NOAA Technical Memorandum NMFS-AFSC-179

Data Report: 2006 Aleutian Islands Bottom Trawl Survey

by
C. N. Rooper

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Fisheries Science Center

February 2008

NOAA Technical Memorandum NMFS

The National Marine Fisheries Service's Alaska Fisheries Science Center uses the NOAA Technical Memorandum series to issue informal scientific and technical publications when complete formal review and editorial processing are not appropriate or feasible. Documents within this series reflect sound professional work and may be referenced in the formal scientific and technical literature.

The NMFS-AFSC Technical Memorandum series of the Alaska Fisheries Science Center continues the NMFS-F/NWC series established in 1970 by the Northwest Fisheries Center. The NMFS-NWFSC series is currently used by the Northwest Fisheries Science Center.

This document should be cited as follows:

> Rooper, C. N.. 2008. Data report: 2006 Aleutian Islands bottom trawl survey . U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-179, 237 p.

Reference in this document to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

NOAA Technical Memorandum NMFS-AFSC-179

Data Report: 2006 Aleutian Islands Bottom Trawl Survey

by
C. N. Rooper

Alaska Fisheries Science Center
7600 Sand Point Way N.E.
Seattle, WA 98115
www.afsc.noaa.gov

U.S. DEPARTMENT OF COMMERCE
Carlos M. Gutierrez, Secretary
National Oceanic and Atmospheric Administration
Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (ret.), Under Secretary and Administrator
National Marine Fisheries Service
John Oliver, Acting Assistant Administrator for Fisheries

February 2008

Notice to Users of this Document

This document is being made available in .PDF format for the convenience of users; however, the accuracy and correctness of the document can only be certified as was presented in the original hard copy format.

ABSTRACT

Tenth in a series dating from 1980, the fourth biennial groundfish assessment survey of the Aleutian Islands region was conducted during the summer of 2006 by the Alaska Fisheries Science Center's (AFSC) Resource Assessment and Conservation Engineering (RACE) Division. The survey area covered the continental shelf and upper continental slope to 500 m in the Aleutian Archipelago from Islands of Four Mountains (170° W long.) to Stalemate Bank (170° E long.), including Petrel Bank and Petrel Spur (180° long.), and the northern side of the Aleutian Islands between Unimak Pass (165° W long.) and the Islands of Four Mountains. The survey was conducted aboard two chartered trawlers, the F/V *Gladiator*, and F/V *Sea Storm*. Samples were collected successfully at 358 survey stations using standard RACE Division Poly Nor'Eastern high-opening bottom trawl nets with rubber bobbin roller gear. The primary survey objectives were to define the distribution and estimate the relative abundance of principal groundfish and commercially or ecologically important invertebrate species that inhabit the Aleutian marine habitat and to collect data to define biological parameters useful to fisheries researchers and managers such as growth rates; length-weight relationships; feeding habits; and size, sex, and age compositions. Atka mackerel (*Pleurogrammus monopterygius*) were the most abundant species in the survey area with an estimated biomass greater than 740,000 metric tons (t). Pacific ocean perch (*Sebastes alutus*; POP) were the most abundant species of rockfish; catches of POP were high throughout the survey area at intermediate depths. Arrowtooth flounder (*Atheresthes stomias*) were the dominant flatfish species and were ubiquitous. The skate assemblage was made up of predominantly two species, whiteblotched skate (*Bathyraja maculata*) and Alaska skate (*B. parmifera*), with a wide diversity of species captured in the eastern portion of the survey area. Survey results are presented as estimates of catch per unit of effort and biomass, species distribution and relative abundance, length frequency distribution, and length-weight relationships for commercially important species and for others of biological interest.

CONTENTS

INTRODUCTION

The 2006 biennial bottom trawl survey of the Aleutian Islands region was conducted from 31 May through 11 August by the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC), National Marine Fisheries Service (NMFS), Seattle, Washington. It was the tenth comprehensive NMFS bottom trawl survey of this area conducted since 1980. The surveys conducted prior to 1991 were cooperative efforts involving U.S. and Japanese scientists and vessels. From 1991 to 2000 the surveys were planned and conducted on a triennial basis by NMFS, employing chartered U.S. fishing vessels. Biennial surveys began in 2000. The primary focus of these surveys is to build a standardized time series of data to assess, describe, and monitor the distribution, abundance, and biological condition of Aleutian groundfish and invertebrate stocks. This report presents 2006 survey results for the principal fish species in each of four North Pacific Fisheries Management Council (NPFMC) regulatory areas: Southern Bering Sea, and Eastern, Central, and Western Aleutians. No detailed comparisons to previous surveys are made in this report, however most time-series of principal groundfish and invertebrate species are available through the AFSC Resource Ecology and Ecosystem Modeling website (http://access.afsc.noaa.gov/reem/ecoweb/Index.cfm). The specific survey objectives were to: 1) define the distribution and relative abundance of the principal groundfish and important invertebrate species that inhabit the Aleutian region; 2) obtain data from which to estimate the abundance of principal groundfish species; 3) collect data to define biological parameters including; age, growth rates, length-weight relationships, feeding habits, and size and sex compositions; 4) collect accurate net mensuration data describing the performance of standard research trawls used by all of the vessels during the survey; 5) conduct special collections as requested by other researchers or research groups. Special collections were made for projects addressing: genetics of skate and Atka mackerel, bryozoans, eelpouts, cephalopod parasites, marine mammal prey items, mollusks, octopus, sculpin maturity, crabs, Pacific ocean perch maturity, skate eggs, snailfish, testing net mensuration equipment, light effects on trawl catches and observations of seabirds, short-tailed albatross, and killer whales.

METHODS

Survey Area

The Aleutian region is an extensive archipelago of volcanic origin typified by a relatively narrow continental shelf and a steep continental slope that drops quickly into the Aleutian Trench on the south side and into the Aleutian Basin and Bowers Basin on the north side (Fig. 1). The islands are separated by numerous deep passes and relatively narrow channels. Strong currents flow through the passes and across the shelf, sometimes making sampling operations difficult. The continental shelf and upper continental slope are typified by hard and sometimes irregular terrain necessitating the use of bobbin-style roller gear on the research trawls. Extending over 900 nautical miles (nmi) from east to west, the survey area is composed of the continental shelf and upper slope from Islands of Four Mountains (170° W long.) to Stalemate Bank (170° E long.), including Petrel Bank and Petrel Spur (180° long.), and the northern side of the archipelago between Unimak Pass (165° W long.) and the Islands of Four Mountains (Fig. 1). Survey depths range from nearshore waters to 500 m. The total area surveyed is more than 64,415 km^2 (Table 1). The Western Aleutians area represents 24% of the total survey area, the Central Aleutians

area, almost 26%, the Eastern Aleutians area, 39%, and the Southern Bering Sea area comprises about 11%. In terms of the sampled depths, the 1-100 m and 101-200 m depth intervals make up 33.5% and 30.4% of the area, respectively. Reflecting the fact that the upper continental slope is relatively narrow and steep in many places, the area represented by the 201-300 m and 301-500 m depth intervals are 14.4% and 21.7%, respectively.

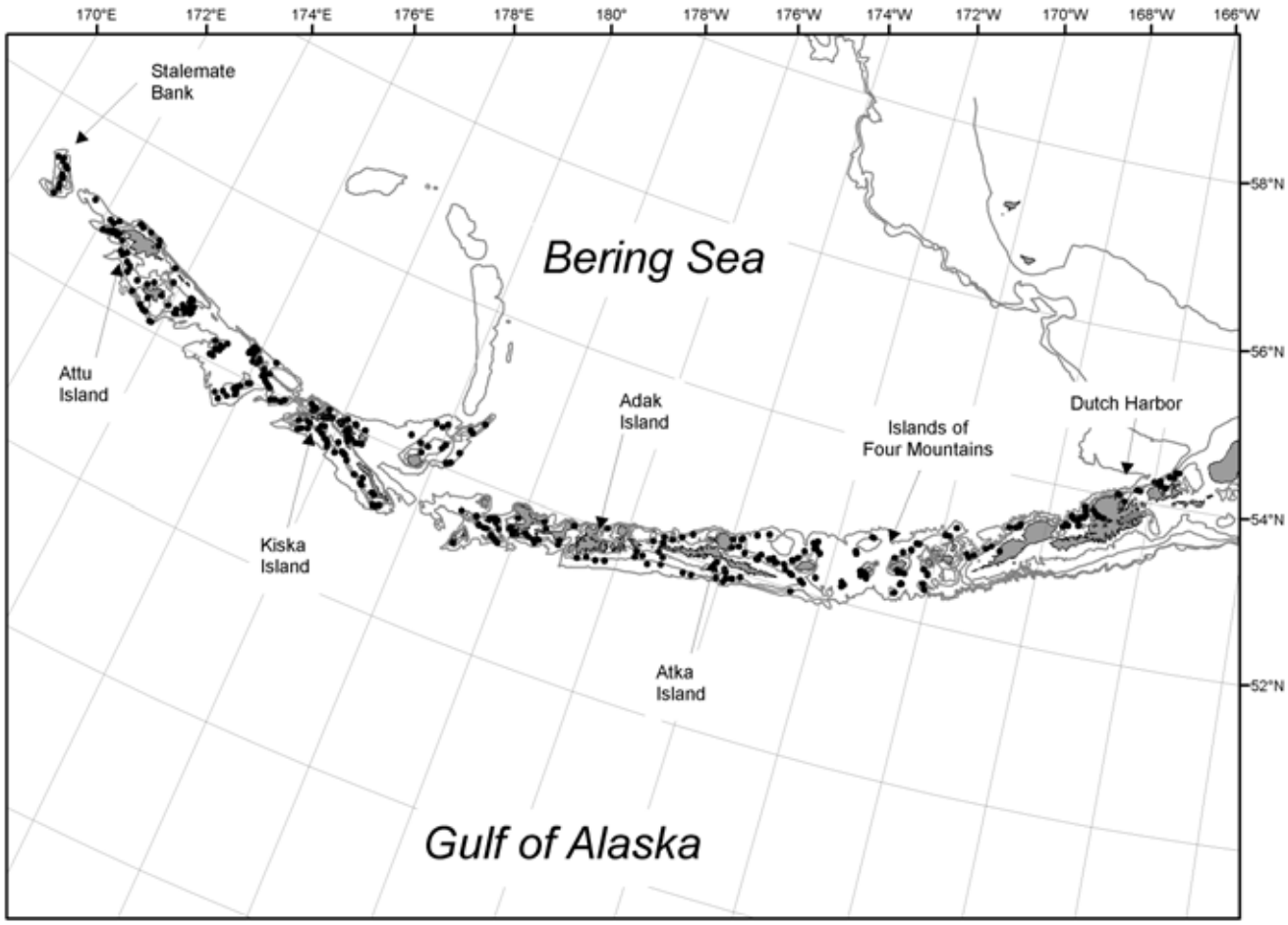


Figure 1. -- Locations of trawl hauls (black dots) performed during the 2006 bottom trawl survey of the Aleutian Islands.

Vessels

Both chartered vessels were house-forward stern trawlers with stern ramps, aft net storage reels (mounted over the stern ramp), telescoping deck cranes, propeller nozzles, and paired, controlled-tension hydraulic trawl winches containing between 1,645 and 2,200 m of 2.54 cm diameter steel cable. The *Sea Storm* is 37.5 m in overall length (LOA) and is powered by a single 1,710 continuous horsepower (HP) main engine. The *Gladiator* is 38 m LOA with a 1,725 HP

main engine. Aboard both vessels electronic equipment included global positioning system (GPS) with video position plotters, at least two radars, single sideband and VHF transmitter-receivers, color video fishfinders (echosounders), paper recorder echosounders, and auto-pilots. Captains Jeff Boddington and Ed French operated the *Gladiator* for one leg apiece. The *Sea Storm* was operated by Captain Steve Branstiter for two legs and Captain Jerry Ellefson for one leg.

Fishing Gear

The fishing gear and protocols for deployment are described in detail in Stauffer (2004). Both vessels used standard RACE Division Poly Nor'Eastern high-opening bottom trawls with 24.2 m roller gear constructed with 36 cm rubber bobbins separated by 10 cm rubber disks. The fishing dimensions of the trawls were measured using Scanmar acoustic net mensuration equipment mounted on the wing-tips and headrope of the trawl. Each trawl was measured and certified as conforming to standard measurements prior to its use in the survey.

Survey Design

For this survey the Aleutian region is divided into four major areas based on geographic features and NPFMC regulatory areas. Those areas are further divided into 45 area-depth strata or subareas (Appendix A). Survey depth intervals are as follows: 1-100, 101-200, 201-300, and 301-500 m. Naming conventions to designate direction and relative geographic locations of subareas in text, figures, and tables use the abbreviations N, S, E, and W (or their combinations, i.e., NW) for the four major points of the compass. Most of the areas suitable to deploy the RACE standard research trawl and to meet trawl duration and performance criteria have been reasonably well defined during past surveys. Thus, the vast majority of allocated stations for the 2006 survey were placed at or near locations sampled during previous surveys. Consistent with recent RACE Division assessment surveys (Martin and Clausen 1995, Stark and Clausen 1995, Munro and Hoff 1995, Martin 1997, Britt and Martin 2001), sample allocations for each stratum were determined using a modified Neyman optimum allocation sampling strategy (Cochran 1977) which considers relative abundances of commercially important groundfish species from the previous five surveys of the area and the current ex-vessel value of the species. An estimated maximum of 366 tows was set as the number of tows that we could expect to perform given survey time and vessel scheduling restrictions, expected weather days, and time lost to gear repairs. To avoid duplicate tows, no two selected stations could be located less than a kilometer apart. The allocation model drew random stations within each stratum from a 5 by 5 nmi grid imposed on the entire survey area. A minimum of two stations was allocated to any given stratum. In 2006, special emphasis was placed on strata with historically high rockfish catches. So initially 316 of the 366 stations were chosen using the standard allocation model, and an additional 50 stations were allocated based entirely on rockfish catch data alone.

Most of the 366 allocated tow locations were selected randomly without replacement from a database of previously conducted tows, but to satisfy the sampling requirements in certain strata, thus minimizing projected sample variances, some previously unsampled locations were required. Assigned sample densities were highest in the 101-200 m and 201-300 m depth intervals at about 6 and 8 tows per 1,000 km^2, respectively (Table 1). The projected overall

sample density was 5.5 tows per 1,000 km^2. If fishing gear conflicts or untrawlable bottom prevented us from sampling a station, we sought an alternate station in the same stratum as a replacement. To locate new or alternate tow sites, search patterns were run within the proper stratum using an echosounder to locate trawlable bottom where a successful 15-minute tow could be conducted. Search time at any station was limited to 2 hours duration.

Table 1. -- Number of stations allocated, attempted, and successfully completed and sampling density for the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC Area	Depth Range (m)	Stations Allocated	Stations Attempted	Stations Successful	Area (km^2)	Stations/ 1,000 km^2
Western Aleutians	1 - 100	22	22	22	4,877	4.51
	101 - 200	47	54	47	5,318	8.84
	201 - 300	23	23	23	1,724	13.34
	301 - 500	22	21	21	3,272	6.42
	All depths	**114**	**120**	**113**	**15,190**	**7.44**
Central Aleutians	1 - 100	32	35	32	5,847	5.47
	101 - 200	35	36	35	4,606	7.60
	201 - 300	22	24	21	2,109	9.96
	301 - 500	22	25	22	3,981	5.53
	All depths	**111**	**120**	**110**	**16,543**	**6.65**
Eastern Aleutians	1 - 100	15	12	12	6,848	1.75
	101 - 200	32	33	31	7,768	3.99
	201 - 300	28	33	27	4,901	5.51
	301 - 500	22	30	21	5,683	3.70
	All depths	**97**	**108**	**91**	**25,200**	**3.61**
Southern Bering Sea	1 - 100	21	24	21	4,026	5.22
	101 - 200	11	12	11	1,849	5.95
	201 - 300	4	6	4	564	7.09
	301 - 500	8	9	8	1,043	7.67
	All depths	**44**	**51**	**44**	**7,482**	**5.88**
All areas	1 - 100	90	93	87	21,598	4.03
	101 - 200	125	135	124	19,540	6.35
	201 - 300	77	86	75	9,298	8.07
	301 - 500	74	85	72	13,979	5.15
	All depths	**366**	**399**	**358**	**64,415**	**5.56**

Trawl Performance Data Collection

A concerted effort was made to standardize towing procedures. The goal of each tow was for the net to arrive quickly on bottom in towing configuration at the standard towing speed of 3 knots and to maintain the vessel speed while the net held its fishing configuration with proper bottom contact for 15 minutes. To reduce potential fishing power differences between the vessels, standard scope ratio tables of trawl warp relative to bottom depth were used. Towing time was abbreviated on some occasions to avoid potential gear damage or when echosounder or net mensuration data suggested the net configuration was abnormal. The date, time, and GPS-generated position were recorded every 6 seconds during each tow. Pressure at depth (transformed as estimated depth), water temperature, and time were recorded every 6 seconds during most tows using a SeaBird Model 39 data logger which was attached near the middle of the trawl headrope. During the tow the vertical and horizontal trawl openings were monitored with Scanmar net sonde units. On rare occasions, Scanmar units were not used on the net to avoid potential loss or damage due to extremely rough bottom conditions. A bottom contact sensor was attached to the midpoint of the roller gear to record the date, time, and tilt angle relative to bottom, indicating the degree of contact with the bottom. Surface water temperatures were collected using a bucket thermometer during the tow. At the end of each tow, retrieval started with the vessel maintaining or increasing towing speed with the objective of lifting the trawl quickly away from the bottom. All tows were performed during daylight hours within the period between one-half hour after sunrise and one-half hour before sunset. All of the trawl performance data collected during the tow was judged after its completion using computer-generated graphics and data summaries. A trawl sample was considered to be successful if horizontal and vertical net openings remained within a predetermined normal range, the roller gear maintained consistent contact with the bottom, the net suffered little or no damage during the tow, and there were no significant encounters with derelict fishing gear. The minimum accepted duration for satisfactory tows was about 10 minutes.

Catch Processing and Data Collection

Catches weighing up to approximately 1,100 kg were emptied directly onto a sorting table, sorted to species (or species group for some invertebrates), and weighed to the nearest 10 g using a Marel Model M1100 electronic digital platform scale. Species catches weighing less than about 2 kg were generally weighed to the nearest 2 g on a smaller capacity, electronic Marel Model M60 digital scale. Larger catches that contained more than 1,100 kg were often processed completely by splitting the total catch onto the table in two or more portions. Very large catches that could be lifted off the deck in the codend were weighed with a dynamometer or the weight was estimated volumetrically. Nondominant species were separated from the other catch and their total weight was determined and summed with the weights from the subsample to give total weights by species. The total weights of the dominant species were subsampled and extrapolated to total weights. The total catch weight minus the weights of the separated non-dominant species. Pacific halibut (scientific names for all species are listed in Appendix Tables B1 and B2) were immediately measured and released if not retained for biological samples. Halibut catch weights were estimated during data entry using length-weight parameters supplied by the International Pacific Halibut Commission and length frequency data. A random sample of up to 200 length frequencies was collected for each of the major species. A target tow-by-tow length

frequency sample size was pre-assigned for each species. A smaller length frequency sample was collected for some minor catch components such as sculpins. Most individuals were sexed prior to measurement. All skates and Pacific halibut were measured. Unsexed length frequencies were collected for forage fish such as herring, capelin, and eulachon. Length frequencies were collected with barcode-reader data loggers and barcoded length boards. Data were downloaded to a computer and appended to a database after each tow.

Age structures (otoliths) were collected for most major species. Separate collections were made from each of the four major subareas. Samples were stratified by sex and size with a specified number of otoliths collected per centimeter length interval. Limits were placed on the number collected per sex-centimeter per day to distribute the sample evenly over each area. Length was measured to the nearest centimeter and weight was estimated to the nearest 2-10 g (scale accuracy depends on the weight of the specimen) with the digital scales. Fork length was measured for all fish species except grenadiers (snout to insertion of ventral fin) and skates and sharks (total length). Stomach samples were collected for selected species throughout the survey area by biologists from the AFSC's Resource Ecology and Ecosystem Management Program.

Data Analysis

The descriptions in the Data Analysis and Data Limitations sections are largely drawn from Martin (1997) and represent a concise summary of current RACE catch analysis procedures and assumptions about survey sampling limitations. Biomass estimates were calculated using the area-swept method (Alverson and Pereyra 1969). The area swept by the trawl was estimated by multiplying the estimated distance towed (km) by the estimated mean net spread (m) for each tow. The distance towed was estimated by computing the distance traveled over ground by the vessel between the estimated time when the footrope came into contact with the bottom (on-bottom) and the estimated time when the center of the footrope left the bottom (off-bottom). The distance traveled by the vessel was estimated by smoothing the GPS position data to eliminate the dither introduced by variability in signal reception and system precision, and measuring the distance along this line. The mean net spread was estimated by averaging the smoothed Scanmar net spread readings collected during the on-bottom to off-bottom time period. All satisfactory performance tows had at least partial Scanmar data sets available. For each species, a catch-per-unit-effort (CPUE) was calculated for each tow by dividing catch weight (kg) by the area swept by the trawl (hectares, ha). The mean CPUE for each stratum was calculated as the mean of the individual tow CPUEs (including zero catches) within the stratum. Mean CPUEs for combined strata were calculated as the weighted average of the individual stratum CPUE means (weighted by stratum area). Biomass estimates (t) were calculated by multiplying each stratum mean CPUE by the stratum area and summing the results to obtain estimates by NPFMC regulatory area and depth interval. The 95% confidence interval was calculated for each species biomass estimate. A detailed description of the analytical procedures is presented in Wakabayashi et al. (1985).

Population length compositions were estimated by expanding the length frequency data to the total catch for each species by length and sex category at each station (Wakabayashi et al. 1985). The stratum population within a sex-length category was calculated by multiplying the stratum population by the proportion of fish in that category from the summed station data. Population size composition estimates were summed over strata to derive estimates by area. Length-weight

data collected from individual fish were used to estimate length-weight relationships based on a nonlinear least-squares regression algorithm. The length-weight relationship was expressed as:

$W = a * L^b$,

where W is weight in grams, L is length in mm and a and b are the parameters fitted.

Data Limitations

Due to the multi-species nature of this survey, there are some limitations in its ability to estimate fish abundance. Populations whose entire depth range is not covered by the survey are not fully sampled (e.g., sablefish and shortspine thornyhead). Populations that extend into areas untrawlable with the survey gear or that occupy the water column above the headrope of the trawl are not fully represented (e.g., many rockfish species). Populations of species that exhibit a highly contagious distribution pattern (e.g., Atka mackerel and Pacific ocean perch) might be better sampled with a different survey design. For these reasons, survey estimates of abundance are considered more reliable for species that are widely and more uniformly distributed. Contagious distributions might be indicated by catch patterns that show a few high catches, the remainder being much smaller or "zero" catches. Estimates of population size within the survey area are routinely expressed as absolute abundance estimates. These estimates require the assumption that 100% of the fish within the path of the trawl are captured. In fact, as with any fishing gear, the survey trawl exhibits some size selectivity. Small fish might pass through the net mesh and would not be sampled well. Some larger fish may be able to swim ahead of the trawl, at least for a short time. Some fish are herded into the path of the trawl by the doors and the bridles (Somerton and Munro 2001). Some fish escape under the footrope of the net. Video and bottom contact sensor evidence suggests that this might be a problem with the research trawl, especially if towing speed exceeds 3 knots (Somerton and Weinberg 2000). The rate of herding and escapement depend upon several factors including the species and water temperature. This is an active area of ongoing research at the AFSC and at other research institutions. Given these limitations, survey abundance estimates should be considered relative measures of abundance.

RESULTS

A total of 399 trawl tows were attempted. Three hundred and fifty-eight (358) successful tows were conducted at 366 allocated station locations. All successful tows were included in the biomass and size composition analysis (Table 1). Scanmar net spread data were collected with all but five successful tows. Headrope depth and temperature data were successfully recorded for all but one tow. Average bottom temperatures ranged from 3.1° to 7.0°C, but the vast majority of bottom temperatures ranged between 3.5° and 5.0°C. Sea surface temperatures ranged from 4.0° to 10.9°C.

Results by Area

Over 150 species of fish from 28 families and 400 invertebrate species or taxa from 11 phyla were captured during the 2006 survey. Appendix B presents lists of fish (Appendix Table B-1)

and invertebrate (Appendix Table B-2) species encountered during the survey. This report deals largely with groundfish species. Relative abundance estimates, reported as catch-per-unit-effort (kg/ha), are presented in Table 2 for the 20 most abundant groundfish species in each of the four NPFMC regulatory areas covered by the survey, combined Aleutian areas, and the entire survey region. Atka mackerel was the most abundant species captured over the entire survey region (Table 2), followed by Pacific ocean perch (POP) and northern rockfish. Atka mackerel and POP generated the two highest mean CPUEs in the Eastern and Central Aleutian areas. Pacific ocean perch and northern rockfish were the most abundant species in the Western Aleutians area. In the Southern Bering Sea area, arrowtooth flounder, Pacific ocean perch, northern rockfish, and walleye pollock mean CPUEs were exceptionally high compared to all other species in the area. Pacific cod, an important Aleutian groundfish species, was more or less uniformly distributed throughout the survey area, but at levels much lower than Atka mackerel or POP.

Results by Species

More detailed species-specific accounts are provided below. The first species group includes the flatfish, followed by roundfish, rockfish, and skates, respectively. Some minor species of biological interest such as sculpins have been grouped for convenience sake, but when data such as species-specific length frequency or length weight information are available, these are presented separately for each species.

Generally, the following items are presented for most, but not all species: 1) a short summary of the data collected and data analysis, 2) a table showing the number of hauls, the number of hauls with catch, mean CPUE, estimated biomass and confidence intervals, mean length and mean weight of that species by NPFMC area and depth interval, 3) a table showing mean CPUE and estimated biomass confidence intervals by subarea and depth stratum, 4) figures showing the station distribution and CPUE, 5) figures showing the estimated size composition of the population by NPFMC area and depth interval, and 6) figures and nonlinear regression parameters showing the length-weight relationship. The distribution maps show relative abundance categorized into five categories: 1) no catch, 2) sample CPUE less than mean CPUE, 3) between mean CPUE and two standard deviations (SD) above mean CPUE, 4) between two and four SDs, and 5) greater than four SDs above the mean CPUE. The species nomenclature used in the following sections generally follows Robins et al. (1991), Mecklenburg et al. (2002) or Kessler (1985).

Table 2. -- Mean CPUE (kg/ha) for the 20 most abundant groundfish and total sampling effort for each NPFMC regulatory area from the 2006 Aleutian Islands bottom trawl survey.

Western Aleutians Area	CPUE
Pacific ocean perch	185.61
Northern rockfish	66.67
Atka mackerel	66.29
Pacific cod	12.99
Arrowtooth flounder	8.78
Northern rock sole	8.41
Shortspine thornyhead	7.32
Giant grenadier	5.25
Walleye pollock	4.29
Kamchatka flounder	3.49
Pacific halibut	3.39
Whiteblotched skate	3.00
Flathead sole	2.26
Rex sole	1.86
Prowfish	1.66
Alaska skate	1.66
Shortraker rockfish	1.63
Greenland turbot	1.30
Aleutian skate	0.76
Darkfin sculpin	0.74
Number of hauls	113

Central Aleutians Area	CPUE
Atka mackerel	168.07
Pacific ocean perch	103.33
Northern rockfish	42.82
Northern rock sole	22.46
Giant grenadier	17.94
Pacific cod	13.32
Walleye pollock	11.17
Kamchatka flounder	7.41
Arrowtooth flounder	5.02
Alaska skate	3.98
Pacific halibut	3.70
Shortspine thornyhead	3.62
Dusky rockfish	3.37
Shortraker rockfish	3.22
Black-spotted rockfish	2.86
Sablefish	2.39
Yellow Irish lord	1.96
Aleutian skate	1.61
Rex sole	1.57
Whiteblotched skate	1.19
Number of hauls	110

Eastern Aleutians Area	CPUE
Atka mackerel	138.97
Pacific ocean perch	75.69
Giant grenadier	61.50
Arrowtooth flounder	50.37
Walleye pollock	27.78
Pacific cod	17.20
Northern rockfish	9.12
Whiteblotched skate	8.88
Northern rock sole	7.71
Pacific halibut	7.24
Kamchatka flounder	6.41
Greenland turbot	6.25
Sablefish	2.19
Yellow Irish lord	2.12
Shortraker rockfish	1.58
Alaska skate	1.31
Black-spotted rockfish	1.10
Aleutian skate	0.93
Mud skate	0.90
Rex sole	0.89
Number of hauls	91

Combined Aleutian Areas	CPUE
Atka mackerel	128.03
Pacific ocean perch	113.05
Northern rockfish	34.27
Giant grenadier	33.84
Arrowtooth flounder	26.10
Walleye pollock	16.68
Pacific cod	14.95
Northern rock sole	12.18
Kamchatka flounder	5.92
Pacific halibut	5.19
Whiteblotched skate	5.08
Greenland turbot	3.45
Shortspine thornyhead	3.14
Alaska skate	2.18
Shortraker rockfish	2.07
Sablefish	1.72
Yellow Irish lord	1.60
Black-spotted rockfish	1.41
Rex sole	1.34
Aleutian skate	1.08
Number of hauls	314

Southern Bering Sea Area	CPUE
Arrowtooth flounder	47.12
Pacific ocean perch	31.68
Northern rockfish	30.59
Walleye pollock	24.07
Atka mackerel	16.45
Kamchatka flounder	15.56
Northern rock sole	11.22
Pacific halibut	10.86
Pacific cod	9.90
Rex sole	8.80
Southern rock sole	7.84
Flathead sole	5.17
Yellow Irish lord	2.29
Greenland turbot	1.71
Shortraker rockfish	1.58
Alaska skate	1.44
Shortspine thornyhead	1.29
Whiteblotched skate	1.09
Black-spotted rockfish	1.06
Dusky rockfish	0.98
Number of hauls	44

All Areas	CPUE
Atka mackerel	115.07
Pacific ocean perch	103.60
Northern rockfish	33.84
Giant grenadier	29.91
Arrowtooth flounder	28.54
Walleye pollock	17.54
Pacific cod	14.36
Northern rock sole	12.07
Kamchatka flounder	7.04
Pacific halibut	5.84
Whiteblotched skate	4.61
Greenland turbot	3.25
Shortspine thornyhead	2.93
Rex sole	2.21
Alaska skate	2.09
Shortraker rockfish	2.01
Yellow Irish lord	1.68
Sablefish	1.54
Flathead sole	1.50
Black-spotted rockfish	1.37
Number of hauls	358

Flatfish

Arrowtooth flounder (*Atheresthes stomias*)

Arrowtooth flounder was the most abundant flatfish species in the survey area. Its relative abundance was highest in the Eastern Aleutians area and the Southern Bering Sea area (Table 2), much higher than the mean CPUE in the Western or Central Aleutian areas. This species was distributed throughout the entire survey area and in all depth intervals (Table 3, Fig. 2). Mean CPUE was highest in the 201-300 m depth interval in the combined Aleutian areas and in the 101-200 m interval in the Southern Bering Sea area. The estimated biomass was 183,836 t, 69% of which was found in the Eastern Aleutians area. In the 19 subareas and depth strata where arrowtooth flounder was most abundant, virtually every trawl haul produced arrowtooth flounder (Table 4). The species was not particularly abundant or highly concentrated but was widely distributed. Many stations produced CPUEs within the range of mean CPUE to two standard deviations above the mean (Fig. 2).

Mean length and weight of arrowtooth flounder increased with depth (Table 3) and were larger in the combined Aleutian areas than in the Southern Bering Sea area. Maximum lengths of males were shorter than females (Fig. 3) and females were more abundant in the deeper strata. The size differences between males and females are illustrated by the length-weight relationships found in Figure 4.

Kamchatka flounder (*Atheresthes evermanni*)

Relative abundance of Kamchatka flounder was highest in the Southern Bering Sea where it was more abundant than all other flatfish except arrowtooth flounder (Table 2). This species was least abundant in the Western Aleutians area. Total estimated biomass was approximately 45,000 t, almost all of which was found in the 301-500 m depth interval (Table 5). It is possible that this species is also abundant in deeper, unsampled depths, since the results of the 1980 U.S.-Japan cooperative trawl survey showed that 31% of the total Aleutian biomass of arrowtooth and Kamchatka flounder combined was between 500 m and 900 m depths (Ronholt et al. 1986). Relative abundance increased markedly with depth, as did mean individual weight and length. Kamchatka flounder and arrowtooth flounder are physically very similar and probably occupy similar ecological niches, but adults of the former species inhabit the deepest survey strata, whereas the latter is most abundant at depths < 300 m (Tables 3 and 5). Kamchatka flounder mean CPUE was highest in the 301-500 m depth interval in the Southern Bering Sea subarea, and this species was captured in most trawl hauls conducted at this depth interval (Table 6). Relatively high CPUEs were found at four stations; one east of Amlia Island, two west of Tanaga Island, and one east of Kiska Island (Fig. 5).

Like arrowtooth flounder, Kamchatka flounder exhibit sexual dimorphism. Adult females grow larger than males (Fig. 6). Mean length also increased with depth. No length-weight data was collected for this species.

Table 3. -- Number of survey hauls, number of hauls with arrowtooth flounder, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	10	6.433	3,137	0	9,040	5.452	31.6
	101-200	47	33	12.655	6,730	2,697	10,762	1.078	44.2
	201-300	23	19	14.529	2,504	1,512	3,496	1.440	47.6
	301-500	21	12	2.971	972	358	1,587	3.018	62.4
	All depths	113	74	8.784	13,343	6,383	20,304	2.316	43.2
Central Aleutians	1-100	32	20	1.691	989	240	1,738	0.567	35.6
	101-200	35	27	4.634	2,134	993	3,276	0.965	42.2
	201-300	21	20	12.191	2,571	1,431	3,711	1.727	53.8
	301-500	22	20	6.577	2,618	1,534	3,702	3.256	63.7
	All depths	110	87	5.025	8,312	6,312	10,313	1.875	51.8
Eastern Aleutians	1-100	12	5	4.477	3,066	0	8,052	0.456	33.8
	101-200	31	22	15.004	11,655	6,344	16,966	0.794	40.5
	201-300	27	25	151.546	74,280	0	149,981	1.465	51.8
	301-500	21	14	66.730	37,922	0	100,123	1.899	56.1
	All depths	91	66	50.365	126,923	32,534	221,313	1.509	51.6
All Aleutian Areas	1-100	66	35	4.09	7,192	0	14,469	2.650	33.1
	101-200	113	82	11.60	20,519	13,925	27,113	0.905	41.9
	201-300	71	64	90.86	79,355	5,890	152,820	1.473	51.8
	301-500	64	46	32.09	41,513	0	101,113	2.011	56.7
	All depths	314	227	26.10	148,579	54,821	242,337	1.602	50.9
Southern Bering Sea	1-100	21	19	10.461	4,211	2,370	6,052	0.465	34.0
	101-200	11	11	43.349	8,014	2,151	13,876	0.559	36.4
	201-300	4	4	27.106	1,528	0	5,034	0.914	44.5
	301-500	8	8	206.134	21,503	0	50,281	1.668	52.8
	All depths	44	42	47.125	35,257	9,986	60,528	1.239	46.4

Table 4. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of arrowtooth flounder by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Southern Bering Sea	301-500	Combined Southern Bering	8	8	206.13	21,503	0	50,286
Eastern Aleutians	201-300	SE Eastern Aleutians	9	8	184.66	38,051	0	93,278
Eastern Aleutians	201-300	NE Eastern Aleutians	12	11	183.14	36,052	0	97,629
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	6	123.64	33,012	0	100,003
Southern Bering Sea	101-200	E Southern Bering	9	9	64.62	7,619	1,616	13,623
Eastern Aleutians	101-200	NW Eastern Aleutians	3	3	39.31	6,267	0	16,554
Central Aleutians	201-300	N Central Aleutians	10	10	38.17	1,676	673	2,679
Southern Bering Sea	201-300	Combined Southern Bering	4	4	27.11	1,528	0	5,034
Western Aleutians	201-300	W Western Aleutians	13	11	23.22	2,183	1,194	3,173
Eastern Aleutians	301-500	SE Eastern Aleutians	9	7	18.95	4,879	0	12,885
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	17.70	2,245	0	30,765
Eastern Aleutians	101-200	NE Eastern Aleutians	11	9	16.81	3,382	1,677	5,087
Southern Bering Sea	1-100	E Southern Bering	19	18	16.55	4,038	2,220	5,857
Central Aleutians	201-300	SE Central Aleutians	2	2	14.44	689	0	4,477
Western Aleutians	101-200	W Western Aleutians	29	26	14.28	5,803	2,036	9,571
Central Aleutians	301-500	N Central Aleutians	11	11	11.51	1,427	517	2,337
Central Aleutians	301-500	SE Central Aleutians	5	5	11.02	787	0	1,587
Central Aleutians	101-200	SE Central Aleutians	10	8	9.76	734	0	1,630
Western Aleutians	1-100	W Western Aleutians	8	5	8.40	3,102	0	9,794
Western Aleutians	101-200	E Western Aleutians	18	7	7.40	926	0	2,600
Central Aleutians	101-200	N Central Aleutians	8	6	6.10	650	0	1,459
Eastern Aleutians	101-200	SW Eastern Aleutians	7	7	6.07	1,373	731	2,014
Southern Bering Sea	101-200	W Southern Bering	2	2	5.89	395	0	5,238
Central Aleutians	101-200	SW Central Aleutians	13	12	5.61	590	319	862
Western Aleutians	301-500	W Western Aleutians	18	10	4.76	814	252	1,377
Western Aleutians	201-300	E Western Aleutians	10	8	4.10	321	0	662
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	3.55	55	0	737
Eastern Aleutians	101-200	SE Eastern Aleutians	10	3	3.33	633	0	2,017
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	2.74	523	0	2,572
Central Aleutians	1-100	SE Central Aleutians	7	6	2.67	311	0	878
Central Aleutians	301-500	SW Central Aleutians	3	2	2.56	202	0	670
Central Aleutians	1-100	N Central Aleutians	11	7	2.55	536	0	1,157
Central Aleutians	201-300	Petrel Bank	3	3	1.94	149	0	590
Eastern Aleutians	201-300	SW Eastern Aleutians	4	4	1.71	123	0	262
Central Aleutians	301-500	Petrel Bank	3	2	1.63	202	0	635
Central Aleutians	201-300	SW Central Aleutians	6	5	1.34	57	0	117
Eastern Aleutians	1-100	NW Eastern Aleutians	2	1	1.32	256	0	3,503
Southern Bering Sea	1-100	W Southern Bering Sea	2	1	1.09	173	0	2,371
Western Aleutians	301-500	E Western Aleutians	3	2	1.01	158	0	696
Central Aleutians	101-200	Petrel Bank	4	1	0.92	160	0	670
Central Aleutians	1-100	SW Central Aleutians	9	7	0.88	142	3	282
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	0.71	31	0	425
Western Aleutians	1-100	E Western Aleutians	14	5	0.30	36	0	78
Eastern Aleutians	1-100	SE Eastern Aleutians	6	1	0.25	43	0	152

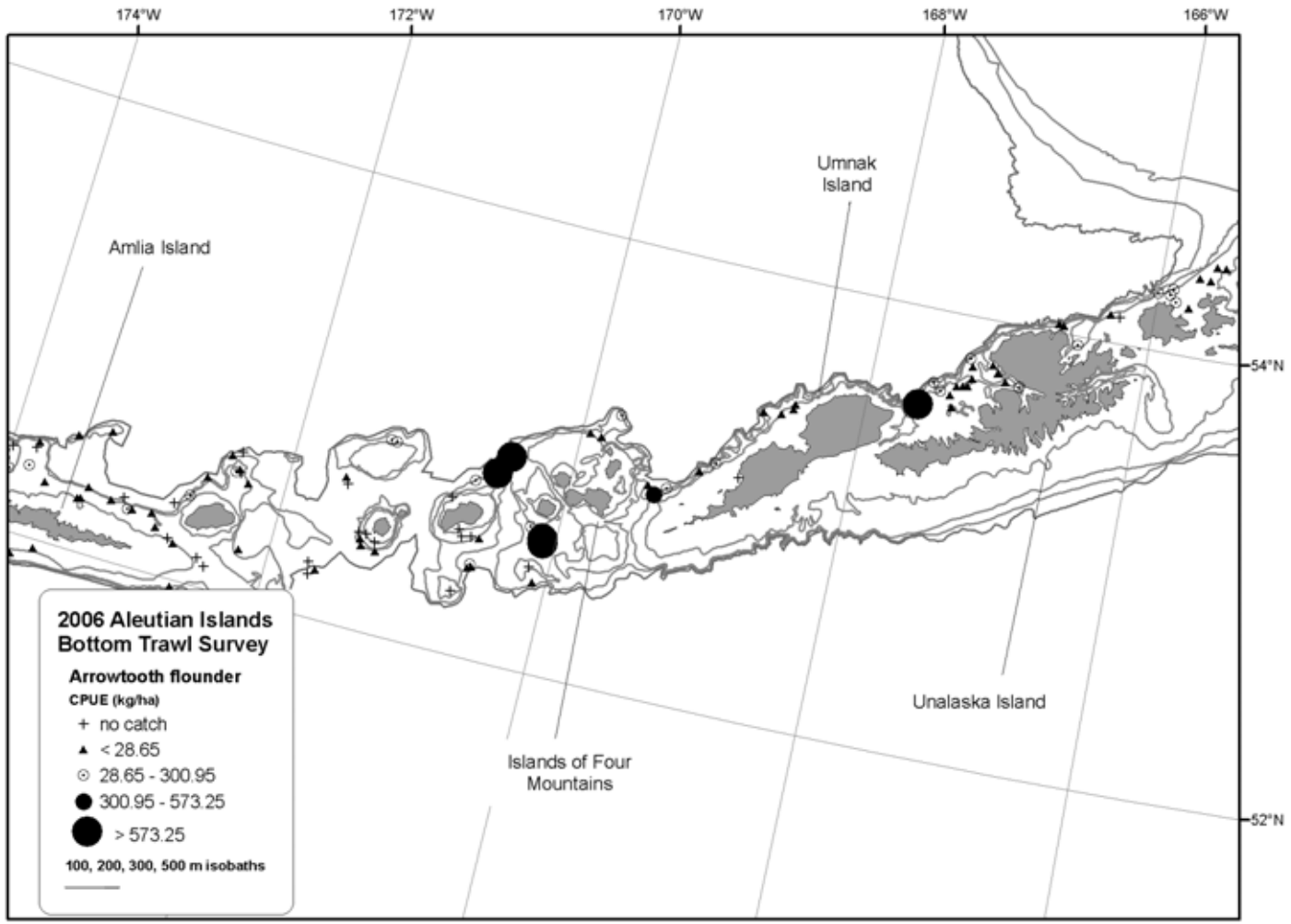


Figure 2. -- Distribution and relative abundance of arrowtooth flounder from the 2006 Aleutian Islands bottom trawl survey.

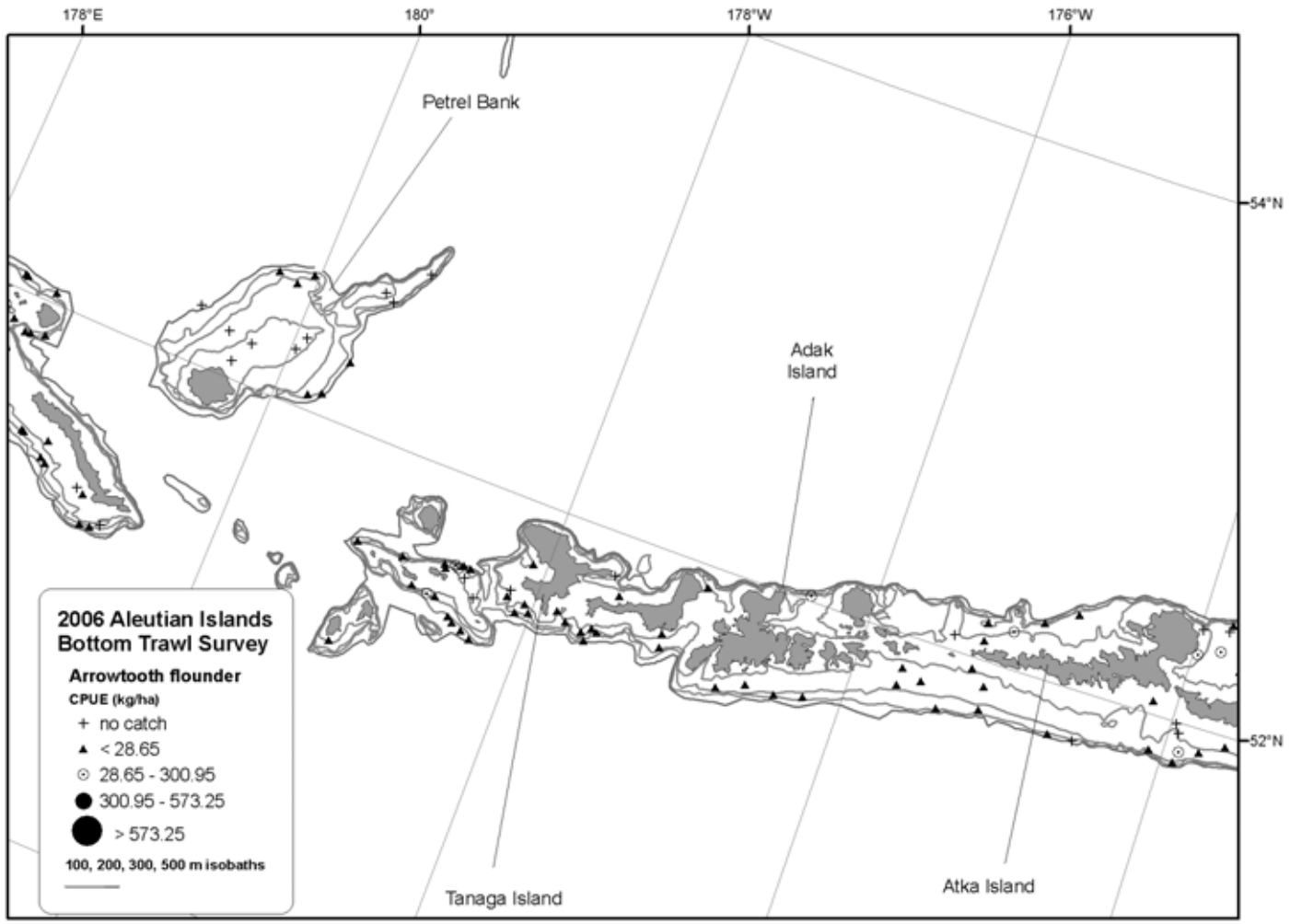


Figure 2. -- (continued).

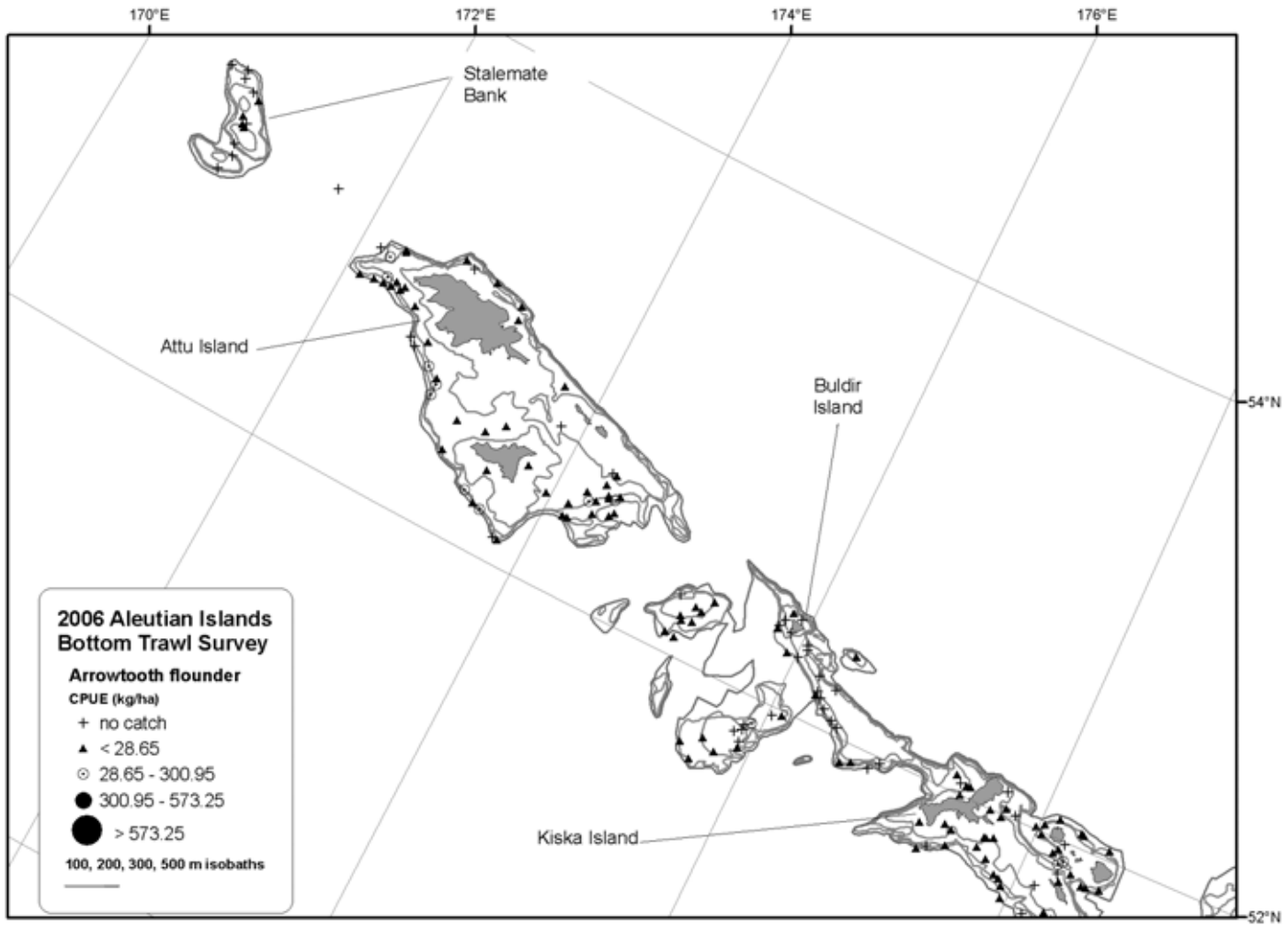


Figure 2. -- (continued).

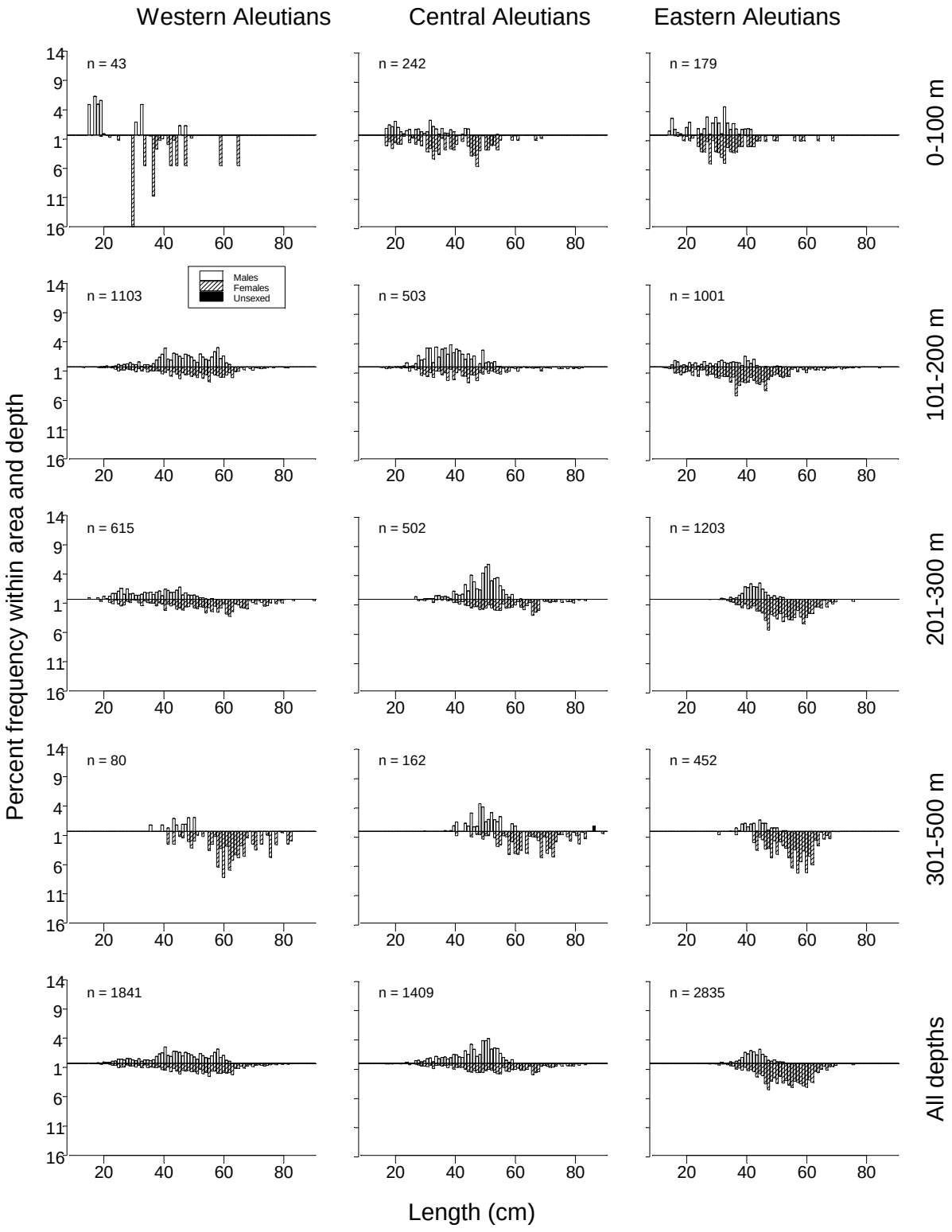


Figure 3. -- Size composition of arrowtooth flounder captured in the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

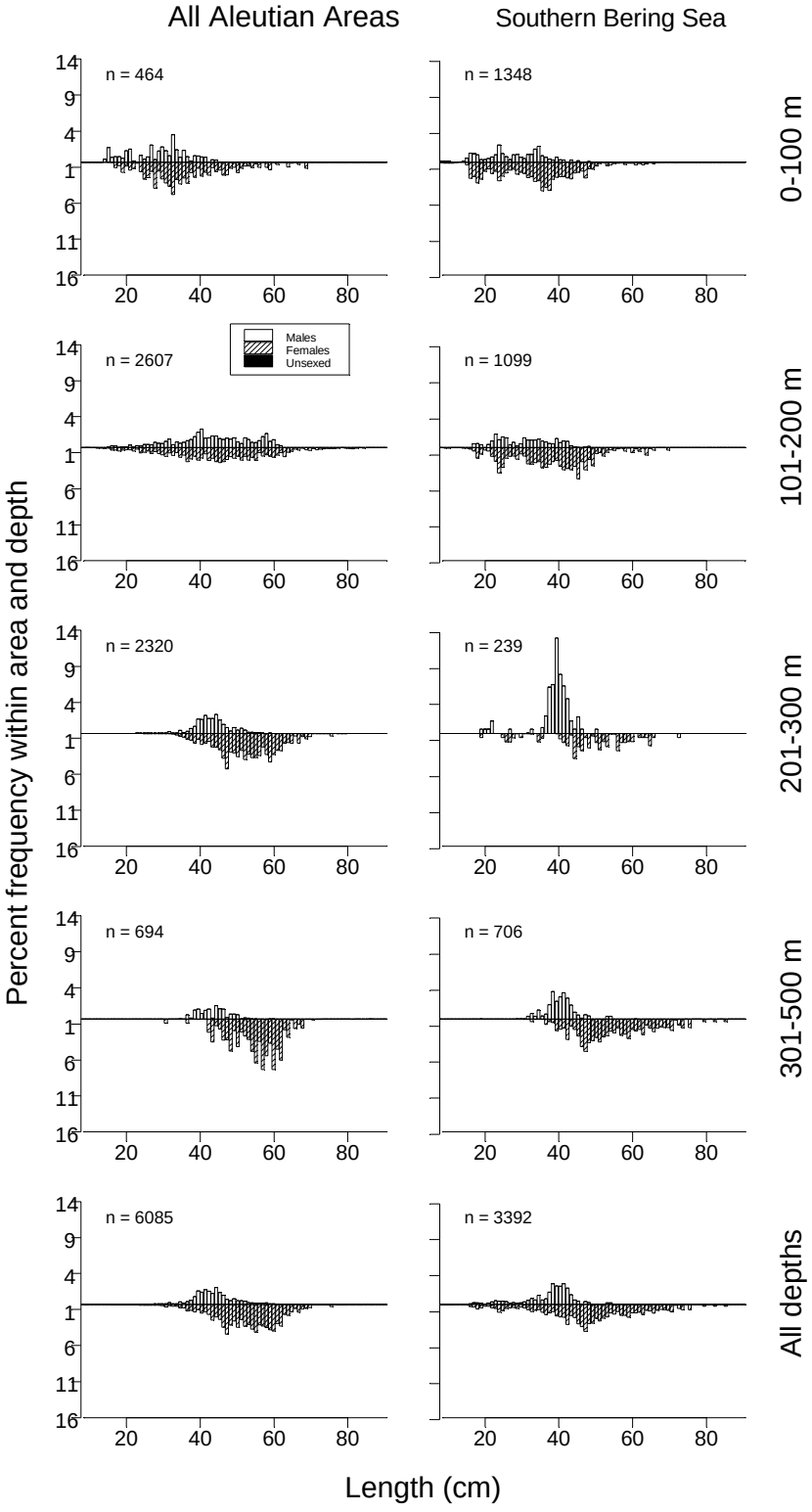


Figure 3. -- (continued).

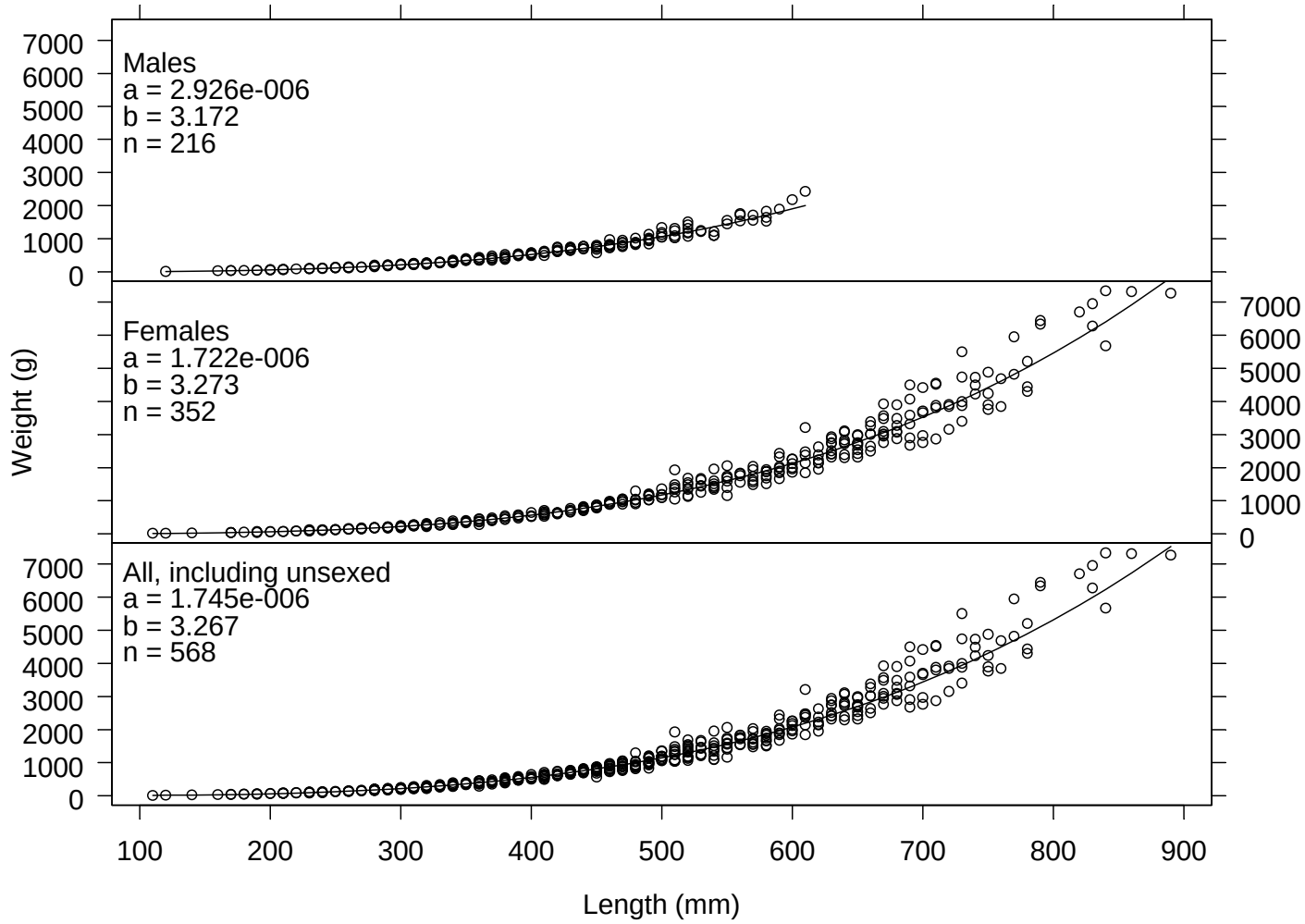


Figure 4. -- Length-weight relationship for arrowtooth flounder specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 5. -- Number of survey hauls, number of hauls with Kamchatka flounder, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	2	0.063	31	0	93	0.785	37.8
	101-200	47	28	1.295	689	317	1,060	0.374	32.5
	201-300	23	20	4.434	764	95	1,433	2.172	52.2
	301-500	21	18	11.688	3,825	740	6,910	3.210	61.7
	All depths	113	68	3.495	5,309	2,287	8,331	2.679	56.4
Central Aleutians	1-100	32	12	0.331	194	42	346	0.383	34.2
	101-200	35	24	0.998	460	186	733	0.479	33.9
	201-300	21	17	2.078	438	180	697	1.251	42.4
	301-500	22	19	28.063	11,171	2,696	19,646	2.509	60.2
	All depths	110	72	7.413	12,263	4,176	20,349	2.354	58.2
Eastern Aleutians	1-100	12	4	1.183	810	0	2,442	0.182	26.2
	101-200	31	20	1.744	1,355	623	2,086	0.221	27.2
	201-300	27	15	11.491	5,632	0	16,091	1.288	46.9
	301-500	21	16	14.710	8,360	2,216	14,503	1.941	54.9
	All depths	91	55	6.411	16,157	4,373	27,940	1.481	48.3
All Aleutian Areas	1-100	66	18	0.59	1,035	0	2,525	0.238	28.1
	101-200	113	72	1.41	2,503	1,662	3,344	0.310	29.9
	201-300	71	52	7.83	6,835	0	17,006	1.384	47.2
	301-500	64	53	18.05	23,356	12,890	33,821	2.421	58.6
	All depths	314	195	5.92	33,728	19,248	48,207	1.987	53.2
Southern Bering Sea	1-100	21	6	0.039	16	0	32	0.234	28.6
	101-200	11	8	0.265	49	9	89	0.213	27.1
	201-300	4	2	0.112	6	0	23	0.236	29.2
	301-500	8	7	110.914	11,570	0	31,089	1.857	54.7
	All depths	44	23	15.560	11,641	0	28,299	1.847	54.6

Table 6. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Kamchatka flounder by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Southern Bering Sea	301-500	Combined Southern Bering	8	7	110.91	11,570	0	31,092
Central Aleutians	301-500	N Central Aleutians	11	11	75.13	9,314	639	17,989
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	10	28.83	7,698	1,101	14,296
Eastern Aleutians	201-300	NE Eastern Aleutians	12	8	27.38	5,390	0	16,585
Western Aleutians	301-500	W Western Aleutians	18	15	12.22	2,090	0	4,706
Central Aleutians	301-500	Petrel Bank	3	3	11.49	1,422	0	6,360
Western Aleutians	301-500	E Western Aleutians	3	3	11.11	1,735	0	5,206
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	6.13	778	0	10,193
Central Aleutians	301-500	SE Central Aleutians	5	4	5.98	427	0	1,434
Western Aleutians	201-300	E Western Aleutians	10	7	5.47	429	0	1,130
Eastern Aleutians	101-200	NW Eastern Aleutians	3	3	4.77	761	0	2,084
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	3.78	59	0	631
Central Aleutians	201-300	N Central Aleutians	10	10	3.67	161	43	279
Western Aleutians	201-300	W Western Aleutians	13	13	3.57	336	143	528
Eastern Aleutians	301-500	SE Eastern Aleutians	9	5	2.55	655	0	1,413
Central Aleutians	201-300	Petrel Bank	3	2	2.31	177	0	605
Eastern Aleutians	101-200	NE Eastern Aleutians	11	9	2.05	412	29	794
Central Aleutians	101-200	N Central Aleutians	8	7	1.73	185	0	451
Western Aleutians	101-200	W Western Aleutians	29	24	1.63	661	285	1,037
Central Aleutians	101-200	SW Central Aleutians	13	10	1.49	157	44	270
Central Aleutians	201-300	SW Central Aleutians	6	3	1.41	60	0	158
Central Aleutians	101-200	SE Central Aleutians	10	6	1.06	80	0	165
Central Aleutians	201-300	SE Central Aleutians	2	2	0.85	41	0	498
Eastern Aleutians	201-300	SE Eastern Aleutians	9	3	0.81	167	0	471
Eastern Aleutians	101-200	SW Eastern Aleutians	7	7	0.78	176	23	330
Central Aleutians	1-100	SW Central Aleutians	9	4	0.63	102	0	230
Central Aleutians	1-100	N Central Aleutians	11	6	0.38	81	0	190
Southern Bering Sea	101-200	E Southern Bering Sea	9	7	0.35	41	4	78
Eastern Aleutians	201-300	SW Eastern Aleutians	4	2	0.23	17	0	58
Western Aleutians	101-200	E Western Aleutians	18	4	0.22	27	0	62
Central Aleutians	101-200	Petrel Bank	4	1	0.22	38	0	157
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	0.14	6	0	82
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	0.12	8	0	108
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	0.12	23	0	308
Southern Bering Sea	201-300	Combined Southern Bering	4	2	0.11	6	0	19
Central Aleutians	301-500	SW Central Aleutians	3	1	0.10	8	0	43
Central Aleutians	1-100	SE Central Aleutians	7	2	0.10	11	0	35
Western Aleutians	1-100	W Western Aleutians	8	1	0.08	30	0	101
Southern Bering Sea	1-100	E Southern Bering Sea	19	6	0.06	16	0	32
Eastern Aleutians	1-100	NW Eastern Aleutians	2	1	0.05	10	0	137
Eastern Aleutians	101-200	SE Eastern Aleutians	10	1	0.03	5	0	17
Western Aleutians	1-100	E Western Aleutians	14	1	0.01	1	0	3

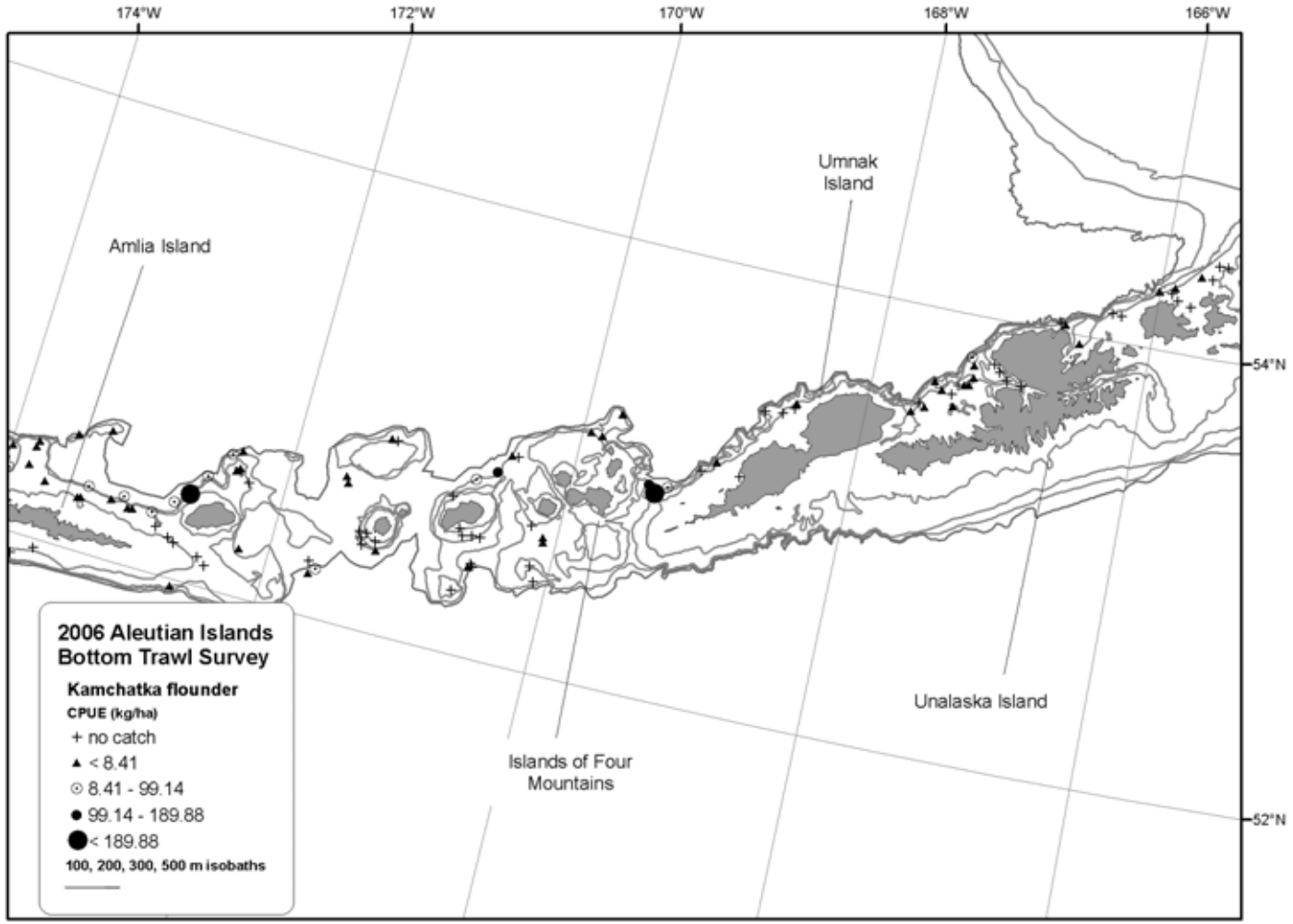


Figure 5. -- Distribution and relative abundance of Kamchatka flounder from the 2006 Aleutian Islands bottom trawl survey.

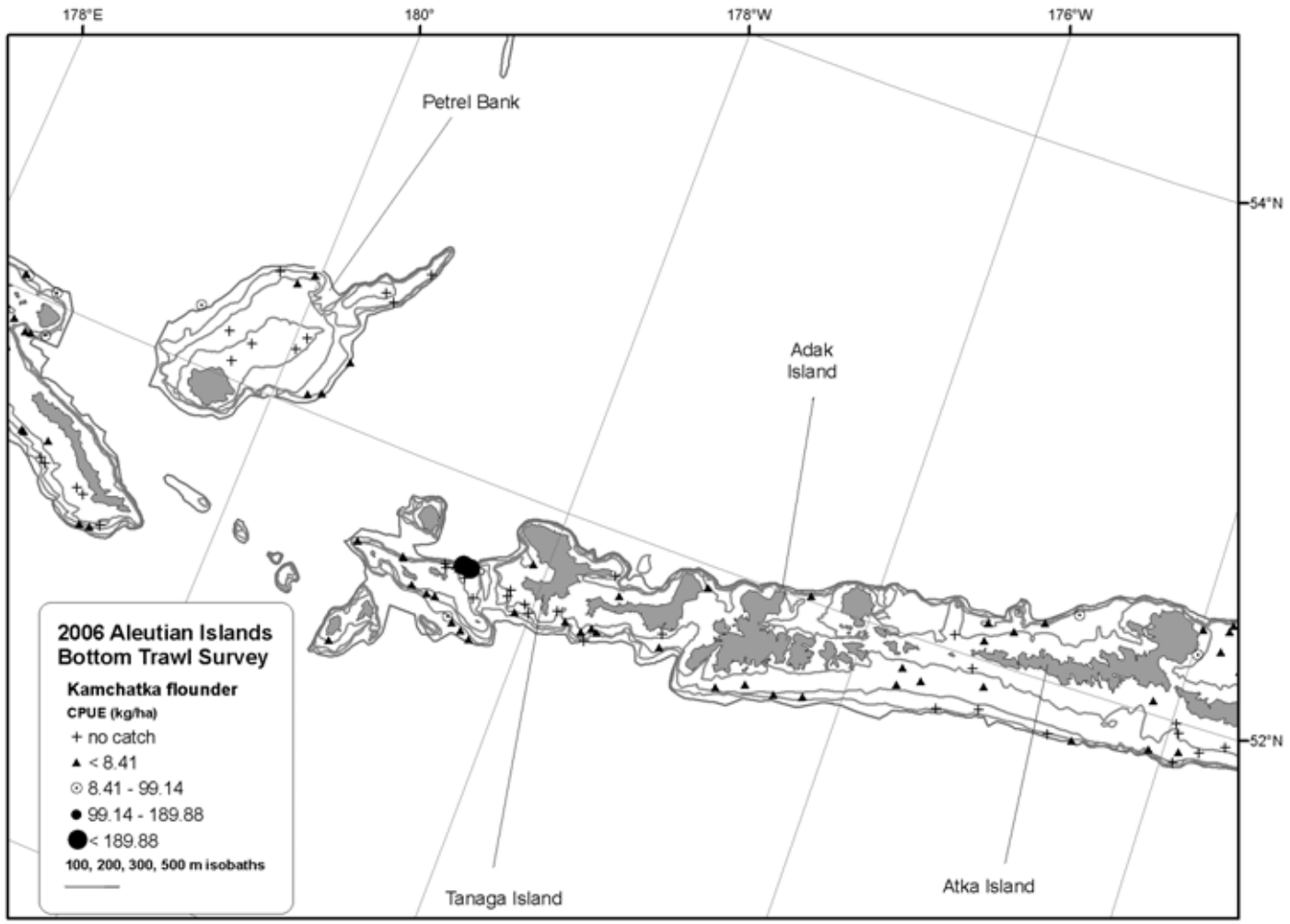


Figure 5. -- (Continued).

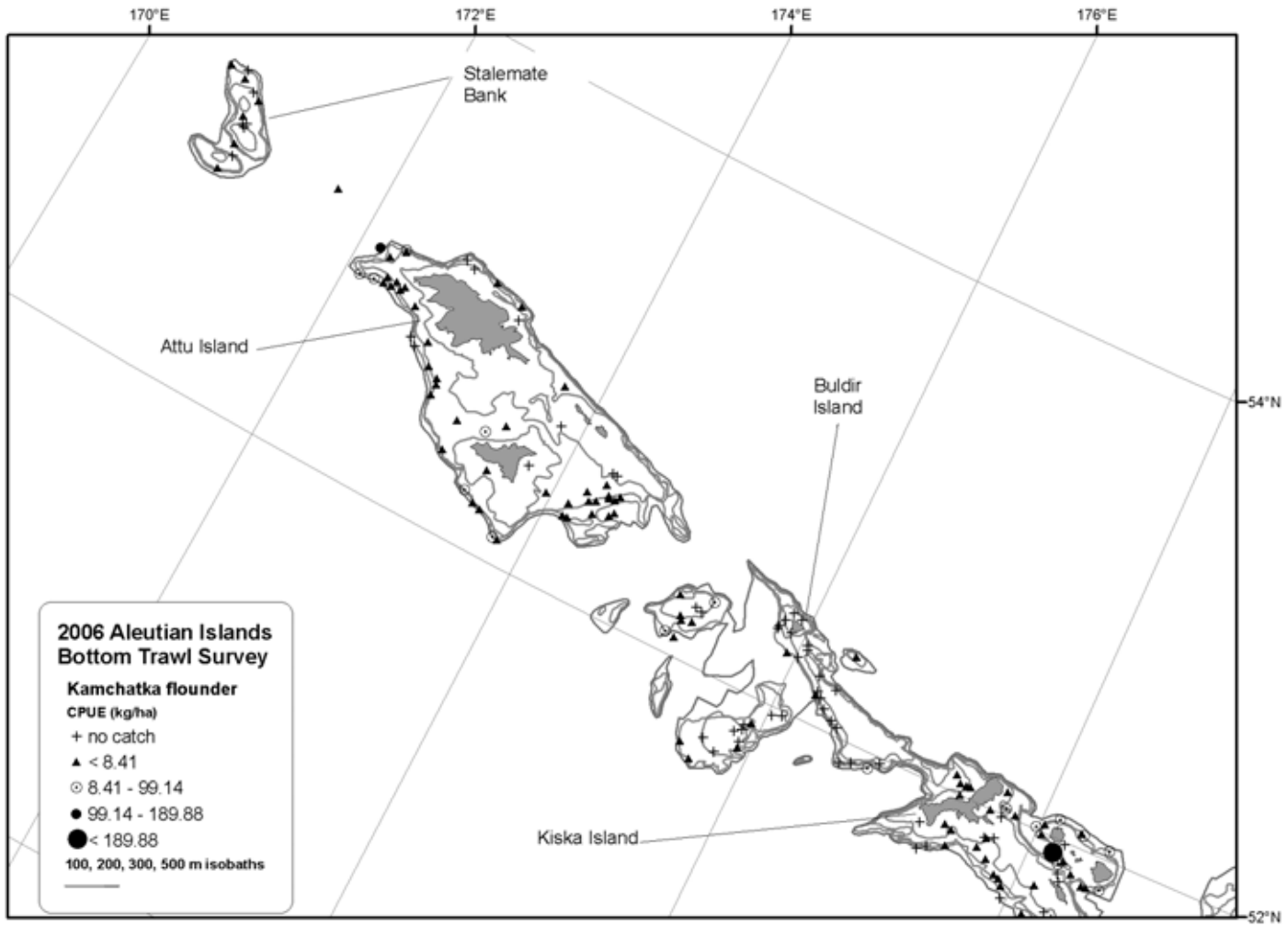


Figure 5. -- (Continued).

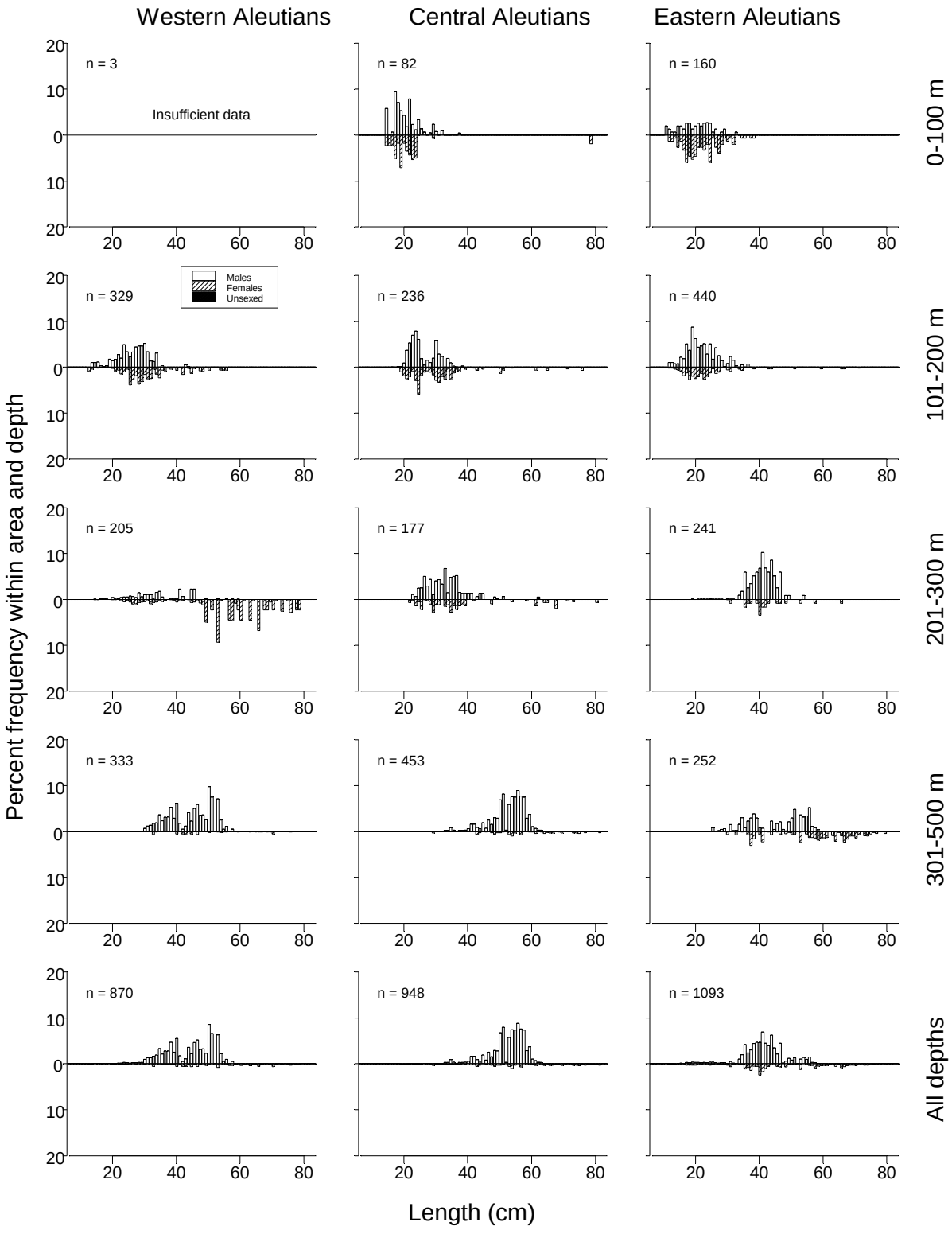


Figure 6. -- Size composition of Kamchatka flounder from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

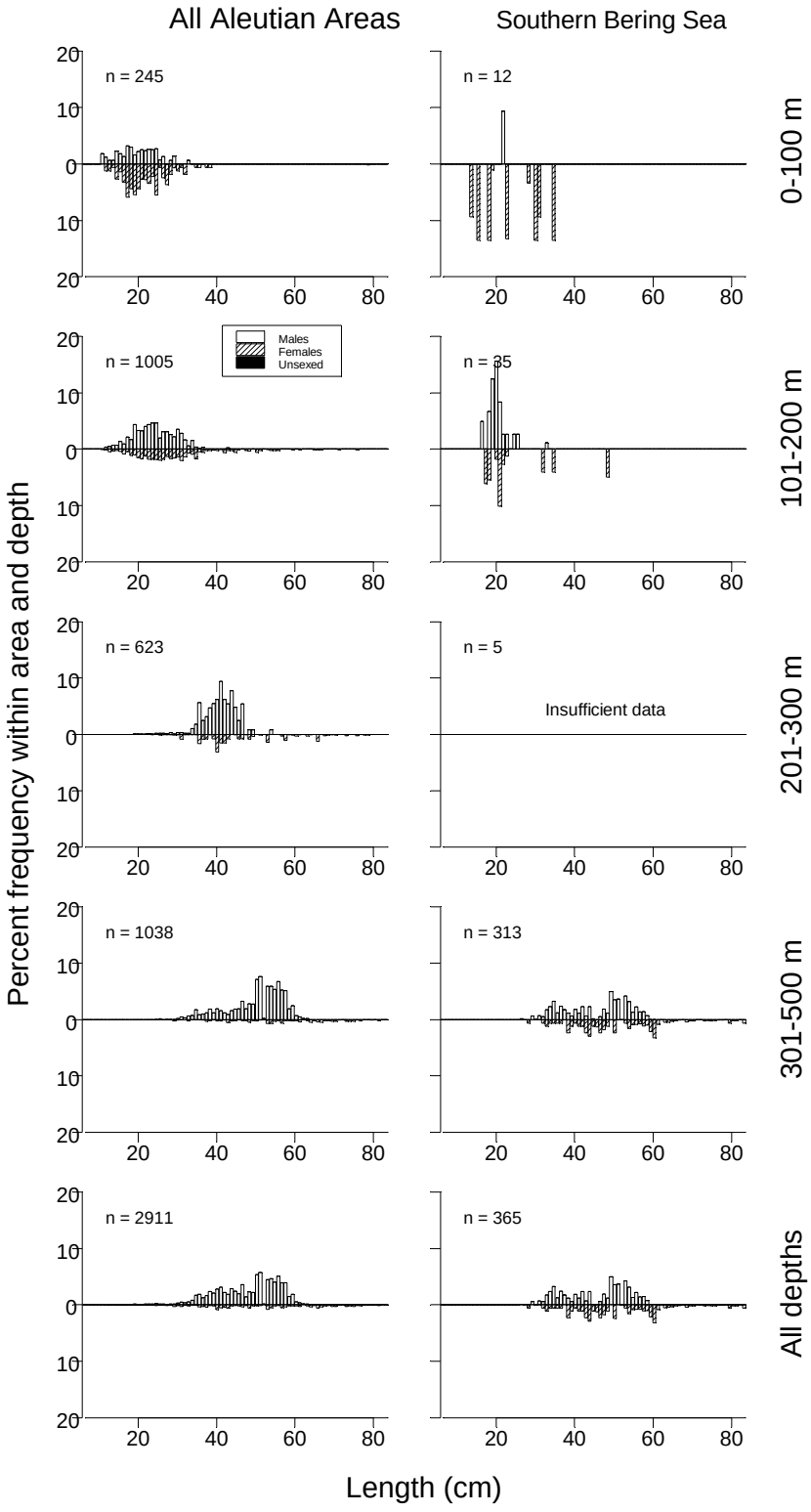


Figure 6. -- (continued).

Northern rock sole (*Lepidopsetta polyxystra*)

Since the 1997 Aleutian Islands bottom trawl survey, two species of rock sole (northern rock sole, *L. polyxystra,* and southern rock sole, *L. bilineata*) have been separated in trawl catches. In the Aleutian areas northern rock sole is the more abundant of the two (Table 2) and, in fact was the only species of rock sole found west of Atka Island in the Eastern Aleutians area (Fig. 7). The relative abundance of northern rock sole ranked eighth overall in the combined Aleutian areas, much less than that of Atka mackerel and POP (Table 2). The highest mean catch rate was in the Central Aleutians area. In the Southern Bering Sea area, northern rock sole mean CPUE is only slightly higher than that of southern rock sole. Northern rock sole mean CPUE and estimated biomass was highest in the 1-100 m depth interval in all survey areas (Table 7). Although occurrences were reported in waters deeper than 300 m in some locations, northern rock sole abundance was very low in the deepest depth interval. Most of the estimated biomass deeper than 200 m was composed of females (Fig. 8). More than 74% of the estimated northern rock sole biomass in the Aleutian areas occurred in the 1-100 m interval and 97% occurred within the shallower two depth intervals. In the Central Aleutians area within the 1-100 m interval, northern rock sole were caught in all trawl hauls (Table 7). The highest stratum-specific mean CPUE occurred in the 1-100 m depth interval, in the Petrel Bank subarea (Table 8, Fig. 7). However, only five tows were conducted in that subarea (Table 8). Ranked a close second, the 1-100 m N Central Aleutians subarea produced the highest estimated individual subarea biomass, based on 11 tows.

Sexual dimorphism was pronounced. For the combined Aleutian areas the largest female size composition mode was about 7 cm larger than that of the males (Fig. 8). Figure 9 presents the length-weight relationships for male, female, and combined sexes of northern rock sole.

Southern rock sole (*L. bilineata*)

Southern rock sole was most abundant in the Southern Bering Sea area (Table 2). Although captured in most shallow tows around Unalaska Island, this species rarely occurred west of Umnak Island and none were reported from catches west of Atka Island (Fig. 10). Thus, the survey defines what appears to be the western margin of the southern rock sole distribution in the Aleutian archipelago. In the Southern Bering Sea area 88% of the estimated biomass was found in the 1-100 m depth interval where all but two tows reported southern rock sole (Tables 9 and 10). Female southern rock sole represent 58% of the total biomass. All of the southern rock sole larger than 41 cm in the biomass-weighted size composition were females (Fig. 11). Figure 12 shows the length-weight relationships for male, female and combined sex southern rock sole.

Table 7. -- Number of survey hauls, number of hauls with northern rock sole, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	21	18.607	9,074	2,472	15,676	0.367	30.8
	101-200	47	35	6.426	3,417	1,986	4,848	0.366	30.8
	201-300	23	6	1.595	275	0	593	0.726	38.7
	301-500	21	1	0.006	2	0	6	0.550	35.0
	All depths	113	63	8.405	12,768	6,333	19,203	0.374	31.0
Central Aleutians	1-100	32	32	49.408	28,890	11,728	46,052	0.410	32.0
	101-200	35	33	15.916	7,331	4,524	10,137	0.450	33.3
	201-300	21	17	4.164	878	303	1,453	0.668	38.5
	301-500	22	4	0.150	60	0	170	0.603	37.2
	All depths	110	86	22.462	37,159	20,269	54,048	0.424	32.4
Eastern Aleutians	1-100	12	10	18.710	12,812	8,511	17,114	0.422	31.8
	101-200	31	24	7.554	5,868	3,043	8,694	0.531	34.5
	201-300	27	11	0.987	484	159	808	0.793	40.0
	301-500	21	1	0.469	267	0	823	0.786	40.1
	All depths	91	46	7.711	19,431	14,634	24,228	0.469	33.0
All Aleutian Areas	1-100	66	63	28.90	50,777	32,423	69,130	0.405	31.8
	101-200	113	92	9.39	16,616	12,495	20,737	0.461	33.2
	201-300	71	34	1.87	1,636	933	2,340	0.715	39.0
	301-500	64	6	0.25	328	0	872	0.751	39.5
	All depths	314	195	12.18	69,357	50,797	87,917	0.428	32.3
Southern Bering Sea	1-100	21	21	17.691	7,122	1,876	12,368	0.610	35.5
	101-200	11	6	6.535	1,208	0	2,460	0.601	36.3
	201-300	4	1	1.125	63	0	265	0.682	37.7
	301-500	8	0	0.000	0	--	--	--	--
	All depths	44	28	11.219	8,394	3,196	13,592	0.609	35.6

Table 8. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of northern rock sole by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	1-100	Petrel Bank	5	5	87.51	8,401	0	27,989
Central Aleutians	1-100	N Central Aleutians	11	11	55.09	11,601	1,968	21,233
Central Aleutians	1-100	SE Central Aleutians	7	7	39.71	4,622	2,030	7,214
Central Aleutians	101-200	SW Central Aleutians	13	13	36.62	3,853	1,656	6,050
Southern Bering Sea	1-100	W Southern Bering	2	2	34.78	5,514	0	37,267
Eastern Aleutians	1-100	NW Eastern Aleutians	2	2	33.87	6,546	0	13,966
Central Aleutians	1-100	SW Central Aleutians	9	9	26.37	4,267	1,946	6,587
Central Aleutians	101-200	SE Central Aleutians	10	10	23.67	1,779	0	3,662
Western Aleutians	1-100	W Western Aleutians	8	8	20.42	7,541	161	14,922
Eastern Aleutians	1-100	SE Eastern Aleutians	6	4	16.90	2,941	0	6,564
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	14.22	1,803	0	12,987
Central Aleutians	101-200	N Central Aleutians	8	8	13.93	1,484	528	2,441
Eastern Aleutians	101-200	NW Eastern Aleutians	3	3	12.96	2,066	0	6,397
Western Aleutians	1-100	E Western Aleutians	14	13	12.95	1,533	391	2,674
Central Aleutians	201-300	N Central Aleutians	10	10	9.91	435	50	820
Southern Bering Sea	101-200	W Southern Bering	2	2	9.62	644	0	5,854
Western Aleutians	101-200	W Western Aleutians	29	26	8.07	3,280	1,830	4,730
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	7.99	1,523	0	12,283
Central Aleutians	201-300	SE Central Aleutians	2	2	7.86	375	0	3,060
Eastern Aleutians	101-200	NE Eastern Aleutians	11	8	7.69	1,548	406	2,691
Southern Bering Sea	1-100	E Southern Bering	19	19	6.59	1,608	1,016	2,200
Eastern Aleutians	101-200	SW Eastern Aleutians	7	6	5.59	1,265	0	3,011
Eastern Aleutians	101-200	SE Eastern Aleutians	10	7	5.20	989	174	1,803
Southern Bering Sea	101-200	E Southern Bering	9	4	4.79	564	0	1,450
Eastern Aleutians	201-300	SW Eastern Aleutians	4	3	2.57	184	0	564
Western Aleutians	201-300	W Western Aleutians	13	4	2.18	205	0	505
Central Aleutians	201-300	SW Central Aleutians	6	5	1.59	68	0	190
Eastern Aleutians	201-300	NE Eastern Aleutians	12	6	1.33	263	45	480
Central Aleutians	101-200	Petrel Bank	4	2	1.23	214	0	794
Southern Bering Sea	201-300	Combined Southern Bering	4	1	1.13	63	0	265
Western Aleutians	101-200	E Western Aleutians	18	9	1.09	137	0	275
Eastern Aleutians	301-500	SE Eastern Aleutians	9	1	1.04	267	0	882
Western Aleutians	201-300	E Western Aleutians	10	2	0.89	70	0	225
Central Aleutians	301-500	SW Central Aleutians	3	1	0.67	53	0	280
Eastern Aleutians	201-300	NW Eastern Aleutians	2	1	0.59	9	0	125
Eastern Aleutians	201-300	SE Eastern Aleutians	9	1	0.14	28	0	93
Central Aleutians	301-500	N Central Aleutians	11	3	0.05	7	0	15
Western Aleutians	301-500	W Western Aleutians	18	1	0.01	2	0	6

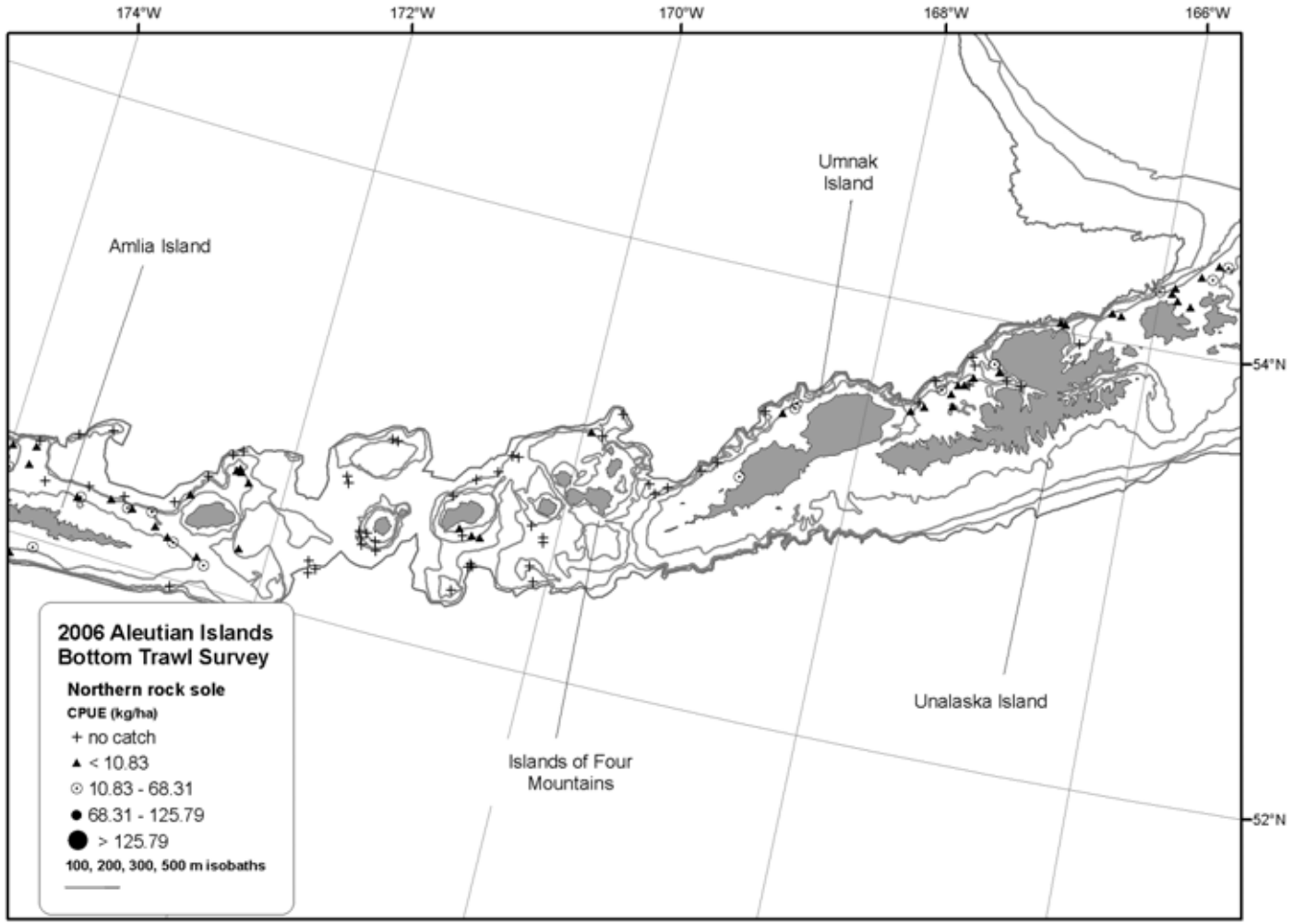


Figure 7. -- Distribution and relative abundance of northern rock sole from the 2006 Aleutian Islands bottom trawl survey.

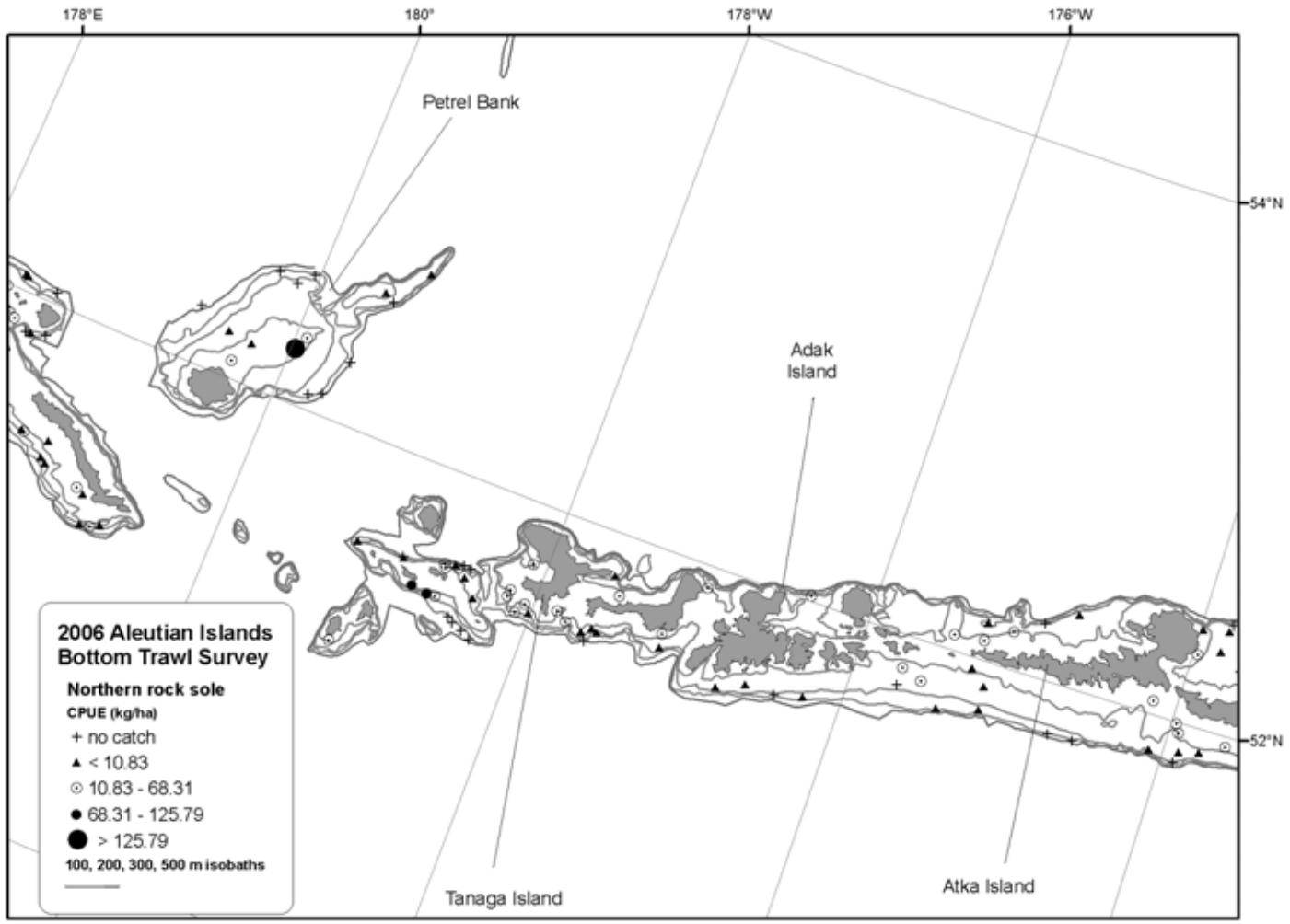


Figure 7. -- (continued).

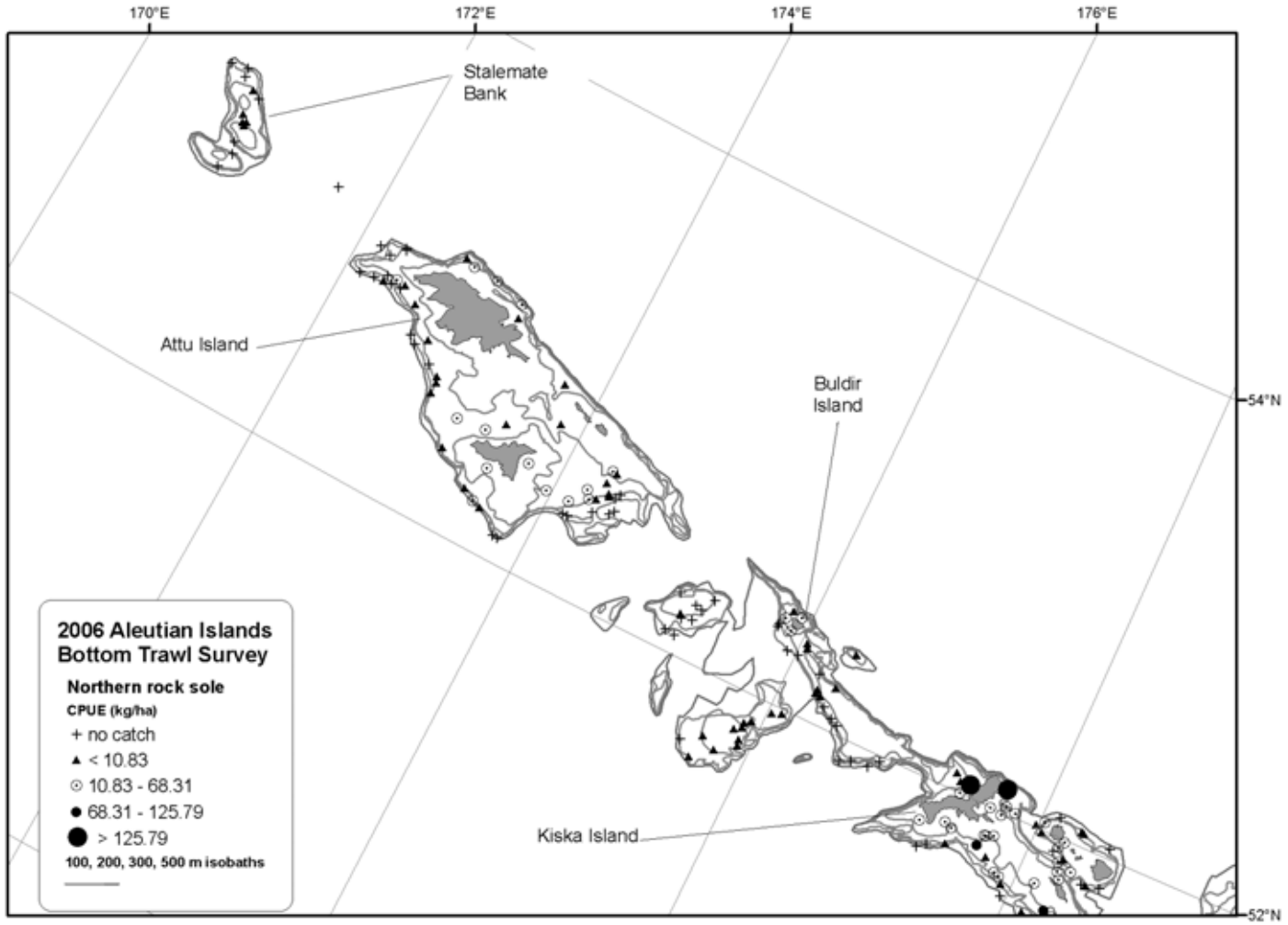


Figure 7. -- (continued).

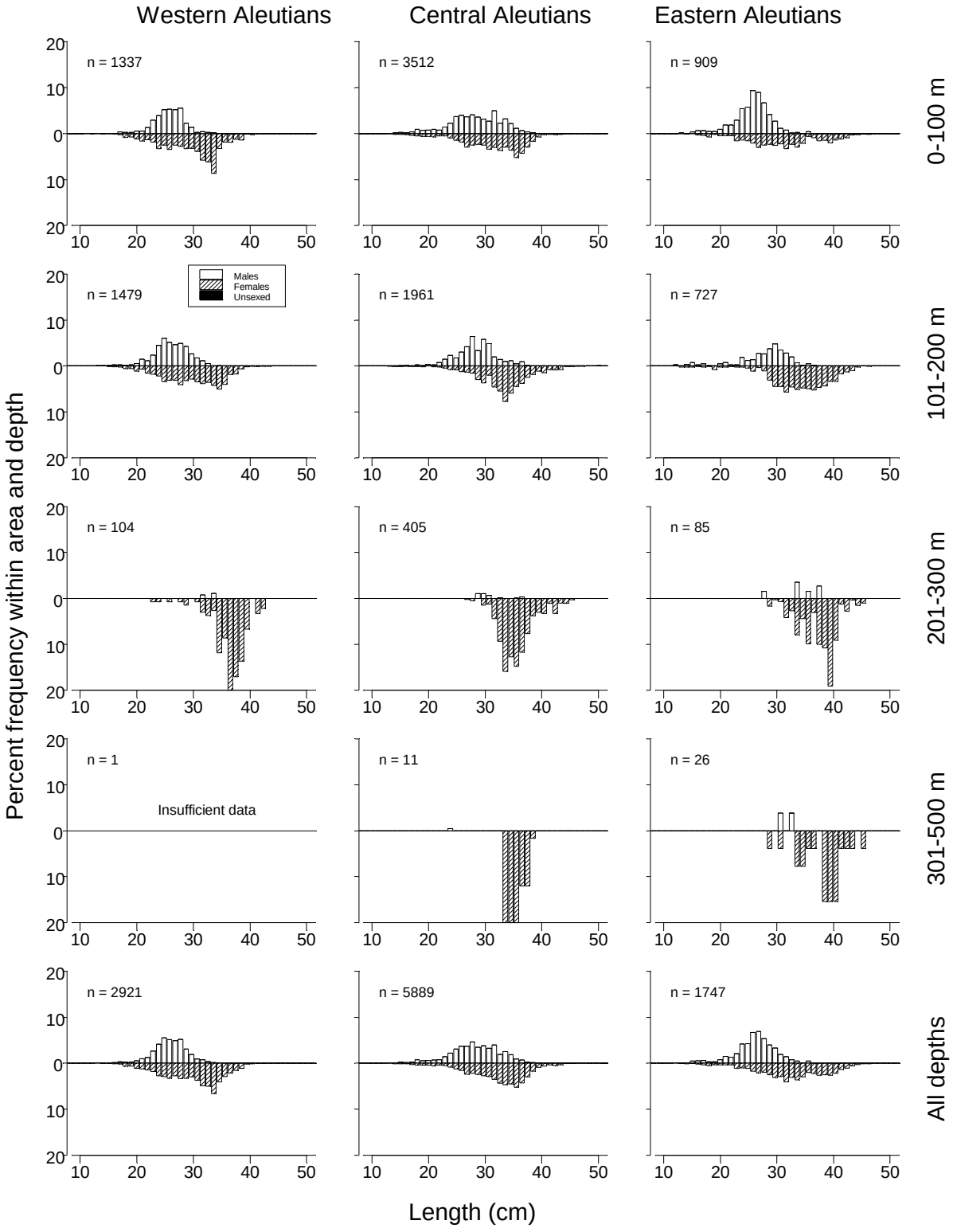


Figure 8. -- Size composition of northern rock sole from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

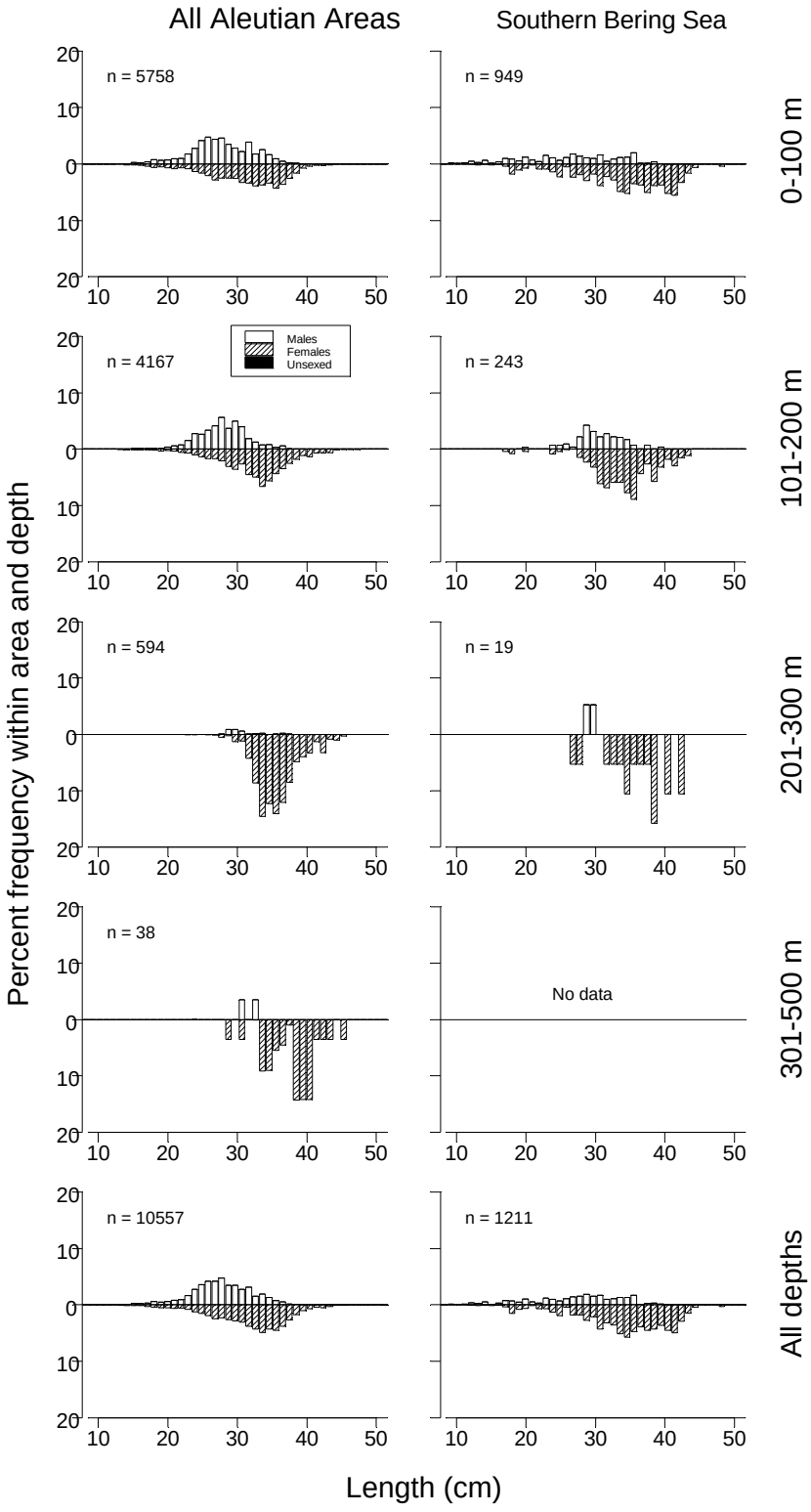


Figure 8. -- (continued).

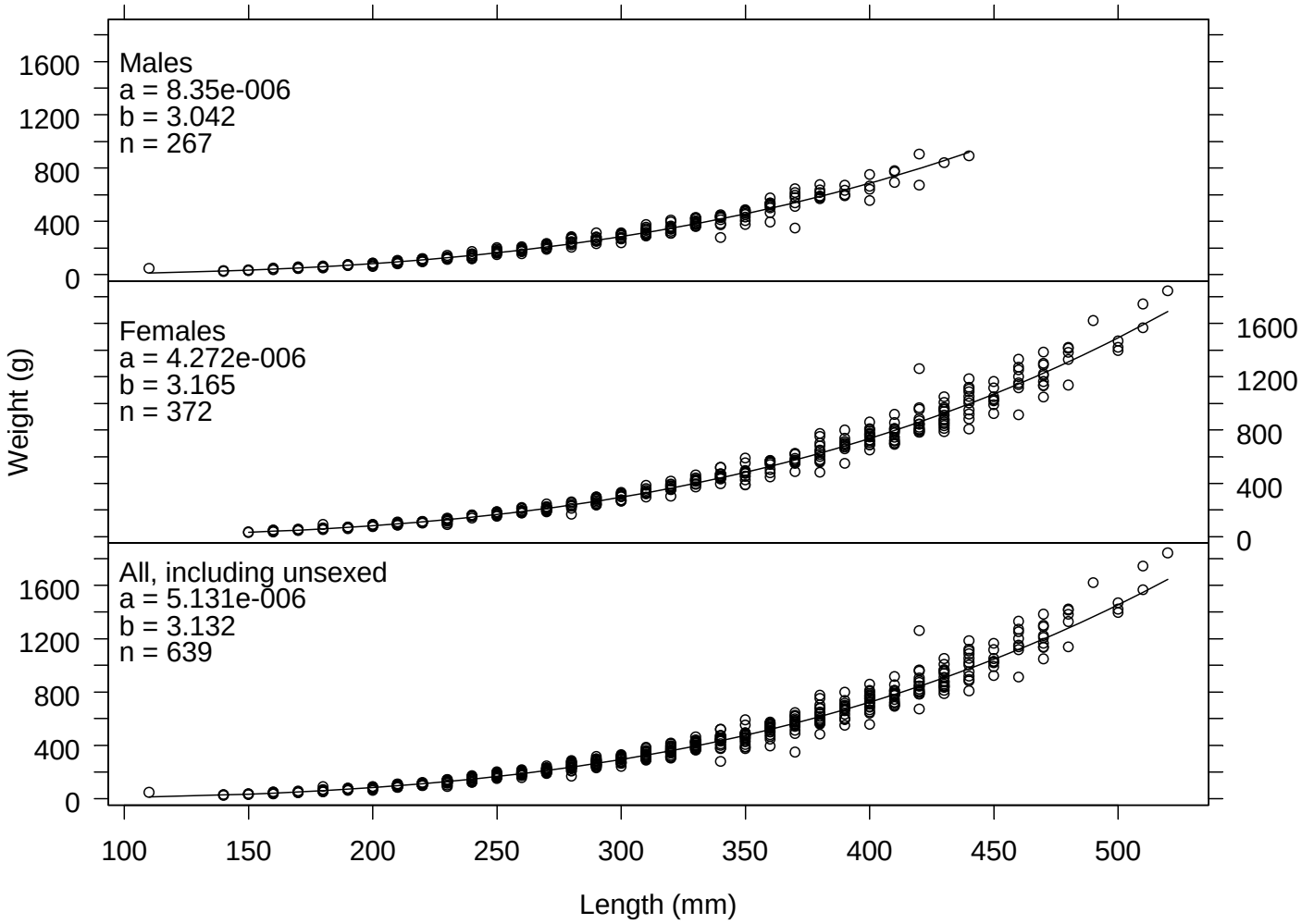


Figure 9. -- Length-weight relationship for northern rock sole specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 9. -- Number of survey hauls, number of hauls with southern rock sole, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	2	0.018	9	0	24	0.622	37.6
	101-200	47	0	0.000	0	--	--	--	--
	201-300	23	0	0.000	0	--	--	--	--
	301-500	21	0	0.000	0	--	--	--	--
	All depths	113	2	0.006	9	0	24	0.622	37.6
Central Aleutians	1-100	32	3	0.038	23	0	49	0.989	43.6
	101-200	35	0	0.000	0	--	--	--	--
	201-300	21	0	0.000	0	--	--	--	--
	301-500	22	0	0.000	0	--	--	--	--
	All depths	110	3	0.014	23	0	49	0.989	43.6
Eastern Aleutians	1-100	12	7	1.600	1,096	571	1,620	0.806	38.2
	101-200	31	4	0.044	35	0	75	0.828	39.3
	201-300	27	0	0.000	0	--	--	--	--
	301-500	21	0	0.000	0	--	--	--	--
	All depths	91	11	0.448	1,130	655	1,605	0.806	38.3
All Aleutian Areas	1-100	66	12	0.64	1,127	650	1,604	0.808	38.4
	101-200	113	4	0.02	35	0	74	0.828	39.3
	201-300	71	0	0.00	0	--	--	--	--
	301-500	64	0	0.00	0	--	--	--	--
	All depths	314	16	0.20	1,162	690	1,633	0.809	38.4
Southern Bering Sea	1-100	21	19	12.709	5,116	2,248	7,985	0.603	35.4
	101-200	11	9	4.050	749	39	1,458	0.752	39.0
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	0	0.000	0	--	--	--	--
	All depths	44	28	7.839	5,865	3,019	8,712	0.622	35.8

Table 10. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of southern rock sole by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Southern Bering Sea	1-100	E Southern Bering	19	17	17.84	4,354	1,879	6,828
Southern Bering Sea	101-200	W Southern Bering	2	2	5.26	352	0	3,180
Southern Bering Sea	1-100	W Southern Bering	2	2	4.81	763	0	9,780
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	3.54	449	0	1,395
Southern Bering Sea	101-200	E Southern Bering	9	7	3.36	396	0	922
Eastern Aleutians	1-100	SE Eastern Aleutians	6	3	2.42	421	0	923
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	1.19	226	0	1,672
Eastern Aleutians	101-200	SE Eastern Aleutians	10	2	0.12	23	0	60
Central Aleutians	1-100	SE Central Aleutians	7	1	0.08	9	0	32
Western Aleutians	1-100	E Western Aleutians	14	2	0.07	9	0	25
Eastern Aleutians	101-200	NE Eastern Aleutians	11	1	0.05	11	0	35
Central Aleutians	1-100	SW Central Aleutians	9	1	0.04	7	0	22
Central Aleutians	1-100	N Central Aleutians	11	1	0.03	7	0	21
Eastern Aleutians	101-200	SW Eastern Aleutians	7	1	0.00	1	0	3

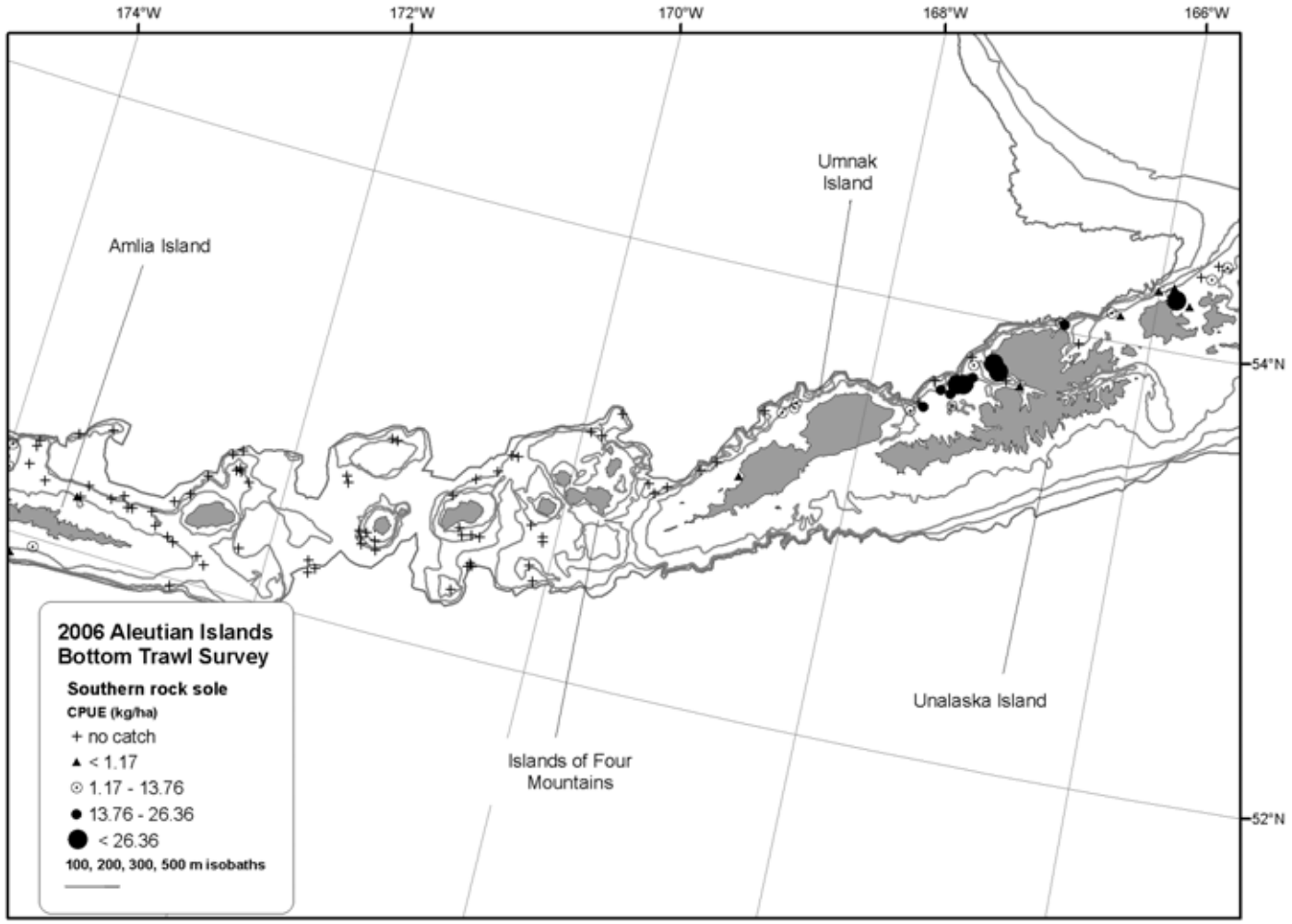


Figure 10. -- Distribution and relative abundance of southern rock sole from the 2006 Aleutian Islands bottom trawl survey.

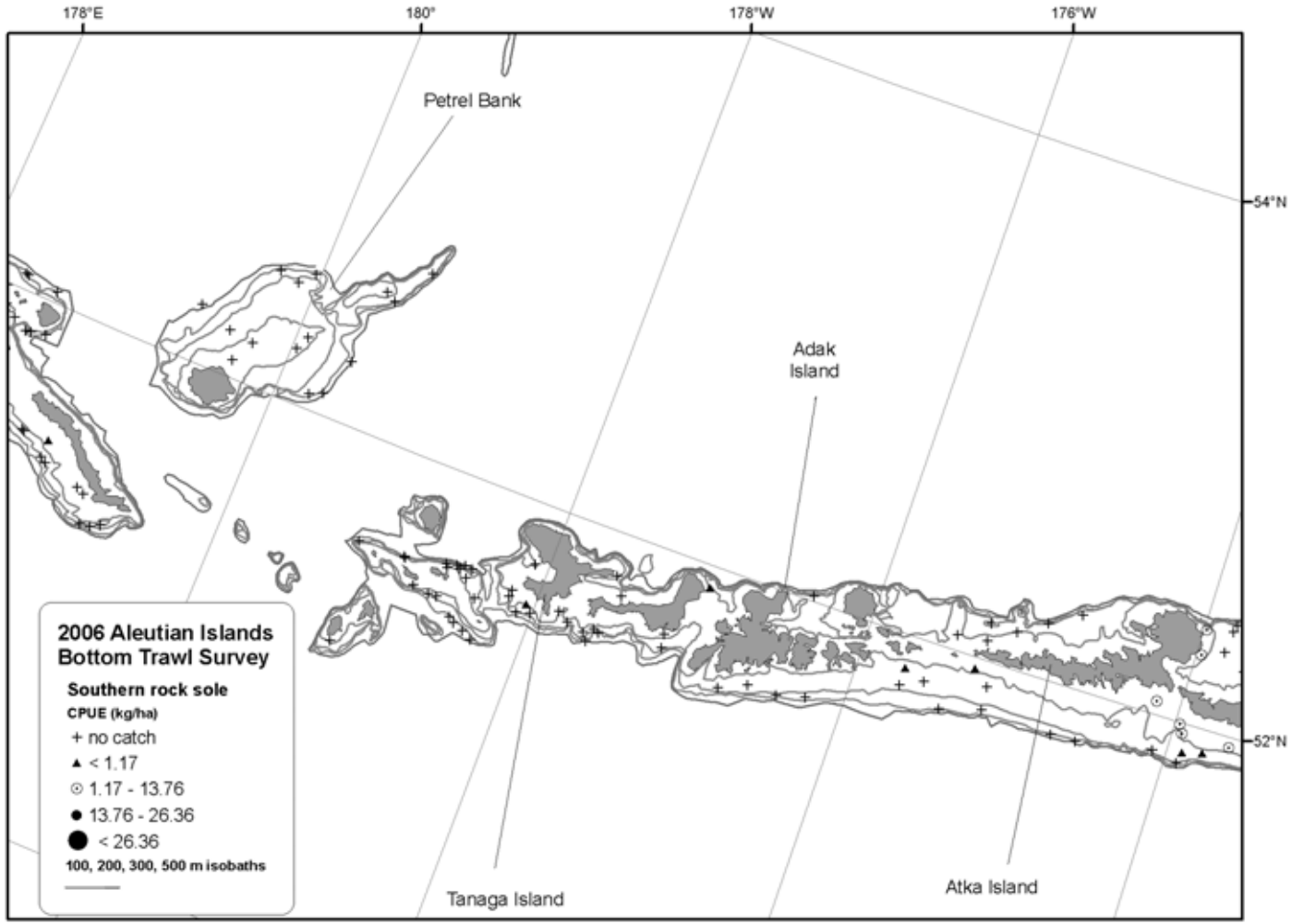


Figure 10. -- (continued).

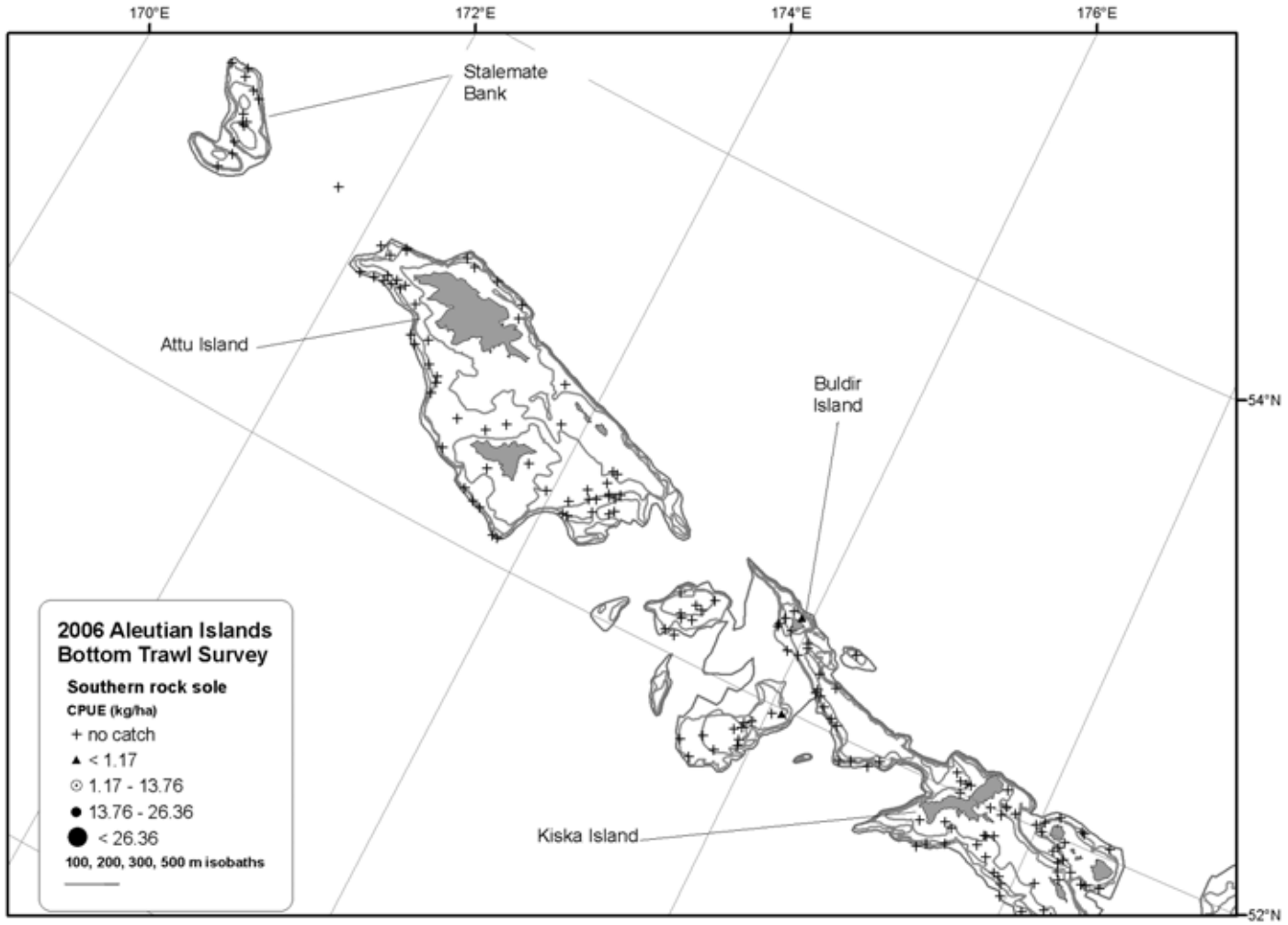


Figure 10. -- (continued).

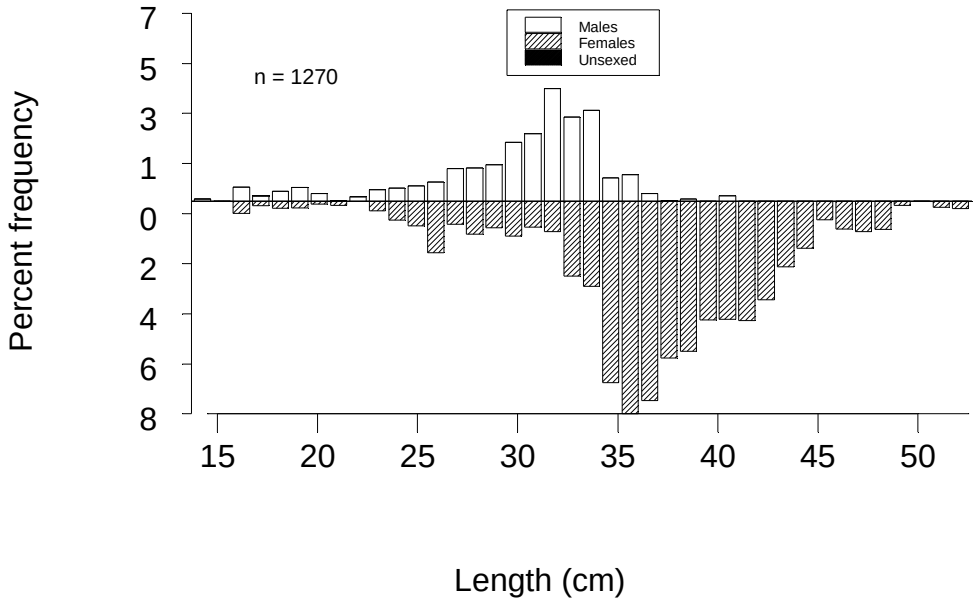


Figure 11. -- Size composition of southern rock sole from the 2006 Aleutian Islands bottom trawl survey.

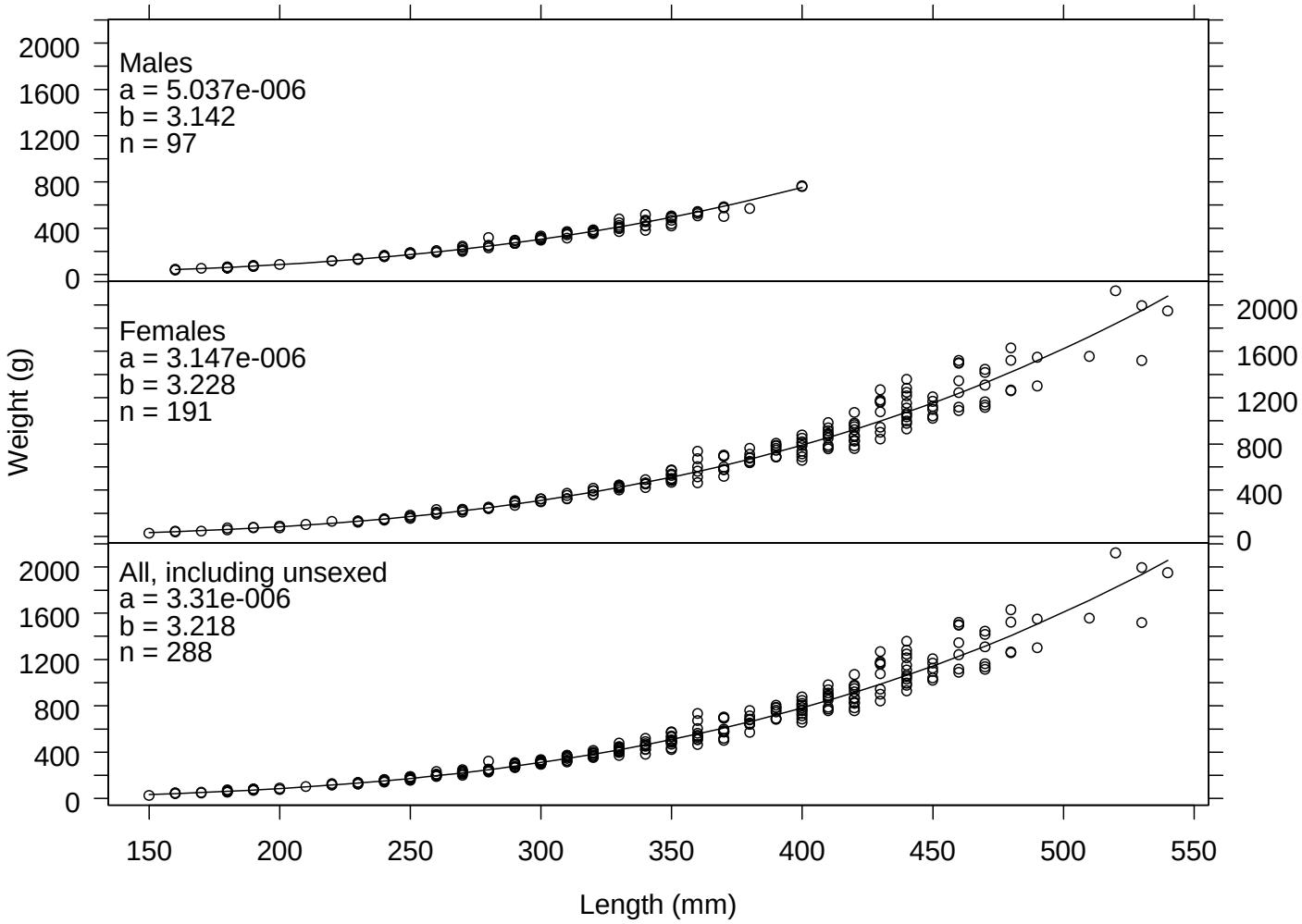


Figure 12. -- Length-weight relationship for southern rock sole specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Pacific halibut (*Hippoglossus stenolepis*)

Pacific halibut was distributed throughout the survey area with the exception of Stalemate Bank on the extreme western end (Fig. 13). This species was not particularly abundant in the Western and Central NPFMC Aleutian regulatory areas, although its mean CPUE was relatively high (7-11 kg/ha) in the Eastern Aleutian and Southern Bering Sea areas (Table 2). Although halibut were distributed at all depths in the Eastern Aleutians area and Southern Bering Sea, they were only found in relatively high abundance at the shallow depths in the other two NPFMC areas (Table 11). Estimated biomass totaled slightly above 37,600 t, with almost half found in the Eastern Aleutians area and 80% of the estimated total Aleutian biomass in the 1-100 m and 101-200 m depth intervals. Whereas abundance generally decreased with increasing depth, mean individual weight and length increased (Table 11 and Fig. 14). The two highest individual subarea mean CPUEs were from the 1-100 m and 101- 200 m depth intervals in the SE Eastern Aleutians and E Southern Bering Sea subareas (Table 12). Individual length and weight data were not collected during this survey.

Greenland turbot (*Reinhardtius hippoglossoides*)

This commercially important species is probably under-sampled by this trawl survey since the maximum depth sampled is only 500 m, resulting in an underestimate of total biomass for the species. Aleutian area relative abundance and estimated biomass were invariably highest in the 301-500 m depth interval (Table 13). In 1980 the U.S.- Japan cooperative trawl survey sampled to 900 m with a much larger, stronger trawl with a very heavy footrope. In that year, more than 80% of the total estimated Aleutian biomass was found in the 501-900 m depth interval (Ronholt et al. 1986). During the 2006 survey, the most notable incidence of Greenland turbot was found in 301-500 m in the Eastern Aleutians area (Table 14) around Seguam Island (Fig. 15). Catches of female Greenland turbot were relatively small compared to males (Fig. 16). Although females were not well represented in the catches, they were generally larger than the males. It is possible that females primarily inhabit greater depths. The results of the 1980 U.S.- Japan cooperative trawl survey showed that virtually all Greenland turbot larger than 75 cm fork length were females. Greenland turbot larger than 75 cm were found most frequently in the 501-900 m depth interval, outside the scope of the present survey. Figure 17 presents length-weight relationships for male and female Greenland turbot and for the combined sexes.

Table 11. -- Number of survey hauls, number of hauls with Pacific halibut, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	12	6.057	2,954	200	5,708	5.810	71.8
	101-200	47	11	3.700	1,968	557	3,378	13.348	97.4
	201-300	23	4	1.062	183	0	407	13.488	100.9
	301-500	21	1	0.155	51	0	157	14.143	104.0
	All depths	113	28	3.394	5,155	2,177	8,133	9.042	82.9
Central Aleutians	1-100	32	25	7.547	4,413	2,359	6,467	15.336	82.0
	101-200	35	18	2.682	1,235	570	1,900	4.883	69.7
	201-300	21	3	0.431	91	0	240	6.637	82.1
	301-500	22	2	0.956	381	0	1,102	33.850	124.4
	All depths	110	48	3.699	6,120	3,910	8,330	14.249	82.2
Eastern Aleutians	1-100	12	12	8.320	5,698	1,905	9,490	3.757	62.8
	101-200	31	25	9.546	7,415	4,425	10,406	4.405	68.6
	201-300	27	18	6.439	3,156	1,230	5,083	5.098	72.0
	301-500	21	6	3.482	1,979	0	4,570	12.249	96.1
	All depths	91	61	7.241	18,248	12,794	23,701	5.173	70.4
All Aleutian Areas	1-100	66	49	7.43	13,064	8,282	17,847	8.132	71.3
	101-200	113	54	6.00	10,618	7,337	13,899	6.118	74.1
	201-300	71	25	3.93	3,430	1,543	5,317	5.587	73.8
	301-500	64	9	1.86	2,410	0	4,991	15.702	100.7
	All depths	314	137	5.19	29,523	22,986	36,060	7.730	75.0
Southern Bering Sea	1-100	21	21	11.249	4,529	2,808	6,249	1.810	50.8
	101-200	11	10	11.248	2,079	0	4,163	5.199	64.3
	201-300	4	3	5.833	329	0	1,122	6.424	79.2
	301-500	8	4	11.368	1,186	0	2,877	11.167	90.0
	All depths	44	38	10.857	8,123	5,204	11,042	4.231	61.1

Table 12. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Pacific halibut by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Eastern Aleutians	101-200	SE Eastern Aleutians	10	10	19.78	3,758	1,136	6,379
Southern Bering Sea	1-100	E Southern Bering	19	19	16.87	4,117	2,499	5,735
Southern Bering Sea	101-200	W Southern Bering	2	2	16.35	1,095	0	12,236
Eastern Aleutians	1-100	NW Eastern Aleutians	2	2	13.87	2,680	0	23,759
Central Aleutians	1-100	Petrel Bank	5	2	12.09	1,160	0	3,332
Southern Bering Sea	301-500	Combined Southern Bering	8	4	11.37	1,186	0	2,821
Eastern Aleutians	1-100	SE Eastern Aleutians	6	6	9.57	1,666	825	2,508
Eastern Aleutians	201-300	NE Eastern Aleutians	12	7	8.59	1,690	10	3,371
Southern Bering Sea	101-200	E Southern Bering	9	8	8.35	984	236	1,733
Central Aleutians	1-100	SE Central Aleutians	7	6	7.94	924	0	1,924
Eastern Aleutians	101-200	NW Eastern Aleutians	3	3	7.64	1,217	0	3,433
Central Aleutians	1-100	N Central Aleutians	11	9	7.43	1,563	714	2,413
Western Aleutians	1-100	W Western Aleutians	8	7	7.27	2,687	0	5,805
Eastern Aleutians	101-200	NE Eastern Aleutians	11	8	6.51	1,310	316	2,303
Central Aleutians	101-200	SE Central Aleutians	10	9	6.47	487	73	900
Eastern Aleutians	201-300	SE Eastern Aleutians	9	8	6.40	1,318	80	2,556
Southern Bering Sea	201-300	Combined Southern Bering	4	3	5.83	329	0	1,122
Eastern Aleutians	301-500	SE Eastern Aleutians	9	3	5.50	1,417	0	4,139
Eastern Aleutians	101-200	SW Eastern Aleutians	7	4	5.00	1,131	0	2,551
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	4.94	77	0	687
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	4.90	621	0	3,934
Central Aleutians	101-200	N Central Aleutians	8	5	4.80	512	0	1,054
Central Aleutians	1-100	SW Central Aleutians	9	8	4.73	765	84	1,446
Western Aleutians	101-200	W Western Aleutians	29	8	4.51	1,832	407	3,257
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	3.83	731	0	3,335
Central Aleutians	301-500	N Central Aleutians	11	1	2.78	345	0	1,113
Southern Bering Sea	1-100	W Southern Bering Sea	2	2	2.60	412	0	4,168
Western Aleutians	1-100	E Western Aleutians	14	5	2.26	267	0	535
Central Aleutians	101-200	SW Central Aleutians	13	4	2.25	237	0	553
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	3	2.10	562	0	1,439
Central Aleutians	201-300	SE Central Aleutians	2	1	1.46	70	0	956
Western Aleutians	201-300	E Western Aleutians	10	1	1.24	97	0	317
Western Aleutians	101-200	E Western Aleutians	18	3	1.08	135	0	304
Eastern Aleutians	201-300	SW Eastern Aleutians	4	1	0.99	71	0	297
Western Aleutians	201-300	W Western Aleutians	13	3	0.91	86	0	187
Central Aleutians	301-500	SE Central Aleutians	5	1	0.50	36	0	135
Central Aleutians	201-300	N Central Aleutians	10	2	0.48	21	0	55
Western Aleutians	301-500	W Western Aleutians	18	1	0.30	51	0	158

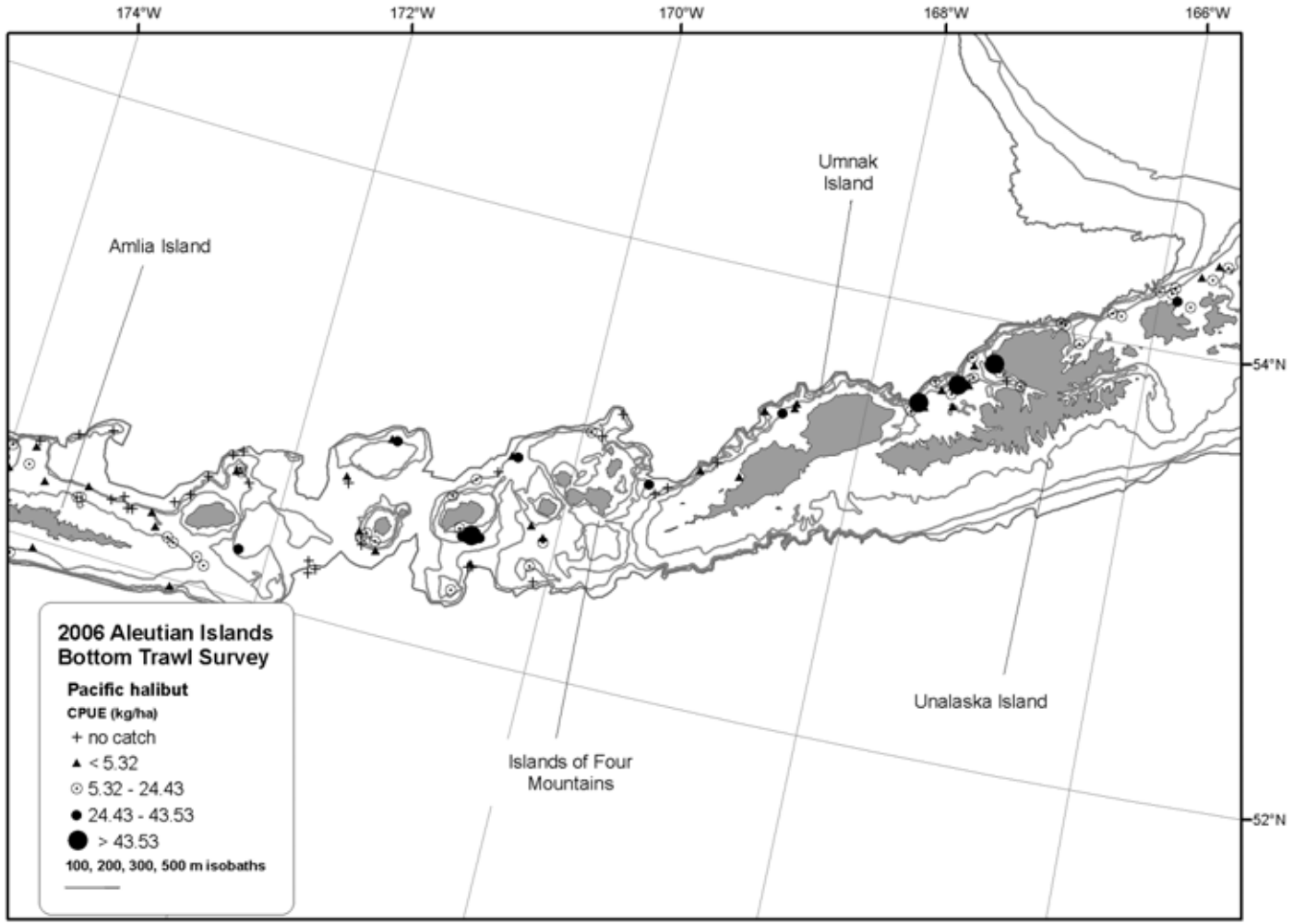


Figure 13. -- Distribution and relative abundance of Pacific halibut from the 2006 Aleutian Islands bottom trawl survey.

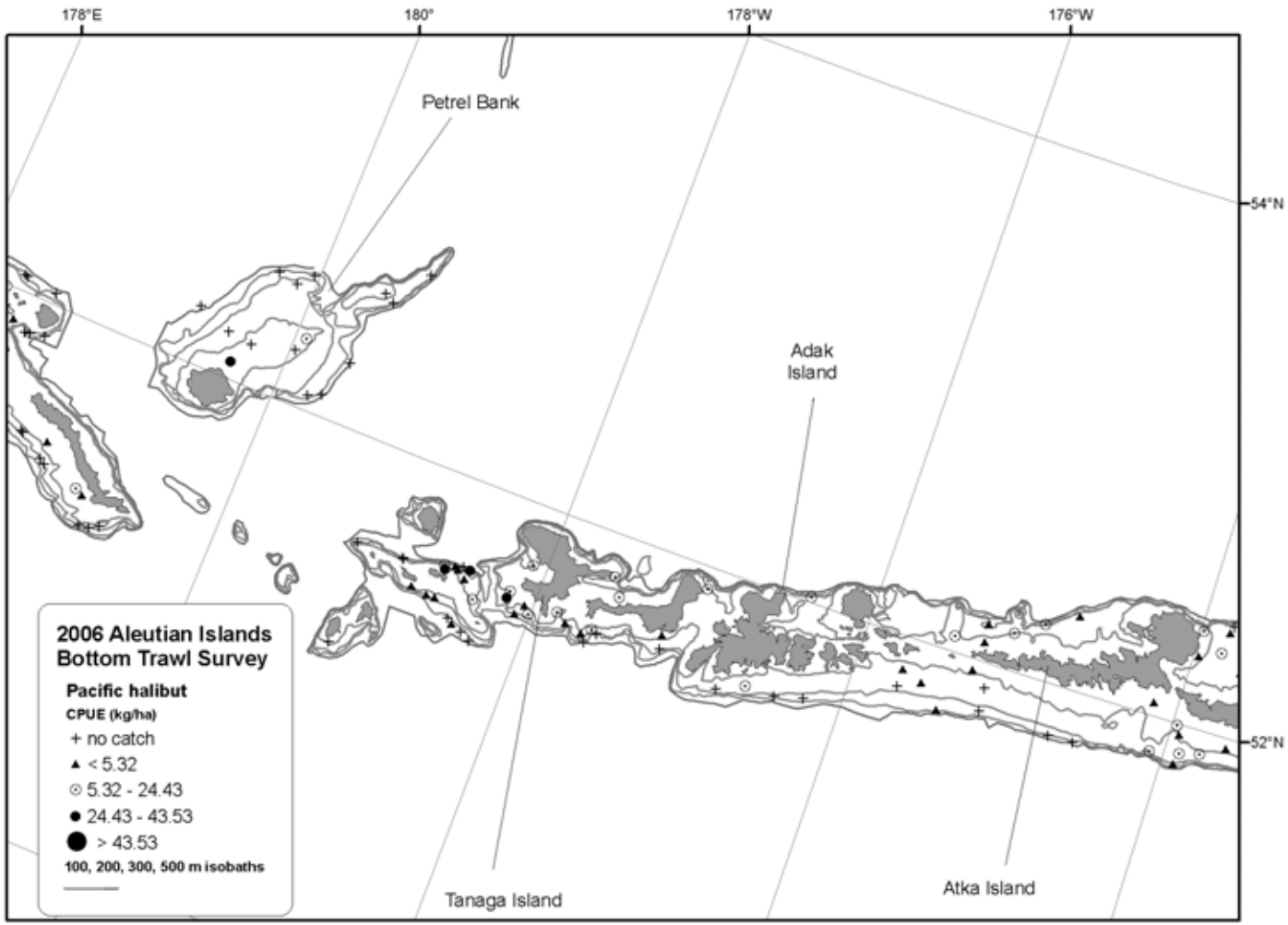


Figure 13. -- (continued).

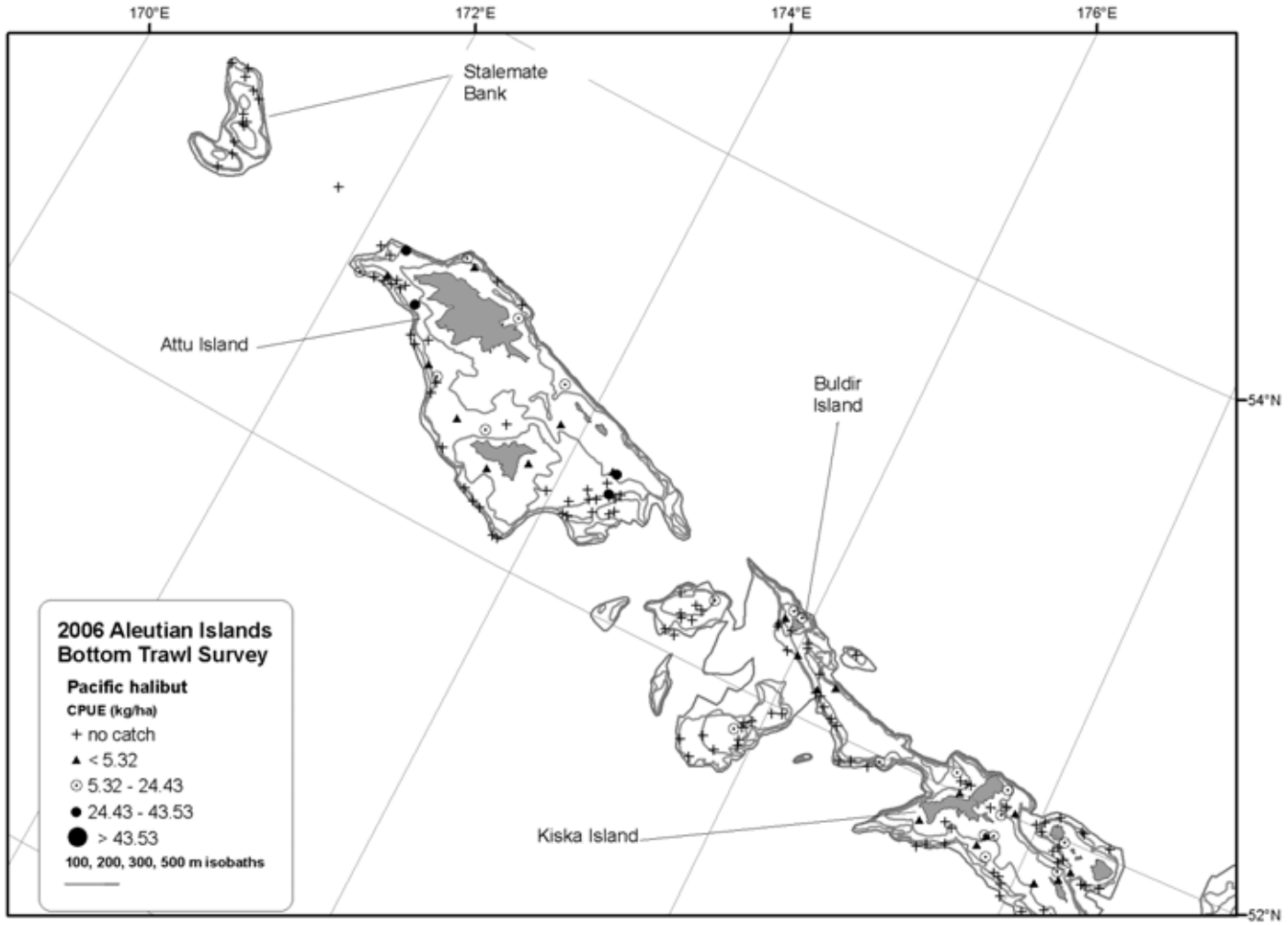


Figure 13. -- (continued).

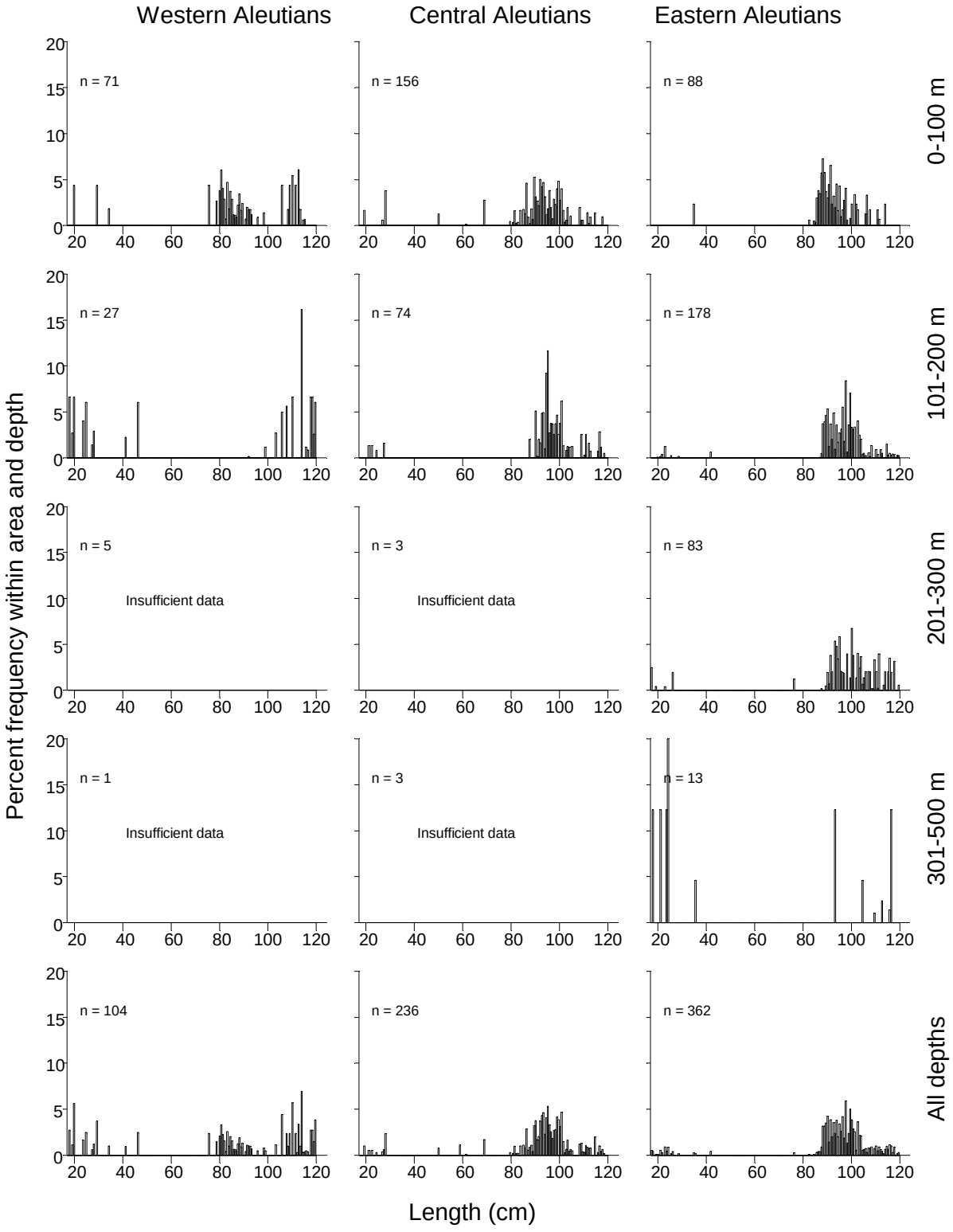


Figure 14. -- Size composition of Pacific halibut from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval. Pacific halibut were not sexed.

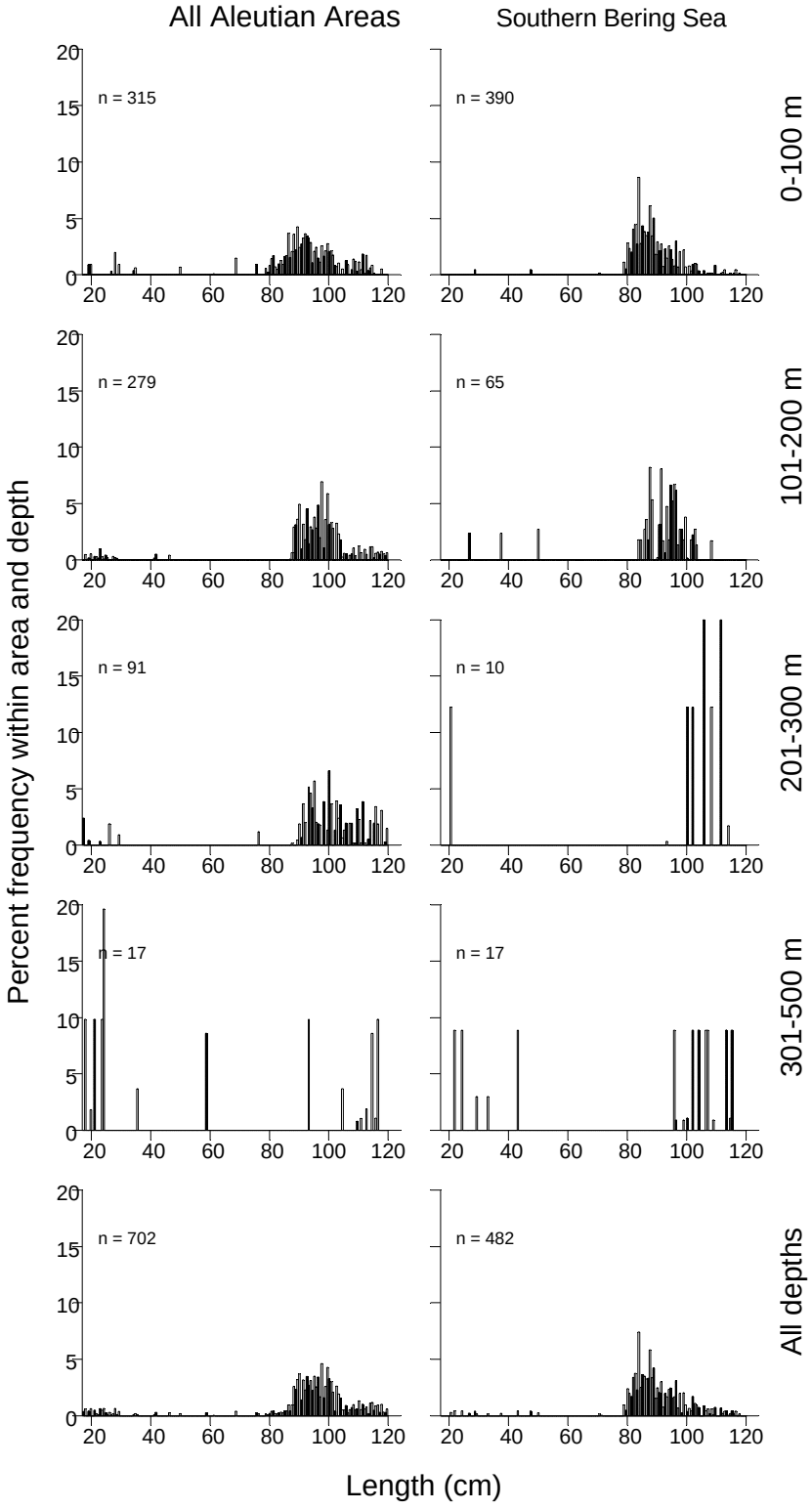


Figure 14. -- (continued).

Table 13. -- Number of survey hauls, number of hauls with Greenland turbot, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	0	0.000	0	--	--	--	--
	101-200	47	0	0.000	0	--	--	--	--
	201-300	23	2	1.279	220	0	569	6.777	87.7
	301-500	21	14	5.354	1,752	489	3,015	4.782	76.9
	All depths	113	16	1.299	1,973	728	3,217	5.005	78.1
Central Aleutians	1-100	32	0	0.000	0	--	--	--	--
	101-200	35	1	0.575	265	0	802	7.625	88.5
	201-300	21	1	0.126	27	0	82	8.493	90.0
	301-500	22	10	4.134	1,646	452	2,840	5.512	78.7
	All depths	110	12	1.171	1,937	683	3,191	5.842	80.2
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	0	0.000	0	--	--	--	--
	201-300	27	1	1.506	738	0	2,255	4.966	75.2
	301-500	21	8	26.403	15,004	0	34,258	3.843	73.2
	All depths	91	9	6.247	15,742	0	34,138	3.896	73.3
All Aleutian Areas	1-100	66	0	0.00	0	--	--	--	--
	101-200	113	1	0.15	265	0	789	7.625	88.5
	201-300	71	4	1.13	985	0	2,495	5.466	78.4
	301-500	64	32	14.23	18,402	0	36,922	4.082	74.0
	All depths	314	37	3.45	19,652	1,348	37,955	4.199	74.4
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	0	0.000	0	--	--	--	--
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	4	12.291	1,282	0	2,749	3.670	74.0
	All depths	44	4	1.714	1,282	31	2,533	3.670	74.0

Table 14. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Greenland turbot by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	6	55.38	14,786	0	35,661
Southern Bering Sea	301-500	Combined Southern Bering	8	4	12.29	1,282	0	2,749
Central Aleutians	301-500	Petrel Bank	3	3	6.92	856	0	2,654
Western Aleutians	301-500	W Western Aleutians	18	11	5.44	931	216	1,647
Western Aleutians	301-500	E Western Aleutians	3	3	5.26	821	0	2,978
Central Aleutians	301-500	N Central Aleutians	11	5	5.13	636	0	1,474
Eastern Aleutians	201-300	NE Eastern Aleutians	12	1	3.75	738	0	2,362
Western Aleutians	201-300	W Western Aleutians	13	2	2.35	220	0	586
Central Aleutians	101-200	Petrel Bank	4	1	1.53	265	0	1,107
Central Aleutians	301-500	SE Central Aleutians	5	1	1.52	108	0	409
Eastern Aleutians	301-500	SE Eastern Aleutians	9	2	0.85	219	0	565
Central Aleutians	201-300	N Central Aleutians	10	1	0.60	27	0	86
Central Aleutians	301-500	SW Central Aleutians	3	1	0.57	45	0	240

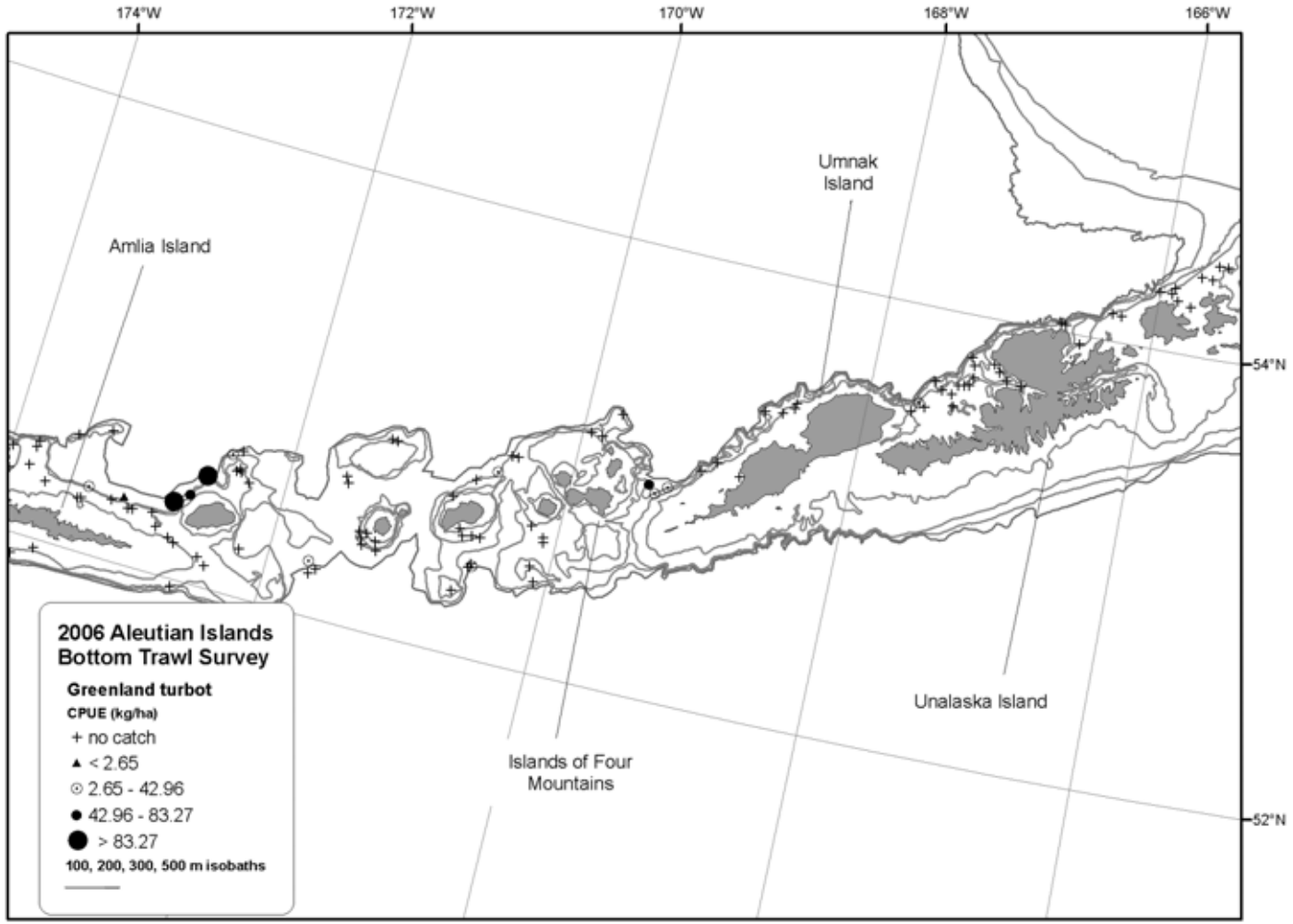


Figure 15. -- Distribution and relative abundance of Greenland turbot from the 2006 Aleutian Islands bottom trawl survey.

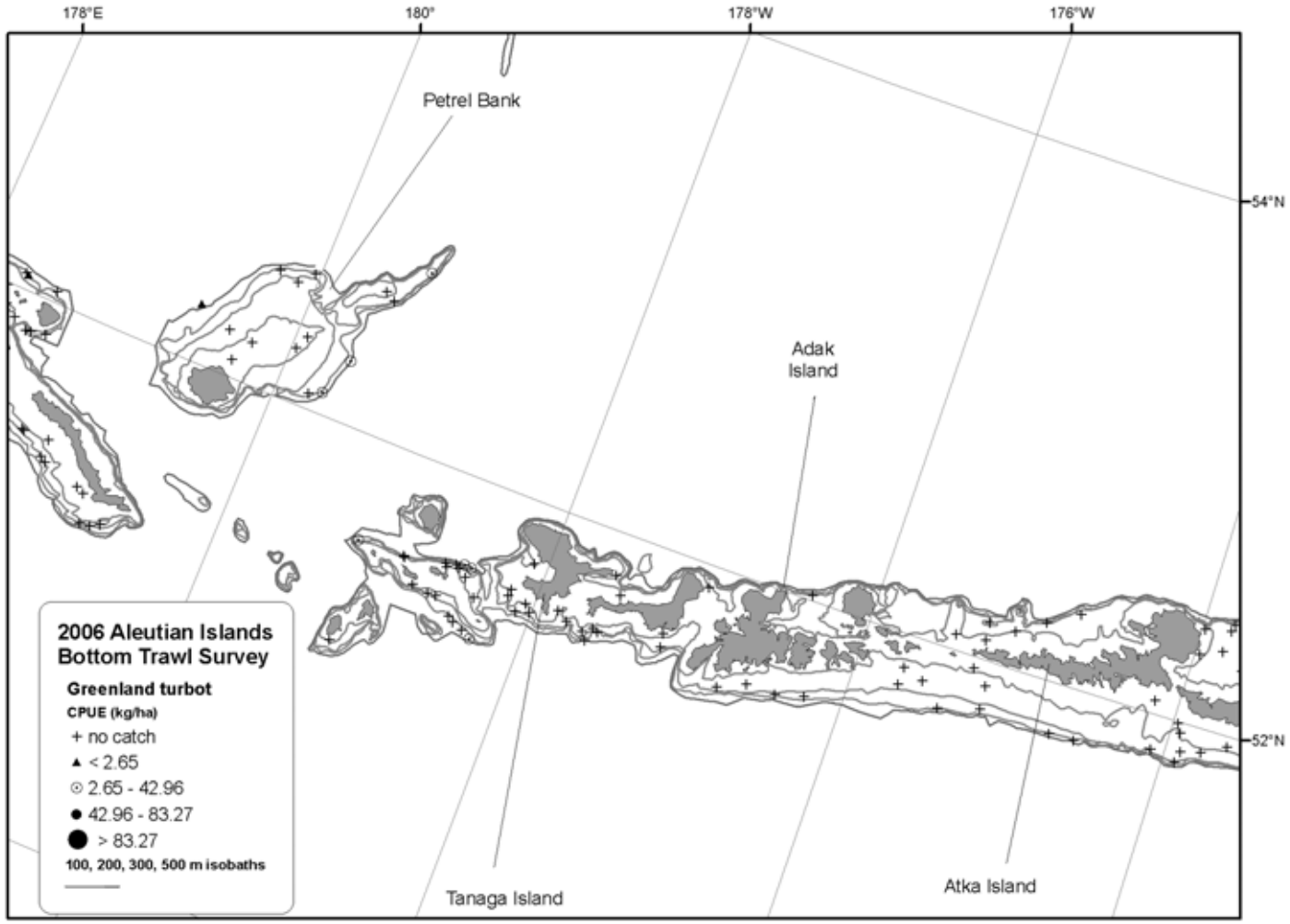


Figure 15. -- (continued).

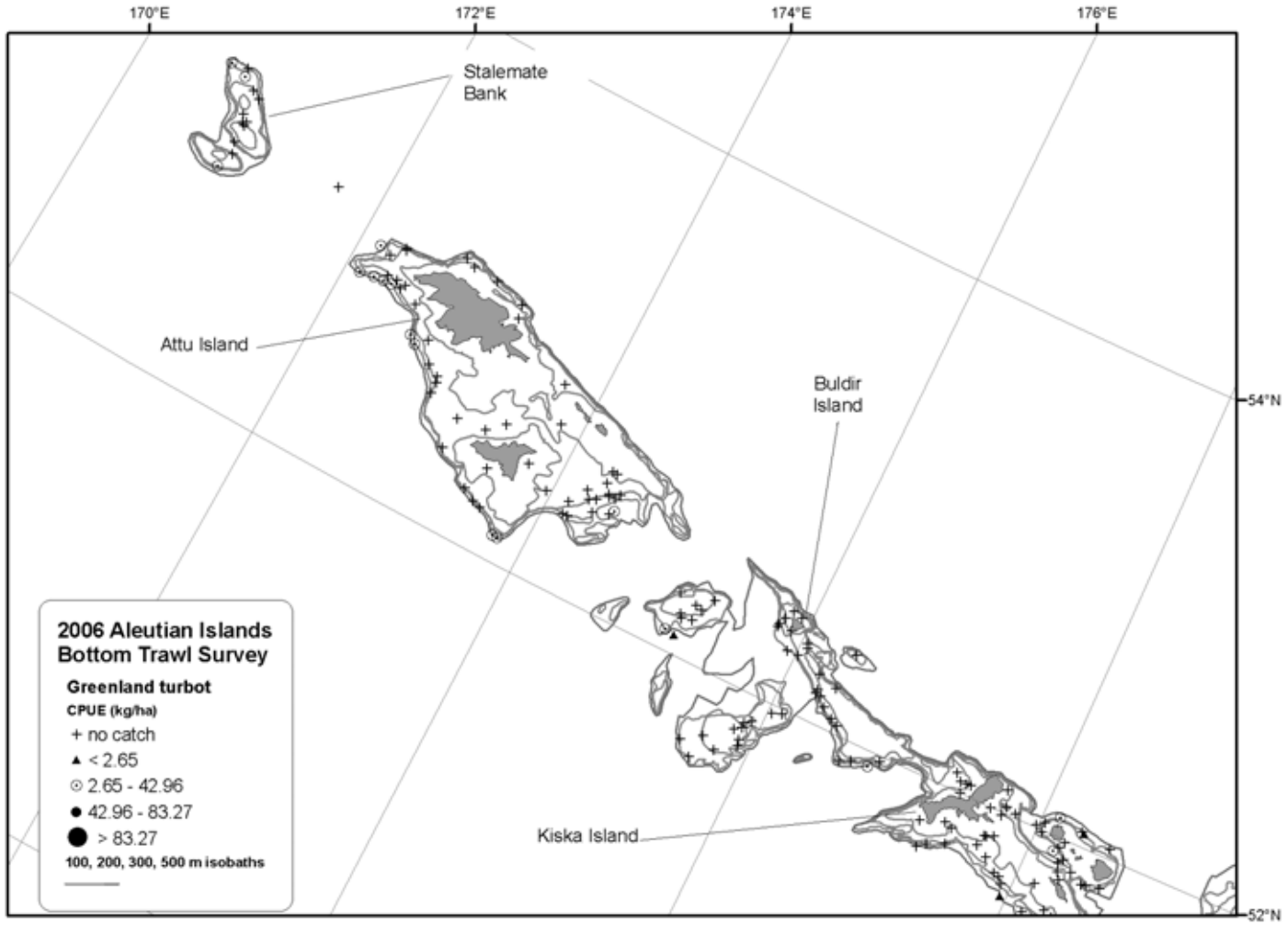


Figure 15. -- (continued).

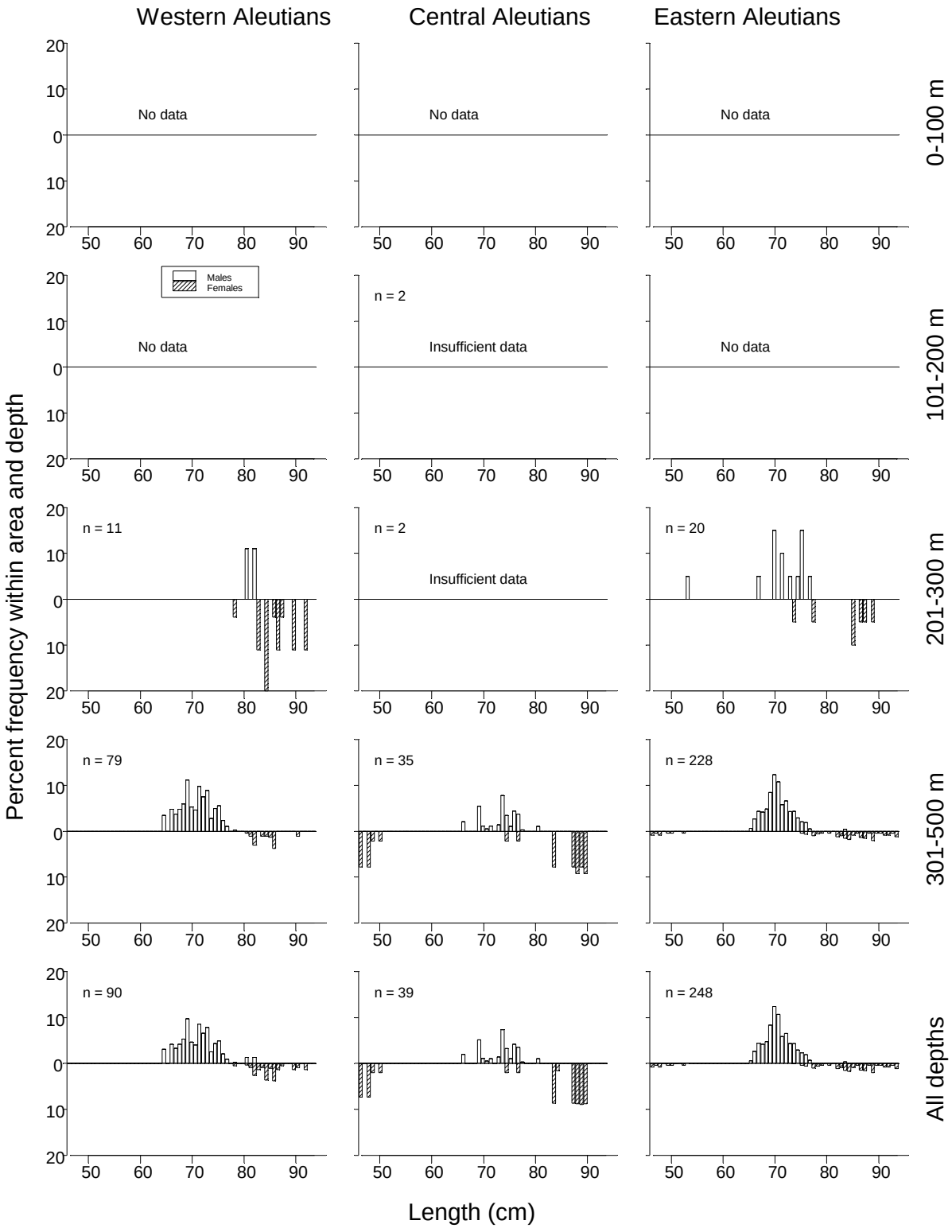


Figure 16. -- Size composition of Greenland turbot from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

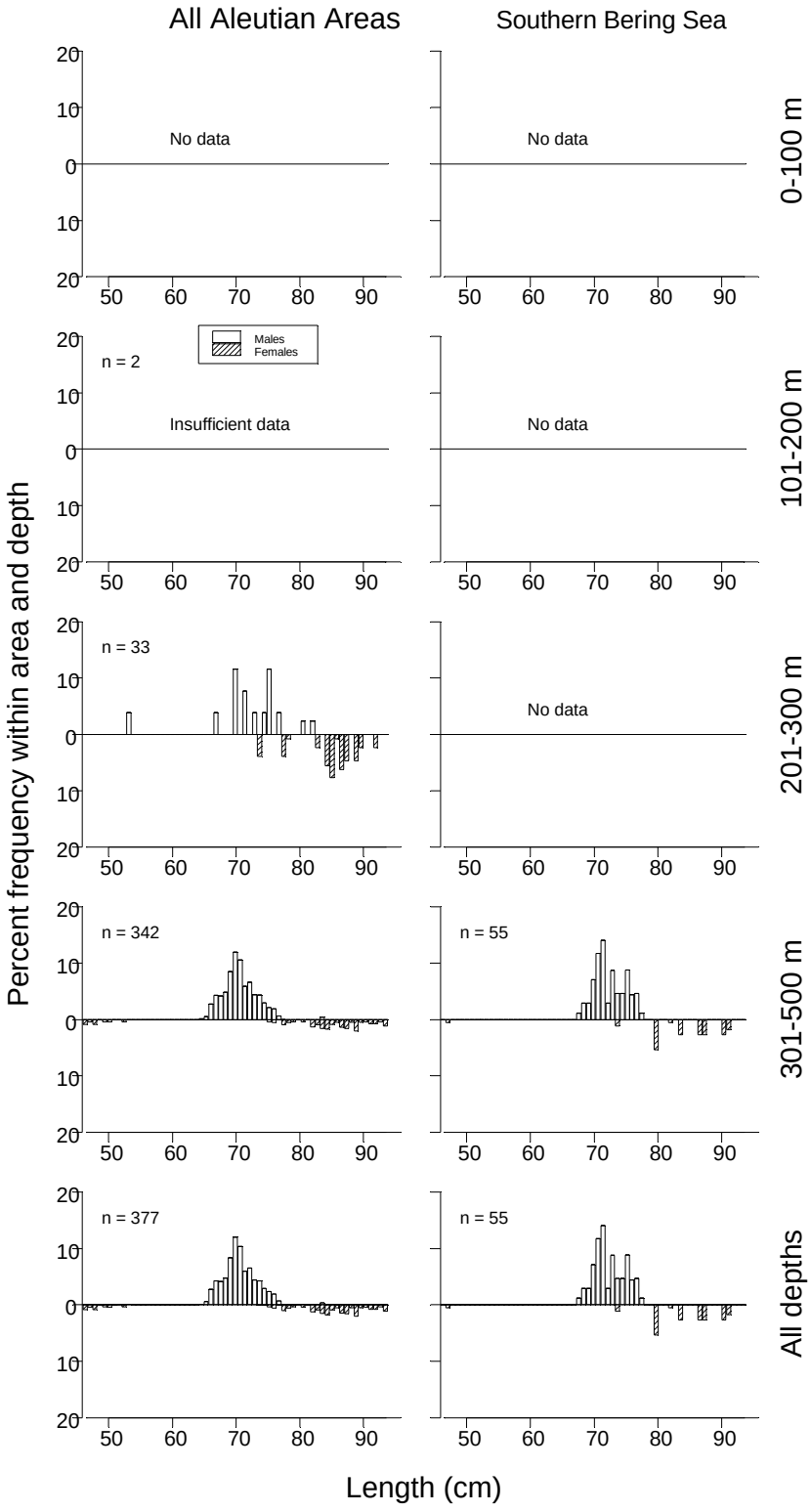


Figure 16. -- (continued).

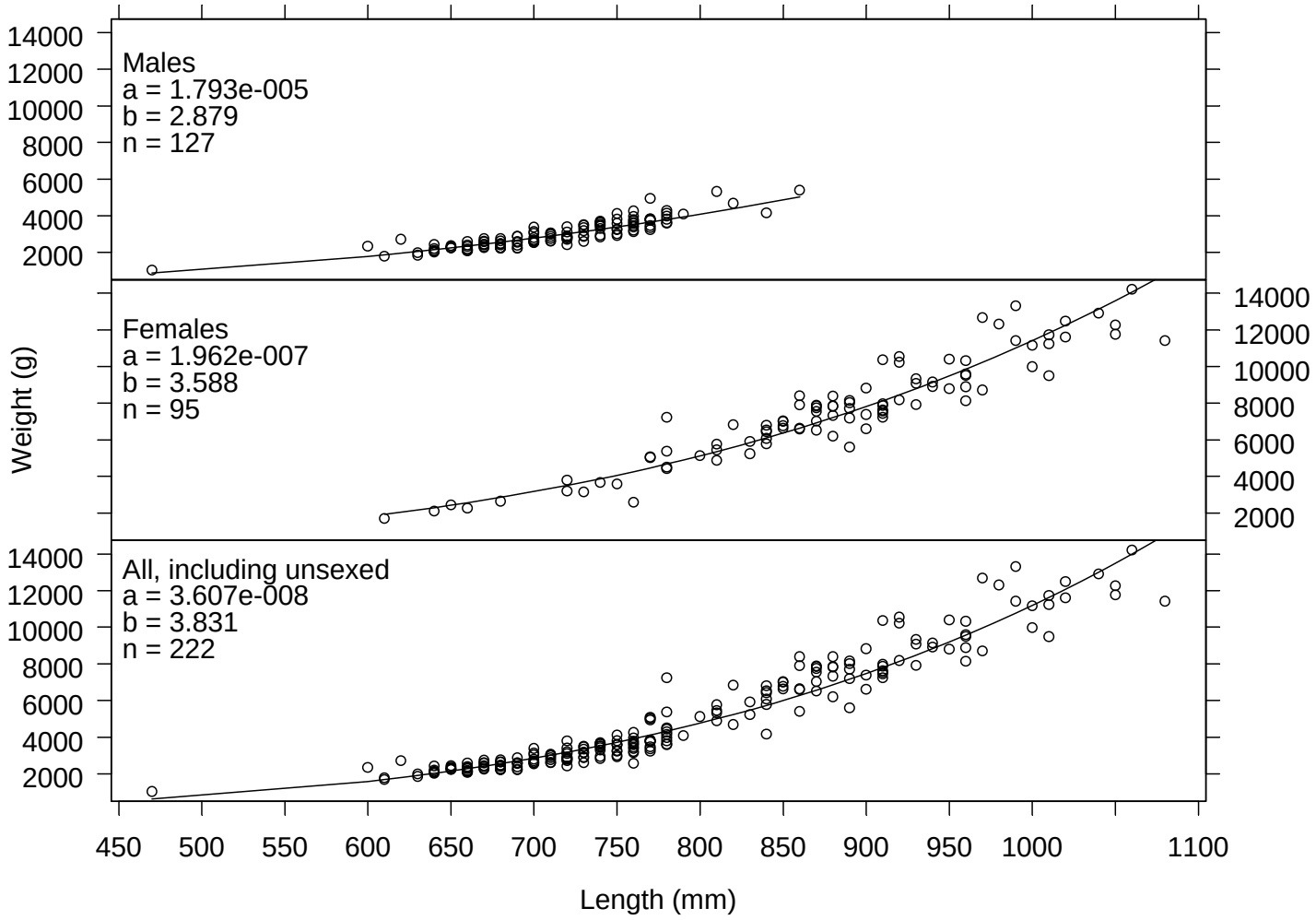


Figure 17. -- Length-weight relationship for Greenland turbot specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Flathead sole (*Hippoglossoides elassodon*)

Flathead sole is widely distributed in the Aleutian region although at low relative abundance levels (Table 2), especially in the Central Aleutians area where CPUE ranked lower than the top 20 species. Total estimated biomass was 9,600 t, with 40% found in the Southern Bering Sea area (Table 15). The highest mean CPUE was found in the Southern Bering Sea area in the 101-200 m depth interval where flathead sole individual mean length and weight was the smallest. The highest stratum mean CPUEs were in the E Southern Bering Sea in 101-200 m and the NE Eastern Aleutian subarea in 1-100 m (where only two trawl hauls were conducted) (Table 16). The four largest station-specific CPUEs were concentrated near Unalaska Island, especially in Makushin Bay (Fig. 18). Size compositions did not increase with depth, although females appear to reach greater size than males in most areas (Figs. 19 and 20).

Rex sole (*Glyptocephalus zachirus*)

Rex sole are ubiquitous over the entire survey area, although at relatively low levels of abundance (Table 2). Mean CPUE was highest in the 301-500 m depth interval in the Aleutian areas and in the Southern Bering Sea area (Table 17). The top two ranked subarea mean CPUEs were in the Southern Bering Sea area (Table 18). The highest catches were centered around Unalaska Island (Fig. 21). Males were smaller than females in all areas and at the shallower depths females dominated in terms of catch, while both sexes were equally common at deeper depths (Fig. 22). Length-weight relationships were based on small sample sizes (Fig. 23).

Dover sole (*Microstomus pacificus*)

Dover sole appeared at low abundance levels throughout the survey area, mostly at depths greater than 100 m. Abundance most likely does not approach commercially exploitable levels, so this species is mostly of biological interest as part of the Aleutian ecosystem. The highest stratum-specific estimated biomass was reported from the 301-500 m depth interval in the Central Aleutian area (Table 19), more specifically from three tows in the 301-500 m and 201-300 m depth intervals on Petrel Bank (Table 20). Males outnumbered females in length frequency collections (Fig. 24). Length-weight relationships were similar for both sexes (Fig. 25).

Table 15. -- Number of survey hauls, number of hauls with flathead sole, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	7	3.137	1,530	218	2,842	0.598	37.2
	101-200	47	26	2.974	1,581	889	2,274	0.254	28.8
	201-300	23	11	1.854	320	101	538	0.218	27.9
	301-500	21	2	0.013	4	0	10	0.381	34.0
	All depths	113	46	2.262	3,435	1,996	4,874	0.404	32.4
Central Aleutians	1-100	32	4	0.038	22	0	47	0.278	30.8
	101-200	35	5	0.292	135	0	290	0.930	40.3
	201-300	21	6	0.397	84	3	164	0.681	39.0
	301-500	22	0	0.000	0	--	--	--	--
	All depths	110	15	0.145	241	69	412	0.783	39.0
Eastern Aleutians	1-100	12	4	1.403	961	0	2,896	0.206	27.5
	101-200	31	13	1.465	1,138	57	2,219	0.601	37.5
	201-300	27	4	0.033	16	0	33	0.353	32.6
	301-500	21	1	0.010	5	0	16	0.412	36.0
	All depths	91	22	0.841	2,120	82	4,159	0.419	32.9
All Aleutian Areas	1-100	66	15	1.43	2,513	352	4,674	0.445	33.4
	101-200	113	44	1.61	2,854	1,594	4,114	0.424	32.8
	201-300	71	21	0.48	419	195	644	0.316	30.3
	301-500	64	3	0.01	9	0	22	0.398	35.1
	All depths	314	83	1.02	5,796	3,317	8,275	0.425	32.9
Southern Bering Sea	1-100	21	17	3.077	1,239	429	2,049	0.483	34.9
	101-200	11	9	12.793	2,365	5	4,725	0.182	25.3
	201-300	4	1	0.123	7	0	37	0.423	36.3
	301-500	8	3	2.461	257	0	685	0.612	38.4
	All depths	44	30	5.169	3,868	1,563	6,172	0.308	29.3

Table 16. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of flathead sole by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Southern Bering Sea	101-200	E Southern Bering	9	7	19.68	2,320	0	4,763
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	6.93	879	0	12,044
Southern Bering Sea	1-100	E Southern Bering	19	17	5.08	1,239	423	2,055
Western Aleutians	1-100	W Western Aleutians	8	6	4.14	1,527	35	3,019
Western Aleutians	101-200	W Western Aleutians	29	24	3.85	1,565	861	2,269
Western Aleutians	201-300	W Western Aleutians	13	10	3.32	313	83	542
Eastern Aleutians	101-200	NW Eastern Aleutians	3	3	3.08	491	0	2,371
Southern Bering Sea	301-500	Combined Southern Bering	8	3	2.46	257	0	685
Eastern Aleutians	101-200	SW Eastern Aleutians	7	3	1.91	433	0	1,117
Eastern Aleutians	101-200	NE Eastern Aleutians	11	7	1.07	215	0	450
Central Aleutians	201-300	SE Central Aleutians	2	2	0.83	40	0	425
Central Aleutians	101-200	N Central Aleutians	8	2	0.74	79	0	216
Central Aleutians	201-300	N Central Aleutians	10	3	0.71	31	0	76
Southern Bering Sea	101-200	W Southern Bering	2	2	0.67	45	0	163
Central Aleutians	101-200	SW Central Aleutians	13	3	0.53	56	0	165
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	0.41	78	0	323
Central Aleutians	201-300	SW Central Aleutians	6	1	0.30	13	0	46
Eastern Aleutians	201-300	NW Eastern Aleutians	2	1	0.17	3	0	36
Western Aleutians	101-200	E Western Aleutians	18	2	0.14	17	0	42
Southern Bering Sea	201-300	Combined Southern Bering	4	1	0.12	7	0	29
Western Aleutians	201-300	E Western Aleutians	10	1	0.09	7	0	23
Central Aleutians	1-100	SW Central Aleutians	9	2	0.08	13	0	35
Eastern Aleutians	201-300	SW Eastern Aleutians	4	1	0.05	4	0	16
Eastern Aleutians	201-300	NE Eastern Aleutians	12	2	0.05	10	0	25
Central Aleutians	1-100	N Central Aleutians	11	2	0.05	10	0	25
Eastern Aleutians	1-100	SE Eastern Aleutians	6	1	0.03	5	0	17
Western Aleutians	1-100	E Western Aleutians	14	1	0.02	3	0	9
Western Aleutians	301-500	W Western Aleutians	18	2	0.02	4	0	11
Eastern Aleutians	301-500	SE Eastern Aleutians	9	1	0.02	5	0	18

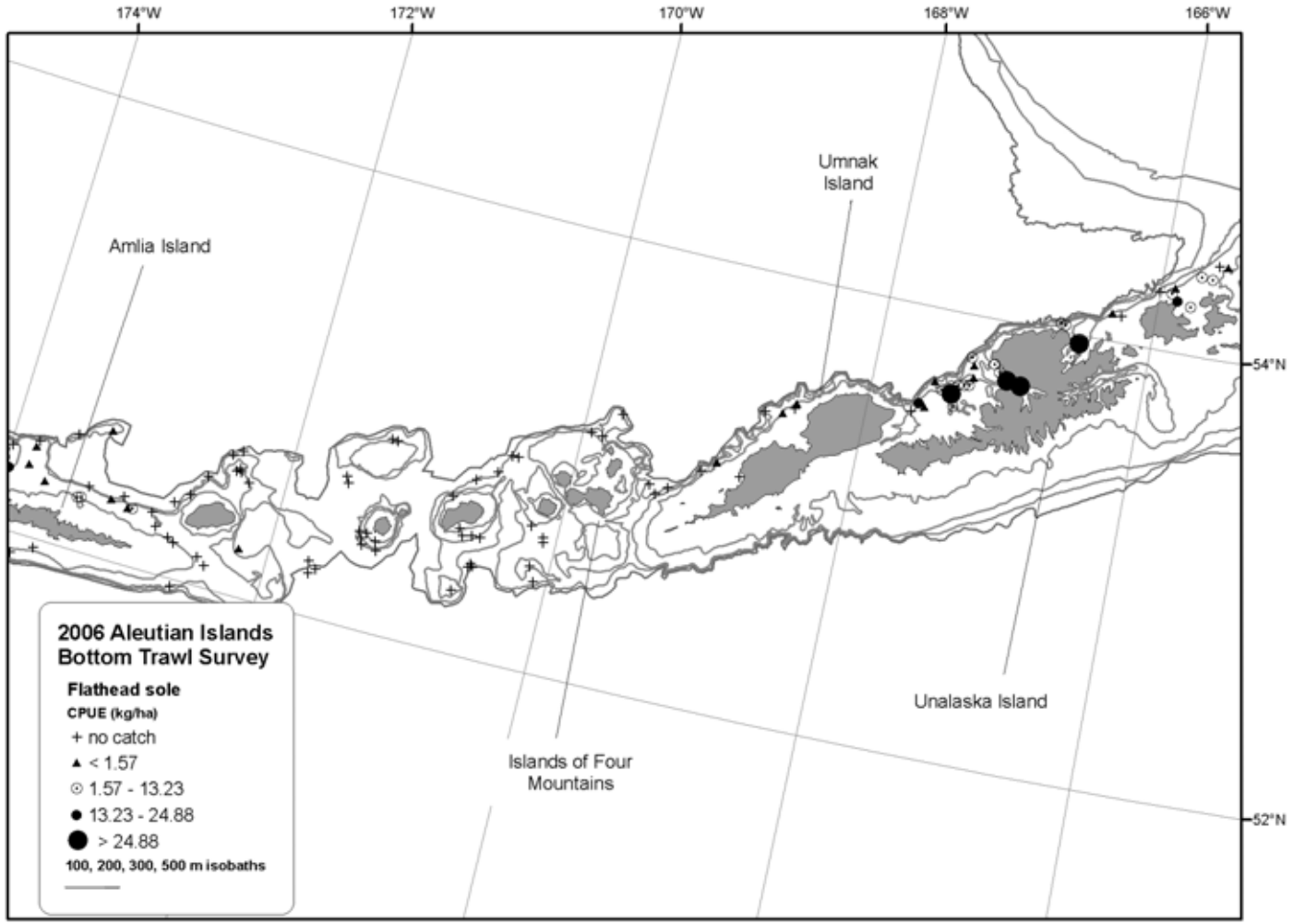


Figure 18. -- Distribution and relative abundance of flathead sole from the 2006 Aleutian Islands bottom trawl survey.

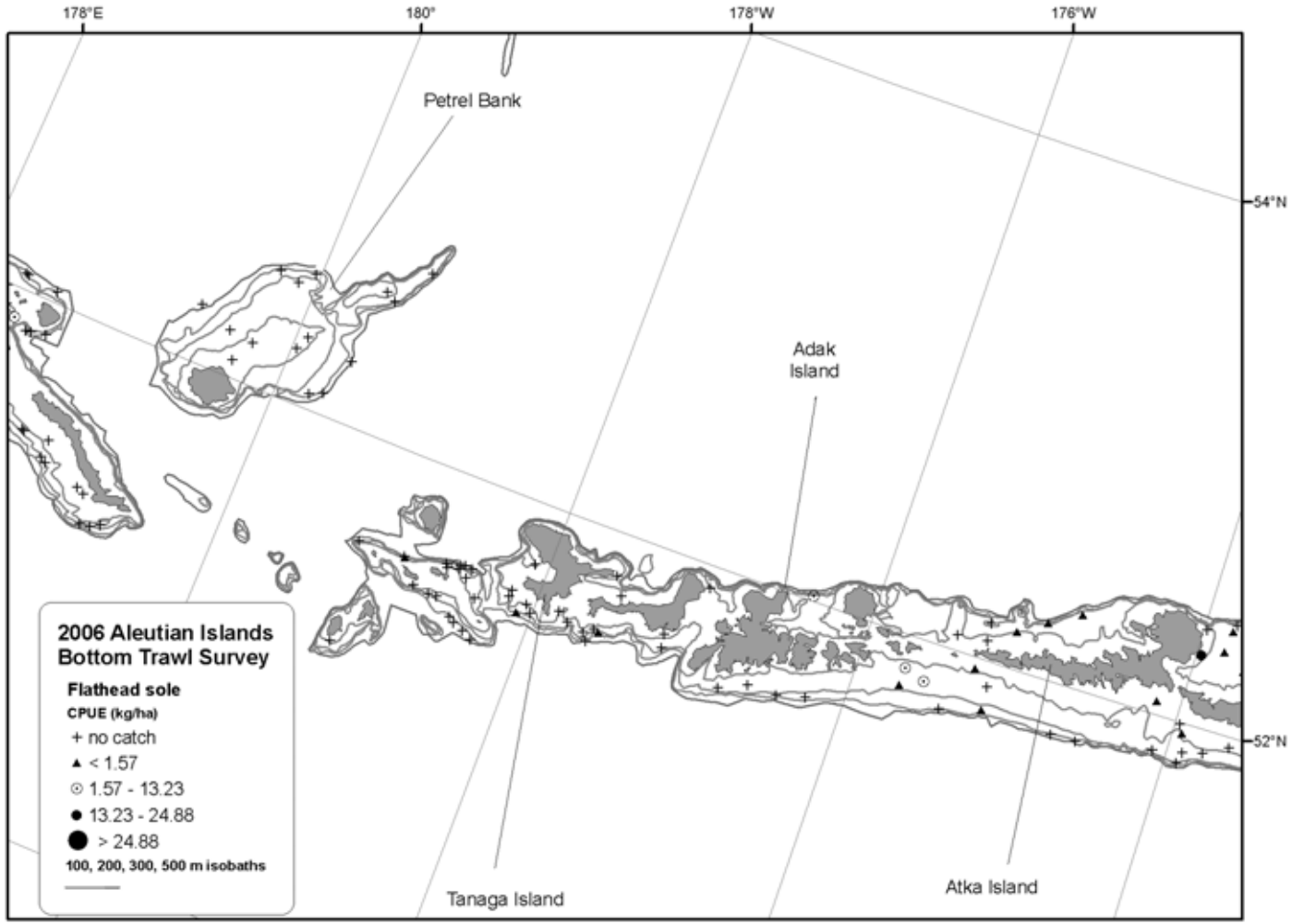


Figure 18. -- (continued).

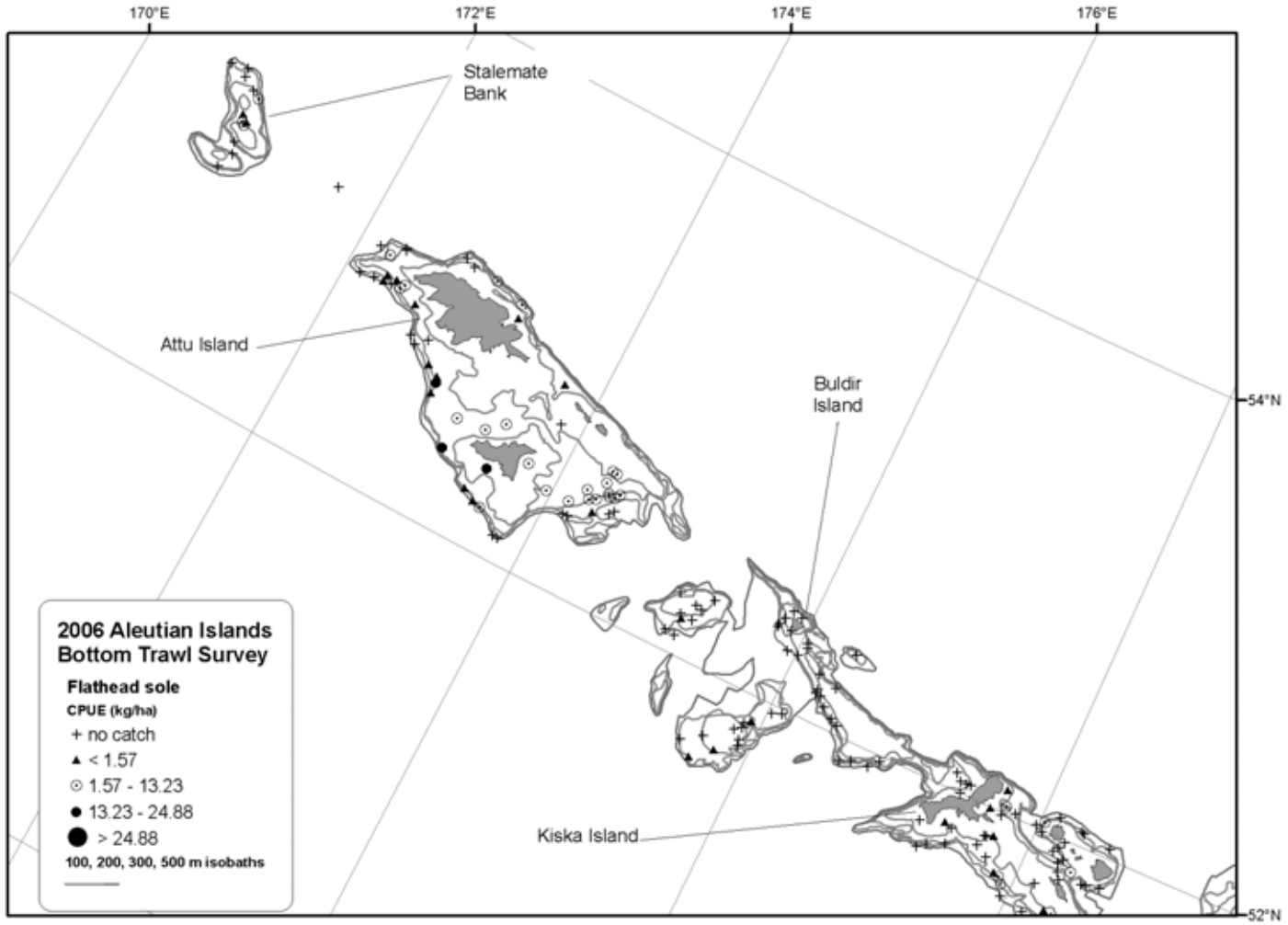


Figure 18. -- (continued).

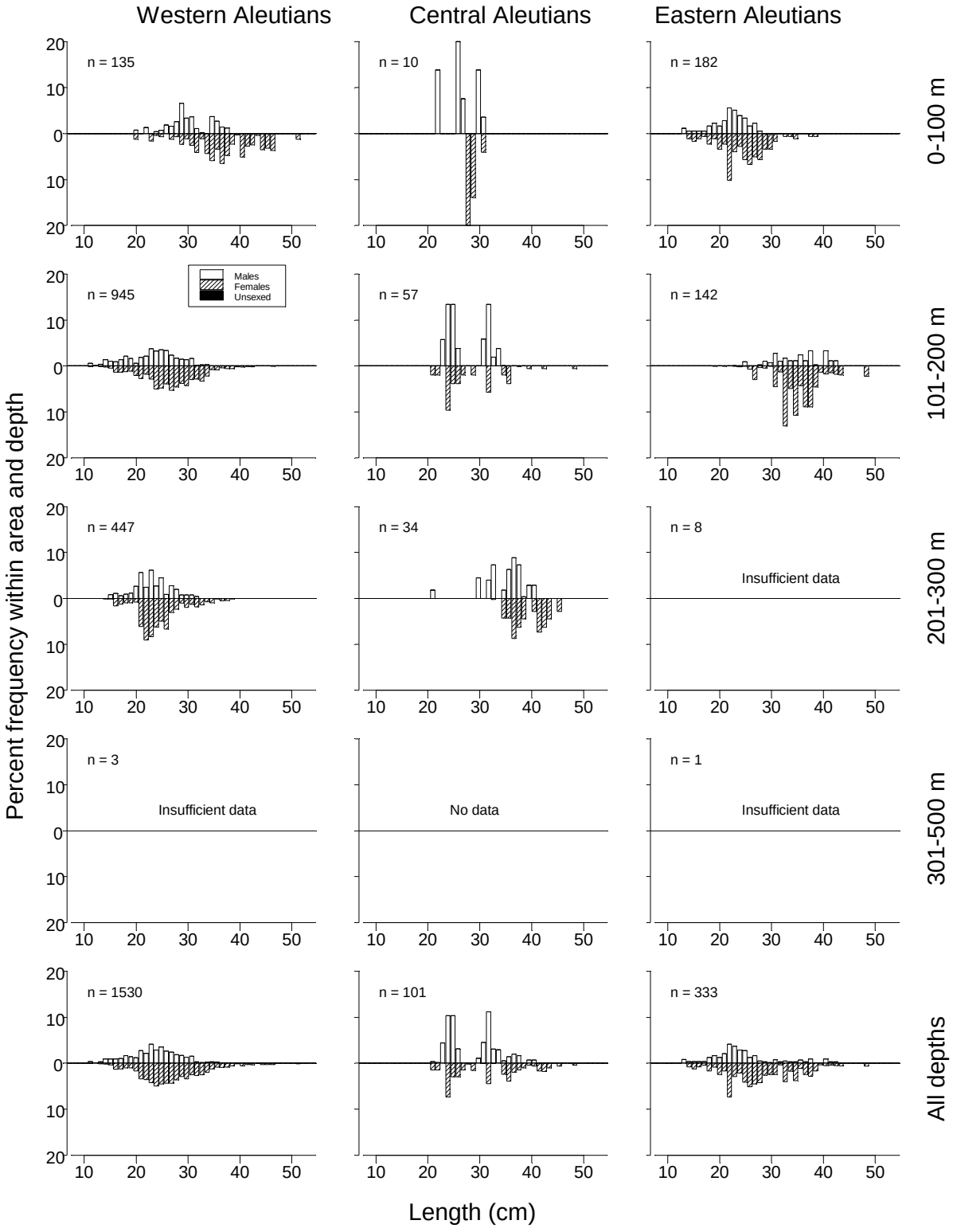


Figure 19. -- Size composition of flathead sole from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

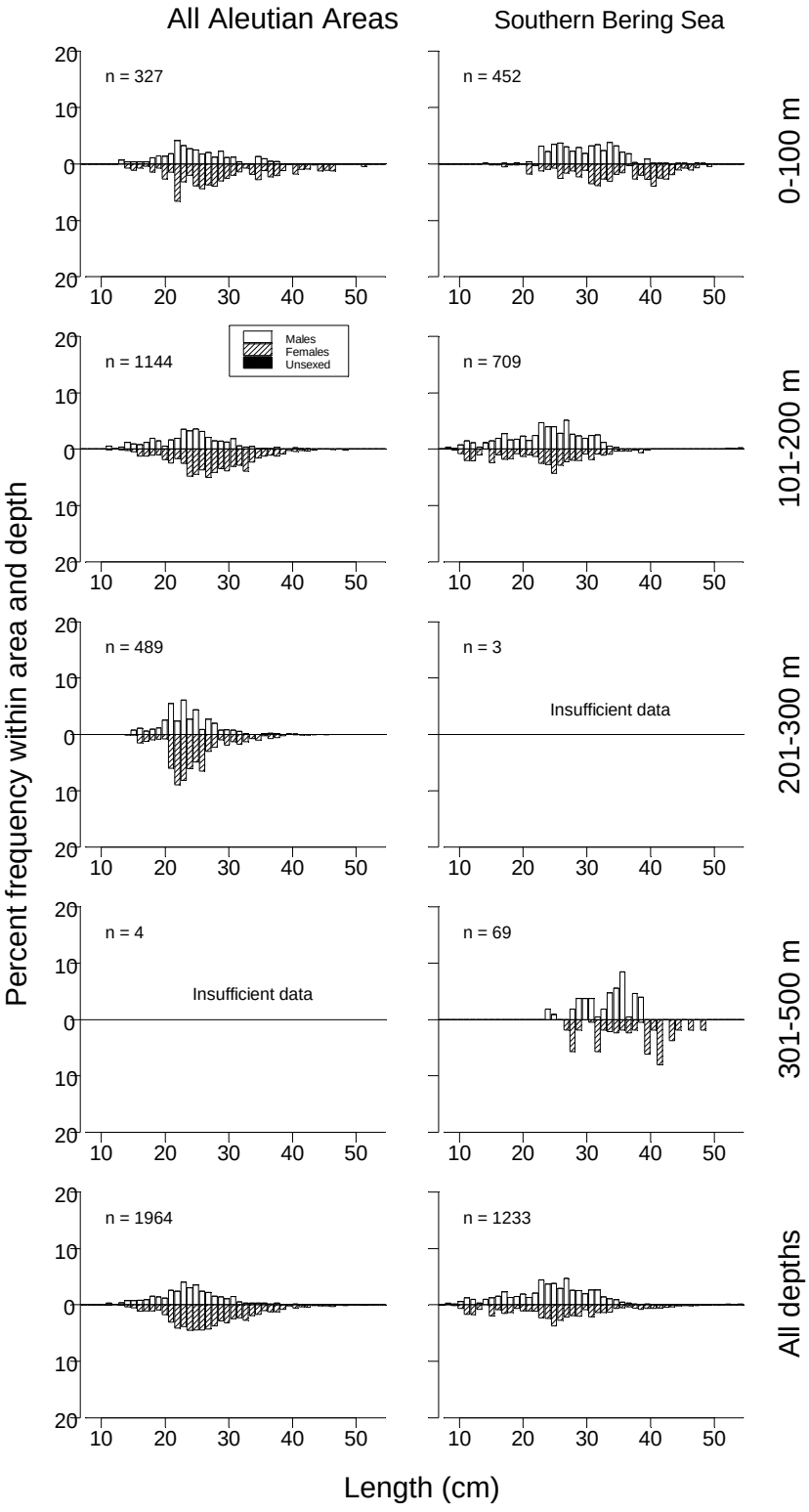


Figure 19. -- (continued).

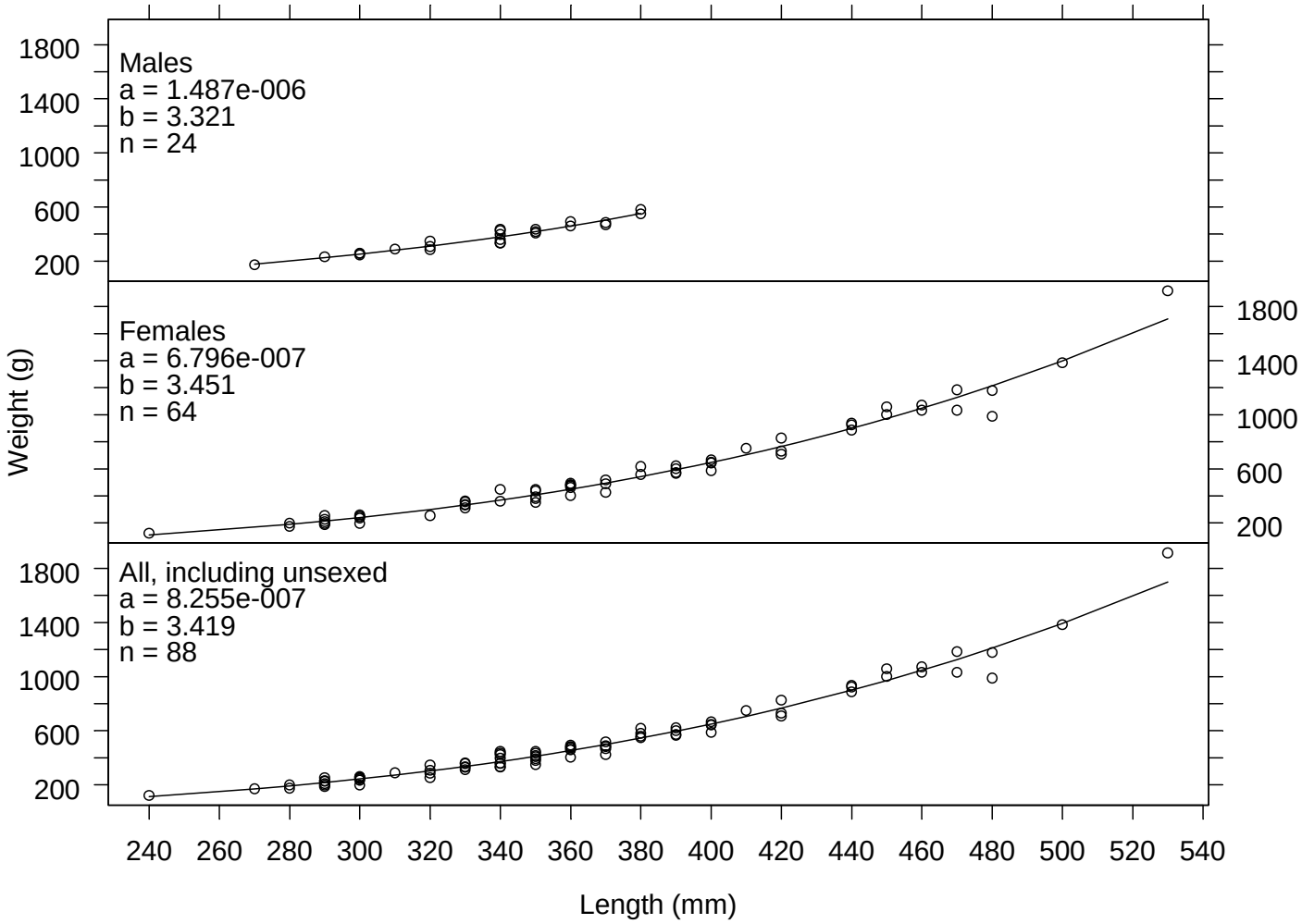


Figure 20. -- Length-weight relationship for flathead sole specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 17. -- Number of survey hauls, number of hauls with rex sole, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	6	0.935	456	37	875	0.752	45.5
	101-200	47	21	1.836	976	252	1,701	0.576	41.0
	201-300	23	11	2.876	496	92	900	0.571	40.8
	301-500	21	14	2.737	896	78	1,714	0.608	42.3
	All depths	113	52	1.859	2,824	1,632	4,015	0.614	42.1
Central Aleutians	1-100	32	2	0.030	18	0	43	0.564	38.8
	101-200	35	10	0.830	383	23	742	0.586	41.1
	201-300	21	13	5.685	1,199	370	2,028	0.600	42.3
	301-500	22	16	2.500	995	444	1,546	0.804	46.6
	All depths	110	41	1.568	2,594	1,585	3,603	0.676	43.8
Eastern Aleutians	1-100	12	1	0.877	601	0	1,922	0.374	35.4
	101-200	31	6	0.311	241	18	464	0.727	43.7
	201-300	27	10	0.549	269	49	490	0.765	45.4
	301-500	21	6	1.972	1,121	365	1,877	0.567	41.9
	All depths	91	23	0.886	2,232	805	3,658	0.556	40.8
All Aleutian Areas	1-100	66	9	0.61	1,074	0	2,339	0.537	39.8
	101-200	113	37	0.90	1,600	777	2,423	0.601	41.4
	201-300	71	34	2.25	1,964	1,056	2,872	0.615	42.4
	301-500	64	36	2.33	3,012	1,821	4,202	0.657	43.6
	All depths	314	116	1.34	7,650	5,552	9,747	0.618	42.3
Southern Bering Sea	1-100	21	12	1.432	576	0	1,217	0.530	40.3
	101-200	11	10	13.516	2,499	0	5,005	0.524	39.9
	201-300	4	2	2.329	131	0	393	0.675	44.9
	301-500	8	7	32.353	3,375	0	8,572	0.614	43.8
	All depths	44	31	8.797	6,581	1,561	11,601	0.574	42.1

Table 18. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of rex sole by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Southern Bering Sea	301-500	Combined Southern Bering	8	7	32.35	3,375	0	8,573
Southern Bering Sea	101-200	E Southern Bering	9	9	21.09	2,487	0	5,081
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	10.41	456	222	690
Central Aleutians	201-300	Petrel Bank	3	3	9.19	704	0	2,223
Central Aleutians	201-300	N Central Aleutians	10	7	7.51	330	7	652
Central Aleutians	301-500	SW Central Aleutians	3	3	7.41	585	0	1,546
Western Aleutians	201-300	W Western Aleutians	13	8	5.19	488	63	912
Western Aleutians	301-500	W Western Aleutians	18	12	4.99	854	29	1,679
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	4.74	601	0	8,231
Central Aleutians	101-200	SW Central Aleutians	13	5	3.34	352	0	734
Central Aleutians	201-300	SW Central Aleutians	6	2	2.66	113	0	376
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	4	2.49	665	0	1,483
Southern Bering Sea	1-100	E Southern Bering	19	12	2.36	576	0	1,222
Southern Bering Sea	201-300	Combined Southern Bering	4	2	2.33	131	0	393
Western Aleutians	1-100	E Western Aleutians	14	4	2.28	270	0	571
Western Aleutians	101-200	W Western Aleutians	29	16	2.27	924	190	1,658
Central Aleutians	301-500	N Central Aleutians	11	9	1.84	228	0	482
Eastern Aleutians	201-300	SW Eastern Aleutians	4	3	1.43	102	0	332
Central Aleutians	201-300	SE Central Aleutians	2	1	1.09	52	0	711
Central Aleutians	301-500	SE Central Aleutians	5	2	1.05	75	0	225
Central Aleutians	301-500	Petrel Bank	3	2	0.88	108	0	380
Eastern Aleutians	101-200	NE Eastern Aleutians	11	3	0.76	153	0	340
Western Aleutians	1-100	W Western Aleutians	8	2	0.50	186	0	529
Eastern Aleutians	201-300	NE Eastern Aleutians	12	4	0.50	98	0	218
Eastern Aleutians	101-200	NW Eastern Aleutians	3	1	0.42	68	0	358
Western Aleutians	101-200	E Western Aleutians	18	5	0.42	53	0	120
Eastern Aleutians	201-300	SE Eastern Aleutians	9	2	0.32	66	0	198
Western Aleutians	301-500	E Western Aleutians	3	2	0.27	42	0	168
Eastern Aleutians	201-300	NW Eastern Aleutians	2	1	0.19	3	0	41
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	0.18	12	0	164
Central Aleutians	101-200	N Central Aleutians	8	2	0.15	16	0	46
Western Aleutians	201-300	E Western Aleutians	10	3	0.11	8	0	18
Eastern Aleutians	101-200	SW Eastern Aleutians	7	2	0.09	20	0	60
Central Aleutians	101-200	Petrel Bank	4	1	0.08	13	0	56
Central Aleutians	1-100	SE Central Aleutians	7	1	0.07	8	0	27
Central Aleutians	1-100	SW Central Aleutians	9	1	0.06	10	0	33
Central Aleutians	101-200	SE Central Aleutians	10	2	0.03	2	0	5

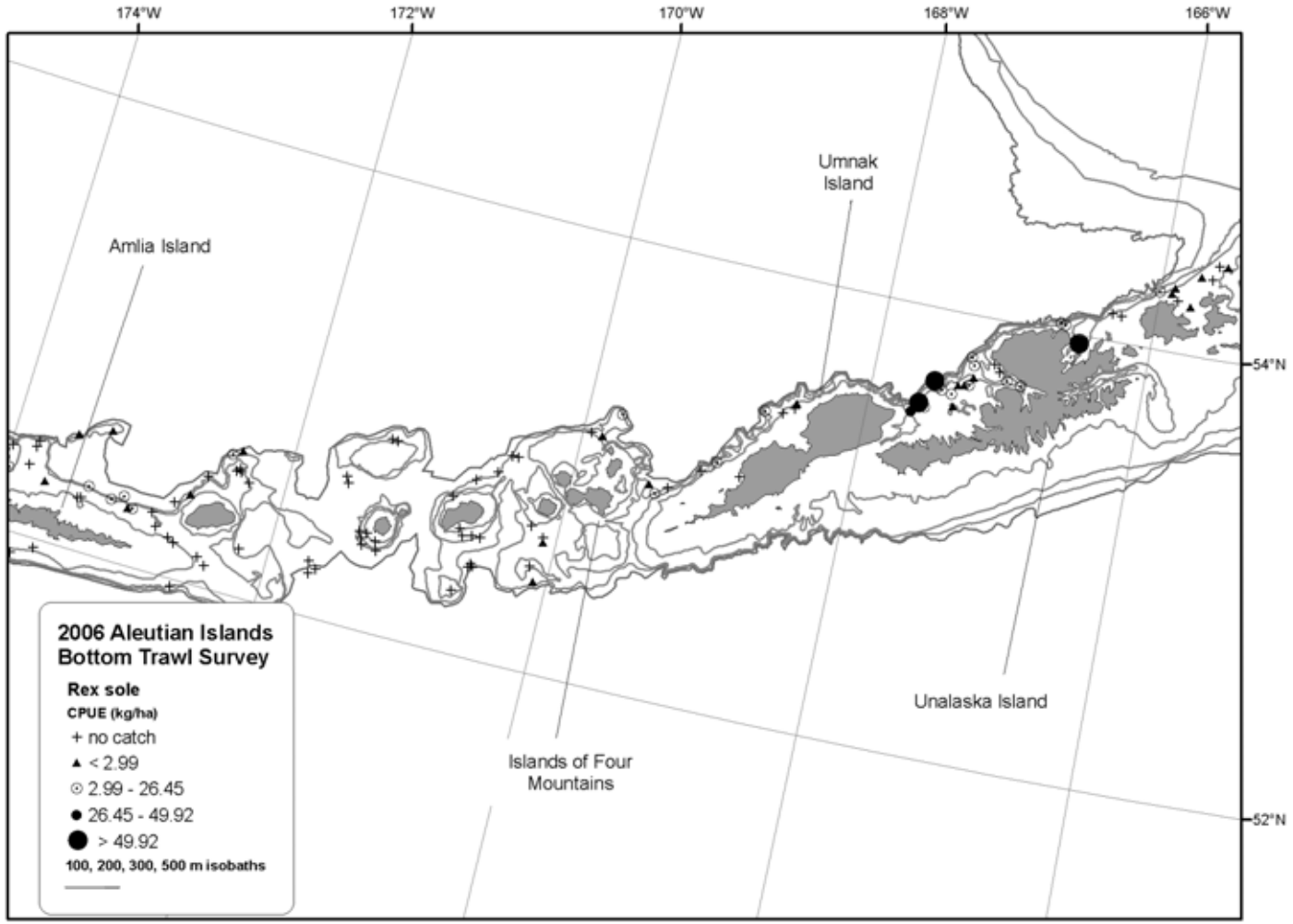


Figure 21. -- Distribution and relative abundance of rex sole from the 2006 Aleutian Islands bottom trawl survey.

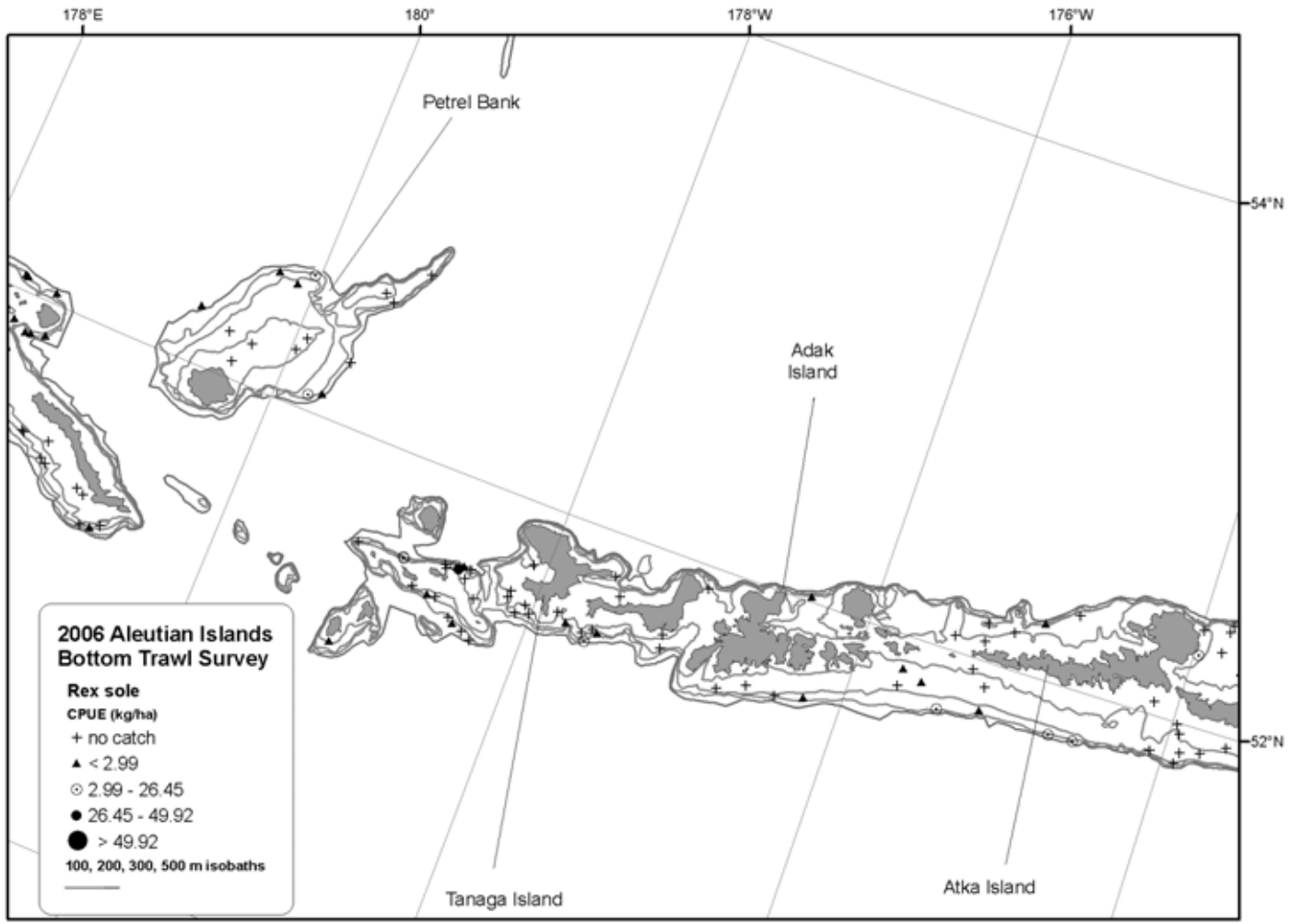


Figure 21. -- (continued).

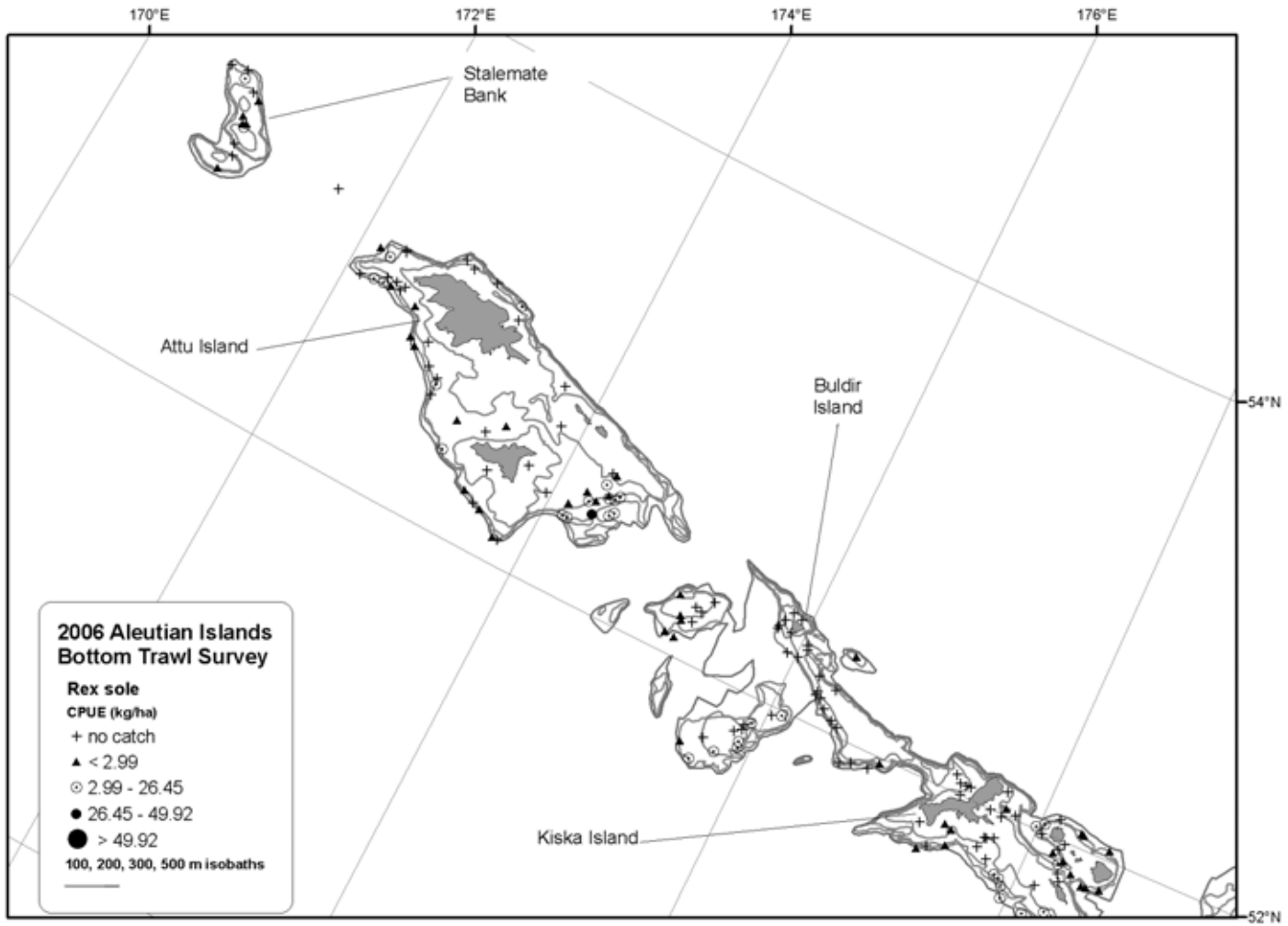


Figure 21. -- (continued).

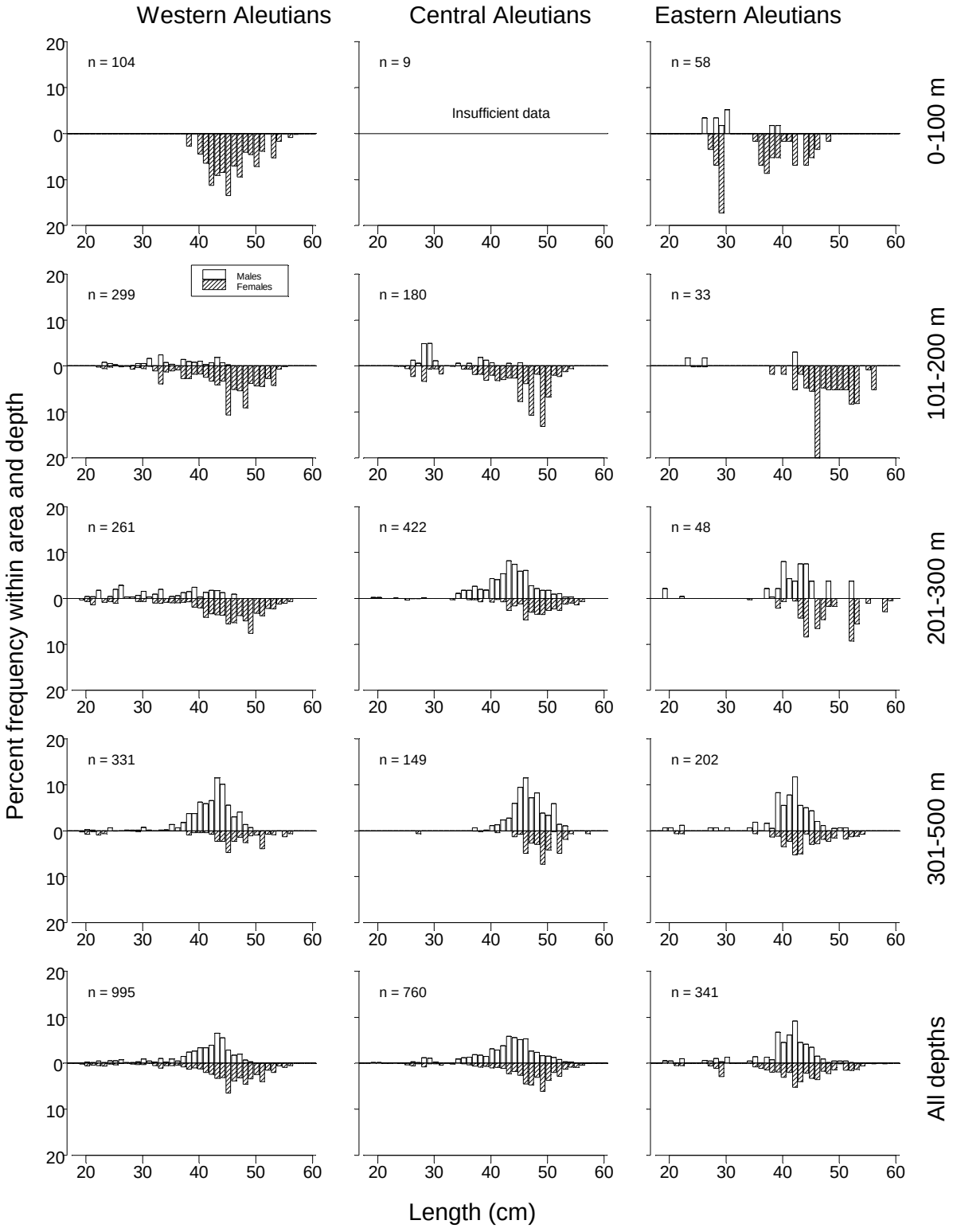


Figure 22. -- Size composition of rex sole from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

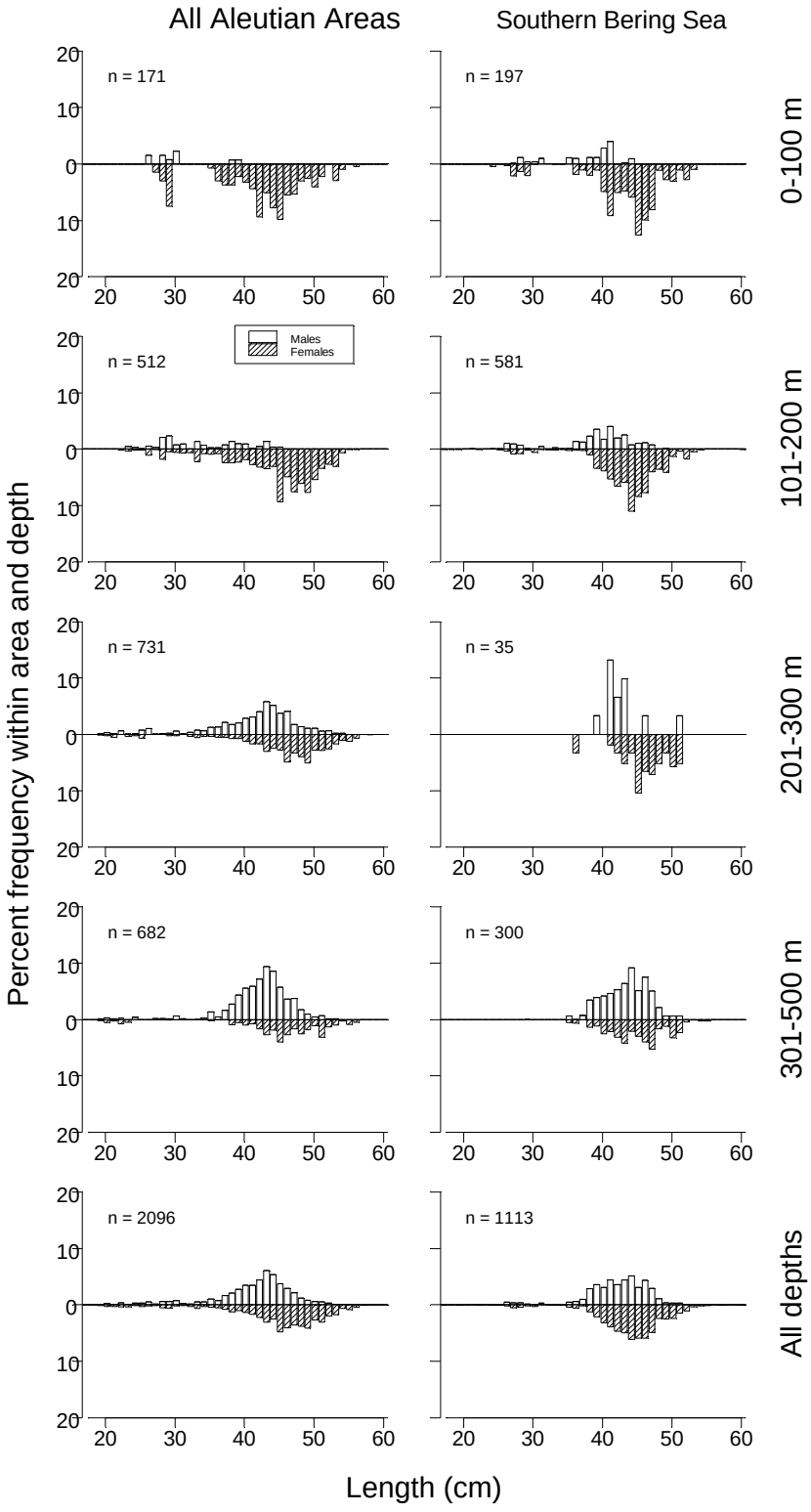


Figure 22. -- (continued).

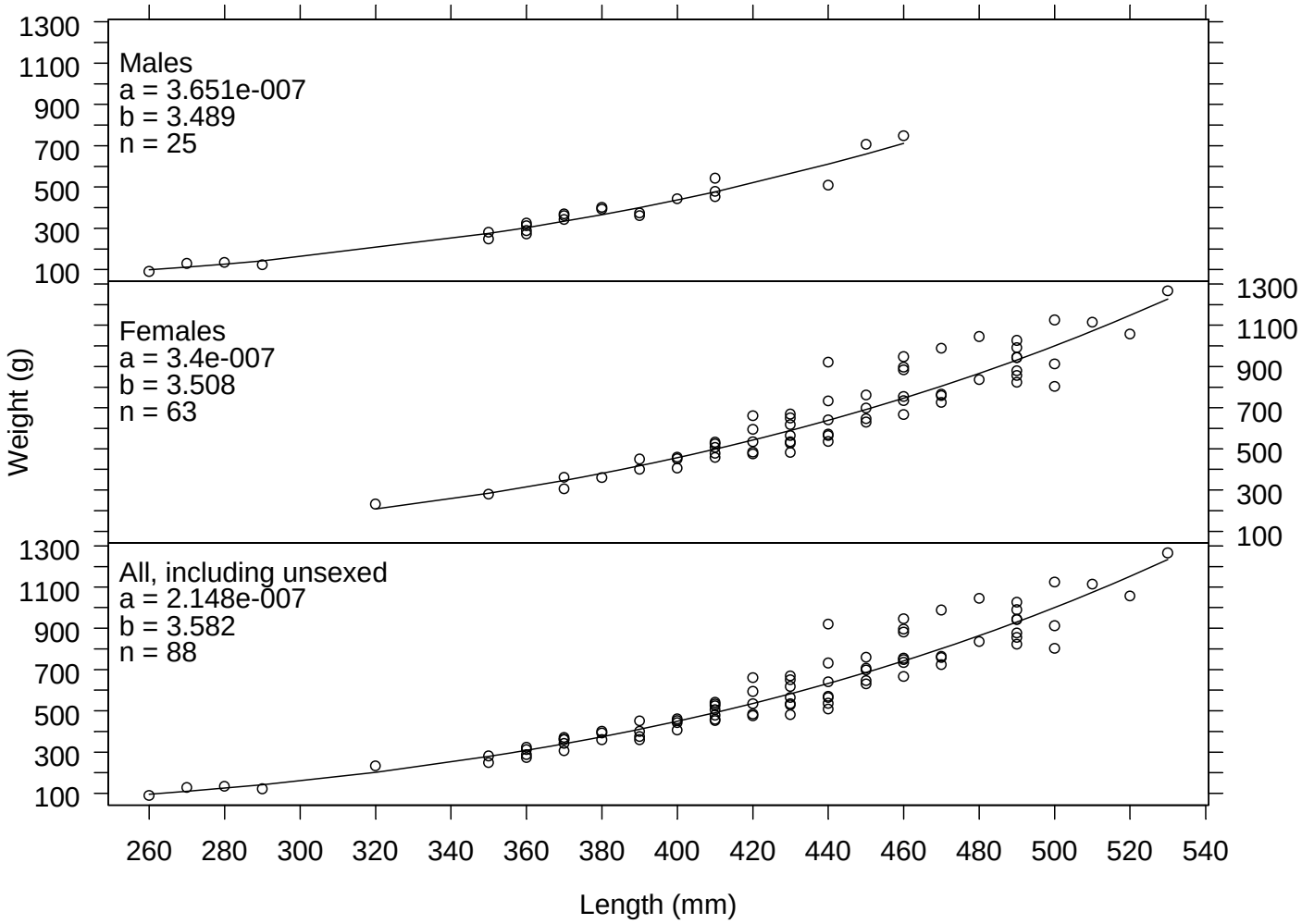


Figure 23. -- Length-weight relationship for rex sole specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 19. -- Number of survey hauls, number of hauls with Dover sole, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	1	0.009	4	0	14	0.725	40.0
	101-200	47	10	0.183	97	0	195	0.970	41.9
	201-300	23	4	0.373	64	0	135	1.431	48.8
	301-500	21	4	0.074	24	0	51	1.315	47.8
	All depths	113	19	0.125	190	70	310	1.164	45.0
Central Aleutians	1-100	32	3	0.069	40	0	116	0.538	36.4
	101-200	35	4	0.093	43	0	111	0.687	37.8
	201-300	21	4	0.636	134	0	337	0.792	40.8
	301-500	22	5	3.142	1,251	0	3,762	1.224	46.7
	All depths	110	16	0.887	1,468	0	3,864	1.150	45.6
Eastern Aleutians	1-100	12	1	0.005	4	0	12	0.132	24.0
	101-200	31	0	0.000	0	--	--	--	--
	201-300	27	1	0.008	4	0	12	0.571	39.0
	301-500	21	4	0.205	116	0	241	0.842	42.9
	All depths	91	6	0.049	124	6	243	0.812	42.2
All Aleutian Areas	1-100	66	5	0.03	49	0	124	0.524	35.8
	101-200	113	14	0.08	140	23	256	0.884	40.7
	201-300	71	9	0.23	202	0	408	0.990	43.3
	301-500	64	13	1.08	1,392	0	3,801	1.194	46.4
	All depths	314	41	0.31	1,782	0	4,167	1.128	45.3
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	5	0.176	33	3	62	0.496	36.4
	201-300	4	1	0.178	10	0	42	0.918	43.5
	301-500	8	4	3.167	330	0	758	0.893	42.3
	All depths	44	10	0.498	373	7	739	0.859	41.8

Table 20. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Dover sole by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	301-500	Petrel Bank	3	1	9.73	1,204	0	6,384
Southern Bering Sea	301-500	Combined Southern Bering	8	4	3.17	330	0	758
Central Aleutians	201-300	Petrel Bank	3	2	1.70	130	0	548
Western Aleutians	201-300	W Western Aleutians	13	3	0.65	61	0	135
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	0.64	28	0	386
Central Aleutians	1-100	Petrel Bank	5	1	0.39	37	0	140
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	3	0.33	88	0	207
Southern Bering Sea	101-200	E Southern Bering	9	5	0.28	33	2	63
Central Aleutians	301-500	N Central Aleutians	11	3	0.25	31	0	71
Central Aleutians	301-500	SE Central Aleutians	5	1	0.23	16	0	61
Central Aleutians	101-200	Petrel Bank	4	2	0.22	38	0	145
Western Aleutians	101-200	E Western Aleutians	18	5	0.22	27	0	63
Southern Bering Sea	201-300	Combined Southern Bering	4	1	0.18	10	0	42
Western Aleutians	101-200	W Western Aleutians	29	5	0.17	70	0	163
Western Aleutians	301-500	W Western Aleutians	18	4	0.14	24	0	51
Central Aleutians	201-300	SW Central Aleutians	6	1	0.07	3	0	10
Western Aleutians	201-300	E Western Aleutians	10	1	0.04	3	0	10
Western Aleutians	1-100	E Western Aleutians	14	1	0.04	4	0	14
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	0.03	4	0	50
Central Aleutians	201-300	N Central Aleutians	10	1	0.03	1	0	4
Central Aleutians	101-200	N Central Aleutians	8	1	0.03	3	0	10
Eastern Aleutians	201-300	NE Eastern Aleutians	12	1	0.02	4	0	13
Central Aleutians	1-100	N Central Aleutians	11	2	0.02	3	0	9
Central Aleutians	101-200	SW Central Aleutians	13	1	0.01	1	0	4

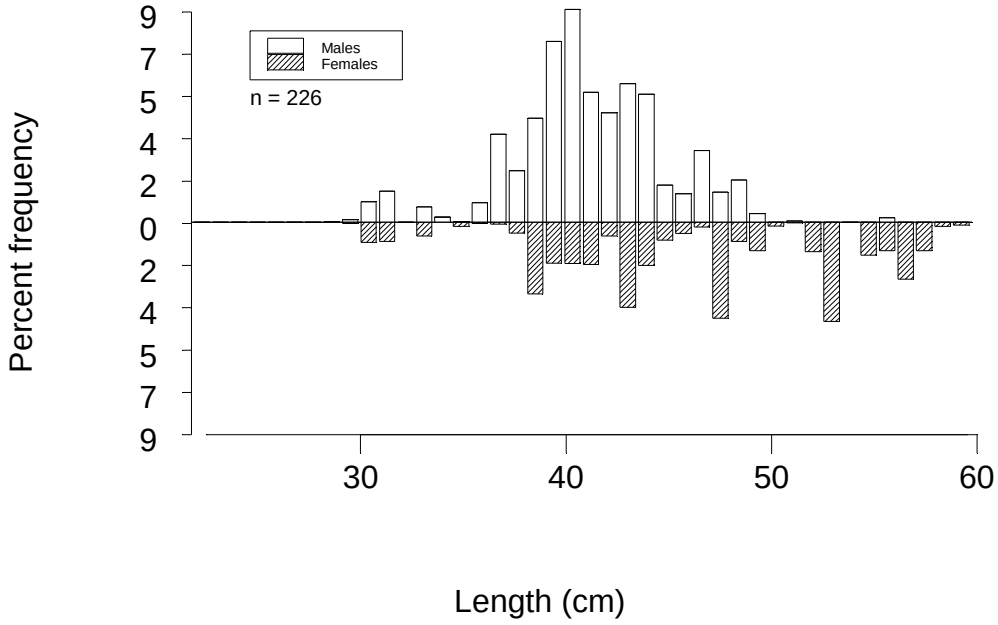


Figure 24. -- Size composition of Dover sole from the 2006 Aleutian Islands bottom trawl survey.

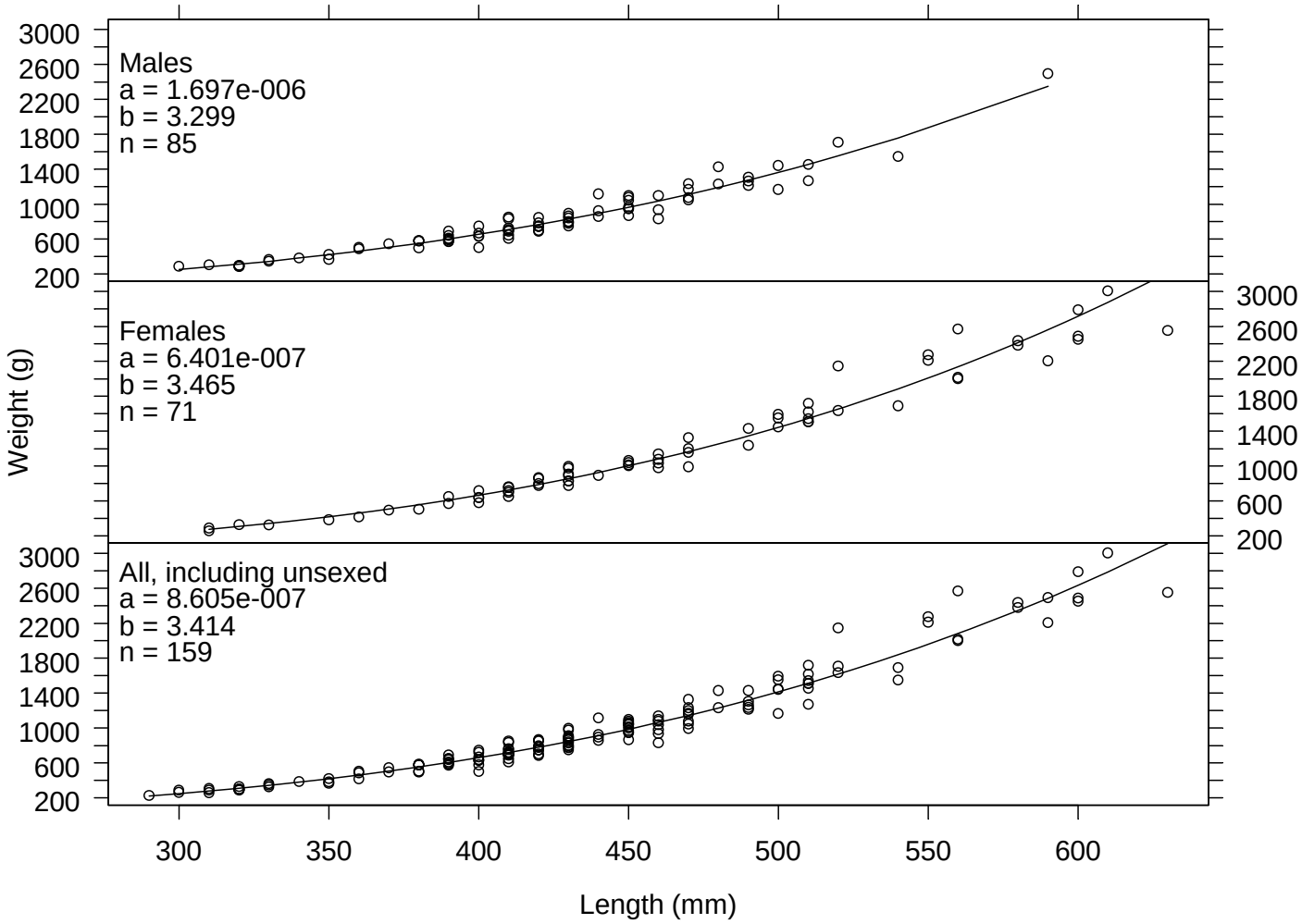


Figure 25. -- Length-weight relationship for Dover sole specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Roundfish

Atka mackerel (*Pleurogrammus monopterygius*)

Atka mackerel had the highest mean CPUE and estimated biomass of all species in the 2006 survey (Table 2), and were distributed throughout the entire survey area (Fig. 26). Estimated biomass for the entire survey area surpassed 740,000 t. Atka mackerel mean CPUE and estimated biomass were notably highest (84% of total biomass) in the Central and Eastern Aleutians areas, respectively (Table 21). The highest Atka mackerel abundance in the Western and Central Aleutians areas was found in the 1-100 m depth interval, and in the 101-200 m depth interval in the Eastern Aleutians area. Atka mackerel was captured in 62% of all successful survey tows conducted shallower than 300 m. The highest two stratum-specific mean CPUEs were found in the NE and SE Eastern Aleutians subareas between the Islands of Four Mountains and Amchitka Island in depth intervals of 101-200 m and 1-100 m, respectively (Table 22 and Fig. 26). The next three most important subareas were the SE Central Aleutians area at depths of 1-100 m and 101-200 m, and the E Western Aleutians subarea in the shallowest depth interval.

The largest mean size fish were found in the Eastern Aleutians and Southern Bering Sea areas. Almost 10,000 Atka mackerel were measured during the survey. One major mode dominated the Aleutian size distributions for males and females at 37 cm, while a smaller mode at 23 cm was also present at the 201-300 m depth interval (Fig. 27). The primary mode in the Southern Bering Sea was at 45 cm, although these fish represented only a small part of the Atka mackerel population. Figure 28 shows length-weight relationships for male, female, and combined sexes of Atka mackerel. Larger males were slightly heavier than similar-sized females. Data were pooled over the entire survey area.

Table 21. -- Number of survey hauls, number of hauls with Atka mackerel, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	20	132.117	64,429	13,100	115,757	0.478	33.4
	101-200	47	29	67.561	35,926	0	86,872	0.352	30.6
	201-300	23	13	1.843	318	36	600	0.313	28.2
	301-500	21	4	0.062	21	0	50	0.614	35.9
	All depths	113	66	66.287	100,693	30,648	170,739	0.432	32.4
Central Aleutians	1-100	32	29	329.775	192,832	77,991	307,672	0.566	35.2
	101-200	35	29	184.775	85,102	9,655	160,548	0.634	37.0
	201-300	21	3	0.486	103	0	292	0.752	39.6
	301-500	22	0	0.000	0	--	--	--	--
	All depths	110	61	168.073	278,036	144,474	411,597	0.587	35.8
Eastern Aleutians	1-100	12	5	156.587	107,230	0	255,591	0.737	38.3
	101-200	31	12	264.038	205,108	0	567,230	0.782	39.7
	201-300	27	13	77.179	37,829	0	85,627	0.836	40.2
	301-500	21	3	0.071	40	0	99	0.726	39.1
	All depths	91	33	138.968	350,206	0	729,472	0.774	39.3
All Aleutian Areas	1-100	66	54	207.43	364,490	182,379	546,601	0.601	35.8
	101-200	113	70	184.35	326,136	0	688,106	0.696	38.0
	201-300	71	29	43.79	38,249	0	84,628	0.831	40.1
	301-500	64	7	0.05	61	0	123	0.688	38.0
	All depths	314	160	128.03	728,935	324,627	1,133,244	0.656	37.0
Southern Bering Sea	1-100	21	16	25.546	10,284	0	20,987	1.353	44.8
	101-200	11	5	0.953	176	0	384	1.204	43.3
	201-300	4	4	32.664	1,842	0	7,560	0.917	41.9
	301-500	8	1	0.057	6	0	20	0.514	33.5
	All depths	44	26	16.451	12,308	1,344	23,273	1.285	44.3

Table 22. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Atka mackerel by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Eastern Aleutians	101-200	NE Eastern Aleutians	11	5	875.29	176,156	0	567,533
Eastern Aleutians	1-100	SE Eastern Aleutians	6	4	615.92	107,209	0	280,511
Central Aleutians	1-100	SE Central Aleutians	7	5	565.49	65,825	0	161,535
Central Aleutians	101-200	SE Central Aleutians	10	7	547.46	41,158	0	102,582
Western Aleutians	1-100	E Western Aleutians	14	14	540.16	63,918	10,612	117,224
Central Aleutians	1-100	Petrel Bank	5	5	281.56	27,031	0	89,050
Central Aleutians	1-100	SW Central Aleutians	9	8	270.04	43,683	0	87,629
Central Aleutians	1-100	N Central Aleutians	11	11	267.35	56,294	0	118,112
Central Aleutians	101-200	Petrel Bank	4	4	238.47	41,388	0	121,867
Eastern Aleutians	201-300	NE Eastern Aleutians	12	7	191.21	37,640	0	88,820
Eastern Aleutians	101-200	SE Eastern Aleutians	10	4	152.13	28,908	0	79,061
Western Aleutians	101-200	E Western Aleutians	18	16	79.86	10,002	2,692	17,313
Western Aleutians	101-200	W Western Aleutians	29	13	63.77	25,924	0	77,270
Southern Bering Sea	1-100	E Southern Bering	19	15	41.82	10,206	0	20,984
Southern Bering Sea	201-300	Combined Southern Bering	4	4	32.66	1,842	0	7,559
Central Aleutians	101-200	SW Central Aleutians	13	12	15.79	1,661	93	3,230
Central Aleutians	101-200	N Central Aleutians	8	6	8.39	895	0	2,803
Western Aleutians	201-300	W Western Aleutians	13	6	2.51	236	0	512
Central Aleutians	201-300	SE Central Aleutians	2	1	1.88	90	0	1,231
Western Aleutians	1-100	W Western Aleutians	8	6	1.38	510	0	1,426
Southern Bering Sea	101-200	E Southern Bering	9	4	1.21	142	0	342
Western Aleutians	201-300	E Western Aleutians	10	7	1.05	82	0	193
Eastern Aleutians	201-300	SE Eastern Aleutians	9	6	0.92	189	0	433
Southern Bering Sea	101-200	W Southern Bering	2	1	0.51	34	0	467
Southern Bering Sea	1-100	W Southern Bering	2	1	0.50	79	0	1,076
Central Aleutians	201-300	N Central Aleutians	10	1	0.17	7	0	24
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	0.17	21	0	287
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	0.13	6	0	75
Eastern Aleutians	101-200	NW Eastern Aleutians	3	1	0.12	18	0	98
Eastern Aleutians	101-200	SW Eastern Aleutians	7	2	0.11	25	0	65
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	1	0.10	26	0	85
Western Aleutians	301-500	E Western Aleutians	3	1	0.09	14	0	72
Central Aleutians	201-300	Petrel Bank	3	1	0.07	5	0	29
Southern Bering Sea	301-500	Combined Southern Bering	8	1	0.06	6	0	20
Western Aleutians	301-500	W Western Aleutians	18	3	0.04	7	0	15
Eastern Aleutians	301-500	SE Eastern Aleutians	9	1	0.03	9	0	28

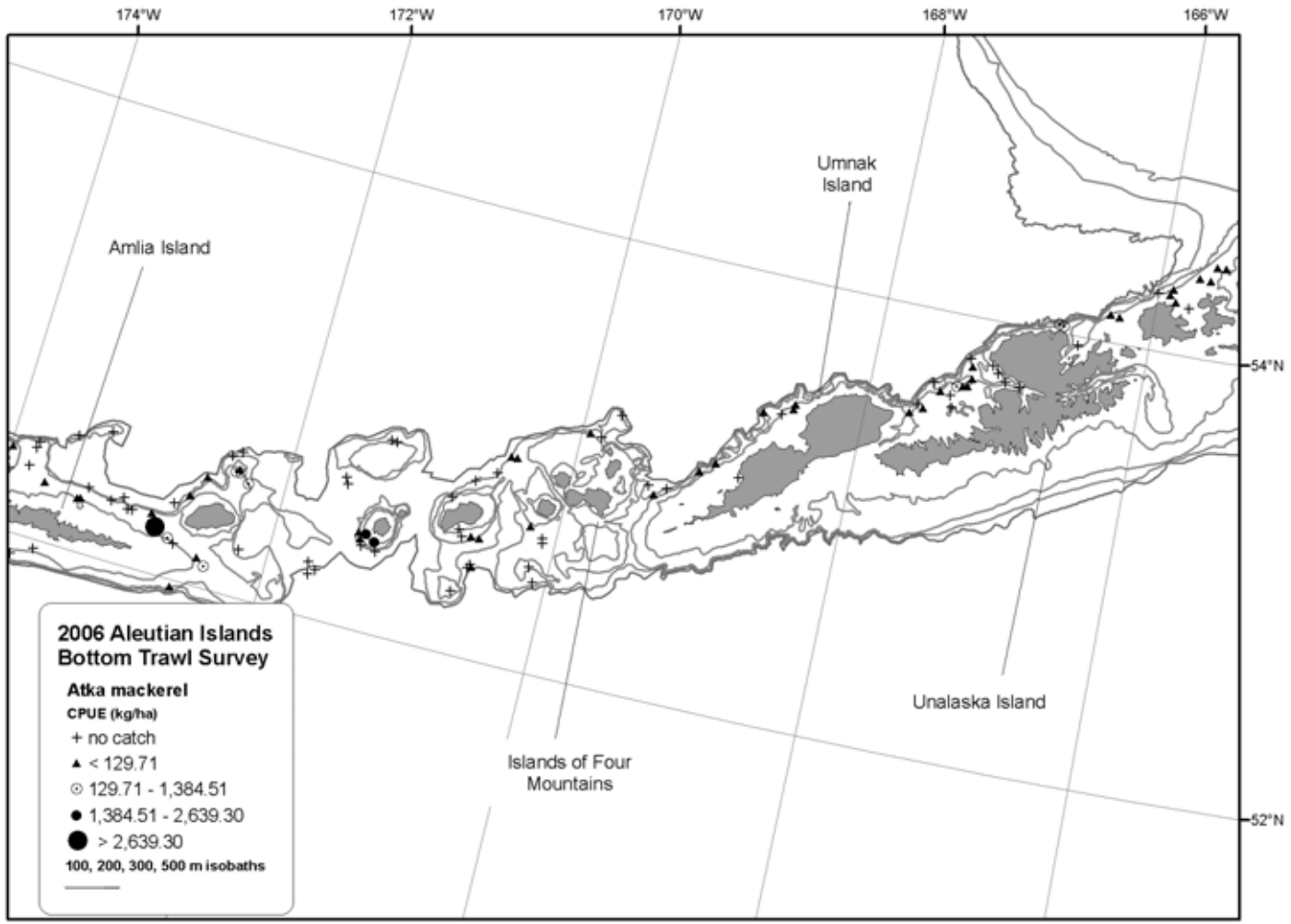


Figure 26. -- Distribution and relative abundance of Atka mackerel from the 2006 Aleutian Islands bottom trawl survey.

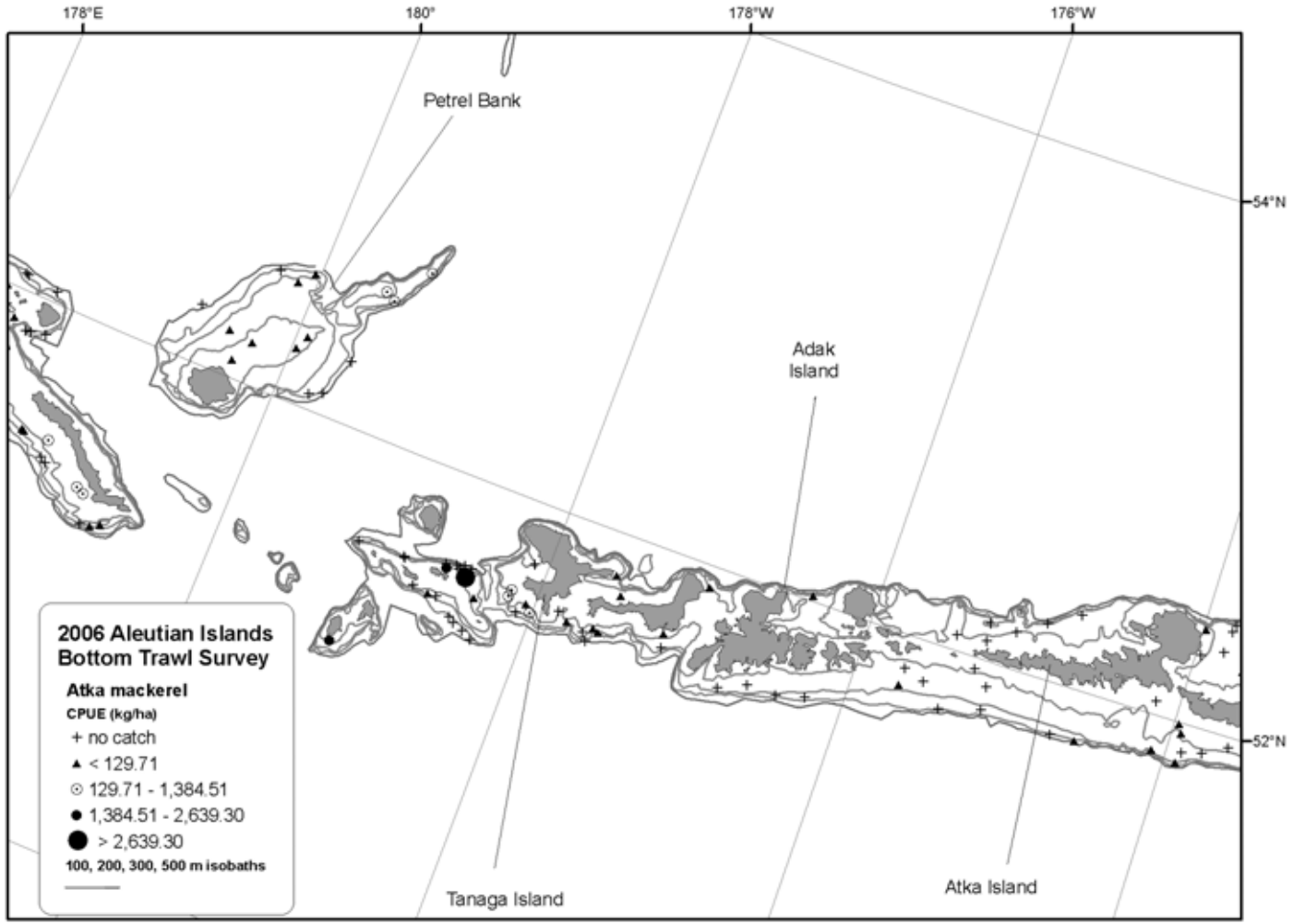


Figure 26. -- (continued).

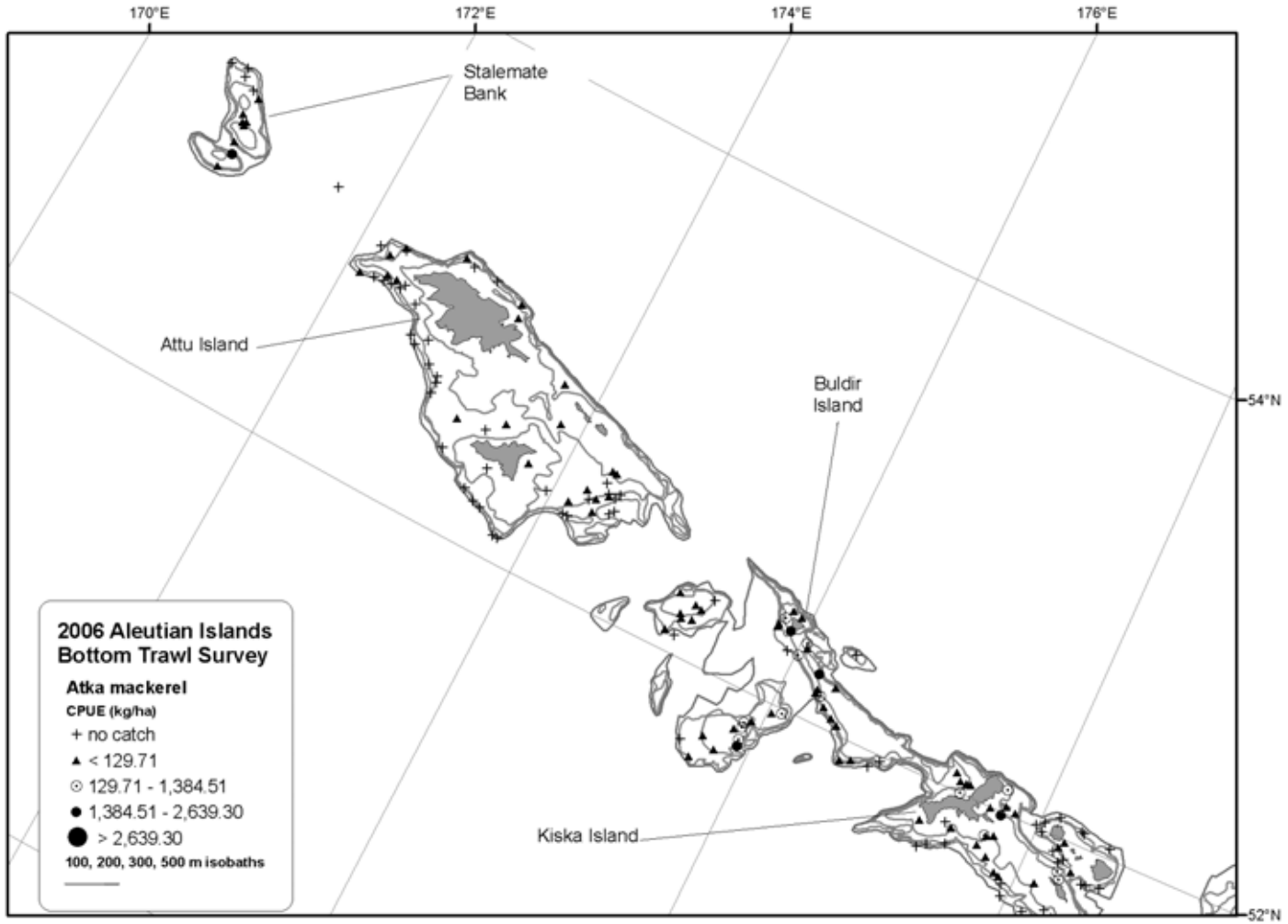


Figure 26. -- (continued).

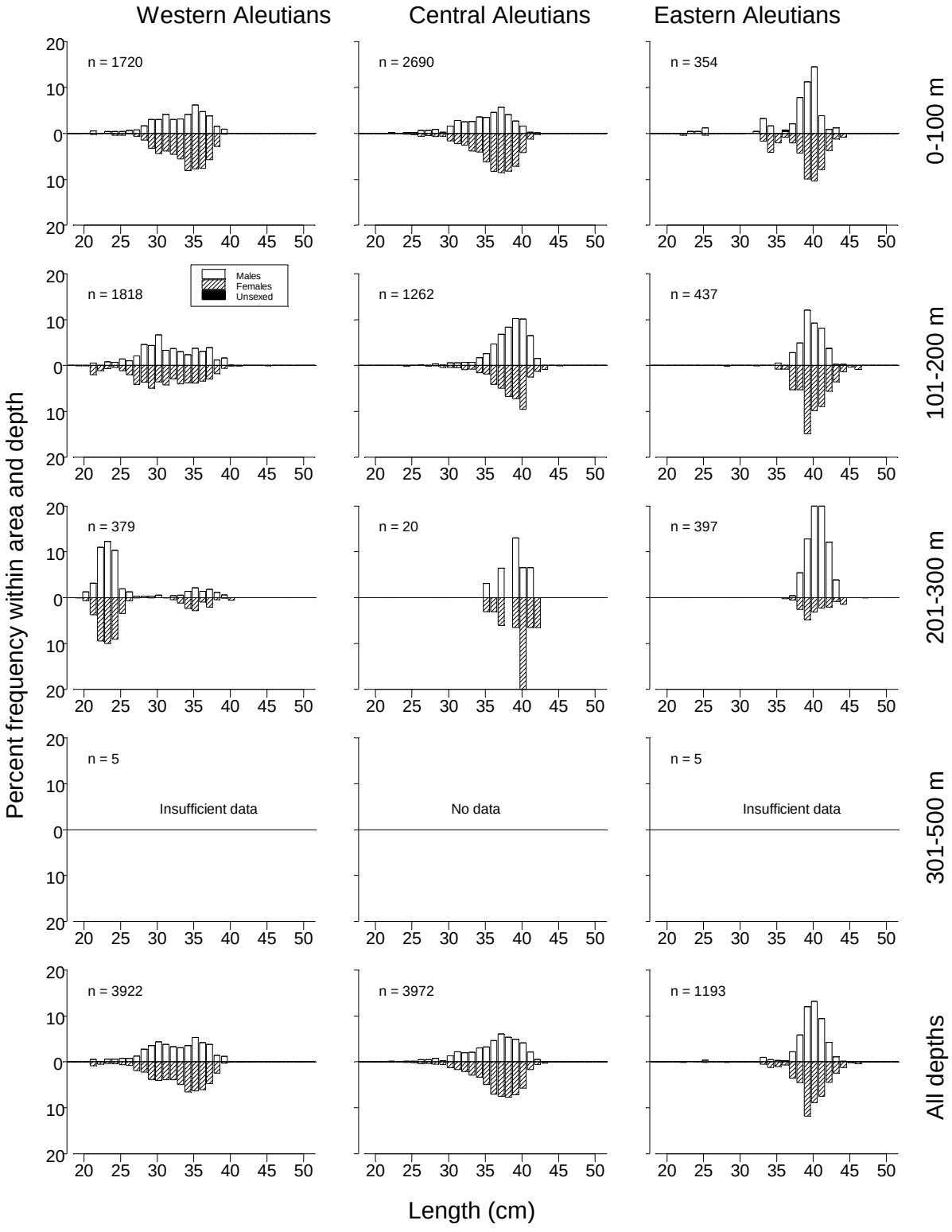


Figure 27. -- Size composition of Atka mackerel from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

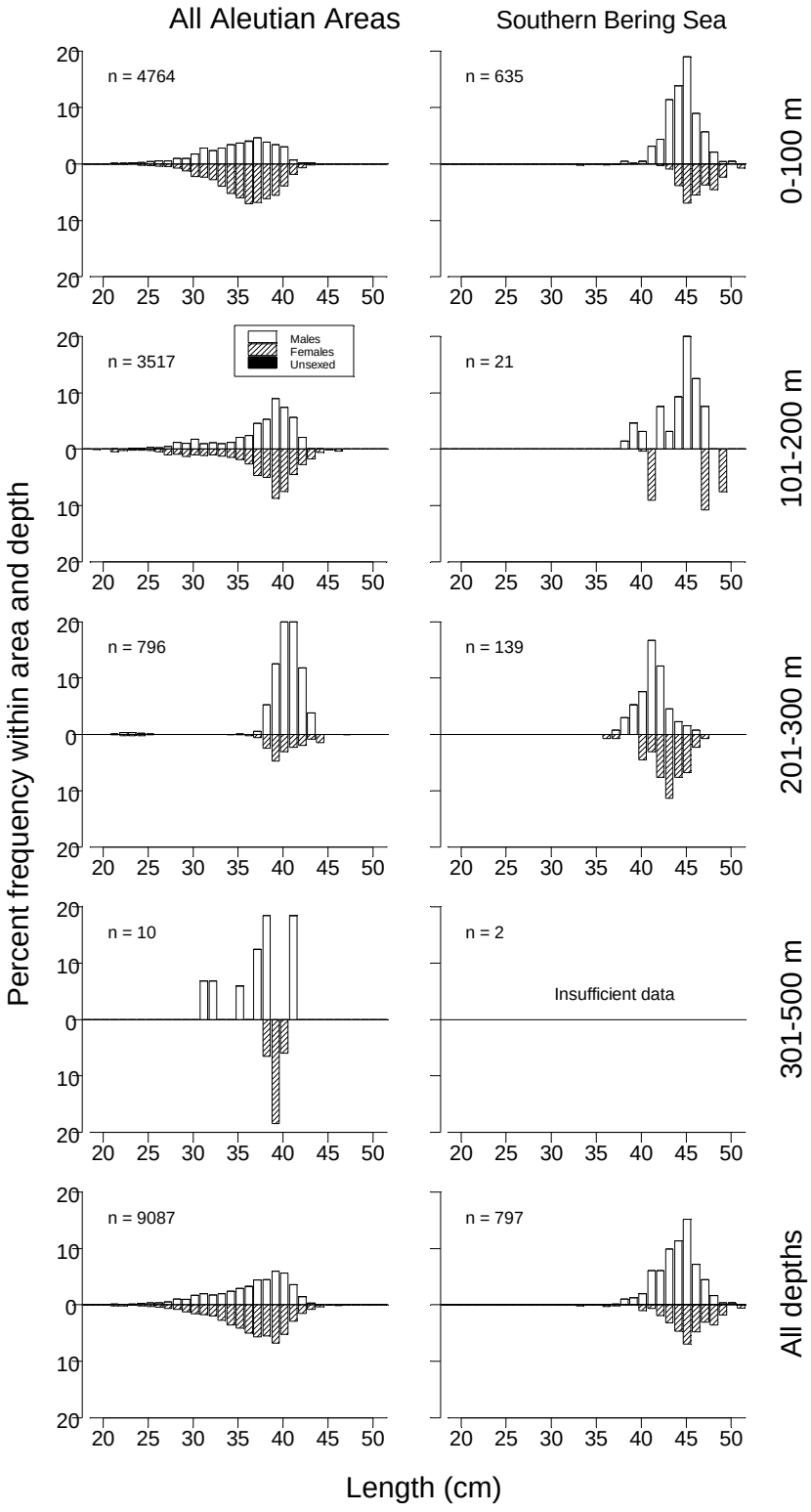


Figure 27. -- (continued).

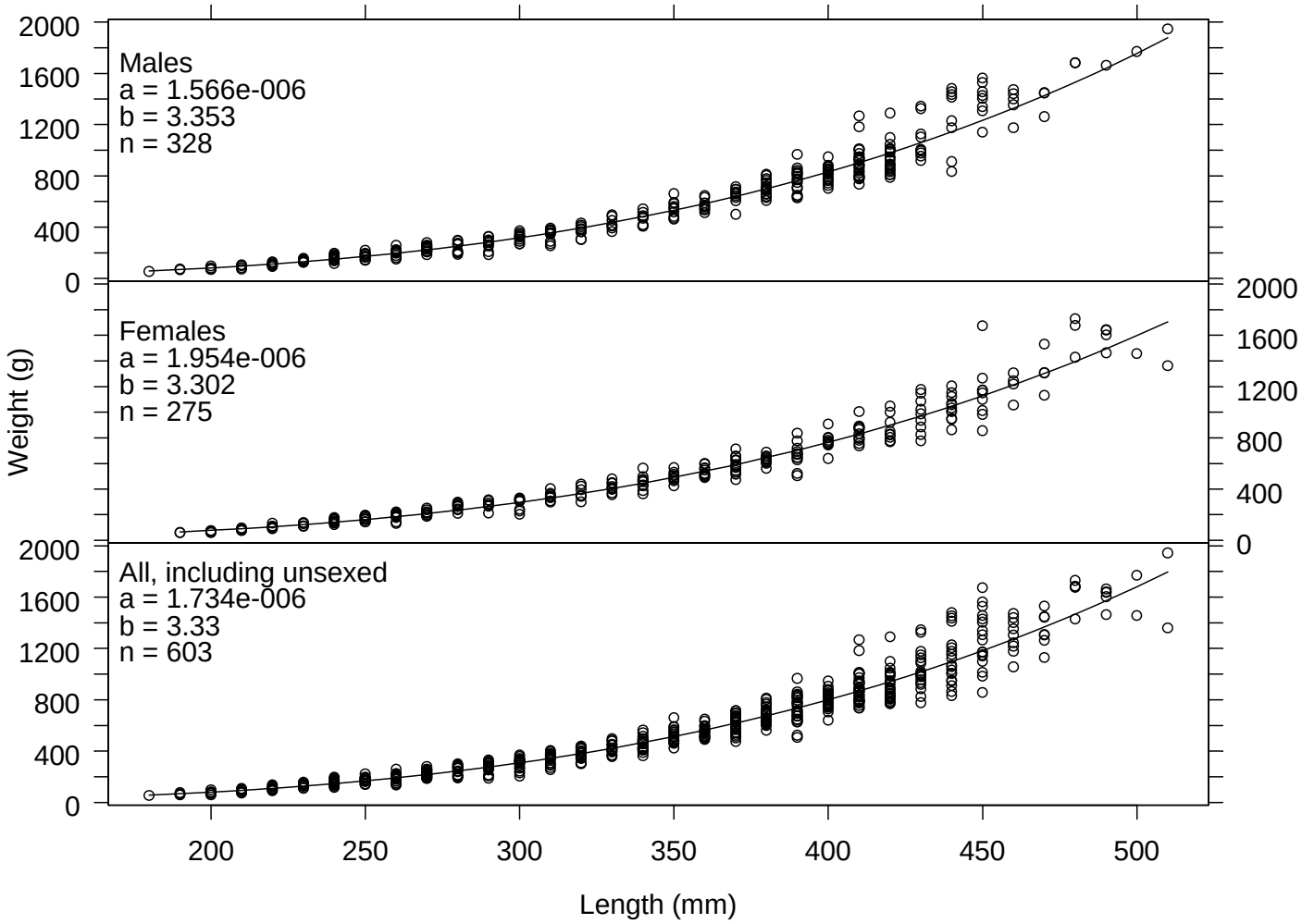


Figure 28. -- Length-weight relationship for Atka mackerel specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Pacific cod (*Gadus macrocephalus*)

Pacific cod were more or less evenly distributed throughout the survey area to depths of about 300 m (Table 23). Cod mean CPUE was highest in the Aleutian areas and decreased in the Southern Bering Sea area (Table 2). Estimated biomass for the entire survey area was 92,526 t. The Eastern Aleutians area biomass was about double that of the other Aleutian areas. Although the mean CPUE in the Southern Bering Sea was comparable to the Aleutian areas, the relatively small geographic area only produced an estimated biomass of 9,900 t (Table 23). The 101-200 m depth interval produced 64% of the overall Aleutian biomass. The 1-100 m interval produced 41% of the estimated biomass in the Southern Bering Sea area. Pacific cod were captured in 76% of all successful survey tows conducted shallower than 300 m. There were no outstandingly large catches of Pacific cod, only one catch exceeded four times the standard deviation of the mean CPUE. This catch occurred in Seguam Pass at 101-200 m depth interval (Fig. 29). The highest three CPUEs were observed in the SE Eastern Aleutians (101-200 m depth interval) and the SE Central Aleutians (1-100 and 101-200 m depth intervals) subareas (Table 24). Over 3,200 cod were measured representing a very broad size range. In the Aleutian areas, distinct length frequency modes were found at 18 and 40 cm, while there was a broad distribution of lengths from 60 to 115 cm (Fig. 30). In the Southern Bering Sea area cod less than 55 cm were uncommon (Fig. 28). Figure 31 shows length-weight relationships for male, female, and combined sexes of Pacific cod. Judging by the similar coefficients, the male and female regression curves track each other very closely, but there were more of the largest cod represented in the female curve.

Walleye pollock (*Theragra chalcogramma*)

Walleye pollock mean CPUE was the sixth highest among species in the combined Aleutian areas and fourth highest in the Southern Bering Sea area (Table 2). Pollock were captured in all areas and depth intervals. Estimated total pollock biomass reached almost 113,000 t and 56% of the total was found in the 101-200 m depth interval in the Eastern Aleutians area (Table 25). In the areas where pollock was most abundant, a large proportion of trawl hauls caught that species (Table 25). The three highest subarea mean CPUEs were in the N Central Aleutians subarea (201-300 m) and NE and SE Eastern Aleutians subareas (101-200 m) (Table 26). The high mean CPUE in the N Central Aleutians subarea resulted from two large catches that occurred immediately west of Tanaga Island. The high mean CPUE from the Eastern Aleutians area resulted from a two large catches near Amlia Island (Fig. 32) Juvenile pollock were caught in high abundance at the 101-200 m depth interval in the Aleutian Islands areas and the Southern Bering Sea (Fig. 33). Figure 34 illustrates the length-weight relationships for male, female, and combined sexes of walleye pollock.

Table 23. -- Number of survey hauls, number of hauls with Pacific cod, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	13	15.816	7,713	2,328	13,097	2.984	46.8
	101-200	47	31	21.030	11,183	3,716	18,649	4.644	66.4
	201-300	23	13	4.866	839	332	1,346	2.174	57.2
	301-500	21	0	0.000	0	--	--	--	--
	All depths	113	57	12.991	19,734	10,758	28,710	3.890	58.3
Central Aleutians	1-100	32	30	22.155	12,955	6,718	19,192	4.301	63.8
	101-200	35	30	17.314	7,974	2,359	13,589	3.665	61.7
	201-300	21	15	5.235	1,104	270	1,937	2.320	56.5
	301-500	22	0	0.000	0	--	--	--	--
	All depths	110	75	13.319	22,033	13,826	30,239	3.972	62.7
Eastern Aleutians	1-100	12	5	1.037	710	0	1,508	3.308	51.1
	101-200	31	28	45.612	35,432	0	83,517	6.292	77.8
	201-300	27	22	14.423	7,070	3,276	10,863	3.987	68.0
	301-500	21	3	0.242	137	0	320	2.897	63.5
	All depths	91	58	17.202	43,349	0	90,273	5.857	75.7
All Aleutian Areas	1-100	66	48	12.17	21,378	13,342	29,413	3.793	57.2
	101-200	113	89	30.86	54,589	7,046	102,131	5.571	73.1
	201-300	71	50	10.32	9,012	5,222	12,802	3.614	65.6
	301-500	64	3	0.11	137	0	312	2.897	63.5
	All depths	314	190	14.95	85,116	37,099	133,132	4.913	68.3
Southern Bering Sea	1-100	21	18	7.607	3,063	1,045	5,081	2.881	56.9
	101-200	11	11	11.931	2,206	956	3,455	2.035	54.7
	201-300	4	4	28.679	1,617	0	4,771	3.619	67.5
	301-500	8	4	5.033	525	0	1,302	2.534	60.3
	All depths	44	37	9.905	7,410	4,330	10,491	2.766	58.8

Table 24. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Pacific cod by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Eastern Aleutians	101-200	SE Eastern Aleutians	10	9	147.65	28,056	0	81,120
Central Aleutians	1-100	SE Central Aleutians	7	7	60.48	7,040	1,770	12,310
Central Aleutians	101-200	SE Central Aleutians	10	10	40.21	3,023	0	6,590
Central Aleutians	101-200	SW Central Aleutians	13	11	31.93	3,360	0	8,180
Southern Bering Sea	201-300	Combined Southern Bering	4	4	28.68	1,617	0	4,770
Eastern Aleutians	201-300	NE Eastern Aleutians	12	11	27.55	5,423	1,516	9,330
Central Aleutians	1-100	SW Central Aleutians	9	8	24.29	3,929	0	8,876
Eastern Aleutians	101-200	NE Eastern Aleutians	11	10	23.06	4,641	418	8,863
Western Aleutians	101-200	W Western Aleutians	29	22	21.37	8,688	1,477	15,899
Western Aleutians	101-200	E Western Aleutians	18	9	19.92	2,495	33	4,957
Western Aleutians	1-100	E Western Aleutians	14	6	17.17	2,031	191	3,872
Western Aleutians	1-100	W Western Aleutians	8	7	15.38	5,681	0	11,464
Southern Bering Sea	101-200	E Southern Bering	9	9	14.76	1,740	834	2,646
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	12.74	199	0	1,371
Southern Bering Sea	1-100	E Southern Bering	19	17	12.26	2,992	965	5,019
Central Aleutians	101-200	N Central Aleutians	8	7	12.11	1,291	276	2,306
Central Aleutians	201-300	SW Central Aleutians	6	4	11.50	490	0	1,220
Eastern Aleutians	101-200	SW Eastern Aleutians	7	6	9.58	2,167	642	3,691
Central Aleutians	201-300	N Central Aleutians	10	9	9.24	405	0	897
Western Aleutians	201-300	W Western Aleutians	13	11	8.49	799	271	1,326
Central Aleutians	1-100	N Central Aleutians	11	10	7.22	1,521	853	2,189
Southern Bering Sea	101-200	W Southern Bering	2	2	6.96	466	0	5,554
Eastern Aleutians	201-300	SE Eastern Aleutians	9	6	5.23	1,078	199	1,957
Eastern Aleutians	201-300	SW Eastern Aleutians	4	3	5.17	371	0	1,315
Southern Bering Sea	301-500	Combined Southern Bering	8	4	5.03	525	0	1,276
Central Aleutians	1-100	Petrel Bank	5	5	4.85	465	47	883
Central Aleutians	201-300	SE Central Aleutians	2	2	4.37	209	0	2,440
Eastern Aleutians	101-200	NW Eastern Aleutians	3	3	3.57	569	0	1,617
Eastern Aleutians	1-100	SE Eastern Aleutians	6	3	2.58	449	0	1,192
Central Aleutians	101-200	Petrel Bank	4	2	1.73	301	0	1,134
Eastern Aleutians	1-100	NW Eastern Aleutians	2	2	1.35	262	0	3,041
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	1.35	59	0	556
Western Aleutians	201-300	E Western Aleutians	10	2	0.51	40	0	105
Southern Bering Sea	1-100	W Southern Bering Sea	2	1	0.45	71	0	970
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	1	0.29	78	0	255

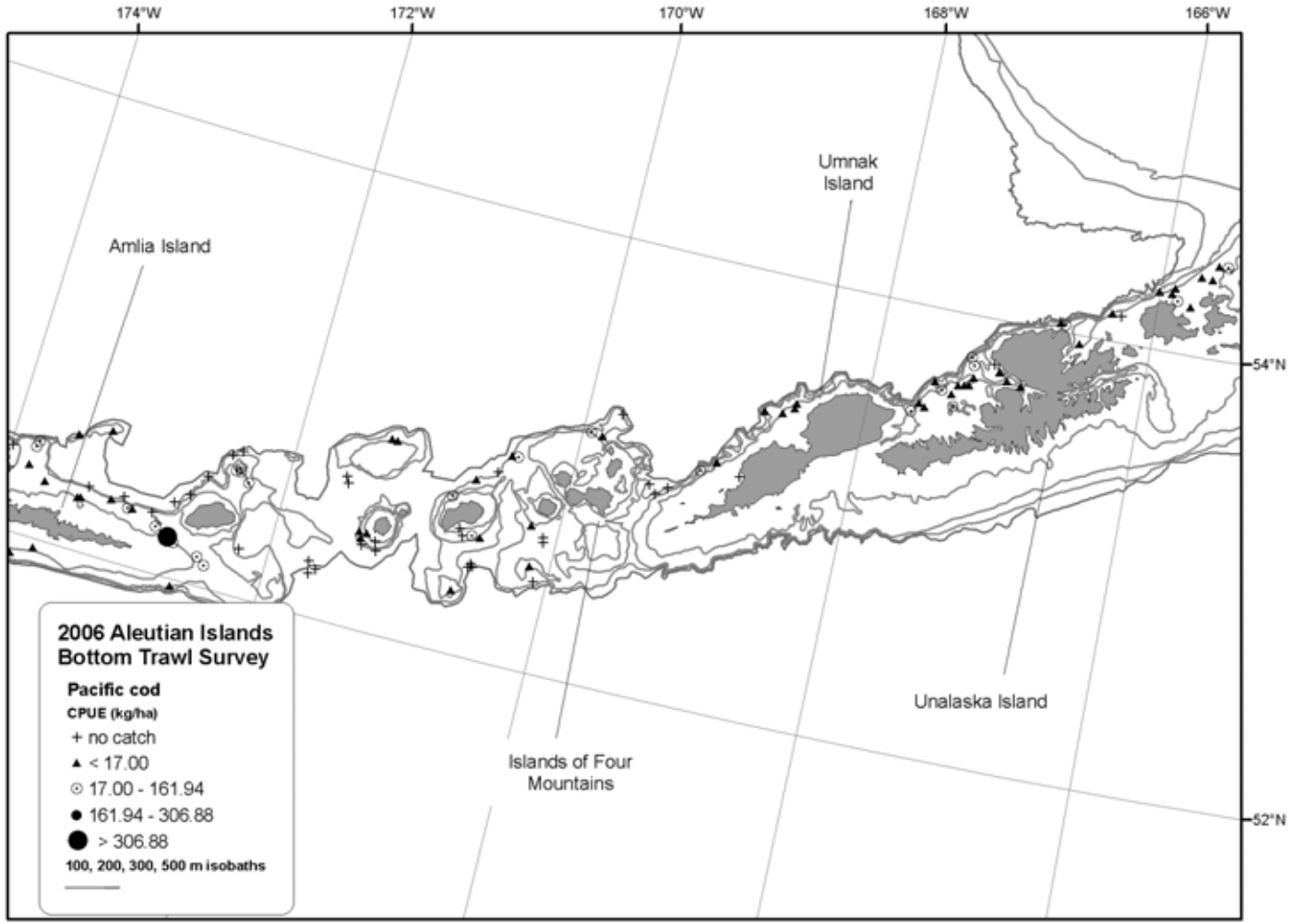


Figure 29. -- Distribution and relative abundance of Pacific cod from the 2006 Aleutian Islands bottom trawl survey.

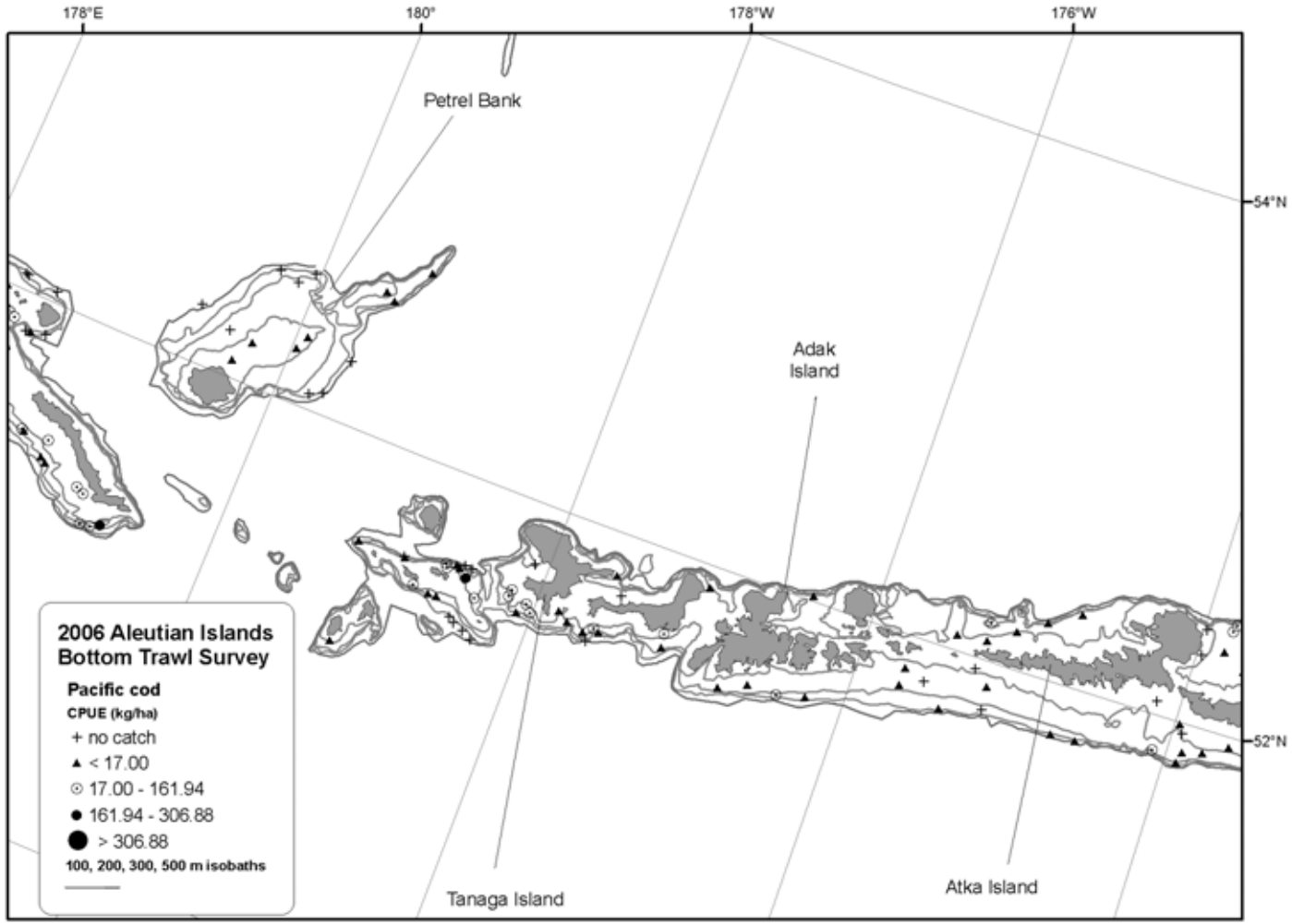


Figure 29. -- (continued).

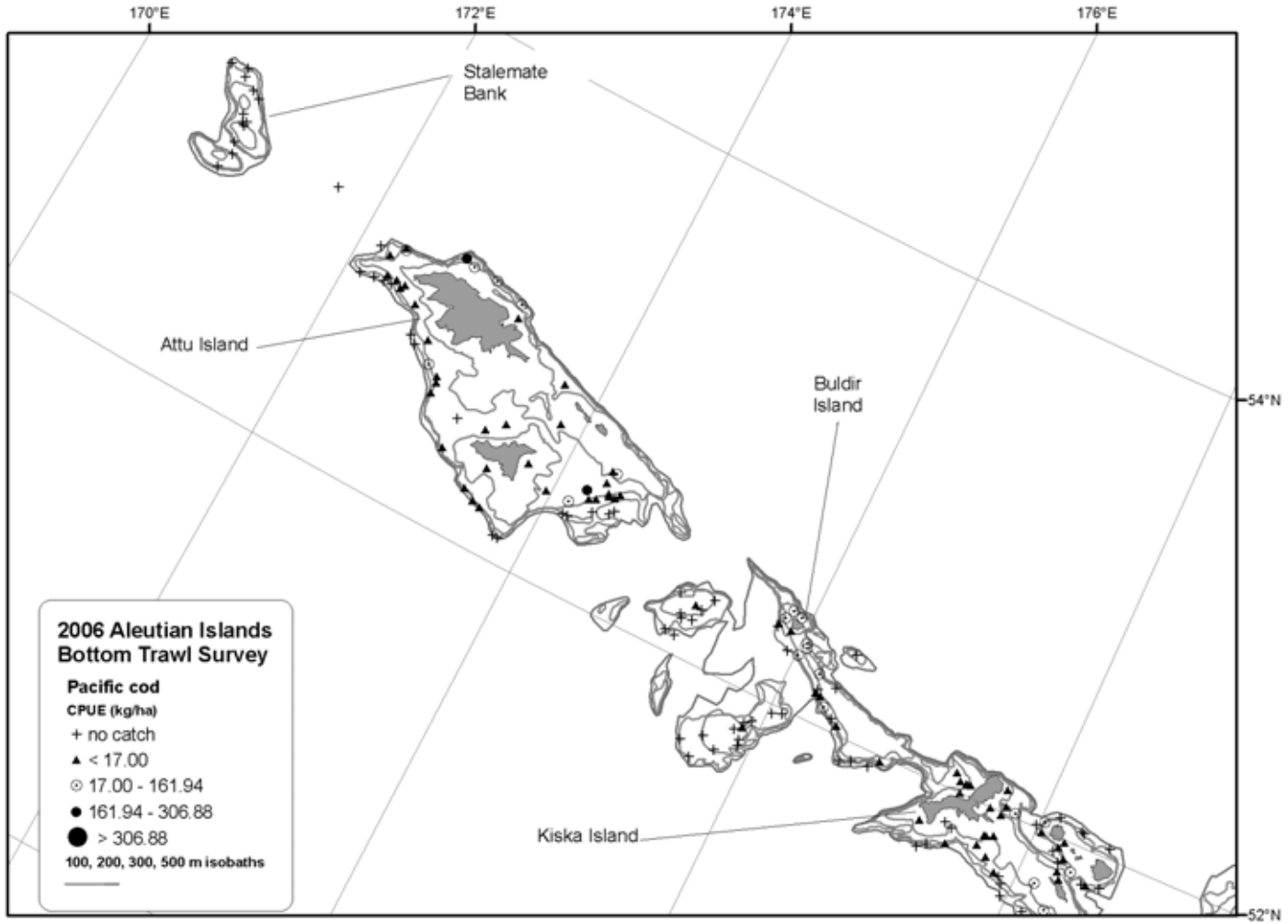


Figure 29. -- (continued).

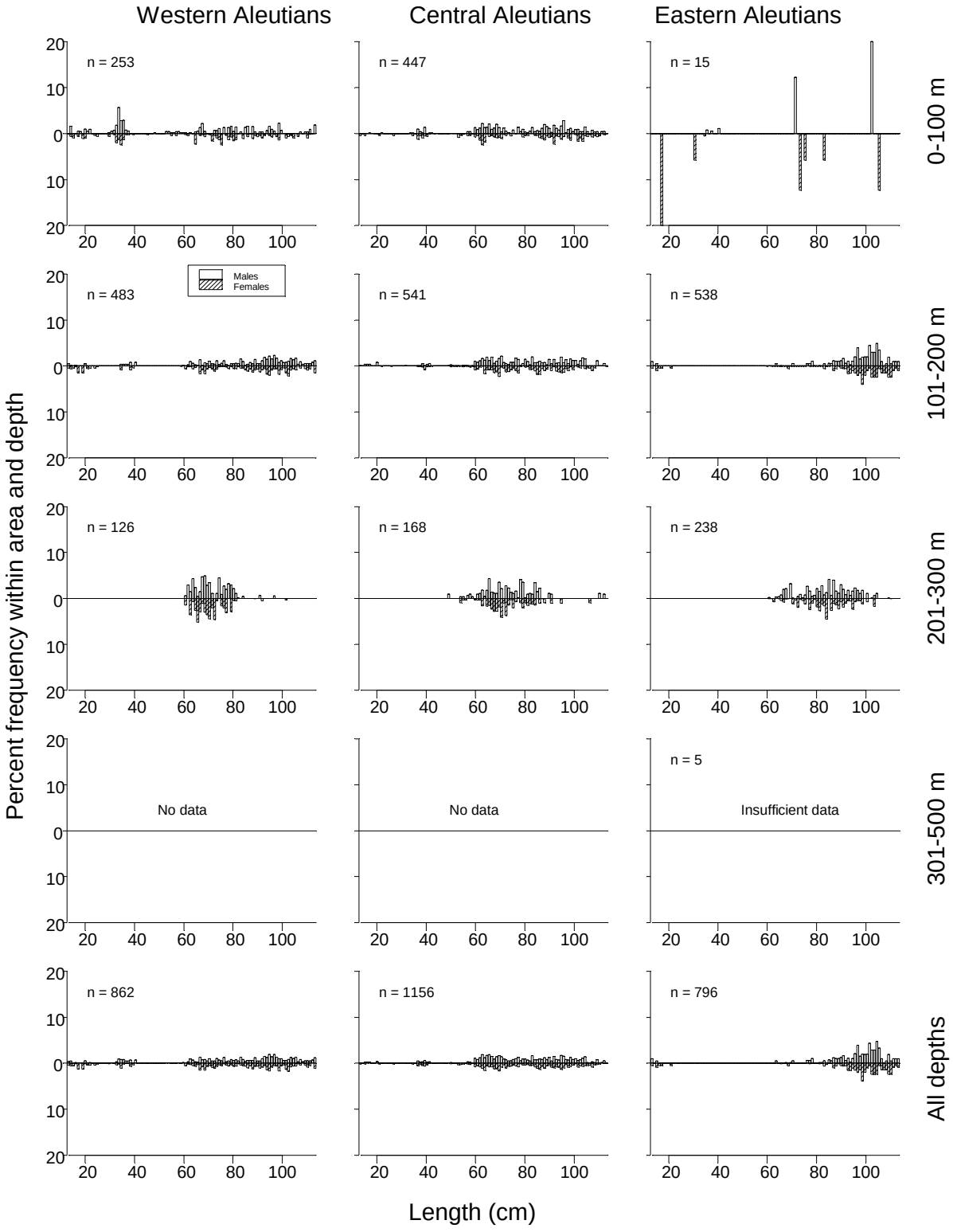


Figure 30. -- Size composition of Pacific cod from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

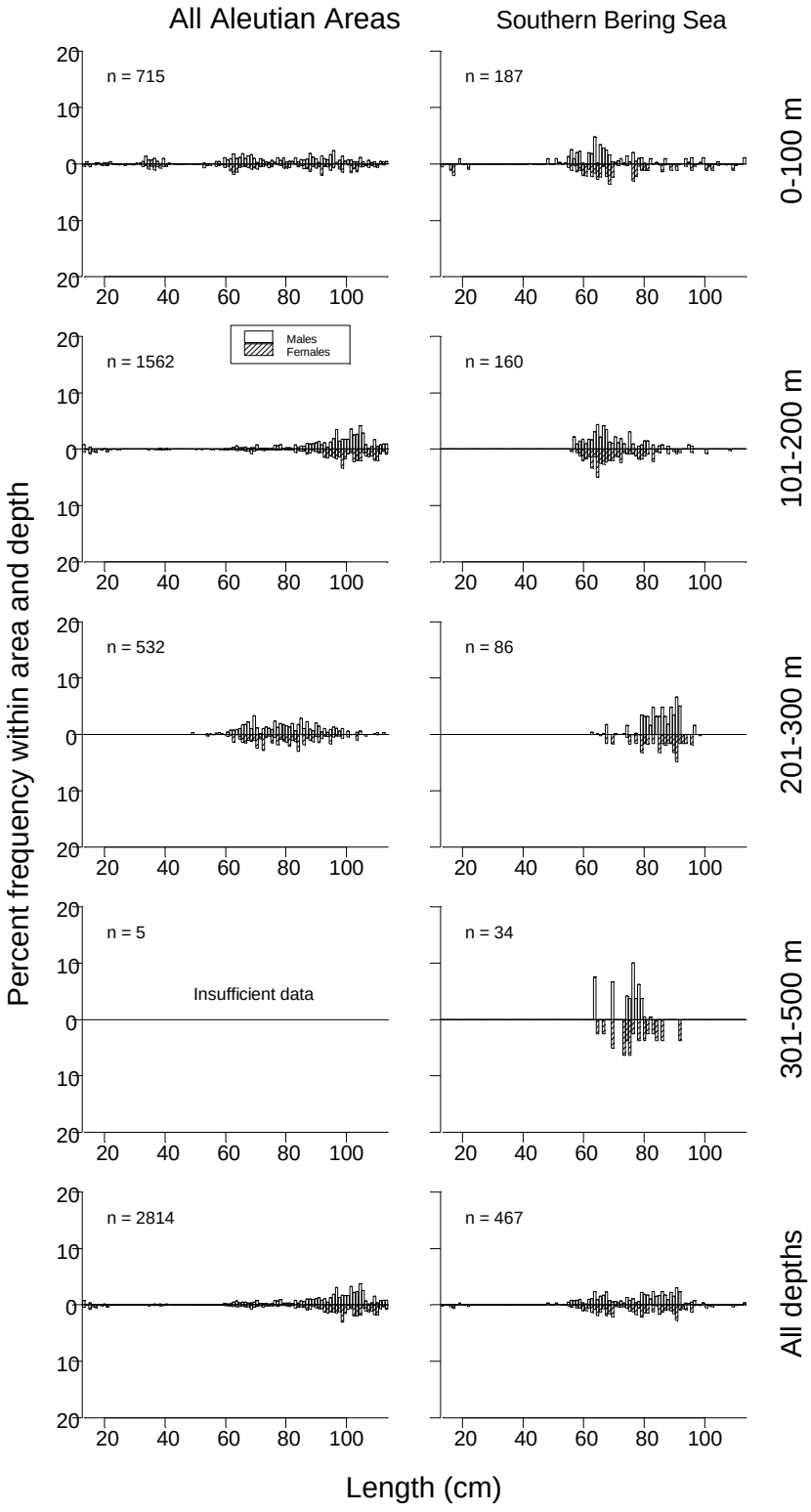


Figure 30. -- (continued).

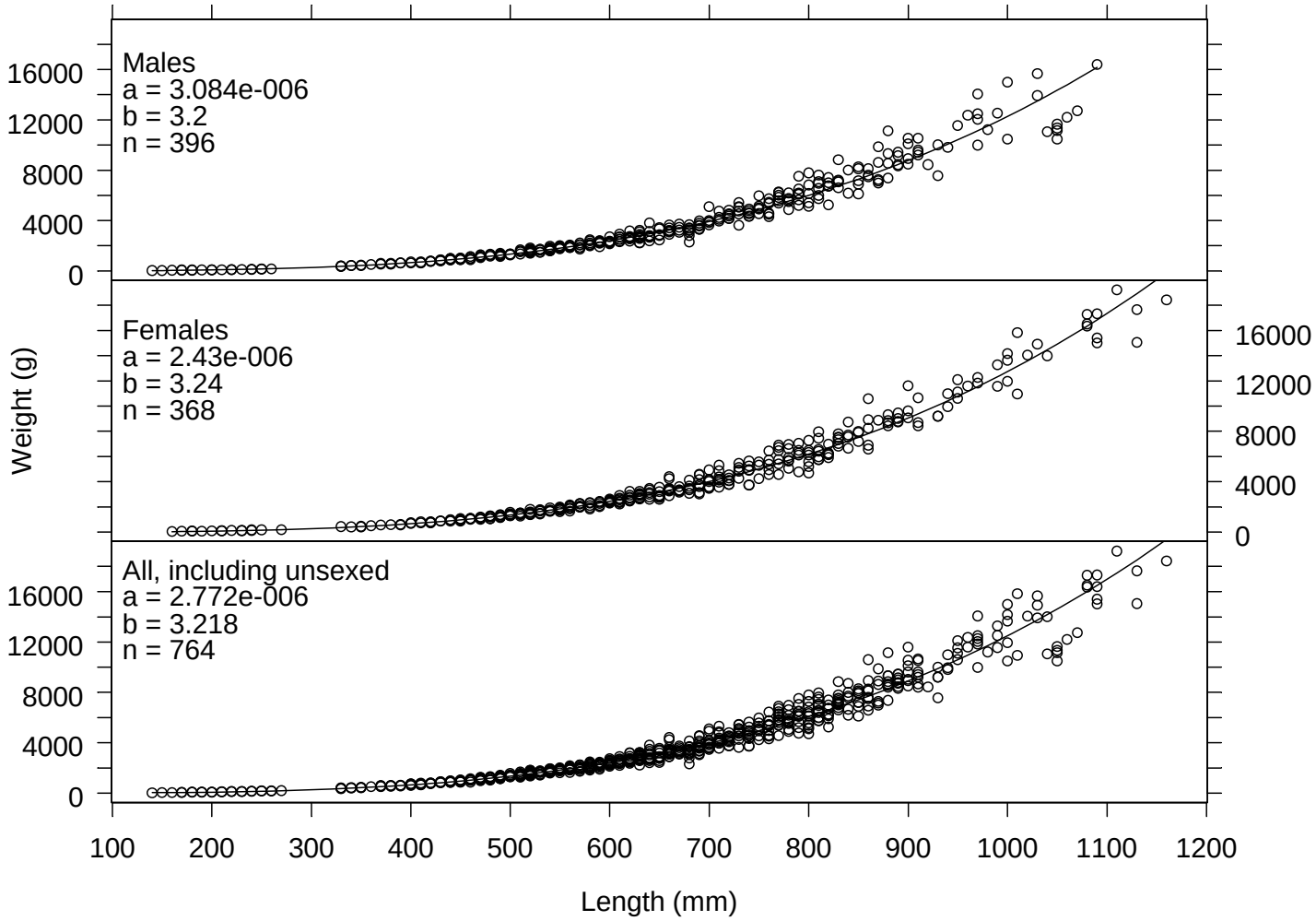


Figure 31. -- Length-weight relationship for Pacific cod specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 25. -- Number of survey hauls, number of hauls with walleye pollock, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	10	0.668	326	0	651	1.685	53.6
	101-200	47	29	4.551	2,420	547	4,293	0.793	44.2
	201-300	23	21	20.197	3,481	0	8,097	1.458	58.4
	301-500	21	7	0.877	287	0	753	1.089	52.7
	All depths	113	67	4.288	6,514	1,714	11,314	1.206	52.6
Central Aleutians	1-100	32	7	2.048	1,198	0	3,555	0.496	40.4
	101-200	35	23	8.432	3,884	0	8,009	1.267	52.3
	201-300	21	20	60.068	12,667	0	26,511	1.674	60.2
	301-500	22	11	1.843	734	80	1,387	1.514	59.0
	All depths	110	61	11.172	18,482	4,523	32,441	1.506	57.2
Eastern Aleutians	1-100	12	3	0.026	18	0	44	0.052	18.8
	101-200	31	21	80.958	62,889	0	154,379	1.627	57.4
	201-300	27	24	10.563	5,177	1,651	8,704	1.334	56.9
	301-500	21	12	3.365	1,912	0	3,963	1.328	55.3
	All depths	91	60	27.776	69,996	0	159,082	1.596	57.3
All Aleutian Areas	1-100	66	20	0.88	1,541	0	3,870	0.743	42.9
	101-200	113	73	39.11	69,193	0	158,065	1.577	56.7
	201-300	71	65	24.42	21,326	6,957	35,695	1.556	59.1
	301-500	64	30	2.27	2,933	823	5,044	1.351	56.0
	All depths	314	188	16.68	94,992	5,554	184,431	1.552	57.0
Southern Bering Sea	1-100	21	15	11.777	4,741	927	8,555	0.849	47.8
	101-200	11	10	64.448	11,914	0	32,830	0.996	41.4
	201-300	4	1	8.948	505	0	2,110	1.593	61.2
	301-500	8	7	8.113	846	135	1,558	1.242	54.5
	All depths	44	33	24.068	18,006	0	37,063	0.986	44.3

Table 26. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of walleye pollock by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	201-300	N Central Aleutians	10	9	251.55	11,043	0	25,987
Eastern Aleutians	101-200	NE Eastern Aleutians	11	8	185.81	37,395	0	119,956
Eastern Aleutians	101-200	SE Eastern Aleutians	10	7	132.98	25,268	0	82,211
Southern Bering Sea	101-200	E Southern Bering	9	8	101.03	11,913	0	33,234
Western Aleutians	201-300	E Western Aleutians	10	10	40.33	3,159	0	8,176
Central Aleutians	201-300	SW Central Aleutians	6	6	26.72	1,138	0	2,591
Southern Bering Sea	1-100	E Southern Bering	19	15	19.43	4,741	900	8,583
Central Aleutians	101-200	SW Central Aleutians	13	11	14.71	1,548	191	2,905
Eastern Aleutians	201-300	NE Eastern Aleutians	12	10	13.32	2,622	0	5,479
Central Aleutians	1-100	Petrel Bank	5	3	12.27	1,178	0	4,386
Central Aleutians	101-200	Petrel Bank	4	3	11.66	2,024	0	8,156
Eastern Aleutians	201-300	SE Eastern Aleutians	9	8	11.62	2,394	0	4,963
Southern Bering Sea	201-300	Combined Southern Bering	4	1	8.95	505	0	2,110
Southern Bering Sea	301-500	Combined Southern Bering	8	7	8.11	846	135	1,558
Central Aleutians	301-500	N Central Aleutians	11	9	5.79	718	19	1,418
Eastern Aleutians	301-500	SE Eastern Aleutians	9	3	5.79	1,490	0	3,745
Western Aleutians	101-200	W Western Aleutians	29	18	4.60	1,868	181	3,555
Central Aleutians	201-300	Petrel Bank	3	3	4.58	351	0	1,574
Western Aleutians	101-200	E Western Aleutians	18	11	4.40	552	0	1,465
Western Aleutians	201-300	W Western Aleutians	13	11	3.42	322	129	515
Central Aleutians	201-300	SE Central Aleutians	2	2	2.81	134	0	872
Central Aleutians	101-200	SE Central Aleutians	10	5	2.81	211	0	478
Eastern Aleutians	201-300	SW Eastern Aleutians	4	4	2.07	148	0	343
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	1.82	80	0	211
Western Aleutians	301-500	E Western Aleutians	3	2	1.58	247	0	1,204
Western Aleutians	1-100	E Western Aleutians	14	5	1.35	160	0	388
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	7	1.28	343	110	575
Central Aleutians	101-200	N Central Aleutians	8	4	0.95	101	0	256
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	0.87	14	0	99
Eastern Aleutians	101-200	NW Eastern Aleutians	3	2	0.77	122	0	400
Eastern Aleutians	101-200	SW Eastern Aleutians	7	4	0.46	104	0	268
Western Aleutians	1-100	W Western Aleutians	8	5	0.45	166	0	438
Western Aleutians	301-500	W Western Aleutians	18	5	0.24	40	0	86
Central Aleutians	1-100	SE Central Aleutians	7	2	0.16	19	0	64
Central Aleutians	301-500	SW Central Aleutians	3	1	0.15	12	0	64
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	0.08	11	0	147
Central Aleutians	301-500	SE Central Aleutians	5	1	0.05	4	0	14
Eastern Aleutians	1-100	NW Eastern Aleutians	2	1	0.03	5	0	73
Southern Bering Sea	101-200	W Southern Bering Sea	2	2	0.02	1	0	8
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	0.01	2	0	21
Central Aleutians	1-100	N Central Aleutians	11	2	0.00	1	0	2

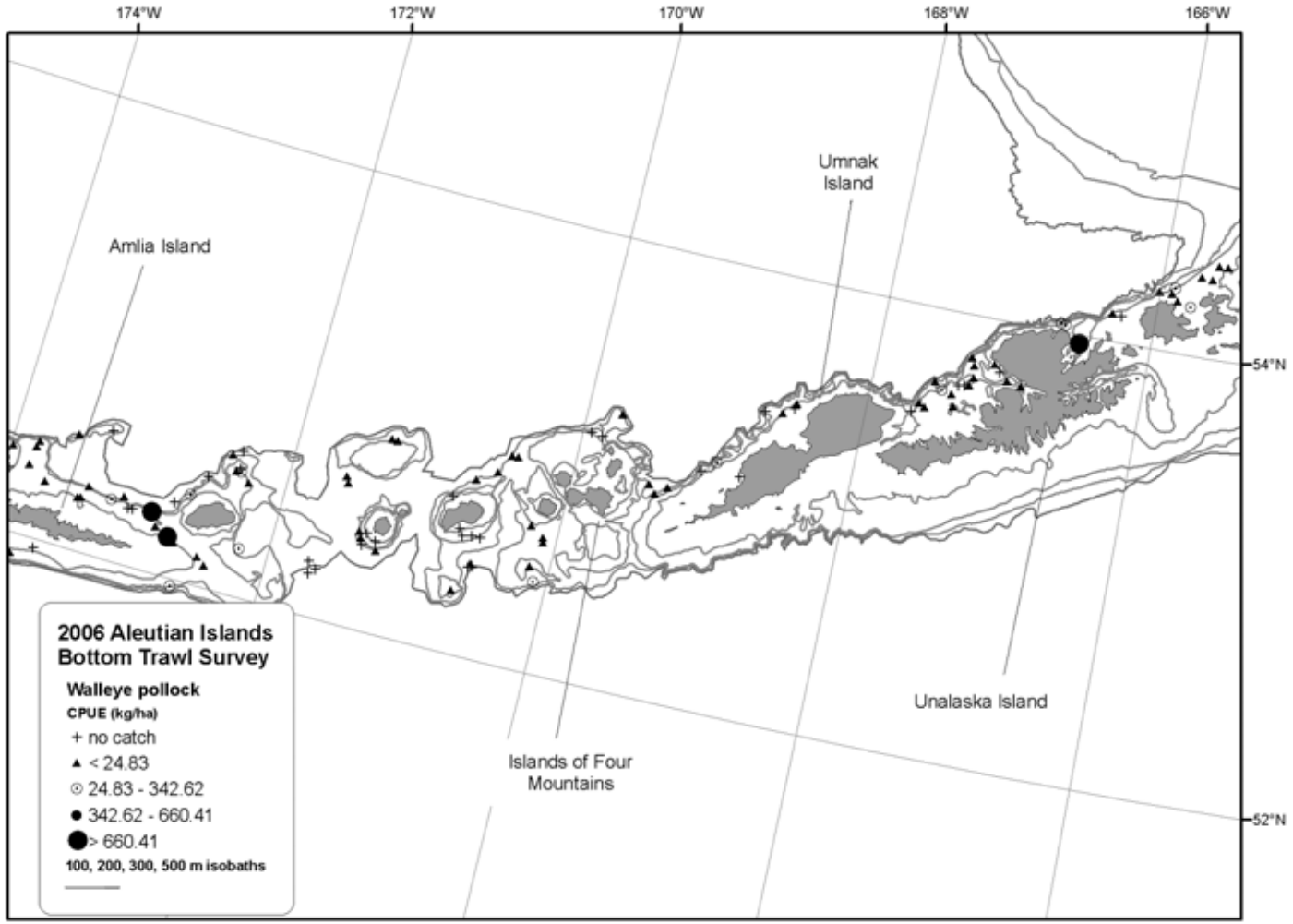


Figure 32. -- Distribution and relative abundance of walleye pollock from the 2006 Aleutian Islands bottom trawl survey.

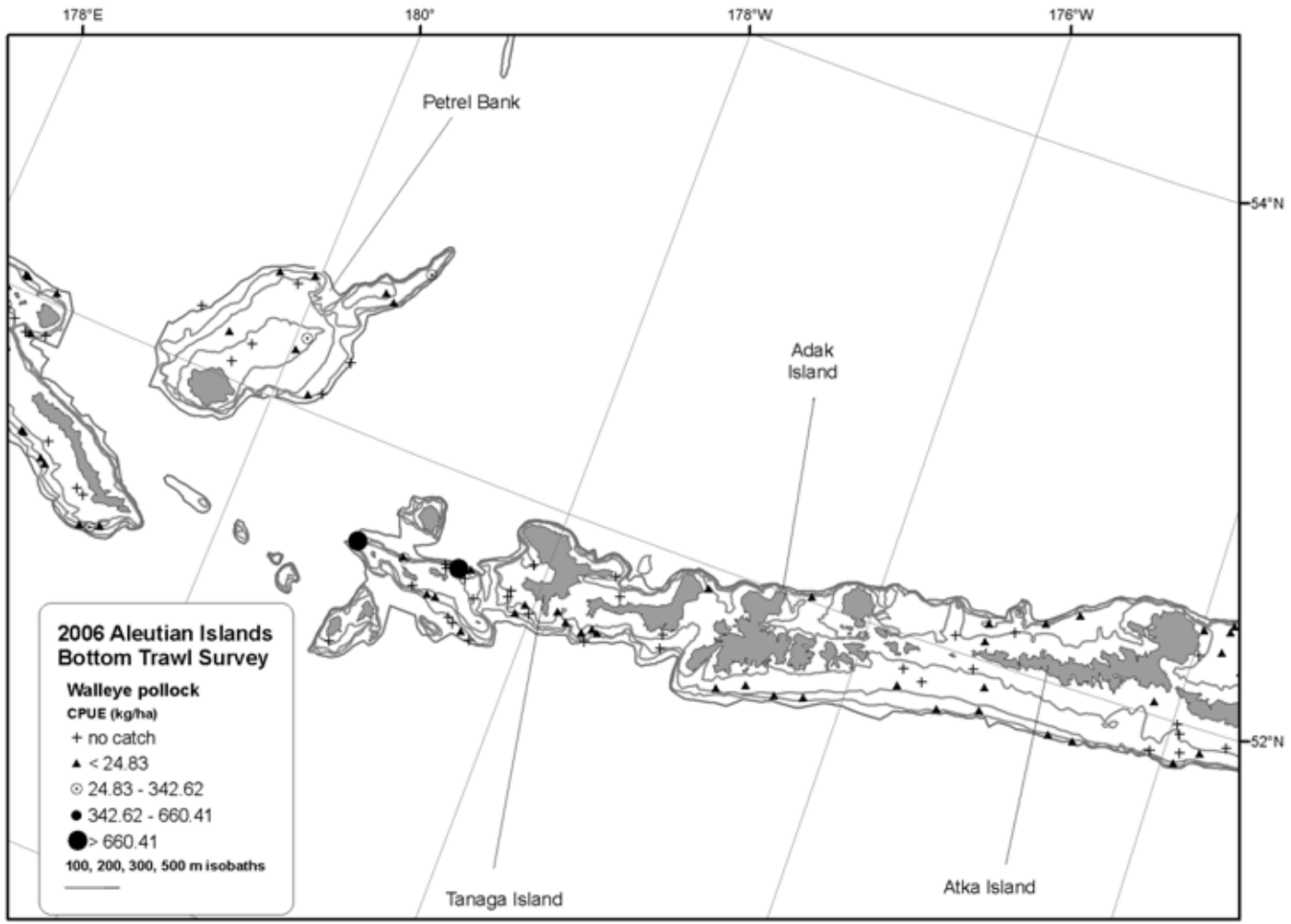


Figure 32. -- (continued).

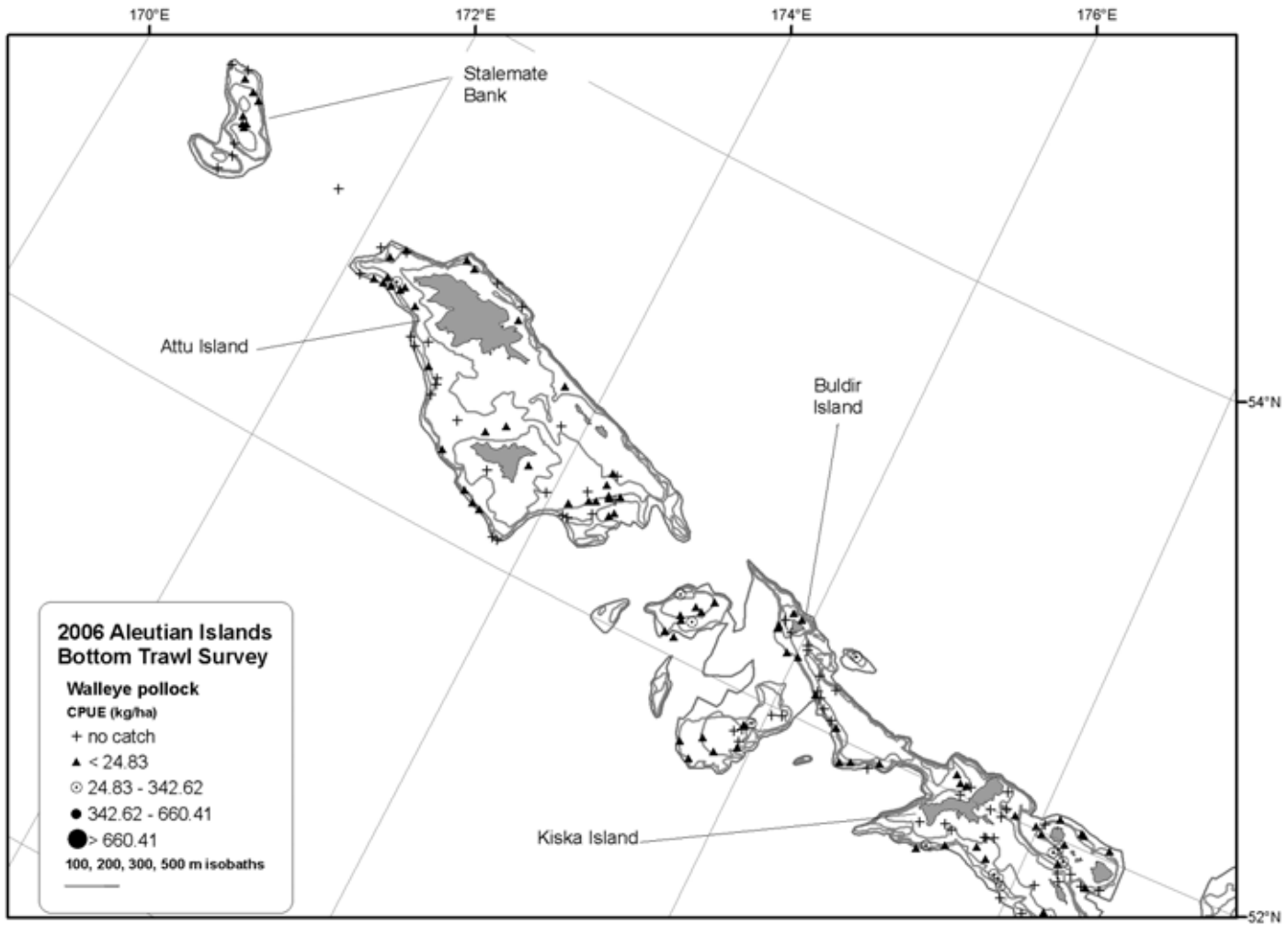


Figure 32. -- (continued).

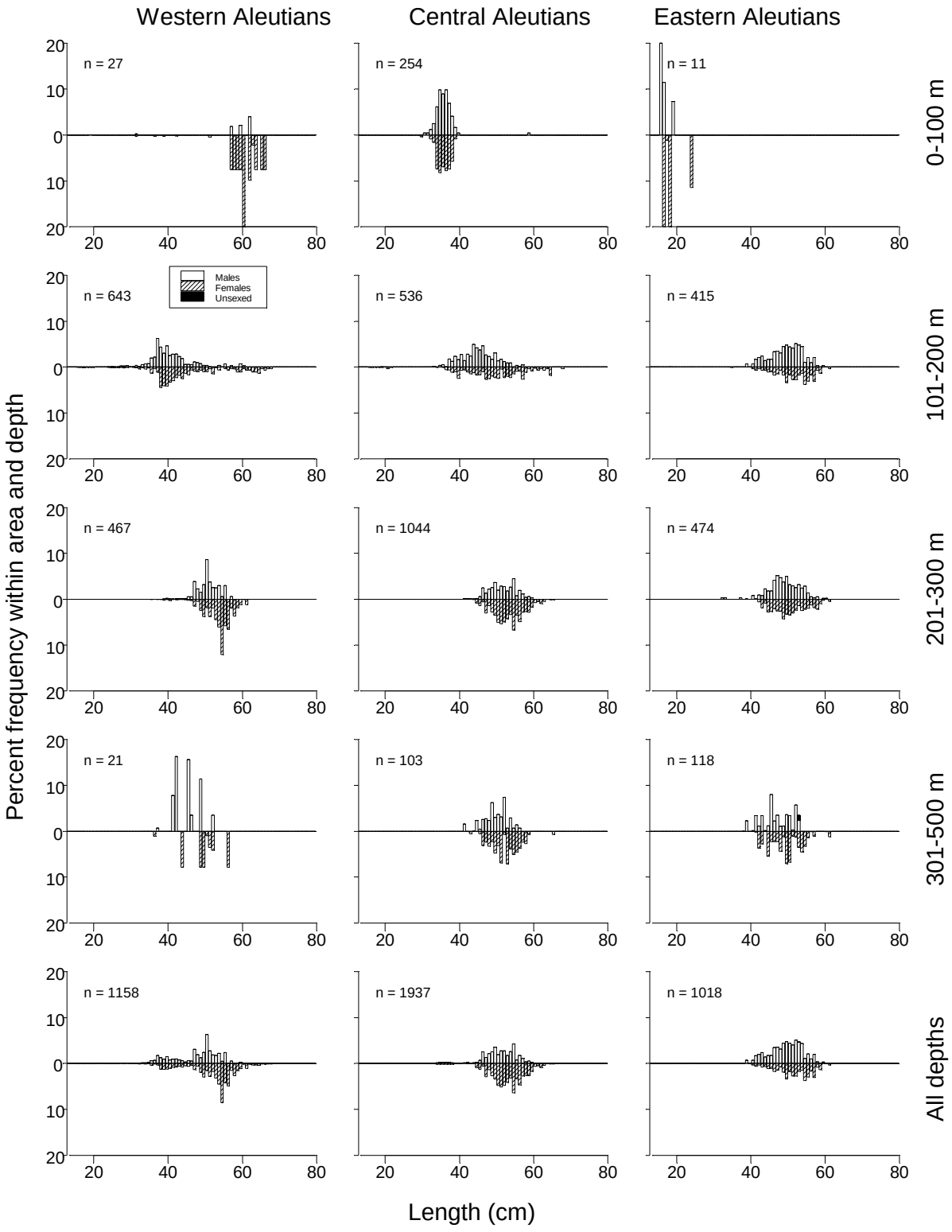


Figure 33. -- Size composition of walleye pollock from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

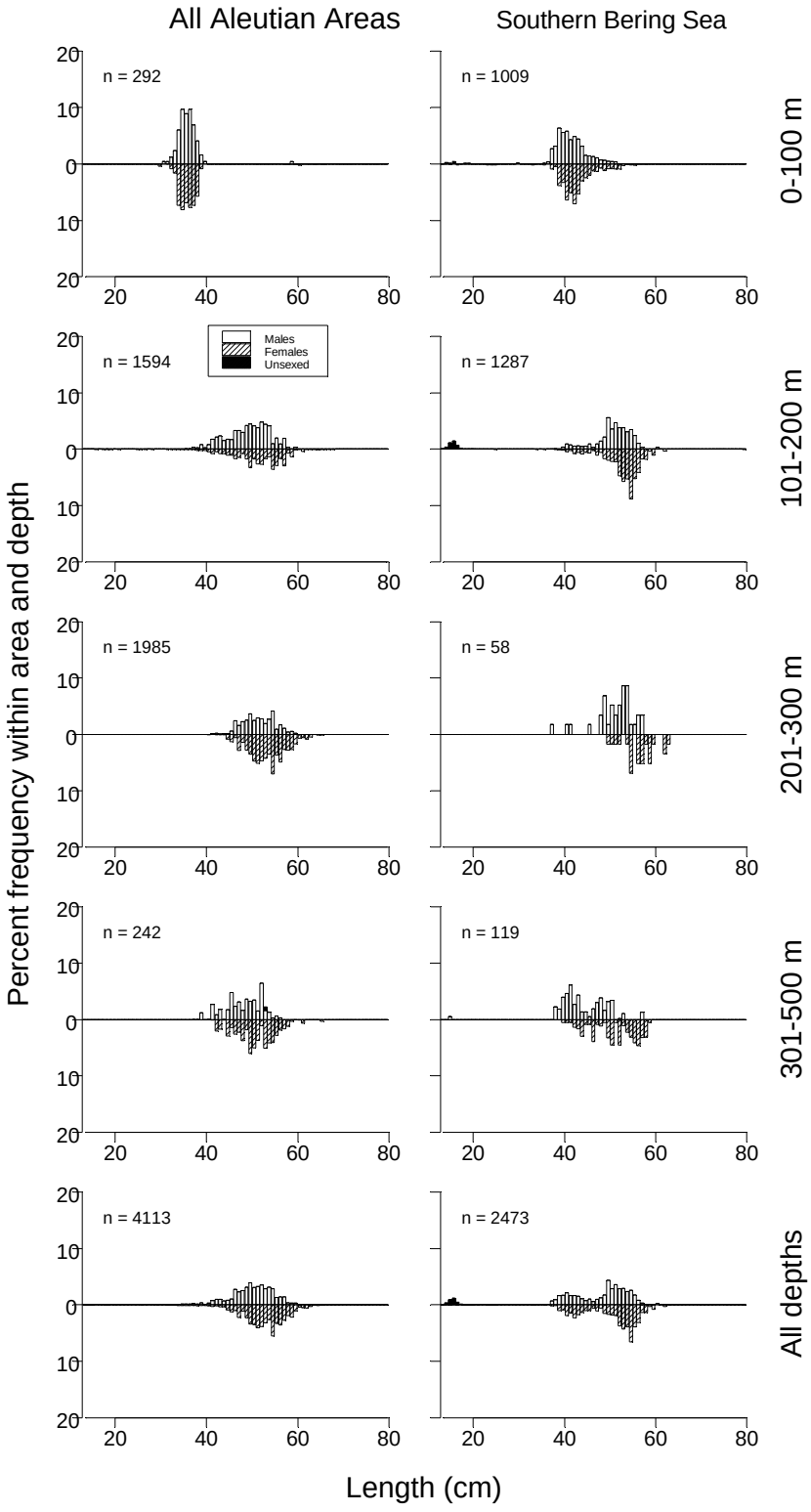


Figure 33. -- (continued).

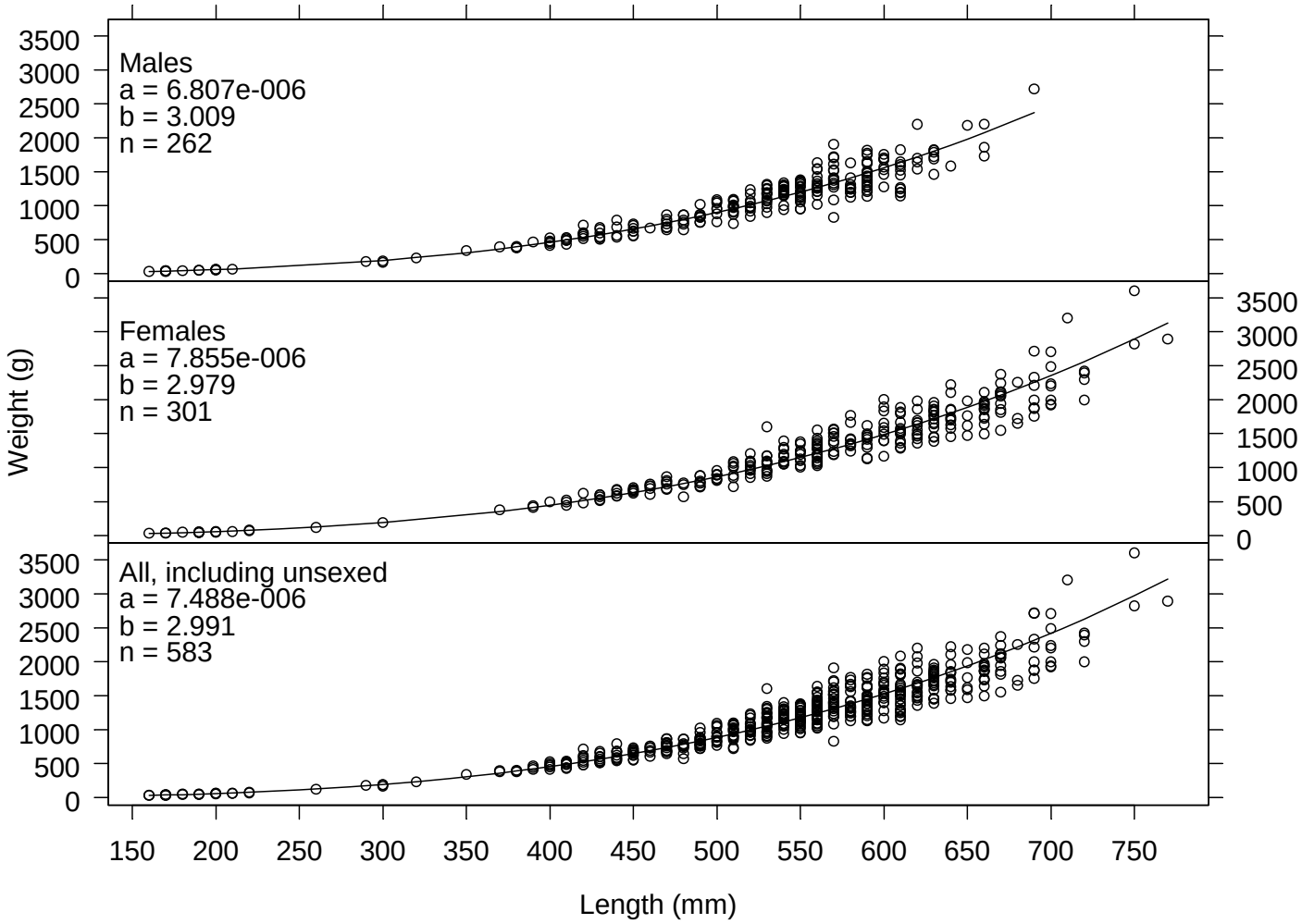


Figure 34. -- Length-weight relationship for walleye pollock specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Sablefish (*Anoplopoma fimbria*)

Sablefish habitat customarily extends deeper than is sampled by this survey. Mean CPUE was highest in the Central Aleutians area (Table 2). Throughout the entire survey area, mean CPUE was always highest at depths deeper than 200 m (Table 27). Mean individual weight and length generally increased with increasing depth (Table 27). The total biomass estimate of 9,944 t is undoubtedly an underestimate of true biomass. The two highest mean CPUEs were reported for the Central Aleutian subareas in the 201-300 m depth intervals (Table 28). The largest individual catch was reported west of Tanaga Island (Fig. 35). Figure 36 summarizes sablefish size composition data. Generally sablefish captured during the survey were in the middle of their normal adult size range. No length-weight data were collected for sablefish.

Giant grenadier (*Albatrossia pectoralis*)

Catches of giant grenadier were almost completely restricted to the 301-500 m depth interval, primarily in the Eastern Aleutians area (Tables 29 and 30). The high mean CPUE in that area resulted from two large catches north of Seguam Island (Fig. 37). While those few large catches contributed unusually heavy influence, giant grenadier abundance is probably very high along the Aleutian Archipelago. The survey does not sample deeper waters adequately to measure grenadier abundance, nor does it capture a significant number of male grenadiers (Fig. 38). This species was found to be most abundant in the 501-900 m depth range during the 1980 U.S.-Japan cooperative trawl survey (Ronholt et al. 1986). Ronholt also reported that the larger grenadiers were found in the 301-500 m depth interval and the smaller sizes were found in the 501-900 m interval. Coincidentally, the mean vent length of males was 21.1 cm and the mean vent length of females was 26.6 cm. (The vent length measurement is the distance from anterior tip of the head to the origin of the anal fin). Thus, it might be expected that males are more likely to be found in depths outside the survey range. Length-weight relationships are shown in Figure 39, although the male relationship is based on only five individuals.

Table 27. -- Number of survey hauls, number of hauls with sablefish, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	0	0.000	0	--	--	--	--
	101-200	47	0	0.000	0	--	--	--	--
	201-300	23	0	0.000	0	--	--	--	--
	301-500	21	6	1.058	346	59	633	3.640	68.8
	All depths	113	6	0.228	346	73	619	3.640	68.8
Central Aleutians	1-100	32	0	0.000	0	--	--	--	--
	101-200	35	2	0.327	151	0	403	2.416	60.7
	201-300	21	5	11.716	2,471	0	5,746	2.287	60.2
	301-500	22	8	3.332	1,326	0	2,717	2.988	64.8
	All depths	110	15	2.386	3,948	565	7,330	2.528	61.8
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	0	0.000	0	--	--	--	--
	201-300	27	8	4.166	2,042	0	4,400	2.256	59.8
	301-500	21	12	6.101	3,467	626	6,308	2.391	60.6
	All depths	91	20	2.186	5,509	1,971	9,047	2.341	60.3
All Aleutian Areas	1-100	66	0	0.00	0	--	--	--	--
	101-200	113	2	0.09	151	0	396	2.416	60.7
	201-300	71	13	5.17	4,513	642	8,384	2.273	60.1
	301-500	64	26	3.97	5,139	2,095	8,184	2.629	62.2
	All depths	314	41	1.72	9,803	4,943	14,663	2.462	61.2
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	2	0.059	11	0	28	0.612	39.9
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	4	1.244	130	0	288	4.079	68.3
	All depths	44	6	0.188	141	5	276	3.808	66.1

Table 28. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of sablefish by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	201-300	N Central Aleutians	10	4	33.54	1,472	0	4,199
Central Aleutians	201-300	SE Central Aleutians	2	1	20.91	998	0	13,683
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	6	12.17	3,248	176	6,321
Eastern Aleutians	201-300	NE Eastern Aleutians	12	4	7.71	1,519	0	3,929
Central Aleutians	301-500	N Central Aleutians	11	4	7.05	875	0	2,199
Central Aleutians	301-500	SE Central Aleutians	5	4	6.32	452	0	1,301
Eastern Aleutians	201-300	SE Eastern Aleutians	9	3	2.47	509	0	1,295
Central Aleutians	101-200	SE Central Aleutians	10	2	2.00	151	0	431
Southern Bering Sea	301-500	Combined Southern Bering	8	4	1.24	130	0	288
Western Aleutians	301-500	W Western Aleutians	18	4	1.10	189	0	424
Western Aleutians	301-500	E Western Aleutians	3	2	1.01	158	0	505
Eastern Aleutians	301-500	SE Eastern Aleutians	9	5	0.82	210	0	443
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	0.20	9	0	121
Eastern Aleutians	201-300	SW Eastern Aleutians	4	1	0.20	14	0	60
Southern Bering Sea	101-200	E Southern Bering	9	2	0.09	11	0	28

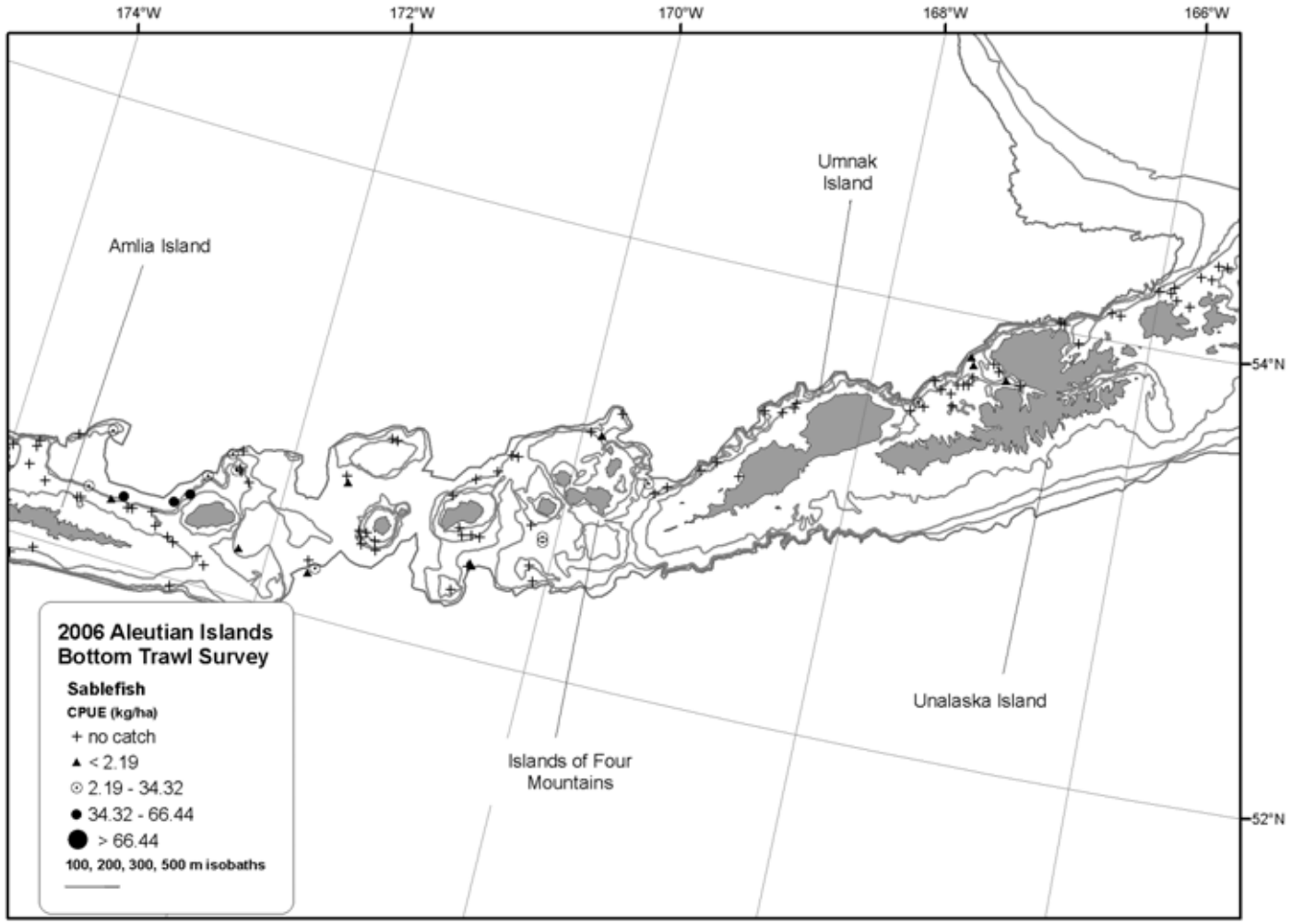


Figure 35. -- Distribution and relative abundance of sablefish from the 2006 Aleutian Islands bottom trawl survey.

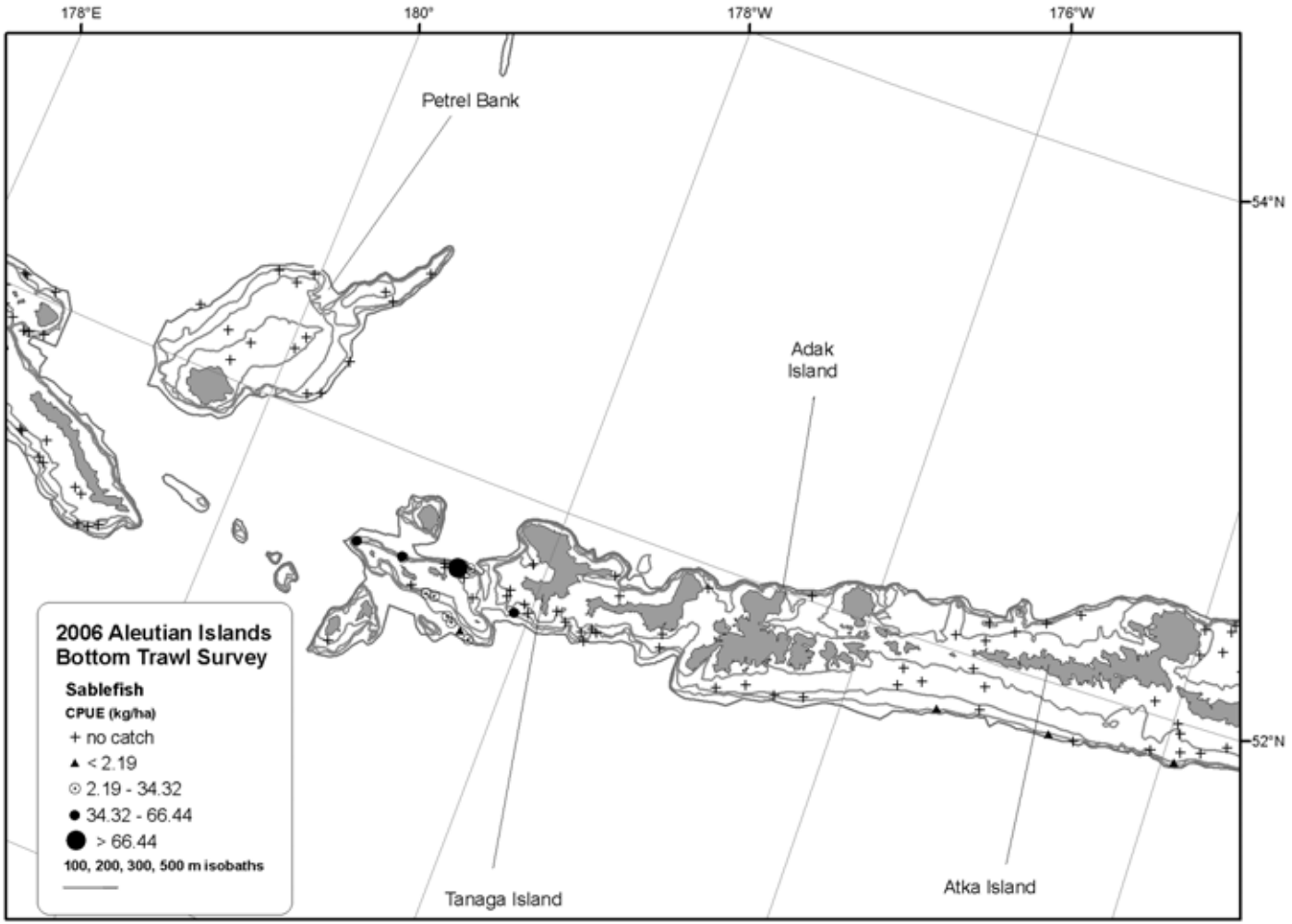


Figure 35. -- (continued).

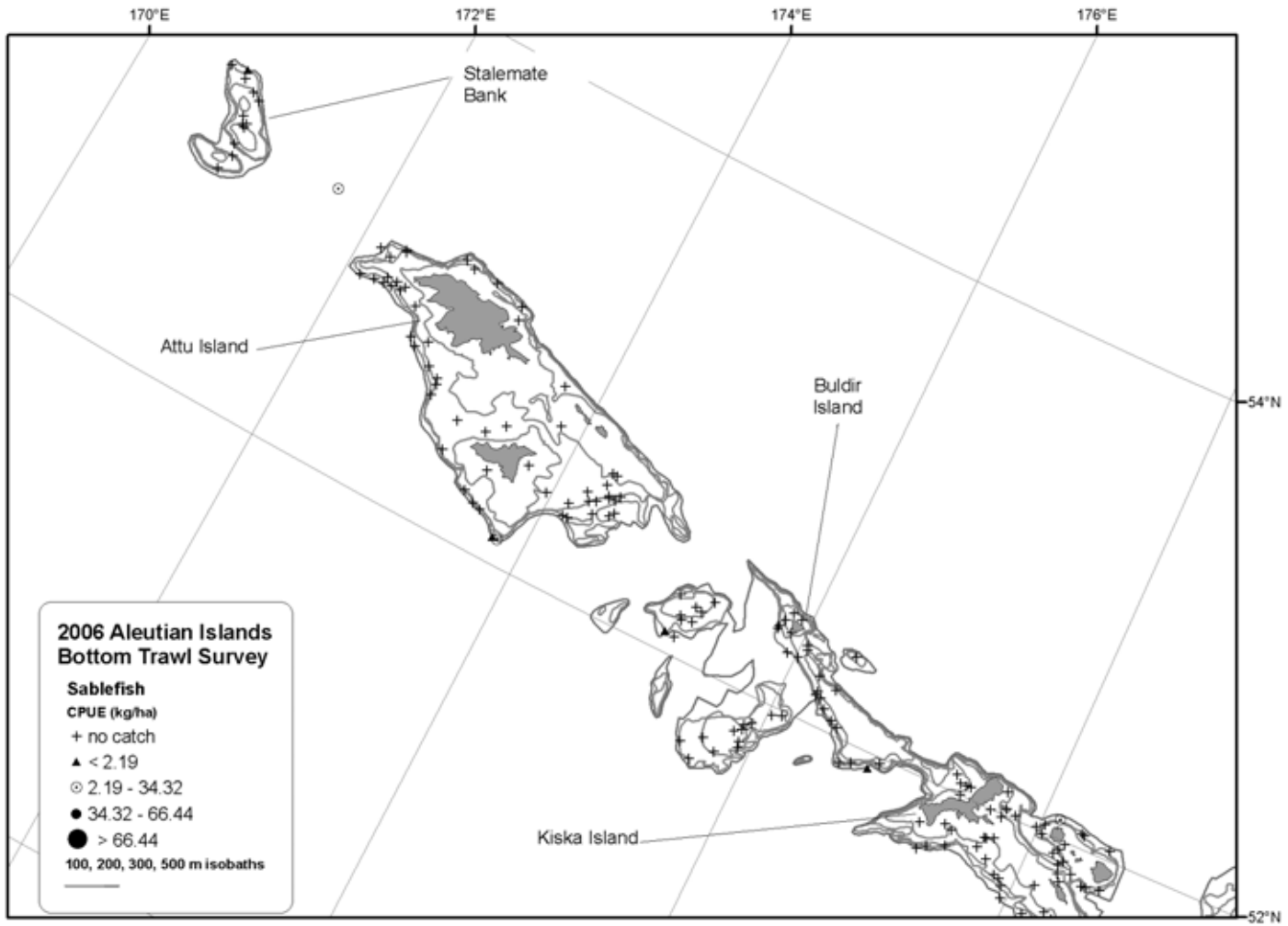


Figure 35. -- (continued).

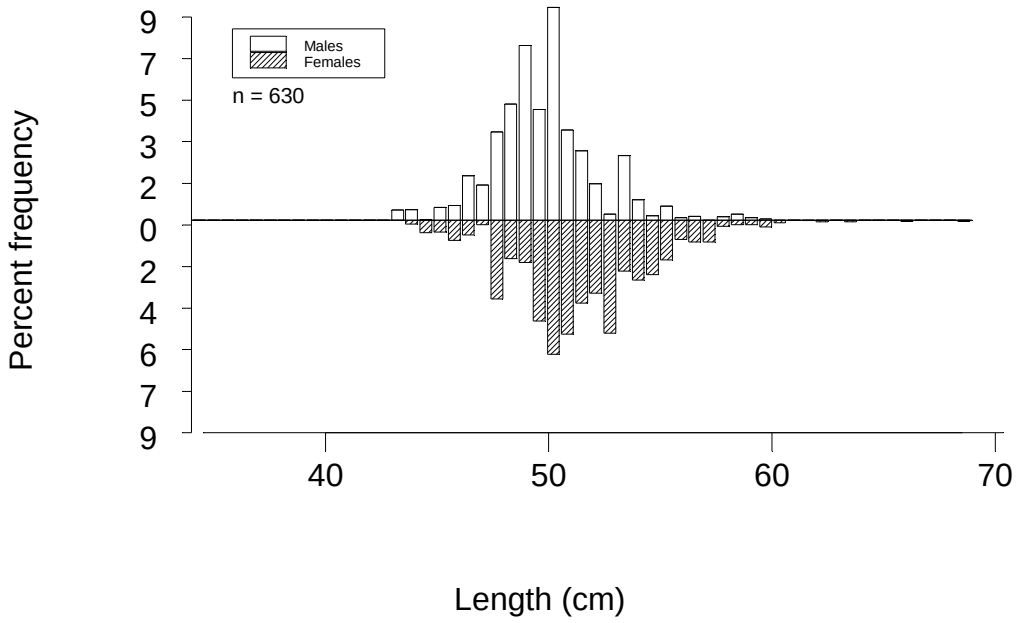


Figure 36. -- Size composition of sablefish from the 2006 Aleutian Islands bottom trawl survey.

Table 29. -- Number of survey hauls, number of hauls with giant grenadier, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	0	0.000	0	--	--	--	--
	101-200	47	0	0.000	0	--	--	--	--
	201-300	23	0	0.000	0	--	--	--	--
	301-500	21	9	24.388	7,981	0	17,984	4.480	31.3
	All depths	113	9	5.254	7,981	0	17,483	4.480	31.3
Central Aleutians	1-100	32	0	0.000	0	--	--	--	--
	101-200	35	0	0.000	0	--	--	--	--
	201-300	21	0	0.000	0	--	--	--	--
	301-500	22	16	74.538	29,672	3,612	55,732	4.492	32.1
	All depths	110	16	17.937	29,672	4,833	54,511	4.492	32.1
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	0	0.000	0	--	--	--	--
	201-300	27	1	3.601	1,765	0	5,394	4.951	32.6
	301-500	21	11	269.618	153,222	0	381,963	4.607	33.3
	All depths	91	12	61.502	154,988	0	372,167	4.611	33.3
All Aleutian Areas	1-100	66	0	0.00	0	--	--	--	--
	101-200	113	0	0.00	0	--	--	--	--
	201-300	71	1	2.02	1,765	0	5,286	4.951	32.6
	301-500	64	36	147.55	190,875	0	410,977	4.584	33.0
	All depths	314	37	33.84	192,640	0	409,316	4.588	33.0
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	0	0.000	0	--	--	--	--
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	0	0.000	0	--	--	--	--
	All depths	44	0	0.000	0	--	--	--	--

Table 30. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of giant grenadier by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	6	534.30	142,658	0	389,533
Central Aleutians	301-500	N Central Aleutians	11	6	131.92	16,355	0	42,869
Central Aleutians	301-500	SE Central Aleutians	5	4	86.81	6,201	0	14,136
Central Aleutians	301-500	Petrel Bank	3	3	42.65	5,278	0	16,226
Eastern Aleutians	301-500	SE Eastern Aleutians	9	4	40.76	10,494	0	23,551
Western Aleutians	301-500	E Western Aleutians	3	1	28.65	4,473	0	23,722
Central Aleutians	301-500	SW Central Aleutians	3	3	23.29	1,838	0	5,598
Western Aleutians	301-500	W Western Aleutians	18	8	20.50	3,508	0	7,153
Eastern Aleutians	201-300	NE Eastern Aleutians	12	1	8.97	1,765	0	5,651
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	1.61	71	0	968

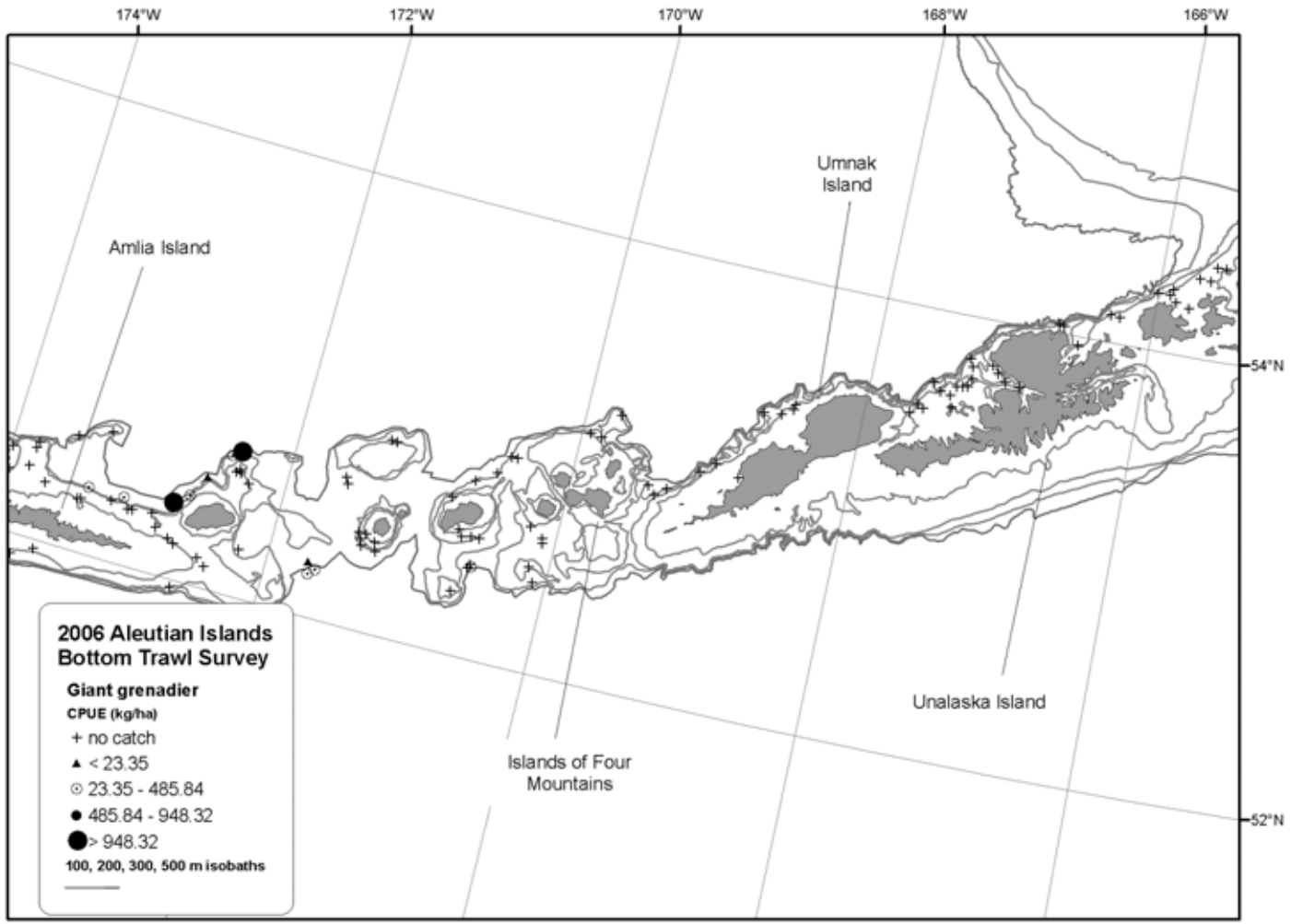


Figure 37. -- Distribution and relative abundance of giant grenadier from the 2006 Aleutian Islands bottom trawl survey.

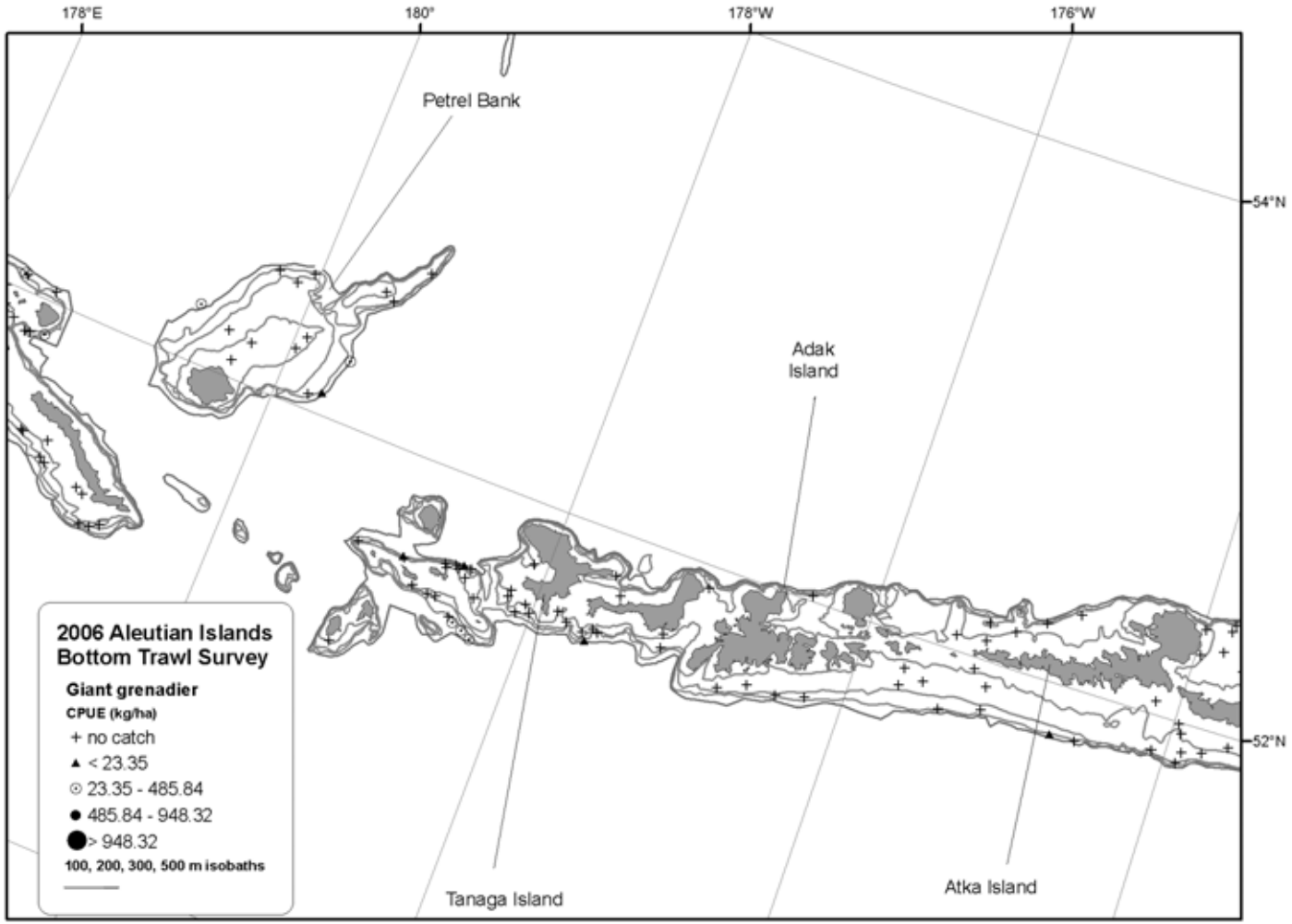


Figure 37. -- (continued).

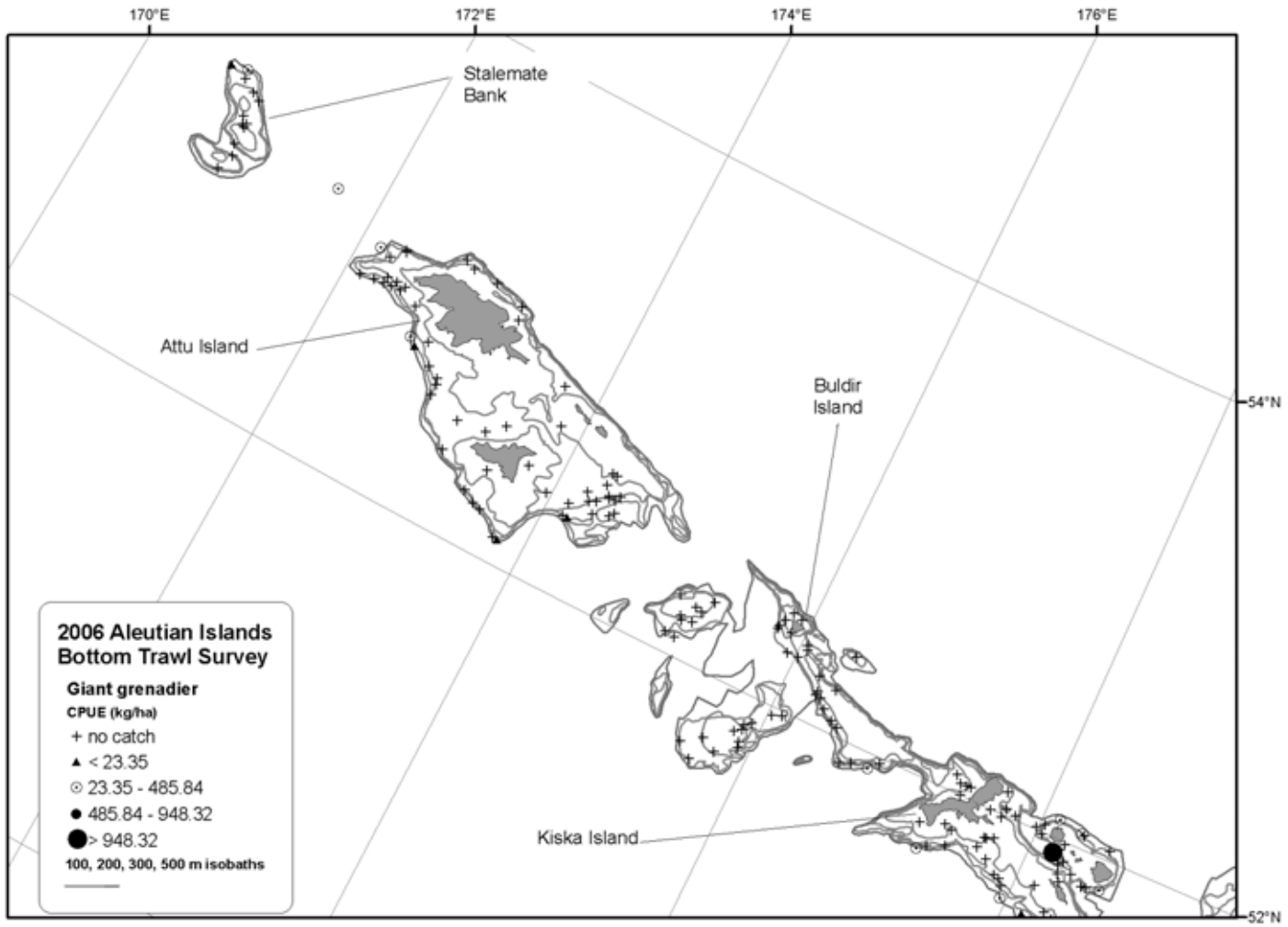


Figure 37. -- (continued).

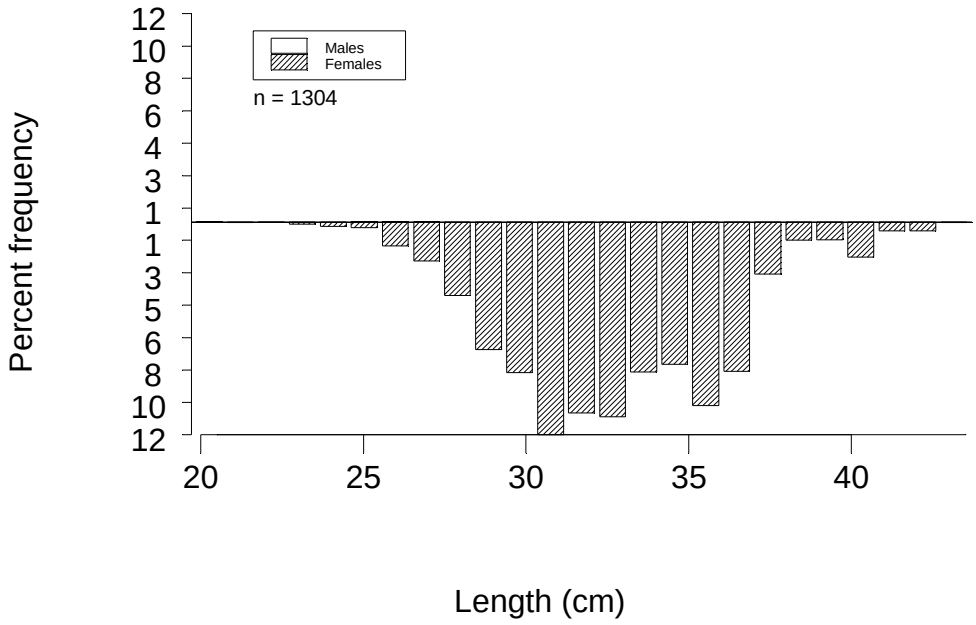


Figure 38. -- Size composition of giant grenadier from the 2006 Aleutian Islands bottom trawl survey.

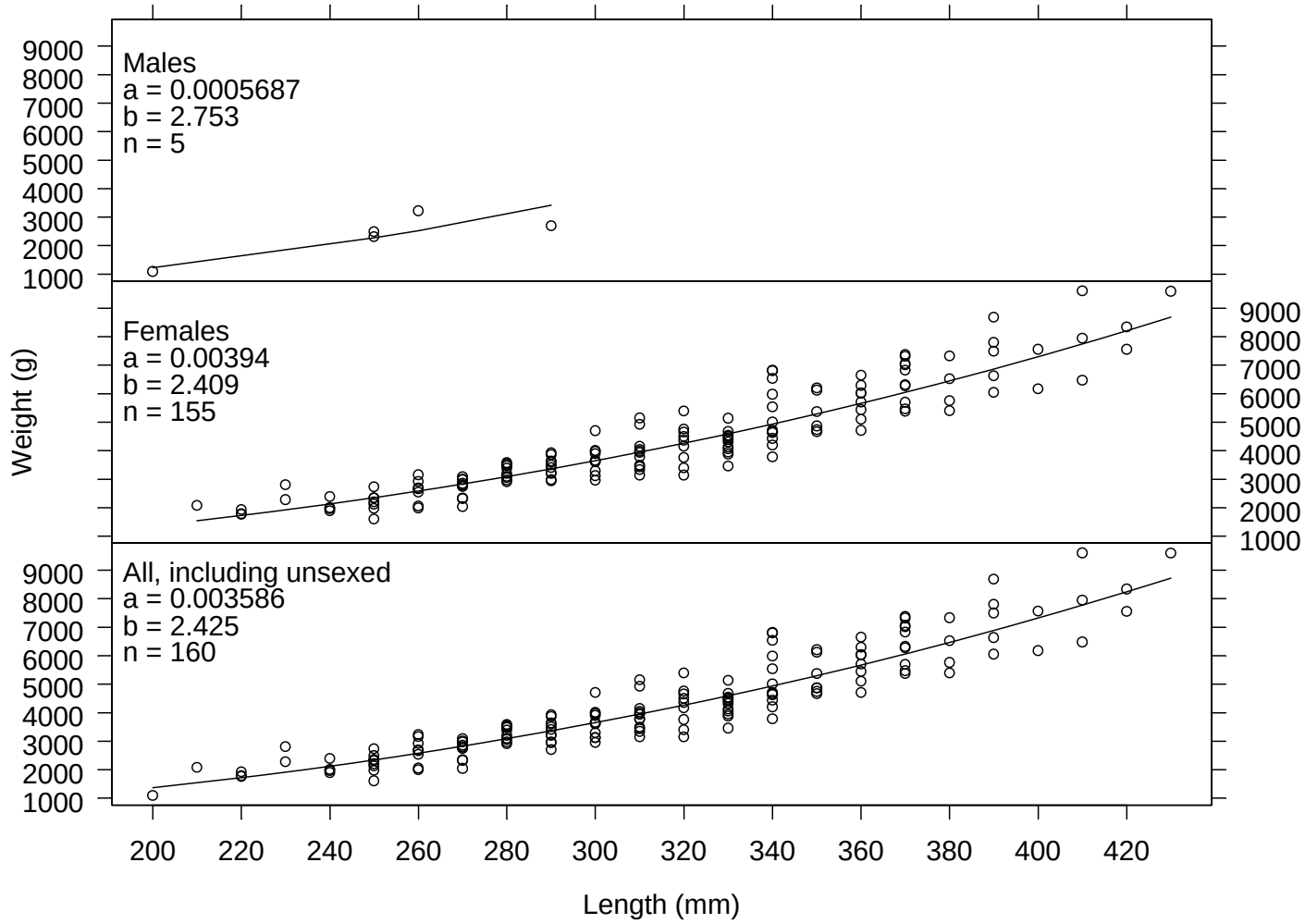


Figure 39. -- Length-weight relationship for giant grenadier specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Sculpins (Cottidae)

Sculpins are probably not sampled well by the AFSC survey trawl. The small size of many of the species and their demersal orientation may help them to escape under the footrope, especially on rough bottom. They are no doubt biologically important, perhaps not as individual species, but as a family. In this report, sculpin catch rates and biomass estimates are treated as a grouped whole. However, in some cases, specific information allows them to be reported upon separately. Twenty-four species of sculpins were identified from trawl catches and are summarized by total catch in Table 31. Yellow Irish lord represented the largest total catch in terms of weight, but darkfin sculpin were much more numerous.

Sculpins were captured throughout the survey area (Table 2) and in all depth intervals (Table 32). They were captured in 99% of all trawl hauls. Sculpin mean CPUE was lowest in the Western Aleutians area and highest in the Southern Bering Sea. The 1-100 m depth interval on Petrel Bank was the most productive subarea (Table 33 and Fig. 40).

Table 31. -- Sculpin species catch (weight and numbers) in the 2006 Aleutian Islands bottom trawl survey. Data are combined across areas and are shown for species identified in the catch.

Species name	Common name	Weight (kg)	Number
Hemilepidotus jordani	yellow Irish lord	1,318	2,069
Malacocottus zonurus	darkfin sculpin	765	7,642
Myoxocephalus polyacanthocephalus	great sculpin	238	68
Hemitripterus bolini	bigmouth sculpin	228	41
Triglops scepticus	spectacled sculpin	132	1,572
Gymnocanthus galeatus	armorhead sculpin	49	255
Triglops forficata	scissortail sculpin	18	223
Hemilepidotus zapus	longfin Irish lord	15	259
Dasycottus setiger	spinyhead sculpin	2	25
Enophrys lucasi	leister sculpin	1	5
Thyriscus anoplus	sponge sculpin	1	46
Triglops macellus	roughspine sculpin	1	14
Hemilepidotus hemilepidotus	red Irish lord	1	1
Enophrys diceraus	antlered sculpin	1	3
Bolinia euryptera	broadfin sculpin	<1	9
Triglops pingeli	ribbed sculpin	<1	13
Icelus euryops	wide-eye sculpin	<1	14
Psychrolutes phrictus	blob sculpin	<1	2
Rastrinus scutiger	roughskin sculpin	<1	13
Icelus uncinalis	uncinate sculpin	<1	2
Nautichthys oculofasciatus	sailfin sculpin	<1	4
Myoxocephalus quadricornis	fourhorn sculpin	<1	5
Archistes biseriatus	scaled sculpin	<1	1
Icelus spiniger	thorny sculpin	<1	1

Table 32. -- Number of survey hauls, number of hauls with sculpin species, mean CPUE, biomass estimates with confidence intervals, and mean weight based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Western Aleutians	1-100	22	22	0.129	6,307	0	22,501	0.623
	101-200	47	47	0.183	9,733	0	28,544	0.478
	201-300	23	23	0.387	6,670	0	21,689	0.081
	301-500	21	21	0.065	2,116	0	4,563	0.034
	All depths	113	113	0.163	24,826	0	52,922	0.370
Central Aleutians	1-100	32	32	0.627	36,684	1,795	71,573	0.638
	101-200	35	35	0.298	13,720	71	27,370	0.275
	201-300	21	21	0.424	8,937	0	20,787	0.145
	301-500	22	19	0.045	1,808	0	7,434	0.071
	All depths	110	107	0.370	61,149	22,650	99,649	0.468
Eastern Aleutians	1-100	12	12	0.510	34,953	0	83,151	0.639
	101-200	31	31	0.359	27,878	0	72,438	0.691
	201-300	27	27	0.394	19,301	0	56,719	0.247
	301-500	21	21	0.174	9,912	0	31,347	0.090
	All depths	91	91	0.365	92,044	17,907	166,181	0.513
All Aleutian Areas	1-100	79	79	0.53	94,087	7,092	181,083	0.664
	101-200	95	95	0.32	50,176	2,538	97,814	0.567
	201-300	71	71	0.41	35,212	0	75,881	0.197
	301-500	48	45	0.16	13,387	0	35,566	0.104
	All depths	293	290	0.38	192,863	84,661	301,065	0.515
Southern Bering Sea	1-100	21	21	0.474	19,064	0	88,029	0.782
	101-200	11	11	0.258	4,762	0	16,067	1.058
	201-300	4	4	0.173	975	0	3,475	0.399
	301-500	8	8	0.552	5,755	0	19,128	0.121
	All depths	44	44	0.408	30,555	0	98,987	0.688

Table 33. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of sculpin species by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	1-100	Petrel Bank	5	5	213.59	20,505	19,533	21,478
Eastern Aleutians	1-100	SE Eastern Aleutians	6	6	92.44	16,090	15,017	17,164
Eastern Aleutians	101-200	SE Eastern Aleutians	10	10	84.57	16,070	14,639	17,501
Western Aleutians	201-300	E Western Aleutians	10	10	78.62	6,159	5,645	6,673
Southern Bering Sea	1-100	E Southern Bering	19	19	75.13	18,335	16,139	20,531
Eastern Aleutians	201-300	SE Eastern Aleutians	9	9	71.36	14,705	13,398	16,013
Central Aleutians	201-300	SE Central Aleutians	2	2	59.64	2,847	1,425	4,269
Eastern Aleutians	1-100	NW Eastern Aleutians	2	2	58.36	11,278	4,888	17,668
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	58.30	7,393	4,491	10,294
Southern Bering Sea	301-500	Combined Southern Bering	8	8	55.17	5,755	5,332	6,178
Central Aleutians	1-100	SE Central Aleutians	7	7	51.41	5,984	5,189	6,780
Central Aleutians	201-300	Petrel Bank	3	3	46.09	3,533	3,018	4,048
Central Aleutians	101-200	SE Central Aleutians	10	10	44.53	3,348	3,166	3,530
Central Aleutians	1-100	N Central Aleutians	11	11	44.42	9,352	8,794	9,911
Southern Bering Sea	101-200	W Southern Bering	2	2	33.59	2,249	971	3,527
Central Aleutians	201-300	SW Central Aleutians	6	6	32.98	1,405	1,268	1,541
Central Aleutians	101-200	N Central Aleutians	8	8	31.81	3,391	3,106	3,675
Western Aleutians	101-200	E Western Aleutians	18	18	30.47	3,816	3,459	4,174
Western Aleutians	1-100	E Western Aleutians	14	14	28.62	3,387	2,932	3,841
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	26.43	1,158	761	1,555
Central Aleutians	201-300	N Central Aleutians	10	10	26.26	1,153	1,037	1,268
Central Aleutians	101-200	Petrel Bank	4	4	25.30	4,390	4,146	4,635
Central Aleutians	101-200	SW Central Aleutians	13	13	24.63	2,592	2,298	2,886
Eastern Aleutians	101-200	NE Eastern Aleutians	11	11	22.91	4,610	4,233	4,986
Eastern Aleutians	301-500	SE Eastern Aleutians	9	9	22.05	5,678	4,996	6,360
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	21.74	339	148	530
Southern Bering Sea	101-200	E Southern Bering Sea	9	9	21.31	2,513	2,224	2,801
Eastern Aleutians	101-200	SW Eastern Aleutians	7	7	20.01	4,524	4,078	4,970
Eastern Aleutians	201-300	NE Eastern Aleutians	12	12	18.22	3,586	3,378	3,794
Southern Bering Sea	201-300	Combined Southern Bering	4	4	17.28	975	896	1,054
Eastern Aleutians	101-200	NW Eastern Aleutians	3	3	16.77	2,674	2,168	3,180
Western Aleutians	101-200	W Western Aleutians	29	29	14.56	5,917	5,422	6,412
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	10	11.52	3,076	2,779	3,373
Western Aleutians	301-500	E Western Aleutians	3	3	11.38	1,777	1,643	1,910
Central Aleutians	301-500	N Central Aleutians	11	11	10.90	1,351	1,171	1,532
Eastern Aleutians	201-300	SW Eastern Aleutians	4	4	9.36	670	593	748
Western Aleutians	1-100	W Western Aleutians	8	8	7.91	2,920	2,621	3,220
Central Aleutians	301-500	SE Central Aleutians	5	5	6.33	452	376	528
Western Aleutians	201-300	W Western Aleutians	13	13	5.43	511	460	562
Central Aleutians	1-100	SW Central Aleutians	9	9	5.21	842	757	928
Southern Bering Sea	1-100	W Southern Bering Sea	2	2	4.60	729	515	944
Western Aleutians	301-500	W Western Aleutians	18	18	1.98	339	296	382
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	1.01	192	83	301
Central Aleutians	301-500	SW Central Aleutians	3	3	0.06	5	4	6

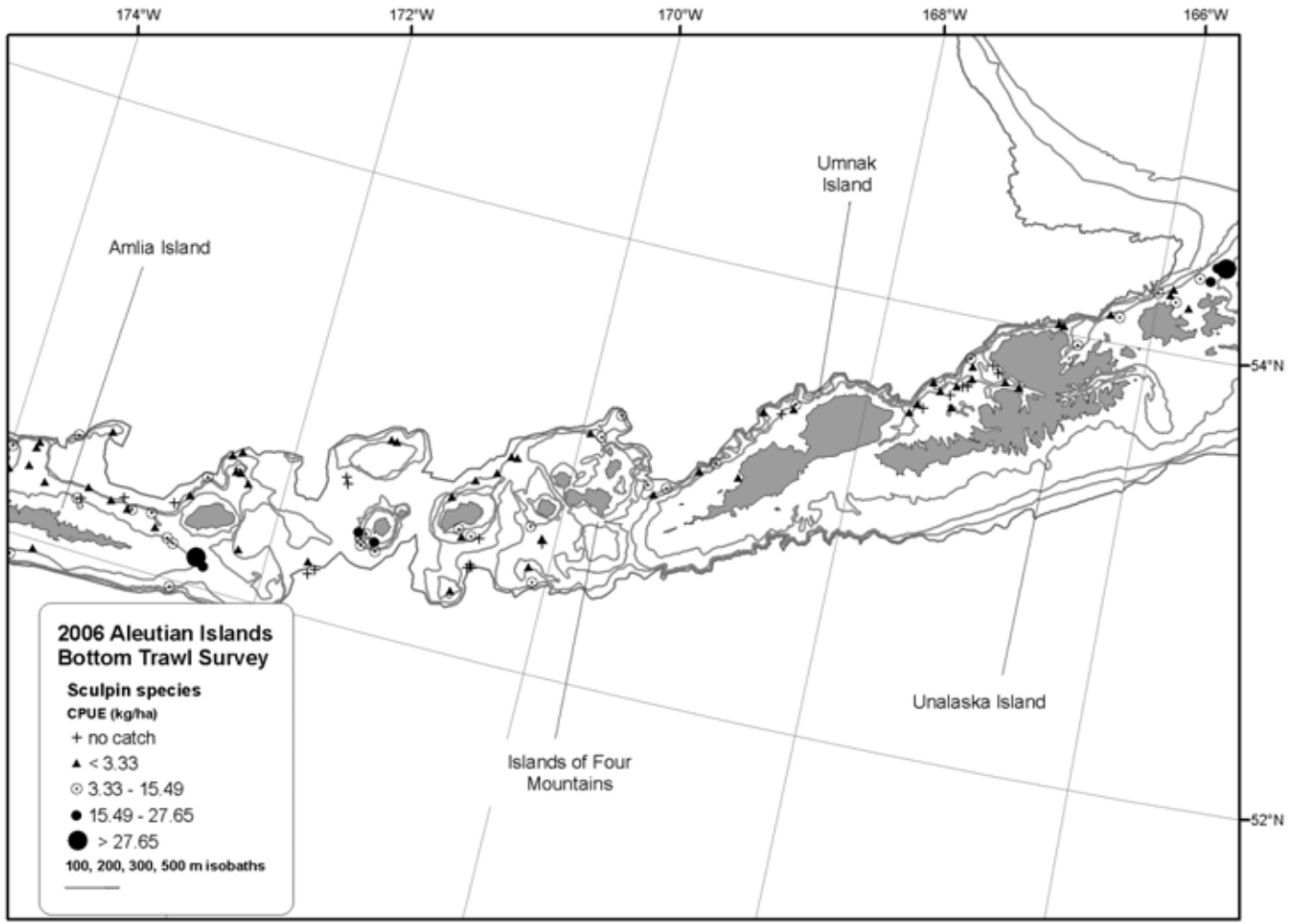


Figure 40. -- Distribution and relative abundance of sculpin species from the 2006 Aleutian Islands bottom trawl survey.

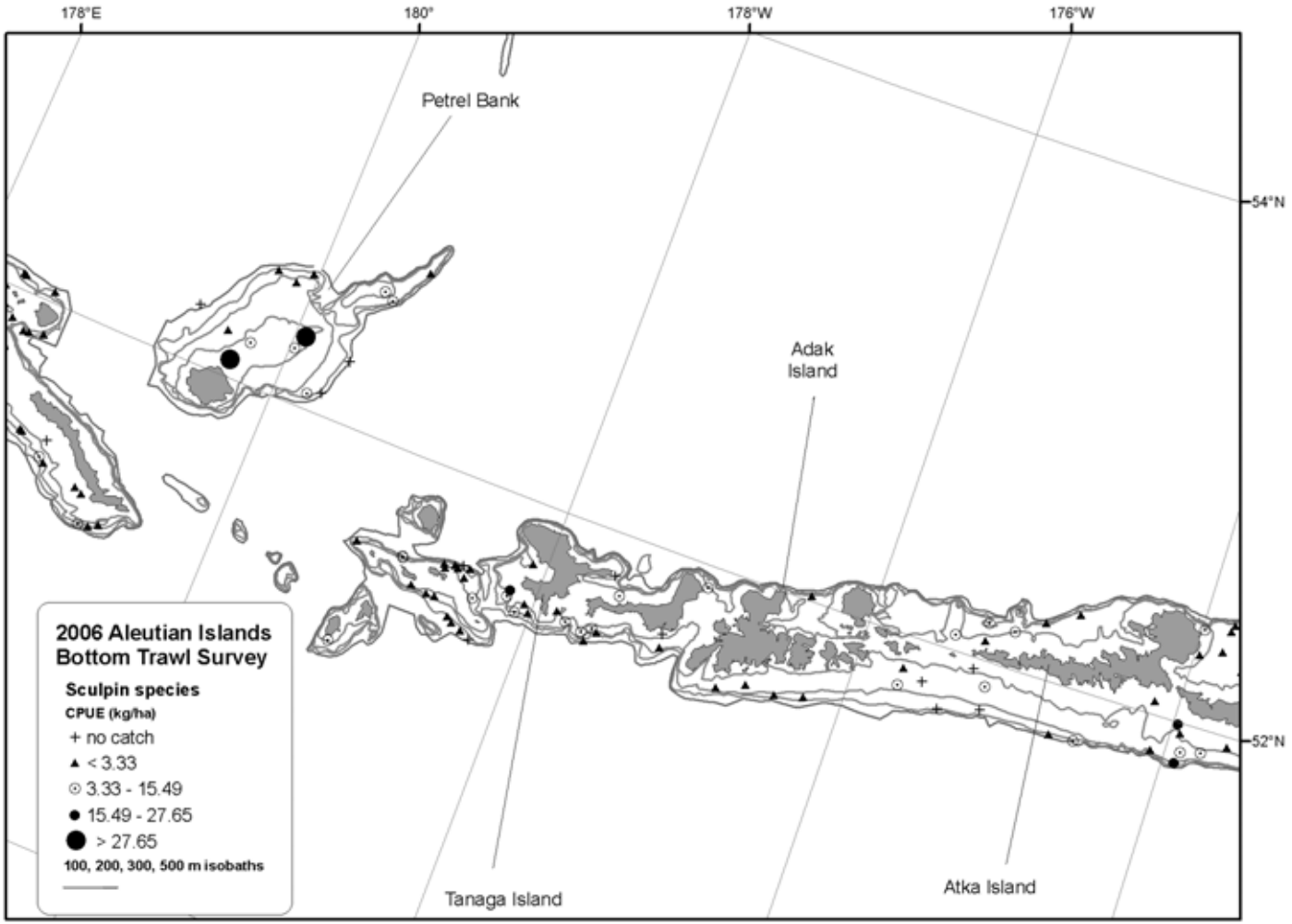


Figure 40. -- (continued).

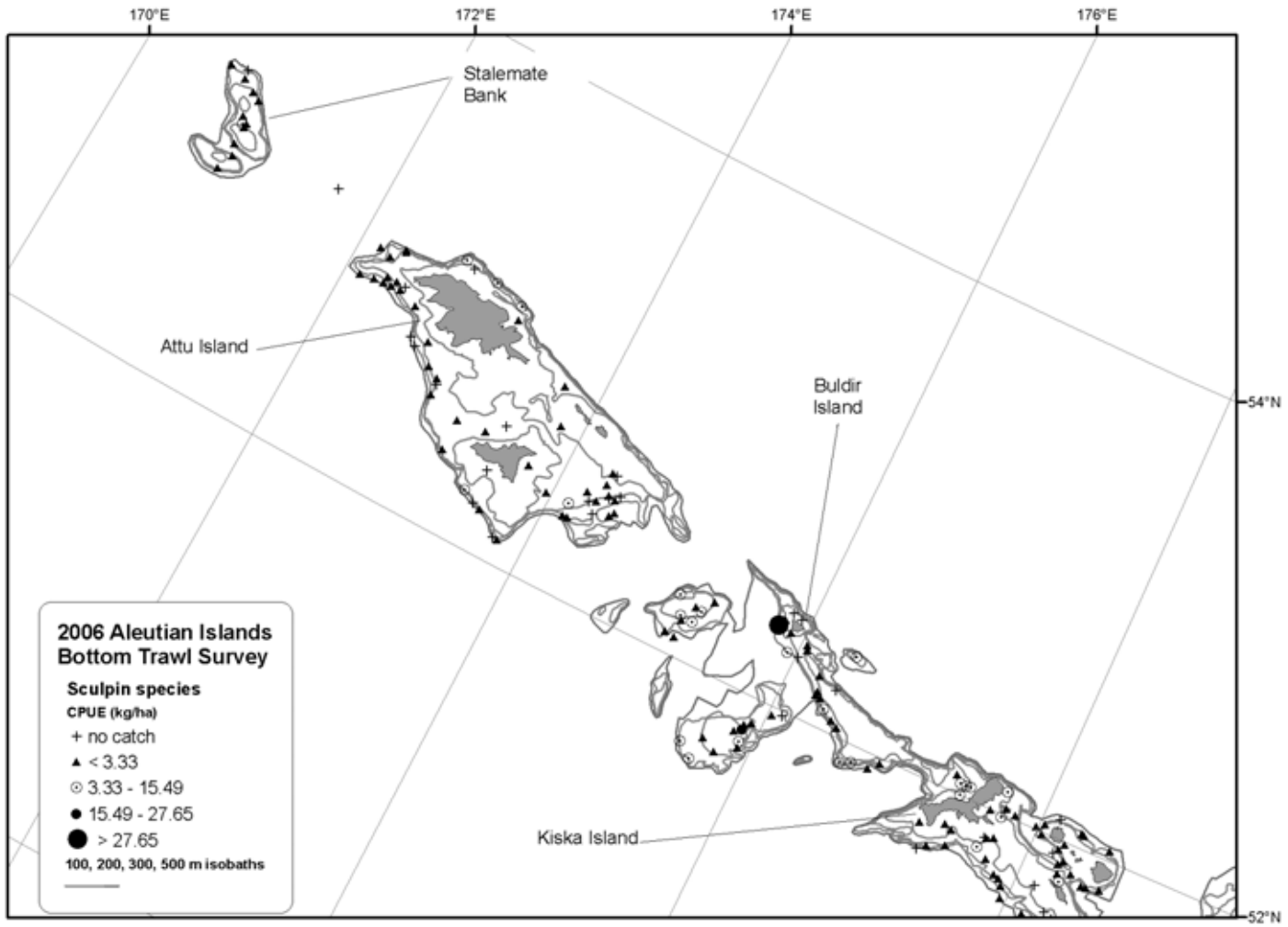


Figure 40. -- (continued).

Rockfishes

Pacific ocean perch (*Sebastes alutus*)

The highest area-specific catch rate for Pacific ocean perch (POP) was in the Western Aleutians area (Table 2). The overall mean CPUE of POP by area diminished in an easterly direction (Table 34, Fig. 41). Estimated biomass for the entire survey area surpassed 667,000 t (Table 34) and more than 96% of the total estimated biomass was found in the Aleutian areas. Biomass and mean CPUE increased with depth to about 300 m. Whereas Atka mackerel abundance was highest in the 101-200 m depth interval, the highest concentrations of POP were found in the 201-300 m depth interval. While over 75% of the trawl hauls between 101 and 300 m captured POP, the largest catches occurred at depths in the 201-300 m interval (Fig. 41). The highest five stratum-specific mean CPUEs were all found in the 201-300 m depth interval (Table 35). These occurred in the W Western Aleutians; an area containing Stalemate Bank, the northern subarea of the Central Aleutians area near Segula and Kiska Islands, the eastern subarea of the Western Aleutians area which contains Buldir Reef, Tahoma Bank, and Walls Plateau, the NE Eastern Aleutians subarea; north of Amlia Island and the SW Central Aleutians subarea. Mean lengths and weights increased with depth (Table 34). Size composition data show matching male and female frequency modes (25 cm) for juvenile POP (Fig. 42), but the primary adult frequency mode for males (35 cm) differs from that of females (38 cm). Size compositions by depth interval showed that in 1-100 m small POP predominated, in 101-200 m there was a mix of adult and juvenile sizes, and the two deeper strata contained adults exclusively. Figure 43 shows length-weight relationships for male, female, and combined sexes of POP. The regression curves for the sexes match closely, but the maximum length of females is larger than males.

Table 34. -- Number of survey hauls, number of hauls with Pacific ocean perch, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	6	1.686	823	0	2,085	0.148	21.7
	101-200	47	35	153.628	81,694	41,742	121,645	0.436	31.1
	201-300	23	22	1,145.732	197,482	117,913	277,050	0.626	35.5
	301-500	21	12	5.954	1,948	0	4,799	0.607	35.2
	All depths	113	75	185.608	281,946	196,308	367,584	0.569	34.2
Central Aleutians	1-100	32	8	1.642	960	0	2,757	0.267	26.9
	101-200	35	22	154.982	71,380	10,590	132,169	0.588	34.1
	201-300	21	21	465.028	98,067	43,226	152,907	0.802	38.1
	301-500	22	14	1.345	536	138	933	0.880	39.2
	All depths	110	65	103.334	170,942	91,992	249,891	0.710	36.4
Eastern Aleutians	1-100	12	2	0.204	140	0	360	0.347	29.4
	101-200	31	16	36.879	28,648	0	62,253	0.353	29.3
	201-300	27	25	322.814	158,227	14,967	301,486	0.901	38.6
	301-500	21	16	6.577	3,737	0	8,142	0.728	37.3
	All depths	91	59	75.694	190,752	48,664	332,841	0.815	37.2
All Aleutian Areas	1-100	66	16	1.09	1,922	0	4,069	0.222	24.8
	101-200	113	73	102.72	181,722	103,489	259,954	0.483	32.0
	201-300	71	68	519.55	453,775	286,889	620,661	0.760	37.2
	301-500	64	42	4.81	6,221	1,180	11,263	0.703	36.8
	All depths	314	199	113.05	643,640	461,511	825,769	0.679	35.7
Southern Bering Sea	1-100	21	6	0.101	41	1	81	0.156	21.6
	101-200	11	3	0.145	27	0	66	0.562	31.3
	201-300	4	3	328.185	18,505	0	64,614	0.770	37.7
	301-500	8	8	49.163	5,129	0	12,774	0.938	39.8
	All depths	44	20	31.679	23,701	1,112	46,291	0.805	38.1

Table 35. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Pacific ocean perch by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Western Aleutians	201-300	W Western Aleutians	13	12	1396.68	131,319	54,148	208,490
Central Aleutians	201-300	N Central Aleutians	10	10	984.45	43,218	10,661	75,775
Western Aleutians	201-300	E Western Aleutians	10	10	844.56	66,163	32,783	99,543
Eastern Aleutians	201-300	NE Eastern Aleutians	12	11	620.77	122,203	0	272,445
Central Aleutians	201-300	SW Central Aleutians	6	6	556.44	23,706	0	53,688
Central Aleutians	101-200	SW Central Aleutians	13	10	423.92	44,609	0	94,668
Central Aleutians	201-300	SE Central Aleutians	2	2	419.65	20,032	0	255,078
Western Aleutians	101-200	E Western Aleutians	18	18	353.46	44,269	19,802	68,735
Southern Bering Sea	201-300	Combined Southern Bering	4	3	328.19	18,505	0	52,605
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	188.60	2,941	0	30,239
Central Aleutians	201-300	Petrel Bank	3	3	144.96	11,110	719	21,501
Eastern Aleutians	201-300	SE Eastern Aleutians	9	8	128.22	26,421	0	55,087
Central Aleutians	101-200	Petrel Bank	4	3	109.14	18,941	0	76,847
Eastern Aleutians	201-300	SW Eastern Aleutians	4	4	92.99	6,662	0	20,804
Western Aleutians	101-200	W Western Aleutians	29	17	92.06	37,425	4,465	70,385
Eastern Aleutians	101-200	SW Eastern Aleutians	7	4	89.89	20,325	0	58,820
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	57.22	2,507	0	28,776
Central Aleutians	101-200	N Central Aleutians	8	5	55.39	5,905	0	19,801
Southern Bering Sea	301-500	Combined Southern Bering	8	8	49.16	5,129	0	12,775
Eastern Aleutians	101-200	NW Eastern Aleutians	3	1	27.82	4,435	0	23,520
Central Aleutians	101-200	SE Central Aleutians	10	4	25.60	1,925	0	4,522
Eastern Aleutians	101-200	SE Eastern Aleutians	10	7	16.50	3,135	0	7,290
Western Aleutians	301-500	W Western Aleutians	18	10	8.61	1,474	0	4,286
Central Aleutians	1-100	SW Central Aleutians	9	4	5.59	904	0	2,935
Western Aleutians	1-100	E Western Aleutians	14	5	5.46	646	0	1,901
Eastern Aleutians	101-200	NE Eastern Aleutians	11	4	3.74	754	0	1,810
Eastern Aleutians	301-500	SE Eastern Aleutians	9	7	3.25	837	0	1,684
Western Aleutians	301-500	E Western Aleutians	3	2	3.04	475	0	1,773
Central Aleutians	301-500	N Central Aleutians	11	7	2.53	314	0	673
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	7	1.47	393	0	899
Central Aleutians	301-500	Petrel Bank	3	2	1.23	153	0	582
Central Aleutians	301-500	SE Central Aleutians	5	4	0.72	51	0	103
Western Aleutians	1-100	W Western Aleutians	8	1	0.48	177	0	595
Eastern Aleutians	1-100	SE Eastern Aleutians	6	1	0.47	81	0	290
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	0.31	59	0	804
Central Aleutians	1-100	SE Central Aleutians	7	1	0.29	34	0	116
Central Aleutians	301-500	SW Central Aleutians	3	1	0.23	18	0	97
Southern Bering Sea	101-200	E Southern Bering Sea	9	3	0.23	27	0	67
Southern Bering Sea	1-100	E Southern Bering Sea	19	6	0.17	41	0	81
Central Aleutians	1-100	N Central Aleutians	11	2	0.09	19	0	60
Central Aleutians	1-100	Petrel Bank	5	1	0.03	3	0	12

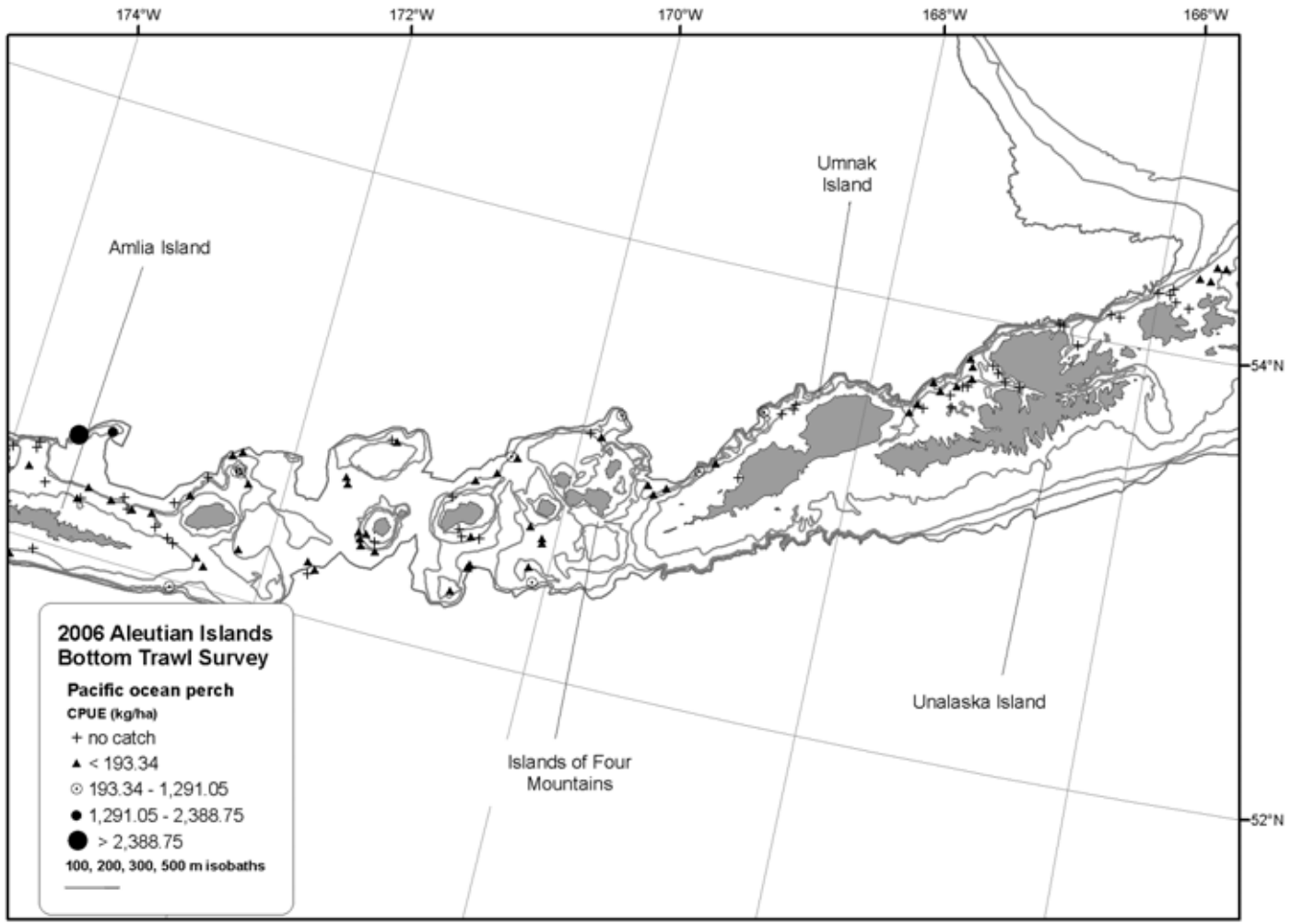


Figure 41. -- Distribution and relative abundance of Pacific ocean perch from the 2006 Aleutian Islands bottom trawl survey.

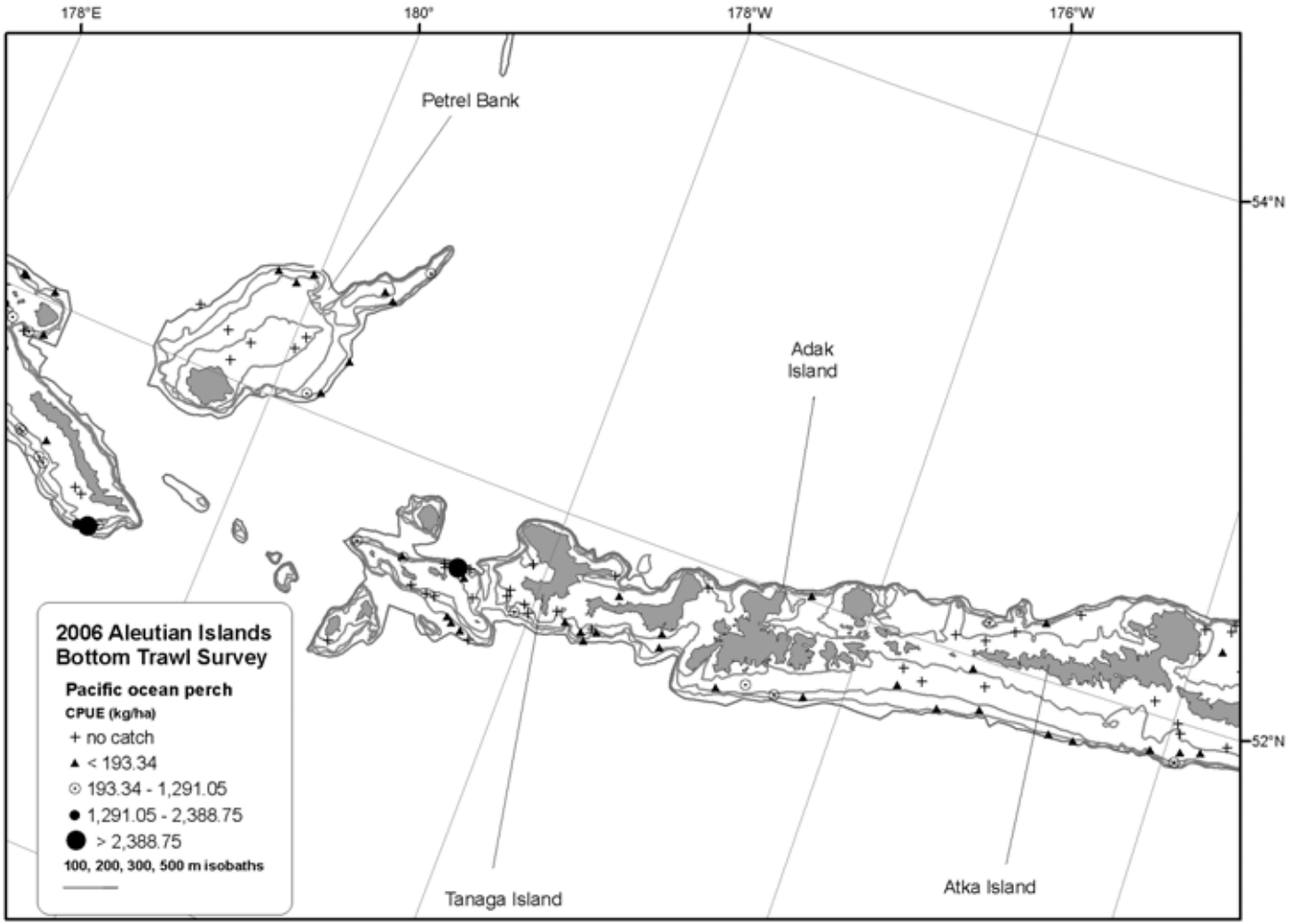


Figure 41. -- (continued)

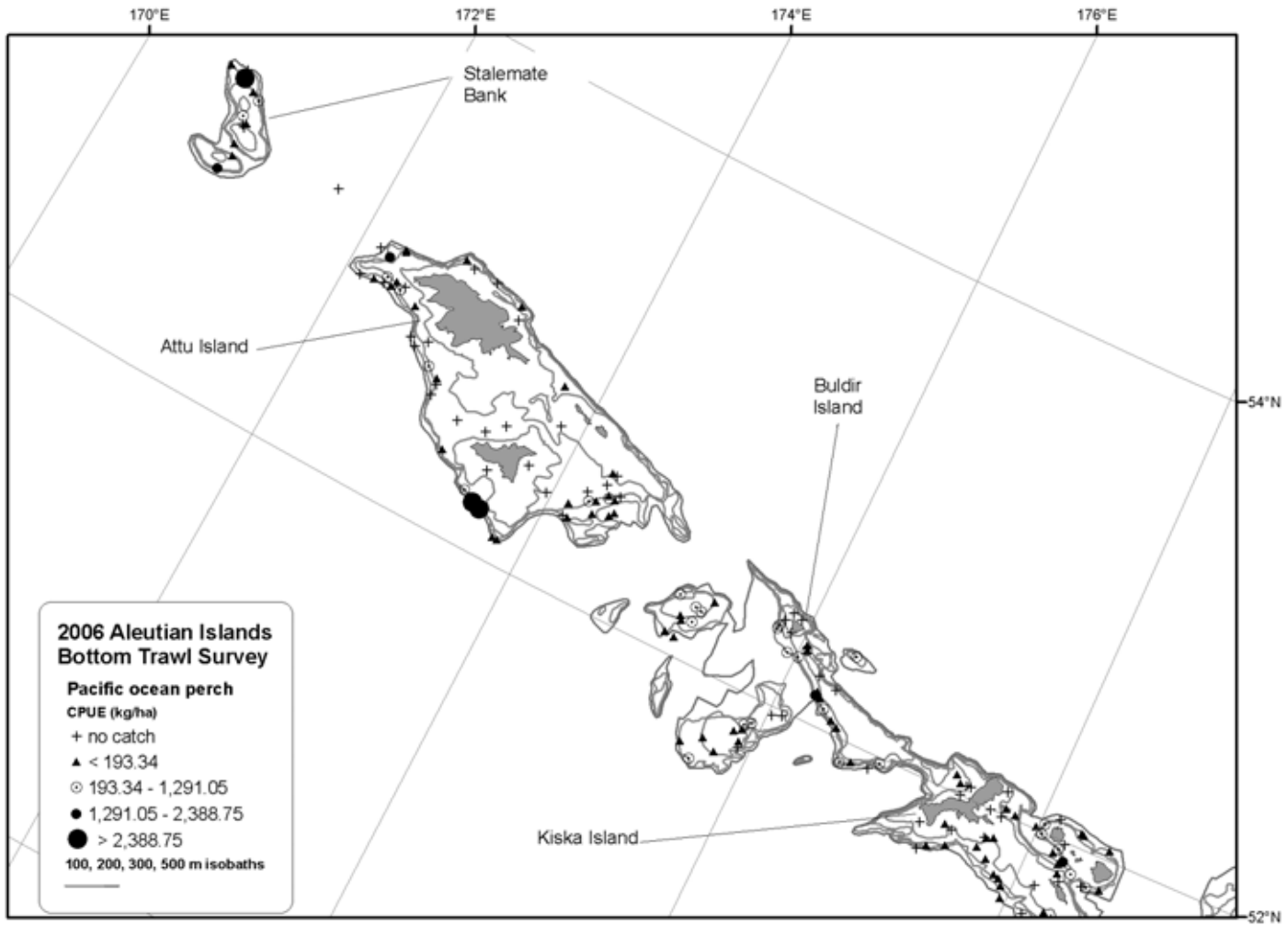


Figure 41. -- (continued)

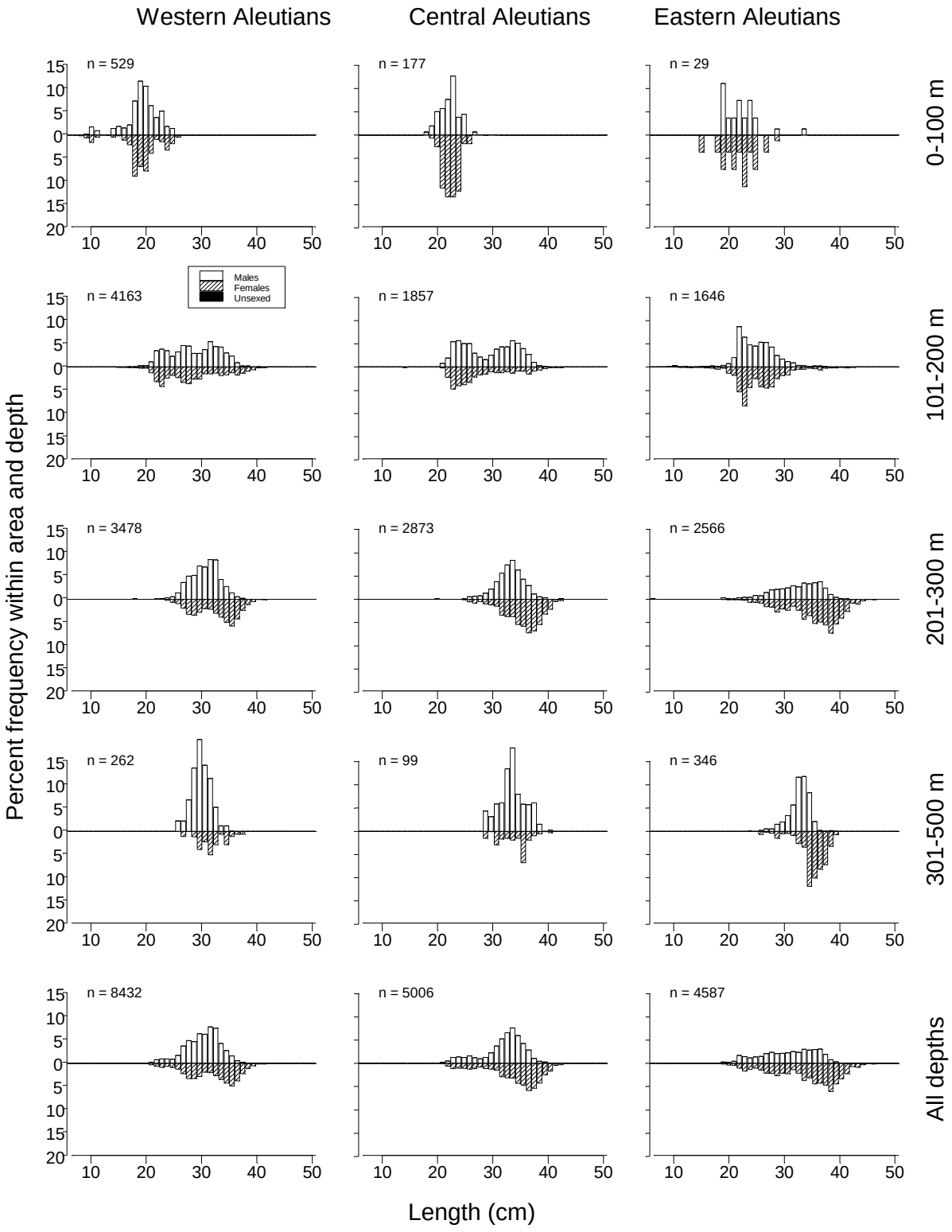


Figure 42. -- Size composition of Pacific ocean perch from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

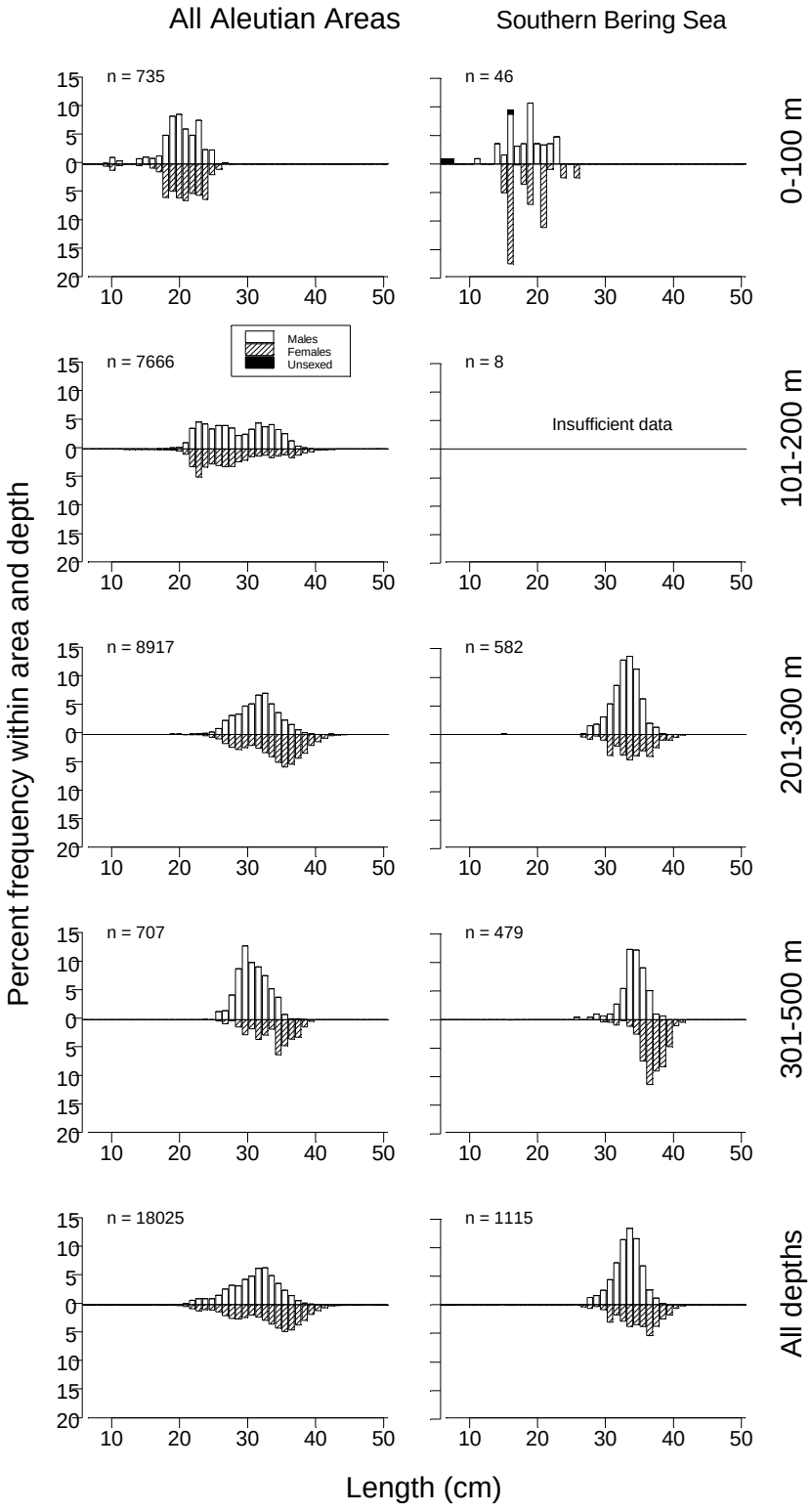


Figure 42. -- (continued).

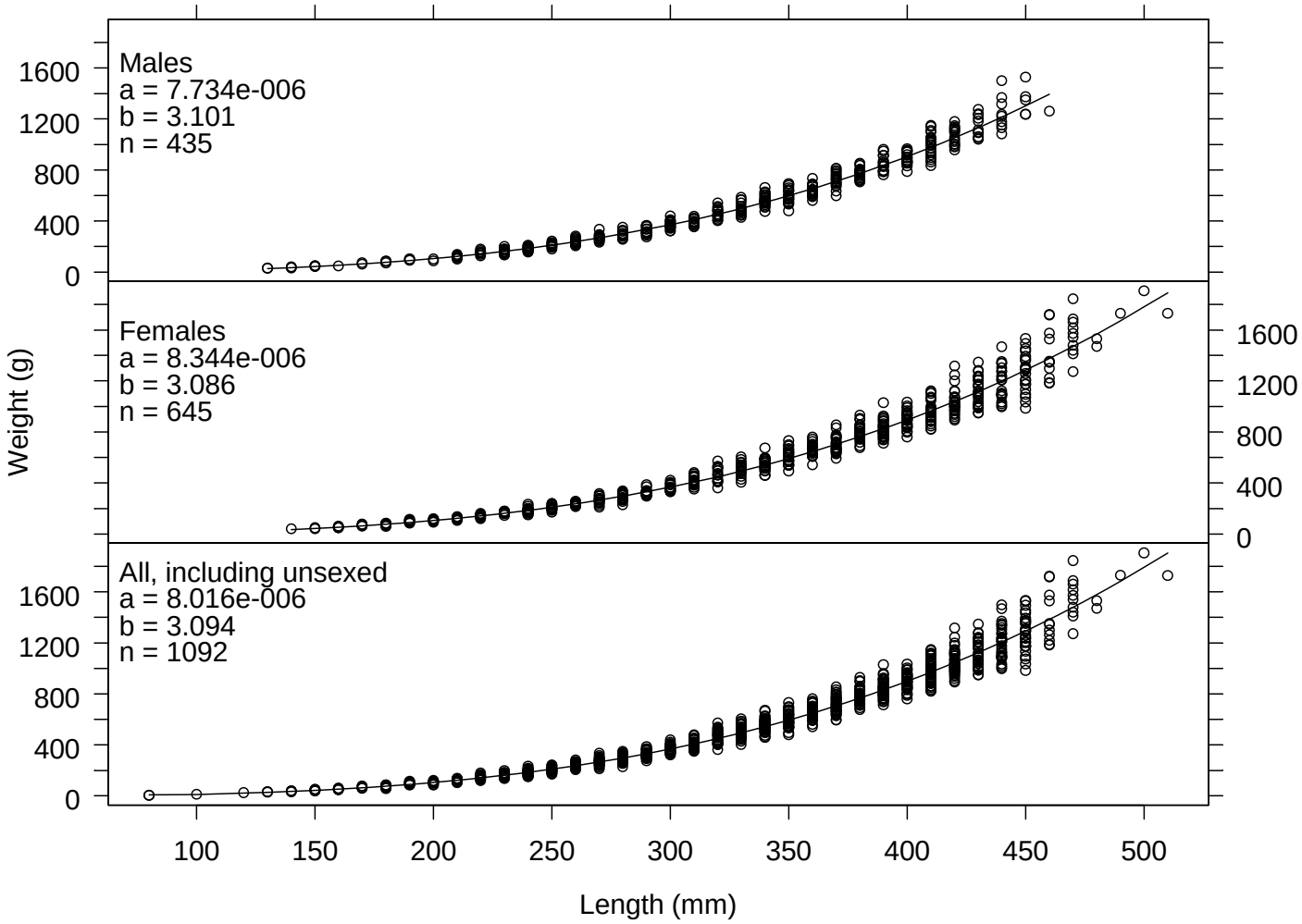


Figure 43. -- Length-weight relationship for Pacific ocean perch specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Northern rockfish (*Sebastes polyspinis*)

Northern rockfish relative abundance was highest in the Western and Central Aleutian areas the (Table 2). Figure 44 shows that the largest catches of northern rockfish were widely spread throughout the Aleutian Island Archipelago, although many of the larger catches were west of 180° longitude. The biomass in the Southern Bering Sea was the result of one large catch that occurred north of Unalaska Island. Estimated total survey biomass was slightly less than 218,000 t, with about 46% found in the Western Aleutians area (Table 36), and in depths less than 200 m (Table 37). Northern rockfish were encountered in relatively small numbers in the 201-300 m depth interval and rarely in trawl hauls deeper than 300 m. The distribution by depth is more similar to that of Atka mackerel than POP. Northern rockfish were captured in 55% of all successful tows shallower than 200 m. The highest catch rate of northern rockfish occurred in 101-200 m in the SW Central Aleutians subarea between Amchitka and Kiska Islands. All tows in that subarea caught northern rockfish (Table 37). Mean individual length and weight increased with depth to 300 m. The size composition modes for both sexes occurred between 30 and 35 cm at all depth intervals in the Aleutian areas, while slightly larger fish were observed in the Southern Bering Sea 1-100 m depth interval (Fig. 45). The primary modes in the size compositions of both males and females in all Aleutian areas combined were at 30 cm, but larger females represented a greater proportion of the population than larger males. Figure 46 depicts length-weight relationships for male, female, and combined sexes of northern rockfish. The male and female regression curves are very similar, but the maximum lengths for females are slightly larger than for males.

Table 36. -- Number of survey hauls, number of hauls with northern rockfish, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	16	76.384	37,250	15,569	58,930	0.315	27.8
	101-200	47	33	120.212	63,924	7,851	119,997	0.421	30.8
	201-300	23	11	0.592	102	20	184	0.474	33.1
	301-500	21	0	0.000	0	--	--	--	--
	All depths	113	60	66.671	101,276	42,358	160,193	0.382	29.7
Central Aleutians	1-100	32	15	57.611	33,687	0	79,796	0.489	31.7
	101-200	35	23	80.530	37,089	0	93,836	0.588	34.4
	201-300	21	12	0.245	52	23	81	0.518	32.6
	301-500	22	2	0.014	5	0	13	0.530	33.1
	All depths	110	52	42.819	70,834	0	142,042	0.541	33.1
Eastern Aleutians	1-100	12	6	8.217	5,627	200	11,055	0.666	34.9
	101-200	31	18	20.028	15,558	0	36,023	0.594	34.6
	201-300	27	15	3.652	1,790	0	4,259	0.929	39.3
	301-500	21	1	0.012	7	0	21	0.568	34.0
	All depths	91	40	9.119	22,982	2,366	43,597	0.638	35.0
All Aleutian Areas	1-100	66	37	43.57	76,564	26,627	126,501	0.418	30.0
	101-200	113	74	65.89	116,572	35,946	197,198	0.497	32.5
	201-300	71	38	2.23	1,944	0	4,341	0.894	38.8
	301-500	64	3	0.01	12	0	28	0.551	33.6
	All depths	314	152	34.27	195,091	101,089	289,093	0.470	31.6
Southern Bering Sea	1-100	21	3	56.726	22,837	0	70,581	0.705	35.7
	101-200	11	1	0.003	1	0	2	0.033	14.0
	201-300	4	3	0.759	43	0	101	0.653	34.8
	301-500	8	1	0.030	3	0	10	0.667	34.0
	All depths	44	8	30.587	22,883	0	68,918	0.705	35.7

Table 37. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of northern rockfish by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	101-200	SW Central Aleutians	13	13	317.11	33,369	0	93,987
Western Aleutians	1-100	E Western Aleutians	14	12	278.66	32,975	11,683	54,267
Western Aleutians	101-200	E Western Aleutians	18	17	189.19	23,695	0	57,720
Central Aleutians	1-100	Petrel Bank	5	1	188.56	18,102	0	68,355
Central Aleutians	1-100	SE Central Aleutians	7	2	115.99	13,502	0	46,527
Western Aleutians	101-200	W Western Aleutians	29	16	98.96	40,229	0	86,750
Southern Bering Sea	1-100	E Southern Bering	19	3	93.59	22,837	0	70,763
Eastern Aleutians	101-200	SW Eastern Aleutians	7	5	47.15	10,661	0	33,805
Eastern Aleutians	1-100	SE Eastern Aleutians	6	5	32.24	5,611	0	11,951
Eastern Aleutians	101-200	SE Eastern Aleutians	10	6	25.10	4,770	0	12,159
Central Aleutians	101-200	N Central Aleutians	8	5	14.91	1,590	0	4,576
Central Aleutians	101-200	Petrel Bank	4	1	11.82	2,052	0	8,581
Western Aleutians	1-100	W Western Aleutians	8	4	11.57	4,275	0	12,069
Eastern Aleutians	201-300	NE Eastern Aleutians	12	7	8.00	1,575	0	4,213
Central Aleutians	1-100	N Central Aleutians	11	5	5.70	1,199	0	3,401
Central Aleutians	1-100	SW Central Aleutians	9	7	5.47	884	0	2,136
Central Aleutians	101-200	SE Central Aleutians	10	4	1.04	78	0	223
Western Aleutians	201-300	E Western Aleutians	10	5	0.81	63	0	140
Eastern Aleutians	201-300	SE Eastern Aleutians	9	4	0.77	158	0	333
Eastern Aleutians	201-300	SW Eastern Aleutians	4	3	0.76	54	0	140
Southern Bering Sea	201-300	Combined Southern Bering	4	3	0.76	43	0	101
Central Aleutians	201-300	SW Central Aleutians	6	4	0.51	22	0	47
Eastern Aleutians	101-200	NE Eastern Aleutians	11	4	0.48	97	0	210
Western Aleutians	201-300	W Western Aleutians	13	6	0.41	39	0	82
Central Aleutians	201-300	N Central Aleutians	10	6	0.37	16	0	38
Central Aleutians	201-300	SE Central Aleutians	2	2	0.29	14	0	41
Eastern Aleutians	101-200	NW Eastern Aleutians	3	3	0.18	29	0	108
Eastern Aleutians	201-300	NW Eastern Aleutians	2	1	0.16	3	0	34
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	0.09	16	0	222
Central Aleutians	301-500	N Central Aleutians	11	2	0.04	5	0	14
Southern Bering Sea	301-500	Combined Southern Bering	8	1	0.03	3	0	10
Eastern Aleutians	301-500	Combined Eastern Aleutians	10	1	0.03	7	0	22
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	0.01	1	0	7

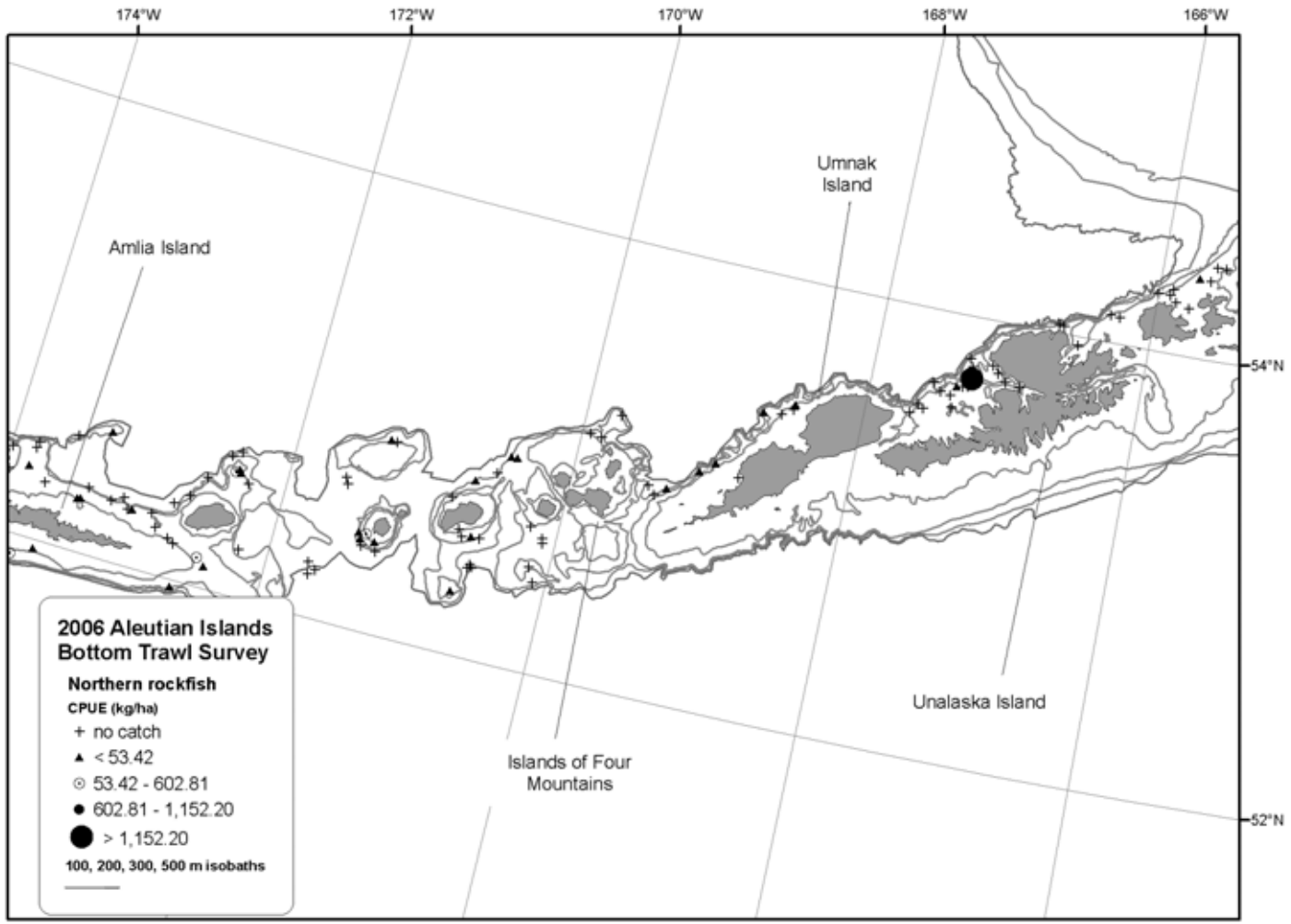


Figure 44. -- Distribution and relative abundance of northern rockfish from the 2006 Aleutian Islands bottom trawl survey.

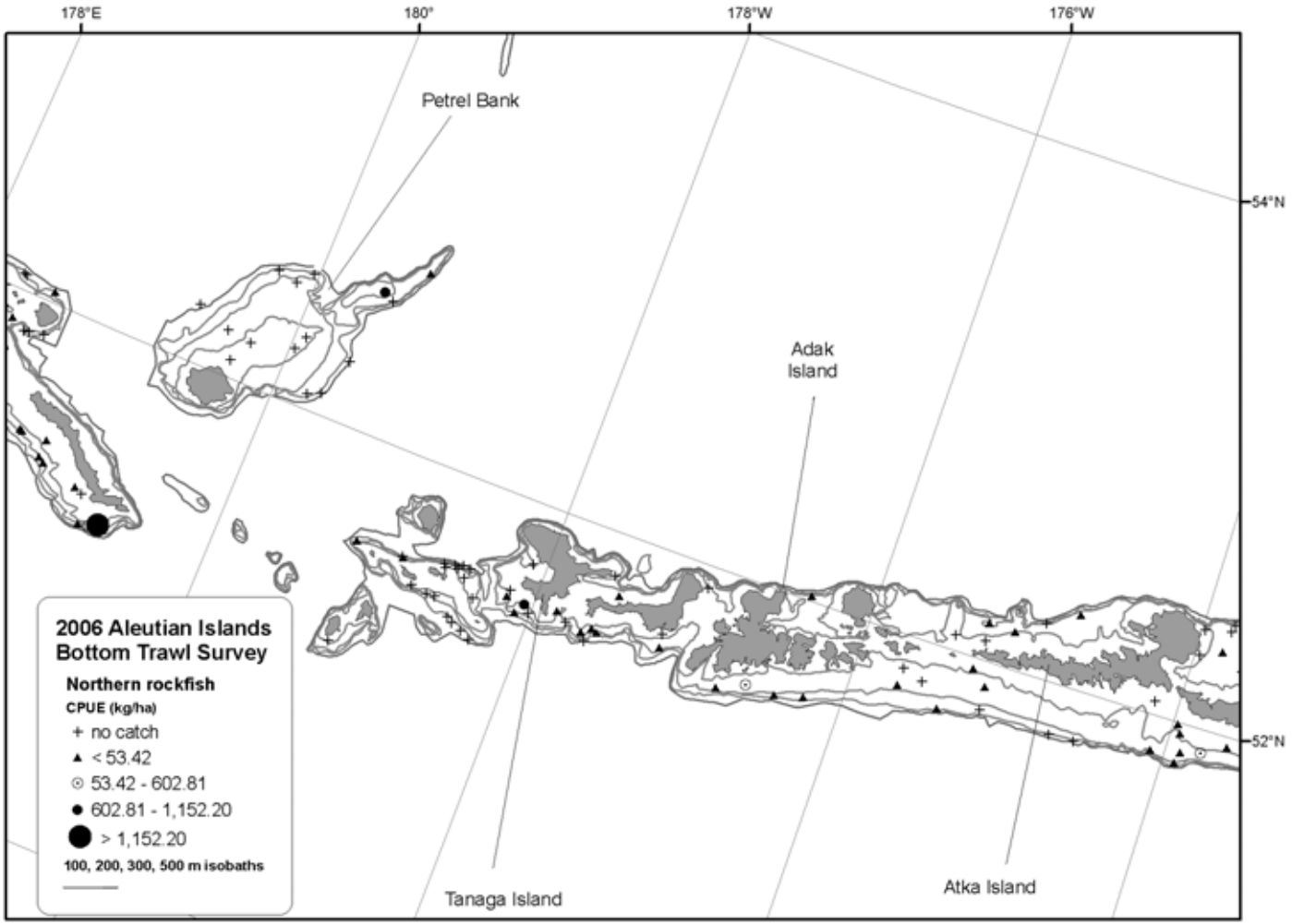


Figure 44. -- (continued).

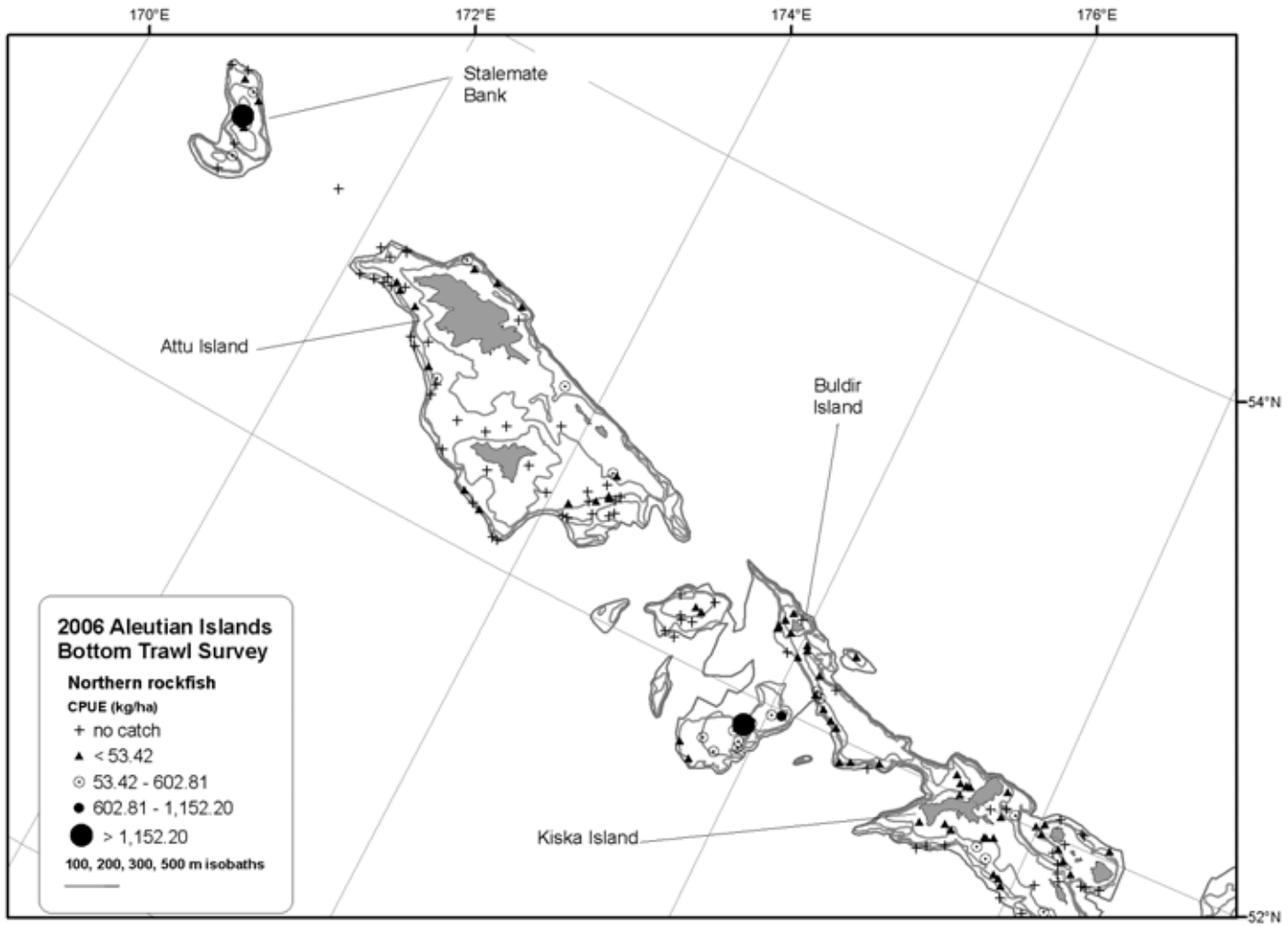


Figure 44. -- (continued).

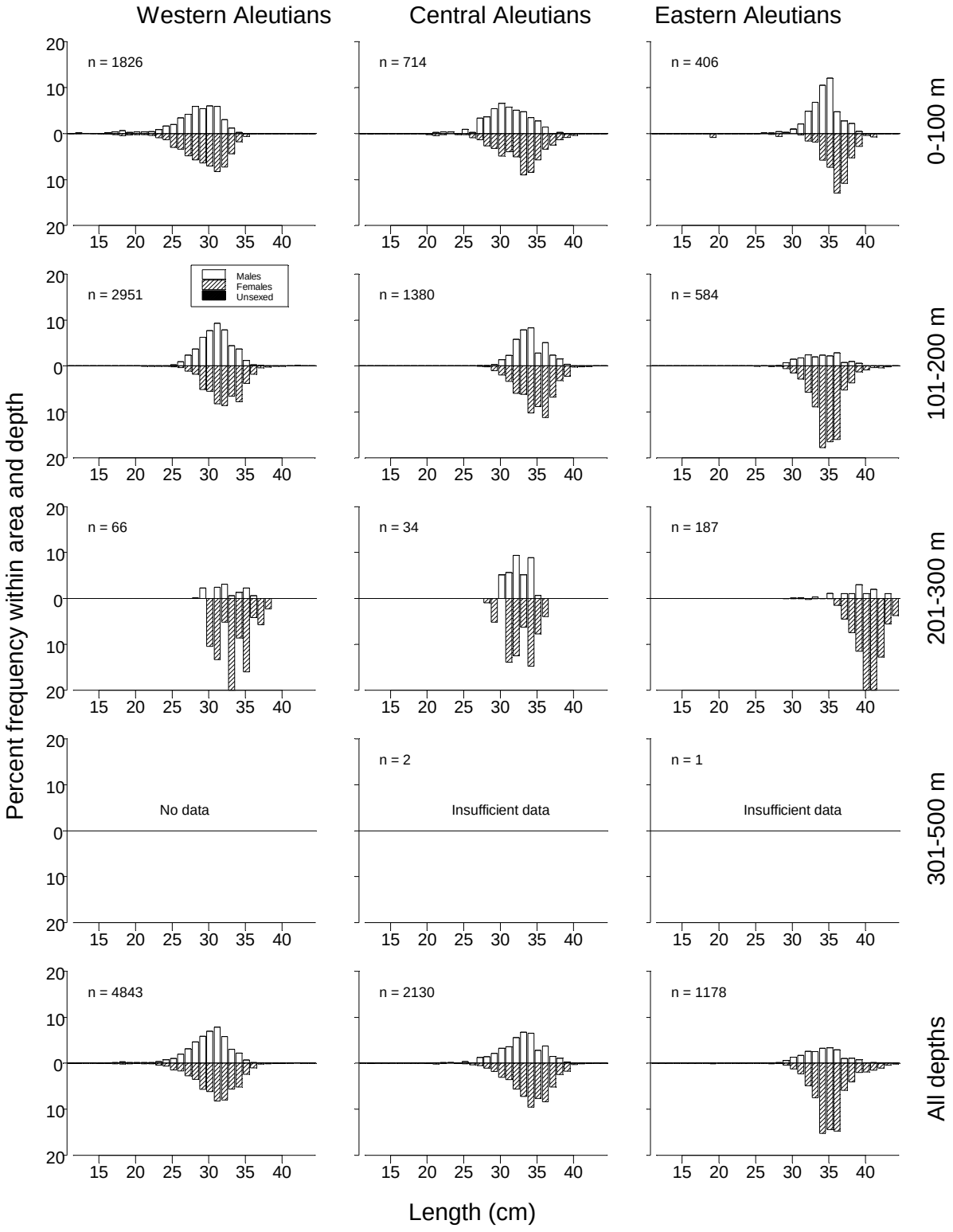


Figure 45. -- Size composition of northern rockfish from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

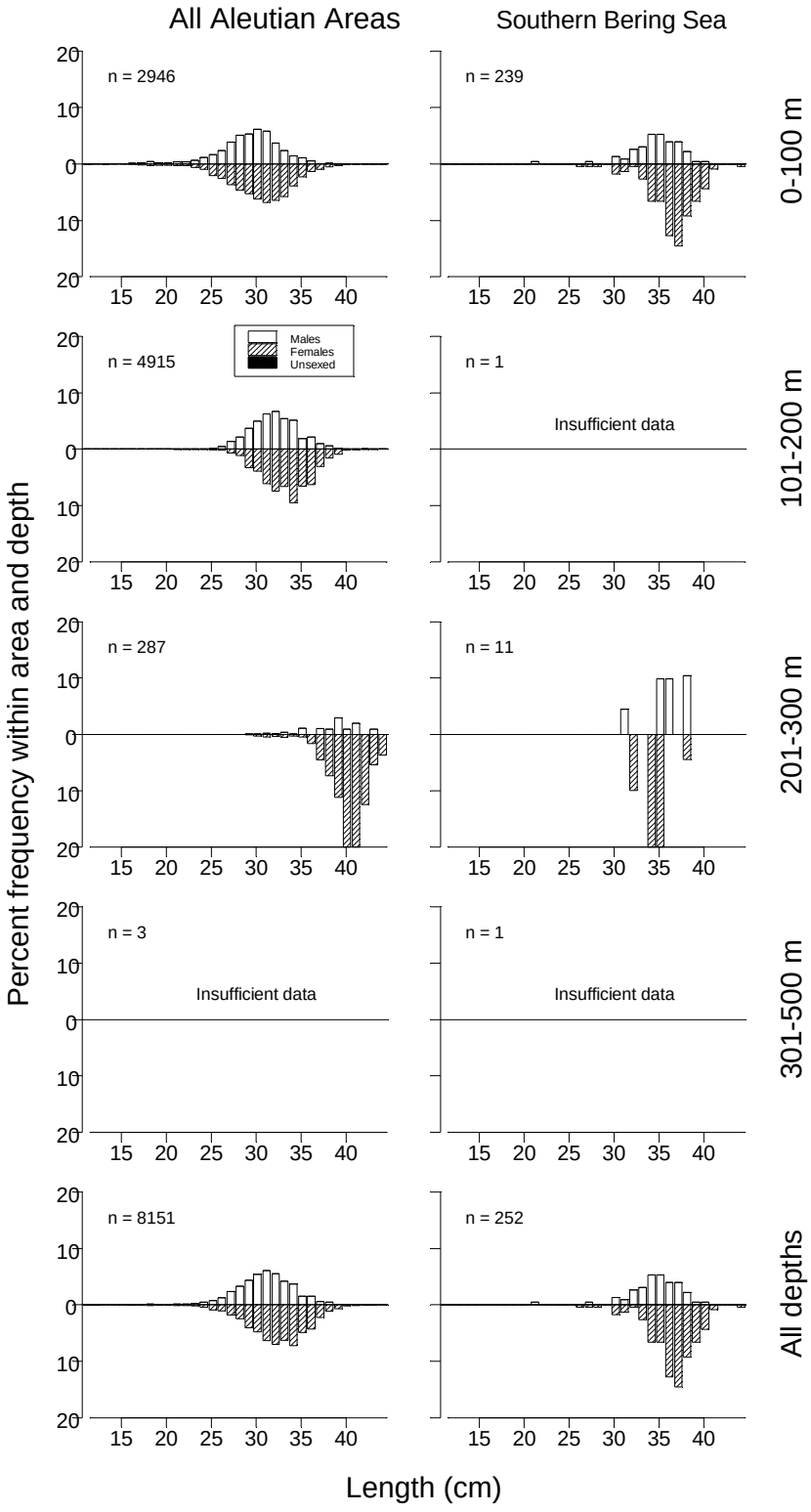


Figure 45. -- (continued).

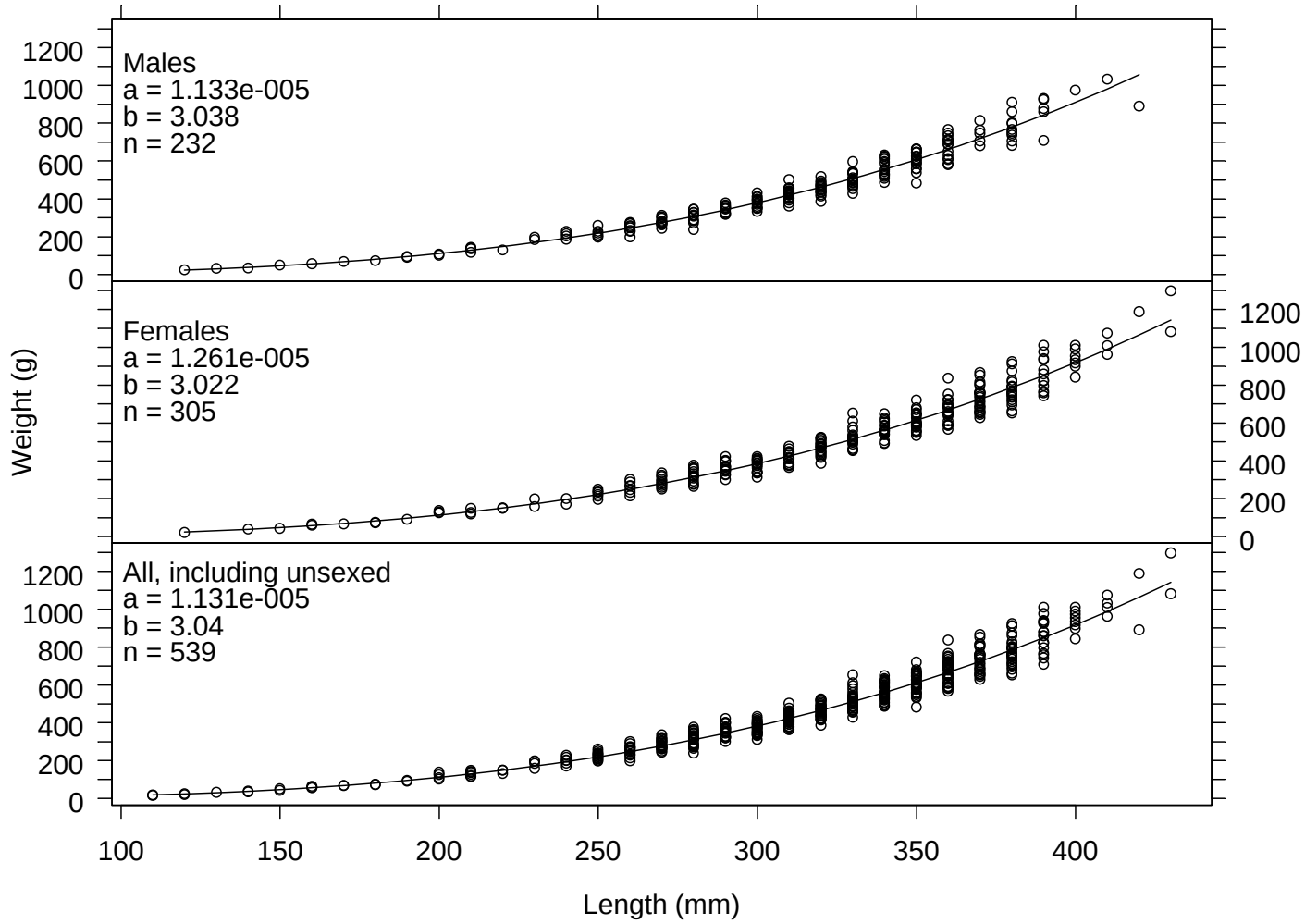


Figure 46. -- Length-weight relationship for northern rockfish specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Shortraker rockfish (*Sebastes borealis*)

Shortraker rockfish mean CPUE was higher than that of rougheye or blackspotted rockfish in all major survey areas (Table 2). The estimated biomass for this species was higher at the deepest depth intervals across all NPFMC areas (Table 38). A significant proportion, about 16%, of the total shortraker rockfish biomass estimated from the 1980 U.S.-Japan cooperative Aleutian trawl survey was found in the 501-900 m depth interval (Ronholt et al. 1986). Thus, estimates from the 2006 AFSC survey are likely to have excluded some part of the shortraker rockfish population. The seven highest area-specific mean CPUEs were all in the 301-500 m depth interval (Table 39), with the highest CPUE estimate from the SE Central Aleutians subarea. All trawl hauls in this subarea produced catches of shortraker rockfish. Four catches accounted for the entire biomass estimate in the Southern Bering Sea area (Table 39). Notable individual catches of shortraker rockfish occurred between Unalaska and Umnak Islands, in Seguam Pass, west of Tanaga Island, east of Kiska Island (Segula Island), and west of Attu Island (Fig. 47). Size compositions of males and females from the combined Aleutian areas were similar (Fig. 48). Figure 49 presents length-weight relationships for shortraker rockfish.

Rougheye rockfish (*Sebastes aleutianus*)

For the first time in 2006, the species previously known as rougheye rockfish were separated into rougheye rockfish (*S. aleutianus*) and blackspotted rockfish (*S. melanostictus*). This resulted in a much lower estimate of mean CPUE and biomass of rougheye rockfish in the 2006 Aleutian Islands bottom trawl survey. The CPUE was only significant in the Southern Bering Sea, and the total estimated biomass was only 699 t across all areas (Table 40). Rougheye rockfish were generally only found in the deepest depth stratum (301-500 m) and were only found in seven subareas (Table 41). The largest catches were found on the northwest side of Unalaska Island, with one other significant catch in the Central Aleutian Islands near Kiska Island (Fig. 50). The size composition and length-weight relationships for rougheye rockfish are shown in Figures 51 and 52.

Blackspotted rockfish (*Sebastes melanostictus*)

For the first time in 2006, the species previously known as rougheye rockfish were separated into rougheye rockfish (*S. aleutianus*) and blackspotted rockfish (*S. melanostictus*). Blackspotted rockfish mean CPUE was highest in the Central Aleutians area and abundance increased with depth (Table 42). The largest average blackspotted rockfish lengths and weights were found in the 201-300 m depth interval, with the exception of the Eastern Aleutians area, where the largest mean sizes were found in the 301-500 m interval. With the exception of one relatively large catch in the Southern Bering Sea area and two in the Eastern Aleutians area the catches were relatively small in these areas (Fig. 53). This survey appears to sample the majority of the blackspotted rockfish depth distribution, but probably not their preferred rough bottom habitat. The highest stratum-specific mean CPUEs were in the 301-500 m depth intervals in the N Central Aleutians subarea, followed by the 301-500 m interval in the SW Eastern Aleutians subarea (Table 43). Combined Aleutian size compositions for males and females were similar (Fig. 54) and a smaller mode of fish (25 cm) was observed in the 201-300 m depth interval in the Aleutian Island areas. Figure 55 shows length-weight relationships for blackspotted rockfish.

Table 38. -- Number of survey hauls, number of hauls with shortraker rockfish, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	1	0.352	172	0	531	9.118	72.0
	101-200	47	0	0.000	0	--	--	--	--
	201-300	23	3	0.387	67	0	145	5.583	65.9
	301-500	21	17	6.820	2,232	846	3,618	1.491	41.3
	All depths	113	21	1.626	2,471	1,109	3,832	2.132	44.1
Central Aleutians	1-100	32	0	0.000	0	--	--	--	--
	101-200	35	0	0.000	0	--	--	--	--
	201-300	21	7	1.352	285	0	639	4.173	57.2
	301-500	22	19	12.686	5,050	3,641	6,459	2.121	48.2
	All depths	110	26	3.225	5,335	3,951	6,719	2.231	48.6
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	0	0.000	0	--	--	--	--
	201-300	27	3	0.634	311	0	794	2.288	49.6
	301-500	21	11	6.448	3,664	0	9,495	2.199	48.3
	All depths	91	14	1.577	3,975	0	9,548	2.206	48.4
All Aleutian Areas	1-100	66	1	0.10	172	0	515	9.118	72.0
	101-200	113	0	0.00	0	--	--	--	--
	201-300	71	13	0.76	663	80	1,245	3.431	54.5
	301-500	64	47	8.46	10,946	5,048	16,845	2.019	46.8
	All depths	314	61	2.07	11,781	5,935	17,627	2.202	47.6
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	0	0.000	0	--	--	--	--
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	4	11.314	1,180	0	2,635	2.915	50.0
	All depths	44	4	1.578	1,180	0	2,421	2.915	50.0

Table 39. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of shortraker rockfish by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	301-500	SE Central Aleutians	5	5	28.28	2,020	1,519	2,522
Eastern Aleutians	301-500	SE Eastern Aleutians	9	5	11.62	2,991	0	9,421
Southern Bering Sea	301-500	Combined Southern Bering	8	4	11.31	1,180	0	2,635
Central Aleutians	301-500	N Central Aleutians	11	9	11.08	1,374	266	2,481
Western Aleutians	301-500	W Western Aleutians	18	14	9.74	1,666	359	2,973
Central Aleutians	301-500	SW Central Aleutians	3	2	9.68	764	0	2,470
Central Aleutians	301-500	Petrel Bank	3	3	7.21	892	256	1,529
Central Aleutians	201-300	N Central Aleutians	10	6	6.42	282	0	666
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	5.63	247	199	294
Western Aleutians	301-500	E Western Aleutians	3	3	3.63	566	0	1,600
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	4	1.60	426	0	872
Eastern Aleutians	201-300	SW Eastern Aleutians	4	2	1.22	87	0	314
Eastern Aleutians	201-300	SE Eastern Aleutians	9	1	1.08	223	0	738
Western Aleutians	201-300	W Western Aleutians	13	3	0.71	67	0	149
Western Aleutians	1-100	W Western Aleutians	8	1	0.47	172	0	579
Central Aleutians	201-300	SW Central Aleutians	6	1	0.07	3	0	11

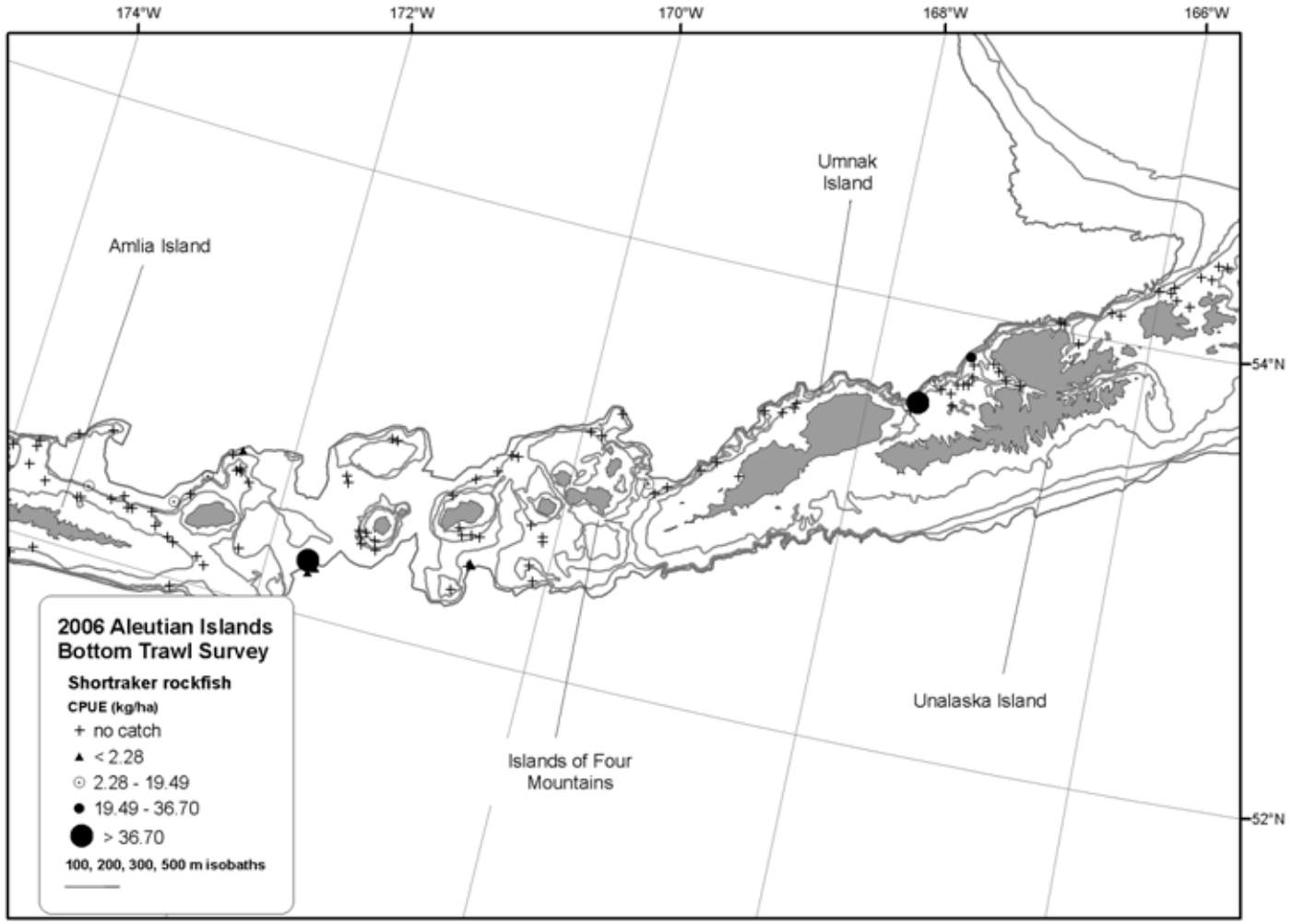


Figure 47. -- Distribution and relative abundance of shortraker rockfish from the 2006 Aleutian Islands bottom trawl survey.

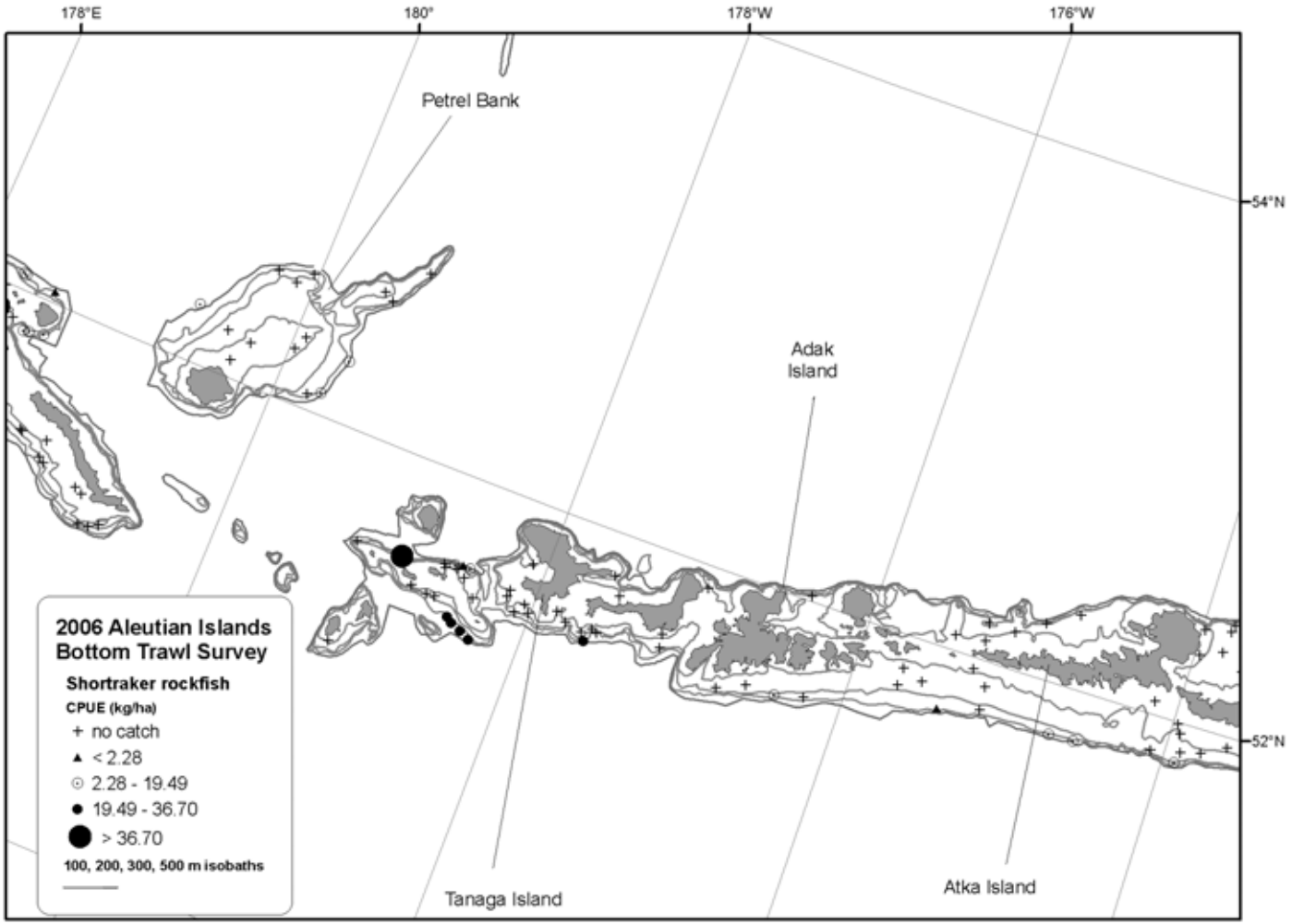


Figure 47. -- (continued).

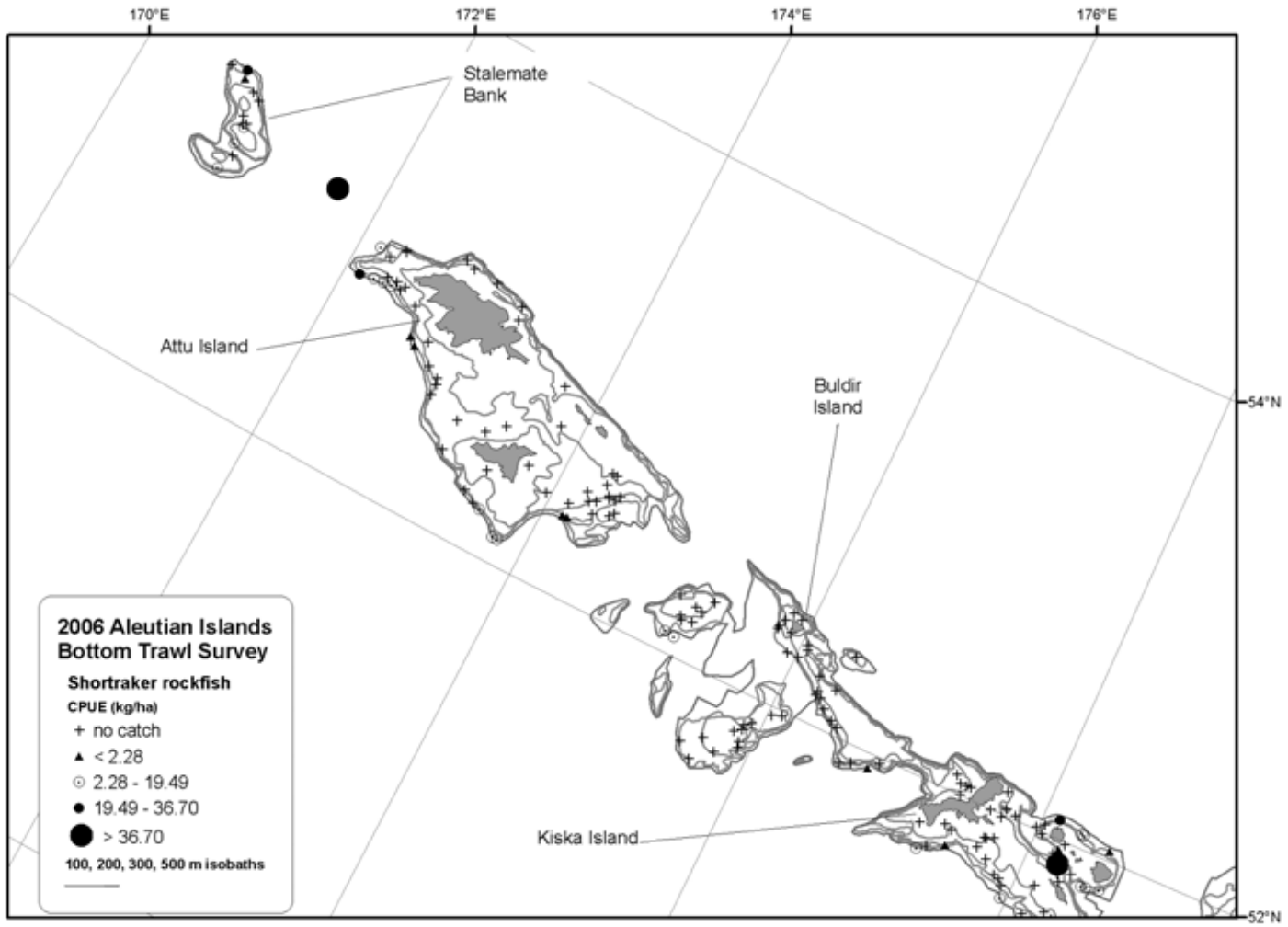


Figure 47. -- (continued).

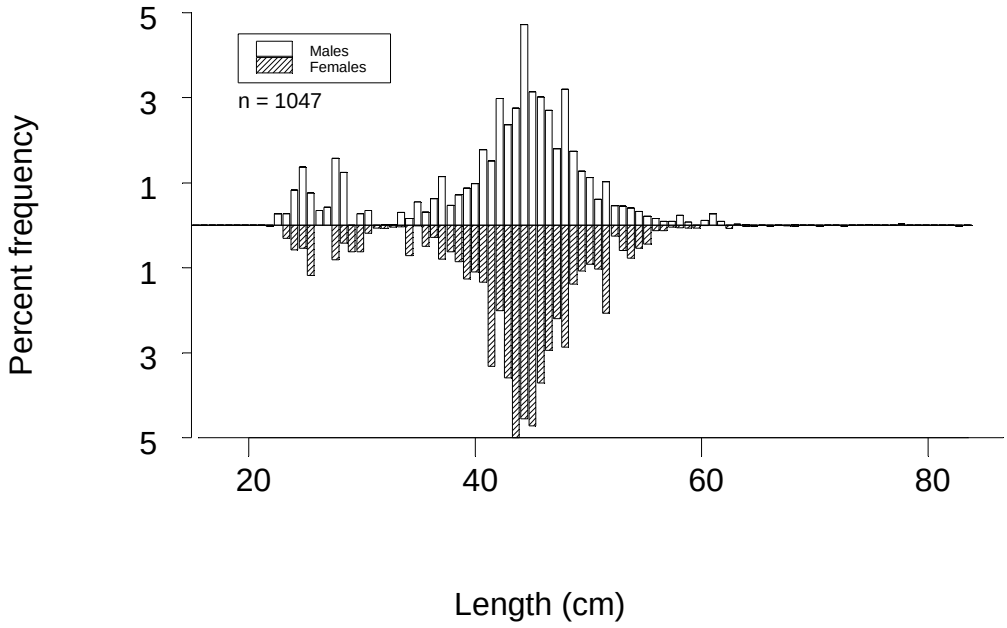


Figure 48. -- Size composition of shortraker rockfish from the 2006 Aleutian Islands bottom trawl survey.

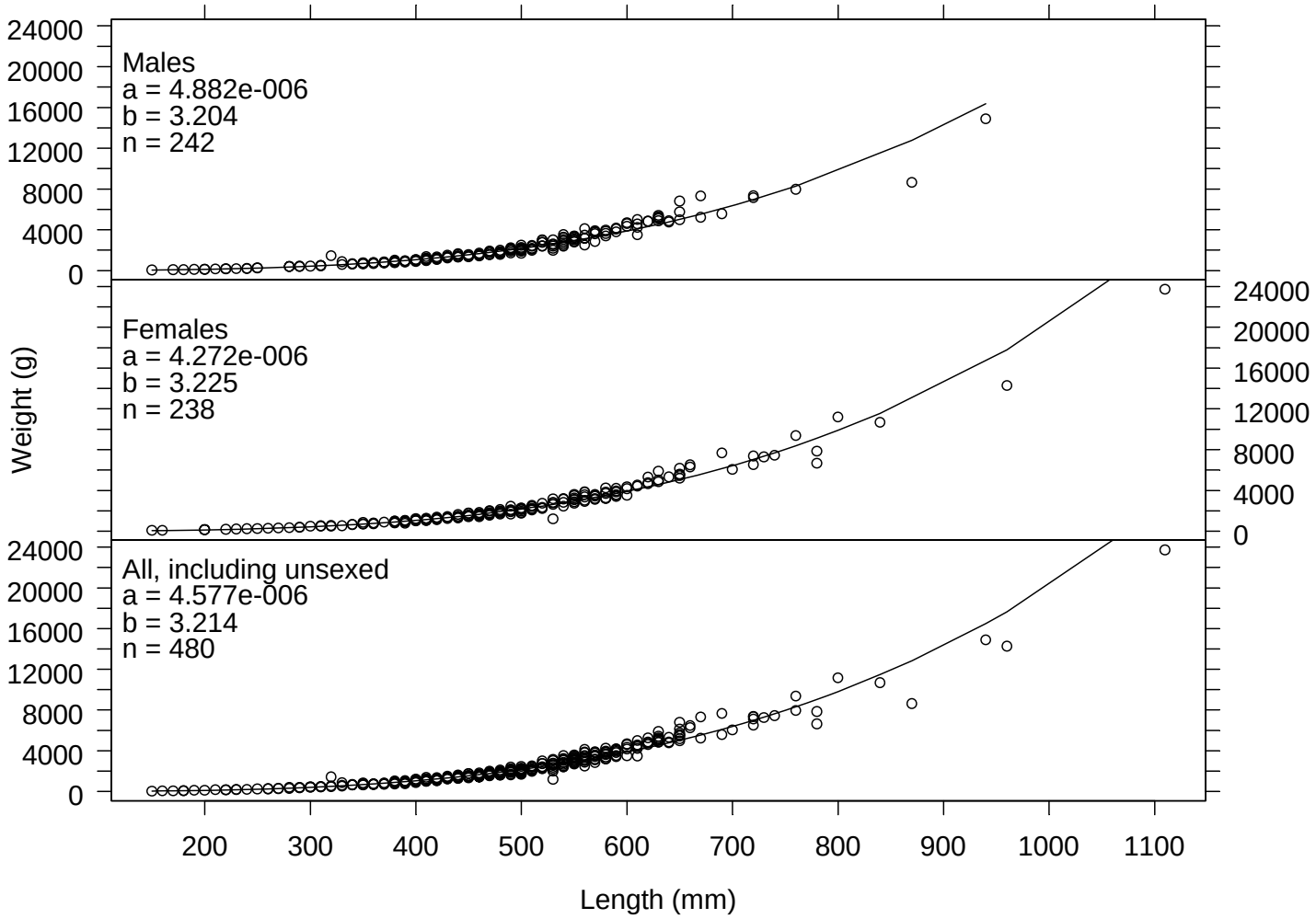


Figure 49. -- Length-weight relationship for shortraker rockfish specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 40. -- Number of survey hauls, number of hauls with rougheye rockfish, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	0	0.000	0	--	--	--	--
	101-200	47	0	0.000	0	--	--	--	--
	201-300	23	0	0.000	0	--	--	--	--
	301-500	21	0	0.000	0	--	--	--	--
	All depths	113	0	0.000	0	--	--	--	--
Central Aleutians	1-100	32	0	0.000	0	--	--	--	--
	101-200	35	0	0.000	0	--	--	--	--
	201-300	21	0	0.000	0	--	--	--	--
	301-500	22	5	0.571	227	0	563	1.567	45.5
	All depths	110	5	0.137	227	0	547	1.567	45.5
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	0	0.000	0	--	--	--	--
	201-300	27	1	0.033	16	0	49	2.250	50.0
	301-500	21	2	0.043	24	0	60	1.199	42.4
	All depths	91	3	0.016	40	0	87	1.617	45.5
All Aleutian Areas	1-100	66	0	0.00	0	--	--	--	--
	101-200	113	0	0.00	0	--	--	--	--
	201-300	71	1	0.02	16	0	48	2.250	50.0
	301-500	64	7	0.19	252	0	575	1.531	45.2
	All depths	314	8	0.05	268	0	588	1.574	45.5
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	3	0.788	146	0	363	0.567	32.3
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	7	2.734	285	0	572	1.985	48.1
	All depths	44	10	0.576	431	119	743	1.506	42.8

Table 41. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of rougheye rockfish by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Southern Bering Sea	301-500	Combined Southern Bering	8	7	2.73	285	0	572
Central Aleutians	301-500	N Central Aleutians	11	4	1.77	219	0	577
Southern Bering Sea	101-200	E Southern Bering	9	3	1.24	146	0	367
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	0.25	11	0	147
Central Aleutians	301-500	SE Central Aleutians	5	1	0.12	9	0	32
Eastern Aleutians	201-300	NE Eastern Aleutians	12	1	0.08	16	0	51
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	1	0.05	14	0	44

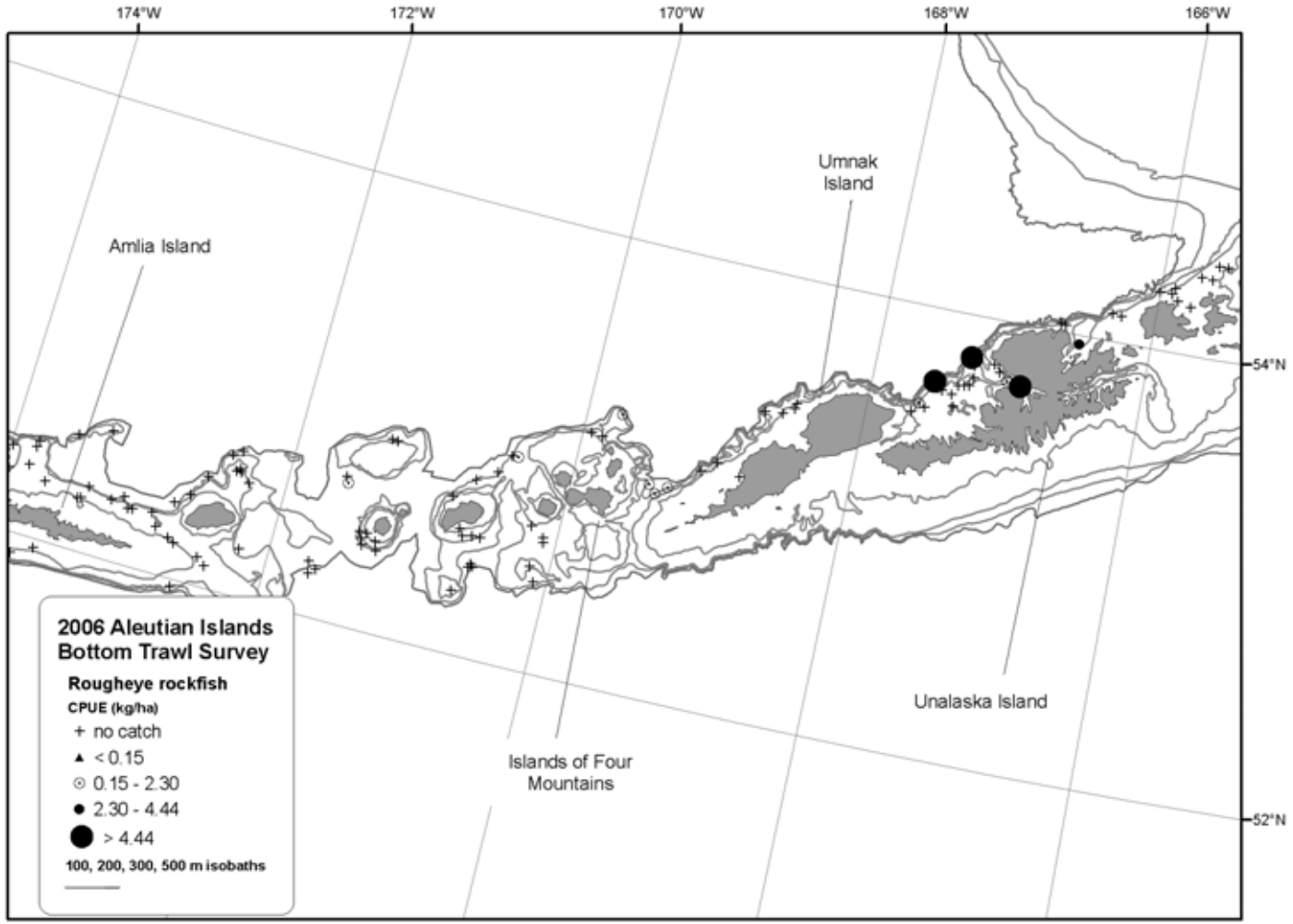


Figure 50. -- Distribution and relative abundance of rougheye rockfish from the 2006 Aleutian Islands bottom trawl survey.

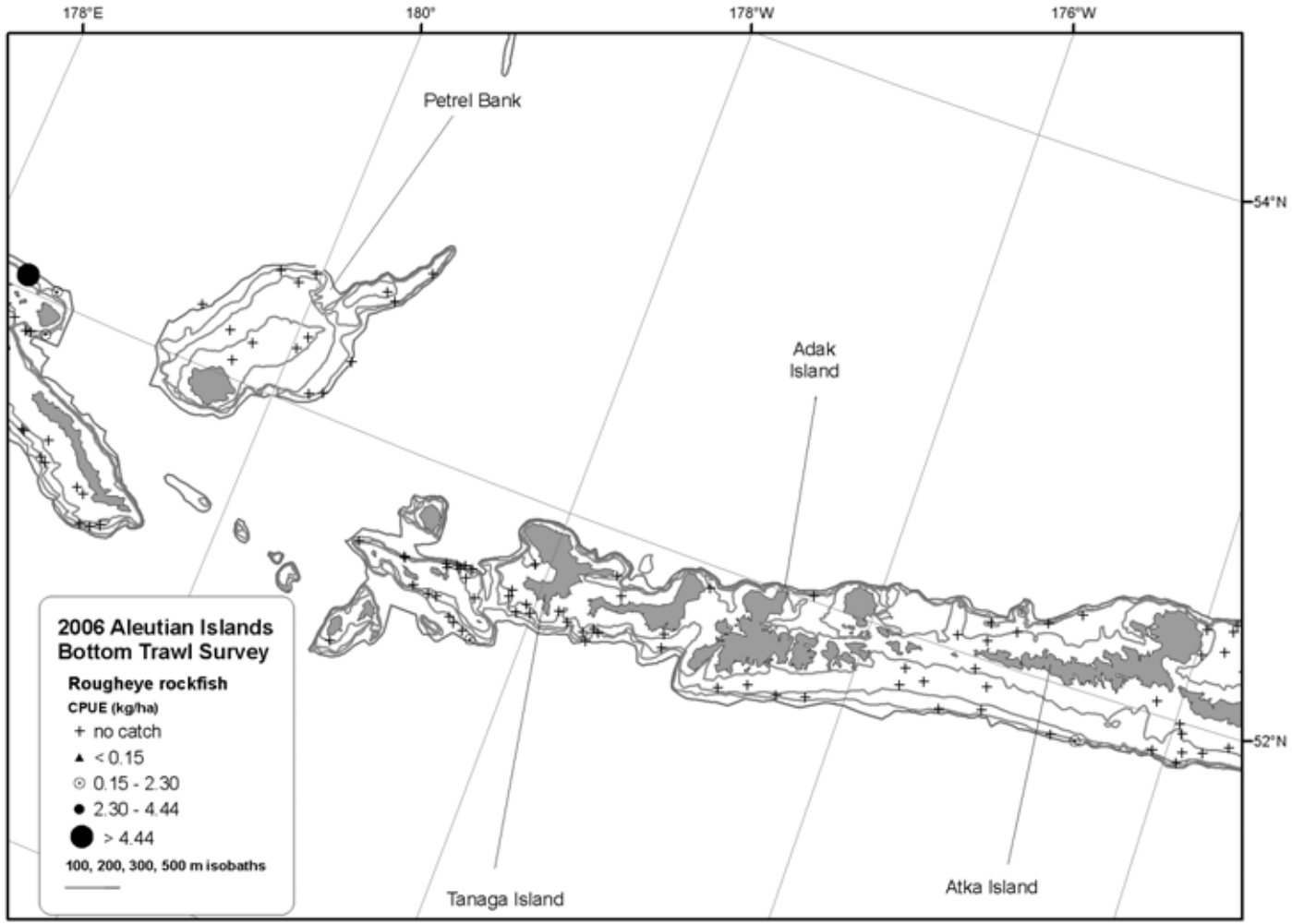


Figure 50. -- (continued).

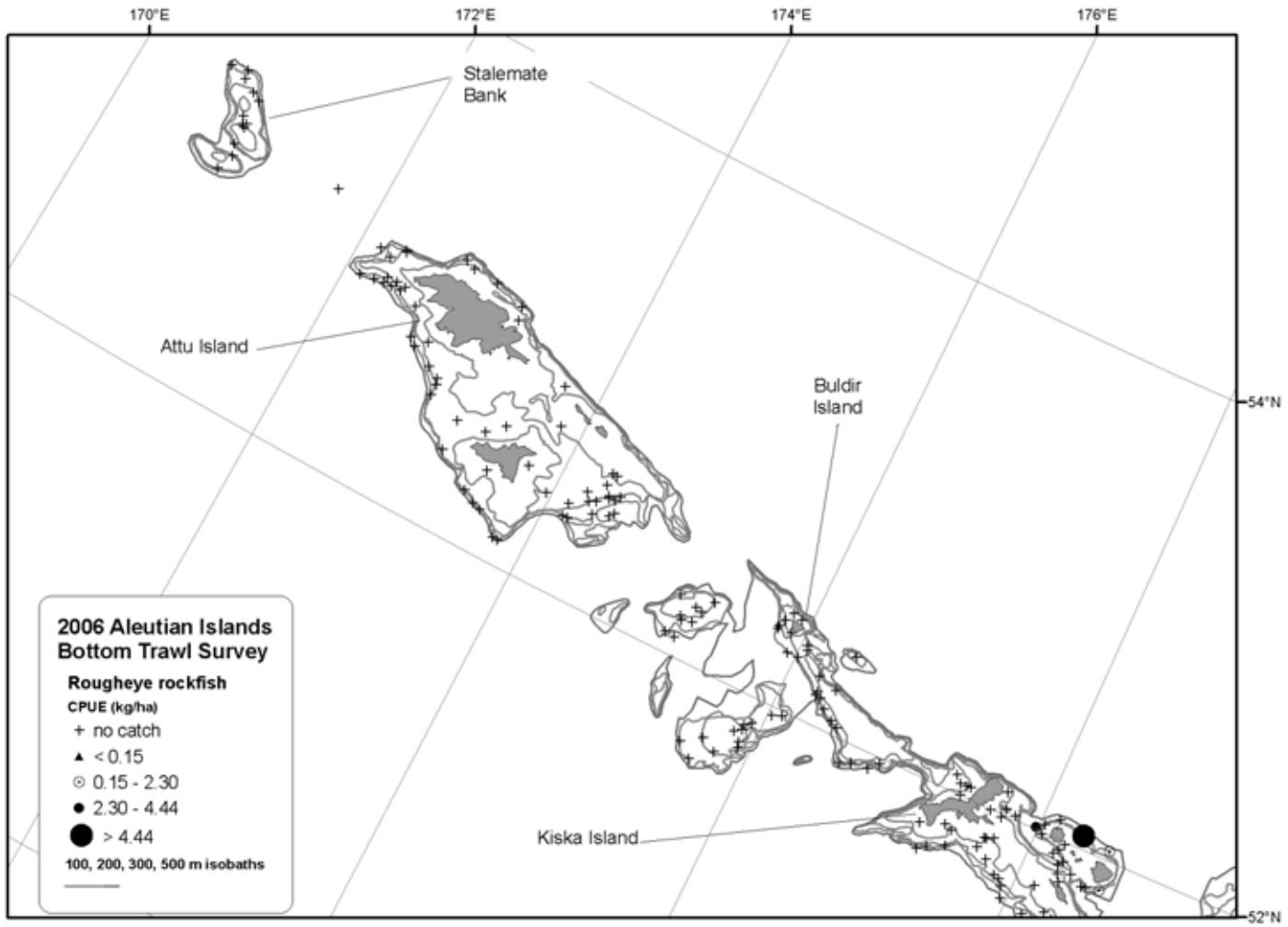


Figure 50. -- (continued).

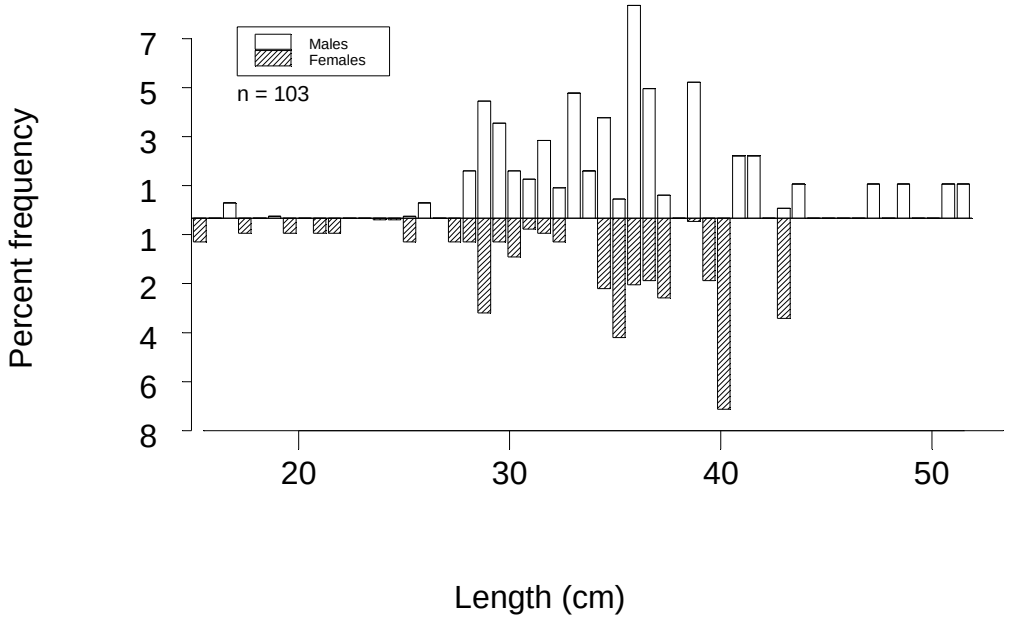


Figure 51. -- Size composition of rougheye rockfish from the 2006 Aleutian Islands bottom trawl survey.

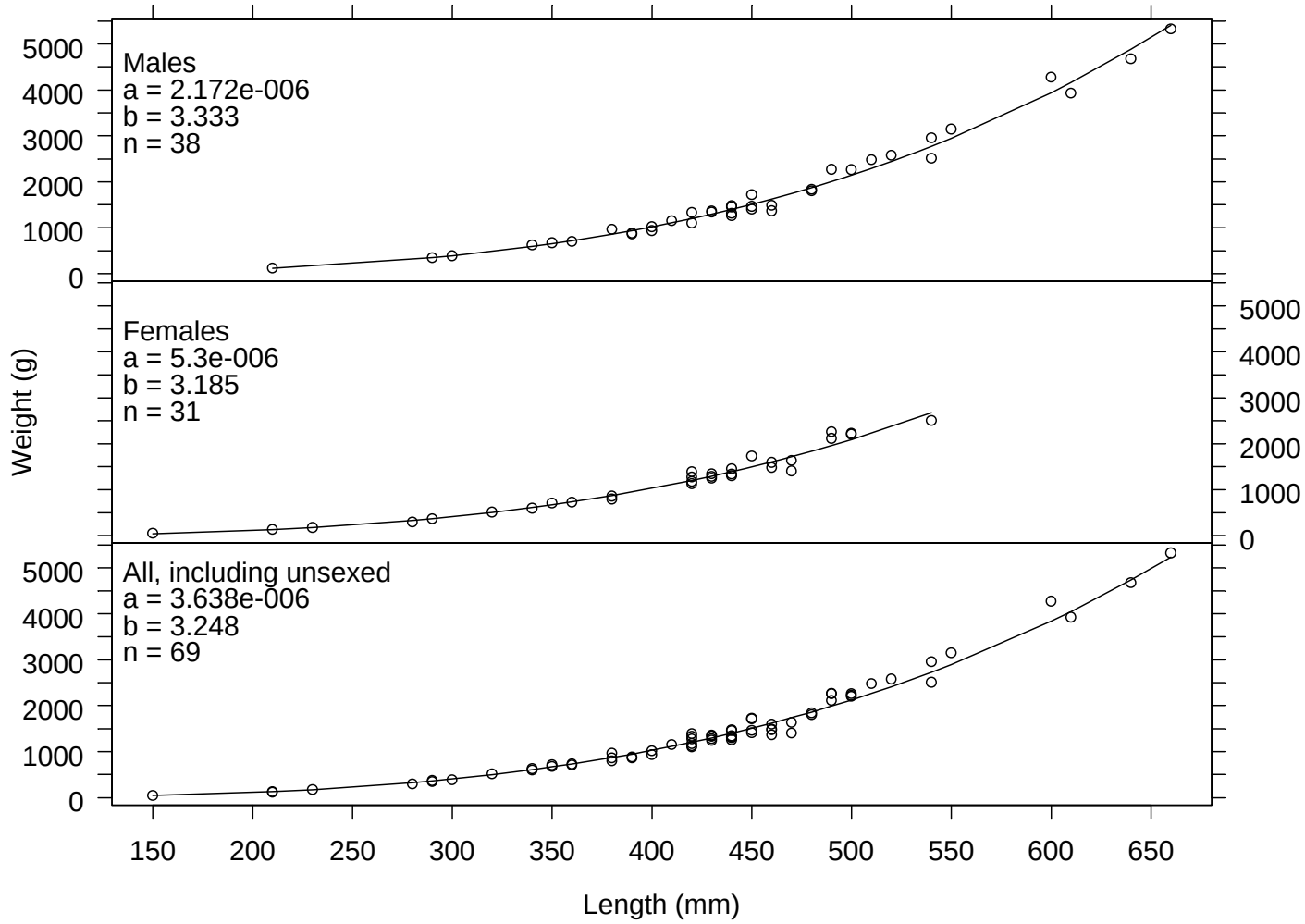


Figure 52. -- Length-weight relationship for rougheye rockfish specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 42. -- Number of survey hauls, number of hauls with blackspotted rockfish, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	0	0.000	0	--	--	--	--
	101-200	47	6	0.048	26	0	56	1.378	38.8
	201-300	23	11	0.642	111	32	189	1.075	34.4
	301-500	21	12	1.169	382	79	686	2.340	50.6
	All depths	113	29	0.341	519	219	818	2.022	46.5
Central Aleutians	1-100	32	0	0.000	0	--	--	--	--
	101-200	35	2	0.021	10	0	28	1.625	45.5
	201-300	21	13	1.020	215	45	386	1.316	41.4
	301-500	22	20	11.322	4,507	588	8,426	1.618	45.3
	All depths	110	35	2.861	4,732	993	8,471	1.604	45.1
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	2	0.008	6	0	15	0.433	29.9
	201-300	27	10	2.050	1,005	0	2,549	0.988	38.5
	301-500	21	15	3.083	1,752	717	2,787	1.460	44.8
	All depths	91	27	1.096	2,763	976	4,550	1.286	42.5
All Aleutian Areas	1-100	66	0	0.00	0	--	--	--	--
	101-200	113	10	0.02	41	6	77	1.297	39.1
	201-300	71	34	1.52	1,331	0	2,840	1.048	38.6
	301-500	64	47	5.13	6,642	2,737	10,546	1.618	45.5
	All depths	314	91	1.41	8,014	3,891	12,136	1.521	44.3
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	0	0.000	0	--	--	--	--
	201-300	4	3	0.458	26	0	58	1.117	41.3
	301-500	8	7	7.360	768	0	1,648	1.388	43.3
	All depths	44	10	1.061	794	43	1,544	1.379	43.2

Table 43. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of blackspotted rockfish by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	301-500	N Central Aleutians	11	11	29.45	3,651	0	7,821
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	18.04	791	0	5,229
Southern Bering Sea	301-500	Combined Southern Bering	8	7	7.36	768	0	1,648
Central Aleutians	301-500	SE Central Aleutians	5	5	6.15	439	123	756
Eastern Aleutians	201-300	SE Eastern Aleutians	9	3	3.86	794	0	2,503
Eastern Aleutians	301-500	SE Eastern Aleutians	9	8	3.19	821	23	1,619
Central Aleutians	301-500	Petrel Bank	3	2	3.01	373	0	1,175
Eastern Aleutians	201-300	SW Eastern Aleutians	4	2	2.57	184	0	582
Central Aleutians	201-300	N Central Aleutians	10	7	2.27	100	0	222
Western Aleutians	301-500	W Western Aleutians	18	11	1.83	312	43	582
Central Aleutians	201-300	SW Central Aleutians	6	4	1.20	51	0	119
Western Aleutians	201-300	E Western Aleutians	10	8	0.93	72	13	132
Central Aleutians	201-300	Petrel Bank	3	1	0.71	55	0	290
Central Aleutians	301-500	SW Central Aleutians	3	2	0.56	45	0	141
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	5	0.53	140	25	256
Southern Bering Sea	201-300	Combined Southern Bering	4	3	0.46	26	0	58
Western Aleutians	301-500	E Western Aleutians	3	1	0.45	70	0	371
Western Aleutians	201-300	W Western Aleutians	13	3	0.41	38	0	98
Central Aleutians	201-300	SE Central Aleutians	2	1	0.20	9	0	129
Eastern Aleutians	201-300	NE Eastern Aleutians	12	5	0.13	26	0	59
Western Aleutians	101-200	E Western Aleutians	18	5	0.10	13	0	28
Central Aleutians	101-200	N Central Aleutians	8	1	0.09	9	0	31
Western Aleutians	101-200	W Western Aleutians	29	1	0.03	13	0	40
Eastern Aleutians	101-200	SE Eastern Aleutians	10	1	0.02	4	0	13
Eastern Aleutians	101-200	SW Eastern Aleutians	7	1	0.01	2	0	7
Central Aleutians	101-200	SW Central Aleutians	13	1	0.01	1	0	2

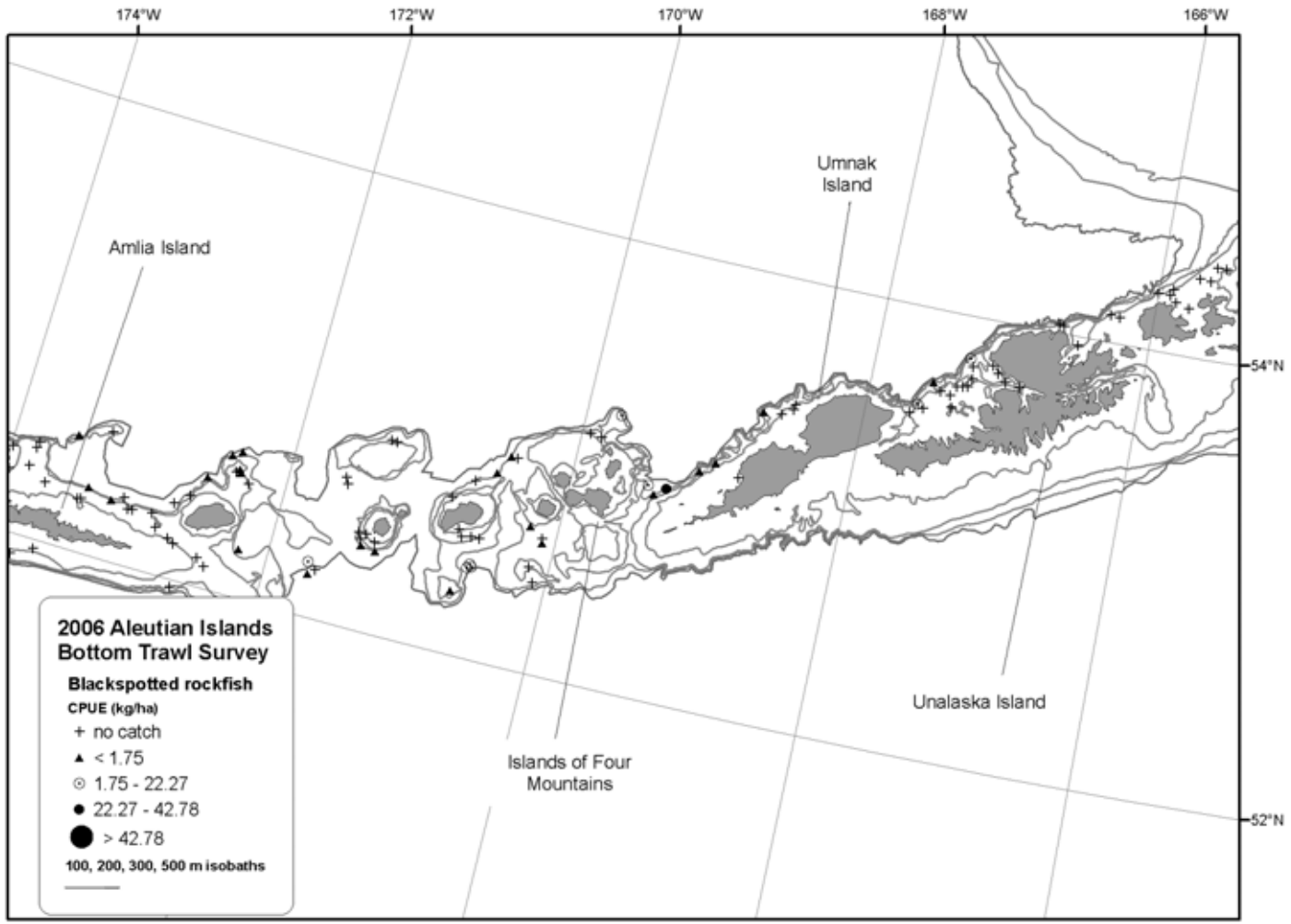


Figure 53. -- Distribution and relative abundance of blackspotted rockfish from the 2006 Aleutian Islands bottom trawl survey.

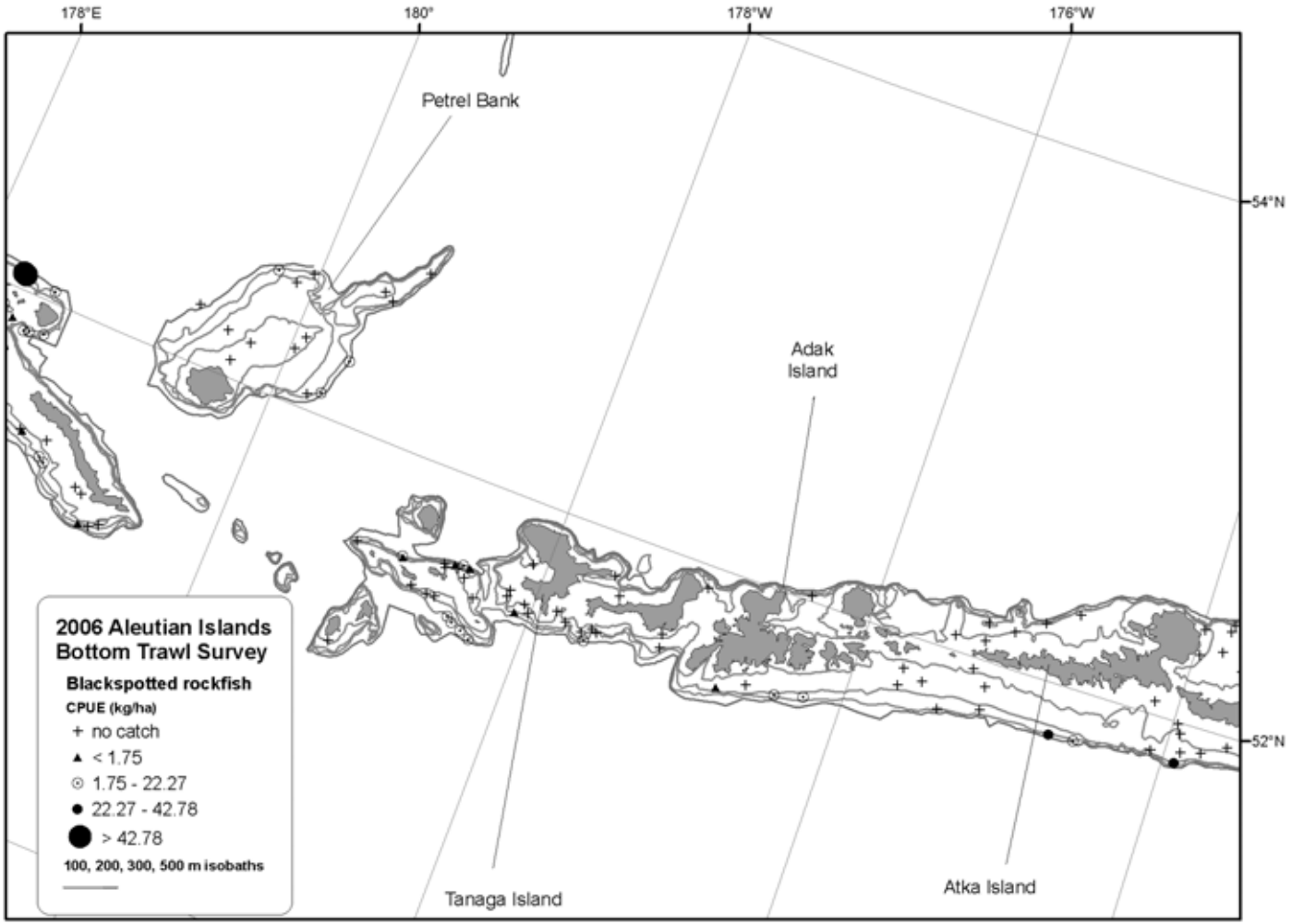


Figure 53. -- (continued).

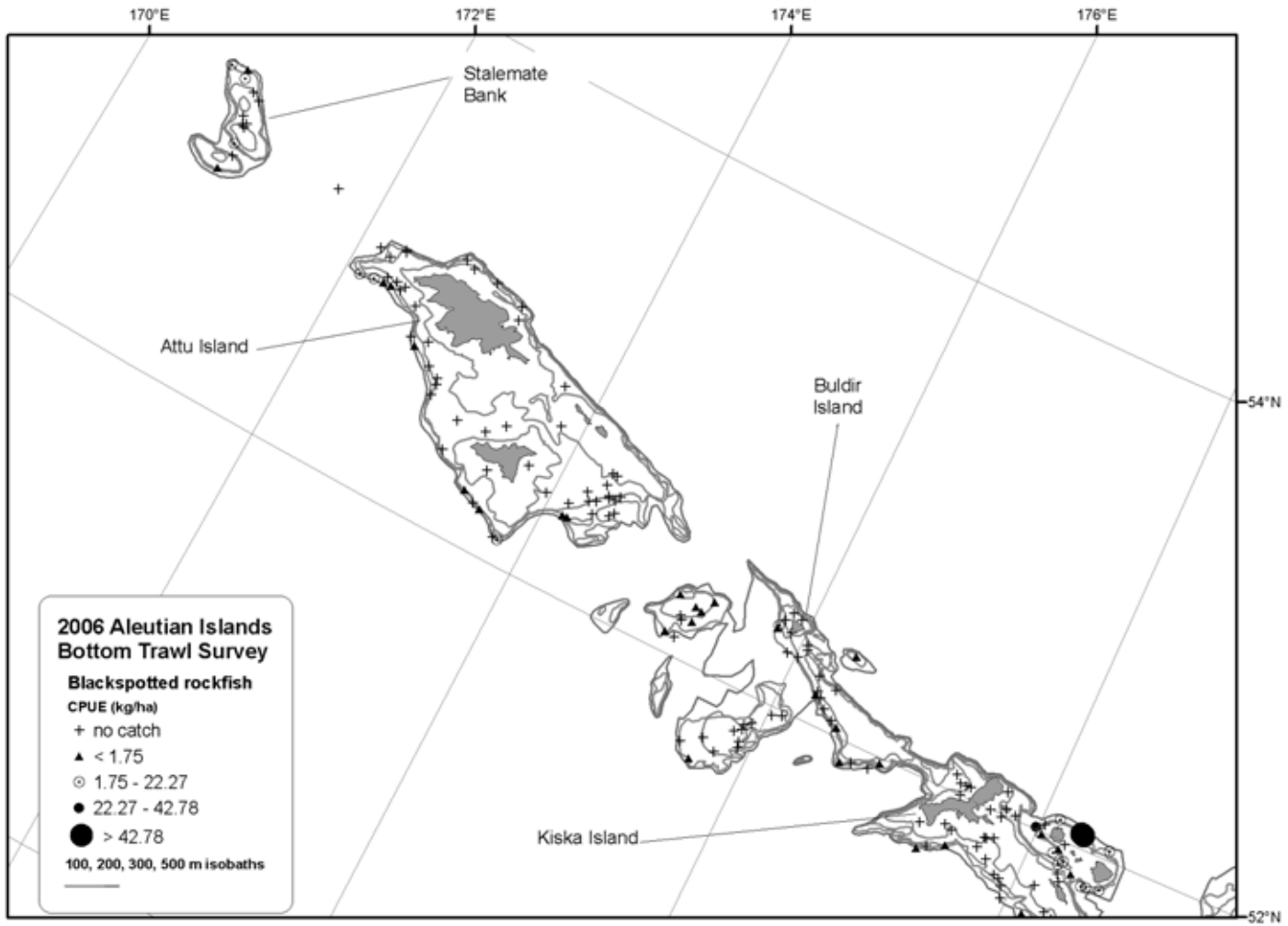


Figure 53. -- (continued).

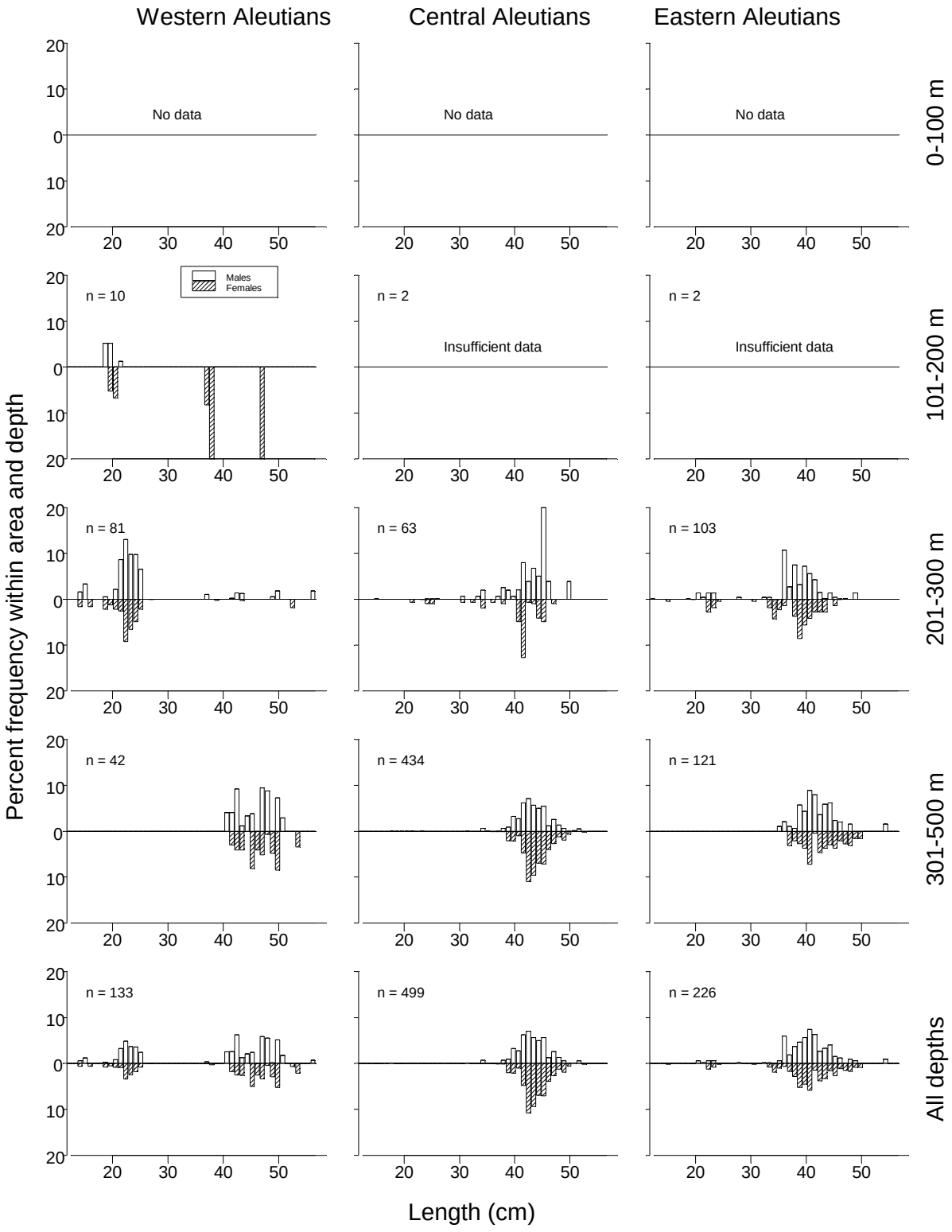


Figure 54. -- Size composition of blackspotted rockfish from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

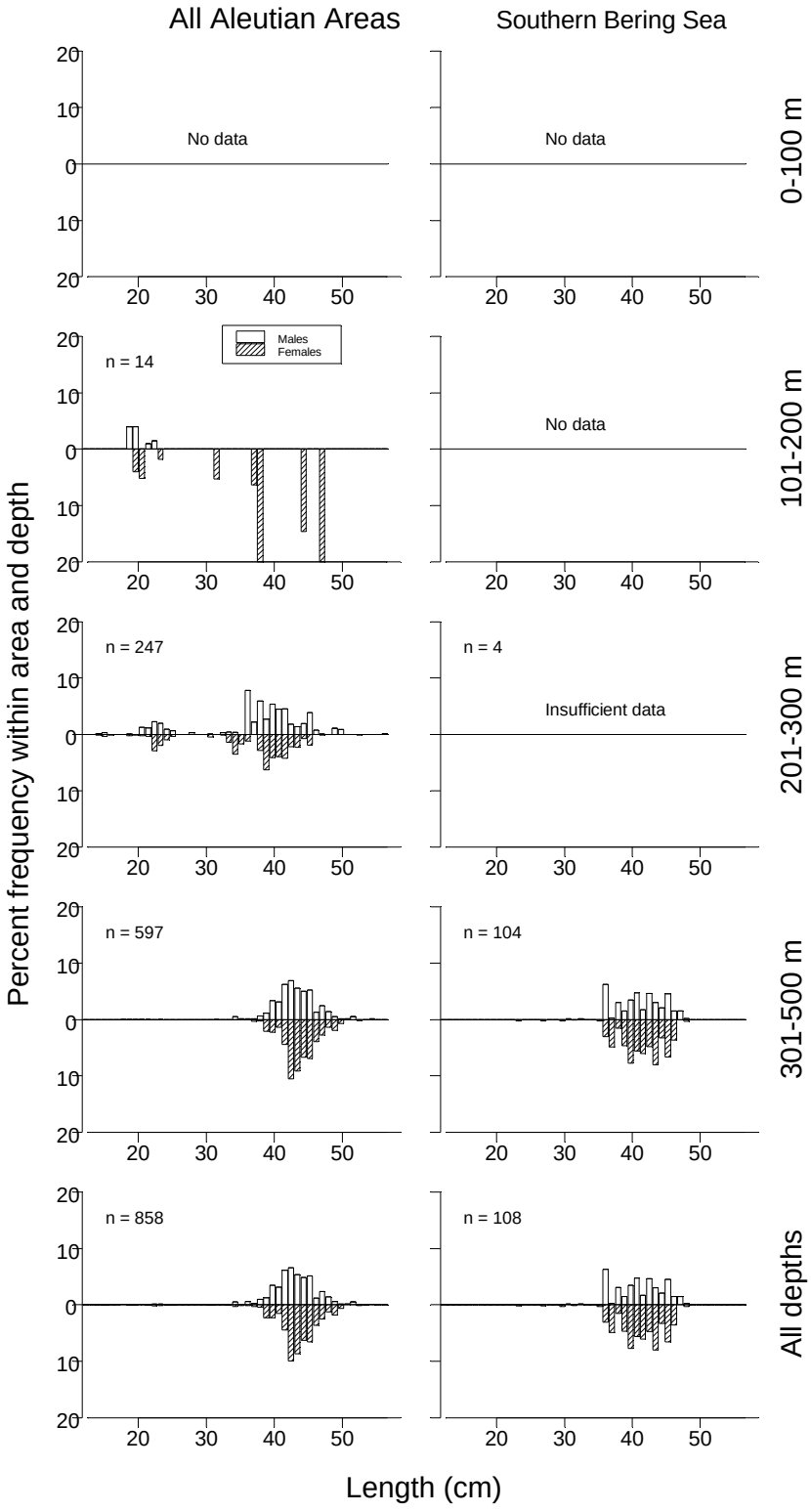


Figure 54. -- (continued).

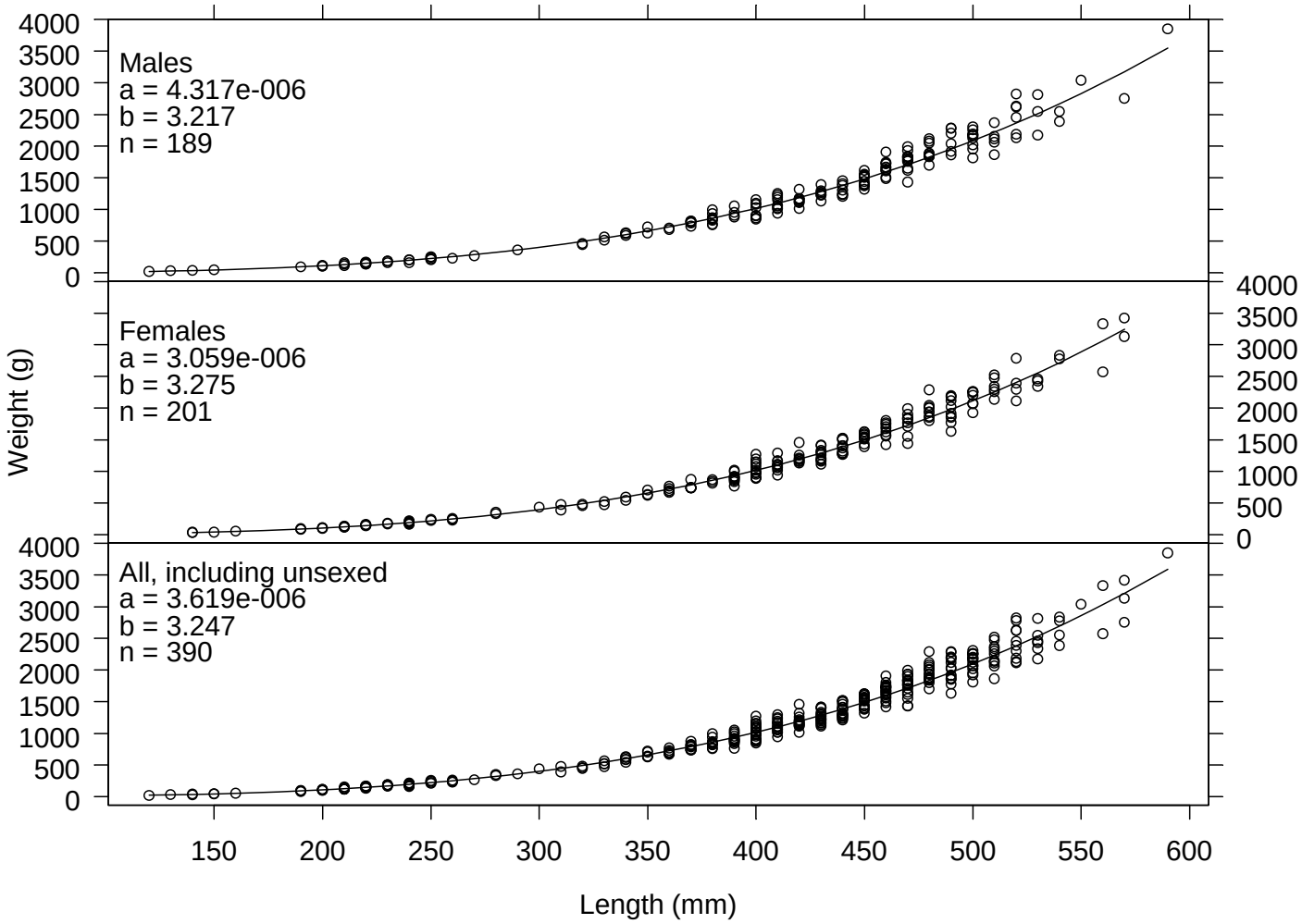


Figure 55. -- Length-weight relationship for blackspotted rockfish specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Shortspine thornyhead (*Sebastolobus alascanus*)

Thornyheads tend to be most abundant in the Western and Central Aleutian areas at depths greater than 200 m (Table 44) and catch rates were highest in the 301- 500 m depth interval. They were captured in all trawl hauls in the 301-500 m depth interval in the Western Aleutians area and the two subareas in this depth interval in the Western Aleutians (W and E Western Aleutians) exhibited the highest CPUEs of all subareas in the survey (Table 45). They were also common in all strata deeper than 200 m on Petrel Bank. Notable individual catches were made on the small plateau north of the Islands of Four Mountains, on Stalemate Bank, and SW of Attu Island (Fig. 56). Biomass estimates from this survey are very likely underestimates of thornyhead abundance; Ronholt et al. (1986) reported that 68% of the total Aleutian thornyhead biomass was found in the 501-900 m depth interval, a depth zone unsampled by the present survey. Male and female size compositions share similar ranges in fork lengths, with females comprising the majority of the catch (Fig. 57). Figure 58 presents length-weight relationships for male, female, and combined sexes of shortspine thornyhead. The two curves are remarkably similar.

Dusky rockfish (*Sebastes variabilis*)

Dusky rockfish were distributed in the two shallowest depth strata (1-100 m and 101-200 m) at very low abundances throughout most of the Aleutian Islands bottom trawl survey area. Dusky rockfish were most abundant at shallow depths (1-100 m) in the Central Aleutians area (Table 46). Over 70% of the biomass of dusky rockfish resulted from one bottom trawl haul conducted in the SE Central Aleutians subarea at the shallowest depth interval (Table 47). Both female and male dusky rockfish had similar length frequency distributions (Fig. 59). However, the largest fish measured in 2006 were males (Fig. 60).

Dark rockfish (*Sebastes ciliatus*)

Similar to dusky rockfishes, dark rockfish were found in very low abundance throughout the survey area. Dark rockfish only occurred in the shallowest tows and all except one occurred in the 1-100 m depth strata (Table 48). The total biomass was low and 92% of the biomass was found in the Western Aleutians Island NPFMC area. The species only occurred in six Aleutian Island subareas and was most commonly captured in the E Western Aleutians subarea near Attu Island (Table 49). Length-frequencies and length-weight relationships for dark rockfish are shown in Figures 61 and 62.

Table 44. -- Number of survey hauls, number of hauls with shortspine thornyhead, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	0	0.000	0	--	--	--	--
	101-200	47	6	0.771	410	0	1,104	0.725	35.4
	201-300	23	9	8.912	1,536	0	3,784	0.715	35.6
	301-500	21	21	28.020	9,170	6,014	12,325	0.518	31.9
	All depths	113	36	7.317	11,116	7,366	14,865	0.553	32.6
Central Aleutians	1-100	32	1	0.005	3	0	9	0.340	32.0
	101-200	35	1	0.014	7	0	20	0.184	26.0
	201-300	21	12	8.964	1,890	939	2,842	0.443	31.0
	301-500	22	20	10.268	4,087	2,330	5,845	0.466	31.2
	All depths	110	34	3.619	5,987	4,084	7,890	0.458	31.2
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	1	0.003	3	0	8	0.167	25.0
	201-300	27	2	0.085	42	0	105	0.919	40.4
	301-500	21	4	1.284	730	0	1,695	0.577	33.8
	All depths	91	7	0.307	774	0	1,695	0.594	34.1
All Aleutian Areas	1-100	66	1	0.00	3	0	8	0.340	32.0
	101-200	113	8	0.24	419	0	1,102	0.713	35.2
	201-300	71	23	3.97	3,468	1,122	5,814	0.569	33.2
	301-500	64	45	10.81	13,987	10,403	17,570	0.506	31.8
	All depths	314	77	3.14	17,876	13,602	22,151	0.523	32.2
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	0	0.000	0	--	--	--	--
	201-300	4	1	0.564	32	0	133	0.355	30.3
	301-500	8	5	8.974	936	0	2,189	0.309	27.9
	All depths	44	6	1.294	968	0	2,038	0.311	28.0

Table 45. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of shortspine thornyhead by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Western Aleutians	301-500	W Western Aleutians	18	18	34.45	5,894	2,744	9,045
Western Aleutians	301-500	E Western Aleutians	3	3	20.98	3,275	2,229	4,322
Central Aleutians	301-500	Petrel Bank	3	3	17.66	2,186	0	5,259
Western Aleutians	201-300	W Western Aleutians	13	7	16.02	1,506	0	3,867
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	14.91	653	0	6,486
Central Aleutians	201-300	SW Central Aleutians	6	5	14.11	601	146	1,056
Central Aleutians	201-300	Petrel Bank	3	3	12.76	978	0	2,440
Central Aleutians	301-500	SW Central Aleutians	3	3	10.98	867	0	2,498
Southern Bering Sea	301-500	Combined Southern Bering	8	5	8.97	936	0	2,189
Central Aleutians	201-300	SE Central Aleutians	2	2	6.20	296	0	3,443
Central Aleutians	301-500	N Central Aleutians	11	9	6.13	760	241	1,279
Central Aleutians	301-500	SE Central Aleutians	5	5	3.85	275	69	481
Western Aleutians	101-200	W Western Aleutians	29	4	0.94	383	0	1,088
Southern Bering Sea	201-300	Combined Southern Bering	4	1	0.56	32	0	133
Western Aleutians	201-300	E Western Aleutians	10	2	0.39	30	0	84
Central Aleutians	201-300	N Central Aleutians	10	2	0.35	15	0	45
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	2	0.29	76	0	209
Western Aleutians	101-200	E Western Aleutians	18	2	0.21	26	0	74
Eastern Aleutians	201-300	SW Eastern Aleutians	4	1	0.19	14	0	58
Eastern Aleutians	201-300	SE Eastern Aleutians	9	1	0.14	28	0	92
Central Aleutians	101-200	Petrel Bank	4	1	0.04	7	0	28
Central Aleutians	1-100	SW Central Aleutians	9	1	0.02	3	0	9
Eastern Aleutians	101-200	SW Eastern Aleutians	7	1	0.01	3	0	9

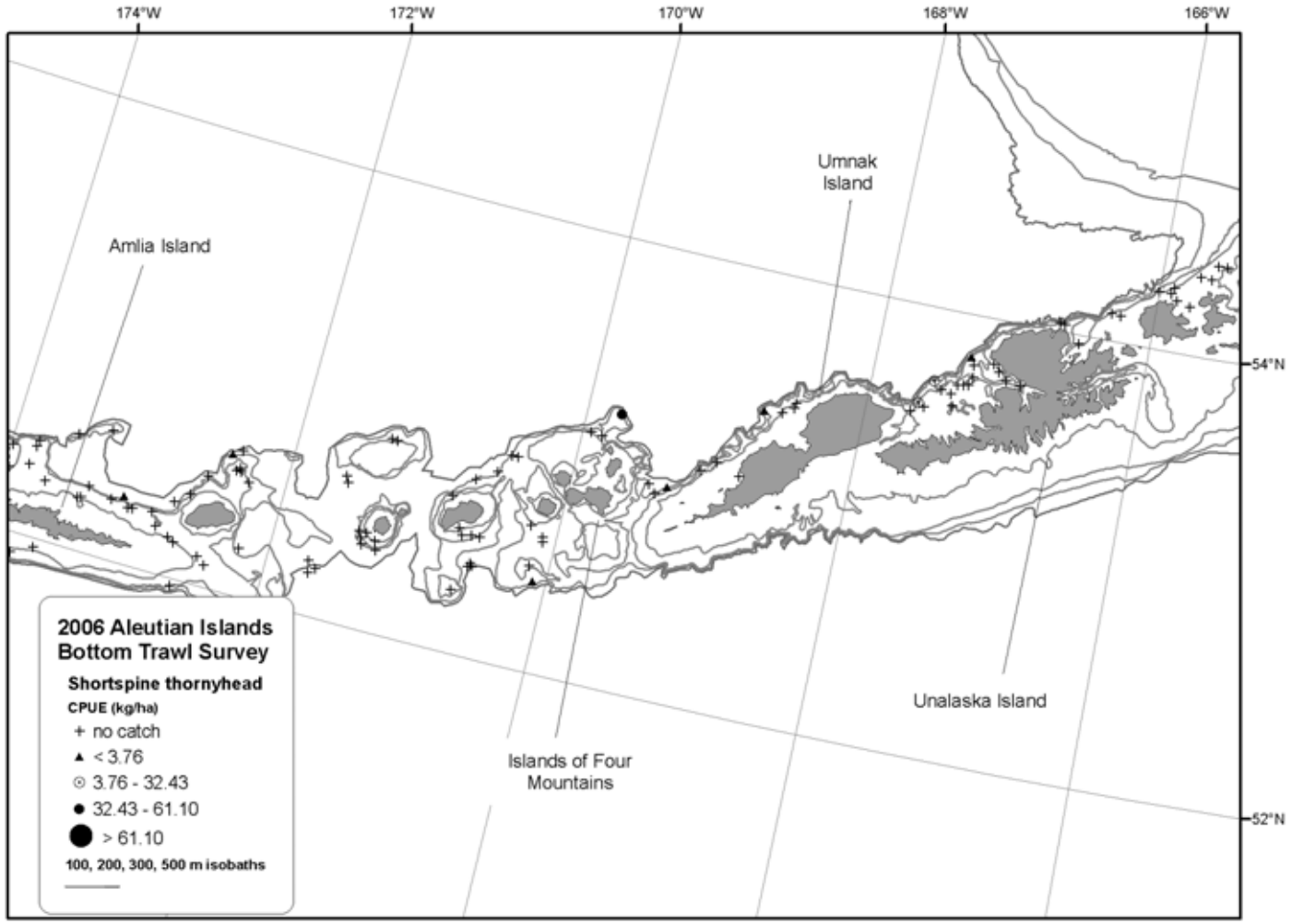


Figure 56. -- Distribution and relative abundance of shortspine thornyhead from the 2006 Aleutian Islands bottom trawl survey.

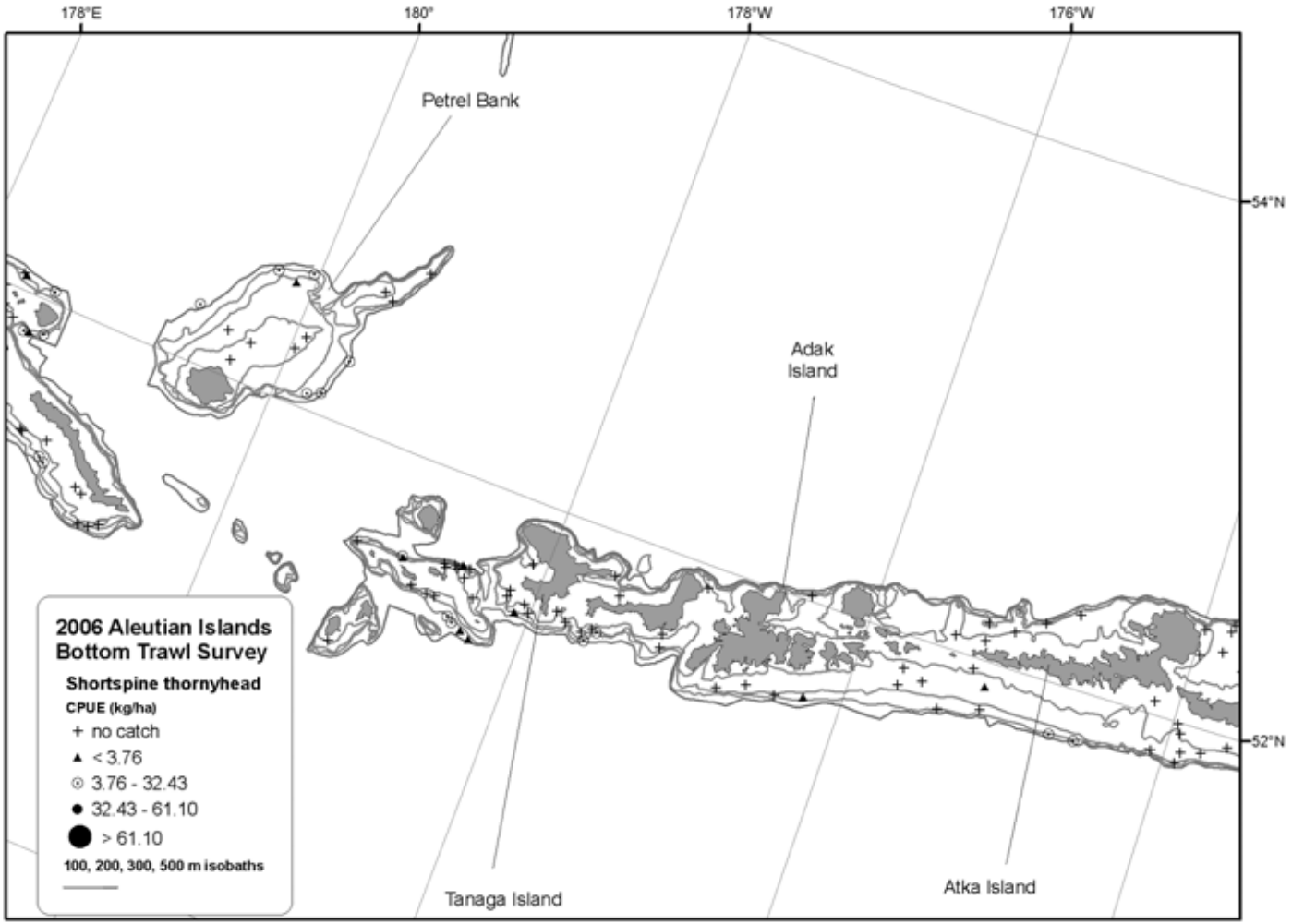


Figure 56. -- (continued).

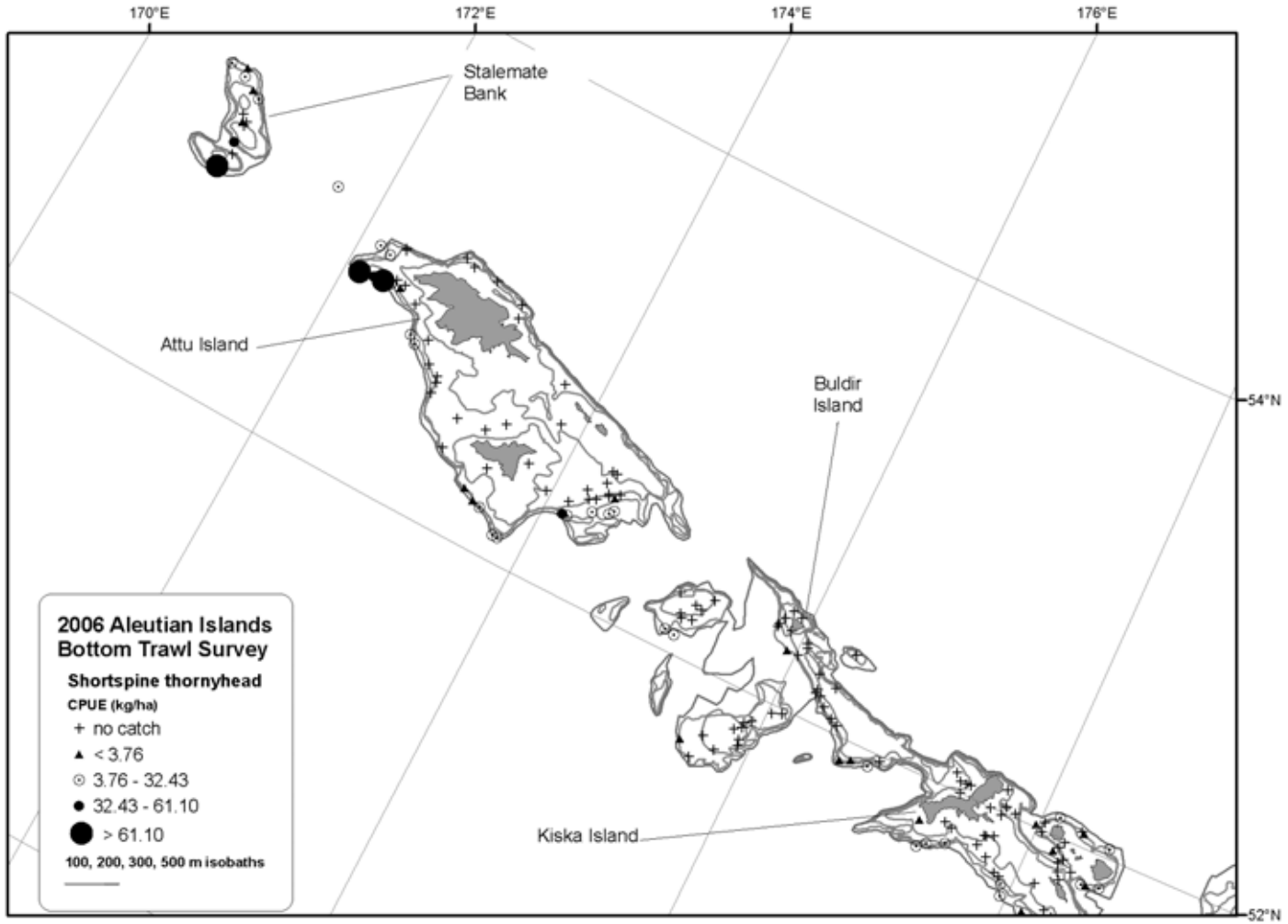


Figure 56. -- (continued).

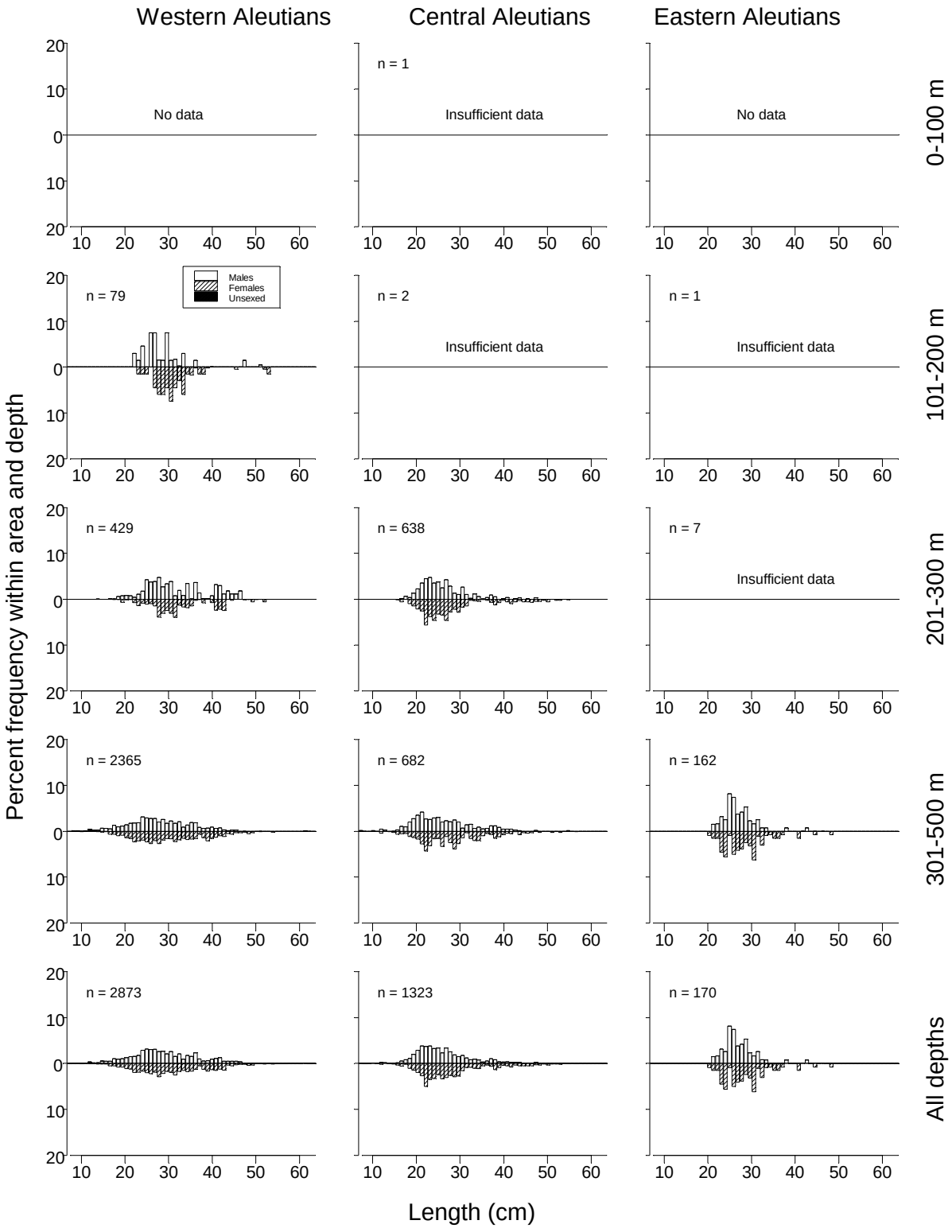


Figure 57. -- Size composition of shortspine thornyhead from the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

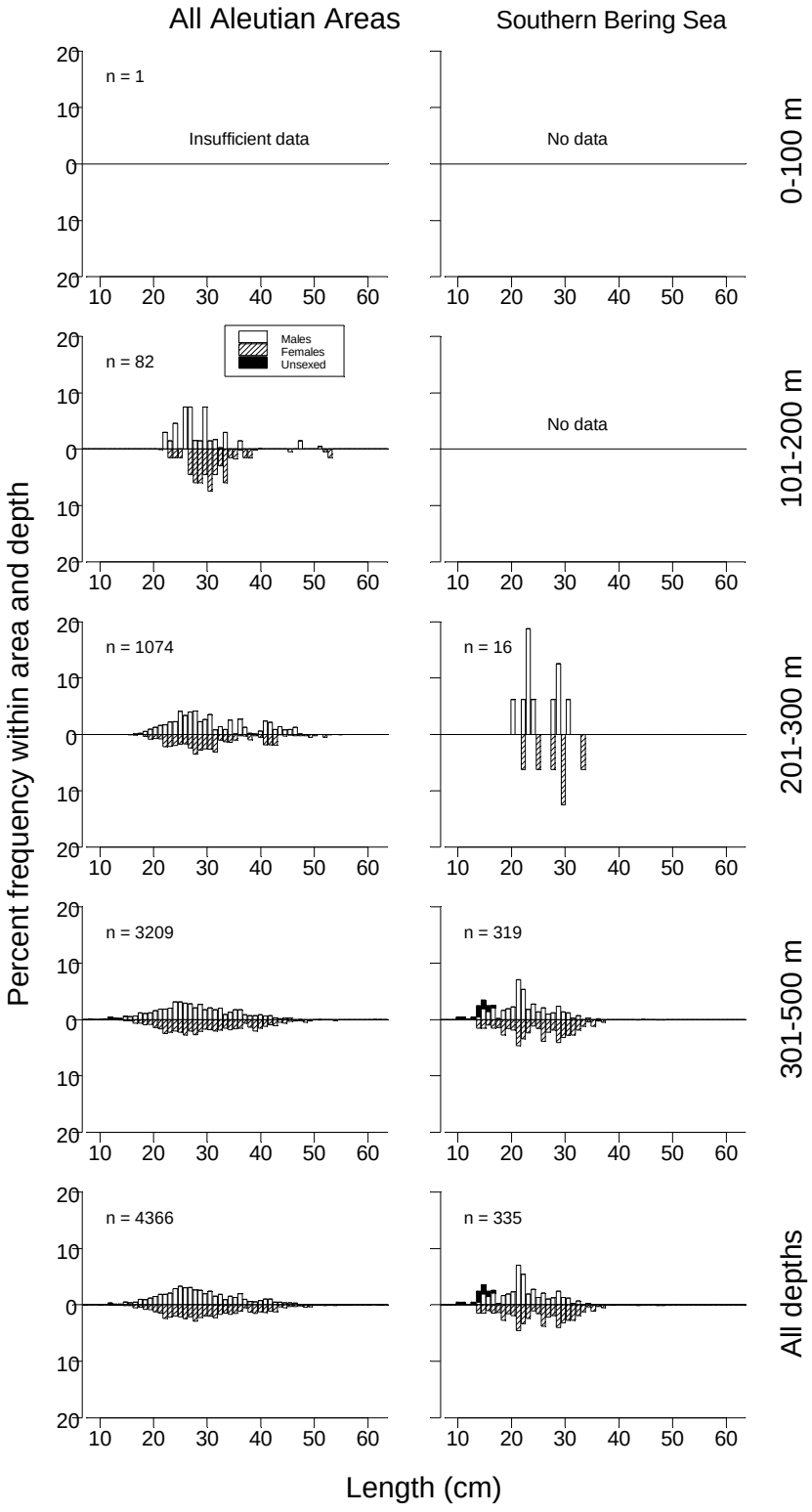


Figure 57. -- (continued).

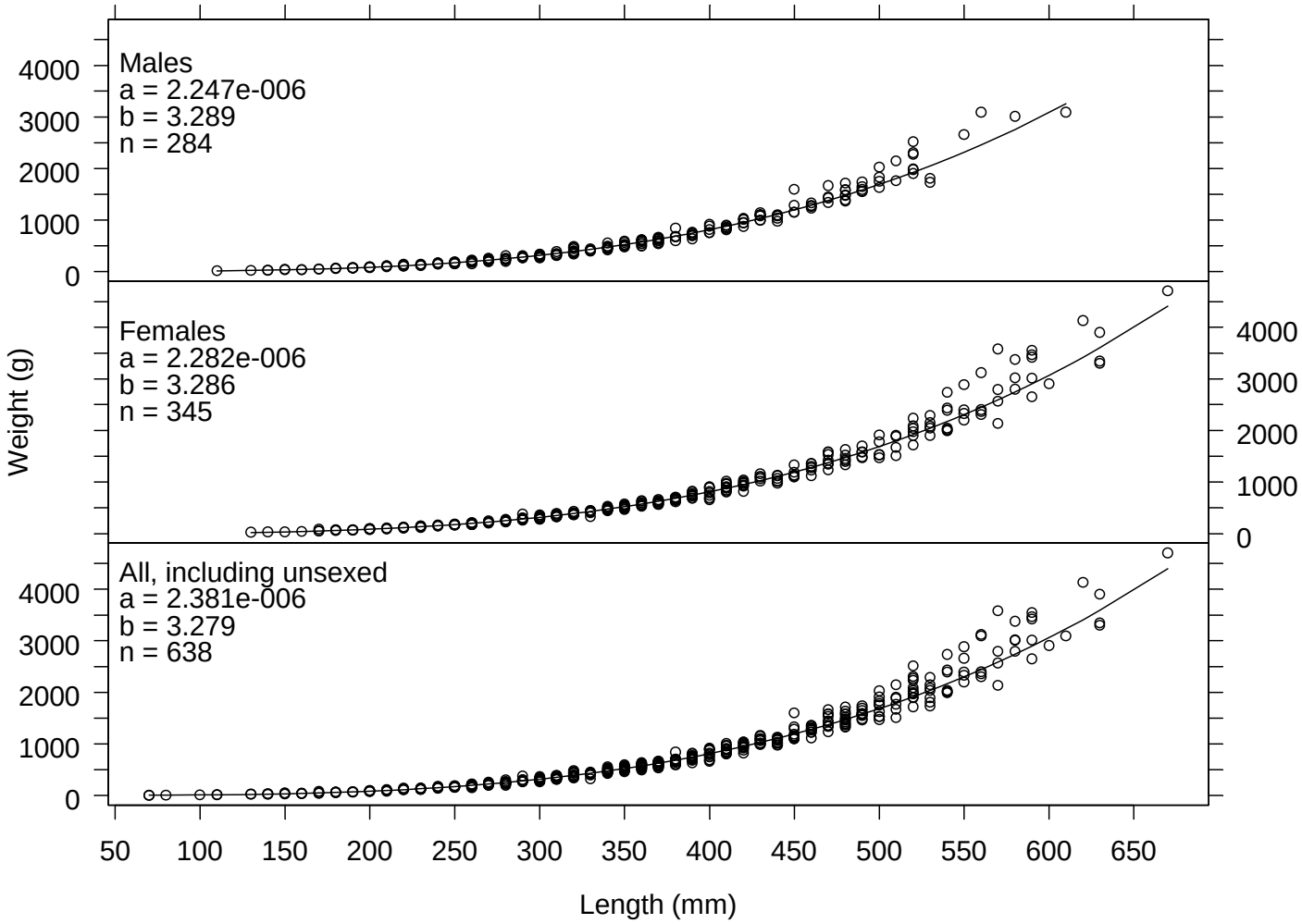


Figure 58. -- Length-weight relationship for shortspine thornyhead specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 46. -- Number of survey hauls, number of hauls with dusky rockfish, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	3	0.053	26	0	68	0.919	367.1
	101-200	47	1	0.006	3	0	10	1.125	410.0
	201-300	23	1	0.023	4	0	13	1.303	420.0
	301-500	21	0	0.000	0	--	--	--	--
	All depths	113	5	0.022	33	0	75	0.988	378.0
Central Aleutians	1-100	32	3	9.046	5,290	0	16,057	1.337	412.4
	101-200	35	6	0.602	277	0	639	1.534	436.6
	201-300	21	3	0.063	13	0	28	1.722	440.9
	301-500	22	0	0.000	0	--	--	--	--
	All depths	110	12	3.373	5,580	0	16,037	1.348	413.7
Eastern Aleutians	1-100	12	1	0.159	109	0	352	1.098	391.4
	101-200	31	4	0.238	184	0	408	1.527	430.3
	201-300	27	3	0.101	50	0	115	1.819	464.6
	301-500	21	0	0.000	0	--	--	--	--
	All depths	91	8	0.136	343	29	657	1.433	422.9
All Aleutian Areas	1-100	66	7	3.09	5,425	0	15,957	1.331	411.8
	101-200	113	11	0.26	465	51	879	1.528	433.9
	201-300	71	7	0.08	67	1	132	1.768	457.2
	301-500	64	0	0.00	0	--	--	--	--
	All depths	314	25	1.05	5,957	0	16,341	1.351	414.0
Southern Bering Sea	1-100	21	2	1.769	712	0	2,181	1.214	406.2
	101-200	11	1	0.029	5	0	17	1.022	400.0
	201-300	4	2	0.235	13	0	38	1.098	415.4
	301-500	8	0	0.000	0	--	--	--	--
	All depths	44	5	0.977	731	0	2,151	1.211	406.3

Table 47. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of dusky rockfish by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	1-100	SE Central Aleutians	7	2	45.38	5,282	0	18,184
Southern Bering Sea	1-100	E Southern Bering	19	2	2.92	712	0	2,192
Central Aleutians	101-200	SW Central Aleutians	13	4	1.16	122	0	324
Central Aleutians	101-200	Petrel Bank	4	1	0.87	152	0	634
Eastern Aleutians	101-200	SW Eastern Aleutians	7	2	0.73	164	0	430
Eastern Aleutians	1-100	SE Eastern Aleutians	6	1	0.63	109	0	390
Eastern Aleutians	201-300	NW Eastern Aleutians	2	1	0.34	5	0	73
Southern Bering Sea	201-300	Combined Southern Bering	4	2	0.24	13	0	38
Central Aleutians	201-300	SW Central Aleutians	6	2	0.23	10	0	26
Western Aleutians	1-100	E Western Aleutians	14	3	0.22	26	0	70
Eastern Aleutians	201-300	NE Eastern Aleutians	12	1	0.11	22	0	71
Eastern Aleutians	101-200	SE Eastern Aleutians	10	2	0.11	21	0	52
Eastern Aleutians	201-300	SE Eastern Aleutians	9	1	0.11	22	0	73
Central Aleutians	201-300	N Central Aleutians	10	1	0.08	4	0	12
Central Aleutians	101-200	SE Central Aleutians	10	1	0.05	4	0	13
Southern Bering Sea	101-200	E Southern Bering	9	1	0.05	5	0	18
Central Aleutians	1-100	SW Central Aleutians	9	1	0.05	7	0	24
Western Aleutians	201-300	W Western Aleutians	13	1	0.04	4	0	13
Western Aleutians	101-200	E Western Aleutians	18	1	0.03	3	0	11

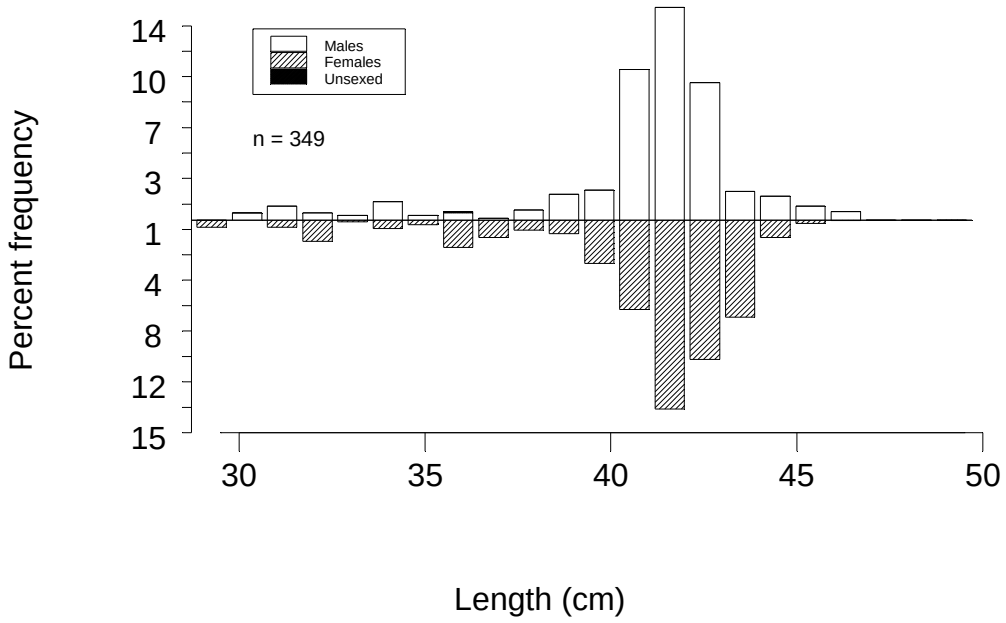


Figure 59. -- Size composition of dusky rockfish from the 2006 Aleutian Islands bottom trawl survey.

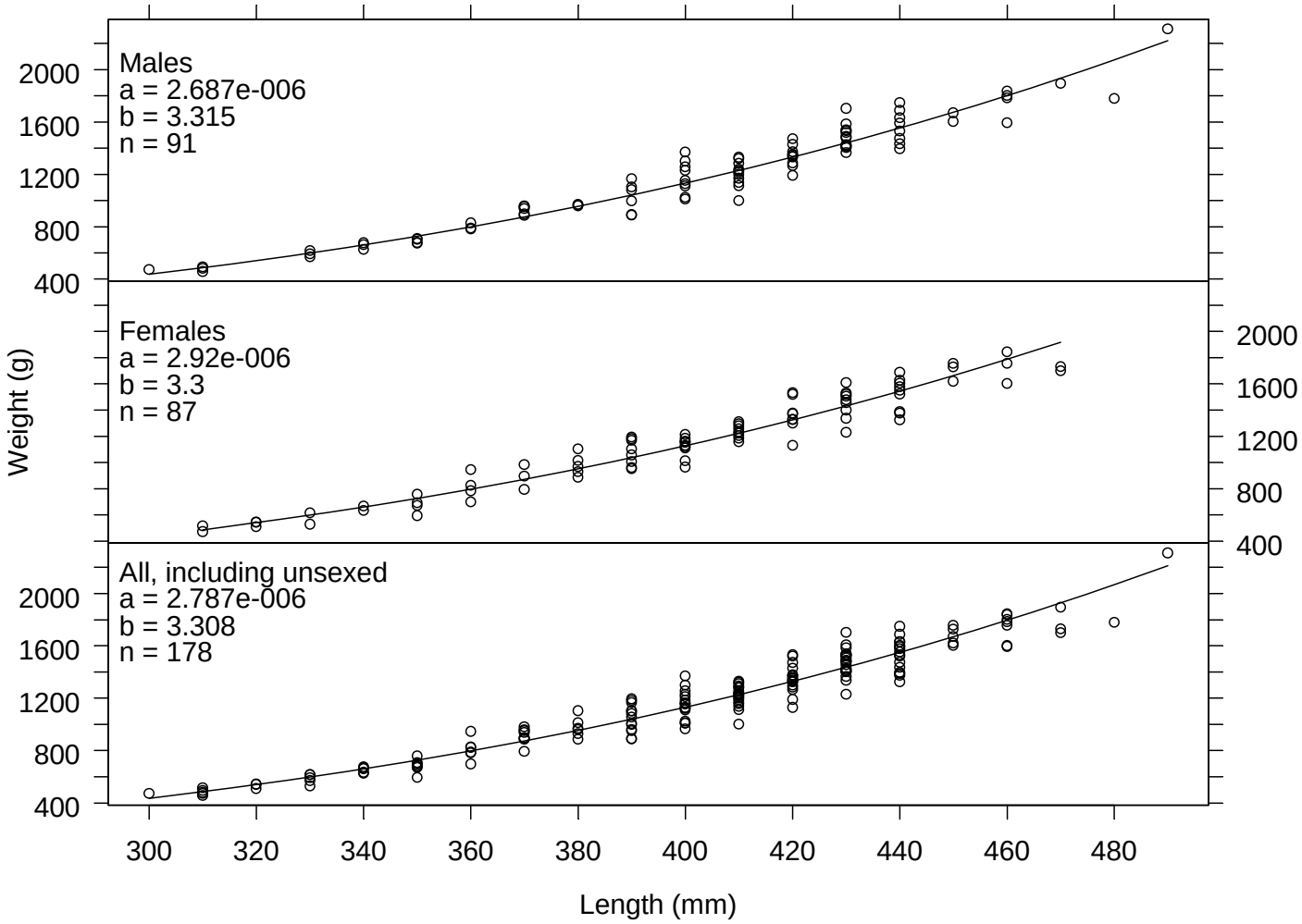


Figure 60. -- Length-weight relationship for dusky rockfish specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 48. -- Number of survey hauls, number of hauls with dark rockfish, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	6	1.842	898	0	1,841	0.904	362.3
	101-200	47	0	0.000	0	--	--	--	--
	201-300	23	0	0.000	0	--	--	--	--
	301-500	21	0	0.000	0	--	--	--	--
	All depths	113	6	0.591	898	0	1,797	0.904	362.3
Central Aleutians	1-100	32	2	0.125	73	0	206	1.154	389.9
	101-200	35	0	0.000	0	--	--	--	--
	201-300	21	0	0.000	0	--	--	--	--
	301-500	22	0	0.000	0	--	--	--	--
	All depths	110	2	0.044	73	0	202	1.154	389.9
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	1	0.011	8	0	25	0.725	340.0
	201-300	27	0	0.000	0	--	--	--	--
	301-500	21	0	0.000	0	--	--	--	--
	All depths	91	1	0.003	8	0	25	0.725	340.0
All Aleutian Areas	1-100	66	8	0.55	971	56	1,886	0.922	364.4
	101-200	113	1	0.00	8	0	25	0.725	340.0
	201-300	71	0	0.00	0	--	--	--	--
	301-500	64	0	0.00	0	--	--	--	--
	All depths	314	9	0.17	980	78	1,881	0.921	364.2
Southern Bering Sea	1-100	21	1	0.003	1	0	4	0.208	250.0
	101-200	11	1	0.004	1	0	2	0.130	230.0
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	0	0.000	0	--	--	--	--
	All depths	44	2	0.003	2	0	5	0.179	242.4

Table 49. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of dark rockfish by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Western Aleutians	1-100	E Western Aleutians	14	6	7.59	898	0	1,878
Central Aleutians	1-100	SE Central Aleutians	7	1	0.55	64	0	222
Central Aleutians	1-100	SW Central Aleutians	9	1	0.05	9	0	28
Eastern Aleutians	101-200	SW Eastern Aleutians	7	1	0.04	8	0	29
Southern Bering Sea	101-200	E Southern Bering	9	1	0.01	1	0	3
Southern Bering Sea	1-100	E Southern Bering	19	1	0.01	1	0	4

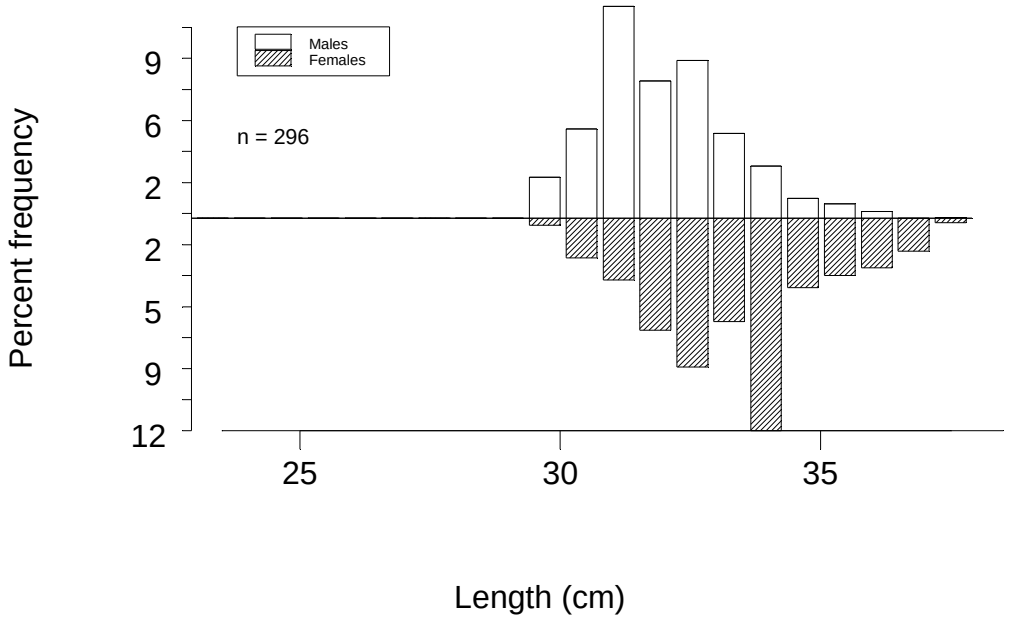


Figure 61. -- Size composition of dark rockfish from the 2006 Aleutian Islands bottom trawl survey.

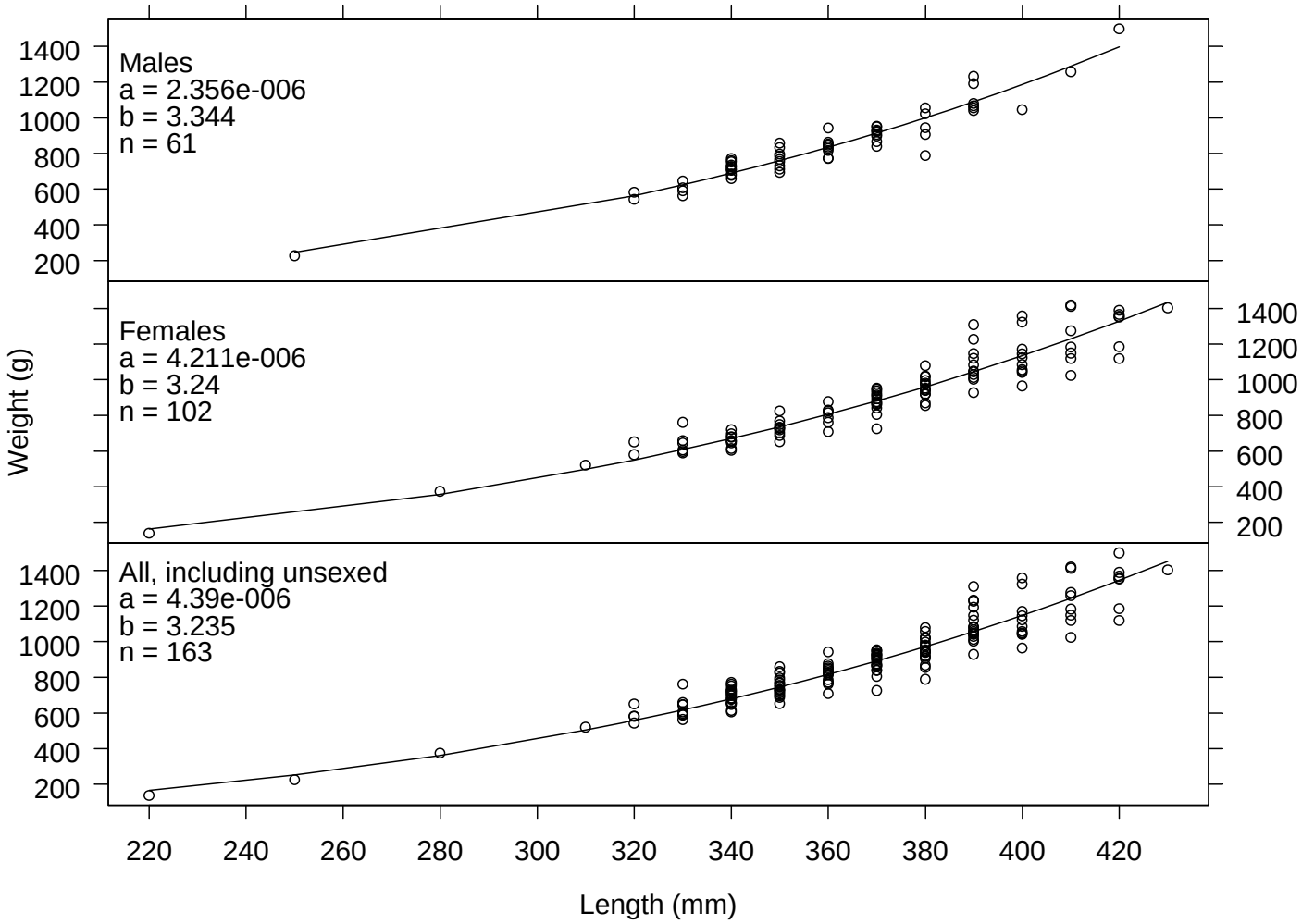


Figure 62. -- Length-weight relationship for dark rockfish specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Skates

Whiteblotched skate (*Bathyraja maculata*)

Whiteblotched skate was the most abundant species of skate captured in Aleutian NPFMC areas and the second most abundant skate in the Southern Bering Sea area (Table 2). In all areas except the Western Aleutians CPUE increased with depth and in all areas mean size decreased with depth (Table 50). The highest subarea-specific mean CPUEs occurred in the SE and NE Eastern Aleutian subareas in 101-200 m and 201-300 m depth intervals (Table 51). High catches were observed west of Amlia Island and on Stalemate Bank (Fig. 63). A wide range of both males and females were captured, and their respective length frequency distributions were similar (Fig. 64). Figure 65 shows the length-weight relationships for male, female, and combined sexes of whiteblotched skate.

Alaska skate (*Bathyraja parmifera*)

Alaska skate was the second most abundant species of skate captured during this survey, but was the most abundant skate in the Central Aleutians area (Table 2). The estimated biomass of 13,484 t was highest in the 1-100 m and 101-200 m depth intervals and was fairly equally distributed across both intervals (Table 52). Mean sizes generally decreased from west to east. The smallest mean sizes were found in the shallower depths. The highest three subarea-specific mean CPUEs and estimated biomasses were found in the Central Aleutians area (Table 53). Notable catches were observed at Petrel Bank and surrounding islands (Fig. 66). Figures 67 and 68 show the length-frequency and length-weight relationships for Alaska skate.

Aleutian skate (*Bathyraja aleutica*)

Aleutian skate was relatively evenly distributed across the Western and Central Aleutian areas (Table 54). The estimated biomass was greater than 6,600 t and was highest at mid-depths (101-200 m and 201-300 m depth intervals). The top three subareas in terms of mean CPUE were the SE Central Aleutians, Petrel Bank and the N Central Aleutians subarea at depth intervals of 1-100, 101-200 and 101-200 m depth intervals (Table 55). Noteable catches were found at Seguam Island and on the west and east sides of Kiska Island (Fig. 69). Figures 70 and 71 show the length-frequency and length-weight relationships for Aleutian skate.

Table 50. -- Number of survey hauls, number of hauls with whiteblotched skate, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	1	6.041	2,946	0	9,092	8.652	102.3
	101-200	47	7	2.756	1,466	0	3,010	5.291	81.5
	201-300	23	1	0.484	83	0	257	4.032	82.4
	301-500	21	1	0.176	58	0	178	2.646	67.2
	All depths	113	10	2.997	4,553	0	10,589	7.409	94.8
Central Aleutians	1-100	32	2	0.373	218	0	553	10.067	113.5
	101-200	35	4	0.895	412	0	1,147	8.077	106.5
	201-300	21	3	1.427	301	0	735	8.338	105.7
	301-500	22	11	2.616	1,041	149	1,934	3.278	73.8
	All depths	110	20	1.192	1,972	744	3,200	5.804	89.9
Eastern Aleutians	1-100	12	2	1.627	1,114	0	2,666	9.317	109.8
	101-200	31	11	10.598	8,232	1,107	15,358	6.260	95.5
	201-300	27	15	13.471	6,603	3,082	10,124	5.715	92.2
	301-500	21	14	11.298	6,420	1,777	11,064	2.965	70.0
	All depths	91	42	8.877	22,370	13,361	31,378	5.306	87.9
All Aleutian Areas	1-100	66	5	2.43	4,279	0	10,338	8.897	104.8
	101-200	113	22	5.71	10,110	2,995	17,225	6.194	93.9
	201-300	71	19	8.00	6,987	3,542	10,433	5.808	92.7
	301-500	64	26	5.81	7,519	2,987	12,050	3.006	70.5
	All depths	314	72	5.08	28,895	18,077	39,712	5.671	89.1
Southern Bering Sea	1-100	21	0	0.000	0	--	--	--	--
	101-200	11	1	1.116	206	0	666	12.895	119.0
	201-300	4	2	2.124	120	0	361	7.375	102.9
	301-500	8	5	4.712	492	0	1,040	2.631	73.7
	All depths	44	8	1.093	818	173	1,462	5.915	89.4

Table 51. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of whiteblotched skate by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Eastern Aleutians	101-200	SE Eastern Aleutians	10	7	23.85	4,533	0	10,207
Eastern Aleutians	201-300	NE Eastern Aleutians	12	9	23.24	4,575	1,654	7,496
Eastern Aleutians	101-200	NE Eastern Aleutians	11	4	18.38	3,700	0	9,103
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	7	13.62	3,637	0	7,302
Eastern Aleutians	301-500	SE Eastern Aleutians	9	7	10.81	2,783	0	6,303
Eastern Aleutians	201-300	SE Eastern Aleutians	9	6	9.84	2,028	0	4,525
Western Aleutians	1-100	W Western Aleutians	8	1	7.98	2,946	0	9,914
Eastern Aleutians	1-100	SE Eastern Aleutians	6	2	6.40	1,114	0	2,928
Southern Bering Sea	301-500	Combined Southern Bering	8	5	4.71	492	0	1,040
Central Aleutians	301-500	Petrel Bank	3	2	4.71	582	0	2,132
Western Aleutians	101-200	W Western Aleutians	29	5	3.52	1,432	0	3,003
Central Aleutians	101-200	N Central Aleutians	8	1	3.38	360	0	1,212
Southern Bering Sea	101-200	W Southern Bering	2	1	3.08	206	0	2,828
Central Aleutians	301-500	SE Central Aleutians	5	1	3.08	220	0	831
Central Aleutians	201-300	Petrel Bank	3	1	2.55	195	0	1,035
Central Aleutians	201-300	N Central Aleutians	10	2	2.41	106	0	265
Southern Bering Sea	201-300	Combined Southern Bering	4	2	2.12	120	0	361
Central Aleutians	301-500	N Central Aleutians	11	8	1.93	239	82	396
Central Aleutians	1-100	SE Central Aleutians	7	1	1.27	148	0	509
Western Aleutians	201-300	W Western Aleutians	13	1	0.89	83	0	265
Western Aleutians	301-500	W Western Aleutians	18	1	0.34	58	0	179
Central Aleutians	1-100	N Central Aleutians	11	1	0.34	71	0	228
Central Aleutians	101-200	SE Central Aleutians	10	2	0.32	24	0	65
Western Aleutians	101-200	E Western Aleutians	18	2	0.27	33	0	82
Central Aleutians	101-200	SW Central Aleutians	13	1	0.26	28	0	88

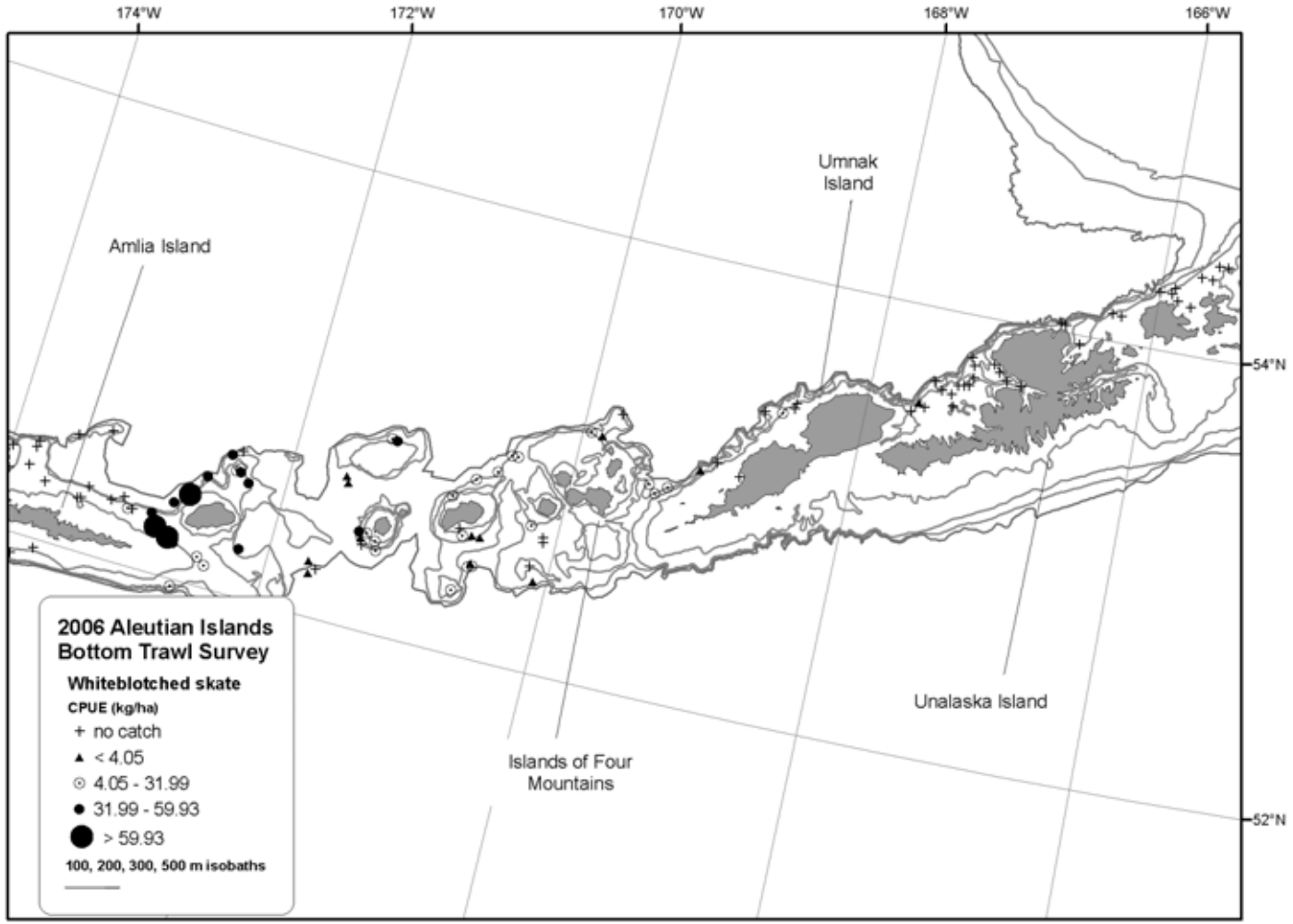


Figure 63. -- Distribution and relative abundance of whiteblotched skate from the 2006 Aleutian Islands bottom trawl survey.

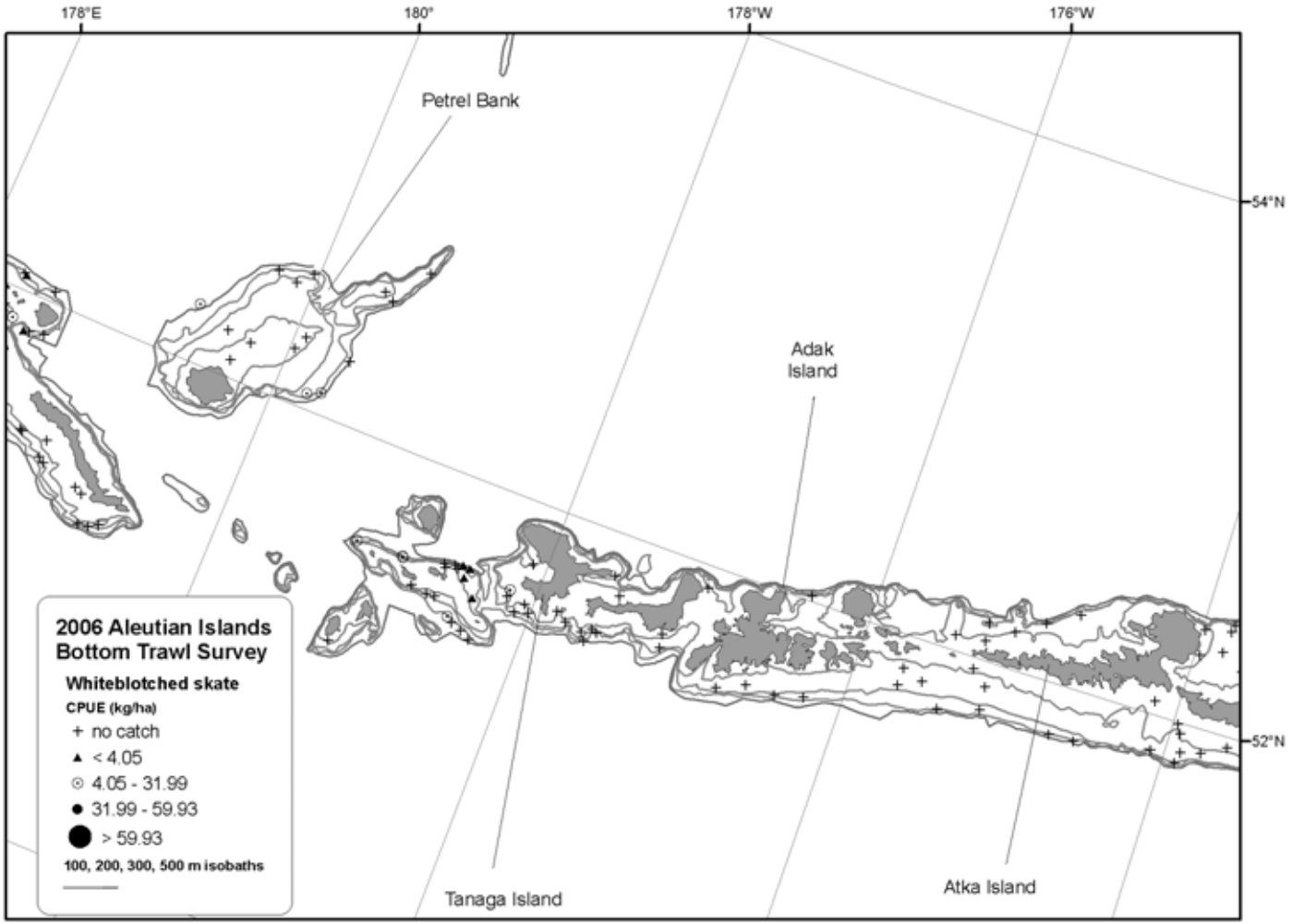


Figure 63. -- (continued).

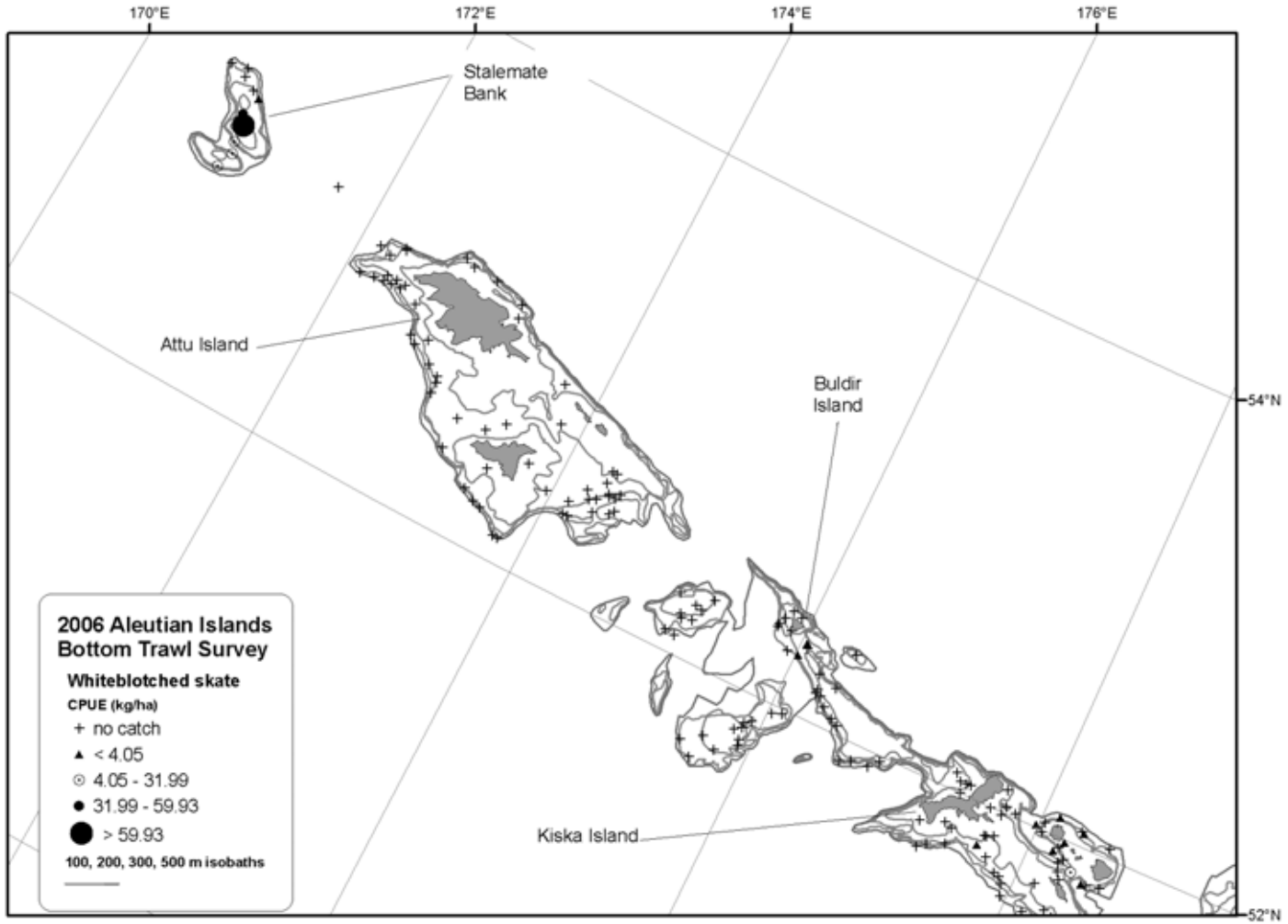


Figure 63. -- (continued).

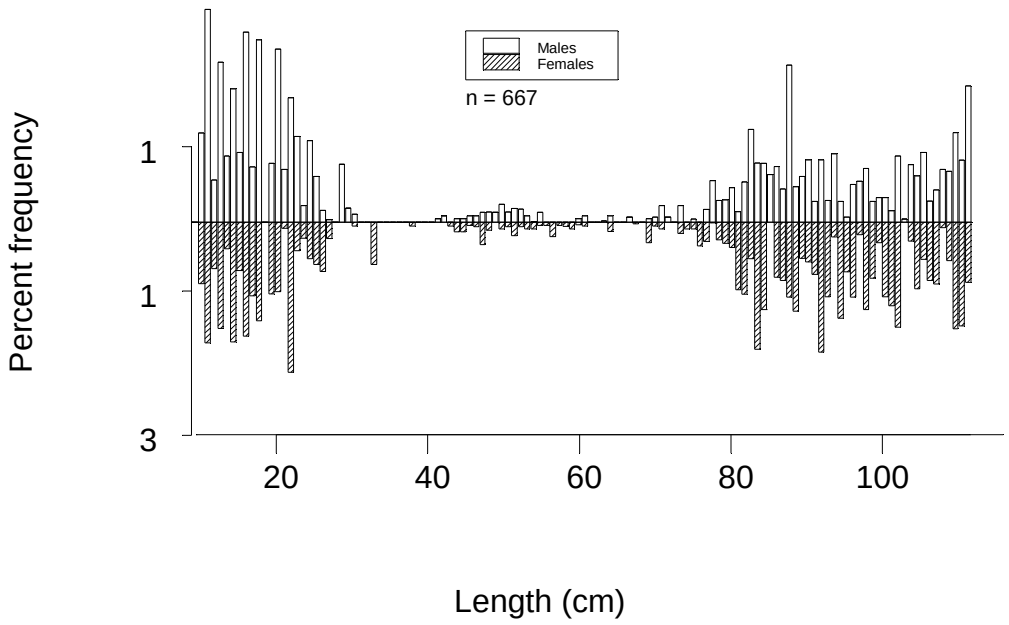


Figure 64. -- Size composition of whiteblotched skate from the 2006 Aleutian Islands bottom trawl survey.

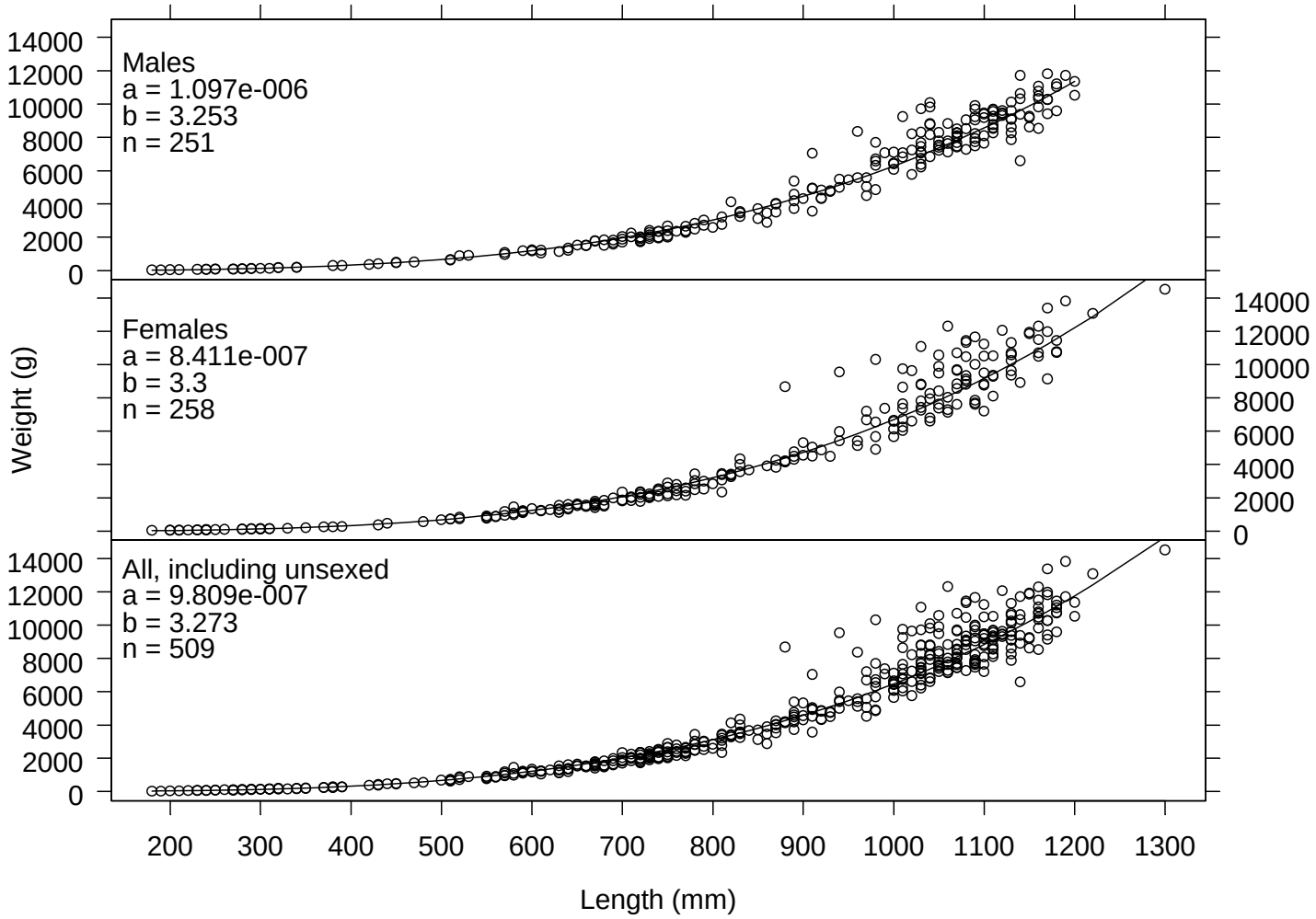


Figure 65. -- Length-weight relationship for whiteblotched skate specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 52. -- Number of survey hauls, number of hauls with Alaska skate, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	7	2.369	1,155	0	2,719	7.878	92.9
	101-200	47	17	2.041	1,085	493	1,678	8.665	93.8
	201-300	23	3	1.608	277	0	772	8.711	98.5
	301-500	21	0	0.000	0	--	--	--	--
	All depths	113	27	1.657	2,517	849	4,186	8.309	93.9
Central Aleutians	1-100	32	18	4.963	2,902	605	5,200	9.472	100.6
	101-200	35	10	7.753	3,571	464	6,678	8.645	100.8
	201-300	21	2	0.542	114	0	311	15.114	120.6
	301-500	22	0	0.000	0	--	--	--	--
	All depths	110	30	3.982	6,588	2,821	10,354	9.122	101.1
Eastern Aleutians	1-100	12	2	2.404	1,647	0	3,773	4.770	84.7
	101-200	31	7	2.014	1,564	0	3,591	6.439	94.6
	201-300	27	1	0.180	88	0	270	12.800	118.0
	301-500	21	0	0.000	0	--	--	--	--
	All depths	91	10	1.309	3,299	541	6,056	5.776	90.3
All Aleutian Areas	1-100	66	27	3.25	5,704	2,383	9,024	7.792	94.4
	101-200	113	34	3.52	6,220	2,562	9,879	8.094	98.0
	201-300	71	6	0.55	480	0	1,020	10.989	107.3
	301-500	64	0	0.00	0	--	--	--	--
	All depths	314	67	2.18	12,404	7,486	17,321	8.067	96.7
Southern Bering Sea	1-100	21	6	2.107	849	0	1,973	7.684	98.7
	101-200	11	3	1.008	187	0	422	5.145	85.6
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	2	0.430	45	0	115	3.874	87.9
	All depths	44	11	1.443	1,080	0	2,189	7.087	96.0

Table 53. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Alaska skate by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	1-100	SE Central Aleutians	7	4	13.34	1,553	0	4,147
Central Aleutians	101-200	Petrel Bank	4	2	11.42	1,983	0	5,952
Central Aleutians	101-200	N Central Aleutians	8	3	10.21	1,089	0	3,089
Eastern Aleutians	1-100	NW Eastern Aleutians	2	2	8.52	1,647	0	13,921
Eastern Aleutians	101-200	NW Eastern Aleutians	3	2	6.27	999	0	5,004
Central Aleutians	101-200	SW Central Aleutians	13	4	4.48	472	0	1,025
Central Aleutians	1-100	N Central Aleutians	11	8	3.54	745	186	1,305
Southern Bering Sea	1-100	W Southern Bering	2	1	3.21	510	0	6,985
Western Aleutians	101-200	E Western Aleutians	18	9	3.00	375	99	652
Western Aleutians	201-300	E Western Aleutians	10	1	3.00	235	0	765
Central Aleutians	1-100	Petrel Bank	5	2	2.56	246	0	916
Western Aleutians	1-100	W Western Aleutians	8	2	2.42	893	0	2,616
Western Aleutians	1-100	E Western Aleutians	14	5	2.21	262	0	665
Central Aleutians	1-100	SW Central Aleutians	9	4	2.21	358	26	690
Central Aleutians	201-300	SW Central Aleutians	6	1	2.15	92	0	327
Eastern Aleutians	101-200	SE Eastern Aleutians	10	2	2.12	403	0	1,150
Western Aleutians	101-200	W Western Aleutians	29	8	1.75	710	170	1,250
Southern Bering Sea	1-100	E Southern Bering	19	5	1.39	339	0	707
Southern Bering Sea	101-200	W Southern Bering	2	1	1.07	72	0	983
Southern Bering Sea	101-200	E Southern Bering	9	2	0.97	115	0	294
Central Aleutians	201-300	N Central Aleutians	10	1	0.52	23	0	74
Western Aleutians	201-300	W Western Aleutians	13	2	0.45	43	0	135
Eastern Aleutians	201-300	NE Eastern Aleutians	12	1	0.45	88	0	282
Eastern Aleutians	101-200	NE Eastern Aleutians	11	2	0.45	90	0	241
Southern Bering Sea	301-500	Combined Southern Bering	8	2	0.43	45	0	115
Central Aleutians	101-200	SE Central Aleutians	10	1	0.38	28	0	92
Eastern Aleutians	101-200	SW Eastern Aleutians	7	1	0.32	73	0	250

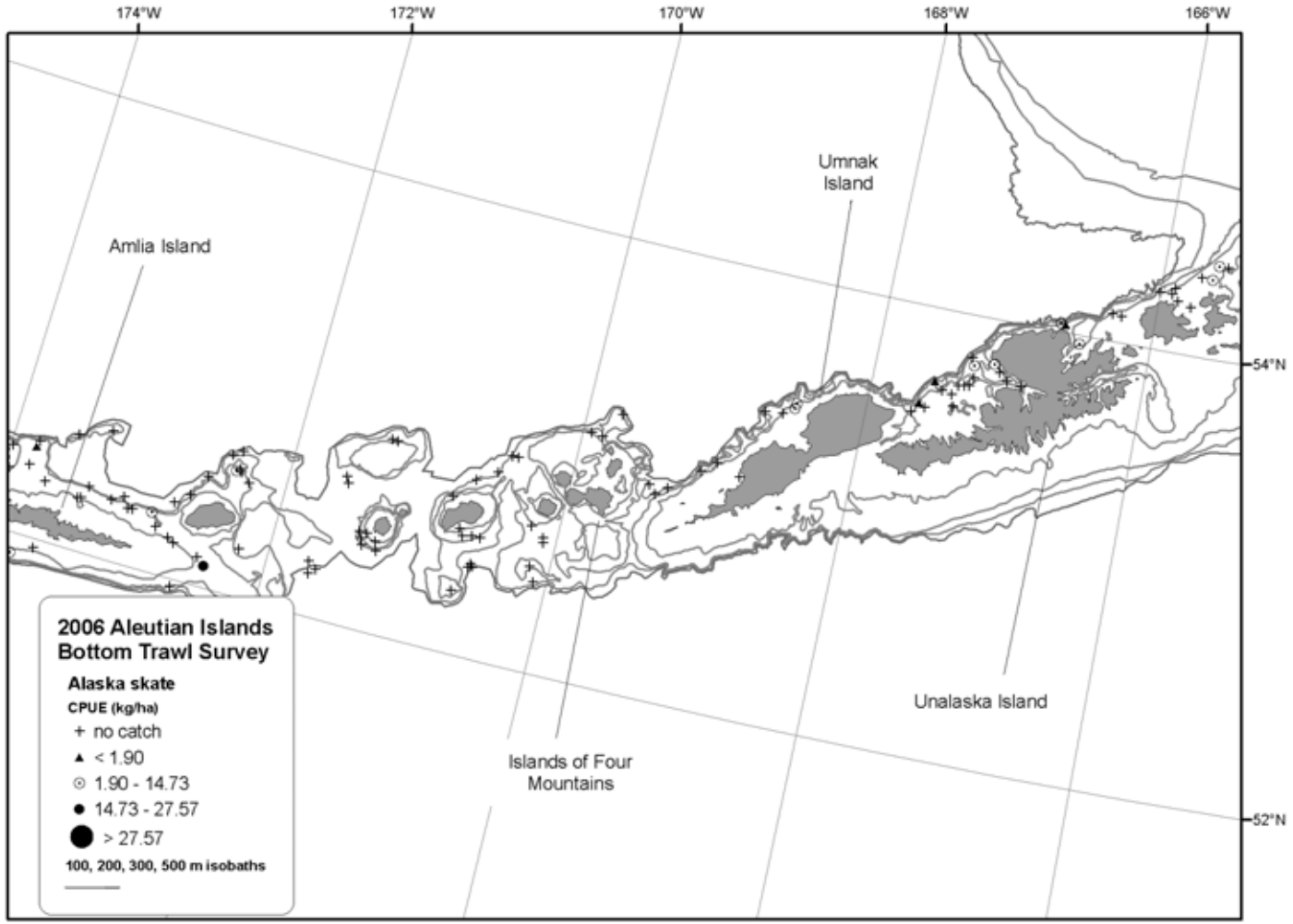


Figure 66. -- Distribution and relative abundance of Alaska skate from the 2006 Aleutian Islands bottom trawl survey.

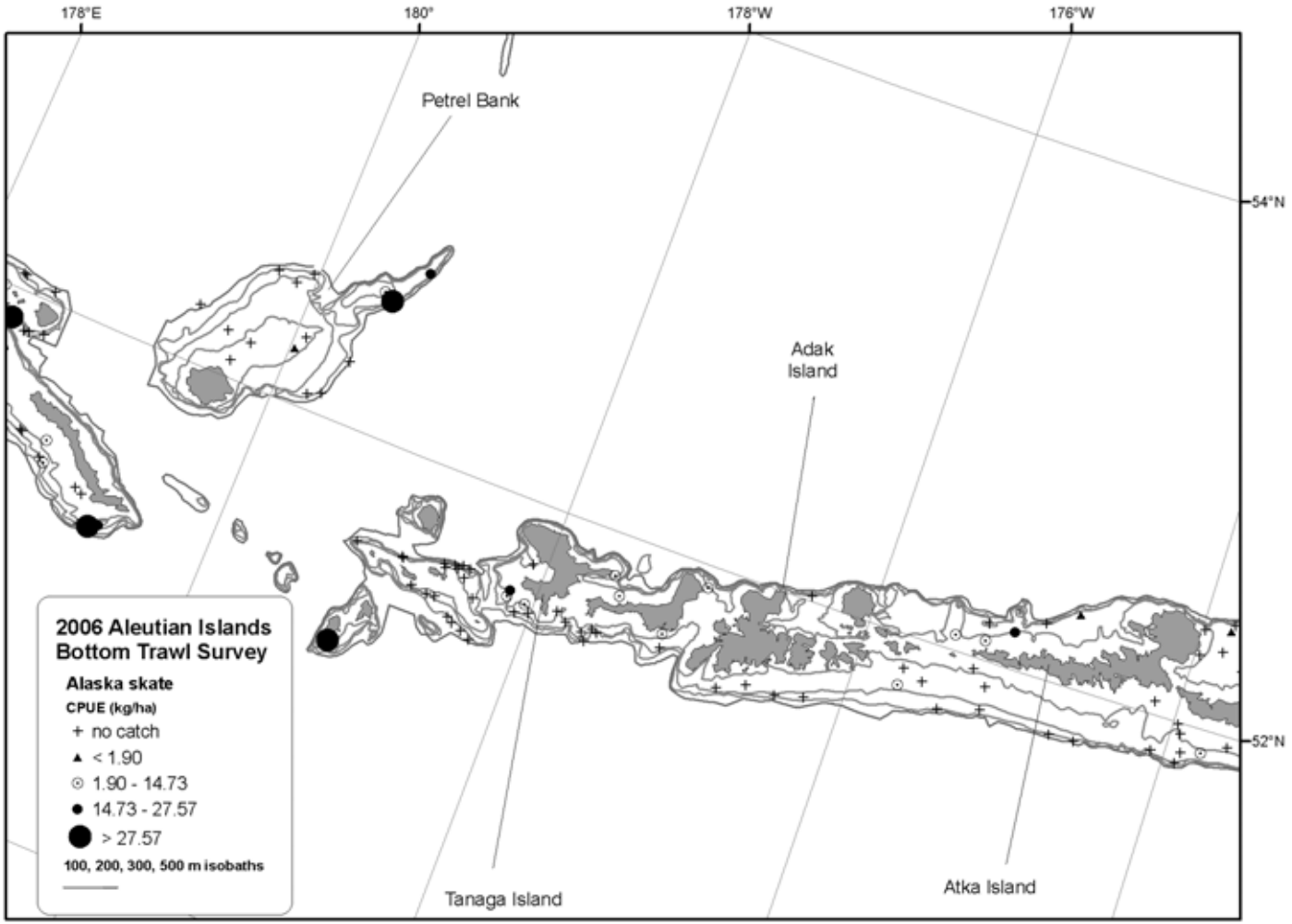


Figure 66. -- (continued).

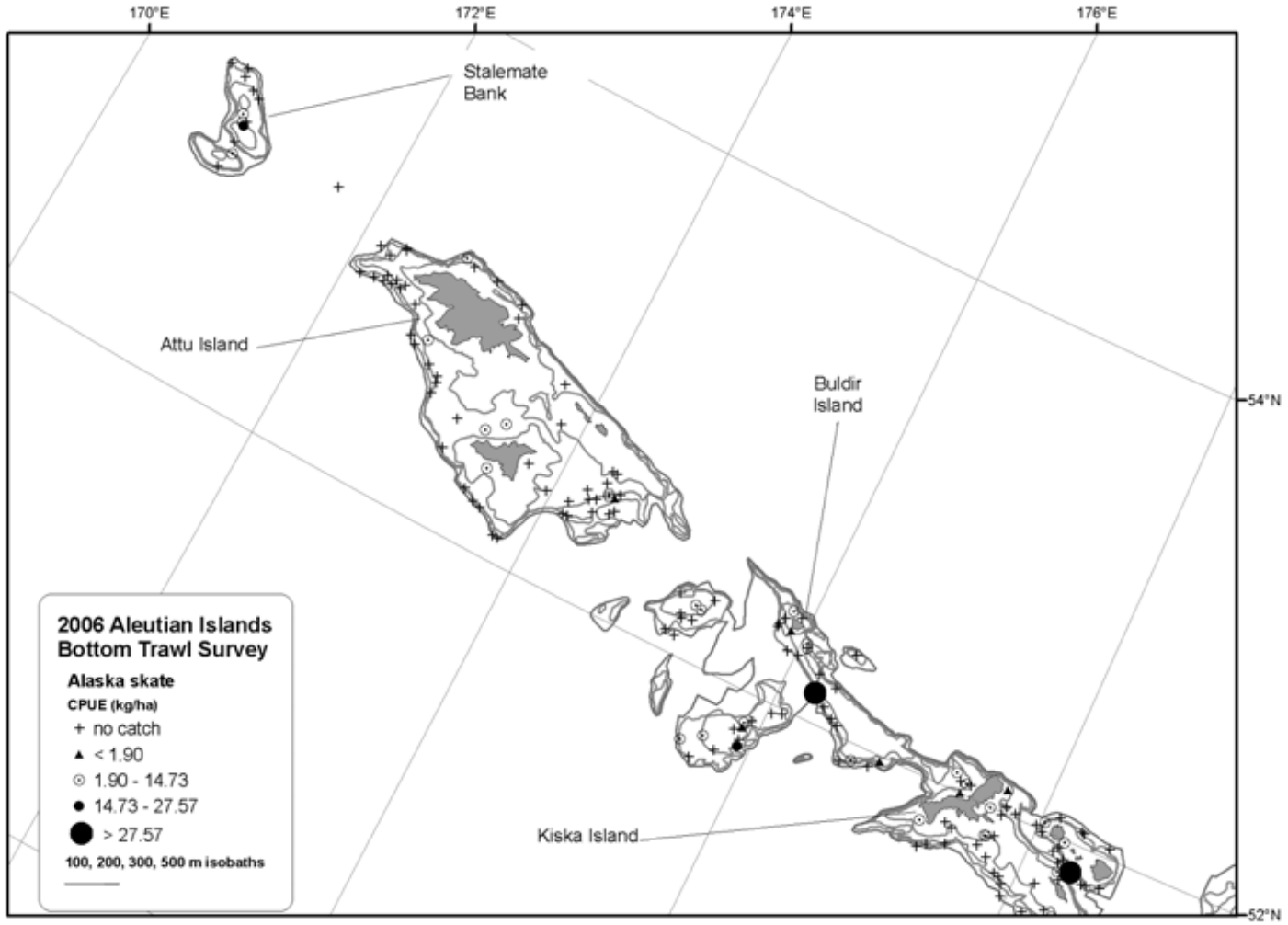


Figure 66. -- (continued).

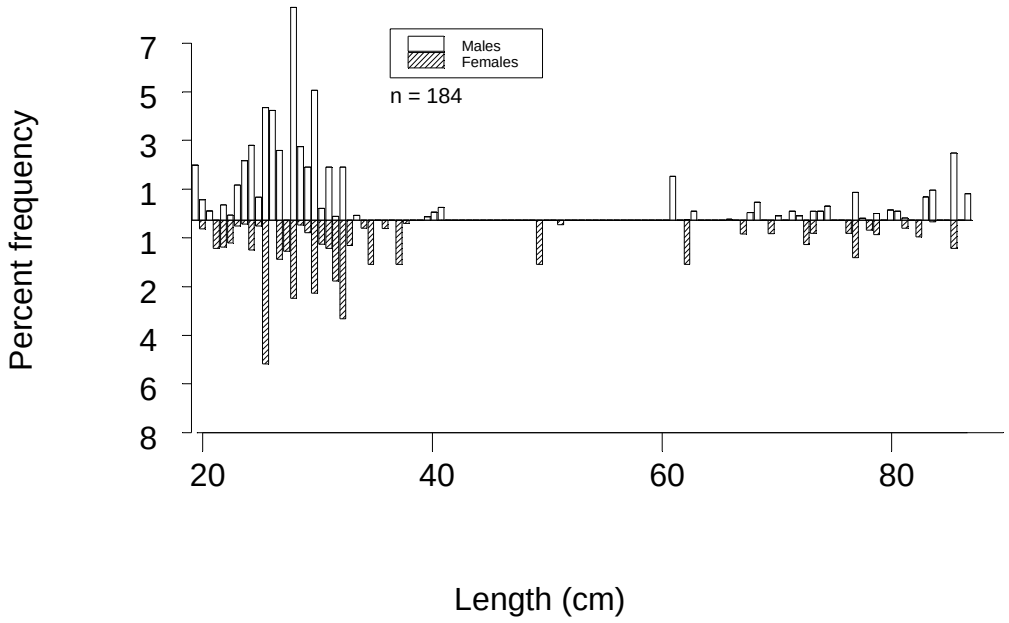


Figure 67. -- Size composition of Alaska skate from the 2006 Aleutian Islands bottom trawl survey.

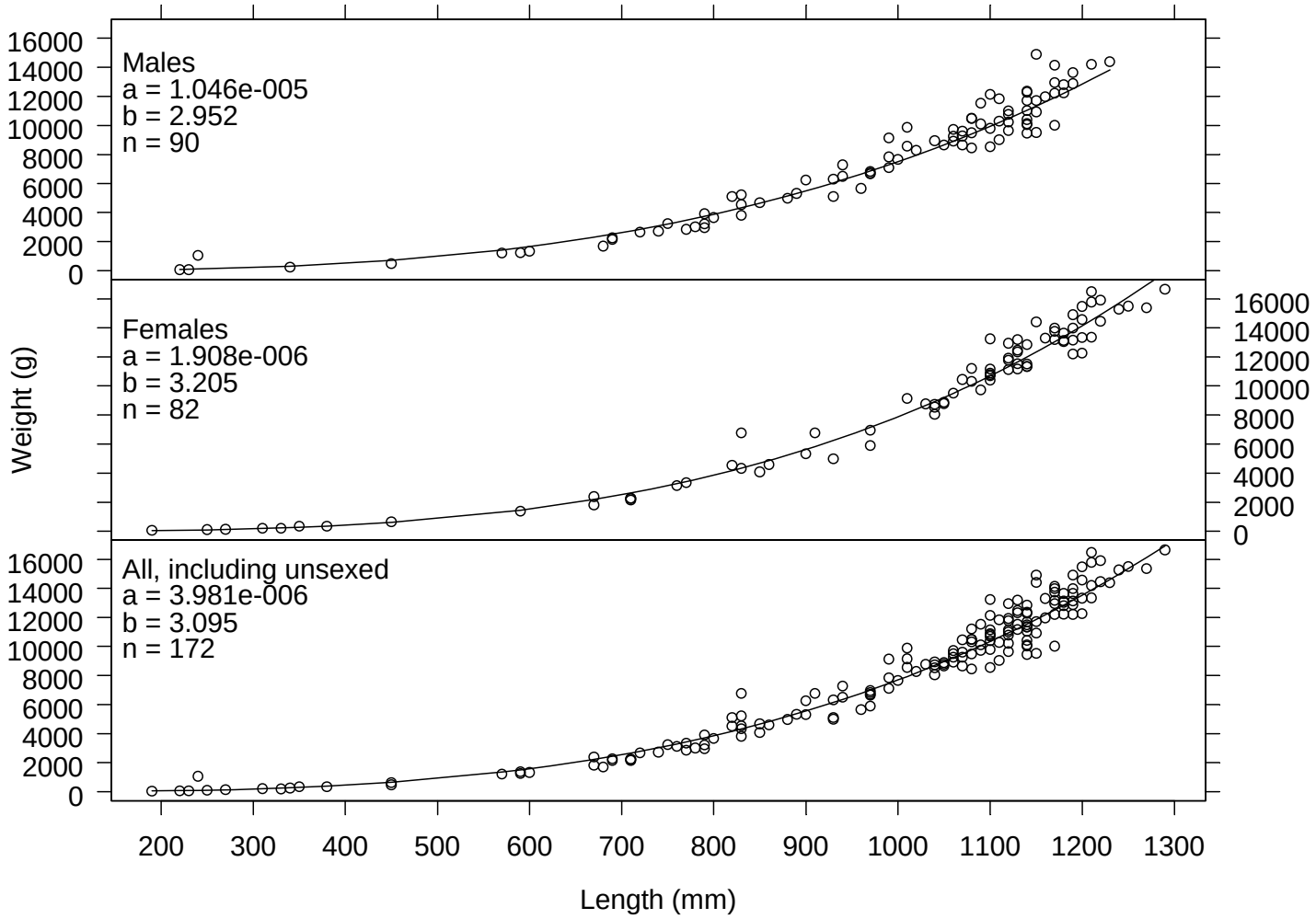


Figure 68. -- Length-weight relationship for Alaska skate specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 54. -- Number of survey hauls, number of hauls with Aleutian skate, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	1	0.689	336	0	1,035	17.843	137.0
	101-200	47	6	0.826	440	69	810	11.440	116.4
	201-300	23	5	2.029	350	6	693	11.083	119.3
	301-500	21	2	0.079	26	0	69	3.535	82.5
	All depths	113	14	0.758	1,151	323	1,979	13.022	122.5
Central Aleutians	1-100	32	2	0.099	58	0	146	4.220	94.0
	101-200	35	9	4.222	1,944	0	4,231	11.245	119.8
	201-300	21	4	2.045	431	87	776	16.154	131.1
	301-500	22	4	0.592	236	0	501	2.680	75.9
	All depths	110	19	1.614	2,669	400	4,939	11.129	117.2
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	6	1.512	1,175	77	2,273	18.002	136.1
	201-300	27	5	2.387	1,170	0	2,461	12.106	124.8
	301-500	21	0	0.000	0	--	--	--	--
	All depths	91	11	0.931	2,345	703	3,987	15.059	130.4
All Aleutian Areas	1-100	66	3	0.22	394	0	1,071	15.841	130.7
	101-200	113	21	2.01	3,559	1,061	6,056	13.500	124.7
	201-300	71	14	2.23	1,951	615	3,287	12.817	125.2
	301-500	64	6	0.20	262	3	520	2.765	76.6
	All depths	314	44	1.08	6,166	3,268	9,063	12.977	123.2
Southern Bering Sea	1-100	21	1	0.559	225	0	694	20.043	151.0
	101-200	11	1	1.090	202	0	650	12.594	125.0
	201-300	4	0	0.000	0	--	--	--	--
	301-500	8	1	0.886	92	0	311	16.109	135.0
	All depths	44	3	0.694	519	0	1,156	16.449	138.1

Table 55. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of Aleutian skate by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Central Aleutians	1-100	SE Central Aleutians	7	4	13.34	1,553	0	4,147
Central Aleutians	101-200	Petrel Bank	4	2	11.42	1,983	0	5,952
Central Aleutians	101-200	N Central Aleutians	8	3	10.21	1,089	0	3,089
Eastern Aleutians	1-100	NW Eastern Aleutians	2	2	8.52	1,647	0	13,921
Eastern Aleutians	101-200	NW Eastern Aleutians	3	2	6.27	999	0	5,004
Central Aleutians	101-200	SW Central Aleutians	13	4	4.48	472	0	1,025
Central Aleutians	1-100	N Central Aleutians	11	8	3.54	745	186	1,305
Southern Bering Sea	1-100	W Southern Bering	2	1	3.21	510	0	6,985
Western Aleutians	101-200	E Western Aleutians	18	9	3.00	375	99	652
Western Aleutians	201-300	E Western Aleutians	10	1	3.00	235	0	765
Central Aleutians	1-100	Petrel Bank	5	2	2.56	246	0	916
Western Aleutians	1-100	W Western Aleutians	8	2	2.42	893	0	2,616
Western Aleutians	1-100	E Western Aleutians	14	5	2.21	262	0	665
Central Aleutians	1-100	SW Central Aleutians	9	4	2.21	358	26	690
Central Aleutians	201-300	SW Central Aleutians	6	1	2.15	92	0	327
Eastern Aleutians	101-200	SE Eastern Aleutians	10	2	2.12	403	0	1,150
Western Aleutians	101-200	W Western Aleutians	29	8	1.75	710	170	1,250
Southern Bering Sea	1-100	E Southern Bering	19	5	1.39	339	0	707
Southern Bering Sea	101-200	W Southern Bering	2	1	1.07	72	0	983
Southern Bering Sea	101-200	E Southern Bering	9	2	0.97	115	0	294
Central Aleutians	201-300	N Central Aleutians	10	1	0.52	23	0	74
Western Aleutians	201-300	W Western Aleutians	13	2	0.45	43	0	135
Eastern Aleutians	201-300	NE Eastern Aleutians	12	1	0.45	88	0	282
Eastern Aleutians	101-200	NE Eastern Aleutians	11	2	0.45	90	0	241
Southern Bering Sea	301-500	Combined Southern Bering	8	2	0.43	45	0	115
Central Aleutians	101-200	SE Central Aleutians	10	1	0.38	28	0	92
Eastern Aleutians	101-200	SW Eastern Aleutians	7	1	0.32	73	0	250

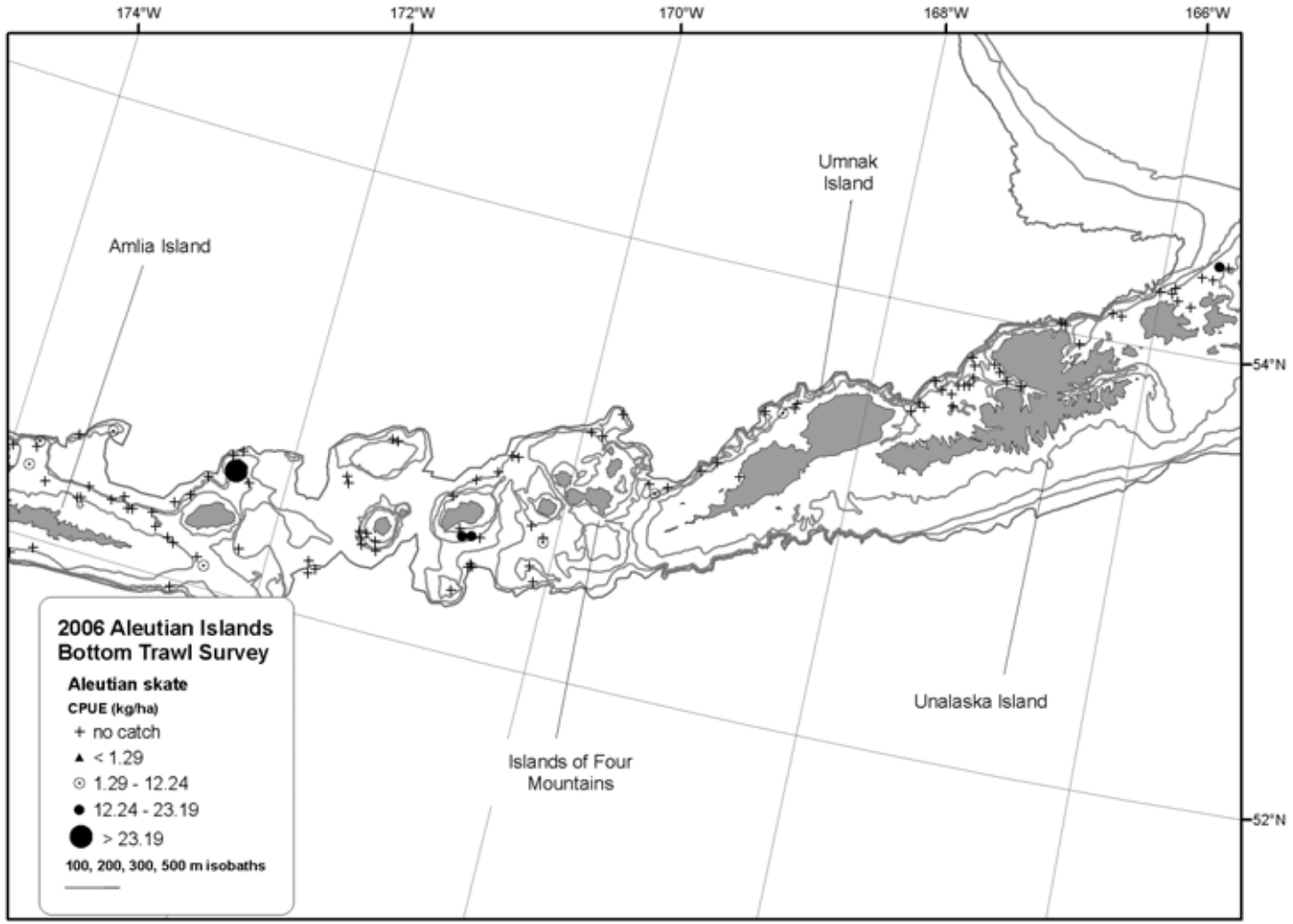


Figure 69. -- Distribution and relative abundance of Aleutian skate from the 2006 Aleutian Islands bottom trawl survey.

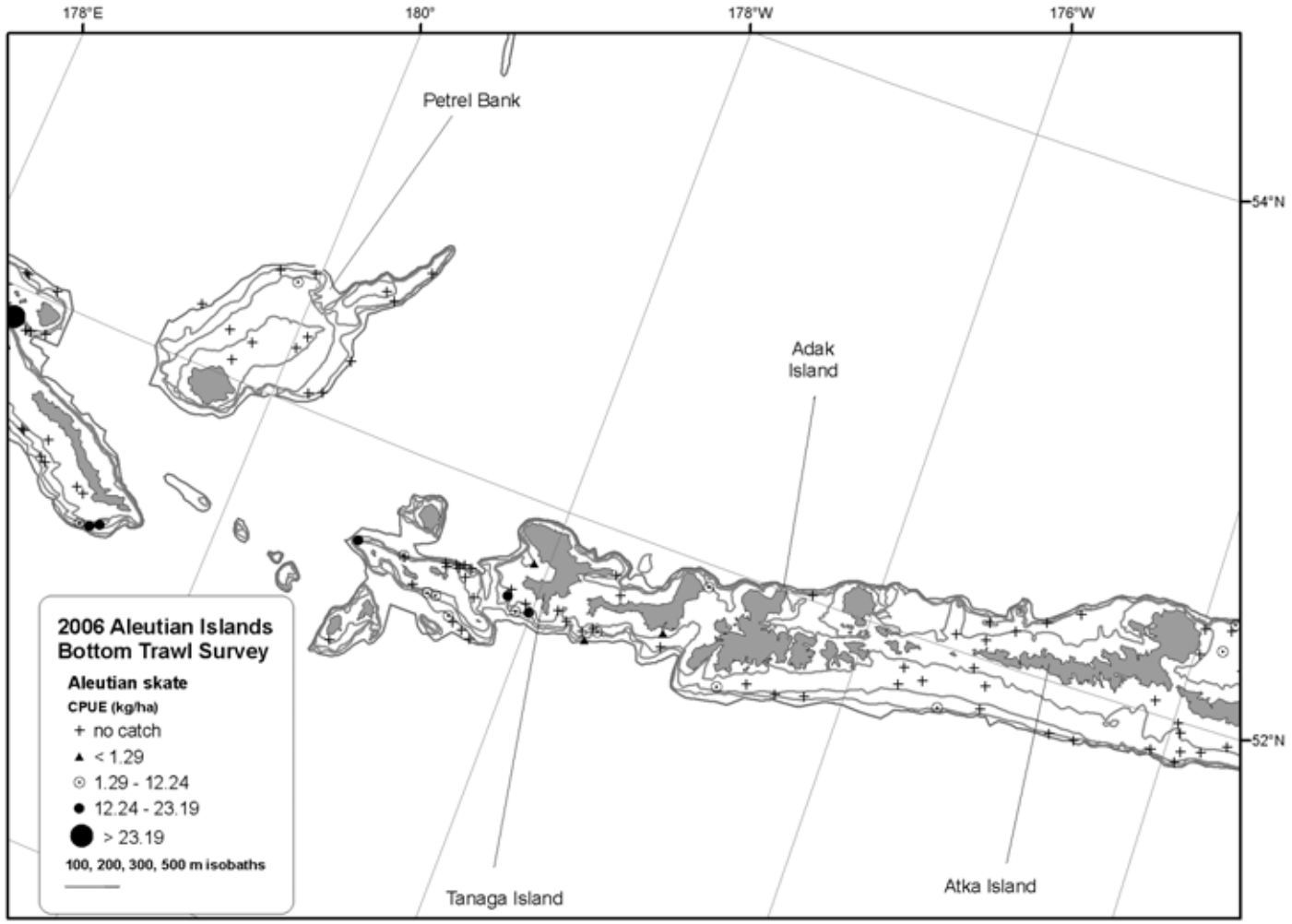


Figure 69. -- (continued).

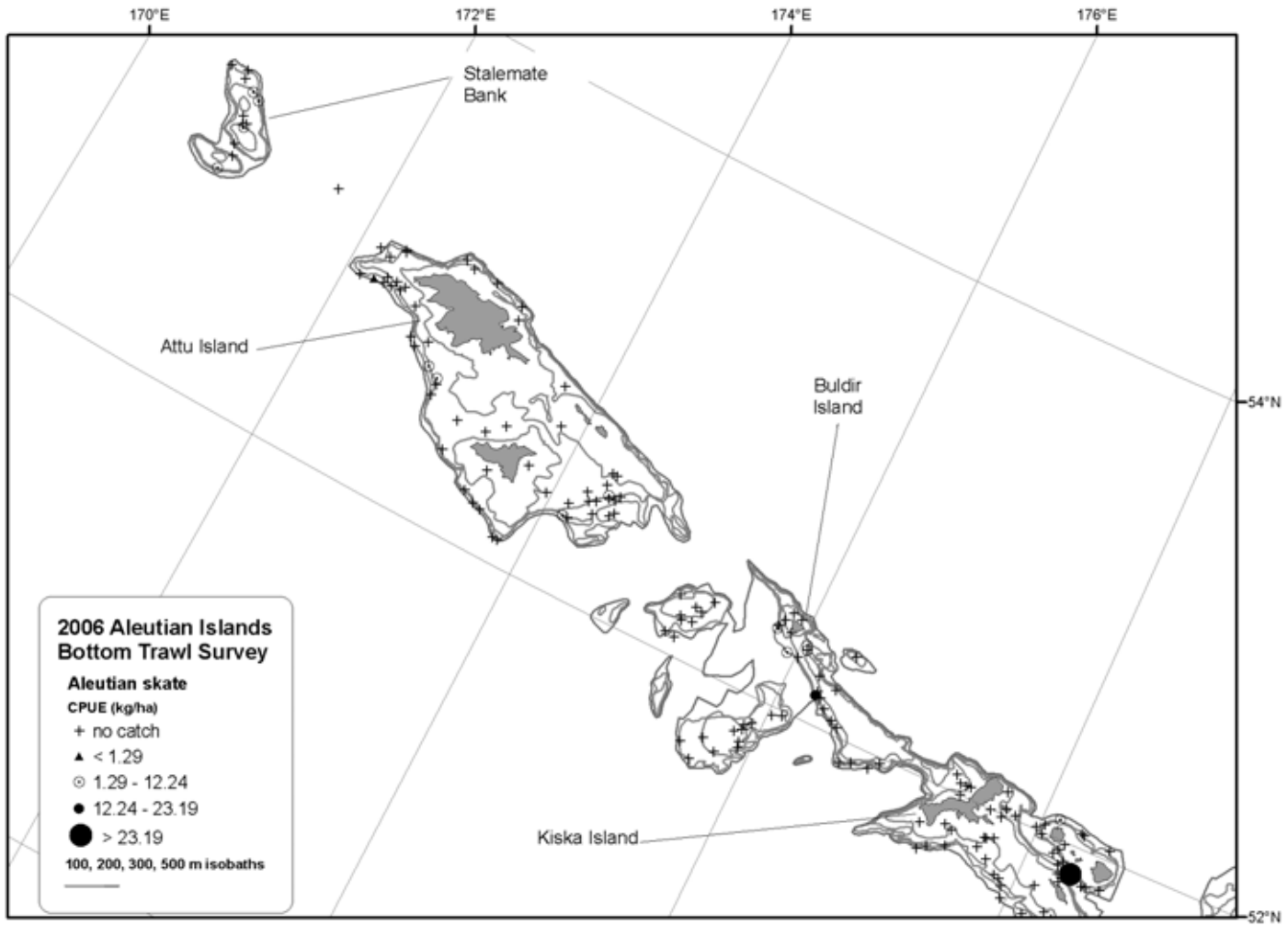


Figure 69. -- (continued).

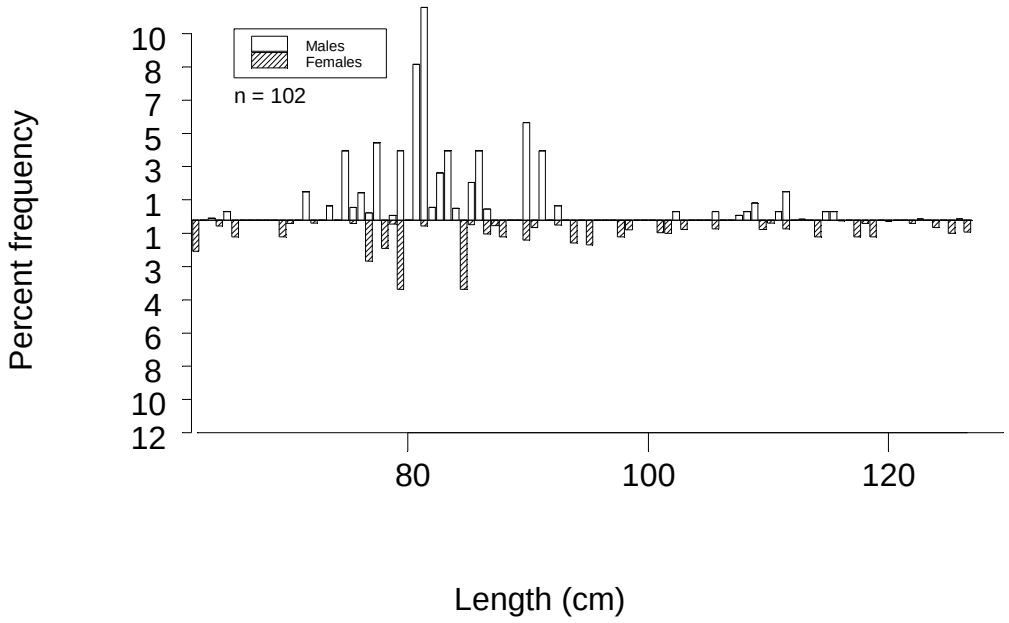


Figure 70. -- Size composition of Aleutian skate from the 2006 Aleutian Islands bottom trawl survey.

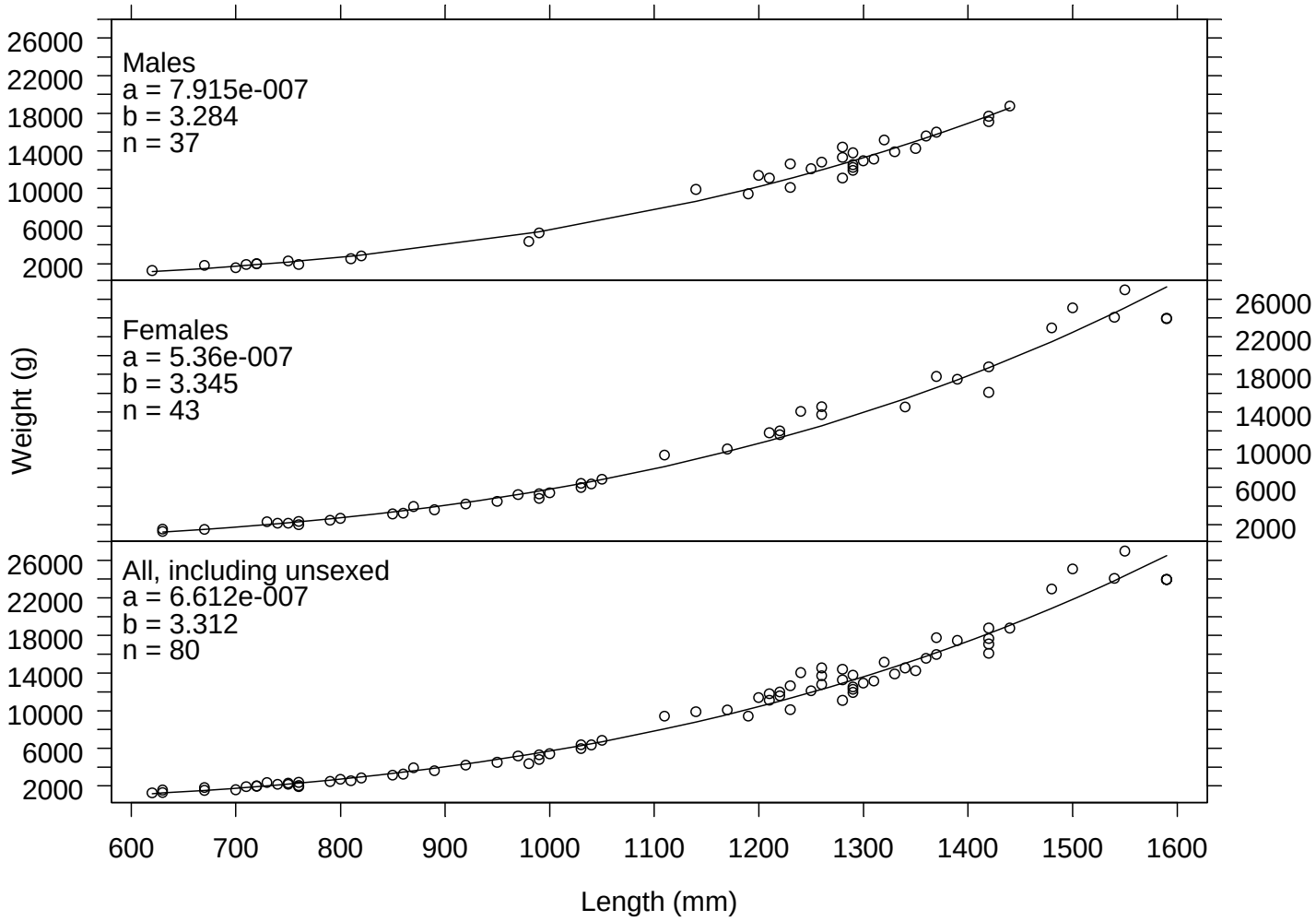


Figure 71. -- Length-weight relationship for Aleutian skate specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Mud skate (*Bathyraja taranetzi*)

Mud skates were found throughout the survey area in most depth intervals (Table 56). Mean CPUE was very modest, increasing somewhat with depth. With an estimated biomass of almost 3,000 t, it represents a small part of the general skate population in the Aleutian region. Subarea-specific mean CPUEs were small but catches were scattered across the entire survey area, mostly in strata deeper than 200 m (Table 57). Figure 72 summarizes catch locations and CPUE. Note that the CPUE values cited in the figure legend are very small. Figures 73 and 74 present length-frequency and length-weight data collected on mud skate during the 2006 Aleutian Islands bottom trawl survey.

Miscellaneous skates

Miscellaneous skate species captured during the Aleutian Islands bottom trawl survey in 2006 included the deepsea skate (*Bathyraja abyssicola*), big skate (*Raja binoculata*), Bering skate (*Bathyraja interrupta*), commander skate (*Bathyraja lindbergi*), and butterfly skate (*Bathyraja mariposa*). Most of these skates were captured at shallow depths in the Southern Bering Sea subareas and reflect the region's position as a transition zone between species dominant on the Bering Sea shelf and those dominant in the Aleutian Islands area (Table 58).

Table 56. -- Number of survey hauls, number of hauls with mud skate, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)	Mean length (cm)
Western Aleutians	1-100	22	0	0.000	0	--	--	--	--
	101-200	47	3	0.054	29	0	67	1.543	59.8
	201-300	23	1	0.006	1	0	3	0.378	41.0
	301-500	21	4	0.086	28	0	66	0.829	52.4
	All depths	113	8	0.038	58	6	110	1.176	55.9
Central Aleutians	1-100	32	2	0.029	17	0	42	1.041	58.6
	101-200	35	7	0.102	47	11	83	1.193	59.4
	201-300	21	15	1.297	274	108	439	0.987	55.7
	301-500	22	14	0.655	261	117	404	0.726	50.5
	All depths	110	38	0.362	598	386	810	0.891	53.8
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--	--
	101-200	31	8	0.276	215	0	431	0.964	56.3
	201-300	27	4	0.185	91	0	214	0.749	51.2
	301-500	21	14	3.436	1,953	255	3,650	0.637	48.2
	All depths	91	26	0.896	2,258	623	3,893	0.673	49.1
All Aleutian Areas	1-100	66	2	0.01	17	0	42	1.041	58.6
	101-200	113	18	0.16	291	74	507	1.059	57.1
	201-300	71	20	0.42	365	167	563	0.926	54.5
	301-500	64	32	1.73	2,242	609	3,874	0.650	48.5
	All depths	314	72	0.51	2,914	1,281	4,548	0.728	50.2
Southern Bering Sea	1-100	21	1	0.026	11	0	33	1.870	0.0
	101-200	11	0	0.000	0	--	--	--	--
	201-300	4	1	0.174	10	0	52	0.897	56.0
	301-500	8	3	0.343	36	0	81	0.837	49.7
	All depths	44	5	0.075	56	8	104	1.042	41.4

Table 57. -- Sampling effort, mean CPUE, and estimated biomass with 95% confidence intervals (CI) of mud skate by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2006 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Stratum Name	Number of Hauls	Hauls with Catch	Mean CPUE (kg/ha)	Biomass (t)	Lower CI Biomass (t)	Upper CI Biomass (t)
Eastern Aleutians	301-500	SE Eastern Aleutians	9	6	4.34	1,118	0	2,455
Eastern Aleutians	301-500	Combined Eastern Aleutian	10	6	2.70	720	0	1,996
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	2.62	115	0	1,251
Central Aleutians	201-300	Petrel Bank	3	3	2.09	160	0	471
Eastern Aleutians	201-300	NW Eastern Aleutians	2	1	1.51	24	0	323
Central Aleutians	301-500	N Central Aleutians	11	9	1.42	177	41	312
Central Aleutians	201-300	N Central Aleutians	10	7	1.04	45	5	86
Central Aleutians	201-300	SE Central Aleutians	2	2	0.94	45	0	329
Eastern Aleutians	101-200	NE Eastern Aleutians	11	6	0.93	187	0	420
Central Aleutians	301-500	SE Central Aleutians	5	3	0.81	58	0	130
Central Aleutians	101-200	SE Central Aleutians	10	5	0.55	42	2	81
Central Aleutians	201-300	SW Central Aleutians	6	3	0.54	23	0	61
Southern Bering Sea	301-500	Combined Southern Bering	8	3	0.34	36	0	81
Central Aleutians	301-500	SW Central Aleutians	3	2	0.33	26	0	107
Eastern Aleutians	201-300	NE Eastern Aleutians	12	2	0.31	61	0	183
Southern Bering Sea	201-300	Combined Southern Bering	4	1	0.17	10	0	41
Eastern Aleutians	101-200	SW Eastern Aleutians	7	2	0.12	28	0	72
Western Aleutians	301-500	E Western Aleutians	3	1	0.11	17	0	90
Eastern Aleutians	201-300	SW Eastern Aleutians	4	1	0.08	6	0	24
Western Aleutians	101-200	W Western Aleutians	29	3	0.07	29	0	68
Western Aleutians	301-500	W Western Aleutians	18	3	0.07	11	0	25
Central Aleutians	101-200	SW Central Aleutians	13	2	0.05	5	0	13
Central Aleutians	1-100	N Central Aleutians	11	1	0.05	11	0	34
Southern Bering Sea	1-100	E Southern Bering	19	1	0.04	11	0	33
Central Aleutians	1-100	SW Central Aleutians	9	1	0.04	7	0	21
Western Aleutians	201-300	E Western Aleutians	10	1	0.01	1	0	4

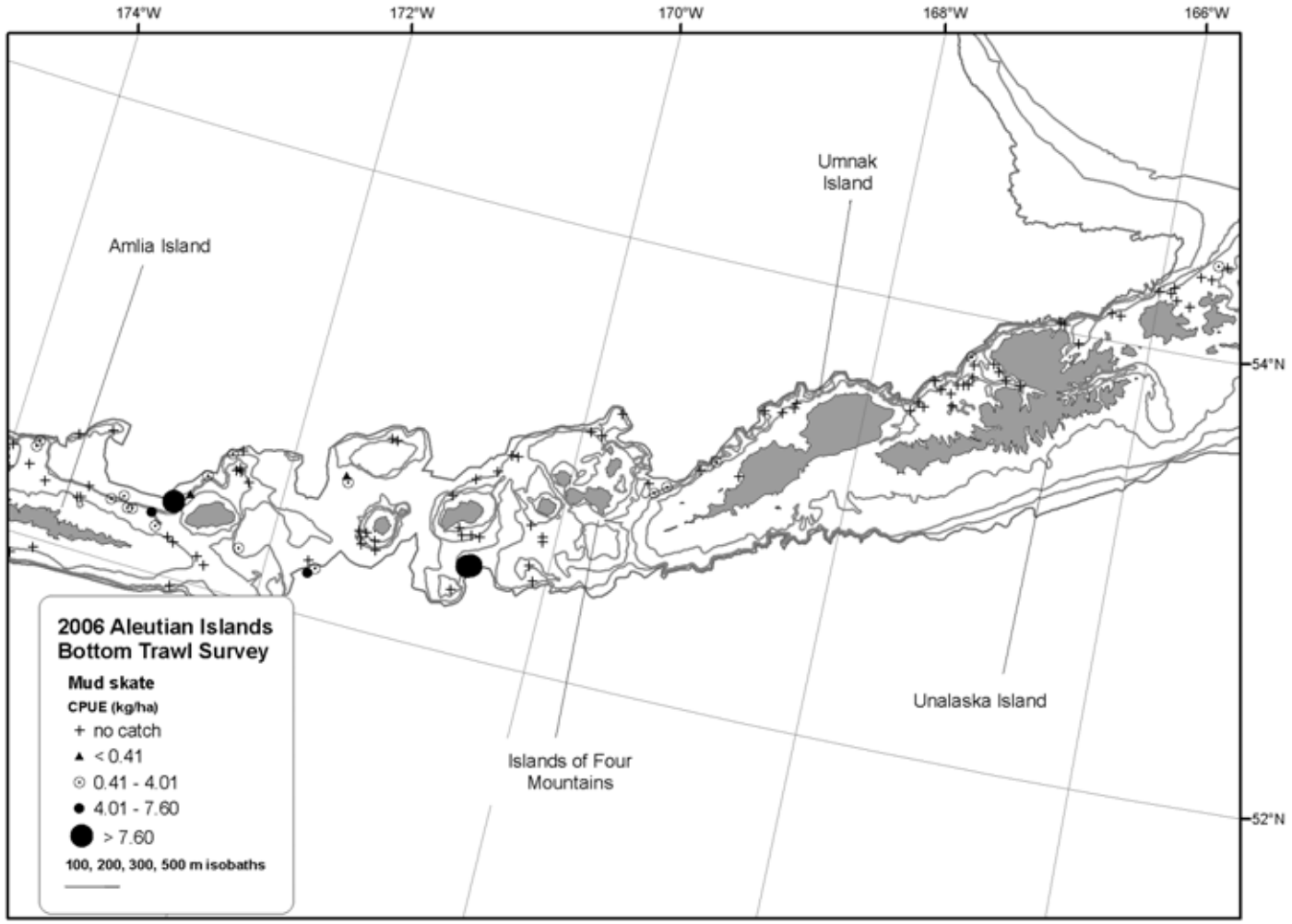


Figure 72. -- Distribution and relative abundance of mud skate from the 2006 Aleutian Islands bottom trawl survey.

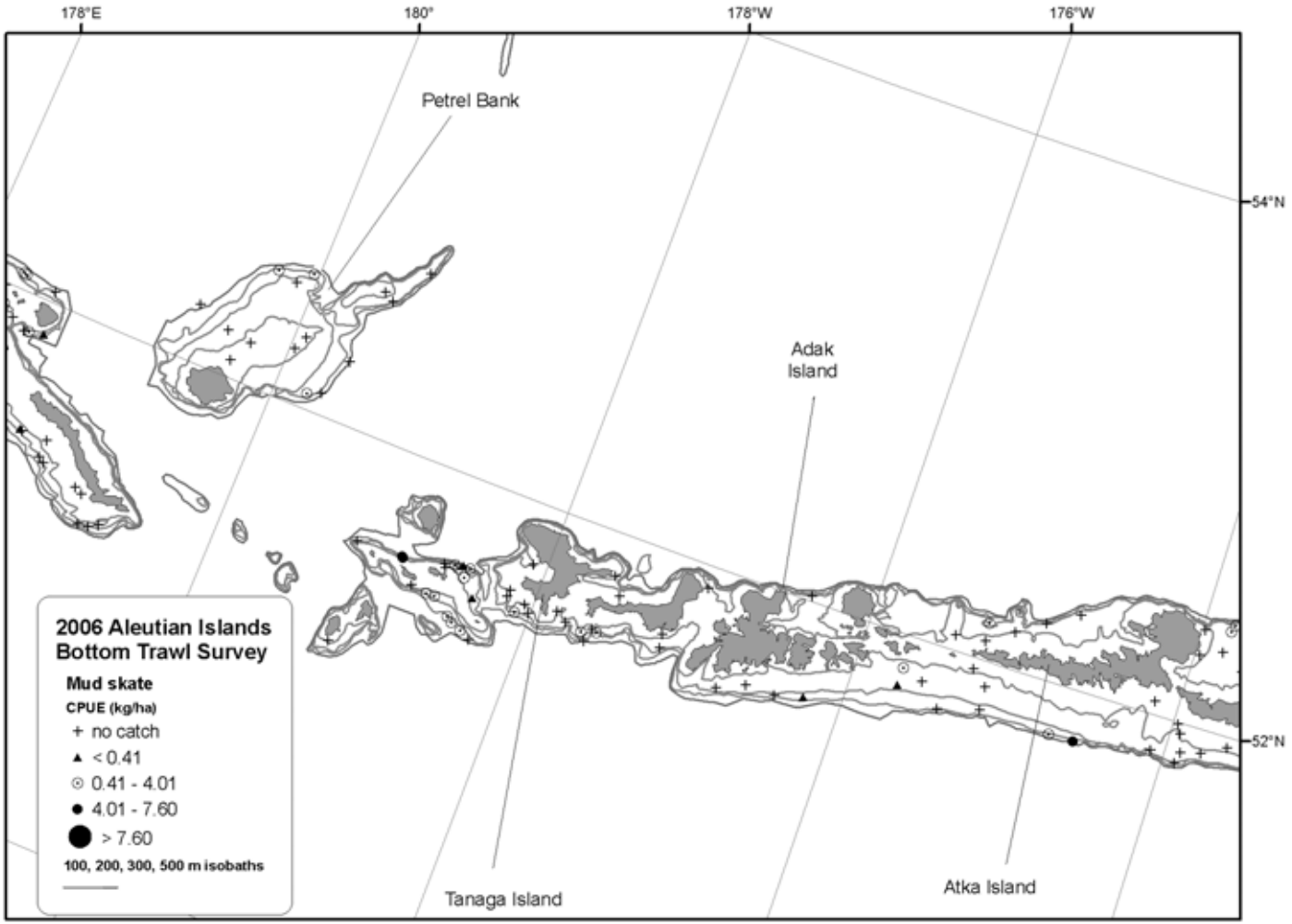


Figure 72. -- (continued).

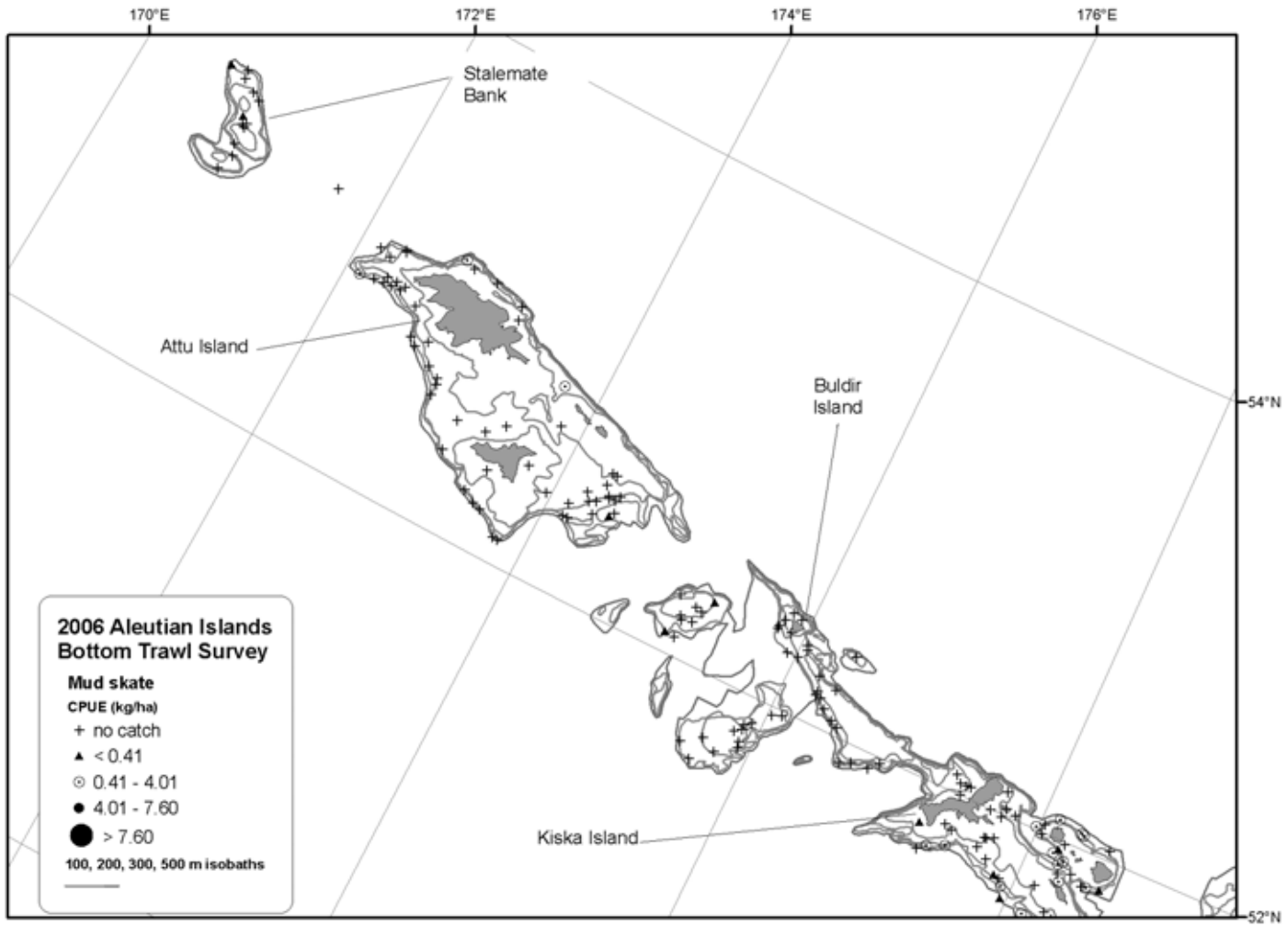


Figure 72. -- (continued).

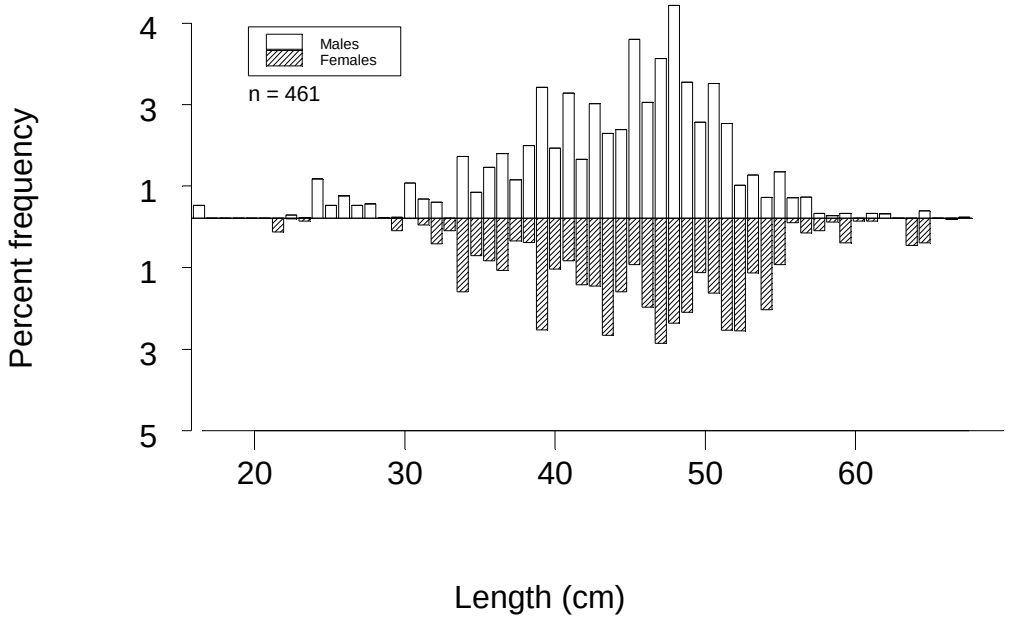


Figure 73. -- Size composition of mud skate from the 2006 Aleutian Islands bottom trawl survey.

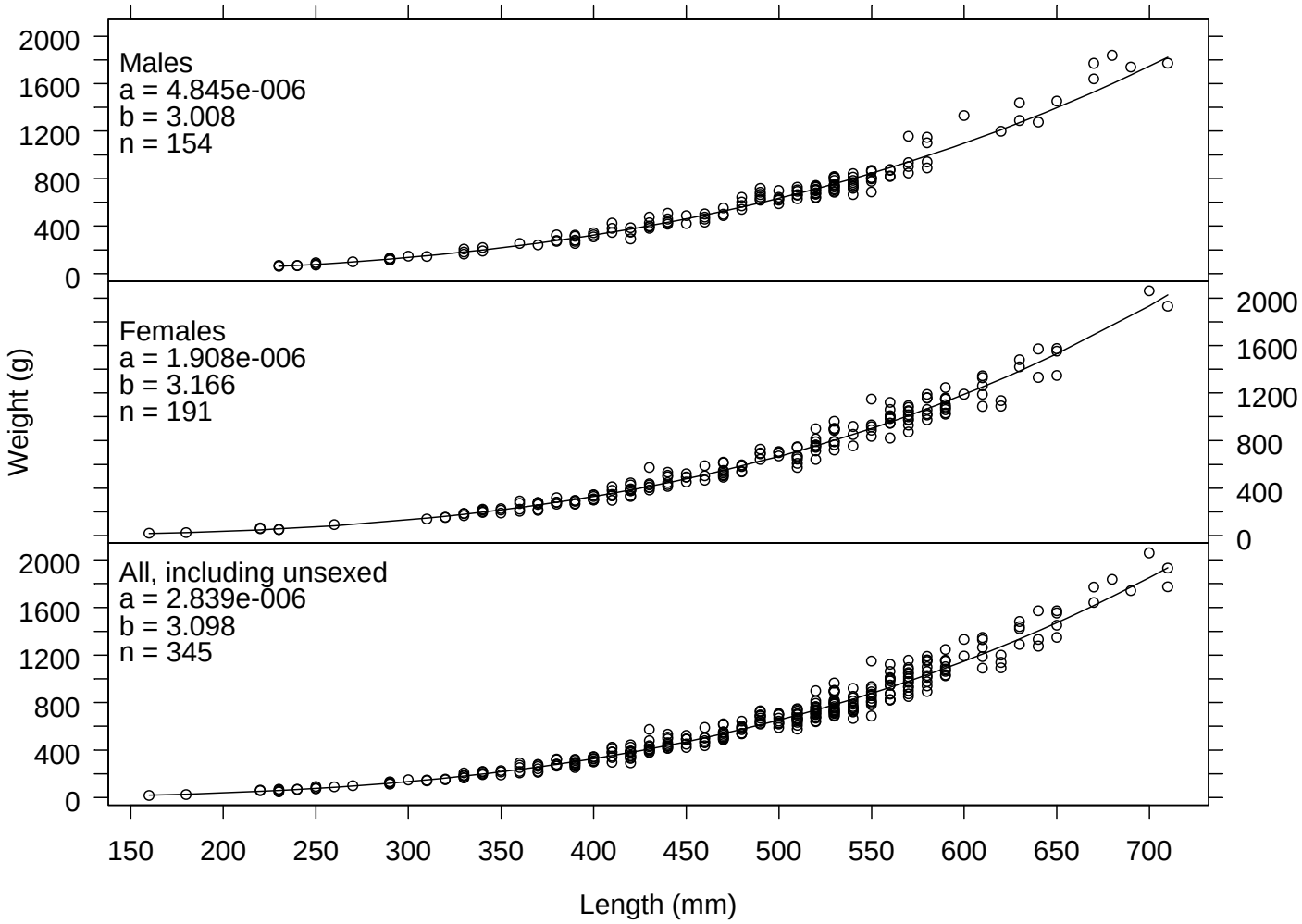


Figure 74. -- Length-weight relationship for mud skate specimens collected during the 2006 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated by $W = a \times L^b$.

Table 58. -- Number of survey hauls, number of hauls with miscellaneous skates, mean CPUE, biomass estimates with confidence intervals, mean weight, and mean length based on the 2006 Aleutian Islands bottom trawl survey by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Western Aleutians	1-100	22	0	0.000	0	--	--	--
	101-200	47	29	0.002	122	0	1,444	1.069
	201-300	23	0	0.000	0	--	--	--
	301-500	21	0	0.000	0	--	--	--
	All depths	113	29	0.001	122	0	1,423	1.069
Central Aleutians	1-100	32	0	0.000	0	--	--	--
	101-200	35	13	0.000	2	0	20	0.072
	201-300	21	0	0.000	0	--	--	--
	301-500	22	3	0.024	960	0	4,428	8.880
	All depths	110	16	0.006	962	0	4,258	8.858
Eastern Aleutians	1-100	12	0	0.000	0	--	--	--
	101-200	31	0	0.000	0	--	--	--
	201-300	27	0	0.000	0	--	--	--
	301-500	21	10	0.028	1,614	0	12,257	2.290
	All depths	91	10	0.006	1,614	0	11,750	2.290
All Aleutian Areas	1-100	78	19	0.01	2,485	0	21,528	8.698
	101-200	103	53	0.02	4,111	0	14,081	20.983
	201-300	71	4	0.00	112	0	561	2.060
	301-500	70	13	0.02	2,573	0	13,279	4.748
	All depths	322	89	0.02	9,281	0	33,019	12.964
Southern Bering Sea	1-100	21	19	0.062	2,485	0	22,434	8.698
	101-200	11	11	0.216	3,986	0	15,090	21.607
	201-300	4	4	0.020	112	0	828	2.060
	301-500	8	0	0.000	0	--	--	--
	All depths	44	34	0.088	6,583	0	28,336	16.401

CITATIONS

Alverson, D.L., and W.T. Pereyra. 1969. Demersal fish explorations in the northeastern Pacific Ocean – An evaluation of exploratory fishing methods and analytical approaches to stock size and yield forecasts. J. Fish. Res. Board Can. 26:1985-2001.

Britt, L.L., and M.H. Martin. 2001. Data report: 1999 Gulf of Alaska bottom trawl survey. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-121, 249 p.

Cochran, W.G. 1977. Sampling Techniques. 3rd ed. Wiley Series in Probability and Mathematical Statistics – Applied. John Wiley & Sons. NY. 428 p.

Hughes, S.E. 1976. System for sampling large trawl catches of research vessels. J. Fish. Res. Board Can. 33:833-839.

Kessler, D.W. 1985. Alaska's Saltwater Fishes and Other Sealife. Alaska Northwest Publishing Company. Anchorage, Alaska.

Martin, M.H. 1997. Data report: 1996 Gulf of Alaska bottom trawl survey. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-82, 235 p.

Martin , M.H., and D.M. Clausen. 1995. Data report: 1993 Gulf of Alaska bottom trawl survey. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-59, 217 p.

Mecklenburg, C.W., T.A. Mecklenburg, and L.K. Thorsteinson. 2002. Fishes of Alaska American Fisheries Society. Bethesda, Maryland. 1,116 pages.

Munro, P.T., and R.Z. Hoff. 1995. Two demersal trawl surveys in the Gulf of Alaska: Implications of survey design and methods. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-50, 139 p.

Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea, and W.B. Scott. 1991. Common and scientific names of fishes from the United States and Canada. Fifth ed. Am. Fish. Soc. Spec. Publ. No. 20. 183 p.

Ronholt, L.L., K. Wakabayashi, T.K. Wilderbuer, H. Yamaguchi, and K. Okada. 1986. Groundfish resource of the Aleutian Island waters based on the U.S.-Japan trawl survey, June – November 1980. Int. North Pac. Fish. Comm. Bull. 48.

Somerton, D.A., and P.T. Munro. 2001. Bridle efficiency of a survey trawl for flatfish. Fish. Bull. 99:641-652.

Somerton, D.A., and K.L. Weinberg. 2000. The effect of speed through the water on footrope contact of a survey trawl. Fish. Res. 1144:1-8.

Stark, J.W., and D.M. Clausen. 1995. Data report: 1990 Gulf of Alaska bottom trawl survey. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-49, 221 p.

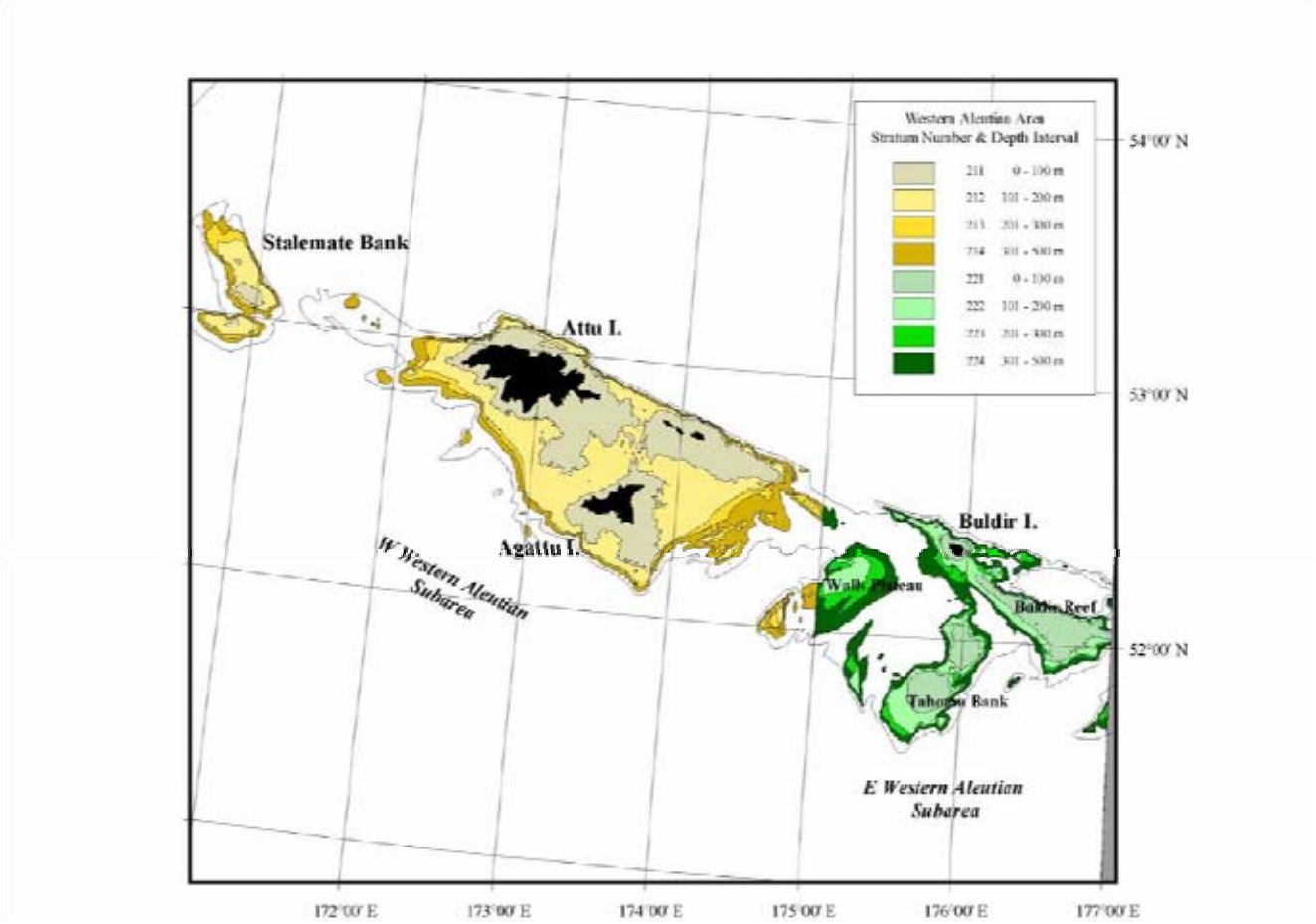
Stauffer, G. 2004. NOAA protocols for groundfish bottom trawl surveys of the nation's fishery resources. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-65, 205 p. Available online at http://spo.nmfs.noaa.gov/tm/tm65.pdf

Wakabayashi, K., R.G. Bakkala, and M.S. Alton. 1985. Methods of the U.S.-Japan demersal trawl surveys, 7-29. *In* R.G. Bakkala and K. Wakabayashi (editors), Results of cooperative U.S.-Japan groundfish investigations in the Bering Sea during May-August 1979. Int. North Pac. Fish. Comm. Bull. 44.

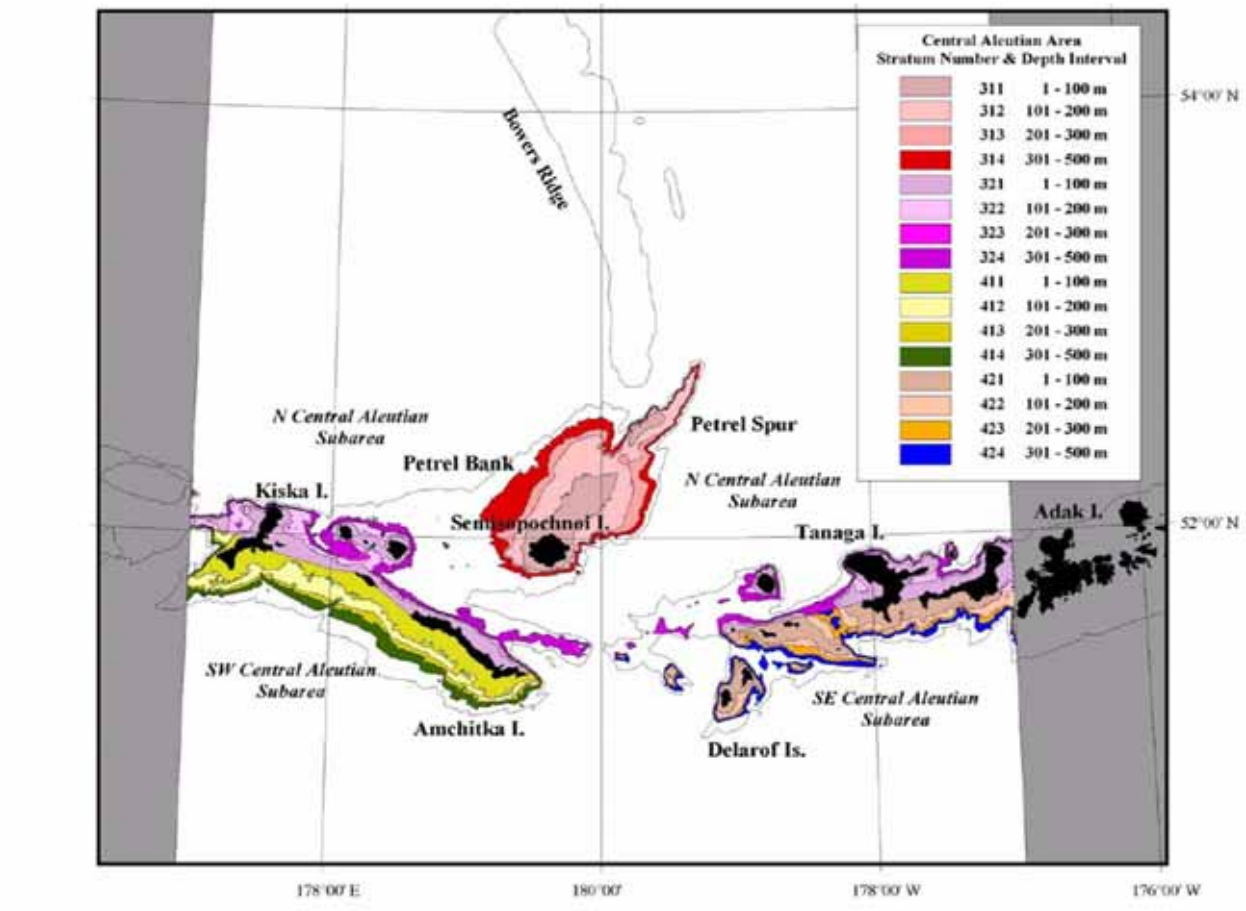
APPENDIX A

Appendix Table A-1. -- Survey sampling areas, subareas, stratum codes, depth ranges, and areas.

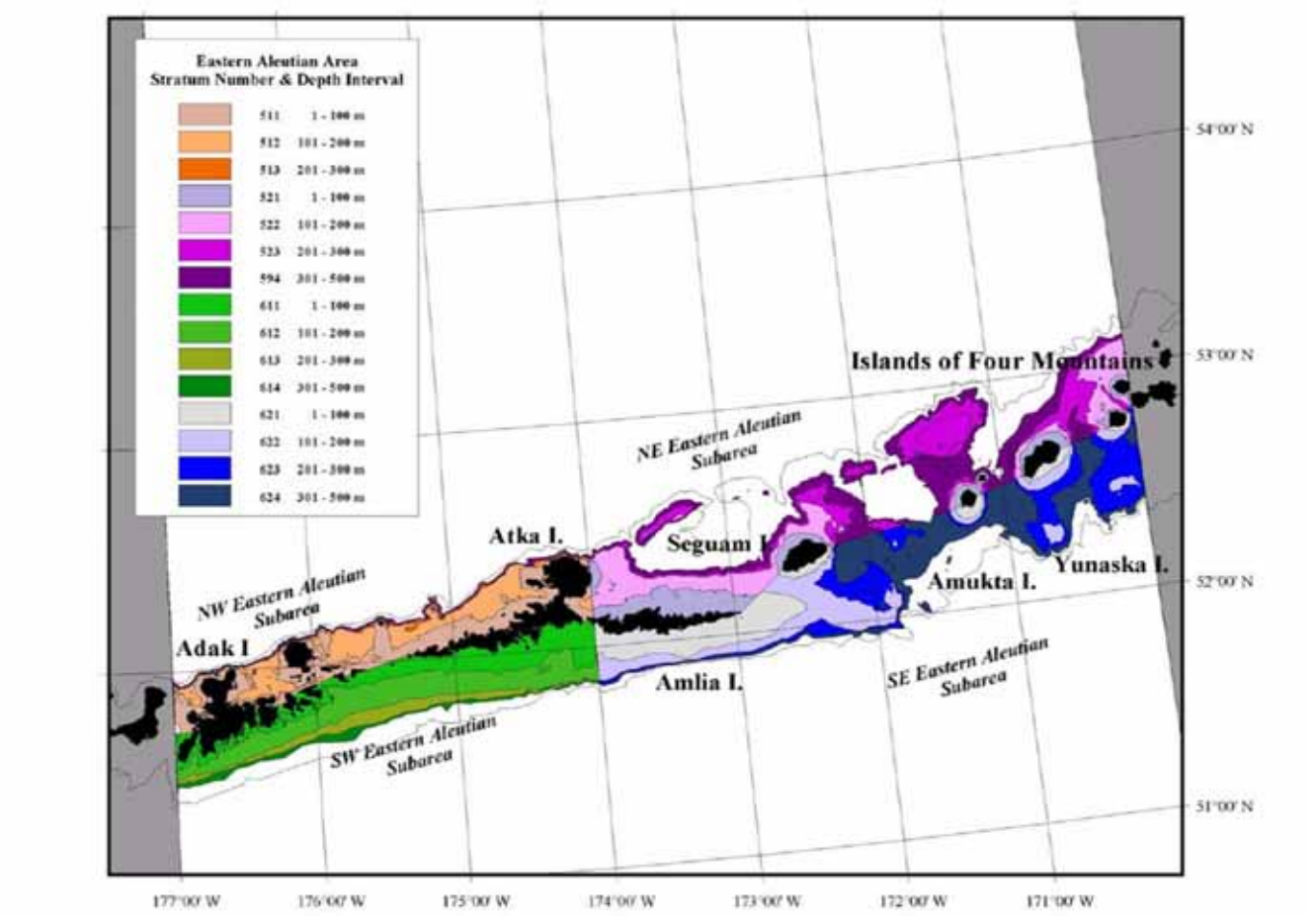
NPFMC Area	Subarea Description	Stratum Code	Depth Interval (m)	Area (km^2)
Western Aleutians	W Western Aleutians	211	1-100	3,693
	W Western Aleutians	212	101-200	4,065
	W Western Aleutians	213	201-300	940
	W Western Aleutians	214	301-500	1,711
	E Western Aleutians	221	1-100	1,183
	E Western Aleutians	222	101-200	1,252
	E Western Aleutians	223	201-300	783
	E Western Aleutians	224	301-500	1,561
Central Aleutians	Petrel Bank	311	1-100	960
	Petrel Bank	312	101-200	1,736
	Petrel Bank	313	201-300	766
	Petrel Bank	314	301-500	1,237
	N Central Aleutians	321	1-100	2,106
	N Central Aleutians	322	101-200	1,066
	N Central Aleutians	323	201-300	439
	N Central Aleutians	324	301-500	1,240
	SW Central Aleutians	411	1-100	1,618
	SW Central Aleutians	412	101-200	1,052
	SW Central Aleutians	413	201-300	426
	SW Central Aleutians	414	301-500	789
	SE Central Aleutians	421	1-100	1,164
	SE Central Aleutians	422	101-200	752
	SE Central Aleutians	423	201-300	477
	SE Central Aleutians	424	301-500	714
Eastern Aleutians	NW Eastern Aleutians	511	1-100	1,932
	NW Eastern Aleutians	512	101-200	1,594
	NW Eastern Aleutians	513	201-300	156
	NE Eastern Aleutians	521	1-100	1,268
	NE Eastern Aleutians	522	101-200	2,013
	NE Eastern Aleutians	523	201-300	1,969
	Combined Eastern Aleutian Islands	594	301-500	2,670
	SW Eastern Aleutians	611	1-100	1,907
	SW Eastern Aleutians	612	101-200	2,261
	SW Eastern Aleutians	613	201-300	716
	SW Eastern Aleutians	614	301-500	438
	SE Eastern Aleutians	621	1-100	1,741
	SE Eastern Aleutians	622	101-200	1,900
	SE Eastern Aleutians	623	201-300	2,061
	SE Eastern Aleutians	624	301-500	2,575
Southern Bering Sea	W Southern Bering Sea	711	1-100	1,586
	W Southern Bering Sea	712	101-200	670
	E Southern Bering Sea	721	1-100	2,440
	E Southern Bering Sea	722	101-200	1,179
	Combined Southern Bering Sea	793	201-300	564
	Combined Southern Bering Sea	794	301-500	1,043



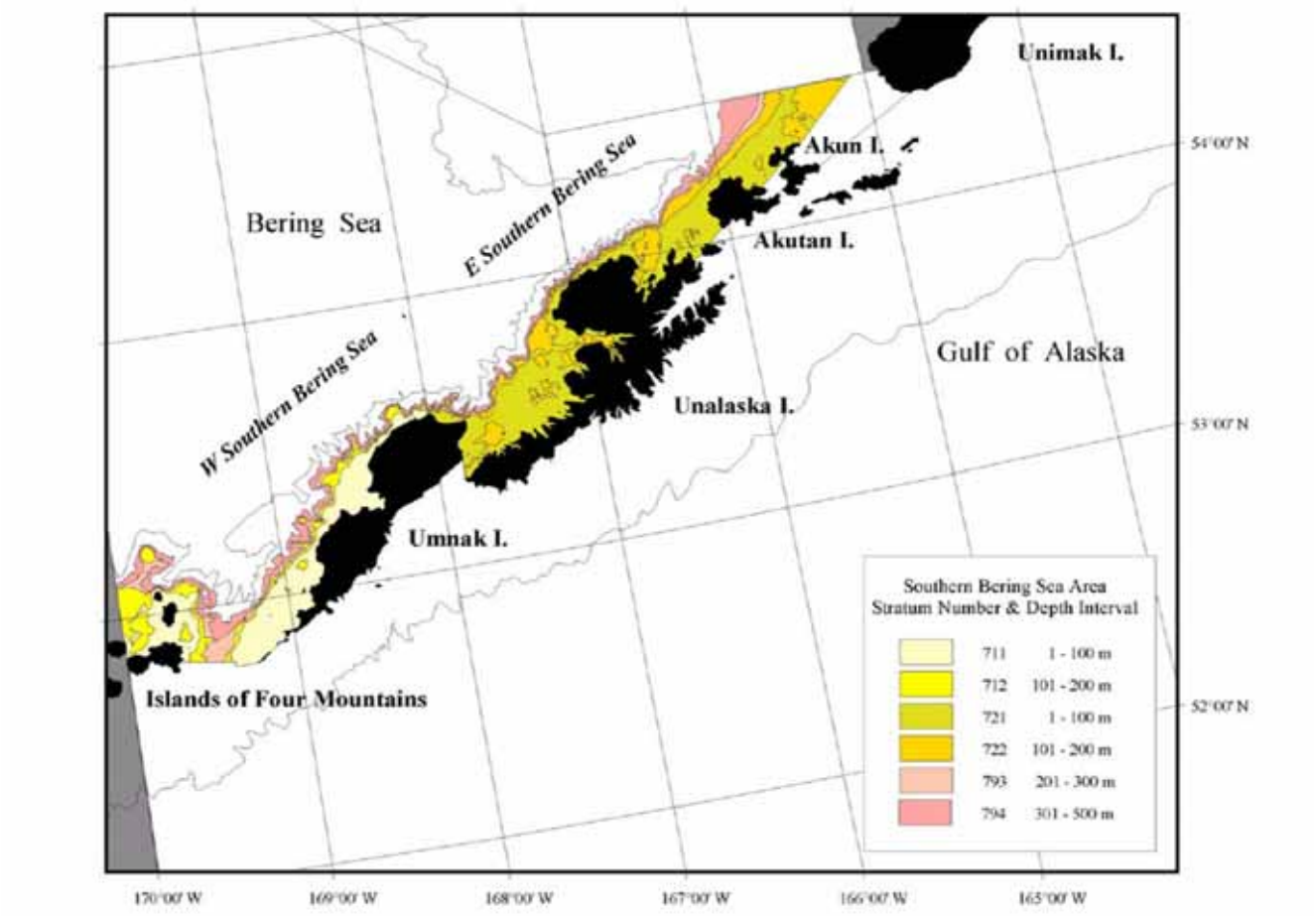
Appendix Figure A-1. -- Strata sampled during the Aleutian Islands groundfish trawl survey by NPFMC management area and sampling subarea.



Appendix Figure A-2. -- Strata sampled during the Aleutian Islands groundfish trawl survey by NPFMC management area and sampling subarea.



Appendix Figure A-3. -- Strata sampled during the Aleutian Islands groundfish trawl survey by NPFMC management area and sampling subarea.



Appendix Figure A-4. -- Strata sampled during the Aleutian Islands groundfish trawl survey by NPFMC management area and sampling subarea.

APPENDIX B

Appendix Table B-1. -- Fish species encountered and identified during the 2006 Aleutian Islands bottom trawl survey.

Family	Species name	Common name
Petromyzontidae	*Lampetra tridentata*	Pacific lamprey
Squalidae	*Squalus acanthias*	spiny dogfish
	Somniosus pacificus	Pacific sleeper shark
Rajidae	*Rajidae unident.*	skate unident.
	Bathyraja abyssicola	deepsea skate
	Raja binoculata	big skate
	Bathyraja interrupta	Bering skate
	Bathyraja taranetzi	mud skate
	Bathyraja parmifera	Alaska skate
	Bathyraja aleutica	Aleutian skate
	Bathyraja lindbergi	commander skate
	Bathyraja maculata	whiteblotched skate
	Bathyraja mariposa	butterfly skate
Pleuronectidae	*Atheresthes stomias*	arrowtooth flounder
	Atheresthes evermanni	Kamchatka flounder
	Reinhardtius hippoglossoides	Greenland turbot
	Hippoglossus stenolepis	Pacific halibut
	Hippoglossoides elassodon	flathead sole
	Parophrys vetulus	English sole
	Microstomus pacificus	Dover sole
	Glyptocephalus zachirus	rex sole
	Platichthys stellatus	starry flounder
	Lepidopsetta polyxystra	northern rock sole
	Lepidopsetta bilineata	southern rock sole
	Isopsetta isolepis	butter sole
Agonidae	*Leptagonus frenatus*	sawback poacher
	Odontopyxis trispinosa	pygmy poacher
	Bathyagonus nigripinnis	blackfin poacher
	Podothecus accipenserinus	sturgeon poacher
	Hypsagonus quadricornis	fourhorn poacher
Ammodytidae	*Ammodytes hexapterus*	Pacific sand lance
Anoplopomatidae	*Anoplopoma fimbria*	sablefish
Argentinidae	*Nansenia candida*	bluethroat argentine
Bathylagidae	*Bathylagus pacificus*	Pacific blacksmelt
	Leuroglossus schmidti	northern smoothtongue
Bathymasteridae	*Ronquilus jordani*	northern ronquil
	Bathymaster caeruleofasciatus	Alaskan ronquil
	Bathymaster signatus	searcher
Chauliodontidae	Chauliodontidae	viperfish unident.
	Chauliodus macouni	Pacific viperfish
Macrouridae	*Albatrossia pectoralis*	giant grenadier

Appendix Table B-1. -- (continued).

Family	Species name	Common name
Cottidae	*Icelinus* sp.	
	Thyriscus anoplus	sponge sculpin
	Gymnocanthus galeatus	armorhead sculpin
	Bolinia euryptera	broadfin sculpin
	Malacocottus zonurus	darkfin sculpin
	Hemilepidotus zapus	longfin Irish lord
	Hemilepidotus hemilepidotus	red Irish lord
	Hemilepidotus jordani	yellow Irish lord
	Triglops forficata	scissortail sculpin
	Triglops scepticus	spectacled sculpin
	Triglops pingeli	ribbed sculpin
	Triglops macellus	roughspine sculpin
	Archistes biseriatus	scaled sculpin
	Myoxocephalus polyacanthocephalus	great sculpin
	Myoxocephalus quadricornis	fourhorn sculpin
	Enophrys lucasi	leister sculpin
	Enophrys diceraus	antlered sculpin
	Dasycottus setiger	spinyhead sculpin
	Psychrolutes phrictus	blob sculpin
	Nautichthys oculofasciatus	sailfin sculpin
	Hemitripterus bolini	bigmouth sculpin
	Hemitripterus bolini eggs	bigmouth sculpin eggs
	Icelus spiniger	thorny sculpin
	Icelus euryops	wide-eye sculpin
	Icelus uncinalis	uncinate sculpin
	Rastrinus scutiger	roughskin sculpin
	Icelus sp.	
Gadidae	*Gadus macrocephalus*	Pacific cod
	Theragra chalcogramma	walleye pollock
	Sigmops gracilis	slender fangjaw
Gonostomatidae	*Cyclothone atraria*	black bristlemouth
	Cyclothone acclinidens	benttooth bristlemouth
Hexagrammidae	*Pleurogrammus monopterygius*	Atka mackerel
	Hexagrammos lagocephalus	rock greenling
	Hexagrammos decagrammus	kelp greenling
Cyclopteridae	*Aptocyclus ventricosus*	smooth lumpsucker
	Lethotremus muticus	docked snailfish
	Eumicrotremus birulai	round lumpsucker
	Eumicrotremus orbis	Pacific spiny lumpsucker
	Eumicrotremus sp.	spiny lumpsuckers
	Eumicrotremus barbatus	papillose lumpsucker
	Cyclopteropsis phrynoides	toad lumpsucker
	Liparidinae	snailfish unident.
	Liparis sp.	
	Crystallichthys cyclospilus	blotched snailfish
	Liparis ochotensis	Okhotsk snailfish

Appendix Table B-1. -- (continued).

Family	Species name	Common name
Cyclopteridae (cont.)	*Allocareproctus jordani*	cherry snailfish
	Careproctus sp.	
	Careproctus melanurus	blacktail snailfish
	Careproctus simis	long snouted pink snailfish
	Careproctus ectenes	shovelhead snailfish
	Careproctus furcellus	emarginate snailfish
	Careproctus gilberti	smalldisk snailfish
	Careproctus colletti	Alaska snailfish
	Careproctus rastrinus	salmon snailfish
	Careproctus zachirus	paintbrush snailfish
	Paraliparis dactylosus	red snailfish
	Careproctus sp. H (Orr and Maslenikov)	comic snailfish
	Paraliparis sp.	
	Liparis cus nanus	pygmy snailfish
	Nectoliparis pelagicus	tadpole snailfish
	Careproctus sp. B (Orr)	
	Allocareproctus sp.	
	Allocareproctus kallaion	combed snailfish
	Allocareproctus unangas	goldeneye snailfish
Melamphaeidae	*Poromitra crassiceps*	crested bigscale
Myctophidae	*Melamphaes lugubris*	highsnout bigscale
	Merluccius productus	Pacific hake
	Stenobrachius sp.	
	Stenobrachius leucopsarus	northern lampfish
	Stenobrachius nannochir	garnet lampfish
	Diaphus theta	California headlightfish
	Lampanyctus sp.	
	Nannobrachium regale	pinpoint lampfish
	Lampanyctus jordani	brokenline lampfish
	Protomyctophum sp.	
	Protomyctophum thompsoni	northern flashlightfish
Osmeridae	*Thaleichthys pacificus*	eulachon
	Mallotus villosus	capelin
Salmonidae	*Oncorhynchus keta*	chum salmon
Scopelarchidae	*Benthalbella dentata*	northern pearleye
Notosudidae	*Scopelosaurus harryi*	scaly paperbone
Alepisauridae	*Alepisaurus ferox*	longnose lancetfish
Stichaeidae	*Lumpenella longirostris*	longsnout prickleback
	Chirolophis sp.	
	Chirolophis decoratus	decorated warbonnet
	Bryozoichthys lysimus	nutcracker prickleback
	Bryozoichthys marjorius	pearly prickleback
Zaproridae	*Zaprora silenus*	prowfish
Zoarcidae	Zoarcidae	eelpout unident.
	Bothrocara brunneum	twoline eelpout
	Bothrocara pusillum	Alaska eelpout

Appendix Table B-1. -- (continued).

Family	Species name	Common name
Zoarcidae (cont.)	*Lycenchelys camchatica*	Kamchatka eelpout
	Lycodapus fierasfer	blackmouth eelpout
	Lycodes sp.	
	Lycodes akuugun	bicolor eelpout
	Lycodes palearis	wattled eelpout
	Lycodes concolor	ebony eelpout
	Lycodes diapterus	black eelpout
	Lycodes brevipes	shortfin eelpout
	Lycodapus sp.	
	Puzanovia rubra	coral eelpout
Scorpaenidae	*Sebastolobus alascanus*	shortspine thornyhead
	Sebastolobus macrochir	broadfin thornyhead
	Sebastes sp.	rockfish unident.
	Sebastes aleutianus	rougheye rockfish
	Sebastes melanostictus	black-spotted rockfish
	Sebastes alutus	Pacific ocean perch
	Sebastes ciliatus	dark rockfish
	Sebastes variabilis	dusky rockfish
	Sebastes polyspinis	northern rockfish
	Sebastes babcocki	redbanded rockfish
	Sebastes variegatus	harlequin rockfish
	Sebastes borealis	shortraker rockfish

Appendix Table B-2. -- Invertebrate species encountered and identified during the 2006 Aleutian Islands bottom trawl survey.

Phylum	Species name	Common name
Cnidaria	Hydrozoa (class)	unidentified hydroid
	Hydroid sp. A	champagne flute hydroid
	Aglaophenia sp.	
	Abietinaria sp.	
	Abietinaria greenei	bushy white hydroid
	Abietinaria sp. A (Clark 2006)	white tangled hydroid
	Sertulariidae unid.	Sertulariid hydroid
	Scyphozoa (class)	jellyfish unidentified
	Chrysaora sp.	chrysaora jellyfish
	Periphylla periphylla	
	Chrysaora melanaster	
	Phacellophora camtschatica	egg yolk jelly
	Aequorea sp.	
	Atolla sp.	
	Aurelia sp.	
	Aurelia labiata	
	Cyanea capillata	lion's mane
	Anthozoa	
	Alcyonacea	soft coral unidentified
	Alyconaria unident.	octocoral unidentified
	Alcyonium sp.	
	Alcyonium sp. A (Clark 2006)	pink orange mushroom coral
	Alcyonium sp. B (Clark 2006)	
	Gersemia sp.	sea raspberry
	Anthomastus sp.	
	Anthomastus sp. A	red anthomastus
	Anthomastus sp. B	gray anthomastus
	Gorgonacea (order)	gorgonian coral unidentified
	Primnoa sp.	
	Primnoa pacifica	
	Primnoa willeyi	red tree coral
	Chrysopathes speciosa	
	Paragorgia sp.	
	Paragorgia arborea	Kamchatka coral
	Paragorgia pacifica	
	Alaskagorgia aleutiana	
	Cryogorgia koolsae	
	Calcigorgia spiculifera	
	Clavularia sp.	
	Clavularia sp. *cf. evagorgiacrustans* (Bayer et al.)	
	Clavularia incrustans	encrusting coral
	Virgularia sp.	smoothstem seawhip
	Virgularidae	sea whip unidentified

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Cnidaria (cont.)	*Halipteris willemoesi*	
	Ptilosarcus gurneyi	orange sea pen
	Actiniaria	sea anemone unidentified
	Actinauge verrillii	reticulate anemone
	Paractinostola faeculenta	rough purple sea anemone
	Actinoscyphia sp.	
	Metridium sp.	
	Metridium senile	clonal plumose anemone
	Metridium farcimen (=Metridium giganteum)	gigantic anemone
	Stomphia didemon	cowardly anemone
	Stomphia sp.	
	Stomphia coccinea	swimming anemone
	Urticina crassicornis	mottled anemone
	Bathyphelia australis	hot dog sea anemone
	Cribrinopsis fernaldi	chevron-tentacled anemone
	Liponema brevicornis	tentacle-shedding anemone
	Actinostola sp.	
	Actinistola sp. A (Clark 2006)	
	Scleractinia unident.	stony coral unidentified
	Javania borealis	
	Caryophyllia sp.	
	Caryophyllia alaskensis	Alaska cup coral
	Stylasterina unident.	hydrocoral unidentified
	Stylaster sp.	
	Stylaster brochi	
	Crypthelia trophostega	
	Stylaster campylecus	
	Stylaster moseleyana	
	Cyclohelia lamellata	
	Cyclohelia sp.	
	Stylaster sp. A (Clark 2006)	undulate hydrocoral
	Distichopora sp.	
	Thouarella sp. 2 (Bayer et al.)	
	Thouarella superba	
	Errinopora sp.	
	Plumarella sp.	
	Isidella sp.	articulated bamboo coral
	Plumarella sp. 1 (Bayer)	
	Thouarella sp.	
	Fanellia sp.	
	Fanellia compressa	
	Fanellia fraseri	
	Muriceides nigra	
	Muriceides sp.	
	Amphilaphis sp.	
	Amphilaphis sp. 1	

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Cnidaria (cont.)	*Amphilaphis* sp. 2	
	Amphilaphis sp. 3	
	Arthrogorgia sp.	
	Arthrogorgia utinomi	
	Muriceides sp. *cf. cylindrica* (Bayer et al.)	
	Plumarella sp. 2 (Clark 2006)	
	Primnoa wingi	
Ctenophora	various unidentified species	
	Beroe sp.	
Annelida	Polychaeta (class)	polychaete worm unidentified
	Chaetopterus sp.	
	Aphrodita sp.	
	Aphrodita negligens	
	Onuphis conchylega	gravel tube worm
	Polynoidae	scale worm unidentified
	Eunoe sp.	
	Eunoe nodosa	giant scale worm
	Gattyana cilata	
	Serpula sp.	
	Pectinaria granulata	
	Hirudinea unident.	leech unidentified
	Carcinobdella sp.	
	Notostombdella (=Carcinobdella) cyclostomum	striped sea leech
	Notostombdella sp.	
Arthropoda	Amphipoda	amphipod unidentified
	Gammaridae	gammarid amphipod unidentified
	Isopoda	isopod unidentified
	Arcturus sp. 1 (Clark 2006)	
	Arcturus sp.	
	Rocinella angusta	
	Mysidacea	mysid unidentified
	Gnathophausia gigas	
	Cirripedia	
	Balanus sp.	
	Balanus evermanni	giant barnacle
	Balanus rostratus	beaked barnacle
	Pandalidae	pandalid shrimp unidentified
	Pandalus jordani	ocean shrimp
	Pandalus borealis	northern shrimp
	Pandalus tridens	yellowleg pandalid
	Pandalus hypsinotus	coonstripe shrimp
	Pandalus stenolepis	roughpatch shrimp
	Pandalopsis sp.	
	Pandalopsis aleutica	
	Pandalopsis longirostris	
	Pandalopsis dispar	sidestripe shrimp

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Arthropoda (cont.)	*Pandalopsis ampla*	
	Hippolytidae	hippolytid shrimp unidentified
	Spirontocaris arcuata	Rathbun blade shrimp
	Eualus sp.	
	Eualus biunguis	deepsea eualid
	Eualus suckleyi	shortscale eualid
	Lebbeus sp.	
	Lebbeus grandimana	candy stripe shrimp
	Lebbeus groenlandicus	spiny lebbeid
	Crangonidae	crangonid shrimp unidentified
	Crangon communis	twospine crangon
	Argis sp.	
	Argis dentata	Arctic argid
	Sclerocrangon boreas	sculptured shrimp
	Argis levior	Nelson's argid
	Argis ovifer	split-eye argid
	Pasiphaea pacifica	Pacific glass shrimp
	Pasiphaea tarda	crimson pasiphaeid
	Cancer oregonensis	Oregon rock crab
	Oregonia bifurca	
	Oregonia gracilis	graceful decorator crab
	Chorilia longipes	Longhorned decorator crab
	Chionoecetes tanneri	grooved Tanner crab
	Chionoecetes bairdi	Tanner crab
	Hyas lyratus	Pacific lyre crab
	Pagurus sp.	
	Pagurus brandti	sponge hermit
	Pagurus aleuticus	Aleutian hermit
	Labidochirus splendescens	splendid hermit
	Pagurus confragosus	knobbyhand hermit
	Pagurus cornutus	
	Pagurus kennerlyi	bluespine hermit
	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
	Lithodidae unident.	stone crab unidentified
	Lopholithodes foraminatus	box crab
	Acantholithodes hispidus	fuzzy crab
	Lithodes couesi	scarlet king crab
	Lithodes aequispina	golden king crab
	Hapalogaster grebnitzkii	
	Rhinolithodes wosnessenskii	rhinoceros crab
	Paralithodes camtschaticus	red king crab

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Arthropoda (cont.)	*Placetron wosnessenskii*	scaled crab
	Erimacrus isenbeckii	horsehair crab
	Pycnogonida	sea spider unidentified
	Colossendeis sp.	
Mollusca	Polyplacophora unident.	chiton unidentified
	Lepidozona beringiana	
	Amicula vestita	
	Placiphorella pacifica	
	Placiphorella rufa	
	Nudibranchia unident.	nudibranch unidentified
	Tochuina tetraquetra	giant orange tochui
	Dendronotus sp.	
	Tritonia sp.	
	Tritenia festiva	
	Anisodoris lentiginosa	mottled pale sea-lemon
	Archidoris odhneri	white night doris
	Cranopsis major	great puncturella
	Gastropod unident.	snail unidentified
	Naticidae	
	Cryptonatica affinis	Arctic moonsnail
	Cryptonatica (=Natica) aleutica	Aleutian moonsnail
	Lamellaria sp.	
	Crepidula sp.	slipper shell
	Crepidula grandis	great slippersnail
	Colus sp.	
	Colus periscelidus	garter whelk
	Japelion aleutica	
	Japelion sp. A	
	Pyrulofusus dexius	
	Volutopsius sp.	
	Pyrulofusus deformis	warped whelk
	Pyrulofusus harpa	left-hand whelk
	Pyrulofusus melonis	
	Volutopsius sp. A (McLean & Clark)	
	Beringius sp.	
	Beringius beringii	
	Beringius undatus	
	Beringius sp. B	
	Beringius sp. D (McLean & Clark)	
	Neptunea sp.	
	Neptunea pribiloffensis	Pribilof whelk
	Neptunea sp. A (McLean & Clark)	
	Neptunea sp. C (McLean & Clark)	
	Plicifusus sp.	
	Aforia circinata	keeled aforia
	Boreoscala groenlandica	Greenland wentletrap

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Mollusca (cont.)	*Fusitriton oregonensis*	Oregon triton
	Fusitriton sp.	
	Margarites sp.	
	Buccinum sp.	
	Buccinum sigmatopleura	
	Buccinum simulatum	
	Buccinum aleuticum	Aleut whelk
	Buccinum castaneum	chestnut whelk
	Bathybuccinum sp.	
	Buccinum sp. C	
	Buccinum triplostephamum	
	Buccinum sp. E	
	Buccinum sp. F	
	Arctomelon stearnsii	Alaska volute
	Arctomelon tamikoae	
	Velutina sp.	
	Bivalvia unident.	bivalve unidentified
	Modiolus modiolus	northern horsemussel
	Mytilus sp.	
	Chlamys sp.	
	Patinopecten caurinus	weathervane scallop
	Delectopecten vancouverensis	Vancouver scallop
	Cyclopecten sp.	
	Hiatella arctica	Arctic hiatella
	Panomya sp.	
	Yoldia sp.	
	Limopsis akutanica	Akutan limops
	Empleconia vaginata	vaginated limops
	Vilasina seminuda	
	Musculus discors	discordant mussel
	Astarte sp.	
	Clinocardium sp.	
	Clinocardium blandum	strait cockle
	Serripes sp.	
	Serripes groenlandicus	Greenland cockle
	Servipes notabilis	oblique smoothcockle
	Mya arenaria	softshell
	Pododesmus macroschisma	Alaska falsejingle
	Pododesmus sp.	
	Octopodidae	octopus unidentified
	Benthoctopus leioderma	smoothskin octopus
	Octopus sp.	
	Opisthoteuthis californiana	flapjack devilfish
	Octopus dofleini	giant octopus
	Vampyroteuthis infernalis	vampire squid
	Teuthoidea	squid unidentified

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Mollusca (cont.)	*Rossia pacifica*	eastern Pacific bobtail
	Loligo opalescens	California market squid
	Berryteuthis magister	magistrate armhook squid
	Gonatopsis sp.	
	Gonatopsis borealis	boreopacific armhook squid
	Onychoteuthis borealijaponicus	boreal clubhook squid
	Chiroteuthis calyx	
Echinodermata	Asteroidea unident.	starfish unidentified
	Evasterias echinosoma	giant sea star
	Orthasterias koehleri	redbanded sea star
	Leptasterias hylodes	Aleutian sea star
	Leptasterias trunculenta	
	Pycnopodia helianthoides	sunflower sea star
	Lethasterias nanimensis	blackspined sea star
	Pedicellaster magister	majestic sea star
	Stephanasterias albula	
	Henricia sp. A	
	Henricia sp. B	
	Henricia sp.	
	Henricia aspera	ridged blood star
	Henricia aleutica	
	Henricia multispina	
	Odontohenricia fisheri	
	Odontohenricia sp.	
	Odontohenricia sp. A (Clark)	
	Odontohenricia sp. B (Clark)	
	Odontohenricia sp. C (Clark)	
	Henricia sp. D (Clark 2006)	fuzzy henricia
	Leptasterias polaris	
	Leptasterias sp.	
	Gephyreaster swifti	Swift's sea star
	Pseudarchaster sp.	
	Pseudarchaster alascensis	
	Hippasteria sp.	
	Hippasteria kurilensis	
	Hippasteria armata	
	Hippasteria sp. A (Clark, 1999)	
	Hippasteria heathi	
	Hippasteria spinosa	spiny red sea star
	Pseudarchaster parelii	scarlet sea star
	Mediaster aequalis	vermilion sea star
	Ceramaster sp.	
	Ceramaster japonicus	red bat star
	Ceramaster patagonicus	orange bat sea star
	Ceramaster stellatus	
	Luidia sp.	

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Echinodermata (cont.)	*Luidia foliolata*	sand sea star
	Solaster sp.	
	Solaster hypothrissus	
	Solaster sp. B	
	Solaster stimpsoni	striped sun sea star
	Solaster sp. A (Clark 1997)	
	Solaster sp. C	
	Crossaster sp.	
	Crossaster borealis	grooved sea star
	Crossaster sp. A (Clark)	
	Crossaster sp. B (Clark)	
	Crossaster papposus	rose sea star
	Lophaster sp.	
	Lophaster vexator	
	Lophaster furcilliger	crested sea star
	Pteraster sp.	
	Pteraster temnochiton	cushion sea star
	Pteraster sp. A (Clark, 1999)	
	Pteraster tesselatus	
	Pteraster jordani	
	Pteraster sp. C (Clark)	
	Pteraster militaris	wrinkled star
	Pteraster marssipus	
	Pteraster pulvillus	
	Diplopteraster multipes	pincushion sea star
	Asterias amurensis	purple-orange sea star
	Ctenodiscus crispatus	common mud star
	Leptychaster sp.	
	Leptychaster arcticus	North Pacific sea star
	Cladaster validus	
	Dipsacaster borealis	northern sea star
	Cheiraster sp.	
	Cheiraster (=Luidiaster) dawsoni	fragile sea star
	Echinacea unident.	sea urchin unidentified
	Strongylocentrotus droebachiensis	green sea urchin
	Strongylocentrotus sp.	
	Strongylocentrotus polyacanthus	
	Echinarachnius parma	parma sand dollar
	Florometra sp.	
	Ophiuroid unident.	brittlestarfish unidentified
	Gorgonocephalus eucnemis	basketstar
	Astrochele laevis	
	Ophiura sarsi	notched brittlestar
	Amphiophiura nodosa	
	Stegophiura ponderosa	
	Ophiacantha cataleimmoida	

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Echinodermata (cont.)	*Ophiopholis* sp.	
	Ophiopholis longispina	
	Ophiopholis aculeata	ubiquitous brittle star
	Holothuroidea unident.	sea cucumber unidentified
	Pseudostichopus mollis	sandy sea cucumber
	Pentamera sp.	
	Bathyplotes sp.	
	Cucumaria sp.	
	Cucumaria fallax	sea football
	Cucumaria frondosa	
	Stichopus japonicus	
	Psolus sp.	
	Psolus phantapus	
	Psolus sp. A (Clark 2006)	
	Psolus squamatus	whitescaled sea cucumber
	Psolus japonicus	
	Thylonidium sp.	
	Pannychia moseleyi	
	Synallactes sp. A (Clark 2006)	
	Synallactes challengeri	
Porifera	Porifera (phylum)	sponge unidentified
	Suberites sp.	
	Suberites ficus	hermit sponge
	Suberites montinger	peach sponge
	Aphrocallistes vastus	clay pipe sponge
	Heterochone tenerum	crusty tube sponge
	Phakellia sp.	
	Mycale sp.	
	Mycale loveni	tree sponge
	Mycale adhaerens	smooth scallop sponge
	Geodiidae	
	Geodia mesotriaena	
	Geodia sp.	
	Halichondria sp.	
	Halichondria panicea	barrel sponge
	Rhabdocalyptus sp.	cloud sponge
	Phakellia dalli	cat-o-nine-tails sponge
	Myxilla brunnea	soft brown sponge
	Phakellia beringensis	hat sponge
	Plicatellopsis amphispicula	firm finger sponge
	Histodermella sp. A (Clark 2006)	spud sponge
	Leucosolenia blanca	yellow leafy sponge
	Tethya sp.	ball sponge
	Leucandra sp. A	hairy vase sponge
	Polymastia sp.	
	Halichondria sitiens	black papilliate sponge

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Porifera (cont.)	*Halichondria cf. sitiens*	yellow green papillate sponge
		yellow papillate sponge
	Polymastia sp. B (Clark 2006)	orange nipple ball sponge
	Neoesperiopsis rigida	soft finger sponge
	Neoesperiopsis infundibula	
	orange papilliate sponge	
	Neoesperiopsis digitata	
	Inflatella sp. 1 (Clark 2006)	orange papillate sponge
	Polymastia fluegeli	Flugel's nippled spong
	Polymastia robusta	long nippled sponge
	Polymastia sp. A (Clark 2006)	prolific nipple sponge
	Oscarella lobularis	stalked ball sponge
	Stylocordyla eous	slender stalked sponge
	Stylocordyla sp.	
	Plakina tanaga	white convoluted sponge
	Latrunculia sp. A (Clark 2006)	green papillate sponge
	Axinella sp.	firm gray sponge
	Chrondrocladia gigantia	carnivorous cattail sponge
	Asbestopluma sp. A (Clark 2006)	fuzzy sponge
	Melonchela clathrata	lattice sponge
	Isodictya palmata	prickly pear sponge
	Staurocalyptus sp.	
	Aulosaccus schulzei	vase sponge
	Farrea beringiana	Bering lace sponge
	Regadrella okinoseana	lacy basket sponge
	Molgula grifithsii	sea grape
	Molgula retortiformis	sea clod
	Craniella cranium	baseball sponge
	Craniella spinosa	furry ball sponge
	Tetilla sp. A (Clark 2006)	spiky ball sponge
	Tetilla sigmoanchoratum	spiny ball sponge
	Tetilla sp.	
	Craniella sp.	puffball sponges
Rhychocoela	*Emplectonema* sp.	
	cf. Emplectonema sp.	black specked ribbon worm
	Tubulanus sp. A (Clark 2006)	
Sipuncula	Sipuncula (phylum)	peanut worm unid.
Bryozoa	Bryozoa (phylum)	bryozoan unidentified
	Phidolopora pacifica	lacy bryozoan
	Bugula californica	
	Eucratea loricata	feathery bryozoan
	Alcyonidium pedunculatum	
	Porella compressa	flattened bryozoan
	Rhamphostomella costata	ribbed bryozoan
	Cellepora ventricosa	coral bryozoan
	Microporina borealis	

Appendix Table B-2. -- (continued).

Phylum	Species name	Common name
Bryozoa (cont.)	*Dendrobeania* sp.	
Chordata	Ascidian unident.	tunicate unidentified
	Thaliacea unident.	salp unidentified
	Styela sp.	
	Styela rustica	sea potato
	Styela sp. B (Clark 2006)	
	Halocynthia sp.	sea peach unidentified
	Halocynthia aurantium	sea peach
	Amaroucium soldatovi	
	Aplidium sp.	sea glob
	Ascidia paratropa	glassy tunicate

RECENT TECHNICAL MEMORANDUMS

Copies of this and other NOAA Technical Memorandums are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22167 (web site: *www.ntis.gov)*. Paper and microfiche copies vary in price.

AFSC-

178 AYDIN, K., S. GAICHAS, I. ORTIZ, D. KINZEY, and N. FRIDAY. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling, 298 p. NTIS number pending.

177 YANG, M-S. 2007. Food habits and diet overlap of seven skate species in the Aleutian Islands, 46 p. NTIS No. PB2008-102387.

176 LAUTH, R. R., and E. ACUNA. 2007. Results of the 2006 eastern Bering Sea continental shelf bottom trawl survey of groundfish and invertebrate resources, 175 p. NTIS PB2008-100452.

175 IVASHCHENKO,Y. V., P. J. CLAPHAM, and R. L. BROWNELL JR. (editors). 2007. Scientific reports of Soviet whaling expeditions in the North Pacific, 1955-1978, 34 p. [Translation: Y. V. Ivashchenko] + Appendix. NTIS No. PB2007112474.

174 TESTA, J. W. (editor). 2007. Fur seal investigations, 2004-2005, 76 p. NTIS No. PB2007-112500.

173 SIGLER, M. F., D. FALVEY, C. R. LUNSFORD, K. BARKHAU, and L. BEHNKEN. 2007. Product recovery rates for bled sablefish, 14 p. NTIS No. PB2007-112003.

172 MALECHA, P. W., D. H. HANSELMAN, and J. HEIFETZ. 2007. Growth and mortality of rockfishes (Scorpaenidae) from Alaska waters, 61 p. NTIS No. PB2007-112002.

171 HJELLVIK, V., and A. De ROBERTIS. 2007. Vessel comparison on the seabed echo: Influence of vessel attitude, 34 p. NTIS No. PB2007-111255.

170 RODGVELLER, C. J., J. H. MOSS, and A. M. FELDMANN. 2007. The influence of sampling location, timing, and hatching origin on the prediction of energy density in juvenile pink salmon, 27 p. NTIS No. PB2007-110270.

169 PELLA, J., and J. MASELKO. 2007. Probability sampling and estimation of the oil remaining in 2001 from the *Exxon Valdez* oil spill in Prince William Sound, 58 p. NTIS No. PB2007-110269.

168 ANGLISS, R. P., and R. B. OUTLAW. 2007. Alaska marine mammal stock assessments, 2006, 244 p. NTIS No. PB 2007-106476.

167 PEREZ, M. A. 2006. Analysis of marine mammal bycatch data from the trawl, longline, and pot groundfish fisheries of Alaska,1998-2004, defined by geographic area, gear type, and catch target groundfish species, 194 p. NTIS No. PB2007-106475.

166 WING, B. L, M. M. MASUDA, and S. G. TAYLOR. 2006. Time series analyses of physical environmental data records from Auke Bay, Alaska, 75 p. NTIS No. PB2007-101890.

165 EILER, J. H., T. R. SPENCER, J. J. PELLA, and M. M. MASUDA. 2006. Stock composition, run timing, and movement patterns of Chinook salmon returning to the Yukon River Basin in 2004, 107 p. NTIS No. PB2007-102224.

164 YANG, M-S., K. DODD, R. HIBPSHMAN, and A. WHITEHOUSE. 2006. Food habits of groundfishes in the Gulf of Alaska in 1999 and 2001, 199 p. NTIS No. PB2006-112369.

163 EILER, J. H., T. R. SPENCER, J. J. PELLA, and M. M. MASUDA. 2006. Stock composition, run timing, and movement patterns of chinook salmon returning to the Yukon River basin in 2003, 104 p.NTIS No. PB2006-108429.