Bottom Trawl Survey for Rockfish off the Southwest Coast of Vancouver Island, September 9 to 27, 1996

N. Olsen, G. D. Workman, and L. J. Richards

Fisheries and Oceans Canada
Science Branch, Pacific Region
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

1997

Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2409

Fisheries and Oceans / Pêches et Océans

Canada

Canadian Manuscript Report of

Fisheries and Aquatic Sciences 2409

1997

BOTTOM TRAWL SURVEY FOR ROCKFISH OFF THE SOUTHWEST COAST OF VANCOUVER ISLAND, SEPTEMBER 9 TO 27, 1996

by

N. Olsen, G. D. Workman, and L. J. Richards

Fisheries and Oceans Canada

Science Branch, Pacific Region

Pacific Biological Station

Nanaimo, British Columbia

V9R 5K6

Cat. No. Fs 97- 4/2409E ISSN 0706-6473

Correct citation for this publication:

Olsen, N., G. D. Workman and L. J. Richards. 1997. Bottom trawl survey for rockfish off the southwest coast of Vancouver Island, September 9 to 27, 1996. Can. Manuscr. Rep. Fish. Aquat. Sci. 2409: 83 p.

ABSTRACT

Olsen, N., G. D. Workman, and L. J. Richards. 1997. Bottom trawl survey for rockfish off the southwest coast of Vancouver Island, September 9 to 27, 1996. Can. Manuscr. Rep. Fish. Aquat. Sci. 2409: 83 p.

A bottom trawl survey for rockfish was conducted by the fishing vessel CALEDONIAN off the southwest coast of Vancouver Island from September 9 to 27, 1996. Objectives of the survey were to estimate the relative biomass of the Pacific ocean perch stock in the major statistical Area 3C and a portion of Area 3D, and to collect biological samples for several rockfish species. Biomass estimates from this survey were compared to previous surveys conducted between 1965 and 1972 by the R/V G. B. REED, in 1979 by the F/V ARCTIC HARVESTER, and in 1986 by the F/V HOWE BAY. Biological information was collected for Pacific ocean perch, *(Sebastes alutus)*, yellowmouth rockfish *(S. reedi)*, redstripe rockfish *(S. proriger)*, splitnose rockfish *(S. diploproa)*, redbanded rockfish *(S. babcocki)*, sharpchin rockfish *(S. zacentrus)*, rougheye rockfish *(S. aleutianus)*, greenstriped rockfish *(S. elongatus)*, shortspine thornyhead *(Sebastolobus alascanus)*, and sablefish *(Anoplopoma fimbria)* caught during the survey. Pacific ocean perch relative biomass was estimated to be between 2,095-2,358 tonnes and 1,630-2,885 tonnes using classical and bootstrap methods, respectively, while shortspine thornyhead relative biomass was estimated to be between 105-117 tonnes and 85-137 tonnes, respectively. Pacific ocean perch was by far the most abundant rockfish species by weight, followed by sharpchin rockfish, and splitnose rockfish.

RÉSUMÉ

Olsen, N., G. D. Workman, and L. J. Richards. 1997. Bottom trawl survey for rockfish off the southwest coast of Vancouver Island, September 9 to 27, 1996. Can. Manuscr. Rep. Fish. Aquat. Sci. 2409: 83 p.

Un relevé au chalut de fond visant les sébastes a été mené du 9 au 27 septembre 1996 par le bateau de pêche CALEDONIAN près de la côte sud-ouest de l'île de Vancouver. Le relevé avait pour objectifs d'estimer la biomasse relative du stock de sébaste à longue mâchoire dans la grande zone statistique 3C et dans une partie de la zone 3D, et de recueillir de échantillons biologiques de plusieurs espèces de sébastes. Les estimations de la biomasse obtenues ont été comparées à celles fournies par des relevés antérieurs, menés entre 1965 et 1972 par le G. B REED (bateau de recherche), en 1979 par l'ARCTIC HARVESTER (bateau de pêche), et en 1986 par le HOWE BAY (bateau de pêche). Des données biologiques ont été recueillies sur le sébaste à longue mâchoire (*Sebastes alutus*), le sébaste à bouche jaune (*S. reedi*), le sébaste à raie rouge (*S. proriger*), le bec-de lièvre (*S. diploproa*), le sébaste à bandes rouges (*S. babcocki*), le sébaste à menton pointu (*S. zacentrus*), le sébaste à oeil épineux (*S. aleutianus*), le sébaste à bandes vertes (*S. elongatus*), le sébastolobe à courtes épines (*Sebastolobus alascanus*) et la morue charbonnière (*Anoplopoma fimbria*), espèces capturées pendant le relevé. On a estimé la biomasse relative de sébaste à longue mâchoire respectivement à 2,095-2,358 tonnes et 1,630-2,885 tonnes avec la méthode classique et la méthode bootstrap, tandis que la biomasse relative de sébastolobe à courtes épines était estimée à 105-117 tonnes et 85-135 tonnes respectivement. Le sébaste à longue mâchoire était de loin le sébaste le plus abondant, suivi par le sébaste à menton pointu et par le bec-de-lièvre.

INTRODUCTION

Pacific ocean perch *(Sebastes alutus)* is an important rockfish species in the B.C. trawl fishery. A foreign fishery was active coast-wide between 1956 and 1984 with the largest catches landed between 1965 and 1970 (Fig. 1). The Canadian trawl fishery began to target Pacific ocean perch about 1980 with an average annual catch of 5,656 tonnes between 1980 and 1995. Off the west coast of Vancouver Island, Canadian trawl catch of Pacific ocean perch averaged 950 tonnes annually between 1980 and 1995 (Fig. 2).

The Department of Fisheries and Oceans launched a program in 1963 to investigate the distribution, abundance, and biology of Pacific ocean perch in the northeast Pacific ocean. Between 1963 and 1966, eight surveys were conducted by the R/V G. B. REED, covering an area from Cape Blanco, Oregon to Unalaska Island, Alaska (Westrheim 1967). Since 1965, at least 12 research trawl surveys have been completed on the Southwest coast of Vancouver Island, mainly in the area off La Perouse Bank (Westrheim 1967; Harling et al. 1967, 1968, 1970a, 1970b; Westrheim et al. 1969a, 1969b, 1972; Lapi and Richards 1981, Leaman et al. 1988). The R/V G. B. REED was used to perform most of these surveys but was replaced in 1984 by the R/V W. E. RICKER. Since that time, surveys have been performed by either the R/V W. E. RICKER or by chartered commercial vessels.

Between 1980 and 1984 inclusive, an over-fishing experiment was conducted off the southwest coast of Vancouver Island. The Pacific ocean perch quota was raised from 300 to 500 tonnes for the duration of this 5 year period. Upon completion of the experiment, Pacific ocean perch relative biomass was estimated at approximately 1,900 tonnes, a reduction of 51% from the estimate of 1979 (Leaman and Stanley 1993). In addition, the survey CPUE for all rockfishes fell by 68% between 1979 and 1985 (Leaman and Stanley 1993). In 1985, the Pacific ocean perch quota for Vancouver Island was returned to 300 tonnes and then subsequently dropped to 100 tonnes in an attempt to rehabilitate the stock. In recent years, only incidental catches of Pacific ocean perch have been permitted in this area.

In 1996 the F/V CALEDONIAN was chartered to perform a 3-week trawl survey off the Southwest coast of Vancouver Island. This document reports the results of this survey and summarizes the catch and biological data collected. In addition, relative biomass estimates are presented.

METHODS

VESSEL AND GEAR

The F/V CALEDONIAN was chartered to conduct a bottom trawl survey off the southwest coast of Vancouver Island between September 9 - 27, 1996. The F/V CALEDONIAN is a 35 m stern trawler. The trawl net used on the survey was an Atlantic Western II box trawl net (Fig. 3).

SURVEY DESIGN

The survey design follows that described in Yamanaka et al. (1996). An area swept method was used to determine the relative biomass of Pacific ocean perch. Survey sites were selected using a depth-stratified random design. Based on previous surveys and commercial catch records, the survey area was confined to depths between 150 m and 450 m extending from approximately N 48° 20' to N 49° 30' (Fig. 4 - 9). Certain canyons within this area were excluded from sampling due to extremely steep and unfishable topography (Fig. 10). The survey area was divided into a grid of 2 km^2 sampling units. The mean depth of each sampling unit was calculated and used to assign each to one of three depth strata: 150 - 200 m, 200 - 300 m, and 300 - 450 m. Sampling units were randomly selected from each stratum with 28 in 150 - 200 m stratum, 57 in the 200 - 300 m stratum, and 15 in the 300 - 450 m stratum, for a total of 100 survey sites. The number of sampling units selected per stratum was determined using Neymann allocation (Scheaffer et al. 1979) and was approximately proportional to the average stratum catch rate variance from previous surveys. The 200 - 300 m stratum had the highest variance calculated from previous surveys, so a greater proportion of the survey sites were selected from that stratum (Table 1).

The bathymetry of each targeted sampling unit was examined prior to fishing and a suitable location was chosen to set the trawl net. Tows were usually run along depth contours in order to maintain a relatively stable depth for the duration of the tow. When sampling units were deemed to be unfishable due to the bottom topography, an alternate sampling unit was randomly chosen from the remaining units in the same stratum. An attempt was made to keep as much of the tow inside the sampling unit as possible. However, since the duration of each tow was 30 min and the vessel traveled at an average of 3 knots, tows normally covered a distance of approximately 2.8 km and thus passed outside of the sampling unit boundaries. Tow time was measured from the time the hydraulics were locked after the net was deployed to the time the hydraulics were unlocked to retrieve the net. No method was available for detecting when the gear actually struck bottom after the hydraulics were locked. Throughout each tow a GPS plotter was used to update the position of the ship every 30 sec, a method unavailable in previous surveys where the distance covered by each tow was estimated by multiplying the tow duration by the speed of the vessel. The plotted tow length and the dimension of the trawl net were later used to calculate the approximate area swept by the net during

tow. A total of 100 tows was performed (Fig. 4 - 9). When gear hang-ups were experienced during a tow (two such events took place), that tow and sampling unit were omitted from the survey and a new sampling unit was randomly selected from the same stratum.

Following the methodology in previous surveys (e.g. Leaman and Nagtegaal 1982; Yamanaka et al. 1996), the effective path width of the trawl net is considered as the distance between the trawl doors and not the distance between the trawl wing tips. Leaman and Nagtegaal (1982) discuss evidence supporting the theory that the trawl doors herd fish into the net. The distance between the trawl doors (doorspread) was calculated using the method of Carrothers (1980). This procedure requires the use of two wire-rope catenaries, one fitted to the ground-warp, upper wing leg and the forward one-eighth of the headline, and one fitted to the bight of the headline (Carrothers 1980). Since wire-rope catenaries were unavailable to us, we calculated the mean doorspread of 0.03017 nm from a range of doorspread values based on a wire-rope catenary parameter between 600 - 1400, in 100 unit increments (Yamanaka et al. 1996).

The survey design differed from the surveys done in 1979 and 1985. The sampling scheme for the 1979 ARCTIC HARVESTER survey did not follow any rigorous allocation framework (Leaman et al. 1988). Strata were based on broad depth and bottom topography and hauls within each strata were made at the skipper's discretion (Lapi and Richards 1981). The 1985 HOWE BAY survey replicated the hauls done by the ARCTIC HARVESTER in 1979. Surveys of the southwest coast prior to 1979 also did not follow a rigorous survey design and none of the surveys prior to 1985 presented original estimates of Pacific ocean perch biomass. Relative biomass estimates for the 1979 ARCTIC HARVESTER survey were calculated but not published until 1988 along with the relative biomass estimates for the 1985 HOWE BAY survey (Leaman et al. 1988). Because of these differences, no attempt is made to compare relative biomass estimates from the present survey with those done prior to 1979. Estimates are compared with the original estimates from the 1979 and 1985 surveys and with estimates derived from a reanalysis of the data from these surveys using the methodology employed for this report.

Estimates of biomass were calculated using two methods. The first method followed stratified sampling theory (Cochran 1977), where the mean biomass estimate per tow $\bar{y}_h$ is calculated by dividing the catch by the area covered by the trawl net on each tow and taking the mean over each stratum. The relative biomass estimate y_{st} for the entire survey area over all strata is then given by multiplying the mean biomass estimates per stratum by the proportion of the survey area in each stratum W_h, summed over all strata and multiplied by the total area of the survey N (1.1).

$$y_{st} = N \sum_{h=1}^{3} W_h \bar{y}_h \qquad (1.1)$$

The second method employed a bootstrap procedure. The bootstrap is data-based simulation method that involves re-sampling a data set many times in order to make statistical inferences about the data (Efron and Tibshirani 1993).

Biomass estimates for rockfish species should be used as relative indices only due to several constraining assumptions that are not met. These are:

1. All fish in the water column within the path of the net (between the trawl doors) are captured. This assumes that no fish escape either above or below the net.

2. The haul location within each sampling unit is representative of the entire sampling unit (i.e. there is no variation in catch density over the area of the sampling unit).

3. Fish density distributions remain constant over time.

CATCH PROCESSING

Visual estimates of the total catch weight of each tow were made jointly by the skipper of the CALEDONIAN and by an experienced observer after dumping the cod end contents into the checker. If the catch was estimated to be less than 1,000 kg the entire catch was processed, otherwise the catch was sub-sampled by filling nine 50 kg baskets with a random assortment of the catch. The nine-basket sub-sample was sorted to species and weighed, and the ratio of the each sub-sampled species weight to the total weight of the sub-sampled catch was used to estimate the total weight of each species for the entire catch. The catch not processed in the nine-basket sub-sample was processed by the crew of the CALEDONIAN for later sale.

BIOLOGICAL SAMPLING

Biological samples, including length, weight, sex, maturity, and otoliths were collected for several rockfish species, for shortspine thornyhead, and for sablefish (Table 2). Length and sex data were generally collected for each rockfish species with an abundance of at least 50 kg per haul, up to approximately 150 - 200 kg (three or four 50 kg baskets) of fish. Ageing and maturity information was collected for at least 10 fish per species per haul, randomly selected from the original sample.

RESULTS AND DISCUSSION

GENERAL

One hundred hauls were made by the F/V CALEDONIAN between September 9 and September 27, 1996. Fifty two species of fish were caught during the survey, of which 22 were rockfish species and 30 were other species, including shortspine thornyhead. Three invertebrates groups were also recorded. Bridge log and catch data by haul are presented in Appendix Table 1.

Pacific ocean perch account for the highest proportion (37%) of the total catch weight (Table 3) and the highest proportion (51%) of the rockfish catch weight (Table 4). The second and third-most abundant rockfish species by weight were splitnose rockfish (8% and 11% of the all-species and rockfish catch weights, respectively) and sharpchin rockfish (7% and 10% of the all-species and rockfish catch weights, respectively).

BIOLOGICAL DATA

Length/sex frequencies were collected for 7 species of rockfish and for shortspine thornyhead and sablefish (Table 2, Appendix Table 2). Length, weight, sex, maturity, and otolith samples were collected for these same species and for greenstriped rockfish (Table 2). Length distributions for selected species are shown in Fig. 11-15. The length distribution of Pacific ocean perch is polymodal with minor modes occurring at approximately 19 and 30 cm for both males and females and with major modes at 37 cm for males and 40 cm for females (Fig. 11). The distributions for males and females are similar to the distributions obtained in 1985 by the HOWE BAY with the exception of a more pronounced occurrence of smaller fish in 1996 (Fig. 16). These smaller fish were captured mainly from depths less than 200 m, a depth range that was much more heavily sampled in 1996 than 1985 (Fig. 17). Although larger fish were also taken from these depths, smaller fish were generally not encountered at depths greater than 200 m. Ages for Pacific ocean perch ranged from 1 to 72 years, although fish older than 40 years were rare (Fig. 18). Modes in the age composition at 5, 12, 15, and 19 years correspond to the 1991, 1984, 1981, and 1977 year-classes, respectively. Fish younger than 20 years dominate in all depth strata (Fig. 19).

The length frequency for shortspine thornyhead shows a single mode at 21 cm (Fig. 12). There was no difference in the length distribution between sexes for this species. Mean shortspine thornyhead lengths generally increased with increasing depth. However, smaller fish were encountered at all depths (Fig. 17). Redstripe rockfish length distributions also showed one mode for males occurring at 29 cm and one mode for females occurring at 33 cm (Fig. 13). A relationship between length and depth is not apparent for this species (Fig. 17). The length distribution of yellowmouth rockfish is bimodal with modes at 36 cm and 43 cm (Fig. 14). Insufficient data are available to

the relationship between length and depth for this species (Fig. 17). Splitnose rockfish had a modal length of 25 cm (Fig. 14). Sharpchin rockfish length distributions have modes of 25 cm for males and 32 cm for females (Fig. 15). There is no apparent relationship between length and depth for either of these species (Fig. 17).

The proportion of male rockfish sampled was less than 0.5 for Pacific ocean perch, redstripe rockfish, yellowmouth rockfish, sharpchin rockfish, and splitnose rockfish (Fig. 20). It was greater than 0.5 for shortspine thornyheads (Fig. 20). The proportion of sexes for Pacific ocean perch, shortspine thornyhead, sharpchin rockfish, redstripe rockfish, yellowmouth rockfish, and splitnose rockfish was not related to depth (logistic regression, $p > 0.05$; Fig. 21-23).

The length-weight relationships for Pacific ocean perch, shortspine thornyheads, redstripe rockfish, yellowmouth rockfish, sharpchin rockfish, and splitnose rockfish are shown in Figs. 24-25. The length-weight relationship differed among sexes for Pacific ocean perch and splitnose rockfish, but not for shortspine thornyhead, redstripe rockfish, yellowmouth rockfish, or sharpchin rockfish. The difference in the length-weight relationship among sexes for Pacific ocean perch is probably due to the fact that females grow larger than males (Fig. 11).

CATCH DENSITY AND RELATIVE BIOMASS ESTIMATES

Catch densities by depth are shown for rockfish and Pacific ocean perch in Table 5. Catch density and its variance was highest for Pacific ocean perch in the 200 - 300 m depth interval (Fig. 26). In most cases, previous surveys also recorded the highest Pacific ocean perch catch densities from this stratum (Table 6).

For Pacific ocean perch, the relative biomass estimate for the entire survey is 2,226 tonnes using survey sampling methods (Table 7) and 2,223 tonnes using naïve bootstrap methods (Table 8). The corresponding estimates for Area 3C only are 1,855 tonnes and 1,835 tonnes, respectively (Tables 7 and 8). The relative biomass estimates for Pacific ocean perch are similar to estimates obtained during the HOWE BAY survey in 1985 (Table 9). Relative biomass estimates of shortspine thornyhead for the entire survey area and for Area 3C are 111 tonnes and 100 tonnes, respectively (Tables 7 and 8). Original biomass estimates of shortspine thornyhead were not presented for the ARCTIC HARVESTER and HOWE BAY surveys of 1979 and 1985.

COMPARISON OF BIOMASS ESTIMATES WITH 1979 AND 1985 SURVEYS

To compare biomass estimates from this survey with the surveys done in 1985 and 1979, the data from the 1985 and 1979 surveys were reanalyzed by applying the same methodology and depth strata used in 1996. The relative biomass estimates of Pacific ocean perch drop from 11,469 tonnes in 1979 to 3,764 tonnes in 1985, and drop again between 1985 and 1996 to 2,227 tonnes (Table 10). Similarly, the original estimates from the 1979 and 1985 surveys drop from 4,217 tonnes to 1,862 tonnes (Table 9). This reanalysis overestimates the biomass from the 1979 and 1985 surveys since it includes areas not covered in the original survey designs. Thus, an analysis was done restricting the depth ranges of the 1979, 1985, and 1996 surveys to the depths covered by the surveys in 1979 and 1985 (approximately 175 - 400 m). This reduces the Pacific ocean perch relative biomass estimates for both the 1979 and 1985 surveys but increases slightly the estimate for the 1996 survey (Table 10). The increase in the 1996 estimate is due to the removal of observations of low catch density recorded in greater than 400 m of water (Fig. 26). In contrast, the 1979 and 1985 surveys did not conduct tows deeper than 400 m or shallower than 175 m, so restricting the depth range reduces the effect of the few, relatively large observations of catch density in these strata and yields a lower biomass estimate. For the shallow and deep strata, biomass estimates decline between 1985 and 1996. For the middle strata the biomass estimate increases 35% from 1,189 tonnes to 1,849 tonnes, resulting from a higher mean catch density and CPUE recorded in this stratum in 1996 (Table 6). The increase in catch density in the middle stratum between 1985 and 1996 is, however, not statistically significant ($p > 0.05$).

Original estimates of shortspine thornyhead biomass were not presented in the reports for the 1979 and 1985 surveys. A reanalysis as above yields a steady decline in relative biomass estimates for shortspine thornyhead from a high of 624 tonnes in 1979 to 192 tonnes in 1985 and 111 tonnes in 1996, while the restricted depth range analysis yields 360 tonnes, 94 tonnes, and 76 tonnes, respectively (Table 11). Differences in catch rates over this period were not significant ($p > 0.05$). Much of the large relative biomass estimate from 1979 arises from two extreme values in the 300 - 400 m depth range (Fig. 27).

For all rockfish combined and for Pacific ocean perch, catch densities in the 200 - 300 m depth range are significantly greater in 1979 than in 1985 and 1996 ($p < 0.05$). This is consistent with an analysis of the over-fishing experiment conducted between 1980 and 1984. Although it would appear that rockfish and Pacific ocean perch biomass has not increased significantly since 1985, differences in survey design between the 1985 survey and the present survey limit the usefulness of this comparison. A detailed age-structured analysis based on these data may provide more information of the status of the Pacific ocean perch stock and other rockfish stocks in this area.

ACKNOWLEDGEMENTS

Thanks to Captain Al Marsden and the crew of the CALEDONIAN, and observers from Archipelago Marine Research for their help during the survey. Thanks also to Rob Kronlund for assisting in the survey design and analysis of data, and to the staff of the ageing lab at the Pacific Biological Station for ageing the otoliths. Funding for the F/V CALEDONIAN was provided by the Canadian Groundfish Research and Conservation Society.

REFERENCES

Cochran, W. G. 1977. Sampling techniques, third edition. John Wiley & Sons, New York.

Corrothers, P. J. G. 1980. Estimation of trawl door spread from wingspread. J. Northw. Atl. Fish. Sci. Vol. 1: 81-89.

Efron, B., and R. J. Tibshirani. 1993. An introduction to the bootstrap. Chapman and Hall, New York.

Harling, W. R., D. Davenport, and S. J. Westrheim. 1967. G. B. Reed groundfish cruise No. 67-1, February 1 to April 24, 1967. Fish Res. Board Can. Tech. Rep. 22.

Harling, W. R., D. Davenport, L. E. McLeod, and S. J. Westrheim. 1968. G. B. Reed groundfish cruise No. 68-2, April 2 to June 11, 1968. Fish. Res. Board Can. Tech. Rep. 81.

Harling, W. R., D. Davenport, M. S. Smith, and R. M. Wowchuk. 1970. G. B. Reed groundfish cruise No. 70-3, September 9 to 25, 1970. Fish. Res. Board Can. Tech. Rep. 221.

Harling, W. R., D. Davenport, M. S. Smith, U. Kristiansen, and S. J. Westrheim. 1970. G. B. groundfish cruise No. 70-1, March 5 - June 18, 1970. Fish. Res. Board Can. Tech. Rep. 205.

Lapi, L. A., and J. E. Richards. 1981. Data collected during rockfish (*Sebastes sp.*) assessments of the west Langara Island and west coast Vancouver Island fishing grounds in 1979. Can. Data Rep. Fish. Aquat. Sci. 286: 113 p.

Leaman, B. M., and D. A. Nagtegaal. 1982. Biomass estimation of rockfish stocks off the west coast of the Queen Charlotte Islands during 1978 and 1979. Can. Manuscr. Rep. Fish. Aquat. Sci. 1652: 46 p.

Leaman, B. M., G. E. Gillespie, D. A. Nagtegaal, and R. D. Stanley. 1988. Biomass survey of rockfish stocks off the southwest coast of Vancouver Island, September 7-23, 1985 (M/V HOWE BAY). Can. Tech. Rep. Fish. Aquat. Sci. 1611: 99 p.

Leaman, B. M., and R. D. Stanley. 1993. Experimental management programs for two rockfish stocks off British Columbia, Canada, p. 403-418. *In* S. J. Smith, J. J. Hunt and D. Rivard [ed.] Risk evaluation and biological reference points for fisheries management. Can. Spec. Publ. Fish. Aquat. Sci. 120.

Scheaffer, R. L., W. Menenhall, and L. Ott. 1979. Elementary survey sampling, 2nd edition. Duxbury Press, Massachusetts.

Westrheim, S. J. 1967. G. B. Reed groundfish cruise reports, 1963-66. Fish. Res. Board Can. Tech. Rep. 30.

Westrheim, S. J., D. Davenport, W. R. Harling, M. S. Smith, and R. M. Wowchuk. 1969. G. B. Reed groundfish cruise No. 69-1, February 11-27, 1969. Fish. Res. Board Can. Tech. Rep. 113.

Westrheim, S. J., D. Davenport, M. S. Smith, and D. M. Bianchin. 1969. G. B. Reed groundfish cruise No. 69-2, June 18 - July 2, 1969. Fish. Res. Board Can. Tech. Rep. 132.

Westrheim, S. J., D. Davenport, W. R. Harling, and M. S. Smith. 1972. G. B. Reed groundfish cruise No. 72-3, September 9-28, 1972. Fish. Res. Board Can. Tech. Rep. 345.

Yamanaka, K. L., L. J. Richards, and G. D. Workman. 1996. Bottom trawl survey for rockfish in Queen Charlotte Sound, September 11 to 22, 1995. Can. Manuscr. Rep. Fish. Aquat. Sci. 2362: 116 p.

Table 1. Depth intervals, areas, and numbers of tows per strata. Each stratum unit is 2 km square or 1.166 square nautical miles (nm^2).

Strata	Depth Interval (m)	Area nm^2	Proportion of Total Area	Number of Tows
1	150-200	352	0.52	28
2	201-300	145	0.22	57
3	301-450	175	0.26	15

5 EMIS.

1	100-150	110-275	~~21~~
2	150-200	276-360	40
3	200-250	365-460	31
4	250-325	960-625	15

Table 2. Numbers of fish per species sampled for length and sex (L/S) and for length, weight, sex, maturity, and otoliths (L/W/S/M/O).

Species	L/S	L/W/S/M/O
Pacific ocean perch	5668	680
redstripe rockfish	777	245
yellowmouth rockfish	323	90
sharpchin rockfish	1248	170
splitnose rockfish	903	120
redbanded rockfish	15	30
rougheye rockfish	22	70
greenstriped rockfish	0	50
shortspine thornyhead	1631	484
sablefish	28	197

Table 3. Species composition by weight for all species.

Species Code	Species Name	Catch (Kg)	Percent
396	Pacific ocean perch	34,370	36.58
412	splitnose rockfish	7,587	8.08
450	sharpchin rockfish	6,913	7.36
440	yelowmouth rockfish	4,478	4.77
439	redstripe rockfish	3,810	4.06
405	silvergray rockfish	1,896	2.02
418	yellowtail rockfish	1,510	1.61
437	canary rockfish	1,466	1.56
451	shortspine thornyhead	1,020	1.09
414	greenstriped rockfish	930	0.99
401	redbanded rockfish	680	0.72
435	bocaccio rockfish	608	0.65
410	darkblotched rockfish	349	0.37
421	rosethorn rockfish	337	0.36
394	rougheye rockfish	335	0.36
403	shortraker rockfish	283	0.3
442	yelloweye rockfish	143	0.15
417	widow rockfish	105	0.11
444	stripetail rockfish	11	0.01
448	pygmy rockfish	10	0.01
400	aurora rockfish	5	0
420	chillipepper rockfish	1	0
455	Blackcod	4,754	5.06
225	Hake	583	0.62
467	Lingcod	383	0.41
222	Pacific Cod	263	0.28
228	Walleye Pollock	15	0.02
231	Eelpouts	6	0
249	Rattail	4	0
602	Turbot	10,165	10.82
626	Dover Sole	1,875	2
614	Halibut	1,435	1.53
610	Rex Sole	836	0.89
628	English Sole	201	0.21
607	Petrale Sole	137	0.15
625	Slender Sole	27	0.03
612	Flathead Sole	6	0
44	Spiny Dogfish	5,799	6.17
59	Longnose Skate	270	0.29
95	American Shad	154	0.16
936	Squid	86	0.09
66	Ratfish	62	0.07
43	Sleeper Shark	30	0.03
38	Brown Cat Shark	7	0
58	Sandpaper Skate	3	0
Total:		93,948	100

Table 4. Species composition by weight for rockfish species.

species code	species name	catch weight (kg)	Percent of total rockfish catch
396	Pacific ocean perch	34,370	51.42
412	splitnose rockfish	7,587	11.35
450	sharpchin rockfish	6,913	10.34
440	yelowmouth rockfish	4,478	6.70
439	redstripe rockfish	3,810	5.70
405	silvergray rockfish	1,896	2.84
418	yellowtail rockfish	1,510	2.26
437	canary rockfish	1,466	2.19
451	shortspine thornyhead	1,020	1.53
414	greenstriped rockfish	930	1.39
401	redbanded rockfish	680	1.02
435	bocaccio rockfish	608	0.91
410	darkblotched rockfish	349	0.52
421	rosethorn rockfish	337	0.50
394	rougheye rockfish	335	0.50
403	shortraker rockfish	283	0.42
442	yelloweye rockfish	143	0.21
417	widow rockfish	105	0.16
444	stripetail rockfish	11	0.02
448	pygmy rockfish	10	0.01
400	aurora rockfish	5	0.01
420	chillipepper rockfish	1	0.00
Total		66,847	100

Table 5. Summary of total catch, rockfish catch, and Pacific ocean perch catch (kg), and rockfish and Pacific ocean perch catch density (kg/nm^2) by stratum and haul.

strata	depth (m)	haul	date	start time (hr)	tow length (nm)	total catch (kg)	rockfish catch (kg)	percent rockfish	rockfish density (kg/nm^2)	POP catch (kg)
1	154	12	960912	1638	1.51	412	239	58	5,246	0
1	157	13	960912	1802	1.58	188	13	7	273	0
1	172	14	960913	0658	1.6	171	30	18	621	0
1	172	20	960913	1627	1.48	298	153	51	3,427	26
1	157	27	960914	1724	1.5	313	114	36	2,519	9
1	152	28	960915	0655	1.39	420	286	68	6,820	0
1	176	29	960915	0801	1.43	429	284	66	6,583	0
1	165	37	960916	1042	1.54	2,045	245	12	1,012	0
1	156	38	960916	1151	1.55	104	7	7	150	0
1	157	39	960916	1252	1.61	147	7	5	144	1
1	183	48	960920	1426	1.56	909	294	32	2,210	6
1	170	49	960920	1618	1.5	334	19	6	420	0
1	157	50	960920	1726	1.45	5,909	2,289	39	2,674	0
1	152	51	960921	0702	1.77	4,545	2,033	45	2,622	0
1	156	52	960921	0858	1.51	536	209	39	4,588	0
1	192	65	960922	1324	1.5	254	85	33	1,878	10
1	188	66	960922	1447	1.57	225	36	16	760	0
1	165	67	960922	1554	1.48	283	159	56	3,561	0
1	174	68	960922	1702	1.51	64	20	31	439	0
1	187	69	960923	0703	1.65	255	65	25	1,306	0
1	181	70	960923	0802	1.62	179	37	21	757	0
1	157	76	960923	1606	1.57	237	11	5	232	3
1	176	78	960924	0716	1.7	204	59	29	1,150	12
1	192	81	960924	1124	1.69	1,818	1,656	91	5,197	456
1	192	84	960924	1550	1.62	1,136	1,068	94	5,095	107
1	163	85	960924	1711	1.47	163	35	21	789	11
1	161	99	960926	1200	1.53	147	17	12	368	0
1	183	100	960926	1311	1.57	818	726	89	4,982	0
2	256	1	960911	0708	1.44	1,133	1,028	91	23,662	665
2	256	2	960911	0954	1.46	2,727	2,054	75	5,857	1,688
2	234	3	960911	1222	1.52	1,455	773	53	3,729	642
2	205	4	960911	1407	1.5	1,136	685	60	3,624	230
2	231	5	960911	1549	1.49	683	358	52	7,964	317
2	275	6	960911	1720	1.49	1,000	805	80	5,428	689
2	249	7	960912	0658	1.31	773	471	61	4,909	425
2	201	8	960912	0824	1.59	373	251	67	5,232	115
2	201	9	960912	1048	1.5	437	91	21	2,011	6
2	231	10	960912	1248	1.44	727	292	40	2,716	146
2	201	11	960912	1452	1.37	455	366	80	5,274	3
2	209	15	960913	0806	1.54	274	93	34	2,002	33
2	275	16	960913	0946	1.52	215	67	31	1,461	54
2	220	18	960913	1319	1.32	500	288	58	4,344	13
2	247	19	960913	1442	1.36	355	105	30	2,559	45
2	210	21	960913	1748	1.5	1,136	837	74	5,038	613
2	209	25	960914	1218	1.41	346	301	87	7,076	162
2	209	26	960914	0015	1.38	398	346	87	8,310	210
2	220	30	960915	0929	1.66	909	720	79	4,333	53
2	284	31	960915	1104	1.49	382	169	44	3,759	120
2	293	32	960915	1305	1.69	500	341	68	4,197	164
2	256	33	960915	1435	1.47	455	379	83	5,614	81
2	201	36	960916	0904	1.36	1,591	1,331	84	6,239	26
2	229	40	960916	1441	1.27	2,273	2,155	95	7,647	51
2	201	41	960916	1557	1.45	2,500	2,424	97	6,583	126

Table 5. continued.

strata	depth (m)	haul	date	start time (hr)	tow length (nm)	total catch (kg)	rockfish catch (kg)	percent rockfish	rockfish density (kg/nm²)	POP catch (kg)
2	210	42	960916	1719	1.49	1,091	848	78	5,294	453
2	238	43	960920	0710	1.55	3,636	3,447	95	6,223	3,269
2	220	44	960920	0824	1.36	909	765	84	6,580	547
2	229	45	960920	0938	1.64	3,182	2,992	94	5,720	2,104
2	210	46	960920	1101	1.54	4,545	4,381	96	6,306	3,364
2	238	47	960920	1230	1.52	1,591	1,204	76	5,321	1,061
2	256	53	960921	1005	1.62	1,136	1,004	88	5,299	462
2	229	54	960921	1120	1.6	1,705	1,449	85	5,510	610
2	265	55	960921	1243	1.55	818	637	78	4,876	438
2	229	56	960921	1359	1.52	1,818	1,636	90	5,888	964
2	267	58	960921	1647	1.48	534	432	81	9,675	371
2	238	60	960922	0656	1.56	682	415	61	3,739	363
2	251	61	960922	0714	1.54	818	660	81	4,950	603
2	238	62	960922	0927	1.48	682	514	75	4,994	493
2	238	63	960922	1037	1.61	1,136	955	84	5,188	898
2	210	64	960922	1157	1.52	230	116	50	2,530	66
2	247	72	960923	1023	1.31	262	221	84	5,592	93
2	293	73	960923	1203	1.51	332	99	30	2,173	11
2	256	74	960923	1326	1.58	2,500	2,404	96	5,769	1,670
2	201	75	960923	1440	1.32	2,727	2,370	87	6,880	121
2	229	77	960923	1711	1.61	2,045	1,752	86	5,167	1,033
2	238	79	960924	0808	1.76	1,591	1,491	94	5,047	590
2	220	82	960924	1253	1.49	1,364	1,230	90	6,051	172
2	220	86	960925	0726	1.46	1,136	804	71	4,609	701
2	256	87	960925	0842	1.45	372	239	64	5,463	182
2	275	88	960925	0954	1.53	359	265	74	5,741	243
2	262	91	960925	1410	1.55	909	880	97	5,752	831
2	229	92	960925	1517	1.54	1,591	1,450	91	5,747	1,260
2	201	93	960925	1626	1.35	222	111	50	2,725	74
2	216	94	960925	1727	1.48	1,909	1,623	85	6,271	1,403
2	275	96	960926	0817	1.5	727	669	92	5,568	626
2	225	97	960926	0922	1.58	1,591	1,456	91	5,412	1,162
3	355	17	960913	1123	1.4	402	70	17	1,657	63
3	340	22	960914	0705	1.37	167	32	19	774	15
3	421	23	960914	0843	1.5	177	31	18	685	6
3	417	24	960914	1052	1.34	133	40	30	989	8
3	395	34	960915	1612	1.48	212	61	29	1,366	19
3	417	35	960916	0709	1.51	99	37	37	812	5
3	503	57	960921	1521	1.48	270	76	28	1,702	48
3	355	59	960921	1810	1.42	455	263	58	3,851	207
3	458	71	960923	0913	1.69	269	74	28	1,451	0
3	494	80	960924	0941	1.6	548	88	16	1,823	24
3	448	83	960924	1431	1.54	428	24	6	517	0
3	375	89	960925	1111	1.42	397	218	55	5,089	133
3	311	90	960925	1251	1.38	395	300	76	7,206	270
3	393	95	960926	0705	1.45	279	59	21	1,349	16
3	476	98	960926	1038	1.4	277	32	12	758	0

Table 6. Depth intervals, number of hauls (N), Pacific ocean perch catch density (kg/nm^2), and CPUE (kg/hr) with coefficients of variation (CV) for trawl surveys off the Southwest coast of Vancouver Island between 1965 and 1996.

Year	Vessel	Depth (m)	N	Catch density	CV	CPUE	CV
1965	G.B. Reed	50 - 200	2	919	139	92	139
		200 - 300	3	18,722	102	1,872	102
		300 - 450	4	45,724	44	4,572	44
1965	G.B. Reed	50 - 200	8	50,387	150	5,038	150
		200 - 300	4	88,138	71	8,812	71
		300 - 450	3	7,775	76	777	76
1967	G.B. Reed	50 - 200	6	579	120	58	120
		200 - 300	14	25,837	234	2,583	234
		300 - 450	31	34,638	110	3,463	110
1968	G.B. Reed	50 - 200	7	91	198	9	198
		200 - 300	22	8,506	182	850	182
		300 - 450	36	19,090	80	1,909	80
1970	G.B. Reed	50 - 200	5	302	164	30	164
		200 - 300	14	21,756	50	2,175	50
		300 - 450	17	19,405	50	1,940	50
1972	G.B. Reed	50 - 200	5	968	211	97	211
		200 - 300	14	65,060	82	6,505	82
		300 - 450	17	16,495	50	1,649	50
1979	Arctic Harvester	50 - 200	4	9,842	176	722	176
		200 - 300	26	40,385	139	2,963	139
		300 - 450	7	12,368	120	908	120
1985	Howe Bay	50 - 200	10	3,479	160	328	160
		200 - 300	48	6,363	154	599	154
		300 - 450	17	4,462	73	420	73
1996	Caledonian	50 - 200	28	459	374	46	381
		200 - 300	57	12,741	121	1,178	122
		300 - 450	15	1,273	156	109	153

Table 7. Biomass estimates (tonnes) using methods from sampling theory for stratified random designs, for the entire survey area (Area 3C/D) and for Area 3C.

	Area 3C/D combined			Area 3C		
species	estimate	upper 95% CI	lower 95% CI	estimate	upper 95% CI	lower 95% CI
Pacific ocean perch	2,226	2,358	2,095	1,835	1,956	1,715
boccacio rockfish	47	52	43	31	34	27
canary rockfish	283	331	234	124	150	97
darkblotch rockfish	41	50	32	37	44	30
greenstripe rockfish	156	168	144	104	113	94
redbanded rockfish	57	62	53	38	42	35
redstripe rockfish	978	1,233	723	750	957	543
rosethorn rockfish	51	58	44	39	45	34
rougheye rockfish	63	71	55	49	57	41
sharpchin rockfish	748	887	610	642	759	526
shortraker rockfish	34	39	28	35	41	29
silvergrey rockfish	188	207	168	120	137	103
splitnose rockfish	560	649	471	439	512	366
shortspine thornyhead	111	117	105	100	105	94
widow rockfish	12	15	9	10	13	8
yelloweye rockfish	35	44	27	29	36	23
yellowmouth rockfish	283	339	228	276	333	220
yellowtail rockfish	345	444	245	252	333	171
lingcod	63	71	55	28	33	24
sablefish	724	803	646	587	654	521
dover sole	332	347	318	258	272	244
rex sole	134	143	125	74	81	67
slender sole	7	7	6	4	5	4
turbot	1,577	1,792	1,362	992	1,168	817
spiny dogfish	1,526	2,010	1,041	1,254	1,647	861

Table 8. Biomass estimates from naïve bootstrap methods, for the entire survey area (Area 3C/D) and for Area 3C.

	Area 3C/D combined			Area 3C		
species	estimate	upper 95% CI	lower 95% CI	estimate	upper 95% CI	lower 95% CI
Pacific ocean perch	2,223	2,885	1,630	1,855	2,429	1,311
boccacio rockfish	48	71	27	31	49	15
canary rockfish	290	519	117	125	249	37
darkblotch rockfish	41	77	15	37	71	14
greenstriped rockfish	157	210	108	104	143	69
redbanded rockfish	58	79	41	39	58	24
redstripe rockfish	955	2,162	187	758	1,716	94
rosethorn rockfish	51	83	26	39	65	17
rougheye rockfish	64	104	34	48	84	24
sharpchin rockfish	735	1,394	280	629	1,161	232
shortraker rockfish	33	57	10	36	60	14
silvergrey rockfish	191	280	110	117	200	47
splitnose rockfish	559	975	268	435	770	188
shortspine thornyhead	111	137	85	100	122	78
widow rockfish	12	25	3	10	21	3
yelloweye rockfish	35	70	7	31	57	6
yellowmouth rockfish	286	612	49	287	675	41
yellowtail rockfish	342	798	48	263	707	24
lingcod	63	96	35	28	50	12
sablefish	726	1,078	445	581	878	344
dover sole	332	383	275	258	312	201
rex sole	135	174	99	74	102	48
slender sole	7	9	4	4	7	2
turbot	1,549	2,501	985	972	1,774	525
spiny dogfish	1,514	3,918	105	1,232	3,093	88

Table 9. Comparison of biomass estimates from Area 3C surveys conducted in 1979 (Arctic Harvester) and 1985 (Howe Bay), with Area 3C estimates from the current survey (Caledonian).

Cruise:	**Arctic Harvester**	**Howe Bay**	**Caledonian**		
Depth range:	**183-365**	**160-439**	**150-450**		
Number of tows:	**45**	**56**	**70**		
	estimate	**estimate**	**estimate**	**upper 95% CI**	**lower 95% CI**
Pacific ocean perch	4,217	1,862 +/- 17%	1,835	1,956	1,715
Redstripe rockfish	173	121 +/- 162%	750	957	543
Yellowmouth rockfish	153	127 +/- 188%	276	333	220
Sharpchin rockfish	106	387 +/- 109%	642	759	526
Splitnose rockfish	1,207	258 +/- 20%	439	512	366
Darkblotch rockfish	148	48 +/- 99%	37	44	30
Redbanded rockfish	158	94 +/- 46%	38	42	35
Yelloweye rockfish	N/A	N/A	29	36	23
Canary rockfish	13	16 +/- 138%	124	150	97
Boccacio rockfish	351	199 +/- 326%	31	34	27
Silvergrey rockfish	34	197 +/- 202%	120	137	103
Greenstripe rockfish	42	41 +/- 176%	104	113	94
Rosethorn rockfish	19	8 +/- 249%	39	45	34
Yellowtail rockfish	0	19 +/- 283%	252	333	171
Rougheye rockfish	312	81 +/- 70%	49	57	41
Shortraker rockfish	138	20 +/- 167%	35	41	29
Widow rockfish	9	2 +/- 238%	10	13	8
Shortspine thornyhead	N/A	N/A	100	105	94
Sablefish	N/A	N/A	587	654	521
Lingcod	N/A	N/A	28	33	24
Turbot	N/A	N/A	992	1,168	817
Dover sole	N/A	N/A	258	272	244
Rex sole	N/A	N/A	74	81	67
Slender sole	N/A	N/A	4	5	4
Spiny dogfish	N/A	N/A	1,254	1,647	861

Table 10. Comparison of relative biomass estimates of Pacific ocean perch from this and previous surveys using methodology described in this report. 1996 strata include the total depth range covered by the CALEDONIAN in 1996. Limited strata are based on depths covered by the ARCTIC HARVESTER and HOWE BAY in 1979 and 1985, respectively.

		1979	1985	1996
	strata	Arctic Harvester	Howe Bay	Caledonian
1996 Strata	**1**	3,466.3	1,573.1	161.6
150 - 450 m	**2**	5,839.6	1,189.4	1,842.3
	3	2,163.1	1,001.8	222.7
	total biomass	**11,469.0**	**3,764.3**	**2,226.6**
Limited Strata	**1**	1,056.0	479.3	125.9
175 - 400 m	**2**	5,839.6	1,189.4	1,842.3
	3	2,163.1	520.7	426.6
	total biomass	**9,058.7**	**2,189.3**	**2,394.8**

Table 11. Comparison of relative biomass estimates of shortspine thornyhead from this and previous surveys using methodology described in this report. 1996 strata include the total depth range covered by the CALEDONIAN in 1996. Limited strata are based on depths covered by the ARCTIC HARVESTER and HOWE BAY in 1979 and 1985, respectively.

	strata	1979 Arctic Harvester	1985 Howe Bay	1996 Caledonian
1996 Strata	**1**	157.7	96.3	11.4
150 - 450 m	**2**	145.1	31.6	43.2
	3	321.1	63.6	56.2
	total biomass	**624.0**	**191.5**	**110.8**
Limited Strata	**1**	48.0	29.3	7.8
175 - 400 m	**2**	145.1	31.8	43.6
	3	166.9	33.1	24.3
	total biomass	**360.1**	**94.2**	**75.7**

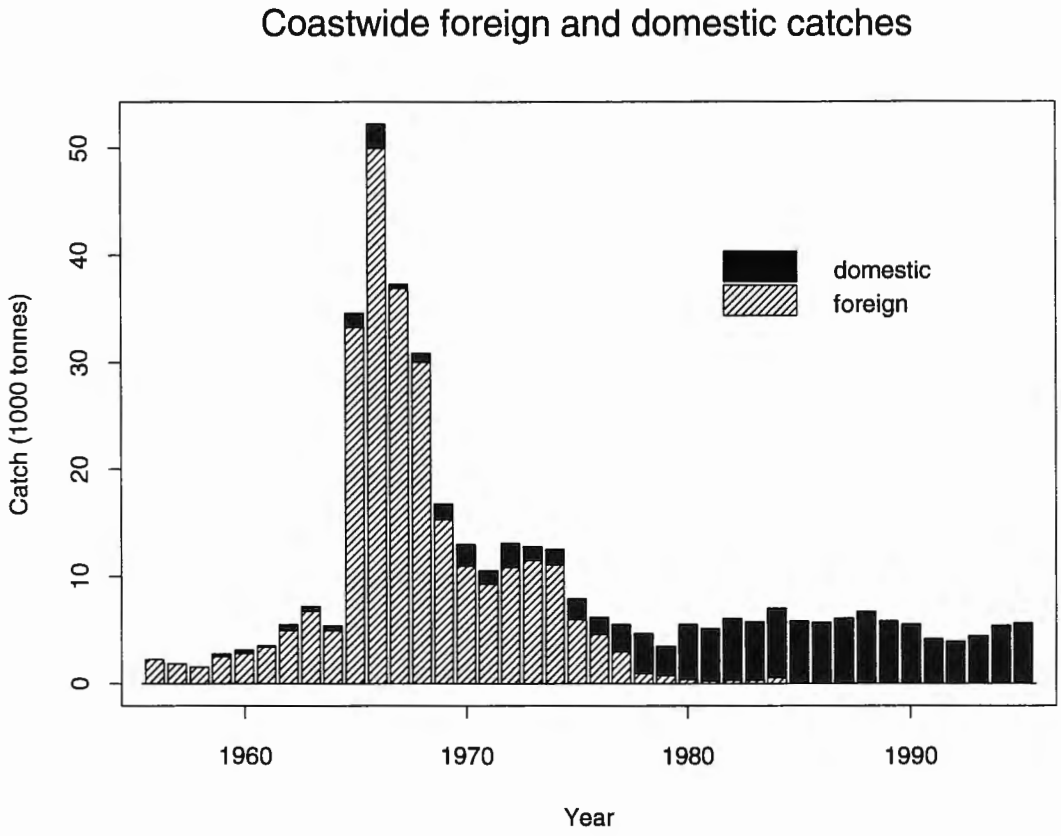

Figure 1. Coastwide annual catches of Pacific ocean perch by weight for foreign and domestic fisheries. Foreign catches prior to 1965 include landings taken from the Vancouver region, an area which extends south of the Canada/U.S. border to 47° 30' N. Modified from Leaman and Stanley (1993).

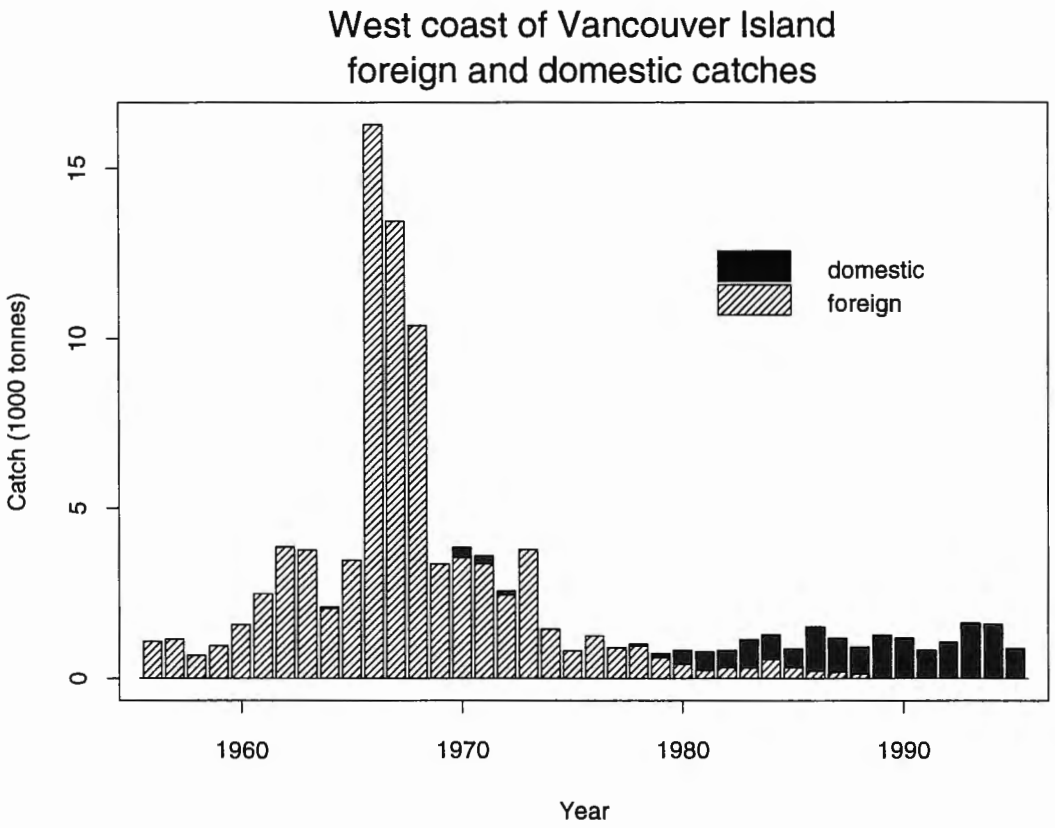

Figure 2. Annual catches of Pacific ocean perch by weight for foreign and domestic fisheries on the West coast of Vancouver Island. Foreign catches prior to 1965 include landings taken from the Vancouver region, an area which extends south of the Canada/U.S. border to 47° 30' N. Modified from Leaman and Stanley (1993).

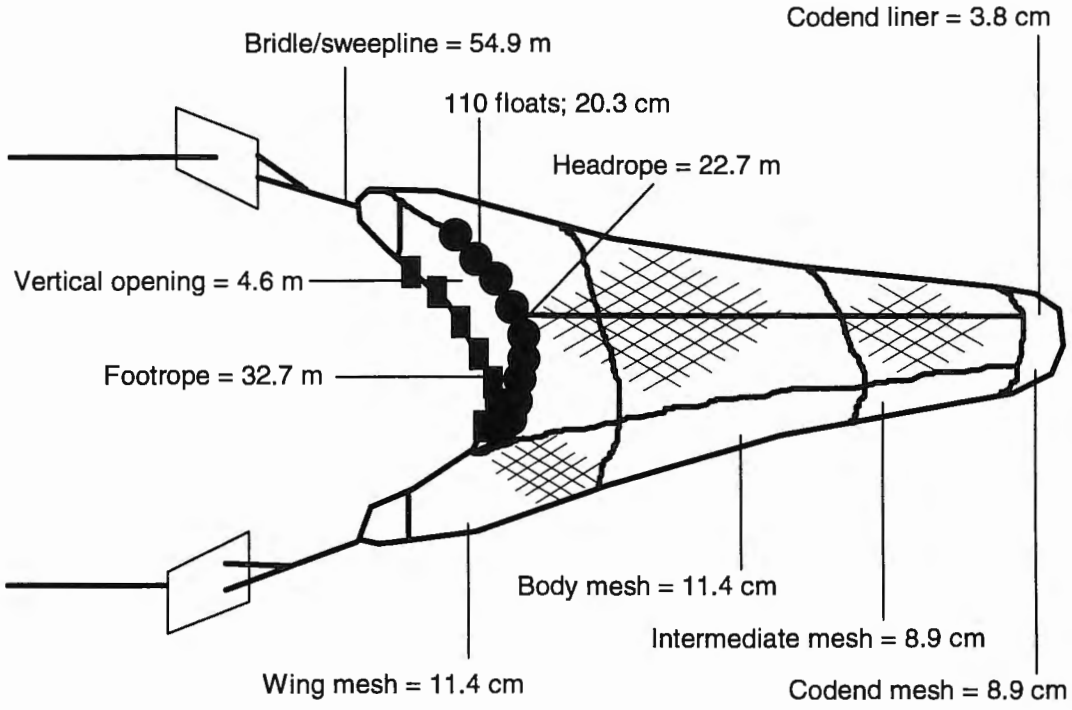

Figure 3. Dimensions of the Atlantic Western II box trawl used on board the F/V Caledonian between September 9 - 27, 1996.

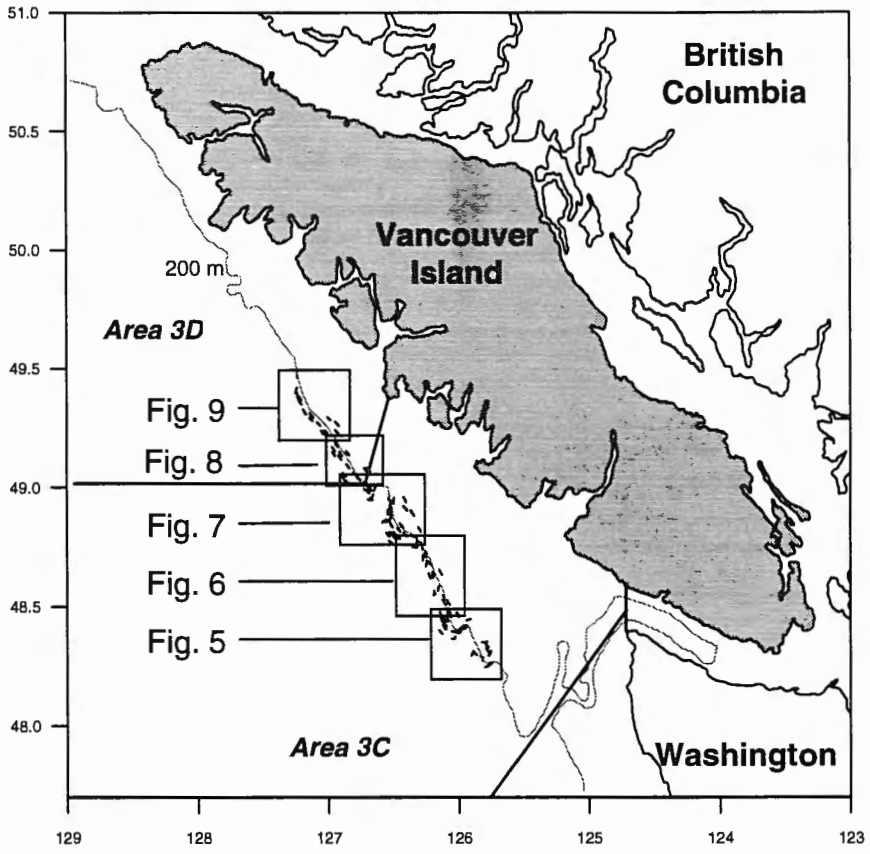

Figure 4. Survey area off the southwest coast of Vancouver Island, British Columbia. The 200 m depth contour, the track of each tow, and the Area 3C, 3D delimiters are shown. Boxes indicate regions expanded in subsequent figures.

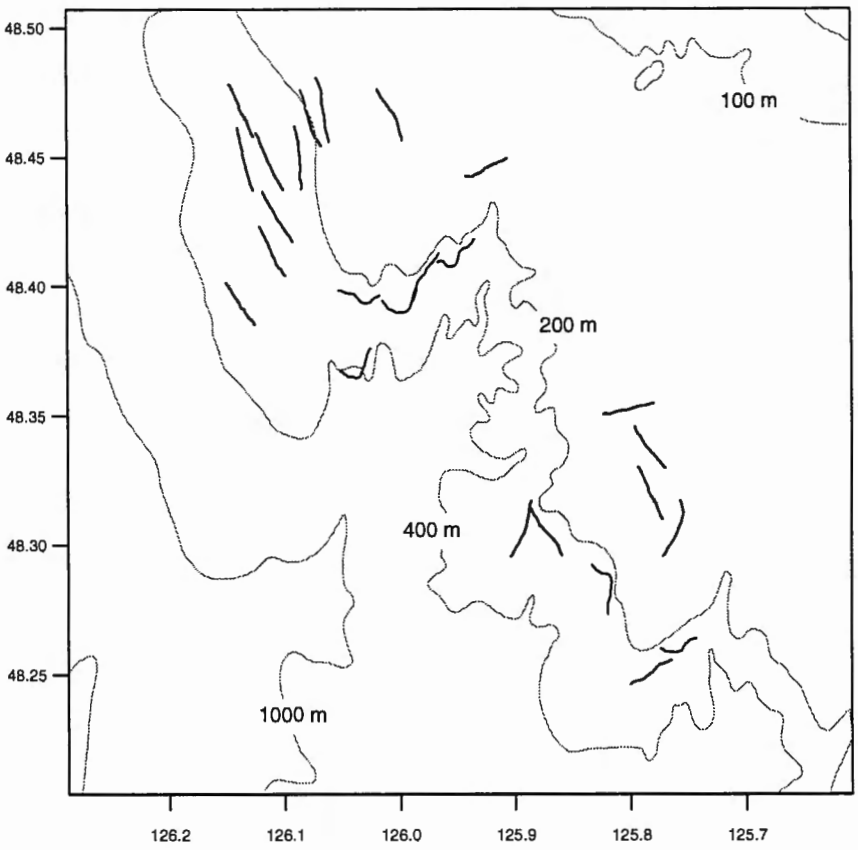

Figure 5. Expanded area 3C from figure 4 showing depth contours and tow tracks.

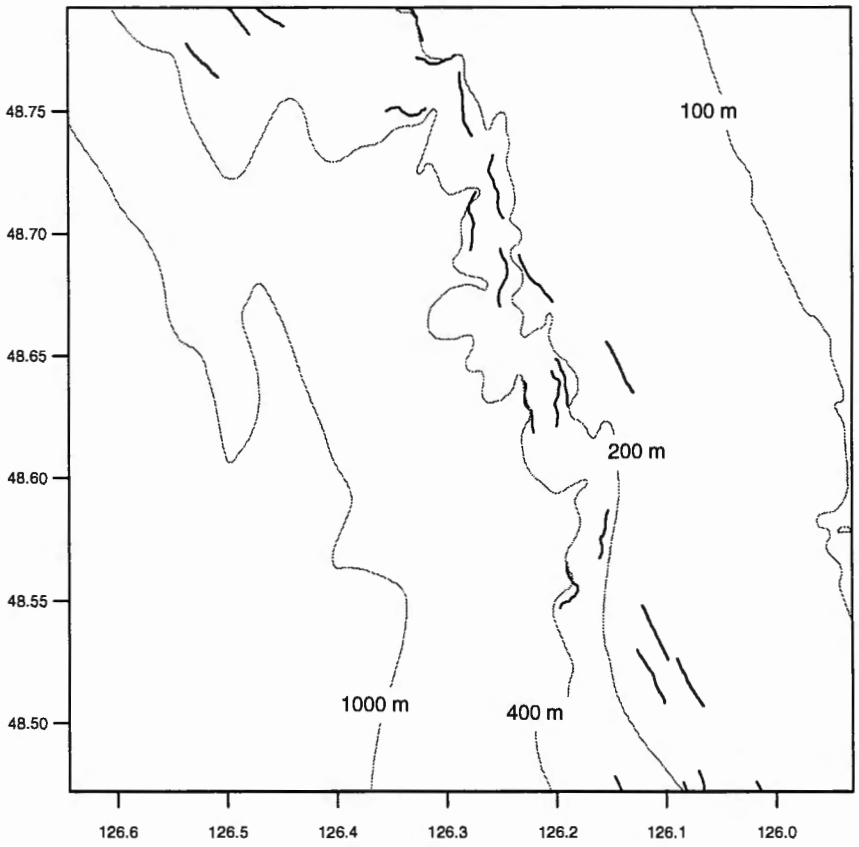

Figure 6. Expanded area 3C from figure 4 showing depth contours and tow tracks.

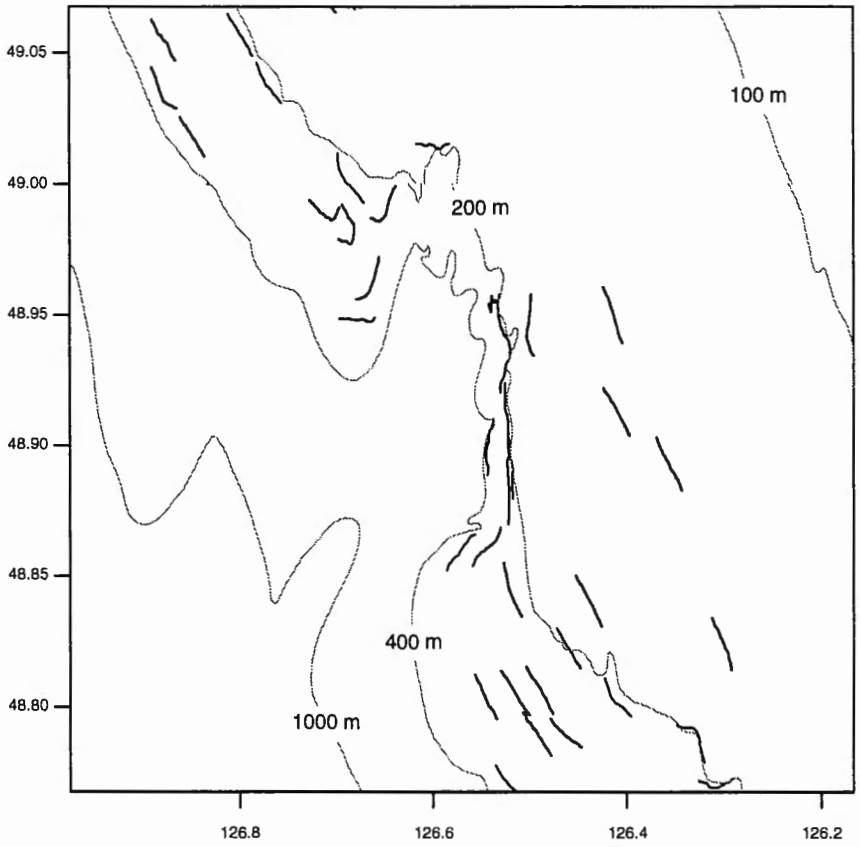

Figure 7. Expanded area 3C from figure 4 showing depth contours and tow tracks.

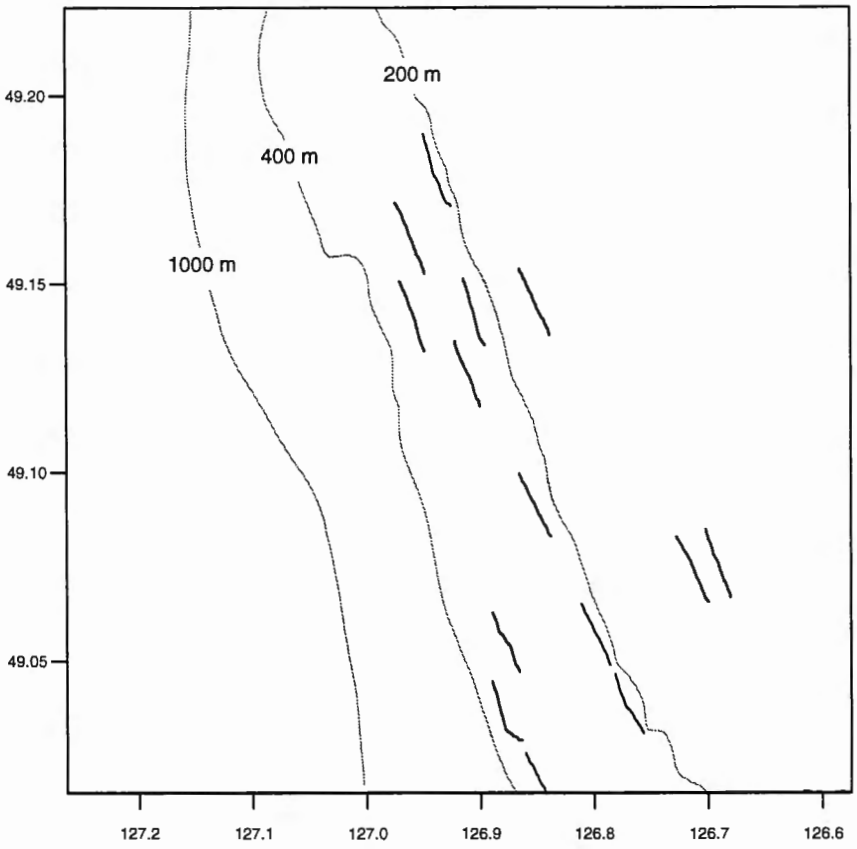

Figure 8. Expanded area 3D from figure 4 showing depth contours and tow tracks.

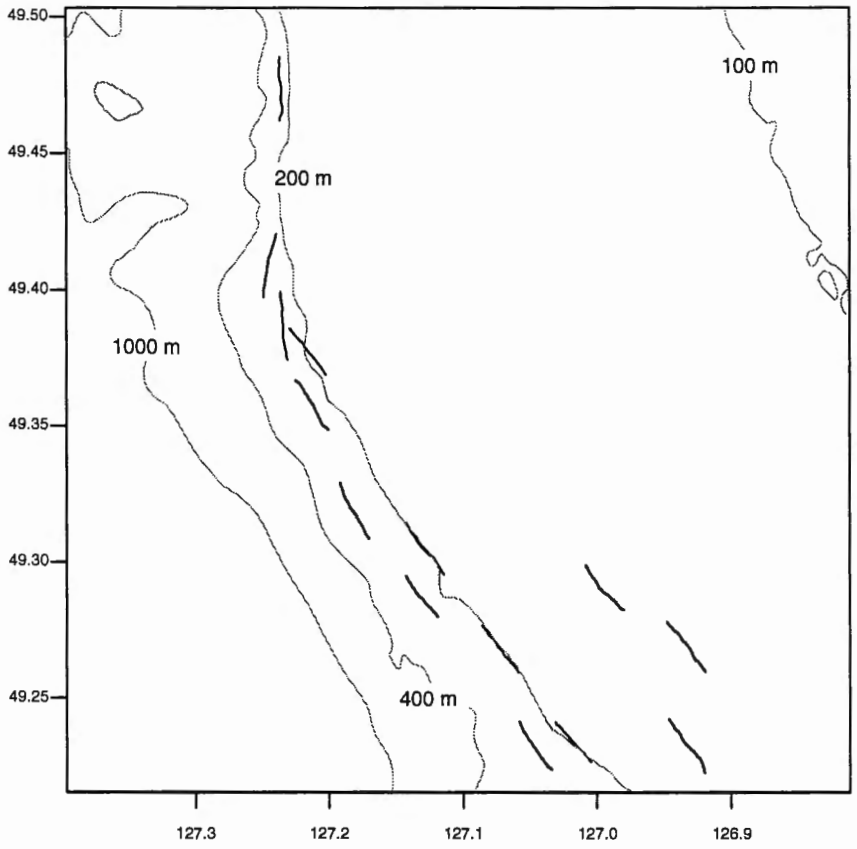

Figure 9. Expanded area 3D from figure 4 showing depth contours and tow tracks.

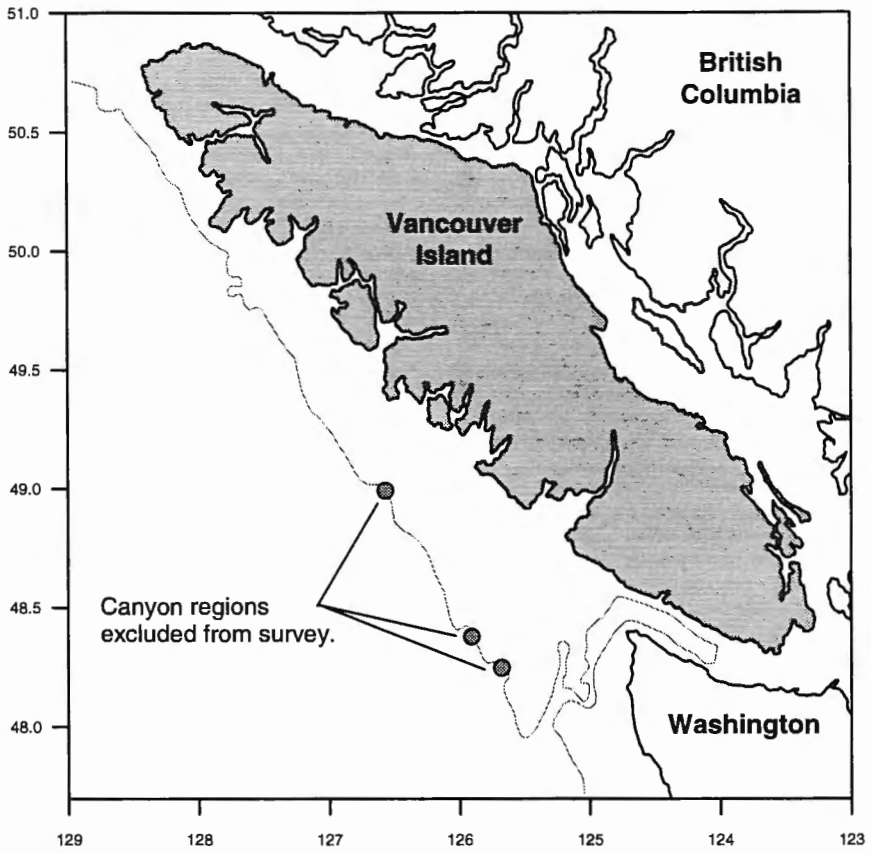

Figure 10. Canyon areas excluded from the survey due to unfishable topography.

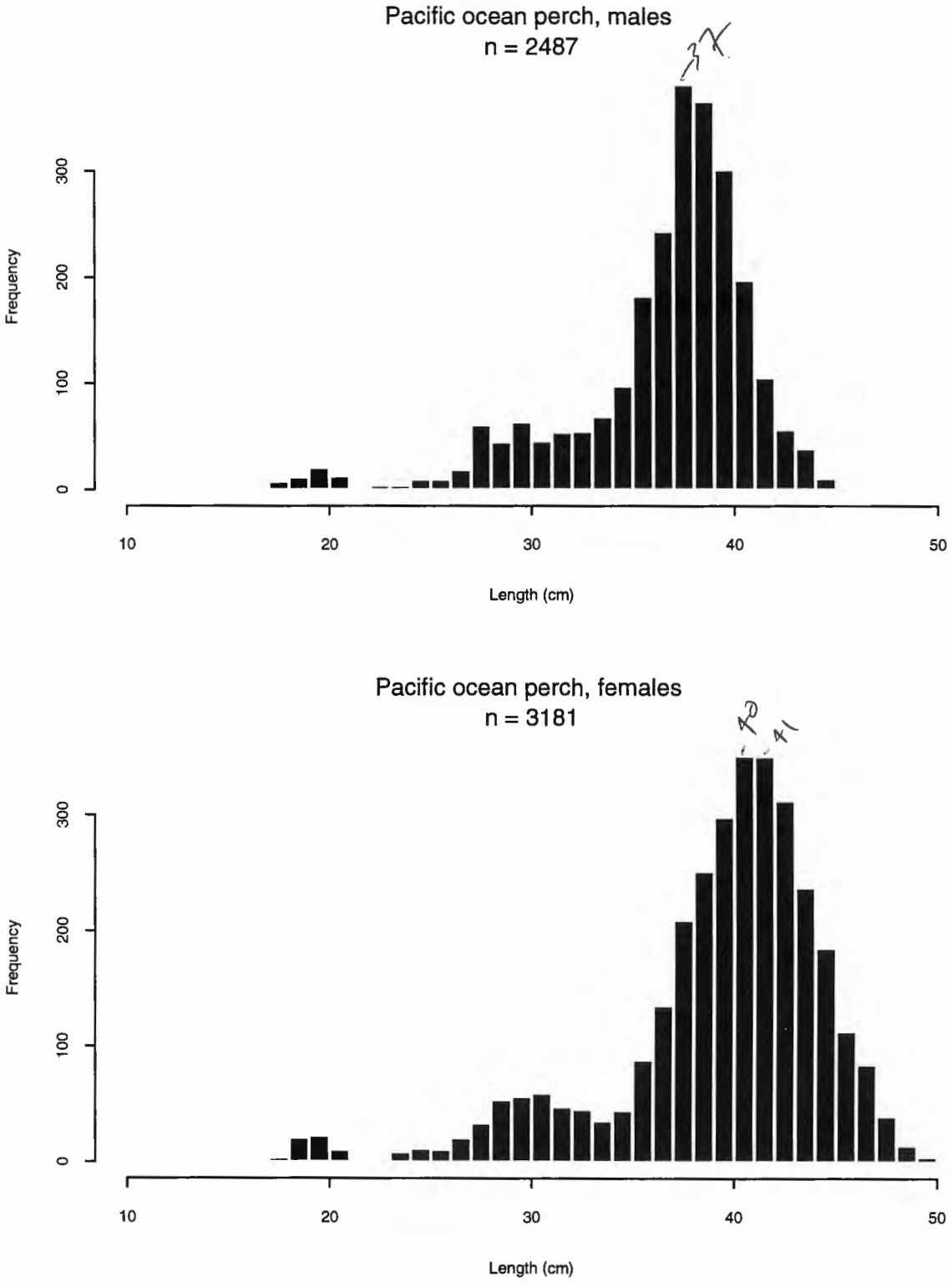

Figure 11. Length frequency distributions for male and female Pacific ocean perch.

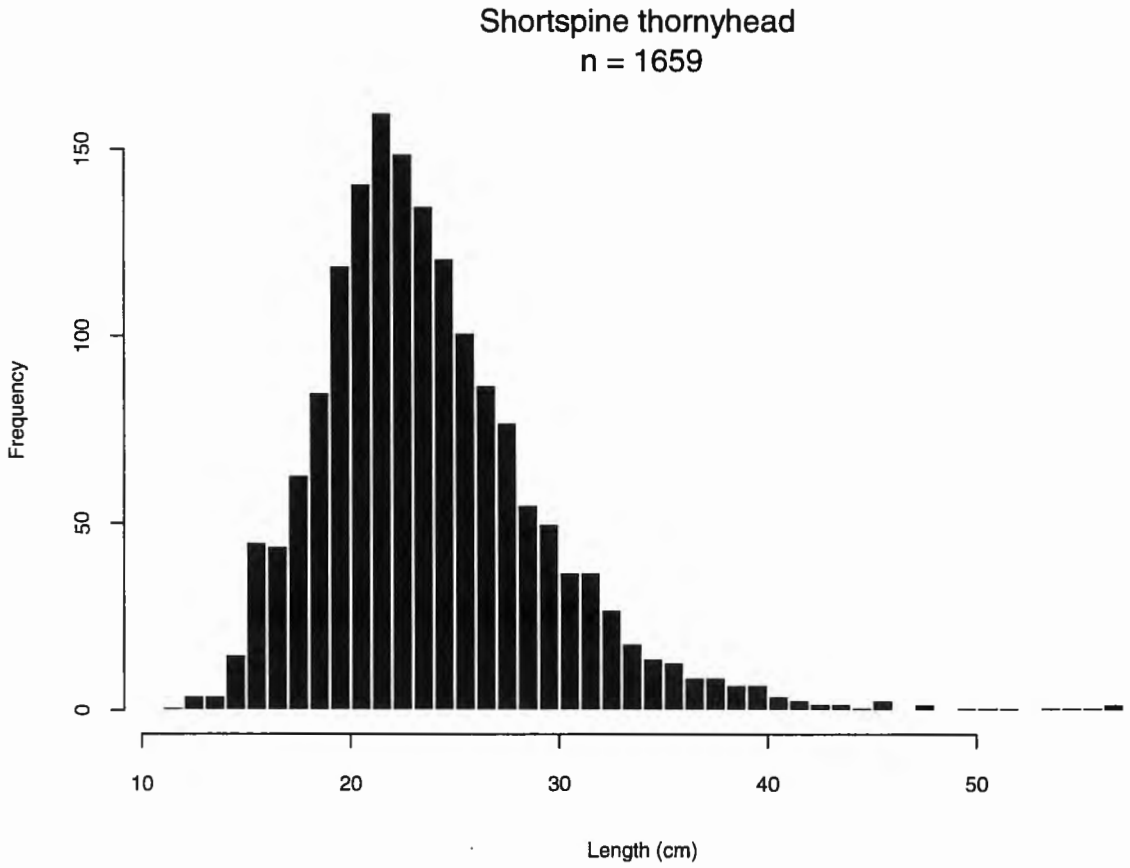

Figure 12. Length frequency distribution for shortspine thornyhead.

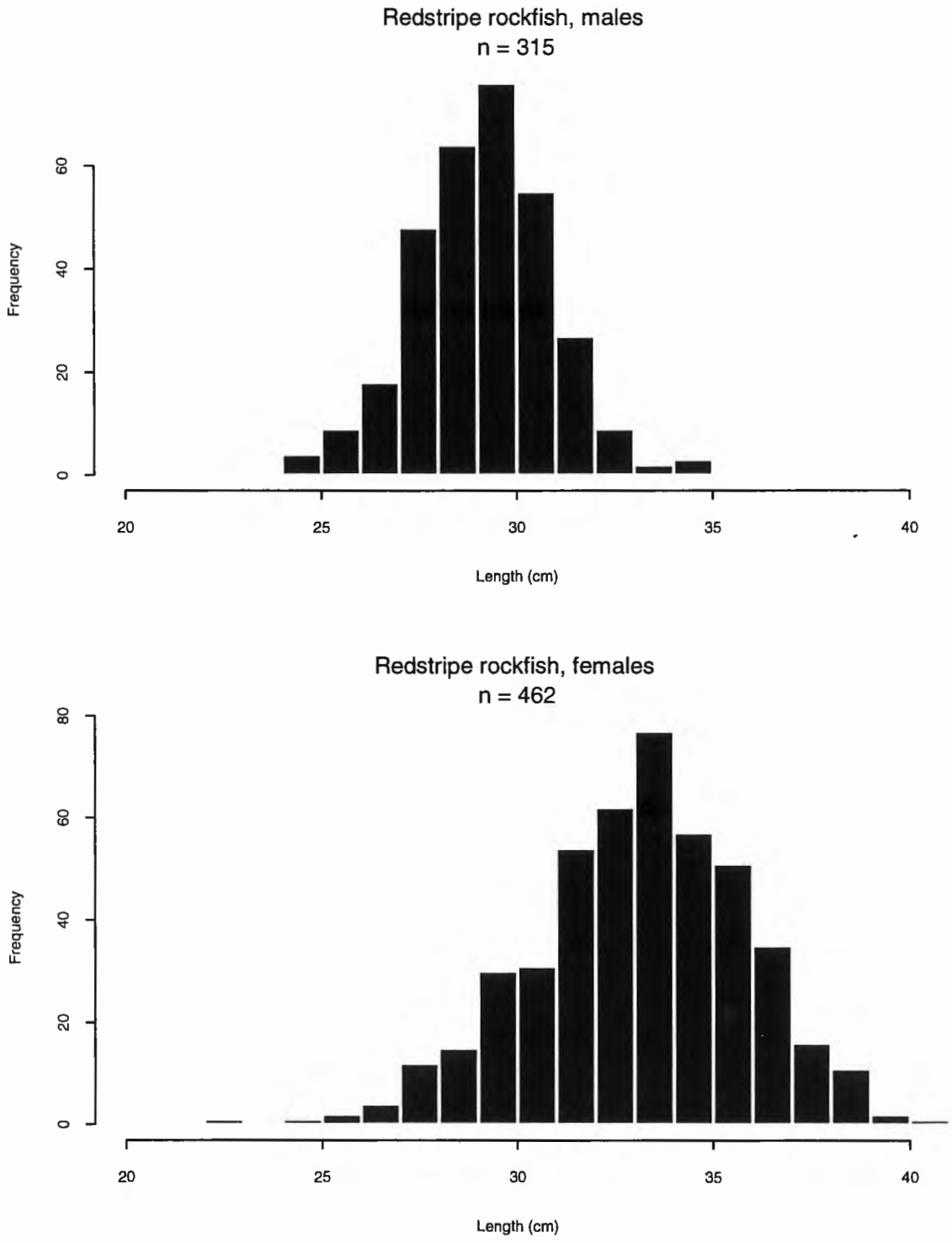

Fig. 13. Length frequency distributions for male and female redstripe rockfish.

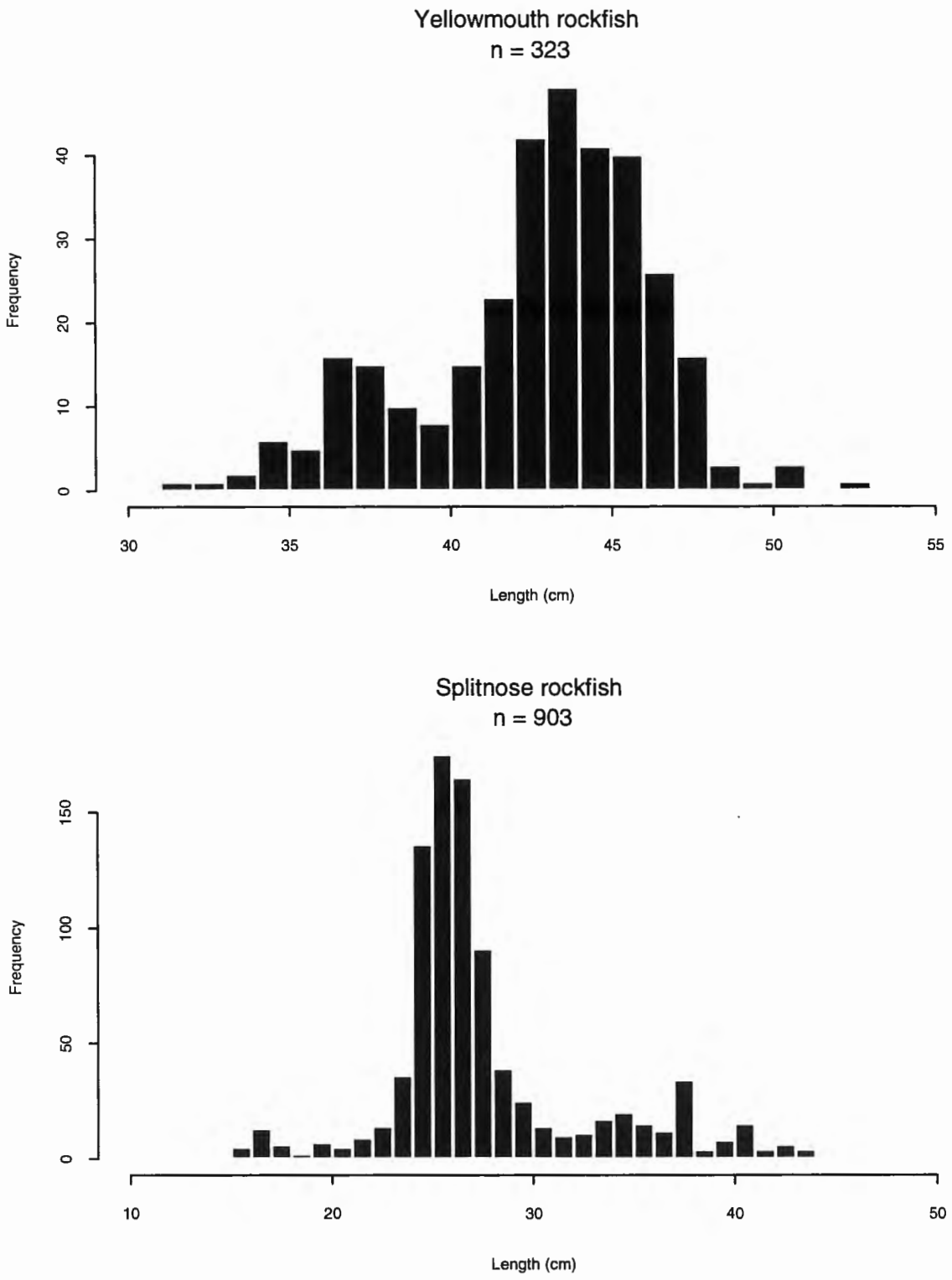

Fig. 14. Length frequency distributions for yellowmouth rockfish and splitnose rockfish.

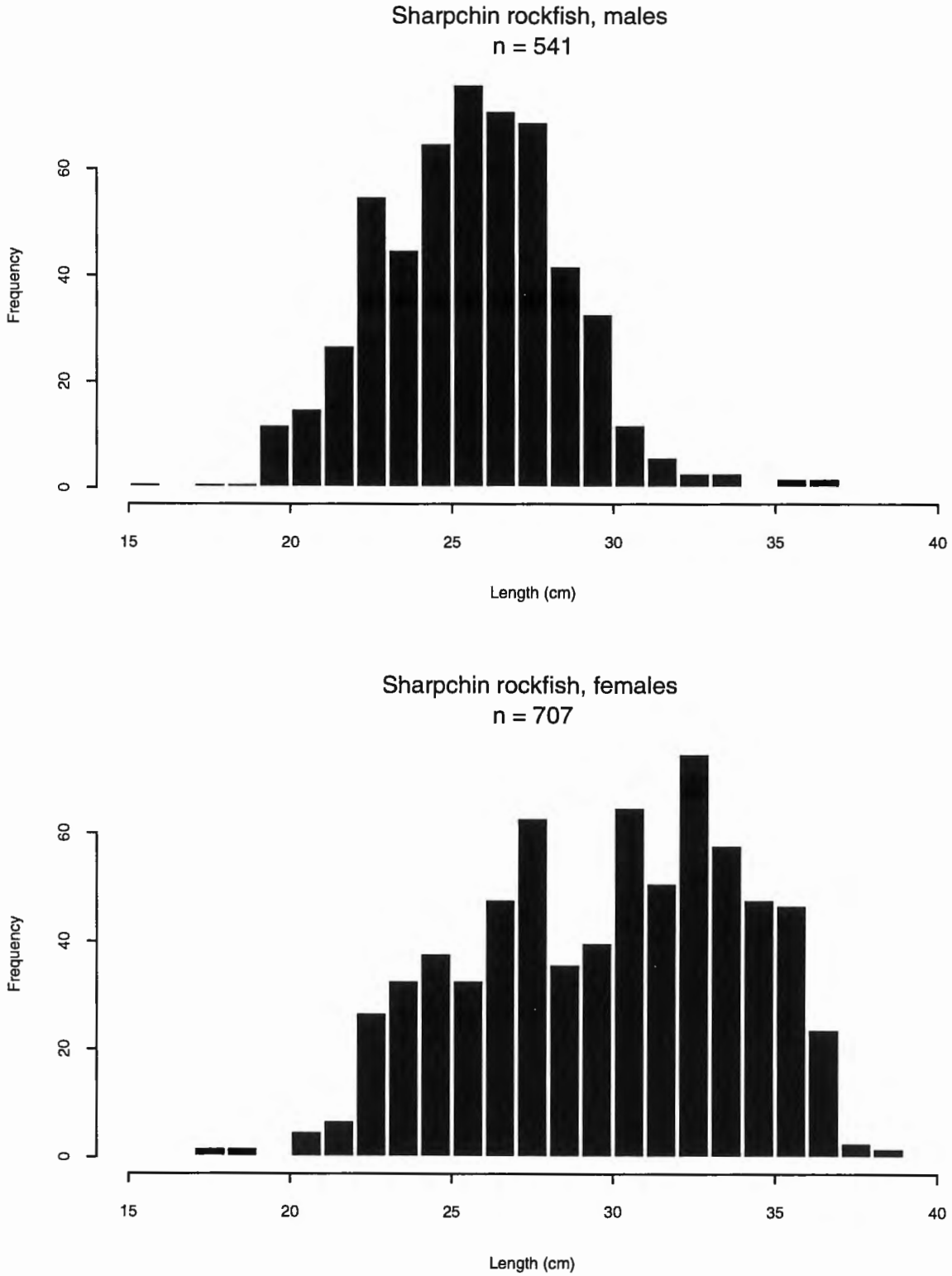

Fig. 15. Length frequency distributions for male and female sharpchin rockfish.

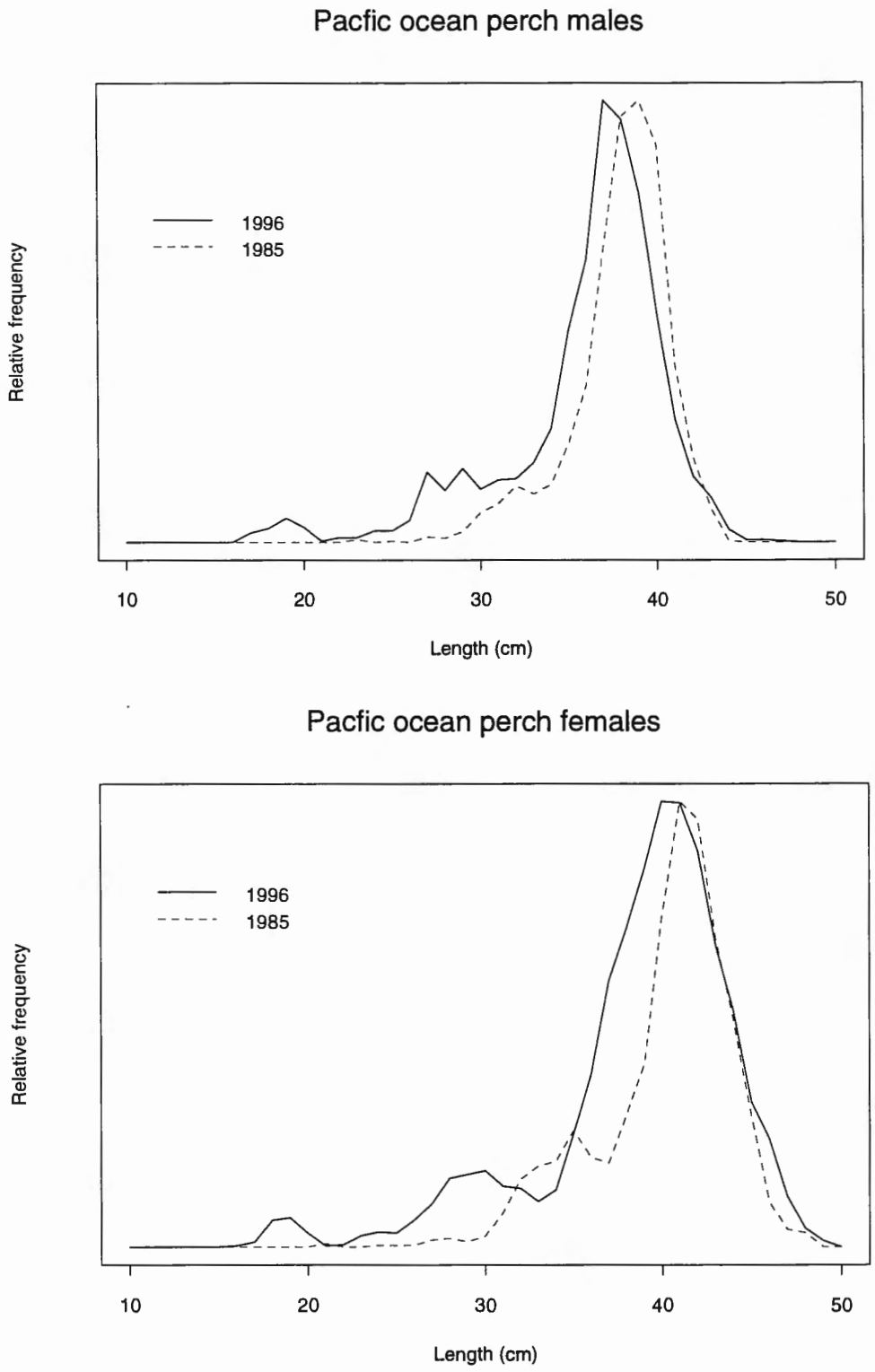

Figure 16. Normalized length frequency distributions for male and female Pacific ocean perch caught by the F/V CALEDONIAN in 1996 (solid lines) and the F/V HOWE BAY in 1985 (dashed line).

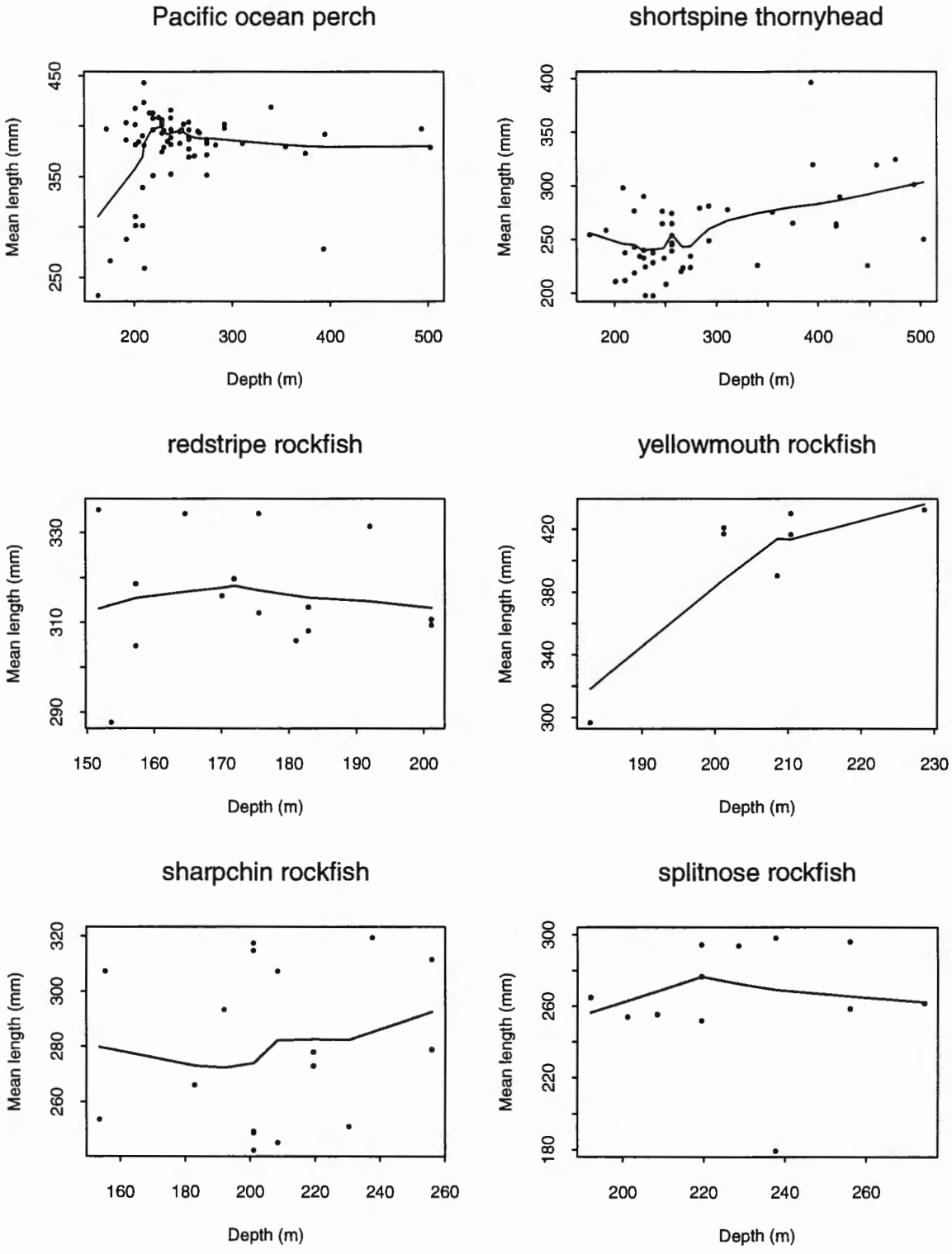

Figure 17. Mean length over depth for 6 species of rockfish.

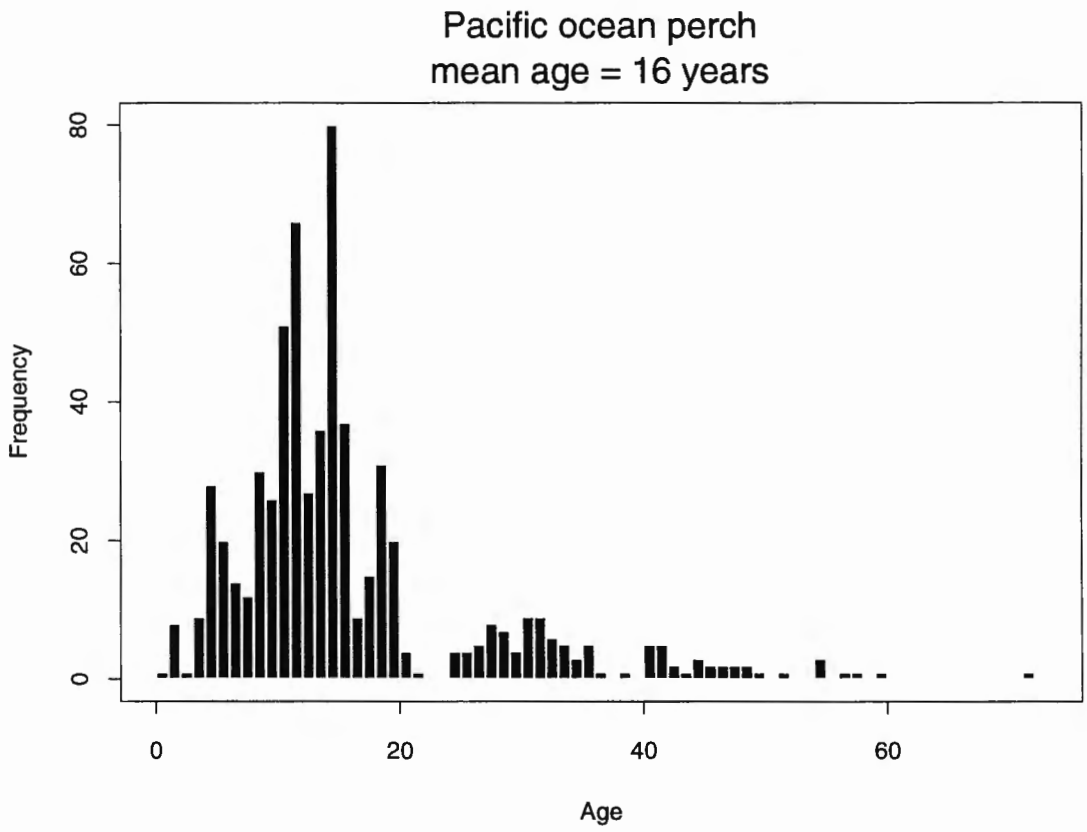

Figure 18. Age frequency distribution of Pacific ocean perch.

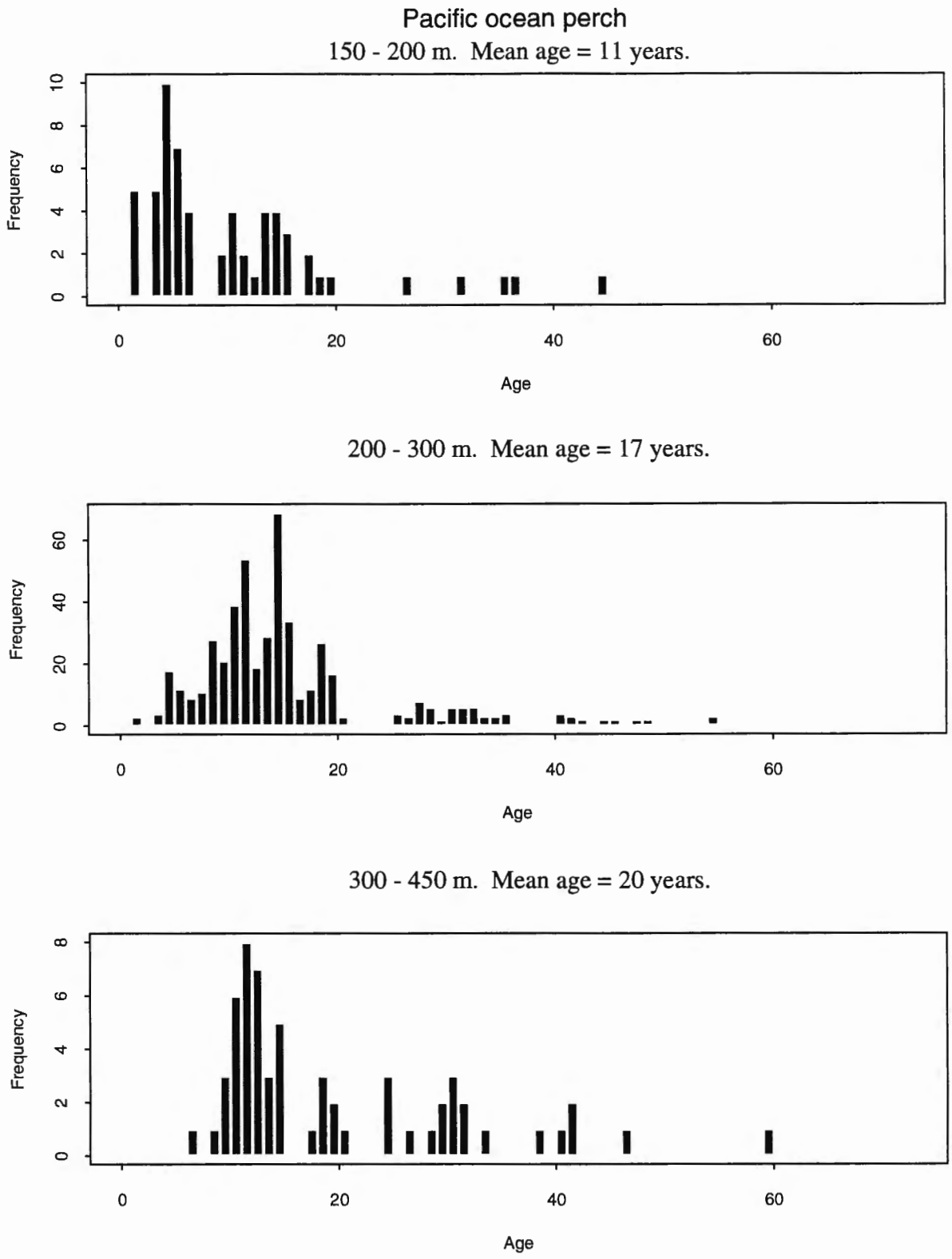

Figure 19. Age frequency distribution of Pacific ocean perch for each of three depth strata.

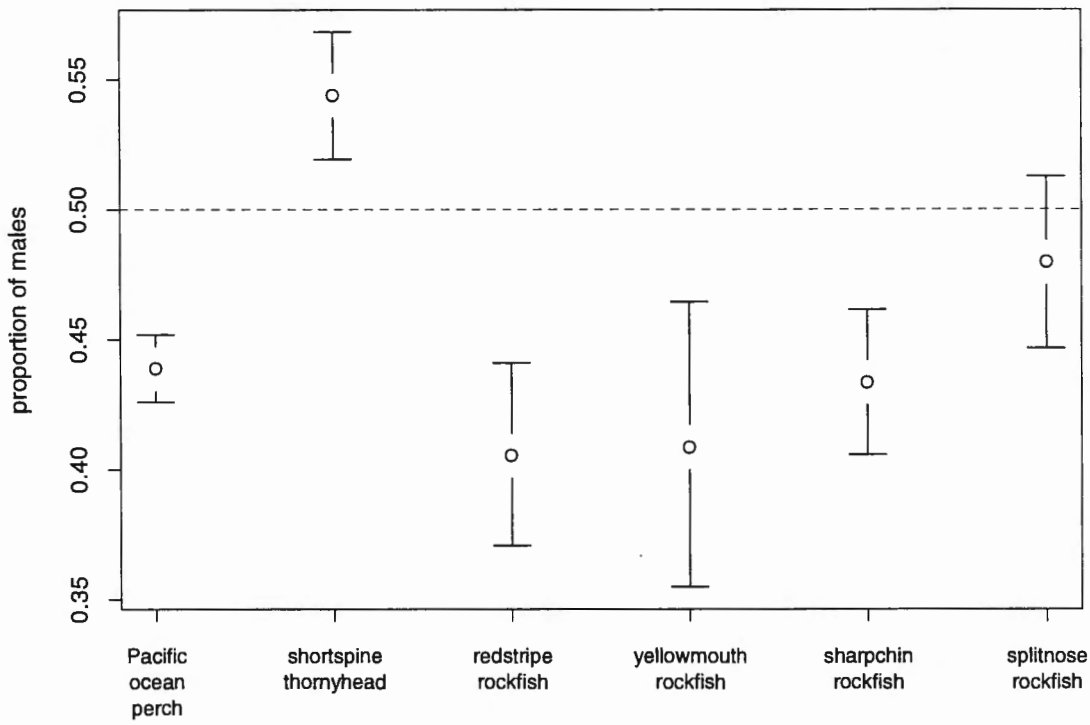

Figure 20. The sample proportion of males for 5 species of rockfish and shortspine thornyheads.

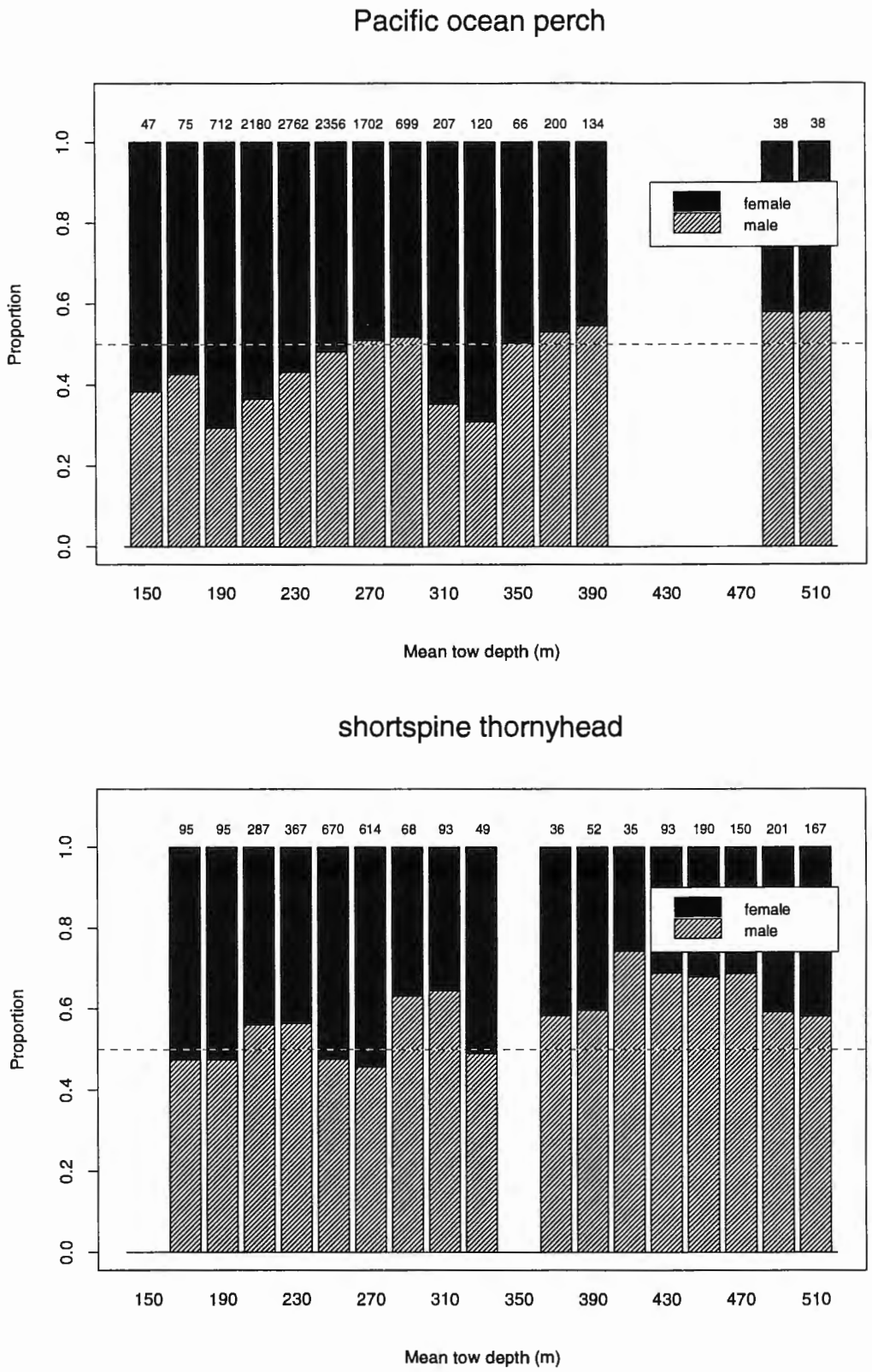

Figure 21. Sex proportions by depth interval for Pacific ocean perch and shortspine thornyhead. The sample size for each depth interval is shown above each bar.

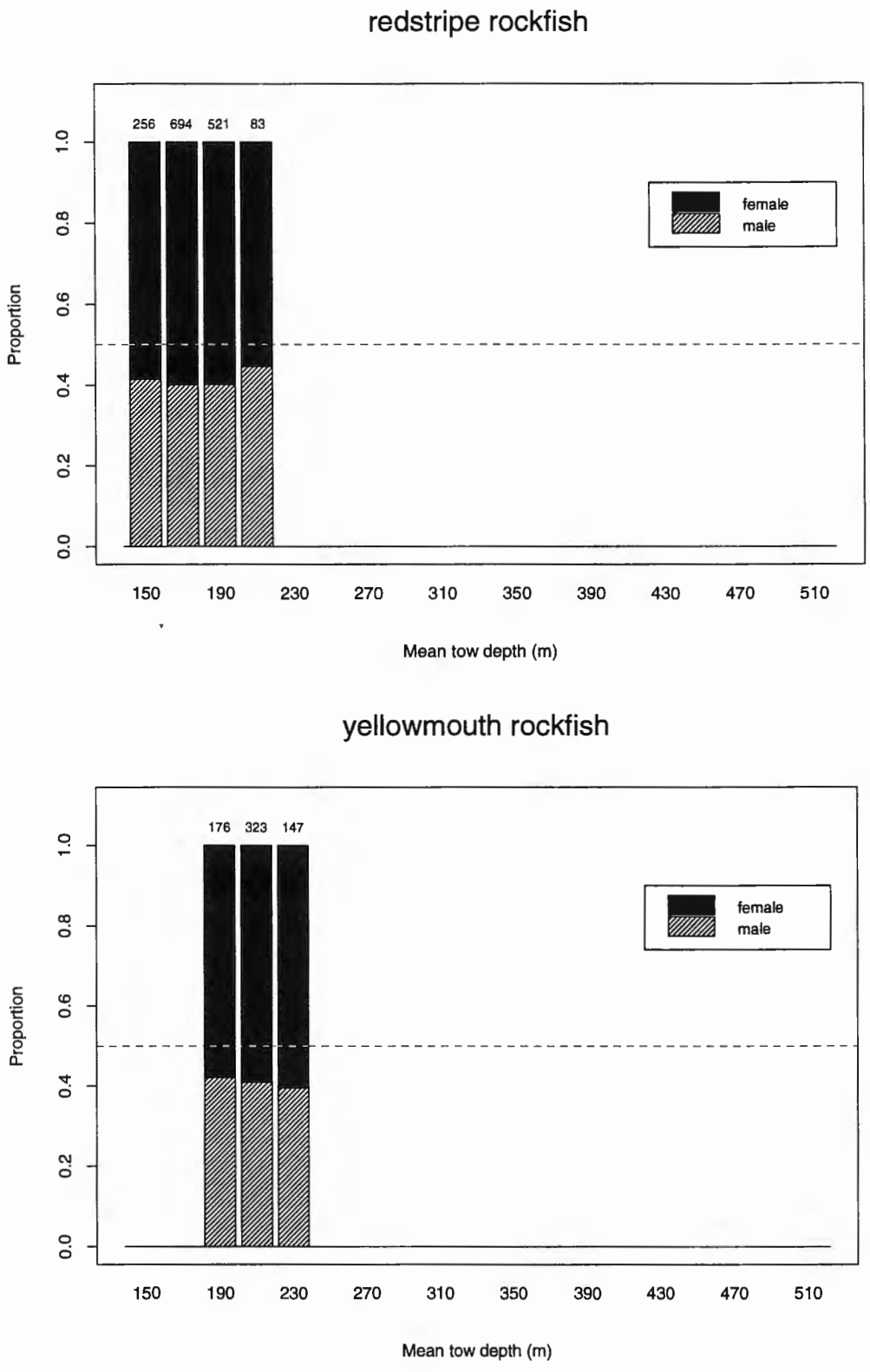

Figure 22. Sex proportions by depth interval for redstripe rockfish and yellowmouth rockfish. The sample size for each depth interval is shown above each bar.

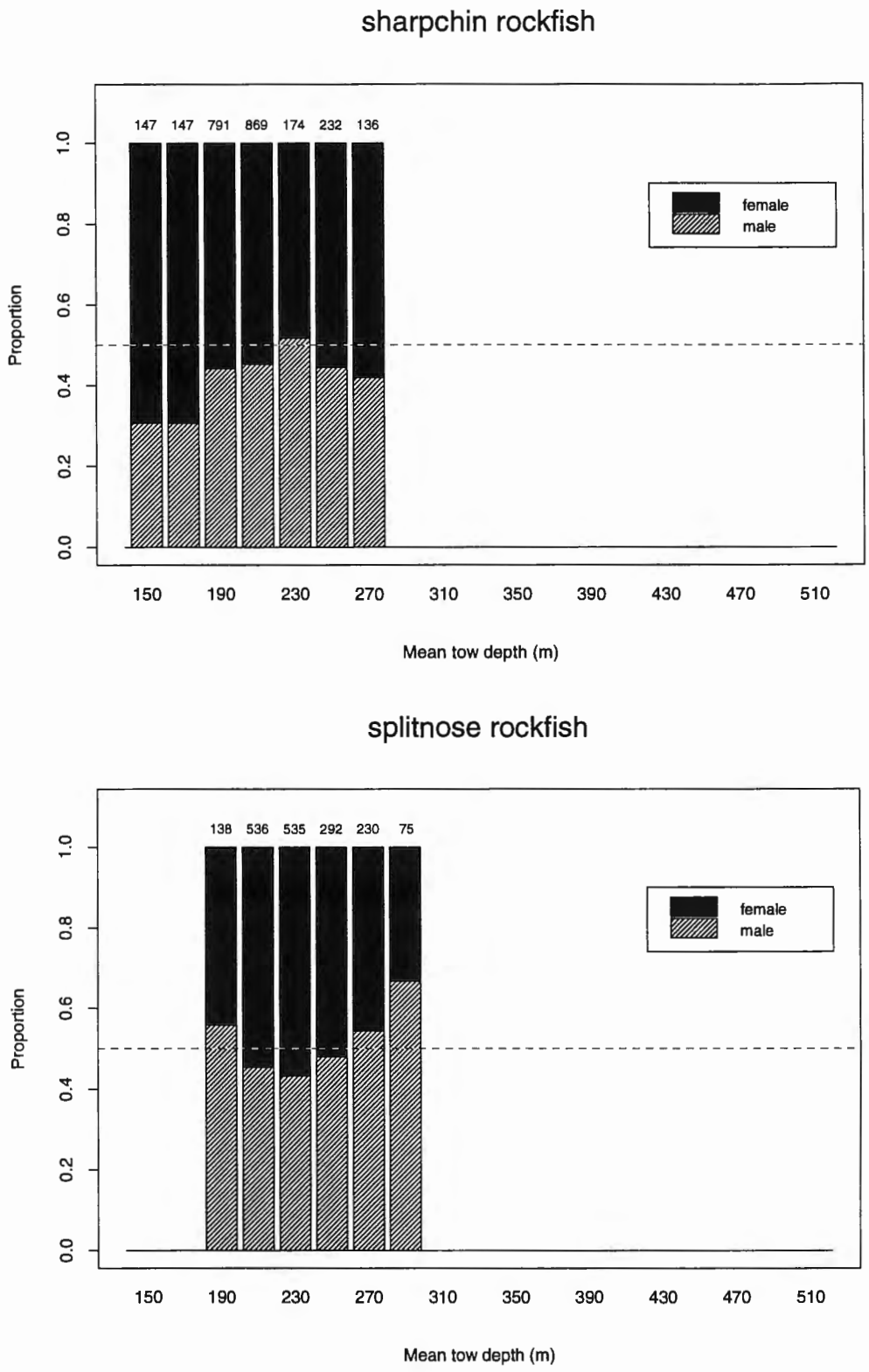

Figure 23. Sex proportions by depth interval for sharpchin rockfish and splitnose rockfish. The sample size for each depth interval is shown above each bar.

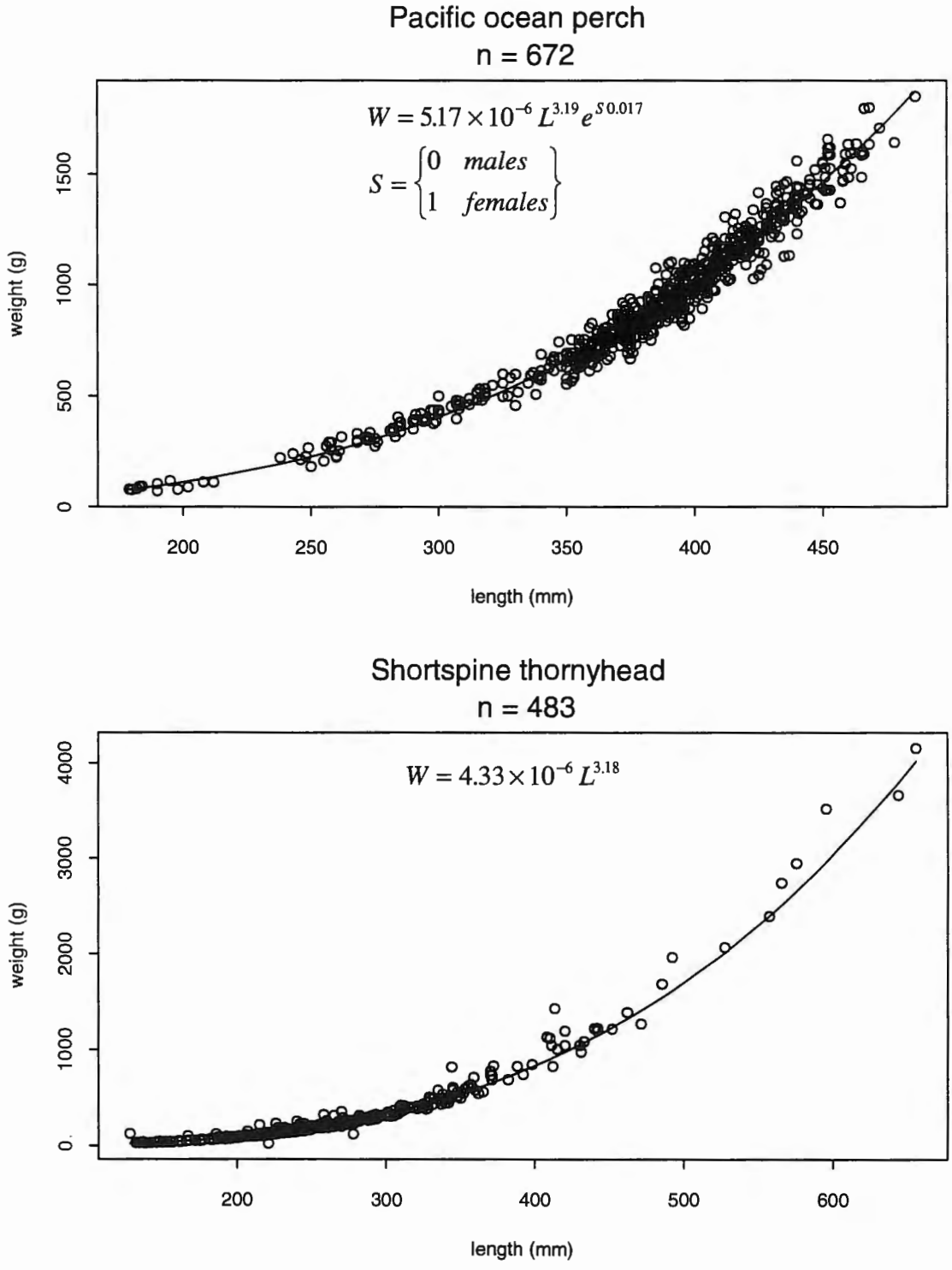

Figure 24. The length-weight relationship for Pacific ocean perch and shortspine thornyhead (sexes combined).

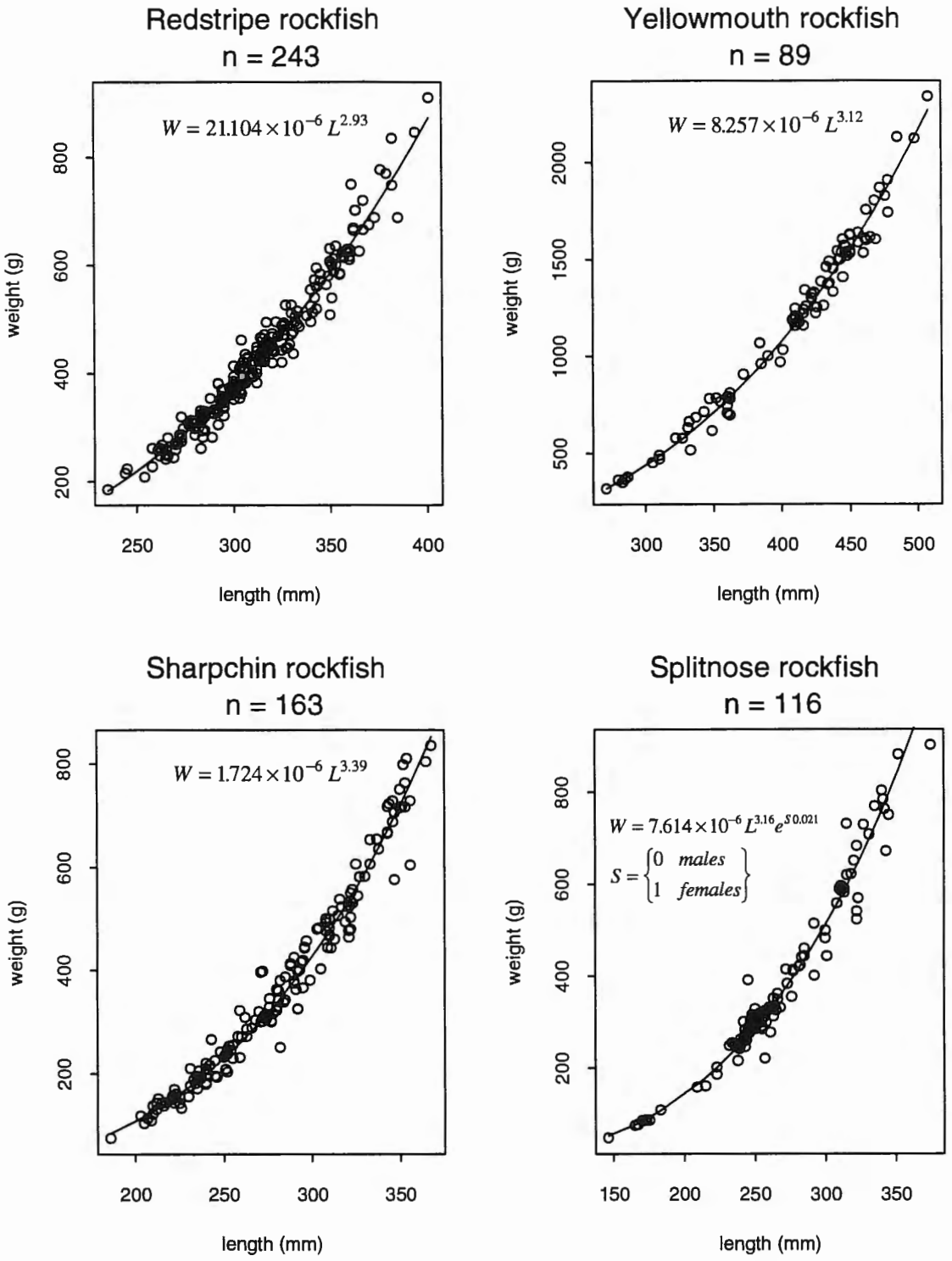

Figure 25. The length-weight relationship for redstripe rockfish, yellowmouth rockfish, sharpchin rockfish (sexes combined), and splitnose rockfish.

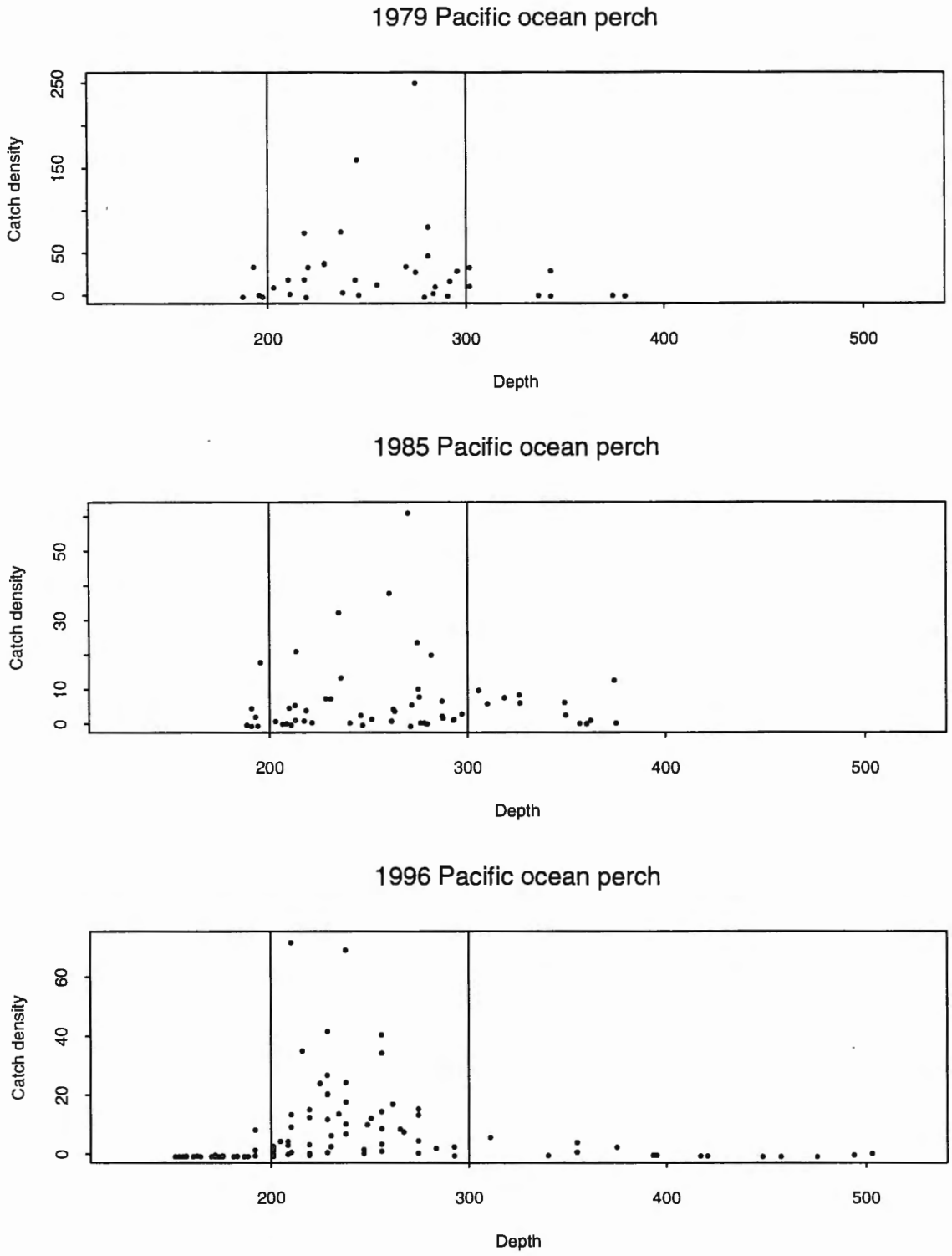

Figure 26. Pacific ocean perch catch densities (kg/nm^2) vs depth for surveys done in 1979, 1985, and 1996.

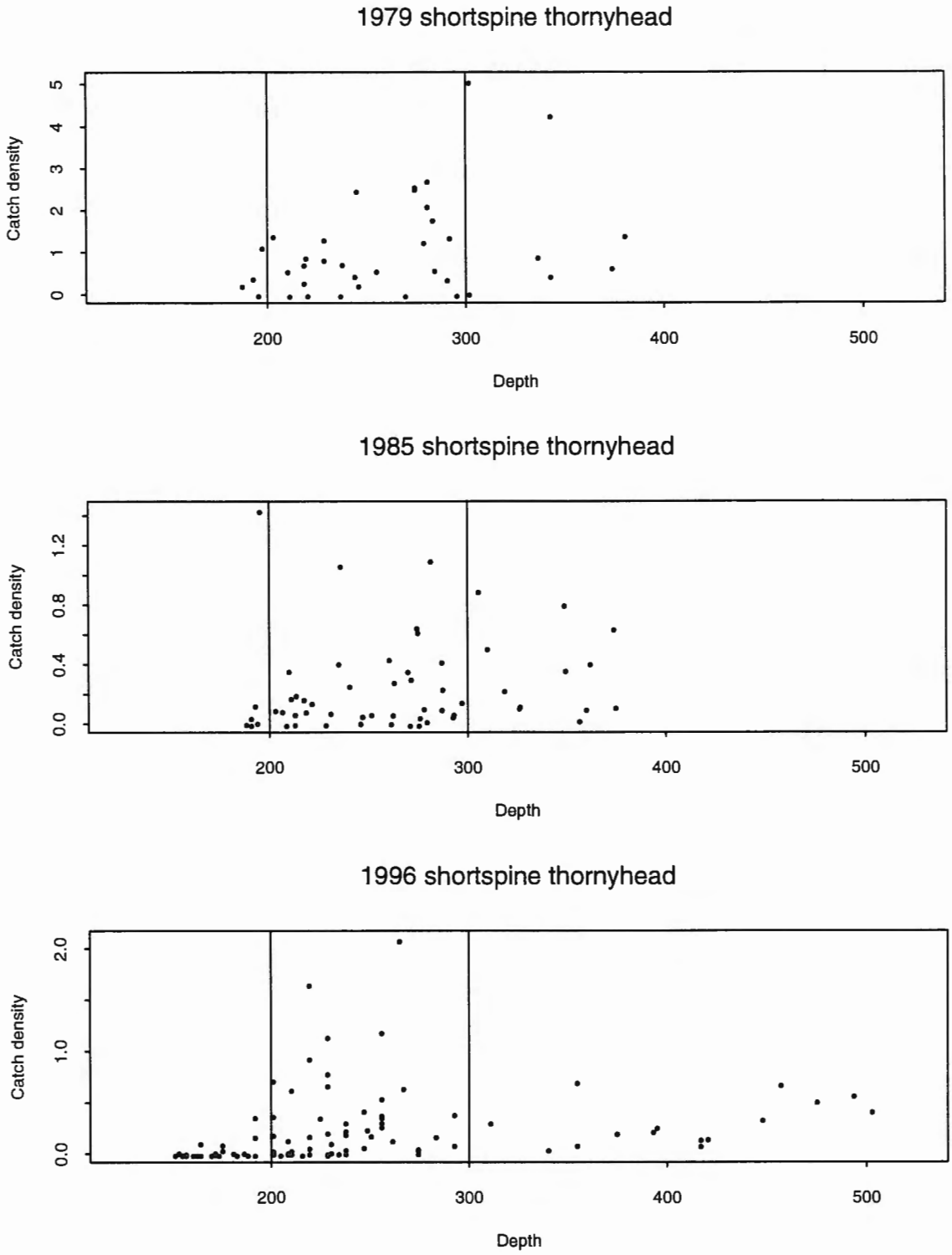

Figure 27. Shortspine thornyhead catch densities (kg/nm^2) vs depth for surveys done in 1979, 1985, and 1996.

APPENDIX TABLE 1. Haul information for the F/V CALEDONIAN during the rockfish survey off the west coast of Vancouver Island, September 9 - 27, 1996.

Haul No.	1	2	3	4	5	6
Date	sept 11	sept 11	sept 11	sept 11	sept 11	sept 11
Area	4 25	4 25	4 25	4 25	4 25	4 25
Time Start (Lst)	708	954	1222	1407	1549	1720
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	49	49	49	49	49	49
(Min)	29.1	25.2	23.9	23.2	22.0	19.7
W. Long. (Deg)	127	127	127	127	127	127
(Min)	14.2	14.4	14.2	13.8	13.5	11.5
Finish N. Lat. (Deg)	49	49	49	49	49	49
(Min)	27.7	23.8	22.5	22.1	20.9	18.6
W.Long. (Deg)	127	127	127	127	127	127
(Min)	14.2	14.9	13.9	12.1	12.1	10.3
Direction (Deg.True)	150	180	180	100	100	100
Length Of Set Km.	1.4	1.5	1.5	1.5	1.5	1.5
Depth (Modal, fa)	130	130	120	110	120	140
Rockfish						
P. Ocean Perch	665	1688	642	230	317	689
Splitnose	234	326	9	..	..	82
Sharpchin	48	..	..	4	4	..
Yellowmouth	..	..	..	..	..	..
Redstripe	..	..	..	4	..	..
Silvergray	..	..	63	79	5	..
Yellowtail	3	..	9	4	..	..
Canary	..	..	..	330	18	..
SS. Thornyhead	52	16	..	..	1	..
Greenstripe	..	..	5	13	4	..
Redbanded	19	24	9	4	8	7
Bocaccio	..	..	36	4	..	23
OTHERS	7	..	..	13	1	3
Roundfish						
Blackcod	19	..	145	46	29	10
Hake	..	..	..	..	..	7
Lingcod	7	..	59	38	..	..
Pacific Cod	..	..	5	..	3	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	53	462	407	347	230	129
Dover Sole	21	16	5	13	5	3
Halibut	..	195	48	..	27	47
Rex Sole	5	..	14	8	30	..
English Sole	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
UNKNOWN GROUP						
**OTHERS	..	..	..	..	1	..
Total Catch (Kg)	1133	2727	1455	1136	683	1000
Remarks	usable	usable	usable	usable	usable	usable

** Others may include: Spiny dogfish, Brown cat shark, Sleeper shark, skate, ratfish, eelpout, American shad, eulachon, Pacific herring, sanddab, threadfin, rattail, or miscellaneous invertebrate.

APPENDIX TABLE 1 CONTINUED.

Haul No.	7	8	9	10	11	12
Date	sept 12	sept 12	sept 12	sept 12	sept 12	sept 12
Area	4 25	4 25	4 25	4 25	4 25	4 25
Time Start (Lst)	658	824	1048	1248	1452	1638
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	49	49	49	49	49	49
(Min)	16.8	18.8	16.6	14.5	14.5	17.9
W. Long. (Deg)	127	127	127	127	127	127
(Min)	7.2	8.6	5.1	3.5	1.9	.5
Finish N. Lat. (Deg)	49	49	49	49	49	49
(Min)	17.7	17.7	15.5	13.4	13.6	16.9
W.Long. (Deg)	127	127	127	127	127	126
(Min)	8.6	6.9	3.5	2.0	.2	58.8
Direction (Deg.True)	300	120	120	130	116	122
Length Of Set Km.	1.3	1.6	1.5	1.4	1.4	1.5
Depth (Modal, fa)	130	110	110	120	100	80
Rockfish						
P. Ocean Perch	425	115	6	146	3	..
Splitnose	5	..	2	59	5	..
Sharpchin	5	27	22	30	45	16
Yellowmouth	..	..	..	..	..	..
Redstripe	..	46	9	..	15	104
Silvergray	..	16	12	10	158	39
Yellowtail	..	1	6	5	3	44
Canary	..	8	14	..	79	5
SS. Thornyhead	10	1	..	5	2	1
Greenstripe	..	17	14	20	18	13
Redbanded	24	3	..	..	2	..
Bocaccio	..	9	3	10	34	17
OTHERS	2	8	3	7	2	..
Roundfish						
Blackcod	63	17	58	111	23	3
Hake	10	2	..	15	3	5
Lingcod	..	..	8	..	..	..
Pacific Cod	5	2	13	..	..	5
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	190	60	183	131	18	133
Dover Sole	12	9	16	87	22	18
Halibut	..	15	..	..	..	..
Rex Sole	19	14	61	54	12	9
English Sole	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
UNKNOWN GROUP						
OTHERS	2	3	7	37	10	..
Total Catch (Kg)	773	373	437	727	455	412
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	13	14	15	16	17	18
Date	sept 12	sept 13	sept 13	sept 13	sept 13	sept 13
Area	4 25	4 25	4 25	4 25	4 25	4 25
Time Start (Lst)	1802	658	806	946	1123	1319
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	49	49	49	49	49	49
(Min)	16.7	14.5	11.4	10.3	9.0	9.1
W. Long. (Deg)	126	126	126	126	126	126
(Min)	56.9	56.8	56.9	58.5	58.2	54.9
Finish N. Lat. (Deg)	49	49	49	49	49	49
(Min)	15.6	13.4	10.2	9.2	7.9	8.0
W.Long. (Deg)	126	126	126	126	126	126
(Min)	55.2	55.2	55.5	56.9	56.9	53.7
Direction (Deg.True)	120	120	125	120	115	115
Length Of Set Km.	1.6	1.6	1.5	1.5	1.4	1.3
Depth (Modal, fa)	80	90	110	150	190	120
Rockfish						
P. Ocean Perch	..	..	33	54	63	13
Splitnose	..	..	17	3	..	248
Sharpchin	..	..	..	..	..	..
Yellowmouth	..	..	..	..	..	..
Redstripe	5	..	..	..	..	..
Silvergray	..	4	10	..	..	..
Yellowtail	3	..	2	..	..	..
Canary	4	2	5	..	..	..
SS. Thornyhead	..	..	..	2	4	..
Greenstripe	1	7	6	2	..	..
Redbanded	..	17	12	2	..	12
Bocaccio	..	..	4	4	..	13
OTHERS	..	..	4	..	3	2
Roundfish						
Blackcod	..	12	22	8	30	50
Hake	..	..	10	45	..	..
Lingcod	21	..	..	..	..	..
Pacific Cod	..	..	..	..	..	3
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	1	..
Flatfish						
Turbot	140	96	114	68	213	103
Dover Sole	..	8	6	8	47	2
Halibut	..	..	..	..	..	43
Rex Sole	7	14	8	11	37	2
English Sole	..	..	..	..	..	7
OTHERS	3	..	..	..	..	..
UNKNOWN GROUP						
OTHERS	4	11	21	8	4	2
Total Catch (Kg)	188	171	274	215	402	500
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	19	20	21	22	23	24
Date	sept 13	sept 13	sept 13	sept 14	sept 14	sept 14
Area	4 25	4 25	4 25	4 25	4 25	4 25
Time Start (Lst)	1442	1627	1748	705	843	1052
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	49	49	49	49	49	49
(Min)	8.1	9.2	6.0	3.8	2.7	1.5
W. Long. (Deg)	126	126	126	126	126	126
(Min)	55.3	51.9	52.0	53.4	53.4	51.6
Finish N. Lat. (Deg)	49	49	49	49	49	49
(Min)	7.1	8.2	5.0	2.8	1.7	.6
W.Long. (Deg)	126	126	126	126	126	126
(Min)	54.0	50.3	50.2	51.9	51.8	50.1
Direction (Deg.True)	108	123	110	115	110	108
Length Of Set Km.	1.4	1.5	1.5	1.4	1.5	1.3
Depth (Modal, fa)	130	90	110	180	220	220
Rockfish						
P. Ocean Perch	45	26	613	15	6	8
Splitnose	46	..	..	..	..	..
Sharpchin	..	..	48	..	..	..
Yellowmouth	..	..	117	..	..	..
Redstripe	..	106	..	..	..	..
Silvergray	..	1	18	..	..	..
Yellowtail	..	3	..	..	..	..
Canary	..	8	7	..	..	..
SS. Thornyhead	3	1	..	2	7	6
Greenstripe	..	5	22	..	..	..
Redbanded	9	2	4	6	4	..
Bocaccio	..	..	..	..	..	..
OTHERS	2	1	7	9	14	26
Roundfish						
Blackcod	16	10	147	31	16	9
Hake	68	7	7	5	1	6
Lingcod	..	..	..	..	..	..
Pacific Cod	..	..	..	..	..	..
Walleye Pollock	..	..	4	..	..	..
OTHERS	..	..	..	..	..	1
Flatfish						
Turbot	133	91	73	37	13	19
Dover Sole	10	3	11	23	40	42
Halibut	11	..	50	..	62	..
Rex Sole	2	16	4	35	9	6
English Sole	3	6	..	..	..	..
OTHERS	..	2	..	..	..	..
UNKNOWN GROUP						
OTHERS	7	10	4	4	5	10
Total Catch (Kg)	355	298	1136	167	177	133
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	25	26	27	28	29	30
Date	sept 14	sept 14	sept 14	sept 15	sept 15	sept 15
Area	4 25	4 25	4 25	3 24	3 24	3 24
Time Start (Lst)	1218	15	1724	655	801	929
Duration(Hr.Min)	.30	.30	.30	.27	.30	.30
Start N. Lat. (Deg)	49	49	49	49	49	48
(Min)	3.9	2.8	5.0	5.1	.9	59.6
W. Long. (Deg)	126	126	126	126	126	126
(Min)	48.7	46.9	43.6	42.1	37.0	40.3
Finish N. Lat. (Deg)	49	49	49	49	49	49
(Min)	2.9	1.9	3.9	4.0	.9	.7
W.Long. (Deg)	126	126	126	126	126	126
(Min)	47.1	45.4	42.0	40.8	34.9	42.0
Direction (Deg.True)	100	122	108	100	071	203
Length Of Set Km.	1.4	1.4	1.5	1.4	1.4	1.7
Depth (Modal, fa)	110	110	80	80	90	110
Rockfish						
P. Ocean Perch	162	210	9	..	..	53
Splitnose	..	..	..	..	..	594
Sharpchin	36	32	..	..	60	13
Yellowmouth	44	..	..	..	..	..
Redstripe	8	4	11	..	11	..
Silvergray	6	64	45	11	17	..
Yellowtail	..	..	2	..	82	27
Canary	..	..	7	258	80	10
SS. Thornyhead	6	1	..	..	2	3
Greenstripe	17	16	34	11	17	13
Redbanded	2	15	..	..	3	7
Bocaccio	..	..	..	6	4	..
OTHERS	20	4	6	..	8	..
Roundfish						
Blackcod	17	12	5	..	..	7
Hake	..	..	..	..	..	..
Lingcod	..	..	18	33	11	..
Pacific Cod	5	..	5	4	10	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	17	9	143	83	94	106
Dover Sole	2	11	13	4	1	17
Halibut	..	..	..	..	..	..
Rex Sole	2	12	7	2	3	23
English Sole	..	..	..	4	19	17
OTHERS	..	..	..	4	5	20
UNKNOWN GROUP						
OTHERS	2	8	8	..	2	..
Total Catch (Kg)	346	398	313	420	429	909
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	31	32	33	34	35	36
Date	sept 15	sept 15	sept 15	sept 15	sept 16	sept 16
Area	3 24	3 24	3 24	3 24	3 24	3 24
Time Start (Lst)	1104	1305	1435	1612	709	904
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	59.6	59.5	59.2	58.3	56.9	57.5
W. Long. (Deg)	126	126	126	126	126	126
(Min)	43.7	41.6	39.9	39.3	41.8	32.0
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	59.5	58.7	60.0	57.4	56.9	56.3
W.Long. (Deg)	126	126	126	126	126	126
(Min)	41.8	41.9	38.3	40.8	39.6	31.3
Direction (Deg.True)	111	115	000	175	075	115
Length Of Set Km.	1.5	1.7	1.5	1.5	1.5	1.4
Depth (Modal, fa)	150	300	140	210	220	110
Rockfish						
P. Ocean Perch	120	164	81	19	5	26
Splitnose	32	119	255	14	..	16
Sharpchin	2	..	..	..	..	432
Yellowmouth	..	..	..	..	..	463
Redstripe	..	..	..	..	..	26
Silvergray	..	..	..	..	..	172
Yellowtail	..	..	..	..	..	26
Canary	..	..	..	..	..	16
SS. Thornyhead	8	5	12	12	4	16
Greenstripe	..	2	..	..	..	21
Redbanded	7	19	12	4	..	10
Bocaccio	..	..	..	..	..	94
OTHERS	..	32	19	12	28	15
Roundfish						
Blackcod	29	6	26	26	6	..
Hake	22	..	8	3	4	..
Lingcod	..	..	..	..	..	..
Pacific Cod	..	..	..	..	..	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	87	78	26	16	..	244
Dover Sole	38	32	14	95	14	16
Halibut	..	..	..	..	11	..
Rex Sole	21	21	2	4	1	..
English Sole	13	14	..	..	..	..
OTHERS	2	3	..	..	4	..
UNKNOWN GROUP						
OTHERS	1	5	2	7	22	..
Total Catch (Kg)	382	500	455	212	99	1591
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	37	38	39	40	41	42
Date	sept 16	sept 16	sept 16	sept 16	sept 16	sept 16
Area	3 24	3 24	3 24	3 24	3 24	3 24
Time Start (Lst)	1042	1151	1252	1441	1557	1719
Duration(Hr.Min)	.30	.30	.30	.28	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	57.5	57.7	54.2	56.4	55.4	54.2
W. Long. (Deg)	126	126	126	126	126	126
(Min)	29.9	25.5	22.2	31.3	31.5	31.4
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	56.1	56.3	53.0	55.2	54.0	52.8
W.Long. (Deg)	126	126	126	126	126	126
(Min)	29.8	24.2	20.6	31.8	31.4	31.1
Direction (Deg.True)	180	139	135	100	170	158
Length Of Set Km.	1.5	1.5	1.6	1.3	1.5	1.5
Depth (Modal, fa)	90	80	80	120	100	110
Rockfish						
P. Ocean Perch	..	..	1	51	126	453
Splitnose	..	..	..	22	..	11
Sharpchin	..	..	..	81	84	21
Yellowmouth	10	..	..	1596	1751	217
Redstripe	47	3	..	..	8	18
Silvergray	5	1	..	390	328	50
Yellowtail	..	1	1	15	51	7
Canary	104	..	..	..	17	7
SS. Thornyhead	5	..	..	..	8	29
Greenstripe	42	2	1	..	8	29
Redbanded	..	..	..	..	8	7
Bocaccio	..	..	..	..	25	..
OTHERS	31	..	4	..	8	..
Roundfish						
Blackcod	31	2	3	37	..	96
Hake	..	8	60	..	..	4
Lingcod	26	..	..	..	..	..
Pacific Cod	26	..	..	..	..	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	1655	58	39	29	76	135
Dover Sole	5	4	8	..	..	4
Halibut	16	5	4	29	..	..
Rex Sole	..	3	5	..	..	4
English Sole	..	..	..	..	..	..
OTHERS	..	4	3	..	..	..
UNKNOWN GROUP						
OTHERS	42	13	18	22	..	..
Total Catch (Kg)	2045	104	147	2273	2500	1091
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	43	44	45	46	47	48
Date	sept 20	sept 20	sept 20	sept 20	sept 20	sept 20
Area	3 23	3 23	3 23	3 23	3 23	3 23
Time Start (Lst)	710	824	938	1101	1230	1426
Duration(Hr.Min)	.30	.28	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	14.8	15.8	16.4	17.8	17.7	17.7
W. Long. (Deg)	125	125	125	125	125	125
(Min)	48.0	44.6	49.2	51.6	54.2	46.3
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	15.3	15.6	17.5	18.8	19.0	19.0
W.Long. (Deg)	125	125	125	125	125	125
(Min)	45.9	46.4	50.0	53.2	53.1	45.4
Direction (Deg.True)	048	000	000	293	005	010
Length Of Set Km.	1.5	1.4	1.6	1.5	1.5	1.6
Depth (Modal, fa)	130	130	130	120	130	100
Rockfish						
P. Ocean Perch	3269	547	2104	3364	1061	6
Splitnose	47	42	729	359	..	..
Sharpchin	59	34	21	449	54	..
Yellowmouth	..	..	..	75	44	..
Redstripe	..	..	..	30	..	189
Silvergray	..	..	..	..	..	..
Yellowtail	..	..	11	..	..	11
Canary	..	..	..	..	..	20
SS. Thornyhead	..	68	11	..	..	..
Greenstripe	..	8	..	15	10	28
Redbanded	..	31	32	..	..	..
Bocaccio	..	..	63	60	25	..
OTHERS	71	33	21	30	10	40
Roundfish						
Blackcod	190	11	116	120	232	102
Hake	..	11	11	..	20	..
Lingcod	..	34	..	..	..	..
Pacific Cod	..	..	..	..	..	6
Walleye Pollock	..	..	11	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	..	31	32	..	..	212
Dover Sole	..	40	..	15	..	11
Halibut	..	..	..	..	125	..
Rex Sole	..	8	..	..	..	..
English Sole	..	..	..	30	..	11
OTHERS	..	8	..	..	..	..
UNKNOWN GROUP						
OTHERS	..	..	21	..	10	274
Total Catch (Kg)	3636	909	3182	4545	1591	909
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	49	50	51	52	53	54
Date	sept 20	sept 20	sept 21	sept 21	sept 21	sept 21
Area	3 23	3 23	3 23	3 23	3 23	3 23
Time Start (Lst)	1618	1726	702	858	1005	1120
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	18.6	19.8	21.0	27.0	25.1	24.8
W. Long. (Deg)	125	125	125	125	125	125
(Min)	46.3	46.2	49.4	54.4	56.1	57.9
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	19.8	20.7	21.3	26.6	24.5	23.6
W.Long. (Deg)	125	125	125	125	125	125
(Min)	47.6	47.8	46.8	56.5	58.0	59.4
Direction (Deg.True)	201	000	067	000	000	000
Length Of Set Km.	1.5	1.5	1.8	1.5	1.6	1.6
Depth (Modal, fa)	90	80	80	80	130	120
Rockfish						
P. Ocean Perch	..	..	..	..	462	610
Splitnose	..	..	..	..	194	768
Sharpchin	..	20	..	59	151	11
Yellowmouth	..	..	..	..	..	..
Redstripe	7	1624	1147	107	..	..
Silvergray	..	59	..	6	..	11
Yellowtail	..	274	813	6	..	..
Canary	..	215	73	22	..	..
SS. Thornyhead	..	..	..	..	16	33
Greenstripe	8	39	..	4	..	..
Redbanded	2	..	..	5	128	5
Bocaccio	..	..	..	..	..	..
OTHERS	2	59	..	..	55	10
Roundfish						
Blackcod	19	372	450	60	27	82
Hake	..	..	..	15	..	..
Lingcod	..	20	..	5	..	22
Pacific Cod	2	20	29	8	..	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	97	..	58	160	54	103
Dover Sole	3	..	29	29	12	11
Halibut	..	..	43	..	..	..
Rex Sole	..	..	..	10	8	..
English Sole	55	..	15	1	..	..
OTHERS	..	..	29	..	..	..
UNKNOWN GROUP						
OTHERS	139	3209	1859	39	31	38
Total Catch (Kg)	334	5909	4545	536	1136	1705
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	55	56	57	58	59	60
Date	sept 21	sept 21	sept 21	sept 21	sept 21	sept 22
Area	3 23	3 23	3 23	3 23	3 23	3 23
Time Start (Lst)	1243	1359	1521	1647	1810	656
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	23.9	23.8	22.6	24.2	23.1	25.0
W. Long. (Deg)	125	126	126	126	126	126
(Min)	59.1	1.0	1.5	5.9	7.5	5.6
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	23.7	23.9	22.0	25.4	24.1	26.2
W.Long. (Deg)	126	126	126	126	126	126
(Min)	.9	3.2	3.1	7.3	9.0	7.1
Direction (Deg.True)	000	215	000	290	313	324
Length Of Set Km.	1.5	1.5	1.5	1.5	1.4	1.6
Depth (Modal, fa)	140	120	130	140	190	130
Rockfish						
P. Ocean Perch	438	964	48	371	207	363
Splitnose	45	545	5	17	..	19
Sharpchin	22	12	..	1	..	7
Yellowmouth	..	..	..	..	..	..
Redstripe	..	18	..	..	..	..
Silvergray	..	..	..	3	..	..
Yellowtail	..	..	1	..	..	..
Canary	..	..	..	..	..	..
SS. Thornyhead	98	36	19	29	30	9
Greenstripe	3	18	..	..	..	14
Redbanded	14	24	2	4	2	2
Bocaccio	..	..	..	..	..	..
OTHERS	17	18	1	7	24	..
Roundfish						
Blackcod	6	18	36	16	5	71
Hake	..	..	5	4	3	5
Lingcod	11	..	..	..	..	..
Pacific Cod	..	..	..	1	..	5
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	137	152	41	49	..	182
Dover Sole	11	6	82	18	88	2
Halibut	..	..	..	..	..	..
Rex Sole	..	..	11	12	46	2
English Sole	..	..	..	..	..	..
OTHERS	6	..	..	..	49	..
UNKNOWN GROUP						
OTHERS	11	6	19	2	..	..
Total Catch (Kg)	818	1818	270	534	455	682
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	61	62	63	64	65	66
Date	sept 22	sept 22	sept 22	sept 22	sept 22	sept 22
Area	3 23	3 23	3 23	3 23	3 23	3 23
Time Start (Lst)	714	927	1037	1157	1324	1447
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	26.2	27.5	27.6	26.3	27.3	27.4
W. Long. (Deg)	126	126	126	126	126	126
(Min)	7.6	7.6	7.4	5.1	4.0	3.6
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	27.7	28.7	26.2	27.7	28.5	28.8
W.Long. (Deg)	126	126	126	126	126	126
(Min)	8.4	8.8	6.0	5.4	5.1	4.3
Direction (Deg.True)	328	323	133	000	310	000
Length Of Set Km.	1.5	1.5	1.6	1.5	1.5	1.6
Depth (Modal, fa)	130	130	120	110	100	100
Rockfish						
P. Ocean Perch	603	493	898	66	10	..
Splitnose	46	2	8	..	..	..
Sharpchin	..	..	..	..	..	..
Yellowmouth	..	..	..	..	..	..
Redstripe	..	..	..	..	..	..
Silvergray	..	5	..	..	10	13
Yellowtail	..	..	..	..	..	2
Canary	..	..	..	2	2	1
SS. Thornyhead	9	2	11	2	..	..
Greenstripe	3	2	8	46	62	19
Redbanded	..	..	..	..	..	..
Bocaccio	..	9	15	..	..	..
OTHERS	..	..	15	..	1	1
Roundfish						
Blackcod	6	48	38	43	45	46
Hake	6	..	..	1	2	3
Lingcod	11	..	..	..	3	32
Pacific Cod	..	7	..	3	12	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	129	101	91	40	48	70
Dover Sole	3	..	..	3	17	14
Halibut	..	..	..	..	..	..
Rex Sole	..	..	..	1	11	3
English Sole	..	..	..	..	..	..
OTHERS	..	..	..	1	1	..
UNKNOWN GROUP						
OTHERS	3	12	53	22	30	21
Total Catch (Kg)	818	682	1136	230	254	225
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	67	68	69	70	71	72
Date	sept 22	sept 22	sept 23	sept 23	sept 23	sept 23
Area	3 23	3 23	3 23	3 23	3 23	3 23
Time Start (Lst)	1554	1702	703	802	913	1023
Duration(Hr.Min)	.30	.30	.30	.30	.30	.26
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	27.4	30.4	30.5	31.6	32.8	34.1
W. Long. (Deg)	125	126	126	126	126	126
(Min)	59.8	4.0	6.1	5.9	11.8	9.6
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	28.6	31.6	31.8	32.9	33.9	35.2
W.Long. (Deg)	126	126	126	126	126	126
(Min)	1.1	5.4	7.6	7.3	11.4	9.1
Direction (Deg.True)	338	317	330	322	057	037
Length Of Set Km.	1.5	1.5	1.6	1.6	1.7	1.3
Depth (Modal, fa)	90	90	100	90	240	130
Rockfish						
P. Ocean Perch	..	..	..	..	..	93
Splitnose	..	..	..	..	..	52
Sharpchin	42	5	..	..	..	22
Yellowmouth	..	..	..	..	..	..
Redstripe	1	..	4	4	..	..
Silvergray	31	..	3	1	..	..
Yellowtail	2	..	..	..	..	..
Canary	21	7	12	2	3	..
SS. Thornyhead	..	..	1	1	35	17
Greenstripe	36	6	25	14	..	..
Redbanded	5	1	2	3	..	4
Bocaccio	..	..	3	..	..	..
OTHERS	21	1	15	12	36	33
Roundfish						
Blackcod	12	..	81	30	34	..
Hake	57	..	1	3	..	..
Lingcod	..	5	..	5	3	..
Pacific Cod	1	..	2	1	..	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
Flatfish						
Turbot	36	24	73	65	79	18
Dover Sole	6	9	20	25	68	11
Halibut	..	..	..	..	..	8
Rex Sole	3	2	10	8	8	2
English Sole	..	..	..	1	..	..
OTHERS	..	..	..	..	..	..
UNKNOWN GROUP						
OTHERS	9	4	3	4	3	2
Total Catch (Kg)	283	64	255	179	269	262
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	73	74	75	76	77	78
Date	sept 23	sept 23	sept 23	sept 23	sept 23	sept 24
Area	3 23	3 23	3 23	3 23	3 23	3 23
Time Start (Lst)	1203	1326	1440	1606	1711	716
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	37.1	37.3	37.7	38.1	40.2	40.3
W. Long. (Deg)	126	126	126	126	126	126
(Min)	13.2	12.0	11.3	7.8	15.1	12.2
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	38.4	38.6	38.9	39.3	41.6	41.5
W.Long. (Deg)	126	126	126	126	126	126
(Min)	13.8	12.2	12.0	9.2	15.0	14.0
Direction (Deg.True)	375	021	337	331	008	319
Length Of Set Km.	1.5	1.6	1.3	1.6	1.6	1.7
Depth (Modal, fa)	220	80	100	80	130	90
Rockfish						
P. Ocean Perch	11	1670	121	3	1033	12
Splitnose	..	271	61	..	440	..
Sharpchin	..	341	1937	1	216	6
Yellowmouth	..	..	..	..	..	..
Redstripe	..	..	..	..	..	8
Silvergray	..	..	43	..	..	..
Yellowtail	..	..	..	2	..	3
Canary	..	..	35	..	..	11
SS. Thornyhead	18	26	26	..	56	5
Greenstripe	..	..	..	..	..	3
Redbanded	1	17	52	..	..	3
Bocaccio	..	..	69	5	..	8
OTHERS	69	79	26	..	7	..
Roundfish						
Blackcod	72	35	35	4	..	6
Hake	..	9	..	23	21	2
Lingcod	..	..	..	..	..	..
Pacific Cod	..	..	..	..	..	7
Walleye Pollock	..	..	..	..	..	..
OTHERS	1	..	..	1	..	..
Flatfish						
Turbot	29	26	17	93	202	35
Dover Sole	87	26	17	16	56	29
Halibut	..	..	280	..	..	17
Rex Sole	11	..	9	16	14	38
English Sole	..	..	..	..	..	4
OTHERS	..	..	..	5	..	5
UNKNOWN GROUP						
OTHERS	33	..	..	68	..	2
Total Catch (Kg)	332	2500	2727	237	2045	204
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	79	80	81	82	83	84
Date	sept 24	sept 24	sept 24	sept 24	sept 24	sept 24
Area	3 23	3 23	3 24	3 24	3 24	3 24
Time Start (Lst)	808	941	1124	1253	1431	1550
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	42.4	41.6	44.4	46.4	45.1	46.7
W. Long. (Deg)	126	126	126	126	126	126
(Min)	14.9	16.7	16.6	17.4	19.1	19.2
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	43.9	43.0	45.9	46.3	45.0	47.6
W.Long. (Deg)	126	126	126	126	126	126
(Min)	15.4	16.3	17.2	19.6	21.3	20.9
Direction (Deg.True)	345	000	000	273	236	334
Length Of Set Km.	1.8	1.6	1.7	1.5	1.5	1.6
Depth (Modal, fa)	120	130	100	110	250	100
Rockfish						
P. Ocean Perch	590	24	456	172	..	107
Splitnose	362	..	19	561	..	669
Sharpchin	456	..	1037	375	..	167
Yellowmouth	..	..	..	..	..	9
Redstripe	..	..	12	..	..	64
Silvergray	..	..	..	..	..	..
Yellowtail	..	..	..	..	..	..
Canary	33	..	19	..	..	..
SS. Thornyhead	17	28	19	41	16	9
Greenstripe	6	..	6	36	..	30
Redbanded	11	..	..	23	1	4
Bocaccio	..	..	..	..	..	..
OTHERS	17	36	87	23	7	8
Roundfish						
Blackcod	22	217	69	41	242	56
Hake	..	..	..	..	2	..
Lingcod	..	..	..	..	..	..
Pacific Cod	..	..	31	..	..	4
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	3	..	..	1	..
Flatfish						
Turbot	50	121	56	41	96	..
Dover Sole	17	78	..	5	52	..
Halibut	..	18	..	48	..	..
Rex Sole	6	13	6	..	4	9
English Sole	..	..	..	..	..	..
OTHERS	6	..	..	..	..	..
UNKNOWN GROUP						
OTHERS	..	10	..	..	7	..
Total Catch (Kg)	1591	548	1818	1364	428	1136
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	85	86	87	88	89	90
Date	sept 24	sept 25	sept 25	sept 25	sept 25	sept 25
Area	3 24	3 24	3 24	3 24	3 24	3 24
Time Start (Lst)	1711	726	842	954	1111	1251
Duration(Hr.Min)	.30	.30	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	48.8	47.8	47.7	47.9	45.8	47.7
W. Long. (Deg)	126	126	126	126	126	126
(Min)	17.5	23.7	28.8	30.4	30.5	32.1
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	50.0	48.7	47.1	46.9	46.7	48.7
W.Long. (Deg)	126	126	126	126	126	126
(Min)	18.7	25.4	26.8	28.7	32.2	33.4
Direction (Deg.True)	332	303	131	134	000	313
Length Of Set Km.	1.5	1.5	1.5	1.5	1.4	1.4
Depth (Modal, fa)	80	120	140	150	200	170
Rockfish						
P. Ocean Perch	11	701	182	243	133	270
Splitnose	..	20	1	3	..	..
Sharpchin	..	36	2	..	..	..
Yellowmouth	2	..	..	..	..	..
Redstripe	..	8	..	..	..	..
Silvergray	..	..	3	..	..	..
Yellowtail	9	..	..	..	..	..
Canary	..	..	..	..	..	..
SS. Thornyhead	..	8	16	2	9	13
Greenstripe	3	16	..	..	..	..
Redbanded	2	4	5	..	3	11
Bocaccio	..	..	..	5	..	..
OTHERS	8	12	30	12	73	6
Roundfish						
Blackcod	23	135	14	2	6	4
Hake	4	..	4	9	15	5
Lingcod	..	..	..	..	..	..
Pacific Cod	..	4	3	2	..	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	1	..	..	..
Flatfish						
Turbot	65	123	87	67	45	60
Dover Sole	29	16	17	7	62	13
Halibut	..	..	4	..	..	..
Rex Sole	6	4	3	2	21	7
English Sole	..	..	..	..	..	..
OTHERS	..	..	..	..	10	..
UNKNOWN GROUP						
OTHERS	1	52	..	5	20	6
Total Catch (Kg)	163	1136	372	359	397	395
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	91	92	93	94	95	96
Date	sept 25	sept 25	sept 25	sept 25	sept 26	sept 26
Area	3 24	3 24	3 24	3 24	3 24	3 24
Time Start (Lst)	1410	1517	1626	1727	705	817
Duration(Hr.Min)	.30	.30	.30	.30	.30	.28
Start N. Lat. (Deg)	48	48	48	48	48	48
(Min)	48.8	48.9	48.9	50.1	51.1	51.2
W. Long. (Deg)	126	126	126	126	126	126
(Min)	31.9	30.3	26.9	30.5	35.1	33.6
Finish N. Lat. (Deg)	48	48	48	48	48	48
(Min)	47.8	47.8	49.8	51.3	52.0	52.1
W.Long. (Deg)	126	126	126	126	126	126
(Min)	30.1	28.6	28.4	31.6	33.4	31.8
Direction (Deg.True)	132	138	310	313	000	048
Length Of Set Km.	1.5	1.5	1.4	1.5	1.5	1.5
Depth (Modal, fa)	140	120	100	110	210	70
Rockfish						
P. Ocean Perch	831	1260	74	1403	16	626
Splitnose	7	..	..	..	..	21
Sharpchin	7	71	1	12	..	..
Yellowmouth	..	54	1	41	..	..
Redstripe	..	..	2	6	..	..
Silvergray	..	11	6	104	..	..
Yellowtail	..	11	1	12	..	..
Canary	..	..	..	..	..	..
SS. Thornyhead	7	..	1	..	10	3
Greenstripe	..	16	14	..	..	..
Redbanded	7	5	..	..	..	..
Bocaccio	..	..	..	23	..	..
OTHERS	23	22	11	24	33	19
Roundfish						
Blackcod	..	49	15	29	..	..
Hake	3	..	..	..	7	8
Lingcod	..	..	6	..	..	..
Pacific Cod	..	..	8	12	..	..
Walleye Pollock	..	..	..	..	..	..
OTHERS	..	..	..	..	1	..
Flatfish						
Turbot	16	65	52	12	118	35
Dover Sole	3	..	8	..	28	3
Halibut	..	27	..	233	32	11
Rex Sole	3	..	3	..	10	3
English Sole	..	..	..	..	..	..
OTHERS	..	..	..	..	..	..
UNKNOWN GROUP						
OTHERS	3	..	19	..	24	..
Total Catch (Kg)	909	1591	222	1909	279	727
Remarks	usable	usable	usable	usable	usable	usable

APPENDIX TABLE 1 CONTINUED.

Haul No.	97	98	99	100
Date	sept 26	sept 26	sept 26	sept 26
Area	3 24	3 24	3 24	3 24
Time Start (Lst)	922	1038	1200	1311
Duration(Hr.Min)	.30	.30	.30	.30
Start N. Lat. (Deg)	48	48	48	48
(Min)	52.2	53.3	55.3	51.0
W. Long. (Deg)	126	126	126	126
(Min)	31.4	32.6	25.5	27.2
Finish N. Lat. (Deg)	48	48	48	48
(Min)	53.8	54.6	54.2	49.9
W.Long. (Deg)	126	126	126	126
(Min)	31.3	32.3	23.8	25.6
Direction (Deg.True)	000	000	136	132
Length Of Set Km.	1.6	1.4	1.5	1.6
Depth (Modal, fa)	120	250	80	90
Rockfish				
P. Ocean Perch	1162	..	..	..
Splitnose	175	..	..	..
Sharpchin	11	..	..	258
Yellowmouth	39	..	..	15
Redstripe	..	..	..	154
Silvergray	..	..	..	83
Yellowtail	11	..	3	43
Canary	..	..	..	9
SS. Thornyhead	17	22	..	..
Greenstripe	11	..	12	49
Redbanded	..	..	..	3
Bocaccio	28	..	..	9
OTHERS	..	10	2	101
Roundfish				
Blackcod	51	60	58	15
Hake	..	..	15	9
Lingcod	..	..	2	3
Pacific Cod	..	..	..	9
Walleye Pollock	..	..	..	..
OTHERS	..	..	..	..
Flatfish				
Turbot	39	134	33	28
Dover Sole	6	41	12	9
Halibut	22	4	..	..
Rex Sole	6	4	..	6
English Sole	..	..	1	..
OTHERS	..	..	..	..
UNKNOWN GROUP				
OTHERS	12	2	9	12
Total Catch (Kg)	1591	277	147	818
Remarks	usable	usable	usable	usable

Appendix Table 2. Number at length (cm) by species, haul, and sex for rockfish (*Sebastes sp.*) and shortspine thornyhead (*Sebastolobus alascanus*) collected during the rockfish survey off the west coast of Vancouver Island, September 9 - 27, 1996.

Species:	*Sebastes aleutianus*	
	Haul no.	
Fork	89	
Length (cm)	M	F
40	-	-
41	1	-
42	1	1
43	-	1
44	2	1
45	-	2
46	1	-
47	3	3
48	1	2
49	-	1
50	-	-
51	-	-
52	1	-
53	-	-
54	-	-
55	-	-
56	-	-
57	-	1
58	-	-
59	-	-
60	-	-
Total	10	12

Appendix Table 2 continued.

Species: *Sebastes alutus*

Fork	Haul no. 1		2		3		4		5		6		7		8		9		10		15	
Length (cm)	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	F	M	F	M	F
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
18	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1	-	-	1	-	-
19	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	2	-	-	-	3	-
20	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
24	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	1
27	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-	1	2	4
28	-	-	-	-	-	-	1	1	-	1	-	-	-	-	-	-	1	1	-	4	5
29	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	4	1	1	-
30	-	1	1	-	-	-	-	-	3	-	-	-	-	-	-	1	1	-	1	2	7
31	-	1	-	-	-	-	4	1	1	1	-	1	-	-	-	-	1	-	-	6	6
32	1	-	-	-	2	1	1	2	1	-	-	1	-	-	-	-	-	-	-	-	5
33	1	1	-	-	1	-	-	3	4	-	2	-	-	-	-	1	-	1	1	3	4
34	4	-	-	-	2	2	2	1	3	1	1	4	1	1	1	1	-	2	2	3	2
35	5	3	2	-	7	3	-	4	4	-	4	5	5	1	2	4	-	3	1	-	1
36	12	3	7	3	9	7	-	2	9	4	4	3	2	3	4	5	-	3	1	-	1
37	8	4	7	6	16	8	3	3	16	4	5	8	10	4	10	4	-	7	1	1	-
38	10	1	8	5	8	8	2	4	19	3	13	10	10	6	10	9	-	7	2	-	-
39	6	8	8	6	9	7	2	2	14	5	9	12	3	10	7	8	-	3	4	-	-
40	5	6	7	3	7	4	-	1	8	11	3	15	1	11	6	11	-	2	4	-	-
41	1	3	2	10	9	2	-	5	6	4	2	10	1	10	-	6	-	-	3	-	-
42	1	1	-	6	10	-	-	6	3	12	-	3	2	14	-	4	-	1	4	-	-
43	-	-	2	6	6	1	-	1	1	7	1	1	-	6	1	5	-	1	-	-	-
44	-	3	1	5	3	2	-	-	-	5	1	1	-	2	-	1	-	-	-	-	1
45	-	-	-	4	1	-	-	-	-	1	-	1	-	2	-	-	-	-	1	-	-
46	-	-	-	1	2	1	-	-	-	2	-	-	-	-	-	1	-	-	1	-	-
47	-	1	-	1	1	-	-	1	-	-	-	-	-	-	-	1	-	-	1	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	54	36	45	56	94	47	18	38	94	61	45	75	35	72	43	67	7	36	30	28	40

Appendix Table 2 continued.

Species: *Sebastes alutus*

Fork	Haul no.																				
	16		17		19		21		25		26		31		32		33		42		
Length (cm)	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
19	-	1	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-
20	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	2	2	1	1	-	-	-	-	-	-	-	-	-
26	-	2	-	-	-	-	-	-	-	1	2	-	1	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	2	2	-	2	-	-	1	-	-	-	-	-	-
28	-	1	-	1	-	-	-	-	1	1	-	3	-	1	-	-	1	-	-	-	-
29	1	1	-	-	-	-	-	-	6	3	1	3	-	-	-	-	-	-	-	-	-
30	-	3	-	-	-	-	-	-	3	2	1	-	-	-	-	-	-	-	-	-	-
31	-	2	-	-	1	-	-	-	-	1	3	-	-	-	2	1	-	-	-	-	1
32	-	3	-	-	-	-	-	-	1	2	1	1	1	-	2	1	-	-	-	-	-
33	1	1	-	-	-	1	-	1	-	1	1	1	1	1	1	-	-	-	-	-	1
34	1	-	2	-	1	1	-	-	-	-	1	3	1	-	2	1	2	-	-	-	1
35	2	-	7	1	-	2	-	1	4	-	1	2	14	2	7	1	2	-	-	-	2
36	4	4	4	3	2	4	1	-	4	1	1	1	13	1	3	3	1	-	1	-	1
37	3	6	9	5	4	7	3	1	-	4	2	2	17	5	7	2	4	1	4	3	3
38	3	1	3	6	-	2	-	2	3	5	1	12	5	8	3	3	4	1	-	10	3
39	3	1	4	6	-	3	-	1	-	12	-	16	3	8	5	2	4	3	-	7	8
40	1	1	1	8	1	3	1	7	-	7	-	17	3	7	3	6	-	-	6	12	-
41	-	7	2	1	-	3	1	17	1	17	-	27	-	8	-	7	1	-	-	8	-
42	-	5	1	-	-	3	1	15	-	12	1	7	-	9	-	7	-	2	1	5	-
43	-	1	-	2	-	1	1	18	-	3	-	11	-	7	-	7	-	-	2	9	-
44	-	1	-	-	-	-	-	12	-	7	-	2	1	2	-	7	-	3	-	10	-
45	-	1	-	-	-	-	-	9	-	7	-	4	-	2	-	3	-	3	-	5	-
46	-	-	-	-	-	-	-	12	-	3	-	4	-	1	-	-	-	-	-	7	-
47	-	-	-	-	-	-	-	8	-	1	-	3	-	1	-	-	-	-	-	2	-
48	-	-	-	-	-	-	-	2	-	1	-	1	-	-	-	-	-	-	-	3	-
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	19	43	33	33	9	30	8	106	37	99	17	125	60	63	36	51	19	13	15	81	20

Appendix Table 2 continued.

Species: *Sebastes alutus*

Fork	Haul no.																					
	43		44		45		46		47		53		54		55		56		57		58	
Length (cm)	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
28	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-
30	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
31	1	5	1	-	-	-	-	-	1	-	-	2	-	-	-	-	1	-	-	-	-	-
32	1	4	2	-	-	-	-	-	1	1	-	-	1	1	-	-	-	-	-	4	1	
33	-	3	2	-	-	-	2	-	-	-	-	2	-	-	-	-	1	-	-	1	2	
34	-	1	-	-	-	1	1	1	-	1	1	1	3	1	2	1	-	-	-	8	1	
35	-	2	3	-	-	2	-	2	1	1	-	1	2	3	4	1	-	1	-	5	5	
36	3	4	7	1	-	5	1	5	3	7	3	1	1	2	3	4	1	2	-	4	3	
37	10	4	4	6	1	10	4	18	6	11	7	10	3	3	1	10	-	-	-	10	6	
38	10	10	8	7	2	17	6	17	3	11	2	10	1	17	5	11	-	5	1	10	9	
39	10	9	4	4	5	16	10	7	7	13	8	13	3	11	4	9	3	6	3	8	3	
40	11	8	8	8	10	5	11	10	6	7	6	15	2	9	4	8	3	2	2	5	13	
41	11	3	1	3	17	3	7	2	11	3	4	7	3	5	7	4	4	4	1	1	7	
42	15	2	7	1	18	1	14	3	4	1	3	4	6	5	2	1	5	2	2	2	11	
43	7	2	3	-	-	-	1	2	4	2	6	3	2	3	8	1	9	-	4	1	6	
44	5	1	3	1	8	-	2	1	1	-	6	-	2	-	4	-	17	-	2	-	4	
45	1	1	3	-	3	-	3	-	5	-	4	-	1	-	5	-	5	-	1	-	3	
46	1	-	5	-	-	-	-	-	-	-	-	-	3	-	2	-	4	-	-	-	2	
47	1	-	-	-	2	-	1	-	-	-	-	-	1	-	-	-	2	-	-	-	-	
48	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	87	62	66	31	66	60	63	68	53	58	51	69	34	61	51	51	57	22	16	61	77	

Appendix Table 2 continued.

Species: *Sebastes alutus*

Fork	Haul no.																				
	60		61		62		63		64		72		74		77		78		79		
Length (cm)	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	1	-	-	-
18	-	-	-	-	-	-	-	-	1	5	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	7	9	-	-	-	-	-	-	1	3	-	-	-
20	1	-	-	-	-	-	-	-	5	6	-	-	-	-	-	-	-	1	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
23	-	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
24	2	1	-	-	-	-	-	-	5	-	-	-	-	-	-	-	1	-	-	-	-
25	-	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
26	2	2	-	1	-	-	-	-	2	3	-	-	-	-	-	-	2	1	-	-	-
27	3	-	1	-	1	-	1	-	5	3	-	-	-	-	-	-	1	1	-	-	-
28	5	9	3	1	1	1	2	1	4	6	-	-	-	-	-	-	-	1	-	-	-
29	12	10	1	1	2	1	-	2	5	4	-	-	-	-	-	-	6	2	-	-	-
30	7	8	2	1	-	-	-	-	5	10	1	-	-	-	-	-	-	2	-	-	-
31	6	8	1	2	1	-	-	1	-	2	-	-	-	-	-	-	3	-	-	-	-
32	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
33	1	-	2	-	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-
34	-	-	1	2	5	-	2	-	-	-	1	1	-	1	-	1	-	-	-	1	-
35	1	-	2	10	3	1	1	1	-	-	1	-	1	4	4	-	-	-	3	-	-
36	4	3	3	2	4	2	2	2	-	-	3	1	8	2	4	3	-	-	4	1	-
37	8	3	1	6	12	3	5	1	-	-	5	2	14	2	9	3	-	-	9	4	-
38	12	-	5	6	13	9	4	2	-	-	4	1	11	5	13	6	-	-	4	6	1
39	8	4	9	5	8	3	-	5	-	-	5	2	15	3	11	7	-	-	8	5	1
40	3	4	2	9	5	5	-	9	-	-	7	4	8	5	13	5	-	-	7	5	-
41	2	3	1	8	1	13	-	4	-	-	9	4	4	6	5	8	-	-	2	5	-
42	-	3	1	9	-	8	-	9	-	-	2	6	2	4	3	7	-	-	3	2	-
43	-	3	-	8	-	4	-	12	-	-	1	7	3	6	1	5	-	-	1	4	-
44	-	3	-	5	-	4	-	7	-	-	-	4	-	3	-	6	-	-	-	4	2
45	-	4	-	6	-	6	-	6	-	-	-	3	-	-	-	-	-	-	-	1	-
46	-	3	-	1	-	4	-	9	-	-	-	-	-	2	-	-	-	-	-	-	-
47	-	1	-	-	-	1	-	7	-	-	-	1	-	-	-	-	-	-	-	-	-
48	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	79	74	35	84	59	66	18	79	43	53	40	36	66	43	63	51	14	14	41	38	4

Appendix Table 2 continued.

Species: *Sebastes alutus*

Fork	Haul no.																					
	81		82		85		86		87		88		89		90		91		92		93	
Length (cm)	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
17	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
18	-	-	-	3	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3
19	-	-	-	1	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	5	3
20	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
21	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	1	1	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	4	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	2	1	1	2	1	-	2	-	-	-	-	-	-	-	-	-	-	-	1
26	-	1	1	-	2	4	3	2	1	1	-	-	-	-	-	-	-	-	-	-	1	-
27	-	1	-	3	2	8	11	3	1	23	1	1	-	-	-	1	-	-	-	2	3	
28	-	3	-	1	1	9	10	3	2	1	2	1	-	-	-	1	-	-	-	3	3	
29	-	3	1	1	-	5	13	5	7	1	1	2	1	-	-	3	1	-	-	2	3	
30	-	-	-	-	-	8	12	1	3	2	-	1	1	-	-	4	1	-	-	2	3	
31	-	-	3	-	1	6	4	4	1	3	1	2	-	-	-	1	-	1	2	1	4	
32	-	1	3	-	-	5	6	1	-	15	1	4	-	-	-	4	4	-	1	1	6	
33	2	-	1	-	-	2	3	1	-	27	1	5	-	1	-	2	1	1	1	1	4	
34	-	1	-	-	-	3	1	4	1	26	2	2	2	3	1	3	-	-	1	1	2	
35	1	-	3	-	-	5	-	3	2	21	5	18	2	8	2	13	6	1	2	1	1	
36	1	-	-	-	-	4	1	1	2	21	2	17	10	13	9	20	8	4	-	2	2	
37	5	-	-	-	-	13	3	8	7	11	7	11	4	8	8	12	13	10	6	7	1	
38	2	-	-	-	-	8	2	14	4	3	-	4	10	2	10	8	19	12	5	2	4	
39	1	-	-	-	-	9	5	10	5	2	3	3	6	2	14	1	13	9	7	8	4	
40	7	-	-	-	-	4	3	4	7	1	5	-	9	-	5	1	5	2	11	1	5	
41	4	-	-	-	-	-	3	2	7	-	3	2	8	-	9	1	3	6	6	3	3	
42	7	-	-	-	-	1	2	-	1	1	2	-	3	-	9	-	6	-	9	-	2	
43	6	-	-	-	-	1	-	-	2	-	1	-	3	-	9	-	2	1	5	-	3	
44	4	-	-	-	-	-	-	-	-	-	-	-	2	-	4	-	1	-	3	-	-	
45	2	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	
46	4	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
48	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
49	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	49	10	13	18	29	98	91	67	55	161	37	73	61	37	83	75	83	47	59	48	64	

Appendix Table 2 continued.

Species:	*Sebastes alutus*					
	Haul no.					
Fork	94		96		97	
Length (cm)	M	F	M	F	M	F
15	-	-	-	-	-	-
16	-	-	-	-	-	-
17	-	-	-	-	-	-
18	-	-	-	-	-	-
19	-	-	-	-	-	-
20	-	-	-	-	-	-
21	-	-	-	-	-	-
22	-	-	-	-	-	-
23	-	-	-	-	-	-
24	-	-	-	-	-	-
25	-	-	-	-	-	-
26	-	-	-	-	-	-
27	-	-	-	-	-	-
28	-	-	-	-	-	-
29	-	-	-	-	-	-
30	-	-	-	-	-	-
31	-	-	-	-	-	-
32	-	1	-	-	-	-
33	-	-	-	-	-	-
34	-	-	1	2	-	-
35	1	-	7	3	-	-
36	-	1	6	6	4	4
37	2	5	14	2	2	5
38	3	5	10	6	6	5
39	4	11	2	12	3	3
40	2	9	1	14	5	16
41	4	13	-	9	3	11
42	1	9	-	5	-	8
43	1	10	-	5	1	7
44	-	7	-	3	-	8
45	-	4	-	1	-	1
46	-	2	-	-	-	8
47	-	2	-	-	-	1
48	-	-	-	-	-	-
49	-	-	-	-	-	1
50	-	-	-	-	-	-
Total	18	79	41	68	24	78

Appendix Table 2 continued.

Species:	*Sebastes babcocki*	
	Haul no.	
Fork	1	
Length (cm)	M	F
25	-	-
26	1	1
27	-	-
28	-	-
29	-	1
30	-	-
31	-	-
32	-	1
33	1	-
34	-	-
35	-	-
36	3	-
37	3	-
38	-	-
39	-	-
40	-	-
41	-	-
42	-	1
43	-	-
44	-	-
45	1	-
46	-	-
47	-	-
48	-	-
49	1	-
50	-	-
51	-	-
52	-	-
53	-	-
54	-	1
55	-	-
Total	10	5

Appendix Table 2 continued.

Species: *Sebastes diploproa*

Fork	Haul no.																			
	1		2		6		10		15		18		30		79		82		84	
Length (cm)	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	1	1	1	-	-	2	-	-	-	-	-	-
16	-	-	-	-	-	-	1	-	3	3	3	-	1	2	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	2	2	1	1	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	1	-	2	3	-	-	-	1	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	2	1	1	-	1	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	2	3	2	-	-	1	-	-	-	-	1	-
22	-	2	-	-	-	1	1	-	5	3	-	-	1	1	-	1	1	-	-	-
23	5	3	5	-	1	-	-	1	2	3	7	4	7	4	-	-	-	-	2	-
24	6	6	12	5	13	4	2	6	2	2	20	9	21	18	1	1	3	-	15	2
25	2	6	13	3	17	7	7	15	5	1	13	22	19	18	8	2	3	2	15	5
26	3	7	11	11	12	6	6	15	4	3	9	31	13	14	4	4	3	3	5	11
27	3	6	1	4	6	4	12	4	1	2	5	13	7	13	2	2	2	3	3	7
28	-	3	-	1	-	3	4	4	2	-	3	7	2	-	3	-	4	1	3	2
29	1	5	-	1	1	-	1	2	-	-	2	5	3	2	-	-	-	6	-	2
30	6	8	-	-	-	-	-	-	-	-	-	3	1	2	1	1	2	1	1	2
31	3	1	-	-	-	-	-	-	-	-	1	-	-	3	-	2	1	3	-	-
32	1	5	-	-	-	-	-	-	-	-	-	1	-	-	2	4	-	1	-	1
33	3	1	-	-	-	-	-	-	-	-	-	-	-	4	2	-	2	1	-	-
34	-	1	-	-	-	-	-	-	-	-	-	-	-	2	5	-	-	1	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	1	-	1	-
36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
37	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	33	54	42	26	50	25	35	47	31	29	68	98	75	88	30	25	23	25	46	32

Appendix Table 2 continued.

Species:	*Sebastes proriger*													
	Haul no.													
Fork	8		12		20		48		49		51		100	
Length (cm)	1	2	1	2	1	2	1	2	1	2	1	2	1	2
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	1	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	1	-	3	1	-	-	-	-	-	-	-	-	-	-
25	1	-	4	2	1	-	-	-	3	-	-	-	-	-
26	-	1	8	3	2	-	4	-	2	-	1	-	1	-
27	5	-	16	9	9	-	12	1	1	1	3	1	2	-
28	9	1	16	7	8	1	8	3	8	1	9	2	6	-
29	7	4	16	12	12	1	17	5	9	5	7	3	8	-
30	5	1	9	11	10	4	10	7	6	4	5	1	10	3
31	4	6	3	16	4	9	5	10	3	4	4	6	4	3
32	-	7	-	4	3	15	2	12	-	10	2	6	2	8
33	2	10	-	1	-	14	-	13	-	20	-	15	-	4
34	3	6	-	1	-	10	-	8	-	15	-	12	-	5
35	-	4	-	1	-	8	-	13	-	10	-	13	-	2
36	-	5	-	-	-	4	-	4	-	9	-	11	-	2
37	-	-	-	1	-	1	-	3	-	3	-	7	-	1
38	-	-	-	-	-	-	-	3	-	4	-	4	-	-
39	-	-	-	-	-	1	-	1	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Total	37	46	75	69	49	68	58	83	32	87	31	81	33	28

Appendix Table 2 continued.

Species:	*Sebastes reedi*									
	Haul no.									
Fork	25		36		40		41		42	
Length (cm)	M	F	M	F	M	F	M	F	M	F
27	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-
31	-	-	1	-	-	-	-	-	-	-
32	-	1	-	-	-	-	-	-	-	-
33	1	-	-	1	-	-	-	-	-	-
34	2	-	2	-	-	-	1	1	-	-
35	-	-	1	1	-	-	-	3	-	-
36	1	2	-	-	1	1	7	2	1	1
37	1	2	1	1	4	1	1	2	1	1
38	1	1	1	-	1	3	1	1	1	-
39	-	1	1	-	1	2	-	2	1	-
40	1	1	-	-	3	6	2	1	1	-
41	1	-	2	3	6	3	3	3	1	1
42	1	3	-	8	7	7	7	7	2	-
43	1	1	2	4	9	11	7	8	-	5
44	-	-	1	8	2	9	9	9	-	3
45	-	-	3	5	6	10	3	7	1	5
46	-	1	1	2	3	11	1	3	-	4
47	-	3	-	2	3	3	3	2	-	-
48	-	-	-	-	2	-	-	-	-	1
49	-	-	-	-	-	-	1	-	-	-
50	-	-	1	-	1	-	1	-	-	-
51	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	-	1	-	-	-	-
53	-	-	-	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-	-
Total	10	16	17	35	49	68	47	51	9	21

Appendix Table 2 continued.

Species: *Sebastes zacentrus*

Fork	Haul no. 1		5		8		9		10		11		12		25		26		36		
Length (cm)	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-
19	-	-	1	-	7	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
20	-	-	1	-	4	3	-	1	-	-	-	-	1	-	1	-	8	1	-	-	-
21	1	-	4	-	10	3	1	3	-	-	1	1	1	-	1	-	6	-	1	-	-
22	1	1	3	-	10	13	5	7	3	-	5	-	9	-	1	1	13	4	2	-	-
23	-	-	1	-	6	11	3	4	-	-	4	7	6	4	4	1	8	6	1	-	-
24	1	-	-	-	16	10	3	5	3	1	8	7	6	-	2	2	7	10	2	2	-
25	5	-	1	1	6	2	4	4	1	1	18	9	3	3	5	2	7	8	8	1	-
26	4	1	-	1	2	6	1	4	-	4	7	8	2	8	4	2	6	7	14	2	6
27	10	10	-	-	2	3	3	6	4	-	4	9	-	4	2	1	3	8	3	5	6
28	6	2	-	-	-	2	1	3	2	3	2	5	1	2	6	2	-	6	5	3	-
29	7	1	-	-	-	-	-	7	3	2	-	-	-	1	1	6	2	2	8	3	3
30	-	7	-	-	-	3	1	8	-	-	-	2	1	-	-	13	-	6	1	4	-
31	-	4	-	-	-	1	-	2	-	1	-	-	-	1	2	5	-	3	3	8	-
32	-	4	-	-	-	-	-	2	-	1	-	2	-	1	-	8	-	4	-	13	-
33	1	-	-	-	-	1	-	-	-	3	-	-	-	-	-	6	-	1	-	4	-
34	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	4	-	-	-	3	-
35	-	1	-	-	-	-	-	-	-	1	-	-	-	-	1	1	-	2	-	4	-
36	1	-	-	-	-	-	-	-	-	1	-	-	-	1	-	1	-	-	-	2	-
37	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	37	35	11	2	66	60	22	58	16	19	49	50	30	25	30	55	64	68	48	57	15

Appendix Table 2 continued.

Species:	*Sebastes zacentrus*										
	Haul no.										
Fork	52		74		75		79		81		82
Length (cm)	F	M	F	M	F	M	F	M	F	M	F
10	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	1	-	-	-	-	-	-	-
22	-	-	-	-	1	1	-	1	-	1	-
23	-	1	-	3	-	1	-	2	-	5	-
24	-	-	-	4	-	2	-	5	-	6	1
25	-	1	-	8	-	1	-	2	2	6	-
26	-	5	-	9	-	1	1	5	3	5	1
27	-	5	5	10	3	4	3	7	4	6	2
28	-	5	1	6	2	3	1	1	3	4	1
29	-	1	5	2	4	1	2	3	5	2	2
30	2	1	2	-	9	3	1	1	3	4	5
31	8	-	1	-	5	-	3	-	5	1	4
32	12	1	6	-	7	1	5	-	4	1	6
33	22	-	6	-	5	-	4	-	1	2	5
34	17	-	5	-	7	-	4	-	-	-	3
35	11	-	6	-	10	1	2	-	6	-	3
36	5	-	7	-	3	-	2	-	1	1	1
37	-	-	-	-	-	-	1	-	-	-	-
38	-	-	-	-	1	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-
Total	77	20	44	43	57	19	29	27	37	44	34

Species: *Sebastolobus alascanus*

Fork	Haul no. 1		23		31		33		42		44		53				54		55			
Length (cm)	M	F	M	F	M	F	M	F	M	F	M	F	U	M	F	U	M	F	M	F	U	M
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	1	-
13	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-
14	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	2	-	-
15	-	1	1	-	-	1	1	-	-	-	4	5	2	-	-	-	-	1	5	2	-	-
16	-	-	1	-	-	-	-	-	-	-	8	1	2	-	-	-	-	-	6	5	-	-
17	-	-	-	-	-	1	-	-	-	-	7	4	-	-	-	-	1	-	7	4	1	1
18	1	-	-	-	-	-	2	-	-	-	14	7	-	1	-	-	1	1	6	10	-	1
19	3	1	3	-	1	1	-	-	-	-	15	6	-	1	1	-	5	5	6	7	-	2
20	1	3	1	1	-	1	5	1	1	1	16	10	2	-	2	1	2	3	11	2	-	2
21	6	4	1	1	1	-	1	2	-	-	9	11	-	1	1	-	1	3	10	11	-	3
22	3	7	1	1	-	1	1	4	1	2	11	5	-	-	-	-	-	-	8	3	-	2
23	5	7	2	-	1	2	2	-	1	2	6	3	-	-	1	-	1	3	4	3	-	-
24	4	7	-	-	-	3	1	1	2	-	5	4	-	-	-	-	1	-	6	3	-	-
25	4	7	2	-	1	2	2	-	-	2	2	2	-	-	-	-	-	-	3	2	-	2
26	2	3	-	-	-	1	-	1	1	2	2	3	-	1	-	-	-	1	3	2	-	-
27	4	5	-	-	1	-	2	1	1	3	2	3	-	1	-	-	-	1	3	5	-	-
28	4	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	2	2	-	-
29	3	1	1	-	-	-	-	2	-	-	1	1	-	-	-	-	-	-	3	1	-	1
30	1	-	1	-	1	-	1	1	-	2	1	-	-	-	-	-	1	1	-	-	-	-
31	4	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	-	-
32	3	2	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	1	1	-	-
33	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-
34	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
35	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-
36	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
40	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	49	53	16	3	7	17	19	16	8	16	105	66	8	5	5	1	14	20	89	72	2	14

Species: *Sebastolobus alascanus*

Fork	Haul no. 56		57			58			60		71			72		73		80		82		83	
Length (cm)	F	M	F	U	M	F	U	M	F	M	F	U	M	F	M	F	M	F	M	F	M	F
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	2	-	-	1	-	1	-	-	-	-	-	1	-	-	1	-	-	1	-	1	-	-
15	-	2	2	3	3	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
16	-	-	3	-	4	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-	1	-	-
17	-	3	5	2	3	2	1	-	1	2	-	2	1	-	1	-	-	-	1	1	2	1	-
18	-	6	10	-	3	4	-	-	1	5	-	-	2	1	1	-	1	-	-	-	1	1	-
19	2	10	6	-	4	11	-	1	3	1	1	1	-	3	-	-	2	-	-	2	1	2	-
20	3	7	4	-	9	10	-	3	1	6	-	-	3	4	2	-	4	2	-	1	3	2	-
21	1	5	4	-	5	12	-	3	2	8	4	1	7	1	2	1	-	-	5	2	5	3	-
22	4	7	3	-	9	16	-	-	2	4	2	1	-	3	2	1	1	-	2	1	5	2	-
23	-	3	1	-	15	17	-	1	1	9	2	-	3	3	1	-	3	2	2	1	3	2	-
24	2	-	1	-	5	18	-	-	-	6	3	-	3	1	-	-	2	6	2	-	1	2	-
25	1	3	-	-	7	6	-	-	-	10	3	-	1	-	2	-	3	3	-	1	2	1	-
26	-	2	-	-	1	9	-	-	-	6	4	-	3	1	4	-	-	4	-	-	1	3	-
27	-	-	-	-	2	3	-	-	-	2	4	-	2	2	-	-	1	1	3	2	8	2	-
28	-	1	-	-	1	3	-	1	-	5	2	-	4	-	4	2	3	-	-	-	2	1	-
29	-	-	-	-	-	1	-	1	-	3	3	-	1	1	4	-	1	2	-	-	2	1	-
30	-	-	-	-	1	2	-	-	-	3	2	-	-	-	2	-	3	-	-	-	1	1	-
31	-	1	-	-	-	1	-	-	-	-	-	-	-	-	3	1	3	1	-	-	4	1	-
32	-	1	2	-	-	1	-	-	-	1	-	-	-	-	1	1	3	-	1	-	3	-	-
33	-	-	-	-	-	1	-	-	-	1	-	-	-	1	1	1	1	-	1	-	-	-	-
34	-	1	-	-	-	1	-	-	-	1	-	-	1	-	2	-	4	-	-	-	-	-	-
35	-	1	-	-	-	-	-	-	-	1	1	-	1	1	-	-	1	-	-	-	-	-	-
36	-	1	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	1	-	-	1	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	1	1	-
38	-	-	-	-	-	1	-	-	-	2	-	-	1	-	1	-	-	1	-	-	-	-	-
39	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	13	57	43	7	74	120	2	10	11	81	35	8	36	23	36	8	40	27	20	11	48	26	

Species: *Sebastolobus alascanus*

Fork	Haul no.											
	87		89		90		95		98		100	
Length (cm)	M	F	M	F	M	F	M	F	M	F	M	F
10	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	1	-	-	-	-	-	-
14	-	-	-	-	-	1	-	-	1	-	-	-
15	2	3	2	-	1	-	-	-	-	-	-	-
16	-	3	1	1	-	-	-	1	3	-	-	-
17	-	1	2	-	3	1	1	-	1	-	-	-
18	2	1	1	-	-	1	-	-	-	-	-	-
19	5	-	2	-	3	-	-	-	1	1	-	-
20	2	2	1	1	2	2	-	1	-	-	-	-
21	5	5	3	2	2	2	1	1	1	-	-	1
22	5	6	2	4	3	3	-	-	4	2	5	-
23	4	6	2	-	1	-	-	-	1	-	9	-
24	3	6	1	2	3	2	-	-	1	1	12	1
25	3	4	-	2	-	-	1	-	1	1	10	5
26	4	3	-	1	1	3	1	-	-	-	9	5
27	-	4	-	-	-	-	-	-	1	1	-	7
28	-	-	1	1	1	1	1	2	2	1	-	6
29	1	1	-	-	2	3	1	-	1	-	-	7
30	1	-	-	-	-	1	-	-	1	-	-	9
31	-	1	1	-	1	1	-	-	-	-	-	5
32	-	-	-	-	-	1	-	-	-	-	-	2
33	-	1	-	-	1	2	-	-	-	1	-	1
34	-	1	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	1	1	1	-	-	1
36	-	1	1	-	-	-	-	-	-	-	-	-
37	-	1	1	-	-	-	-	-	1	-	-	-
38	-	1	-	-	-	-	-	-	-	-	-	-
39	-	-	-	-	-	-	1	-	-	1	-	-
40	-	-	-	-	-	-	1	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	1	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	1	-	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	1	-	1	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	1	-	-
51	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-	1	-	-
56	-	-	-	-	-	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-	-	-	-	-	-
58	-	-	-	-	-	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-
Total	37	51	21	15	24	25	10	6	22	12	45	50

Appendix Table 2 continued.

Species:	*Anoplopoma fimbria*			
	Haul no.			
Fork	9		10	
Length (cm)	M	F	M	F
45	-	-	-	-
46	-	-	-	-
47	-	-	-	-
48	-	-	-	-
49	2	-	-	-
50	-	-	-	-
51	-	1	-	-
52	2	1	1	2
53	-	1	-	-
54	-	-	-	-
55	1	-	-	-
56	-	-	1	2
57	-	-	-	-
58	1	1	-	-
59	-	1	1	1
60	-	1	1	1
61	-	-	-	-
62	-	-	-	-
63	-	-	-	-
64	-	-	-	-
65	-	-	-	-
66	-	-	-	-
67	-	1	-	-
68	-	1	1	1
69	-	-	-	-
70	-	-	-	-
71	-	-	-	-
72	-	-	1	1
73	-	-	-	-
74	-	-	-	-
75	-	-	-	-
Total	6	8	6	8