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Distribution, Abundance, and Biological Characteristics of Groundfish in the Eastern Bering Sea Based on Results of the U.S. Bottom Trawl Survey During June-September 1991

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DISTRIBUTION, ABUNDANCE, AND BIOLOGICAL CHARACTERISTICS OF GROUNDFISH IN THE EASTERN BERING SEA BASED ON RESULTS OF THE U.S. BOTTOM TRAWL SURVEY DURING JUNE-SEPTEMBER 1991

By

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ABSTRACT

The Resource Assessment and Conservation Engineering Division (RACE) of the Alaska Fisheries Science Center (AFSC) conducted the 5th comprehensive triennial survey of the demersal fish and crab stocks of the eastern Berirng Sea in 1991. The triennial survey, which was initiated in 1979, is an expansion of the annual demersal fish and crab bottom trawl survey that began in 1971 that encompasses a major portion of the eastern Bering Sea shelf between the 20-m isobath and the 200-m isobath from the Alaska Peninsula north to approximately the latitude of St. Matthew Island (lat. 60° 50'N). The expanded survey conducted every three years also includes bottom trawl surveys of the slope, the north shelf, and Norton Sound, and an echo integration-midwater trawl assessment of walleye pollock (Theragra chalcogramms). The results of the bottom trawl portions of the survey for groundfish are presented here as a processed report. Results of the 1991 midwater pollock survey will be presented separately by the Midwater Assessment and Conservation Engineering Task. Methods are described in some detail, but results are mainly presented through tables and figures without a narrative description of findings.

Survey results presented in this report include analyses of relative fishing powers of survey vessels, abundance estimates for fish and invertebrates, geographic distributions of economically important fish species and major fish families, size

composition of principal fish species, and age and growth information for selected species. Surface and bottom temperatures recorded at each station are also presented.

Appendices provide detailed station data and listings of the analyses of abundance and biological data of the sampled populations.

CONTENTS

INTRODUCTION

The eastern Bering Sea supports one of the most productive groundfish fisheries in the world with annual commercial catches since 1970 ranging from 1.2 to 2.2 million metric tons (t) (Bakkala 1988). Although many species of fish are caught commercially, the most abundant has been walleye pollock which, since 1970, has comprised more than 70% of the total landings (North Pacific Fishery Management Council 1990). The next most abundant species in 1991 were yellowfin sole (Pleuronectes asper) and Pacific cod (Gadus macrocephalus) which were 10 and 5%, respectively, of the commercial landings (Guttormsen 1993).

The Resource Assessment and Conservation Engineering Division of the Alaska Fisheries Science Center has conducted annual bottom trawl surveys to monitor the abundance, distribution, and biological condition of eastern Bering Sea demersal fish and crab stocks since 1971. In 1975, the first large-scale survey of the eastern Bering Sea shelf was conducted under contract from the Bureau of Land Management to: assess the potential impact of proposed offshore oil exploration and development on fishery resources, and provide a data base for stock assessments and the developement of management policies for foreign and domestic fisheries (Pereyra et al. 1976). During this baseline survey, sampling was conducted over the Bering Sea shelf between the 20 m and 200 m isobaths and from the Alaska Peninsula north to approximately 62°N lat. (Fig. 1). Following

1975, the area of coverage of the annual survey was reduced until 1979 when with the cooperation of the Japan Fisheries Agency, the survey was expanded to provide higher sampling densities and larger collections of biological data (Fig.2, Bakkala and Wakabayashi 1985). The 1979 survey encompassed the entire region sampled in the 1975 baseline study, and in addition, the continental slope waters between the Aleutian Islands and the U.S.-Russian convention line, and the northern region of the shelf between St. Matthew and St. Lawrence Islands. Subsequent annual bottom trawl surveys have essentially re-sampled the stations established during the 1975 survey, with slight modifications each year.

The standard survey area of approximately 463,000 km^2 (Fig. 3) encompasses a major portion of the eastern Bering Sea continental shelf and the distributions of the principal species of crab and groundfish that inhabit shelf waters. Every third year (1982, 1985, 1988, 1991) an extended triennial survey has been conducted (Fig. 4), including a hydroacoustic assessment of midwater pollock. During the larger triennial surveys, sampling with bottom trawls is extended beyond the standard survey area to the continental slope, Norton Sound, and the region between St. Matthew and St. Lawrence Islands (Fig. 4). In past reports, hydroacoustic results were combined with results from the bottom trawl surveys to provide an overall assessment of pollock. However, 1991 results will be presented separately to expedite the release of this report.
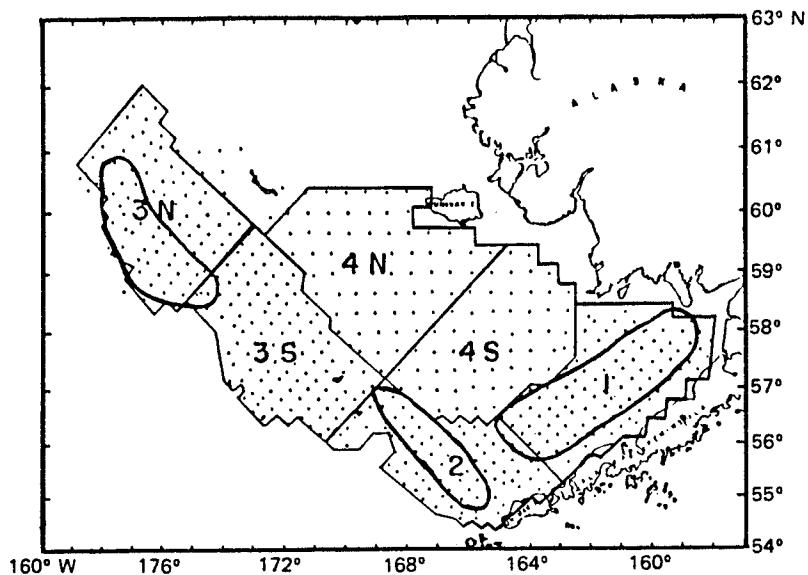
Figure 1.--Sampling stations and survey stratification used for
analyses of data from the 1975 baseline survey on the
eastern Bering Sea shelf, with approximate locations
of oil lease areas (from Pereya et al. 1976).
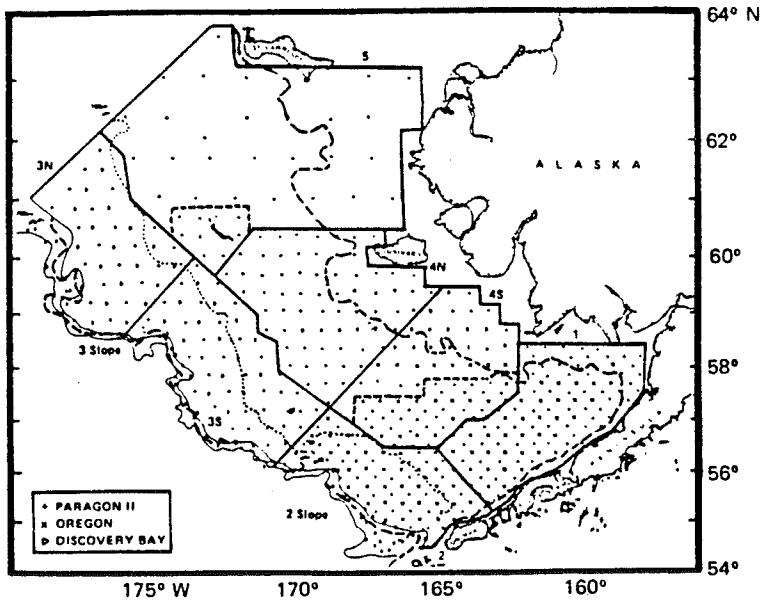
Figure 2.--Sampling stations and survey stratification used for
analyses of data from the 1979 expanded triennial
survey on the eastern Bering Sea shelf and slope (from
Bakkala and Wakabayashi 1985)
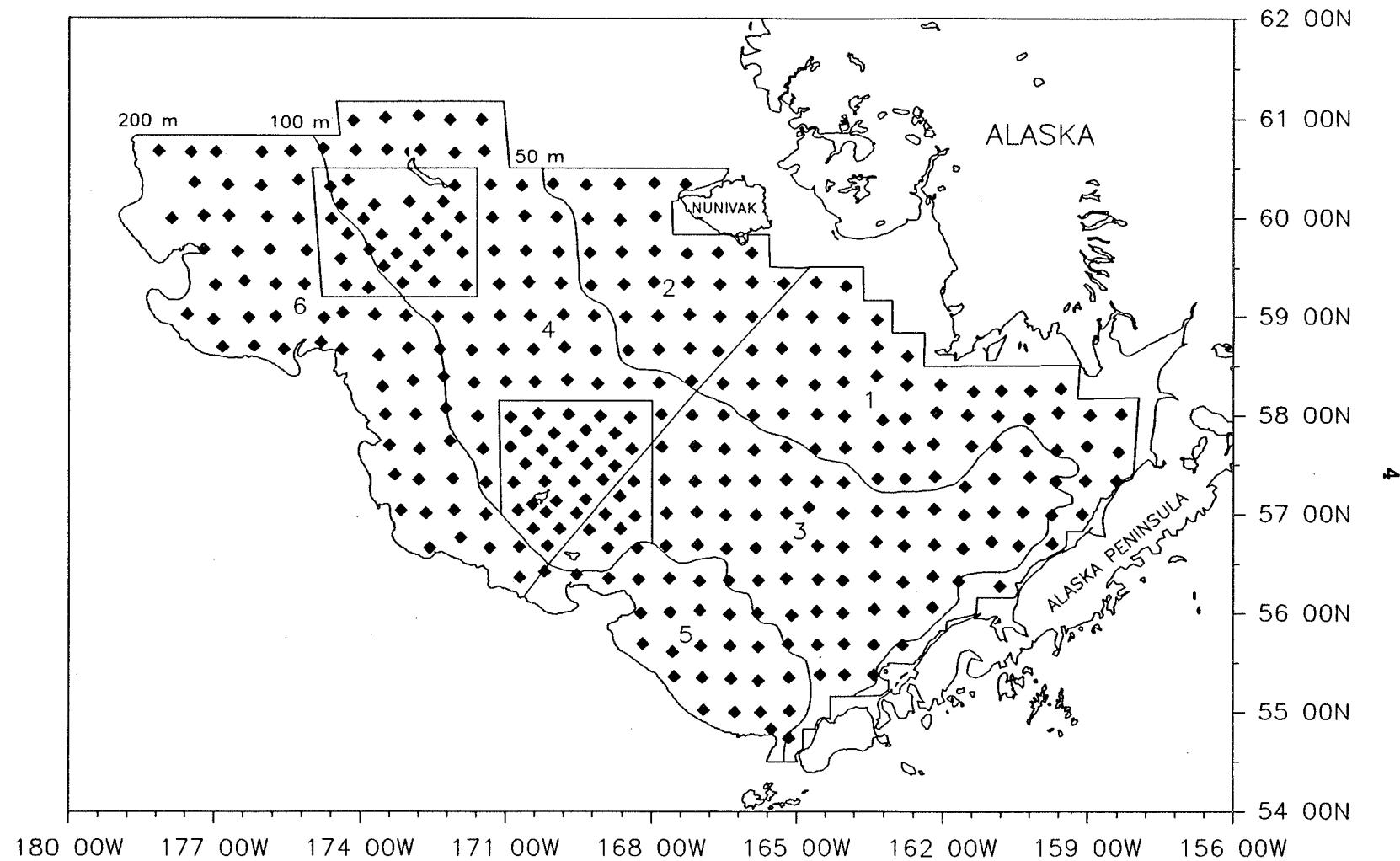
Figure 3.--Standard sampling area for the eastern Bering Sea survey including high density crab stations.
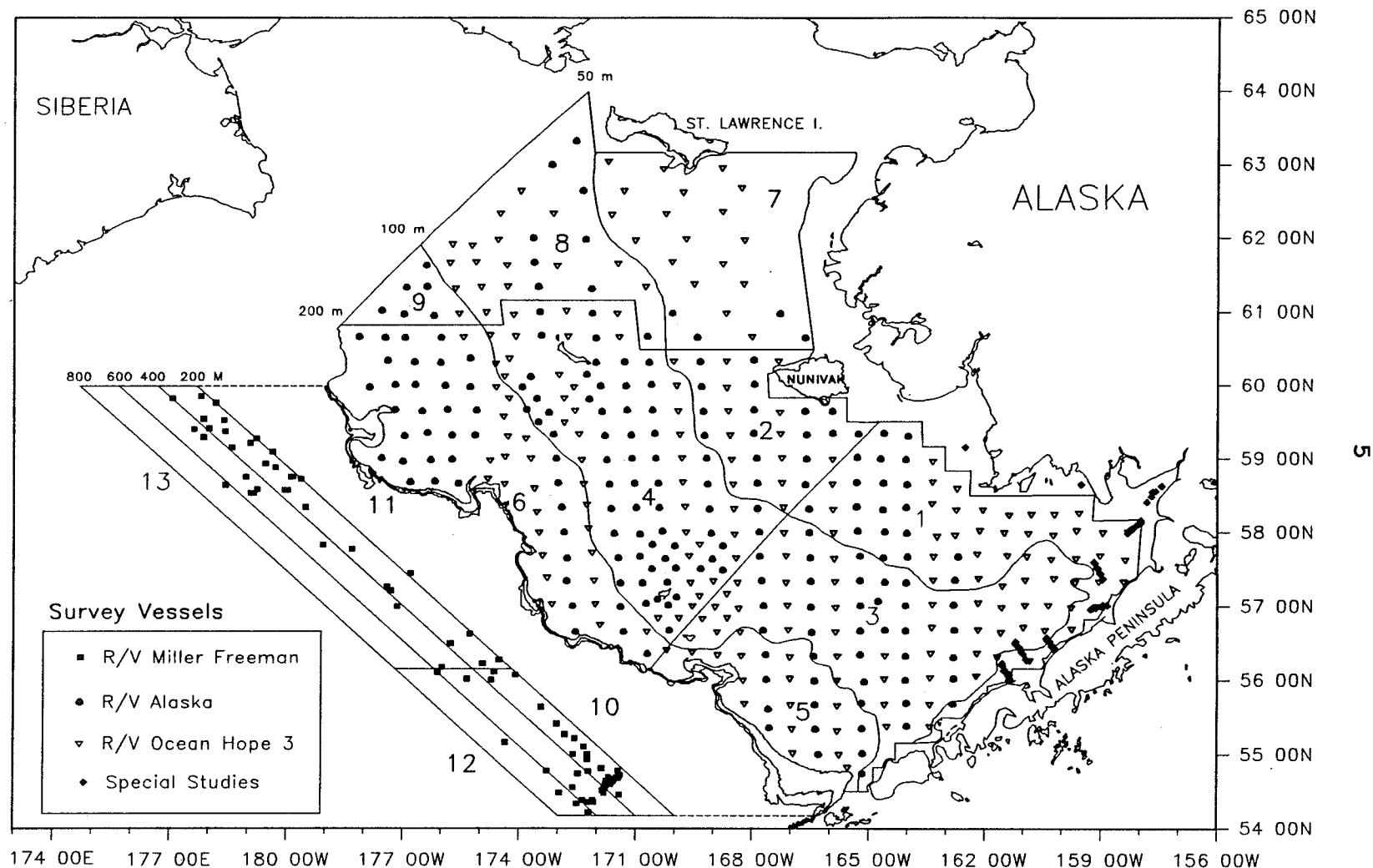
Figure 4.--Station pattern of the 1991 bottom trawl survey and stratification used in the analyses of the survey data.

The information gathered by the annual surveys serves to: 1) provide the North Pacific Fishery Management Council with annual fishery-independent estimates of abundance and biological condition of commercially harvested stocks, 2) provide distribution and abundance information to commercial fishermen, and the general public and 3) develop a time-series data base contributing to our understanding of the population dynamics and interactions of groundfish species.

This report presents information collected by the AFSC in the eastern Bering Sea during the 1991 triennial bottom trawl survey. Results of previous triennial surveys were reported by Bakkala and Wakabayashi (1985), Bakkala et al. (1985), Walters et al. (1988) and Bakkala et al. (1992). The crab/groundfish triennial survey and several ancillary projects were conducted from May 15 to September 26 by two U.S. chartered fishing vessels and a National Oceanic and Atmospheric Administration (NOAA) vessel. The north shelf and western Bering Sea were also surveyed by the Russian research vessel Novodrutsk from May 14 to July 3. The survey data collected by the Russian vessel is not compatible with the U.S. data and will be presented separately in a report by Zimmermann et al. (1993). Detailed data on principal crab species not included here can be found in Stevens et al. (1991). Results of the studies in Norton Sound will be issued in a future report.

METHODS

Survey Area and Sampling Design

The stratification of the sampling area for analysis of the 1991 survey data was the same as that used for analyzing the 1988 triennial survey data, with the exception of strata 9 (Fig. 4). Prior to 1988, stratification originated from the sampling scheme used by U.S. and Japanese vessels during the 1979 survey (Fig. 2, Bakkala and Wakabayashi 1985). Since this survey began in 1975 several different stratification schemes have been used. The original baseline survey of 1975 (Fig. 1) was expanded in 1979 to incorporate the efforts of the Japanese vessels on the continental shelf and the slope. Beginning in 1980 stratification was changed to cover just the continental shelf.

Following the 1979 survey, the AFSC developed a standard survey area on the continental shelf that has been sampled each year since 1979 (Fig. 3). Stratification of this standard survey area is based on depth contours (<50 m, 50-100 m, 100-200 m) that correspond to oceanographic domains on the shelf which may more accurately reflect differences in fish distributions and thereby minimize variances of abundance estimates (Bakkala 1993). A 12-year consecutive time series of assessment data now exists for this area which has been used to examine long-term trends in abundance and to assess the current condition of the various principal species of groundfish for management purposes. Because

of the importance of this standard survey area, it has been used as the foundation for the stratification scheme for the 1991 triennial survey. During triennial surveys, the areal coverage is extended north to St. Lawrence Island and west to a depth of 800 meters on the continental slope (Fig. 4).

In the standard survey area on the shelf (Fig. 3), the systematic sampling scheme of 352 stations is based on a 20 x 20 nautical mile (nmi) grid. Samples of demersal fish and invertebrates are obtained by trawling at or near the center of each grid block. In the Pribilof and St. Matthew Islands regions, however, sampling density is doubled by adding stations at the grid block corners; this is done in order to increase coverage of blue king crab (Paralithodes platypus) stocks present in these areas.

In 1991, the survey vessels fished alternate north-south lines of the station grid, proceeding from Bristol Bay westward to the shelf break (Fig. 4). The alternate-line fishing pattern facilitates comparison of fishing powers of the two vessels, while the progression from east to west presumably prevents multiple encounters of species which may be migrating to inshore feeding or spawning grounds (from west to east) during the course of the survey (Smith and Bakkala 1982).

The presence of high-density sampling in subareas 3, 4, and 6 necessitated a further division of these subareas into high-density and standard-density strata, resulting in a total of 10 geographic strata for the standard shelf statistical

calculations. The overall area estimated to be represented by each station in the standard survey area (subareas 1-6) is 1,320 km^2 (Table 1). However, because of the high-density sampling in subareas 3, 4, and 6, and the irregular boundaries of the survey area, sampling representation varied among subareas from 1,123 to 1,492 km^2 per station.

In most of the north shelf region (subareas 7, 8 and 9, Fig. 4), sampling effort was reduced to an average of one station per 2,600 km^2 because of the lower abundance of groundfish in this region than in the standard survey area. However, standard density sampling was performed in all of subarea 9 and the southwest portion of subarea 8 to improve sampling of snow crab (_Chionoecetes opilio_) in these waters.

As noted earlier, the availability of navigational charts made it possible to restratify the continental slope region in terms of meters. The interval sampled (200-800 m) was divided equally into two depth subdivisions (200-500 m and 500-800 m). In addition, the diagonal line separating the shelf region into southeast and northwest portions was extended to the slope to create four subareas on the slope (subareas 10-13, Fig. 4).

The distribution of the stations on the slope is not systematic such as that on the shelf. The station were selected from those fished by the _Daikichi maru No. 32_ in 1985 as part of the 1985 triennial survey. The average area per station, therefore, varied by subarea from 210 to 368 km^2 (Table 1).

Table 1.--Size of subareas and sampling densities by subarea
during the 1991 bottom trawl survey.

Subarea	Area (km^2)	No. Stations successfully sampled	Sampling density (km^2/station)
Eastern Bering Sea Shelf			
1	77,871	58	1,343
2	41,027	31	1,323
3	103,300	75	1,377
4	107,822	96	1,123
5	38,792	26	1,492
6	94,562	65	1,455
North Shelf			
7	72,827	22	3,310
8	56,017	25	2,241
9	11,568	7	1,653
Slope			
10	7,785	37	210
11	5,646	27	209
12	4,392	16	275
13	3,311	9	368
Total survey area	624,921	494	1,265

Vessels and Fishing Gear

For the fourth consecutive year, the standard area of the eastern Bering sea bottom trawl survey was sampled aboard the 30.5 m University of Washington research vessel Alaska and the 33.5 m fishing vessel Ocean Hope 3 (Table 2). These vessels also completed all stations on the north shelf and Norton Sound. As in previous years, both vessels were equipped with 83-112 eastern otter trawls which have 25.3 m (83 ft) headropes and 34.1 m (112 ft) footropes (Table 3 and Appendix A). These nets were attached to tail chains with 54.9 m (30 fathoms) paired dandylines. Each lower dandyline had a 0.61 m chain extension connected to the lower wing edge to improve bottom tending characteristics. Steel "V"-doors measuring 1.8 x 2.7 m and weighing 816 kg were used.

Table 2.--Characteristics of vessels used during the 1991 eastern Bering Sea survey.

Vessel	Overall length (m)	Gross tonnage (tons)	Shaft horse- power	Survey period	
				Start	Finish
Alaska	30.5	219	800	17 June	18 Aug.
Ocean Hope 3	31.4	192	850	15 May	3 Sept.[a]
Miller Freeman	65.5	1,515	2,150	31 Aug.	26 Sept.

[a]Includes time for the Norton Sound survey.

The 83-112 eastern otter trawl used by all U.S. vessels during the survey on the shelf has been the standard trawl for this survey since 1982. This trawl is believed to be more efficient at fishing for bottom-dwelling species, such as the flatfishes, than trawls used prior to 1982 (Bakkala et al. 1985).

The 65.5 m NOAA vessel <u>Miller</u> <u>Freeman</u> sampled only the stations on the continental slope. The Poly-Nor'eastern bottom trawl used by the vessel on the slope was essentially the same as that used by the U.S. vessel sampling slope waters during the 1979 triennial survey (Bakkala and Wakabayashi 1985) except that it is now constructed of polyethylene rather than nylon. These four seam trawls had a 27.2-m headrope and 37.4-m footrope. The nets were equipped with 998-kg, 1.8 X 2.7-m steel V-doors and 35.6 cm bobbin roller gear. An additional 6 m of cable was attached to each end of the roller gear. Three 54.9-m dandylines extended from each wing. The codend consisted of 8.9-cm stretch mesh with a 3.2-cm mesh liner (Table 3 and Appendix A). SCANMAR[1] net mensuration systems were used aboard each vessel to measure net height and width. Net width was measured as the distance between two sensors attached to the upper dandyline, about 0.61 m in front of the net. These measurements were used to derive the area swept by the trawl for calculating abundance estimates. Measurements were made for the majority of the tows aboard the R/V <u>Alaska</u> and F/V <u>Ocean</u> <u>Hope</u> <u>3</u> as well as the NOAA

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[1]Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

Table 3.--Bottom trawls used during the 1991 eastern Bering Sea
survey (also see Appendix A)

Characteristic	83-112 trawl	Poly-Nor'eastern trawl
Horizontal gape while fishing (m)	~14-20	~13-16
Vertical opening while fishing (m)	~2-3	~6
Headrope length (m)	25.3	27.2
Footrope length (m)	34.1	37.4
Mesh sizes (mm)		
Wing	102	127
Body	102	127
Intermediate	89	89
Codend	89	89
Codend liner	32	32
Door(m)		
Length	2.7	2.7
Height	1.8	1.8
Dandyline (m)		
Length	54.9	54.9

vessel Miller Freeman operating on the slope. This was the
second triennial survey where measurements were made routinely on
almost every tow. During surveys prior to 1988, measurements
were either made for only a small selected sample of tows or
values based on previous measurements were used. In the analyses
of these earlier survey data, a mean value was used for all tows
of a particular vessel in the survey. During 1988 and 1991, when
reliable data was obtained, the mean value for each tow (usually

from over 100 readings at 10-second intervals) was used to determine the area swept by the net during that tow. For all tows with reliable data, the functional relationship between scope (trawl wire paid out) and net-width was also determined (Fig. 5) from which net-width values could be estimated for tows lacking mensuration data as described by Rose and Walters (1990).
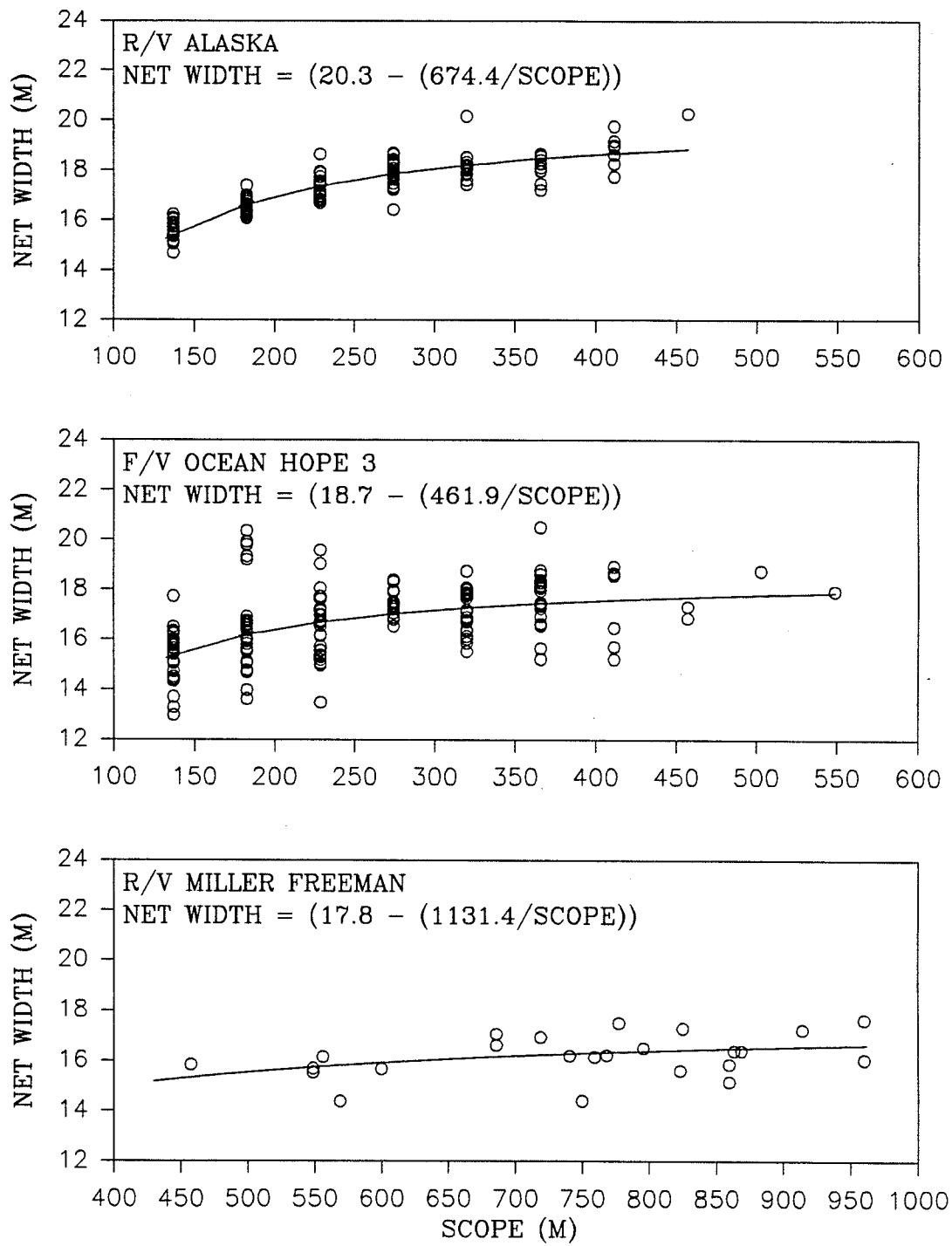
Figure 5.--Relationship between net width and scope (trawl warp paid out) for the three vessels participating in the 1991 demersal trawl survey in the eastern Bering Sea.

Data Collection and Station Sampling Procedures

Sampling procedures used in RACE eastern Bering Sea
assessment surveys are described in detail by Wakabayashi et al.
(1985). A brief summary follows.

Samples were collected by trawling at the center of each 20
x 20 nautical mile grid block (or corner station, in the case of
high-density strata) for 30 minutes (timed after the net had
settled on the bottom), towing at a speed of 1.54 m/sec (3
knots). Station positions were determined by Loran-C or Global
Positioning System (GPS) at the start and end of each tow.
Computed distance between positions was used as the best estimate
of distance fished. The beginning of the tow was determined to
be when the net was estimated to reach the bottom and ended when
retrieval of the trawl warp was started (Wakabayashi et al.
1985). If the bottom appeared to be untrawlable at a specified
location, the nearest trawlable site within the same grid square
was used. If the net was ripped or "hung up" on some object on
the bottom during the tow, the catch was discarded and a new
sample obtained.

Catches of less than approximately 1,150 kg (2,500 lb) were
processed entirely. For catches larger than 1,150 kg, the total
catch was weighed using an electronic scale (load cell) and then
released into a deck bin. A subsample was removed for processing
using a small cargo net. Weights and numbers of a species in the
processed portion of the catch were expanded to the estimated

total catch by applying the ratio of the weight of the total catch to the weight of that portion of the catch processed.

Important fish and invertebrates were sorted to species. Similar features between arrowtooth (<u>Atheresthes stomias</u>) and Kamchatka flounder (<u>A. evermanni</u>), and between flathead sole (<u>Hippoglossoides elassodon</u>) and Bering flounder (<u>H. robustus</u>) made identification of these species difficult within the time constraints of the survey; thus, these species were grouped by genus for purposes of this report. Minor species of fish and invertebrates were sorted to the lowest taxonomic level practicable. Catch weights and numbers by species or species group were taken directly or, when subsampled, estimated by extrapolating the proportion in the subsample to that of the entire catch weight. Pacific halibut (<u>Hippoglossus stenolepis</u>) and crab species of the genera <u>Paralithodes</u> (red and blue king crabs, <u>camtschatica</u> and <u>platypus</u>, respectively), <u>Chionoecetes</u> (snow and Tanner crabs, <u>opilio</u> and <u>bairdi</u>, respectively), and hair crabs (<u>Erimacrus isenbeckii</u>) were usually weighed and enumerated from the entire catch.

Size composition data were collected for each commercially important species. Pacific halibut, walleye pollock, Pacific cod, and yellowfin sole were measured whenever caught while other species were measured as time permitted (Table 4). Pacific halibut were measured immediately upon capture and returned to the sea in an effort to reduce sampling mortality. Random samples of up to approximately 200 individuals (300 in the case

Table 4.--Biological data collected by the scientific personnel
aboard the Alaska, Ocean Hope 3 and Miller Freeman
during the 1991 eastern Bering Sea survey.

Species	Length measurements[a]	Age structures	Stomach samples
Walleye pollock	46,930	1,373	3,126
Pacific cod	7,245	946	1,739
Yellowfin sole	30,912	804	734
Rock sole	32,204	625	274
Hippoglossoides spp.	26,230	420	863
Pacific halibut	2,256	692	234
Alaska plaice	9,275	300	232
Atheresthes spp.	9,826	425	198
Greenland turbot	2,470	390	114
Rex sole	942	--	--
Dover sole	8	--	--
Pacific ocean perch	987	117	--
Starry flounder	221	--	--
Saffron cod	1,167	--	--
Arctic cod	63	--	--
Longhead dab	868	--	--
Shortraker rockfish	141	--	--
Rougheye rockfish	102	--	--
Shortspine thornyhead	615	--	--
Giant grenadier[b]	1,083	--	--
Coryphaenoides spp.[b]	578	--	--
Misc. species	1,324	--	--

[a]Fork lengths (anterior tip of the head to the middle portion of
the posterior edge of the caudal fin) were measured for all
species except giant grenadiers and Coryphanoides spp..

[b]Anus lengths were measured for giant grenadiers and
Coryphanoides spp. (antierior tip of the head to the middle
of the anus.

of walleye pollock) of the remaining species were sexed and measured to the nearest centimeter from the tip of the snout to the end of the middle ray of the caudal fin (fork length).

Sagittal otoliths were collected from seven commercially important species (Table 4). In both the northwestern and southeastern divisions of the survey area, three otolith pairs per sex/centimeter interval were collected for Pacific cod and rock sole (Pleuronectes bilineatus), and five pairs per sex/centimeter interval for pollock, yellowfin sole, flathead sole, and Alaska plaice (Pleuronectes quadrituberculatus). Scales as well as otoliths were taken from Pacific cod to aid in ageing young fish. In the case of the Hippoglossoides, otoliths were collected only from individuals that were identified with certainty as flathead sole. Age structures for roundfish were preserved in 50% ethanol/water; flatfish otoliths were preserved in 50% glycerol/water.

Temperature profiles were taken at each station with an expendable bathythermograph cast; surface temperatures were taken by bucket thermometer.

Data Analyses

A brief description of the procedures used in analysis of RACE Bering Sea survey data follows (for a detailed description see Wakabayashi et al. 1985). Many of the species collected were grouped by family for data analysis because of their insignificant commercial value or questionable identification.

Relative fishing powers of survey vessels were estimated during the eastern Bering Sea surveys to account for differences in the efficiencies of the vessels at capturing various species; by compensating for these differences abundance estimates are assumed to be improved.

Since 1979, the Bayesian technique of Geisser and Eddy (1979) was used to compare the relative fishing powers of the two survey vessels. If the distribution of catch-per-unit-effort (CPUE) values for any one species were statistically different between vessels, catch rates of the less efficient vessel were expanded by the ratio of the mean CPUEs (more efficient divided by less efficient) of the two vessels. Recent work at the AFSC determined that the ratio of means was extremely unstable and too sensitive to abnormally large values of CPUE. Consequently, a new method developed by Kappenman (1992) was used to compare CPUE distributions and determine a scaling factor for correction. A total of 261 of the 354 stations sampled by the two vessels within the standard survey area were used in the analysis.

Mean CPUE values for each species were calculated in

kilograms per hectare and number per hectare for each of the 14 strata; area swept (hectares) was computed as the distance towed multiplied by the mean net width (Alverson and Pereyra 1969). Mean CPUE values, weighted by strata areas, were calculated for individual subareas and for the overall survey area. Biomass and population estimates were derived for each stratum by multiplying the stratum mean CPUE by the stratum area. Stratum totals were then added together to produce estimates for each subarea and for the total survey area.

In estimating the size composition of populations of principal commercial species, length-frequency data obtained at each station were expanded to the station catch by proportion and then extrapolated to the stratum population by the weighted CPUE. Stratum estimates were summed to derive the estimated size composition by subarea and for the overall survey area.

Otolith and scale samples collected during the survey were read by the Age and Growth Determination Unit of the AFSC's Resource Ecology and Fisheries Management (REFM) Division. From these age samples, stratified by sex and length, an age-length key was produced that showed the distribution of ages by sex at each centimeter interval. Population age composition was estimated by apportioning ages to the estimated population at each length interval.

Growth characteristics of principal species were described with von Bertalanffy (1938) growth curves fitted to age-length data collected in this survey.

Special Studies

In addition to the 495 standard triennial survey tows, 79 tows were made for special studies (Fig. 4). Two tows were made, one in Togiak Bay and one in Kuskokwim Bay, to assess the abundance and spawning condition of yellowfin sole inshore of the standard survey area. Catches from these two tows were used to define geographic distributions of fish groups. They were not used to estimate population parameters in order to maintain comparability with estimates from previous standard annual surveys. Prior to the standard survey, 75 beam trawls and 2 scallop dredge tows were made to assess the near shore populations of juvenile crab and flatfish.

Stomach samples from several of the most prevalent commercial species in each haul were collected and preserved in formalin for later examination by the Food Habits Program of the AFSC's REFM Division (Table 4).

Additional activities included collecting specimens for observer training programs, crab and fish pathology studies, and fulfilling requests from academic institutions.

ASSUMPTIONS AND LIMITATIONS

The assumptions and limitations that apply to most trawl
surveys also apply to the 1991 triennial survey. The estimates
of abundance and size composition, as well as the distribution of
the species, are limited by the area and timing of the surveys,
and the sampling gear used. The survey is designed as a
multispecies survey, and therefore has some limitations for
almost any individual species. For example, during the summer
period when the survey was performed, many species have juvenile
distributions in shallow coastal waters where the trawl cannot be
operated effectively. These include many of the flatfish and
herring as well as some of the cods and smelts. On the
continental slope, the bottom terrain is such that trawlable
bottom is difficult to find. Some species, such as the
rockfishes, are known to congregate in untrawable areas,
resulting in undersampled populations. In addition, there are a
number of species that have distributions extending beyond the
depth and geographic boundaries of these surveys.

The trawl used in the bottom trawl survey is designed
primarily for demersal species. The head rope height is limited
to a few meters, and species that display primarily pelagic
behavior may not be well represented in the trawl catches. In
some cases this phenomenon may be limited to specific age groups
within a species. The catchability coefficient is assumed to be
1.0 for all species in this analysis. The actual value may be

less than that because of escapement by some species. Then again, for some other species, the herding effects of the doors and dandylines may result in catchability coefficients exceeding 1.0.

The bottom trawl survey of the standard U.S. area on the continental shelf (subareas 1-6) is designed to progress from east to west. It is believed that most of the target species migrate from west to east during the early summer period and would therefore be sampled only once, rather than following the same group of fish. Some of the species may have opposite or near-random movement. In those cases there may have been unknown errors caused by such movements. For most species, these various factors are believed to result in an underestimation of abundance rather than an overestimation. The difference between the estimates and the true value may vary considerably between species.

RESULTS OF 1991 TRIENNIAL SURVEY

Station Data

Station data from the 1991 survey are listed in Appendix B. The data are organized by area of survey activity and vessel. Appendix Tables B1-B3 contain standard bottom trawl stations used in the analyses.

Environmental Conditions

Sea surface temperatures recorded during the 1991 survey ranged from 3.0°C to 12.8°C (Fig. 6). One cell of cold water averaging 4.0°C was observed within the 50 m isobath off northern Bristol Bay. Most of the remaining inner shelf water ranged from 5.0 to 12.0°C. Midshelf surface water mainly ranged from 6.0 to 10.0°C as did the outer shelf water south of the Pribilof Islands. Surface waters over the outer shelf north of the Pribilofs and over much of the slope ranged from 8.0 to 12.0°C. The warmest temperatures observed were near shore on the north shelf where surface temperatures reached 13.0°C.

Bottom temperature conditions during summer 1991 were slightly warmer than the 1988 temperatures (Fig. 6). Water of less than 0°C covered extensive areas of the midshelf to as far south as the vicinity between St. Matthew's Island and the Pribilof Islands. Somewhat warmer 2.0 - 5.0°C bottom water was
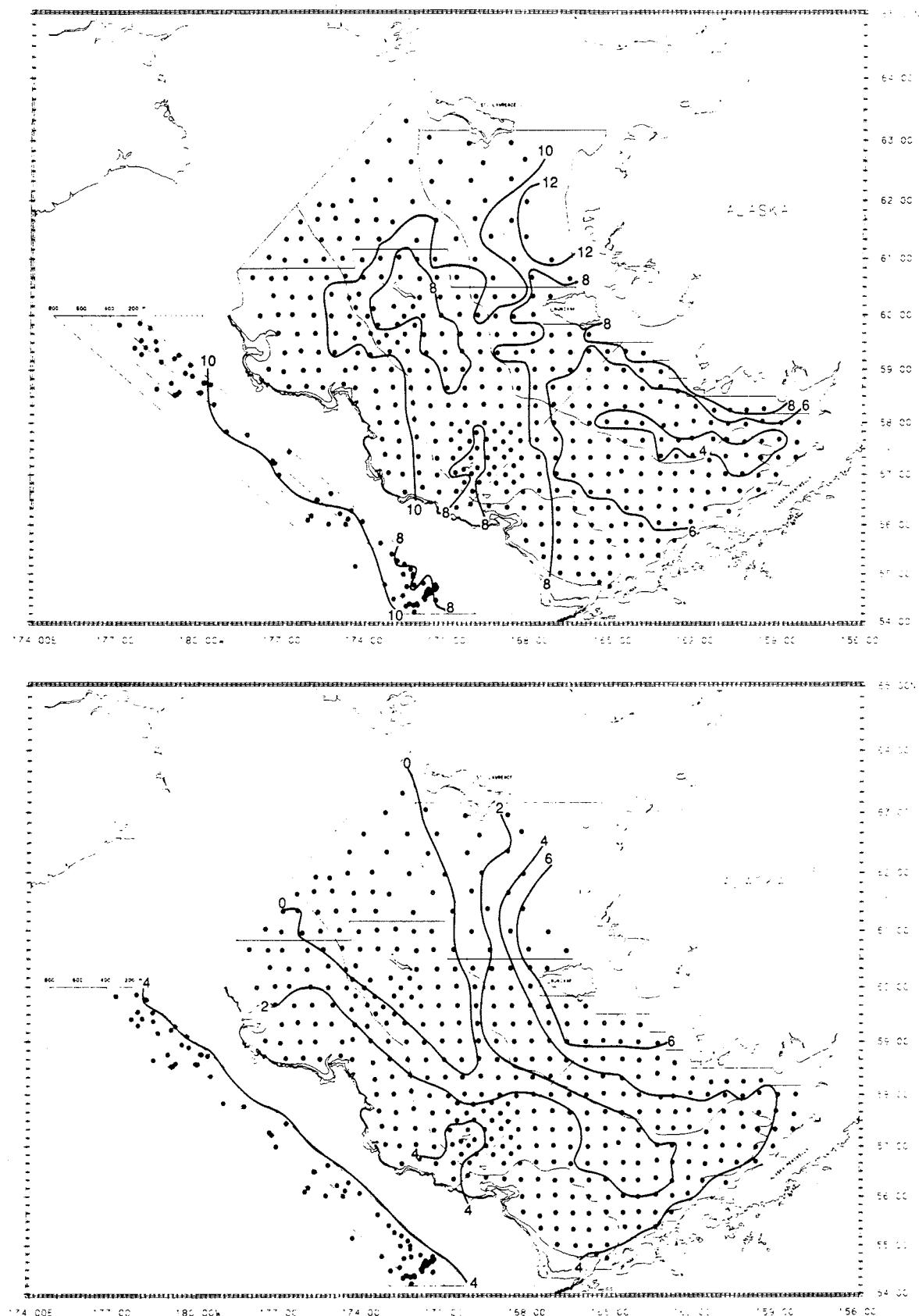
Figure 6.--Distribution of surface water (top panel) and
bottom water (lower panel) temperatures (°C)
observed during the 1991 survey.

found over most of the outer shelf and the slope. Bottom temperatures on the slope were quite uniform with almost all the observations ranging from 2.9 to 4.3°C. Some much warmer bottom temperatures (6-9°C and higher) were recorded on the more inshore areas of the north shelf.

The mean bottom temperature for the standard annual survey area (excluding the north shelf) was 2.6°C (Fig. 7). This value falls in the middle of the range of mean summer bottom water temperatures (1.8 to 5.1°C) for years in which the total standard area has been surveyed. Mean bottom temperatures observed over a more limited region of the southeast Bering Sea which has been sampled annually since 1971 have ranged from 1.2 to 4.8°C; the 1991 value for this area was 3.4°C, near the middle of the range for this area.
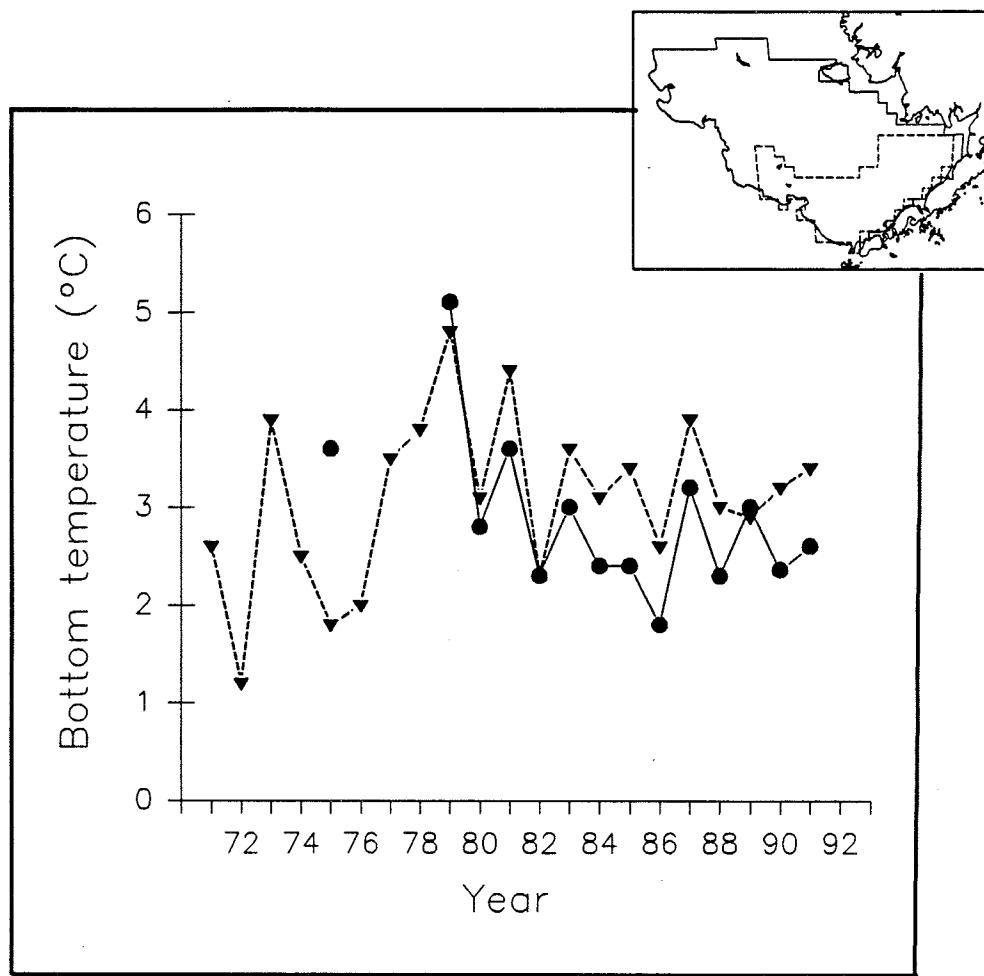
Figure 7.--Mean summer bottom water temperatures based on
        bathythermograph casts made during Alaska
        Fisheries Science Center groundifish surveys.
        The 1971-91 means (dashed line) are from the
        southeast Bering Sea (see inset) and the 1975
        and 1979-91 means are from the larger survey
        area outlined on the inset.

Relative Fishing Powers

Relative fishing powers of survey vessels were estimated
during the eastern Bering Sea surveys to account for differences
in the efficiencies of the vessels at capturing various species;
by compensating for these differences, abundance estimates are
assumed to be improved.

A total of 261 alternate-row tows (Fig. 8) were used in the
statistical comparison of vessel catch rates developed by
Kappenman (1992). Based on this analysis, neither the Alaska nor
the Ocean Hope 3 was significantly more efficient at capturing
the following species or species groups: walleye pollock, Pacific
cod, rock sole, Hippoglossoides spp., Alaska plaice, Atheresthes
spp., Pacific halibut, Myoxocephalus spp., skates (Rajidae),
Tanner crab, and snow crab. The results from the Kappenman
method showed no difference in fishing power for 1991. Therefore
fishing power corrections were not applied to catches of either
vessel. Between-vessel fishing power corrections have usually
been required for 1 to 4 species in past years, while in 1988 the
analysis indicated that 13 species required fishing power
corrections.

No comparative fishing experiments were conducted between
the NOAA vessel Miller Freeman, which sampled slope waters, and
the Alaska and Ocean Hope 3. Therefore, no attempt was made to
standardize the abundance data from the Miller Freeman to that of
the other U.S. vessels engaged in sampling shelf waters.
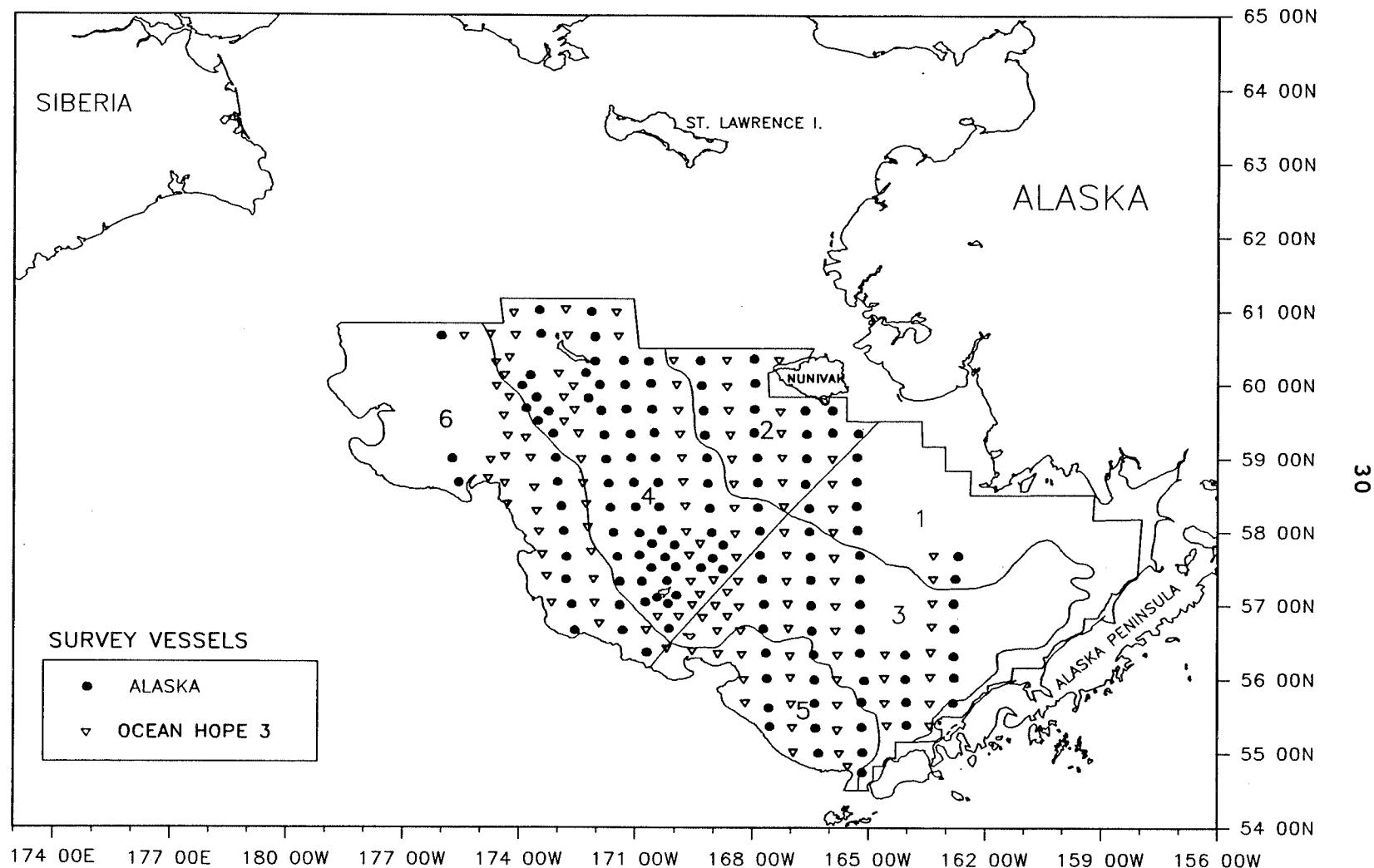
Figure 8.--Stations used to determine relative fishing powers of the **Alaska** and the **Ocean Hope 3** during the 1991 bottom trawl survey.

Species Encountered

Appendix C contains a ranking of relative abundance based on
the mean CPUE, of all fish and invertebrates identified during
the 1991 bottom trawl survey. There were 132 species of fish
identified among 36 families, more in number than the 106 species
among 34 families identified during the 1988 triennial survey
(Bakkala et al. 1988). The listing in Appendix C may include
some species of uncertain identification. In presenting
information in the main body of this report, fish species with
difficult or uncertain identifications were grouped into broader
taxonomic categories as shown in Table 5. In addition, in some
of the tables summarizing abundance data for the overall survey,
commercially unimportant species were grouped by family. In
these latter tables, infrequently occurring species were grouped
as "other fish."

Table 5.--Species groupings used in presenting information on the distribution and abundance of principal species and species groups of fish.

Group name	Species included
Skates	All _Rajidae_
Smelts	All _Osmeridae_
Other eelpouts	All _Zoarcidae_ except _Bothrocara brunneum_, _Lycodes raridens_, _L. palearis_, _L. concolor_, _L. brevipus_, _L. pacificus_
Rattails	All _Macrouridae_
Other rockfish	All _Sebastes_ except _S. aleutianus_, _S. alutus_, _S. borealis_
Thornyhead rockfish	All _Sebastolobus_
Irish lords	All _Hemilepidotus_ except _H. papilio_
Other _Myoxcephalus_	All _Myoxcephalus_ except _M. jaok_
Gymnocanthus	All _Gymnocanthus_ sculpins
Malacocottus	All _Malacocottus_ sculpins
Other sculpins	All _Cottidae_ except species and species groups of sculpins listed above and _Dasycottus setiger_, _Melletes papilio_ and _Hemitripterus bolini_
Poachers	All _Agonidae_
Snailfishes	All _Cyclopteridae_
Arrowtooth flounder	All _Atheresthes_
Flathead sole	All _Hippoglossoides_

Overall Abundance of Major Fish and Invertebrate Families

The total animal biomass for the overall survey area was estimated at 18.3 million t, of which fish species accounted for 76% (13.8 million t) and invertebrates 24% (4.5 million t) (Tables 6 and 7). Within the groundfish complex, the most abundant families were the Gadids (cods) which represented 34% (6.3 million t) of the total animal biomass and the Pleuronectids (flatfish) (6.4 million t), which represented 35% of the total animal biomass; these families combined represented 92% of the total fish biomass. The next most abundant families were the Rajidae (skates) and Cottidae (sculpins) representing 2.6 and 1.8% of the total, respectively. The most abundant invertebrate groups were the Crustacea (crabs) (44.2% of the total sampled invertebrate biomass), Echinodermata (starfish) (38.3%), and Mollusca (snails) (8.8%).

The majority of the fish biomass (88.2%) was located on the eastern Bering Sea shelf (subareas 1-6; see Fig. 4 for location of subareas). The outer shelf (subareas 5 & 6), accounted for 28% (4.0 million t), the middle shelf 37% and the inner shelf 23% of the total fish biomass. Sixty-nine percent (2.7 million t) of the outer shelf and 43% (2.2 million t) of the middle shelf biomass consisted of walleye pollock. Yellowfin sole dominated the inner shelf biomass at 46% (1.4 million t). The north shelf (subareas 7-9) accounted for 10% of the total fish biomass and the continental slope (subareas 10-13) for 1.7%.

Table 6.--Biomass estimates (metric tons) for major fish species and fish groups taken during the 1991 bottom trawl survey.

Taxon	Estimated total biomass (t)[a] and 95% confidence interval	Proportion of total animal biomass[b]	Shelf 1	2	3	4	5	6	North shelf 7	8	9	Slope 10	11	12	13
Gadidae (cods)															
Walleye pollock	5,362,511 ± 24%	0.293	113,608	65,365	1,650,733	563,177	436,784	2,279,301	84,103	26,356	70,568	27,645	44,514	235	121
Pacific cod	582,795 ± 15%	0.032	81,942	22,957	125,829	104,554	51,171	146,137	21,742	5,567	18,130	1,406	3,359	0	0
Other cods	377,002 ± 155%	0.021	1,674	2,133	0	388	0	9	311,724	61,059	14	0	0	0	0
Total cods	6,322,308 ± 22%	0.346	197,225	90,455	1,776,563	668,119	487,955	2,425,447	417,570	92,981	88,712	29,052	47,873	235	121
Anoplopomatidae															
Sablefish	4,538 ± 32%	<0.001	0	0	0	0	338	0	0	0	0	796	188	2,384	832
Scorpaenidae (rockfish)															
Pacific ocean perch	11,373 ± 105%	0.001	0	0	0	0	0	0	0	0	0	6,039	5,224	12	98
Thornyheads	1,655 ± 37%	<0.001	0	0	0	0	0	0	0	0	0	480	106	695	374
Other rockfish	4,529 ± 95%	<0.001	0	0	0	0	807	52	0	0	0	1,710	1,789	69	101
Total rockfish	17,556 ± 69%	0.001	0	0	0	0	807	52	0	0	0	8,229	7,119	777	573
Pleuronectidae (flatfishes)															
Yellowfin sole	2,807,912 ± 15%	0.154	1,016,190	446,874	612,992	315,753	742	783	361,232	53,348	0	0	0	0	0
Rock sole	1,647,202 ± 12%	0.090	765,309	237,497	266,594	273,126	5,440	40,289	38,197	20,124	423	7	196	0	0
Hippoglossoides spp.	613,979 ± 16%	0.034	22,503	1,041	243,884	66,761	103,737	132,422	4,521	13,262	8,942	11,149	5,346	38	372
Alaska plaice	714,156 ± 21%	0.039	88,288	70,633	121,824	228,156	224	19,967	133,937	51,127	0	0	0	0	0
Atheresthes spp.	418,482 ± 36%	0.023	567	0	95,204	10,454	171,770	111,916	0	0	187	15,101	11,578	876	831
Greenland turbot	53,865 ± 22%	0.003	0	0	1	412	0	10,245	0	78	2,246	20,319	7,064	10,948	2,551
Pacific halibut	111,150 ± 19%	0.006	30,538	17,843	20,115	13,751	8,372	6,986	11,403	118	66	767	1,061	130	0
Other flatfish	78,471 ± 43%	0.005	41,573	10,213	5,924	398	12,988	2,820	2,630	283	0	1,278	348	11	5
Total flatfish	6,445,219 ± 9%	0.353	1,964,968	784,101	1,366,538	908,810	303,273	325,428	551,920	138,339	11,863	48,621	25,594	12,004	3,759
Clupeidae															
Pacific herring	40,838 ± 83%	0.002	24,160	380	6,062	959	383	1,304	7,542	36	13	0	0	0	0
Cottidae (sculpins)	320,152 ± 28%	0.018	61,503	39,882	24,479	94,312	5,060	47,737	31,262	11,247	2,643	983	823	161	60
Macrouridae (rattails)	38,083 ± 51%	0.002	0	0	0	0	0	0	0	0	0	54	7,077	5,725	25,227
Zoarcidae (eelpouts)	50,488 ± 17%	0.003	9	32	4,165	16,162	2,741	14,059	1,757	8,136	2,022	213	47	1,076	69
Osmeridae (smelts)	10,585 ± 42%	0.001	991	850	1,449	547	5,911	18	404	380	8	28	0	0	0
Agonidae (poachers)	39,634 ± 18%	0.002	9,546	8,114	8,968	10,176	419	200	2,166	16	3	17	7	1	1
Cyclopteridae (snailfishes)	22,697 ± 27%	0.001	64	13	1,227	11,935	77	2,329	797	5,461	487	199	37	18	54
Rajidae (skates)	480,165 ± 17%	0.026	12,455	5,253	89,056	82,094	87,755	187,403	4,202	2,870	5,813	791	2,319	90	65
Other fish	31,827 ± 88%	0.002	2,009	1,480	339	345	15,791	4,029	4,575	405	2	90	1,027	1,217	519
Total fish	13,824,511 ± 12%	0.756	2,272,930	930,561	3,278,854	1,793,578	910,759	3,008,029	1,022,196	259,871	111,566	89,086	92,112	23,690	31,280

[a]Rounding accounts for minor discrepancies between sums of subareas and total survey area, and between sums of taxonomic subgroups and major groups.

[b]Proportion of total estimated biomass, fish and invertebrates combined, for the total survey area. Total estimated biomass = 18,283,775 t.

34

Table 7.--Biomass estimates (metric tons) for major invertebrate species and invertebrate groups taken during the 1991 bottom trawl survey.

| | Estimated total biomass (t)[a] and 95% confidence interval | Proportion of total animal biomass[b] | Estimated biomass (t) by subarea | | | | | | | | | | | | |
| | | | Shelf | | | | | | North shelf | | | Slope | | | |
Taxon			1	2	3	4	5	6	7	8	9	10	11	12	13
Crustacea															
Chionoecetes spp. (snow crab)	1,316,264 ± 17%	0.072	13,241	1,300	201,639	425,316	101,054	180,418	17,634	7	0	0	0	0	0
Lithodes spp. (king crab)	176 ± 187%	<0.001	0	0	0	0	0	32	0	0	0	0	14	4	126
Paralithodes spp. (king crab)	107,234 ± 67%	0.006	12,250	236	71,444	20,650	0	2,097	288	240	0	4	9	17	0
Erimacrus isenbeckii (hair crab)	2,409 ± 57%	<0.001	195	63	609	1,394	4	9	136	0	0	0	0	0	0
Paguridae (hermit crab)	483,894 ± 15%	0.026	37,576	26,873	171,067	123,236	5,670	76,288	27,924	12,686	2,572	0	1	0	0
Other crab	49,425 ± 29%	0.003	12,794	8,990	12,149	10,971	458	551	2,801	703	7	0	0	0	0
Total crab	1,959,568 ± 12%	0.107	76,056	37,461	456,908	581,566	54,305	406,460	132,213	194,046	20,213	39	25	132	143
Shrimps	11,423 ± 31%	0.001	86	1,020	83	1,078	1,010	4,517	1,187	457	107	1,322	479	12	65
Other crustaceans	1,476 ± 163%	<0.001	158	3	22	44	0	59	1,190	0	0	0	0	0	0
Total crustaceans	1,972,466 ± 12%	0.108	76,298	38,484	457,014	582,688	55,315	411,036	134,590	194,504	20,320	1,361	505	144	208
Mollusca															
Gastropoda (snails)	381,067 ± 15%	0.021	16,982	37,857	93,069	87,031	9,255	69,589	46,190	18,134	3,145	7	2	2	3
Pelecypoda (bivalves)	3,043 ± 38%	<0.001	439	633	792	660	48	55	357	48	11	0	0	0	0
Squids	2,949 ± 28%	<0.001	8	0	0	1	0	11	0	0	0	1,442	954	323	210
Octopuses	8,176 ± 67%	<0.001	0	0	3,133	19	2,544	2,295	0	107	29	7	38	5	0
Other mollusks	0 ± 0%	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Total mollusks	395,235 ± 15%	0.022	17,429	38,290	96,994	87,710	11,847	71,950	46,546	18,290	3,185	1,456	994	330	213
Echinodermata															
Asteroidea (starfish)	1,391,938 ± 13%	0.076	437,019	260,565	323,507	160,979	1,773	33,774	160,691	11,341	2,253	23	3	6	3
Ophiuroidea (brittle stars)	295,603 ± 99%	0.016	2,387	1,123	46,313	25,481	143,659	61,146	4,219	9,218	2,044	2	1	0	10
Echinoidea (sea urchin)	9,028 ± 65%	<0.001	49	59	2,506	461	4,246	1,122	503	43	39	0	0	0	0
Holothuroidea (sea cucumbers)	13,022 ± 87%	0.001	5,785	8	5,462	1,403	0	0	306	0	0	54	1	3	0
Total echinoderms	1,709,590 ± 20%	0.094	445,240	261,756	377,789	188,324	149,678	96,043	165,719	20,601	4,335	79	6	8	13
Ascidiacea	215,858 ± 37%	0.012	18,292	22,623	68,925	63,478	81	0	37,933	4,526	0	0	0	0	0
Porifera (sponges)	20,039 ± 59%	0.001	948	515	14,428	1,113	99	2,143	779	5	0	0	9	0	0
Coelenterata	137,930 ± 17%	0.008	7,028	2,512	41,026	33,916	35,273	6,558	2,999	4,799	687	920	745	893	576
Other invertebrates	8,146 ± 90%	<0.001	947	139	275	600	2	2,623	3,494	64	0	0	0	2	0
Total invertebrates	4,459,264 ± 10%	0.244	566,183	364,318	1,056,450	957,828	252,295	590,353	392,060	242,788	28,526	3,817	2,258	1,376	1,010

[a] Rounding accounts for minor discrepancies between sums of subareas and total survey area, and between sums of taxonomic subgroups and major groups.
[b] Proportion of total estimated biomass, fish and invertebrates combined, for the total survey area. Total estimated biomass = 18,283,775 t.

35

Relative Importance of Individual Species of Fish

Listings of all species of fish and invertebrates in order
of relative abundance (CPUE) taken on the continental shelf and
slope and in the overall survey area are presented in Appendix C.
Table 6 presents biomass estimates for all principal species and
species groups of fish from the bottom trawl data.

Over all depths, walleye pollock was the most abundant
species representing nearly 40% of the total fish biomass
estimate from the bottom trawl survey. Flatfish represented an
important component of the bottom trawl estimates. Yellowfin
sole was the second most abundant species representing 20% of the
total fish biomass, and rock sole was third with 12%.

The relative proportion of each species in the bottom trawl
survey varied considerably with depth. In the inshore waters
less than 50 m in depth, yellowfin sole was the predominant
species, representing 43% of the fish biomass estimate in area 1,
2 and 7. Rock sole was second with 25% and Alaska plaice was
third with 7%. In these waters, walleye pollock made up only 6%
of the estimated fish biomass.

Across the rest of the shelf, from 50 m to the shelf edge
near 200 m, walleye pollock made up 54% of the bottom trawl
biomass estimate for fish (areas 3-6, 8 & 9). Yellowfin sole was
second with 11% and rock sole was third with 7%. Pacific cod
dropped to 4.8% from close to 7% in 1988.

On the continental slope, walleye pollock was still the predominate species with 32% of the biomass. Greenland turbot (<u>Reinhardtius hippoglossoides)</u> was second with 17%, and the rattails (Macrouridae) were third with 16%. Arrowtooth flounder was 12% while sablefish (<u>Anoplopoma fimbria</u>), and Pacific ocean perch (<u>Sebastes alutus</u>) accounted for 2% and 4.8% respectively.

Abundance, Distribution, and Size and Age Composition of
Principal Species of Fish, Shrimps, Squids and Octopi

Tables 8-43 and Figures 9-76 summarize findings from the
1991 triennial survey for each of the principal commercially
important species of demersal fish and the more abundant species
groups such as the sculpins, eelpouts, and skates, and the
shrimps, squids, and octopi (Table 7). Tables summarize mean
CPUE and biomass estimates, population numbers and mean size by
subarea. Figures illustrate the geographic distributions and
length compositions of each species. Where data are available,
the age distribution and growth characteristics of the
populations are also shown.
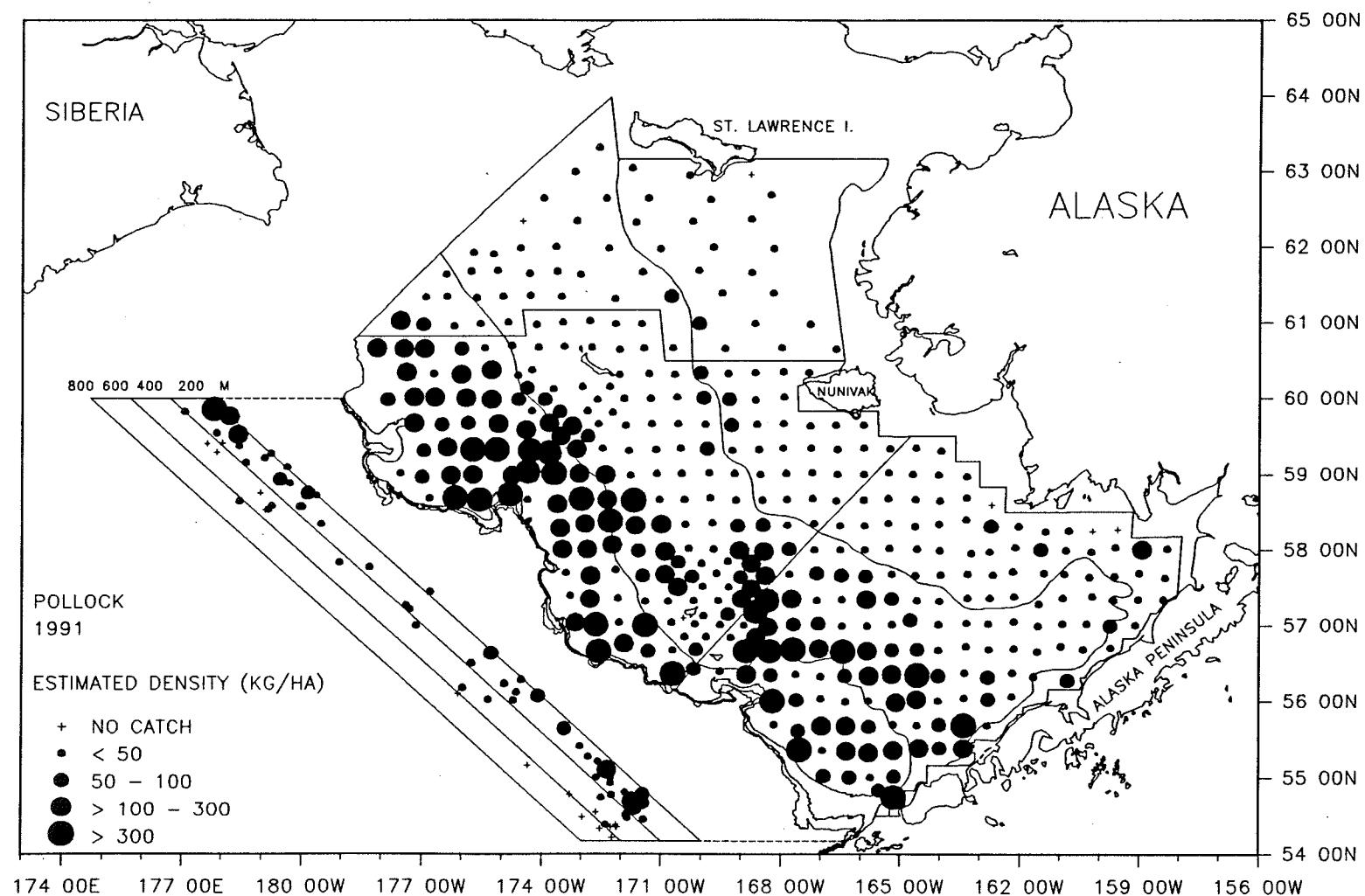
Figure 9.--Distribution and relative abundance of walleye pollock in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 8.--Abundance estimates and mean size of walleye pollock by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	14.589	113,608	0.021	247,173,961	0.027	0.460	24.7
2	< 50	15.932	65,365	0.012	205,220,087	0.022	0.319	21.1
3	50 - 100	159.800	1,650,733	0.308	1,877,054,884	0.206	0.879	44.8
4	50 - 100	52.232	563,177	0.105	828,808,076	0.091	0.680	38.1
5	100 - 200	112.595	436,784	0.081	431,312,168	0.047	1.013	51.0
6	100 - 200	241.037	2,279,301	0.425	4,839,865,553	0.530	0.471	35.3
Subareas combined		110.255	5,108,969	0.953	8,429,434,729	0.924	0.606	37.8
North Shelf								
7	< 50	11.548	84,103	0.016	274,653,820	0.030	0.306	18.8
8	50 - 100	4.705	26,356	0.005	128,823,355	0.014	0.205	17.0
9	100 - 200	61.003	70,568	0.013	213,535,993	0.023	0.330	29.0
Subareas combined		12.893	181,027	0.034	617,013,168	0.068	0.293	21.9
Slope								
10	200 - 500	35.513	27,645	0.005	23,401,216	0.003	1.181	53.0
11	200 - 500	78.836	44,514	0.008	54,162,454	0.006	0.822	48.3
12	500 - 800	0.534	235	<0.001	190,821	<0.001	1.230	54.7
13	500 - 800	0.365	121	<0.001	169,564	<0.001	0.713	44.3
Subareas combined		34.312	72,515	0.014	77,924,056	0.009	0.931	49.7
All subareas combined		85.811	5,362,511	1.000	9,124,371,952	1.000	0.588	36.9

POLLOCK

100-200m   50-100m   < 50 m

Subarea 9   Subarea 8   Subarea 7
L̄ = 29.0 cm   L̄ = 17.0 cm   L̄ = 18.8 cm

500-800m   200-500m

Subarea 13   Subarea 11   Subarea 6   Subarea 4   Subarea 2
L̄ = 44.3 cm   L̄ = 48.3 cm   L̄ = 35.3 cm   L̄ = 38.1 cm   L̄ = 21.1 cm

Subarea 12   Subarea 10   Subarea 5   Subarea 3   Subarea 1
L̄ = 54.7 cm   L̄ = 53.0 cm   L̄ = 51.1 cm   L̄ = 44.8 cm   L̄ = 24.7 cm

Percent
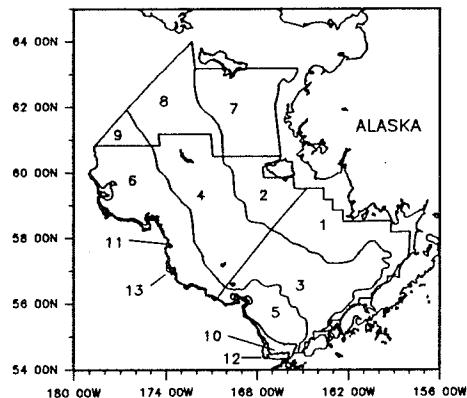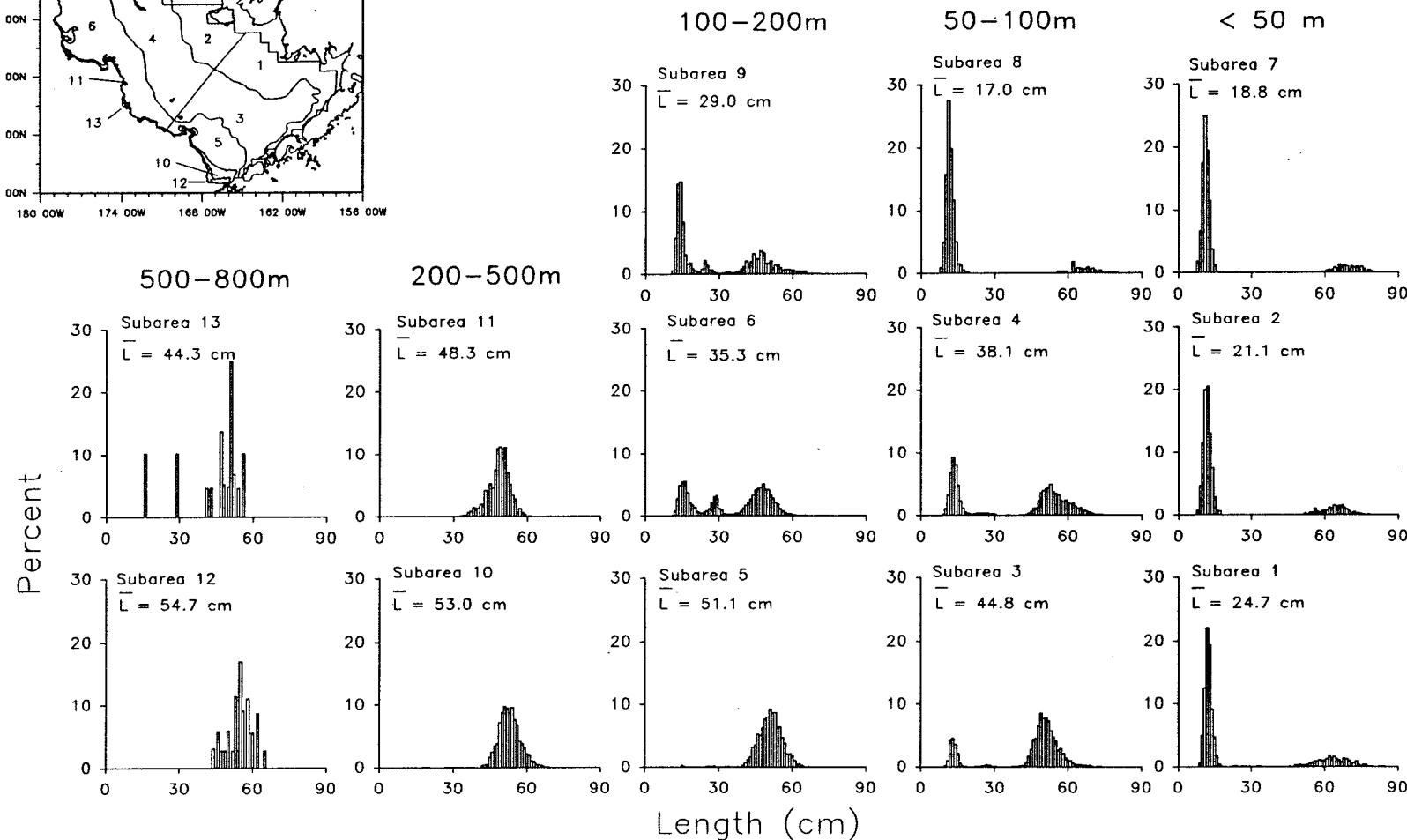
Length (cm)

Figure 10.--Length composition of walleye pollock by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.
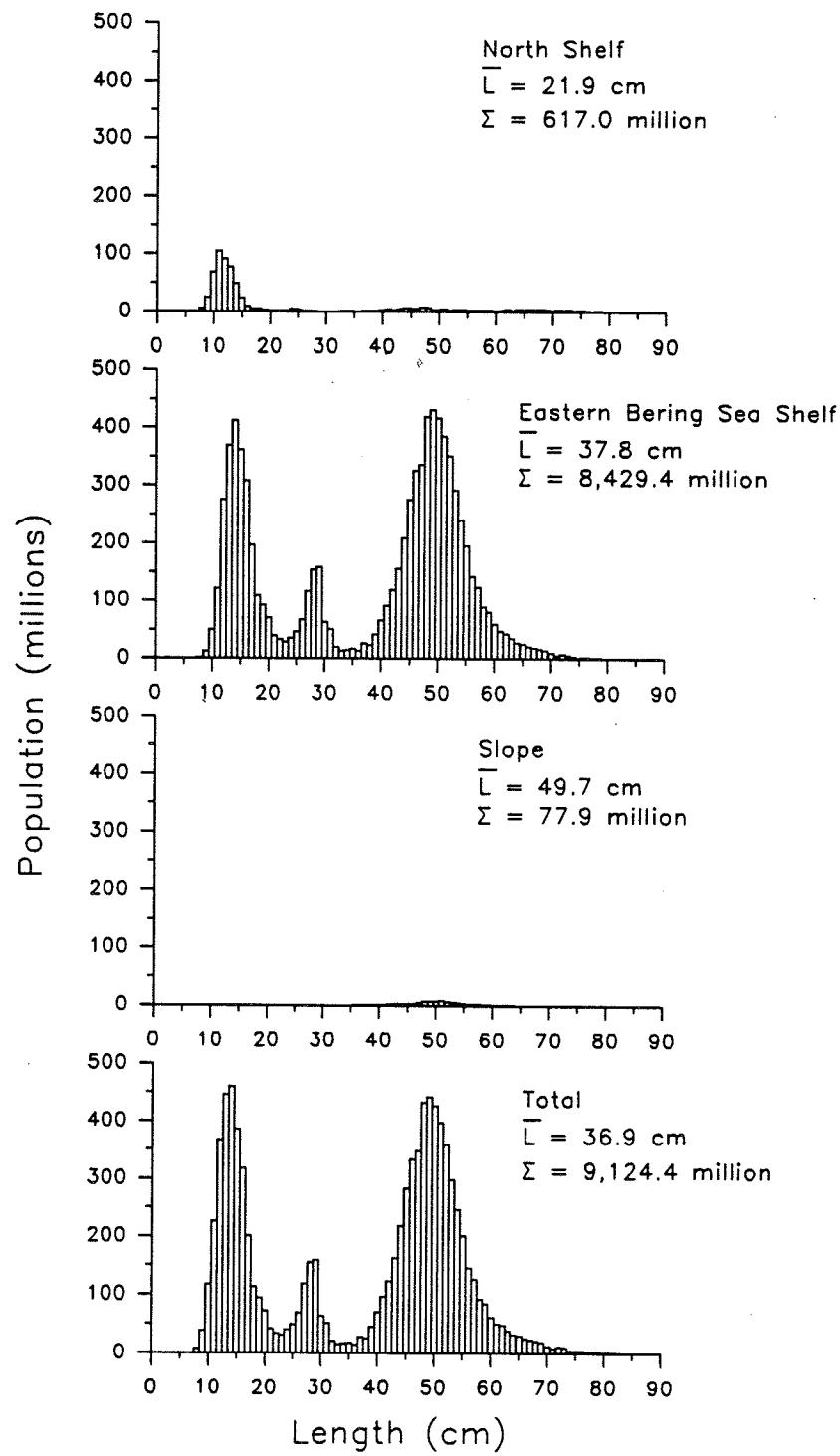
Figure 11.--Population number estimates by centimeter length
interval for walleye pollock in the eastern Bering
Sea as shown by data from the 1991 bottom trawl
survey.

Table 9.--Estimated population numbers (millions of fish) of walleye pollock by age group and subarea as shown by age and length data from the 1991 bottom trawl survey of the eastern Bering Sea.

		500-800 m		200-500 m			50-200 m	< 50 m		100-200 m		50-100 m	< 50 m		All subareas combined	Proportion of total
Age	Year class	13	12	11	10	9	8	7	6	5	4	3	2	1		
1	1990	0.02	0.00	0.09	0.00	98.80	111.25	228.97	790.75	1.39	286.50	290.97	155.22	177.76	2,520.81	0.28
2	1989	0.02	0.00	0.05	0.03	24.25	3.06	4.77	220.13	1.39	49.01	38.83	6.84	9.91	929.31	0.10
3	1988	0.00	0.00	0.40	0.04	4.89	0.01	0.00	61.69	1.80	5.84	7.70	0.00	0.35	240.07	0.03
4	1987	0.00	0.00	0.95	0.04	2.79	0.00	0.00	379.33	0.73	0.93	3.81	0.00	0.03	71.69	0.01
5	1986	0.01	0.00	5.62	0.36	14.45	0.00	0.03	306.88	1.45	6.47	52.64	0.01	0.04	479.30	0.05
6	1985	0.01	0.01	5.14	0.79	10.05	0.01	0.04	820.07	20.35	12.57	84.99	0.04	0.19	446.95	0.05
7	1984	0.04	0.04	15.98	5.09	23.29	0.27	0.20	284.06	26.23	84.32	397.31	0.80	2.04	1,461.33	0.16
8	1983	0.01	0.02	6.11	2.17	7.19	0.16	0.10	467.93	111.88	37.00	165.50	0.51	1.26	549.30	0.06
9	1982	0.03	0.05	12.72	7.44	12.37	1.01	3.05	112.77	45.20	129.41	422.59	4.43	8.26	1,189.28	0.13
10	1981	0.01	0.01	2.80	1.86	3.39	0.54	0.64	121.13	119.98	38.82	116.03	1.76	3.51	311.25	0.03
11	1980	0.01	0.03	2.62	2.69	5.50	3.12	7.19	25.08	29.10	77.21	154.31	9.46	13.92	435.29	0.05
12	1979	0.00	0.01	0.36	0.46	1.16	0.95	2.17	63.60	38.09	17.24	28.73	2.83	4.06	89.54	0.01
13	1978	0.01	0.02	1.12	2.03	3.91	3.24	8.18	7.97	6.48	55.75	88.51	9.62	12.74	273.09	0.03
14	1977	0.00	0.00	0.17	0.23	0.67	1.03	3.33	1.76	24.37	10.14	13.67	2.31	4.57	46.73	0.01
15	1976	0.00	0.00	0.01	0.05	0.27	0.62	2.69	3.77	2.65	4.57	4.49	1.64	1.86	18.55	0.00
16	1975	0.00	0.00	0.01	0.05	0.19	0.50	2.85	0.64	0.61	3.51	3.30	1.08	3.24	18.87	0.00
17	1974	0.00	0.00	0.00	0.02	0.13	0.08	0.24	1.36	0.38	1.23	0.82	0.28	0.39	3.96	0.00
18	1973	0.00	0.00	0.00	0.04	0.10	0.00	0.00	0.44	0.12	1.47	1.72	0.00	0.88	0.00	0.00
19	1972	0.00	0.00	0.00	0.04	0.07	0.08	0.75	0.19	0.00	0.52	0.38	0.37	0.54	7.25	0.00
20	1971	0.00	0.00	0.00	0.00	0.01	0.24	0.41	0.03	0.47	0.16	0.07	0.21	0.18	2.83	0.00
21	1970	0.00	0.00	0.00	0.00	0.01	0.08	0.32	0.03	0.02	0.55	0.37	0.06	0.18	1.07	0.00
AGE UNKNOWN		0.00	0.00	0.02	0.00	0.06	2.58	8.72	1,170.32	0.00	6.15	0.66	7.77	1.44	1,197.73	0.00
TOTAL		0.17	0.19	54.16	23.40	213.54	128.82	274.65	4,839.87	431.31	828.81	1,877.05	205.22	247.17	9,124.37	1.00

43
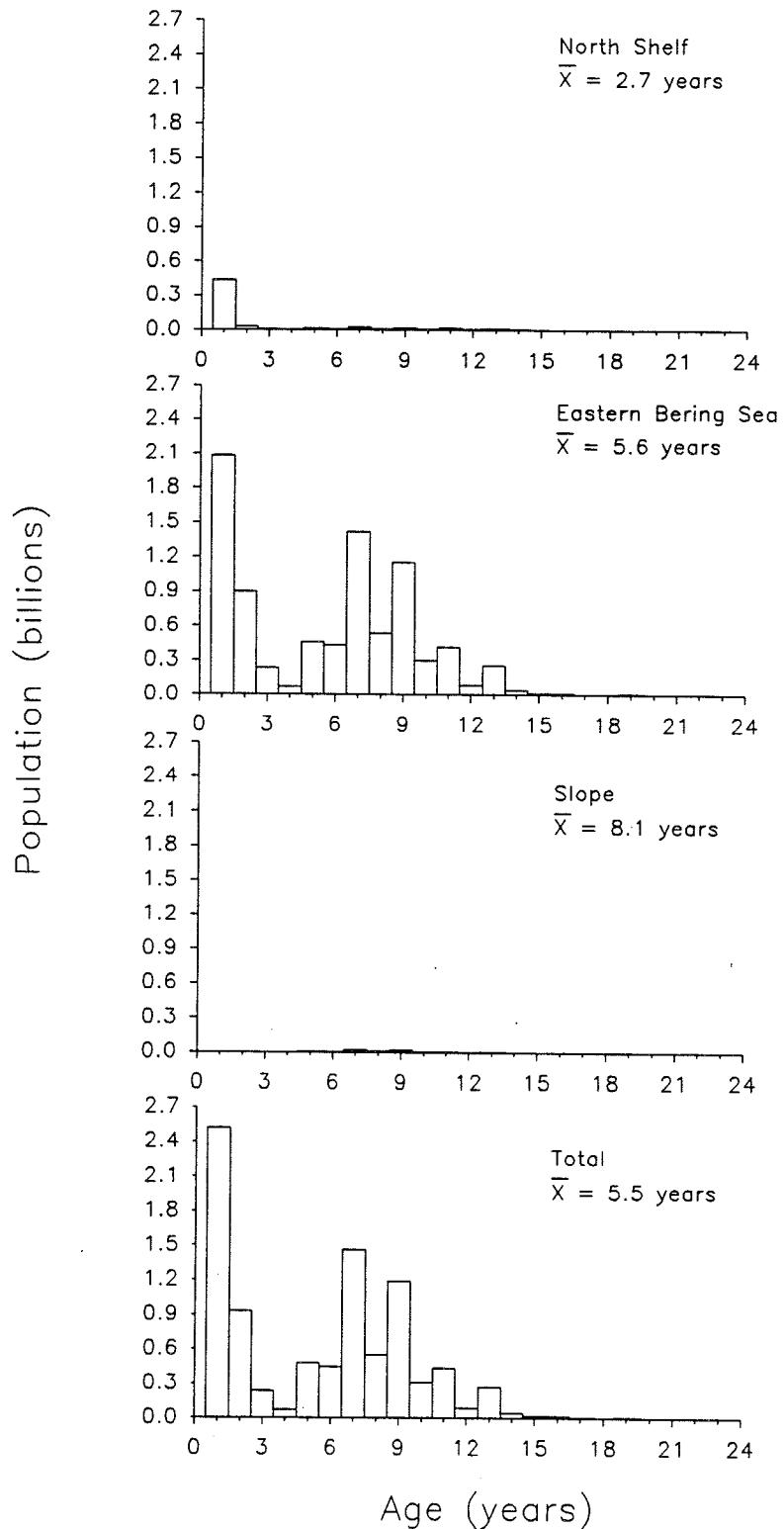
Figure 12.--Population estimates by age for walleye pollock, 1991 eastern Bering Sea bottom trawl survey.
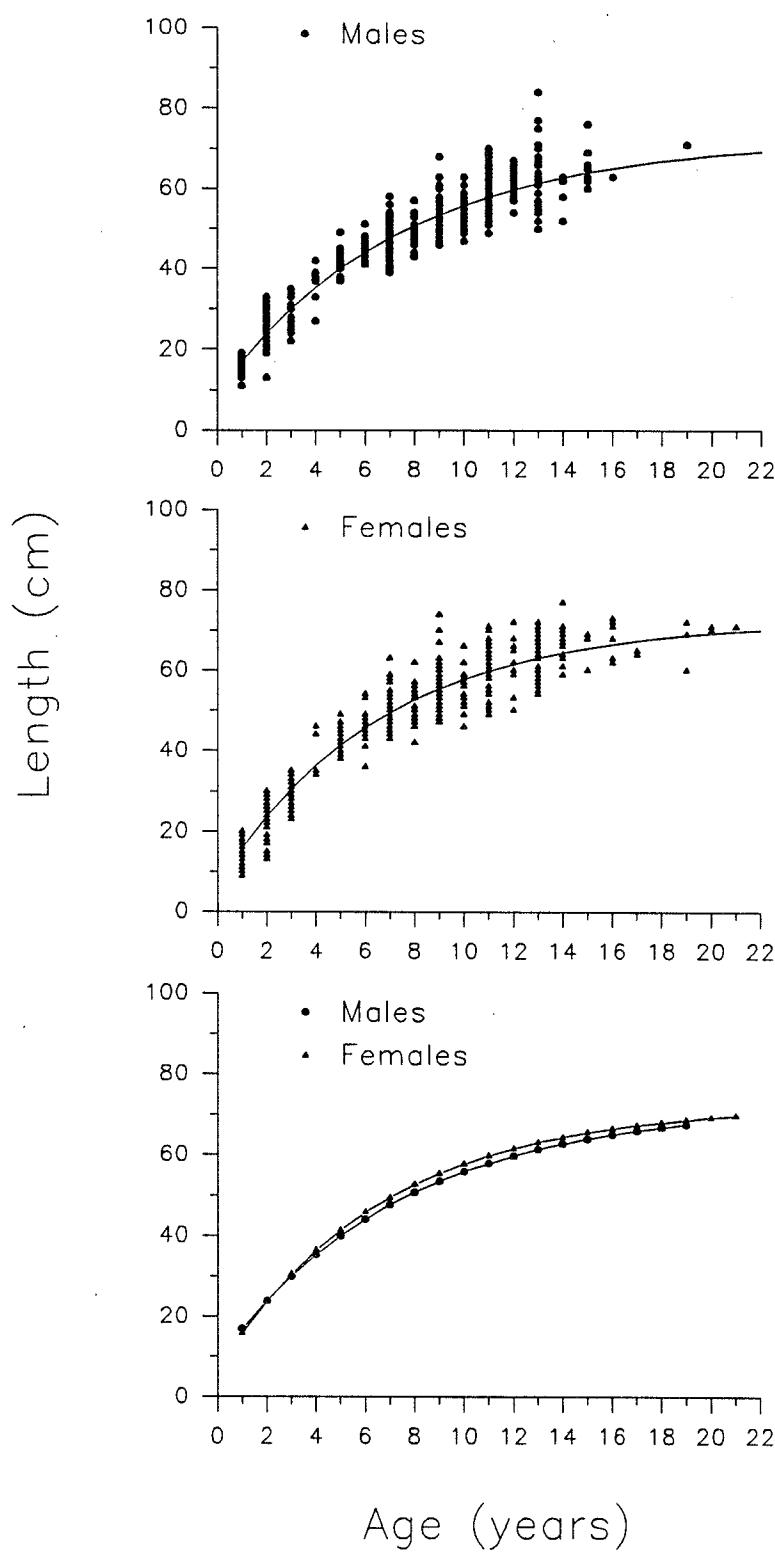
Figure 13.--Von Bertalanffy growth curves for male and female
walleye pollock, from the 1991 eastern Bering Sea
bottom trawl survey. Mean lengths at age can be
found in Appendix F.

Table 10.--Parameters of the von Bertalanffy growth curves for
walleye pollock by sex based on age reading from
otoliths and length data from the 1991 U.S. bottom
trawl survey.

Sex	Number of age readings	Age range	Length range (cm)	Parameters		
				L_{inf}	K	t_0
Male	519	1-19	11-84	72.752	.1326	-1.0057
Female	564	1-21	9-77	72.623	.1492	-0.6470
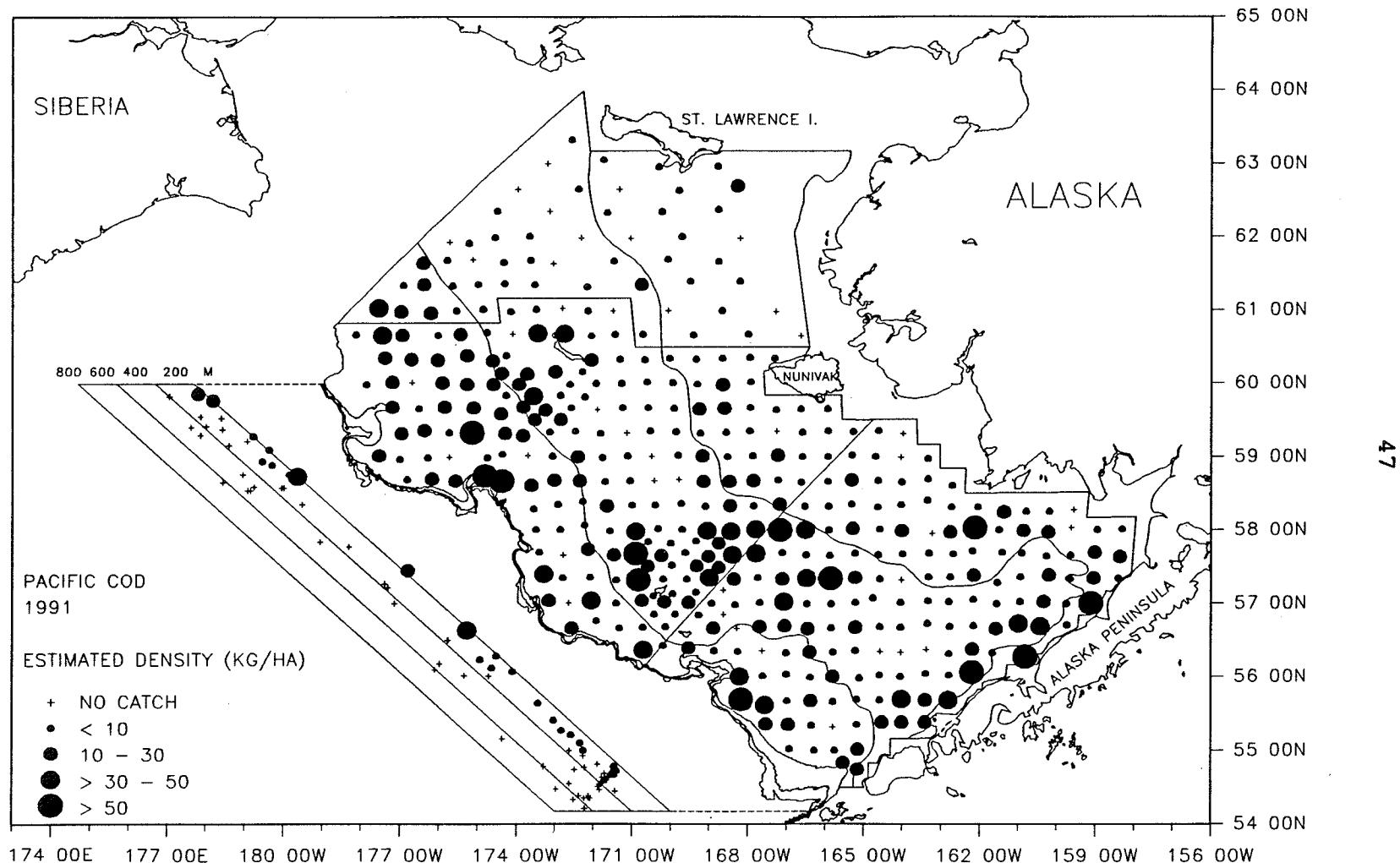
Figure 14.--Distribution and relative abundance of Pacific cod in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 11.--Abundance estimates and mean size of Pacific cod by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	10.523	81,942	0.141	184,635,115	0.352	0.444	27.7
2	< 50	5.595	22,957	0.039	24,239,887	0.046	0.947	33.8
3	50 - 100	12.181	125,829	0.216	99,427,558	0.190	1.266	42.2
4	50 - 100	9.697	104,554	0.179	119,851,252	0.228	0.872	37.4
5	100 - 200	13.191	51,171	0.088	18,519,007	0.035	2.763	56.9
6	100 - 200	15.454	146,137	0.251	50,168,443	0.096	2.913	54.5
Subareas combined		11.494	532,590	0.914	496,841,261	0.947	1.072	37.0
North Shelf								
7	< 50	2.985	21,742	0.037	14,542,190	0.028	1.495	40.1
8	50 - 100	0.994	5,567	0.010	4,733,286	0.009	1.176	34.3
9	100 - 200	15.673	18,130	0.031	7,466,522	0.014	2.428	51.2
Subareas combined		3.236	45,439	0.078	26,741,998	0.051	1.699	42.1
Slope								
10	200 - 500	1.806	1,406	0.002	474,200	0.001	2.965	61.8
11	200 - 500	5.950	3,359	0.006	578,816	0.001	5.804	74.5
12	500 - 800	0.000	0	0.000	0	0.000	-	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		2.255	4,766	0.008	1,053,016	0.002	4.526	68.7
All subareas combined		9.326	582,795	1.000	524,636,275	1.000	1.111	37.4
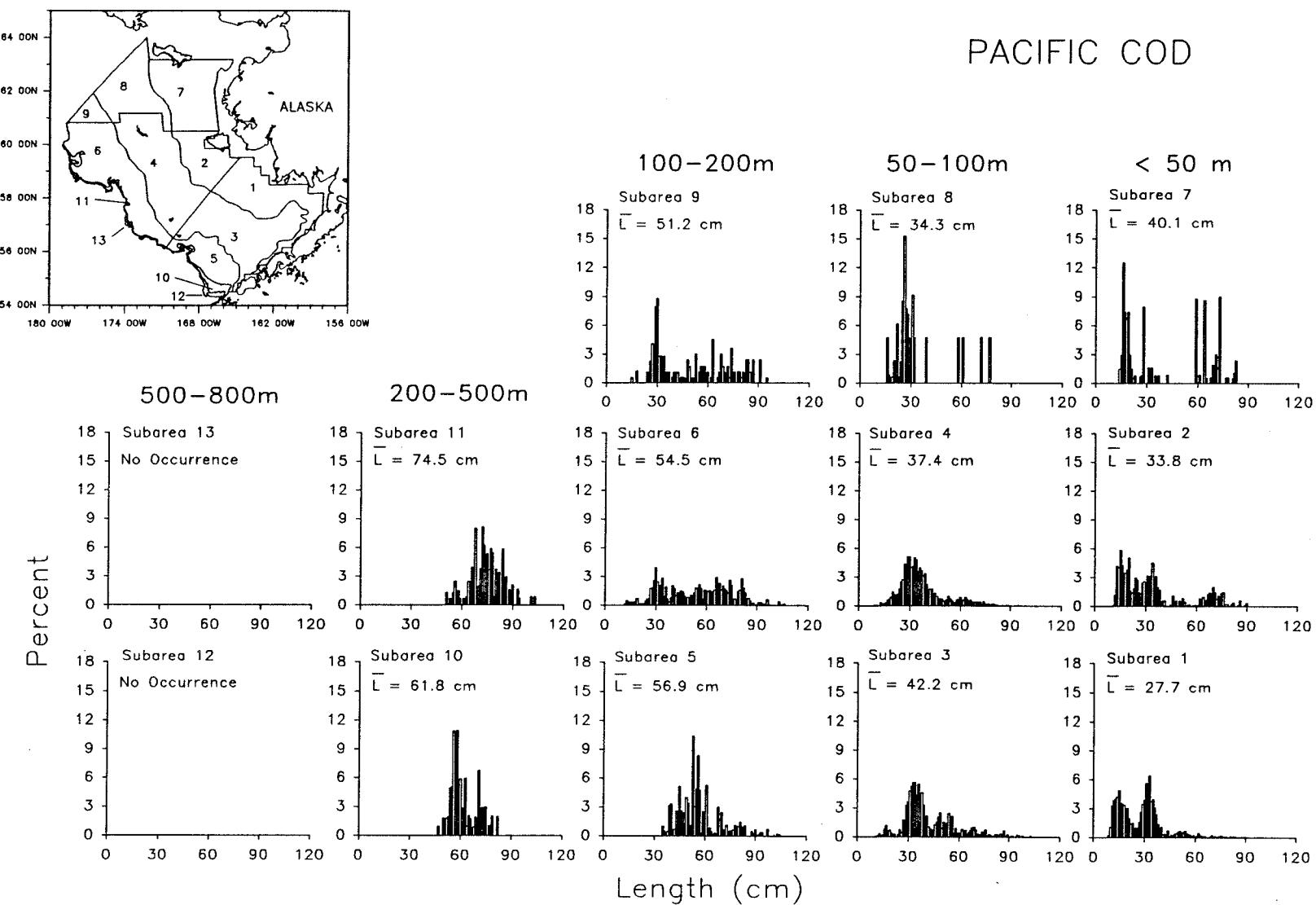
Figure 15.--Length composition of Pacific cod by subarea and depth zone as shown by
data from the 1991 eastern Bering Sea bottom trawl survey.
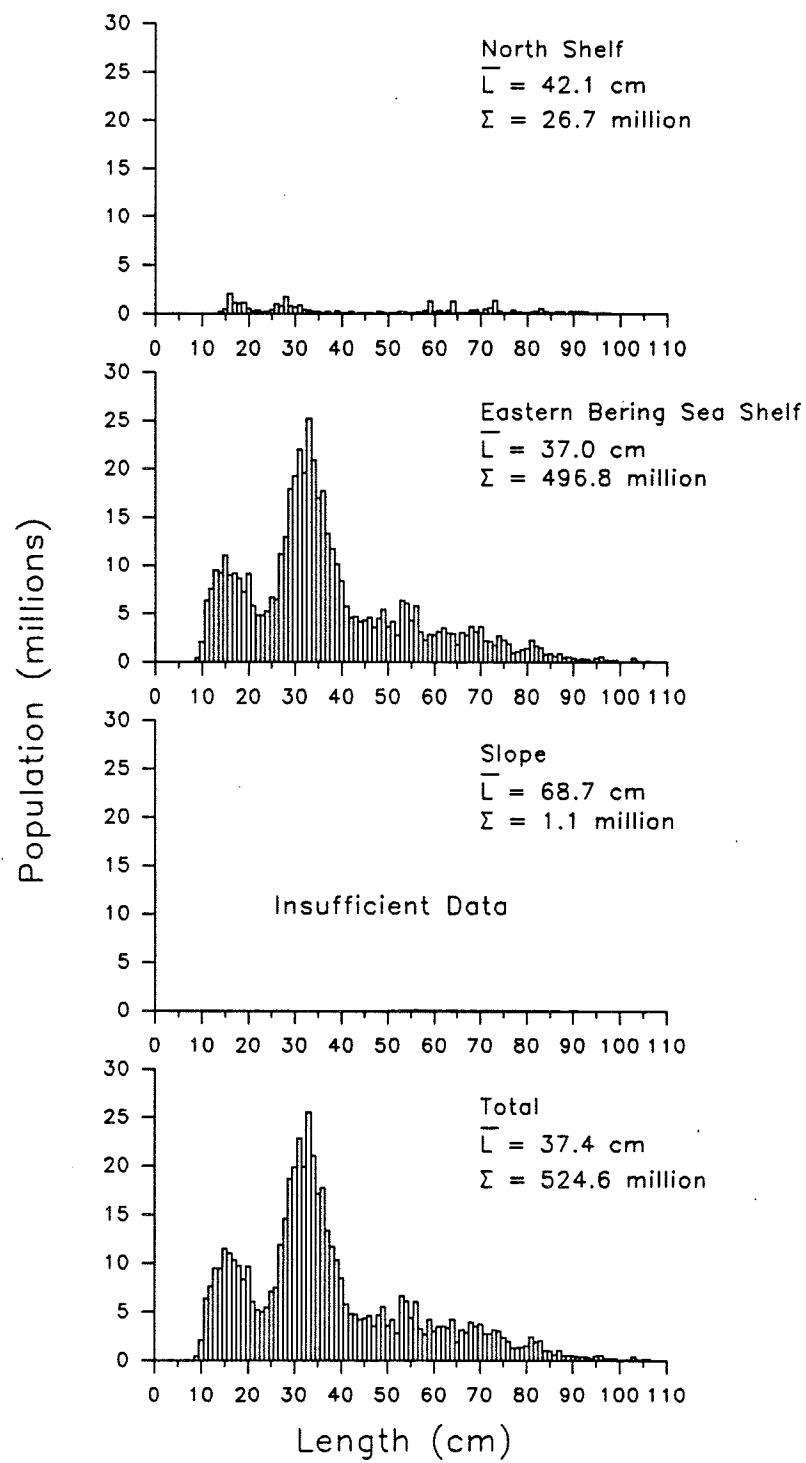
Figure 16.--Population number estimates by centimeter length
interval for Pacific cod in the eastern Bering Sea
as shown by data from the 1991 bottom trawl survey.

Table 12.—Estimated population numbers (millions of fish) of Pacific cod by age group and subarea as shown by age and length data from the 1991 bottom trawl survey of the eastern Bering Sea.

		Depth and Subarea														
		500-800 m		200-500 m		50-200 m		< 50 m	100-200 m		50-100 m		< 50 m		All subareas combined	Pro-portion of total
Age	Year class	13	12	11	10	9	8	7	6	5	4	3	2	1		
1	1990	0.00	0.00	0.00	0.00	0.25	0.90	5.58	1.93	0.00	10.11	4.91	7.34	55.17	86.20	0.16
2	1989	0.00	0.00	0.00	0.00	1.93	2.28	2.15	7.41	0.09	40.55	23.28	5.72	51.09	134.00	0.26
3	1988	0.00	0.00	0.00	0.00	1.29	0.66	0.61	8.60	2.61	41.71	35.78	3.85	43.35	138.00	0.26
4	1987	0.00	0.00	0.01	0.05	0.61	0.00	0.05	4.84	5.62	10.55	13.82	0.93	7.32	43.80	0.08
5	1986	0.00	0.00	0.05	0.24	0.68	0.45	1.42	7.09	5.33	7.16	9.29	0.59	4.97	37.26	0.07
6	1985	0.00	0.00	0.14	0.10	1.03	0.13	2.58	8.01	1.80	5.52	5.69	1.98	1.74	28.70	0.05
7	1984	0.00	0.00	0.21	0.07	0.69	0.32	1.35	6.39	1.39	2.66	2.75	1.55	1.43	18.81	0.04
8	1983	0.00	0.00	0.08	0.01	0.36	0.00	0.32	2.51	0.73	0.61	1.30	0.21	0.68	6.81	0.01
9	1982	0.00	0.00	0.01	0.00	0.16	0.00	0.00	0.17	0.06	0.07	0.45	0.06	0.09	1.08	0.00
10	1981	0.00	0.00	0.03	0.00	0.13	0.00	0.10	1.65	0.43	0.20	0.53	0.05	0.15	3.28	0.01
11	1980	0.00	0.00	0.02	0.00	0.18	0.00	0.08	0.59	0.18	0.13	0.54	0.04	0.10	1.86	0.00
12	1979	0.00	0.00	0.01	0.00	0.11	0.00	0.08	0.43	0.15	0.02	0.16	0.00	0.06	1.01	0.00
13	1978	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.02	0.26	0.00	0.14	0.64	0.00
AGE UNKNOWN		0.00	0.00	0.01	0.00	0.04	0.00	0.21	0.33	0.13	0.55	0.67	1.91	18.35	22.21	0.04
TOTAL		0.00	0.00	0.58	0.47	7.47	4.73	14.54	50.17	18.52	119.85	99.43	24.24	184.64	524.64	1.00
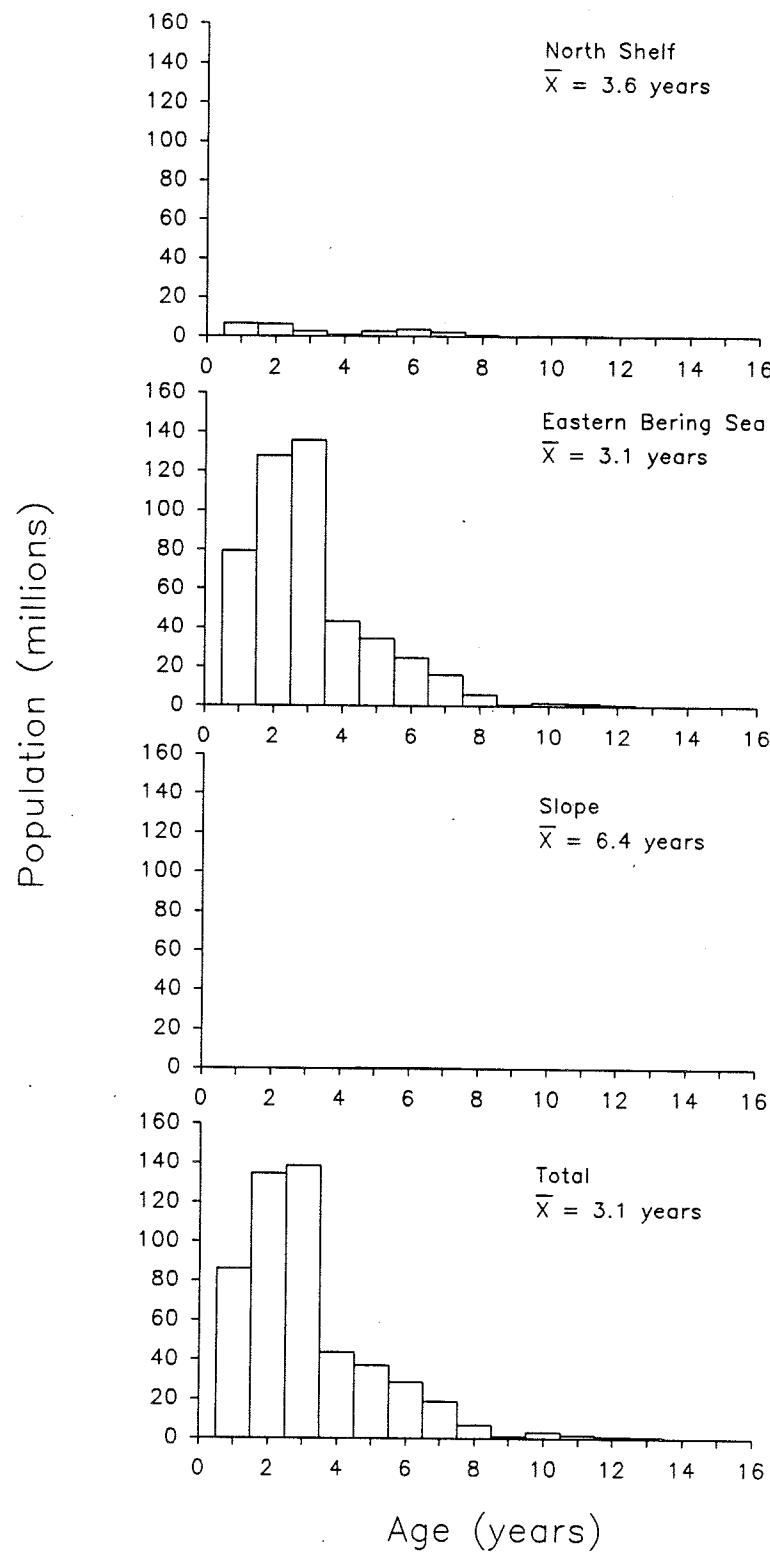
Figure 17.--Population estimates by age for Pacific cod,
        1991 eastern Bering Sea bottom trawl survey.
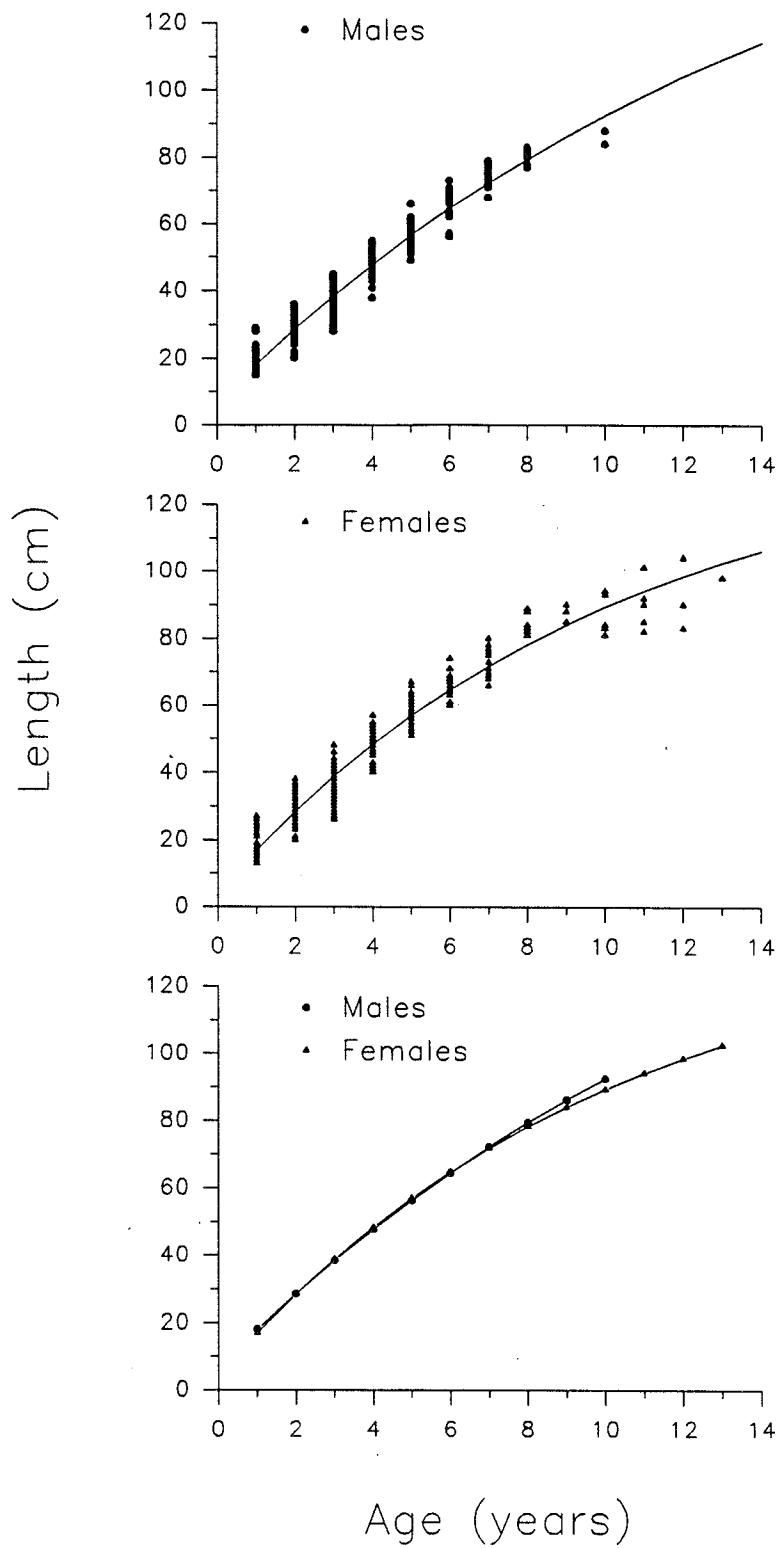
Figure 18.--Von Bertalanffy growth curves for male and female
Pacific cod, from the 1991 eastern Bering Sea
bottom trawl survey. Mean lengths at age results
can be found in Appendix F.

Table 13.--Parameters of the von Bertalanffy growth curves for Pacific cod by sex based on age reading from otoliths and length data from the 1991 U.S. bottom trawl survey.

Sex	Number of age readings	Age range	Length range (cm)	Parameters		
				L_{inf}	K	t_0
Male	313	1-10	15-88	191.24	.0625	-0.5875
Female	351	1-13	13-104	141.43	.0969	-0.3155
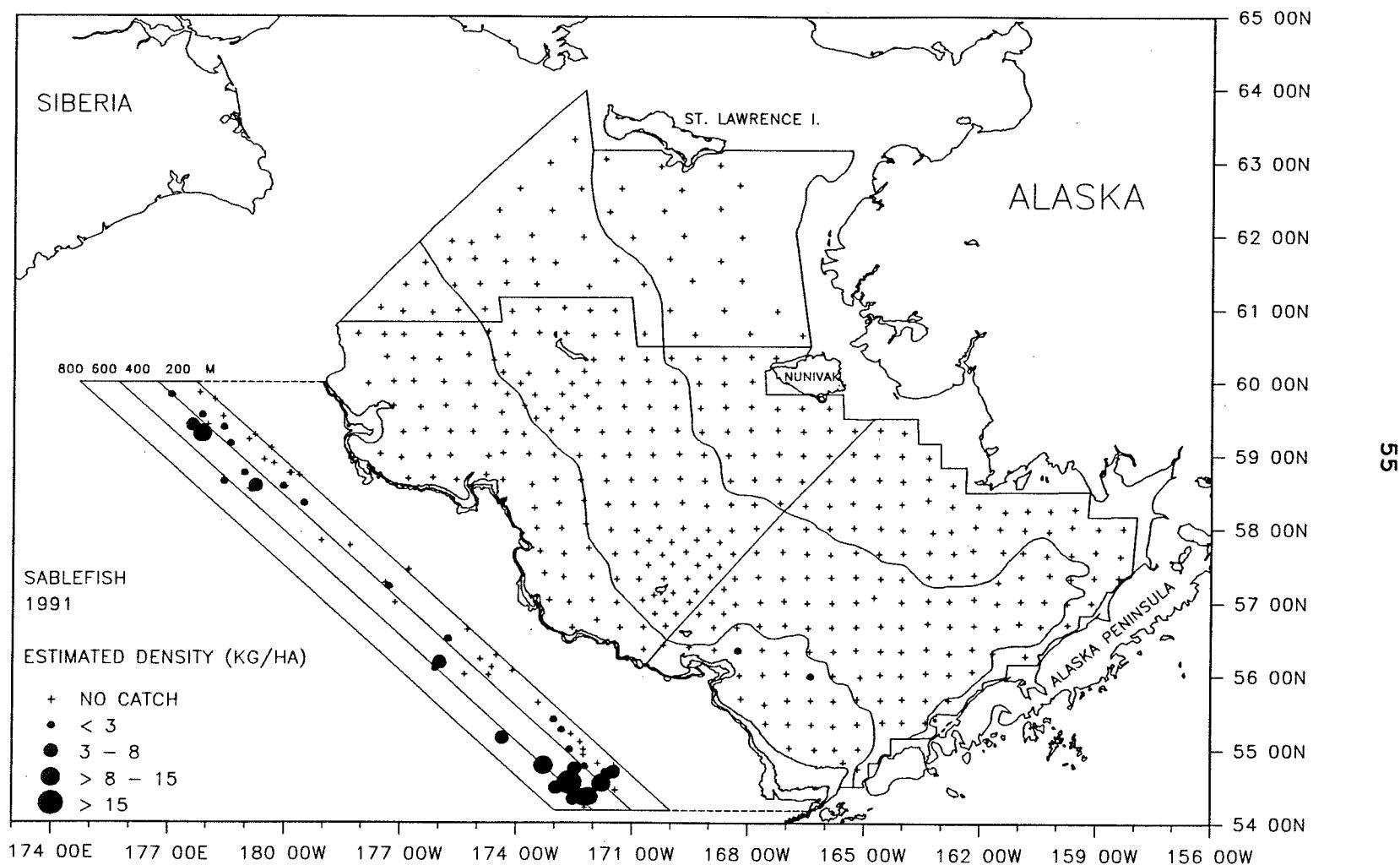
Figure 19.--Distribution and relative abundance of sablefish in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 14.--Abundance estimates and mean size of sablefish by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.000	0	0.000	0	0.000	–	–
2	< 50	0.000	0	0.000	0	0.000	–	–
3	50 - 100	0.000	0	0.000	0	0.000	–	–
4	50 - 100	0.000	0	0.000	0	0.000	–	–
5	100 - 200	0.087	338	0.075	200,114	0.121	1.690	54.5
6	100 - 200	0.000	0	0.000	0	0.000	–	–
Subareas combined		0.007	338	0.075	200,114	0.121	1.690	54.5
North Shelf								
7	< 50	0.000	0	0.000	0	0.000	–	–
8	50 - 100	0.000	0	0.000	0	0.000	–	–
9	100 - 200	0.000	0	0.000	0	0.000	–	–
Subareas combined		0.000	0	0.000	0	0.000	0.000	–
Slope								
10	200 - 500	1.022	796	0.175	410,908	0.248	1.936	57.6
11	200 - 500	0.332	188	0.041	67,488	0.041	2.781	63.2
12	500 - 800	5.429	2,384	0.525	753,938	0.454	3.163	66.2
13	500 - 800	2.512	832	0.183	227,235	0.137	3.660	69.6
Subareas combined		1.987	4,199	0.925	1,459,568	0.879	2.877	64.2
All subareas combined		0.073	4,538	1.000	1,659,683	1.000	2.734	63.0
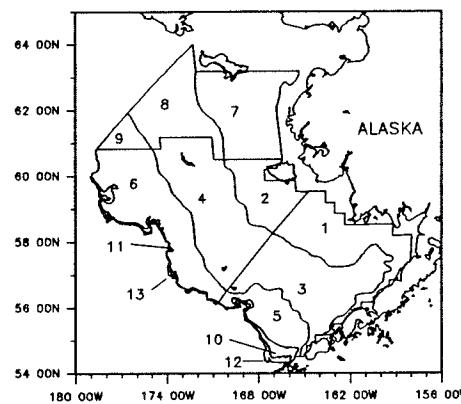
SABLEFISH
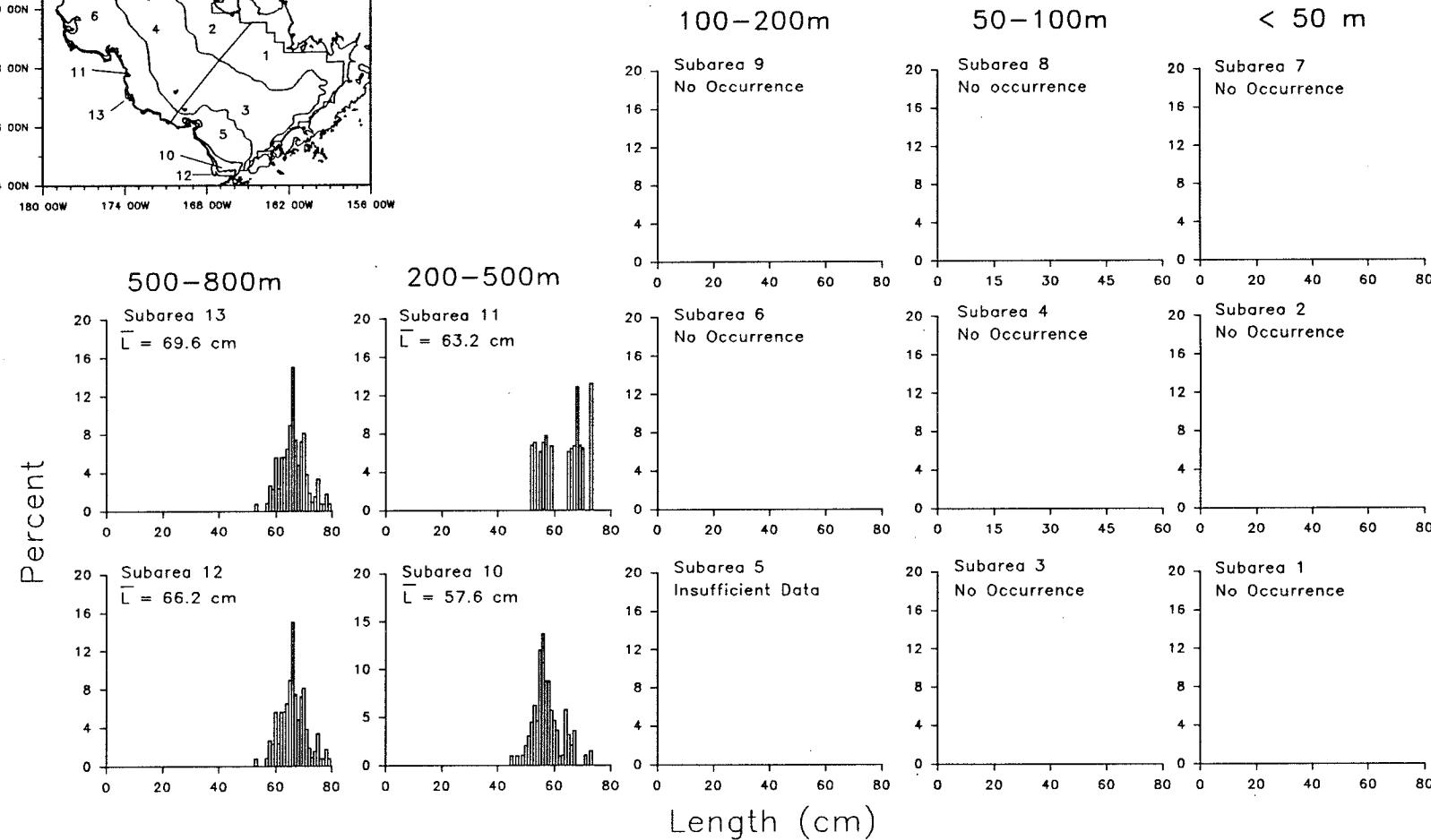
Figure 20.--Length composition of sablefish by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.
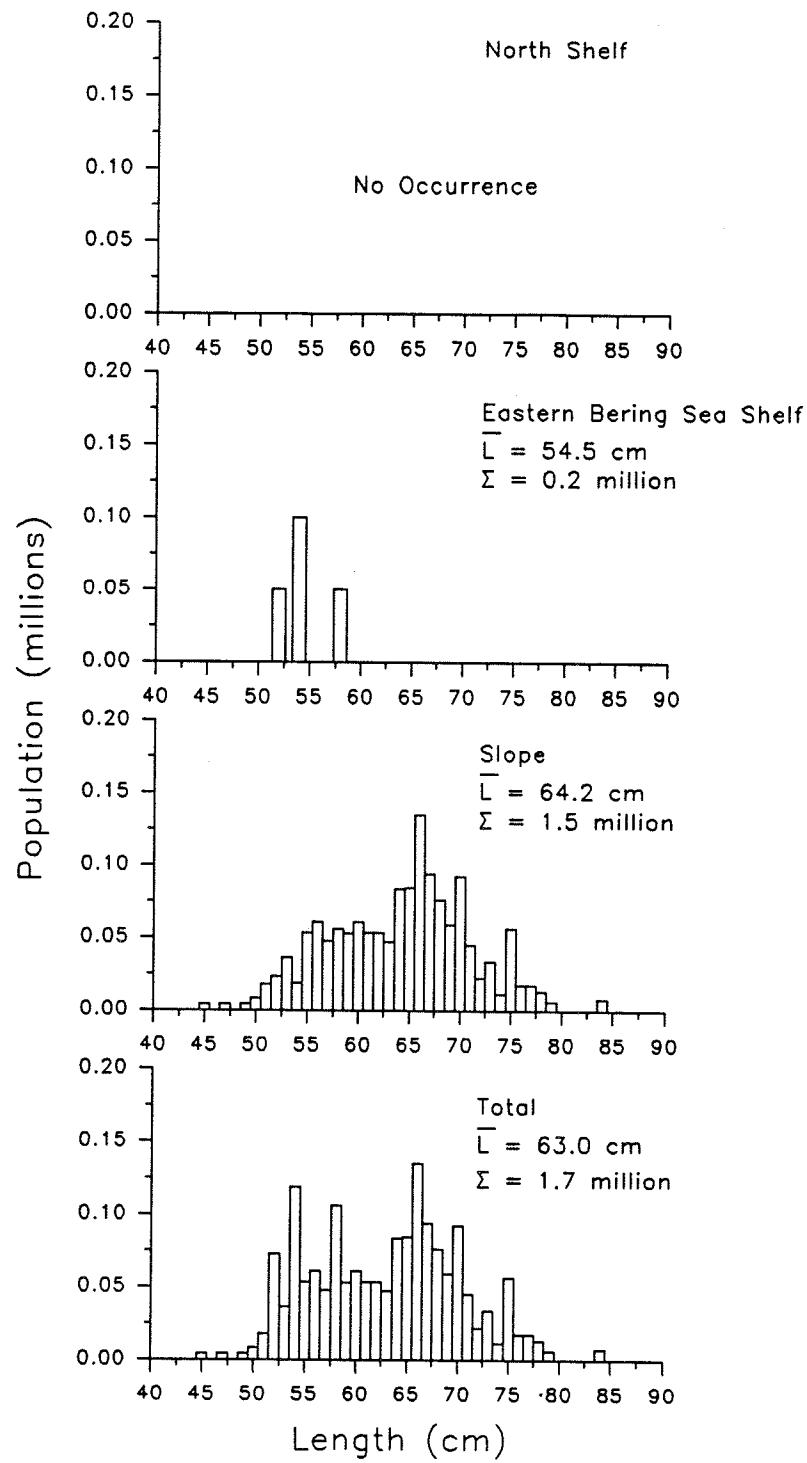
Figure 21.--Population number estimates by centimeter length
interval for sablefish in the eastern Bering Sea as
shown by data from the 1991 bottom trawl survey.
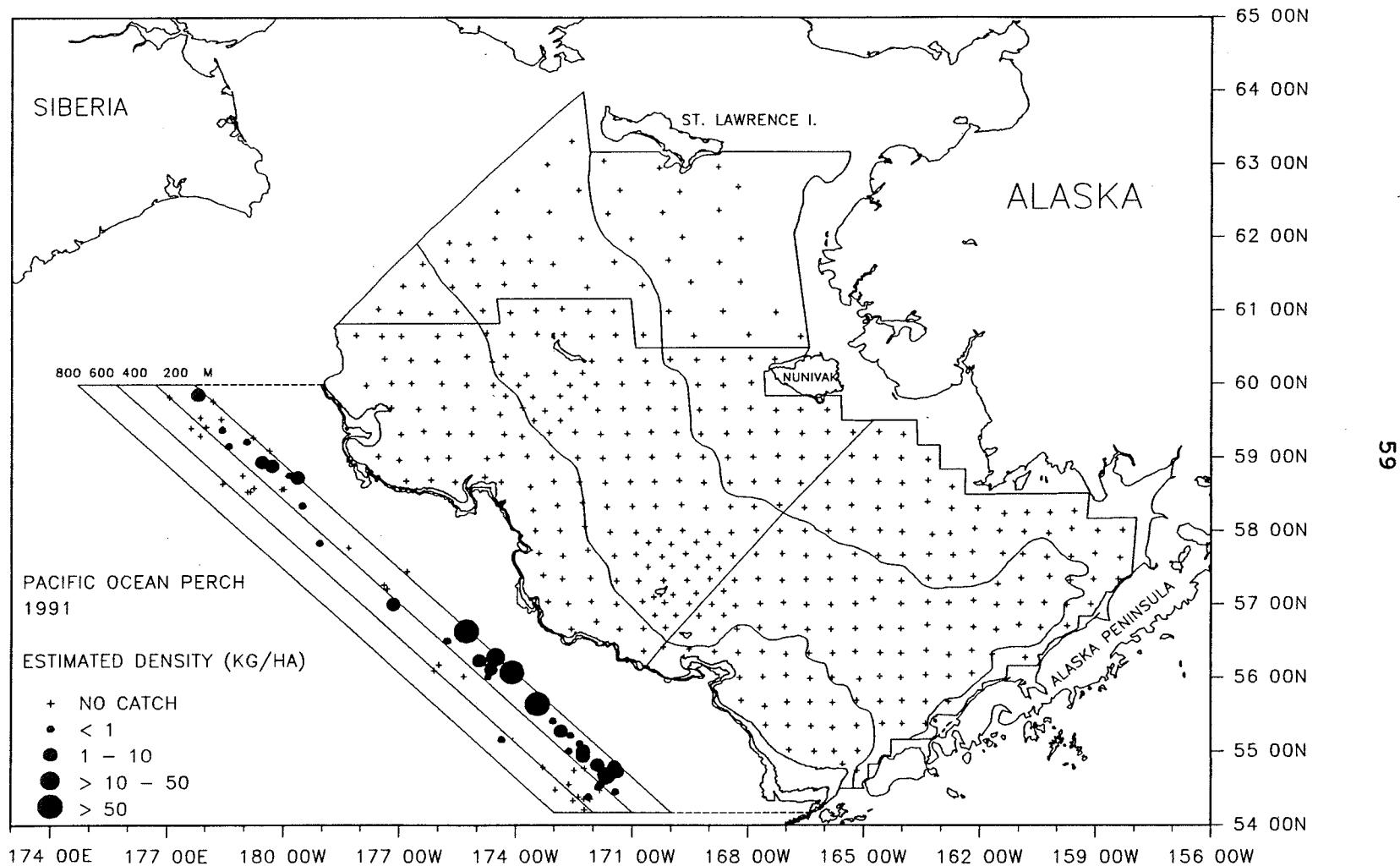
Figure 22.--Distribution and relative abundance of Pacific ocean perch in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 15.--Abundance estimates and mean size of Pacific ocean perch by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

| Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.000	0	0.000	0	0.000	–	–
2	< 50	0.000	0	0.000	0	0.000	–	–
3	50 – 100	0.000	0	0.000	0	0.000	–	–
4	50 – 100	0.000	0	0.000	0	0.000	–	–
5	100 – 200	0.000	0	0.000	0	0.000	–	–
6	100 – 200	0.000	0	0.000	0	0.000	–	–
Subareas combined		0.000	0	0.000	0	0.000	–	–
North Shelf								
7	< 50	0.000	0	0.000	0	0.000	–	–
8	50 – 100	0.000	0	0.000	0	0.000	–	–
9	100 – 200	0.000	0	0.000	0	0.000	–	–
Subareas combined		0.000	0	0.000	0	0.000	–	–
Slope								
10	200 – 500	7.757	6,039	0.531	6,710,616	0.485	0.900	39.0
11	200 – 500	9.251	5,224	0.459	6,976,598	0.504	0.749	37.3
12	500 – 800	0.028	12	0.001	20,278	0.001	0.611	38.5
13	500 – 800	0.297	98	0.009	128,967	0.009	0.762	36.1
Subareas combined		5.381	11,373	1.000	13,836,458	1.000	0.822	38.1
All subareas combined		0.182	11,373	1.000	13,836,458	1.000	0.822	38.1

60
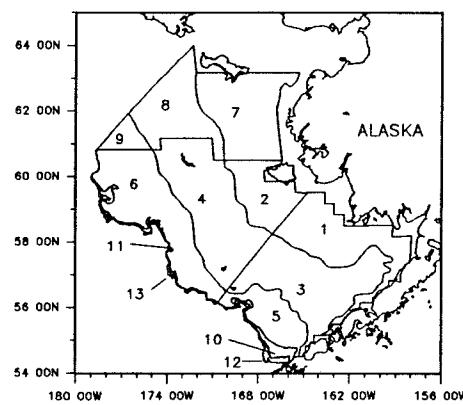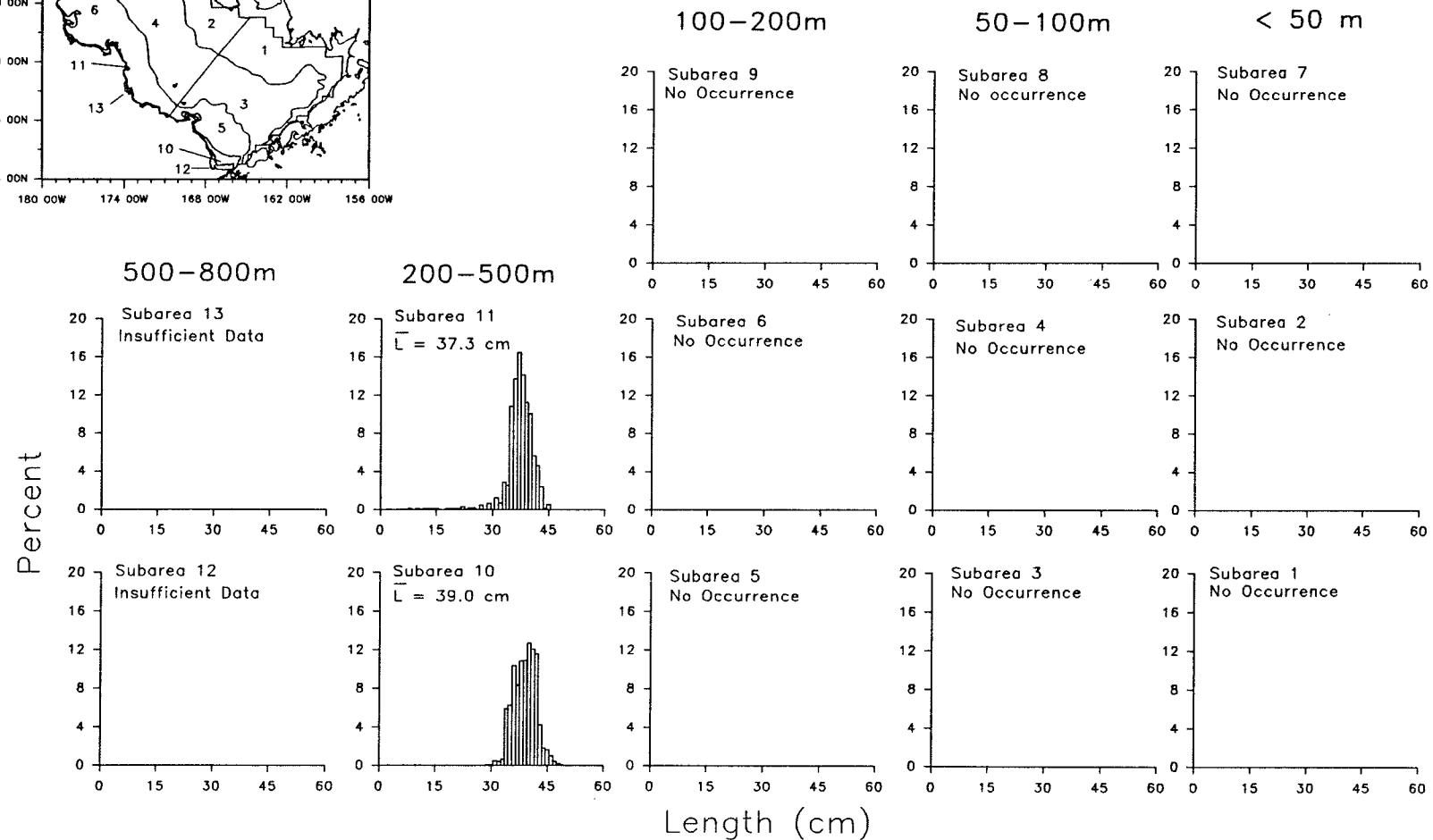
PACIFIC OCEAN PERCH

Figure 23.--Length composition of Pacific ocean perch by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.
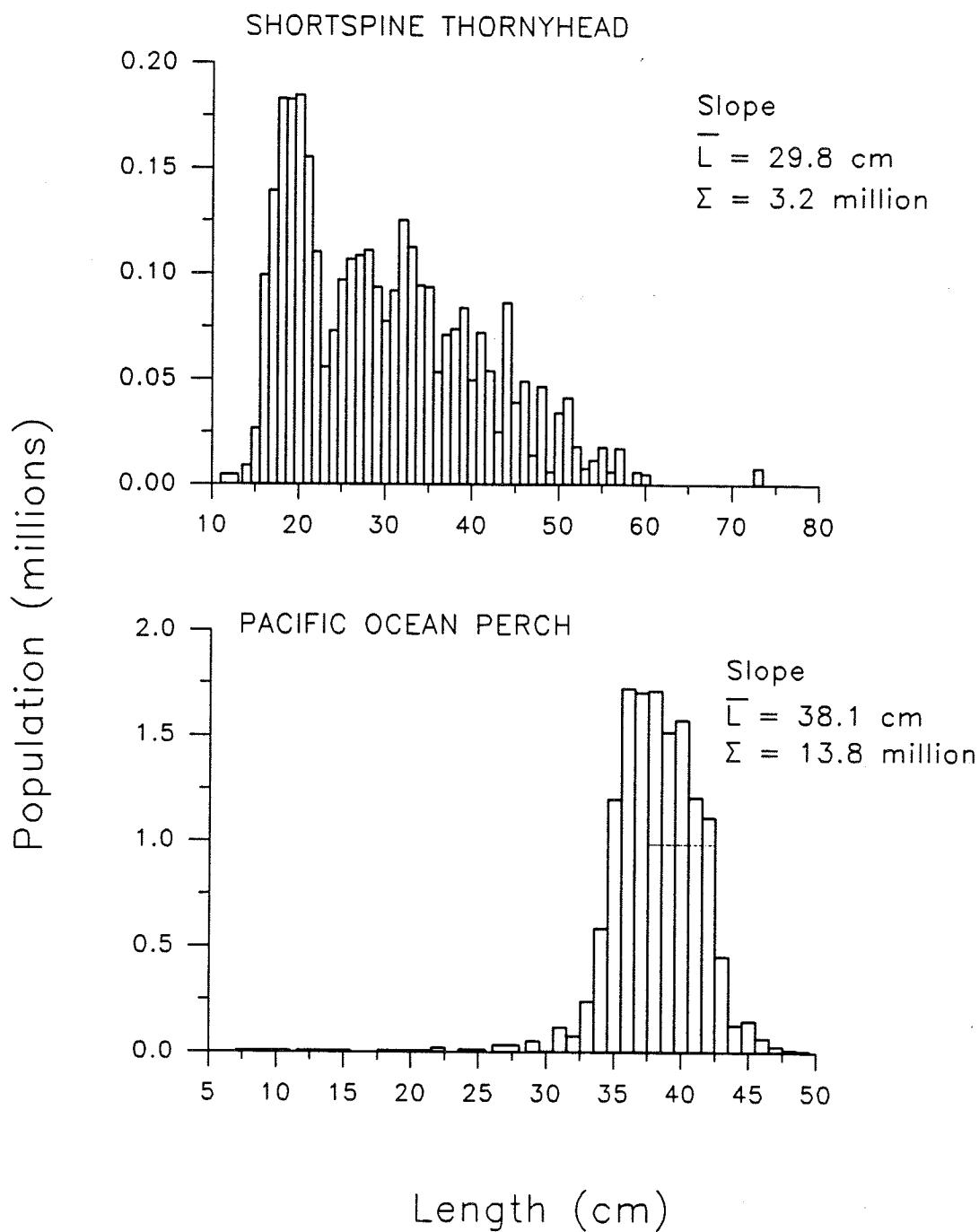
Figure 24.--Population number estimates by centimeter length interval for Pacific ocean perch and short spine thornyhead in the eastern Bering Sea as shown by data from the 1991 bottom trawl survey.
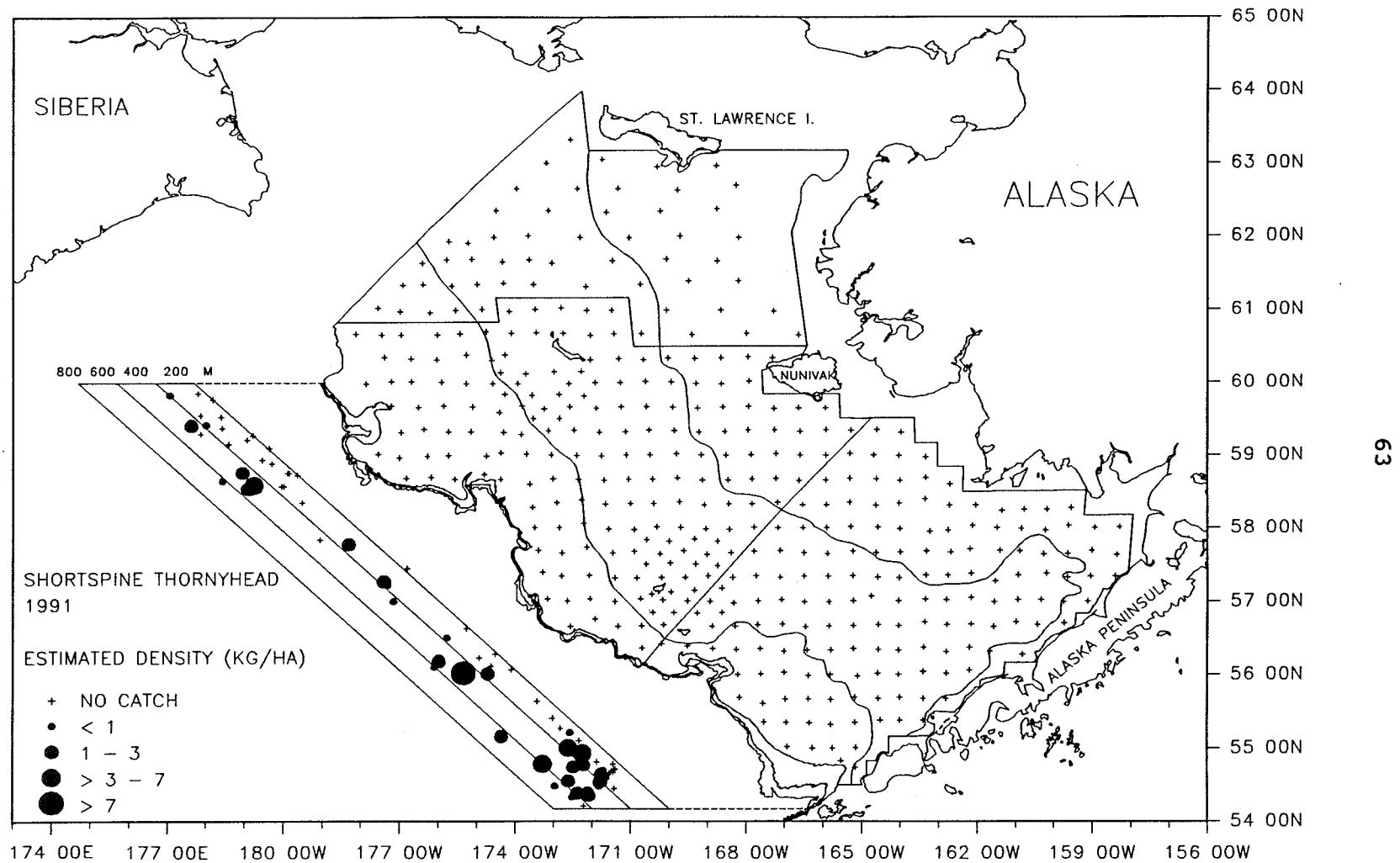
Figure 25.—Distribution and relative abundance of shortspine thornyhead in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 16.--Abundance estimates and mean size of shortspine thornyhead rockfish by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.000	0	0.000	0	0.000	-	-
2	< 50	0.000	0	0.000	0	0.000	-	-
3	50 - 100	0.000	0	0.000	0	0.000	-	-
4	50 - 100	0.000	0	0.000	0	0.000	-	-
5	100 - 200	0.000	0	0.000	0	0.000	-	-
6	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
North Shelf								
7	< 50	0.000	0	0.000	0	0.000	-	-
8	50 - 100	0.000	0	0.000	0	0.000	-	-
9	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
Slope								
10	200 - 500	0.616	480	0.290	2,129,040	0.660	0.225	24.4
11	200 - 500	0.188	106	0.064	150,235	0.047	0.705	33.4
12	500 - 800	1.583	695	0.420	696,743	0.216	0.998	40.4
13	500 - 800	1.131	374	0.226	251,389	0.078	1.489	43.5
Subareas combined		0.783	1,655	1.000	3,227,407	1.000	0.513	29.8
All subareas combined		0.026	1,655	1.000	3,227,407	1.000	0.513	29.8
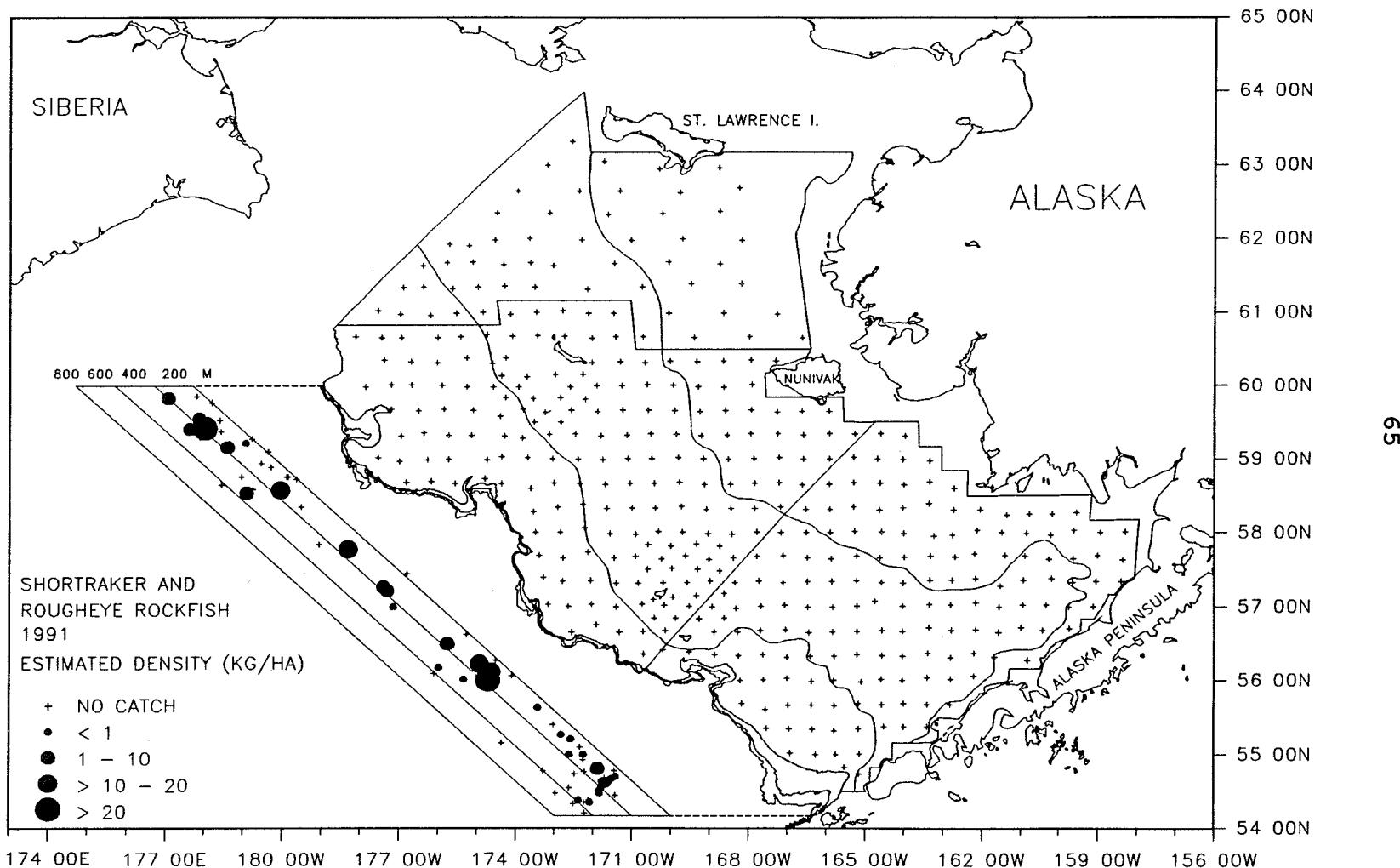
Figure 26.--Distribution and relative abundance of rougheye and shortraker rockfish
in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 17.--Abundance estimates and mean size of rougheye rockfish, shortraker rockfish and other rockfish by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Rougheye rockfish								
10	200 - 500	0.473	368	0.416	234,014	0.429	1.573	45.3
11	200 - 500	0.773	436	0.494	273,812	0.502	1.594	45.8
12	500 - 800	0.088	38	0.044	24,020	0.044	1.601	47.0
13	500 - 800	0.123	41	0.046	13,785	0.025	2.948	57.0
Subareas combined		0.418	884	1.000	545,631	1.000	1.619	45.9
Shortraker rockfish								
10	200 - 500	1.692	1,317	0.478	388,771	0.489	3.388	50.0
11	200 - 500	2.391	1,350	0.489	337,689	0.425	3.997	58.0
12	500 - 800	0.070	31	0.011	18,339	0.023	1.687	51.0
13	500 - 800	0.181	60	0.022	49,431	0.062	1.209	35.3
Subareas combined		1.305	2,758	1.000	794,231	1.000	3.472	52.5
Other rockfish								
Shelf subareas		0.019	858	0.968	1,421,995	0.885	0.604	-
Slope subareas		0.014	29	0.032	184,774	0.115	0.155	-
All subareas combined		0.014	887	1.000	1,606,769	1.000	0.552	-
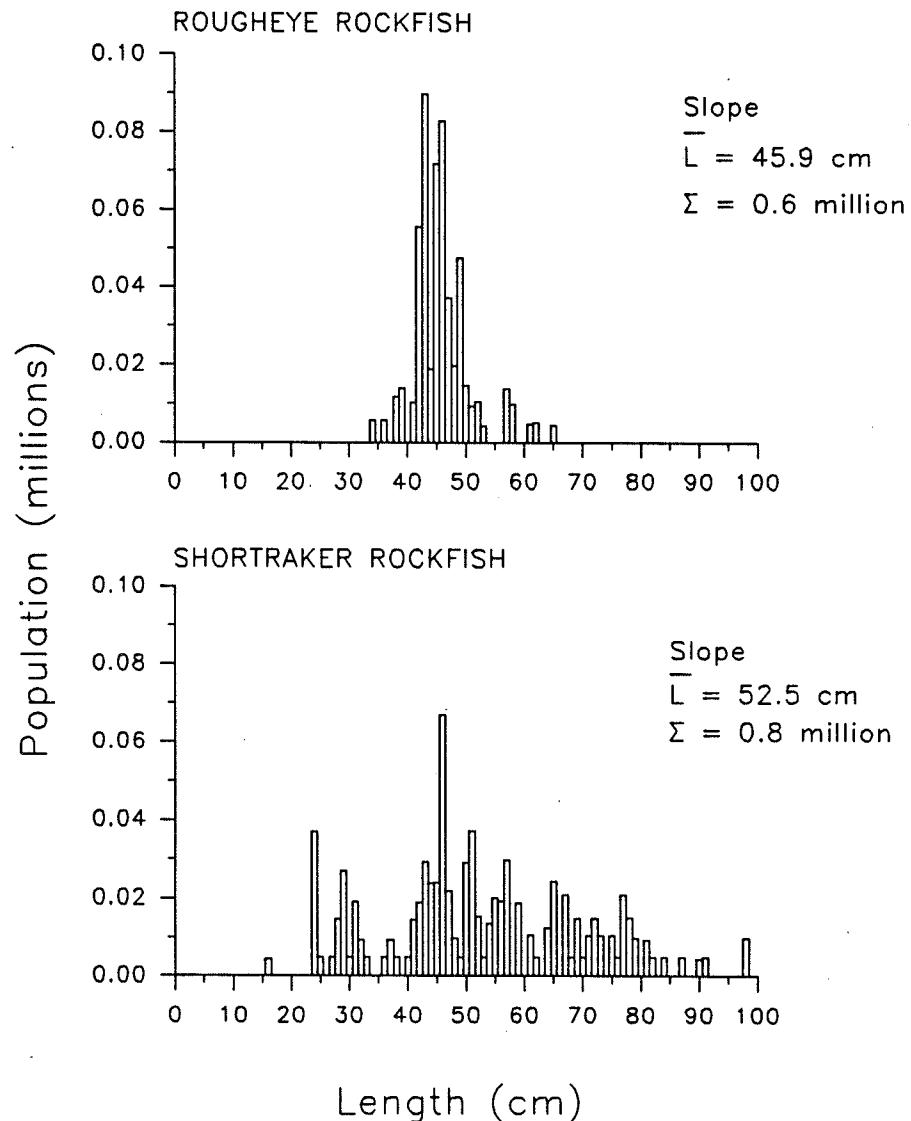
Figure 27.--Length composition of rougheye and shortraker
rockfish by subarea and depth zone as shown by data
from the 1991 eastern Bering Sea bottom trawl survey.

SIBERIA

ST. LAWRENCE I.

ALASKA

800 600 400 200 M

NUNIVAK

OTHER ROCKFISH
1991

ESTIMATED DENSITY (KG/HA)

+ NO CATCH
● < 1
● 1 − 3
● > 3 − 7
● > 7

ALASKA PENINSULA

65 00N
64 00N
63 00N
62 00N
61 00N
60 00N
59 00N
58 00N
57 00N
56 00N
55 00N
54 00N

174 00E   177 00E   180 00W   177 00W   174 00W   171 00W   168 00W   165 00W   162 00W   159 00W   156 00W
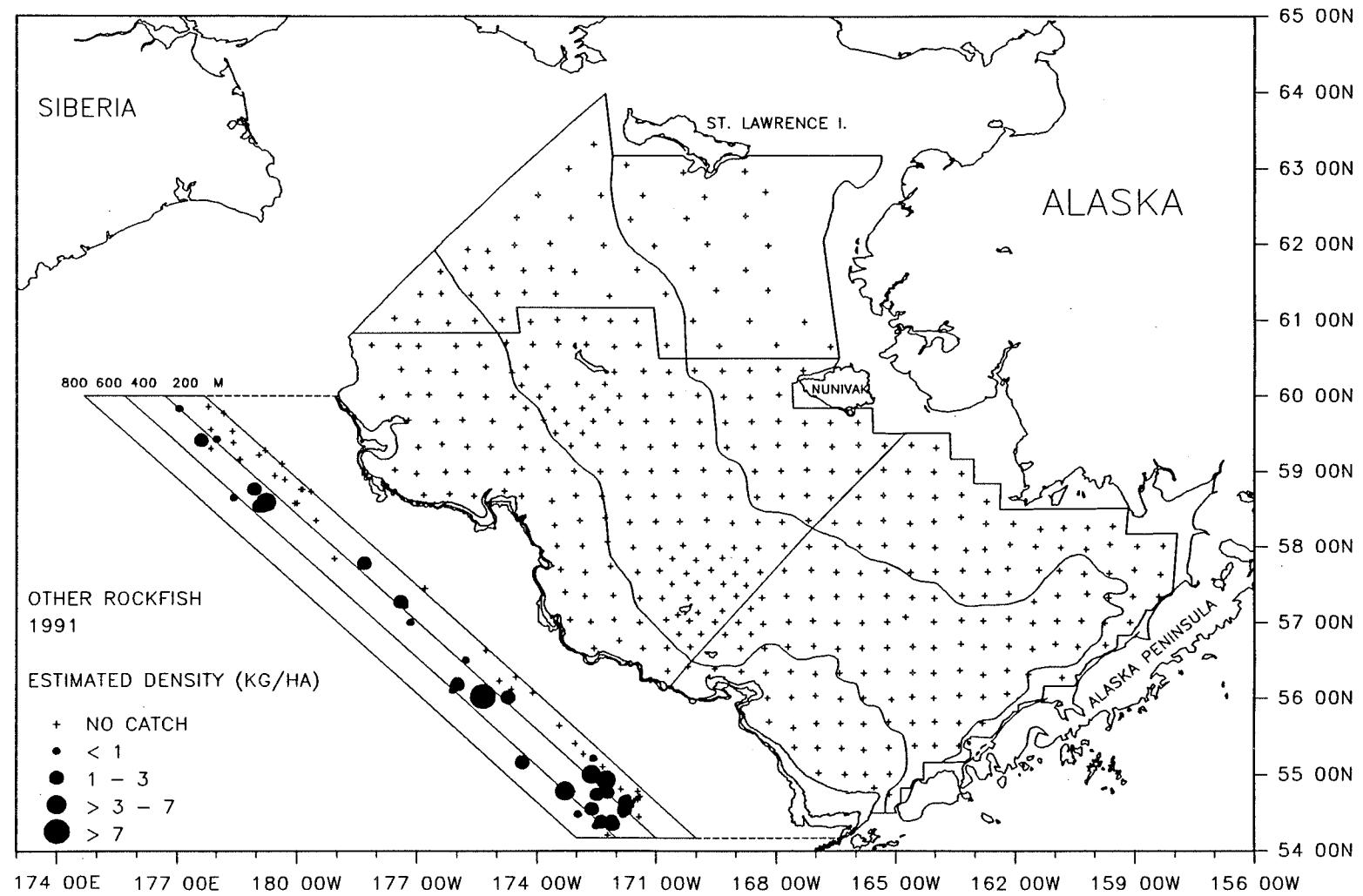
Figure 28.--Distribution and relative abundance of other rockfish (northern, dusky
and unidentified) in the eastern Bering Sea as shown by the 1991 bottom
trawl survey.

SIBERIA

ST. LAWRENCE I.

ALASKA

800 600 400 200 M

NUNIVAK

YELLOWFIN SOLE
1991

ESTIMATED DENSITY (KG/HA)

+   NO CATCH
·   < 50
●   50 – 100
●   >100 – 200
●   > 200

ALASKA PENINSULA

65 00N
64 00N
63 00N
62 00N
61 00N
60 00N
59 00N
58 00N
57 00N
56 00N
55 00N
54 00N

174 00E   177 00E   180 00W   177 00W   174 00W   171 00W   168 00W   165 00W   162 00W   159 00W   156 00W

69
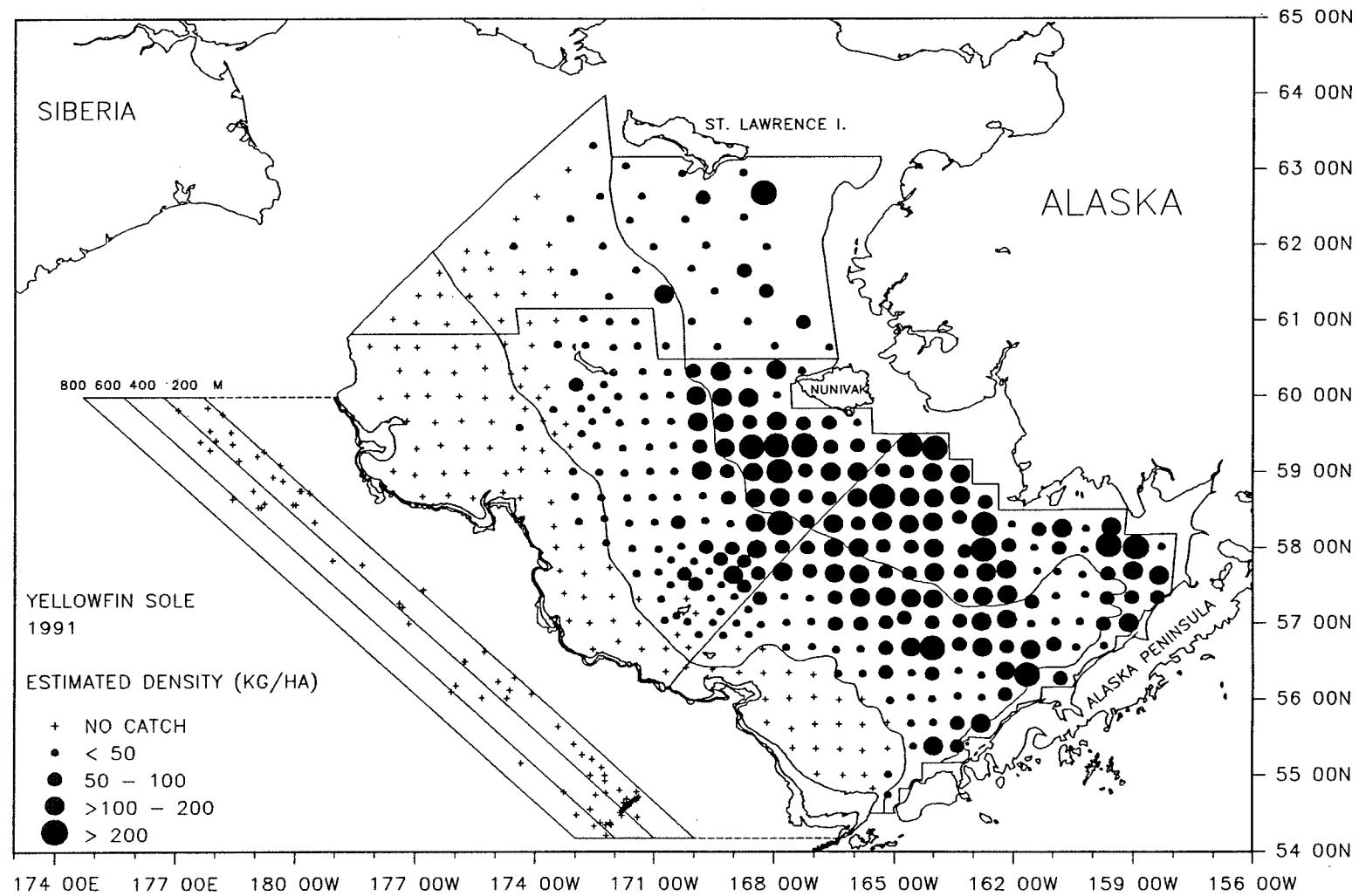
Figure 29.--Distribution and relative abundance of yellowfin sole in the eastern Bering
Sea as shown by the 1991 bottom trawl survey.

Table 18.--Abundance estimates and mean size of yellowfin sole by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

| Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	130.496	1,016,190	0.362	4,447,924,852	0.412	0.228	25.4
2	< 50	108.922	446,874	0.159	1,961,430,246	0.182	0.228	24.7
3	50 - 100	59.341	612,992	0.218	2,164,638,126	0.200	0.283	28.1
4	50 - 100	29.285	315,753	0.112	963,476,824	0.089	0.328	28.9
5	100 - 200	0.191	742	<0.001	1,989,553	<0.001	0.373	30.8
6	100 - 200	0.083	783	<0.001	1,599,886	<0.001	0.489	35.4
Subareas combined		51.650	2,393,333	0.852	9,541,059,487	0.883	0.251	26.3
North Shelf								
7	< 50	49.601	361,232	0.129	1,068,284,687	0.099	0.338	28.2
8	50 - 100	9.523	53,348	0.019	193,279,350	0.018	0.276	29.3
9	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		29.526	414,580	0.148	1,261,564,038	0.117	0.329	28.4
Slope								
10	200 - 500	0.000	0	0.000	0	0.000	-	-
11	200 - 500	0.000	0	0.000	0	0.000	-	-
12	500 - 800	0.000	0	0.000	0	0.000	-	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
All subareas combined		44.932	2,807,912	1.000	10,802,623,524	1.000	0.260	26.5
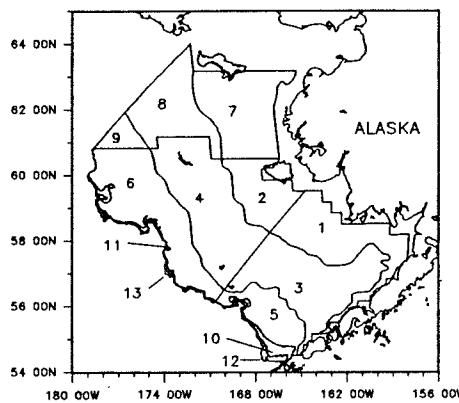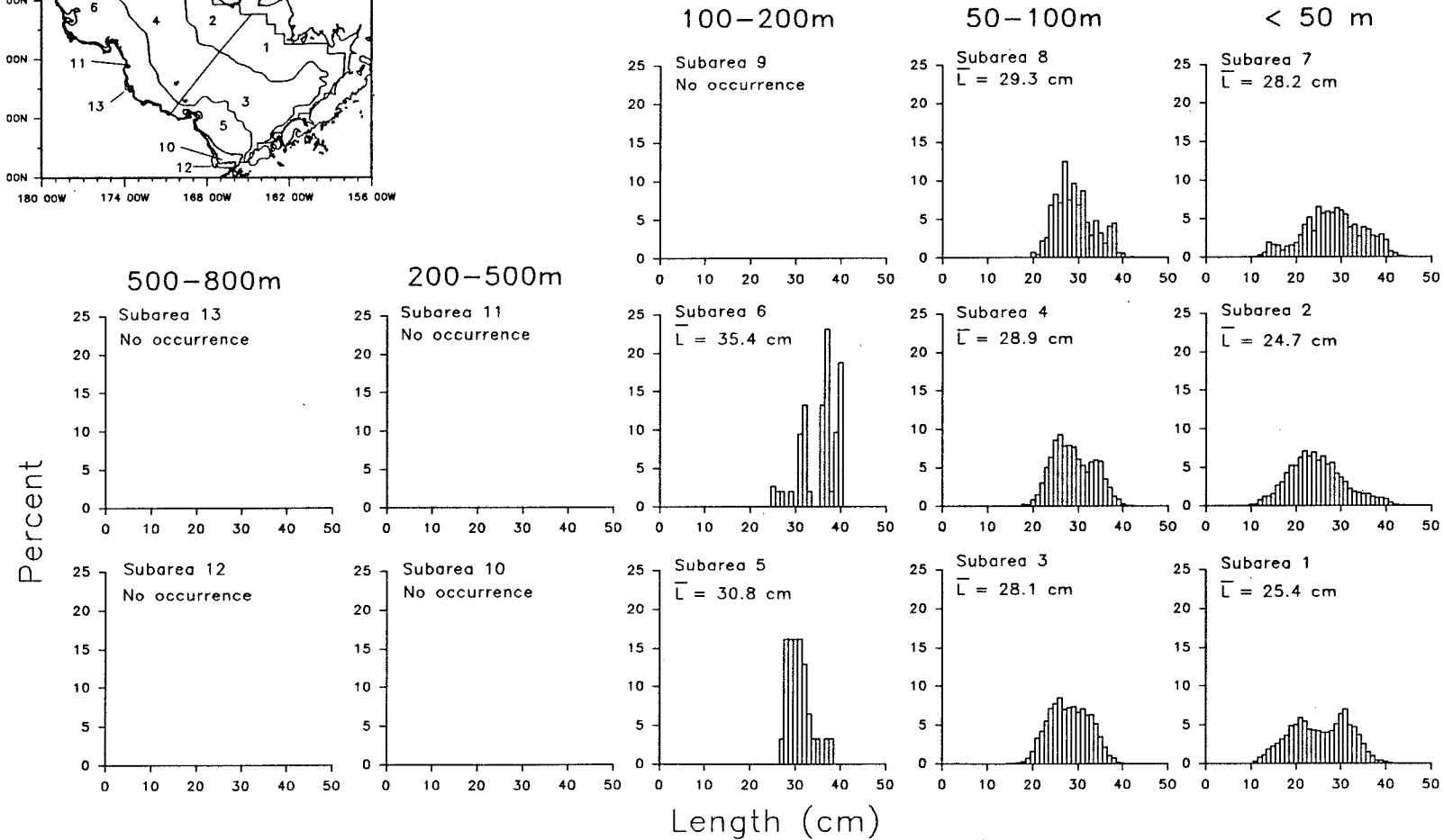
Figure 30.--Length composition of yellowfin sole by subarea and depth zone as
shown by data from the 1991 eastern Bering Sea bottom trawl survey.
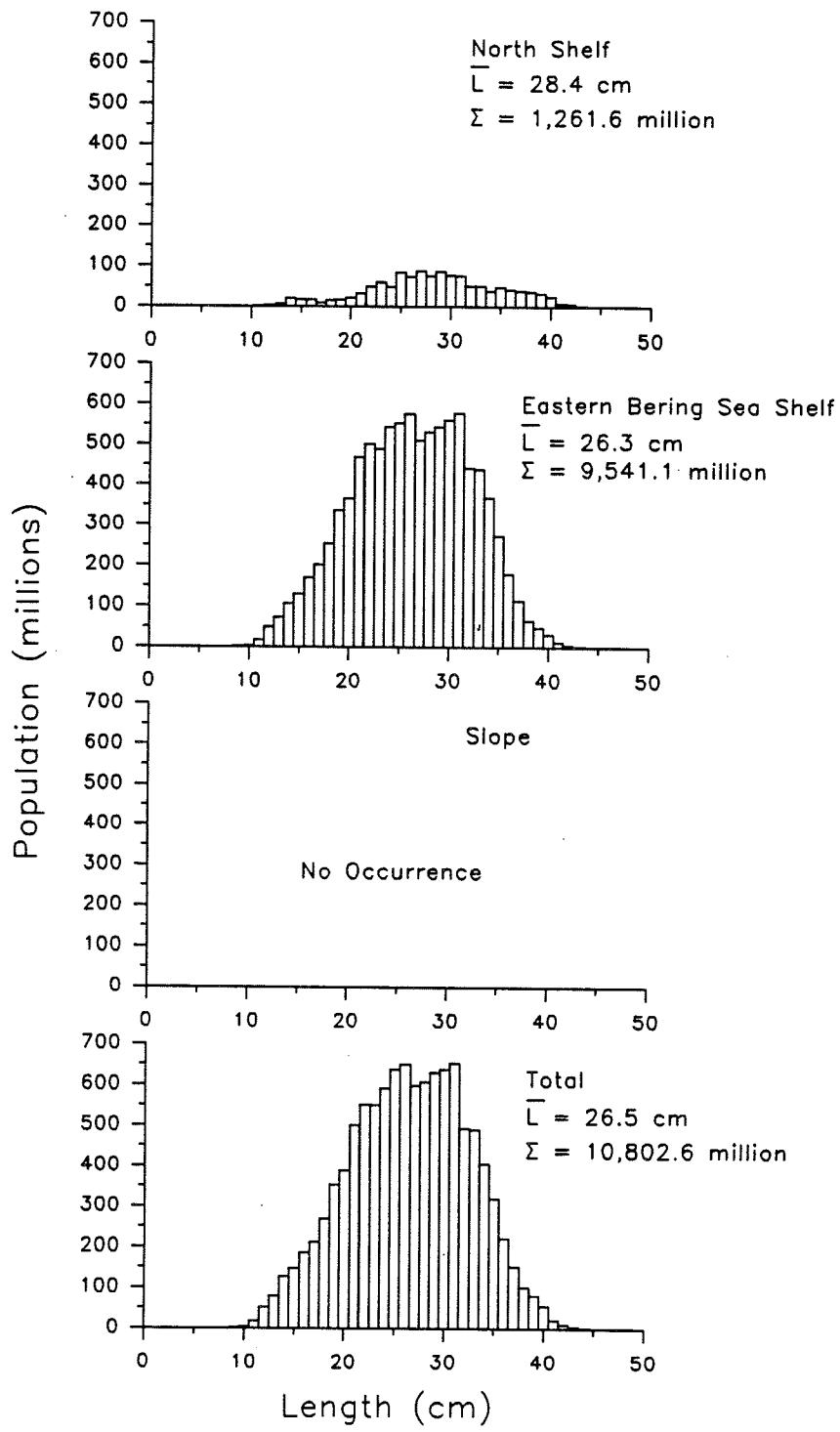
Figure 31.--Population number estimates by centimeter length interval for yellowfin sole in the eastern Bering Sea as shown by data from the 1991 bottom trawl survey.

Table 19.--Estimated population numbers (millions of fish) of yellowfin sole by age group and subarea as shown by age and length data from the 1991 bottom trawl survey of the eastern Bering Sea.

| | | Depth and Subarea | | | | | | | | | | | | | |
		500-800 m		200-500 m		50-200 m		< 50 m	100-200 m		50-100 m		< 50 m		All subareas combined	Pro-portion of total
Age	Year class	13	12	11	10	9	8	7	6	5	4	3	2	1		
1	1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1989	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1988	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.05	3.06	6.48	9.78	0.00
4	1987	0.00	0.00	0.00	0.00	0.00	0.00	26.65	0.00	0.00	0.03	1.03	62.06	166.22	255.98	0.02
5	1986	0.00	0.00	0.00	0.00	0.00	0.50	50.58	0.00	0.00	4.22	22.05	170.52	397.25	645.11	0.06
6	1985	0.00	0.00	0.00	0.00	0.00	0.43	17.31	0.00	0.00	3.32	14.93	71.84	166.19	274.02	0.03
7	1984	0.00	0.00	0.00	0.00	0.00	5.41	53.31	0.00	0.00	35.60	102.86	201.21	378.99	777.39	0.07
8	1983	0.00	0.00	0.00	0.00	0.00	33.38	168.82	0.03	0.08	173.09	424.31	483.29	852.27	2,135.26	0.20
9	1982	0.00	0.00	0.00	0.00	0.00	5.38	22.76	0.01	0.02	25.50	55.27	49.39	76.91	235.23	0.02
10	1981	0.00	0.00	0.00	0.00	0.00	64.85	272.21	0.14	0.71	315.60	688.45	469.23	949.01	2,760.21	0.26
11	1980	0.00	0.00	0.00	0.00	0.00	13.33	57.74	0.08	0.23	54.14	144.25	76.10	260.87	606.75	0.06
12	1979	0.00	0.00	0.00	0.00	0.00	20.79	84.43	0.20	0.37	106.40	231.92	104.74	320.92	869.78	0.08
13	1978	0.00	0.00	0.00	0.00	0.00	3.02	16.64	0.05	0.05	15.59	36.67	16.88	73.60	162.49	0.02
14	1977	0.00	0.00	0.00	0.00	0.00	4.23	23.05	0.06	0.06	26.60	56.15	22.62	91.01	223.78	0.02
15	1976	0.00	0.00	0.00	0.00	0.00	3.22	15.90	0.05	0.03	16.28	37.49	15.75	68.00	156.74	0.01
16	1975	0.00	0.00	0.00	0.00	0.00	4.18	27.60	0.07	0.06	22.95	44.72	23.01	74.09	196.67	0.02
17	1974	0.00	0.00	0.00	0.00	0.00	6.67	30.75	0.10	0.07	30.14	64.66	28.14	113.14	273.68	0.03
18	1973	0.00	0.00	0.00	0.00	0.00	6.91	37.63	0.14	0.09	26.98	43.47	28.36	60.32	203.92	0.02
19	1972	0.00	0.00	0.00	0.00	0.00	2.57	13.28	0.06	0.04	16.38	28.93	10.70	36.60	108.57	0.01
20	1971	0.00	0.00	0.00	0.00	0.00	4.23	44.49	0.22	0.04	24.00	38.99	35.85	82.91	230.74	0.02
21	1970	0.00	0.00	0.00	0.00	0.00	6.06	33.36	0.13	0.06	27.96	57.46	31.11	119.41	275.55	0.03
22	1969	0.00	0.00	0.00	0.00	0.00	2.78	23.32	0.10	0.03	12.80	29.10	20.85	60.14	149.12	0.01
23	1968	0.00	0.00	0.00	0.00	0.00	0.80	6.08	0.03	0.01	4.97	8.38	5.41	10.72	36.39	0.00
24	1967	0.00	0.00	0.00	0.00	0.00	2.89	14.51	0.01	0.02	13.38	23.42	11.34	43.92	109.50	0.01
25	1966	0.00	0.00	0.00	0.00	0.00	0.39	4.17	0.02	0.00	1.71	2.34	4.22	8.00	20.86	0.00
26	1965	0.00	0.00	0.00	0.00	0.00	0.40	7.59	0.04	0.00	3.20	2.69	5.04	5.94	24.90	0.00
27	1964	0.00	0.00	0.00	0.00	0.00	0.47	7.23	0.03	0.00	1.82	1.95	4.96	9.28	25.76	0.00
28	1963	0.00	0.00	0.00	0.00	0.00	0.29	1.35	0.00	0.00	0.58	2.94	1.55	10.79	17.50	0.00
29	1962	0.00	0.00	0.00	0.00	0.00	0.00	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	1961	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	1960	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	1959	0.00	0.00	0.00	0.00	0.00	0.09	1.82	0.03	0.00	0.23	0.13	1.53	0.70	4.52	0.00
AGE UNKNOWN		0.00	0.00	0.00	0.00	0.00	0.00	5.52	0.00	0.00	0.00	0.00	2.66	4.25	12.42	0.00
TOTAL		0.00	0.00	0.00	0.00	0.00	193.28	1,068.28	1.60	1.99	963.48	2,164.64	1,961.43	4,447.92	10,802.62	1.00

73
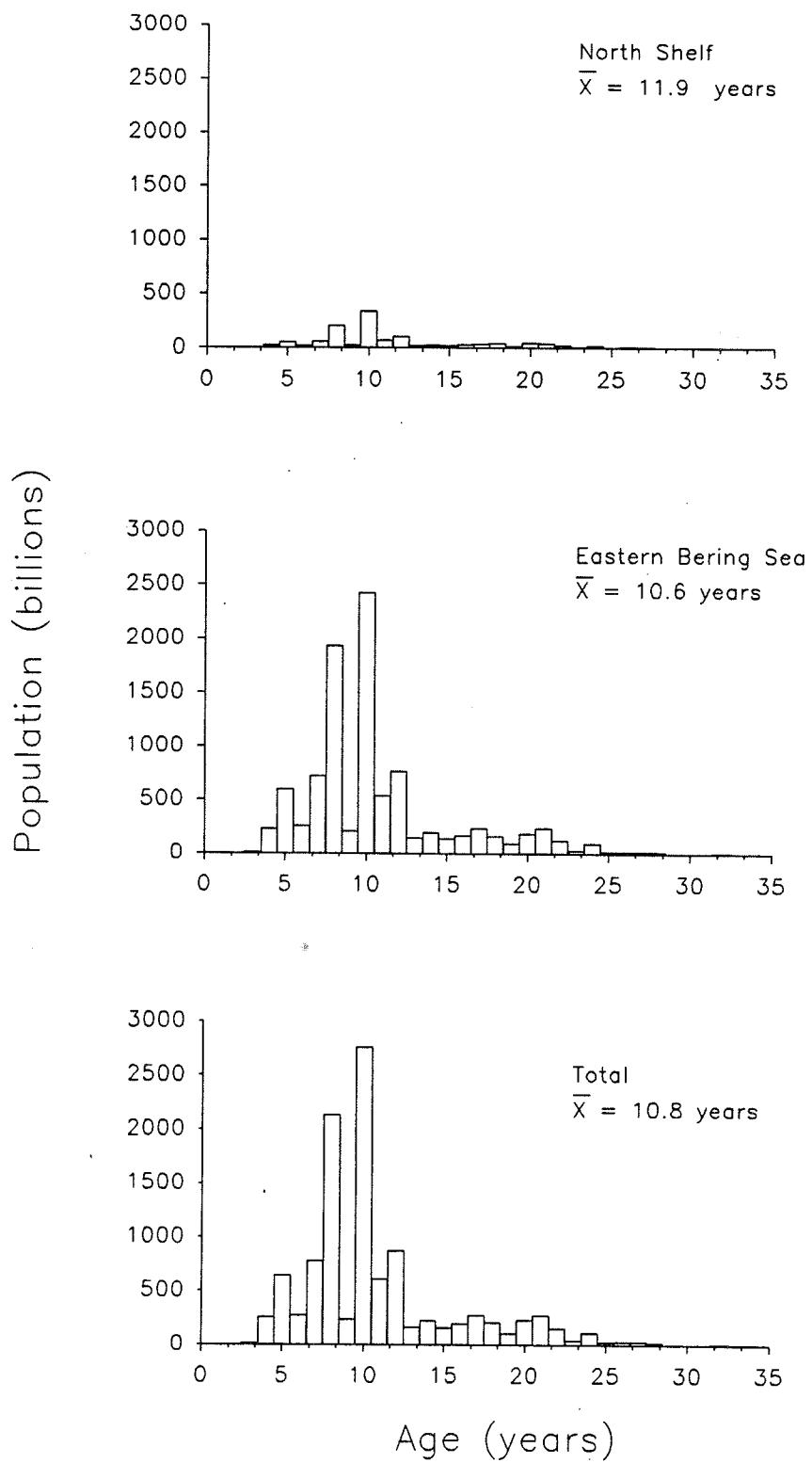
Figure 32.--Population estimates by age for yellowfin sole, 1991 eastern Bering Sea bottom trawl survey.
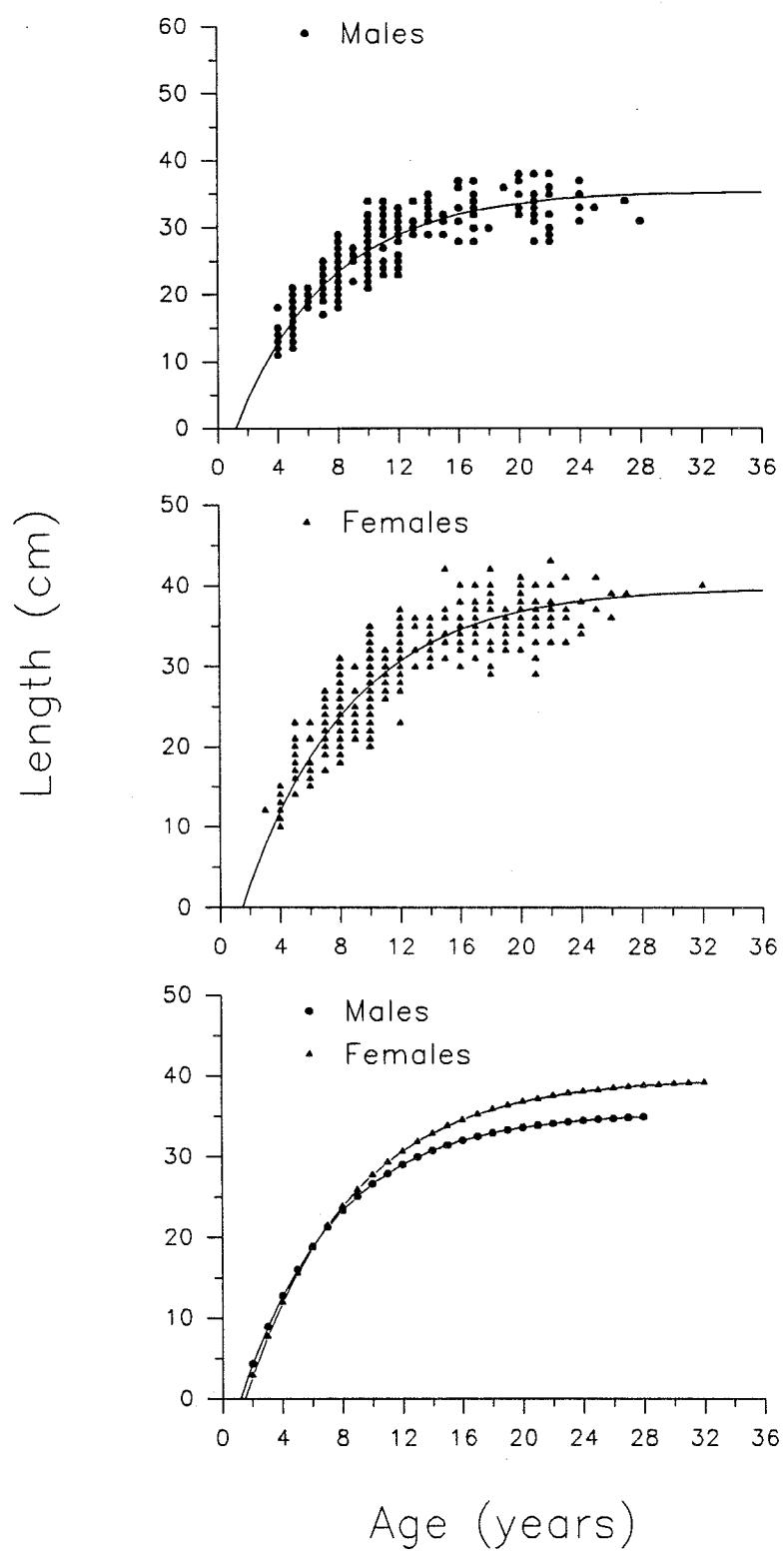
Figure 33.--Von Bertalanffy growth curves for male and female
yellowfin sole,form the 1991 eastern Bering Sea
bottom trawl survey. Mean lengths at age can be
found in Appendix F.

Table 20.--Parameters of the von Bertalanffy growth curves for
yellowfin sole by sex based on age reading from
otoliths and length data from the 1991 U.S. bottom
trawl survey.

| Sex | Number of age readings | Age range | Length range (cm) | Parameters | | t_0 |
				L_{inf}	K	
Male	349	4-28	11-38	35.481	.1573	1.1637
Female	445	3-32	10-43	39.789	.1402	1.4644
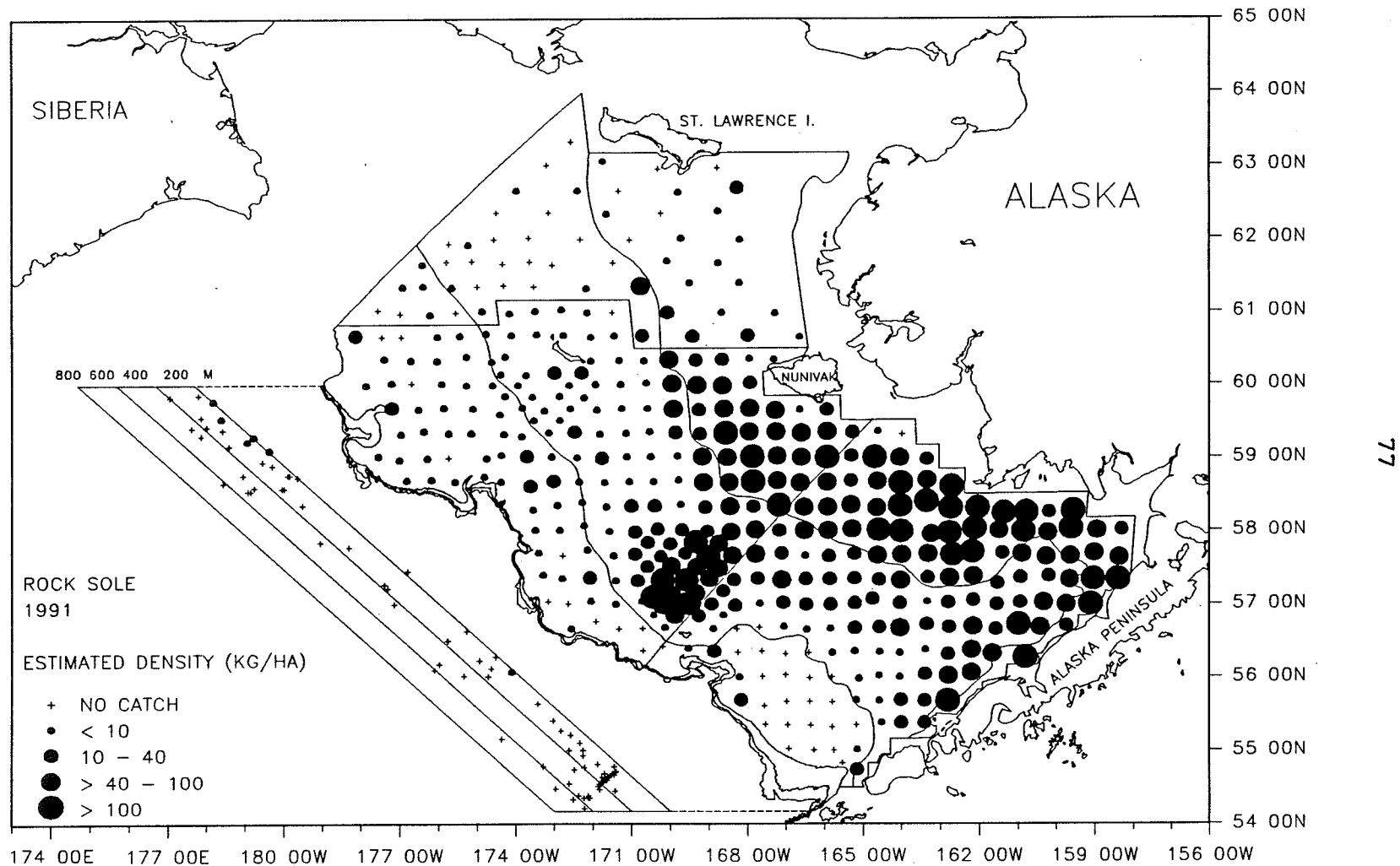
Figure 34.—Distribution and relative abundance of rock sole in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 21.--Abundance estimates and mean size of rock sole by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	98.279	765,309	0.465	5,392,003,060	0.486	0.142	20.6
2	< 50	57.888	237,497	0.144	1,755,924,764	0.158	0.135	19.8
3	50 - 100	25.808	266,594	0.162	2,051,203,885	0.185	0.130	21.9
4	50 - 100	25.331	273,126	0.166	1,479,131,024	0.133	0.185	22.5
5	100 - 200	1.402	5,440	0.003	11,173,197	0.001	0.487	34.3
6	100 - 200	4.261	40,289	0.024	96,835,870	0.009	0.416	31.3
Subareas combined		34.276	1,588,256	0.964	10,786,271,801	0.972	0.147	21.1
North Shelf								
7	< 50	5.245	38,197	0.023	253,362,518	0.023	0.151	20.7
8	50 - 100	3.592	20,124	0.012	55,335,740	0.005	0.364	30.0
9	100 - 200	0.365	423	<0.001	1,506,266	<0.001	0.281	28.9
Subareas combined		4.184	58,744	0.036	310,204,524	0.028	0.189	22.4
Slope								
10	200 - 500	0.009	7	<0.001	5,173	<0.001	1.361	46.0
11	200 - 500	0.347	196	<0.001	358,034	<0.001	0.548	33.2
12	500 - 800	0.000	0	0.000	0	0.000	-	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.096	203	0.000	363,207	0.000	0.559	33.4
All subareas combined		26.359	1,647,202	1.000	11,096,839,532	1.000	0.148	21.1

ROCK SOLE
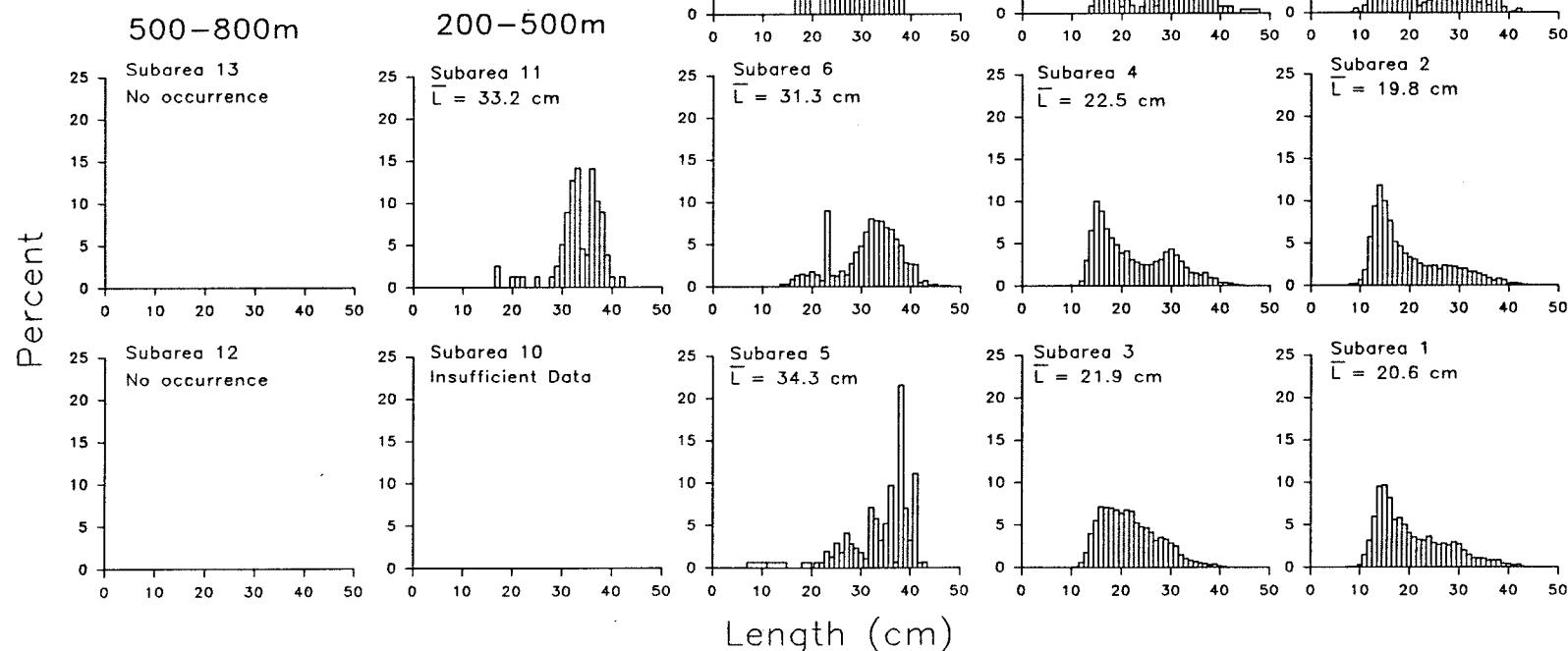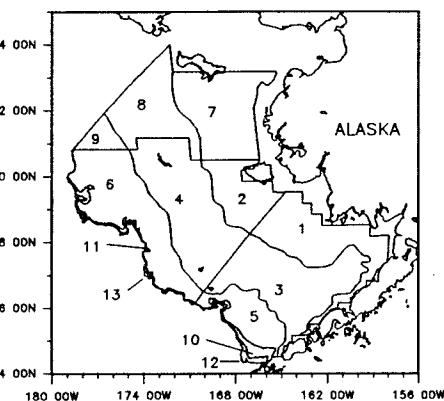
Figure 35.--Length composition of rock sole by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.
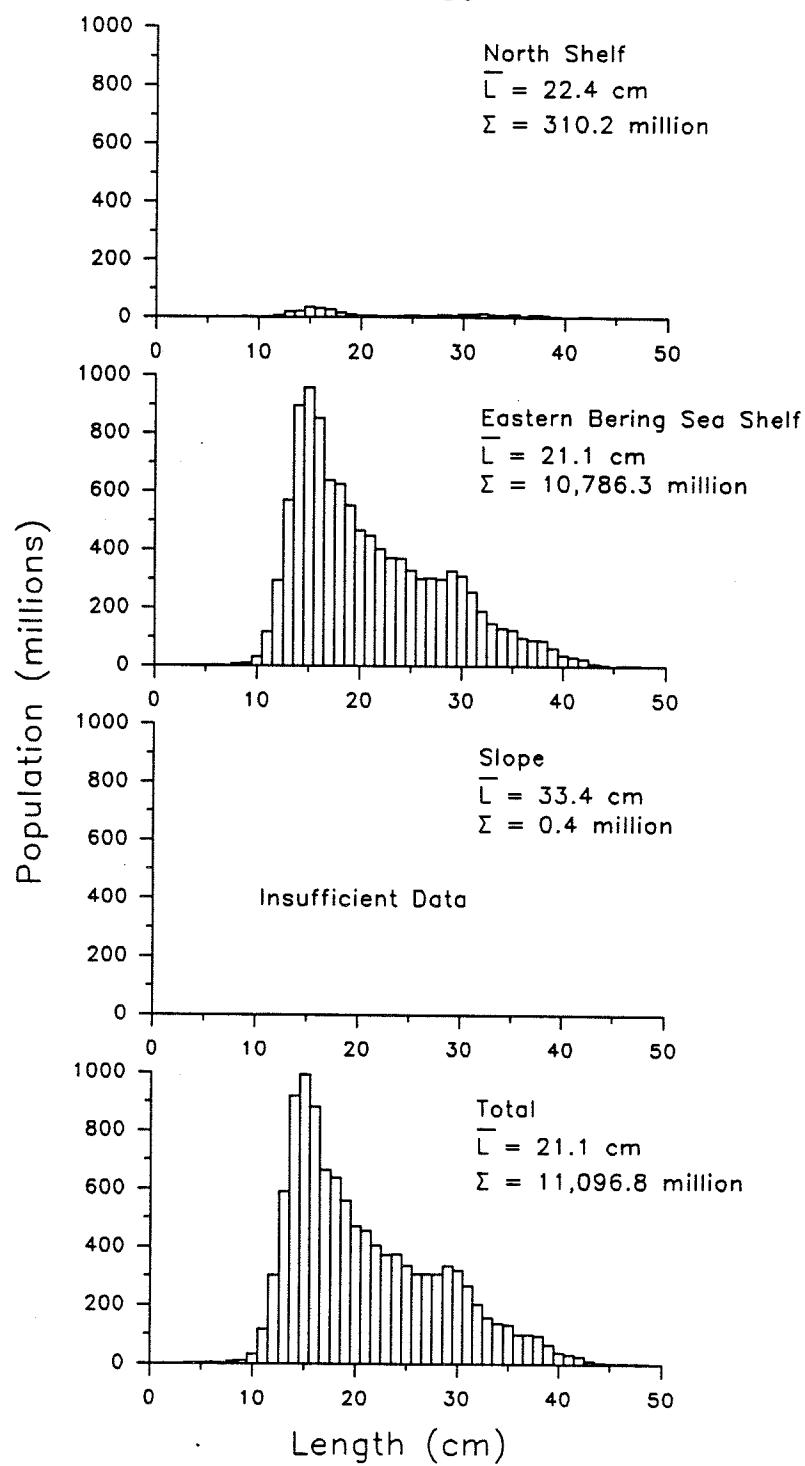
Figure 36.--Population number estimates by centimeter length
interval for rock sole in the eastern Bering Sea
as shown by data from the 1991 bottom trawl survey.

Table 22.--Estimated population numbers (millions of fish) of rock sole by age group and subarea as shown by age and length data from the 1991 bottom trawl survey of the eastern Bering Sea.

		500-800 m		200-500 m		50-200 m		< 50 m	100-200 m		50-100 m		< 50 m		All subareas combined	Proportion of total
Age	Year class	13	12	11	10	9	8	7	6	5	4	3	2	1		
1	1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1989	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.52	0.59	6.07	19.22	26.74	0.00
3	1988	0.00	0.00	0.00	0.00	0.00	0.05	4.06	0.03	0.00	6.52	5.72	52.02	103.53	171.92	0.02
4	1987	0.00	0.00	0.00	0.00	0.02	4.47	110.07	2.18	0.11	437.10	448.11	769.91	1,975.87	3,747.84	0.34
5	1986	0.00	0.00	0.01	0.00	0.09	5.06	44.33	5.96	0.17	312.47	567.59	307.91	1,113.86	2,357.44	0.21
6	1985	0.00	0.00	0.01	0.00	0.20	2.84	16.74	7.52	0.53	164.61	362.68	163.50	639.45	1,358.08	0.12
7	1984	0.00	0.00	0.01	0.00	0.21	2.99	14.18	7.93	0.75	126.75	256.06	114.17	467.61	990.66	0.09
8	1983	0.00	0.00	0.05	0.00	0.35	7.11	18.20	14.72	1.00	139.26	174.89	114.01	403.89	873.48	0.08
9	1982	0.00	0.00	0.05	0.00	0.23	6.46	13.85	12.73	1.10	89.70	90.66	72.78	241.44	529.00	0.05
10	1981	0.00	0.00	0.06	0.00	0.20	8.28	9.89	12.59	1.07	73.94	65.22	51.20	150.59	373.05	0.03
11	1980	0.00	0.00	0.05	0.00	0.10	6.37	8.19	9.63	1.54	47.42	37.63	35.97	97.03	243.94	0.02
12	1979	0.00	0.00	0.05	0.00	0.04	5.00	5.04	8.82	1.20	32.75	17.07	22.41	68.14	160.52	0.01
13	1978	0.00	0.00	0.02	0.00	0.03	2.28	2.48	3.50	1.17	15.42	9.95	11.26	30.07	76.19	0.01
14	1977	0.00	0.00	0.02	0.00	0.01	2.32	2.65	3.65	0.88	12.06	5.83	10.15	23.82	61.38	0.00
15	1976	0.00	0.00	0.01	0.00	0.00	0.84	0.92	1.69	0.24	6.67	3.02	5.72	15.85	34.96	0.00
16	1975	0.00	0.00	0.00	0.00	0.00	0.09	0.14	0.00	0.21	3.07	0.37	2.19	7.29	13.37	0.00
17	1974	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.85	0.00
18	1973	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.31	0.15	0.74	0.23	0.58	1.78	3.89	0.00
19	1972	0.00	0.00	0.00	0.00	0.00	0.12	0.11	0.19	0.05	0.96	0.52	0.85	1.81	4.61	0.00
20	1971	0.00	0.00	0.00	0.00	0.00	0.03	0.92	0.22	0.03	0.71	0.27	0.55	1.92	4.65	0.00
21	1970	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.22	0.02	1.13	0.05	0.68	2.92	5.19	0.00
22	1969	0.00	0.00	0.00	0.00	0.02	0.80	0.00	1.46	0.54	5.71	3.37	3.84	10.20	25.95	0.00
30	1960	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.30	0.00	0.08	1.52	1.99	0.00
AGE UNKNOWN		0.00	0.00	0.00	0.00	0.04	0.00	1.22	2.45	0.42	1.15	0.99	10.03	13.91	29.90	0.00
TOTAL		0.00	0.00	0.36	0.01	1.51	55.34	253.36	96.84	11.17	1,479.13	2,051.20	1,755.92	5,392.00	11,096.84	1.00
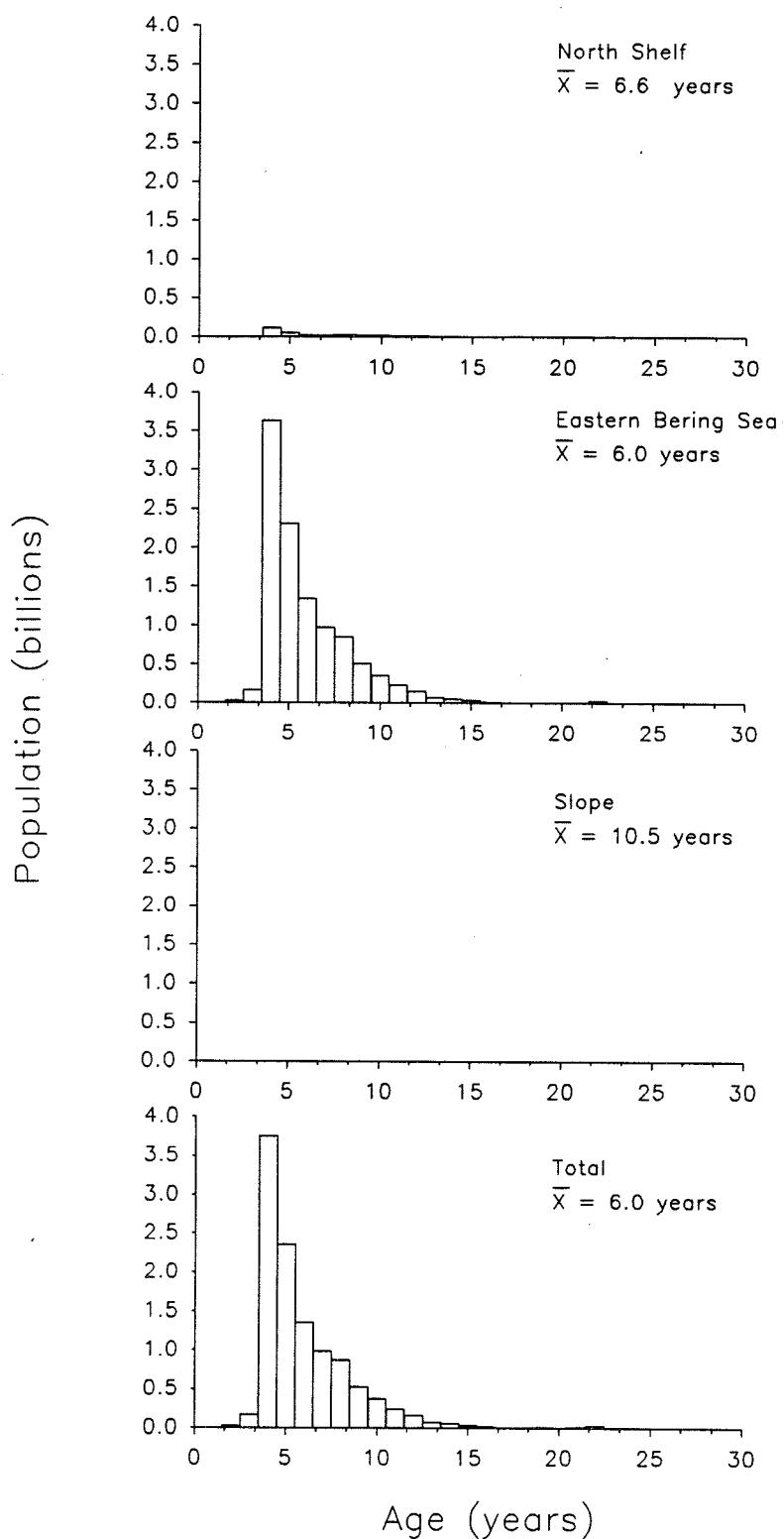
Figure 37.--Population estimates by age for rock sole, 1991 eastern Bering Sea bottom trawl survey.
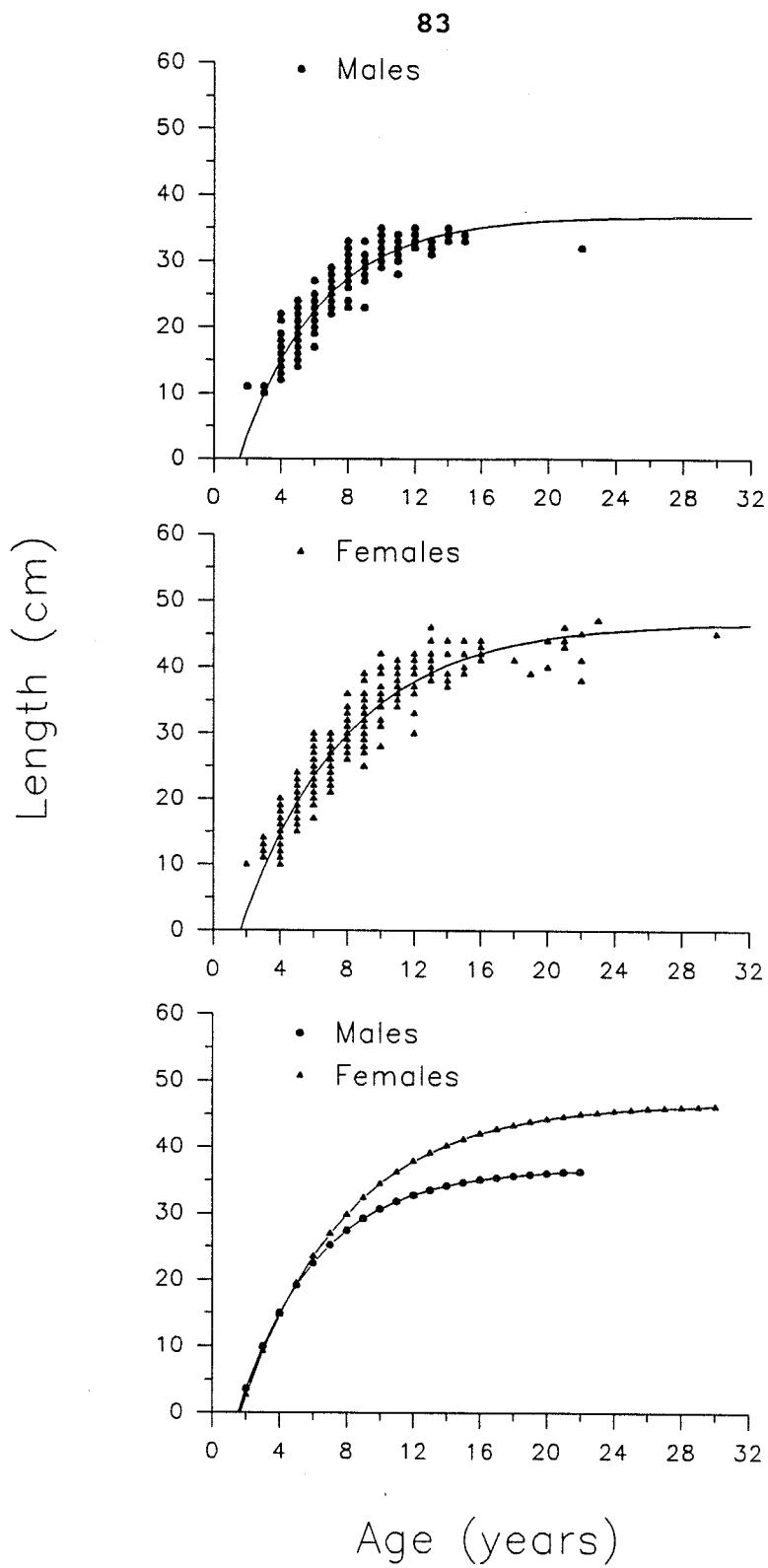
Figure 38.--Von Bertalanffy growth curves for male and female rock sole, from the 1991 eastern Bering sea bottom trawl survey. Mean lengths at age can be found in Appendix F.

Table 23.--Parameters of the von Bertalanffy growth curves for
rock sole by sex based on age reading from otoliths
and length data from the 1991 U.S. bottom trawl
survey.

| Sex	Number of age readings	Age range	Length range (cm)	Parameters		
				L_{inf}	K	t_0
Male	251	2-22	10-35	36.847	.2104	1.5122
Female	371	2-30	10-47	46.768	.1596	1.6296
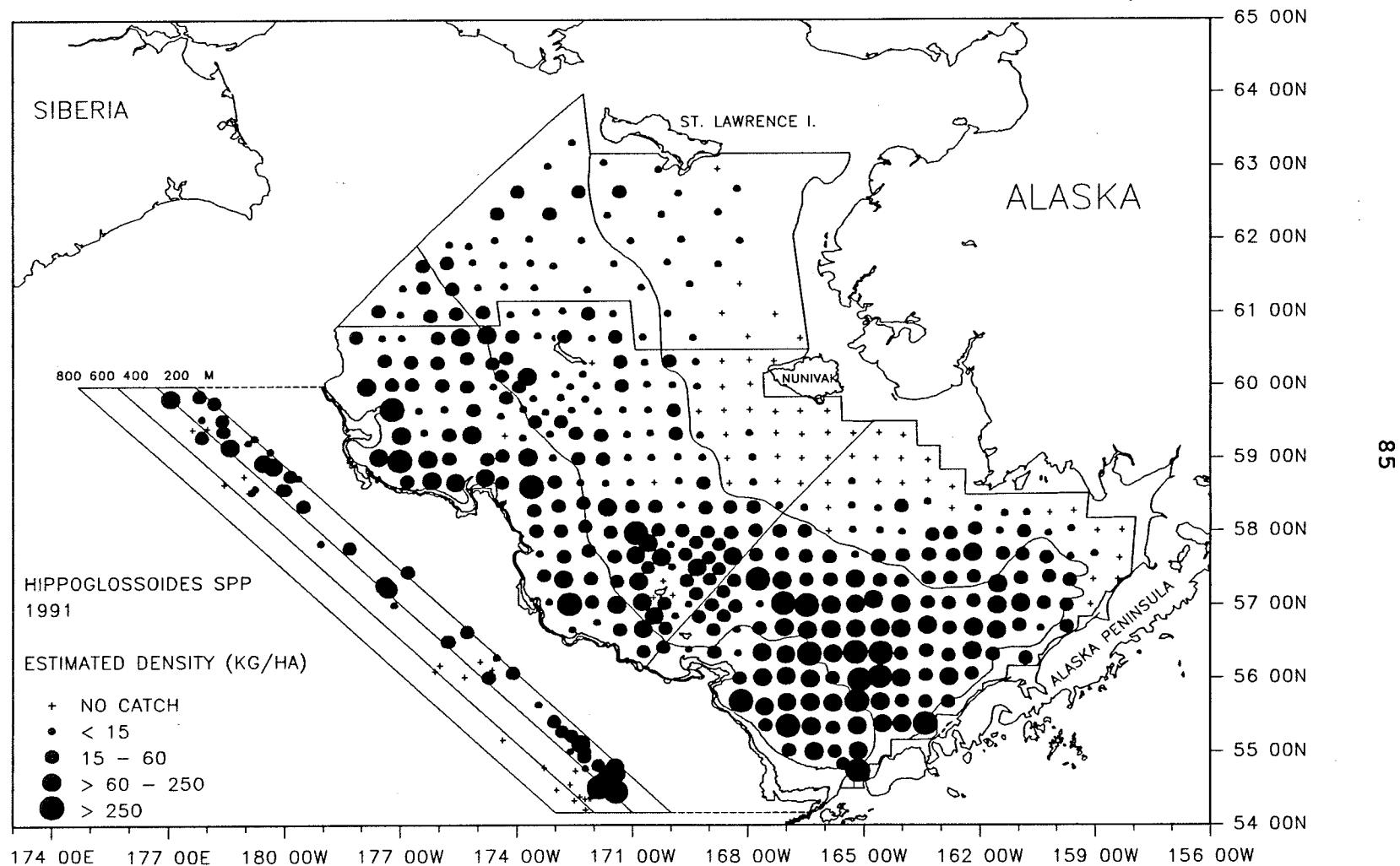
Figure 39.--Distribution and relative abundance of Hippoglossoides spp. in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 24.--Abundance estimates and mean size of _Hippoglossoides_ spp. by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

| Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	2.890	22,503	0.037	54,536,794	0.019	0.413	33.5
2	< 50	0.254	1,041	0.002	2,743,735	0.001	0.379	21.3
3	50 - 100	23.609	243,884	0.397	958,175,639	0.341	0.255	31.0
4	50 - 100	6.192	66,761	0.109	236,279,066	0.084	0.283	28.6
5	100 - 200	26.742	103,737	0.169	663,058,925	0.236	0.156	24.6
6	100 - 200	14.004	132,422	0.216	582,946,769	0.208	0.227	26.4
Subareas combined		12.309	570,348	0.929	2,497,740,929	0.889	0.228	28.1
North Shelf								
7	< 50	0.621	4,521	0.007	32,510,698	0.012	0.139	21.5
8	50 - 100	2.367	13,262	0.022	178,078,604	0.063	0.074	18.8
9	100 - 200	7.730	8,942	0.015	60,315,503	0.021	0.148	24.5
Subareas combined		1.903	26,724	0.044	270,904,805	0.096	0.099	20.4
Slope								
10	200 - 500	14.322	11,149	0.018	26,606,717	0.009	0.419	32.8
11	200 - 500	9.469	5,346	0.009	13,211,918	0.005	0.405	32.5
12	500 - 800	0.088	38	<0.001	68,941	<0.001	0.558	38.6
13	500 - 800	1.124	372	0.001	524,372	<0.001	0.710	40.1
Subareas combined		8.000	16,906	0.028	40,411,947	0.014	0.418	32.8
All subareas combined		9.825	613,979	1.000	2,809,057,681	1.000	0.219	27.4
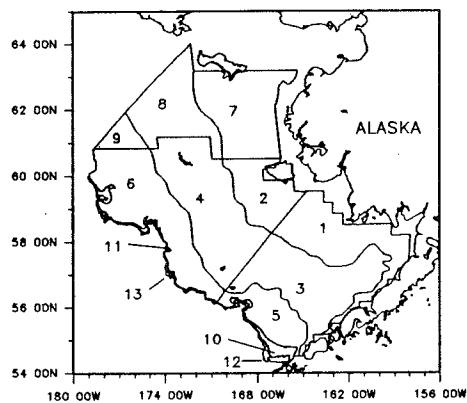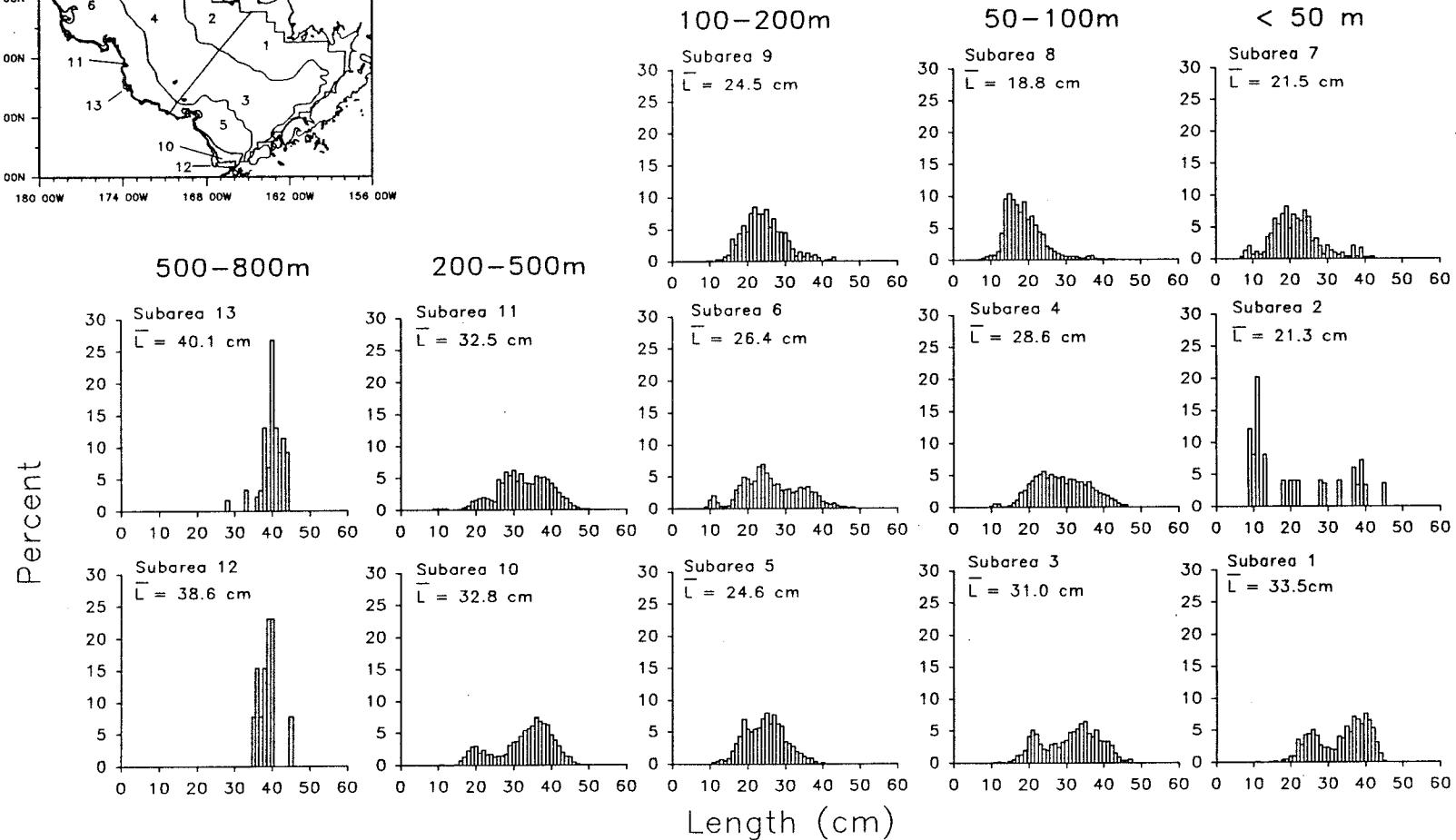
Figure 40.--Length composition of Hippoglossoides spp. by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.
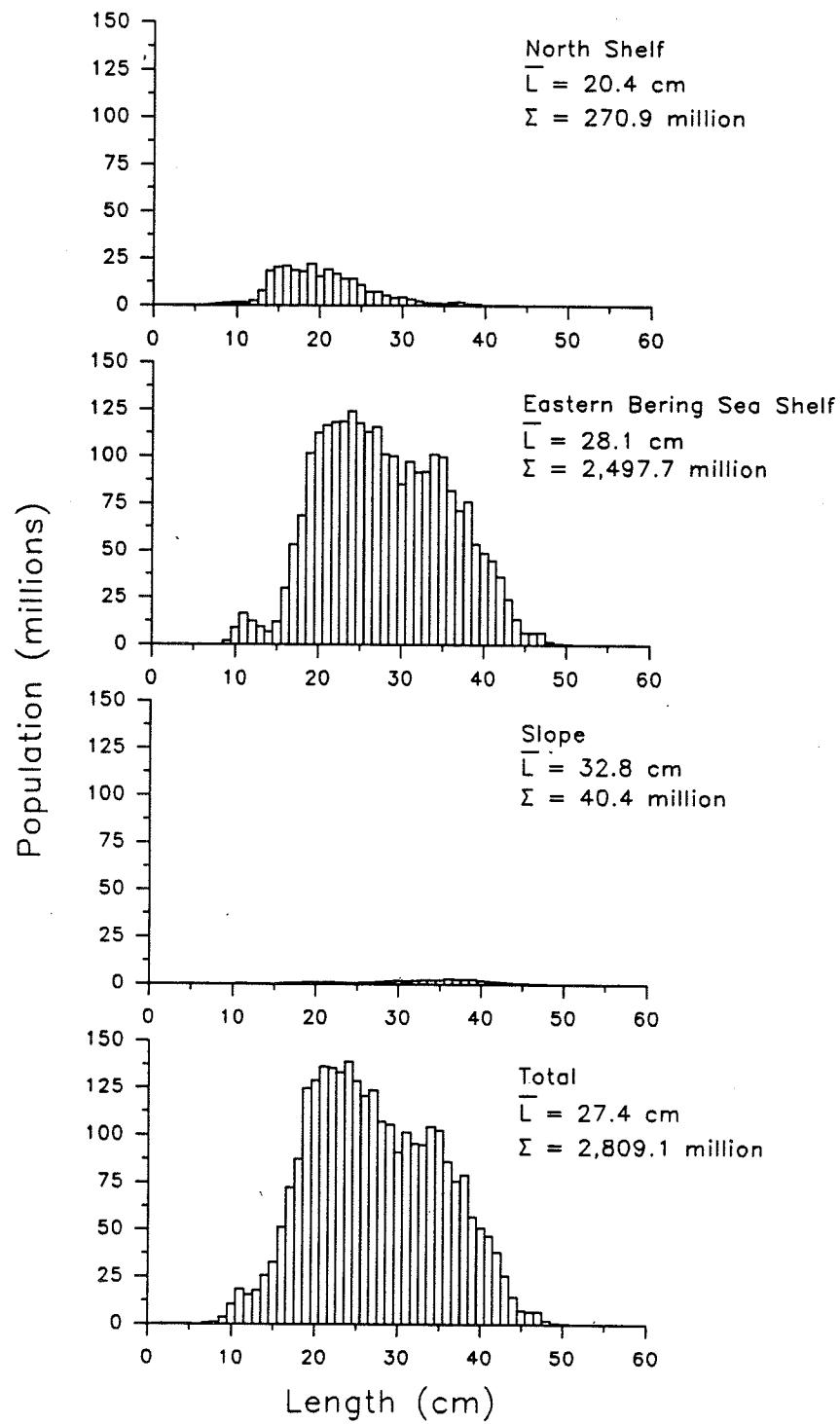
Figure 41.--Population number estimates by centimeter length interval for _Hippoglossoides_ spp. in the eastern Bering Sea as shown by data from the 1991 bottom trawl survey.
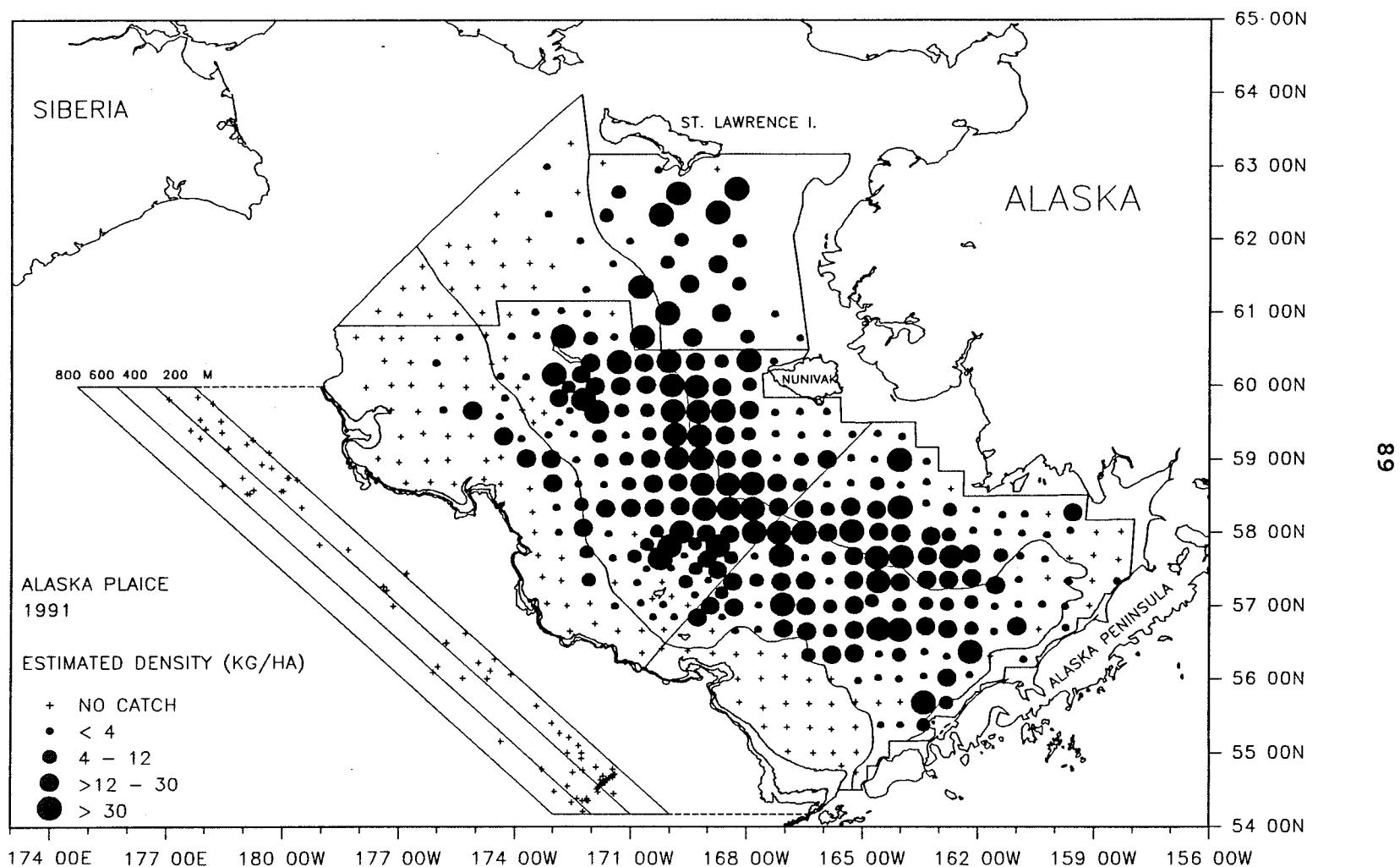
Figure 42.--Distribution and relative abundance of Alaska plaice in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 25.--Abundance estimates and mean size of Alaska plaice by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	11.338	88,288	0.124	190,780,180	0.148	0.463	32.0
2	< 50	17.216	70,633	0.099	141,172,687	0.110	0.500	31.9
3	50 - 100	11.793	121,824	0.171	420,363,805	0.327	0.290	36.8
4	50 - 100	21.160	228,156	0.319	264,969,458	0.206	0.861	38.5
5	100 - 200	0.058	224	<0.001	188,450	<0.001	1.187	41.5
6	100 - 200	2.111	19,967	0.028	10,763,444	0.008	1.855	48.0
Subareas combined		11.418	529,092	0.741	1,028,238,024	0.799	0.515	35.8
North Shelf								
7	< 50	18.391	133,937	0.188	185,405,820	0.144	0.722	36.3
8	50 - 100	9.127	51,127	0.072	72,897,102	0.057	0.701	36.7
9	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		13.180	185,064	0.259	258,302,922	0.201	0.716	36.4
Slope								
10	200 - 500	0.000	0	0.000	0	0.000	-	-
11	200 - 500	0.000	0	0.000	0	0.000	-	-
12	500 - 800	0.000	0	0.000	0	0.000	-	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
All subareas combined		11.428	714,156	1.000	1,286,540,946	1.000	0.555	35.9
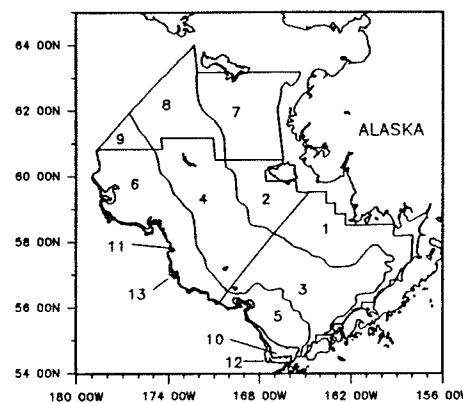
ALASKA PLAICE
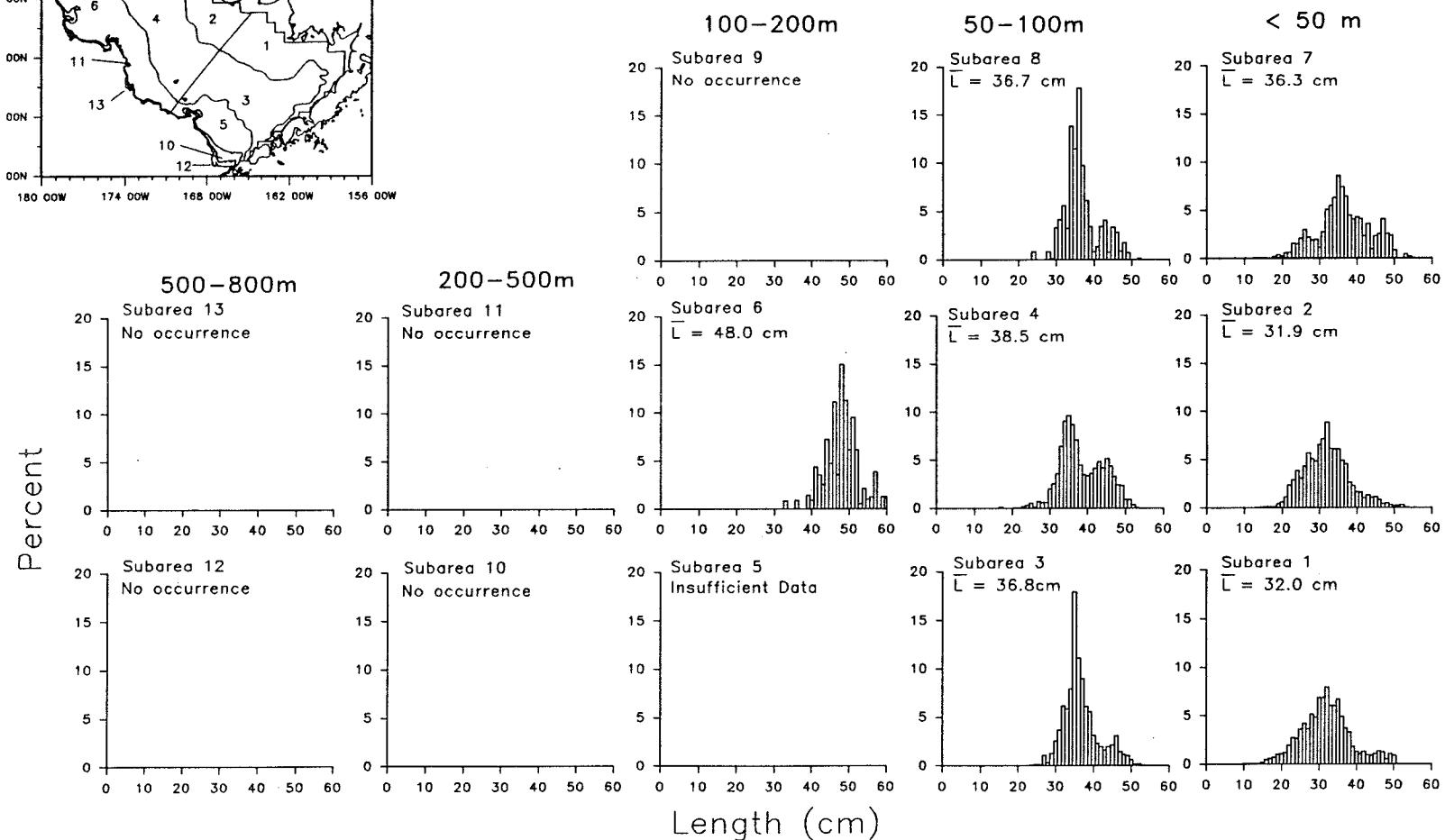
Figure 43.--Length composition of Alaska plaice by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.
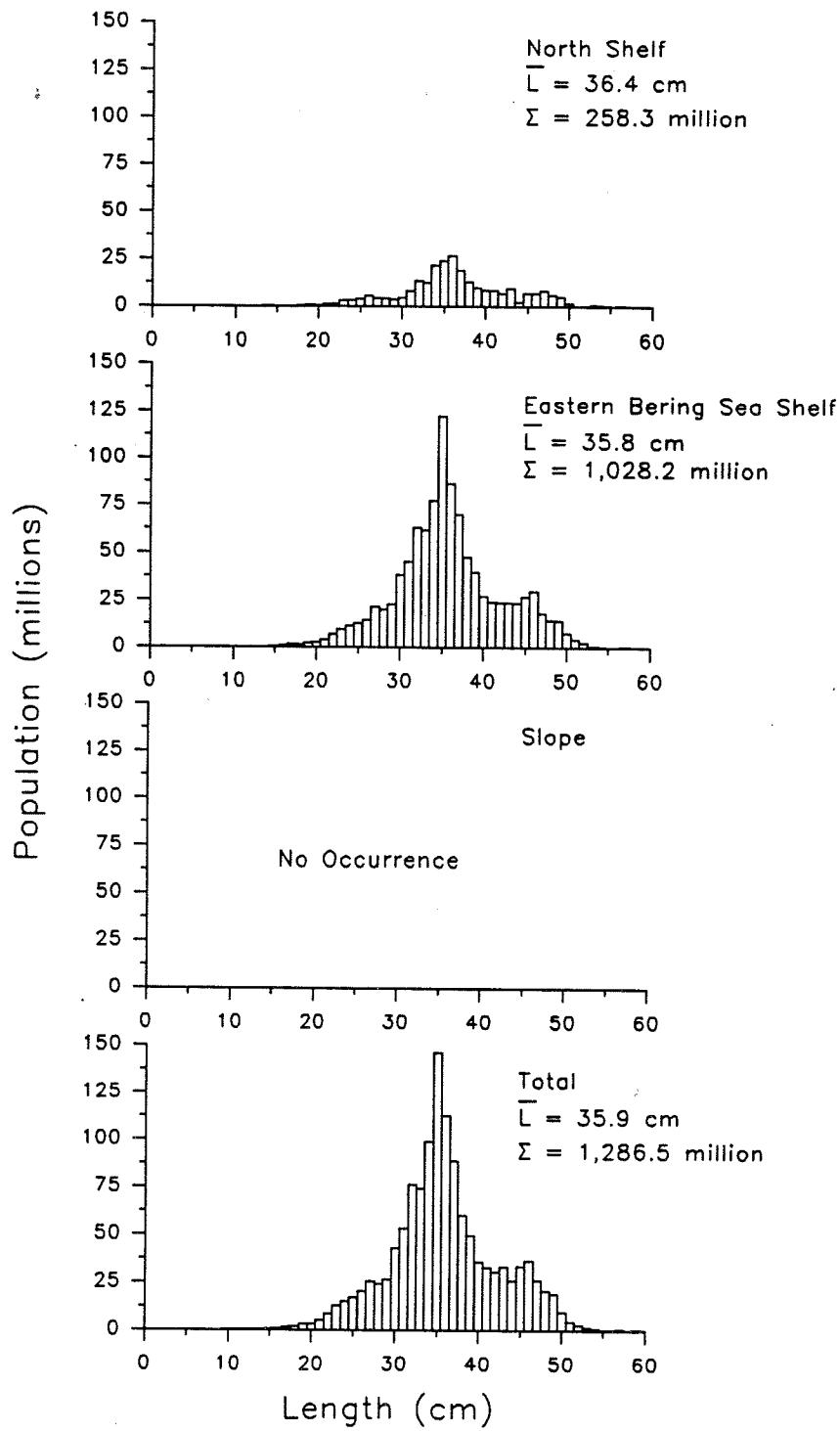
Figure 44.--Population number estimates by centimeter length
interval for Alaska plaice in the eastern Bering Sea
as shown by data from the 1991 bottom trawl survey.
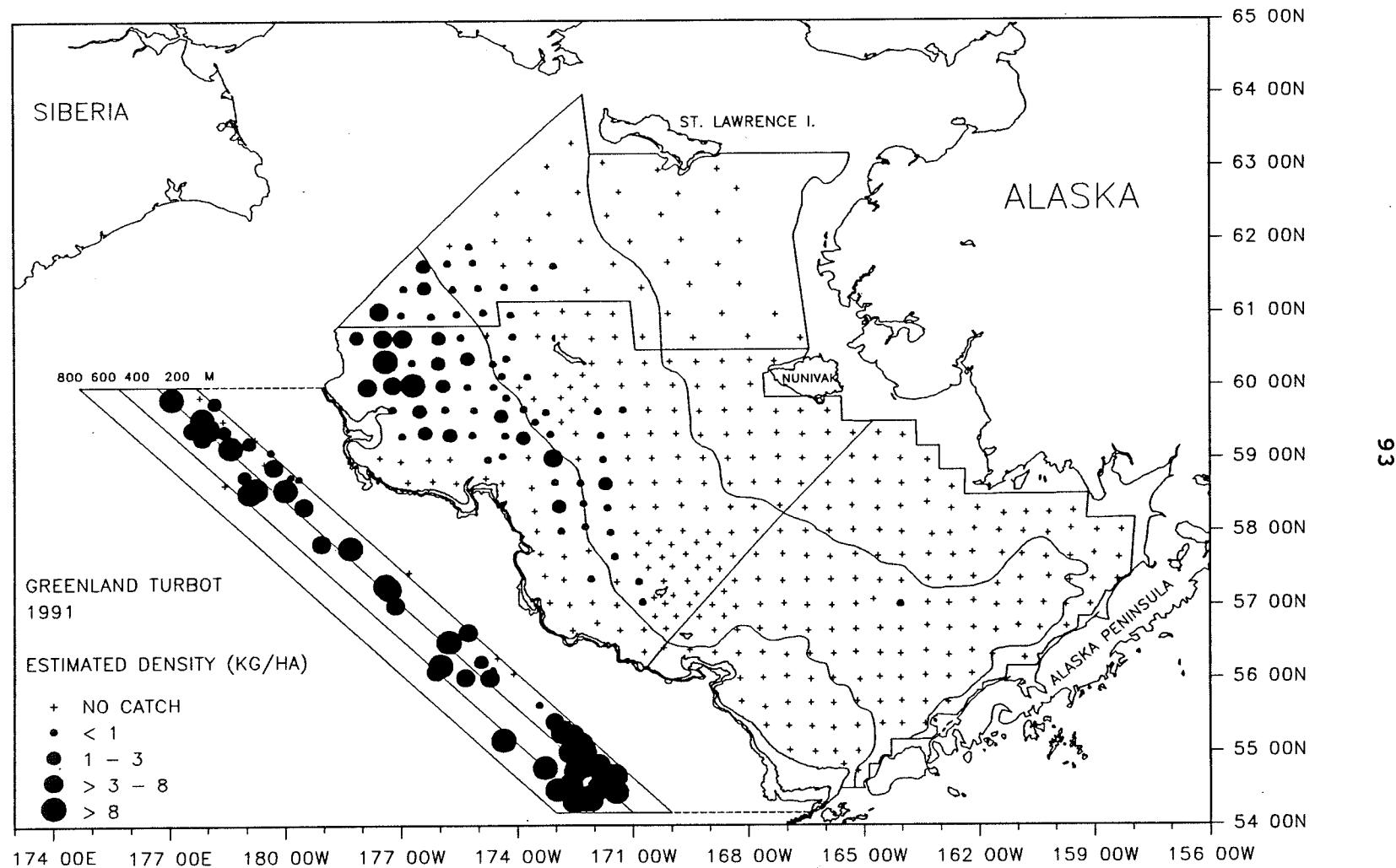
Figure 45.—Distribution and relative abundance of Greenland turbot in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 26.--Abundance estimates and mean size of Greenland turbot by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.000	0	0.000	0	0.000	-	-
2	< 50	0.000	0	0.000	0	0.000	-	-
3	50 - 100	<0.001	1	<0.001	29,081	0.001	0.045	-
4	50 - 100	0.038	412	0.008	1,863,397	0.040	0.221	24.3
5	100 - 200	0.000	0	0.000	0	0.000	-	-
6	100 - 200	1.083	10,245	0.190	21,183,660	0.454	0.484	30.4
Subareas combined		0.230	10,658	0.198	23,076,138	0.495	0.462	29.9
North Shelf								
7	< 50	0.000	0	0.000	0	0.000	-	-
8	50 - 100	0.014	78	0.001	2,956,798	0.063	0.027	14.5
9	100 - 200	1.941	2,246	0.042	8,987,162	0.193	0.250	26.7
Subareas combined		0.166	2,324	0.043	11,943,960	0.256	0.195	23.7
Slope								
10	200 - 500	26.101	20,319	0.377	5,915,688	0.127	3.435	68.9
11	200 - 500	12.511	7,064	0.131	2,740,760	0.059	2.577	62.2
12	500 - 800	24.926	10,948	0.203	2,136,689	0.046	5.124	75.7
13	500 - 800	7.706	2,551	0.047	815,810	0.017	3.127	67.8
Subareas combined		19.344	40,883	0.759	11,608,947	0.249	3.522	68.5
All subareas combined		0.862	53,865	1.000	46,629,046	1.000	1.155	37.9
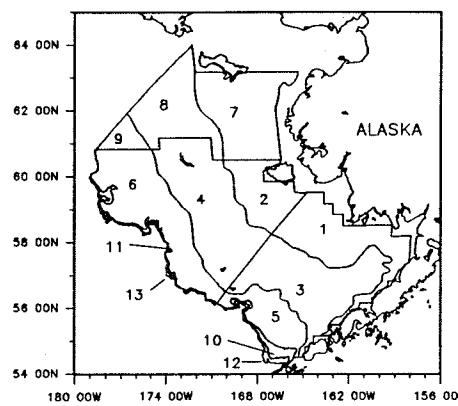
GREENLAND TURBOT
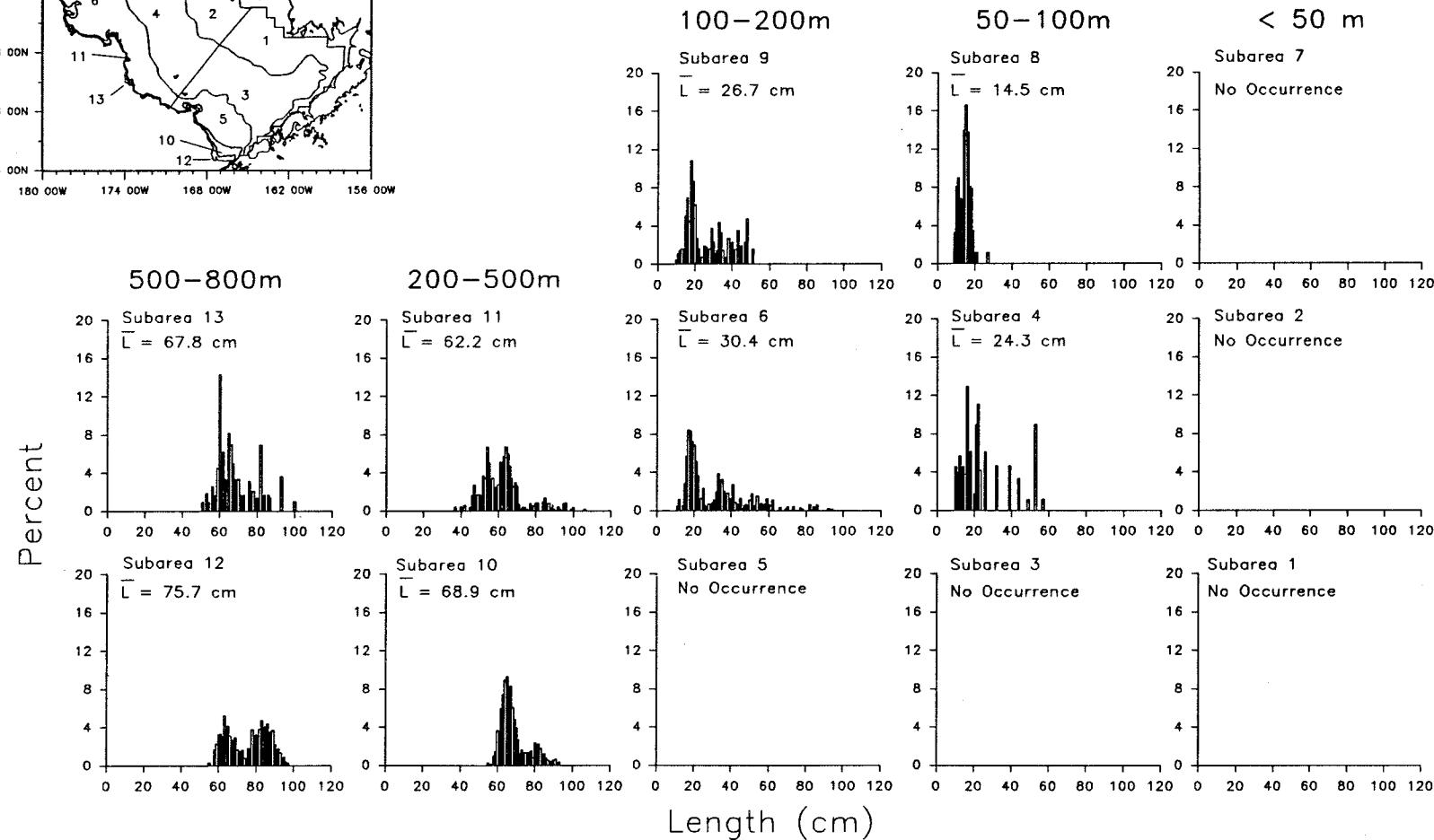
Figure 46.--Length composition of Greenland turbot by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.

95
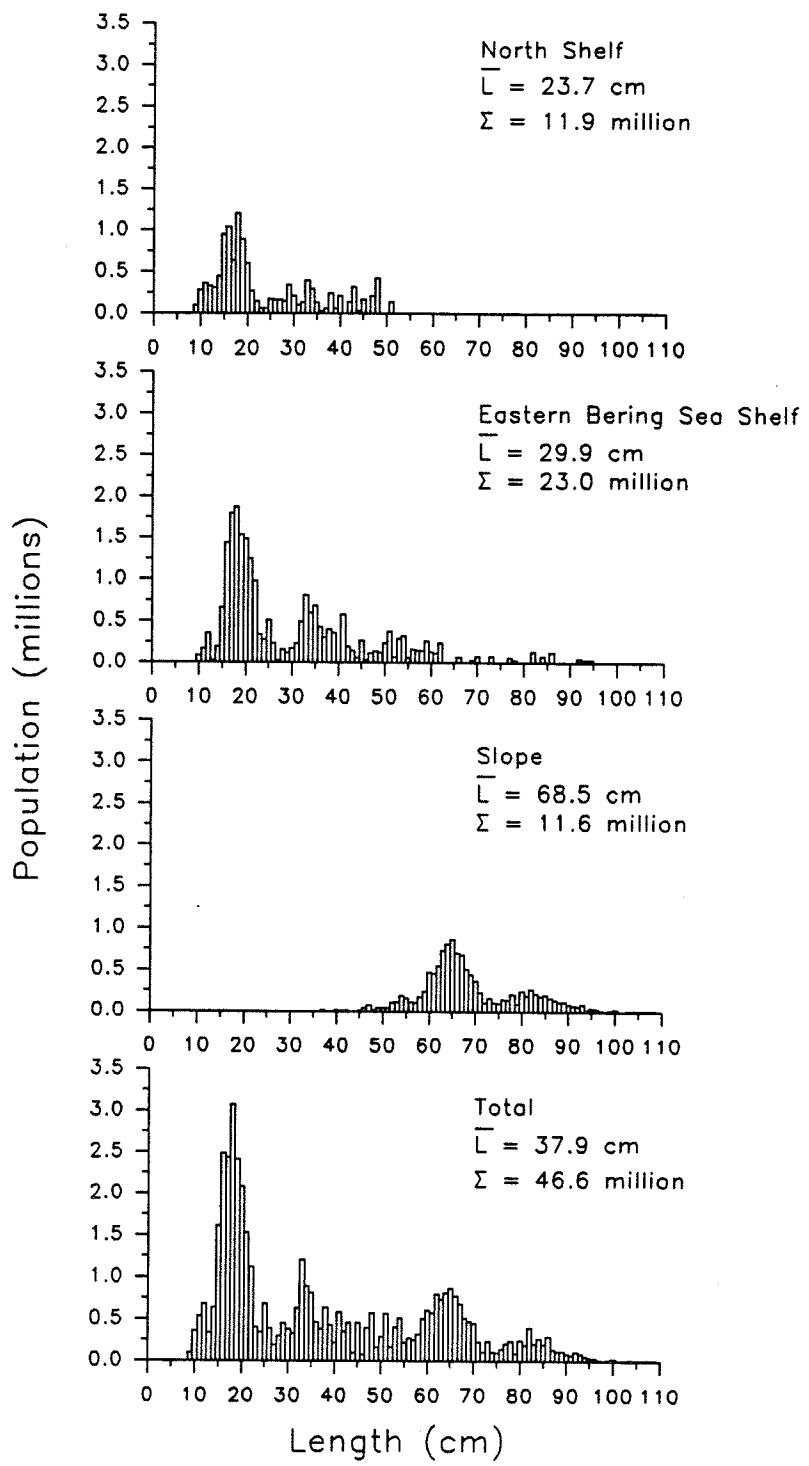
Figure 47.--Population number estimates by centimeter length
interval for Greenland turbot in the eastern Bering
Sea as shown by data from the 1991 bottom trawl
survey.
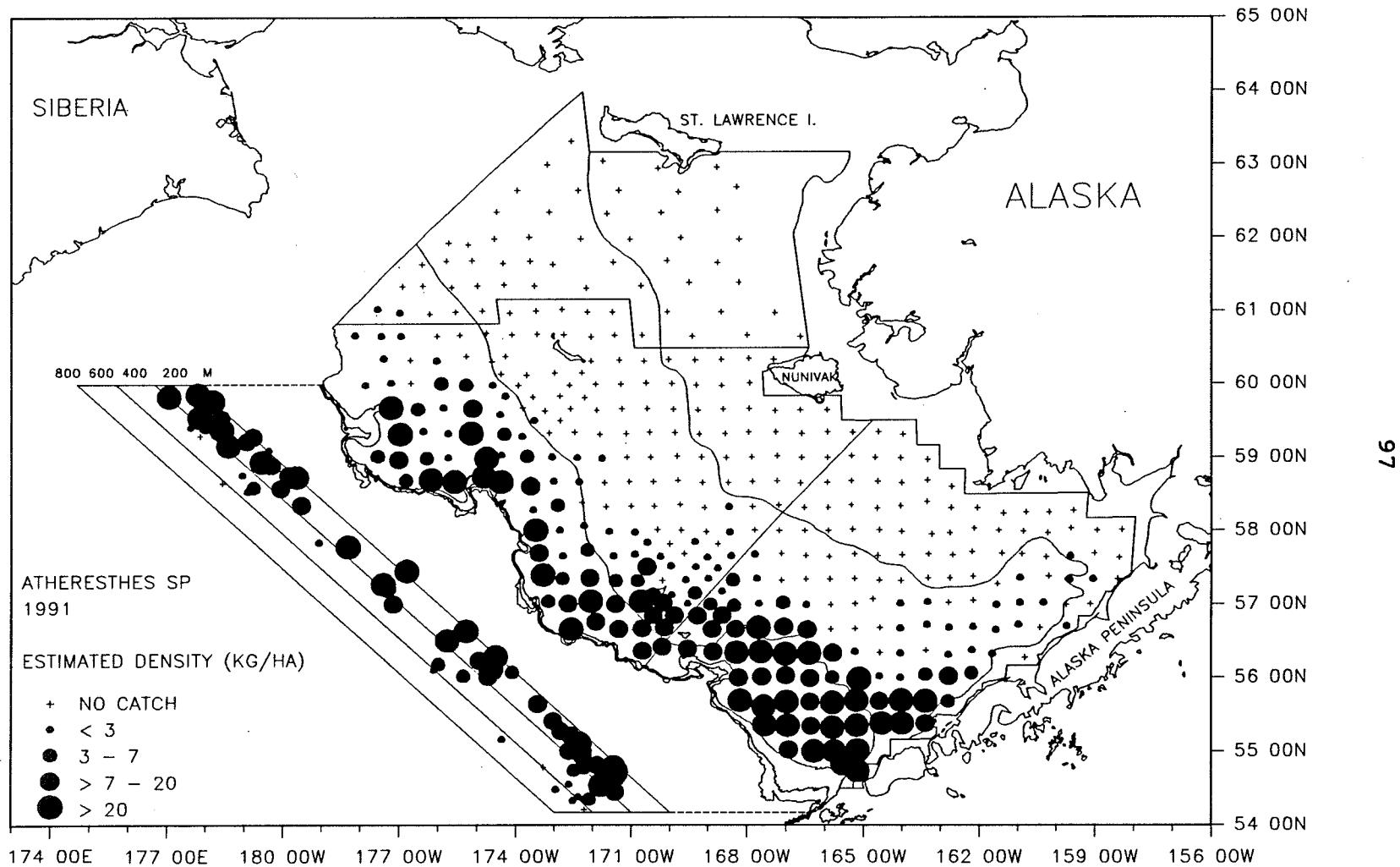
Figure 48.--Distribution and relative abundance of <u>Atheresthes</u> spp. in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 27.--Abundance estimates and mean size of _Atheresthes_ spp. by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.073	567	0.001	4,528,715	0.006	0.125	23.2
2	< 50	0.000	0	0.000	0	0.000	–	–
3	50 - 100	9.216	95,204	0.227	255,155,458	0.324	0.373	32.9
4	50 - 100	0.970	10,454	0.025	38,710,127	0.049	0.270	29.1
5	100 - 200	44.279	171,770	0.410	333,503,121	0.423	0.515	35.9
6	100 - 200	11.835	111,916	0.267	137,676,878	0.175	0.813	40.1
Subareas combined		8.415	389,910	0.932	769,574,298	0.976	0.507	35.2
North Shelf								
7	< 50	0.000	0	0.000	0	0.000	–	–
8	50 - 100	0.000	0	0.000	0	0.000	–	–
9	100 - 200	0.161	187	0.000	163,763	<0.001	1.140	–
Subareas combined		0.013	187	0.000	163,763	<0.001	1.140	–
Slope								
10	200 - 500	19.398	15,101	0.036	10,411,155	0.013	1.450	50.5
11	200 - 500	20.506	11,578	0.028	7,102,489	0.009	1.630	53.1
12	500 - 800	1.995	876	0.002	491,210	0.001	1.784	54.6
13	500 - 800	2.508	831	0.002	412,830	0.001	2.012	55.0
Subareas combined		13.431	28,386	0.068	18,417,684	0.023	1.541	51.7
All subareas combined		6.697	418,482	1.000	788,155,745	1.000	0.531	35.6
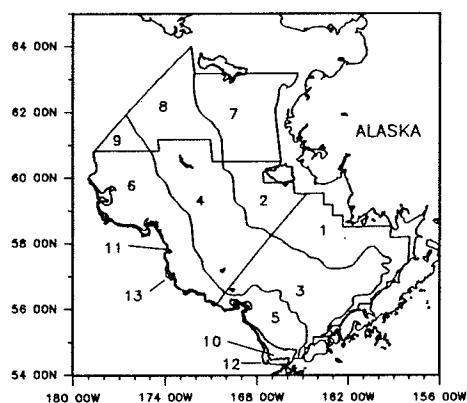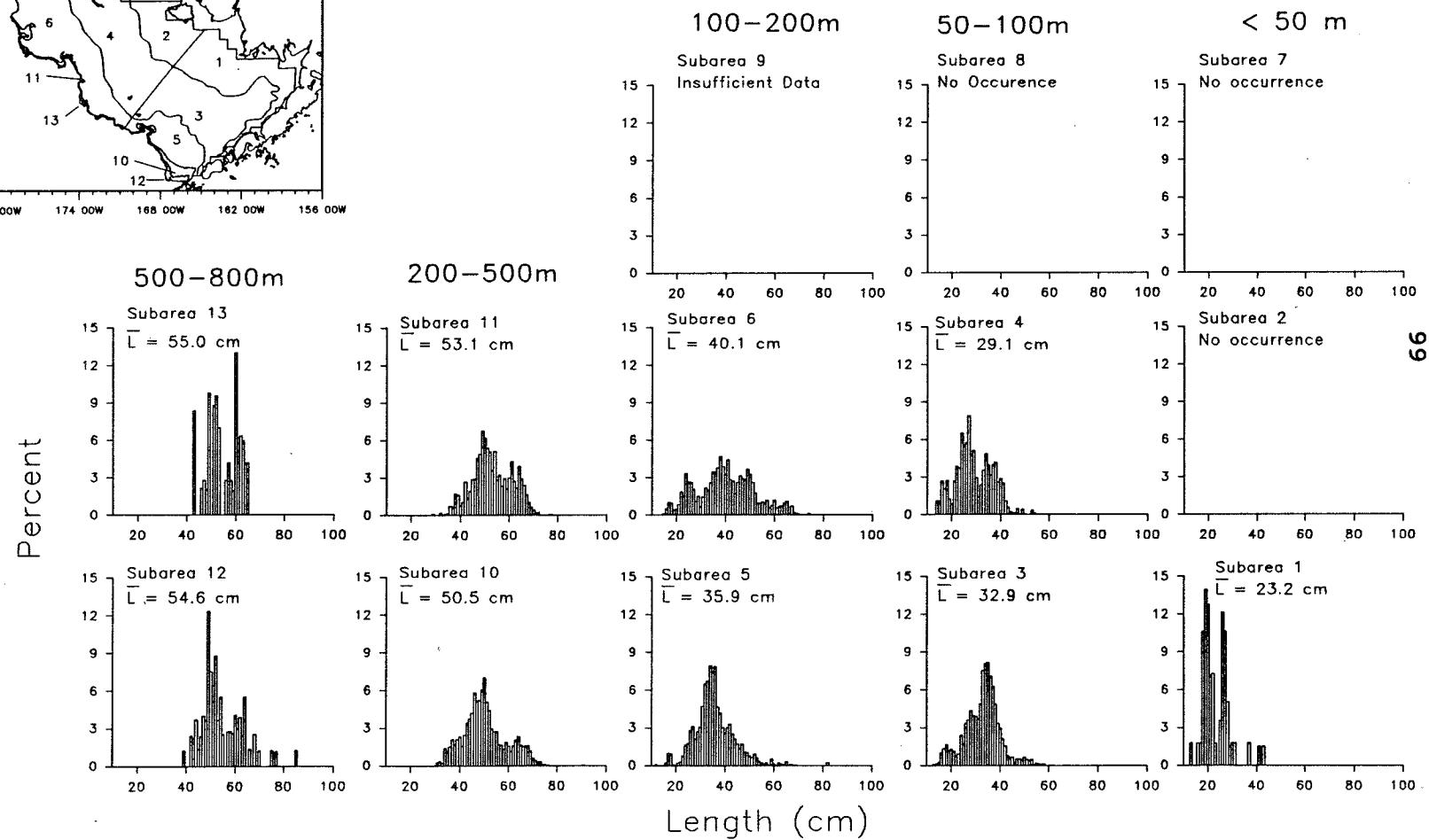
Figure 49.--Length composition of <u>Atheresthes</u> spp. by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.
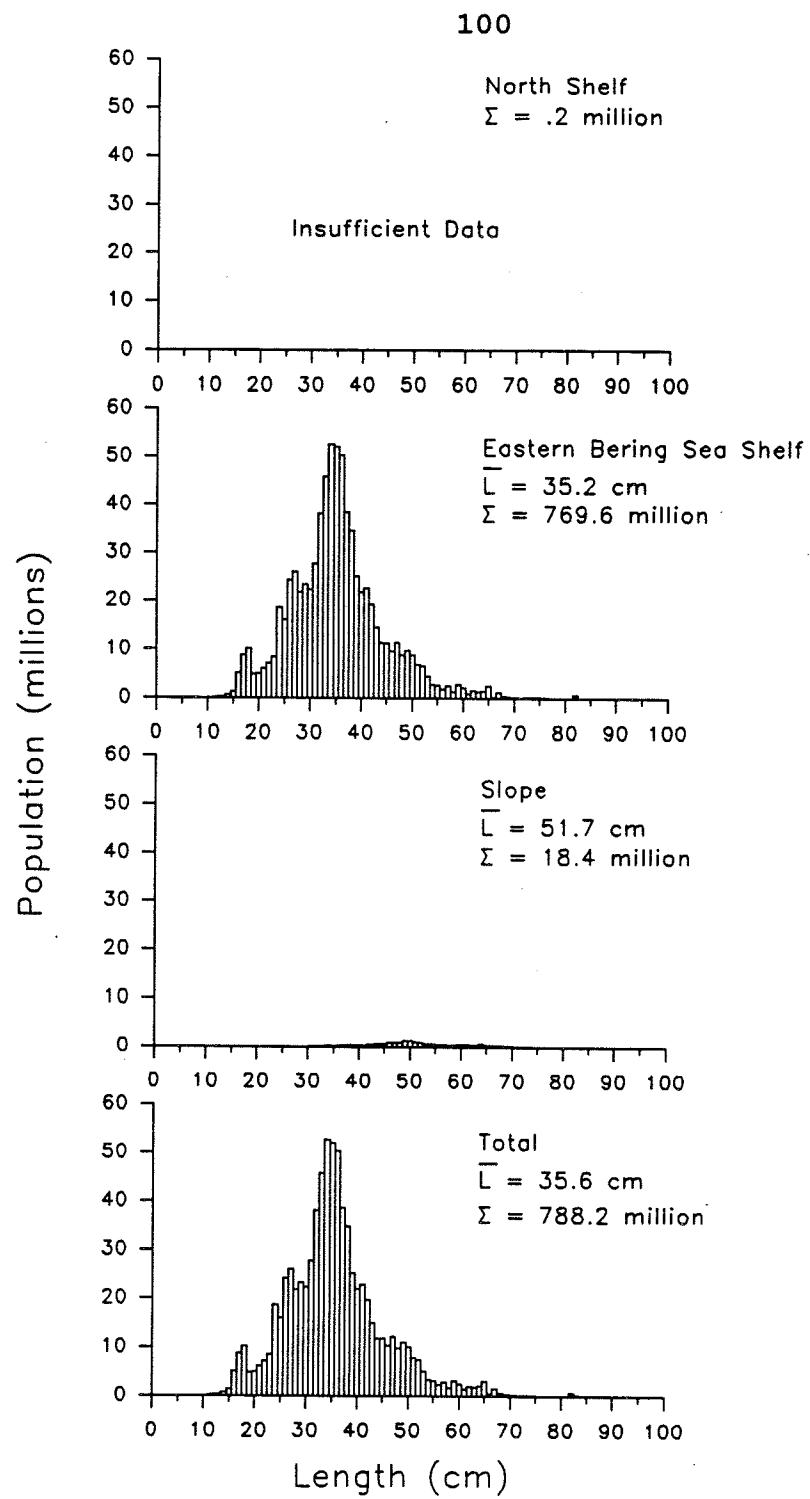
Figure 50.--Population number estimates by centimeter length interval for <u>Atheresthes</u> spp. in the eastern Bering Sea as shown by data from the 1991 bottom trawl survey.
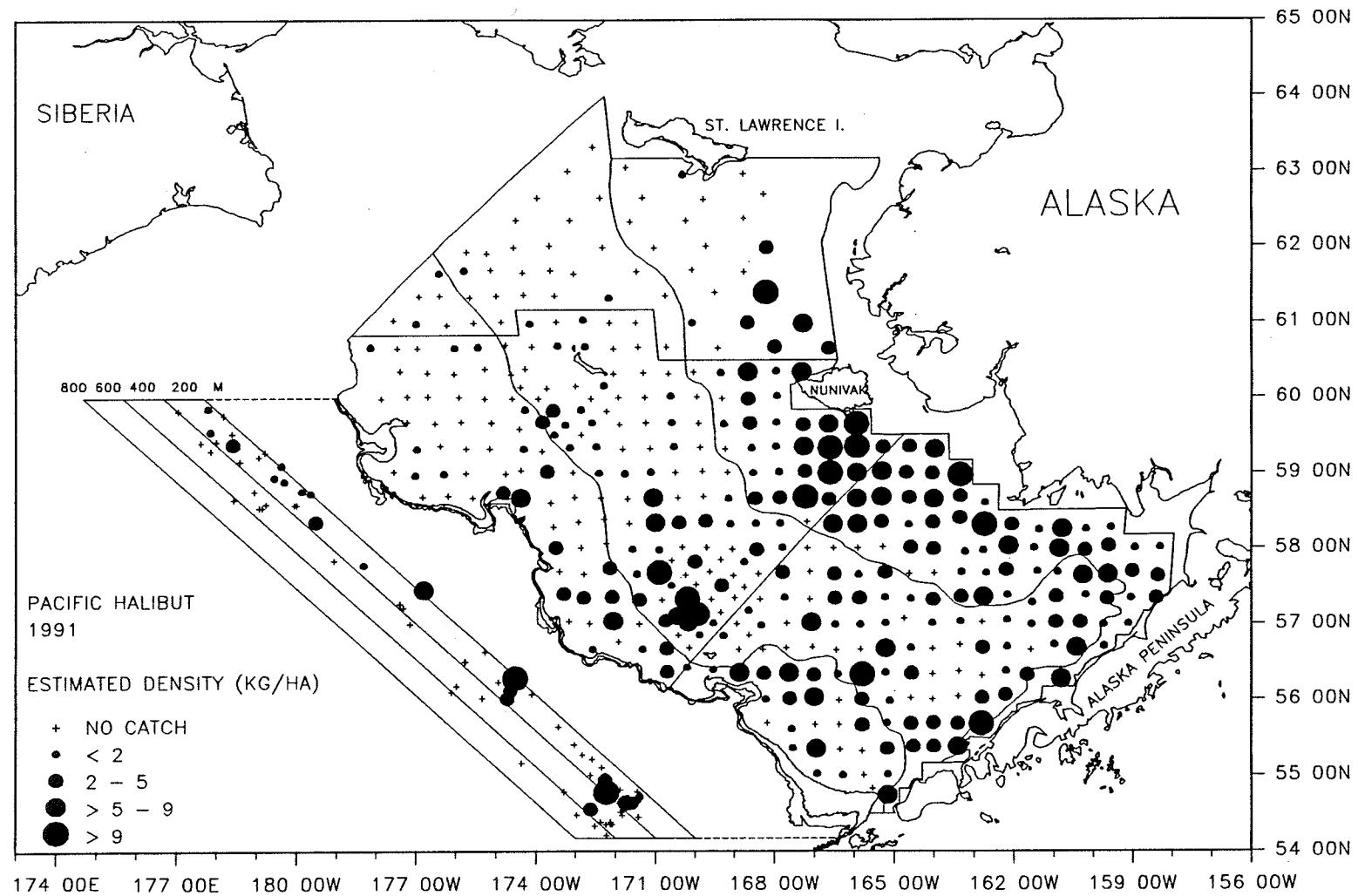
Figure 51.--Distribution and relative abundance of Pacific halibut in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 28.--Abundance estimates and mean size of Pacific halibut by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	3.922	30,538	0.275	28,144,834	0.381	1.085	41.8
2	< 50	4.349	17,843	0.161	17,814,186	0.241	1.002	40.3
3	50 - 100	1.947	20,115	0.181	7,536,351	0.102	2.669	52.8
4	50 - 100	1.275	13,751	0.124	9,347,237	0.127	1.471	45.5
5	100 - 200	2.158	8,372	0.075	1,318,933	0.018	6.347	76.9
6	100 - 200	0.739	6,986	0.063	1,256,154	0.017	5.561	69.1
Subareas combined		2.106	97,605	0.878	65,417,695	0.886	1.492	44.4
North Shelf								
7	< 50	1.566	11,403	0.103	8,012,419	0.108	1.423	46.3
8	50 - 100	0.021	118	0.001	164,930	0.002	0.715	41.0
9	100 - 200	0.057	66	0.001	64,567	0.001	1.021	46.0
Subareas combined		0.825	11,587	0.104	8,241,916	0.112	1.406	46.2
Slope								
10	200 - 500	0.985	767	0.007	89,157	0.001	8.603	85.9
11	200 - 500	1.880	1,061	0.010	104,846	0.001	10.123	85.3
12	500 - 800	0.296	130	0.001	6,210	<0.001	20.956	117.0
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.927	1,958	0.018	200,212	0.003	9.782	86.5
All subareas combined		1.779	111,150	1.000	73,859,823	1.000	1.505	44.7
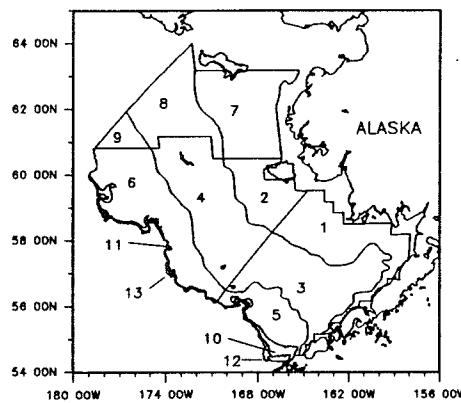
PACIFIC HALIBUT
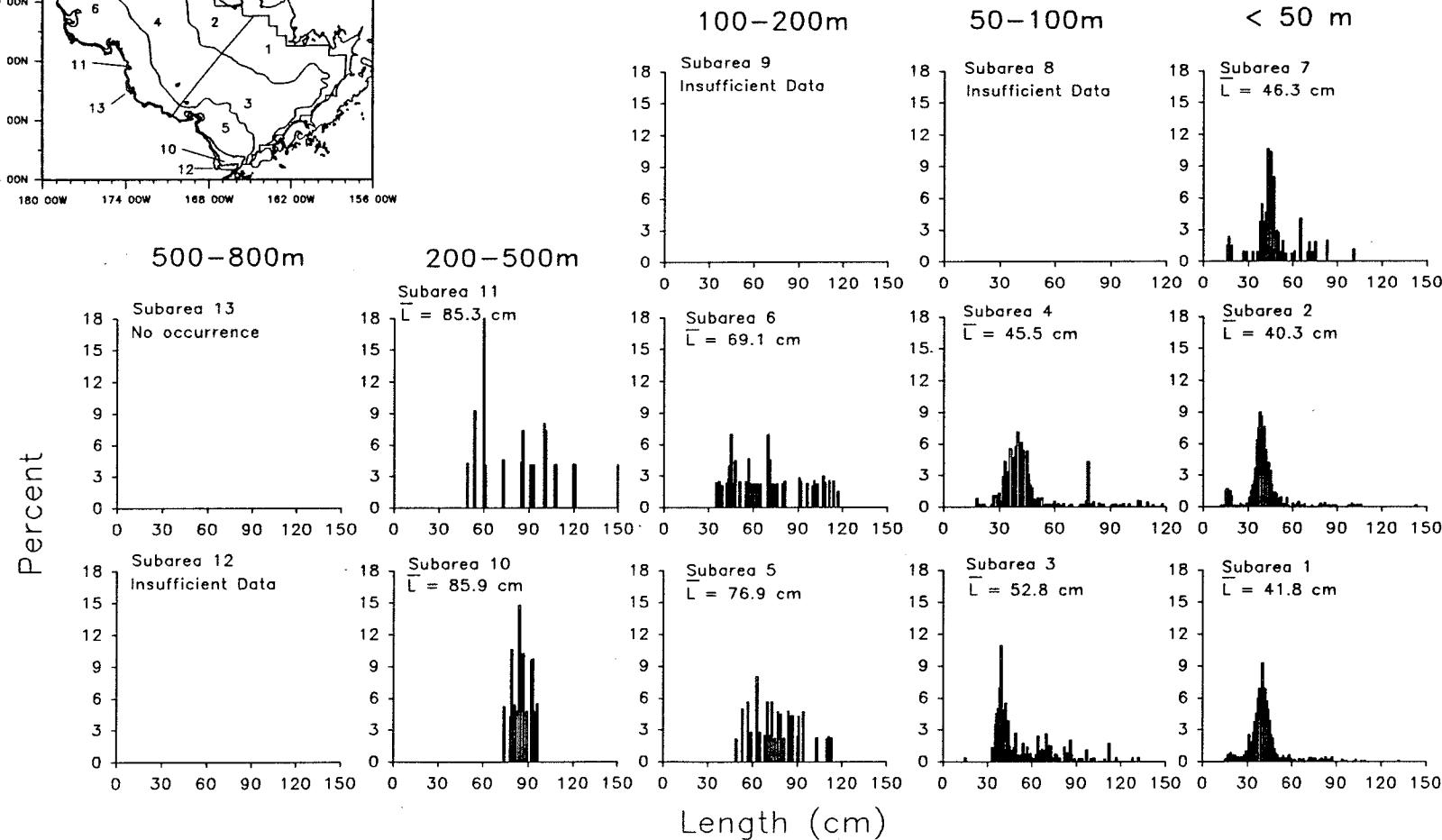
Figure 52.--Length composition of Pacific haliut by subarea and depth zone as shown by data from the 1991 eastern Bering Sea bottom trawl survey.
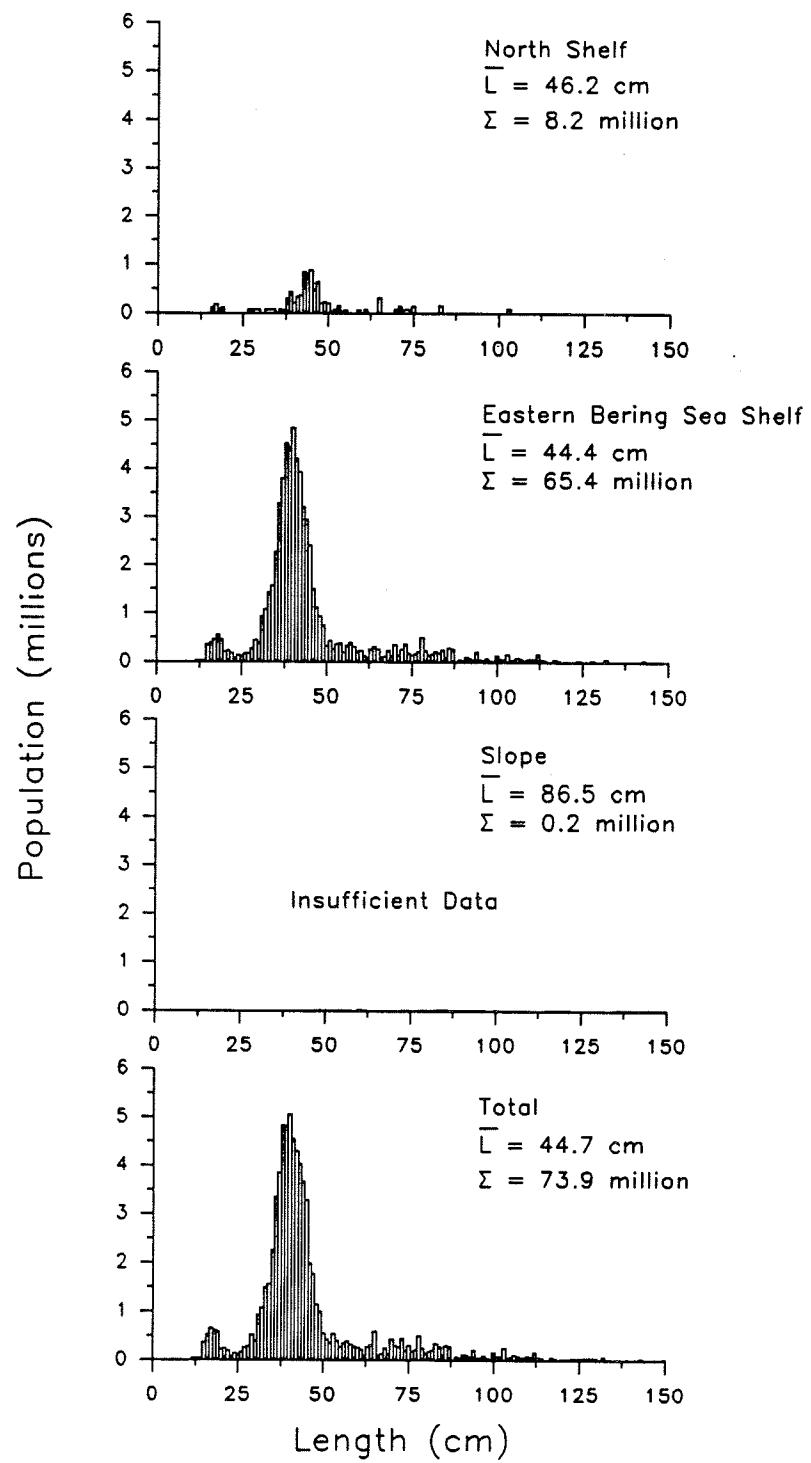
Figure 53.--Population number estimates by centimeter length
interval for Pacific halibut in the eastern Bering
Sea as shown by data from the 1991 bottom trawl
survey.
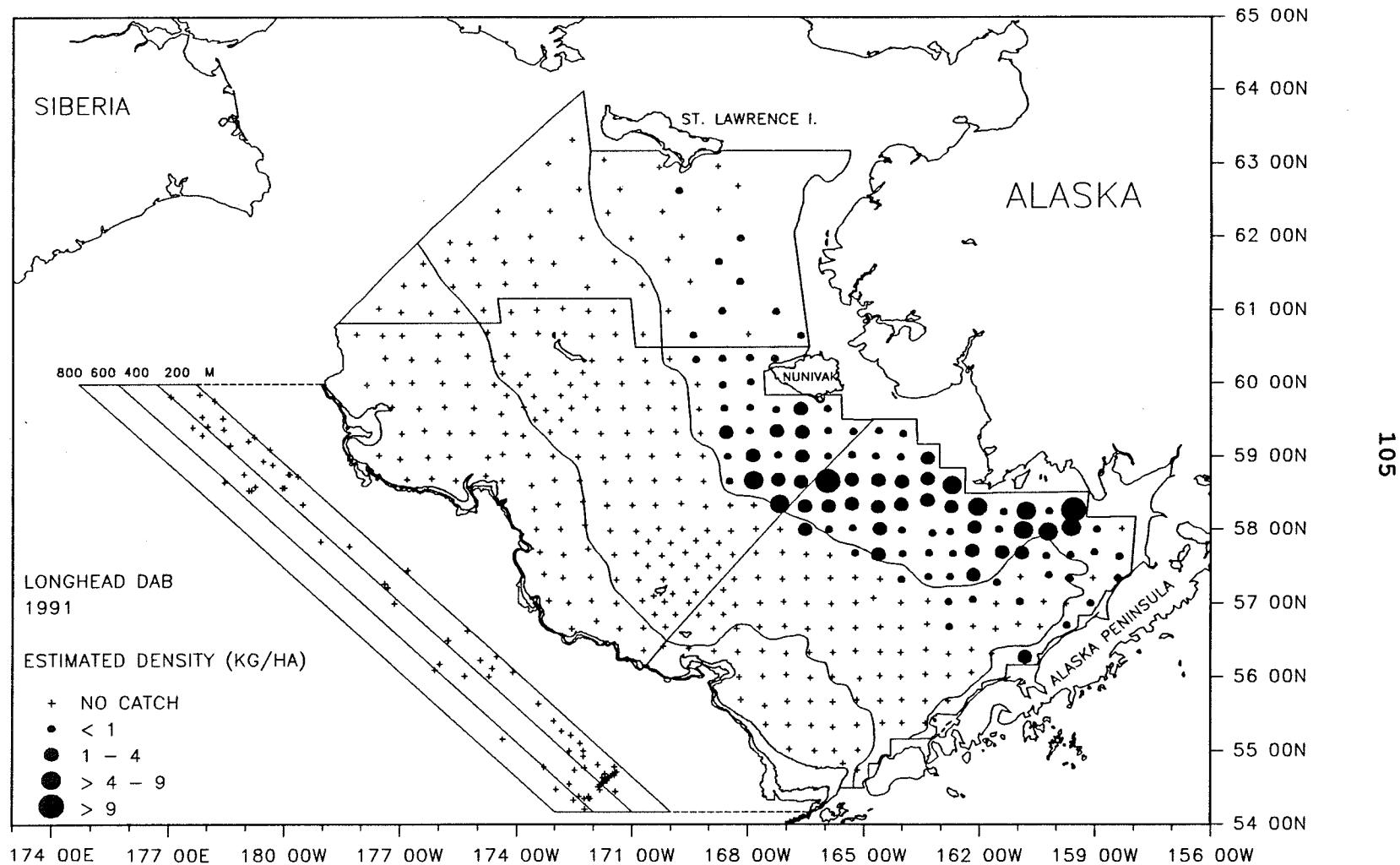
Figure 54.--Distribution and relative abundance of longhead dab in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 29.--Abundance estimates and mean size of longhead dab by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	1.719	13,384	0.698	98,953,043	0.631	0.135	21.4
2	< 50	1.083	4,442	0.232	45,325,359	0.289	0.098	20.1
3	50 - 100	0.083	854	0.045	5,009,632	0.032	0.170	-
4	50 - 100	0.000	0	0.000	0	0.000	-	-
5	100 - 200	0.000	0	0.000	0	0.000	-	-
6	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.403	18,680	0.974	149,288,034	0.952	0.125	21.0
North Shelf								
7	< 50	0.067	489	0.026	7,460,399	0.048	0.066	18.6
8	50 - 100	0.000	0	0.000	0	0.000	-	-
9	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.035	489	0.026	7,460,399	0.048	0.066	18.6
Slope								
10	200 - 500	0.000	0	0.000	0	0.000	-	-
11	200 - 500	0.000	0	0.000	0	0.000	-	-
12	500 - 800	0.000	0	0.000	0	0.000	-	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
All subareas combined		0.307	19,169	1.000	156,748,433	1.000	0.122	20.9
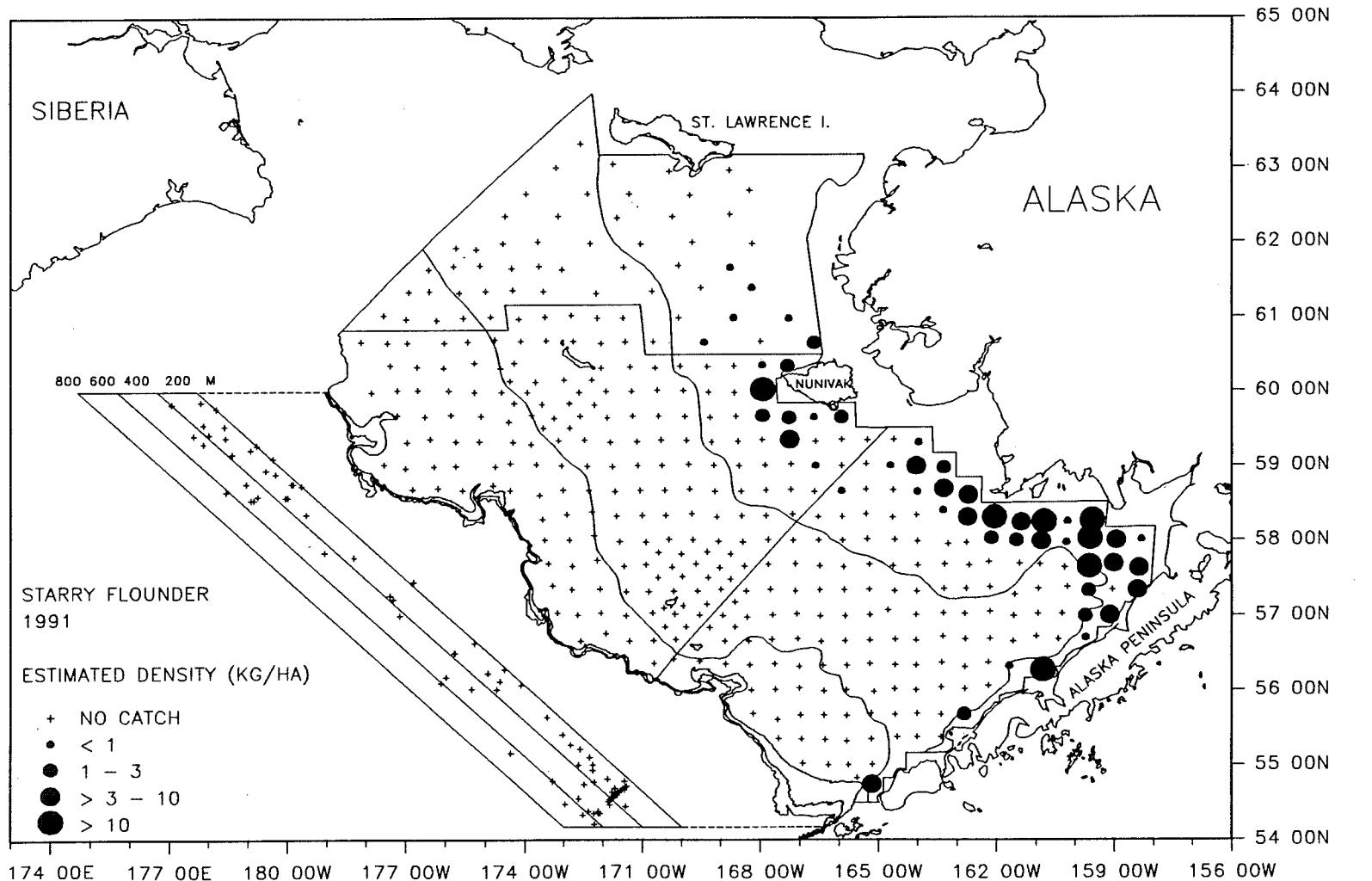
Figure 55.--Distribution and relative abundance of starry flounder in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

107

Table 30.--Abundance estimates and mean size of starry flounder by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	3.501	27,263	0.767	22,325,309	0.784	1.221	43.7
2	< 50	1.407	5,771	0.162	4,399,759	0.155	1.312	44.2
3	50 - 100	0.123	1,271	0.036	556,678	0.020	2.283	-
4	50 - 100	0.000	0	0.000	0	0.000	-	-
5	100 - 200	0.000	0	0.000	0	0.000	-	-
6	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.740	34,305	0.965	27,281,746	0.958	1.257	43.8
North Shelf								
7	< 50	0.169	1,233	0.035	1,183,228	0.042	1.042	38.3
8	50 - 100	0.000	0	0.000	0	0.000	-	-
9	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.088	1,233	0.035	1,183,228	0.042	1.042	38.3
Slope								
10	200 - 500	0.000	0	0.000	0	0.000	-	-
11	200 - 500	0.000	0	0.000	0	0.000	-	-
12	500 - 800	0.000	0	0.000	0	0.000	-	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
All subareas combined		0.569	35,538	1.000	28,464,974	1.000	1.248	43.6
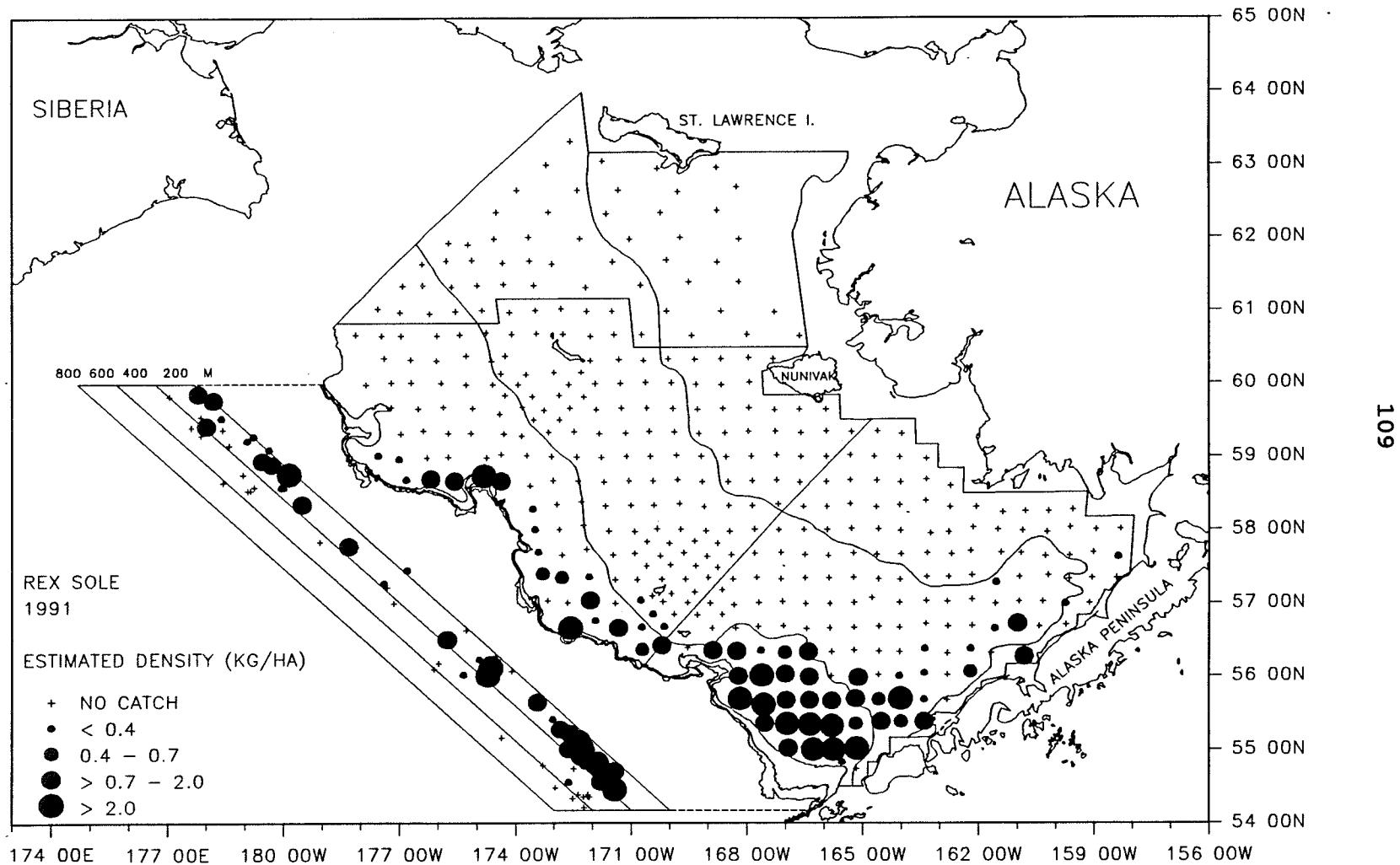
Figure 56.--Distribution and relative abundance of rex sole in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 31.--Abundance estimates and mean size of rex sole by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.020	158	0.008	418,587	0.008	0.378	-
2	< 50	0.000	0	0.000	0	-	0.000	-
3	50 - 100	0.150	1,551	0.081	3,627,869	0.069	0.427	38.1
4	50 - 100	0.005	51	0.003	101,381	0.002	0.501	-
5	100 - 200	3.339	12,951	0.677	35,794,438	0.680	0.362	35.8
6	100 - 200	0.298	2,820	0.147	9,100,769	0.173	0.310	35.9
Subareas combined		0.378	17,531	0.916	49,043,044	0.931	0.357	36.0
North Shelf								
7	< 50	0.000	0	0.000	0	0.000	-	-
8	50 - 100	0.000	0	0.000	0	0.000	-	-
9	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
Slope								
10	200 - 500	1.595	1,241	0.065	2,579,966	0.049	0.481	39.0
11	200 - 500	0.613	346	0.018	1,026,805	0.019	0.337	35.3
12	500 - 800	0.024	11	0.001	23,841	<0.001	0.450	40.4
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.756	1,598	0.084	3,630,612	0.069	0.440	38.0
All subareas combined		0.306	19,129	1.000	52,673,656	1.000	0.363	36.1
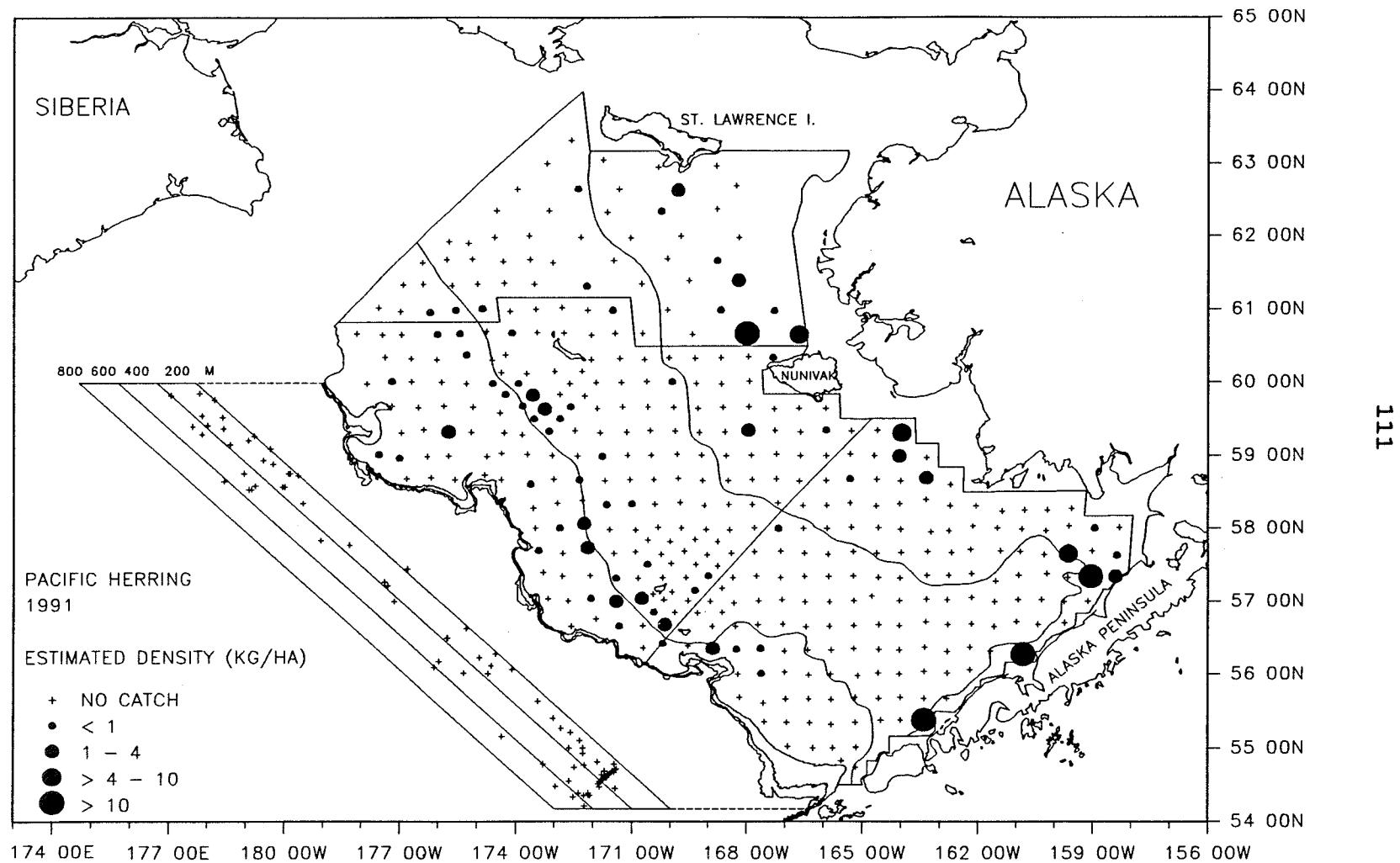
Figure 57.--Distribution and relative abundance of Pacific herring in the eastern
Bering Sea as shown by the 1991 bottom trawl survey.

Table 32.--Abundance estimates and mean size of Pacific herring by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	3.103	24,160	0.592	82,976,386	0.356	0.291	30.4
2	< 50	0.093	380	0.009	4,642,792	0.020	0.082	20.1
3	50 - 100	0.587	6,062	0.148	26,011,299	0.111	0.233	28.8
4	50 - 100	0.089	959	0.023	4,044,620	0.017	0.237	27.5
5	100 - 200	0.099	383	0.009	1,145,792	0.005	0.334	34.0
6	100 - 200	0.138	1,304	0.032	7,461,010	0.032	0.175	31.0
Subareas combined		0.718	33,248	0.814	126,281,899	0.541	0.263	29.7
North Shelf								
7	< 50	1.036	7,542	0.185	106,809,336	0.458	0.071	19.9
8	50 - 100	0.006	36	0.001	191,420	0.001	0.186	-
9	100 - 200	0.011	13	<0.001	123,456	0.001	0.105	-
Subareas combined		0.541	7,590	0.186	107,124,212	0.459	0.071	19.9
Slope								
10	200 - 500	0.000	0	0.000	0	0.000	-	-
11	200 - 500	0.000	0	0.000	0	0.000	-	-
12	500 - 800	0.000	0	0.000	0	0.000	-	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
All subareas combined		0.653	40,838	1.000	233,406,111	1.000	0.175	25.2
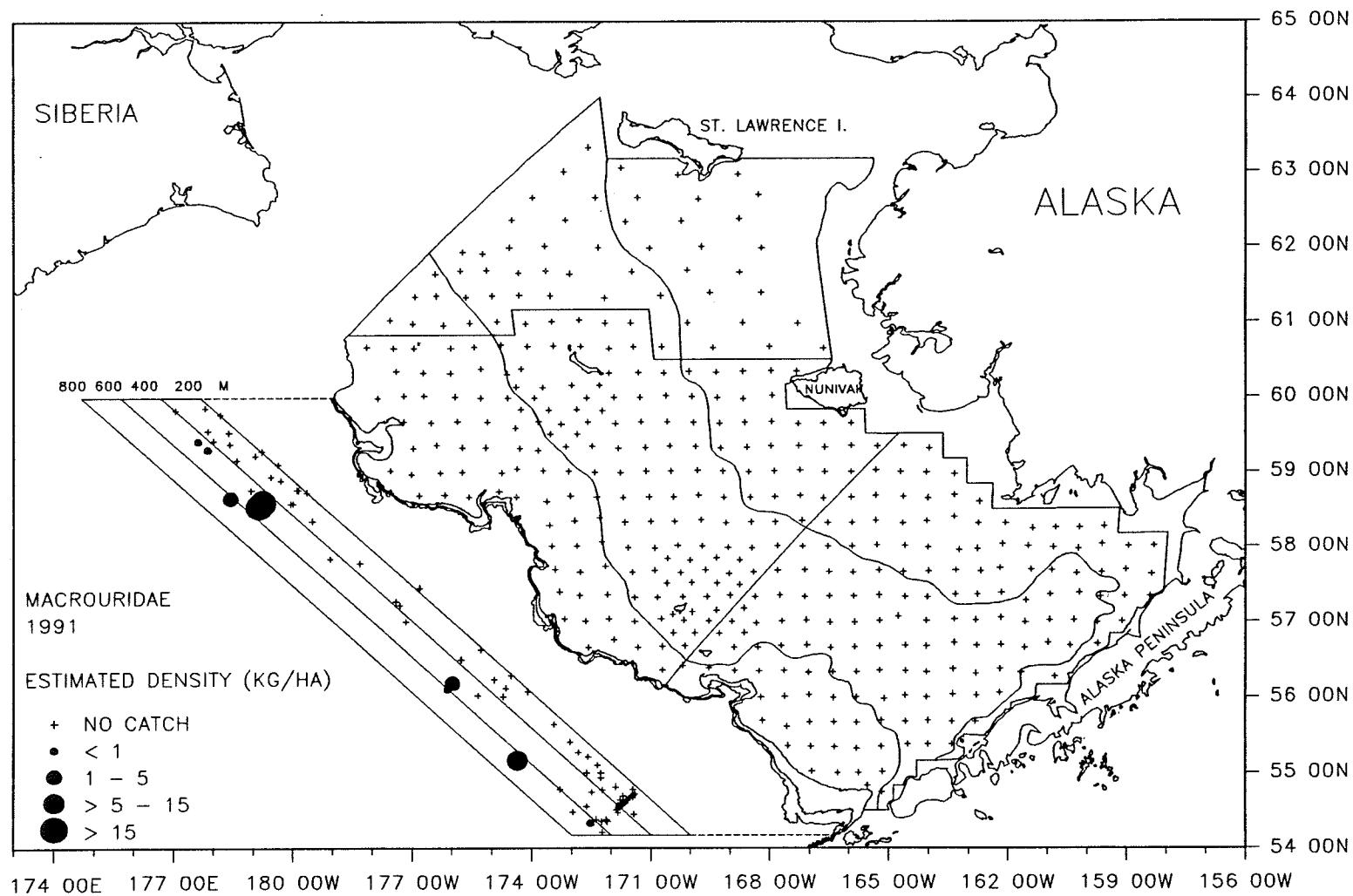
Figure 58.--Distribution and relative abundance of Macrouridae (not including giant grenadier) in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 33.--Abundance estimates and mean size of Macrouridae and giant grenadiers
by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

| Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Macrouridae								
10	200 - 500	0.069	54	0.001	19,003	0.001	2.831	-
11	200 - 500	12.533	7,077	0.186	1,258,404	0.044	5.624	-
12	500 - 800	13.035	5,725	0.150	6,527,869	0.230	0.877	-
13	500 - 800	76.193	25,227	0.662	20,571,614	0.725	1.226	-
Subareas combined		18.020	38,083	1.000	28,376,889	1.000	1.342	-
Giant grenadier								
10	200 - 500	0.069	54	0.001	14,466	0.001	3.704	28.3
11	200 - 500	12.533	7,077	0.200	1,258,404	0.116	5.624	32.8
12	500 - 800	12.360	5,429	0.153	5,281,292	0.487	1.028	16.9
13	500 - 800	69.098	22,878	0.646	4,296,587	0.396	5.325	30.9
Subareas combined		16.768	35,437	1.000	10,850,749	1.000	3.266	24.3
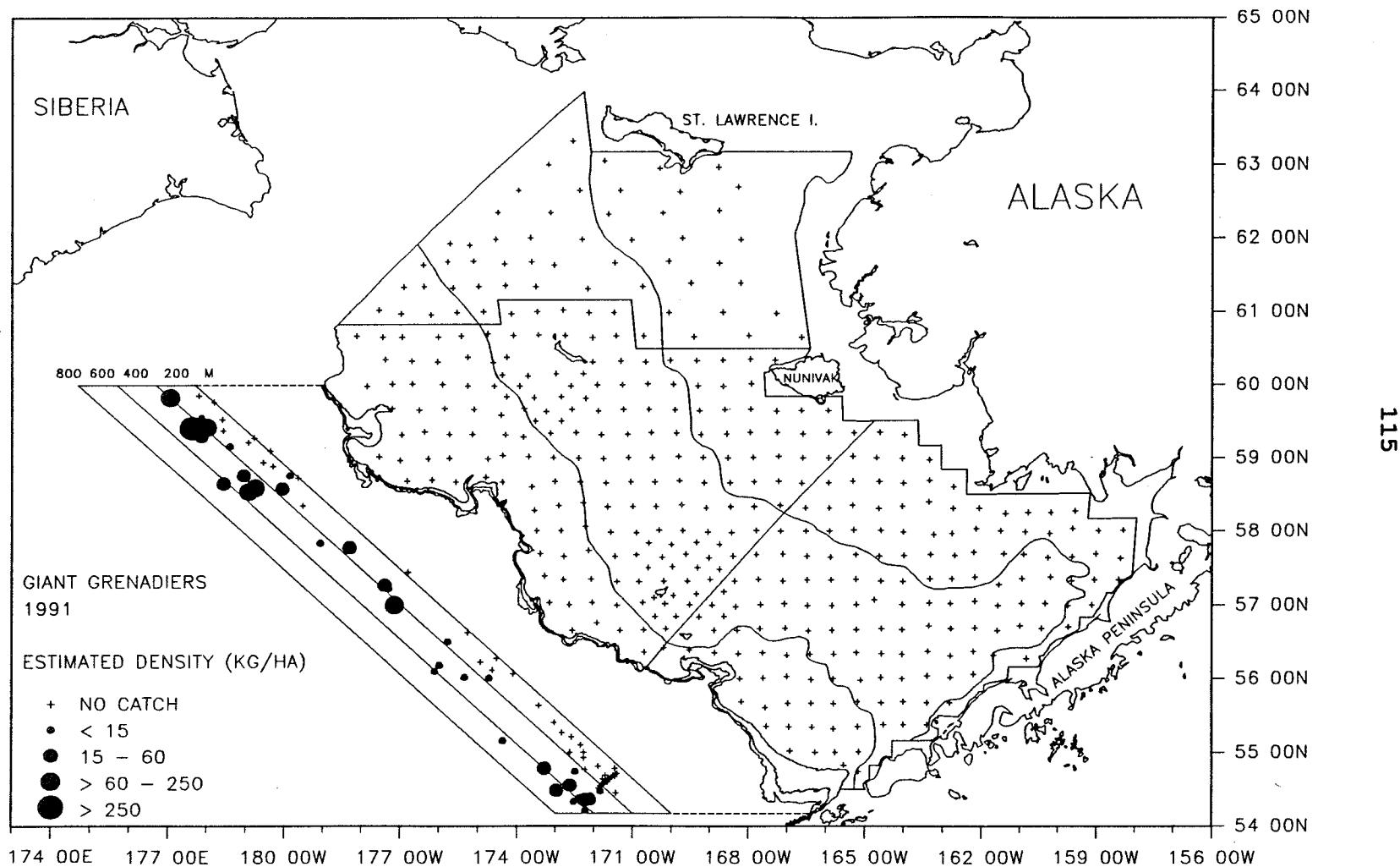
Figure 59.--Distribution and relative abundance of giant grenadier in the
eastern Bering Sea as shown by the 1991 bottom trawl survey.
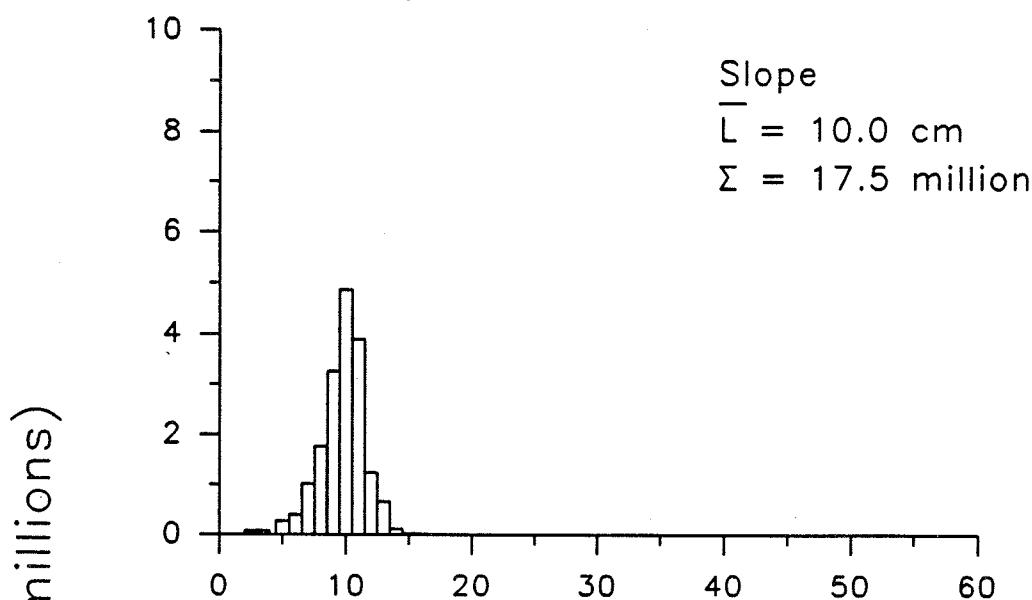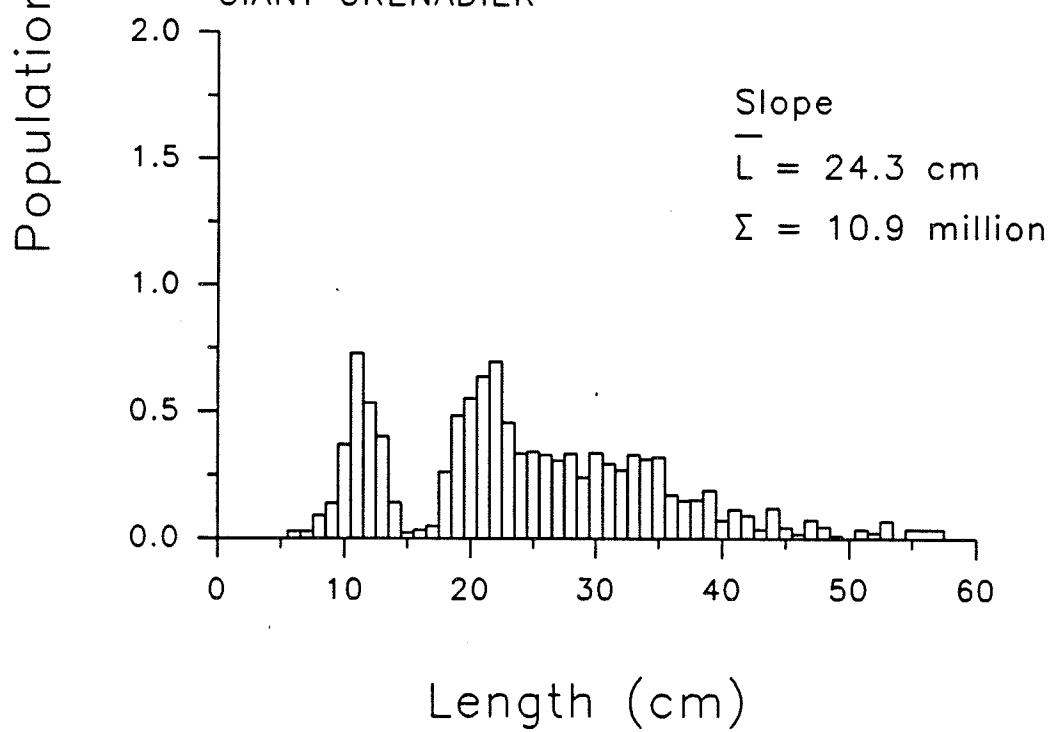
Figure 60.--Population number estimates by centimeter length
interval for Macrouridae spp. and giant grenadier
in the eastern Bering Sea as shown by data from
the 1991 bottom trawl survey.

SIBERIA

ALASKA

ST. LAWRENCE I.

800 600 400 200 M

NUNIVAK

ALASKA PENINSULA

GREAT SCULPIN
1991

ESTIMATED DENSITY (KG/HA)

+   NO CATCH
•   < 15
●   15 – 60
●   > 60 – 250
●   > 250

65 00N
64 00N
63 00N
62 00N
61 00N
60 00N
59 00N
58 00N
57 00N
56 00N
55 00N
54 00N

174 00E   177 00E   180 00W   177 00W   174 00W   171 00W   168 00W   165 00W   162 00W   159 00W   156 00W
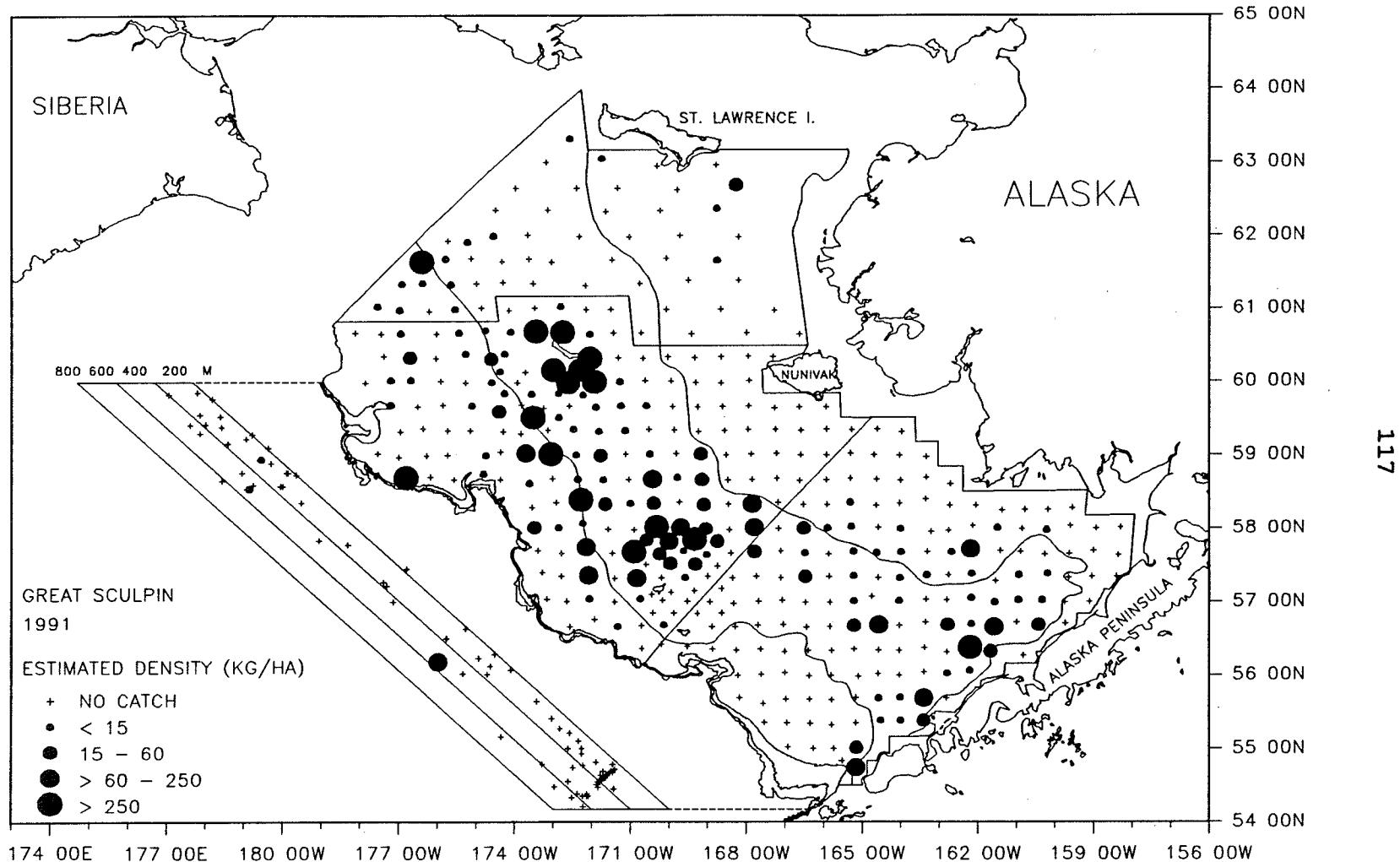
Figure 61.--Distribution and relative abundance of great sculpin in the
eastern Bering Sea as shown by the 1991 bottom trawl survey.

117
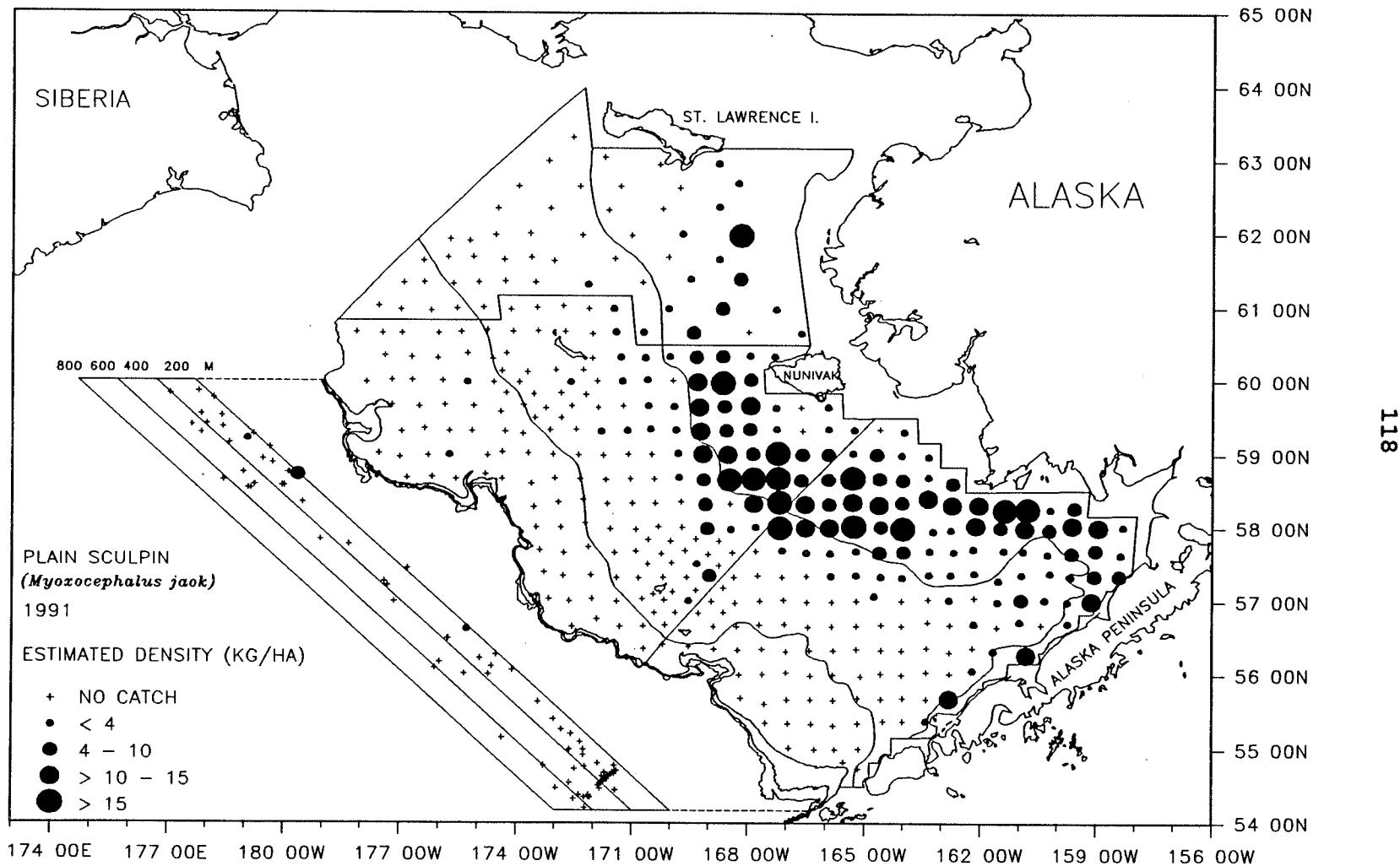
Figure 62.--Distribution and relative abundance of plain sculpin in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

SIBERIA

ALASKA

ST. LAWRENCE I.

NUNIVAK

800 600 400 200 M

GYMNOCANTHUS SP
1991

ESTIMATED DENSITY (KG/HA)

+   NO CATCH
·   < 0.2
●   0.2 − 0.7
●   > 0.7 − 3.0
●   > 3.0

ALASKA PENINSULA

65 00N
64 00N
63 00N
62 00N
61 00N
60 00N
59 00N
58 00N
57 00N
56 00N
55 00N
54 00N

174 00E   177 00E   180 00W   177 00W   174 00W   171 00W   168 00W   165 00W   162 00W   159 00W   156 00W
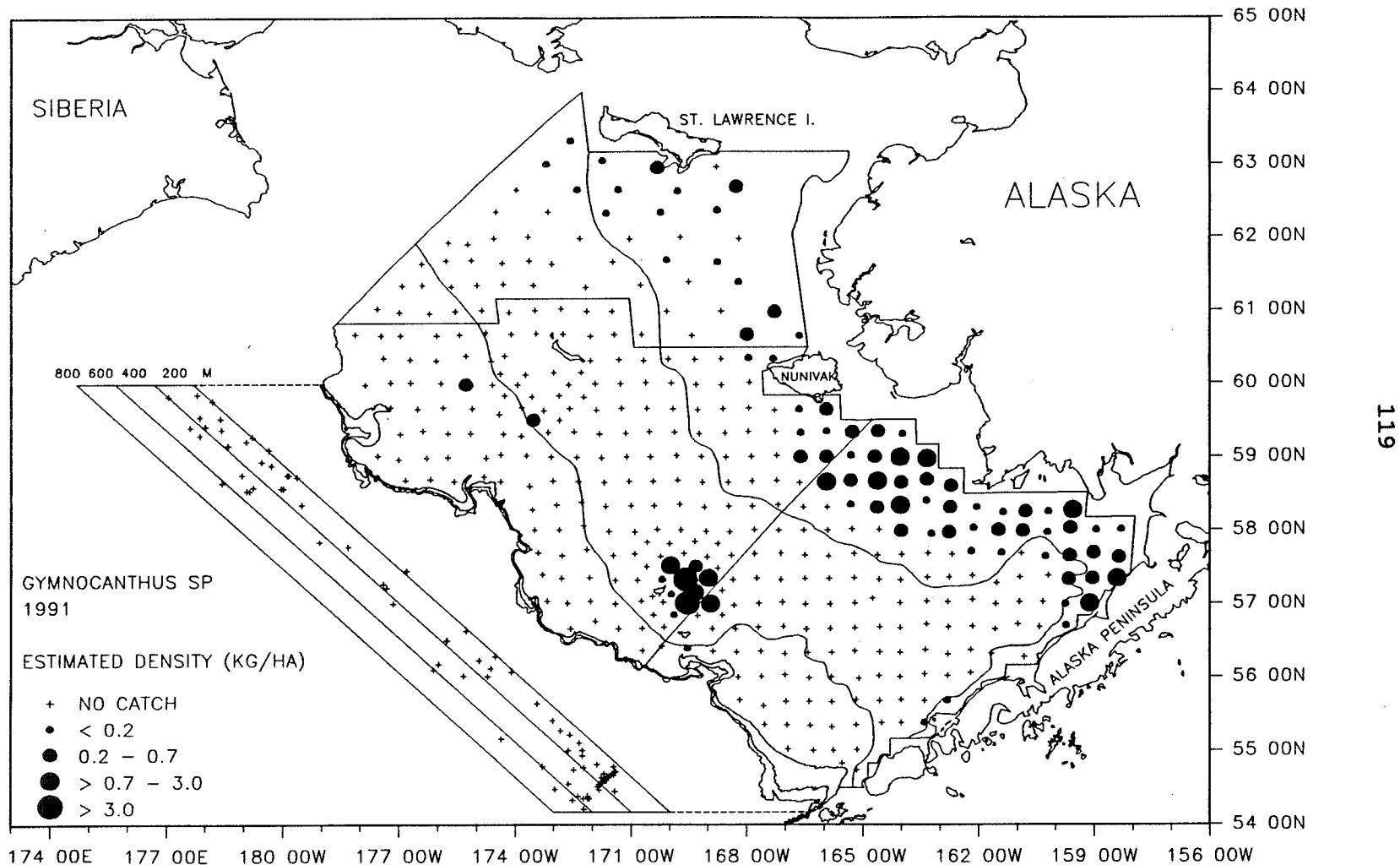
Figure 63.--Distribution and relative abundance of <u>Gymnocanthus</u> spp. in the
eastern Bering Sea as shown by the 1991 bottom trawl survey.
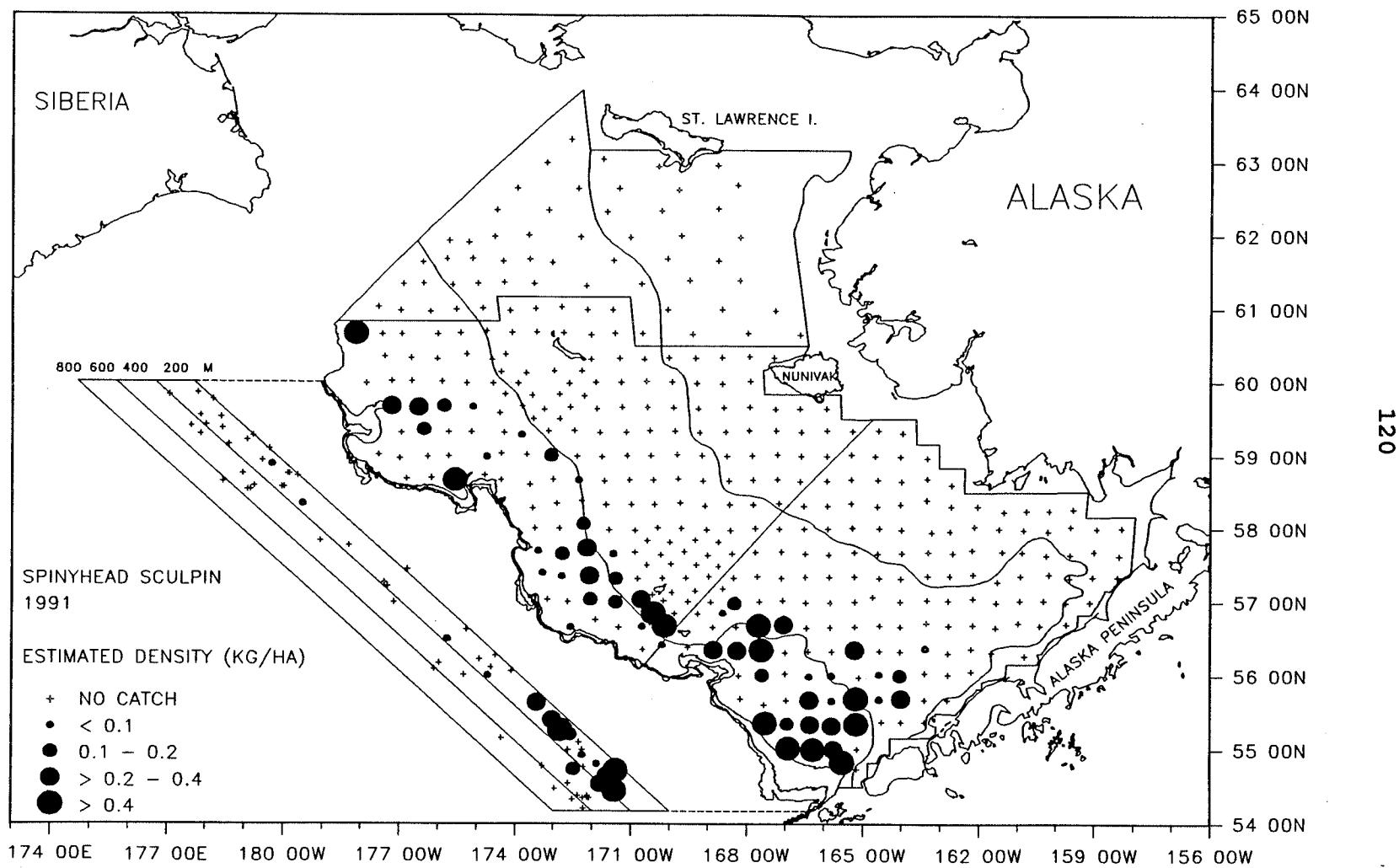
Figure 64.--Distribution and relative abundance of spinyhead sculpin in the
eastern Bering Sea as shown by the 1991 bottom trawl survey.
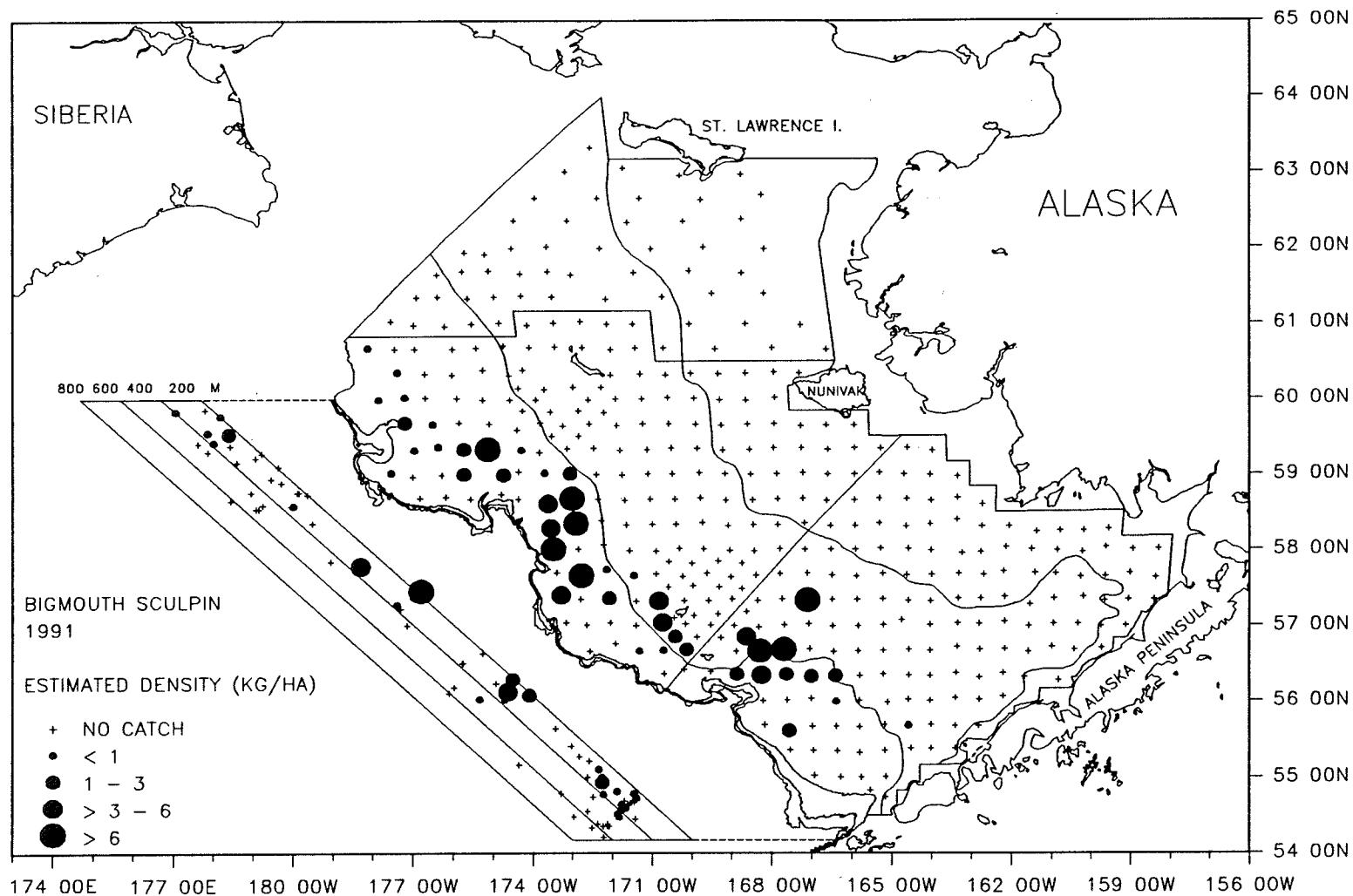
Figure 65.--Distribution and relative abundance of bigmouth sculpin in the
eastern Bering Sea as shown by the 1991 bottom trawl survey.
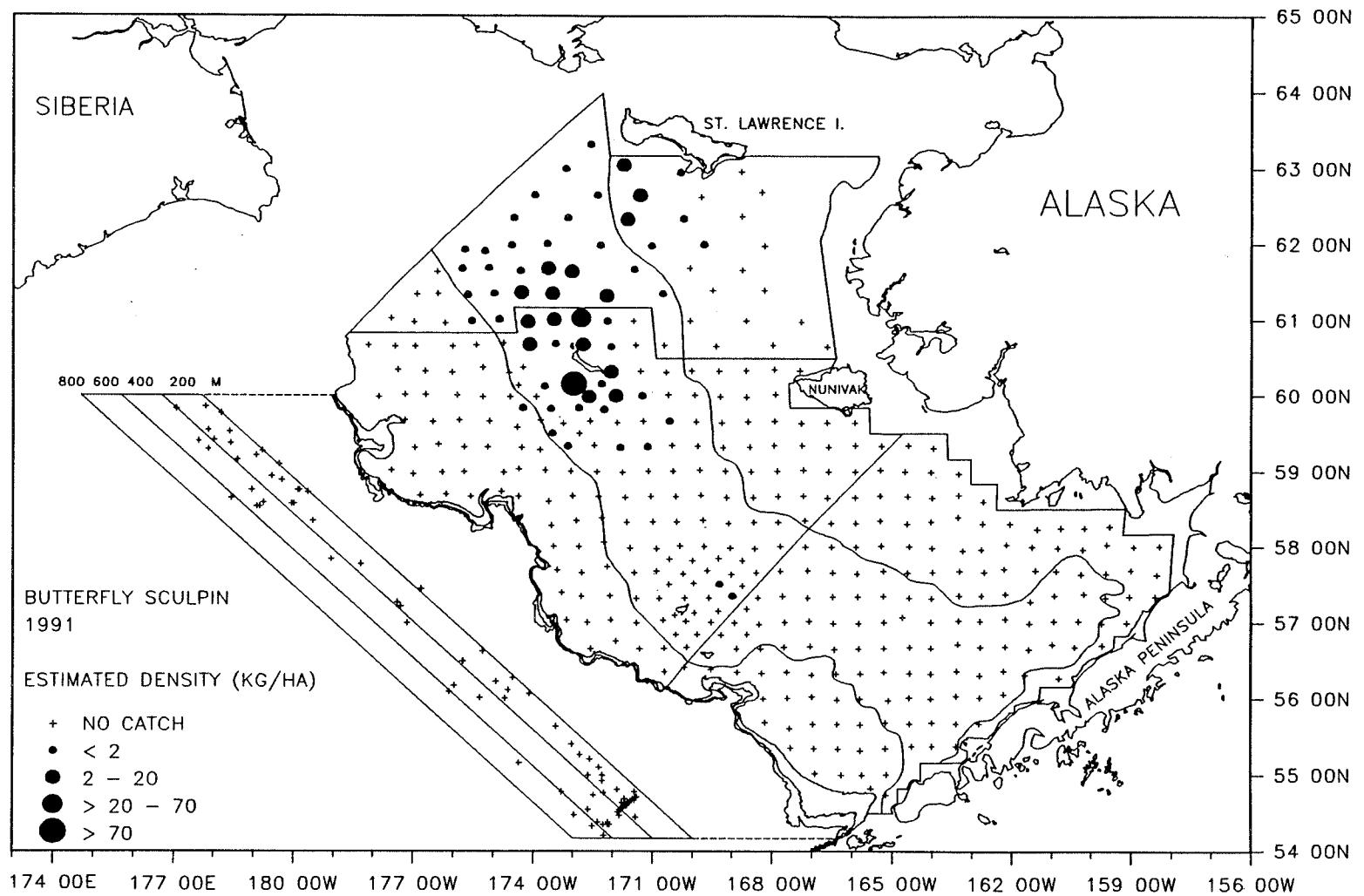
Figure 66.--Distribution and relative abundance of butterfly sculpin in the
eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 34.--Estimates of biomass (in metric tons) and population in millions (below) by depth (m) and subareas for sculpins from the 1991 bottom trawl survey in the eastern Bering Sea.

Species	Eastern Bering Sea Shelf <50		Eastern Bering Sea Shelf 50-100		Eastern Bering Sea Shelf 100-200		North Shelf <50	North Shelf 50-100	North Shelf 100-200	Slope 200-500		Slope 500-800		All subareas combined	Proportion of total population
	1	2	3	4	5	6	7	8	9	10	11	12	13		
Gymnocanthus spp.	2,951	221	124	1,804	3	31	496	109	0	0	0	0	0	5,739	0.018
	98.4	5.6	0.4	4.9	0.1	0.1	12.3	1.3	0.0	0.0	0.0	0.0	0.0	123.0	0.179
Butterfly sculpin	0	0	0	46,694	0	5	7,887	9,773	43	0	0	0	0	64,402	0.201
	0.0	0.0	0.0	95.9	0.0	<0.1	16.1	21.9	0.1	0.0	0.0	0.0	0.0	134.0	0.195
Malacocottus spp.	0	0	0	0	48	7	0	0	0	673	115	3	6	851	0.003
	0.0	0.0	0.0	0.0	0.1	<0.1	0.0	0.0	0.0	3.2	1.4	<0.1	0.1	4.9	0.007
Yellow Irish lords	69	0	2,937	4,813	370	2,451	0	0	0	0	0	0	0	10,639	0.033
	0.4	0.0	7.5	10.3	0.5	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.5	0.039
Plain sculpin	56,374	39,358	8,594	8,363	0	482	14,650	563	0	0	224	0	0	128,608	0.402
	98.8	58.4	9.7	7.7	0.0	0.2	20.8	0.5	0.0	0.0	0.1	0.0	0.0	196.3	0.286
Other Myoxocephalus	1,990	0	8,610	30,825	582	29,021	7,918	793	2,546	<0.1	20	130	46	82,483	0.258
	2.4	0.0	6.1	33.0	0.3	10.6	14.3	1.1	1.7	<0.1	<0.1	0.1	<0.1	69.5	0.101
Spinyhead sculpin	0	0	348	233	1,023	565	0	0	0	88	3	5	0	2,265	0.007
	0.0	0.0	1.1	1.5	5.8	3.0	0.0	0.0	0.0	1.0	<0.1	0.1	0.0	12.5	0.018
Bigmouth sculpin	0	0	3,351	1,194	2,773	13,362	0	0	0	206	400	20	0	21,306	0.067
	0.0	0.0	0.8	0.4	0.6	4.5	0.0	0.0	0.0	0.1	0.1	<0.1	0.0	6.6	0.010
Other sculpins	119	302	516	387	262	1,813	311	11	53	16	62	2	7	3,856	0.012
	12.9	7.3	22.8	8.9	5.7	47.6	2.9	0.2	2.6	0.1	1.3	<0.1	0.1	112.6	0.164
Total sculpins	61,503	39,882	24,479	94,312	5,060	47,737	31,262	11,247	2,643	983	823	161	60	320,152	1.000
	212.8	71.3	48.5	162.6	13.0	73.9	66.5	24.9	4.5	4.5	2.9	0.2	0.2	685.9	1.000

123
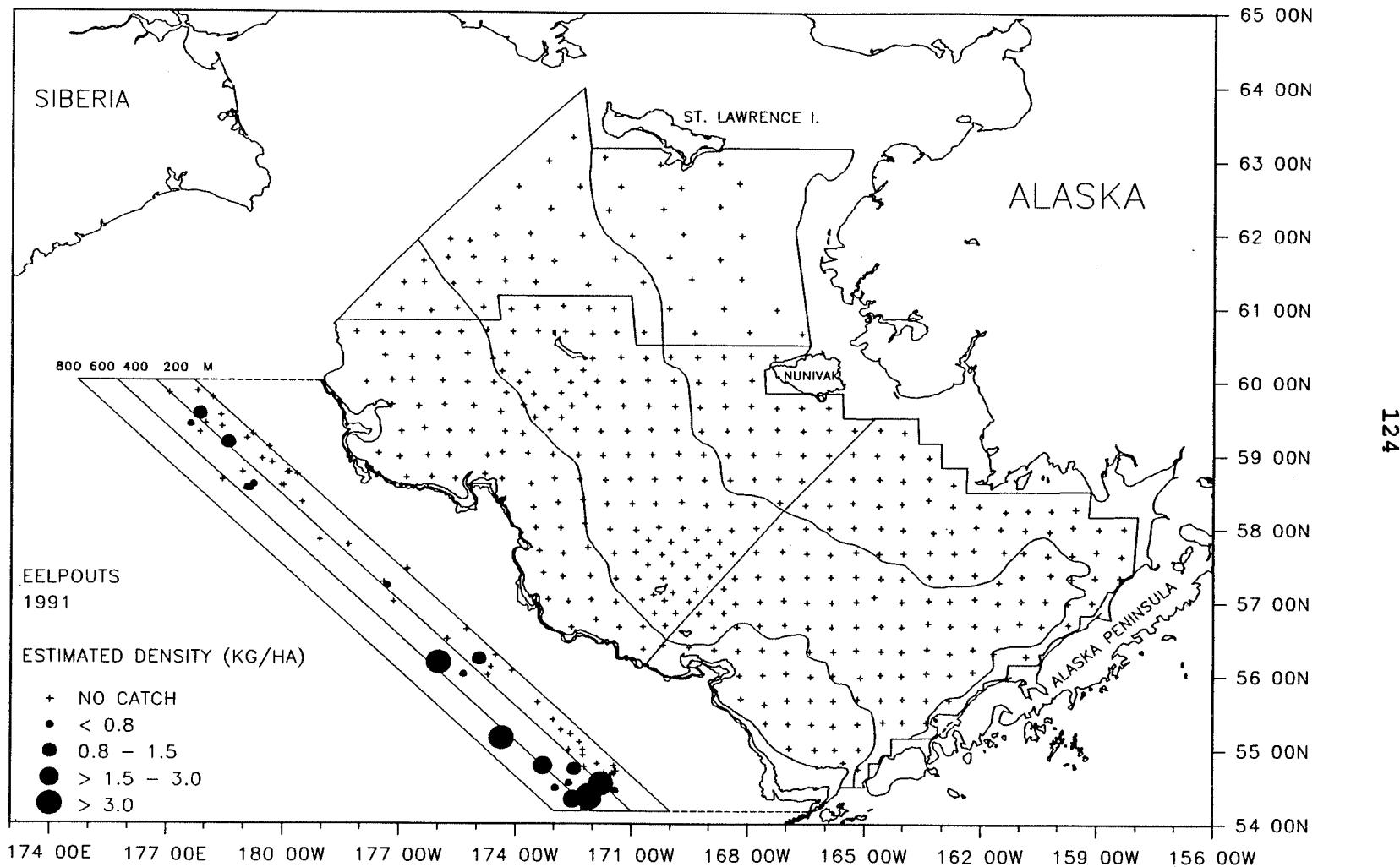
Figure 67.—Distribution and relative abundance of two-line, blackbelly and ebony eelpouts in eastern Bering Sea as shown by the 1991 bottom trawl survey.
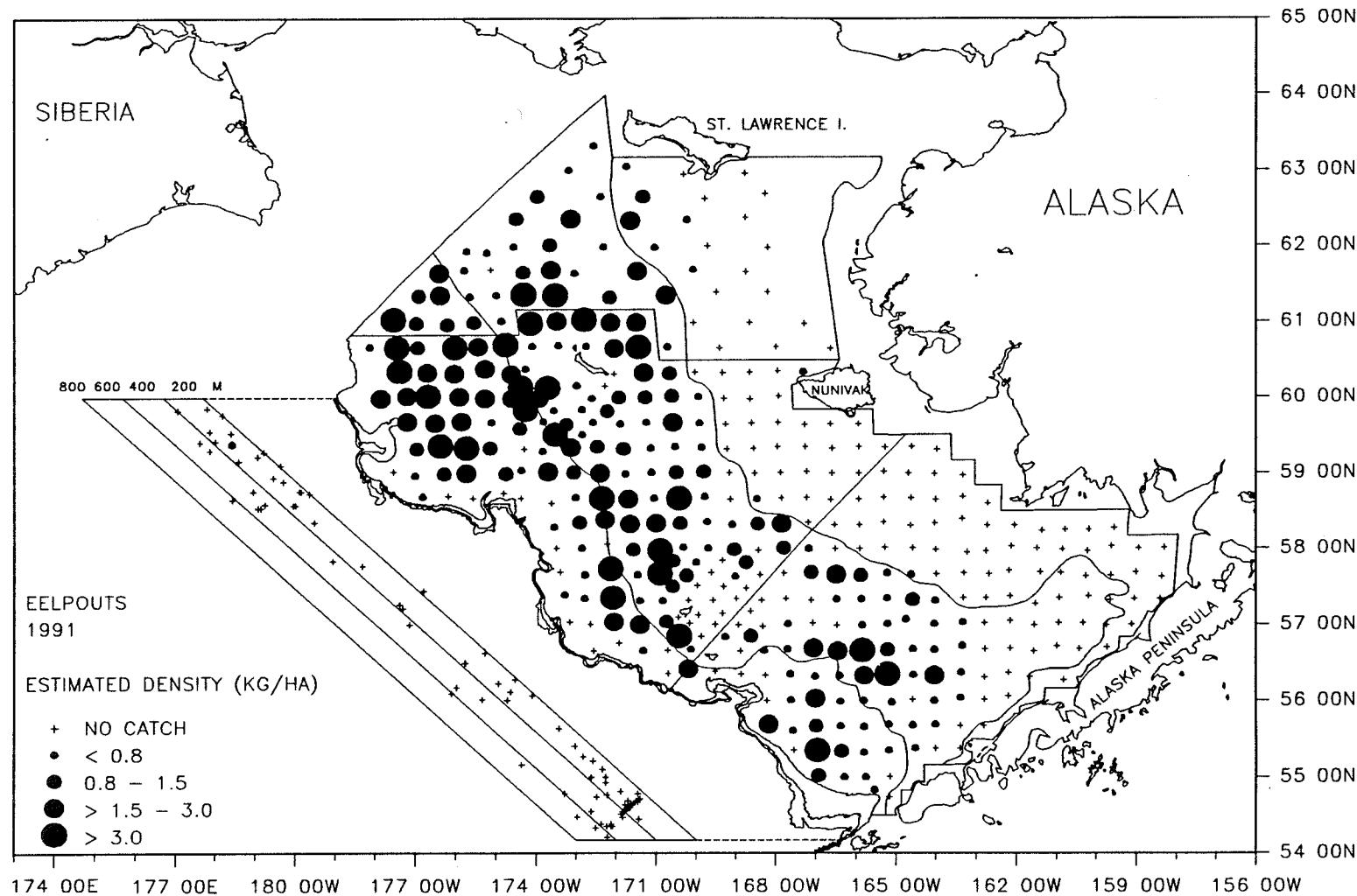
Figure 68.--Distribution and relative abundance of marbled, wattled and shortfin eelpouts in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 35.--Estimates of biomass (in metric tons) and population in millions (below) by depth (m) and subareas for eelpouts from the 1991 bottom trawl survey in the eastern Bering Sea.

| | Eastern Bering Sea Shelf | | | | | | North Shelf | | | Slope | | | | | |
| | <50 | | 50-100 | | 100-200 | | <50 | 50-100 | 100-200 | 200-500 | | 500-800 | | All subareas | Proportion of total |
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	combined	population
Marbled	0	0	0	7,047	0	20	1,364	7,905	59	0	0	0	0	16,394	0.325
eelpout	0.0	0.0	0.0	4.5	0.0	<0.1	1.6	18.9	<0.1	0.0	0.0	0.0	0.0	25.0	0.064
Two-line	0	0	0	0	0	0	0	0	0	128	35	582	10	755	0.015
eelpout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	<0.1	6.5	<0.1	6.7	0.017
Wattled	9	20	2,459	6,924	45	5,673	0	229	1,577	0	3	0	0	16,939	0.336
eelpout	0.1	<0.1	9.1	43.3	0.1	35.0	0.0	4.1	16.4	0.0	<0.1	0.0	0.0	108.0	0.278
Shortfin	0	12	1,706	2,188	2,695	8,366	0	3	355	0	0	0	0	15,324	0.304
eelpout	0.0	0.1	9.6	35.3	42.2	148.9	0.0	0.1	6.5	0.0	0.0	0.0	0.0	242.7	0.626
Blackbelly	0	0	0	0	0	0	0	0	0	49	8	178	23	259	0.005
eelpout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	0.2	0.1	0.4	0.001
Other	0	0	0	3	0	0	394	0	32	36	1	315	36	816	0.016
eelpouts	0.0	0.0	0.0	<0.1	0.0	0.0	0.9	0.0	<0.1	0.5	<0.1	3.5	0.1	5.1	0.013
Total	9	32	4,165	16,162	2,741	14,059	1,757	8,136	2,022	213	47	1,076	69	50,488	1.000
eelpouts	0.1	0.1	18.7	83.1	42.3	183.9	2.5	23.1	23.0	0.7	<0.1	10.3	0.2	388.0	1.000

126

Figure 69.--Distribution and relative abundance of skates in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 36.--Abundance estimates and mean size of skates by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	1.599	12,455	0.026	2,238,044	0.022	5.565	-
2	< 50	1.280	5,253	0.011	759,658	0.007	6.915	-
3	50 - 100	8.621	89,056	0.185	23,633,963	0.230	3.768	-
4	50 - 100	7.614	82,094	0.171	18,485,818	0.180	4.441	-
5	100 - 200	22.622	87,755	0.183	12,442,779	0.121	7.053	-
6	100 - 200	19.818	187,403	0.390	40,348,287	0.393	4.645	-
Subareas combined		10.014	464,016	0.966	97,908,549	0.953	4.739	-
North Shelf								
7	< 50	0.577	4,202	0.009	1,255,548	0.012	3.347	-
8	50 - 100	0.512	2,870	0.006	709,222	0.007	4.046	-
9	100 - 200	5.025	5,813	0.012	2,274,070	0.022	2.556	-
Subareas combined		0.918	12,885	0.027	4,238,840	0.041	3.040	-
Slope								
10	200 - 500	1.016	791	0.002	172,613	0.002	4.580	-
11	200 - 500	4.107	2,319	0.005	315,032	0.003	7.361	-
12	500 - 800	0.206	90	<0.001	43,287	<0.001	2.089	-
13	500 - 800	0.196	65	<0.001	29,215	<0.001	2.223	-
Subareas combined		1.545	3,265	0.007	560,147	0.005	5.829	-
All subareas combined		7.684	480,165	1.000	102,707,536	1.000	4.675	-
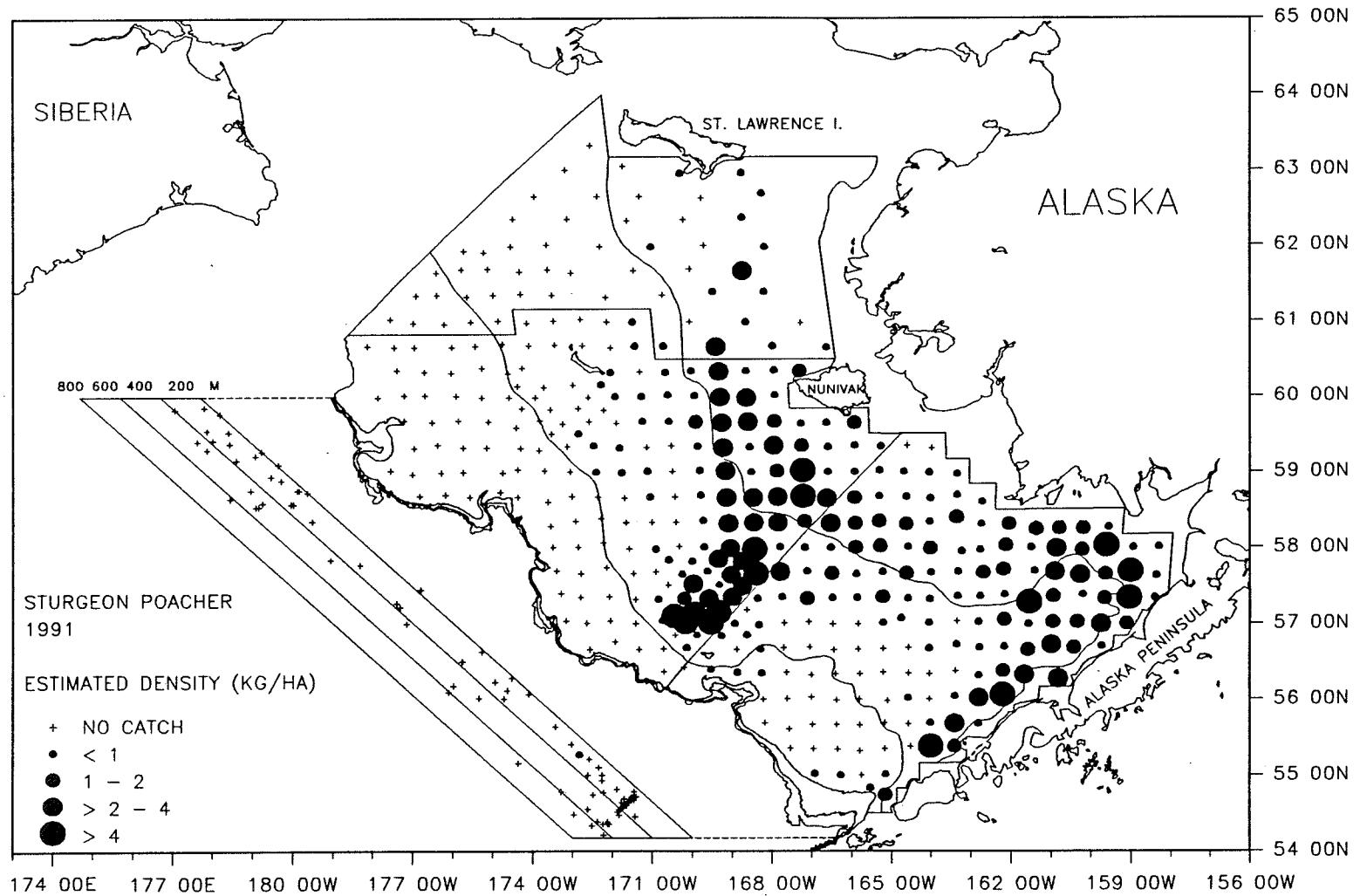
Figure 70.--Distribution and relative abundance of sturgeon poacher in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 37.--Abundance estimates and mean size of poachers by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	1.226	9,546	0.241	124,594,528	0.253	0.077	-
2	< 50	1.978	8,114	0.205	94,344,328	0.191	0.086	-
3	50 - 100	0.868	8,968	0.226	111,843,986	0.227	0.080	-
4	50 - 100	0.944	10,176	0.257	123,295,310	0.250	0.083	-
5	100 - 200	0.108	419	0.011	6,395,388	0.013	0.065	-
6	100 - 200	0.021	200	0.005	7,191,652	0.015	0.028	-
Subareas combined		0.808	37,422	0.944	467,665,192	0.948	0.080	-
North Shelf								
7	< 50	0.297	2,166	0.055	24,626,074	0.050	0.088	-
8	50 - 100	0.003	16	<0.001	498,109	0.001	0.033	-
9	100 - 200	0.003	3	<0.001	180,620	<0.001	0.018	-
Subareas combined		0.156	2,186	0.055	25,304,803	0.051	0.086	-
Slope								
10	200 - 500	0.022	17	<0.001	290,610	0.001	0.059	-
11	200 - 500	0.013	7	<0.001	108,892	<0.001	0.065	-
12	500 - 800	0.002	1	<0.001	11,667	<0.001	0.068	-
13	500 - 800	0.002	1	<0.001	8,904	<0.001	0.091	-
Subareas combined		0.012	26	0.001	420,072	0.001	0.061	-
All subareas combined		0.634	39,634	1.000	493,390,068	1.000	0.080	-
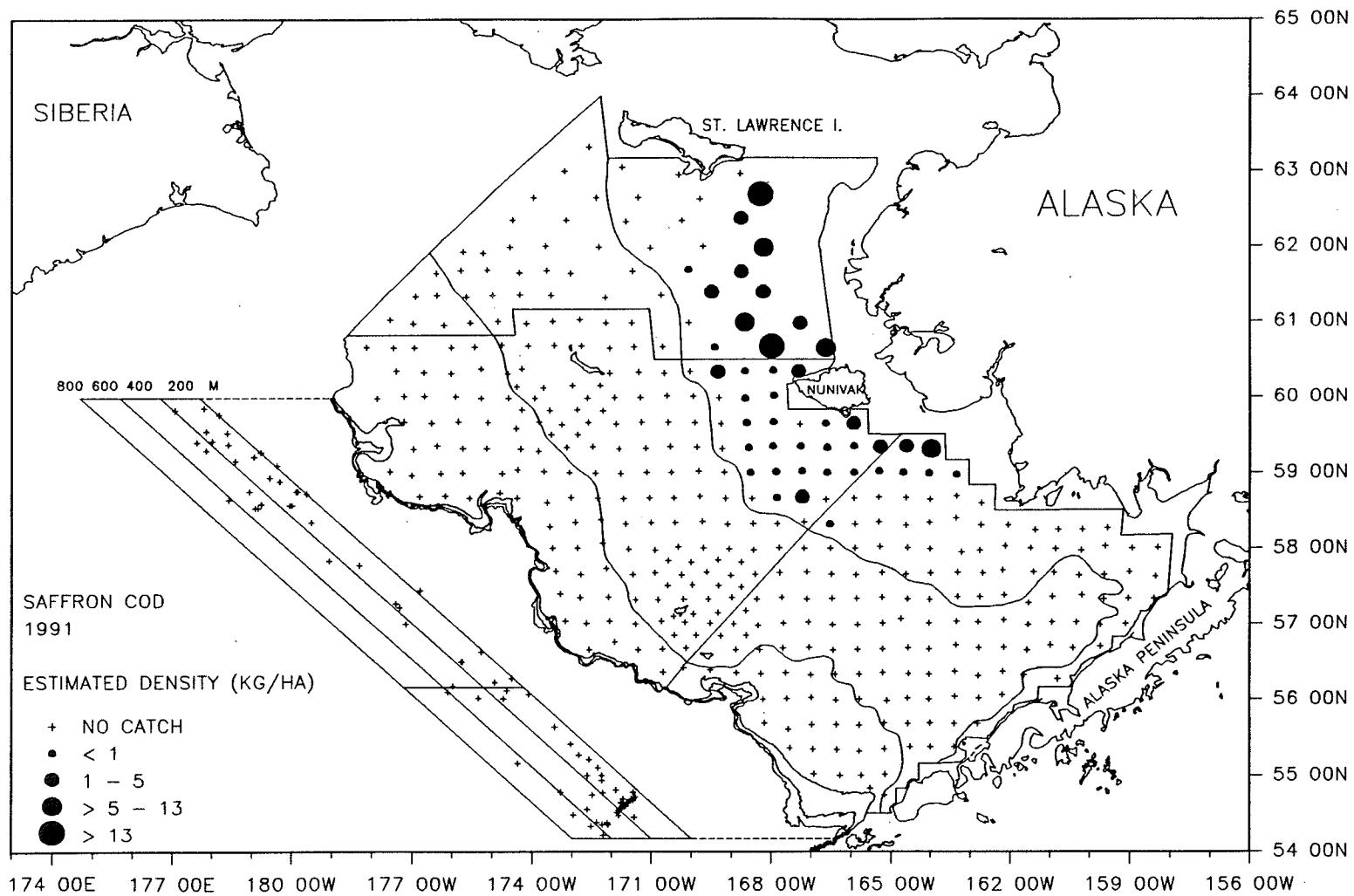
Figure 71.--Distribution and relative abundance of saffron cod in the eastern Bering
Sea as shown by the 1991 bottom trawl survey.

131

Table 38.--Abundance estimates and mean size of saffron cod by subarea from the 1991 bottom trawl survey of the eastern Bering Sea.

| Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.215	1,674	0.005	54,343,157	0.019	0.031	15.6
2	< 50	0.520	2,133	0.007	27,589,172	0.010	0.077	19.5
3	50 - 100	0.000	0	0.000	0	0.000	-	-
4	50 - 100	0.000	0	0.000	0	0.000	-	-
5	100 - 200	0.000	0	0.000	0	0.000	-	-
6	100 - 200	0.000	0	0.000	0	0.000	0.000	-
Subareas combined		0.082	3,807	0.012	81,932,328	0.029	0.046	16.9
North Shelf								
7	< 50	42.762	311,419	0.988	2,775,082,173	0.971	0.112	23.6
8	50 - 100	0.000	0	0.000	0	0.000	-	-
9	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		22.179	311,419	0.988	2,775,082,173	0.971	0.112	23.6
Slope								
10	200 - 500	0.000	0	0.000	0	0.000	-	-
11	200 - 500	0.000	0	0.000	0	0.000	-	-
12	500 - 800	0.000	0	0.000	0	0.000	-	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
All subareas combined		5.044	315,227	1.000	2,857,014,501	1.000	0.110	23.4
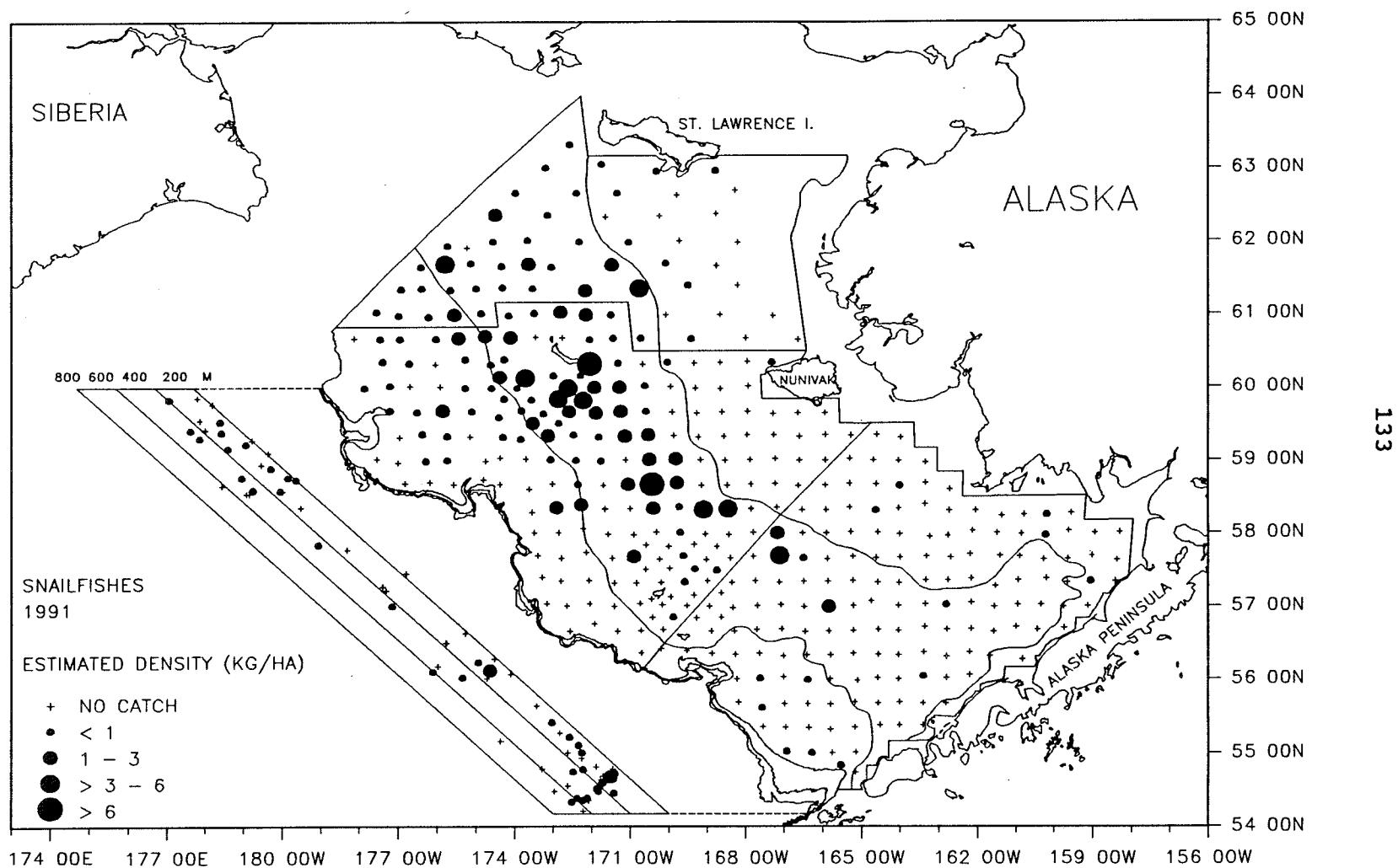
Figure 72.--Distribution and relative abundance of snailfish in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 39.--Abundance estimates and mean size of snailfish by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.008	64	0.003	356,558	0.007	0.181	−
2	< 50	0.003	13	0.001	287,726	0.006	0.045	−
3	50 − 100	0.119	1,227	0.054	1,080,687	0.021	1.135	−
4	50 − 100	1.107	11,935	0.526	13,508,391	0.267	0.884	−
5	100 − 200	0.020	77	0.003	634,972	0.013	0.122	−
6	100 − 200	0.246	2,329	0.103	6,920,484	0.137	0.336	−
Subareas combined		0.338	15,645	0.689	22,788,817	0.451	0.687	−
North Shelf								
7	< 50	0.109	797	0.035	3,388,397	0.067	0.235	−
8	50 − 100	0.975	5,461	0.241	21,753,906	0.431	0.251	−
9	100 − 200	0.421	487	0.021	1,947,099	0.039	0.250	−
Subareas combined		0.480	6,744	0.297	27,089,403	0.536	0.249	−
Slope								
10	200 − 500	0.255	199	0.009	176,751	0.003	1.123	−
11	200 − 500	0.065	37	0.002	78,416	0.002	0.470	−
12	500 − 800	0.041	18	0.001	70,631	0.001	0.256	−
13	500 − 800	0.164	54	0.002	300,204	0.006	0.181	−
Subareas combined		0.146	308	0.014	626,002	0.012	0.492	−
All subareas combined		0.363	22,697	1.000	50,504,222	1.000	0.449	−
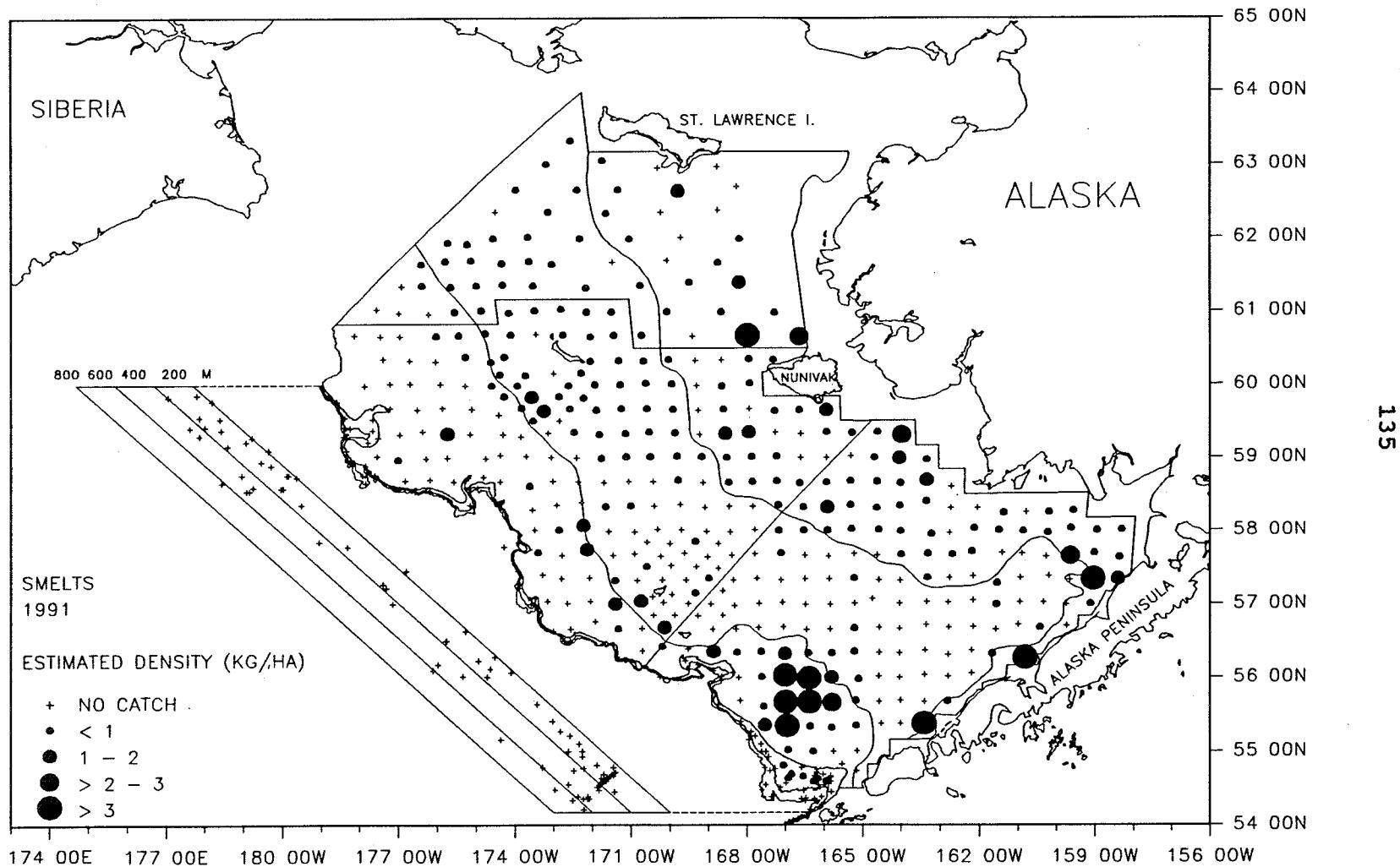
Figure 73.--Distribution and relative abundance of smelts in the eastern Bering
Sea as shown by the 1991 bottom trawl survey.

Table 40.--Abundance estimates and mean size of smelts by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

| Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.127	991	0.094	44,879,491	0.150	0.022	–
2	< 50	0.207	850	0.080	41,553,458	0.139	0.020	–
3	50 - 100	0.140	1,449	0.137	17,384,466	0.058	0.083	–
4	50 - 100	0.051	547	0.052	30,745,530	0.103	0.018	–
5	100 - 200	1.524	5,911	0.558	119,418,243	0.399	0.050	–
6	100 - 200	0.002	18	0.002	1,230,396	0.004	0.015	–
Subareas combined		0.211	9,766	0.923	255,211,583	0.853	0.038	–
North Shelf								
7	< 50	0.056	404	0.038	17,811,839	0.060	0.023	–
8	50 - 100	0.068	380	0.036	25,312,763	0.085	0.015	–
9	100 - 200	0.007	8	0.001	352,473	0.001	0.022	–
Subareas combined		0.056	792	0.075	43,477,075	0.145	0.018	–
Slope								
10	200 - 500	0.036	28	0.003	360,356	0.001	0.077	–
11	200 - 500	0.000	0	0.000	0	0.000	–	–
12	500 - 800	0.000	0	0.000	0	0.000	–	–
13	500 - 800	0.000	0	0.000	0	0.000	–	–
Subareas combined		0.013	28	0.003	360,356	0.001	0.077	–
All subareas combined		0.169	10,585	1.000	299,049,014	1.000	0.035	–
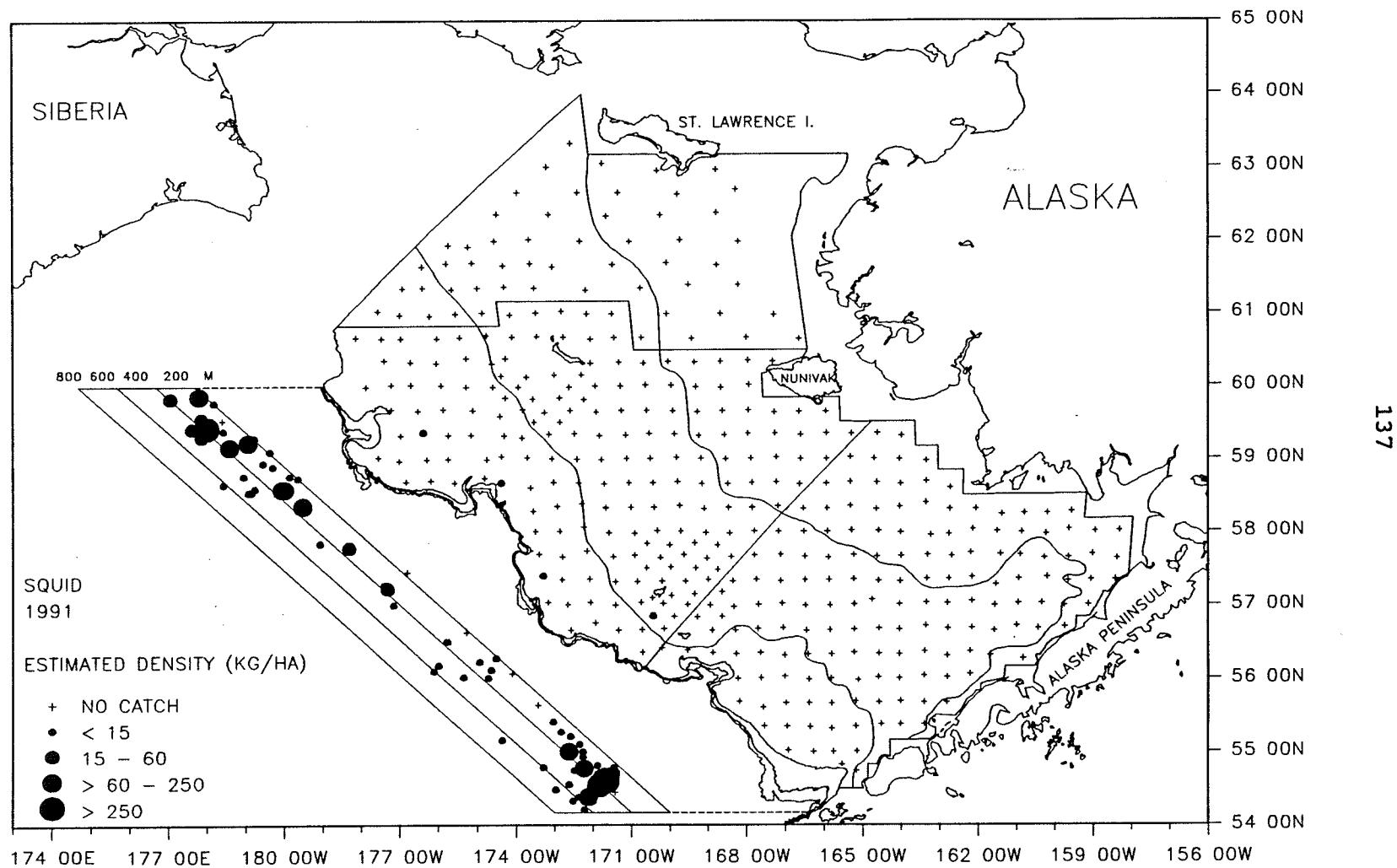
Figure 74.--Distribution and relative abundance of squid in the eastern Bering
Sea as shown by the 1991 bottom trawl survey.

Table 41.--Abundance estimates and mean size of squids by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.001	8	0.003	-	-	-	-
2	< 50	0.000	0	0.000	0	0.000	-	-
3	50 - 100	0.000	0	0.000	0	0.000	-	-
4	50 - 100	<0.001	1	<0.001	15,501	0.001	0.045	-
5	100 - 200	0.000	0	0.000	0	0.000	-	-
6	100 - 200	0.001	11	0.004	245,023	0.020	0.045	-
Subareas combined		<0.001	20	0.007	260,524	0.022	0.076	-
North Shelf								
7	< 50	0.000	0	0.000	0	0.000	-	-
8	50 - 100	0.000	0	0.000	0	0.000	-	-
9	100 - 200	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.000	0	0.000	0	0.000	-	-
Slope								
10	200 - 500	1.853	1,442	0.489	5,254,728	0.439	0.274	-
11	200 - 500	1.689	954	0.323	4,644,367	0.388	0.205	-
12	500 - 800	0.736	323	0.110	989,610	0.083	0.327	-
13	500 - 800	0.634	210	0.071	809,928	0.068	0.259	-
Subareas combined		1.386	2,930	0.993	11,698,633	0.978	0.250	-
All subareas combined		0.047	2,949	1.000	11,959,158	1.000	0.247	-
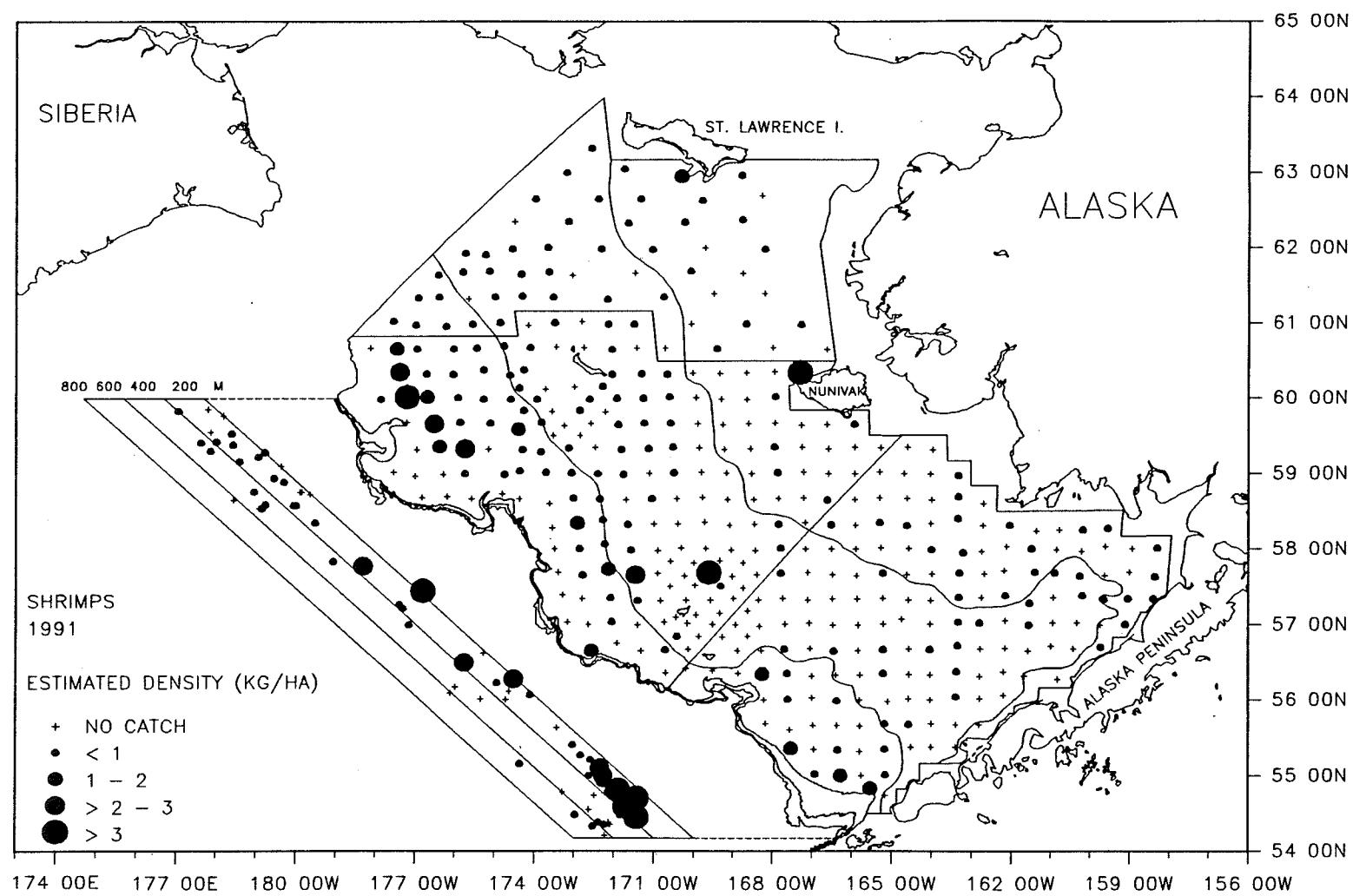
Figure 75.--Distribution and relative abundance of shrimps in the eastern Bering Sea as shown by the 1991 bottom trawl survey.

Table 42.--Abundance estimates and mean size of shrimps by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

| Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.011	85	0.007	13,931,171	0.010	0.006	−
2	< 50	0.249	1,020	0.089	44,955,419	0.032	0.023	−
3	50 - 100	0.008	83	0.007	2,988,224	0.002	0.028	−
4	50 - 100	0.100	1,078	0.094	92,538,326	0.065	0.012	−
5	100 - 200	0.260	1,010	0.088	205,388,220	0.144	0.005	−
6	100 - 200	0.478	4,517	0.395	629,338,377	0.441	0.007	−
Subareas combined		0.168	7,793	0.682	989,139,738	0.694	0.008	−
North Shelf								
7	< 50	0.163	1,187	0.104	96,233,127	0.067	0.012	−
8	50 - 100	0.082	457	0.040	34,874,914	0.024	0.013	−
9	100 - 200	0.092	107	0.009	10,961,447	0.008	0.010	−
Subareas combined		0.125	1,751	0.153	142,069,487	0.100	0.012	−
Slope								
10	200 - 500	1.698	1,322	0.116	233,651,542	0.164	0.006	−
11	200 - 500	0.849	479	0.042	56,660,664	0.040	0.008	−
12	500 - 800	0.027	12	0.001	744,250	0.001	0.016	−
13	500 - 800	0.198	65	0.006	3,424,492	0.002	0.019	−
Subareas combined		0.889	1,879	0.164	294,480,948	0.207	0.006	−
All subareas combined		0.183	11,423	1.000	1,425,690,173	1.000	0.008	−
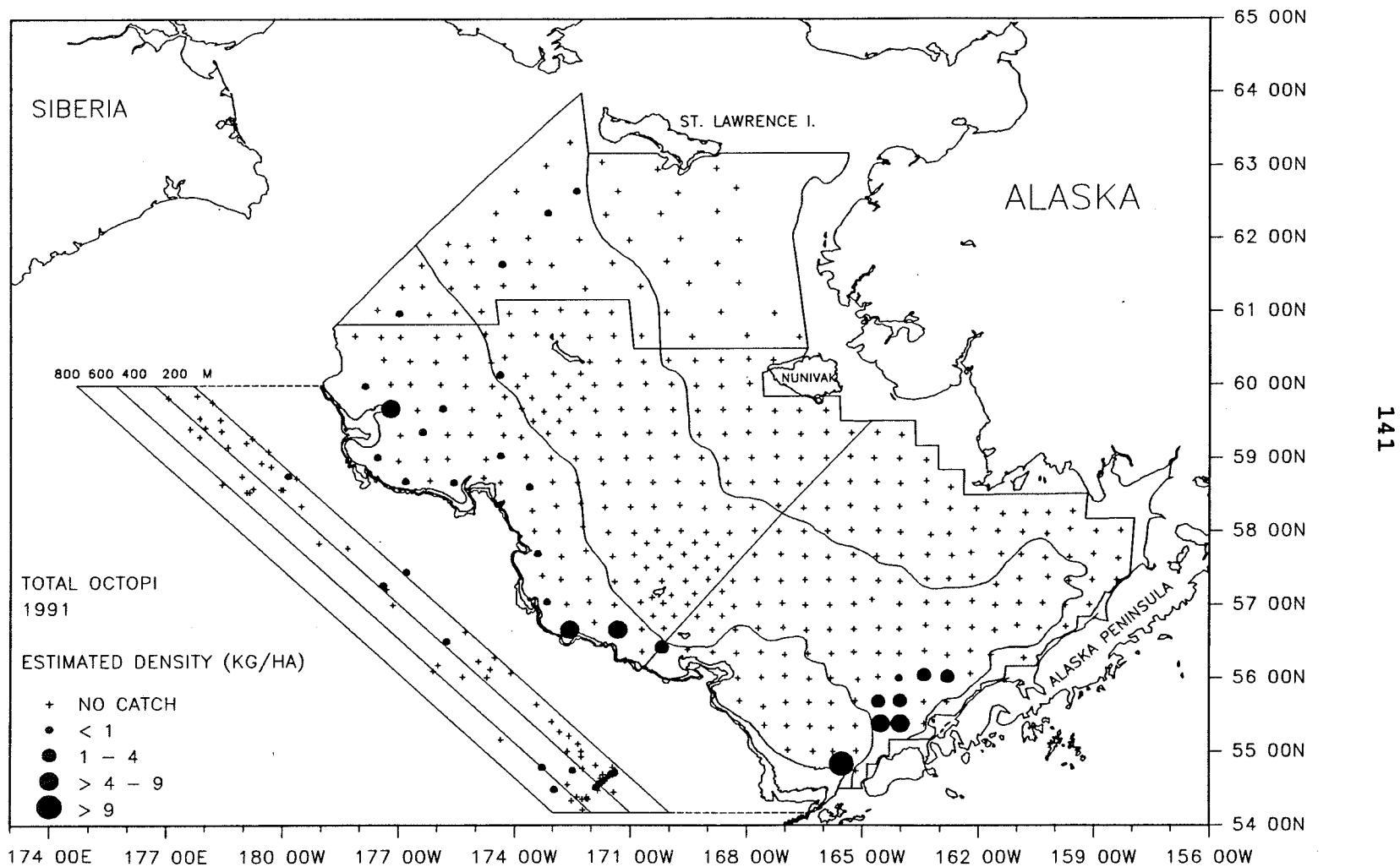
Figure 76.--Distribution and relative abundance of octopi in the eastern Bering
Sea as shown by the 1991 bottom trawl survey.

Table 43.--Abundance estimates and mean size of octopi by subarea from the 1991 bottom
trawl survey of the eastern Bering Sea.

Subarea	Depth Interval (m)	Mean CPUE (kg/ha)	Estimated biomass (t)	Proportion of estimated biomass	Estimated population numbers	Proportion of estimated population	Mean Weight (kg)	Mean Length (cm)
Eastern Bering Sea Shelf								
1	< 50	0.000	0	0.000	0	0.000	-	-
2	< 50	0.000	0	0.000	0	0.000	-	-
3	50 - 100	0.303	3,133	0.383	351,656	0.109	8.908	-
4	50 - 100	0.002	19	0.002	41,477	0.013	0.454	-
5	100 - 200	0.656	2,544	0.311	128,996	0.040	19.718	-
6	100 - 200	0.243	2,295	0.281	1,744,724	0.543	1.315	-
Subareas combined		0.172	7,990	0.977	2,266,853	0.706	3.525	-
North Shelf								
7	< 50	0.000	0	0.000	0	0.000	-	-
8	50 - 100	0.019	107	0.013	835,900	0.260	0.128	-
9	100 - 200	0.025	29	0.004	32,202	0.010	0.907	-
Subareas combined		0.010	136	0.017	868,102	0.270	0.157	-
Slope								
10	200 - 500	0.009	7	0.001	22,625	0.007	0.310	-
11	200 - 500	0.068	38	0.005	30,247	0.009	1.267	-
12	500 - 800	0.010	5	0.001	24,372	0.008	0.186	-
13	500 - 800	0.000	0	0.000	0	0.000	-	-
Subareas combined		0.024	50	0.006	77,244	0.024	0.645	-
All subareas combined		0.131	8,176	1.000	3,212,198	1.000	2.545	-

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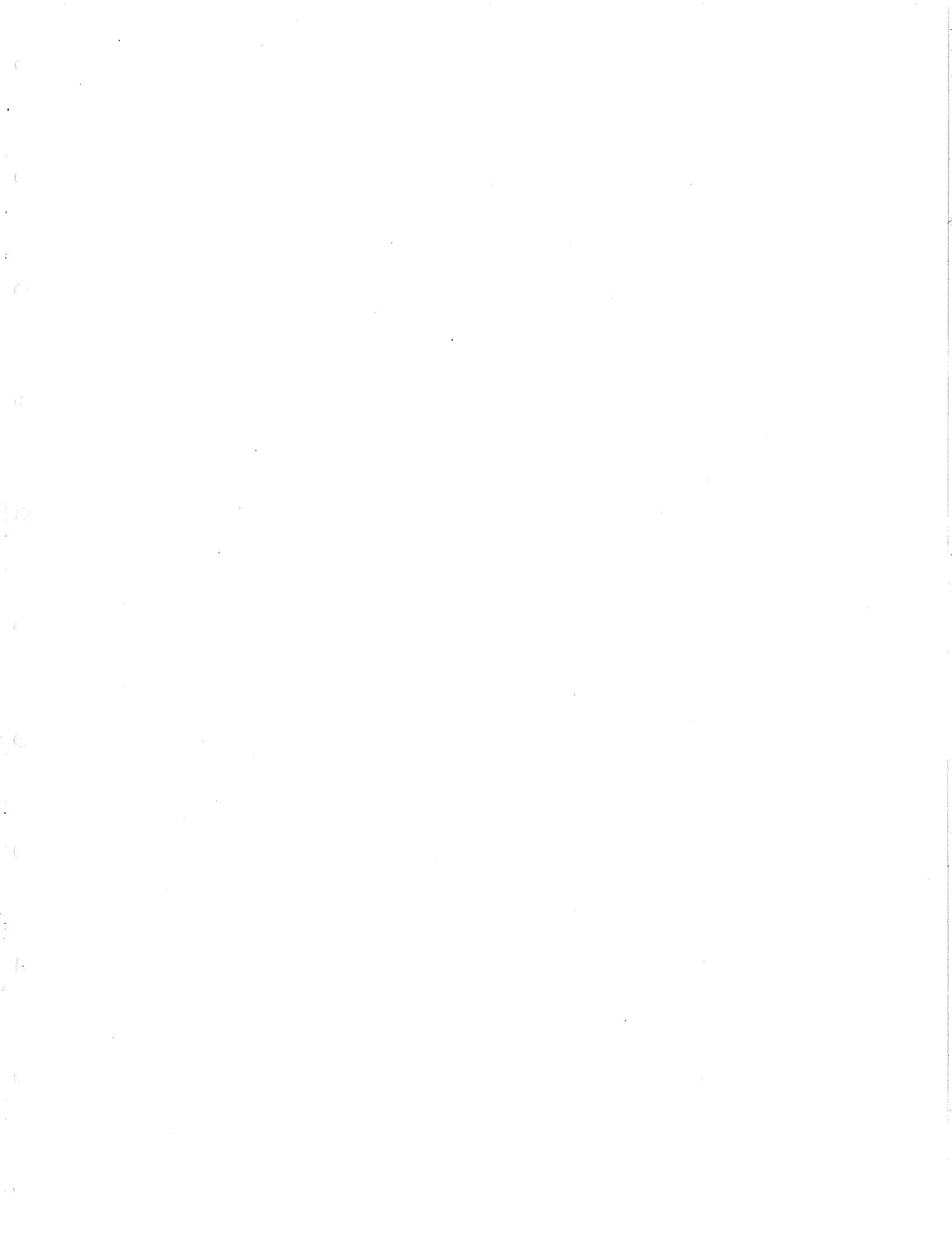
APPENDIX A

Schematic Diagrams of Trawls Used During the
1991 Eastern Bering Sea Survey

List of Figures

83/112 EASTERN

Figure A-1.—Schematic diagram of the 83-112 Eastern bottom trawl used by the vessels on the continental shelf during 1991 survey.

POLY—NOREASTERN
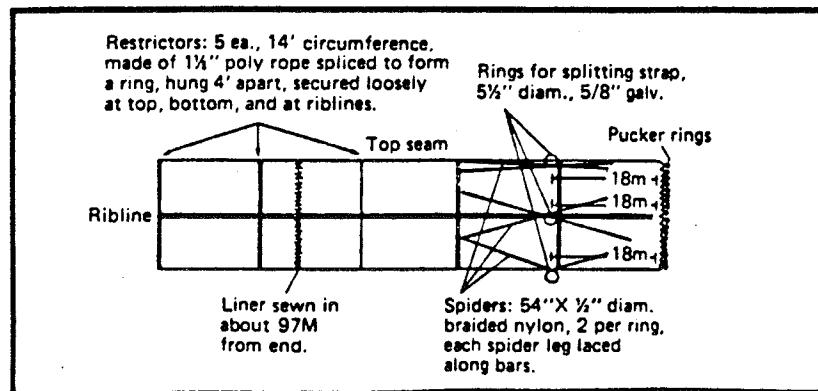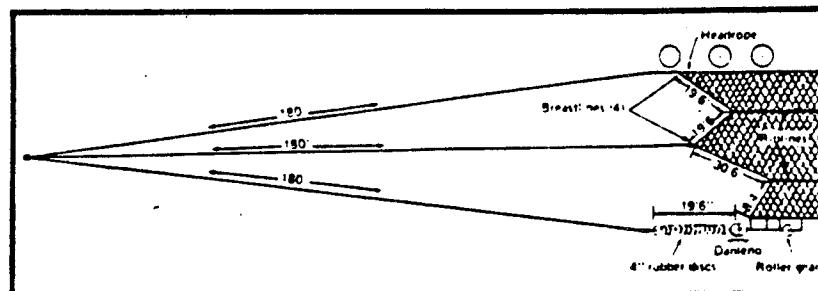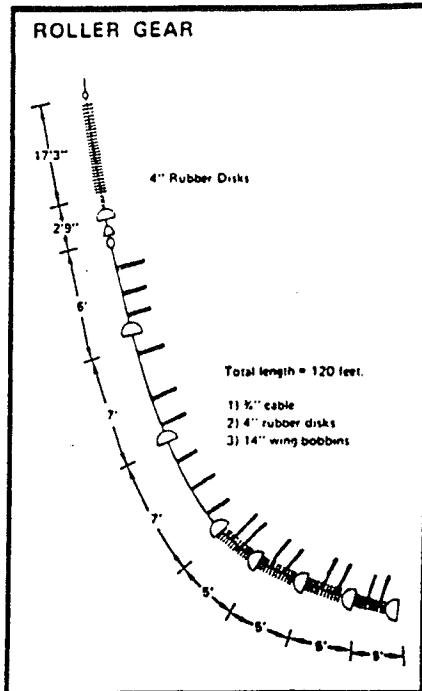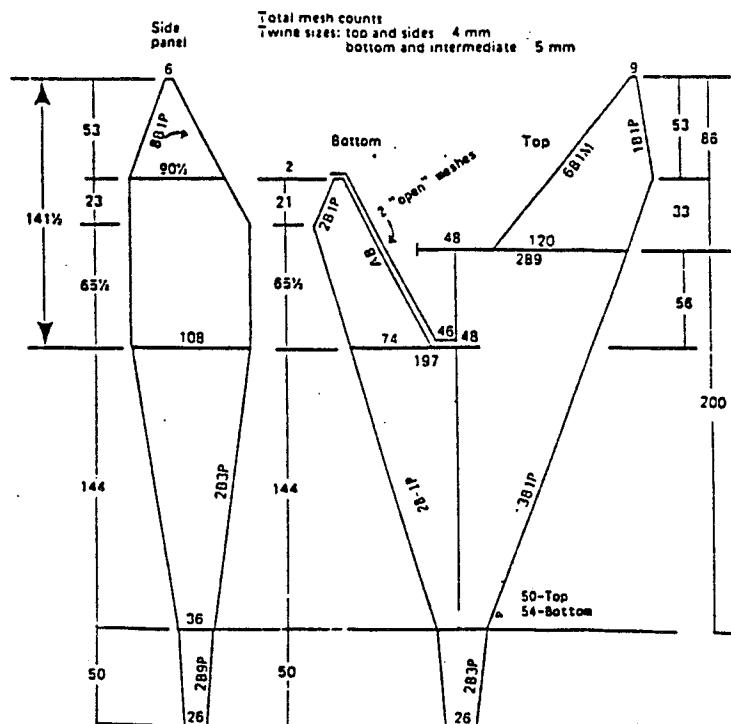
Figure A-2.—Schematic diagram of the Nor'eastern trawl used by the NOAA vessel **Miller Freeman** on the continental slope during the 1991 survey.

APPENDIX B

Station Data From the 1991 Eastern Bering Sea Survey

Appendix B contains listings of stations for all trawl stations
completed during the 1991 survey.

In using the following tables it should be noted that the
"Latitude" and "Longitude" columns designate the start position
of the tow, and the "Time" column lists the nearest hour of
Alaska daylight savings time at the start of the tow. Values of
-9.0 for surface and gear temperatures indicate that no data was
collected.

List of Tables

Table B-1.--Station data for the chartered vessel <u>Alaska</u> during the 1991 bottom
          trawl survey.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
1	6/20/91	57 67	162 69	42	6	0.50	1.48	10	-9.0	-9.0
2	6/20/91	57 36	162 77	46	9	0.50	1.53	10	5.0	4.0
3	6/20/91	57 02	162 81	59	14	0.50	1.60	31	5.5	2.3
4	6/20/91	56 68	162 79	70	17	0.50	1.54	31	6.2	3.2
5	6/21/91	56 31	162 81	79	7	0.50	1.58	31	6.1	2.3
6	6/21/91	56 02	162 80	77	9	0.50	1.67	31	6.1	2.7
7	6/21/91	55 68	162 82	49	12	0.50	1.59	10	6.2	4.6
9	6/21/91	55 38	164 01	73	18	0.33	1.00	31	7.5	4.2
10	6/22/91	55 69	164 02	93	6	0.50	1.49	31	6.9	3.1
11	6/22/91	56 00	164 05	90	9	0.50	1.52	31	6.8	1.6
12	6/22/91	56 33	164 05	84	12	0.50	1.60	31	6.1	1.3
13	6/22/91	56 67	164 05	73	14	0.50	1.53	31	5.8	2.2
16	6/23/91	56 68	164 58	73	8	0.50	1.58	31	5.1	2.0
22	6/24/91	57 07	164 76	68	12	0.54	1.54	31	5.6	2.5
23	6/24/91	57 01	164 05	66	15	0.50	1.51	31	6.3	2.6
24	6/24/91	57 32	164 03	62	17	0.50	1.51	31	5.8	2.0
25	6/25/91	57 33	164 59	64	6	0.50	1.50	31	6.6	1.9
26	6/25/91	57 66	164 63	53	9	0.50	1.55	10	5.6	2.4
27	6/25/91	57 67	164 00	49	11	0.50	1.37	10	4.6	3.4
28	6/25/91	57 99	164 02	44	14	0.50	1.58	10	4.4	4.0
29	6/25/91	58 01	164 59	42	16	0.50	1.46	10	4.4	3.8
30	6/26/91	58 31	164 64	42	6	0.50	1.48	10	4.6	4.0
31	6/26/91	58 34	164 04	40	8	0.50	1.47	10	5.0	4.5
32	6/26/91	58 65	164 02	33	11	0.50	1.47	10	5.6	5.4
33	6/26/91	58 67	164 63	35	13	0.50	1.49	10	5.6	5.0
34	6/26/91	59 00	164 70	24	16	0.50	1.53	10	5.9	5.6
35	6/26/91	58 99	164 05	26	19	0.50	1.52	10	6.8	6.4
36	6/27/91	59 31	163 99	18	6	0.50	1.56	10	8.9	11.7
38	6/27/91	59 35	164 62	20	11	0.50	1.44	10	8.2	8.0
39	6/27/91	59 34	165 28	18	13	0.50	1.56	20	7.2	6.8
40	6/27/91	59 65	165 95	22	16	0.45	1.32	20	7.6	7.4
41	6/28/91	59 35	165 94	22	10	0.50	1.38	20	6.4	6.2
42	6/29/91	59 02	165 31	26	10	0.50	1.47	10	6.2	5.9
43	6/29/91	58 68	165 32	37	13	0.50	1.43	10	4.9	4.6
44	6/29/91	58 35	165 32	42	15	0.50	1.49	10	4.6	3.8
45	6/29/91	58 02	165 29	48	18	0.50	1.46	10	4.4	3.5
46	6/30/91	57 68	165 23	59	6	0.50	1.56	31	4.9	1.9
47	6/30/91	57 35	165 23	64	9	0.50	1.50	31	5.9	2.4
48	6/30/91	57 01	165 22	70	12	0.50	1.54	31	5.4	2.1
49	6/30/91	56 67	165 22	73	15	0.50	1.47	31	5.8	1.7
50	6/30/91	56 35	165 22	84	18	0.50	1.47	31	6.5	2.1
51	7/ 1/91	55 98	165 11	95	6	0.50	1.49	31	6.9	3.5
52	7/ 1/91	55 69	165 18	108	9	0.50	1.44	31	7.1	3.4
53	7/ 1/91	55 35	165 17	110	11	0.51	1.35	50	6.8	4.2
54	7/ 1/91	55 01	165 15	110	14	0.50	1.51	50	6.7	4.3
55	7/ 1/91	54 74	165 16	90	16	0.30	0.92	31	7.1	5.1
56	7/ 2/91	55 00	166 28	143	6	0.50	1.53	50	6.7	3.7
57	7/ 2/91	55 34	166 36	132	9	0.50	1.46	50	7.6	3.7
58	7/ 2/91	55 67	166 38	126	12	0.50	1.31	50	7.4	3.5
59	7/ 2/91	55 99	166 39	123	14	0.50	1.35	50	7.5	3.6
60	7/ 2/91	56 33	166 41	102	17	0.50	1.42	31	7.2	3.3
61	7/ 3/91	56 65	166 46	82	6	0.50	1.48	31	6.7	2.0
62	7/ 3/91	56 99	166 48	71	9	0.50	1.52	31	5.9	2.7
63	7/ 3/91	57 34	166 49	68	12	0.50	1.41	31	5.4	2.8
64	7/ 3/91	57 66	166 50	64	14	0.50	1.52	31	5.3	2.1

Table B-1.—Station data for the <u>Alaska</u> continued.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
65	7/ 3/91	58 00	166 53	59	17	0.50	1.41	31	5.7	2.2
66	7/ 4/91	58 32	166 54	44	6	0.50	1.47	10	5.8	3.7
67	7/ 4/91	58 65	166 64	38	9	0.53	1.60	20	5.8	4.0
68	7/ 4/91	59 00	166 61	31	11	0.50	1.51	20	6.9	5.6
69	7/ 4/91	59 33	166 61	26	14	0.50	1.47	20	7.8	7.2
70	7/ 4/91	59 65	166 65	24	16	0.50	1.50	20	8.8	8.0
71	7/ 6/91	60 65	166 65	18	7	0.50	1.52	70	8.8	8.4
72	7/ 6/91	60 98	167 30	20	10	0.50	1.51	70	12.8	7.9
73	7/ 6/91	60 35	167 97	29	15	0.50	1.27	20	7.4	6.4
74	7/ 6/91	60 02	167 95	20	17	0.50	1.47	20	7.1	6.7
75	7/ 7/91	59 67	167 96	33	6	0.50	1.49	20	8.5	4.0
76	7/ 7/91	59 35	167 97	37	8	0.50	1.54	20	8.4	4.2
77	7/ 7/91	59 01	167 89	38	11	0.50	1.49	20	8.8	4.0
78	7/ 7/91	58 67	167 87	44	13	0.51	1.38	20	8.4	3.7
79	7/ 7/91	58 33	167 86	59	16	0.50	1.49	41	8.4	1.6
80	7/ 8/91	58 01	167 81	66	6	0.50	1.49	41	8.3	2.4
81	7/ 8/91	57 68	167 80	66	9	0.50	1.52	31	8.4	3.4
82	7/ 8/91	57 35	167 75	71	11	0.50	1.47	31	8.9	-9.0
83	7/ 8/91	57 01	167 70	75	14	0.50	1.34	31	10.1	2.5
84	7/ 8/91	56 68	167 71	101	16	0.42	1.26	31	10.5	2.9
85	7/ 9/91	56 35	167 64	130	6	0.50	1.44	50	10.2	3.3
86	7/ 9/91	56 01	167 62	132	9	0.50	1.51	50	10.0	3.3
88	7/ 9/91	55 61	167 57	135	13	0.50	1.57	50	10.1	3.4
89	7/ 9/91	55 36	167 54	146	15	0.52	1.56	50	9.9	3.4
90	7/12/91	57 49	168 76	70	14	0.50	1.50	42	10.2	2.9
91	7/12/91	57 51	169 33	68	16	0.50	1.49	42	10.7	2.5
92	7/13/91	57 64	169 03	68	6	0.50	1.50	42	10.2	2.7
93	7/13/91	57 82	168 76	70	8	0.50	1.49	42	9.7	2.7
94	7/13/91	57 99	169 06	68	11	0.33	0.98	42	9.2	2.0
95	7/13/91	58 33	169 11	66	15	0.33	1.01	41	9.5	1.5
96	7/13/91	58 66	169 16	60	18	0.33	0.99	41	9.2	1.6
97	7/14/91	59 01	169 19	51	6	0.25	0.76	41	8.7	2.5
98	7/14/91	59 32	169 25	48	9	0.33	1.06	20	8.4	2.8
99	7/14/91	59 65	169 28	46	11	0.33	1.09	20	9.5	2.5
100	7/14/91	59 99	169 33	44	14	0.50	1.48	20	8.6	-9.0
101	7/14/91	60 33	169 36	40	16	0.33	1.00	20	10.2	3.1
102	7/14/91	60 66	169 44	40	18	0.83	1.02	70	9.8	1.7
103	7/15/91	60 99	170 09	46	6	0.50	1.57	70	9.7	-0.6
104	7/15/91	60 67	170 74	57	9	0.25	0.74	81	9.3	0.0
105	7/17/91	60 33	171 33	64	8	0.33	1.00	41	9.1	-0.5
106	7/17/91	60 32	170 69	60	10	0.33	1.06	41	9.0	0.2
107	7/17/91	60 02	170 63	64	12	0.50	1.43	41	9.2	-0.1
108	7/17/91	60 00	171 29	68	15	0.50	1.52	41	8.8	-0.5
109	7/17/91	59 67	171 26	71	18	0.50	1.52	41	8.4	-0.8
110	7/18/91	59 67	170 60	66	7	0.50	1.57	41	8.6	-0.3
111	7/18/91	59 35	170 54	64	9	0.50	1.49	41	8.5	-9.0
112	7/18/91	59 33	171 15	75	12	0.50	1.49	41	8.4	-0.9
113	7/18/91	59 01	171 13	77	14	0.50	1.53	41	8.3	-0.8
114	7/18/91	59 01	170 51	71	17	0.38	1.16	41	8.4	-0.7
115	7/19/91	58 67	170 44	73	6	0.33	1.02	41	8.5	-0.3
116	7/19/91	58 67	171 06	82	9	0.25	0.75	41	8.0	0.1
117	7/19/91	58 34	171 01	82	11	0.33	1.01	41	8.8	0.5
118	7/19/91	58 34	170 41	73	13	0.33	1.16	41	8.8	0.2
119	7/19/91	58 02	170 33	73	16	0.25	0.71	42	8.9	0.8
120	7/19/91	57 84	170 59	77	18	0.25	0.75	42	8.6	1.7
121	7/20/91	57 98	170 91	84	6	0.33	0.99	42	9.2	2.0

Table B-1.--Station data for the <u>Alaska</u> continued.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
122	7/20/91	57 68	170 91	84	9	0.33	0.98	42	9.0	3.0
123	7/20/91	57 51	170 60	73	11	0.33	0.93	42	9.0	3.0
124	7/20/91	57 65	170 25	71	14	0.33	0.97	42	8.5	2.1
125	7/20/91	57 82	170 01	71	16	0.33	1.02	42	8.2	1.6
126	7/20/91	57 52	169 98	68	18	0.50	1.53	42	8.3	2.7
127	7/21/91	57 33	170 20	49	8	0.33	0.92	42	8.1	5.4
129	7/21/91	57 13	169 96	46	10	0.33	1.01	42	6.6	5.9
130	7/21/91	57 02	170 17	66	12	0.33	1.13	42	6.1	5.3
132	7/21/91	57 04	170 75	88	16	0.33	0.91	42	8.3	3.6
133	7/21/91	57 32	170 84	80	18	0.50	1.55	42	8.7	3.7
134	7/22/91	57 10	170 45	46	8	0.33	0.92	42	5.9	5.4
135	7/23/91	56 68	170 14	95	10	0.50	1.51	42	7.4	3.3
136	7/23/91	56 36	170 71	121	14	0.50	1.55	61	7.9	3.6
137	7/23/91	56 66	171 33	119	17	0.50	1.49	61	8.0	3.5
138	7/24/91	57 00	171 41	110	7	0.50	1.53	61	8.8	3.1
139	7/24/91	57 32	171 41	99	9	0.50	1.54	41	8.7	3.1
140	7/24/91	57 66	171 47	97	12	0.50	1.50	41	8.7	2.8
141	7/24/91	57 99	171 58	97	14	0.50	1.47	41	8.8	2.2
142	7/24/91	58 33	171 66	95	17	0.50	1.53	41	8.7	1.1
143	7/25/91	58 66	171 71	91	7	0.50	1.48	41	8.8	1.0
144	7/25/91	58 99	171 78	86	9	0.50	1.51	41	8.5	0.3
145	7/25/91	59 32	171 83	79	12	0.50	1.46	43	8.1	-0.8
146	7/25/91	59 65	171 91	77	14	0.50	1.51	43	8.2	-1.0
147	7/25/91	59 82	172 24	73	16	0.33	1.04	43	8.5	-1.0
148	7/26/91	60 00	171 95	66	6	0.25	0.71	43	6.9	0.0
149	7/26/91	60 16	172 31	55	7	0.33	0.91	43	6.9	2.3
150	7/26/91	60 32	172 07	57	10	0.33	0.95	43	-9.0	-9.0
151	7/27/91	60 65	172 07	60	6	0.25	0.72	41	8.0	-1.0
152	7/27/91	60 99	172 17	62	9	0.33	0.94	41	8.7	-0.2
153	7/27/91	61 32	172 19	62	11	0.50	1.49	81	9.1	-1.3
154	7/27/91	61 99	172 35	53	16	0.50	1.48	81	9.8	-1.3
155	7/28/91	62 65	172 42	51	6	0.50	1.49	81	9.9	-1.1
156	7/28/91	63 32	172 60	62	11	0.50	1.51	81	9.6	-1.6
157	7/28/91	63 00	173 22	68	14	0.50	1.46	81	9.4	-1.6
158	7/29/91	62 01	173 69	60	6	0.33	0.99	82	9.7	-1.6
159	7/29/91	61 68	173 66	70	9	0.50	1.53	82	9.8	-1.7
160	7/29/91	61 35	173 55	73	11	0.50	1.48	82	9.7	-1.6
161	7/29/91	61 01	173 51	75	14	0.50	1.48	41	9.2	-1.5
162	7/29/91	60 69	173 47	64	16	0.50	1.49	41	9.0	0.4
164	7/30/91	60 13	173 74	88	7	0.33	0.93	43	8.4	-0.6
165	7/30/91	59 99	173 95	97	9	0.50	1.59	43	8.6	0.1
168	7/30/91	59 83	173 58	97	14	0.50	1.45	43	8.1	0.2
169	7/30/91	59 68	173 84	104	16	0.50	1.49	62	8.9	0.7
170	7/30/91	59 51	173 54	102	18	0.50	1.44	43	8.8	0.8
171	7/30/91	59 64	173 27	97	20	0.50	1.47	43	8.9	0.6
172	7/31/91	59 34	173 15	101	7	0.50	1.47	43	8.9	0.8
173	7/31/91	59 01	173 08	106	9	0.50	1.45	61	9.5	1.4
174	7/31/91	58 68	173 03	112	12	0.33	0.94	61	9.6	1.7
175	7/31/91	58 35	172 93	108	15	0.50	1.44	61	9.6	1.7
176	7/31/91	58 01	172 87	108	17	0.50	1.47	61	9.8	2.5
177	8/ 1/91	57 66	172 79	119	6	0.50	1.45	61	9.8	-9.0
178	8/ 1/91	57 35	172 80	115	9	0.63	1.56	61	9.9	3.0
179	8/ 1/91	57 01	172 65	123	12	0.50	1.47	61	10.1	3.1
180	8/ 1/91	56 66	172 57	135	15	0.25	0.71	61	10.0	-9.0
181	8/ 6/91	58 67	175 58	134	13	0.33	1.03	61	9.3	-9.0
182	8/ 6/91	59 00	175 75	135	16	0.50	1.53	61	10.0	2.3

Table B-1.--Station data for the <u>Alaska</u> continued.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
183	8/ 6/91	59 33	175 75	137	18	0.50	1.49	61	10.2	1.0
184	8/ 7/91	59 68	175 87	137	7	0.50	1.47	61	9.8	1.3
185	8/ 7/91	60 01	175 93	128	10	0.50	1.46	61	9.5	1.6
186	8/ 7/91	60 32	176 05	123	13	0.50	1.43	61	9.8	1.2
187	8/ 7/91	60 66	176 04	117	15	0.50	1.51	61	-9.0	0.8
188	8/ 7/91	60 96	176 23	113	18	0.33	1.02	90	10.7	-0.2
189	8/ 8/91	61 64	176 43	104	9	0.50	1.49	90	10.0	-0.1
190	8/ 8/91	61 35	176 41	108	12	0.50	1.48	90	10.4	0.0
191	8/ 8/91	61 34	176 94	117	14	0.50	1.46	90	10.0	0.0
192	8/ 8/91	61 03	177 57	135	17	0.50	1.45	90	10.0	-9.0
193	8/ 9/91	60 98	177 00	124	7	0.50	1.50	90	10.2	0.4
194	8/ 9/91	60 66	176 97	134	10	0.50	1.52	61	9.8	0.9
195	8/ 9/91	60 66	177 48	148	12	0.33	1.03	61	9.6	-9.0
196	8/ 9/91	60 67	178 15	163	14	0.50	1.47	61	10.6	1.4
197	8/ 9/91	60 35	177 41	150	18	0.50	1.42	61	10.2	0.8
198	8/10/91	60 33	176 73	139	7	0.58	1.46	61	9.6	1.0
199	8/10/91	60 02	176 71	143	10	0.33	1.05	61	9.3	0.9
200	8/10/91	60 02	177 22	137	12	0.50	1.51	61	9.8	0.9
201	8/10/91	59 99	177 88	141	15	0.33	1.03	61	9.7	0.9
202	8/10/91	59 68	177 22	177	18	0.50	1.40	61	9.8	2.1
203	8/11/91	59 66	176 53	137	7	0.50	1.47	61	9.1	1.1
204	8/11/91	59 36	176 39	137	10	0.50	1.50	61	9.0	1.0
205	8/11/91	59 32	176 98	146	12	0.50	1.47	61	9.8	2.9
206	8/11/91	59 02	177 56	135	15	0.50	1.47	61	-9.0	2.6
207	8/11/91	58 97	177 02	134	18	0.50	1.54	61	9.7	2.0
208	8/12/91	58 69	176 83	134	7	0.33	1.02	61	9.4	2.0
209	8/12/91	58 70	176 19	137	9	0.58	1.53	61	9.1	2.6
210	8/12/91	58 99	176 30	137	13	0.50	1.45	61	9.2	3.0
211	8/12/91	59 33	175 16	135	18	0.33	0.92	61	9.2	2.2
212	8/13/91	59 67	175 12	126	7	0.33	1.00	61	9.2	1.6
213	8/13/91	59 99	175 29	119	9	0.33	1.00	61	8.9	1.0
214	8/13/91	60 38	175 29	110	11	0.33	1.04	61	8.8	0.5

Table B-2.--Station data for the chartered vessel <u>Ocean</u> <u>Hope</u> <u>3</u> during the 1991 bottom trawl survey.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
1	6/ 7/91	57 34	159 05	49	7	0.50	1.60	10	4.5	-9.0
2	6/ 7/91	57 34	158 41	33	10	0.50	1.36	10	5.3	4.6
3	6/ 7/91	57 63	158 37	33	14	0.50	1.46	10	5.1	-9.0
4	6/ 7/91	58 01	158 31	31	17	0.50	1.65	10	5.2	4.8
5	6/ 8/91	58 00	158 95	42	7	0.50	1.56	10	6.3	-9.0
6	6/ 8/91	57 69	159 02	48	10	0.50	1.32	10	3.0	3.7
7	6/ 8/91	57 00	159 12	29	14	0.50	1.67	10	5.0	4.8
8	6/ 8/91	56 70	159 74	35	18	0.50	1.69	10	5.5	4.1
9	6/ 9/91	56 99	159 75	59	7	0.50	1.86	10	5.5	3.6
10	6/ 9/91	57 33	159 66	57	10	0.50	1.56	10	4.0	3.5
11	6/ 9/91	57 65	159 64	49	12	0.50	1.51	10	3.8	3.4
12	6/ 9/91	58 03	159 62	40	16	0.25	0.78	10	6.8	3.6
13	6/ 9/91	58 27	159 56	24	18	0.50	1.31	10	7.5	5.9
15	6/10/91	58 25	160 19	33	12	0.25	0.85	10	-9.0	7.4
16	6/10/91	57 97	160 22	49	14	0.50	1.58	10	4.9	3.4
17	6/10/91	57 64	160 27	53	16	0.50	1.79	31	4.9	3.2
18	6/11/91	57 38	160 20	59	7	0.50	1.41	31	4.0	3.5
19	6/11/91	57 02	160 34	66	10	0.50	1.66	31	4.3	3.4
20	6/11/91	56 68	160 43	62	12	0.50	1.73	31	5.3	3.4
21	6/12/91	56 27	160 82	33	7	0.50	1.84	10	5.3	5.0
22	6/12/91	56 72	160 99	70	11	0.50	1.40	31	5.1	3.5
23	6/12/91	57 02	160 95	60	13	0.50	1.45	31	-9.0	3.0
24	6/12/91	57 36	160 94	59	16	0.50	1.43	31	-9.0	3.3
25	6/13/91	57 68	160 90	57	7	0.50	1.50	31	5.3	3.2
26	6/13/91	57 99	160 86	46	9	0.50	1.58	10	5.9	3.5
27	6/13/91	58 25	160 79	33	11	0.50	1.32	10	7.5	4.1
28	6/13/91	58 24	161 37	44	14	0.50	1.54	10	8.5	3.8
29	6/13/91	58 00	161 49	55	16	0.50	1.51	10	4.7	3.4
30	6/14/91	57 69	161 41	51	7	0.50	1.56	10	3.9	3.7
31	6/14/91	57 28	161 54	57	10	0.50	1.61	31	4.9	3.6
32	6/14/91	56 99	161 56	70	13	0.50	1.47	31	5.2	3.0
33	6/14/91	56 65	161 58	91	15	0.50	1.42	31	5.3	2.9
34	6/14/91	56 32	161 67	62	18	0.50	1.96	10	-9.0	3.8
35	6/15/91	56 06	162 21	77	7	0.50	1.49	31	5.9	3.3
36	6/15/91	56 37	162 20	88	9	0.50	1.47	31	5.3	-9.0
37	6/15/91	56 69	162 17	71	12	0.50	1.47	31	4.9	3.0
38	6/15/91	57 05	162 17	59	15	0.50	1.59	31	5.1	3.0
39	6/15/91	57 38	162 16	51	17	0.50	1.49	10	4.3	3.8
41	6/18/91	58 60	162 72	27	7	0.50	1.52	10	5.5	5.3
42	6/18/91	58 31	162 74	31	9	0.50	1.59	10	5.3	4.8
43	6/18/91	58 40	163 36	35	12	0.50	1.71	10	5.1	4.8
44	6/18/91	58 69	163 35	31	14	0.50	1.89	10	5.4	4.9
45	6/18/91	58 97	163 35	22	16	0.50	1.39	10	7.1	6.3
46	6/19/91	58 31	162 05	48	6	0.50	1.47	10	5.4	4.7
47	6/19/91	58 03	162 13	40	9	0.50	1.53	10	5.7	4.5
48	6/19/91	57 71	162 19	46	12	0.50	1.75	10	4.8	4.1
49	6/19/91	57 97	162 77	42	15	0.50	1.41	10	5.5	3.7
50	6/19/91	57 95	163 23	42	17	0.50	1.69	10	4.8	3.6
51	6/20/91	57 68	163 32	48	7	0.50	1.65	10	3.9	3.5
52	6/20/91	57 36	163 33	53	9	0.50	1.43	10	3.9	2.7
53	6/20/91	57 03	163 35	66	14	0.50	1.60	31	4.9	2.8
54	6/20/91	56 72	163 36	75	17	0.50	1.40	31	5.8	-9.0
55	6/21/91	56 37	163 39	86	7	0.50	1.43	31	6.0	-9.0
56	6/21/91	56 04	163 40	90	9	0.50	1.45	31	6.2	1.9
57	6/21/91	55 68	163 41	82	12	0.50	1.42	31	6.6	2.9

157

Table B-2.--Station data for the Ocean Hope 3 continued.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
58	6/21/91	55 38	163 41	55	15	0.50	1.56	31	6.6	4.4
59	6/22/91	55 38	164 52	102	7	0.50	1.56	31	-9.0	4.0
60	6/22/91	55 68	164 58	97	9	0.50	1.65	31	6.4	2.9
61	6/22/91	56 02	164 59	93	12	0.50	1.68	31	6.7	1.6
62	6/22/91	56 34	164 57	88	15	0.50	1.55	31	6.4	-9.0
63	6/29/91	59 00	165 94	29	7	0.50	1.46	20	-9.0	-9.0
64	6/29/91	58 66	165 94	37	10	0.50	1.66	10	-9.0	-9.0
65	6/29/91	58 32	165 92	44	13	0.50	1.57	10	-9.0	-9.0
66	6/29/91	58 00	165 91	57	15	0.50	1.82	10	-9.0	-9.0
67	6/30/91	57 65	165 89	66	7	0.50	1.68	31	-9.0	-9.0
68	6/30/91	57 34	165 87	70	10	0.50	1.75	31	4.3	-9.0
69	6/30/91	56 99	165 85	73	13	0.50	1.75	31	5.3	-9.0
70	6/30/91	56 66	165 85	80	15	0.50	1.75	31	6.2	-9.0
71	6/30/91	56 33	165 80	93	18	0.50	1.82	31	6.8	-9.0
72	7/ 1/91	56 00	165 81	112	7	0.50	1.79	31	7.0	-9.0
73	7/ 1/91	55 66	165 80	119	9	0.50	1.45	50	-9.0	-9.0
74	7/ 1/91	55 32	165 80	123	12	0.50	1.72	50	7.2	-9.0
75	7/ 1/91	55 00	165 75	132	14	0.50	1.75	50	6.4	-9.0
76	7/ 1/91	54 83	165 53	166	16	0.50	1.87	50	-9.0	-9.0
77	7/ 2/91	55 02	166 93	155	6	0.50	1.43	50	7.8	-9.0
78	7/ 2/91	55 35	166 96	143	9	0.50	1.45	50	7.7	-9.0
79	7/ 2/91	55 67	166 99	137	11	0.50	1.47	50	-9.0	-9.0
80	7/ 2/91	56 03	167 01	135	14	0.50	1.53	50	-9.0	-9.0
81	7/ 2/91	56 32	167 02	115	17	0.50	1.41	50	-9.0	-9.0
82	7/ 3/91	56 69	167 06	97	6	0.50	1.48	31	7.0	-9.0
83	7/ 3/91	57 02	167 08	75	9	0.50	1.50	31	6.3	-9.0
84	7/ 3/91	57 33	167 12	71	11	0.50	1.60	31	6.8	-9.0
85	7/ 3/91	57 69	167 12	70	14	0.50	1.48	31	7.2	-9.0
86	7/ 3/91	58 00	167 18	66	17	0.50	1.50	31	6.4	-9.0
87	7/ 4/91	58 35	167 19	51	7	0.17	0.51	20	-9.0	-9.0
88	7/ 4/91	58 68	167 23	44	9	0.50	1.56	20	6.4	-9.0
89	7/ 4/91	59 02	167 24	40	12	0.50	1.46	20	7.3	-9.0
90	7/ 4/91	59 35	167 27	31	14	0.50	1.42	20	7.6	-9.0
91	7/ 4/91	59 64	167 29	31	17	0.50	1.47	20	7.8	-9.0
92	7/ 6/91	60 34	167 33	33	6	0.50	1.46	20	6.6	-9.0
93	7/ 6/91	60 67	168 01	27	9	0.50	1.76	70	7.5	-9.0
94	7/ 6/91	60 99	168 69	35	13	0.50	1.50	70	-9.0	-9.0
95	7/ 6/91	60 34	168 68	37	18	0.50	1.49	20	9.6	-9.0
96	7/ 7/91	59 98	168 67	40	6	0.50	1.39	20	7.6	-9.0
97	7/ 7/91	59 66	168 63	40	8	0.50	1.55	20	8.6	-9.0
98	7/ 7/91	59 33	168 58	40	11	0.50	1.42	20	8.3	-9.0
99	7/ 7/91	59 00	168 54	48	14	0.50	1.42	20	8.7	-9.0
100	7/ 7/91	58 66	168 49	55	17	0.50	1.51	20	8.8	-9.0
101	7/ 8/91	58 33	168 47	66	6	0.50	1.50	41	8.7	-9.0
102	7/ 8/91	57 98	168 45	70	9	0.25	0.82	42	9.1	-9.0
103	7/ 8/91	57 66	168 41	71	11	0.17	0.46	42	-9.0	-9.0
104	7/ 8/91	57 33	168 37	75	14	0.17	0.46	32	-9.0	-9.0
105	7/ 8/91	56 98	168 34	84	16	0.50	1.46	32	10.7	-9.0
106	7/ 9/91	56 66	168 30	108	6	0.50	1.47	50	-9.0	-9.0
107	7/ 9/91	56 34	168 27	157	9	0.50	1.49	50	9.9	-9.0
108	7/ 9/91	56 00	168 22	152	11	0.50	1.39	50	10.3	-9.0
109	7/ 9/91	55 69	168 18	137	14	0.50	1.50	50	10.0	-9.0
110	7/10/91	56 39	169 54	130	6	0.25	0.69	50	-9.0	-9.0
111	7/10/91	56 35	168 88	128	9	0.50	1.38	50	10.3	-9.0
112	7/10/91	56 66	168 90	102	12	0.25	0.74	32	10.6	-9.0
113	7/10/91	56 84	169 28	80	14	0.50	1.54	32	10.4	-9.0

Table B-2.--Station data for the <u>Ocean</u> <u>Hope</u> <u>3</u> continued.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
115	7/11/91	56 85	169 89	73	6	0.50	1.50	42	10.3	-9.0
116	7/11/91	57 01	169 54	64	9	0.50	1.43	42	10.5	-9.0
117	7/11/91	57 15	169 35	73	12	0.25	0.70	42	10.5	-9.0
118	7/11/91	57 00	168 95	80	15	0.50	1.45	32	11.1	-9.0
119	7/11/91	56 85	168 64	97	17	0.50	1.45	32	11.0	-9.0
120	7/12/91	57 18	168 65	79	6	0.50	1.44	32	10.6	-9.0
121	7/12/91	57 35	169 00	73	8	0.50	1.48	42	10.6	-9.0
122	7/12/91	57 33	169 59	64	11	0.50	1.56	42	11.0	-9.0
123	7/13/91	57 69	169 63	71	6	0.50	1.59	42	-9.0	-9.0
124	7/13/91	57 85	169 35	68	8	0.50	1.43	42	9.8	-9.0
125	7/13/91	58 01	169 71	71	11	0.50	1.53	42	8.9	-9.0
126	7/13/91	58 36	169 74	71	14	0.50	1.52	41	-9.0	-9.0
127	7/13/91	58 69	169 80	70	17	0.50	1.52	41	9.0	-9.0
128	7/14/91	59 02	169 83	64	6	0.50	1.52	41	9.1	-9.0
129	7/14/91	59 34	169 88	62	9	0.25	0.79	41	9.3	-9.0
130	7/14/91	59 66	169 93	59	11	0.25	0.79	41	9.2	-9.0
131	7/14/91	60 01	169 97	57	14	0.25	0.82	41	9.7	-9.0
132	7/14/91	60 34	170 05	53	16	0.50	1.54	20	9.3	-9.0
133	7/15/91	60 99	171 52	62	6	0.50	1.56	41	10.1	-9.0
134	7/15/91	60 67	171 46	64	9	0.50	1.46	41	-9.0	-9.0
135	7/22/91	56 42	170 20	113	7	0.50	1.20	50	8.2	5.5
136	7/23/91	56 85	170 43	101	9	0.50	1.44	42	8.5	3.5
137	7/23/91	56 67	170 72	113	12	0.50	1.65	61	8.5	3.6
138	7/23/91	56 76	171 93	123	17	0.63	2.33	61	9.0	3.5
139	7/24/91	57 04	172 06	119	7	0.50	1.42	61	9.2	3.3
140	7/24/91	57 36	172 09	112	9	0.50	1.51	61	9.2	2.8
141	7/24/91	57 74	172 15	110	13	0.50	1.49	61	9.1	2.7
142	7/24/91	58 07	172 24	106	15	0.50	1.55	61	9.1	1.7
143	7/24/91	58 39	172 29	104	18	0.50	1.51	61	9.2	1.5
144	7/25/91	58 67	172 37	104	7	0.50	1.40	61	-9.0	1.4
145	7/25/91	59 00	172 42	101	9	0.50	1.44	41	9.2	1.1
146	7/25/91	59 35	172 49	90	12	0.50	1.36	43	8.4	0.2
147	7/25/91	59 51	172 87	97	15	0.50	1.50	43	8.6	0.1
148	7/25/91	59 67	172 60	86	17	0.50	1.78	43	8.5	-0.8
149	7/26/91	59 84	172 88	82	7	0.33	1.06	43	8.3	-1.0
150	7/26/91	59 99	172 63	68	10	0.50	1.27	43	7.9	-0.6
151	7/26/91	60 16	173 01	60	12	0.50	1.20	43	8.1	1.2
152	7/27/91	60 68	172 78	46	8	0.50	1.48	41	6.7	2.1
153	7/27/91	61 03	172 83	70	12	0.25	0.75	41	8.3	-1.1
154	7/27/91	61 64	173 07	68	16	0.50	1.63	82	8.8	-1.5
155	7/28/91	62 35	173 17	71	7	0.50	1.61	81	9.6	-1.3
156	7/28/91	62 65	174 00	71	10	0.50	1.56	81	10.0	-1.5
157	7/28/91	62 35	174 52	71	14	0.50	1.52	81	10.2	-1.6
158	7/28/91	61 99	174 58	75	16	0.50	1.46	82	10.0	-1.7
159	7/29/91	61 65	174 35	79	6	0.50	1.14	82	9.4	-1.6
160	7/29/91	61 36	174 33	80	9	0.50	1.57	82	9.5	-1.5
161	7/29/91	60 98	174 17	86	12	0.50	1.44	41	9.5	-1.5
162	7/29/91	60 68	174 12	90	14	0.50	1.60	41	9.4	-1.4
163	7/29/91	60 38	174 28	95	17	0.50	1.53	43	8.7	-9.0
164	7/30/91	60 31	174 63	106	7	0.50	1.45	43	8.7	-0.3
165	7/30/91	60 14	174 40	104	8	0.50	1.65	43	8.8	0.3
166	7/30/91	59 99	174 61	112	11	0.50	1.46	62	8.6	0.7
167	7/30/91	59 84	174 28	112	13	0.50	1.42	62	-9.0	0.8
168	7/30/91	59 59	174 42	119	15	0.50	1.55	62	9.1	1.2
169	7/30/91	59 32	174 31	121	18	0.50	1.40	62	9.6	1.7
170	7/31/91	59 29	173 85	115	7	0.50	1.50	62	9.3	1.4

Table B-2.--Station data for the Ocean Hope 3 continued.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
171	7/31/91	59 02	173 72	121	9	0.50	1.48	61	9.6	1.8
172	7/31/91	58 61	173 63	128	12	0.50	1.41	61	9.3	2.3
173	7/31/91	58 29	173 56	117	15	0.33	1.11	61	10.0	2.5
174	7/31/91	58 01	173 50	121	17	0.50	1.39	61	10.0	2.9
175	8/ 1/91	57 70	173 41	150	7	0.50	1.65	61	10.0	3.3
176	8/ 1/91	57 40	173 30	123	9	0.50	1.43	61	9.9	3.3
177	8/ 1/91	57 04	173 17	137	12	0.50	1.22	61	9.8	3.4
179	8/ 5/91	58 67	174 39	170	10	0.50	1.64	61	9.3	3.1
180	8/ 5/91	58 74	174 82	174	12	0.50	1.43	61	9.7	2.8
181	8/ 5/91	58 99	174 76	132	15	0.50	1.45	61	9.9	2.2
182	8/ 5/91	59 04	174 38	130	17	0.50	1.48	61	9.9	2.0
183	8/ 6/91	60 70	174 78	101	7	0.50	1.35	41	10.3	-1.2
184	8/ 6/91	61 01	174 88	95	9	0.50	1.49	82	10.2	-1.5
185	8/ 6/91	61 35	175 01	91	12	0.50	1.54	82	10.3	-1.5
186	8/ 6/91	61 69	175 15	90	15	0.50	1.60	82	11.2	-1.6
187	8/ 6/91	61 91	175 25	88	17	0.50	1.49	82	10.7	-1.6
188	8/ 7/91	61 93	175 75	97	7	0.50	1.61	82	10.5	-1.6
189	8/ 7/91	61 68	175 81	99	9	0.50	1.22	82	10.4	-1.5
190	8/ 7/91	61 33	175 67	102	12	0.50	1.48	82	10.6	-1.4
191	8/ 7/91	61 00	175 57	106	15	0.50	1.45	90	10.7	-1.3
192	8/ 7/91	60 67	175 46	112	17	0.50	1.44	61	10.4	-0.3
193	8/17/91	61 35	170 78	49	13	0.50	1.67	81	10.2	0.4
194	8/17/91	61 67	171 50	57	15	0.50	1.61	81	10.2	0.9
195	8/17/91	61 98	171 06	51	19	0.50	1.56	70	10.2	-9.0
196	8/18/91	62 33	171 67	48	7	0.50	1.38	70	10.0	-9.0
197	8/18/91	62 65	171 36	48	10	0.50	1.65	70	9.7	0.7
198	8/18/91	63 05	171 77	57	14	0.50	1.47	70	10.2	0.9
199	8/19/91	62 95	170 34	42	7	0.50	1.45	70	9.0	0.9
200	8/19/91	62 63	169 82	40	10	0.50	1.44	70	9.8	0.9
201	8/19/91	62 34	170 26	40	13	0.50	1.45	70	10.1	0.9
202	8/19/91	62 00	169 74	44	17	0.50	1.53	70	10.1	2.1
203	8/19/91	61 69	170 10	46	19	0.33	0.95	70	-9.0	1.0
204	8/20/91	61 39	169 52	42	7	0.50	1.42	70	10.7	2.8
205	8/20/91	61 39	168 23	31	12	0.50	1.53	70	11.7	6.5
206	8/20/91	61 66	168 78	37	15	0.50	1.40	70	-9.0	3.9
207	8/20/91	61 98	168 22	29	18	0.50	1.36	70	12.8	3.6
208	8/21/91	62 37	168 79	35	7	0.50	1.57	70	-9.0	1.7
209	8/21/91	62 69	168 30	35	10	0.50	1.40	70	10.2	3.0
210	8/21/91	62 96	168 81	27	14	0.22	0.55	70	-9.0	2.9

Table B-3.--Station data for the NOAA vessel <u>Miller</u> <u>Freeman</u> during the 1991
bottom trawl survey.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
1	8/31/91	54 21	166 35	750	20	0.50	1.81	120	9.1	4.0
2	9/ 1/91	54 33	166 48	761	1	0.25	0.83	120	9.1	3.7
3	9/ 1/91	54 35	166 58	677	4	0.50	1.55	120	9.1	3.8
4	9/ 1/91	54 38	166 06	627	7	0.32	1.02	120	8.0	3.8
5	9/ 1/91	54 45	165 81	412	9	0.50	1.61	100	7.7	4.0
6	9/ 1/91	54 59	165 82	406	13	0.50	1.60	100	7.7	3.9
7	9/ 1/91	54 60	165 94	406	16	0.50	1.66	100	8.0	3.8
8	9/ 1/91	54 56	165 89	450	20	0.50	1.42	100	7.9	4.0
9	9/ 1/91	54 65	165 83	353	21	0.50	1.38	100	7.7	4.1
10	9/ 2/91	54 69	166 02	302	0	0.50	1.66	100	8.0	4.2
11	9/ 2/91	54 72	166 19	258	3	0.50	1.64	100	7.7	4.1
12	9/ 2/91	54 70	166 18	280	6	0.50	1.44	100	7.5	4.1
13	9/ 2/91	54 63	166 15	355	9	0.50	1.71	100	7.4	3.9
14	9/ 2/91	54 63	166 19	362	14	0.50	1.80	100	9.0	4.0
15	9/ 2/91	54 60	166 23	386	20	0.50	1.56	100	9.0	3.9
16	9/ 3/91	54 59	166 27	397	0	0.50	1.55	100	9.2	4.0
17	9/ 3/91	54 54	166 13	457	4	0.50	1.18	100	9.2	3.9
18	9/ 3/91	54 51	166 11	494	6	0.50	1.70	100	9.4	3.9
19	9/ 3/91	54 47	166 53	507	9	0.50	1.67	120	9.6	3.9
20	9/ 3/91	54 66	166 54	333	13	0.50	1.82	100	9.4	4.1
21	9/ 3/91	54 69	166 84	357	15	0.50	1.76	100	10.0	4.1
22	9/ 3/91	54 81	167 05	337	19	0.50	1.51	100	9.5	4.2
23	9/ 3/91	54 57	166 98	437	22	0.50	1.57	100	9.4	3.9
24	9/ 4/91	54 38	167 36	697	2	0.50	1.45	120	9.1	3.5
25	9/ 4/91	54 48	167 62	794	4	0.50	1.35	120	9.8	3.5
26	9/ 4/91	54 74	167 41	529	8	0.50	1.52	120	5.9	3.8
27	9/ 4/91	54 78	167 54	713	10	0.50	1.54	120	9.5	3.7
28	9/ 4/91	54 93	167 44	364	13	0.50	1.61	100	8.5	4.0
29	9/ 4/91	55 00	167 51	329	16	0.50	1.63	100	8.7	4.1
30	9/ 4/91	55 10	167 64	296	18	0.50	1.49	100	9.2	4.1
31	9/ 4/91	55 16	167 96	786	21	0.50	1.49	120	8.9	3.8
32	9/ 5/91	55 27	167 90	326	1	0.50	1.60	100	8.3	4.0
33	9/ 5/91	55 41	168 17	304	3	0.50	1.70	100	9.0	4.0
35	9/ 5/91	55 64	168 76	285	8	0.50	1.58	100	9.7	4.1
36	9/ 5/91	56 07	168 38	219	15	0.50	1.36	100	10.1	4.1
37	9/ 5/91	56 02	168 67	569	20	0.50	1.50	120	9.3	3.7
38	9/ 5/91	56 10	168 89	722	22	0.50	1.57	120	9.3	3.7
39	9/ 6/91	56 18	169 29	646	5	0.50	1.29	120	9.3	3.4
40	9/ 6/91	56 23	169 61	351	8	0.50	1.42	100	9.2	4.0
41	9/ 6/91	56 12	169 51	338	12	0.50	1.41	100	8.8	3.9
42	9/ 6/91	56 01	170 26	412	21	0.50	1.42	100	8.7	4.0
45	9/11/91	56 28	171 36	212	11	0.50	1.67	110	9.7	3.6
46	9/11/91	56 50	172 59	419	17	0.50	1.43	110	9.9	3.9
47	9/11/91	56 50	172 72	419	20	0.50	1.57	110	10.3	3.9
48	9/11/91	56 63	173 01	219	22	0.50	1.79	110	9.8	3.8
49	9/12/91	57 00	173 59	505	4	0.25	0.69	130	9.6	4.2
50	9/12/91	57 22	173 92	422	12	0.50	1.59	110	9.6	3.9
51	9/12/91	57 45	173 93	168	15	0.28	0.95	110	9.7	3.6
53	9/13/91	57 84	173 91	538	1	0.50	1.42	130	9.6	3.9
54	9/13/91	58 35	175 16	375	11	0.50	1.65	110	9.7	4.0
55	9/13/91	58 59	174 97	567	18	0.37	1.02	130	9.8	3.7
56	9/14/91	58 73	175 21	201	0	0.50	1.44	110	9.5	3.7
57	9/14/91	58 54	176 58	616	9	0.43	1.32	130	9.5	3.6
58	9/16/91	59 41	178 26	538	9	0.50	1.58	130	8.8	4.0
59	9/16/91	59 83	178 83	452	18	0.42	1.30	110	8.7	4.0

Table B-3.--Station data for the <u>Miller</u> <u>Freeman</u> continued.

Haul	Date	Latitude Deg Min	Longitude Deg Min	Depth (M)	Time	Dura-tion (Hr)	Dis-tance (nmi)	Strata	Surf. Temp. (°C)	Gear Temp. (°C)
60	9/16/91	59 86	178 81	247	21	0.50	1.58	110	8.8	3.8
61	9/17/91	59 77	178 61	198	3	0.50	1.57	110	8.5	3.0
62	9/17/91	59 55	178 40	401	8	0.50	1.50	110	8.8	3.9
63	9/17/91	59 42	178 41	430	11	0.28	0.65	110	8.4	3.9
65	9/17/91	59 53	177 68	274	19	0.32	1.00	110	8.4	3.9
66	9/17/91	59 38	177 68	353	22	0.50	1.58	110	8.5	3.8
67	9/18/91	59 28	177 53	203	0	0.50	1.56	110	8.6	·2.9
68	9/18/91	59 22	177 79	273	3	0.50	1.62	110	8.8	3.9
69	9/18/91	59 30	178 43	538	7	0.35	1.01	130	8.6	4.1
70	9/18/91	59 16	178 46	426	10	0.50	1.52	110	8.8	4.1
71	9/18/91	59 10	178 35	198	13	0.50	1.61	110	9.0	3.1
72	9/18/91	58 94	178 16	320	16	0.35	1.06	110	8.7	3.9
73	9/18/91	58 76	177 93	551	19	0.50	1.49	130	8.9	4.0
74	9/18/91	58 89	177 86	285	21	0.50	1.62	110	8.9	4.0
75	9/19/91	58 76	177 62	247	1	0.17	0.55	110	8.9	3.7
76	9/19/91	58 76	177 63	238	3	0.50	1.53	110	8.8	3.4
77	9/19/91	58 65	177 85	743	6	0.50	1.49	130	8.8	4.0
78	9/19/91	58 58	177 07	390	11	0.50	1.59	110	8.9	4.1
79	9/21/91	58 58	177 07	373	10	0.50	1.56	110	8.5	4.0
80	9/21/91	58 54	176 19	638	15	0.33	0.86	130	8.6	3.7
81	9/22/91	57 78	174 29	377	0	0.50	1.43	110	9.5	4.0
82	9/22/91	57 27	173 88	417	5	0.35	1.18	110	9.5	3.9
83	9/23/91	55 21	167 79	298	11	0.50	1.42	100	7.7	4.2
84	9/23/91	55 00	167 62	422	14	0.50	1.55	100	7.3	3.9
85	9/23/91	54 77	167 27	444	18	0.50	1.60	100	7.6	3.9
86	9/23/91	54 55	167 52	668	20	0.50	1.41	120	7.8	3.6
87	9/24/91	54 51	167 14	490	0	0.50	1.58	100	9.4	3.9
88	9/24/91	54 64	166 92	399	4	0.50	1.50	100	7.6	4.0
89	9/24/91	54 78	166 58	241	7	0.50	1.52	100	7.4	4.3
90	9/24/91	54 67	166 25	298	10	0.50	1.54	100	7.5	4.3
91	9/24/91	54 67	165 83	316	15	0.50	1.52	100	7.6	4.2
92	9/24/91	54 54	166 01	470	18	0.50	1.59	100	7.6	3.9
93	9/24/91	54 36	166 47	638	22	0.50	1.40	120	7.4	3.8
94	9/25/91	54 35	166 25	636	1	0.50	1.33	120	7.1	3.5
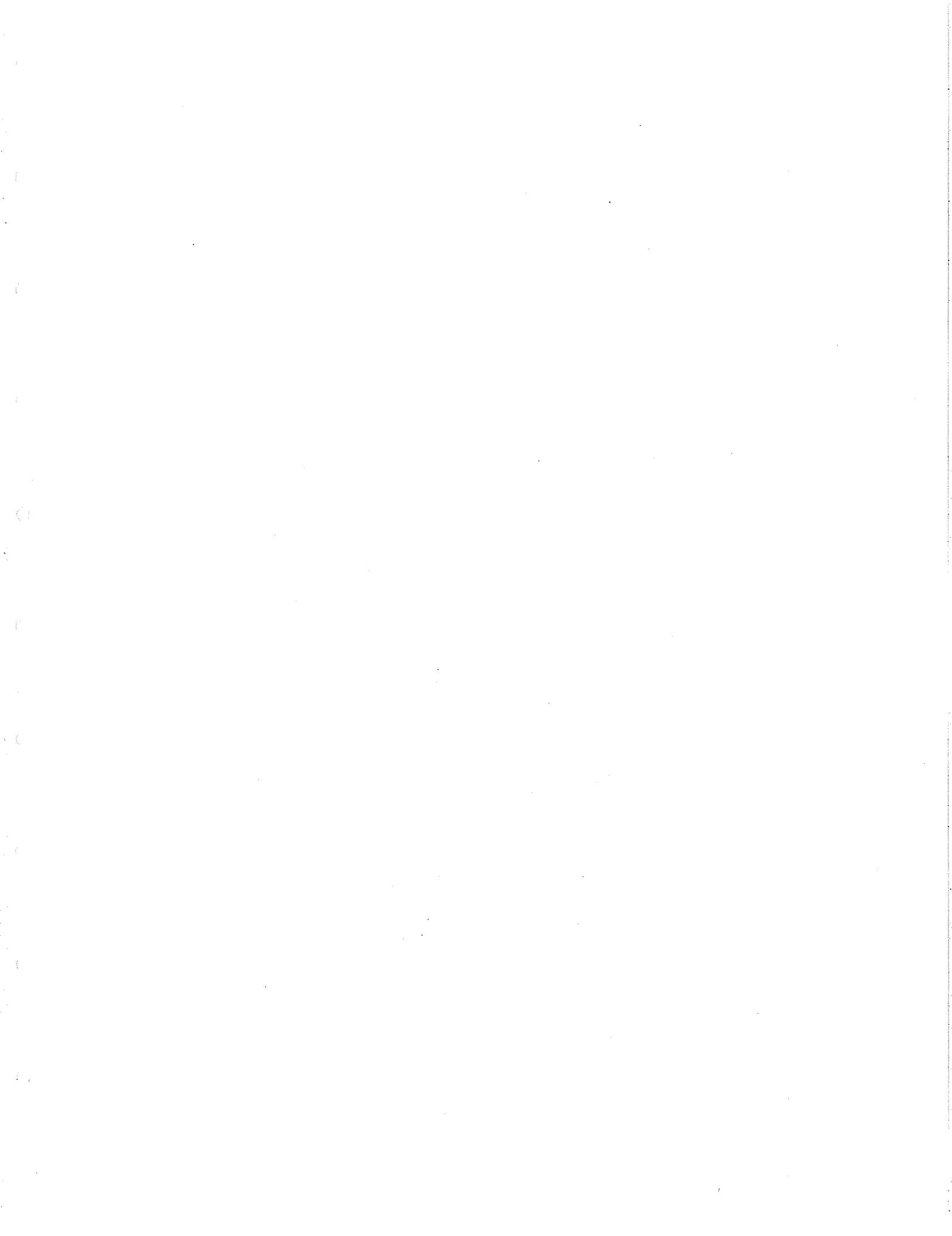
APPENDIX C

Rank Order of Relative Abundance for Fish
and Invertebrate Species

        Appendix C contains listings of all fish and invertebrate
species caught during the 1991 bottom trawl survey in the eastern
Bering Sea in order of relative abundance. The rank order lists
are based on at-sea identifications, and the species groupings
shown in Table 5 were not used in producing the lists.

List of Tables

Table C-1.--(Cont.).

RANK	SPECIES	MEAN CPUE (KG/HA)	VARIANCE	90 PERCENT CONFIDENCE LIMITS		PROPORTION	CUMULATIVE PROPORTION	NAME
48	80020	0.30446	0.034	0.00000	0.61130	0.00100663	0.97695954	EVASTERIAS ECHINOSOMA
49	10200	0.29035	0.006	0.16242	0.41829	0.00095997	0.97791951	REX SOLE
50	69323	0.28507	0.004	0.18303	0.38711	0.00094251	0.97886202	BLUE KING CRAB
51	24185	0.28049	0.001	0.22749	0.33349	0.00092737	0.97978939	WATTLED EELPOUT
52	24184	0.27152	0.003	0.18315	0.35990	0.00089772	0.98068710	MARBLED EELPOUT (PREV. SPARSE TOOTHED
53	83010	0.26080	0.003	0.17551	0.34610	0.00086227	0.98154938	BASKETSTARFISH UNIDENT.
54	24191	0.25380	0.002	0.18860	0.31900	0.00083913	0.98238850	SHORTFIN EELPOUT
55	81741	0.23666	0.056	0.00000	0.62902	0.00078245	0.98317096	ASTERIAS SP.
56	72500	0.23364	0.003	0.13995	0.32734	0.00077248	0.98394344	OREGON TRITON
57	83320	0.21814	0.014	0.02387	0.41241	0.00072123	0.98466467	OPHIURA SARSI
58	10115	0.21501	0.002	0.13726	0.29276	0.00071088	0.98537555	GREENLAND TURBOT (=GREENLAND HALIBUT)
59	22201	0.21349	0.002	0.13501	0.29197	0.00070586	0.98608141	LIPARIS SP.
60	69520	0.19869	0.003	0.10597	0.29141	0.00065690	0.98673831	HYAS SP.
61	80200	0.17689	0.001	0.12498	0.22881	0.00058485	0.98732316	LETHASTERIAS NANIMENSIS
62	21347	0.17621	0.001	0.12755	0.22486	0.00058258	0.98790574	YELLOW IRISH LORD
63	99993	0.17224	0.002	0.09702	0.24746	0.00056946	0.98847520	EMPTY BIVALVE SHELLS
64	85201	0.16604	0.008	0.01321	0.31887	0.00054897	0.98902417	CUCUMARIA FALLAX
65	21368	0.16542	0.004	0.06082	0.27002	0.00054692	0.98957109	WARTY SCULPIN (=SHORTHORNED SCULPIN)
66	98310	0.16325	0.005	0.04855	0.27794	0.00053973	0.99011082	APLIDIUM SP.
67	68590	0.15360	0.001	0.10455	0.20265	0.00050784	0.99061865	TANNER CRAB (HYBRID)
68	22200	0.13688	0.001	0.09419	0.17957	0.00045255	0.99107120	SNAILFISH UNIDENT.
69	78010	0.13458	0.002	0.05922	0.20994	0.00044495	0.99151616	OCTOPUS UNIDENT.
70	41201	0.13274	0.001	0.09249	0.17298	0.00043886	0.99195501	SEA RASPBERRY
71	71001	0.12674	0.001	0.07229	0.18119	0.00041903	0.99237404	SNAIL (GASTROPOD) EGGS
72	80594	0.12411	0.003	0.03966	0.20857	0.00041034	0.99278438	LEPTASTERIAS ARCTICA
73	72755	0.11915	0.002	0.05448	0.18382	0.00039394	0.99317833	POLAR WHELK
74	23010	0.10412	0.001	0.05260	0.15564	0.00034424	0.99352257	EULACHON
75	66031	0.09433	0.000	0.05952	0.12914	0.00031188	0.99383445	NORTHERN SHRIMP (=PINK SHRIMP=NORTHERN
76	82510	0.09292	0.002	0.01978	0.16607	0.00030722	0.99414167	GREEN SEA URCHIN
77	72740	0.08512	0.000	0.05550	0.11474	0.00028144	0.99442311	BUCCINUM SP.
78	72752	0.06615	0.000	0.04857	0.08373	0.00021870	0.99464181	LADDER WHELK (PREV. SILKY WHELK)
79	20322	0.06457	0.001	0.01376	0.11537	0.00021347	0.99485528	BERING WOLFFISH
80	95000	0.05728	0.003	0.00000	0.14690	0.00018939	0.99504467	BRYOZOAN UNIDENT.
81	72751	0.05472	0.000	0.01947	0.08998	0.00018093	0.99522560	SINUOUS WHELK (PREV. LYRE WHELK)
82	21316	0.05309	0.000	0.02431	0.08188	0.00017554	0.99540114	ARMORHEAD SCULPIN
83	71750	0.05266	0.000	0.02224	0.08308	0.00017411	0.99557524	VOLUTOPSIUS SP. (=PYRULOFUSUS SP.)
84	21375	0.05107	0.001	0.00416	0.09797	0.00016883	0.99574408	MYOXOCEPHALUS SP.
85	10270	0.05061	0.001	0.00849	0.09272	0.00016732	0.99591140	BUTTER SOLE
86	56311	0.04787	0.001	0.00883	0.08691	0.00015828	0.99606967	GIANT SCALE WORM
87	81780	0.04726	0.000	0.01334	0.08118	0.00015625	0.99622593	COMMON MUD STAR
88	98105	0.04471	0.001	0.00666	0.08276	0.00014783	0.99637375	BOLTENIA OVIFERA
89	72743	0.04192	0.000	0.03088	0.05297	0.00013861	0.99651236	BUCCINUM ANGULOSUM
90	69400	0.03990	0.000	0.02108	0.05873	0.00013193	0.99664429	HORSEHAIR CRAB
91	23041	0.03959	0.000	0.02941	0.04976	0.00013088	0.99677517	CAPELIN
92	68578	0.03810	0.000	0.02270	0.05350	0.00012596	0.99690113	NORTH PACIFIC TOAD CRAB(=HYAS CRAB (SHA
93	21313	0.03773	0.000	0.02344	0.05202	0.00012476	0.99702589	GYMNOCANTHUS SP.
94	21390	0.03592	0.000	0.02566	0.04619	0.00011877	0.99714466	SPINYHEAD SCULPIN
95	21446	0.03288	0.000	0.02451	0.04125	0.00010871	0.99725337	ICELUS SP.

Table C-1.--(Cont.).

RANK	SPECIES	MEAN CPUE (KG/HA)	VARIANCE	90 PERCENT CONFIDENCE LIMITS		PROPORTION	CUMULATIVE PROPORTION	NAME
144	71010	0.00560	0.000	0.00199	0.00921	0.00001851	0.99951097	NUDIBRANCH UNIDENT.
145	71537	0.00558	0.000	0.00117	0.01000	0.00001845	0.99952942	RUSTY MOONSNAIL
146	75285	0.00547	0.000	0.00276	0.00819	0.00001809	0.99954751	GREENLAND COCKLE
147	81355	0.00524	0.000	0.00173	0.00875	0.00001733	0.99956484	PTERASTER OBSCURUS
148	66502	0.00485	0.000	0.00184	0.00786	0.00001603	0.99958087	CRANGON SP.
149	72063	0.00475	0.000	0.00112	0.00837	0.00001570	0.99959657	KEELED AFORIA
150	98000	0.00445	0.000	0.00080	0.00810	0.00001472	0.99961129	TUNICATE UNIDENT.
151	21314	0.00422	0.000	0.00129	0.00714	0.00001394	0.99962522	THREADED SCULPIN
152	20061	0.00419	0.000	0.00032	0.00806	0.00001385	0.99963907	BERING POACHER
153	66045	0.00412	0.000	0.00179	0.00646	0.00001363	0.99965270	HUMPY SHRIMP
154	41100	0.00398	0.000	0.00000	0.00887	0.00001317	0.99966587	SOFT CORAL UNIDENT.
155	75284	0.00397	0.000	0.00000	0.00888	0.00001313	0.99967899	SERRIPES SP.
156	71764	0.00379	0.000	0.00127	0.00631	0.00001255	0.99969154	TULIP WHELK
157	66000	0.00368	0.000	0.00000	0.00966	0.00001216	0.99970370	SHRIMP UNIDENT.
158	72501	0.00361	0.000	0.00005	0.00717	0.00001193	0.99971563	FUSITRITON SP.
159	71530	0.00360	0.000	0.00125	0.00594	0.00001189	0.99972752	ARCTIC MOONSNAIL
160	75111	0.00323	0.000	0.00143	0.00503	0.00001068	0.99973821	ARCTIC SURFCLAM (PREV. ALASKA SURF CLAM
161	56312	0.00321	0.000	0.00104	0.00538	0.00001060	0.99974880	DEPRESSED SCALE WORM
162	21350	0.00290	0.000	0.00163	0.00418	0.00000959	0.99975840	TRIGLOPS SP.
163	65000	0.00282	0.000	0.00066	0.00498	0.00000934	0.99976773	CIRRIPEDIA (CLASS)
164	98300	0.00278	0.000	0.00000	0.00609	0.00000918	0.99977691	COMPOUND ASCIDIAN UNIDENT.
165	74050	0.00268	0.000	0.00000	0.00586	0.00000887	0.99978578	MUSSEL UNIDENT.
166	23808	0.00265	0.000	0.00121	0.00410	0.00000877	0.99979455	SNAKE PRICKLEBACK
167	50160	0.00262	0.000	0.00000	0.00536	0.00000868	0.99980323	SEA MOUSE UNIDENT.
168	43010	0.00257	0.000	0.00000	0.00684	0.00000850	0.99981173	METRIDIUM SP.
169	20050	0.00251	0.000	0.00170	0.00331	0.00000829	0.99982003	ALEUTIAN ALLIGATORFISH
170	21384	0.00244	0.000	0.00000	0.00648	0.00000806	0.99982809	ENOPHRYS SP.
171	71891	0.00243	0.000	0.00067	0.00419	0.00000803	0.99983612	PLICIFUSUS KROYERI
172	43020	0.00229	0.000	0.00000	0.00608	0.00000757	0.99984369	METRIDIUM SENILE
173	71710	0.00223	0.000	0.00059	0.00387	0.00000737	0.99985106	COLUS SP.
174	95020	0.00209	0.000	0.00019	0.00398	0.00000690	0.99985797	FEATHERY BRYOZOAN
175	21388	0.00205	0.000	0.00000	0.00430	0.00000677	0.99986473	ANTLERED SCULPIN
176	81090	0.00193	0.000	0.00000	0.00407	0.00000640	0.99987113	CROSSASTER SP.
177	20036	0.00191	0.000	0.00000	0.00403	0.00000631	0.99987744	SPINYCHEEK STARSNOUT
178	91060	0.00165	0.000	0.00000	0.00437	0.00000544	0.99988288	SCALLOP SPONGE
179	65203	0.00155	0.000	0.00000	0.00331	0.00000512	0.99988799	GIANT BARNACLE
180	71030	0.00154	0.000	0.00000	0.00343	0.00000510	0.99989310	ROSY TRITONIA (PREV.DIOMEDES' TRITON)
181	71760	0.00152	0.000	0.00000	0.00354	0.00000503	0.99989813	VOLUTE WHELK
182	56300	0.00150	0.000	0.00000	0.00303	0.00000496	0.99990308	SCALE WORM UNIDENT.
183	23805	0.00140	0.000	0.00078	0.00201	0.00000462	0.99990771	DAUBED SHANNY
184	21921	0.00120	0.000	0.00000	0.00257	0.00000397	0.99991168	ATKA MACKEREL
185	74311	0.00119	0.000	0.00009	0.00229	0.00000393	0.99991561	ARCTIC HIATELLA
186	71770	0.00101	0.000	0.00000	0.00218	0.00000332	0.99991893	BERINGIUS KENNICOTTII
187	66530	0.00100	0.000	0.00056	0.00144	0.00000331	0.99992224	RIDGED CRANGON
188	66580	0.00095	0.000	0.00006	0.00184	0.00000314	0.99992538	ARCTIC ARGID
189	10180	0.00091	0.000	0.00000	0.00197	0.00000300	0.99992837	DOVER SOLE
190	20202	0.00090	0.000	0.00037	0.00143	0.00000297	0.99993135	PACIFIC SAND LANCE
191	71726	0.00088	0.000	0.00001	0.00175	0.00000292	0.99993426	THICK-RIBBED WHELK

Table C-1.--(Cont.).

RANK	SPECIES	MEAN CPUE (KG/HA)	VARIANCE	90 PERCENT CONFIDENCE LIMITS		PROPORTION	CUMULATIVE PROPORTION	NAME
240	21331	0.00013	0.000	0.00000	0.00029	0.00000044	0.99999380	ARTEDIELLUS SP.
241	94000	0.00013	0.000	0.00000	0.00027	0.00000044	0.99999423	SIPUNCULID WORM UNIDENT.
242	79020	0.00013	0.000	0.00000	0.00035	0.00000044	0.99999467	ROSSIA PACIFICA
243	75266	0.00013	0.000	0.00000	0.00035	0.00000044	0.99999510	PACIFIC RAZOR (PREV. PACIFIC RAZOR CL
244	75286	0.00011	0.000	0.00000	0.00024	0.00000037	0.99999548	BROAD COCKLE
245	20001	0.00011	0.000	0.00000	0.00022	0.00000037	0.99999584	TUBENOSE POACHER
246	21339	0.00011	0.000	0.00000	0.00029	0.00000036	0.99999620	MALACOCOTTUS SP.
247	20002	0.00011	0.000	0.00000	0.00029	0.00000036	0.99999656	DRAGON POACHER
248	74655	0.00011	0.000	0.00000	0.00028	0.00000035	0.99999691	MANY-RIB CYCLOCARDIA
249	91050	0.00011	0.000	0.00000	0.00028	0.00000035	0.99999727	BARREL SPONGE
250	21341	0.00010	0.000	0.00000	0.00027	0.00000034	0.99999761	DARKFIN SCULPIN
251	21356	0.00010	0.000	0.00000	0.00022	0.00000033	0.99999794	ROUGHSPINE SCULPIN
252	44000	0.00008	0.000	0.00000	0.00020	0.00000025	0.99999819	STONY CORAL UNIDENT.
253	75240	0.00007	0.000	0.00000	0.00018	0.00000022	0.99999841	MACOMA SP.
254	21405	0.00006	0.000	0.00000	0.00017	0.00000021	0.99999862	EYESHADE SCULPIN
255	23807	0.00006	0.000	0.00000	0.00012	0.00000018	0.99999881	SLENDER EELBLENNY
256	21346	0.00005	0.000	0.00000	0.00014	0.00000017	0.99999898	RED IRISH LORD
257	23804	0.00005	0.000	0.00000	0.00013	0.00000017	0.99999915	ARCTIC SHANNY
258	95070	0.00005	0.000	0.00000	0.00012	0.00000015	0.99999930	RIBBED BRYOZOAN
259	94500	0.00005	0.000	0.00000	0.00012	0.00000015	0.99999945	ECHIUROID WORM UNIDENT.
260	24100	0.00004	0.000	0.00000	0.00012	0.00000014	0.99999959	EELPOUT UNIDENT.
261	71575	0.00004	0.000	0.00000	0.00012	0.00000014	0.99999974	POLINICES SP.
262	21352	0.00003	0.000	0.00000	0.00009	0.00000011	0.99999985	SCISSORTAIL SCULPIN
263	72420	0.00002	0.000	0.00000	0.00006	0.00000007	0.99999993	BOREOTROPHON SP. (FORMERLY TROPHONOPSIS
264	71535	0.00002	0.000	0.00000	0.00006	0.00000007	1.00000000	NATICA ALEUTICA
	TOTAL	302.45921						

Table C-2.--(Cont.).

RANK	SPECIES	MEAN CPUE (KG/HA)	VARIANCE	90 PERCENT CONFIDENCE LIMITS		PROPORTION	CUMULATIVE PROPORTION	NAME
48	23657	0.01423	0.000	0.00000	0.03791	0.00012291	0.99813854	LONGNOSE LANCETFISH
49	22175	0.01278	0.000	0.00235	0.02321	0.00011039	0.99824894	SMOOTH LUMPSUCKER
50	20622	0.01223	0.000	0.00237	0.02208	0.00010563	0.99835457	NORTHERN SMOOTHTONGUE
51	23836	0.01100	0.000	0.00347	0.01852	0.00009499	0.99844956	LONGSNOUT PRICKLEBACK
52	22600	0.01086	0.000	0.00591	0.01581	0.00009382	0.99854338	LANTERNFISH UNIDENT.
53	23010	0.01018	0.000	0.00291	0.01745	0.00008794	0.99863132	EULACHON
54	20720	0.00990	0.000	0.00000	0.02137	0.00008552	0.99871684	SEARCHER
55	79210	0.00825	0.000	0.00000	0.02198	0.00007124	0.99878808	MAGISTRATE ARMHOOK SQUID (PREV. RED SQ
56	00401	0.00816	0.000	0.00000	0.01903	0.00007046	0.99885854	SKATE EGG CASE UNIDENT.
57	20006	0.00805	0.000	0.00345	0.01266	0.00006957	0.99892810	SAWBACK POACHER
58	30040	0.00766	0.000	0.00000	0.01613	0.00006618	0.99899428	ROCKFISH UNIDENT.
59	66772	0.00740	0.000	0.00000	0.01725	0.00006394	0.99905822	CRIMSON PASIPHAEID
60	80000	0.00737	0.000	0.00225	0.01249	0.00006370	0.99912192	STARFISH UNIDENT.
61	21300	0.00670	0.000	0.00000	0.01709	0.00005791	0.99917984	SCULPIN UNIDENT.
62	71500	0.00603	0.000	0.00193	0.01014	0.00005212	0.99923195	SNAIL UNIDENT.
63	80729	0.00542	0.000	0.00071	0.01012	0.00004678	0.99927874	RED BAT STAR
64	99999	0.00490	0.000	0.00014	0.00966	0.00004236	0.99932110	UNSORTED SHAB
65	83010	0.00480	0.000	0.00000	0.01105	0.00004146	0.99936256	BASKETSTARFISH UNIDENT.
66	42000	0.00463	0.000	0.00000	0.01234	0.00004002	0.99940257	SEA PEN UNIDENT.
67	30420	0.00441	0.000	0.00000	0.00912	0.00003812	0.99944069	NORTHERN ROCKFISH
68	91000	0.00422	0.000	0.00000	0.01108	0.00003649	0.99947718	SPONGE UNIDENT.
69	22623	0.00406	0.000	0.00000	0.01053	0.00003509	0.99951226	BROADFIN LANTERNFISH
70	68541	0.00402	0.000	0.00025	0.00778	0.00003469	0.99954695	TANNER CRAB UNIDENT.
71	80730	0.00370	0.000	0.00041	0.00698	0.00003195	0.99957890	ORANGE BAT STAR
72	21438	0.00367	0.000	0.00000	0.00863	0.00003167	0.99961058	THORNY SCULPIN
73	22390	0.00323	0.000	0.00000	0.00861	0.00002791	0.99963849	OXEYE OREO
74	23055	0.00297	0.000	0.00000	0.00703	0.00002568	0.99966417	RAINBOW SMELT
75	20061	0.00277	0.000	0.00098	0.00456	0.00002392	0.99968809	BERING POACHER
76	68560	0.00258	0.000	0.00000	0.00689	0.00002232	0.99971041	BROAD SNOW CRAB (=TANNER CRAB(BAIRDI))
77	10190	0.00252	0.000	0.00000	0.00673	0.00002180	0.99973221	DEEPSEA SOLE
78	22625	0.00228	0.000	0.00036	0.00421	0.00001974	0.99975195	BROKENLINE LAMPFISH
79	21010	0.00196	0.000	0.00055	0.00338	0.00001696	0.99976891	PACIFIC VIPERFISH
80	21921	0.00182	0.000	0.00000	0.00397	0.00001571	0.99978462	ATKA MACKEREL
81	21355	0.00181	0.000	0.00009	0.00352	0.00001561	0.99980022	RIBBED SCULPIN
82	23800	0.00180	0.000	0.00000	0.00480	0.00001555	0.99981577	PRICKLEBACK UNIDENT.
83	69300	0.00179	0.000	0.00000	0.00478	0.00001548	0.99983125	LITHODES COUESI
84	21368	0.00151	0.000	0.00000	0.00403	0.00001308	0.99984433	WARTY SCULPIN (=SHORTHORNED SCULPIN)
85	30150	0.00147	0.000	0.00000	0.00325	0.00001270	0.99985703	DUSKY ROCKFISH
86	24185	0.00140	0.000	0.00000	0.00374	0.00001213	0.99986916	WATTLED EELPOUT
87	56300	0.00140	0.000	0.00000	0.00309	0.00001213	0.99988129	SCALE WORM UNIDENT.
88	66019	0.00138	0.000	0.00000	0.00368	0.00001194	0.99989324	PANDALID SHRIMP UNIDENT.
89	66020	0.00138	0.000	0.00000	0.00312	0.00001193	0.99990517	PANDALUS SP.
90	22915	0.00126	0.000	0.00000	0.00336	0.00001090	0.99991606	ONEIRODES THOMSONI
91	22410	0.00104	0.000	0.00020	0.00189	0.00000903	0.99992509	LONGFIN DRAGONFISH
92	68580	0.00095	0.000	0.00000	0.00254	0.00000823	0.99993333	NARROW SNOW CRAB(=TANNER CRAB(OPILIO))
93	83000	0.00089	0.000	0.00000	0.00237	0.00000767	0.99994099	BRITTLESTARFISH UNIDENT.
94	20038	0.00085	0.000	0.00010	0.00161	0.00000737	0.99994837	BLACKFIN POACHER
95	69010	0.00079	0.000	0.00000	0.00159	0.00000681	0.99995518	HERMIT CRAB UNIDENT.

171

APPENDIX D

Abundance and Size Composition Estimates for Principal Species of Fish, Shrimps, Squids, and Octopi

Appendix D presents estimates of catch per unit effort (CPUE), biomass, population numbers, variances and confidence intervals for the sampled populations of principal species. The appendix also contains population estimates by sex and centimeter length interval for these species.

Definitions of headings that are not readily apparent are as follows:

Stratum--Subareas 1-13 (Fig. 4) were divided into standard and high-density sampling strata for analytical purposes. Strata included in each subarea were as follows:

Subarea	Stratum	Sampling density	Subarea	Stratum	Sampling density
1	10	Standard	7	70	Standard
2	20	"	8	81	"
3	31	"		82	High
	32	High	9	90	Standard
4	41	Standard	10	100	"
	42	High	11	110	"
	43	High	12	120	"
5	50	Standard	13	130	"
6	61	Standard			
	62	High			

Abundance estimates are also summarized regionally as shown by the following stratum codes: 910--North shelf, 920--standard annual survey area, 930--North shelf and standard survey area combined, 940--slope.

MEAN WT KG--Mean weight of individual fish or invertabrates in kilograms.

BIOMASS MT--Biomass estimates in metric tons.

L-F--Length frequency measurements.

Table D-1. --Walleye pollock. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	55	55	54	14.59	.833727E+01	31.74	.549402E+02
20	31	31	31	31	15.93	.114261E+02	50.02	.209406E+03
31	68	68	68	68	125.70	.220117E+04	143.97	.152500E+04
32	7	7	7	7	527.19	.860939E+05	588.32	.939440E+05
SUBTOTAL	75	75	75	75	159.80	.246425E+04	181.71	.195471E+04
41	44	44	44	43	47.13	.259559E+03	69.89	.461911E+03
42	31	30	30	30	74.38	.245230E+03	111.23	.660350E+03
43	21	21	21	21	42.18	.129803E+03	58.50	.281127E+03
SUBTOTAL	96	95	95	94	52.23	.104917E+03	76.87	.199737E+03
50	26	26	26	26	112.60	.443248E+03	111.18	.509025E+03
61	59	59	59	59	241.61	.162314E+04	514.42	.553387E+04
62	6	6	6	6	233.12	.127334E+05	476.18	.349807E+05
SUBTOTAL	65	65	65	65	241.04	.146880E+04	511.82	.496870E+04
70	22	21	21	21	11.55	.945754E+01	37.71	.205270E+03
81	11	10	10	9	7.25	.260306E+02	20.31	.378148E+02
82	14	14	14	14	0.34	.890126E-02	27.59	.520215E+02
SUBTOTAL	25	24	24	23	4.70	.103745E+02	23.00	.221422E+02
90	7	7	7	7	61.00	.857268E+03	184.59	.574558E+04
100	37	37	37	37	35.51	.325703E+02	30.06	.261871E+02
110	27	25	25	25	78.84	.306821E+04	95.92	.400902E+04
120	16	5	5	5	0.53	.195819E+00	0.43	.112299E+00
130	9	5	5	5	0.37	.203486E-01	0.51	.463362E-01
910	54	52	52	51	12.89	.100141E+02	43.94	.977423E+02
920	351	347	347	345	110.26	.192749E+03	181.91	.321645E+03
930	405	399	399	396	87.61	.114066E+03	149.83	.194727E+03
940	89	72	72	72	34.31	.223437E+03	36.87	.289723E+03
TOTAL	494	471	471	468	85.81	.106737E+03	146.01	.182110E+03

Table D-1.--Walleye pollock (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG	POPULATION	VARIANCE POPULATION	EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	UPPER
10	0.460	247,173,961	.333153027E+16	57.00	131,553,325	362,794,597
20	0.319	205,220,087	.352476689E+16	30.00	83,987,063	326,453,111
31	0.873	1,360,850,133	.136261664E+18	67.00	623,438,699	2,098,261,568
32	0.896	516,204,750	.723237598E+17	6.00	0	1,174,278,348
SUBTOTAL	0.879	1,877,054,884	.208585424E+18	37.87	952,122,688	2,801,987,080
41	0.674	438,249,461	.181610495E+17	43.00	166,318,067	710,180,856
42	0.669	267,083,191	.380712883E+16	30.00	141,087,839	393,078,543
43	0.721	123,475,423	.125251674E+16	20.00	49,649,978	197,300,868
SUBTOTAL	0.680	828,808,076	.232206951E+17	65.50	524,346,079	1,133,270,073
50	1.013	431,312,168	.766007292E+16	25.00	251,017,173	611,607,164
61	0.470	4,533,746,849	.429846450E+18	58.00	3,221,116,510	5,846,377,187
62	0.490	306,118,704	.144564947E+17	5.00	0	615,243,312
SUBTOTAL	0.471	4,839,865,553	.444302945E+18	61.16	3,506,966,673	6,172,764,433
70	0.306	274,653,820	.108869859E+17	21.00	57,625,121	491,682,518
81	0.357	71,828,527	.472863072E+15	10.00	23,379,742	120,277,311
82	0.012	56,994,828	.221940819E+15	13.00	24,815,843	89,173,813
SUBTOTAL	0.205	128,823,355	.694803891E+15	18.46	73,442,816	184,203,893
90	0.330	213,535,993	.768860301E+16	6.00	0	428,100,404
100	1.181	23,401,216	.158697026E+14	36.00	15,316,737	31,485,696
110	0.822	54,162,454	.127816461E+16	26.00	0	127,667,390
120	1.230	190,821	.216637655E+11	15.00	0	504,475
130	0.713	169,564	.507949212E+10	8.00	5,214	333,914
910	0.293	617,013,168	.192703928E+17	23.92	330,493,145	903,533,190
920	0.606	8,429,434,729	.690625434E+18	108.71	6,780,930,826	10,077,938,632
930	0.585	9,046,447,897	.709895827E+18	114.45	7,376,507,534	10,716,388,259
940	0.931	77,924,056	.129406105E+16	26.65	4,107,336	151,740,775
TOTAL	0.588	9,124,371,952	.711189888E+18	114.87	7,453,191,332	10,795,552,572

Table D-1.--Walleye pollock (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
490	254,044,667	188,456,942	0	442,501,609	0.0485	0.6949
500	241,290,512	185,986,394	0	427,276,906	0.0468	0.7417
510	213,621,466	183,594,806	0	397,216,272	0.0435	0.7853
520	182,819,958	175,894,939	0	358,714,897	0.0393	0.8246
530	146,283,213	152,769,812	0	299,053,025	0.0328	0.8573
540	120,273,553	126,817,074	0	247,090,626	0.0271	0.8844
550	88,420,422	112,699,139	0	201,119,562	0.0220	0.9065
560	60,652,182	85,253,049	0	145,905,231	0.0160	0.9225
570	46,828,290	79,583,542	0	126,411,832	0.0139	0.9363
580	34,160,537	58,077,811	0	92,238,349	0.0101	0.9464
590	32,794,123	51,027,842	0	83,821,965	0.0092	0.9556
600	22,971,724	38,687,637	0	61,659,361	0.0068	0.9624
610	15,727,241	34,841,846	0	50,569,088	0.0055	0.9679
620	16,748,386	31,710,369	0	48,458,754	0.0053	0.9732
630	10,991,452	27,275,756	0	38,267,208	0.0042	0.9774
640	10,551,272	21,003,111	0	31,554,383	0.0035	0.9809
650	8,305,458	20,455,361	0	28,760,819	0.0032	0.9840
660	7,943,653	17,557,140	0	25,500,792	0.0028	0.9868
670	6,171,694	16,549,966	0	22,721,661	0.0025	0.9893
680	4,865,934	15,977,369	0	20,843,303	0.0023	0.9916
690	5,583,620	12,263,015	0	17,846,635	0.0020	0.9935
700	1,666,363	10,556,718	0	12,223,081	0.0013	0.9949
710	880,420	7,494,773	0	8,375,193	0.0009	0.9958
720	1,568,721	9,177,764	0	10,746,484	0.0012	0.9970
730	1,670,080	7,543,671	0	9,213,751	0.0010	0.9980
740	872,543	2,973,461	0	3,846,005	0.0004	0.9984
750	30,932	4,179,320	0	4,210,252	0.0005	0.9989
760	1,561,917	2,422,361	0	3,984,278	0.0004	0.9993
770	433,793	1,302,393	0	1,736,187	0.0002	0.9995
780	121,966	2,121,996	0	2,243,962	0.0002	0.9997
790	0	749,618	0	749,618	0.0001	0.9998
800	74,133	652,237	0	726,369	0.0001	0.9999
810	0	258,776	0	258,776	<0.0001	0.9999
820	67,743	83,570	0	151,313	<0.0001	1.0000
830	0	112,926	0	112,926	<0.0001	1.0000
840	96,590	0	0	96,590	<0.0001	1.0000
860	0	141,967	0	141,967	<0.0001	1.0000
870	0	24,832	0	24,832	<0.0001	1.0000
890	0	44,986	0	44,986	<0.0001	1.0000
TOTAL	3,339,487,239	3,001,222,160	2,783,662,553	9,124,371,952		

Table D-2.--Pacific cod (Cont.).   Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	81,942	.510845490E+09	57.00	36,667	127,217
20	22,957	.229933397E+08	30.00	13,165	32,748
31	119,441	.304131008E+09	67.00	84,603	154,279
32	6,388	.912474380E+07	6.00	0	13,780
SUBTOTAL	125,829	.313255752E+09	70.37	90,490	161,168
41	44,877	.982264622E+08	43.00	24,878	64,876
42	38,383	.581931431E+08	30.00	22,805	53,960
43	21,294	.219820369E+08	20.00	11,514	31,074
SUBTOTAL	104,554	.178401642E+09	88.06	77,965	131,143
50	51,171	.293892041E+09	25.00	15,856	86,486
61	134,124	.377932136E+09	58.00	95,202	173,046
62	12,013	.493498238E+07	5.00	6,302	17,725
SUBTOTAL	146,137	.382867119E+09	59.41	106,983	185,292
70	21,742	.788783754E+08	21.00	3,269	40,215
81	5,354	.123890749E+08	10.00	0	13,196
82	213	.310477326E+04	13.00	92	333
SUBTOTAL	5,567	.123921797E+08	10.01	0	13,410
90	18,130	.265964283E+08	6.00	5,511	30,750
100	1,406	.125786785E+06	36.00	686	2,126
110	3,359	.199474664E+07	26.00	456	6,263
120	0	0.	0.00	0	0
130	0	0.	0.00	0	0
910	45,439	.117866983E+09	32.34	23,315	67,563
920	532,590	.170225538E+10	236.08	450,902	614,279
930	578,029	.182012237E+10	260.78	493,561	662,498
940	4,766	.212053342E+07	29.30	1,788	7,744
TOTAL	582,795	.182224290E+10	261.38	498,277	667,313

CONFIDENCE LIMITS	TOTAL BIOMASS MT		TOTAL POPULATION	
	LOWER	UPPER	LOWER	UPPER
80.000 PERCENT	527,772	637,818	457,337,141	591,935,410
90.000 PERCENT	512,021	653,569	438,033,312	611,239,239
95.000 PERCENT	498,277	667,313	421,171,365	628,101,186

Table D-2.--Pacific cod (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
90	0	0	433,845	433,845	0.0008	0.0008
100	157,549	0	1,928,187	2,085,736	0.0040	0.0048
110	32,086	199,828	6,121,192	6,353,106	0.0121	0.0169
120	128,344	451,585	7,028,304	7,608,233	0.0145	0.0314
130	1,562,398	874,438	7,050,523	9,487,359	0.0181	0.0495
140	3,099,842	1,381,260	4,979,599	9,460,701	0.0180	0.0675
150	4,103,277	2,138,965	5,287,835	11,530,077	0.0220	0.0895
160	4,592,149	3,400,319	3,037,471	11,029,939	0.0210	0.1105
170	4,069,501	3,040,771	3,198,788	10,309,060	0.0196	0.1302
180	4,085,484	3,436,097	2,196,359	9,717,939	0.0185	0.1487
190	3,484,090	3,322,541	1,532,626	8,339,257	0.0159	0.1646
200	4,413,791	3,563,061	1,670,090	9,646,942	0.0184	0.1830
210	2,735,664	1,843,311	1,471,353	6,050,328	0.0115	0.1945
220	2,922,606	2,017,850	247,507	5,187,962	0.0099	0.2044
230	2,147,152	2,851,242	0	4,998,394	0.0095	0.2139
240	2,783,504	2,661,790	0	5,445,294	0.0104	0.2243
250	3,366,488	3,731,421	0	7,097,909	0.0135	0.2378
260	2,973,613	4,494,548	0	7,468,161	0.0142	0.2521
270	5,886,992	6,049,979	0	11,936,971	0.0228	0.2748
280	6,515,905	8,117,144	0	14,633,049	0.0279	0.3027
290	8,884,403	9,782,871	0	18,667,274	0.0356	0.3383
300	9,424,332	10,476,180	0	19,900,512	0.0379	0.3762
310	11,119,273	11,737,329	0	22,856,602	0.0436	0.4198
320	9,628,995	10,317,374	0	19,946,369	0.0380	0.4578
330	11,929,265	13,652,852	0	25,582,117	0.0488	0.5066
340	10,269,004	10,800,237	0	21,069,240	0.0402	0.5467
350	8,416,508	8,771,539	0	17,188,047	0.0328	0.5795
360	8,071,353	9,728,954	0	17,800,308	0.0339	0.6134
370	6,274,303	7,156,878	0	13,431,181	0.0256	0.6390
380	6,758,876	4,936,606	0	11,695,482	0.0223	0.6613
390	6,149,216	4,175,925	0	10,325,141	0.0197	0.6810
400	2,936,831	5,535,932	0	8,472,763	0.0161	0.6972
410	2,941,558	2,821,453	0	5,763,011	0.0110	0.7081
420	2,659,694	2,123,731	0	4,783,424	0.0091	0.7173
430	2,463,073	2,231,215	0	4,694,288	0.0089	0.7262
440	2,629,511	1,557,500	0	4,187,011	0.0080	0.7342
450	2,243,654	2,073,266	0	4,316,921	0.0082	0.7424
460	1,497,311	3,097,500	0	4,594,811	0.0088	0.7512
470	1,629,341	1,943,605	0	3,572,946	0.0068	0.7580
480	1,767,437	2,913,361	0	4,680,798	0.0089	0.7669
490	2,836,303	2,675,702	0	5,512,005	0.0105	0.7774
500	1,116,745	2,500,120	0	3,616,865	0.0069	0.7843
510	2,469,794	1,745,015	0	4,214,809	0.0080	0.7923
520	1,439,675	1,381,878	0	2,821,553	0.0054	0.7977

183

Table D-2.--Pacific cod (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
970	132,724	83,551	0	216,275	0.0004	0.9982
980	0	142,013	0	142,013	0.0003	0.9985
990	0	186,958	0	186,958	0.0004	0.9988
1010	5,025	33,429	0	38,455	0.0001	0.9989
1020	0	20,881	0	20,881	<0.0001	0.9989
1030	0	386,454	0	386,454	0.0007	0.9997
1040	0	56,990	0	56,990	0.0001	0.9998
1050	0	29,409	0	29,409	0.0001	0.9998
1060	0	94,008	0	94,008	0.0002	1.0000
TOTAL	236,121,186	242,331,411	46,183,678	524,636,275		

Table D-3.--Sablefish (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	0	0.	0.00	0	0
20	0	0.	0.00	0	0
31	0	0.	0.00	0	0
32	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
41	0	0.	0.00	0	0
42	0	0.	0.00	0	0
43	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
50	338	.655572102E+05	25.00	0	866
61	0	0.	0.00	0	0
62	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
70	0	0.	0.00	0	0
81	0	0.	0.00	0	0
82	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
90	0	0.	0.00	0	0
100	796	.640047920E+05	36.00	282	1,309
110	188	.347132948E+04	26.00	67	309
120	2,384	.278602677E+06	15.00	1,260	3,509
130	832	.113903239E+06	8.00	53	1,610
910	0	0.	0.00	0	0
920	338	.655572102E+05	25.00	0	866
930	338	.655572102E+05	25.00	0	866
940	4,199	.459982038E+06	30.62	2,816	5,583
TOTAL	4,538	.525539248E+06	39.00	3,071	6,004

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	3,592	5,483	1,309,928	2,009,438
90.000 PERCENT	3,316	5,759	1,208,761	2,110,604
95.000 PERCENT	3,071	6,004	1,120,020	2,199,345

Table D-3.--Sablefish (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
450	4,098	0	0	4,098	0.0025	0.0025
470	4,098	0	0	4,098	0.0025	0.0049
490	4,410	0	0	4,410	0.0027	0.0076
500	4,098	4,320	0	8,418	0.0051	0.0127
510	8,680	9,244	0	17,925	0.0108	0.0235
520	14,079	58,920	0	72,999	0.0440	0.0675
530	26,829	9,349	0	36,179	0.0218	0.0893
540	58,537	60,451	0	118,988	0.0717	0.1609
550	17,025	36,477	0	53,502	0.0322	0.1932
560	14,223	46,868	0	61,091	0.0368	0.2300
570	22,143	25,543	0	47,685	0.0287	0.2587
580	33,047	73,142	0	106,190	0.0640	0.3227
590	33,331	19,906	0	53,237	0.0321	0.3548
600	41,597	19,570	0	61,167	0.0369	0.3916
610	26,319	26,946	0	53,265	0.0321	0.4237
620	28,006	25,427	0	53,432	0.0322	0.4559
630	40,726	6,442	0	47,168	0.0284	0.4843
640	33,756	50,092	0	83,848	0.0505	0.5349
650	33,601	51,233	0	84,834	0.0511	0.5860
660	85,409	49,936	0	135,345	0.0815	0.6675
670	59,330	35,026	0	94,356	0.0569	0.7244
680	32,075	44,363	0	76,438	0.0461	0.7704
690	40,603	18,679	0	59,282	0.0357	0.8062
700	68,320	24,155	0	92,475	0.0557	0.8619
710	40,550	4,388	0	44,938	0.0271	0.8889
720	14,233	7,839	0	22,072	0.0133	0.9022
730	16,277	17,259	0	33,536	0.0202	0.9225
740	0	11,295	0	11,295	0.0068	0.9293
750	24,357	31,996	0	56,353	0.0340	0.9632
760	11,705	5,640	0	17,346	0.0105	0.9737
770	0	17,361	0	17,361	0.0105	0.9841
780	6,812	6,210	0	13,021	0.0078	0.9920
790	0	5,842	0	5,842	0.0035	0.9955
840	0	7,487	0	7,487	0.0045	1.0000
TOTAL	848,276	811,407	0	1,659,683		

Table D-4.--Pacific ocean perch (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	0	0.	0.00	0	0
20	0	0.	0.00	0	0
31	0	0.	0.00	0	0
32	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
41	0	0.	0.00	0	0
42	0	0.	0.00	0	0
43	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
50	0	0.	0.00	0	0
61	0	0.	0.00	0	0
62	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
70	0	0.	0.00	0	0
81	0	0.	0.00	0	0
82	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
90	0	0.	0.00	0	0
100	6,039	.177943193E+08	36.00	0	14,600
110	5,224	.178391632E+08	26.00	0	13,907
120	12	.918978727E+02	15.00	0	33
130	98	.870751455E+04	8.00	0	314
910	0	0.	0.00	0	0
920	0	0.	0.00	0	0
930	0	0.	0.00	0	0
940	11,373	.356422820E+08	60.39	0	23,314
TOTAL	11,373	.356422820E+08	60.39	0	23,314

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	3,636	19,111	4,546,124	23,126,793
90.000 PERCENT	1,397	21,349	1,850,835	25,822,081
95.000 PERCENT	0	23,314	0	28,191,645

Table D-4.--Pacific ocean perch (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
80	0	0	6,823	6,823	0.0005	0.0005
100	0	0	6,823	6,823	0.0005	0.0010
120	0	0	6,823	6,823	0.0005	0.0015
130	0	0	6,823	6,823	0.0005	0.0020
140	0	0	6,823	6,823	0.0005	0.0025
150	0	0	6,823	6,823	0.0005	0.0030
180	0	6,823	0	6,823	0.0005	0.0035
190	0	6,823	0	6,823	0.0005	0.0039
200	6,823	0	0	6,823	0.0005	0.0044
210	6,823	0	0	6,823	0.0005	0.0049
220	0	20,468	0	20,468	0.0015	0.0064
240	11,848	0	0	11,848	0.0009	0.0073
250	6,823	6,823	0	13,645	0.0010	0.0083
270	20,218	13,645	0	33,863	0.0024	0.0107
290	52,311	0	0	52,311	0.0038	0.0145
300	4,730	0	0	4,730	0.0003	0.0148
310	69,969	49,292	0	119,262	0.0086	0.0234
320	76,929	0	0	76,929	0.0056	0.0290
330	179,252	62,313	0	241,565	0.0175	0.0465
340	460,634	127,694	0	588,327	0.0425	0.0890
350	1,012,969	188,611	0	1,201,581	0.0868	0.1758
360	1,332,427	390,904	0	1,723,331	0.1246	0.3004
370	1,289,522	415,834	0	1,705,356	0.1233	0.4236
380	976,352	737,647	0	1,713,999	0.1239	0.5475
390	705,818	812,494	0	1,518,313	0.1097	0.6572
400	559,950	1,014,441	0	1,574,392	0.1138	0.7710
410	287,184	920,399	0	1,207,583	0.0873	0.8583
420	153,776	960,932	0	1,114,708	0.0806	0.9389
430	84,689	371,018	0	455,707	0.0329	0.9718
440	40,149	88,590	0	128,739	0.0093	0.9811
450	11,472	137,567	0	149,039	0.0108	0.9919
460	0	66,652	0	66,652	0.0048	0.9967
470	0	28,681	0	28,681	0.0021	0.9988
480	0	11,472	0	11,472	0.0008	0.9996
490	0	5,736	0	5,736	0.0004	1.0000
TOTAL	7,350,666	6,444,858	40,935	13,836,458		

Table D-5.--Shortraker rockfish (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	0	0.	0.00	0	0
20	0	0.	0.00	0	0
31	0	0.	0.00	0	0
32	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
41	0	0.	0.00	0	0
42	0	0.	0.00	0	0
43	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
50	0	0.	0.00	0	0
61	0	0.	0.00	0	0
62	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
70	0	0.	0.00	0	0
81	0	0.	0.00	0	0
82	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
90	0	0.	0.00	0	0
100	1,317	.541729711E+06	36.00	0	2,811
110	1,350	.585379054E+06	26.00	0	2,923
120	31	.447019538E+03	15.00	0	76
130	60	.202103538E+04	8.00	0	163
910	0	0.	0.00	0	0
920	0	0.	0.00	0	0
930	0	0.	0.00	0	0
940	2,758	.112957682E+07	59.81	632	4,883
TOTAL	2,758	.112957682E+07	59.81	632	4,883

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	1,380	4,135	428,313	1,160,149
90.000 PERCENT	982	4,534	322,490	1,265,972
95.000 PERCENT	632	4,883	229,673	1,358,789

Table D-5.--Shortraker rockfish (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
160	4,373	0	0	4,373	0.0055	0.0055
240	27,064	9,836	0	36,900	0.0465	0.0520
250	4,882	0	0	4,882	0.0061	0.0581
270	0	4,918	0	4,918	0.0062	0.0643
280	4,918	9,836	0	14,754	0.0186	0.0829
290	22,110	4,918	0	27,028	0.0340	0.1169
300	0	4,918	0	4,918	0.0062	0.1231
310	4,918	14,209	0	19,127	0.0241	0.1472
320	4,373	4,918	0	9,291	0.0117	0.1589
330	4,918	0	0	4,918	0.0062	0.1651
360	0	4,918	0	4,918	0.0062	0.1713
370	4,882	4,373	0	9,255	0.0117	0.1829
380	0	4,918	0	4,918	0.0062	0.1891
400	0	4,918	0	4,918	0.0062	0.1953
410	4,817	9,735	0	14,553	0.0183	0.2136
420	14,061	4,817	0	18,879	0.0238	0.2374
430	4,918	24,257	0	29,175	0.0367	0.2741
440	4,572	19,334	0	23,906	0.0301	0.3042
450	4,882	19,088	0	23,971	0.0302	0.3344
460	33,295	33,742	0	67,036	0.0844	0.4188
470	12,309	9,644	0	21,953	0.0276	0.4465
480	4,822	4,918	0	9,740	0.0123	0.4587
490	4,817	0	0	4,817	0.0061	0.4648
500	9,644	19,504	0	29,148	0.0367	0.5015
510	32,801	4,317	0	37,117	0.0467	0.5482
520	0	15,373	0	15,373	0.0194	0.5676
530	4,918	0	0	4,918	0.0062	0.5738
540	13,567	0	0	13,567	0.0171	0.5909
550	9,644	10,456	0	20,099	0.0253	0.6162
560	19,288	0	0	19,288	0.0243	0.6404
570	14,466	15,338	0	29,803	0.0375	0.6780
590	14,466	4,261	0	18,727	0.0236	0.7015
610	4,822	5,794	0	10,616	0.0134	0.7149
620	0	4,822	0	4,822	0.0061	0.7210
640	12,305	0	0	12,305	0.0155	0.7365
650	4,822	19,594	0	24,416	0.0307	0.7672
670	0	20,911	0	20,911	0.0263	0.7935
680	4,918	0	0	4,918	0.0062	0.7997
690	4,317	10,456	0	14,772	0.0186	0.8183
700	0	4,817	0	4,817	0.0061	0.8244
710	0	10,456	0	10,456	0.0132	0.8376
720	14,772	0	0	14,772	0.0186	0.8562
730	0	10,456	0	10,456	0.0132	0.8693
750	10,456	0	0	10,456	0.0132	0.8825

Table D-6. --Rougheye rockfish. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	0	0	0	0.00	0.	0.00	0.
20	31	0	0	0	0.00	0.	0.00	0.
31	68	0	0	0	0.00	0.	0.00	0.
32	7	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	75	0	0	0	0.00	0.	0.00	0.
41	44	0	0	0	0.00	0.	0.00	0.
42	31	0	0	0	0.00	0.	0.00	0.
43	21	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	96	0	0	0	0.00	0.	0.00	0.
50	26	0	0	0	0.00	0.	0.00	0.
61	59	0	0	0	0.00	0.	0.00	0.
62	6	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	65	0	0	0	0.00	0.	0.00	0.
70	22	0	0	0	0.00	0.	0.00	0.
81	11	0	0	0	0.00	0.	0.00	0.
82	14	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	25	0	0	0	0.00	0.	0.00	0.
90	7	0	0	0	0.00	0.	0.00	0.
100	37	18	18	15	0.47	.669836E-01	0.30	.255448E-01
110	27	8	8	8	0.77	.858265E-01	0.48	.344515E-01
120	16	4	4	3	0.09	.165377E-02	0.05	.604575E-03
130	9	1	1	1	0.12	.150682E-01	0.04	.173342E-02
910	54	0	0	0	0.00	0.	0.00	0.
920	351	0	0	0	0.00	0.	0.00	0.
930	405	0	0	0	0.00	0.	0.00	0.
940	89	31	31	27	0.42	.156557E-01	0.26	.599367E-02
TOTAL	494	31	31	27	0.01	.179058E-04	0.01	.685510E-05

Table D-6.--Rougheye rockfish (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG	POPULATION	VARIANCE POPULATION	EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	UPPER
10	0.000	0	0.	0.00	0	0
20	0.000	0	0.	0.00	0	0
31	0.000	0	0.	0.00	0	0
32	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
41	0.000	0	0.	0.00	0	0
42	0.000	0	0.	0.00	0	0
43	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
50	0.000	0	0.	0.00	0	0
61	0.000	0	0.	0.00	0	0
62	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
70	0.000	0	0.	0.00	0	0
81	0.000	0	0.	0.00	0	0
82	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
90	0.000	0	0.	0.00	0	0
100	1.573	234,014	.154804553E+11	36.00	0	486,513
110	1.594	273,812	.109839237E+11	26.00	58,334	489,289
120	1.601	24,020	.116629229E+09	15.00	1,006	47,034
130	2.948	13,785	.190022419E+09	8.00	0	45,573
910	0.000	0	0.	0.00	0	0
920	0.000	0	0.	0.00	0	0
930	0.000	0	0.	0.00	0	0
940	1.619	545,631	.267710307E+11	63.41	218,557	872,704
TOTAL	1.619	545,631	.267710307E+11	63.41	218,557	872,704

Table D-7. --Shortspine thornyhead. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	0	0	0	0.00	0.	0.00	0.
20	31	0	0	0	0.00	0.	0.00	0.
31	68	0	0	0	0.00	0.	0.00	0.
32	7	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	75	0	0	0	0.00	0.	0.00	0.
41	44	0	0	0	0.00	0.	0.00	0.
42	31	0	0	0	0.00	0.	0.00	0.
43	21	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	96	0	0	0	0.00	0.	0.00	0.
50	26	0	0	0	0.00	0.	0.00	0.
61	59	0	0	0	0.00	0.	0.00	0.
62	6	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	65	0	0	0	0.00	0.	0.00	0.
70	22	0	0	0	0.00	0.	0.00	0.
81	11	0	0	0	0.00	0.	0.00	0.
82	14	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	25	0	0	0	0.00	0.	0.00	0.
90	7	0	0	0	0.00	0.	0.00	0.
100	37	15	15	14	0.62	.377394E-01	2.73	.803027E+00
110	27	6	6	6	0.19	.842952E-02	0.27	.130730E-01
120	16	14	14	13	1.58	.257568E+00	1.59	.257868E+00
130	9	7	7	7	1.13	.129733E+00	0.76	.441129E-01
910	54	0	0	0	0.00	0.	0.00	0.
920	351	0	0	0	0.00	0.	0.00	0.
930	405	0	0	0	0.00	0.	0.00	0.
940	89	42	42	40	0.78	.200306E-01	1.53	.122106E+00
TOTAL	494	42	42	40	0.03	.229094E-04	0.05	.139656E-03

203

Table D-7.--Shortspine thornyhead (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG	POPULATION	VARIANCE POPULATION	EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	UPPER
10	0.000	0	0.	0.00	0	0
20	0.000	0	0.	0.00	0	0
31	0.000	0	0.	0.00	0	0
32	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
41	0.000	0	0.	0.00	0	0
42	0.000	0	0.	0.00	0	0
43	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
50	0.000	0	0.	0.00	0	0
61	0.000	0	0.	0.00	0	0
62	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
70	0.000	0	0.	0.00	0	0
81	0.000	0	0.	0.00	0	0
82	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
90	0.000	0	0.	0.00	0	0
100	0.225	2,129,040	.486644060E+12	36.00	713,333	3,544,747
110	0.705	150,235	.416796984E+10	26.00	17,500	282,970
120	0.998	696,743	.497456301E+11	15.00	221,451	1,172,036
130	1.489	251,389	.483576192E+10	8.00	91,030	411,747
910	0.000	0	0.	0.00	0	0
920	0.000	0	0.	0.00	0	0
930	0.000	0	0.	0.00	0	0
940	0.513	3,227,407	.545393422E+12	44.09	1,737,985	4,716,829
TOTAL	0.513	3,227,407	.545393422E+12	44.09	1,737,985	4,716,829

Table D-7.--Shortspine thornyhead (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
570	0	17,295	0	17,295	0.0054	0.9942
590	0	6,060	0	6,060	0.0019	0.9960
600	0	4,817	0	4,817	0.0015	0.9975
730	0	7,942	0	7,942	0.0025	1.0000
TOTAL	1,302,700	863,455	1,061,252	3,227,407		

Table D-8.--Yellowfin sole (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	1,016,190	.102862609E+11	57.00	813,028	1,219,352
20	446,874	.258143134E+10	30.00	343,124	550,623
31	599,802	.379817257E+10	67.00	476,687	722,917
32	13,190	.393024999E+08	6.00	0	28,531
SUBTOTAL	612,992	.383747507E+10	68.31	489,262	736,721
41	217,382	.259516503E+10	43.00	114,587	320,177
42	88,204	.295491303E+09	30.00	53,103	123,306
43	10,166	.294344710E+08	20.00	0	21,483
SUBTOTAL	315,753	.292009081E+10	53.43	207,280	424,225
50	742	.549929907E+06	25.00	0	2,269
61	780	.186303756E+06	58.00	0	1,644
62	3	.852038842E+01	5.00	0	10
SUBTOTAL	783	.186312276E+06	58.01	0	1,647
70	361,232	.236894764E+11	21.00	41,091	681,373
81	53,341	.200351524E+10	10.00	0	153,068
82	7	.202328891E+02	13.00	0	16
SUBTOTAL	53,348	.200351526E+10	10.00	0	153,074
90	0	0.	0.00	0	0
100	0	0.	0.00	0	0
110	0	0.	0.00	0	0
120	0	0.	0.00	0	0
130	0	0.	0.00	0	0
910	414,580	.256929917E+11	24.34	83,740	745,419
920	2,393,333	.196259944E+11	156.99	2,115,952	2,670,713
930	2,807,912	.453189860E+11	69.44	2,382,786	3,233,039
940	0	0.	0.00	0	0
TOTAL	2,807,912	.453189860E+11	69.44	2,382,786	3,233,039

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	2,532,240	3,083,585	9,959,539,588	11,645,707,461
90.000 PERCENT	2,452,601	3,163,224	9,718,104,170	11,887,142,879
95.000 PERCENT	2,382,786	3,233,039	9,507,382,232	12,097,864,817

Table D-8.--Yellowfin sole (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
90	1,410,504	0	0	1,410,504	0.0001	0.0001
100	1,911,605	1,609,622	0	3,521,227	0.0003	0.0005
110	6,392,501	11,868,413	0	18,260,913	0.0017	0.0021
120	22,797,985	29,354,240	0	52,152,225	0.0048	0.0070
130	37,717,565	41,360,614	0	79,078,179	0.0073	0.0143
140	71,169,286	55,609,192	0	126,778,477	0.0117	0.0260
150	75,303,790	71,228,976	0	146,532,766	0.0136	0.0396
160	91,793,775	94,566,386	0	186,360,161	0.0173	0.0568
170	106,128,422	105,669,686	0	211,798,108	0.0196	0.0765
180	133,923,669	135,554,763	0	269,478,431	0.0249	0.1014
190	183,932,614	169,262,058	0	353,194,672	0.0327	0.1341
200	205,275,525	183,426,168	0	388,701,693	0.0360	0.1701
210	278,997,195	222,247,277	0	501,244,472	0.0464	0.2165
220	285,131,890	266,057,657	0	551,189,547	0.0510	0.2675
230	281,351,179	268,739,720	0	550,090,899	0.0509	0.3184
240	305,932,257	286,101,773	0	592,034,029	0.0548	0.3732
250	325,480,241	312,008,043	0	637,488,284	0.0590	0.4322
260	315,503,061	335,147,398	0	650,650,459	0.0602	0.4925
270	290,092,750	308,165,903	0	598,258,653	0.0554	0.5479
280	301,433,976	305,077,109	0	606,511,085	0.0561	0.6040
290	308,368,766	322,083,431	0	630,452,197	0.0584	0.6624
300	347,713,503	289,983,696	0	637,697,199	0.0590	0.7214
310	332,553,940	321,015,488	0	653,569,428	0.0605	0.7819
320	195,965,008	296,803,628	0	492,768,636	0.0456	0.8275
330	139,899,129	350,413,899	0	490,313,028	0.0454	0.8729
340	79,176,427	326,739,179	0	405,915,605	0.0376	0.9105
350	40,543,908	279,268,072	0	319,811,980	0.0296	0.9401
360	21,658,858	198,844,418	0	220,503,277	0.0204	0.9605
370	9,782,827	142,049,419	0	151,832,246	0.0141	0.9745
380	4,968,824	96,457,916	0	101,426,741	0.0094	0.9839
390	1,529,245	79,326,146	0	80,855,391	0.0075	0.9914
400	5,891,507	49,717,911	0	55,609,418	0.0051	0.9966
410	0	21,391,649	0	21,391,649	0.0020	0.9985
420	0	10,409,115	0	10,409,115	0.0010	0.9995
430	0	3,657,159	0	3,657,159	0.0003	0.9998
440	0	1,456,187	0	1,456,187	0.0001	1.0000
450	0	219,483	0	219,483	<0.0001	1.0000
TOTAL	4,809,731,731	5,992,891,794	0	10,802,623,525		

Table D-9.--Rock sole (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	765,309	.547859730E+10	57.00	617,041	913,577
20	237,497	.987617408E+09	30.00	173,324	301,670
31	252,610	.100504196E+10	67.00	189,280	315,941
32	13,984	.122535032E+08	6.00	5,418	22,550
SUBTOTAL	266,594	.101729547E+10	68.53	202,900	330,289
41	76,028	.372333629E+09	43.00	37,091	114,964
42	180,452	.127217799E+10	30.00	107,619	253,286
43	16,646	.181455833E+08	20.00	7,760	25,531
SUBTOTAL	273,126	.166265721E+10	48.34	191,061	355,191
50	5,440	.941007463E+07	25.00	0	11,760
61	38,530	.643508514E+08	58.00	22,470	54,591
62	1,759	.805671659E+05	5.00	1,029	2,488
SUBTOTAL	40,289	.644314186E+08	58.14	24,218	56,360
70	38,197	.174799642E+09	21.00	10,697	65,697
81	20,101	.247526545E+09	10.00	0	55,154
82	23	.331437623E+03	13.00	0	62
SUBTOTAL	20,124	.247526877E+09	10.00	0	55,177
90	423	.112627718E+06	6.00	0	1,244
100	7	.495566899E+02	36.00	0	21
110	196	.199428068E+05	26.00	0	486
120	0	0.	0.00	0	0
130	0	0.	0.00	0	0
910	58,744	.422439147E+09	23.54	16,322	101,166
920	1,588,256	.922000888E+10	134.62	1,398,135	1,778,376
930	1,646,999	.964244802E+10	145.49	1,452,573	1,841,426
940	203	.199923635E+05	26.13	0	494
TOTAL	1,647,202	.964246802E+10	145.50	1,452,776	1,841,629

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	1,520,628	1,773,777	10,255,767,685	11,937,911,379
90.000 PERCENT	1,484,394	1,810,011	10,014,997,848	12,178,681,216
95.000 PERCENT	1,452,776	1,841,629	9,804,896,264	12,388,782,800

Table D-9.--Rock sole (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
40	0	0	367,100	367,100	<0.0001	<0.0001
50	0	0	786,770	786,770	0.0001	0.0001
60	0	0	2,685,492	2,685,492	0.0002	0.0003
70	493,961	261,126	94,175	849,263	0.0001	0.0004
80	3,245,128	1,016,241	3,496,814	7,758,183	0.0007	0.0011
90	4,392,472	2,943,727	3,759,743	11,095,942	0.0010	0.0021
100	12,507,914	8,914,427	10,570,267	31,992,608	0.0029	0.0050
110	47,186,257	29,251,748	41,800,712	118,238,717	0.0107	0.0157
120	137,579,582	97,696,147	66,908,889	302,184,617	0.0272	0.0429
130	287,316,794	176,643,405	125,868,910	589,829,108	0.0532	0.0960
140	385,325,128	307,306,833	226,960,977	919,592,937	0.0829	0.1789
150	421,651,878	332,980,748	237,715,798	992,348,424	0.0894	0.2683
160	374,814,905	312,842,631	195,609,380	883,266,917	0.0796	0.3479
170	307,973,810	242,590,190	114,053,667	664,617,667	0.0599	0.4078
180	297,099,150	268,205,073	72,654,312	637,958,534	0.0575	0.4653
190	273,972,665	250,931,739	35,149,143	560,053,546	0.0505	0.5158
200	260,447,989	203,257,330	8,547,073	472,252,392	0.0426	0.5583
210	228,544,548	222,738,930	3,939,230	455,222,708	0.0410	0.5994
220	220,912,388	184,354,864	0	405,267,252	0.0365	0.6359
230	204,737,497	168,662,587	0	373,400,084	0.0336	0.6695
240	189,271,414	185,049,448	0	374,320,862	0.0337	0.7033
250	182,480,672	153,843,463	0	336,324,135	0.0303	0.7336
260	161,770,259	144,995,904	0	306,766,163	0.0276	0.7612
270	167,017,096	140,251,796	0	307,268,892	0.0277	0.7889
280	170,481,190	137,303,072	0	307,784,262	0.0277	0.8166
290	198,496,382	136,119,718	0	334,616,101	0.0302	0.8468
300	189,219,275	131,662,038	0	320,881,313	0.0289	0.8757
310	144,911,756	123,110,522	0	268,022,278	0.0242	0.8999
320	94,503,001	109,966,706	0	204,469,708	0.0184	0.9183
330	53,416,276	104,986,003	0	158,402,279	0.0143	0.9326
340	18,413,524	118,669,612	0	137,083,136	0.0124	0.9449
350	6,808,466	125,929,549	0	132,738,016	0.0120	0.9569
360	3,909,221	96,423,724	0	100,332,945	0.0090	0.9659
370	1,239,941	98,964,685	0	100,204,626	0.0090	0.9750
380	208,826	95,011,281	0	95,220,107	0.0086	0.9835
390	385,931	64,551,731	0	64,937,662	0.0059	0.9894
400	251,650	38,545,997	0	38,797,647	0.0035	0.9929
410	643,258	31,095,273	0	31,738,530	0.0029	0.9957
420	0	26,673,643	0	26,673,643	0.0024	0.9982
430	0	10,013,307	0	10,013,307	0.0009	0.9991
440	0	4,576,016	0	4,576,016	0.0004	0.9995
450	0	1,210,172	0	1,210,172	0.0001	0.9996
460	0	2,338,534	0	2,338,534	0.0002	0.9998
470	0	1,986,509	0	1,986,509	0.0002	1.0000

Table D-10. --Flathead sole. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	36	36	32	2.89	.261413E+00	7.00	.176559E+01
20	31	8	8	5	0.25	.121610E-01	0.67	.116475E+00
31	68	68	68	68	24.95	.131250E+02	99.36	.789249E+03
32	7	7	7	7	9.17	.138421E+01	21.57	.181882E+02
SUBTOTAL	75	75	75	75	23.61	.110001E+02	92.76	.660999E+03
41	44	43	43	42	4.20	.576675E+00	16.83	.170045E+02
42	31	28	28	28	11.83	.412053E+01	27.20	.219188E+02
43	21	20	20	20	5.70	.320886E+01	31.01	.972065E+02
SUBTOTAL	96	91	91	90	6.19	.522346E+00	21.91	.105631E+02
50	26	26	26	26	26.74	.479302E+02	170.92	.142849E+04
61	59	59	59	58	14.86	.562109E+01	64.63	.829753E+02
62	6	5	5	5	2.30	.707832E+00	20.69	.748653E+02
SUBTOTAL	65	64	64	63	14.00	.488606E+01	61.65	.724230E+02
70	22	16	16	9	0.62	.653223E-01	4.46	.465425E+01
81	11	11	11	10	2.16	.178061E+00	33.53	.769719E+02
82	14	14	14	14	2.73	.386176E+00	28.80	.400231E+02
SUBTOTAL	25	25	25	24	2.37	.123463E+00	31.79	.361152E+02
90	7	7	7	7	7.73	.290462E+01	52.14	.186006E+03
100	37	35	35	35	14.32	.947074E+01	34.18	.301803E+02
110	27	25	25	25	9.47	.325683E+01	23.40	.292389E+02
120	16	1	1	1	0.09	.767862E-02	0.16	.246378E-01
130	9	5	5	4	1.12	.963345E+00	1.58	.174011E+01
910	54	48	48	40	1.90	.569378E-01	19.29	.826265E+01
920	351	300	300	291	12.31	.112184E+01	53.90	.465006E+02
930	405	348	348	331	9.89	.663818E+00	45.85	.278346E+02
940	89	66	66	65	8.00	.154142E+01	19.12	.622564E+01
TOTAL	494	414	414	396	9.82	.621441E+00	44.95	.259909E+02

Table D-10.--Flathead sole (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG	POPULATION	VARIANCE POPULATION	EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	UPPER
10	0.413	54,536,794	.107064226E+15	57.00	33,809,832	75,263,757
20	0.379	2,743,735	.196052340E+13	30.00	0	5,602,916
31	0.251	939,249,845	.705207900E+17	67.00	408,754,464	1,469,745,227
32	0.425	18,925,794	.140024027E+14	6.00	9,769,173	28,082,415
SUBTOTAL	0.255	958,175,639	.705347924E+17	67.03	427,627,594	1,488,723,685
41	0.250	105,510,771	.668570877E+15	43.00	53,335,753	157,685,789
42	0.435	65,311,106	.126369167E+15	30.00	42,356,159	88,266,053
43	0.184	65,457,189	.433088695E+15	20.00	22,045,896	108,868,483
SUBTOTAL	0.283	236,279,066	.122802874E+16	74.27	166,356,119	306,202,013
50	0.156	663,058,925	.214967464E+17	25.00	361,026,488	965,091,362
61	0.230	569,648,546	.644514711E+16	58.00	408,916,608	730,380,485
62	0.111	13,298,223	.309396389E+14	5.00	0	27,599,002
SUBTOTAL	0.227	582,946,769	.647608675E+16	58.54	421,913,997	743,979,541
70	0.139	32,510,698	.246850050E+15	21.00	0	65,190,540
81	0.064	118,585,382	.962512089E+15	10.00	49,463,066	187,707,699
82	0.095	59,493,222	.170751487E+15	13.00	31,268,089	87,718,355
SUBTOTAL	0.074	178,078,604	.113326358E+16	13.54	105,869,366	250,287,842
90	0.148	60,315,503	.248908872E+15	6.00	21,709,560	98,921,445
100	0.419	26,606,717	.182895981E+14	36.00	17,927,716	35,285,718
110	0.405	13,211,918	.932201898E+13	26.00	6,934,542	19,489,293
120	0.558	68,941	.475289516E+10	15.00	0	215,855
130	0.710	524,372	.190755412E+12	8.00	0	1,531,530
910	0.099	270,904,805	.162902250E+16	24.55	187,760,834	354,048,776
920	0.228	2,497,740,929	.998446790E+17	106.68	1,870,727,142	3,124,754,716
930	0.216	2,768,645,734	.101473702E+18	110.06	2,136,856,149	3,400,435,319
940	0.418	40,411,947	.278071254E+14	61.18	29,867,213	50,956,682
TOTAL	0.219	2,809,057,681	.101501509E+18	110.12	2,177,181,536	3,440,933,826

Table D-10.--Flathead sole (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
500	0	305,619	0	305,619	0.0001	1.0000
510	0	4,822	0	4,822	<0.0001	1.0000
TOTAL	1,280,117,402	1,478,525,696	50,414,584	2,809,057,681		

Table D-11.--Alaska plaice (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	88,288	.398379135E+09	57.00	48,306	128,270
20	70,633	.123715261E+09	30.00	47,921	93,346
31	111,657	.236729836E+09	67.00	80,921	142,393
32	10,168	.709456431E+07	6.00	3,650	16,685
SUBTOTAL	121,824	.243824401E+09	70.37	90,647	153,002
41	174,288	.157849584E+10	43.00	94,118	254,458
42	28,159	.563681114E+08	30.00	12,828	43,490
43	25,708	.704780279E+08	20.00	8,196	43,221
SUBTOTAL	228,156	.170534198E+10	49.88	145,130	311,181
50	224	.500286277E+05	25.00	0	684
61	17,451	.347611221E+08	58.00	5,647	29,255
62	2,516	.377320847E+07	5.00	0	7,510
SUBTOTAL	19,967	.385343306E+08	62.70	7,558	32,376
70	133,937	.179091797E+10	21.00	45,913	221,961
81	51,127	.144365613E+10	10.00	0	135,781
82	0	0.	0.00	0	0
SUBTOTAL	51,127	.144365613E+10	10.00	0	135,781
90	0	0.	0.00	0	0
100	0	0.	0.00	0	0
110	0	0.	0.00	0	0
120	0	0.	0.00	0	0
130	0	0.	0.00	0	0
910	185,064	.323457410E+10	28.97	68,758	301,370
920	529,092	.250984513E+10	100.85	429,580	628,604
930	714,156	.574441923E+10	77.90	563,026	865,285
940	0	0.	0.00	0	0
TOTAL	714,156	.574441923E+10	77.90	563,026	865,285

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	616,088	812,223	905,620,545	1,667,461,347
90.000 PERCENT	587,803	840,508	795,907,928	1,777,173,964
95.000 PERCENT	563,026	865,285	699,875,017	1,873,206,875

Table D-11.--Alaska plaice (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
100	0	0	72,553	72,553	0.0001	0.0001
110	0	79,273	0	79,273	0.0001	0.0001
120	79,273	0	0	79,273	0.0001	0.0002
130	35,415	79,273	0	114,688	0.0001	0.0003
140	105,436	226,497	0	331,933	0.0003	0.0005
150	232,158	188,361	0	420,519	0.0003	0.0009
160	345,178	693,814	0	1,038,992	0.0008	0.0017
170	1,040,642	645,731	0	1,686,372	0.0013	0.0030
180	1,091,084	846,173	0	1,937,256	0.0015	0.0045
190	2,223,657	1,085,971	0	3,309,628	0.0026	0.0071
200	2,000,310	1,287,567	0	3,287,877	0.0026	0.0096
210	2,561,492	2,522,844	0	5,084,336	0.0040	0.0136
220	4,235,249	4,109,256	0	8,344,505	0.0065	0.0200
230	7,314,921	5,317,508	0	12,632,429	0.0098	0.0299
240	7,902,462	7,292,998	0	15,195,459	0.0118	0.0417
250	9,047,194	8,014,178	0	17,061,372	0.0133	0.0549
260	12,319,114	7,957,181	0	20,276,295	0.0158	0.0707
270	16,058,346	9,539,362	0	25,597,708	0.0199	0.0906
280	15,975,593	8,351,767	0	24,327,359	0.0189	0.1095
290	18,160,559	8,630,810	0	26,791,369	0.0208	0.1303
300	27,998,165	15,027,431	0	43,025,596	0.0334	0.1638
310	41,020,314	12,397,243	0	53,417,557	0.0415	0.2053
320	65,671,225	10,874,114	0	76,545,339	0.0595	0.2648
330	62,719,961	11,661,508	0	74,381,469	0.0578	0.3226
340	77,858,401	21,254,776	0	99,113,177	0.0770	0.3996
350	119,872,084	26,434,459	0	146,306,542	0.1137	0.5134
360	90,574,617	22,293,797	0	112,868,414	0.0877	0.6011
370	62,554,989	26,432,262	0	88,987,251	0.0692	0.6703
380	38,213,563	22,127,887	0	60,341,450	0.0469	0.7172
390	21,744,592	27,794,692	0	49,539,284	0.0385	0.7557
400	13,439,909	22,372,406	0	35,812,314	0.0278	0.7835
410	1,735,597	30,963,114	0	32,698,711	0.0254	0.8089
420	228,681	30,305,173	0	30,533,854	0.0237	0.8327
430	307,052	33,080,844	0	33,387,895	0.0260	0.8586
440	143,673	25,739,072	0	25,882,745	0.0201	0.8787
450	171,066	33,375,306	0	33,546,372	0.0261	0.9048
460	182,141	36,280,797	0	36,462,939	0.0283	0.9331
470	29,814	26,331,916	0	26,361,730	0.0205	0.9536
480	29,814	20,563,845	0	20,593,659	0.0160	0.9696
490	0	19,152,336	0	19,152,336	0.0149	0.9845
500	0	9,322,545	0	9,322,545	0.0072	0.9918
510	0	4,481,032	0	4,481,032	0.0035	0.9953
520	0	2,788,974	0	2,788,974	0.0022	0.9974
530	0	1,582,867	0	1,582,867	0.0012	0.9986

Table D-12. --Greenland turbot. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	0	0	0	0.00	0.	0.00	0.
20	31	0	0	0	0.00	0.	0.00	0.
31	68	1	1	0	0.00	.194739E-07	0.00	.946508E-05
32	7	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	75	1	1	0	0.00	.163062E-07	0.00	.792546E-05
41	44	8	8	8	0.04	.972396E-03	0.15	.447012E-02
42	31	2	2	2	0.00	.931531E-06	0.03	.452761E-03
43	21	9	9	9	0.06	.125772E-02	0.39	.138956E-01
SUBTOTAL	96	19	19	19	0.04	.377105E-03	0.17	.206675E-02
50	26	0	0	0	0.00	0.	0.00	0.
61	59	32	32	25	1.12	.848881E-01	2.22	.198442E+00
62	6	6	6	6	0.62	.440180E-01	2.53	.293595E+00
SUBTOTAL	65	38	38	31	1.08	.739420E-01	2.24	.173735E+00
70	22	0	0	0	0.00	0.	0.00	0.
81	11	0	0	0	0.00	0.	0.00	0.
82	14	9	9	8	0.04	.579004E-03	1.43	.887337E+00
SUBTOTAL	25	9	9	8	0.01	.787218E-04	0.53	.120643E+00
90	7	7	7	7	1.94	.101622E+01	7.77	.392494E+01
100	37	34	34	33	26.10	.246810E+02	7.60	.219630E+01
110	27	20	20	20	12.51	.191575E+02	4.85	.424022E+01
120	16	15	15	15	24.93	.237810E+02	4.86	.628840E+00
130	9	8	8	8	7.71	.110113E+02	2.46	.110848E+01
910	54	16	16	15	0.17	.691003E-02	0.85	.458418E-01
920	351	58	58	50	0.23	.309979E-02	0.50	.734760E-02
930	405	74	74	65	0.22	.219940E-02	0.58	.680671E-02
940	89	77	77	76	19.34	.601349E+01	5.49	.655021E+00
TOTAL	494	151	151	141	0.86	.893092E-02	0.75	.710326E-02

Table D-12.--Greenland turbot (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG	POPULATION	VARIANCE POPULATION	EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	UPPER
10	0.000	0	0.	0.00	0	0
20	0.000	0	0.	0.00	0	0
31	0.045	29,081	.845721333E+09	67.00	0	87,176
32	0.000	0	0.	0.00	0	0
SUBTOTAL	0.045	29,081	.845721333E+09	67.00	0	87,176
41	0.280	970,901	.175752711E+12	43.00	124,960	1,816,842
42	0.045	70,313	.261031072E+10	30.00	0	174,641
43	0.167	822,184	.619099503E+11	20.00	303,151	1,341,216
SUBTOTAL	0.221	1,863,397	.240272972E+12	63.43	883,534	2,843,260
50	0.000	0	0.	0.00	0	0
61	0.503	19,557,226	.154140899E+14	58.00	11,696,825	27,417,627
62	0.246	1,626,434	.121334252E+12	5.00	730,875	2,521,992
SUBTOTAL	0.484	21,183,660	.155354241E+14	58.87	13,296,521	29,070,799
70	0.000	0	0.	0.00	0	0
81	0.000	0	0.	0.00	0	0
82	0.027	2,956,798	.378566988E+13	13.00	0	7,159,467
SUBTOTAL	0.027	2,956,798	.378566988E+13	13.00	0	7,159,467
90	0.250	8,987,162	.525226526E+13	6.00	3,379,171	14,595,152
100	3.435	5,915,688	.133098267E+13	36.00	3,574,405	8,256,971
110	2.577	2,740,760	.135187750E+13	26.00	350,244	5,131,277
120	5.124	2,136,689	.121310098E+12	15.00	1,394,470	2,878,907
130	3.127	815,810	.121513987E+12	8.00	11,965	1,619,656
910	0.195	11,943,960	.903793514E+13	14.33	5,495,413	18,392,508
920	0.462	23,076,138	.157765428E+14	60.70	15,133,523	31,018,753
930	0.371	35,020,098	.248144779E+14	62.83	25,062,253	44,977,943
940	3.522	11,608,947	.292568425E+13	69.97	8,193,723	15,024,172
TOTAL	1.155	46,629,046	.277401622E+14	77.55	36,126,861	57,131,230

Table D-12.--Greenland turbot (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
530	330,006	75,413	0	405,419	0.0087	0.7107
540	156,831	355,813	0	512,643	0.0110	0.7217
550	166,771	55,656	0	222,428	0.0048	0.7265
560	116,464	159,642	0	276,106	0.0059	0.7324
570	86,226	165,380	0	251,606	0.0054	0.7378
580	137,017	185,563	0	322,580	0.0069	0.7447
590	326,829	179,220	0	506,049	0.0109	0.7555
600	390,104	217,540	0	607,644	0.0130	0.7686
610	367,956	204,261	0	572,217	0.0123	0.7808
620	580,078	216,230	0	796,308	0.0171	0.7979
630	508,765	227,243	0	736,008	0.0158	0.8137
640	651,810	162,106	0	813,916	0.0175	0.8312
650	688,325	181,520	0	869,846	0.0187	0.8498
660	556,118	218,431	0	774,550	0.0166	0.8664
670	460,595	222,530	0	683,125	0.0147	0.8811
680	411,262	98,824	0	510,086	0.0109	0.8920
690	391,560	84,533	0	476,093	0.0102	0.9022
700	210,898	238,193	0	449,092	0.0096	0.9119
710	147,588	79,418	0	227,006	0.0049	0.9167
720	67,569	34,704	0	102,273	0.0022	0.9189
730	66,336	171,583	0	237,919	0.0051	0.9240
740	37,312	66,103	0	103,415	0.0022	0.9262
750	13,645	81,275	0	94,920	0.0020	0.9283
760	16,180	125,428	0	141,608	0.0030	0.9313
770	0	202,029	0	202,029	0.0043	0.9356
780	0	236,042	0	236,042	0.0051	0.9407
790	0	90,263	0	90,263	0.0019	0.9426
800	4,454	238,972	0	243,425	0.0052	0.9479
810	0	193,025	0	193,025	0.0041	0.9520
820	0	400,307	0	400,307	0.0086	0.9606
830	0	209,654	0	209,654	0.0045	0.9651
840	11,688	255,648	0	267,336	0.0057	0.9708
850	0	194,452	0	194,452	0.0042	0.9750
860	0	286,682	0	286,682	0.0061	0.9811
870	0	135,788	0	135,788	0.0029	0.9840
880	0	112,974	0	112,974	0.0024	0.9865
890	0	115,020	0	115,020	0.0025	0.9889
900	0	81,117	0	81,117	0.0017	0.9907
910	0	69,168	0	69,168	0.0015	0.9922
920	0	105,434	0	105,434	0.0023	0.9944
930	0	81,218	0	81,218	0.0017	0.9962
940	0	47,641	0	47,641	0.0010	0.9972
950	0	38,955	0	38,955	0.0008	0.9980
960	0	30,462	0	30,462	0.0007	0.9987

Table D-13. --Arrowtooth flounder. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	6	6	4	0.07	.318182E-02	0.58	.237595E+00
20	31	0	0	0	0.00	0.	0.00	0.
31	68	41	41	34	9.38	.727634E+01	24.70	.523747E+02
32	7	7	7	7	7.49	.369310E+01	24.69	.443773E+02
SUBTOTAL	75	48	48	41	9.22	.611939E+01	24.70	.441755E+02
41	44	6	6	5	0.17	.105462E-01	0.59	.101763E+00
42	31	24	24	23	3.87	.129181E+01	14.55	.165731E+02
43	21	1	1	1	0.05	.266652E-02	0.04	.168303E-02
SUBTOTAL	96	31	31	29	0.97	.677315E-01	3.59	.856364E+00
50	26	26	26	26	44.28	.277613E+03	85.97	.950604E+03
61	59	53	53	43	12.57	.829822E+01	15.55	.749065E+01
62	6	5	5	5	1.70	.737019E+00	1.01	.185809E+00
SUBTOTAL	65	58	58	48	11.84	.721170E+01	14.56	.650766E+01
70	22	0	0	0	0.00	0.	0.00	0.
81	11	0	0	0	0.00	0.	0.00	0.
82	14	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	25	0	0	0	0.00	0.	0.00	0.
90	7	2	2	0	0.16	.129849E-01	0.14	.126539E-01
100	37	37	37	36	19.40	.601601E+01	13.37	.281874E+01
110	27	26	26	26	20.51	.100287E+02	12.58	.429627E+01
120	16	13	13	12	2.00	.268385E+00	1.12	.824723E-01
130	9	7	7	7	2.51	.153132E+01	1.25	.318775E+00
910	54	2	2	0	0.01	.881341E-04	0.01	.858875E-04
920	351	169	169	148	8.41	.255388E+01	16.61	.918187E+01
930	405	171	171	148	6.46	.150418E+01	12.75	.540791E+01
940	89	83	83	81	13.43	.158126E+01	8.71	.700494E+00
TOTAL	494	254	254	229	6.70	.140597E+01	12.61	.504912E+01

Table D-13.--Arrowtooth flounder (Cont.).   Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG	POPULATION	VARIANCE POPULATION	EFFECTIVE DEGREES FREEDOM	95% CONFIDENCE LIMITS LOWER	POPULATION 95% CONFIDENCE LIMITS UPPER
10	0.125	4,528,715	.144075792E+14	57.00	0	12,132,135
20	0.000	0	0.	0.00	0	0
31	0.380	233,490,828	.467977491E+16	67.00	96,832,688	370,148,968
32	0.303	21,664,630	.341643531E+14	. 6.00	7,361,846	35,967,413
SUBTOTAL	0.373	255,155,458	.471393926E+16	67.94	118,022,280	392,288,636
41	0.287	3,678,345	.400105133E+13	43.00	0	7,714,575
42	0.266	34,945,188	.955492750E+14	30.00	14,984,779	54,905,597
43	1.259	86,594	.749846656E+10	20.00	0	267,228
SUBTOTAL	0.270	38,710,127	.995578248E+14	32.53	18,398,183	59,022,070
50	0.515	333,503,121	.143051968E+17	25.00	87,118,192	579,888,049
61	0.809	137,027,206	.581840309E+15	58.00	88,733,819	185,320,593
62	1.680	649,672	.767895832E+11	5.00	0	1,362,120
SUBTOTAL	0.813	137,676,878	.581917099E+15	58.02	89,380,304	185,973,452
70	0.000	0	0.	0.00	0	0
81	0.000	0	0.	0.00	0	0
82	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
90	1.140	163,763	.169331467E+11	6.00	0	482,185
100	1.450	10,411,155	.170818806E+13	36.00	7,758,776	13,063,533
110	1.630	7,102,489	.136974841E+13	26.00	4,696,224	9,508,755
120	1.784	491,210	.159098203E+11	15.00	222,418	760,002
130	2.012	412,830	.349448934E+11	8.00	0	843,903
910	1.140	163,763	.169331467E+11	6.00	0	482,185
920	0.507	769,574,298	.197150186E+17	45.63	486,689,909	1,052,458,687
930	0.507	769,738,061	.197150355E+17	45.63	486,853,551	1,052,622,572
940	1.541	18,417,684	.312879119E+13	63.82	14,882,365	21,953,003
TOTAL	0.531	788,155,745	.197181643E+17	45.64	505,248,789	1,071,062,702

Table D-13.--Arrowtooth flounder (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)		MALES	FEMALES	UNSEXED	TOTAL	CUMULATIVE PROPORTION	PROPORTION
550	182,823	2,908,331	0	3,091,154	0.0039	0.9655
560	42,245	2,313,259	0	2,355,504	0.0030	0.9685
570	65,971	2,805,600	0	2,871,571	0.0036	0.9721
580	12,969	1,653,650	0	1,666,619	0.0021	0.9742
590	17,145	3,094,750	0	3,111,896	0.0039	0.9782
600	19,310	2,515,621	0	2,534,931	0.0032	0.9814
610	215,002	1,161,665	0	1,376,666	0.0017	0.9832
620	279,355	1,703,727	0	1,983,082	0.0025	0.9857
630	145,890	1,611,914	0	1,757,804	0.0022	0.9879
640	140,296	1,934,668	0	2,074,964	0.0026	0.9905
650	0	2,928,260	0	2,928,260	0.0037	0.9943
660	0	542,833	0	542,833	0.0007	0.9949
670	11,548	1,525,196	0	1,536,745	0.0019	0.9969
680	299,834	349,167	0	649,000	0.0008	0.9977
690	20,186	399,272	0	419,457	0.0005	0.9982
700	6,758	196,283	0	203,041	0.0003	0.9985
710	0	59,828	0	59,828	0.0001	0.9986
720	0	47,077	0	47,077	0.0001	0.9986
730	0	30,804	0	30,804	<0.0001	0.9987
740	0	137,620	0	137,620	0.0002	0.9989
750	0	15,800	0	15,800	<0.0001	0.9989
760	0	4,920	0	4,920	<0.0001	0.9989
770	0	10,074	0	10,074	<0.0001	0.9989
820	0	666,924	0	666,924	0.0008	0.9997
830	0	29,557	0	29,557	<0.0001	0.9998
850	0	6,005	0	6,005	<0.0001	0.9998
910	0	4,920	0	4,920	<0.0001	0.9998
TOTAL	264,806,975	522,771,193	413,815	787,991,982		

Table D-14.--Pacific halibut (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	30,538	.223496394E+08	57.00	21,068	40,008
20	17,843	.121247104E+08	30.00	10,732	24,953
31	19,831	.175924816E+08	67.00	11,452	28,209
32	285	.326086495E+05	6.00	0	727
SUBTOTAL	20,115	.176250903E+08	67.25	11,729	28,502
41	3,839	.174144942E+07	43.00	1,177	6,502
42	9,339	.267600251E+08	30.00	0	19,903
43	572	.146138192E+06	20.00	0	1,369
SUBTOTAL	13,751	.286476127E+08	34.28	2,866	24,635
50	8,372	.405699795E+07	25.00	4,222	12,521
61	6,490	.320445395E+07	58.00	2,906	10,074
62	496	.153107057E+06	5.00	0	1,502
SUBTOTAL	6,986	.335756100E+07	62.03	3,323	10,650
70	11,403	.274214152E+08	21.00	511	22,295
81	91	.823751095E+04	10.00	0	293
82	27	.735929477E+03	13.00	0	86
SUBTOTAL	118	.897344043E+04	11.79	0	324
90	66	.187401673E+04	6.00	0	172
100	767	.532716064E+05	36.00	299	1,235
110	1,061	.397082388E+06	26.00	0	2,357
120	130	.169333483E+05	15.00	0	407
130	0	0.	0.00	0	0
910	11,587	.274322627E+08	21.02	692	22,481
920	97,605	.881616118E+08	180.48	79,014	116,195
930	109,191	.115593874E+09	169.41	87,904	130,479
940	1,958	.467287342E+06	35.43	570	3,347
TOTAL	111,150	.116061162E+09	170.77	89,819	132,480

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	97,263	125,036	61,509,013	86,210,632
90.000 PERCENT	93,288	129,011	57,973,390	89,746,256
95.000 PERCENT	89,819	132,480	54,888,114	92,381,532

Table D-14.--Pacific halibut (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
120	0	0	29,689	29,689	0.0004	0.0004
130	0	0	29,689	29,689	0.0004	0.0008
140	30,306	0	0	30,306	0.0004	0.0012
150	91,278	97,937	176,898	366,113	0.0050	0.0062
160	92,134	93,350	336,947	522,431	0.0071	0.0132
170	132,169	92,277	428,569	653,015	0.0088	0.0221
180	0	61,828	557,397	619,225	0.0084	0.0305
190	30,306	66,415	496,892	593,613	0.0080	0.0385
200	0	0	215,964	215,964	0.0029	0.0414
210	0	0	240,115	240,115	0.0033	0.0447
220	0	0	188,903	188,903	0.0026	0.0472
230	31,522	0	30,422	61,944	0.0008	0.0481
240	30,666	0	111,191	141,857	0.0019	0.0500
250	63,044	0	53,815	116,859	0.0016	0.0516
260	28,673	28,673	111,957	169,303	0.0023	0.0539
270	60,195	0	204,779	264,975	0.0036	0.0575
280	0	0	280,358	280,358	0.0038	0.0613
290	91,715	33,377	403,713	528,805	0.0072	0.0684
300	30,306	0	359,558	389,863	0.0053	0.0737
310	160,842	88,868	686,739	936,449	0.0127	0.0864
320	87,435	123,621	866,865	1,077,921	0.0146	0.1010
330	151,913	59,503	1,285,012	1,496,427	0.0203	0.1212
340	66,275	90,640	1,409,826	1,566,740	0.0212	0.1424
350	122,645	95,428	2,046,382	2,264,455	0.0307	0.1731
360	134,175	87,035	3,140,626	3,361,836	0.0455	0.2186
370	87,094	112,986	3,661,474	3,861,554	0.0523	0.2709
380	118,266	25,128	4,687,070	4,830,464	0.0654	0.3363
390	28,673	92,270	4,714,540	4,835,483	0.0655	0.4018
400	111,275	53,965	4,898,196	5,063,437	0.0686	0.4703
410	89,101	54,575	4,408,545	4,552,220	0.0616	0.5320
420	121,521	88,074	4,093,839	4,303,435	0.0583	0.5902
430	62,382	188,437	3,799,045	4,049,864	0.0548	0.6451
440	113,321	141,284	3,422,030	3,676,635	0.0498	0.6948
450	122,121	89,945	3,076,368	3,288,434	0.0445	0.7394
460	59,803	223,211	1,700,834	1,983,849	0.0269	0.7662
470	60,953	213,230	1,496,627	1,770,810	0.0240	0.7902
480	79,953	219,310	842,008	1,141,271	0.0155	0.8056
490	117,556	134,104	742,253	993,913	0.0135	0.8191
500	32,175	73,375	442,170	547,720	0.0074	0.8265
510	85,336	92,353	256,782	434,470	0.0059	0.8324
520	32,175	97,686	217,156	347,018	0.0047	0.8371
530	0	63,044	468,878	531,923	0.0072	0.8443
540	85,686	89,977	221,991	397,654	0.0054	0.8497
550	31,520	0	235,975	267,494	0.0036	0.8533

Table D-14.--Pacific halibut (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
1020	0	0	54,542	54,542	0.0007	0.9837
1030	0	30,061	217,575	247,635	0.0034	0.9871
1040	0	37,602	0	37,602	0.0005	0.9876
1050	0	0	56,249	56,249	0.0008	0.9884
1060	0	0	98,699	98,699	0.0013	0.9897
1070	0	4,274	67,345	71,619	0.0010	0.9907
1080	0	4,274	29,589	33,863	0.0005	0.9911
1090	0	0	50,614	50,614	0.0007	0.9918
1100	0	0	70,930	70,930	0.0010	0.9928
1110	0	0	63,754	63,754	0.0009	0.9936
1120	0	0	157,628	157,628	0.0021	0.9958
1130	0	30,061	20,449	50,510	0.0007	0.9965
1140	0	0	31,263	31,263	0.0004	0.9969
1170	0	6,210	48,167	54,377	0.0007	0.9976
1180	0	0	26,672	26,672	0.0004	0.9980
1200	4,363	0	0	4,363	0.0001	0.9980
1210	0	4,274	0	4,274	0.0001	0.9981
1240	0	0	24,865	24,865	0.0003	0.9984
1280	0	28,388	0	28,388	0.0004	0.9988
1320	0	27,244	28,561	55,805	0.0008	0.9996
1430	0	0	27,591	27,591	0.0004	0.9999
1500	0	4,274	0	4,274	0.0001	1.0000
TOTAL	4,344,954	5,785,056	63,729,812	73,859,823		

Table D-15.--Longhead dab (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	13,384	.483113155E+07	57.00	8,981	17,787
20	4,442	.143534091E+07	30.00	1,996	6,889
31	854	.114099471E+06	67.00	179	1,528
32	0	0.	0.00	0	0
SUBTOTAL	854	.114099471E+06	67.00	179	1,528
41	0	0.	0.00	0	0
42	0	0.	0.00	0	0
43	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
50	0	0.	0.00	0	0
61	0	0.	0.00	0	0
62	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
70	489	.435068939E+05	21.00	56	923
81	0	0.	0.00	0	0
82	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
90	0	0.	0.00	0	0
100	0	0.	0.00	0	0
110	0	0.	0.00	0	0
120	0	0.	0.00	0	0
130	0	0.	0.00	0	0
910	489	.435068939E+05	21.00	56	923
920	18,680	.638057193E+07	85.11	13,649	23,711
930	19,169	.642407882E+07	86.26	14,122	24,217
940	0	0.	0.00	0	0
TOTAL	19,169	.642407882E+07	86.26	14,122	24,217

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	15,892	22,447	131,489,153	182,007,712
90.000 PERCENT	14,948	23,390	124,223,066	189,273,799
95.000 PERCENT	14,122	24,217	117,866,951	195,629,915

Table D-15.--Longhead dab (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
120	170,586	0	0	170,586	0.0011	0.0011
140	506,716	170,586	0	677,301	0.0043	0.0054
150	2,045,911	256,994	0	2,302,905	0.0147	0.0201
160	7,707,481	573,130	0	8,280,611	0.0528	0.0729
170	14,626,280	675,669	0	15,301,948	0.0976	0.1705
180	16,493,908	1,394,973	0	17,888,881	0.1141	0.2847
190	16,975,092	2,297,001	0	19,272,093	0.1229	0.4076
200	10,209,333	4,954,608	0	15,163,942	0.0967	0.5044
210	5,437,313	10,345,189	0	15,782,502	0.1007	0.6051
220	3,817,787	9,403,380	0	13,221,167	0.0843	0.6894
230	2,528,027	8,827,305	0	11,355,332	0.0724	0.7618
240	865,349	7,143,956	0	8,009,305	0.0511	0.8129
250	95,904	4,447,422	0	4,543,327	0.0290	0.8419
260	0	4,758,254	0	4,758,254	0.0304	0.8723
270	0	5,102,171	0	5,102,171	0.0326	0.9048
280	405,122	3,627,115	0	4,032,237	0.0257	0.9306
290	0	2,667,502	0	2,667,502	0.0170	0.9476
300	0	562,767	0	562,767	0.0036	0.9512
310	0	1,649,469	0	1,649,469	0.0105	0.9617
320	0	383,618	0	383,618	0.0024	0.9641
330	0	410,838	0	410,838	0.0026	0.9668
340	0	202,044	0	202,044	0.0013	0.9680
TOTAL	81,884,810	69,853,991	0	151,738,801		

Table D-16.--Starry flounder (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	27,263	.500889457E+08	57.00	13,085	41,440
20	5,771	.126593051E+08	30.00	0	13,037
31	1,271	.161528333E+07	67.00	0	3,810
32	0	0.	0.00	0	0
SUBTOTAL	1,271	.161528333E+07	67.00	0	3,810
41	0	0.	0.00	0	0
42	0	0.	0.00	0	0
43	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
50	0	0.	0.00	0	0
61	0	0.	0.00	0	0
62	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
70	1,233	.273321796E+06	21.00	146	2,321
81	0	0.	0.00	0	0
82	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
90	0	0.	0.00	0	0
100	0	0.	0.00	0	0
110	0	0.	0.00	0	0
120	0	0.	0.00	0	0
130	0	0.	0.00	0	0
910	1,233	.273321796E+06	21.00	146	2,321
920	34,305	.643635341E+08	83.87	18,324	50,286
930	35,538	.646368559E+08	84.57	19,526	51,551
940	0	0.	0.00	0	0
TOTAL	35,538	.646368559E+08	84.57	19,526	51,551

CONFIDENCE LIMITS	TOTAL BIOMASS MT		TOTAL POPULATION	
	LOWER	UPPER	LOWER	UPPER
80.000 PERCENT	25,142	45,934	18,954,153	37,975,795
90.000 PERCENT	22,147	48,929	16,208,506	40,721,442
95.000 PERCENT	19,526	51,551	13,802,422	43,127,526

Table D-16.--Starry flounder (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
240	169,033	0	0	169,033	0.0059	0.0059
300	192,056	0	0	192,056	0.0067	0.0127
320	403,498	0	0	403,498	0.0142	0.0269
330	547,564	0	0	547,564	0.0192	0.0461
340	564,619	49,460	0	614,079	0.0216	0.0677
350	192,056	0	0	192,056	0.0067	0.0744
360	1,363,548	49,460	0	1,413,008	0.0496	0.1241
370	830,620	109,584	0	940,204	0.0330	0.1571
380	692,052	603,123	0	1,295,175	0.0455	0.2026
390	1,556,582	939,813	0	2,496,394	0.0877	0.2903
400	1,973,641	362,909	0	2,336,550	0.0821	0.3724
410	1,532,759	407,303	0	1,940,062	0.0682	0.4405
420	1,420,677	897,576	0	2,318,253	0.0814	0.5220
430	316,244	616,196	0	932,440	0.0328	0.5547
440	0	961,459	0	961,459	0.0338	0.5885
450	126,582	1,041,166	0	1,167,748	0.0410	0.6295
460	192,056	947,449	0	1,139,505	0.0400	0.6696
470	0	747,691	0	747,691	0.0263	0.6958
480	0	1,080,375	0	1,080,375	0.0380	0.7338
490	0	1,059,259	0	1,059,259	0.0372	0.7710
500	0	1,342,663	0	1,342,663	0.0472	0.8182
510	72,269	1,061,499	0	1,133,769	0.0398	0.8580
520	0	303,533	0	303,533	0.0107	0.8687
530	0	848,296	0	848,296	0.0298	0.8985
540	0	516,668	0	516,668	0.0182	0.9166
550	0	72,269	0	72,269	0.0025	0.9192
560	0	628,173	0	628,173	0.0221	0.9412
570	0	219,169	0	219,169	0.0077	0.9489
580	0	126,582	0	126,582	0.0044	0.9534
590	0	498,009	0	498,009	0.0175	0.9709
600	0	272,757	0	272,757	0.0096	0.9804
TOTAL	12,145,854	15,762,442	0	27,908,296		

Table D-17.--Rex sole (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	158	.155141810E+05	57.00	0	408
20	0	0.	0.00	0	0
31	1,551	.225506723E+06	67.00	602	2,500
32	0	0.	0.00	0	0
SUBTOTAL	1,551	.225506723E+06	67.00	602	2,500
41	0	0.	0.00	0	0
42	51	.956286676E+03	30.00	0	114
43	0	0.	0.00	0	0
SUBTOTAL	51	.956286676E+03	30.00	0	114
50	12,951	.204418341E+08	25.00	3,637	22,265
61	2,820	.102474316E+07	58.00	794	4,847
62	0	0.	0.00	0	0
SUBTOTAL	2,820	.102474316E+07	58.00	794	4,847
70	0	0.	0.00	0	0
81	0	0.	0.00	0	0
82	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
90	0	0.	0.00	0	0
100	1,241	.762145255E+05	36.00	681	1,802
110	346	.705895121E+04	26.00	173	519
120	11	.872895058E+02	15.00	0	31
130	0	0.	0.00	0	0
910	0	0.	0.00	0	0
920	17,531	.217085544E+08	28.16	7,989	27,073
930	17,531	.217085544E+08	28.16	7,989	27,073
940	1,598	.833607662E+05	42.56	1,016	2,181
TOTAL	19,129	.217919152E+08	28.38	9,569	28,690

CONFIDENCE LIMITS	TOTAL BIOMASS MT		TOTAL POPULATION	
	LOWER	UPPER	LOWER	UPPER
80.000 PERCENT	13,000	25,259	39,133,099	66,214,213
90.000 PERCENT	11,189	27,070	35,153,326	70,193,986
95.000 PERCENT	9,569	28,690	31,619,204	73,728,108

Table D-17.--Rex sole (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
140	0	0	372,411	372,411	0.0071	0.0071
150	432,975	0	372,411	805,385	0.0153	0.0224
160	0	191,023	0	191,023	0.0036	0.0260
170	119,782	106,629	0	226,410	0.0043	0.0303
180	127,933	47,478	0	175,412	0.0033	0.0336
190	0	6,767	0	6,767	0.0001	0.0337
200	0	12,770	0	12,770	0.0002	0.0340
210	118,720	6,009	0	124,729	0.0024	0.0364
220	25,480	251,213	0	276,693	0.0053	0.0416
230	255,410	28,287	0	283,697	0.0054	0.0470
240	73,623	101,556	0	175,179	0.0033	0.0503
250	226,265	231,334	0	457,598	0.0087	0.0590
260	434,632	117,490	0	552,122	0.0105	0.0695
270	237,677	536,884	0	774,560	0.0147	0.0842
280	293,910	258,187	0	552,097	0.0105	0.0947
290	671,321	1,018,311	0	1,689,632	0.0321	0.1268
300	980,671	797,770	0	1,778,441	0.0338	0.1605
310	1,969,646	1,796,898	0	3,766,545	0.0715	0.2320
320	1,156,824	2,551,759	0	3,708,584	0.0704	0.3024
330	2,623,714	2,670,670	0	5,294,384	0.1005	0.4029
340	1,056,287	693,609	0	1,749,895	0.0332	0.4362
350	977,239	687,691	0	1,664,931	0.0316	0.4678
360	738,282	285,842	0	1,024,124	0.0194	0.4872
370	1,083,936	688,685	0	1,772,621	0.0337	0.5209
380	2,144,017	617,553	0	2,761,570	0.0524	0.5733
390	933,400	1,334,337	0	2,267,737	0.0431	0.6163
400	1,662,765	2,556,378	0	4,219,142	0.0801	0.6964
410	682,352	2,203,087	0	2,885,438	0.0548	0.7512
420	1,011,551	1,989,225	0	3,000,777	0.0570	0.8082
430	462,901	2,073,656	0	2,536,556	0.0482	0.8564
440	135,292	1,810,541	0	1,945,833	0.0369	0.8933
450	240,398	1,470,643	0	1,711,041	0.0325	0.9258
460	351,444	1,274,073	0	1,625,517	0.0309	0.9566
470	23,151	355,075	0	378,227	0.0072	0.9638
480	31,425	407,548	0	438,973	0.0083	0.9722
490	47,874	389,884	0	437,758	0.0083	0.9805
500	0	59,382	0	59,382	0.0011	0.9816
510	5,429	38,190	0	43,619	0.0008	0.9824
520	0	13,803	0	13,803	0.0003	0.9827
530	0	183,955	0	183,955	0.0035	0.9862
540	0	196,134	0	196,134	0.0037	0.9899
570	0	6,060	0	6,060	0.0001	0.9900
580	0	6,153	0	6,153	0.0001	0.9901

Table D-18. --Pacific herring. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	10	10	5	3.10	.382165E+01	10.66	.354467E+02
20	31	3	3	2	0.09	.531082E-02	1.13	.806360E+00
31	68	2	2	1	0.64	.403684E+00	2.75	.740245E+01
32	7	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	75	2	2	1	0.59	.338020E+00	2.52	.619835E+01
41	44	7	7	0	0.03	.192894E-03	0.13	.294903E-02
42	31	6	6	1	0.14	.480108E-02	0.48	.566032E-01
43	21	7	7	1	0.21	.116852E-01	0.99	.232483E+00
SUBTOTAL	96	20	20	2	0.09	.751144E-03	0.38	.127139E-01
50	26	5	5	2	0.10	.429670E-02	0.30	.469889E-01
61	59	16	16	1	0.13	.280952E-02	0.76	.145783E+00
62	6	3	3	0	0.27	.277023E-01	1.15	.483483E+00
SUBTOTAL	65	19	19	1	0.14	.256854E-02	0.79	.128869E+00
70	22	8	8	2	1.04	.467038E+00	14.67	.105837E+03
81	11	2	2	0	0.00	.121422E-04	0.04	.604344E-03
82	14	1	1	0	0.01	.781264E-04	0.03	.898757E-03
SUBTOTAL	25	3	3	0	0.01	.154608E-04	0.03	.363029E-03
90	7	2	2	0	0.01	.602725E-04	0.11	.510929E-02
100	37	0	0	0	0.00	0.	0.00	0.
110	27	0	0	0	0.00	0.	0.00	0.
120	16	0	0	0	0.00	0.	0.00	0.
130	9	0	0	0	0.00	0.	0.00	0.
910	54	13	13	2	0.54	.125643E+00	7.63	.284716E+02
920	351	59	59	13	0.72	.124947E+00	2.73	.132182E+01
930	405	72	72	15	0.68	.803859E-01	3.87	.231828E+01
940	89	0	0	0	0.00	0.	0.00	0.
TOTAL	494	72	72	15	0.65	.750407E-01	3.73	.216412E+01

Table D-18.--Pacific herring (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG POPULATION	VARIANCE POPULATION	EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	UPPER
10	0.291	82,976,386	.214946278E+16	57.00	0	175,847,026
20	0.082	4,642,792	.135728204E+14	30.00	0	12,165,787
31	0.233	26,011,299	.661422129E+15	67.00	0	77,387,547
32	0.000	0	0.	0.00	0	0
SUBTOTAL	0.233	26,011,299	.661422129E+15	67.00	0	77,387,547
41	0.229	801,018	.115947649E+12	43.00	113,918	1,488,117
42	0.282	1,156,590	.326335595E+12	30.00	0	2,323,098
43	0.215	2,087,013	.103579227E+13	20.00	0	4,210,016
SUBTOTAL	0.237	4,044,620	.147807551E+13	37.99	1,582,460	6,506,780
50	0.334	1,145,792	.707114418E+12	25.00	0	2,878,048
61	0.168	6,724,015	.113237422E+14	58.00	0	13,461,235
62	0.233	736,995	.199809546E+12	5.00	0	1,886,234
SUBTOTAL	0.175	7,461,010	.115235518E+14	59.85	671,738	14,250,281
70	0.071	106,809,336	.561330785E+16	21.00	0	262,647,121
81	0.135	129,497	.755715303E+10	10.00	0	323,182
82	0.295	61,922	.383439185E+10	13.00	0	195,675
SUBTOTAL	0.186	191,420	.113915449E+11	18.97	0	414,808
90	0.105	123,456	.683713941E+10	6.00	0	325,791
100	0.000	0	0.	0.00	0	0
110	0.000	0	0.	0.00	0	0
120	0.000	0	0.	0.00	0	0
130	0.000	0	0.	0.00	0	0
910	0.071	107,124,212	.561332607E+16	21.00	0	262,962,250
920	0.263	126,281,899	.283816647E+16	91.96	20,301,270	232,262,528
930	0.175	233,406,111	.845149255E+16	44.98	48,094,183	418,718,039
940	0.000	0	0.	0.00	0	0
TOTAL	0.175	233,406,111	.845149255E+16	44.98	48,094,183	418,718,039

Table D-19. --Giant grenadier. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	0	0	0	0.00	0.	0.00	0.
20	31	0	0	0	0.00	0.	0.00	0.
31	68	0	0	0	0.00	0.	0.00	0.
32	7	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	75	0	0	0	0.00	0.	0.00	0.
41	44	0	0	0	0.00	0.	0.00	0.
42	31	0	0	0	0.00	0.	0.00	0.
43	21	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	96	0	0	0	0.00	0.	0.00	0.
50	26	0	0	0	0.00	0.	0.00	0.
61	59	0	0	0	0.00	0.	0.00	0.
62	6	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	65	0	0	0	0.00	0.	0.00	0.
70	22	0	0	0	0.00	0.	0.00	0.
81	11	0	0	0	0.00	0.	0.00	0.
82	14	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	25	0	0	0	0.00	0.	0.00	0.
90	7	0	0	0	0.00	0.	0.00	0.
100	37	1	1	1	0.07	.473832E-02	0.02	.345308E-03
110	27	11	11	11	12.53	.279724E+02	2.23	.107539E+01
120	16	16	16	15	12.36	.688574E+01	12.02	.213992E+02
130	9	9	9	9	69.10	.621510E+03	12.98	.957130E+01
910	54	0	0	0	0.00	0.	0.00	0.
920	351	0	0	0	0.00	0.	0.00	0.
930	405	0	0	0	0.00	0.	0.00	0.
940	89	37	37	36	16.77	.175484E+02	5.13	.123595E+01
TOTAL	494	37	37	36	0.57	.200706E-01	0.17	.141359E-02

Table D-19.--Giant grenadier (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG	POPULATION	VARIANCE POPULATION	EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	POPULATION 95% CONFIDENCE LIMITS UPPER
10	0.000	0	0.	0.00	0	0
20	0.000	0	0.	0.00	0	0
31	0.000	0	0.	0.00	0	0
32	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
41	0.000	0	0.	0.00	0	0
42	0.000	0	0.	0.00	0	0
43	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
50	0.000	0	0.	0.00	0	0
61	0.000	0	0.	0.00	0	0
62	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
70	0.000	0	0.	0.00	0	0
81	0.000	0	0.	0.00	0	0
82	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
90	0.000	0	0.	0.00	0	0
100	3.704	14,466	.209260768E+09	36.00	0	43,823
110	5.624	1,258,404	.342858953E+12	26.00	54,531	2,462,278
120	1.028	5,281,292	.412814250E+13	15.00	951,562	9,611,022
130	5.325	4,296,587	.104922972E+13	8.00	1,934,507	6,658,667
910	0.000	0	0.	0.00	0	0
920	0.000	0	0.	0.00	0	0
930	0.000	0	0.	0.00	0	0
940	3.266	10,850,749	.552044043E+13	23.84	6,001,253	15,700,244
TOTAL	3.266	10,850,749	.552044043E+13	23.84	6,001,253	15,700,244

Table D-19.--Giant grenadier (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
510	0	0	34,161	34,161	0.0031	0.9884
520	0	18,201	4,703	22,904	0.0021	0.9906
530	0	0	68,322	68,322	0.0063	0.9969
560	0	0	34,161	34,161	0.0031	1.0000
TOTAL	578,891	2,880,136	7,391,722	10,850,749		

Table D-20.--Coryphaenoides spp. (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	0	0.	0.00	0	0
20	0	0.	0.00	0	0
31	0	0.	0.00	0	0
32	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
41	0	0.	0.00	0	0
42	0	0.	0.00	0	0
43	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
50	0	0.	0.00	0	0
61	0	0.	0.00	0	0
62	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
70	0	0.	0.00	0	0
81	0	0.	0.00	0	0
82	0	0.	0.00	0	0
SUBTOTAL	0	0.	0.00	0	0
90	0	0.	0.00	0	0
100	54	.287091138E+04	36.00	0	163
110	7,077	.891823692E+07	26.00	937	13,217
120	5,725	.137740528E+07	15.00	3,224	8,226
130	25,227	.679770652E+08	8.00	6,215	44,240
910	0	0.	0.00	0	0
920	0	0.	0.00	0	0
930	0	0.	0.00	0	0
940	38,083	.782755783E+08	10.55	18,610	57,556
TOTAL	38,083	.782755783E+08	10.55	18,610	57,556

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	26,024	50,142	16,661,442	40,092,336
90.000 PERCENT	22,193	53,973	12,849,475	43,904,304
95.000 PERCENT	18,610	57,556	9,215,399	47,538,380

Table D-20.--_Coryphaenoides_ spp. (Cont.). Section d, population number estimates by sex and centimeter interval for the overall survey area.

LENGTH (MM)	MALES	FEMALES	UNSEXED	TOTAL	PROPORTION	CUMULATIVE PROPORTION
30	0	0	100,336	100,336	0.0035	0.0035
50	0	0	334,454	334,454	0.0118	0.0153
60	0	0	500,475	500,475	0.0176	0.0330
70	41,720	0	1,214,087	1,255,808	0.0443	0.0772
80	417,204	0	2,068,890	2,486,094	0.0876	0.1648
90	1,043,011	41,720	3,072,970	4,157,701	0.1465	0.3113
100	1,293,333	375,484	5,883,289	7,552,106	0.2661	0.5775
110	500,645	667,527	5,113,408	6,281,580	0.2214	0.7988
120	83,441	625,806	1,670,827	2,380,074	0.0839	0.8827
130	0	625,806	835,518	1,461,325	0.0515	0.9342
140	0	83,441	325,349	408,790	0.0144	0.9486
150	0	0	113,808	113,808	0.0040	0.9526
160	0	0	66,931	66,931	0.0024	0.9550
TOTAL	3,379,355	2,419,785	21,300,343	27,099,483		

Table D-21.--Total shrimps (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	85	.250522427E+03	57.00	53	116
20	1,020	.999943805E+06	30.00	0	3,062
31	83	.365089837E+03	67.00	45	121
32	0	0.	0.00	0	0
SUBTOTAL	83	.365089837E+03	67.00	45	121
41	573	.209146997E+06	43.00	0	1,496
42	407	.147616143E+06	30.00	0	1,192
43	98	.148369212E+04	20.00	18	179
SUBTOTAL	1,078	.358246832E+06	73.60	0	2,272
50	1,010	.172789423E+06	25.00	154	1,867
61	4,375	.125442299E+07	58.00	2,132	6,617
62	142	.126554721E+05	5.00	0	431
SUBTOTAL	4,517	.126707846E+07	59.11	2,264	6,769
70	1,187	.231194141E+06	21.00	187	2,187
81	365	.168207229E+05	10.00	76	654
82	93	.109297053E+04	13.00	21	164
SUBTOTAL	457	.179136934E+05	11.31	163	752
90	107	.438492039E+04	6.00	0	269
100	1,322	.716147618E+05	36.00	779	1,865
110	479	.304235082E+05	26.00	121	838
120	12	.258458237E+02	15.00	1	23
130	65	.125973378E+04	8.00	0	147
910	1,751	.253492755E+06	24.94	714	2,788
920	7,793	.279867413E+07	123.48	4,480	11,105
930	8,971	.284301989E+07	124.37	5,632	12,309
940	1,879	.103323850E+06	59.89	1,236	2,522
TOTAL	11,423	.315549073E+07	150.44	7,905	14,940

CONFIDENCE LIMITS	TOTAL BIOMASS MT LOWER	UPPER	TOTAL POPULATION LOWER	UPPER
80.000 PERCENT	9,133	13,712	0	0
90.000 PERCENT	8,477	14,368	0	0
95.000 PERCENT	7,905	14,940	0	0

Table D-22. --Squids. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	1	0	0	0.00	.104121E-05	0.00	0.
20	31	0	0	0	0.00	0.	0.00	0.
31	68	0	0	0	0.00	0.	0.00	0.
32	7	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	75	0	0	0	0.00	0.	0.00	0.
41	44	0	0	0	0.00	0.	0.00	0.
42	31	1	1	0	0.00	.857510E-07	0.01	.416784E-04
43	21	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	96	1	1	0	0.00	.425252E-08	0.00	.206689E-05
50	26	0	0	0	0.00	0.	0.00	0.
61	59	3	3	0	0.00	.686706E-06	0.03	.333766E-03
62	6	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	65	3	3	0	0.00	.596512E-06	0.03	.289928E-03
70	22	0	0	0	0.00	0.	0.00	0.
81	11	0	0	0	0.00	0.	0.00	0.
82	14	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	25	0	0	0	0.00	0.	0.00	0.
90	7	0	0	0	0.00	0.	0.00	0.
100	37	35	30	0	1.85	.146513E+00	0.00	0.
110	27	23	21	0	1.69	.221303E+00	0.00	0.
120	16	16	16	0	0.74	.559039E-01	2.25	.377151E+00
130	9	9	9	0	0.63	.177065E-01	2.45	.139862E+00
910	54	0	0	0	0.00	0.	0.00	0.
920	351	5	4	0	0.00	.544778E-07	0.01	.121862E-04
930	361	5	4	0	0.00	.399536E-07	0.00	.893725E-05
940	89	83	76	0	1.39	.385242E-01	0.85	.197219E-01
TOTAL	494	88	80	0	0.05	.440910E-04	0.03	.292565E-04

273

Table D-22.--Squids (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG POPULATION	VARIANCE POPULATION		EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	UPPER
10	0.000	0	0.	0.00	0	0
20	0.000	0	0.	0.00	0	0
31	0.000	0	0.	0.00	0	0
32	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
41	0.000	0	0.	0.00	0	0
42	0.045	15,501	.240289292E+09	30.00	0	47,155
43	0.000	0	0.	0.00	0	0
SUBTOTAL	0.045	15,501	.240289292E+09	30.00	0	47,155
50	0.000	0	0.	0.00	0	0
61	0.045	245,023	.259254677E+11	58.00	0	567,389
62	0.000	0	0.	0.00	0	0
SUBTOTAL	0.045	245,023	.259254677E+11	58.00	0	567,389
70	0.000	0	0.	0.00	0	0
81	0.000	0	0.	0.00	0	0
82	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
90	0.000	0	0.	0.00	0	0
100	0.274	5,254,728	0.	0.00	0	0
110	0.205	4,644,367	0.	0.00	0	0
120	0.327	989,610	.727566210E+11	15.00	414,806	1,564,414
130	0.259	809,928	.153320046E+11	8.00	524,394	1,095,463
910	0.000	0	0.	0.00	0	0
920	0.076	260,524	.261657570E+11	59.07	0	584,211
930	0.076	260,524	.261657570E+11	59.07	0	584,211
940	0.250	11,698,633	.880886256E+11	20.30	11,079,514	12,317,753
TOTAL	0.247	11,959,158	.114254383E+12	33.14	11,271,060	12,647,255

Table D-23.--Octopi (Cont.). Section b, biomass estimates by stratum.

STRATUM	BIOMASS MT	VARIANCE BIOMASS	EFF. DEG. FREEDOM	BIOMASS-95% CONFIDENCE LIMITS LOWER	UPPER
10	0	0.	0.00	0	0
20	0	0.	0.00	0	0
31	3,133	.204623403E+07	67.00	275	5,990
32	0	0.	0.00	0	0
SUBTOTAL	3,133	.204623403E+07	67.00	275	5,990
41	0	0.	0.00	0	0
42	0	0.	0.00	0	0
43	19	.353950284E+03	20.00	0	58
SUBTOTAL	19	.353950284E+03	20.00	0	58
50	2,544	.417275564E+07	25.00	0	6,752
61	2,295	.130599022E+07	58.00	7	4,583
62	0	0.	0.00	0	0
SUBTOTAL	2,295	.130599022E+07	58.00	7	4,583
70	0	0.	0.00	0	0
81	88	.567353171E+04	10.00	0	256
82	19	.368251062E+03	13.00	0	61
SUBTOTAL	107	.604178277E+04	11.30	0	278
90	29	.853396789E+03	6.00	0	101
100	7	.101626375E+02	36.00	1	13
110	38	.507983204E+03	26.00	0	85
120	5	.778121060E+01	15.00	0	10
130	0	0.	0.00	0	0
910	136	.689517956E+04	14.19	0	314
920	7,990	.752533385E+07	71.83	2,514	13,465
930	8,126	.753222903E+07	71.96	2,648	13,604
940	50	.525927052E+03	27.85	3	97
TOTAL	8,176	.753275495E+07	71.97	2,697	13,654

CONFIDENCE LIMITS	TOTAL BIOMASS MT		TOTAL POPULATION	
	LOWER	UPPER	LOWER	UPPER
80.000 PERCENT	4,622	11,729	2,061,373	4,363,023
90.000 PERCENT	3,597	12,755	1,725,044	4,699,352
95.000 PERCENT	2,697	13,654	1,427,676	4,996,720

Table D-24 --Saffron cod. Section a, CPUE estimates by subarea.

STRATUM	TOTAL HAULS	HAULS WITH CATCH	HAULS WITH NUMS.	HAULS WITH L-F	MEAN CPUE KG/HA	VARIANCE MEAN CPUE KG/HA	MEAN CPUE NO/HA	VARIANCE MEAN CPUE NO/HA
10	58	7	7	2	0.21	.344251E-01	6.98	.408623E+02
20	31	23	23	5	0.52	.152873E-01	6.72	.346946E+01
31	68	0	0	0	0.00	0.	0.00	0.
32	7	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	75	0	0	0	0.00	0.	0.00	0.
41	44	0	0	0	0.00	0.	0.00	0.
42	31	0	0	0	0.00	0.	0.00	0.
43	21	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	96	0	0	0	0.00	0.	0.00	0.
50	26	0	0	0	0.00	0.	0.00	0.
61	59	0	0	0	0.00	0.	0.00	0.
62	6	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	65	0	0	0	0.00	0.	0.00	0.
70	22	12	12	8	42.76	.146200E+04	381.05	.938047E+05
81	11	0	0	0	0.00	0.	0.00	0.
82	14	0	0	0	0.00	0.	0.00	0.
SUBTOTAL	25	0	0	0	0.00	0.	0.00	0.
90	7	0	0	0	0.00	0.	0.00	0.
100	37	0	0	0	0.00	0.	0.00	0.
110	27	0	0	0	0.00	0.	0.00	0.
120	16	0	0	0	0.00	0.	0.00	0.
130	9	0	0	0	0.00	0.	0.00	0.
910	54	12	12	8	22.18	.393298E+03	197.64	.252348E+05
920	351	30	30	7	0.08	.109206E-02	1.77	.118121E+01
930	405	42	42	15	5.22	.212704E+02	47.32	.136540E+04
940	89	0	0	0	0.00	0.	0.00	0.
TOTAL	494	42	42	15	5.04	.198560E+02	45.72	.127461E+04

Table D-24.--Saffron cod (Cont.). Section c, population number estimates by stratum.

STRATUM	MEAN WEIGHT KG POPULATION	VARIANCE POPULATION		EFFECTIVE DEGREES FREEDOM	POPULATION 95% CONFIDENCE LIMITS LOWER	UPPER
10	0.031	54,343,157	.247785704E+16	57.00	0	154,056,113
20	0.077	27,589,172	.583986580E+14	30.00	11,984,409	43,193,935
31	0.000	0	0.	0.00	0	0
32	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
41	0.000	0	0.	0.00	0	0
42	0.000	0	0.	0.00	0	0
43	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
50	0.000	0	0.	0.00	0	0
61	0.000	0	0.	0.00	0	0
62	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
70	0.112	2,775,082,173	.497516930E+19	21.00	0	7,414,540,381
81	0.000	0	0.	0.00	0	0
82	0.000	0	0.	0.00	0	0
SUBTOTAL	0.000	0	0.	0.00	0	0
90	0.000	0	0.	0.00	0	0
100	0.000	0	0.	0.00	0	0
110	0.000	0	0.	0.00	0	0
120	0.000	0	0.	0.00	0	0
130	0.000	0	0.	0.00	0	0
910	0.112	2,775,082,173	.497516930E+19	21.00	0	7,414,540,381
920	0.046	81,932,328	.253625570E+16	59.66	0	182,654,832
930	0.110	2,857,014,501	.497770556E+19	21.02	0	7,497,655,117
940	0.000	0	0.	0.00	0	0
TOTAL	0.110	2,857,014,501	.497770556E+19	21.02	0	7,497,655,117

APPENDIX E

Age-Length Keys for Principal Species of Fish

Appendix E presents age-length keys for principal species of fish by sex and sexes combined. Lengths are expressed in millimeters. Asterisks indicate ages affected by the linear interpolation used to assign age distribution to length classes (in the age-length key) not represented by collection age data.

List of Tables

Male Key   Walleye Pollock

LEN GTH	AVG AGE	STD. DEV.	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
350	3.00	0.00	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
370	4.50	0.58	4	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
380	4.50	0.71	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
390	5.00	1.73	3	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	5.67	1.03	6	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
410	6.33	0.58	3	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420	6.17	0.98	6	0	0	0	0	0	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
430	6.18	0.98	11	0	0	0	0	0	3	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
440	6.60	0.97	10	0	0	0	0	0	2	1	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
450	6.13	0.99	8	0	0	0	0	0	3	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
460	7.33	1.12	9	0	0	0	0	0	0	2	4	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
470	7.60	1.24	15	0	0	0	0	0	0	2	7	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
480	7.50	1.03	16	0	0	0	0	0	0	3	5	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
490	8.38	1.33	13	0	0	0	0	0	0	0	5	1	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
500	8.62	1.71	13	0	0	0	0	0	0	0	5	0	6	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
510	8.57	1.60	14	0	0	0	0	0	0	1	4	1	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
520	9.87	1.77	15	0	0	0	0	0	0	0	2	0	5	3	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
530	9.08	1.12	13	0	0	0	0	0	0	0	1	2	7	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
540	10.00	1.81	12	0	0	0	0	0	0	0	0	2	5	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
550	10.38	1.39	13	0	0	0	0	0	0	0	0	4	4	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
560	10.11	2.03	9	0	0	0	0	0	0	0	1	0	4	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
570	10.13	1.36	8	0	0	0	0	0	0	0	0	1	2	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
580	10.60	1.90	10	0	0	0	0	0	0	0	1	0	2	0	5	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
590	11.55	1.04	11	0	0	0	0	0	0	0	0	0	0	1	6	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
600	11.00	1.65	12	0	0	0	0	0	0	0	0	0	3	0	6	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
610	11.13	0.99	8	0	0	0	0	0	0	0	0	0	0	2	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
620	12.56	1.33	9	0	0	0	0	0	0	0	0	0	0	0	3	0	5	0	1	0	0	0	0	0	0	0	0	0	0	0
630	12.00	2.62	8	0	0	0	0	0	0	0	0	0	1	2	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
640	11.88	0.99	8	0	0	0	0	0	0	0	0	0	0	0	4	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0

```
* 360  3.67  0.93       0.0      0.0      1.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
                   4.5      0.0      2.5      1.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
```

Female Key Walleye Pollock

LEN GTH	AVG AGE	STD. DEV.	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
130	1.00	0.00	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	1.50	0.71	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	1.33	0.58	3	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	1.00	0.00	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	2.00	0.00	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	2.00	0.00	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	2.00	0.00	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	2.00	0.00	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	2.25	0.50	4	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	2.20	0.45	5	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	2.00	0.00	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	2.00	0.00	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0.	0	0	0	0	0	0	0	0	0	0	0	0	0
280	2.17	0.41	6	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	2.00	0.00	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
300	2.00	0.00	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
310	3.00	0.00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	3.00	0.00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
* 330  3.33  0.82        0.0     0.0     0.5     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
                   1.5       0.0     1.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
```

LEN GTH	AVG AGE	STD. DEV.	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
340	3.50	0.71	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	3.67	0.58	3	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
360	6.00	0.00	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
* 370  5.50  0.00        0.0     0.0     0.0     0.5     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
                   1.0       0.0     0.0     0.5     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
```

LEN GTH	AVG AGE	STD. DEV.	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
380	5.00	0.00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
390	5.00	0.00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	5.00	0.00	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
410	5.33	0.58	3	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420	5.50	1.22	6	0	0	0	0	0	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table E.-1.--(cont.).

Sexes Combined Key   Walleye Pollock

LEN GTH	AVG AGE	STD. DEV.	FREQ- UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
90	1.00	0.00	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	1.00	0.00	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	1.00	0.00	9	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	1.00	0.00	7	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	1.00	0.00	13	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	1.10	0.32	10	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	1.09	0.30	11	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	1.00	0.00	7	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	1.17	0.41	6	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	1.00	0.00	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190	1.33	0.58	3	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	1.75	0.50	4	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	2.00	0.00	9	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	2.11	0.33	9	0	0	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	2.00	0.00	9	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	2.20	0.42	10	0	0	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	2.09	0.30	11	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	2.00	0.00	13	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	2.33	0.65	12	0	0	9	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	2.08	0.29	12	0	0	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	2.00	0.00	9	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
300	2.00	0.00	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
310	2.50	0.71	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	2.50	0.71	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	3.00	1.00	3	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340	3.25	0.50	4	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	3.25	0.46	8	0	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
360	6.00	0.00	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
370	4.50	0.58	4	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
380	4.67	0.58	3	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
390	5.00	1.41	4	0	0	0	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	5.44	0.88	9	0	0	0	0	0	7	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
410	5.83	0.75	6	0	0	0	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sexes Combined Key   Walleye Pollock

LEN GTH	AVG AGE	STD. DEV.	FREQ- UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
750	13.00	0.00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
760	15.00	0.00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
770	14.00	0.00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
840	13.00	0.00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL 7.45 4.13

		0.0	101.0	11.0	33.0	39.0	33.0	17.0	10.0	7.5	0.0	2.0	0.0	0.0	0.0
	767.0	68.0	19.0	43.0	103.0	112.0	94.0	60.5	8.0	2.0	3.0	1.0	0.0	0.0	

Table E.-2.--(cont.).

Male Key Pacific cod

LENGTH	AVG AGE	STD. DEV.	FREQUENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
480	4.00	0.00	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
490	4.25	0.50	4	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
500	4.00	0.00	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
510	4.25	0.50	4	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
520	4.50	0.71	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
530	4.20	0.45	5	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
540	4.71	0.49	7	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550	4.50	0.55	6	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
560	5.17	0.41	6	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
570	5.17	0.41	6	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
580	5.00	0.00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
590	5.00	0.00	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
600	5.00	0.00	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
610	5.00	0.00	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
620	5.57	0.53	7	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
630	6.00	0.00	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
640	6.00	0.00	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
* 650	5.78	0.47	4.5	0.0	0.0	0.0	0.0	0.0	1.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
660	5.67	0.52	6	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
670	6.00	0.00	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
680	6.25	0.50	4	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
690	6.00	0.00	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
700	6.00	0.00	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
710	6.50	0.71	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
720	7.00	0.00	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
730	6.50	0.71	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
740	7.00	0.00	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
750	7.00	0.00	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
760	7.00	0.00	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
770	7.67	0.58	3	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table E.-2.--(cont.).

Female Key   Pacific cod

LEN GTH	AVG AGE	STD. DEV.	FREQ- UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
130	1.00	0.00	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	1.00	0.00	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	1.00	0.00	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	1.00	0.00	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	1.00	0.00	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	1.00	0.00	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190	1.00	0.00	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	2.00	0.00	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	1.67	0.52	6	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	1.00	0.00	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	1.40	0.55	5	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	1.67	0.58	3	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	1.75	0.50	4	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	2.00	0.53	8	0	1	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	2.00	0.71	5	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	2.14	0.38	7	0	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	2.17	0.39	12	0	0	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
300	2.33	0.50	9	0	0	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
310	2.50	0.52	12	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	2.60	0.52	10	0	0	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	2.44	0.53	9	0	0	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340	2.50	0.53	10	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	2.63	0.52	8	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
360	2.83	0.41	6	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
370	2.89	0.33	9	0	0	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
380	2.91	0.30	11	0	0	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
390	3.00	0.00	8	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	3.10	0.32	10	0	0	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
410	3.17	0.41	6	0	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420	3.40	0.55	5	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
430	3.67	0.58	3	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
440	3.00	0.00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
450	4.00	0.00	6	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table E.-2.--(cont.).

Female Key   Pacific cod

LEN GTH	AVG AGE	STD. DEV.	FREQ- UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
760	7.00	0.00	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
770	7.00	0.00	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
780	7.00	0.00	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* 790 7.00 0.00 FREQUENCY 1.5
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
1.5 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

LEN GTH	AVG AGE	STD. DEV.	FREQ- UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
800	7.00	0.00	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
810	8.67	1.15	3	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
820	9.50	2.12	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
830	10.00	2.00	3	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
840	8.67	1.15	3	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
850	10.00	1.41	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* 860 9.29 1.54 FREQUENCY 2.3333
0.0 0.0 0.0 0.0 .6667 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
2.3333 0.0 0.0 0.0 0.0 1.0 .6667 0.0 0.0 0.0 0.0 0.0 0.0 0.0

* 870 8.75 1.22 FREQUENCY 2.6667
0.0 0.0 0.0 0.0 1.333 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
2.6667 0.0 0.0 0.0 0.0 1.0 .3333 0.0 0.0 0.0 0.0 0.0 0.0 0.0

LEN GTH	AVG AGE	STD. DEV.	FREQ- UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
880	8.33	0.58	3	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
890	8.00	0.00	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
900	10.67	1.53	3	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* 910 10.75 1.54 FREQUENCY 2.0
0.0 0.0 0.0 0.0 0.0 0.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
2.0 0.0 0.0 0.0 0.0 0.5 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

LEN GTH	AVG AGE	STD. DEV.	FREQ- UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
920	11.00	0.00	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
930	10.00	0.00	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
940	10.00	0.00	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* 950 10.75 0.00 FREQUENCY 1.0
0.0 0.0 0.0 0.0 0.0 0.75 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
1.0 0.0 0.0 0.0 0.0 0.0 0.25 0.0 0.0 0.0 0.0 0.0 0.0 0.0

Table E.-2.--(cont.).

Sexes Combined Key   Pacific cod

LEN GTH	AVG AGE	STD. DEV.	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
130	1.00	0.00	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	1.00	0.00	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	1.00	0.00	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	1.00	0.00	6	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	1.00	0.00	7	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	1.00	0.00	6	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190	1.00	0.00	9	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	1.43	0.53	7	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	1.60	0.52	10	0	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	1.38	0.52	8	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	1.29	0.49	7	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	1.57	0.53	7	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	1.88	0.35	8	0	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	2.00	0.41	13	0	1	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	2.00	0.43	12	0	1	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	2.07	0.47	14	0	1	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	2.15	0.49	20	0	1	15	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
300	2.32	0.48	19	0	0	13	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
310	2.41	0.50	22	0	0	13	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	2.50	0.51	20	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	2.39	0.50	18	0	0	11	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340	2.58	0.51	19	0	0	8	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	2.69	0.48	16	0	0	5	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
360	2.77	0.44	13	0	0	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
370	2.94	0.24	17	0	0	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
380	3.00	0.32	21	0	0	1	19	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
390	3.00	0.00	16	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	3.06	0.25	16	0	0	0	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
410	3.15	0.38	13	0	0	0	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420	3.22	0.44	9	0	0	0	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
430	3.50	0.53	8	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
440	3.50	0.58	4	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.	0
450	3.88	0.35	8	0	0	0	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table E.-2.--(cont.).

Sexes Combined Key   Pacific cod

LEN GTH	AVG AGE	STD DEV	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
790	7.00	0.00	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
800	7.67	0.58	3	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
810	8.50	1.00	4	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
820	8.60	1.34	5	0	0	0	0	0	0	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
830	9.20	1.79	5	0	0	0	0	0	0	0	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
840	9.00	1.15	4	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
850	10.00	1.41	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
* 860	9.38	1.41	2.6667	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.6667	1.0	.3333	.6667	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* 870	9.00	1.20	3.3333	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.333	1.0	.6667	.3333	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
880	8.75	0.96	4	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
890	8.00	0.00	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
900	10.67	1.53	3	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
* 910	10.75	1.54	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
920	11.00	0.00	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
930	10.00	0.00	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
940	10.00	0.00	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
* 950	10.75	0.00	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.75	0.0	0.0	0.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* 960	11.50	0.00	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table E.-3.--Age-length keys for yellowfin sole from age data collected on the continental shelf during the 1991 bottom trawl survey.

Male Key   Yellowfin Sole

LEN GTH	AVG AGE	STD. DEV.	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
110	4.00	0.00	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	4.33	0.58	3	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	4.33	0.58	3	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	4.50	0.58	4	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	4.71	0.49	7	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	5.00	0.00	7	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	5.67	1.03	6	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	6.45	1.37	11	0	0	0	0	1	1	5	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190	6.67	1.23	12	0	0	0	0	0	3	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	7.08	1.19	13	0	0	0	0	0	2	2	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	8.00	1.51	15	0	0	0	0	0	1	1	3	6	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	7.85	0.75	20	0	0	0	0	0	0	0	6	12	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	8.81	1.47	21	0	0	0	0	0	0	0	3	10	0	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	8.95	1.36	22	0	0	0	0	0	0	0	1	12	0	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	9.83	1.17	24	0	0	0	0	0	0	0	1	3	1	15	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	9.45	1.43	20	0	0	0	0	0	0	0	0	8	1	8	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	9.57	0.95	23	0	0	0	0	0	0	0	0	5	2	14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	11.45	3.90	22	0	0	0	0	0	0	0	0	3	0	14	0	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0
290	11.37	3.06	19	0	0	0	0	0	0	0	0	1	0	11	2	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0
300	12.35	3.41	17	0	0	0	0	0	0	0	0	0	0	5	6	2	1	0	0	0	1	1	0	0	0	1	0	0	0	0
310	15.21	5.27	19	0	0	0	0	0	0	0	0	0	0	2	4	2	2	1	2	1	0	0	0	0	3	0	0	1	0	1
320	15.14	3.92	14	0	0	0	0	0	0	0	0	0	0	1	1	4	0	1	1	0	3	0	0	1	1	1	0	0	0	0
330	18.69	4.00	16	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	2	1	0	0	4	4	0	0	1	1	0
340	15.38	6.02	8	0	0	0	0	0	0	0	0	0	0	2	1	0	1	1	0	0	1	0	0	0	1	0	0	0	0	1
350	20.22	3.19	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	3	1	1	0	2	0	0
360	18.25	2.87	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0
370	19.25	3.59	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0
380	21.25	0.96	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0
TOTAL	10.65	4.82	349	0	0	0	0	11	27	10	21	75	5	88	23	18	5	6	4	7	9	1	1	10	12	8	0	5	1	2

303

Table E.-3.--(cont.).

Sexes Combined Key   Yellowfin Sole

LEN GTH	AVG AGE	STD. DEV.	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
100	4.00	0.00	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	4.00	0.00	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	4.00	0.63	6	0	0	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	4.25	0.50	4	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	4.43	0.53	7	0	0	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	4.92	0.79	12	0	0	0	0	4	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	5.08	0.29	12	0	0	0	0	0	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	5.79	0.97	14	0	0	0	0	0	8	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	6.50	1.36	20	0	0	0	0	1	4	7	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190	6.91	1.11	22	0	0	0	0	0	4	2	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	7.15	1.22	26	0	0	0	0	0	4	2	8	11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	7.90	1.45	31	0	0	0	0	0	2	2	8	11	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	8.06	1.00	35	0	0	0	0	0	0	0	11	16	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	8.63	1.51	41	0	0	0	0	0	1	1	4	20	1	10	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	8.61	1.18	41	0	0	0	0	0	0	0	3	25	2	8	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	9.48	1.17	44	0	0	0	0	0	0	0	2	10	3	25	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	9.33	1.27	43	0	0	0	0	0	0	0	1	16	1	21	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	9.43	1.11	44	0	0	0	0	0	0	0	1	12	3	24	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	10.90	2.96	41	0	0	0	0	0	0	0	0	4	0	28	1	4	0	0	0	1	1	0	0	0	1	1	0	0	0	0
290	11.28	2.95	40	0	0	0	0	0	0	0	0	2	0	23	6	3	1	1	1	0	0	1	0	0	1	1	0	0	0	0
300	11.82	2.88	38	0	0	0	0	0	0	0	0	1	2	12	8	7	2	1	0	1	1	2	0	0	0	1	0	0	0	0
310	13.53	4.43	40	0	0	0	0	0	0	0	0	1	0	8	7	9	2	2	3	1	1	0	0	0	4	0	0	1	0	1
320	13.97	3.66	38	0	0	0	0	0	0	0	0	0	0	5	6	10	2	2	1	1	3	1	2	3	1	1	0	0	0	0
330	16.72	4.30	39	0	0	0	0	0	0	0	0	0	0	3	1	7	0	3	1	4	3	2	1	4	6	1	1	1	1	0
340	15.79	4.53	28	0	0	0	0	0	0	0	0	0	0	3	1	5	1	3	2	1	5	0	1	2	1	0	0	2	0	1
350	17.47	4.52	32	0	0	0	0	0	0	0	0	0	0	4	0	2	2	2	0	2	2	3	2	4	3	2	0	4	0	0
360	17.73	3.78	26	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	2	4	1	0	2	2	3	3	1	0	0	1
370	18.00	3.89	25	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	1	1	4	2	2	3	3	1	1	1	1	0
380	19.65	2.62	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4	0	2	2	3	0	2	0	0
390	22.20	4.02	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	2
400	20.55	4.27	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	3	1	2	0	0	0	1
410	22.00	2.45	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	1	0
420	17.00	1.73	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0
430	22.00	0.00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
TOTAL	11.37	5.02	794	0	0	0	1	20	44	19	51	145	16	187	40	62	12	18	12	19	24	20	10	27	26	17	4	11	3	6

305

Table E.-4.--(cont.).

Female Key   Rock sole

LEN GTH	AVG AGE	STD. DEV.	FREQ-UENCY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
100	3.00	1.41	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	3.50	0.71	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	3.88	0.35	8	0	0	0	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	3.92	0.29	12	0	0	0	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	3.90	0.32	10	0	0	0	1	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	4.07	0.27	14	0	0	0	0	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	4.31	0.48	13	0	0	0	0	9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	4.86	0.77	14	0	0	0	0	5	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	4.89	0.33	9	0	0	0	0	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190	5.17	0.72	12	0	0	0	0	2	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	5.36	0.67	11	0	0	0	0	1	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	5.73	0.79	11	0	0	0	0	0	5	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	5.58	0.67	12	0	0	0	0	0	6	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	5.82	0.75	11	0	0	0	0	0	4	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	6.30	0.67	10	0	0	0	0	0	1	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	6.78	0.97	9	0	0	0	0	0	0	4	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	6.70	0.82	10	0	0	0	0	0	0	5	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	7.73	0.90	11	0	0	0	0	0	0	1	3	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	7.73	1.10	11	0	0	0	0	0	0	1	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	7.55	0.82	11	0	0	0	0	0	0	1	4	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
300	8.18	1.60	11	0	0	0	0	0	0	1	3	3	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
310	8.46	0.66	13	0	0	0	0	0	0	0	0	8	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	8.83	0.83	12	0	0	0	0	0	0	0	0	5	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	8.69	1.11	13	0	0	0	0	0	0	0	0	7	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340	9.38	0.96	13	0	0	0	0	0	0	0	0	3	3	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	10.10	0.99	10	0	0	0	0	0	0	0	0	0	4	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
360	10.46	1.33	13	0	0	0	0	0	0	0	0	1	2	4	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
370	11.60	1.17	10	0	0	0	0	0	0	0	0	0	0	2	2	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0
380	13.38	3.89	8	0	0	0	0	0	0	0	0	0	1	0	2	0	2	2	0	0	0	0	0	0	1	0	0	0	0	0
390	12.50	2.53	14	0	0	0	0	0	0	0	0	0	1	2	2	3	2	2	1	0	0	0	1	0	0	0	0	0	0	0
400	13.08	2.63	13	0	0	0	0	0	0	0	0	0	0	1	2	5	1	0	3	0	0	0	0	1	0	0	0	0	0	0
410	14.63	3.78	8	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	1	0	1	0	0	0	1	0	0	0	0
420	14.00	1.73	11	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	5	1	0	0	0	0	0	0	0	0	0	0
430	17.43	2.44	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	2	0	0	0	0	0
440	16.50	3.27	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	0	0	0	0
450	26.00	5.66	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
460	18.33	4.62	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
470	23.00	0.00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
TOTAL	8.30	4.14	371	0	0	1	4	60	46	44	30	43	32	22	17	22	10	8	10	8	0	1	1	2	5	3	1	0	0	1

APPENDIX F

Population Esitmates by Age for Principal Fish Species

     Appendix F presents population estimates and mean lengths at age by sex and for sexes combined. Population estimates listed as "below minimum key length", "above maximum key length" and "between key lengths" refer to fish lengths that lack age observations. Asterisks indicate ages affected by the linear interpolation used to assign age distributions to length classes (in the age-length key) not represented by collected age data.

List of Tables

Table F.-1.--(cont.).

Females   Walleye Pollock

Age Class	Number	Proportion	Cumulative Number	Cumulative Proportion	Mean Length	Std. Dev. of length
Below Minimum Key Length	8,957,934	0.0030	8,957,934	0.0030	114.95	6.45
1	13,850,020	0.0046	22,807,955	0.0076	147.04	13.26
* 2	301,884,451	0.1006	324,692,405	0.1082	260.70	31.16
3	126,690,682	0.0422	451,383,087	0.1504	290.92	24.66
4	20,554,131	0.0068	471,937,218	0.1572	408.71	53.41
* 5	267,492,979	0.0891	739,430,197	0.2464	427.34	26.85
* 6	192,491,233	0.0641	931,921,430	0.3105	456.27	37.97
7	694,084,057	0.2313	1,626,005,487	0.5418	495.49	34.24
8	245,414,004	0.0818	1,871,419,491	0.6236	503.04	36.91
* 9	541,408,335	0.1804	2,412,827,826	0.8039	533.03	42.05
10	112,039,532	0.0373	2,524,867,358	0.8413	535.46	45.30
11	196,491,199	0.0655	2,721,358,557	0.9068	568.47	54.06
12	44,295,156	0.0148	2,765,653,713	0.9215	578.60	67.25
13	161,202,073	0.0537	2,926,855,786	0.9752	608.46	47.96
* 14	29,486,040	0.0098	2,956,341,826	0.9850	665.39	53.23
15	8,065,788	0.0027	2,964,407,615	0.9877	654.76	39.72
16	17,953,229	0.0060	2,982,360,844	0.9937	691.47	45.88
17	3,959,889	0.0013	2,986,320,733	0.9950	644.70	4.99
19	6,809,703	0.0023	2,993,130,436	0.9973	663.59	53.78
20	2,830,135	0.0009	2,995,960,571	0.9982	703.78	4.85
21	1,070,682	0.0004	2,997,031,253	0.9986	710.00	0.00
Above Maximum Key Length	4,190,907	0.0014	3,001,222,160	1.0000	793.32	21.26
Total	3,001,222,160	1.0000	3,001,222,160	1.0000	476.80	111.09

311

Table F.-1.--(cont.).

Males, Females, and Unsexed   Walleye Pollock

Age Class	Number	Proportion	Cumulative Number	Cumulative Proportion	Mean Length	Std. Dev. of length
Below Minimum Key Length	19,322,398	0.0021	19,322,398	0.0021	98.64	17.06
* 1	2,520,810,635	0.2763	2,540,133,033	0.2784	138.69	22.26
* 2	929,314,513	0.1018	3,469,447,546	0.3802	234.99	54.30
* 3	240,072,318	0.0263	3,709,519,865	0.4066	293.85	30.15
* 4	71,691,121	0.0079	3,781,210,986	0.4144	387.47	42.51
* 5	479,304,502	0.0525	4,260,515,488	0.4669	428.05	27.13
* 6	446,948,391	0.0490	4,707,463,878	0.5159	453.17	31.64
7	1,461,332,344	0.1602	6,168,796,223	0.6761	482.42	35.13
8	549,295,345	0.0602	6,718,091,568	0.7363	492.72	33.01
* 9	1,189,277,739	0.1303	7,907,369,307	0.8666	520.85	37.44
10	311,249,985	0.0341	8,218,619,292	0.9007	527.65	38.99
11	435,289,787	0.0477	8,653,909,079	0.9484	562.76	50.62
12	89,535,512	0.0098	8,743,444,591	0.9583	578.30	55.37
13	273,094,090	0.0299	9,016,538,681	0.9882	589.40	54.67
* 14	46,734,722	0.0051	9,063,273,403	0.9933	625.29	72.02
15	18,552,654	0.0020	9,081,826,057	0.9953	658.05	46.29
16	18,869,184	0.0021	9,100,695,241	0.9974	688.49	46.66
17	3,959,889	0.0004	9,104,655,130	0.9978	644.70	4.99
19	7,249,913	0.0008	9,111,905,043	0.9986	666.40	53.29
20	2,830,135	0.0003	9,114,735,178	0.9989	703.78	4.85
21	1,070,682	0.0001	9,115,805,860	0.9991	710.00	0.00
Between Key Lengths	4,375,185	0.0005	9,120,181,045	0.9995	732.38	18.12
Above Maximum Key Length	4,190,907	0.0005	9,124,371,952	1.0000	793.32	21.26
Total	9,124,371,952	1.0000	9,124,371,952	1.0000	368.68	173.77

Table F.-2.--(cont.).

Females   Pacific Cod

Age Class	Number	Proportion	Cumulative Number	Cumulative Proportion	Mean Length	Std. Dev. of length
Below Minimum Key Length	651,413	0.0027	651,413	0.0027	116.93	4.61
1	25,529,355	0.1053	26,180,768	0.1080	188.96	37.28
2	68,735,948	0.2836	94,916,716	0.3917	295.35	40.70
3	72,307,376	0.2984	167,224,092	0.6901	353.27	41.69
4	23,594,311	0.0974	190,818,403	0.7874	482.91	38.62
5	19,915,697	0.0822	210,734,100	0.8696	574.58	36.14
* 6	10,716,658	0.0442	221,450,758	0.9138	673.48	43.45
* 7	10,566,719	0.0436	232,017,478	0.9574	740.92	39.37
* 8	3,600,693	0.0149	235,618,171	0.9723	837.04	26.85
* 9	1,076,875	0.0044	236,695,045	0.9767	871.25	18.00
* 10	1,998,335	0.0082	238,693,381	0.9850	869.84	61.24
* 11	1,855,706	0.0077	240,549,086	0.9926	884.43	63.32
* 12	1,014,992	0.0042	241,564,079	0.9968	907.65	88.75
* 13	643,916	0.0027	242,207,995	0.9995	970.35	13.17
Above Maximum Key Length	123,417	0.0005	242,331,411	1.0000	1057.62	4.26
Total	242,331,411	1.0000	242,331,411	1.0000	402.91	177.37

Table F.-2.--(cont.).

Males, Females, and Unsexed   Pacific Cod

Age Class	Number	Proportion	Cumulative Number	Cumulative Proportion	Mean Length	Std. Dev. of length
Below Minimum Key Length	21,143,161	0.0403	21,143,161	0.0403	118.08	12.26
1	86,196,586	0.1643	107,339,747	0.2046	178.00	36.45
2	134,497,534	0.2564	241,837,281	0.4610	294.43	40.11
3	138,474,598	0.2639	380,311,879	0.7249	356.53	40.48
4	43,800,748	0.0835	424,112,627	0.8084	483.45	39.50
* 5	37,259,347	0.0710	461,371,974	0.8794	573.46	37.82
* 6	28,703,567	0.0547	490,075,541	0.9341	667.97	39.37
* 7	18,809,645	0.0359	508,885,186	0.9700	739.04	34.40
* 8	6,808,182	0.0130	515,693,368	0.9830	822.74	27.77
* 9	1,076,875	0.0021	516,770,242	0.9850	871.25	18.00
* 10	3,282,147	0.0063	520,052,389	0.9913	863.28	49.09
* 11	1,855,706	0.0035	521,908,095	0.9948	884.43	63.32
* 12	1,014,992	0.0019	522,923,087	0.9967	907.65	88.75
* 13	643,916	0.0012	523,567,003	0.9980	970.35	13.17
Above Maximum Key Length	1,069,272	0.0020	524,636,275	1.0000	938.53	51.96
Total	524,636,275	1.0000	524,636,275	1.0000	373.58	180.70

Table F.-3.--(cont.).

Females   Yellowfin Sole

Age Class	Number	Proportion	Cumulative Number	Cumulative Proportion	Mean Length	Std. Dev. of length
3	9,784,747	0.0016	9,784,747	0.0016	120.00	0.00
4	139,972,527	0.0234	149,757,273	0.0250	133.28	12.47
5	264,682,327	0.0442	414,439,601	0.0692	176.37	21.36
6	132,310,095	0.0221	546,749,696	0.0912	174.68	26.04
7	455,453,110	0.0760	1,002,202,805	0.1672	210.37	23.95
8	1,043,901,878	0.1742	2,046,104,684	0.3414	235.89	29.39
9	166,410,637	0.0278	2,212,515,321	0.3692	246.90	28.57
10	1,473,511,540	0.2459	3,686,026,861	0.6151	274.82	32.82
11	241,963,047	0.0404	3,927,989,908	0.6554	298.92	17.97
12	597,447,011	0.0997	4,525,436,919	0.7551	316.80	27.29
13	80,903,329	0.0135	4,606,340,248	0.7686	334.53	22.02
14	152,902,330	0.0255	4,759,242,578	0.7941	335.30	19.16
15	91,506,485	0.0153	4,850,749,063	0.8094	342.53	23.43
16	134,703,733	0.0225	4,985,452,796	0.8319	342.71	24.18
17	171,937,798	0.0287	5,157,390,594	0.8606	345.89	20.74
18	183,462,050	0.0306	5,340,852,644	0.8912	350.78	35.18
19	103,157,060	0.0172	5,444,009,704	0.9084	341.77	16.86
20	164,560,478	0.0275	5,608,570,182	0.9359	363.33	28.47
21	144,726,284	0.0241	5,753,296,466	0.9600	342.98	28.01
22	72,335,119	0.0121	5,825,631,585	0.9721	363.53	26.31
23	36,385,940	0.0061	5,862,017,525	0.9782	356.65	27.42
24	71,797,778	0.0120	5,933,815,303	0.9901	351.65	15.13
25	12,112,170	0.0020	5,945,927,473	0.9922	387.66	19.86
26	24,903,612	0.0042	5,970,831,085	0.9963	379.11	14.43
27	15,865,229	0.0026	5,986,696,314	0.9990	390.00	0.00
32	4,519,810	0.0008	5,991,216,124	0.9997	400.00	0.00
Above Maximum Key Length	1,675,670	0.0003	5,992,891,794	1.0000	441.31	3.37
Total	5,992,891,794	1.0000	5,992,891,794	1.0000	275.50	63.94

Table F.-4.--Population estimates of rock sole by age (years), derived from data collected
on the continental shelf during the 1991 bottom trawl survey. Mean lengths are
presented in millimeters.

Males   Rock Sole

Age Class	Number	Proportion	Cumulative Number	Cumulative Proportion	Mean Length	Std. Dev. of length
Below Minimum Key Length	8,131,561	0.0016	8,131,561	0.0016	84.79	6.09
2	11,796,564	0.0023	19,928,125	0.0039	110.00	0.00
3	47,897,606	0.0095	67,825,731	0.0134	107.39	4.39
4	1,687,663,915	0.3341	1,755,489,646	0.3475	148.71	19.72
5	1,174,815,036	0.2326	2,930,304,682	0.5801	187.44	21.78
6	579,116,424	0.1146	3,509,421,107	0.6947	218.29	23.56
7	544,280,197	0.1077	4,053,701,304	0.8025	255.00	20.26
8	420,110,941	0.0832	4,473,812,245	0.8856	278.77	21.96
9	201,644,279	0.0399	4,675,456,524	0.9255	286.97	23.53
10	192,165,599	0.0380	4,867,622,123	0.9636	306.30	12.54
11	94,423,344	0.0187	4,962,045,467	0.9823	308.45	16.91
12	22,470,212	0.0044	4,984,515,679	0.9867	329.53	10.90
13	28,511,455	0.0056	5,013,027,134	0.9924	317.85	7.65
14	12,898,265	0.0026	5,025,925,399	0.9949	336.72	6.96
15	8,565,645	0.0017	5,034,491,044	0.9966	333.07	4.61
22	10,500,333	0.0021	5,044,991,378	0.9987	320.00	0.00
Above Maximum Key Length	6,638,828	0.0013	5,051,630,205	1.0000	370.60	16.55
Total	5,051,630,205	1.0000	5,051,630,205	1.0000	205.08	59.71

321

Table F.-4.--(cont.).

Unsexed   Rock Sole

Age Class	Number	Proportion	Cumulative Number	Cumulative Proportion	Mean Length	Std. Dev. of length
Below Minimum Key Length	11,190,094	0.0097	11,190,094	0.0097	75.05	14.89
2	10,490,208	0.0091	21,680,301	0.0188	106.64	4.72
3	51,733,683	0.0449	73,413,984	0.0638	118.28	12.91
4	814,590,119	0.7077	888,004,103	0.7715	145.04	14.69
5	229,091,573	0.1990	1,117,095,676	0.9706	169.93	13.57
6	33,497,609	0.0291	1,150,593,285	0.9997	181.04	12.89
7	375,165	0.0003	1,150,968,450	1.0000	210.00	0.00
Total	1,150,968,450	1.0000	1,150,968,450	1.0000	148.83	21.11