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1998 Bottom Trawl Survey of the Eastern Bering Sea Continental Shelf

June 2000

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1998 BOTTOM TRAWL SURVEY OF THE EASTERN BERING SEA CONTINENTAL SHELF

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ABSTRACT

The Resource Assessment and Conservation Engineering Division of the Alaska Fisheries Science Center conducts annual bottom trawl surveys to monitor the condition of the demersal fish and crab stocks of the eastern Bering Sea continental shelf. The standard study area, surveyed each year since 1979, encompasses a major portion of the eastern Bering Sea shelf between the 20-m and the 200-m isobaths and from the Alaska Peninsula north to approximately the latitude of St. Matthew Island (60° 50′ N). In 1998, this area was again surveyed by two chartered trawlers, the 40-m F/V *Arcturus* and the 40-m F/V *Aldebaran*.

Demersal populations were sampled by trawling for 30 minutes at stations centered in a 20 × 20 nautical mile grid covering the survey area. At each station, species composition of the catch was determined and commercially important species were sampled to obtain length distributions and age structure samples.

Survey results presented in this report include relative fishing powers of the survey vessels, abundance estimates for fish and invertebrates, geographic distributions of important fish species, size composition of principal fish species, and age and growth information for selected species. Surface and bottom temperatures recorded at each sampling station are also presented.

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

CONTENTS

INTRODUCTION

The eastern Bering Sea continental shelf supports one of the most productive groundfish fisheries in the world (Bakkala 1993). Since 1970, annual commercial catches of groundfish have ranged from 1.2 to 2.2 million metric tons (t) (North Pacific Fishery Management Council 1998). Although many species are caught commercially, the most abundant has been walleye pollock (*Theragra chalcogramma*), which, since 1970, has comprised more than 70% of the total landings. The next most abundant species have been yellowfin sole (*Limanda asper*) and Pacific cod (*Gadus macrocephalus*) which have comprised 8% and 5%, respectively, of the commercial landings.

Since 1971, the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC) has conducted annual bottom trawl surveys of the eastern Bering Sea continental shelf. In 1975, the first large-scale survey of the eastern Bering Sea shelf was conducted under contract from the Bureau of Land Management in response to a need for baseline data to assess the potential impact of proposed offshore oil exploration and development on fishery resources (Pereyra et al. 1976). During this baseline survey, sampling was conducted over the eastern Bering Sea shelf between the 20-m and 200-m isobaths and from the Alaska Peninsula north to approximately 62°N. In subsequent years, the areal coverage of the annual surveys was reduced, until 1979 when the most comprehensive survey of the Bering Sea shelf was undertaken in cooperation with the Japan Fisheries Agency (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.-U.S.S.R. convention line, and the shelf region between St. Matthew and St. Lawrence Islands. A

hydroacoustic survey was also conducted in 1979 to assess the midwater component of the walleye pollock population. Subsequent annual bottom trawl surveys have essentially resampled the stations established during the 1975 survey, with slight modifications each year. This region encompasses the major portion of economically important eastern Bering Sea groundfish populations, except those primarily located in continental slope waters. Every third year, through 1991 (1979, 1982, 1985, 1988, 1991) an extended survey was conducted, including hydroacoustic assessment of midwater pollock, bottom trawl sampling of the continental slope (the continental slope was not surveyed in 1994 or 1997), and bottom trawl sampling in the region between St. Matthew and St. Lawrence Islands. 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 exploited stocks, 2) provide distribution and abundance information to commercial fishermen, and 3) develop a time-series database 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 1998 bottom trawl survey. The groundfish/crab survey and several ancillary projects were conducted from 5 June to 6 August by two U.S. vessels. Detailed information on principal crab species can be found in a report by Stevens et al. (1998).

METHODS

Survey Area and Sampling Design

The standard station pattern for the eastern Bering Sea survey is based on a systematic 20 × 20 nautical mile grid. In areas surrounding St. Matthew and the Pribilof Islands, grid block corners were also sampled to better assess blue king crab (*Paralithodes platypus*) concentrations. The survey design pattern called for 356 stations. In 1998, 355 standard stations and 20 additional stations northwest of the standard pattern were successfully sampled (Fig. 1 and Appendix A).

Starting with the eastern stations, the two vessels fished alternate north/south lines of stations such that coverage of the survey area was similar for each vessel. This sampling design facilitated the computation of relative fishing powers (or catch efficiencies) of the two vessels. The progression from east to west was established to prevent multiple encounters of yellowfin sole, Alaska plaice (*Pleuronectes quadrituberculatus*), and perhaps other species which may be migrating eastward during the course of the survey (Smith and Bakkala 1982). Tows were usually 30 minutes in duration and fishing was limited to daylight hours. For data analysis, the survey region was divided into six subareas bounded by the 50-m, 100-m, and 200-m isobaths and by a line separating the northwest and southeast portions of the study area (Fig. 1). This stratification scheme was designed to reduce the variances of population and biomass estimates by conforming to oceanographic domains which seem related to distributions of Bering Sea fishes (Bakkala 1993). The presence of high-density sampling for blue king crab in subareas 3, 4, and 6 necessitated a further division of these subareas into high-density and standard-density

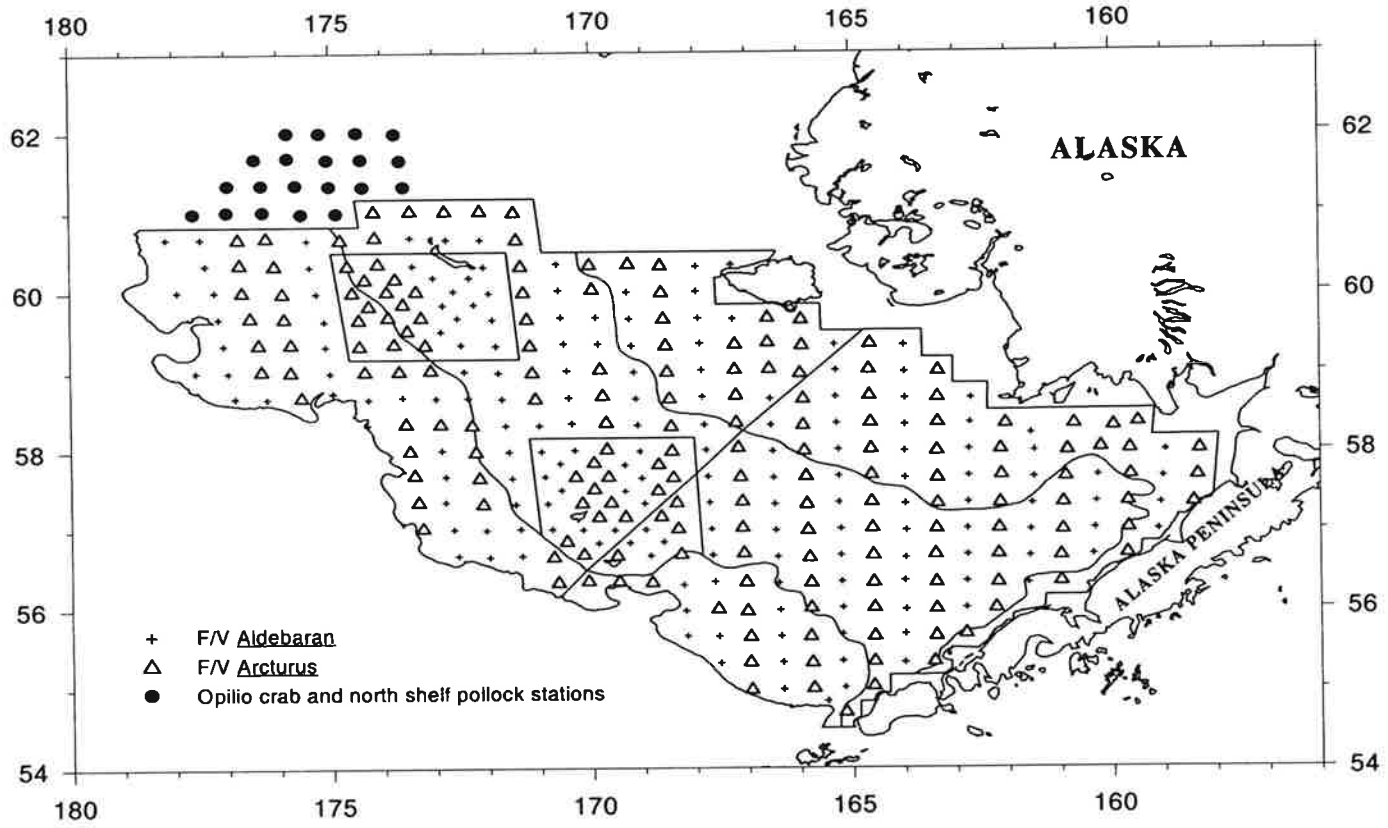

Figure 1.--Standard and special study stations sampled during the 1998 eastern Bering Sea bottom trawl survey, and stratifications used for the analysis of data.

sample strata, resulting in a total of 10 geographic strata. The overall sampling density for the entire survey area was one station per 1,305 km^2 (Table 1). However, because of the high-density sampling in subareas 3, 4, and 6, and the irregular subarea boundaries, sampling density among the six subareas varied from one station per 1,123 km^2 to one per 1,492 km^2.

Table 1.--Size of subareas and strata, and sampling densities for the 1998 eastern Bering Sea bottom trawl survey (See also Fig. 1).

Subarea	Area (km^2)	No. Stations successfully sampled	Sampling density (km^2/stn)
1 (10)	77,871	58	1,343
2 (20)	41,027	31	1,323
3	103,300	77	1,342
(31)	94,526	69	1,370
(32)	8,774	8	1,097
4	107,822	96	1,123
(41)	62,703	44	1,425
(42)	24,011	30	800
(43)	21,108	22	959
5 (50)	38,792	26	1,492
6	94,562	67	1,411
(61)	88,134	60	1,469
(62)	6,429	7	918
Subareas Combined	463,374	355	1,305

Vessels and Fishing Gear

The 1998 eastern Bering Sea bottom trawl survey was conducted aboard the 40-m fishing vessels F/V *Arcturus* and F/V *Aldebaran* (Table 2). 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 (Fig. 2). 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 × 2.7 m and weighing 816 kg were used.

Table 2.--Characteristics of vessels used during the 1998 eastern Bering Sea bottom trawl survey.

Vessel	Overall length (m)	Horsepower	Survey period	
			Start	Finish
F/V *Arcturus*	40	1,525	5 June	6 August
F/V *Aldebaran*	40	1,525	5 June	6 August

SCANMAR[1] net mensuration systems were used aboard each vessel to measure net height and width. Net width was measured by the distance between two sensors attached to the upper starboard and port dandylines, about 0.61 m in front of the net. Mean net widths were calculated from observations recorded within each tow. These data were then used to establish a net width-scope (wire-out) relationship for each vessel to enable prediction of net width for tows where net width data were not available (Fig. 3) as described by Rose and Walters (1990). Estimates of net width were used in area-swept calculations.

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

83/112 EASTERN

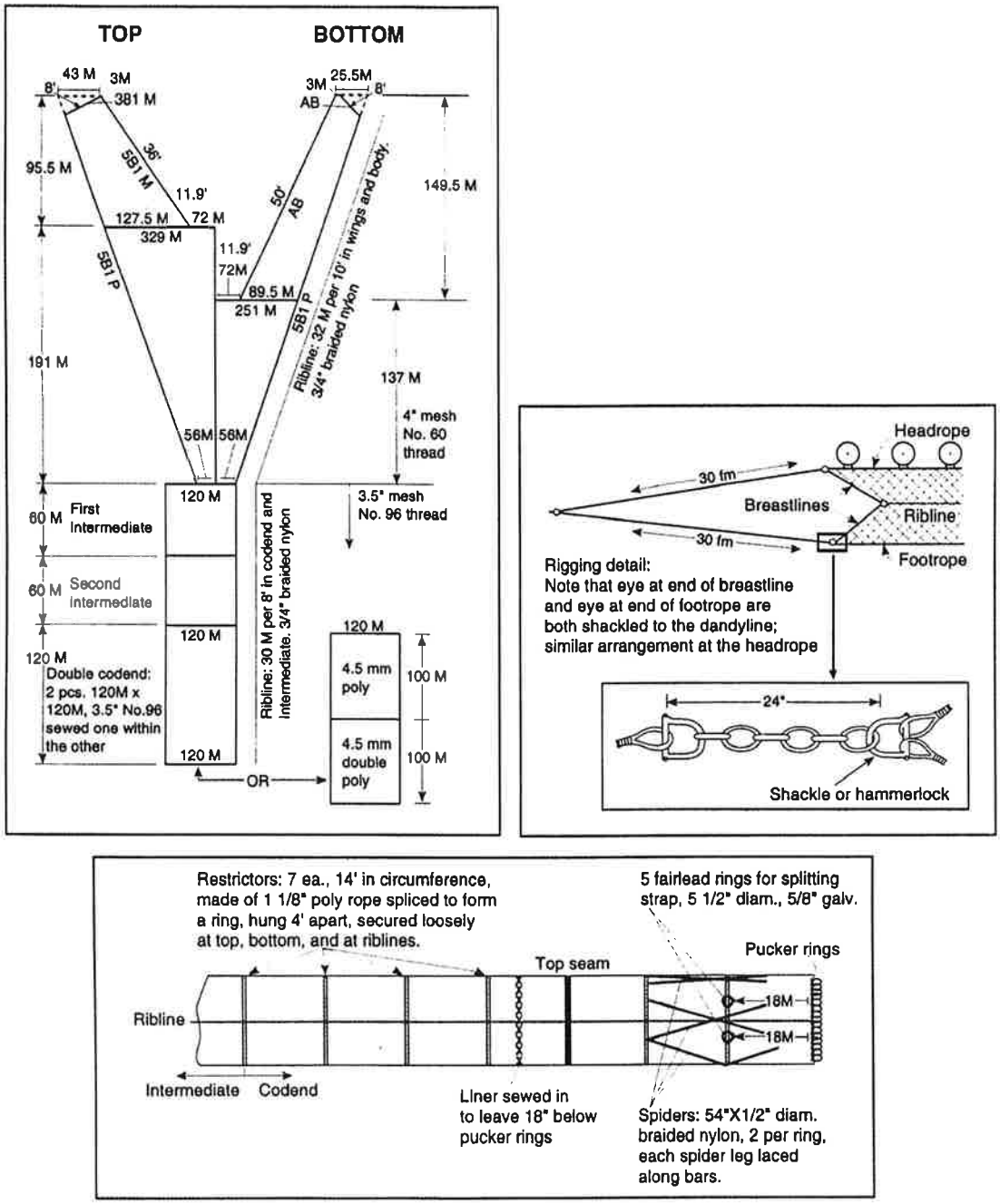

Figure 2.–Schematic diagram of trawl used during the 1998 eastern Bering Sea bottom trawl survey.

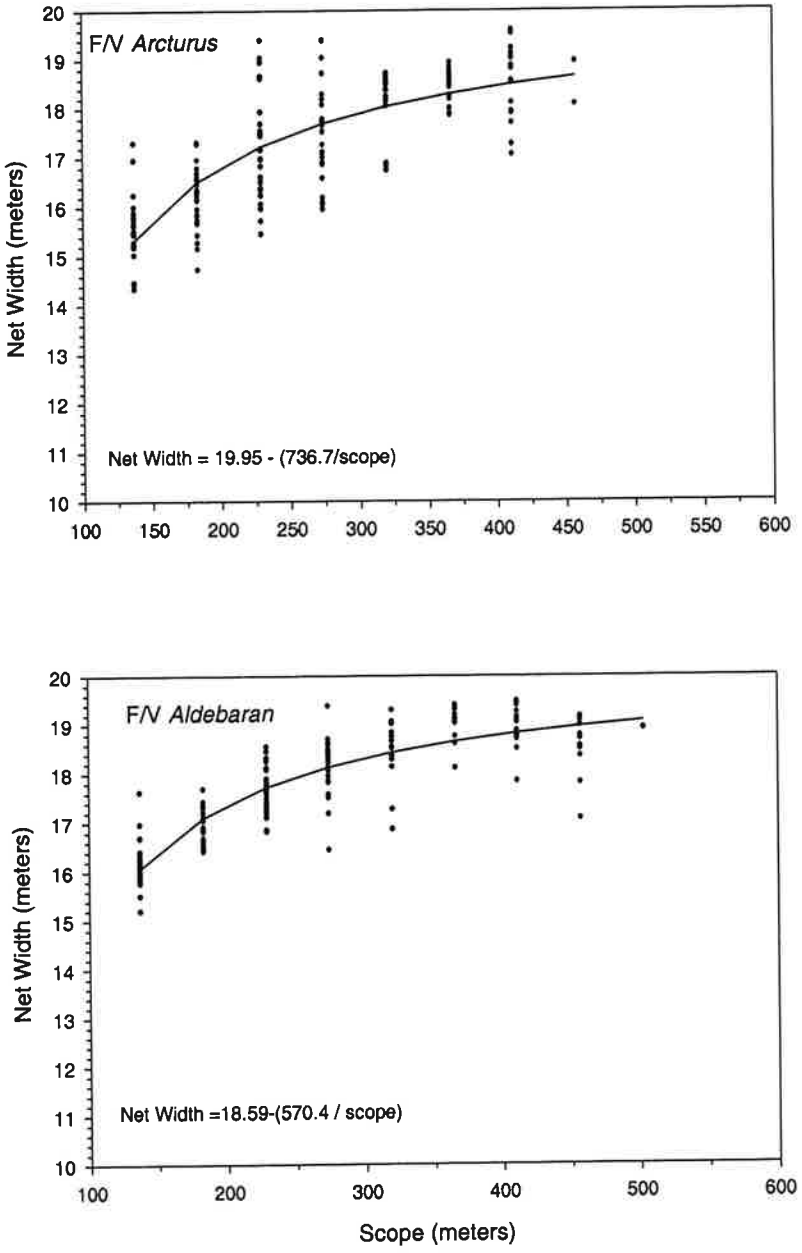

Figure 3.--Relationship between net-width and scope (wire-out) for vessels participating in the 1998 eastern Bering Sea survey.

Data Collection

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 × 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). If the bottom appeared to be untrawlable at the 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 and larger catches were subsampled. Economically important fish and invertebrates were sorted to species with the exception of two species of flatfish. Similar features between flathead sole (*Hippoglossoides elassodon*) and Bering flounder (*Hippoglossoides robustus*), made identification of these species (*Hippoglossoides* spp. in text and tables) 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 . All sculpins of the genus *Myoxocephalus* have been grouped (*Myoxocephalus* spp. in text and tables) for the purpose of this report due to growing concerns about correct identification of great sculpin (*Myoxocephalus polycanthocephalus*), plain sculpin (*Myoxocephalus jaok*), and warty sculpin (*Myoxocephalus verrucosus*). Catch weights and numbers by species or species group were estimated directly or, when subsampled, estimated by extrapolating the proportion in the subsample to that of the entire catch weight. Pacific halibut (*Hippoglossus stenolepis*) and crab

species of the genera *Paralithodes* (red and blue king crabs, *P. camtschaticus* and *P. platypus*, respectively), *Chionoecetes* (snow and Tanner crabs, *C. opilio* and *C. bairdi*, respectively), and *Erimacrus isenbeckii* (hair crab) 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 3). Pacific halibut were measured immediately upon capture and returned to the sea in an effort to reduce sampling mortality for this species. Random samples of the remaining species of up to approximately 200 individuals (300 in the case of walleye pollock) were sexed and measured to the nearest centimeter from the tip of the snout to the end of the middle rays of the caudal fin (fork length).

Sagittal otoliths were collected from nine fish 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 spp. (*Lepidopsetta* spp.; two species are now recognized from the Bering Sea: *L. bilineata* and a new species described by Orr and Matarese (in press)), and five otolith pairs per sex/centimeter interval for all other species. Scales as well as otoliths were taken from Pacific cod to aid in age determination of young fish. Individual fish weight data were collected for arrowtooth flounder (*Atheresthes stomias*) and Kamchatka flounder (*A. evermanni*) in conjunction with otolith sampling. In the case of the *Hippoglossoides* spp., otoliths were collected only from individuals that were identified with certainty as flathead sole. Age structures for roundfish were preserved in 50% ethanol; flatfish otoliths were preserved in 50% glycerol.

Temperature profiles were taken at each station using a micro-bathythermograph (MBT) attached to the head rope of the net; surface temperatures were taken by bucket thermometer.

Table 3.--Number of length measurements taken during the 1998 eastern Bering Sea bottom trawl survey.

	Length measurements by subarea						
Species	1	2	3	4	5	6	Total[a]
Alaska plaice	1,749	1,726	1,901	4,164	---	509	10,101
Bering flounder	1	6	---	772	---	165	2,863
Dover sole	---	---	1	---	1	---	2
Greenland turbot	---	---	5	46	1	229	445
Kamchatka flounder	---	---	120	64	332	572	1,099
Pacific cod	1,969	784	1,882	3,400	275	983	9,574
Pacific halibut	501	175	280	226	78	237	1,500
Pacific herring	45	---	---	---	---	---	45
Pacific ocean perch	---	---	---	---	13	---	13
Sakhalin sole	---	---	---	---	---	---	4
arrowtooth flounder	31	---	1,760	800	2,735	3,580	8,910
butter sole	36	---	24	---	---	---	60
chum salmon	---	---	---	3	1	1	5
flathead sole	927	20	5,101	3,045	3,809	8,709	22,042
great sculpin	21	---	20	---	---	---	41
light dusky rockfish	---	---	---	---	7	---	7
longhead dab	398	56	41	---	---	---	495
northern rock sole	9,350	4,415	10,126	12,957	180	5,372	44,055
northern rockfish	---	---	---	---	114	---	114
plain sculpin	580	---	3	---	---	---	583
rex sole	2	---	66	---	425	116	609
sablefish	---	---	1	1	---	---	2
southern rock sole	---	---	50	---	---	---	50
starry flounder	387	12	21	---	---	---	420
walleye pollock	4,164	1,587	6,565	11,703	304	9,494	37,635
yellowfin sole	9,529	4,558	9,070	10,635	14	528	34,509

[a]Some length measurements were collected outside the standard survey area.

Table 4.--Number of fish in which age structures (otoliths and/or scales) were collected, by species and subarea, during the 1998 eastern Bering Sea bottom trawl survey.

	Subarea						
Species	1	2	3	4	5	6	Total[a]
walleye pollock	313	23	368	206	---	279	1261
Pacific cod[b]	206	73	122	141	---	112	694
yellowfin sole	213	75	201	83	---	---	575
Alaska plaice	169	56	96	77	---	22	420
northern rock sole	101	72	91	99	---	28	409
arrowtooth flounder	---	---	94	24	69	93	280
Greenland turbot	---	---	---	11	---	73	200
flathead sole	35	---	52	---	---	---	87

[a]Some age structures were collected outside the standard survey area.
[b]Scales were also taken.

Data Analysis

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

Relative fishing powers between the two vessels were determined using the methods of Kappenman (1992). Three hundred seventy-five stations sampled by the two vessels during the standard survey (Fig. 1) were used in that analysis (see Appendix A).

Mean catch per unit effort (CPUE) values for each species were calculated in kilograms per hectare and number per hectare for each of the 10 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 staff of the Age and Growth Program 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 number at each length interval. Only species whose age samples have been read by the time of writing of this publication have been included in the age analyses. Species completed at a later date will be presented in subsequent publications.

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

Special Studies

Stomach samples from several of the most prevalent commercial species in each haul were collected and preserved in 10% formalin for later examination by REFM's Food Habits Task (Table 5).

Additional activities included collecting specimens for observer training programs, collecting samples for fish and crab pathology studies (Table 5), and fulfilling collection requests from academic institutions.

Table 5.--Biological fish samples collected for special studies during the 1998 eastern Bering Sea bottom trawl survey.

Species	Stomach samples collected	Pathology samples
Walleye pollock	2,271	1140
Pacific cod	1,645	
Yellowfin sole	812	
Lepidopsetta spp.	253	
Hippoglossoides spp.	470	
Pacific halibut	388	
Alaska plaice	197	
Atheresthes spp.	326	
Greenland turbot	94	
Sculpins	58	
Skates	316	
Red king crab		110
Blue king crab		38
Opilio tanner crab		1

RESULTS

Station Data

Station data from the 1998 survey are listed in Appendix A. Relevant information such as position, tow parameters, time, and environmental measurements are listed for each vessel for all standard bottom trawl stations used in the analyses.

Environmental Conditions

Sea surface temperatures recorded during the survey ranged from 4.2° to 10.4° C (Fig. 4). As in most previous years, surface temperature increased from east to west across the shelf, probably reflecting the progression of summer warming as the survey proceeded from east to west.

Bottom temperatures ranged from 0.5° to 6.6° C (Fig. 5). The warmest temperatures (above 5° C) occurred in shallow waters along the central portion of the inner shelf east of Nunivak Island. The coldest bottom temperatures observed were in the northern portion of the mid-shelf at depths between 50 and 100 m.

The mean bottom water temperature for the total survey area in 1998 was 3.3° C (Fig. 6). Historically, this was above the value recorded for mean summer bottom water temperatures in the standard survey area since 1981 (annual mean temperatures range from 1.7° to 5.1°C; average of annual means is 2.7° C). 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 1998 value for this area was 4.0°C, one degree above the long-term average (3.1° C) (Fig. 6).

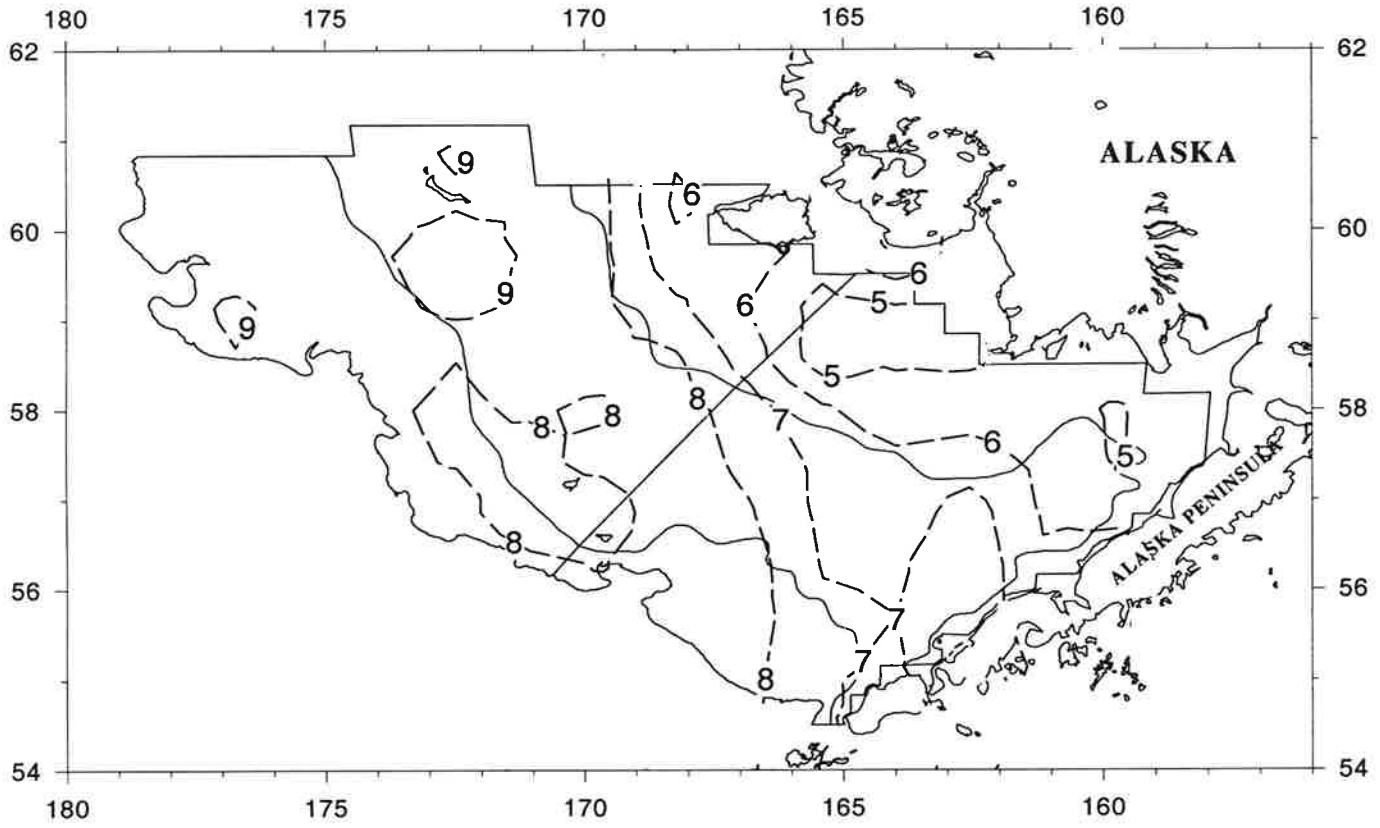

Figure 4.–Distribution of surface water temperatures (°C) observed during the 1998 eastern Bering Sea bottom trawl survey.

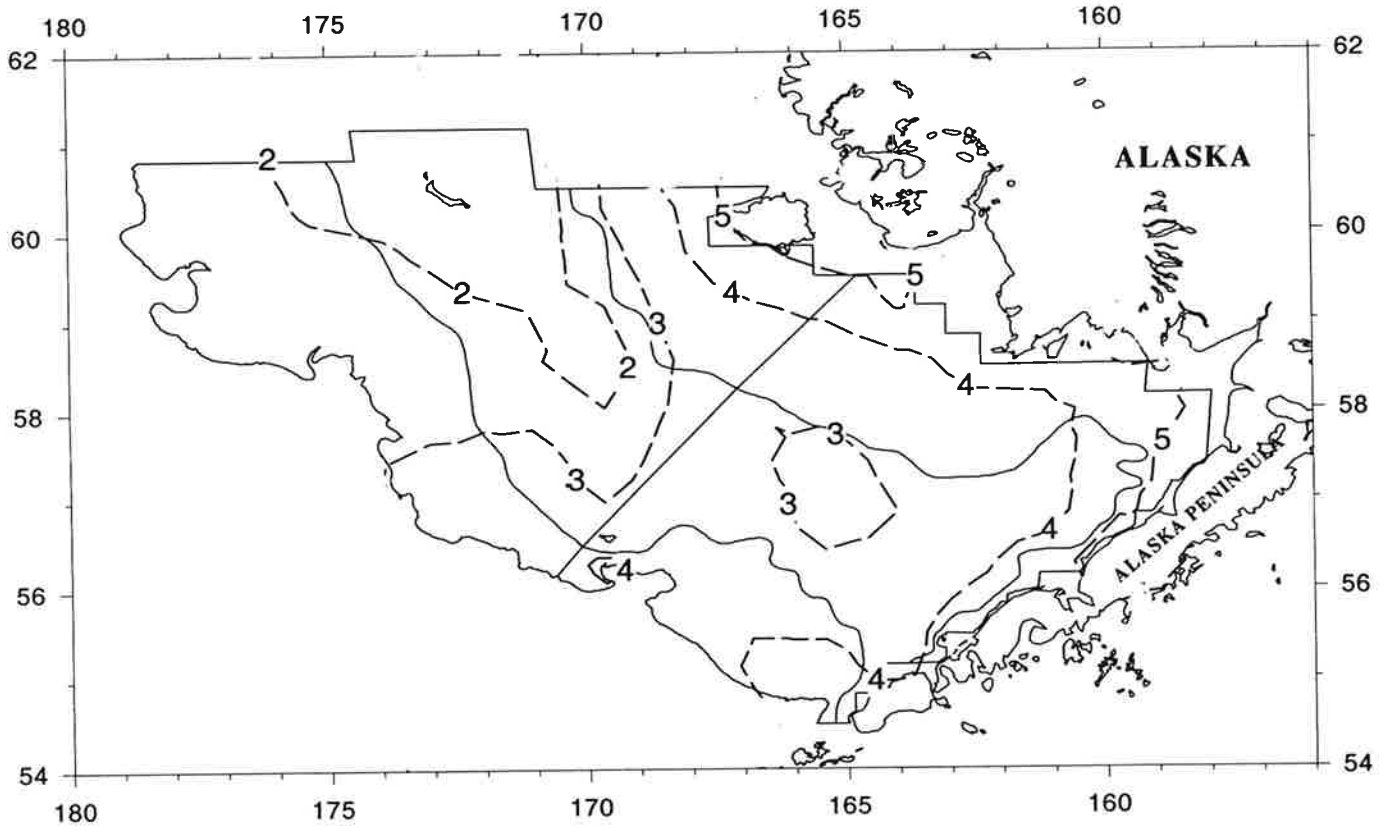

Figure 5.–Distribution of bottom water temperatures (°C) observed during the 1998 eastern Bering Sea bottom trawl survey.

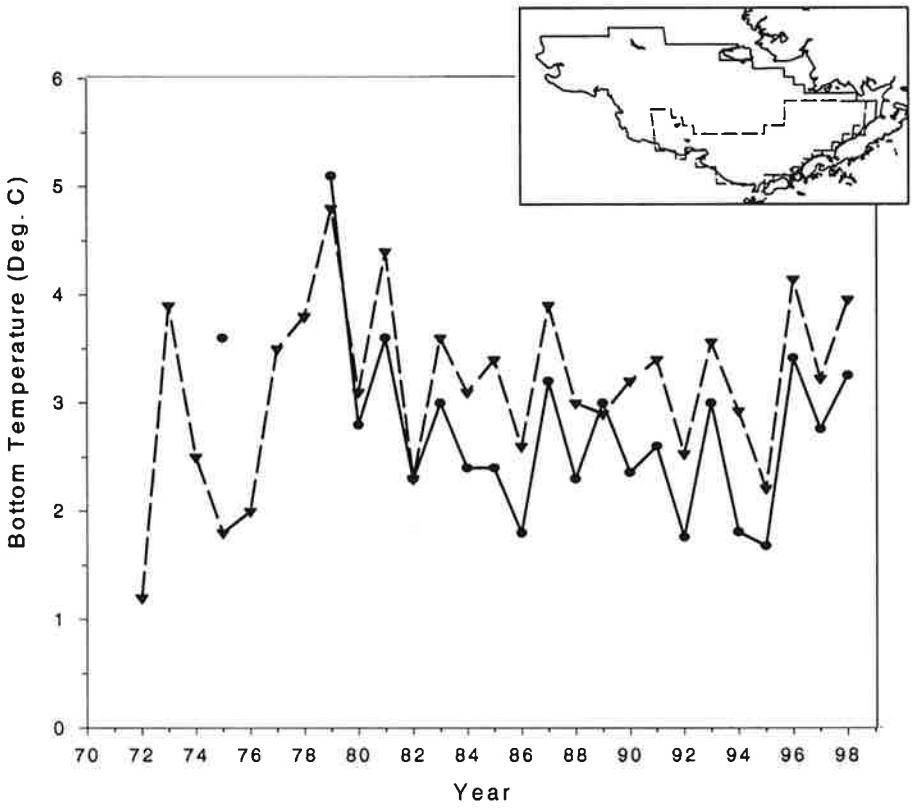

Figure 6.--Mean summer bottom water temperatures based on expendable bathythermograph casts or micro-bathythermographs attached to the net headrope during Alaska Fisheries Science Center bottom trawl surveys. The 1971-98 means (dashed line) are from the southeast Bering Sea (see insert) and the 1975 and 1979-98 means are from the larger survey area outlined on the inset. The 1975 data point for the overall survey area is based on data collected from August through September, while those in all other years and areas were collected from June through early August.

Relative Fishing Powers of Survey Vessels

A total of 375 alternate-row tows were used in the comparison of vessel catch rates with the methods developed by Kappenman (1992). Based on this analysis, the F/V *Aldebaran* was more efficient than the F/V *Arcturus* at capturing Pacific halibut, *Lepidopsetta* spp., Alaska plaice, and walleye pollock, and the F/V *Arcturus* was more efficient at capturing *Myoxocephalus* spp. and skates. Fishing power corrections were applied to catches (by species) of the less efficient vessel (Table 6).

Table 6.--Species for which fishing power corrections were applied in 1998, and scaling factors determined by the method of Kappenman (1992) based on 375 total hauls.

Species	Hauls with catch		Catch multiplier	
	F/V *Arcturus*	F/V *Aldebaran*	F/V *Arcturus*	F/V *Aldebaran*
Pacific halibut	130	131	1.00	1.04
yellowfin sole	155	141	1.11	1.00
Myoxocephalus spp.	119	113	1.00	1.01
Pacific cod	175	170	1.10	1.00
walleye pollock	175	172	1.00	1.08
snow crab	138	146	1.00	1.24
blue king crab	30	24	1.30	1.00

Estimated Biomass of Major Fish and Invertebrate Groups

Total demersal animal biomass for the overall survey area was estimated at 12.9 million t, of which fish species accounted for 75% (9.7 million t, Table 7), and invertebrates 25% (3.2 million t, Table 8). Concentrations of fish biomass were located in Bristol Bay and along the Alaska Peninsula, around the Pribilof Islands, and northwest of the Pribilofs (Fig. 7). Although 19 families and 96 species of fish were identified in the catches (Appendix B), the fish biomass was dominated by flatfishes (Pleuronectidae, 6.3 million t) and cods (Gadidae, 2.8 million t) (Table 7). The biomass of invertebrates was comprised primarily of the phyla Echinodermata (1.6 million t), Crustacea (0.80 million t), and Mollusca (0.4 million t). A total of 187 invertebrate species from 12 phyla were identified in the survey (Table 8, Appendix B).

Relative Abundance of Individual Fish Species

Relative abundance of the 11 most abundant species and species groups of fish are shown in Figure 8. These taxa accounted for 72% (206.8 kg/ha) of total animal mean CPUE (278.5 kg/ha) and 97% of total fish mean CPUE (211.9 kg/ha). Overall, but particularly in water deeper than 50 m, walleye pollock were the dominant species in the catch with a mean CPUE of 50.4 kg/ha. Pacific cod were consistently abundant across all depths with an overall mean CPUE of 12.2 kg/ha. Yellowfin sole and *Lepidopsetta* spp., with overall mean catch rates of 50.9kg/ha and 47.3 kg/ha, respectively, dominated catches in water less than 50 m. Yellowfin sole and rock sole were also prominent on the mid-shelf waters between the 50-m and the 100-m isobaths along with Alaska plaice and *Hippoglossoides* spp. See Appendix C for a descending rank of all organisms caught.

Table 7.--Biomass estimates(t) for major fish species and fish groups taken during the 1998 eastern Bering Sea bottom trawl survey.

Taxon	Estimated total biomass (t)[a] and 95% confidence interval		Proportion of total animal biomass[b]	Estimated biomass by subarea (t)					
				1	2	3	4	5	6
Gadidae (cods)									
Walleye pollock	2,212,689	± 20%	0.171	390,464	46,893	606,579	718,138	7,315	443,299
Pacific cod	558,419	± 16%	0.043	139,695	21,003	127,509	151,441	20,817	97,954
Other cods	3,764	± 77%	0.000	1,433	2,216	0	43	0	72
Total cods	2,774,872	± 17%	0.215	531,592	70,112	734,088	869,622	28,132	541,325
Anoplopomatidae									
Sablefish	433	± 139%	0.000	0	0	398	35	0	0
Scorpaenidae (rockfish)									
Pacific ocean perch	285	± 192%	0.000	0	0	0	0	276	9
Other rockfish	14,532	± 200%	0.001	0	0	0	0	14,532	0
Total rockfish	14,817	± 200%	0.001	0	0	0	0	14,808	9
Pleuronectidae (flatfishes)									
Yellowfin sole	2,332,068	± 13%	0.181	796,642	298,887	855,792	369,854	384	10,510
Lepidopsetta spp.	2,168,259	± 11%	0.168	984,638	313,386	402,479	340,700	2,778	124,277
Hippoglossoides spp.	683,549	± 41%	0.053	35,948	918	187,322	80,176	62,772	316,414
Alaska plaice	452,596	± 26%	0.035	75,007	29,864	121,650	186,955	0	39,120
Arrowtooth flounder	344,890	± 23%	0.027	1,338	0	96,676	15,902	84,691	146,282
Kamchatka flounder	23,474	± 17%	0.002	0	0	2,558	2,561	3,178	15,176
Greenland turbot	28,126	± 29%	0.002	0	0	1,089	5,657	201	21,180
Pacific halibut	166,842	± 15%	0.013	30,676	12,392	30,298	24,270	18,742	50,464
Other flatfish	73,938	± 42%	0.006	57,187	6,078	4,538	31	4,775	1,331
Total flatfish	6,273,742	± 9%	0.486	1,981,435	661,526	1,702,401	1,026,104	177,520	724,755
Clupeidae									
Pacific herring	14,900	± 69%	0.001	12,450	852	788	781	0	28
Cottidae (sculpins)	198,343	± 22%	0.015	44,606	21,569	39,573	33,941	5,261	53,393
Zoarcidae (eelpouts)	32,931	± 26%	0.003	202	19	5,737	8,435	464	18,074
Osmeridae (smelts)	5,273	± 50%	0.000	766	140	744	50	3,573	0
Agonidae (poachers)	20,436	± 17%	0.002	8,365	2,378	6,414	2,933	122	226
Cyclopteridae (snailfishes)	948	± 50%	0.000	16	7	91	478	0	356
Rajidae (skates)	354,188	± 11%	0.027	26,977	42,867	59,335	82,312	32,774	109,923
Other fish	10,479	± 54%	0.001	1,579	1,183	1,934	344	1,996	3,443
Total fish	9,701,363	± 8%	0.751	2,607,989	800,652	2,551,503	2,025,035	264,650	1,451,533

[a]Differences in sums of estimates and totals are due to rounding.
[b]Proportion of total estimated biomass, fish and invertebrates combined, for the total survey area. Total estimated biomass=12,911,100t.

Table 8.--Biomass estimates(t) for major invertebrate species and invertebrate groups taken during the 1998 eastern Bering Sea bottom trawl survey.

Taxon	Estimated total biomass (t)[a] and 95% confidence interval	Proportion of total animal biomass[b]	Estimated biomass by subarea (t) 1	2	3	4	5	6
Crustacea								
Chionoecetes sp. (snow crab)	361,517 ± 16%	0.028	1,767	3,523	44,075	179,604	25,257	107,290
Lithodes sp. king crab	37 ± 161%	0.000	0	0	0	0	0	37
Paralithodes sp. (king crab)	101,870 ± 29%	0.008	20,646	714	61,391	18,522	0	596
Erimacrus isenbeckii (hair crab)	3,097 ± 41%	0.000	175	384	1,157	1,362	20	0
Paguridae hermit crab	313,190 ± 13%	0.024	23,569	31,759	100,884	100,248	4,378	52,352
Other crab	17,227 ± 66%	0.001	5,780	1,391	2,693	7,092	174	98
Total crab	796,938 ± 9%	0.062	51,937	37,772	210,200	306,828	29,829	160,372
Shrimps	4,422 ± 37%	0.000	29	54	119	140	197	3,883
Other crustaceans	1,348 ± 100%	0.000	147	10	254	292	60	585
Total crustaceans	802,708 ± 9%	0.062	52,112	37,836	210,574	307,259	30,086	164,840
Mollusca								
Gastropoda (snails)	353,922 ± 15%	0.027	34,867	22,266	109,581	103,696	7,000	76,512
Pelecypoda (bivalves)	5,066 ± 29%	0.000	1,074	303	1,951	671	210	858
Squids	68 ± 81%	0.000	0	0	0	0	11	57
Octopuses	1,225 ± 106%	0.000	0	0	545	75	0	605
Other mollusks	0 ± 0%	0.000	0	0	0	0	0	0
Total mollusks	360,281 ± 15%	0.028	35,941	22,569	112,077	104,441	7,221	78,031
Echinodermata								
Asteroidea (starfish)	928,776 ± 12%	0.072	395,233	124,825	177,250	123,734	2,820	104,914
Ophiuroidea (brittle stars)	237,769 ± 46%	0.018	8,637	1,962	48,983	25,756	757	151,674
Echinoidea (sea urchin)	5,121 ± 73%	0.000	39	0	451	328	2,914	1,389
Holothuroidea (sea cucumbers)	7,462 ± 67%	0.001	2,707	0	4,037	686	31	0
Total echinoderms	1,179,206 ± 13%	0.091	406,627	126,788	230,763	150,530	6,523	257,976
Ascidiacea	192,814 ± 35%	0.015	27,249	13,556	78,614	73,344	51	0
Porifera (sponges)	278,814 ± 102%	0.022	1,184	18	275,771	1,141	130	570
Coelenterata	205,100 ± 21%	0.016	29,779	3,481	87,520	53,595	17,117	13,607
Other invertebrates	190,892 ± 17%	0.015	20,772	22,855	71,176	62,193	1,396	12,500
Total invertebrates	3,209,737 ± 11%	0.249	573,653	227,104	1,066,453	752,477	62,525	527,526

[a]Differences in sums of estimates and totals are due to rounding.
[b]Proportion of total estimated biomass, fish and invertebrates combined, for the total survey area. Total estimated biomass=12,911,100t.

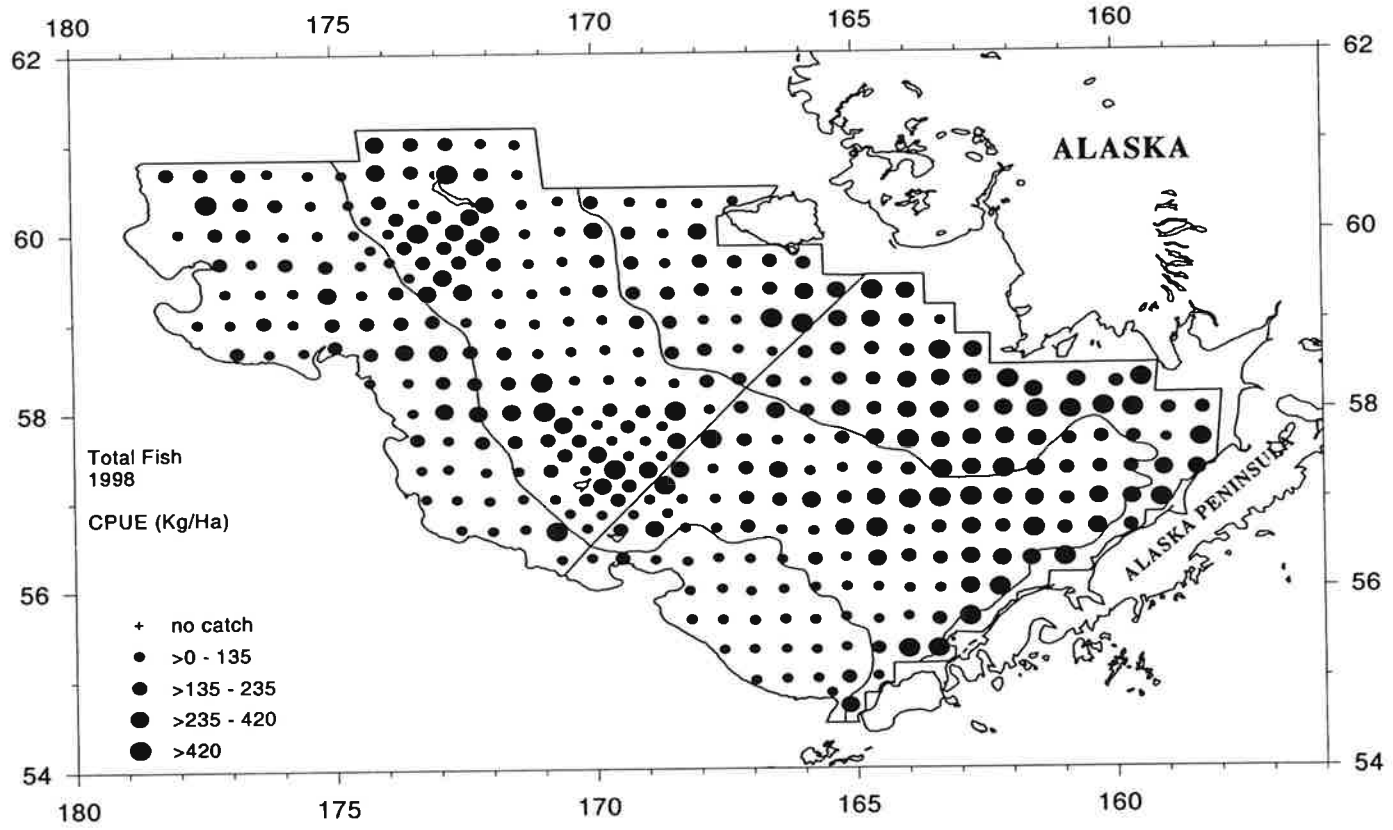

Figure 7.–Distribution and relative abundance of total fish, 1998 eastern Bering Sea bottom trawl survey.

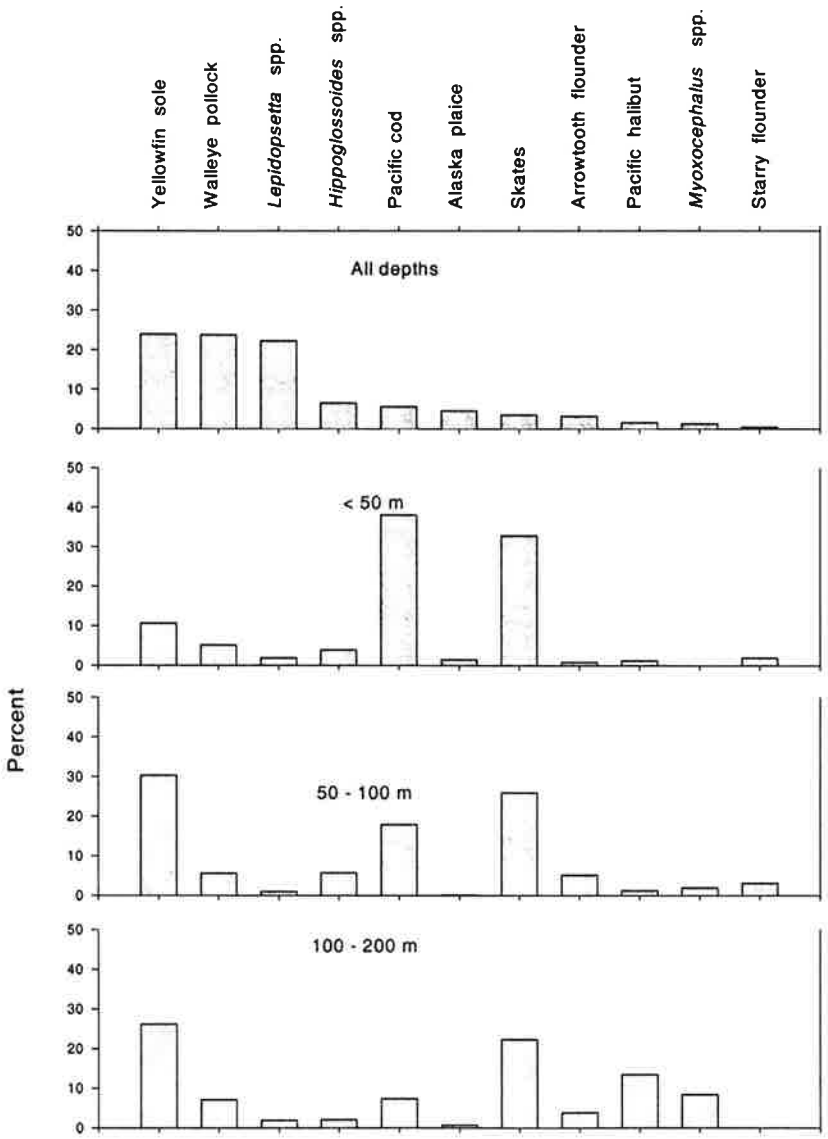

Figure 8.--Relative abundance (% CPUE in kg/ha) of principal groundfish species (top 11 for all depths combined) by depth zones and for all depths combined, 1998 eastern Bering Sea bottom trawl survey.

Abundance, Distribution, and Size and Age Composition of Principal Species and Species Groups

Geographical distributions, population numbers, biomass estimates, and size composition are presented for each of the following commercially important eastern Bering Sea groundfish: walleye pollock, Pacific cod, yellowfin sole, *Lepidopsetta* spp., *Hippoglossoides* spp., Alaska plaice, Greenland turbot (*Reinhardtius hippoglossoides*), arrowtooth flounder, Kamchatka flounder, and Pacific halibut. Estimated biomass, population numbers, and mean size (by length and weight) are summarized by subarea and for the entire survey area. Size composition data are illustrated in histograms relating the population percentage of length by centimeter interval for each subarea and in population numbers for the total survey area. Age composition and von Bertalanffy growth parameters are given for walleye pollock, yellowfin sole, and *Lepidopsetta* spp.. Geographical distributions for some common, but generally noncommercial fish species are presented. These are total skates, *Myoxocephalus* spp., bigmouth sculpin (*Hemitripterus bolini*), wattled eelpout (*Lycodes palearis*), shortfin eelpout (*L. brevipes*), marbled eelpout (*L. raridens*), sturgeon poacher (*Podothecus acipenserinus*), Bering poacher (*Occella dodecaedron*), eulachon (*Thaleichthys pacificus*), capelin (*Mallotus villosus*), and Pacific herring (*Clupea pallasi*). Biomass and population estimates as well as mean weight are given by subarea and total area. These tables are not given for the pelagic species such as eulachon, capelin, and Pacific herring due to the bottom sampling nature of the survey. We do not believe these species are adequately represented in the samples; however, plots are shown to give some idea of geographic distribution.

Appendices to the report contain detailed results of the analysis. CPUE, population, and biomass estimates as well as the variances and confidence limits for each species by stratum are given in Appendix D. Population estimates by sex and size class for the total survey area are listed in Appendix E.

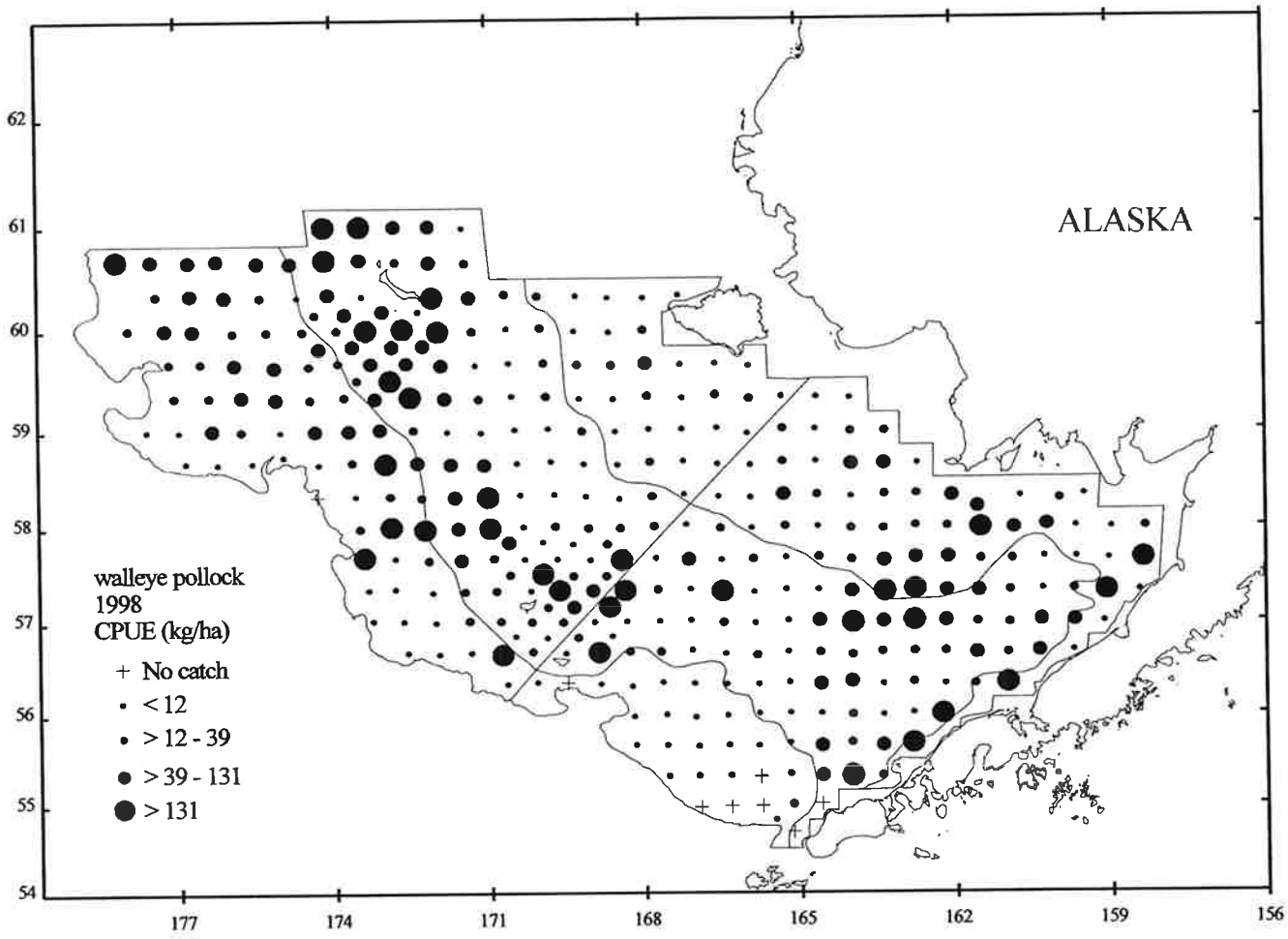

Figure 9--. Distribution and relative abundance in kg/ha of walleye pollock, 1998 eastern Bering Sea bottom trawl survey.

Table 9.--Abundance estimates and mean size of walleye pollock by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	50.14	390,464	0.176	470,491,483	0.109	0.830	43.5
2	11.43	46,893	0.021	101,167,882	0.023	0.464	27.3
3	58.72	606,579	0.274	1,072,336,282	0.249	0.566	41.6
4	66.60	718,138	0.325	1,526,057,972	0.354	0.471	38.8
5	1.89	7,315	0.003	11,699,136	0.003	0.625	41.1
6	46.88	443,299	0.200	1,131,713,276	0.262	0.392	33.6
All subareas combined[b]	47.75	2,212,689	1.000	4,313,466,031	1.000	0.513	38.4
95% Confidence interval		±451,182		±914,430,828			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

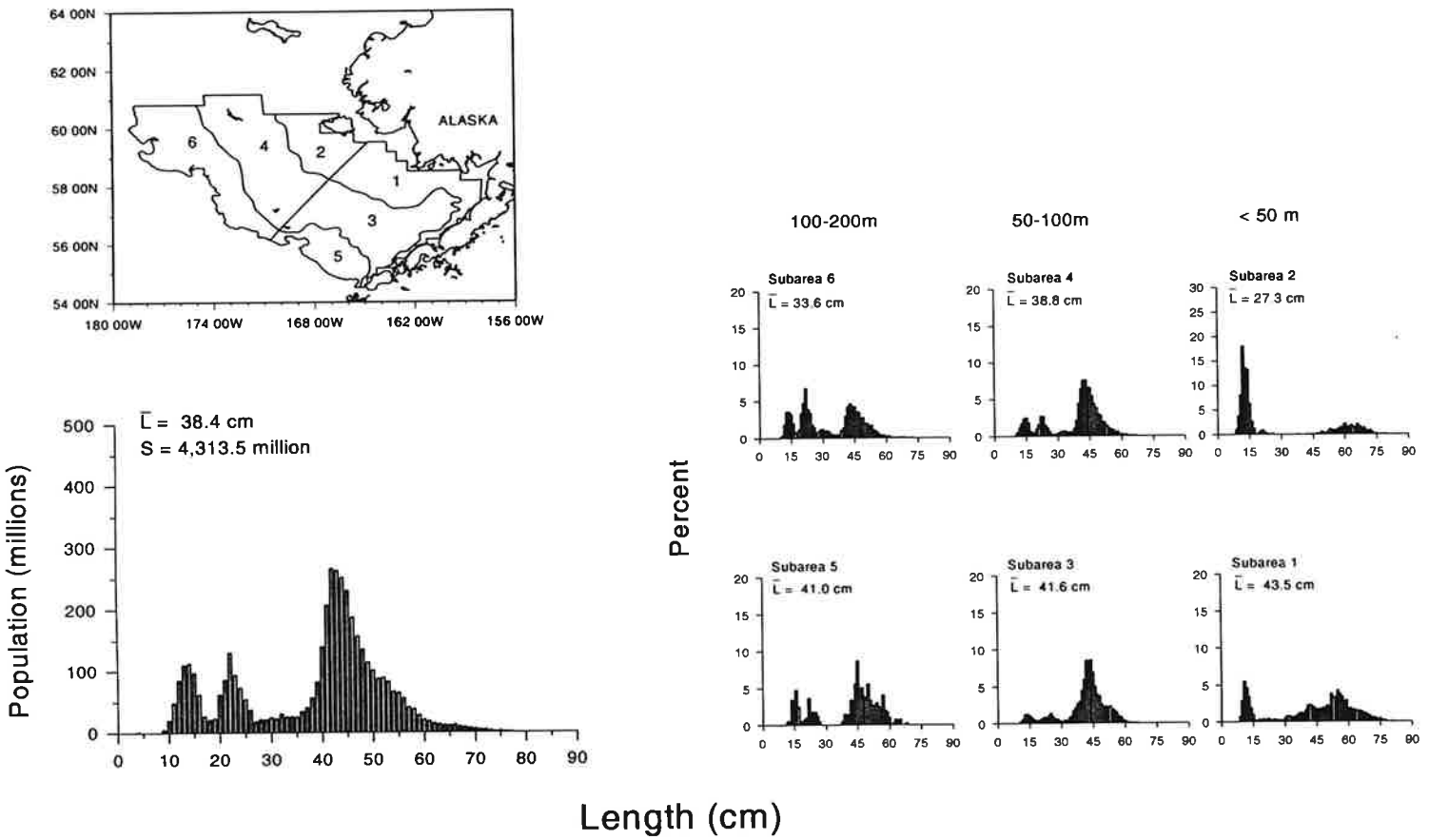

Figure 10.–Estimated relative size distribution (sexes combined) of walleye pollock in terms of population numbers and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

Table 10.--Estimated population numbers (millions) of walleye pollock by age group and subarea, 1998 eastern Bering Sea bottom trawl survey.

		Depth and Subarea							
		100 - 200 m		50 - 100 m		< 50 m			
Age	Year class	6	5	4	3	2	1	All subareas combined	Proportion
1	1997	184.49	1.71	167.42	60.08	68.63	96.37	578.70	0.1342
2	1996	283.59	1.31	166.05	62.00	2.80	9.87	525.61	0.1219
3	1995	98.65	0.19	73.58	56.17	0.23	21.58	250.40	0.0581
4	1994	24.57	0.11	48.12	56.79	0.04	11.72	141.34	0.0328
5	1993	45.22	0.45	102.68	84.37	0.10	12.73	245.54	0.0569
6	1992	274.88	3.24	608.79	456.33	1.23	71.99	1,416.46	0.3284
7	1991	89.73	1.45	160.74	115.69	2.01	42.41	412.03	0.0955
8	1990	58.78	1.37	92.90	82.81	3.25	53.02	292.13	0.0677
9	1989	42.80	1.12	69.29	63.92	4.54	55.24	236.91	0.0549
10	1988	9.76	0.33	15.73	15.06	1.72	17.13	59.73	0.0138
11	1987	4.53	0.16	6.96	6.46	1.06	8.97	28.14	0.0065
12	1986	1.36	0.04	1.57	1.39	1.12	4.74	10.23	0.0024
13	1985	2.65	0.08	3.27	4.64	1.62	9.97	22.23	0.0052
14	1984	2.22	0.04	2.44	1.73	4.03	15.84	26.30	0.0061
15	1983	1.81	0.04	1.78	1.65	2.17	10.48	17.94	0.0042
16	1982	1.59	0.04	1.76	1.14	3.09	11.50	19.12	0.0044
17	1981	1.40	0.02	0.97	0.55	1.76	7.46	12.15	0.0028
18	1980	0.46	0.00	0.28	0.26	0.53	3.98	5.50	0.0013
19	1979	0.12	0.00	0.15	0.06	0.16	0.86	1.36	0.0003
20	1978	0.32	0.00	0.48	0.44	0.45	2.03	3.73	0.0009
21	1977	0.11	0.00	0.05	0.06	0.18	0.56	0.97	0.0002
99	1899	2.68	0.00	1.05	0.72	0.45	2.05	6.94	0.0016
All ages combined		1,131.72	11.70	1,526.06	1,072.32	101.17	470.50	4,313.46	1.0000

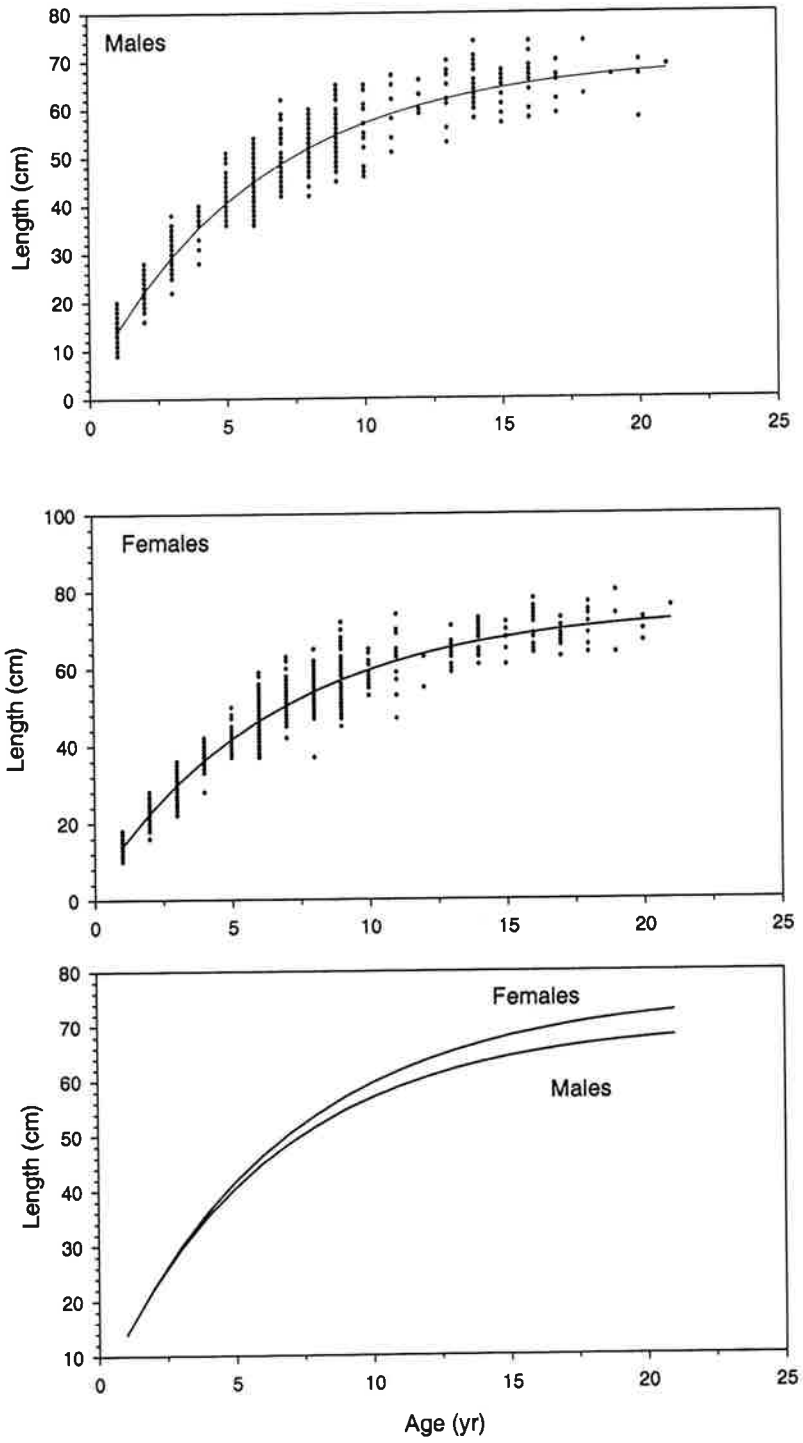

Figure 11.--Distribution of walleye pollock aged samples from the 1998 eastern Bering Sea bottom trawl survey by length for males, females and compared showing non-linear von Bertalanffy estimates.

Table 11.--Von Bertalanffy growth parameter estimates for walleye pollock by sex, based on otolith age reading and length data, from the 1998 eastern Bering Sea bottom trawl survey.

Sex	Number of age readings	Age range (years)	Length range (cm)	Parameters L_{inf}	K	t_o
Male	558	1-21	9-74	70.40	0.16	-0.38
Female	602	1-21	10-80	75.70	0.15	-0.36

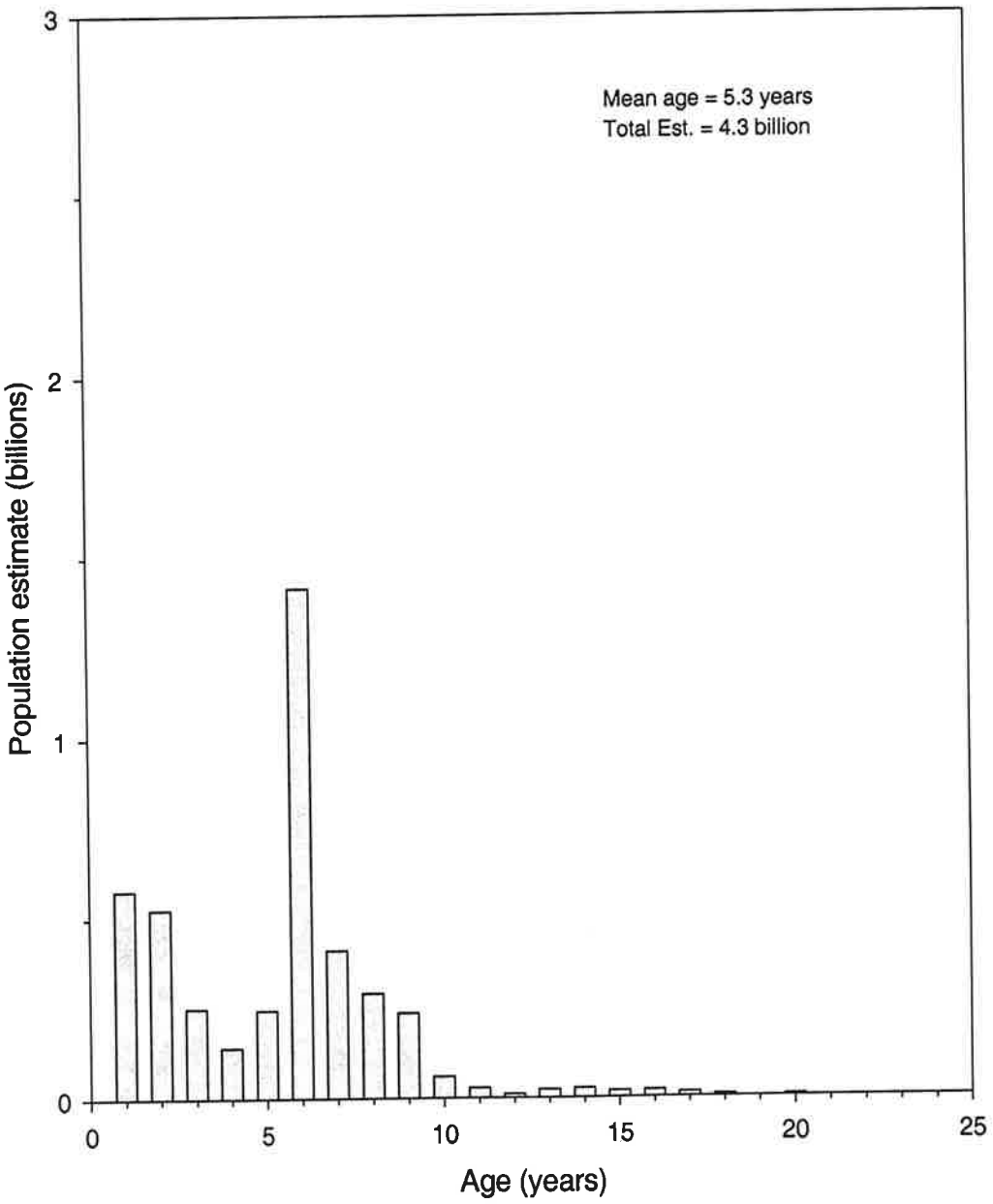

Figure 12.--Population number estimates by age for walleye pollock, 1998 eastern Bering Sea bottom trawl survey.

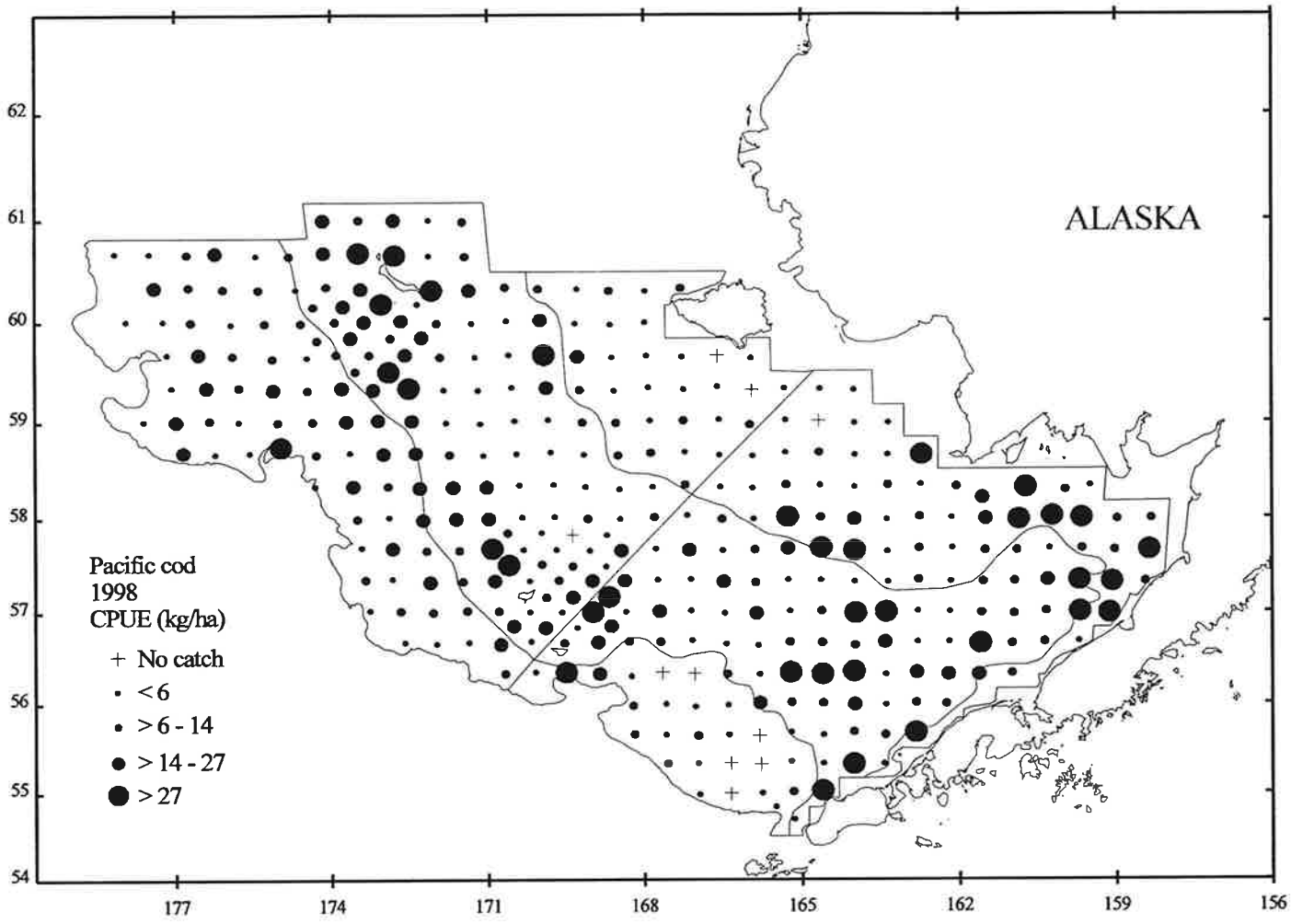

Figure 13--. Distribution and relative abundance in kg/ha of Pacific cod, 1998 eastern Bering Sea bottom trawl survey.

Table 12.--Abundance estimates and mean size of Pacific cod by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	17.94	139,695	0.250	175,428,039	0.327	0.796	35.7
2	5.12	21,003	0.038	39,392,542	0.073	0.533	29.9
3	12.34	127,509	0.228	112,631,236	0.210	1.132	41.3
4	14.05	151,441	0.271	168,778,106	0.314	0.897	38.4
5	5.37	20,817	0.037	9,215,757	0.017	2.259	54.6
6	10.36	97,954	0.175	31,832,667	0.059	3.077	60.1
All subareas combined[b]	12.05	558,419	1.000	537,278,347	1.000	1.039	39.1
95% Confidence interval		±89,460		±95,561,855			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

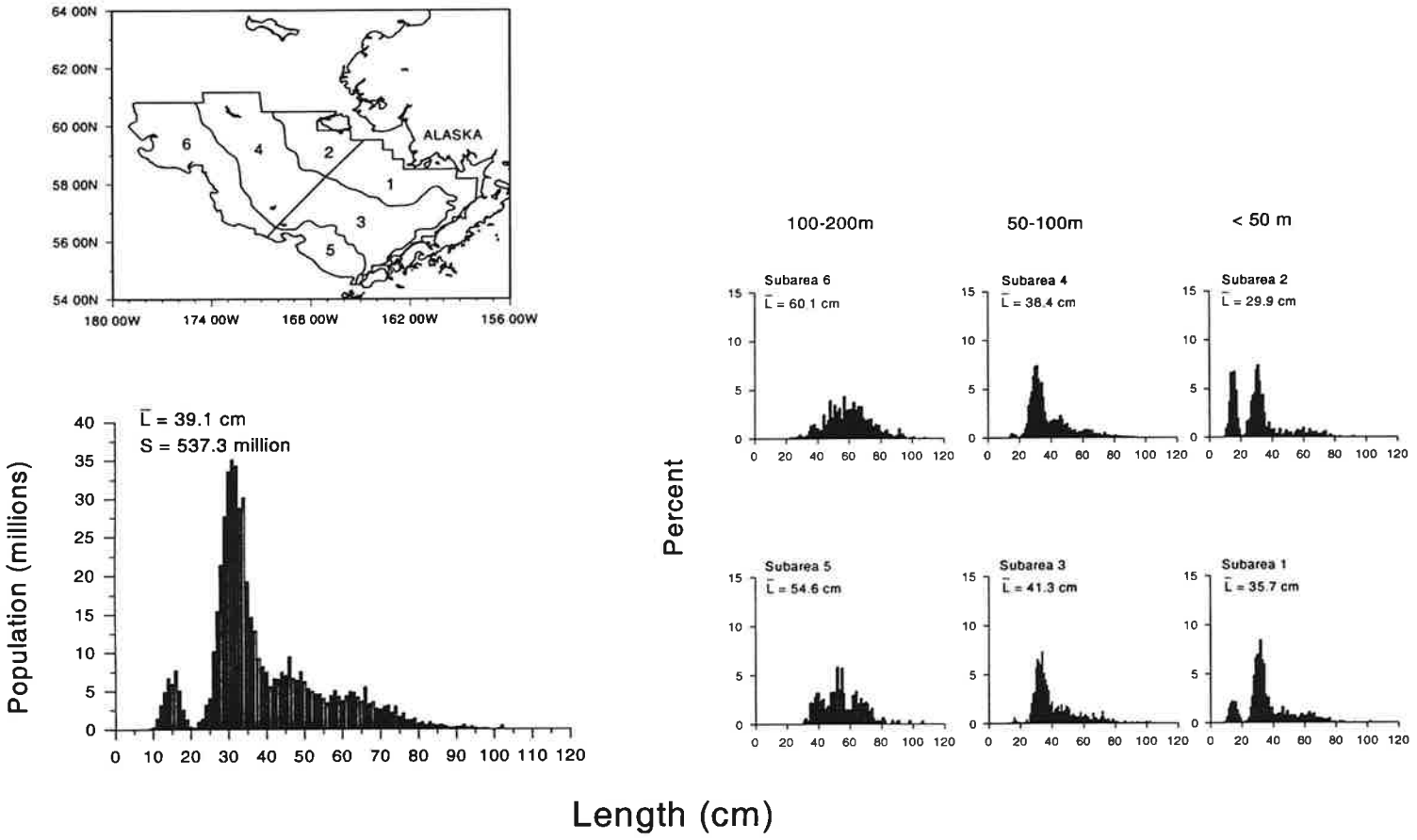

Figure 14.--Estimated relative size distribution (sexes combined) of Pacific cod in terms of population numbers and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

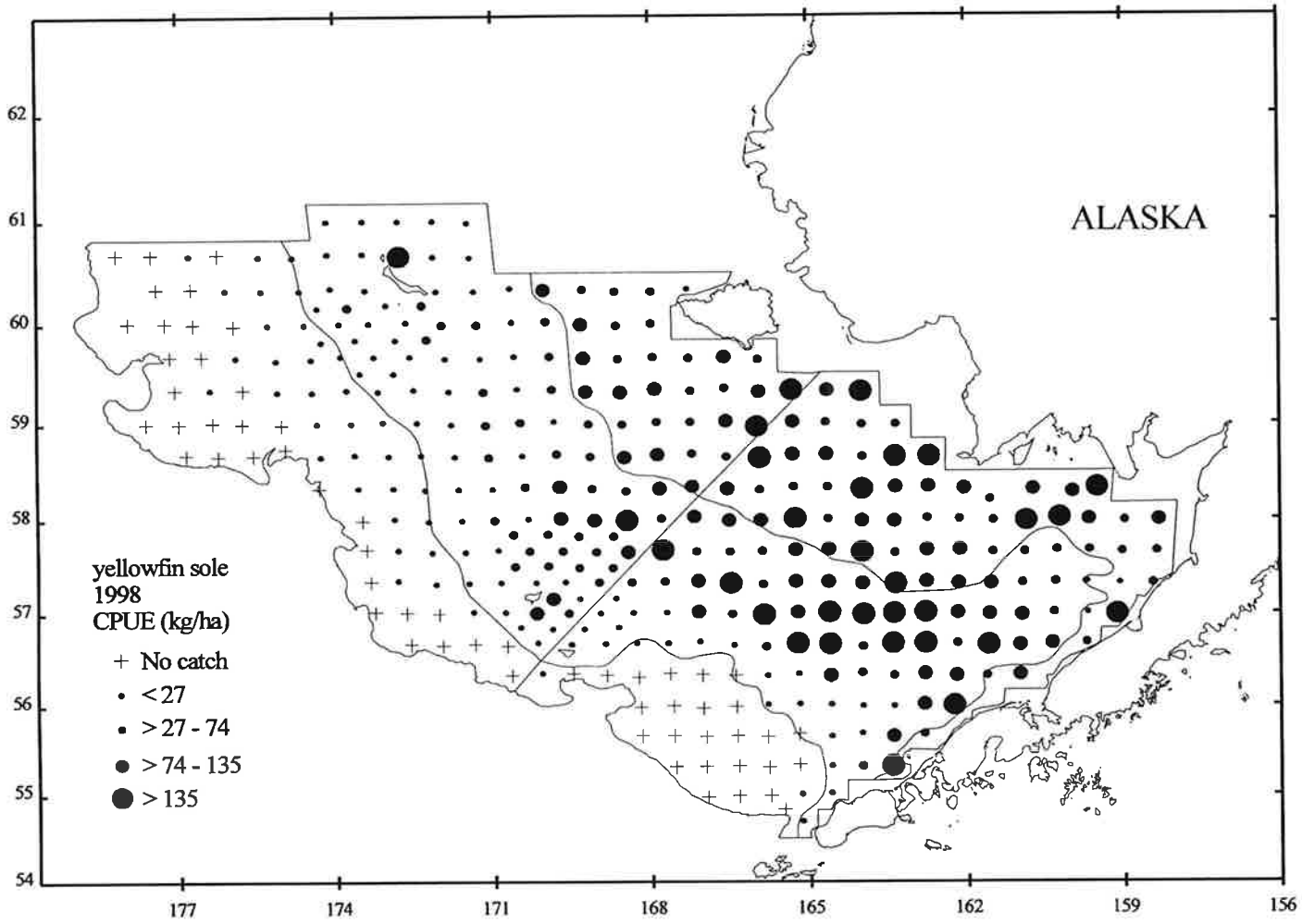

Figure 15--. Distribution and relative abundance in kg/ha of yellowfin sole, 1998 eastern Bering Sea bottom trawl survey.

Table 13.--Abundance estimates and mean size of yellowfin sole by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	102.30	796,642	0.342	4,049,302,938	0.410	0.197	24.6
2	72.85	298,887	0.128	1,387,221,319	0.141	0.215	24.8
3	82.85	855,792	0.367	3,255,396,146	0.330	0.263	27.6
4	34.30	369,854	0.159	1,152,766,626	0.117	0.321	29.5
5	0.10	384	0.000	624,640	0.000	0.615	34.2
6	1.11	10,510	0.005	22,763,157	0.002	0.462	33.7
All subareas combined[b]	50.33	2,332,068	1.000	9,868,074,827	1.000	0.236	26.2
95% Confidence interval		±296,633		±1,564,830,205			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

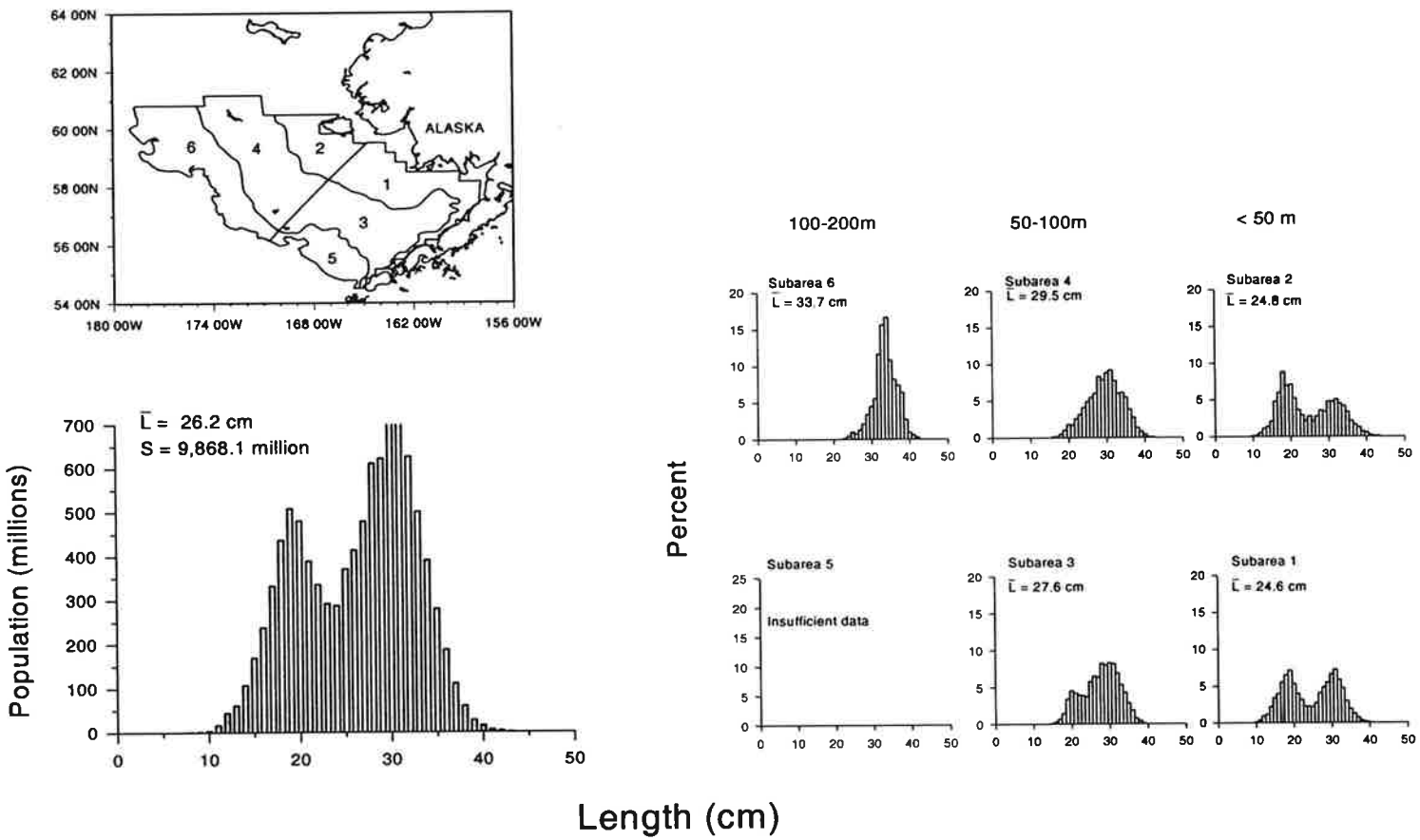

Figure 16.--Estimated size distribution (sexes combined) of yellowfin sole in terms of population numbers, and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

Table 14.--Estimated population numbers (millions) of yellowfin sole by age group and subarea, 1998 eastern Bering Sea bottom trawl survey.

		Depth and Subarea							
		100 - 200 m		50 - 100 m		< 50 m		All subareas	
Age	Year class	6	5	4	3	2	1	combined	Proportion
3	1995	0.00	0.00	0.00	0.00	9.48	49.44	58.92	0.0060
4	1994	0.00	0.00	0.78	6.53	30.78	115.15	153.23	0.0155
5	1993	0.00	0.00	9.37	68.98	201.00	549.90	829.25	0.0840
6	1992	0.04	0.00	48.03	255.83	186.33	499.24	989.47	0.1003
7	1991	0.30	0.02	131.86	566.56	293.22	740.43	1,732.39	0.1756
8	1990	0.21	0.01	63.16	193.58	44.13	117.73	418.81	0.0424
9	1989	0.44	0.02	63.39	194.14	35.55	136.40	429.94	0.0436
10	1988	0.79	0.03	99.24	268.24	42.19	163.71	574.20	0.0582
11	1987	1.06	0.03	115.84	306.53	54.51	207.36	685.32	0.0694
12	1986	1.53	0.04	107.43	291.69	61.26	253.05	715.00	0.0725
13	1985	0.88	0.02	46.24	120.66	30.61	122.15	320.56	0.0325
14	1984	1.45	0.03	51.43	120.76	37.04	122.89	333.60	0.0338
15	1983	1.84	0.04	65.66	173.06	47.12	165.15	452.87	0.0459
16	1982	0.50	0.01	23.21	57.89	21.26	77.07	179.95	0.0182
17	1981	4.34	0.10	105.38	237.20	84.86	249.09	680.96	0.0690
18	1980	1.78	0.06	56.93	130.08	45.43	143.49	377.76	0.0383
19	1979	1.40	0.04	33.17	58.28	31.11	71.46	195.46	0.0198
20	1978	0.65	0.01	15.43	28.32	15.36	36.06	95.83	0.0097
21	1977	0.21	0.00	5.95	11.01	8.26	19.09	44.53	0.0045
22	1976	1.02	0.02	24.20	39.04	19.35	46.18	129.82	0.0132
23	1975	0.54	0.03	10.79	10.95	10.91	15.84	49.06	0.0050
24	1974	0.86	0.03	15.97	20.75	12.77	22.81	73.19	0.0074
25	1973	0.96	0.04	17.59	24.40	15.34	29.32	87.65	0.0089
26	1972	0.20	0.01	4.72	8.89	9.46	20.73	44.01	0.0045
27	1971	0.50	0.03	10.30	11.65	8.10	9.56	40.14	0.0041
28	1970	0.12	0.01	2.98	4.10	3.98	9.61	20.80	0.0021
29	1969	0.26	0.00	5.36	11.31	4.54	10.95	32.44	0.0033
30	1968	0.37	0.01	9.15	23.24	7.92	22.50	63.19	0.0064
31	1967	0.17	0.00	4.87	9.66	5.70	13.94	34.34	0.0035
33	1965	0.13	0.01	1.34	1.11	1.43	1.17	5.19	0.0005
99	1899	0.20	0.00	3.00	0.98	8.21	7.82	20.21	0.0020
All Ages Combined		22.75	0.65	1,152.77	3,255.42	1,387.21	4,049.29	9,868.09	1.0000

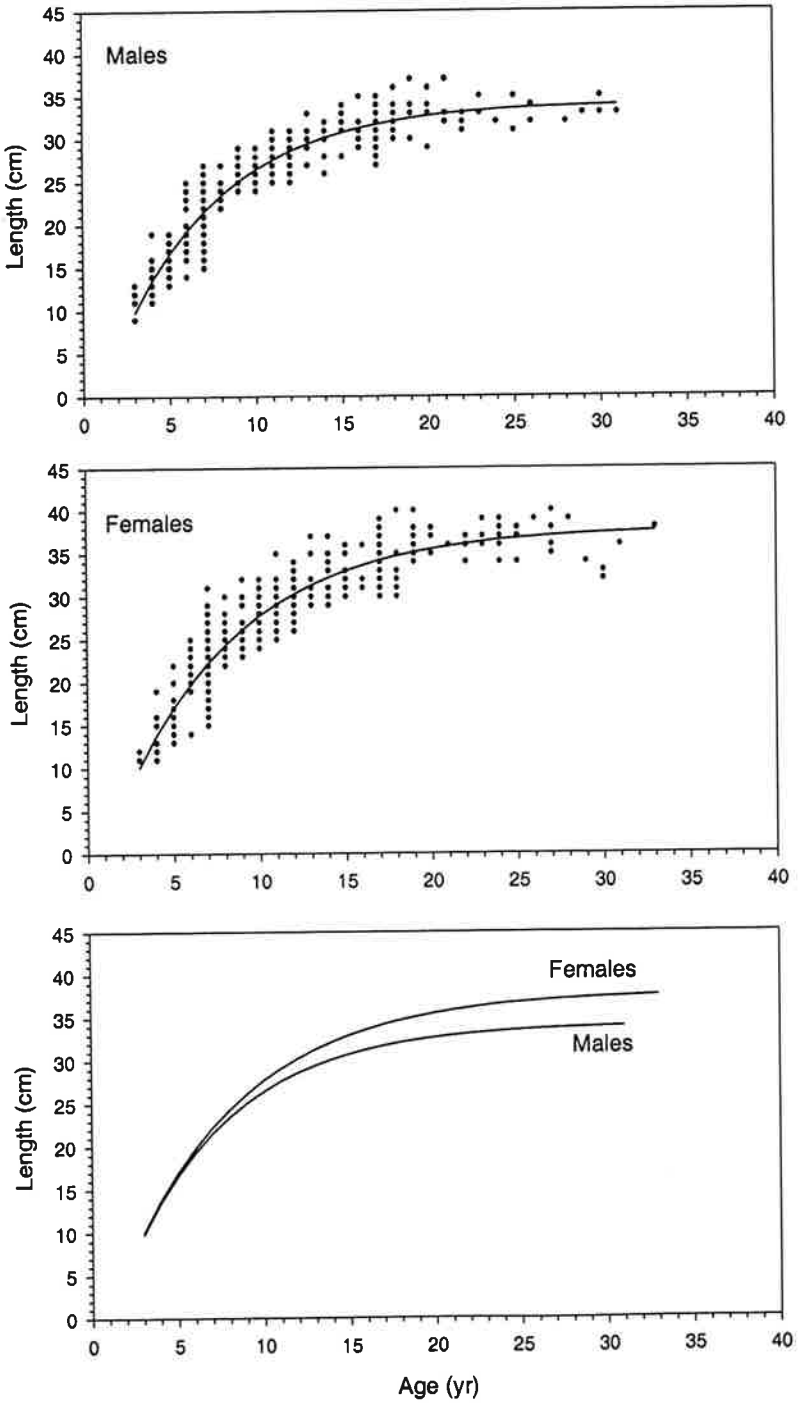

Figure 17.--Distribution of yellowfin sole aged samples from the 1998 eastern Bering Sea bottom trawl survey by length for males, females, and compared showing non-linear von Bertalanffy estimates.

Table 15.--Von Bertalanffy growth parameter estimates for yellowfin sole by sex, based on otolith age reading and length data from the 1998 eastern Bering Sea bottom trawl survey.

Sex	Number of age readings	Age range (years)	Length range (cm)	Parameters L_{inf}	K	t_o
Male	244	3-31	9-37	34.17	0.16	0.94
Female	326	3-33	11-40	37.93	0.14	0.85

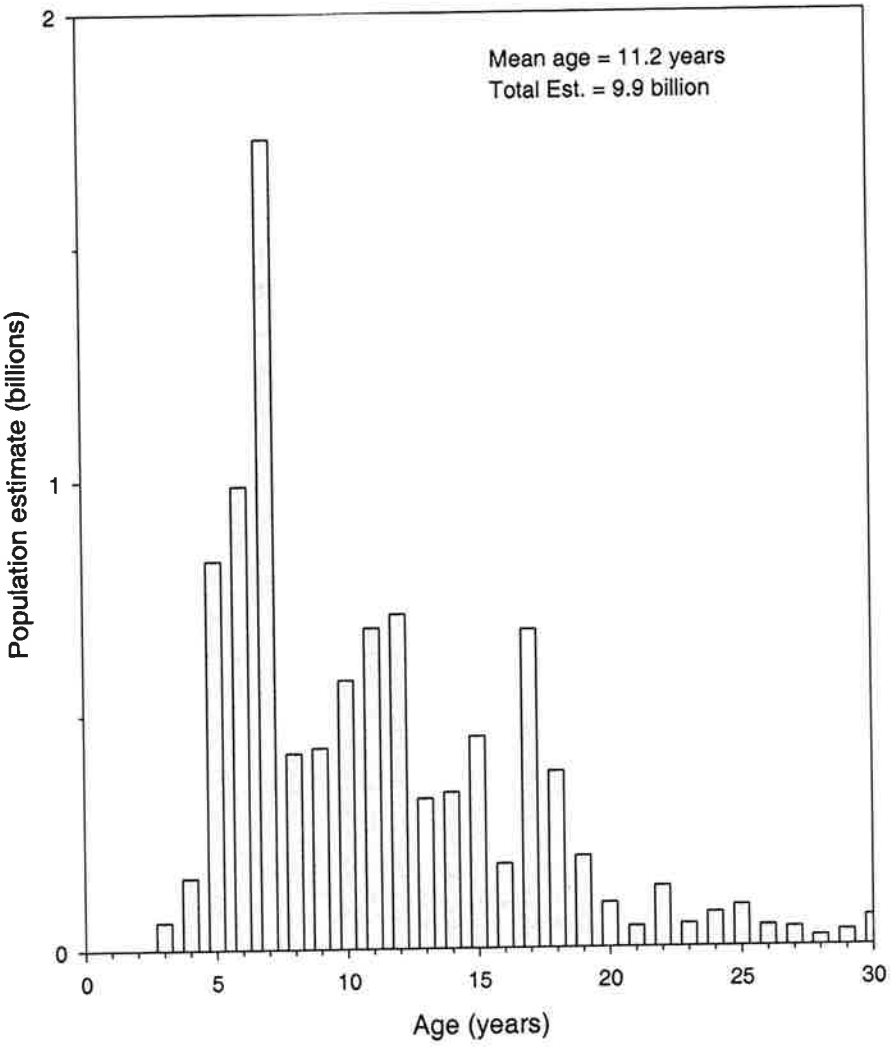

Figure 18.--Population number estimates by age for yellowfin sole, 1998 eastern Bering Sea bottom trawl survey.

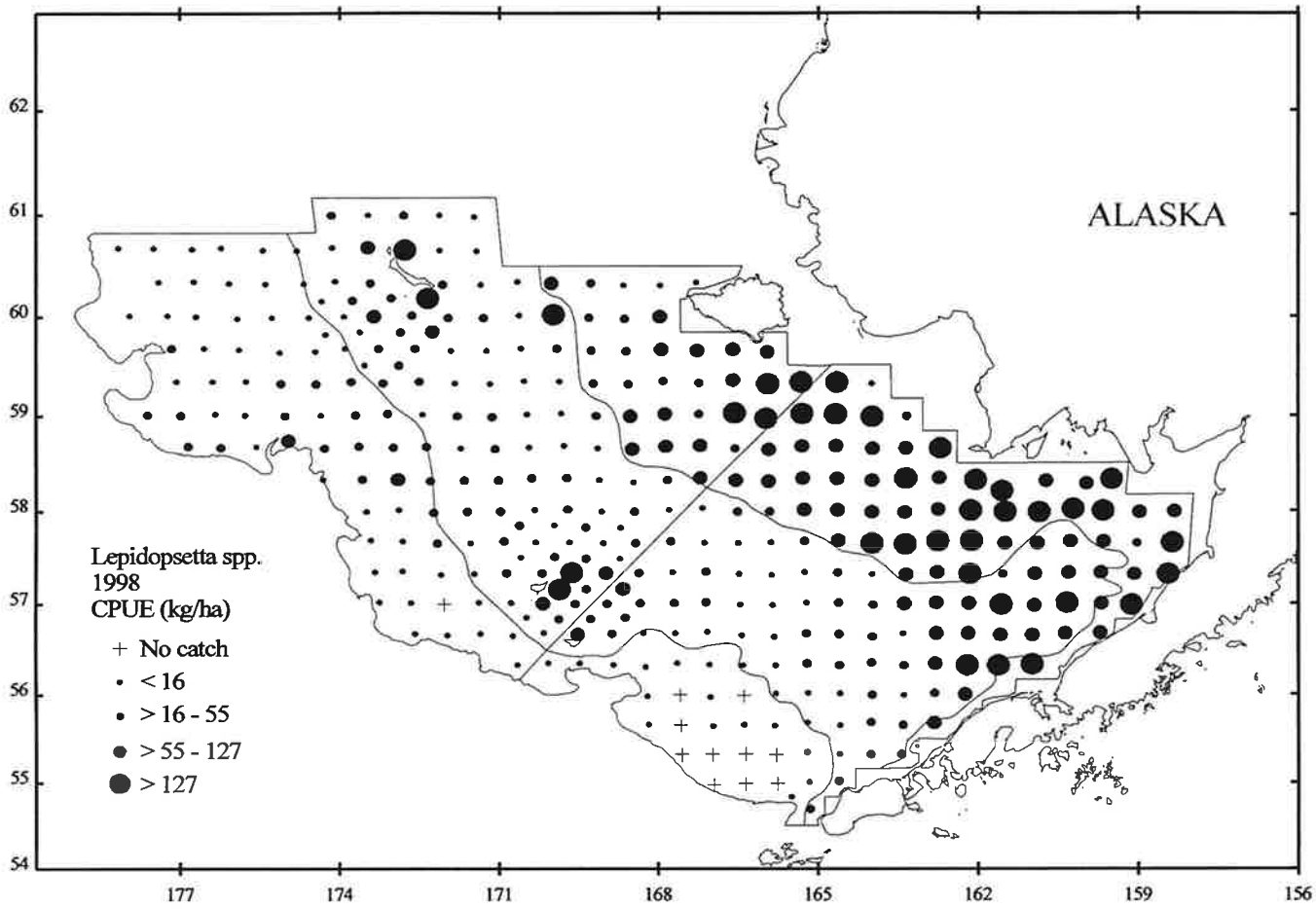

Figure 19--. Distribution and relative abundance in kg/ha of *Lepidopsetta* spp., 1998 eastern Bering Sea bottom trawl survey.

Table 16.--Abundance estimates and mean size of *Lepidopsetta* spp. by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	126.44	984,638	0.454	4,869,116,281	0.498	0.202	25.3
2	76.39	313,386	0.145	1,280,728,011	0.131	0.245	26.6
3	38.96	402,479	0.186	2,085,129,163	0.213	0.193	24.8
4	31.60	340,700	0.157	1,211,579,466	0.124	0.281	28.2
5	0.72	2,778	0.001	7,944,257	0.001	0.350	29.8
6	13.14	124,277	0.057	332,457,436	0.034	0.374	30.9
All subareas combined[b]	46.79	2,168,259	1.000	9,786,954,612	1.000	0.222	25.9
95% Confidence interval		±244,540		±1,021,342,392			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

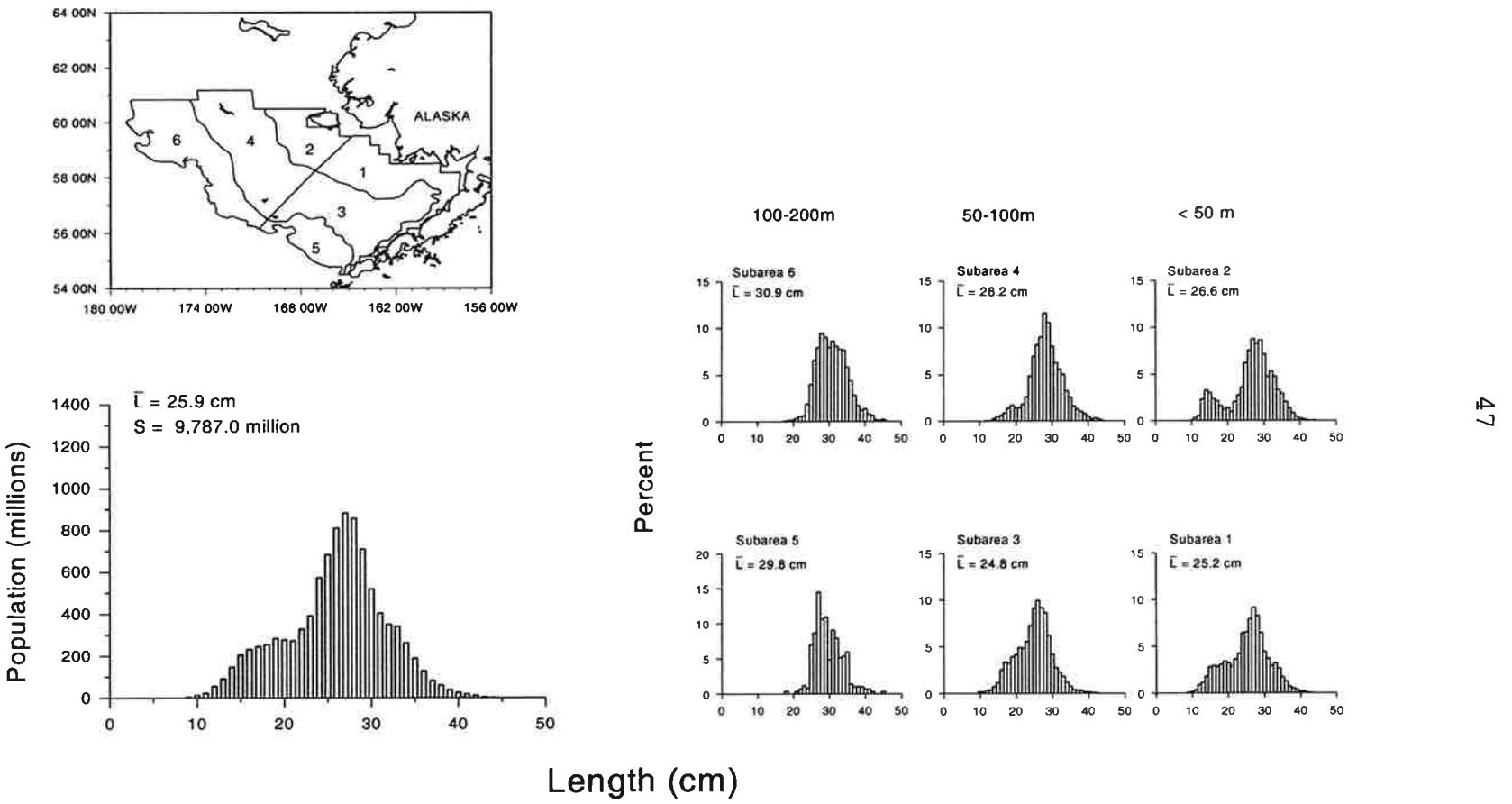

Figure 20.--Estimated relative size distribution (sexes combined) of *Lepidopsetta* spp. in terms of population numbers and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

Table 17.--Estimated population numbers (millions) of *Lepidopsetta* spp. by age group and subarea, 1998 eastern Bering Sea bottom trawl survey.

		Depth and Subarea							
		100 - 200 m		50 - 100 m		< 50 m			
Age	Year class	6	5	4	3	2	1	All subareas combined	Proportion
2	1996	0.00	0.00	0.00	0.00	0.00	1.87	1.87	0.0002
3	1995	0.00	0.00	4.19	33.33	55.97	170.33	263.82	0.0270
4	1994	0.50	0.01	27.13	149.89	113.17	447.27	737.98	0.0754
5	1993	1.75	0.05	54.20	257.10	62.71	485.10	860.91	0.0880
6	1992	3.65	0.10	42.15	170.76	46.28	337.67	600.61	0.0614
7	1991	16.58	0.58	100.52	253.13	96.64	473.71	941.16	0.0962
8	1990	45.10	1.42	221.62	445.20	208.02	893.00	1,814.36	0.1854
9	1989	19.65	0.61	81.92	121.46	74.59	260.51	558.75	0.0571
10	1988	23.42	0.58	93.44	122.28	82.79	270.35	592.86	0.0606
11	1987	91.53	2.03	263.02	258.07	253.76	741.53	1,609.95	0.1645
12	1986	58.58	1.20	180.88	169.73	163.56	467.64	1,041.59	0.1064
13	1985	21.92	0.47	60.93	57.51	55.25	147.61	343.70	0.0351
14	1984	11.74	0.18	22.79	11.73	24.02	51.21	121.66	0.0124
15	1983	15.86	0.31	27.78	15.01	27.37	64.64	150.96	0.0154
16	1982	8.29	0.15	12.31	6.04	6.78	18.12	51.69	0.0053
17	1981	5.88	0.13	8.48	4.19	3.96	10.63	33.27	0.0034
18	1980	1.35	0.01	2.16	0.91	1.14	3.50	9.08	0.0009
19	1979	2.61	0.04	3.44	1.49	1.03	4.06	12.68	0.0013
21	1977	1.20	0.01	1.55	0.74	0.79	2.10	6.39	0.0007
22	1976	1.40	0.01	2.02	0.96	0.91	2.59	7.89	0.0008
24	1974	0.13	0.00	0.12	0.13	0.13	0.32	0.82	0.0001
26	1972	0.84	0.02	0.79	0.69	0.59	3.04	5.96	0.0006
99	1899	0.47	0.03	0.12	4.77	1.29	12.30	18.98	0.0019
All Ages Combined		332.45	7.94	1,211.56	2,085.12	1,280.75	4,869.10	9,786.94	1.0000

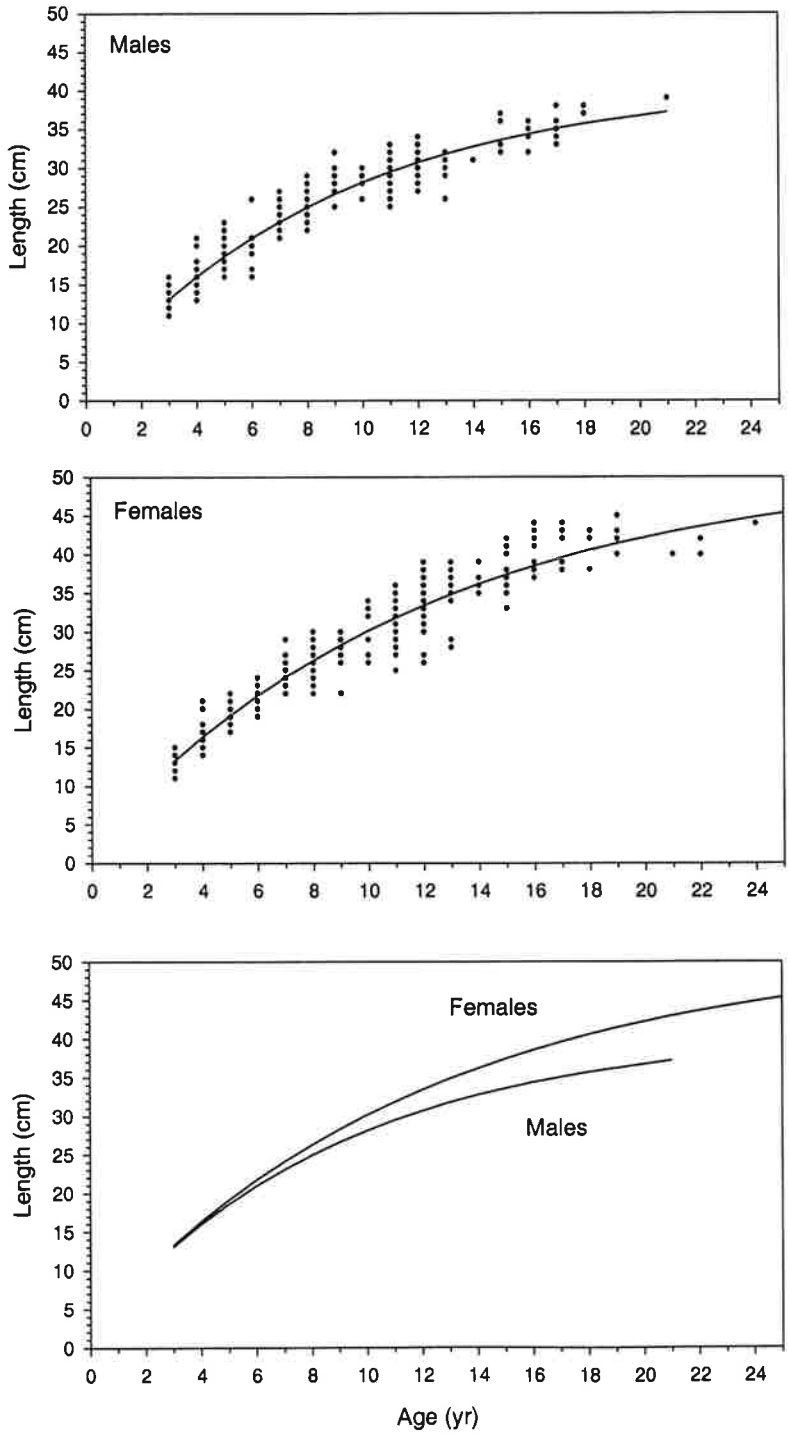

Figure 21.–Distribution of *Lepidopsetta* spp. aged samples from the 1998 eastern Bering Sea bottom trawl survey by length for males, females, and compared showing non-linear von Bertalanffy estimates.

Table 18.--Von Bertalanffy growth parameter estimates for *Lepidopsetta* spp. by sex, based on otolith age reading and length data from the 1998 eastern Bering Sea bottom trawl survey.

Sex	Number of age readings	Age range (years)	Length range (cm)	Parameters		
				L_{inf}	K	t_o
Male	166	3-21	11-39	40.98	0.11	-0.48
Female	233	3-26	11-45	51.54	0.08	-0.62

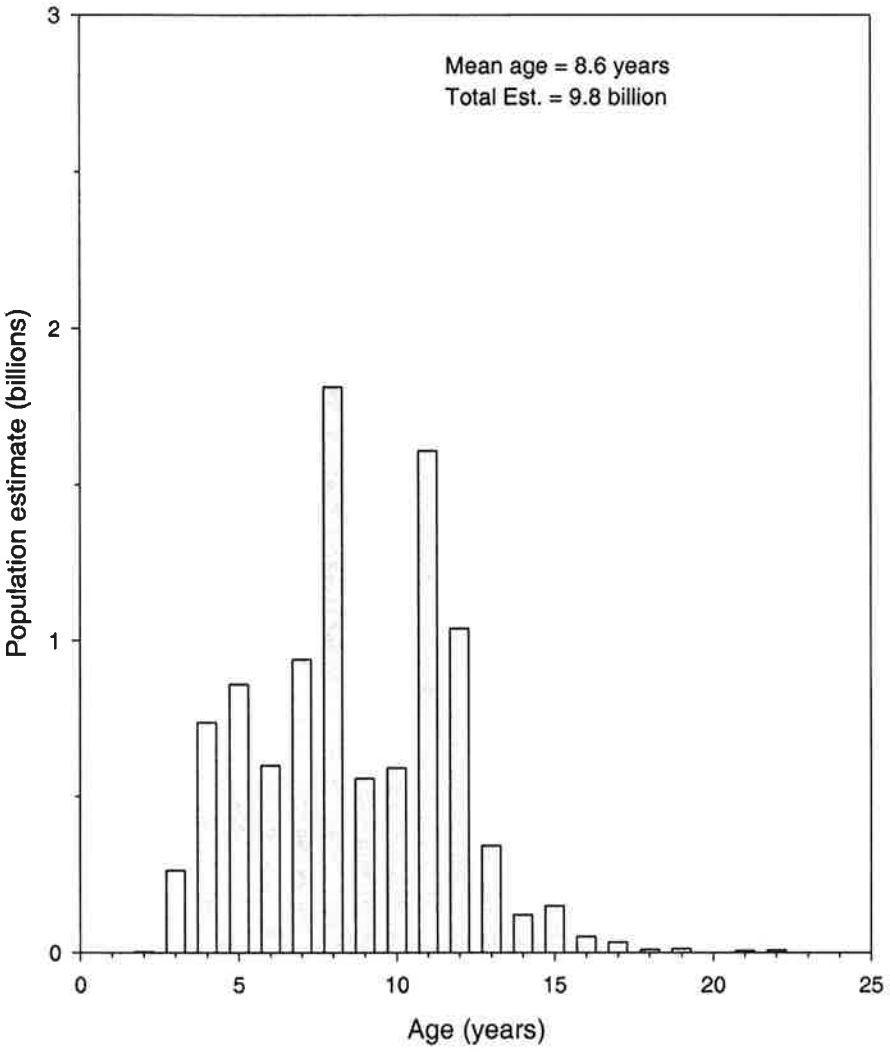

Figure 22.--Population number estimates by age for *Lepidopsetta* spp., 1998 eastern Bering Sea bottom trawl survey.

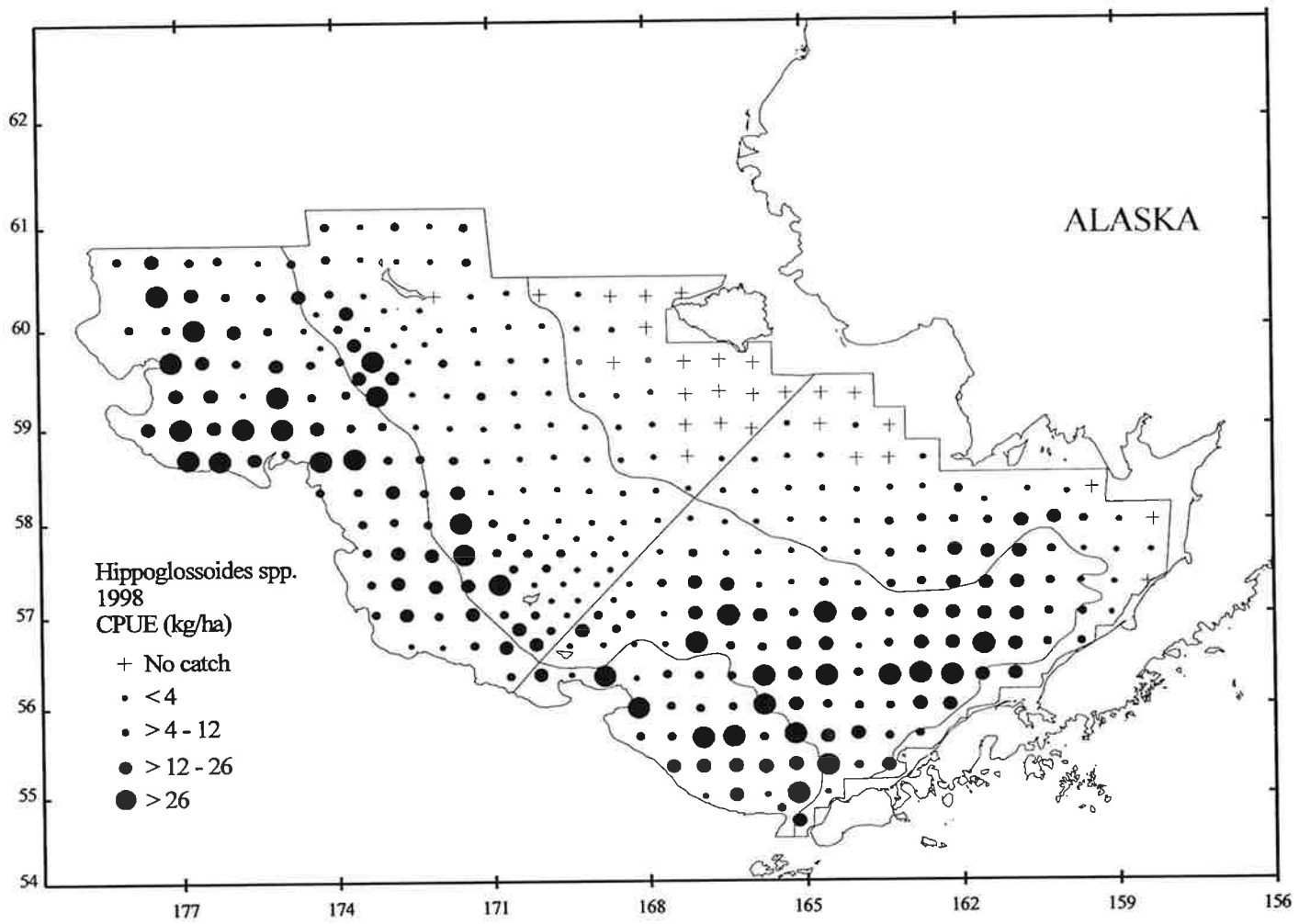

Figure 23--. Distribution and relative abundance in kg/ha of *Hippoglossoides* spp., 1998 eastern Bering Sea bottom trawl survey.

Table 19.--Abundance estimates and mean size of *Hippoglossoides* spp. by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	4.62	35,948	0.053	71,104,260	0.035	0.506	36.0
2	0.22	918	0.001	1,534,015	0.001	0.598	35.4
3	18.13	187,322	0.274	506,949,174	0.247	0.370	32.3
4	7.44	80,176	0.117	177,936,121	0.087	0.451	33.9
5	16.18	62,772	0.092	324,725,595	0.158	0.193	26.4
6	33.46	316,414	0.463	970,938,385	0.473	0.326	29.0
All subareas combined[b]	14.75	683,549	1.000	2,053,187,550	1.000	0.333	30.1
95% Confidence interval		±281,272		±565,476,976			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

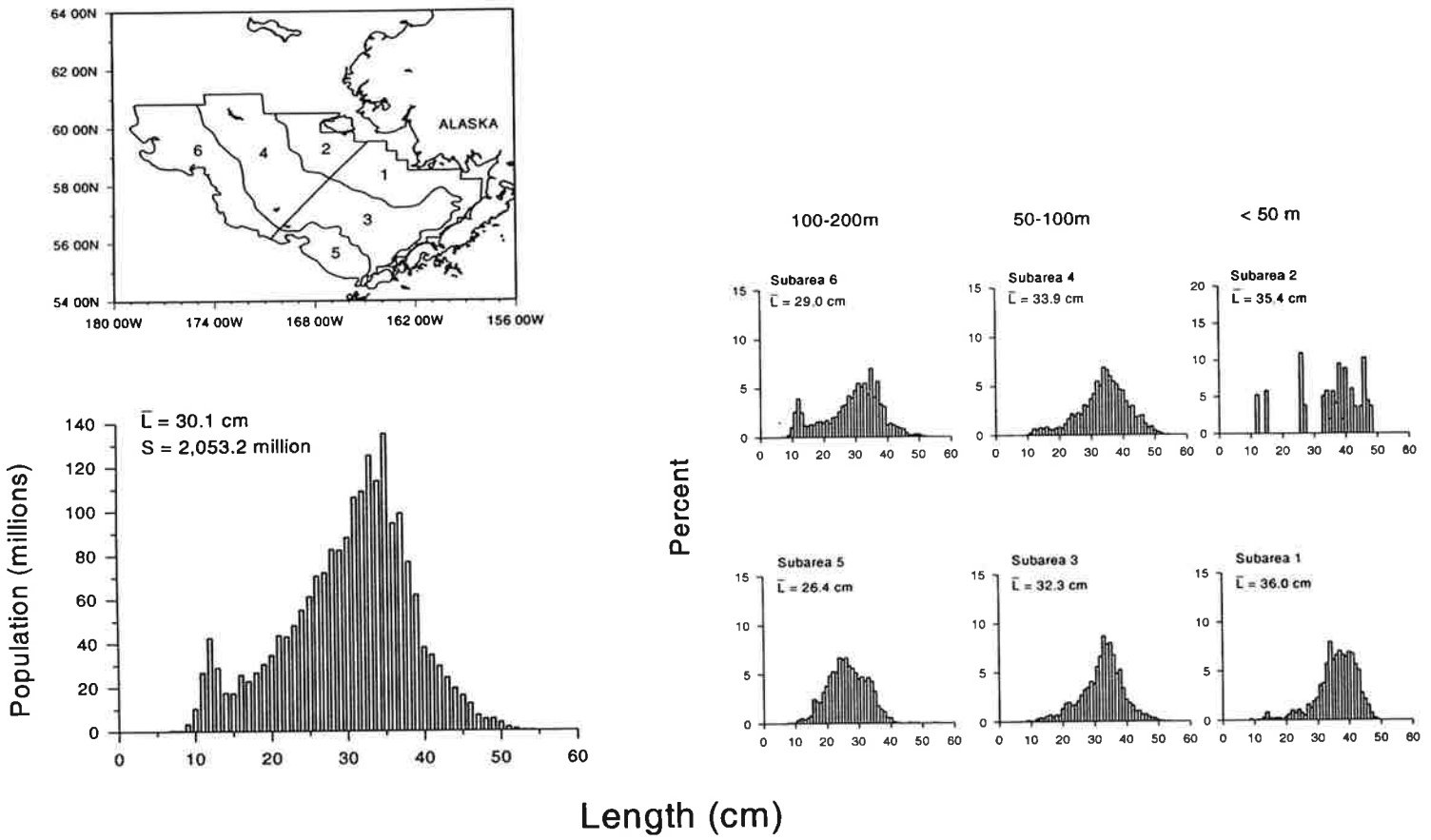

Figure 24.--Estimated relative size distribution (sexes combined) of *Hippoglossoides* spp. in terms of population numbers and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

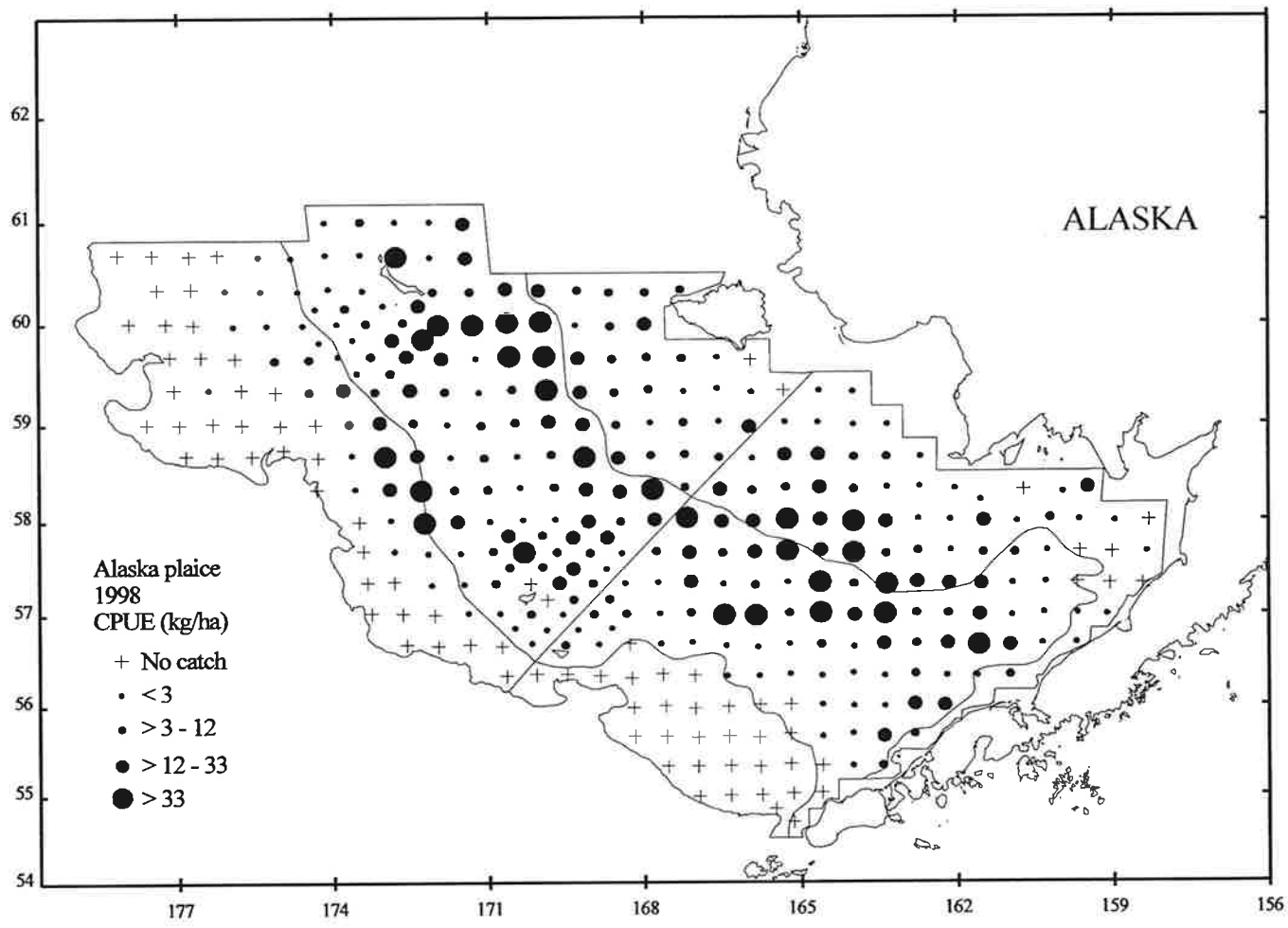

Figure 25--. Distribution and relative abundance in kg/ha of Alaska plaice, 1998 eastern Bering Sea bottom trawl survey.

Table 20.--Abundance estimates and mean size of Alaska plaice by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	9.63	75,007	0.166	155,485,711	0.212	0.482	32.0
2	7.28	29,864	0.066	87,162,455	0.119	0.343	29.7
3	11.78	121,650	0.269	190,780,312	0.260	0.638	35.7
4	17.34	186,955	0.413	273,693,511	0.373	0.683	36.5
5	0.00	0	0.000	0	0.000	0.000	0.0
6	4.14	39,120	0.086	27,534,649	0.037	1.421	44.9
All subareas combined[b]	9.77	452,596	1.000	734,656,637	1.000	0.616	34.9
95% Confidence interval		±117,314		±152,025,132			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

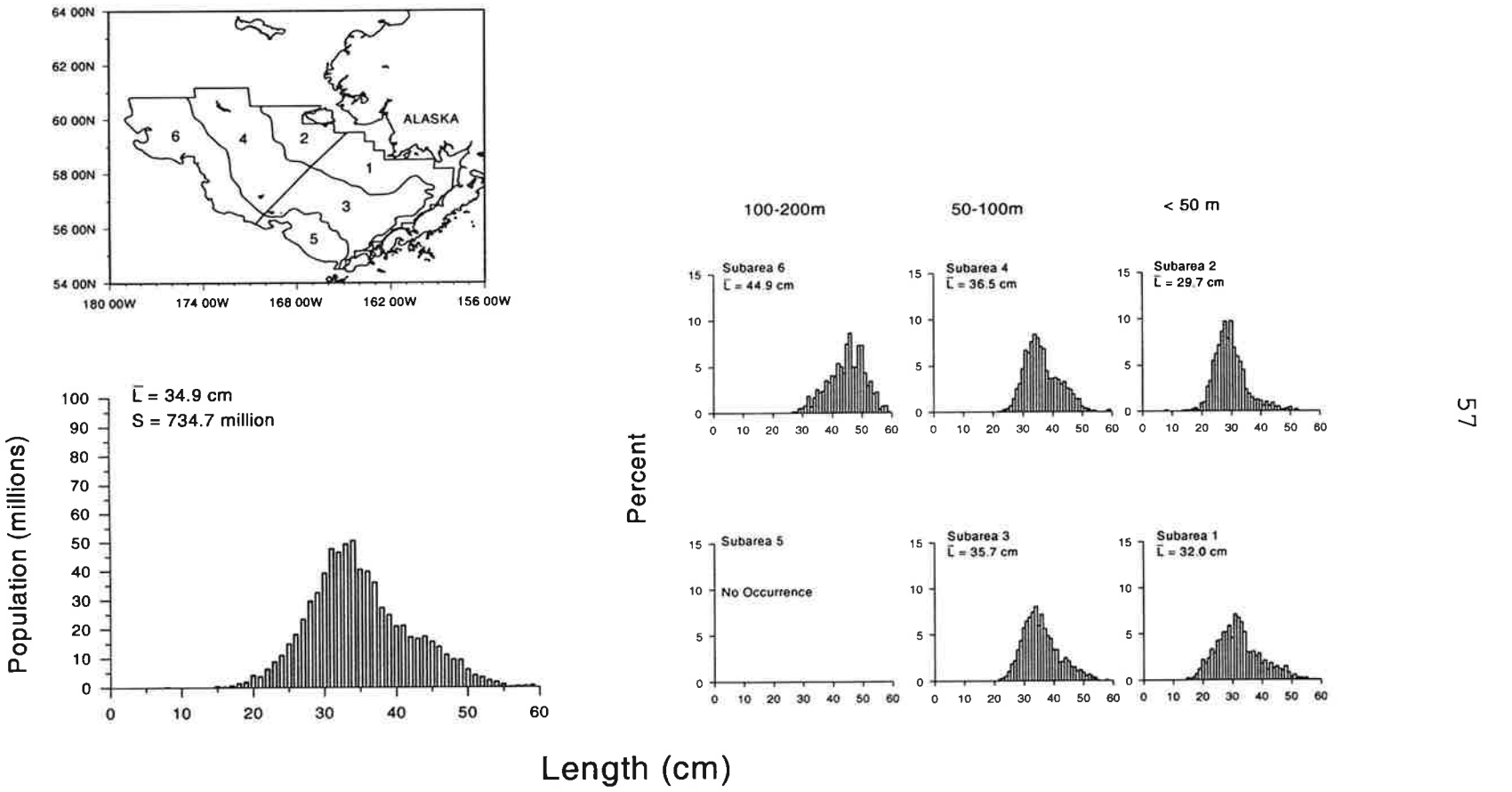

Figure 26.--Estimated relative size distribution (sexes combined) of Alaska plaice in terms of population numbers and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

Table 17.--Estimated population numbers (millions) of Alaska plaice by age group and subarea, 1998 eastern Bering Sea bottom trawl survey.

		Depth and Subarea							
		100 - 200 m		50 - 100 m		< 50 m		All subareas combined	Proportion
Age	Year class	6	5	4	3	2	1		
4	1994	0.00	0.00	0.02	0.02	0.44	0.68	1.17	0.0016
5	1993	0.00	0.00	0.17	0.29	2.25	6.05	8.77	0.0119
6	1992	0.04	0.00	4.11	4.74	9.29	13.72	31.89	0.0434
7	1991	0.13	0.00	11.95	12.87	21.97	26.68	73.60	0.1002
8	1990	0.35	0.00	19.90	19.30	14.95	16.80	71.29	0.0970
9	1989	1.58	0.00	41.15	31.19	14.64	21.19	109.75	0.1494
10	1988	0.97	0.00	24.77	17.37	5.93	10.95	59.98	0.0816
11	1987	2.42	0.00	29.15	19.43	4.22	11.09	66.31	0.0903
12	1986	3.23	0.00	31.41	20.26	3.86	11.45	70.21	0.0956
13	1985	1.16	0.00	14.07	7.76	1.67	4.49	29.14	0.0397
14	1984	1.54	0.00	20.29	12.17	1.97	6.77	42.74	0.0582
15	1983	1.53	0.00	14.21	8.36	1.09	4.26	29.46	0.0401
16	1982	1.72	0.00	9.69	6.30	1.09	3.68	22.48	0.0306
17	1981	2.14	0.00	14.95	8.32	1.27	4.80	31.47	0.0428
18	1980	0.96	0.00	7.24	3.75	0.41	1.84	14.20	0.0193
19	1979	1.12	0.00	6.24	3.30	0.41	1.61	12.69	0.0173
20	1978	1.47	0.00	6.15	3.79	0.33	2.13	13.87	0.0189
21	1977	2.18	0.00	6.20	4.04	0.38	2.04	14.84	0.0202
22	1976	1.64	0.00	3.35	2.25	0.25	1.71	9.20	0.0125
23	1975	0.66	0.00	2.25	1.29	0.17	0.81	5.18	0.0070
24	1974	0.93	0.00	2.79	1.95	0.13	0.94	6.75	0.0092
25	1973	0.68	0.00	0.42	0.61	0.07	0.21	1.99	0.0027
26	1972	0.17	0.00	0.55	0.20	0.00	0.06	0.97	0.0013
30	1968	0.15	0.00	0.42	0.22	0.02	0.25	1.07	0.0014
31	1967	0.28	0.00	0.98	0.58	0.06	0.32	2.22	0.0030
99	1899	0.49	0.00	1.25	0.41	0.30	0.97	3.42	0.0047
All Ages Combined		27.54	0.00	273.68	190.77	87.17	155.50	734.66	1.0000

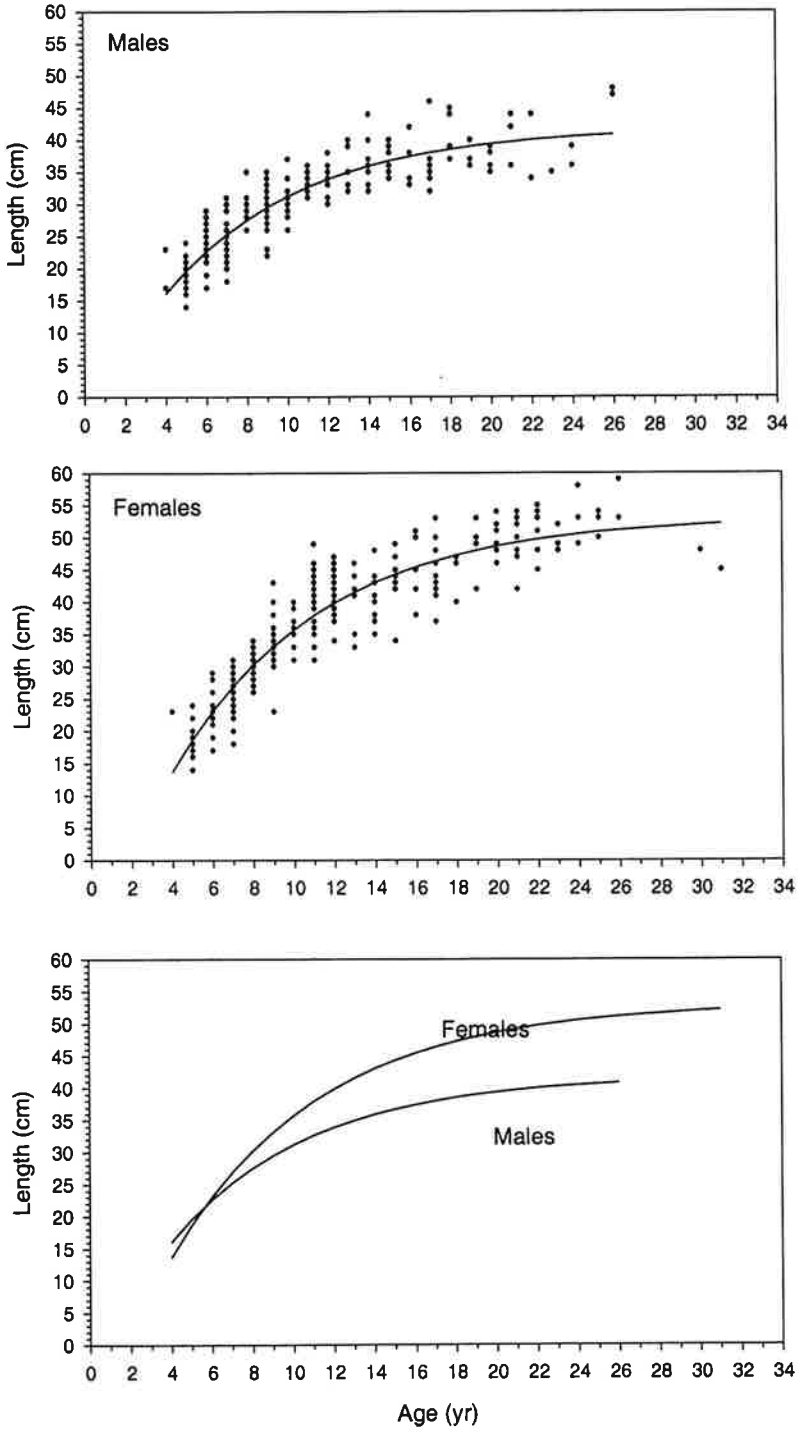

Figure 27.–Distribution of Alaska plaice aged samples from the 1998 eastern Bering Sea bottom trawl survey by length for males, females, and compared showing non-linear von Bertalanffy estimates.

Table 18.--Von Bertalanffy growth parameter estimates for Alaska plaice by sex, based on otolith age reading and length data from the 1998 eastern Bering Sea bottom trawl survey.

Sex	Number of age readings	Age range (years)	Length range (cm)	Parameters		
				L_{inf}	K	t_o
Male	180	4-26	16-48	41.83	0.15	0.69
Female	236	4-31	14-59	53.15	0.14	1.80

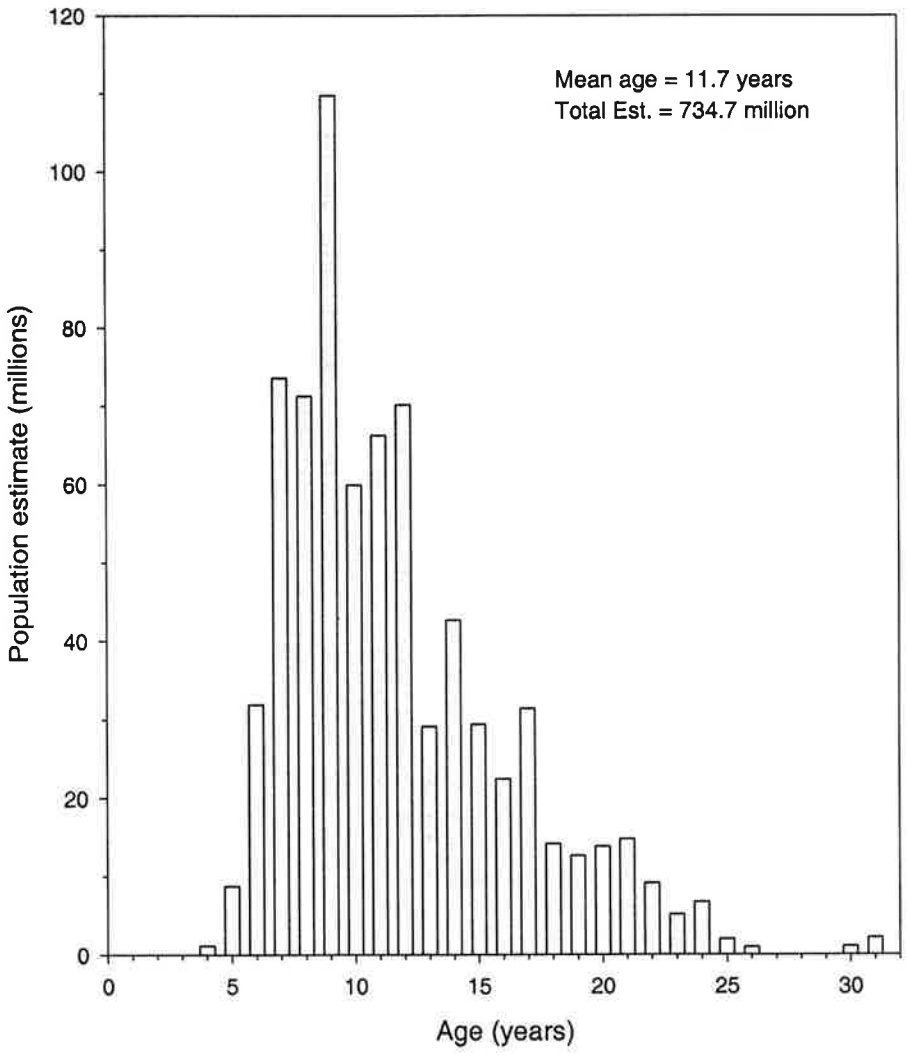

Figure 28.–Population number estimates by age for Alaska plaice, 1998 eastern Bering Sea bottom trawl survey.

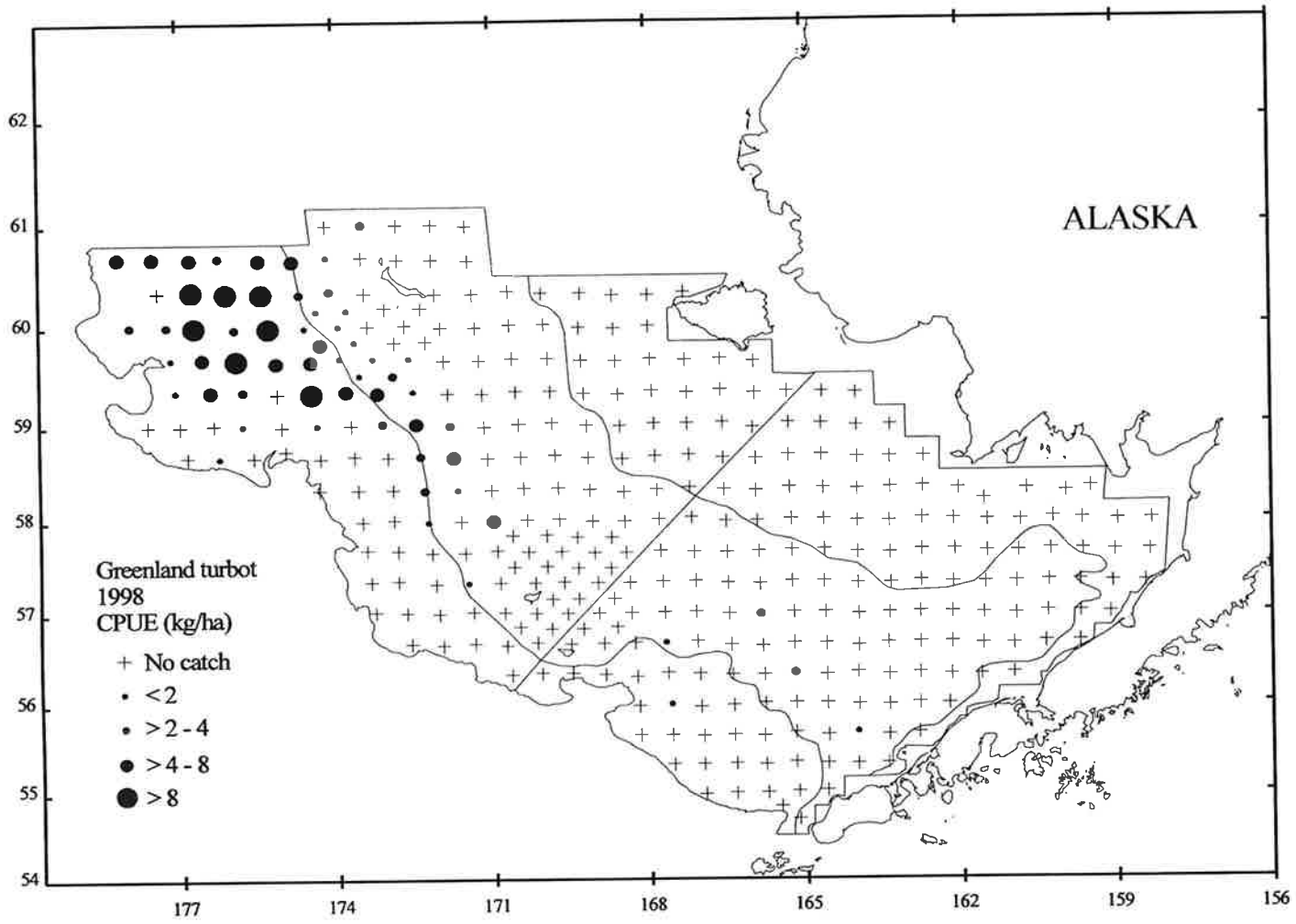

Figure 29--. Distribution and relative abundance in kg/ha of Greenland turbot, 1998 eastern Bering Sea bottom trawl survey.

Table 23.--Abundance estimates and mean size of Greenland turbot by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	0.00	0	0.000	0	0.000	0.000	0.0
2	0.00	0	0.000	0	0.000	0.000	0.0
3	0.11	1,089	0.039	189,573	0.024	5.744	81.2
4	0.52	5,657	0.201	1,164,218	0.147	4.859	68.2
5	0.05	201	0.007	29,139	0.004	6.898	87.0
6	2.24	21,180	0.753	6,512,435	0.825	3.252	57.7
All subareas combined[b]	0.61	28,126	1.000	7,895,366	1.000	3.562	59.9
95% Confidence interval		±8,075		±2,810,378			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

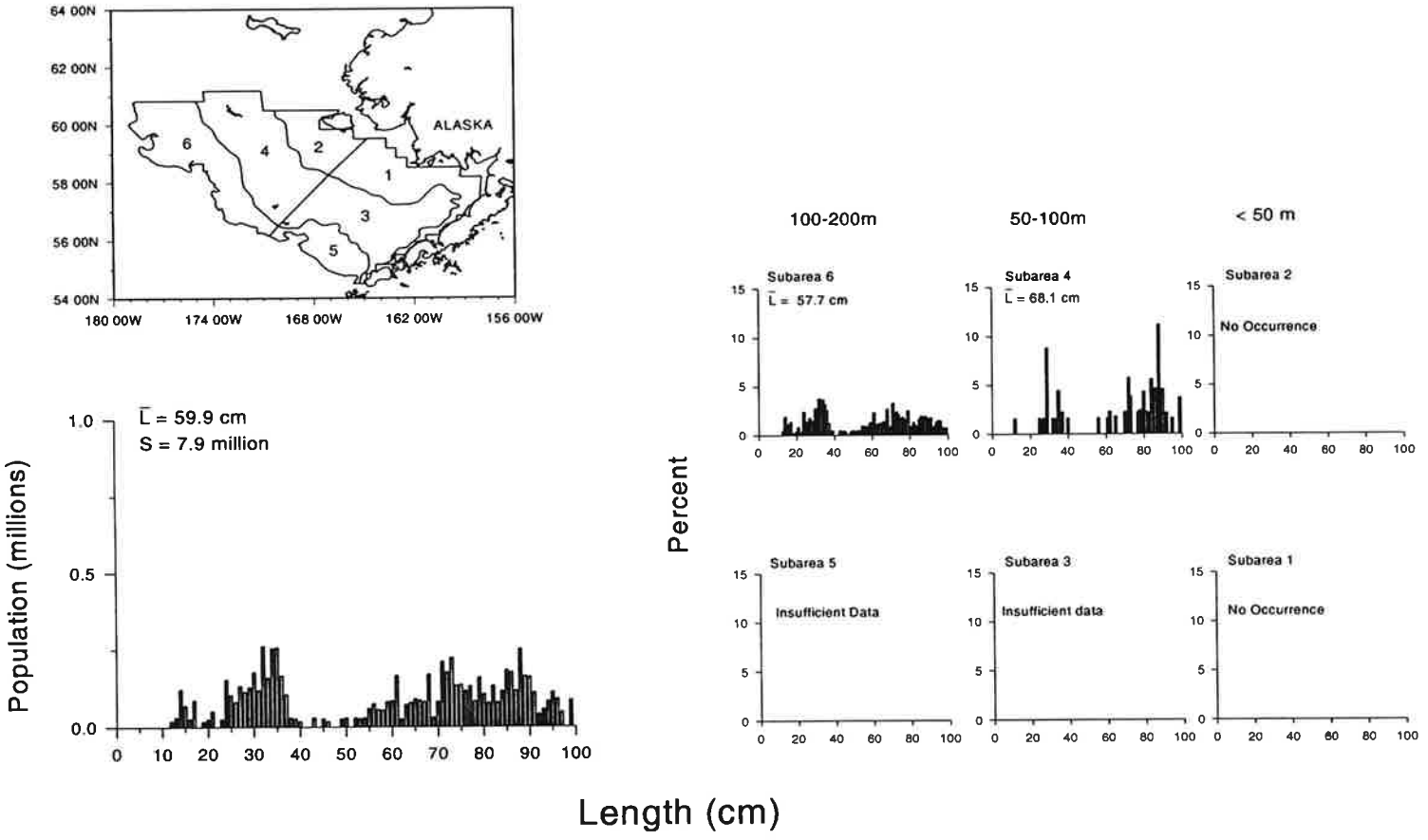

Figure 30.--Estimated relative size distribution (sexes combined) of Greenland turbot in terms of population number and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

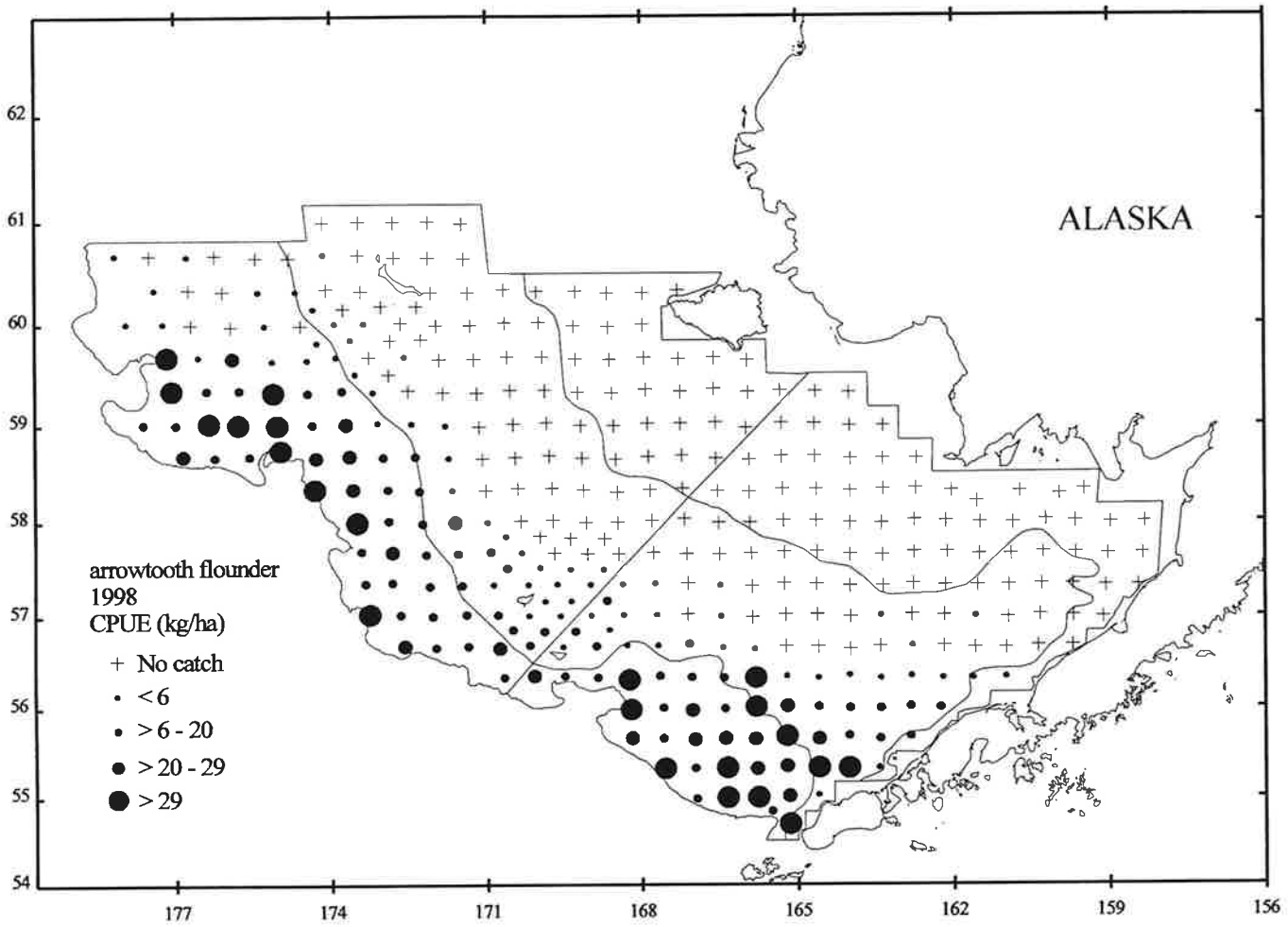

Figure 31--. Distribution and relative abundance in kg/ha of arrowtooth flounder, 1998 eastern Bering Sea bottom trawl survey.

Table 24.--Abundance estimates and mean size of arrowtooth flounder by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	0.17	1,338	0.004	4,690,780	0.009	0.285	28.6
2	0.00	0	0.000	0	0.000	0.000	0.0
3	9.36	96,676	0.280	184,063,548	0.354	0.525	35.2
4	1.47	15,902	0.046	29,975,332	0.058	0.531	33.8
5	21.83	84,691	0.246	145,688,213	0.280	0.581	35.8
6	15.47	146,282	0.424	156,174,709	0.300	0.937	41.1
All subareas combined[b]	7.44	344,890	1.000	520,592,582	1.000	0.662	37.0
95% Confidence interval		±78,488		±158,827,228			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

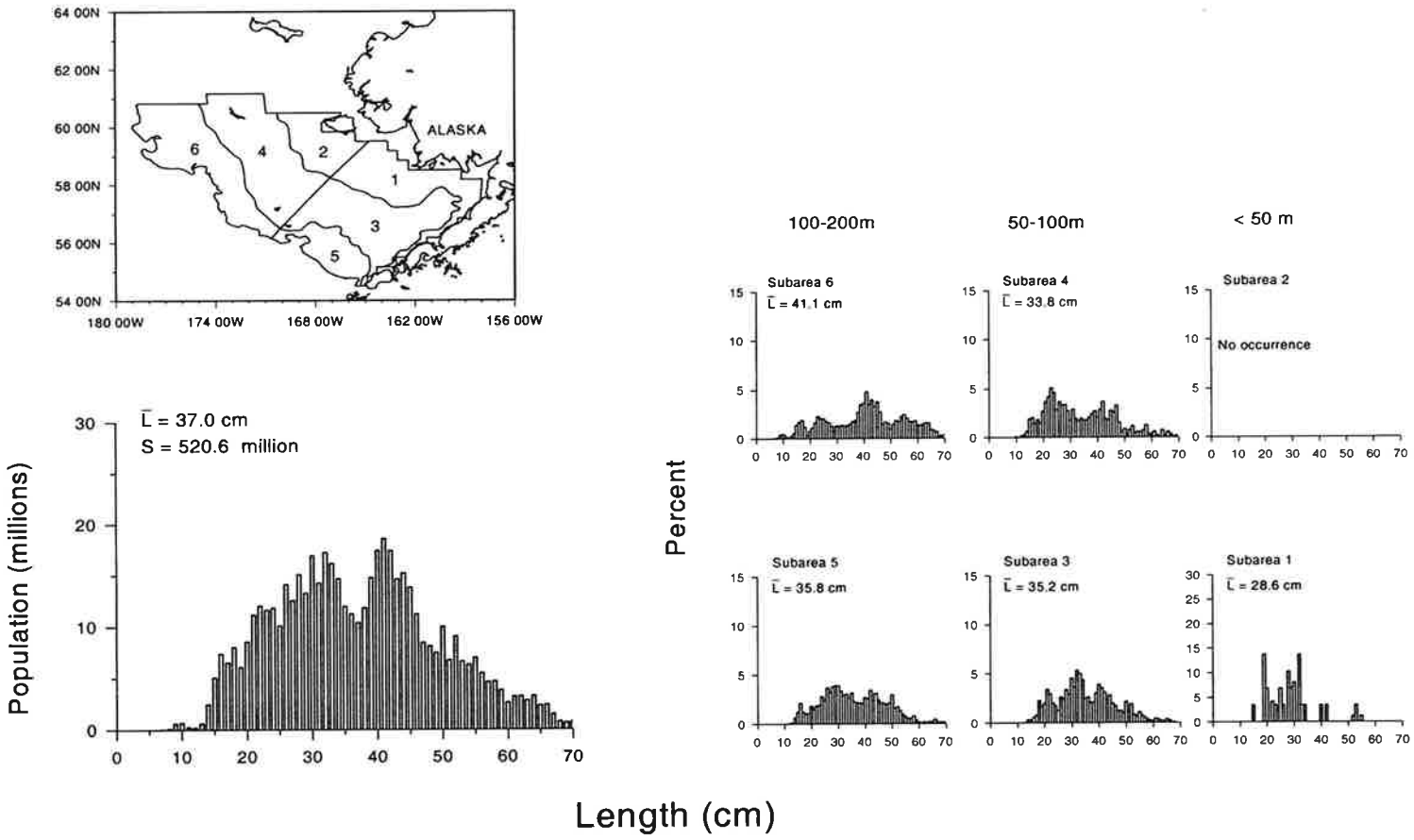

Figure 32.--Estimated relative size distribution (sexes combined) of arrowtooth flounder in terms of population numbers and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

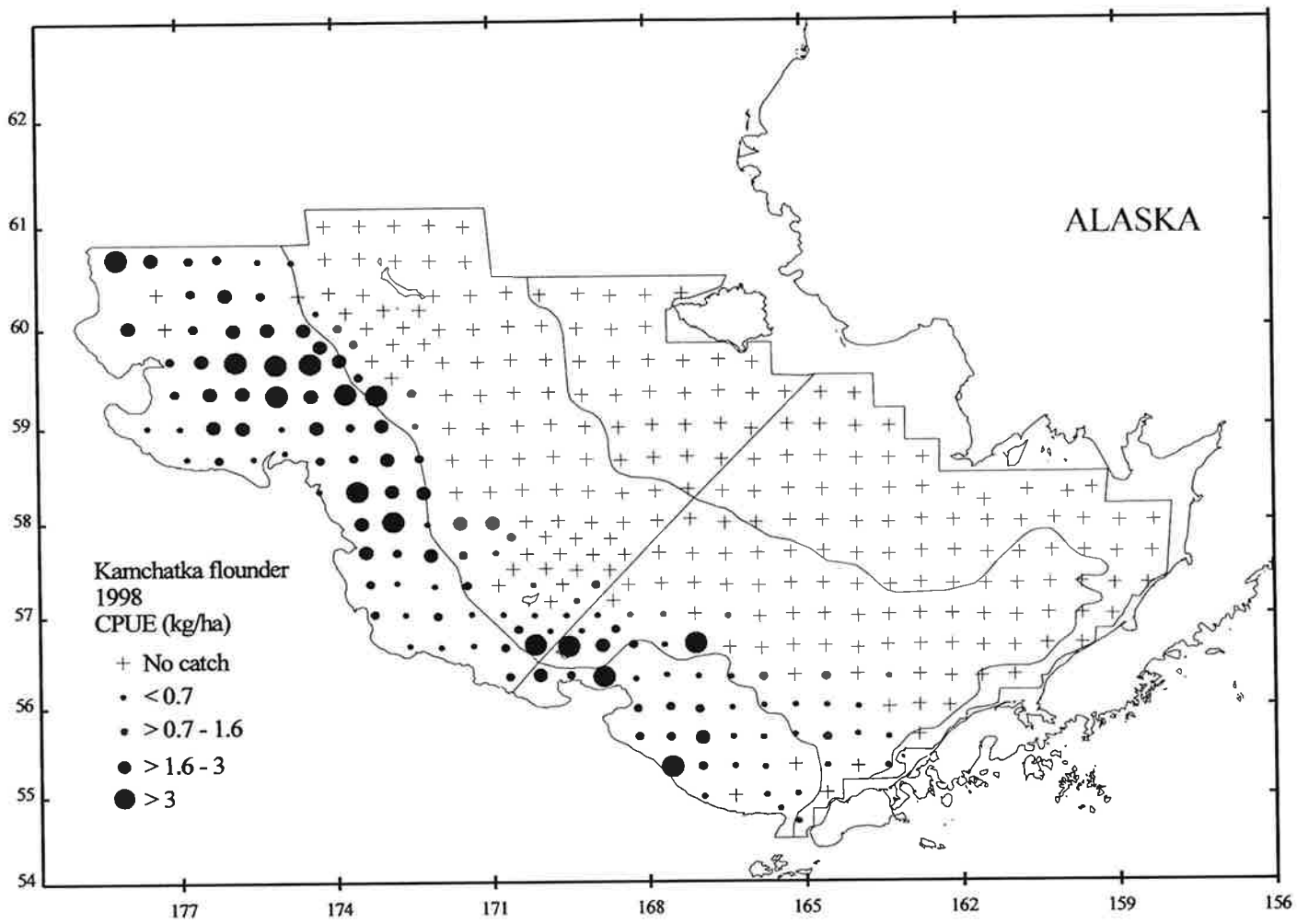

Figure 33--. Distribution and relative abundance in kg/ha of Kamchatka flounder, 1998 eastern Bering Sea bottom trawl survey.

Table 25.--Abundance estimates and mean size of Kamchatka flounder by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	0.00	0	0.000	0	0.000	0.000	0.0
2	0.00	0	0.000	0	0.000	0.000	0.0
3	0.25	2,558	0.109	5,539,742	0.150	0.462	30.3
4	0.24	2,561	0.109	1,832,117	0.049	1.398	46.1
5	0.82	3,178	0.135	9,924,162	0.268	0.320	28.7
6	1.60	15,176	0.647	19,756,582	0.533	0.768	37.7
All subareas combined[b]	0.51	23,474	1.000	37,052,603	1.000	0.634	34.6
95% Confidence interval		±4,003		±6,683,440			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

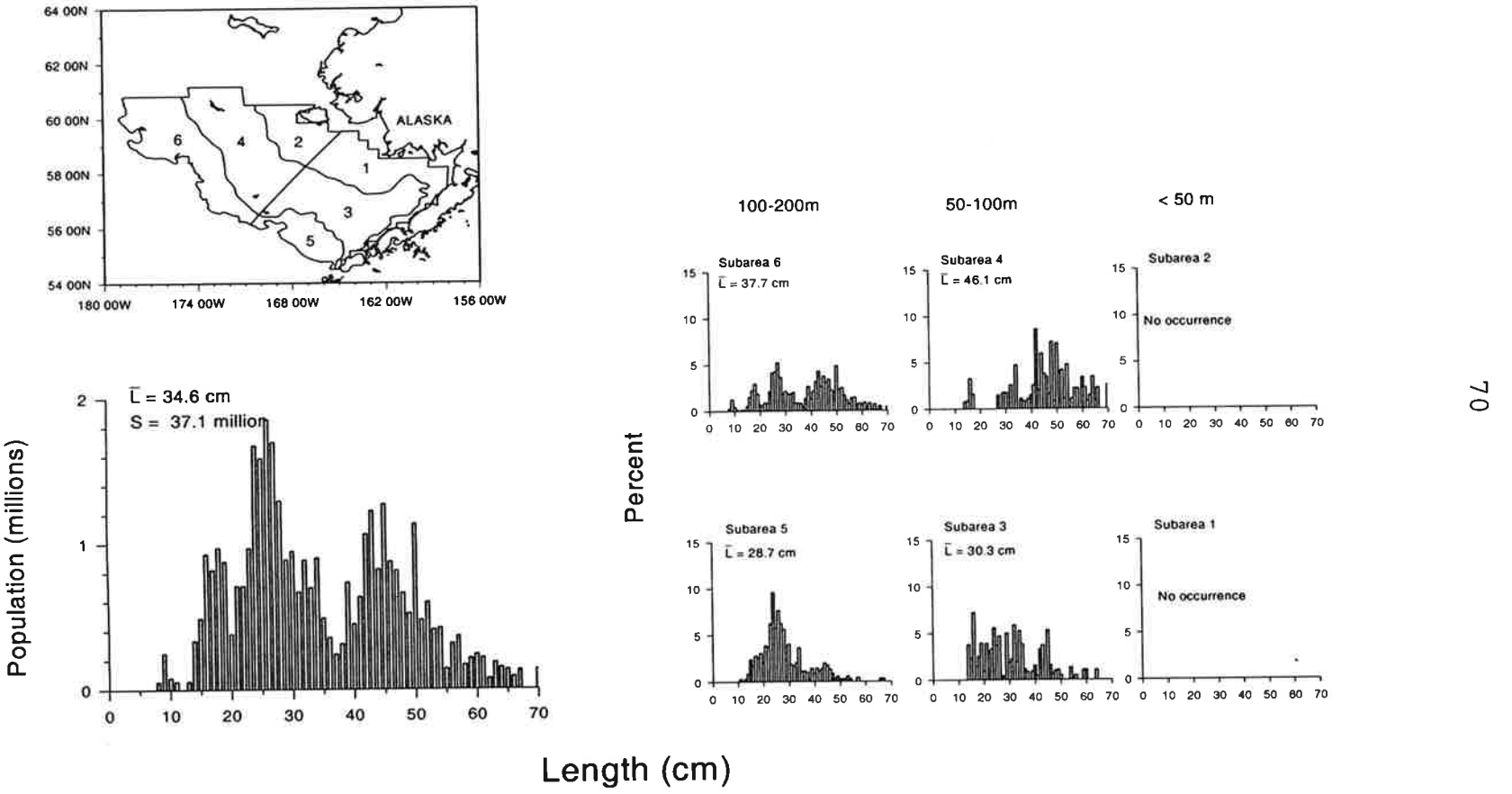

Figure 34.--Estimated relative size distribution (sexes combined) of Kamchatka flounder in terms of population numbers and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

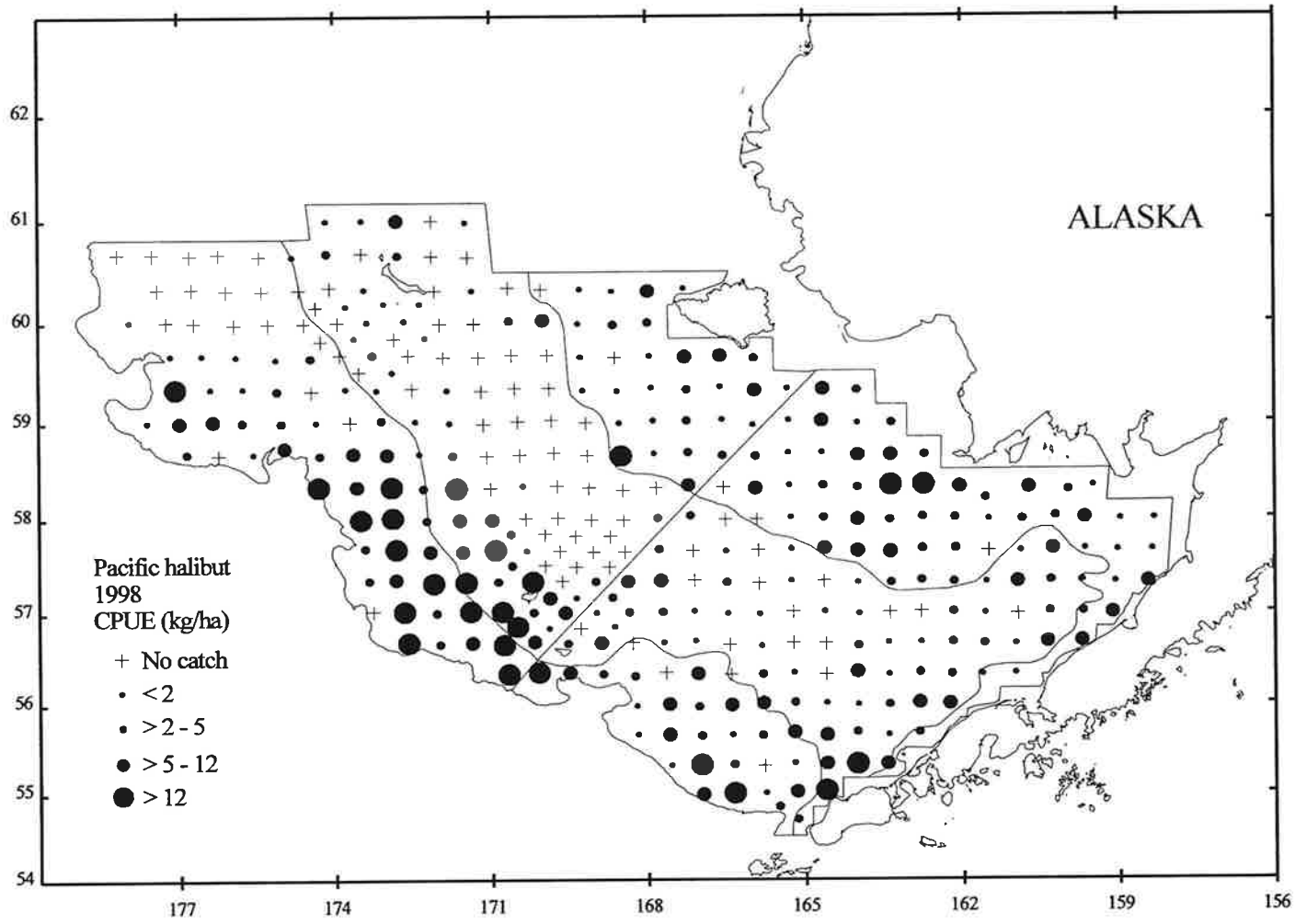

Figure 35--. Distribution and relative abundance in kg/ha of Pacific halibut, 1998 eastern Bering Sea bottom trawl survey.

Table 26.--Abundance estimates and mean size of Pacific halibut by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean size Weight (kg)	Mean size Length (cm)
1	3.94	30,676	0.184	18,567,143	0.400	1.652	46.2
2	3.02	12,392	0.074	5,213,744	0.112	2.377	51.1
3	2.93	30,298	0.182	9,174,073	0.198	3.303	58.9
4	2.25	24,270	0.145	4,615,920	0.099	5.258	66.9
5	4.83	18,742	0.112	2,332,477	0.050	8.035	82.4
6	5.34	50,464	0.302	6,525,134	0.141	7.734	81.7
All subareas combined[b]	3.60	166,842	1.000	46,428,491	1.000	3.594	58.1
95% Confidence interval		±24,282		±9,138,875			

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

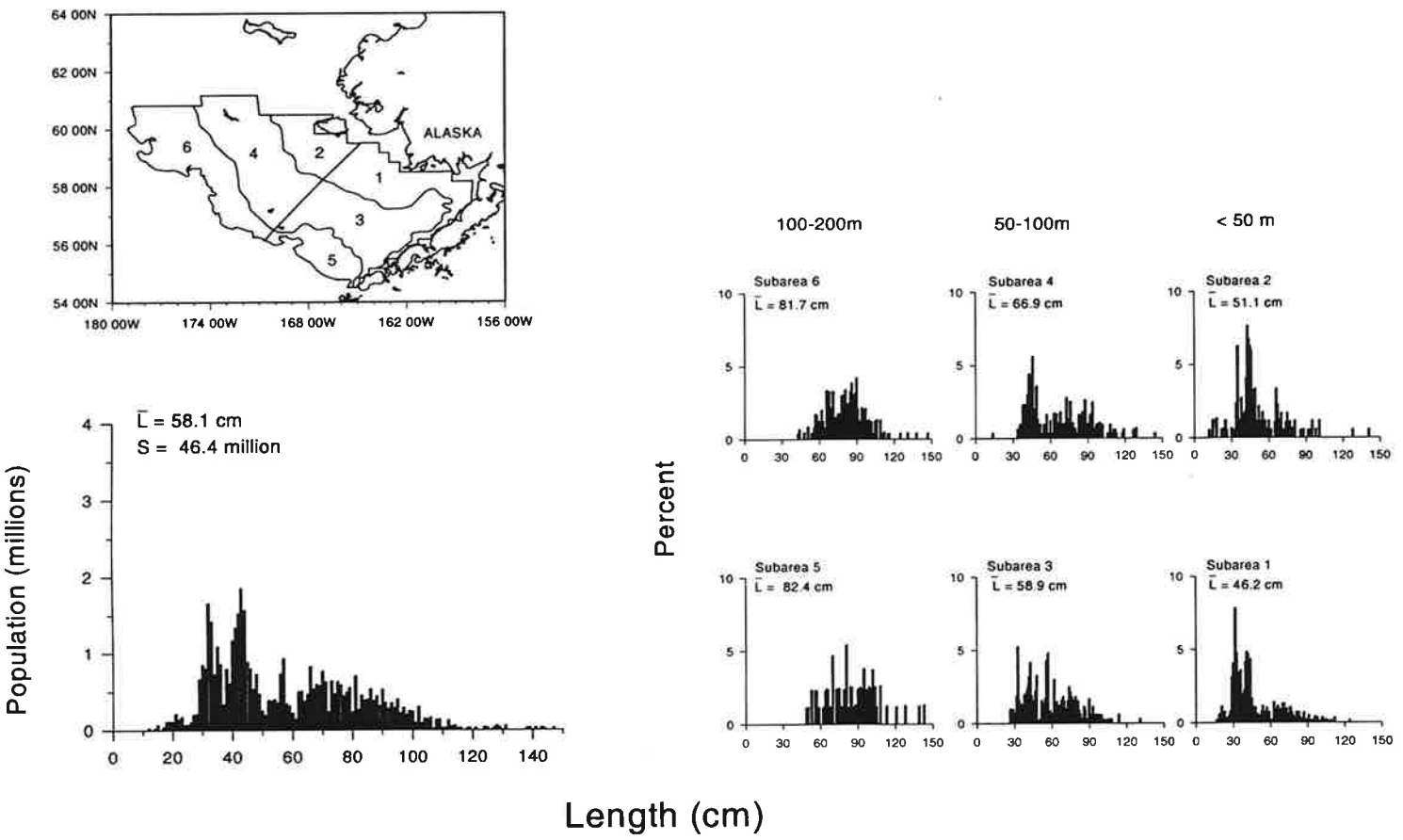

Figure 36.--Estimated relative size distribution (sexes combined) of Pacific halibut in terms of population numbers and percent for subareas 1-6, 1998 eastern Bering Sea bottom trawl survey.

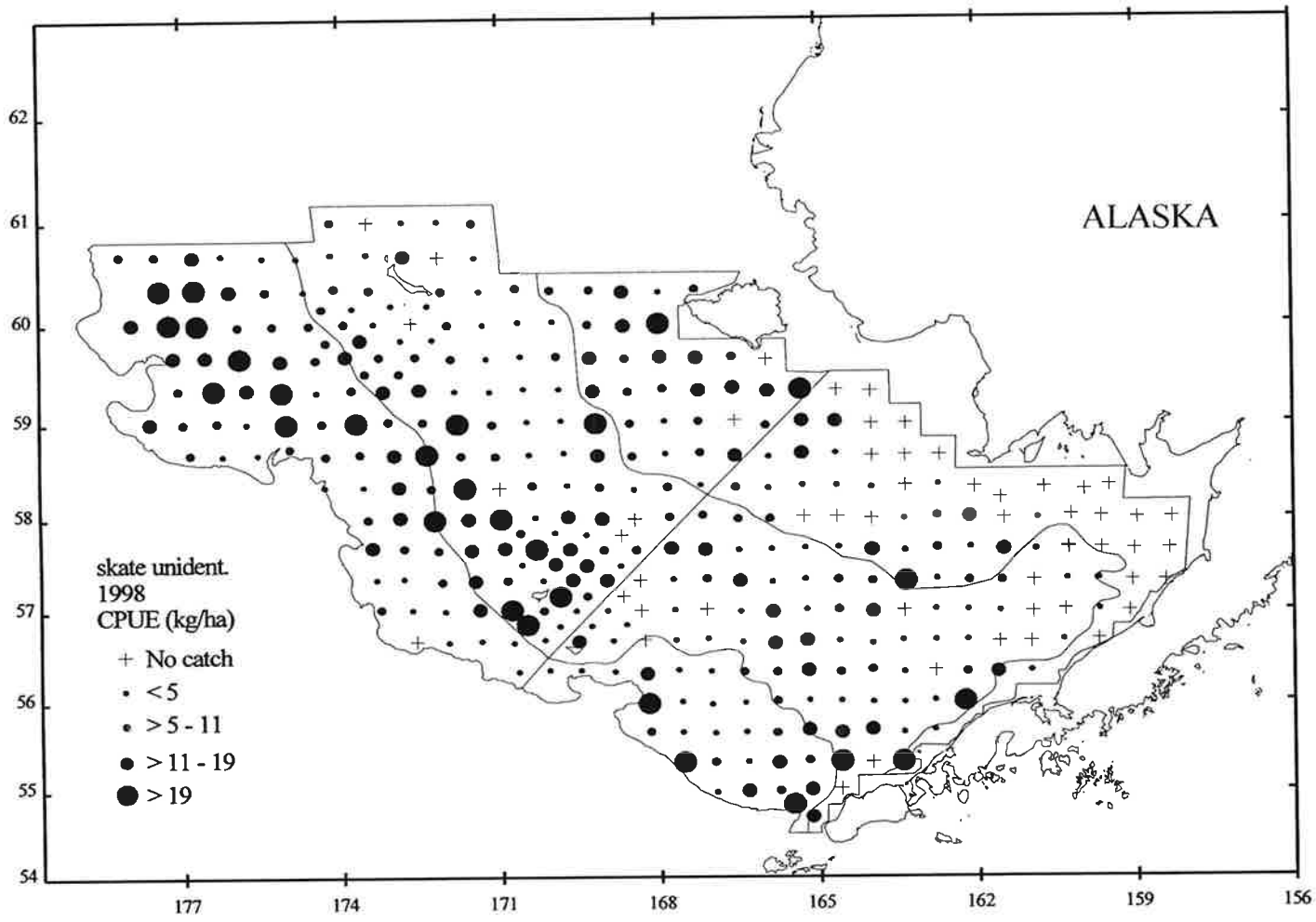

Figure 37--. Distribution and relative abundance in kg/ha of skates, 1998 eastern Bering Sea bottom trawl survey.

Table 27.--Abundance estimates and mean weight of skates by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean Weight (kg)
1	3.46	26,977	0.076	6,426,595	0.065	4.198
2	10.45	42,867	0.121	11,376,406	0.115	3.768
3	5.74	59,335	0.168	20,527,081	0.207	2.891
4	7.63	82,312	0.232	28,583,563	0.288	2.880
5	8.45	32,774	0.093	6,634,570	0.067	4.940
6	11.62	109,923	0.310	25,803,117	0.260	4.260
All subareas combined[b]	7.64	354,188	1.000	99,351,332	1.000	3.565
95% Confidence interval		±37,555		±9,953,717		

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

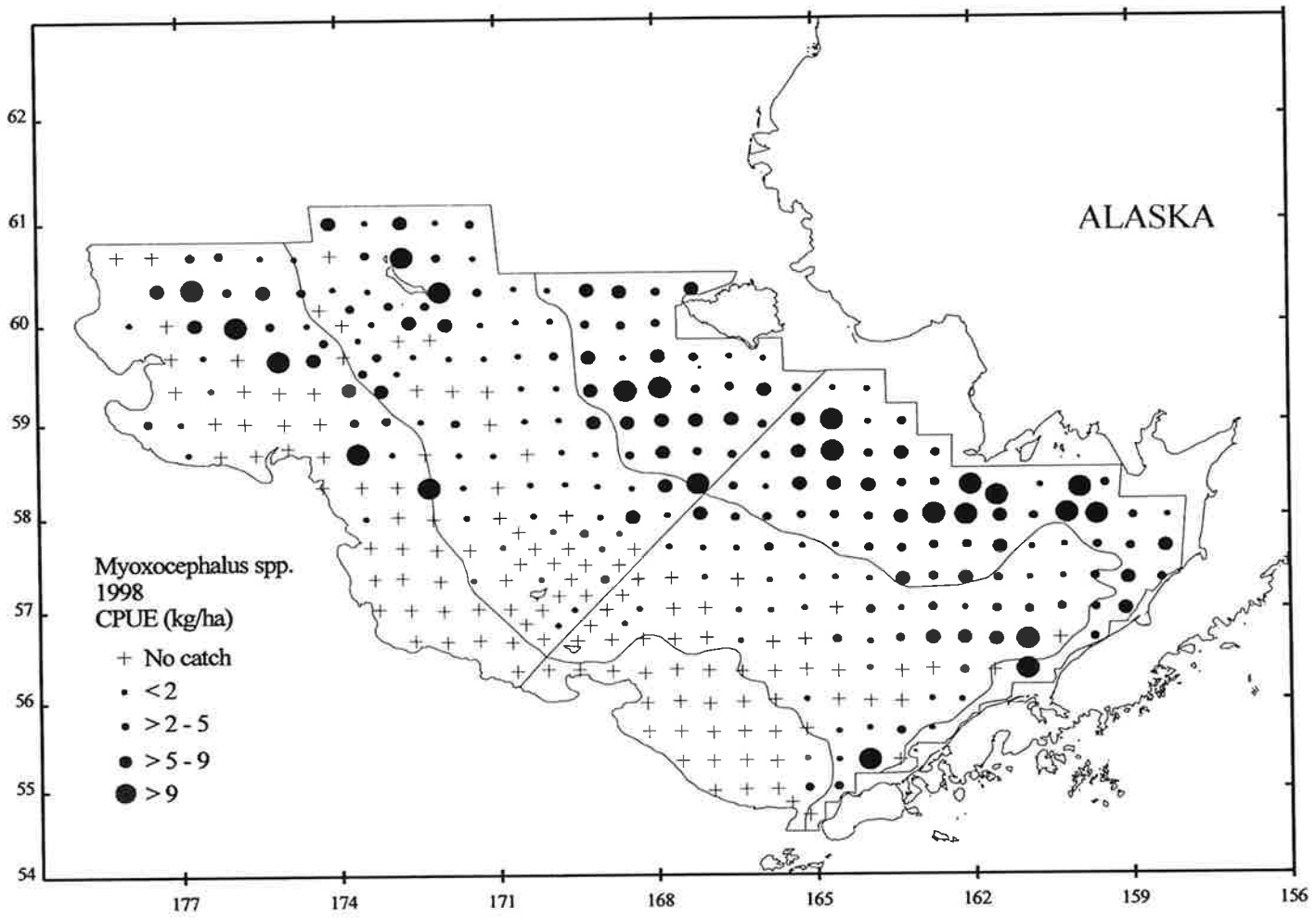

Figure 38--. Distribution and relative abundance in kg/ha of *Myoxocephalus* spp., 1998 eastern Bering Sea bottom trawl survey.

Table 28.--Abundance estimates and mean weight of *Myoxocephalus* spp. by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean Weight (kg)
1	5.51	42,884	0.304	63,105,253	0.466	0.680
2	5.18	21,260	0.151	34,588,284	0.255	0.615
3	1.72	17,744	0.126	7,444,281	0.055	2.384
4	1.96	21,187	0.150	17,412,377	0.129	1.217
5	0.10	371	0.003	160,988	0.001	2.305
6	3.98	37,634	0.267	12,685,899	0.094	2.967
All subareas combined[b]	3.04	141,079	1.000	135,397,082	1.000	1.042
95% Confidence interval		±33,125		±21,180,805		

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

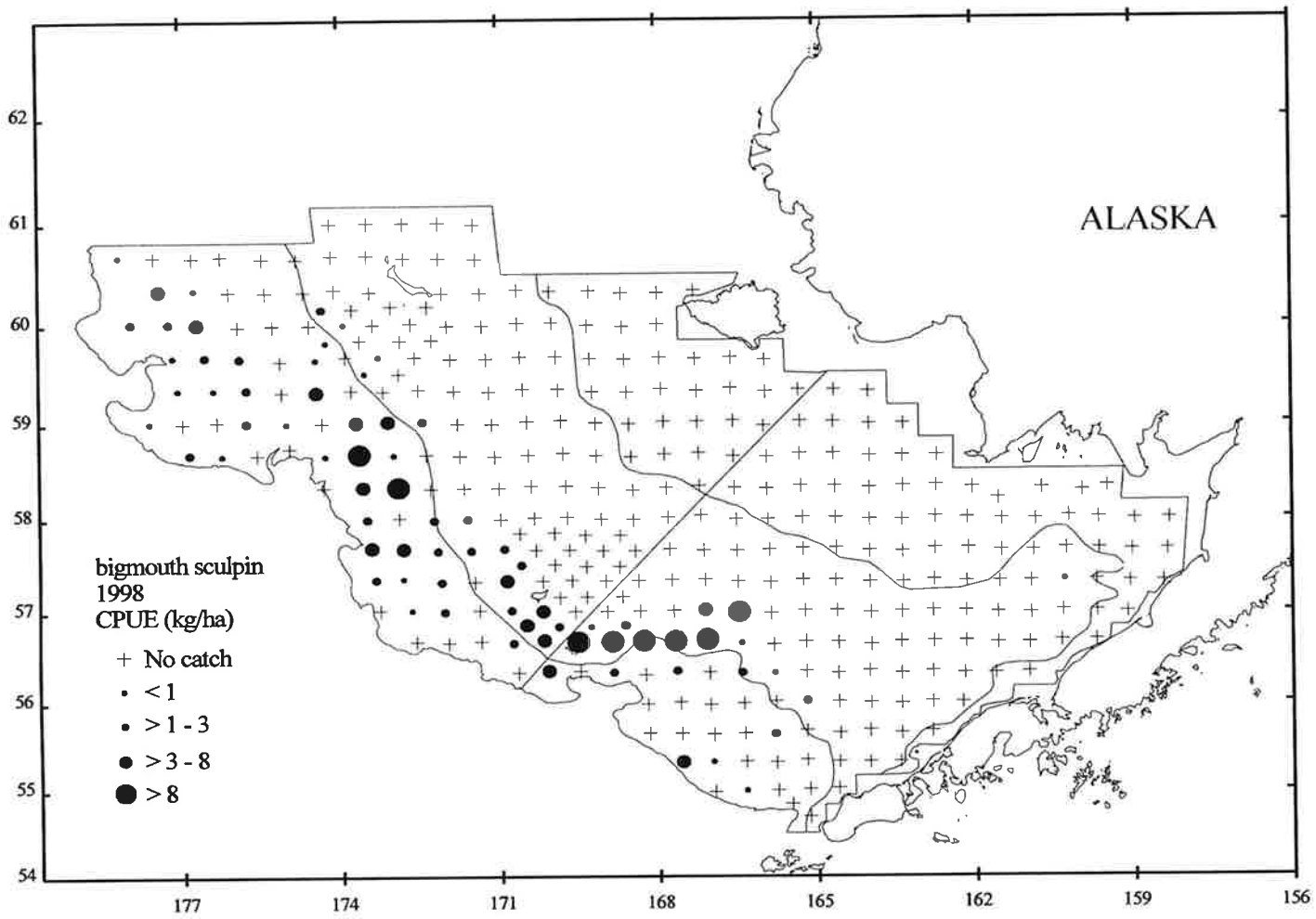

Figure 39--. Distribution and relative abundance in kg/ha of bigmouth sculpin, 1998 eastern Bering Sea bottom trawl survey.

Table 30.--Abundance estimates and mean weight of bigmouth sculpin by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean Weight (kg)
1	0.00	0	0.000	0	0.000	0.000
2	0.00	0	0.000	0	0.000	0.000
3	1.53	15,808	0.436	3,198,524	0.328	4.942
4	0.30	3,240	0.089	695,493	0.071	4.659
5	1.15	4,463	0.123	972,393	0.100	4.590
6	1.35	12,765	0.352	4,884,238	0.501	2.614
All subareas combined[b]	0.78	36,276	1.000	9,750,648	1.000	3.720
95% Confidence interval		±18,917		±4,126,433		

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

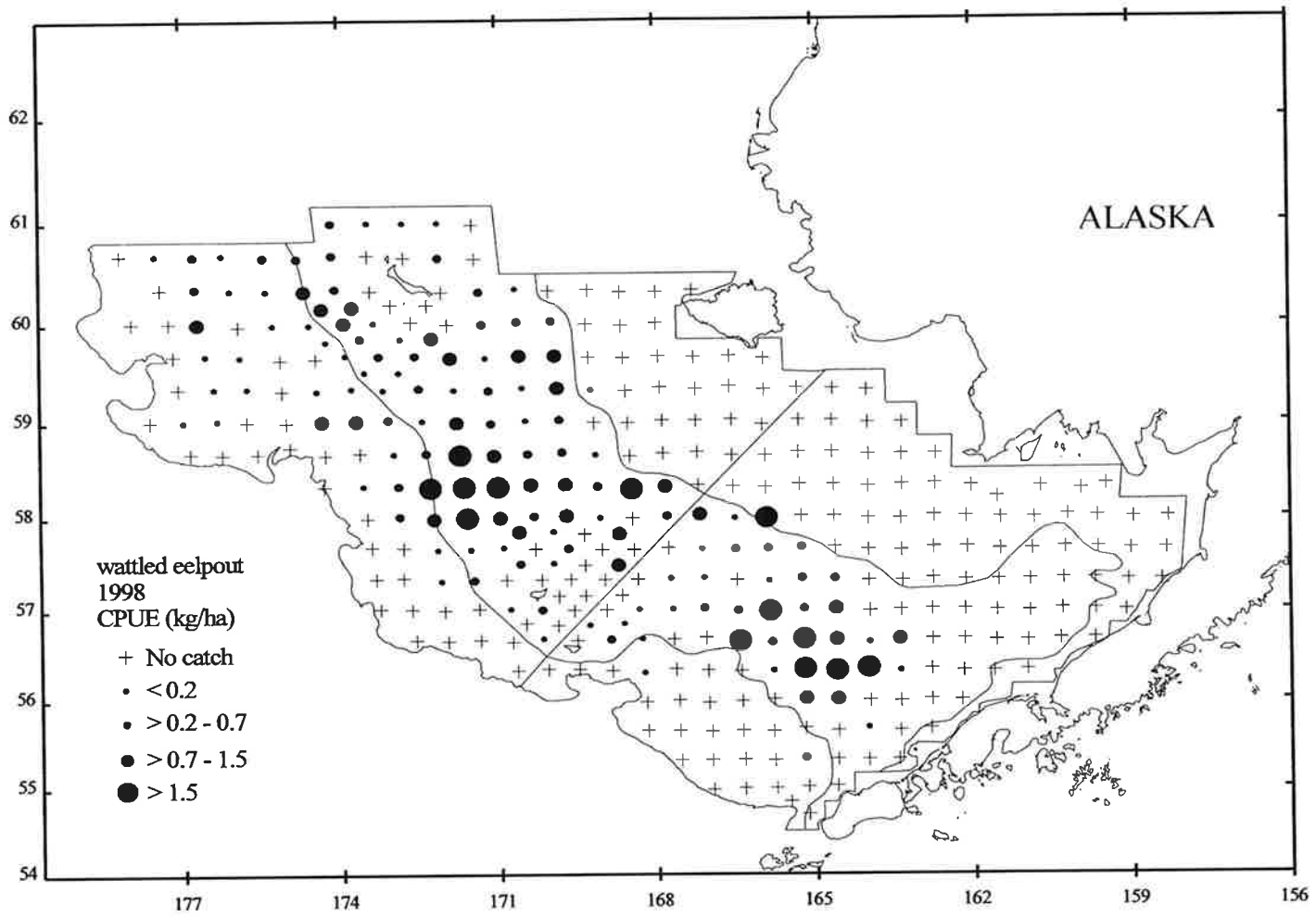

Figure 40--. Distribution and relative abundance in kg/ha of wattled eelpout, 1998 eastern Bering Sea bottom trawl survey.

Table 31.--Abundance estimates and mean weight of wattled eelpout by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean Weight (kg)
1	0.03	202	0.017	1,533,992	0.026	0.132
2	0.00	19	0.002	54,609	0.001	0.348
3	0.50	5,120	0.436	21,268,044	0.366	0.241
4	0.45	4,813	0.410	25,159,133	0.433	0.191
5	0.02	94	0.008	471,938	0.008	0.199
6	0.16	1,484	0.126	9,612,371	0.165	0.154
All subareas combined[b]	0.25	11,732	1.000	58,100,088	1.000	0.202
95% Confidence interval		±3,418		±13,612,642		

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

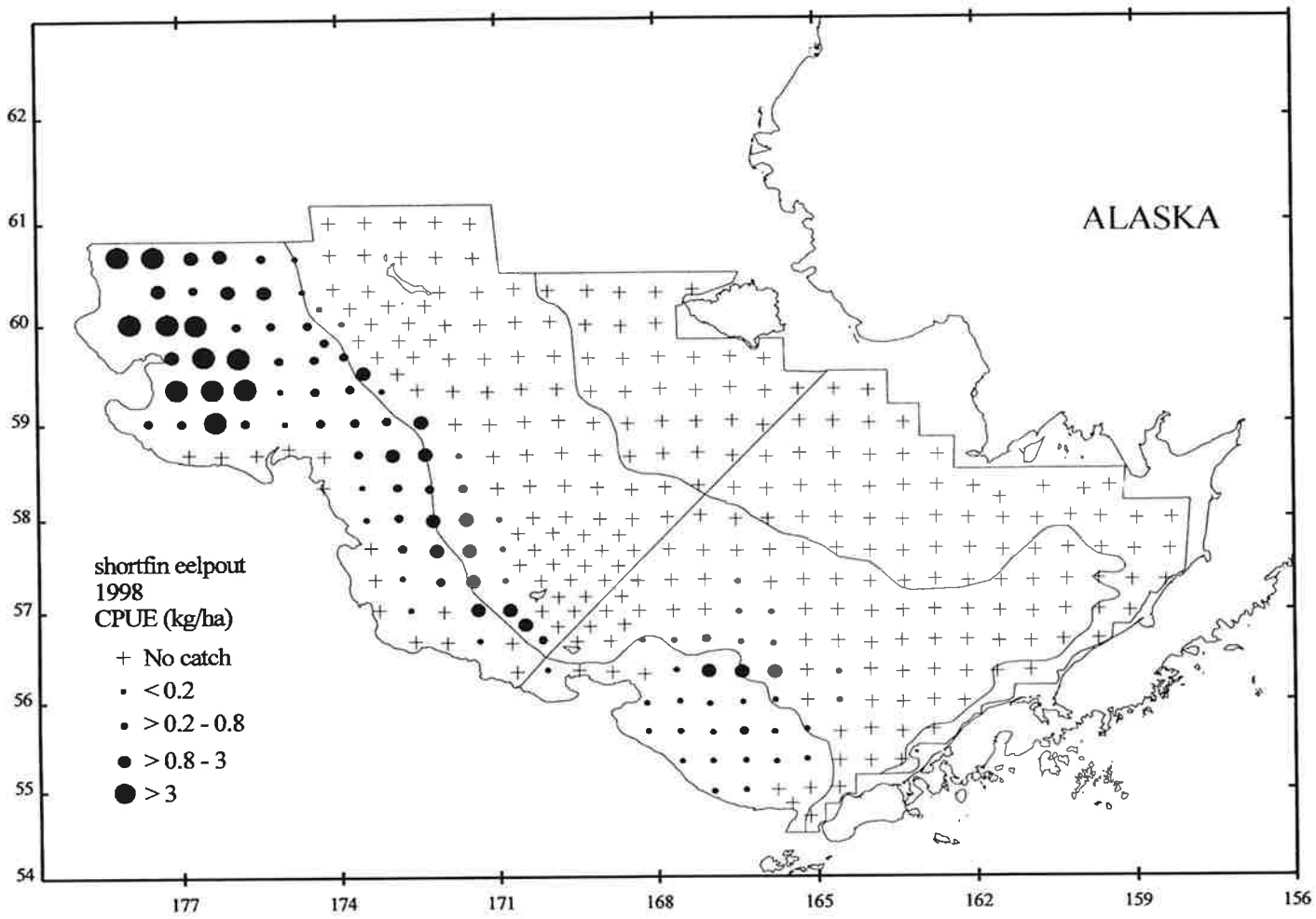

Figure 41--. Distribution and relative abundance in kg/ha of shortfin eelpout, 1998 eastern Bering Sea bottom trawl survey.

Table 32.--Abundance estimates and mean weight of shortfin eelpout by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean Weight (kg)
1	0.00	0	0.000	0	0.000	0.000
2	0.00	0	0.000	0	0.000	0.000
3	0.06	618	0.032	11,888,759	0.032	0.052
4	0.16	1,729	0.090	47,984,052	0.129	0.036
5	0.10	370	0.019	8,475,717	0.023	0.044
6	1.75	16,589	0.859	303,615,350	0.816	0.055
All subareas combined[b]	0.42	19,306	1.000	371,963,878	1.000	0.052
95% Confidence interval		±7,902		±129,088,360		

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

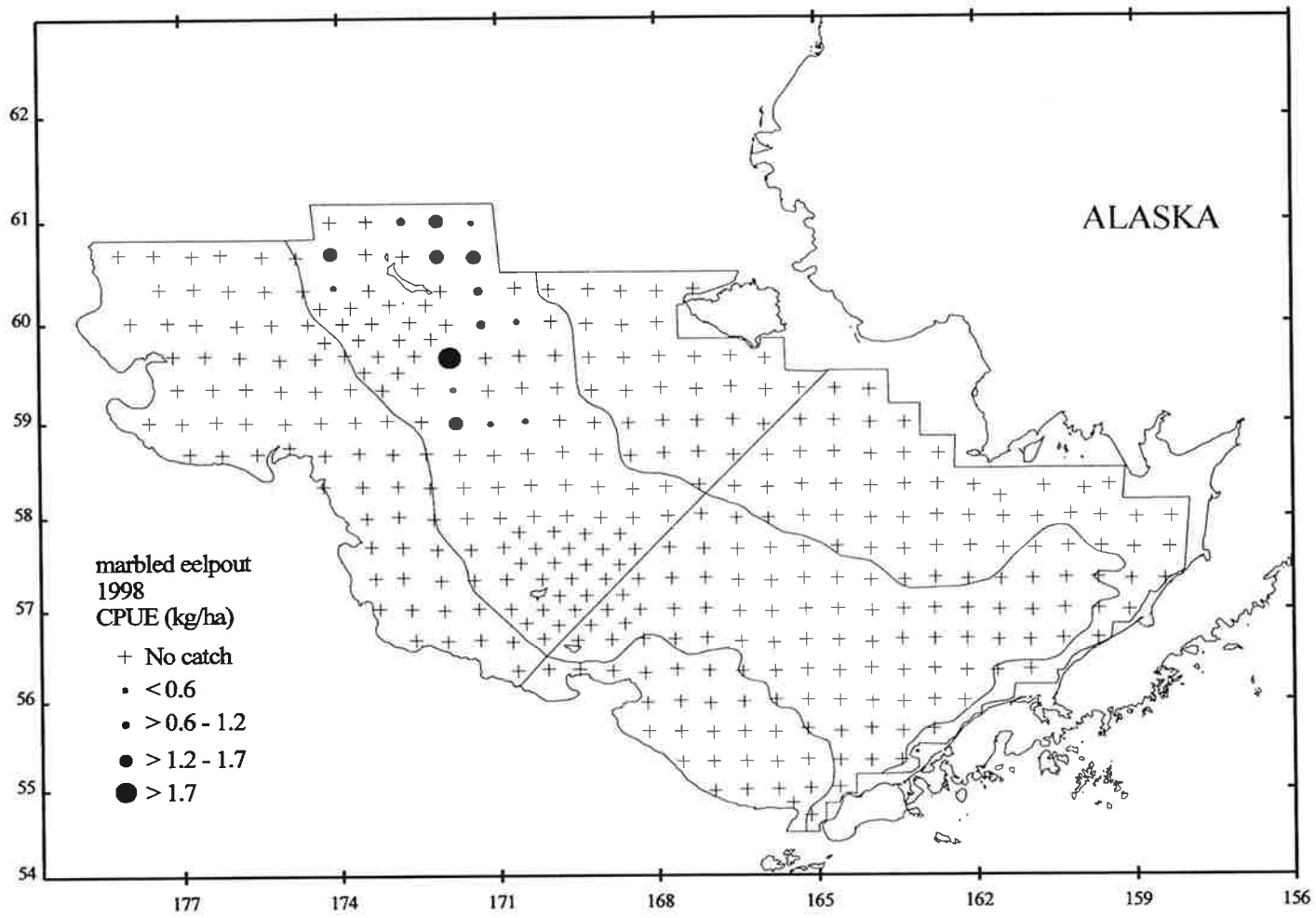

Figure 42--. Distribution and relative abundance in kg/ha of marbled eelpout, 1998 eastern Bering Sea bottom trawl survey.

Table 33.--Abundance estimates and mean weight of marbled eelpout by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean Weight (kg)
1	0.00	0	0.000	0	0.000	0.000
2	0.00	0	0.000	0	0.000	0.000
3	0.00	0	0.000	0	0.000	0.000
4	0.17	1,882	1.000	1,402,800	1.000	1.342
5	0.00	0	0.000	0	0.000	0.000
6	0.00	0	0.000	0	0.000	0.000
All subareas combined[b]	0.04	1,882	1.000	1,402,800	1.000	1.342
95% Confidence interval		±1,029		±817,435		

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

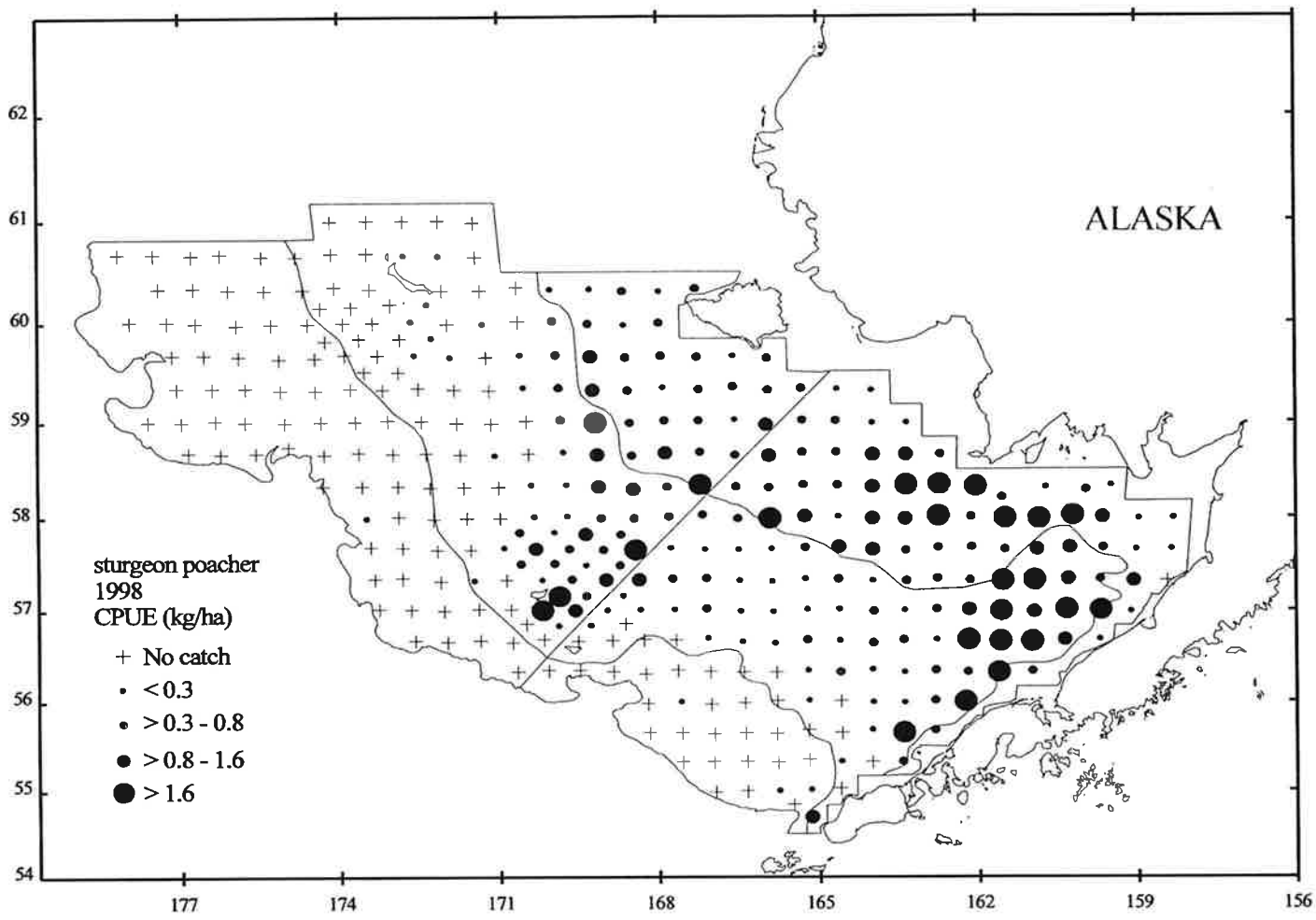

Figure 43--. Distribution and relative abundance in kg/ha of sturgeon poacher, 1998 eastern Bering Sea bottom trawl survey.

Table 34.--Abundance estimates and mean weight of sturgeon poacher by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean Weight (kg)
1	1.05	8,160	0.422	101,342,407	0.366	0.081
2	0.57	2,336	0.121	33,010,439	0.119	0.071
3	0.60	6,171	0.319	93,021,715	0.336	0.066
4	0.25	2,647	0.137	49,509,213	0.179	0.053
5	0.00	18	0.001	191,120	0.001	0.094
6	0.00	3	0.000	27,551	0.000	0.109
All subareas combined[b]	0.42	19,334	1.000	277,102,445	1.000	0.070
95% Confidence interval		±3,503		±43,115,654		

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

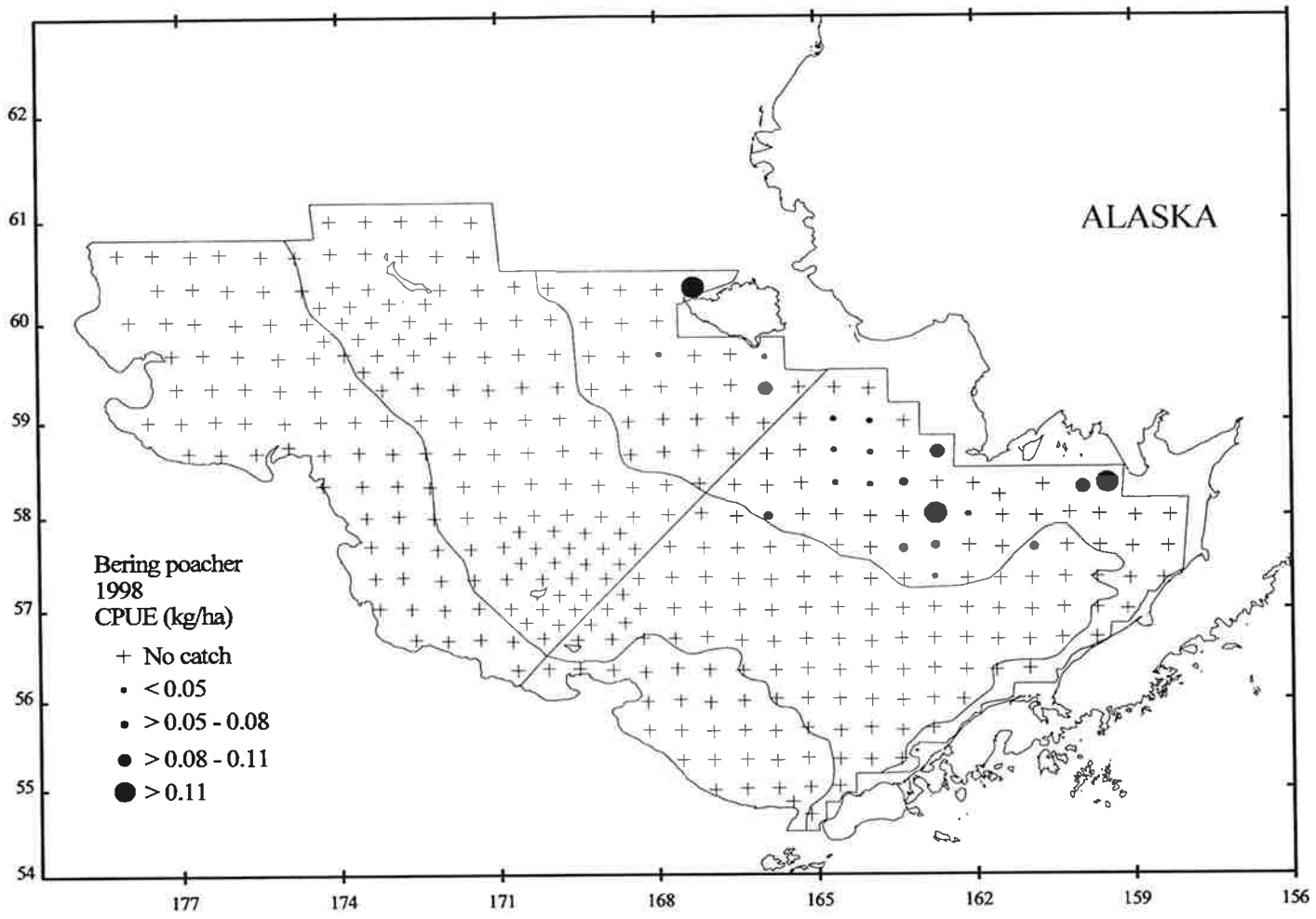

Figure 44--. Distribution and relative abundance in kg/ha of Bering poacher, 1998 eastern Bering Sea bottom trawl survey.

Table 35.--Abundance estimates and mean weight of Bering poacher by subarea, 1998 eastern Bering Sea bottom trawl survey.

Subarea	Mean CPUE (kg/ha)	Estimated biomass (t)[a]	Proportion of estimated biomass	Estimated population numbers[a]	Proportion of estimated population	Mean Weight (kg)
1	0.02	173	0.779	3,409,726	0.697	0.051
2	0.01	42	0.189	1,195,085	0.244	0.035
3	0.00	7	0.032	289,192	0.059	0.024
4	0.00	0	0.000	0	0.000	0.000
5	0.00	0	0.000	0	0.000	0.000
6	0.00	0	0.000	0	0.000	0.000
All subareas combined[b]	0.00	222	1.000	4,894,003	1.000	0.045
95% Confidence interval		±137		±2,959,288		

[a]Variances of abundance estimates are given in Appendix D.
[b]Differences in sums of estimates and totals are due to rounding.

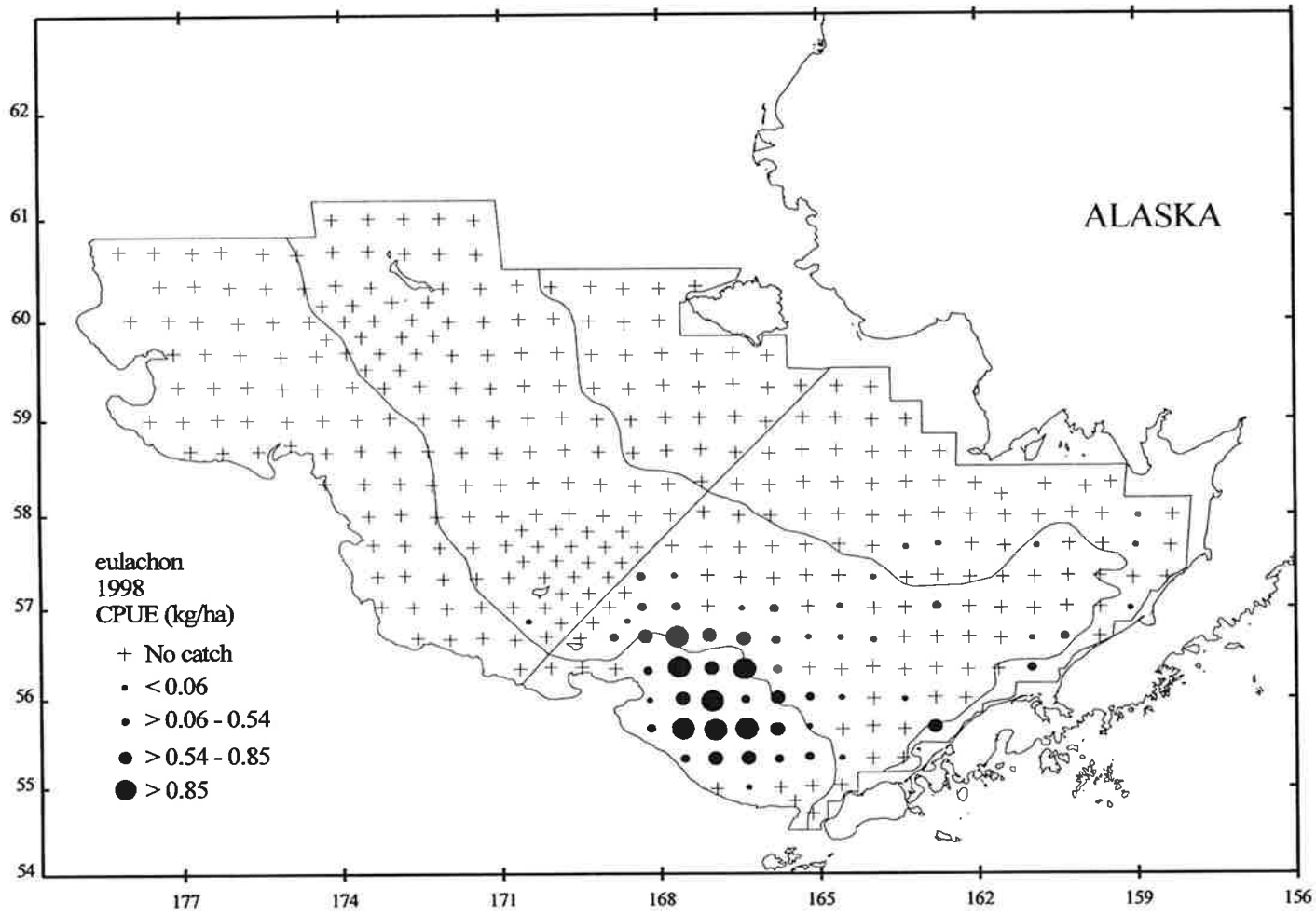

Figure 45--. Distribution and relative abundance in kg/ha of eulachon, 1998 eastern Bering Sea bottom trawl survey.

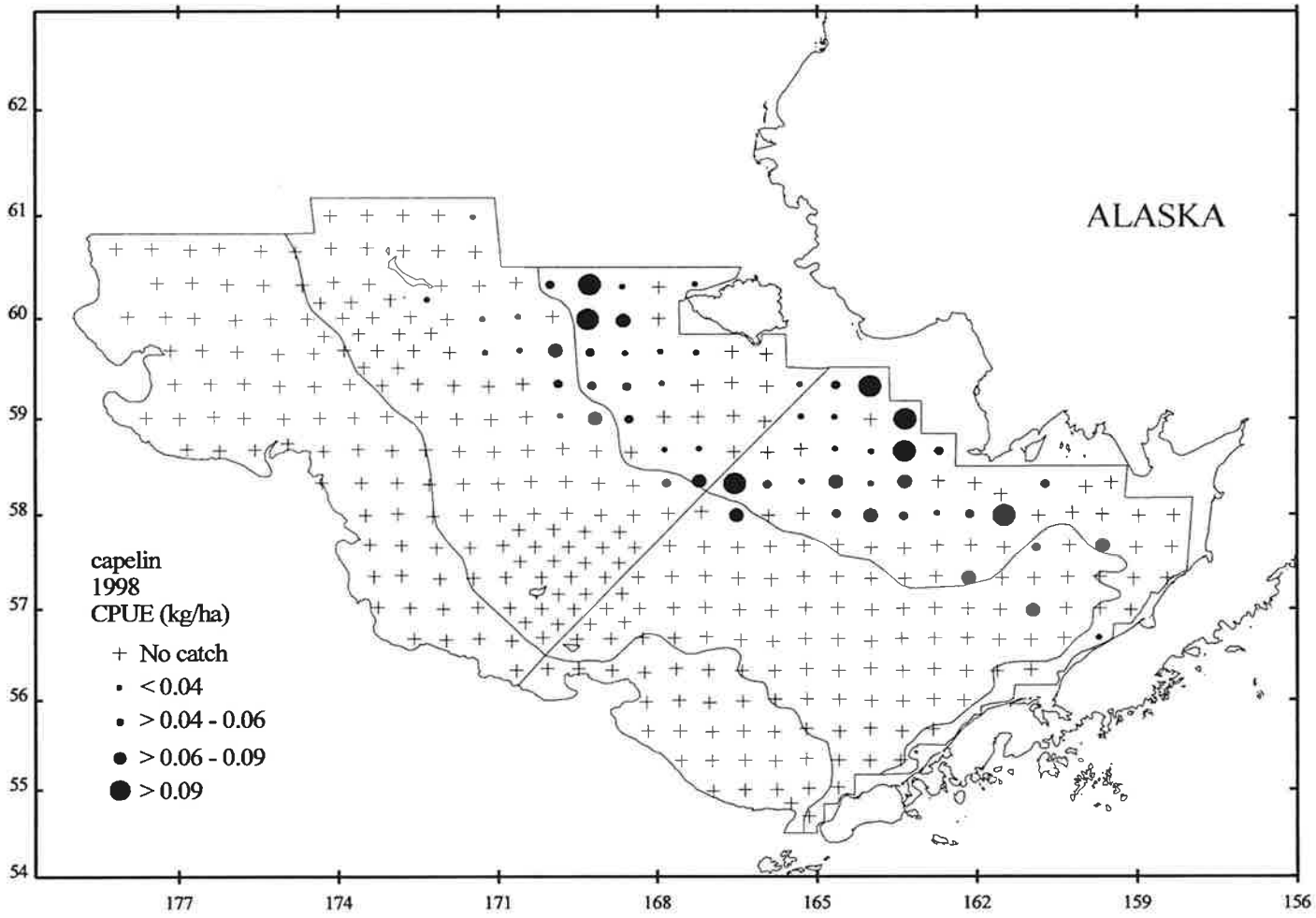

Figure 46--. Distribution and relative abundance in kg/ha of capelin, 1998 eastern Bering Sea bottom trawl survey.

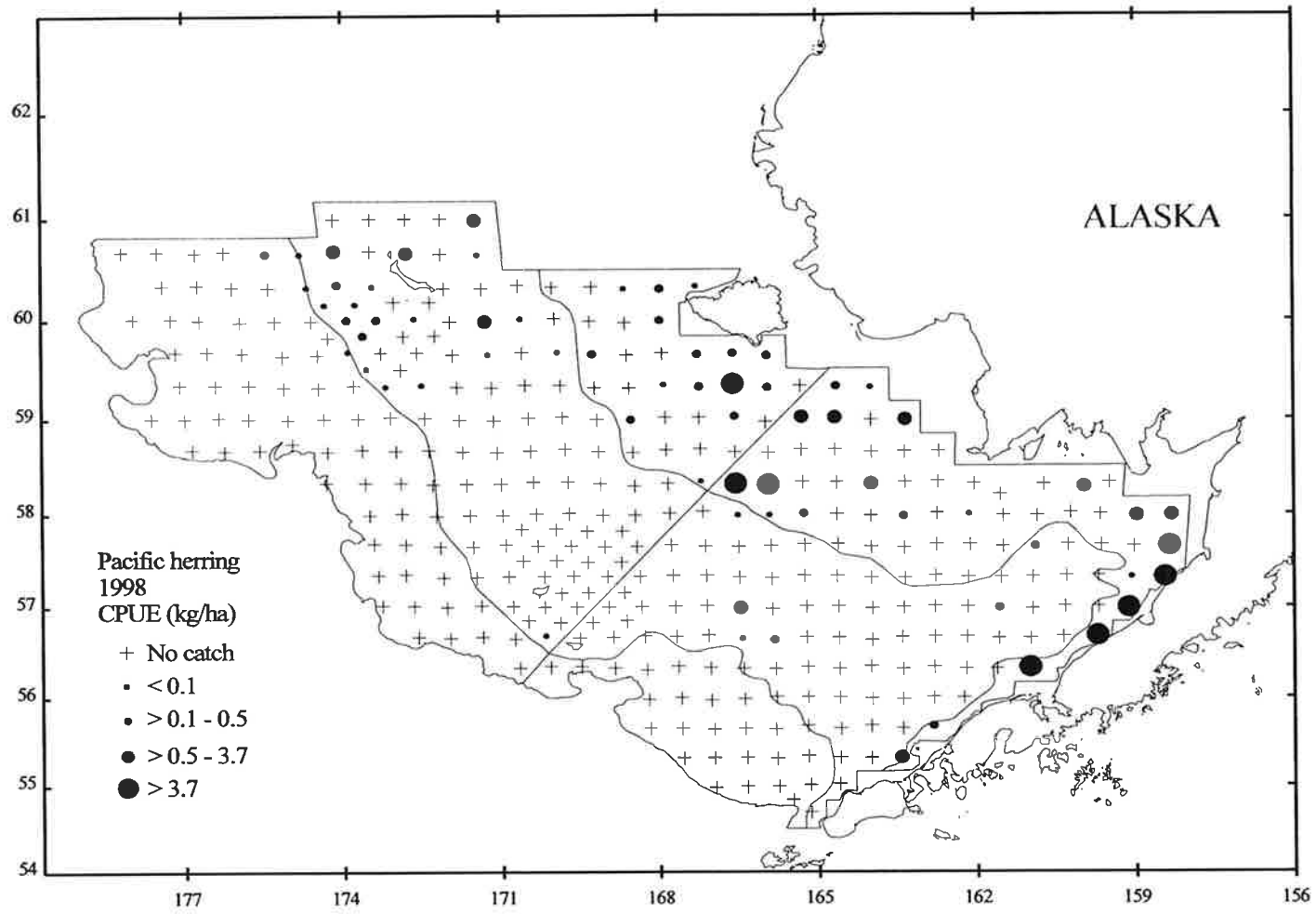

Figure 47--. Distribution and relative abundance in kg/ha of Pacific herring, 1998 eastern Bering Sea bottom trawl survey.

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APPENDIX A

Station Data, 1998 Eastern Bering Sea Bottom Trawl Survey

Appendix A contains station data by vessel for the 355 successfully completed standard survey stations. In using the tables, the following should be noted:

1. Time represents the nearest hour at the start of the tow.
2. Haul numbers are not always sequential because special study and unsatisfactory hauls were omitted.
3. All longitudes are in Western Hemisphere, latitudes in Northern Hemisphere. Geodetic positions are displayed as degrees and decimal minutes.
4. Width codes are as follows:

   M = Net width was measured by mensuration gear.

   F = Net width was estimated from a function of wire out or wire out and net height.
5. Hauls marked with an "*" were used for the FPC analysis.

List of Tables

Appendix A Table 1--Haul data for stations sampled by the F/V *Arcturus* during the 1998 eastern Bering Sea bottom trawl survey.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	1	06/09/98	57.324	158.431	31	06	0.50	2.66	10	5.6	5.6	17.3	M
*	2	06/09/98	57.663	158.353	33	09	0.51	2.33	10	5.8	---	15.5	M
*	3	06/09/98	57.995	158.313	33	11	0.47	2.75	10	5.8	5.1	16.3	M
*	4	06/09/98	58.336	159.489	20	16	0.38	1.86	10	7.0	6.3	14.3	M
*	5	06/10/98	58.291	159.964	42	06	0.26	1.33	10	5.3	4.7	15.3	F
*	6	06/10/98	58.020	160.213	48	08	0.50	2.69	10	4.6	3.8	16.6	M
*	7	06/10/98	58.002	159.651	39	11	0.50	2.71	10	4.9	4.1	15.5	M
*	8	06/10/98	57.675	159.645	47	14	0.50	2.85	10	4.7	4.2	16.3	M
*	9	06/10/98	57.340	159.694	52	16	0.49	2.72	10	4.9	4.5	16.3	M
*	10	06/11/98	57.004	159.685	53	06	0.49	2.62	10	5.8	4.9	15.9	M
*	11	06/11/98	56.683	159.710	33	09	0.51	2.75	10	6.5	6.0	15.0	M
*	12	06/11/98	56.333	160.986	50	14	0.49	2.74	10	5.8	5.4	15.2	M
*	13	06/12/98	56.657	160.986	65	06	0.50	2.67	31	6.2	4.1	16.0	M
*	14	06/12/98	56.981	160.948	65	11	0.48	2.74	31	5.8	3.4	15.7	M
*	15	06/12/98	57.327	160.937	59	16	0.51	2.73	31	6.1	3.6	15.7	M
*	16	06/13/98	57.656	160.889	54	08	0.50	2.76	31	4.9	3.9	15.4	M
*	17	06/13/98	57.986	160.850	43	13	0.51	2.82	10	6.8	4.0	15.3	M
*	18	06/13/98	58.317	160.721	20	16	0.49	2.76	10		5.9	14.4	M
*	19	06/14/98	58.326	162.042	44	06	0.49	2.76	10	4.9	4.4	15.4	M
*	20	06/14/98	58.004	162.134	35	09	0.50	2.91	10	4.9	3.7	14.5	M
*	21	06/14/98	57.681	162.124	45	12	0.51	2.77	10	6.0	3.8	15.7	M
*	22	06/15/98	57.325	162.153	48	06	0.49	2.67	10	6.0	3.9	15.7	M
*	23	06/15/98	57.004	162.173	59	11	0.49	2.75	31	6.9	3.4	16.2	M
*	24	06/15/98	56.677	162.185	62	15	0.50	2.75	31	7.7	3.3	16.1	M
*	25	06/16/98	56.323	162.201	73	09	0.49	2.74	31	8.1	3.8	16.0	M
*	26	06/16/98	55.996	162.243	68	12	0.50	2.78	31	7.8	5.4	15.5	M
*	27	06/16/98	55.676	162.821	48	16	0.49	2.72	10	8.7	5.4	14.7	M
*	28	06/18/98	55.325	163.431	50	06	0.49	2.68	31	6.9	5.6	15.7	M
*	29	06/18/98	55.649	163.406	77	09	0.51	2.67	31	7.2	4.6	16.1	M
*	30	06/18/98	55.987	163.392	83	11	0.46	2.50	31	7.5	---	18.1	M
*	31	06/18/98	56.322	163.392	83	14	0.48	2.73	31	7.5	3.3	17.1	M

Appendix A Table 1.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	32	06/19/98	56.674	163.408	72	06	0.50	2.68	31	7.0	3.4	17.1	M
*	33	06/19/98	56.999	163.387	62	11	0.49	2.75	31	6.8	3.3	16.6	M
*	34	06/20/98	57.318	163.350	52	06	0.51	2.81	10	6.4	3.7	16.6	M
*	35	06/20/98	57.645	163.363	45	11	0.51	2.84	10	4.5	3.6	17.0	M
*	36	06/20/98	57.984	163.371	41	15	0.51	3.06	10	4.8	4.3	16.8	M
*	37	06/21/98	58.342	163.351	35	06	0.50	2.73	10	4.8	4.7	16.0	M
*	38	06/21/98	58.656	163.355	30	09	0.51	2.72	10	5.1	5.1	15.2	M
*	39	06/21/98	58.988	163.340	20	11	0.51	2.95	10	6.1	6.1	15.9	M
*	40	06/21/98	59.332	164.647	21	16	0.50	2.96	10	6.5	6.4	17.0	M
*	41	06/22/98	59.009	164.670	26	06	0.51	2.71	10	5.5	5.4	15.3	M
*	42	06/22/98	58.681	164.662	35	08	0.49	2.82	10	5.0	---	15.2	M
*	43	06/22/98	58.340	164.642	41	11	0.51	2.85	10	5.0	3.7	16.4	M
*	44	06/22/98	58.008	164.633	42	13	0.51	2.99	10	4.4	3.8	16.2	M
*	45	06/22/98	57.684	164.620	50	16	0.50	2.69	10	5.3	3.6	16.3	M
*	46	06/23/98	57.339	164.630	64	06	0.50	2.76	31	6.9	2.8	16.5	M
*	47	06/23/98	57.010	164.614	66	09	0.50	2.69	31	6.9	2.9	17.2	M
*	48	06/23/98	56.667	164.606	73	11	0.50	2.84	31	6.6	3.1	17.5	M
*	49	06/23/98	56.324	164.598	84	14	0.49	2.68	31	6.8	3.6	17.0	M
*	51	06/23/98	56.005	164.588	90	18	0.49	2.94	31	6.7	3.3	18.2	M
*	52	06/24/98	55.648	164.582	95	06	0.51	2.73	31	6.9	4.6	18.7	M
*	54	06/24/98	55.327	164.586	99	10	0.50	2.89	31	6.4	5.2	18.4	M
*	55	06/24/98	55.021	164.601	62	13	0.52	2.55	31	6.7	6.0	17.6	M
*	56	06/24/98	54.693	165.147	81	16	0.50	2.54	31	6.5	5.1	16.2	M
*	57	06/27/98	54.994	165.755	127	10	0.50	2.76	50	7.8	4.1	18.8	M
*	58	06/27/98	55.315	165.777	118	12	0.47	2.66	50	8.3	4.1	18.2	M
*	59	06/27/98	55.647	165.808	114	15	0.50	2.74	50	9.4	4.1	18.5	M
*	60	06/28/98	56.004	165.793	104	06	0.52	2.79	31	8.3	4.3	18.2	M
*	61	06/28/98	56.323	165.797	89	08	0.52	2.94	31	8.1	3.5	18.2	M
*	62	06/28/98	56.639	165.823	76	11	0.51	2.94	31	8.0	3.3	17.7	M
*	63	06/28/98	56.983	165.856	70	13	0.53	2.81	31	8.1	3.0	18.3	M
*	64	06/28/98	57.313	165.873	66	16	0.48	2.72	31	8.0	2.0	16.3	M
*	65	06/29/98	57.664	165.884	61	06	0.50	2.73	31	7.7	2.3	17.7	M

Appendix A Table 1.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	66	06/29/98	57.992	165.910	53	09	0.48	2.67	10	7.2	3.5	16.7	M
*	67	06/29/98	58.312	165.930	42	11	0.51	3.00	10	6.5	4.1	16.6	M
*	68	06/29/98	58.644	165.929	36	13	0.50	2.84	10	6.0	4.3	15.8	M
*	69	06/29/98	58.966	165.981	29	16	0.51	2.80	20	5.4	4.6	15.8	M
*	70	06/30/98	59.317	165.945	22	06	0.52	2.73	20	6.2	---	15.4	M
*	71	06/30/98	59.640	165.959	23	08	0.44	2.44	20	6.5	6.6	15.6	M
*	72	06/30/98	59.665	166.604	26	11	0.52	2.95	20	6.8	6.1	16.0	M
*	73	06/30/98	59.355	166.602	27	13	0.51	2.64	20	7.2	5.4	15.8	M
*	74	06/30/98	59.022	166.572	32	16	0.50	2.75	20	6.3	4.4	15.8	M
*	75	07/01/98	59.326	167.244	31	06	0.51	2.74	20	5.6	5.1	15.5	M
*	76	07/01/98	59.012	167.248	38	08	0.51	2.75	20	4.9	3.9	15.5	M
*	77	07/01/98	58.686	167.221	42	11	0.51	2.76	20	4.8	4.0	16.1	M
*	78	07/01/98	58.347	167.215	51	13	0.50	2.66	20	6.9	3.3	16.2	M
*	79	07/01/98	58.030	167.178	63	15	0.50	2.78	31	8.1	2.8	17.5	M
*	80	07/02/98	57.661	167.135	65	06	0.50	2.72	31	8.2	3.3	17.0	M
*	81	07/02/98	57.349	167.106	68	08	0.49	2.70	31	7.7	2.9	16.5	M
*	82	07/02/98	57.016	167.104	71	11	0.51	2.82	31	8.5	3.7	16.1	M
*	83	07/02/98	56.694	167.082	92	13	0.49	2.75	31	8.9	---	16.9	M
*	84	07/02/98	56.331	167.040	111	16	0.49	2.65	50	9.0	---	18.4	M
*	85	07/03/98	54.979	166.948	157	06	0.47	2.55	50	8.3	---	19.0	M
*	86	07/03/98	55.321	166.975	136	09	0.46	2.54	50	8.0	4.0	19.1	M
*	87	07/03/98	55.643	166.970	131	11	0.48	2.63	50	8.3	4.1	19.5	M
*	88	07/03/98	55.966	167.025	132	14	0.47	2.62	50	8.6	4.1	19.2	M
*	89	07/03/98	55.994	167.585	130	16	0.49	2.72	50	8.5	4.1	18.8	M
*	90	07/05/98	57.156	169.864	52	08	0.51	2.72	42	6.7	4.9	16.3	M
*	91	07/05/98	57.159	169.357	69	10	0.54	2.89	42	8.1	2.9	16.6	M
*	92	07/05/98	57.163	168.668	73	13	0.50	2.76	32	8.6	3.7	16.9	M
*	93	07/05/98	57.005	168.345	78	16	0.51	2.71	32	8.9	3.8	17.5	M
*	94	07/05/98	56.681	168.286	103	19	0.52	2.85	50	9.0	3.8	18.6	M
*	95	07/06/98	56.328	168.850	125	09	0.55	3.01	50	8.7	3.8	18.1	M
*	96	07/06/98	56.345	169.486	137	13	0.26	1.39	50	8.7	3.9	19.1	M
*	97	07/06/98	56.665	169.522	76	17	0.50	2.64	32	7.4	4.7	17.0	M

Appendix A Table 1.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	98	07/07/98	57.336	168.368	71	07	0.53	2.86	32	8.7	3.6	17.5	M
*	99	07/07/98	57.489	168.726	69	09	0.52	2.88	42	8.7	3.2	17.3	M
*	100	07/07/98	57.655	168.432	67	12	0.52	2.82	42	8.6	3.4	16.4	M
*	101	07/07/98	57.821	168.712	68	14	0.51	2.86	42	8.8	2.7	17.0	M
*	102	07/07/98	57.992	168.454	65	16	0.52	2.75	42	8.9	---	16.8	M
*	103	07/08/98	58.300	168.470	63	06	0.53	2.97	41	8.7	2.9	17.2	M
*	104	07/08/98	58.649	168.499	51	08	0.51	2.82	20	8.2	3.5	15.8	M
*	105	07/08/98	58.989	168.539	44	12	0.52	2.84	20	8.1	4.1	16.1	M
*	106	07/08/98	59.314	168.575	39	14	0.50	2.73	20	7.0	4.0	15.5	M
*	107	07/08/98	59.648	168.617	37	17	0.50	2.76	20	7.0	4.1	15.7	M
*	108	07/09/98	59.976	168.651	37	06	0.51	2.87	20	7.4	4.1	15.6	M
*	109	07/09/98	60.311	168.672	35	08	0.51	2.75	20	7.4	4.8	15.5	M
*	110	07/09/98	60.330	169.285	41	11	0.53	2.88	20	8.0	3.6	16.5	M
*	111	07/09/98	60.329	170.028	51	14	0.51	2.86	20	8.4	2.8	17.3	M
*	112	07/09/98	60.018	169.984	53	16	0.50	2.70	41	8.4	2.9	16.5	M
*	113	07/10/98	59.020	169.837	61	06	0.52	2.95	41	8.2	2.2	17.9	M
*	114	07/10/98	58.685	169.786	65	09	0.50	2.76	41	8.2	1.8	17.9	M
*	115	07/10/98	58.347	169.727	67	12	0.50	2.85	41	8.3	1.3	17.7	M
*	116	07/10/98	58.015	169.709	68	15	0.50	2.82	42	7.6	1.7	17.2	M
*	117	07/10/98	57.846	169.958	68	17	0.52	2.92	42	8.3	---	17.8	M
*	118	07/11/98	57.667	170.308	71	06	0.54	3.03	42	8.1	3.3	16.9	M
*	119	07/11/98	57.666	169.678	69	08	0.51	2.80	42	8.0	2.1	17.2	F
*	120	07/11/98	57.510	169.952	66	11	0.51	2.76	42	8.1	3.1	17.2	F
*	121	07/11/98	57.339	169.632	60	13	0.52	2.89	42	8.3	2.4	17.2	F
*	122	07/11/98	57.333	170.189	51	16	0.51	2.84	42	7.6	4.3	17.3	M
*	123	07/12/98	56.849	170.489	99	06	0.51	2.77	42	7.4	3.9	18.2	M
*	124	07/12/98	56.682	170.162	95	08	0.52	2.84	42	8.0	3.9	18.0	F
*	125	07/12/98	56.347	170.076	105	11	0.54	2.91	50	8.3	---	18.7	M
*	126	07/12/98	56.329	170.655	116	13	0.53	2.82	61	8.5	---	18.3	F
*	127	07/12/98	56.650	170.743	110	16	0.53	2.85	61	8.8	3.8	18.3	F
*	128	07/13/98	57.319	172.090	106	06	0.54	2.89	61	7.9	3.5	18.6	M
*	129	07/13/98	57.654	172.158	105	10	0.52	2.93	61	7.9	3.1	18.3	F

Appendix A Table 1.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	130	07/13/98	57.983	172.226	102	12	0.50	2.75	61	7.9	2.8	18.0	F
*	131	07/13/98	58.317	172.291	99	15	0.52	2.90	61	7.8	2.4	18.0	F
*	132	07/13/98	58.333	172.896	106	17	0.55	3.20	61	7.6	2.5	18.6	M
*	133	07/14/98	58.334	173.564	111	06	0.53	2.83	61	7.4	2.9	18.8	M
*	134	07/14/98	57.993	173.487	114	10	0.53	2.82	61	7.8	3.0	18.9	M
*	135	07/14/98	57.689	173.406	144	12	0.53	2.91	61	7.8	3.3	18.1	M
*	136	07/14/98	57.347	173.330	117	15	0.48	2.75	61	8.1	3.1	18.6	M
*	137	07/14/98	57.019	173.249	137	17	0.50	2.79	61	8.3	3.6	18.5	F
*	138	07/19/98	58.651	171.078	80	08	0.52	2.83	41	8.8	2.0	17.8	M
*	139	07/19/98	58.982	171.134	75	10	0.53	2.91	41	8.9	1.5	17.8	M
*	140	07/19/98	59.320	171.175	73	13	0.52	2.86	41	9.0	1.3	18.2	M
*	141	07/19/98	59.654	171.235	71	15	0.53	2.97	41	9.0	1.1	19.4	M
*	142	07/20/98	59.987	171.298	67	06	0.52	2.88	41	8.4	1.0	17.4	M
*	143	07/20/98	60.317	171.352	64	09	0.50	2.78	41	9.1	1.0	19.0	M
*	144	07/20/98	60.648	171.432	61	11	0.52	2.88	41	9.1	1.4	19.0	M
*	145	07/20/98	60.982	171.480	57	14	0.53	2.94	41	9.0	2.0	19.4	M
*	146	07/20/98	61.000	172.129	62	17	0.49	2.80	41	9.2	0.5	18.7	M
*	147	07/21/98	60.998	172.795	64	06	0.48	2.64	41	7.8	5.1	18.6	M
*	148	07/21/98	61.001	173.463	73	09	0.49	2.78	41	7.8	0.6	19.0	M
*	149	07/21/98	60.997	174.153	80	11	0.52	2.89	41	8.2	1.4	18.7	M
*	150	07/21/98	60.684	174.138	84	14	0.50	2.87	41	8.9	1.4	17.7	M
*	151	07/21/98	60.352	174.083	88	17	0.51	2.81	43	8.7	1.6	18.5	M
*	153	07/22/98	60.160	173.758	84	08	0.51	2.77	43	8.4	1.4	18.1	M
*	154	07/22/98	60.003	173.353	72	11	0.52	2.85	43	8.8	1.2	17.7	M
*	155	07/22/98	60.001	173.914	93	14	0.54	2.93	43	8.9	1.7	18.6	M
*	156	07/22/98	59.844	173.611	92	17	0.52	2.81	43	9.2	1.8	18.1	M
*	157	07/22/98	59.676	173.257	93	19	0.52	2.87	43	9.4	1.8	18.2	M
*	158	07/23/98	59.680	173.892	104	06	0.55	3.12	62	8.7	---	18.5	M
*	159	07/23/98	59.510	173.526	102	08	0.51	2.85	43	8.9	---	18.4	M
*	160	07/23/98	59.342	173.778	108	11	0.53	2.94	62	9.0	---	18.8	M
*	161	07/23/98	59.328	173.183	98	13	0.50	2.76	43	9.3	1.7	16.7	M
*	162	07/23/98	59.017	173.086	104	16	0.49	2.82	61	9.1	2.0	16.8	M

Appendix A Table 1.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	163	07/24/98	59.002	173.689	115	06	0.50	2.78	61	---	---	17.9	M
*	164	07/24/98	58.999	174.341	126	09	0.54	2.94	61	8.6	2.5	19.6	M
*	165	07/24/98	59.318	174.437	118	11	0.51	2.84	62	8.8	2.0	18.3	M
*	166	07/24/98	59.650	174.451	113	14	0.52	2.94	62	8.8	1.7	18.5	M
*	167	07/24/98	59.820	174.259	105	16	0.52	2.93	62	8.9	1.6	18.6	M
*	168	07/24/98	59.990	174.573	106	18	0.54	2.94	62	9.0	1.4	18.7	M
*	169	07/25/98	60.154	174.335	99	06	0.52	2.85	43	8.8	1.6	18.7	M
*	170	07/25/98	60.325	174.671	101	08	0.49	2.74	62	8.7	1.6	18.5	M
*	171	07/25/98	60.651	174.802	96	10	0.51	2.95	41	8.6	1.6	18.7	M
*	181	07/27/98	60.681	176.225	117	11	0.50	2.74	61	8.7	1.4	17.9	M
*	182	07/27/98	60.667	176.769	127	14	0.52	2.96	61	9.1	2.2	18.6	M
*	183	07/27/98	60.350	176.736	135	16	0.50	2.70	61	9.2	2.4	17.9	M
*	184	07/27/98	60.329	176.073	120	19	0.50	2.73	61	8.1	1.9	18.0	M
*	185	07/28/98	59.981	175.919	128	06	0.52	2.85	61	8.8	1.7	18.6	M
*	186	07/28/98	60.001	176.692	139	09	0.50	2.89	61	8.7	2.4	17.1	M
*	187	07/28/98	59.682	176.543	137	12	0.51	2.76	61	8.7	---	17.9	M
*	188	07/28/98	59.668	175.886	137	15	0.50	2.79	61	9.7	---	17.3	M
*	189	07/28/98	59.348	175.755	134	17	0.51	3.17	61	9.6	2.3	17.7	M
*	190	07/29/98	59.344	176.380	135	07	0.50	2.74	61	8.6	---	18.5	M
*	191	07/29/98	59.013	176.324	134	09	0.51	2.82	61	8.8	---	19.0	M
*	192	07/29/98	59.000	175.762	134	12	0.51	2.91	61		---	18.9	M
*	193	07/29/98	58.678	175.557	134	15	0.48	2.71	61	8.9	3.0	18.8	M

Appendix A Table 2--Haul data for stations sampled by the F/V *Aldebaran* during the 1998 eastern Bering Sea bottom trawl survey.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	1	06/09/98	56.990	159.121	32	06	0.51	2.76	10	5.6	5.4	16.7	M
*	2	06/09/98	57.322	159.067	48	09	0.51	2.85	10	5.1	4.9	17.4	M
*	3	06/09/98	57.658	159.018	46	12	0.52	2.88	10	4.6	4.1	17.7	M
*	4	06/09/98	57.988	158.967	40	14	0.51	2.71	10	5.4	4.4	17.0	M
*	5	06/10/98	57.677	160.272	53	08	0.51	2.80	31	4.2	3.9	17.3	M
*	6	06/10/98	57.340	160.303	60	14	0.52	2.95	31	4.6	4.1	17.6	M
*	7	06/11/98	57.009	160.334	61	08	0.52	2.86	31	5.5	3.8	17.3	M
*	8	06/11/98	56.676	160.369	57	14	0.52	2.93	31	7.0	4.2	16.9	M
*	9	06/12/98	56.321	161.618	63	06	0.51	2.85	10	9.0	3.9	16.8	M
*	10	06/12/98	56.660	161.584	88	11	0.53	2.86	31	6.1	3.2	16.9	M
*	11	06/13/98	56.991	161.567	68	06	0.51	2.83	31	5.8	3.0	17.1	M
*	12	06/13/98	57.323	161.536	54	11	0.50	2.79	31	5.5	3.6	16.6	M
*	13	06/14/98	57.655	161.496	52	06	0.51	2.81	10	4.3	3.4	16.5	M
*	14	06/14/98	57.990	161.488	54	12	0.50	2.74	10	4.7	3.5	16.4	M
*	15	06/14/98	58.209	161.549	37	14	0.28	1.56	10	4.9	4.1	15.2	M
*	16	06/15/98	58.658	162.706	23	06	0.51	2.80	10	4.9	4.7	15.5	M
*	17	06/15/98	58.348	162.726	30	08	0.52	2.90	10	4.7	4.3	16.4	M
*	18	06/15/98	58.014	162.747	40	11	0.50	2.87	10	4.7	3.8	16.1	M
*	19	06/15/98	57.677	162.753	42	15	0.52	2.94	10	6.2	3.8	16.7	M
*	20	06/16/98	57.343	162.768	48	06	0.52	2.89	10	6.6	3.7	17.4	M
*	21	06/16/98	57.010	162.785	59	11	0.52	2.85	31	7.9	3.3	16.9	M
*	22	06/16/98	56.677	162.786	70	16	0.51	2.84	31	8.5	3.5	17.2	M
*	23	06/17/98	56.344	162.804	76	09	0.52	2.84	31	7.5	4.0	18.2	M
*	24	06/17/98	56.009	162.816	77	14	0.52	2.88	31	7.4	4.1	18.3	M
*	25	06/19/98	55.322	164.004	75	06	0.51	2.84	31	6.3	4.9	17.6	M
*	26	06/19/98	55.682	164.003	92	09	0.52	2.87	31	6.9	3.6	18.4	M
*	27	06/19/98	55.989	163.985	88	11	0.52	2.99	31	7.0	3.6	17.3	M
*	28	06/19/98	56.353	163.997	84	14	0.51	3.11	31	7.0	3.2	18.6	M
*	29	06/19/98	56.640	163.982	74	16	0.52	3.29	31	6.7	3.1	18.4	M
*	30	06/20/98	56.987	163.968	67	06	0.51	2.88	31	6.4	3.0	17.5	M
*	31	06/20/98	57.322	163.986	60	08	0.51	2.87	31	6.3	3.2	17.1	M

Appendix A Table 2.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	32	06/20/98	57.653	163.987	49	11	0.51	2.88	10	5.4	4.2	16.5	M
*	33	06/20/98	57.987	163.991	44	13	0.52	2.86	10	5.2	3.3	16.6	M
*	34	06/20/98	58.320	163.988	36	16	0.52	2.95	10	4.9	---	16.5	M
*	35	06/21/98	58.654	163.980	31	06	0.51	2.88	10	4.9	---	15.8	M
*	36	06/21/98	58.986	163.987	27	08	0.52	2.89	10	5.3	5.3	17.6	M
*	37	06/21/98	59.321	163.998	16	11	0.53	2.89	10	7.4	---	16.2	M
*	38	06/21/98	59.336	165.322	16	15	0.53	2.97	20	5.7	5.5	16.0	M
*	39	06/22/98	59.015	165.302	24	06	0.52	2.85	10	4.9	4.9	16.3	M
*	40	06/22/98	58.679	165.304	35	08	0.50	2.81	10	4.5	4.2	16.4	M
*	41	06/22/98	58.343	165.287	40	11	0.52	2.96	10	4.2	3.2	16.9	M
*	42	06/22/98	58.012	165.259	45	13	0.51	2.91	10	5.4	3.4	16.9	M
*	43	06/22/98	57.678	165.254	56	15	0.51	2.93	31	6.8	2.8	17.7	M
*	44	06/23/98	57.343	165.253	63	06	0.51	2.81	31	6.7	2.6	17.4	M
*	45	06/23/98	57.009	165.220	67	08	0.51	2.76	31	6.6	2.2	17.7	M
*	46	06/23/98	56.675	165.219	71	11	0.52	2.90	31	6.4	3.0	17.8	M
*	47	06/23/98	56.343	165.206	71	13	0.51	2.87	31	6.8	3.0	17.9	M
*	48	06/23/98	56.012	165.189	91	16	0.52	2.81	31	7.0	3.8	18.6	M
*	49	06/24/98	55.679	165.201	105	06	0.52	2.86	31	6.7	4.5	18.8	M
*	50	06/24/98	55.343	165.203	107	08	0.52	2.88	50	6.9	4.0	18.7	F
*	51	06/24/98	55.009	165.160	106	11	0.53	3.00	50	6.8	4.2	18.7	F
*	52	06/24/98	54.838	165.494	148	13	0.52	2.87	50	7.0	4.0	18.5	M
*	53	06/27/98	54.991	166.347	141	11	0.52	2.84	50	7.6	3.8	17.8	M
*	54	06/27/98	55.325	166.353	130	13	0.54	2.92	50	8.7	3.8	18.8	F
*	55	06/27/98	55.655	166.384	124	16	0.55	3.03	50	9.0	3.9	18.8	F
*	56	06/28/98	55.984	166.400	122	06	0.51	2.81	50	8.0	3.9	18.7	F
*	57	06/28/98	56.324	166.416	102	08	0.51	2.87	31	7.8	3.6	18.4	F
*	58	06/28/98	56.655	166.432	83	11	0.51	2.87	31	7.9	3.3	18.1	M
*	59	06/28/98	56.990	166.464	72	13	0.53	2.97	31	7.6	3.6	17.8	M
*	60	06/29/98	57.324	166.482	68	06	0.51	2.84	31	7.5	3.3	17.4	M
*	61	06/29/98	57.657	166.501	65	08	0.51	2.93	31	7.5	2.2	17.9	M
*	62	06/29/98	57.991	166.513	59	11	0.52	2.91	31	7.5	2.8	17.7	M
*	63	06/29/98	58.322	166.548	46	13	0.51	2.88	10	5.9	3.6	17.2	M

Appendix A Table 2.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	64	06/29/98	58.654	166.564	40	16	0.49	2.81	20	5.6	3.6	16.2	M
*	65	06/30/98	59.654	167.280	30	06	0.51	2.89	20	5.6	5.2	16.3	M
*	66	06/30/98	59.665	167.952	32	08	0.55	2.82	20	4.5	3.9	16.1	M
*	67	06/30/98	59.997	167.987	23	11	0.53	3.14	20	5.3	4.8	15.9	M
*	68	06/30/98	60.310	167.982	30	13	0.52	3.06	20	6.6	5.6	16.7	M
*	69	06/30/98	60.337	167.303	30	15	0.52	3.00	20	6.3	5.9	16.3	M
*	70	07/01/98	59.346	167.919	38	06	0.50	2.87	20	4.7	3.7	15.8	M
*	71	07/01/98	59.013	167.887	39	08	0.50	2.84	20	4.3	3.8	16.0	M
*	72	07/01/98	58.677	167.872	45	10	0.52	2.84	20	5.6	3.8	16.7	M
*	73	07/01/98	58.325	167.834	59	13	0.52	2.93	41	7.3	2.8	17.2	M
*	74	07/01/98	58.011	167.801	65	16	0.51	2.87	41	7.9	2.9	17.2	M
*	75	07/02/98	57.676	167.770	67	06	0.51	2.81	31	7.8	2.9	17.3	M
*	76	07/02/98	57.344	167.739	71	08	0.51	2.85	31	8.0	3.4	17.4	M
*	77	07/02/98	57.007	167.704	75	11	0.51	2.89	31	8.2	3.6	17.2	M
*	78	07/02/98	56.678	167.685	100	13	0.48	2.78	31	8.6	3.4	16.5	M
*	79	07/02/98	56.345	167.650	126	15	0.52	2.84	50	8.3	3.9	18.8	M
*	80	07/03/98	55.318	167.550	147	06	0.38	2.02	50	8.0	3.7	17.1	M
*	81	07/03/98	55.655	167.581	133	09	0.52	2.81	50	8.0	4.0	19.5	M
*	82	07/03/98	55.659	168.182	133	12	0.52	2.93	50	8.2	3.8	19.5	M
*	83	07/03/98	55.975	168.209	146	14	0.48	2.64	50	8.1	3.7	19.0	M
*	84	07/03/98	56.304	168.243	152	16	0.52	2.89	50	8.5	3.7	19.2	M
*	85	07/05/98	57.002	170.178	67	06	0.52	2.86	42	6.7	4.1	17.5	M
*	86	07/05/98	56.999	169.570	58	09	0.53	2.91	42	7.3	3.0	17.1	M
*	87	07/05/98	57.001	168.970	78	11	0.53	2.82	32	8.1	3.8	18.1	M
*	88	07/05/98	56.849	168.625	94	14	0.54	2.80	32	8.5	3.6	18.8	M
*	89	07/05/98	56.673	168.877	99	16	0.40	2.13	32	8.5	3.6	19.3	M
*	90	07/06/98	56.834	169.277	79	06	0.52	2.86	32	7.3	3.4	18.4	M
*	91	07/06/98	56.831	169.880	71	09	0.54	3.16	42	7.5	4.3	18.3	M
*	92	07/07/98	57.334	168.989	69	06	0.54	2.87	42	8.1	3.1	18.0	M
*	93	07/07/98	57.491	169.363	69	08	0.53	2.94	42	8.1	2.7	18.1	M
*	94	07/07/98	57.657	169.039	67	10	0.52	2.86	42	7.9	2.4	17.8	M
*	95	07/07/98	57.823	169.369	64	12	0.52	2.99	42	8.0	1.6	17.8	M

Appendix A Table 2.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	96	07/07/98	57.994	169.072	68	14	0.52	2.79	42	8.5	2.1	17.8	M
*	97	07/07/98	58.325	169.116	66	16	0.54	2.94	41	8.1	1.8	18.1	M
*	98	07/08/98	58.658	169.149	61	06	0.53	2.70	41	8.4	2.7	17.6	M
*	99	07/08/98	58.992	169.180	52	08	0.52	2.90	41	8.0	3.0	16.9	M
*	100	07/08/98	59.321	169.231	48	11	0.52	2.88	20	8.0	3.4	16.8	M
*	101	07/08/98	59.655	169.271	46	13	0.53	2.90	20	7.8	3.6	17.1	M
*	102	07/08/98	59.988	169.320	44	15	0.52	3.03	20	8.0	3.3	16.8	M
*	103	07/09/98	60.346	170.662	60	06	0.28	1.47	41	8.5	2.2	18.3	M
*	104	07/09/98	60.012	170.630	63	08	0.53	2.91	41	8.8	2.2	17.9	M
*	105	07/09/98	59.676	170.589	65	11	0.52	2.83	41	8.1	2.2	17.9	M
*	106	07/09/98	59.676	169.917	55	13	0.54	2.95	41	8.5	3.0	17.8	M
*	107	07/09/98	59.344	169.872	59	16	0.53	2.81	41	8.6	2.8	18.1	M
*	108	07/10/98	59.348	170.535	66	06	0.52	2.89	41	7.8	1.9	18.1	M
*	109	07/10/98	59.010	170.478	69	12	0.54	2.99	41	7.5	1.5	18.1	F
*	110	07/10/98	58.668	170.441	72	15	0.53	2.95	41	7.7	1.4	18.1	F
*	111	07/10/98	58.345	170.385	72	17	0.53	2.87	41	8.0	1.5	18.7	M
*	112	07/11/98	58.010	170.328	73	06	0.53	2.85	42	7.7	2.2	18.1	M
*	113	07/11/98	57.843	170.610	77	08	0.53	2.80	42	8.0	2.6	18.1	M
*	114	07/11/98	57.677	170.903	84	10	0.52	2.78	42	8.1	3.1	18.5	M
*	115	07/11/98	57.504	170.584	72	12	0.53	2.93	42	7.3	3.7	17.5	M
*	116	07/11/98	57.334	170.855	81	14	0.52	2.93	42	7.7	3.9	18.2	M
*	118	07/12/98	57.010	170.775	93	06	0.54	2.85	42	6.1	4.0	18.7	M
*	119	07/12/98	57.015	171.383	107	09	0.54	2.92	61	7.9	3.5	19.1	M
*	120	07/12/98	56.673	171.350	117	11	0.53	2.94	61	8.2	3.6	19.1	M
*	121	07/12/98	56.657	171.971	124	14	0.55	2.90	61	8.2	3.6	18.7	M
*	122	07/12/98	56.997	172.034	115	17	0.35	1.83	61	8.0	3.6	18.1	M
*	123	07/13/98	57.327	171.467	99	06	0.52	2.90	41	8.0	3.4	18.5	M
*	124	07/13/98	57.657	171.533	98	09	0.53	3.04	41	8.0	3.3	18.1	M
*	125	07/13/98	57.993	171.590	96	11	0.52	2.87	41	7.9	3.0	18.4	M
*	126	07/13/98	57.994	170.970	85	14	0.51	2.87	42	8.1	2.5	18.3	M
*	127	07/13/98	58.322	171.007	82	16	0.52	2.81	41	8.2	2.1	18.5	M
*	128	07/14/98	58.012	172.877	107	06	0.54	2.83	61	7.7	2.8	18.6	M

Appendix A Table 2.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	129	07/14/98	57.679	172.808	118	09	0.53	2.77	61	7.6	3.0	19.2	M
*	130	07/14/98	57.357	172.814	115	11	0.54	2.90	61	7.9	3.0	19.4	M
*	131	07/14/98	57.012	172.655	120	14	0.53	2.88	61	8.2	3.3	19.3	M
*	132	07/14/98	56.674	172.575	134	16	0.53	2.81	61	8.6	3.6	19.1	M
*	133	07/19/98	58.321	171.651	94	06	0.53	2.84	41	8.3	2.2	18.6	M
*	134	07/19/98	58.659	171.723	91	09	0.54	2.95	41	8.4	1.9	19.1	M
*	135	07/19/98	58.992	171.787	85	12	0.54	2.96	41	8.5	1.7	18.3	M
*	136	07/19/98	59.326	171.834	79	14	0.54	2.95	43	8.8	1.3	19.4	M
*	137	07/20/98	59.655	171.900	76	06	0.53	2.87	43	8.4	1.1	18.2	M
*	138	07/20/98	59.987	171.961	65	09	0.52	2.79	43	8.3	0.7	17.6	M
*	139	07/20/98	60.318	172.066	57	11	0.53	2.90	43	9.2	0.9	17.4	M
*	140	07/20/98	60.656	172.123	59	14	0.53	2.88	41	8.7	0.5	18.6	M
*	141	07/20/98	60.662	172.773	43	16	0.53	2.94	41	8.2	3.2	17.1	M
*	142	07/21/98	60.684	173.467	65	06	0.52	2.78	41	7.2	1.4	17.6	M
*	143	07/21/98	60.333	173.421	61	09	0.29	1.42	43	7.5	1.3	18.5	M
*	144	07/21/98	60.185	173.029	58	11	0.53	2.91	43	6.5	1.5	18.3	M
*	145	07/21/98	60.013	172.641	64	13	0.36	1.94	43	8.6	1.0	17.9	M
*	146	07/21/98	60.183	172.343	56	15	0.53	2.89	43	9.6	2.4	17.7	M
*	147	07/22/98	59.848	172.253	74	06	0.53	2.87	43	8.9	1.1	18.4	M
*	148	07/22/98	59.841	172.848	78	09	0.54	2.89	43	8.8	1.2	18.6	M
*	149	07/22/98	59.678	172.570	82	11	0.53	2.90	43	8.9	1.5	18.6	M
*	150	07/22/98	59.508	172.884	91	13	0.37	2.05	43	9.1	1.6	18.8	M
*	151	07/22/98	59.344	172.501	86	16	0.41	2.10	43	9.5	1.6	18.8	M
*	152	07/23/98	59.010	172.439	97	07	0.53	2.82	41	10.4	2.0	19.0	M
*	153	07/23/98	58.675	172.367	100	09	0.53	2.91	61	9.3	2.2	18.8	M
*	154	07/23/98	58.668	172.983	110	12	0.54	2.94	61	8.9	2.3	18.6	M
*	155	07/23/98	58.679	173.629	124	14	0.56	2.97	61	9.1	2.8	18.7	M
*	156	07/23/98	58.333	174.302	158	19	0.54	3.01	61	8.7	3.2	18.7	M
*	157	07/24/98	58.659	174.276	155	07	0.54	3.00	61	8.1	2.8	18.6	M
*	158	07/24/98	58.739	174.956	141	10	0.55	2.97	61	8.3	2.9	19.1	M
*	159	07/24/98	58.992	175.010	127	12	0.53	2.85	61	7.9	2.7	19.1	M
*	160	07/24/98	59.322	175.096	130	14	0.54	2.98	61	8.3	2.3	18.9	M

Appendix A Table 2.--Continued.

	Haul	MM/DD/YY	Latitude	Longitude	Depth (m)	Time (hr.)	Duration (hr.)	Distance (km)	Strata	Surf. Temp.	Gear Temp.	Net Width (m)	Width Code
*	161	07/24/98	59.639	175.117	124	17	0.55	3.00	61	8.4	1.8	18.8	M
*	162	07/25/98	59.989	175.267	116	07	0.53	2.89	61	8.1	1.5	19.1	M
*	163	07/25/98	60.323	175.393	110	09	0.55	2.94	61	8.3	1.5	19.0	M
*	164	07/25/98	60.656	175.441	105	12	0.56	3.10	61	8.3	1.6	19.3	M
*	176	07/27/98	60.679	178.154	158	17	0.54	2.97	61	8.7	2.5	19.1	M
*	177	07/28/98	60.677	177.489	144	07	0.56	3.02	61	8.4	2.3	18.8	M
*	179	07/28/98	60.344	177.395	146	11	0.29	1.50	61	8.2	2.5	17.8	M
*	180	07/28/98	60.011	177.936	140	14	0.55	2.93	61	8.7	2.0	18.4	M
*	181	07/28/98	60.011	177.226	135	16	0.38	2.02	61	9.0	2.5	18.5	M
*	182	07/28/98	59.680	177.149	170	19	0.56	3.04	61	8.9	2.7	18.9	M
*	183	07/29/98	59.345	177.056	82	07	0.56	3.02	61	8.1	---	19.1	M
*	184	07/29/98	59.004	177.593	131	10	0.54	2.81	61	8.7	2.8	19.4	M
*	185	07/29/98	58.998	176.969	133	12	0.54	3.01	61	8.4	2.8	19.4	M
*	186	07/29/98	58.681	176.838	132	15	0.54	2.99	61	9.2	2.9	19.0	M
*	187	07/29/98	58.667	176.224	138	17	0.54	2.93	61	9.1	2.7	19.30	M

APPENDIX B

List of Species Encountered

Appendix B contains a listing of all fish and invertebrate species taken during the 1998 eastern Bering Sea bottom trawl survey.

List of Tables

Table — Page

Appendix B Table 1.--Fish species encountered during the 1998 eastern Bering Sea bottom trawl survey.

Family	Scientific name	Common name
Squalidae	*Squalus acanthias*	spiny dogfish
	Somniosus pacificus	Pacific sleeper shark
Rajidae	*Rajidae* unident.	skate unident.
	Raja sp.	
	Bathyraja sp.	
	Raja binoculata	big skate
	Bathyraja interrupta	Bering skate
	Bathyraja parmifera	Alaska skate
	Bathyraja aleutica	Aleutian skate
	Pleuronectiformes	flatfish unident.
Pleuronectidae	*Atheresthes stomias*	arrowtooth flounder
	Atheresthes evermanni	Kamchatka flounder
	Reinhardtius hippoglossoides	Greenland turbot
	Hippoglossus stenolepis	Pacific halibut
	Hippoglossoides elassodon	flathead sole
	Hippoglossoides robustus	Bering flounder
	Microstomus pacificus	Dover sole
	Glyptocephalus zachirus	rex sole
	Limanda asper	yellowfin sole
	Limanda proboscidea	longhead dab
	Limanda sakhalinensis	Sakhalin sole
	Platichthys stellatus	starry flounder
	Lepidopsetta sp. cf. *bilineata*	northern rock sole
	Lepidopsetta bilineata	southern rock sole
	Isopsetta isolepis	butter sole
	Pleuronectes quadrituberculatus	Alaska plaice
Agonidae	Agonidae	poacher unident.

Appendix B Table 1.--Continued.

Family	Scientific name	Common name
	Percis japonicus	dragon poacher
	Sarritor frenatus	sawback poacher
	Bathyagonus infraspinatus	spinycheek starsnout
	Podothecus acipenserinus	sturgeon poacher
	Aspidophoroides bartoni	Aleutian alligatorfish
	Occella dodecaedron	Bering poacher
Ammodytidae	*Ammodytes hexapterus*	Pacific sand lance
Anarhichadidae	*Anarhichas orientalis*	Bering wolffish
Anoplopomatidae	*Anoplopoma fimbria*	sablefish
Bathymasteridae	*Bathymaster signatus*	searcher
Clupeidae	*Clupea pallasi*	Pacific herring
Cottidae	Cottidae	sculpin unident.
	Icelinus borealis	northern sculpin
	Gymnocanthus sp.	
	Gymnocanthus pistilliger	threaded sculpin
	Gymnocanthus galeatus	armorhead sculpin
	Gymnocanthus detrisus	
	Artediellus sp.	
	Artediellus pacificus	Pacific hookear sculpin
	Malacocottus sp.	
	Hemilepidotus hemilepidotus	red Irish lord
	Hemilepidotus jordani	yellow Irish lord
	Hemilepidotus papilio	butterfly sculpin
	Triglops sp.	
	Triglops forficata	scissortail sculpin
	Triglops scepticus	spectacled sculpin
	Triglops pingeli	ribbed sculpin
	Triglops macellus	roughspine sculpin
	Myoxocephalus verrucosus	warty sculpin

Appendix B Table 1.--Continued.

Family	Scientific name	Common name
	Myoxocephalus polyacanthocephalus	great sculpin
	Myoxocephalus jaok	plain sculpin
	Myoxocephalus sp.	
	Dasycottus setiger	spinyhead sculpin
	Hemitripterus bolini	bigmouth sculpin
	Icelus spiniger	thorny sculpin
	Icelus spatula	spatulate sculpin
	Icelus sp.	
Trichodontidae	*Trichodon trichodon*	Pacific sandfish
Gadidae	*Gadus macrocephalus*	Pacific cod
	Boreogadus saida	Arctic cod
	Eleginus gracilis	saffron cod
	Theragra chalcogramma	walleye pollock
Hexagrammidae	Hexagrammidae	greenling unident.
	Pleurogrammus monopterygius	Atka mackerel
	Hexagrammos stelleri	whitespotted greenling
Cyclopteridae	*Aptocyclus ventricosus*	smooth lumpsucker
	Liparidinae	snailfish unident.
	Liparis sp.	
	Liparis gibbus	dusky snailfish
	Crystallichthys cyclospilus	blotched snailfish
	Careproctus rastrinus	salmon snailfish
Osmeridae	*Thaleichthys pacificus*	eulachon
	Mallotus villosus	capelin
	Osmerus mordax	rainbow smelt
Salmonidae	*Oncorhynchus tshawytscha*	chinook salmon
	Oncorhynchus keta	chum salmon
Stichaeidae	*Lumpenus* sp.	
	Eumesogrammus praecisus	fourline snakeblenny

Appendix B Table 1.--Continued.

Family	Scientific name	Common name
	Lumpenus maculatus	daubed shanny
	Lumpenus fabricii	slender eelblenny

Appendix B Table 2.--Invertebrate species encountered during the 1998 eastern Bering Sea bottom trawl survey.

Phylum	Species name	Common name
Cnidaria	Scyphozoa (class)	jellyfish unident.
	Gersemia sp.	sea raspberry
	Gorgonacea (order)	gorgonian coral unident.
	Pennatulacea (order)	sea pen or sea whip unident.
	Virgularia sp.	smoothstem seawhip
	Virgularidae	sea whip unident.
	Stylatula sp.	slender seawhips
	Actiniaria (order)	sea anemone unident.
	Metridium sp.	
	Metridium senile	clonal plumose anemone
	Urticina	
	Liponema brevicorne	tentacle-shedding anemone
Annelida	Aphroditidae	sea mouse unident.
	Polynoidae	scale worm unident.
	Eunoe sp.	
	Eunoe nodosa	giant scale worm
	Eunoe depressa	depressed scale worm
	Hirudinea unident.	leech unident.
Arthropoda	Isopoda (order)	isopod unident.
	Thoracica (order)	barnacle unident.
	Balanus sp.	
	Balanus evermanni	giant barnacle
	Pandalus borealis	northern shrimp
	Pandalus goniurus	humpy shrimp
	Crangon sp.	
	Crangon abyssorum	abyssal crangon
	Crangon communis	twospine crangon

Appendix B Table 2.--Continued.

Phylum	Species name	Common name
	Argis sp.	
	Sclerocrangon sp.	
	Argis lar	kuro argid
	Cancer sp.	cancer crab unident.
	Cancer oregonensis	Oregon rock crab
	Cancer productus	red rock crab
	Oregonia gracilis	graceful decorator crab
	Chionoecetes bairdi	Tanner crab
	Chionoecetes angulatus	triangle Tanner crab
	Hyas coarctatus	circumboreal toad crab
	Hyas lyratus	Pacific lyre crab
	Chionoecetes opilio	narrow snow crab
	Chionoecetes hybrid	tanner crab
	Telmessus cheiragonus	helmet crab
	Paguridae	hermit crab unident.
	Pagurus sp.	
	Pagurus brandti	sponge hermit
	Pagurus aleuticus	Aleutian hermit
	Labidochirus splendescens	splendid hermit
	Pagurus confragosus	knobbyhand hermit
	Pagurus cornutus	
	Pagurus trigonocheirus	fuzzy hermit crab
	Pagurus ochotensis	Alaskan hermit
	Pagurus rathbuni	longfinger hermit
	Elassochirus tenuimanus	widehand hermit crab
	Pagurus capillatus	hairy hermit crab
	Elassochirus cavimanus	purple hermit
	Lithodes aequispina	golden king crab

Appendix B Table 2.--Continued.

Phylum	Species name	Common name
	Hapalogaster grebnitzkii	
	Paralithodes camtschaticus	red king crab
	Paralithodes platypus	blue king crab
	Erimacrus isenbeckii	horsehair crab
	Hyas sp.	
Mollusca	Nudibranchia unident.	nudibranch unident.
	Tritonia sp.	
	Tritonia diomedea	rosy tritonia
	Gastropod unident.	snail unident.
	Natica sp.	
	Natica aleutica	Aleutian moonsnail
	Natica russa	rusty moonsnail
	Polinices sp.	
	Crepidula sp.	slipper shell
	Crepidula grandis	great slippersnail
	Colus sp.	
	Colus herendeenii	thin-ribbed whelk
	Colus spitzbergensis	thick-ribbed whelk
	Colus halli	shrew whelk
	Volutopsius sp.	
	Pyrulofusus deformis	warped whelk
	Volutopsius fragilis	fragile whelk
	Volutopsius filosus	threaded whelk
	Pyrulofusus melonis	
	Volutopsius stefanssoni	shouldered whelk
	Beringius sp.	
	Beringius kennicottii	
	Beringius frielei	

Appendix B Table 2.--Continued.

Phylum	Species name	Common name
	Beringius beringii	
	Neptunea sp.	
	Neptunea pribiloffensis	Pribilof whelk
	Neptunea borealis	
	Neptunea lyrata	lyre whelk
	Neptunea ventricosa	fat whelk
	Neptunea heros	
	Neptunea magna	helmet whelk
	Plicifusus	
	Aforia circinata	keeled aforia
	Boreotrophon muriciformis	
	Fusitriton oregonensis	Oregon triton
	Fusitriton sp.	
	Buccinum sp.	
	Buccinum angulosum	angular whelk
	Buccinum plectrum	sinuous whelk
	Buccinum scalariforme	ladder whelk
	Buccinum polare	polar whelk
	Buccinum solenum	
	Arctomelon stearnsii	Alaska volute
	Bivalvia unident.	bivalve unident.
	Mytilidae	mussel unident.
	Mytilus sp.	
	Mytilus edulis	blue mussel
	Pectinid unident.	scallop unident.
	Chlamys sp.	
	Chlamys rubida	reddish scallop
	Patinopecten caurinus	weathervane scallop

Appendix B Table 2.--Continued.

Phylum	Species name	Common name
	Hiatella arctica	Arctic hiatella
	Yoldia sp.	
	Musculus sp.	
	Musculus discors	discordant mussel
	Cyclocardia crebricostata	many-rib cyclocardia
	Cyclocardia sp.	
	Clinocardium sp.	
	Clinocardium ciliatum	hairy cockle
	Mactromeris sp.	
	Mactromeris polynyma	Arctic surfclam
	Macoma sp.	
	Macoma nasuta	bent-nose macoma
	Macoma brota	heavy macoma
	Siliqua sp.	
	Siliqua alta	Alaska razor
	Serripes sp.	
	Serripes groenlandicus	Greenland cockle
	Mya arenaria	softshell
	Mya pseudoarenaria	false softshell
	Pododesmus macroschisma	Alaska falsejingle
	Octopus dofleini	giant octopus
	Rossia pacifica	eastern Pacific bobtail
Echinodermata	Asteroidea unident.	starfish unident.
	Evasterias sp.	
	Evasterias echinosoma	
	Pycnopodia helianthoides	
	Lethasterias nanimensis	
	Henricia sp.	

Appendix B Table 2.--Continued.

Phylum	Species name	Common name
	Leptasterias polaris	
	Leptasterias arctica	
	Leptasterias sp.	
	Pseudarchaster parelii	
	Ceramaster sp.	
	Ceramaster japonicus	red bat star
	Dermasterias imbricata	
	Solaster sp.	
	Crossaster sp.	
	Crossaster papposus	rose sea star
	Pteraster sp.	
	Pteraster tesselatus	
	Pteraster obscurus	
	Diplopteraster multipes	
	Asterias sp.	
	Asterias amurensis	purple-orange seastar
	Ctenodiscus crispatus	common mud star
	Echinacea unident.	sea urchin unident.
	Strongylocentrotus droebachiensis	green sea urchin
	Strongylocentrotus pallidus	white sea urchin
	Echinarachnius parma	Parma sand dollar
	Ophiuroid unident.	brittlestarfish unident.
	Gorgonocephalus eucnemis	basketstarfish
	Ophiura sarsi	
	Holothuroidea unident.	sea cucumber unident.
	Cucumaria sp.	
	Cucumaria fallax	
	Psolus sp.	

Appendix B Table 2.--Continued.

Phylum	Species name	Common name
Porifera	Porifera (Phylum)	sponge unident.
	Suberites ficus	hermit sponge
	Aphrocallistes vastus	clay pipe sponge
Platyhelminthes	Platyhelminthes (phylum)	flatworm unident.
Rhynchocoela	Nemertea (phylum)	nemertean worm unident.
Sipuncula	Sipuncula (phylum)	sipunculid worm unident.
Bryozoa	Bryozoa unident.	bryozoan unident.
	Flustra serrulata	leafy bryozoan
	Rhamphostomella costata	ribbed bryozoan
Brachiopoda	brachiopod unident.	lampshells unident.
Chordata	Ascidian unident.	tunicate unident.
	Styela rustica	sea potato
	Boltenia sp.	
	Boltenia ovifera	
	Halocynthia sp.	sea peach unident.
	Halocynthia aurantium	sea peach
	Aplidium sp.	sea glob
	Molgula grifithsii	sea grape
	Molgula retortiformis	sea clod

APPENDIX C

Rank Order of Relative Abundance of Fish and Invertebrates

Appendix C ranks all fish and invertebrates caught during the 1998 eastern Bering Sea bottom trawl survey by descending CPUE (kg/ha).

Appendix C Table 1.--Rank of fish and invertebrate taxa by unweighted total CPUE (kg/ha) from the 1998 eastern Bering Sea bottom trawl survey.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
1	10210	50.87680	15.124	43.25453	58.49907	0.18270341	0.18270341	Limanda aspera
2	21740	50.44953	30.022	39.71022	61.18884	0.18116905	0.36387246	Theragra chalcogramma
3	10260	47.25741	11.533	40.60128	53.91354	0.16970586	0.53357831	Lepidopsetta sp.
4	81742	16.41816	1.822	13.77265	19.06367	0.05895916	0.59253747	Asterias amurensis
5	10129	14.02870	7.687	8.59461	19.46280	0.05037840	0.64291587	Hippoglossoides sp.
6	21720	12.18844	0.928	10.29995	14.07692	0.04376983	0.68668570	Gadus macrocephalus
7	10285	9.81786	1.500	7.41700	12.21873	0.03525687	0.72194258	Pleuronectes quadrituberculatus
8	400	7.68786	0.192	6.82856	8.54717	0.02760785	0.74955042	Rajidae unident.
9	68580	7.34183	0.473	5.99363	8.69003	0.02636519	0.77591562	Chionoecetes opilio
10	10110	6.89152	0.775	5.16648	8.61656	0.02474810	0.80066372	Atheresthes stomias
11	91000	5.89155	8.869	0.05458	11.72853	0.02115713	0.82182085	Porifera (Phylum)
12	69010	4.70733	0.245	3.73650	5.67815	0.01690445	0.83872530	Paguridae
13	83020	4.39203	1.146	2.29358	6.49048	0.01577219	0.85449749	Gorgonocephalus eucnemis
14	10120	3.54193	0.075	3.00626	4.07760	0.01271940	0.86721689	Hippoglossus stenolepis
15	40500	3.01743	0.162	2.22778	3.80708	0.01083588	0.87805278	Scyphozoa (class)
16	21375	2.98476	0.117	2.31400	3.65552	0.01071856	0.88877133	Myoxocephalus sp.
17	71884	2.36930	0.122	1.68433	3.05427	0.00850838	0.89727971	Neptunea heros
18	98082	2.34367	0.216	1.43204	3.25530	0.00841635	0.90569607	Styela rustica
19	71820	1.98777	0.082	1.42744	2.54809	0.00713826	0.91283432	Neptunea pribiloffensis
20	69322	1.83008	0.107	1.18984	2.47032	0.00657200	0.91940632	Paralithodes camtschaticus
21	81780	1.76770	0.335	0.63244	2.90296	0.00634798	0.92575430	Ctenodiscus crispatus
22	69035	1.26335	0.077	0.71879	1.80790	0.00453679	0.93029109	Pagurus sp.
23	43000	1.15508	0.083	0.59201	1.71815	0.00414800	0.93443910	Actiniaria (order)
24	98200	1.14066	0.357	0.00000	2.31196	0.00409621	0.93853531	Halocynthia sp.
25	10220	1.04078	0.106	0.40408	1.67748	0.00373754	0.94227285	Platichthys stellatus
26	71882	1.03050	0.019	0.76105	1.29995	0.00370061	0.94597346	Neptunea ventricosa
27	80590	0.87217	0.031	0.52868	1.21567	0.00313206	0.94910552	Leptasterias polaris
28	21420	0.80805	0.048	0.37925	1.23684	0.00290177	0.95200729	Hemitripterus bolini
29	71870	0.74357	0.024	0.43849	1.04864	0.00267021	0.95467750	Neptunea lyrata
30	10115	0.60430	0.009	0.41601	0.79258	0.00217008	0.95684758	Reinhardtius hippoglossoides

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
31	69060	0.59090	0.021	0.30993	0.87187	0.00212198	0.95896956	Pagurus aleuticus
32	98205	0.52973	0.077	0.00000	1.07310	0.00190233	0.96087189	Halocynthia aurantium
33	10112	0.50359	0.003	0.39400	0.61318	0.00180843	0.96268032	Atheresthes evermanni
34	69323	0.47406	0.010	0.28169	0.66644	0.00170240	0.96438272	Paralithodes platypus
35	68560	0.46747	0.006	0.31805	0.61689	0.00167872	0.96606144	Chionoecetes bairdi
36	20040	0.42301	0.002	0.34014	0.50589	0.00151909	0.96758053	Podothecus acipenserinus
37	21347	0.40246	0.017	0.14650	0.65842	0.00144526	0.96902579	Hemilepidotus jordani
38	81741	0.38958	0.061	0.00000	0.87437	0.00139904	0.97042482	Asterias sp.
39	24191	0.38026	0.007	0.21670	0.54383	0.00136556	0.97179038	Lycodes brevipes
40	68577	0.34564	0.025	0.03363	0.65765	0.00124124	0.97303162	Hyas coarctatus
41	21110	0.31326	0.012	0.09506	0.53147	0.00112496	0.97415658	Clupea pallasi
42	10211	0.30973	0.004	0.18018	0.43928	0.00111228	0.97526886	Limanda proboscidea
43	69090	0.30132	0.002	0.20576	0.39688	0.00108208	0.97635094	Pagurus ochotensis
44	98100	0.29873	0.007	0.13144	0.46601	0.00107276	0.97742369	Boltenia sp.
45	83320	0.28963	0.011	0.08734	0.49192	0.00104009	0.97846378	Ophiura sarsi
46	71500	0.28007	0.004	0.15571	0.40442	0.00100574	0.97946952	Gastropod unident.
47	30420	0.26421	0.068	0.00000	0.77513	0.00094882	0.98041834	Sebastes polyspinis
48	24185	0.25387	0.001	0.18104	0.32670	0.00091168	0.98133002	Lycodes palearis
49	80200	0.25145	0.004	0.12376	0.37914	0.00090298	0.98223300	Lethasterias nanimensis
50	98310	0.21642	0.006	0.05994	0.37290	0.00077718	0.98301017	Aplidium sp.
51	41201	0.21179	0.002	0.12840	0.29518	0.00076057	0.98377074	Gersemia sp.
52	71001	0.20413	0.001	0.14176	0.26650	0.00073306	0.98450381	gastropod eggs
53	72500	0.19832	0.001	0.12516	0.27147	0.00071218	0.98521599	Fusitriton oregonensis
54	71753	0.18697	0.007	0.02131	0.35262	0.00067141	0.98588740	Pyrulofusus deformis
55	98105	0.18655	0.004	0.06010	0.31300	0.00066992	0.98655732	Boltenia ovifera
56	71756	0.17641	0.005	0.03957	0.31326	0.00063351	0.98719083	Volutopsius fragilis
57	83000	0.16885	0.006	0.01417	0.32353	0.00060636	0.98779719	Ophiuroid unident.
58	69086	0.16538	0.009	0.00000	0.35542	0.00059389	0.98839108	Pagurus trigonocheirus
59	10200	0.14631	0.001	0.07667	0.21594	0.00052540	0.98891647	Glyptocephalus zachirus
60	85201	0.13778	0.003	0.03528	0.24028	0.00049478	0.98941126	Cucumaria fallax
61	80020	0.13051	0.006	0.00000	0.27603	0.00046868	0.98987994	Evasterias echinosoma
62	69120	0.11121	0.002	0.02520	0.19722	0.00039937	0.99027931	Pagurus capillatus

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
63	95000	0.10015	0.003	0.00000	0.21427	0.00035966	0.99063897	Bryozoa unident.
64	72755	0.09730	0.000	0.05621	0.13839	0.00034942	0.99098839	Buccinum polare
65	72752	0.09424	0.000	0.06223	0.12626	0.00033844	0.99132683	Buccinum scalariforme
66	80594	0.08984	0.001	0.01638	0.16330	0.00032261	0.99164944	Leptasterias arctica
67	23010	0.08514	0.001	0.03287	0.13740	0.00030575	0.99195518	Thaleichthys pacificus
68	66031	0.08195	0.000	0.04742	0.11648	0.00029430	0.99224948	Pandalus borealis
69	69400	0.08174	0.000	0.04401	0.11948	0.00029354	0.99254303	Erimacrus isenbeckii
70	72743	0.08173	0.000	0.05091	0.11256	0.00029352	0.99283654	Buccinum angulosum
71	82510	0.07944	0.001	0.01010	0.14878	0.00028528	0.99312182	Strongylocentrotus droebachiensis
72	21735	0.07724	0.001	0.01502	0.13946	0.00027738	0.99339920	Eleginus gracilis
73	80595	0.07547	0.004	0.00000	0.20260	0.00027101	0.99367022	Leptasterias sp.
74	72740	0.06446	0.000	0.03470	0.09422	0.00023148	0.99390170	Buccinum sp.
75	80010	0.06399	0.001	0.00871	0.11926	0.00022979	0.99413148	Evasterias sp.
76	71835	0.06248	0.000	0.04248	0.08247	0.00022435	0.99435584	Neptunea borealis
77	43010	0.05764	0.001	0.01039	0.10489	0.00020700	0.99456283	Metridium sp.
78	20720	0.05675	0.001	0.00606	0.10744	0.00020379	0.99476663	Bathymaster signatus
79	69061	0.04696	0.000	0.01919	0.07472	0.00016863	0.99493526	Labidochirus splendescens
80	50160	0.04602	0.001	0.00000	0.09360	0.00016526	0.99510052	Aphroditidae
81	20322	0.04291	0.000	0.00030	0.08552	0.00015408	0.99525460	Anarhichas orientalis
82	71763	0.04133	0.000	0.00000	0.08496	0.00014841	0.99540300	Volutopsius stefanssoni
83	320	0.04073	0.002	0.00000	0.12057	0.00014628	0.99554928	Somniosus pacificus
84	10270	0.04053	0.000	0.00962	0.07145	0.00014555	0.99569484	Isopsetta isolepis
85	24184	0.04042	0.000	0.01578	0.06506	0.00014515	0.99583999	Lycodes raridens
86	68570	0.03968	0.002	0.00000	0.11601	0.00014249	0.99598247	Chionoecetes angulatus
87	81315	0.03850	0.001	0.00000	0.11070	0.00013827	0.99612074	Pteraster tesselatus
88	21314	0.03787	0.000	0.01926	0.05649	0.00013600	0.99625674	Gymnocanthus pistilliger
89	68781	0.03444	0.000	0.01921	0.04967	0.00012368	0.99638043	Telmessus cheiragonus
90	21316	0.03162	0.000	0.00000	0.07347	0.00011355	0.99649397	Gymnocanthus galeatus
91	23235	0.03044	0.000	0.00815	0.05274	0.00010932	0.99660330	Oncorhynchus keta
92	21592	0.02865	0.000	0.00045	0.05685	0.00010289	0.99670619	Trichodon trichodon
93	71772	0.02683	0.000	0.01292	0.04073	0.00009634	0.99680253	Beringius beringii
94	71886	0.02597	0.000	0.01559	0.03636	0.00009327	0.99689580	Neptunea magna

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
95	21438	0.02559	0.000	0.01653	0.03466	0.00009191	0.99698771	Icelus spiniger
96	75285	0.02469	0.000	0.01016	0.03923	0.00008868	0.99707639	Serripes groenlandicus
97	69070	0.02429	0.000	0.00290	0.04567	0.00008721	0.99716360	Pagurus confragosus
98	68578	0.02252	0.000	0.01556	0.02948	0.00008088	0.99724448	Hyas lyratus
99	71010	0.02244	0.000	0.00703	0.03785	0.00008059	0.99732507	Nudibranchia unident.
100	82500	0.02225	0.000	0.01376	0.03074	0.00007991	0.99740498	Echinacea unident.
101	21348	0.02124	0.000	0.00442	0.03805	0.00007627	0.99748125	Hemilepidotus papilio
102	21390	0.02051	0.000	0.01361	0.02741	0.00007365	0.99755490	Dasycottus setiger
103	21313	0.02029	0.000	0.00000	0.05363	0.00007287	0.99762777	Gymnocanthus sp.
104	69042	0.02013	0.000	0.00000	0.04033	0.00007230	0.99770007	Pagurus brandti
105	85000	0.01997	0.000	0.00000	0.05208	0.00007171	0.99777178	Holothuroidea unident.
106	71750	0.01872	0.000	0.00000	0.03910	0.00006723	0.99783901	Volutopsius sp.
107	20006	0.01841	0.000	0.01141	0.02541	0.00006612	0.99790513	Sarritor frenatus
108	43040	0.01833	0.000	0.00000	0.04592	0.00006583	0.99797096	Urticina (=Tealia)
109	81355	0.01768	0.000	0.01085	0.02451	0.00006349	0.99803445	Pteraster obscurus
110	71891	0.01761	0.000	0.00834	0.02689	0.00006325	0.99809770	Plicifusus (=Colus)
111	43090	0.01652	0.000	0.00000	0.03784	0.00005934	0.99815704	Liponema brevicorne
112	78010	0.01413	0.000	0.00029	0.02798	0.00005076	0.99820780	octopus unident.
113	65100	0.01390	0.000	0.00000	0.03080	0.00004991	0.99825770	Thoracica (order)
114	81095	0.01366	0.000	0.00477	0.02256	0.00004907	0.99830677	Crossaster papposus
115	98300	0.01301	0.000	0.00000	0.02691	0.00004674	0.99835351	compound ascidian unident.
116	74120	0.01290	0.000	0.00000	0.03037	0.00004632	0.99839984	Patinopecten caurinus
117	81310	0.01284	0.000	0.00066	0.02501	0.00004610	0.99844593	Pteraster sp.
118	65201	0.01122	0.000	0.00000	0.03321	0.00004029	0.99848622	Balanus sp.
119	78403	0.01120	0.000	0.00000	0.03316	0.00004024	0.99852646	Octopus dofleini
120	22205	0.01086	0.000	0.00262	0.01910	0.00003900	0.99856546	Liparis gibbus
121	72063	0.01026	0.000	0.00167	0.01886	0.00003684	0.99860230	Aforia circinata
122	30152	0.01015	0.000	0.00000	0.02394	0.00003645	0.99863875	Sebastes new
123	56311	0.01007	0.000	0.00552	0.01463	0.00003617	0.99867491	Eunoe nodosa
124	69080	0.00999	0.000	0.00000	0.02838	0.00003589	0.99871081	Pagurus cornutus
125	75110	0.00993	0.000	0.00477	0.01509	0.00003565	0.99874646	Mactromeris sp.
126	42001	0.00956	0.000	0.00000	0.02164	0.00003434	0.99878080	Virgularia sp.

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
127	69121	0.00955	0.000	0.00000	0.02706	0.00003429	0.99881509	Elassochirus cavimanus
128	20510	0.00942	0.000	0.00000	0.02187	0.00003382	0.99884891	Anoplopoma fimbria
129	23055	0.00939	0.000	0.00000	0.02468	0.00003371	0.99888262	Osmerus mordax
130	68510	0.00937	0.000	0.00521	0.01354	0.00003367	0.99891628	Oregonia gracilis
131	71761	0.00935	0.000	0.00000	0.02560	0.00003359	0.99894987	Pyrulofusus melonis
132	81360	0.00897	0.000	0.00000	0.01845	0.00003221	0.99898208	Diplopteraster multipes
133	74562	0.00866	0.000	0.00000	0.02204	0.00003111	0.99901319	Musculus discors
134	23041	0.00861	0.000	0.00588	0.01134	0.00003091	0.99904410	Mallotus villosus
135	99902	0.00848	0.000	0.00000	0.02073	0.00003046	0.99907456	Molgula grifithsii
136	74560	0.00767	0.000	0.00117	0.01417	0.00002754	0.99910210	Musculus sp.
137	68590	0.00758	0.000	0.00358	0.01157	0.00002721	0.99912931	Chionoecetes hybrid
138	71710	0.00754	0.000	0.00000	0.01901	0.00002708	0.99915639	Colus sp.
139	74000	0.00740	0.000	0.00000	0.01722	0.00002658	0.99918298	Bivalvia unident.
140	80160	0.00726	0.000	0.00000	0.01847	0.00002608	0.99920906	Pycnopodia helianthoides
141	75111	0.00722	0.000	0.00235	0.01209	0.00002592	0.99923498	Mactromeris polynyma
142	85200	0.00660	0.000	0.00000	0.01953	0.00002369	0.99925867	Cucumaria sp.
143	80540	0.00651	0.000	0.00288	0.01013	0.00002337	0.99928205	Henricia sp.
144	71640	0.00640	0.000	0.00000	0.01575	0.00002298	0.99930503	Crepidula sp.
145	72751	0.00617	0.000	0.00235	0.00998	0.00002215	0.99932718	Buccinum plectrum
146	75284	0.00594	0.000	0.00014	0.01174	0.00002132	0.99934850	Serripes sp.
147	50010	0.00577	0.000	0.00000	0.01567	0.00002072	0.99936922	tube worm unident.
148	98000	0.00575	0.000	0.00000	0.01189	0.00002065	0.99938986	Ascidian unident.
149	30060	0.00537	0.000	0.00000	0.01558	0.00001930	0.99940916	Sebastes alutus
150	69095	0.00536	0.000	0.00000	0.01355	0.00001924	0.99942841	Pagurus rathbuni
151	310	0.00522	0.000	0.00000	0.01546	0.00001876	0.99944717	Squalus acanthias
152	22236	0.00478	0.000	0.00230	0.00727	0.00001718	0.99946435	Careproctus rastrinus
153	20061	0.00467	0.000	0.00172	0.00762	0.00001677	0.99948112	Occella dodecaedron
154	74100	0.00462	0.000	0.00000	0.00960	0.00001658	0.99949770	Pectinid unident.
155	71771	0.00456	0.000	0.00000	0.01111	0.00001638	0.99951409	Beringius frielei
156	71681	0.00456	0.000	0.00000	0.01068	0.00001636	0.99953045	Crepidula grandis
157	65203	0.00440	0.000	0.00000	0.00939	0.00001578	0.99954623	Balanus evermanni
158	75240	0.00428	0.000	0.00044	0.00813	0.00001539	0.99956162	Macoma sp.

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
159	21932	0.00410	0.000	0.00117	0.00703	0.00001472	0.99957634	Hexagrammos stelleri
160	74980	0.00403	0.000	0.00054	0.00753	0.00001449	0.99959082	Clinocardium sp.
161	66570	0.00360	0.000	0.00220	0.00500	0.00001292	0.99960374	Argis sp.
162	42003	0.00356	0.000	0.00000	0.01054	0.00001279	0.99961653	Virgularidae
163	21354	0.00323	0.000	0.00000	0.00748	0.00001159	0.99962812	Triglops scepticus
164	99904	0.00313	0.000	0.00000	0.00927	0.00001125	0.99963936	Molgula retortiformis
165	43020	0.00303	0.000	0.00000	0.00774	0.00001087	0.99965023	Metridium senile
166	95030	0.00284	0.000	0.00000	0.00606	0.00001018	0.99966041	Flustra serrulata
167	72501	0.00277	0.000	0.00000	0.00820	0.00000995	0.99967036	Fusitriton sp.
168	56300	0.00277	0.000	0.00000	0.00599	0.00000995	0.99968031	Polynoidae
169	68050	0.00275	0.000	0.00000	0.00813	0.00000986	0.99969017	Cancer productus
170	22175	0.00265	0.000	0.00000	0.00783	0.00000950	0.99969967	Aptocyclus ventricosus
171	20050	0.00264	0.000	0.00133	0.00394	0.00000947	0.99970914	Aspidophoroides bartoni
172	21725	0.00254	0.000	0.00143	0.00364	0.00000911	0.99971825	Boreogadus saida
173	42000	0.00248	0.000	0.00000	0.00682	0.00000889	0.99972714	Pennatulacea (order)
174	41500	0.00232	0.000	0.00000	0.00673	0.00000832	0.99973546	Gorgonacea (order)
175	72756	0.00227	0.000	0.00000	0.00491	0.00000817	0.99974363	Buccinum solenum
176	71726	0.00222	0.000	0.00000	0.00527	0.00000798	0.99975160	Colus spitzbergensis
177	75600	0.00220	0.000	0.00000	0.00525	0.00000790	0.99975950	Pododesmus macroschisma
178	71770	0.00220	0.000	0.00000	0.00546	0.00000789	0.99976739	Beringius kennicottii
179	80000	0.00217	0.000	0.00000	0.00582	0.00000779	0.99977518	Asteroidea unident.
180	81060	0.00213	0.000	0.00000	0.00540	0.00000764	0.99978282	Solaster sp.
181	74656	0.00208	0.000	0.00000	0.00525	0.00000745	0.99979027	Cyclocardia sp.
182	91016	0.00207	0.000	0.00000	0.00601	0.00000744	0.99979772	Suberites ficus
183	22201	0.00206	0.000	0.00000	0.00474	0.00000741	0.99980512	Liparis sp.
184	71890	0.00189	0.000	0.00000	0.00530	0.00000679	0.99981191	Plicifusus (=Colus)
185	71575	0.00174	0.000	0.00000	0.00378	0.00000626	0.99981817	Polinices sp.
186	56312	0.00172	0.000	0.00036	0.00309	0.00000619	0.99982436	Eunoe depressa
187	21355	0.00164	0.000	0.00050	0.00278	0.00000589	0.99983025	Triglops pingeli
188	82730	0.00159	0.000	0.00031	0.00287	0.00000571	0.99983596	sand dollar unident.
189	56310	0.00151	0.000	0.00029	0.00273	0.00000543	0.99984140	Eunoe sp.
190	68040	0.00136	0.000	0.00038	0.00234	0.00000489	0.99984628	Cancer oregonensis

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
191	21300	0.00129	0.000	0.00000	0.00371	0.00000462	0.99985091	Cottidae
192	71025	0.00128	0.000	0.00000	0.00309	0.00000461	0.99985552	Tritonia sp.
193	72790	0.00122	0.000	0.00000	0.00361	0.00000438	0.99985990	Arctomelon stearnsii
194	66502	0.00117	0.000	0.00064	0.00170	0.00000421	0.99986410	Crangon sp.
195	79020	0.00115	0.000	0.00010	0.00221	0.00000414	0.99986824	Rossia pacifica
196	21350	0.00107	0.000	0.00000	0.00280	0.00000386	0.99987210	Triglops sp.
197	80660	0.00107	0.000	0.00019	0.00196	0.00000385	0.99987595	Pseudarchaster parelii
198	71030	0.00105	0.000	0.00000	0.00312	0.00000379	0.99987974	Tritonia diomedea
199	71769	0.00103	0.000	0.00000	0.00229	0.00000372	0.99988345	Beringius sp.
200	69110	0.00099	0.000	0.00000	0.00241	0.00000357	0.99988702	Elassochirus tenuimanus
201	74080	0.00099	0.000	0.00000	0.00285	0.00000355	0.99989057	Mytilus edulis
202	23805	0.00098	0.000	0.00047	0.00149	0.00000352	0.99989409	Lumpenus maculatus
203	72403	0.00097	0.000	0.00000	0.00287	0.00000348	0.99989757	Boreotrophon muriciformis
204	74065	0.00096	0.000	0.00000	0.00252	0.00000345	0.99990102	Mytilus sp.
205	71759	0.00096	0.000	0.00000	0.00249	0.00000344	0.99990446	Volutopsius filosus
206	21356	0.00095	0.000	0.00000	0.00262	0.00000340	0.99990786	Triglops macellus
207	80728	0.00092	0.000	0.00003	0.00181	0.00000329	0.99991116	Ceramaster sp.
208	21921	0.00091	0.000	0.00000	0.00270	0.00000328	0.99991444	Pleurogrammus monopterygius
209	20202	0.00089	0.000	0.00012	0.00166	0.00000319	0.99991763	Ammodytes hexapterus
210	81090	0.00088	0.000	0.00000	0.00219	0.00000316	0.99992079	Crossaster sp.
211	75267	0.00087	0.000	0.00016	0.00159	0.00000314	0.99992393	Siliqua alta
212	10180	0.00083	0.000	0.00009	0.00157	0.00000297	0.99992689	Microstomus pacificus
213	23220	0.00081	0.000	0.00000	0.00241	0.00000292	0.99992981	Oncorhynchus tshawytscha
214	22200	0.00077	0.000	0.00000	0.00177	0.00000278	0.99993259	Liparidinae
215	91030	0.00077	0.000	0.00000	0.00228	0.00000277	0.99993535	Aphrocallistes vastus
216	10212	0.00072	0.000	0.00003	0.00141	0.00000258	0.99993793	Limanda sakhalinensis
217	74414	0.00072	0.000	0.00000	0.00185	0.00000258	0.99994051	Yoldia sp.
218	69310	0.00071	0.000	0.00000	0.00183	0.00000253	0.99994304	Lithodes aequispina
219	21346	0.00068	0.000	0.00000	0.00161	0.00000243	0.99994548	Hemilepidotus hemilepidotus
220	71525	0.00064	0.000	0.00000	0.00172	0.00000229	0.99994776	Natica sp.
221	21339	0.00063	0.000	0.00000	0.00176	0.00000225	0.99995002	Malacocottus sp.
222	69520	0.00059	0.000	0.00000	0.00176	0.00000213	0.99995215	Hyas sp.

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
223	74050	0.00058	0.000	0.00000	0.00172	0.00000209	0.99995424	Mytilidae
224	68010	0.00058	0.000	0.00000	0.00143	0.00000209	0.99995633	Cancer sp.
225	21446	0.00058	0.000	0.00008	0.00107	0.00000207	0.99995840	Icelus sp.
226	66515	0.00056	0.000	0.00000	0.00147	0.00000202	0.99996041	Crangon communis
227	75241	0.00051	0.000	0.00000	0.00126	0.00000184	0.99996225	Macoma nasuta
228	66611	0.00051	0.000	0.00017	0.00085	0.00000183	0.99996408	Argis lar
229	74104	0.00051	0.000	0.00000	0.00119	0.00000182	0.99996590	Chlamys sp.
230	23808	0.00050	0.000	0.00015	0.00085	0.00000180	0.99996769	Lumpenus sagitta
231	75264	0.00049	0.000	0.00000	0.00111	0.00000176	0.99996946	Siliqua sp.
232	71721	0.00048	0.000	0.00000	0.00122	0.00000173	0.99997119	Colus herendeenii
233	20000	0.00045	0.000	0.00003	0.00088	0.00000162	0.99997281	Agonidae
234	74655	0.00042	0.000	0.00000	0.00103	0.00000153	0.99997434	Cyclocardia crebricostata
235	21329	0.00042	0.000	0.00000	0.00124	0.00000151	0.99997585	Gymnocanthus detrisus
236	21333	0.00036	0.000	0.00000	0.00087	0.00000128	0.99997713	Artediellus pacificus
237	66045	0.00034	0.000	0.00001	0.00067	0.00000122	0.99997835	Pandalus goniurus
238	71731	0.00034	0.000	0.00000	0.00072	0.00000122	0.99997957	Colus halli
239	24186	0.00034	0.000	0.00000	0.00099	0.00000121	0.99998077	Lycodes mucosus
240	80729	0.00032	0.000	0.00000	0.00069	0.00000115	0.99998193	Ceramaster japonicus
241	94000	0.00030	0.000	0.00000	0.00061	0.00000109	0.99998302	Sipuncula (phylum)
242	21441	0.00030	0.000	0.00000	0.00061	0.00000107	0.99998408	Icelus spatula
243	82526	0.00029	0.000	0.00000	0.00087	0.00000106	0.99998514	Strongylocentrotus pallidus
244	71537	0.00028	0.000	0.00000	0.00083	0.00000101	0.99998615	Natica russa
245	74311	0.00026	0.000	0.00000	0.00061	0.00000092	0.99998707	Hiatella arctica
246	74983	0.00025	0.000	0.00000	0.00069	0.00000090	0.99998796	Clinocardium ciliatum
247	21900	0.00023	0.000	0.00000	0.00069	0.00000084	0.99998880	Hexagrammidae
248	95070	0.00022	0.000	0.00000	0.00065	0.00000079	0.99998959	Rhamphostomella costata
249	71535	0.00022	0.000	0.00001	0.00042	0.00000077	0.99999036	Natica aleutica
250	74106	0.00018	0.000	0.00000	0.00053	0.00000065	0.99999101	Chlamys rubida

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
251	23801	0.00018	0.000	0.00000	0.00052	0.00000063	0.99999164	Lumpenus sp.
252	85210	0.00017	0.000	0.00000	0.00050	0.00000060	0.99999225	Psolus sp.
253	79000	0.00015	0.000	0.00000	0.00032	0.00000055	0.99999279	squid unident.
254	20036	0.00015	0.000	0.00000	0.00032	0.00000055	0.99999334	Bathyagonus infraspinatus
255	23807	0.00013	0.000	0.00000	0.00030	0.00000047	0.99999381	Lumpenus fabricii
256	71800	0.00012	0.000	0.00000	0.00035	0.00000042	0.99999422	Neptunea sp.
257	23803	0.00011	0.000	0.00000	0.00032	0.00000039	0.99999500	Eumesogrammus praecisus
258	69316	0.00011	0.000	0.00000	0.00032	0.00000039	0.99999500	Hapalogaster grebnitzkii
259	97000	0.00011	0.000	0.00000	0.00031	0.00000038	0.99999538	brachiopod unident.
260	92500	0.00010	0.000	0.00000	0.00031	0.00000038	0.99999576	Nemertea (phylum)
261	23850	0.00010	0.000	0.00000	0.00031	0.00000038	0.99999613	Poroclinus rothrocki
262	80910	0.00010	0.000	0.00000	0.00030	0.00000036	0.99999649	Dermasterias imbricata
263	95010	0.00009	0.000	0.00000	0.00025	0.00000031	0.99999680	bryozoan sp. A unident.
264	66510	0.00008	0.000	0.00000	0.00019	0.00000028	0.99999708	Crangon abyssorum
265	22206	0.00007	0.000	0.00000	0.00020	0.00000025	0.99999732	Crystallichthys cyclospilus
266	42004	0.00006	0.000	0.00000	0.00019	0.00000023	0.99999755	Stylatula sp.
267	82740	0.00006	0.000	0.00000	0.00019	0.00000023	0.99999778	Echinarachnius parma
268	75332	0.00006	0.000	0.00000	0.00018	0.00000022	0.99999800	Mya arenaria
269	66600	0.00006	0.000	0.00000	0.00017	0.00000021	0.99999821	Sclerocrangon sp.
270	40011	0.00006	0.000	0.00000	0.00017	0.00000021	0.99999862	hydroid unident.
271	59100	0.00006	0.000	0.00000	0.00017	0.00000021	0.99999862	Hirudinea unident.
272	92000	0.00006	0.000	0.00000	0.00016	0.00000020	0.99999882	Platyhelminthes (phylum)
273	21331	0.00005	0.000	0.00000	0.00016	0.00000019	0.99999901	Artediellus sp.
274	20002	0.00005	0.000	0.00000	0.00016	0.00000019	0.99999919	Percis japonicus
275	10001	0.00005	0.000	0.00000	0.00015	0.00000018	0.99999937	Pleuronectiformes
276	21352	0.00005	0.000	0.00000	0.00014	0.00000017	0.99999955	Triglops forficata
277	75247	0.00005	0.000	0.00000	0.00014	0.00000017	0.99999971	Macoma brota
278	75335	0.00004	0.000	0.00000	0.00012	0.00000014	0.99999986	Mya pseudoarenaria

Appendix C Table 1.--Continued.

Rank	Species	Mean CPUE (kg/ha)	Variance	95 Percent Confidence Limits		Proportion	Cumulative Proportion	Name
279	62000	0.00002	0.000	0.00000	0.00007	0.00000008	0.99999994	Isopoda (order)
280	21311	0.00002	0.000	0.00000	0.00005	0.00000006	1.00000000	Icelinus borealis

APPENDIX D

Abundance Estimates for Principal Fish Species

Appendix D presents estimates of area weighted catch-per-unit-effort (CPUE), population numbers and biomass for the principal fish species. Estimates of variance and confidence intervals do not incorporate variation associated with fishing power corrections or measurements of effort. CPUE is measured in kilograms (kg) and numbers (no.) per hectare. Estimates are given separately for each of the 10 geographic strata used in the analysis; estimates for each of the six standard subareas are presented as subtotals of the component strata. Stratum codes correspond to subareas as follows:

Subarea	Stratum
1	10
2	20
3	31
	32 (Pribilof Islands high density)
4	41
	42 (Pribilof Islands high density)
	43 (St. Matthew Island high density)
5	50
6	61
	62 (St. Matthew Island high density)

List of Tables

Appendix D Table 1.--CPUE, population, and biomass estimates for walleye pollock.

CPUE

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	58	58	55	50.14	.10080E+03	60.42	.22240E+03
20	31	31	31	31	11.43	.26870E+01	24.66	.21310E+02
31	69	67	67	67	45.89	.13540E+03	76.48	.40380E+03
32	8	8	8	8	196.97	.19580E+05	398.20	.84720E+05
Subtotal	77	75	75	75	58.72	.25460E+03	103.81	.94940E+03
41	44	44	44	44	48.86	.13610E+03	98.79	.79820E+03
42	30	30	30	30	64.95	.51050E+03	173.31	.34890E+04
43	22	22	22	22	121.19	.68890E+03	232.37	.23800E+04
Subtotal	96	96	96	96	66.60	.97740E+02	141.53	.53420E+03
50	26	21	21	20	1.89	.99850E+00	3.02	.25600E+01
61	60	59	59	59	48.25	.79420E+02	118.86	.39660E+03
62	7	7	7	7	28.02	.47270E+02	130.92	.22880E+04
Subtotal	67	66	66	66	46.88	.69210E+02	119.68	.35510E+03
Total	355	347	347	343	47.75	.52600E+03	93.09	.20850E+04

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	470,491,483	.13486E+17	57.00	235,797,010	705,185,955
20	101,167,882	.35862E+15	30.00	62,441,052	139,894,712
31	722,949,900	.36080E+17	68.00	343,052,715	1,102,847,084
32	349,386,383	.65224E+17	7.00	0	953,384,009
Subtotal	1,072,336,282	.10130E+18	16.37	397,574,619	1,747,097,945
41	619,430,813	.31384E+17	43.00	261,398,543	977,463,083
42	416,147,079	.20118E+17	29.00	126,089,358	706,204,799
43	490,480,080	.10602E+17	21.00	276,311,775	704,648,386
Subtotal	1,526,057,972	.62104E+17	91.36	1,027,644,373	2,024,471,572
50	11,699,136	.38522E+14	25.00	0	24,484,784
61	1,047,547,047	.30809E+17	59.00	692,811,373	1,402,282,720
62	84,166,229	.94553E+15	6.00	8,922,286	159,410,172
Subtotal	1,131,713,276	.31754E+17	62.10	775,317,461	1,488,109,091
Total	4,313,466,031	.20905E+18	63.48	3,399,035,203	5,227,896,859

Appendix D Table 1.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	390,464	.61094E+10	57.00	232,498	548,431
20	46,893	.45225E+08	30.00	33,161	60,626
31	433,750	.12099E+11	68.00	213,756	653,745
32	172,829	.15070E+11	7.00	0	473,225
Subtotal	606,579	.27170E+11	21.34	263,729	949,430
41	306,395	.53508E+10	43.00	158,560	454,230
42	155,948	.29434E+10	29.00	45,001	266,896
43	255,794	.30691E+10	21.00	140,563	371,026
Subtotal	718,138	.11363E+11	91.37	504,940	931,336
50	7,315	.15027E+08	25.00	0	15,300
61	425,284	.61692E+10	59.00	266,546	584,022
62	18,015	.19534E+08	6.00	7,200	28,830
Subtotal	443,299	.61887E+10	59.37	284,310	602,288
Total	2,212,689	.50891E+11	69.43	1,761,507	2,663,871

Appendix D Table 2.--CPUE, population, and biomass estimates for Pacific cod.

CPUE

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	57	56	55	17.94	.18200E+02	22.53	.14960E+02
20	31	29	29	29	5.12	.50710E+00	9.60	.27190E+01
31	69	69	69	69	11.81	.18640E+01	11.29	.19210E+01
32	8	8	8	8	18.12	.18540E+02	6.74	.27420E+01
Subtotal	77	77	77	77	12.34	.16940E+01	10.90	.16290E+01
41	44	44	44	44	13.80	.15060E+02	15.58	.23320E+02
42	30	29	29	29	10.34	.38200E+01	8.91	.27000E+01
43	22	22	22	22	19.00	.70330E+01	23.54	.57220E+02
Subtotal	96	95	95	95	14.05	.55510E+01	15.65	.10210E+02
50	26	20	20	20	5.37	.18390E+01	2.38	.41980E+00
61	60	60	60	60	10.38	.94280E+00	3.34	.11090E+00
62	7	7	7	7	10.06	.50450E+01	3.68	.65690E+00
Subtotal	67	67	67	67	10.36	.84230E+00	3.37	.99410E-01
Total	355	345	344	343	12.05	.28640E+02	11.59	.30040E+02

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	175,428,039	.90737E+15	57.00	114,550,377	236,305,701
20	39,392,542	.45769E+14	30.00	25,577,844	53,207,241
31	106,716,830	.17168E+15	68.00	80,511,304	132,922,355
32	5,914,407	.21111E+13	7.00	2,478,124	9,350,689
Subtotal	112,631,236	.17379E+15	69.58	86,265,082	138,997,391
41	97,706,355	.91672E+15	43.00	36,515,703	158,897,007
42	21,389,564	.15569E+14	29.00	13,320,594	29,458,534
43	49,682,187	.25494E+15	21.00	16,470,922	82,893,452
Subtotal	168,778,106	.11872E+16	62.23	99,865,582	237,690,630
50	9,215,757	.63179E+13	25.00	4,027,806	14,403,707
61	29,467,597	.86180E+13	59.00	23,534,667	35,400,526
62	2,365,070	.27146E+12	6.00	1,090,143	3,639,997
Subtotal	31,832,667	.88894E+13	62.17	25,869,633	37,795,701
Total	537,278,347	.23294E+16	144.31	441,716,492	632,840,202

Appendix D Table 2.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	139,695	.11038E+10	57.00	72,551	206,838
20	21,003	.85351E+07	30.00	15,037	26,968
31	111,609	.16652E+09	68.00	85,800	137,418
32	15,900	.14270E+08	7.00	6,966	24,833
Subtotal	127,509	.18079E+09	74.82	100,617	154,401
41	86,502	.59194E+09	43.00	37,331	135,672
42	24,832	.22024E+08	29.00	15,235	34,429
43	40,107	.31336E+08	21.00	28,430	51,784
Subtotal	151,441	.64530E+09	50.70	100,102	202,780
50	20,817	.27672E+08	25.00	9,981	31,654
61	91,487	.73233E+08	59.00	74,192	108,782
62	6,467	.20848E+07	6.00	2,755	10,180
Subtotal	97,954	.75318E+08	61.91	80,597	115,312
Total	558,419	.20414E+10	138.23	468,960	647,879

Appendix D Table 3.--CPUE, population, and biomass estimates for yellowfin sole.

CPUE

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	58	58	57	102.30	.14110E+03	520.00	.57980E+04
20	31	31	31	30	72.85	.41540E+02	338.12	.11960E+04
31	69	67	67	67	89.16	.12200E+03	339.83	.25880E+04
32	8	8	8	8	14.82	.21270E+02	49.15	.30280E+03
Subtotal	77	75	75	75	82.85	.10230E+03	315.14	.21690E+04
41	44	44	44	44	30.13	.19770E+02	97.14	.24370E+03
42	30	30	30	30	61.49	.25090E+03	192.45	.20050E+04
43	22	22	22	22	15.78	.79790E+01	38.63	.51810E+02
Subtotal	96	96	96	96	34.30	.19430E+02	106.91	.18390E+03
50	26	3	3	3	0.10	.57850E-02	0.16	.11470E-01
61	60	26	26	26	0.99	.69830E-01	2.16	.32970E+00
62	7	7	7	7	2.78	.86010E+00	5.85	.41040E+01
Subtotal	67	33	33	33	1.11	.64640E-01	2.41	.30540E+00
Total	355	296	296	294	50.33	.30450E+03	212.96	.93470E+04

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	4,049,302,938	.35156E+18	57.00	2,851,000,810	5,247,605,067
20	1,387,221,319	.20134E+17	30.00	1,097,471,173	1,676,971,465
31	3,212,274,775	.23127E+18	68.00	2,250,459,210	4,174,090,341
32	43,121,371	.23308E+15	7.00	5,763,039	80,479,703
Subtotal	3,255,396,146	.23151E+18	68.14	2,293,096,034	4,217,696,258
41	609,123,226	.95829E+16	43.00	411,283,297	806,963,156
42	462,097,459	.11562E+17	29.00	241,885,587	682,309,330
43	81,545,941	.23084E+15	21.00	49,852,520	113,239,363
Subtotal	1,152,766,626	.21375E+17	67.72	860,360,072	1,445,173,181
50	624,640	.17255E+12	25.00	0	1,480,352
61	19,004,468	.25612E+14	59.00	8,776,562	29,232,374
62	3,758,689	.16962E+13	6.00	571,737	6,945,642
Subtotal	22,763,157	.27308E+14	64.30	12,311,733	33,214,581
Total	9,868,074,827	.62460E+18	131.13	8,303,244,622	11,432,905,032

Appendix D Table 3.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	796,642	.85587E+10	57.00	609,673	983,611
20	298,887	.69927E+09	30.00	244,810	352,965
31	842,790	.10905E+11	68.00	633,938	1,051,642
32	13,002	.16373E+08	7.00	3,432	22,572
Subtotal	855,792	.10921E+11	68.20	646,783	1,064,800
41	188,912	.77734E+09	43.00	132,565	245,259
42	147,636	.14465E+10	29.00	69,859	225,414
43	33,305	.35551E+08	21.00	20,867	45,743
Subtotal	369,854	.22594E+10	59.19	273,789	465,918
50	384	.87059E+05	25.00	0	993
61	8,723	.54244E+07	59.00	4,016	13,430
62	1,787	.35547E+06	6.00	254	3,320
Subtotal	10,510	.57798E+07	64.27	5,702	15,318
Total	2,332,068	.22444E+11	160.60	2,035,435	2,628,701

Appendix D Table 4.--CPUE, population, and biomass estimates for *Lepidopsetta* spp..

CPUE

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	58	58	57	126.44	.10450E+03	625.28	.22240E+04
20	31	31	31	31	76.39	.20830E+03	312.17	.24180E+04
31	69	69	69	69	38.40	.20680E+02	204.19	.65910E+03
32	8	8	8	8	44.98	.53830E+02	176.64	.74430E+03
Subtotal	77	77	77	77	38.96	.17710E+02	201.85	.55720E+03
41	44	44	44	44	27.36	.55960E+02	93.50	.43290E+03
42	30	30	30	30	38.59	.12080E+03	162.13	.14580E+04
43	22	22	22	22	36.23	.70540E+02	111.82	.77450E+03
Subtotal	96	96	96	96	31.60	.27620E+02	112.37	.24840E+03
50	26	16	16	16	0.72	.16780E+00	2.05	.18100E+01
61	60	59	58	58	12.94	.38010E+01	33.86	.24540E+02
62	7	7	7	7	15.85	.30950E+02	52.97	.57100E+03
Subtotal	67	66	65	65	13.14	.34450E+01	35.16	.23960E+02
Total	355	344	343	342	46.79	.36170E+03	211.21	.54740E+04

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	4,869,116,281	.13487E+18	57.00	4,126,913,994	5,611,318,567
20	1,280,728,011	.40705E+17	30.00	868,744,067	1,692,711,954
31	1,930,141,605	.58888E+17	68.00	1,444,804,818	2,415,478,392
32	154,987,557	.57303E+15	7.00	98,373,947	211,601,167
Subtotal	2,085,129,163	.59461E+17	69.27	1,597,436,711	2,572,821,614
41	586,246,244	.17020E+17	43.00	322,586,807	849,905,680
42	389,298,071	.84048E+16	29.00	201,541,917	577,054,225
43	236,035,151	.34508E+16	21.00	113,848,999	358,221,303
Subtotal	1,211,579,466	.28875E+17	85.60	871,724,298	1,551,434,634
50	7,944,257	.27239E+14	25.00	0	18,695,537
61	298,404,162	.19064E+16	59.00	210,162,271	386,646,052
62	34,053,274	.23598E+15	6.00	0	71,643,122
Subtotal	332,457,436	.21424E+16	64.76	239,885,477	425,029,394
Total	9,786,954,612	.26608E+18	162.68	8,765,612,220	10,808,297,005

Appendix D Table 4.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	984,638	.63369E+10	57.00	823,756	1,145,519
20	313,386	.35054E+10	30.00	192,488	434,285
31	363,011	.18481E+10	68.00	277,031	448,991
32	39,469	.41440E+08	7.00	24,244	54,693
Subtotal	402,479	.18896E+10	70.74	315,541	489,418
41	171,559	.22003E+10	43.00	76,760	266,359
42	92,662	.69648E+09	29.00	38,613	146,711
43	76,478	.31428E+09	21.00	39,604	113,353
Subtotal	340,700	.32110E+10	76.93	227,368	454,032
50	2,778	.25252E+07	25.00	0	6,052
61	114,088	.29527E+09	59.00	79,360	148,815
62	10,190	.12791E+08	6.00	1,438	18,941
Subtotal	124,277	.30806E+09	63.06	89,174	159,380
Total	2,168,259	.15254E+11	178.96	1,923,718	2,412,799

Appendix D Table 5.--CPUE, population, and biomass estimates for *Hippoglossoides* spp..

CPUE

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	49	49	48	4.62	.51340E+00	9.13	.26600E+01
20	31	14	14	14	0.22	.32850E-02	0.37	.86490E-02
31	69	69	69	69	19.25	.76620E+01	52.19	.55290E+02
32	8	8	8	8	6.06	.55120E+01	15.51	.40520E+02
Subtotal	77	77	77	77	18.13	.64550E+01	49.08	.46590E+02
41	44	44	44	43	5.97	.37570E+01	15.65	.19910E+02
42	30	30	30	29	5.69	.12570E+01	12.92	.76010E+01
43	22	21	21	21	13.77	.46860E+02	23.11	.11260E+03
Subtotal	96	95	95	93	7.44	.31290E+01	16.50	.11430E+02
50	26	26	26	26	16.18	.64080E+01	83.71	.14830E+03
61	60	60	59	59	35.42	.23940E+03	108.18	.91710E+03
62	7	7	7	7	6.58	.29410E+01	27.28	.34700E+02
Subtotal	67	67	66	66	33.46	.20800E+03	102.68	.79680E+03
Total	355	328	327	324	14.75	.22450E+03	44.31	.10060E+04

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	71,104,260	.16127E+15	57.00	45,438,963	96,769,558
20	1,534,015	.14559E+12	30.00	754,871	2,313,158
31	493,344,123	.49403E+16	68.00	352,769,455	633,918,792
32	13,605,050	.31193E+14	7.00	0	27,271,699
Subtotal	506,949,174	.49715E+16	68.83	365,931,412	647,966,935
41	98,130,952	.78270E+15	43.00	41,589,776	154,672,128
42	31,026,111	.43822E+14	29.00	17,488,609	44,563,614
43	48,779,057	.50186E+15	21.00	2,047,779	95,510,336
Subtotal	177,936,121	.13284E+16	67.08	105,041,959	250,830,282
50	324,725,595	.22320E+16	25.00	227,402,642	422,048,547
61	953,399,915	.71233E+17	59.00	414,003,405	1,492,796,425
62	17,538,471	.14339E+14	6.00	8,272,453	26,804,489
Subtotal	970,938,385	.71248E+17	59.02	431,487,589	1,510,389,182
Total	2,053,187,550	.79941E+17	73.80	1,487,710,573	2,618,664,526

Appendix D Table 5.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	35,948	.31131E+08	57.00	24,671	47,224
20	918	.55301E+05	30.00	438	1,399
31	182,000	.68457E+09	68.00	129,672	234,329
32	5,322	.42432E+07	7.00	450	10,193
Subtotal	187,322	.68882E+09	68.82	134,831	239,812
41	37,461	.14773E+09	43.00	12,897	62,025
42	13,660	.72483E+07	29.00	8,147	19,174
43	29,055	.20876E+09	21.00	0	59,195
Subtotal	80,176	.36373E+09	51.20	41,632	118,720
50	62,772	.96426E+08	25.00	42,504	83,039
61	312,181	.18597E+11	59.00	36,575	587,788
62	4,233	.12156E+07	6.00	1,535	6,931
Subtotal	316,414	.18598E+11	59.01	40,798	592,029
Total	683,549	.19779E+11	66.62	402,277	964,822

Appendix D Table 6.--CPUE, population, and biomass estimates for Alaska plaice.

CPUE

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	51	51	0	9.63	.59130E+01	19.97	.18000E+02
20	31	29	29	0	7.28	.14390E+01	21.25	.10700E+02
31	69	63	63	0	12.42	.75490E+01	19.64	.17110E+02
32	8	8	8	0	4.80	.24650E+01	5.90	.37430E+01
Subtotal	77	71	71	0	11.78	.63390E+01	18.47	.14350E+02
41	44	44	44	0	22.03	.53440E+02	32.64	.72210E+02
42	30	28	28	0	9.17	.50550E+01	14.47	.12060E+02
43	22	22	22	0	12.68	.10120E+02	16.24	.17680E+02
Subtotal	96	94	94	0	17.34	.18710E+02	25.38	.25700E+02
50	26	0	0	0	0.00	.00000E+00	0.00	.00000E+00
61	60	21	21	0	4.01	.25930E+01	2.85	.13210E+01
62	7	7	7	0	5.86	.11820E+02	3.70	.55610E+01
Subtotal	67	28	28	0	4.14	.23070E+01	2.91	.11740E+01
Total	355	273	273	0	9.77	.34710E+02	15.85	.69920E+02

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	155,485,711	.10913E+16	57.00	88,721,580	222,249,842
20	87,162,455	.18003E+15	* 30.00	59,723,340	114,601,570
31	185,607,442	.15287E+16	68.00	107,410,625	263,804,259
32	5,172,870	.28819E+13	7.00	1,158,021	9,187,719
Subtotal	190,780,312	.15316E+16	68.25	112,509,821	269,050,802
41	204,667,461	.28391E+16	43.00	96,982,397	312,352,526
42	34,751,968	.69505E+14	29.00	17,677,871	51,826,065
43	34,274,082	.78767E+14	21.00	15,760,646	52,787,517
Subtotal	273,693,511	.29874E+16	47.49	163,232,287	384,154,734
50	0	.00000E+00	25.00	0	0
61	25,157,590	.10265E+15	59.00	4,682,032	45,633,147
62	2,377,059	.22981E+13	6.00	0	6,086,609
Subtotal	27,534,649	.10494E+15	61.37	7,046,274	48,023,024
Total	734,656,637	.58952E+16	142.20	582,631,505	886,681,770

Appendix D Table 6.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	75,007	.35853E+09	57.00	36,740	113,275
20	29,864	.24221E+08	30.00	19,814	39,913
31	117,434	.67454E+09	68.00	65,490	169,378
32	4,216	.18976E+07	7.00	958	7,474
Subtotal	121,650	.67644E+09	68.38	69,633	173,667
41	138,164	.21009E+10	43.00	45,529	230,798
42	22,023	.29146E+08	29.00	10,966	33,079
43	26,768	.45090E+08	21.00	12,801	40,735
Subtotal	186,955	.21752E+10	46.03	92,698	281,212
50	0	.00000E+00	25.00	0	0
61	35,354	.20139E+09	59.00	6,673	64,034
62	3,767	.48860E+07	6.00	0	9,176
Subtotal	39,120	.20627E+09	61.54	10,396	67,845
Total	452,596	.34406E+10	105.32	335,282	569,909

Appendix D Table 7.--CPUE, population, and biomass estimates for Greenland turbot.

CPUE

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	.00000E+00	0.00	.00000E+00
20	31	0	0	0	0.00	.00000E+00	0.00	.00000E+00
31	69	4	4	4	0.12	.40440E-02	0.02	.11730E-03
32	8	0	0	0	0.00	.00000E+00	0.00	.00000E+00
Subtotal	77	4	4	4	0.11	.33860E-02	0.02	.98240E-04
41	44	8	8	8	0.53	.41440E-01	0.10	.17110E-02
42	30	1	1	1	0.25	.61760E-01	0.06	.40570E-02
43	22	11	11	11	0.81	.67930E-01	0.19	.29180E-02
Subtotal	96	20	20	20	0.52	.19680E-01	0.11	.89180E-03
50	26	1	1	1	0.05	.26860E-02	0.01	.56420E-04
61	60	27	27	27	2.06	.16430E+00	0.69	.24310E-01
62	7	7	7	7	4.66	.20510E+01	0.73	.27430E-01
Subtotal	67	34	34	34	2.24	.15220E+00	0.69	.21240E-01
Total	355	59	59	59	0.61	.17800E+00	0.17	.22290E-01

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	0	.00000E+00	57.00	0	0
20	0	.00000E+00	30.00	0	0
31	189,573	.10483E+11	68.00	0	394,350
32	0	.00000E+00	7.00	0	0
Subtotal	189,573	.10483E+11	8.60	0	425,681
41	603,689	.67290E+11	43.00	79,434	1,127,944
42	152,934	.23389E+11	29.00	0	465,685
43	407,594	.13000E+11	21.00	169,755	645,434
Subtotal	1,164,218	.10368E+12	81.29	520,233	1,808,203
50	29,139	.84909E+09	25.00	0	89,166
61	6,044,719	.18883E+13	59.00	3,267,553	8,821,884
62	467,717	.11337E+11	6.00	207,170	728,263
Subtotal	6,512,435	.18996E+13	59.69	3,726,946	9,297,925
Total	7,895,366	.20146E+13	150.52	5,084,987	10,705,744

Appendix D Table 7.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	0	.00000E+00	57.00	0	0
20	0	.00000E+00	30.00	0	0
31	1,089	.36133E+06	68.00	0	2,291
32	0	.00000E+00	7.00	0	0
Subtotal	1,089	.36133E+06	64.56	0	2,291
41	3,340	.16291E+07	43.00	760	5,920
42	597	.35609E+06	29.00	0	1,819
43	1,720	.30264E+06	21.00	576	2,864
Subtotal	5,657	.22879E+07	74.28	2,631	8,682
50	201	.40425E+05	25.00	0	616
61	18,185	.12764E+08	59.00	10,965	25,406
62	2,995	.84767E+06	6.00	742	5,248
Subtotal	21,180	.13611E+08	64.31	13,801	28,559
Total	28,126	.16301E+08	108.41	20,051	36,201

Appendix D Table 8.--CPUE, population, and biomass estimates for arrowtooth flounder.

CPUE

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	3	3	3	0.17	.20830E-01	0.60	.30910E+00
20	31	0	0	0	0.00	.00000E+00	0.00	.00000E+00
31	69	35	35	34	9.69	.12740E+02	18.15	.63400E+02
32	8	8	8	8	5.81	.10600E+01	14.25	.87070E+01
Subtotal	77	43	43	42	9.36	.10680E+02	17.82	.53150E+02
41	44	8	8	8	1.35	.51720E+00	1.57	.75180E+00
42	30	20	20	20	2.99	.63230E+00	8.30	.55570E+01
43	22	7	7	7	0.13	.41230E-02	0.10	.12800E-02
Subtotal	96	35	35	35	1.47	.20640E+00	2.78	.52990E+00
50	26	26	26	26	21.83	.28340E+01	37.56	.15820E+02
61	60	53	53	52	16.43	.42760E+01	17.61	.40720E+01
62	7	6	6	6	2.36	.14850E+01	1.50	.66400E+00
Subtotal	67	59	59	58	15.47	.37210E+01	16.52	.35410E+01
Total	355	166	166	164	7.44	.17460E+02	11.23	.73340E+02

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	4,690,780	.18744E+14	57.00	0	13,440,576
20	0	.00000E+00	30.00	0	0
31	171,556,912	.56649E+16	68.00	21,026,132	322,087,693
32	12,506,635	.67030E+13	7.00	6,383,623	18,629,647
Subtotal	184,063,548	.56716E+16	68.16	33,443,735	334,683,360
41	9,835,233	.29558E+14	43.00	0	20,822,869
42	19,934,422	.32036E+14	29.00	8,359,729	31,509,114
43	205,678	.57035E+10	21.00	48,592	362,763
Subtotal	29,975,332	.61599E+14	68.12	14,278,285	45,672,379
50	145,688,213	.23800E+15	25.00	113,907,932	177,468,494
61	155,211,972	.31632E+15	59.00	119,267,697	191,156,246
62	962,738	.27441E+12	6.00	0	2,309,544
Subtotal	156,174,709	.31659E+15	59.10	120,214,847	192,134,571
Total	520,592,582	.63065E+16	83.58	361,765,354	679,419,810

Appendix D Table 8.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	1,338	.12632E+07	57.00	0	3,609
20	0	.00000E+00	30.00	0	0
31	91,577	.11386E+10	68.00	24,091	159,064
32	5,099	.81599E+06	7.00	2,963	7,235
Subtotal	96,676	.11394E+10	68.10	29,166	164,187
41	8,441	.20335E+08	43.00	0	17,555
42	7,180	.36452E+07	29.00	3,270	11,090
43	280	.18371E+05	21.00	0	563
Subtotal	15,902	.23998E+08	57.16	6,001	25,802
50	84,691	.42645E+08	25.00	71,239	98,144
61	144,764	.33214E+09	59.00	107,932	181,596
62	1,518	.61360E+06	6.00	0	3,532
Subtotal	146,282	.33275E+09	59.22	109,416	183,148
Total	344,890	.15401E+10	112.93	266,402	423,377

Appendix D Table 9.--CPUE, population, and biomass estimates for Kamchatka flounder.

CPUE

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	.00000E+00	0.00	.00000E+00
20	31	0	0	0	0.00	.00000E+00	0.00	.00000E+00
31	69	19	19	19	0.18	.70790E-02	0.35	.11200E-01
32	8	6	6	6	0.94	.20020E+00	2.51	.15170E+01
Subtotal	77	25	25	25	0.25	.73720E-02	0.54	.20320E-01
41	44	5	5	5	0.13	.42910E-02	0.10	.25260E-02
42	30	12	12	12	0.36	.20100E-01	0.36	.11170E-01
43	22	6	6	5	0.41	.47620E-01	0.17	.69350E-02
Subtotal	96	23	23	22	0.24	.42730E-02	0.17	.16740E-02
50	26	24	24	24	0.82	.32130E-01	2.56	.30680E+00
61	60	58	58	56	1.49	.24210E-01	2.06	.51820E-01
62	7	6	6	6	3.19	.10640E+01	2.48	.93990E+00
Subtotal	67	64	64	62	1.60	.25950E-01	2.09	.49360E-01
Total	355	136	136	133	0.51	.69720E-01	0.80	.37820E+00

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	0	.00000E+00	57.00	0	0
20	0	.00000E+00	30.00	0	0
31	3,333,347	.10003E+13	68.00	1,333,028	5,333,666
32	2,206,395	.11682E+13	7.00	0	4,851,172
Subtotal	5,539,742	.21685E+13	22.43	2,485,605	8,593,879
41	608,069	.99302E+11	43.00	0	1,244,931
42	855,464	.64399E+11	29.00	335,743	1,375,186
43	368,584	.30898E+11	21.00	2,965	734,203
Subtotal	1,832,117	.19460E+12	90.64	949,848	2,714,385
50	9,924,162	.46171E+13	25.00	5,497,766	14,350,558
61	18,165,402	.40252E+13	59.00	14,110,674	22,220,129
62	1,591,180	.38843E+12	6.00	0	3,193,540
Subtotal	19,756,582	.44137E+13	64.99	15,554,838	23,958,326
Total	37,052,603	.11394E+14	121.12	30,369,163	43,736,043

Appendix D Table 9.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	0	.00000E+00	57.00	0	0
20	0	.00000E+00	30.00	0	0
31	1,731	.63254E+06	68.00	140	3,321
32	828	.15413E+06	7.00	0	1,756
Subtotal	2,558	.78666E+06	66.71	785	4,332
41	846	.16870E+06	43.00	16	1,676
42	861	.11590E+06	29.00	163	1,558
43	855	.21215E+06	21.00	0	1,813
Subtotal	2,561	.49676E+06	75.51	1,152	3,971
50	3,178	.48348E+06	25.00	1,745	4,610
61	13,123	.18807E+07	59.00	10,352	15,895
62	2,053	.43990E+06	6.00	430	3,676
Subtotal	15,176	.23206E+07	58.41	12,098	18,255
Total	23,474	.40875E+07	225.15	19,471	27,477

Appendix D Table 10.--CPUE, population, and biomass estimates for Pacific halibut.

CPUE

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	3.94	.20340E+00	2.38	.21700E+00
20	31	29	29	29	3.02	.35190E+00	1.27	.79640E-01
31	69	54	54	54	2.88	.19020E+00	0.89	.49220E-01
32	8	7	7	7	3.45	.12610E+01	0.91	.93910E-01
Subtotal	77	61	61	61	2.93	.16840E+00	0.89	.41890E-01
41	44	19	19	19	1.83	.31270E+00	0.35	.16650E-01
42	30	16	16	16	4.88	.22830E+01	0.90	.76630E-01
43	22	12	12	12	0.51	.32560E-01	0.13	.80780E-03
Subtotal	96	47	47	47	2.25	.22020E+00	0.43	.94610E-02
50	26	23	23	23	4.83	.76440E+00	0.60	.93740E-02
61	60	44	44	44	5.69	.99170E+00	0.73	.14040E-01
62	7	2	2	2	0.47	.98920E-01	0.08	.29270E-02
Subtotal	67	46	46	46	5.34	.86190E+00	0.69	.12210E-01
Total	355	261	261	260	3.60	.25700E+01	1.00	.36960E+00

POPULATION

Stratum	Population	Variance population	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	18,567,143	.13160E+14	57.00	11,235,576	25,898,709
20	5,213,744	.13405E+13	30.00	2,849,561	7,577,926
31	8,377,759	.43981E+13	68.00	4,183,422	12,572,097
32	796,314	.72295E+11	7.00	138,370	1,454,258
Subtotal	9,174,073	.44704E+13	70.07	4,945,403	13,402,744
41	2,180,965	.65455E+12	43.00	545,889	3,816,041
42	2,159,334	.44178E+12	29.00	798,102	3,520,565
43	275,621	.35992E+10	21.00	150,836	400,407
Subtotal	4,615,920	.10999E+13	72.47	2,518,371	6,713,469
50	2,332,477	.14106E+12	25.00	1,558,789	3,106,166
61	6,474,863	.10905E+13	59.00	4,364,402	8,585,325
62	50,271	.12097E+10	6.00	0	135,381
Subtotal	6,525,134	.10917E+13	59.13	4,413,503	8,636,766
Total	46,428,491	.21304E+14	132.66	37,289,616	55,567,366

Appendix D Table 10.--Continued.

BIOMASS

Stratum	Biomass (t)	Variance biomass	Eff. deg. freedom	95% Confidence Limits Lower	Upper
10	30,676	.12334E+08	57.00	23,579	37,774
20	12,392	.59238E+07	30.00	7,415	17,369
31	27,268	.16998E+08	68.00	19,022	35,514
32	3,030	.97058E+06	7.00	619	5,440
Subtotal	30,298	.17968E+08	73.65	21,820	38,776
41	11,468	.12293E+08	43.00	4,382	18,554
42	11,727	.13162E+08	29.00	4,307	19,146
43	1,075	.14505E+06	21.00	283	1,867
Subtotal	24,270	.25600E+08	69.07	14,150	34,389
50	18,742	.11503E+08	25.00	11,755	25,728
61	50,161	.77031E+08	59.00	32,423	67,899
62	303	.40881E+05	6.00	0	798
Subtotal	50,464	.77072E+08	59.06	32,722	68,207
Total	166,842	.15040E+09	183.03	142,560	191,124

APPENDIX E

Population Estimates by Sex and Size Groups for Principal Fish Species

Appendix E presents estimates of the numbers of individuals within the overall survey area by sex and size group for principal fish species.

List of Tables

Appendix E Table 1.--Population estimates by sex and size group for walleye pollock from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
40	237,243	346,052	0	583,295	0.0001	0.0001
50	0	28,480	0	28,480	0.0000	0.0001
70	48,106	0	0	48,106	0.0000	0.0002
80	0	0	144,033	144,033	0.0000	0.0002
90	0	0	4,764,889	4,764,889	0.0011	0.0013
100	137,485	0	19,495,491	19,632,976	0.0046	0.0058
110	837,810	109,353	47,078,352	48,025,515	0.0111	0.0170
120	888,325	1,739,102	82,408,191	85,035,618	0.0197	0.0367
130	2,129,572	3,019,247	104,377,741	109,526,560	0.0254	0.0621
140	3,243,607	4,679,352	104,047,640	111,970,598	0.0260	0.0880
150	4,331,748	6,018,523	86,523,536	96,873,807	0.0225	0.1105
160	3,662,248	4,852,037	53,753,241	62,267,526	0.0144	0.1249
170	1,981,587	2,199,404	22,310,422	26,491,413	0.0061	0.1311
180	4,265,135	4,288,122	12,230,031	20,783,288	0.0048	0.1359
190	8,551,226	7,701,942	6,386,026	22,639,194	0.0052	0.1411
200	29,883,405	28,344,923	3,067,748	61,296,076	0.0142	0.1554
210	41,077,355	44,159,188	602,063	85,838,606	0.0199	0.1753
220	61,649,662	67,777,886	158,935	129,586,482	0.0300	0.2053
230	42,412,014	51,151,413	262,991	93,826,418	0.0218	0.2270
240	34,414,676	38,693,228	0	73,107,904	0.0169	0.2440
250	21,749,545	32,337,845	56,599	54,143,989	0.0126	0.2565
260	16,513,476	20,353,752	0	36,867,228	0.0085	0.2651
270	10,462,983	7,512,114	0	17,975,097	0.0042	0.2693
280	11,143,149	10,114,557	0	21,257,706	0.0049	0.2742
290	9,174,125	11,633,158	0	20,807,283	0.0048	0.2790
300	13,465,780	10,852,357	0	24,318,137	0.0056	0.2847
310	13,705,056	8,278,604	0	21,983,661	0.0051	0.2897
320	16,639,328	13,142,928	0	29,782,256	0.0069	0.2967
330	13,658,723	11,672,775	0	25,331,498	0.0059	0.3025
340	16,911,934	8,602,675	0	25,514,609	0.0059	0.3084
350	14,478,882	10,584,021	0	25,062,902	0.0058	0.3143
360	18,196,994	15,892,681	0	34,089,676	0.0079	0.3222
370	26,409,026	13,741,031	0	40,150,057	0.0093	0.3315
380	40,942,069	15,280,772	0	56,222,841	0.0130	0.3445
390	59,930,148	21,849,625	0	81,779,772	0.0190	0.3635
400	97,005,242	41,880,737	0	138,885,978	0.0322	0.3957
410	151,415,827	54,978,957	0	206,394,784	0.0478	0.4435
420	172,914,969	92,954,437	0	265,869,405	0.0616	0.5051
430	162,638,313	99,909,825	0	262,548,138	0.0609	0.5660
440	145,100,831	106,304,851	0	251,405,682	0.0583	0.6243
450	119,199,591	110,744,264	0	229,943,855	0.0533	0.6776
460	94,822,294	91,839,536	0	186,661,831	0.0433	0.7209
470	72,482,129	83,690,696	0	156,172,825	0.0362	0.7571
480	68,149,444	66,802,003	0	134,951,447	0.0313	0.7884

Appendix E Table 1.--Continued.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
490	56,335,255	57,356,165	0	113,691,421	0.0264	0.8147
500	53,127,610	47,847,581	0	100,975,190	0.0234	0.8381
510	45,735,556	41,402,130	0	87,137,686	0.0202	0.8583
520	46,339,673	42,421,540	0	88,761,213	0.0206	0.8789
530	43,622,662	38,879,540	0	82,502,202	0.0191	0.8980
540	33,827,032	32,721,539	0	66,548,571	0.0154	0.9135
550	34,184,729	30,048,719	0	64,233,448	0.0149	0.9284
560	27,529,476	28,212,325	0	55,741,801	0.0129	0.9413
570	18,662,290	21,970,182	0	40,632,472	0.0094	0.9507
580	17,127,145	20,553,669	0	37,680,814	0.0087	0.9594
590	12,803,402	15,055,271	0	27,858,673	0.0065	0.9659
600	9,815,979	10,321,803	0	20,137,782	0.0047	0.9706
610	7,300,312	10,374,835	0	17,675,147	0.0041	0.9747
620	6,161,828	8,382,970	0	14,544,797	0.0034	0.9780
630	7,373,308	5,853,286	0	13,226,594	0.0031	0.9811
640	5,993,129	5,438,675	0	11,431,804	0.0027	0.9837
650	4,547,150	6,134,084	0	10,681,234	0.0025	0.9862
660	6,264,302	5,505,252	0	11,769,554	0.0027	0.9890
670	4,155,176	4,837,201	0	8,992,377	0.0021	0.9910
680	3,544,403	4,627,839	0	8,172,242	0.0019	0.9929
690	2,387,913	4,256,726	0	6,644,639	0.0015	0.9945
700	2,140,105	3,538,378	0	5,678,483	0.0013	0.9958
710	1,137,312	2,935,022	0	4,072,334	0.0009	0.9967
720	1,218,149	2,907,229	0	4,125,378	0.0010	0.9977
730	492,810	2,422,885	0	2,915,695	0.0007	0.9984
740	119,546	1,387,320	0	1,506,866	0.0003	0.9987
750	356,539	1,766,969	0	2,123,508	0.0005	0.9992
760	203,844	988,305	0	1,192,149	0.0003	0.9995
770	0	1,064,906	0	1,064,906	0.0002	0.9997
780	0	310,097	0	310,097	0.0001	0.9998
790	0	273,150	0	273,150	0.0001	0.9999
800	0	26,985	0	26,985	0.0000	0.9999
810	0	335,058	0	335,058	0.0001	1.0000
830	0	92,435	0	92,435	0.0000	1.0000
850	0	117,881	0	117,881	0.0000	1.0000
Total	2,079,367,698	1,686,430,404	547,667,929	4,313,466,031	1.0000	1.0000

Appendix E Table 2.--Population estimates by sex and size group for Pacific cod from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
90	0	0	75,687	75,687	0.0001	0.0001
100	96,980	0	151,915	248,894	0.0005	0.0006
110	398,692	486,961	487,826	1,373,480	0.0026	0.0032
120	875,903	616,725	1,631,450	3,124,078	0.0058	0.0090
130	1,216,181	1,275,520	2,379,399	4,871,100	0.0091	0.0180
140	2,078,303	1,896,608	2,713,777	6,688,688	0.0124	0.0305
150	2,544,179	2,187,598	1,200,833	5,932,610	0.0110	0.0415
160	3,409,740	2,791,580	1,490,448	7,691,768	0.0143	0.0558
170	2,013,572	2,112,697	966,538	5,092,807	0.0095	0.0653
180	1,087,370	866,552	594,327	2,548,249	0.0047	0.0701
190	573,153	617,670	71,675	1,262,499	0.0023	0.0724
200	103,179	163,019	71,675	337,873	0.0006	0.0730
210	79,593	159,016	0	238,609	0.0004	0.0735
220	205,570	718,578	39,384	963,531	0.0018	0.0753
230	503,428	856,048	0	1,359,476	0.0025	0.0778
240	1,377,700	1,819,231	0	3,196,931	0.0060	0.0838
250	1,938,070	2,115,335	0	4,053,405	0.0075	0.0913
260	4,913,208	5,266,929	0	10,180,137	0.0189	0.1103
270	7,656,707	7,754,222	0	15,410,929	0.0287	0.1389
280	10,725,880	10,697,164	0	21,423,044	0.0399	0.1788
290	14,049,548	13,655,890	0	27,705,438	0.0516	0.2304
300	15,882,223	17,670,310	0	33,552,533	0.0624	0.2928
310	17,387,066	17,734,568	0	35,121,634	0.0654	0.3582
320	19,397,875	14,930,302	0	34,328,177	0.0639	0.4221
330	14,999,731	13,828,473	0	28,828,204	0.0537	0.4757
340	15,152,696	15,042,518	0	30,195,214	0.0562	0.5319
350	9,031,473	10,215,007	0	19,246,480	0.0358	0.5678
360	6,984,533	7,635,739	0	14,620,272	0.0272	0.5950
370	6,216,120	6,636,294	0	12,852,414	0.0239	0.6189
380	4,011,579	5,249,200	0	9,260,780	0.0172	0.6361
390	4,797,559	3,395,401	0	8,192,961	0.0152	0.6514
400	3,864,045	3,625,149	0	7,489,194	0.0139	0.6653
410	3,550,519	2,043,515	0	5,594,035	0.0104	0.6757
420	3,389,550	3,190,654	0	6,580,204	0.0122	0.6880
430	3,905,601	2,625,196	0	6,530,796	0.0122	0.7001
440	4,386,701	3,083,092	0	7,469,793	0.0139	0.7140
450	2,457,505	4,574,703	0	7,032,208	0.0131	0.7271
460	4,165,140	5,248,069	0	9,413,209	0.0175	0.7447
470	3,045,638	3,564,200	0	6,609,837	0.0123	0.7570
480	3,445,281	2,944,955	0	6,390,236	0.0119	0.7689
490	4,248,868	3,259,284	0	7,508,151	0.0140	0.7828
500	3,847,317	2,364,657	0	6,211,974	0.0116	0.7944
510	3,210,017	2,079,653	0	5,289,670	0.0098	0.8042
520	2,576,112	2,375,809	0	4,951,922	0.0092	0.8135

Appendix E Table 2.--Continued.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
530	2,430,403	2,173,093	0	4,603,495	0.0086	0.8220
540	2,585,027	2,034,722	0	4,619,749	0.0086	0.8306
550	2,169,701	1,860,190	0	4,029,891	0.0075	0.8381
560	1,832,400	1,612,239	0	3,444,639	0.0064	0.8445
570	1,886,658	2,509,910	0	4,396,568	0.0082	0.8527
580	2,673,028	2,375,251	0	5,048,279	0.0094	0.8621
590	2,055,980	2,206,663	0	4,262,643	0.0079	0.8700
600	1,368,934	2,341,727	0	3,710,661	0.0069	0.8769
610	2,033,588	2,294,087	0	4,327,675	0.0081	0.8850
620	2,988,882	1,932,825	0	4,921,707	0.0092	0.8942
630	2,805,476	1,999,724	0	4,805,200	0.0089	0.9031
640	1,797,383	2,384,081	0	4,181,464	0.0078	0.9109
650	1,620,478	2,017,412	0	3,637,890	0.0068	0.9177
660	2,101,063	3,370,362	0	5,471,426	0.0102	0.9278
670	1,900,814	1,396,888	0	3,297,702	0.0061	0.9340
680	1,899,298	1,671,554	0	3,570,851	0.0066	0.9406
690	1,284,498	1,416,350	0	2,700,848	0.0050	0.9457
700	674,630	1,894,645	0	2,569,274	0.0048	0.9504
710	1,157,688	1,763,587	0	2,921,275	0.0054	0.9559
720	969,951	2,136,123	0	3,106,074	0.0058	0.9617
730	827,203	1,313,783	0	2,140,986	0.0040	0.9656
740	956,907	1,964,051	0	2,920,959	0.0054	0.9711
750	557,361	1,048,553	0	1,605,915	0.0030	0.9741
760	700,541	1,351,094	0	2,051,634	0.0038	0.9779
770	352,295	828,608	0	1,180,903	0.0022	0.9801
780	412,420	753,492	0	1,165,912	0.0022	0.9823
790	394,642	1,009,419	0	1,404,060	0.0026	0.9849
800	242,644	475,414	0	718,058	0.0013	0.9862
810	290,310	606,914	0	897,224	0.0017	0.9879
820	210,711	306,146	0	516,857	0.0010	0.9888
830	271,723	581,067	0	852,790	0.0016	0.9904
840	259,064	342,795	0	601,859	0.0011	0.9915
850	225,083	244,569	0	469,652	0.0009	0.9924
860	188,224	371,813	0	560,036	0.0010	0.9935
870	222,245	194,177	0	416,421	0.0008	0.9942
880	26,549	186,443	0	212,992	0.0004	0.9946
890	96,831	72,476	0	169,307	0.0003	0.9949
900	75,231	202,915	0	278,146	0.0005	0.9955
910	109,533	188,478	0	298,011	0.0006	0.9960
920	111,036	425,111	0	536,147	0.0010	0.9970
930	21,511	142,554	0	164,064	0.0003	0.9973
940	27,602	319,169	0	346,771	0.0006	0.9980
950	30,240	116,442	0	146,682	0.0003	0.9982
960	26,006	44,578	0	70,584	0.0001	0.9984
970	0	120,364	0	120,364	0.0002	0.9986
980	0	113,254	0	113,254	0.0002	0.9988
990	0	29,986	0	29,986	0.0001	0.9989

Appendix E Table 2.--Continued.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
1000	0	34,339	0	34,339	0.0001	0.9989
1010	0	48,402	0	48,402	0.0001	0.9990
1020	0	450,183	0	450,183	0.0008	0.9999
1060	0	26,653	0	26,653	0.0000	0.9999
1080	0	26,369	0	26,369	0.0000	1.0000
1100	0	26,383	0	26,383	0.0000	1.0000
Total	260,671,897	264,731,517	11,874,932	537,278,347	1.0000	1.0000

Appendix E Table 3.--Population estimates by sex and size group for yellowfin sole from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
80	810,108	324,738	0	1,134,847	0.0001	0.0001
90	1,264,018	350,009	0	1,614,027	0.0002	0.0003
100	2,726,505	1,113,295	0	3,839,800	0.0004	0.0007
110	8,545,705	8,403,182	0	16,948,886	0.0017	0.0024
120	25,456,651	19,540,098	0	44,996,749	0.0046	0.0069
130	30,167,791	31,624,953	0	61,792,744	0.0063	0.0132
140	50,553,801	57,449,760	0	108,003,561	0.0109	0.0242
150	95,449,231	74,345,516	0	169,794,747	0.0172	0.0414
160	130,381,306	108,065,608	0	238,446,914	0.0242	0.0655
170	157,704,104	174,824,091	0	332,528,195	0.0337	0.0992
180	191,676,241	245,552,948	0	437,229,189	0.0443	0.1435
190	248,502,882	260,402,053	0	508,904,935	0.0516	0.1951
200	241,188,143	239,606,177	0	480,794,319	0.0487	0.2438
210	200,396,290	189,147,974	0	389,544,263	0.0395	0.2833
220	163,033,490	172,852,517	0	335,886,008	0.0340	0.3173
230	142,757,079	149,912,131	29,843	292,699,053	0.0297	0.3470
240	148,185,133	139,726,643	89,529	288,001,306	0.0292	0.3762
250	217,871,433	152,895,560	149,215	370,916,208	0.0376	0.4138
260	230,694,130	183,919,111	119,372	414,732,612	0.0420	0.4558
270	271,766,004	207,554,159	29,843	479,350,006	0.0486	0.5044
280	356,469,541	255,643,798	89,529	612,202,869	0.0620	0.5664
290	333,683,987	289,551,183	0	623,235,169	0.0632	0.6296
300	351,022,298	355,846,888	119,372	706,988,558	0.0716	0.7012
310	344,865,454	389,915,803	59,686	734,840,943	0.0745	0.7757
320	243,299,042	383,498,752	0	626,797,794	0.0635	0.8392
330	168,995,204	331,658,307	119,372	500,772,883	0.0507	0.8899
340	85,066,566	306,166,179	59,686	391,292,431	0.0397	0.9296
350	31,586,816	249,342,383	89,529	281,018,728	0.0285	0.9581
360	16,287,280	171,624,502	59,686	187,971,469	0.0190	0.9771
370	6,756,723	104,311,098	29,843	111,097,664	0.0113	0.9884
380	3,159,939	57,028,476	59,686	60,248,101	0.0061	0.9945
390	527,409	27,389,308	0	27,916,718	0.0028	0.9973
400	347,165	15,337,427	0	15,684,592	0.0016	0.9989
410	0	5,950,288	0	5,950,288	0.0006	0.9995
420	50,723	3,411,115	0	3,461,838	0.0004	0.9999
430	0	1,167,665	0	1,167,665	0.0001	1.0000
450	0	268,746	0	268,746	0.0000	1.0000
Total	4,501,248,193	5,365,722,443	1,104,192	9,868,074,827	1.0000	1.0000

Appendix E Table 4.--Population estimates by sex and size group for *Lepidopsetta* spp. from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
70	216,061	0	0	216,061	0.0000	0.0000
80	0	42,386	0	42,386	0.0000	0.0000
90	4,194,027	561,302	748,384	5,503,714	0.0006	0.0006
100	8,305,739	2,925,190	1,122,576	12,353,505	0.0013	0.0019
110	15,970,932	7,538,864	0	23,509,796	0.0024	0.0043
120	31,365,557	15,772,310	9,354,802	56,492,669	0.0058	0.0100
130	56,606,195	27,855,024	7,858,034	92,319,253	0.0094	0.0195
140	90,234,171	52,036,961	5,987,074	148,258,206	0.0151	0.0346
150	123,979,903	76,740,431	4,116,113	204,836,446	0.0209	0.0555
160	151,470,511	78,445,074	2,245,153	232,160,738	0.0237	0.0793
170	154,891,527	89,396,477	1,122,576	245,410,580	0.0251	0.1043
180	154,188,415	99,579,284	0	253,767,699	0.0259	0.1303
190	171,218,568	112,127,364	0	283,345,932	0.0290	0.1592
200	162,031,213	115,242,959	0	277,274,172	0.0283	0.1875
210	149,254,947	123,323,063	0	272,578,010	0.0279	0.2154
220	185,082,917	141,872,159	0	326,955,076	0.0334	0.2488
230	240,588,450	150,365,369	0	390,953,819	0.0399	0.2887
240	346,375,609	227,331,571	0	573,707,180	0.0586	0.3474
250	407,764,094	275,918,953	0	683,683,047	0.0699	0.4172
260	519,917,478	290,768,224	0	810,685,702	0.0828	0.5001
270	588,640,149	295,391,431	0	884,031,580	0.0903	0.5904
280	595,215,706	262,943,715	0	858,159,421	0.0877	0.6781
290	435,149,583	275,103,411	0	710,252,994	0.0726	0.7506
300	238,940,550	279,997,203	0	518,937,753	0.0530	0.8037
310	94,772,089	308,419,577	0	403,191,666	0.0412	0.8449
320	41,292,055	308,823,560	0	350,115,615	0.0358	0.8806
330	21,099,386	320,125,215	0	341,224,601	0.0349	0.9155
340	11,089,923	250,742,353	0	261,832,276	0.0268	0.9423
350	4,197,297	184,044,724	0	188,242,022	0.0192	0.9615
360	1,953,944	126,549,176	0	128,503,120	0.0131	0.9746
370	473,641	82,645,931	0	83,119,572	0.0085	0.9831
380	891,006	59,819,251	0	60,710,256	0.0062	0.9893
390	152,986	39,167,727	0	39,320,713	0.0040	0.9933
400	809,776	24,944,453	0	25,754,229	0.0026	0.9960
410	80,164	17,893,016	0	17,973,180	0.0018	0.9978
420	26,721	11,590,506	0	11,617,227	0.0012	0.9990
430	362,388	4,174,558	0	4,536,945	0.0005	0.9995
440	0	2,461,716	0	2,461,716	0.0003	0.9997
450	26,721	1,462,537	0	1,489,258	0.0002	0.9999
460	428,882	735,590	0	1,164,471	0.0001	1.0000
470	237,087	0	0	237,087	0.0000	1.0000
510	0	24,919	0	24,919	0.0000	1.0000
Total	5,009,496,368	4,744,903,532	32,554,712	9,786,954,612	1.0000	1.0000

Appendix E Table 5.--Population estimates by sex and size group for *Hippoglossoides* spp. from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
50	0	0	27,831	27,831	0.0000	0.0000
70	63,048	0	292,575	355,623	0.0002	0.0002
80	181,318	18,099	139,052	338,469	0.0002	0.0004
90	1,074,727	561,217	1,759,722	3,395,665	0.0017	0.0020
100	4,141,332	3,506,964	2,763,792	10,412,089	0.0051	0.0071
110	13,028,583	9,327,558	4,333,551	26,689,692	0.0130	0.0201
120	20,549,485	13,161,579	8,692,168	42,403,231	0.0207	0.0407
130	13,883,447	10,807,733	4,070,785	28,761,965	0.0140	0.0547
140	9,458,881	5,604,517	2,447,146	17,510,544	0.0085	0.0633
150	8,618,118	5,730,012	3,012,073	17,360,203	0.0085	0.0717
160	13,378,351	11,013,559	1,265,601	25,657,510	0.0125	0.0842
170	12,686,065	9,764,385	365,719	22,816,168	0.0111	0.0953
180	13,940,255	12,652,429	44,275	26,636,959	0.0130	0.1083
190	15,084,393	15,323,242	0	30,407,635	0.0148	0.1231
200	15,566,772	18,959,271	0	34,526,043	0.0168	0.1399
210	21,489,064	21,977,549	0	43,466,613	0.0212	0.1611
220	24,322,430	18,645,634	0	42,968,064	0.0209	0.1820
230	21,806,224	26,196,394	0	48,002,617	0.0234	0.2054
240	31,343,384	23,570,087	0	54,913,471	0.0267	0.2322
250	37,384,301	23,634,741	0	61,019,042	0.0297	0.2619
260	36,268,408	34,235,441	0	70,503,848	0.0343	0.2962
270	40,029,247	32,006,580	0	72,035,827	0.0351	0.3313
280	46,838,183	35,741,973	0	82,580,155	0.0402	0.3715
290	46,486,894	35,800,316	0	82,287,209	0.0401	0.4116
300	58,849,637	29,142,939	0	87,992,576	0.0429	0.4544
310	74,751,115	31,454,818	0	106,205,933	0.0517	0.5062
320	74,478,631	34,529,246	0	109,007,877	0.0531	0.5593
330	84,480,003	40,856,613	0	125,336,617	0.0610	0.6203
340	66,812,093	46,848,636	0	113,660,730	0.0554	0.6757
350	88,752,085	46,285,993	0	135,038,078	0.0658	0.7414
360	53,210,559	41,202,546	0	94,413,105	0.0460	0.7874
370	52,080,562	46,838,513	0	98,919,075	0.0482	0.8356
380	33,330,064	43,530,224	0	76,860,288	0.0374	0.8730
390	25,510,458	36,240,638	0	61,751,096	0.0301	0.9031
400	8,231,320	29,645,345	0	37,876,665	0.0184	0.9216
410	3,712,302	30,640,181	0	34,352,484	0.0167	0.9383
420	2,863,817	26,440,338	0	29,304,155	0.0143	0.9526
430	1,353,750	22,824,011	0	24,177,760	0.0118	0.9643
440	711,902	18,742,784	0	19,454,686	0.0095	0.9738
450	548,564	15,568,518	0	16,117,081	0.0078	0.9817
460	142,858	12,289,546	0	12,432,404	0.0061	0.9877
470	101,018	7,071,774	0	7,172,793	0.0035	0.9912
480	190,166	5,274,552	0	5,464,719	0.0027	0.9939
490	0	5,580,314	0	5,580,314	0.0027	0.9966
500	0	3,857,116	0	3,857,116	0.0019	0.9985
510	0	1,761,913	0	1,761,913	0.0009	0.9993

Appendix E Table 5.--Continued

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
520	0	873,736	0	873,736	0.0004	0.9998
530	0	195,677	0	195,677	0.0001	0.9999
540	0	304,199	0	304,199	0.0001	1.0000
Total	1,077,733,815	946,239,447	29,214,288	2,053,187,550	1.0000	1.0000

Appendix E Table 6.--Population estimates by sex and size group for Alaska plaice from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
80	90,186	0	0	90,186	0.0001	0.0001
140	0	63,514	0	63,514	0.0001	0.0002
150	152,282	262,263	0	414,545	0.0006	0.0008
160	173,486	117,494	0	290,980	0.0004	0.0012
170	595,087	53,980	0	649,066	0.0009	0.0021
180	726,177	702,380	0	1,428,557	0.0019	0.0040
190	1,330,443	594,553	0	1,924,996	0.0026	0.0066
200	2,255,673	1,919,345	0	4,175,019	0.0057	0.0123
210	2,149,701	1,596,768	0	3,746,469	0.0051	0.0174
220	3,982,235	2,426,673	0	6,408,909	0.0087	0.0261
230	4,501,481	4,345,748	0	8,847,229	0.0120	0.0382
240	6,104,602	4,928,613	0	11,033,214	0.0150	0.0532
250	8,931,152	5,984,444	0	14,915,596	0.0203	0.0735
260	11,503,225	6,766,425	0	18,269,650	0.0249	0.0984
270	14,429,860	9,051,856	0	23,481,717	0.0320	0.1303
280	18,850,852	10,819,742	0	29,670,594	0.0404	0.1707
290	21,928,886	10,694,045	0	32,622,932	0.0444	0.2151
300	25,961,275	13,336,270	0	39,297,545	0.0535	0.2686
310	32,837,337	14,961,637	0	47,798,974	0.0651	0.3337
320	31,950,673	14,641,805	0	46,592,478	0.0634	0.3971
330	32,103,218	17,327,898	0	49,431,116	0.0673	0.4644
340	31,963,898	18,582,724	0	50,546,622	0.0688	0.5332
350	22,829,305	17,729,333	0	40,558,638	0.0552	0.5884
360	24,061,219	15,798,765	0	39,859,983	0.0543	0.6426
370	15,941,728	20,138,940	0	36,080,669	0.0491	0.6918
380	10,461,626	16,875,474	0	27,337,099	0.0372	0.7290
390	5,847,905	19,077,501	0	24,925,406	0.0339	0.7629
400	1,718,130	19,244,135	0	20,962,265	0.0285	0.7914
410	1,659,416	19,583,709	0	21,243,125	0.0289	0.8203
420	1,205,370	16,069,108	0	17,274,478	0.0235	0.8439
430	141,469	16,565,035	0	16,706,504	0.0227	0.8666
440	699,032	16,780,789	0	17,479,821	0.0238	0.8904
450	108,380	15,551,880	0	15,660,260	0.0213	0.9117
460	0	13,987,018	0	13,987,018	0.0190	0.9307
470	70,693	11,012,593	0	11,083,286	0.0151	0.9458
480	0	9,586,592	0	9,586,592	0.0130	0.9589
490	27,718	9,368,384	0	9,396,102	0.0128	0.9717
500	96,323	5,971,453	0	6,067,776	0.0083	0.9799
510	25,008	4,120,246	0	4,145,253	0.0056	0.9856
520	0	3,493,452	0	3,493,452	0.0048	0.9903
530	0	2,359,052	0	2,359,052	0.0032	0.9935
540	0	1,836,222	0	1,836,222	0.0025	0.9960
550	70,438	1,009,627	0	1,080,065	0.0015	0.9975
560	0	169,123	0	169,123	0.0002	0.9977
570	70,438	235,470	0	305,908	0.0004	0.9982
580	70,438	375,932	0	446,371	0.0006	0.9988

Appendix E Table 6.--Continued

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
590	70,438	562,304	0	632,742	0.0009	0.9996
600	82,058	0	0	82,058	0.0001	0.9997
610	0	73,015	0	73,015	0.0001	0.9998
620	70,438	26,932	0	97,370	0.0001	1.0000
660	27,076	0	0	27,076	0.0000	1.0000
Total	337,876,375	396,780,262	0	734,656,637	1.0000	1.0000

Appendix E Table 7.--Population estimates by sex and size group for Greenland turbot from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
120	17,808	0	0	17,808	0.0023	0.0023
130	0	30,544	0	30,544	0.0039	0.0061
140	69,378	52,924	0	122,302	0.0155	0.0216
150	69,378	0	0	69,378	0.0088	0.0304
160	26,764	0	0	26,764	0.0034	0.0338
170	86,702	0	0	86,702	0.0110	0.0448
190	16,735	0	0	16,735	0.0021	0.0469
200	24,503	0	0	24,503	0.0031	0.0500
210	51,268	0	0	51,268	0.0065	0.0565
230	24,503	0	0	24,503	0.0031	0.0596
240	49,007	103,954	0	152,961	0.0194	0.0790
250	105,044	0	0	105,044	0.0133	0.0923
260	81,189	0	0	81,189	0.0103	0.1026
270	29,922	102,440	0	132,361	0.0168	0.1193
280	96,531	18,099	0	114,630	0.0145	0.1338
290	102,310	26,764	0	129,075	0.0163	0.1502
300	120,389	56,776	0	177,165	0.0224	0.1726
310	60,023	59,843	0	119,866	0.0152	0.1878
320	234,300	26,764	0	261,064	0.0331	0.2209
330	103,105	56,996	0	160,101	0.0203	0.2411
340	86,331	167,881	0	254,212	0.0322	0.2733
350	227,715	29,769	0	257,484	0.0326	0.3060
360	83,298	82,866	0	166,164	0.0210	0.3270
370	52,667	53,655	0	106,322	0.0135	0.3405
380	29,922	0	0	29,922	0.0038	0.3443
390	26,764	0	0	26,764	0.0034	0.3477
400	18,356	0	0	18,356	0.0023	0.3500
430	0	30,011	0	30,011	0.0038	0.3538
450	0	26,764	0	26,764	0.0034	0.3572
460	0	18,099	0	18,099	0.0023	0.3595
490	26,276	0	0	26,276	0.0033	0.3628
500	29,922	0	0	29,922	0.0038	0.3666
520	30,011	0	0	30,011	0.0038	0.3704
530	26,764	0	0	26,764	0.0034	0.3738
540	0	30,445	0	30,445	0.0039	0.3776
550	60,367	0	0	60,367	0.0076	0.3853
560	48,597	26,764	0	75,361	0.0095	0.3948
570	25,922	29,769	0	55,691	0.0071	0.4019
580	53,867	0	0	53,867	0.0068	0.4087
590	0	82,326	0	82,326	0.0104	0.4191
600	29,922	55,120	0	85,041	0.0108	0.4299
610	147,145	18,890	0	166,035	0.0210	0.4509
620	26,549	0	0	26,549	0.0034	0.4543
630	45,700	26,764	0	72,464	0.0092	0.4635
640	48,544	30,445	0	78,989	0.0100	0.4735
650	90,654	0	0	90,654	0.0115	0.4849

Appendix E Table 7.--Continued

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
660	56,348	30,544	0	86,892	0.0110	0.4960
670	55,691	26,551	0	82,242	0.0104	0.5064
680	56,466	113,755	0	170,221	0.0216	0.5279
690	0	30,544	0	30,544	0.0039	0.5318
700	26,764	55,612	0	82,377	0.0104	0.5422
710	155,868	54,954	0	210,822	0.0267	0.5689
720	122,898	53,867	0	176,765	0.0224	0.5913
730	43,551	180,102	0	223,653	0.0283	0.6196
740	79,451	54,425	0	133,876	0.0170	0.6366
750	76,356	59,711	0	136,067	0.0172	0.6538
760	0	117,064	0	117,064	0.0148	0.6687
770	30,937	100,663	0	131,600	0.0167	0.6853
780	27,812	56,079	0	83,890	0.0106	0.6960
790	29,769	129,615	0	159,384	0.0202	0.7161
800	0	106,166	0	106,166	0.0134	0.7296
810	25,922	52,188	0	78,110	0.0099	0.7395
820	0	133,361	0	133,361	0.0169	0.7564
830	0	80,275	0	80,275	0.0102	0.7665
840	0	116,279	0	116,279	0.0147	0.7813
850	0	183,239	0	183,239	0.0232	0.8045
860	0	176,500	0	176,500	0.0224	0.8268
870	0	118,445	0	118,445	0.0150	0.8418
880	0	251,505	0	251,505	0.0319	0.8737
890	39,309	124,670	0	163,979	0.0208	0.8945
900	0	160,963	0	160,963	0.0204	0.9148
910	0	111,085	0	111,085	0.0141	0.9289
920	0	41,527	0	41,527	0.0053	0.9342
930	0	56,721	0	56,721	0.0072	0.9414
940	0	83,270	0	83,270	0.0105	0.9519
950	0	111,682	0	111,682	0.0141	0.9661
960	0	90,624	0	90,624	0.0115	0.9775
970	0	47,324	0	47,324	0.0060	0.9835
990	0	86,873	0	86,873	0.0110	0.9945
1010	0	16,666	0	16,666	0.0021	0.9966
1020	0	26,551	0	26,551	0.0034	1.0000
Total	3,411,295	4,484,071	0	7,895,366	1.0000	1.0000

Appendix E Table 8.--Population estimates by sex and size group for arrowtooth flounder from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
70	0	0	44,318	44,318	0.0001	0.0001
80	26,338	26,955	89,170	142,463	0.0003	0.0004
90	0	0	619,641	619,641	0.0012	0.0015
100	20,546	110,738	570,763	702,048	0.0013	0.0029
110	0	0	298,183	298,183	0.0006	0.0035
120	111,601	94,817	26,572	232,991	0.0004	0.0039
130	308,007	154,124	175,264	637,395	0.0012	0.0051
140	961,035	1,306,962	226,392	2,494,389	0.0048	0.0099
150	1,885,264	2,682,853	507,774	5,075,891	0.0098	0.0197
160	2,830,813	4,188,732	358,908	7,378,453	0.0142	0.0339
170	2,138,660	3,955,529	418,027	6,512,216	0.0125	0.0464
180	2,649,724	5,369,178	26,127	8,045,029	0.0155	0.0618
190	1,448,153	4,546,450	104,507	6,099,110	0.0117	0.0735
200	3,579,768	4,976,028	0	8,555,796	0.0164	0.0900
210	5,278,050	5,895,665	0	11,173,715	0.0215	0.1114
220	4,597,422	7,460,196	0	12,057,619	0.0232	0.1346
230	3,651,593	7,993,898	0	11,645,491	0.0224	0.1570
240	4,321,221	7,528,852	0	11,850,073	0.0228	0.1797
250	3,124,108	6,998,850	0	10,122,957	0.0194	0.1992
260	6,342,123	7,783,047	0	14,125,170	0.0271	0.2263
270	4,687,493	7,885,711	0	12,573,204	0.0242	0.2505
280	4,519,233	10,592,669	0	15,111,902	0.0290	0.2795
290	4,444,018	8,851,448	0	13,295,467	0.0255	0.3050
300	6,122,527	10,811,164	0	16,933,691	0.0325	0.3376
310	4,525,285	9,757,169	0	14,282,454	0.0274	0.3650
320	5,067,719	12,178,266	0	17,245,986	0.0331	0.3981
330	4,441,265	11,739,960	0	16,181,225	0.0311	0.4292
340	5,249,151	9,473,226	0	14,722,377	0.0283	0.4575
350	3,158,395	8,862,374	0	12,020,769	0.0231	0.4806
360	3,966,418	7,316,203	0	11,282,621	0.0217	0.5022
370	3,864,723	6,560,870	0	10,425,593	0.0200	0.5223
380	5,018,750	6,838,314	0	11,857,065	0.0228	0.5450
390	5,656,967	9,152,046	0	14,809,013	0.0284	0.5735
400	5,591,374	11,855,229	0	17,446,603	0.0335	0.6070
410	6,704,767	11,891,381	0	18,596,148	0.0357	0.6427
420	4,759,645	12,655,768	0	17,415,414	0.0335	0.6762
430	4,871,558	9,789,330	0	14,660,888	0.0282	0.7043
440	3,881,297	11,371,461	0	15,252,758	0.0293	0.7336
450	4,015,324	9,838,771	0	13,854,095	0.0266	0.7602
460	3,036,571	8,197,715	0	11,234,286	0.0216	0.7818
470	1,232,446	7,231,973	0	8,464,419	0.0163	0.7981
480	1,326,021	6,797,752	0	8,123,773	0.0156	0.8137
490	740,336	6,742,159	0	7,482,495	0.0144	0.8281
500	493,233	9,513,060	0	10,006,292	0.0192	0.8473
510	293,836	6,458,484	0	6,752,320	0.0130	0.8603
520	524,780	8,571,205	0	9,095,985	0.0175	0.8777

Appendix E Table 8.--Continued

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
530	270,239	6,370,322	0	6,640,561	0.0128	0.8905
540	262,296	6,038,878	0	6,301,175	0.0121	0.9026
550	90,229	6,891,984	0	6,982,214	0.0134	0.9160
560	144,818	5,362,973	0	5,507,791	0.0106	0.9266
570	49,239	4,596,793	0	4,646,032	0.0089	0.9355
580	136,725	4,569,681	0	4,706,406	0.0090	0.9445
590	0	3,820,172	0	3,820,172	0.0073	0.9519
600	182,484	2,465,634	0	2,648,119	0.0051	0.9570
610	161,418	3,062,895	0	3,224,313	0.0062	0.9632
620	48,906	3,185,000	0	3,233,907	0.0062	0.9694
630	0	2,851,504	0	2,851,504	0.0055	0.9749
640	15,884	3,270,491	0	3,286,375	0.0063	0.9812
650	59,123	2,285,847	0	2,344,969	0.0045	0.9857
660	74,436	2,335,001	0	2,409,437	0.0046	0.9903
670	165,184	1,337,581	0	1,502,765	0.0029	0.9932
680	0	788,100	0	788,100	0.0015	0.9947
690	0	677,013	0	677,013	0.0013	0.9960
700	0	756,310	0	756,310	0.0015	0.9975
710	0	687,661	0	687,661	0.0013	0.9988
720	0	84,543	0	84,543	0.0002	0.9989
730	0	328,910	0	328,910	0.0006	0.9996
740	0	135,091	0	135,091	0.0003	0.9998
750	0	30,909	0	30,909	0.0001	0.9999
930	0	30,909	0	30,909	0.0001	0.9999
970	0	27,607	0	27,607	0.0001	1.0000
Total	143,128,543	373,998,392	3,465,646	520,592,582	1.0000	1.0000

Appendix E Table 9.--Population estimates by sex and size group for Kamchatka flounder from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
80	0	0	53,615	53,615	0.0014	0.0014
90	59,550	0	188,685	248,235	0.0067	0.0081
100	0	0	81,455	81,455	0.0022	0.0103
110	29,391	0	26,315	55,706	0.0015	0.0118
130	30,892	0	27,300	58,192	0.0016	0.0134
140	158,605	150,196	26,315	335,116	0.0090	0.0225
150	168,011	292,074	26,315	486,400	0.0131	0.0356
160	591,129	314,059	26,315	931,503	0.0251	0.0607
170	470,250	351,633	0	821,884	0.0222	0.0829
180	628,186	345,461	0	973,647	0.0263	0.1092
190	581,700	298,650	0	880,350	0.0238	0.1329
200	165,528	214,120	0	379,648	0.0102	0.1432
210	330,255	379,602	0	709,857	0.0192	0.1624
220	459,415	250,305	0	709,720	0.0192	0.1815
230	384,740	585,328	0	970,068	0.0262	0.2077
240	662,457	1,011,674	0	1,674,132	0.0452	0.2529
250	875,359	713,303	0	1,588,662	0.0429	0.2957
260	1,180,009	674,973	0	1,854,983	0.0501	0.3458
270	1,114,424	583,407	0	1,697,831	0.0458	0.3916
280	557,521	738,900	0	1,296,421	0.0350	0.4266
290	500,036	392,248	0	892,284	0.0241	0.4507
300	530,405	419,206	0	949,611	0.0256	0.4763
310	392,725	274,554	0	667,279	0.0180	0.4943
320	535,420	353,521	0	888,941	0.0240	0.5183
330	527,743	169,080	0	696,823	0.0188	0.5371
340	607,689	295,005	0	902,695	0.0244	0.5615
350	170,188	318,873	0	489,061	0.0132	0.5747
360	101,575	253,931	0	355,505	0.0096	0.5843
370	120,471	122,776	0	243,247	0.0066	0.5909
380	216,365	96,107	0	312,471	0.0084	0.5993
390	260,889	472,660	0	733,549	0.0198	0.6191
400	305,124	144,010	0	449,135	0.0121	0.6312
410	358,674	273,276	0	631,950	0.0171	0.6483
420	612,488	454,429	0	1,066,917	0.0288	0.6771
430	510,133	717,066	0	1,227,198	0.0331	0.7102
440	364,557	457,725	0	822,282	0.0222	0.7324
450	800,959	472,227	0	1,273,185	0.0344	0.7667
460	485,903	391,774	0	877,677	0.0237	0.7904
470	291,388	524,122	0	815,510	0.0220	0.8124
480	410,052	249,081	0	659,133	0.0178	0.8302
490	212,952	308,207	0	521,159	0.0141	0.8443
500	534,349	600,999	0	1,135,348	0.0306	0.8749
510	336,781	138,764	0	475,545	0.0128	0.8878
520	257,902	337,780	0	595,682	0.0161	0.9038
530	155,015	253,969	0	408,984	0.0110	0.9149
540	286,920	133,268	0	420,188	0.0113	0.9262

Appendix E Table 9.--Continued

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
550	51,305	89,693	0	140,998	0.0038	0.9300
560	27,613	287,544	0	315,156	0.0085	0.9385
570	37,186	328,108	0	365,295	0.0099	0.9484
580	0	168,312	0	168,312	0.0045	0.9529
590	73,982	139,598	0	213,580	0.0058	0.9587
600	0	239,224	0	239,224	0.0065	0.9652
610	63,626	152,523	0	216,150	0.0058	0.9710
620	0	75,133	0	75,133	0.0020	0.9730
630	0	183,805	0	183,805	0.0050	0.9780
640	0	147,903	0	147,903	0.0040	0.9820
650	0	135,427	0	135,427	0.0037	0.9856
660	0	86,448	0	86,448	0.0023	0.9880
670	0	131,473	0	131,473	0.0035	0.9915
700	27,016	109,487	0	136,503	0.0037	0.9952
720	0	20,452	0	20,452	0.0006	0.9957
730	0	33,469	0	33,469	0.0009	0.9966
740	0	55,020	0	55,020	0.0015	0.9981
790	0	43,355	0	43,355	0.0012	0.9993
810	0	26,114	0	26,114	0.0007	1.0000
Total	18,614,853	17,981,434	456,317	37,052,603	1.0000	1.0000

Appendix E Table 10.--Population estimates by sex and size group for Pacific halibut from the 1998 eastern Bering Sea bottom trawl survey.

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
120	0	0	27,305	27,305	0.0006	0.0006
140	16,682	0	0	16,682	0.0004	0.0009
150	0	34,763	28,579	63,341	0.0014	0.0023
170	0	37,588	0	37,588	0.0008	0.0031
180	72,430	34,763	0	107,192	0.0023	0.0054
190	0	75,335	34,194	109,529	0.0024	0.0078
200	0	71,396	34,194	105,590	0.0023	0.0101
210	33,728	105,124	68,166	207,019	0.0045	0.0145
220	106,457	0	33,543	140,000	0.0030	0.0175
230	103,058	0	68,388	171,446	0.0037	0.0212
240	37,667	0	30,515	68,182	0.0015	0.0227
250	62,784	0	0	62,784	0.0014	0.0241
260	0	68,458	29,311	97,769	0.0021	0.0262
270	70,791	98,289	28,314	197,393	0.0043	0.0304
280	113,599	37,667	57,858	209,124	0.0045	0.0349
290	219,433	353,637	90,377	663,447	0.0143	0.0492
300	254,953	491,356	102,582	848,892	0.0183	0.0675
310	379,524	294,422	131,857	805,803	0.0174	0.0848
320	529,950	726,474	399,423	1,655,848	0.0357	0.1205
330	599,956	526,845	291,213	1,418,014	0.0305	0.1510
340	245,677	241,350	244,334	731,361	0.0158	0.1668
350	377,621	314,324	396,948	1,088,894	0.0235	0.1903
360	415,301	147,908	299,558	862,767	0.0186	0.2088
370	38,869	105,553	192,566	336,988	0.0073	0.2161
380	385,633	166,119	246,238	797,990	0.0172	0.2333
390	233,575	161,341	218,275	613,190	0.0132	0.2465
400	196,660	476,416	496,279	1,169,355	0.0252	0.2717
410	507,736	454,169	371,869	1,333,774	0.0287	0.3004
420	651,869	344,026	527,844	1,523,739	0.0328	0.3332
430	733,923	410,882	708,152	1,852,958	0.0399	0.3731
440	361,867	363,727	841,325	1,566,919	0.0337	0.4069
450	282,305	199,380	407,664	889,349	0.0192	0.4260
460	178,231	298,171	326,538	802,940	0.0173	0.4433
470	127,222	121,426	291,042	539,689	0.0116	0.4550
480	162,134	57,304	508,689	728,127	0.0157	0.4706
490	180,381	143,310	148,412	472,103	0.0102	0.4808
500	39,830	140,725	69,596	250,152	0.0054	0.4862
510	77,326	55,655	60,418	193,400	0.0042	0.4904
520	141,760	77,363	168,374	387,498	0.0083	0.4987
530	167,481	121,025	90,059	378,565	0.0082	0.5069
540	133,511	149,996	117,597	401,104	0.0086	0.5155
550	59,009	166,694	130,606	356,309	0.0077	0.5232
560	455,970	134,587	142,337	732,894	0.0158	0.5390
570	486,944	116,045	331,374	934,364	0.0201	0.5591
580	156,651	157,347	26,653	340,651	0.0073	0.5664
590	69,698	149,879	94,604	314,181	0.0068	0.5732

Appendix E Table 10.--Continued

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
600	26,369	112,813	82,268	221,450	0.0048	0.5780
610	67,867	0	75,060	142,927	0.0031	0.5810
620	123,927	142,962	233,965	500,854	0.0108	0.5918
630	271,661	113,650	123,158	508,469	0.0110	0.6028
640	180,436	25,471	171,406	377,313	0.0081	0.6109
650	202,089	36,096	231,018	469,202	0.0101	0.6210
660	238,865	190,494	395,685	825,044	0.0178	0.6388
670	320,087	121,121	95,540	536,748	0.0116	0.6503
680	119,237	229,842	248,985	598,065	0.0129	0.6632
690	173,817	107,928	301,900	583,645	0.0126	0.6758
700	367,023	127,820	272,718	767,561	0.0165	0.6923
710	230,420	125,188	274,077	629,685	0.0136	0.7059
720	119,734	33,728	86,802	240,265	0.0052	0.7111
730	354,559	158,174	125,574	638,307	0.0137	0.7248
740	299,592	52,559	121,433	473,584	0.0102	0.7350
750	248,836	85,381	300,280	634,496	0.0137	0.7487
760	133,128	135,374	320,886	589,388	0.0127	0.7614
770	128,870	130,580	186,951	446,401	0.0096	0.7710
780	204,800	139,043	146,750	490,593	0.0106	0.7816
790	91,473	149,461	314,726	555,659	0.0120	0.7935
800	56,615	73,445	103,016	233,075	0.0050	0.7985
810	304,779	169,498	232,189	706,465	0.0152	0.8138
820	64,952	91,218	109,316	265,486	0.0057	0.8195
830	42,042	120,113	291,972	454,127	0.0098	0.8293
840	111,156	119,055	159,160	389,372	0.0084	0.8376
850	116,887	97,579	183,713	398,180	0.0086	0.8462
860	141,137	138,153	255,920	535,210	0.0115	0.8577
870	85,054	165,199	130,578	380,831	0.0082	0.8659
880	97,918	166,564	176,529	441,010	0.0095	0.8754
890	72,260	122,130	124,530	318,920	0.0069	0.8823
900	53,920	154,416	323,671	532,008	0.0115	0.8938
910	103,222	168,934	84,607	356,764	0.0077	0.9015
920	59,988	92,076	125,381	277,444	0.0060	0.9074
930	27,000	140,233	184,395	351,627	0.0076	0.9150
940	16,250	27,983	246,266	290,499	0.0063	0.9213
950	116,959	153,557	131,693	402,209	0.0087	0.9299
960	70,801	105,706	44,659	221,165	0.0048	0.9347
970	54,223	110,921	125,417	290,560	0.0063	0.9409
980	32,310	64,062	106,764	203,136	0.0044	0.9453
990	28,459	74,033	144,967	247,459	0.0053	0.9507
1000	0	131,898	107,955	239,853	0.0052	0.9558
1010	0	93,271	0	93,271	0.0020	0.9578
1020	52,774	139,043	108,768	300,585	0.0065	0.9643
1030	0	86,202	0	86,202	0.0019	0.9662
1040	0	146,792	0	146,792	0.0032	0.9693
1050	0	52,878	87,742	140,620	0.0030	0.9723
1060	0	27,410	135,004	162,414	0.0035	0.9758
1070	16,250	0	0	16,250	0.0003	0.9762

Appendix E Table 10.--Continued

Length (mm)	Males	Females	Unsexed	Total	Proportion	Cumulative Proportion
1080	56,549	30,848	43,512	130,909	0.0028	0.9790
1090	43,890	31,333	57,161	132,384	0.0029	0.9819
1100	0	26,817	0	26,817	0.0006	0.9824
1110	0	27,089	0	27,089	0.0006	0.9830
1120	0	65,644	57,991	123,635	0.0027	0.9857
1130	0	45,046	0	45,046	0.0010	0.9867
1140	0	0	56,002	56,002	0.0012	0.9879
1150	0	0	26,132	26,132	0.0006	0.9884
1160	0	0	26,132	26,132	0.0006	0.9890
1180	0	18,027	0	18,027	0.0004	0.9894
1190	0	0	29,041	29,041	0.0006	0.9900
1210	0	27,407	0	27,407	0.0006	0.9906
1240	0	35,486	0	35,486	0.0008	0.9914
1250	0	27,260	0	27,260	0.0006	0.9920
1270	0	27,089	0	27,089	0.0006	0.9925
1280	0	29,642	29,449	59,090	0.0013	0.9938
1290	0	32,035	0	32,035	0.0007	0.9945
1310	0	0	55,027	55,027	0.0012	0.9957
1380	0	27,260	0	27,260	0.0006	0.9963
1390	0	28,414	0	28,414	0.0006	0.9969
1410	0	29,642	0	29,642	0.0006	0.9975
1430	0	30,909	0	30,909	0.0007	0.9982
1440	16,250	0	0	16,250	0.0003	0.9985
1470	0	27,260	0	27,260	0.0006	0.9991
1570	0	0	16,081	16,081	0.0003	0.9995
1620	0	24,675	0	24,675	0.0005	1.0000
Total	15,212,626	14,072,775	17,143,090	46,428,491	1.0000	1.0000