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ABSTRACT

The sixth biennial groundfish assessment survey of the Aleutian Islands region was conducted during the summer of 2012 by the Alaska Fisheries Science Center's (AFSC) Resource Assessment and Conservation Engineering (RACE) Division. This effort constitutes the twelfth in the full series dating from 1980. 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 *Ocean Explorer* and F/V *Sea Storm*. Samples were collected successfully at 420 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. Pacific ocean perch or POP (*Sebastes alutus*) were by far the most abundant species with an estimated biomass of 902,399 metric tons (t). Northern rockfish (*Sebastes polyspinis*) and Atka mackerel (*Pleurogrammus monopterygius*) were also abundant with estimated biomasses of 285,164 and 276,877 t, respectively. Catches of POP were large throughout the survey area at intermediate depths. Northern rock sole were the most abundant flatfish species although they were rarely encountered in the southern Bering Sea. Arrowtooth flounder (*Atheresthes stomias*) were almost as abundant and were more ubiquitous. The skate assemblage was comprised of three skate species, whiteblotched (*Bathyraja maculata*), leopard (*B. panthera*) and Aleutian (*B. aleutica*), 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, population size composition, and length-weight relationships for commercially important species and for others of biological interest.

CONTENTS

INTRODUCTION

The 2012 biennial bottom trawl survey of the Aleutian Islands region was conducted from 4 June through 14 August by the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC), National Marine Fisheries Service (NMFS), Seattle, Washington, marking the twelfth comprehensive NMFS bottom trawl survey of this area 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 2008 survey was cancelled. The primary focus of these surveys is to continue a standardized (Stauffer 2004) time series of data to assess, describe, and monitor the distribution, abundance, and biological condition of Aleutian groundfish and invertebrate stocks. This report presents 2012 survey results for the principal fish species in areas corresponding to subdistricts of each of three North Pacific Fishery Management Council (NPFMC) regulatory areas: Eastern, Central, and Western Aleutians as well as a fourth survey area located in the southern Bering Sea. These areas are further described in the “Survey Design” section of this document. 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[1]. 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 fishing effort 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 blackspotted and rougheye rockfishes, different species of corals and creating a genetic database for several prey species for use in trophic analysis. Additional projects included collection of octopus sex and weight data, snailfish and lumpsucker voucher specimens, sponge taxonomy, monitoring the presence of snailfish eggs in king crab as well as bigmouth sculpin eggs in sponge, ambient light levels during fishing operations; acoustic profiling, and recorded observations of short-tailed albatross.

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 (Stauffer 2004). Extending over 1,670 km from east to west, the survey area is composed of the continental shelf and upper

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http://access.afsc.noaa.gov/reem/ecoweb/Index.cfm [1] slope from Islands of Four Mountains (170°W long.) to Stalemate Bank (170°E long.), including Petrel Bank (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 near shore waters to 500 m. The total survey area is about 64,416 km^2 (Table 1). The Western Aleutian Islands district (WAI) represents 24% of the total survey area, the Central Aleutian Islands district (CAI) almost 26%, the Eastern Aleutian Islands district (EAI) 39%, and the Southern Bering Sea district (SBS) comprises about 11%. In terms of the sampled depths, the 1-100 m and 101-200 m depth intervals make up 33.5% and 30.3% 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.

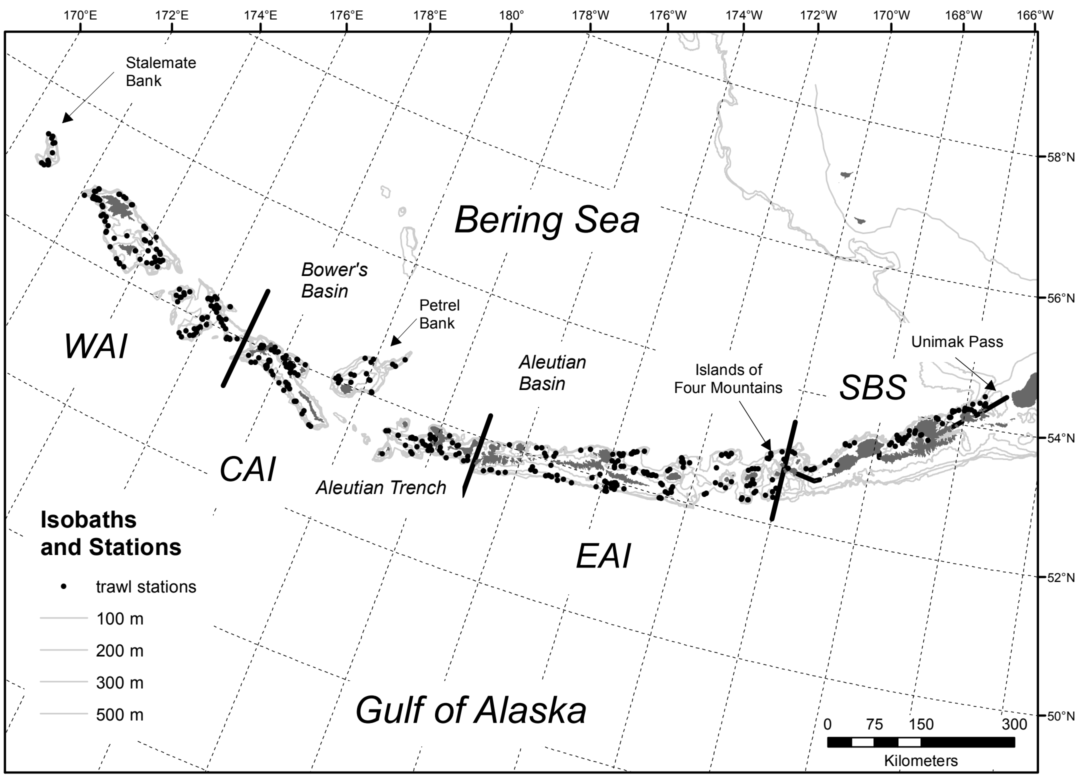


Figure 1. -- Map of the Aleutian Islands 2012 bottom trawl survey area indicating survey districts (WAI = Western Aleutian Islands, CAI = Central Aleutian Islands, EAI = Eastern Aleutian Islands, and SBS = Southern Bering Sea), isobaths from 100-500 m and stations sampled (black dots).

Vessels

Both chartered vessels were house-forward stern trawlers with stern ramps and two net storage reels mounted either over the stern ramp (*Sea Storm*) or directly behind the house (*Ocean Explorer*), telescoping deck cranes, propeller nozzles, and paired, controlled-tension hydraulic trawl winches containing between 1,280 and 1,460 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 *Ocean Explorer* is 47.2 m LOA with a 1,800 HP main engine. Aboard both vessels electronic equipment included a global positioning system (GPS) with video position plotters, at least two radars, single sideband and VHF transmitter-receivers, color video fish finders (echo sounders), paper recorder echo sounders, and auto-pilots. The survey was divided into three legs of equal length with a port call between each to accommodate crew changes and to resupply. Captains Rick Loan and Darin Vanderpol operated the *Ocean Explorer* for one and two legs, respectively. The *Sea Storm* was operated by Captain Jerry Ellefson for all three legs.

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 36cm 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 certified as conforming to standard measurements and dimensions prior to its use in the survey.

Survey Design

The Aleutian Islands Biennial Bottom Trawl Survey is a stratified-random survey design of trawlable areas in the archipelago shallower than 500 m. Strata are based upon four depth intervals (1-100 m, 101-200 m, 201-300 m, and 301-500 m) and established survey districts and subdistricts. The Aleutian Islands survey area is contained within the NPFMC BSAI (Bering Sea and Aleutian Islands) management area[2], and consists of four survey districts. The survey districts correspond to subdivisions of the NPFMC Western, Central, and Eastern Aleutian districts with the addition of a southern Bering Sea sampling district defined as the region between 170°W and 165°W and north of the archipelago. These four survey districts are further divided into 45 strata defined by geographic subdistricts and corresponding depth intervals. Subdistricts are defined by two to four roughly equal geographical areas within a survey district designated by cardinal points (N, S, E, W), sub-cardinal points (NW, NE, SE, SW), or in some cases by a "combined" subdistrict where a narrow or limited depth interval is integrated over several subdistricts (Appendix A).

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, Rooper and Wilkins 2008, von Szalay et al. 2008, von Szalay et al. 2010), sampling effort for each subdistrict was 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 each species. A maximum of 420 stations was estimated as the number of trawls that we could expect to complete given survey time and vessel scheduling restrictions, expected weather days, and other logistics such as time lost to gear repairs. The allocation model drew random stations within each subdistrict from a 5 by 5 km grid imposed on the entire survey area. A minimum of two stations were allocated to any given subdistrict. Most of the 420 allocated tow locations were selected randomly without

[2]http://alaskafisheries.noaa.gov/npfmc/PDFdocuments/fmp/BSAI/BSAI.pdf

replacement from a database of previously conducted tows, but to satisfy the minimal sampling requirements in certain subdistricts, some previously unsampled stations were required in some subdistricts. Most of the areas suitable to deploy the standard research trawl and to meet trawl duration and performance criteria have been reasonably well defined during past surveys. Thus, the majority of allocated stations for the 2012 survey were placed at or near locations sampled during previous surveys. Assigned sample densities were highest in the 201-300 m depth intervals at about 12 tows per 1,000 km^2 (Table 1). Survey wide, the projected overall sample density was 6.5 tows per 1,000 km^2. If fishing gear conflicts or rough or otherwise untrawlable bottom prevented us from sampling a particular pre-selected station, we used an alternate station in the same subdistrict as a replacement. To locate new or alternate tow sites, search patterns were run within the proper subdistrict using an echosounder to locate trawlable bottom where a successful 15-minute tow could be conducted. Search time to find an alternate station was limited to 2 hours searching a 5 by 5 km grid cell.

Table 1. -- Number of stations allocated, attempted, successfully completed, and sampling density for the 2012 Aleutian Islands bottom trawl survey by survey district and depth interval.

Survey district	Depth range (m)	Stations Allocated	Stations Attempted	Stations Successful	Area (km^2)	Sampling Density (stations/1,000 km^2)
Western Aleutians	1 - 100	23	23	23	4,877	4.72
	101 - 200	57	59	57	5,318	10.72
	201 - 300	31	31	31	1,724	17.98
	301 - 500	9	9	9	3,272	2.75
	All depths	**120**	**122**	**120**	**15,191**	**7.90**
Central Aleutians	1 - 100	26	27	26	5,847	4.45
	101 - 200	41	41	41	4,606	8.90
	201 - 300	32	32	32	2,109	15.17
	301 - 500	14	15	14	3,981	3.52
	All depths	**113**	**115**	**113**	**16,543**	**6.83**
Eastern Aleutians	1 - 100	14	14	14	6,848	2.04
	101 - 200	59	59	59	7,768	7.60
	201 - 300	46	46	46	4,901	9.39
	301 - 500	13	14	13	5,683	2.29
	All depths	**132**	**133**	**132**	**25,200**	**5.24**
Southern Bering Sea	1 - 100	26	26	26	4,026	6.46
	101 - 200	16	16	16	1,849	8.65
	201 - 300	8	8	8	564	14.18
	301 - 500	5	7	5	1,043	4.79
	All depths	**55**	**57**	**55**	**7,482**	**7.35**
All areas	1 - 100	89	90	89	21,598	4.12
	101 - 200	173	175	173	19,541	8.85
	201 - 300	117	117	117	9,298	12.58
	301 - 500	41	45	41	13,979	2.93
	All depths	**420**	**427**	**420**	**64,416**	**6.52**

Trawl Performance Data Collection

A concerted effort was made to perform consistent towing procedures. The operational 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 that speed while the net held its fishing configuration with proper bottom contact for 15 minutes. Standard scope tables (Stauffer 2004) of trawl warp relative to bottom depth were used. Towing time was abbreviated on some occasions to avoid potential gear damage or when the echosounder indicated upcoming obstacles or the net mensuration suggested the net configuration was abnormal. The date, time, and GPS-generated position were recorded every 2 seconds during each tow. Pressure at depth (used to derive estimated depth), water temperature, and time were recorded every second during most tows using a Seabird Model SBE-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 occasion, these units were not deployed on the net to avoid loss or damage due to extremely rough bottom conditions. An accelerometer was attached to the midpoint of the roller gear to record the date, time, and acceleration in three dimensions of the footrope, indicating the degree of contact with the bottom. At the end of each tow, retrieval started with the vessel maintaining or increasing towing speed while engaging the trawl winches to wind up the wire 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. Trawl performance was assessed after the tow from the mensuration and other sensors deployed during the trawl 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 other fishing gear (e.g., catching a crab pot or fowling longline gear). The minimum accepted duration for satisfactory tows was about 10 minutes except when the net mensuration data indicated that a large catch had occurred and the codend was full. In these instances shorter tow durations could be accepted.

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 about 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 (load cell) when the sea state allowed, and the weights of the largest catches (exceeding approximately 6 t) were estimated volumetrically. For catches with total weights determined with a load cell, those less abundant species were separated from the catch and their weights were determined and subtracted from the load cell weight to obtain the total weight of abundant species by extrapolation. For very large catches with more than one abundant species, a subsample of the dominant species was taken to estimate their relative weights, which was then extrapolated to obtain their separate total weights. A similar procedure was used for volumetrically estimated catches except the total catch weight was estimated by multiplying the density of a representative sample of the total catch (containing both the abundant and less abundant species) by the total catch volume. Pacific halibut (scientific names for all species encountered during the survey 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 specimens of each of the major fish species was collected and measured to generate length frequencies. A smaller length frequency sample was collected for some minor catch components such as sculpins. The sex of most individuals was determined prior to measurement. All skates and Pacific halibut were measured. Unsexed length frequencies were collected for forage fish such as Pacific herring, capelin, and eulachon. Length measurements were collected with barcode-reader data loggers and barcoded length boards and downloaded to a computer and appended to a database after each tow.

Age structures (otoliths) were collected for many species. Separate collections were made from each of the four major sampling districts. Samples were either randomly selected (for walleye pollock) or stratified by sex and size with a specified number of otoliths collected per 1.0 centimeter length interval on a per area or per trawl haul basis. For species from which otoliths were collected on a per area basis, limits were placed on the number collected per sex-centimeter per day to distribute the sample evenly over the area. Length was measured to the nearest centimeter and weight was estimated to the nearest 2-10 g (scale accuracy depended on the weight of the specimen) with the digital scales. Fork length was measured for all fish species except grenadiers (snout to origin of anal 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

Biomass estimates were calculated using a area-swept method (Alverson and Pereyra 1969). The area swept by the trawl (i.e., fishing effort) 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 and measuring the distance along this line. The mean net spread was estimated by averaging the Scanmar net spread readings collected during the on-bottom to off-bottom time period. 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 in hectares (ha). The mean CPUE for each subdistrict was calculated as the mean of the individual tow CPUEs (including zero catches) within the subdistrict. Mean CPUEs for combined subdistricts were calculated as the weighted average of the individual subdistrict CPUE means (weighted by subdistrict). Biomass estimates (t) were calculated by multiplying each subdistrict mean CPUE by the subdistrict and summing the results to obtain estimates by survey district 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 district/depth range population within a sex-length category was calculated by multiplying the district/depth range population by the proportion of fish in that category from the summed station data. Population size composition estimates were summed over subdistricts to derive estimates by area. Lengths and weights 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 fitted parameters (Appendix C).

Data Limitations

The primary purpose of this survey is to support management of a large number of fish and benthic invertebrate species, including various groupings of fish: flatfish, roundfish, and rockfish. These different groups are expected to display differences in both haul level and survey level catchabilities, which, in turn, are generally unknown and may not be consistent even within each group. Survey catch rates and derived abundance estimates are used to tune stock assessment models and to monitor fish trends and status. Sampling gear and its deployment are standardized and intentionally not modified over time to ensure consistency and statistical continuity of the time series necessary to reliably monitor the status of fish stocks and to forecast trends.

RESULTS

We successfully sampled all of the 420 stations allocated in 427 attempts (Table 1). All successful tows were included in the biomass and size composition analysis. Scanmar net spread and height measurements were successfully recorded for all tows. Temperatures on the surface and at depth were successfully recorded for all but thirteen tows. Average bottom temperatures ranged from 2.5° to 5.8°C, but most bottom temperatures ranged between 3.2° and 4.8°C. Sea surface temperatures ranged from 4.0° to 9.5°C.

Results by Area

Over 125 fish species from 27 families and 382 invertebrate species or taxa from 14 phyla were captured during the 2012 survey. Appendix B presents lists of fish (Appendix Table B-1) and invertebrate (Appendix Table B-2) taxa encountered during the survey. This report deals primarily with the groundfish results. Relative abundance estimates, reported as CPUE in kg/ha, are presented for the 20 most abundant groundfish species in each of the four survey districts covered in 2012, combined Aleutian areas, and the entire survey region (Table 2). Pacific ocean perch (POP) was the most abundant species captured over the entire survey region, followed by northern rockfish and Atka mackerel and, to a lesser extent, giant grenadier (Table 2). In each of the four survey districts mean POP CPUEs were high compared to all other species in the area. The only other species with a CPUE even close to that of POP was northern rockfish in the Western Aleutians area. Pacific cod were more or less uniformly distributed throughout the survey area, but at lower CPUEs than POP.

Results by Species

More detailed species-specific accounts are provided below. The first species group includes the flatfishes, followed by roundfish, rockfish, and skates, respectively. Responding to requests from stock assessors this year we separated the cottids by species, and thanks to acceptance of a newly described skate species, introduced biomass estimates for *Bathyraja panthera* for the first time. In those sections of this report which address cottids and skates, tables are included which describe the relative abundance of all the species from the two groups in terms of mean weight and number as well as total estimated biomass in descending order along with cumulative biomass for the entire group. More detailed information is then provided for those species which cumulatively comprise about 90 % of the estimated biomass for that group.

Generally, the following information is presented for most, but not all species: 1) a short summary of the data collected and data analyses, 2) a table showing the number of hauls, the number of hauls with catch, mean CPUE, estimated biomass and confidence intervals, and mean weight of that species by survey district and depth interval, 3) a table showing mean CPUE and estimated biomass with confidence intervals by subarea and depth range, 4) figures showing the station distribution and CPUE, and 5) figures showing the size composition of the population. The distribution maps show relative abundance in 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 species in each survey district during the 2012 Aleutian Islands bottom trawl survey

Western Aleutians Area	**CPUE**	**Central Aleutians Area**	**CPUE**	**Eastern Aleutians Area**	**CPUE**
Pacific ocean perch	173.57	Pacific ocean perch	141.25	Pacific ocean perch	145.40
northern rockfish	142.41	Atka mackerel	65.97	giant grenadier	20.59
Atka mackerel	87.94	northern rockfish	31.84	Atka mackerel	13.15
arrowtooth flounder	11.42	giant grenadier	19.87	walleye pollock	12.50
Pacific cod	8.90	northern rock sole	17.72	Pacific cod	12.14
northern rock sole	8.78	Kamchatka flounder	9.24	arrowtooth flounder	11.46
shortspine thornyhead	6.20	Pacific cod	8.95	northern rock sole	7.87
walleye pollock	3.53	arrowtooth flounder	6.29	Kamchatka flounder	6.67
leopard skate	3.00	blackspotted rockfish	4.97	northern rockfish	6.20
shortraker rockfish	2.93	walleye pollock	4.49	Pacific halibut	5.73
whiteblotched skate	2.89	shortraker rockfish	4.34	yellow Irish lord	3.48
Pacific halibut	2.51	Pacific halibut	3.41	whiteblotched skate	3.43
rex sole	2.15	leopard skate	3.16	shortraker rockfish	1.60
flathead sole	2.11	yellow Irish lord	2.64	blackspotted rockfish	1.49
Kamchatka flounder	1.77	shortspine thornyhead	2.13	Aleutian skate	1.23
magistrate armhook squid	1.65	rex sole	1.21	rex sole	1.21
giant grenadier	1.17	Aleutian skate	1.07	southern rock sole	1.08
prowfish	1.17	sablefish	1.02	darkfin sculpin	0.90
Greenland turbot	0.72	whiteblotched skate	0.80	giant octopus	0.79
Aleutian skate	0.69	darkfin sculpin	0.79	sablefish	0.70
Number of hauls	120	Number of hauls	113	Number of hauls	132

Combined Aleutian Area	**CPUE**	**Southern Bering Sea Area**	**CPUE**	**All Areas**	**CPUE**
Pacific ocean perch	151.71	Pacific ocean perch	51.67	Pacific ocean perch	140.09
northern rockfish	49.99	walleye pollock	17.69	northern rockfish	44.27
Atka mackerel	48.45	Pacific halibut	10.22	Atka mackerel	42.98
giant grenadier	15.20	Pacific cod	9.29	giant grenadier	13.44
northern rock sole	10.97	southern rock sole	7.88	Pacific cod	10.22
Pacific cod	10.35	rex sole	7.75	northern rock sole	10.16
arrowtooth flounder	9.95	arrowtooth flounder	5.00	arrowtooth flounder	9.37
walleye pollock	7.78	northern rock sole	3.98	walleye pollock	8.93
Kamchatka flounder	6.11	flathead sole	1.57	Kamchatka flounder	5.45
Pacific halibut	4.20	Atka mackerel	1.35	Pacific halibut	4.90
shortraker rockfish	2.75	whiteblotched skate	1.35	shortraker rockfish	2.52
shortspine thornyhead	2.54	yellow Irish lord	0.99	whiteblotched skate	2.38
whiteblotched skate	2.52	magistrate armhook squid	0.82	shortspine thornyhead	2.31
yellow Irish lord	2.36	shortraker rockfish	0.75	yellow Irish lord	2.20
blackspotted rockfish	2.16	northern rockfish	0.74	rex sole	2.19
leopard skate	1.83	shortspine thornyhead	0.60	blackspotted rockfish	1.96
rex sole	1.46	Kamchatka flounder	0.41	leopard skate	1.62
Aleutian skate	1.04	blackspotted rockfish	0.41	southern rock sole	1.34
flathead sole	0.77	starry flounder	0.28	Aleutian skate	0.94
darkfin sculpin	0.76	Dover sole	0.26	flathead sole	0.86
Number of hauls	365	Number of hauls	55	Number of hauls	420

Flatfish

Arrowtooth flounder (*Atheresthes stomias*)

Arrowtooth flounder was the seventh most abundant species and the second most abundant flatfish species caught in the 2012 survey (Table 2). Its relative abundance was highest in the Eastern Aleutians (Table 2), where the mean CPUE was more than twice as high as in the Southern Bering Sea district where they were the least abundant. The estimated biomass was 60,372 t, 48% of which was found in the Eastern Aleutians district (Table 3). Arrowtooth flounder were distributed throughout the survey area and were found in all depth intervals (Table 3, Fig. 2). Mean CPUEs were highest in the 1-100 m depth interval in the Western Aleutians district and in the 200-300 m depth interval in the Central and Eastern Aleutians districts. In the Southern Bering Sea district the 300-500 m depth range had a slightly higher CPUE than the 200-300 m range, but these CPUEs were much greater than in the shallowest depth zones. The subdistrict with the highest concentration was the NW Eastern Aleutians Subarea in the 201-300 m depth range (Table 4). This subdistrict was estimated to contain about 1.8% of the catch despite representing only about 0.2% of the total survey area (Table 4, Appendix Table A-1). Mean weight of arrowtooth flounder increased with depth (Table 3), and they were somewhat larger in the combined Aleutian districts compared with the Southern Bering Sea district (Table 3, Fig. 3). Maximum lengths of males were substantially shorter than females (Fig. 3). The length-weight relationship parameters for males, females and combined sexes of arrowtooth flounder were computed from total survey area data (Appendix C).

Kamchatka flounder (*Atheresthes evermanni*)

Kamchatka flounder was the ninth most abundant species and the third most abundant flatfish species caught in the 2012 survey (Table 2). Although this species was caught in all depths and all survey districts, the districts with the highest abundances were the Central and Eastern Aleutians districts in water depths between 301-500 m (Table 5, Fig. 4). The survey district with the highest abundance of Kamchatka flounder was the Central Aleutians district where its CPUE ranked higher than arrowtooth flounder. The area of lowest abundance was the Southern Bering Sea district where it ranked seventeenth overall (Table 2). 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 combined total Aleutian biomass of arrowtooth and Kamchatka flounder was between 500 and 900 m (Ronholt et al. 1986). Relative abundance increased markedly with depth, as did mean individual weight and length (Table 5). Like arrowtooth flounder, Kamchatka flounder exhibit sexual dimorphism with adult females growing larger than males. Length composition of males displayed a well-defined mode which increased with depth below 200 m in the Aleutians districts (Table 6, Fig. 5). The biomass of Kamchatka flounder was 35,100 t. The two subareas with the highest concentrations were the N Central Aleutians and Combined Eastern Aleutian Islands subareas, both in the 301-500 m depth range. These two subareas combined represent just 6% of the survey district (Appendix Table A-1) but contain 73% of the estimated Kamchatka biomass (Table 6).

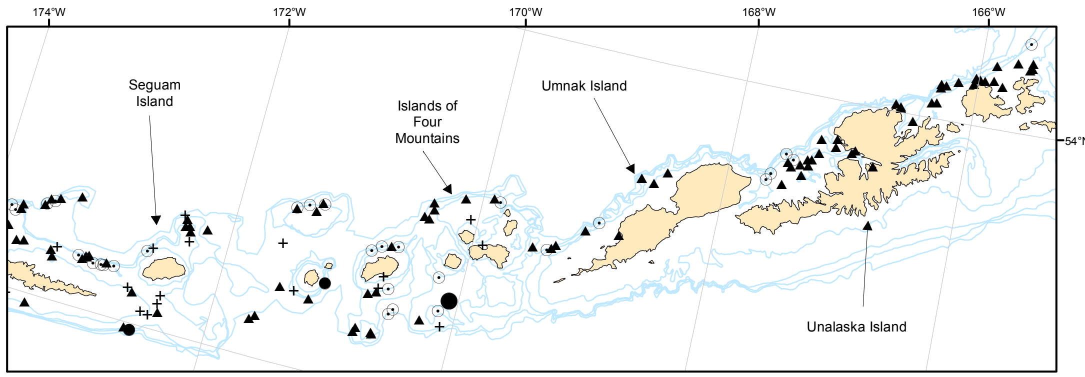
Table 3. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing arrowtooth flounder, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	16	20.96	10,219	0	21,716	0.813
	101 - 200	57	44	10.41	5,534	3,131	7,936	1.044
	201 - 300	31	26	6.16	1,062	600	1,525	2.733
	301 - 500	9	4	1.61	527	0	1,450	4.160
	All depths	120	90	11.42	17,342	5,509	29,175	0.943
Central Aleutians	1 - 100	26	10	1.60	934	0	2,744	0.848
	101 - 200	41	31	4.72	2,173	526	3,820	1.150
	201 - 300	32	30	21.18	4,466	1,439	7,493	1.349
	301 - 500	14	11	7.11	2,830	0	8,295	2.048
	All depths	113	82	6.29	10,403	5,272	15,534	1.354
Eastern Aleutians	1 - 100	14	9	14.02	9,603	0	39,440	0.382
	101 - 200	59	47	8.37	6,505	4,350	8,660	0.690
	201 - 300	46	42	22.61	11,084	1,626	20,542	1.058
	301 - 500	13	11	2.98	1,696	0	3,684	1.332
	All depths	132	109	11.46	28,888	2,511	55,264	0.624
All Aleutian Areas	1 - 100	63	35	11.81	20,756	0	42,082	0.535
	101 - 200	157	122	8.03	14,212	10,715	17,709	0.855
	201 - 300	109	98	19.02	16,612	6,739	26,485	1.172
	301 - 500	36	26	3.91	5,053	1,550	8,557	1.817
	All depths	365	281	9.95	56,633	33,341	79,924	0.782
Southern Bering Sea	1 - 100	26	25	2.06	831	313	1,350	0.285
	101 - 200	16	16	6.64	1,228	307	2,148	0.539
	201 - 300	8	8	10.28	580	0	1,192	0.955
	301 - 500	5	5	10.55	1,100	418	1,783	1.192
	All depths	55	54	5.00	3,739	2,458	5,020	0.556

Table 4. -- Summary of arrowtooth flounder mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by subdistrict (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth range (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	70.71	1,103	0	11,349
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	68.68	8,709	0	96,582
Central Aleutians	201-300	N Central Aleutians	16	15	52.61	2,310	593	4,026
Eastern Aleutians	201-300	SE Eastern Aleutians	12	9	38.86	8,008	0	17,361
Central Aleutians	201-300	SE Central Aleutians	5	5	32.85	1,568	0	4,278
Western Aleutians	1-100	W Western Aleutians	11	11	27.44	10,134	0	21,773
Central Aleutians	301-500	SE Central Aleutians	2	2	23.80	1,700	0	17,075
Western Aleutians	101-200	E Western Aleutians	22	12	13.29	1,665	46	3,283
Central Aleutians	101-200	N Central Aleutians	9	8	11.55	1,231	0	2,822
Eastern Aleutians	101-200	SW Eastern Aleutians	10	9	11.36	2,568	1,043	4,092
Eastern Aleutians	101-200	NE Eastern Aleutians	26	22	10.76	2,165	1,361	2,969
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	5	10.55	1,100	363	1,837
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	8	10.28	580	0	1,207
Western Aleutians	101-200	W Western Aleutians	35	32	9.52	3,869	2,034	5,704
Central Aleutians	201-300	SW Central Aleutians	7	6	8.79	374	0	789
Eastern Aleutians	201-300	NE Eastern Aleutians	26	26	8.55	1,682	971	2,394
Southern Bering Sea	101-200	E Southern Bering Sea	14	14	8.47	999	72	1,926
Central Aleutians	301-500	N Central Aleutians	8	7	7.57	939	43	1,834
Western Aleutians	201-300	E Western Aleutians	14	12	6.74	528	154	902
Central Aleutians	1-100	SE Central Aleutians	7	1	6.56	764	0	2,633
Eastern Aleutians	101-200	SE Eastern Aleutians	19	12	6.00	1,139	0	2,422
Eastern Aleutians	301-500	SE Eastern Aleutians	7	7	5.98	1,541	0	3,590
Western Aleutians	201-300	W Western Aleutians	17	14	5.68	534	225	844
Central Aleutians	101-200	SW Central Aleutians	15	14	4.38	461	222	700
Central Aleutians	101-200	SE Central Aleutians	10	6	4.30	323	0	899
Eastern Aleutians	201-300	SW Eastern Aleutians	6	5	4.07	292	9	575
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	3.99	761	0	7,089
Eastern Aleutians	101-200	NW Eastern Aleutians	4	4	3.97	633	0	1,668
Southern Bering Sea	101-200	W Southern Bering Sea	2	2	3.41	229	186	271
Western Aleutians	301-500	W Western Aleutians	7	4	3.08	527	0	1,482
Southern Bering Sea	1-100	E Southern Bering Sea	24	24	2.89	705	492	917
Central Aleutians	201-300	Petrel Bank	4	4	2.79	214	0	498
Central Aleutians	301-500	SW Central Aleutians	2	2	2.42	191	0	1,154
Central Aleutians	101-200	Petrel Bank	7	3	0.91	158	0	353
Southern Bering Sea	1-100	W Southern Bering Sea	2	1	0.80	127	0	1,736
Eastern Aleutians	1-100	SE Eastern Aleutians	8	5	0.76	133	0	291
Western Aleutians	1-100	E Western Aleutians	12	5	0.72	85	6	163
Central Aleutians	1-100	SW Central Aleutians	3	3	0.54	88	0	186
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	0.54	24	14	33
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	2	0.49	132	0	374
Central Aleutians	1-100	N Central Aleutians	11	4	0.34	72	0	169
Central Aleutians	1-100	Petrel Bank	5	2	0.11	11	0	32

a)



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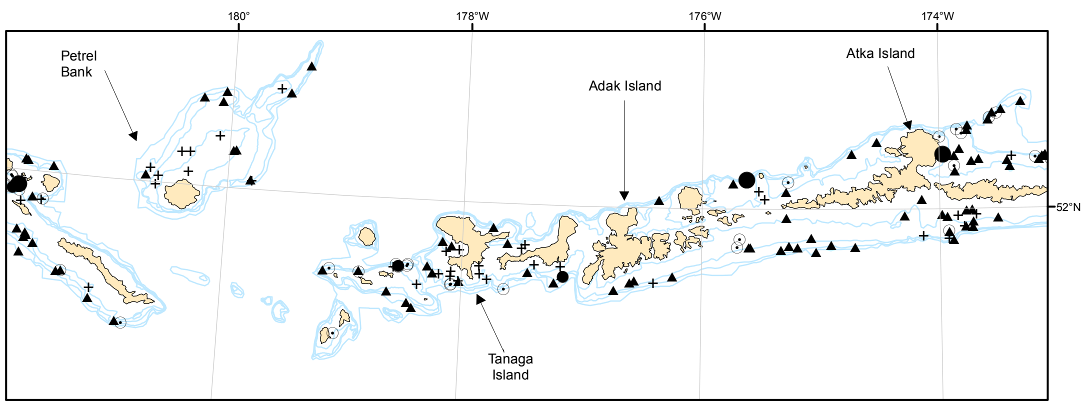

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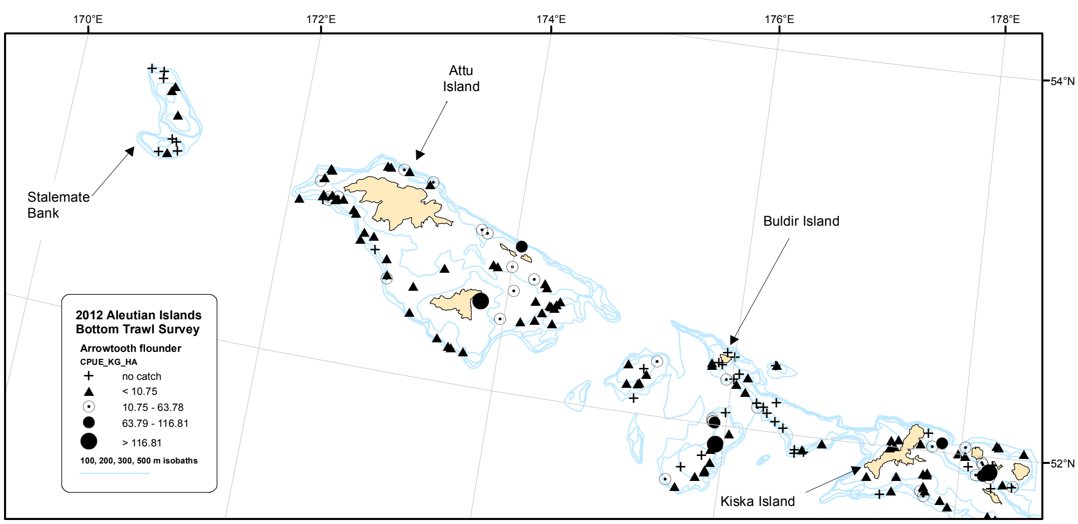


Figure 2. -- Distribution and relative abundance of arrowtooth flounder from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

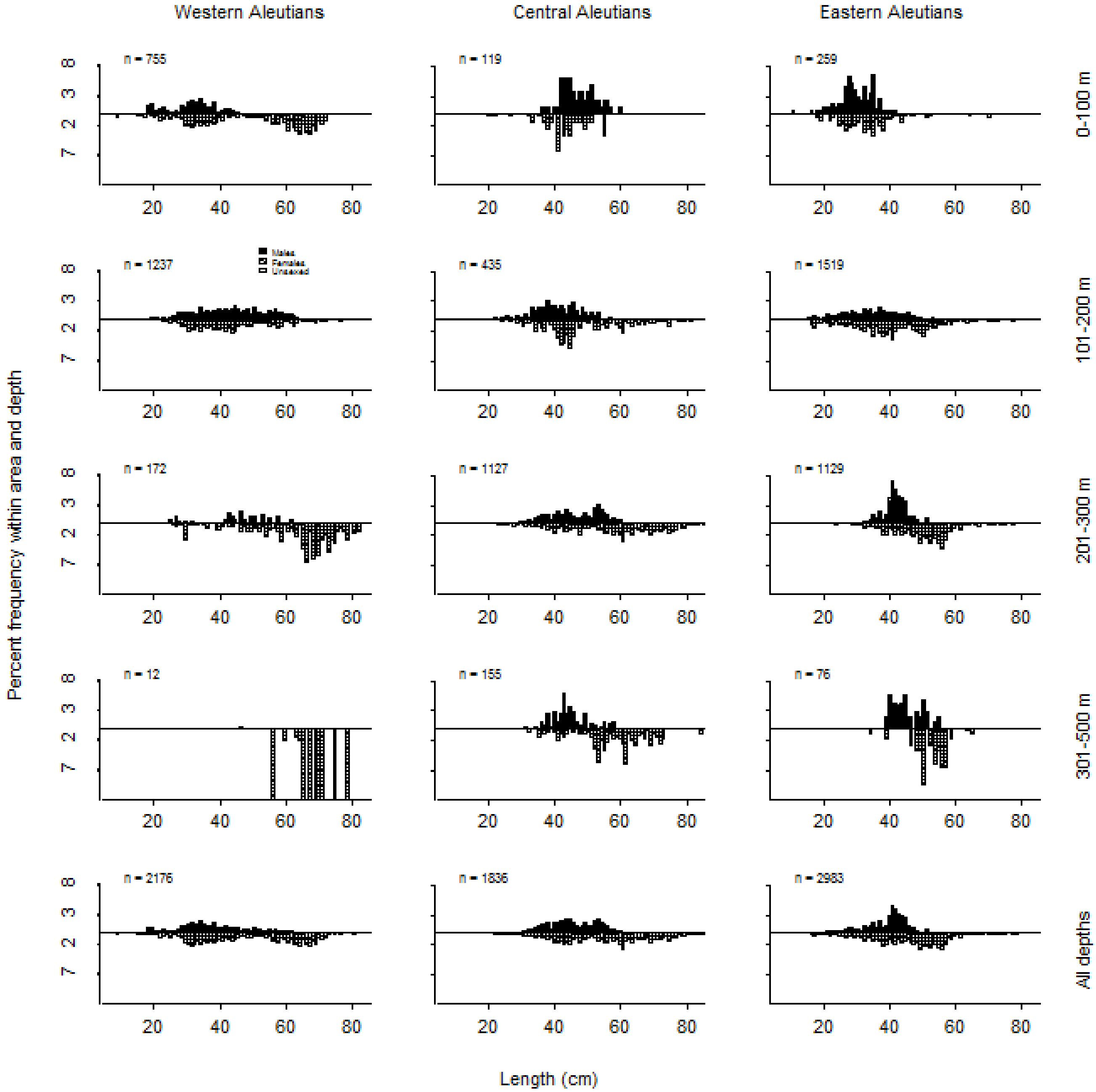


Figure 3. -- Length composition by depth intervals of arrowtooth flounder from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

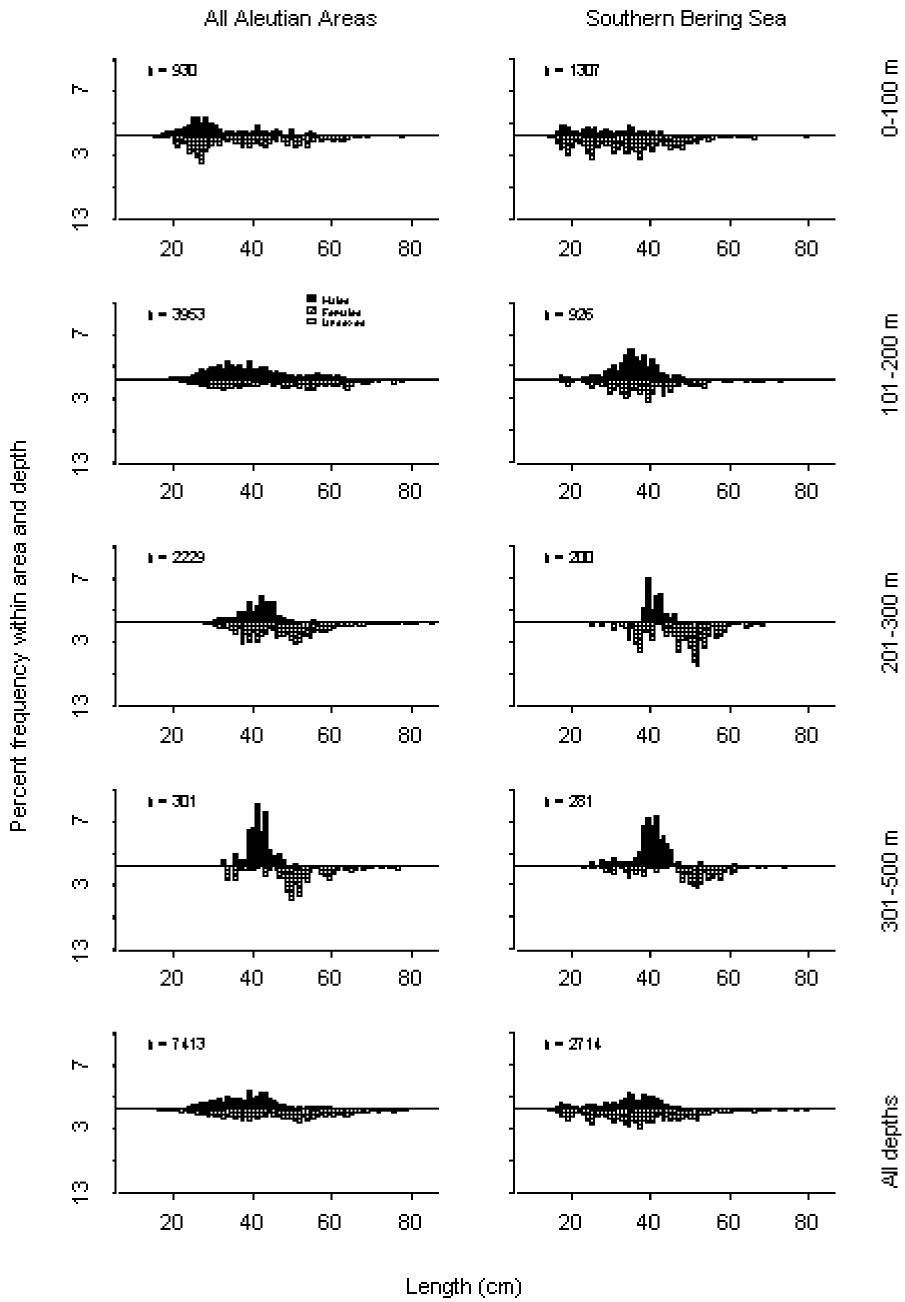


Figure 3. -- (continued).

Table 5. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing Kamchatka flounder, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	**Depth (m)**	**Haul count**	**Hauls w/ catch**	**CPUE (kg/ha)**	**Biomass (t)**	**95% LCL (t)**	**95% UCL (t)**	**weight (kg)**
Western Aleutians	1 - 100	23	12	0.74	362	0	772	0.276
	101 - 200	57	45	2.19	1,165	742	1,588	0.551
	201 - 300	31	27	3.78	651	395	907	2.008
	301 - 500	9	6	1.57	515	0	1,622	3.169
	All depths	120	90	1.77	2,693	1,718	3,669	0.688
Central Aleutians	1 - 100	26	6	0.10	56	0	123	0.205
	101 - 200	41	19	0.63	292	86	497	0.301
	201 - 300	32	28	4.02	847	160	1,534	1.044
	301 - 500	14	13	35.39	14,088	0	31,959	2.512
	All depths	113	66	9.24	15,283	0	33,171	1.995
Eastern Aleutians	1 - 100	14	2	0.41	279	26	532	0.167
	101 - 200	59	30	1.93	1,501	0	3,200	0.385
	201 - 300	46	30	3.99	1,957	0	3,930	1.146
	301 - 500	13	9	23.01	13,079	0	45,155	2.332
	All depths	132	71	6.67	16,816	0	49,074	1.305
All Aleutian Areas	1 - 100	63	20	0.40	697	266	1,128	0.214
	101 - 200	157	94	1.67	2,958	1,238	4,677	0.423
	201 - 300	109	85	3.96	3,455	1,355	5,555	1.215
	301 - 500	36	28	21.40	27,682	0	66,311	2.433
	All depths	365	227	6.11	34,792	0	73,593	1.422
Southern Bering Sea	1 - 100	26	11	0.02	10	2	17	0.128
	101 - 200	16	11	0.17	31	0	66	0.239
	201 - 300	8	4	0.68	39	0	88	2.325
	301 - 500	5	5	2.20	229	0	534	1.520
	All depths	55	31	0.41	308	0	619	0.831

Table 6. -- Summary of Kamchatka flounder mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by subdistrict (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	301-500	N Central Aleutians	8	8	106.67	13,225	0	31,516
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	4	47.25	12,616	0	49,377
Central Aleutians	201-300	N Central Aleutians	16	16	12.24	537	0	1,225
Central Aleutians	301-500	SW Central Aleutians	2	2	7.57	597	0	6,605
Eastern Aleutians	201-300	NE Eastern Aleutians	26	22	6.67	1,313	0	2,955
Western Aleutians	201-300	E Western Aleutians	14	11	5.30	415	175	656
Eastern Aleutians	101-200	NE Eastern Aleutians	26	18	4.56	919	0	2,240
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	4.12	64	0	230
Central Aleutians	201-300	SE Central Aleutians	5	4	3.61	172	11	334
Central Aleutians	201-300	SW Central Aleutians	7	7	3.01	128	39	217
Eastern Aleutians	101-200	NW Eastern Aleutians	4	3	2.94	468	0	1,770
Eastern Aleutians	201-300	SE Eastern Aleutians	12	3	2.73	563	0	1,764
Western Aleutians	101-200	W Western Aleutians	35	32	2.61	1,061	645	1,477
Western Aleutians	201-300	W Western Aleutians	17	16	2.51	236	123	349
Western Aleutians	301-500	E Western Aleutians	2	2	2.21	345	0	3,396
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	2.20	279	0	1,027
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	5	2.20	229	0	558
Central Aleutians	301-500	Petrel Bank	2	2	2.05	253	0	1,830
Eastern Aleutians	301-500	SE Eastern Aleutians	7	4	1.75	450	0	964
Central Aleutians	101-200	N Central Aleutians	9	6	1.33	141	0	323
Western Aleutians	301-500	W Western Aleutians	7	4	0.99	169	0	396
Western Aleutians	1-100	W Western Aleutians	11	10	0.95	352	0	767
Western Aleutians	101-200	E Western Aleutians	22	13	0.83	105	26	183
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	4	0.68	39	0	89
Central Aleutians	101-200	SW Central Aleutians	15	8	0.52	55	15	95
Central Aleutians	101-200	Petrel Bank	7	2	0.43	74	0	200
Eastern Aleutians	101-200	SW Eastern Aleutians	10	4	0.35	79	0	176
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	0.30	13	0	178
Central Aleutians	101-200	SE Central Aleutians	10	3	0.28	21	0	55
Eastern Aleutians	201-300	SW Eastern Aleutians	6	3	0.23	16	0	42
Central Aleutians	1-100	N Central Aleutians	11	5	0.22	45	0	111
Southern Bering Sea	101-200	E Southern Bering Sea	14	10	0.19	22	6	38
Eastern Aleutians	101-200	SE Eastern Aleutians	19	5	0.18	35	0	73
Central Aleutians	301-500	SE Central Aleutians	2	1	0.18	13	0	178
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	0.13	9	0	116
Central Aleutians	201-300	Petrel Bank	4	1	0.12	9	0	38
Western Aleutians	1-100	E Western Aleutians	12	2	0.08	10	0	29
Central Aleutians	1-100	SW Central Aleutians	3	1	0.07	11	0	56
Southern Bering Sea	1-100	E Southern Bering Sea	24	11	0.04	10	2	17

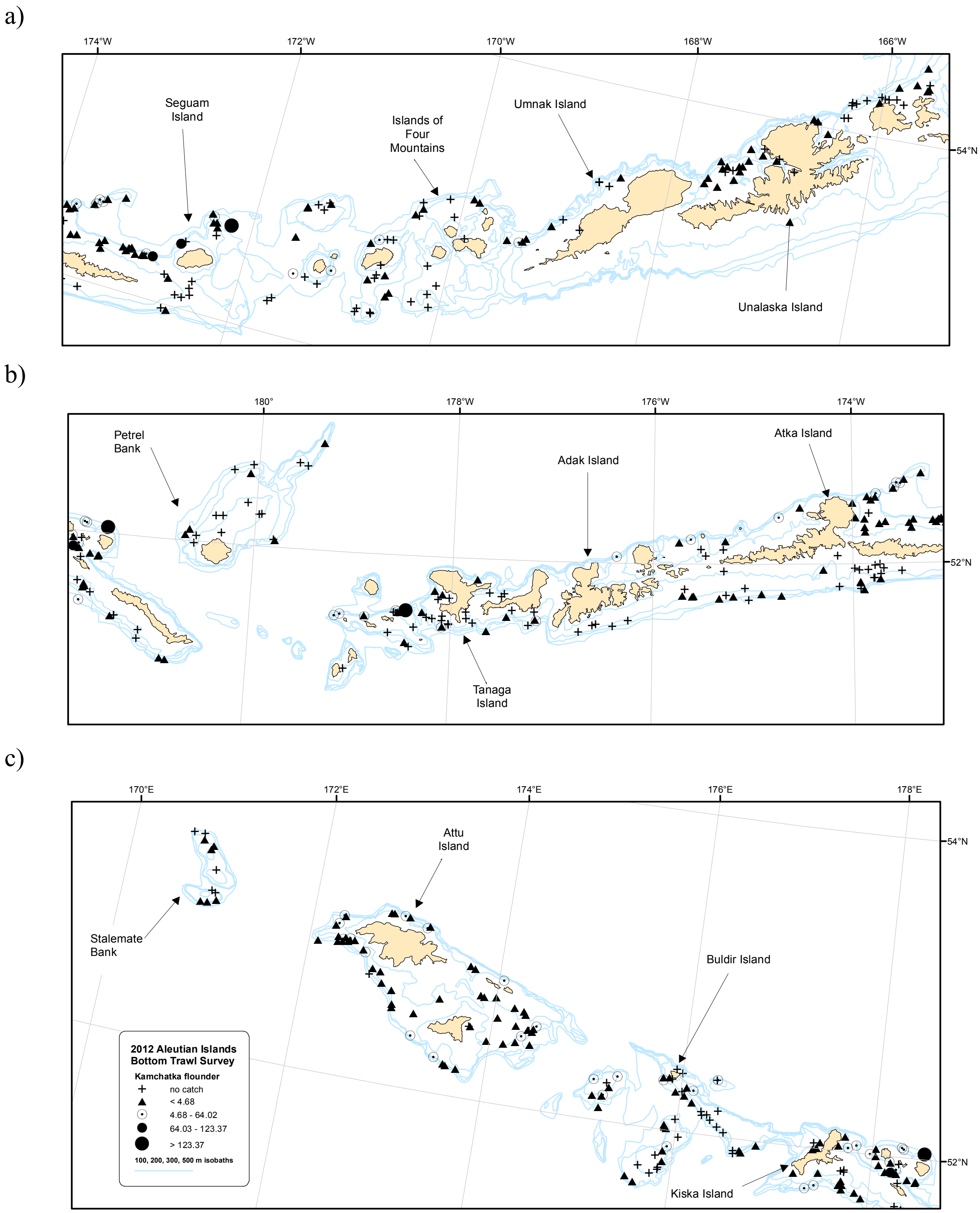


Figure 4. -- Distribution and relative abundance of Kamchatka flounder from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

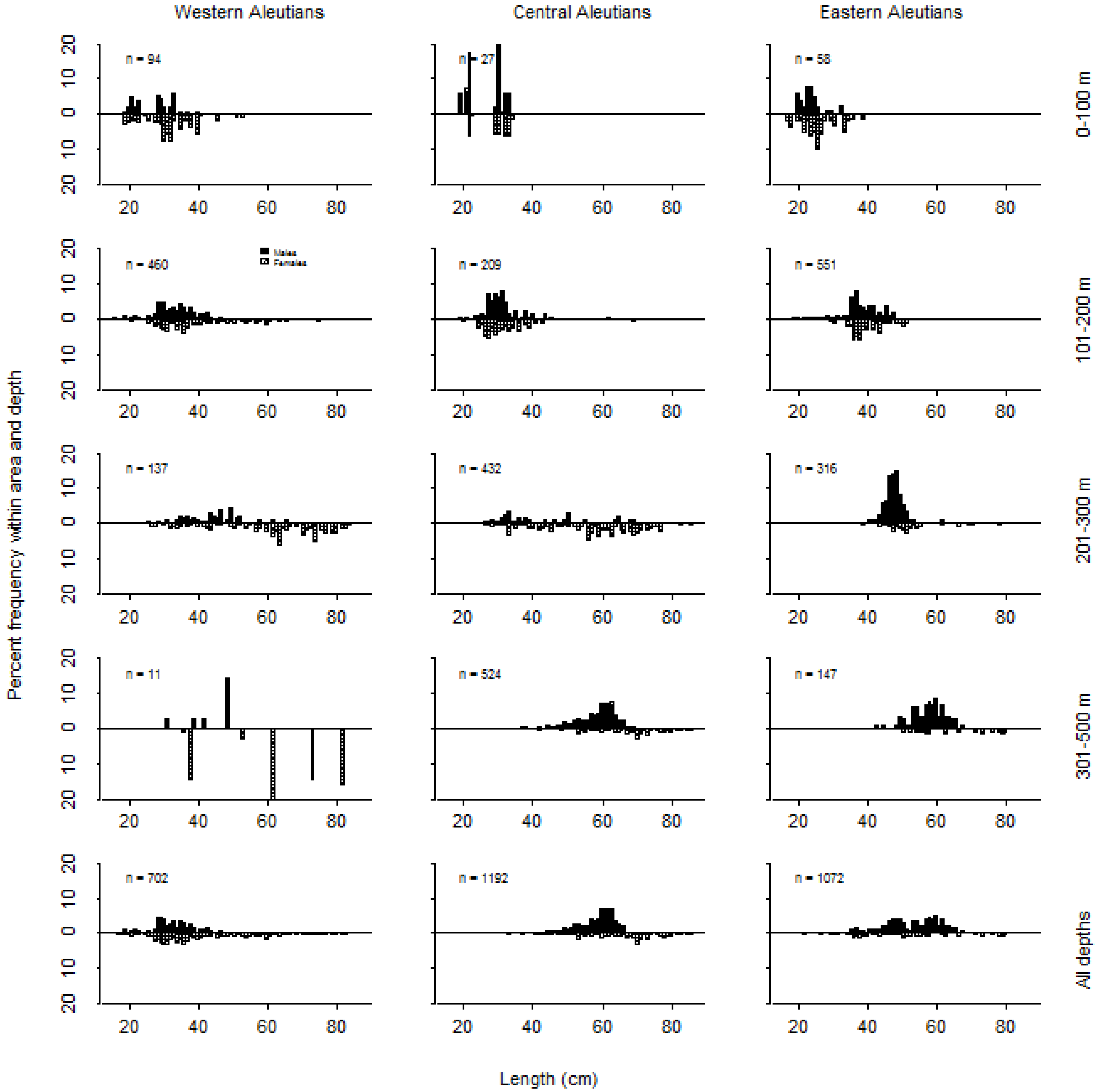


Figure 5. -- Length composition by depth intervals of Kamchatka flounder from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

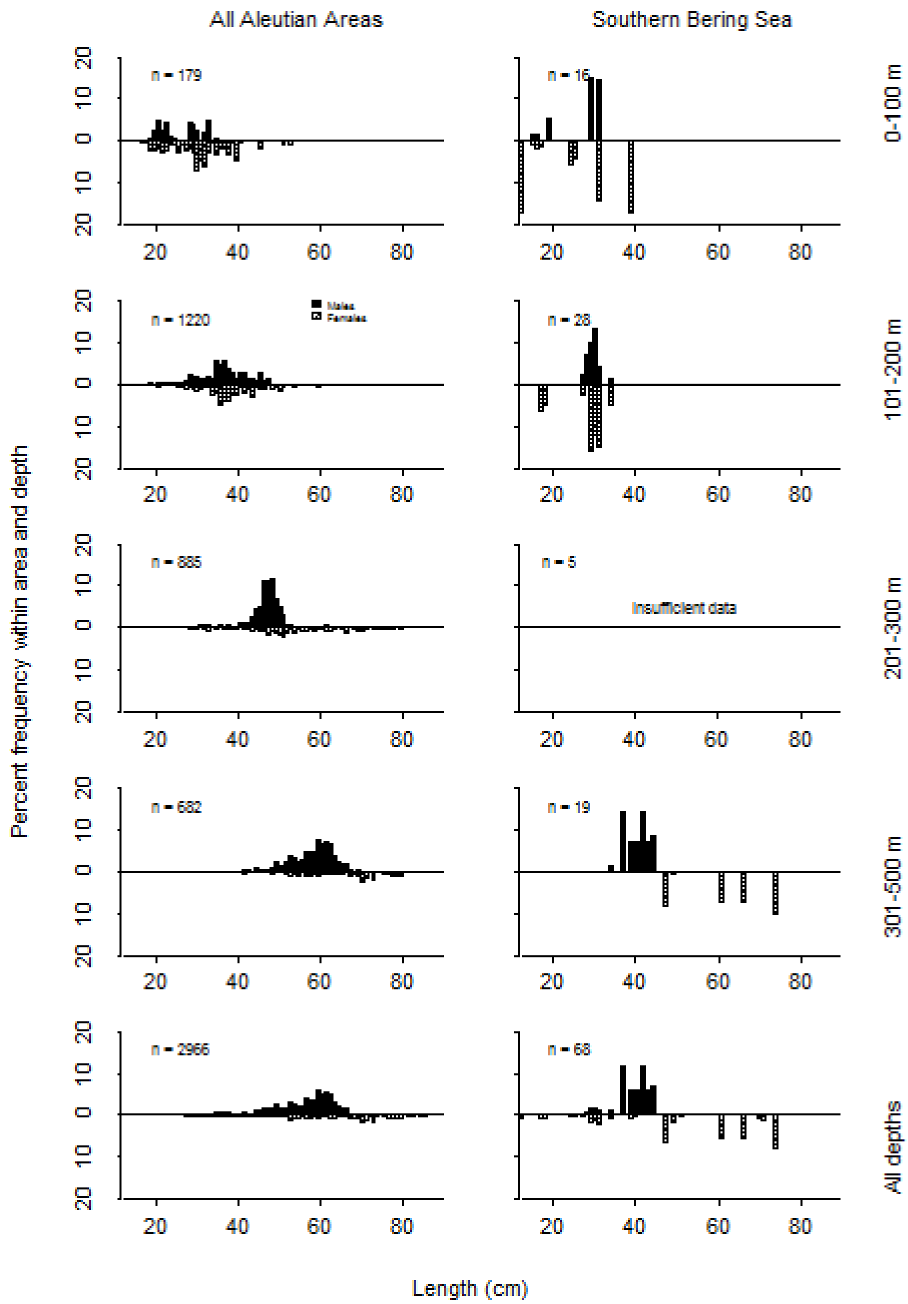


Figure 5. -- (continued).

Northern rock sole (*Lepidopsetta polyxystra*)

Northern rock sole was the sixth most abundant fish species and the most abundant flatfish species overall from the 2012 survey (Table 2). This species was caught in all areas, though it was much less common in the Southern Bering Sea (Table 7). In the Eastern and Western Aleutian Islands districts it was caught in depths shallower than 300 m and at all depths in the Central district. In all districts this species was most abundant in shallower depths. More than 65% of the estimated northern rock sole biomass among the Aleutian districts occurred in the 1-100 m depth interval and 95% occurred shallower than 200 m (Table 7). The largest catches occurred in the shallow waters of the Central Aleutian Islands between Buldir Island and Petrel Bank (Fig. 6); this area contained the two highest subdistrict-specific CPUEs for this species. The survey area comprised of the SW Central, North Central and Petrel Bank subareas in 1-100 m water depths represents only 7% of the study area (Appendix Table A-1) yet contains 27% of the northern rock sole population. This species was caught in all but one of the nineteen tows conducted in these three subdistricts (Table 8). They were also more common in depths greater than 200 m in the Central Aleutians district. Females were generally slightly larger than males (Fig. 7). Length-weight relationship parameters for males, females and combined sexes of northern rock sole were computed from our survey data (Appendix C).

Southern rock sole (*Lepidopsetta bilineata*)

Southern rock sole was the eighteenth most abundant species (Table 2) and the greatest abundance of southern rock sole was recorded in the Southern Bering Sea district (Table 9). They were common in shallow tows around Unalaska Island but rarely occurred west of Umnak (Table 8, Fig. 6). They did occur in a small cluster of stations just southeast of Atka Island (Fig. 8). Thus, the survey area encompasses what appears to be the western margin of the southern rock sole distribution in the Aleutian archipelago. In the Southern Bering Sea area 94% of the estimated biomass was found in the 1-100 m depth interval where all but three tows collected southern rock sole (Tables 9 and 10); the southern rock sole collected here also correspond to 64% of their overall biomass for the entire survey area. Virtually all of the southern rock sole longer than 41 cm were females, and males appear to be slightly shorter than females overall (Fig. 9). Length-weight relationship parameters for males, females and combined sexes of were computed from southern rock sole survey data (Appendix C).

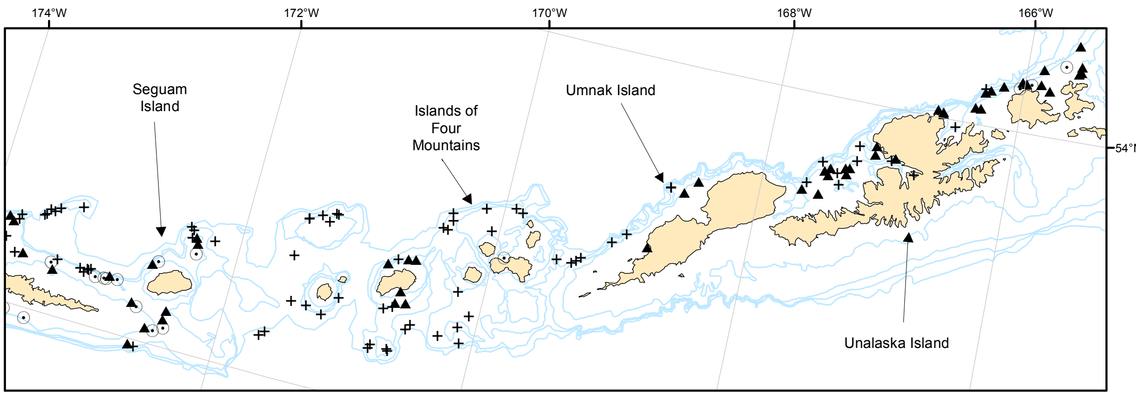
Table 7. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing northern rock sole, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	23	21.1	10,288	5,979	14,596	0.321
	101 - 200	57	37	5.55	2,953	1,439	4,466	0.383
	201 - 300	31	4	0.55	95	0	251	0.656
	301 - 500	9	0	---	---	---	---	---
	All depths	120	64	8.78	13,336	8,771	17,900	0.334
Central Aleutians	1 - 100	26	25	31.2	18,243	9,473	27,012	0.362
	101 - 200	41	39	18.73	8,628	321	16,935	0.548
	201 - 300	32	25	5.2	1,096	486	1,706	0.616
	301 - 500	14	3	3.36	1,339	0	7,029	0.661
	All depths	113	92	17.72	29,306	17,963	40,648	0.419
Eastern Aleutians	1 - 100	14	14	17.24	11,808	0	23,651	0.476
	101 - 200	59	45	9.54	7,408	3,965	10,851	0.564
	201 - 300	46	11	1.27	621	160	1,082	0.719
	301 - 500	13	0		---	---	---	---
	All depths	132	70	7.87	19,838	8,600	31,075	0.511
All Aleutian Areas	1 - 100	63	62	22.96	40,338	26,913	53,763	0.376
	101 - 200	157	121	10.73	18,989	10,443	27,535	0.519
	201 - 300	109	40	2.08	1,812	1,083	2,542	0.650
	301 - 500	36	3	1.04	1,339	0	7,029	0.661
	All depths	365	226	10.97	62,479	46,807	78,150	0.420
Southern Bering Sea	1 - 100	26	23	6.46	2,602	0	5,627	0.511
	101 - 200	16	12	2.05	380	0	854	0.541
	201 - 300	8	0	---	---	---	---	---
	301 - 500	5	0	---	---	---	---	---
	All depths	55	35	3.98	2,981	0	6,074	0.515

Table 8. -- Summary of northern rock sole mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by subdistrict (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	1-100	SW Central Aleutians	3	3	40.16	6,497	0	16,411
Central Aleutians	1-100	Petrel Bank	5	4	39.94	3,835	0	9,393
Central Aleutians	1-100	N Central Aleutians	11	11	34.30	7,222	2,190	12,254
Eastern Aleutians	1-100	NW Eastern Aleutians	2	2	31.41	6,069	0	48,690
Central Aleutians	101-200	SW Central Aleutians	15	15	26.50	2,788	1,285	4,291
Western Aleutians	1-100	W Western Aleutians	11	11	22.11	8,166	4,316	12,017
Central Aleutians	101-200	Petrel Bank	7	6	20.99	3,643	0	11,985
Eastern Aleutians	101-200	SW Eastern Aleutians	10	9	19.68	4,449	1,117	7,781
Western Aleutians	1-100	E Western Aleutians	12	12	17.93	2,121	7	4,236
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	17.63	2,235	0	8,755
Central Aleutians	101-200	SE Central Aleutians	10	9	17.31	1,301	447	2,155
Central Aleutians	301-500	SW Central Aleutians	2	1	16.75	1,322	0	18,122
Central Aleutians	201-300	SW Central Aleutians	7	7	10.01	426	0	865
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	9.67	1,843	0	20,661
Central Aleutians	201-300	N Central Aleutians	16	15	9.59	421	177	665
Eastern Aleutians	1-100	SE Eastern Aleutians	8	8	9.54	1,661	768	2,554
Southern Bering Sea	1-100	W Southern Bering Sea	2	2	9.21	1,461	0	9,343
Central Aleutians	101-200	N Central Aleutians	9	9	8.40	896	234	1,557
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	8.18	128	0	1,454
Western Aleutians	101-200	W Western Aleutians	35	28	6.99	2,841	1,330	4,352
Eastern Aleutians	201-300	SW Eastern Aleutians	6	5	6.26	448	17	879
Central Aleutians	1-100	SE Central Aleutians	7	7	5.92	689	179	1,200
Eastern Aleutians	101-200	NE Eastern Aleutians	26	16	5.85	1,177	489	1,865
Eastern Aleutians	101-200	SE Eastern Aleutians	19	16	5.42	1,030	395	1,664
Central Aleutians	201-300	SE Central Aleutians	5	3	5.21	249	0	741
Eastern Aleutians	101-200	NW Eastern Aleutians	4	4	4.72	753	0	1,872
Southern Bering Sea	1-100	E Southern Bering Sea	24	21	4.68	1,141	456	1,826
Southern Bering Sea	101-200	W Southern Bering Sea	2	2	2.99	200	0	1,884
Southern Bering Sea	101-200	E Southern Bering Sea	14	10	1.52	179	31	327
Western Aleutians	101-200	E Western Aleutians	22	9	0.89	111	15	207
Western Aleutians	201-300	W Western Aleutians	17	2	0.79	75	0	227
Western Aleutians	201-300	E Western Aleutians	14	2	0.27	21	0	59
Eastern Aleutians	201-300	NE Eastern Aleutians	26	4	0.23	45	0	109
Central Aleutians	301-500	N Central Aleutians	8	2	0.14	17	0	45

a)



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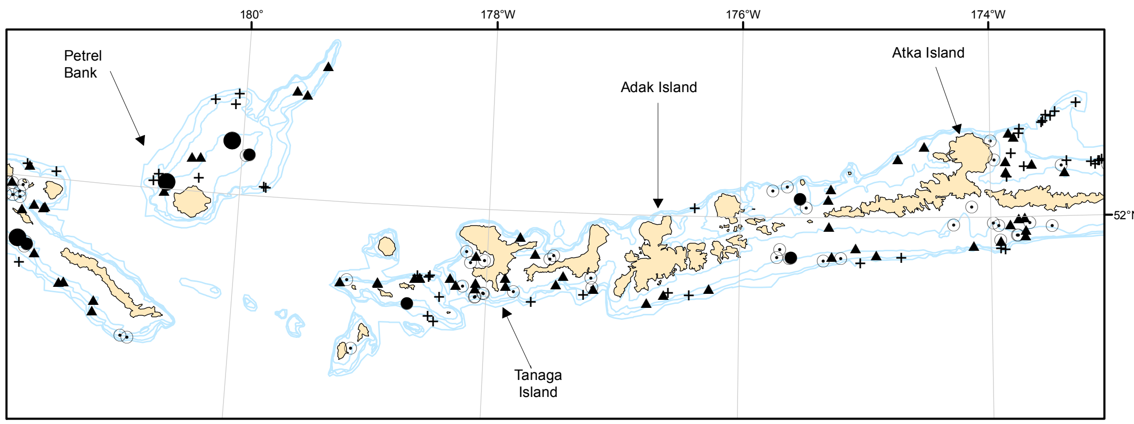

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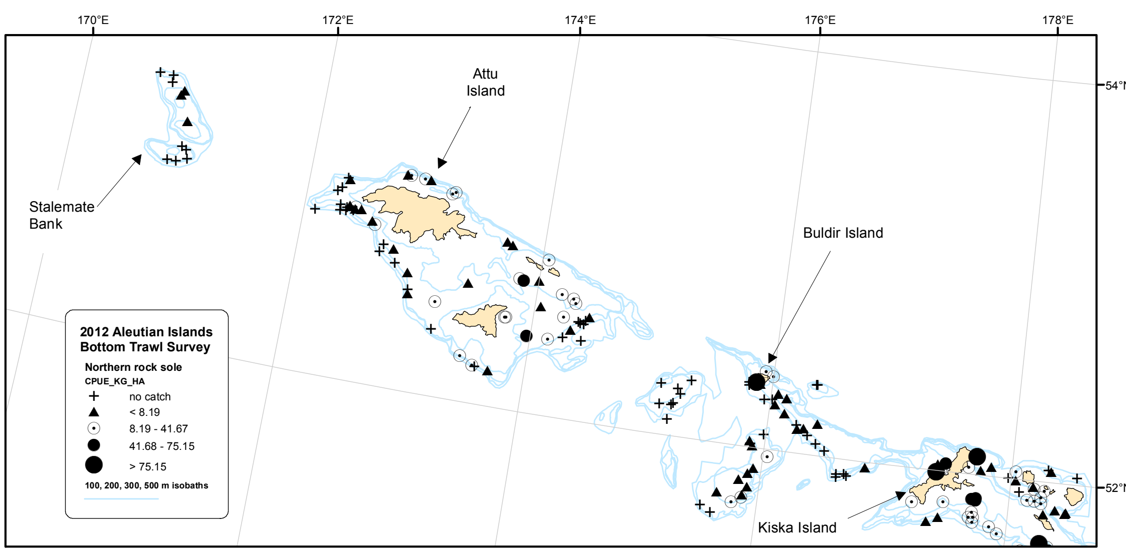


Figure 6. -- Distribution and relative abundance of northern rocksole from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

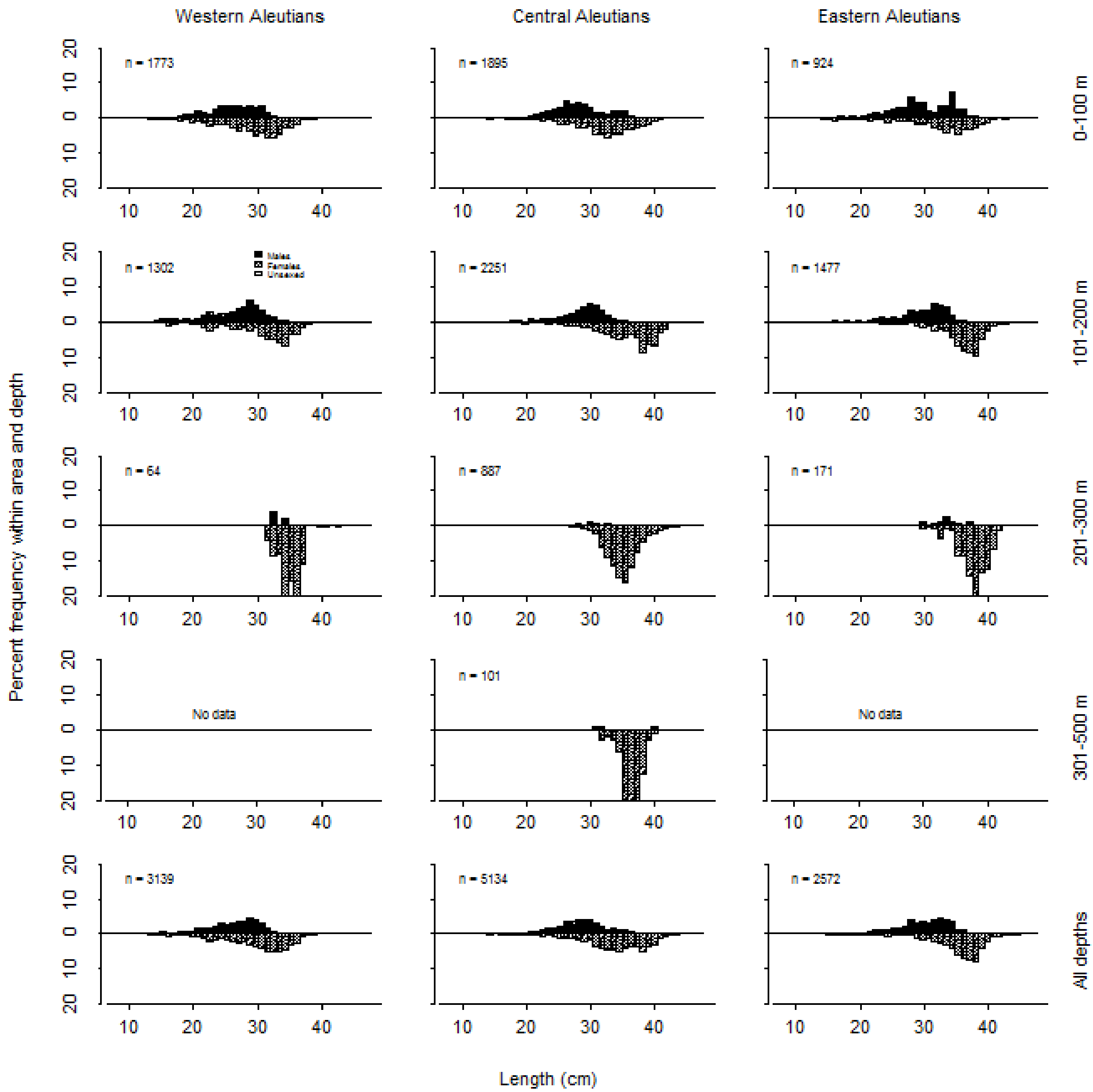


Figure 7. -- Length composition by depth intervals of northern rock sole from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

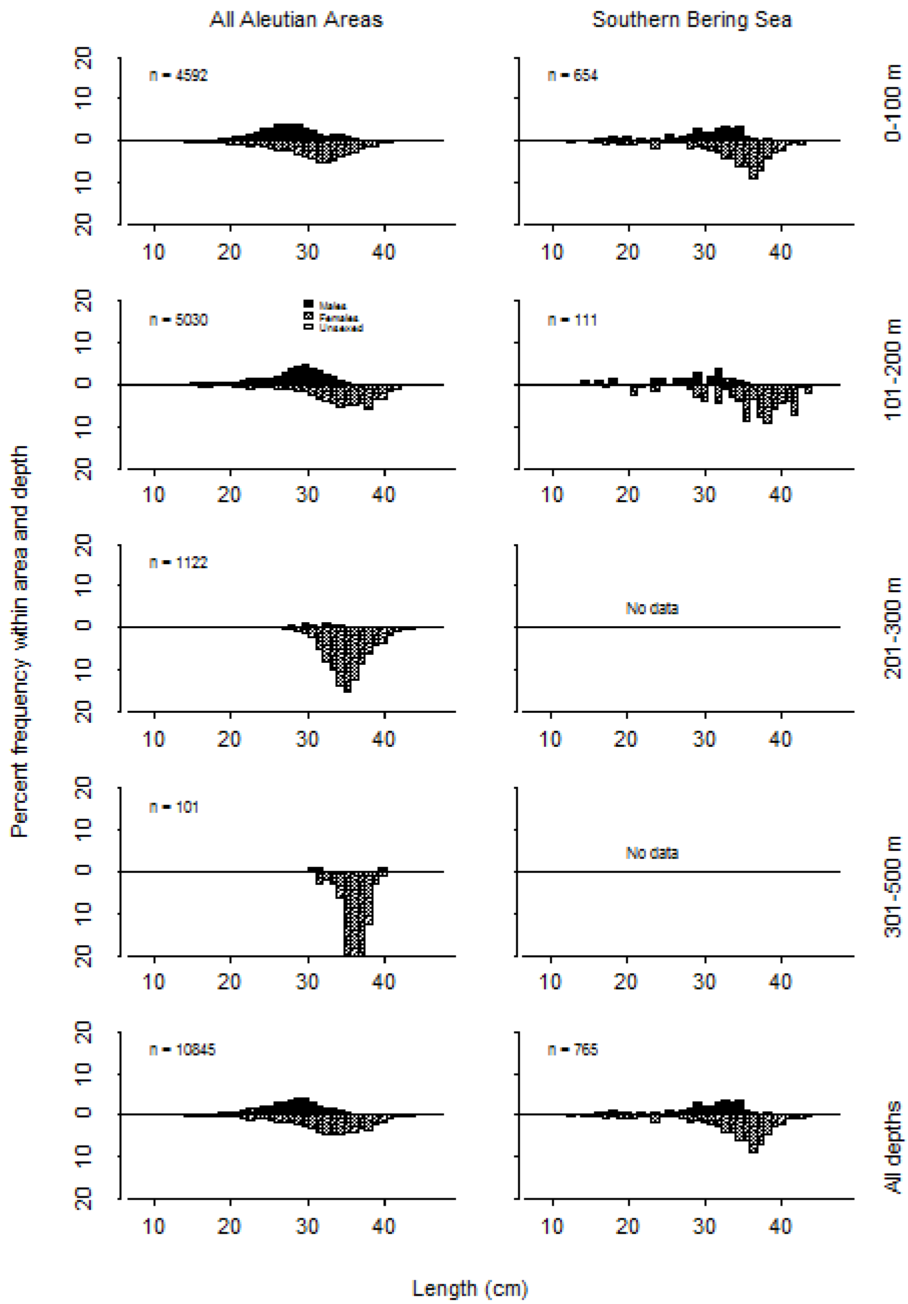


Figure 7. -- (continued).

Table 9. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing southern rock sole, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	**Depth (m)**	**Haul count**	**Hauls w/ catch**	**CPUE (kg/ha)**	**Biomass (t)**	**95% LCL (t)**	**95% UCL (t)**	**weight (kg)**
Western Aleutians	1 - 100	23	3	0.03	15	0	33	0.491
	101 - 200	57	0	---	---	---	---	---
	201 - 300	31	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	All depths	120	3	0.01	15	0	33	0.491
Central Aleutians	1 - 100	26	5	0.06	36	2	71	0.913
	101 - 200	41	1	0.01	2	0	7	0.543
	201 - 300	32	0	---	---	---	---	---
	301 - 500	14	0	---	---	---	---	---
	All depths	113	6	0.02	39	4	74	0.878
Eastern Aleutians	1 - 100	14	10	3.76	2,574	0	5,360	0.698
	101 - 200	59	6	0.18	140	0	421	0.611
	201 - 300	46	0	---	---	---	---	---
	301 - 500	13	0	---	---	---	---	---
	All depths	132	16	1.08	2,714	0	5,519	0.693
All Aleutian Areas	1 - 100	63	18	1.49	2,625	0	5,412	0.698
	101 - 200	157	7	0.08	143	0	423	0.610
	201 - 300	109	0	---	---	---	---	---
	301 - 500	36	0	---	---	---	---	---
	All depths	365	25	0.49	2,767	0	5,573	0.693
Southern Bering Sea	1 - 100	26	23	13.79	5,552	0	11,798	0.625
	101 - 200	16	6	1.83	338	80	595	0.702
	201 - 300	8	2	0.07	4	0	11	0.588
	301 - 500	5	0	---	---	---	---	---
	All depths	55	31	7.88	5,894	0	12,150	0.629

Table 10. -- Summary of southern rock sole mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by subdistrict (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Southern Bering Sea	1-100	W Southern Bering Sea	2	2	15.44	2,448	0	22,278
Southern Bering Sea	1-100	E Southern Bering Sea	24	21	12.72	3,105	642	5,567
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	6.56	832	0	4,906
Eastern Aleutians	1-100	SE Eastern Aleutians	8	7	5.92	1,031	88	1,973
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	3.73	711	0	9,741
Southern Bering Sea	101-200	W Southern Bering Sea	2	2	2.32	156	0	734
Southern Bering Sea	101-200	E Southern Bering Sea	14	4	1.54	182	0	420
Eastern Aleutians	101-200	NW Eastern Aleutians	4	1	0.62	99	0	413
Central Aleutians	1-100	SE Central Aleutians	7	2	0.16	19	0	52
Western Aleutians	1-100	E Western Aleutians	12	3	0.12	15	0	33
Eastern Aleutians	101-200	SE Eastern Aleutians	19	2	0.10	19	0	48
Central Aleutians	1-100	N Central Aleutians	11	3	0.08	17	0	38
Eastern Aleutians	101-200	SW Eastern Aleutians	10	1	0.07	17	0	55
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	2	0.07	4	0	11
Eastern Aleutians	101-200	NE Eastern Aleutians	26	2	0.03	6	0	14
Central Aleutians	101-200	SW Central Aleutians	15	1	0.02	2	0	7

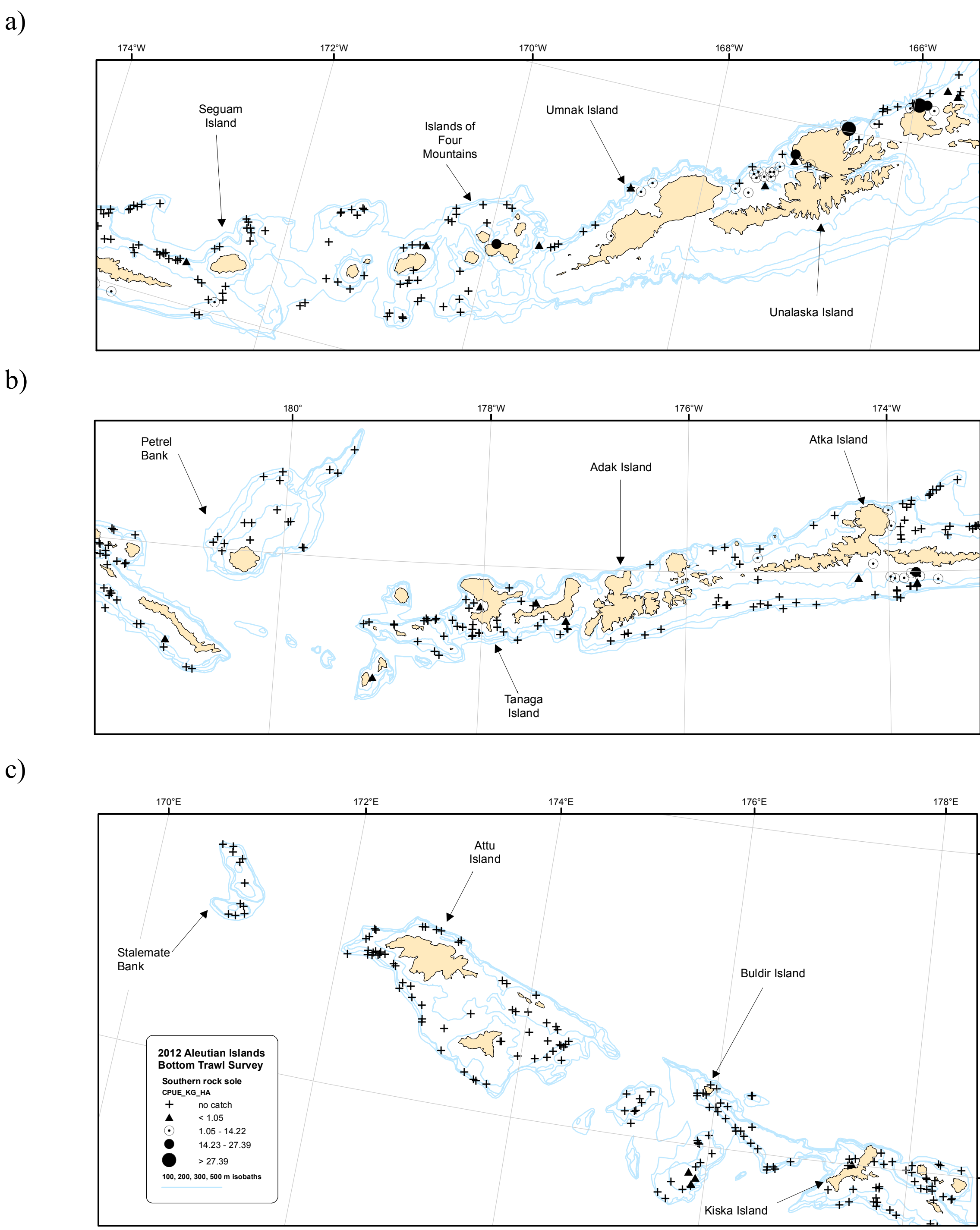


Figure 8. -- Distribution and relative abundance of southern rock sole from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

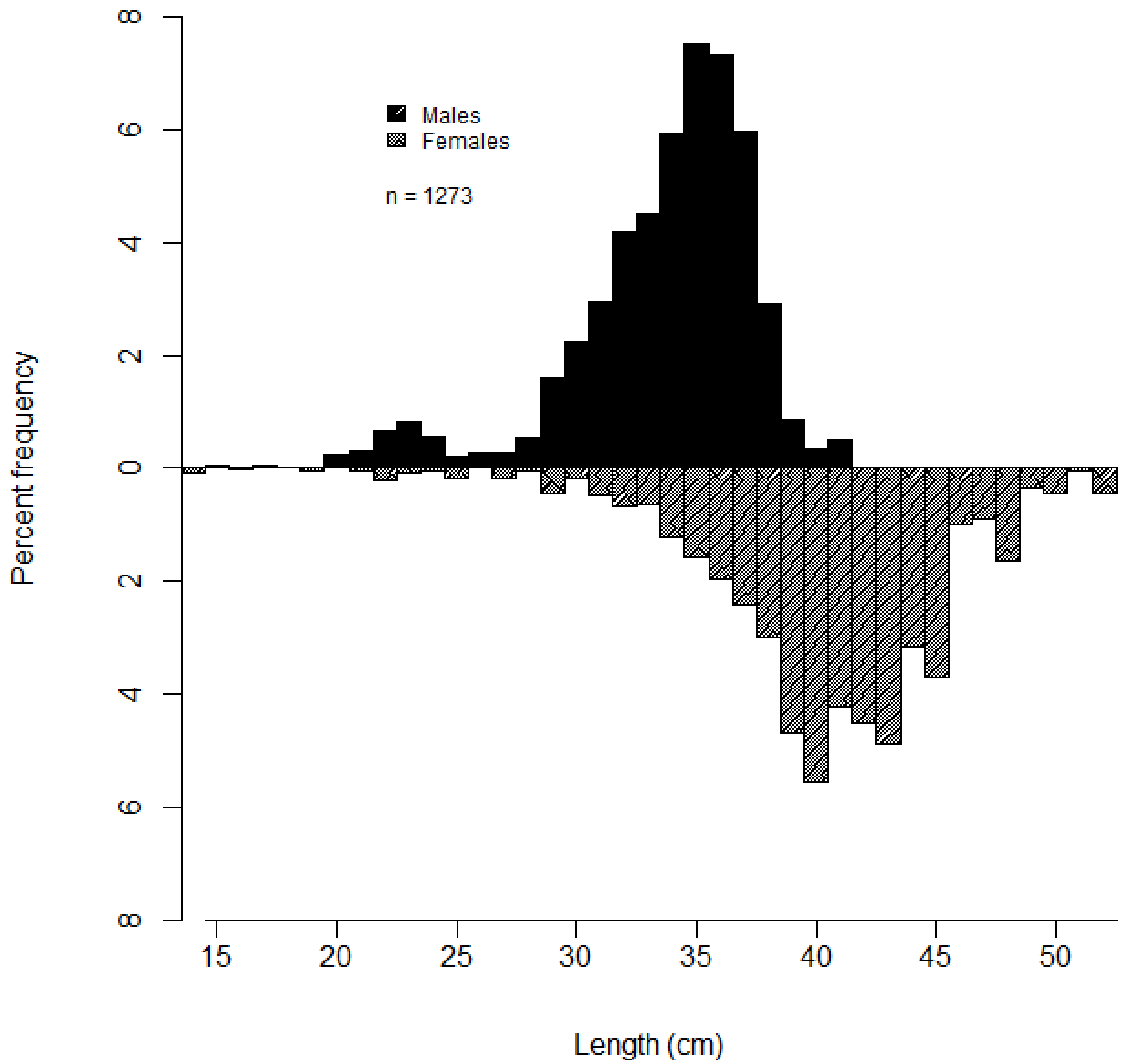


Figure 9. -- Length composition of southern rock sole from the 2012 Aleutian Islands bottom trawl survey.

Pacific halibut (*Hippoglossus stenolepis*)

Pacific halibut were the tenth most abundant fish and the fourth most abundant flatfish species caught in the 2012 survey (Table 2). They occurred throughout most of the survey area and at all depths (Fig.10). Their CPUE generally increased from west to east across the survey area with the largest catches and greatest estimated biomass of halibut occurring in the Eastern Aleutians district (Table 11). In addition to being more common in the eastern portion of the survey area, halibut were most common in depths less than 200 m with 86% of their estimated biomass in this depth range. The Combined Southern Bering Sea was an exception to this pattern where the 201-300 m depth interval had the second highest CPUE of the survey with a catch rate of 11.31 kg/ha (Table 11). The subdistrict with the highest CPUE was the W Southern Bering Sea 1-100 m depth interval with a catch rate of 22.43 kg/ha (Table 12). In all survey districts except the Western Aleutians district the mean weight was greatest in the 200-300 m depth range. Length frequency data showed a distinct mode at about 36 cm in the 1-100 and 101-200 m depth intervals (Fig. 11).

Greenland turbot (*Reinhardtius hippoglossoides*)

The Aleutian Islands population of commercially important Greenland turbot is likely under-estimated by this survey since the maximum depth sampled is less than 500 m which is a fraction of the depth range over which they are reportedly distributed (Mecklenburg et al. 2002). Relative abundance and estimated biomass were highest in the 301-500 m depth interval across all areas (Tables 13, 14, Fig. 12). Females were generally larger than males (Fig. 13). Results from the 1980 U.S.-Japan cooperative trawl survey partially explain these results by demonstrating that virtually all Greenland turbot larger than 75 cm fork length (FL) were females and that turbot greater than 75 cm FL were found most frequently in the 501-900 m depth interval which is not sampled in the present survey (Ronholt et al. 1986). Female depth distribution may be centered on deeper depths than that of males. Length-weight relationship parameters for males, females and combined sexes were computed from survey data for Greenland turbot (Appendix C).

Table 11. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing Pacific halibut, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	8	6.76	3,296	0	7,034	13.081
	101 - 200	57	4	0.78	415	0	928	15.775
	201 - 300	31	3	0.59	102	0	244	14.948
	301 - 500	9	0	---	---	---	---	---
	All depths	120	15	2.51	3,812	30	7,594	13.374
Central Aleutians	1 - 100	26	15	3.51	2,055	326	3,784	3.545
	101 - 200	41	21	4.96	2,286	1,215	3,357	4.968
	201 - 300	32	12	4.06	856	0	2,560	19.898
	301 - 500	14	2	1.12	445	0	1,276	17.996
	All depths	113	50	3.41	5,642	3,209	8,075	5.094
Eastern Aleutians	1 - 100	14	14	8.75	5,993	0	12,673	3.392
	101 - 200	59	48	8.34	6,477	4,121	8,833	3.557
	201 - 300	46	21	3.78	1,852	932	2,772	6.691
	301 - 500	13	2	0.23	128	0	329	4.352
	All depths	132	85	5.73	14,450	6,888	22,011	3.711
All Aleutian Areas	1 - 100	63	37	6.46	11,344	4,683	18,005	4.366
	101 - 200	157	73	5.19	9,177	6,622	11,733	3.977
	201 - 300	109	36	3.22	2,809	1,189	4,428	8.602
	301 - 500	36	4	0.44	573	0	1,373	10.584
	All depths	365	150	4.2	23,903	16,616	31,191	4.521
Southern Bering Sea	1 - 100	26	23	14.42	5,807	0	13,609	1.823
	101 - 200	16	12	4.72	873	0	1,909	2.359
	201 - 300	8	5	11.31	638	0	1,463	12.955
	301 - 500	5	4	3.17	331	19	643	6.562
	All depths	55	44	10.22	7,649	0	15,891	2.092

Table 12. -- Summary of Pacific halibut mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Southern Bering Sea	1-100	W Southern Bering Sea	2	2	22.41	3,553	0	24,988
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	5	11.31	638	0	1,484
Eastern Aleutians	1-100	NW Eastern Aleutians	2	2	10.93	2,112	0	26,113
Eastern Aleutians	101-200	SE Eastern Aleutians	19	16	10.88	2,068	1,111	3,025
Eastern Aleutians	101-200	NW Eastern Aleutians	4	4	10.85	1,729	0	3,924
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	9.95	1,262	0	10,889
Southern Bering Sea	1-100	E Southern Bering Sea	24	21	9.24	2,254	879	3,628
Eastern Aleutians	101-200	NE Eastern Aleutians	26	22	9.09	1,830	789	2,870
Western Aleutians	1-100	W Western Aleutians	11	7	8.84	3,265	0	7,048
Central Aleutians	101-200	N Central Aleutians	9	7	8.76	934	242	1,627
Central Aleutians	101-200	SE Central Aleutians	10	9	8.50	639	129	1,148
Central Aleutians	201-300	Petrel Bank	4	1	7.96	610	0	2,552
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	7.82	1,492	0	6,843
Central Aleutians	1-100	N Central Aleutians	11	6	6.50	1,370	0	3,081
Eastern Aleutians	1-100	SE Eastern Aleutians	8	8	6.48	1,128	425	1,830
Southern Bering Sea	101-200	E Southern Bering Sea	14	11	6.48	764	0	1,793
Eastern Aleutians	201-300	NW Eastern Aleutians	2	1	5.76	90	0	1,232
Eastern Aleutians	201-300	SE Eastern Aleutians	12	7	4.49	926	136	1,715
Eastern Aleutians	201-300	NE Eastern Aleutians	26	13	4.25	836	368	1,304
Central Aleutians	101-200	Petrel Bank	7	4	4.04	701	0	1,477
Eastern Aleutians	101-200	SW Eastern Aleutians	10	6	3.76	850	116	1,584
Central Aleutians	301-500	N Central Aleutians	8	2	3.59	445	0	1,298
Central Aleutians	1-100	SE Central Aleutians	7	6	3.34	389	85	693
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	4	3.17	331	0	668
Central Aleutians	201-300	N Central Aleutians	16	7	2.80	123	28	218
Central Aleutians	201-300	SE Central Aleutians	5	4	2.57	123	0	266
Central Aleutians	1-100	SW Central Aleutians	3	2	1.71	276	0	1,075
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	1.63	109	0	1,497
Western Aleutians	201-300	E Western Aleutians	14	2	1.04	82	0	221
Western Aleutians	101-200	W Western Aleutians	35	4	1.02	415	0	928
Eastern Aleutians	301-500	SE Eastern Aleutians	7	2	0.50	128	0	336
Western Aleutians	1-100	E Western Aleutians	12	1	0.26	31	0	99
Central Aleutians	1-100	Petrel Bank	5	1	0.22	21	0	78
Western Aleutians	201-300	W Western Aleutians	17	1	0.21	20	0	62
Central Aleutians	101-200	SW Central Aleutians	15	1	0.12	12	0	38

a)

b)

c)

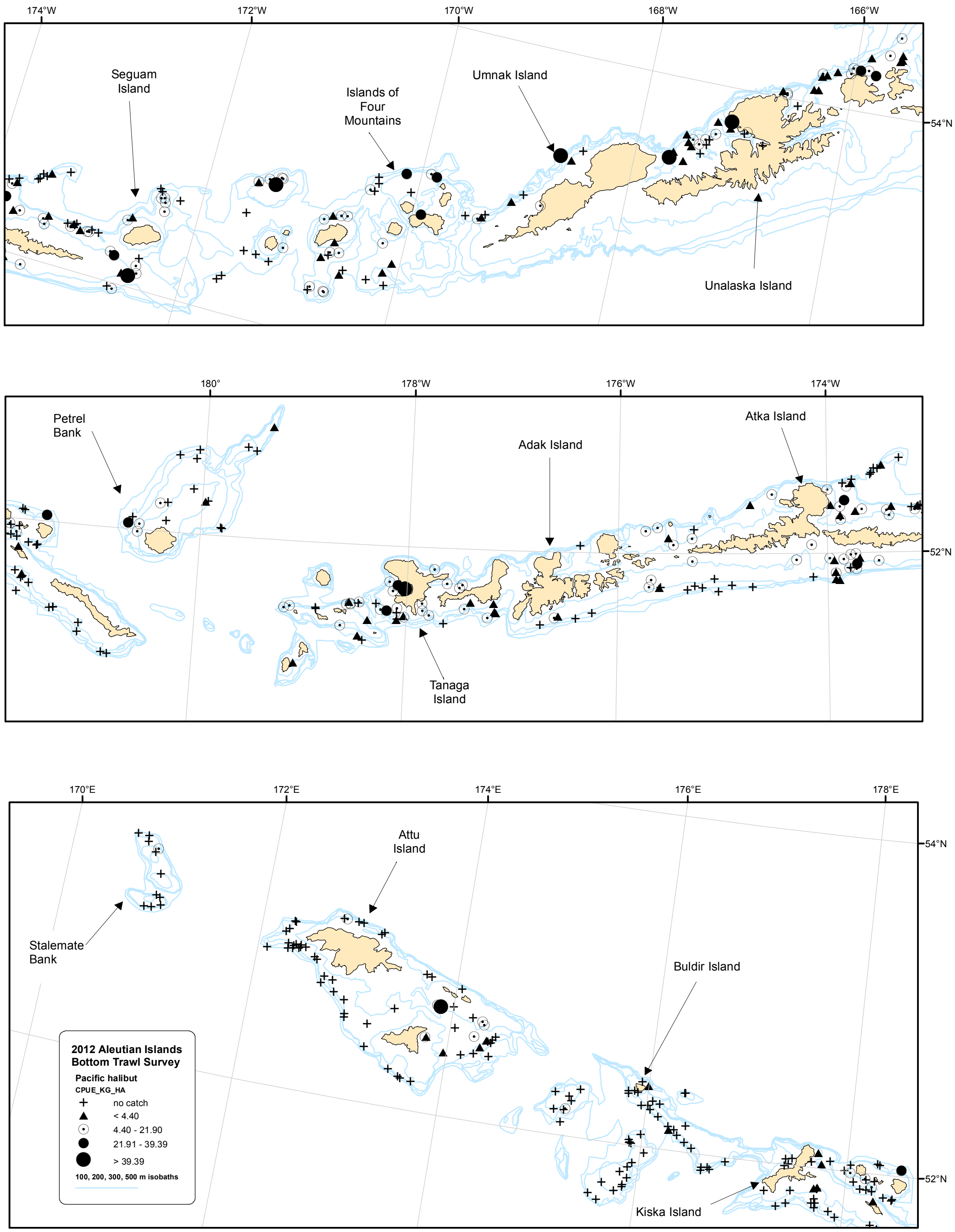


Figure 10. -- Distribution and relative abundance of Pacific halibut from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

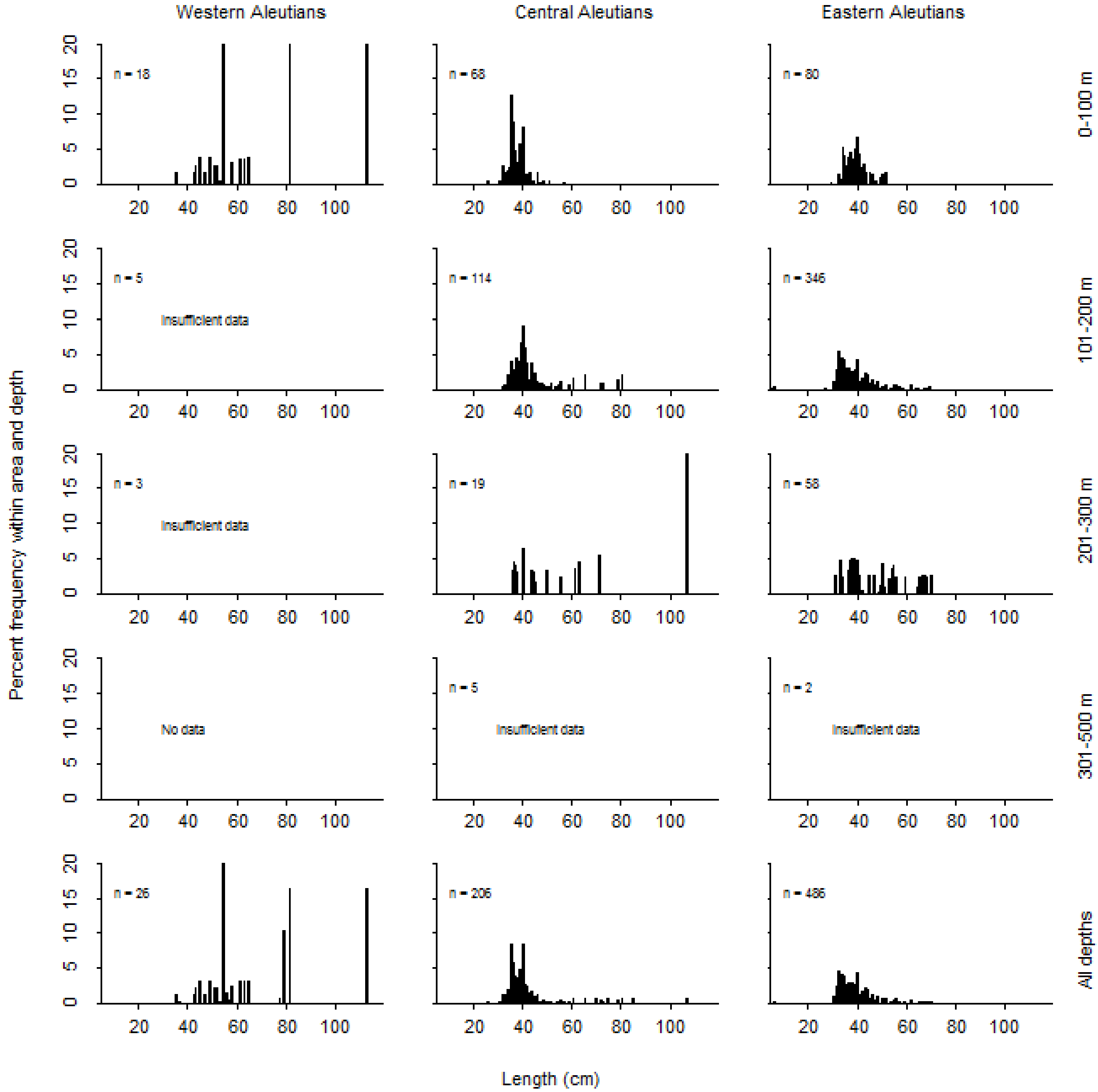


Figure 11. -- Length composition by depth intervals of Pacific halibut from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

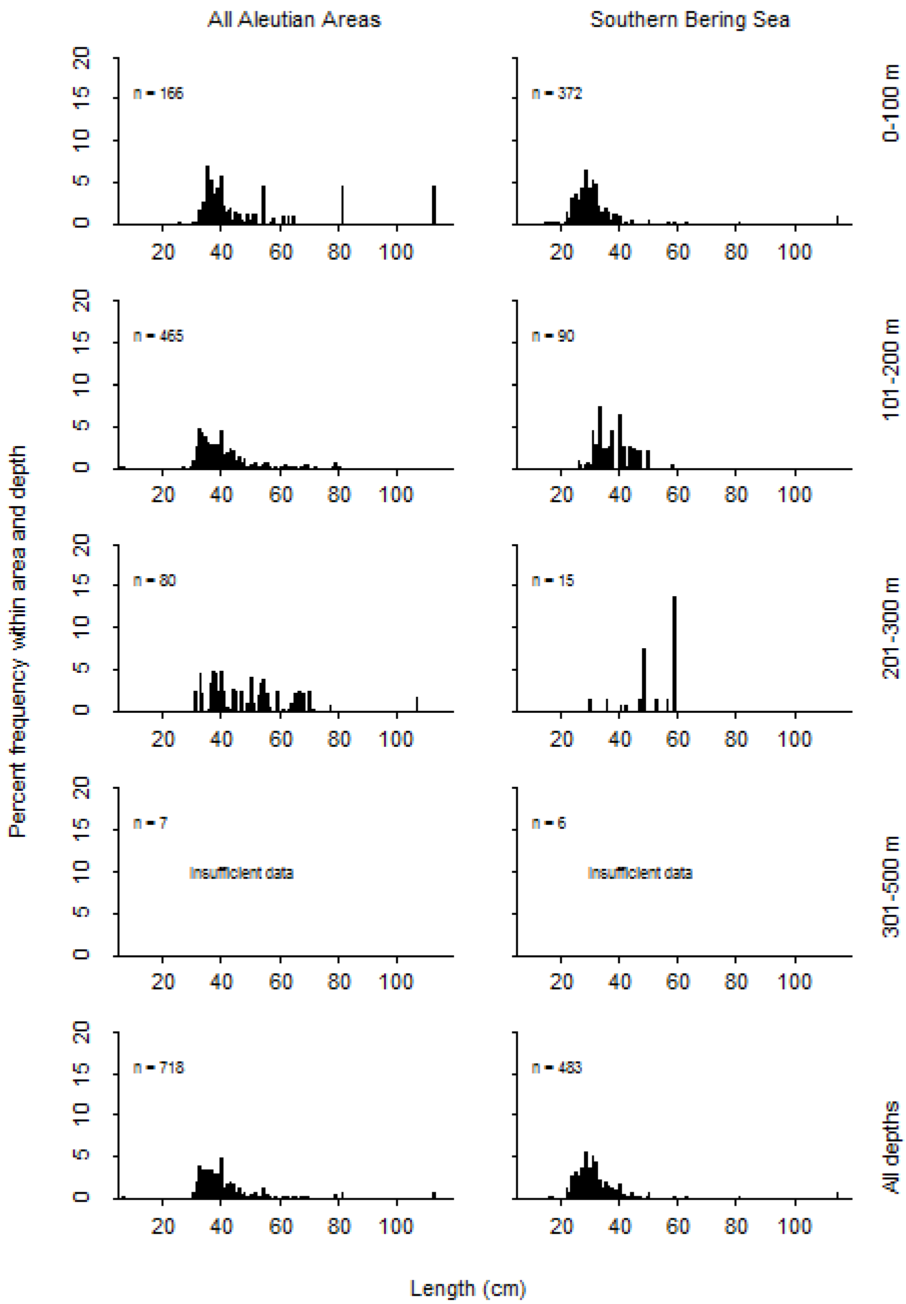


Figure 11. -- (continued).

Table 13. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing Greenland turbot, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	0	---	---	---	---	---
	201 - 300	31	3	0.38	65	0	141	5.044
	301 - 500	9	5	3.14	1,026	0	3,903	5.822
	All depths	120	8	0.72	1,091	0	3,972	5.769
Central Aleutians	1 - 100	26	1	0.18	106	0	378	12.101
	101 - 200	41	1	0.61	282	0	948	8.638
	201 - 300	32	1	0.04	9	0	27	3.639
	301 - 500	14	5	2.1	835	0	2,689	4.873
	All depths	113	8	0.74	1,231	0	2,517	5.724
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	0	---	---	---	---	---
	201 - 300	46	1	0.04	18	0	55	2.771
	301 - 500	13	2	0.29	163	0	457	3.177
	All depths	132	3	0.07	181	0	478	3.131
All Aleutian Areas	1 - 100	63	1	0.06	106	0	378	12.101
	101 - 200	157	1	0.16	282	0	948	8.638
	201 - 300	109	5	0.1	91	7	176	4.209
	301 - 500	36	12	1.56	2,023	0	4,584	5.074
	All depths	365	19	0.44	2,502	0	5,239	5.418
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	0	---	---	---	---	---
	201 - 300	8	0	---	---	---	---	---
	301 - 500	5	1	0.94	98	0	349	3.779
	All depths	55	1	0.13	98	0	349	3.779

Table 14. -- Summary of Greenland turbot mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	301-500	SW Central Aleutians	2	1	4.97	392	0	5,374
Western Aleutians	301-500	E Western Aleutians	2	1	4.14	646	0	8,859
Western Aleutians	301-500	W Western Aleutians	7	4	2.22	380	0	799
Central Aleutians	301-500	Petrel Bank	2	2	1.87	231	0	510
Central Aleutians	101-200	Petrel Bank	7	1	1.62	282	0	971
Central Aleutians	301-500	N Central Aleutians	8	1	1.40	173	0	583
Central Aleutians	1-100	Petrel Bank	5	1	1.10	106	0	400
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	1	0.94	98	0	369
Western Aleutians	201-300	W Western Aleutians	17	3	0.69	65	0	142
Central Aleutians	301-500	SE Central Aleutians	2	1	0.54	39	0	529
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	1	0.40	107	0	445
Eastern Aleutians	301-500	SE Eastern Aleutians	7	1	0.22	56	0	193
Central Aleutians	201-300	N Central Aleutians	16	1	0.19	9	0	27
Eastern Aleutians	201-300	NE Eastern Aleutians	26	1	0.09	18	0	55

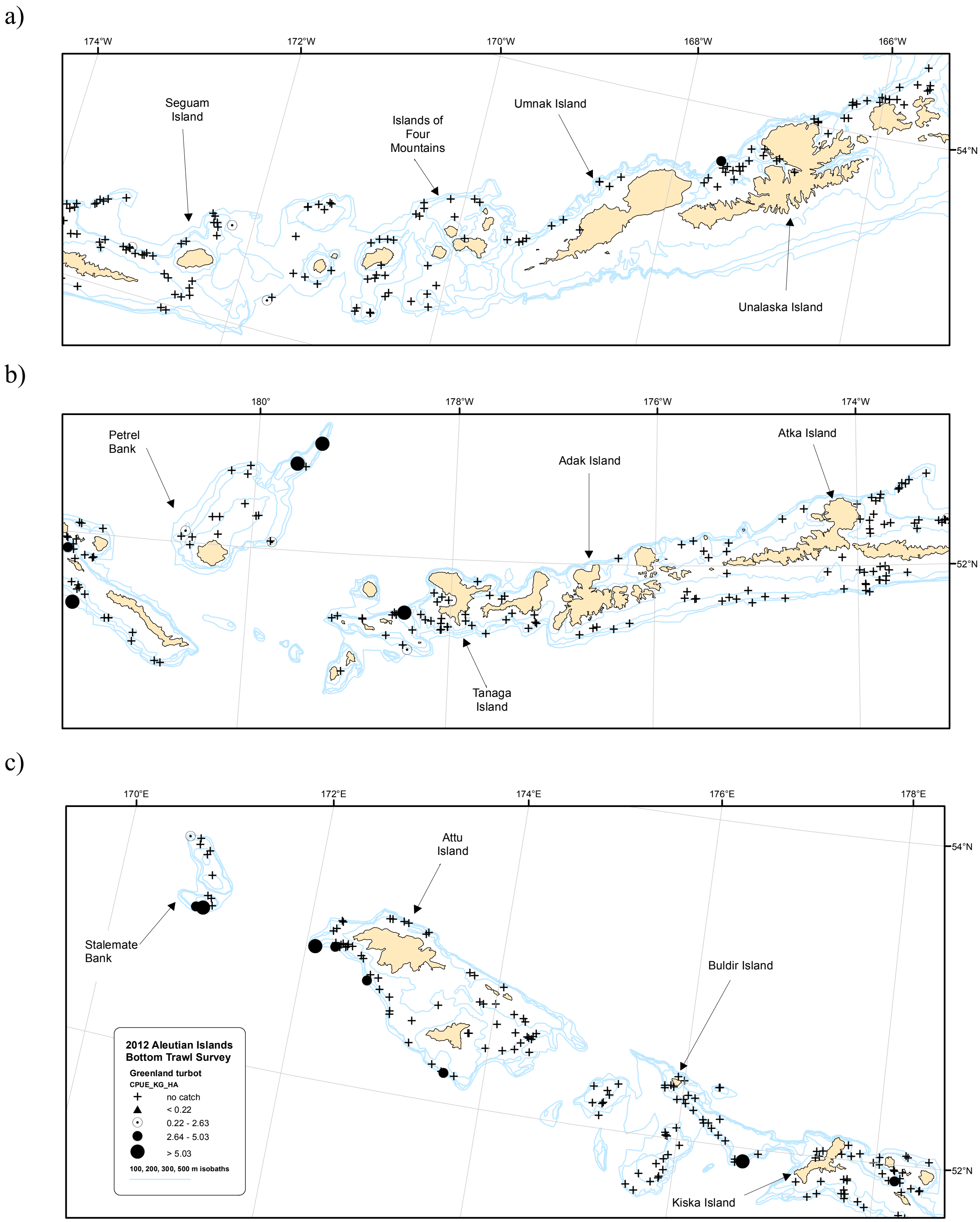


Figure 12. -- Distribution and relative abundance of Greenland turbot from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

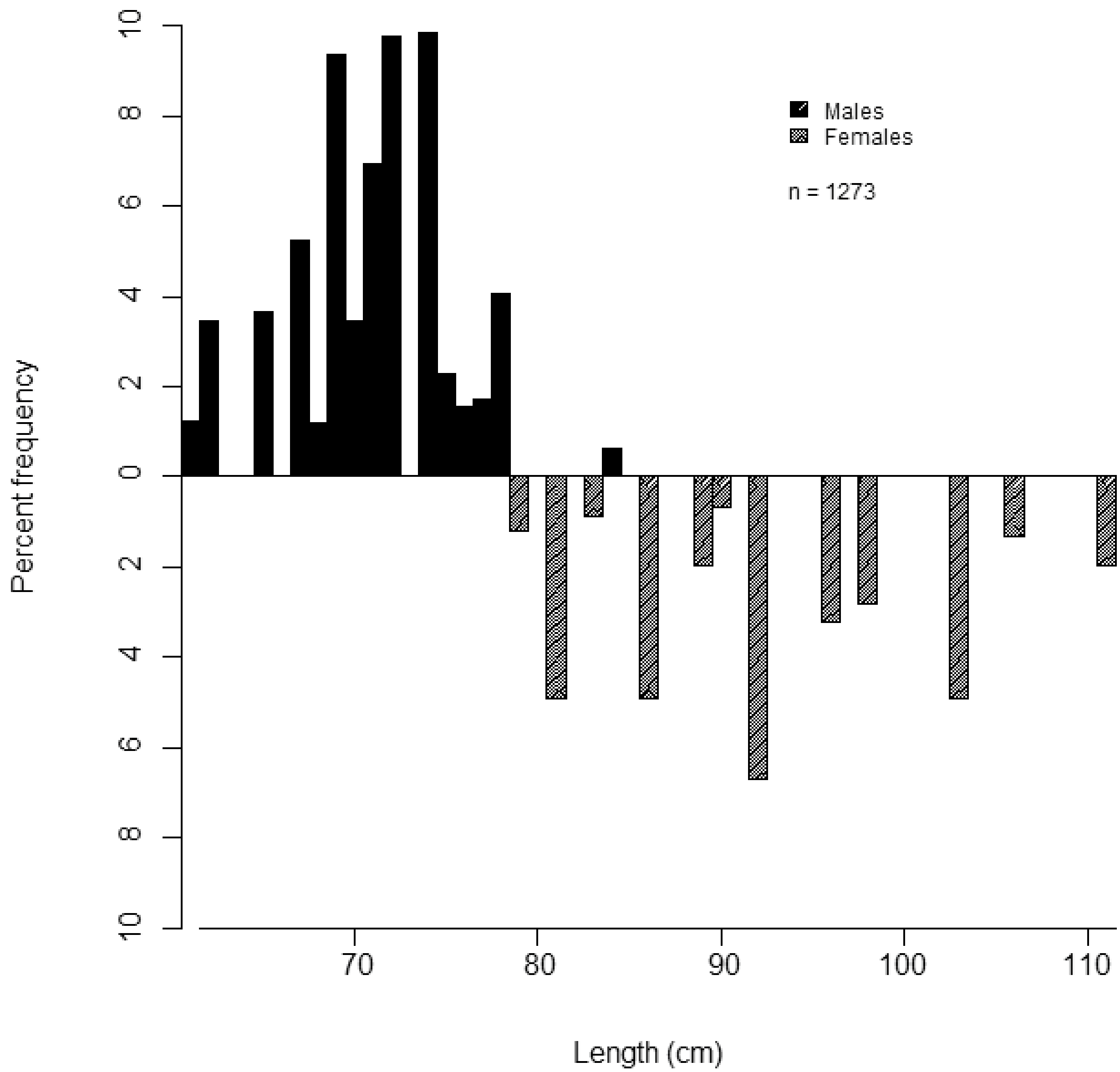


Figure 13. -- Length composition of Greenland turbot from the 2012 Aleutian Islands bottom trawl survey.

Flathead sole (*Hippoglossoides elassodon*)

Flathead sole are widely distributed throughout the Aleutians in relatively low abundance. They were ranked twentieth among the top 20 taxa by mean CPUE (Table 2). Their estimated total biomass was 5,566 t, with 77% of that found in the Western and Eastern Aleutian districts (Table 15). The highest mean flathead sole CPUE was recorded from the NW Eastern Aleutians subdistrict between 201 and 300 m while the next highest ranking subdistricts were shallower (Table 16). The top six subdistricts contained 85% of the estimated biomass even though these subdistricts constituted only 21% of the survey area (Appendix Table A-1). Flathead sole were patchily distributed across the Aleutian archipelago with the six largest station-specific CPUEs dispersed between Unalaska in the east and Attu in the west (Fig. 14). Fish length did not appear to be depth dependent but females appeared longer than males in most areas (Fig. 15).

Rex sole (*Glyptocephalus zachirus*)

Rex sole were widely dispersed across the survey area in relatively low abundance (Table 2). Their abundance varied geographically and displayed a trend of higher mean CPUEs in deeper eastern Aleutian waters: 101-200 m in the Western Aleutians, 201-300 m in the Central and Eastern Aleutians, and 301-500 m in the Southern Bering Sea district. Catches in the Southern Bering Sea accounted for about 41% of their estimated biomass of 14,100 t (Table 17) even though the area encompassed in this district is less than 12% of the total survey area (Table 1). The Combined Southern Bering Sea subarea in 301-500 m of water yielded the highest mean CPUE which was nearly double that of the next highest CPUE (Table 18). Most of the largest catches were collected around Unalaska Island (Fig. 16). Males were generally smaller than females; females dominated the catches in depths less than 300 m in the Aleutian districts while males were more dominant in the Southern Bering Sea district (Fig. 17).

Dover sole (*Microstomus pacificus*)

Dover sole were not abundant in the survey area and primarily occurred at depths greater than 100 m and have an estimated biomass of 1,200 t (Table 19). Abundance most likely does not approach commercially exploitable levels but this species is of biological interest as part of the Aleutian ecosystem. Their highest estimated biomass was reported from the 1-100 m depth interval in the Central Aleutian district (Table 19); specifically from three tows from the 1-100 m depth interval on Petrel Bank subdistrict (Table 20). Females were slightly larger than males (Fig 18).

Table 15. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing flathead sole, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	10	2.52	1,231	401	2,060	0.296
	101 - 200	57	36	3.50	1,860	830	2,890	0.269
	201 - 300	31	11	0.67	116	21	211	0.179
	301 - 500	9	0		---	---	---	---
	All depths	120	57	2.11	3,206	1,911	4,502	0.273
Central Aleutians	1 - 100	26	1	0.02	12	0	37	0.257
	101 - 200	41	6	0.08	37	0	83	0.604
	201 - 300	32	6	0.18	38	0	80	0.611
	301 - 500	14	0		---	---	---	---
	All depths	113	13	0.05	87	21	152	0.514
Eastern Aleutians	1 - 100	14	2	0.05	36	0	169	0.370
	101 - 200	59	19	1.16	902	337	1,466	0.257
	201 - 300	46	13	0.33	161	0	456	0.500
	301 - 500	13	0		---	---	---	---
	All depths	132	34	0.44	1,099	501	1,697	0.280
All Aleutian Areas	1 - 100	63	13	0.73	1,278	446	2,111	0.297
	101 - 200	157	61	1.58	2,799	1,635	3,962	0.267
	201 - 300	109	30	0.36	315	65	565	0.306
	301 - 500	36	0		---	---	---	---
	All depths	365	104	0.77	4,392	2,969	5,815	0.278
Southern Bering Sea	1 - 100	26	19	1.23	495	277	714	0.360
	101 - 200	16	14	3.55	656	0	1,622	0.174
	201 - 300	8	1	0.12	7	0	22	0.698
	301 - 500	5	2	0.15	15	0	44	0.584
	All depths	55	36	1.57	1,174	203	2,145	0.226

Table 16. -- Summary of flathead sole mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	6.52	102	0	1,238
Southern Bering Sea	101-200	E Southern Bering Sea	14	13	4.96	585	0	1,552
Western Aleutians	101-200	W Western Aleutians	35	30	4.39	1,783	756	2,809
Western Aleutians	1-100	W Western Aleutians	11	10	3.33	1,231	391	2,070
Eastern Aleutians	101-200	NE Eastern Aleutians	26	13	2.72	546	51	1,042
Southern Bering Sea	1-100	E Southern Bering Sea	24	19	2.03	495	276	715
Eastern Aleutians	101-200	SW Eastern Aleutians	10	5	1.48	333	30	637
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	1.07	71	0	979
Western Aleutians	201-300	W Western Aleutians	17	9	0.78	74	11	137
Western Aleutians	101-200	E Western Aleutians	22	6	0.62	77	0	168
Western Aleutians	201-300	E Western Aleutians	14	2	0.54	42	0	119
Central Aleutians	201-300	N Central Aleutians	16	3	0.44	19	0	55
Eastern Aleutians	201-300	SW Eastern Aleutians	6	3	0.43	30	0	84
Central Aleutians	101-200	SW Central Aleutians	15	4	0.26	28	0	73
Central Aleutians	201-300	SW Central Aleutians	7	2	0.25	11	0	29
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	0.24	30	0	415
Central Aleutians	201-300	SE Central Aleutians	5	1	0.17	8	0	30
Eastern Aleutians	201-300	NE Eastern Aleutians	26	8	0.15	29	5	54
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	2	0.15	15	0	46
Eastern Aleutians	101-200	NW Eastern Aleutians	4	1	0.14	22	0	91
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	1	0.12	7	0	23
Central Aleutians	101-200	N Central Aleutians	9	1	0.06	6	0	20
Central Aleutians	1-100	N Central Aleutians	11	1	0.05	12	0	37
Central Aleutians	101-200	SE Central Aleutians	10	1	0.05	3	0	11
Eastern Aleutians	1-100	SE Eastern Aleutians	8	1	0.03	6	0	20

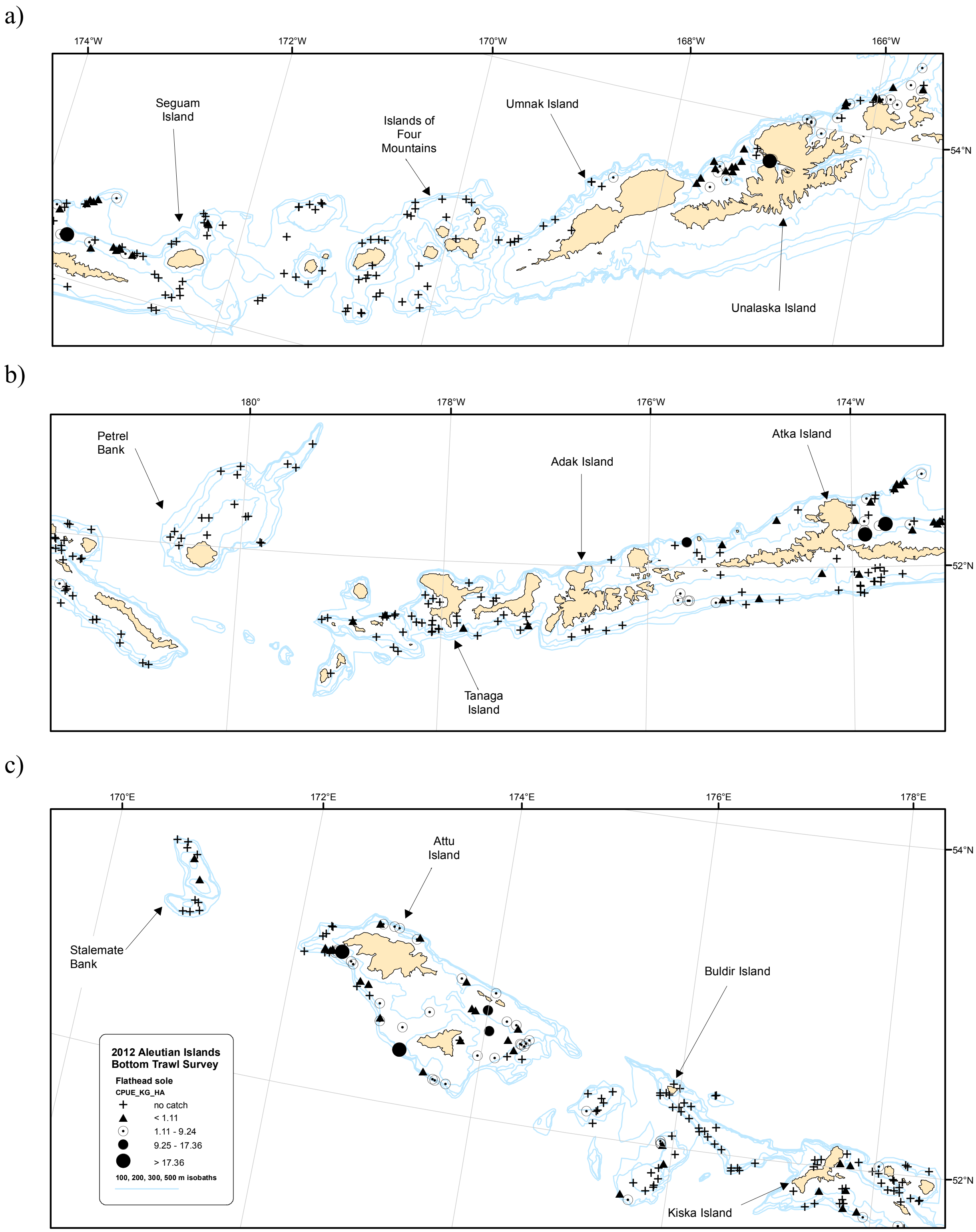


Figure 14. --Distribution and relative abundance of flathead sole from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

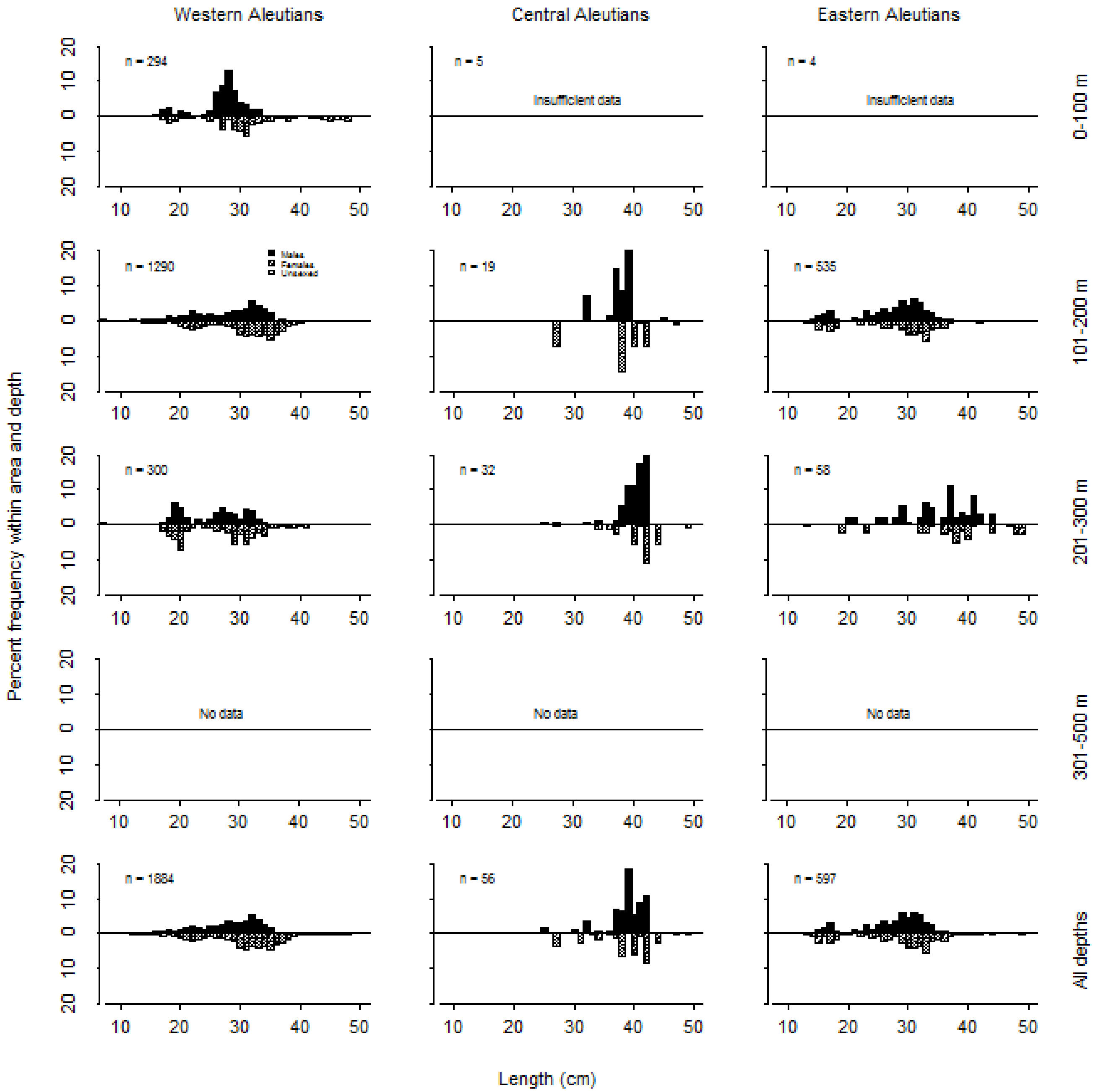


Figure 15. --Length composition by depth intervals of flathead sole from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

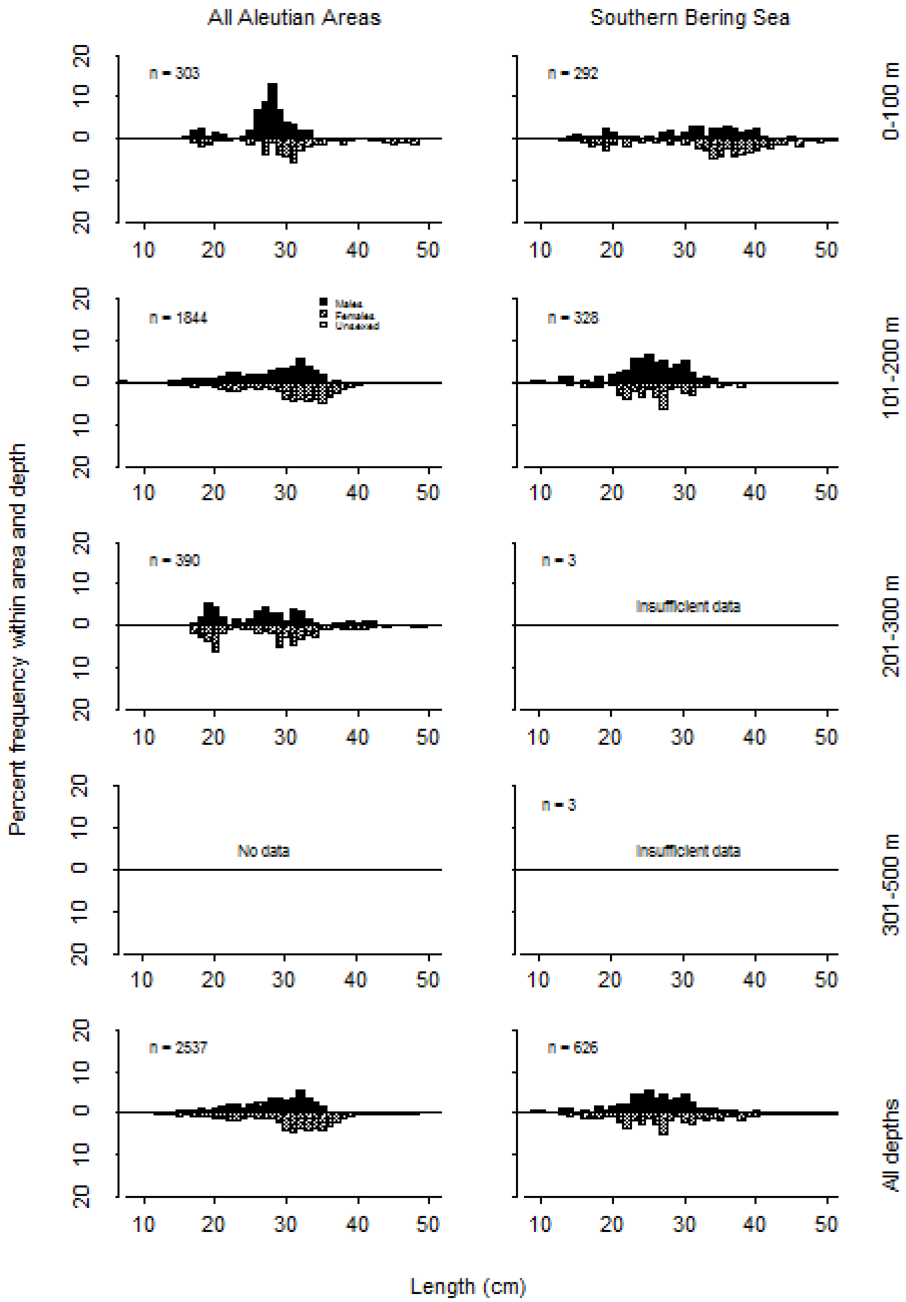


Figure 15. -- (continued).

Table 17. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing rex sole, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	9	1.11	541	0	1,113	0.810
	101 - 200	57	36	3.99	2,121	839	3,402	0.517
	201 - 300	31	15	2.01	346	72	619	0.422
	301 - 500	9	5	0.77	251	0	561	0.608
	All depths	120	65	2.15	3,258	1,833	4,684	0.543
Central Aleutians	1 - 100	26	3	0.04	25	0	55	1.015
	101 - 200	41	14	0.37	169	48	291	0.546
	201 - 300	32	16	3.43	724	118	1,330	0.701
	301 - 500	14	10	2.74	1,090	327	1,854	0.795
	All depths	113	43	1.21	2,008	1,025	2,991	0.733
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	20	1.53	1,185	0	2,395	0.781
	201 - 300	46	19	2.74	1,343	321	2,365	0.655
	301 - 500	13	5	0.90	513	0	1,096	0.617
	All depths	132	44	1.21	3,041	1,436	4,645	0.691
All Aleutian Areas	1 - 100	63	12	0.32	566	0	1,133	0.818
	101 - 200	157	70	1.96	3,475	1,767	5,182	0.586
	201 - 300	109	50	2.76	2,413	1,217	3,609	0.618
	301 - 500	36	20	1.43	1,854	930	2,777	0.709
	All depths	365	152	1.46	8,307	6,045	10,570	0.632
Southern Bering Sea	1 - 100	26	16	0.64	256	100	412	0.519
	101 - 200	16	14	5.81	1,075	257	1,892	0.530
	201 - 300	8	6	11.65	657	0	1,784	0.578
	301 - 500	5	3	36.50	3,807	0	11,750	0.619
	All depths	55	39	7.75	5,795	0	13,898	0.591

Table 18. -- Summary of rex sole mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	3	36.50	3,807	0	12,384
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	19.04	297	0	4,025
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	6	11.65	657	0	1,812
Eastern Aleutians	201-300	SW Eastern Aleutians	6	5	9.04	647	0	1,517
Southern Bering Sea	101-200	E Southern Bering Sea	14	13	8.90	1,050	228	1,871
Central Aleutians	201-300	SW Central Aleutians	7	4	8.33	355	0	957
Central Aleutians	301-500	SE Central Aleutians	2	2	6.36	454	0	2,877
Western Aleutians	101-200	W Western Aleutians	35	29	4.31	1,752	506	2,998
Central Aleutians	201-300	N Central Aleutians	16	9	3.46	152	27	276
Eastern Aleutians	101-200	SW Eastern Aleutians	10	4	3.19	720	0	1,884
Central Aleutians	301-500	N Central Aleutians	8	6	2.98	369	0	828
Western Aleutians	101-200	E Western Aleutians	22	7	2.94	368	62	675
Central Aleutians	201-300	SE Central Aleutians	5	1	2.43	116	0	439
Western Aleutians	1-100	E Western Aleutians	12	5	2.16	256	4	508
Western Aleutians	201-300	E Western Aleutians	14	5	2.01	158	0	398
Western Aleutians	201-300	W Western Aleutians	17	10	2.00	188	32	344
Eastern Aleutians	101-200	NE Eastern Aleutians	26	14	1.81	365	0	737
Central Aleutians	301-500	SW Central Aleutians	2	1	1.80	142	0	1,948
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	3	1.70	453	0	1,113
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	1.37	60	0	467
Central Aleutians	201-300	Petrel Bank	4	2	1.32	101	0	304
Eastern Aleutians	201-300	NE Eastern Aleutians	26	11	1.11	219	29	409
Western Aleutians	301-500	W Western Aleutians	7	3	1.07	182	0	490
Southern Bering Sea	1-100	E Southern Bering Sea	24	16	1.05	256	100	413
Central Aleutians	301-500	Petrel Bank	2	1	1.01	124	0	1,704
Eastern Aleutians	201-300	SE Eastern Aleutians	12	1	0.87	180	0	576
Central Aleutians	101-200	SW Central Aleutians	15	7	0.86	91	0	183
Western Aleutians	1-100	W Western Aleutians	11	4	0.77	285	0	805
Western Aleutians	301-500	E Western Aleutians	2	2	0.44	68	0	673
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	0.37	25	0	343
Eastern Aleutians	101-200	NW Eastern Aleutians	4	1	0.34	55	0	228
Central Aleutians	101-200	N Central Aleutians	9	4	0.24	26	0	55
Eastern Aleutians	101-200	SE Eastern Aleutians	19	1	0.24	45	0	140
Central Aleutians	101-200	Petrel Bank	7	2	0.23	39	0	117
Central Aleutians	1-100	Petrel Bank	5	2	0.21	20	0	54
Central Aleutians	101-200	SE Central Aleutians	10	1	0.18	14	0	44
Central Aleutians	1-100	N Central Aleutians	11	1	0.02	5	0	16

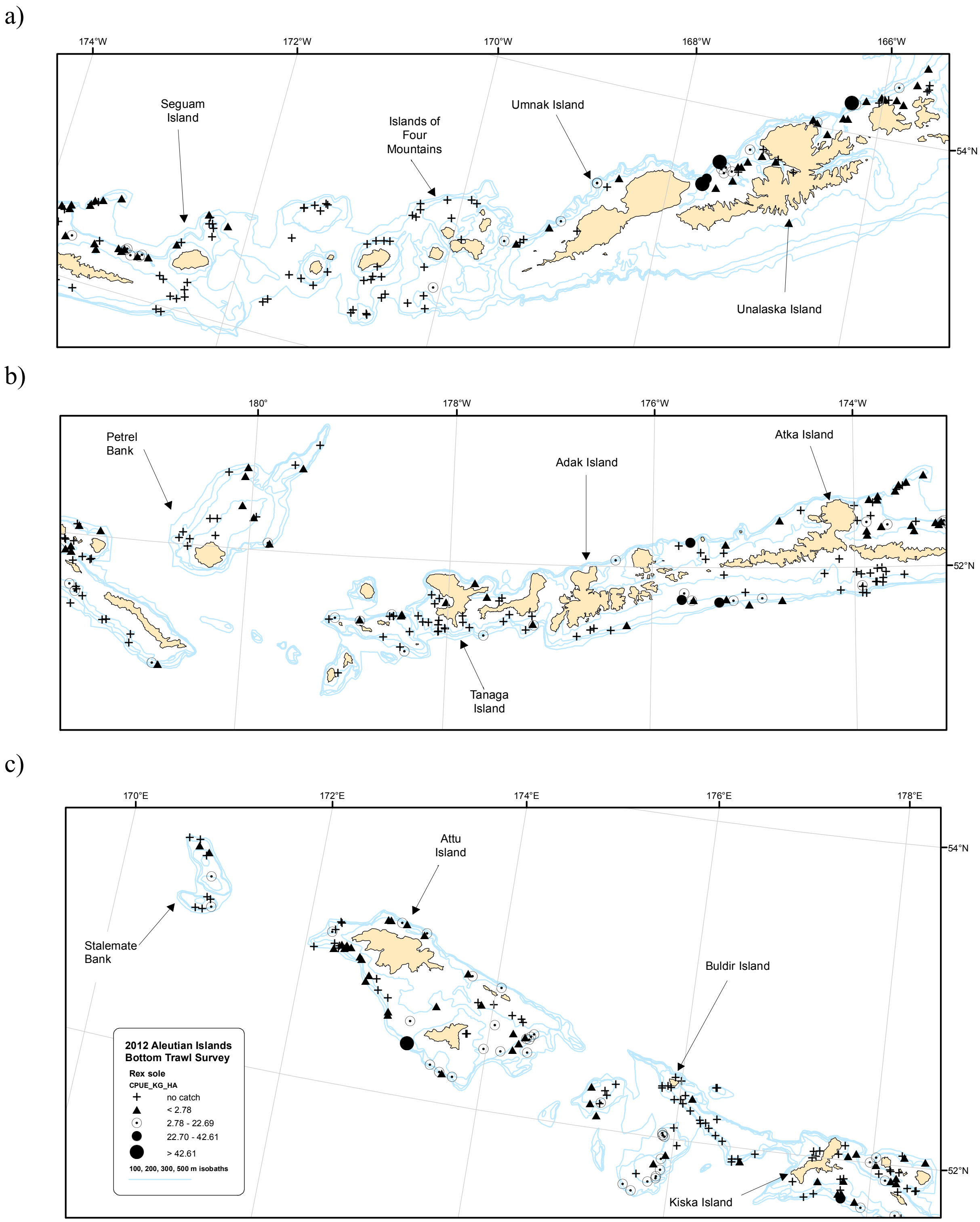


Figure 16. --Distribution and relative abundance of rex sole from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

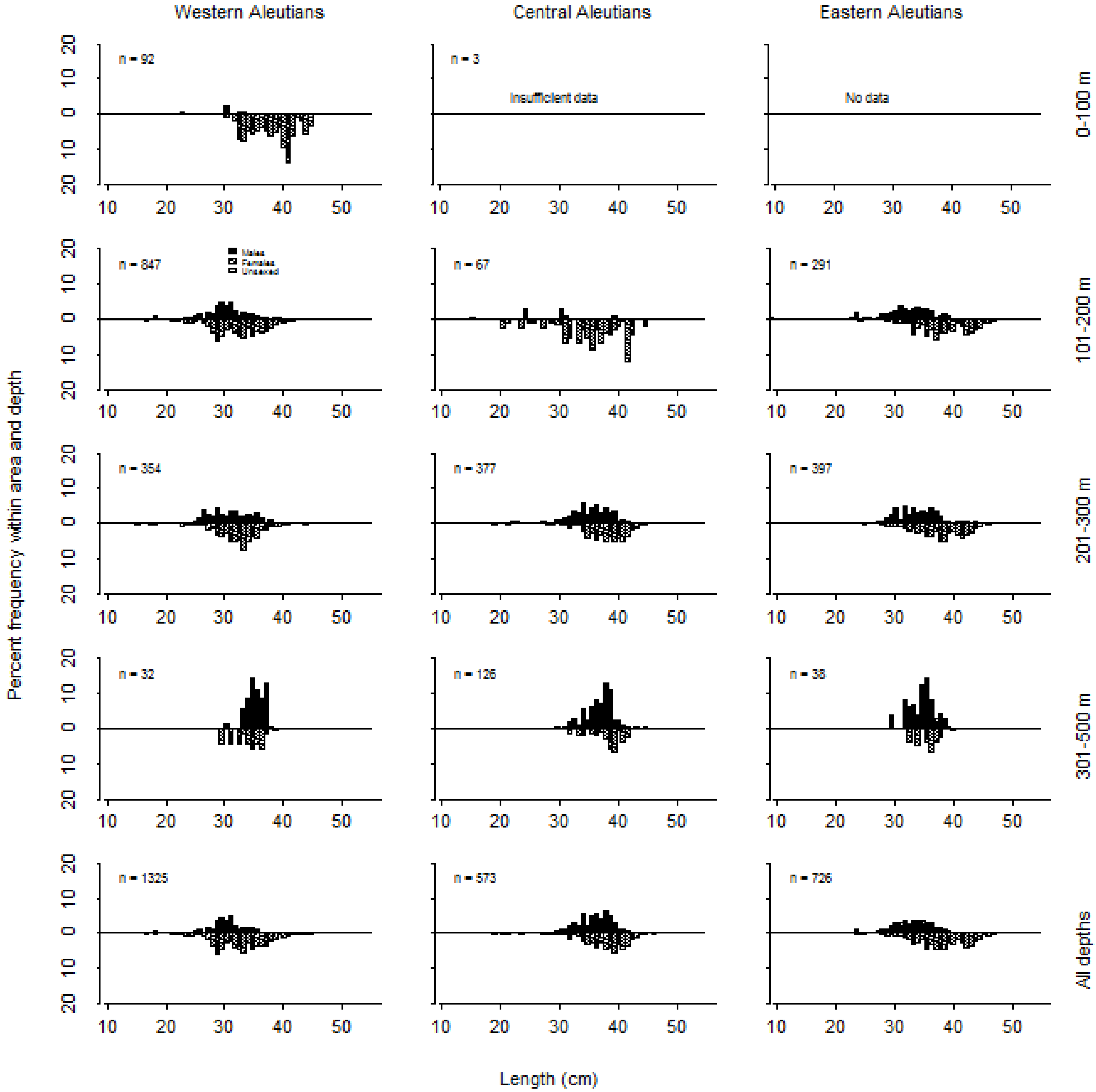


Figure 17. --Length composition by depth intervals of rex sole from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

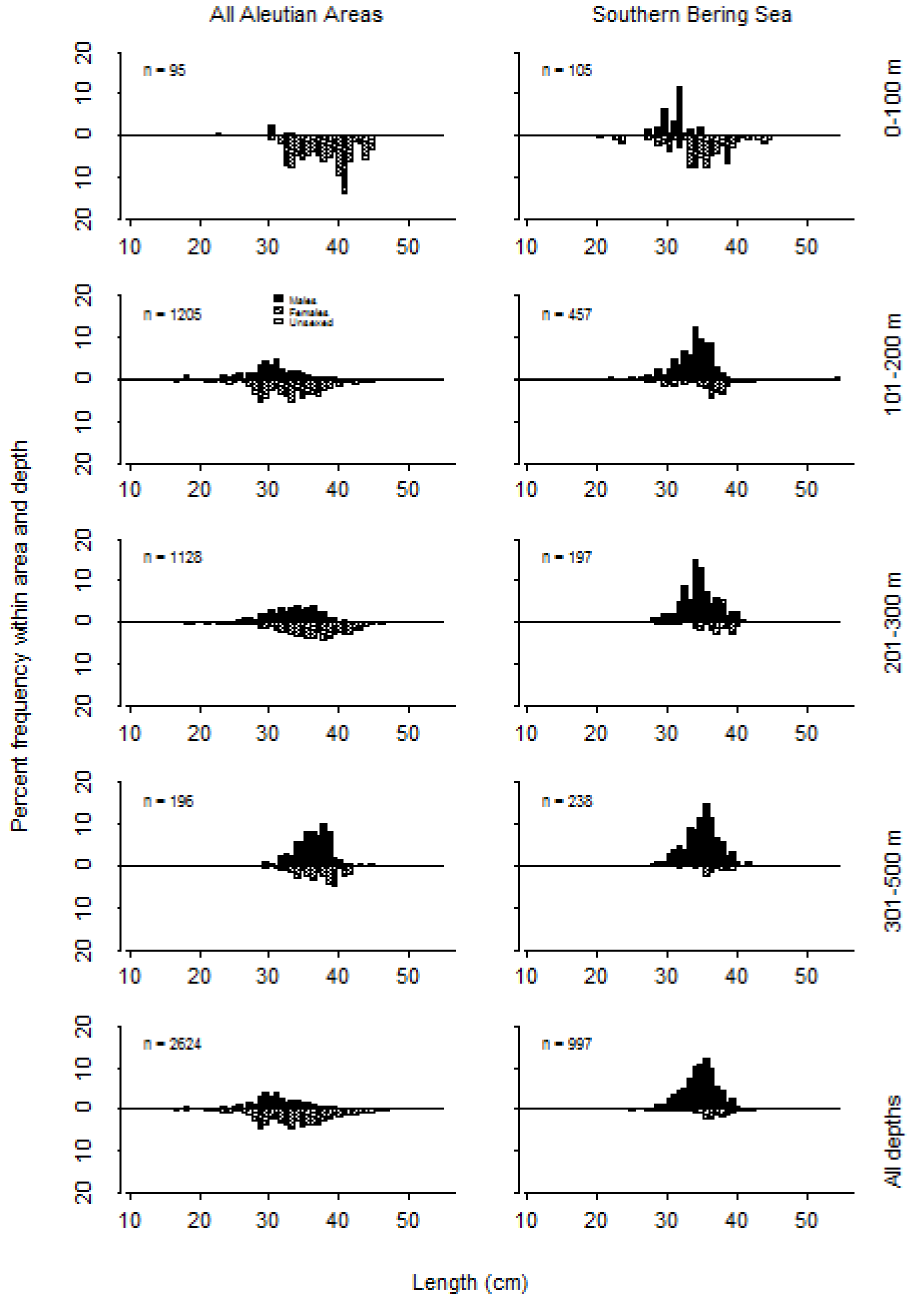


Figure 17. -- (continued).

Table 19. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing Dover sole, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	1	0.06	29	0	93	0.633
	101 - 200	57	7	0.08	45	10	80	0.613
	201 - 300	31	6	0.41	71	0	147	0.996
	301 - 500	9	0	---	---	---	---	---
	All depths	120	14	0.10	146	44	247	0.761
Central Aleutians	1 - 100	26	3	0.44	259	0	584	0.916
	101 - 200	41	4	0.14	63	0	165	0.778
	201 - 300	32	6	0.56	118	55	181	0.870
	301 - 500	14	2	0.48	190	0	934	1.496
	All depths	113	15	0.38	630	0	1,329	1.006
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	1	0.01	4	0	13	0.483
	201 - 300	46	6	0.07	35	10	59	0.611
	301 - 500	13	3	0.36	203	0	461	1.393
	All depths	132	10	0.10	242	0	501	1.146
All Aleutian Areas	1 - 100	63	4	0.16	289	0	622	0.876
	101 - 200	157	12	0.06	112	4	220	0.688
	201 - 300	109	18	0.26	224	131	316	0.849
	301 - 500	36	5	0.30	393	0	904	1.441
	All depths	365	39	0.18	1,017	416	1,618	0.989
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	2	0.01	2	0	6	0.285
	201 - 300	8	0	---	---	---	---	---
	301 - 500	5	2	1.86	194	0	554	0.886
	All depths	55	4	0.26	197	0	556	0.866

Table 20. -- Summary of Dover sole mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	1-100	Petrel Bank	5	3	2.70	259	0	610
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	2	1.86	194	0	582
Central Aleutians	201-300	Petrel Bank	4	4	1.48	114	42	185
Central Aleutians	301-500	Petrel Bank	2	1	1.39	172	0	2,357
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	0.85	13	0	52
Western Aleutians	201-300	E Western Aleutians	14	4	0.70	55	0	127
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	2	0.39	104	0	298
Eastern Aleutians	301-500	SE Eastern Aleutians	7	1	0.39	100	0	344
Western Aleutians	101-200	E Western Aleutians	22	5	0.31	39	4	73
Central Aleutians	101-200	Petrel Bank	7	2	0.30	52	0	155
Central Aleutians	301-500	SE Central Aleutians	2	1	0.25	18	0	246
Western Aleutians	1-100	E Western Aleutians	12	1	0.25	29	0	94
Western Aleutians	201-300	W Western Aleutians	17	2	0.18	17	0	45
Central Aleutians	201-300	N Central Aleutians	16	2	0.10	4	0	12
Central Aleutians	101-200	N Central Aleutians	9	1	0.10	10	0	33
Eastern Aleutians	201-300	NE Eastern Aleutians	26	3	0.07	13	0	28
Eastern Aleutians	201-300	SE Eastern Aleutians	12	1	0.04	8	0	27
Southern Bering Sea	101-200	E Southern Bering Sea	14	2	0.02	2	0	6
Eastern Aleutians	101-200	SW Eastern Aleutians	10	1	0.02	4	0	13
Western Aleutians	101-200	W Western Aleutians	35	2	0.02	6	0	16
Central Aleutians	101-200	SW Central Aleutians	15	1	0.01	1	0	3

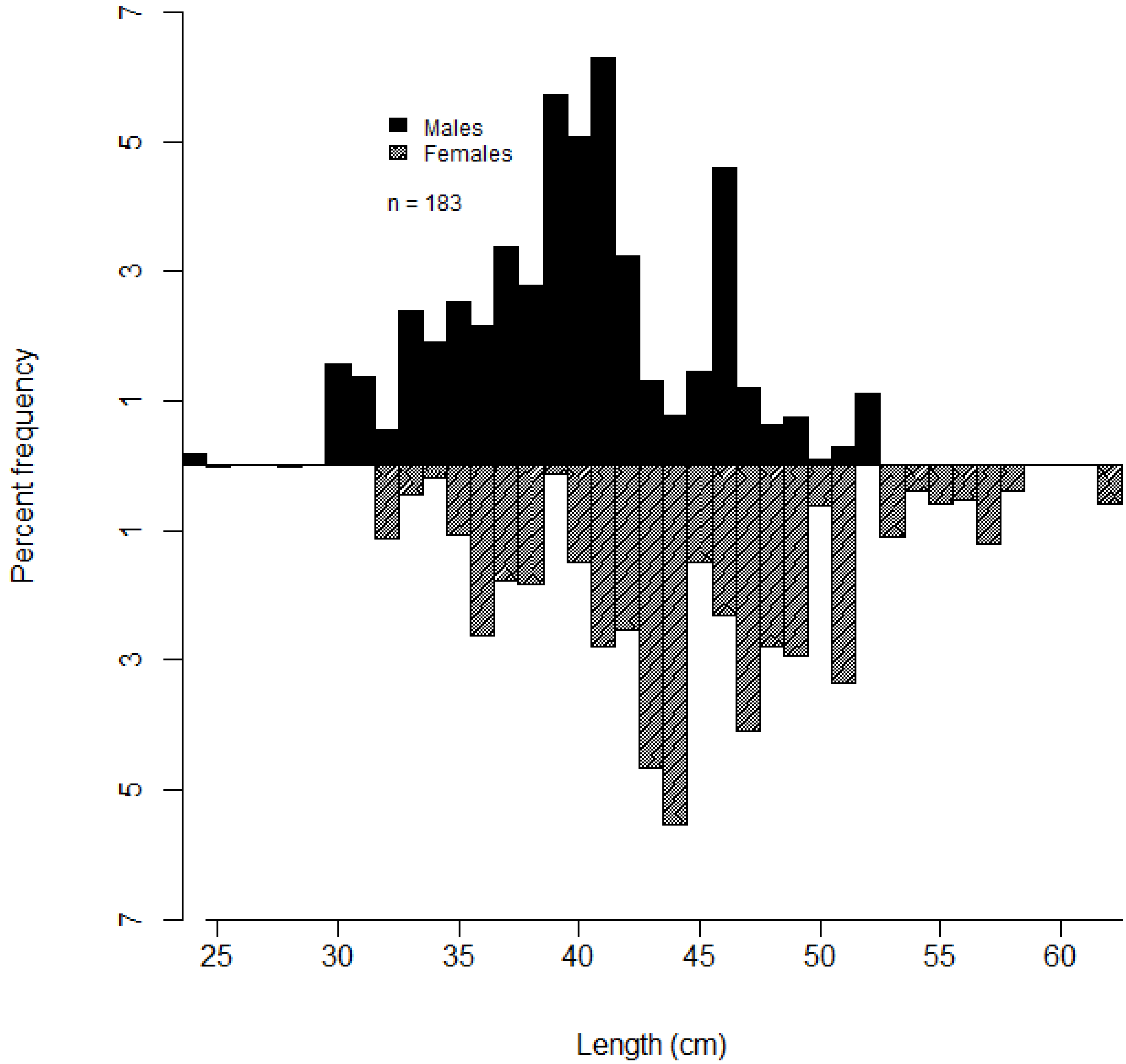


Figure 18. --Length composition of Dover sole from the 2012 Aleutian Islands bottom trawl survey.

Roundfish

Atka mackerel (*Pleurogrammus monopterygius*)

Atka mackerel had the third highest mean CPUE of all species in the 2012 survey (Table 2). They were distributed throughout the survey area though they were less common in the Southern Bering Sea and Eastern Aleutian Islands districts (Fig. 19, Table 21). Larger catches were also more common in the passes (Fig. 19). The total estimated biomass exceeded 276,000 t. Mean CPUEs were much higher in the Western and Central Aleutian Islands districts in water less than 200 m (Table 21). Atka mackerel were caught in 48% of all successful tows and in 63% of tows conducted shallower than 200 m. The highest subdistrict-specific mean CPUE and estimated biomass was found in the E Western Aleutians subarea in the depth interval of 1-100 m (Table 22, Fig. 19).

The largest fish were found in the Southern Bering Sea district in the 101-200 m depth range. The mean weight of Atka mackerel in this area (1.462 kg) was more than five times that of the lowest mean weight of 0.256 kg found in the Central Aleutians district in the 301-500 m depth interval (Table 21). There was no trend linking depth and mean fish weight that was consistent among the different areas though the 2 mid-depth ranges had the greatest mean weights. In the Western Aleutian Islands district, a distinct length modes for females occurred only in the 1-100 as well as the 101-200 m depth ranges at about 37 cm. Males showed a strong mode in the 201-300 m depth interval in this area (Fig. 20). In the Central Aleutians area both males and females showed a weak bimodal distribution in the 1-100 m depth range with modes at 27 and 38 cm. In the 101-200 m depth range a single mode at about 37 cm was apparent for both sexes (Fig. 20). Appendix C presents the length-weight relationship parameters for male, female, and combined sexes of Atka mackerel.

Table 21. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing Atka mackerel, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	21	127.64	62,247	19,719	104,775	0.620
	101 - 200	57	48	133.49	70,983	6,661	135,305	0.616
	201 - 300	31	11	2.03	350	0	855	0.770
	301 - 500	9	1	0.02	8	0	27	0.746
	All depths	120	81	87.94	133,588	58,133	209,043	0.618
Central Aleutians	1 - 100	26	19	106.44	62,238	13,037	111,440	0.349
	101 - 200	41	32	101.74	46,861	6,815	86,906	0.672
	201 - 300	32	9	0.08	16	4	28	0.719
	301 - 500	14	3	0.04	15	0	34	0.256
	All depths	113	63	65.97	109,130	46,558	171,702	0.440
Eastern Aleutians	1 - 100	14	8	8.80	6,029	0	17,489	0.895
	101 - 200	59	24	34.35	26,685	0	56,033	1.083
	201 - 300	46	7	0.89	435	0	1,242	1.034
	301 - 500	13	0	---	---	---	---	---
	All depths	132	39	13.15	33,149	2,120	64,178	1.043
All Aleutian Areas	1 - 100	63	48	74.27	130,514	68,168	192,860	0.457
	101 - 200	157	104	81.69	144,529	64,347	224,711	0.689
	201 - 300	109	27	0.92	801	0	1,740	0.893
	301 - 500	36	4	0.02	23	0	46	0.332
	All depths	365	183	48.45	275,867	175,851	375,883	0.556
Southern Bering Sea	1 - 100	26	7	0.25	103	0	265	1.100
	101 - 200	16	7	4.45	822	0	2,489	1.462
	201 - 300	8	5	1.50	85	0	186	1.114
	301 - 500	5	0	---	---	---	---	---
	All depths	55	19	1.35	1,010	0	2,672	1.379

Table 22. -- Summary of Atka mackerel mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Western Aleutians	1-100	E Western Aleutians	12	12	516.47	61,115	18,181	104,050
Central Aleutians	1-100	Petrel Bank	5	4	398.81	38,286	0	89,960
Western Aleutians	101-200	E Western Aleutians	22	20	283.67	35,528	0	81,546
Central Aleutians	101-200	SE Central Aleutians	10	7	257.01	19,322	0	49,734
Central Aleutians	101-200	SW Central Aleutians	15	14	232.01	24,414	0	54,484
Central Aleutians	1-100	SE Central Aleutians	7	5	141.78	16,504	0	43,291
Western Aleutians	101-200	W Western Aleutians	35	28	87.22	35,455	0	82,176
Eastern Aleutians	101-200	NE Eastern Aleutians	26	10	79.70	16,040	0	39,159
Eastern Aleutians	101-200	SE Eastern Aleutians	19	11	51.84	9,851	0	29,144
Eastern Aleutians	1-100	SE Eastern Aleutians	8	5	33.97	5,913	0	17,664
Central Aleutians	1-100	N Central Aleutians	11	7	31.46	6,624	0	16,880
Central Aleutians	101-200	Petrel Bank	7	5	16.30	2,829	0	8,887
Southern Bering Sea	101-200	E Southern Bering Sea	14	5	6.87	811	0	2,489
Central Aleutians	1-100	SW Central Aleutians	3	3	5.10	824	0	2,442
Western Aleutians	201-300	W Western Aleutians	17	7	3.51	330	0	837
Eastern Aleutians	101-200	SW Eastern Aleutians	10	2	3.46	782	0	2,532
Western Aleutians	1-100	W Western Aleutians	11	9	3.06	1,132	0	2,564
Central Aleutians	101-200	N Central Aleutians	9	6	2.78	296	0	789
Eastern Aleutians	201-300	NE Eastern Aleutians	26	5	2.10	414	0	1,222
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	5	1.50	85	0	188
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	0.40	76	0	1,044
Southern Bering Sea	1-100	E Southern Bering Sea	24	6	0.26	64	0	134
Western Aleutians	201-300	E Western Aleutians	14	4	0.25	20	0	43
Southern Bering Sea	1-100	W Southern Bering Sea	2	1	0.24	38	0	525
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	0.19	24	0	333
Southern Bering Sea	101-200	W Southern Bering Sea	2	2	0.18	12	0	53
Central Aleutians	201-300	SE Central Aleutians	5	2	0.14	6	0	18
Central Aleutians	201-300	SW Central Aleutians	7	3	0.13	6	0	12
Central Aleutians	201-300	N Central Aleutians	16	4	0.10	4	0	9
Eastern Aleutians	1-100	NW Eastern Aleutians	2	1	0.08	15	0	211
Eastern Aleutians	201-300	SE Eastern Aleutians	12	1	0.08	17	0	53
Central Aleutians	301-500	Petrel Bank	2	2	0.08	9	0	59
Eastern Aleutians	101-200	NW Eastern Aleutians	4	1	0.07	12	0	50
Eastern Aleutians	201-300	SW Eastern Aleutians	6	1	0.06	4	0	16
Western Aleutians	301-500	W Western Aleutians	7	1	0.05	8	0	28
Central Aleutians	301-500	N Central Aleutians	8	1	0.05	6	0	19

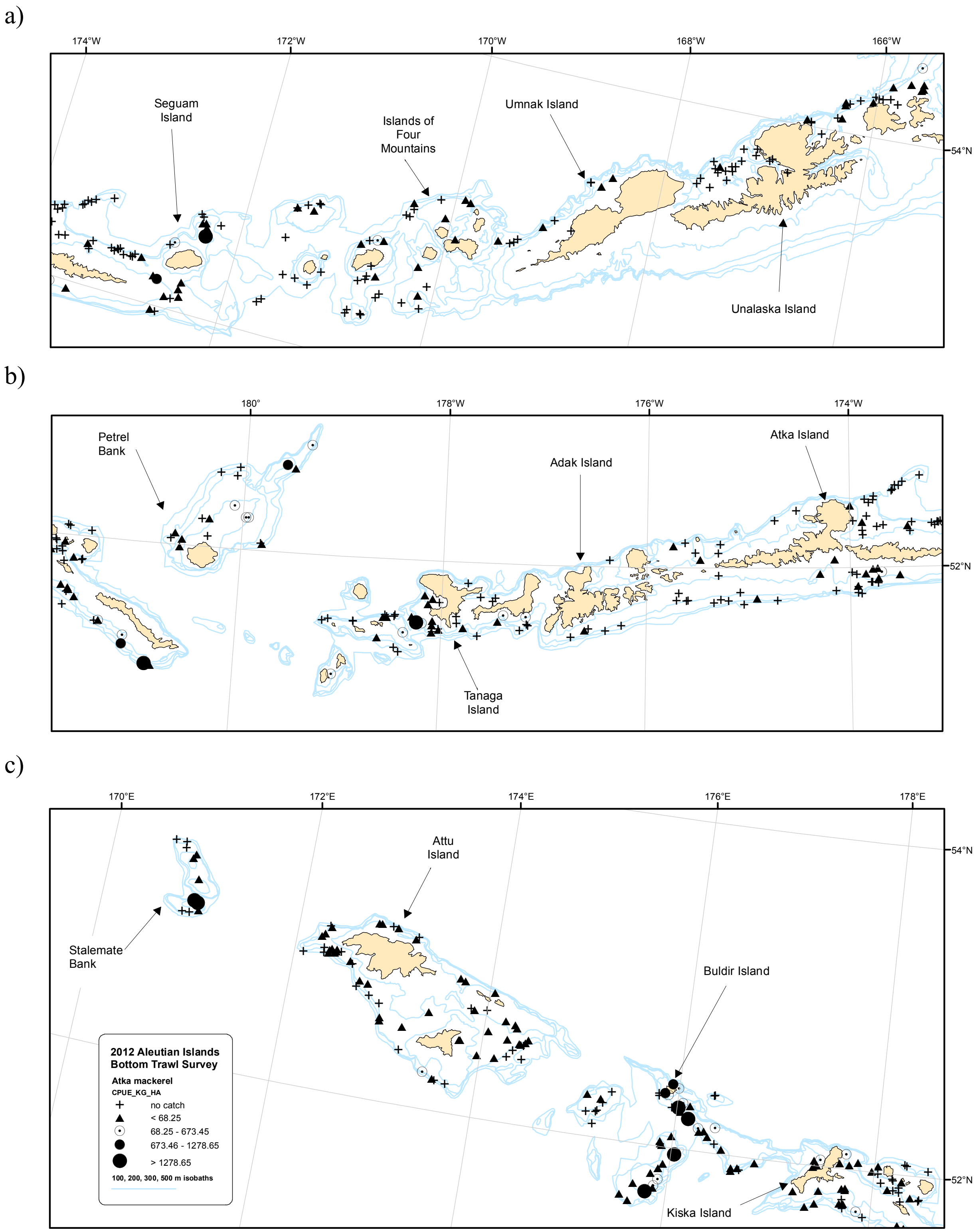


Figure 19. -- Distribution and relative abundance of Atka mackerel from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

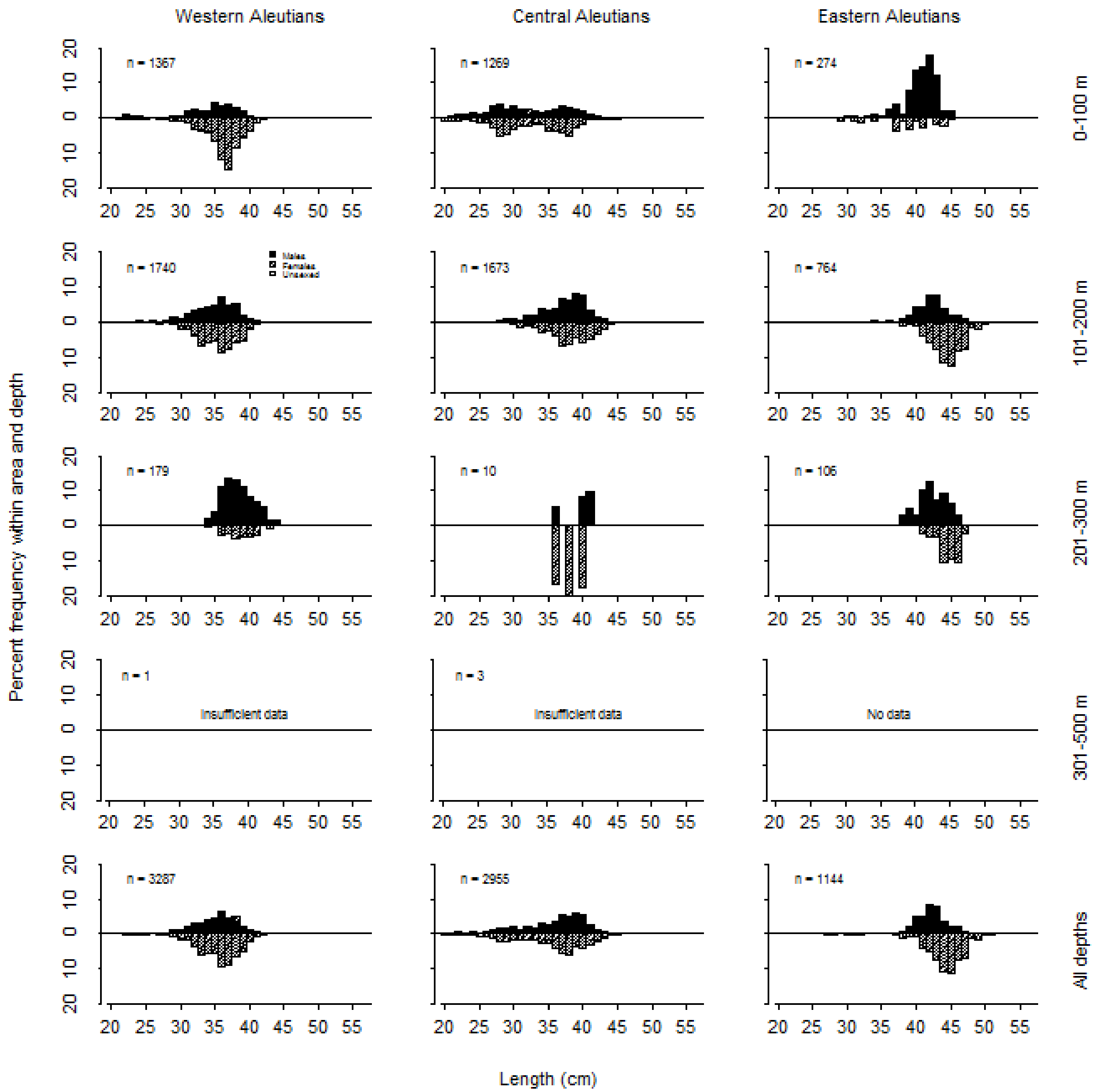


Figure 20. -- Length composition by depth intervals of Atka mackerel from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

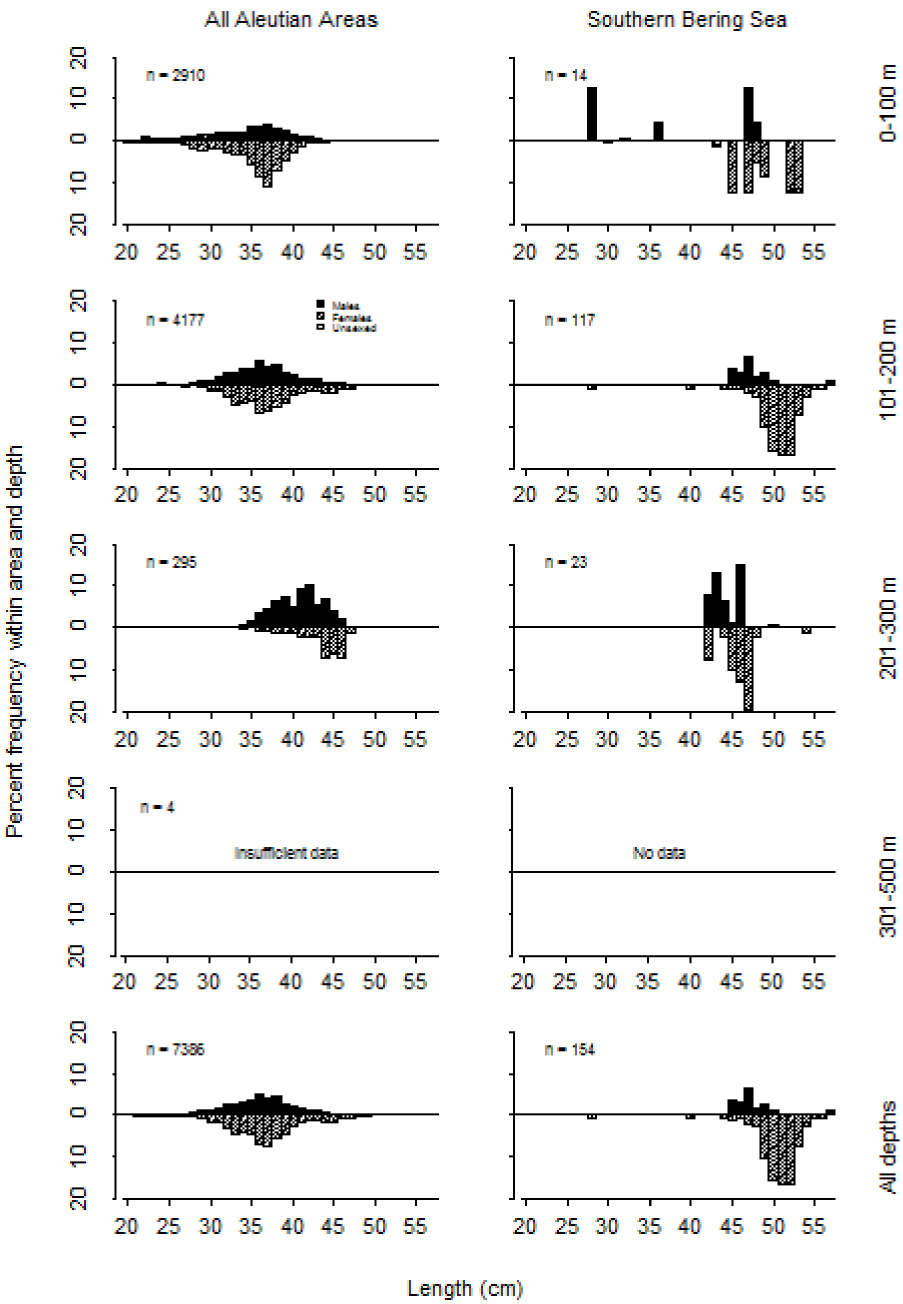


Figure 20. -- (continued).

Pacific cod (*Gadus macrocephalus*)

Pacific cod was the fifth most abundant fish species caught in the 2012 survey and ranked no lower than seventh in any of the survey districts (Table 2). In the Western Aleutains and Eastern Aleutian districts cod occurred only in water depths shallower than 300 m, but were caught in all depth intervals in the remaining areas (Table 23). Although no statistical analysis of these data was conducted it was apparent that there was no correlation between mean weight and depth interval (Table 23). The total estimated biomass was 65,859 t. Ninety percent of the estimated biomass was found in depths less than 200 m. Pacific cod were caught in 74% of all successful survey tows in depths less than 300 m (Table 23). There were few large catches of Pacific cod; only six exceeded four times the standard deviation of the mean CPUE (Fig. 21, Table 24). The largest concentration was found in the NE Eastern Aleutians subdistrict in the 101-200 m depth range. This area contained 19% of the estimated biomass (Table 24) but represented just 3% of the survey area. (Appendix Table A-1). Length frequency data showed a broad distribution of size with a slight mode in both sexes around 62 cm in the combined Aleutian Islands districts in the 101-200 m and to a lesser extent the 201-300 m depth range (Fig. 22). The other depth ranges as well as the Southern Bering Sea district did not reveal any distinct patterns. Cod larger than 80 cm were uncommon in the Southern Bering Sea district but not in the Aleutian areas where they often ranged to 100 cm (Fig. 22). Appendix C presents the weight-length relationship parameters for male, female, and combined sexes of Pacific cod.

Walleye pollock (*Gadus chalcogrammus*)

The mean CPUE of walleye pollock was the eighth highest among species in the combined Aleutian Islands districts and the second highest in the Southern Bering Sea district (Table 2). Pollock were caught in all areas and depth intervals. The total estimated biomass of pollock was 57,518 t. Of this, 72% was caught in the 101-200 m depth range over all areas with 46% coming from the Eastern Aleutian Islands district (Table 25). The CPUE for all depths combined was lowest for the Western Aleutian Islands and increased for each district in an eastward progression (Table 25). Although the Southern Bering Sea district had the highest CPUE in the 101-200 m depth interval (Table 25), the highest mean CPUE within a subdistrict was in the SE Eastern Aleutians subdistrict with a depth range of 101-200 m (Table 26). This depth range and subarea contained 42% of the estimated biomass (Tables 25 and 26) even though it represents just 3% of the survey area (Appendix Table A-1). Large catches of walleye pollock were rare with only one tow near Seguam Island exceeding four times the standard deviation of the mean CPUE (Fig. 23). Juvenile pollock were caught in the 1-100 m depth interval in the Western and Eastern Aleutian Islands areas as well as the Southern Bering Sea district (Fig. 24). Length-weight relationship parameters for male, female and combined sexes of Pollock are presented in Appendix C.

Table 23. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing Pacific cod, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	**Depth (m)**	**Haul count**	**Hauls w/ catch**	**CPUE (kg/ha)**	**Biomass (t)**	**95% LCL (t)**	**95% UCL (t)**	**weight (kg)**
Western Aleutians	1 - 100	23	15	17.17	8,371	731	16,011	4.027
	101 - 200	57	36	9.43	5,015	3,371	6,659	2.544
	201 - 300	31	7	0.74	128	22	233	2.571
	301 - 500	9	0	---	---	---	---	---
	All depths	120	58	8.90	13,514	5,745	21,283	3.296
Central Aleutians	1 - 100	26	16	10.46	6,115	720	11,511	2.022
	101 - 200	41	32	16.31	7,513	3,806	11,220	3.426
	201 - 300	32	25	4.94	1,042	561	1,523	3.122
	301 - 500	14	3	0.34	134	0	419	2.989
	All depths	113	76	8.95	14,804	8,261	21,347	2.645
Eastern Aleutians	1 - 100	14	9	3.98	2,725	0	7,905	1.842
	101 - 200	59	48	30.46	23,661	9,083	38,238	3.535
	201 - 300	46	37	8.58	4,207	2,022	6,392	3.216
	301 - 500	13	0	---	---	---	---	---
	All depths	132	94	12.14	30,592	15,668	45,516	3.227
All Aleutian Areas	1 - 100	63	40	9.79	17,211	7,925	26,497	2.615
	101 - 200	157	116	20.46	36,189	21,071	51,306	3.333
	201 - 300	109	69	6.16	5,377	3,133	7,621	3.178
	301 - 500	36	3	0.10	134	0	419	2.989
	All depths	365	228	10.35	58,911	41,079	76,742	3.072
Southern Bering Sea	1 - 100	26	25	11.33	4,562	0	14,156	2.423
	101 - 200	16	13	7.68	1,419	414	2,425	2.141
	201 - 300	8	7	9.41	530	201	859	2.578
	301 - 500	5	5	4.18	436	249	623	3.031
	All depths	55	50	9.29	6,948	0	16,727	2.400

Table 24. -- Summary of Pacific cod mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	101-200	NE Eastern Aleutians	26	19	63.32	12,744	945	24,542
Eastern Aleutians	101-200	SE Eastern Aleutians	19	19	38.30	7,277	0	15,655
Central Aleutians	101-200	SW Central Aleutians	15	15	31.83	3,349	554	6,144
Central Aleutians	1-100	SE Central Aleutians	7	4	29.05	3,381	0	8,532
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	23.00	359	0	3,207
Central Aleutians	101-200	N Central Aleutians	9	6	22.44	2,392	14	4,771
Central Aleutians	101-200	SE Central Aleutians	10	9	21.72	1,633	47	3,219
Western Aleutians	1-100	E Western Aleutians	12	5	18.98	2,246	0	4,593
Western Aleutians	1-100	W Western Aleutians	11	10	16.58	6,125	0	13,484
Southern Bering Sea	1-100	W Southern Bering Sea	2	2	15.84	2,511	0	30,017
Eastern Aleutians	101-200	NW Eastern Aleutians	4	2	15.75	2,511	0	8,020
Central Aleutians	201-300	N Central Aleutians	16	14	14.56	639	166	1,113
Central Aleutians	1-100	SW Central Aleutians	3	3	11.31	1,830	0	6,313
Eastern Aleutians	201-300	SE Eastern Aleutians	12	11	10.66	2,197	241	4,153
Western Aleutians	101-200	W Western Aleutians	35	27	9.91	4,030	2,673	5,386
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	7	9.41	530	193	868
Southern Bering Sea	101-200	E Southern Bering Sea	14	11	8.80	1,037	329	1,745
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	8.54	1,083	0	4,705
Southern Bering Sea	1-100	E Southern Bering Sea	24	23	8.40	2,051	947	3,155
Western Aleutians	101-200	E Western Aleutians	22	9	7.87	985	10	1,961
Eastern Aleutians	201-300	NE Eastern Aleutians	26	18	7.65	1,505	560	2,451
Eastern Aleutians	1-100	NW Eastern Aleutians	2	1	5.94	1,148	0	15,740
Southern Bering Sea	101-200	W Southern Bering Sea	2	2	5.71	382	0	3,530
Central Aleutians	201-300	SE Central Aleutians	5	5	5.49	262	129	396
Eastern Aleutians	101-200	SW Eastern Aleutians	10	8	5.00	1,129	0	2,423
Central Aleutians	1-100	Petrel Bank	5	3	4.96	476	0	1,456
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	5	4.18	436	234	638
Central Aleutians	201-300	SW Central Aleutians	7	6	3.30	141	15	267
Eastern Aleutians	1-100	SE Eastern Aleutians	8	4	2.18	380	0	833
Eastern Aleutians	201-300	SW Eastern Aleutians	6	6	2.04	146	76	216
Central Aleutians	1-100	N Central Aleutians	11	6	2.03	428	0	922
Central Aleutians	301-500	SE Central Aleutians	2	1	1.13	81	0	1,105
Central Aleutians	101-200	Petrel Bank	7	2	0.80	139	0	384
Western Aleutians	201-300	W Western Aleutians	17	5	0.78	74	0	150
Western Aleutians	201-300	E Western Aleutians	14	2	0.69	54	0	135
Eastern Aleutians	1-100	SW Eastern Aleutians	2	2	0.60	114	0	1,526
Central Aleutians	301-500	N Central Aleutians	8	2	0.43	54	0	145

a)

b)

c)

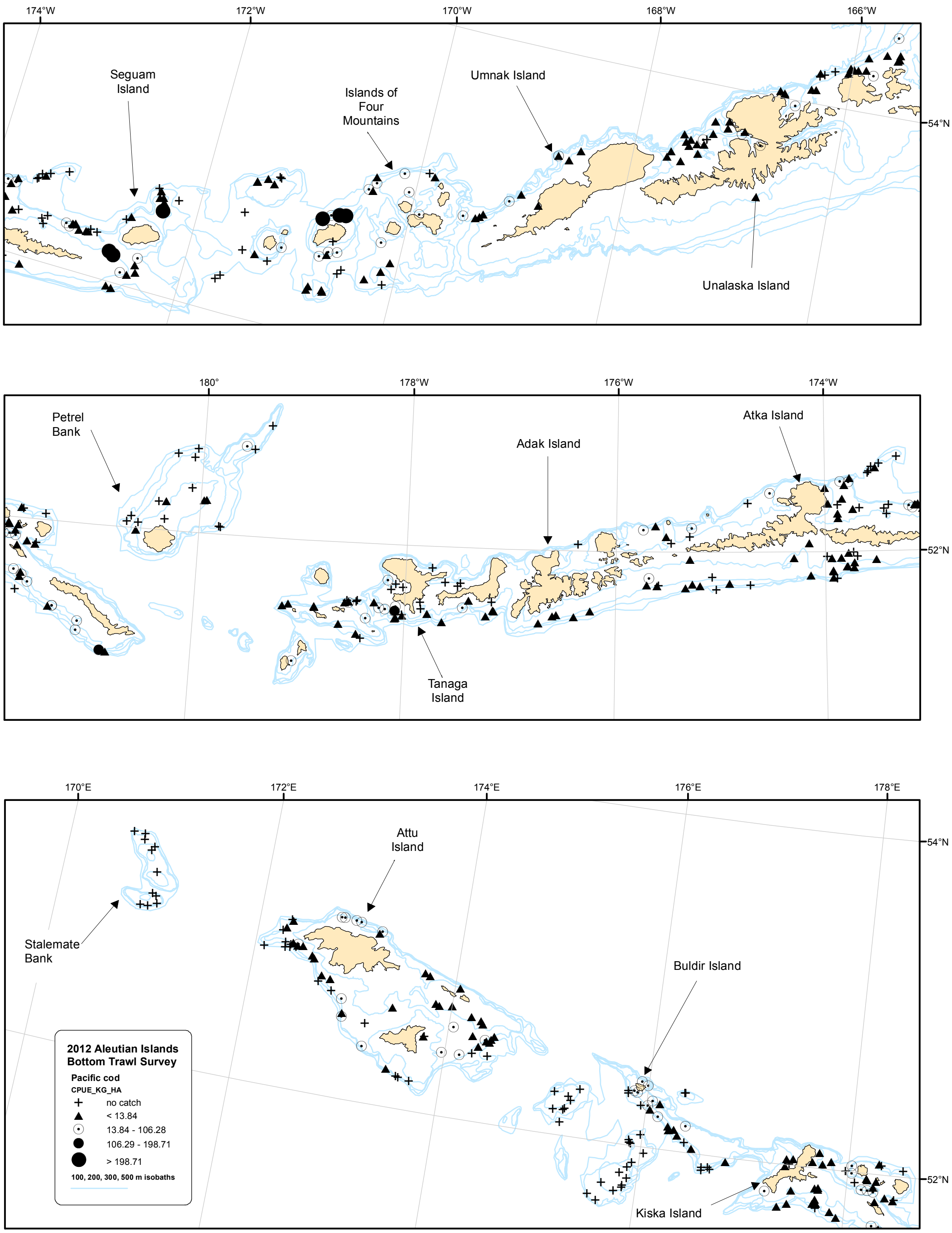


Figure 21. --Distribution and relative abundance of Pacific cod from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

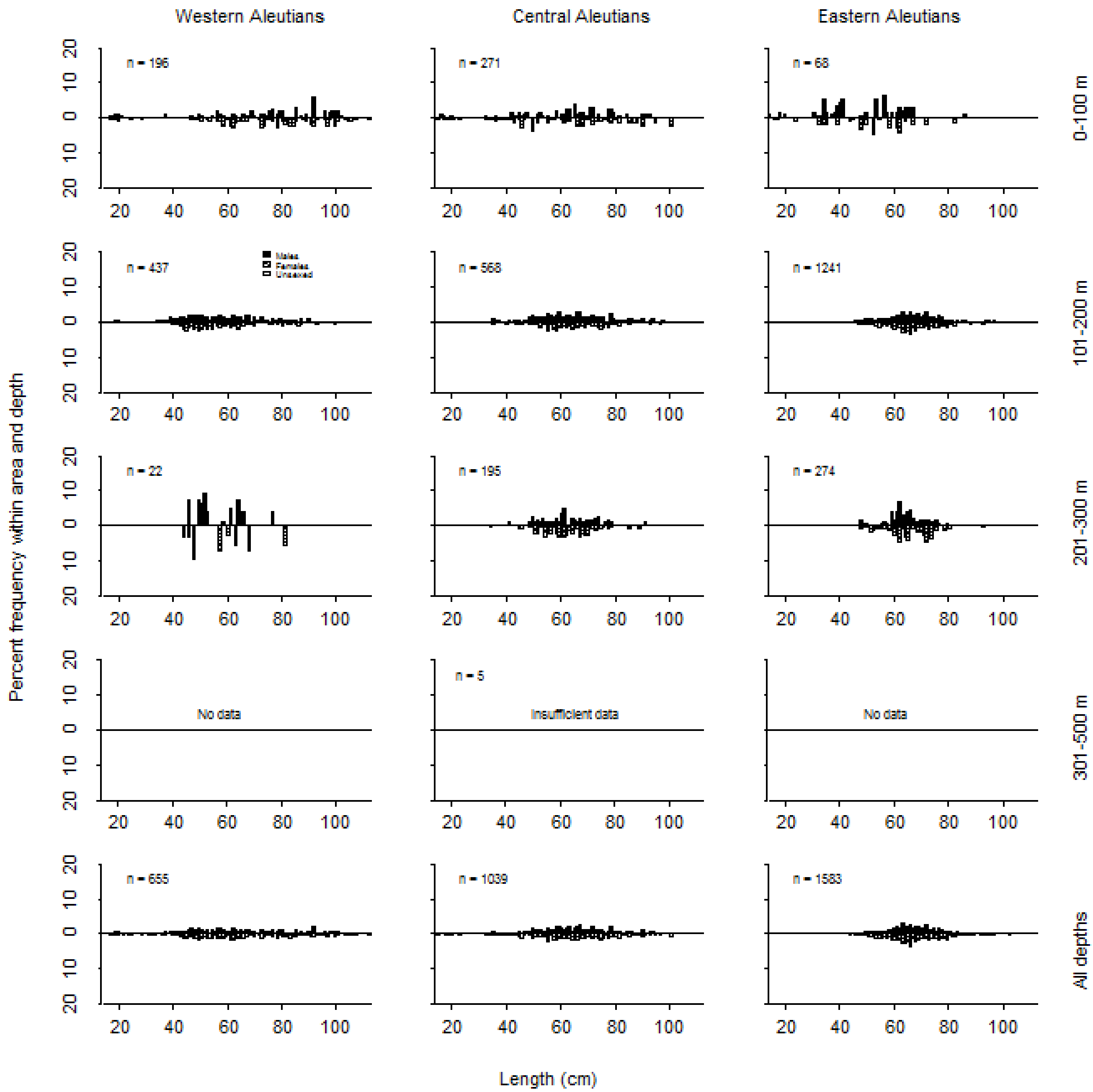


Figure 22. -- Length composition by depth intervals of Pacific cod from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

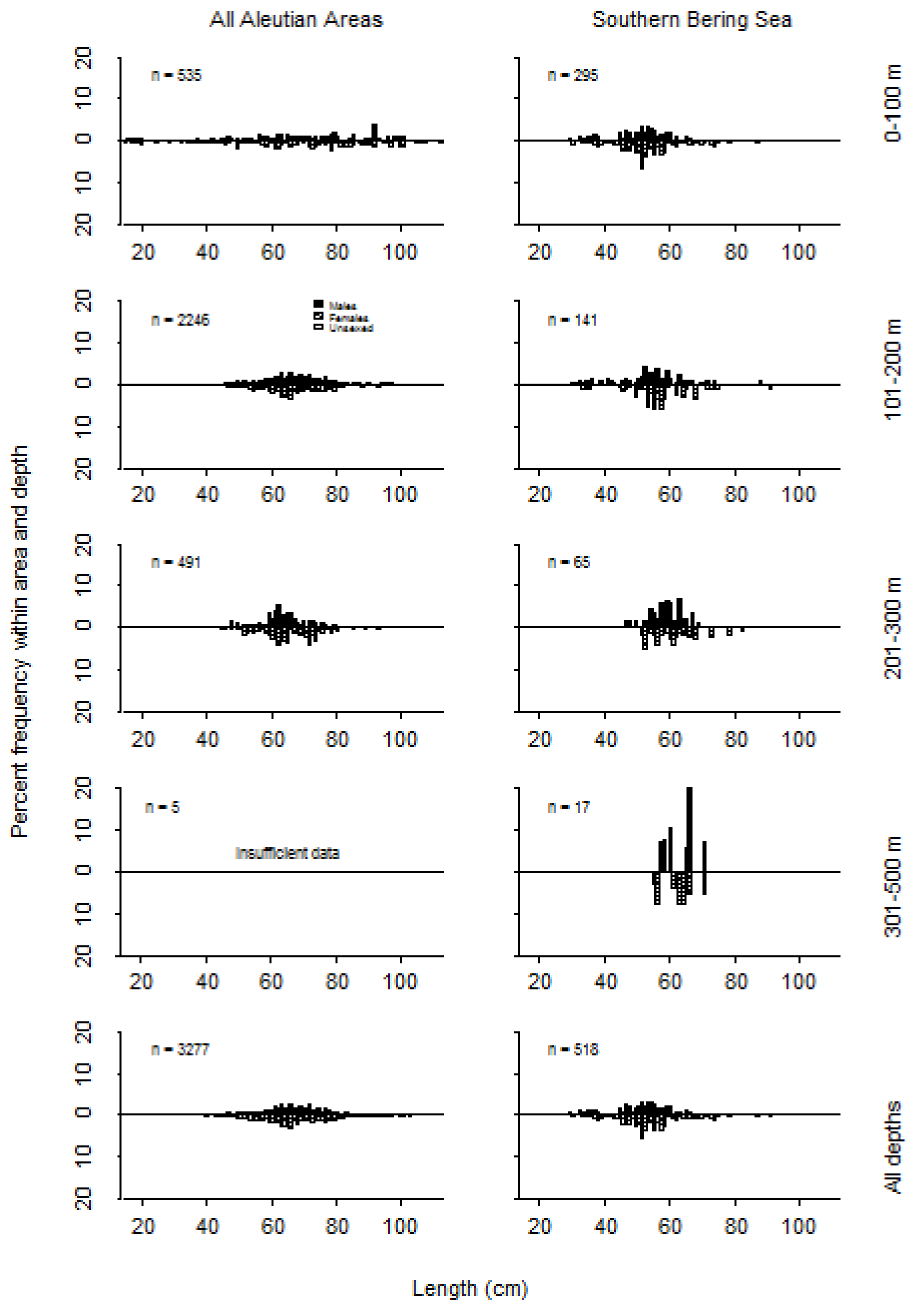


Figure 22. -- (continued).

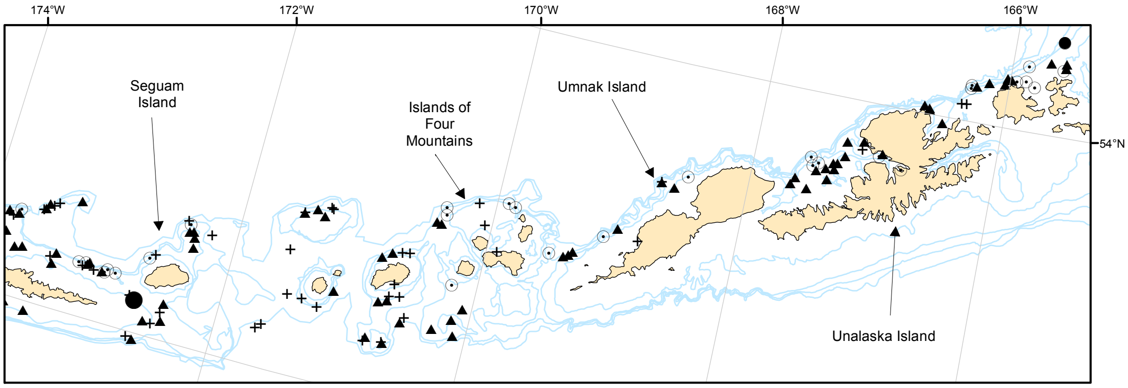
Table 25. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing walleye pollock, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	11	0.19	94	36	151	0.066
	101 - 200	57	39	8.57	4,558	1,009	8,108	0.958
	201 - 300	31	22	3.35	578	166	990	1.300
	301 - 500	9	1	0.40	130	0	436	1.098
	All depths	120	73	3.53	5,360	1,776	8,943	0.795
Central Aleutians	1 - 100	26	7	0.56	328	0	812	0.705
	101 - 200	41	21	4.76	2,192	233	4,151	1.076
	201 - 300	32	30	18.47	3,896	1,552	6,239	1.560
	301 - 500	14	8	2.56	1,018	0	2,056	1.725
	All depths	113	66	4.49	7,433	4,285	10,582	1.330
Eastern Aleutians	1 - 100	14	6	0.32	222	0	611	0.032
	101 - 200	59	38	34.05	26,453	0	76,956	1.950
	201 - 300	46	37	9.58	4,694	2,124	7,265	1.398
	301 - 500	13	3	0.21	118	0	328	1.529
	All depths	132	84	12.50	31,488	0	82,060	1.319
All Aleutian Areas	1 - 100	63	24	0.37	643	85	1,202	0.073
	101 - 200	157	98	18.77	33,204	0	83,702	1.631
	201 - 300	109	89	10.50	9,168	5,745	12,592	1.455
	301 - 500	36	12	0.98	1,266	235	2,296	1.611
	All depths	365	223	7.78	44,281	0	94,916	1.223
Southern Bering Sea	1 - 100	26	21	4.90	1,971	653	3,289	0.948
	101 - 200	16	16	45.02	8,323	704	15,943	0.634
	201 - 300	8	7	40.09	2,260	0	5,087	1.219
	301 - 500	5	5	6.54	682	0	1,537	1.510
	All depths	55	49	17.69	13,237	5,210	21,263	0.756

Table 26. -- Summary of walleye pollock mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	101-200	SE Eastern Aleutians	19	10	127.70	24,265	0	74,855
Southern Bering Sea	101-200	E Southern Bering Sea	14	14	65.69	7,745	112	15,379
Central Aleutians	201-300	N Central Aleutians	16	14	49.72	2,183	164	4,201
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	7	40.09	2,260	0	5,159
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	39.12	610	0	8,202
Central Aleutians	201-300	SW Central Aleutians	7	7	18.36	782	77	1,488
Eastern Aleutians	201-300	NE Eastern Aleutians	26	20	14.27	2,809	935	4,682
Central Aleutians	201-300	SE Central Aleutians	5	5	11.10	530	0	1,676
Western Aleutians	101-200	W Western Aleutians	35	29	10.41	4,230	696	7,765
Eastern Aleutians	101-200	NE Eastern Aleutians	26	17	9.32	1,876	0	5,054
Southern Bering Sea	101-200	W Southern Bering Sea	2	2	8.64	578	0	7,482
Southern Bering Sea	1-100	E Southern Bering Sea	24	21	8.08	1,971	650	3,292
Central Aleutians	301-500	N Central Aleutians	8	5	6.68	829	0	1,879
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	5	6.54	681.8	0	1604.7
Eastern Aleutians	201-300	SE Eastern Aleutians	12	10	5.65	1165	0	2555.4
Central Aleutians	101-200	Petrel Bank	7	4	5.54	962.2	0	2424.3
Central Aleutians	101-200	N Central Aleutians	9	7	5.41	576.6	0	1840.2
Central Aleutians	201-300	Petrel Bank	4	4	5.24	401.2	0	1372.4
Central Aleutians	101-200	SW Central Aleutians	15	7	5.12	539.1	0	1336.6
Western Aleutians	201-300	E Western Aleutians	14	11	3.38	264.9	0	577.7
Central Aleutians	1-100	Petrel Bank	5	4	3.33	320	0	842.5
Western Aleutians	201-300	W Western Aleutians	17	11	3.33	313.2	15.8	610.7
Western Aleutians	101-200	E Western Aleutians	22	10	2.62	328.3	0.7	656
Central Aleutians	301-500	SW Central Aleutians	2	1	1.75	138.2	0	1894.2
Eastern Aleutians	201-300	SW Eastern Aleutians	6	5	1.55	110.8	10.2	211.5
Central Aleutians	101-200	SE Central Aleutians	10	3	1.52	114.1	0	369.1
Eastern Aleutians	101-200	NW Eastern Aleutians	4	2	1.24	197.6	0	683.1
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	1.07	136.2	0	1588.9
Western Aleutians	301-500	W Western Aleutians	7	1	0.76	129.6	0	446.8
Central Aleutians	301-500	SE Central Aleutians	2	2	0.72	51.3	0	408.9
Eastern Aleutians	101-200	SW Eastern Aleutians	10	9	0.51	115	35.9	194.1
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	0.42	80.4	0	1102.6
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	1	0.29	77.3	0	323.5
Western Aleutians	1-100	W Western Aleutians	11	10	0.23	83.5	29.7	137.2
Eastern Aleutians	301-500	SE Eastern Aleutians	7	2	0.16	40.7	0	105.7
Western Aleutians	1-100	E Western Aleutians	12	1	0.08	10	0	31.9
Central Aleutians	1-100	N Central Aleutians	11	3	0.04	7.5	0	19.4
Eastern Aleutians	1-100	SE Eastern Aleutians	8	3	0.03	5.8	0	15

a)



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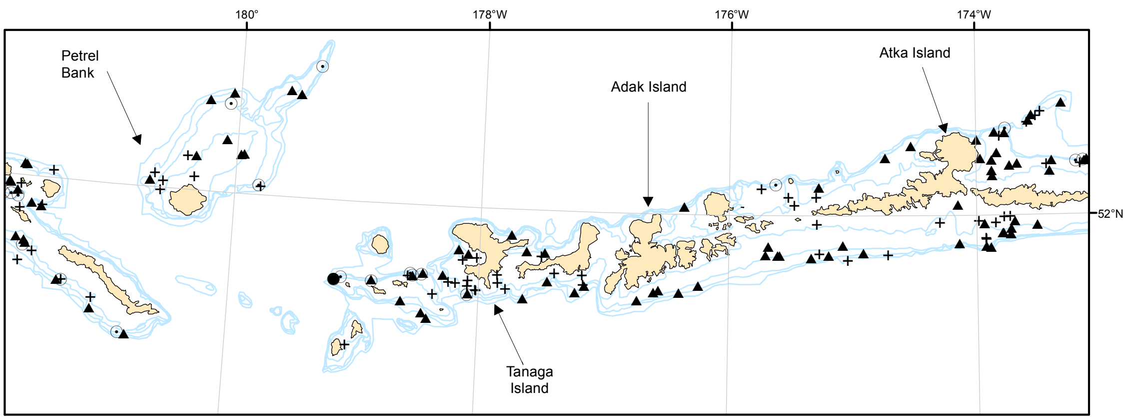

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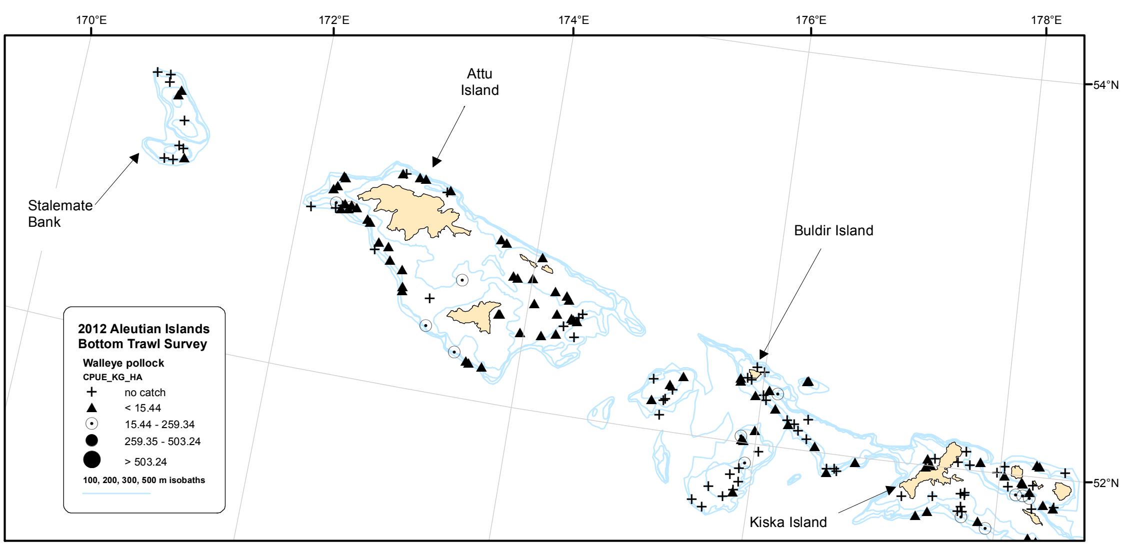


Figure 23. -- Distribution and relative abundance of walleye pollock from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

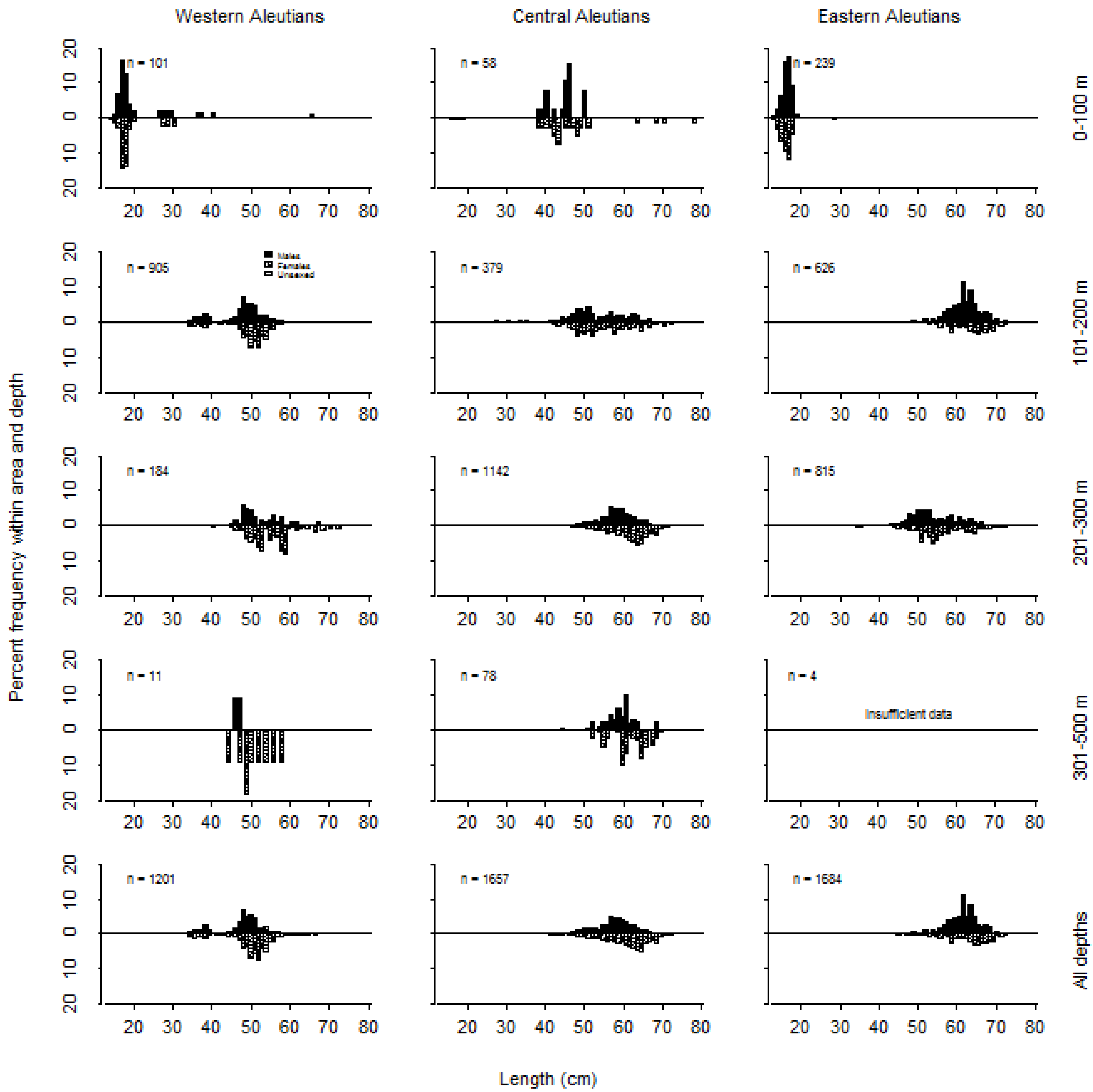


Figure 24. -- Length composition by depth intervals of walleye pollock from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

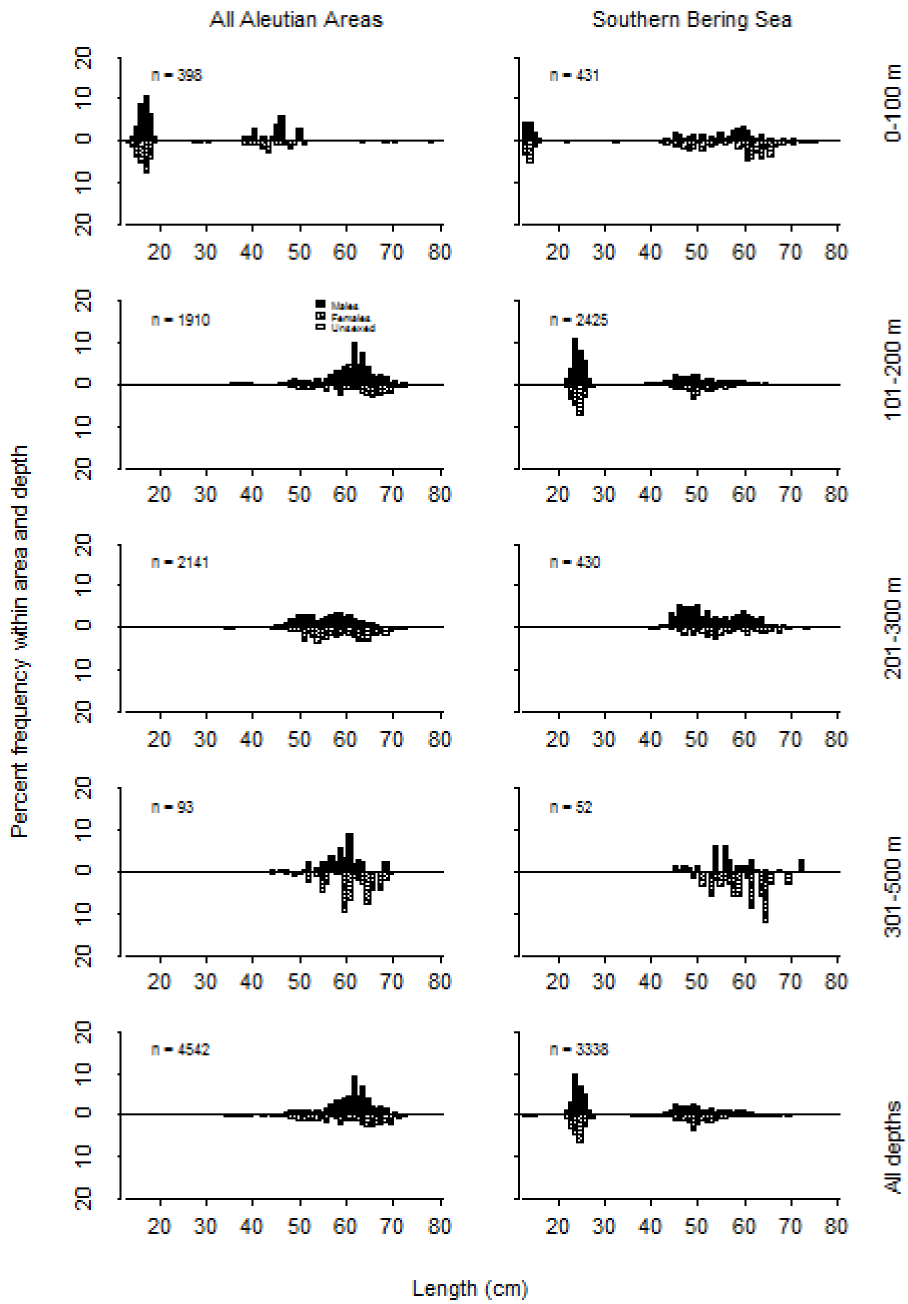


Figure 24. -- (continued).

Sablefish (*Anoplopoma fimbria*)

Sablefish were rare in the 2012 Aleutian Islands survey and were not among the twenty most abundant species. The relative population of this species is likely underestimated in this survey since the maximum depth sampled is less than 500 m which is much shallower than the known depth range of this species (Mecklenburg et al. 2002). The mean CPUE was highest in the Central Aleutian Islands district (Table 2). In all survey districts, mean CPUE was highest at depths greater than 300 m (Table 27). Almost all of the estimated biomass of 3,540 t came from the Central and Eastern Aleutian Islands districts. Mean individual weight generally increased with increasing depth in the Aleutian Islands districts but was greatest in the 200-300 m depth range in the Southern Bering Sea district (Table 27). The highest mean CPUE was reported for the N Central Aleutian subdistrict in the 301-500 m depth interval (Table 28). The three largest individual catches consisted of two tows west of Tanaga Island and one north of Seguam Island (Fig. 25). Figure 26 summarizes sablefish size composition data. Both sexes had a strong mode at 56 cm.

Giant grenadier (*Albatrossia pectoralis*)

Giant grenadier was the fourth most abundant fish species caught in the 2012 survey (Table 2). As with sablefish, the population of giant grenadier is almost certainly under estimated in this survey because of the depth limitations of the survey compared to the known depth distribution of this species (Mecklenburg et al. 2002). Catches of giant grenadier were almost completely restricted to the 301-500 m depth interval (Table 29). All were recorded in the Aleutian Islands districts with 98% from the Central and Eastern areas Aleutian Islands districts (Table 29). The subdistrict with the greatest CPUE was the N Central Aleutian Islands subdistrict in the 301-500m depth range (Table 30). Large catches of this species were rare. Only three tows had a catch of this species that exceeded two standard deviations above the mean CPUE and only one tow, near Kiska Island exceeded four (Fig. 27). Females dominated the survey catches both in terms of numbers and individual sizes (Fig. 28). A prominent length mode occurred at 29 cm vent length for females and a less prominent mode occurred at 28 cm for males (Fig. 28). Appendix C shows the weight-length relationship parameters for male, female, and combined sexes of giant grenadier.

Table 27. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing sablefish, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	0	---	---	---	---	---
	201 - 300	31	0	---	---	---	---	---
	301 - 500	9	1	0.18	60	0	202	5.710
	All depths	120	1	0.04	60	0	202	5.710
Central Aleutians	1 - 100	26	0	---	---	---	---	---
	101 - 200	41	0	---	---	---	---	---
	201 - 300	32	6	1.76	371	0	841	1.533
	301 - 500	14	7	3.32	1,323	0	3,487	1.773
	All depths	113	13	1.02	1,693	0	3,912	1.714
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	1	<0.01	2	0	8	0.121
	201 - 300	46	9	0.94	459	0	1,020	1.798
	301 - 500	13	7	2.28	1,296	38	2,554	2.116
	All depths	132	17	0.7	1,757	376	3,139	1.984
All Aleutian Areas	1 - 100	63	0	---	---	---	---	---
	101 - 200	157	1	<0.01	2	0	8	0.121
	201 - 300	109	15	0.95	830	123	1,536	1.669
	301 - 500	36	15	2.07	2,679	323	5,034	1.956
	All depths	365	31	0.62	3,511	1,053	5,968	1.863
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	0	---	---	---	---	---
	201 - 300	8	1	0.15	8	0	28	2.730
	301 - 500	5	2	0.2	21	0	54	1.245
	All depths	55	3	0.04	29	0	67	1.475

Table 28. -- Summary of sablefish mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	301-500	N Central Aleutians	8	5	8.61	1,068	0	3,287
Central Aleutians	201-300	N Central Aleutians	16	4	4.98	219	0	611
Eastern Aleutians	301-500	SE Eastern Aleutians	7	6	3.73	960	0	2,090
Central Aleutians	301-500	SE Central Aleutians	2	2	3.57	255	0	2,644
Central Aleutians	201-300	SE Central Aleutians	5	2	3.18	152	0	465
Eastern Aleutians	201-300	NE Eastern Aleutians	26	4	1.46	288	0	827
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	1	1.26	337	0	1,408
Eastern Aleutians	201-300	SE Eastern Aleutians	12	4	0.80	164	0	345
Western Aleutians	301-500	W Western Aleutians	7	1	0.35	60	0	207
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	2	0.20	21	0	57
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	1	0.15	8	0	28
Eastern Aleutians	201-300	SW Eastern Aleutians	6	1	0.10	7	0	26
Eastern Aleutians	101-200	NW Eastern Aleutians	4	1	0.01	2	0	9

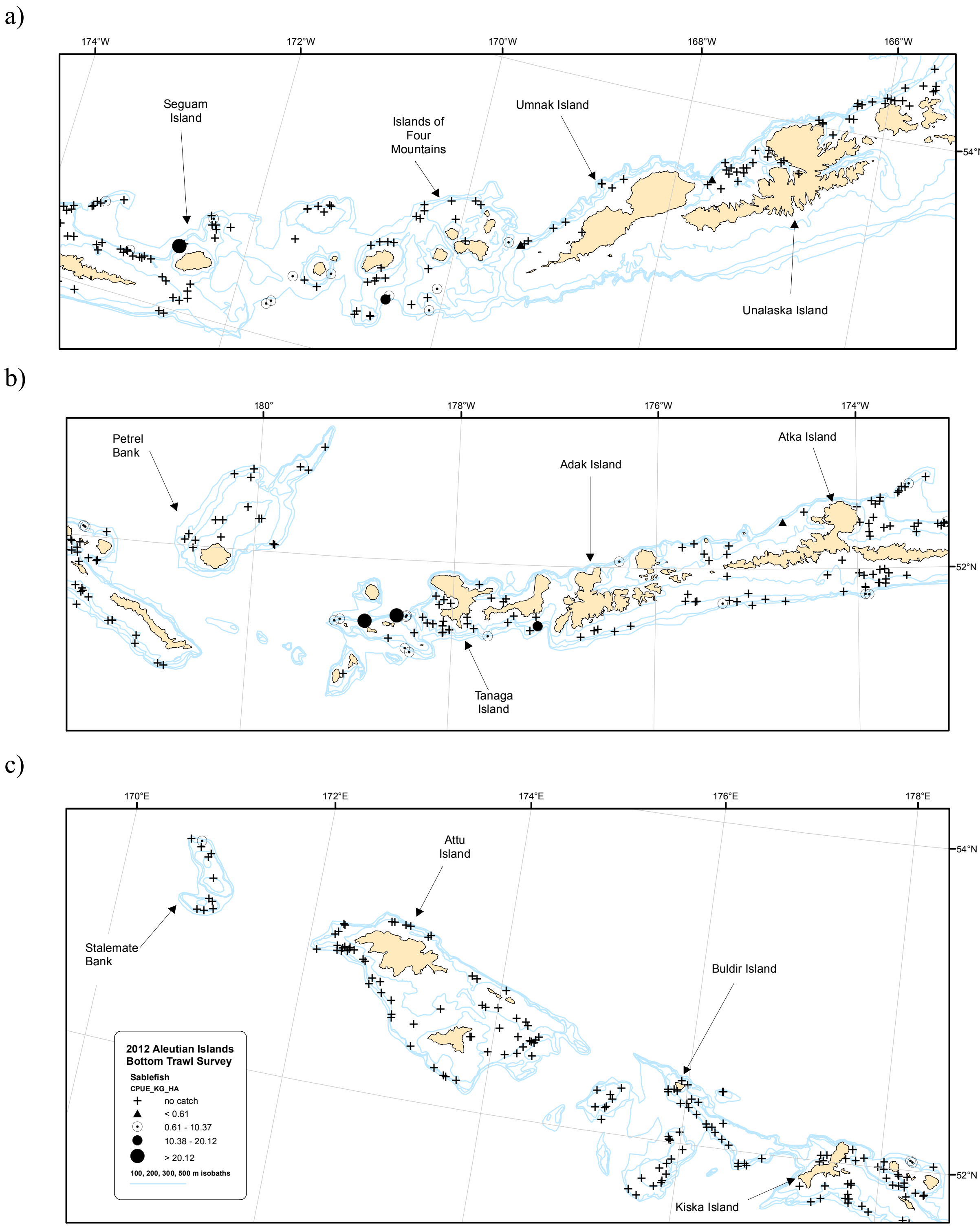


Figure 25. -- Distribution and relative abundance of sablefish from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

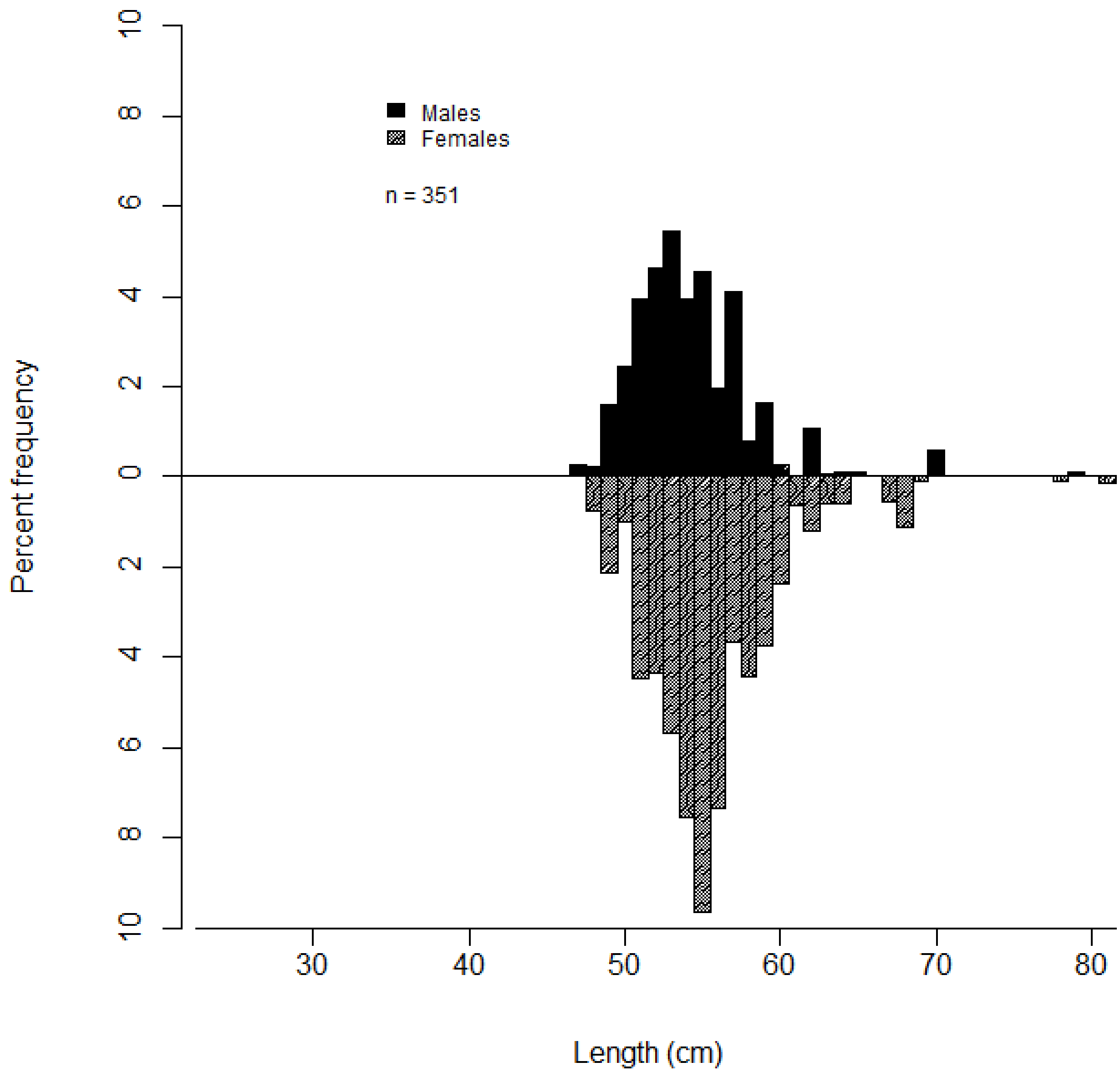


Figure 26. -- Length composition of sablefish from the 2012 Aleutian Islands bottom trawl survey.

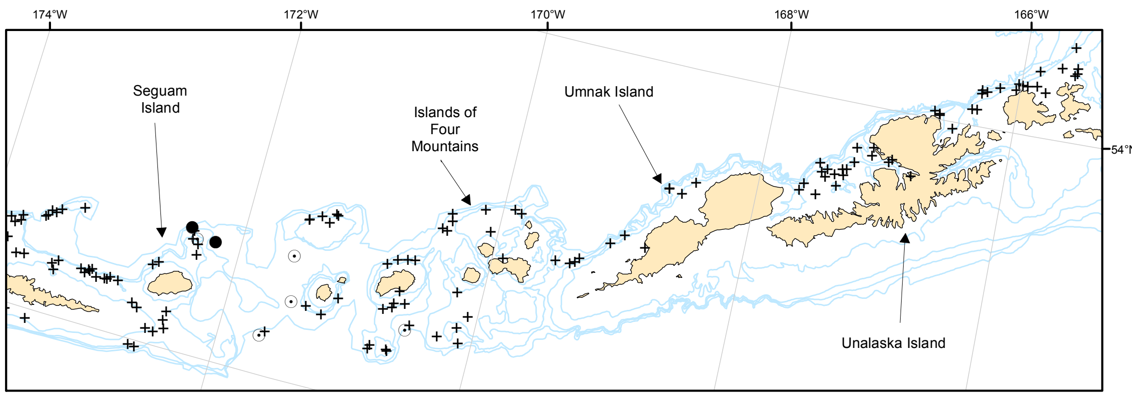
Table 29. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing giant grenadier, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	0	---	---	---	---	---
	201 - 300	31	0	---	---	---	---	---
	301 - 500	9	4	5.45	1,782	0	3,891	3.440
	All depths	120	4	1.17	1,782	0	3,891	3.440
Central Aleutians	1 - 100	26	0	---	---	---	---	---
	101 - 200	41	0	---	---	---	---	---
	201 - 300	32	1	0.03	6	0	18	4.618
	301 - 500	14	6	82.57	32,869	0	95,441	3.808
	All depths	113	7	19.87	32,875	0	95,447	3.808
Eastern Aleutians	1 - 100	14	1	0.11	77	0	253	2.898
	101 - 200	59	0		---	---	---	---
	201 - 300	46	1	0.15	73	0	224	4.165
	301 - 500	13	9	91.06	51,749	14,672	88,826	4.199
	All depths	132	11	20.59	51,899	14,821	88,977	4.196
All Aleutian Areas	1 - 100	63	1	0.04	77	0	253	2.898
	101 - 200	157	0	---	---	---	---	---
	201 - 300	109	2	0.09	79	0	230	4.196
	301 - 500	36	19	66.79	86,400	16,628	156,172	4.024
	All depths	365	22	15.20	86,556	16,784	156,328	4.022
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	0	---	---	---	---	---
	201 - 300	8	0	---	---	---	---	---
	301 - 500	5	0	---	---	---	---	---
	All depths	55	0	---	---	---	---	---

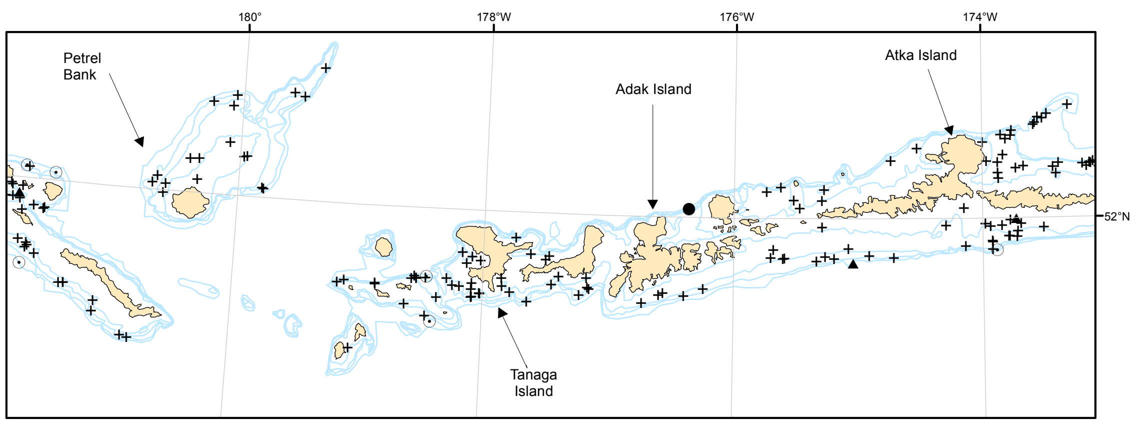
Table 30. -- Summary of giant grenadier mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	301-500	N Central Aleutians	8	4	241.62	29,954	0	93,917
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	4	161.89	43,224	2,088	84,360
Eastern Aleutians	301-500	SE Eastern Aleutians	7	4	32.53	8,374	169	16,580
Central Aleutians	301-500	SW Central Aleutians	2	1	25.22	1,991	0	27,282
Central Aleutians	301-500	SE Central Aleutians	2	1	12.94	924	0	12,666
Western Aleutians	301-500	W Western Aleutians	7	4	10.42	1,782	0	3,964
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	3.43	150	0	2,062
Eastern Aleutians	1-100	SE Eastern Aleutians	8	1	0.44	77	0	258
Eastern Aleutians	201-300	NE Eastern Aleutians	26	1	0.37	73	0	224
Central Aleutians	201-300	N Central Aleutians	16	1	0.13	6	0	18

a)



b)



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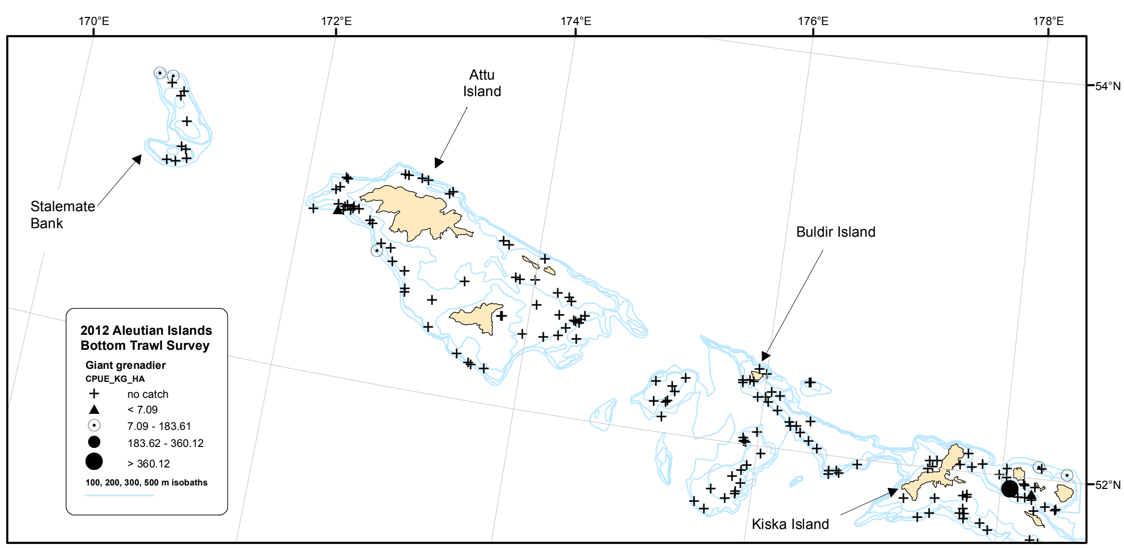


Figure 27. -- Distribution and relative abundance of giant grenadier from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

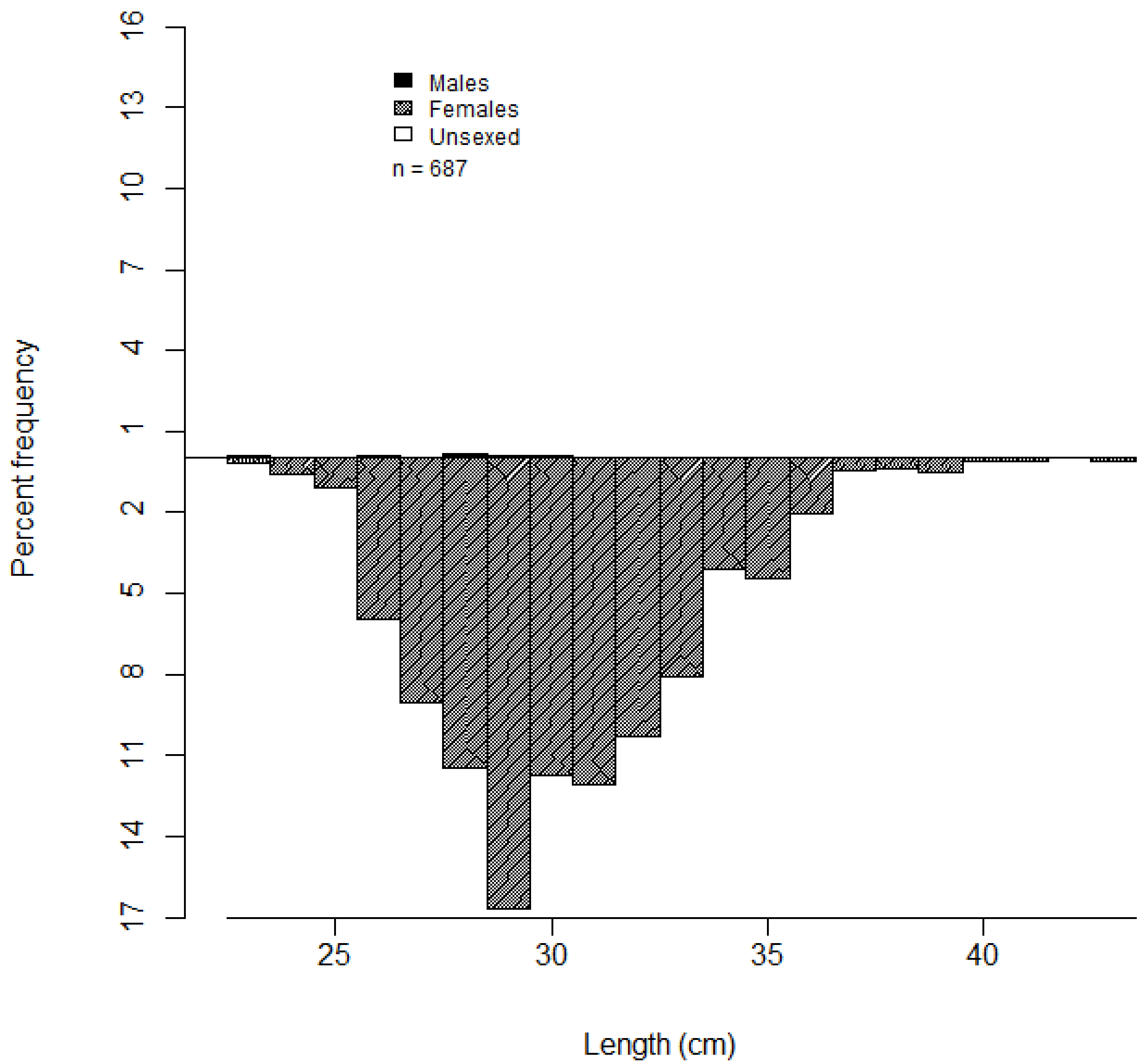


Figure 28. -- Length composition of giant grenadier from the 2012 Aleutian Islands bottom trawl survey.

Sculpins (Cottidae)

The data provided in Table 31 shows total abundance information for all species of Cottidae caught during the 2012 Aleutian Islands bottom trawl survey. This represents a deviation from previous years where this information was provided only for the most abundant or commercially important species of sculpins while the rest of the species were combined. Twenty-eight species or species groups of sculpin were identified during the 2012 Aleutian Islands survey (Appendix B). We only regularly report on a maximum of 16 species from this family and the remaining species caught are grouped into the “scuplin unidentified” category. During 2012 only 10 species categories had biomasses estimated, and we only report on species with total biomass amounts to about 90% of the entire biomass of the family. Those include the yellow Irish lord, the darkfin sculpin and the great sculpin. Most species of sculpins are probably not sampled well by the AFSC survey trawl. The small size of many of the species and their demersal orientation may result in escape under the footrope, especially on rough bottom. Yellow Irish lord represented the largest total catch in terms of weight (Table 31).

Table 31. -- Catch-per-unit-effort (CPUE), biomass, relative (%) biomass, and cumulative abundance (%) of sculpins (Cottidae) collected in the 2012 Aleutian Islands bottom trawl survey combined across survey districts and for all cottid species identified from the catches.

Common name	Mean CPUE (kg/ha)	Biomass (t)	% Biomass	Cumulative %
yellow Irish lord	219.9	14,166	64	64
darkfin sculpin	70.1	4,514	20	84
great sculpin	30.0	1,930	9	92
spectacled sculpin	11.6	746	3	96
armorhead sculpin	6.5	416	2	98
bigmouth sculpin	5.3	339	2	99
sculpin unident.	1.7	108	< 1	100
scissortail sculpin	1.3	83	< 1	--
spinyhead sculpin	< 0.05	3	< 1	--
thorny sculpin	< 0.05	1	< 1	--

Yellow Irish Lord (*Hemilepidotus jordani*)

Yellow Irish lord was the most abundant sculpin species and was the fourteenth most abundant fish species overall ranking and in the top 20 in all areas except the Western Aleutian Islands district (Table 2). They were most abundant in the Eastern Aleutians district where the CPUE was 3.48 kg/ha. This species was found in all depth intervals although not in every depth interval in every survey district. Yellow Irish lords were found in 40% of the tows over the entire survey (Table 32). The highest concentrations were found in the 101-200 m depth interval in the Central and Eastern areas Aleutian Islands districts. The estimated biomass in those depth zones within those two areas made up about 50 % of the estimated biomass over the entire survey area which was 14,100 t. There was no consistent trend between mean weight and depth caught (Table 32). The specific subdistrict with the highest CPUE and estimated biomass was the SE Eastern Aleutians subdistrict (101-200 m) which contains 22 % of the estimated biomass (Table 33) even though it only represents about 3% of the survey area. This species was found in 33 of the 45 defined subdistricts depth strata (Appendix Table A-1).

Darkfin sculpin (*Malacocottus zonurus*)

Darkfin sculpin appeared in 20 most abundant species only in the Central Aleutians and Eastern Aleutian Islands districts where it was ranked twentieth and eighteenth respectively (Table 2). It did not rank among the 20 most abundant species of the survey area but was the second most abundant sculpin species with an estimated biomass representing about 20% of the cottid species overall. The estimated biomass is 4514 t (Table 31). They were found in all survey districts and in all depths (Table 34). The subdistricts with the highest CPUEs contained water deeper than 200 m. The subdistrict with the highest CPUE was the E Western Aleutians subarea in the 201-300 m depth range (Table 35). They were found in 42 of the 45 subdistrict-depth strata (Table 35).

Great sculpin (*Myoxocephalus polyacanthocephalus*)

Great sculpin did not rank in the 20 most abundant species in any of the survey districts although it was the third most abundant species of sculpin (Tables 2 and 31). The estimated biomass of this species makes up about 8% of the entire scuplin population with approximately 1,930 t. They were found in all four survey districts in water shallower than 200 m and usually less than 100 m. (Table 36). The subdistrict with the highest CPUE was the NW Eastern Aleutians subarea in the 1-100m depth interval which contained 31 % of the estimated biomass despite representing only 3% of the total survey area (Appendix Table A-1). Their occurrence was uncommon and only occurred in 12 of the 24 subdistrict- depth strata (Table 37).

Table 32. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing yellow Irish lord, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	8	0.41	202	49	355	0.422
	101 - 200	57	17	0.15	79	31	126	0.571
	201 - 300	31	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	All depths	120	25	0.18	280	126	434	0.455
Central Aleutians	1 - 100	26	15	3.42	1,998	0	4,160	0.709
	101 - 200	41	28	4.97	2,290	816	3,765	0.721
	201 - 300	32	7	0.41	87	0	198	0.656
	301 - 500	14	0	---	---	---	---	---
	All depths	113	50	2.64	4,375	1,939	6,811	0.714
Eastern Aleutians	1 - 100	14	11	4.32	2,956	0	7,039	0.608
	101 - 200	59	35	6.11	4,746	1,838	7,655	0.866
	201 - 300	46	12	1.57	770	218	1,323	0.732
	301 - 500	13	1	0.52	298	0	1,003	0.838
	All depths	132	59	3.48	8,771	3,983	13,559	0.747
All Aleutian Areas	1 - 100	63	34	2.93	5,156	740	9,571	0.632
	101 - 200	157	80	4.02	7,115	3,916	10,314	0.809
	201 - 300	109	19	0.98	857	293	1,421	0.724
	301 - 500	36	1	0.23	298	0	1,003	0.838
	All depths	365	134	2.36	13,426	8,198	18,655	0.726
Southern Bering Sea	1 - 100	26	19	0.91	365	38	693	0.662
	101 - 200	16	13	1.46	270	109	431	0.682
	201 - 300	8	2	1.84	104	0	261	0.743
	301 - 500	5	0	---	---	---	---	---
	All depths	55	34	0.99	740	353	1,126	0.679

Table 33. -- Summary of yellow Irish lord mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	101-200	SE Eastern Aleutians	19	16	16.14	3,067	447	5,687
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	9.79	1,242	0	16,123
Central Aleutians	1-100	SE Central Aleutians	7	5	8.94	1,041	0	3,284
Central Aleutians	1-100	Petrel Bank	5	5	8.49	815	317	1,313
Central Aleutians	101-200	SE Central Aleutians	10	8	8.33	626	0	1,262
Eastern Aleutians	1-100	SE Eastern Aleutians	8	7	6.67	1,162	343	1,980
Eastern Aleutians	101-200	NE Eastern Aleutians	26	11	5.89	1,186	0	2,572
Central Aleutians	101-200	Petrel Bank	7	5	5.81	1,008	0	2,314
Central Aleutians	101-200	N Central Aleutians	9	5	4.77	509	0	1,062
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	3.31	52	0	487
Eastern Aleutians	201-300	SE Eastern Aleutians	12	7	3.07	633	98	1,168
Eastern Aleutians	101-200	SW Eastern Aleutians	10	6	1.86	420	117	722
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	2	1.84	104	0	265
Western Aleutians	1-100	E Western Aleutians	12	7	1.66	197	41	352
Eastern Aleutians	1-100	NW Eastern Aleutians	2	1	1.59	307	0	4,208
Central Aleutians	201-300	N Central Aleutians	16	5	1.49	66	0	174
Southern Bering Sea	101-200	E Southern Bering Sea	14	11	1.48	175	13	336
Southern Bering Sea	101-200	W Southern Bering Sea	2	2	1.43	96	0	269
Central Aleutians	101-200	SW Central Aleutians	15	10	1.40	147	20	274
Southern Bering Sea	1-100	E Southern Bering Sea	24	18	1.35	330	12	649
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	1.29	246	0	3,372
Eastern Aleutians	301-500	SE Eastern Aleutians	7	1	1.16	298	0	1,028
Central Aleutians	1-100	N Central Aleutians	11	4	0.54	113	0	272
Eastern Aleutians	101-200	NW Eastern Aleutians	4	2	0.46	73	0	253
Eastern Aleutians	201-300	NE Eastern Aleutians	26	2	0.41	81	0	229
Central Aleutians	201-300	SE Central Aleutians	5	1	0.33	16	0	60
Southern Bering Sea	1-100	W Southern Bering Sea	2	1	0.22	35	0	480
Central Aleutians	1-100	SW Central Aleutians	3	1	0.18	29	0	156
Western Aleutians	101-200	W Western Aleutians	35	12	0.16	66	20	111
Central Aleutians	201-300	SW Central Aleutians	7	1	0.12	5	0	18
Western Aleutians	101-200	E Western Aleutians	22	5	0.10	13	0	26
Eastern Aleutians	201-300	SW Eastern Aleutians	6	1	0.06	5	0	16
Western Aleutians	1-100	W Western Aleutians	11	1	0.01	5	0	15

Table 34. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing darkfin sculpin, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	4	0.03	16	0	36	0.228
	101 - 200	57	36	0.54	285	127	443	0.112
	201 - 300	31	29	2.35	405	246	565	0.064
	301 - 500	9	5	0.19	63	0	221	0.033
	All depths	120	74	0.51	770	487	1052	0.071
Central Aleutians	1 - 100	26	3	0.05	27	0	84	0.129
	101 - 200	41	18	0.74	341	0	884	0.107
	201 - 300	32	30	1.49	313	87	539	0.158
	301 - 500	14	12	1.59	633	0	2,216	0.114
	All depths	113	63	0.79	1314	0	2724	0.120
Eastern Aleutians	1 - 100	14	2	0.00	3	2	3	0.045
	101 - 200	59	19	0.20	156	0	342	0.105
	201 - 300	46	39	1.89	925	435	1,414	0.103
	301 - 500	13	11	2.08	1182	53	2311	0.065
	All depths	132	71	0.90	2265	996	3,534	0.079
All Aleutian Areas	1 - 100	63	9	0.03	46	0	105	0.136
	101 - 200	157	73	0.44	782	197	1,367	0.108
	201 - 300	109	98	1.88	1643	1102	2184	0.095
	301 - 500	36	28	1.45	1878	511	3245	0.074
	All depths	365	208	0.76	4349	2789	5,909	0.086
Southern Bering Sea	1 - 100	26	0	0.00	0	0	0	
	101 - 200	16	2	0.00	1	0	2	0.104
	201 - 300	8	7	0.90	51	0	122	0.192
	301 - 500	5	4	1.09	113	0	247	0.076
	All depths	55	13	0.22	165	17	313	0.093

Table 35. -- Summary of darkfin sculpin mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Western Aleutians	201-300	E Western Aleutians	14	14	4.33	339	183	495
Central Aleutians	301-500	Petrel Bank	2	2	3.59	445	0	4,990
Eastern Aleutians	201-300	NW Eastern Aleutians	2	1	3.10	48	0	663
Eastern Aleutians	201-300	NE Eastern Aleutians	26	25	2.70	531	212	849
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	4	2.33	623	0	1,845
Eastern Aleutians	301-500	SE Eastern Aleutians	7	5	2.17	558	0	1,300
Central Aleutians	201-300	SE Central Aleutians	5	5	1.76	84	0	174
Western Aleutians	101-200	E Western Aleutians	22	20	1.68	211	66	356
Central Aleutians	201-300	SW Central Aleutians	7	6	1.58	67	0	151
Eastern Aleutians	201-300	SE Eastern Aleutians	12	9	1.56	322	0	694
Central Aleutians	101-200	Petrel Bank	7	5	1.56	270	0	828
Central Aleutians	201-300	Petrel Bank	4	4	1.50	115	0	346
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	4	1.09	113	0	257
Central Aleutians	201-300	N Central Aleutians	16	15	1.08	47	13	81
Central Aleutians	301-500	N Central Aleutians	8	7	1.03	127	0	295
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	7	0.90	51	0	124
Western Aleutians	201-300	W Western Aleutians	17	15	0.71	66	16	116
Central Aleutians	301-500	SE Central Aleutians	2	1	0.64	46	0	629
Eastern Aleutians	101-200	NE Eastern Aleutians	26	8	0.35	70	0	213
Western Aleutians	301-500	E Western Aleutians	2	2	0.34	53	0	511
Central Aleutians	101-200	SW Central Aleutians	15	6	0.34	36	0	76
Eastern Aleutians	201-300	SW Eastern Aleutians	6	4	0.34	24	0	68
Eastern Aleutians	101-200	SW Eastern Aleutians	10	3	0.31	70	0	197
Central Aleutians	101-200	N Central Aleutians	9	4	0.31	33	0	81
Central Aleutians	1-100	Petrel Bank	5	3	0.28	27	0	89
Central Aleutians	301-500	SW Central Aleutians	2	2	0.19	15	0	182
Western Aleutians	101-200	W Western Aleutians	35	16	0.18	74	2	146
Western Aleutians	1-100	E Western Aleutians	12	4	0.14	16	0	36
Eastern Aleutians	101-200	SE Eastern Aleutians	19	7	0.06	12	0	30
Western Aleutians	301-500	W Western Aleutians	7	3	0.06	10	0	27
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	0.05	2	2	3
Central Aleutians	101-200	SE Central Aleutians	10	3	0.04	3	0	8
Eastern Aleutians	101-200	NW Eastern Aleutians	4	1	0.02	4	0	15
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	0.02	3	0	5
Southern Bering Sea	101-200	E Southern Bering Sea	14	2	0.01	1	0	2
Eastern Aleutians	1-100	SE Eastern Aleutians	8	5	0.76	133	0	291
Western Aleutians	1-100	E Western Aleutians	12	5	0.72	85	6	163
Central Aleutians	1-100	SW Central Aleutians	3	3	0.54	88	0	186
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	0.54	24	14	33
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	2	0.49	132	0	374
Central Aleutians	1-100	N Central Aleutians	11	4	0.34	72	0	169
Central Aleutians	1-100	Petrel Bank	5	2	0.11	11	0	32

Table 36. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing great sculpin, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	2	0.33	159	0	422	5.843
	101 - 200	57	3	0.07	38	0	85	1.953
	201 - 300	31	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	All depths	120	5	0.13	196	0	465	4.227
Central Aleutians	1 - 100	26	9	1.24	727	0	1,618	3.297
	101 - 200	41	0	---	---	---	---	---
	201 - 300	32	0	---	---	---	---	---
	301 - 500	14	0	---	---	---	---	---
	All depths	113	9	0.44	727	0	1,618	3.297
Eastern Aleutians	1 - 100	14	7	1.36	930	0	3,522	5.122
	101 - 200	59	2	0.06	49	0	127	3.732
	201 - 300	46	0	---	---	---	---	---
	301 - 500	13	0	---	---	---	---	---
	All depths	132	9	0.39	980	0	3,577	5.027
All Aleutian Areas	1 - 100	63	18	1.03	1,816	0	4,060	4.230
	101 - 200	157	5	0.05	87	0	176	2.676
	201 - 300	109	0	---	---	---	---	---
	301 - 500	36	0	---	---	---	---	---
	All depths	365	23	0.33	1,903	0	4,151	4.121
Southern Bering Sea	1 - 100	26	2	0.07	27	0	66	1.405
	101 - 200	16	0	---	---	---	---	---
	201 - 300	8	0	---	---	---	---	---
	301 - 500	5	0	---	---	---	---	---
	All depths	55	2	0.04	27	0	66	1.405

Table 37. -- Summary of great sculpin mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	1-100	NW Eastern Aleutians	2	1	3.07	593	0	8,131
Central Aleutians	1-100	SE Central Aleutians	7	1	2.15	250	0	862
Central Aleutians	1-100	SW Central Aleutians	3	2	1.82	294	0	1,280
Eastern Aleutians	1-100	NE Eastern Aleutians	2	2	1.31	166	0	1,033
Eastern Aleutians	1-100	SE Eastern Aleutians	8	4	0.98	171	0	357
Central Aleutians	1-100	N Central Aleutians	11	5	0.77	163	11	315
Western Aleutians	1-100	W Western Aleutians	11	2	0.43	159	0	425
Central Aleutians	1-100	Petrel Bank	5	1	0.21	20	0	77
Eastern Aleutians	101-200	SE Eastern Aleutians	19	1	0.19	35	0	109
Southern Bering Sea	1-100	E Southern Bering Sea	24	2	0.11	27	0	66
Western Aleutians	101-200	W Western Aleutians	35	3	0.09	38	0	85
Eastern Aleutians	101-200	SW Eastern Aleutians	10	1	0.06	14	0	46

Rockfishes

Pacific ocean perch (*Sebastes alutus*)

Pacific ocean perch (POP) was the most abundant fish species caught in the 2012 survey as well as the most abundant in each of the four survey districts (Table 2). The overall CPUE of this species was more than triple that of the next most abundant species. The highest area-specific catch rate was in the Western Aleutian Islands district and the lowest was in the Southern Bering Sea district (Table 38). The depth range with the greatest biomass was 201-300 m. Sixty-one percent of the estimated biomass of 902,399 t was caught in this depth interval (Table 38). Every tow in this depth range contained POP. The second greatest abundance was found in the depth interval 101-200 m which accounted for another 35% of the estimated biomass (Table 38). Mean weight generally increased with depth (Table 38). Larger catches were clustered in specific areas. These included Atka, Kiska, Buldir and Attu Islands as well as Stalemate Bank (Fig. 29). The stratum with the highest CPUE was the NW Eastern Aleutians subdistrict in the 201-300 m depth interval. This area represents just 0.2% of the survey area but contained about 10% of the estimated biomass. Likewise, 88% of the estimated biomass was contained in just 13 of these strata (Table 39) which made up just 22% of the survey area. This demonstrates the presence of areas of very concentrated schools. Length composition data (Fig. 20) show relatively similar length distributions for males and females in the three Aleutian Islands districts, but in the Southern Bering Sea district the females were larger than males at depths deeper than 200 m. In the Aleutians areas both males and females showed a mode at approximately 35–38 cm while in the Southern Bering Sea females had a mode at about 40-42 cm. Although there was little data, fish were considerably smaller in the 1-100 m depth range over the survey area with most of the population about 20 cm in length (Fig. 30). Appendix C shows the length-weight relationship parameters for male, female, and combined sexes of POP.

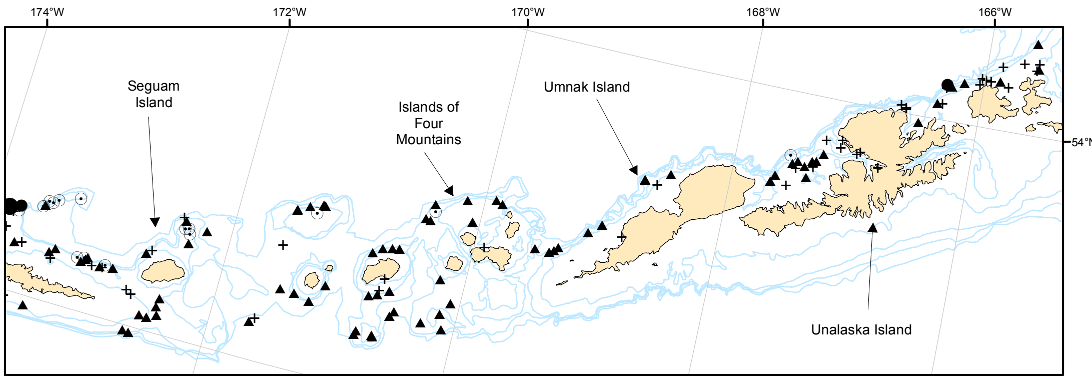
Table 38. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing Pacific Ocean perch, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	6	1.72	841	0	1,973	0.188
	101 - 200	57	50	280.51	149,165	35,502	262,828	0.567
	201 - 300	31	31	643.22	110,867	60,168	161,566	0.672
	301 - 500	9	4	8.52	2,788	0	6,438	0.743
	All depths	120	91	173.57	263,661	139,337	387,986	0.605
Central Aleutians	1 - 100	26	3	0.08	49	0	156	0.151
	101 - 200	41	23	95.16	43,826	191	87,461	0.598
	201 - 300	32	32	849.88	179,226	105,987	252,464	0.820
	301 - 500	14	11	26.54	10,565	0	40,686	0.928
	All depths	113	69	141.25	233,666	149,476	317,855	0.770
Eastern Aleutians	1 - 100	14	5	0.54	369	0	1,615	0.306
	101 - 200	59	43	162.19	125,990	0	335,744	0.628
	201 - 300	46	46	482.80	236,643	29,787	443,499	0.710
	301 - 500	13	8	6.00	3,412	0	9,893	0.637
	All depths	132	102	145.40	366,413	91,948	640,879	0.678
All Aleutian Areas	1 - 100	63	14	0.72	1,259	0	2,608	0.210
	101 - 200	157	116	180.30	318,981	82,789	555,173	0.594
	201 - 300	109	109	603.09	526,735	312,920	740,551	0.735
	301 - 500	36	23	12.96	16,765	0	41,210	0.818
	All depths	365	262	151.71	863,741	557,518	1,169,963	0.675
Southern Bering Sea	1 - 100	26	6	0.15	61	0	135	0.133
	101 - 200	16	10	1.48	274	0	655	0.604
	201 - 300	8	8	433.87	24,464	0	71,739	0.866
	301 - 500	5	5	132.85	13,858	0	46,869	0.914
	All depths	55	29	51.67	38,658	0	92,553	0.872

Table 39. -- Summary of Pacific ocean perch mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	6,017.27	93,827	0	1,122,638
Central Aleutians	201-300	N Central Aleutians	16	16	1,098.33	48,217	29,826	66,608
Central Aleutians	201-300	SE Central Aleutians	5	5	1,052.77	50,255	0	101,075
Central Aleutians	201-300	SW Central Aleutians	7	7	787.54	33,552	0	95,659
Western Aleutians	201-300	W Western Aleutians	17	17	743.60	69,916	24,335	115,496
Central Aleutians	201-300	Petrel Bank	4	4	615.87	47,202	11,294	83,110
Eastern Aleutians	101-200	NE Eastern Aleutians	26	16	563.66	113,440	0	323,444
Western Aleutians	201-300	E Western Aleutians	14	14	522.74	40,951	15,080	66,822
Eastern Aleutians	201-300	NE Eastern Aleutians	26	26	472.72	93,057	42,601	143,514
Eastern Aleutians	201-300	SW Eastern Aleutians	6	6	466.35	33,408	0	89,413
Western Aleutians	101-200	E Western Aleutians	22	22	460.64	57,693	17,360	98,026
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	8	433.87	24,464	0	72,948
Western Aleutians	101-200	W Western Aleutians	35	28	225.02	91,473	0	198,016
Central Aleutians	101-200	SW Central Aleutians	15	13	174.64	18,378	0	41,266
Central Aleutians	101-200	N Central Aleutians	9	4	154.45	16,465	0	54,381
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	5	132.85	13,858	0	49,501
Eastern Aleutians	201-300	SE Eastern Aleutians	12	12	79.35	16,351	6,619	26,083
Central Aleutians	301-500	Petrel Bank	2	2	55.84	6,911	0	91,037
Central Aleutians	101-200	Petrel Bank	7	2	45.52	7,899	0	26,076
Eastern Aleutians	101-200	SW Eastern Aleutians	10	9	34.24	7,742	1,483	14,000
Central Aleutians	301-500	N Central Aleutians	8	6	23.26	2,884	0	8,175
Eastern Aleutians	101-200	NW Eastern Aleutians	4	3	16.75	2,671	0	10,576
Central Aleutians	101-200	SE Central Aleutians	10	4	14.42	1,084	0	2,973
Western Aleutians	301-500	W Western Aleutians	7	3	12.84	2,197	0	5,789
Eastern Aleutians	301-500	SE Eastern Aleutians	7	5	12.81	3,298	0	10,001
Eastern Aleutians	101-200	SE Eastern Aleutians	19	15	11.25	2,138	0	4,984
Central Aleutians	301-500	SE Central Aleutians	2	2	9.48	677	0	5,577
Western Aleutians	301-500	E Western Aleutians	2	1	3.79	591	0	8,104
Western Aleutians	1-100	E Western Aleutians	12	4	3.74	443	0	1,187
Southern Bering Sea	101-200	E Southern Bering Sea	14	9	2.32	274	0	657
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	1.83	80	0	1,097
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	1.49	284	0	3,891
Central Aleutians	301-500	SW Central Aleutians	2	1	1.19	94	0	1,284
Western Aleutians	1-100	W Western Aleutians	11	2	1.08	398	0	1,277
Eastern Aleutians	1-100	SE Eastern Aleutians	8	3	0.48	83	0	218
Central Aleutians	1-100	Petrel Bank	5	1	0.45	43	0	163
Southern Bering Sea	1-100	E Southern Bering Sea	24	6	0.25	61	0	136
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	2	0.13	34	0	97
Central Aleutians	1-100	SW Central Aleutians	3	1	0.03	5	0	28
Eastern Aleutians	1-100	NE Eastern Aleutians	2	1	0.02	2	0	29
Central Aleutians	1-100	SE Central Aleutians	7	1	0.01	1	0	4
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	0.00	0	0	3

a)



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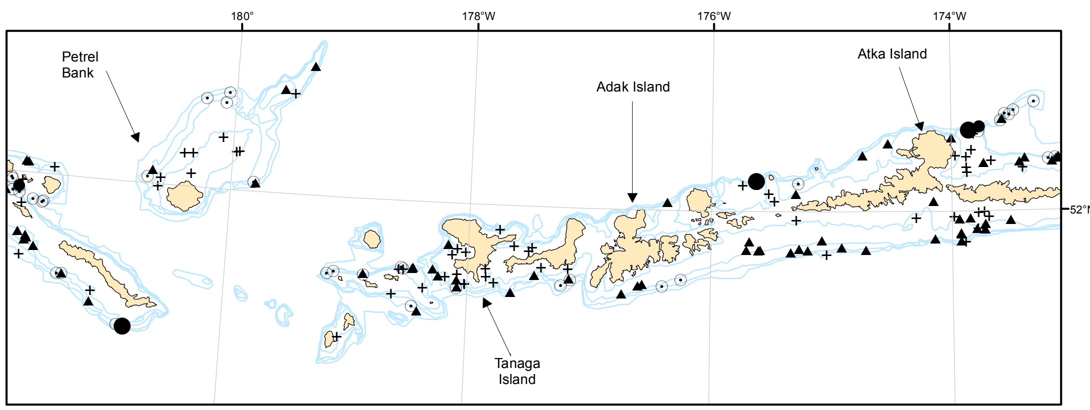

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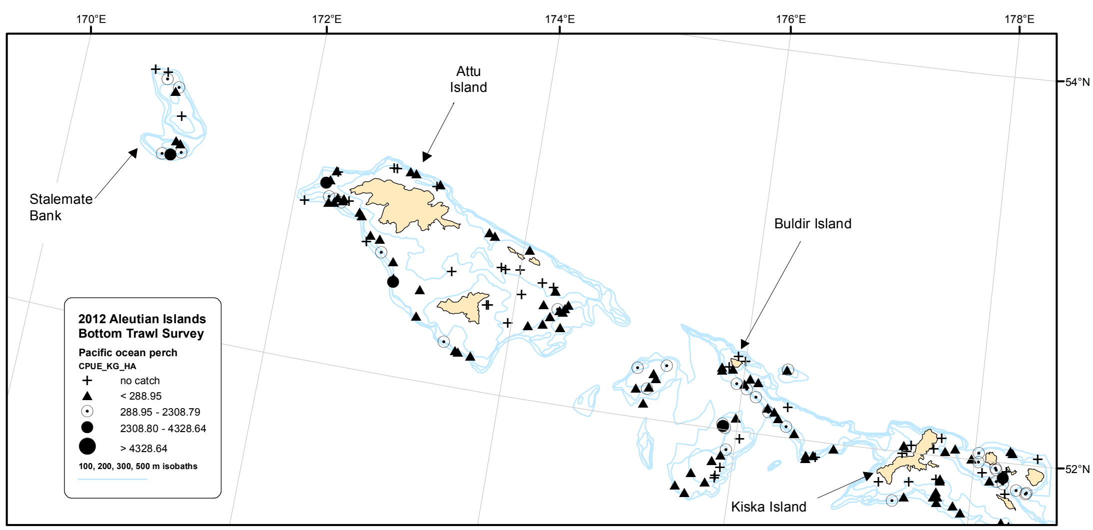


Figure 29. -- Distribution and relative abundance of Pacific ocean perch from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

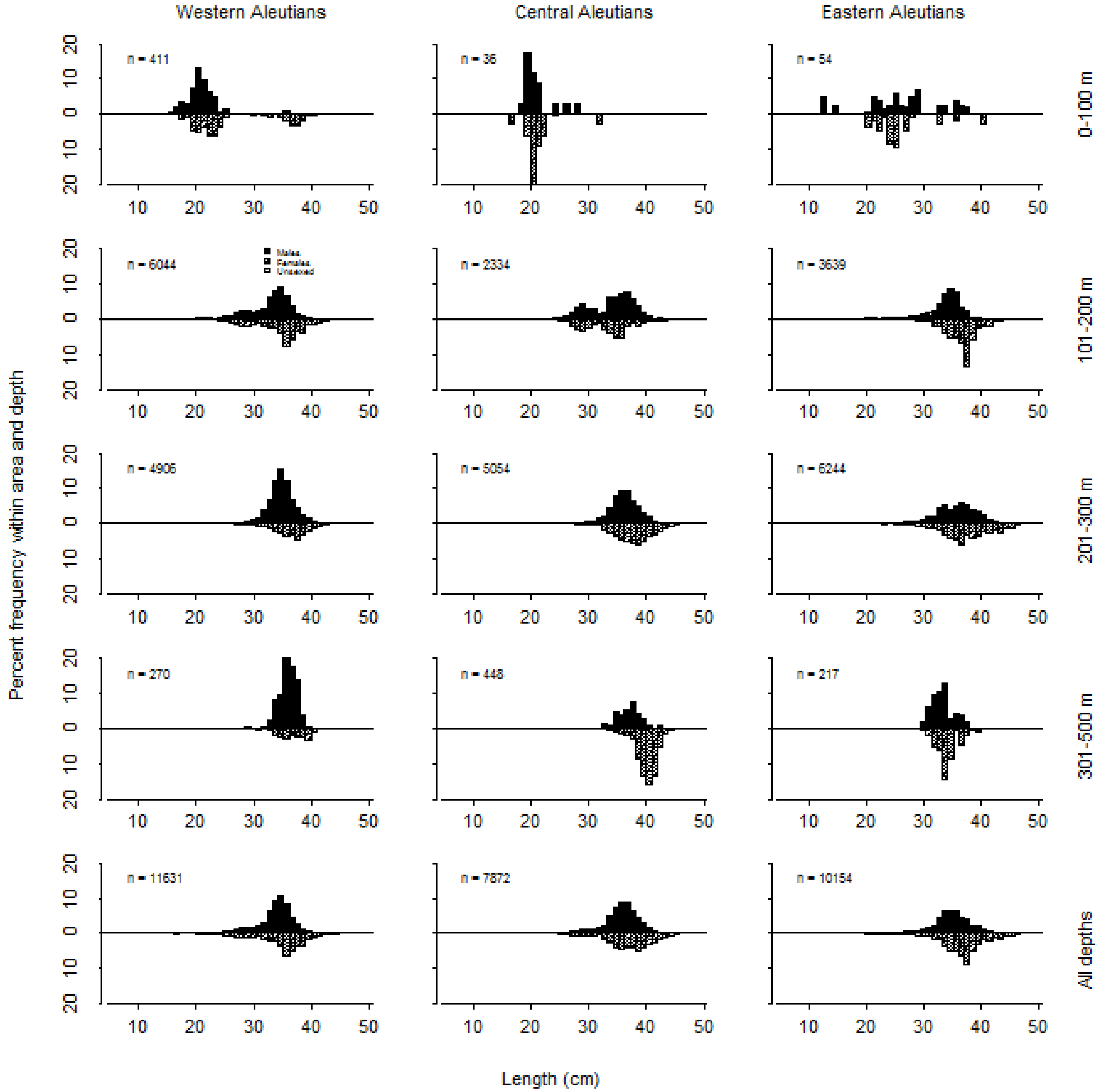


Figure 30. -- Length composition by depth intervals of Pacific ocean perch from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

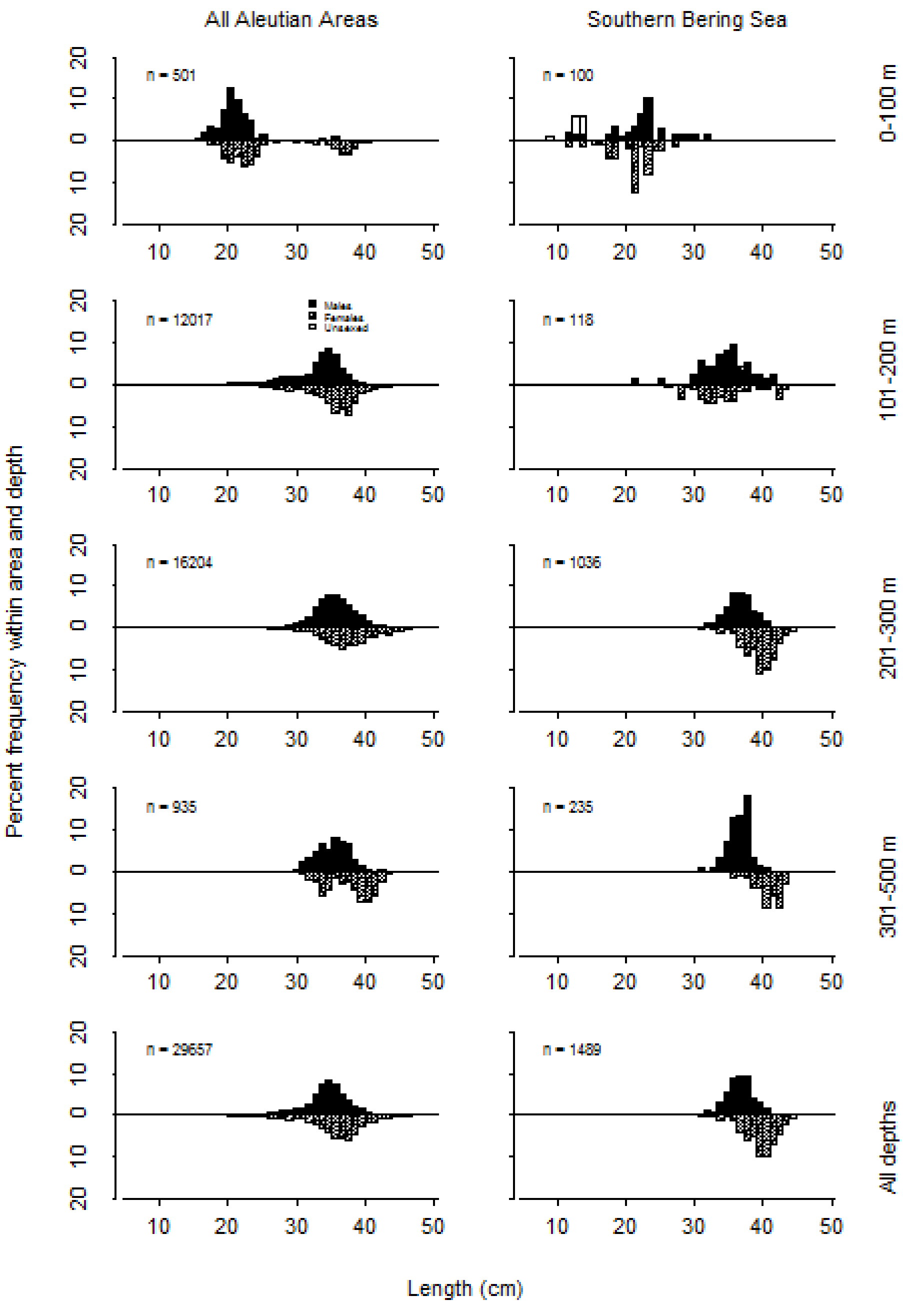


Figure 30. -- (continued).

Northern rockfish (*Sebastes polyspinis*)

Northern rockfish was the second most abundant species caught in the 2012 Aleutian survey. Relative abundance was highest in the Western and Central Aleutian Islands districts (Table 2). Northern rockfish were widely distributed along the Aleutian Islands, but the largest catches were west of 180° longitude (Fig. 31). Although they occurred frequently in the Southern Bering Sea (25% of all tows), catch rates in this area were much lower than in Aleutian Islands districts (Table 40). The total estimated biomass was 285,164 t. Approximately 76% of this was found in the Western Aleutian Islands district and in depths less than 200 m. Northern rockfish occurred in low abundance in the 201-300 m depth interval and were almost absent in depths deeper than 300 m (Table 40). Mean weight generally increased with depth. They were caught in 54% of all tows shallower than 200 m (Table 40). The highest mean CPUE occurred in the 101-200 m depth interval in the W Western Aleutians stratum, where northern rockfish were caught in 28 of the 35 tows (Table 41). In water deeper than 100 m in the Aleutian Islands areas, females showed a distinct mode at about 32 cm (Fig. 32). One exception to this occurred in the Eastern Aleutian Islands district in water deeper than 200 m where the mode was closer to 35 cm. Length modes for males were less distinct (Fig. 32). Appendix C shows the weight-length relationship parameters for male, female, and combined sexes of northern rockfish.

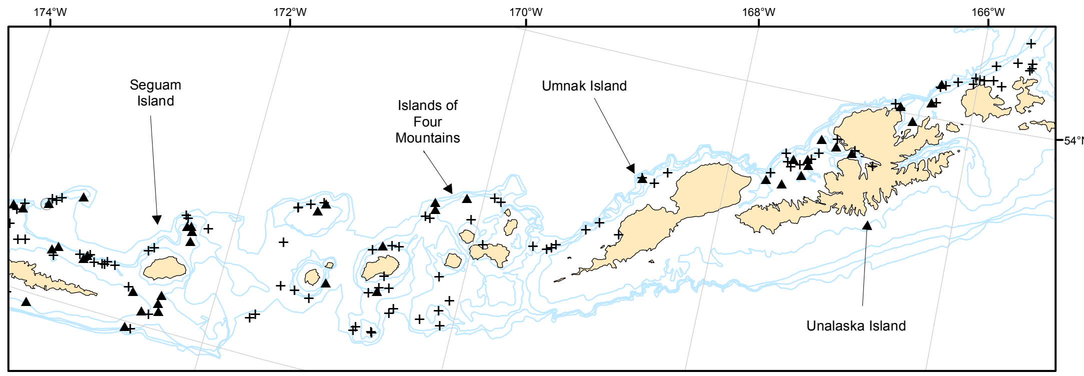
Table 40. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing northern rockfish, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	14	46.44	22,649	2,776	42,521	0.341
	101 - 200	57	48	363.82	193,466	0	482,125	0.521
	201 - 300	31	13	1.22	210	0	542	0.619
	301 - 500	9	0	---	---	---	---	---
	All depths	120	75	142.41	216,325	0	505,630	0.494
Central Aleutians	1 - 100	26	12	24.57	14,366	0	41,087	0.349
	101 - 200	41	24	82.94	38,201	1,191	75,211	0.566
	201 - 300	32	11	0.46	96	28	165	0.514
	301 - 500	14	1	0.03	11	0	57	0.562
	All depths	113	48	31.84	52,674	8,250	97,098	0.484
Eastern Aleutians	1 - 100	14	5	0.79	541	0	1,251	0.402
	101 - 200	59	27	18.47	14,346	0	33,577	0.539
	201 - 300	46	17	1.49	729	0	1,858	0.787
	301 - 500	13	0	---	---	---	---	---
	All depths	132	49	6.20	15,615	0	34,891	0.540
All Aleutian Areas	1 - 100	63	31	21.37	37,556	7,311	67,800	0.345
	101 - 200	157	99	139.06	246,013	0	537,629	0.528
	201 - 300	109	41	1.19	1,035	0	2,208	0.712
	301 - 500	36	1	0.01	11	0	57	0.562
	All depths	365	172	49.99	284,614	0	577,722	0.494
Southern Bering Sea	1 - 100	26	6	0.28	112	0	334	0.246
	101 - 200	16	6	2.22	411	0	1,242	0.761
	201 - 300	8	2	0.48	27	0	79	0.765
	301 - 500	5	0	---	---	---	---	---
	All depths	55	14	0.74	550	0	1,390	0.533

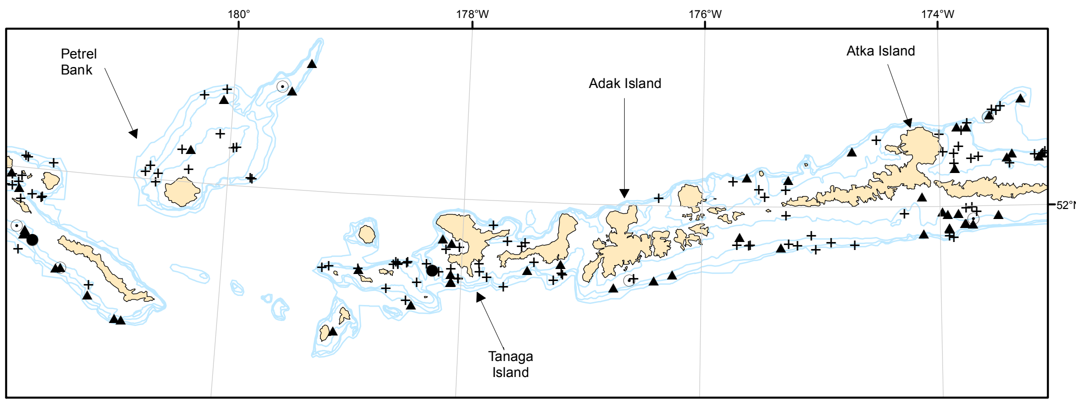
Table 41. -- Summary of northern rockfish mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Western Aleutians	101-200	W Western Aleutians	35	28	435.98	177,234	0	465,752
Central Aleutians	101-200	SW Central Aleutians	15	13	229.03	24,101	0	52,698
Central Aleutians	101-200	SE Central Aleutians	10	3	159.17	11,966	0	39,022
Western Aleutians	1-100	E Western Aleutians	12	9	145.32	17,196	0	35,799
Western Aleutians	101-200	E Western Aleutians	22	20	129.61	16,233	7,032	25,433
Central Aleutians	1-100	Petrel Bank	5	1	112.56	10,806	0	40,802
Eastern Aleutians	101-200	SE Eastern Aleutians	19	12	44.89	8,530	0	25,047
Eastern Aleutians	101-200	SW Eastern Aleutians	10	4	22.58	5,105	0	16,535
Central Aleutians	101-200	N Central Aleutians	9	4	17.82	1,899	0	6,025
Western Aleutians	1-100	W Western Aleutians	11	5	14.76	5,452	0	14,912
Central Aleutians	1-100	N Central Aleutians	11	5	9.43	1,986	0	4,999
Central Aleutians	1-100	SW Central Aleutians	3	3	6.66	1,077	0	4,123
Central Aleutians	1-100	SE Central Aleutians	7	3	4.27	497	0	1,440
Southern Bering Sea	101-200	E Southern Bering Sea	14	6	3.48	411	0	1,248
Eastern Aleutians	201-300	NE Eastern Aleutians	26	10	3.31	651	0	1,780
Eastern Aleutians	101-200	NE Eastern Aleutians	26	10	3.30	664	0	1,500
Eastern Aleutians	1-100	SE Eastern Aleutians	8	4	2.74	476	0	1,215
Western Aleutians	201-300	E Western Aleutians	14	8	2.57	202	0	535
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	1.56	24	0	145
Central Aleutians	101-200	Petrel Bank	7	4	1.35	235	0	523
Central Aleutians	201-300	N Central Aleutians	16	5	1.06	47	0	103
Central Aleutians	201-300	SW Central Aleutians	7	5	1.02	44	0	91
Eastern Aleutians	201-300	SW Eastern Aleutians	6	3	0.49	35	0	108
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	2	0.48	27	0	81
Southern Bering Sea	1-100	E Southern Bering Sea	24	6	0.46	112	0	335
Eastern Aleutians	1-100	SW Eastern Aleutians	2	1	0.34	64	0	883
Eastern Aleutians	101-200	NW Eastern Aleutians	4	1	0.29	47	0	195
Central Aleutians	301-500	SE Central Aleutians	2	1	0.15	11	0	149
Central Aleutians	201-300	SE Central Aleutians	5	1	0.13	6	0	23
Western Aleutians	201-300	W Western Aleutians	17	5	0.09	9	0	17
Eastern Aleutians	201-300	SE Eastern Aleutians	12	2	0.09	18	0	49

a)



b)



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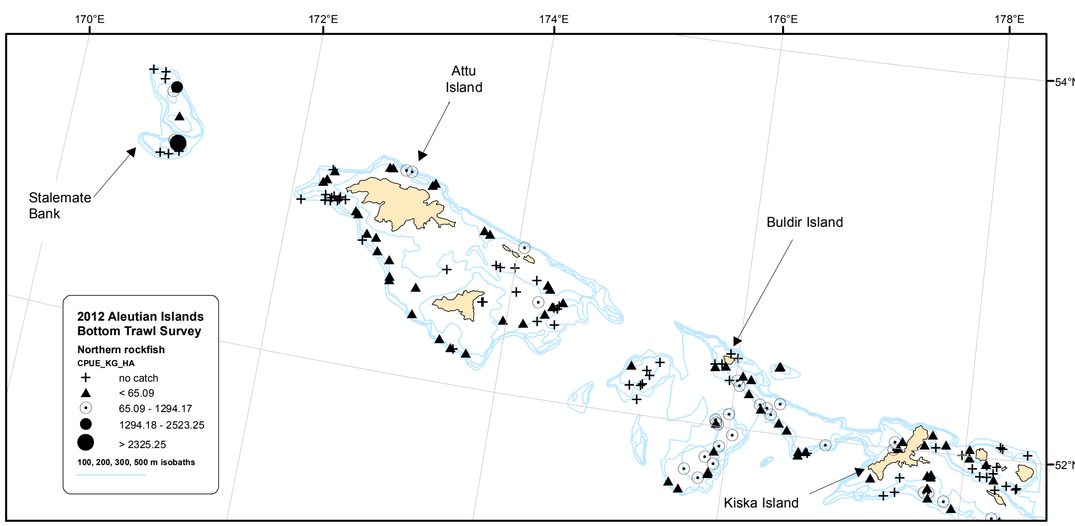

Figure 31. -- Distribution and relative abundance of northern rockfish from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

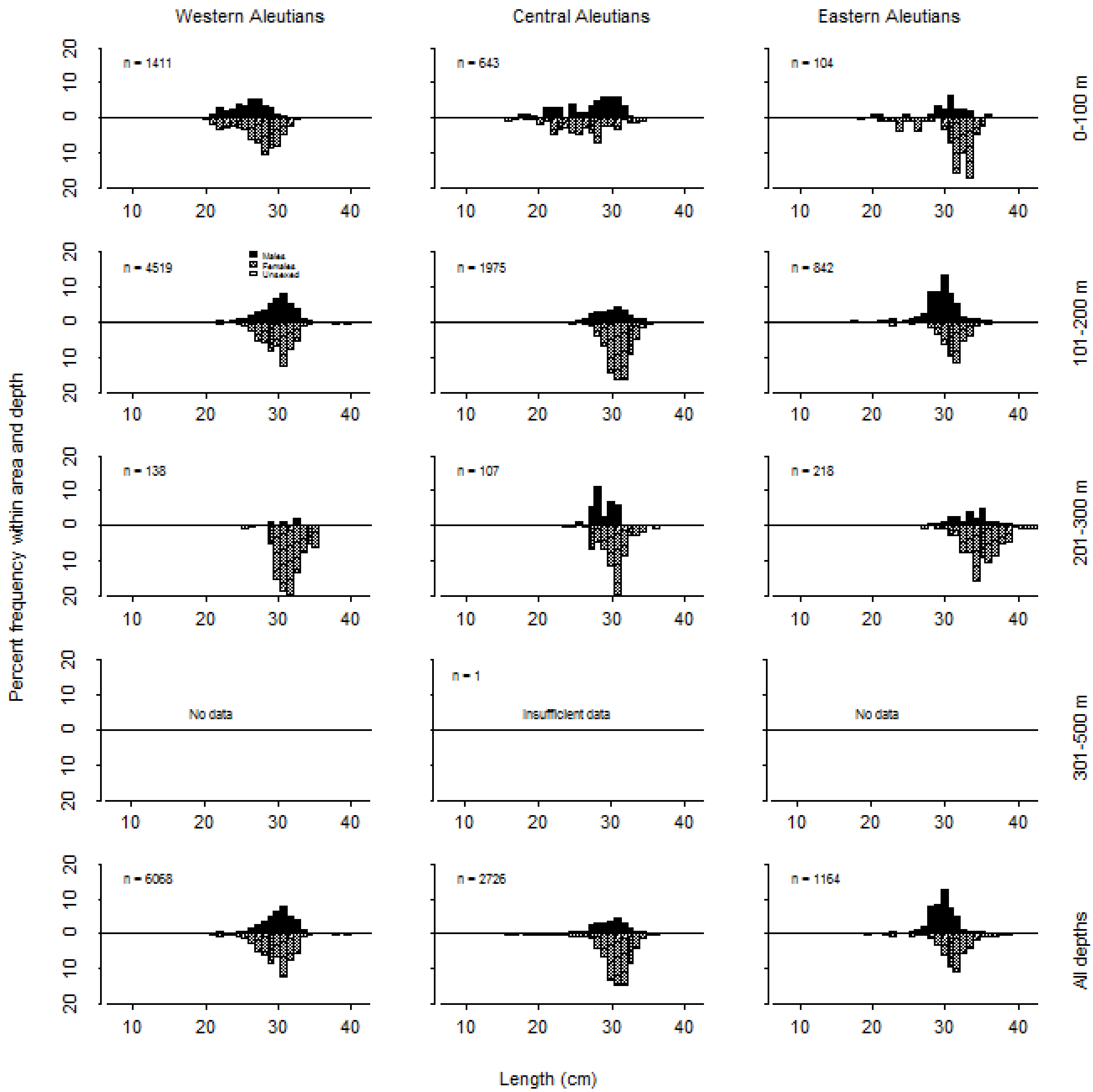

Figure 32. -- Length composition by depth intervals of northern rockfish from the 2012 Aleutian Islands bottom trawl survey districts and all Aleutian districts combined.

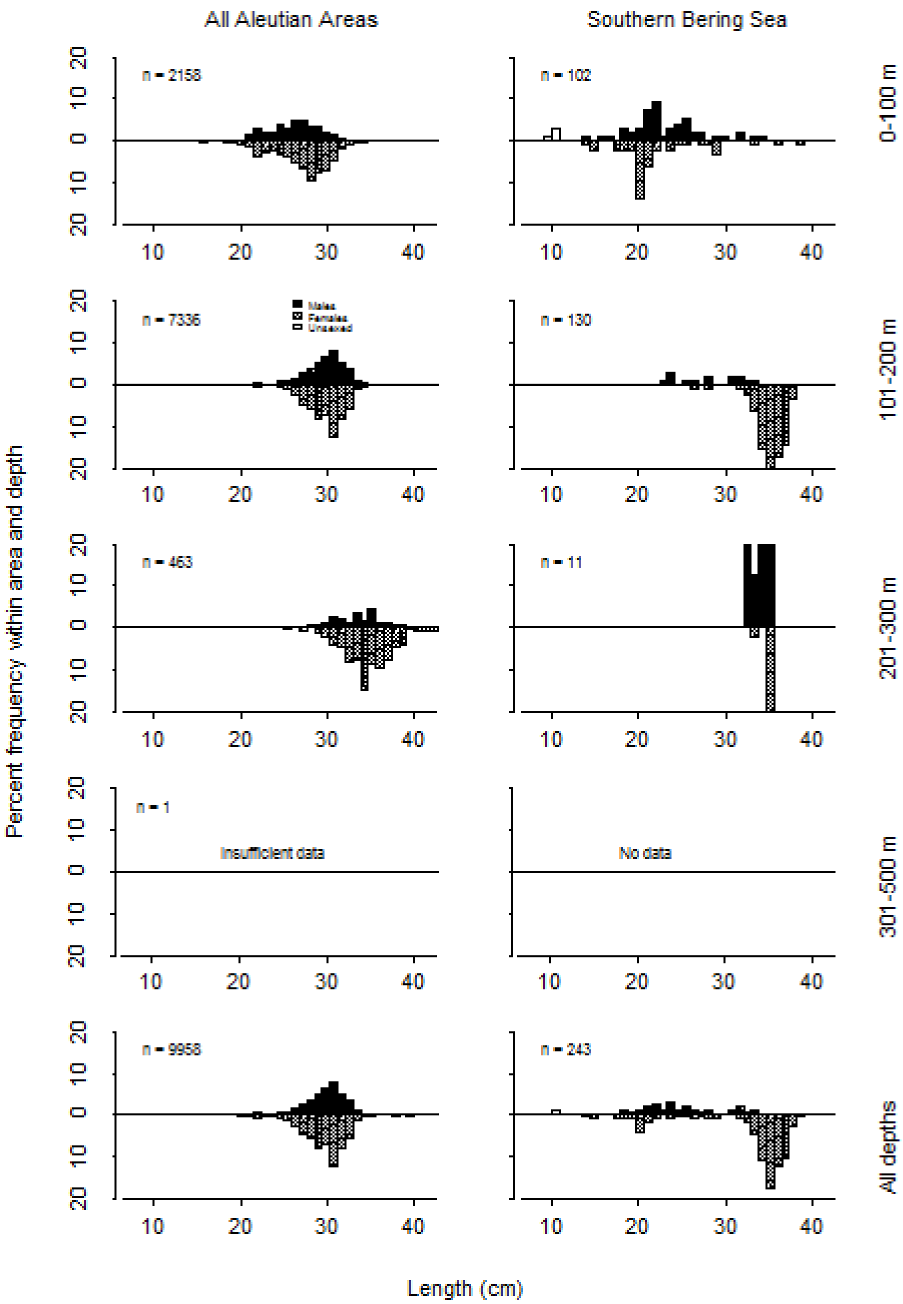

Figure 32. -- (continued).

Shortraker rockfish (*Sebastes borealis*)

Shortraker rockfish was the eleventh most abundant fish species caught in the survey and the third most abundant rockfish species (Table 2). Their abundance was highest in the Central Aleutian Islands district and lowest in the Southern Bering Sea (Table 42). The total estimated biomass was 16,230 t, 96% of which is deeper than 300 m (Table 42). They were found in 72% of all tows below 300 m in the three combined Aleutian Island districts. The mean weight in these three combined districts was greater in the 201-300 m depth range than the 301-500 m range (Table 42). This species was found in only one tow shallower than 200 m which was located in the Southern Bering Sea district. The largest catches occurred west of Tanaga Island and on Stalemate Bank (Fig. 33) The three subareas with the highest CPUE were the N Central Aleutians, the SE Central Aleutians and the W Western Aleutians, all in the 301-500 m depth range (Table 43). These three subdistricts produced 66% of the estimated biomass but represented just 6% of the survey area (Appndix Table A-1). 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 2012 AFSC survey are likely to have excluded a large portion of the shortraker rockfish population. Length frequency data showed nearly equal proportions of males and females. Females averaged slightly larger with a mode around 47 cm while males showed a strong mode at about 45 cm (Fig. 34). Appendix C shows the length-weight relationship parameters for male, female and combined sexes of shortraker rockfish.

Rougheye rockfish (*Sebastes aleutianus*)

The estimated biomass (194 t) of rougheye rockfish was among the lowest of all fish species reported. More than half of this (102 t) came from the Southern Bering Sea district (Table 44). They were encountered in all depth intervals, although they were most common in depths greater than 200 m (Tables 44, 45). Only two catches exceeded two standard deviations above the mean CPUE. Both of these were located near Unmak Island (Fig. 35). The strata with the three highest CPUEs included the Combined Southern Bering Sea subdistrict in 201-300 m as well as the 301-500 m depth ranges and the SE Central Aleutians subarea in the 301-500 m depth range (Table 45). These three areas accounted for 63% of the biomass (Table 45) but less than 4% of the survey area (Appendix Table A-1). Length frequency data showed the highest concentration of fish between 35 and 55 cm, however sample size was very small (Fig. 36).

Blackspotted rockfish (*Sebastes melanostictus*)

Blackspotted rockfish were identified as a separate species for the first time in 2006. In previous years this species had not been distinguished from rougheye rockfish. The mean CPUE was highest in the Central Aleutian Islands district where 65% of the estimated biomass occurred in water deeper than 200 m (Table 46). Only one catch east of Kiska Island (Fig. 37) exceeded the mean CPUE by more than two standard deviations. . This tow occurred in the N Central Aleutian Islands subdistrict which had the two highest CPUEs within a subdistrict and depth zone of the entire survey in the 201-300 m and 301-500 m depth intervals (Table 47). Both males and females had a strong mode at 48 cm (Fig. 38).

Table 42. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing shortraker rockfish, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	0	---	---	---	---	---
	201 - 300	31	1	0.05	9	0	27	3.526
	301 - 500	9	7	13.59	4,446	0	9,245	1.484
	All depths	120	8	2.93	4,455	0	9,253	1.486
Central Aleutians	1 - 100	26	0	---	---	---	---	---
	101 - 200	41	0	---	---	---	---	---
	201 - 300	32	7	0.53	113	9	216	4.011
	301 - 500	14	11	17.76	7,069	138	14,001	1.944
	All depths	113	18	4.34	7,182	250	14,114	1.959
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	0	---	---	---	---	---
	201 - 300	46	3	1.00	492	0	1,174	3.259
	301 - 500	13	8	6.23	3,539	0	8,042	1.335
	All depths	132	11	1.60	4,031	0	8,611	1.439
All Aleutian Areas	1 - 100	63	0	---	---	---	---	---
	101 - 200	157	0	---	---	---	---	---
	201 - 300	109	11	0.70	614	0	1,303	3.379
	301 - 500	36	26	11.64	15,054	6,279	23,829	1.622
	All depths	365	37	2.75	15,668	6,864	24,471	1.655
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	1	0.06	12	0	36	2.994
	201 - 300	8	1	0.05	3	0	10	0.934
	301 - 500	5	2	5.25	547	0	1,576	12.415
	All depths	55	4	0.75	562	0	1,591	10.987

Table 43. -- Summary of shortraker rockfish mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	301-500	N Central Aleutians	8	7	41.05	5,089	0	11,419
Central Aleutians	301-500	SE Central Aleutians	2	2	25.62	1,830	0	20,738
Western Aleutians	301-500	W Western Aleutians	7	5	22.41	3,835	0	8,911
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	19.27	845	0	10,802
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	2	7.24	1,933	0	6,716
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	2	5.25	547	0	1,658
Eastern Aleutians	201-300	SW Eastern Aleutians	6	2	4.27	306	0	988
Western Aleutians	301-500	E Western Aleutians	2	2	3.92	611	0	6,254
Eastern Aleutians	301-500	SE Eastern Aleutians	7	4	2.96	761	0	1,840
Central Aleutians	201-300	N Central Aleutians	16	4	1.56	68	0	154
Eastern Aleutians	201-300	SE Eastern Aleutians	12	1	0.91	187	0	597
Central Aleutians	201-300	SE Central Aleutians	5	2	0.85	41	0	110
Central Aleutians	301-500	SW Central Aleutians	2	1	0.81	64	0	880
Central Aleutians	301-500	Petrel Bank	2	1	0.70	86	0	1,181
Southern Bering Sea	101-200	E Southern Bering Sea	14	1	0.10	12	0	36
Western Aleutians	201-300	W Western Aleutians	17	1	0.09	9	0	28
Central Aleutians	201-300	SW Central Aleutians	7	1	0.09	4	0	13
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	1	0.05	3	0	10

a) b) c)

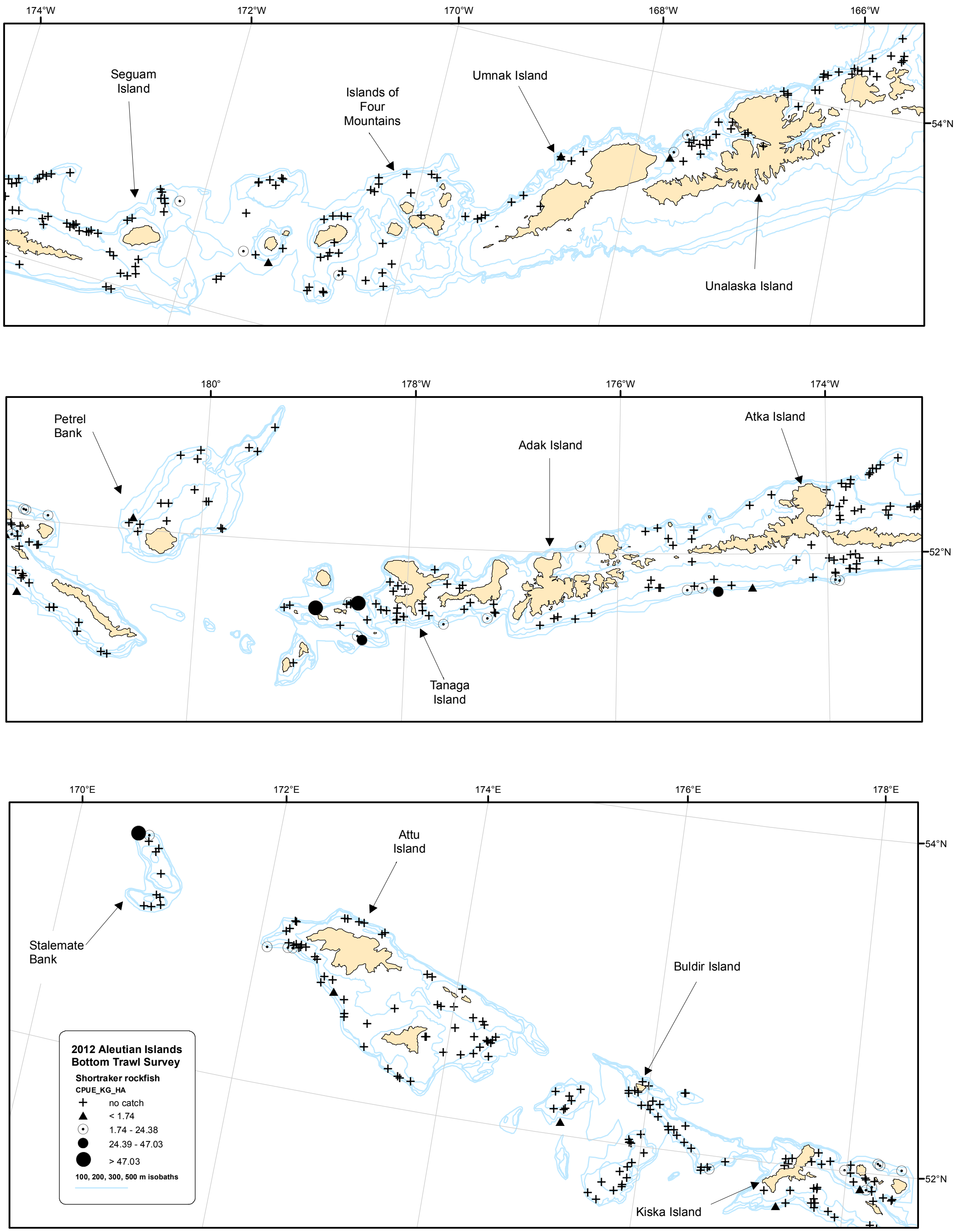

Figure 33. -- Distribution and relative abundance of shortraker rockfish from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

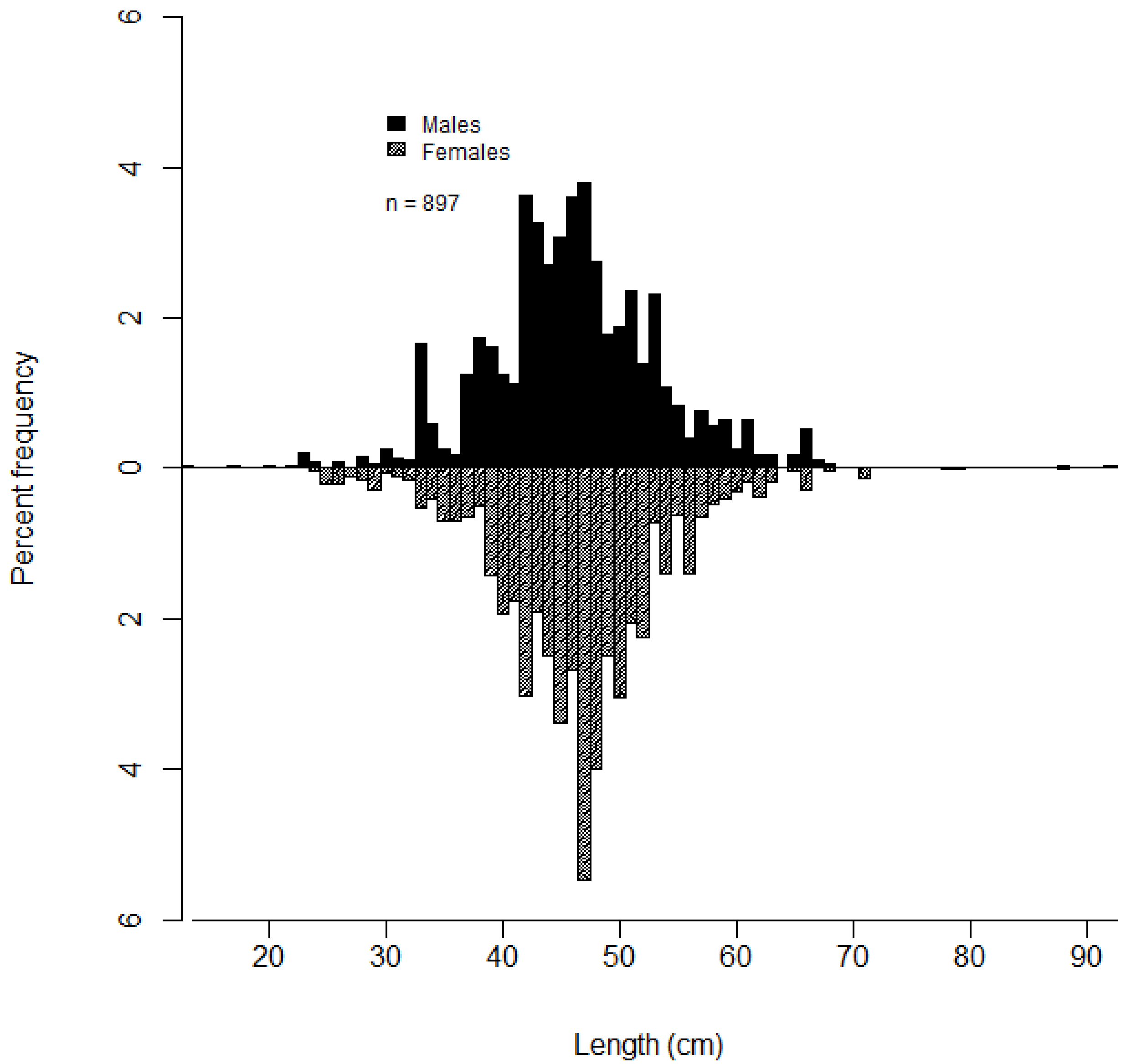

Figure 34. -- Length composition of shortraker rockfish from the 2012 Aleutian Islands bottom trawl survey.

Table 44. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing rougheye rockfish, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	0	---	---	---	---	---
	201 - 300	31	1	0.01	2	0	6	0.798
	301 - 500	9	0	---	---	---	---	---
	All depths	120	1	<0.01	2	0	6	0.798
Central Aleutians	1 - 100	26	0	---	---	---	---	---
	101 - 200	41	0	---	---	---	---	---
	201 - 300	32	0	---	---	---	---	---
	301 - 500	14	2	0.12	49	0	164	1.894
	All depths	113	2	0.03	49	0	164	1.894
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	2	0.04	30	0	85	2.231
	201 - 300	46	2	0.02	11	0	28	1.006
	301 - 500	13	0	---	---	---	---	---
	All depths	132	4	0.02	41	0	98	1.670
All Aleutian Areas	1 - 100	63	0	---	---	---	---	---
	101 - 200	157	2	0.02	30	0	85	2.231
	201 - 300	109	3	0.02	13	0	31	0.968
	301 - 500	36	2	0.04	49	0	164	1.894
	All depths	365	7	0.02	92	0	193	1.738
Southern Bering Sea	1 - 100	26	1	0.01	5	0	14	1.009
	101 - 200	16	1	0.03	6	0	18	0.387
	201 - 300	8	6	0.78	44	11	77	1.537
	301 - 500	5	2	0.46	48	0	128	2.683
	All depths	55	10	0.14	102	15	188	1.553

Table 45. -- Summary of rougheye rockfish mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	6	0.78	44	10	78
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	2	0.46	48	0	135
Central Aleutians	301-500	SE Central Aleutians	2	1	0.45	32	0	444
Central Aleutians	301-500	N Central Aleutians	8	1	0.13	16	0	55
Eastern Aleutians	101-200	SW Eastern Aleutians	10	1	0.11	24	0	79
Southern Bering Sea	101-200	E Southern Bering Sea	14	1	0.05	6	0	18
Eastern Aleutians	201-300	SE Eastern Aleutians	12	1	0.03	6	0	20
Eastern Aleutians	201-300	NE Eastern Aleutians	26	1	0.03	5	0	15
Eastern Aleutians	101-200	NE Eastern Aleutians	26	1	0.03	5	0	16
Western Aleutians	201-300	E Western Aleutians	14	1	0.03	2	0	6
Southern Bering Sea	1-100	E Southern Bering Sea	24	1	0.02	5	0	14

a)
b)
c)

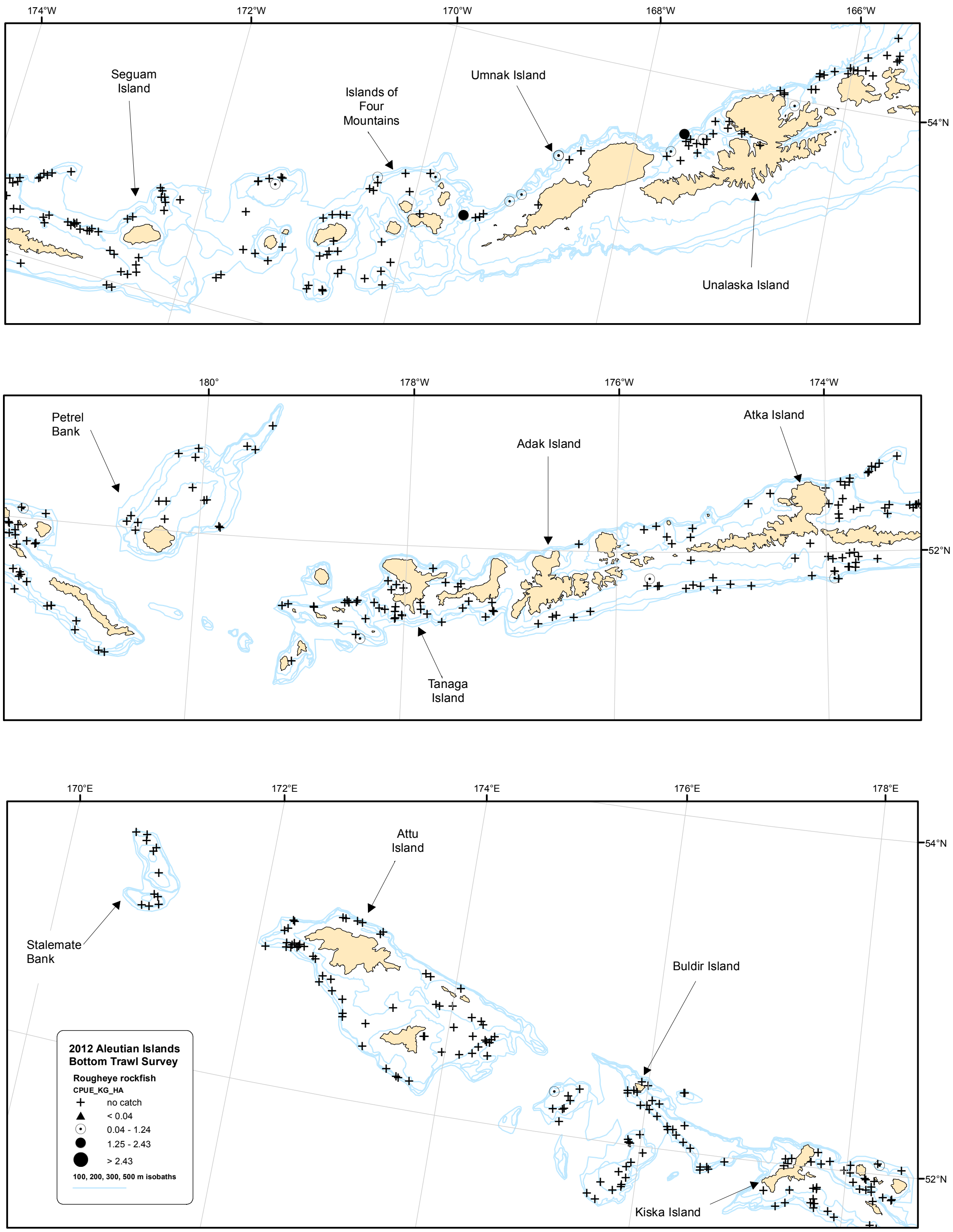

Figure 35. -- Distribution and relative abundance of rougheye rockfish from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

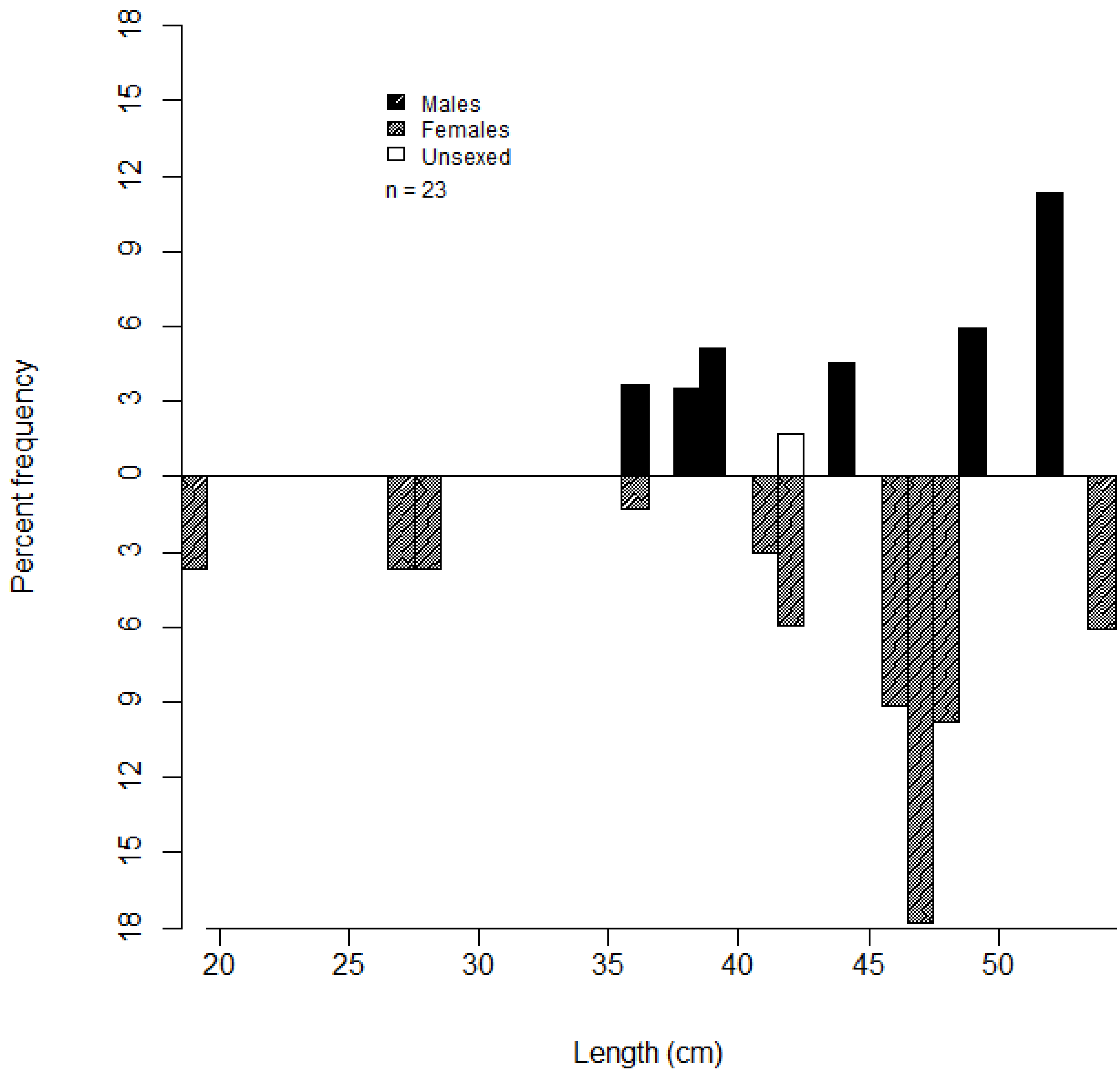

Figure 36. -- Length composition of rougheye rockfish from the 2012 Aleutian Islands bottom trawl survey.

Table 46. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing blackspotted rockfish, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	8	0.04	19	6	33	0.624
	201 - 300	31	8	0.79	136	0	308	0.392
	301 - 500	9	4	0.54	177	0	410	1.522
	All depths	120	20	0.22	333	40	626	0.673
Central Aleutians	1 - 100	26	0	<0.01	---	---	---	---
	101 - 200	41	1	---	2	0	5	0.543
	201 - 300	32	16	23.13	4,877	0	14,250	1.752
	301 - 500	14	11	8.39	3,341	765	5,917	1.411
	All depths	113	28	4.97	8,220	0	17,643	1.594
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	5	0.03	27	0	65	0.285
	201 - 300	46	22	1.47	722	41	1,403	0.710
	301 - 500	13	11	5.29	3,009	47	5,971	1.223
	All depths	132	38	1.49	3,757	712	6,802	1.052
All Aleutian Areas	1 - 100	63	0	---	---	---	---	---
	101 - 200	157	14	0.03	48	7	88	0.374
	201 - 300	109	46	6.57	5,735	0	14,983	1.383
	301 - 500	36	26	5.05	6,527	2,713	10,341	1.320
	All depths	365	86	2.16	12,310	2,192	22,427	1.335
Southern Bering Sea	1 - 100	26	1	0.01	3	0	8	0.561
	101 - 200	16	2	0.04	8	0	22	0.394
	201 - 300	8	6	1.28	72	27	117	0.819
	301 - 500	5	4	2.12	221	0	486	1.613
	All depths	55	13	0.41	304	34	574	1.217

Table 47. -- Summary of blackspotted rockfish mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	201-300	N Central Aleutians	16	8	107.96	4,740	0	14,161
Central Aleutians	301-500	N Central Aleutians	8	7	22.12	2,742	75	5,410
Eastern Aleutians	301-500	SE Eastern Aleutians	7	5	6.53	1,682	0	4,597
Central Aleutians	301-500	SE Central Aleutians	2	2	5.83	416	0	946
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	4	4.57	1,220	0	3,209
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	2.44	107	0	550
Eastern Aleutians	201-300	SW Eastern Aleutians	6	3	2.42	173	0	593
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	4	2.12	221	0	507
Western Aleutians	201-300	E Western Aleutians	14	7	1.72	135	0	308
Central Aleutians	201-300	SE Central Aleutians	5	4	1.69	81	0	201
Eastern Aleutians	201-300	SE Eastern Aleutians	12	4	1.41	291	0	865
Eastern Aleutians	201-300	NE Eastern Aleutians	26	15	1.31	258	80	435
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	6	1.28	72	26	119
Central Aleutians	301-500	Petrel Bank	2	1	1.19	148	0	2,021
Western Aleutians	301-500	W Western Aleutians	7	4	1.04	177	0	418
Central Aleutians	201-300	SW Central Aleutians	7	3	1.02	44	0	126
Central Aleutians	301-500	SW Central Aleutians	2	1	0.44	35	0	478
Central Aleutians	201-300	Petrel Bank	4	1	0.17	13	0	55
Western Aleutians	101-200	E Western Aleutians	22	8	0.16	19	6	33
Eastern Aleutians	101-200	SW Eastern Aleutians	10	2	0.10	22	0	60
Southern Bering Sea	101-200	E Southern Bering Sea	14	2	0.07	8	0	22
Eastern Aleutians	101-200	SE Eastern Aleutians	19	3	0.03	5	0	12
Western Aleutians	201-300	W Western Aleutians	17	1	0.02	2	0	5
Central Aleutians	101-200	SW Central Aleutians	15	1	0.02	2	0	6
Southern Bering Sea	1-100	E Southern Bering Sea	24	1	0.01	3	0	8

a)

b)

c)

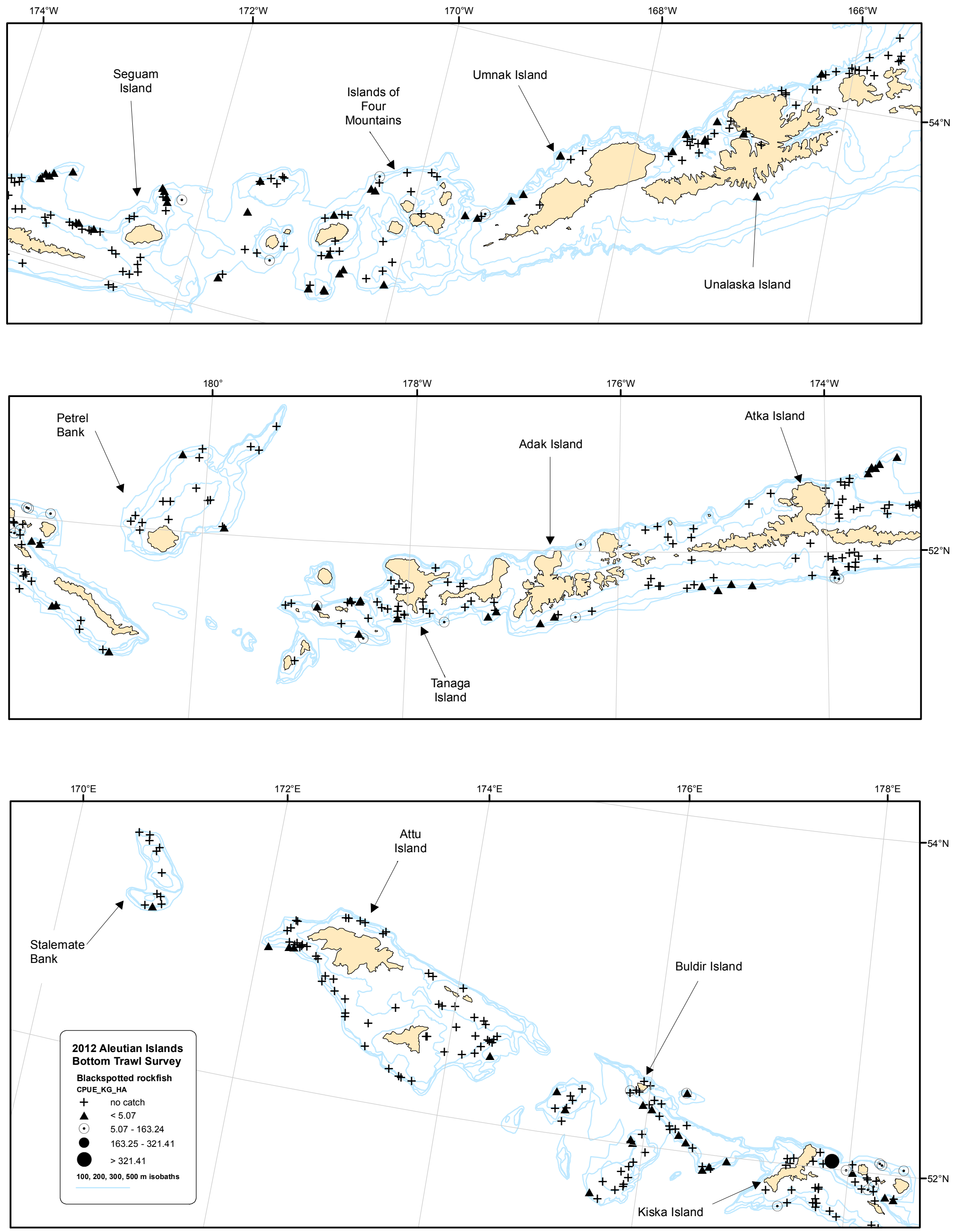

Figure 37. -- Distribution and relative abundance of blackspotted rockfish from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

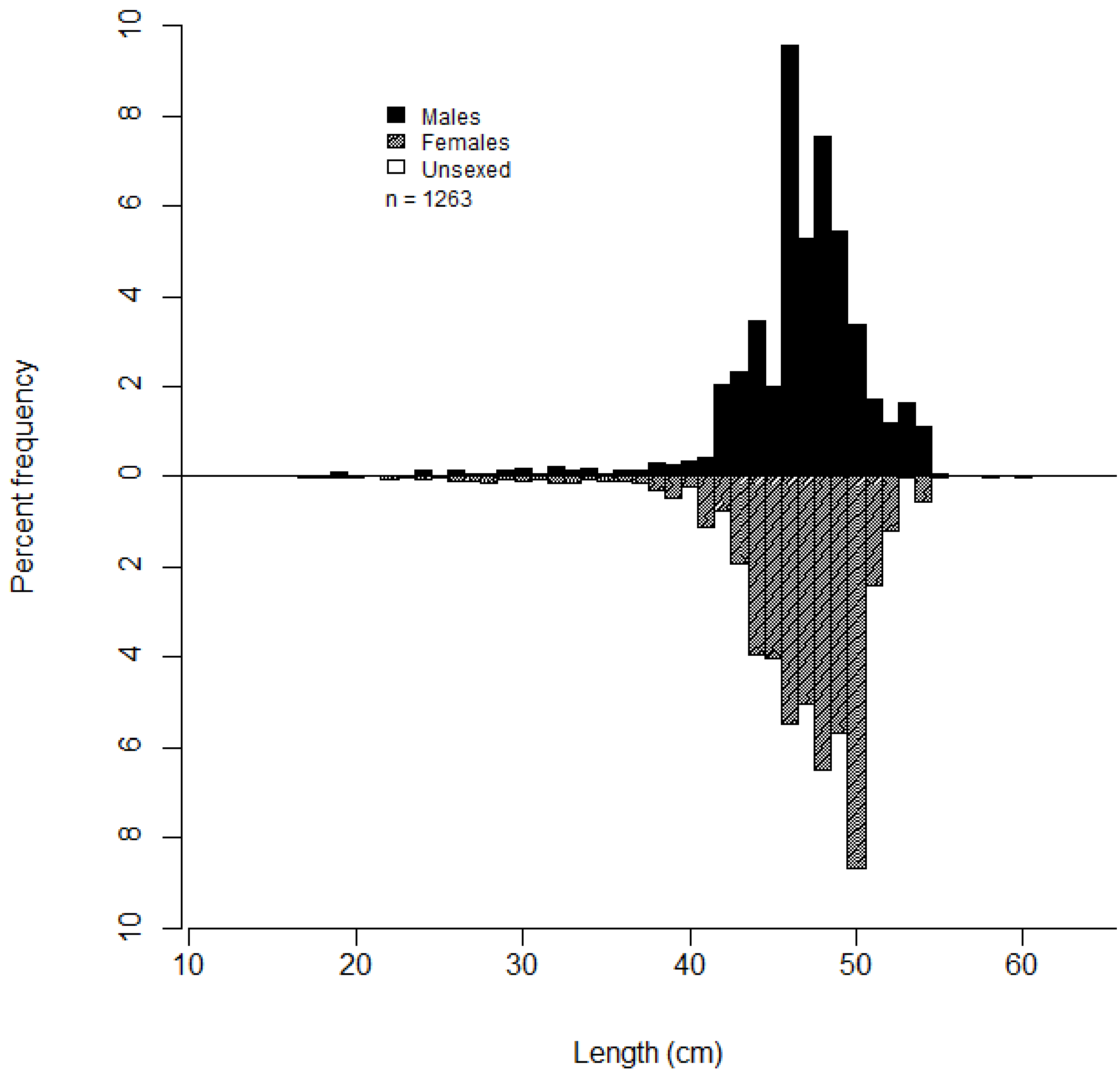

Figure 38. -- Length composition of blackspotted rockfish from the 2012 Aleutian Islands bottom trawl survey.

Shortspine thornyhead (*Sebastolobus alascanus*)

Shortspine thornyheads were the thirteenth most abundant species caught in the survey and the forth most abundant species of rockfish (Table 2). This species was most common in the Western and Central Aleutian Islands districts at depths greater than 200 m (Table 48). Catch rates were highest in the 301- 500 m depth interval (Table 48). They were caught in 75% of all tows deeper than 300 m over the entire survey. The only concentration of large catches occurred near Attu Island and Stalemate Bank (Fig. 39). In this region the three highest CPUEs by subdistrict (Table 49) produced 56% of the estimated biomass but represents only 6% of the survey area (Appendix Table A-1). Those subdistricts include the W Western Aleutians subdistrict in the 201-300 and 301-500 m depth ranges and the E Western Aleutians subdistrict in the 301-500 m depth interval (Table 49). The biomass estimate of 15,000 t of this species for the survey is probably an underestimate for the entire population for this region; Ronholt et al. (1986) reported that 68% of the total Aleutian shortspine thornyhead biomass was found in the 501-900 m depth interval, a depth zone not sampled by this survey. The length compositions of males and females showed roughly equal proportions of males and females. Both had a strong mode at 34 cm (Fig. 40). Appendix C shows the length-weight relationship parameters for male, female and combined sexes of shortspine thornyhead.

Dusky rockfish (*Sebastes variabilis*)

Dusky rockfish were uncommon and not among the 20 most abundant fish species. Dusky rockfish were found in all of the depth ranges and in all of the districts although occurrence in the Western Aleutians area was limited to one tow (Table 50). In the combined Aleutian Islands districts, 66% of the estimated biomass was found in the 101-200 m depth range however in the Southern Bering Sea area 62% was found in the 1-100 m depth interval. The total estimated biomass for the survey area was 372 t (Table 50). The highest CPUE (0.97 kg/ha) of dusky rockfish in a single subdistrict was found in the NW Eastern Aleutians subarea in the 201-300 m depth interval (Table 51). This species was found in only 25 of the 420 tows and 14 of the 45 strata (Table 51). There was no trend in individual mean weight with increasing depth. Appendix C shows the length-weight relationship parameters for male, female, and combined sexes of dusky rockfish.

Dark rockfish (*Sebastes ciliatus*)

Dark rockfish, like dusky rockfish, were found in very low abundance in the survey area and only occurred in the Western and Central Aleutian Islands districts (Table 52). They only occurred in the shallowest depth interval (1-100 m) in a total of five tows (Table 53). The total biomass was only 194 t, 91% of which was in the Western Aleutian Islands district. This species only occurred in two of the 45 survey strata. The strata-specific CPUE was by far highest in the E Western Aleutians subarea near Attu Island (Table 53).

Table 48. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing shortspine thornyhead, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	15	1.80	957	113	1,800	0.551
	201 - 300	31	23	13.27	2,288	670	3,905	0.642
	301 - 500	9	9	18.87	6,175	1,884	10,466	0.486
	All depths	120	47	6.20	9,419	4,812	14,026	0.523
Central Aleutians	1 - 100	26	0	---	---	---	---	---
	101 - 200	41	0	---	---	---	---	---
	201 - 300	32	11	5.57	1,175	0	2,435	0.383
	301 - 500	14	13	5.89	2,344	0	5,265	0.560
	All depths	113	24	2.13	3,519	921	6,118	0.485
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	0	---	---	---	---	---
	201 - 300	46	4	0.36	175	0	387	0.882
	301 - 500	13	6	2.34	1,330	0	3,432	0.947
	All depths	132	10	0.60	1,505	0	3,624	0.939
All Aleutian Areas	1 - 100	63	0	---	---	---	---	---
	101 - 200	157	15	0.54	957	113	1,800	0.551
	201 - 300	109	38	4.16	3,637	1,761	5,514	0.533
	301 - 500	36	28	7.61	9,849	5,495	14,204	0.538
	All depths	365	81	2.54	14,443	9,624	19,262	0.538
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	0	---	---	---	---	---
	201 - 300	8	4	1.04	58	0	127	0.329
	301 - 500	5	3	3.77	393	0	1,282	0.451
	All depths	55	7	0.60	452	0	1,344	0.430

Table 49. -- Summary of shortspine thornyhead mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Western Aleutians	201-300	W Western Aleutians	17	17	23.41	2,201	578	3,824
Western Aleutians	301-500	W Western Aleutians	7	7	19.46	3,331	0	6,756
Western Aleutians	301-500	E Western Aleutians	2	2	18.22	2,844	0	14,396
Central Aleutians	201-300	SW Central Aleutians	7	5	10.54	449	0	991
Central Aleutians	201-300	Petrel Bank	4	4	9.40	720	0	1,981
Central Aleutians	301-500	SE Central Aleutians	2	2	8.44	603	0	4,402
Central Aleutians	301-500	Petrel Bank	2	2	7.54	933	0	8,436
Central Aleutians	301-500	SW Central Aleutians	2	2	5.99	473	62	884
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	3	4.12	1,099	0	3,452
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	3	3.77	393	0	1,353
Eastern Aleutians	301-500	SW Eastern Aleutians	2	2	2.80	123	0	1,659
Central Aleutians	301-500	N Central Aleutians	8	7	2.71	335	0	682
Western Aleutians	101-200	W Western Aleutians	35	14	2.34	951	107	1,794
Western Aleutians	201-300	E Western Aleutians	14	6	1.11	87	0	179
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	4	1.04	58	0	129
Eastern Aleutians	201-300	SW Eastern Aleutians	6	2	0.80	57	0	162
Eastern Aleutians	201-300	SE Eastern Aleutians	12	2	0.57	118	0	314
Eastern Aleutians	301-500	SE Eastern Aleutians	7	1	0.42	109	0	375
Central Aleutians	201-300	N Central Aleutians	16	2	0.13	6	0	15
Western Aleutians	101-200	E Western Aleutians	22	1	0.05	6	0	20

a)

b)

c)

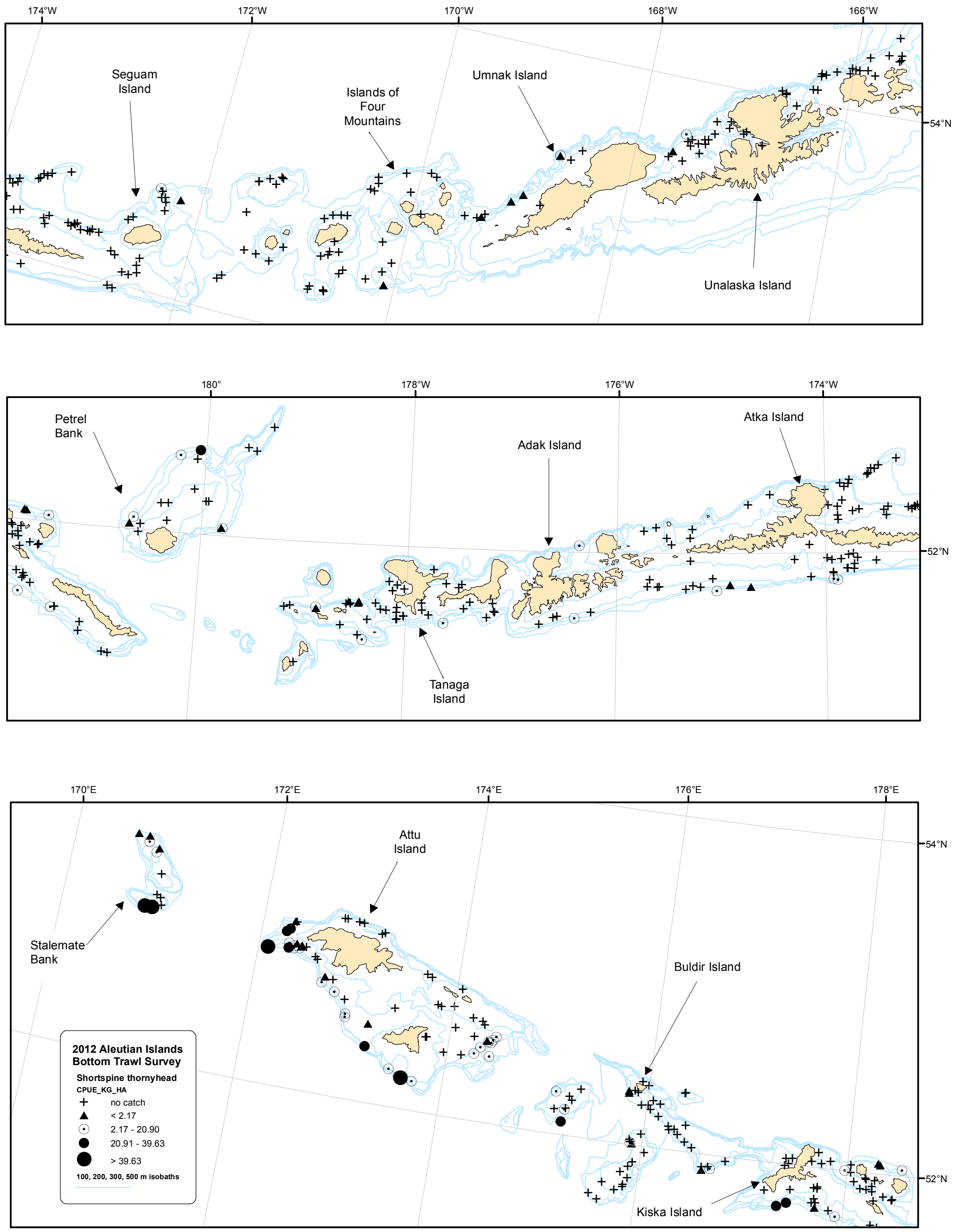

Figure 39. -- Distribution and relative abundance of shortspine thornyhead from the 2012 Aleutian Islands bottom trawl survey across the a) eastern, b) central, and c) western archipelago.

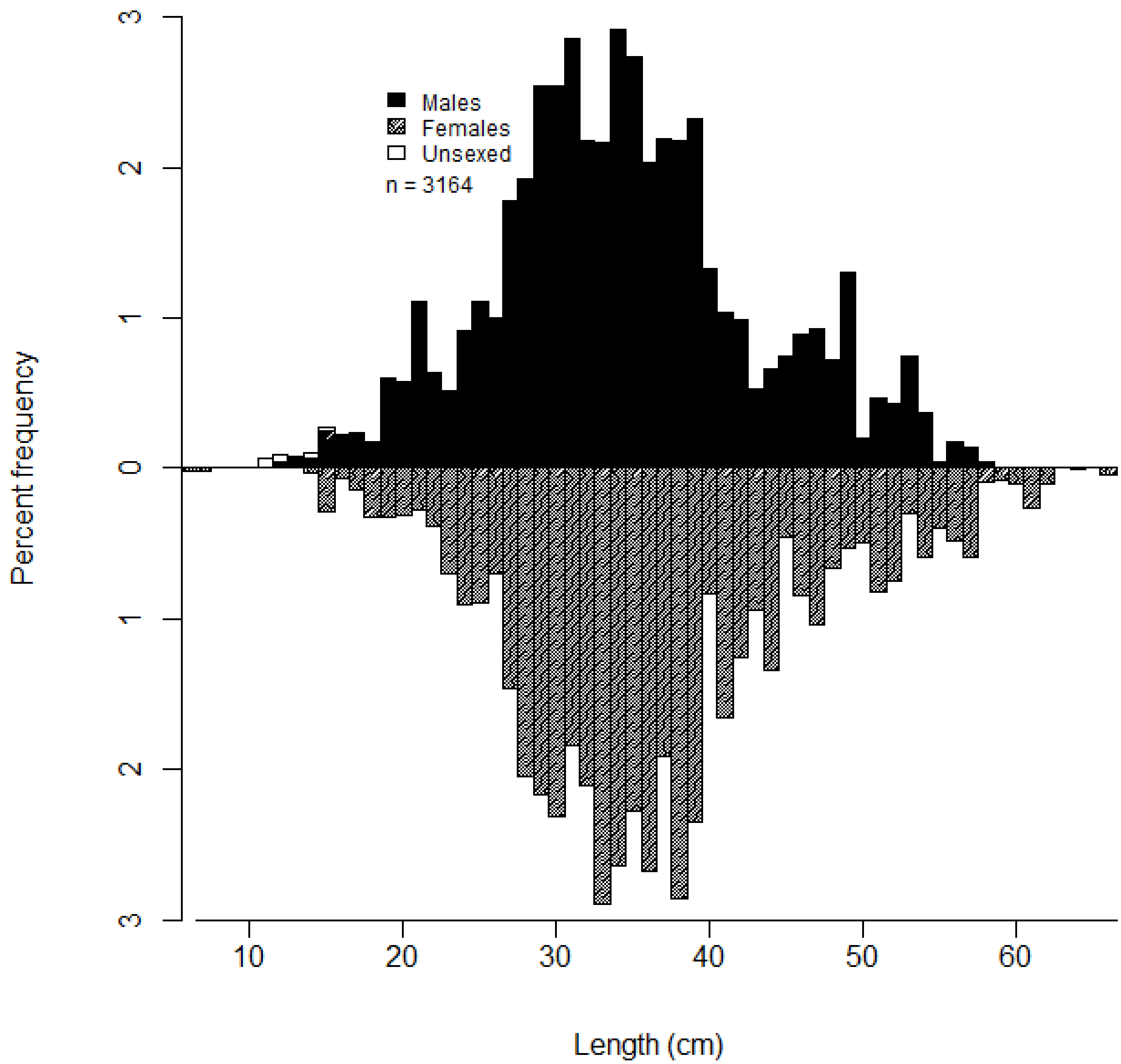

Figure 40. --Length composition of shortspine thornyhead from the 2012 Aleutian Islands bottom trawl survey.

Table 50. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing dusky rockfish, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	1	0.01	4	0	12	1.386
	201 - 300	31	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	All depths	120	1	<0.01	4	0	12	1.386
Central Aleutians	1 - 100	26	1	0.02	9	0	30	1.234
	101 - 200	41	4	0.15	69	0	159	1.231
	201 - 300	32	2	0.04	9	0	22	1.201
	301 - 500	14	1	0.07	28	0	147	1.442
	All depths	113	8	0.07	115	0	233	1.274
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	4	0.11	85	0	191	1.345
	201 - 300	46	3	0.07	33	0	72	1.543
	301 - 500	13	0	---	---	---	---	---
	All depths	132	7	0.05	118	7	230	1.394
All Aleutian Areas	1 - 100	63	1	0.01	9	0	30	1.234
	101 - 200	157	9	0.09	158	23	294	1.294
	201 - 300	109	5	0.05	41	1	82	1.456
	301 - 500	36	1	0.02	28	0	147	1.442
	All depths	365	16	0.04	237	82	391	1.333
Southern Bering Sea	1 - 100	26	4	0.21	84	0	233	0.598
	101 - 200	16	4	0.20	37	0	85	0.747
	201 - 300	8	1	0.25	14	0	47	1.093
	301 - 500	5	0	---	---	---	---	---
	All depths	55	9	0.18	135	0	293	0.666

Table 51. -- Summary of dusky rockfish mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	201-300	NW Eastern Aleutians	2	2	0.97	15	0	103
Central Aleutians	101-200	SW Central Aleutians	15	2	0.42	44	0	127
Central Aleutians	301-500	SE Central Aleutians	2	1	0.39	28	0	380
Southern Bering Sea	1-100	E Southern Bering Sea	24	4	0.34	84	0	233
Eastern Aleutians	101-200	SE Eastern Aleutians	19	2	0.33	63	0	163
Southern Bering Sea	101-200	E Southern Bering Sea	14	4	0.31	37	0	85
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	1	0.25	14	0	48
Central Aleutians	201-300	SW Central Aleutians	7	2	0.20	9	0	23
Central Aleutians	101-200	SE Central Aleutians	10	1	0.12	9	0	28
Eastern Aleutians	101-200	NE Eastern Aleutians	26	2	0.11	23	0	60
Central Aleutians	101-200	Petrel Bank	7	1	0.10	17	0	57
Eastern Aleutians	201-300	NE Eastern Aleutians	26	1	0.09	18	0	54
Central Aleutians	1-100	SE Central Aleutians	7	1	0.08	9	0	31
Western Aleutians	101-200	E Western Aleutians	22	1	0.03	4	0	12

Table 52. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing dark rockfish, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	4	0.36	177	0	426	0.872
	101 - 200	57	0	---	---	---	---	---
	201 - 300	31	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	All depths	120	4	0.12	177	0	426	0.872
Central Aleutians	1 - 100	26	1	0.03	17	0	70	0.829
	101 - 200	41	0	---	---	---	---	---
	201 - 300	32	0	---	---	---	---	---
	301 - 500	14	0	---	---	---	---	---
	All depths	113	1	0.01	17	0	70	0.829
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	0	---	---	---	---	---
	201 - 300	46	0	---	---	---	---	---
	301 - 500	13	0	---	---	---	---	---
	All depths	132	0	---	---	---	---	---
All Aleutian Areas	1 - 100	63	5	0.11	194	0	440	0.868
	101 - 200	157	0	---	---	---	---	---
	201 - 300	109	0	---	---	---	---	---
	301 - 500	36	0	---	---	---	---	---
	All depths	365	5	0.03	194	0	440	0.868
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	0	---	---	---	---	---
	201 - 300	8	0	---	---	---	---	---
	301 - 500	5	0	---	---	---	---	---
	All depths	55	0	---	---	---	---	---

Table 53. -- Summary of dark rockfish mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Western Aleutians	1-100	E Western Aleutians	12	4	1.50	177	0	428
Central Aleutians	1-100	SW Central Aleutians	3	1	0.10	17	0	89

Skates

The data provided in Table 54 shows total abundance information for all species of skate caught during the 2012 Aleutian Islands bottom trawl survey. This represents a deviation from previous years where this information was provided only for the most abundant or commercially important species of skate while the rest of the species were combined. For the purposes of this report additional information on the skate species will only be provided for those species whose cumulative estimated total biomass amounts to about 90% of the entire biomass of the family. Table 54 shows estimated biomass for 11 nominal species and one species group. The three most abundant skate species, whiteblotched, leopard and Aleutian skate, constitute 90% of the skate biomass over the entire survey.

Table 54. -- Catch-per-unit-effort (CPUE), biomass, relative (%) biomass, and cumulative abundance (%) of skates (Rajidae) collected in the 2012 Aleutian Islands bottom trawl survey combined across survey districts and for all skates identified from the catches.

Common name	Mean CPUE (kg/ha)	Biomass (t)	% Biomass	Cumulative %
whiteblotched skate	2.4	15,360	43	43
leopard skate	1.6	10,421	29	73
Aleutian skate	0.9	6,072	17	90
Alaska skate	0.2	1,503	4	94
mud skate	0.2	1,277	4	98
butterfly skate	< 0.1	307	1	99
big skate	< 0.1	195	1	99
Bering skate	< 0.1	109	< 1	99
Commander skate	< 0.1	86	< 1	100
whitebrow skate	< 0.1	72	< 1	--
roughtail skate	< 0.1	2	< 1	--
skate unident.	< 0.1	1	< 1	--

Skates

Whiteblotched skate (*Bathyraja maculata*)

Whiteblotched skate was the most abundant species of skate caught in the 2012 Aleutian Islands bottom trawl survey as well as the twelfth most abundant fish species (Table 2). Their biomass was 15,360 t and this species represented 43% of the entire skate biomass for this survey (Table 54). Whiteblotched skate CPUE was highest in the 101-200 m depth interval in all of the Aleutian Islands survey districts and in the 301-500m depth interval in the Southern Bering Sea district. Mean weight decreased with depth (Table 55). The highest stratum mean CPUEs occurred in the NE Eastern Aleutian and the SE Eastern Aleutian subareas in the 101-200 m depth interval (Table 56). Appendix C shows the length-weight relationship parameters for male, female and combined sexes of whiteblotched skate.

Leopard skate (*Bathyraja panthera*)

The leopard skate was the second most abundant skate species and the seventeenth most abundant fish species caught in the 2012 Aleutian Islands bottom trawl survey (Table 2). The estimated biomass of this species was 10,421 t which means that they comprised about 29% of the entire skate biomass (Table 54). Leopard skates were more abundant in the western portion of the survey area (Table 57) with the greatest CPUEs in the W Western Aleutians (101-200 m), SE Central Aleutians (1-100 m) and Petrel Bank (1-100 m) subdistricts respectively. Overall they were encountered in 18 of the 45 strata (Table 58). Leopard skates were not encountered in the Southern Bering Sea district and were caught in only two tows in the Eastern Aleutian Islands district, but they were caught in 26% of tows in the two remaining areas (Table 58)

Aleutian skate (*Bathyraja aleutica*)

The Aleutian skate was the third most abundant skate species and ranked nineteenth in abundance among all fish species in this survey (Table 2). Their estimated biomass was 6072 t (Table 54). They were distributed across the entire survey area and found in all depth intervals. In the Western and Central Aleutian Islands districts their CPUE was highest in the 101-200 m depth range while in the Eastern Aleutian Islands district the 201-300 m depth interval had the highest CPUE (Table 59). The area of highest concentration was the Petrel Bank subdistrict in the 101-200m depth range (Table 60). This subdistrict is in the Central Aleutian Islands district. Other subdistricts with high concentrations included the SE Central Aleutian and SW Eastern Aleutian subdistricts in the 201-200 m depth intervals and the E Western Aleutian subdistrict in the 101-200 m depth range.(Table 60). They were infrequent in the Southern Bering Sea district where they were occurred in only 4% of the tows.

Table 55. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing whiteblotched skate, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	0	---	---	---	---	---
	101 - 200	57	6	8.16	4,340	0	9,120	6.741
	201 - 300	31	1	0.32	55	0	170	8.976
	301 - 500	9	0	---	---	---	---	---
	All depths	120	7	2.89	4,395	0	9,176	6.762
Central Aleutians	1 - 100	26	1	0.15	86	0	274	9.057
	101 - 200	41	6	1.53	706	109	1,302	9.208
	201 - 300	32	8	1.09	230	0	469	7.926
	301 - 500	14	5	0.76	302	0	1,160	2.942
	All depths	113	20	0.80	1,323	501	2,145	6.075
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	20	7.53	5,846	1,963	9,728	7.982
	201 - 300	46	21	4.69	2,299	1,046	3,551	6.516
	301 - 500	13	6	0.86	490	52	927	1.653
	All depths	132	47	3.43	8,634	4,589	12,678	6.251
All Aleutian Areas	1 - 100	63	1	0.05	86	0	274	9.057
	101 - 200	157	32	6.16	10,891	4,751	17,032	7.497
	201 - 300	109	30	2.96	2,583	1,311	3,854	6.659
	301 - 500	36	11	0.61	792	164	1,420	1.985
	All depths	365	74	2.52	14,351	8,059	20,643	6.381
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	1	0.70	129	0	685	9.068
	201 - 300	8	4	2.95	167	0	393	6.121
	301 - 500	5	3	6.83	713	0	1,488	4.431
	All depths	55	8	1.35	1,009	199	1,818	4.985

Table 56. -- Summary of whiteblotched skate mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Eastern Aleutians	101-200	NE Eastern Aleutians	26	10	16.20	3,261	0	6,569
Eastern Aleutians	101-200	SE Eastern Aleutians	19	10	13.60	2,585	370	4,800
Western Aleutians	101-200	W Western Aleutians	35	6	10.68	4,340	0	9,120
Eastern Aleutians	201-300	NE Eastern Aleutians	26	15	6.97	1,373	520	2,226
Southern Bering Sea	301-500	Combined Southern Bering Sea	5	3	6.83	713	0	1,550
Eastern Aleutians	201-300	SE Eastern Aleutians	12	6	4.49	926	0	1,889
Central Aleutians	101-200	Petrel Bank	7	4	3.12	542	0	1,095
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	4	2.95	167	0	399
Central Aleutians	101-200	SE Central Aleutians	10	2	2.18	164	0	416
Central Aleutians	201-300	SE Central Aleutians	5	2	2.16	103	0	287
Southern Bering Sea	101-200	W Southern Bering Sea	2	1	1.93	129	0	1,770
Eastern Aleutians	301-500	SE Eastern Aleutians	7	5	1.67	429	0	879
Central Aleutians	301-500	Petrel Bank	2	1	1.54	191	0	2,617
Central Aleutians	201-300	Petrel Bank	4	1	0.94	72	0	302
Central Aleutians	201-300	N Central Aleutians	16	4	0.82	36	0	75
Central Aleutians	301-500	SE Central Aleutians	2	1	0.62	44	0	607
Western Aleutians	201-300	W Western Aleutians	17	1	0.58	55	0	170
Central Aleutians	301-500	N Central Aleutians	8	3	0.54	67	0	152
Central Aleutians	201-300	SW Central Aleutians	7	1	0.43	18	0	63
Central Aleutians	1-100	N Central Aleutians	11	1	0.41	86	0	277
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	1	0.23	60	0	252

Table 57. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing leopard skate, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	10	2.26	1,100	0	2,354	9.719
	101 - 200	57	23	6.35	3,376	122	6,631	10.707
	201 - 300	31	2	0.51	88	0	225	13.437
	301 - 500	9	0	---	---	---	---	---
	All depths	120	35	3.00	4,565	1,141	7,988	10.491
Central Aleutians	1 - 100	26	11	5.74	3,357	0	7,147	6.844
	101 - 200	41	8	3.21	1,478	302	2,653	9.263
	201 - 300	32	5	0.64	136	0	378	4.157
	301 - 500	14	2	0.66	261	0	1,382	5.666
	All depths	113	26	3.16	5,232	1,325	9,139	7.178
Eastern Aleutians	1 - 100	14	0	---	---	---	---	---
	101 - 200	59	2	0.80	625	0	2,265	8.777
	201 - 300	46	0	---	---	---	---	---
	301 - 500	13	0	---	---	---	---	---
	All depths	132	2	0.25	625	0	2,265	8.777
All Aleutian Areas	1 - 100	63	21	2.54	4,457	655	8,260	7.383
	101 - 200	157	33	3.10	5,479	1,899	9,058	10.033
	201 - 300	109	7	0.26	224	0	488	5.709
	301 - 500	36	2	0.20	261	0	1,382	5.666
	All depths	365	63	1.83	10,421	5,295	15,547	8.437
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	0	---	---	---	---	---
	201 - 300	8	0	---	---	---	---	---
	301 - 500	5	0	---	---	---	---	---
	All depths	55	0	---	---	---	---	---

Table 58. – Summary of leopard skate mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey District	Depth (m)	Subdistrict Name	Number of Hauls	Hauls w/Catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Western Aleutians	101-200	W Western Aleutians	33	19	17.01	6,916	2,257	11,575
Central Aleutians	1-100	SE Central Aleutians	12	6	11.94	1,390	0	3,369
Central Aleutians	1-100	Petrel Bank	9	3	5.52	530	0	1,342
Western Aleutians	1-100	W Western Aleutians	13	4	4.55	1,679	0	3,917
Central Aleutians	1-100	N Central Aleutians	16	5	2.77	584	0	1,264
Central Aleutians	101-200	SW Central Aleutians	18	4	2.34	246	0	647
Western Aleutians	101-200	E Western Aleutians	22	5	2.27	285	18	551
Central Aleutians	101-200	SE Central Aleutians	14	5	2.24	168	14	323
Western Aleutians	201-300	E Western Aleutians	9	3	2.18	170	0	369
Central Aleutians	101-200	Petrel Bank	6	1	2.05	356	0	1,271
Central Aleutians	101-200	N Central Aleutians	9	1	1.30	138	0	458
Central Aleutians	201-300	SW Central Aleutians	6	2	0.99	42	0	144
Eastern Aleutians	101-200	NE Eastern Aleutians	24	2	0.97	194	0	510
Eastern Aleutians	1-100	SE Eastern Aleutians	13	2	0.72	125	0	346
Western Aleutians	1-100	E Western Aleutians	19	5	0.45	53	0	126
Western Aleutians	201-300	W Western Aleutians	13	1	0.31	29	0	93
Western Aleutians	301-500	W Western Aleutians	7	2	0.29	50	0	147
Central Aleutians	201-300	N Central Aleutians	9	1	0.02	1	0	3

Table 59. -- Summary by survey districts and depth intervals of 2012 Aleutian Islands trawl effort (number of trawl hauls), number of hauls containing Aleutian skate, their mean CPUE and biomass estimates with lower and upper lower 95% confidence limits (LCL and UCL, respectively), and average fish weight.

Survey district	Depth (m)	Haul count	Hauls w/ catch	CPUE (kg/ha)	Biomass (t)	95% LCL (t)	95% UCL (t)	weight (kg)
Western Aleutians	1 - 100	23	1	0.53	260	0	827	18.085
	101 - 200	57	9	1.14	607	185	1,028	12.162
	201 - 300	31	5	1.06	182	7	357	8.623
	301 - 500	9	0	---	---	---	---	---
	All depths	120	15	0.69	1,049	354	1,744	12.284
Central Aleutians	1 - 100	26	0	---	---	---	---	---
	101 - 200	41	10	2.78	1,281	0	2,748	12.462
	201 - 300	32	5	2.16	455	0	1,013	13.363
	301 - 500	14	2	0.09	34	0	87	3.427
	All depths	113	17	1.07	1,770	233	3,307	12.059
Eastern Aleutians	1 - 100	14	1	0.44	301	0	996	10.853
	101 - 200	59	11	1.56	1,213	451	1,975	14.643
	201 - 300	46	8	1.68	825	216	1,434	16.171
	301 - 500	13	4	1.35	768	0	2,175	7.097
	All depths	132	24	1.23	3,108	1,269	4,946	11.516
All Aleutian Areas	1 - 100	63	2	0.32	562	0	1,429	13.321
	101 - 200	157	30	1.75	3,100	1,489	4,712	13.166
	201 - 300	109	18	1.67	1,463	668	2,257	13.769
	301 - 500	36	6	0.62	802	0	2,210	6.788
	All depths	365	56	1.04	5,927	3,590	8,263	11.805
Southern Bering Sea	1 - 100	26	0	---	---	---	---	---
	101 - 200	16	1	0.29	54	0	171	14.981
	201 - 300	8	1	1.61	91	0	300	12.767
	301 - 500	5	0	---	---	---	---	---
	All depths	55	2	0.19	145	0	366	13.514

Table 60. -- Summary of Aleutian skate mean catch-per-unit-effort (CPUE) and estimated biomass (t) including the lower and upper 95% confidence limits (LCL and UCL, respectively) from the 2012 Aleutian Islands bottom trawl survey by stratum (i.e., the composite of survey district, depth interval, and subarea) ordered from highest to lowest CPUE.

Survey district	Depth (m)	Subdistrict name	Number of hauls	Hauls w/catch	CPUE (kg/ha)	Biomass (t)	LCL (t)	UCL (t)
Central Aleutians	101-200	Petrel Bank	7	2	4.93	855	0	2,311
Central Aleutians	201-300	SE Central Aleutians	5	2	4.49	215	0	691
Eastern Aleutians	201-300	SW Eastern Aleutians	6	3	3.33	239	0	537
Western Aleutians	101-200	E Western Aleutians	22	6	3.06	383	41	725
Eastern Aleutians	101-200	SW Eastern Aleutians	10	4	2.84	643	11	1,274
Central Aleutians	101-200	SE Central Aleutians	10	5	2.83	213	7	418
Eastern Aleutians	301-500	Combined Eastern Aleutian Islands	4	2	2.71	723	0	2,332
Eastern Aleutians	201-300	NE Eastern Aleutians	26	4	2.28	448	0	936
Western Aleutians	1-100	E Western Aleutians	12	1	2.20	260	0	833
Central Aleutians	201-300	Petrel Bank	4	1	2.01	154	0	644
Central Aleutians	101-200	SW Central Aleutians	15	2	1.81	191	0	512
Western Aleutians	201-300	E Western Aleutians	14	3	1.77	138	0	304
Eastern Aleutians	1-100	SE Eastern Aleutians	8	1	1.73	301	0	1,014
Eastern Aleutians	101-200	NE Eastern Aleutians	26	4	1.73	348	0	704
Central Aleutians	201-300	SW Central Aleutians	7	1	1.67	71	0	246
Southern Bering Sea	201-300	Combined Southern Bering Sea	8	1	1.61	91	0	305
Eastern Aleutians	101-200	SE Eastern Aleutians	19	3	1.17	223	0	521
Eastern Aleutians	201-300	SE Eastern Aleutians	12	1	0.67	139	0	445
Western Aleutians	101-200	W Western Aleutians	35	3	0.55	223	0	486
Eastern Aleutians	301-500	SW Eastern Aleutians	2	1	0.48	21	0	290
Western Aleutians	201-300	W Western Aleutians	17	2	0.47	44	0	115
Southern Bering Sea	101-200	E Southern Bering Sea	14	1	0.46	54	0	171
Central Aleutians	201-300	N Central Aleutians	16	1	0.35	15	0	48
Central Aleutians	301-500	N Central Aleutians	8	2	0.28	34	0	88
Central Aleutians	101-200	N Central Aleutians	9	1	0.21	22	0	74
Eastern Aleutians	301-500	SE Eastern Aleutians	7	1	0.09	24	0	82

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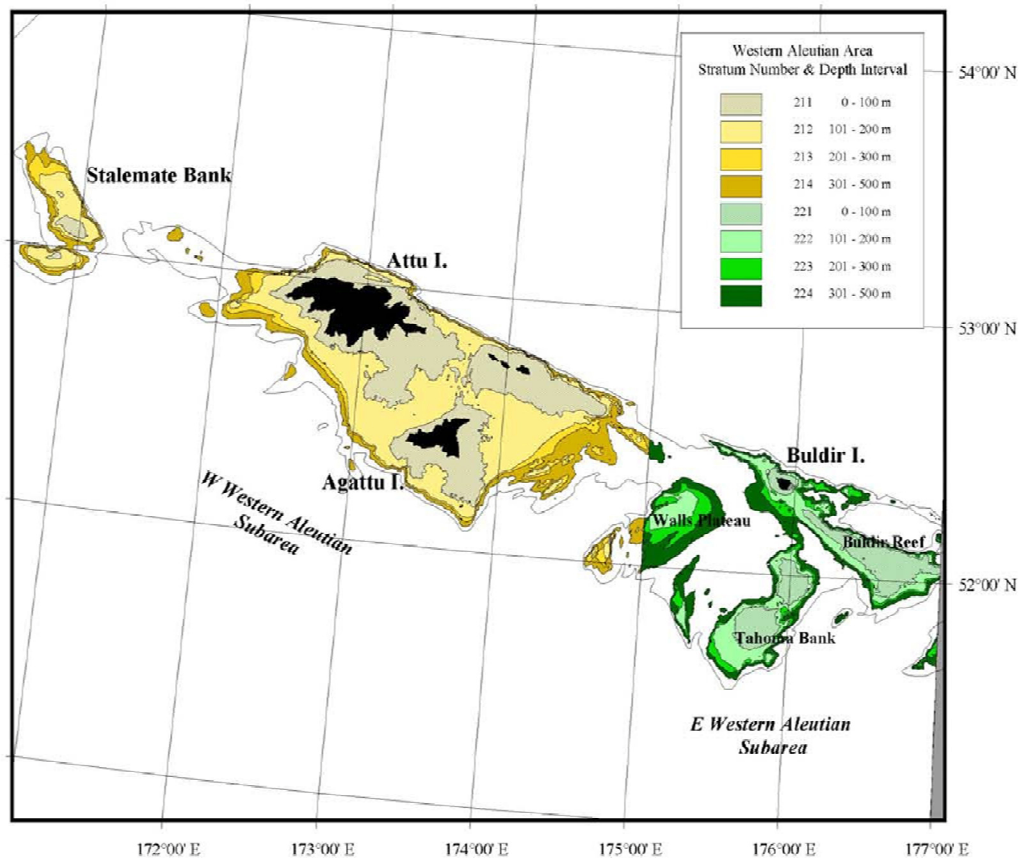
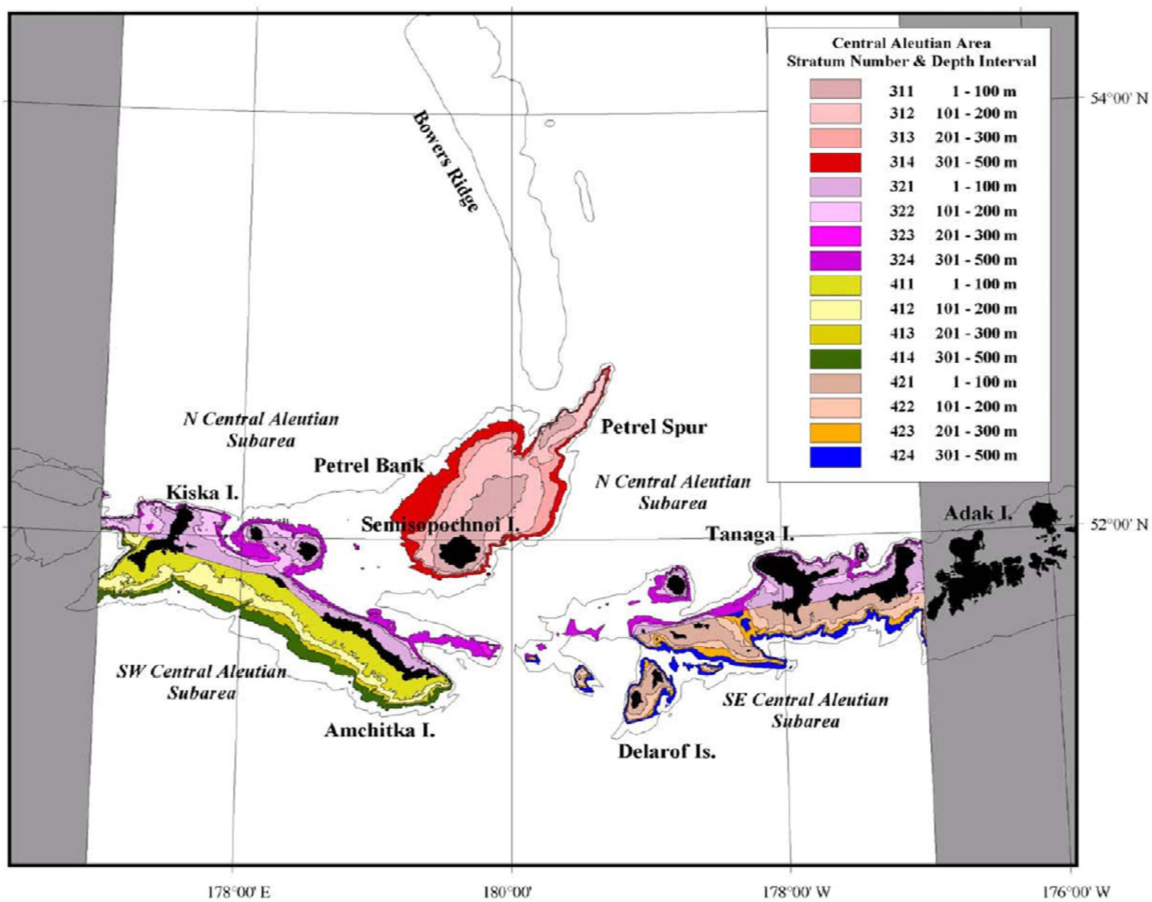
APPENDIX A

Appendix Table A-1. -- Survey strata including sampling districts, subdistricts, subdistrict codes, depth ranges, and areas.

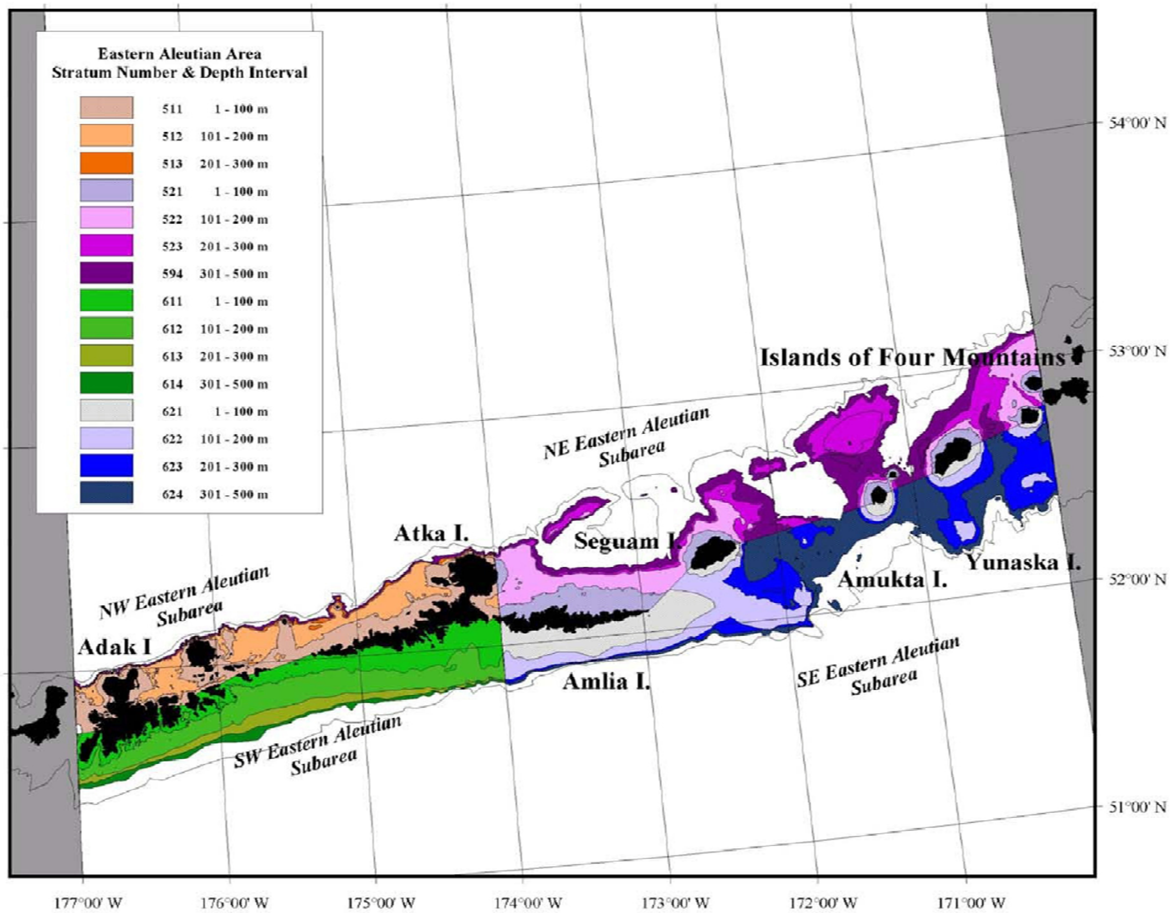
Survey district	Stratum name	Stratum Code	Depth Interval (m)	Area (km^2)
Western Aleutians	W Western Aleutians	211	1-100	3,693
	W Western Aleutians	212	101-200	4,065
	W Western Aleutians	213	201-300	940
	W Western Aleutians	214	301-500	1,711
	E Western Aleutians	221	1-100	1,183
	E Western Aleutians	222	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



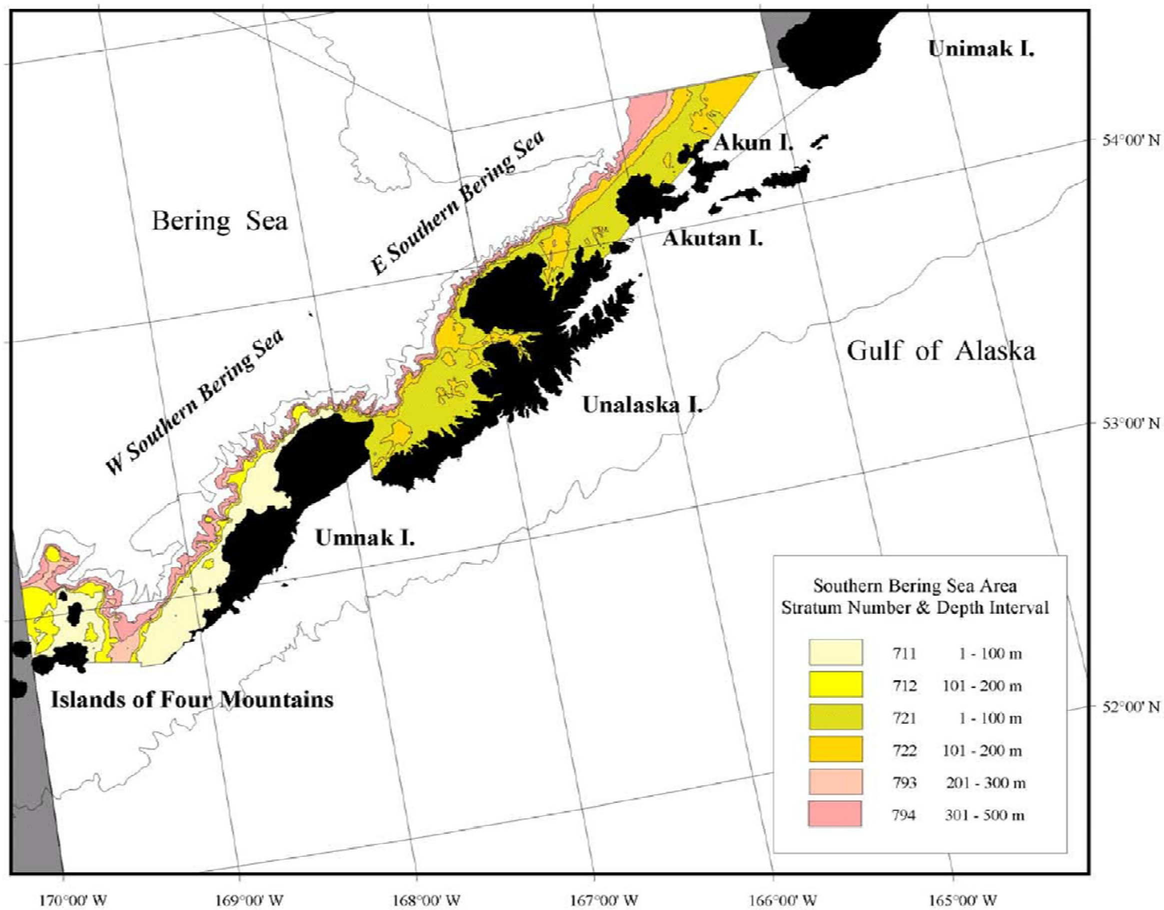
Appendix Figure A-1. -- Subdistricts and depth zones sampled during the 2012 Aleutian Islands groundfish trawl survey by survey district and sampling subarea.



Appendix Figure A-2. -- Subdistricts and depth zones sampled during the 2012 Aleutian Islands groundfish trawl survey by survey district and sampling subarea.



Appendix Figure A-3. -- Subdistricts and depth zones sampled during the 2012 Aleutian Islands groundfish trawl survey by survey district and sampling subarea.



Appendix Figure A-4. -- Subdistricts and depth zones sampled during the 2012 Aleutian Islands groundfish trawl survey by survey district and sampling subarea.

APPENDIX B

Appendix Table B-1. -- Fish species encountered and identified during the 2012 Aleutian Islands bottom trawl survey.

FAMILY	SPECIES_NAME	COMMON_NAME
Petromyzontidae	*Lampetra tridentata*	Pacific lamprey
Squalidae	*Somniosus pacificus*	Pacific sleeper shark
Rajidae	Rajidae unident.	skate unident.
	Raja binoculata	big skate
	Bathyraja interrupta	Bering skate
	Bathyraja taranetzi	mud skate
	Bathyraja trachura	roughtail skate
	Bathyraja parmifera	Alaska skate
	Bathyraja aleutica	Aleutian skate
	Bathyraja lindbergi	Commander skate
	Bathyraja panthera	leopard skate
	Bathyraja maculata	whiteblotched skate
	Bathyraja mariposa	butterfly skate
	Bathyraja minispinosa	whitebrow skate
Bathylagidae	*Bathylagus* sp.	blacksmelt unident.
	Bathylagus milleri	robust blacksmelt
	Leuroglossus schmidti	northern smoothtongue
Searsiidae	*Sagamichthys abei*	shining tubeshoulder
Osmeridae	*Thaleichthys pacificus*	eulachon
	Mallotus villosus	capelin
Salmonidae	*Oncorhynchus keta*	chum salmon
Melanostomiidae	*Tactostoma macropus*	longfin dragonfish
Chauliodontidae	Chauliodontinae unident	viperfish unident.
	Chauliodus macouni	Pacific viperfish
Gonostomatidae	*Cyclothone* sp.	
	Cyclothone acclinidens	benttooth bristlemouth
Myctophidae	*Myctophidae unident*	lanternfish unident.
	Stenobrachius sp.	
	Stenobrachius leucopsarus	northern lampfish
	Diaphus sp.	
	Diaphus theta	California headlightfish
	Lampanyctus sp.	
	Nannobrachium regale	pinpoint lampfish
	Lampanyctus jordani	brokenline lampfish
	Protomyctophum thompsoni	northern flashlightfish
Macrouridae	*Albatrossia pectoralis*	giant grenadier
	Coryphaenoides cinereus	popeye grenadier
Gadidae	*Gadus macrocephalus*	Pacific cod
	Gadus chalcogrammus	walleye pollock
Melamphaeidae	Melamphaidae unident.	bigscale unident.
	Poromitra curilensis	crested bigscale
	Melamphaes lugubris	highsnout bigscale
Scorpaenidae	*Sebastolobus alascanus*	shortspine thornyhead
	Sebastes sp.	rockfish unident.
	Sebastes aleutianus	rougheye rockfish

FAMILY	SPECIES_NAME	COMMON_NAME
	Sebastes melanostictus	blackspotted 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
Anoplopomatidae	*Anoplopoma fimbria*	sablefish
Hexagrammidae	*Pleurogrammus monopterygius*	Atka mackerel
	Hexagrammos lagocephalus	rock greenling
	Hexagrammos decagrammus	kelp greenling
Cottidae	Cottidae unident.	sculpin unident.
	Icelinus sp.	
	Thyriscus anoplus	sponge sculpin
	Icelinus borealis	northern sculpin
	Gymnocanthus galeatus	armorhead sculpin
	Artediellus pacificus	hookhorn sculpin
	Bolinia euryptera	broadfin sculpin
	Malacocottus sp.	
	Malacocottus zonurus	darkfin sculpin
	Hemilepidotus zapus	longfin Irish lord
	Hemilepidotus hemilepidotus	red Irish lord
	Hemilepidotus jordani	yellow Irish lord
	Triglops forficata	scissortail sculpin
	Triglops metopias	crescent-tail sculpin
	Triglops scepticus	spectacled sculpin
	Triglops pingeli	ribbed sculpin
	Triglops macellus	roughspine sculpin
	Archistes biseriatus	scaled sculpin
	Myoxocephalus polyacanthocephalus	great sculpin
	Dasycottus setiger	spinyhead sculpin
	Nautichthys oculofasciatus	sailfin sculpin
	Hemitripterus bolini	bigmouth sculpin
	Icelus spiniger	thorny sculpin
	Icelus euryops	wide-eye sculpin
	Icelus spatula	spatulate sculpin
	Icelus uncinalis	uncinate sculpin
	Rastrinus scutiger	roughskin sculpin
	Icelus sp.	
Agonidae	*Leptagonus leptorhynchus*	longnose poacher
	Leptagonus frenatus	sawback poacher
	Bathyagonus nigripinnis	blackfin poacher
	Podothecus accipenserinus	sturgeon poacher
	Hypsagonus quadricornis	fourhorn poacher
Cyclopteridae	*Aptocyclus ventricosus*	smooth lumpsucker
	Lethotremus muticus	docked snailfish
	Eumicrotremus birulai	round lumpsucker
	Eumicrotremus orbis	Pacific spiny lumpsucker

FAMILY	SPECIES_NAME	COMMON_NAME
	Eumicrotremus andriashevi	pimpled lumpsucker
	Eumicrotremus sp.	spiny lumpsuckers
	Eumicrotremus barbatus	papillose lumpsucker
	Eumicrotremus phrynoides	toad lumpsucker
Liparidae	Liparidae unident.	snailfish unident.
	Crystallichthys cyclospilus	blotched snailfish
	Allocareproctus jordani	cherry snailfish
	Careproctus sp.	
	Careproctus melanurus	blacktail snailfish
	Careproctus simus	proboscis snailfish
	Careproctus furcellus	emarginate snailfish
	Careproctus gilberti	smalldisk snailfish
	Careproctus sp. cf. gilberti	dominator snailfish
	Careproctus rastrinus	salmon snailfish
	Careproctus candidus	bigeye snailfish
	Paraliparis dactylosus	red snailfish
	Allocareproctus sp.	
	Allocareproctus unangas	goldeneye snailfish
	Careproctus faunus	mischievous snailfish
Bathymasteridae	*Bathymaster caeruleofasciatus*	Alaskan ronquil
	Bathymaster signatus	searcher
Zoarcidae	*Lycodes akuugun*	bicolor eelpout
	Lycodes palearis	wattled eelpout
	Lycodes concolor	ebony eelpout
	Lycodes brevipes	shortfin eelpout
	Gymnelus sp.	
	Lycodes beringi	Bering eelpout
	Lycodapus sp.	
Stichaeidae	*Lumpenus sagitta*	snake prickleback
	Lumpenella longirostris	longsnout prickleback
	Chirolophis decoratus	decorated warbonnet
	Bryozoichthys lysimus	nutcracker prickleback
	Bryozoichthys marjorius	pearly prickleback
Zaproridae	*Zaprora silenus*	prowfish
Ammodytidae	*Ammodytes hexapterus*	Pacific sand lance
Pleuronectidae	*Atheresthes stomias*	arrowtooth flounder
	Atheresthes evermanni	Kamchatka flounder
	Reinhardtius hippoglossoides	Greenland turbot
	Hippoglossus stenolepis	Pacific halibut
	Hippoglossoides elassodon	flathead sole
	Eopsetta jordani	petrale sole
	Parophrys vetulus	English sole
	Microstomus pacificus	Dover sole
	Glyptocephalus zachirus	rex sole
	Limanda aspera	yellowfin sole
	Platichthys stellatus	starry flounder
	Lepidopsetta polyxystra	northern rock sole
	Lepidopsetta bilineata	southern rock sole
	Isopsetta isolepis	butter sole

Appendix Table B-2. -- Invertebrate species encountered and identified during the 2012 Aleutian Islands bottom trawl survey.

PHYLUM	SPECIES_NAME	COMMON_NAME
Porifera	Porifera unident.	sponge unident.
	Suberites sp.	
	Suberites montiniger	peach sponge
	Suberites domuncula	hermit sponge
	Aphrocallistes vastus	clay pipe sponge
	Heterochone calyx	goblet sponge
	Phakellia sp.	
	Mycale sp.	
	Mycale loveni	tree sponge
	Coelosphaeridae	ginseng sponge
	Geodia mesotriaena	
	Geodia sp.	
	Halichondria sp.	
	Halichondria panicea	barrel sponge
	Rhabdocalyptus sp.	cloud sponge
	Mycale bellabellensis	lampshade sponge
	Phakellia cribrosa	funnel sponge
	Phakellia dalli	cat-o-nine-tails sponge
	Myxilla incrustans	scallop sponge
	Myxilla brunnea	soft brown sponge
	Phakellia beringensis	hat sponge
	Plicatellopsis amphispicula	firm finger sponge
	Pachastrellidae sp. 1	mushroom sponge
	Histodermella sp. A	spud sponge
	Leucosolenia blanca	yellow leafy sponge
	Tethya sp.	ball sponge
	Polymastia sp.	
	Polymastia sp. B	orange nipple ball sponge
	Neoesperiopsis rigida	soft finger sponge
	Neoesperiopsis infundibula	rough China hat sponge
	Neoesperiopsis sp.	
	Esperiopsis flagrum	cheesestick sponge
	Neoesperiopsis digitata	
	Inflatella sp. 1	
	Stelletta sp.	stone sponge
	Mycalecarmia lobata	cotton ball sponge
	Polymastia fluegeli	Flugel's nippled spong
	Polymastia robusta	long nippled sponge
	Polymastia sp. A	prolific nipple sponge
	Vulcanella sp. 1	fuzzy cratered sponge
	Vulcanella sp.	
	Tentorium semisuberites	two nipple sponge
	Craniella villosa	
	Scypha ciliata	hairy urn sponge
	Oscarella lobularis	stalked ball sponge
	Stylocordyla borealis	lollypop sponge

PHYLUM	SPECIES_NAME	COMMON_NAME
	Plakina tanaga	white convoluted sponge
	Latrunculia sp. A	green papillate sponge
	Latrunculia sp. B	smooth green sponge
	Axinella sp.	firm gray sponge
	Chondrocladia gigantea	carnivorous cattail sponge
	Asbestopluma sp. A	fuzzy sponge
	Melonchela clathriata	lattice sponge
	Isodictya palmata	prickly pear sponge
	Hexactinellida unident.	glass sponge unident.
	Staurocalyptus sp.	
	Geodinella robusta	calcareous finger sponge
	Aulosaccus schulzei	vase sponge
	Regadrella okinoseana	lacy basket sponge
	Craniella spinosa	furry ball sponge
	Tetilla sp. A	spiky ball sponge
	Tetilla sigmoanchoratum	spiny ball sponge
	Tetilla sp.	
	Craniella sp.	puffball sponges
Cnidaria	Cnidaria unident.	coelenterate unident.
	Bonneviella sp. A	champagne flute hydroid
	Bonneviella sp.	
	Aglaophenia sp.	
	Abietinaria sp.	
	Abietinaria greenei	bushy white hydroid
	Abietinaria sp. A	white tangled hydroid
	Sertulariidae unident.	Sertulariid hydroid
	Scyphozoa unident.	jellyfish unident.
	Periphylla periphylla	
	Chrysaora melanaster	
	Phacellophora camtschatica	egg yolk jelly
	Aequorea sp.	
	Atolla sp.	
	Aurelia sp.	
	Aurelia labiata	
	Cyanea capillata	lion's mane
	Anthozoa	
	Alcyonium sp.	
	Alcyonium sp. A	pink orange mushroom coral
	Gersemia sp.	sea raspberry
	Anthomastus sp.	
	Anthomastus sp. A	red anthomastus
	Anthomastus sp. B	gray anthomastus
	Gorgonacea	gorgonian coral unident.
	Primnoa sp.	
	Primnoa pacifica	
	Primnoa willeyi	red tree coral
	Swiftia sp.	
	Paragorgia sp.	
	Paragorgia arborea	Kamchatka coral

PHYLUM	SPECIES_NAME	COMMON_NAME
	Paragorgia pacifica	
	Plexauridae unident.	plexaurid corals
	Alaskagorgia aleutiana	
	Cryogorgia koolsae	
	Parastenella sp. A	sugar coral
	Calcigorgia sp.	
	Calcigorgia spiculifera	
	Clavularia incrustans	encrusting coral
	Virgularia sp.	smoothstem seawhip
	Virgulariidae unident.	sea whip unident.
	Halipteris sp.	
	Halipteris willemoesi	
	Ptilosarcus sp.	
	Ptilosarcus gurneyi	orange sea pen
	Actiniaria	sea anemone unident.
	Actinauge verrilli	reticulate anemone
	Paractinostola faeculenta	rough purple sea anemone
	Metridium farcimen	gigantic anemone
	Stomphia didemon	cowardly anemone
	Stomphia sp.	
	Urticina sp.	
	Urticina crassicornis	mottled anemone
	Bathyphelia australis	hot dog sea anemone
	Oractis sp.	
	Actiniidae unident.	actinid sea anemones unident.
	Cribrinopsis fernaldi	chevron-tentacled anemone
	Liponema brevicornis	tentacle-shedding anemone
	Actinostolidae	
	Actinistola sp. A	
	Actinistola sp. B	
	Actinostola groenlandica	
	Caryophylliidae unident.	cup corals
	Javania borealis	
	Caryophyllia sp.	
	Caryophyllia alaskensis	Alaska cup coral
	Stylasteridae unident.	stylasterid corals
	Stylaster sp.	
	Stylaster polyorchis	
	Stylaster campylecus	
	Stylaster moseleyana	
	Cyclohelia lamellata	
	Cyclohelia sp.	
	Cyclohelia sp. A	
	Stylaster sp. A	undulate hydrocoral
	Thouarella sp. 1	
	Thouarella sp. 2	
	Thouarella superba	
	Errinopora zarhyncha	
	Errinopora sp.	

PHYLUM	SPECIES_NAME	COMMON_NAME
	Plumarella sp.	
	Plumarella sp. 1	
	Thouarella sp.	
	Fanellia sp.	
	Fanellia compressa	
	Muriceides nigra	
	Muriceides sp.	
	Amphilaphis sp.	
	Amphilaphis sp. 2	
	Amphilaphis sp. 3	
	Arthrogorgia sp.	
	Muriceides sp. *cf. cylindrica*	
	Amphilaphis sp. 4	
	Plumarella sp. 2	
	Primnoa wingi	
	Arthrogorgia otsukai	
Annelida	Polychaeta unident.	polychaete worm unident.
	Eunice valens	
	Chaetopterus sp.	
	Aphroditidae unident.	sea mouse unident.
	Aphrodita sp.	
	Aphrodita negligens	
	Euphrosine multibranchiata	
	Onuphis conchylega	gravel tube worm
	Nereididae unident.	
	Cheilonereis cyclurus	
	Polynoidae unident.	scale worm unident.
	Eunoe sp.	
	Eunoe nodosa	giant scale worm
	Eunoe depressa	depressed scale worm
	Gattyana ciliata	
	Serpulidae unident.	serpulid worm
	Serpula columbiana	
	Hirudinea unident.	leech unident.
	Notostomum cyclostomum	striped sea leech
Platyhelminthes	Platyhelminthes unident.	flatworm unident.
Rhynchocoela	*Tubulanus* sp. A	
	Cerebratulus californienesis	
Priapulida	Chaetognatha unident.	arrow worm unid.
Sipuncula	Sipuncula unident.	peanut worm unid.
Echiura	Echiura unident.	echiuroid worm unident.
Arthropoda	Amphipoda unident.	amphipod unident.
	Isopoda unident.	isopod unident.
	Arcturus sp. 1	
	Rocinella angusta	
	Neognathophausia gigas	giant red mysid
	Balanus sp.	
	Balanus evermanni	giant barnacle
	Pandalus jordani	ocean shrimp

PHYLUM	SPECIES_NAME	COMMON_NAME
	Pandalus eous	Alaskan pink
	Pandalus tridens	yellowleg pandalid
	Pandalus goniurus	humpy shrimp
	Pandalus hypsinotus	coonstripe shrimp
	Pandalus stenolepis	roughpatch shrimp
	Pandalopsis aleutica	
	Pandalopsis longirostris	
	Pandalopsis sp. *cf. lamelligera*	
	Pandalopsis dispar	sidestripe shrimp
	Pandalopsis ampla	
	Hippolytidae unident.	hippolytid shrimp unident.
	Spirontocaris sp.	
	Spirontocaris arcuata	Rathbun blade shrimp
	Spirontocaris lamellicornis	
	Eualus barbatus	barbed eualid
	Eualus biunguis	deepsea eualid
	Lebbeus sp.	
	Lebbeus groenlandicus	spiny lebbeid
	Crangon sp.	
	Crangon communis	twospine crangon
	Crangon dalli	ridged crangon
	Argis sp.	
	Argis alaskensis	common argid
	Sclerocrangon boreas	sculptured shrimp
	Argis levior	Nelson's argid
	Argis ovifer	split-eye argid
	Pasiphaea pacifica	Pacific glass shrimp
	Notostomus japonicus	spinyridge shrimp
	Cancer branneri	
	Cancer oregonensis	Oregon rock crab
	Oregonia gracilis	graceful decorator crab
	Chorilia longipes	longhorned decorator crab
	Chionoecetes bairdi	Tanner crab
	Hyas lyratus	Pacific lyre crab
	Paguridae	hermit crab unident.
	Pagurus sp.	
	Pagurus brandti	sponge hermit
	Pagurus aleuticus	Aleutian hermit
	Labidochirus splendescens	splendid hermit
	Pagurus confragosus	knobbyhand hermit
	Pagurus cornutus	
	Pagurus dalli	whiteknee hermit
	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

PHYLUM	SPECIES_NAME	COMMON_NAME
	Elassochirus gilli	Pacific red hermit
	Acantholithodes hispidus	fuzzy crab
	Lithodes sp.	
	Lithodes aequispinus	golden king crab
	Hapalogaster grebnitzkii	
	Rhinolithodes wosnessenskii	rhinoceros crab
	Placetron wosnessenskii	scaled crab
	Erimacrus isenbeckii	horsehair crab
	Munida quadrispina	pinchbug
	Pycnogonida unident.	sea spider unident.
	Colossendeis sp.	
Mollusca	*Polyplacophora*	chiton unident.
	Lepidozona beringiana	
	Lepidozona sp.	
	Amicula vestita	
	Placiphorella sp.	
	Placiphorella pacifica	
	Placiphorella rufa	
	Nudibranchia unident.	nudibranch unident.
	Dendronotus sp.	
	Tritonia sp.	
	Tritonia festiva	festive Tritonia
	Tritonia diomedea	rosy tritonia
	Dorididae unident.	dorid nudibranch unident.
	Archidoris odhneri	white night doris
	Diaulula sp. A	
	Cranopsis major	great puncturella
	Gastropoda unident.	snail unident.
	Bulbus fragilis	fragile moonsnail
	Amauropsis purpurea	purple moon snail
	Cryptonatica sp.	
	Cryptonatica	Aleutian moonsnail
	Lamellaria sp.	
	Onchidiopsis glacialis	icy lamellaria
	Onchidiopsis sp. A	
	Onchidiopsis sp.	
	Colus sp.	
	Colus periscelidus	garter whelk
	Japelion aleutica	
	Japelion sp.	
	Japelion sp. A	
	Volutopsius sp. C	
	Pyrulofusus sp.	
	Pyrulofusus dexius	
	Volutopsius sp.	
	Pyrulofusus harpa	left-hand whelk
	Volutopsius regularis	regular whelk
	Pyrulofusus melonis	
	Beringius sp.	

PHYLUM	SPECIES_NAME	COMMON_NAME
	Beringius kennicottii	
	Beringius undatus	
	Beringius sp. A	Baxter's Beringius
	Beringius sp. D	
	Beringius sp. F	
	Neoberingius sp.	
	Neptunea sp.	
	Neptunea amianta	white neptune
	Neptunea lyrata	lyre whelk
	Neptunea sp. A	
	Neptunea sp. C	
	Plicifusus kroyeri	
	Aforia sp.	
	Fusitriton oregonensis	Oregon triton
	Margarites sp. C	
	Buccinum sp.	
	Buccinum scalariforme	ladder whelk
	Buccinum sp. E	two-ribbed chestnut whelk
	Buccinum sp. F	crenulated whelk
	Arctomelon sp.	
	Arctomelon stearnsii	Alaska volute
	Arctomelon tamikoae	
	Arctomelon sp. *cf. stearnsii*	
	Velutina conica	conical lamellaria
	Modiolus modiolus	northern horsemussel
	Chlamys sp.	
	Hiatella sp.	
	Hiatella arctica	Arctic hiatella
	Panomya norvegica	Arctic roughmya
	Yoldia sp.	
	Yoldia thraciaeformis	broad yoldia
	Limopsis akutanica	Akutan limops
	Musculus discors	discordant mussel
	Astarte sp.	
	Astarte compacta	
	Astarte arctica	
	Astarte montagui	
	Cyclocardia crassidens	thick carditid
	Cyclocardia sp.	
	Clinocardium sp.	
	Serripes sp.	
	Serripes groenlandicus	Greenland cockle
	Pododesmus macrochisma	Alaska falsejingle
	Anomiidae unident.	falsejingles unident.
	Octopodidae unident.	octopus unident.
	Benthoctopus leioderma	smoothskin octopus
	Opisthoteuthis californiana	flapjack devilfish
	Octopus dofleini	giant octopus
	Sasakiopus salebrosus	pygmy benthoctopus

PHYLUM	SPECIES_NAME	COMMON_NAME
	Decapodiformes	squid unident.
	Rossia pacifica	eastern Pacific bobtail
	Gonatus sp.	
	Berryteuthis magister	magistrate armhook squid
	Gonatopsis sp.	
	Gonatopsis borealis	boreopacific armhook squid
	Moroteuthis robusta	robust clubhook squid
	Chiroteuthis calyx	
Bryozoa	Bryozoa unident.	bryozoan unident.
	Leieschara orientalis	
	Phidolopora pacifica	lacy bryozoan
	Bugula californica	
	Alcyonidium pedunculatum	
	Alcyonidium sp. A	medusa bryozoan
	Alcyonidium sp.	
	Myriozoum subgracile	
	Idmidronea sp.	
	Porella compressa	flattened bryozoan
	Rhamphostomella costata	ribbed bryozoan
	Costazia ventricosa	rusty bryozoan
	Microporina borealis	
	Microporina sp.	
	Dendrobeania sp.	
Brachiopoda	*Laqueus californianus*	California lamp shell
Echinodermata	Asteroidea unident.	sea star unident.
	Evasterias echinosoma	giant sea star
	Leptasterias hylodes	Aleutian sea star
	Leptasterias stolocantha	
	Leptasterias coei	
	Leptasterias truculenta	giant Aleutian six-rayed star
	Pycnopodia helianthoides	sunflower sea star
	Stylasterias sp.	
	Lethasterias nanimensis	blackspined sea star
	Pedicellaster magister	majestic sea star
	Stephanasterias albula	
	Henricia sp. B	white Henricia
	Henricia sp. C	mottled Henricia
	Henricia sp.	
	Henricia sanguinolenta	sanguine sea star
	Henricia aspera	ridged blood star
	Henricia leviuscula	blood sea star
	Henricia spiculifera	spiny Henricia
	Odontohenricia fisheri	
	Odontohenricia sp.	
	Odontohenricia sp. A	
	Odontohenricia sp. B	
	Odontohenricia sp. C	
	Leptasterias sp.	
	Henricia beringiana	Bering Henricia

PHYLUM	SPECIES_NAME	COMMON_NAME
	Gephyreaster swifti	Swift's sea star
	Gephyreaster sp.	
	Pseudarchaster sp.	
	Hippasteria sp.	
	Hippasteria kurilensis	
	Hippasteria armata	
	Hippasteria sp. A	
	Hippasteria spinosa	spiny red sea star
	Pseudarchaster parelii	scarlet sea star
	Mediaster tenellus	
	Ceramaster sp.	
	Ceramaster japonicus	red bat star
	Ceramaster patagonicus	orange bat sea star
	Ceramaster stellatus	
	Solaster sp.	
	Solaster endeca	northern sun sea star
	Solaster hypothrissus	
	Solaster stimpsoni	striped sun sea star
	Solaster sp. A	
	Solaster sp. C	beautiful sun star
	Solaster sp. D	serpent sun star
	Solaster sp. E	Kessler sun star
	Solaster sp. F	Fisher sun star
	Solaster sp. G	ocher sun star
	Crossaster sp.	
	Crossaster borealis	grooved sea star
	Crossaster sp. A	white rose star
	Crossaster sp. B	pink rose star
	Crossaster papposus	rose sea star
	Heterozonias alternatus	cannonball sun star
	Lophaster vexator	crested star
	Pteraster sp.	
	Pteraster sp. A	
	Pteraster sp. B	
	Pteraster tesselatus	
	Pteraster jordani	
	Pteraster sp. C	
	Pteraster militaris	wrinkled star
	Pteraster marssipus	
	Pteraster obscurus	obscure sea star
	Pteraster pulvillus	
	Diplopteraster multipes	pincushion sea star
	Diplopteraster sp.	
	Ctenodiscus crispatus	common mud star
	Leptychaster anomalus	
	Leptychaster arcticus	North Pacific sea star
	Cladaster validus	
	Cladaster sp.	
	Dipsacaster borealis	northern sea star

PHYLUM	SPECIES_NAME	COMMON_NAME
	Cheiraster sp. A	Aleutian fragile sea star
	Cheiraster dawsoni	fragile sea star
	Nearchaster variabilis	
	Nearchaster sp.	
	Strongylocentrotus droebachiensis	green sea urchin
	Strongylocentrotus sp.	
	Strongylocentrotus polyacanthus	
	Strongylocentrotus pallidus	white sea urchin
	Brisaster latifrons	heart urchin
	Echinarachnius parma	parma sand dollar
	Florometra sp.	
	Florometra inexpectata	
	Florometra asperrima	common northern feather star
	Ophiuroidea unident.	brittlestar unident.
	Gorgonocephalus eucnemis	basketstar
	Asteronyx sp.	
	Asteronyx loveni	serpent sea star
	Astrochele laevis	
	Astrochele sp. A	
	Ophiura sp.	
	Ophiura sarsi	notched brittlestar
	Stegophiura ponderosa	
	Ophiopholis sp.	
	Ophiopholis longispina	
	Ophiopholis aculeata	ubiquitous brittle star
	Ophiolebes sp. D	
	Amphiodia sp.	
	Holothuroidea unident.	sea cucumber unident.
	Pseudostichopus sp.	
	Bathyplotes sp.	
	Cucumaria sp.	
	Cucumaria fallax	sea football
	Cucumaria frondosa	
	Psolus sp.	
	Psolus sp. A	
	Psolus squamatus	whitescaled sea cucumber
	Psolus japonicus	
	Thylonidium sp.	
	Pannychia moseleyi	deep sea papillate cucumber
	Synallactes sp. A	
	Synallactes sp.	
	Synallactes challengeri	
Chordata	Ascidiacea unident.	tunicate unident.
	Thaliacea unident.	salp unident.
	Styela rustica	sea potato
	Styela sp. A	
	Styela sp. B	
	Halocynthia aurantium	sea peach
	Distaplia sp.	

PHYLUM	SPECIES_NAME	COMMON_NAME
	Distaplia occidentalis	
	Distaplia smithi	
	Amaroucium soldatovi	
	Chelyosoma orientale	
	Aplidium sp. A	sea glob
	Aplidium new species a	orange aplidium
	Synoicum sp.	sea blob
	Trididemnum opacum	
	Ascidia paratropa	glassy tunicate
	Chelyosoma productum	
	Molgula grifithsii	sea grape

APPENDIX C

Appendix Table C-1. -- Length-weight parameters (*a* and *b*) for species where individual length and weight data were collected (length in mm and weight in grams). The number of individuals measured and weighed (*n*) is also provided.

Species	Sex	a	b	n
Atheresthes stomias	Male	2.789E-06	3.179	146
	Female	1.768E-06	3.267	256
	Both	1.766E-06	3.264	402
Atheresthes evermanni	Male	2.054E-06	3.242	207
	Female	1.167E-06	3.348	263
	Both	1.309E-06	3.324	470
Reinhardtius hippoglossoides	Male	2.339E-06	3.190	30
	Female	1.502E-05	2.944	13
	Both	1.255E-07	3.638	43
Lepidopsetta polyxystra	Male	5.251E-06	3.127	181
	Female	4.307E-06	3.164	230
	Both	4.548E-06	3.154	411
Lepidopsetta bilineata	Male	4.766E-06	3.150	133
	Female	3.783E-06	3.189	172
	Both	4.261E-06	3.169	305
Albatrossia pectoralis	Male	9.978E-04	2.649	13
	Female	4.364E-03	2.393	127
	Both	3.484E-03	2.432	140
Gadus macrocephalus	Male	3.982E-05	2.797	304
	Female	2.958E-06	3.208	302
	Both	1.261E-05	2.980	606
Theragra chalcogramma	Male	5.678E-06	3.040	256
	Female	7.889E-06	2.981	304
	Both	6.929E-06	3.005	560

Species	Sex	a	b	n
Pleurogrammus monopterygius	Male	3.795E-06	3.206	207
	Female	3.778E-06	3.198	215
	Both	3.937E-06	3.195	422
Sebastes melanostictus	Male	3.853E-06	3.233	285
	Female	3.838E-06	3.236	251
	Both	3.824E-06	3.236	538
Sebastes alutus	Male	6.115E-06	3.139	552
	Female	9.089E-06	3.068	591
	Both	7.068E-06	3.112	1147
Sebastes variabilis	Male	4.762E-06	3.211	40
	Female	5.557E-06	3.184	44
	Both	5.103E-06	3.199	84
Sebastes polyspinis	Male	9.179E-06	3.074	259
	Female	1.290E-05	3.014	314
	Both	9.817E-06	3.062	575
Sebastes borealis	Male	7.541E-06	3.128	218
	Female	4.840E-06	3.204	209
	Both	6.062E-06	3.166	427
Hemilepidotus jordani	Male	1.900E-06	3.319	154
	Female	3.667E-06	3.207	152
	Both	2.617E-06	3.264	308

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