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U.S. DEPARTMENT OF COMMERCE
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ABSTRACT

The 1995 Alaska Fisheries Science Center West Coast triennial bottom trawl survey was conducted to assess stocks of groundfish inhabiting the continental shelf waters off the coasts of California, Oregon, Washington, and British Columbia. This was the seventh survey in an ongoing series to monitor long-term trends in the distribution and abundance of these groundfish populations.

The objectives of the 1995 survey were similar to those of the previous surveys in the series. We have made minor changes in the survey design over the years. The three most recent surveys have shifted emphasis away from estimating rockfish abundance, as had been the case from 1977 through 1986, toward assessing a broader range of groundfish species. The current design also focuses upon precisely estimating the near-bottom component of the Pacific hake and juvenile (age l+) sablefish resource. The survey encompassed the coastal waters from Pt. Conception, California, to central Vancouver Island, British Columbia (34°30'-49°40'N lat.). The depth range of the survey was extended in 1995 for more complete coverage of the habitat of shelf rockfish. The 1980-86 surveys had covered depths from 55-366 m; in 1995, we surveyed between 55 and 500 m. A total of 533 stations were occupied, of which 522 were successfully sampled. Catches included 155 different species of fish and 112 different species of invertebrates.

This report documents survey design and the methods used in 1995, summarizes biological and environmental data collected, and presents the results of standard analyses of distribution, abundance, and biological parameters for the commercially important groundfish species in the region. Data on water temperature, catch composition, relative abundance, and geographic distribution are reported. Estimates of biomass, population abundance, length composition and age composition are also presented. Data appendices are located in a separate companion volume.

CONTENTS

INTRODUCTION

In 1995, the seventh in an ongoing series of groundfish assessment surveys of the continental shelf resources off the coasts of California, Oregon, Washington, and British Columbia was carried out by the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC). These bottom trawl surveys, initiated in 1977 and repeated triennially, have been designed to provide resource managers with fishery-independent data about the distribution, abundance, and biological characteristics of several commercially important species, particularly Pacific hake (also known as Pacific whiting), *Merluccius productus,* sablefish, *Anoplopoma fimbria,* and many of the shelf and slope rockfish (genus *Sebastes)* species (Wilkins 1996). Hydroacoustic surveys of the off-bottom component of the Pacific hake population have been conducted concurrently with these bottom trawl surveys by the Midwater Assessment and Conservation Engineering (MACE) Task of the RACE Division.

The first of these bottom trawl surveys, conducted in 1977 (Gunderson and Sample 1980), sampled between Pt. Hueneme, California, (34°00'N lat.) and the U.S.-Canada border in depths ranging from 91 to 457 m. The sampling effort was stratified by depth and latitude according to fishery catch information. The following two surveys, conducted in 1980 (Coleman 1986) and 1983 (Weinberg et al. 1984), emphasized obtaining better biomass estimates of canary *(Sebastes pinniger)* and yellowtail rockfish

(S. flavidus), while maintaining the important general goals of a multispecies monitoring program. In 1980, strata were adjusted and sampling depths shifted to cover the 55-366 m depth interval, while the latitudinal boundaries extended from Monterey Bay, California (36°48'N lat.), to northern Vancouver Island, British Columbia (50°00'N lat.). The same area was surveyed using the same survey design in 1983 but only extended as far north as Vancouver Island's Estevan Point (49°15'N lat.). The results of the 1980 and 1983 surveys indicated that further work was needed to improve the precision of canary and yellowtail rockfish abundance estimates. Consequently, in 1986 the sampling effort was reallocated to concentrate on the 92-219 m depth interval north of 42°35'N lat., where canary and yellowtail rockfish were thought to be most abundant (Coleman 1988). Results of these first four surveys were also used to examine trends in the distribution and abundance of 14 of the more commercially important groundfish species (Dark and Wilkins 1994).

Despite efforts to improve the precision of rockfish abundance estimates over the first four iterations of the triennial survey, the large variances of the estimates remained a problem. We concluded that precise estimates of rockfish abundance were not possible using current trawl survey methods and realistic sampling levels. It was clear that higher priority should be given to obtaining the information that our survey was able to provide well. Consequently, beginning in 1989 the triennial bottom trawl survey was designed to monitor a broad

range of demersal species and also focus on providing precise estimates of the demersal component of the Pacific hake stock and sablefish pre-recruits (age l+) (Weinberg et al. 1994, Zimmermann et al. 1994). Weinberg (1994) used the results of the 1977-92 surveys to describe rockfish community structure and species assemblages. His findings, as well as recent assessments of slope and shelf rockfish stocks (Rogers et al. 1996) indicated that more complete depth coverage of the habitats of these species during our surveys would improve our ability to assess them. In 1995, we redirected a portion of our samples from four small areas of high density sampling for Pacific hake and sablefish and placed them in a new, deeper depth stratum between 367 and 500 m that extended along the entire coast.

The specific objectives of the 1995 survey were

1) to describe and assess the demersal component of the Pacific hake resource;

2) to describe and assess the abundance of the pre-recruit component of sablefish, specifically those 1.5 years old because the abundance of these pre-recruits estimated from trawl survey data has been shown to be consistent with that inferred from commercial catch levels;

3) to describe and assess shelf and slope rockfish stocks throughout their entire depth ranges;

4) to monitor the status of other important groundfish stocks;

5) to determine the biological characteristics (e.g., size and age compositions, size at maturity, length/weight relationships and feeding habits) of key groundfish species;

6) to continue studies on the movement of juvenile sablefish through tagging;

7) to collect oceanographic data describing the habitat, including surface temperatures, bottom temperatures, and water column temperature profiles at each sampling station; and

8) to collect samples requested for special studies conducted by scientists at various fishery agencies and academic institutions.

This report documents the survey design and field procedures used, summarizes the data collected, and presents the results of the standard PACE analyses. Included are summaries of catches, relative densities, distributions, and estimates of biomass, population abundance, and size compositions for selected species. Age compositions are also included for six species for which ages have been determined from otoliths or fin ray collections and length-weight relationships are described for many groundfish species. For the sake of brevity, our discussion concentrates on the primary target species of this survey, Pacific hake and sablefish, in the areas of most concern to

management. Unabridged printouts of the results of analyses, which include numerous species, are available upon request as appendices bound in a separate volume. Electronic data files and files containing results of analyses (e.g., size and age composition) can also be obtained from the authors upon request.

SURVEY METHODS

Survey Period and Sampling Area

The 1995 survey was conducted from 6 June to 24 September, which is slightly earlier than the time period of previous triennial surveys (mid-July through September). Operations began off Pt. Conception, California, and proceeded northward to central Vancouver Island off Clayoquot Sound (34°30'-49°40' N lat.). We sampled stations between the depths of 55 and 500 m. The survey area has started at Point Conception since 1989 to allow us to detect concentrations of juvenile Pacific hake and sablefish which may be present only between Point Conception and Monterey Bay. Stations in Canada were sampled to help estimate density at the northern limit of the Pacific hake distribution and to collect more complete data sets on transboundary stocks such as yellowtail rockfish, Pacific ocean perch, *Sebastes alutus,* and lingcod, *Ophiodon elongatus.*

Vessels and Sampling Gear

Two trawlers, the R/V *Alaska* and the F/V *Vesteraalen,* were chartered to conduct the bottom trawl survey. Pertinent details

about these vessels are presented in Table 1. Each vessel was equipped with dual net reels, modern electronics, and Loran C and Global Positioning System (GPS) navigational aids.

The standard RACE high-opening Nor'eastern trawl, constructed of polyethylene mesh and equipped with bobbin roller gear, was used aboard both vessels throughout the 1995 survey (Fig. 1). This trawl has a 27.2 m headrope and a 37.4 m footrope. All trawls were rigged consistently with RACE survey gear standards employing three 55 m dandylines (1.59 cm steel cable) connected to each wing and fished with 2.1 x 1.5 m steel V-doors weighing approximately 567 kg each.

Measurements of the trawl's horizontal (wingtip to wingtip) and vertical opening (center of headrope to bottom) were collected throughout the duration of 413 (79%) of the successfully completed tows using a SCANMAR net mensuration system. Mean net widths and heights were calculated for each successfully measured trawl haul. The overall mean path width of the net was 12.53 m (range 10.09-14.49 m) for all measured trawl hauls by the R/V *Alaska* and 13.92 m (range 10.95-16.58 m) for all measured trawl hauls by the F/V *Vesteraalen.* In those instances when horizontal measurements were unavailable, the average net width (m) was estimated using the following relationships (C. Rose, Alaska Fish. Sci. Cent., pers. commun., April 1996):

R/V ***Alaska***

Net width = 10.76 m if scope (wire out) < 221 m

= 12.05 m if scope > 221 m and < 360 m

= 12.70 m if scope > 360 m

F/V ***Vesteraalen***

Net width = 15.74 - 875.38 / S

where: S = scope (m).

These equations were derived by examining the relationship between mean net width and a set of variables known to be important in determining the horizontal opening of the net (Rose 1993).

Survey Area Stratification

The 1995 triennial survey sampled the entire survey area with a nearly uniform sampling density, which was similar to the low-density levels used in prior (1977-92) surveys. In the two previous surveys, the shallow depths (<183 m) in four latitudinal strata had been sampled at a higher rate to increase the precision of juvenile sablefish abundance estimates. The higher-density sampling in these areas was scaled back to normal density for the 1995 survey. Ten latitudinal strata of similar size were used during the analyses to ensure that catch rates of various species were extrapolated to meaningful areas of their respective habitats.

The survey area was also stratified by depth, since most groundfish species in the area exhibit a strong depth range preference. All previous West Coast triennial surveys have been divided into two major depth strata: 55-183 m representing a continental shelf habitat and 184-366 m representing the shelf break and the uppermost continental slope. Pacific hake and juvenile sablefish catch rates, in particular, are usually significantly higher in the shallower stratum. An additional deeper depth stratum (366-500 m) was added to the design of the 1995 survey so that the survey area would encompass the entire depth range of slope rockfish species. The survey area stratification is displayed schematically in Figure 2.

Trawl Station Allocation

A systematic-random design was used to allocate trawl stations to best achieve the primary survey objectives, which were to estimate the abundance and biological characteristics of Pacific hake and juvenile sablefish stocks and concurrently monitor the condition of a broader range of commercially important groundfish species. Tracklines were laid across the survey area from the 55 m isobath due west extending to the 500 m isobath at intervals of 18.5 km along the coast. Stations were randomly placed along tracklines at the rate of one station per 7.4 km in the shallow stratum and one station per 9.3 km in the two deeper stratum. At least one station was assigned to each depth stratum along each trackline segment. A total of 610

stations were established. The number of stations allocated to each stratum, as well as the number successfully sampled, are shown in Table 2.

Trawling Procedures

Stations were located using GPS and then surveyed with the echo sounder prior to towing. 'If the terrain was determined to be too rugged to tow upon successfully, then an alternative site was searched for within a l-nautical mile radius of the original site. If no favorable ground was located within about 2 hours, the station was declared untrawlable and abandoned.

Before starting the survey, each vessel conducted an exercise to empirically establish the proper amount of trawl warp to deploy at a given depth to assure that the net would fish solidly on the bottom. We did this by deploying the trawl and towing it at a speed of 1.54 m/sec (3.0 knots) over deep water, increasing the length of trawl warp by 46 m (25 fm) intervals and allowing the trawl to settle to an equilibrium depth at each warp length. A micro-bathythermograph (MBT) was attached to the trawl headrope during this exercise and the settling depth was recorded for different trawl warp lengths. We tabulated the minimum length of trawl warp needed to fish the trawl at any given bottom depth and paid out an additional 90-150 m of warp to ensure solid bottom contact.

We made concerted efforts to deploy the sampling trawl in the same manner at each station so as to obtain standard samples.

Skippers set the trawl and payed out the prescribed amount of trawl warp while traveling faster than the target towing speed. The vessel was slowed as the brakes were set on the trawl winches and the gear was allowed to sink toward bottom. Before reaching bottom, the speed of the vessel was increased to the target towing speed of 1.54 m/sec (3.0 knots) so that the trawl was nearly in its fishing configuration when it contacted the bottom. We used information from the Scanmar, MBT, and GPS to determine when and where the trawl reached bottom and settled into its equilibrium fishing configuration. After achieving equilibrium, the trawl was towed at 1.54 m/sec for 30 minutes. The net was retrieved as quickly as possible to clearly delineate the time and position of the endpoint of the sample. Skippers tried to maintain a constant depth while towing. If the gear was damaged during the tow severely enough to affect catch composition, the haul was considered unsatisfactory and the station was either repeated or abandoned. Unsuccessful tows were not used to calculate biomass or population estimates. During the time the two vessels were working together, they fished alternate tracklines to enable comparison of their relative fishing powers.

Catch Sampling and Oceanographic Data Collection

The procedures for catch processing documented by Gunderson and Sample (1980) were used in 1995. Briefly, catches which fit on the sampling table (about one metric ton (t)) were processed entirely, while larger catches were either weighed by an

electronic load cell (up to 4.5 t) or measured volumetrically, then subsampled following methods described by Hughes (1976). Catches were then sorted by species, weighed, and enumerated. Fork length measurements (in centimeters) were obtained by sex for primary and secondary target species[1] whenever they were caught. Lengths were also taken for other major components of the catch when time allowed.

Otoliths (used for age determination), along with individual specimen weight and maturity data, were collected from a variety of species. Collections for Pacific hake and sablefish were stratified by length interval (5 otoliths/sex/cm) for biological subareas. Collections for canary and splitnose rockfish (S. *diploproa)* were stratified by size intervals of 5 cm or more (50-100 otoliths/interval) for the entire survey area. Random collections were made for bocaccio *(S.paucispinis),* yellowtail rockfish, Pacific ocean perch, darkblotched rockfish *(S. crameri),* yelloweye rockfish (S. *ruberrimus),* yellowmouth rockfish (S. *reedi),* chilipepper (S. *goodei),* silvergray (s. *brevispinis)* rockfish, sharpchin rockfish (S. zacentrus), and redstripe rockfish (S. *proriger).* Fin rays were collected from lingcod for determining age. We collected stratified samples of individual fish weights (5 observations per sex/cm interval from each state and from Canada) from several additional commercially

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'Primary target species are Pacific hake and sablefish. Secondary target species include canary rockfish, yellowtail rockfish, bocaccio, chilipepper, Pacific ocean perch, sharpchin rockfish, splitnose rockfish, darkblotched rockfish, yelloweye rockfish, yellowmouth rockfish, silvergray rockfish, and lingcod.

important species. Other requests for meristic data, and for samples of stomach contents, tissues, and whole fish were also fulfilled as time allowed.

Surface temperatures were measured with bucket thermometers and MBTs. Water column temperature profiles and bottom temperatures were also collected with MBTs.

Data Analyses

Several analyses are performed routinely on RACE bottom trawl survey data. These include:

1) estimation of relative abundance,
2) estimation of population biomass,
3) estimation of population numbers, and
4) estimation of the population's size composition.

We use the area-swept method described by Gunderson and Sample (1980) to calculate catch rates, which are in turn used to estimate population biomass and numbers. Briefly, this method entails standardizing species catch rates from each station into catch per unit effort (CPUE) in terms of kilograms or numbers per hectare trawled (kg/ha, no./ha) and calculating the arithmetic mean CPUE for each sampling stratum. Relative abundance (mean CPUE) of each species is then calculated for each International North Pacific Fisheries Commission (INPFC) area as the sum of the mean CPUEs of each appropriate sampling stratum weighted by their respective stratum areas. Population biomass and numbers in each stratum are estimated by multiplying the stratum mean CPUE by the

stratum area. Stratum estimates are summed to provide biomass and population estimates for various portions of the survey area (INPFC areas, U.S. waters, etc.). In cases where our sampling strata straddle more than one INPFC area, we expand the overall sampling stratum mean CPUE to the area of that portion of the sampling stratum lying within the INPFC area.

The size composition of each species was estimated in a manner similar to the population estimate. Length-frequency data collected at each station were weighted by the CPUE (number/ha) of that species at that station, summed over all hauls in a stratum, and expanded to the stratum population estimate to estimate the population. As with population estimates, stratum estimates were summed to derive the estimated size compositions for various portions of the survey area.

Ages were determined from otolith or fin ray samples collected from groundfish species. The age compositions of these stocks were estimated by multiplying their population size composition by age-length keys (matrices of length vs. age) constructed from the age data from corresponding or appropriately pooled strata.

RESULTS

Haul, Catch, and Biological Data

During the 1995 survey, 522 of the 610 stations were successfully sampled within the 55-500 m depth bounds. Twenty-four tows were unsuccessful due to damaged trawls and 76 stations were abandoned due to untrawlable bottom. Sampling density ranged from 0 to 11.97 hauls per 1,000 km^2 in the shallow strata, from 3.73 to 22.83 hauls per 1,000 km^2 in the middle strata, and from 3.13 to 19.21 hauls per 1,000 km^2 in the deep strata (Table 2). Over the entire survey area, the sampling density was slightly higher in the deep strata (12.66 hauls per 1,000 km^2) than in the middle (10.25 hauls per 1,000 km^2) or the shallow (7.64 hauls per 1,000 km^2) strata. Overall, the average sampling density was also slightly higher in the U.S. portion of the survey area than in Canada. Figure 3 shows the location of successful tows by depth stratum.

A total of 155 fish species representing 54 families were identified to the species level over the course of the survey (Table 3). Members from several additional families were taken but identified only to genus. Table 3 also lists the frequencies of occurrence, depth ranges, and the range of distribution by latitude for all fish taxa identified in trawl samples. The greatest number of species taken (n=39) belonged to the rockfish (Scorpaenidae) family, followed by the flatfishes (Bothidae,

Pleuronectidae, and Soleidae) with 20, and the sculpins (Cottidae) with 11 species.

We measured the length of 313,327 fish. A summary of the number of fish measured is presented in Table 4 by species, INPFC area, and depth stratum. The number of specimens collected for other biological samples (age structures, length-weight relationships, maturity, food habits, etc.) are reported in Table 5. Appendix A (see separate Data Appendices volume) summarizes the catch data by haul for each vessel.

Temperature Data

Sea surface temperatures measured at 541 stations using a bucket thermometer ranged from 8.7° to 18.2°C. The overall mean surface temperature was 13.6°C. Temperature profiles of the water column (surface to bottom) were collected at 526 stations. Bottom temperatures from these stations ranged from 5.4" to 9.7°C, averaging 7.3°C. Figures 4 and 5 illustrate the observed surface and bottom temperatures, respectively, by latitude from the 1995 survey and compare these data with temperature data collected in previous triennial surveys.

Relative Abundance

The 20 most abundant groundfish species are presented by depth stratum for the individual INPFC areas in Table 6. The complete listings of the relative abundance of all fish ranked by mean CPUE for each INPFC area and depth stratum are presented in

Appendix B (see separate volume of Data Appendices). Relative catch rates of all fish and invertebrate species are also ranked in Appendix B by depth stratum for all survey areas combined. Average total fish densities were highest in the Monterey INPFC area (212.6 kg/ha), followed by the Columbia (190.1 kg/ha), Vancouver (148.4 kg/ha), Conception(l04.3 kg/ha), and Eureka (88.2 kg/ha) INPFC areas.

Pacific hake was the most abundant species overall, accounting for 53% of the total survey finfish CPUE (88.5 kg/ha) and 57% in U.S. waters alone (98.2 kg/ha). The highest average CPUE for Pacific hake was in the Columbia INPFC area (126.6 kg/ha), where it comprised 66% of the area's total finfish CPUE. Pacific hake were least abundant in the Conception INPFC area (15.1 kg/ha) where it accounted for 14.5% of all fish. Besides the Columbia INPFC area, Pacific hake also dominated samples in the U.S. portion of the Vancouver INPFC area (122.7 kg/ha and in the Monterey (115.1 kg/ha) and Eureka (33.1 kg/ha) INPFC areas.

Dover sole *(Microstomus pacificus)* and Pacific sanddab *(Citharichthys sordidus)* were the second and third most abundant fish species, respectively, both surveywide and in U.S. waters. Mean Dover sole catch rates were 8.4 kg/ha in both areas, or about 5% of the finfish CPUE. Pacific sanddab catch rates averaged 7.2 kg/ha surveywide and 7.8 kg/ha in U.S. waters, or about 4.5% of the finfish CPUE.

Sablefish ranked fourth in relative abundance among all species both surveywide (5.7 kg/ha) and in U.S. waters (5.5 kg/ha), accounting for 3% of the catch in both areas. Mean catch rates of sablefish were highest in the Columbia INPFC area (8.1 kg/ha), followed by the Eureka (7.2 kg/ha), Vancouver (5.0 kg/ha, Conception (3.2 kg/ha), and Monterey (2.6 kg/ha) INPFC areas. Sablefish accounted for between 1.2% and 8.1% of INPFC area fish catches.

Catch composition and relative densities varied widely among geographic areas. In the total survey area, the four most abundant species after Pacific hake (88.5 kg/ha) were Dover sole (8.5 kg/ha), Pacific sanddab (7.2), sablefish (5.7 kg/ha), and arrowtooth flounder *(Atheresthes stomias) (5.0* kg/ha). These five species as a group accounted for 69% of finfish CPUE. In U.S. waters only, four of the same species were among the five most abundant. Pacific hake (98.2 kg/ha) was most abundant, followed by Dover sole (8.4 kg/ha), Pacific sanddab (7.8 kg/ha), sablefish (5.5 kg/ha), and splitnose rockfish (4.9 kg/ha). Moving from south to north and listed in order of abundance, the five most prominent species in the Conception INPFC area were splitnose rockfish (18.0 kg/ha), Pacific hake, Dover sole, stripetail rockfish (S. *saxicola),* and spotted ratfish *(Hydrolagus collei);* in the Monterey INPFC area: Pacific hake (115.1 kg/ha), Dover sole, stripetail rockfish, splitnose rockfish, and chilipepper; in the Eureka INPFC area: Pacific hake (33.1 kg/ha), Dover sole, sablefish, Pacific herring, chub

mackerel *(Scomber japonicus);* in the Columbia INPFC area: Pacific hake (126.6 kg/ha), Pacific sanddab, sablefish, Dover sole, and jack mackerel *(Trachurus symmetricus);* in the U.S. Vancouver INPFC area: Pacific hake (122.7 kg/ha), spiny dogfish *(Scpalus acanthias),* Dover sole, arrowtooth flounder, and Pacific halibut *(Hippoglossus stenolepis);* and in the Canadian Vancouver INPFC area: arrowtooth flounder (27.7 kg/ha), Pacific hake, spiny dogfish, Dover sole, and Pacific ocean perch.

The catch composition also varied among depth strata. In the shallow stratum (55-183 m) for the entire survey area, Pacific hake (130.4 kg/ha) dominated catches, followed by Pacific sanddab, spiny dogfish, jack mackerel, and arrowtooth flounder. The five most abundant species in the middle depth stratum (184-366 m) were Pacific hake (30.6 kg/ha), splitnose rockfish, stripetail rockfish, sablefish, and Dover sole. The five most abundant species in the deep stratum (367-500 m) were Dover sole (23.1 kg/ha), sablefish, Pacific hake, rex sole *(Glyptocephalus zachirus),* and shortspine thornyhead *(Sebastolobus alascanus).*

Maps of the geographical distribution of the primary and secondary target species, based on catch rates at each station, are presented by species in Figures 6-34 in alphabetical order. Yelloweye and yellowmouth rockfish, despite being secondary target species, were not mapped because they were caught so infrequently. Distribution maps of the following selected additional groundfish species also appear:

Arrowtooth flounder	Aurora rockfish	Dover sole
English sole	Greenstriped rockfish	Longspine thornyhead
Pacific halibut	Pacific sanddab	Petrale sole
Redstripe rockfish	Rougheye rockfish	Shortbelly rockfish
Spiny dogfish	Stripetail rockfish	Shortspine thornyhead
Widow rockfish		

The distribution of each species is presented by relative density classifications (high, moderate, and low) in the distribution maps. For each species, all non-zero station catch rates were sorted in decreasing order and classified in either the top l0%, middle 30%, and lowest 60% of the catch rate values. Stations where the species was not caught are also shown. The distribution of sampling effort should be considered when viewing these charts since heavier sampling in an area may give the impression of high densities when, in fact, CPUE was only moderate or low.

Biomass and Population Estimates

Abundance estimates in metric tons of biomass and associated 90% confidence intervals are presented for various taxa in the total survey and by INPFC area and depth stratum in Tables 7-10. Similarly, estimates of population numbers are presented for important species groups in Tables 11-14. Detailed listings of biomass and population estimates are presented for the major species in Appendix C in the Data Appendices volume.

The on-bottom component of the Pacific hake population was estimated to be 586,200 t for the entire area (Table 7). Two of the five INPFC areas accounted for 75% of the total estimated Pacific hake biomass: 49% in the Columbia INPFC area and 26% in

the Monterey area. Six percent (34,839 t) was in Canadian waters. Pacific hake biomass was distributed mostly in the shallow stratum (552,003 t or 94% of the total estimate), with 28,436 t (4%) in the middle depth stratum and 5,761 t (1%) in the deep stratum (Tables 8-10).

The total sablefish biomass estimate was 30,472 t (Table 7). The Columbia and Vancouver INPFC areas contributed 54% and 25%, respectively, of the total sablefish biomass between the depths of 55 and 500 m. Sablefish in Canadian waters (6,364 t) amounted to 21% of the total. The distribution of sablefish biomass was nearly uniform in the two shallower strata, with 11,869 t (39% of the total) in the shallow stratum and 11,814 t (39%) in the middle depth stratum. We estimated 6,788 t of sablefish (22%) in the deep stratum (Tables 8-10).

We should warn readers that the biomass and population estimates presented are likely to be conservative since only a portion of the stock may be available to the bottom trawl and some escapement may occur. For lack of data on species-by-species catchability, abundance calculations are based on the assumption that all fish in front of the trawl and between the wingtips are captured. The degree of conservative bias will vary among species. For instance, a large portion of the total Pacific hake stock is pelagic and would be missed by a bottom trawl. Also, because roller gear is used, escapement underneath the trawl is likely to occur, particularly for the flatfish

species. Furthermore, the survey covers limited portions of the depth and geographic range of many of these species.

This survey is the main source of fishery-independent information on the abundance, distribution, and length and age-composition for most of these species. Other fishery-independent data sources used for stock assessments include the AFSC echo integration/midwater trawl survey of the West Coast Pacific hake resource and the AFSC bottom trawl survey of upper continental slope groundfish resources (sablefish, Dover sole, and thornyheads). Stock assessment scientists utilize our survey results, along with commercial catch and effort data, in order to set the most appropriate catch levels.

Length Composition

Estimated population length compositions for several groundfish species are presented in alphabetical order by sex and INPFC area (Figs. 35-68). The length compositions for Pacific hake and sablefish include separate presentations of their length compositions by depth stratum. The length compositions of the remaining species are presented for the combined depths only. Computer files of estimated length compositions, by sex and INPFC area, are available upon request for any species from which length data were collected.

Three length modes were evident in the Pacific hake length distributions. For the total survey area, there was a small peak at 34.5 cm, but the majority of the population was found in two

peaks centered at 25 cm and 46.5 cm (Fig. 46). The overall population mean length was 36.1 cm. Hake ranged in length from 4 to 83 cm. The male and female components of the population were very similar with the average length of females (36.8 cm) being only slightly longer than that of the males (35.3 cm). The Conception INPFC area contained mostly small (<30 cm) and intermediate-sized (30-40 cm) Pacific hake, the Monterey INPFC area contained mostly intermediate-sized and large (>40 cm) hake, and north of the Monterey INPFC area we found only small and large hake. Pacific hake lengths averaged 30.9, 38.9, 39.6, 34.5, 41.1 and 31.4 cm in the Conception, Monterey, Eureka, Columbia, U.S. Vancouver and Canadian Vancouver INPFC areas, respectively. Mean lengths of Pacific hake generally increased with depth except for in the Columbia INPFC area, where 40-50 cm fish dominated the shallow stratum (Fig. 47). In other areas hake were slightly longer in the middle strata than in the shallow strata. Hake in the deep strata were generally much longer than in shallower strata.

Sablefish inhabit a wide range of depths, exceeding the bounds of this survey. Its size distribution can be described by data from this survey for only the shallow end of its range. At these depths, the estimated length distribution for sablefish was generally bimodal with a narrow peak at 38 cm and a broader peak around 53 cm (Fig. 57). A small group of fish between 15 and 25 cm long were also seen in the northern part of the survey area; interestingly these were seen primarily at the deepest

stations of the Vancouver and Columbia INPFC areas (Fig. 60). Sablefish samples from throughout the survey area ranged from 14 to 86 cm in length, but the overall average length of the population was 46.2 cm. The average length of males was 46.7 cm and the average length of females was 47.4 cm. Juvenile sablefish (<42 cm) accounted for the majority of the populations in the Conception (55%), Monterey (64%), and U.S.-Vancouver (68%) INPFC areas, and somewhat less than half (34-45%) of the populations in all other areas. Mean sablefish lengths were lower in the Conception (41.0 cm), Monterey (41.4 cm), and U.S.-Vancouver (39.0 cm) INPFC areas than in the remaining areas, where mean length ranged from 46.6 to 51.1 cm. Mean sablefish lengths in deep strata were greater than in the shallow strata in all INPFC areas (Figs. 58-60) except in the Columbia and Vancouver INPFC areas, where fish shorter than 25 cm dominated the sablefish catch.

Age Compositions

Otoliths or dorsal fin rays were collected from specimens of 24 groundfish species (Table 5) to determine their ages. To date, ages have been determined for the structures collected from Pacific hake, lingcod, bocaccio, chilipepper, yellowtail rockfish, and darkblotched rockfish. The age composition of these species was estimated and is presented in Figures 69-74. For this report, each of these species has been treated as a single, homogenous stock and all age data collected during the

1995 survey has been used to estimate the species's length-age relationship. When it has been appropriate, the age compositions of several of these resources have been estimated and presented in more geographic detail in stock assessment documents published by the Pacific Fishery Management Council.

The age composition of the Pacific hake resource (Fig. 69) shows that the population is primarily supported by fish from four or five year classes spawned in 1980, 1984, 1987, 1993, and 1994. Few fish from any other year class contribute to the size of this resource. The lingcod resource, on the other hand, is represented more evenly by fish between 1 and 7 years old (Fig. 70). Bocaccio younger than age 4 were the most abundant in the 1995 survey area (Fig. 71), though some older age groups, particularly those between 8 and 12 years old, contributed significantly to the size of the population.

The three other rockfish species which have been aged exhibit similar profiles. These fish generally become fully available to the survey and commercial trawl gear when they are between 3 and 6 years old. Prior to that, they can be detected by the survey trawl when the younger age groups are notably abundant. Following their full recruitment to the gear, the age composition figures (Figs. 72-74) track the relatively constant decrease in their abundance as they age, a normal result of natural and fishing-induced mortality.

Length-Weight Relationships

From the individual fish weight samples, we determined length-weight relationships using a linear least-squares regression model on log-transformed data. Results of these analyses are summarized in Table 15 for males, females, and for all fish combined (including unsexed fish). The following equations describe the relationships for Pacific hake and sablefish (sexes combined):

Pacific hake:	$W = 0.0086206 * L^{2.902250}$	for males
	$W = 0.0037867 * L^{3.140277}$	for females
	$W = 0.0025952 * L^{3.229277}$	for all sexes
Sablefish:	$W = 0.0025338 * L^{3.346895}$	for males
	$W = 0.0022243 * L^{3.336907}$	for females
	$W = 0.0026478 * L^{3.335682}$	for all sexes

where:

W = estimated weight (g)

L = fork length (cm).

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Table 1.--Attributes of the vessels and net used during the 1995 triennial West Coast groundfish survey.

Vessel	Vessel length	Horsepower	Mean net width	Survey period
F/V *Vesteraalen*	38.0 m	1,700	13.92 m	1 June-2 August
R/V *Alaska*	30.5 m	855	12.53 m	19 June-24 September

Table 2.--Sampling stratum boundaries used for analyses, stratum areas (km*), and realized sampling density (hauls/l,000 km^2) based on successful tows during the 1995 triennial West Coast groundfish survey. Strata have been grouped according to International North Pacific Fisheries Commission (INPFC) areas. Differences in totals are due to rounding.

	Shallow Strata (55-183 m)				Middle Strata (184-366 m)				Deep Strata (367-500 m)			
INPFC Areas / Latitude bounds	Code	Area (km^2)	Number of hauls	Hauls per 1,000 km^2	Code	Area (km^2)	Number of hauls	Hauls per 1,000 km^2	Code	Area (km^2)	Number of hauls	Hauls per 1,000 km^2
Vancouver												
48°20' - 49°40'	19	8,587.0	58	6.75	29	1,211.2	10	8.26	39	442.2	6	13.57
47°50' - 48°20'	18	2,282.2	12	5.26	28	874.6	9	10.29	38	241.0	3	12.45
47°30' - 47°50'	17	1,032.6	8	7.75	27	536.7	2	3.73	37	320.0	1	3.13
47°30' - 49°40'	--	11,901.8	78	6.55	--	2,622.5	21	8.01	--	1,003.2	10	9.97
Vancouver (Canada only)												
48°20' - 49°40'	19	8,224.4	55	6.69	29	941.7	7	7.43	39	442.2	6	13.57
Border - 48°20'	18	159.4	0	0.00	28	87.6	2	22.83	38	66.5	1	15.04
Border - 49°40'	--	8,383.8	55	6.56	--	1,029.3	9	8.74	--	508.7	7	13.76
Vancouver (U.S. only)												
48°20' - Border	19	362.6	3	8.27	29	269.5	3	11.13				
47°50' - 48°20'	18	2,122.8	12	5.65	28	787.0	7	8.89	38	174.5	2	11.46
47°30' - 47°50'	17	1,032.6	8	7.75	27	124.7	2	16.04	37	102.2	1	9.78
47°30' - Border	--	3,518.0	23	6.54	--	1,181.2	12	10.16	--	276.7	3	10.84
Columbia												
46°30' - 47°30'	17	3,378.0	25	7.40	27	412.0	3	7.28	37	217.8	2	9.18
44°40' - 46°30'	16	6,014.3	49	8.15	26	2,118.5	19	8.97	36	2,101.2	17	8.09
43°00' - 44°40'	15	6,250.0	41	6.56	25	1,508.1	17	11.27	35	775.0	10	12.90
43°00' - 47°30'	--	15,642.3	115	7.35	--	4,038.6	39	9.66	--	3,094.0	29	9.37
Eureka												
40°30' - 43°00'	14	4,090.6	37	9.05	24	1,076.2	16	14.87	34	736.6	13	17.65

Table 2.--Continued

Monterey												
38°00' - 40°30'	13	4,724.4	41	8.68	23	1,112.2	14	12.59	33	676.8	13	19.21
36°50' - 38°00'	12	3,735.0	30	8.03	22	493.9	6	12.15	32	354.4	5	14.11
36°00' - 36°50'	11	551.6	5	9.06	21	189.1	2	10.58	31	189.2	2	10.57
36°00' - 40°30'	--	9,011.0	76	8.43	--	1,795.2	22	12.25	--	1,220.4	20	16.39
Conception												
35°40' - 36°00'	11	167.1	2	11.97	21	104.9	2	19.07	31	113.2	2	17.67
34°30' - 35°40'	10	1,343.4	14	10.42	20	1,089.7	10	9.18	30	943.6	16	16.96
34°30' - 36°00'	--	1,510.5	16	10.59	--	1,194.6	12	10.05	--	1,056.8	18	17.03
1995 Totals												
U.S. Total		33,772.4	267	7.91		9,285.8	101	10.88		6,384.5	83	13.00
Entire Survey		42,156.2	322	7.64		10,727.1	110	10.25		7,111.0	90	12.66

Table 3.--Frequency of occurrence, depth and latitude ranges for fish species caught during the 1995 triennial West Coast groundfish survey.

Family and Scientific Name	Common Name	Frequency of Occurrence	Minimum Depth (m)	Maximum Depth (m)	Mean Depth (m)	Latitude Range (ddmm)* South/North
Myxinidae						
Myxinidae unident.	Hagfish unident.	2	78	190	134	4103/4414
Eptatretus deani	Black hagfish	7	375	488	424	4135/4446
Eptatretus stouti	Pacific hagfish	6	58	237	149	4114/4823
Petromyzontidae						
Petromyzontidae unident.	Lamprey unident.	1	373	373	373	4103/4103
Lampetra tridentata	Pacific lamprey	3	70	372	198	4506/4756
Chimaeridae						
Hydrolagus colliei	Spotted ratfish	282	49	491	187	3434/4934
Hexanchidae						
Hexanchus griseus	Sixgill shark	1	75	75	75	3814/3814
Alopiidae						
Alopias vulpinus	Thresher shark	1	62	62	62	4605/4605
Scyliorhinidae						
Scyliorhinidae unident.	Cat shark unident.	5	144	417	334	3526/4433
Apristurus brunneus	Brown cat shark	88	61	495	354	3434/4756
Parmaturus xaniurus	Filetail cat shark	18	88	491	392	3443/3735
Carcharhinidae						
Mustelus californicus	Gray smoothhound	1	67	67	67	3455/3455
Squalidae						
Squalus acanthias	Spiny dogfish	289	49	488	145	3433/4934
Squatinidae						
Squatina californica	Pacific angel shark	1	62	62	62	3506/3506
Somniosus pacificus	Pacific sleeper shark	1	446	446	446	3936/3936
Torpedinidae						
Torpedo californica	Pacific electric ray	29	53	276	128	3433/4515
Rajidae						
Rajidae unident.	Skate unident.	3	122	389	299	3925/4003
Raja binoculata	Big skate	44	52	365	106	3443/4905
Raja inornata	California skate	6	75	103	88	3443/3815
Bathyraja interrupta	Bering skate	103	56	491	279	3434/4924
Raja rhina	Longnose skate	176	49	491	191	3434/4926
Raja stellulata	Starry skate	2	62	64	63	3745/3745
Clupeidae						
Clupea pallasi	Pacific herring	201	52	383	104	3506/4935
Alosa sapidissima	American shad	154	49	237	111	3433/4934
Sardinops sagax	Pacific sardine	44	52	198	102	3433/4934
Engraulidae						
Engraulis mordax	Northern anchovy	16	53	115	74	3506/4225
Argentinidae						
Argentina sialis	Pacific argentine	42	77	325	124	3443/4326
Osmeridae						
Osmeridae unident.	Smelt unident.	1	62	62	62	4046/4046
Thaleichthys pacificus	Eulachon	88	66	328	137	4124/4934
Allosmerus elongatus	Whitebait smelt	25	52	103	71	4054/4934
Salmonidae						
Oncorhynchus tshawytscha	Chinook salmon	87	49	205	92	3433/4926
Bathylagidae						
Bathylagidae unident.	Deepsea smelt unident.	3	467	488	475	3515/4813
Bathylagus milleri	Robust blacksmelt	5	67	491	326	3443/4634
Leuroglossus stilbius	California smoothtongue	3	418	495	468	4013/4344
Sternoptychidae						
Argyropelecus sp.	Deepwater hachetfish	3	244	436	366	3453/4054
Chauliodontidae						
Chauliodus macouni	Pacific viperfish	20	67	495	401	3443/4813
Melanostomiidae						
Melanostomiidae unident.	Scaleless dragonfish unident.	1	459	459	459	3454/3454
Bathophilus flemingi	Highfin dragonfish	2	244	385	315	4003/4004
Tactostoma macropus	Longfin dragonfish	8	298	495	438	3534/4813

Table 3.--Continued.

Family and Scientific Name	Common Name	Frequency of Occurrence	Minimum Depth (m)	Maximum Depth (m)	Mean Depth (m)	Latitude Range (ddmm) South/North
Malacosteidae		2	209	389	299	3806/3807
Aristostomias scintillans	Shining loosejaw	6	97	495	402	3456/4813
Searsiidae						
Sagamichthys abei	Shining tubeshoulder	3	265	382	341	4446/4845
Stomiidae unident.	Viperfish unident.	1	488	488	488	4322/4322
Idiacanthidae						
Idiacanthus antrostomus	Pacific blackdragon	5	103	445	357	3453/3655
Synodontidae						
Synodontidae unident.	Lizardfish unident.	2	71	87	79	3714/3715
Synodus lucioceps	California lizardfish	5	54	93	77	3506/3704
Paralepidae						
Lestidiops ringens	Slender barracudina	1	479	479	479	4505/4505
Myctophidae						
Myctophidae unident.	Lanternfish unident.	58	110	491	360	3443/4924
Symbolophorus californiensis	California lanternfish	1	440	440	440	4735/4735
Stenobrachius leucopsarus	Northern lampfish	21	122	495	342	4323/4813
Diaphus theta	California headlightfish	9	105	402	250	4753/4825
Lampanyctus sp.		1	314	314	314	3715/3715
Lampanyctus ritteri	Broadfin lanternfish	9	75	494	406	3936/4735
Tarletonbeania crenularis	Blue lanternfish	2	384	404	394	4143/4213
Moridae						
Antimora microlepis	Pacific flatnose	1	439	439	439	4035/4035
Physiculus rastrelliger	Hundred fathom codling	1	318	318	318	4444/4444
Gadidae						
Microgadus proximus	Pacific tomcod	43	52	128	73	3825/4934
Gadus macrocephalus	Pacific cod	55	65	253	140	4616/4934
Theragra chalcogramma	Walleye pollock	19	67	247	129	4323/4914
Merluccius productus	Pacific hake	480	49	495	198	3433/4934
Macrouridae						
Nezumia stelgidolepis	California grenadier	10	284	495	420	3436/4505
Coelorinchus scaphopsis	Shoulderspot grenadier	2	269	284	277	3436/3755
Coryphaenoides acrolepis	Pacific grenadier	4	432	482	459	3927/4424
Albatrossia pectoralis	Giant grenadier	1	446	446	446	3936/3936
Ophidiidae						
Chilara taylori	Spotted cusk-eel	73	49	491	150	3434/4846
Batrachoididae						
Porichthys notatus	Plainfin midshipman	75	49	383	98	3433/4855
Atherinidae						
Atherinidae unident.	Silverside unident.	1	62	62	62	3745/3745
Trachipteridae						
Trachipterus altivelis	King-of-the-salmon	3	445	469	458	3503/4813
Scorpaenidae						
Sebastes unident.	Rockfish unident.	8	79	389	152	3523/4925
Sebastes aleutianus	Rougheye rockfish	88	90	494	267	4033/4928
Sebastes alutus	Pacific ocean perch	108	96	469	271	3824/4934
Sebastes auriculatus	Brown rockfish	4	54	95	79	3656/3816
Sebastes aurora	Aurora rockfish	89	81	494	397	3434/4922
Sebastes babcocki	Redbanded rockfish	102	128	469	285	3526/4924
Sebastes borealis	Shortraker rockfish	10	306	469	410	4114/4922
Sebastes brevispinis	Silvergray rockfish	15	95	247	161	4645/4935
Sebastes caurinus	Copper rockfish	5	54	110	79	3455/3656
Sebastes chlorostictus	Greenspotted rockfish	27	79	276	158	3523/4654
Sebastes crameri	Darkblotched rockfish	181	61	491	219	3443/4928
Sebastes diploproa	Splitnose rockfish	161	87	491	288	3434/4924
Sebastes elongatus	Greenstriped rockfish	185	62	491	158	3434/4935
Sebastes entomelas	Widow rockfish	45	79	439	195	3523/4912
Sebastes eos	Pink rockfish	1	269	269	269	3755/3755
Sebastes flavidus	Yellowtail rockfish	77	52	402	132	3506/4934

Table 3. --Continued.

Family and Scientific Name	Common Name	Frequency of Occurrence	Minimum Depth (m)	Maximum Depth (m)	Mean Depth (m)	Latitude Range (ddmm) South/North
Scorpaenidae (continued)						
Sebastes goodei	Chilipepper	89	60	491	172	3434/4905
Sebastes helvomaculatus	Rosethorn rockfish	60	86	444	219	3514/4928
Sebastes hopkinsi	Squarespot rockfish	4	77	124	99	3523/3545
Sebastes jordani	Shortbelly rockfish	68	53	491	143	3454/4845
Sebastes levis	Cowcod	27	80	491	162	3628/4605
Sebastes maliger	Quillback rockfish	2	67	95	81	4845/4905
Sebastes melanostomus	Blackgill rockfish	35	224	491	406	3443/4534
Sebastes miniatus	Vermilion rockfish	3	79	373	187	3523/4103
Sebastes mystinus	Blue rockfish	2	61	79	70	3523/4237
Sebastes paucispinis	Bocaccio	49	80	389	159	3434/4934
Sebastes pinniger	Canary rockfish	53	61	237	136	3523/4935
Sebastes proriger	Redstripe rockfish	30	81	247	156	3804/4928
Sebastes reedi	Yellowmouth rockfish	6	109	323	222	4403/4913
Sebastes rosenblatti	Greenblotched rockfish	1	491	491	491	3735/3735
Sebastes ruberrimus	Yelloweye rockfish	13	85	169	136	3834/4924
Sebastes rubrivinctis	Flag rockfish	1	125	125	125	3804/3804
Sebastes rufus	Bank rockfish	33	95	454	325	3434/4305
Sebastes saxicola	Stripetail rockfish	174	55	491	172	3434/4913
Sebastes semicinctus	Halfbanded rockfish	31	60	130	95	3443/4034
Sebastes variegatus	Harlequin rockfish	1	265	265	265	4755/4755
Sebastes wilsoni	Pygmy rockfish	21	75	383	156	3715/4928
Sebastes zacentrus	Sharpchin rockfish	70	81	444	207	3628/4928
Sebastolobus alascanus	Shortspine thornyhead	202	66	495	318	3434/4924
Sebastolobus altivelis	Longspine thornyhead	36	62	495	432	3444/4813
Anoplopomatidae						
Anoplopoma fimbria	Sablefish	402	52	495	220	3434/4935
Hexagrammidae						
Ophiodon elongatus	Lingcod	220	52	314	123	3443/4935
Hexagrammos decagrammus	Kelp greenling	7	67	121	92	4403/4905
Zaniolepis latipinnis	Longspine combfish	33	55	154	85	3455/3907
Cottidae						
Cottidae unident.	Sculpin unident.	2	53	194	124	3734/3807
Icelinus oculatus	Frogmouth sculpin	2	165	309	237	3834/4433
Icelinus filamentosus	Threadfin sculpin	72	54	400	165	3434/4928
Radulinus asprellus	Slim sculpin	1	128	128	128	3514/3514
Scorpaenichthys marmoratus	Cabezon	1	80	80	80	3907/3907
Malacocottus kincaidi	Blackfin sculpin	6	222	439	313	4714/4815
Malacocottus zonurus	Darkfin sculpin	1	342	342	342	4816/4816
Hemilepidotus spinosus	Brown Irish lord	4	61	97	87	4302/4845
Chitonotus pugetensis	roughback sculpin	3	62	74	66	3745/4125
Leptocottus armatus	Pacific staghorn sculpin	4	71	168	110	4327/4615
Enophrys taurina	Bull sculpin	3	62	102	76	3604/3745
Icelinus burchami	Dusky sculpin	1	439	439	439	4756/4756
Agonidae						
Agonidae unident.	Poacher unident.	3	158	211	187	4343/4454
Agonopsis vulsa	Northern spearnose poacher	2	111	151	131	4703/4835
Xeneretmus latifrons	Blacktip poacher	18	115	317	192	4305/4604
Xeneretmus leiops	Smootheye poacher	14	143	342	218	3806/4904
Bathyagonus pentacanthus	Bigeye poacher	4	208	440	316	4424/4913
Bathyagonus nigripinnis	Blackfin poacher	5	155	488	350	3755/4922
Podothecus acipenserinus	Sturgeon poacher	1	56	56	56	4905/4905
Anoplagonus inermis	Smooth alligatorfish	1	458	458	458	4416/4416
Cyclopteridae						
Cyclopteridae unident.	Snailfish unident.	15	196	485	385	3434/4203
Liparis sp.	Snailfish unident.	1	160	160	160	4805/4805
Careproctus sp.	Snailfish unident.	4	268	491	410	4013/4334
Careproctus melanurus	Blacktail snailfish	42	190	494	389	3454/4845
Carangidae						
Trachurus symmetricus	Jack mackerel	78	53	373	109	3523/4753

Table 3. --Continued.

Family and Scientific Name	Common Name	Frequency of Occurrence	Minimum Depth (m)	Maximum Depth (m)	Mean Depth (m)	Latitude Range (ddmm) South/North
Sciaenidae						
Genyonemus lineatus	White croaker	45	49	168	83	3433/3835
Embiotocidae						
Cymatogaster aggregata	Shiner perch	2	62	62	62	3506/4046
Zalembius rosaceus	Pink seaperch	59	53	127	88	3443/3925
Bathymasteridae						
Ronquilus jordani	Northern ronquil	5	120	227	169	4703/4924
Zoarcidae						
Bothrocara brunneum	Twoline eelpout	2	439	491	465	3735/4035
Lycodes cortezianus	Bigfin eelpout	196	62	495	300	3434/4924
Lycodapus mandibularis	Pallid eelpout	3	412	485	445	3534/4524
Lycodes diapterus	Black eelpout	97	62	495	366	3444/4922
Lycodes brevipes	Shortfin eelpout	1	198	198	198	4814/4814
Lycodes pacificus	Blackbelly eelpout	94	59	387	140	4055/4926
Cryptacanthodidae						
Cryptacanthodes giganteus	Giant wrymouth	3	127	182	147	4604/4823
Anarhichadidae						
Anarrhichthys ocellatus	Wolf-eel	7	52	126	80	3745/4915
Icosteidae						
Icosteus aenigmaticus	Ragfish	1	444	444	444	4615/4615
Ammodytidae						
Ammodytes hexapterus	Pacific sand lance	1	60	60	60	4303/4303
Trichiuridae						
Benthodesmus pacificus	North-Pacific frost fish	1	372	372	372	4756/4756
Scombridae						
Scomber japonicus	Chub mackerel	112	56	412	122	3433/4934
Stromateidae						
Peprilus simillimus	Pacific pompano	23	49	121	76	3433/4644
Icichthys lockingtoni	Medusafish	1	312	312	312	4033/4033
Bothidae						
Citharichthys sp.	Sanddab unident.	3	109	211	147	3536/4403
Citharichthys sordidus	Pacific sanddab	251	49	276	96	3433/4934
Hippoglossina stomata	Bigmouth sole	2	86	121	104	3443/3443
Paralichthys californicus	California halibut	1	54	54	54	3656/3656
Xystreurys liolepis	Fantail sole	1	67	67	67	3455/3455
Pleuronectidae						
Atheresthes stomias	Arrowtooth flounder	277	52	495	196	3816/4935
Hippoglossus stenolepis	Pacific halibut	138	52	452	146	3745/4935
Hippoglossoides elassodon	Flathead sole	87	71	225	130	4404/4934
Eopsetta exilis	Slender sole	399	52	491	178	3434/4935
Eopsetta jordani	Petrale sole	253	49	379	109	3433/4935
Parophrys vetulus	English sole	317	49	491	128	3435/4935
Microstomus pacificus	Dover sole	499	49	495	197	3434/4935
Embassichthys bathybius	Deepsea sole	3	458	469	465	3835/4813
Glyptocephalus zachirus	Rex sole	514	49	495	191	3434/4935
Platichthys stellatus	Starry flounder	1	62	62	62	4425/4425
Psettichthys melanostictus	Sand sole	3	52	67	60	4405/4425
Pleuronectes bilineatus	Rock sole sp.	43	52	152	82	3506/4915
Isopsetta isolepis	Butter sole	3	52	95	70	4405/4845
Pleuronichthys decurrens	Curlfin sole	48	49	209	81	3433/4835
Pleuronichthys verticalis	Hornyhead turbot	17	52	110	71	3647/4915
Soleidae						
Symphurus atricauda	California tonguefish	2	86	93	90	3643/3655

*ddmm=degrees and minutes of latitude

Table 4. --Number of length frequency measurements collected by International North Pacific Fisheries Commission area and depth stratum (m) during the 1995 West Coast triennial groundfish bottom trawl survey.

	CONCEPTION			MONTEREY			EUREKA			COLUMBIA			VANCOUVER		
Species	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500
Spiny dogfish				93											
Pacific sanddab	776			5,426	70		1,892	4		7,549			4,298		
California halibut				4											
Arrowtooth flounder					5		18	109	35	440	509	16	3,053	871	205
Pacific halibut				10	1		26	11		126	16	1	220	34	15
Flathead sole										160			1,492	112	
Slender sole				56	57		1			315	20		1,478	358	4
Petrale sole	81	10		480	78	1	196	8		392	5		392	4	
English sole	458			3,674	223	58	117	2		3,681	151	7	2,896	66	
Dover sole	27	625	1,868	1,839	930	1,650	100	611	879	4,203	2,841	2,303	3,674	1,430	750
Rex sole	57	590	1,555	2,213	826	1,151	513	676	594	9,331	3,217	1,877	5,696	1,217	633
Sand sole										64					
Rock sole				87						88			375		
Butter sole													1		
Curlfin sole				19						19			7		
Hornyhead turbot				3									31		
Sablefish	49	347	295	419	548	323	211	654	527	1,347	1,626	1,082	589	173	83
Plainfin midshipman				169											
Jack mackerel										184					
Pacific tomcod							71			125			101		
Pacific cod										11	1		264	54	
Walleye pollock													63	27	
Lingcod	40	2		167	24		17	8		185	19		398	14	
Pacific hake	180	1,898	1,781	11,944	2,967	1,021	1,765	2,457	1,004	72,035	4,190	1,241	35,675	842	348
Chinook salmon	3						74			14			15		
White croaker				892											
Chub mackerel							74			355					
Lizardfish unidentified				5											

Table 4.--Continued.

	CONCEPTION			MONTEREY			EUREKA			COLUMBIA			VANCOUVER		
Species	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500
Shortspine thornyhead		27	612		361	938		223	542	153	2,090	3,870	15	1,158	1,273
Longspine thornyhead			733	2		82						1,105			164
Rougheye rockfish								1	7	145	80	100	129	139	492
Pacific ocean perch					2			210	3	5	275	213	250	1,077	397
Brown rockfish				1											
Aurora rockfish		7	872	3	8	891		1	304		3	259			13
Silvergray rockfish											2		45	51	
Copper rockfish	3			1											
Greenspotted rockfish		9		125	11			1		2					
Darkblotched rockfish			1	12	262	15	55	232	17	841	713	8	362	415	3
Splitnose rockfish		1,570	858	20	2,583	632	9	1,382	118	37	2,129	101	5	571	7
Greenstriped rockfish		27		1,355	152	6	383	93		1,591	766		1,180	512	2
Widow rockfish	25	2		175	15		16	15		2	241	3	7		
Yellowtail rockfish	80	1		164			14			470	14		256	126	2
Chilipepper	696	423	3	2,116	733	2	32	37			1		7		
Rosethorn rockfish				12	89			3		342	262	16	150	424	1
Squarespot rockfish	34														
Shortbelly rockfish	165	526		2,009	445	2	199	68		64	7		1		
Cowcod				14	3	1	2			1	4				
Quillback rockfish													12		
Blackgill rockfish		2	99		1	83			1			2			
Vermilion rockfish	5			4					1						
Blue rockfish	21						2								
Bocaccio	70	8		50	36	2	2	1		4			3	2	
Canary rockfish	1			230			22	1		339	5		21	19	
Redstripe rockfish				8			28			238	214		332	429	
Yelloweye rockfish				1						6			8		
Redbanded rockfish		1	1	1	41	17		33	11	6	125	13	12	95	13
Flag rockfish				3											

Table 4.--Continued.

	CONCEPTION			MONTEREY			EUREKA			COLUMBIA			VANCOUVER		
Species	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500	55-183	184-366	367-500
Stripetail rockfish	356	994		2,331	1,679	123	812	1,035		221	1,566		21	37	
Halfbanded rockfish	180			330			1								
Pygmy rockfish				1						235	1		155	9	
Sharpchin rockfish				24	498		78	164		2	1,265	7	240	581	
Bank rockfish		1	9	1	158	6		1	2		2				
Shortraker rockfish									1			10			7
Yellowmouth rockfish										13	1			18	
Greenblotched rockfish						1									

Table 5. --Number of biological data samples collected during the 1995 triennial West Coast bottom trawl groundfish survey.

Species	Age Structures*	Specimen Weights	Maturity Observations
Pacific sanddab	102	368	211
Arrowtooth flounder	—	48	—
Pacific halibut	98	124	110
Slender sole	—	60	60
Petrale sole	—	6	—
English sole	69	76	—
Dover sole	—	71	—
Rex sole	88	140	-
Sablefish	1,325	1,326	1,304
Plainfin midshipman	--	150	150
Lingcod	802	795	577
Pacific hake	598	598	598
White croaker	--	159	159
Chub mackerel	119	119	--
Rougheye rockfish	--	93	--
Pacific ocean perch	651	651	651
Aurora rockfish	23	61	61
Silvergray rockfish	86	85	86
Darkblotched rockfish	638	711	711
Splitnose rockfish	589	589	567
Greenstriped rockfish	342	342	342
Yellowtail rockfish	346	487	487
Chilipepper	304	304	247
Rosethorn rockfish	112	112	112
Cowcod	--	1	1
Blackgill rockfish	3	11	11
Bocaccio	145	144	136
Canary rockfish	314	314	313
Redstripe rockfish	188	188	187
Yelloweye rockfish	22	22	22
Stripetail rockfish	--	58	--
Halfbanded rockfish	--	17	17
Sharpchin rockfish	386	386	386
Yellowmouth rockfish	17	17	17

*Dorsal finrays were collected from lingcod. Otoliths were collected from all other species.

Table 6. --Mean catch per unit of effort (CPUE, kg/ha) for the 20 most abundant groundfish species in each International North Pacific Fisheries Commission area and depth stratum during the 1995 West Coast triennial groundfish survey.

CONCEPTION AREA 55-183 m		CONCEPTION AREA 184-366 m		CONCEPTION AREA 367-500 m		CONCEPTION AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Spotted ratfish	21.99	Splitnose rockfish	62.79	Dover sole	27.36	Splitnose rockfish	17.99
Pacific sanddab	13.00	Stripetail rockfish	38.21	Pacific hake	13.33	Pacific hake	15.11
Spiny dogfish	11.40	Pacific hake	37.30	Rex sole	6.42	Dover sole	12.84
Pacific sardine	10.58	Chilipepper	13.68	Aurora rockfish	4.63	Stripetail rockfish	10.08
Northern anchovy	4.69	Shortbelly rockfish	11.84	Sablefish	4.15	Spotted ratfish	8.12
Plainfin midshipman	2.96	Dover sole	8.13	Splitnose rockfish	4.10	Pacific sanddab	4.52
Chilipepper	2.50	Rex sole	6.32	Shortspine thornyhead	2.14	Chilipepper	4.45
Halfbanded rockfish	2.32	Sablefish	5.50	Longspine thornyhead	1.42	Spiny dogfish	4.22
White croaker	1.22	Bigfin eelpout	0.91	Brown catshark	1.42	Rex sole	4.20
English sole	1.01	Spiny dogfish	0.56	Filetail catshark	1.32	Pacific sardine	3.68
Chub mackerel	0.95	Spotted ratfish	0.55	Blackgill rockfish	1.21	Sablefish	3.16
Petrale sole	0.55	Slender sole	0.45	Black eelpout	1.05	Shortbelly rockfish	3.13
Pink seaperch	0.51	Longnose skate	0.29	Bigfin eelpout	1.04	Aurora rockfish	1.82
Chinook salmon	0.49	Bocaccio	0.24	Spotted ratfish	0.85	Northern anchovy	1.63
Pacific hake	0.47	Pacific electric ray	0.24	Longnose skate	0.50	Plainfin midshipman	1.05
Stripetail rockfish	0.31	Bank rockfish	0.19	Spiny dogfish	0.28	Shortspine thornyhead	0.88
Sablefish	0.27	Filetail catshark	0.18	Slender sole	0.13	Halfbanded rockfish	0.81
Pacific pompano	0.25	Petrale sole	0.15	Bering skate	0.11	Bigfin eelpout	0.68
Pacific argentine	0.21	Shortspine thornyhead	0.14	Bank rockfish	0.10	Brown catshark	0.58
Bocaccio	0.20	Greenstriped rockfish	0.10	King-of-the-salmon	0.05	Filetail catshark	0.56
Number of hauls	16	Number of hauls	12	Number of hauls	18	Number of hauls	46

Table 6. --Continued.

MONTEREY AREA 55-183 m		MONTEREY AREA 184-366 m		MONTEREY AREA 367-500 m		MONTEREY AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Pacific hake	158.30	Pacific hake	64.03	Dover sole	44.76	Pacific hake	115.09
Pacific sanddab	12.59	Splitnose rockfish	46.75	Rex sole	10.06	Dover sole	12.03
Jack mackerel	12.00	Stripetail rockfish	31.63	Pacific hake	7.04	Stripetail rockfish	10.82
Shortbelly rockfish	11.87	Dover sole	16.82	Sablefish	6.01	Splitnose rockfish	9.37
Chilipepper	10.66	Chilipepper	11.28	Aurora rockfish	3.90	Chilipepper	8.97
Stripetail rockfish	7.45	Sharpchin rockfish	7.84	Splitnose rockfish	3.84	Shortbelly rockfish	8.26
English sole	5.11	Rex sole	5.79	Shortspine thornyhead	2.62	Pacific sanddab	8.23
White croaker	5.11	Sablefish	5.59	Bigfin eelpout	1.90	Jack mackerel	7.73
Spiny dogfish	3.61	Spiny dogfish	5.10	Blackgill rockfish	1.11	Rex sole	4.01
Plainfin midshipman	2.31	Shortbelly rockfish	3.28	Brown catshark	1.00	English sole	3.74
Dover sole	2.03	Darkblotched rockfish	2.58	Longspine thornyhead	0.82	Spiny dogfish	3.32
Rex sole	1.90	Lingcod	2.38	Stripetail rockfish	0.71	White croaker	3.29
Chub mackerel	1.25	English sole	2.16	Spotted ratfish	0.61	Sablefish	2.56
Canary rockfish	1.24	Bank rockfish	1.98	Longnose skate	0.45	Plainfin midshipman	1.49
Greenstriped rockfish	1.24	Bocaccio	1.67	Pacific sleeper shark	0.38	Sharpchin rockfish	1.47
Petrale sole	0.96	Shortspine thornyhead	1.62	Spiny dogfish	0.28	Greenstriped rockfish	0.88
Sablefish	0.77	Spotted ratfish	1.49	English sole	0.27	Chub mackerel	0.81
Halfbanded rockfish	0.66	Bigfin eelpout	0.68	Slender sole	0.24	Canary rockfish	0.80
Widow rockfish	0.63	Pacific sanddab	0.66	Bering skate	0.22	Spotted ratfish	0.78
Spotted ratfish	0.62	Petrale sole	0.48	Filetail catshark	0.22	Shortspine thornyhead	0.75
Number of hauls	76	Number of hauls	22	Number of hauls	20	Number of hauls	118

Table 6. --Continued.

EUREKA AREA 55-183 m		EUREKA AREA 184-366 m		EUREKA AREA 367-500 m		EUREKA AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Pacific hake	31.03	Pacific hake	52.64	Sablefish	20.28	Pacific hake	33.08
Pacific herring	10.30	Dover sole	12.49	Dover sole	20.11	Dover sole	7.35
Chub mackerel	7.53	Sablefish	11.46	Pacific hake	14.85	Sablefish	7.17
Pacific sanddab	6.87	Stripetail rockfish	8.71	Rex sole	8.96	Pacific herring	5.78
Spiny dogfish	6.81	Splitnose rockfish	5.46	Shortspine thornyhead	6.26	Chub mackerel	5.25
Jack mackerel	2.33	Rex sole	4.23	Black eelpout	3.37	Spiny dogfish	4.02
Chinook salmon	2.33	Chub mackerel	4.16	Brown catshark	2.71	Pacific sanddab	3.85
Pacific halibut	1.83	Arrowtooth flounder	2.95	Aurora rockfish	2.39	Rex sole	3.19
Stripetail rockfish	1.47	Pacific ocean perch	2.57	Bigfin eelpout	1.27	Stripetail rockfish	2.93
Rex sole	0.71	Pacific halibut	2.27	Arrowtooth flounder	1.23	Shortspine thornyhead	1.74
Sablefish	0.71	Shortspine thornyhead	2.07	Spiny dogfish	0.86	Pacific halibut	1.57
Big skate	0.65	Darkblotched rockfish	1.83	Splitnose rockfish	0.81	Chinook salmon	1.53
Dover sole	0.65	Sharpchin rockfish	1.05	Longnose skate	0.56	Splitnose rockfish	1.48
Petrale sole	0.63	Chinook salmon	0.90	Spotted ratfish	0.38	Jack mackerel	1.31
English sole	0.56	Bigfin eelpout	0.84	Rougheye rockfish	0.24	Arrowtooth flounder	1.10
Lingcod	0.32	English sole	0.59	Darkblotched rockfish	0.24	Black eelpout	0.74
Longnose skate	0.30	Spotted ratfish	0.50	Redbanded rockfish	0.16	Pacific ocean perch	0.63
Whitebait smelt	0.27	Lingcod	0.48	Bering skate	0.12	Brown catshark	0.55
Arrowtooth flounder	0.26	Greenstriped rockfish	0.47	Blacktail snailfish	0.12	Darkblotched rockfish	0.51
Greenstriped rockfish	0.23	Longnose skate	0.42	Chub mackerel	0.10	Bigfin eelpout	0.48
Number of hauls	37	Number of hauls	16	Number of hauls	13	Number of hauls	66

Table 6. --Continued.

COLUMBIA AREA 55-183 m		COLUMBIA AREA 184-366 m		COLUMBIA AREA 367-500 m		COLUMBIA AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Pacific hake	194.97	Sablefish	21.09	Sablefish	12.56	Pacific hake	126.55
Pacific sanddab	16.69	Pacific hake	14.55	Dover sole	11.11	Pacific sanddab	10.49
Jack mackerel	8.69	Dover sole	9.15	Shortspine thornyhead	9.30	Sablefish	8.14
Chub mackerel	7.30	Darkblotched rockfish	8.32	Pacific hake	5.83	Dover sole	5.82
Pygmy rockfish	4.65	Widow rockfish	6.67	Rex sole	3.73	Jack mackerel	5.46
Rex sole	4.08	Arrowtooth flounder	5.82	Pacific ocean perch	1.35	Chub mackerel	4.59
Dover sole	3.36	Rex sole	5.69	Rougheye rockfish	1.25	Rex sole	4.37
Sablefish	2.63	Sharpchin rockfish	5.38	Longnose skate	0.87	Pygmy rockfish	2.92
English sole	2.29	Splitnose rockfish	4.46	Arrowtooth flounder	0.82	Shortspine thornyhead	2.32
Pacific halibut	1.87	Shortspine thornyhead	3.75	Longspine thornyhead	0.81	Arrowtooth flounder	2.09
American shad	1.56	Stripetail rockfish	2.32	Aurora rockfish	0.78	Darkblotched rockfish	2.06
Greenstriped rockfish	1.49	Pacific halibut	1.82	Shortraker rockfish	0.78	Pacific halibut	1.60
Arrowtooth flounder	1.15	Greenstriped rockfish	1.25	Brown catshark	0.65	English sole	1.57
Canary rockfish	1.11	Pacific ocean perch	0.78	Bigfin eelpout	0.34	Widow rockfish	1.43
Pacific herring	0.85	English sole	0.59	Black eelpout	0.27	Greenstriped rockfish	1.20
Yellowtail rockfish	0.79	Slender sole	0.45	Splitnose rockfish	0.25	Sharpchin rockfish	1.15
Lingcod	0.78	Longnose skate	0.39	Pacific halibut	0.20	American shad	0.99
Spiny dogfish	0.66	Redstripe rockfish	0.38	Blackgill rockfish	0.19	Splitnose rockfish	0.99
Redstripe rockfish	0.54	Lingcod	0.37	Spotted ratfish	0.17	Canary rockfish	0.71
Petrale sole	0.52	Redbanded rockfish	0.37	Bering skate	0.11	Lingcod	0.57
Number of hauls	115	Number of hauls	39	Number of hauls	29	Number of hauls	183

Table 6. --Continued.

U.S. VANCOUVER AREA 55-183 m		U.S. VANCOUVER AREA 184-366 m		U.S. VANCOUVER AREA 367-500 m		U.S. VANCOUVER AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Pacific hake	198.03	Dover sole	13.18	Dover sole	5.37	Pacific hake	122.67
Spiny dogfish	15.30	Arrowtooth flounder	8.28	Pacific ocean perch	2.54	Spiny dogfish	10.14
Pacific halibut	6.77	Pacific hake	8.27	Pacific hake	2.50	Dover sole	5.97
Pacific sanddab	6.26	Pacific ocean perch	4.87	Shortspine thornyhead	2.42	Arrowtooth flounder	4.83
Pacific herring	3.95	Shortspine thornyhead	3.73	Rex sole	1.62	Pacific halibut	4.48
Arrowtooth flounder	3.58	Rex sole	3.70	Sablefish	1.36	Pacific sanddab	3.79
Yellowtail rockfish	3.48	Spiny dogfish	2.79	Rougheye rockfish	1.07	Pacific herring	2.39
English sole	3.37	Sablefish	1.99	Arrowtooth flounder	0.66	Yellowtail rockfish	2.36
Dover sole	2.29	Greenstriped rockfish	1.66	Brown catshark	0.32	Rex sole	2.27
Sablefish	1.85	Darkblotched rockfish	1.48	Yellowtail rockfish	0.27	English sole	2.09
Rex sole	1.60	Spotted ratfish	1.45	Shortraker rockfish	0.20	Sablefish	1.86
Greenstriped rockfish	1.37	Pacific halibut	1.22	Aurora rockfish	0.17	Pacific ocean perch	1.77
American shad	0.94	Longnose skate	1.01	Black eelpout	0.11	Shortspine thornyhead	1.37
Pacific cod	0.79	Yellowtail rockfish	0.74	Bigfin eelpout	0.06	Greenstriped rockfish	1.36
Lingcod	0.78	Flathead sole	0.58	Darkblotched rockfish	0.04	American shad	0.65
Petrale sole	0.63	Slender sole	0.53	Blacktail snailfish	0.03	Lingcod	0.60
Chub mackerel	0.52	Rosethorn rockfish	0.48	Greenstriped rockfish	0.03	Pacific cod	0.60
Longnose skate	0.45	Bering skate	0.45	Northern lampfish	0.02	Longnose skate	0.59
Slender sole	0.19	Lingcod	0.41	Blackfin sculpin	0.01	Darkblotched rockfish	0.53
Flathead sole	0.17	Pacific cod	0.40	Rosethorn rockfish	0.01	Spotted ratfish	0.52
Number of hauls	23	Number of hauls	12	Number of hauls	3	Number of hauls	38

Table 6. --Continued.

CANADIAN VANCOUVER AREA 55-183 m		CANADIAN VANCOUVER AREA 184-366 m		CANADIAN VANCOUVER AREA 367-500 m		CANADIAN VANCOUVER AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Pacific hake	33.39	Pacific ocean perch	47.46	Rougheye rockfish	43.82	Arrowtooth flounder	27.73
Arrowtooth flounder	26.48	Arrowtooth flounder	43.57	Arrowtooth flounder	17.11	Pacific hake	26.76
Spiny dogfish	16.57	Sharpchin rockfish	12.70	Dover sole	12.67	Spiny dogfish	12.85
Dover sole	8.66	Redstripe rockfish	9.94	Pacific ocean perch	11.16	Dover sole	8.82
Sablefish	7.06	Dover sole	6.79	Pacific hake	8.26	Pacific ocean perch	7.18
Rex sole	5.33	Pacific halibut	6.43	Pacific halibut	5.29	Sablefish	6.71
Pacific sanddab	4.66	Sablefish	6.07	Shortspine thornyhead	4.99	Rex sole	5.17
Lingcod	4.11	Rex sole	4.82	Sablefish	4.80	Rougheye rockfish	4.87
Flathead sole	3.09	Splitnose rockfish	4.26	Rex sole	4.29	Pacific sanddab	3.61
English sole	2.61	Darkblotched rockfish	3.91	Longnose skate	1.02	Lingcod	3.35
Pacific halibut	2.12	Yellowtail rockfish	3.84	Shortraker rockfish	0.68	Pacific halibut	2.98
Pacific cod	1.87	Rougheye rockfish	3.60	Bigfin eelpout	0.67	Flathead sole	2.39
Pacific herring	1.76	Silvergray rockfish	2.98	Redbanded rockfish	0.59	English sole	2.10
Greenstriped rockfish	1.65	Greenstriped rockfish	2.02	Bering skate	0.35	Sharpchin rockfish	1.86
Longnose skate	1.47	Pacific cod	1.71	King-of-the-salmon	0.25	Redstripe rockfish	1.71
Eulachon	1.44	Rosethorn rockfish	1.61	Spotted ratfish	0.21	Pacific cod	1.67
Spotted ratfish	1.20	Shortspine thornyhead	1.60	Longspine thornyhead	0.18	Greenstriped rockfish	1.54
Rock sole	0.83	Redbanded rockfish	1.34	Splitnose rockfish	0.15	Pacific herring	1.37
Petrale sole	0.82	Lingcod	1.31	Darkblotched rockfish	0.14	Longnose skate	1.36
Slender sole	0.65	Spotted ratfish	1.27	Spiny dogfish	0.14	Eulachon	1.12
Number of hauls	55	Number of hauls	9	Number of hauls	7	Number of hauls	71

Table 6.--Continued.

VANCOUVER AREA 55-183 m		VANCOUVER AREA 184-366 m		VANCOUVER AREA 367-500 m		VANCOUVER AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Pacific hake	80.91	Arrowtooth flounder	24.56	Rougheye rockfish	31.00	Pacific hake	60.19
Arrowtooth flounder	19.49	Pacific ocean perch	24.28	Arrowtooth flounder	12.18	Arrowtooth flounder	19.75
Spiny dogfish	16.00	Dover sole	10.69	Dover sole	10.48	Spiny dogfish	11.90
Dover sole	6.77	Sharpchin rockfish	5.94	Pacific ocean perch	8.58	Dover sole	7.83
Sablefish	5.50	Pacific hake	5.19	Pacific hake	6.53	Pacific ocean perch	5.30
Pacific sanddab	5.07	Redstripe rockfish	4.48	Shortspine thornyhead	4.22	Sablefish	5.02
Rex sole	4.19	Rex sole	4.35	Sablefish	3.77	Rex sole	4.15
Pacific halibut	3.45	Sablefish	3.76	Pacific halibut	3.70	Pacific sanddab	3.67
Lingcod	3.09	Pacific halibut	3.63	Rex sole	3.49	Pacific halibut	3.50
English sole	2.80	Shortspine thornyhead	2.93	Longnose skate	0.72	Rougheye rockfish	3.27
Pacific herring	2.37	Darkblotched rockfish	2.65	Shortraker rockfish	0.53	Lingcod	2.39
Flathead sole	2.20	Yellowtail rockfish	2.17	Bigfin eelpout	0.49	English sole	2.10
Greenstriped rockfish	1.55	Splitnose rockfish	2.05	Redbanded rockfish	0.42	Pacific herring	1.72
Pacific cod	1.53	Greenstriped rockfish	1.91	Bering skate	0.24	Flathead sole	1.66
Yellowtail rockfish	1.22	Rougheye rockfish	1.84	King-of-the-salmon	0.17	Greenstriped rockfish	1.47
Longnose skate	1.15	Spiny dogfish	1.60	Spotted ratfish	0.14	Pacific cod	1.30
Eulachon	1.01	Spotted ratfish	1.42	Longspine thornyhead	0.13	Yellowtail rockfish	1.29
Spotted ratfish	0.88	Silvergray rockfish	1.34	Darkblotched rockfish	0.11	Sharpchin rockfish	1.26
Petrale sole	0.76	Longnose skate	1.02	Splitnose rockfish	0.11	Redstripe rockfish	1.11
Rock sole	0.60	Rosethorn rockfish	1.01	Spiny dogfish	0.10	Longnose skate	1.09
Number of hauls	78	Number of hauls	21	Number of hauls	10	Number of hauls	109

Table 6.--Continued.

U.S. SURVEY AREA 55-183 m		U.S. SURVEY AREA 184-366 m		U.S. SURVEY AREA 367-500 m		U.S. SURVEY AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Pacific hake	149.86	Pacific hake	33.64	Dover sole	23.94	Pacific hake	98.18
Pacific sanddab	12.99	Splitnose rockfish	20.46	Sablefish	9.96	Dover sole	8.40
Jack mackerel	7.46	Stripetail rockfish	13.86	Pacific hake	9.04	Pacific sanddab	7.75
Chub mackerel	4.63	Sablefish	12.15	Rex sole	6.58	Sablefish	5.50
Spiny dogfish	4.25	Dover sole	11.77	Shortspine thornyhead	5.41	Splitnose rockfish	4.91
Shortbelly rockfish	3.41	Rex sole	5.36	Aurora rockfish	2.60	Stripetail rockfish	4.50
Chilipepper	3.19	Darkblotched rockfish	4.28	Splitnose rockfish	2.03	Jack mackerel	4.43
English sole	2.86	Chilipepper	4.17	Brown cat shark	1.21	Rex sole	3.91
Rex sole	2.54	Sharpchin rockfish	4.04	Bigfin eelpout	1.00	Spiny dogfish	2.92
Stripetail rockfish	2.35	Arrowtooth flounder	3.75	Black eelpout	0.89	Chub mackerel	2.90
Dover sole	2.33	Widow rockfish	2.69	Longspine thornyhead	0.79	Chilipepper	2.82
Pacific herring	2.30	Shortspine thornyhead	2.61	Longnose skate	0.61	Shortbelly rockfish	2.51
Pygmy rockfish	2.00	Shortbelly rockfish	2.18	Blackgill rockfish	0.61	English sole	1.89
Pacific halibut	1.72	Spiny dogfish	1.56	Pacific ocean perch	0.57	Shortspine thornyhead	1.59
Sablefish	1.63	Pacific ocean perch	1.30	Rougheye rockfish	0.51	Arrowtooth flounder	1.42
Spotted ratfish	1.63	Pacific halibut	1.23	Arrowtooth flounder	0.50	Pacific herring	1.37
White croaker	1.52	Greenstriped rockfish	0.88	Spotted ratfish	0.45	Pacific halibut	1.30
Greenstriped rockfish	1.14	English sole	0.82	Filetail cat shark	0.34	Spotted ratfish	1.20
American shad	0.86	Lingcod	0.80	Shortraker rockfish	0.29	Pygmy rockfish	1.19
Canary rockfish	0.85	Spotted ratfish	0.67	Spiny dogfish	0.27	Darkblotched rockfish	1.09
Number of hauls	267	Number of hauls	101	Number of hauls	83	Number of hauls	451

Table 6.--Continued.

ENTIRE AREA 55-183 m		ENTIRE AREA 184-366 m		ENTIRE AREA 367-500 m		ENTIRE AREA 55-500 m	
Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)	Species Name	Mean CPUE (kg/ha)
Pacific hake	130.43	Pacific hake	30.64	Dover sole	23.07	Pacific hake	88.46
Pacific sanddab	11.61	Splitnose rockfish	18.95	Sablefish	9.56	Dover sole	8.46
Spiny dogfish	6.36	Stripetail rockfish	12.61	Pacific hake	8.98	Pacific sanddab	7.19
Jack mackerel	6.21	Sablefish	11.57	Rex sole	6.40	Sablefish	5.66
Arrowtooth flounder	5.22	Dover sole	11.30	Shortspine thornyhead	5.38	Arrowtooth flounder	5.00
Chub mackerel	3.85	Arrowtooth flounder	6.98	Rougheye rockfish	3.88	Splitnose rockfish	4.32
Dover sole	3.40	Rex sole	5.28	Aurora rockfish	2.40	Spiny dogfish	4.27
Rex sole	3.02	Pacific ocean perch	5.07	Splitnose rockfish	1.89	Rex sole	4.08
Shortbelly rockfish	2.84	Sharpchin rockfish	4.71	Arrowtooth flounder	1.80	Stripetail rockfish	3.89
English sole	2.82	Darkblotched rockfish	4.21	Pacific ocean perch	1.39	Jack mackerel	3.83
Chilipepper	2.66	Chilipepper	3.79	Brown catshark	1.12	Chub mackerel	2.51
Sablefish	2.56	Shortspine thornyhead	2.51	Bigfin eelpout	0.98	Chilipepper	2.44
Pacific herring	2.22	Widow rockfish	2.45	Black eelpout	0.83	Shortbelly rockfish	2.17
Stripetail rockfish	1.96	Shortbelly rockfish	1.98	Longspine thornyhead	0.75	English sole	1.92
Pacific halibut	1.79	Pacific halibut	1.64	Longnose skate	0.64	Pacific halibut	1.53
Pygmy rockfish	1.67	Spiny dogfish	1.43	Blackgill rockfish	0.56	Shortspine thornyhead	1.47
Spotted ratfish	1.56	Greenstriped rockfish	0.96	Pacific halibut	0.48	Pacific herring	1.37
White croaker	1.27	Redstripe rockfish	0.95	Spotted ratfish	0.43	Pacific ocean perch	1.32
Greenstriped rockfish	1.23	Lingcod	0.84	Shortraker rockfish	0.32	Spotted ratfish	1.19
Lingcod	1.16	English sole	0.80	Filetail catshark	0.31	Darkblotched rockfish	1.05
Number of hauls	322	Number of hauls	110	Number of hauls	90	Number of hauls	522

Table 7. --Estimates of fish biomass from the 1995 West Coast triennial bottom trawl survey by International North Pacific Fisheries Commission (INPFC) area for all depth strata combined (55-500 m). Precision of the estimates are presented as coefficients of variation (CV%). "T" denotes trace value. Differences in totals result from rounding.

Taxon	Estimated biomass (t) and *CV%* Total Survey Area		Percent of total fish biomass	Estimated biomass (t) and *CV%* by INPFC area: Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Cartilaginous																	
Skates and rays	4,959	*8*	0.47	188	*21*	705	*14*	523	*26*	1,392	*14*	396	*20*	1,754	*17*	3,205	*9*
Spiny dogfish	30,274	*18*	2.88	1,859	*71*	4,272	*38*	2,861	*40*	1,090	*15*	5,825	*44*	14,368	*26*	15,907	*22*
Other sharks	1,721	*39*	0.16	347	*22*	301	*25*	208	*26*	856	*78*	6	*89*	2	*100*	1,719	*40*
Total cartilaginous	43,496	*13*	4.14	4,779	*39*	7,406	*29*	3,683	*31*	3,901	*19*	6,398	*40*	17,330	*22*	26,167	*16*
Flatfish																	
Arrowtooth flounder	34,465	*22*	3.28	0	-	17	*56*	511	*22*	4,198	*26*	4,302	*15*	25,438	*28*	9,028	*14*
Dover sole	40,428	*6*	3.84	4,501	*15*	10,095	*12*	3,078	*17*	11,623	*9*	2,787	*12*	8,344	*17*	32,084	*6*
English sole	12,630	*8*	1.20	270	*31*	4,866	*13*	291	*30*	3,874	*14*	933	*25*	2,396	*19*	10,234	*9*
Pacific halibut	10,860	*20*	1.03	0	-	255	*40*	987	*33*	3,997	*21*	3,041	*60*	2,581	*14*	8,279	*25*
Pacific sanddab	49,522	*13*	4.71	2,189	*56*	11,416	*15*	2,811	*34*	26,951	*21*	2,430	*33*	3,726	*28*	45,796	*14*
Petrale sole	3,068	*9*	0.29	140	*23*	875	*16*	261	*29*	823	*13*	266	*33*	703	*22*	2,365	*9*
Rex sole	22,664	*5*	2.15	1,716	*27*	3,851	*12*	1,400	*18*	9,373	*7*	1,311	*12*	5,012	*12*	17,651	*6*
Total flatfish	179,602	*6*	17.08	8,924	*17*	31,960	*8*	9,384	*14*	61,969	*10*	15,477	*14*	51,889	*14*	127,713	*6*
Rockfish																	
Shortspine thornyhead	7,011	*10*	0.67	249	*26*	583	*19*	684	*20*	4,523	*15*	568	*19*	405	*20*	6,606	*11*
Bocaccio	670	*38*	0.06	58	*56*	493	*50*	11	*69*	32	*81*	11	*63*	65	*47*	605	*42*
Canary	3,393	*41*	0.32	T	*100*	1,095	*83*	63	*53*	1,922	*55*	60	*44*	253	*41*	3,140	*45*

Table 7.--Continued.

Taxon	Estimated biomass (t) and *CV%* Total Survey Area		Percent of total fish biomass	Estimated biomass (t) and *CV%* by INPFC area													
				Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Rockfish (cont.)																	
Chilipepper	13,530	*24*	1.29	1,467	*54*	11,963	*26*	94	*66*	T	*100*	T	*100*	6	*100*	13,524	*24*
Darkblotched	5,898	*53*	0.56	3	*67*	460	*37*	226	*34*	4,157	*76*	423	*29*	629	*41*	5,269	*59*
Greenstriped	6,489	*19*	0.62	8	*58*	1,178	*32*	143	*34*	2,691	*28*	963	*51*	1,506	*36*	4,984	*21*
Pacific ocean perch	6,812	*39*	0.65	0	-	12	*79*	275	*43*	761	*28*	3,555	*63*	2,208	*33*	4,603	*49*
Redstripe	2,682	*48*	0.26	0	-	10	*100*	4	*100*	1,114	*85*	262	*69*	1,292	*53*	1,390	*70*
Sharpchin	5,304	*33*	0.51	T	*100*	1,379	*63*	147	*72*	1,946	*49*	534	*53*	1,298	*66*	4,006	*34*
Shortbelly	13,180	*58*	1.26	1,643	*89*	11,360	*66*	67	*63*	108	*97*	T	*100*	1	*100*	13,179	*58*
Silvergray	749	*42*	0.07	0	-	0	-	0	-	9	*100*	92	*59*	647	*42*	102	*54*
Splitnose	20,355	*32*	1.94	8,521	*53*	8,978	*51*	648	*31*	1,787	*37*	357	*59*	65	*42*	20,290	*32*
Stripetail	19,301	*22*	1.84	4,080	*50*	12,714	*28*	1,536	*37*	928	*36*	26	*50*	15	*57*	19,285	*22*
Widow	3,026	*76*	0.29	10	*64*	584	*56*	83	*57*	2,325	*98*	20	*69*	5	*76*	3,021	*76*
Yellowtail	4,036	*35*	0.39	29	*91*	408	*67*	31	*55*	1,384	*57*	1,530	*62*	654	*54*	3,382	*38*
Total rockfish	130,221	*13*	12.43	17,318	*24*	53,207	*21*	4,286	*17*	34,057	*33*	8,984	*29*	12,368	*21*	117,853	*14*
Other fish																	
Lingcod	6,152	*18*	0.59	42	*31*	703	*35*	179	*25*	1,320	*19*	552	*27*	3,356	*30*	2,796	*14*
Pacific hake	583,257	*10*	55.68	6,394	*43*	152,049	*19*	19,286	*29*	284,121	*13*	86,568	*37*	34,839	*29*	548,418	*11*
Sablefish	30,327	*20*	2.90	1,250	*16*	2,307	*14*	2,996	*18*	16,214	*23*	1,196	*22*	6,364	*73*	23,963	*16*
Total fish	1,047,435	*6*	100.00	43,010	*17*	268,541	*12*	50,304	*12*	431,117	*9*	122,678	*28*	131,784	*11*	915,651	*7*

Table 8. --Estimates of fish biomass from the 1995 West Coast triennial bottom trawl survey by International North Pacific Fisheries Commission (INPFC) area for the shallowest depth stratum (55-183 m). Precision of the estimates are presented as coefficients of variation (CV%). "T" denotes trace value. Differences in totals result from rounding.

Taxon	Estimated biomass (t) and *CV%* Total Survey Area		Percent of total fish biomass	Estimated biomass (t) and *CV%* by INPFC area													
				Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Cartilaginous																	
Skates and rays	3,543	*11*	0.41	45	*44*	515	*17*	397	*32*	826	*18*	225	*32*	1,534	*19*	2,009	*12*
Spiny dogfish	28,737	*18*	3.31	1,748	*76*	3,319	*43*	2,783	*41*	1,058	*15*	5,609	*46*	14,220	*26*	14,517	*24*
Other sharks	762	*87*	0.09	36	*77*	52	*88*	6	*66*	669	*99*	T	*100*	0	-	762	*87*
Total cartilaginous	38,572	*15*	4.45	4,013	*47*	5,715	*34*	3,195	*36*	3,036	*24*	5,902	*43*	16,712	*22*	21,860	*19*
Flatfish																	
Arrowtooth flounder	24,852	*30*	2.87	0	-	0	-	103	*41*	1,683	*17*	2,212	*24*	20,853	*34*	3,998	*15*
Dover sole	15,109	*11*	1.74	8	*33*	1,823	*18*	259	*43*	5,117	*14*	977	*14*	6,926	*20*	8,183	*10*
English sole	11,858	*8*	1.37	195	*27*	4,540	*13*	228	*34*	3,656	*15*	896	*26*	2,342	*19*	9,516	*9*
Pacific halibut	8,666	*25*	1.00	0	-	249	*41*	743	*39*	3,054	*25*	2,725	*67*	1,896	*17*	6,770	*29*
Pacific sanddab	49,415	*13*	5.70	2,152	*57*	11,347	*15*	2,810	*34*	26,950	*21*	2,430	*33*	3,726	*28*	45,689	*14*
Petrale sole	2,931	*9*	0.34	108	*25*	811	*16*	257	*29*	795	*13*	261	*34*	699	*22*	2,233	*10*
Rex sole	13,264	*7*	1.53	17	*41*	1,723	*19*	288	*17*	6,172	*10*	719	*14*	4,343	*13*	8,921	*8*
Total flatfish	131,477	*8*	15.17	2,501	*49*	20,950	*10*	4,716	*24*	48,376	*12*	10,502	*21*	44,432	*16*	87,045	*8*
Rockfish																	
Shortspine thornyhead	115	*35*	0.01	0	-	0	-	2	*73*	99	*39*	3	*76*	10	*59*	104	*37*
Bocaccio	293	*28*	0.03	31	*92*	192	*37*	7	*92*	32	*81*	1	*58*	30	*58*	263	*31*
Canary	3,245	*43*	0.37	T	*100*	1,095	*83*	62	*55*	1,895	*56*	31	*60*	163	*45*	3,083	*45*

Table 8.--Continued.

Taxon	Estimated biomass (t) and *CV%* Total Survey Area		Percent of total fish biomass	Estimated biomass (t) and *CV%* by INPFC area													
				Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Rockfish (cont.)																	
Chilipepper	10,002	*30*	1.16	295	*36*	9,640	*31*	60	*97*	0	-	T	*100*	6	*100*	9,996	*30*
Darkblotched	1,055	*39*	0.12	0	-	9	*52*	12	*55*	576	*51*	122	*60*	336	*58*	718	*49*
Greenstriped	5,414	*22*	0.63	3	*100*	1,091	*34*	94	*48*	2,086	*35*	811	*60*	1,329	*40*	4,084	*26*
Pacific ocean perch	103	*47*	0.01	0	-	10	*100*	0	-	4	*51*	22	*55*	68	*65*	35	*44*
Redstripe	1,431	*69*	0.17	0	-	10	*100*	4	*100*	948	*99*	20	*62*	449	*63*	982	*95*
Sharpchin	327	*70*	0.04	0	-	5	*56*	51	*96*	2	*82*	14	*70*	255	*84*	72	*70*
Shortbelly	11,068	*68*	1.28	124	*62*	10,792	*70*	47	*79*	105	*100*	T	*100*	1	*100*	11,067	*68*
Silvergray	413	*49*	0.05	0	-	0	-	0	-	0	-	17	*49*	395	*49*	17	*49*
Splitnose	10	*39*	T	T	*100*	3	*48*	1	*58*	3	*88*	1	*89*	1	*52*	8	*45*
Stripetail	7,426	*39*	0.86	47	*54*	6,717	*43*	600	*71*	52	*38*	4	*69*	5	*69*	7,421	*39*
Widow	641	*52*	0.07	9	*68*	549	*60*	50	*90*	7	*82*	20	*69*	5	*76*	636	*52*
Yellowtail	3,470	*38*	0.40	29	*93*	407	*67*	31	*55*	1,318	*60*	1,364	*69*	320	*55*	3,150	*40*
Total rockfish	55,497	*26*	6.42	1,022	*35*	31,193	*32*	1,031	*56*	15,862	*65*	2,563	*41*	3,826	*33*	51,671	*28*
Other fish																	
Lingcod	5,344	*21*	0.62	30	*35*	300	*21*	128	*27*	1,164	*21*	478	*31*	3,243	*31*	2,101	*15*
Pacific hake	549,580	*11*	63.62	73	*91*	140,278	*21*	12,662	*43*	276,613	*13*	85,817	*37*	34,138	*30*	515,442	*11*
Sablefish	11,851	*43*	1.37	43	*47*	699	*20*	289	*31*	4,432	*36*	770	*32*	5,617	*82*	6,233	*26*
Total fish	863,811	*8*	100.00	11,613	*27*	219,599	*14*	31,499	*18*	378,583	*10*	109,309	*31*	113,258	*13*	750,552	*8*

Table 9. --Estimates of fish biomass from the 1995 West Coast triennial bottom trawl survey by International North Pacific Fisheries Commission (INPFC) area for the middle depth stratum (184-366 m). Precision of the estimates are presented as coefficients of variation (CV%). "T" denotes trace value. Differences in totals result from rounding.

Taxon	Estimated biomass (t) and *CV%* Total Survey Area		Percent of total fish biomass	Estimated biomass (t) and *CV%* by INPFC area													
				Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Cartilaginous																	
Skates and rays	851	*14*	0.62	79	*38*	105	*34*	75	*40*	277	*27*	148	*22*	167	*29*	684	*15*
Spiny dogfish	1,390	*61*	1.01	77	*46*	917	*90*	14	*43*	26	*51*	215	*53*	142	*72*	1,249	*66*
Other sharks	71	*38*	0.05	30	*75*	24	*54*	3	*88*	14	*48*	0	-	0	-	71	*38*
Total cartilaginous	3,056	*30*	2.23	306	*34*	1,243	*67*	146	*44*	349	*21*	466	*28*	546	*43*	2,510	*34*
Flatfish																	
Arrowtooth flounder	8,374	*21*	6.10	0	-	17	*56*	317	*33*	2,269	*45*	2,072	*18*	3,698	*30*	4,675	*24*
Dover sole	11,125	*9*	8.11	1,063	*38*	2,926	*21*	1,339	*26*	3,437	*13*	1,542	*20*	819	*18*	10,307	*10*
English sole	730	*29*	0.53	71	*94*	293	*45*	63	*62*	214	*32*	37	*40*	53	*68*	677	*31*
Pacific halibut	1,850	*21*	1.35	0	-	6	*100*	244	*69*	872	*36*	315	*33*	413	*25*	1,438	*26*
Pacific sanddab	107	*98*	0.08	37	*100*	69	*98*	1	*100*	T	*100*	0	-	0	-	107	*98*
Petrale sole	136	*39*	0.10	31	*57*	64	*58*	4	*85*	28	*36*	5	*73*	4	*62*	132	*40*
Rex sole	5,437	*11*	3.96	822	*51*	1,001	*20*	451	*27*	2,166	*12*	549	*22*	448	*36*	4,989	*11*
Total flatfish	28,275	*9*	20.61	2,096	*32*	4,476	*18*	2,434	*19*	9,151	*17*	4,644	*12*	5,475	*24*	22,801	*9*
Rockfish																	
Shortspine thornyhead	2,592	*16*	1.89	18	*39*	279	*33*	221	*38*	1,454	*26*	460	*23*	159	*29*	2,433	*17*
Bocaccio	370	*65*	0.27	27	*60*	294	*81*	4	*100*	0	-	10	*71*	35	*71*	335	*71*
Canary	148	*65*	0.11	0	-	0	-	2	*100*	27	*49*	29	*75*	90	*82*	58	*44*

Table 9.--Continued.

Taxon	Estimated biomass (t) and *CV*% Total Survey Area		Percent of total fish biomass	Estimated biomass (t) and *CV*% by INPFC area													
				Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Rockfish (cont.)																	
Chilipepper	3,525	*35*	2.59	1,170	*67*	2,321	*38*	33	*61*	T	*100*	0	-	0	-	3,525	*35*
Darkblotched	4,786	*65*	3.52	1	*67*	439	*39*	197	*39*	3,564	*87*	300	*32*	285	*59*	4,501	*69*
Greenstriped	1,073	*20*	0.79	5	*71*	86	*57*	50	*40*	605	*28*	152	*43*	177	*37*	897	*23*
Pacific ocean perch	5,601	*47*	4.12	0	-	3	*68*	273	*43*	314	*49*	3,432	*65*	1,579	*44*	4,022	*56*
Redstripe	1,250	*66*	0.92	0	-	0	-	0	-	166	*98*	242	*74*	842	*74*	408	*59*
Sharpchin	4,971	*35*	3.66	T	*100*	1,374	*64*	96	*98*	1,938	*49*	520	*54*	1,042	*80*	3,928	*35*
Shortbelly	2,111	*70*	1.55	1,519	*96*	568	*47*	21	*100*	3	*63*	0	-	0	-	2,111	*70*
Silvergray	337	*71*	0.25	0	-	0	-	0	-	9	*100*	75	*71*	252	*74*	84	*65*
Splitnose	19,195	*34*	14.12	8,124	*55*	8,377	*55*	587	*34*	1,696	*39*	356	*59*	56	*48*	19,140	*34*
Stripetail	11,774	*26*	8.66	4,033	*51*	5,897	*36*	936	*40*	876	*38*	22	*58*	11	*76*	11,763	*26*
Widow	2,375	*96*	1.75	1	*100*	34	*47*	32	*37*	2,308	*99*	0	-	0	-	2,375	*96*
Yellowtail	560	*72*	0.41	T	*100*	1	*100*	0	-	66	*52*	161	*62*	333	*93*	228	*46*
Total rockfish	62,486	*14*	45.96	14,931	*28*	20,156	*29*	2,489	*16*	13,396	*31*	6,085	*40*	5,430	*33*	57,057	*15*
Other fish																	
Lingcod	808	*32*	0.59	12	*63*	402	*58*	51	*58*	156	*29*	74	*38*	114	*67*	695	*35*
Pacific hake	27,915	*14*	20.53	4,860	*57*	10,927	*19*	5,530	*31*	5,663	*15*	638	*31*	296	*46*	27,619	*14*
Sablefish	11,688	*28*	8.60	752	*25*	918	*29*	1,214	*20*	7,952	*41*	354	*24*	498	*24*	11,190	*30*
Total fish	135,970	*9*	100.00	23,099	*29*	38,284	*18*	12,558	*15*	36,902	*14*	12,467	*19*	12,660	*21*	123,310	*9*

Table 10. --Estimates of- fish biomass from the 1995 West Coast triennial bottom trawl survey by International North Pacific Fisheries Commission (INPFC) area for the deepest depth stratum (367-500 m). Precision of the estimates are presented as coefficients of variation (CV%). "T" denotes trace value. Differences in totals result from rounding.

Taxon	Estimated biomass (t) and *CV%* Total Survey Area		Percent of total fish biomass	Estimated biomass (t) and *CV%* by INPFC area													
				Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Cartilaginous																	
Skates and rays	564	*19*	1.18	64	*29*	85	*40*	50	*69*	289	*32*	22	*88*	53	*43*	511	*21*
Spiny dogfish	146	*31*	0.31	34	*45*	37	*62*	63	*67*	6	*61*	1	*100*	6	*71*	140	*33*
Other sharks	888	*14*	1.86	282	*25*	225	*26*	200	*27*	173	*37*	6	*95*	2	*100*	885	*15*
Total cartilaginous	1,869	*11*	3.92	461	*20*	449	*19*	342	*25*	515	*22*	30	*64*	72	*35*	1,796	*11*
Flatfish																	
Arrowtooth flounder	1,240	*21*	2.60	0	-	0	-	90	*21*	246	*28*	18	*62*	886	*28*	354	*21*
Dover sole	14,194	*10*	29.79	3,430	*15*	5,347	*18*	1,481	*25*	3,069	*16*	268	*28*	599	*27*	13,594	*11*
English sole	41	*56*	0.09	4	*100*	33	*65*	0	-	4	*100*	0	-	0	-	41	*56*
Pacific halibut	344	*37*	0.72	0	-	0	-	0	-	71	*100*	0	-	273	*38*	71	*100*
Pacific sanddab	0	-	0.00	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Petrale sole	T	*100*	T	0	-	T	*100*	0	-	0	-	0	-	0	-	T	*100*
Rex sole	3,963	*12*	8.32	877	*21*	1,126	*23*	660	*33*	1,035	*20*	43	*10*	222	*25*	3,741	*13*
Total flatfish	19,850	*10*	41.65	4,326	*15*	6,534	*19*	2,235	*22*	4,442	*15*	331	*24*	1,982	*22*	17,868	*10*
Rockfish																	
Shortspine thornyhead	4,305	*14*	9.03	230	*28*	304	*19*	461	*24*	2,970	*19*	105	*23*	235	*27*	4,069	*14*
Bocaccio	7	*100*	0.01	0	-	7	*100*	0	-	0	-	0	-	0	-	7	*100*
Canary	0	-	0.00	0	-	0	-	0	-	0	-	0	-	0	-	0	-

Table 10.--Continued.

Taxon	Estimated biomass (t) and *CV%* Total Survey Area		Percent of total fish biomass	Estimated biomass (t) and *CV%* by INPFC area													
				Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Rockfish (cont.)																	
Chilipepper	4	*55*	0.01	2	*66*	2	*81*	0	-	0	-	0	-	0	-	4	*55*
Darkblotched	57	*22*	0.12	2	*100*	13	*35*	17	*45*	17	*48*	1	*100*	7	*47*	50	*25*
Greenstriped	2	*73*	T	0	-	2	*100*	0	-	1	*100*	T	*100*	0	-	2	*73*
Pacific ocean perch	1,108	*23*	2.33	0	-	0	-	2	*64*	443	*33*	101	*33*	561	*37*	546	*28*
Redstripe	0	-	0.00	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Sharpchin	6	*70*	0.01	0	-	0	-	0	-	6	*70*	0	-	0	-	6	*70*
Shortbelly	1	*100*	T	0	-	1	*100*	0	-	0	-	0	-	0	-	1	*100*
Silvergray	0	-	0.00	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Splitnose	1,150	*30*	2.41	397	*31*	598	*52*	60	*53*	87	*39*	T	*100*	8	*66*	1,142	*30*
Stripetail	100	*100*	0.21	0	-	100	*100*	0	-	0	-	0	-	0	-	100	*100*
Widow	10	*54*	0.02	0	-	0	-	0	-	10	*54*	0	-	0	-	10	*54*
Yellowtail	6	*100*	0.01	0	-	0	-	0	-	0	-	5	*100*	2	*100*	5	*100*
Total rockfish	12,237	*14*	25.68	1,365	*14*	1,858	*19*	767	*15*	4,799	*18*	337	*27*	3,112	*45*	9,125	*11*
Other fish																	
Lingcod	0	-	0.00	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Pacific hake	5,761	*9*	12.09	1,461	*20*	844	*19*	1,094	*28*	1,845	*9*	112	*23*	405	*22*	5,357	*10*
Sablefish	6,788	*14*	14.24	455	*16*	690	*18*	1,494	*32*	3,829	*20*	72	*45*	249	*76*	6,539	*14*
Total fish	47,654	*7*	100.00	8,299	*10*	10,659	*13*	6,297	*14*	15,633	*12*	902	*26*	5,866	*34*	41,788	*7*

Table 11. --Estimates of fish population numbers (x 1,000) from the 1995 West Coast triennial bottom trawl survey by International North Pacific Fisheries Commission (INPFC) area for all depth strata combined (55-500 m). Precision of the estimates are presented as coefficients of variation (CV%). "T" denotes trace value. Differences in totals result from rounding.

Taxon	Estimated population number (x 1,000) and *CV%* Total Survey Area		Estimated population number (x 1,000) and *CV%* by INPFC area											
			Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Cartilaginous														
Skates and rays	2,412	*8*	178	*26*	663	*14*	196	*19*	589	*15*	287	*35*	499	*14*	1,913	*9*
Spiny dogfish	32,617	*18*	1,602	*54*	7,114	*36*	5,977	*35*	1,548	*16*	7,663	*52*	8,714	*26*	23,903	*22*
Other sharks	3,108	*13*	1,138	*23*	809	*21*	684	*20*	458	*33*	14	*83*	4	*100*	3,104	*13*
Total cartilaginous	58,619	*16*	9,499	*39*	15,966	*32*	7,184	*30*	4,105	*18*	8,424	*47*	13,440	*21*	45,179	*19*
Flatfish														
Arrowtooth flounder	27,080	*15*	0	-	21	*54*	798	*23*	3,696	*14*	3,677	*15*	18,888	*21*	8,192	*10*
Dover sole	139,661	*6*	14,098	*17*	42,454	*12*	10,806	*21*	41,256	*8*	7,816	*11*	23,232	*19*	116,429	*6*
English sole	67,605	*9*	1,753	*29*	27,441	*13*	1,237	*33*	23,611	*15*	4,175	*25*	9,387	*25*	58,111	*9*
Pacific halibut	1,836	*34*	0	-	35	*38*	99	*26*	551	*22*	782	*72*	369	*17*	1,467	*39*
Pacific sanddab	401,039	*10*	21,181	*35*	104,925	*13*	28,692	*33*	192,741	*18*	18,310	*31*	35,191	*26*	365,849	*11*
Petrale sole	6,854	*9*	302	*20*	2,010	*15*	772	*30*	2,020	*15*	541	*33*	1,209	*20*	5,645	*9*
Rex sole	183,672	*5*	10,986	*28*	31,904	*13*	13,038	*19*	88,326	*7*	8,416	*11*	31,001	*13*	152,670	*6*
Total flatfish	871,987	*5*	49,929	*17*	216,492	*8*	56,453	*19*	367,150	*10*	46,280	*14*	135,683	*9*	736,304	*6*
Rockfish														
Shortspine thornyhead	55,718	*9*	1,079	*30*	3,660	*15*	6,391	*21*	37,957	*13*	3,977	*16*	2,653	*18*	53,064	*10*
Bocaccio	572	*35*	189	*76*	342	*41*	7	*58*	15	*79*	2	*60*	16	*45*	556	*36*
Canary	2,312	*36*	2	*100*	692	*65*	66	*59*	1,386	*60*	50	*45*	117	*42*	2,195	*38*

Table 11. --Continued.

Taxon	Estimated population number (x 1,000) and *CV*% Total Survey Area		Estimated population number (x 1,000) and *CV*% by INPFC area											
			Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Rockfish (cont.)																
Chilipepper	33,471	*21*	5,440	*34*	27,846	*23*	157	*57*	2	*100*	1	*100*	26	*100*	33,445	*21*
Darkblotched	11,684	*30*	6	*57*	711	*30*	660	*29*	7,442	*44*	1,167	*27*	1,698	*36*	9,987	*34*
Greenstriped	27,549	*19*	49	*64*	6,626	*28*	1,551	*34*	10,792	*30*	3,722	*51*	4,809	*36*	22,740	*21*
Pacific ocean perch	9,717	*28*	0	-	13	*71*	410	*40*	1,487	*36*	4,218	*52*	3,590	*26*	6,127	*37*
Redstripe	7,986	*46*	0	-	24	*100*	81	*100*	3,568	*82*	641	*65*	3,673	*60*	4,314	*68*
Sharpchin	22,212	*32*	1	*100*	7,350	*62*	687	*74*	7,210	*50*	1,794	*49*	5,170	*57*	17,042	*35*
Shortbelly	127,175	*48*	22,927	*76*	100,952	*58*	2,340	*83*	951	*98*	T	*100*	6	*100*	127,169	*48*
Silvergray	339	*41*	0	-	0	-	0	-	5	*100*	42	*57*	292	*40*	47	*53*
Splitnose	133,460	*30*	59,487	*45*	51,698	*57*	7,816	*42*	12,932	*29*	1,142	*41*	386	*60*	133,075	*30*
Stripetail	184,684	*19*	43,047	*43*	120,954	*24*	11,713	*32*	8,726	*33*	143	*46*	100	*49*	184,584	*19*
Widow	2,736	*64*	58	*73*	950	*75*	71	*52*	1,623	*98*	28	*68*	6	*69*	2,730	*64*
Yellowtail	4,419	*41*	186	*97*	470	*70*	41	*62*	1,996	*78*	1,153	*62*	573	*58*	3,845	*46*
Total rockfish	755,731	*17*	147,026	*23*	338,767	*23*	32,646	*17*	190,054	*47*	19,971	*18*	27,266	*23*	728,465	*17*
Other fish																
Lingcod	3,445	*14*	119	*32*	650	*24*	115	*24*	803	*18*	237	*26*	1,521	*26*	1,924	*12*
Pacific hake	1,525,251	*10*	24,213	*27*	371,959	*17*	39,399	*33*	808,736	*14*	160,524	*29*	120,419	*39*	1,404,831	*11*
Sablefish	25,578	*14*	1,704	*16*	3,047	*16*	2,634	*16*	13,246	*19*	1,361	*22*	3,587	*63*	21,991	*12*
Total fish	3,741,467	*6*	317,075	*22*	1,061,077	*9*	237,726	*18*	1,464,993	*10*	271,546	*20*	389,051	*14*	3,352,416	*6*

Table 12.--Estimates of fish population numbers (x 1,000) from the 1995 West Coast triennial bottom trawl survey by International North Pacific Fisheries Commission (INPFC) area for the shallowest depth stratum (55-183 m). Precision of the estimates are presented as coefficients of variation (CV%). "T" denotes trace value. Differences in totals result from rounding.

Taxon	Estimated population number (x 1,000) and *CV%* Total Survey Area		Estimated population number (x 1,000) and *CV%* by INPFC area													
			Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Cartilaginous																
Skates and rays	1,523	*11*	38	*23*	483	*15*	97	*20*	341	*18*	169	*58*	395	*17*	1,128	*12*
Spiny dogfish	29,597	*20*	1,064	*78*	5,580	*39*	5,525	*38*	1,461	*16*	7,433	*53*	8,534	*26*	21,062	*24*
Other sharks	132	*33*	21	*52*	51	*58*	26	*63*	32	*76*	2	*100*	0	-	132	*33*
Total cartilaginous	47,962	*18*	6,698	*54*	11,827	*41*	5,666	*37*	3,226	*22*	7,861	*60*	12,685	*22*	35,277	*23*
Flatfish																
Arrowtooth flounder	21,218	*19*	0	-	0	-	217	*36*	2,002	*15*	2,196	*22*	16,803	*23*	4,415	*13*
Dover sole	56,331	*10*	109	*31*	12,165	*19*	987	*41*	20,135	*13*	3,223	*14*	19,711	*23*	36,620	*10*
English sole	64,844	*9*	1,387	*27*	26,227	*14*	1,060	*36*	22,817	*16*	4,078	*26*	9,275	*25*	55,569	*10*
Pacific halibut	1,630	*38*	0	-	33	*40*	78	*29*	486	*25*	745	*76*	287	*21*	1,343	*43*
Pacific sanddab	400,050	*10*	20,833	*35*	104,292	*13*	28,686	*33*	192,739	*18*	18,310	*31*	35,191	*26*	364,859	*11*
Petrale sole	6,576	*9*	241	*20*	1,858	*16*	759	*31*	1,975	*15*	537	*33*	1,205	*20*	5,371	*10*
Rex sole	116,383	*7*	163	*33*	17,630	*20*	3,237	*17*	62,292	*9*	5,445	*13*	27,615	*14*	88,768	*8*
Total flatfish	702,487	*6*	23,038	*32*	167,942	*10*	35,625	*27*	313,571	*12*	36,202	*18*	126,109	*10*	576,378	*8*
Rockfish																
Shortspine thornyhead	671	*35*	0	-	0	-	11	*70*	578	*39*	21	*84*	61	*64*	610	*38*
Bocaccio	393	*43*	167	*86*	193	*45*	6	*70*	15	*79*	1	*57*	12	*57*	381	*44*
Canary	2,240	*37*	2	*100*	692	*65*	64	*60*	1,371	*50*	36	*56*	75	*44*	2,164	*38*

Table 12.--Continued.

Taxon	Estimated population number (x 1,000) and *CV*% Total Survey Area		Estimated population number (x 1,000) and *CV*% by INPFC area													
			Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Rockfish (cont.)																
Chilipepper	27,270	*24*	3,160	*36*	23,985	*26*	98	*82*	0	-	1	*100*	26	*100*	27,244	*24*
Darkblotched	4,910	*29*	0	-	41	*47*	164	*53*	3,018	*38*	564	*43*	1,124	*45*	3,787	*35*
Greenstriped	23,019	*22*	25	*100*	5,951	*31*	1,381	*38*	8,394	*38*	3,117	*60*	4,150	*41*	18,869	*25*
Pacific ocean perch	1,036	*34*	0	-	9	*100*	0	-	47	*57*	238	*55*	743	*42*	294	*46*
Redstripe	4,902	*63*	0	-	24	*100*	81	*100*	3,016	*95*	76	*65*	1,706	*66*	3,197	*90*
Sharpchin	2,141	*73*	0	-	71	*63*	211	*97*	7	*72*	88	*75*	1,764	*85*	376	*58*
Shortbelly	104,431	*56*	4,624	*53*	96,631	*60*	2,239	*87*	930	*100*	T	*100*	6	*100*	104,425	*56*
Silvergray	184	*47*	0	-	0	-	0	-	0	-	8	*47*	176	*47*	8	*47*
Splitnose	265	*46*	1	*100*	71	*66*	53	*66*	88	*92*	27	*93*	26	*51*	239	*51*
Stripetail	72,363	*34*	1,694	*55*	64,349	*38*	5,373	*51*	854	*36*	32	*42*	60	*64*	72,303	*34*
Widow	1,056	*67*	56	*75*	916	*77*	44	*81*	6	*70*	28	*68*	6	*69*	1,050	*68*
Yellowtail	3,926	*46*	185	*97*	468	*70*	41	*62*	1,952	*80*	1,024	*69*	256	*56*	3,670	*48*
Total rockfish	361,445	*32*	21,337	*37*	205,335	*34*	9,784	*39*	107,299	*83*	5,852	*37*	11,837	*40*	349,608	*33*
Other fish																
Lingcod	3,215	*15*	110	*34*	546	*26*	97	*26*	742	*20*	220	*28*	1,501	*26*	1,715	*13*
Pacific hake	1,432,442	*11*	1,340	*95*	343,474	*18*	19,570	*43*	789,796	*15*	159,250	*30*	119,011	*40*	1,313,431	*11*
Sablefish	11,872	*25*	113	*47*	1,513	*22*	630	*35*	5,546	*30*	793	*21*	3,278	*69*	8,595	*20*
Total fish	3,033,083	*7*	133,628	*46*	840,947	*11*	163,199	*25*	1,292,293	*11*	242,588	*22*	360,428	*15*	2,672,655	*8*

Table 13.--Estimates of fish population numbers (x 1,000) from the 1995 West Coast triennial bottom trawl survey by International North Pacific Fisheries Commission (INPFC) area for the middle depth stratum (184-366 m). Precision of the estimates are presented as coefficients of variation (CV%). "T" denotes trace value. Differences in totals result from rounding.

Taxon	Estimated population number (x 1,000) and *CV%*		Estimated population number (x 1,000) and *CV%* by INPFC area													
	Total Survey Area		**Conception**		**Monterey**		**Eureka**		**Columbia**		**U.S. Vancouver**		**Canadian Vancouver**		**Total U.S. Area**	
Cartilaginous																
Skates and rays	636	*17*	98	*44*	103	*31*	79	*37*	174	*36*	109	*21*	73	*31*	563	*18*
Spiny dogfish	2,397	*58*	412	*56*	1,482	*91*	27	*33*	76	*83*	229	*55*	171	*63*	2,226	*62*
Other sharks	268	*39*	136	*68*	88	*49*	21	*85*	22	*41*	0	-	0	-	268	*39*
Total cartilaginous	6,532	*31*	1,473	*44*	3,102	*53*	398	*59*	322	*28*	541	*27*	696	*35*	5,836	*34*
Flatfish																
Arrowtooth flounder	5,219	*15*	0	-	21	*54*	483	*35*	1,550	*26*	1,472	*20*	1,693	*27*	3,526	*15*
Dover sole	38,966	*9*	4,243	*35*	11,279	*19*	4,970	*30*	12,598	*11*	3,874	*18*	2,002	*18*	36,964	*9*
English sole	2,654	*37*	355	*92*	1,131	*54*	177	*71*	782	*33*	97	*41*	112	*66*	2,542	*39*
Pacific halibut	173	*20*	0	-	2	*100*	21	*60*	61	*36*	37	*32*	52	*28*	121	*24*
Pacific sanddab	990	*99*	348	*100*	633	*99*	6	*100*	2	*100*	0	-	0	-	990	*99*
Petrale sole	277	*44*	61	*62*	151	*61*	12	*86*	44	*33*	4	*59*	5	*63*	273	*44*
Rex sole	41,448	*11*	5,818	*49*	7,365	*21*	4,224	*27*	18,984	*13*	2,758	*20*	2,299	*36*	39,149	*11*
Total flatfish	97,450	*8*	11,864	*32*	22,128	*17*	10,219	*26*	37,568	*10*	9,135	*15*	6,537	*22*	90,913	*8*
Rockfish																
Shortspine thornyhead	19,315	*15*	96	*41*	1,707	*28*	1,848	*31*	11,896	*22*	2,727	*22*	1,041	*35*	18,274	*16*
Bocaccio	177	*62*	22	*45*	147	*74*	2	*100*	0	-	1	*67*	5	*67*	172	*64*
Canary	72	*64*	0	-	0	-	2	*100*	15	*45*	14	*75*	42	*86*	31	*41*

Table 13.--Continued.

Taxon	Estimated population number (x 1,000) and *CV*% Total Survey Area		Estimated population number (x 1,000) and *CV*% by INPFC area													
			Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Rockfish (cont.)																
Chilipepper	6,194	*36*	2,275	*65*	3,858	*38*	59	*66*	2	*100*	0	-	0	-	6,194	*36*
Darkblotched	6,701	*47*	5	*67*	650	*33*	474	*35*	4,403	*70*	602	*34*	568	*59*	6,133	*51*
Greenstriped	4,514	*21*	24	*79*	663	*69*	170	*37*	2,395	*28*	603	*45*	659	*37*	3,855	*23*
Pacific ocean perch	7,347	*37*	0	-	4	*68*	406	*41*	901	*57*	3,851	*57*	2,185	*40*	5,162	*44*
Redstripe	3,084	*63*	0	-	0	-	0	-	552	*99*	565	*74*	1,967	*74*	1,117	*61*
Sharpchin	20,050	*34*	1	*100*	7,279	*63*	477	*98*	7,182	*50*	1,705	*51*	3,406	*75*	16,645	*36*
Shortbelly	22,740	*76*	18,302	*94*	4,317	*40*	101	*100*	20	*60*	0	-	0	-	22,740	*76*
Silvergray	155	*69*	0	-	0	-	0	-	5	*100*	35	*69*	116	*71*	39	*62*
Splitnose	129,061	*31*	57,845	*46*	49,582	*59*	7,604	*43*	12,571	*30*	1,114	*42*	345	*67*	128,715	*31*
Stripetail	111,567	*22*	41,353	*45*	55,851	*29*	6,340	*40*	7,872	*36*	111	*57*	40	*74*	111,528	*22*
Widow	1,670	*95*	1	*100*	34	*45*	28	*38*	1,608	*99*	0	-	0	-	1,670	*95*
Yellowtail	489	*80*	1	*100*	1	*100*	0	-	44	*54*	127	*71*	317	*96*	173	*54*
Total rockfish	337,526	*15*	120,049	*27*	125,061	*30*	17,639	*20*	51,696	*18*	12,393	*24*	11,688	*35*	325,839	*16*
Other fish																
Lingcod	230	*32*	9	*51*	104	*65*	18	*53*	60	*27*	18	*32*	20	*67*	210	*34*
Pacific hake	82,264	*16*	19,076	*33*	26,917	*19*	18,420	*53*	15,892	*21*	1,119	*29*	840	*57*	81,424	*16*
Sablefish	9,024	*21*	1,207	*22*	1,057	*34*	1,146	*22*	5,127	*36*	244	*25*	243	*27*	8,781	*22*
Total fish	546,595	*10*	154,814	*22*	179,858	*22*	50,452	*18*	114,994	*9*	25,585	*9*	20,892	*22*	525,703	*10*

Table 14.--Estimates of fish population numbers (x 1,000) from the 1995 West Coast triennial bottom trawl survey by International North Pacific Fisheries Commission (INPFC) area for the deepest depth stratum (367-500 m). Precision of the estimates are presented as coefficients of variation (CV%). "T" denotes trace value. Differences in totals result from rounding.

Taxon	Estimated population number (x 1,000) and *CV*% Total Survey Area		Estimated population number (x 1,000) and *CV*% by INPFC area													
			Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Cartilaginous																
Skates and rays	253	*21*	42	*25*	77	*57*	20	*59*	73	*29*	9	*81*	32	*35*	221	*24*
Spiny dogfish	623	*45*	126	*67*	52	*66*	425	*62*	11	*61*	1	*100*	8	*72*	615	*45*
Other sharks	2,708	*14*	980	*25*	670	*24*	637	*21*	404	*37*	13	*93*	4	*100*	2,704	*14*
Total cartilaginous	4,125	*13*	1,328	*25*	1,036	*22*	1,121	*23*	557	*26*	23	*47*	60	*29*	4,066	*13*
Flatfish																
Arrowtooth flounder	642	*23*	0	-	0	-	97	*22*	144	*36*	8	*62*	392	*35*	250	*23*
Dover sole	44,364	*13*	9,745	*19*	19,009	*21*	4,849	*35*	8,523	*17*	718	*24*	1,519	*29*	42,844	*13*
English sole	107	*55*	10	*100*	83	*64*	0	-	13	*100*	0	-	0	-	107	*55*
Pacific halibut	33	*36*	0	-	0	-	0	-	3	*100*	0	-	30	*38*	3	*100*
Pacific sanddab	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Petrale sole	1	*100*	0	-	1	*100*	0	-	0	-	0	-	0	-	1	*100*
Rex sole	25,841	*14*	5,005	*24*	6,909	*24*	5,578	*38*	7,049	*19*	213	*16*	1,087	*25*	24,754	*14*
Total flatfish	72,050	*12*	15,027	*19*	26,423	*22*	10,609	*29*	16,010	*15*	944	*20*	3,037	*26*	69,013	*13*
Rockfish																
Shortspine thornyhead	35,731	*12*	983	*33*	1,953	*16*	4,531	*26*	25,484	*17*	1,229	*16*	1,551	*19*	34,180	*13*
Bocaccio	3	*100*	0	-	3	*100*	0	-	0	-	0	-	0	-	3	*100*
Canary	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-

Table 14.--Continued.

Taxon	Estimated population number (x 1,000) and *CV*% Total Survey Area		Estimated population number (x 1,000) and *CV*% by INPFC area													
			Conception		Monterey		Eureka		Columbia		U.S. Vancouver		Canadian Vancouver		Total U.S. Area	
Rockfish (cont.)																
Chilipepper	7	*50*	4	*63*	3	*73*	0	-	0	-	0	-	0	-	7	*50*
Darkblotched	73	*21*	1	*100*	21	*40*	23	*40*	21	*42*	1	*100*	7	*43*	66	*23*
Greenstriped	16	*78*	0	-	11	*100*	0	-	3	*100*	1	*100*	0	-	16	*78*
Pacific ocean perch	1,334	*22*	0	-	0	-	4	*53*	538	*31*	130	*33*	662	*34*	672	*27*
Redstripe	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Sharpchin	21	*75*	0	-	0	-	0	-	21	*75*	0	-	0	-	21	*75*
Shortbelly	4	*100*	0	-	4	*100*	0	-	0	-	0	-	0	-	4	*100*
Silvergray	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Splitnose	4,135	*29*	1,641	*32*	2,045	*60*	160	*62*	273	*35*	1	*100*	15	*70*	4,120	*29*
Stripetail	754	*99*	0	-	754	*99*	0	-	0	-	0	-	0	-	754	*99*
Widow	9	*66*	0	-	0	-	0	-	9	*66*	0	-	0	-	9	*66*
Yellowtail	3	*100*	0	-	0	-	0	-	0	-	3	*100*	1	*100*	3	*100*
Total rockfish	56,759	*9*	5,641	*16*	8,370	*23*	5,222	*22*	32,059	*14*	1,726	*24*	3,741	*30*	53,018	*10*
Other fish																
Lingcod	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Pacific hake	10,545	*11*	3,797	*27*	1,568	*18*	1,409	*24*	3,048	*9*	155	*26*	568	*22*	9,977	*12*
Sablefish	4,682	*19*	384	*16*	476	*16*	858	*31*	2,573	*26*	324	*72*	66	*66*	4,615	*19*
Total fish	161,789	*7*	28,633	*13*	40,273	*16*	24,075	*17*	57,706	*10*	3,372	*19*	7,731	*26*	154,058	*7*

Table 15.--The length-weight relationships from the 1995 triennial West Coast survey using a non-linear least squares fit for the following equation: Fish weight (grams) = a * {Fork length (cm)}^{b}

Species	Sex	Number sampled	Length-weight coefficients a	b	Predicted weight at length (g)		
					30 cm	50 cm	65 cm
Pacific	M	227	0.0086206	2.902250	166.9	735.1	1,574.2
hake	F	368	0.0037867	3.140277	164.8	819.4	1,867.7
	T	595	0.0025952	3.229277	152.8	795.5	1,856.0
					40 cm	50 cm	65 cm
Sablefish	M	590	0.0025338	3.346895	583.0	1,230.4	2,960.8
	F	691	0.0026314	3.336907	583.6	1,228.8	2,949.2
	T	1,281	0.0026478	3.335682	584.6	1,230.6	2,952.5
					40 cm	50 cm	60 cm
Arrowtooth	M	19	0.0238681	2.728219	560.5	1,030.3	1,694.4
flounder	F	29	0.0022243	3.360838	538.8	1,140.7	2,105.1
	T	48	0.0028142	3.303125	551.0	1,151.5	2,102.9
					20 cm	25 cm	30 cm
Aurora	M	38	0.0099751	3.147265	124.1	250.4	444.4
rockfish	F	23	0.0125867	3.071314	124.7	247.4	433.1
	T	61	0.0116303	3.097371	124.6	248.6	437.3
					40 cm	50 cm	60 cm
Bocaccio	M	80	0.0057868	3.184188	730.6	1,486.9	2,657.1
	F	64	0.0023570	3.393739	644.7	1,374.7	2,552.4
	T	144	0.0041645	3.259462	694.1	1,436.5	2,602.4
					30 cm	40 cm	50 cm
Canary	M	168	0.0161351	3.017130	461.8	1,100.0	2,156.7
rockfish	F	146	0.0284019	2.868344	490.0	1,118.4	2,121.2
	T	314	0.0239309	2.913132	480.8	1,111.7	2,129.5
					20 cm	30 cm	40 cm
Chilipepper	M	160	0.0058871	3.257104	101.7	381.1	972.7
	F	141	0.0071705	3.172045	96.0	347.6	865.7
	T	301	0.0134119	3.009443	110.4	373.9	888.8
					25 cm	30 cm	35 cm
Chub	M	57	0.0064485	3.184451	182.4	326.0	532.7
mackerel	F	62	0.0027736	3.434004	175.2	327.7	556.4
	T	119	0.0047855	3.273600	180.4	327.7	542.7
					20 cm	30 cm	40 cm
Darkblotched	M	352	0.0278166	2.875341	153.2	491.5	1,124.0
rockfish	F	359	0.0254215	2.907385	154.1	500.9	1,156.1
	T	711	0.0242984	2.917394	151.8	495.4	1,146.6
					25 cm	30 cm	35 cm
Dover	M	44	0.0024416	3.378448	129.0	238.8	402.0
sole	F	27	0.0014825	3.519236	123.2	234.1	402.7
	T	71	0.0020001	3.435978	127.2	237.9	404.1
					20 cm	25 cm	30 cm
English	M	32	0.0112982	2.892246	65.4	124.8	211.4
sole	F	44	0.0153056	2.821309	71.7	134.5	225.0
	T	76	0.0107995	2.921289	68.2	131.0	223.1
					20 cm	30 cm	35 cm
Greenstriped	M	156	0.0059851	3.244435	99.6	371.1	611.9
rockfish	F	186	0.0079687	3.152397	100.6	361.3	587.4
	T	342	0.0082559	3.143532	101.5	363.2	589.6

Table 15.--Continued.

Species	Sex	Number sampled	Length-weight coefficients a	b	Predicted weight at length (g)		
					40 cm	60 cm	80 cm
Lingcod	M	303	0.0017255	3.412444	505.7	2,017.2	5,384.0
	F	478	0.0025944	3.297950	498.4	1,898.0	4,901.5
	T	787	0.0031852	3.255106	522.4	1,955.3	4,987.7
					60 cm	80 cm	100 cm
Pacific	M	47	0.0052940	3.188403	2,473.1	6,188.7	12,606.4
halibut	F	77	0.0036992	3.273940	2,452.8	6,290.9	13,061.3
	T	124	0.0035979	3.279696	2,442.6	6,274.9	13,044.9
					20 cm	30 cm	40 cm
Pacific	M	322	0.0115203	3.064958	112.0	388.0	936.9
ocean	F	286	0.0093973	3.134035	112.3	400.3	986.1
perch	T	614	0.0072597	3.198974	105.4	385.6	968.0
					15 cm	20 cm	25 cm
Pacific	M	160	0.0085477	3.042107	32.3	77.6	152.9
sanddab	F	206	0.0065513	3.151577	33.3	82.5	166.7
	T	366	0.0050924	3.223880	31.5	79.7	163.6
					15 cm	20 cm	25 cm
Plainfin	M	129	0.0051545	3.222412	31.8	80.3	164.8
midshipman	F	21	0.0027366	3.465118	32.5	88.2	191.1
	T	150	0.0060021	3.175532	32.6	81.2	165.0
					25 cm	30 cm	40 cm
Redstiped	M	84	0.0332219	2.724867	214.1	351.9	770.6
rockfish	F	103	0.0193272	2.893507	214.3	363.3	835.1
	T	187	0.0183942	2.906431	212.7	361.3	833.6
					20 cm	25 cm	30 cm
Rex	M	60	0.0028163	3.246753	47.2	97.4	176.0
sole	F	80	0.0025689	3.273563	46.6	96.8	175.9
	T	140	0.0026608	3.263501	46.9	97.1	176.0
					20 cm	25 cm	30 cm
Rosethorn	M	57	0.0094133	3.129019	110.8	222.8	394.2
rockfish	F	55	0.0098660	3.104266	107.9	215.6	379.8
	T	112	0.0095669	3.119081	109.3	219.3	387.3
					20 cm	25 cm	30 cm
Rougheye	M	49	0.0080794	3.172299	108.3	219.8	392.0
rockfish	F	44	0.0129749	3.041286	117.5	231.5	403.1
	T	93	0.0103189	3.103895	112.7	225.3	396.7
					20 cm	30 cm	35 cm
Sharpchin	M	164	0.0057519	3.292948	110.7	420.6	698.8
rockfish	F	222	0.0046740	3.345070	105.1	408.1	683.4
	T	386	0.0058196	3.282386	108.5	410.6	681.0
					40 cm	50 cm	60 cm
Silvergray	M	36	0.0155469	2.972009	897.4	1,741.8	2,994.5
rockfish	F	49	0.0092095	3.103242	862.6	1,724.1	3,035.8
	T	85	0.0108259	3.063241	874.9	1,733.1	3,029.5
					20 cm	23 cm	25 cm
Slender	M	30	0.0050288	3.054065	47.3	72.5	93.5
sole	F	30	0.0044990	3.106429	49.5	76.4	99.0
	T	60	0.0040710	3.130611	48.2	74.6	96.9

Table 15.--Continued.

Species	Sex	Number sampled	Length-weight coefficients a	b	Predicted weight at length (g)		
					15 cm	25 cm	35 cm
Splitnose rockfish	M	335	0.0158038	3.031027	58.0	272.9	756.6
	F	252	0.0272121	2.878433	66.1	287.5	757.3
	T	589	0.0200232	2.964282	61.3	278.9	756.1
					20 cm	25 cm	30 cm
Stripetail rockfish	M	34	0.0065088	3.284593	122.1	254.2	462.6
	F	24	0.0193430	2.934448	127.2	244.7	417.9
	T	58	0.0133173	3.045761	122.2	241.1	420.1
					23 cm	26 cm	29 cm
White croaker	M	49	0.0141008	2.926265	136.2	194.9	268.3
	F	109	0.0137296	2.934174	135.9	194.7	268.3
	T	158	0.0210365	2.802070	137.6	194.0	263.5
					25 cm	35 cm	50 cm
Yellowtail rockfish	M	250	0.0097946	3.126650	230.1	658.8	2,009.4
	F	235	0.0105392	3.100547	227.6	646.0	1,952.3
	T	485	0.0113949	3.083169	232.7	656.6	1,972.1

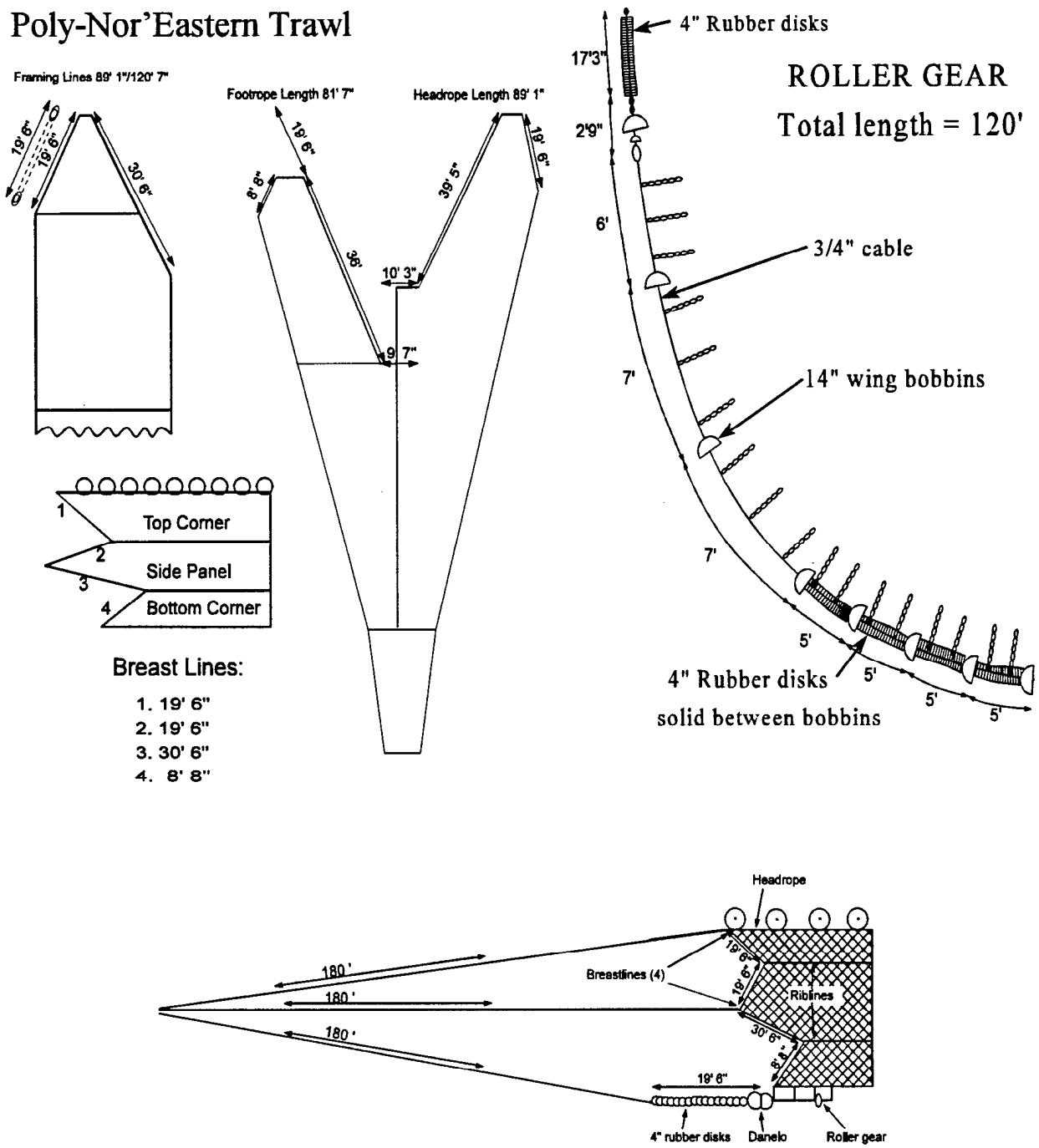

Figure 1 .--The standardized poly-Nor'Eastern trawl and accessories used to sample groundfish during the 1995 West Coast triennial bottom trawl survey.

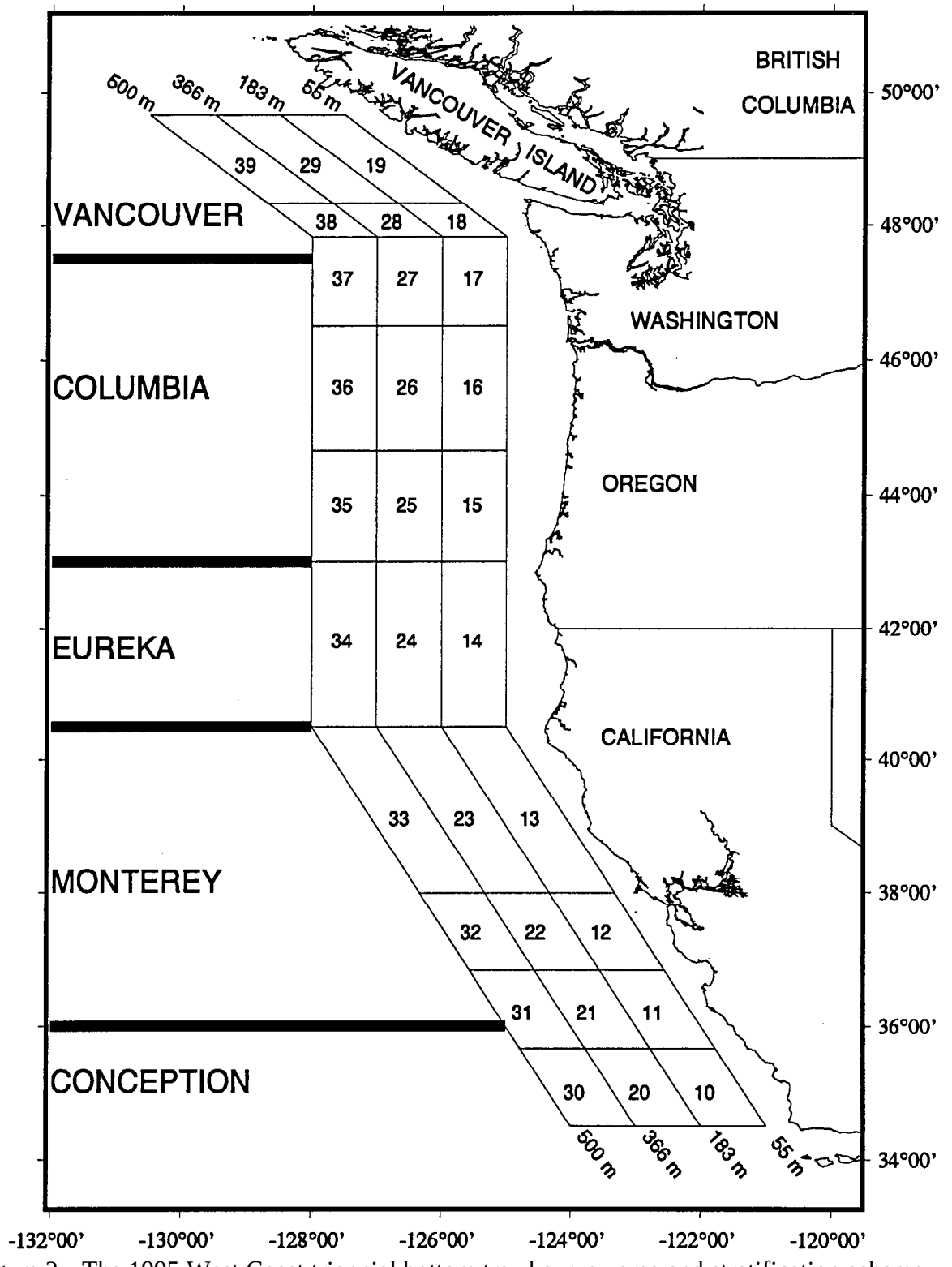

Figure 2.--The 1995 West Coast triennial bottom trawl survey area and stratification scheme (stratum numbers shown), also showing International North Pacific Fisheries Commission statistical areas.

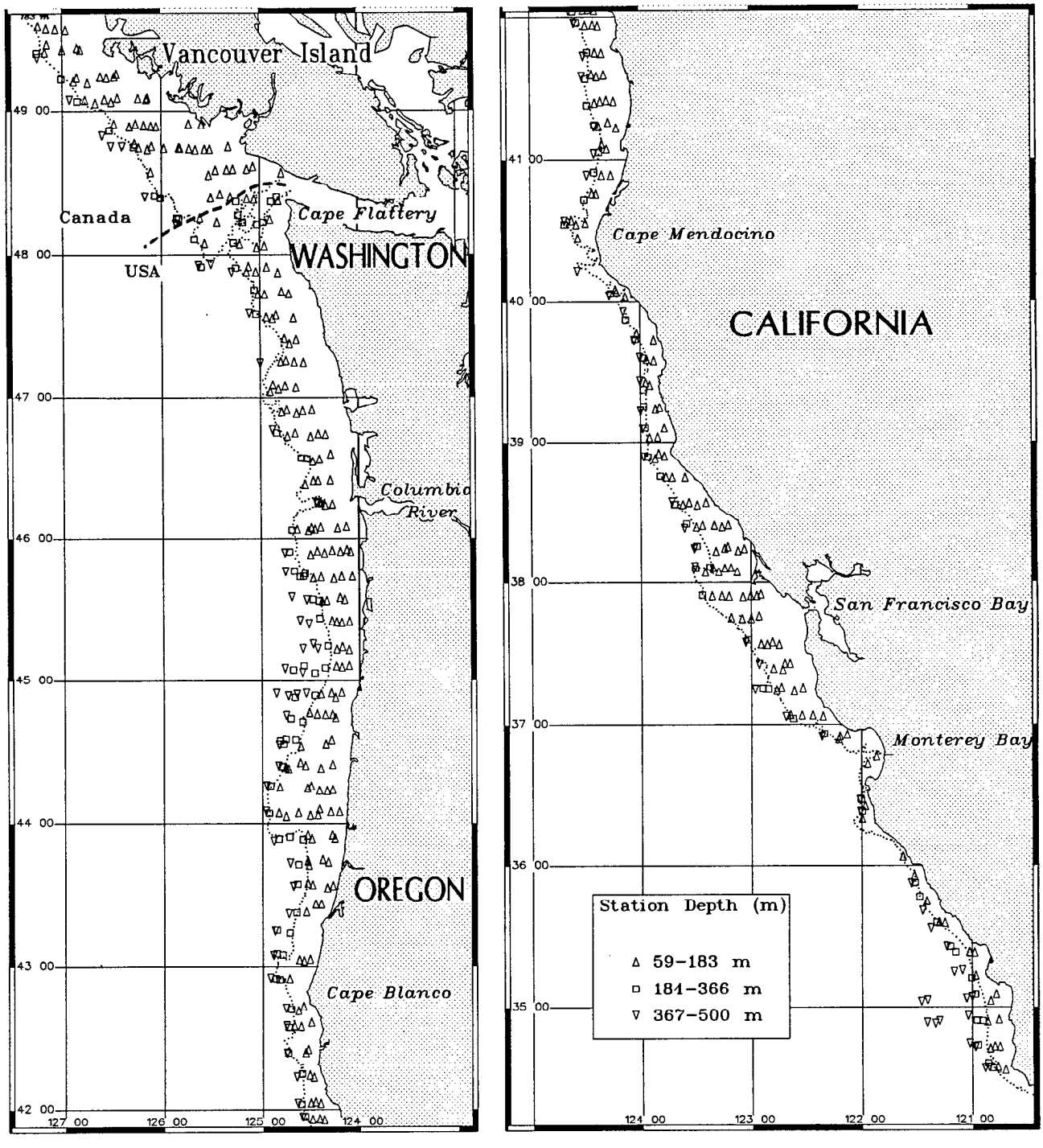

Figure 3.--Locations of stations successfully sampled in each depth stratum during the 1995 West Coast triennial bottom trawl survey.

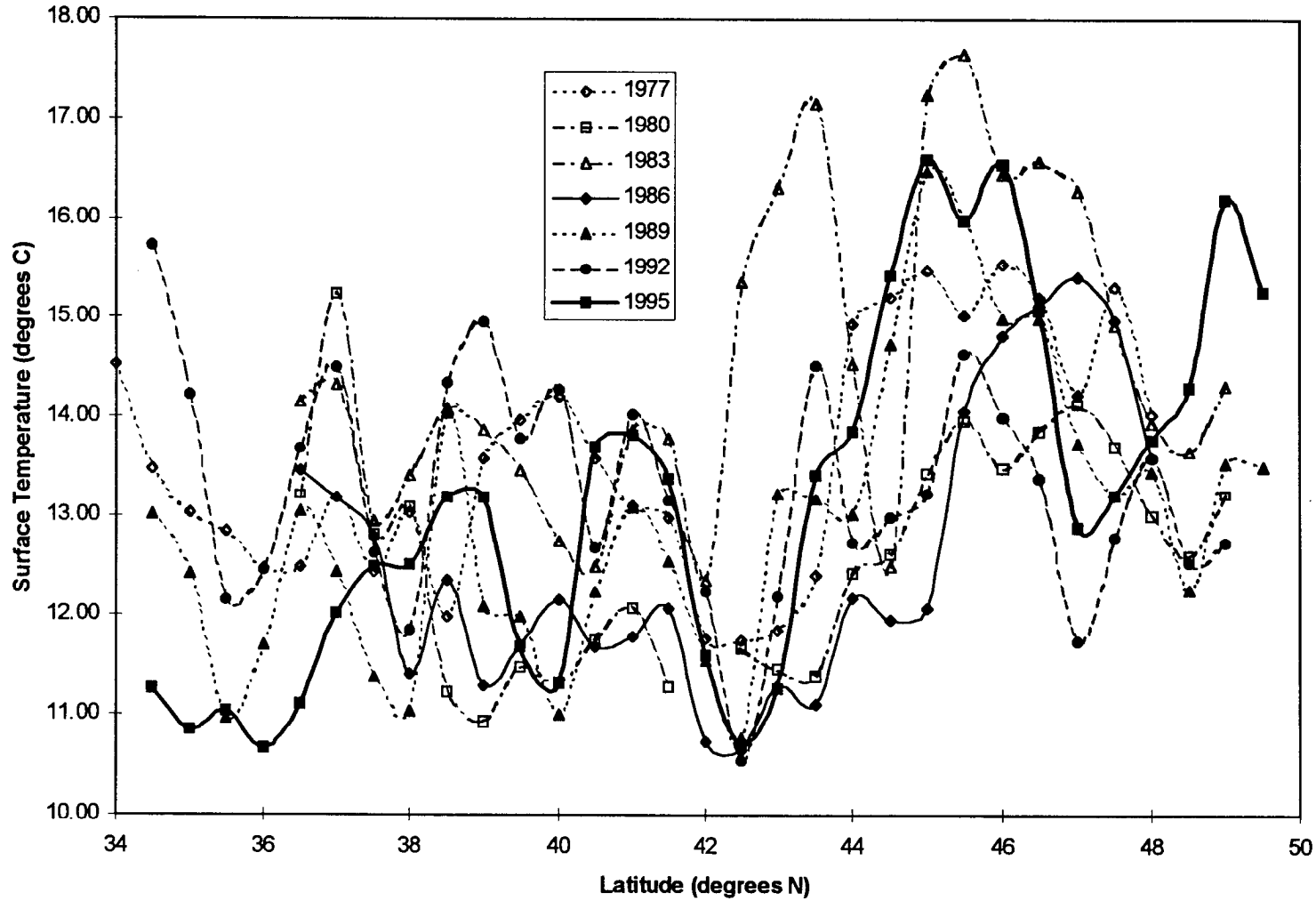

Figure 4.--Sea surface temperatures, averaged by one-half degree latitude, observed during the 1977-95 West Coast triennial bottom trawl surveys.

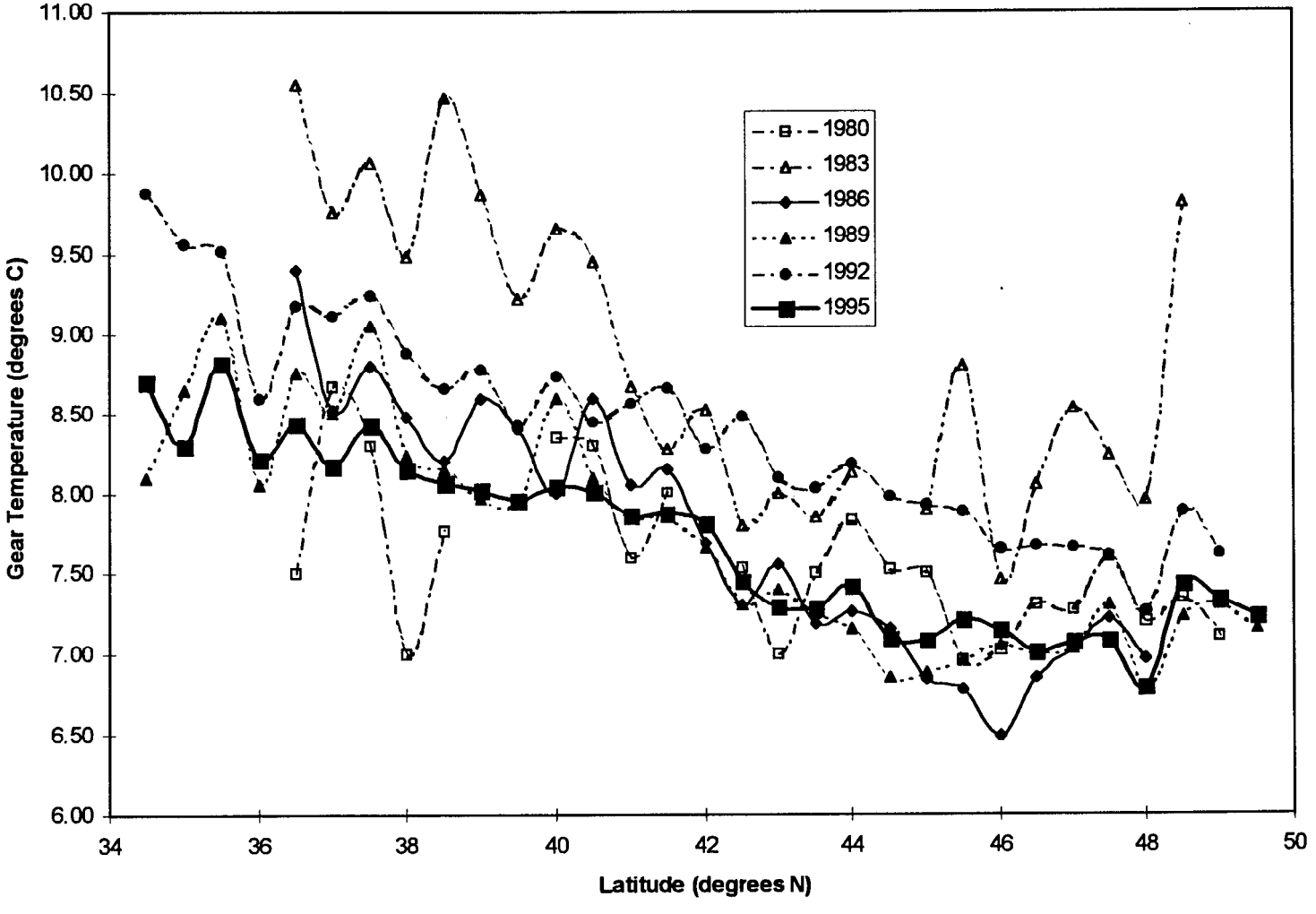

Figure 5.--Bottom temperatures, averaged by one-half degree latitude, observed during the 1980-95 West Coast triennial bottom trawl surveys.

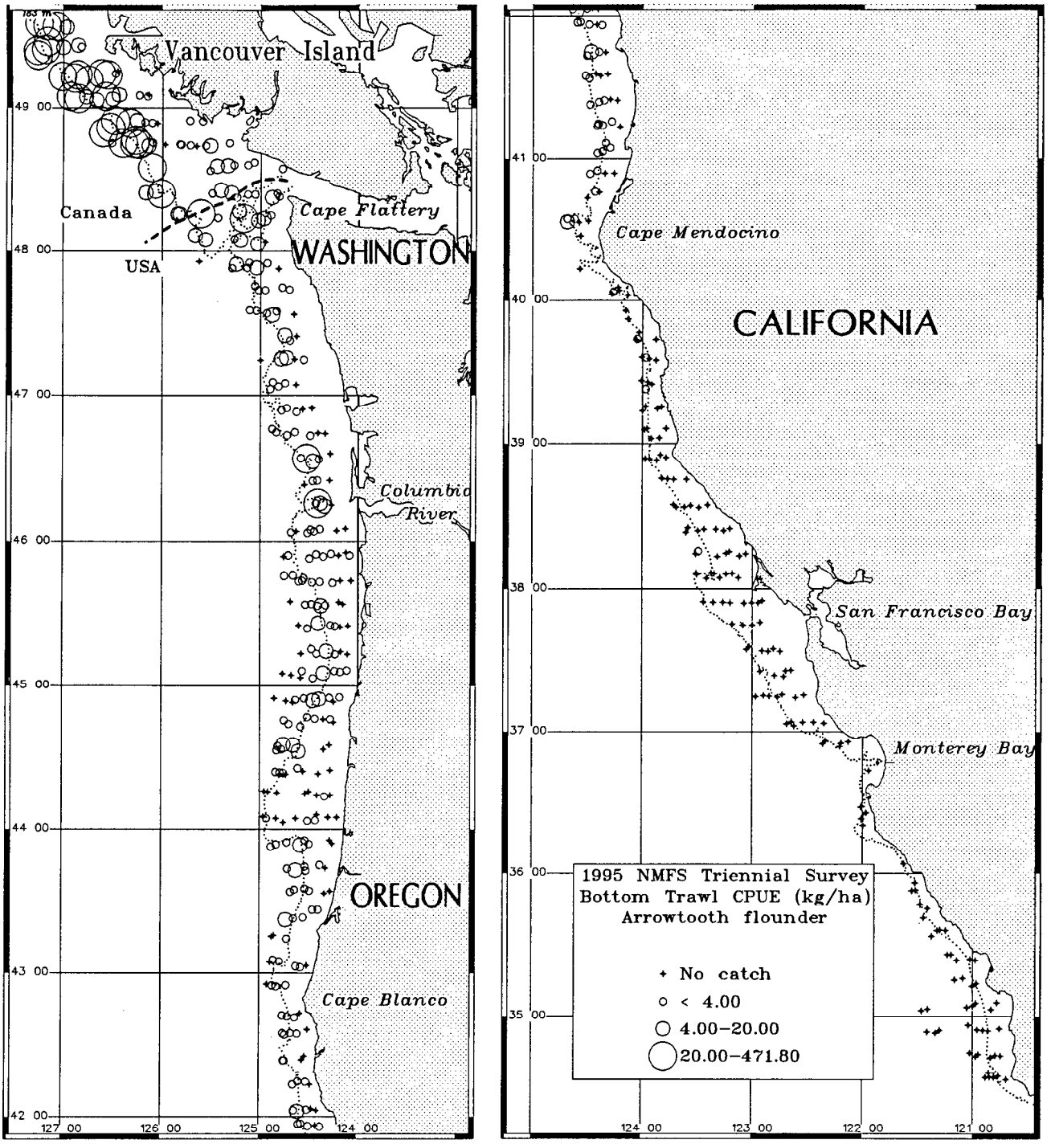

Figure 6.--Arrowtooth flounder distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

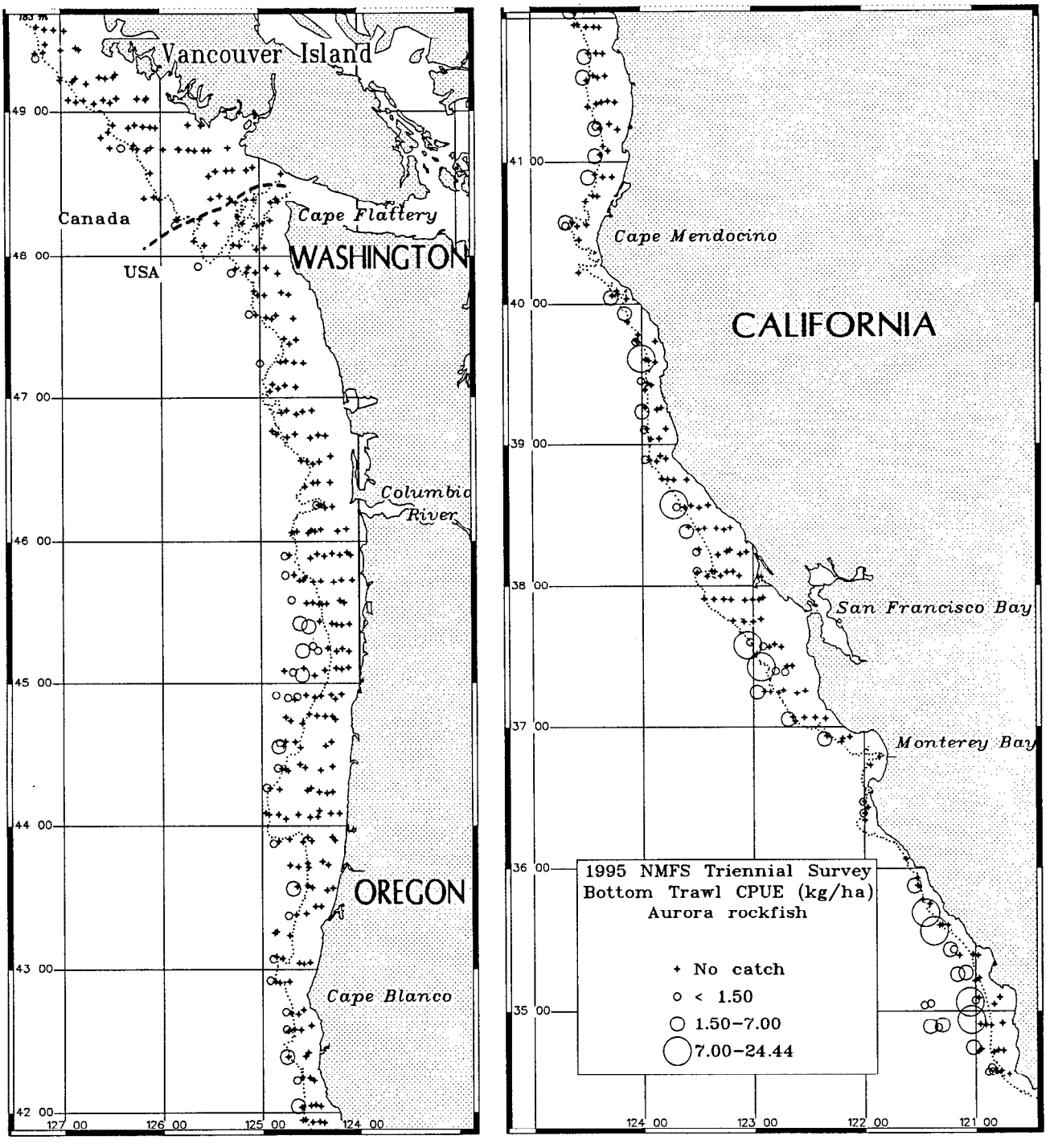

Figure 7.--Aurora rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

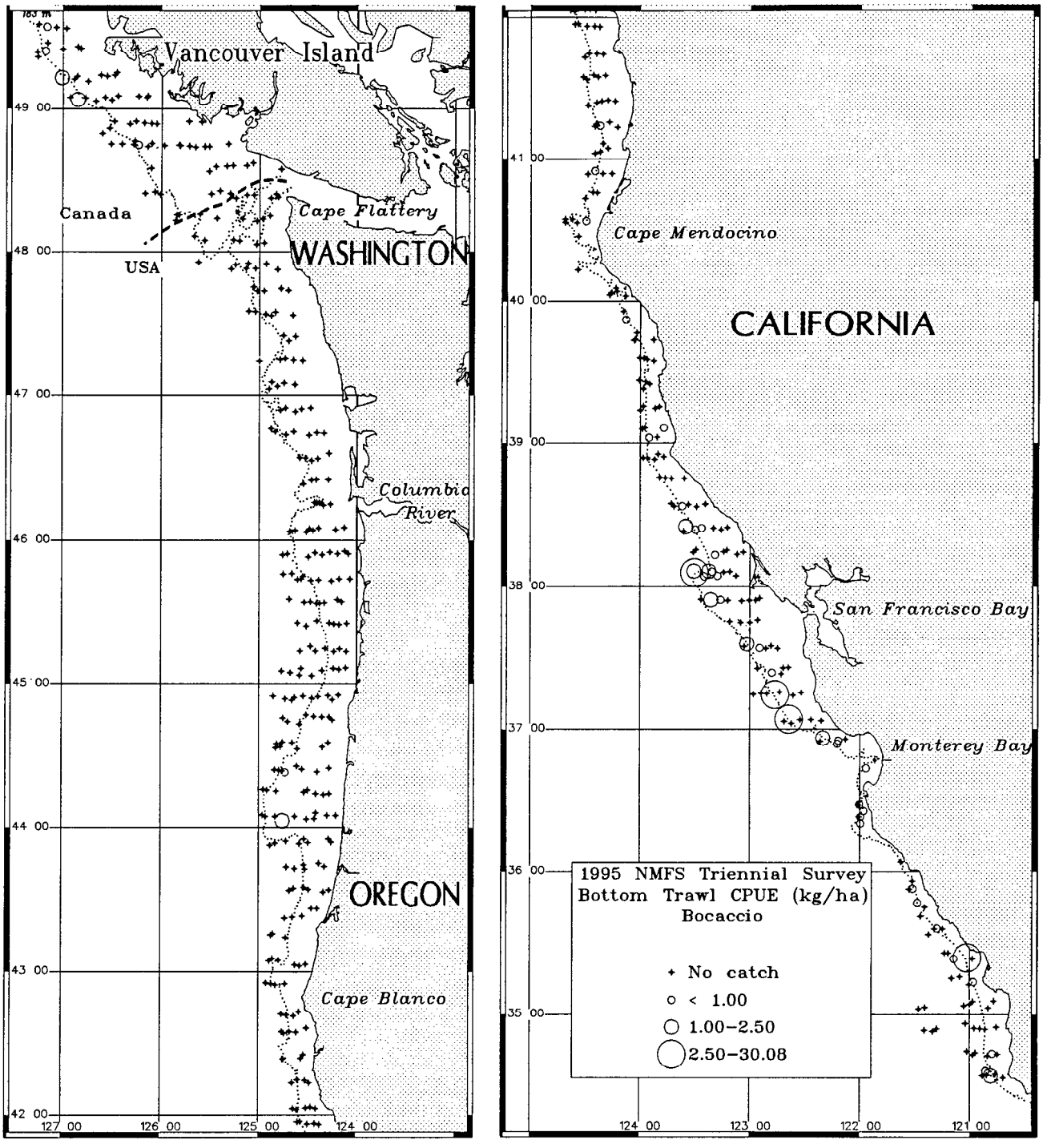

Figure 8.--Bocaccio distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

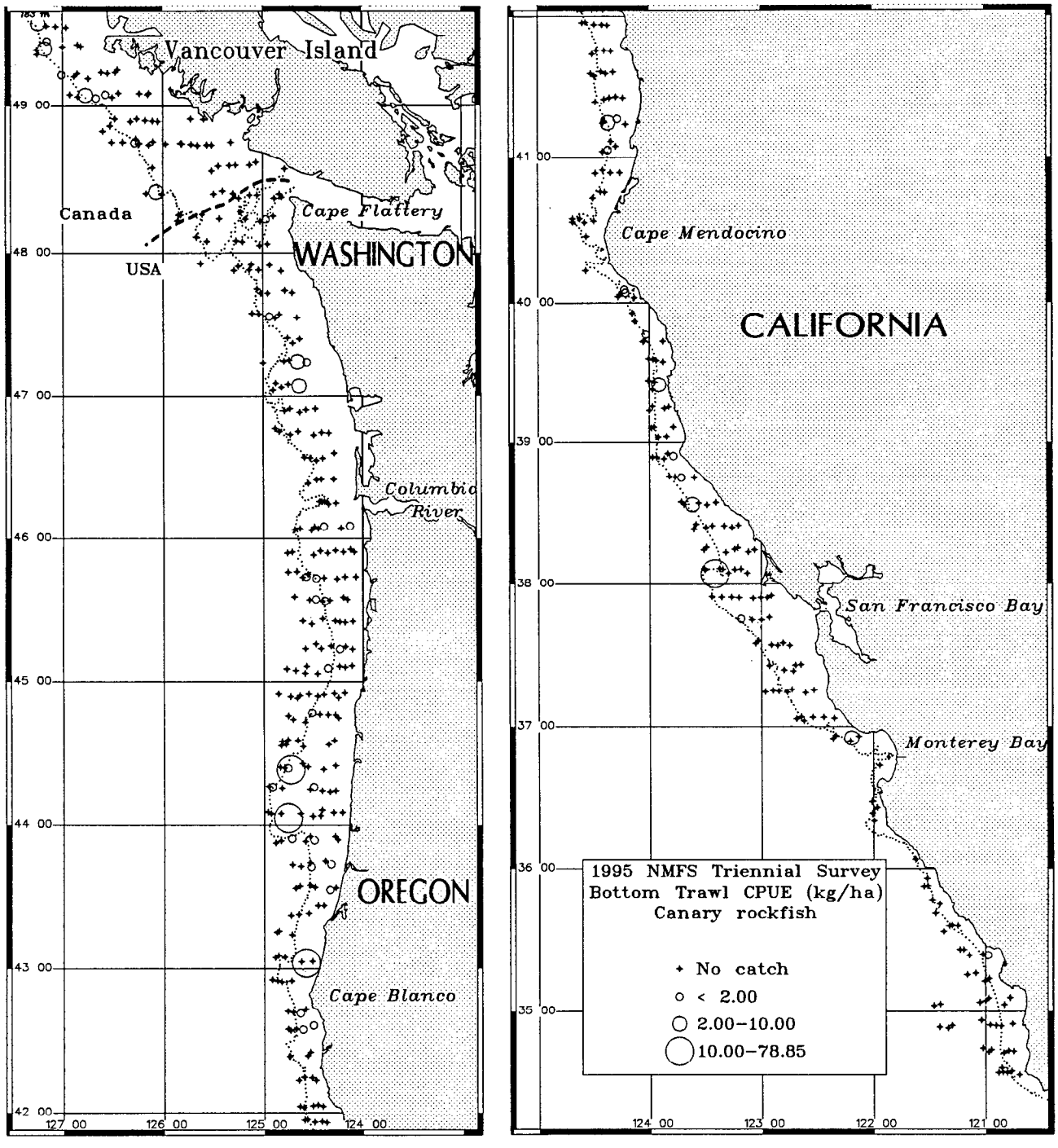

Figure 9.--Canary rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

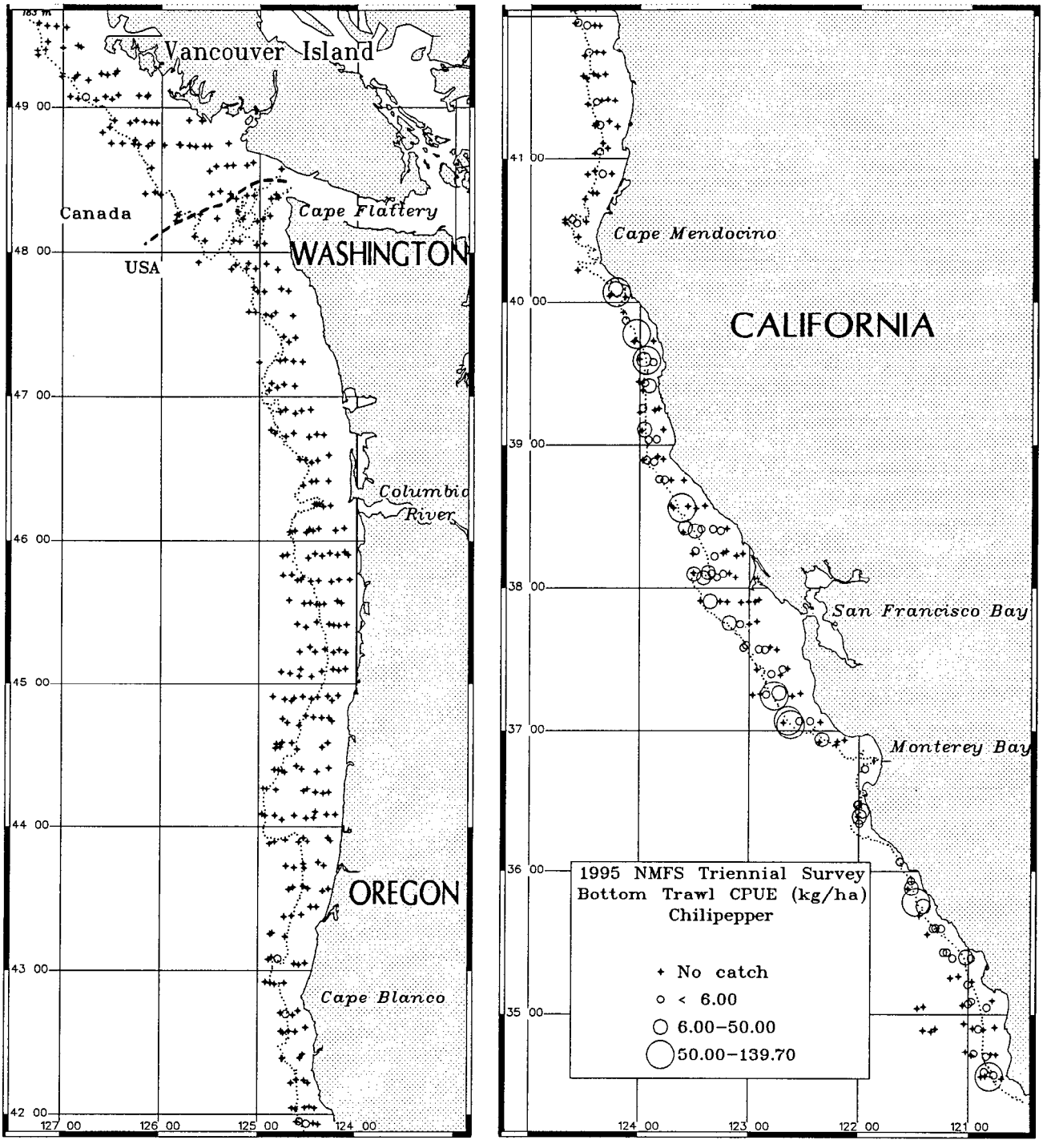

Figure l0.--Chilipepper distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

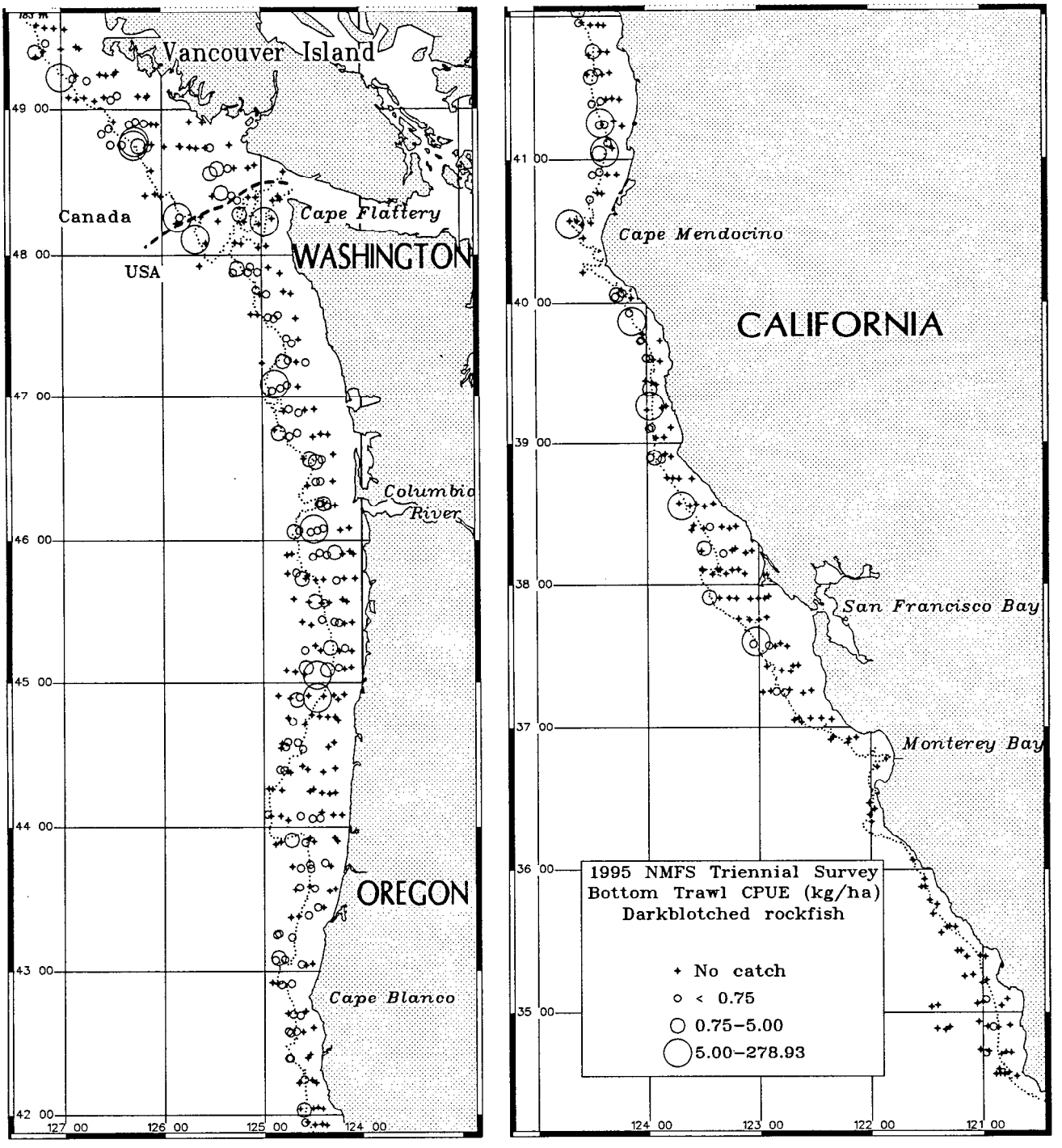

Figure 11 .--Darkblotched rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

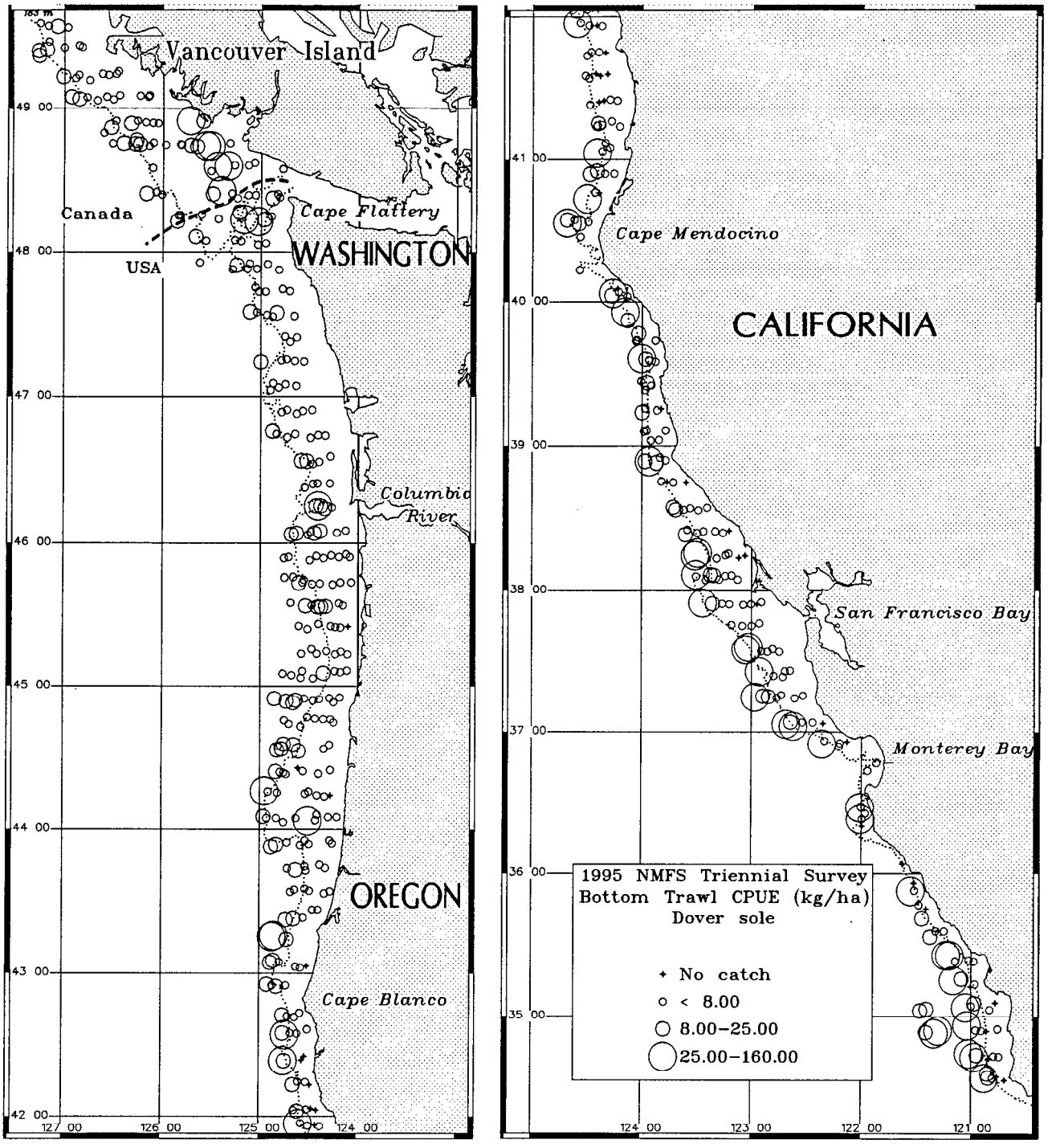

Figure 12.--Dover sole distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

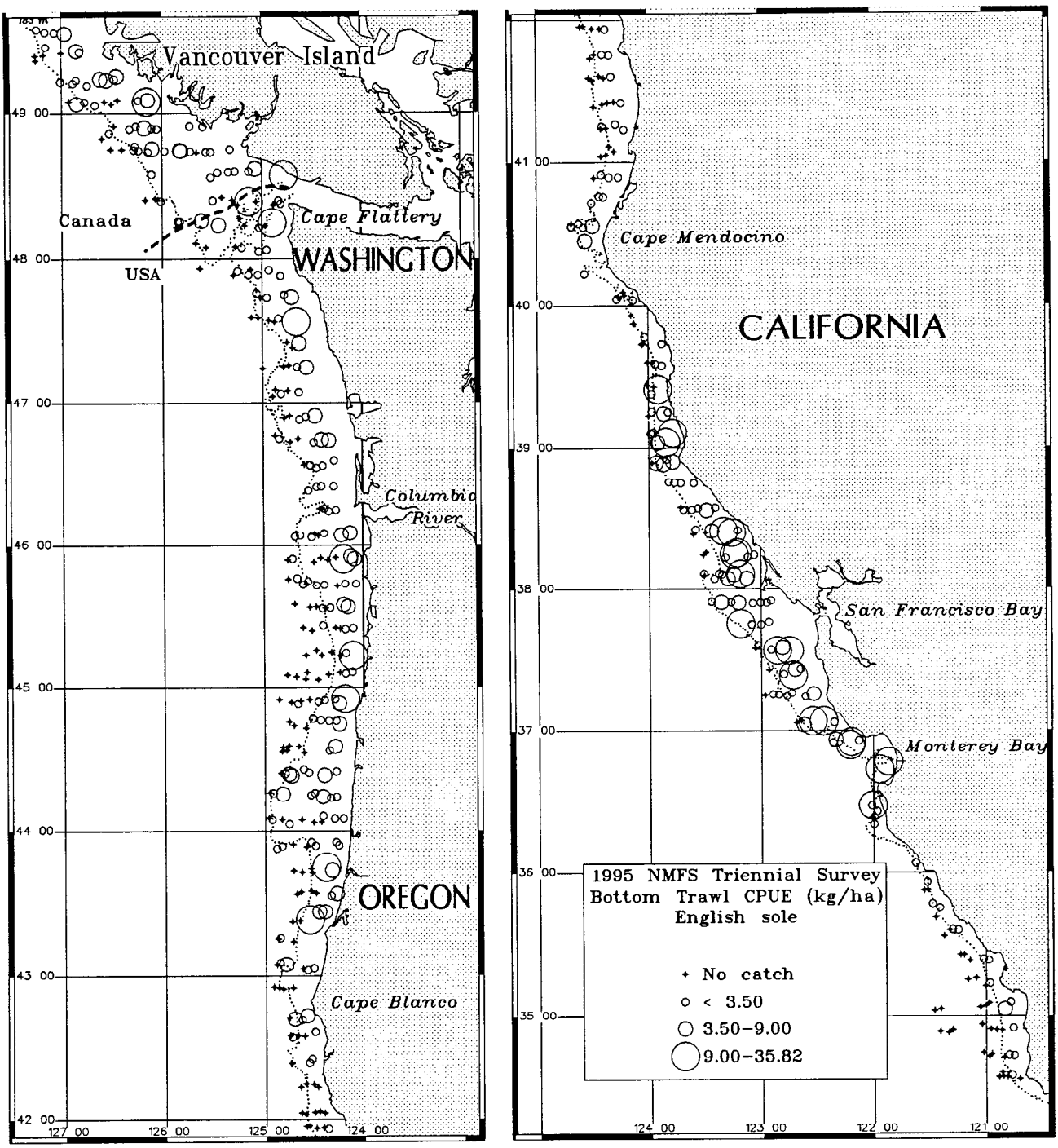

Figure 13.--English sole distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

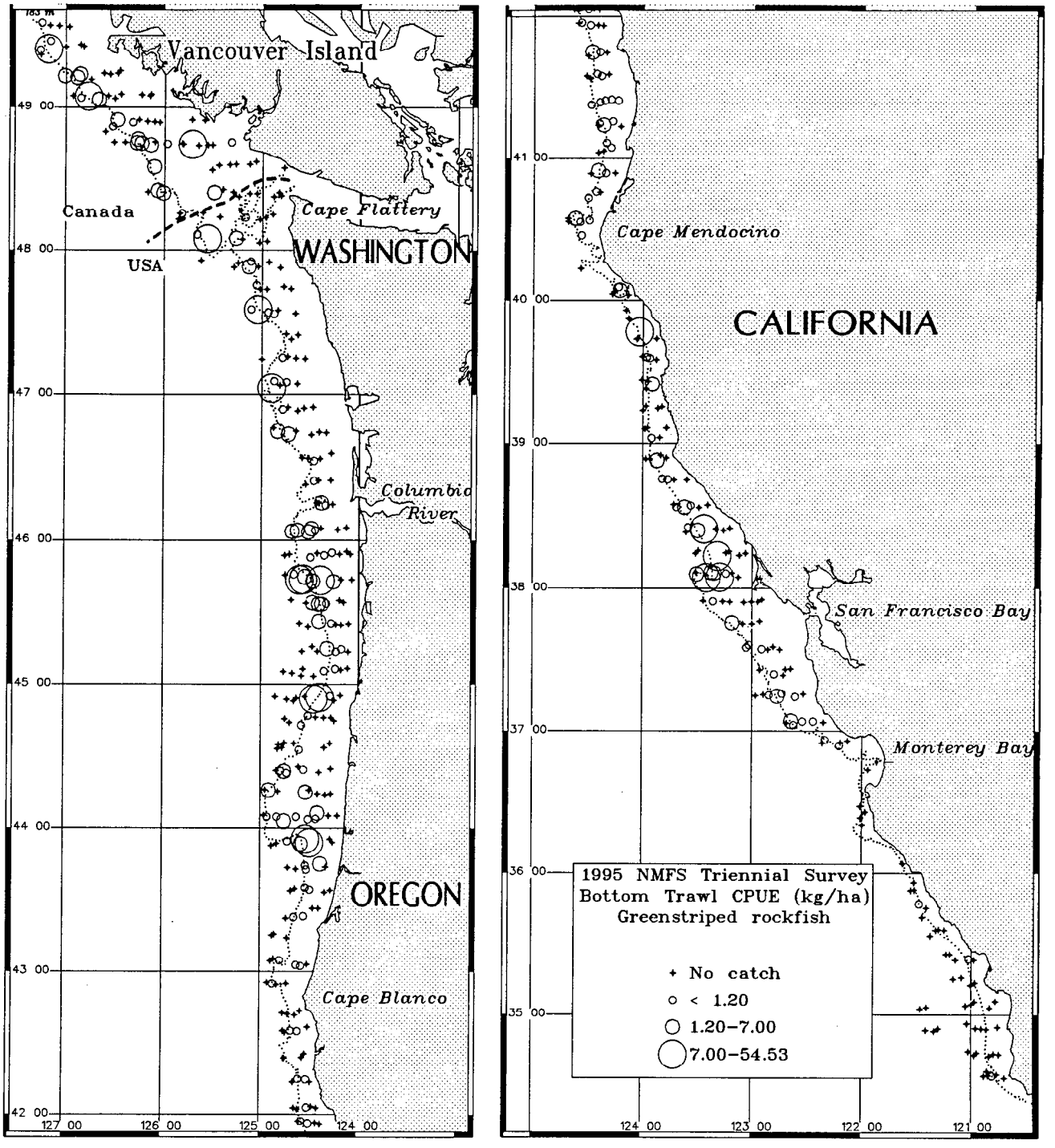

Figure 14.--Greenstriped rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

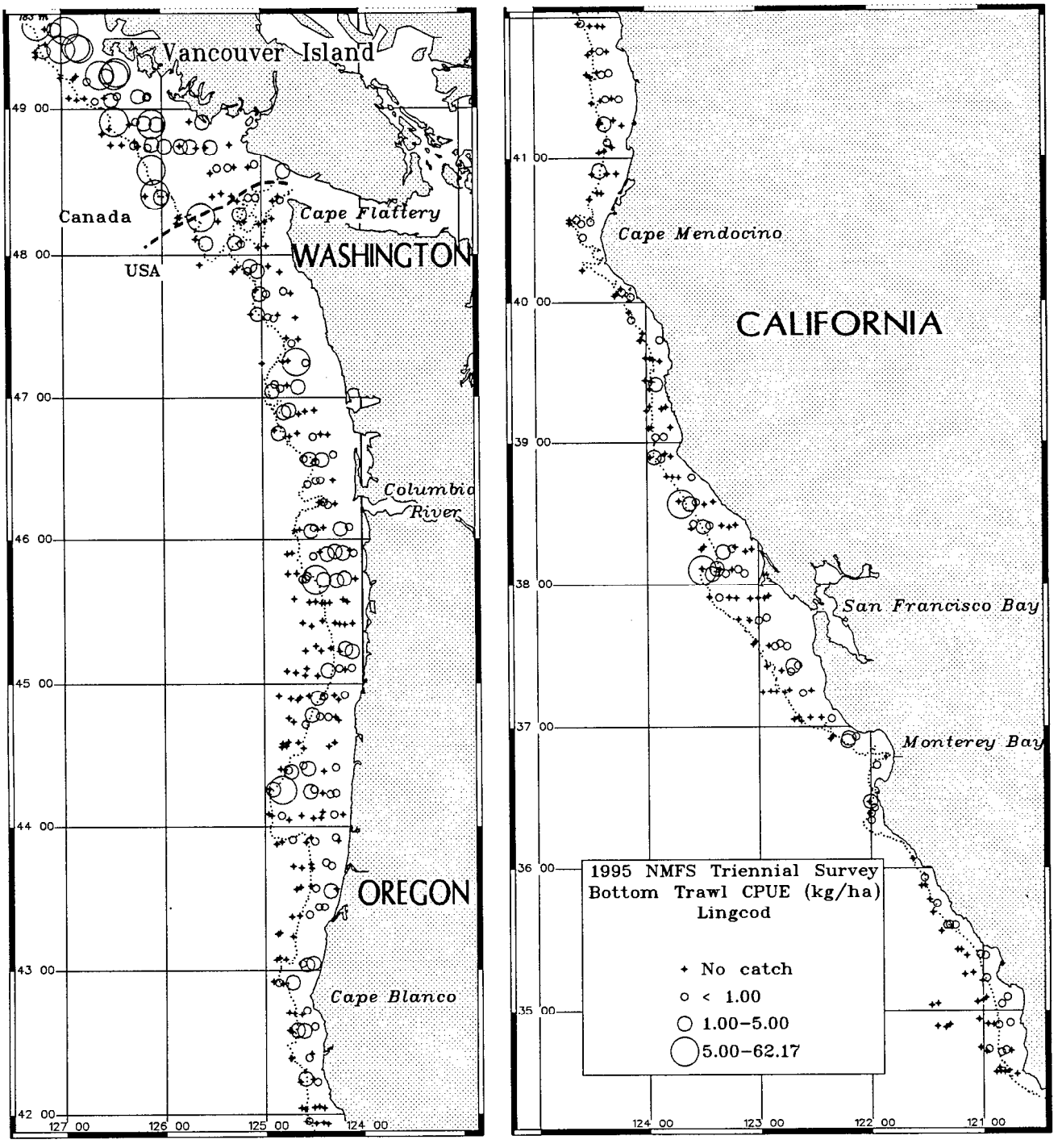

Figure 15 .--Lingcod distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

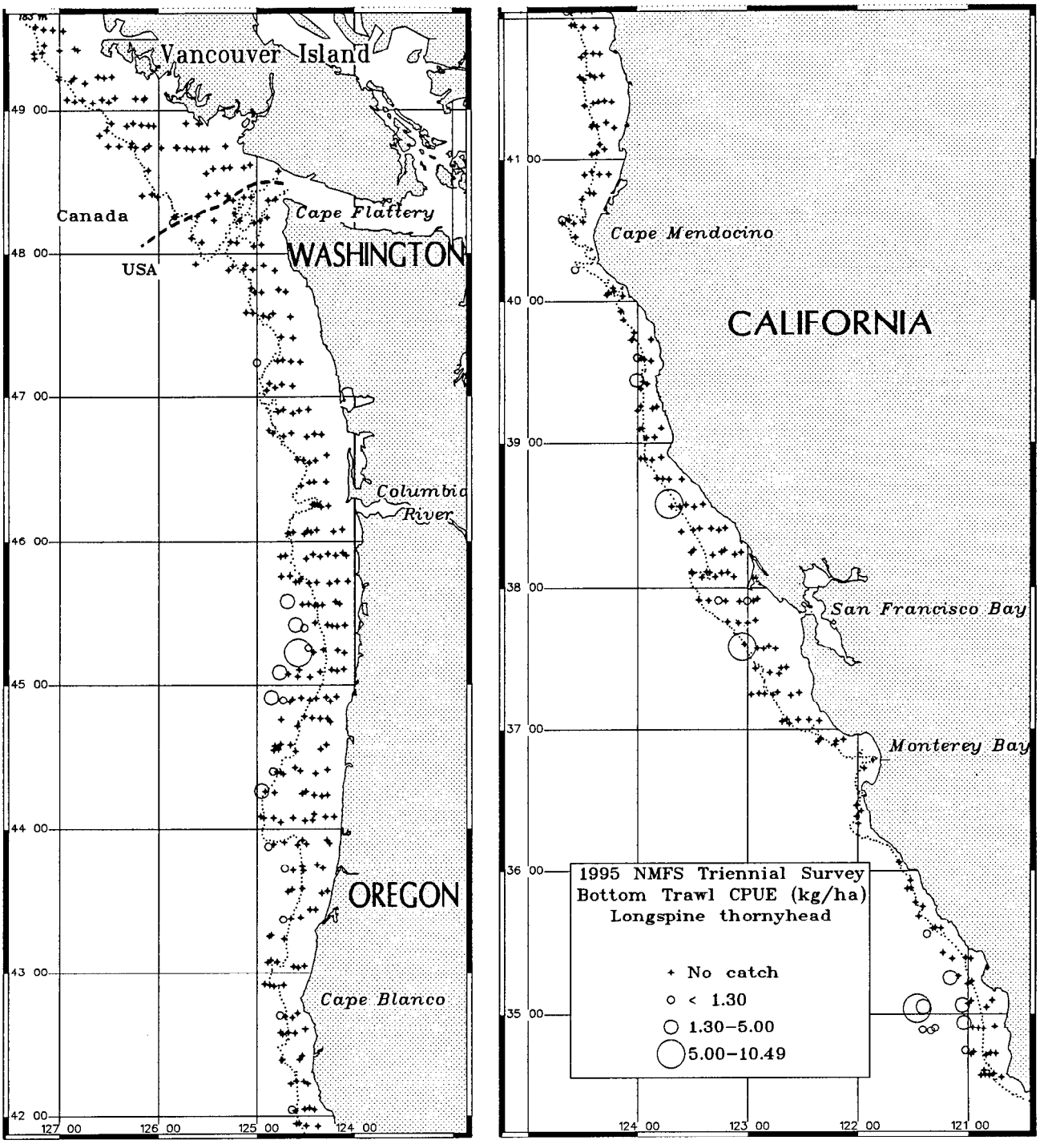

Figure 16.--Longspine thornyhead distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

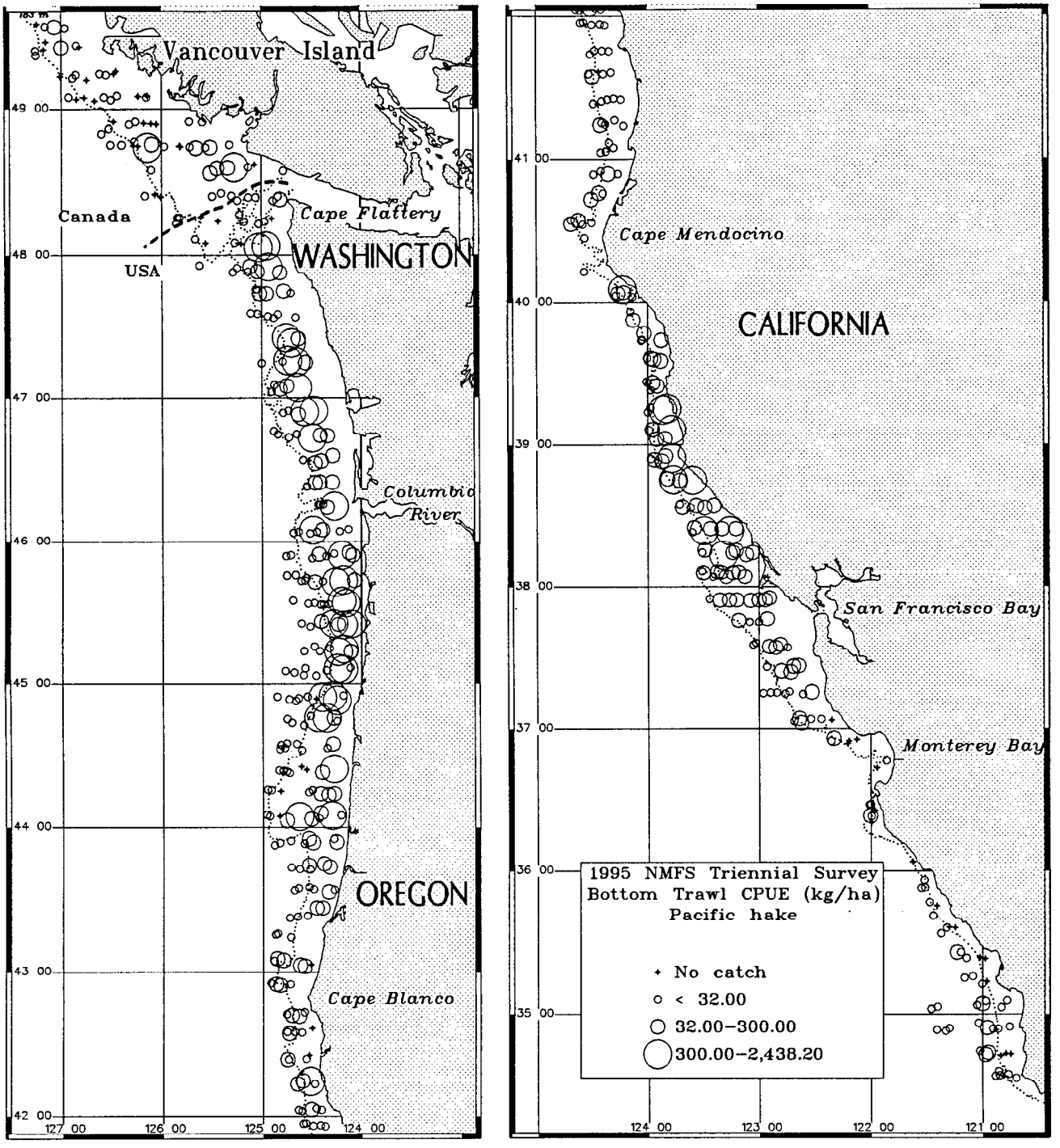

Figure 17.--Pacific hake distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

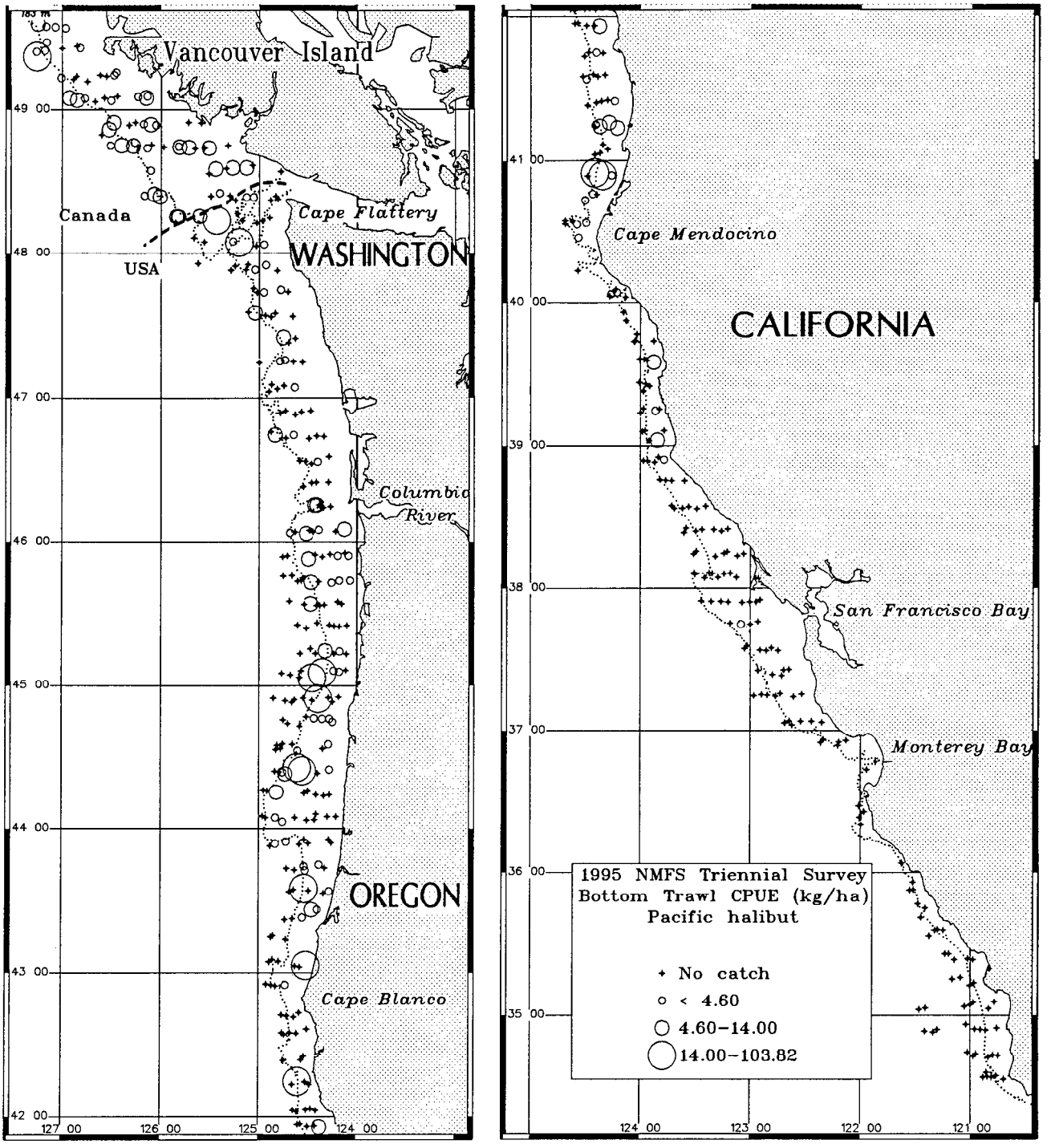

Figure 18.--Pacific halibut distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

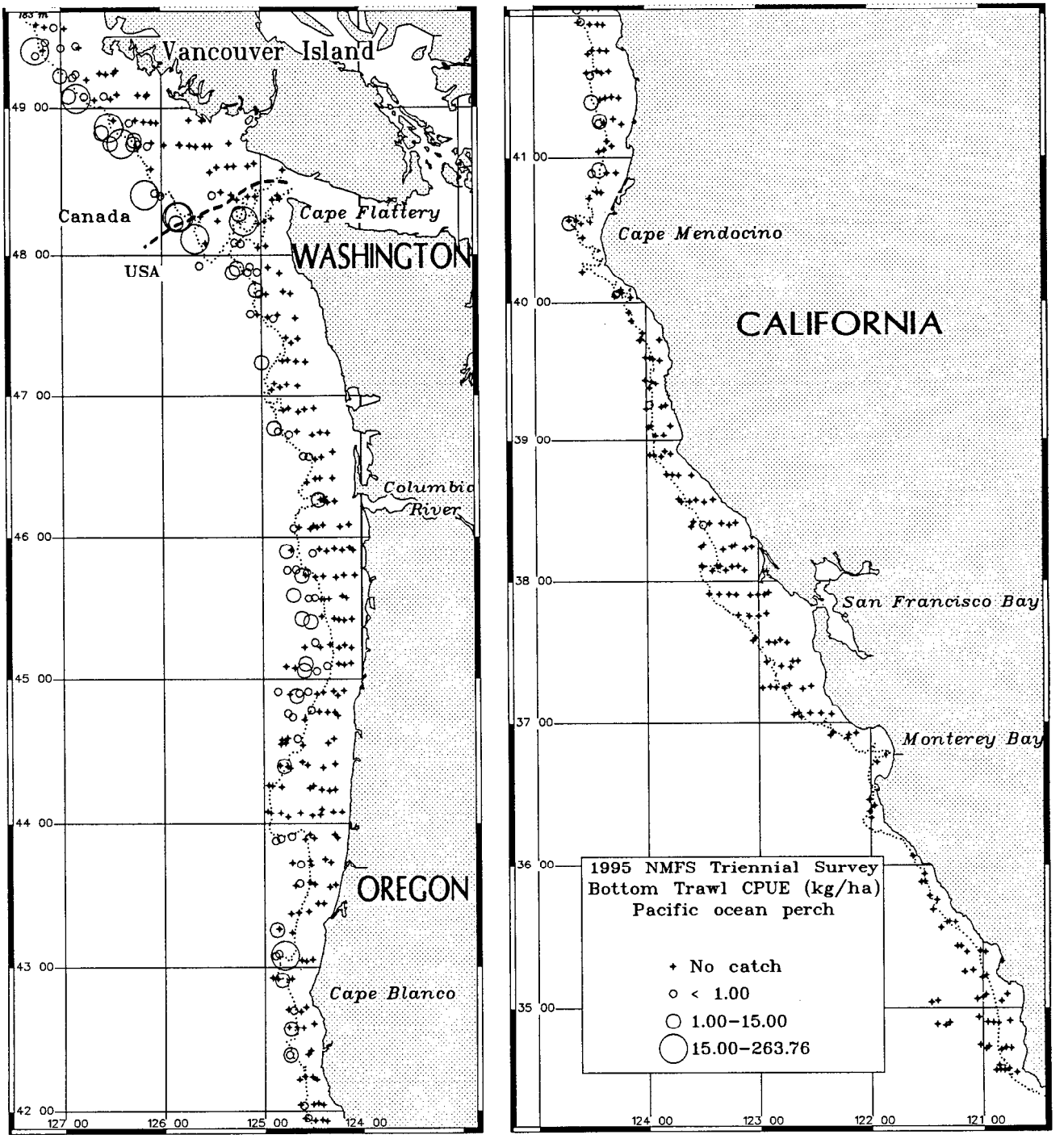

Figure l9.--Pacific ocean perch distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

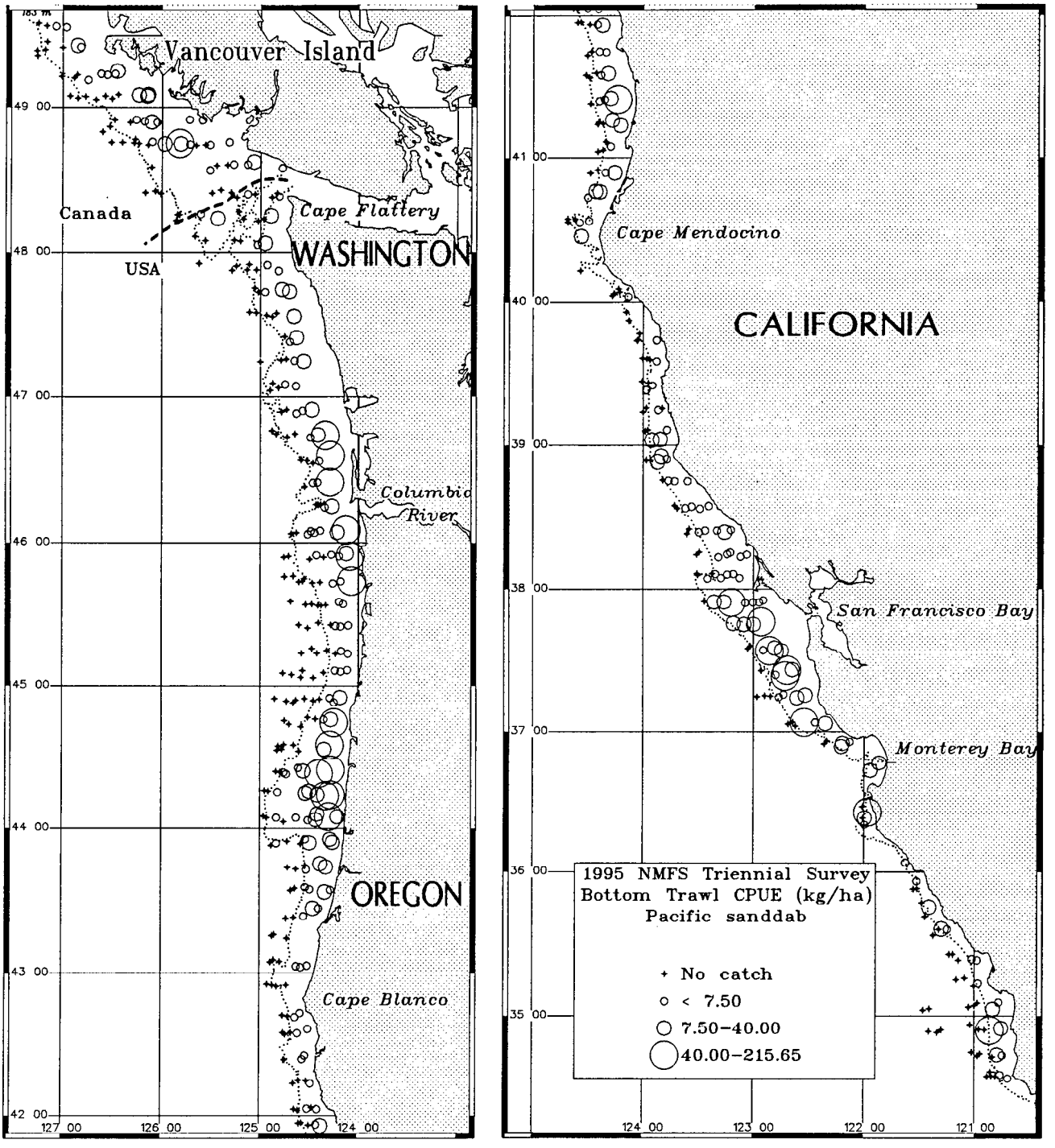

Figure 20.--Pacific sanddab distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

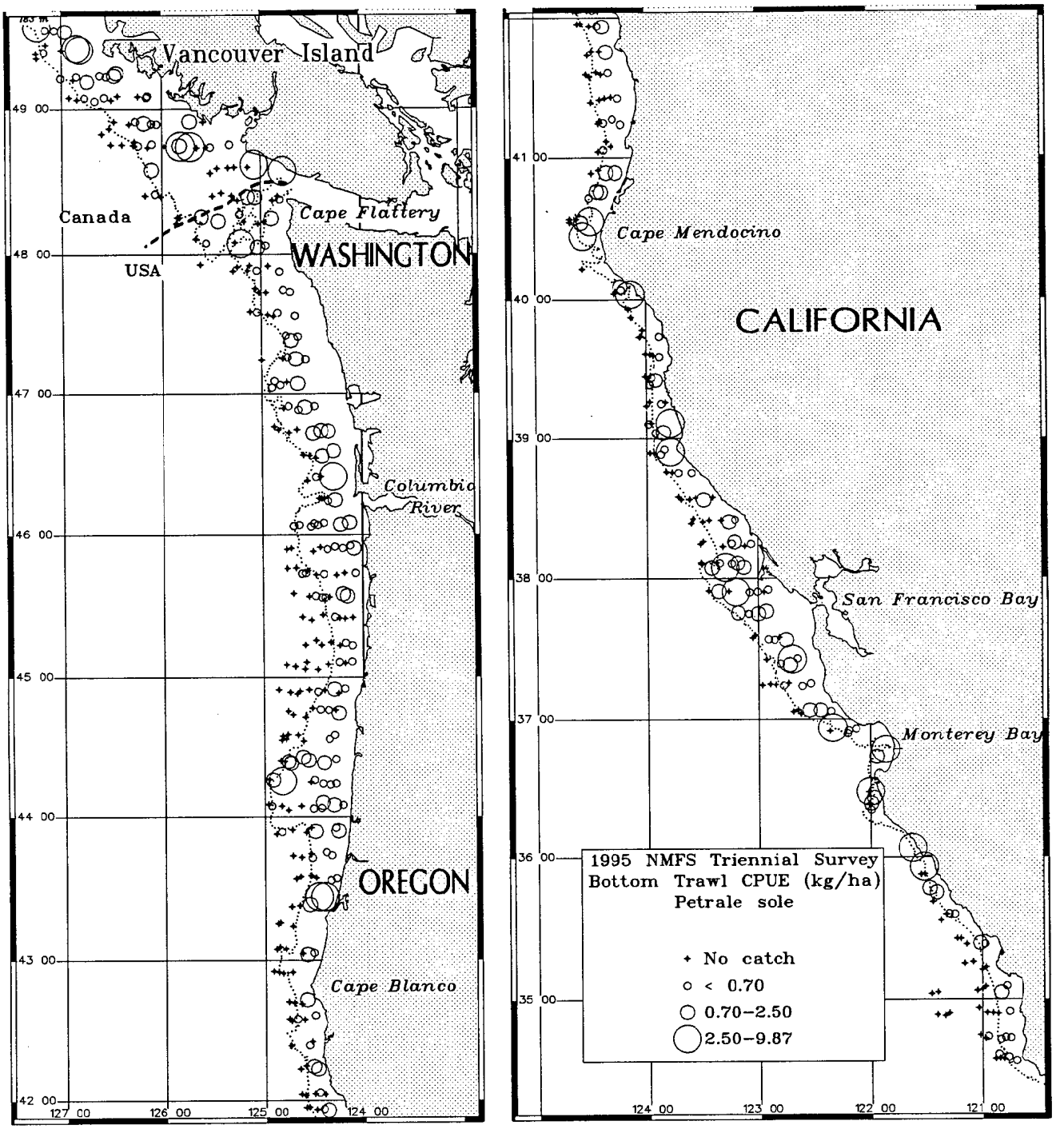

Figure 21.--Petrale sole distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

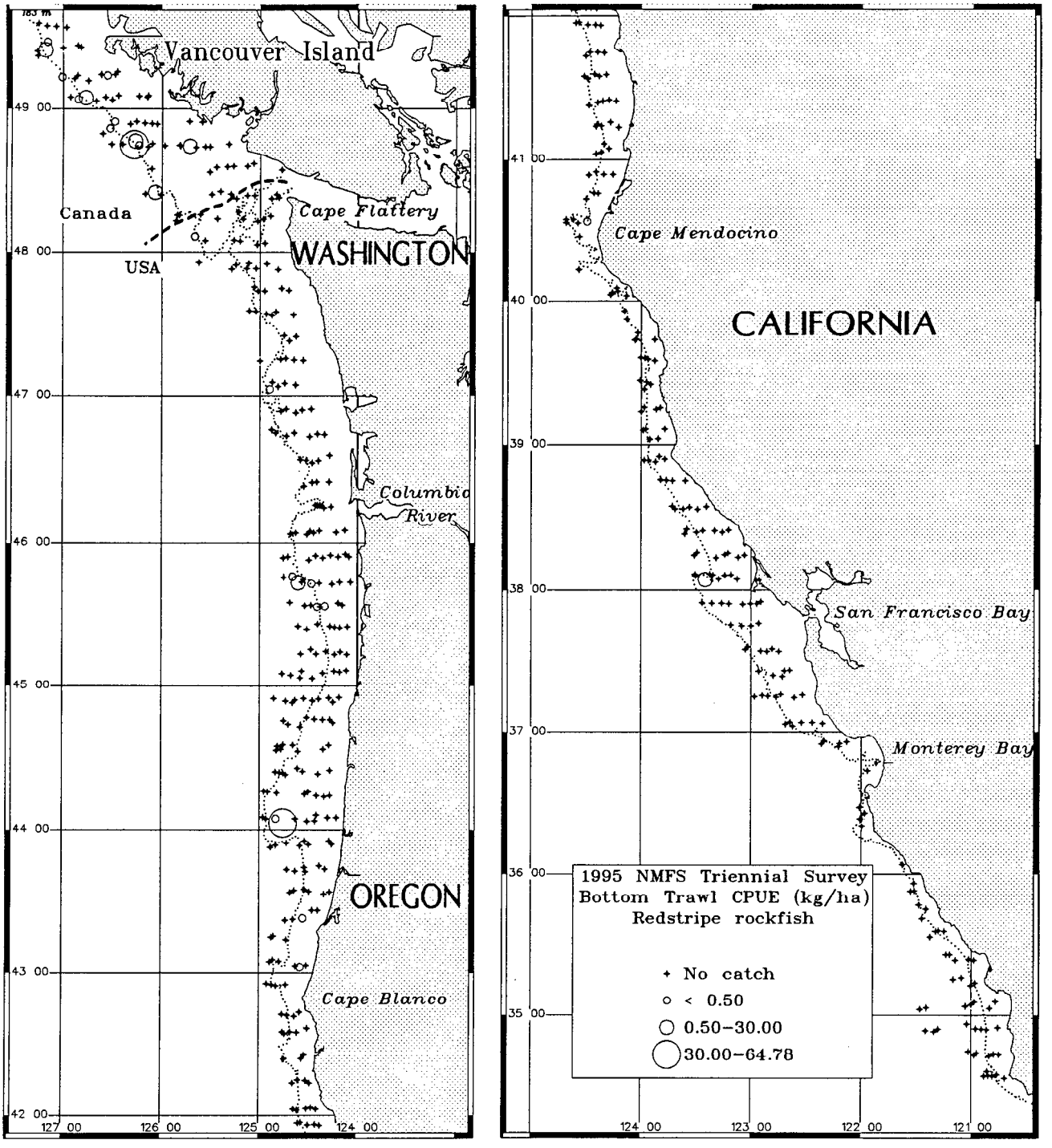

Figure 22.--Redstripe rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

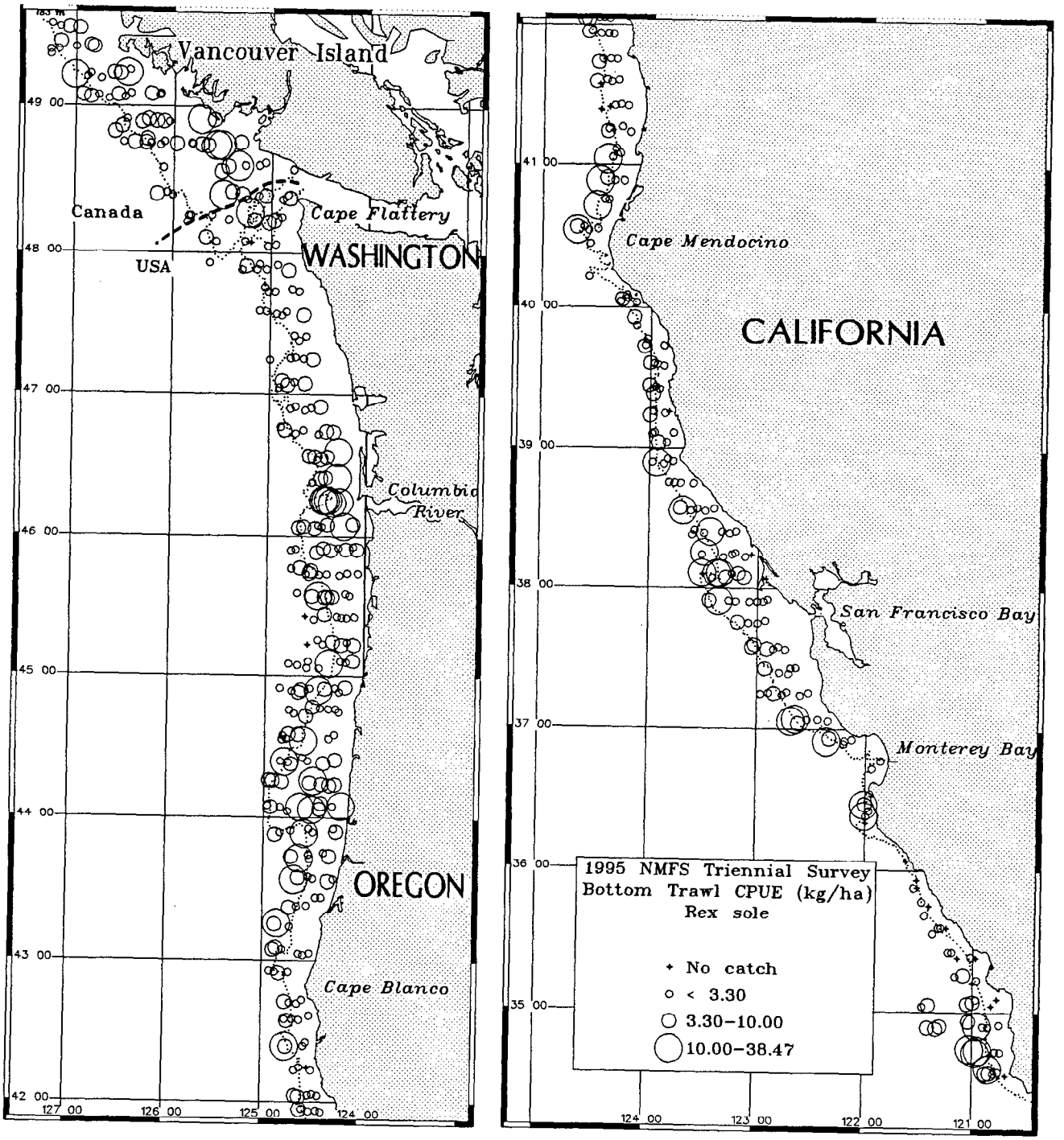

Figure 23 .--Rex sole distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

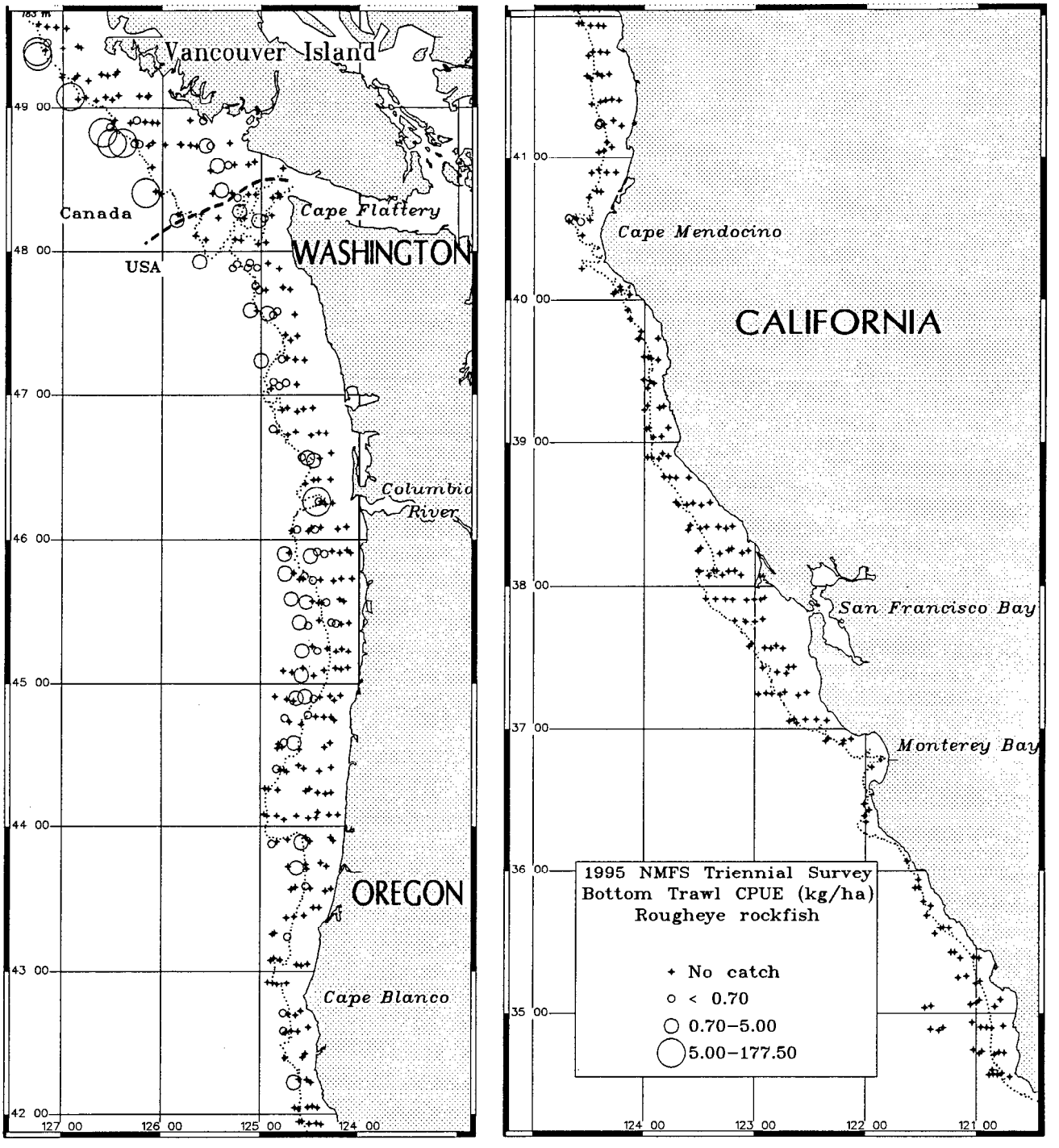

Figure 24.--Rougheye rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

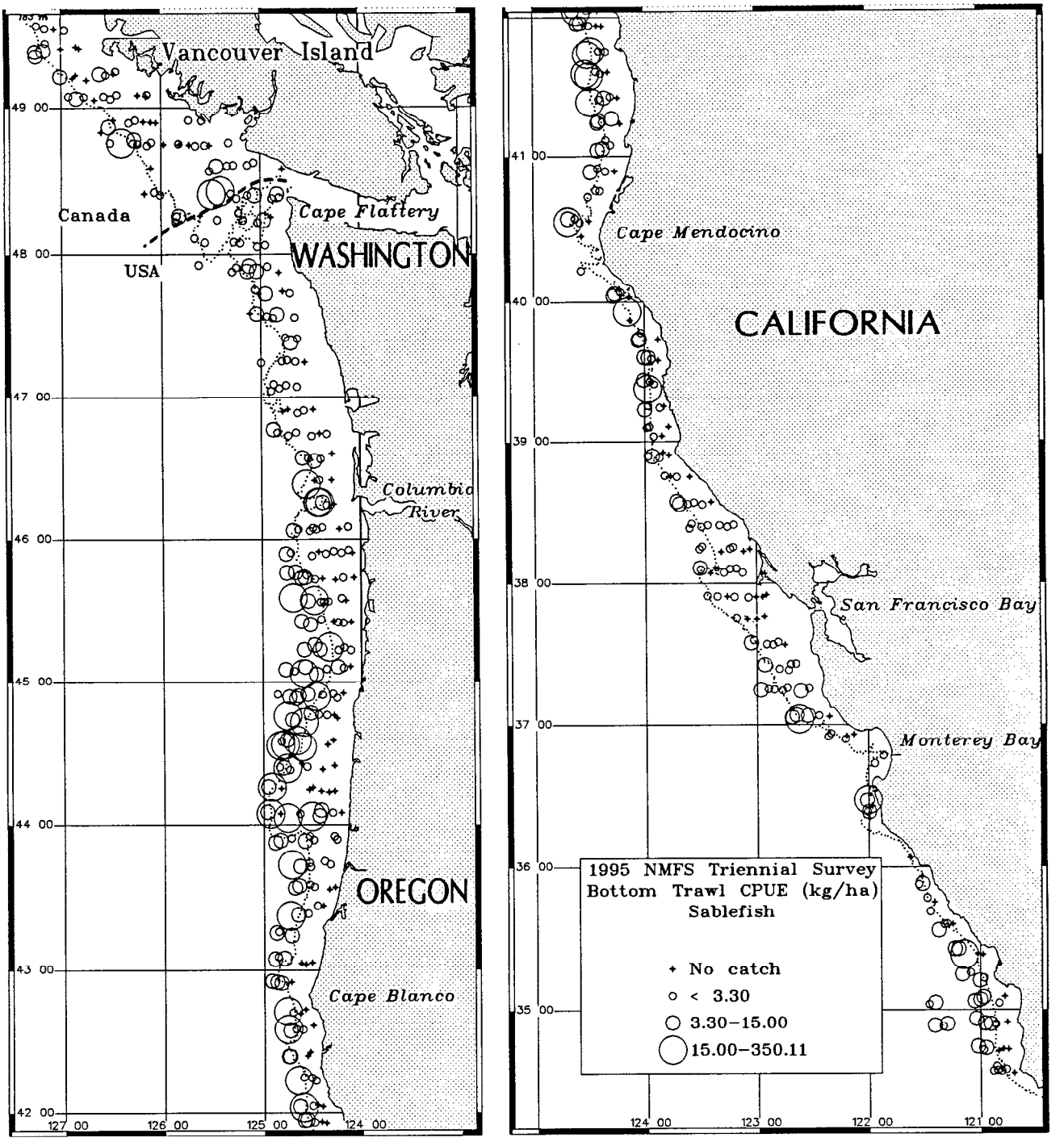

Figure 25.--Sablefish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

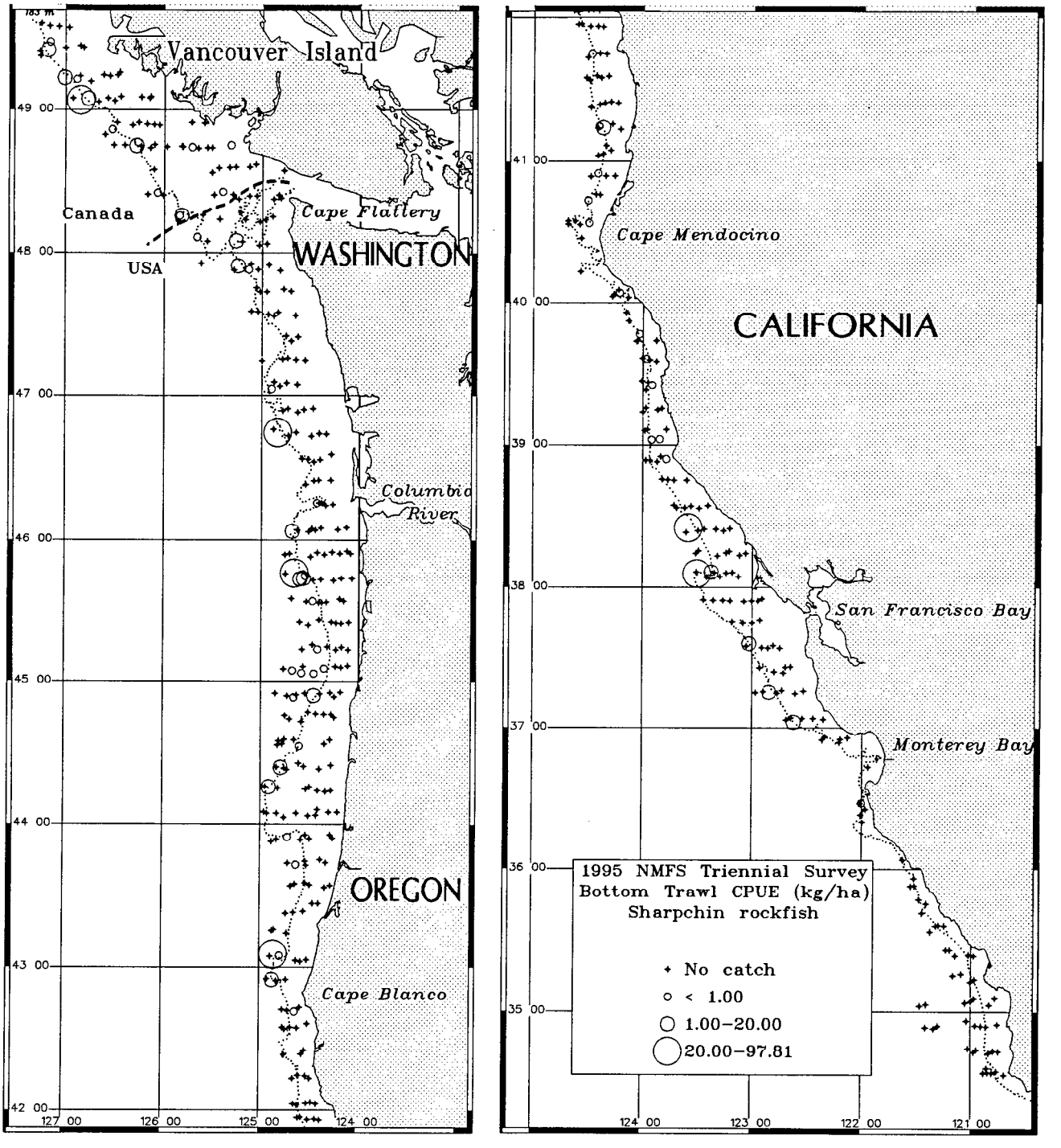

Figure 26.--Sharpchin rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

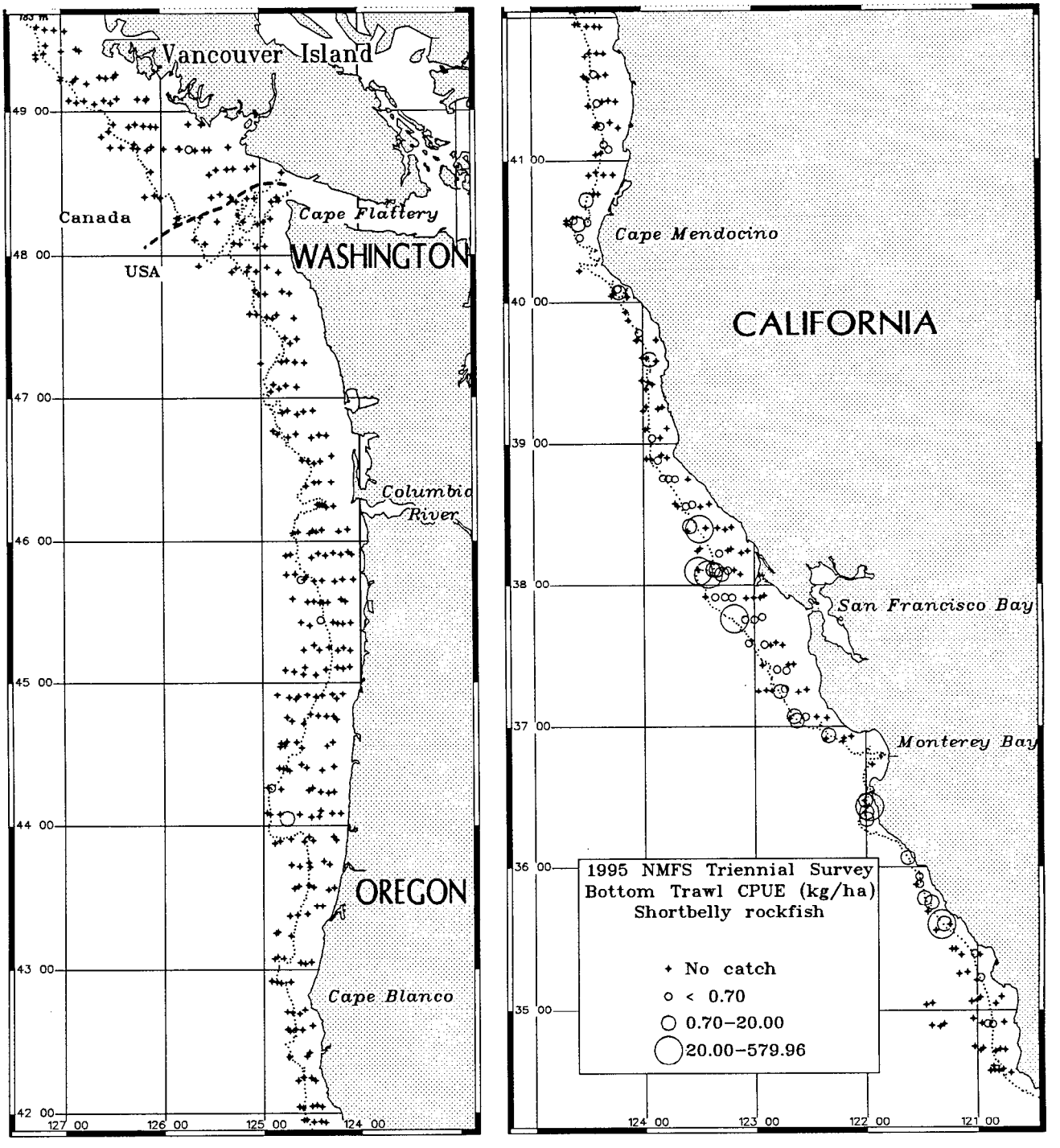

Figure 27.--Shortbelly rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

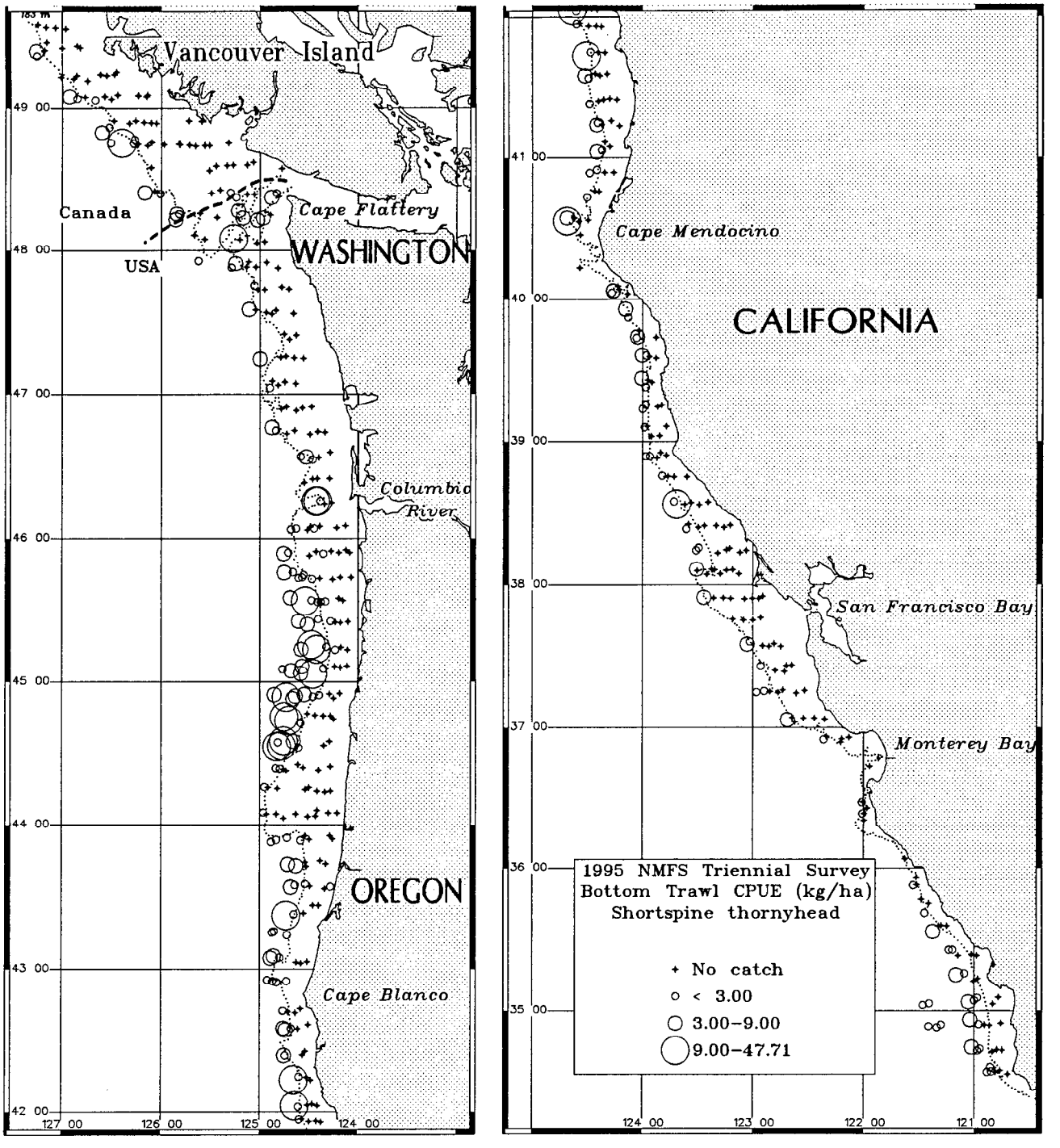

Figure 28.--Shortspine thornyhead distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

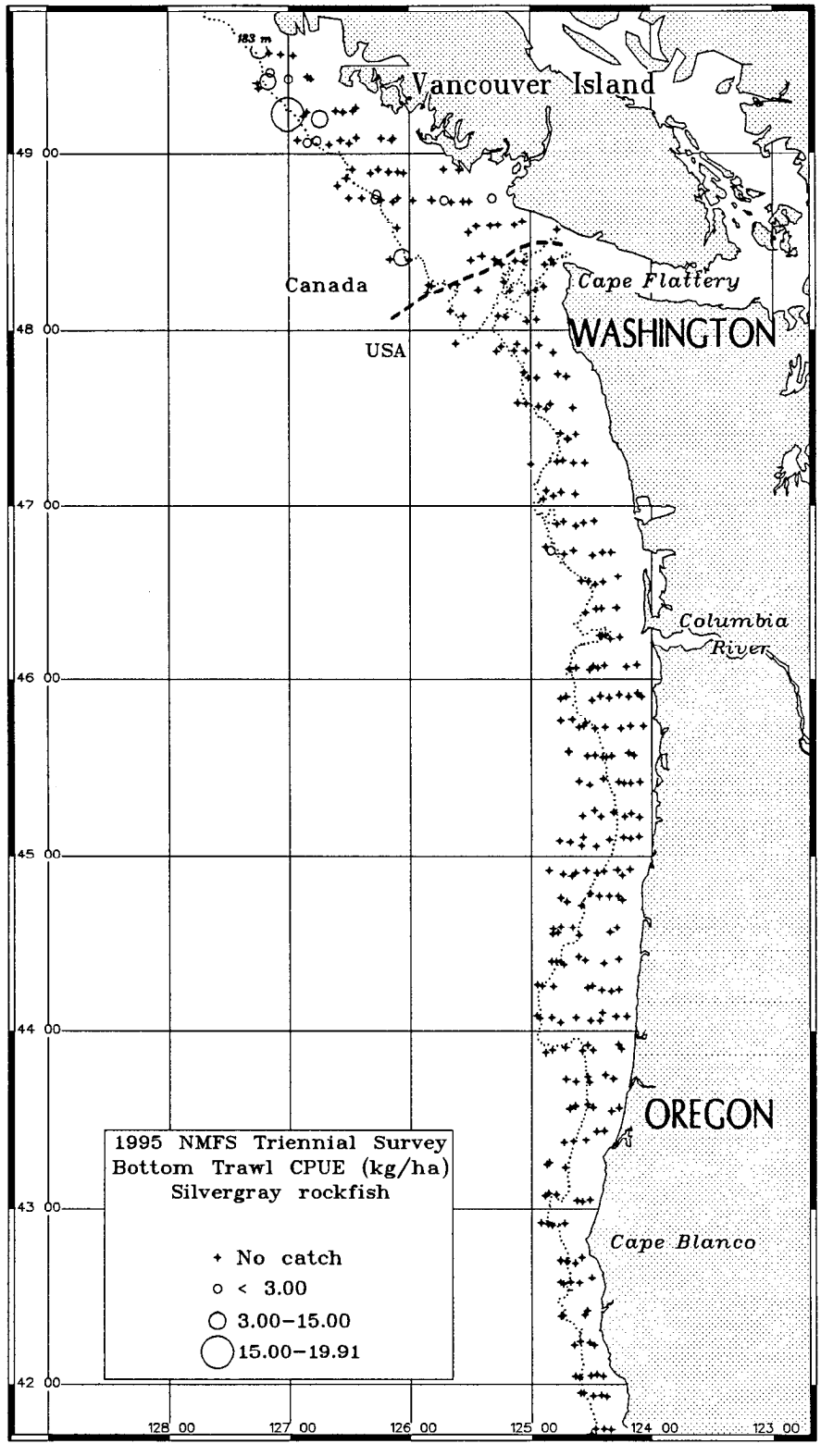

Figure 29.--Silvergray rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

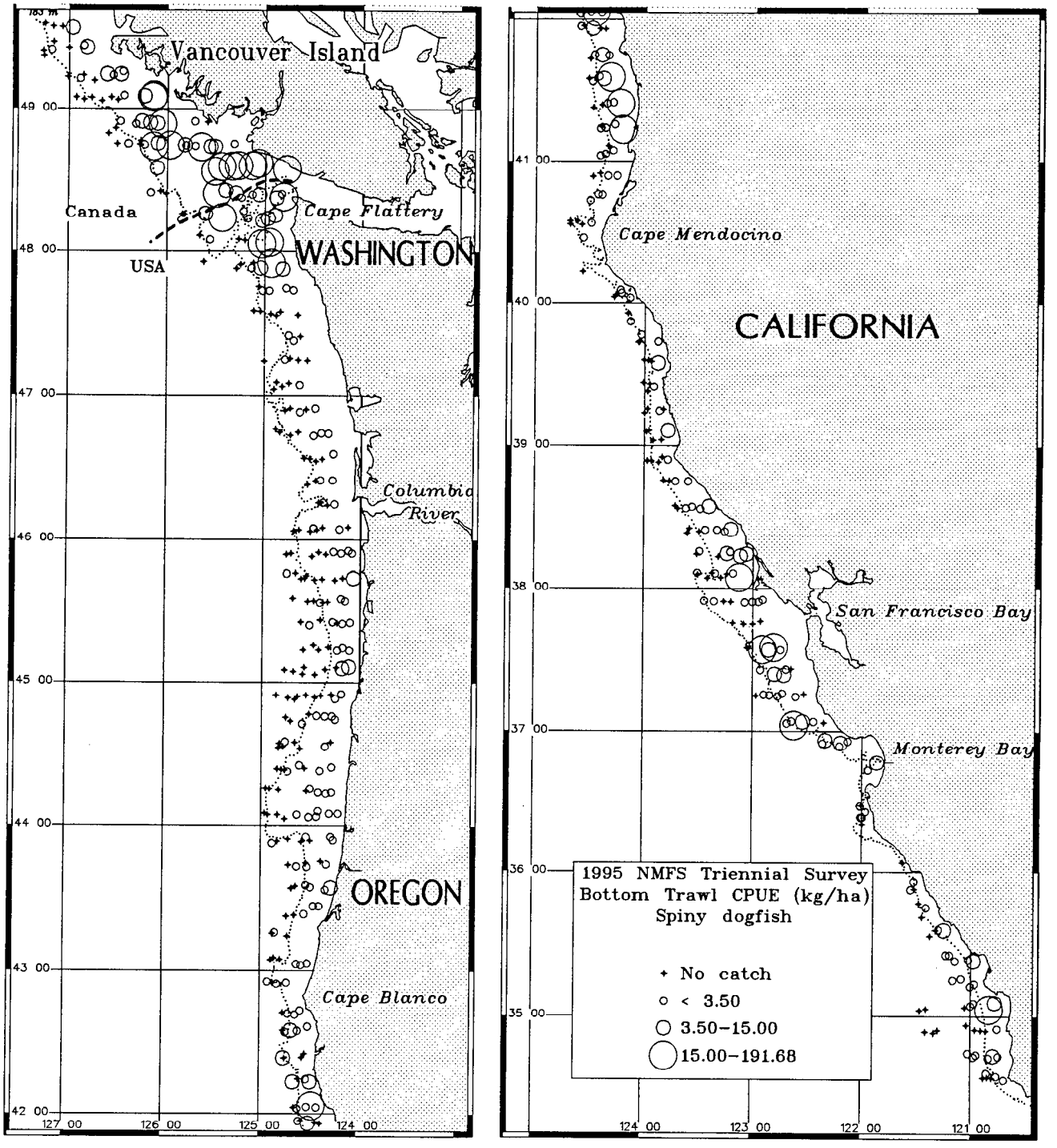

Figure 30.--Spiny dogfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

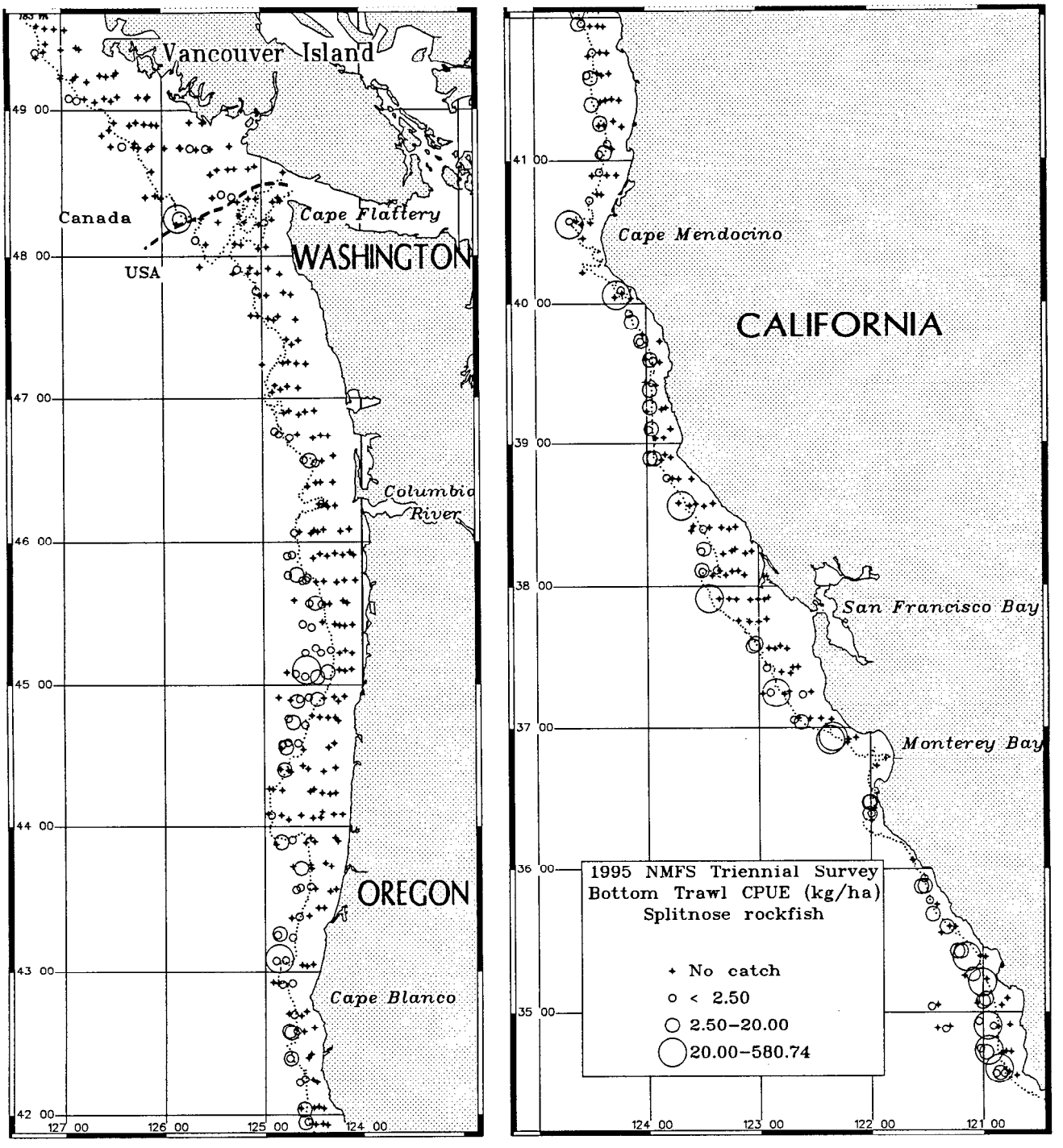

Figure 31 .--Splitnose rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

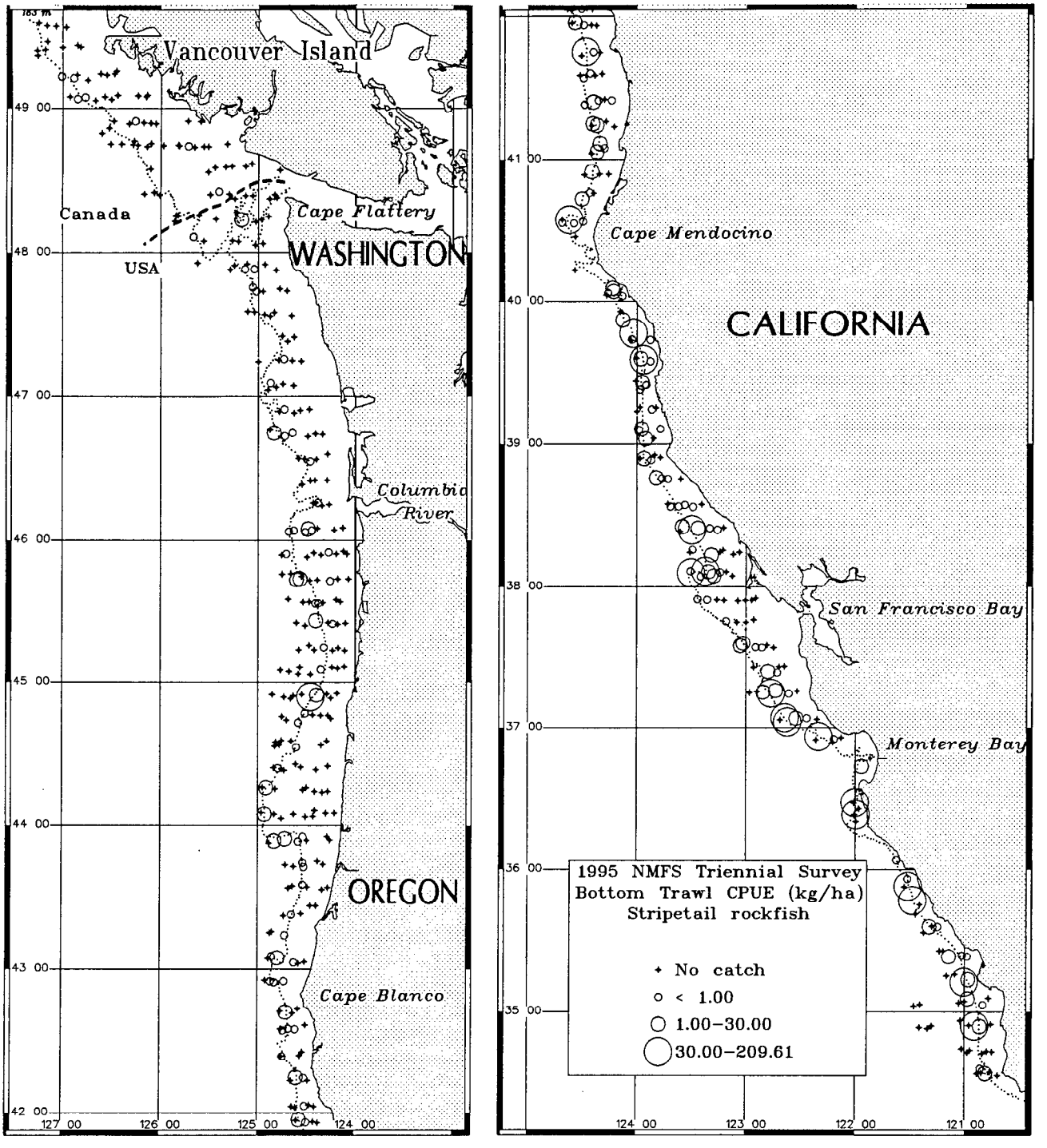

Figure 32.--Stripetail rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

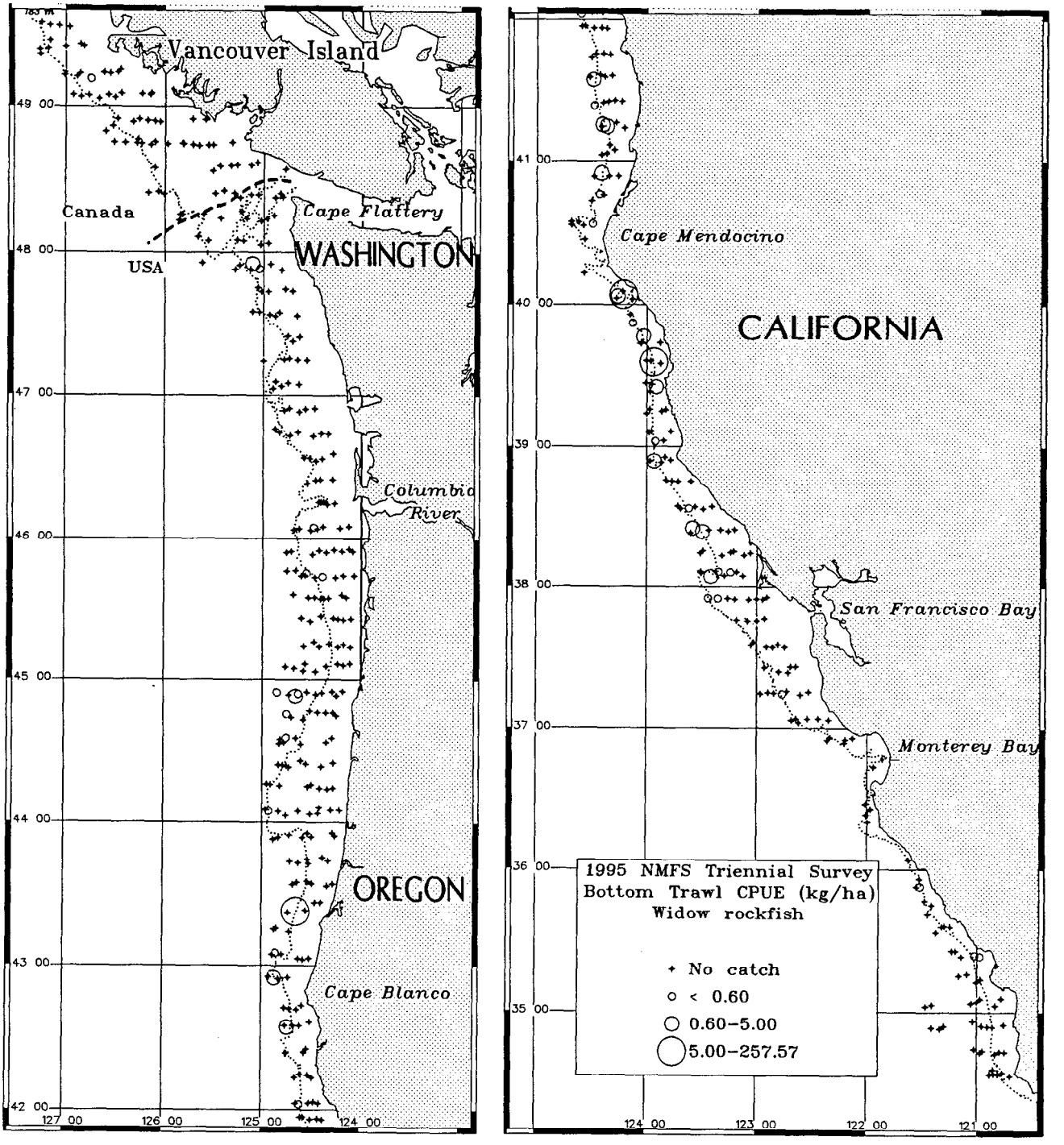

Figure 33 .--Widow rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

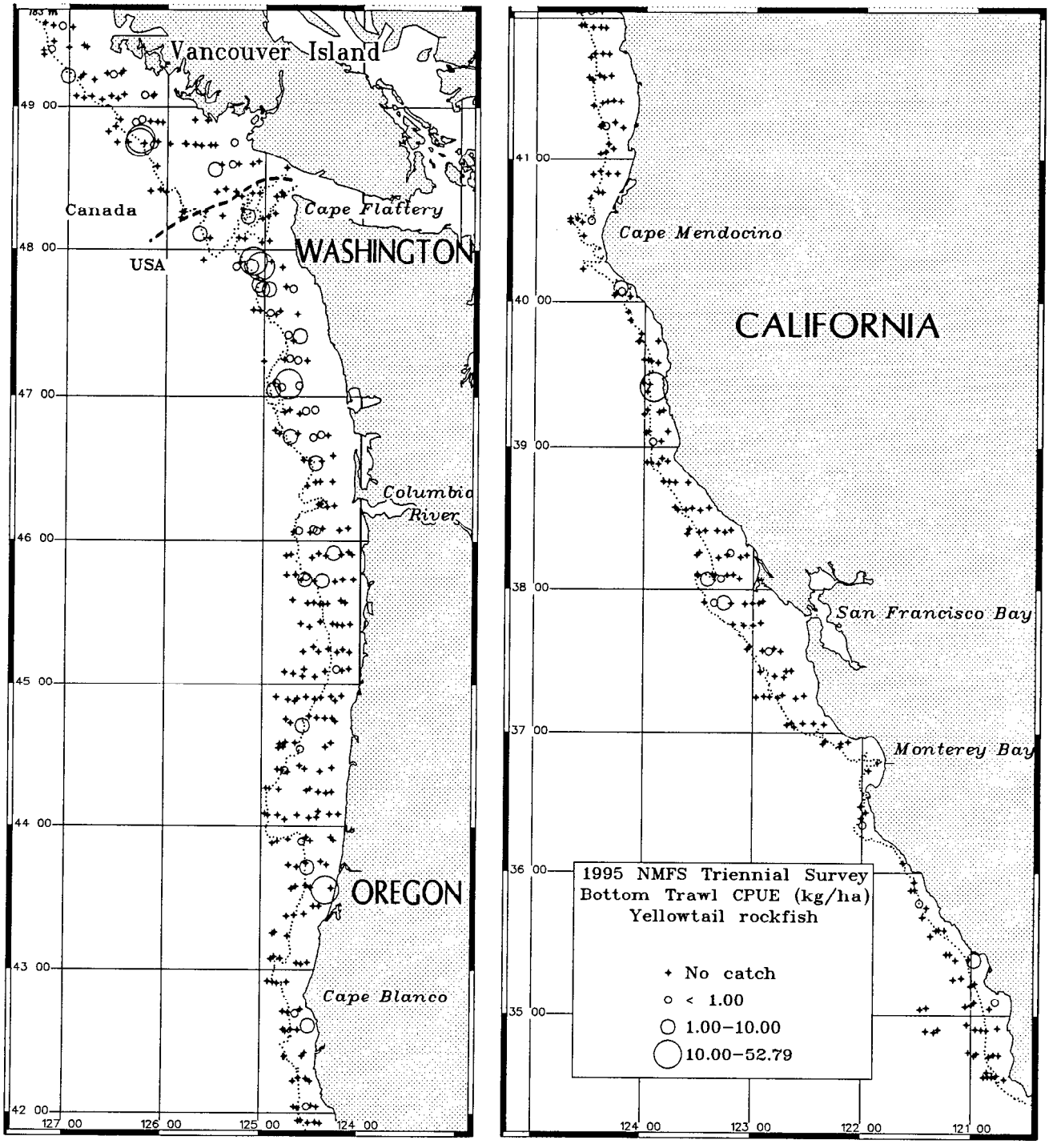

Figure 34.--Yellowtail rockfish distribution and relative abundance measured in catch rates (kg/ha) from the 1995 West Coast triennial bottom trawl survey.

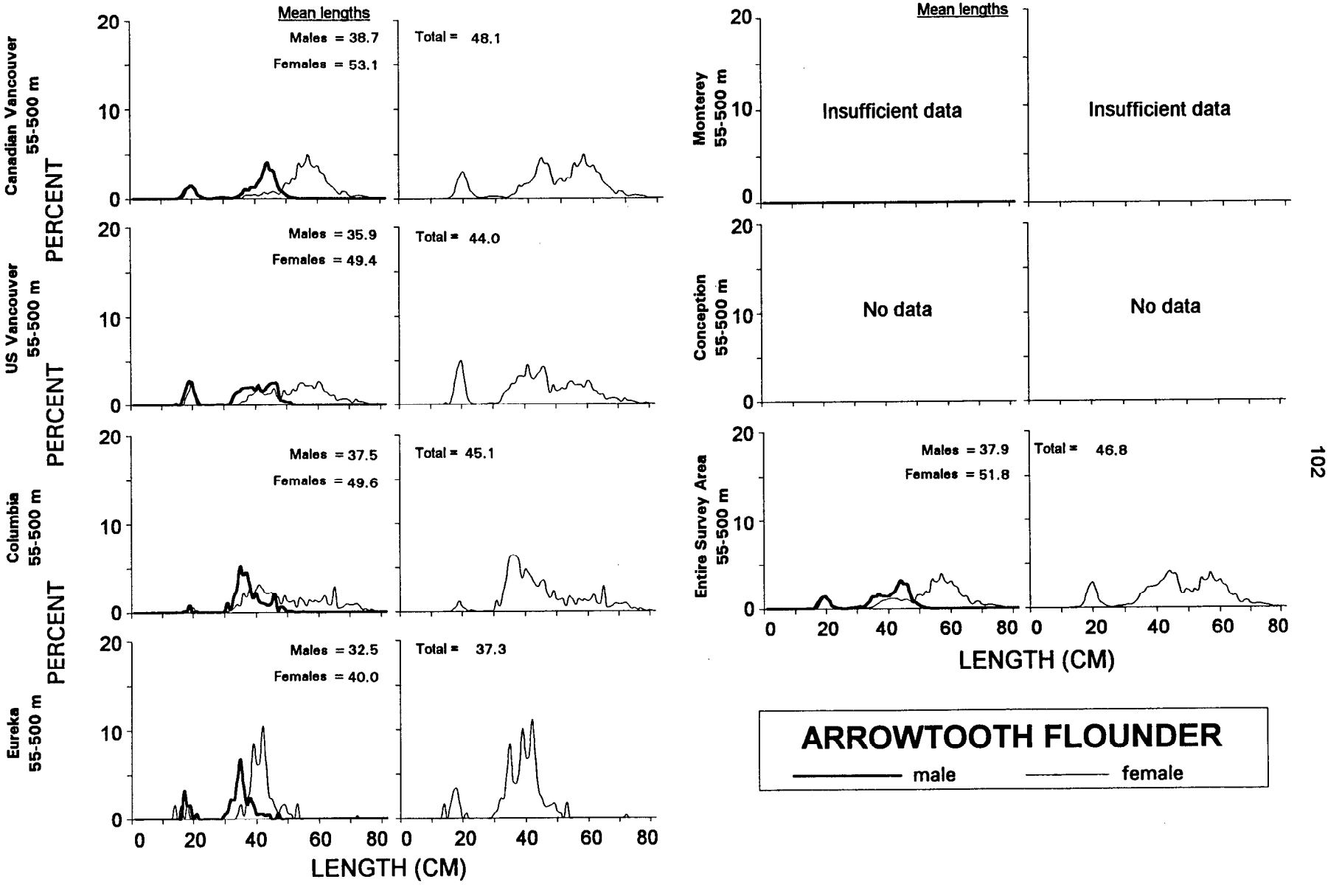

Figure 35.-- Estimated population size composition and mean lengths of arrowtooth flounder by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

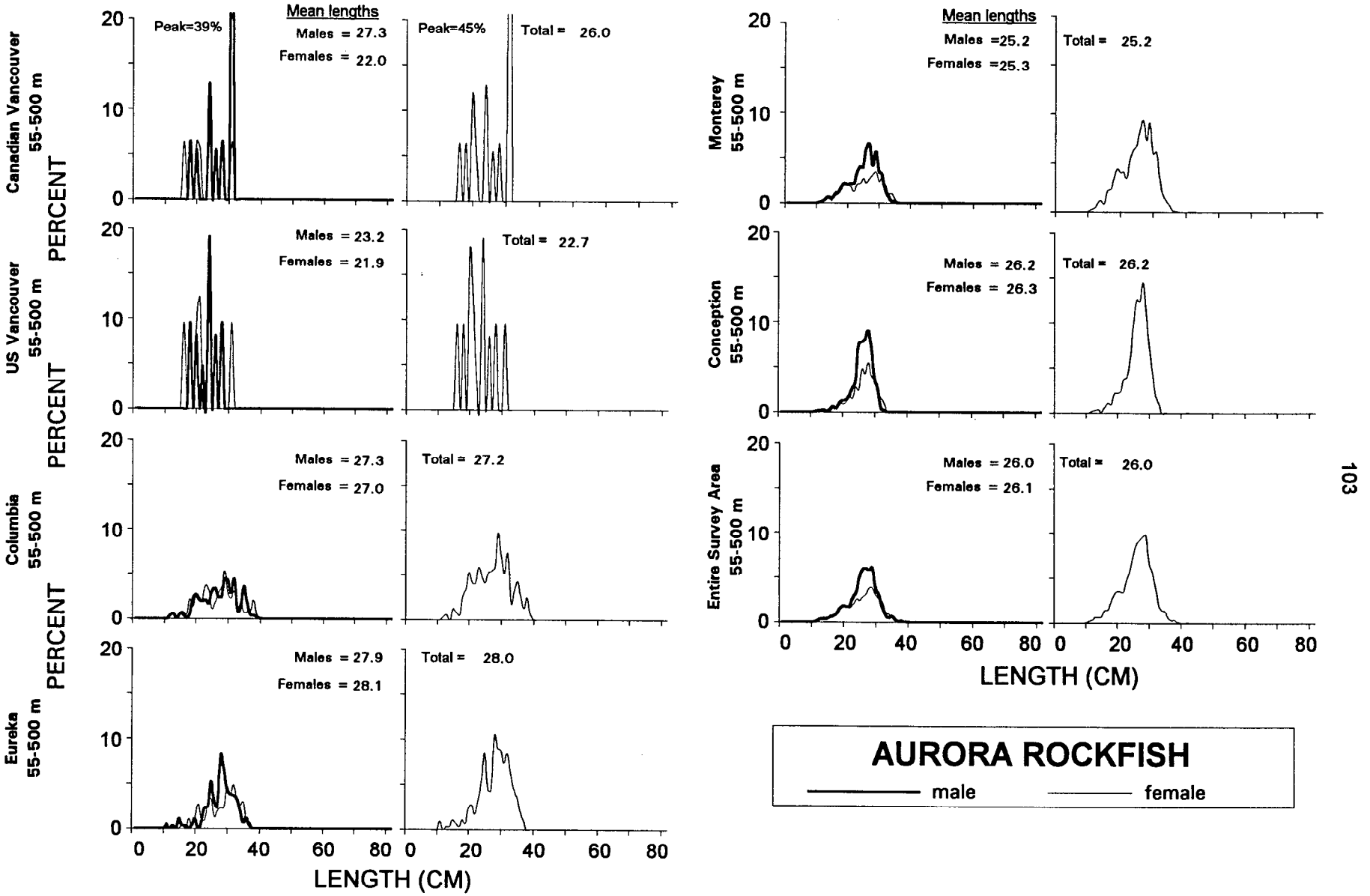

Figure 36.-- Estimated population size composition and mean lengths of aurora rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

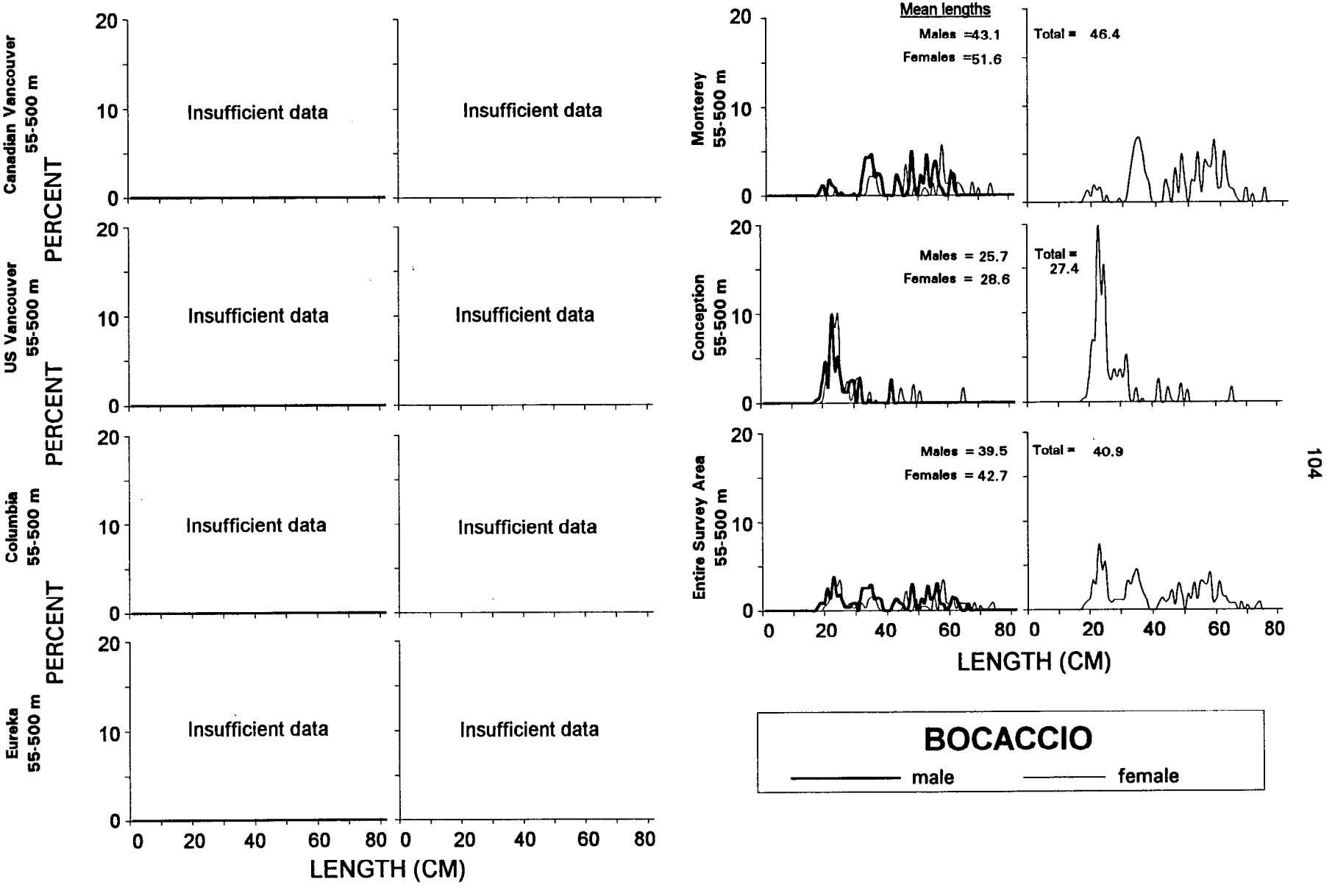

Figure 37.-- Estimated population size composition and mean lengths of bocaccio by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

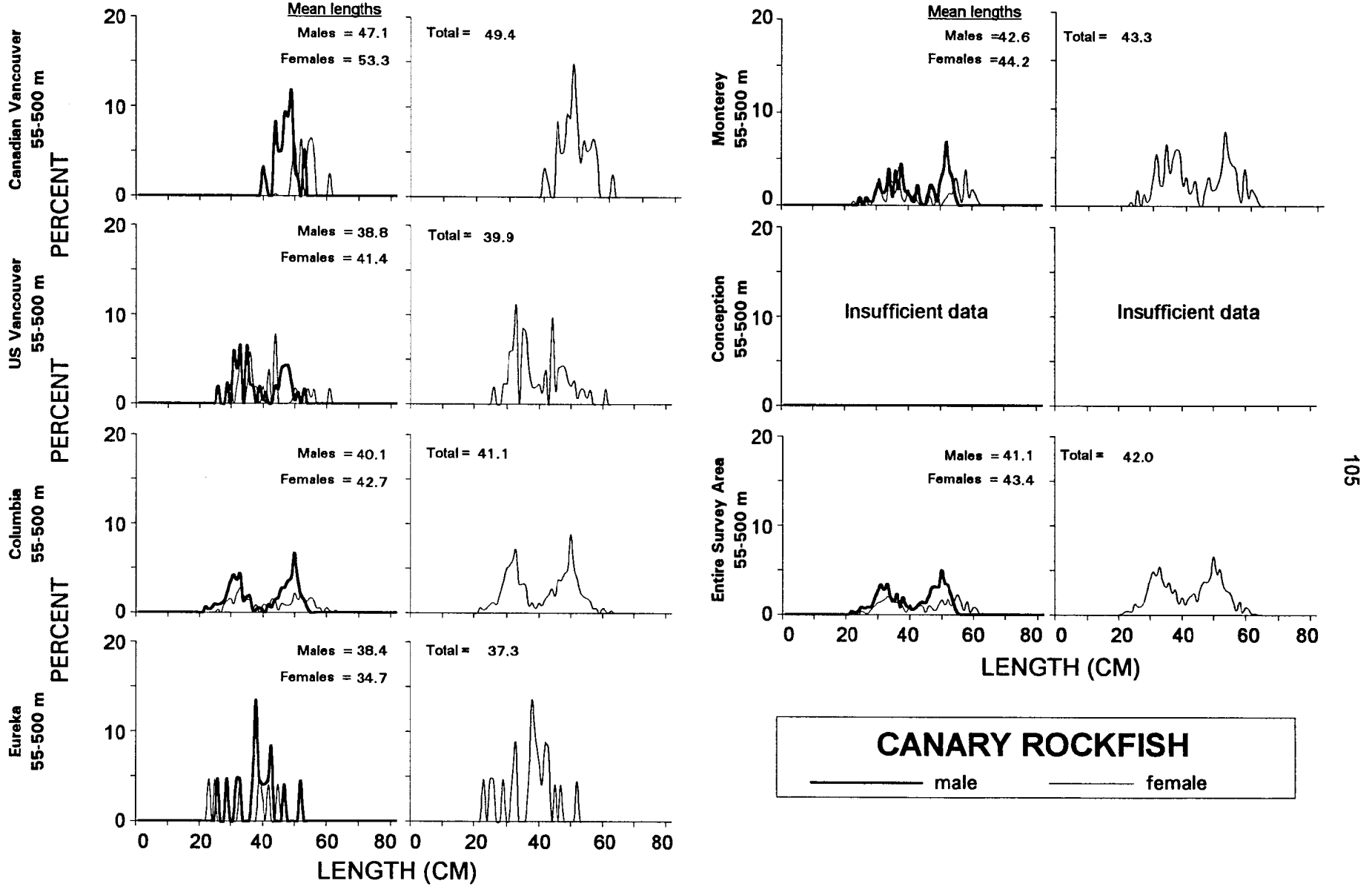

Figure 38.-- Estimated population size composition and mean lengths of canary rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

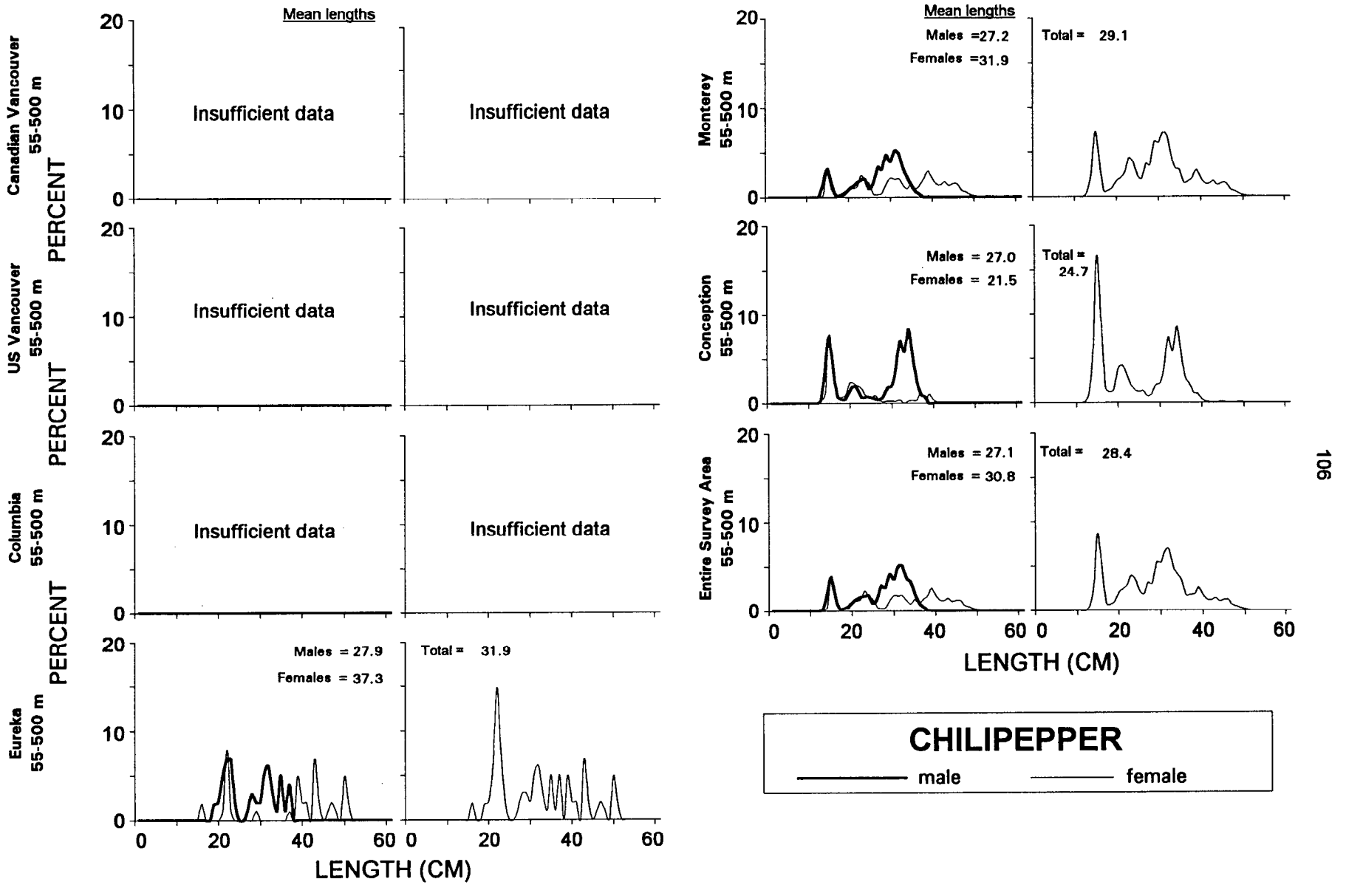

Figure 39.-- Estimated population size composition and mean lengths of chilipepper by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

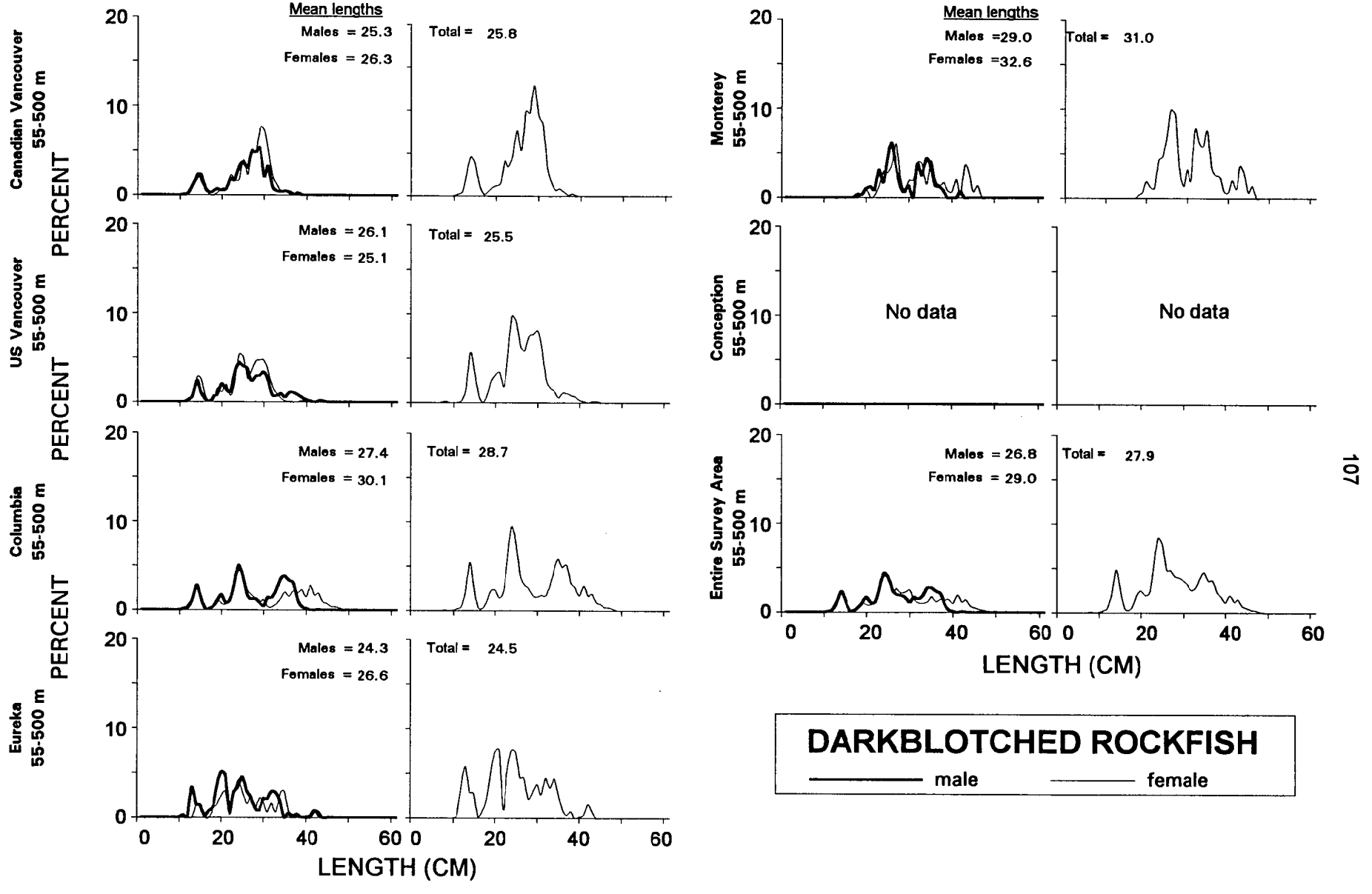

Figure 40.-- Estimated population size composition and mean lengths of darkblotched rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

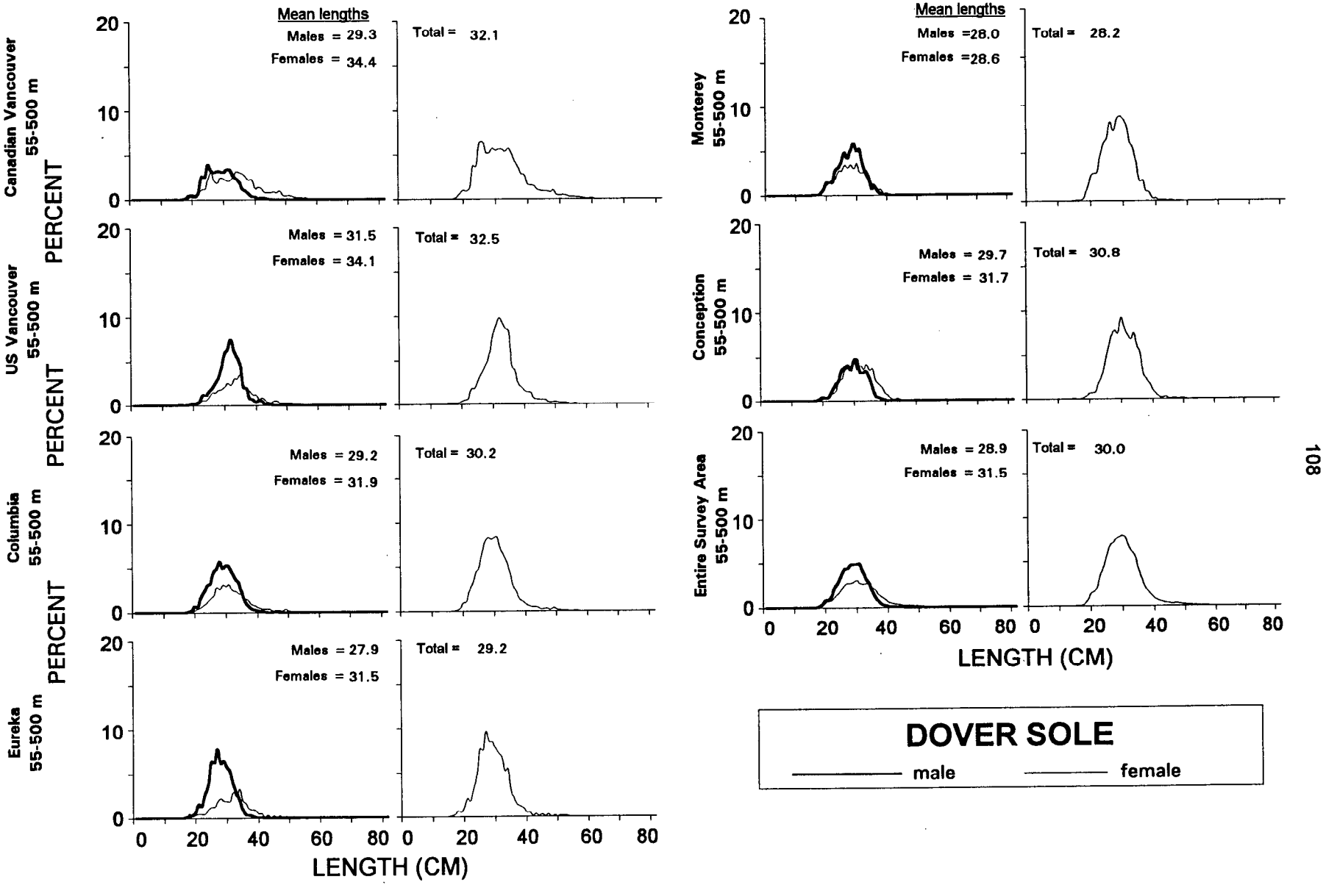

Figure 41.-- Estimated population size composition and mean lengths of Dover sole by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

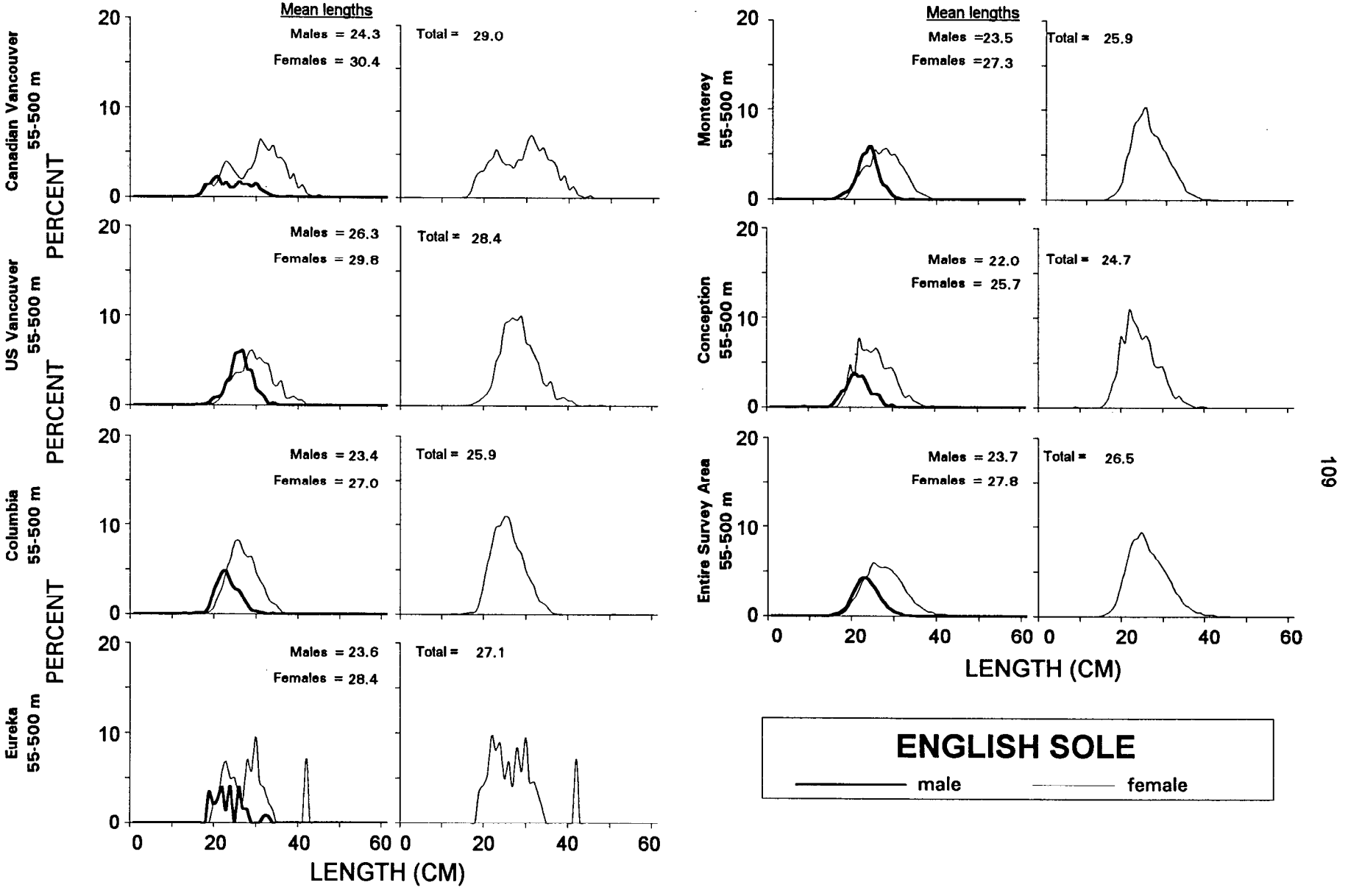

Figure 42.-- Estimated population size composition and mean lengths of English sole by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

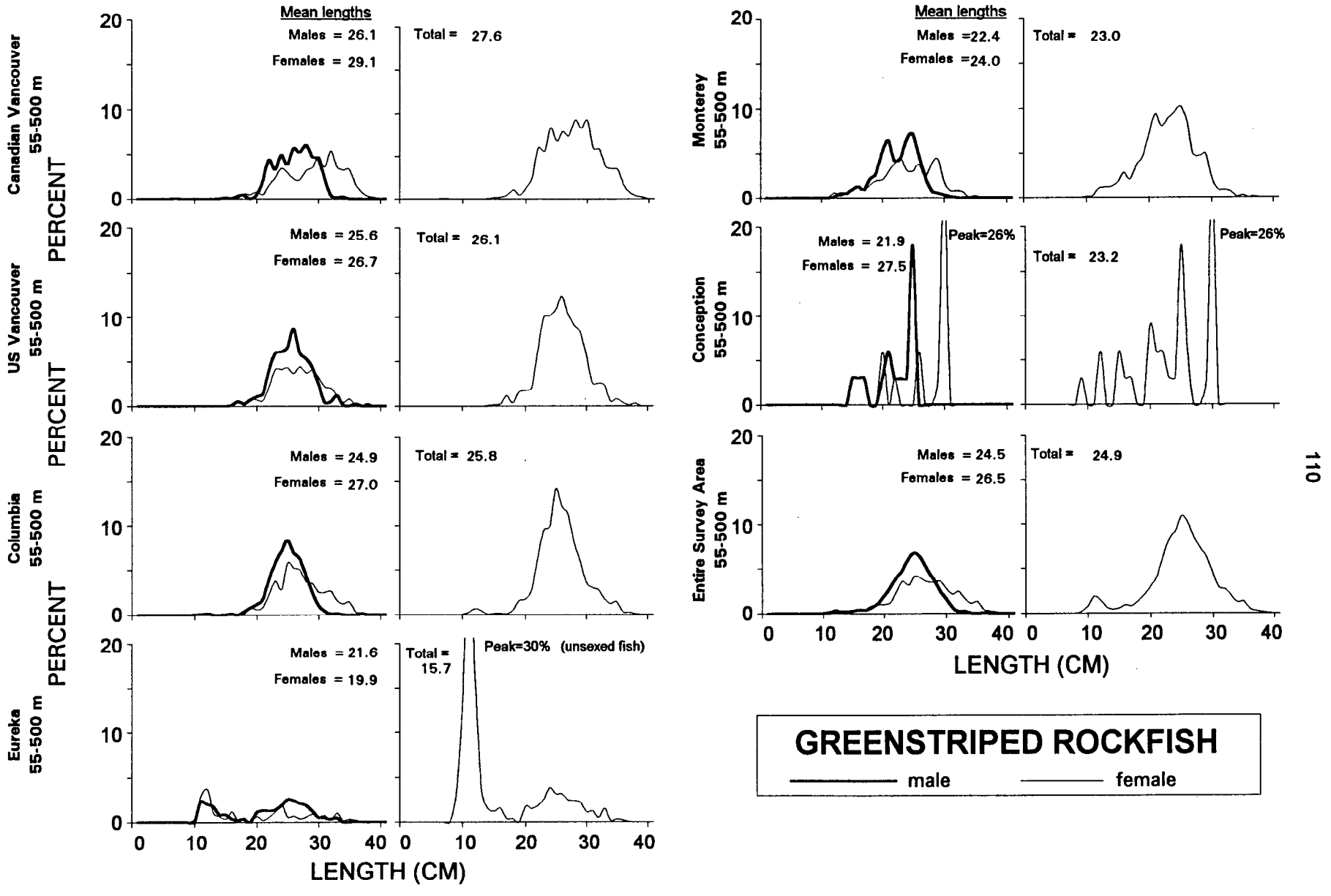

Figure 43.-- Estimated population size composition and mean lengths of greenstriped rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

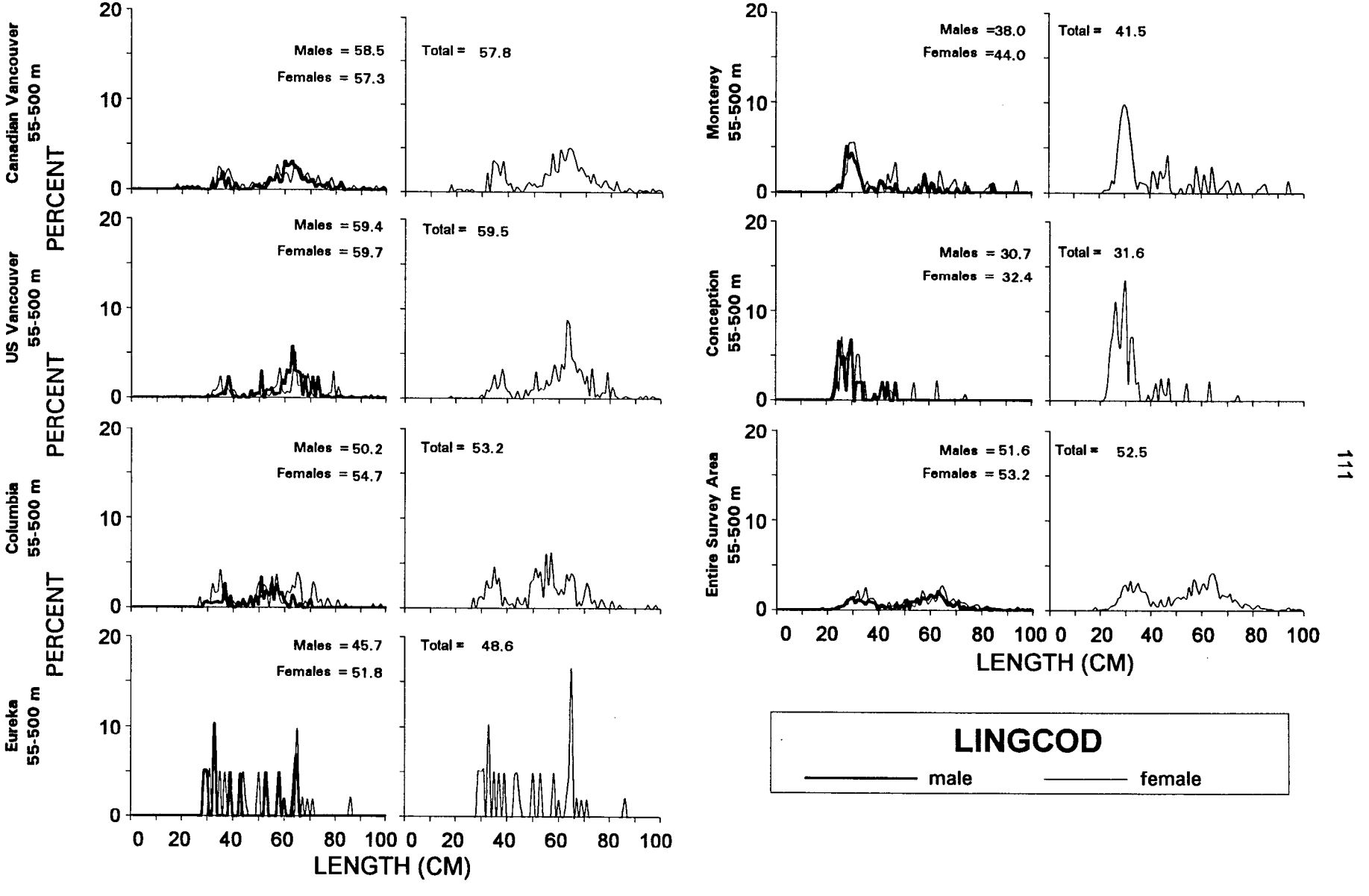

Figure 44.-- Estimated population size composition and mean lengths of lingcod by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

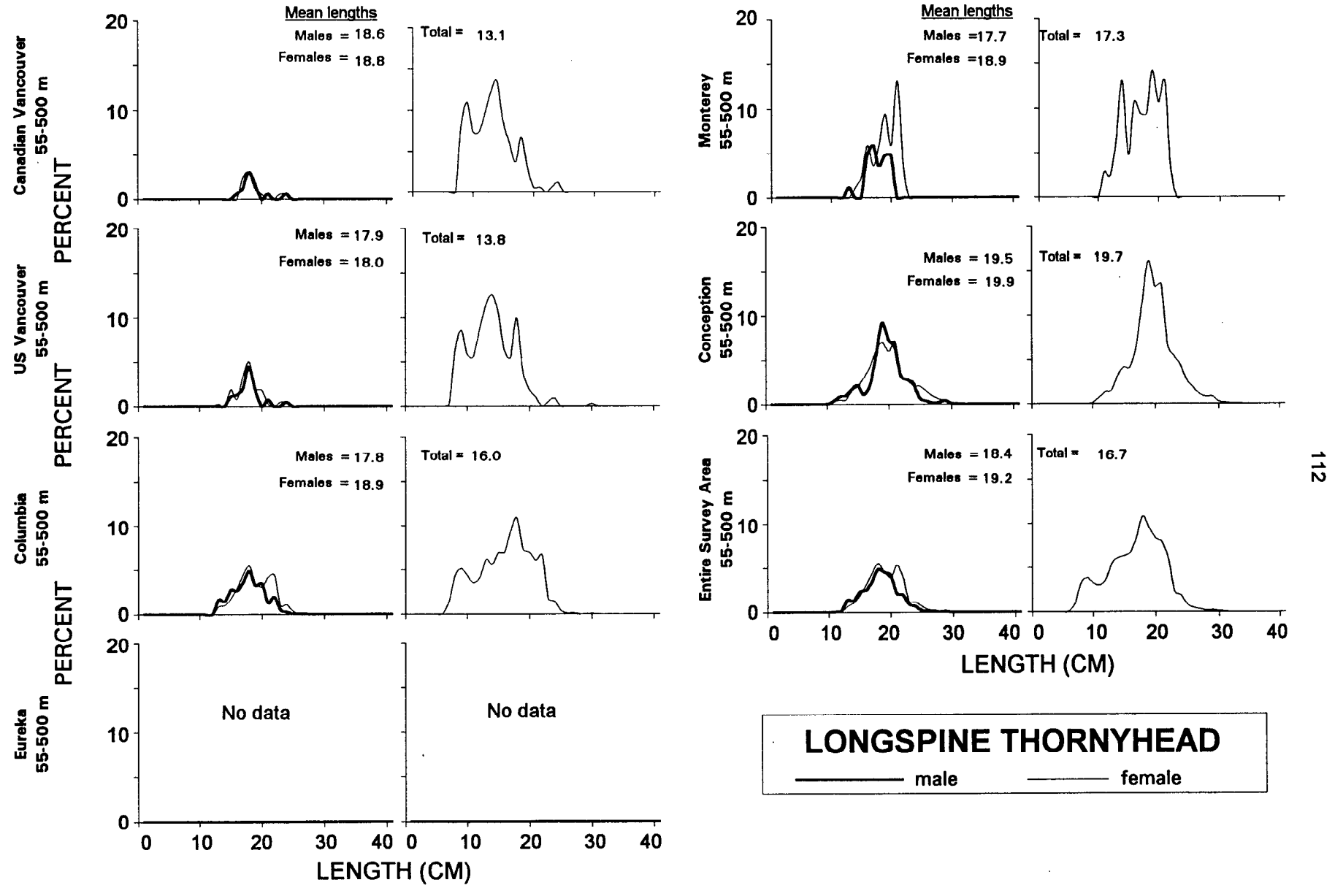

Figure 45.-- Estimated population size composition and mean lengths of longspine thornyhead by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

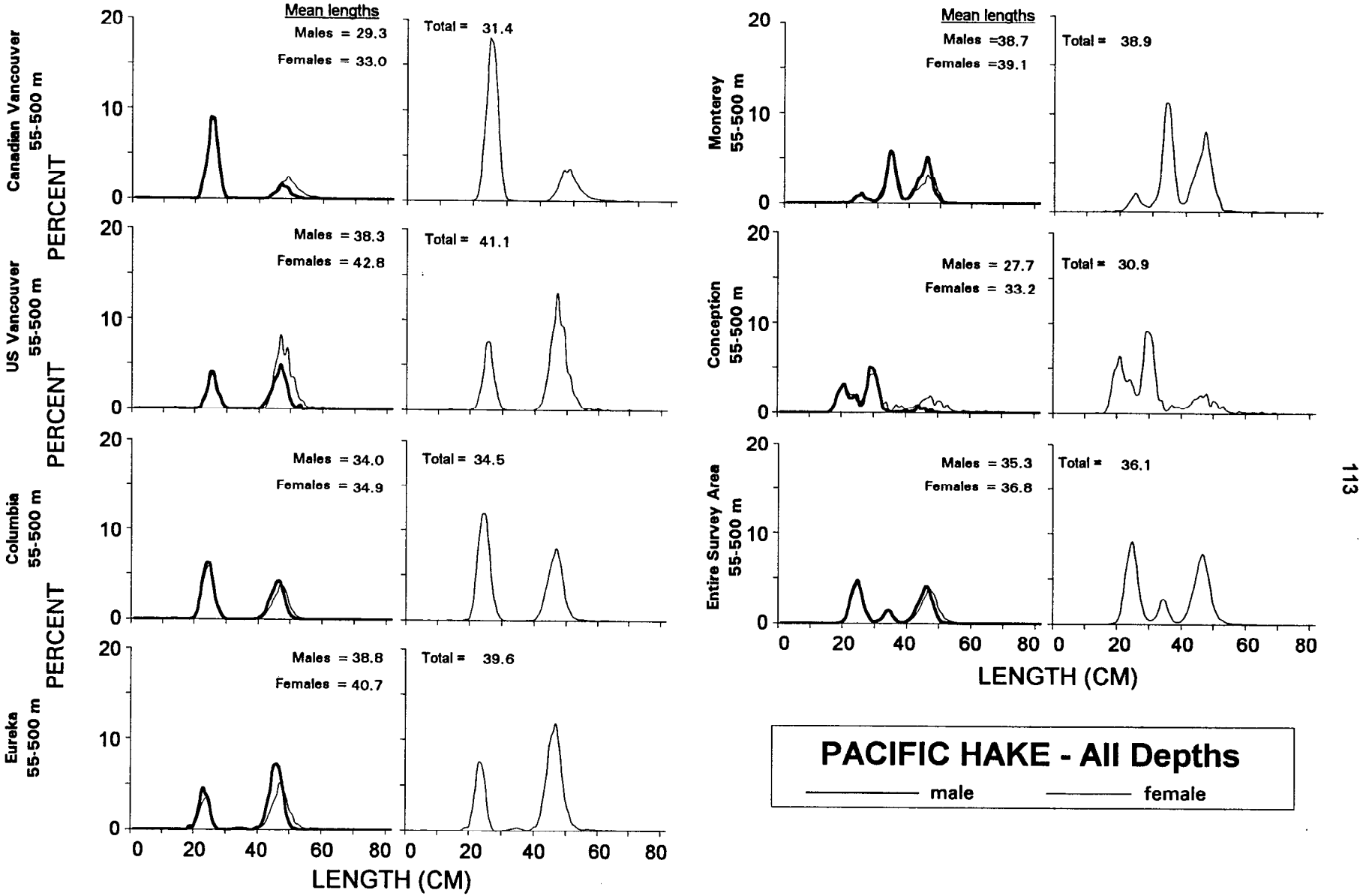

Figure 46.-- Estimated population size composition and mean lengths of Pacific hake by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

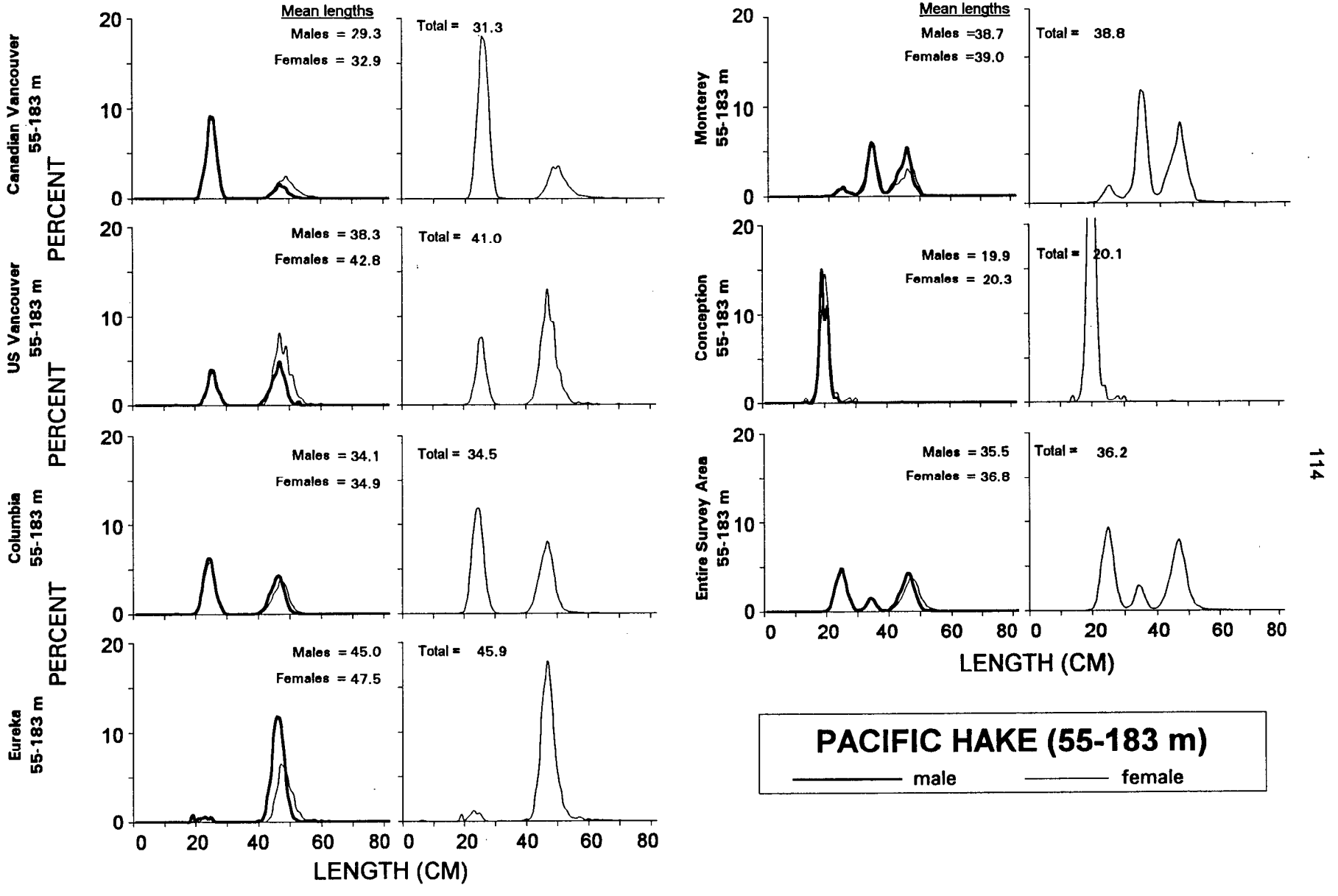

Figure 47.-- Estimated population size composition and mean lengths of Pacific hake by sex and International North Pacific Fisheries Commission area for the shallow depth stratum (55-183 m) from the 1995 triennial bottom trawl survey.

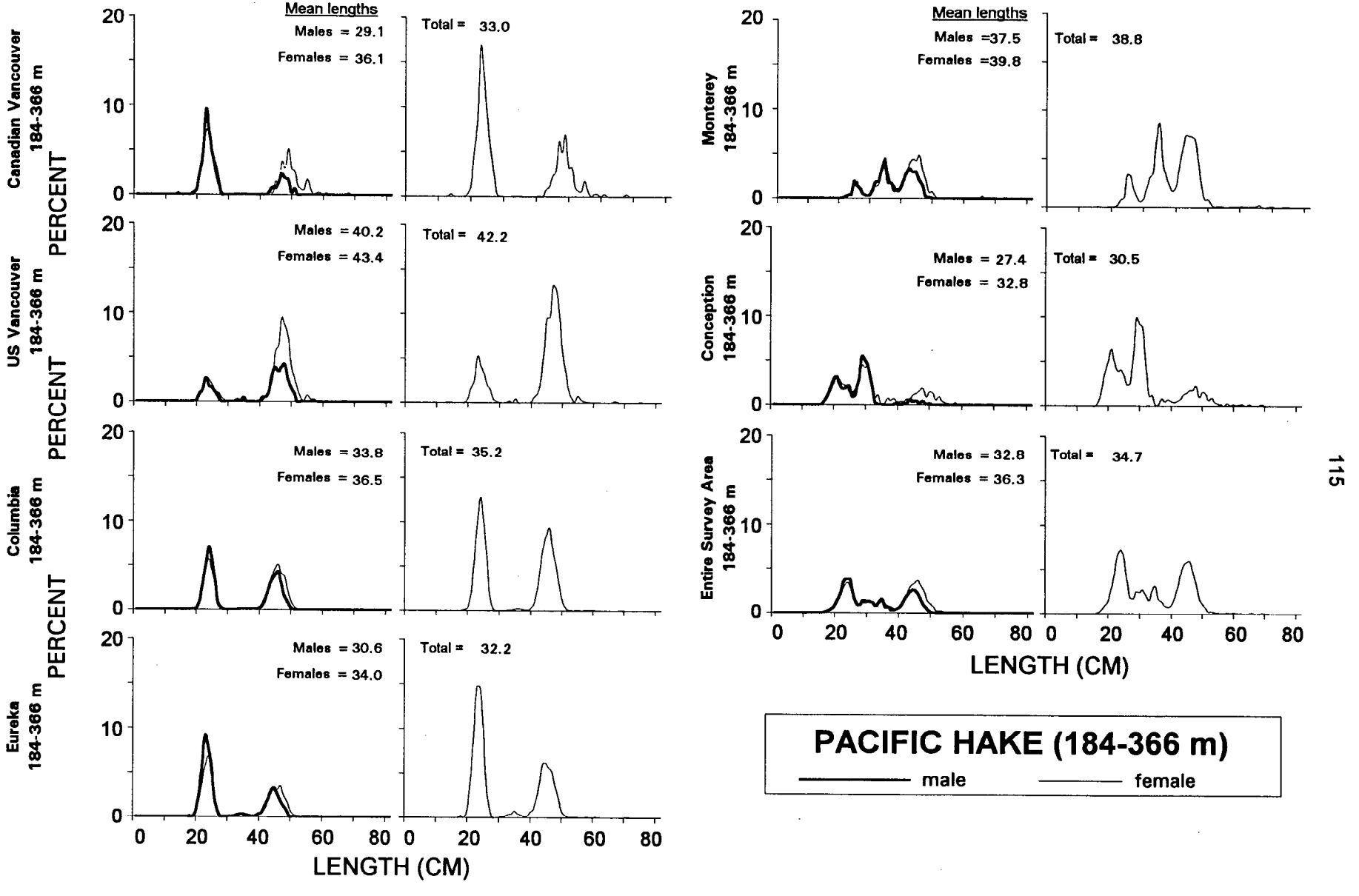

Figure 48.-- Estimated population size composition and mean lengths of Pacific hake by sex and International North Pacific Fisheries Commission area for the middle depth stratum (184-366 m) from the 1995 triennial bottom trawl survey.

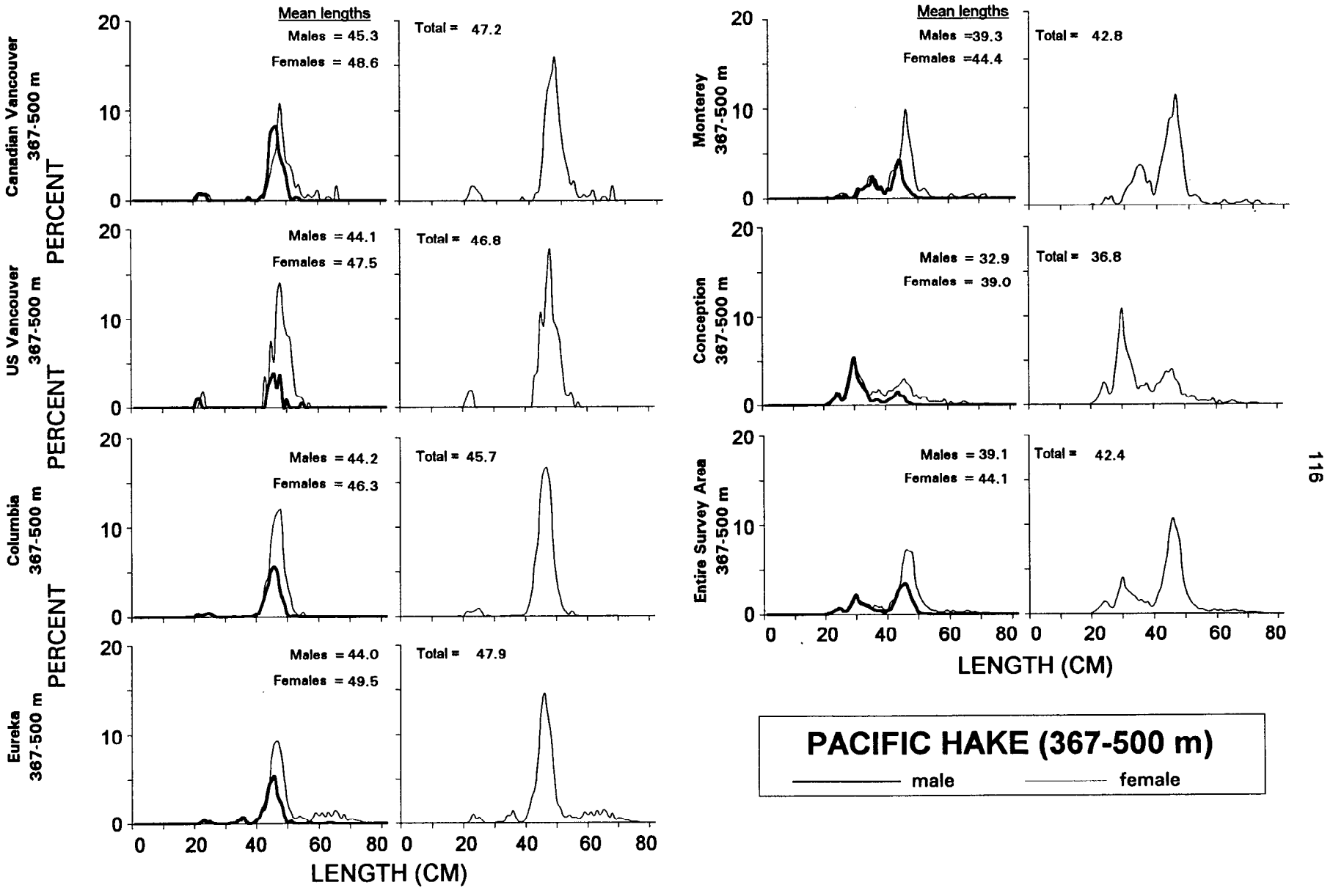

Figure 49.-- Estimated population size composition and mean lengths of Pacific hake by sex and International North Pacific Fisheries Commission area for the deep depth stratum (367-500 m) from the 1995 triennial bottom trawl survey.

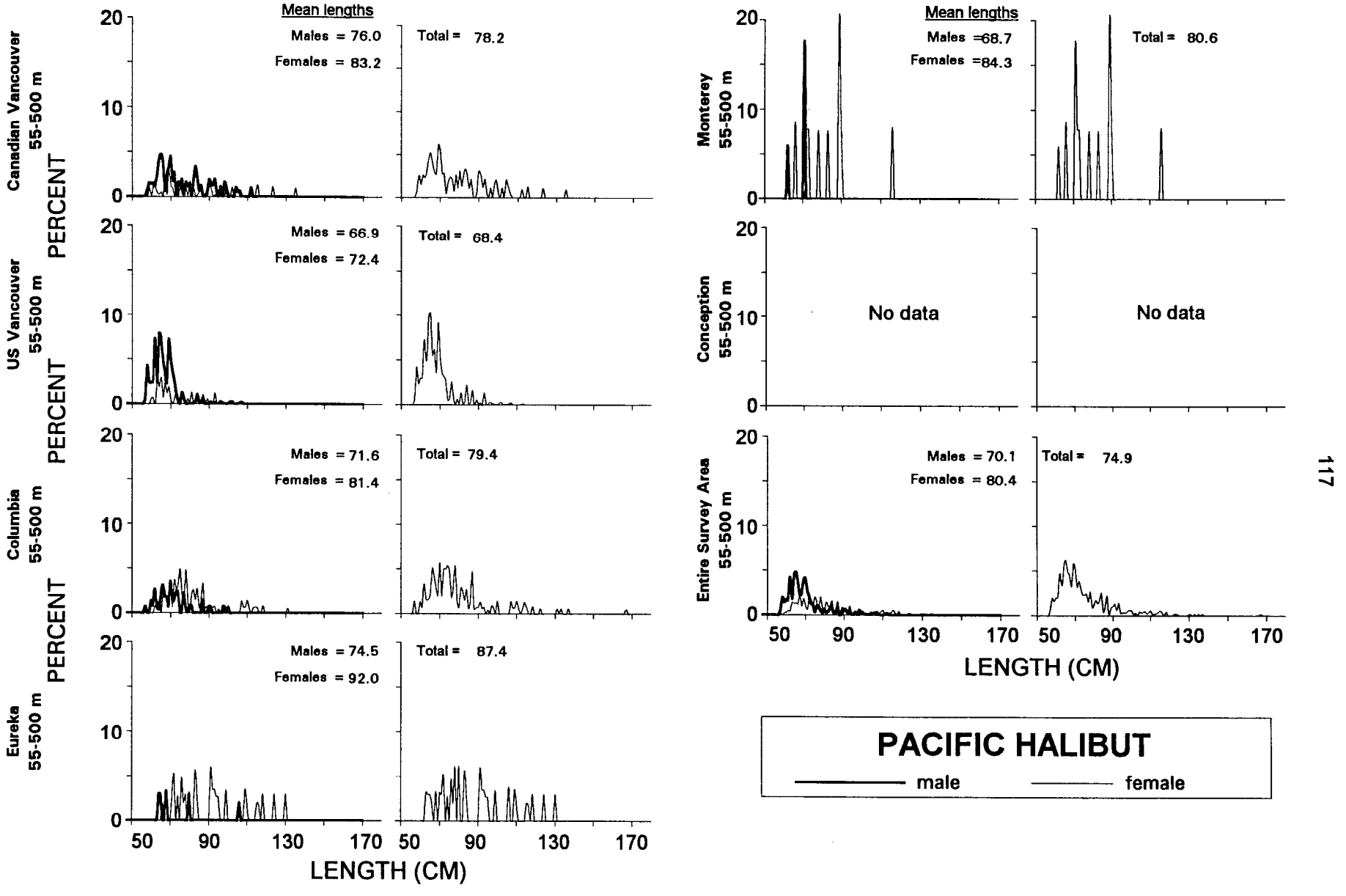

Figure 50.-- Estimated population size composition and mean length of Pacific halibut by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

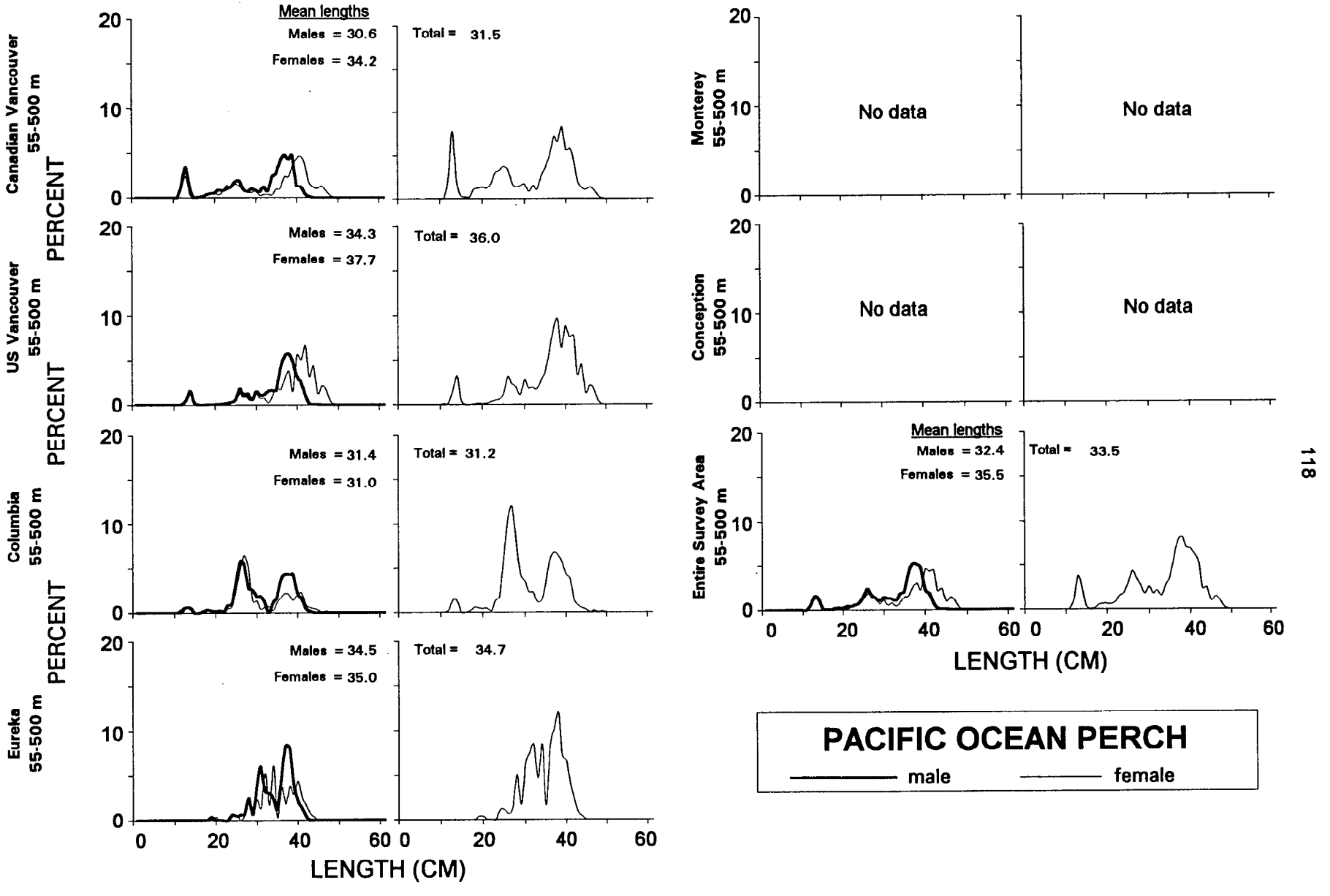

Figure 51.-- Estimated population size composition of Pacific ocean perch by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

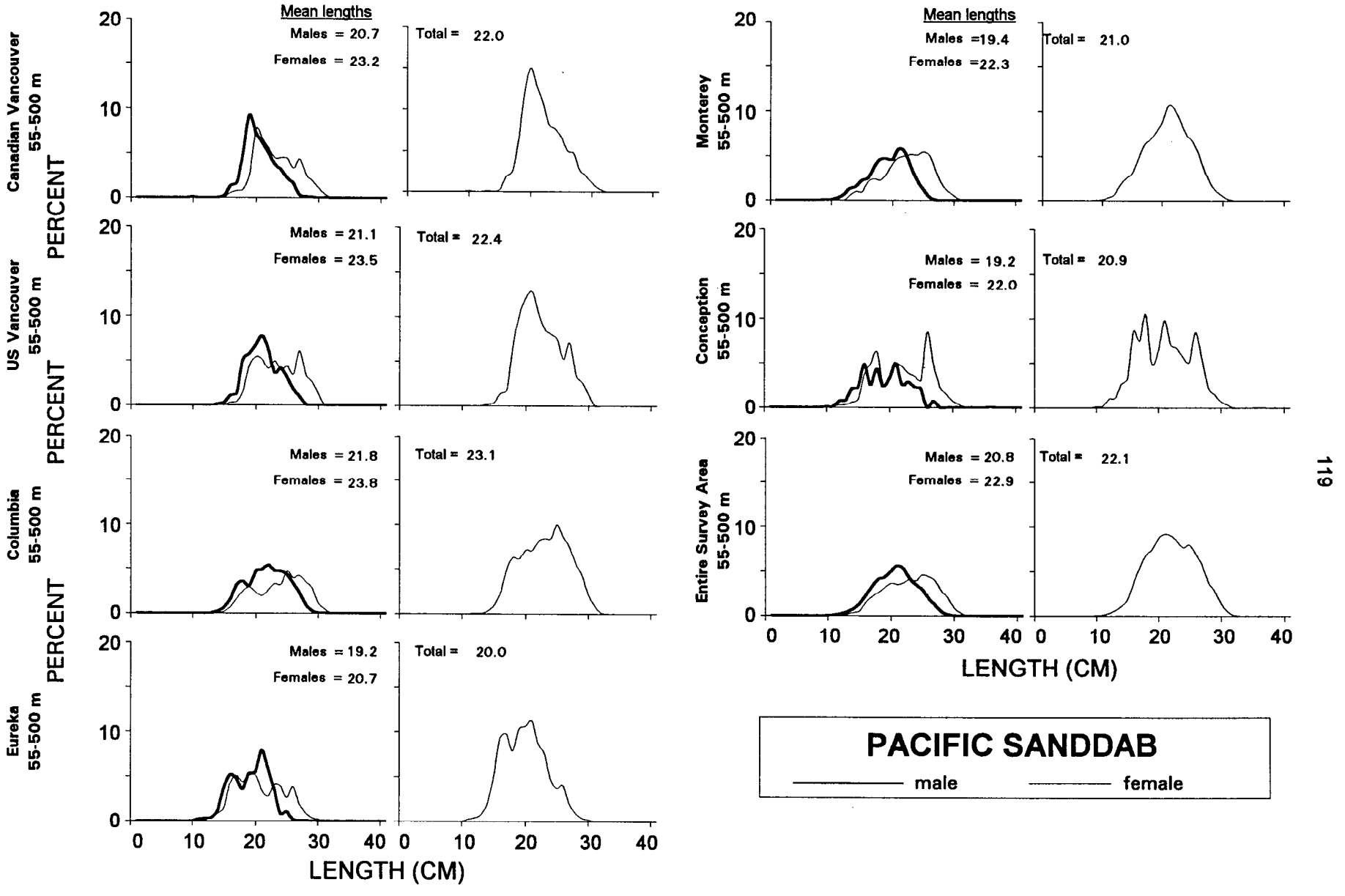

Figure 52.-- Estimated population size composition and mean lengths of Pacific sanddab by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

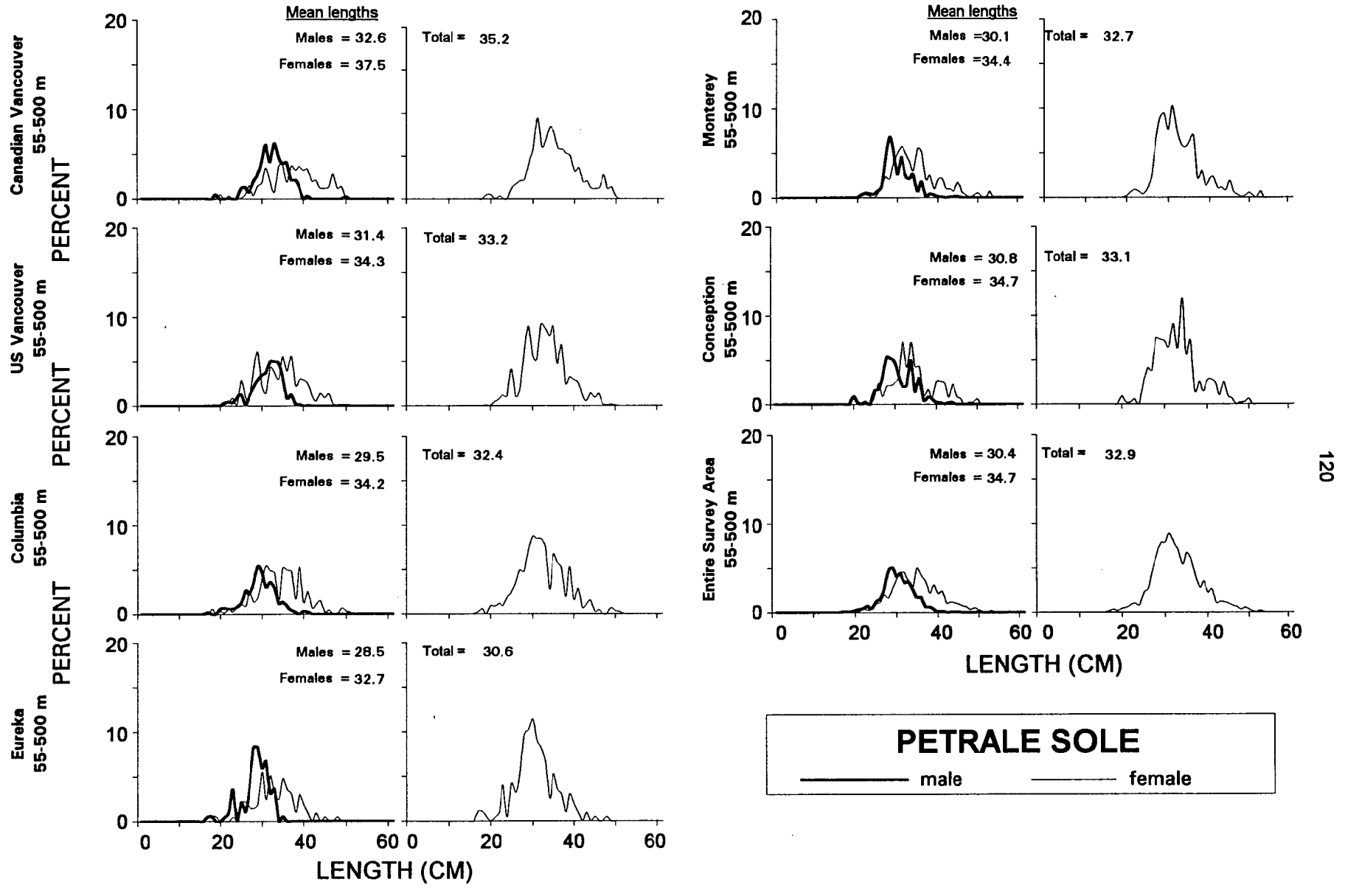

Figure 53.-- Estimated population size composition and mean lengths of petrale sole by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

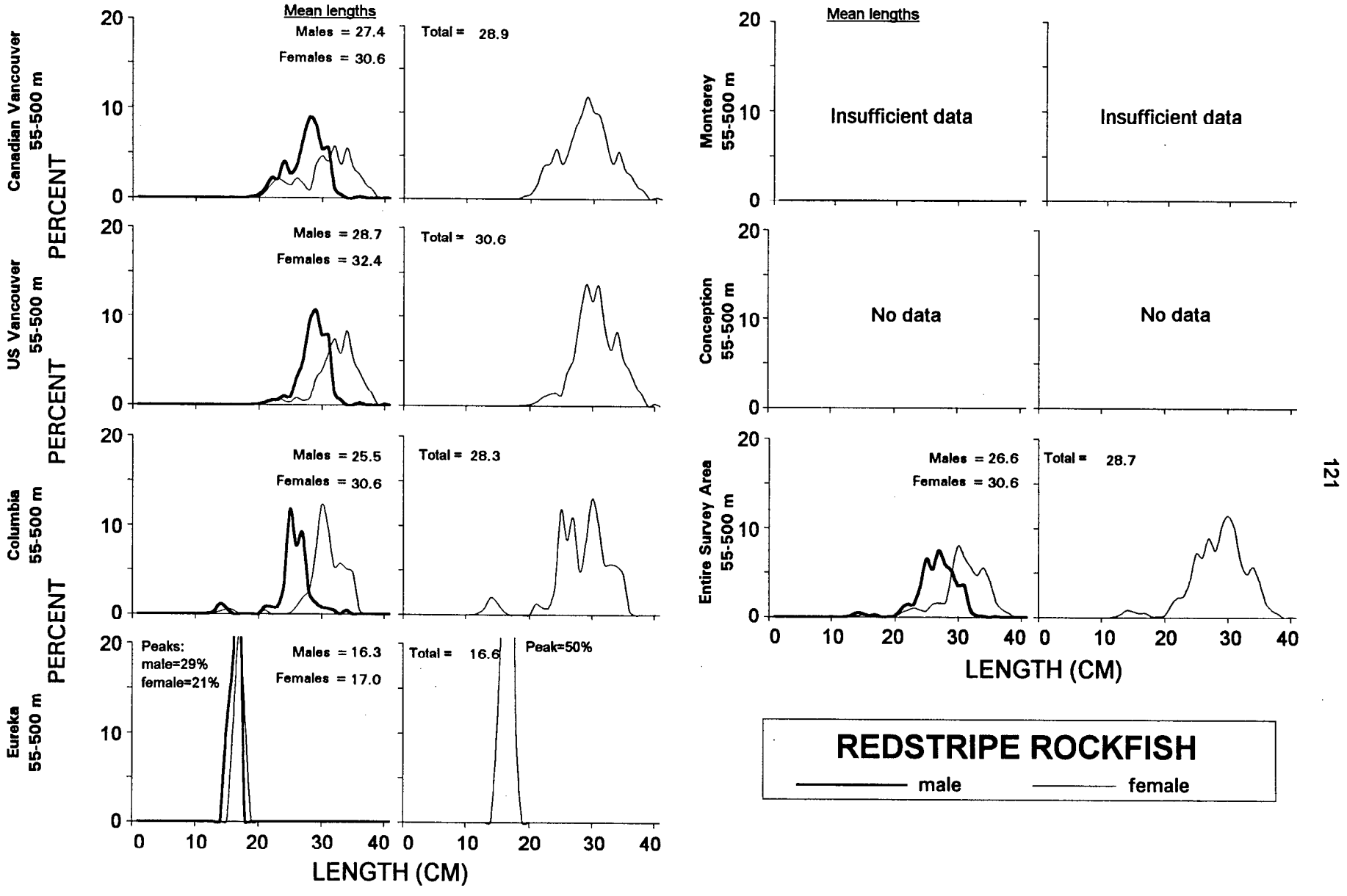

Figure 54.-- Estimated population size composition and mean lengths of redstripe rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

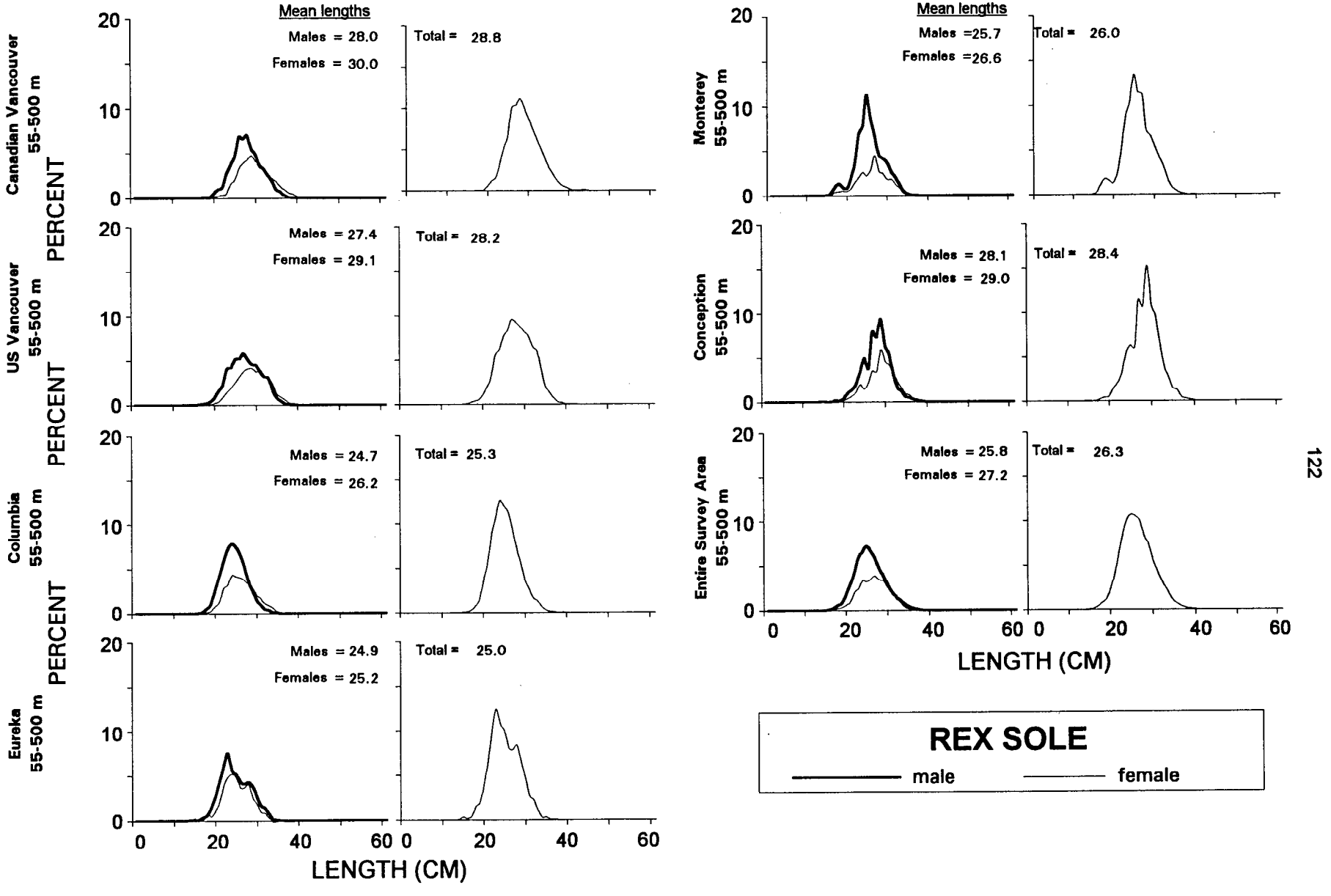

Figure 55.-- Estimated population size composition and mean lengths of rex sole by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

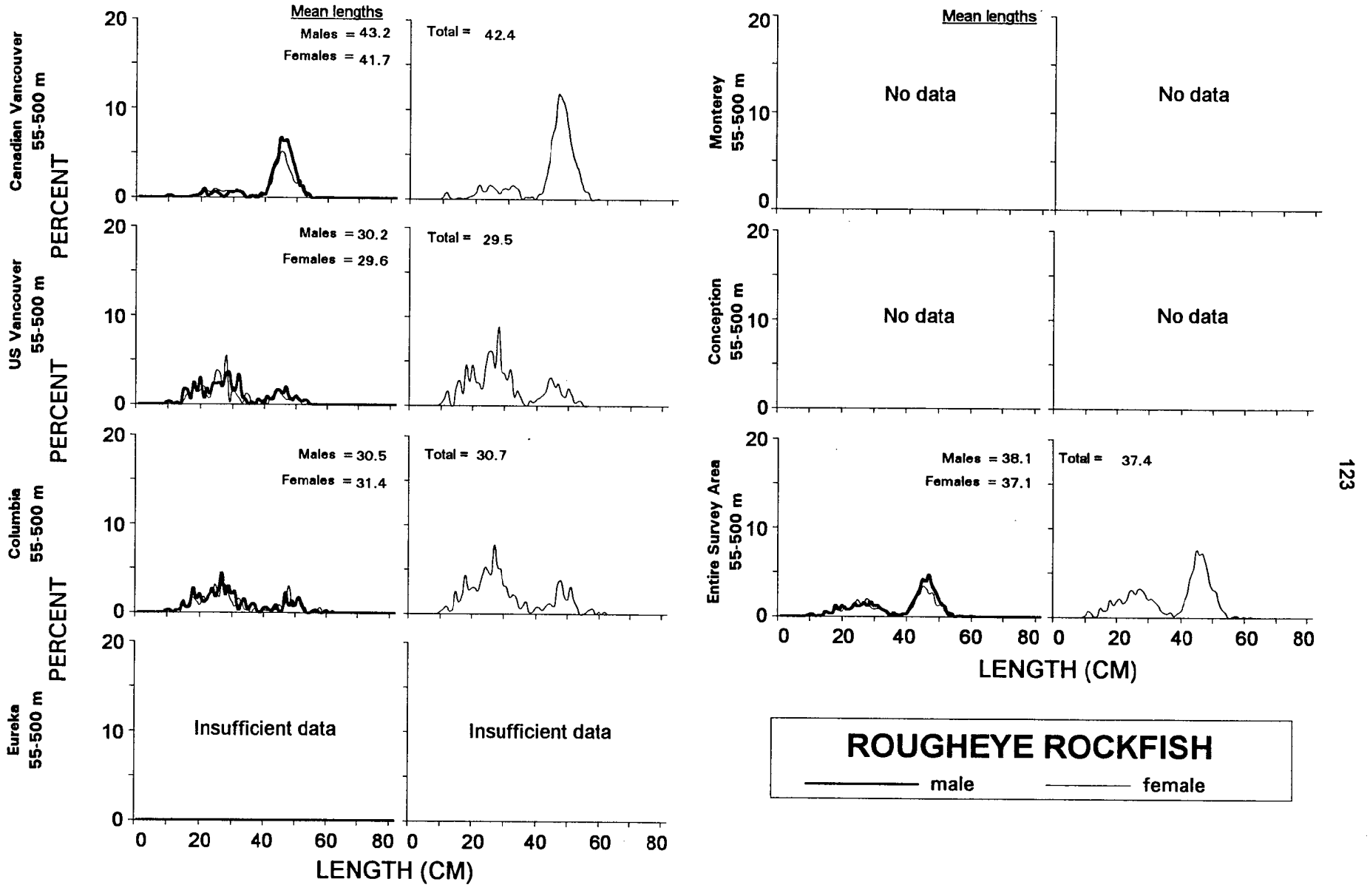

Figure 56.-- Estimated population size composition and mean lengths of rougheye rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

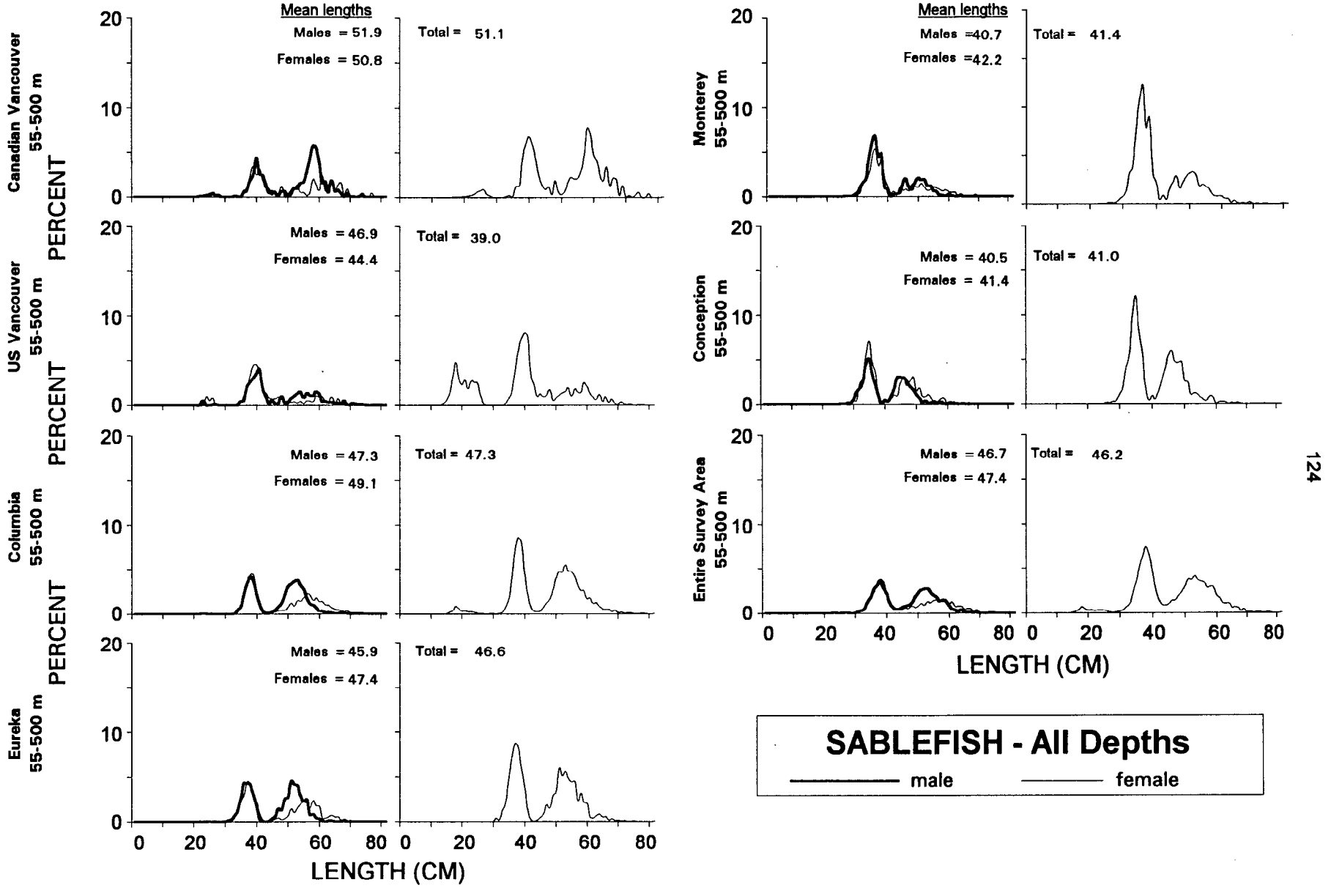

Figure 57.-- Estimated population size composition and mean lengths of sablefish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

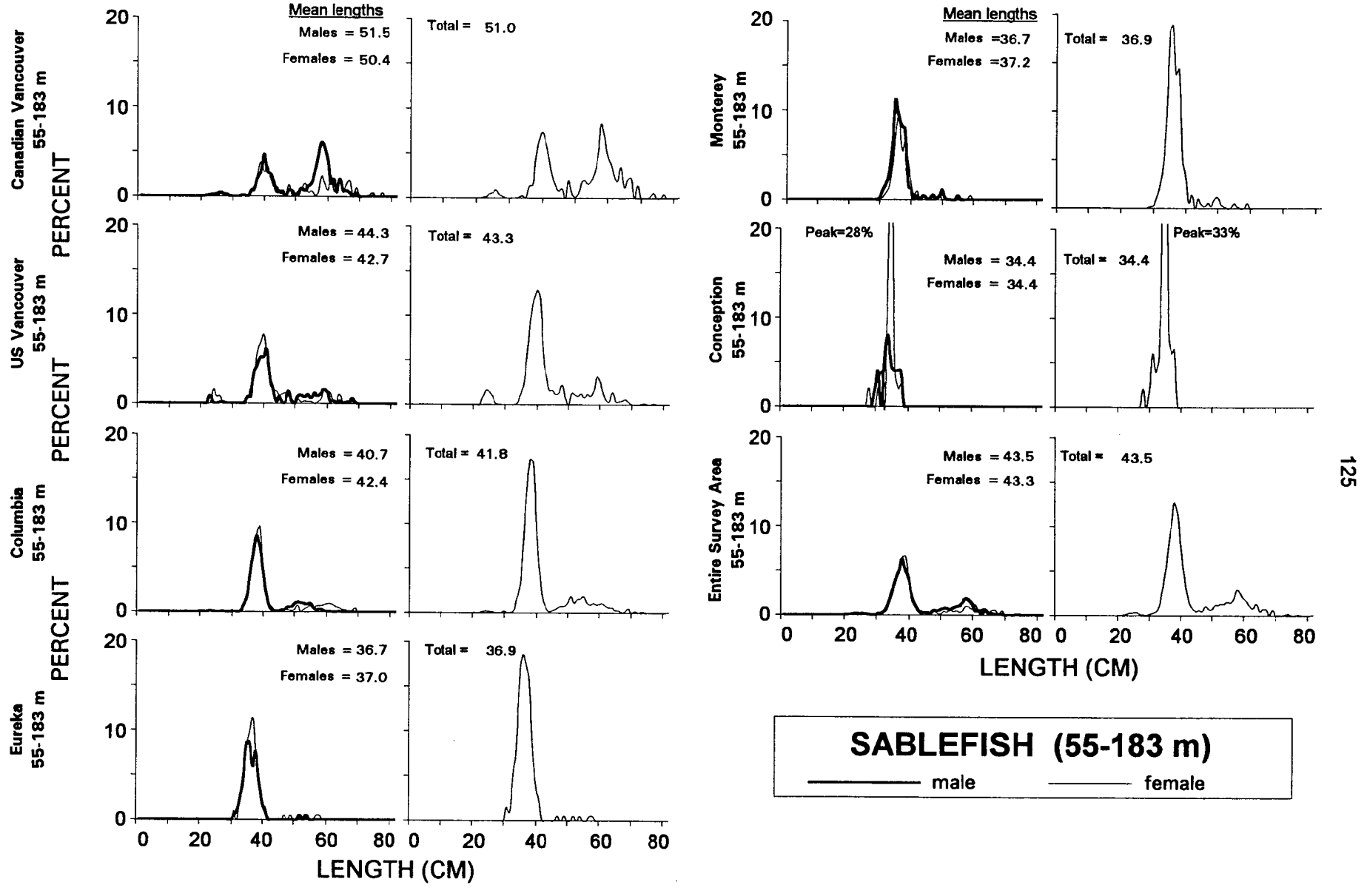

Figure 58.-- Estimated population size composition and mean lengths of sablefish by sex and International North Pacific Fisheries Commission area for the shallow depth stratum (55-183 m) from the 1995 triennial bottom trawl survey.

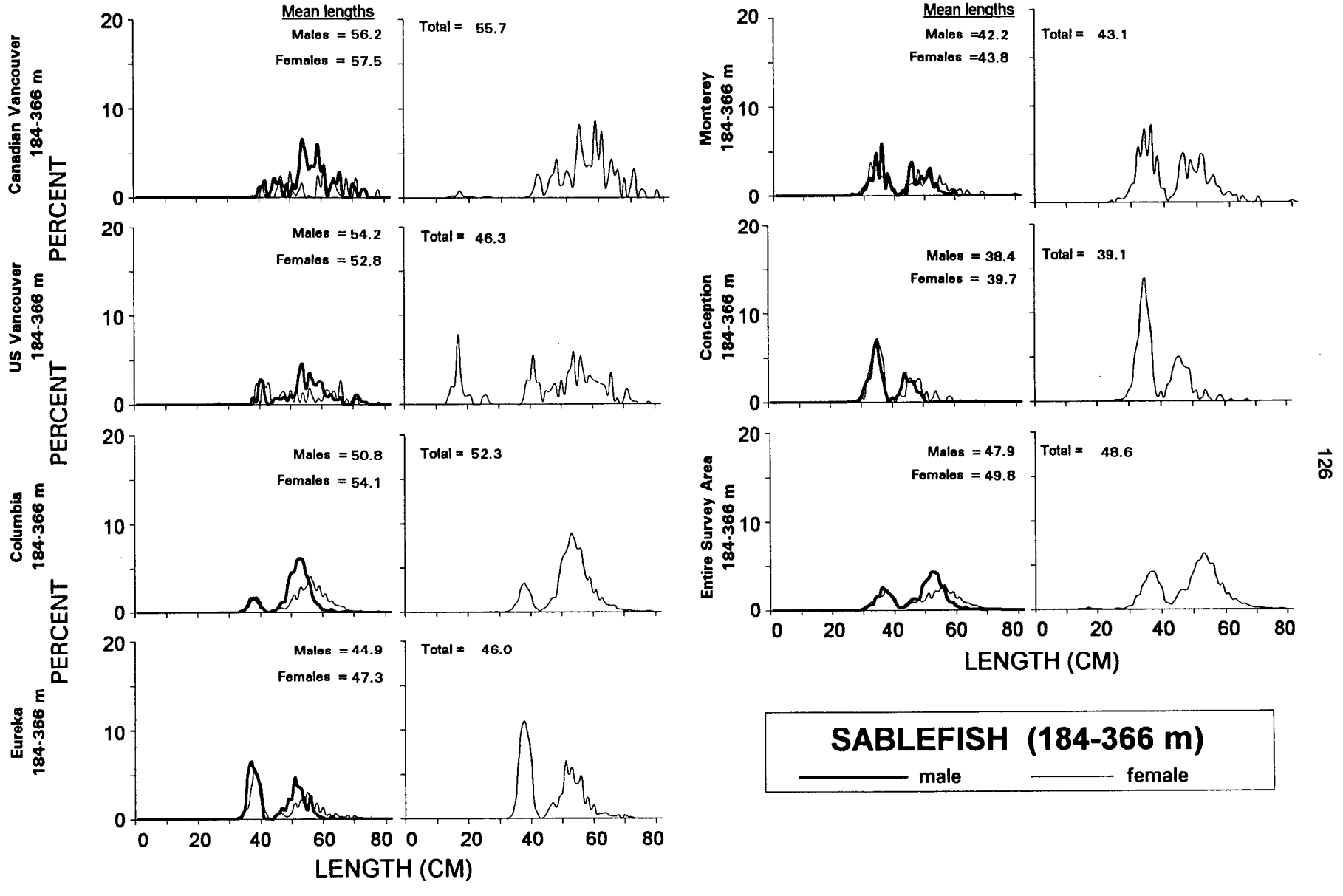

Figure 59.-- Estimated population size composition and mean lengths of sablefish by sex and International North Pacific Fisheries Commission area for the middle depth stratum (184-366 m) from the 1995 triennial bottom trawl survey.

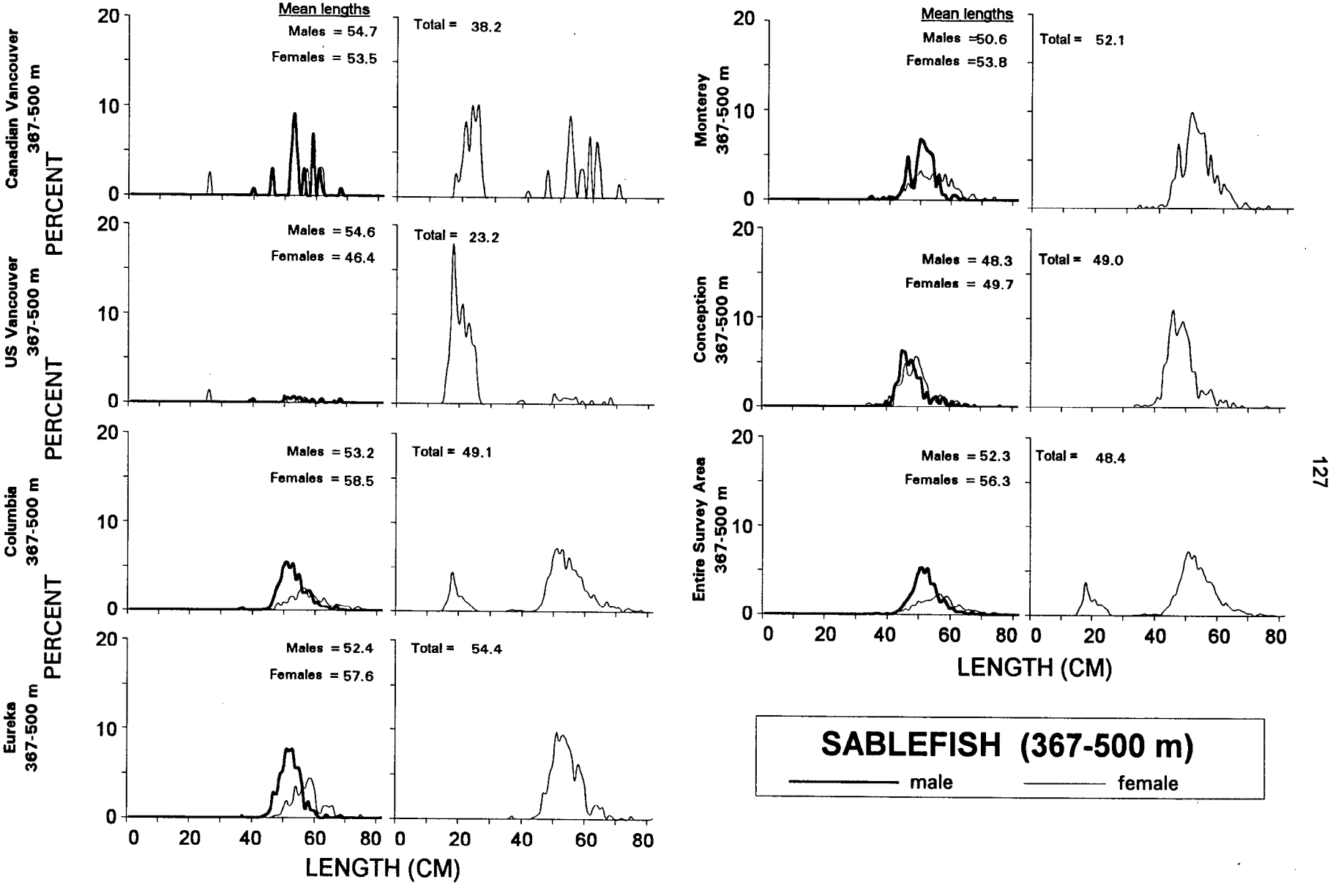

Figure 60.-- Estimated population size composition and mean lengths of sablefish by sex and International North Pacific Fisheries Commission area for the deep depth stratum (367-500 m) from the 1995 triennial bottom trawl survey.

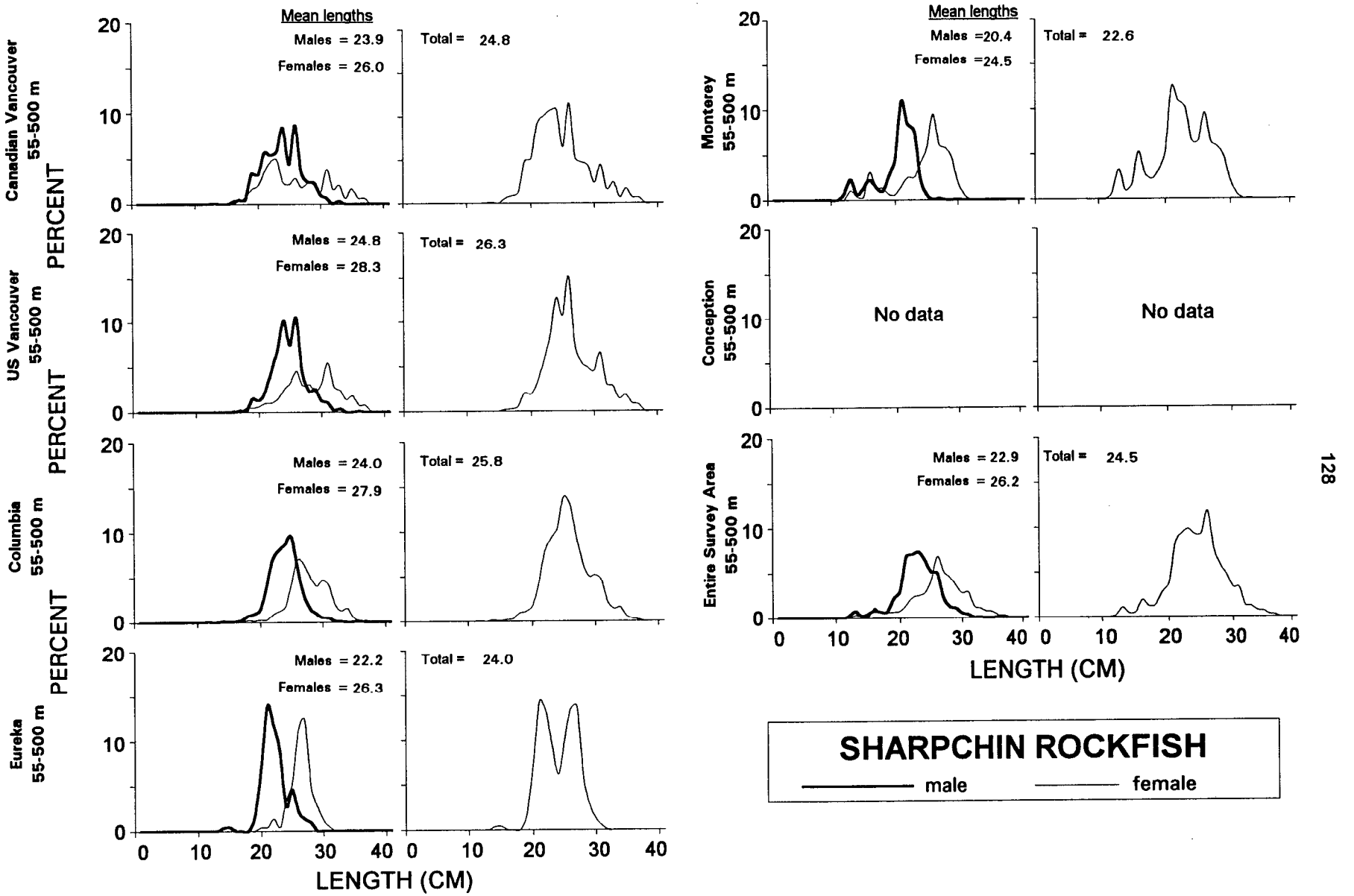

Figure 61.-- Estimated population size composition and mean lengths of Pacific sanddab by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

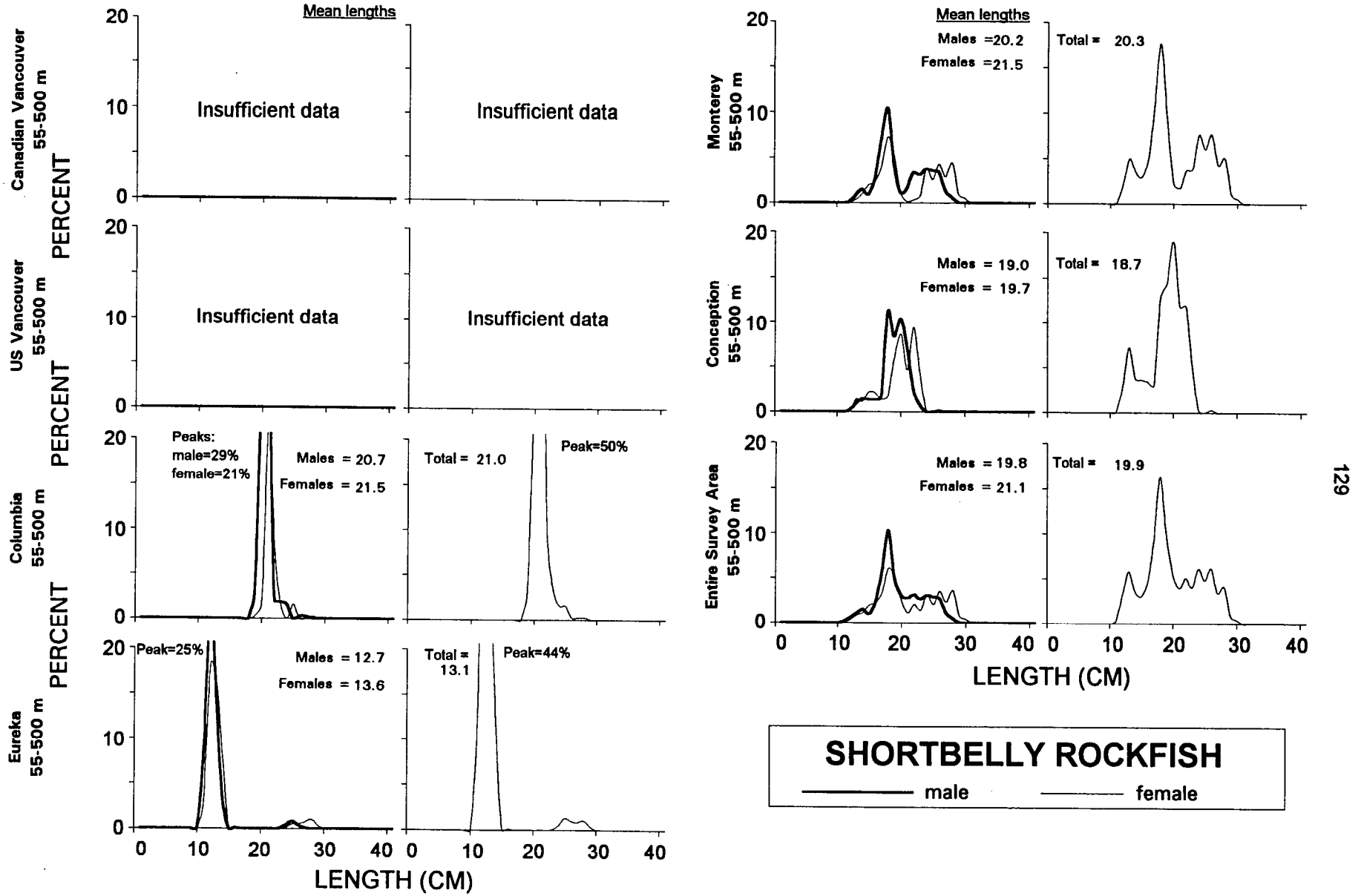

Figure 62.-- Estimated population size composition and mean lengths of shortbelly rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

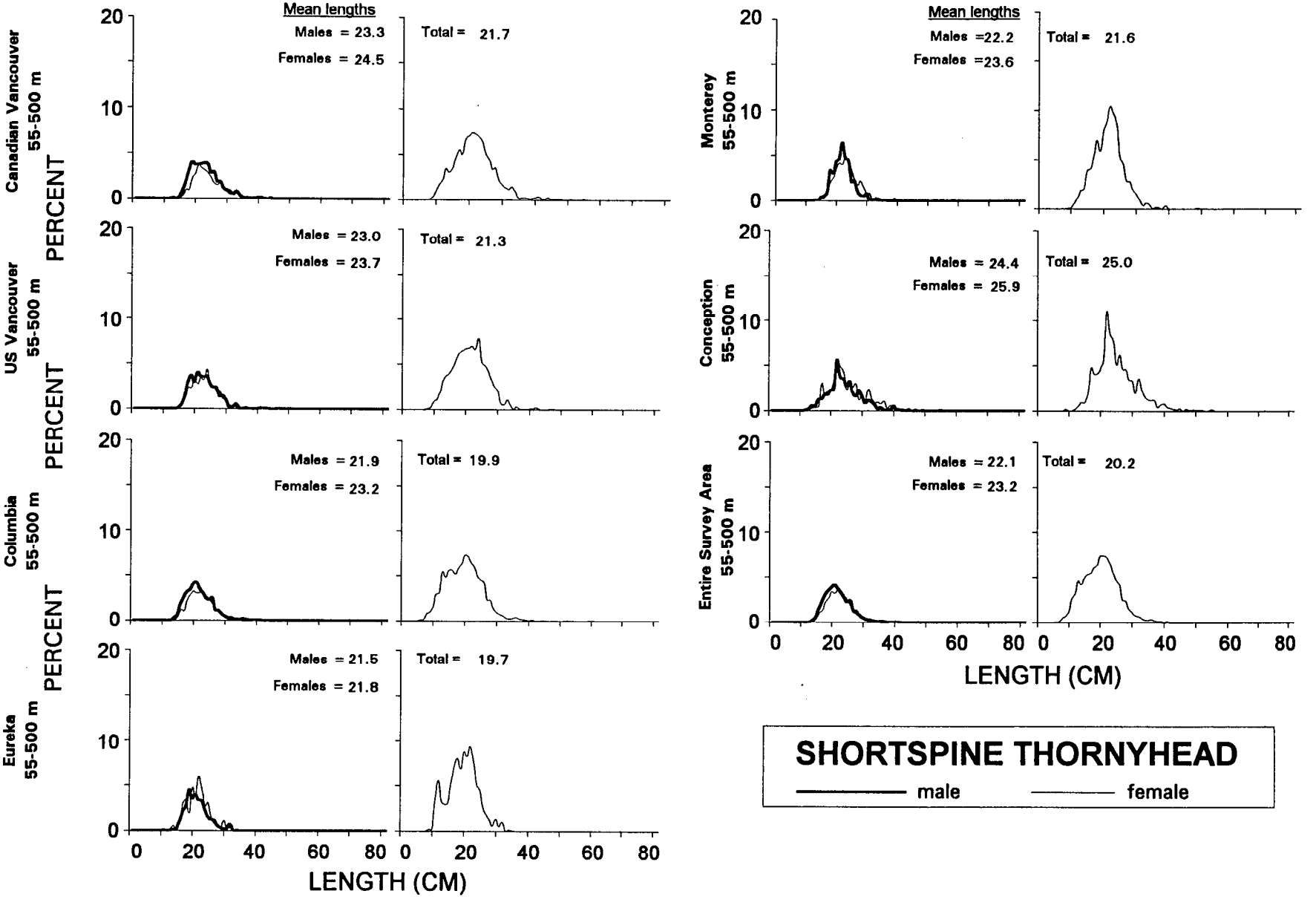

Figure 63.-- Estimated population size composition and mean lengths of shortspine thornyhead by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

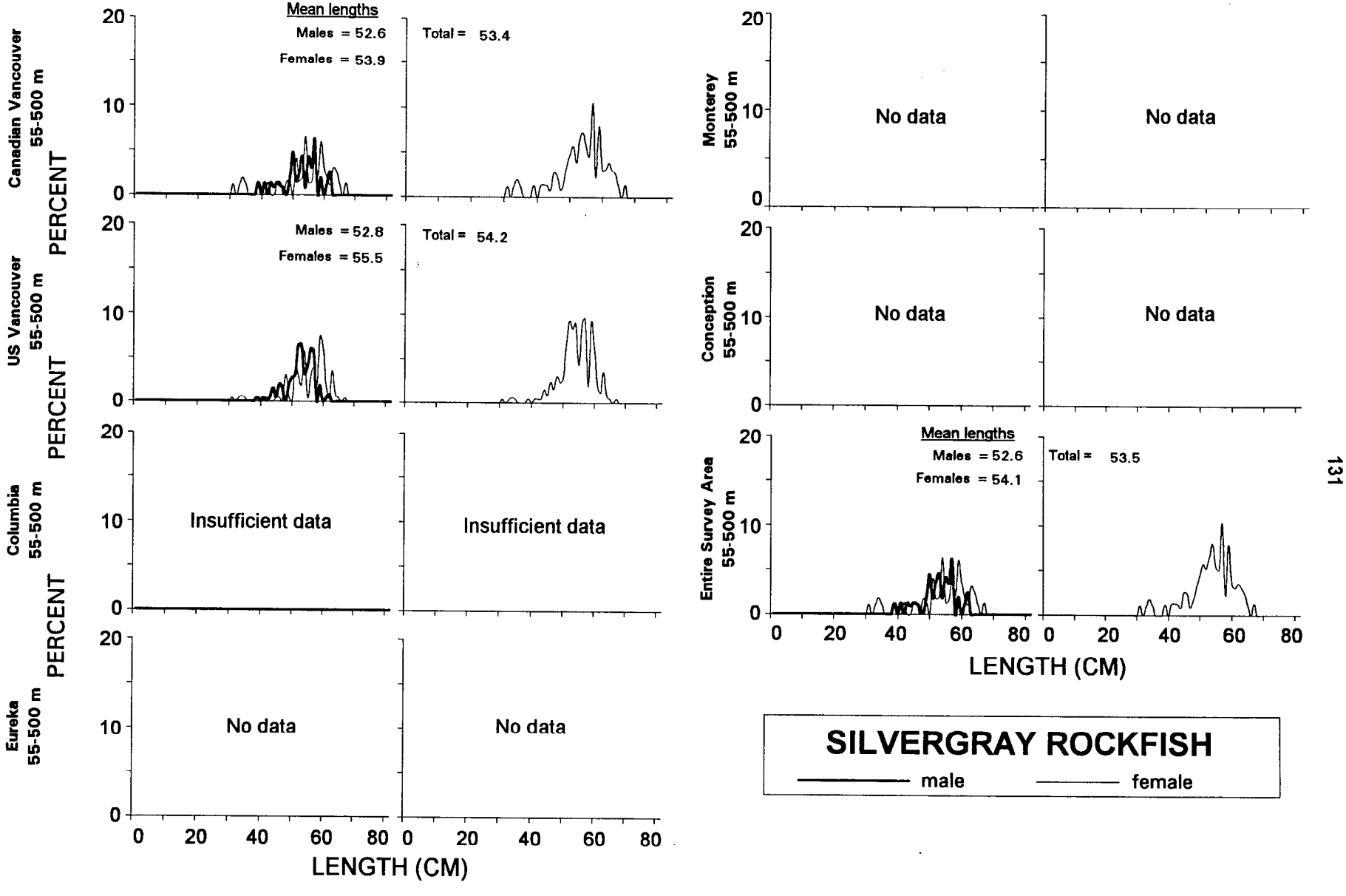

Figure 64-- Estimated population size composition and mean lengths of silvergray rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

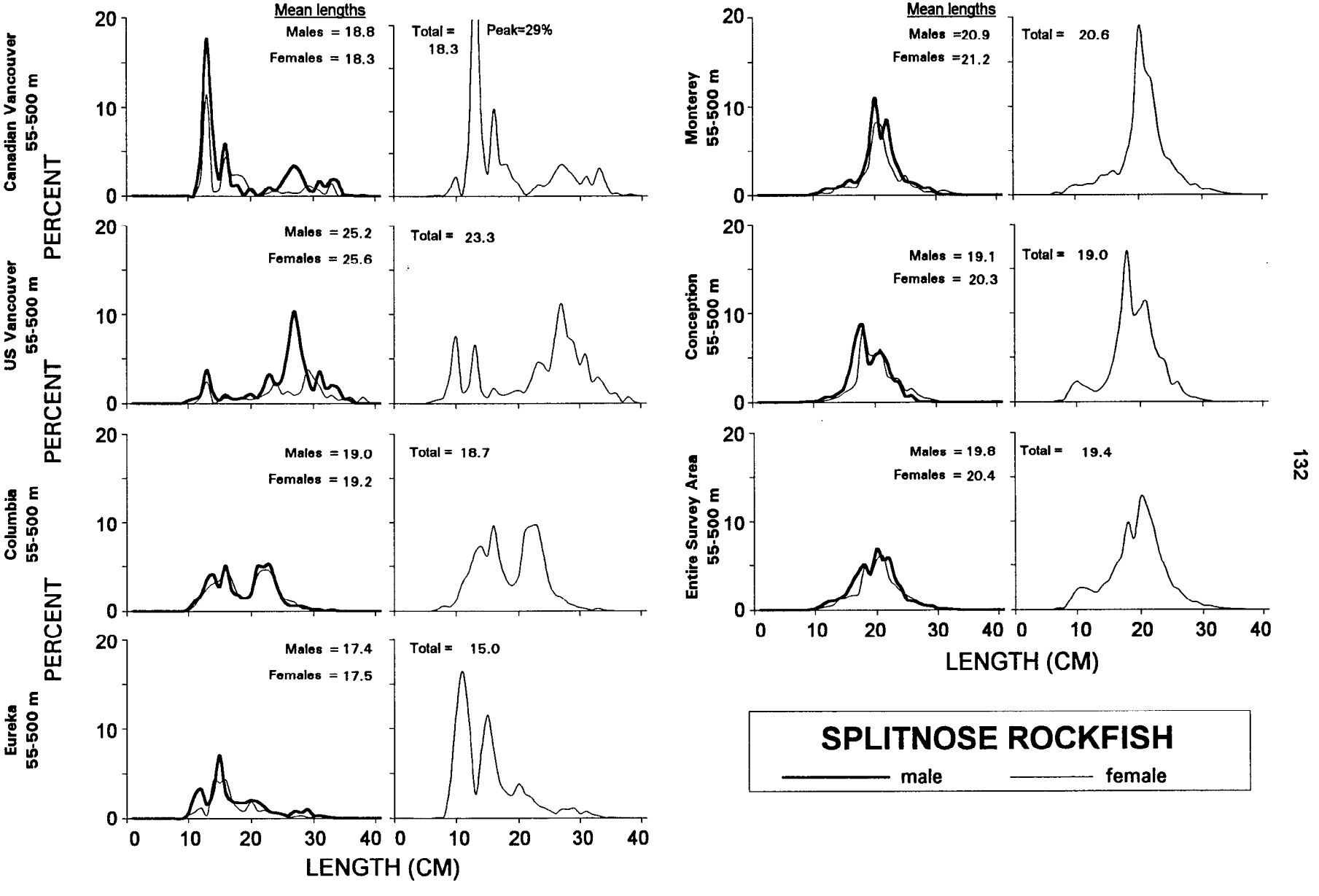

Figure 65.-- Estimated population size composition and mean lengths of splitnose rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

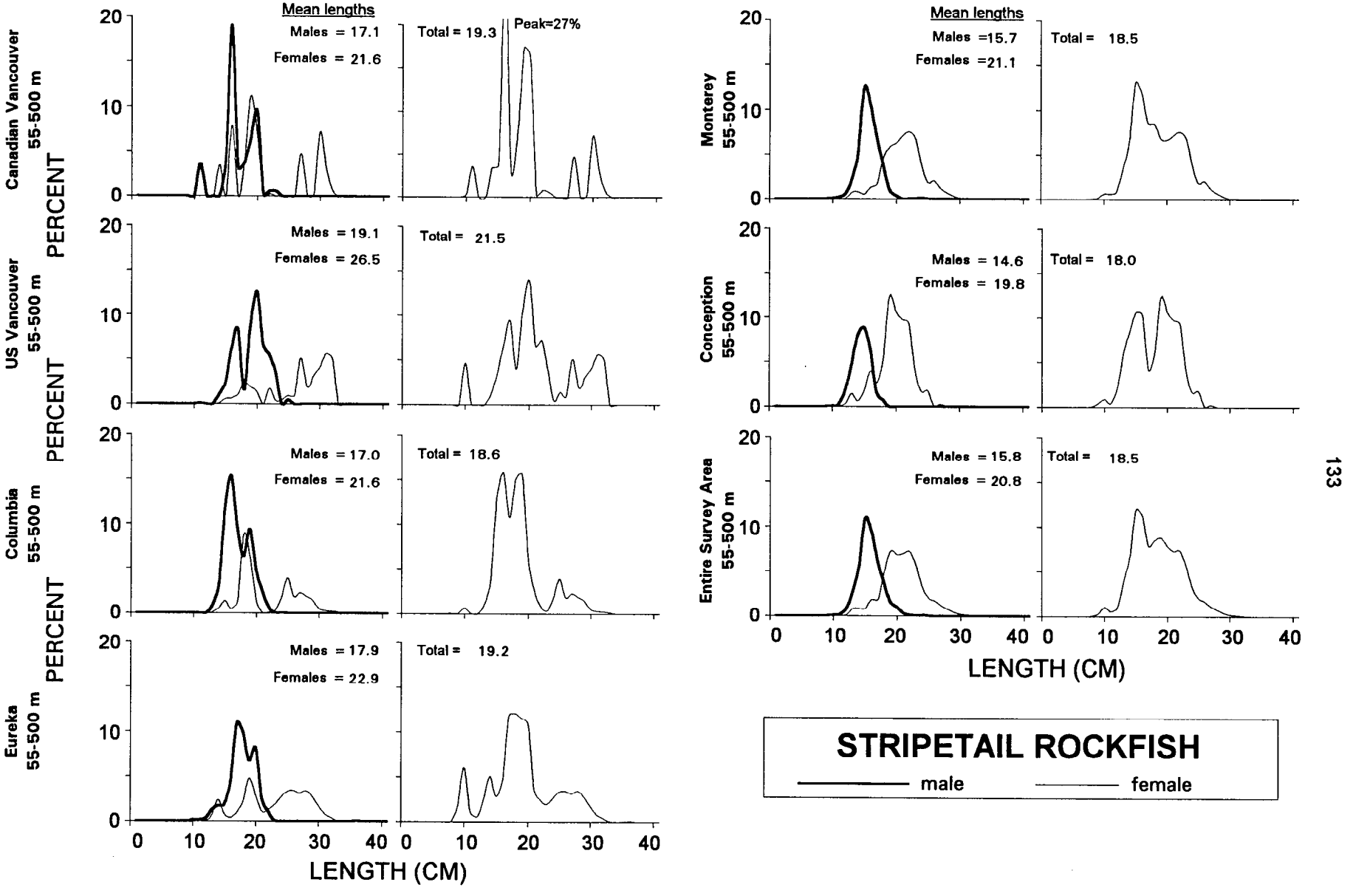

Figure 66.-- Estimated population size composition and mean lengths of stripetail rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

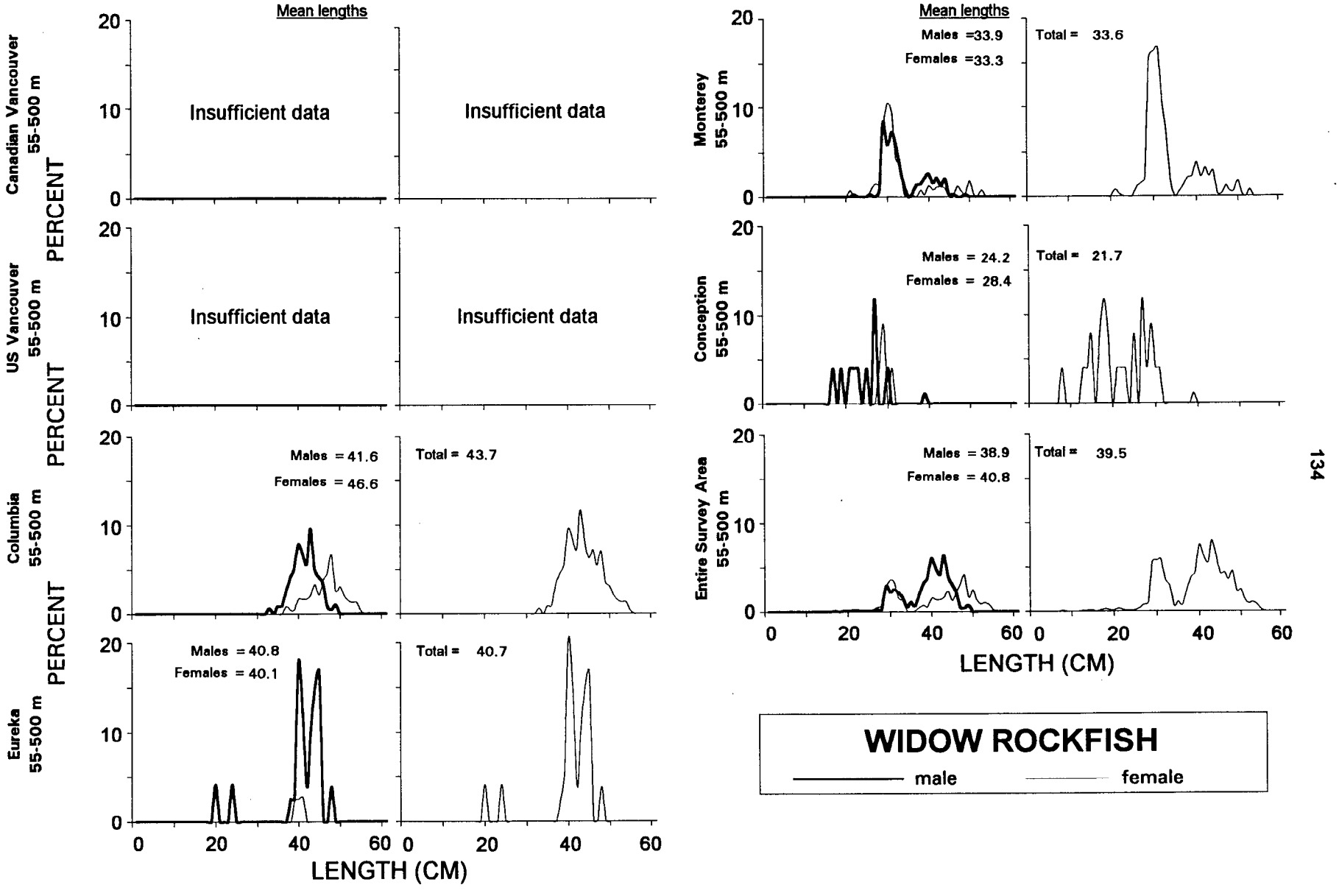

Figure 67.-- Estimated population size composition and mean lengths of widow rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

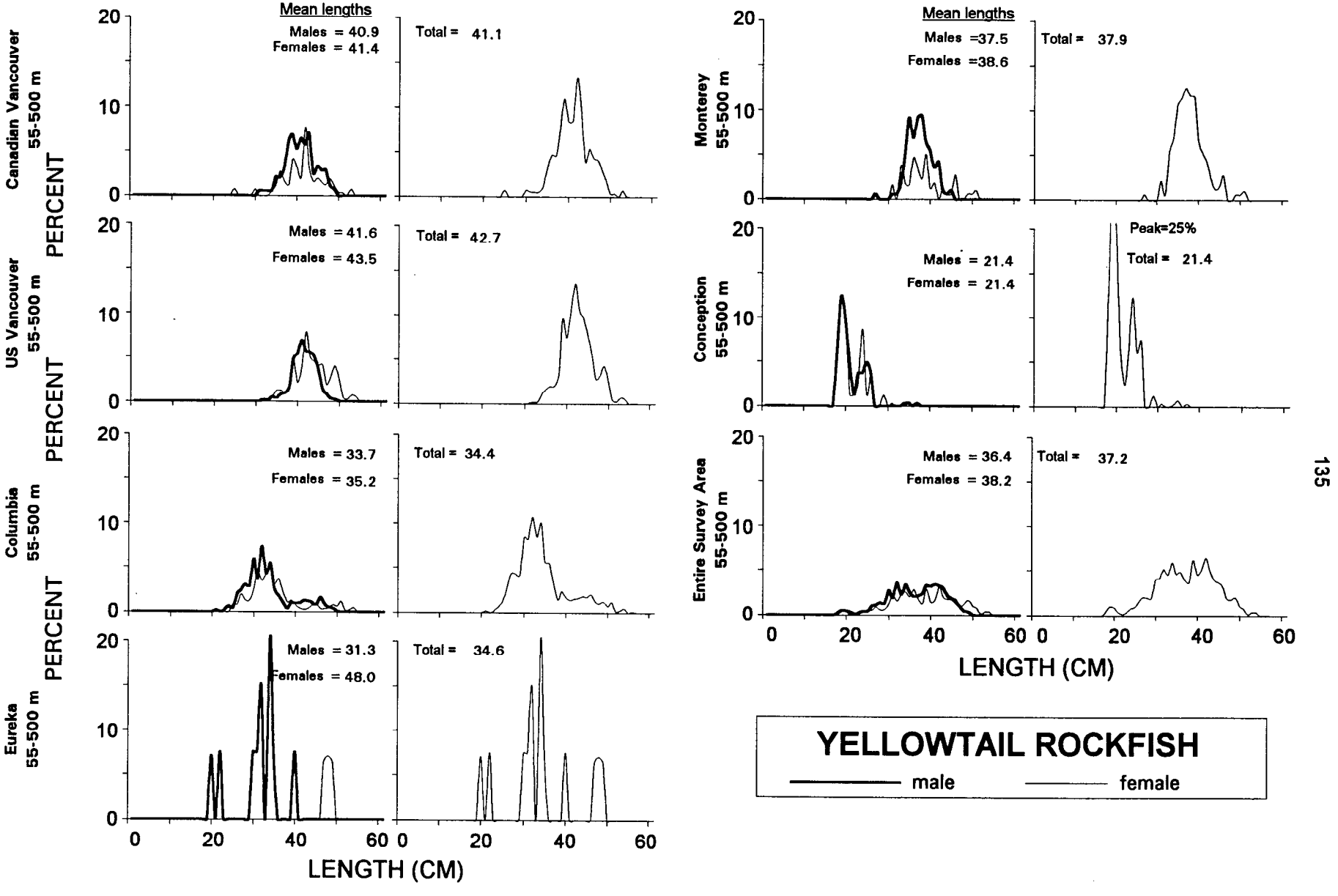

Figure 68.-- Estimated population size composition and mean lengths of yellowtail rockfish by sex and International North Pacific Fisheries Commission area for all depths (55-500 m) from the 1995 triennial bottom trawl survey.

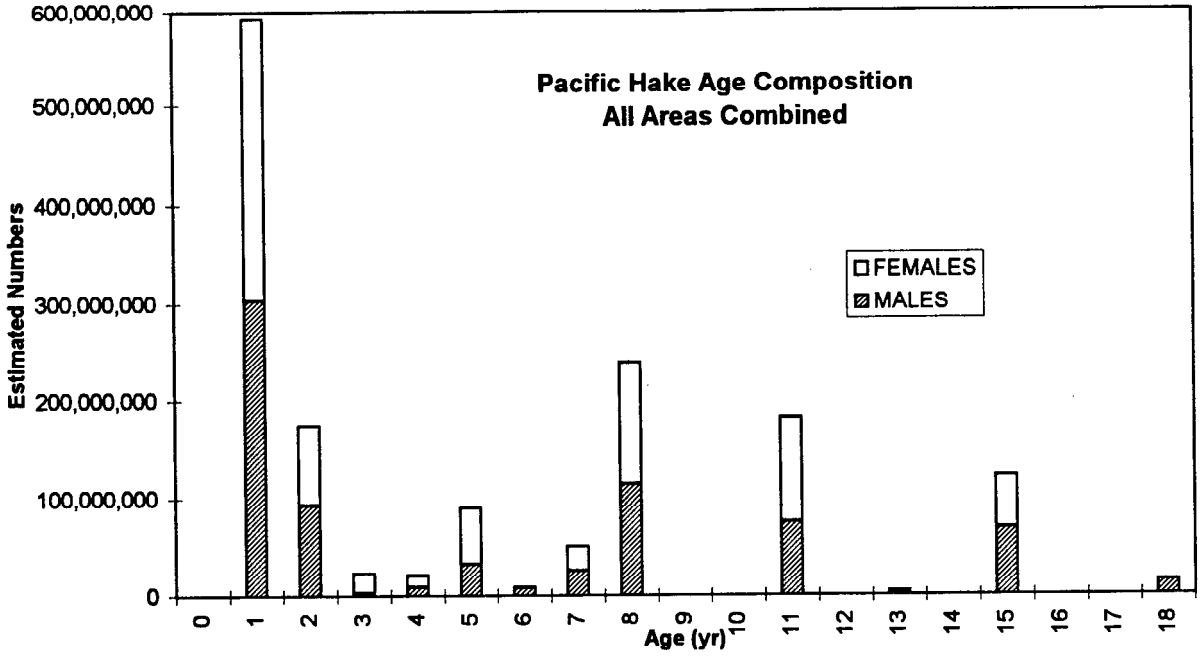

Figure 69.- The age composition of the Pacific hake resource off California, Oregon, Washington, and British Columbia in 1995, based upon results of the National Marine Fisheries Service's triennial bottom trawl survey of groundfish resources.

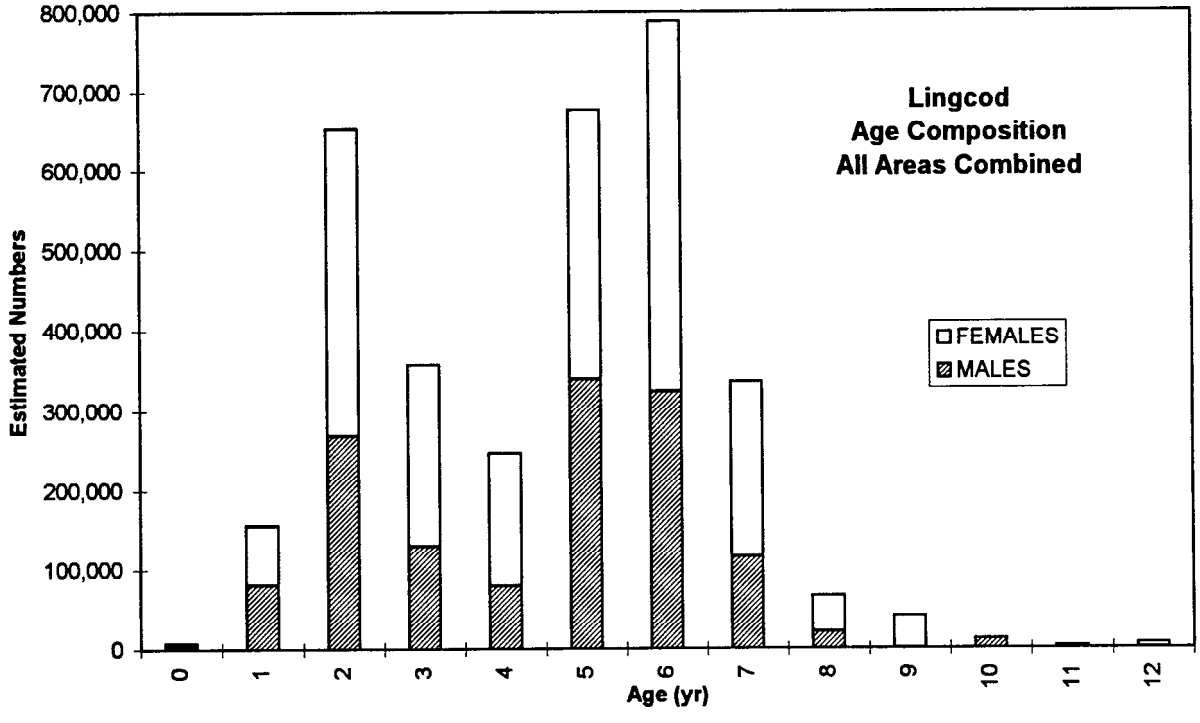

Figure 70.- The age composition of the lingcod resource off California, Oregon, Washington, and British Columbia in 1995, based upon results of the National Marine Fisheries Service's triennial bottom trawl survey of groundfish resources.

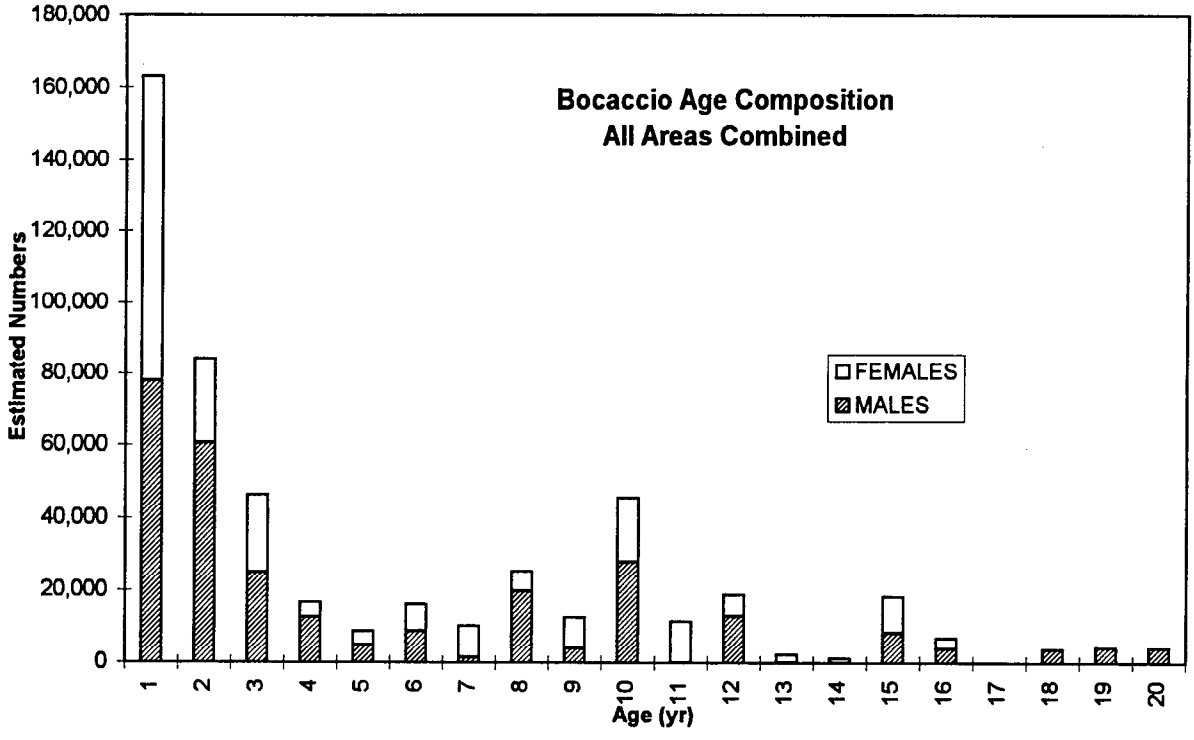

Figure 71.- The age composition of the bocaccio resource off California, Oregon, Washington, and British Columbia in 1995, based upon results of the National Marine Fisheries Service's triennial bottom trawl survey of groundfish resources.

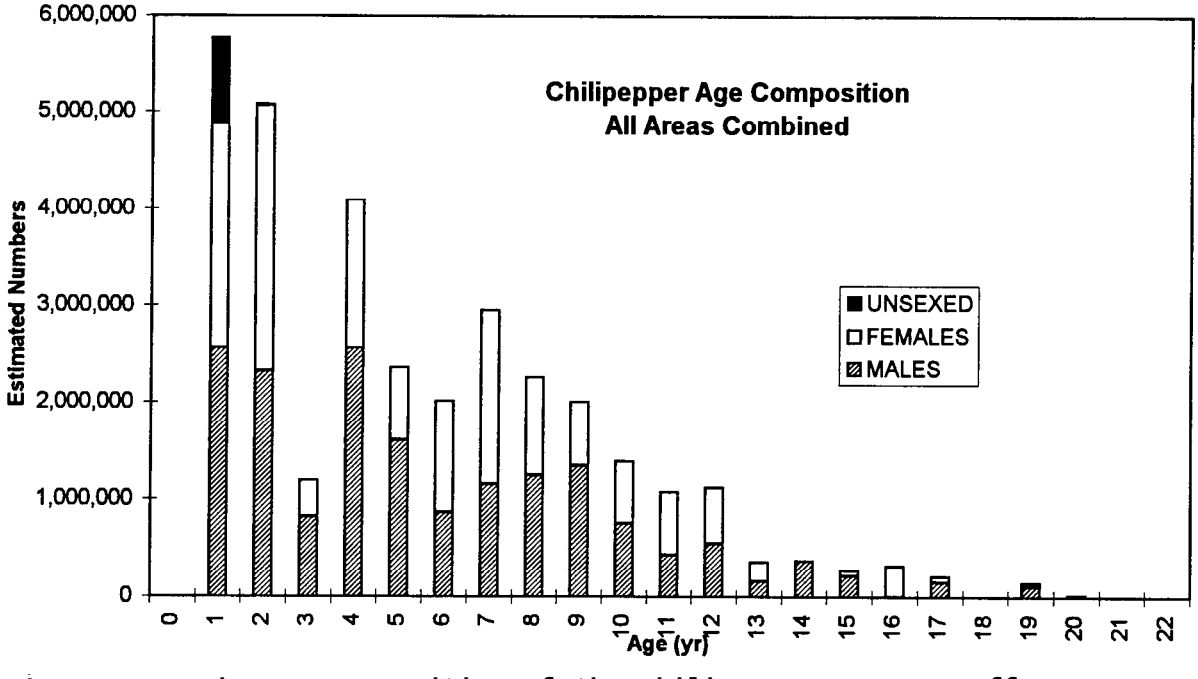

Figure 72.- The age composition of the chilipepper resource off California, Oregon, Washington, and British Columbia in 1995, based upon results of the National Marine Fisheries Service's triennial bottom trawl survey of groundfish resources.

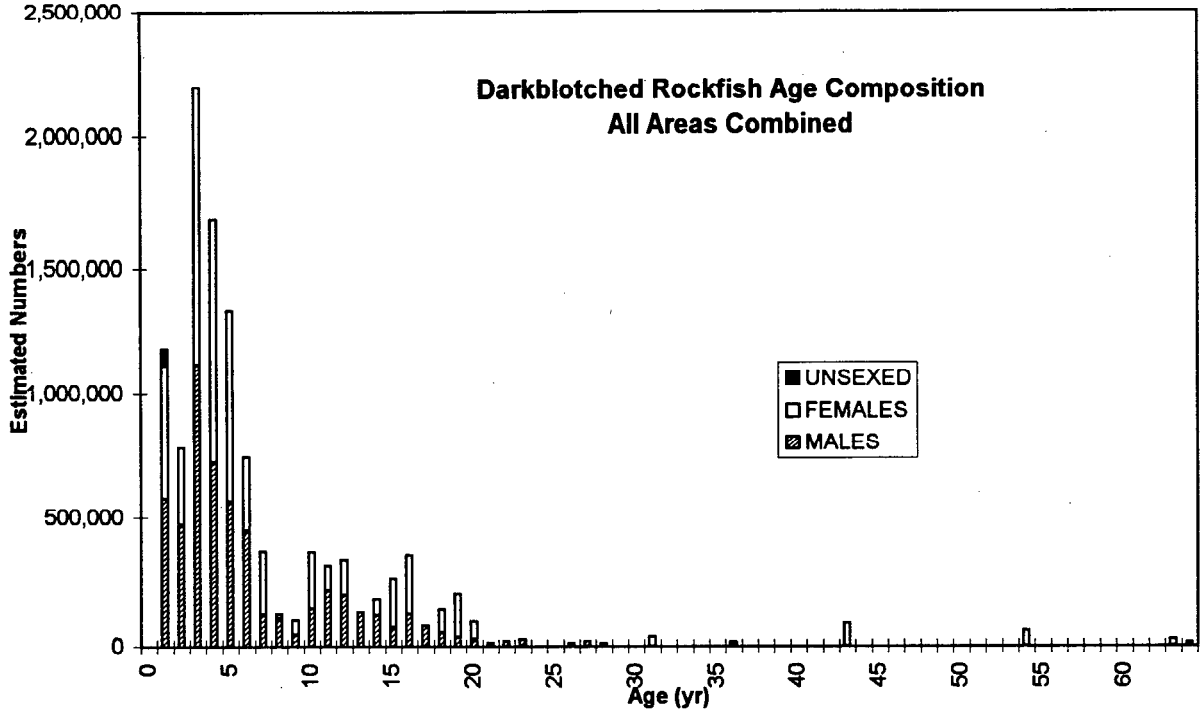

Figure 73.- The age composition of the darkblotched rockfish resource off California, Oregon, Washington, and British Columbia in 1995, based upon results of the National Marine Fisheries Service's triennial bottom trawl survey of groundfish resources.

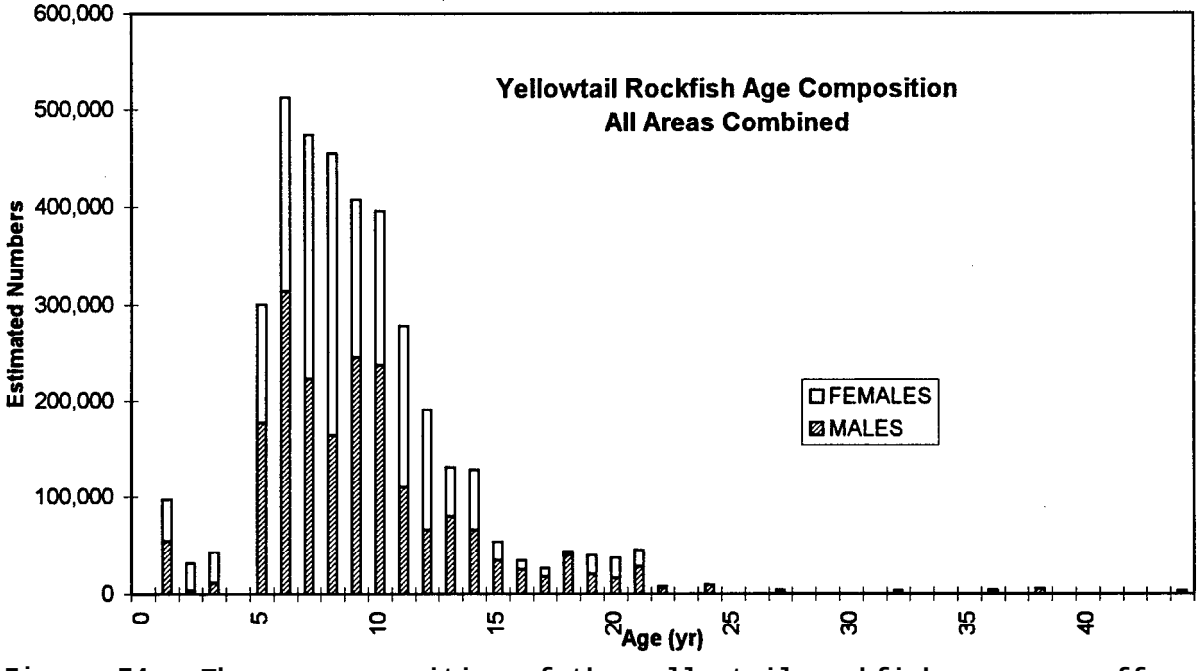

Figure 74.- The age composition of the yellowtail rockfish resource off California, Oregon, Washington, and British Columbia in 1995, based upon results of the National Marine Fisheries Service's triennial bottom trawl survey of groundfish resources.

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