12	26	9	3

Appendix 3. Table 3 (cont'd)

Fork length (cm)	Set no.								
	18	19	20	21	22	23	24	25	26
70	13	7	15	13	5	7	33	14	5
71	14	6	6	10	1	7	19	6	4
72	6	7	10	11	5	10	20	3	3
73	8	9	7	13	1	3	21	5	2
74	10	2	8	11	2	7	8	4	1
75	8	4	12	8	5	3	8	3	2
76	8	4	4	10	2	7	9	5	3
77	4	5	4	8	2	10	2	9	5
78	3	7	3	7	3	5	9	3	1
79	5	1	7	5	5	2	8	4	1
80	3	1	5	8	1	3	4	3	3
81		3	4	5		1	2	1	1
82	3	1	4	2			2		
83	1		3	3			2	2	
84	2	2	3	4	1	1	2		
85		1			2		2	2	1
86		1		2	1		2	1	
87	1			1			1		1
88	1	1	1	3			2		
89		1	1						
90		1	2	3			2		
91				1					
92					1	1			
93			1	1					
94		1							
95									
96			1						1
97									
98									
99									
100									
Total	249	214	259	255	95	135	494	223	97

Appendix 3. Table 3 (cont'd)

Fork length (cm)	Set no.							Total
	27	28	29	30	31	32	33	
40							1	1
41								4
42								6
43								7
44	1					1		21
45	1							23
46								12
47						2	2	28
48	1		1					24
49								17
50	1						1	23
51							1	16
52	1					1	1	23
53	2		1				4	34
54	1		1			1	1	30
55	2		1	1		1	2	42
56	3	2	1	1		1	1	55
57	4	2	1	1			4	99
58	7	1	2	2	1	6	7	142
59	3	2	6	3	2	7	13	188
60	12	3	9	6	3	13	16	289
61	10	2	11	6	3	21	18	262
62	12	6	10	5	5	15	25	351
63	7	4	11	10	6	23	27	384
64	9	3	13	7	2	24	28	389
65	6	5	15	7	2	18	24	369
66	11		13	11	5	22	11	381
67	6	1	10	13	4	21	16	329
68	5	2	13	8	9	18	13	343
69	3	1	12	12	4	7	10	301

Appendix 3. Table 3 (cont'd)

Fork length (cm)	Set no.							Total
	27	28	29	30	31	32	33	
70	8	1	6	5	3	19	9	321
71	4	2	10	7	4	9	8	243
72	1		5	3	5	7	7	240
73	1	3	4	4	5	4	4	217
74	2		4	5	4	6	2	193
75	1	1	4	2	2	3	2	157
76			2	6	2	3	1	135
77	3	1	1	2	3	6	1	134
78	1	1	3	3	3	3	1	106
79		1			2			72
80			1	1	1	3		65
81	1		1	2			1	51
82	1			3	2		1	38
83			3		1	1	1	34
84	1					1		31
85			1					23
86			1				1	16
87							1	10
88						1	1	13
89								4
90	1							10
91								2
92								2
93								3
94								1
95				1				2
96								2
97								
98								
99								1
100								1
Total	133	44	177	137	83	268	267	6,320

Appendix 3. Table 4. Length frequency of sablefish captured by trap off the west coast of the Queen Charlotte Islands, August 1979.

Fork length (cm)	Set no.						Total
	1	2	3	4	15	16	
40							
41							
42							
43							
44							
45						2	2
46						1	1
47						3	3
48						1	1
49							
50							
51	1						1
52							
53							
54							
55					1		1
56							
57	1	2					3
58							
59		1			3		4
60		1			2		3
61	1	3			5		9
62	1	1			8		10
63	2	5			7		14
64	1	3			6		10
65	3	8			7		18
66	4	7			7		18
67	2	7			8		17
68	2	8		1	7	1	19
69	3	11			9		23
70	1	5	1		4		11

Appendix 3. Table 4 (cont'd)

Fork length (cm)	Set no.						Total
	1	2	3	4	15	16	
71		13		1	4		18
72	3	9		1	9		22
73	2	13			6		21
74		5	1		5		11
75	2	13			2		17
76	1	9			2		12
77		5			5		10
78		5			4		9
79	3	4			2		9
80	2	3	2		3	1	11
81	1	2			3		6
82		3			2		5
83	1	4			6		11
84		1					1
85							
86	1	1			1		3
87		3					3
88		2			1		3
89		1			1		2
90		1					1
91							
92		1			1		2
93							
94							
95					1		1
96							
97					1		1
Total	38	160	4	3	133	9	347

Appendix 3. Table 5. Length frequency of sablefish captured by a 14 cm mesh sunken gillnet off the west coast of the Queen Charlotte Islands, August 1979.

Fork length (cm)	Set no.											
	1			2			3			4		
	M	F	T	M	F	T	M	F	T	M	F	T
59	1	-	1									
60							1	-	1			
61												
62							2	-	2			
63	1	1	2	1	-	1						
64	1	-	1				1	1	2			
65	2	-	2	2	-	2				-	1	1
66	1	-	1	1	-	1	1	1	2	2	-	2
67	1	-	1	3	-	3	1	1	2			
68	3	-	3	2	-	3 ^a	4	1	5			
69				1	-	1	1	-	1			
70	-	1	1				1	-	1			
71				1	-	1						
72				-	1	1	1	1	2			
73	-	1	1									
74							-	1	1			
75							-	1	1			
76										-	1	1
77							-	1	1			
78				-	1	1						
79							-	1	1			
Total	10	3	13	11	2	14 ^a	13	9	22	2	2	4

Appendix 3. Table 5 (cont'd)

Fork length (cm)	Set no.					
	5			Total		
	M	F	T	M	F	T
59				1	-	1
60				1	-	1
61						
62				2	-	2
63				2	1	3
64				2	1	3
65				4	1	5
66	-	1	1	5	2	7
67	1	-	1	6	1	7
68				9	1	11 ^a
69				2	-	2
70	-	1	1	1	2	3
71				1	-	1
72				1	2	3
73				-	1	1
74				-	1	1
75				-	1	1
76				-	1	1
77				-	1	1
78				-	1	1
79				-	1	1
Total	1	2	3	37	18	56 ^a

^aIncludes one unsexed.

Appendix 3. Table 6. Length frequency of sablefish captured by a 15 cm mesh gillnet off the west coast of the Queen Charlotte Islands, August 1979.

Fork length (cm)	Set no.														
	2			3			4			5			Total		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
57				-	-	1 ^b							-	-	1
58															
59															
60															
61															
62															
63															
64															
65				1	-	1							1	-	1
66															
67															
68															
69															
70	-	1 ^a	1	-	1	1							-	2	2
71				-	1	1				-	1	1	-	2	2
72										-	1	1	-	1	1
73				-	1	1				-	1	1	-	2	2
74				-	1	1							-	1	1
75				1	2	3							1	2	3
76															
77				-	1	1				-	1	1	-	2	2
78				-	1	1				-	1	1	-	2	2
79															
80				1	-	1							1	-	1
81															
82															
83															
84															
85							-	1	1	-	1	1	-	2	2
86										-	1	1	-	1	1
87															
88															
89															
90															
91				-	1	1							-	1	1
Total	-	1 ^a	1	3	9	13	-	1	1	-	7	7	3	18	22

^aPart of tail missing.

^bNo sex.

Appendix 3. Table 7. Length frequency of sablefish tagged in Hecate Strait and Queen Charlotte Sound, October 1979.

Fork length (cm)	Set no.								
	1	2,3,4	5,6	7	8	9	10	11	12
19									
20									
21									
22									
23									
24									
25									
26							1		
27									
28							2		
29			1						
30				1			2		
31									
32									
33									
34									
35									
36				2	1		1		
37		2	2	1					1
38			1	10	1	1	2	1	
39		1	1	8	2			3	
40		4	7	20	3	1	2	4	
41	1	14	11	33	1		3	2	1
42	2	8	21	40		1	7	7	2
43		12	26	50	1		3	10	1
44	7	17	29	53	2	1	1	6	1
45	6	16	25	40	1		1	7	1
46	3	16	16	32	2			1	
47	4	5	12	15	1		1	1	
48	4	5	7	12			1		

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.							
	1	2,3,4	5,6	7	8	9	10	11 12
49	2	1	3	8				1 1
50	5		2	5				
51	1	1	1					
52	2	1		1				
53	1							
54	1	2						
55			1					
56		1		1				
57	1							
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70	1							
71								
72								
73								
74								
75								
-								
83								
Total	41	106	166	332	15	4	28	43 8

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	13,14,15	16	17,18,19	20	21	22	23,24	25	26
19									
20									
21									
22									1
23									
24									
25									
26									
27									
28	3			1				1	
29							2		
30			1		1				
31									
32									
33							1	1	
34						1			
35	1	1	1						
36	4		3		1			1	
37	7	5	6	1	2	1	3	2	
38	4	10	15	2	2	1	5	3	4
39	9	13	12	4	2	4	16	5	6
40	8	17	5	3	2	1	19	17	17
41	14	23	9		2	4	49	29	28
42	27	48	23	1		8	78	39	32
43	40	53	16	2	2	7	87	63	73
44	35	49	21	2	6	10	72	69	47
45	38	34	15		1	1	59	60	60
46	25	27	9	3	1	3	42	30	34
47	18	21	7	1	2	3	10	28	20
48	10	11	2		3	1	11	18	21

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	13,14,15	16	17,18,19	20	21	22	23,24	25	26
49	7	8				2	2	8	13
50	5	3					4	9	9
51	1	1					2	5	1
52									4
53			1					3	2
54									1
55								1	1
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	256	324	146	20	27	47	462	392	374

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	27	28	29	30	31	32	33	34	35
19									
20									
21									
22									
23									
24									
25									
26									
27				1	1				
28									
29									
30									
31									
32									
33	1								
34									
35	2								1
36	1		1						
37	2	2	1	2	3	3			1
38	2	2	1	11		9			
39	8	3	9	9	3	10			1
40	26	16	6	22	2	16	4		
41	39	20	10	24	2	31	9		
42	49	47	13	44	6	33	15	1	2
43	64	52	14	39	4	36	18	1	2
44	65	43	8	35	4	19	25		
45	51	30	12	29	4	22	24		1
46	40	21	8	16	5	11	17		1
47	30	24	7	6	1	3	9		
48	16	8	4	5		2	10		

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	27	28	29	30	31	32	33	34	35
49	7	4	1			3	2		
50	6	4	1	3		1	1		
51		1					2		
52	3	1							
53	1						1		
54	1					1	1		
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67							1		
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	414	278	96	246	35	200	139	2	9

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	36	37	38	39	40	41	42	43	44
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35								3	1
36		1						1	1
37			1	1				5	3
38			2	1		2		2	3
39		2		1	2	17	1	4	8
40		1			6	19	2	9	15
41	3	1			10	27		8	17
42	1	1		1	7	35		10	28
43				1	8	36		10	44
44				1	8	48	1	15	26
45			1	1	9	43	1	7	24
46					1	32		11	12
47					5	13		3	9
48						11		3	7

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	36	37	38	39	40	41	42	43	44
49					2	10		2	5
50						1		1	
51					1	2			
52									
53								1	1
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67						1			
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	4	6	4	7	59	297	5	95	204

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	45	46	47	48	49	50	51	52	53
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									1
37								1	1
38					1				3
39				1		2	2	3	7
40	3		1	5	6		3	2	7
41	5		3	5	7	3	5	6	15
42	11	6	7	12	8	8	7	5	35
43	7	5	9	14	15	4	22	8	46
44	2	9	20	14	13	7	13	7	29
45	4	6	35	14	7	9	28	8	39
46	2	9	35	25	6	7	11	10	31
47	1	8	22	20	11	7	12	5	22
48		17	23	4	7	3	13	1	14

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	45	46	47	48	49	50	51	52	53
49	1	7	17	6	2	2	4	2	6
50	1	1	8	4	2	2	1	1	3
51		4	4	1	2	1	2	1	1
52	1	2			1		2		2
53			2		1				
54			1						
55									1
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
-									
83		1							
Total	38	75	187	125	89	55	125	60	263

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	54	55	57	58	59	60	61	62	63
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37				1		1	1		1
38		3						1	
39	3			1		2	2	7	4
40	4	8	1	3		1	3	7	4
41	10	11		2		6	11	14	3
42	12	21	2	1	2	4	19	23	4
43	20	34		3	2	7	16	22	17
44	26	46	1	6	1	9	21	24	12
45	24	44	3			12	32	19	12
46	30	50		3		9	22	20	13
47	18	43	1	1	2	5	17	16	12
48	14	20		2		10	6	11	3

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	54	55	57	58	59	60	61	62	63
49	12	6	1	1		2	10	5	3
50	4	15		1		3	5	6	2
51	2			1		4	2	2	2
52	2	1					3		
53	1	2					1		
54		1				1	1		
55							1	1	
56		1				1			
57									
58						1			
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	182	306	9	26	7	78	173	178	92

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	64	65	66	67	68	69	70	71	72
19							1		
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37		1	1		1				
38	1						1		
39	1	4		3		1	1	1	2
40	5	10	5		3	1	2	1	1
41	4	5	12	2		1	9		6
42	8	23	20	4	1	1	12	4	3
43	16	29	15	7	6	3	13	9	13
44	17	34	28	7	1	2	27	7	13
45	24	38	28	4	3	1	21	12	24
46	15	37	27	3	3	3	23	11	16
47	17	35	13	8	3	2	32	15	16
48	11	23	9	3		3	17	13	14

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	64	65	66	67	68	69	70	71	72
49	7	18	7	3	1	2	18	4	8
50	2	12	6	2			14	7	6
51	6	7	4				7	2	3
52							2	4	3
53	2	1					1	4	
54	1		1					2	1
55		1							
56		1					1		
57									
58									
59		1							
60									
61									
62									
63									
64								1	
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75							1		
-									
83									
Total	137	280	176	46	22	20	203	97	129

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	73	74	75	76	77	78	79	80	81
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									1
38									
39							1		
40		4					1		
41						1	6	1	1
42		6	2		3	1	6	4	1
43	1	13	6		1	5	3		1
44	1	17	5		1	6	14	3	3
45		21	10			11	12	2	4
46	2	13	12	1	2	4	16	5	1
47		17	8		2	9	14	4	4
48		9	7		3	6	8	3	5

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	73	74	75	76	77	78	79	80	81
49		4	7			2	7		
50		3	5			8	3	2	2
51		1	2			3	7	1	
52		2	1				3	1	
53						2	5		1
54		1				1	2	1	
55							2		
56		1	1						
57									
58									
60									
61									
62									
63							1		
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	4	112	66	1	12	59	111	27	24

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	82	83	84	85	86	87	88	89	90
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37		1	1					1	
38	2	2			1	1	1	2	
39		2	2	2	1	3	1	2	
40		3	6	5	4	4	6		1
41	1	6	20	4	5	3	11	7	1
42	5	10	32	11	12	4	24	11	1
43	11	14	40	26	12	7	21	26	7
44	12	13	45	19	16	15	33	13	7
45	21	22	57	33	10	8	30	23	5
46	13	17	56	35	3	7	29	28	4
47	9	12	39	24	5	5	20	21	1
48	7	12	27	16	3	6	14	22	2

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	82	83	84	85	86	87	88	89	90
49	6	7	14	8	2	1	12	8	1
50	4	3	12	4		3	6	5	4
51	1	2	4	6		1	2	1	
52	6	2	3	1		4	1	1	
53	3		1					1	1
54	2					1		1	
55	1			2					
56									
57					2				
58	1								
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	105	128	359	196	76	73	211	173	35

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	91	92	93	94	95	96	97	98	99
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									2
38						1			1
39			1	1	1				6
40	1	1	1	4	5	5		4	7
41		1	2	7	4	4	3	4	24
42	3	3	4	6	4	4	5	6	35
43	2	6	4	7	9	4	7	10	52
44	1	10	4	4	8	9	4	3	47
45	2	10	4	10	4	10	5	6	61
46	1	4	13	9	7	4	3	7	63
47	1	8	8	3	2	2	1	2	44
48		1	5	1		2	3	2	23

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	91	92	93	94	95	96	97	98	99
49	1	4	3		3	1	3		18
50		3	2	1					17
51			6				3	1	8
52		1	1	1	1		1		2
53			1		2		3		3
54									2
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	12	52	59	54	50	46	41	45	415

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	100	101	102	103	104	105	106	107	108
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33	1								
34									
35									
36									
37							1		
38			4			1			
39	1	3	2		1			4	1
40	1	3	19	4	2	1	7	7	3
41	4	4	15	1	2	1	12	6	4
42	5	12	61	7	3	2	13	15	7
43	11	10	56	4	9	3	16	13	10
44	13	7	43	6	6	6	13	14	2
45	8	7	46	3	6	5	9	12	
46	10	8	23	3	6	4	14	4	4
47	3	8	21	3	7	6	11	2	1
48	4	3	15	1	3	1	6	2	1

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	100	101	102	103	104	105	106	107	108
49	4	2	3		3		1	2	
50		3	3		3		2		
51	3	1	4	1		1	1		1
52			1						
53		1							
54									
55	1		1						
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	69	72	317	33	51	31	106	81	34

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	109	110	111	112	113	114	115	116	117
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37					1			1	
38								1	
39	1	1	4			1		3	
40	2	2	3	1		1		3	
41	3	6	9		1	1	1	10	1
42	9	13	19		1	2	3	7	1
43	10	6	15	4	3	4	2	9	2
44	8	13	10	1	7	2	2	3	4
45	12	14	7	3	5	2		6	1
46	6	8	6	3	6	4		1	2
47	1	6	8	2	2	2			2
48	3	3	6		3	2			1

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	109	110	111	112	113	114	115	116	117
49	2		1			2			1
50			1	1	1				
51	1		1		1				
52			1		1				
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68						1			
69									
70									
71						1			
72									
73						2			
74						1			
75				1					
-									
83									
Total	58	72	91	16	32	28	8	44	15

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	118	119	120	121	122	123	124	125	126
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37								1	
38								1	
39			1			1	4	3	3
40	10	3	7	9	1	1	5	10	12
41	11	5	6	12	3	1	10	14	9
42	27	3	6	8	3	4	10	32	12
43	24	5	16	24		1	12	36	19
44	15	1	15	25	1	2	22	22	11
45	22	2	13	15	2	2	15	22	7
46	15	4	15	23		2	22	8	7
47	9	1	6	14	1		4	6	6
48	7	1	9	8	1		5	1	3

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.								
	118	119	120	121	122	123	124	125	126
49	6		3	5			3	3	1
50	1		1	2			6		
51		1	2	2					
52				2					
53		1	1	2					
54	1								
55			1						
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
-									
83									
Total	148	27	102	151	12	14	118	159	90

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.						Total
	127	128	129	130	131	132	
19							1
20							
21							
22							1
23							
24							
25							
26							1
27							2
28							7
29							3
30							5
31							
32							
33							4
34							1
35							10
36							19
37						1	77
38					1		126
39	2	2		2	4	3	281
40	5	5	1		4	3	557
41	8	6	6	1	9	3	871
42	6	11	2	3	7	6	1,423
43	18	13	6	1	4	2	1,801
44	22	15	2	2	4	7	1,761
45	9	9	1		6	2	1,729
46	4	2	1	1	1	2	1,418
47	1	1		1	1		1,024
48	3	4		1	2	1	700

Appendix 3. Table 7 (cont'd)

Fork length (cm)	Set no.						Total
	127	128	129	130	131	132	
49	2		1				404
50	1					1	281
51							146
52	1						73
53							54
54							28
55							15
56							8
57							3
58							2
59							1
60							
61							
62							
63							1
64							1
65							
66							
67							2
68							1
69							
70							1
71							1
72							
73							2
74							1
75							2
-							
83							1
Total	82	68	20	12	43	31	12,850

Appendix 3. Table 8. Length frequency of sablefish tagged in Hecate Strait and Queen Charlotte Sound, November 1979.

Fork length (cm)	Set no.				
	2	3	4	5	6
25					
26				1	
27			1	3	
28	1			3	2
29			1	3	
30			2	3	
31	1	1	1	2	1
32				2	
33			2		
34	1				1
35			1		1
36			4	2	2
37	1		1		9
38	3		8	1	5
39			8	1	11
40	1	1	19		17
41	1	1	19		23
42	3	2	30		52
43	5	3	33	1	48
44	1	2	33		47
45	1		29		47
46			21		36
47			11		19
48		1	4		11
49			1		6

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.				
	2	3	4	5	6
50			3		6
51					4
52					
53					
54					
55					
56					
57					
58					
59					
60					
61					
62					
63					
64					
65					
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					
76					
Total	19	11	232	22	348

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.					
	7	8	9	10	11	12
25						
26						1
27				1	2	
28	1			1		
29	1	1		2	1	
30	3			2	1	
31	1	1		2		
32	1			3		
33	1			2		
34						1
35	1					
36	1				1	2
37	4	1	6		2	1
38	7	1	7	2	3	1
39	6	4	14		2	
40	15	12	29		7	3
41	13	17	40		15	4
42	20	43	76	1	19	4
43	19	58	93		28	8
44	22	68	100	1	36	5
45	16	71	84		37	6
46	16	73	64		21	4
47	7	49	42		17	1
48	8	35	24		8	2
49	1	31	8		3	2

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.					
	7	8	9	10	11	12
50	3	18	9		1	1
51		5	5			
52		2				
53		2	1			
54		1				
55		1				
56						
57		1				
58						
59						
60						
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						
76			1			
Total	167	495	603	17	204	46

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.							
	13	14,15	16	17	18	19	20	21
25								
26		1					1	
27								
28		2					1	
29		2					1	
30		2		1				
31		2						
32	1							1
33								
34	1						2	
35		2				1	1	1
36	4	4					1	1
37	2	3		2	2		1	
38	2	4		2	2	1	1	5
39	3	4	1	4	1	1	2	7
40	12	3	4	21	6	7	8	15
41	12	5	3	24	13	7	18	22
42	28	10	13	52	11	10	13	42
43	25	10	12	94	13	7	15	53
44	44	9	7	105	12	4	13	60
45	41	3	12	120	15	8	17	58
46	30	6	10	94	12	6	5	54
47	16	6	7	75	1	2	10	49
48	20	1	5	51	5	1	5	23
49	8	1	3	16	3			11

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.							
	13	14,15	16	17	18	19	20	21
50	4		3	12			3	5
51	2	1		2				2
52		1		1	1			1
53				2				
54								
55								
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								
76								
Total	255	82	80	678	97	55	118	410

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.									
	22	23	23,24	25	26	27	28	29	30	31
25						1				
26						1				
27					1					
28						2				
29					4		1	1		
30					6				2	
31	1				3					
32	1				2	1				
33	1				1					
34					1		1		1	1
35	2				2				1	
36	5	1	1	1	1	1			5	
37	4	3	2	1	4			2	8	1
38	6	3		2	2			2	4	
39	6	7		7	4		1	4	7	1
40	17	18	1	23	12	1		8	6	
41	23	40	4	28	6	2	5	10	8	1
42	32	54	2	29		3	3	19	7	2
43	39	73	2	43	8		2	21	16	3
44	27	93	1	45	7	1	2	28	11	7
45	19	94	3	46	1	1	2	18	7	6
46	23	73	1	40	3			15	6	1
47	20	65	2	21	1			5	4	1
48	9	29		14				4	1	1
49	1	12		1				4	2	1

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.									
	22	23	23,24	25	26	27	28	29	30	31
50	2	8		2				4	1	1
51	1	3		1						
52		1						1		
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										
70										
71										
72										
73										
74										
75										
76										
Total	239	577	19	304	69	14	17	146	97	27

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.									
	32	34	35	36	37	38	39	40	41	42
25										
26										
27										
28								1		
29								2		
30								4		
31				1				3		
32								2		
33								1		
34						1				
35							1			
36										
37				2			1	6		
38	3			6	2	3	2	7		2
39	2			5	4	2	5	10	1	2
40	5		4	22	7	14	16	18	18	18
41	3	1	7	31	26	27	33	27	33	31
42	6		21	57	54	56	59	36	60	62
43	4	4	23	94	84	88	106	38	86	104
44	5	6	19	90	109	110	140	39	113	119
45	8	2	24	81	119	131	122	40	89	129
46	2	4	18	78	105	112	127	39	83	81
47	2	2	11	58	88	80	90	16	80	54
48		2	14	37	39	55	60	11	58	40
49	1		2	23	40	29	36	4	22	14

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.									
	32	34	35	36	37	38	39	40	41	42
50		1	6	18	10	14	25	4	15	9
51	1		2	9	15	6	14	2	10	5
52			2	3	6	4	8		2	2
53			2	1	4	5	3		2	2
54			1			1	3	1		
55			2	2			4			
56							1		1	
57			1		1				1	1
58		1		1					1	
59									1	
60										
61										
62										
63			1							
64										
65			2							
66										
67										
68										
69										
70										
71										
72			1							
73										
74										
75										
76										
Total	42	23	16	619	713	738	856	311	676	675

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.								
	43	45	46	47	48,49	50	51	52	53
25								6	2
26									4
27						1		1	15
28							1	12	24
29					1	2	3	5	25
30						2	2	4	33
31	1				1		2	6	22
32						2	1	1	8
33					1				1
34					1	1	1		2
35	1						2		
36						1			
37	2								1
38	4								4
39	8		3		1	1		1	11
40	21	1	7	3	1				3
41	44		4	5	5	1			2
42	56	10	14	6	13				3
43	72	18	23	27	23	1			4
44	92	29	34	26	20	1			3
45	75	30	33	30	33			1	2
46	70	30	21	38	23				1
47	48	27	24	24	25				1
48	42	24	16	18	17	1			2
49	22	7	9	11	8				

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.								
	43	45	46	47	48,49	50	51	52	53
50	11	4	4	7	5				
51	5	7		6	7				
52	1	3	2	6	1				
53		3	2	2		1			1
54	2				1				
55		2			2				
56			1	1	2				
57				2					
58									
59	1				1				
60									
61									
62									
63									
64									
65									
66									
67									
68				1					
69									
70									
71									
72									
73									
74									
75									
76									
Total	578	195	197	213	192	15	12	37	174

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.						Total
	54	55	56	57	58	59,60	
25							9
26							9
27							25
28	2						53
29	1	3					60
30	5	1				2	75
31	2	1	1			1	57
32	1					1	28
33	1						11
34	1		1				18
35							17
36	1						39
37	3			1			76
38	1			1			109
39	3	4		3		2	174
40	9	2		14		4	453
41	6	4	2	10	4	2	672
42	7	7	4	14	4	3	1,132
43	4	21	5	37	16	6	1,620
44	4	9	9	34	15	9	1,826
45	4	9	6	36	12	5	1,783
46	1	7	9	31	26	5	1,525
47	1	8	7	18	20	5	1,120
48		5	2	7	10		722
49		1	2	7	8		361

Appendix 3. Table 8 (cont'd)

Fork length (cm)	Set no.						Total
	54	55	56	57	58	59,60	
50	1	2	1	5	2	1	231
51		1	2	5	1		124
52			2	1	3		54
53			1	2	1		37
54				1			11
55			1				14
56							6
57							7
58							3
59							3
60							
61							
62							
63							1
64							
65							2
66							
67							
68							1
69							
70							
71							
72							1
73							
74							
75							
76							1
Total	58	85	55	227	122	46	12,470

Appendix 3. Table 9. Length frequency of sablefish sampled during the tagging cruise in Hecate Strait and Queen Charlotte Sound, November 1979.

[illegible]

Appendix 3. Table 9 (cont'd)

Fork length (cm)	Set no.											
	29			31			32			33		
	M	F	T	M	F	T	M	F	T	M	F	T
56												
57												
58												
59												
60												
61												
62												
63												
64												
65												
66												
67												
68												
-												
78												
Total	15	10	25	13	10	23	15	21	36	9	6	15

Appendix 3. Table 9 (cont'd)

[illegible]

Appendix 3. Table 9 (cont'd)

Fork length (cm)	Set no.											
	35			37			38			39		
	M	F	T	M	F	T	M	F	T	M	F	T
56												
57												
58												
59												
60												
61												
62	-	2	2									
63												
64												
65	-	1	1									
66												
67	-	2	2									
68	-	2	2									
-												
78	-	1	1									
Total	58	46	104	25	12	37	26	13	39	21	24	45

Appendix 3. Table 9 (cont'd)

Fork length (cm)	Set no.											
	41			43			44			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
26										-	1	1
27							1	-	1	2	-	2
28							-	1	1	-	1	1
29							1	2	3	1	2	3
30							2	2	4	3	2	5
31							3	-	3	3	1	4
32							-	3	3	-	5	5
33							-	2	2	-	2	2
34												
35										1	-	1
36										1	2	3
37							1	-	1	3	2	5
38										4	3	7
39							1	2	3	6	6	12
40	1	1	2	-	1	1	5	2	7	19	12	31
41	5	2	7	1		1	3	3	6	22	13	35
42	9	3	12	6	1	7	7	3	10	45	15	60
43	1	2	3	4	1	5	9	4	13	47	20	67
44	1	4	5	3	3	6	4	3	7	44	28	72
45	7	4	11	4	4	8	4	7	11	32	34	66
46	1	3	4	2	3	5	5	4	9	27	26	53
47	1	1	2	4	3	7	5	6	11	19	24	43
48	-	1	1	1	2	3	3	9	12	6	17	23
49							3	9	12	4	12	16
50	-	1	1				1	4	5	1	8	9
51	2	-	2	-	1	1	1	9	10	3	11	14
52				-	1	1	1	-	1	1	2	3
53							1	4	5	2	5	7
54							-	2	2	-	3	3
55							-	3	3	-	3	3

Appendix 3. Table 9 (cont'd)

Fork length (cm)	Set no.											
	41			43			44			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
56												
57												
58												
59							-	1	1	-	1	1
60												
61												
62												
63										-	2	2
64												
65												
66										-	1	1
67												
68										-	2	2
-										-	2	2
78												
										-	1	1
Total	28	22	50	25	20	45	61	85	146	296	269	565

APPENDIX 4

Appendix 4. Table 1. Length frequency of C. armatus caught off the west coast of the Queen Charlotte Islands, August 1979.

[illegible]

Appendix 4. Table 1 (cont't)

Total length (cm)	Set no.											
	5			6			7			8		
	M	F	T	M	F	T	M	F	T	M	F	T
65	-	1	1	-	2	2						
66												
67												
68				-	1	1						
69												
70												
71												
72												
73												
74												
75										-	1	1
76												
77												
78				-	1	1						
79										-	-	1
80												
Total	-	6	6	-	16	16	4	1	7 ^a	5	2	8 ^a

Appendix 4. Table 1 (cont'd)

[illegible]

Appendix 4. Table 1 (cont't)

Total length (cm)	Set no.											
	9			10			11			12		
	M	F	T	M	F	T	M	F	T	M	F	T
65							-	1	1			
66	-	1	1				-	1	1			
67	-	1	1									
68												
69												
70												
71												
72										-	1	1
73												
74												
75												
76												
77												
78												
79												
80												
Total	5	5	10	1	4	5	-	4	4	-	4	4

Appendix 4. Table 1 (cont'd)

Total length (cm)	Set no.								
	17			18			Total		
	M	F	T	M	F	T	M	F	T
35				-	-	1	-	-	1
36									
37									
38									
39							-	1	1
40									
41							1	-	1
42							-	1	1
43							1	-	1
44									
45							1	2	4
46	1	-	1				3	-	3
47									
48							1	-	1
49							-	1	2
50							3	-	3
51							4	4	8
52							-	2	2
53							-	2	2
54							-	2	2
55							1	1	2
56	-	2	2				-	4	4
57	-	1	1				1	1	2
58							-	3	3
59							-	1	1
60	-	1	1				-	3	3
61									
62							-	3	3
63							-	3	3
64				-	1	1	-	2	2

Appendix 4. Table 1 (cont'd)

Total length (cm)	Set no.								
	17			18			Total		
	M	F	T	M	F	T	M	F	T
65							-	4	4
66							-	2	2
67							-	1	1
68							-	1	1
69									
70									
71									
72							-	1	1
73									
74									
75							-	1	1
76									
77									
78							-	1	1
79							-	-	1
80									
Total	1	4	5	-	1	2 ^a	16	47	67 ^a

^aIncludes unsexed fish.

Appendix 4. Table 2. Length frequency of C. acrolepis caught off the west coast of the Queen Charlotte Islands, August 1979.

Total length (cm)	Set no.											
	3			4			14			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
43				1	-	1				1	-	1
44				1	-	1				1	-	1
45												
46												
47												
48												
49												
50												
51												
52												
53												
54				-	1	1				-	1	1
55												
56												
57												
58												
59												
60												
61				-	1	1				-	1	1
62												
63	1	-	1							1	-	1
64				-	1 ^a	1				-	1	1
65												
66												
67												
68												
69	-	-	1	-	1 ^a	1				-	1	2
70	-	1	1	-	3	3				-	4	4

Appendix 4. Table 2 (cont'd).

Total length (cm)	Set no.											
	3			4			14			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
71	-	1	1							-	1	1
72							1	-	1	1	-	1
73				-	1	1				-	1	1
74							1	-	1	1	-	1
75				-	2 ^a	2	-	1	1	-	3	3
76	1	-	1				1	-	1	2	-	2
77	-	1	1	-	1	1				-	2	2
78	1	-	1							1	-	1
79	1	-	1	-	1	1				1	1	2
80							-	2	2	-	2	2
81							-	1	1	-	1	1
82							-	1	1	-	1	1
83				-	1	1				-	1	1
Total	4	3	8	2	13	15	3	5	8	9	21	31

^aPart of tail missing.

