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Data Report: 2015 Gulf of Alaska Bottom Trawl Survey

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PREFACE

This report presents data from the 2015 Gulf of Alaska groundfish survey conducted by the Alaska Fisheries Science Center of the National Marine Fisheries Service. It contains detailed descriptions of the survey planning and operations, species distribution and abundance charts, length frequency plots, tables of estimated biomass, catch per unit effort, average weight and length estimates, length frequency plots, length-weight regression parameters, lists of identified species, survey strata specifications and charts, and trawl descriptions and diagrams.

ABSTRACT

Scientists of the Groundfish Assessment Program of Alaska Fisheries Science Center's Resource Assessment and Conservation Engineering (RACE) Division conducted the ninth Gulf of Alaska Biennial Bottom Trawl Survey during the summer of 2015. This survey extends to 13 the series of surveys, previously conducted every 3 years between 1984 and 1999, which constitute the time series used in stock assessments of Gulf of Alaska groundfish resources. The survey area covered the continental shelf and upper continental slope to 1,000 m in the Gulf of Alaska from Islands of Four Mountains (170°W long.) and approximately 2,800 km across the Gulf of Alaska to Dixon Entrance (133°25'W long.). The survey was conducted aboard three chartered commercial trawlers, the FV *Alaska Provider*, FV *Sea Storm*, and FV *Cape Flattery*. Trawl haul samples were successfully collected at 772 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 the principal groundfish species within the survey area and to collect data to estimate biological parameters useful to groundfish researchers and managers including age, growth, length-weight relationships, feeding habits, and size, sex, and age composition. The survey also collected ancillary data requested by other research groups.

A total of 171 fish and 410 invertebrate species were captured in survey tows. The species with the highest total catch abundance (by weight) over the entire survey area were arrowtooth

flounder (*Atheresthes stomias*), Pacific ocean perch (*Sebastes alutus*), walleye pollock (*Gadus chalcogrammus*), giant grenadier (*Albatrossia pectoralis*), Pacific halibut (*Hippoglossus stenolepis*), and Pacific cod (*Gadus macrocephalus*). Survey results presented here include estimates of catch per unit of effort, biomass, population size composition, and length-weight relationships, as well as charts depicting the distribution of catch for commercially important species encountered during the survey.

CONTENTS

INTRODUCTION

The ninth Biennial Gulf of Alaska (GOA) Bottom Trawl Survey of groundfish and invertebrate resources was conducted during the summer of 2015 by the National Marine Fisheries Service's (NMFS) Alaska Fisheries Science Center (AFSC). Scientists from the Groundfish Assessment Program of AFSC's Resource Assessment and Conservation Engineering (RACE) Division in Seattle, Washington, were responsible for the survey's design and operations. This biennial survey extends to 13, the series begun in 1984, previously conducted every 3 years between 1984 and 1999, which has provided a time series of distribution, abundance, and biological characteristics of GOA groundfish resources for the purpose of stock assessment and management.

In this report, we document the operations and results of the 2015 GOA Bottom Trawl Survey. Results of routine analyses of distribution, relative abundance, size composition, and biological characteristics are shown for the principal groundfish species in each of the five International North Pacific Fisheries Commission (INPFC) statistical areas sampled in the GOA during this survey: Shumagin, Chirikof, Kodiak, Yakutat, and Southeastern (Fig. 1). These results provide stock assessment scientists and resource managers the most current information to for use in stock assessments. Only the 2015 survey results are presented and comparisons are not made to the results of previous GOA surveys.

The survey objectives were to:

1) Delineate the distributions of major groundfish and commercially important invertebrate species inhabiting the continental shelf and upper continental slope of the GOA in depths ≤ 1,000 m.

2) Collect data used to estimate the abundance of the major groundfish species.

3) Collect data on specific biological characters of interest to researchers and resource managers including:

- size, sex, and age composition
- growth and length-weight relationships
- food habits

4) Collect specimens and related information for special research projects on behalf of researchers at the AFSC's RACE and Resource Ecology and Fisheries Management (REFM) Divisions as well as several other scientific and academic organizations. The projects were:

- A study on population genetics of Pacific sleeper and salmon sharks;
- A study on the evolution and adaptation of color vision in aquatic environments;
- A study of light levels at trawl stations;
- Coral collection for genetic analysis;
- A study on verification and validation of different catch processing methods;
- Big skate (*Raja binoculata*) and longnose skate (*Raja rhina*) vertebrate collection for age and growth determination;

- A taxonomic study of *Careproctus melanurus*;
- Collection of miscellaneous snailfish species for taxonomic research;
- A study to identify untrawlable areas with ES 60 acoustic data;
- A taxonomic study of Bering skate (*Bathyraja interrupta*);
- A study of the spatial distribution response of northeast Pacific groundfish to 2015 warm water event;
- A study of mollusk distribution and zoogeography;
- A maturity study of three different rockfish species;
- A morphological and genetic identification study of arrowtooth flounder (*Atheresthes stomias*) and Kamchatka flounder (*A. evermani*);
- A genetic study of rougheye and blackspotted rockfishes
- A tagging study of Pacific halibut (*Hippoglossus stenolepis*) to monitor migration patterns;
- Collection of oxygen and pH measurments at trawl stations;
- A study to validate smooth sheet soundings with modern sonar;
- Osteological collection from nine fish species;
- Image data collection for the development of automated species identification software for future electronic monitoring of fisheries;

METHODS

Survey Area

The Gulf of Alaska (Fig. 1) forms the northeastern border of the Pacific Ocean and consists of complex bathymetric features ranging from jagged, mountainous pinnacles to flat, muddy areas. These features provide a variety of habitats resulting in a complex ecosystem. Prevailing rough bottom conditions in many areas require the standard use of rubber bobbin roller gear for all survey bottom trawling operations. The 2015 GOA survey area included the portion of the continental shelf from the Islands of Four Mountains eastward approximately 2,800 km to Dixon Entrance and from nearshore waters (minimum depth approximately 15 m) to a depth of 1,000 m.

The total 2015 survey area was 320,005 km² (Table 1). Continental shelf waters shallower than 200 m made up 79% of the survey area. The width of the shelf varies from approximately 20 km (11 nautical miles (nmi)) off the Islands of Four Mountains to approximately 220 km (120 nautical miles (nmi)) off Cook Inlet. Gullies intrude onto the shelf in many areas, and extend from the upper slope to the inner shore. The outer shelf is bordered by the continental slope, a region approximately 20 km in width, which descends steeply to the abyssal Aleutian Trench in the western and central GOA and to the Alaska Plain in the eastern GOA. The survey assessed only that portion of the slope between 200 and 1,000 m, which represented 21% of the total survey area. The survey was initially stratified by statistical areas erected by the International North Pacific Fisheries Commission (INPFC). While this commission was dissolved in 1992 and replaced by the North Pacific Anadromous Fish Commission (NPAFC) in 1993, reference to the original INPFC statistical survey areas has been

maintained for survey consistency. Some of the INPFC areas directly correspond to the NMFS Reporting Areas: Shumagin--610; Chirikof—620; and Kodiak—630. The INPFC Yakutat and Southeastern areas divide at the 137°W meridian, while the NMFS Reporting Areas Yakutat—640 and Southeastern—650 divide at the 140°W meridian.

About 32% (101,489 km²) of the total survey area is within the Kodiak INPFC statistical area (Table 1). The portion of the survey area contained within the Chirikof INPFC area and the Shumagin INPFC area are approximately equal at about 21% (68,053 km²) and 20% (65,228 km²), respectively, while the Yakutat INPFC survey area makes up about 18% (57,197 km²). The Southeastern INPFC survey area is the smallest portion, of the total survey area at about 9% (28,038 km²).

Vessels

Since the inception of the Gulf of Alaska bottom trawl survey series in 1984, commercial trawlers and crews have been chartered to conduct the survey operations under the supervision and guidance of RACE Groundfish Assessment Program staff. In most years, three vessels (occasionally two) have been chartered for the survey. During the 2015 survey one vessel (FV *Cape Flattery*) was chartered for only 60 days, in contrast to the standard 75 days for the other two vessels, because it was not available for charter until a month after the start of the survey. This vessel was consequently assigned fewer stations than the other two vessels but it covered the same survey area. To make up for the limited charter days for the FV *Cape Flattery*, 4 additional days were added to the charter periods of the other two vessels, and therefore totaled 79 days each. Since these surveys generate quantitative data for a time series to describe trends in

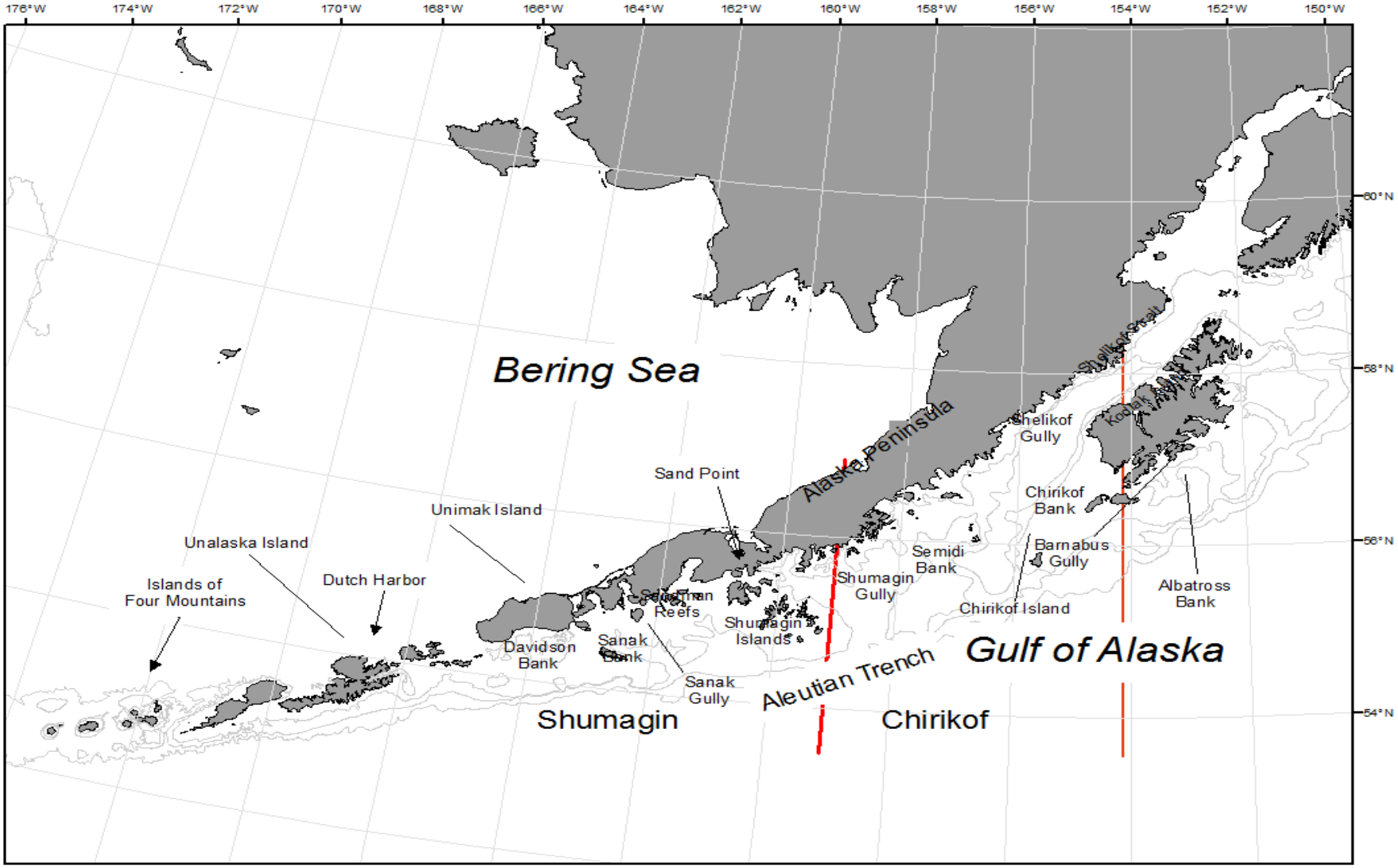

Figure 1. -- The 2015 Gulf of Alaska biennial groundfish survey sampling area including bathymetry, geographic features, and International North Pacific Fisheries Council (INPFC) management areas.

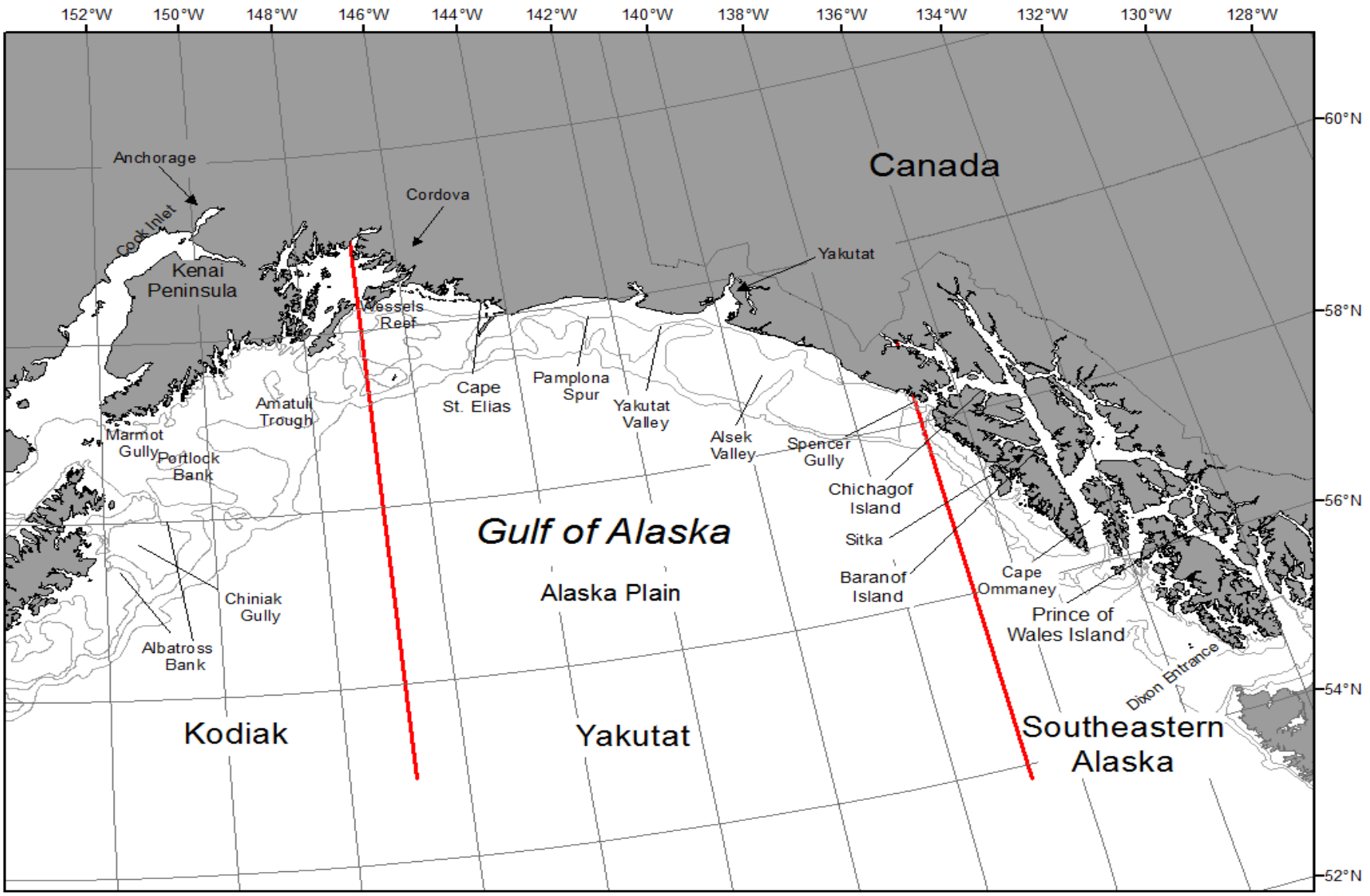

Figure 1. -- Continued.

abundance, distribution, and population biology characteristics of managed resources, it is essential that standardized methods be maintained. Stringent standards for selecting charter vessels are specified whenever new charters are arranged to ensure that the sampling platforms can adequately collect samples and do so in as similar a manner as possible within and between years. As such, vessels and crews must meet minimum criteria in terms of size, main engine horsepower, fishing machinery, skipper and crew experience, and navigational and safety equipment. Continuity of suitable platforms has been further enhanced in the past decade through the use of multi-year charters, assuring both the government and the contractors a stable planning situation for as much as 4 years at a time. In 2015, 800 stations were allocated for a survey that typically targets 820 stations in all depth strata.

The three U.S. commercial fishing vessels chartered for the 2015 GOA bottom trawl survey were the FV *Alaska Provider*, the FV *Sea Storm,* and the FV *Cape Flattery*. All three vessels are house-forward stern trawlers with hydraulic net reels and paired constant tension hydraulic trawl winches containing between 1,280 and 2,196 m of 2.54 cm (2.63 cm *Cape Flattery*) diameter steel cable. All vessels have articulating hydraulic cranes for handling catches and gear. 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 *Alaska Provider* is 53.6 m LOA with a 2,160 HP main engine, and the *Cape Flattery* is 56.7 m LOA with a 1,500 HP main engine. All vessels are equipped with global positioning systems (GPS) integrated with radar, computerized plotting, and autopilots. Other essential electronics supplied by the vessels include color video fish finders, recording depth profilers, and trawl warp measuring systems.

Fishing Gear

All vessels used standard RACE Division Poly Nor'Eastern four-seam bottom trawls with 24.2 m roller gear constructed with 36 cm rubber bobbins separated by 10 cm rubber disks. The fishing dimensions of the trawls during fishing operations were monitored and recorded using Marport® acoustic net mensuration equipment mounted on the wing-tips and headrope of the trawl. Each trawl and associated rigging was measured and certified as conforming to standard measurements similar to those called for in Stauffer (2004).

Survey Design

The 2015 biennial survey was designed based upon stratified random sampling consistent with previous GOA surveys (von Szalay et al. 2008, 2010; Britt and Martin 2000; Martin and Clausen 1995; Stark and Clausen 1995; Munro and Hoff 1995). The survey area was divided into 59 strata defined by water depth, bottom terrain (e.g., shelf, gully, and slope), and INPFC statistical area (Appendix A). As in previous surveys, the number of stations per stratum was determined from a modified Neyman optimal allocation strategy (Cochran 1977). Catch rates, stratum variances, and stratum areas from the 1990-2013 surveys were used to allocate sampling effort among strata for each of the principal groundfish species for each previous survey year using the estimated time to perform a tow in a given stratum as a cost variable, since observations in deeper strata have a greater probability of unacceptable gear performance. A mean sample size was estimated for each species across years and then a weighted mean of the estimated sample sizes was calculated using each species' mean biomass multiplied by its ex-

vessel value as the weighting variable. These were rounded to whole numbers representing the number of stations allocated to each stratum with an additional constraint that each stratum was required to have at least two samples.

Within each stratum, the allocated stations were randomly selected without replacement from polygons formed from the intersection of a grid composed of cells 5×5 km cells and the stratum boundaries. Since many of the polygons formed by this process are less than 25 km^2, the probability of selection was directly related to each polygon's area. Small polygons (< 5 km^2 in area) were excluded from the pool available for assignment since a vessel would be unable to perform a valid tow within such a small area. To maximize efficient use of survey time and optimize fuel consumption, assignment of tows to vessels was non-random in the Central GOA where the shelf is nearly 200 km wide in places. In general, the *Cape Flattery* was assigned to sample the outer shelf and slope stations, and was the only vessel to sample stations in the 701-1,000 m depth interval, the *Alaska Provider* the middle shelf stations, and the *Sea Storm* the nearshore stations. However, tows in the shelf strata between Kodiak Island and Cook Inlet were randomly assigned between the *Alaska Provider* and the *Cape Flattery* to minimize an otherwise blatant vessel effect resulting from two big clusters of stations assigned to only one vessel each.

We initially allocated 825 stations among the 59 survey strata, but subsequently dropped 25 of these in a random manner from the shallowest strata (depths less than 100 m) to accommodate a special project to measure catchability. Furthermore, as it became clear during the third leg that the survey was running behind schedule, a decision was made to drop additional stations in a manner that would expedite efficiency and maximize the total number of stations completed by the end of the survey. This entailed dropping relatively isolated stations that would

require an undue amount of vessel running time. Because of the relatively small number of stations assigned to the deeper strata in the Southeastern region, a priority was made to complete all of those. A total of 26 stations were eliminated in this manner, the vast majority (20) of which were in the Yakutat region. Only one station was successfully completed in the 701-1,000 m depth stratum in the Yakutat region.

Geographic center points of the assigned station polygon were considered to define the location of the station. Vessels were assigned stations, and skippers were directed to thoroughly search each area using echosounder returns to locate sufficient trawlable bottom to perform a successful 15-minute tow, preferably through the center point. If trawlable bottom could not be found in the immediate area of the assigned point, a suitable location within the station polygon was sought. If, in the judgment of the Field Party Chief and Captain, no trawlable grounds could be found in the polygon within 2 hours, a nearby alternate station was selected from successful tows completed during previous GOA surveys. If sufficient trawlable bottom was encountered while transiting to the alternate site, this location was instead selected for the sample.

Data Collection Techniques

The protocols used by the AFSC's RACE Division for conducting bottom trawl surveys have been standardized (Stauffer 2004). Criteria for a successful tow include maintaining a continuous vessel speed of 3 knots (5.56 m/sec) while keeping the net in contact with the bottom and in fishing configuration for 15 minutes. Occasionally, tows of shorter duration were necessary to avoid obstacles (and, hence, net damage) or when net configuration (e.g., reduced wing spread) indicated that an exceptionally large catch was affecting the performance of the

trawl. NOAA Fisheries-supplied GPS receivers recorded trawling position, time, and trackline position. Water temperature profiles were recorded every 1 to 4 seconds during most tows using a Seabird® SBE-39 bathythermograph placed on the headrope of the net. 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. The vertical and horizontal net openings were monitored with Marport net mensuration equipment. To ensure that the Marport sensors were calibrated correctly, a 12 m long restrictor cable was attached to the wing tips of the net on each vessel prior to the official start of the survey, and the Marport readings were carefully monitored for any substantial deviations from 12 m. To minimize fishing power differences between the survey vessels, standardized trawling and gear handling methods were practiced including the use of scope ratio relationships (trawl warp relative to bottom depth) and maintaining a 3-knot trawling speed.

A trawl sample was considered successful if horizontal and vertical net openings remained within established tolerances, the roller gear maintained consistent contact with the bottom, the net suffered little or no damage during the tow, and there were no conflicts with derelict fishing gear. Trawl samples were considered unsuccessful when the Field Party Chief judged that the catch was affected by trawl damage, an unstable trawl configuration, insufficient bottom contact, or in the event the duration of the tow was less than 10 minutes (except in a few cases).

Collection and Processing of Samples

Numbers and weights of all taxa were recorded for each haul. Catches were sorted to species or other appropriate taxonomic levels and then weighed in aggregate using an electronic motion-compensating scale. Catches weighing less than approximately 1,000 kg were emptied directly onto a sorting table, sorted by species, and weighed to the nearest 0.01 kg using a Marel® model M1100 digital scale. Species groups weighing less than about 2 kg were generally weighed to the nearest 2 g on a Marel® model M60 digital scale. Larger catches were processed using several different techniques depending upon the catch size and sea state. Catches greater than 2 metric tons (t) but less than about 5 t were processed by repeatedly filling the sorting table from the codend, sorting, and weighing until the entire catch had been processed or by weighing the entire catch and net with a Measurement System's International Portaweigh® Model 4300 crane scale. Afterwards, the sorting table was filled with a portion of the catch and the excess catch was dumped into a deck bin. The dominant species, usually three or fewer, making up the bulk of the catch were identified. The contents of the deck bin were sorted and the dominant species were discarded. The remaining species were retained, sorted, and weighed with those from the table. Total weight estimates for the dominant species were calculated by expanding their proportion by weight from the sorted sample to the difference between the total catch weight and the total weight of all non-dominant species. Extreme large catches were processed by either measuring the volume in the net or by unloading the net into the deck bin and determining the volume of the catch by measuring the length and width of the bin and taking the average height of the catch. Samples of the catch were then taken from the volume to determine the species composition of primary species and the density of the catch. The density of the catch

was divided into the volume to determine the total catch weight. Minor species were individually collected, counted, and weighed and their total weight was subtracted from the total catch weight. The species composition in weight was then appliesd to the remaining catch weight to estimate the catch weight of each primary species. Pacific halibut were measured and discarded as quickly as possible and their weights were estimated from their lengths.

Additional biological information was collected from species of commercial value, ecological importance, or abundance in the survey area. A random subsample of 100-300 individuals (target subsample size was species-dependent) of each of these species was sorted by sex, and individual lengths were measured using Polycorder (Omnidata®) data loggers with barcode readers and barcoded length strips. When recording fish length, the most common measurement used was fork length (FL), however sharks and skates were measured using total length (TL) and giant grenadier were measured from the tip of the snout to the insertion of the anal fin. Fish that could not be readily sexed were classified as unsexed and measured. Age structures were collected in several ways to meet the needs of stock assessment scientiests. Walleye pollock, sablefish, rex sole, Dover sole, and flathead sole (See Appendix Table B-1 for scientific names of fish species), were randomly selected. Otoliths for Atka mackerel, rock soles, shortspine thornyhead, and Pacific cod were collected from fishes stratified by haul, sex, and length among western, central, and southeasten INPFC regions. Rockfish otolith collections were stratified by area, sex, length, and haul. Every attempt was made to distribute the age specimen collections over the entire survey area. Individuals sampled for age were measured to the nearest 1 cm (FL) and weighed to the nearest 2-5 g (scale accuracy depends on the weight of the specimen) with a Marel® model M60 scale.

Stomach samples for selected species were collected throughout the survey area by biologists from the AFSC's Resource Ecology and Ecosystem Modeling (REEM) Program aboard the FV *Cape Flattery* while stomach contents were scanned aboard the FV *Sea Storm*. Ancillary data and specimens were collected for several other research projects as described previously.

Abundance, Length Composition, and Length-Weight Relations

Biomass estimates were calculated using the area-swept method (Alverson and Pereyra 1969). The area swept was calculated as the product of estimated distance towed and the estimated mean net spread for each tow. The distance towed was assumed to be represented by the distance traveled over ground by the vessel between the time when the footrope came into contact with the bottom (on-bottom) and the time when the center of the footrope left the bottom (off-bottom). The distance traveled by the vessel was estimated by smoothing the GPS location data and measuring the distance along this line. The mean net spread was estimated by averaging the smoothed net spread readings from the Marport® units between on-bottom and off-bottom positions. Net spreads for tows with insufficient Marport data were estimated by a stepwise generalized additive model using net number, net height (when available), mean speed over ground (when available), depth, total catch and the actual scope/expected scope ratio as variables. For each species, catch-per unit effort (CPUE) was calculated as catch weight (kg) per area swept by the trawl in hectares (ha). Mean CPUE was calculated, including zero catches, within each stratum. Mean CPUE values of combined strata were calculated as the weighted average of the component strata CPUE means weighted by stratum area. Biomass estimates were

calculated by multiplying each stratum mean CPUE by the stratum area and summing the results to obtain estimates by INPFC statistical areas and depth intervals. The 95% confidence interval was calculated for each species biomass estimate by calculating the simple standard erorrs and multiplying by 2. A detailed description of the analytical procedures is presented in Wakabayashi et al. (1985).

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

Individual length and weight measurements were used to establish length-weight relationships. The length-weight allometric relationship was expressed as:

$$W = a \times L^b,$$

where W is weight (grams), L is length (mm), and a and b are the fitted parameters from a non-linear least squares regression (See above for length definition). Parameters for the most common species are listed in Appendix C.

Survey Limitations

The primary purpose of this survey is to support management of a large number of fish and benthic invertebrate species, including various functional groups of fishes: flatfishes, roundfishes, and rockfishes. The different functional groups have expected 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, which are used to tune stock assessment models, are also used to monitor population trends and status. Gear deployment is standardized and intentionally not modified over time to ensure the methodological consistency and statistical continuity of the time series necessary to reliably monitor the status of fish stocks and forecast trends.

RESULTS

A total of 800 stations were originally assigned, 836 tows were attempted, but only 772 (92%) were successfully completed and included in the biomass and length composition analyses (Table 1). Headrope depth and temperature measurements were successfully collected for 834 attempted tows (>99%). Bottom temperatures ranged from 0.0° to 12.2° C. Sea surface temperatures ranged from 5.2° to 16.4° C. Average net spread for successfully completed tows ranged from 11.3 to 20.3 m. Average net heights ranged from 4.2 to 8.8 m.

Table 1. -- Number of stations allocated, attempted, and successfully completed, and sampling density for the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth range (m)	Stations Allocated	Stations Attempted	Stations Successful	Area (km^2)	Sampling Density (stations/1000 km^2)
Shumagin	1 - 100	107	115	107	41,289	2.59
	101 - 200	50	53	50	14,677	3.41
	201 - 300	23	23	21	2,788	7.53
	301 - 500	6	6	6	2,531	2.37
	501 - 700	3	5	3	2,006	1.50
	701 - 1000	2	2	2	1,937	-
	All depths	**191**	**204**	**189**	**65,228**	**2.90**
Chirikof	1 - 100	59	63	59	26,035	2.27
	101 - 200	86	99	86	23,849	3.61
	201 - 300	21	25	21	11,546	1.82
	301 - 500	6	7	6	1,604	3.74
	501 - 700	4	6	4	1,953	2.05
	701 - 1000	3	3	3	3,066	-
	All depths	**179**	**203**	**179**	**64,987**	**2.75**
Kodiak	1 - 100	87	92	86	38,516	2.23
	101 - 200	129	133	127	43,332	2.93
	201 - 300	28	28	28	11,490	2.44
	301 - 500	8	8	8	2,912	2.75
	501 - 700	3	4	3	1,745	1.72
	701 - 1000	4	6	4	3,494	-
	All depths	**259**	**271**	**256**	**97,995**	**2.61**
Yakutat	1 - 100	22	19	19	16,661	1.14
	101 - 200	39	33	31	29,382	1.06
	201 - 300	25	18	18	5,170	3.48
	301 - 500	10	9	9	2,628	3.42
	501 - 700	2	2	2	1,469	1.36
	701 - 1000	2	1	1	1,887	-
	All depths	**100**	**82**	**80**	**57,197**	**1.40**
Southeastern	1 - 100	10	9	9	6,546	1.37
	101 - 200	28	28	27	11,084	2.44
	201 - 300	18	19	18	5,052	3.56
	301 - 500	10	9	8	3,117	2.57
	501 - 700	3	4	4	1,033	3.87
	701 - 1000	2	3	2	1,206	-
	All depths	**71**	**72**	**68**	**28,038**	**2.43**
All areas	1 - 100	285	298	280	129,047	2.17
	101 - 200	332	346	321	122,324	2.62
	201 - 300	115	113	106	36,046	2.94
	301 - 500	40	39	37	12,792	2.89
	501 - 700	15	21	16	8,206	1.95
	701 - 1000	13	15	12	11,590	-
	All depths	**800**	**832**	**772**	**320,005**	**2.41**

Catch Results by Area

A total of 171 fish species from 40 families was captured during the 2015 survey. Appendix B presents lists of fish (Appendix Table B-1) and invertebrate (Appendix Table B-2) species encountered during the survey. Relative abundance estimates, reported as CPUE, are presented in Table 2 for the 20 most abundant groundfish species in each of the five INPFC areas.

Over the entire survey area, arrowtooth flounder was the most abundant groundfish encountered during the survey (Table 2). Arrowtooth flounder also had the highest CPUE of any species in four of the five INPFC areas (Shumagins being the exception). Pacific ocean perch, walleye pollock, giant grenadier, and Pacific halibut were also very important components of the Gulf-wide species composition.

In the Shumagin INPFC area, walleye pollock had by far the greatest CPUE of any species. Arrowtooth flounder, Pacific ocean perch, giant grenadier, and Pacific cod were also relatively abundant in this area. In the Chirikof, Kodiak, and Southeastern INPFC areas, arrowtooth flounder and Pacific ocean perch dominated all other species in terms of CPUE, and in the Yakutat INPFC area arrowtooth flounder alone was the dominant species.

Table 2. --Mean CPUE (kg/ha) for the 20 most abundant groundfish in each International North Pacific Fisheries Commission area during the 2015 biennial Gulf of Alaska bottom trawl survey.

Shumagin area		Chirikof area		Kodiak area	
Species	CPUE	Species	CPUE	Species	CPUE
walleye pollock	61.9	arrowtooth flounder	41.2	arrowtooth flounder	62.1
arrowtooth flounder	36.5	Pacific ocean perch	41.2	Pacific ocean perch	47.6
Pacific ocean perch	20.0	giant grenadier	15.1	giant grenadier	22.7
giant grenadier	16.6	walleye pollock	14.4	walleye pollock	17.7
Pacific cod	15.8	flathead sole	8.6	Pacific halibut	15.6
flathead sole	10.4	Pacific halibut	8.3	Pacific cod	8.9
Pacific halibut	10.1	Pacific cod	5.3	sablefish	7.2
southern rock sole	9.7	northern rockfish	5.3	eulachon	7.2
northern rock sole	4.1	rex sole	4.5	flathead sole	6.6
Atka mackerel	3.5	southern rock sole	3.6	Pacific sleeper shark	5.7
yellow Irish lord	2.7	eulachon	2.8	southern rock sole	3.2
yellowfin sole	2.5	big skate	2.7	shortspine thornyhead	2.7
rex sole	2.4	shortspine thornyhead	2.6	longnose skate	2.6
shortspine thornyhead	2.1	sablefish	2.2	rex sole	1.8
big skate	2.1	popeye grenadier	2.2	spiny dogfish	1.8
sablefish	1.7	dusky rockfish	1.9	dusky rockfish	1.6
starry flounder	1.0	northern rock sole	1.8	sharpchin rockfish	1.6
northern rockfish	0.9	Pacific sleeper shark	1.7	big skate	1.3
butter sole	0.8	Aleutian skate	1.3	northern rock sole	1.3
Aleutian skate	0.4	Dover sole	1.3	redstripe rockfish	1.2
Number of hauls	189	Number of hauls	179	Number of hauls	256

Yakutat area		Southeastern area		All areas	
Species	CPUE	Species	CPUE	Species	CPUE
arrowtooth flounder	55.5	arrowtooth flounder	68.9	arrowtooth flounder	51.9
giant grenadier	16.6	Pacific ocean perch	54.6	Pacific ocean perch	35.6
Pacific ocean perch	16.4	silvergray rockfish	14.0	walleye pollock	23.3
Pacific herring	7.7	spotted ratfish	12.1	giant grenadier	16.8
sablefish	6.8	walleye pollock	11.4	Pacific halibut	10.7
shortraker rockfish	5.7	Pacific halibut	10.6	Pacific cod	7.9
spiny dogfish	5.7	sharpchin rockfish	10.0	flathead sole	6.8
walleye pollock	5.7	sablefish	7.4	sablefish	5.0
Pacific halibut	5.4	Pacific hake	6.9	southern rock sole	3.9
flathead sole	3.9	Dover sole	5.3	eulachon	3.4
shortspine thornyhead	3.2	shortraker rockfish	5.2	shortspine thornyhead	2.8
Dover sole	3.1	shortspine thornyhead	4.5	rex sole	2.7
Pacific cod	2.9	Canary rockfish	3.9	shortraker rockfish	2.0
eulachon	2.5	rex sole	3.9	big skate	1.8
big skate	2.2	Pacific cod	2.7	Dover sole	1.7
rex sole	2.0	lingcod	2.3	northern rock sole	1.6
English sole	1.8	southern rock sole	1.7	northern rockfish	1.5
lingcod	1.8	redstripe rockfish	1.4	sharpchin rockfish	1.4
rougheye rockfish	1.3	rougheye rockfish	1.4	silvergray rockfish	1.4
longnose skate	1.0	flathead sole	1.0	longnose skate	1.3
Number of hauls	80	Number of hauls	68	Number of hauls	772

Catch Results by Species

Results for each selected groundfish species are organized as follows:

1. A brief synopsis of the data collected.

2. A summary of the number of trawl hauls attempted, the number of catches containing the species of interest, mean CPUE, estimated biomass with 95% confidence intervals, and mean catch weight by INPFC area and depth.

3. A map of the distribution and relative abundance of the species.

4. Estimated population length composition of the the species.

5. A breakdown of stratum-specific CPUE and biomass estimates (with 95% confidence intervals) for that species.

For other species that were abundant in specific areas (other flatfishes rockfishes, and skates), only items 1, 2, and 5 above are presented.

Naming convention used in this document are based on common scientific usage and the following published resources: Names of Fishes (Page et al. 2013), Names of Decapod Crustaceans (Williams et al., 1989), Names of Mollusks (Turgeon et al., 1998), Names of Cnidaria and Ctenophora (Cairns et al., 2002), and the Integrated Taxonomic Information System (ITIS) database (http://www.itis.usda.gov/). Names used in this document may differ on the basis of the most recent research.

FLATFISHES

Arrowtooth flounder (*Atheresthes stomias*)

Arrowtooth flounder was the most abundant species caught in the 2015 survey (Table 2) and was also the most abundant species in all regions except for the Shumagin region, where it ranked second. Arrowtooth flounder were caught throughout the survey area at all depths less than 700 m (Table 3). The highest densities occurred at depths between 101 and 200 m in all INPFC areas (Fig. 2 and Table 4), and in particular on the Baranof-Chichagof Shelf in the Southeastern INPFC area. Size generally increased with depth, but was relatively constant going from west to east (Fig. 3). The estimated biomass of arrowtooth flounder was 1,659,129 t, and the highest regional biomass was in the Kodiak region. Approximately 76% of the estimated biomass was concentrated in the 101-200 m depth interval (Table 3).

Table 3. -- Number of survey hauls, number of hauls with arrowtooth flounder, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	95	31.26	129,055	83,813	174,298	0.340
	101 - 200	50	48	69.67	102,255	41,849	162,661	0.412
	201 - 300	21	21	18.47	5,148	3,034	7,263	0.819
	301 - 500	6	5	5.66	1,432	0	2,940	1.468
	501 - 700	3	1	0.14	28	0	118	0.813
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	170	36.48	237,919	170,892	304,946	0.375
Chirikof	1 - 100	59	36	8.74	22,749	11,414	34,084	0.495
	101 - 200	86	85	90.27	215,279	156,613	273,945	0.656
	201 - 300	21	21	34.26	39,561	25,522	53,600	0.971
	301 - 500	6	6	19	3,047	705	5,389	0.993
	501 - 700	4	2	0.24	47	0	151	1.117
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	150	41.24	280,683	220,183	341,183	0.671
Kodiak	1 - 100	86	69	20.25	78,000	48,645	107,355	0.616
	101 - 200	127	124	115.78	501,677	298,000	705,354	0.764
	201 - 300	28	28	40.51	46,550	14,573	78,526	0.867
	301 - 500	8	8	12.41	3,615	820	6,409	0.982
	501 - 700	3	2	0.21	37	0	98	0.918
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	231	62.06	629,878	422,653	837,103	0.749
Yakutat	1 - 100	19	19	16.83	28,042	12,867	43,218	0.693
	101 - 200	31	31	89.3	262,365	148,683	376,046	0.826
	201 - 300	18	18	37.05	19,154	0	39,717	0.944
	301 - 500	9	9	23.95	6,293	1,518	11,069	1.177
	501 - 700	2	2	10.61	1,560	0	6,319	1.030
	701 - 1000	1	1	0.45	84	---	---	1.670
	All depths	80	80	55.51	317,497	201,069	433,925	0.824
Southeastern	1 - 100	9	5	0.81	529	0	1,142	0.293
	101 - 200	27	26	164.12	181,911	71,383	292,438	0.811
	201 - 300	18	17	12.39	6,262	0	12,941	0.728
	301 - 500	8	8	13.7	4,270	1,769	6,771	0.979
	501 - 700	4	3	1.74	180	0	532	0.980
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	59	68.89	193,152	82,403	303,901	0.808
All areas	1 - 100	280	224	20.02	258,375	201,984	314,767	0.435
	101 - 200	321	314	103.29	1,263,486	1,003,633	1,523,340	0.712
	201 - 300	106	105	32.37	116,675	81,862	151,487	0.900
	301 - 500	37	36	14.59	18,657	12,835	24,479	1.070
	501 - 700	16	10	2.26	1,852	0	6,647	1.020
	701 - 1000	12	1	0.07	84	84	84	1.670
	All depths	772	690	51.85	1,659,129	1,391,158	1,927,100	0.659

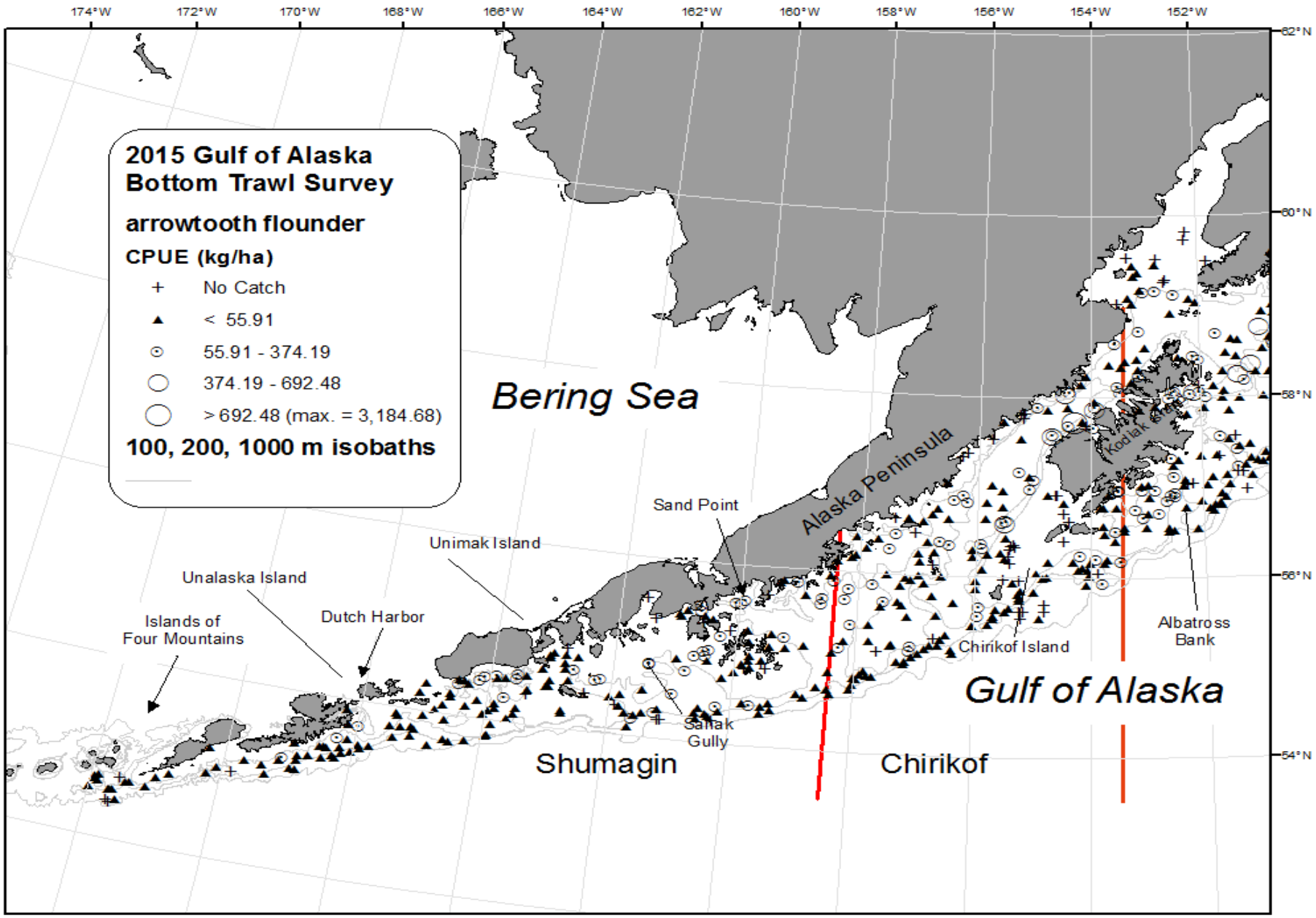

Figure 2. -- Distribution and relative abundance of arrowtooth flounder from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

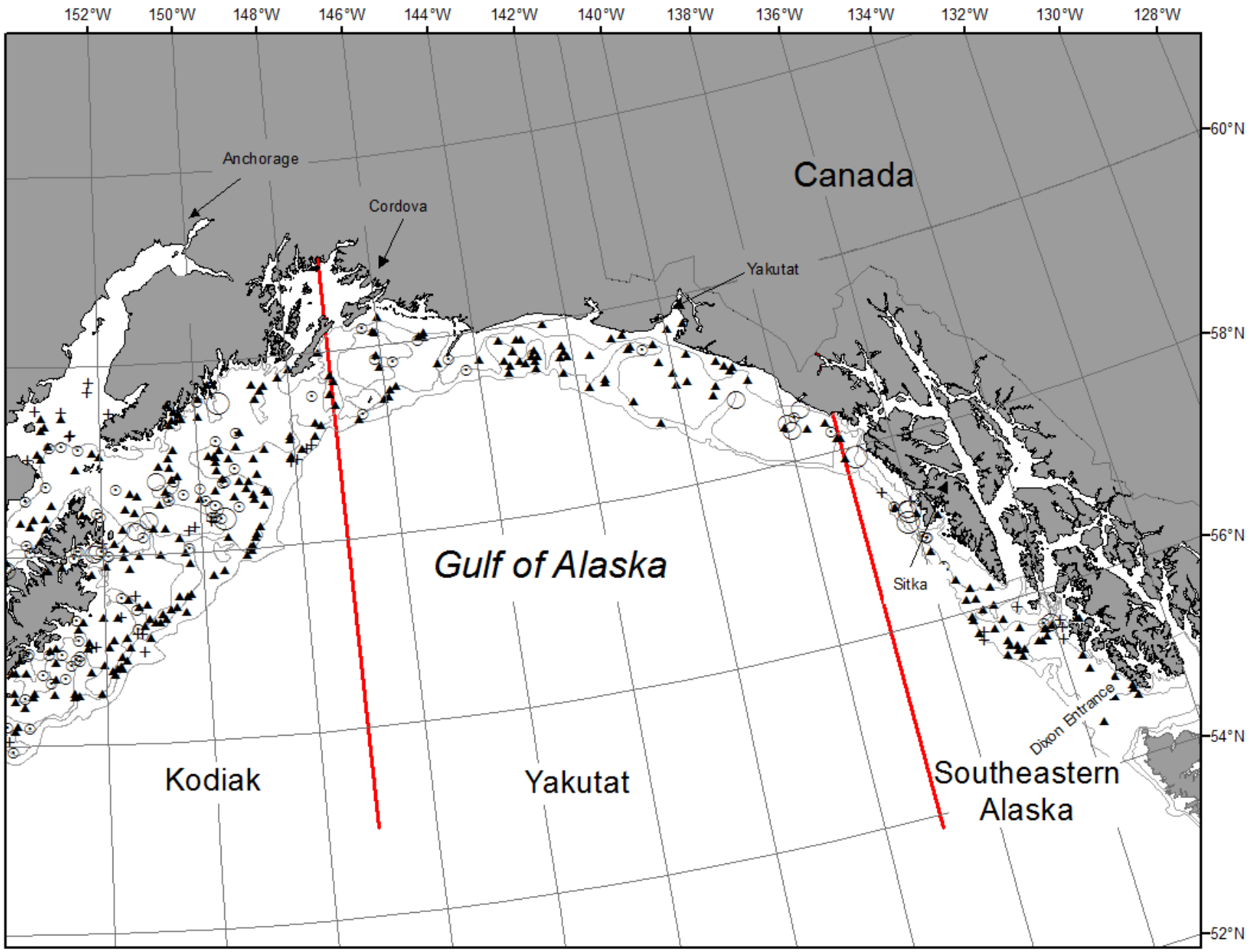

Figure 2. -- Continued (arrowtooth flounder).

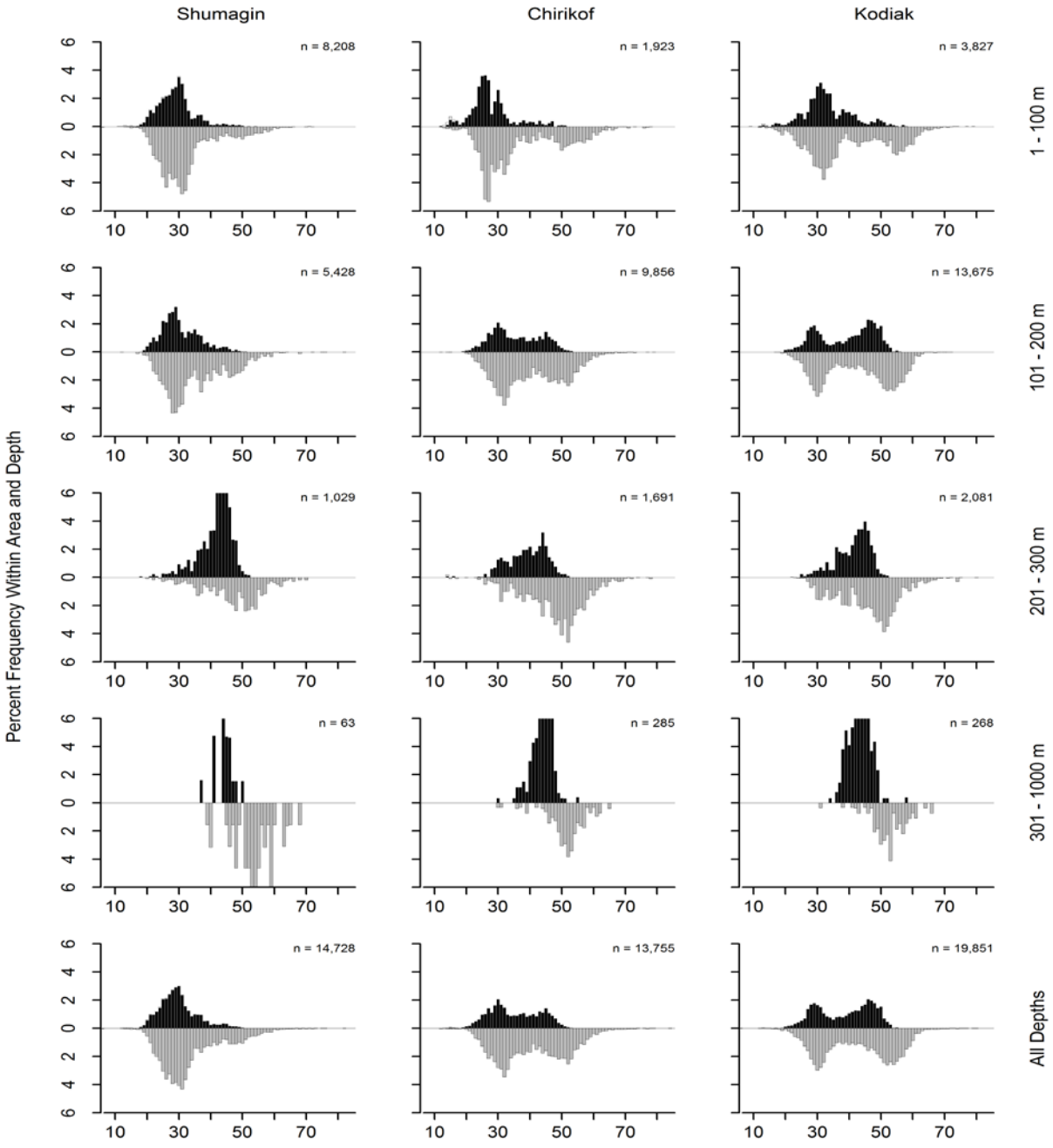

Figure 3. -- Size composition of arrowtooth flounder from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

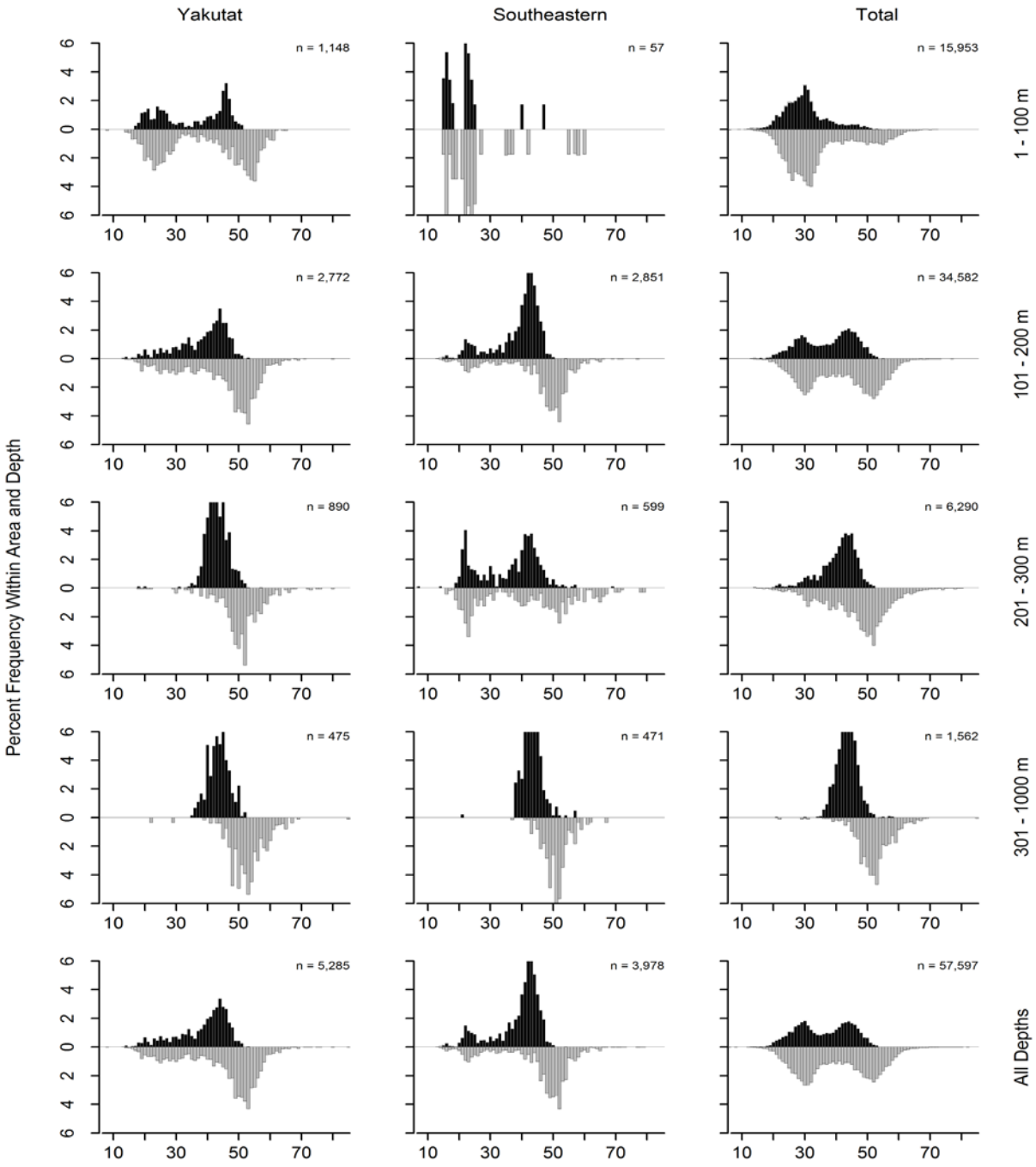

Figure 3. -- Continued (arrowtooth flounder).

Table 4. -- Catch per unit of effort by stratum for arrowtooth flounder sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	11	350.06	146,897	39,782	254,012
Yakutat	101 - 200	Fairweather Shelf	9	9	232.93	180,000	67,681	292,319
Kodiak	101 - 200	Portlock Flats	33	33	212.79	156,112	6,955	305,270
Chirikof	101 - 200	Shelikof Edge	34	34	164.13	126,949	73,137	180,761
Kodiak	101 - 200	Albatross Gullies	29	29	138.86	109,864	70,191	149,537
Shumagin	101 - 200	West Shumagin Gully	4	4	122.58	27,927	10,206	45,648
Shumagin	101 - 200	Sanak Gully	5	5	118.30	50,222	0	111,734
Kodiak	101 - 200	Barren Islands	18	18	98.60	108,274	39,305	177,244
Kodiak	101 - 200	Kenai Flats	15	15	90.93	109,812	0	229,805
Yakutat	101 - 200	Middleton Shelf	6	6	84.29	61,917	11,653	112,182
Kodiak	201 - 300	Upper Shelikof Gully	4	4	72.52	23,265	0	58,694
Kodiak	1 - 100	Albatross Shallows	20	19	71.84	41,423	18,132	64,714
Chirikof	101 - 200	East Shumagin Gully	20	20	67.35	74,789	50,252	99,326
Shumagin	1 - 100	Shumagin Bank	31	26	50.85	63,045	22,192	103,898
Southeastern	101 - 200	Prince of Wales Shelf	16	15	50.84	35,014	0	80,527
Kodiak	1 - 100	Northern Kodiak Shallows	9	8	50.14	11,029	0	27,876
Yakutat	201 - 300	Yakutat Gullies	9	9	46.82	14,246	0	34,951
Southeastern	301 - 500	Southeastern Slope	4	4	38.78	2,997	0	6,264
Yakutat	301 - 500	Yakutat Slope	7	7	38.29	5,823	884	10,761
Chirikof	201 - 300	Lower Shelikof Gully	11	11	35.52	35,586	21,445	49,727
Kodiak	101 - 200	Kodiak Outer Shelf	32	29	35.05	17,615	4,655	30,574
Yakutat	1 - 100	Middleton Shallows	9	9	32.16	21,590	6,038	37,143
Shumagin	101 - 200	Shumagin Outer Shelf	41	39	29.57	24,106	13,036	35,176
Shumagin	1 - 100	Davidson Bank	44	41	29.52	40,382	25,429	55,335
Kodiak	201 - 300	Kodiak Slope	8	8	28.66	4,651	2,343	6,958
Kodiak	201 - 300	Kenai Gullies	16	16	27.98	18,634	12,697	24,570
Chirikof	101 - 200	Chirikof Outer Shelf	32	31	27.03	13,542	6,848	20,235
Chirikof	201 - 300	Chirikof Slope	10	10	26.01	3,975	2,542	5,408
Yakutat	201 - 300	Yakutat Slope	9	9	23.07	4,907	1,619	8,195
Kodiak	1 - 100	Kenai Peninsula	9	9	20.36	10,707	2,459	18,954
Shumagin	1 - 100	Lower Alaska Peninsula	19	15	19.69	13,541	3,988	23,095
Chirikof	301 - 500	Chirikof Slope	6	6	19.00	3,047	586	5,508
Shumagin	201 - 300	Shumagin Slope	21	21	18.47	5,148	3,028	7,269
Yakutat	101 - 200	Yakataga Shelf	8	8	16.23	8,566	6,327	10,805
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	15.89	1,788	0	4,609
Chirikof	1 - 100	Upper Alaska Peninsula	17	9	15.68	12,447	2,810	22,084
Shumagin	1 - 100	Fox Islands	13	13	14.51	12,087	1,088	23,087
Yakutat	101 - 200	Yakutat Flats	8	8	13.16	11,881	2,898	20,865
Kodiak	301 - 500	Kodiak Slope	8	8	12.41	3,615	749	6,481
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	14	11.39	4,474	0	10,968
Yakutat	501 - 700	Yakutat Slope	2	2	10.61	1,560	0	15,612
Chirikof	1 - 100	Semidi Bank	16	14	9.16	6,691	1,121	12,262
Kodiak	1 - 100	Albatross Banks	33	26	8.23	12,669	3,013	22,325
Yakutat	1 - 100	Yakutat Shallows	10	10	6.49	6,452	3,210	9,693
Shumagin	301 - 500	Shumagin Slope	6	5	5.66	1,432	0	3,016
Southeastern	301 - 500	Southeastern Deep Gullies	4	4	5.43	1,274	162	2,385
Yakutat	301 - 500	Yakutat Gullies	2	2	4.25	471	0	1,289
Chirikof	1 - 100	Chirikof Bank	26	13	3.35	3,611	0	7,361
Kodiak	1 - 100	Lower Cook Inlet	15	7	2.20	2,172	0	5,928
Southeastern	501 - 700	Southeastern Slope	4	3	1.74	180	0	583
Southeastern	1 - 100	Southeastern Shallows	9	5	0.81	529	0	1,154
Yakutat	701 - 1000	Yakutat Slope	1	1	0.45	84		
Chirikof	501 - 700	Chirikof Slope	4	2	0.24	47	0	166
Kodiak	501 - 700	Kodiak Slope	3	2	0.21	37	0	119
Shumagin	501 - 700	Shumagin Slope	3	1	0.14	28	0	149

Pacific halibut (*Hippoglossus stenolepis*)

Pacific halibut was the fifth most abundant species caught in the 2015 survey (Table 2) and was among the tenth most abundante species in all five INPFC areas. Pacific halibut were caught throughout the survey area at depths less than 500 m (Table 5). The highest densities occurred in the Kodiak region and at depths less than 200 m (Fig. 4 and Table 6). Females were significantly larger than males. Size generally increased with depth, but was relatively constant going from west to east (Fig. 5). The estimated biomass of Pacific halibut was 341,486 t, and the highest regional biomass was in the Kodiak region, where 46% of the estimated biomass was concentrated (Table 5).

Table 5. -- Number of survey hauls, number of hauls with Pacific halibut, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	106	13.52	55,825	44,270	67,380	1.952
	101 - 200	50	40	6.37	9,345	5,041	13,648	3.765
	201 - 300	21	11	2	557	144	969	4.783
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	157	10.08	65,726	53,510	77,943	2.107
Chirikof	1 - 100	59	57	12.14	31,615	25,655	37,575	1.429
	101 - 200	86	77	9	21,453	16,180	26,726	3.245
	201 - 300	21	10	2.84	3,283	1,293	5,272	4.356
	301 - 500	6	1	0.7	111	0	384	5.220
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	145	8.3	56,461	48,442	64,481	1.914
Kodiak	1 - 100	86	81	23.53	90,615	70,844	110,387	2.454
	101 - 200	127	111	14.9	64,586	51,422	77,749	3.879
	201 - 300	28	21	2.76	3,167	1,930	4,405	4.606
	301 - 500	8	1	0.21	62	0	204	4.485
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	214	15.61	158,430	134,967	181,893	2.919
Yakutat	1 - 100	19	18	6.26	10,424	4,266	16,583	3.473
	101 - 200	31	20	5.95	17,487	6,547	28,427	4.100
	201 - 300	18	12	5.05	2,613	1,061	4,164	7.428
	301 - 500	9	5	2.15	565	156	974	6.493
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	55	5.44	31,089	18,888	43,290	4.035
Southeastern	1 - 100	9	8	22.57	14,778	456	29,099	3.160
	101 - 200	27	22	11.86	13,144	4,818	21,470	5.064
	201 - 300	18	8	3.68	1,858	231	3,485	10.447
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	38	10.62	29,780	13,581	45,978	3.997
All areas	1 - 100	280	270	15.75	203,258	176,117	230,398	2.132
	101 - 200	321	270	10.3	126,014	106,548	145,480	3.865
	201 - 300	106	62	3.18	11,477	8,283	14,671	5.499
	301 - 500	37	7	0.58	738	277	1,199	6.045
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	609	10.67	341,486	308,282	374,691	2.624

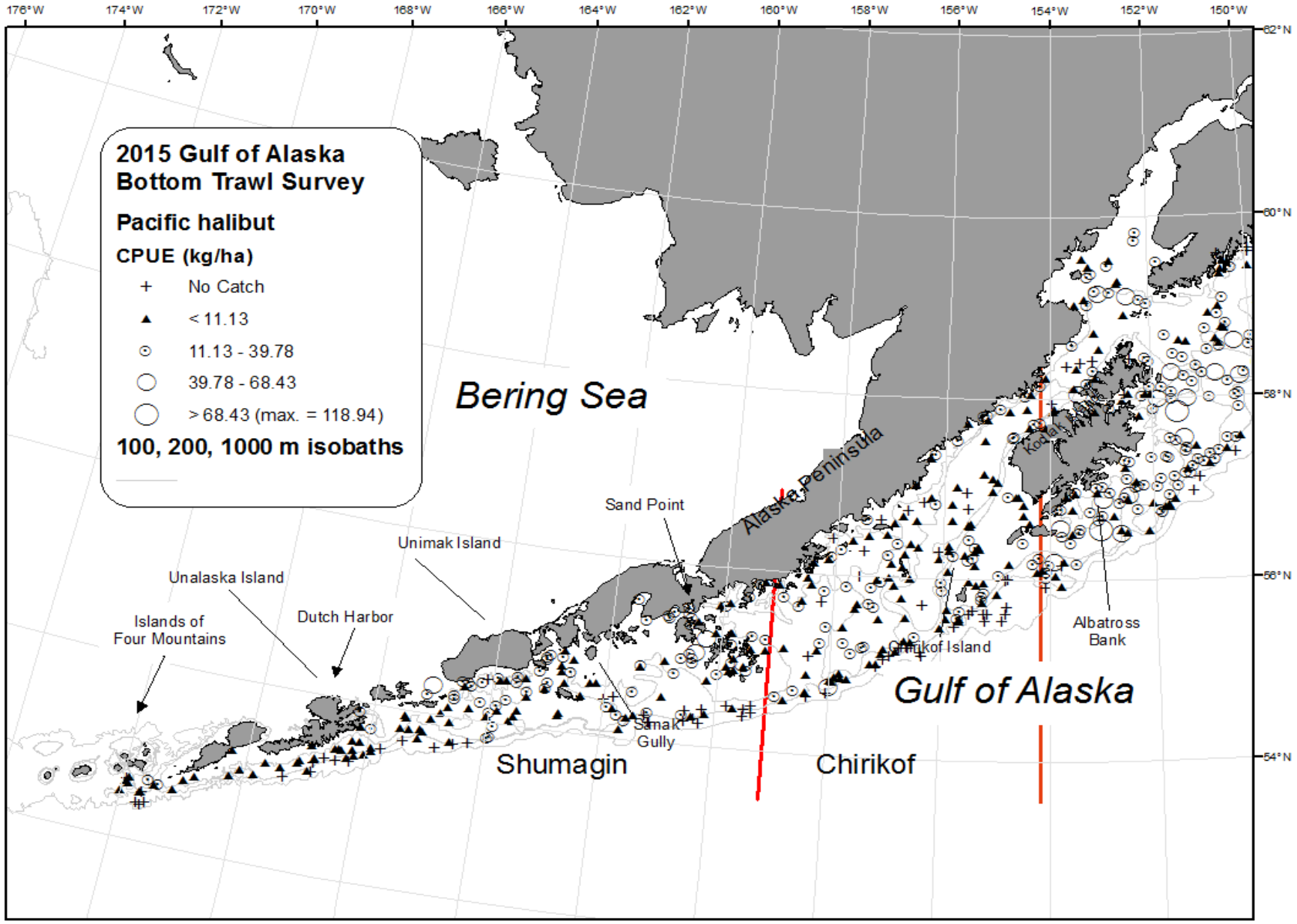

Figure 4. -- Distribution and relative abundance of Pacific halibut from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

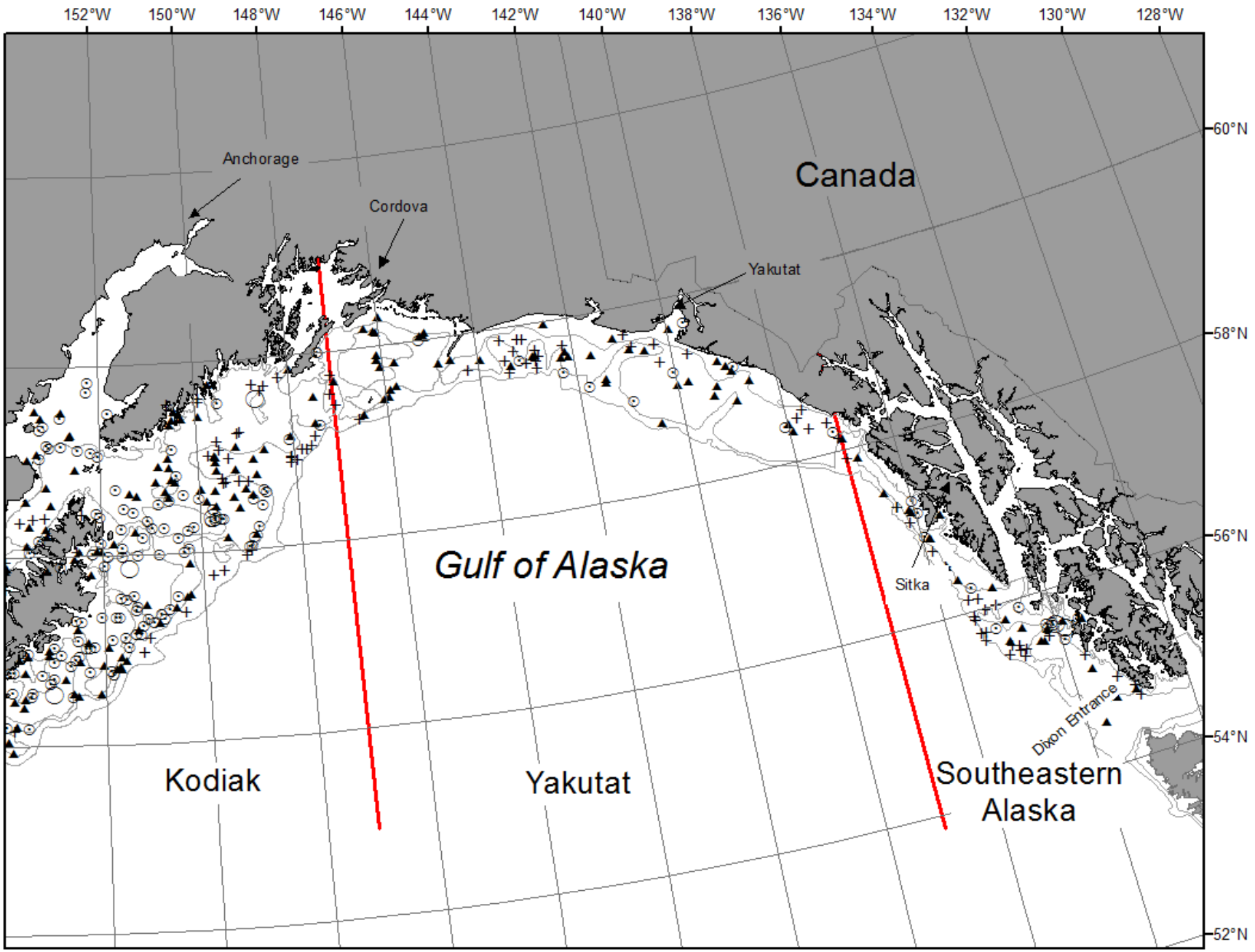

Figure 4. -- Continued (Pacific halibut).

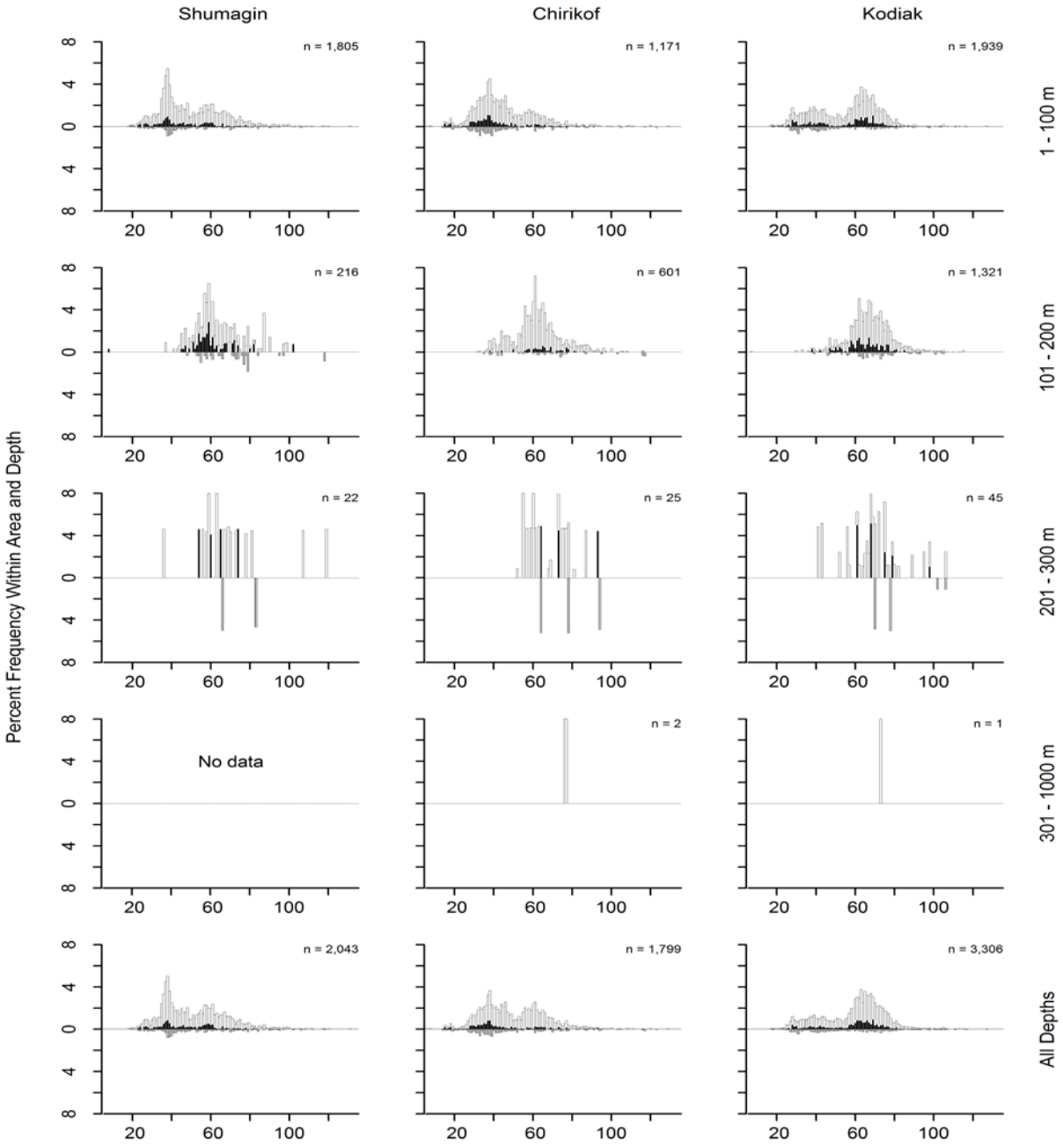

Figure 5. -- Size composition of Pacific halibut from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

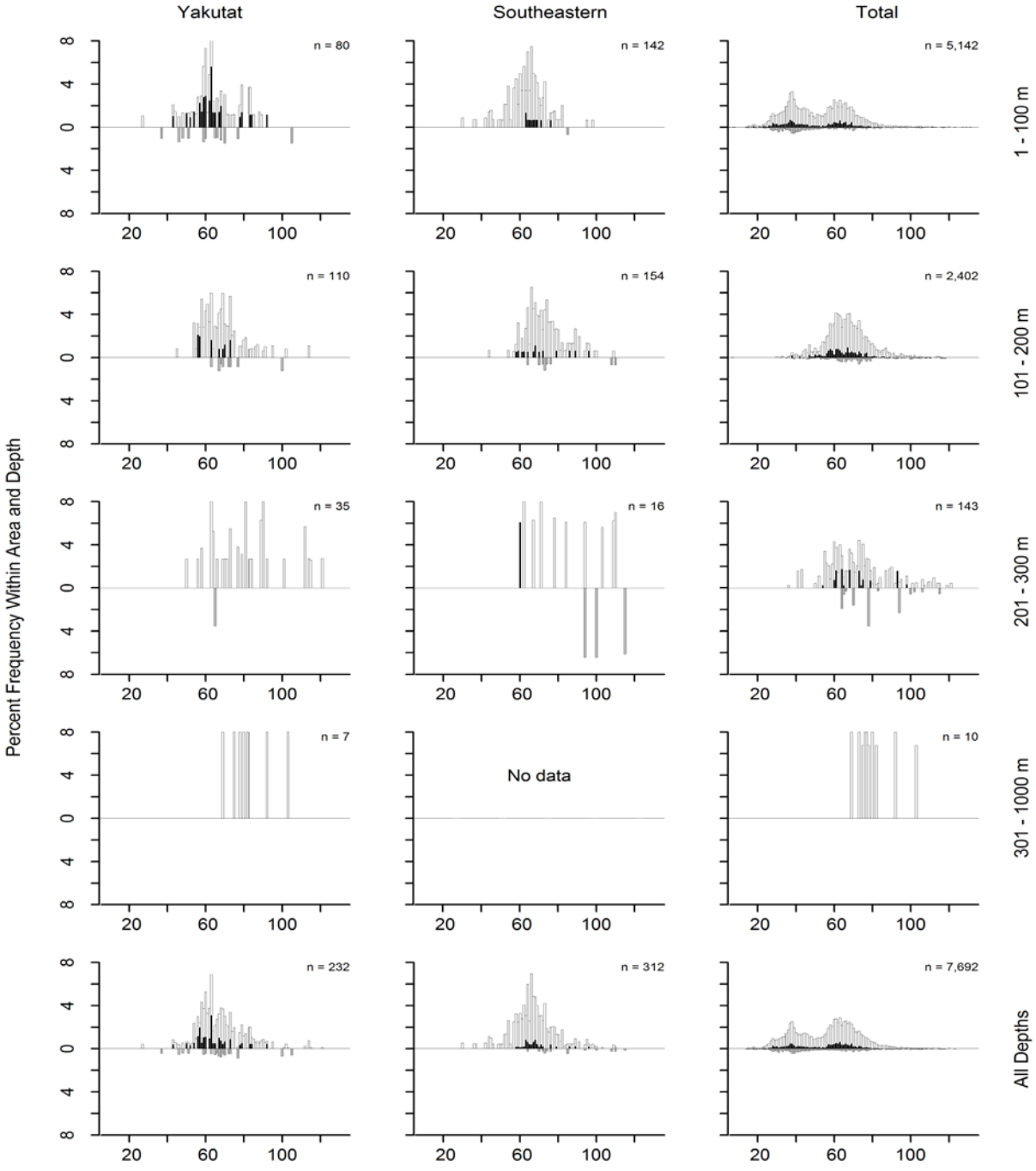

Figure 5. – Continued (Pacific halibut).

Table 6. -- Catch per unit of effort by stratum for Pacific halibut sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	1 - 100	Albatross Banks	33	33	33.87	52,167	39,839	64,495
Southeastern	1 - 100	Southeastern Shallows	9	8	22.57	14,778	178	29,378
Kodiak	1 - 100	Kenai Peninsula	9	7	22.35	11,756	0	27,864
Kodiak	101 - 200	Albatross Gullies	29	29	21.43	16,951	12,924	20,978
Kodiak	101 - 200	Kodiak Outer Shelf	32	32	18.26	9,177	7,357	10,996
Kodiak	1 - 100	Northern Kodiak Shallows	9	8	17.80	3,914	1,171	6,657
Kodiak	101 - 200	Portlock Flats	33	28	17.43	12,784	7,295	18,274
Shumagin	1 - 100	Lower Alaska Peninsula	19	19	17.17	11,806	8,718	14,894
Kodiak	101 - 200	Barren Islands	18	15	15.88	17,439	9,712	25,167
Kodiak	1 - 100	Lower Cook Inlet	15	15	14.60	14,439	8,984	19,894
Kodiak	1 - 100	Albatross Shallows	20	18	14.46	8,339	4,972	11,705
Shumagin	1 - 100	Shumagin Bank	31	31	14.40	17,853	11,257	24,450
Southeastern	101 - 200	Prince of Wales Shelf	16	12	14.40	9,916	1,778	18,054
Shumagin	1 - 100	Fox Islands	13	13	13.12	10,932	1,981	19,883
Chirikof	1 - 100	Semidi Bank	16	15	12.93	9,441	6,010	12,872
Chirikof	1 - 100	Upper Alaska Peninsula	17	16	12.77	10,140	6,309	13,971
Shumagin	101 - 200	West Shumagin Gully	4	4	12.75	2,904	0	7,104
Chirikof	101 - 200	Chirikof Outer Shelf	32	31	11.75	5,888	4,072	7,704
Chirikof	1 - 100	Chirikof Bank	26	26	11.15	12,034	8,562	15,506
Shumagin	1 - 100	Davidson Bank	44	43	11.14	15,234	12,005	18,462
Yakutat	201 - 300	Yakutat Slope	9	9	10.76	2,290	724	3,856
Yakutat	101 - 200	Fairweather Shelf	9	5	10.24	7,913	0	18,108
Chirikof	101 - 200	East Shumagin Gully	20	16	8.46	9,393	4,926	13,861
Yakutat	1 - 100	Yakutat Shallows	10	9	8.15	8,107	1,972	14,243
Chirikof	101 - 200	Shelikof Edge	34	30	7.98	6,172	3,930	8,414
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	10	7.69	3,228	1,015	5,442
Yakutat	101 - 200	Yakutat Flats	8	6	6.90	6,232	825	11,639
Kodiak	101 - 200	Kenai Flats	15	7	6.82	8,234	0	16,883
Kodiak	201 - 300	Kodiak Slope	8	6	5.94	963	151	1,775
Shumagin	101 - 200	Sanak Gully	5	3	5.30	2,248	0	5,568
Shumagin	101 - 200	Shumagin Outer Shelf	41	33	5.14	4,192	2,683	5,702
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	6	4.05	1,589	0	3,181
Yakutat	101 - 200	Middleton Shelf	6	5	3.61	2,649	0	6,667
Yakutat	1 - 100	Middleton Shallows	9	9	3.45	2,317	1,091	3,543
Chirikof	201 - 300	Lower Shelikof Gully	11	8	3.16	3,162	1,156	5,168
Kodiak	201 - 300	Upper Shelikof Gully	4	4	2.66	852	229	1,476
Southeastern	201 - 300	Baranof-Chichagof Slope	4	2	2.39	269	0	902
Yakutat	301 - 500	Yakutat Slope	7	3	2.30	349	0	770
Kodiak	201 - 300	Kenai Gullies	16	11	2.03	1,352	399	2,305
Shumagin	201 - 300	Shumagin Slope	21	11	2.00	557	143	970
Yakutat	301 - 500	Yakutat Gullies	2	2	1.95	216	0	922
Yakutat	101 - 200	Yakataga Shelf	8	4	1.31	693	0	1,457
Yakutat	201 - 300	Yakutat Gullies	9	3	1.06	323	0	757
Chirikof	201 - 300	Chirikof Slope	10	2	0.79	120	0	302
Chirikof	301 - 500	Chirikof Slope	6	1	0.70	111	0	398
Kodiak	301 - 500	Kodiak Slope	8	1	0.21	62	0	207

Flathead sole (*Hippoglossoides elassodon*)

Flathead sole was the seventh most abundant species caught in the 2015 survey (Table 2), and was the fifth most abundant species in the Chirikof area. Although caught throughout the survey area, flathead sole were relatively rare in the Southeastern region and were only caught at depths less than 300 m (Table 7). The highest densities occurred at depths less than 200 m in all INPFC areas (Fig. 6 and Table 8). Size was considerably smaller in the Yakutat and Southeastern regions than in the three western-most regions (Fig. 7). The estimated biomass of flathead sole was 217,763 t, and the highest regional biomass was in the Shumagin region. Ninety-seven percent of the biomass was concentrated in the less than 200 m depth interval (Table 7).

Table 7. -- Number of survey hauls, number of hauls with flathead sole, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	76	12.51	51,636	28,693	74,580	0.292
	101 - 200	50	27	10.9	15,991	4,939	27,043	0.228
	201 - 300	21	7	0.13	37	4	70	0.267
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	110	10.37	67,665	42,937	92,392	0.274
Chirikof	1 - 100	59	31	7.68	19,992	9,993	29,991	0.396
	101 - 200	86	69	14.32	34,157	21,944	46,370	0.295
	201 - 300	21	11	3.87	4,467	1,106	7,829	0.416
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	111	8.61	58,617	42,769	74,464	0.331
Kodiak	1 - 100	86	49	8.34	32,136	21,228	43,044	0.327
	101 - 200	127	81	7.66	33,174	23,029	43,319	0.348
	201 - 300	28	18	1.29	1,488	233	2,742	0.359
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	148	6.58	66,798	52,081	81,514	0.338
Yakutat	1 - 100	19	14	6.93	11,545	6,342	16,747	0.278
	101 - 200	31	15	3.4	9,977	4,662	15,292	0.194
	201 - 300	18	5	0.97	503	0	1,019	0.507
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	34	3.85	22,025	15,122	28,927	0.234
Southeastern	1 - 100	9	3	2.62	1,712	0	4,139	0.286
	101 - 200	27	4	0.86	947	0	2,696	0.718
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	7	0.95	2,659	0	5,562	0.364
All areas	1 - 100	280	173	9.07	117,021	89,670	144,372	0.313
	101 - 200	321	196	7.7	94,246	75,790	112,703	0.282
	201 - 300	106	41	1.8	6,495	2,904	10,086	0.405
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	410	6.8	217,763	184,934	250,591	0.301

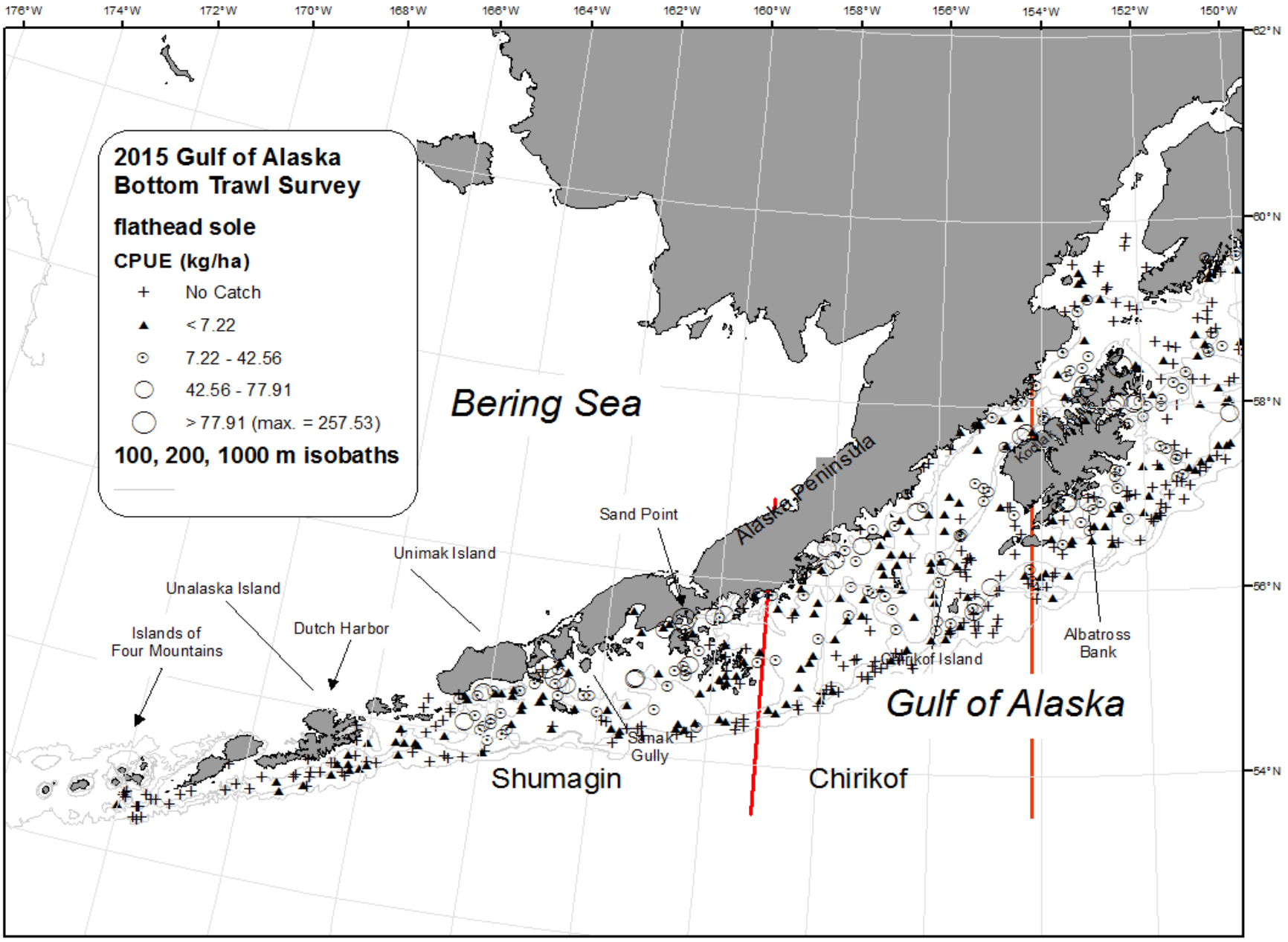

Figure 6. -- Distribution and relative abundance of flathead sole from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

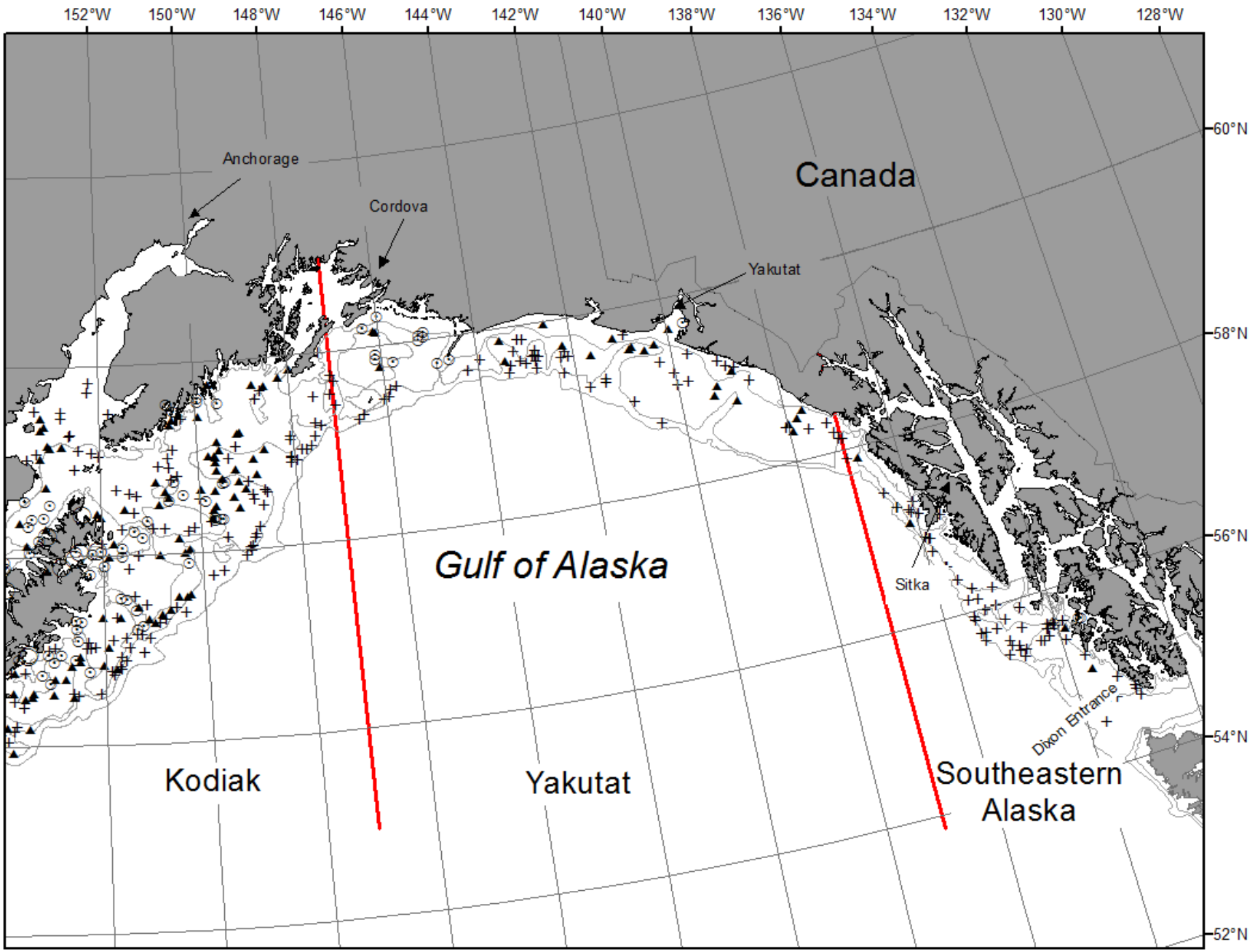

Figure 6. -- Continued (flathead sole).

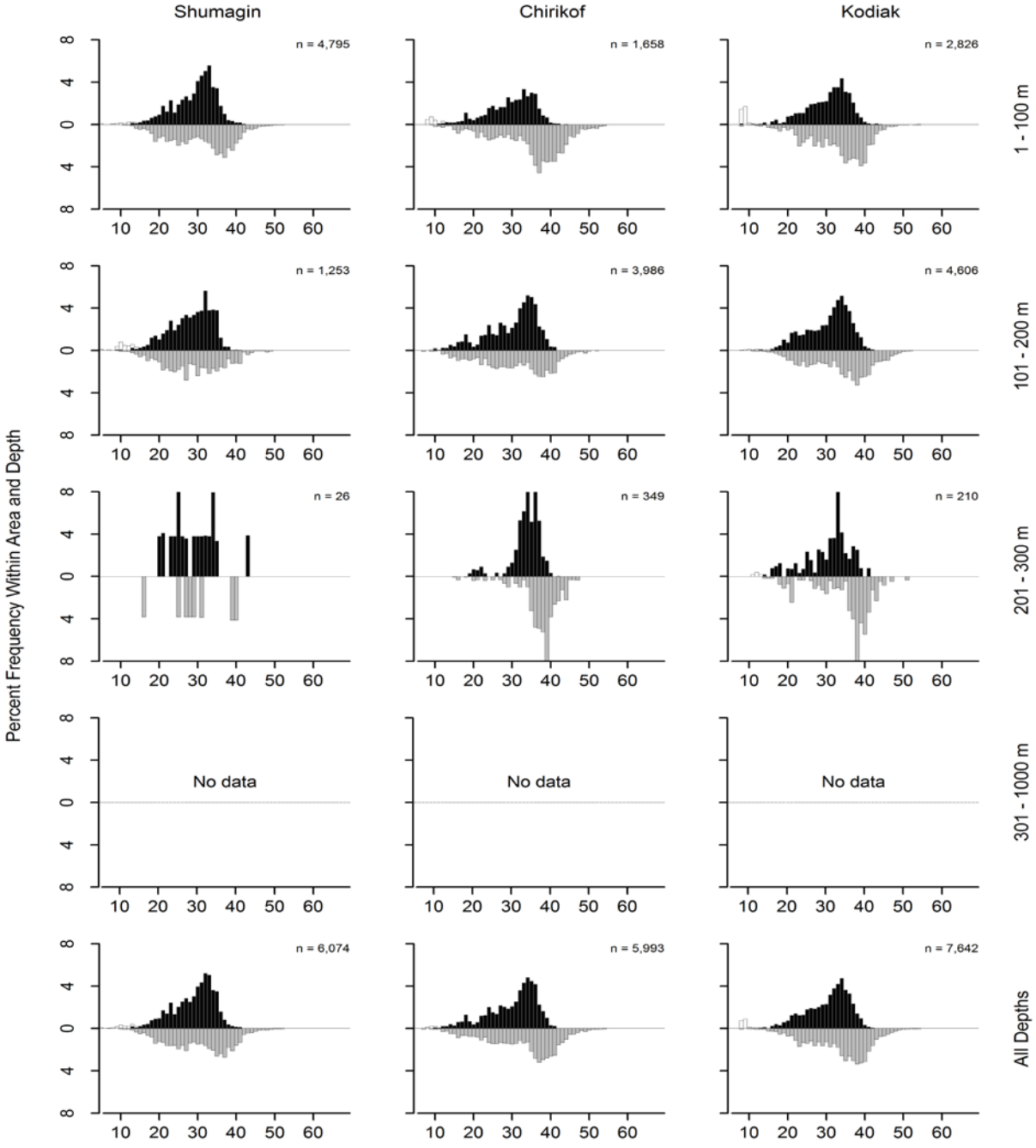

Figure 7. -- Size composition of flathead sole from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

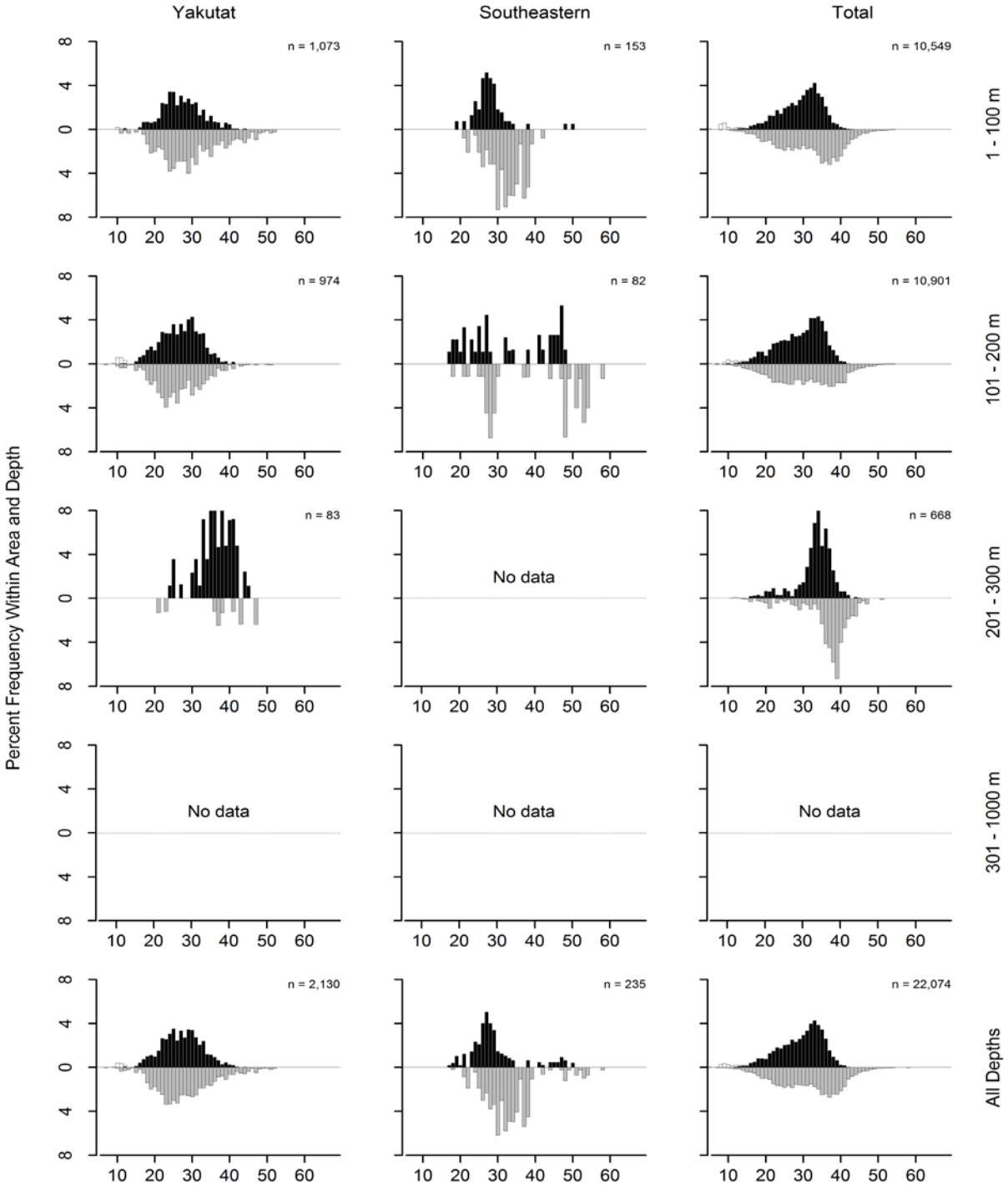

Figure 7. -- Continued (flathead sole).

Table 8. -- Catch per unit of effort by stratum for flathead sole sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Shumagin	1 - 100	Lower Alaska Peninsula	19	16	38.22	26,279	4,526	48,032
Kodiak	1 - 100	Northern Kodiak Shallows	9	9	35.21	7,744	1,406	14,081
Shumagin	101 - 200	West Shumagin Gully	4	4	32.15	7,324	0	15,215
Kodiak	1 - 100	Albatross Shallows	20	14	25.90	14,932	6,262	23,602
Shumagin	101 - 200	Sanak Gully	5	5	18.88	8,013	0	18,470
Kodiak	101 - 200	Albatross Gullies	29	28	18.76	14,846	9,312	20,380
Chirikof	101 - 200	East Shumagin Gully	20	19	17.79	19,756	8,357	31,154
Chirikof	101 - 200	Shelikof Edge	34	34	16.15	12,488	8,433	16,542
Yakutat	1 - 100	Middleton Shallows	9	9	13.33	8,950	3,916	13,984
Yakutat	101 - 200	Middleton Shelf	6	5	11.98	8,798	3,362	14,234
Shumagin	1 - 100	Shumagin Bank	31	23	10.37	12,858	6,073	19,642
Chirikof	1 - 100	Chirikof Bank	26	10	9.78	10,549	1,997	19,101
Shumagin	1 - 100	Davidson Bank	44	34	8.96	12,253	6,549	17,957
Chirikof	1 - 100	Upper Alaska Peninsula	17	12	8.77	6,962	1,614	12,309
Kodiak	1 - 100	Kenai Peninsula	9	6	8.13	4,277	688	7,867
Kodiak	101 - 200	Barren Islands	18	10	7.27	7,988	2,412	13,563
Kodiak	101 - 200	Portlock Flats	33	22	5.93	4,352	1,991	6,713
Chirikof	201 - 300	Lower Shelikof Gully	11	9	4.35	4,357	962	7,751
Kodiak	101 - 200	Kenai Flats	15	10	4.16	5,027	0	11,367
Chirikof	101 - 200	Chirikof Outer Shelf	32	16	3.82	1,914	0	4,029
Chirikof	1 - 100	Semidi Bank	16	9	3.40	2,482	480	4,484
Southeastern	1 - 100	Southeastern Shallows	9	3	2.62	1,712	0	4,186
Yakutat	1 - 100	Yakutat Shallows	10	5	2.61	2,595	60	5,130
Kodiak	1 - 100	Albatross Banks	33	15	2.60	4,010	1,462	6,558
Kodiak	201 - 300	Upper Shelikof Gully	4	4	2.06	661	0	1,965
Kodiak	101 - 200	Kodiak Outer Shelf	32	11	1.91	962	0	2,129
Yakutat	201 - 300	Yakutat Gullies	9	5	1.65	503	0	1,030
Yakutat	101 - 200	Fairweather Shelf	9	5	1.39	1,074	0	2,212
Southeastern	101 - 200	Prince of Wales Shelf	16	2	1.33	913	0	2,670
Kodiak	201 - 300	Kenai Gullies	16	12	1.21	808	0	1,669
Kodiak	1 - 100	Lower Cook Inlet	15	5	1.19	1,173	0	2,593
Shumagin	101 - 200	Shumagin Outer Shelf	41	18	0.80	654	161	1,147
Chirikof	201 - 300	Chirikof Slope	10	2	0.73	111	0	355
Shumagin	1 - 100	Fox Islands	13	3	0.30	247	0	683
Shumagin	201 - 300	Shumagin Slope	21	7	0.13	37	4	70
Kodiak	201 - 300	Kodiak Slope	8	2	0.12	19	0	51
Yakutat	101 - 200	Yakataga Shelf	8	3	0.09	49	0	153
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	2	0.08	34	0	92
Yakutat	101 - 200	Yakutat Flats	8	2	0.06	56	0	156

Southern rock sole (*Lepidopsetta bilineata*)

Southern rock sole was the ninth most abundant species caught in the 2015 survey (Table 2). Although caught throughout the survey area, southern rock sole was rare in the Yakutat region, and was almost exclusively caught in depths less than 200 m (Table 9). The highest densities occurred in the less than 100 m depth interval in all INPFC areas (Fig. 8 and Table 10). Size was relatively constant going from west to east, and the size distribution had two distinct modes in the Kodiak region (Fig. 9). The estimated biomass for southern rock sole was 125,234 t, and the highest regional biomass was in the Shumagin region. Ninety-five percent of the biomass was concentrated in the less than 100 m depth interval (Table 9).

Table 9. -- Number of survey hauls, number of hauls with southern rock sole, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	91	14.92	61,612	48,082	75,141	0.699
	101 - 200	50	24	1.25	1,832	895	2,769	0.785
	201 - 300	21	1	0.02	4	0	13	0.897
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	116	9.73	63,448	49,887	77,009	0.702
Chirikof	1 - 100	59	44	9.01	23,467	14,547	32,388	0.838
	101 - 200	86	13	0.29	690	154	1,225	1.059
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	57	3.55	24,157	15,221	33,093	0.843
Kodiak	1 - 100	86	61	7.65	29,464	20,958	37,969	0.659
	101 - 200	127	30	0.75	3,229	1,035	5,423	0.561
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	91	3.22	32,693	23,922	41,464	0.648
Yakutat	1 - 100	19	2	0.05	89	0	266	0.279
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	2	0.02	89	0	266	0.279
Southeastern	1 - 100	9	7	6.87	4,494	0	10,234	0.337
	101 - 200	27	5	0.32	353	0	733	0.471
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	12	1.73	4,847	0	10,601	0.344
All areas	1 - 100	280	205	9.23	119,126	100,405	137,848	0.683
	101 - 200	321	72	0.5	6,104	3,654	8,553	0.643
	201 - 300	106	1	<0.01	4	0	13	0.897
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	278	3.91	125,234	106,363	144,106	0.681

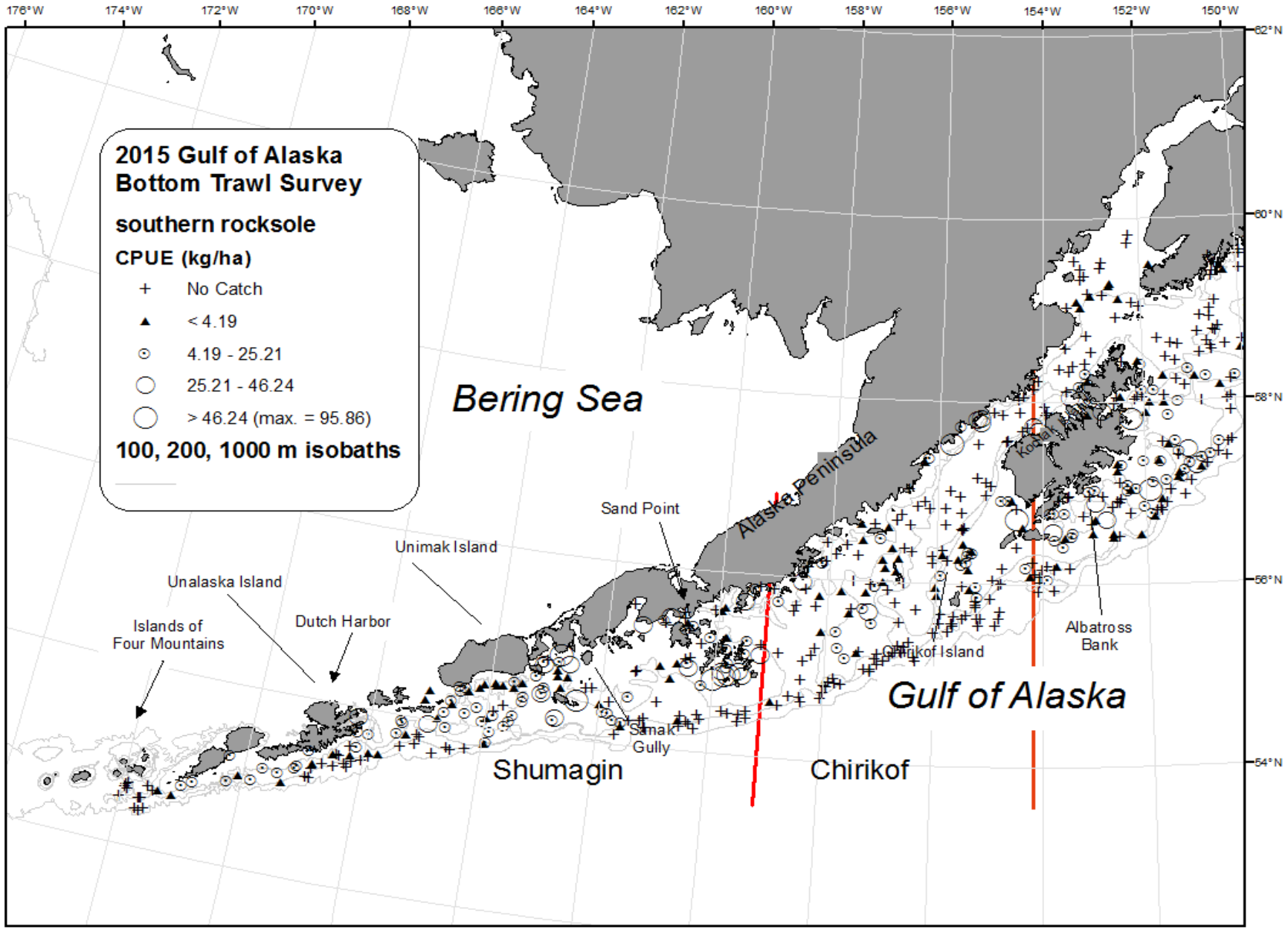

Figure 8. -- Distribution and relative abundance of southern rock sole from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

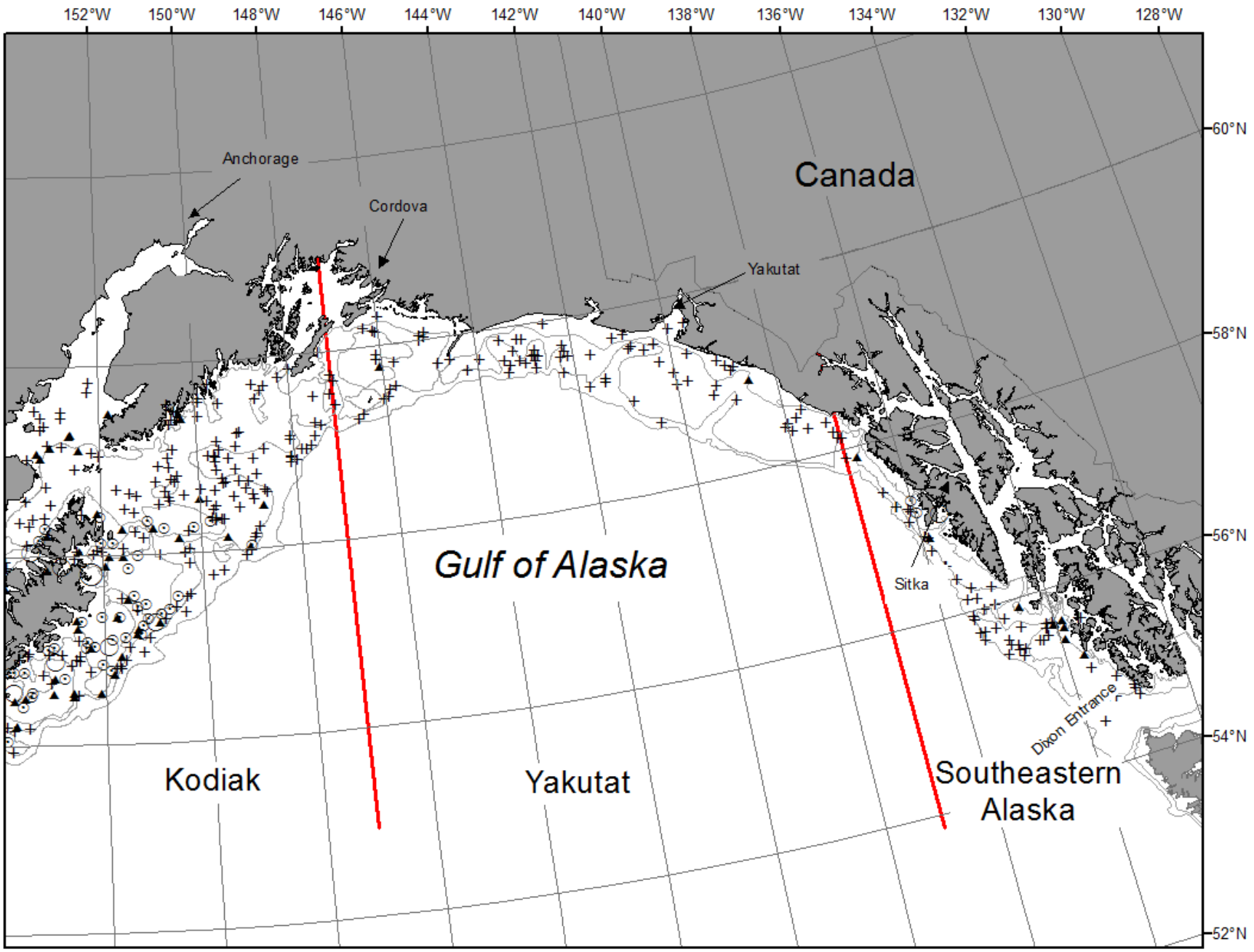

Figure 8. -- Continued (southern rock sole).

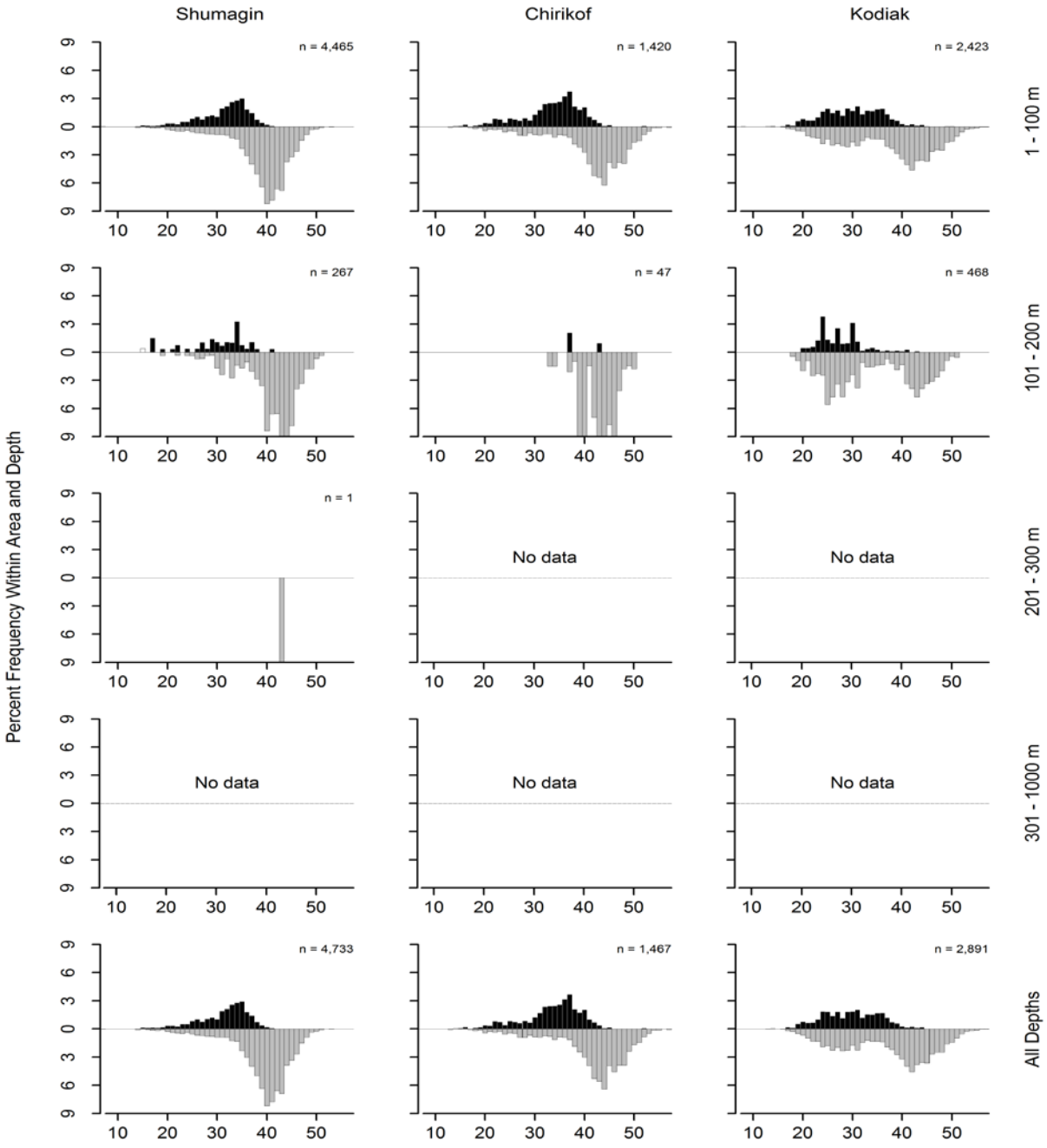

Figure 9. -- Size composition of southern rock sole from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

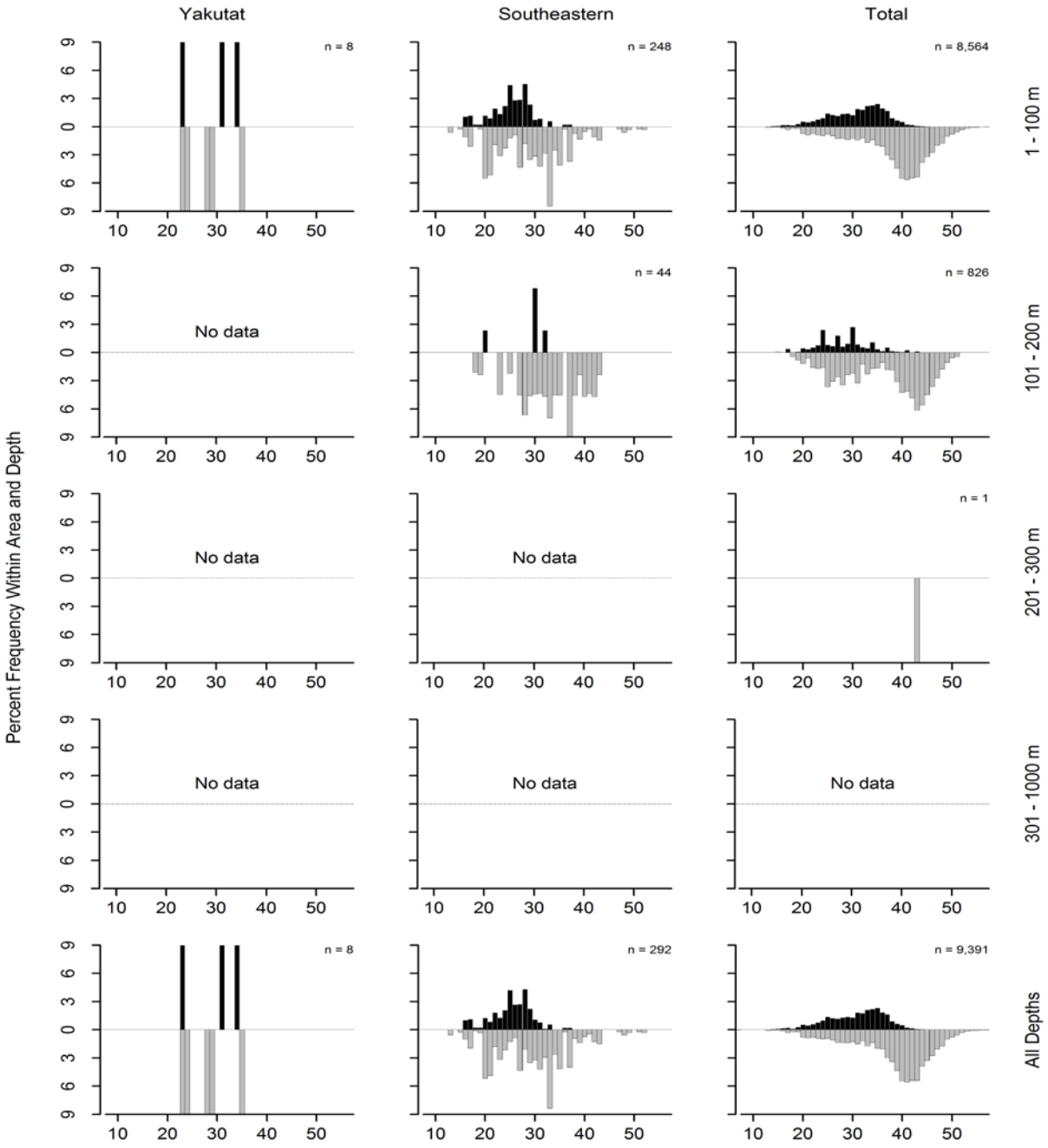

Figure 9. -- Continued (southern rock sole).

Table 10. -- Catch per unit of effort by stratum for southern rock sole sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	1 - 100	Northern Kodiak Shallows	9	9	19.96	4,390	1,662	7,118
Shumagin	1 - 100	Shumagin Bank	31	24	17.66	21,896	11,820	31,971
Shumagin	1 - 100	Lower Alaska Peninsula	19	12	17.38	11,952	5,369	18,536
Shumagin	1 - 100	Fox Islands	13	13	14.11	11,758	7,201	16,316
Chirikof	1 - 100	Upper Alaska Peninsula	17	12	13.17	10,455	4,419	16,491
Kodiak	1 - 100	Albatross Banks	33	32	12.20	18,784	12,465	25,104
Shumagin	1 - 100	Davidson Bank	44	42	11.70	16,006	10,576	21,436
Kodiak	1 - 100	Albatross Shallows	20	14	9.92	5,717	327	11,107
Chirikof	1 - 100	Chirikof Bank	26	19	7.47	8,066	1,944	14,188
Southeastern	1 - 100	Southeastern Shallows	9	7	6.87	4,494	0	10,346
Chirikof	1 - 100	Semidi Bank	16	13	6.77	4,946	1,546	8,346
Kodiak	101 - 200	Kodiak Outer Shelf	32	18	4.40	2,211	600	3,822
Shumagin	101 - 200	Shumagin Outer Shelf	41	19	2.08	1,699	770	2,629
Kodiak	101 - 200	Barren Islands	18	3	0.75	825	0	2,311
Southeastern	101 - 200	Prince of Wales Shelf	16	3	0.44	306	0	684
Kodiak	1 - 100	Kenai Peninsula	9	1	0.40	211	0	696
Chirikof	101 - 200	East Shumagin Gully	20	5	0.38	417	0	893
Kodiak	1 - 100	Lower Cook Inlet	15	5	0.37	362	0	876
Shumagin	101 - 200	West Shumagin Gully	4	2	0.34	78	0	221
Chirikof	101 - 200	Shelikof Edge	34	5	0.22	172	0	357
Chirikof	101 - 200	Chirikof Outer Shelf	32	3	0.20	100	0	270
Kodiak	101 - 200	Albatross Gullies	29	7	0.17	135	7	262
Shumagin	101 - 200	Sanak Gully	5	3	0.13	55	0	151
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	2	0.11	47	0	120
Kodiak	101 - 200	Portlock Flats	33	2	0.08	59	0	154
Yakutat	1 - 100	Yakutat Shallows	10	1	0.08	79	0	256
Yakutat	1 - 100	Middleton Shallows	9	1	0.02	11	0	36
Shumagin	201 - 300	Shumagin Slope	21	1	0.02	4	0	13

Northern rock sole (*Lepidopsetta polyxystra*)

Northern rock sole was the sixteenth most abundant species caught in the 2015 survey area, with the ninth highest mean CPUE in the Shumagin area (Table 2). Northen rock sole were caught almost exclusively in the Shumagin, Chirikof, and Kodiak INPFC areas (Table 11) and were primarily concentrated in depths less than 100 m (Fig. 10 and Table 12). Size was variable for both sexes with no distinct depth or longitudinal trends (Fig. 11). The estimated biomass of northern rock sole was 52, 069 t and the highest regional biomass was in the Shumagin area, where approximately half of the survey-wide biomass was concentrated. More than 99% of the biomass was concentrated in the less than 100 m depth interval (Table 11).

Table 11. -- Number of survey hauls, number of hauls with northern rock sole, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	92	6.43	26,536	17,540	35,532	0.327
	101 - 200	50	16	0.27	392	156	628	0.503
	201 - 300	21	2	0.11	29	0	77	0.886
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	110	4.13	26,958	17,958	35,957	0.329
Chirikof	1 - 100	59	40	4.59	11,955	2,736	21,175	0.450
	101 - 200	86	5	0.09	223	0	591	0.266
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	45	1.79	12,179	2,952	21,405	0.445
Kodiak	1 - 100	86	55	3.28	12,616	4,259	20,974	0.381
	101 - 200	127	11	0.07	313	0	680	0.369
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	66	1.27	12,929	4,564	21,294	0.380
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	0	---	---	---	---	---
Southeastern	1 - 100	9	1	0.01	4	0	12	0.113
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	1	<0.01	4	0	12	0.113
All areas	1 - 100	280	188	3.96	51,111	36,048	66,175	0.363
	101 - 200	321	32	0.08	928	362	1,494	0.377
	201 - 300	106	2	0.01	29	0	77	0.886
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	222	1.63	52,069	36,995	67,143	0.363

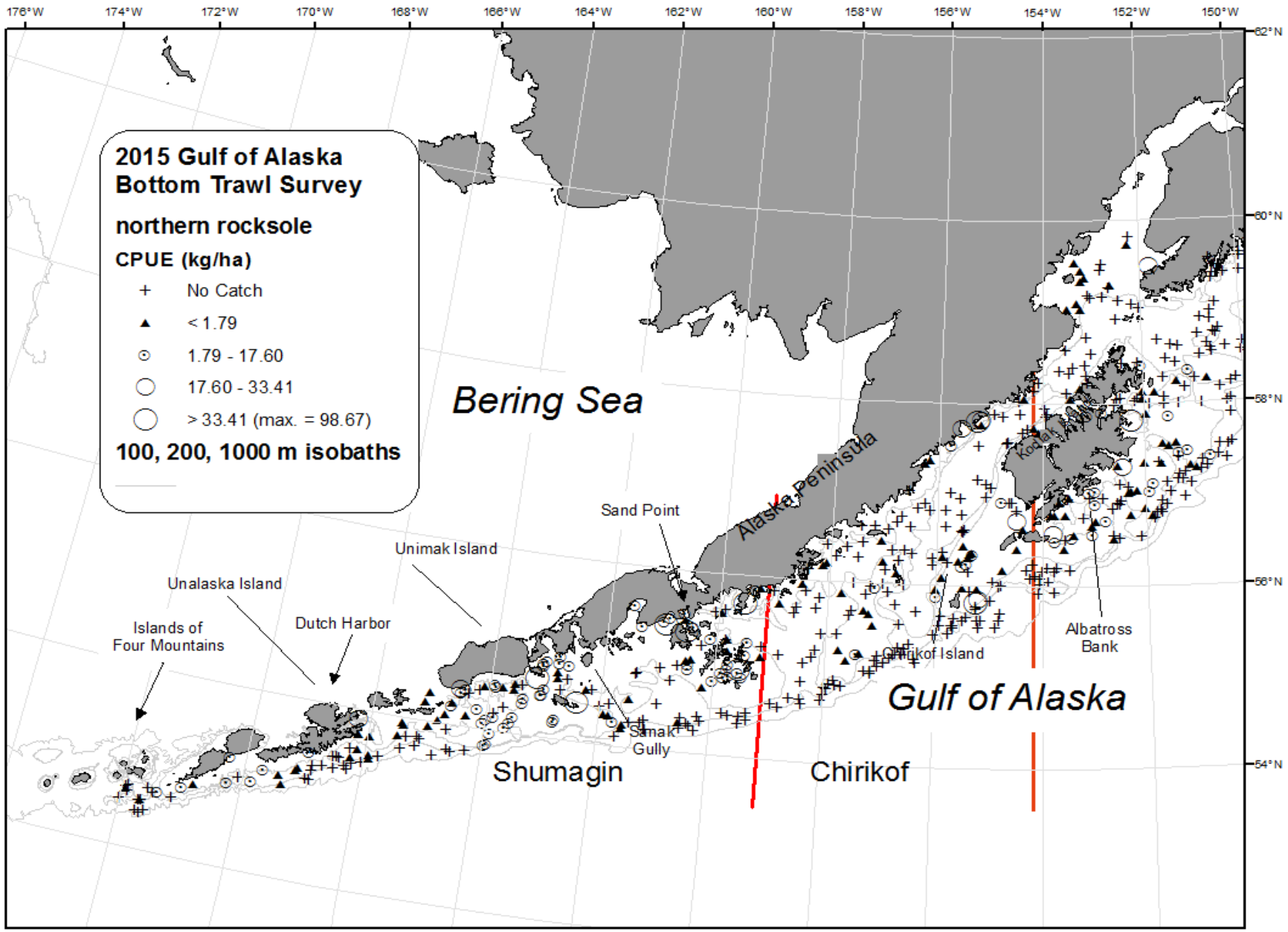

Figure 10. -- Distribution and relative abundance of northern rock sole from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

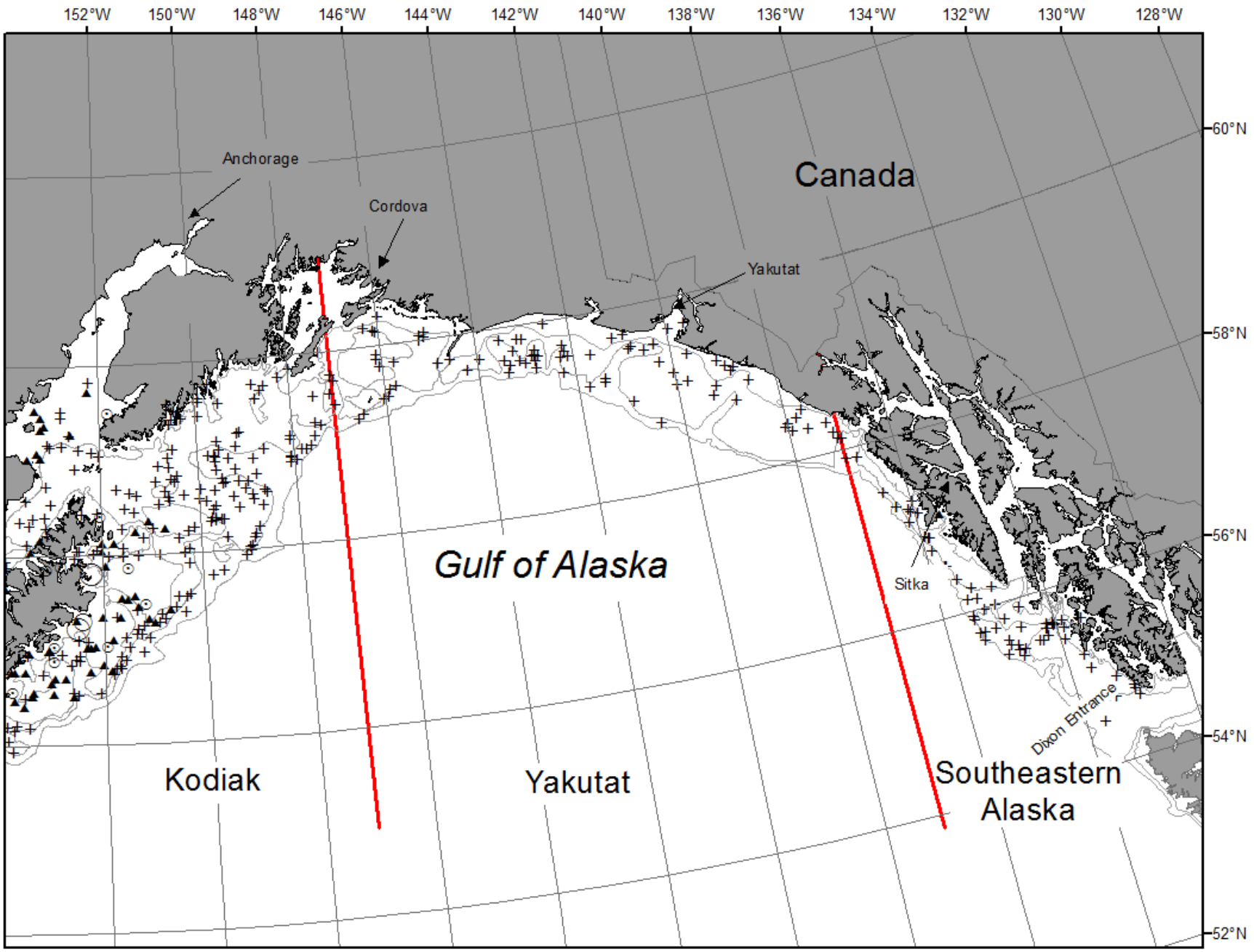

Figure 10. -- Continued (northern rock sole).

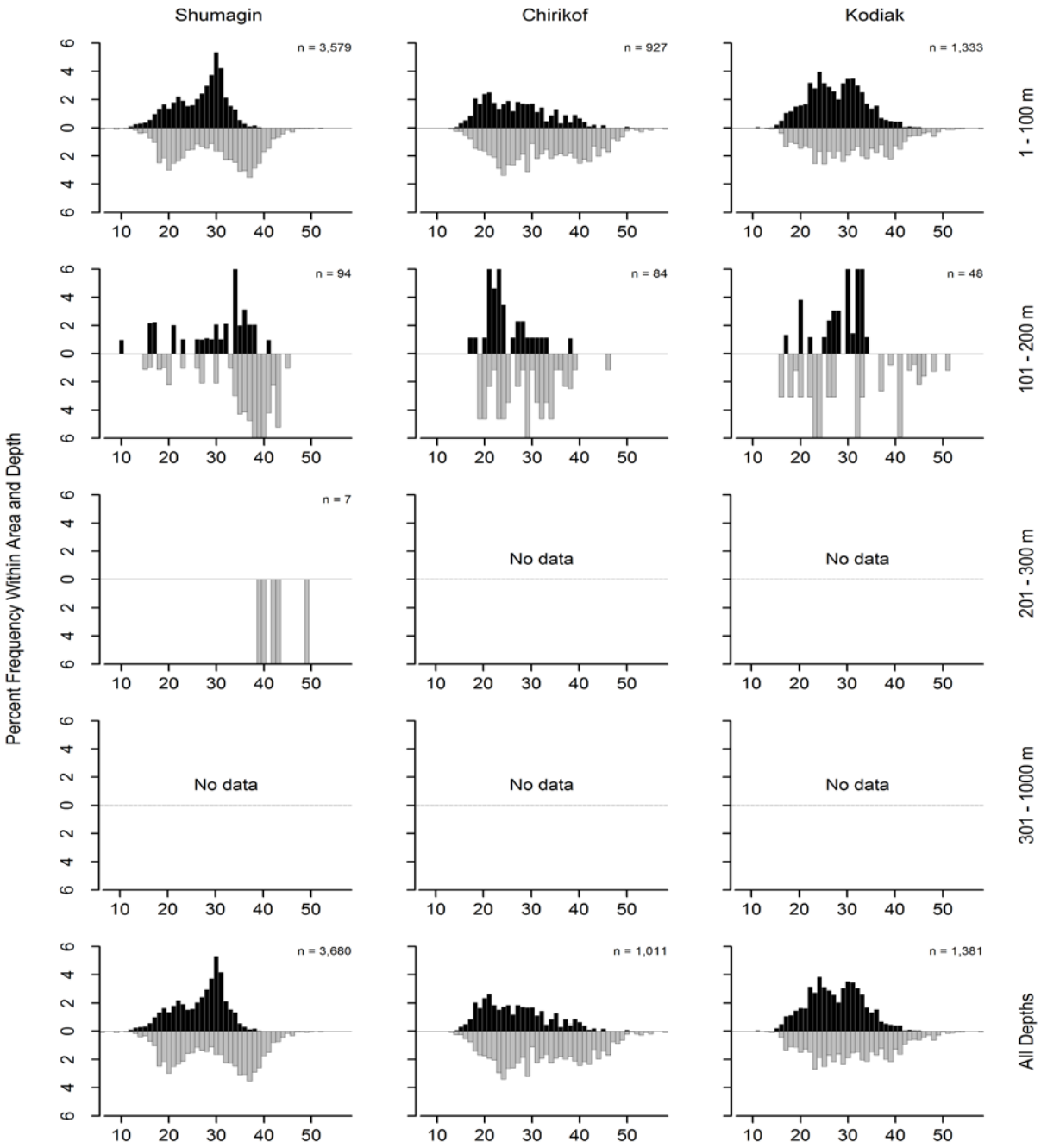

Figure 11. -- Size composition of northern rock sole from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

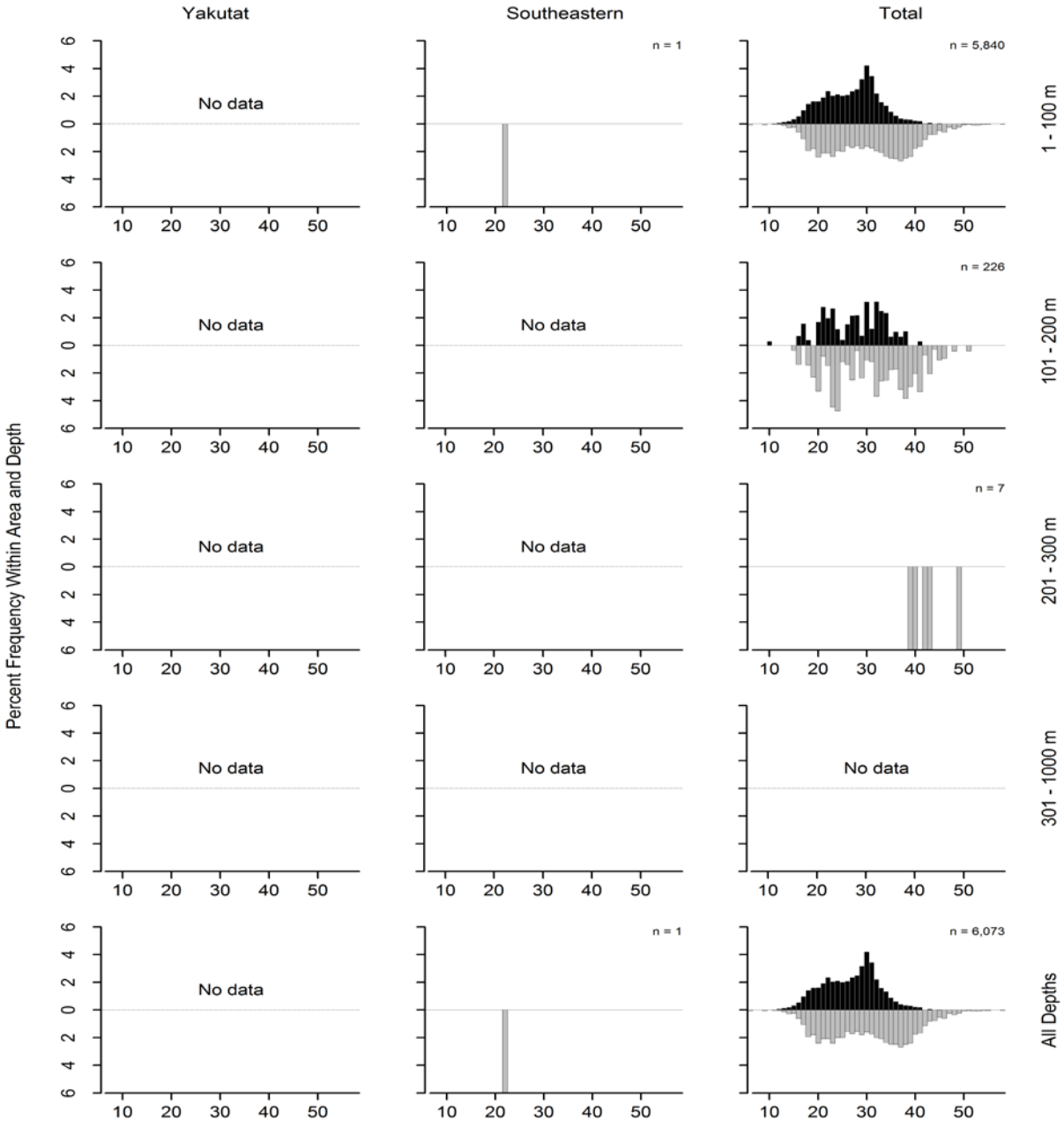

Figure 11. -- Continued (northern rock sole).

Table 12. -- Catch per unit of effort by stratum for northern rock sole sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Shumagin	1 - 100	Lower Alaska Peninsula	19	18	10.24	7,039	3,043	11,035
Kodiak	1 - 100	Albatross Shallows	20	13	9.92	5,722	0	13,034
Chirikof	1 - 100	Upper Alaska Peninsula	17	11	8.52	6,769	0	15,269
Shumagin	1 - 100	Davidson Bank	44	37	6.71	9,182	2,977	15,387
Shumagin	1 - 100	Shumagin Bank	31	24	6.13	7,595	2,794	12,395
Chirikof	1 - 100	Chirikof Bank	26	19	4.43	4,775	613	8,938
Shumagin	1 - 100	Fox Islands	13	13	3.27	2,721	0	5,532
Kodiak	1 - 100	Albatross Banks	33	25	2.93	4,517	814	8,219
Kodiak	1 - 100	Northern Kodiak Shallows	9	7	2.73	601	0	1,517
Kodiak	1 - 100	Lower Cook Inlet	15	10	1.80	1,777	0	4,663
Chirikof	1 - 100	Semidi Bank	16	10	0.56	411	59	763
Shumagin	101 - 200	Shumagin Outer Shelf	41	15	0.47	380	145	615
Chirikof	101 - 200	Shelikof Edge	34	3	0.27	208	0	575
Kodiak	101 - 200	Barren Islands	18	1	0.15	162	0	505
Kodiak	101 - 200	Albatross Gullies	29	8	0.13	102	0	209
Shumagin	201 - 300	Shumagin Slope	21	2	0.11	29	0	77
Kodiak	101 - 200	Kodiak Outer Shelf	32	2	0.10	49	0	134
Shumagin	101 - 200	West Shumagin Gully	4	1	0.05	12	0	51
Chirikof	101 - 200	East Shumagin Gully	20	2	0.01	15	0	42
Southeastern	1 - 100	Southeastern Shallows	9	1	0.01	4	0	13

Rex sole (*Glyptocephalus zachirus*)

Rex sole was the twelfth most abundant species caught in the 2015 survey, and was among the twenty most abundant species in all five INPFC areas (Table 2). Rex sole were caught throughout the survey area in depths less than 700 m (Table 13). The highest concentrations generally occurred in the 101-200 m depth range, but no stratum was dominant in terms of density (Fig. 12 and Table 14). Females were on average somewhat larger than males, and size for both sexes was relatively constant with depth (Fig. 13). The estimated biomass of rex sole was 87,286 t, and the highest regional biomass was in the Chirikof region, where 35% of the estimated biomass was concentrated (Table 13).

Table 13. -- Number of survey hauls, number of hauls with rex sole, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	33	0.69	2,839	1,368	4,309	0.368
	101 - 200	50	43	6.63	9,733	6,060	13,406	0.500
	201 - 300	21	18	11.11	3,096	1,085	5,106	0.546
	301 - 500	6	4	1.06	269	0	568	0.534
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	98	2.44	15,936	11,589	20,284	0.478
Chirikof	1 - 100	59	19	1.47	3,827	762	6,891	0.572
	101 - 200	86	78	8.21	19,574	12,715	26,433	0.431
	201 - 300	21	21	5.84	6,741	0	14,697	0.439
	301 - 500	6	6	2.73	438	0	921	0.361
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	124	4.49	30,580	19,756	41,403	0.445
Kodiak	1 - 100	86	28	0.33	1,263	665	1,861	0.211
	101 - 200	127	92	3.18	13,791	10,095	17,488	0.458
	201 - 300	28	23	2.34	2,690	1,229	4,150	0.315
	301 - 500	8	8	1.61	468	187	748	0.272
	501 - 700	3	2	0.49	85	0	221	0.262
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	153	1.8	18,297	14,289	22,305	0.392
Yakutat	1 - 100	19	17	4.01	6,674	0	15,986	0.233
	101 - 200	31	19	1.03	3,017	555	5,478	0.206
	201 - 300	18	16	2.42	1,252	706	1,798	0.273
	301 - 500	9	9	1.31	346	185	506	0.247
	501 - 700	2	2	1.65	243	0	1,130	0.244
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	63	2.02	11,531	2,104	20,959	0.229
Southeastern	1 - 100	9	4	1.17	763	0	1,909	0.095
	101 - 200	27	24	5.93	6,576	2,964	10,188	0.223
	201 - 300	18	15	3.24	1,638	809	2,466	0.219
	301 - 500	8	7	5.05	1,573	0	3,669	0.255
	501 - 700	4	2	3.8	393	0	1,023	0.309
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	52	3.9	10,942	6,827	15,057	0.208
All areas	1 - 100	280	101	1.19	15,365	5,549	25,181	0.269
	101 - 200	321	256	4.31	52,691	43,237	62,144	0.379
	201 - 300	106	93	4.28	15,416	6,975	23,858	0.370
	301 - 500	37	34	2.42	3,093	867	5,319	0.281
	501 - 700	16	6	0.88	721	0	1,581	0.278
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	490	2.73	87,286	71,836	102,736	0.347

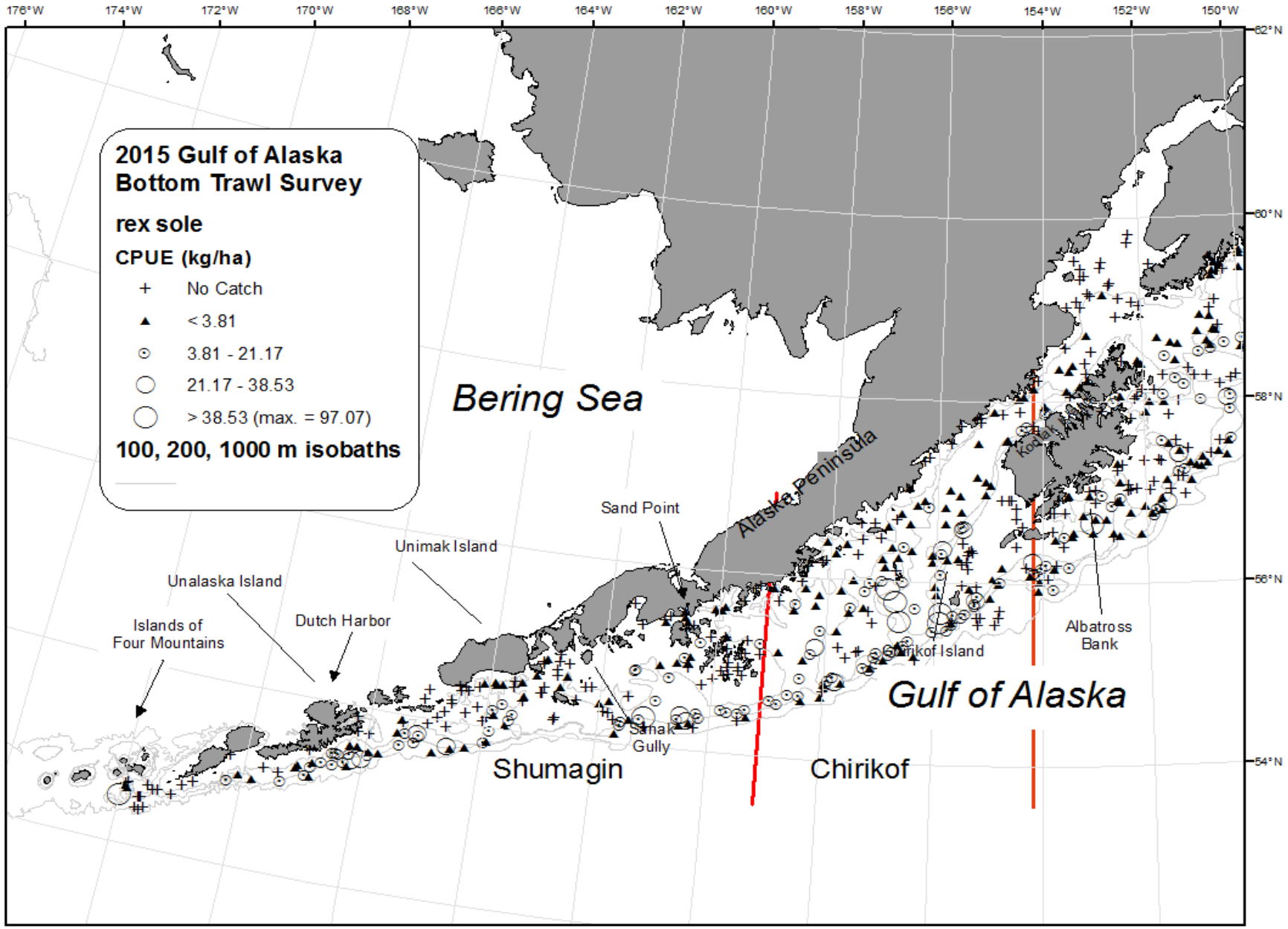

Figure 12. --Distribution and relative abundance of rex sole from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

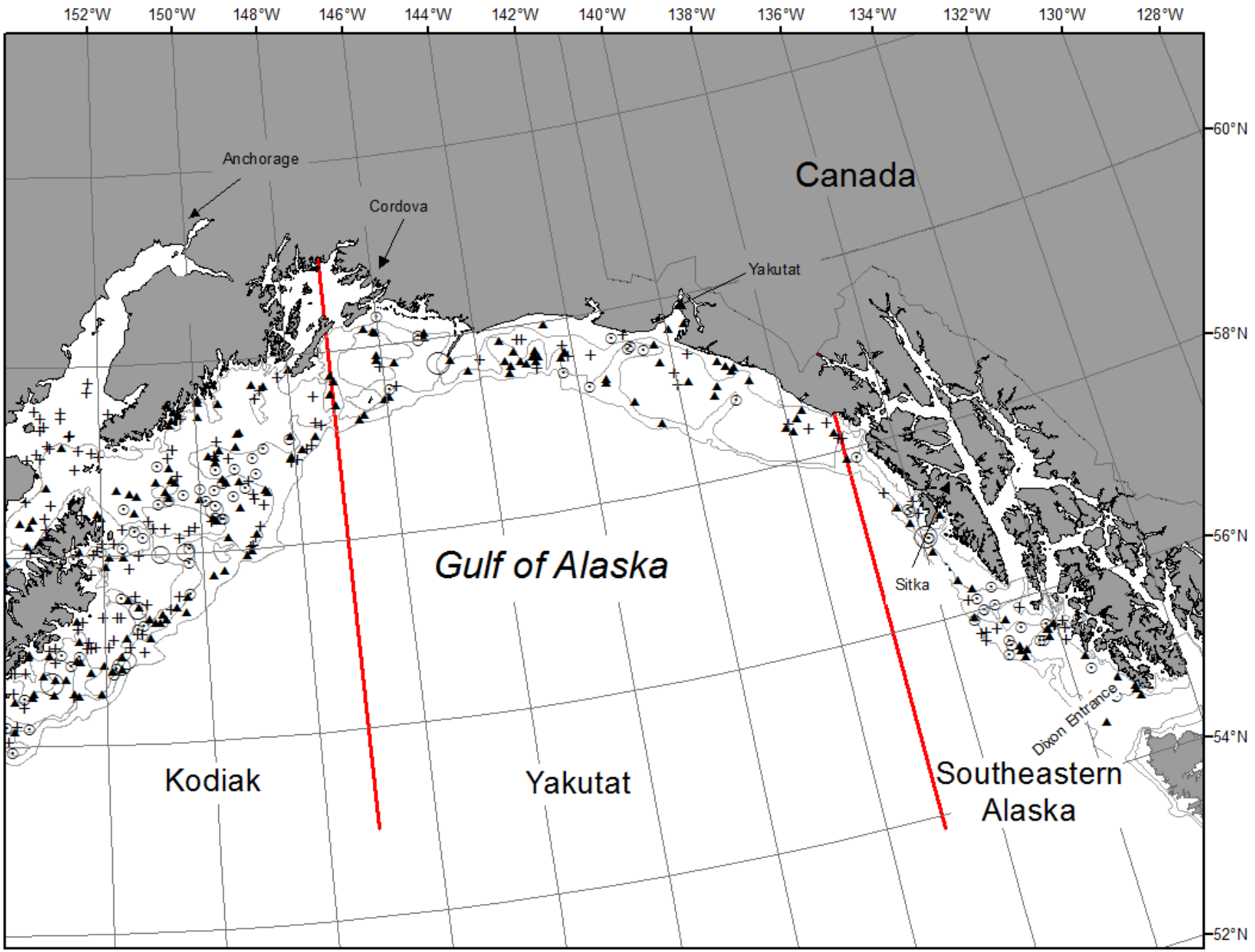

Figure 12. -- Continued (rex sole).

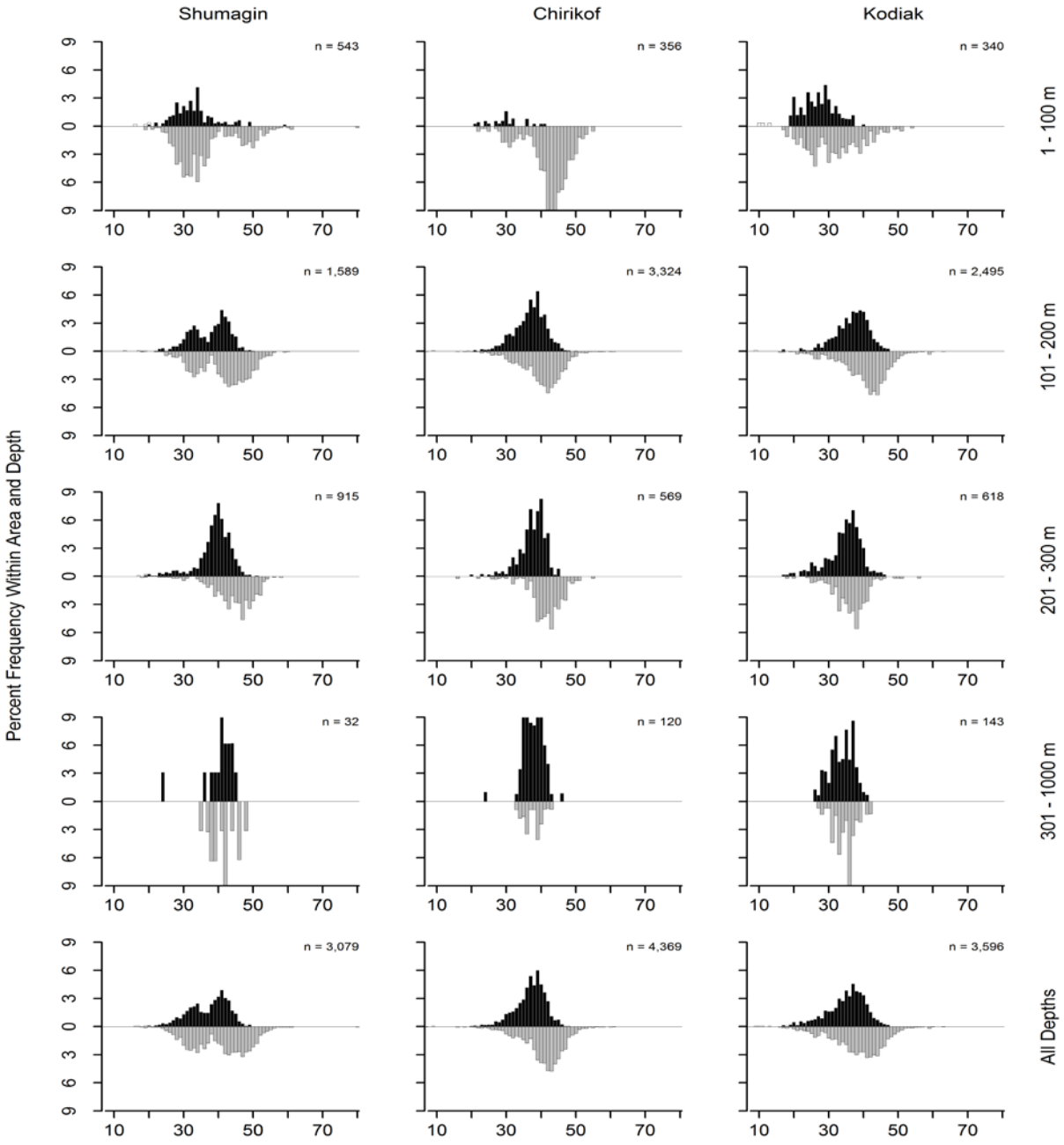

Figure 13. -- Size composition of rex sole from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

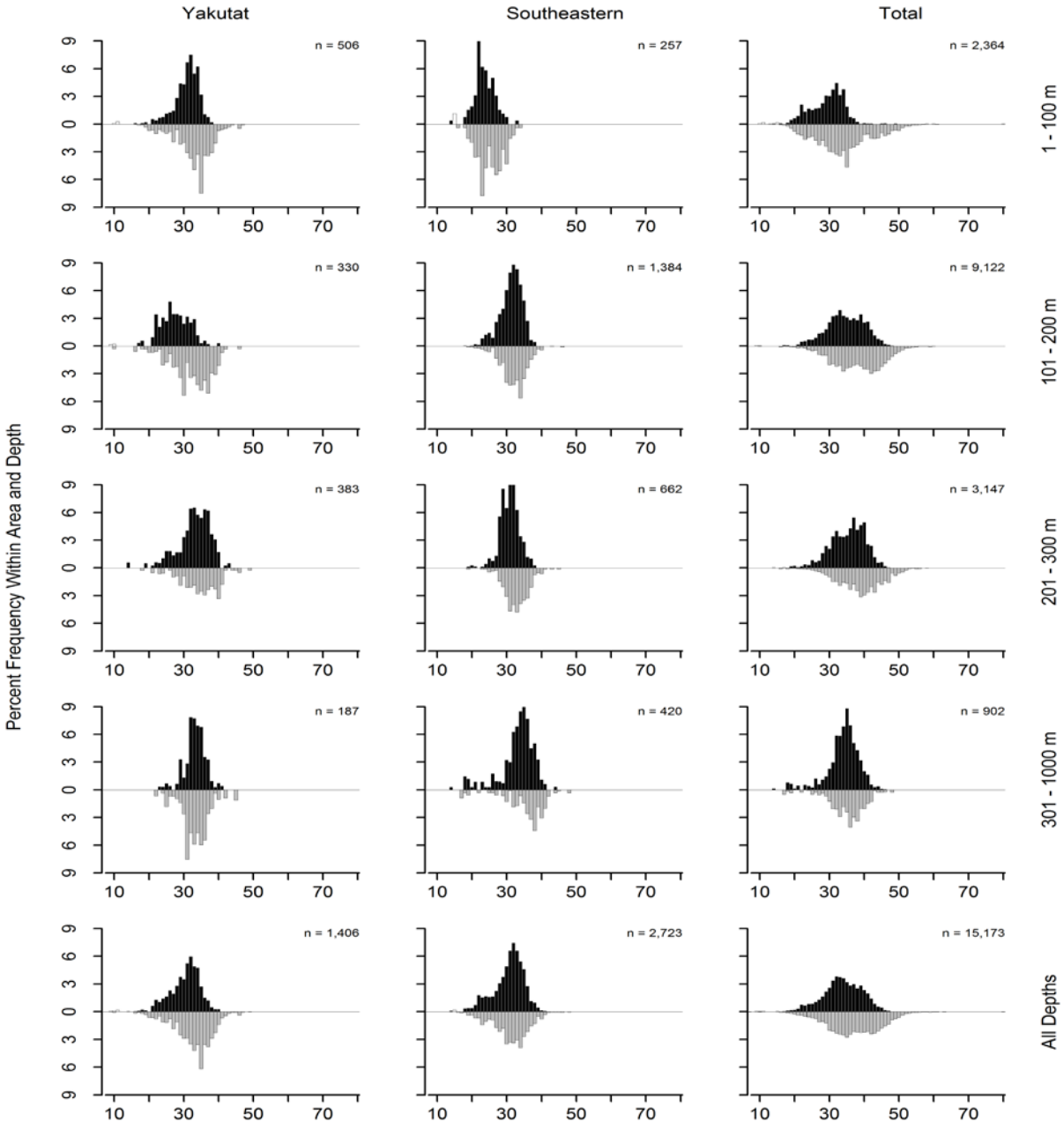

Figure 13. -- Continued (rex sole).

Table 14. -- Catch per unit of effort by stratum for rex sole sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Chirikof	101 - 200	Chirikof Outer Shelf	32	29	12.18	6,104	3,172	9,036
Shumagin	201 - 300	Shumagin Slope	21	18	11.11	3,096	1,080	5,112
Chirikof	101 - 200	Shelikof Edge	34	32	10.80	8,353	3,198	13,508
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	11	9.88	4,144	799	7,490
Shumagin	101 - 200	Shumagin Outer Shelf	41	34	9.18	7,486	4,217	10,754
Kodiak	101 - 200	Albatross Gullies	29	25	8.20	6,483	3,497	9,470
Yakutat	1 - 100	Middleton Shallows	9	8	7.71	5,180	0	14,683
Kodiak	201 - 300	Kodiak Slope	8	7	7.57	1,228	0	2,556
Southeastern	301 - 500	Southeastern Deep Gullies	4	4	6.34	1,487	0	3,885
Chirikof	201 - 300	Lower Shelikof Gully	11	11	5.88	5,886	0	13,925
Chirikof	201 - 300	Chirikof Slope	10	10	5.59	855	358	1,351
Kodiak	101 - 200	Portlock Flats	33	29	5.51	4,045	2,372	5,717
Chirikof	101 - 200	East Shumagin Gully	20	17	4.61	5,117	1,442	8,792
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	13	4.11	1,614	780	2,447
Southeastern	501 - 700	Southeastern Slope	4	2	3.80	393	0	1,116
Southeastern	101 - 200	Prince of Wales Shelf	16	13	3.53	2,432	553	4,311
Shumagin	101 - 200	Sanak Gully	5	5	3.51	1,489	0	3,556
Shumagin	101 - 200	West Shumagin Gully	4	4	3.33	759	0	1,572
Kodiak	101 - 200	Kodiak Outer Shelf	32	19	2.94	1,477	682	2,271
Yakutat	101 - 200	Middleton Shelf	6	6	2.81	2,063	0	4,493
Chirikof	301 - 500	Chirikof Slope	6	6	2.73	438	0	946
Yakutat	201 - 300	Yakutat Slope	9	8	2.60	552	244	860
Yakutat	201 - 300	Yakutat Gullies	9	8	2.30	700	206	1,194
Kodiak	201 - 300	Kenai Gullies	16	14	2.13	1,417	513	2,320
Chirikof	1 - 100	Semidi Bank	16	8	2.06	1,505	0	3,353
Chirikof	1 - 100	Chirikof Bank	26	9	2.04	2,205	0	4,758
Yakutat	301 - 500	Yakutat Slope	7	7	1.82	277	147	408
Yakutat	501 - 700	Yakutat Slope	2	2	1.65	243	0	2,863
Kodiak	301 - 500	Kodiak Slope	8	8	1.61	468	180	755
Yakutat	1 - 100	Yakutat Shallows	10	9	1.50	1,494	0	3,072
Southeastern	1 - 100	Southeastern Shallows	9	4	1.17	763	0	1,932
Kodiak	101 - 200	Barren Islands	18	10	1.15	1,258	0	2,583
Southeastern	301 - 500	Southeastern Slope	4	3	1.12	86	0	228
Shumagin	1 - 100	Davidson Bank	44	16	1.08	1,477	407	2,548
Shumagin	301 - 500	Shumagin Slope	6	4	1.06	269	0	583
Yakutat	101 - 200	Fairweather Shelf	9	6	0.96	741	0	1,855
Shumagin	1 - 100	Shumagin Bank	31	9	0.94	1,170	143	2,198
Kodiak	1 - 100	Albatross Shallows	20	8	0.87	502	84	920
Kodiak	1 - 100	Kenai Peninsula	9	6	0.67	354	3	705
Yakutat	301 - 500	Yakutat Gullies	2	2	0.62	68	0	549
Kodiak	501 - 700	Kodiak Slope	3	2	0.49	85	0	269
Kodiak	101 - 200	Kenai Flats	15	9	0.44	529	0	1,107
Kodiak	1 - 100	Albatross Banks	33	11	0.25	381	63	700
Shumagin	1 - 100	Lower Alaska Peninsula	19	6	0.24	167	0	340
Yakutat	101 - 200	Yakutat Flats	8	5	0.22	196	0	463
Southeastern	201 - 300	Baranof-Chichagof Slope	4	2	0.21	24	0	77
Chirikof	1 - 100	Upper Alaska Peninsula	17	2	0.15	117	0	330
Kodiak	201 - 300	Upper Shelikof Gully	4	2	0.14	45	0	130
Kodiak	1 - 100	Northern Kodiak Shallows	9	3	0.12	26	0	66
Yakutat	101 - 200	Yakataga Shelf	8	2	0.03	16	0	54
Shumagin	1 - 100	Fox Islands	13	2	0.03	24	0	68

Dover sole (*Microstomus pacificus*)

Dover sole was the fifteenth most abundant species caught in the 2015 survey area, with the tenth highest mean CPUE in the Southeastern area (Table 2). Although caught throughout the survey area and in all depth intervals, Dover sole was relatively rare in the Shumagin region (Table 15). The highest densities occurred in the 301-500 m depth interval, with a particularly high concentration in the Southeastern Deep Gullies stratum (Fig. 14, Table 16). Size was relatively constant with depth and longitude except at depths less than 100 m, where size was considerably smaller (Fig. 15). The estimated biomass of Dover sole was 53,067 t, and the highest regional biomass was in the Yakutat region. Approximately 84% of the biomass was concentrated at depths between 101 and 500 m (Table 15).

Table 15. -- Number of survey hauls, number of hauls with Dover sole, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	5	0.06	85	0	173	0.714
	201 - 300	21	4	0.12	34	0	79	0.662
	301 - 500	6	3	0.62	157	0	366	1.400
	501 - 700	3	1	0.30	60	0	251	1.209
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	13	0.05	336	88	584	1.013
Chirikof	1 - 100	59	4	0.2	522	0	1,190	1.233
	101 - 200	86	55	1.46	3,480	1,759	5,201	0.912
	201 - 300	21	16	2.57	2,964	179	5,749	0.953
	301 - 500	6	6	8.44	1,353	0	3,215	0.800
	501 - 700	4	4	1.01	197	48	347	0.868
	701 - 1000	3	2	0.73	224	0	642	0.852
	All depths	179	87	1.28	8,741	5,029	12,453	0.917
Kodiak	1 - 100	86	15	0.05	206	29	383	0.411
	101 - 200	127	79	0.88	3,805	2,675	4,935	0.884
	201 - 300	28	21	2.68	3,080	678	5,482	1.051
	301 - 500	8	8	5.26	1,532	460	2,603	0.774
	501 - 700	3	3	5.87	1,025	0	2,503	1.007
	701 - 1000	4	4	4.8	1,677	0	3,707	1.086
	All depths	256	130	1.12	11,324	8,029	14,618	0.922
Yakutat	1 - 100	19	16	1.24	2,073	644	3,501	0.290
	101 - 200	31	22	2.82	8,275	3,567	12,983	0.718
	201 - 300	18	16	6.2	3,206	1,623	4,788	1.032
	301 - 500	9	9	11.82	3,106	2,217	3,995	0.796
	501 - 700	2	2	7.48	1,100	0	2,583	0.724
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	65	3.11	17,759	12,538	22,980	0.653
Southeastern	1 - 100	9	2	0.03	21	0	54	0.217
	101 - 200	27	18	1.76	1,950	624	3,275	0.528
	201 - 300	18	15	4.05	2,048	427	3,669	0.391
	301 - 500	8	8	31.09	9,690	0	19,511	0.854
	501 - 700	4	4	11.19	1,157	0	2,402	0.902
	701 - 1000	2	1	0.35	42	0	225	0.959
	All depths	68	48	5.32	14,908	5,390	24,425	0.687
All areas	1 - 100	280	37	0.22	2,822	1,250	4,394	0.346
	101 - 200	321	179	1.44	17,594	12,297	22,891	0.750
	201 - 300	106	72	3.14	11,332	7,120	15,543	0.785
	301 - 500	37	34	12.38	15,838	5,650	26,026	0.832
	501 - 700	16	14	4.31	3,538	1,796	5,280	0.864
	701 - 1000	12	7	1.68	1,943	0	4,010	1.050
	All depths	772	343	1.66	53,067	42,836	63,298	0.747

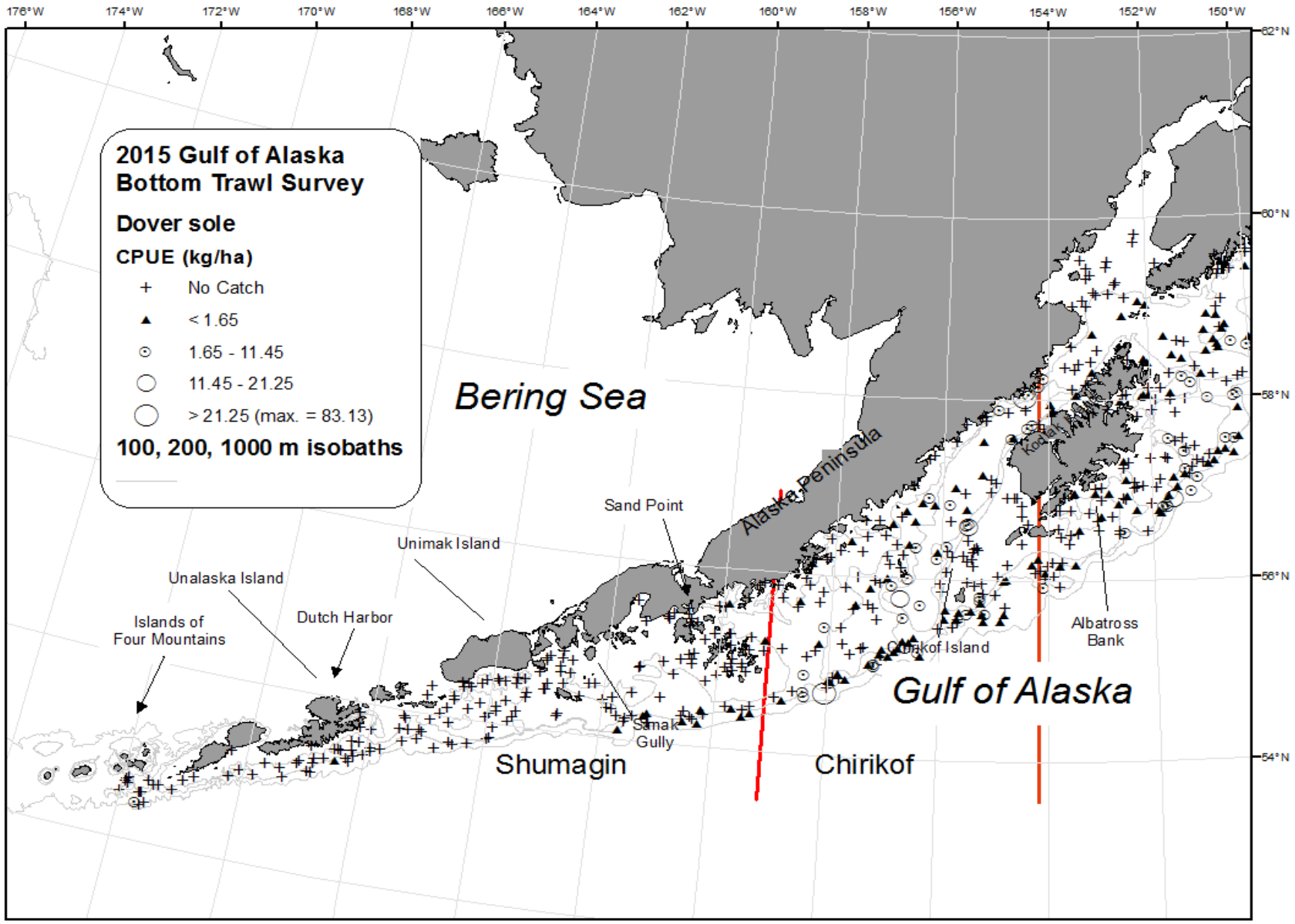

Figure 14. -- Distribution and relative abundance of Dover sole from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

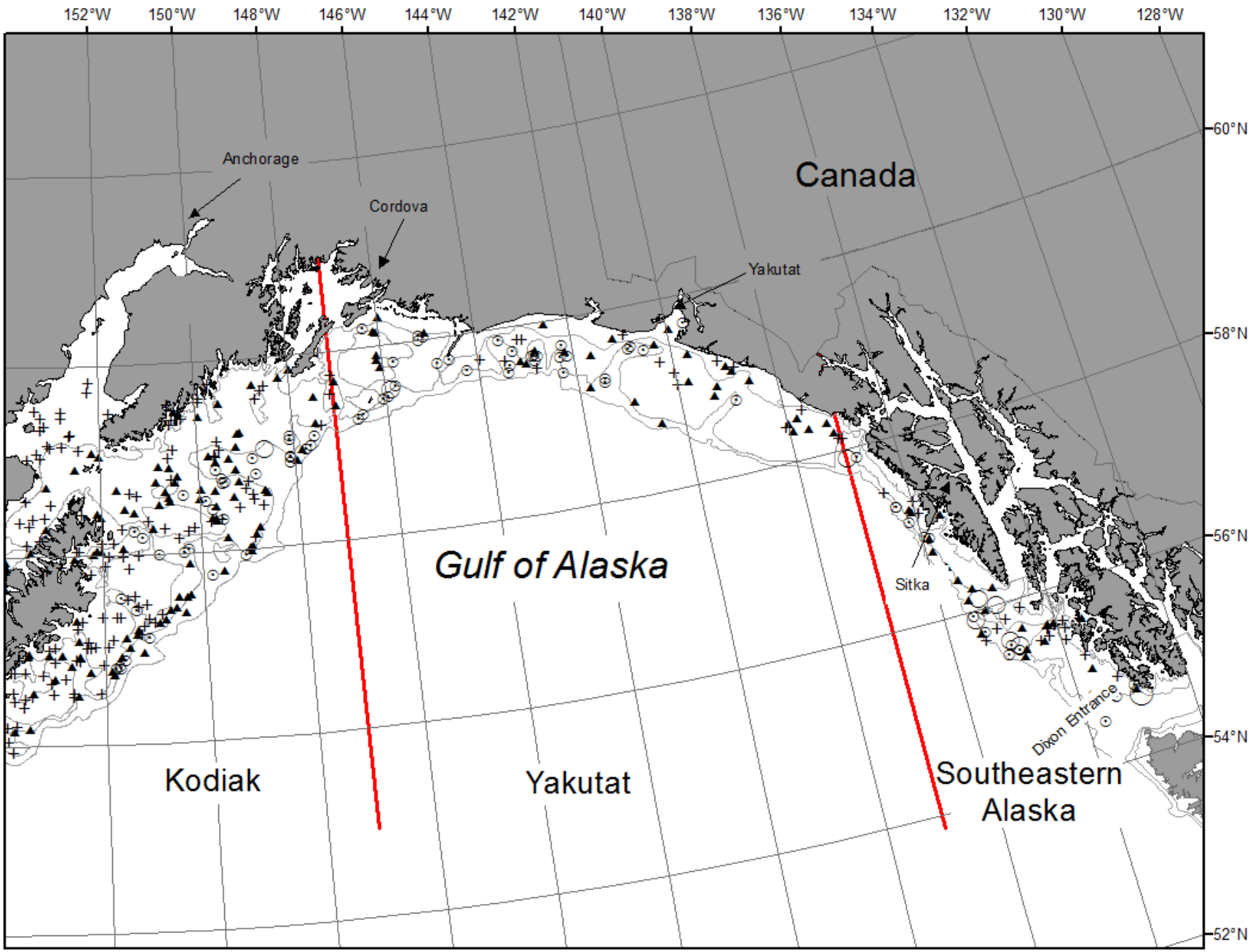

Figure 14. -- Continued (Dover sole).

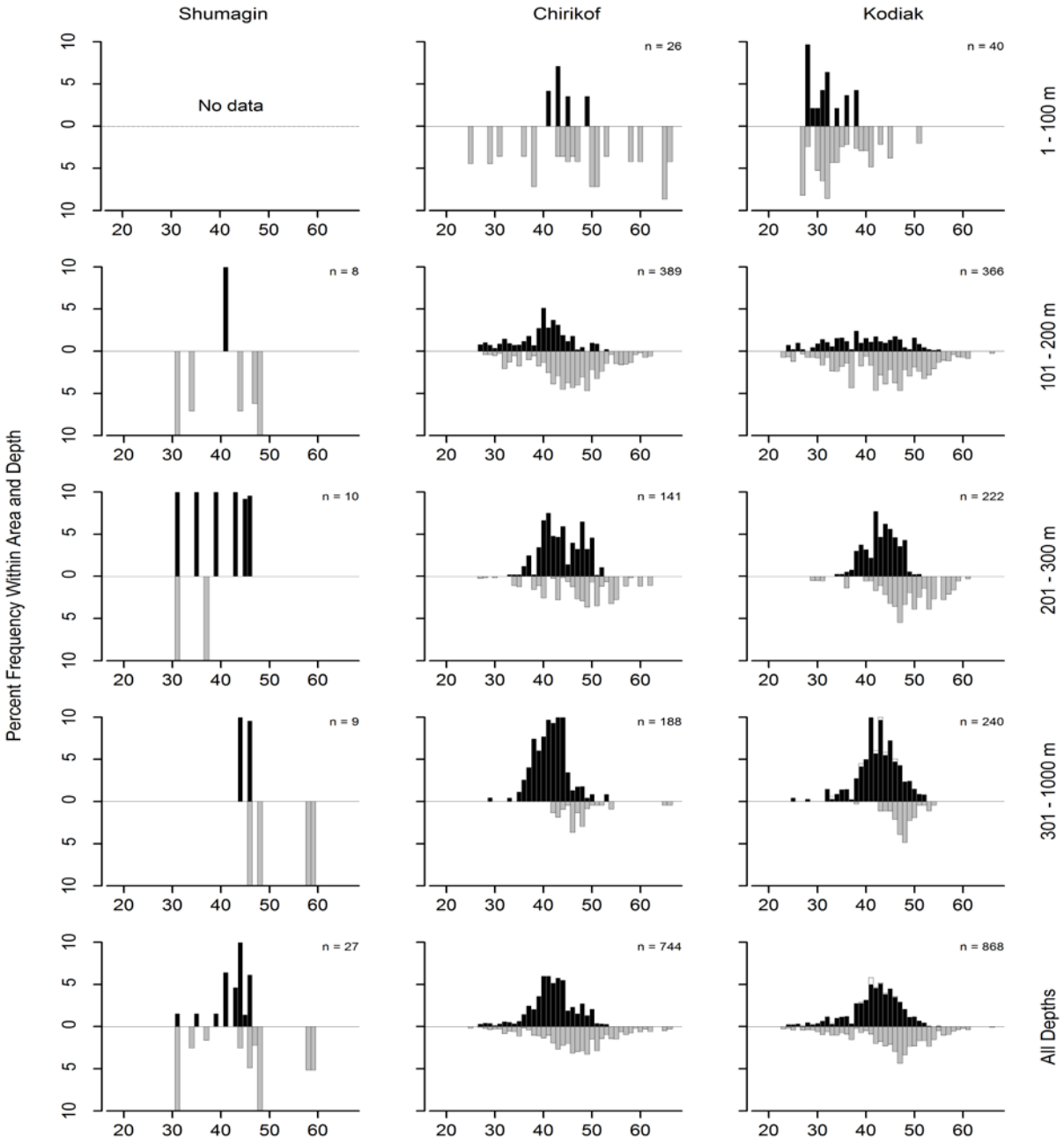

Figure 15. -- Size composition of Dover sole from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

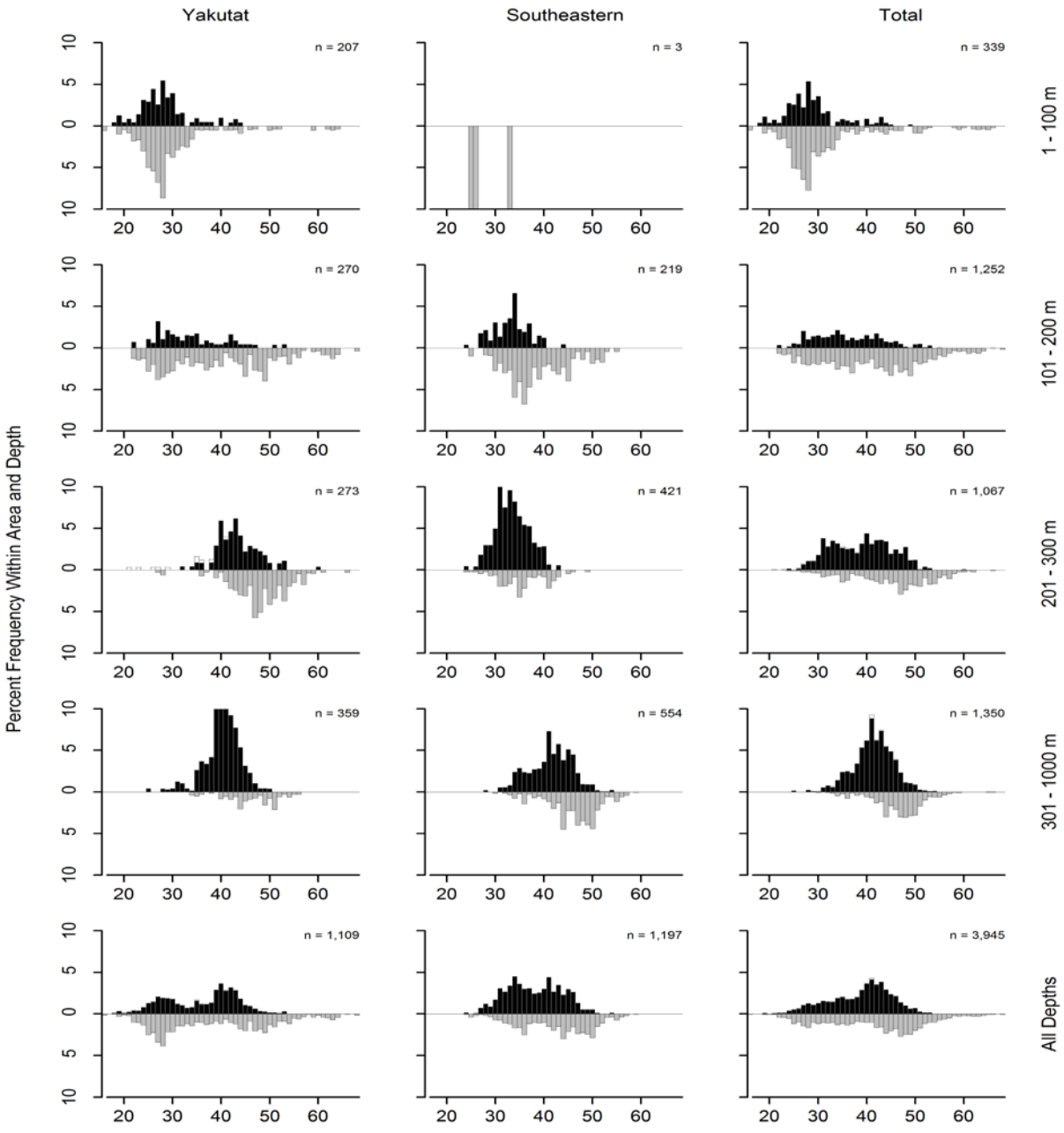

Figure 15. -- Continued (Dover sole).

Table 16. -- Catch per unit of effort by stratum for Dover sole sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Southeastern	301 - 500	Southeastern Deep Gullies	4	4	38.82	9,100	0	20,333
Yakutat	301 - 500	Yakutat Gullies	2	2	15.13	1,675	0	4,119
Southeastern	501 - 700	Southeastern Slope	4	4	11.19	1,157	0	2,584
Yakutat	301 - 500	Yakutat Slope	7	7	9.41	1,431	614	2,248
Chirikof	301 - 500	Chirikof Slope	6	6	8.44	1,353	0	3,310
Yakutat	101 - 200	Middleton Shelf	6	5	7.89	5,794	1,249	10,338
Southeastern	301 - 500	Southeastern Slope	4	4	7.64	590	0	1,325
Yakutat	501 - 700	Yakutat Slope	2	2	7.48	1,100	0	5,479
Yakutat	201 - 300	Yakutat Gullies	9	7	6.33	1,926	679	3,173
Yakutat	201 - 300	Yakutat Slope	9	9	6.02	1,280	82	2,478
Kodiak	501 - 700	Kodiak Slope	3	3	5.87	1,025	0	3,024
Kodiak	301 - 500	Kodiak Slope	8	8	5.26	1,532	433	2,631
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	13	5.05	1,982	354	3,609
Kodiak	701 - 1000	Kodiak Slope	4	4	4.80	1,677	0	4,004
Kodiak	201 - 300	Kenai Gullies	16	12	3.71	2,472	155	4,790
Kodiak	201 - 300	Kodiak Slope	8	8	3.66	594	0	1,343
Chirikof	101 - 200	Shelikof Edge	34	28	3.49	2,699	1,064	4,333
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	11	2.62	1,098	219	1,977
Chirikof	201 - 300	Lower Shelikof Gully	11	8	2.61	2,617	0	5,414
Chirikof	201 - 300	Chirikof Slope	10	8	2.28	348	0	701
Yakutat	101 - 200	Yakataga Shelf	8	5	2.01	1,062	0	2,615
Kodiak	101 - 200	Portlock Flats	33	26	1.89	1,387	627	2,148
Yakutat	101 - 200	Fairweather Shelf	9	7	1.67	1,294	0	3,321
Yakutat	1 - 100	Middleton Shallows	9	9	1.59	1,066	0	2,351
Kodiak	101 - 200	Albatross Gullies	29	18	1.48	1,170	482	1,859
Southeastern	101 - 200	Prince of Wales Shelf	16	7	1.24	852	0	1,934
Yakutat	1 - 100	Yakutat Shallows	10	7	1.01	1,006	115	1,897
Chirikof	501 - 700	Chirikof Slope	4	4	1.01	197	26	369
Kodiak	101 - 200	Kodiak Outer Shelf	32	19	0.95	476	204	747
Chirikof	701 - 1000	Chirikof Slope	3	2	0.73	224	0	789
Shumagin	301 - 500	Shumagin Slope	6	3	0.62	157	0	376
Southeastern	201 - 300	Baranof-Chichagof Slope	4	2	0.59	66	0	253
Kodiak	1 - 100	Northern Kodiak Shallows	9	4	0.52	114	0	301
Chirikof	101 - 200	Chirikof Outer Shelf	32	21	0.52	258	140	375
Chirikof	101 - 200	East Shumagin Gully	20	6	0.47	524	0	1,118
Kodiak	101 - 200	Kenai Flats	15	9	0.37	440	49	831
Southeastern	701 - 1000	Southeastern Slope	2	1	0.35	42	0	580
Chirikof	1 - 100	Upper Alaska Peninsula	17	2	0.30	240	0	742
Kodiak	101 - 200	Barren Islands	18	7	0.30	331	60	602
Shumagin	501 - 700	Shumagin Slope	3	1	0.30	60	0	319
Shumagin	101 - 200	West Shumagin Gully	4	2	0.25	57	0	164
Chirikof	1 - 100	Chirikof Bank	26	1	0.21	222	0	680
Yakutat	101 - 200	Yakutat Flats	8	5	0.14	126	0	263
Shumagin	201 - 300	Shumagin Slope	21	4	0.12	34	0	79
Chirikof	1 - 100	Semidi Bank	16	1	0.08	60	0	188
Kodiak	1 - 100	Albatross Shallows	20	6	0.07	39	4	74
Kodiak	201 - 300	Upper Shelikof Gully	4	1	0.04	14	0	59
Shumagin	101 - 200	Shumagin Outer Shelf	41	3	0.03	28	0	60
Southeastern	1 - 100	Southeastern Shallows	9	2	0.03	21	0	55
Kodiak	1 - 100	Kenai Peninsula	9	1	0.03	15	0	51
Kodiak	1 - 100	Albatross Banks	33	4	0.02	38	0	80

Yellowfin sole (*Limanda aspera*)

Yellowfin sole was not among the twenty most abundant species caught in the 2015 survey, but was the twelfth most abundant species in the Shumagin region (Table 2). Yellowfin sole were almost exclusively caught at depths less than 100 m and were only caught in the Shumagin, Chirikof, and Kodiak INPFC areas (Table 17). The highest density by far was in the Northern Kodiak Shallows stratum, but the bulk of the estimated biomass was concentrated in the Lower Alaska Peninsula and Shumagin Bank strata in the Shumagin region (Fig. 16 and Table 18). Size was highly variable for both sexes and did not exhibit any longitudinal trends (Fig. 17). The estimated biomass of yellowfin sole was 24,789 t, and the highest regional biomass was in the Shumagin region, where 65% was concentrated (Table 17).

Table 17. -- Number of survey hauls, number of hauls with yellowfin sole, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	16	3.93	16,232	512	31,952	0.353
	101 - 200	50	1	<0.01	6	0	20	0.155
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	17	2.49	16,238	517	31,958	0.353
Chirikof	1 - 100	59	4	0.53	1,389	0	4,070	0.324
	101 - 200	86	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	4	0.20	1,389	0	4,070	0.324
Kodiak	1 - 100	86	11	1.86	7,163	0	14,994	0.235
	101 - 200	127	0	---	---	---	---	---
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	11	0.71	7,163	0	14,994	0.235
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	0	---	---	---	---	---
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	31	1.92	24,784	7,152	42,416	0.307
	101 - 200	321	1	<0.01	6	0	20	0.155
	201 - 300	106	0	---	---	---	---	---
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	32	0.77	24,789	7,157	42,422	0.307

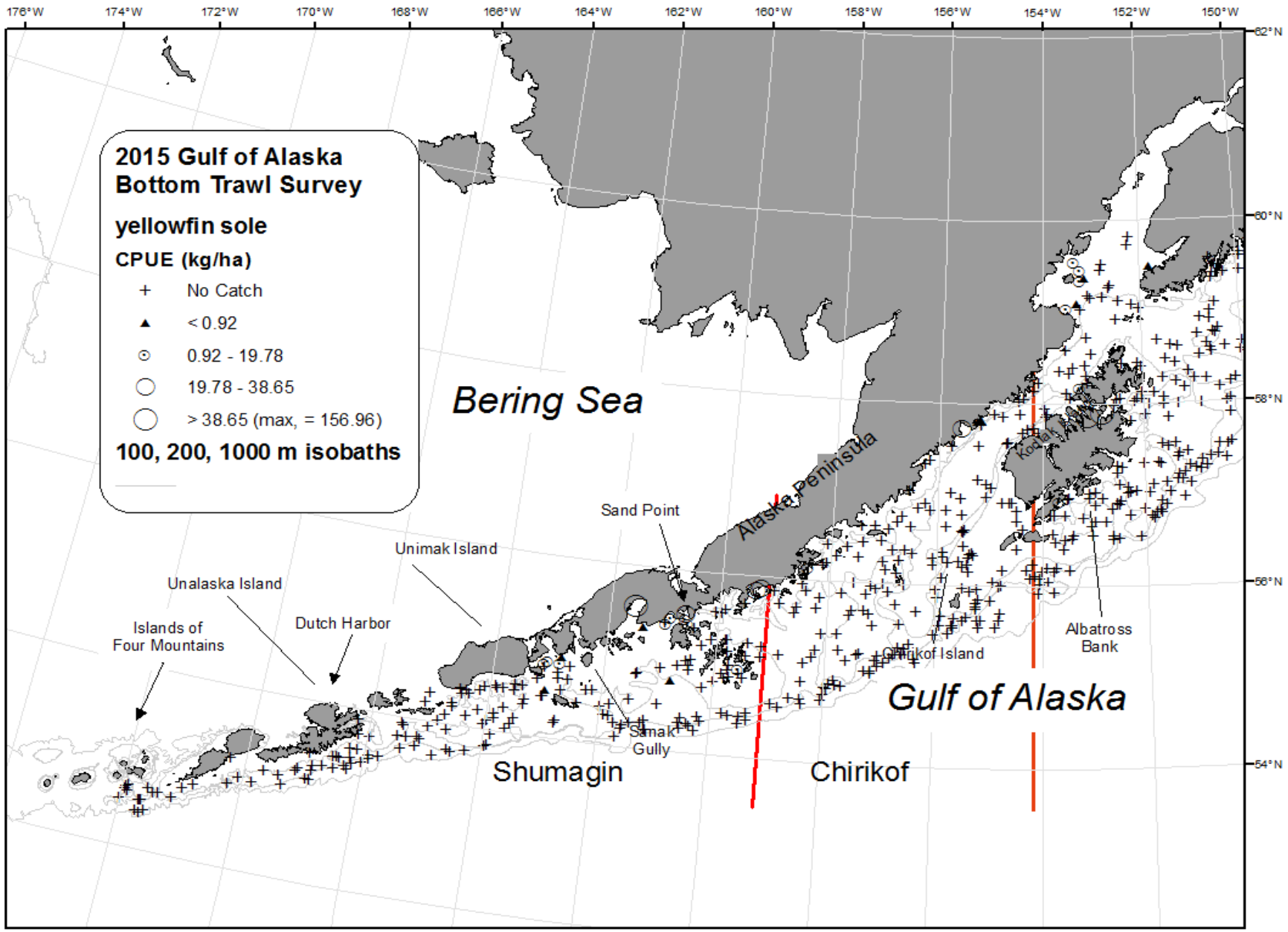

Figure 16. -- Distribution and relative abundance of yellowfin sole from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

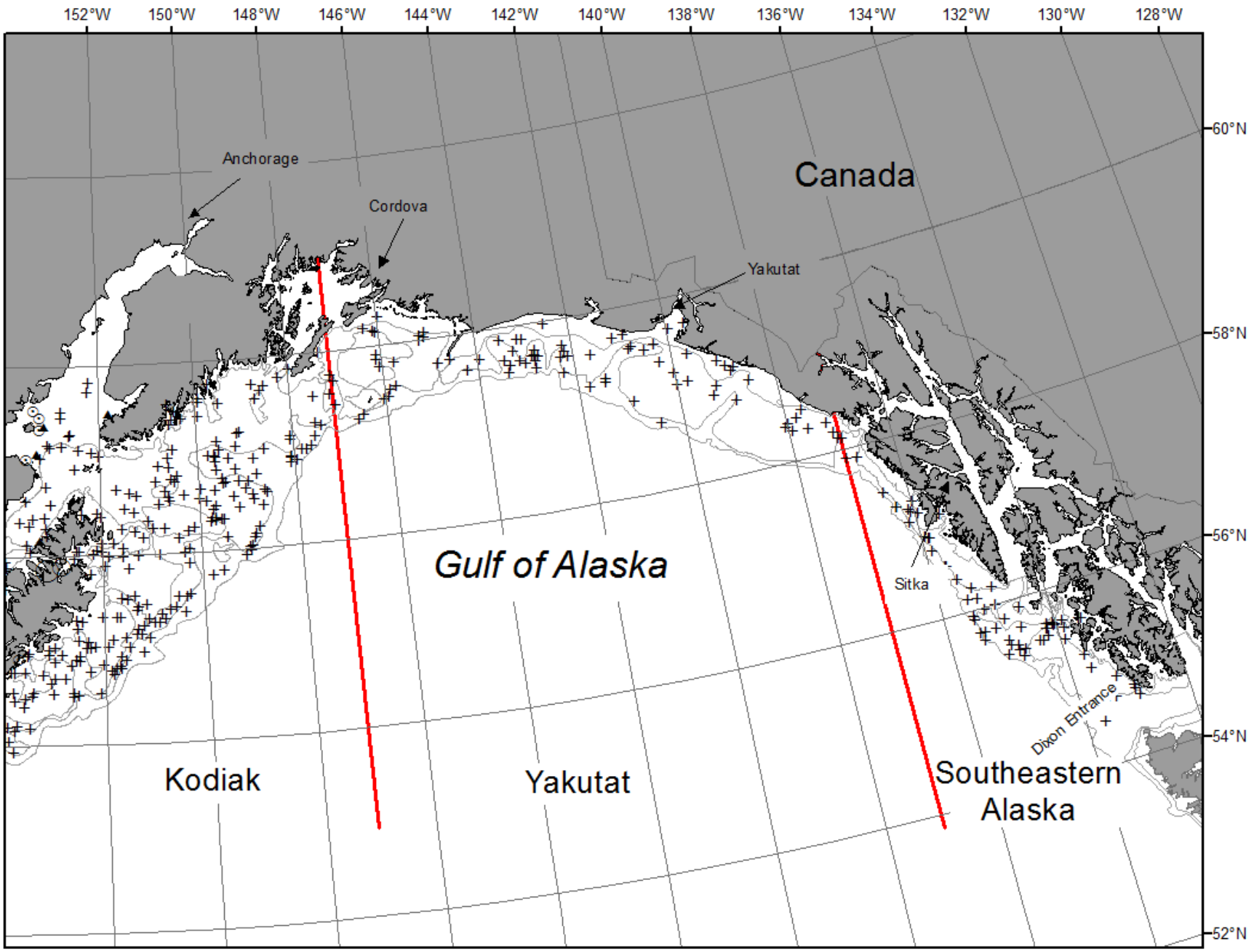

Figure 16. -- Continued (yellowfin sole).

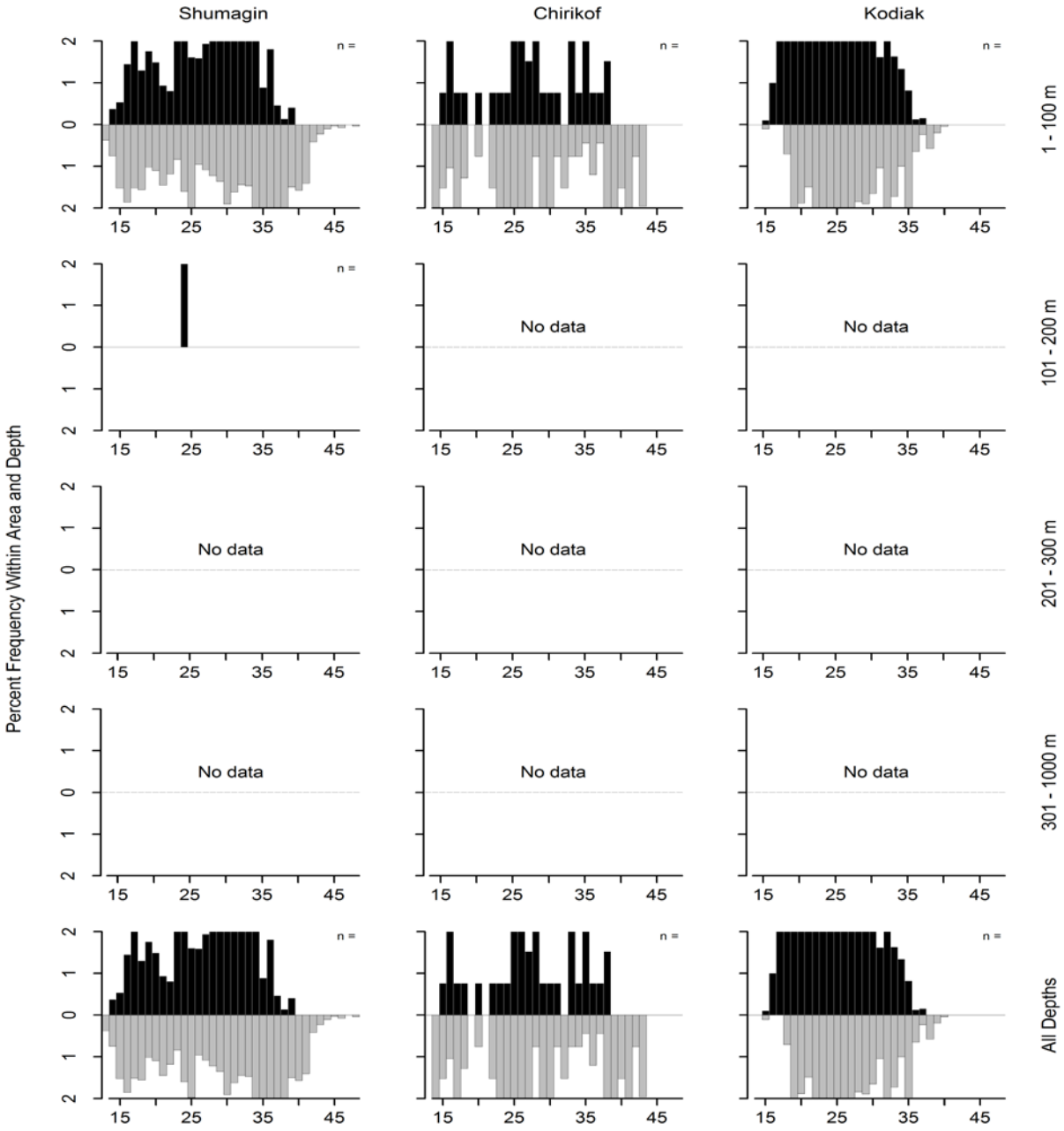

Figure 17. -- Size composition of yellowfin sole from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

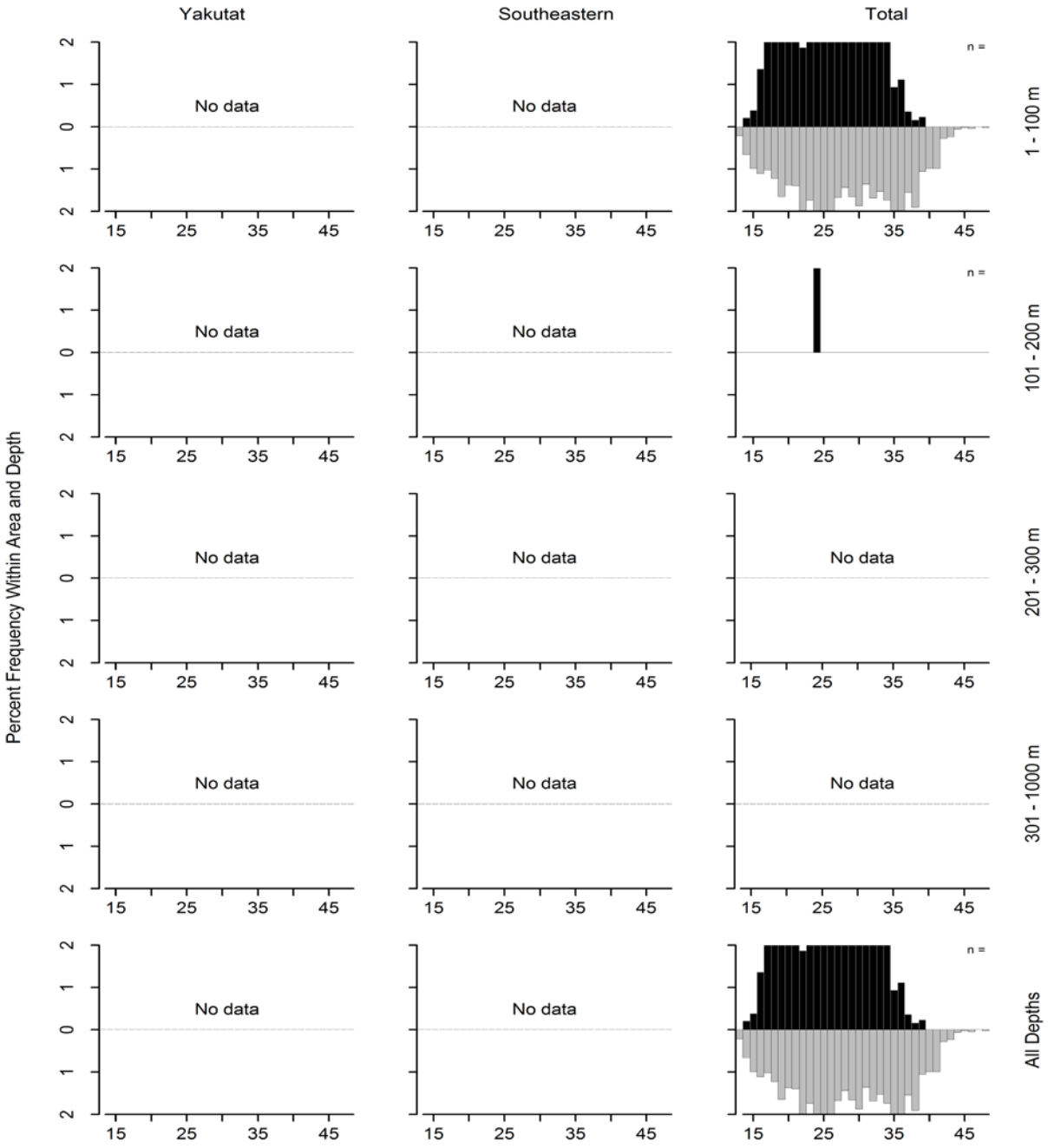

Figure 17. -- Continued (yellowfin sole).

Table 18. -- Catch per unit of effort by stratum for yellowfin sole sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	1 - 100	Northern Kodiak Shallows	9	3	22.49	4,946	0	13,335
Shumagin	1 - 100	Lower Alaska Peninsula	19	13	14.40	9,898	245	19,551
Shumagin	1 - 100	Shumagin Bank	31	2	5.10	6,326	0	19,143
Kodiak	1 - 100	Lower Cook Inlet	15	7	1.78	1,759	159	3,359
Chirikof	1 - 100	Upper Alaska Peninsula	17	4	1.75	1,389	0	4,083
Kodiak	1 - 100	Albatross Shallows	20	1	0.79	458	0	1,416
Shumagin	101 - 200	Sanak Gully	5	1	0.01	6	0	21
Shumagin	1 - 100	Davidson Bank	44	1	0.01	8	0	24

Other Flatfishes

Alaska plaice (*Pleuronectes quadrituberculatus*)

Alaska plaice was rarely encountered during the 2015 survey and was not among the 20 most abundant species in any of the INPFC areas (Table 2). They were only caught in the Shumagin, Chirikof, and Kodiak regions at depths less than 200 m (Table 19). The highest densities occurred in the Lower Alaska Peninsula stratum in the Shumagin INPFC area, where the mean CPUE was almost six times greater than the next highest stratum (Table 20). The estimated biomass of Alaska plaice was 5,448 t, and the highest regional biomass was in the Shumagin region, where 86% of the biomass was concentrated (Table 19).

Starry flounder (*Platichthys stellatus*)

Starry flounder was rarely encountered during the 2015 survey and was only among the 20 most abundant species in the Shumagin INPFC area (Table 2). Starry flounder were caught throughout the survey area except for the Southeastern region, and only at depths less than 100 m (Table 21). The highest densities occurred in the Yakutat Shallows and Lower Cook Inlet strata in the Yakuata and Kodiak INPFC areas, respectively (Table 22). The estimated biomass of starry flounder was 23,446 t, which was distributed relatively evenly among the four regions where it occurred (Table 21).

English sole (*Parophrys vetulus*)

Although English sole was not frequently caught during the 2015 survey, it was among the 20 most abundant species in the Yakutat INPFC area (Table 2). English sole were caught throughout the survey area at depths less than 200 m (Table 23). The highest densities by far occurred in the Yakutat Shallows, Middleton Shallows, and the Northern Kodiak Shallows strata (Table 24). The estimated biomass of English sole was 17,498 t, and the highest regional biomass was in the Yakutat region, where approximately 60% of the biomass was concentrated (Table 23).

Butter sole (*Isopsetta isolepis*)

Although butter sole was not frequently caught during the 2015 survey, it was among the 20 most abundant species in the Shumagin INPFC area (Table 2). Butter sole were caught throughout the survey area except for the Southeastern region, and at depths less than 200 m (Table 25). The highest densities occurred in the Yakutat Shallows stratum and at depths less than 100 m (Table 26). The estimated biomass of butter sole was 16,331 t, and the highest regional biomass were in the Shumagin and Kodiak regions (Table 25).

Table 19. -- Number of survey hauls, number of hauls with Alaska plaice, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	14	1.12	4,625	418	8,832	1.201
	101 - 200	50	2	0.05	67	0	211	1.112
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	16	0.72	4,692	483	8,901	1.200
Chirikof	1 - 100	59	4	0.17	440	0	996	1.006
	101 - 200	86	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	4	0.06	440	0	996	1.006
Kodiak	1 - 100	86	6	0.08	316	58	575	1.171
	101 - 200	127	0	---	---	---	---	---
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	6	0.03	316	58	575	1.171
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	0	---	---	---	---	---
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	24	0.42	5,381	1,142	9,620	1.181
	101 - 200	321	2	0.01	67	0	211	1.112
	201 - 300	106	0	---	---	---	---	---
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	26	0.17	5,448	1,208	9,689	1.180

Table 20. -- Catch per unit of effort by stratum for Alaska plaice sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Shumagin	1 - 100	Lower Alaska Peninsula	19	10	6.36	4,371	151	8,590
Kodiak	1 - 100	Northern Kodiak Shallows	9	4	1.07	236	0	497
Chirikof	1 - 100	Upper Alaska Peninsula	17	3	0.53	420	0	977
Shumagin	1 - 100	Shumagin Bank	31	3	0.19	235	0	614
Shumagin	101 - 200	Sanak Gully	5	1	0.13	55	0	207
Kodiak	1 - 100	Albatross Shallows	20	1	0.07	39	0	121
Shumagin	101 - 200	West Shumagin Gully	4	1	0.05	12	0	51
Kodiak	1 - 100	Lower Cook Inlet	15	1	0.04	41	0	129
Chirikof	1 - 100	Chirikof Bank	26	1	0.02	20	0	62
Shumagin	1 - 100	Davidson Bank	44	1	0.01	19	0	58

Table 21. -- Number of survey hauls, number of hauls with starry flounder, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	13	1.64	6,777	0	14,303	1.998
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	13	1.04	6,777	0	14,303	1.998
Chirikof	1 - 100	59	9	1.87	4,859	563	9,155	2.517
	101 - 200	86	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	9	0.71	4,859	563	9,155	2.517
Kodiak	1 - 100	86	21	1.63	6,264	2,294	10,234	2.200
	101 - 200	127	0	---	---	---	---	---
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	21	0.62	6,264	2,294	10,234	2.200
Yakutat	1 - 100	19	5	3.33	5,546	0	11,581	2.156
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	5	0.97	5,546	0	11,581	2.156
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	48	1.82	23,446	12,514	34,379	2.182
	101 - 200	321	0	---	---	---	---	---
	201 - 300	106	0	---	---	---	---	---
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	48	0.73	23,446	12,514	34,379	2.182

Table 22. -- Catch per unit of effort by stratum for starry flounder sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Yakutat	1 - 100	Yakutat Shallows	10	4	5.30	5,273	0	11,368
Kodiak	1 - 100	Lower Cook Inlet	15	12	4.61	4,556	1,027	8,085
Chirikof	1 - 100	Upper Alaska Peninsula	17	6	3.77	2,990	0	6,260
Shumagin	1 - 100	Lower Alaska Peninsula	19	9	3.14	2,156	0	4,897
Shumagin	1 - 100	Shumagin Bank	31	3	2.72	3,366	0	10,010
Kodiak	1 - 100	Albatross Shallows	20	3	2.22	1,279	0	3,145
Chirikof	1 - 100	Chirikof Bank	26	3	1.73	1,869	0	4,882
Kodiak	1 - 100	Northern Kodiak Shallows	9	3	0.93	205	0	499
Shumagin	1 - 100	Davidson Bank	44	1	0.92	1,256	0	3,794
Yakutat	1 - 100	Middleton Shallows	9	1	0.41	273	0	903
Kodiak	1 - 100	Kenai Peninsula	9	1	0.14	76	0	250
Kodiak	1 - 100	Albatross Banks	33	2	0.10	149	0	410

Table 23. -- Number of survey hauls, number of hauls with English sole, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	12	0.09	351	58	643	0.498
	101 - 200	50	3	0.11	155	0	424	1.047
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	15	0.08	505	137	873	0.593
Chirikof	1 - 100	59	5	0.03	82	0	181	0.817
	101 - 200	86	3	0.09	227	0	550	0.778
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	8	0.05	308	0	644	0.788
Kodiak	1 - 100	86	17	0.32	1,230	0	2,497	0.778
	101 - 200	127	6	0.62	2,699	0	6,531	0.767
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	23	0.39	3,928	0	7,939	0.770
Yakutat	1 - 100	19	12	5.90	9,826	1,475	18,177	0.420
	101 - 200	31	4	0.22	641	0	1,623	0.847
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	16	1.83	10,467	2,072	18,861	0.433
Southeastern	1 - 100	9	3	0.87	568	0	1,275	0.256
	101 - 200	27	9	1.55	1,722	9	3,435	0.536
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	12	0.82	2,290	479	4,101	0.422
All areas	1 - 100	280	49	0.93	12,056	3,579	20,532	0.431
	101 - 200	321	25	0.44	5,442	1,186	9,698	0.686
	201 - 300	106	0	---	---	---	---	---
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	74	0.55	17,498	8,235	26,761	0.487

Table 24. -- Catch per unit of effort by stratum for English sole sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Yakutat	1 - 100	Yakutat Shallows	10	8	6.14	6,109	0	13,280
Yakutat	1 - 100	Middleton Shallows	9	4	5.54	3,717	0	9,029
Kodiak	1 - 100	Northern Kodiak Shallows	9	5	4.52	993	0	2,325
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	5	2.04	857	0	1,907
Kodiak	101 - 200	Kenai Flats	15	1	1.31	1,585	0	4,985
Southeastern	101 - 200	Prince of Wales Shelf	16	4	1.26	864	0	2,321
Kodiak	101 - 200	Barren Islands	18	2	0.93	1,025	0	3,041
Southeastern	1 - 100	Southeastern Shallows	9	3	0.87	568	0	1,289
Yakutat	101 - 200	Middleton Shelf	6	3	0.82	599	0	1,626
Shumagin	101 - 200	West Shumagin Gully	4	2	0.54	123	0	459
Shumagin	1 - 100	Lower Alaska Peninsula	19	5	0.29	199	0	456
Chirikof	101 - 200	East Shumagin Gully	20	3	0.20	227	0	551
Kodiak	101 - 200	Kodiak Outer Shelf	32	1	0.16	80	0	242
Kodiak	1 - 100	Kenai Peninsula	9	1	0.16	82	0	270
Shumagin	1 - 100	Shumagin Bank	31	6	0.12	147	0	307
Shumagin	101 - 200	Sanak Gully	5	1	0.07	31	0	117
Kodiak	1 - 100	Albatross Shallows	20	5	0.07	38	0	82
Yakutat	101 - 200	Fairweather Shelf	9	1	0.05	42	0	138
Chirikof	1 - 100	Upper Alaska Peninsula	17	3	0.05	42	0	122
Kodiak	1 - 100	Albatross Banks	33	5	0.05	72	0	147
Kodiak	1 - 100	Lower Cook Inlet	15	1	0.05	44	0	140
Chirikof	1 - 100	Chirikof Bank	26	2	0.04	40	0	103
Kodiak	101 - 200	Albatross Gullies	29	2	0.01	9	0	22
Shumagin	1 - 100	Fox Islands	13	1	0.01	4	0	13

Table 25. -- Number of survey hauls, number of hauls with butter sole, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	17	1.26	5,202	88	10,317	0.472
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	17	0.80	5,202	88	10,317	0.472
Chirikof	1 - 100	59	15	0.81	2,098	205	3,991	0.359
	101 - 200	86	1	<0.01	6	0	18	0.623
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	16	0.31	2,104	211	3,997	0.359
Kodiak	1 - 100	86	26	1.02	3,927	891	6,962	0.242
	101 - 200	127	4	0.42	1,835	0	5,481	0.223
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	30	0.57	5,761	1,143	10,380	0.236
Yakutat	1 - 100	19	6	1.96	3,263	0	7,416	0.331
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	6	0.57	3,263	0	7,416	0.331
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	64	1.12	14,490	7,181	21,798	0.337
	101 - 200	321	5	0.15	1,841	0	5,487	0.224
	201 - 300	106	0	---	---	---	---	---
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	69	0.51	16,331	8,309	24,352	0.319

Table 26. -- Catch per unit of effort by stratum for butter sole sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Yakutat	1 - 100	Yakutat Shallows	10	5	2.93	2,915	0	7,059
Shumagin	1 - 100	Davidson Bank	44	2	2.10	2,873	0	7,098
Kodiak	1 - 100	Lower Cook Inlet	15	10	1.99	1,965	0	4,317
Chirikof	1 - 100	Chirikof Bank	26	12	1.78	1,924	39	3,810
Shumagin	1 - 100	Shumagin Bank	31	8	1.76	2,181	0	5,182
Kodiak	101 - 200	Barren Islands	18	2	1.65	1,809	0	5,471
Kodiak	1 - 100	Albatross Banks	33	6	0.94	1,450	0	3,423
Kodiak	1 - 100	Albatross Shallows	20	7	0.70	403	0	964
Yakutat	1 - 100	Middleton Shallows	9	1	0.52	347	0	1,148
Kodiak	1 - 100	Northern Kodiak Shallows	9	2	0.33	73	0	187
Chirikof	1 - 100	Upper Alaska Peninsula	17	3	0.22	174	0	419
Shumagin	1 - 100	Lower Alaska Peninsula	19	7	0.22	149	0	334
Kodiak	1 - 100	Kenai Peninsula	9	1	0.07	35	0	117
Kodiak	101 - 200	Albatross Gullies	29	1	0.02	12	0	36
Kodiak	101 - 200	Kenai Flats	15	1	0.01	14	0	43
Chirikof	101 - 200	Shelikof Edge	34	1	0.01	6	0	18

ROUNDFISHES

Walleye pollock (*Gadus chalcogramma*)

Walleye pollock was the third most abundant species caught in the 2015 survey (Table 2) and was at least the eighth most abundant species in all INPFC areas. Although walleye pollock were caught throughout the survey area and at all depths less than 700 m, the bulk of the estimated biomass was concentrated at depths less than 200 m (Table 27). The highest densities occurred in the Kodiak, Shumagin and Chirikof regions at depths less than 300 m (Fig. 18 and Table 28). Size generally increased with depth, although multiple length modes were common (Fig. 19). The estimated biomass of walleye pollock was 745,322 t, and the highest regional biomass was in the Shumagin region, where 54% of the estimated biomass was concentrated (Table 27).

Table 27. -- Number of survey hauls, number of hauls with walleye pollock, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	92	75.75	312,748	128,003	497,493	0.576
	101 - 200	50	45	54.79	80,410	28,314	132,506	0.642
	201 - 300	21	15	38.33	10,687	0	23,683	1.110
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	1	0.19	39	0	161	1.113
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	153	61.92	403,884	211,674	596,095	0.596
Chirikof	1 - 100	59	43	22.08	57,495	0	134,047	0.505
	101 - 200	86	73	10.34	24,666	12,372	36,960	0.376
	201 - 300	21	20	13.67	15,789	3,074	28,504	0.930
	301 - 500	6	3	0.21	34	0	71	1.048
	501 - 700	4	1	0.09	18	0	67	0.922
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	140	14.4	98,001	19,650	176,351	0.499
Kodiak	1 - 100	86	63	13.46	51,838	0	122,759	0.756
	101 - 200	127	100	24.51	106,185	37,622	174,749	1.001
	201 - 300	28	28	18.18	20,889	11,805	29,974	0.862
	301 - 500	8	5	0.65	188	5	371	0.946
	501 - 700	3	2	0.29	50	0	130	1.213
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	198	17.65	179,150	82,187	276,113	0.900
Yakutat	1 - 100	19	17	3.32	5,535	834	10,236	0.223
	101 - 200	31	29	2.23	6,549	329	12,769	0.304
	201 - 300	18	18	38.99	20,158	956	39,360	0.928
	301 - 500	9	5	0.67	176	0	398	1.234
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	69	5.67	32,418	13,308	51,528	0.475
Southeastern	1 - 100	9	6	5.35	3,502	0	8,858	0.285
	101 - 200	27	22	15.34	17,004	6,952	27,056	0.455
	201 - 300	18	16	22.37	11,300	1,669	20,931	0.699
	301 - 500	8	3	0.2	63	0	155	1.201
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	47	11.37	31,869	17,577	46,161	0.484
All areas	1 - 100	280	221	33.41	431,118	220,774	641,462	0.565
	101 - 200	321	269	19.2	234,814	148,592	321,036	0.660
	201 - 300	106	97	21.87	78,824	51,213	106,436	0.888
	301 - 500	37	16	0.36	460	185	735	1.081
	501 - 700	16	4	0.13	106	0	233	1.118
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	607	23.29	745,322	516,356	974,288	0.617

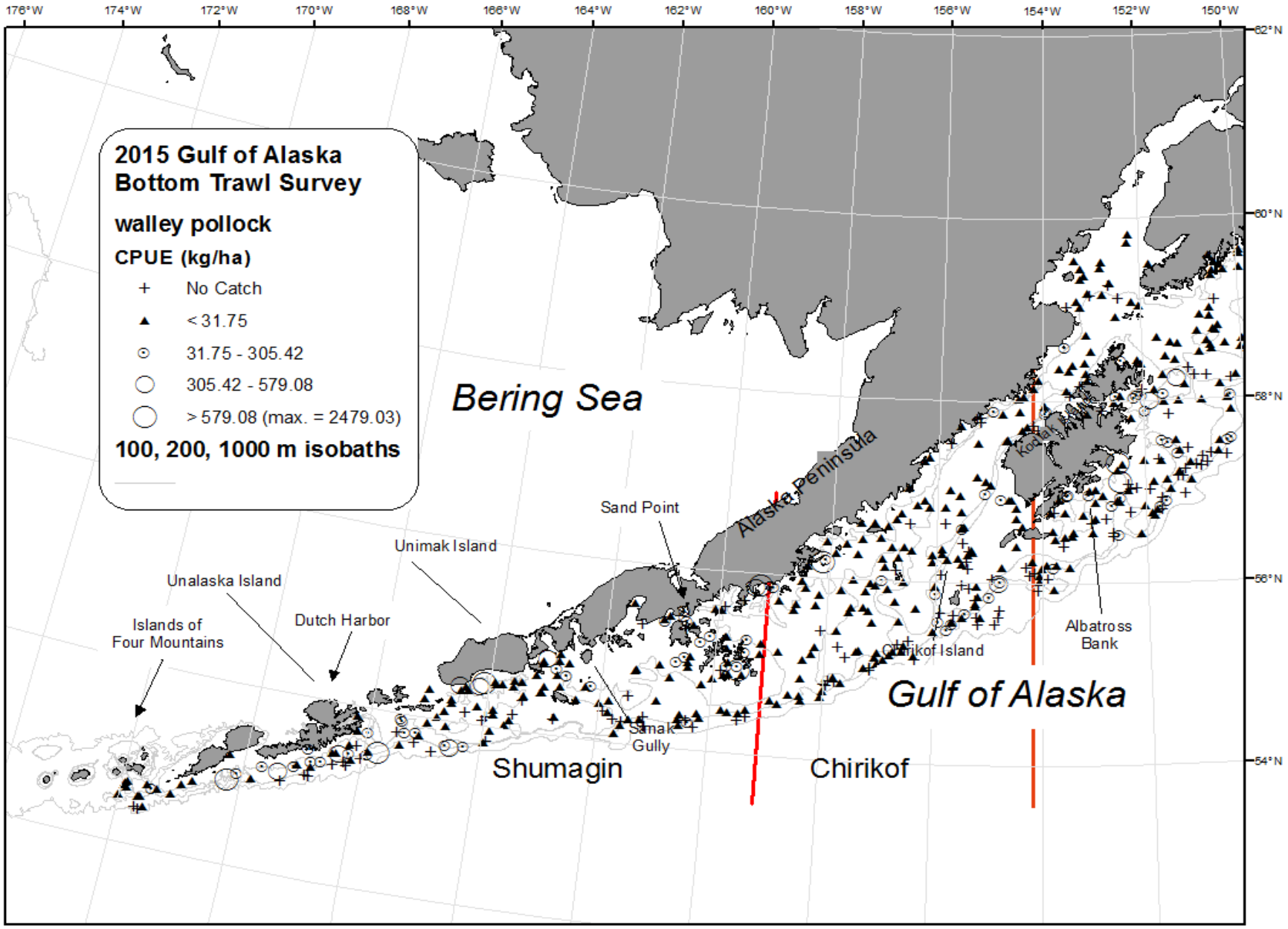

Figure 18. -- Distribution and relative abundance of walleye pollock from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

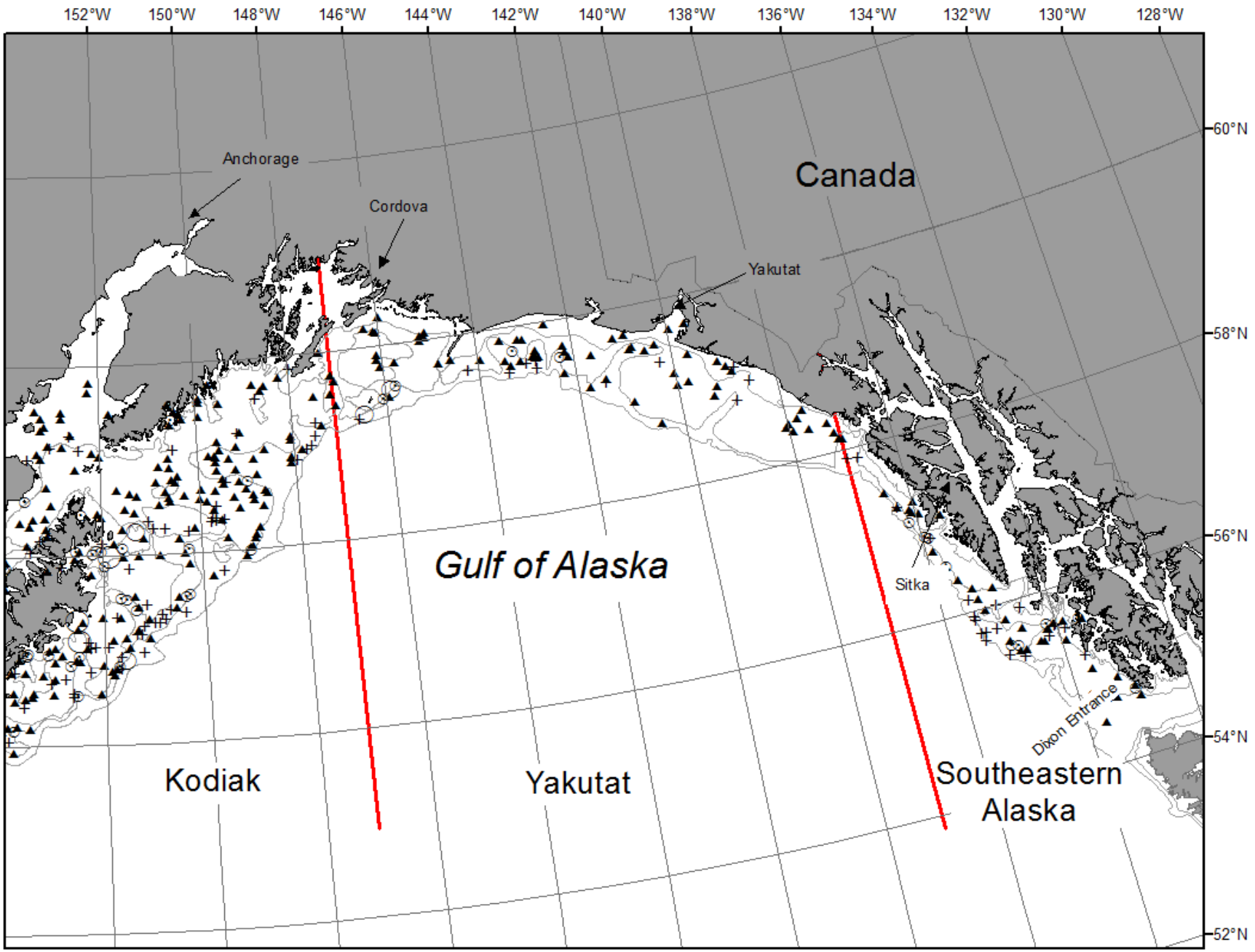

Figure 18. -- Continued (walleye pollock).

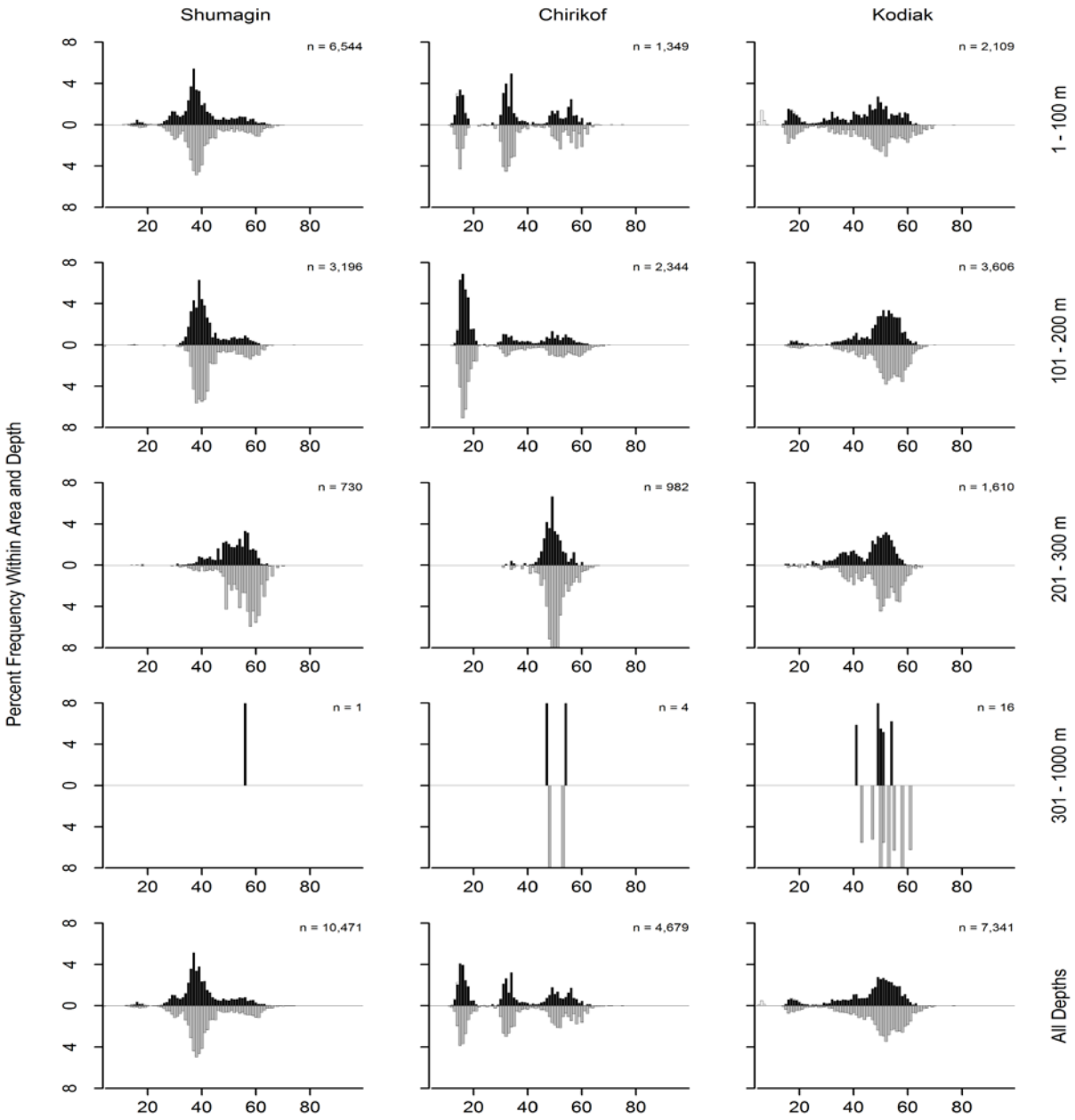

Figure 19. -- Size composition of walleye pollock from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

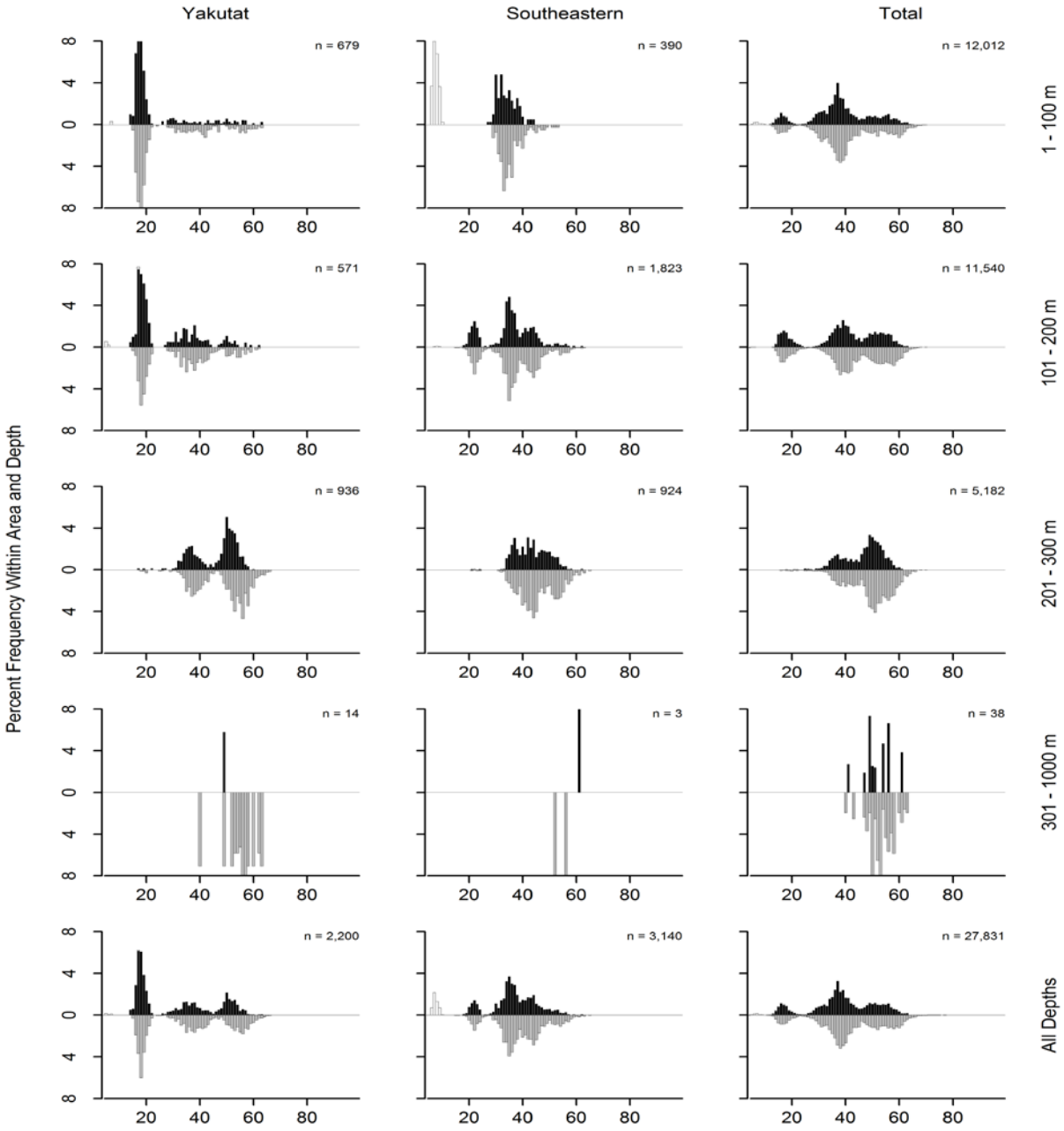

Figure 19. -- Continued (walleye pollock).

Table 28. -- Catch per unit of effort by stratum for walleye pollock sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	101 - 200	Albatross Gullies	29	25	120.88	95634.30	27,052	164,216
Shumagin	1 - 100	Lower Alaska Peninsula	19	17	112.66	77463.10	12,469	142,457
Kodiak	201 - 300	Kodiak Slope	8	8	97.38	15801.20	5,981	25,621
Chirikof	201 - 300	Chirikof Slope	10	10	93.96	14360.70	1,076	27,645
Shumagin	1 - 100	Davidson Bank	44	35	93.89	128451.70	0	291,005
Shumagin	101 - 200	Shumagin Outer Shelf	41	37	86.51	70536.40	21,436	119,637
Yakutat	201 - 300	Yakutat Slope	9	9	79.96	17011.20	0	36,678
Kodiak	1 - 100	Albatross Shallows	20	18	77.40	44628.30	0	115,654
Shumagin	1 - 100	Shumagin Bank	31	28	59.75	74088.30	14,251	133,926
Chirikof	1 - 100	Upper Alaska Peninsula	17	13	53.33	42347.00	0	116,043
Shumagin	1 - 100	Fox Islands	13	12	39.30	32745.10	0	67,042
Shumagin	201 - 300	Shumagin Slope	21	15	38.33	10687.40	0	23,721
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	9	30.04	12604.60	3,031	22,179
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	12	25.58	10045.60	411	19,680
Shumagin	101 - 200	Sanak Gully	5	5	22.81	9685.30	0	33,601
Chirikof	101 - 200	Shelikof Edge	34	32	22.03	17037.00	6,002	28,072
Chirikof	1 - 100	Chirikof Bank	26	17	13.39	14444.80	0	40,001
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	11.15	1254.80	0	2,890
Yakutat	201 - 300	Yakutat Gullies	9	9	10.34	3147.00	284	6,010
Kodiak	1 - 100	Kenai Peninsula	9	8	10.33	5431.90	732	10,132
Kodiak	201 - 300	Kenai Gullies	16	16	6.67	4438.30	2,076	6,801
Southeastern	101 - 200	Prince of Wales Shelf	16	13	6.39	4399.20	0	9,046
Southeastern	1 - 100	Southeastern Shallows	9	6	5.35	3502.20	0	8,963
Chirikof	101 - 200	East Shumagin Gully	20	19	5.19	5764.70	163	11,366
Yakutat	101 - 200	Middleton Shelf	6	6	4.94	3627.50	0	9,993
Kodiak	101 - 200	Barren Islands	18	15	4.00	4392.60	1,582	7,203
Kodiak	101 - 200	Portlock Flats	33	27	3.77	2768.10	0	6,055
Chirikof	101 - 200	Chirikof Outer Shelf	32	22	3.72	1864.10	228	3,500
Yakutat	1 - 100	Yakutat Shallows	10	8	3.69	3672.20	0	8,381
Yakutat	1 - 100	Middleton Shallows	9	9	2.77	1862.70	758	2,967
Kodiak	1 - 100	Northern Kodiak Shallows	9	4	2.68	589.60	0	1,377
Kodiak	101 - 200	Kenai Flats	15	12	2.03	2449.50	0	5,086
Kodiak	201 - 300	Upper Shelikof Gully	4	4	2.03	649.80	0	1,475
Yakutat	101 - 200	Fairweather Shelf	9	8	1.99	1535.00	513	2,557
Kodiak	101 - 200	Kodiak Outer Shelf	32	21	1.87	940.70	227	1,654
Yakutat	101 - 200	Yakataga Shelf	8	8	1.87	984.30	264	1,704
Chirikof	201 - 300	Lower Shelikof Gully	11	10	1.43	1428.40	536	2,321
Yakutat	301 - 500	Yakutat Slope	7	4	0.97	147.00	0	377
Chirikof	1 - 100	Semidi Bank	16	13	0.96	702.90	131	1,274
Shumagin	101 - 200	West Shumagin Gully	4	3	0.83	188.50	0	432
Kodiak	1 - 100	Lower Cook Inlet	15	13	0.69	685.80	245	1,127
Kodiak	301 - 500	Kodiak Slope	8	5	0.65	188.20	0	376
Yakutat	101 - 200	Yakutat Flats	8	7	0.45	402.20	0	890
Kodiak	1 - 100	Albatross Banks	33	20	0.33	502.10	192	812
Kodiak	501 - 700	Kodiak Slope	3	2	0.29	49.70	0	158
Yakutat	301 - 500	Yakutat Gullies	2	1	0.26	28.70	0	393
Southeastern	301 - 500	Southeastern Deep Gullies	4	2	0.23	54.40	0	157
Chirikof	301 - 500	Chirikof Slope	6	3	0.21	33.50	0	73
Shumagin	501 - 700	Shumagin Slope	3	1	0.19	38.60	0	205
Southeastern	301 - 500	Southeastern Slope	4	1	0.10	8.10	0	34
Chirikof	501 - 700	Chirikof Slope	4	1	0.09	17.70	0	74

Pacific cod (*Gadus macrocephalus*)

Pacific cod was the sixth most abundant species caught in the 2015 survey and was among the 20 most abundant species in all five INPFC areas (Table 2). Pacific cod were caught almost exclusively at depths less than 300 m (Table 29). The highest densities occurred at depths less than 200 m in the Shumagin and Kodiak regions (Fig. 20 and Table 30). Size was relatively constant with depth and region (Fig. 21). The estimated biomass of Pacific cod was 253,694 t, with 58% concentrated at depths less than 100 m (Table 29).

Table 29. -- Number of survey hauls, number of hauls with Pacific cod, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	95	23.02	95,055	52,193	137,917	1.200
	101 - 200	50	42	4.93	7,240	4,284	10,195	1.896
	201 - 300	21	13	3.21	894	200	1,587	1.679
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	150	15.82	103,188	60,226	146,150	1.235
Chirikof	1 - 100	59	47	5.02	13,081	9,314	16,847	1.200
	101 - 200	86	66	8.89	21,209	13,699	28,718	1.576
	201 - 300	21	13	1.77	2,042	240	3,844	1.687
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	126	5.34	36,332	27,858	44,805	1.421
Kodiak	1 - 100	86	63	7.64	29,436	11,680	47,191	1.022
	101 - 200	127	94	13.54	58,692	38,855	78,529	1.335
	201 - 300	28	11	1.74	2,001	166	3,837	1.573
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	168	8.88	90,129	63,860	116,397	1.217
Yakutat	1 - 100	19	12	6.2	10,333	0	27,123	2.437
	101 - 200	31	10	1.6	4,691	373	9,010	2.640
	201 - 300	18	10	2.63	1,358	456	2,259	1.730
	301 - 500	9	1	0.04	9	0	32	1.136
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	33	2.87	16,391	0	33,574	2.407
Southeastern	1 - 100	9	5	1.29	846	0	2,066	0.562
	101 - 200	27	21	3.93	4,359	2,745	5,973	1.316
	201 - 300	18	11	4.81	2,428	312	4,545	1.575
	301 - 500	8	1	0.07	22	0	84	2.305
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	38	2.73	7,655	4,849	10,462	1.201
All areas	1 - 100	280	222	11.53	148,750	99,946	197,553	1.193
	101 - 200	321	233	7.86	96,190	74,350	118,031	1.450
	201 - 300	106	58	2.42	8,723	5,428	12,017	1.633
	301 - 500	37	2	0.02	32	0	88	1.765
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	515	7.93	253,694	200,760	306,629	1.292

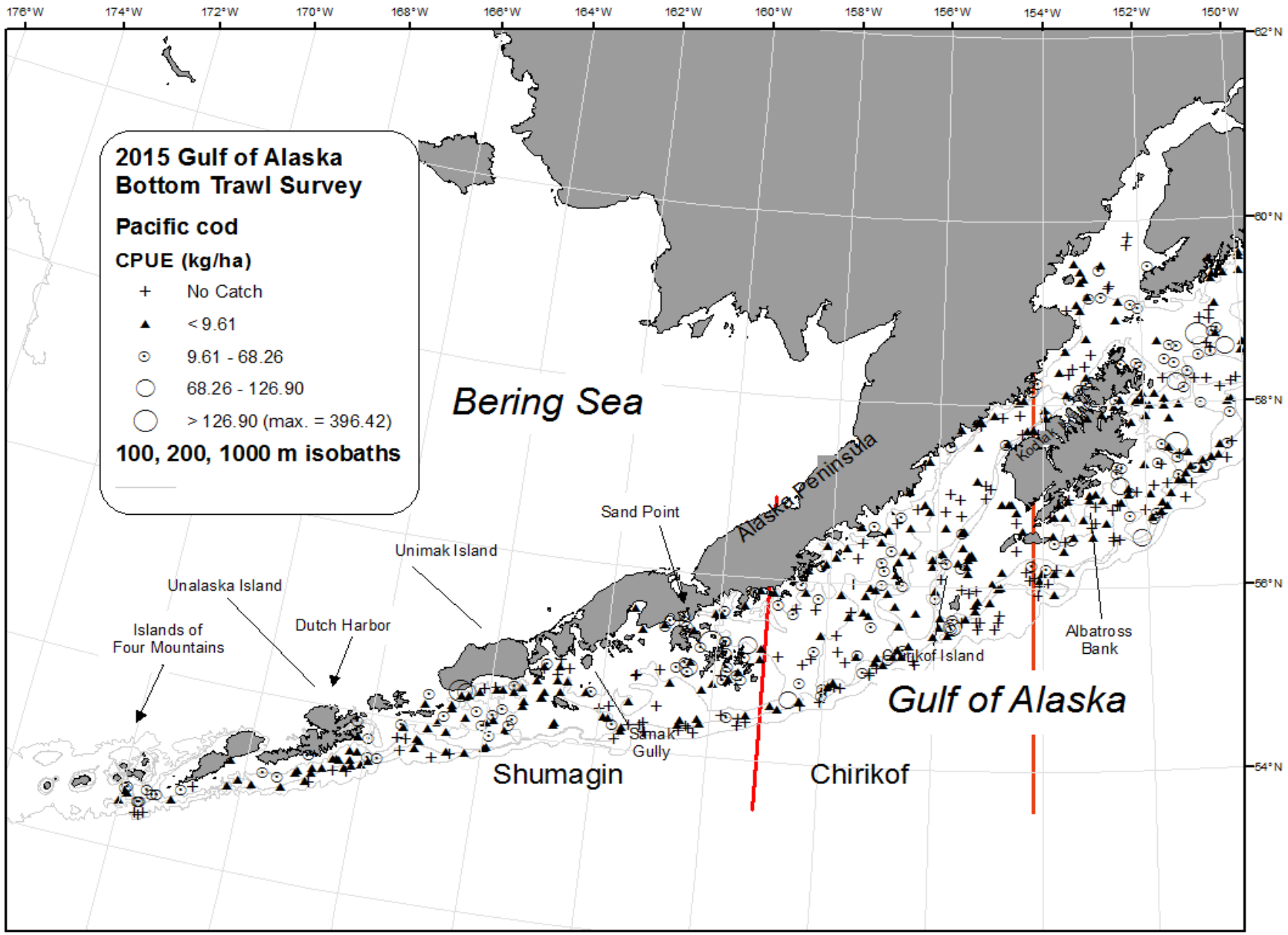

Figure 20. -- Distribution and relative abundance of Pacific cod from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

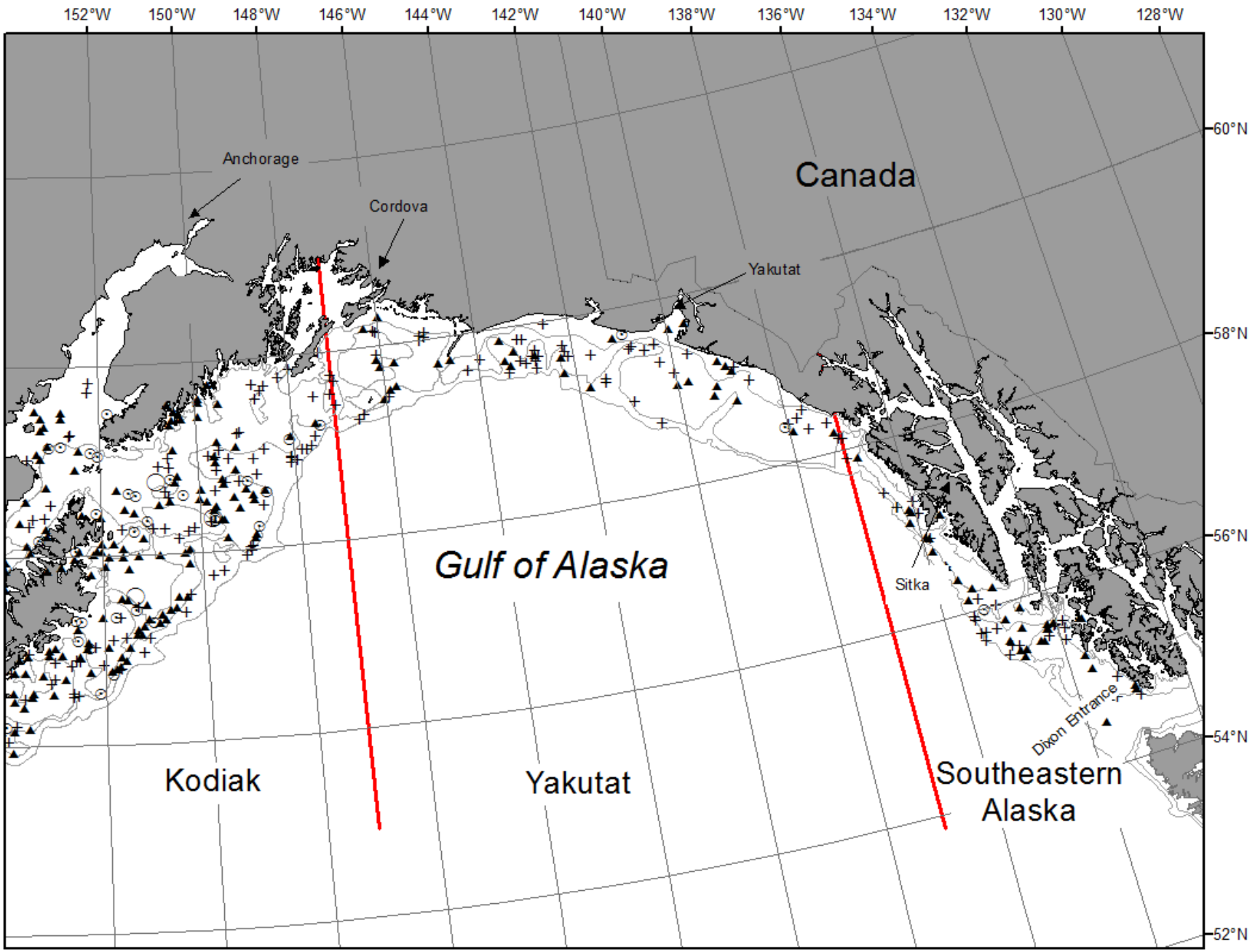

Figure 20. -- Continued (Pacific cod).

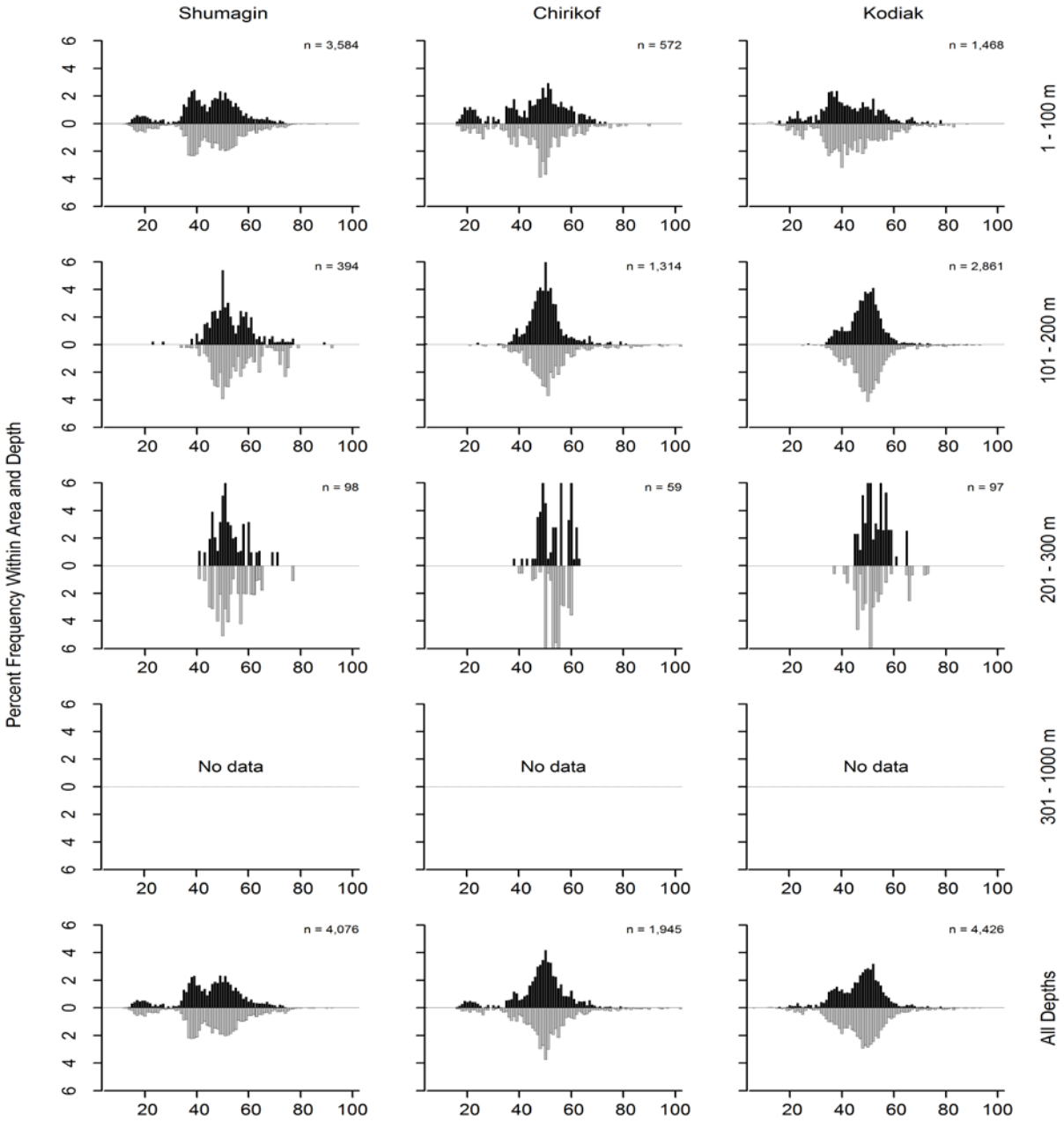

Figure 21. -- Size composition of Pacific cod from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

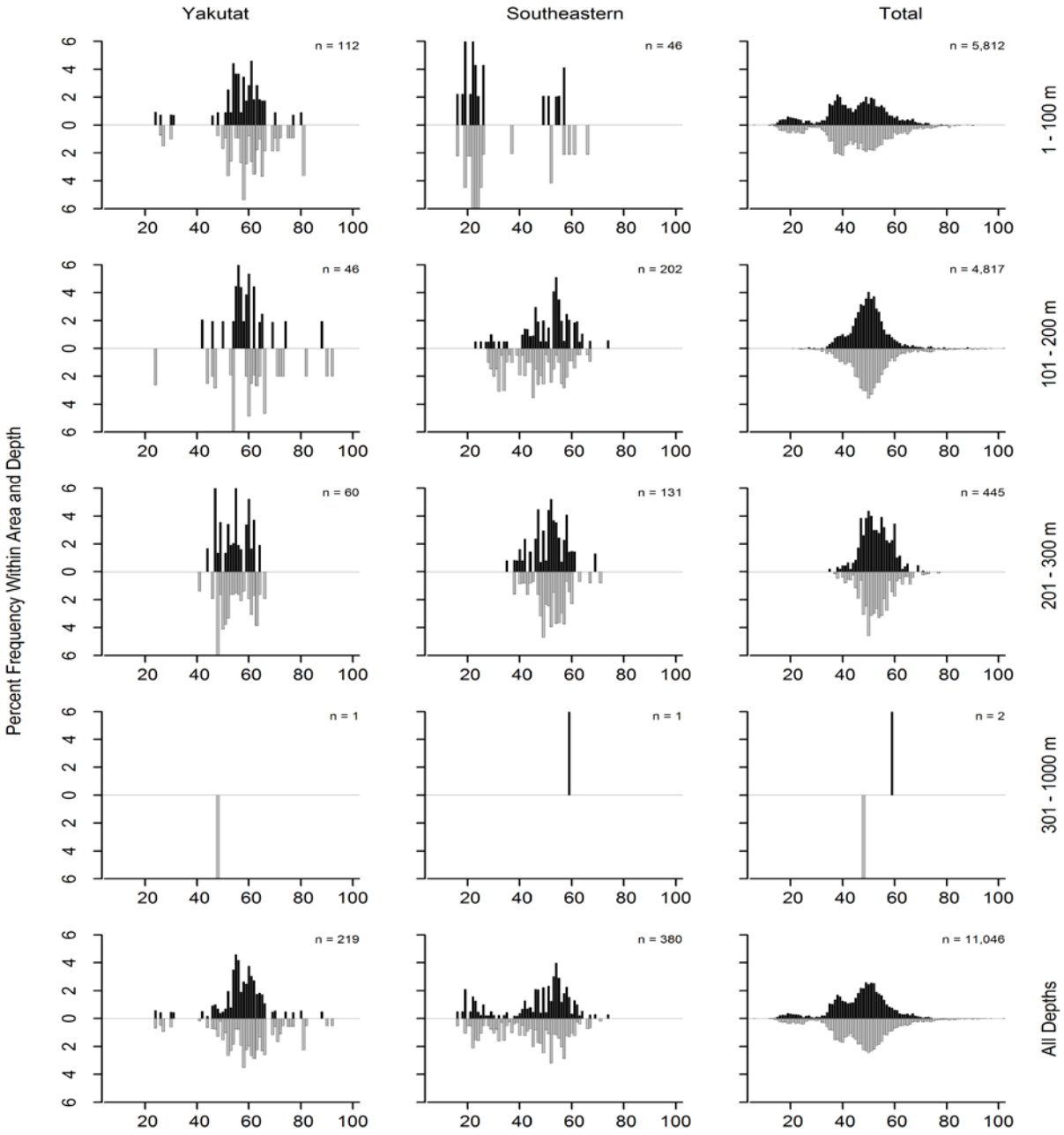

Figure 21. – Continued (Pacific cod).

Table 30. -- Catch per unit of effort by stratum for Pacific cod sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Shumagin	1 - 100	Shumagin Bank	31	27	29.49	36,567	8,531	64,603
Kodiak	101 - 200	Portlock Flats	33	27	29.26	21,464	6,361	36,568
Shumagin	1 - 100	Davidson Bank	44	42	27.29	37,331	5,521	69,141
Kodiak	101 - 200	Barren Islands	18	14	19.50	21,407	10,147	32,667
Chirikof	101 - 200	Chirikof Outer Shelf	32	25	17.54	8,787	3,251	14,323
Shumagin	1 - 100	Lower Alaska Peninsula	19	15	15.19	10,443	3,558	17,329
Shumagin	1 - 100	Fox Islands	13	11	12.86	10,714	3,068	18,361
Kodiak	101 - 200	Kodiak Outer Shelf	32	26	12.16	6,111	2,421	9,802
Kodiak	101 - 200	Albatross Gullies	29	21	10.92	8,641	2,251	15,031
Kodiak	1 - 100	Albatross Banks	33	21	10.57	16,280	0	33,066
Kodiak	1 - 100	Northern Kodiak Shallows	9	8	9.82	2,161	30	4,292
Yakutat	1 - 100	Yakutat Shallows	10	7	9.62	9,566	0	26,598
Chirikof	101 - 200	Shelikof Edge	34	29	9.10	7,035	3,193	10,878
Kodiak	1 - 100	Albatross Shallows	20	17	7.84	4,520	2,209	6,830
Chirikof	1 - 100	Upper Alaska Peninsula	17	15	7.57	6,010	3,536	8,483
Shumagin	101 - 200	Shumagin Outer Shelf	41	36	6.32	5,154	2,852	7,456
Yakutat	201 - 300	Yakutat Slope	9	6	5.56	1,183	270	2,097
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	10	5.40	2,122	81	4,162
Chirikof	1 - 100	Semidi Bank	16	12	5.06	3,694	1,625	5,762
Chirikof	101 - 200	East Shumagin Gully	20	12	4.85	5,386	1,813	8,959
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	10	4.69	1,966	985	2,948
Kodiak	1 - 100	Lower Cook Inlet	15	10	4.49	4,436	0	9,454
Kodiak	201 - 300	Kodiak Slope	8	5	4.42	717	0	1,758
Yakutat	101 - 200	Fairweather Shelf	9	4	4.24	3,274	0	7,591
Shumagin	101 - 200	West Shumagin Gully	4	4	4.15	945	0	2,514
Kodiak	1 - 100	Kenai Peninsula	9	7	3.88	2,040	438	3,641
Southeastern	101 - 200	Prince of Wales Shelf	16	11	3.47	2,393	1,016	3,770
Shumagin	201 - 300	Shumagin Slope	21	13	3.21	894	198	1,589
Chirikof	1 - 100	Chirikof Bank	26	20	3.13	3,377	1,148	5,606
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	2.72	306	0	1,282
Shumagin	101 - 200	Sanak Gully	5	2	2.69	1,141	0	3,084
Kodiak	201 - 300	Upper Shelikof Gully	4	2	2.55	818	0	2,571
Chirikof	201 - 300	Lower Shelikof Gully	11	6	1.82	1,820	19	3,620
Chirikof	201 - 300	Chirikof Slope	10	7	1.46	222	0	519
Southeastern	1 - 100	Southeastern Shallows	9	5	1.29	846	0	2,090
Yakutat	1 - 100	Middleton Shallows	9	5	1.14	767	59	1,474
Yakutat	101 - 200	Yakutat Flats	8	4	1.14	1,028	0	2,525
Kodiak	101 - 200	Kenai Flats	15	6	0.89	1,069	223	1,914
Kodiak	201 - 300	Kenai Gullies	16	4	0.70	466	0	1,011
Yakutat	201 - 300	Yakutat Gullies	9	4	0.57	174	0	361
Yakutat	101 - 200	Middleton Shelf	6	2	0.53	389	0	1,171
Southeastern	301 - 500	Southeastern Slope	4	1	0.29	22	0	93
Yakutat	301 - 500	Yakutat Slope	7	1	0.06	9	0	32

Atka mackerel (*Pleurogrammus monopterygius*)

Although Atka mackerel was not among the 20 most abundant species caught in the 2015 survey, it was the tenth most abundant species in the Shumagin INPFC area (Table 2). The bulk of the estimated biomass was concentrated in the Shumagin region (79%), with most of the remainder in the Chirikof region (Table 31). The highest densities occurred at depths less than 100 m, with a particularly high concentration in the Davidson Bank stratum in the Shumagin INPFC area (Fig. 22 and Table 32). Size was variable for both sexes with no distinct depth or longitudinal trends (Fig. 23). The estimated biomass of Atka mackerel was 28,816 t, and 84% of it was concentrated at depths less than 100 m (Table 31).

Table 31. -- Number of survey hauls, number of hauls with Atka mackerel, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	23	5.16	21,313	0	57,314	1.044
	101 - 200	50	26	0.97	1,420	294	2,546	0.878
	201 - 300	21	1	0.01	3	0	10	0.656
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	50	3.49	22,737	0	58,755	1.032
Chirikof	1 - 100	59	6	0.95	2,467	0	7,157	1.332
	101 - 200	86	20	0.65	1,562	225	2,898	1.014
	201 - 300	21	6	0.29	340	0	751	1.074
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	32	0.64	4,368	0	9,191	1.178
Kodiak	1 - 100	86	3	0.11	423	0	1,004	0.932
	101 - 200	127	22	0.26	1,143	348	1,938	1.117
	201 - 300	28	4	0.1	110	0	238	0.984
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	29	0.17	1,676	680	2,671	1.055
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	4	0.07	36	3	69	0.942
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	4	0.01	36	3	69	0.942
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	32	1.88	24,203	0	60,484	1.066
	101 - 200	321	68	0.34	4,125	2,208	6,042	0.987
	201 - 300	106	15	0.14	489	66	912	1.038
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	115	0.9	28,816	0	65,150	1.053

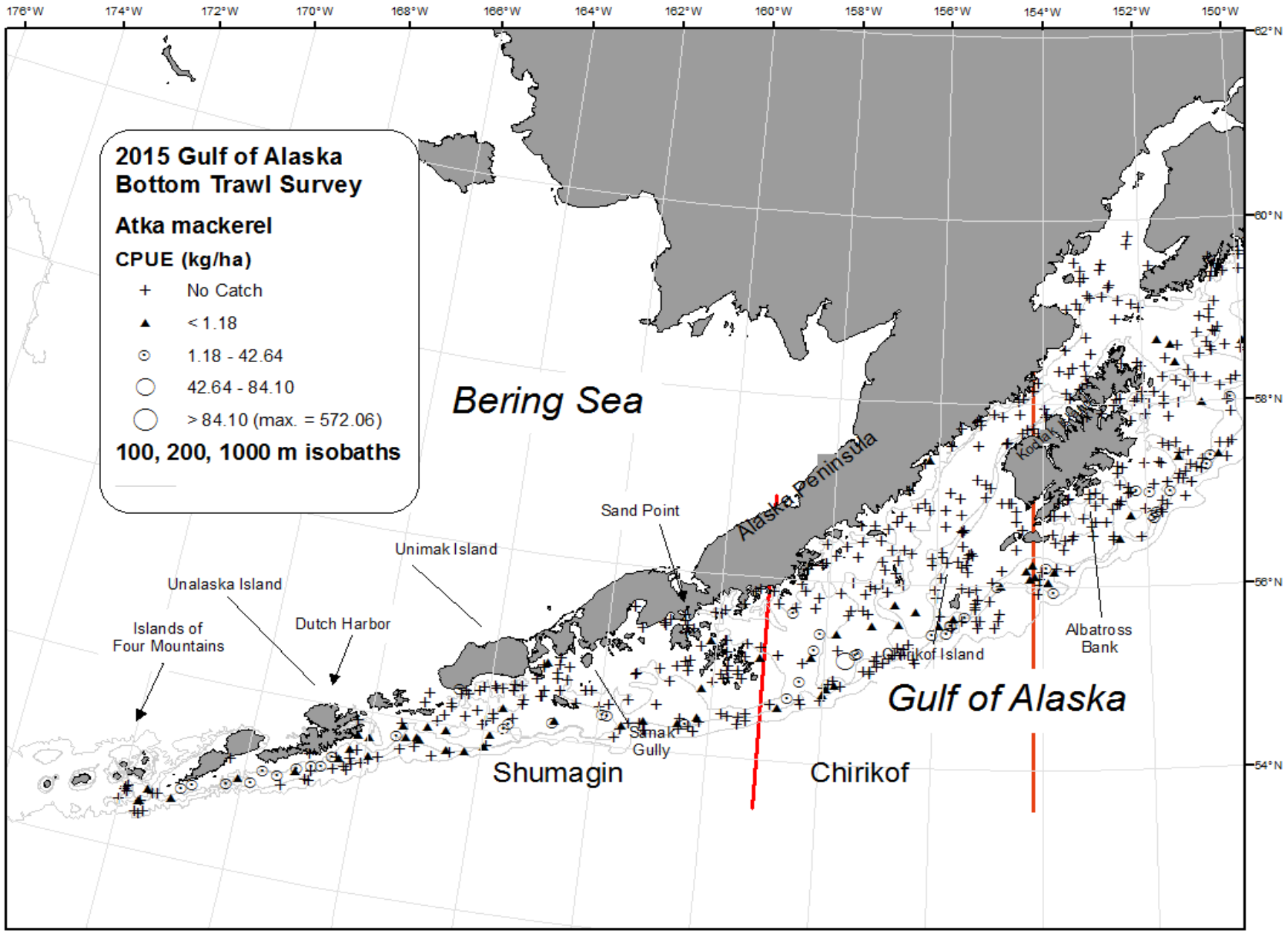

Figure 22. -- Distribution and relative abundance of Atka mackerel from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

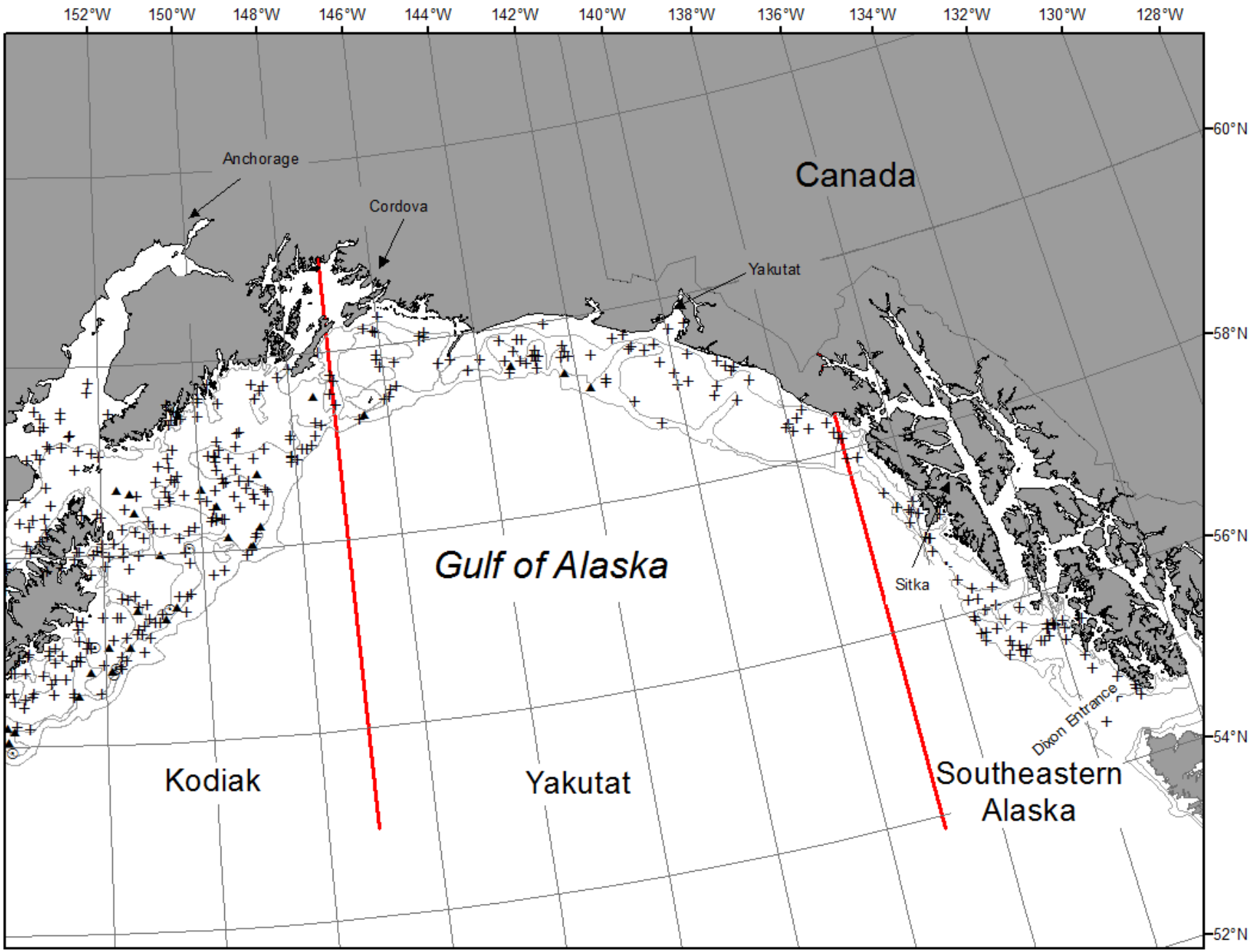

Figure 22. -- Continued (Atka mackerel).

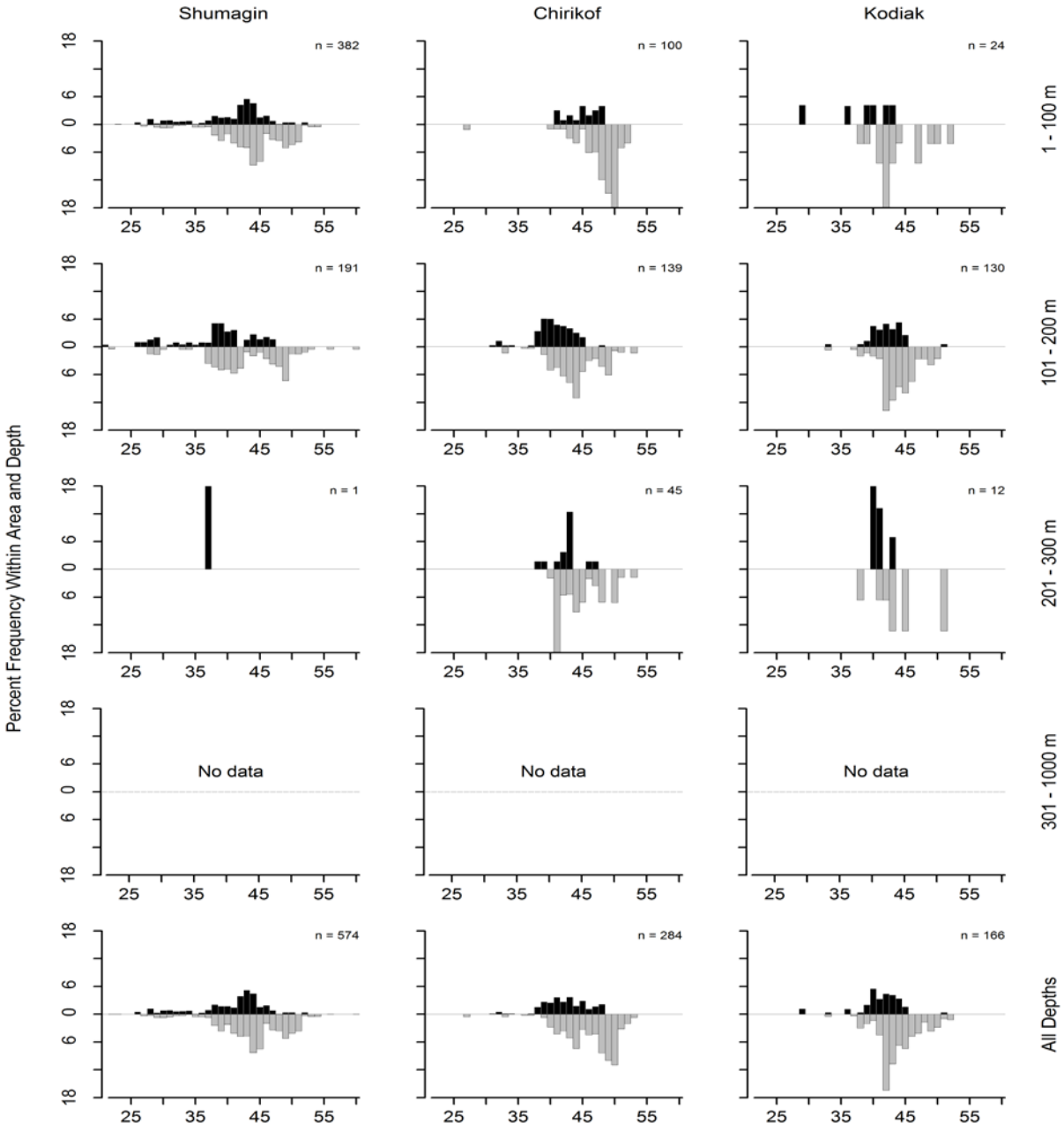

Figure 23. -- Size composition of Atka mackerel from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

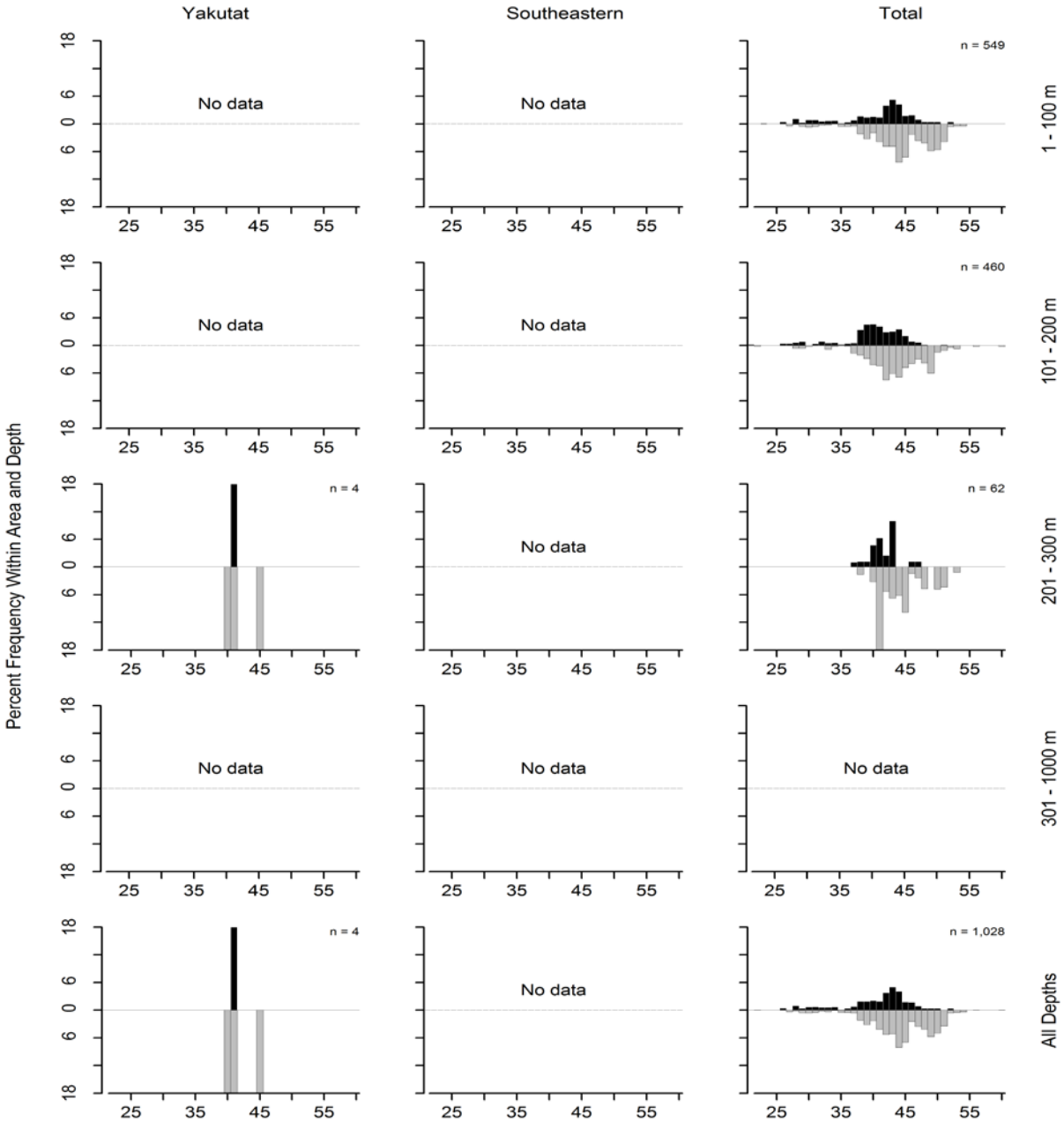

Figure 23. -- Continued (Atka mackerel).

Table 32. -- Catch per unit of effort by stratum for Atka mackerel sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Shumagin	1 - 100	Davidson Bank	44	12	13.59	18,589	0	54,506
Chirikof	1 - 100	Semidi Bank	16	5	3.37	2,462	0	7,177
Shumagin	1 - 100	Fox Islands	13	7	3.19	2,654	1	5,308
Shumagin	101 - 200	Shumagin Outer Shelf	41	26	1.74	1,420	294	2,547
Chirikof	201 - 300	Chirikof Slope	10	4	1.74	266	0	694
Kodiak	101 - 200	Kodiak Outer Shelf	32	11	1.62	813	55	1,571
Chirikof	101 - 200	Chirikof Outer Shelf	32	14	1.16	582	70	1,094
Chirikof	101 - 200	East Shumagin Gully	20	5	0.87	969	0	2,207
Kodiak	201 - 300	Kodiak Slope	8	3	0.37	60	0	145
Kodiak	1 - 100	Albatross Banks	33	3	0.27	423	0	1,004
Kodiak	101 - 200	Albatross Gullies	29	4	0.20	157	0	406
Yakutat	201 - 300	Yakutat Slope	9	4	0.17	36	3	69
Kodiak	101 - 200	Barren Islands	18	3	0.10	113	0	249
Kodiak	201 - 300	Kenai Gullies	16	1	0.07	50	0	155
Chirikof	201 - 300	Lower Shelikof Gully	11	2	0.07	74	0	187
Kodiak	101 - 200	Portlock Flats	33	3	0.04	32	0	68
Shumagin	1 - 100	Shumagin Bank	31	3	0.04	50	0	110
Shumagin	1 - 100	Lower Alaska Peninsula	19	1	0.03	20	0	62
Kodiak	101 - 200	Kenai Flats	15	1	0.02	29	0	92
Chirikof	101 - 200	Shelikof Edge	34	1	0.01	11	0	32
Shumagin	201 - 300	Shumagin Slope	21	1	0.01	3	0	10
Chirikof	1 - 100	Upper Alaska Peninsula	17	1	0.01	4	0	14

Sablefish (*Anoplopoma fimbria*)

Sablefish was the eighth most abundant species caught in the 2015 survey, and was the fifth most abundant species in the Yakutat area (Table 2). Sablefish were relatively abundant throughout the survey area and in all depth intervals (Table 33). The highest densities occurred at depths deeper than 500 m, with particularly high concentrations in the Kodiak, Southeastern, and Yakutat slope strata (Fig. 24 and Table 34). Size generally increased with depth in all regions, but was relatively constant going from west to east (Fig. 25). The estimated biomass of sablefish was 159,199 t, and the highest regional biomass was in the Kodiak region. Approximately 58% of the estimated biomass was concentrated at depths deeper than 500 m (Table 33).

Table 33. -- Number of survey hauls, number of hauls with sablefish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	23	1.33	5,481	68	10,894	0.342
	101 - 200	50	8	0.74	1,092	0	2,267	0.513
	201 - 300	21	14	3.38	941	198	1,684	1.586
	301 - 500	6	6	8.04	2,034	0	4,072	1.921
	501 - 700	3	3	5.75	1,153	0	3,202	3.440
	701 - 1000	2	1	2.57	497	0	2,637	4.362
	All depths	189	55	1.72	11,199	5,184	17,213	0.553
Chirikof	1 - 100	59	5	0.14	377	0	874	0.305
	101 - 200	86	16	0.07	172	74	270	0.529
	201 - 300	21	15	3.99	4,605	456	8,754	2.000
	301 - 500	6	6	14.57	2,337	482	4,191	2.279
	501 - 700	4	4	18.01	3,517	598	6,436	2.825
	701 - 1000	3	3	13.17	4,038	430	7,646	2.585
	All depths	179	49	2.21	15,045	9,608	20,481	1.955
Kodiak	1 - 100	86	16	0.54	2,074	154	3,993	0.369
	101 - 200	127	45	0.84	3,646	1,499	5,793	1.128
	201 - 300	28	18	4.54	5,215	1,642	8,788	2.396
	301 - 500	8	8	33.28	9,690	6,102	13,278	2.629
	501 - 700	3	3	96.15	16,777	1,147	32,408	3.754
	701 - 1000	4	4	102.64	35,862	9,887	61,837	3.630
	All depths	256	94	7.22	73,263	45,224	101,302	2.521
Yakutat	1 - 100	19	12	0.55	915	237	1,593	0.432
	101 - 200	31	16	3.09	9,076	906	17,246	0.572
	201 - 300	18	16	6.56	3,393	1,307	5,479	1.974
	301 - 500	9	9	30.69	8,064	3,249	12,880	2.774
	501 - 700	2	2	64.22	9,436	7,942	10,929	2.819
	701 - 1000	1	1	43.24	8,161	---	---	3.004
	All depths	80	56	6.83	39,045	29,569	48,521	1.362
Southeastern	1 - 100	9	2	1.09	713	0	1,804	0.758
	101 - 200	27	14	1.21	1,339	554	2,124	0.809
	201 - 300	18	10	3.22	1,626	519	2,734	2.140
	301 - 500	8	6	12.46	3,885	0	9,581	2.831
	501 - 700	4	4	27.86	2,880	1,623	4,137	2.424
	701 - 1000	2	2	84.6	10,206	0	34,920	3.681
	All depths	68	38	7.36	20,648	1,020	40,276	2.377
All areas	1 - 100	280	58	0.74	9,559	3,755	15,363	0.369
	101 - 200	321	99	1.25	15,325	6,826	23,824	0.660
	201 - 300	106	73	4.38	15,780	9,995	21,565	2.090
	301 - 500	37	35	20.33	26,010	18,371	33,649	2.588
	501 - 700	16	16	41.14	33,762	19,614	47,910	3.190
	701 - 1000	12	11	50.7	58,764	30,357	87,170	3.448
	All depths	772	292	4.97	159,199	128,996	189,403	1.687

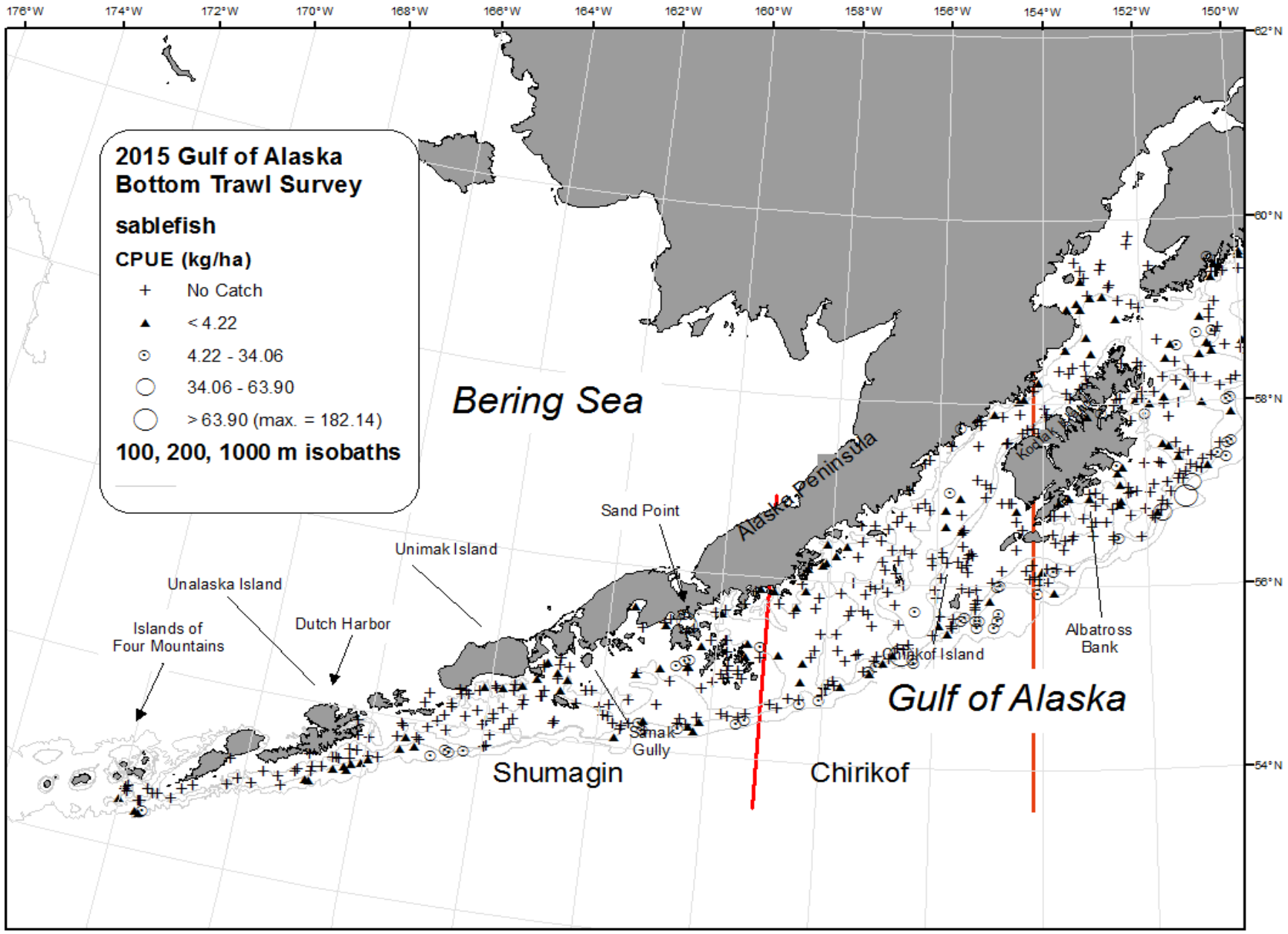

Figure 24. -- Distribution and relative abundance of sablefish from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

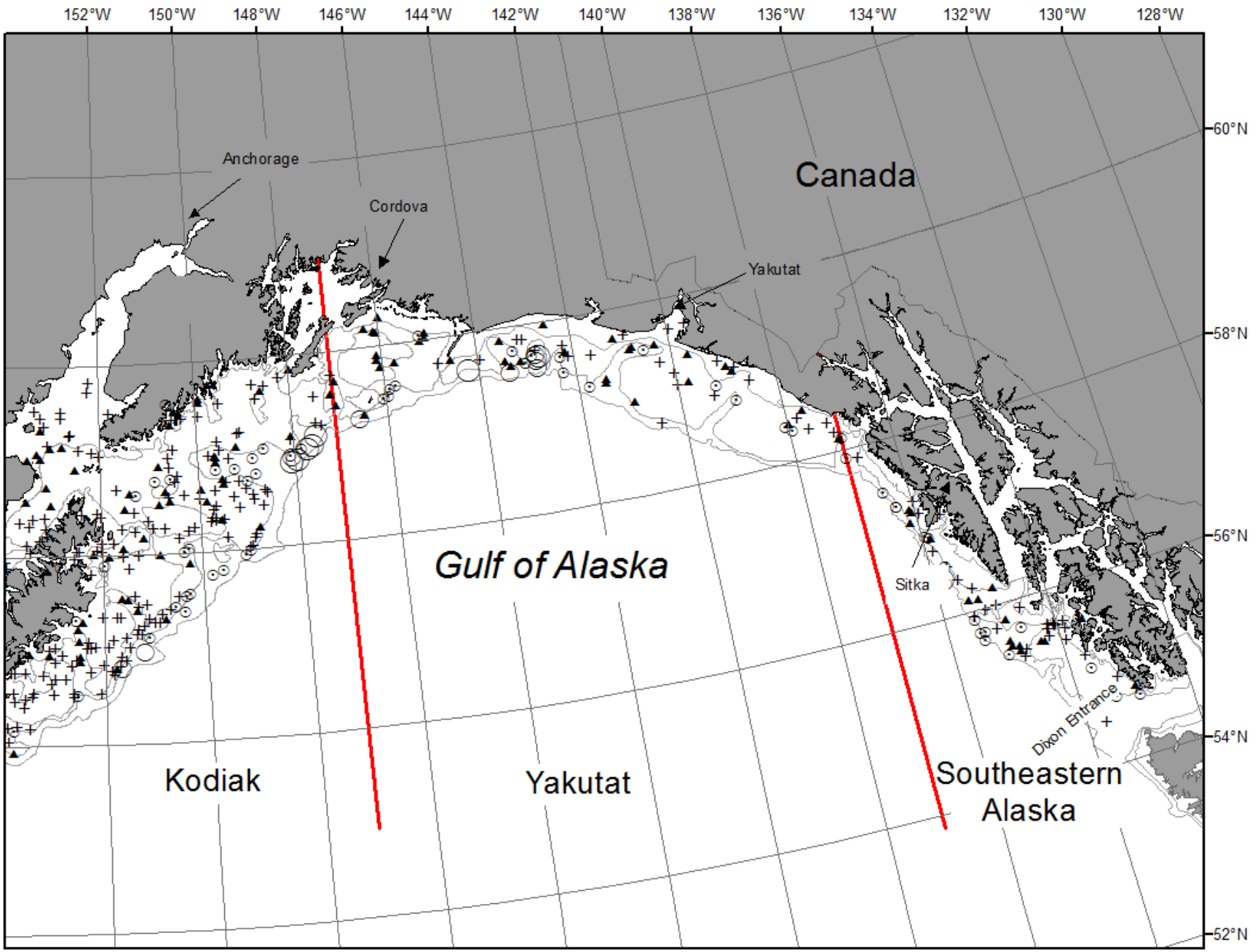

Figure 24. -- Continued (sablefish).

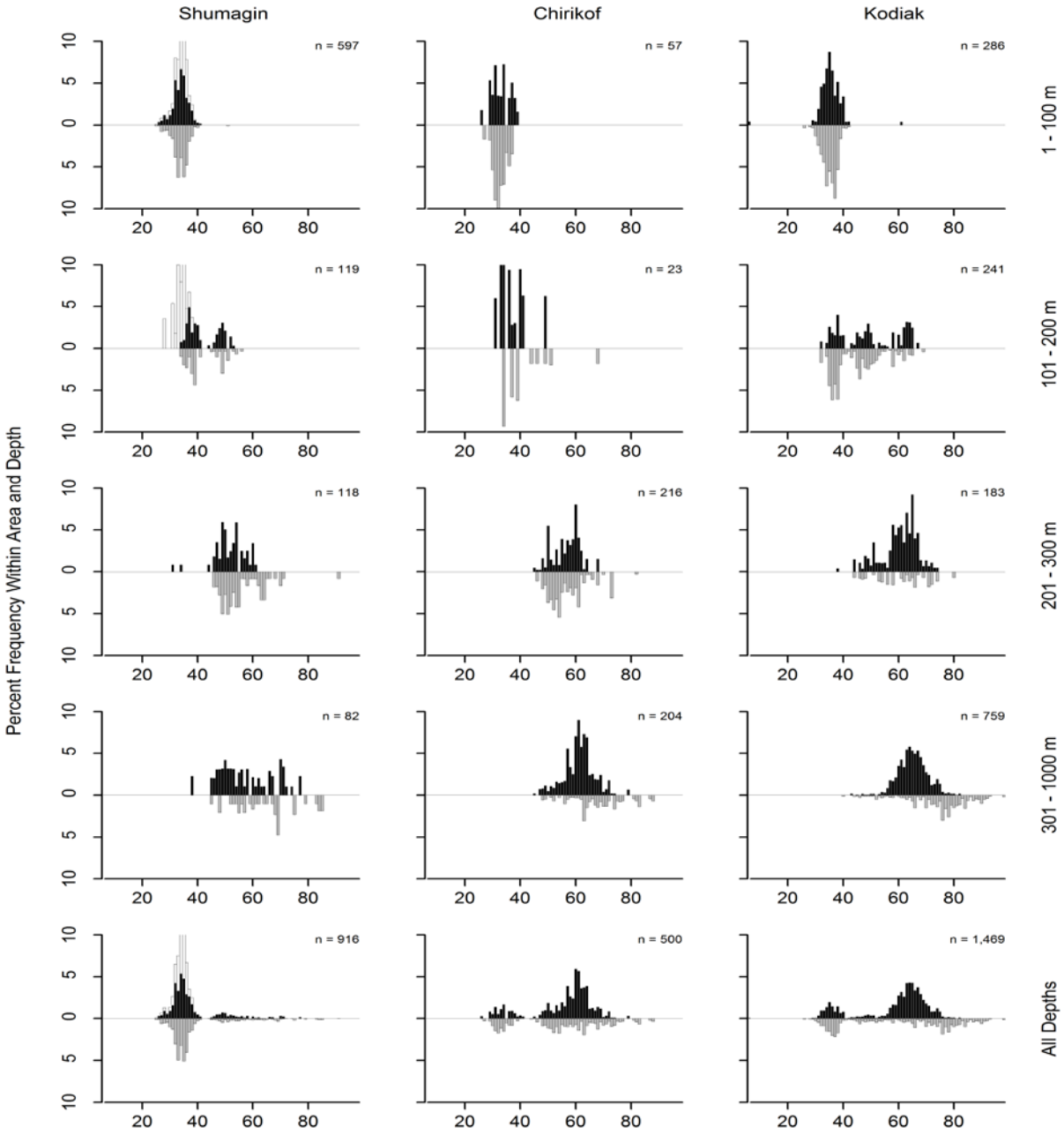

Figure 25. -- Size composition of sablefish from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

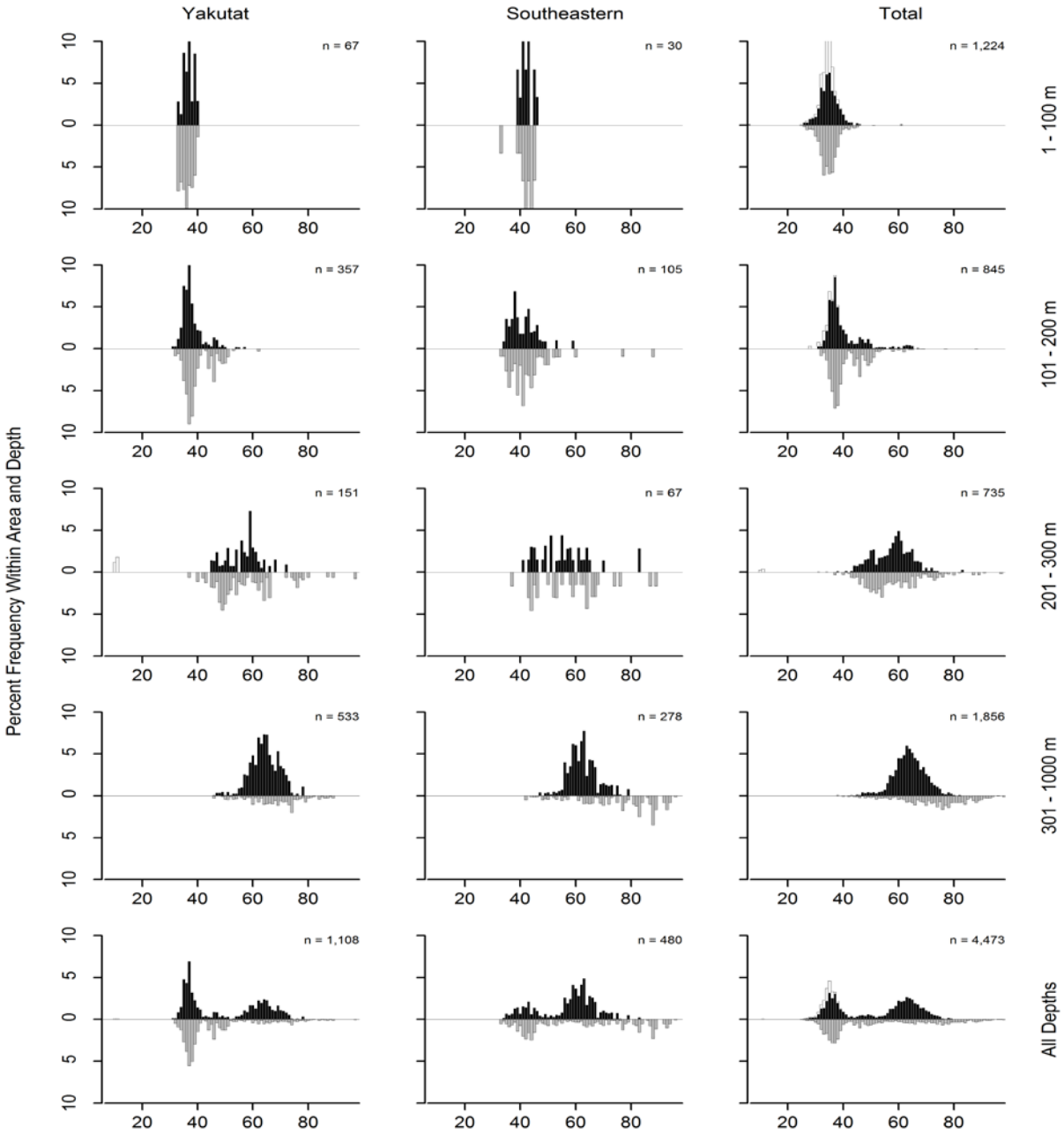

Figure 25. -- Continued (sablefish).

Table 34. -- Catch per unit of effort by stratum for sablefish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	701 - 1000	Kodiak Slope	4	4	102.64	35,862	6,088	65,636
Kodiak	501 - 700	Kodiak Slope	3	3	96.15	16,777	0	37,914
Southeastern	701 - 1000	Southeastern Slope	2	2	84.60	10,206	0	83,182
Yakutat	501 - 700	Yakutat Slope	2	2	64.22	9,436	5,026	13,846
Yakutat	301 - 500	Yakutat Slope	7	7	51.01	7,757	2,793	12,722
Yakutat	701 - 1000	Yakutat Slope	1	1	43.24	8,161		
Kodiak	301 - 500	Kodiak Slope	8	8	33.28	9,690	6,010	13,370
Southeastern	501 - 700	Southeastern Slope	4	4	27.86	2,880	1,439	4,321
Chirikof	501 - 700	Chirikof Slope	4	4	18.01	3,517	171	6,863
Chirikof	201 - 300	Chirikof Slope	10	10	14.78	2,259	0	5,035
Chirikof	301 - 500	Chirikof Slope	6	6	14.57	2,337	388	4,285
Southeastern	301 - 500	Southeastern Deep Gullies	4	3	14.08	3,300	0	9,745
Chirikof	701 - 1000	Chirikof Slope	3	3	13.17	4,038	0	8,918
Yakutat	201 - 300	Yakutat Slope	9	8	10.82	2,302	204	4,399
Kodiak	201 - 300	Kodiak Slope	8	6	10.31	1,674	211	3,136
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	9.17	1,031	0	2,437
Shumagin	301 - 500	Shumagin Slope	6	6	8.04	2,034	0	4,176
Southeastern	301 - 500	Southeastern Slope	4	3	7.58	586	0	1,623
Yakutat	101 - 200	Fairweather Shelf	9	5	6.88	5,315	0	13,288
Shumagin	1 - 100	Lower Alaska Peninsula	19	9	6.44	4,427	0	9,804
Shumagin	501 - 700	Shumagin Slope	3	3	5.75	1,153	0	3,924
Kodiak	201 - 300	Kenai Gullies	16	12	5.32	3,541	182	6,900
Kodiak	1 - 100	Northern Kodiak Shallows	9	2	3.79	835	0	2,713
Yakutat	201 - 300	Yakutat Gullies	9	8	3.59	1,092	403	1,780
Shumagin	201 - 300	Shumagin Slope	21	14	3.38	941	196	1,686
Yakutat	301 - 500	Yakutat Gullies	2	2	2.77	307	0	2,526
Shumagin	701 - 1000	Shumagin Slope	2	1	2.57	497	0	6,817
Chirikof	201 - 300	Lower Shelikof Gully	11	5	2.34	2,345	0	5,533
Yakutat	101 - 200	Middleton Shelf	6	5	2.24	1,648	11	3,285
Yakutat	101 - 200	Yakutat Flats	8	4	2.23	2,015	0	5,628
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	7	2.19	917	268	1,565
Kodiak	101 - 200	Albatross Gullies	29	16	1.65	1,304	137	2,471
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	7	1.52	595	5	1,186
Kodiak	101 - 200	Barren Islands	18	8	1.29	1,414	0	3,155
Kodiak	1 - 100	Kenai Peninsula	9	5	1.29	677	0	1,567
Shumagin	101 - 200	West Shumagin Gully	4	2	1.25	284	0	1,037
Yakutat	1 - 100	Middleton Shallows	9	8	1.13	756	68	1,445
Southeastern	1 - 100	Southeastern Shallows	9	2	1.09	713	0	1,825
Shumagin	1 - 100	Shumagin Bank	31	9	0.82	1,016	0	2,061
Kodiak	101 - 200	Portlock Flats	33	11	0.81	591	100	1,081
Shumagin	101 - 200	Sanak Gully	5	1	0.77	329	0	1,241
Southeastern	101 - 200	Prince of Wales Shelf	16	7	0.61	422	0	951
Shumagin	101 - 200	Shumagin Outer Shelf	41	5	0.59	480	0	1,213
Kodiak	101 - 200	Kodiak Outer Shelf	32	6	0.53	268	0	538
Chirikof	1 - 100	Upper Alaska Peninsula	17	4	0.47	370	0	869
Kodiak	1 - 100	Albatross Shallows	20	4	0.41	233	0	596
Yakutat	101 - 200	Yakataga Shelf	8	2	0.19	98	0	269
Yakutat	1 - 100	Yakutat Shallows	10	4	0.16	158	0	330
Kodiak	1 - 100	Lower Cook Inlet	15	4	0.15	144	0	320
Kodiak	1 - 100	Albatross Banks	33	1	0.12	185	0	562
Chirikof	101 - 200	East Shumagin Gully	20	9	0.09	99	38	160
Chirikof	101 - 200	Chirikof Outer Shelf	32	2	0.08	42	0	114
Kodiak	101 - 200	Kenai Flats	15	4	0.06	70	0	140
Chirikof	101 - 200	Shelikof Edge	34	5	0.04	31	0	62
Shumagin	1 - 100	Davidson Bank	44	5	0.03	39	0	81
Chirikof	1 - 100	Chirikof Bank	26	1	0.01	7	0	21

Giant grenadier (*Albatrossia pectoralis*)

Giant grenadier was the fourth most abundant species caught in the 2015 survey and was among the fourth most abundant species in four of the INPFC areas (Table 2). Giant grenadier were rarely caught at depths less than 300 m but were consistently caught at depths deeper than 500 m (Table 35). The highest densities occurred at depths between 501 and 700 m, with particularly high concentrations in the Kodiak slope stratum (Fig. 26 and Table 36). Size was relatively constant with depth longitude, and females were considerably more abundant than males (Fig. 27). The estimated biomass of giant grenadier was 538,450 t, and the highest regional biomass was in the Kodiak region, where 42% of it was concentrated (Table 35).

Table 35. -- Number of survey hauls, number of hauls with giant grenadier, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	1	0.01	21	0	63	2.518
	201 - 300	21	7	15.83	4,412	0	12,728	3.135
	301 - 500	6	6	101.95	25,804	9,479	42,128	2.980
	501 - 700	3	3	272.59	54,670	0	111,497	2.875
	701 - 1000	2	2	120.20	23,286	0	110,062	2.010
	All depths	189	19	16.59	108,193	36,108	180,278	2.660
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	6	186.38	29,894	0	66,163	2.909
	501 - 700	4	4	212.04	41,416	0	126,261	2.383
	701 - 1000	3	3	103.35	31,682	18,308	45,057	2.787
	All depths	179	13	15.13	102,992	14,994	190,990	2.639
Kodiak	1 - 100	86	0	---	---	---	---	---
	101 - 200	127	0	---	---	---	---	---
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	7	180.05	52,427	20,939	83,914	2.921
	501 - 700	3	3	673.18	117,458	26,014	208,902	2.326
	701 - 1000	4	4	172.13	60,140	20,777	99,504	2.226
	All depths	256	14	22.67	230,025	151,231	308,819	2.409
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	5	14.48	3,806	0	8,063	3.311
	501 - 700	2	2	357.70	52,556	0	159,182	2.642
	701 - 1000	1	1	203.13	38,339	---	---	1.432
	All depths	80	8	16.56	94,701	0	201,608	1.981
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	1	0.98	307	0	1,158	2.792
	501 - 700	4	4	6.00	620	0	1,433	1.546
	701 - 1000	2	2	13.37	1,613	0	7,000	2.133
	All depths	68	7	0.91	2,540	0	8,228	2.004
All areas	1 - 100	280	0	---	---	---	---	---
	101 - 200	321	1	<0.01	21	0	63	2.518
	201 - 300	106	7	1.22	4,412	0	12,728	3.135
	301 - 500	37	25	87.74	112,237	67,280	157,194	2.943
	501 - 700	16	16	325.02	266,720	153,641	379,799	2.488
	701 - 1000	12	12	133.78	155,060	93,788	216,332	2.001
	All depths	772	61	16.83	538,450	410,399	666,502	2.401

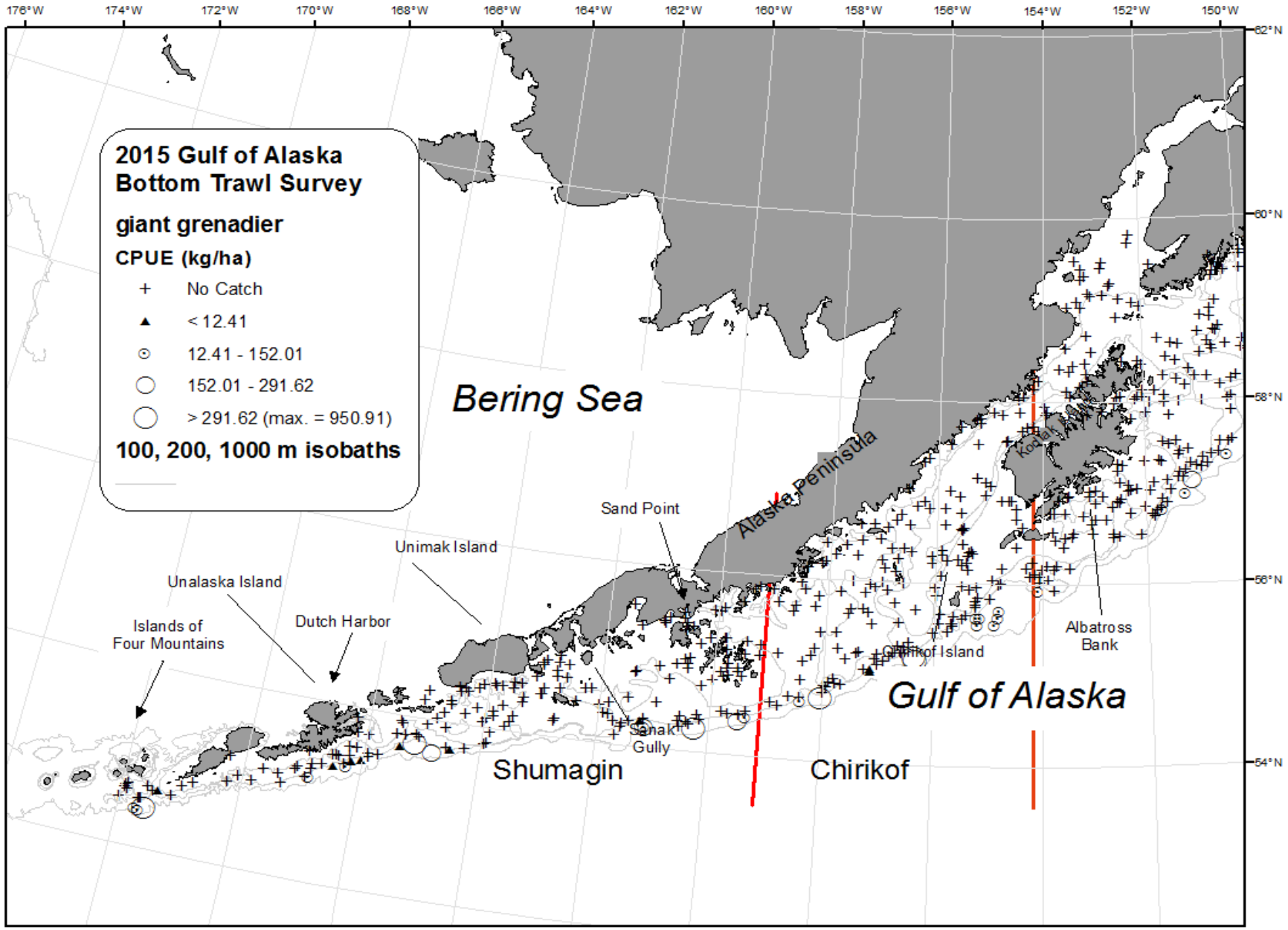

Figure 26. -- Distribution and relative abundance of giant grenadier from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

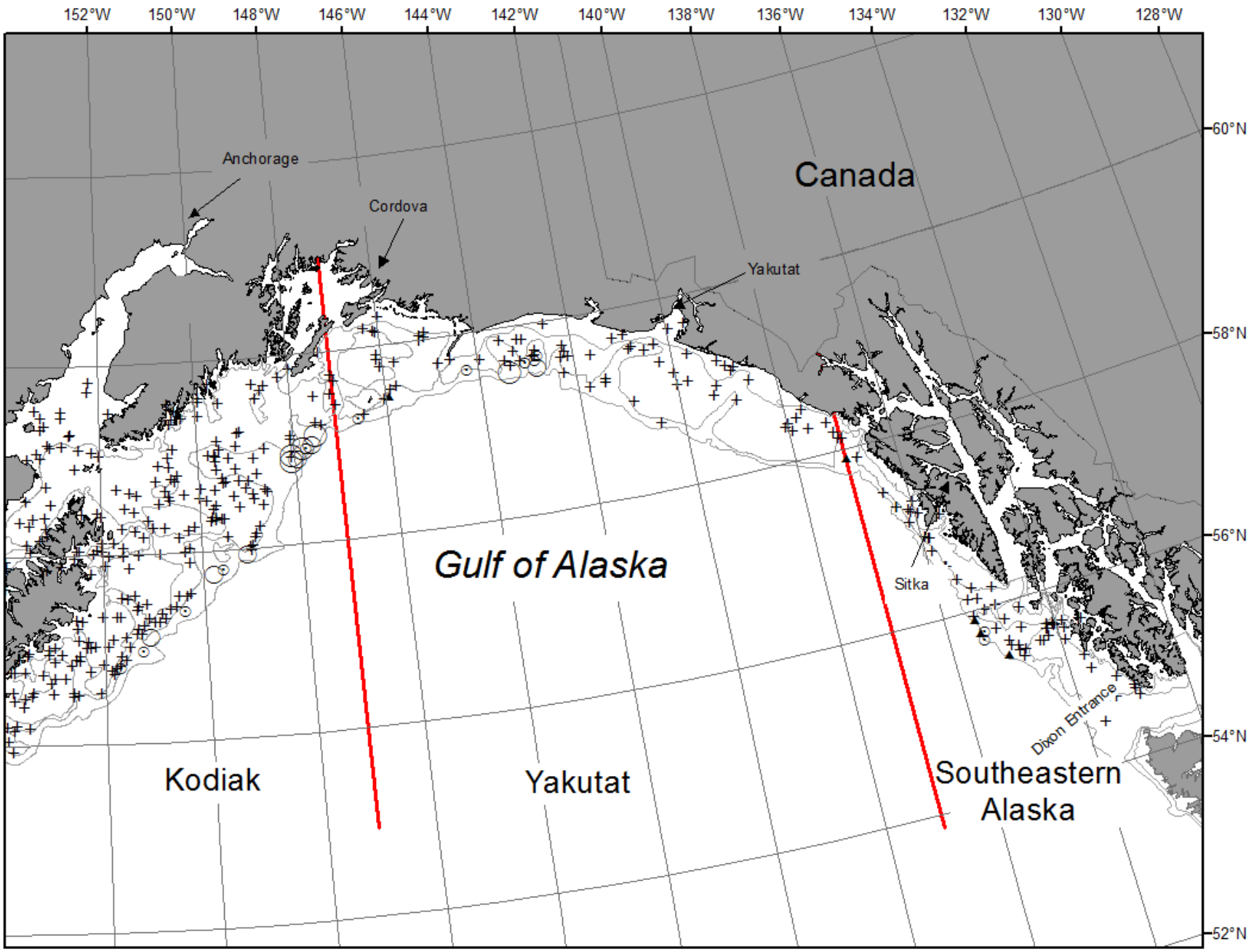

Figure 26. -- Continued (giant grenadier).

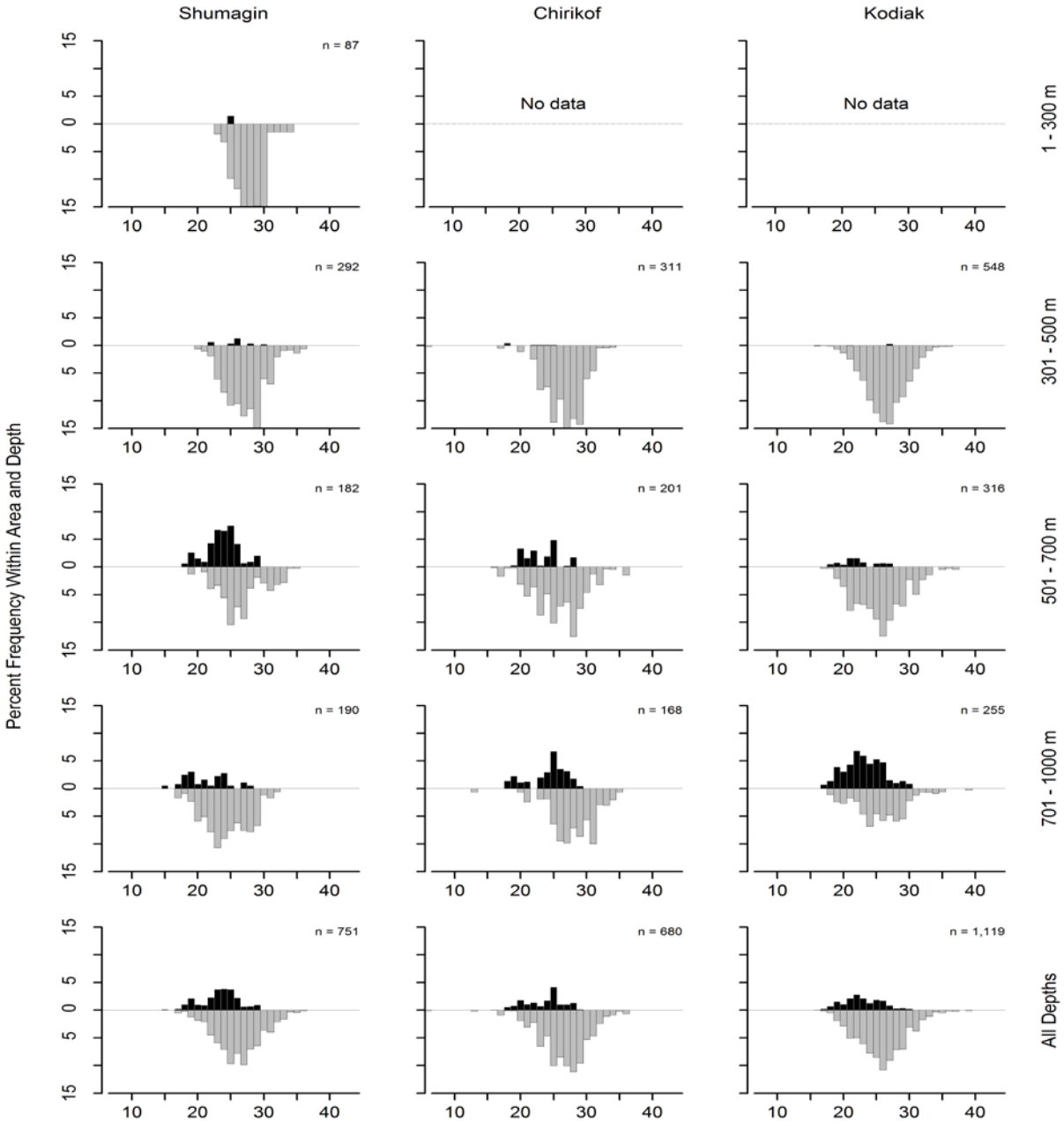

Figure 27. -- Size composition of giant grenadier from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

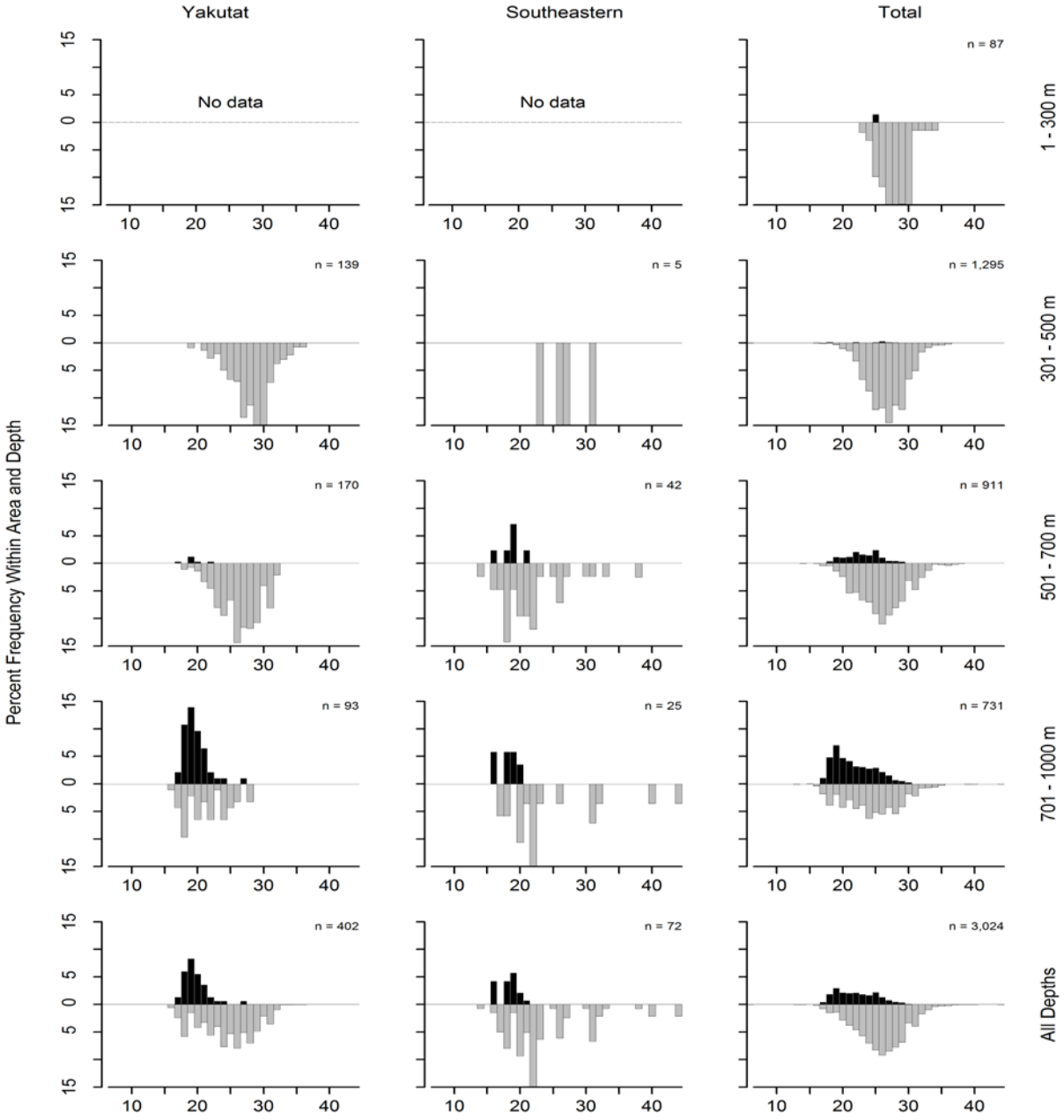

Figure 27. -- Continued (giant grenadier).

Table 36. -- Catch per unit of effort by stratum for giant grenadier sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	501 - 700	Kodiak Slope	3	3	673.18	117,458	0	241,117
Yakutat	501 - 700	Yakutat Slope	2	2	357.70	52,556	0	367,406
Shumagin	501 - 700	Shumagin Slope	3	3	272.59	54,670	0	131,517
Chirikof	501 - 700	Chirikof Slope	4	4	212.04	41,416	0	138,670
Yakutat	701 - 1000	Yakutat Slope	1	1	203.13	38,339		
Chirikof	301 - 500	Chirikof Slope	6	6	186.38	29,894	0	68,000
Kodiak	301 - 500	Kodiak Slope	8	7	180.05	52,427	20,133	84,720
Kodiak	701 - 1000	Kodiak Slope	4	4	172.13	60,140	15,020	105,261
Shumagin	701 - 1000	Shumagin Slope	2	2	120.20	23,286	0	279,520
Chirikof	701 - 1000	Chirikof Slope	3	3	103.35	31,682	13,596	49,768
Shumagin	301 - 500	Shumagin Slope	6	6	101.95	25,804	8,652	42,956
Yakutat	301 - 500	Yakutat Slope	7	5	25.03	3,806	0	8,211
Shumagin	201 - 300	Shumagin Slope	21	7	15.83	4,412	0	12,752
Southeastern	701 - 1000	Southeastern Slope	2	2	13.37	1,613	0	17,521
Southeastern	501 - 700	Southeastern Slope	4	4	6.00	620	0	1,552
Southeastern	301 - 500	Southeastern Deep Gullies	4	1	1.31	307	0	1,282
Shumagin	101 - 200	Shumagin Outer Shelf	41	1	0.03	21	0	63

ROCKFISHES

Pacific ocean perch (*Sebastes alutus*)

Pacific ocean perch was the second most abundant species caught in the 2015 survey, and was also the second most abundant species in three of the INPFC areas (Table 2). Pacific ocean perch were caught throughout the survey area at all depths less than 500 m (Table 37). The highest densities occurred at depths between 101 and 300 m in all regions (Fig. 28 and Table 38), with particularly high concentrations on the Chirikof outer shelf and slope. Size was relatively constant with both depth and longitude (Fig. 29). The estimated biomass of Pacific ocean perch was 1,140,407 t, and the highest regional biomass by far was in the Kodiak region. More than 96% of the estimated biomass was concentrated at depths between 101 and 300 m.

Table 37. -- Number of survey hauls, number of hauls with Pacific ocean perch, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	13	1.34	5,533	0	13,377	0.565
	101 - 200	50	26	63.92	93,811	0	244,327	0.579
	201 - 300	21	20	110.3	30,752	1,966	59,538	0.680
	301 - 500	6	2	1.06	269	0	796	0.689
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	61	19.99	130,364	0	283,658	0.600
Chirikof	1 - 100	59	4	1.86	4,849	0	15,101	0.137
	101 - 200	86	49	93.05	221,910	0	449,420	0.756
	201 - 300	21	17	46.39	53,565	0	141,983	0.878
	301 - 500	6	2	0.13	20	0	56	0.704
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	72	41.19	280,345	38,632	522,058	0.719
Kodiak	1 - 100	86	6	0.03	100	0	222	0.180
	101 - 200	127	95	101.49	439,775	255,241	624,309	0.700
	201 - 300	28	24	36.77	42,251	24,414	60,087	0.734
	301 - 500	8	4	2.22	647	0	1,472	0.733
	501 - 700	3	1	0.44	76	0	319	1.243
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	130	47.58	482,849	297,518	668,180	0.703
Yakutat	1 - 100	19	1	<0.01	3	0	11	0.116
	101 - 200	31	24	16.03	47,100	0	104,686	0.277
	201 - 300	18	15	86.52	44,731	3,458	86,004	0.557
	301 - 500	9	5	6.95	1,827	0	6,674	0.710
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	45	16.38	93,661	23,469	163,854	0.370
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	17	61	67,616	0	141,852	0.633
	201 - 300	18	16	112.35	56,761	16,741	96,781	0.681
	301 - 500	8	6	92.43	28,811	0	76,510	0.913
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	39	54.63	153,188	60,777	245,598	0.691
All areas	1 - 100	280	24	0.81	10,485	0	23,018	0.229
	101 - 200	321	211	71.14	870,211	537,365	1,203,057	0.640
	201 - 300	106	92	63.27	228,060	126,289	329,830	0.697
	301 - 500	37	19	24.68	31,575	0	79,354	0.891
	501 - 700	16	1	0.09	76	0	319	1.243
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	347	35.64	1,140,407	790,319	1,490,494	0.645

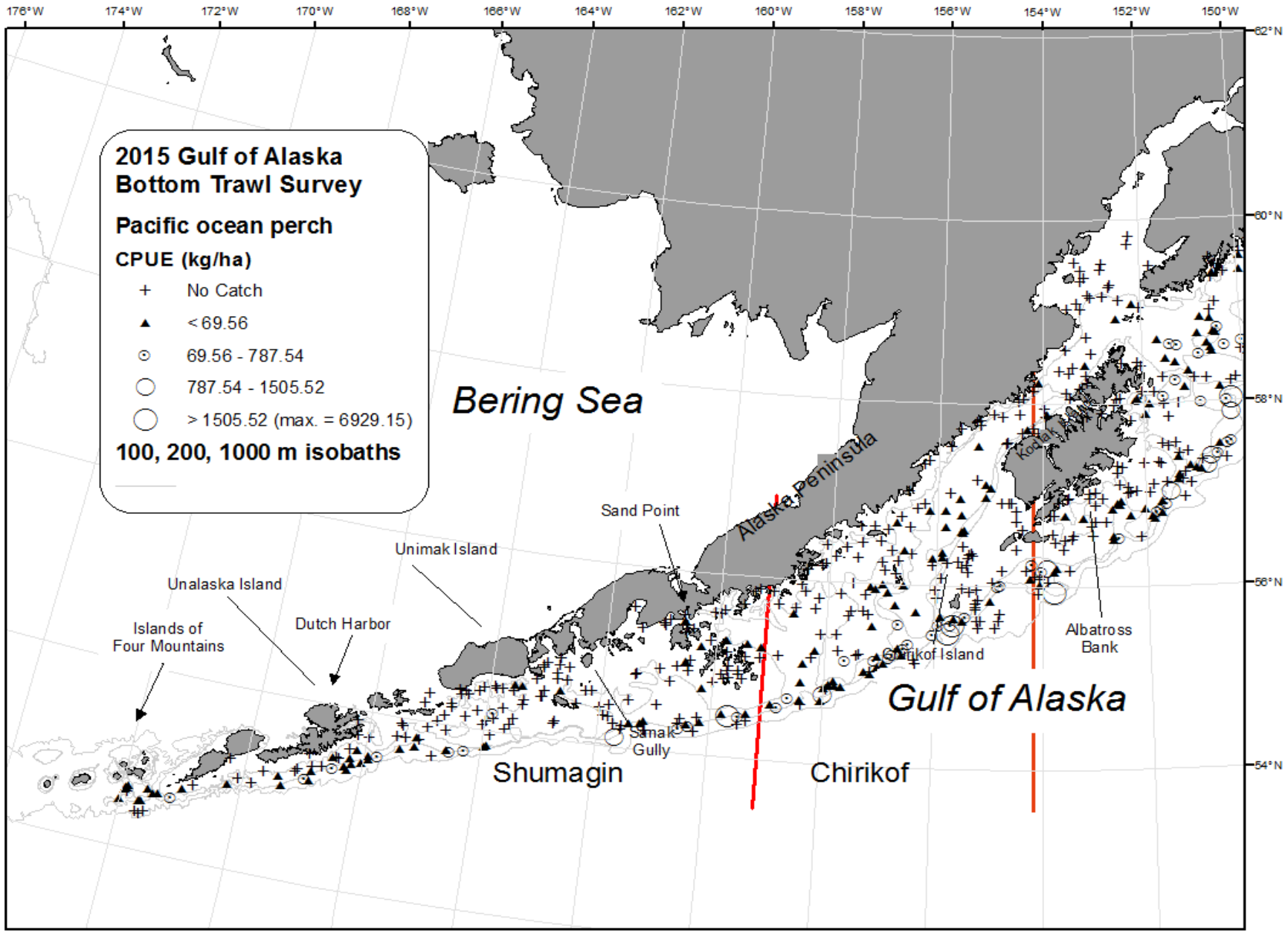

Figure 28. -- Distribution and relative abundance of Pacific ocean perch from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

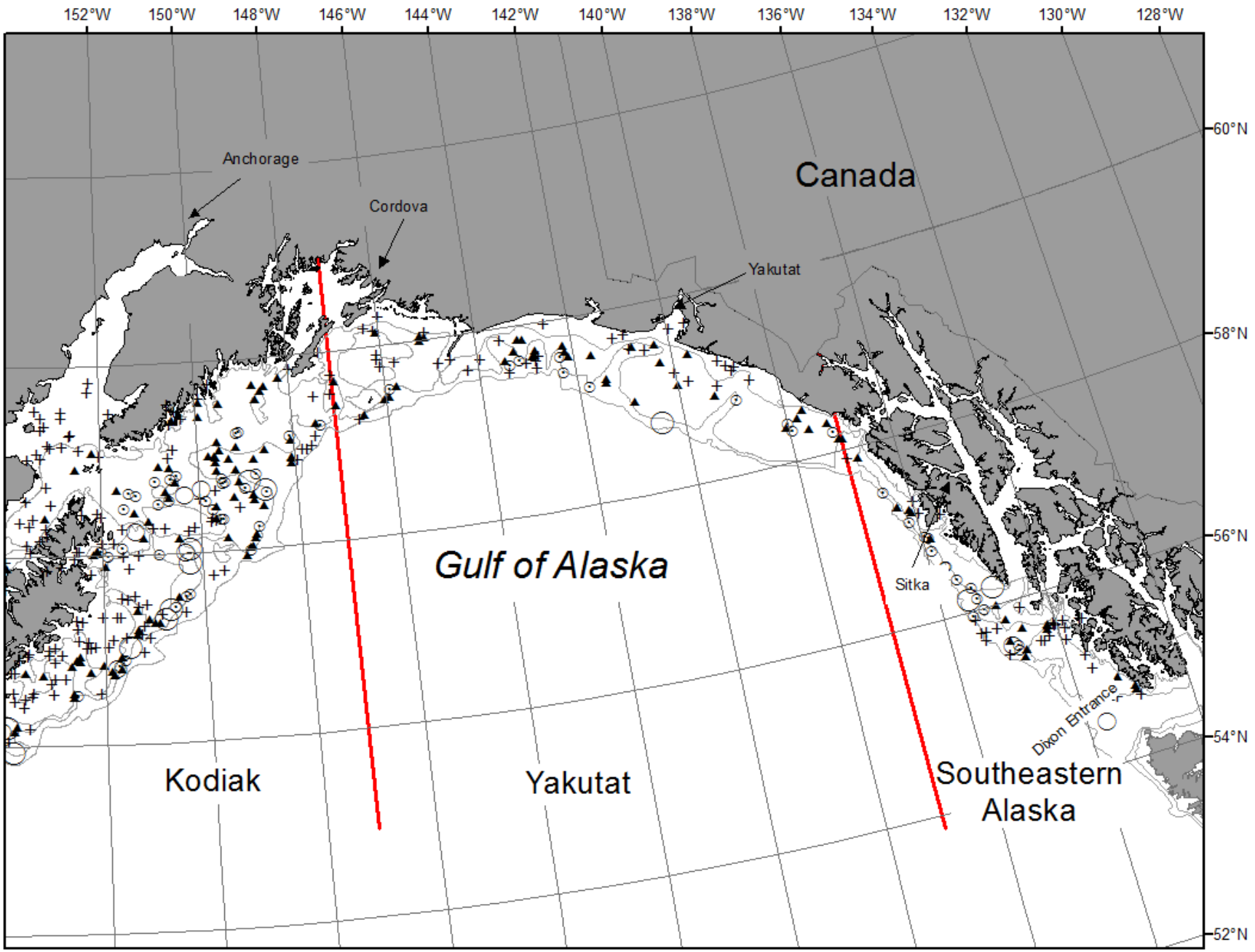

Figure 28. -- Continued (Pacific ocean perch).

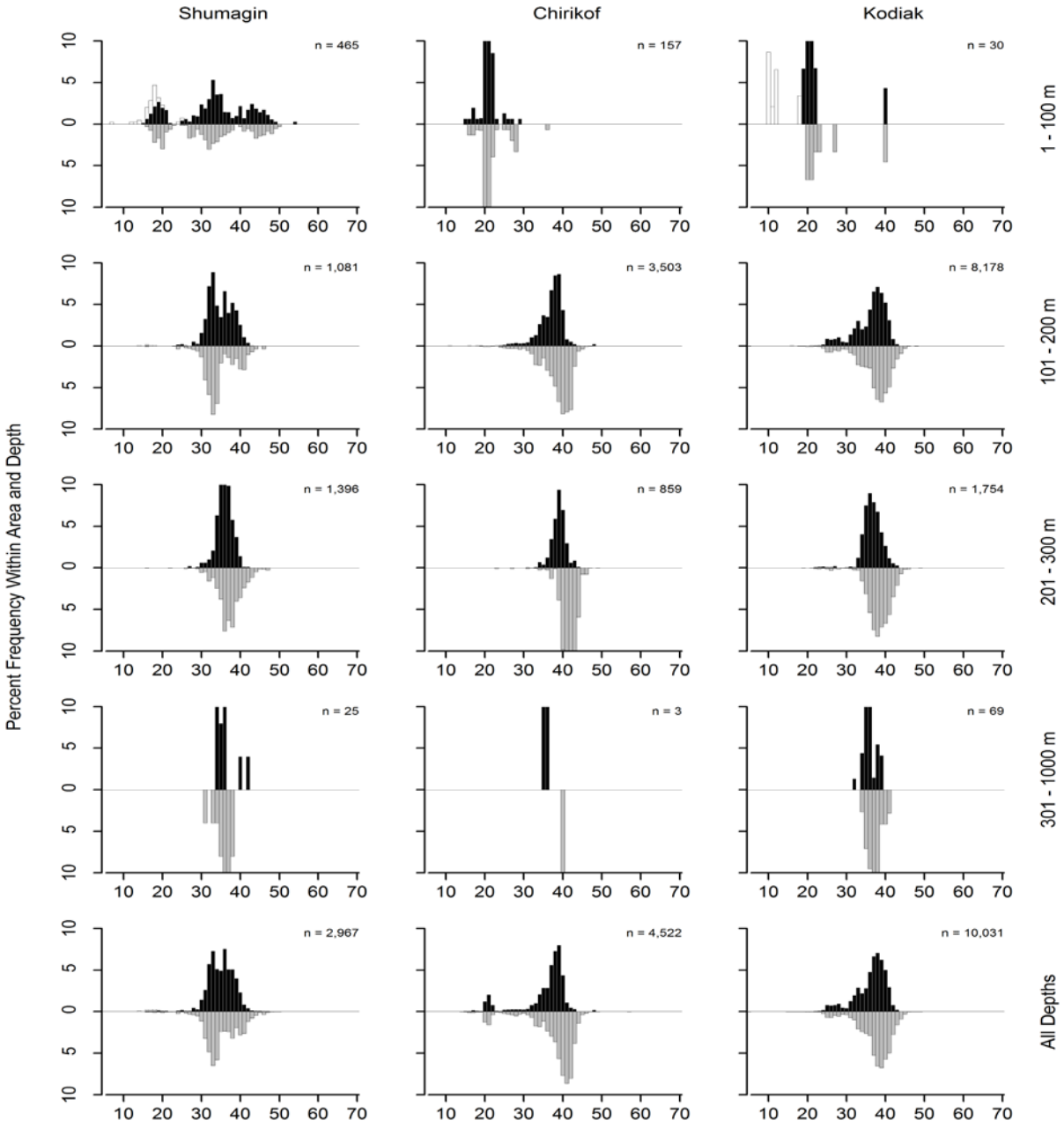

Figure 29. -- Size composition of Pacific ocean perch from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

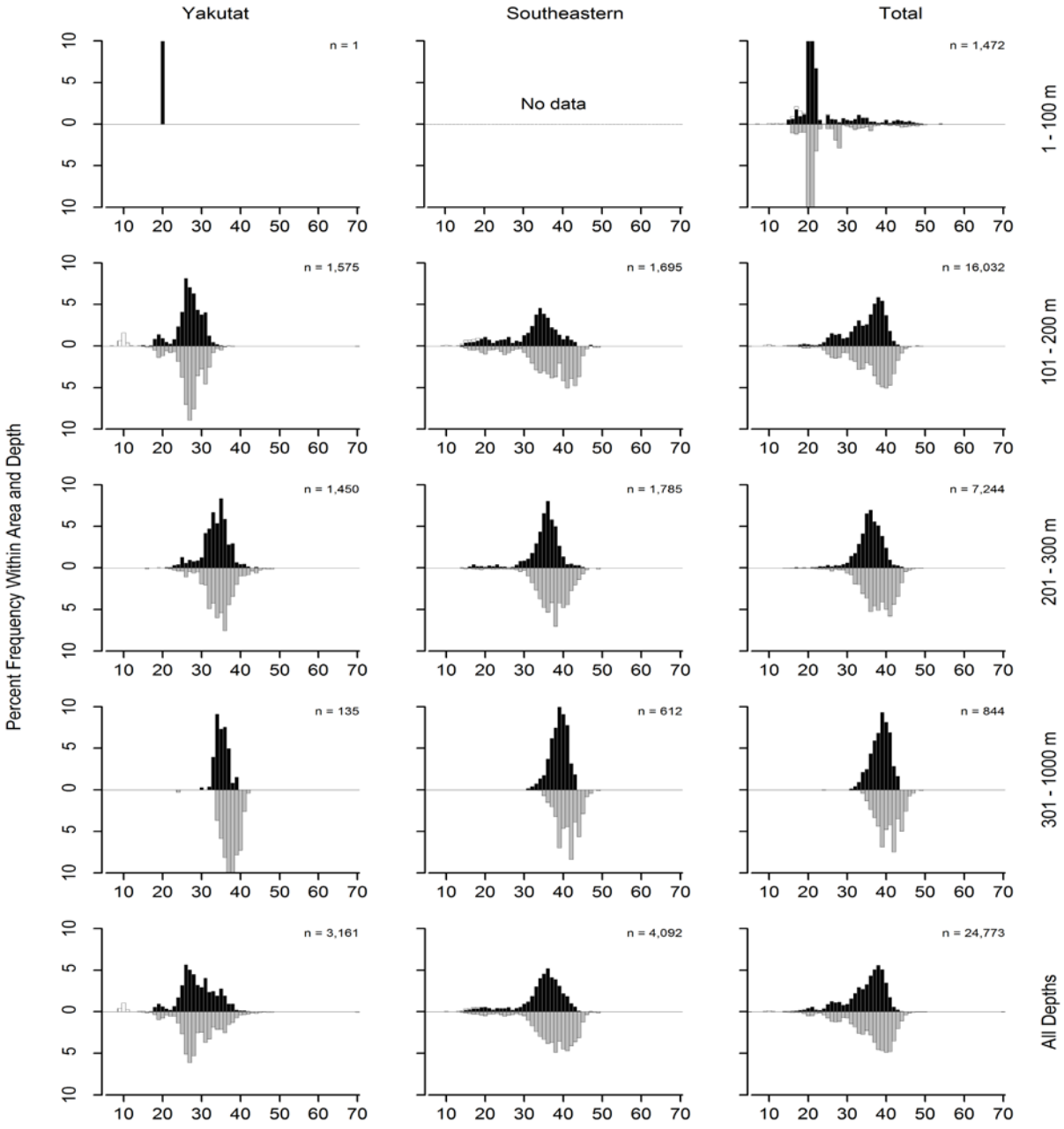

Figure 29. -- Continued (Pacific ocean perch).

Table 38. -- Catch per unit of effort by stratum for Pacific ocean perch sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Chirikof	101 - 200	Chirikof Outer Shelf	32	26	420.37	210,638	0	437,923
Chirikof	201 - 300	Chirikof Slope	10	10	343.35	52,474	0	142,229
Southeastern	301 - 500	Southeastern Slope	4	4	280.07	21,640	0	84,013
Kodiak	101 - 200	Kodiak Outer Shelf	32	25	237.09	119,156	32,529	205,783
Kodiak	101 - 200	Portlock Flats	33	28	209.95	154,030	39,741	268,318
Kodiak	201 - 300	Kodiak Slope	8	8	205.57	33,357	17,572	49,142
Yakutat	201 - 300	Yakutat Slope	9	9	186.23	39,617	0	81,831
Kodiak	101 - 200	Albatross Gullies	29	22	161.37	127,674	10,707	244,641
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	11	157.70	66,178	0	141,297
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	12	116.10	45,595	7,346	83,844
Shumagin	101 - 200	Shumagin Outer Shelf	41	25	114.96	93,738	0	244,254
Shumagin	201 - 300	Shumagin Slope	21	20	110.30	30,752	1,883	59,621
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	99.23	11,166	0	31,064
Yakutat	101 - 200	Fairweather Shelf	9	9	56.30	43,507	0	102,038
Southeastern	301 - 500	Southeastern Deep Gullies	4	2	30.59	7,172	0	28,186
Kodiak	101 - 200	Barren Islands	18	9	27.93	30,672	0	67,254
Yakutat	201 - 300	Yakutat Gullies	9	6	16.81	5,114	0	11,654
Yakutat	301 - 500	Yakutat Gullies	2	2	14.98	1,659	0	15,917
Kodiak	201 - 300	Kenai Gullies	16	15	13.33	8,874	0	20,347
Chirikof	101 - 200	Shelikof Edge	34	19	8.12	6,279	0	13,229
Kodiak	101 - 200	Kenai Flats	15	11	6.83	8,244	0	17,485
Chirikof	1 - 100	Semidi Bank	16	4	6.64	4,849	0	15,154
Chirikof	101 - 200	East Shumagin Gully	20	4	4.50	4,993	0	12,509
Shumagin	1 - 100	Davidson Bank	44	5	2.88	3,938	0	11,438
Yakutat	101 - 200	Yakutat Flats	8	5	2.51	2,263	0	6,828
Kodiak	301 - 500	Kodiak Slope	8	4	2.22	647	0	1,493
Southeastern	101 - 200	Prince of Wales Shelf	16	6	2.09	1,438	0	3,393
Yakutat	101 - 200	Yakataga Shelf	8	7	2.01	1,062	257	1,867
Shumagin	1 - 100	Shumagin Bank	31	6	1.25	1,546	0	3,870
Yakutat	301 - 500	Yakutat Slope	7	3	1.11	169	0	407
Chirikof	201 - 300	Lower Shelikof Gully	11	7	1.09	1,091	0	2,519
Shumagin	301 - 500	Shumagin Slope	6	2	1.06	269	0	823
Kodiak	501 - 700	Kodiak Slope	3	1	0.44	76	0	404
Yakutat	101 - 200	Middleton Shelf	6	3	0.37	268	0	717
Shumagin	101 - 200	West Shumagin Gully	4	1	0.32	73	0	304
Chirikof	301 - 500	Chirikof Slope	6	2	0.13	20	0	58
Kodiak	1 - 100	Kenai Peninsula	9	2	0.07	38	0	95
Kodiak	201 - 300	Upper Shelikof Gully	4	1	0.06	20	0	84
Kodiak	1 - 100	Albatross Banks	33	3	0.04	62	0	173
Shumagin	1 - 100	Fox Islands	13	1	0.04	31	0	99
Shumagin	1 - 100	Lower Alaska Peninsula	19	1	0.03	17	0	53
Yakutat	1 - 100	Middleton Shallows	9	1	0.01	3	0	11
Kodiak	1 - 100	Albatross Shallows	20	1	< 0.01	0	0	1

Northern rockfish (*Sebastes polyspinis*)

Northern rockfish was the seventeenth most abundant species caught in the 2015 survey, and was the eight most abundant species in the Chirikof INPFC area (Table 2). Northern rockfish were almost exclusively caught in the Shumagin, Chirikof, and Kodiak INPFC areas at depths between 101 and 200 m (Table 39). The highest densities by far occurred in the Chirikof Outer Shelf stratum, where 45% of the estimated biomass was concentrated (Fig. 30 and Table 40). Size was relatively constant with depth and INPFC area and was similar for males and females (Fig. 31). The estimated biomass of northern rockfish was 48,933 t, and the highest regional biomass was in the Chirikof area, where 74% of it was concentrated. Approximately 88% of the estimated biomass was concentrated at depths between 101 and 200 m (Table 39).

Table 39. -- Number of survey hauls, number of hauls with northern rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	8	0.65	2,699	0	6,872	1.003
	101 - 200	50	20	2.03	2,978	0	6,106	0.852
	201 - 300	21	1	0.01	3	0	8	0.518
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	29	0.87	5,680	519	10,841	0.917
Chirikof	1 - 100	59	3	1	2,599	0	7,553	0.907
	101 - 200	86	22	14.15	33,737	949	66,524	0.968
	201 - 300	21	2	0.02	21	0	61	0.873
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	27	5.34	36,356	3,285	69,428	0.963
Kodiak	1 - 100	86	3	0.09	332	0	923	1.106
	101 - 200	127	34	1.5	6,517	0	13,226	0.988
	201 - 300	28	1	0.03	37	0	121	0.826
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	38	0.68	6,885	150	13,621	0.992
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	1	0.02	12	0	40	0.938
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	1	<0.01	12	0	40	0.938
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	14	0.44	5,629	0	11,959	0.961
	101 - 200	321	76	3.53	43,232	9,659	76,804	0.962
	201 - 300	106	5	0.02	73	0	163	0.838
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	95	1.53	48,933	14,854	83,013	0.961

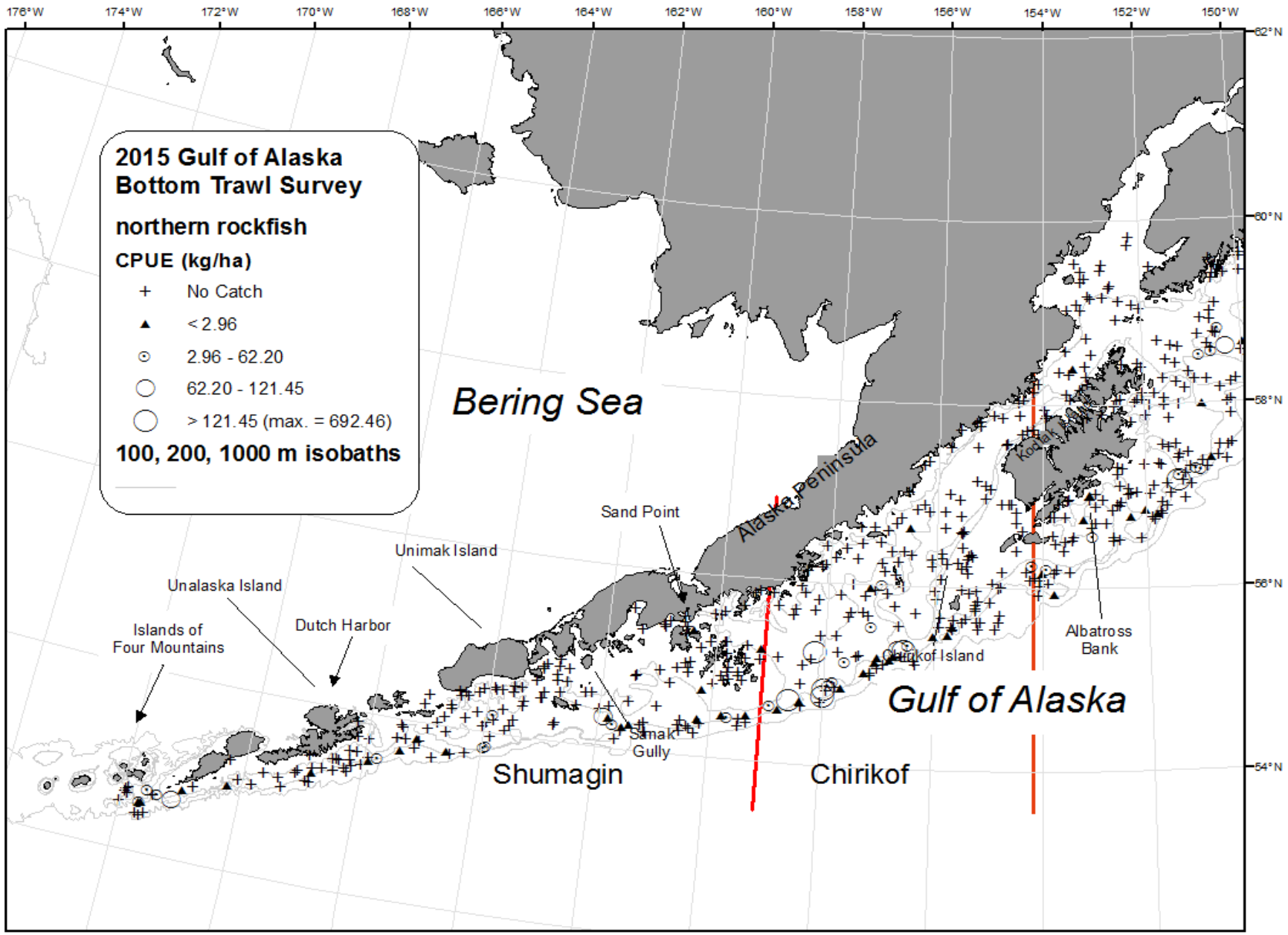

Figure 30. -- Distribution and relative abundance of northern rockfish from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

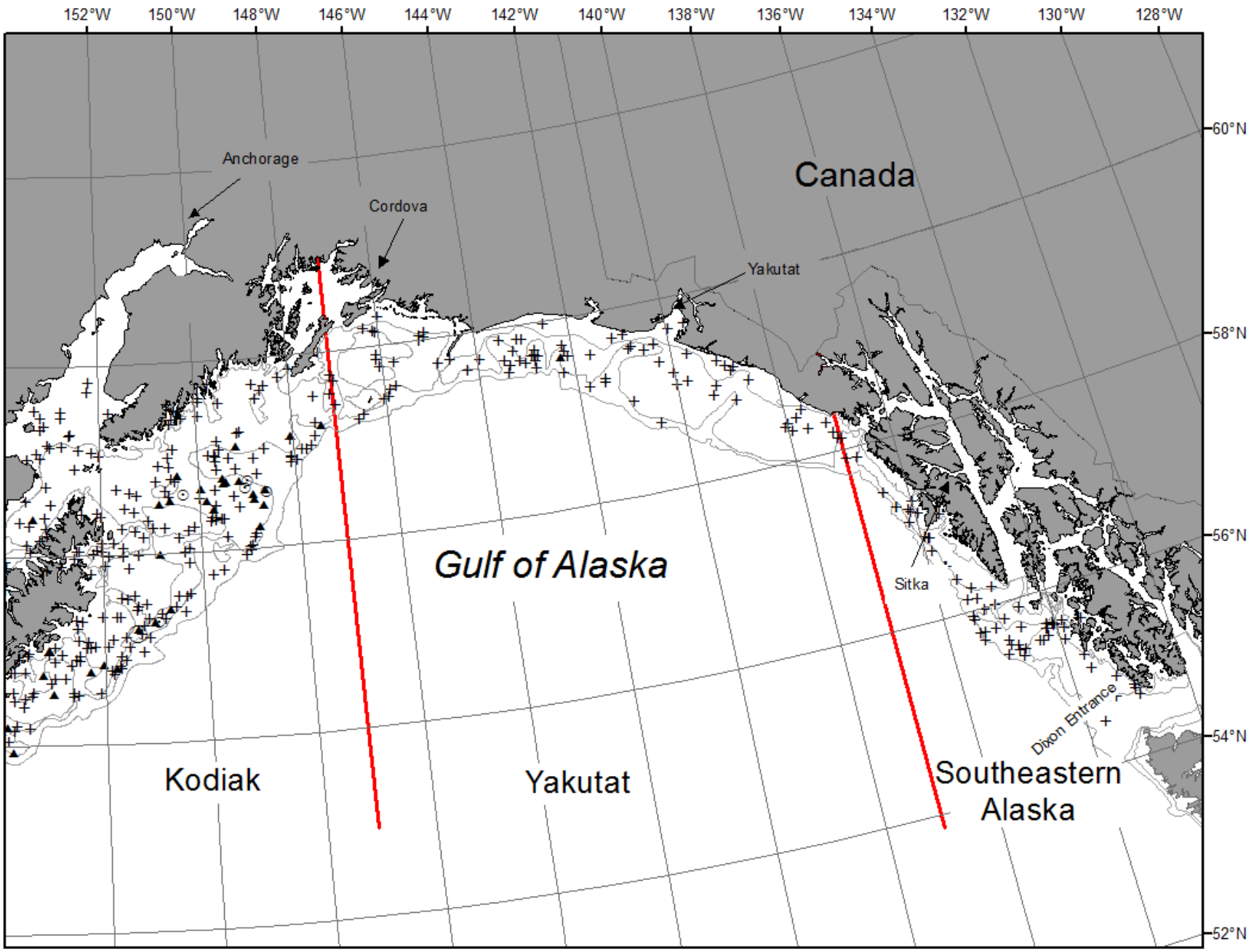

Figure 30. -- Continued (northern rockfish).

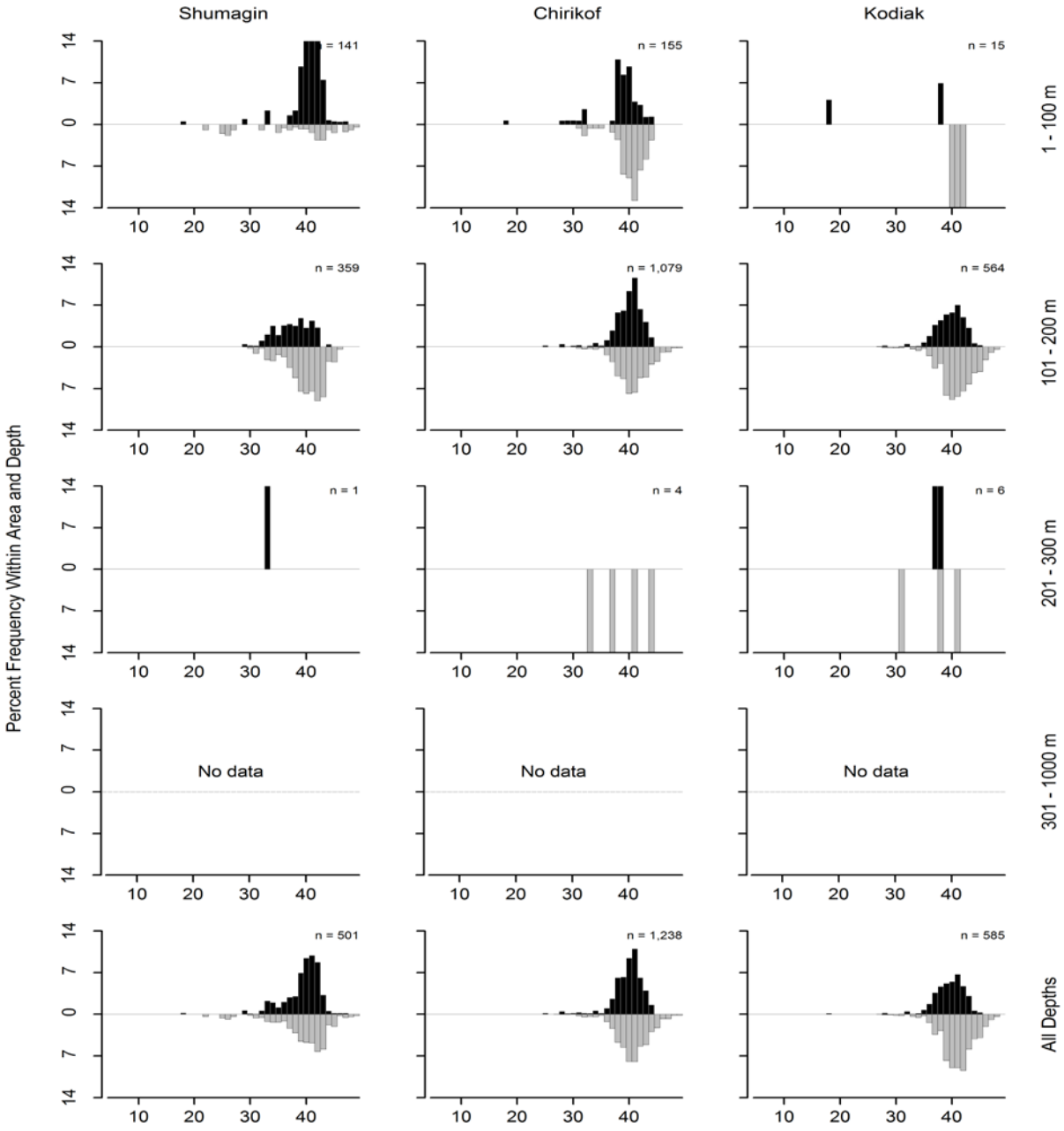

Figure 31. -- Size composition of northern rockfish from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

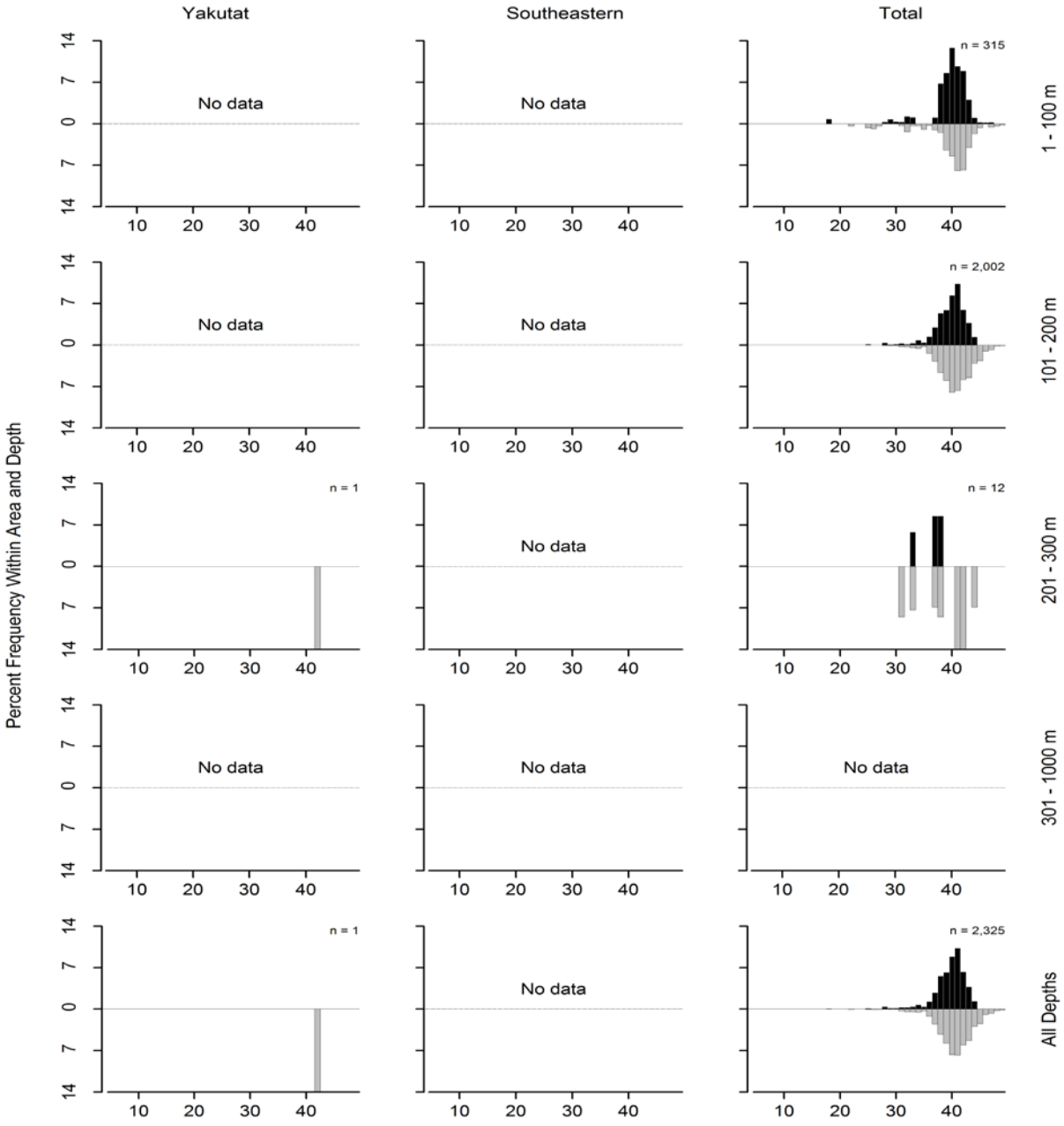

Figure 31. -- Continued (northern rockfish).

Table 40. -- Catch per unit of effort by stratum for northern rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Chirikof	101 - 200	Chirikof Outer Shelf	32	19	43.93	22,011	0	45,773
Chirikof	101 - 200	East Shumagin Gully	20	1	9.83	10,920	0	33,776
Kodiak	101 - 200	Kodiak Outer Shelf	32	12	5.49	2,759	0	7,274
Kodiak	101 - 200	Portlock Flats	33	17	5.02	3,682	0	8,738
Shumagin	101 - 200	Shumagin Outer Shelf	41	19	3.63	2,956	0	6,084
Chirikof	1 - 100	Semidi Bank	16	3	3.56	2,599	0	7,579
Shumagin	1 - 100	Davidson Bank	44	5	1.88	2,568	0	6,735
Chirikof	101 - 200	Shelikof Edge	34	2	1.04	806	0	2,433
Kodiak	201 - 300	Kodiak Slope	8	1	0.23	37	0	123
Kodiak	1 - 100	Albatross Banks	33	2	0.22	331	0	922
Chirikof	201 - 300	Chirikof Slope	10	2	0.14	21	0	61
Shumagin	1 - 100	Fox Islands	13	1	0.13	110	0	351
Shumagin	101 - 200	West Shumagin Gully	4	1	0.10	22	0	92
Kodiak	101 - 200	Albatross Gullies	29	3	0.04	34	0	73
Yakutat	201 - 300	Yakutat Gullies	9	1	0.04	12	0	41
Kodiak	101 - 200	Kenai Flats	15	1	0.03	30	0	95
Shumagin	1 - 100	Shumagin Bank	31	2	0.02	20	0	58
Kodiak	101 - 200	Barren Islands	18	1	0.01	13	0	39
Shumagin	201 - 300	Shumagin Slope	21	1	0.01	3	0	8
Kodiak	1 - 100	Albatross Shallows	20	1	< 0.01	1	0	4

Rougheye rockfish (*Sebastes aleutianus*)

Rougheye rockfish was not among the 20 most abundant species in the 2015 survey, but was the nineteenth most abundant species in the Yakutat and Southeastern regions (Table 2). Rougheye rockfish were caught throughout the survey area and at all depths less than 700 m (Table 41). The highest densities occurred in the 201-300 m depth interval, with particularly high concentrations on the slope and in gullies of the Yakutat and Southeastern regions (Fig. 32 and Table 42). Size was variable for both sexes with no distinct depth or longitutinal trends (Fig. 33). The estimated biomass of rougheye rockfish was 25,254 t, and the highest regional biomass was in the Kodiak region. Approximately 53% of the biomass was concentrated in the 201-300 m depth interval (Table 41).

Table 41. -- Number of survey hauls, number of hauls with rougheye rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	2	0.01	57	0	158	0.570
	101 - 200	50	1	0.02	28	0	100	0.820
	201 - 300	21	4	0.39	109	0	291	2.047
	301 - 500	6	1	0.11	28	0	97	0.899
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	8	0.03	222	3	440	1.016
Chirikof	1 - 100	59	2	0.02	45	0	125	0.785
	101 - 200	86	12	0.11	259	61	456	0.725
	201 - 300	21	13	3.46	3,996	0	8,902	1.349
	301 - 500	6	4	1.30	209	0	497	1.672
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	31	0.66	4,508	0	9,427	1.288
Kodiak	1 - 100	86	10	0.35	1,353	0	3,068	0.685
	101 - 200	127	22	0.75	3,243	0	6,870	0.725
	201 - 300	28	19	3.70	4,246	532	7,959	0.965
	301 - 500	8	2	0.18	53	0	154	0.962
	501 - 700	3	1	0.30	53	0	221	2.571
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	54	0.88	8,947	3,693	14,202	0.819
Yakutat	1 - 100	19	5	0.11	182	0	408	0.263
	101 - 200	31	14	0.52	1,538	526	2,550	0.297
	201 - 300	18	12	7.64	3,950	0	9,971	1.167
	301 - 500	9	7	7.25	1,905	0	4,063	1.151
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	38	1.32	7,576	1,414	13,737	0.694
Southeastern	1 - 100	9	2	0.42	273	0	685	0.459
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	1	2.35	1,189	0	4,491	1.317
	301 - 500	8	7	8.15	2,539	279	4,798	2.086
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	10	1.43	4,001	765	7,238	1.474
All areas	1 - 100	280	21	0.15	1,909	191	3,628	0.559
	101 - 200	321	49	0.41	5,068	1,344	8,791	0.505
	201 - 300	106	49	3.74	13,490	4,875	22,105	1.152
	301 - 500	37	21	3.70	4,734	1,826	7,642	1.535
	501 - 700	16	1	0.06	53	0	221	2.571
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	141	0.79	25,254	15,623	34,884	0.893

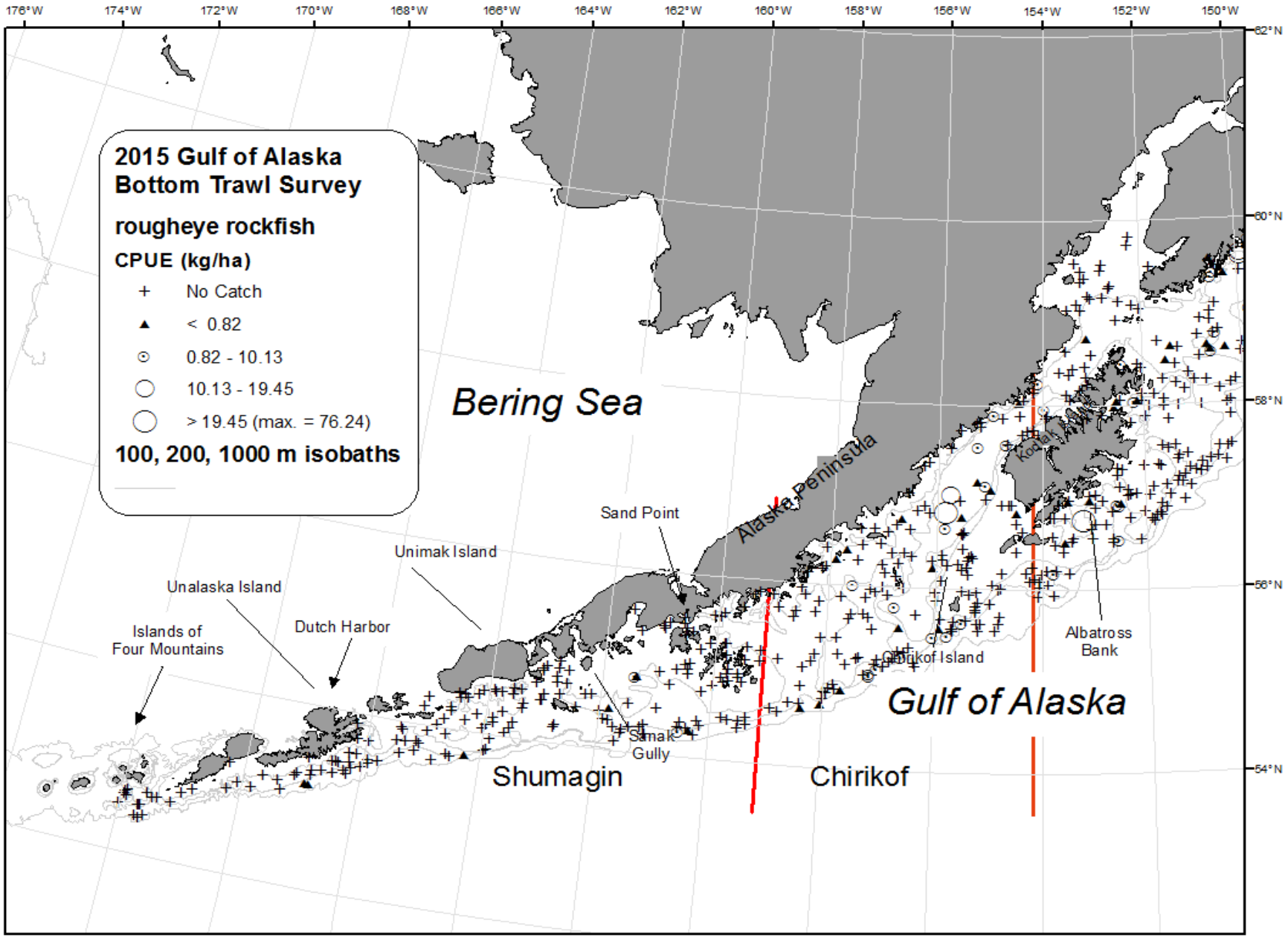

Figure 32. -- Distribution and relative abundance of rougheye rockfish from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

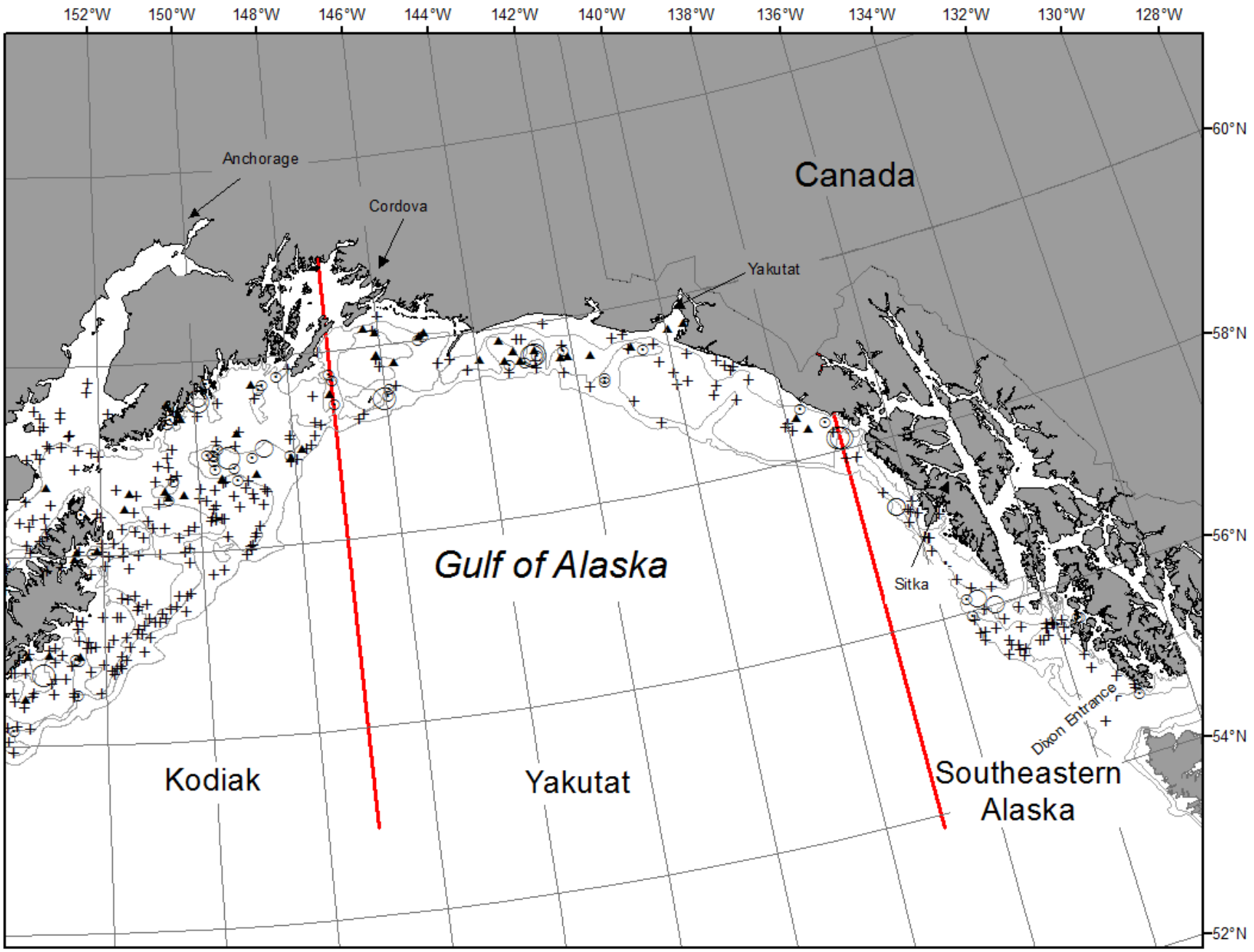

Figure 32. -- Continued (rougheye rockfish).

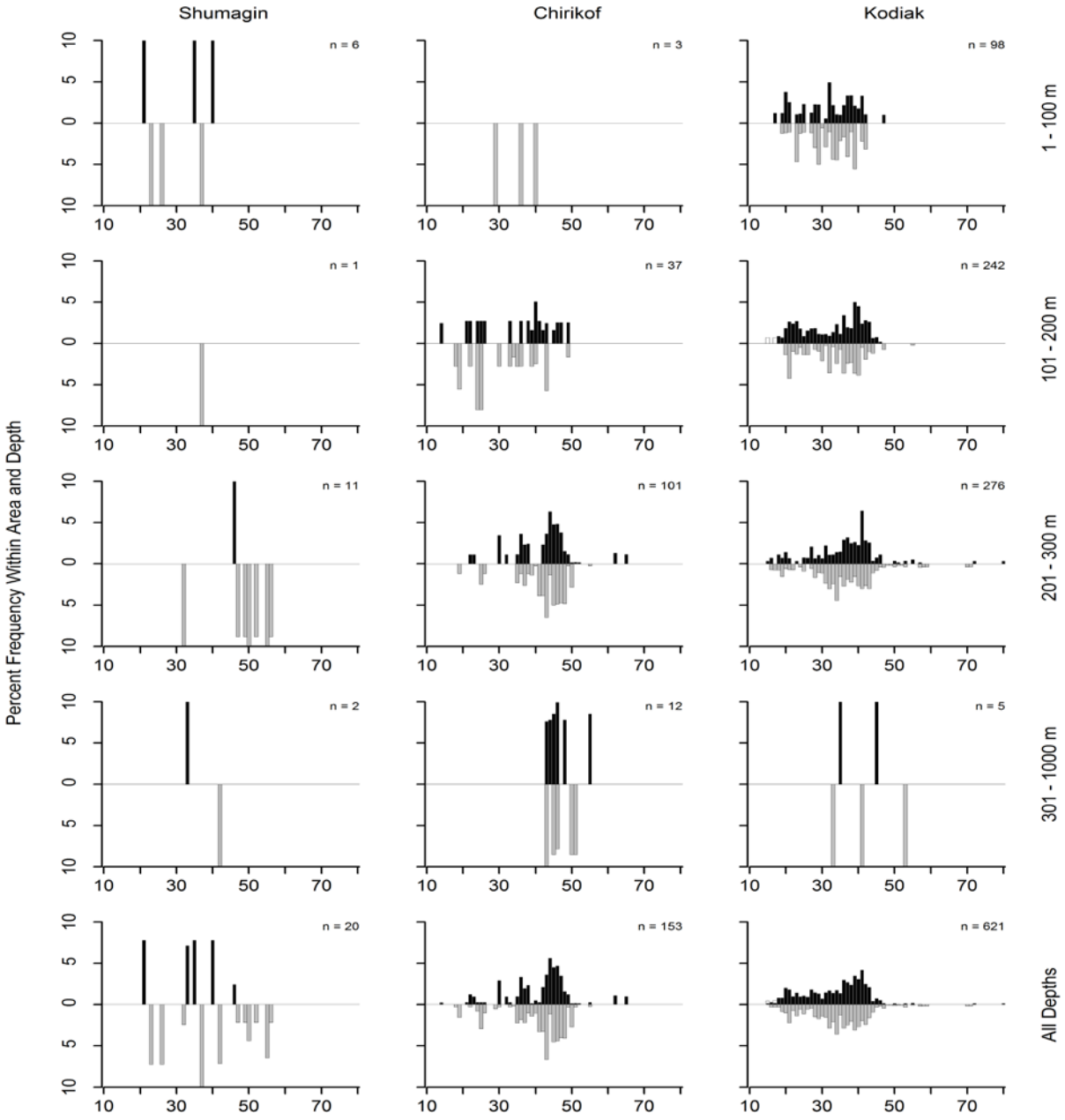

Figure 33. -- Size composition of rougheye rockfish from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

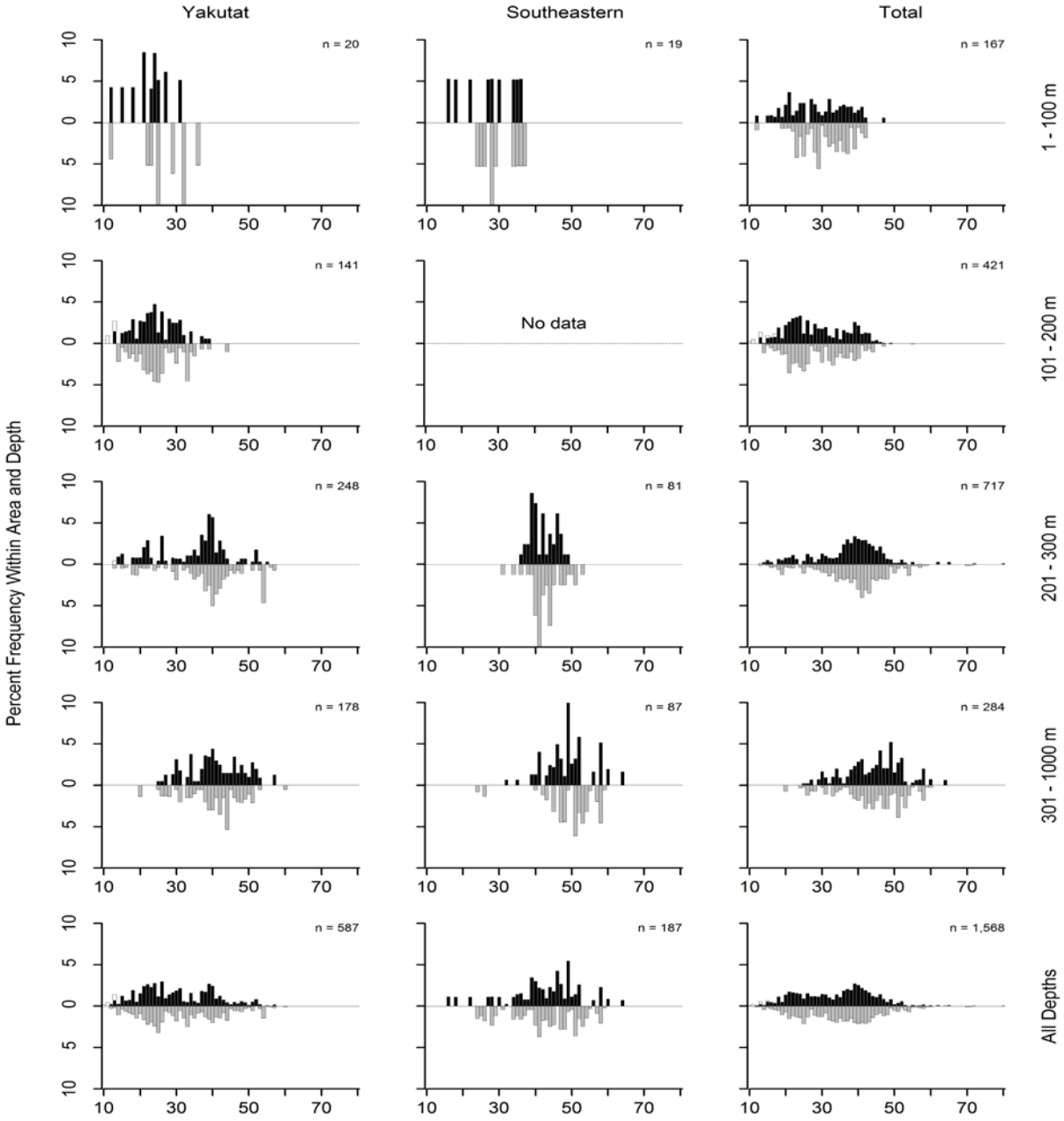

Figure 33. -- Continued (rougheye rockfish).

Table 42. -- Catch per unit of effort by stratum for rougheye rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Yakutat	301 - 500	Yakutat Slope	7	5	11.06	1,682	0	3,900
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	10.57	1,189	0	4,974
Yakutat	201 - 300	Yakutat Gullies	9	8	9.42	2,867	0	8,746
Southeastern	301 - 500	Southeastern Slope	4	4	8.73	674	0	1,610
Southeastern	301 - 500	Southeastern Deep Gullies	4	3	7.95	1,865	0	4,280
Kodiak	201 - 300	Kenai Gullies	16	16	5.86	3,905	204	7,606
Yakutat	201 - 300	Yakutat Slope	9	4	5.09	1,083	0	3,371
Chirikof	201 - 300	Lower Shelikof Gully	11	8	3.79	3,792	0	8,755
Kodiak	1 - 100	Kenai Peninsula	9	6	2.38	1,253	0	2,995
Yakutat	301 - 500	Yakutat Gullies	2	2	2.02	224	0	1,581
Kodiak	101 - 200	Kenai Flats	15	6	1.74	2,095	0	5,384
Kodiak	201 - 300	Kodiak Slope	8	2	1.37	221	0	677
Chirikof	201 - 300	Chirikof Slope	10	5	1.33	203	0	415
Chirikof	301 - 500	Chirikof Slope	6	4	1.30	209	0	512
Kodiak	101 - 200	Albatross Gullies	29	8	1.30	1,030	0	2,620
Yakutat	101 - 200	Middleton Shelf	6	6	1.25	916	0	1,877
Yakutat	101 - 200	Yakataga Shelf	8	4	0.56	293	0	778
Yakutat	101 - 200	Fairweather Shelf	9	4	0.43	329	15	643
Southeastern	1 - 100	Southeastern Shallows	9	2	0.42	273	0	693
Shumagin	201 - 300	Shumagin Slope	21	4	0.39	109	0	292
Kodiak	201 - 300	Upper Shelikof Gully	4	1	0.37	120	0	500
Kodiak	501 - 700	Kodiak Slope	3	1	0.30	53	0	280
Chirikof	101 - 200	Shelikof Edge	34	8	0.25	194	9	379
Kodiak	301 - 500	Kodiak Slope	8	2	0.18	53	0	157
Kodiak	1 - 100	Albatross Shallows	20	4	0.17	100	0	234
Yakutat	1 - 100	Yakutat Shallows	10	2	0.15	150	0	376
Shumagin	301 - 500	Shumagin Slope	6	1	0.11	28	0	100
Kodiak	101 - 200	Portlock Flats	33	5	0.10	75	0	151
Chirikof	101 - 200	Chirikof Outer Shelf	32	2	0.08	38	0	98
Shumagin	101 - 200	Sanak Gully	5	1	0.07	28	0	106
Chirikof	1 - 100	Semidi Bank	16	1	0.05	38	0	118
Yakutat	1 - 100	Middleton Shallows	9	3	0.05	32	0	73
Shumagin	1 - 100	Shumagin Bank	31	2	0.05	57	0	158
Kodiak	101 - 200	Barren Islands	18	3	0.04	43	0	98
Chirikof	101 - 200	East Shumagin Gully	20	2	0.02	27	0	75
Chirikof	1 - 100	Chirikof Bank	26	1	0.01	7	0	21

Blackspotted rockfish (*Sebastes melanostictus*)

Although relatively rare and not among the 20 most abundant species caught in any of the INPFC areas (Table 2) in the 2015 survey, blackspotted rockfish were caught throughout the survey area primarily at depths between 101 and 500 m (Table 43). The highest densities occurred at depths between 301 and 500 m in all but one of the INPFC areas, and they were present in 33 of the 59 survey strata (Fig. 34 and Table 44). Size generally increased with depth, but was relatively constant going from west to east (Fig. 35). The estimated biomass of blackspotted rockfish was 9,299 t, and the highest regional biomass was in the Kodiak region, where 33% of it was concentrated (Table 43).

Table 43. -- Number of survey hauls, number of hauls with blackspotted rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	3	0.03	139	0	320	0.633
	101 - 200	50	3	0.04	66	0	185	0.363
	201 - 300	21	13	2.74	763	280	1,246	0.679
	301 - 500	6	2	0.61	155	0	396	1.415
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	21	0.17	1,123	574	1,672	0.687
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	7	0.03	63	9	116	0.602
	201 - 300	21	8	0.45	515	59	971	1.243
	301 - 500	6	5	6.24	1,001	0	2,406	1.371
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	20	0.23	1,580	291	2,869	1.264
Kodiak	1 - 100	86	4	0.05	209	0	519	0.658
	101 - 200	127	14	0.38	1,667	0	3,822	0.539
	201 - 300	28	12	0.71	821	50	1,592	0.629
	301 - 500	8	5	1.37	398	0	828	0.832
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	35	0.30	3,094	764	5,425	0.596
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	7	0.12	358	0	754	0.336
	201 - 300	18	8	1.03	532	0	1,252	0.521
	301 - 500	9	7	2.93	771	0	1,719	1.159
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	22	0.29	1,661	545	2,777	0.604
Southeastern	1 - 100	9	2	0.39	254	0	723	0.449
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	3	0.67	340	0	1,094	1.171
	301 - 500	8	5	2.58	804	0	2,051	1.290
	501 - 700	4	2	4.28	443	0	1,607	1.852
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	12	0.66	1,841	331	3,350	1.071
All areas	1 - 100	280	9	0.05	602	41	1,162	0.546
	101 - 200	321	31	0.18	2,154	0	4,338	0.484
	201 - 300	106	44	0.82	2,971	1,653	4,289	0.716
	301 - 500	37	24	2.45	3,130	1,289	4,970	1.200
	501 - 700	16	2	0.54	443	0	1,607	1.852
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	110	0.29	9,299	6,037	12,562	0.741

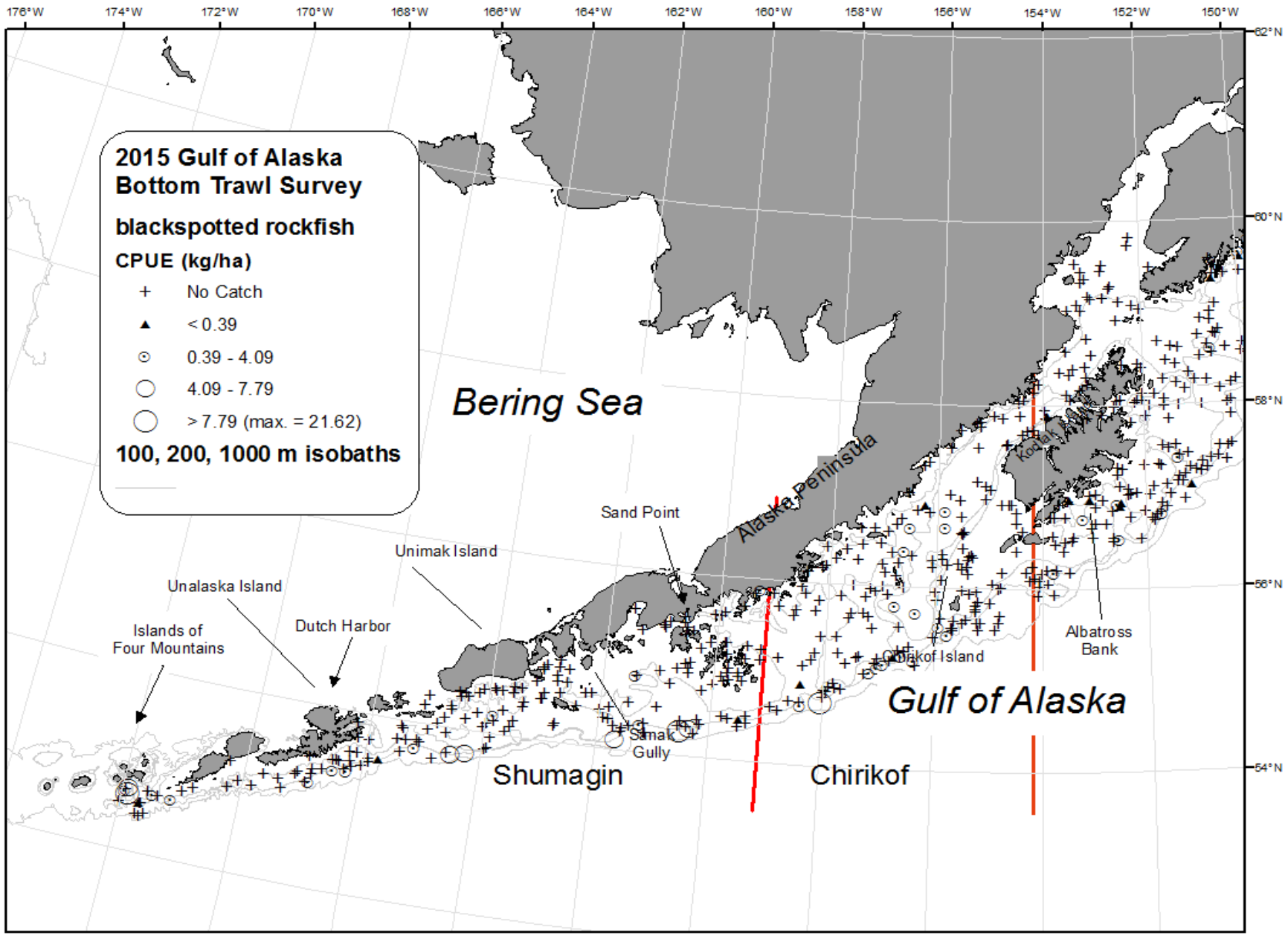

Figure 34. -- Distribution and relative abundance of blackspotted rockfish from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

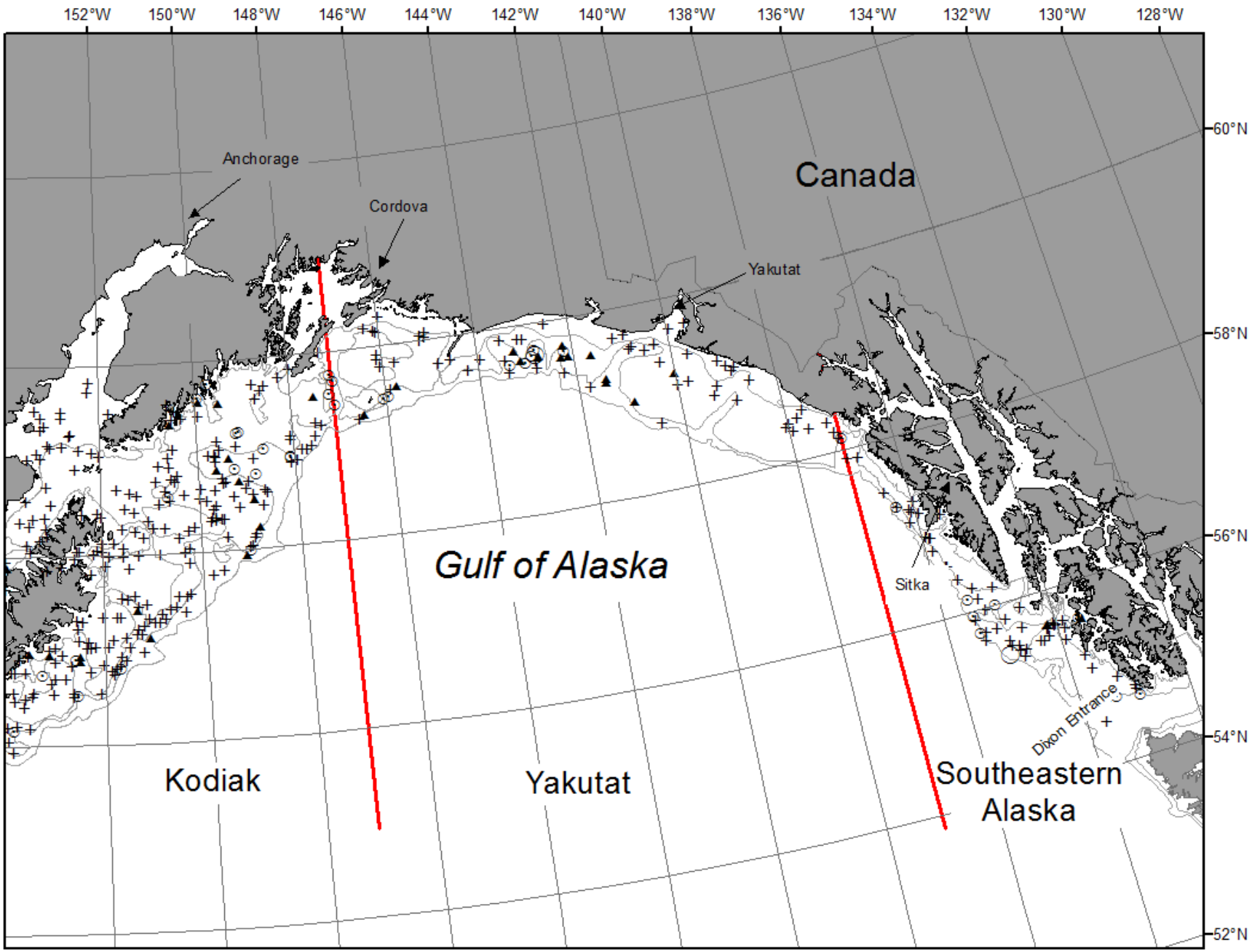

Figure 34. -- Continued (blackspotted rockfish).

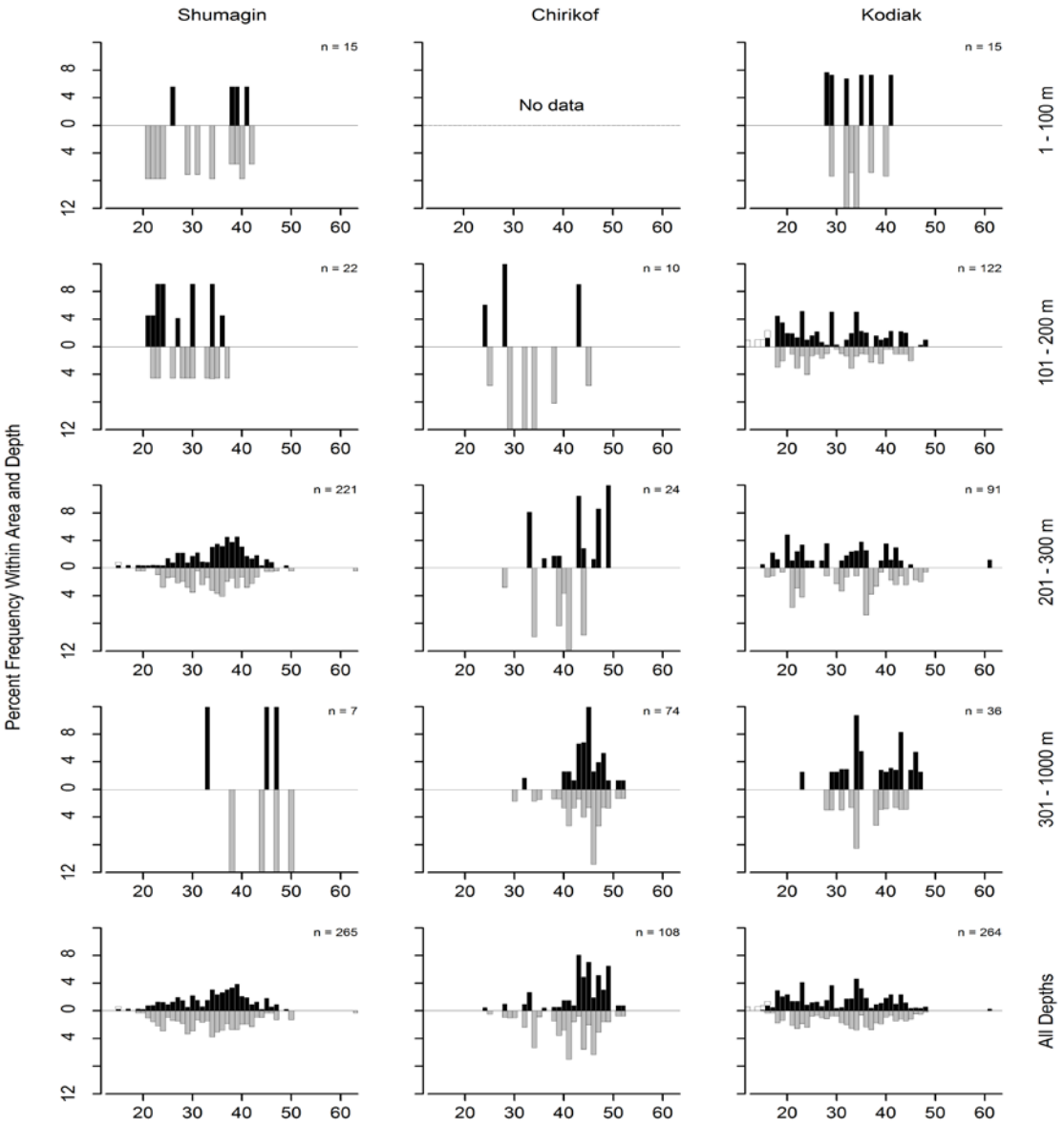

Figure 35. -- Size composition of blackspotted rockfish from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

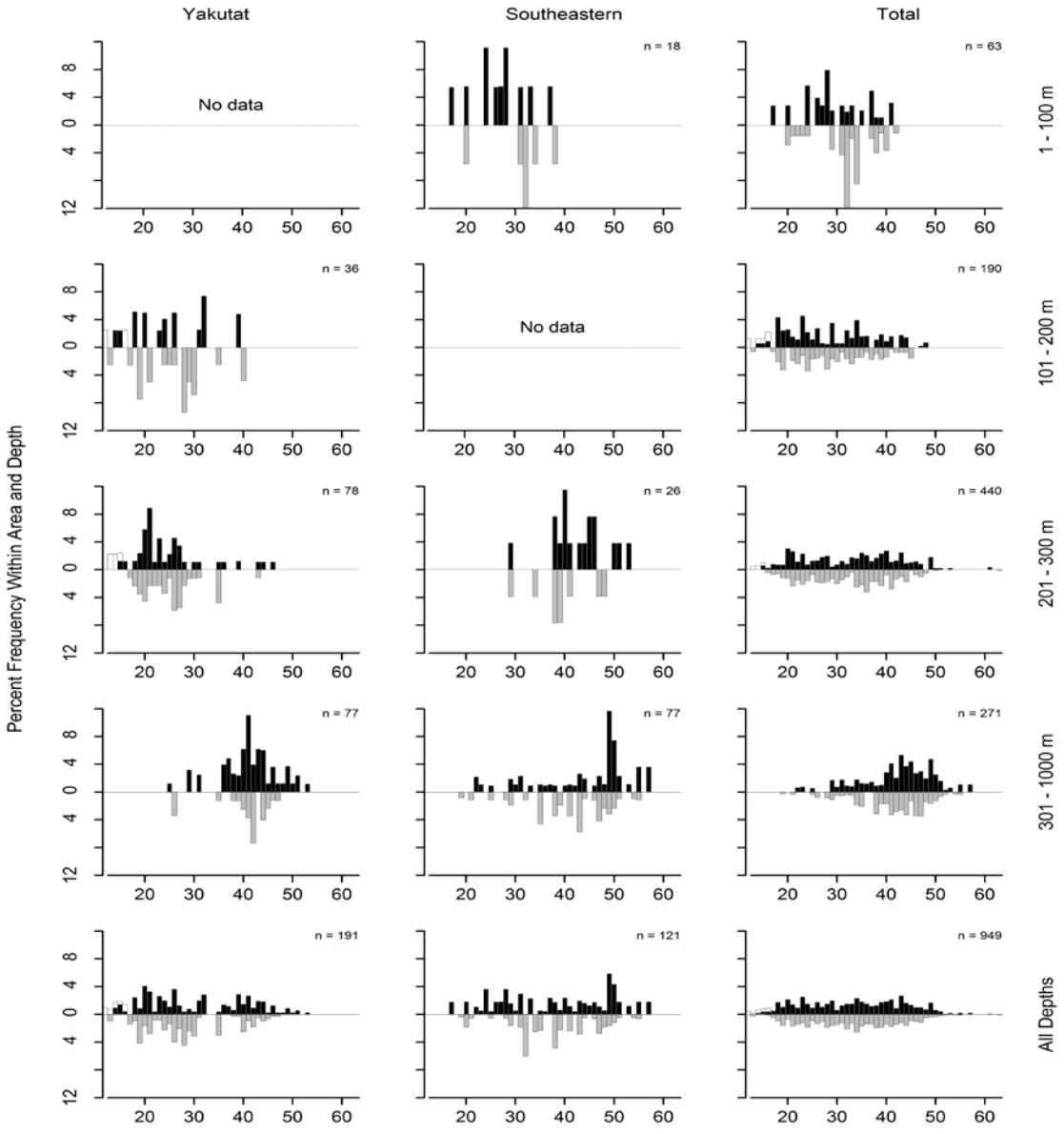

Figure 35. -- Continued (blackspotted rockfish).

Table 44. -- Catch per unit of effort by stratum for blackspotted rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Chirikof	301 - 500	Chirikof Slope	6	5	6.24	1,001	0	2,477
Yakutat	301 - 500	Yakutat Slope	7	5	4.99	758	0	1,739
Southeastern	301 - 500	Southeastern Slope	4	3	4.71	364	0	1,134
Southeastern	501 - 700	Southeastern Slope	4	2	4.28	443	0	1,778
Shumagin	201 - 300	Shumagin Slope	21	13	2.74	763	279	1,248
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	2.59	291	0	1,217
Yakutat	201 - 300	Yakutat Slope	9	5	2.29	488	0	1,219
Southeastern	301 - 500	Southeastern Deep Gullies	4	2	1.88	441	0	1,645
Kodiak	301 - 500	Kodiak Slope	8	5	1.37	398	0	839
Kodiak	101 - 200	Kenai Flats	15	5	1.23	1,479	0	3,637
Kodiak	201 - 300	Kenai Gullies	16	8	1.09	723	0	1,490
Shumagin	301 - 500	Shumagin Slope	6	2	0.61	155	0	409
Kodiak	201 - 300	Kodiak Slope	8	4	0.60	97	0	221
Chirikof	201 - 300	Chirikof Slope	10	4	0.59	90	0	203
Chirikof	201 - 300	Lower Shelikof Gully	11	4	0.43	426	0	874
Southeastern	1 - 100	Southeastern Shallows	9	2	0.39	254	0	732
Yakutat	101 - 200	Yakataga Shelf	8	4	0.38	201	0	540
Kodiak	1 - 100	Kenai Peninsula	9	3	0.38	199	0	515
Kodiak	101 - 200	Albatross Gullies	29	6	0.19	152	0	351
Yakutat	101 - 200	Middleton Shelf	6	1	0.15	110	0	392
Yakutat	201 - 300	Yakutat Gullies	9	3	0.14	44	0	112
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	2	0.12	48	0	132
Yakutat	301 - 500	Yakutat Gullies	2	2	0.12	13	0	44
Shumagin	101 - 200	Shumagin Outer Shelf	41	3	0.08	66	0	185
Shumagin	1 - 100	Davidson Bank	44	1	0.06	76	0	231
Chirikof	101 - 200	Shelikof Edge	34	4	0.06	43	0	89
Yakutat	101 - 200	Yakutat Flats	8	2	0.05	47	0	133
Kodiak	101 - 200	Portlock Flats	33	3	0.05	37	0	87
Shumagin	1 - 100	Shumagin Bank	31	1	0.04	45	0	137
Shumagin	1 - 100	Lower Alaska Peninsula	19	1	0.03	18	0	55
Chirikof	101 - 200	Chirikof Outer Shelf	32	2	0.02	11	0	31
Kodiak	1 - 100	Albatross Shallows	20	1	0.02	9	0	29
Chirikof	101 - 200	East Shumagin Gully	20	1	0.01	9	0	29

Dusky rockfish (*Sebastes variabilis*)

Dusky rockfish was not among the 20 most abundant species in the 2015 survey, but was the sixteenth most abundant species in the Chirikof and Kodiak regions (Table 2). Dusky rockfish were caught throughout the survey area and at all depths less than 300 m (Table 45). The highest densities occurred in the 101-200 m depth interval in four of the five INPFC areas, with particularly high concentrations in the Chirikof Outer Shelf, Portlock Flats, and the upper Kodiak Slope strata (Fig. 36 and Table 46). Size generally increased with depth but did not exhibit a longitudinal trend (Fig. 37). The estimated biomass of dusky rockfish was 32,786 t, and the highest regional biomass was in the Kodiak region. More than 90% of the biomass was concentrated in the 101-200 m depth interval (Table 45).

Table 45. -- Number of survey hauls, number of hauls with dusky rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	7	0.13	546	0	1,154	0.975
	101 - 200	50	6	0.57	841	0	2,076	2.186
	201 - 300	21	1	0.03	8	0	23	1.557
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	14	0.21	1,395	33	2,757	1.468
Chirikof	1 - 100	59	1	0.01	13	0	41	0.724
	101 - 200	86	24	5.37	12,810	232	25,387	1.529
	201 - 300	21	4	0.05	54	1	108	1.284
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	29	1.89	12,877	300	25,455	1.526
Kodiak	1 - 100	86	5	0.02	84	0	175	0.386
	101 - 200	127	49	3.25	14,090	5,430	22,749	1.651
	201 - 300	28	4	1.86	2,133	0	6,862	1.615
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	58	1.61	16,306	6,706	25,906	1.619
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	5	0.53	1,557	0	3,500	1.286
	201 - 300	18	5	0.24	124	8	240	1.533
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	10	0.29	1,682	0	3,628	1.302
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	2	0.32	353	0	1,043	1.406
	201 - 300	18	2	0.34	173	0	489	1.274
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	4	0.19	526	0	1,271	1.360
All areas	1 - 100	280	13	0.05	643	29	1,258	0.809
	101 - 200	321	86	2.42	29,651	14,469	44,832	1.581
	201 - 300	106	16	0.69	2,492	0	7,233	1.573
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	115	1.02	32,786	17,046	48,527	1.551

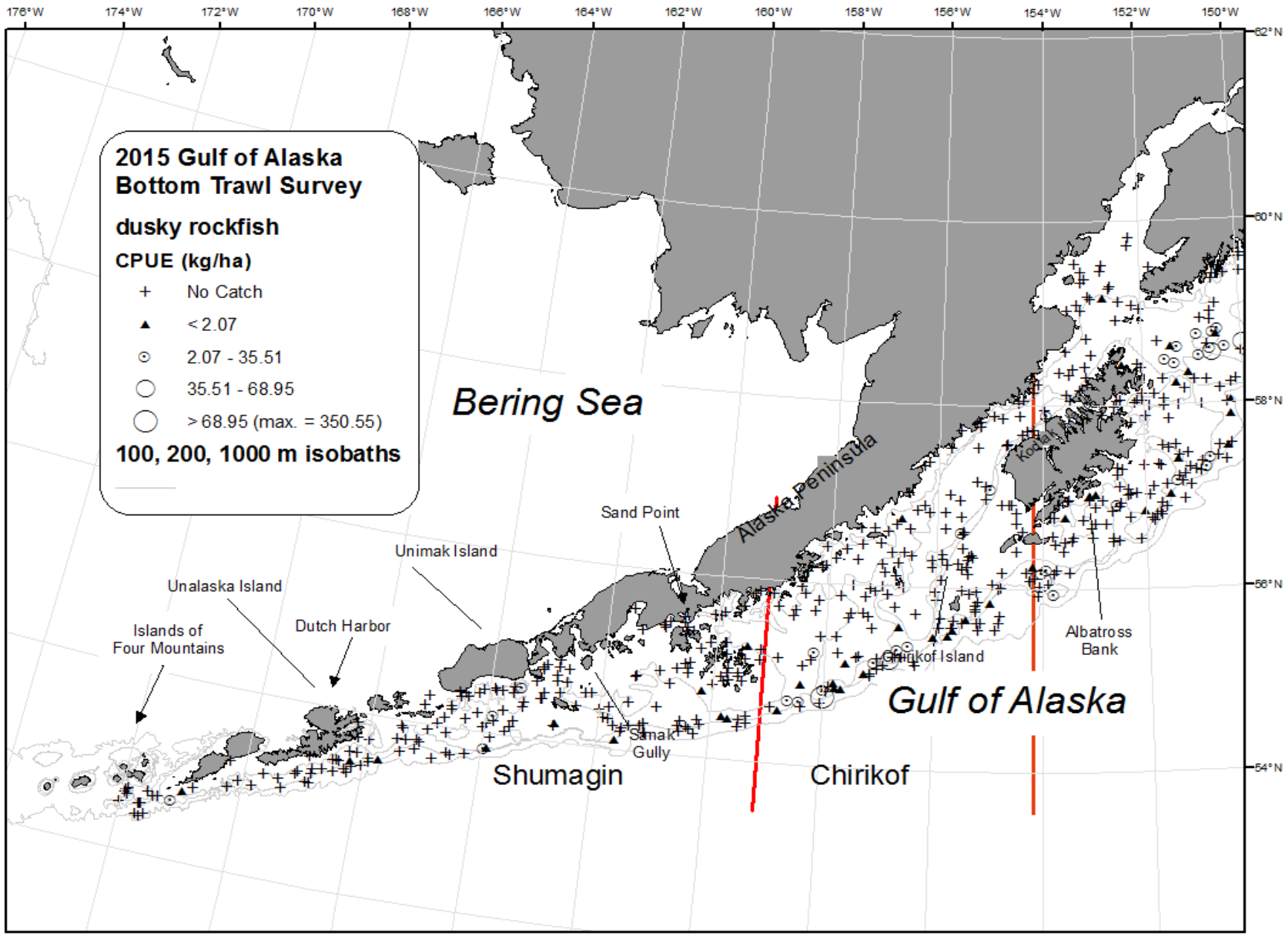

Figure 36. -- Distribution and relative abundance of dusky rockfish from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

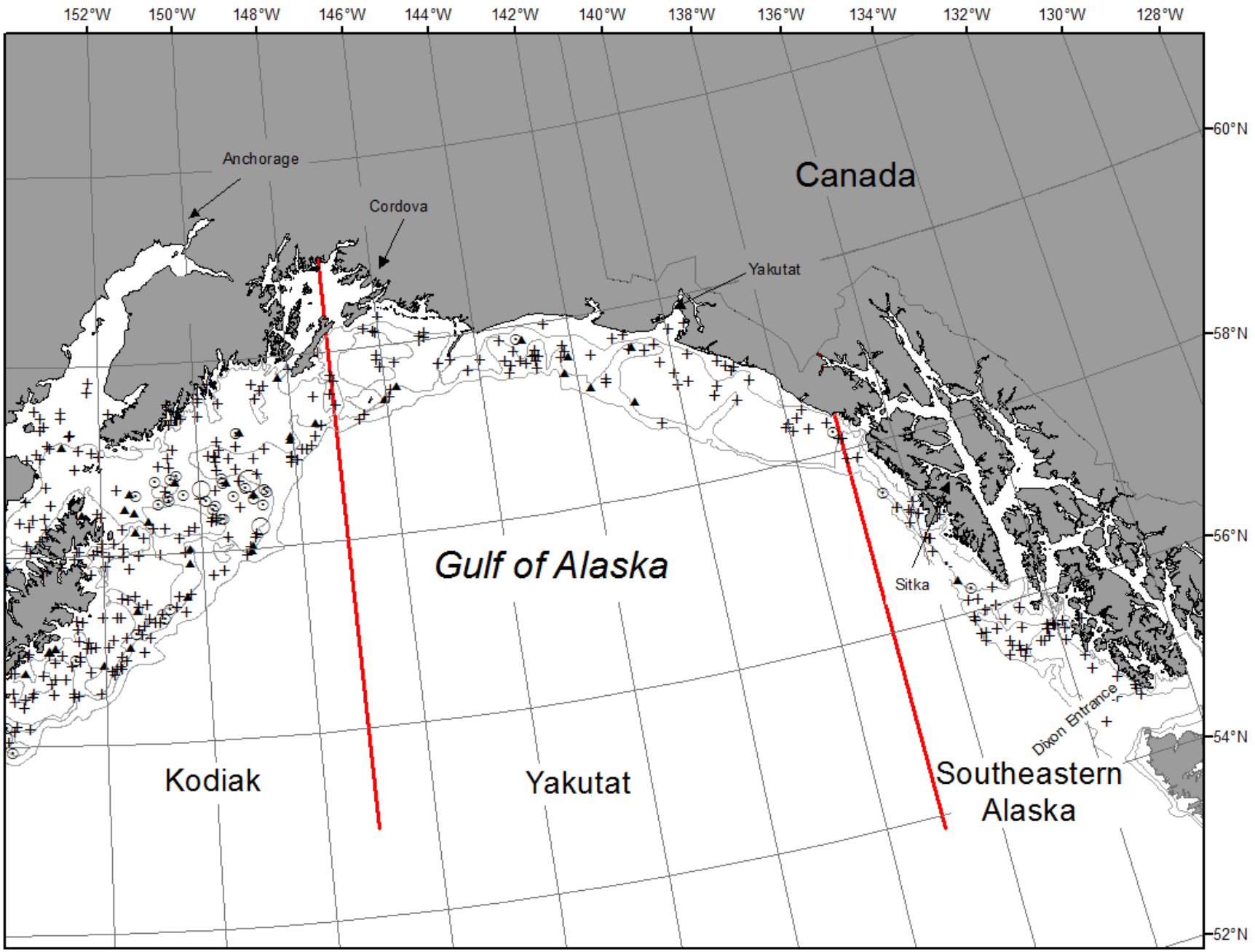

Figure 36. -- Continued (dusky rockfish).

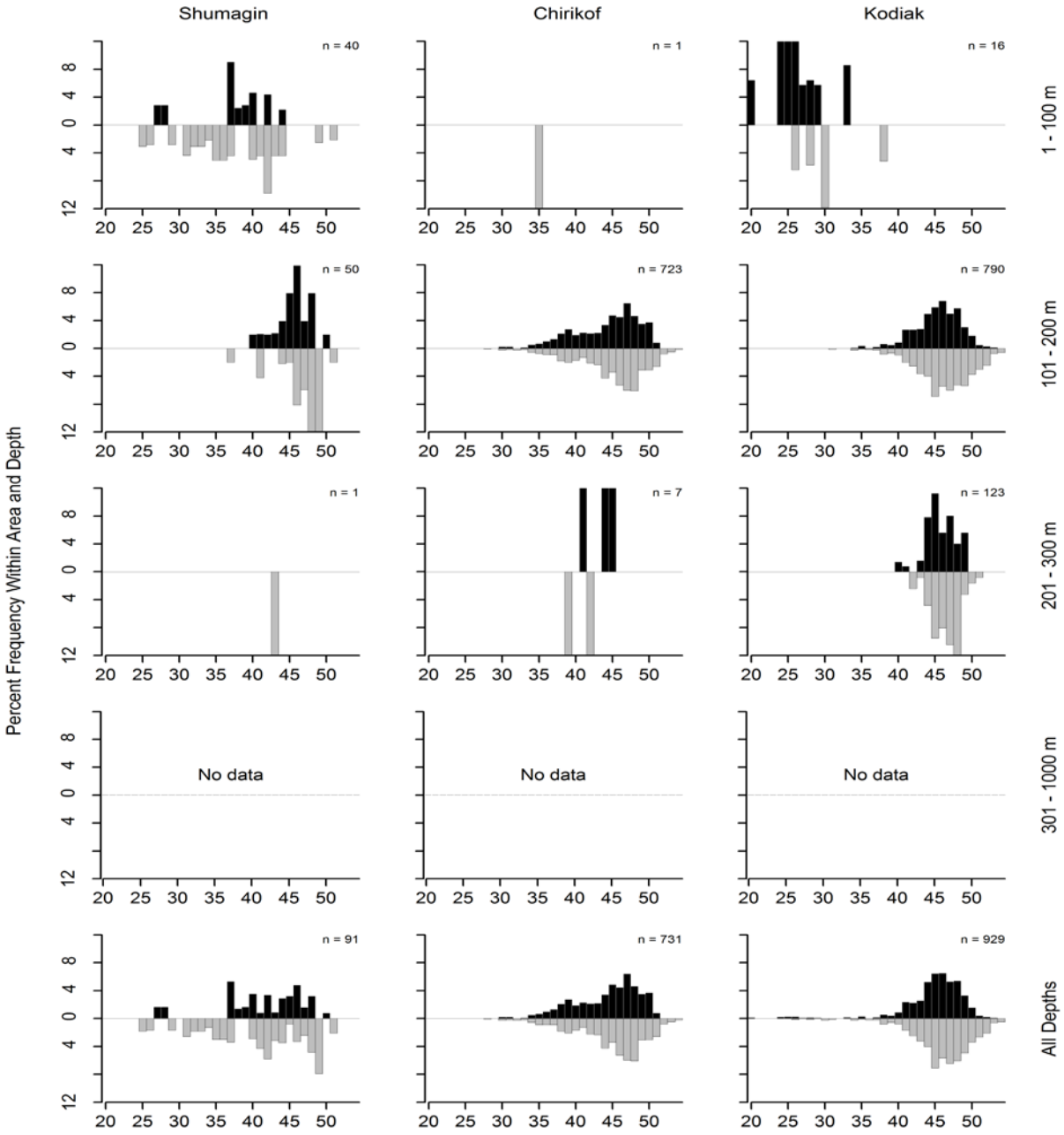

Figure 37. -- Size composition of dusky rockfish from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

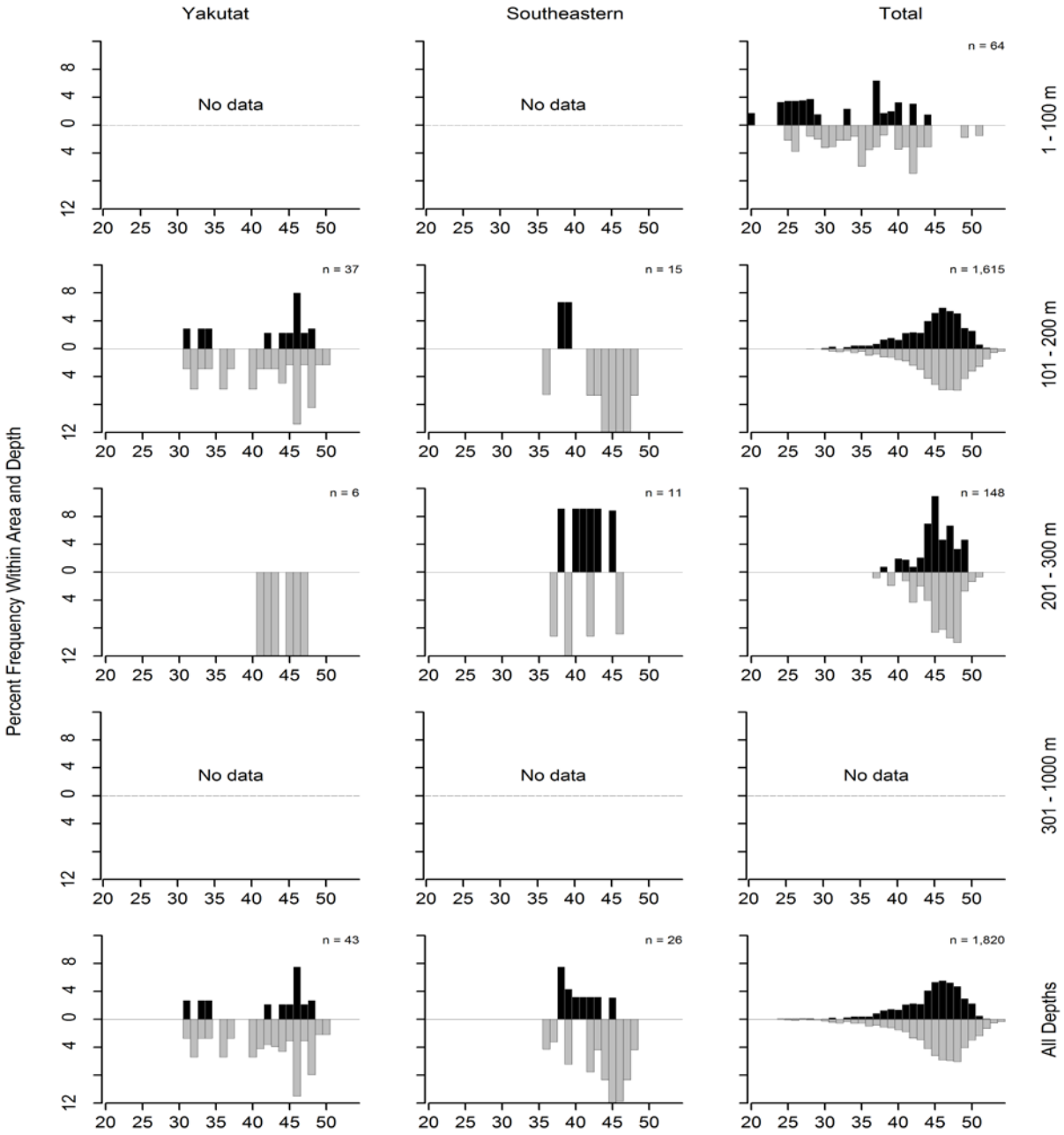

Figure 37. -- Continued (dusky rockfish).

Table 46. -- Catch per unit of effort by stratum for dusky rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Chirikof	101 - 200	Chirikof Outer Shelf	32	17	22.88	11,466	0	23,930
Kodiak	101 - 200	Portlock Flats	33	23	13.66	10,018	1,665	18,370
Kodiak	201 - 300	Kodiak Slope	8	3	12.88	2,090	0	6,938
Kodiak	101 - 200	Kodiak Outer Shelf	32	12	3.46	1,740	146	3,335
Chirikof	101 - 200	Shelikof Edge	34	5	1.50	1,158	0	2,819
Yakutat	101 - 200	Yakataga Shelf	8	3	1.33	702	0	2,141
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	1.16	130	0	544
Shumagin	101 - 200	Shumagin Outer Shelf	41	6	1.03	841	0	2,076
Kodiak	101 - 200	Kenai Flats	15	3	0.96	1,157	0	3,050
Yakutat	101 - 200	Fairweather Shelf	9	1	0.87	672	0	2,221
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	2	0.84	353	0	1,051
Kodiak	101 - 200	Barren Islands	18	6	0.81	889	0	1,800
Yakutat	201 - 300	Yakutat Slope	9	4	0.50	106	0	222
Kodiak	101 - 200	Albatross Gullies	29	5	0.36	285	0	746
Chirikof	201 - 300	Chirikof Slope	10	4	0.36	54	0	109
Shumagin	1 - 100	Davidson Bank	44	4	0.33	452	0	1,046
Yakutat	101 - 200	Yakutat Flats	8	1	0.20	183	0	617
Chirikof	101 - 200	East Shumagin Gully	20	2	0.17	185	0	513
Kodiak	1 - 100	Albatross Shallows	20	4	0.12	71	0	161
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	1	0.11	43	0	136
Shumagin	1 - 100	Shumagin Bank	31	2	0.07	84	0	213
Kodiak	201 - 300	Kenai Gullies	16	1	0.07	43	0	136
Yakutat	201 - 300	Yakutat Gullies	9	1	0.06	19	0	62
Shumagin	201 - 300	Shumagin Slope	21	1	0.03	8	0	24
Chirikof	1 - 100	Semidi Bank	16	1	0.02	13	0	42
Shumagin	1 - 100	Fox Islands	13	1	0.01	11	0	34
Kodiak	1 - 100	Albatross Banks	33	1	0.01	13	0	38

Dark rockfish (*Sebastes ciliatus*)

Dark rockfish was relatively rare and was not among the 20 most abundant species in any the INPFC areas in the 2015 survey (Table 2). Dark rockfish were caught in only 3 tows, all in the Shumagin and Chirikof INPFC areas at depths less than 200 m (Table 47 and 48, Fig. 38). The total estimated biomass of dark rockfish was 108 t (Table 47).

Table 47. -- Number of survey hauls, number of hauls with dark rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	1	<0.01	16	0	47	1.160
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	1	<0.01	16	0	47	1.160
Chirikof	1 - 100	59	1	0.03	86	0	267	1.163
	101 - 200	86	1	<0.01	7	0	21	1.218
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	2	0.01	93	0	274	1.167
Kodiak	1 - 100	86	0	---	---	---	---	---
	101 - 200	127	0	---	---	---	---	---
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	0	---	---	---	---	---
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	0	---	---	---	---	---
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	2	0.01	101	0	285	1.163
	101 - 200	321	1	<0.01	7	0	21	1.218
	201 - 300	106	0	---	---	---	---	---
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	3	<0.01	108	0	292	1.166

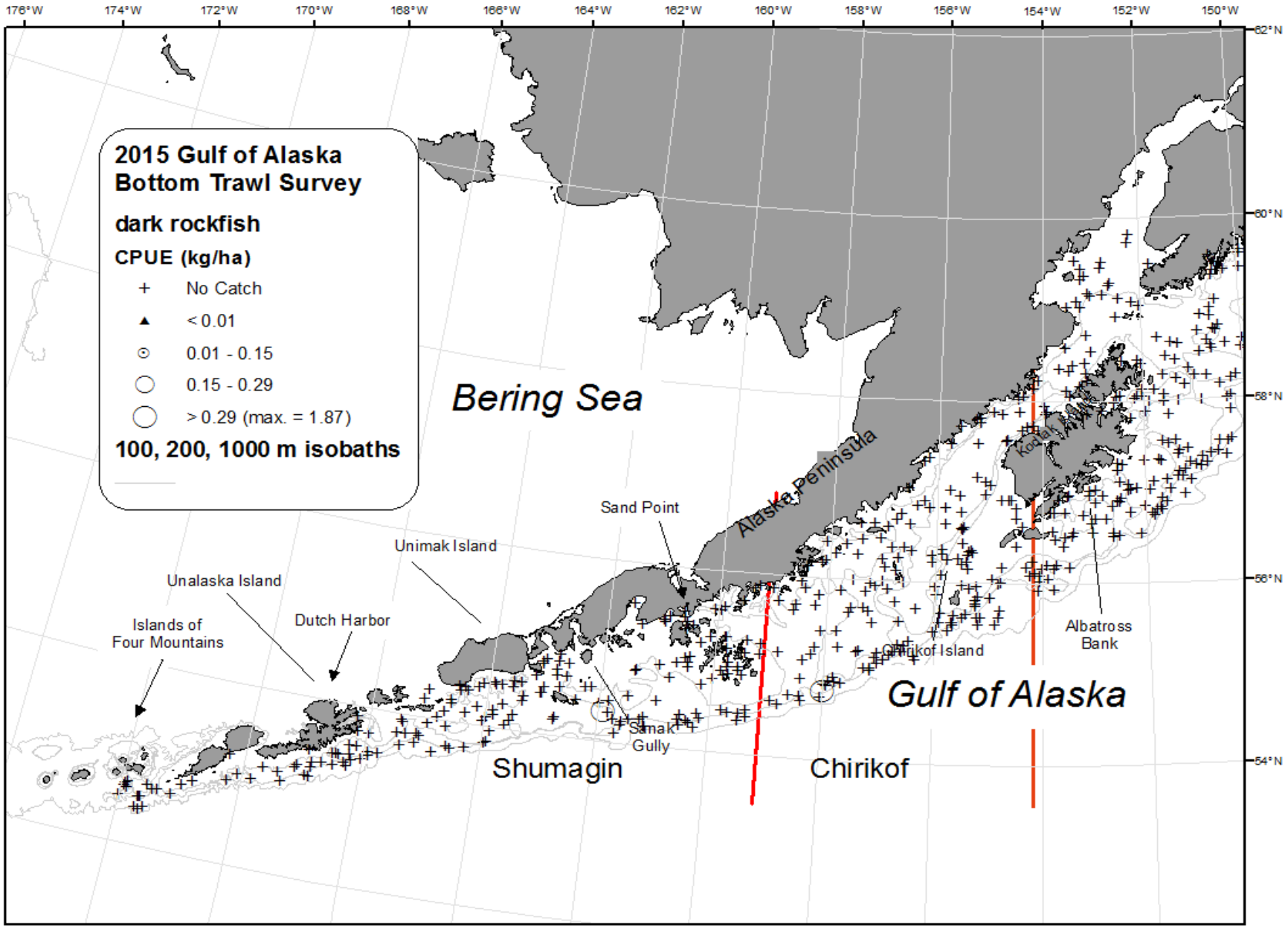

Figure 38. -- Distribution and relative abundance of dark rockfish from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

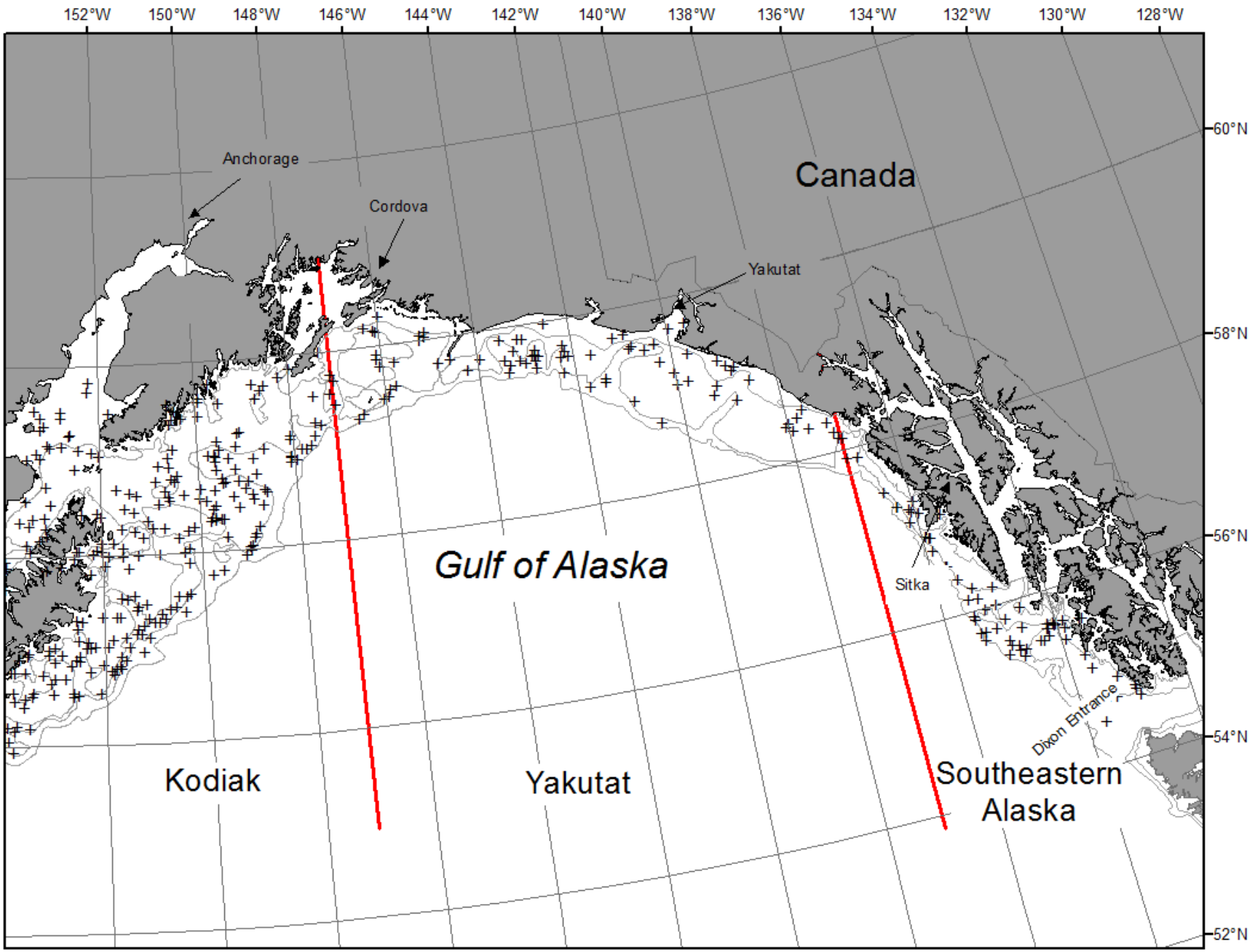

Figure 38. -- Continued (dark rockfish).

Table 48. -- Catch per unit of effort by stratum for dark rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Chirikof	1 - 100	Semidi Bank	16	1	0.12	86	0	268
Chirikof	101 - 200	Chirikof Outer Shelf	32	1	0.01	7	0	21
Shumagin	1 - 100	Davidson Bank	44	1	0.01	16	0	48

Sharpchin rockfish (*Sebastes zacentrus*)

Sharpchin rockfish was the eighteenth most abundant species caught in the 2015 survey, and was the seventh most abundant species in the Southeastern INPFC area (Table 2). Although sharpchin rockfish were caught in all regions, more than 99% of the estimated biomass was concentrated in the Kodiak, Yakutat, and Southeastern regions, and 100% at depths less than 300 m (Table 49). The highest denistites by far occurred at depths between 201 and 300 m in four of the INPFC areas, with particularly high concentrations on the Baranof-Chichagof and Kodiak slopes (Fig. 39 and Table 50). Although females were generally larger than males, size for both sexes was variable with no dintinct depth or longitudinal trends (Fig. 40). The estimated biomass of sharpchin rockfish was 45,016 t, and the highest regional biomass was in the Southeastern region.

Table 49. -- Number of survey hauls, number of hauls with sharpchin rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	1	<0.01	6	0	19	0.410
	101 - 200	50	1	<0.01	5	0	14	0.562
	201 - 300	21	4	0.20	56	0	125	0.457
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	6	0.01	67	0	136	0.458
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	3	0.01	30	0	68	0.493
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	3	<0.01	30	0	68	0.493
Kodiak	1 - 100	86	0	---	---	---	---	---
	101 - 200	127	10	0.16	679	0	1,536	0.227
	201 - 300	28	1	13.21	15,179	0	50,183	0.495
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	11	1.56	15,859	0	50,876	0.471
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	1	0.02	54	0	179	0.145
	201 - 300	18	5	1.99	1,031	0	2,931	0.354
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	6	0.19	1,086	0	2,960	0.330
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	9	6.18	6,852	0	17,649	0.328
	201 - 300	18	9	41.81	21,123	0	73,428	0.433
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	18	9.98	27,975	0	72,873	0.402
All areas	1 - 100	280	1	<0.01	6	0	19	0.410
	101 - 200	321	24	0.62	7,620	0	18,458	0.314
	201 - 300	106	19	10.37	37,390	0	91,330	0.453
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	44	1.41	45,016	0	98,010	0.422

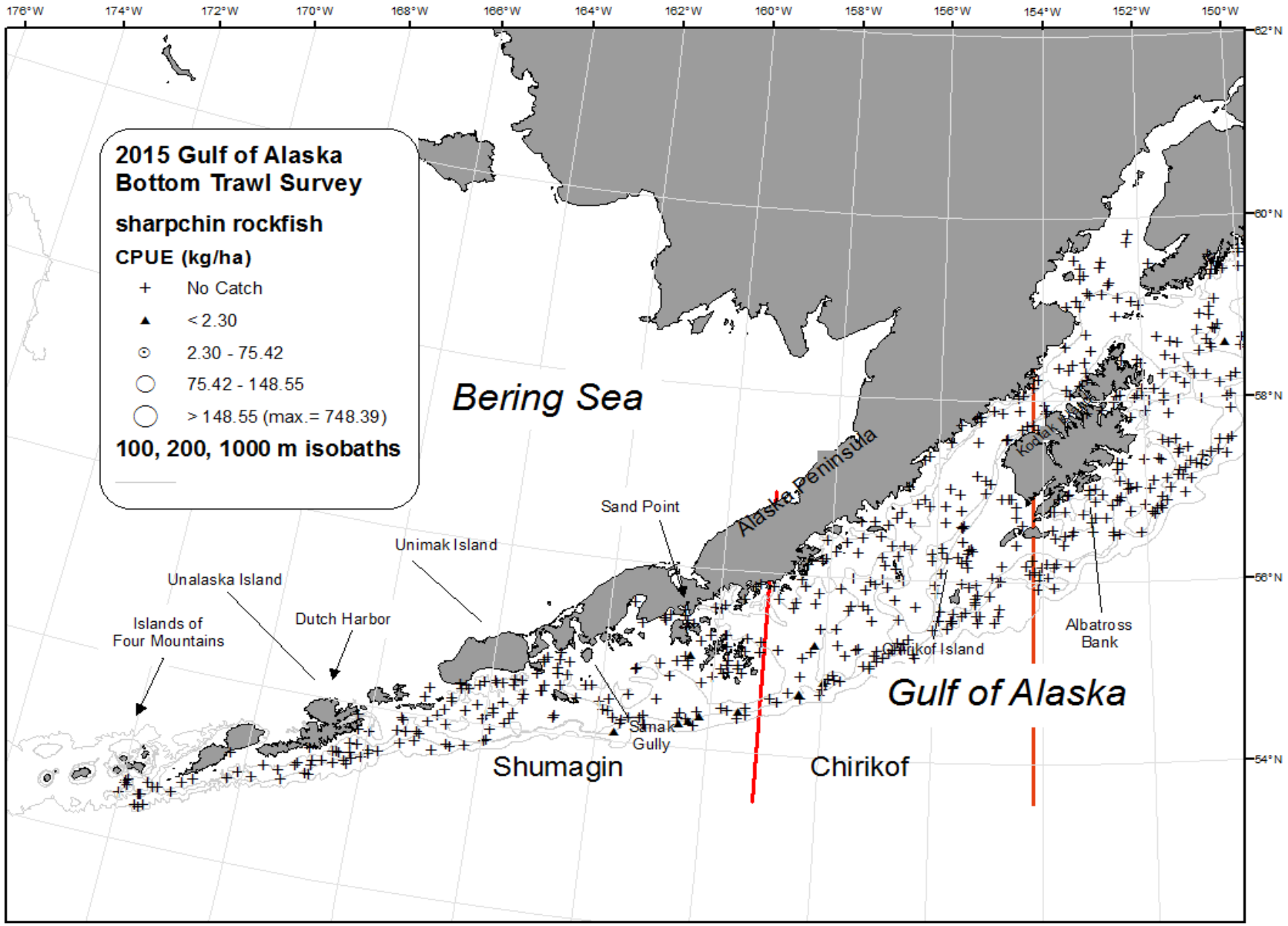

Figure 39. -- Distribution and relative abundance of sharpchin rockfish from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

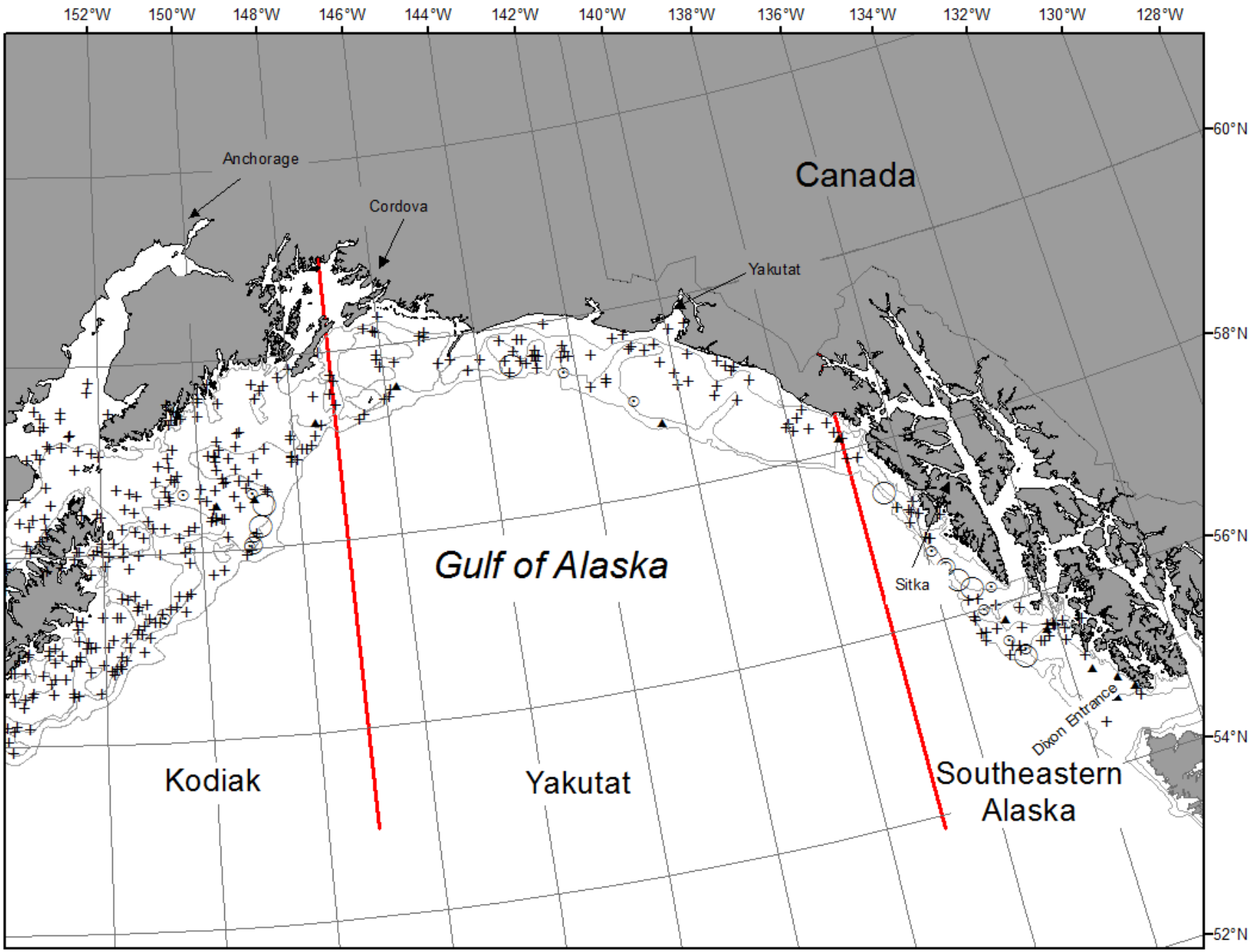

Figure 39. -- Continued (sharpchin rockfish).

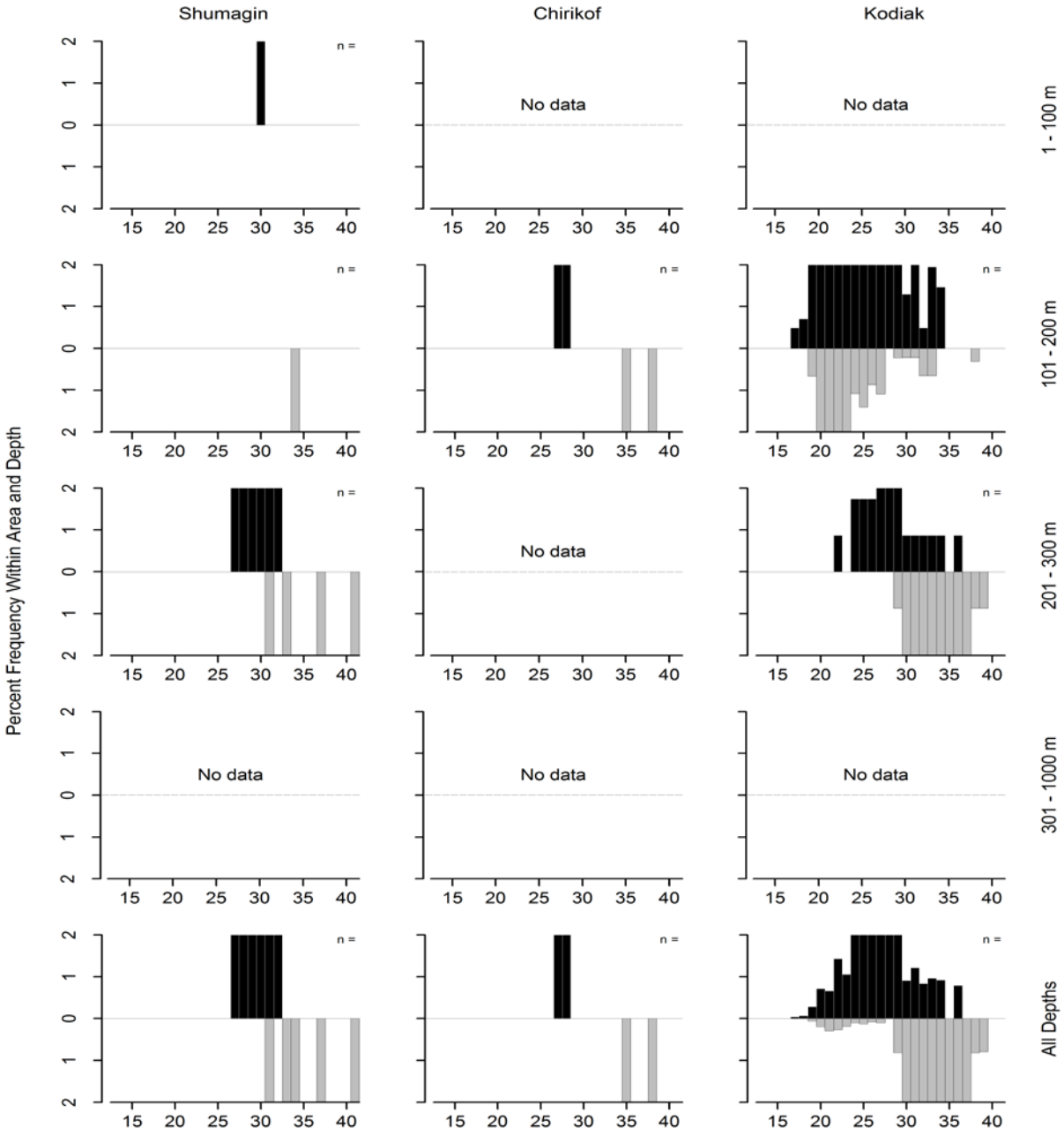

Figure 40. -- Size composition of sharpchin rockfish from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

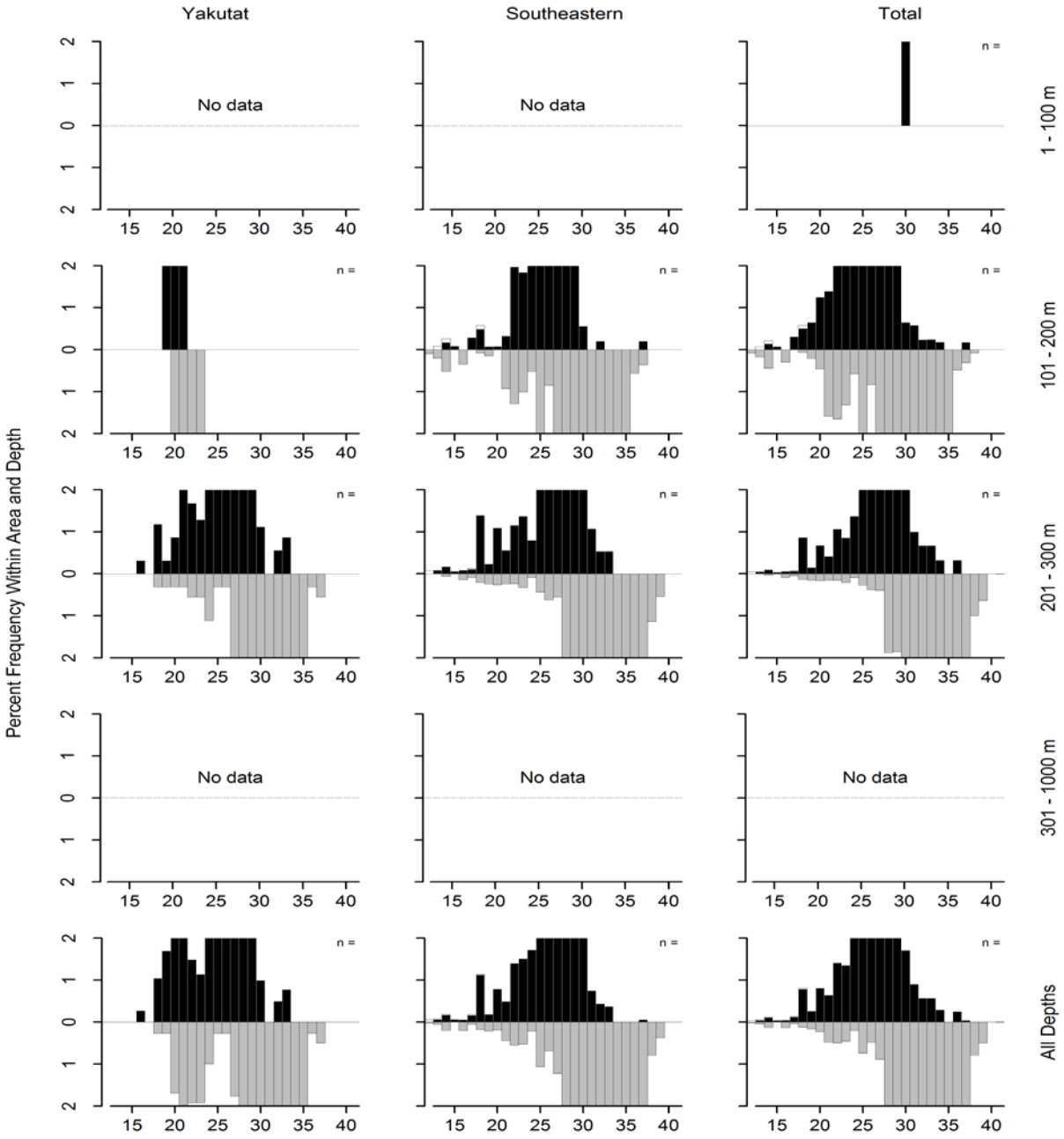

Figure 40. -- Continued (sharpchin rockfish).

Table 50. -- Catch per unit of effort by stratum for sharpchin rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	171.20	19,265	0	78,977
Kodiak	201 - 300	Kodiak Slope	8	1	93.55	15,179	0	51,079
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	4	16.30	6,840	0	17,770
Yakutat	201 - 300	Yakutat Slope	9	4	4.84	1,029	0	2,966
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	6	4.73	1,859	0	5,516
Kodiak	101 - 200	Kodiak Outer Shelf	32	6	1.30	652	0	1,508
Shumagin	201 - 300	Shumagin Slope	21	4	0.20	56	0	125
Yakutat	101 - 200	Yakutat Flats	8	1	0.06	54	0	183
Chirikof	101 - 200	Chirikof Outer Shelf	32	2	0.05	24	0	61
Kodiak	101 - 200	Portlock Flats	33	4	0.04	27	0	61
Southeastern	101 - 200	Prince of Wales Shelf	16	5	0.02	12	1	23
Yakutat	201 - 300	Yakutat Gullies	9	1	0.01	2	0	7
Shumagin	101 - 200	Shumagin Outer Shelf	41	1	0.01	5	0	15
Chirikof	101 - 200	East Shumagin Gully	20	1	0.01	6	0	18
Shumagin	1 - 100	Shumagin Bank	31	1	0.01	6	0	19

Shortraker rockfish (*Sebastes borealis*)

Shortraker rockfish was the thirteenth most abundant species caught in the 2015 survey but was among the twenty most abundant species only in the Yakutat and Southeastern INPFC areas (Table 2). Although caught throughout the survey area at depths between 101 and 700 m, shortraker rockfish were relatively rare in the Shumagin and Chirikof regions and at depths outide the 201-500 m range (Table 51). The highest densities by far occurred in the Southeastern Slope the Yakutat Slope strata, where 53% of the estimated biomass was concentrated (Fig. 41 and Table 52). Size decreased slightly with depth, and increased going from west to east (Table 51, Fig. 42). The estimated biomass of shortraker rockfish was 62,317 t, and the highest regional biomass was in the Yakutat region. Almost 99% of the estimated biomass was concentrated at depths between 201 and 500 m (Table 51).

Table 51. -- Number of survey hauls, number of hauls with shortraker rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	2	0.01	17	0	41	1.097
	201 - 300	21	5	2.99	832	0	1,845	3.815
	301 - 500	6	5	0.85	215	106	324	1.905
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	12	0.16	1,064	50	2,079	3.071
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	1	0.03	79	0	242	8.679
	201 - 300	21	3	2.72	3,139	0	8,279	2.765
	301 - 500	6	5	10.37	1,663	466	2,859	2.213
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	9	0.72	4,881	0	10,022	2.575
Kodiak	1 - 100	86	0	---	---	---	---	---
	101 - 200	127	2	0.03	131	0	338	9.495
	201 - 300	28	7	3.90	4,481	52	8,911	5.735
	301 - 500	8	8	15.12	4,402	0	9,756	2.685
	501 - 700	3	1	1.01	176	0	735	2.854
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	18	0.91	9,191	2,696	15,685	3.682
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	10	44.11	22,807	0	59,119	5.703
	301 - 500	9	8	37.50	9,855	0	20,331	3.902
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	18	5.71	32,662	0	69,765	5.006
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	1	1.23	623	0	2,352	6.207
	301 - 500	8	7	43.01	13,406	0	40,413	6.377
	501 - 700	4	1	4.74	490	0	1,851	3.775
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	9	5.18	14,520	0	41,603	6.225
All areas	1 - 100	280	0	---	---	---	---	---
	101 - 200	321	5	0.02	228	0	486	5.916
	201 - 300	106	26	8.84	31,882	0	68,367	5.114
	301 - 500	37	33	23.09	29,541	3,911	55,171	4.142
	501 - 700	16	2	0.81	666	0	1,898	3.479
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	66	1.95	62,317	19,200	105,433	4.584

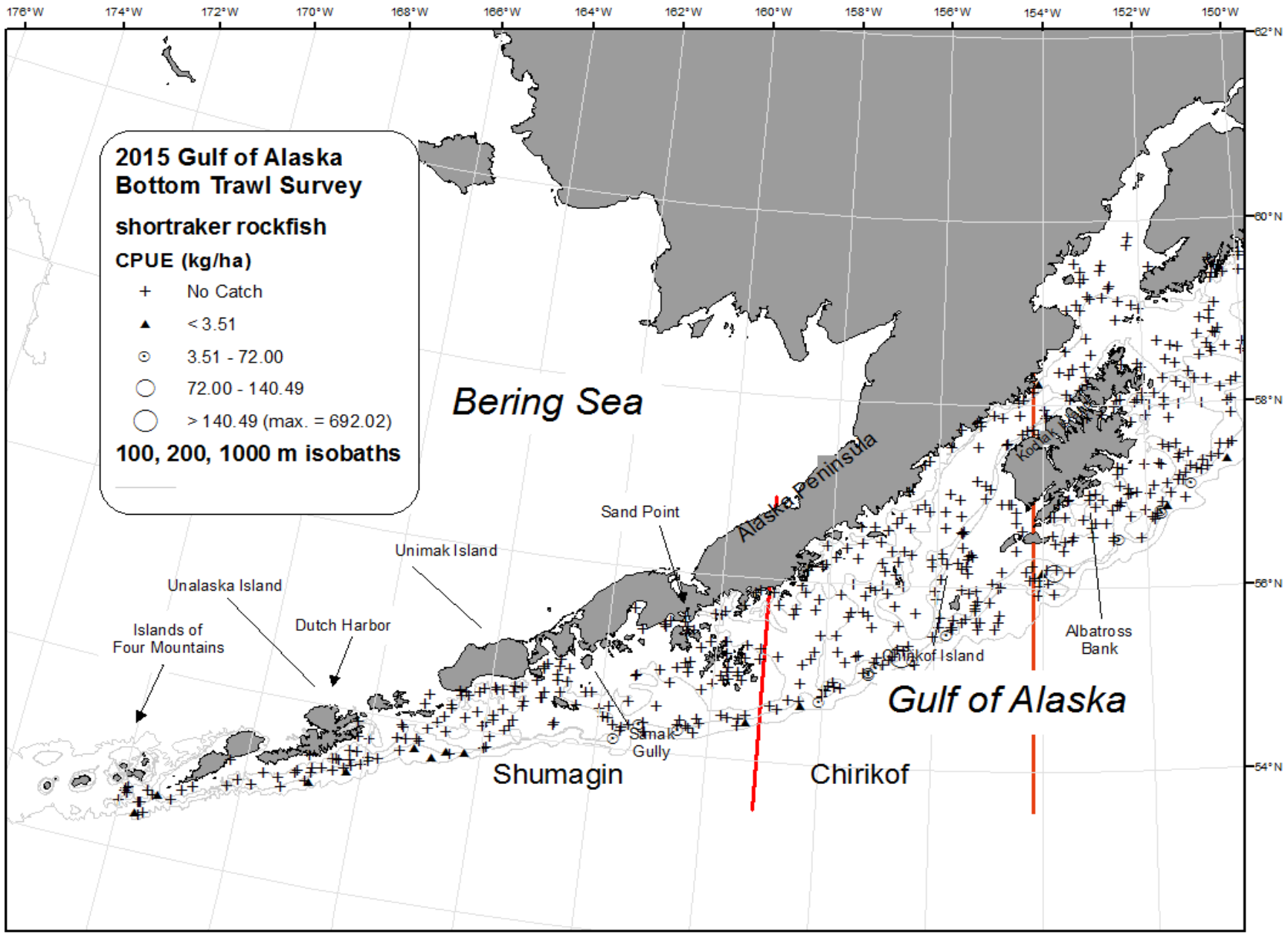

Figure 41. -- Distribution and relative abundance of shortraker rockfish from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

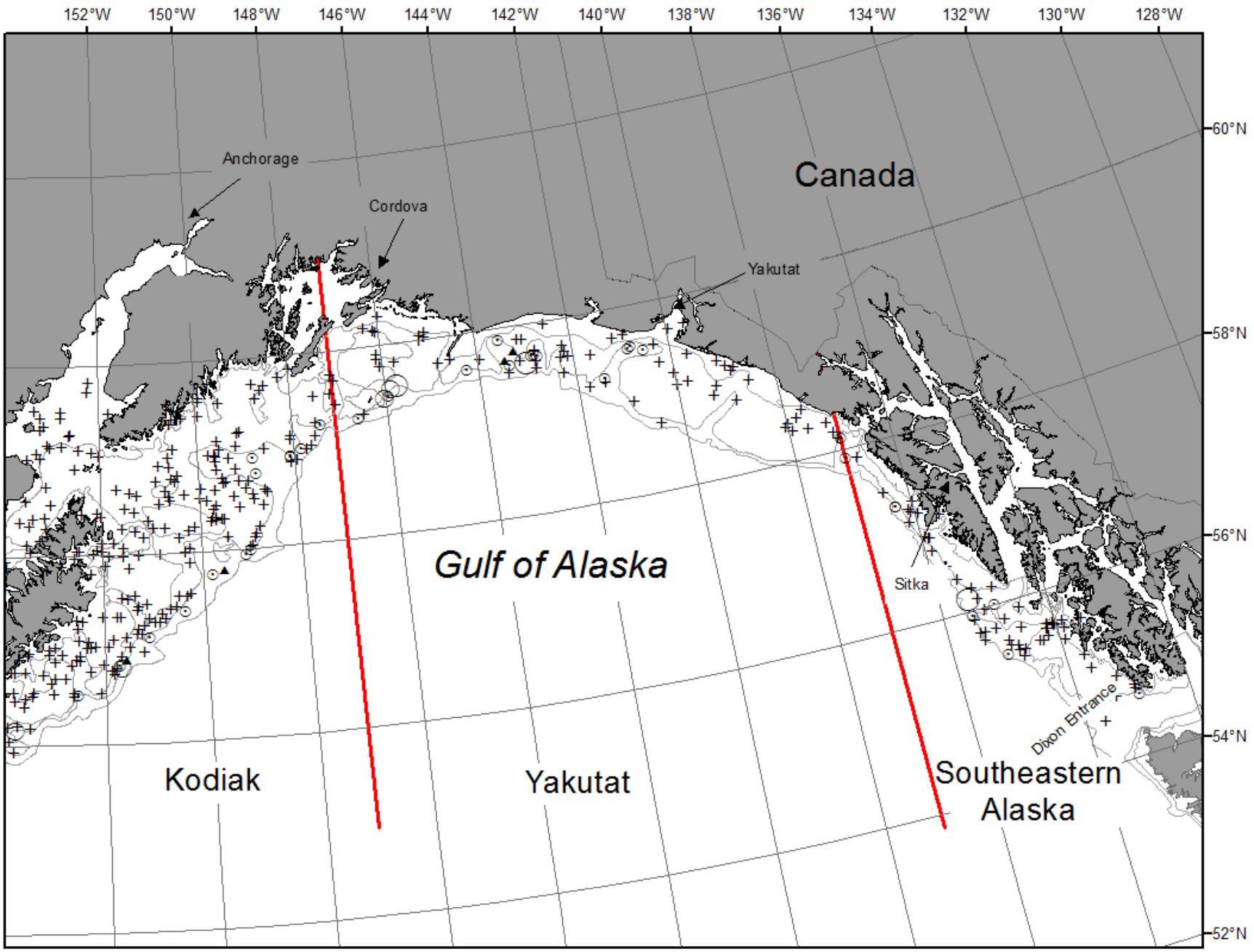

Figure 41. -- Continued (shortraker rockfish).

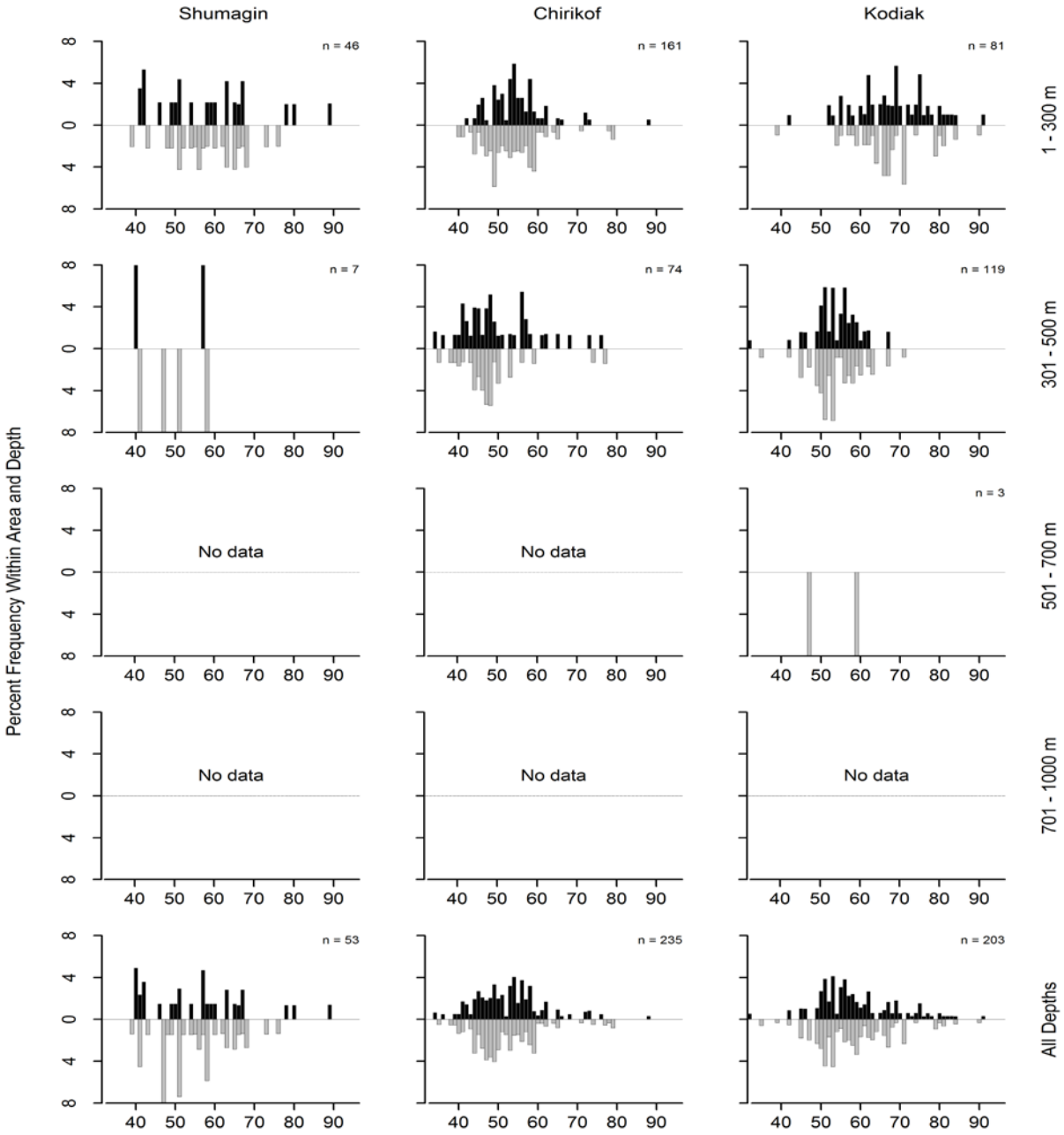

Figure 42. -- Size composition of shortraker rockfish from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

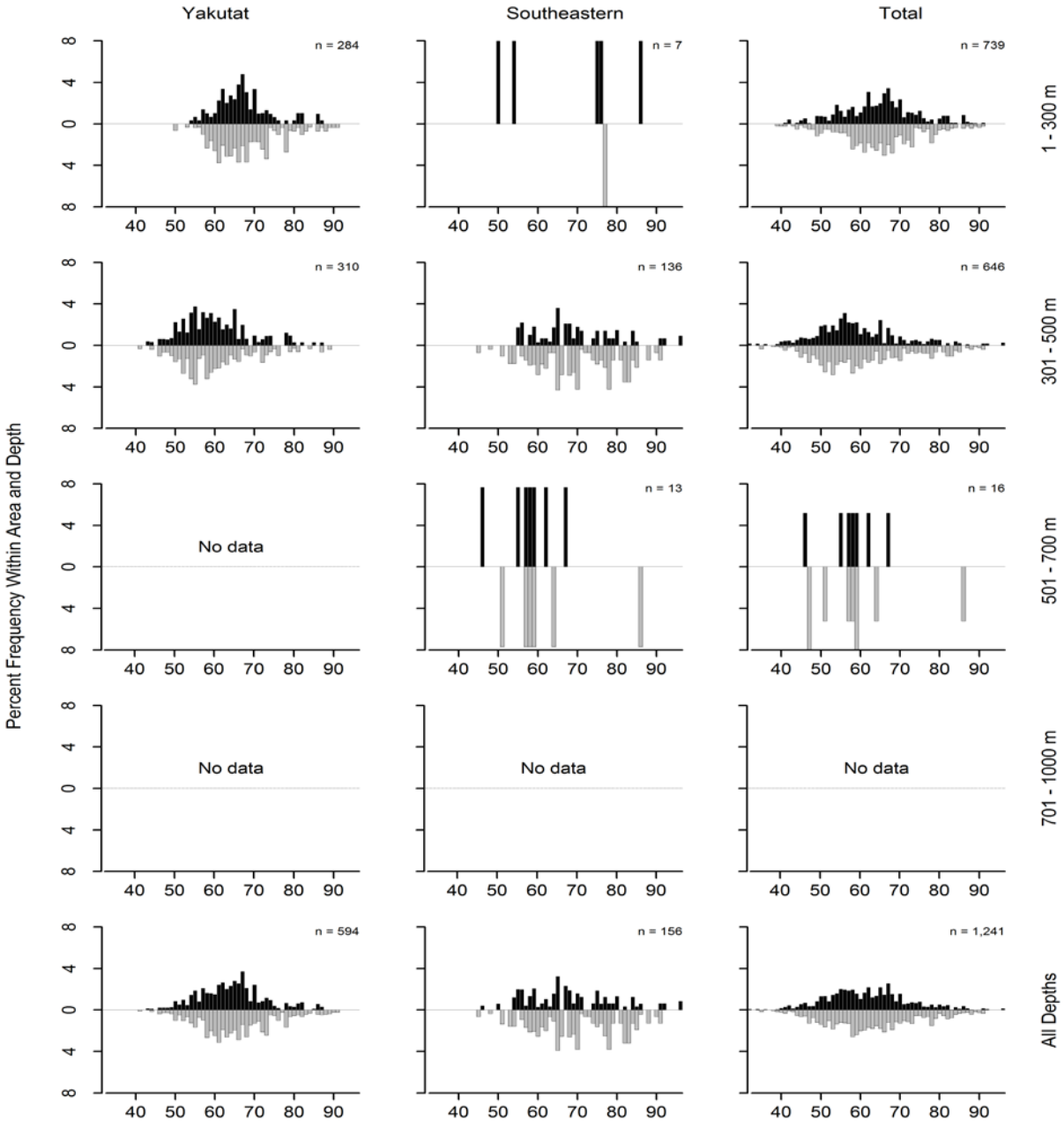

Figure 42. -- Continued (shortraker rockfish).

Table 52. -- Catch per unit of effort by stratum for shortraker rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Southeastern	301 - 500	Southeastern Slope	4	4	148.26	11,456	0	44,716
Yakutat	201 - 300	Yakutat Slope	9	4	100.12	21,299	0	58,279
Yakutat	301 - 500	Yakutat Slope	7	7	63.58	9,667	0	20,498
Chirikof	201 - 300	Chirikof Slope	10	3	20.54	3,139	0	8,357
Kodiak	201 - 300	Kodiak Slope	8	5	16.78	2,722	0	6,269
Kodiak	301 - 500	Kodiak Slope	8	8	15.12	4,402	0	9,893
Chirikof	301 - 500	Chirikof Slope	6	5	10.37	1,663	406	2,920
Southeastern	301 - 500	Southeastern Deep Gullies	4	3	8.32	1,951	0	5,259
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	5.54	623	0	2,605
Yakutat	201 - 300	Yakutat Gullies	9	6	4.96	1,508	0	3,204
Southeastern	501 - 700	Southeastern Slope	4	1	4.74	490	0	2,050
Shumagin	201 - 300	Shumagin Slope	21	5	2.99	832	0	1,848
Kodiak	201 - 300	Kenai Gullies	16	2	2.64	1,760	0	4,963
Yakutat	301 - 500	Yakutat Gullies	2	1	1.69	187	0	2,569
Kodiak	501 - 700	Kodiak Slope	3	1	1.01	176	0	932
Shumagin	301 - 500	Shumagin Slope	6	5	0.85	215	101	330
Kodiak	101 - 200	Kodiak Outer Shelf	32	2	0.26	131	0	338
Chirikof	101 - 200	Shelikof Edge	34	1	0.10	79	0	242
Shumagin	101 - 200	Shumagin Outer Shelf	41	2	0.02	17	0	41

Shortspine thornyhead (*Sebastolobus alascanus*)

Shortspine thornyhead was the eleventh most abundant species caught in the 2015 survey, with a uniform relative abundance in all INPFC areas (Table 2). Shortspine thornyhead were caught throughout the survey area and at all depths deeper than 100 m (Table 53). The highest densities occurred at depths between 301 and 700 m in four of the five regions, with particularly high concentrations in the Chirikof, Southeastern, and Yakutat, slope strata (Fig. 43 and Table 54). Size was relatively constant with both depth and longitude (Fig. 44). The estimated biomass of shortspine thornyhead was 89,241 t, and the highest regional biomass was in the Kodiak region. Approximately 65% of the biomass was concentrated at depths between 201 and 500 m (Table 53).

Table 53. -- Number of survey hauls, number of hauls with shortspine thornyhead, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	12	0.22	329	81	577	0.587
	201 - 300	21	15	16.42	4,578	1,806	7,351	0.222
	301 - 500	6	6	18.75	4,746	2,721	6,770	0.278
	501 - 700	3	3	13.63	2,733	1,034	4,432	0.284
	701 - 1000	2	2	5.92	1,147	0	6,015	0.289
	All depths	189	38	2.07	13,533	8,986	18,080	0.261
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	9	0.38	894	0	2,333	0.527
	201 - 300	21	17	5.7	6,582	270	12,893	0.357
	301 - 500	6	6	35.61	5,712	277	11,147	0.393
	501 - 700	4	4	13.04	2,548	1,021	4,074	0.349
	701 - 1000	3	3	5.55	1,703	711	2,694	0.361
	All depths	179	39	2.56	17,438	9,269	25,606	0.374
Kodiak	1 - 100	86	2	0.01	37	0	103	0.326
	101 - 200	127	13	0.57	2,486	581	4,391	0.337
	201 - 300	28	24	10.49	12,053	8,906	15,200	0.326
	301 - 500	8	8	18.07	5,261	3,859	6,663	0.201
	501 - 700	3	3	12.14	2,119	1,453	2,785	0.241
	701 - 1000	4	4	15.78	5,512	3,917	7,106	0.320
	All depths	256	54	2.71	27,468	23,527	31,410	0.284
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	10	1.16	3,395	0	7,602	0.265
	201 - 300	18	18	9.08	4,696	3,043	6,348	0.277
	301 - 500	9	9	19.07	5,012	3,421	6,604	0.292
	501 - 700	2	2	11.69	1,717	0	4,716	0.211
	701 - 1000	1	1	17.66	3,333	---	---	0.331
	All depths	80	40	3.17	18,153	13,148	23,158	0.279
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	6	0.50	560	0	1,520	0.146
	201 - 300	18	14	6.46	3,262	1,656	4,869	0.155
	301 - 500	8	8	18.66	5,818	2,463	9,173	0.224
	501 - 700	4	4	25.71	2,657	0	5,777	0.421
	701 - 1000	2	2	2.92	353	268	437	0.537
	All depths	68	34	4.51	12,650	8,395	16,905	0.219
All areas	1 - 100	280	2	<0.01	37	0	103	0.326
	101 - 200	321	50	0.63	7,664	2,901	12,426	0.291
	201 - 300	106	88	8.65	31,171	23,255	39,087	0.273
	301 - 500	37	37	20.76	26,549	20,528	32,570	0.263
	501 - 700	16	16	14.35	11,774	8,378	15,169	0.293
	701 - 1000	12	12	10.39	12,047	8,850	15,244	0.329
	All depths	772	205	2.79	89,241	77,916	100,567	0.280

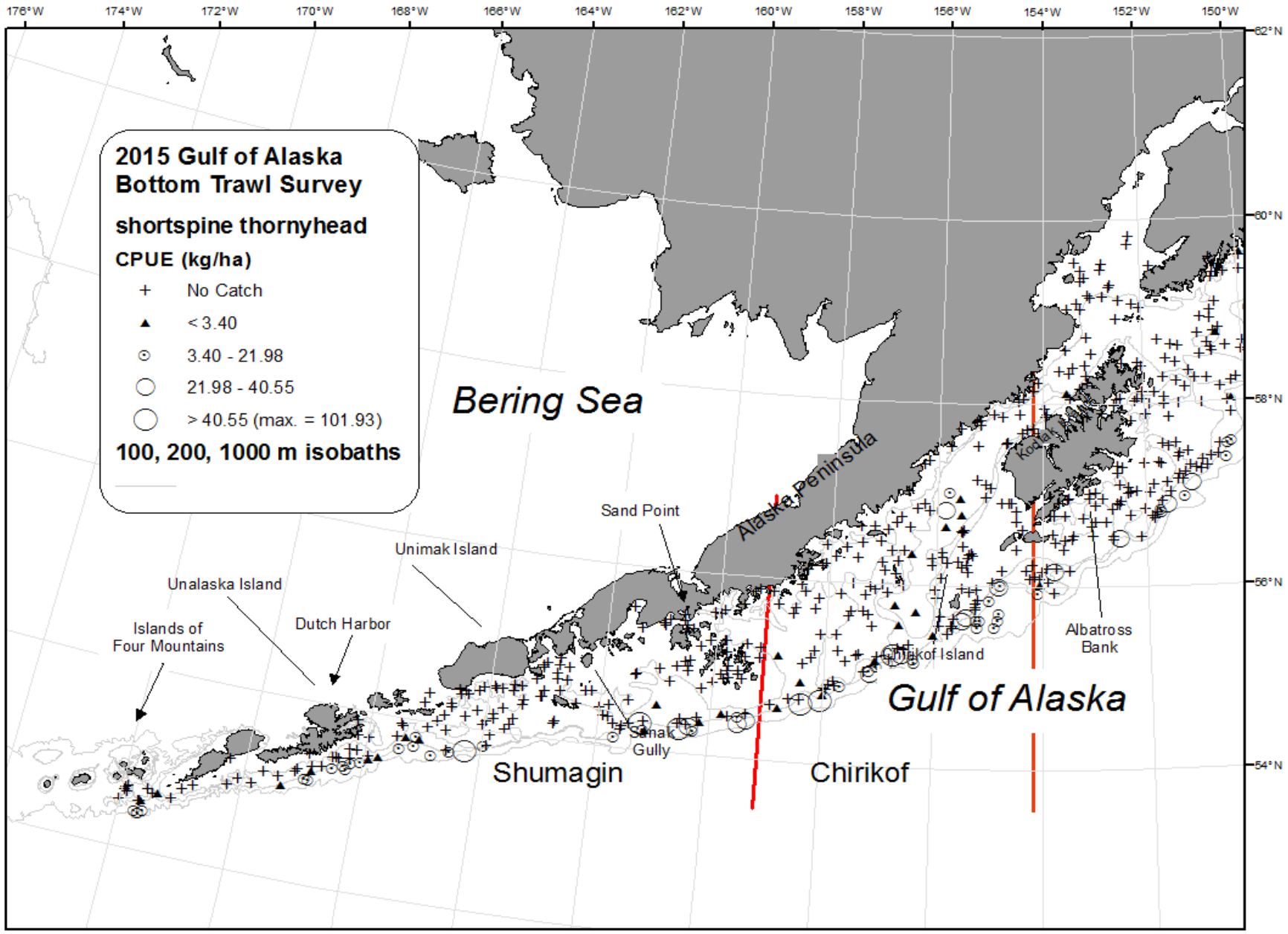

Figure 43. -- Distribution and relative abundance of shortspine thornyhead from the 2015 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

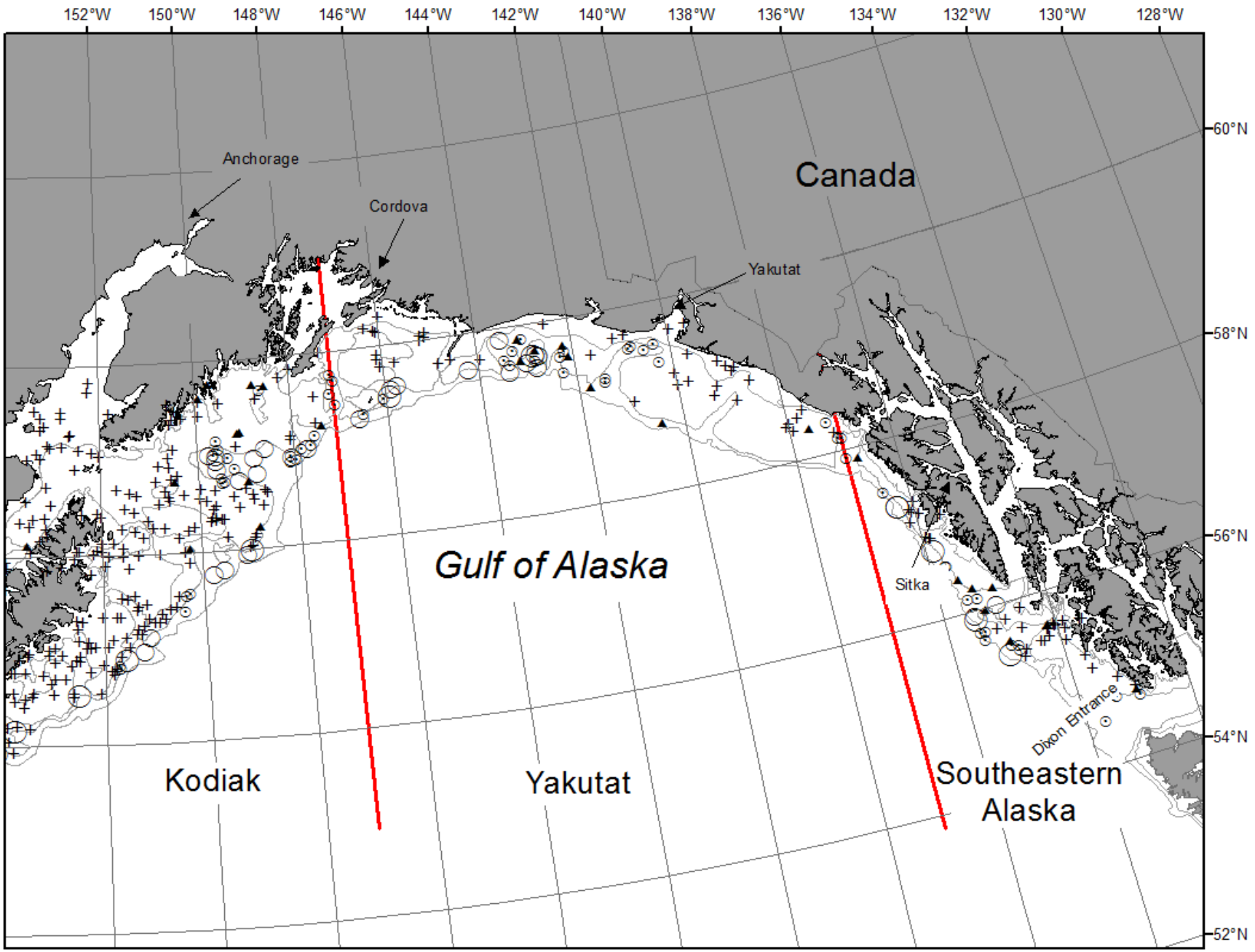

Figure 43. -- Continued (shortspine thornyhead).

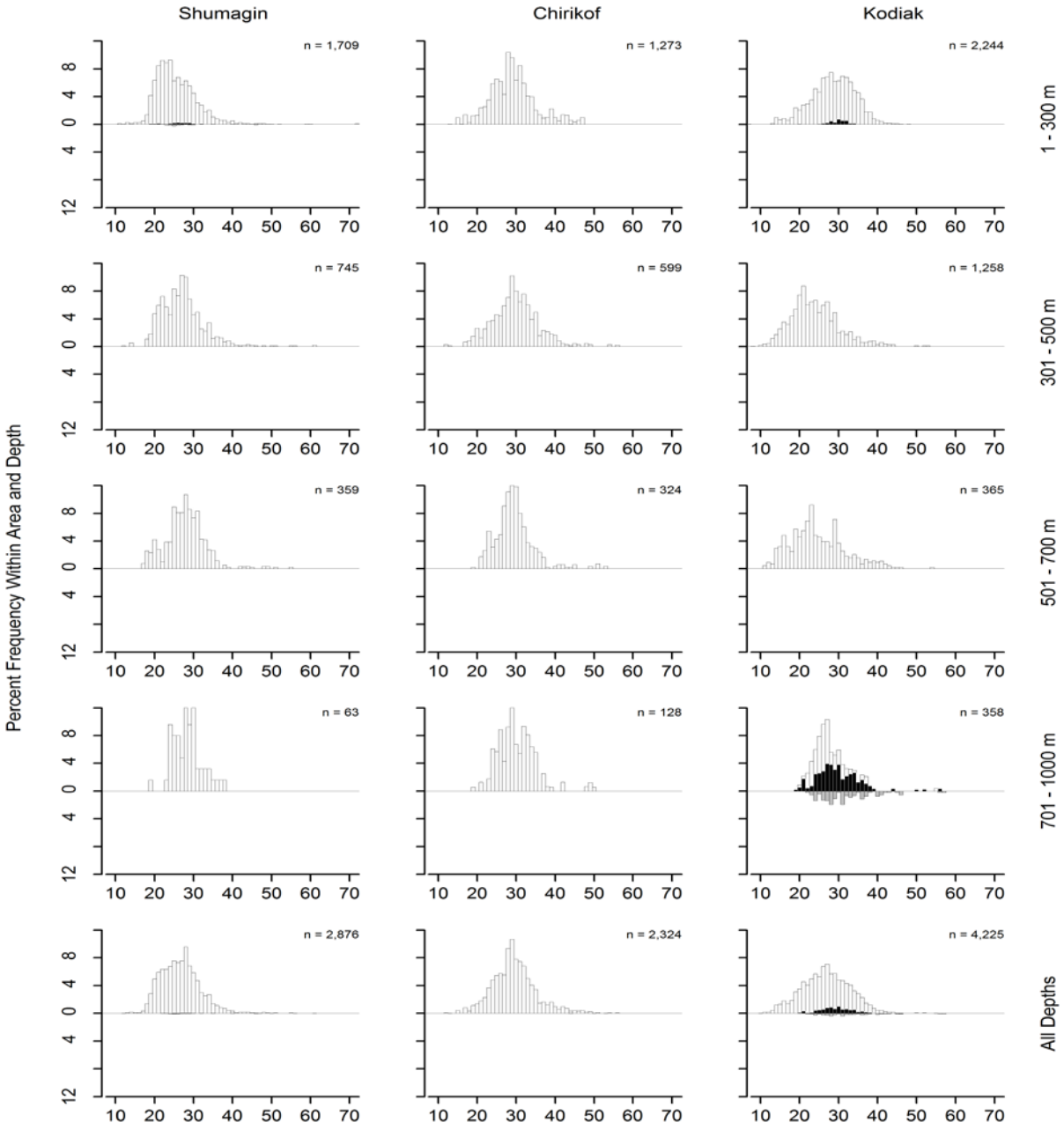

Figure 44. -- Size composition of shortspine thornyhead from the 2015 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

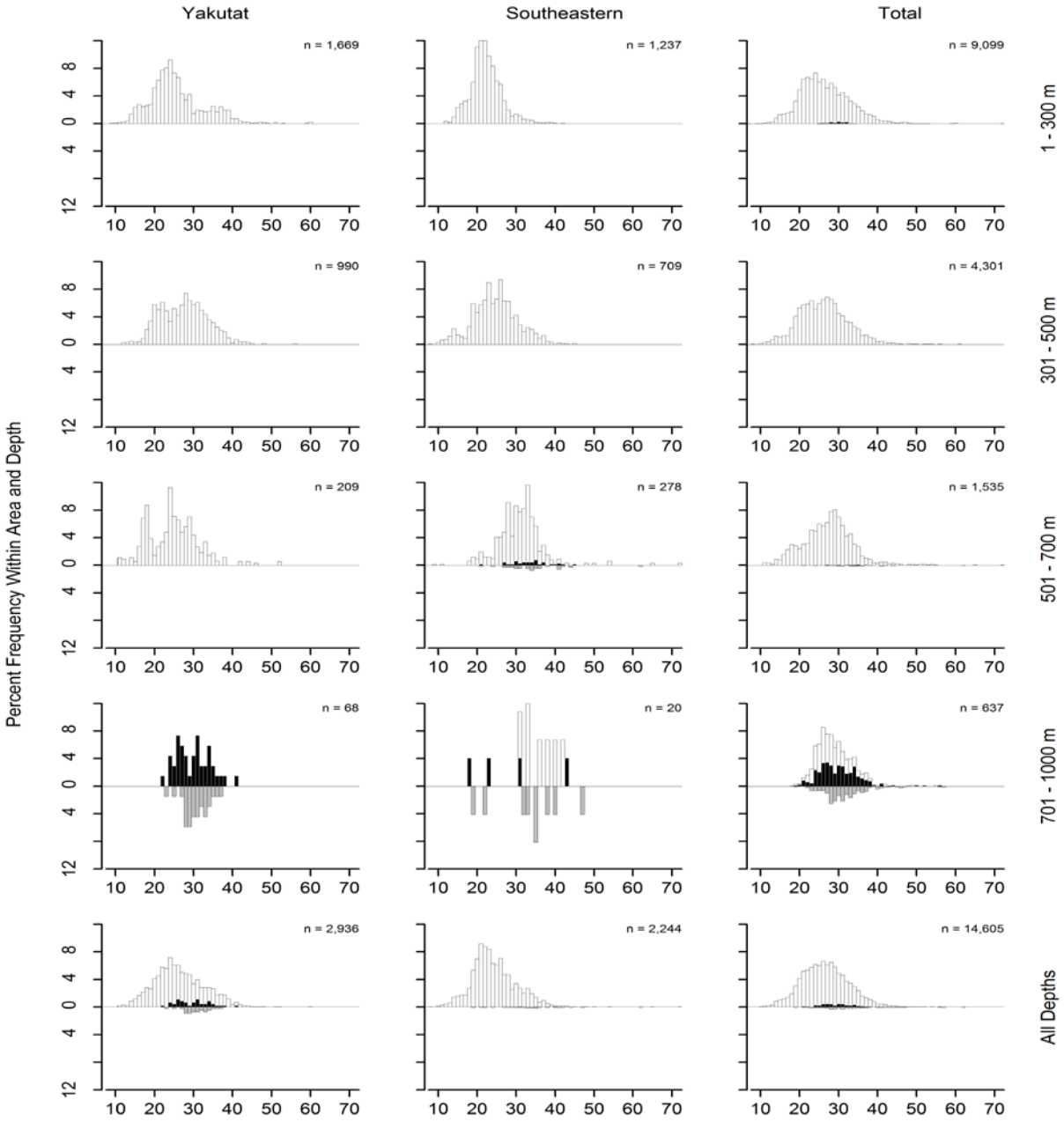

Figure 44. -- Continued (shortspine thornyhead).

Table 54. -- Catch per unit of effort by stratum for shortspine thornyhead sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Chirikof	301 - 500	Chirikof Slope	6	6	35.61	5,712	2	11,423
Southeastern	301 - 500	Southeastern Slope	4	4	34.70	2,681	72	5,291
Southeastern	501 - 700	Southeastern Slope	4	4	25.71	2,657	0	6,234
Yakutat	301 - 500	Yakutat Slope	7	7	25.71	3,910	2,267	5,553
Kodiak	201 - 300	Kodiak Slope	8	8	20.52	3,330	1,192	5,468
Shumagin	301 - 500	Shumagin Slope	6	6	18.75	4,746	2,619	6,872
Kodiak	301 - 500	Kodiak Slope	8	8	18.07	5,261	3,824	6,699
Yakutat	701 - 1000	Yakutat Slope	1	1	17.66	3,333		
Chirikof	201 - 300	Chirikof Slope	10	9	17.53	2,679	1,455	3,903
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	16.84	1,895	0	3,845
Shumagin	201 - 300	Shumagin Slope	21	15	16.42	4,578	1,798	7,359
Kodiak	701 - 1000	Kodiak Slope	4	4	15.78	5,512	3,684	7,340
Shumagin	501 - 700	Shumagin Slope	3	3	13.63	2,733	435	5,030
Southeastern	301 - 500	Southeastern Deep Gullies	4	4	13.38	3,137	0	6,367
Kodiak	201 - 300	Kenai Gullies	16	15	13.06	8,699	6,154	11,244
Chirikof	501 - 700	Chirikof Slope	4	4	13.04	2,548	798	4,297
Kodiak	501 - 700	Kodiak Slope	3	3	12.14	2,119	1,218	3,019
Yakutat	501 - 700	Yakutat Slope	2	2	11.69	1,717	0	10,573
Yakutat	301 - 500	Yakutat Gullies	2	2	9.96	1,103	521	1,684
Yakutat	201 - 300	Yakutat Gullies	9	9	9.28	2,822	1,489	4,155
Yakutat	201 - 300	Yakutat Slope	9	9	8.81	1,874	667	3,080
Shumagin	701 - 1000	Shumagin Slope	2	2	5.92	1,147	0	15,520
Chirikof	701 - 1000	Chirikof Slope	3	3	5.55	1,703	362	3,043
Chirikof	201 - 300	Lower Shelikof Gully	11	8	3.90	3,903	0	10,177
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	10	3.48	1,367	392	2,343
Southeastern	701 - 1000	Southeastern Slope	2	2	2.92	353	103	602
Yakutat	101 - 200	Middleton Shelf	6	1	2.26	1,663	0	5,939
Yakutat	101 - 200	Yakataga Shelf	8	6	1.98	1,043	56	2,030
Chirikof	101 - 200	Chirikof Outer Shelf	32	6	1.47	737	0	2,164
Kodiak	101 - 200	Kenai Flats	15	6	1.33	1,610	0	3,267
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	5	1.32	554	0	1,526
Kodiak	101 - 200	Portlock Flats	33	5	1.17	858	0	1,812
Yakutat	101 - 200	Fairweather Shelf	9	2	0.48	373	0	1,189
Shumagin	101 - 200	Shumagin Outer Shelf	41	11	0.38	306	62	549
Yakutat	101 - 200	Yakutat Flats	8	1	0.35	316	0	1,062
Chirikof	101 - 200	East Shumagin Gully	20	2	0.11	123	0	305
Kodiak	201 - 300	Upper Shelikof Gully	4	1	0.07	24	0	100
Kodiak	1 - 100	Kenai Peninsula	9	2	0.07	37	0	104
Shumagin	101 - 200	Sanak Gully	5	1	0.05	23	0	87
Chirikof	101 - 200	Shelikof Edge	34	1	0.04	34	0	104
Kodiak	101 - 200	Albatross Gullies	29	1	0.02	17	0	50
Southeastern	101 - 200	Prince of Wales Shelf	16	1	0.01	6	0	20
Kodiak	101 - 200	Kodiak Outer Shelf	32	1	< 0.01	2	0	6

Other Rockfishes

Redstripe rockfish (*Sebastes proriger*)

Redstripe rockfish was extremely rare outside the Southeastern and Kodiak INPFC areas, where 94% of the estimatd biomass was concentrated. No redstripe rockfish were caught in the Shumagin region (Table 55). Seven tows in the Kodiak Outer Shelf, Baranof-Chichagof Slope, and Prince of Wales Slope/Gullies strata accounted for almost 89% of the 16,699 t estimated biomass (Table 56).

Silvergray rockfish (*Sebastes brevispinis*)

Silvergray rockfish were rarely caught outside the Yakutat and Southeastern INPFC areas and were not caught at all in the Shumagin region (Table 57). The highest densities occurred in the Baranof-Chichagof Slope, Prince of Wales Shelf, and Prince of Wales Slope and Gullies strata, which accounted for 86% of the biomass estimate (Table 58). Approximately 99% of the 44,174 t estimated biomass was concentrated in the 101 to 300 m depth range, with no silvergray rockfish caught at depths deeper than 500 m.

Harlequin rockfish (*Sebastes variegatus*)

Harlequin rockfish were caught infrequently and in modest numbers throughout the survey area except for the Yakutat region where no catches were recorded. Harlequin rockfish were concentrated almost exclusively at depths between 101 and 200 m (Table 59). The highest densities occurred in the Kodiak Outer Shelf, Baranof-Chichagof Shelf, Chirikof Outer Shelf,

and Shumagin Outer Shelf strata, which accounted for 93% of the 2,316 t estimated biomass (Table 60).

Redbanded rockfish (*Sebastes babcocki*)

Redbanded rockfish were caught infrequently and in relatively modest numbers throughout the survey area (Table 61). The bulk of the estimated biomass (92%) was concentrated in the Kodiak, Yakutat and Southeastern INPFC areas, and the highest densities by far occurred in the 101 to 300 m depth range, with no redbanded rockfish caught at depths deeper than 500 m. The highest concentrations occured in the Baranof-Chichagof Slope and Southeastern Slope strata, which accounted for 17% of the 5,457 t estimated biomass (Table 62).

Yelloweye rockfish (*Sebastes ruberrimus*)

Yelloweye rockfish were caught infrequently and in very modest numbers throughout the survey area (Table 63). No yelloweye rockfish were caught at depths deeper than 300 m. The highest densities generally occurred in the 101 to 200 m depth range, which accounted for almost 79% of the 1,656 t estimated biomass (Table 64).

Rosethorn rockfish (*Sebastes helvomaculatus*)

Rosethorn rockfish were only caught in the Yakutat and Southeastern INPFC areas and in very modest numbers (Table 65). The highest densities occurred in the Yakutat Slope and Yakutat Flats strata, which accounted for 71% of the estimated biomass (Table 66). Rosethorn rockfish were caught almost exclusively in the 101 to 300 m depth range, which accounted for more than 99% of the 1,418 t estimated biomass.

Table 55. -- Number of survey hauls, number of hauls with redstripe rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	0	---	---	---	---	---
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	2	0.10	240	0	722	0.757
	201 - 300	21	1	<0.01	5	0	16	0.725
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	3	0.04	245	0	727	0.756
Kodiak	1 - 100	86	1	<0.01	6	0	20	0.143
	101 - 200	127	4	2.69	11,638	0	35,388	0.596
	201 - 300	28	1	0.05	63	0	208	0.655
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	6	1.15	11,707	0	35,457	0.595
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	1	0.03	88	0	285	0.624
	201 - 300	18	3	1.23	635	0	1,518	0.636
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	4	0.13	722	0	1,567	0.635
Southeastern	1 - 100	9	1	0.02	11	0	37	0.339
	101 - 200	27	3	0.75	830	0	2,116	0.478
	201 - 300	18	4	6.30	3,184	0	7,722	0.632
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	8	1.44	4,026	0	8,644	0.591
All areas	1 - 100	280	2	<0.01	17	0	45	0.228
	101 - 200	321	10	1.05	12,796	0	36,581	0.589
	201 - 300	106	9	1.08	3,886	0	8,483	0.633
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	21	0.52	16,699	0	40,904	0.598

Table 56. -- Catch per unit of effort by stratum for redstripe rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	101 - 200	Kodiak Outer Shelf	32	3	23.15	11,636	0	35,386
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	13.44	1,513	0	6,326
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	3	4.26	1,671	0	5,002
Yakutat	201 - 300	Yakutat Slope	9	3	2.98	635	0	1,535
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	3	1.98	830	0	2,132
Chirikof	101 - 200	Chirikof Outer Shelf	32	2	0.48	240	0	722
Kodiak	201 - 300	Kodiak Slope	8	1	0.39	63	0	212
Yakutat	101 - 200	Fairweather Shelf	9	1	0.11	88	0	289
Chirikof	201 - 300	Chirikof Slope	10	1	0.03	5	0	16
Southeastern	1 - 100	Southeastern Shallows	9	1	0.02	11	0	37
Kodiak	1 - 100	Kenai Peninsula	9	1	0.01	6	0	21
Kodiak	101 - 200	Portlock Flats	33	1	< 0.01	2	0	6

Table 57. -- Number of survey hauls, number of hauls with silvergray rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	0	---	---	---	---	---
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	6	0.04	106	10	201	1.360
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	6	0.02	106	10	201	1.360
Kodiak	1 - 100	86	1	<0.01	19	0	62	0.881
	101 - 200	127	11	0.31	1,338	0	2,967	1.414
	201 - 300	28	1	0.03	35	0	115	0.939
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	13	0.14	1,392	0	3,022	1.385
Yakutat	1 - 100	19	1	0.05	80	0	257	1.970
	101 - 200	31	4	1.01	2,979	0	9,408	2.444
	201 - 300	18	4	0.69	357	0	849	2.607
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	9	0.60	3,416	0	9,866	2.446
Southeastern	1 - 100	9	2	0.37	244	0	724	0.675
	101 - 200	27	18	20.98	23,251	0	52,373	1.830
	201 - 300	18	14	31.10	15,715	1,157	30,273	2.072
	301 - 500	8	1	0.16	51	0	192	2.533
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	35	14.00	39,261	6,928	71,594	1.899
All areas	1 - 100	280	4	0.03	343	0	834	0.809
	101 - 200	321	39	2.26	27,674	0	57,083	1.851
	201 - 300	106	19	4.47	16,106	1,541	30,672	2.076
	301 - 500	37	1	0.04	51	0	192	2.533
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	63	1.38	44,174	11,617	76,732	1.908

Table 58. -- Catch per unit of effort by stratum for silvergray rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	54.96	6,184	0	24,967
Southeastern	101 - 200	Prince of Wales Shelf	16	10	32.16	22,153	0	51,417
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	11	24.27	9,531	2,296	16,766
Yakutat	101 - 200	Fairweather Shelf	9	1	3.68	2,841	0	9,392
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	8	2.62	1,098	322	1,875
Yakutat	201 - 300	Yakutat Slope	9	3	1.62	344	0	845
Kodiak	101 - 200	Kodiak Outer Shelf	32	7	1.12	563	0	1,450
Kodiak	101 - 200	Portlock Flats	33	4	1.06	776	0	2,161
Southeastern	1 - 100	Southeastern Shallows	9	2	0.37	244	0	734
Southeastern	301 - 500	Southeastern Deep Gullies	4	1	0.22	51	0	213
Kodiak	201 - 300	Kodiak Slope	8	1	0.21	35	0	117
Yakutat	101 - 200	Yakataga Shelf	8	2	0.11	57	0	150
Chirikof	101 - 200	Chirikof Outer Shelf	32	3	0.10	50	0	113
Yakutat	101 - 200	Yakutat Flats	8	1	0.09	81	0	274
Yakutat	1 - 100	Yakutat Shallows	10	1	0.08	80	0	260
Chirikof	101 - 200	Shelikof Edge	34	3	0.07	55	0	128
Yakutat	201 - 300	Yakutat Gullies	9	1	0.04	13	0	44
Kodiak	1 - 100	Kenai Peninsula	9	1	0.04	19	0	63

Table 59. -- Number of survey hauls, number of hauls with harlequin rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
1 - 100	107	0	---	---	---	---	---
101 - 200	50	3	0.32	466	0	1,386	0.641
201 - 300	21	1	0.01	2	0	6	0.382
301 - 500	6	0	---	---	---	---	---
501 - 700	3	0	---	---	---	---	---
701 - 1000	2	0	---	---	---	---	---
All depths	189	4	0.07	468	0	1,388	0.639
1 - 100	59	1	<0.01	6	0	19	0.169
101 - 200	86	11	0.15	369	0	817	0.581
201 - 300	21	1	<0.01	3	0	9	0.425
301 - 500	6	0	---	---	---	---	---
501 - 700	4	0	---	---	---	---	---
701 - 1000	3	0	---	---	---	---	---
All depths	179	13	0.06	378	0	826	0.557
1 - 100	86	1	<0.01	5	0	16	0.111
101 - 200	127	8	0.24	1,048	0	2,893	0.223
201 - 300	28	0	---	---	---	---	---
301 - 500	8	0	---	---	---	---	---
501 - 700	3	0	---	---	---	---	---
701 - 1000	4	0	---	---	---	---	---
All depths	256	9	0.10	1,053	0	2,898	0.222
1 - 100	19	0	---	---	---	---	---
101 - 200	31	0	---	---	---	---	---
201 - 300	18	0	---	---	---	---	---
301 - 500	9	0	---	---	---	---	---
501 - 700	2	0	---	---	---	---	---
701 - 1000	1	0	---	---	---	---	---
All depths	80	0	---	---	---	---	---
1 - 100	9	0	---	---	---	---	---
101 - 200	27	6	0.36	397	0	1,229	0.194
201 - 300	18	5	0.02	13	1	24	0.188
301 - 500	8	1	0.02	8	0	29	0.326
501 - 700	4	0	---	---	---	---	---
701 - 1000	2	0	---	---	---	---	---
All depths	68	12	0.15	418	0	1,249	0.195
1 - 100	280	2	<0.01	11	0	27	0.137
101 - 200	321	28	0.19	2,280	76	4,484	0.281
201 - 300	106	7	<0.01	18	4	31	0.219
301 - 500	37	1	0.01	8	0	29	0.326
501 - 700	16	0	---	---	---	---	---
701 - 1000	12	0	---	---	---	---	---
All depths	772	38	0.07	2,316	112	4,521	0.280

Table 60. -- Catch per unit of effort by stratum for harlequin rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	101 - 200	Kodiak Outer Shelf	32	5	1.88	947	0	2,787
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	4	0.93	391	0	1,233
Chirikof	101 - 200	Chirikof Outer Shelf	32	8	0.68	339	0	785
Shumagin	101 - 200	Shumagin Outer Shelf	41	3	0.57	466	0	1,386
Kodiak	101 - 200	Portlock Flats	33	3	0.14	101	0	244
Southeastern	301 - 500	Southeastern Deep Gullies	4	1	0.03	8	0	32
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	4	0.03	11	0	21
Chirikof	201 - 300	Chirikof Slope	10	1	0.02	3	0	9
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	0.02	2	0	9
Chirikof	101 - 200	Shelikof Edge	34	2	0.02	14	0	33
Chirikof	101 - 200	East Shumagin Gully	20	1	0.02	17	0	52
Kodiak	1 - 100	Kenai Peninsula	9	1	0.01	5	0	16
Southeastern	101 - 200	Prince of Wales Shelf	16	2	0.01	6	0	15
Chirikof	1 - 100	Semidi Bank	16	1	0.01	6	0	19
Shumagin	201 - 300	Shumagin Slope	21	1	0.01	2	0	6

Table 61. -- Number of survey hauls, number of hauls with redbanded rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	4	0.19	52	0	106	1.144
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	4	0.01	52	0	106	1.144
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	5	0.05	125	0	254	1.628
	201 - 300	21	9	0.23	270	0	655	1.137
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	14	0.06	395	0	805	1.258
Kodiak	1 - 100	86	1	<0.01	12	0	39	0.507
	101 - 200	127	13	0.23	1,001	0	2,129	1.225
	201 - 300	28	8	0.43.	493	0	1,206	1.065
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	22	0.15	1,506	202	2,810	1.155
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	4	0.05	133	0	350	0.756
	201 - 300	18	12	0.60	309	107	511	0.520
	301 - 500	9	2	2.12	557	0	1,413	1.121
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	18	0.17	998	186	1,810	0.789
Southeastern	1 - 100	9	1	0.03	22	0	72	0.700
	101 - 200	27	10	0.72	803	45	1,562	1.285
	201 - 300	18	13	2.60	1,314	304	2,323	0.868
	301 - 500	8	4	1.18	366	148	585	0.637
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	28	0.89	2,506	1,280	3,732	0.912
All areas	1 - 100	280	2	<0.01	34	0	89	0.618
	101 - 200	321	32	0.17	2,063	711	3,414	1.217
	201 - 300	106	46	0.68	2,438	1,186	3,689	0.854
	301 - 500	37	6	0.72	923	46	1,800	0.861
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	86	0.17	5,457	3,487	7,427	0.961

Table 62. -- Catch per unit of effort by stratum for redbanded rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	4.94	556	0	1,427
Southeastern	301 - 500	Southeastern Slope	4	4	4.74	366	116	617
Yakutat	301 - 500	Yakutat Slope	7	2	3.66	557	0	1,443
Kodiak	201 - 300	Kodiak Slope	8	6	2.54	412	0	1,173
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	9	1.93	758	0	1,605
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	7	1.51	632	0	1,389
Yakutat	201 - 300	Yakutat Slope	9	7	1.09	232	30	435
Kodiak	101 - 200	Kodiak Outer Shelf	32	5	1.00	505	0	1,414
Kodiak	101 - 200	Portlock Flats	33	3	0.47	345	0	1,023
Chirikof	201 - 300	Chirikof Slope	10	6	0.36	55	0	126
Yakutat	201 - 300	Yakutat Gullies	9	5	0.25	76	3	150
Chirikof	101 - 200	Chirikof Outer Shelf	32	5	0.25	125	0	254
Southeastern	101 - 200	Prince of Wales Shelf	16	3	0.25	171	0	381
Chirikof	201 - 300	Lower Shelikof Gully	11	3	0.21	214	0	598
Shumagin	201 - 300	Shumagin Slope	21	4	0.19	52	0	106
Yakutat	101 - 200	Fairweather Shelf	9	2	0.13	104	0	320
Kodiak	201 - 300	Kenai Gullies	16	2	0.12	82	0	203
Kodiak	101 - 200	Kenai Flats	15	3	0.10	120	0	323
Yakutat	101 - 200	Yakataga Shelf	8	1	0.05	26	0	88
Kodiak	101 - 200	Albatross Gullies	29	1	0.04	28	0	87
Southeastern	1 - 100	Southeastern Shallows	9	1	0.03	22	0	73
Kodiak	1 - 100	Kenai Peninsula	9	1	0.02	12	0	39
Yakutat	101 - 200	Yakutat Flats	8	1	< 0.01	3	0	11
Kodiak	101 - 200	Barren Islands	18	1	< 0.01	3	0	9

Table 63. -- Number of survey hauls, number of hauls with yelloweye rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	1	<0.01	17	0	51	1.048
	101 - 200	50	2	0.02	32	0	81	2.026
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	3	0.01	49	0	108	1.537
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	6	0.07	168	0	348	1.566
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	6	0.02	168	0	348	1.566
Kodiak	1 - 100	86	2	0.07	277	0	878	4.136
	101 - 200	127	7	0.08	361	79	643	4.459
	201 - 300	28	1	0.02	18	0	59	2.396
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	10	0.06	655	0	1,312	4.221
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	1	0.15	438	0	1,447	3.050
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	1	0.08	438	0	1,447	3.050
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	2	0.28	316	0	811	3.785
	201 - 300	18	1	0.06	30	0	115	2.447
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	3	0.12	346	0	846	3.612
All areas	1 - 100	280	3	0.02	293	0	896	3.542
	101 - 200	321	18	0.11	1,314	138	2,490	3.049
	201 - 300	106	2	0.01	48	0	131	2.428
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	23	0.05	1,656	368	2,944	3.102

Table 64. -- Catch per unit of effort by stratum for yelloweye rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	2	0.75	316	0	817
Kodiak	1 - 100	Kenai Peninsula	9	1	0.51	266	0	879
Yakutat	101 - 200	Yakutat Flats	8	1	0.49	438	0	1,473
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	0.27	30	0	127
Kodiak	101 - 200	Kodiak Outer Shelf	32	3	0.24	122	0	263
Kodiak	101 - 200	Portlock Flats	33	3	0.24	174	0	387
Chirikof	101 - 200	Chirikof Outer Shelf	32	4	0.13	63	1	124
Kodiak	201 - 300	Kodiak Slope	8	1	0.11	18	0	60
Kodiak	101 - 200	Albatross Gullies	29	1	0.08	65	0	198
Chirikof	101 - 200	East Shumagin Gully	20	1	0.07	76	0	236
Shumagin	101 - 200	Shumagin Outer Shelf	41	2	0.04	32	0	81
Chirikof	101 - 200	Shelikof Edge	34	1	0.04	29	0	89
Shumagin	1 - 100	Shumagin Bank	31	1	0.01	17	0	51
Kodiak	1 - 100	Lower Cook Inlet	15	1	0.01	11	0	34

Table 65. -- Number of survey hauls, number of hauls with rosethorn rockfish, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	0	---	---	---	---	---
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	0	---	---	---	---	---
Kodiak	1 - 100	86	0	---	---	---	---	---
	101 - 200	127	0	---	---	---	---	---
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	0	---	---	---	---	---
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	1	0.23	689	0	2,279	0.320
	201 - 300	18	1	0.62	321	0	1,047	0.285
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	2	0.18	1,010	0	2,764	0.308
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	3	0.09	101	0	251	0.234
	201 - 300	18	9	0.59	298	0	650	0.221
	301 - 500	8	1	0.03	8	0	30	0.410
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	13	0.15	407	36	779	0.227
All areas	1 - 100	280	0	---	---	---	---	---
	101 - 200	321	4	0.06	791	0	2,388	0.306
	201 - 300	106	10	0.17	619	0	1,382	0.250
	301 - 500	37	1	0.01	8	0	30	0.410
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	15	0.04	1,418	0	3,219	0.279

Table 66. -- Catch per unit of effort by stratum for rosethorn rockfish sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Yakutat	201 - 300	Yakutat Slope	9	1	1.51	321	0	1,062
Yakutat	101 - 200	Yakutat Flats	8	1	0.76	689	0	2,319
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	0.76	86	0	317
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	6	0.54	213	0	535
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	3	0.24	101	0	253
Southeastern	301 - 500	Southeastern Slope	4	1	0.10	8	0	33

SKATES

Alaska skate (*Bathyraja parmifera*)

Alaska skate were caught infrequently and only in modest numbers in 13 of the strata in the the Shumagin, Chirikof, and Kodiak INPFC areas (Tables 67 and 68). No Alaska skate were caught in the Yakutat and Southeastern regioins or at depths deeper than 300 m. Although the highest densities generally occurred at depths less 100 m, the Albatross Gullies stratum in the 101-200 m depth interval had the highest concentration and abundance of any stratum. The estimated biomass of Alaka skate was 1,745 t (Table 67).

Aleutian skate (*Bathyraja aleutica*)

Aleutian skate was not among the 20 most abundant species in the 2015 survey, but was nineteenth and twentieth most abundant species in the Chirikof and Shumagin INPFC areas, respectively (Table 2). Although Aleutian skate were caught throughout the survey area, they were extremely rare in the Yakutat and Southeastern regions (Table 69). Aleutian skate were caught in all depth ranges, and the highest densities occurred at depths between 101 and 300 m (Table 70). The estimated biomass of Aleutian skate was 19,121 t, and 83% of this was concentrated at depths between 101 and 300 m (Table 69).

Bering skate (*Bathyraja interrupta*)

Bering skate was not among the 20 most abundant species in any of the INPFC areas in the 2015 survey (Table 2). Although caught throughout the survey area and at all depths less than 500 m, the bulk of the biomass was concentrated at depths between 100 and 300 m in the

Chifikof and Kodiak INPFC areas (Table 71). Particularly high densities were recorded in the Upper Shelikof Gully stratum, where the mean CPUE was twice as high as straum with the second highest mean CPUE (Table 72). The estimated biomass of Bering skate was 3,110 t, and the highest regional biomass was in the Chirikof region.

Big skate (*Raja binoculata*)

Big skate was the fourteenth most abundant species caught in the 2015 survey and was among the 20 most abundant species in all regions except for the Southeastern region (Table 2). Big skate were caught throughout the survey area at depths less than 200 m (Table 73). The highest concentrations occurred in the Northern Kodiak Shallows and the Chirikof Bank strata (Table 74). The estimated biomass of big skate was 58,006 t, and the highest regional biomass was in the Chirikof region. Approximately 93% of the biomass was concentrated at depths less than 100 m (Table 73),

Longnose skate (*Raja rhina*)

Although longnose skate was the twentieth most abundant species caught in the 2015 survey, it was among the 20 most abundant species only in the Kodiak and Yakutat INPFC areas (Table 2). Longnose skate were caught throughout the survey area at all depths less than 500 m (Table 75). Eight of the top nine strata in terms of density were in the Kodiak region and only one of these was deeper than 200 m (Table 76). The estimated biomass of longnose skate was 41,833 t, and the highest regional biomass was in the Kodiak region, where 63% of the estimated biomass was concentrated (Table 75).

Table 67. -- Number of survey hauls, number of hauls with Alaska skate, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	7	0.19	801	156	1,446	5.372
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	1	<0.01	1	0	2	0.086
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	8	0.12	802	156	1,447	5.175
Chirikof	1 - 100	59	1	0.03	78	0	242	4.482
	101 - 200	86	2	0.06	133	0	333	4.345
	201 - 300	21	1	0.16	181	0	579	4.910
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	4	0.06	392	0	855	4.618
Kodiak	1 - 100	86	2	0.04	142	0	348	6.244
	101 - 200	127	6	0.09	410	89	731	5.197
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	8	0.05	552	175	928	5.431
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	0	---	---	---	---	---
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	10	0.08	1,020	326	1,715	5.395
	101 - 200	321	8	0.04	543	170	916	4.959
	201 - 300	106	2	0.05	182	0	580	4.256
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	20	0.05	1,745	883	2,606	5.113

Table 68. -- Catch per unit of effort by stratum for Alaska skate sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	101 - 200	Albatross Gullies	29	5	0.45	357	50	665
Shumagin	1 - 100	Fox Islands	13	2	0.34	286	0	733
Kodiak	1 - 100	Northern Kodiak Shallows	9	1	0.29	63	0	210
Shumagin	1 - 100	Davidson Bank	44	3	0.23	318	0	724
Chirikof	201 - 300	Lower Shelikof Gully	11	1	0.18	181	0	584
Shumagin	1 - 100	Lower Alaska Peninsula	19	1	0.15	105	0	326
Kodiak	1 - 100	Albatross Shallows	20	1	0.14	78	0	241
Chirikof	1 - 100	Semidi Bank	16	1	0.11	78	0	243
Chirikof	101 - 200	East Shumagin Gully	20	1	0.08	84	0	260
Shumagin	1 - 100	Shumagin Bank	31	1	0.07	92	0	279
Chirikof	101 - 200	Shelikof Edge	34	1	0.06	49	0	150
Kodiak	101 - 200	Barren Islands	18	1	0.05	53	0	164
Shumagin	201 - 300	Shumagin Slope	21	1	< 0.01	1	0	2

Table 69. -- Number of survey hauls, number of hauls with Aleutian skate, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	11	0.34	1,423	514	2,332	7.365
	101 - 200	50	11	0.68	999	248	1,750	4.966
	201 - 300	21	5	0.28	77	0	186	2.477
	301 - 500	6	2	0.06	15	0	42	0.483
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	29	0.39	2,514	1,335	3,693	5.504
Chirikof	1 - 100	59	4	0.54	1,409	0	3,215	6.251
	101 - 200	86	27	1.82	4,337	2,282	6,392	8.829
	201 - 300	21	9	2.72	3,136	698	5,574	4.552
	301 - 500	6	1	0.10	17	0	57	1.690
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	1	0.42	129	0	539	4.699
	All depths	179	42	1.33	9,027	5,446	12,609	6.257
Kodiak	1 - 100	86	1	0.02	93	0	283	5.142
	101 - 200	127	22	0.99	4,276	630	7,922	7.903
	201 - 300	28	11	2.19	2,511	1,019	4,003	5.358
	301 - 500	8	3	0.15	43	0	107	1.051
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	37	0.68	6,923	3,125	10,721	6.476
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	2	0.16	466	0	1,535	6.608
	201 - 300	18	3	0.23	121	0	270	2.838
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	1	0.05	7	0	35	0.277
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	7	0.11	607	0	1,689	4.195
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	1	0.08	39	0	121	3.856
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	1	0.10	11	0	40	0.536
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	2	0.02	49	0	135	1.642
All areas	1 - 100	280	16	0.23	2,924	923	4,925	6.698
	101 - 200	321	62	0.82	10,078	5,775	14,382	7.729
	201 - 300	106	29	1.63	5,883	3,215	8,550	4.740
	301 - 500	37	7	0.07	89	10	167	0.989
	501 - 700	16	2	0.02	17	0	50	0.394
	701 - 1000	12	1	0.11	129	0	539	4.699
	All depths	772	117	0.60	19,121	13,795	24,447	6.083

Table 70. -- Catch per unit of effort by stratum for Aleutian skate sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	201 - 300	Upper Shelikof Gully	4	4	7.15	2,293	604	3,981
Chirikof	101 - 200	Shelikof Edge	34	16	3.44	2,658	1,127	4,189
Chirikof	201 - 300	Lower Shelikof Gully	11	6	2.97	2,975	519	5,431
Kodiak	101 - 200	Barren Islands	18	2	1.88	2,065	0	5,381
Chirikof	101 - 200	Chirikof Outer Shelf	32	8	1.75	877	0	1,859
Chirikof	1 - 100	Upper Alaska Peninsula	17	2	1.41	1,121	0	2,888
Shumagin	101 - 200	West Shumagin Gully	4	2	1.33	302	0	901
Kodiak	101 - 200	Portlock Flats	33	4	1.25	917	0	2,213
Kodiak	101 - 200	Kodiak Outer Shelf	32	6	1.06	532	0	1,198
Chirikof	201 - 300	Chirikof Slope	10	3	1.05	161	0	408
Kodiak	101 - 200	Albatross Gullies	29	10	0.96	762	196	1,328
Shumagin	101 - 200	Shumagin Outer Shelf	41	9	0.86	697	50	1,345
Chirikof	101 - 200	East Shumagin Gully	20	3	0.72	803	0	1,830
Kodiak	201 - 300	Kodiak Slope	8	2	0.59	96	0	246
Yakutat	101 - 200	Yakutat Flats	8	1	0.51	463	0	1,559
Shumagin	1 - 100	Shumagin Bank	31	4	0.51	628	0	1,257
Chirikof	701 - 1000	Chirikof Slope	3	1	0.42	129	0	684
Chirikof	1 - 100	Semidi Bank	16	2	0.39	287	0	766
Yakutat	201 - 300	Yakutat Slope	9	2	0.35	74	0	197
Shumagin	1 - 100	Fox Islands	13	2	0.30	254	0	685
Shumagin	1 - 100	Davidson Bank	44	4	0.29	400	0	865
Shumagin	201 - 300	Shumagin Slope	21	5	0.28	77	0	186
Shumagin	1 - 100	Lower Alaska Peninsula	19	1	0.20	141	0	436
Kodiak	201 - 300	Kenai Gullies	16	5	0.18	122	1	243
Yakutat	201 - 300	Yakutat Gullies	9	1	0.16	47	0	156
Kodiak	301 - 500	Kodiak Slope	8	3	0.15	43	0	109
Southeastern	501 - 700	Southeastern Slope	4	1	0.10	11	0	45
Chirikof	301 - 500	Chirikof Slope	6	1	0.10	17	0	59
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	1	0.10	39	0	122
Yakutat	301 - 500	Yakutat Slope	7	1	0.09	14	0	47
Shumagin	301 - 500	Shumagin Slope	6	2	0.06	15	0	43
Kodiak	1 - 100	Albatross Banks	33	1	0.06	93	0	283
Yakutat	501 - 700	Yakutat Slope	2	1	0.05	7	0	92
Yakutat	101 - 200	Yakataga Shelf	8	1	0.01	3	0	10

Table 71. -- Number of survey hauls, number of hauls with Bering skate, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	5	0.03	127	15	239	1.863
	101 - 200	50	1	0.01	15	0	45	1.785
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	6	0.02	142	26	258	1.855
Chirikof	1 - 100	59	5	0.14	371	0	893	1.797
	101 - 200	86	18	0.21	506	242	770	1.828
	201 - 300	21	8	0.60	696	271	1,120	1.956
	301 - 500	6	1	0.03	5	0	17	0.394
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	32	0.23	1,578	882	2,274	1.853
Kodiak	1 - 100	86	0	---	---	---	---	---
	101 - 200	127	12	0.13	584	66	1,101	1.794
	201 - 300	28	8	0.55	627	416	837	2.219
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	20	0.12	1,210	658	1,762	1.992
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	2	0.05	26	0	65	1.195
	301 - 500	9	2	0.24	63	0	209	1.620
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	4	0.02	89	0	226	1.469
Southeastern	1 - 100	9	1	0.03	18	0	59	0.196
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	1	0.01	7	0	20	0.576
	301 - 500	8	2	0.21	66	0	227	1.374
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	4	0.03	91	0	231	0.596
All areas	1 - 100	280	11	0.04	517	0	1,047	1.405
	101 - 200	321	31	0.09	1,105	522	1,687	1.809
	201 - 300	106	19	0.38	1,355	888	1,822	2.019
	301 - 500	37	5	0.10	134	0	315	1.348
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	66	0.10	3,110	2,215	4,005	1.779

Table 72. -- Catch per unit of effort by stratum for Bering skate sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	201 - 300	Upper Shelikof Gully	4	4	1.53	492	268	716
Chirikof	201 - 300	Lower Shelikof Gully	11	7	0.68	685	256	1,114
Chirikof	101 - 200	Shelikof Edge	34	11	0.46	355	131	580
Chirikof	1 - 100	Upper Alaska Peninsula	17	3	0.39	312	0	832
Yakutat	301 - 500	Yakutat Gullies	2	1	0.35	39	0	536
Southeastern	301 - 500	Southeastern Deep Gullies	4	1	0.24	57	0	239
Kodiak	101 - 200	Albatross Gullies	29	5	0.24	190	0	382
Kodiak	101 - 200	Kenai Flats	15	2	0.22	267	0	732
Kodiak	201 - 300	Kenai Gullies	16	4	0.20	135	0	273
Yakutat	301 - 500	Yakutat Slope	7	1	0.16	24	0	83
Chirikof	101 - 200	Chirikof Outer Shelf	32	4	0.15	76	0	186
Southeastern	301 - 500	Southeastern Slope	4	1	0.12	9	0	39
Kodiak	101 - 200	Barren Islands	18	2	0.07	81	0	226
Yakutat	201 - 300	Yakutat Slope	9	1	0.07	15	0	51
Chirikof	201 - 300	Chirikof Slope	10	1	0.07	11	0	34
Chirikof	101 - 200	East Shumagin Gully	20	3	0.07	75	0	178
Shumagin	1 - 100	Davidson Bank	44	3	0.05	74	0	160
Chirikof	1 - 100	Chirikof Bank	26	2	0.05	59	0	144
Kodiak	101 - 200	Portlock Flats	33	2	0.05	35	0	86
Shumagin	1 - 100	Shumagin Bank	31	2	0.04	53	0	128
Yakutat	201 - 300	Yakutat Gullies	9	1	0.03	10	0	34
Chirikof	301 - 500	Chirikof Slope	6	1	0.03	5	0	18
Southeastern	1 - 100	Southeastern Shallows	9	1	0.03	18	0	60
Kodiak	101 - 200	Kodiak Outer Shelf	32	1	0.02	10	0	32
Shumagin	101 - 200	Shumagin Outer Shelf	41	1	0.02	15	0	45
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	1	0.02	7	0	21

Table 73. -- Number of survey hauls, number of hauls with big skate, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	25	3.09	12,750	5,926	19,575	19.440
	101 - 200	50	2	0.48	699	0	2,187	14.426
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	27	2.06	13,449	6,539	20,359	19.096
Chirikof	1 - 100	59	21	6.69	17,419	8,998	25,840	19.030
	101 - 200	86	5	0.48	1,154	0	2,483	14.790
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	26	2.73	18,573	10,048	27,098	18.697
Kodiak	1 - 100	86	15	3.39	13,043	4,168	21,918	16.860
	101 - 200	127	2	0.09	380	0	918	18.093
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	17	1.32	13,423	4,531	22,316	16.893
Yakutat	1 - 100	19	9	6.26	10,423	0	26,113	6.928
	101 - 200	31	5	0.67	1,981	174	3,787	7.744
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	14	2.17	12,404	0	28,204	7.047
Southeastern	1 - 100	9	2	0.24	157	0	401	2.456
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	2	0.06	157	0	401	2.456
All areas	1 - 100	280	72	4.17	53,792	33,458	74,127	13.747
	101 - 200	321	14	0.34	4,213	1,625	6,802	10.450
	201 - 300	106	0	---	---	---	---	---
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	86	1.81	58,006	37,509	78,502	13.439

Table 74. -- Catch per unit of effort by stratum for big skate sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	1 - 100	Northern Kodiak Shallows	9	2	12.06	2,653	0	8,027
Chirikof	1 - 100	Chirikof Bank	26	13	11.91	12,856	5,675	20,036
Shumagin	1 - 100	Lower Alaska Peninsula	19	11	8.96	6,164	2,626	9,701
Yakutat	1 - 100	Yakutat Shallows	10	4	7.60	7,561	0	23,341
Kodiak	1 - 100	Lower Cook Inlet	15	6	6.29	6,217	0	12,927
Chirikof	1 - 100	Upper Alaska Peninsula	17	8	5.75	4,564	0	9,402
Shumagin	1 - 100	Fox Islands	13	3	4.59	3,827	0	9,647
Yakutat	1 - 100	Middleton Shallows	9	5	4.26	2,862	638	5,085
Shumagin	101 - 200	West Shumagin Gully	4	1	2.47	563	0	2,354
Kodiak	1 - 100	Kenai Peninsula	9	1	1.85	974	0	3,221
Yakutat	101 - 200	Middleton Shelf	6	3	1.60	1,172	0	2,728
Kodiak	1 - 100	Albatross Banks	33	3	1.56	2,402	0	5,315
Shumagin	1 - 100	Shumagin Bank	31	6	1.49	1,843	254	3,432
Kodiak	1 - 100	Albatross Shallows	20	3	1.38	796	0	1,732
Chirikof	101 - 200	Shelikof Edge	34	3	1.24	961	0	2,276
Shumagin	1 - 100	Davidson Bank	44	5	0.67	917	40	1,794
Yakutat	101 - 200	Yakataga Shelf	8	1	0.66	349	0	1,173
Yakutat	101 - 200	Fairweather Shelf	9	1	0.60	460	0	1,520
Kodiak	101 - 200	Portlock Flats	33	1	0.26	193	0	588
Southeastern	1 - 100	Southeastern Shallows	9	2	0.24	157	0	406
Kodiak	101 - 200	Albatross Gullies	29	1	0.24	187	0	570
Chirikof	101 - 200	East Shumagin Gully	20	2	0.17	193	0	472
Shumagin	101 - 200	Shumagin Outer Shelf	41	1	0.17	136	0	410

Table 75. -- Number of survey hauls, number of hauls with longnose skate, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	1	0.02	83	0	252	4.339
	101 - 200	50	8	0.43	626	0	1,267	4.863
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	9	0.11	708	63	1,354	4.796
Chirikof	1 - 100	59	7	0.65	1,701	307	3,095	9.107
	101 - 200	86	32	2.25	5,354	3,044	7,663	8.610
	201 - 300	21	2	0.56	653	0	1,673	8.992
	301 - 500	6	1	0.51	82	0	281	7.639
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	42	1.14	7,789	4,984	10,594	8.733
Kodiak	1 - 100	86	20	1.98	7,620	4,146	11,094	9.680
	101 - 200	127	61	3.79	16,406	11,202	21,611	7.558
	201 - 300	28	10	2.03	2,334	274	4,395	8.879
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	91	2.60	26,360	19,908	32,813	8.184
Yakutat	1 - 100	19	3	0.14	227	0	692	2.210
	101 - 200	31	12	1.67	4,906	2,049	7,763	6.795
	201 - 300	18	3	0.42	217	0	479	6.982
	301 - 500	9	5	0.89	233	30	437	4.643
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	23	0.98	5,583	2,683	8,483	6.162
Southeastern	1 - 100	9	2	0.43	278	0	872	1.791
	101 - 200	27	2	0.37	410	0	1,021	12.306
	201 - 300	18	2	0.23	117	0	294	4.920
	301 - 500	8	3	1.88	587	0	1,790	4.670
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	9	0.50	1,392	165	2,618	4.116
All areas	1 - 100	280	33	0.77	9,909	6,139	13,679	7.920
	101 - 200	321	115	2.26	27,702	21,374	34,029	7.535
	201 - 300	106	17	0.92	3,320	1,166	5,475	8.508
	301 - 500	37	9	0.70	901	0	2,149	4.832
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	174	1.31	41,833	34,177	49,489	7.600

Table 76. -- Catch per unit of effort by stratum for longnose skate sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	1 - 100	Kenai Peninsula	9	5	6.18	3,248	353	6,143
Kodiak	1 - 100	Northern Kodiak Shallows	9	3	5.17	1,136	0	2,469
Kodiak	101 - 200	Kenai Flats	15	9	5.06	6,111	1,576	10,645
Chirikof	101 - 200	Shelikof Edge	34	21	4.16	3,218	1,687	4,749
Kodiak	101 - 200	Barren Islands	18	12	4.07	4,474	2,417	6,531
Kodiak	101 - 200	Portlock Flats	33	17	3.48	2,551	1,264	3,838
Kodiak	101 - 200	Albatross Gullies	29	17	3.43	2,710	1,422	3,998
Kodiak	1 - 100	Albatross Shallows	20	7	3.07	1,772	414	3,130
Kodiak	201 - 300	Upper Shelikof Gully	4	2	3.05	979	0	3,241
Southeastern	301 - 500	Southeastern Deep Gullies	4	2	2.41	565	0	1,942
Yakutat	101 - 200	Fairweather Shelf	9	4	2.23	1,724	22	3,426
Kodiak	201 - 300	Kenai Gullies	16	8	2.04	1,356	142	2,569
Yakutat	101 - 200	Middleton Shelf	6	3	1.87	1,373	0	3,199
Chirikof	101 - 200	East Shumagin Gully	20	6	1.59	1,762	23	3,501
Yakutat	301 - 500	Yakutat Slope	7	5	1.53	233	23	444
Chirikof	1 - 100	Semidi Bank	16	3	1.44	1,052	0	2,275
Yakutat	101 - 200	Yakataga Shelf	8	3	1.35	713	0	1,562
Yakutat	101 - 200	Yakutat Flats	8	2	1.21	1,096	0	3,103
Kodiak	101 - 200	Kodiak Outer Shelf	32	6	1.12	560	109	1,012
Shumagin	101 - 200	West Shumagin Gully	4	1	1.04	237	0	990
Southeastern	101 - 200	Baranof-Chichagof Shelf	11	2	0.98	410	0	1,029
Kodiak	1 - 100	Albatross Banks	33	4	0.78	1,199	0	2,634
Chirikof	101 - 200	Chirikof Outer Shelf	32	5	0.75	374	40	708
Yakutat	201 - 300	Yakutat Slope	9	2	0.74	156	0	406
Chirikof	201 - 300	Lower Shelikof Gully	11	2	0.65	653	0	1,686
Chirikof	1 - 100	Upper Alaska Peninsula	17	3	0.54	431	0	1,065
Chirikof	301 - 500	Chirikof Slope	6	1	0.51	82	0	291
Southeastern	1 - 100	Southeastern Shallows	9	2	0.43	278	0	884
Shumagin	101 - 200	Sanak Gully	5	1	0.33	138	0	523
Shumagin	101 - 200	Shumagin Outer Shelf	41	6	0.31	250	34	467
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	2	0.30	117	0	295
Southeastern	301 - 500	Southeastern Slope	4	1	0.29	22	0	92
Kodiak	1 - 100	Lower Cook Inlet	15	1	0.27	264	0	831
Yakutat	1 - 100	Yakutat Shallows	10	2	0.23	226	0	698
Chirikof	1 - 100	Chirikof Bank	26	1	0.20	218	0	667
Yakutat	201 - 300	Yakutat Gullies	9	1	0.20	60	0	199
Shumagin	1 - 100	Shumagin Bank	31	1	0.07	83	0	252
Yakutat	1 - 100	Middleton Shallows	9	1	< 0.01	1	0	4

MISCELLANEOUS SPECIES

Capelin (*Mallotus villosus*)

Capelin was relatively rare and was not among the 20 most abundant species in any of the INPFC areas in the 2015 survey (Table 2). Capelin were caught in modest numbers in all regions except for the Southeastern region (Table 77). The highest densities occurred at depths less than 100 m in the Yakutat Shallows stratum, where the mean CPUE was almost twice as high as the stratum with the second highest mean CPUE (Table 78). The estimated biomass of capelin was 142 t, and the highest regional biomass was in the Yakutat region, where approximately 60% of the biomass was concentrated (Table 77).

Eulachon (*Thaleichthys pacificus*)

Eulachon was the tenth most abundant species caught in the 2015 survey, and was the eighth most abundant species in the Kodiak region (Table 2). Although caught throughout the survey area and at all depths less than 500 m, the bulk of the 108,479 t estimated biomass was concentrated in the Chirikof, Kodiak, and Yakuat INPFC areas (Table 79). The highest densities occurred at depths between 101 and 300 m, with particularly high concentrations in the Upper Shelikof Gully and Barren Islands strata, which accounted for 43% of the estimated biomass (Table 80).

Pacific hake (*Merluccius productus*)

Pacific hake was not among the 20 most abunadant species caught in the 2015 survey, but was the ninth most abundant species in the Southeastern region. Pacific hake were caught only in

the Yakutat and Southeastern INPFC areas and at all depths less than 700 m (Table 81). The highest concentrations were at depths less than 100 m, and two large catches in this depth range in the Southeastern Shallows stratum accounted for almost 95% of the survey biomass estimate (Table 82).

Table 77. -- Number of survey hauls, number of hauls with capelin, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	20	<0.01	8	2	14	0.009
	101 - 200	50	3	<0.01	6	0	18	0.006
	201 - 300	21	1	<0.01	<1	0	0	0.018
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	24	<0.01	14	1	27	0.007
Chirikof	1 - 100	59	7	<0.01	11	0	27	0.005
	101 - 200	86	14	<0.01	9	0	19	0.007
	201 - 300	21	1	<0.01	<1	0	0	0.003
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	22	<0.01	20	2	39	0.006
Kodiak	1 - 100	86	22	<0.01	11	5	18	0.005
	101 - 200	127	12	<0.01	9	0	19	0.007
	201 - 300	28	5	<0.01	2	0	3	0.009
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	39	<0.01	22	11	33	0.006
Yakutat	1 - 100	19	15	0.05	76	0	172	0.008
	101 - 200	31	9	<0.01	10	0	19	0.006
	201 - 300	18	0	---	---	---	---	---
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	24	0.02	85	0	182	0.007
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	0	---	---	---	---	---
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
All areas	1 - 100	280	64	0.01	106	8	204	0.007
	101 - 200	321	38	<0.01	34	15	53	0.006
	201 - 300	106	7	<0.01	2	0	4	0.009
	301 - 500	37	0	---	---	---	---	---
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	109	<0.01	142	42	241	0.007

Table 78. -- Catch per unit of effort by stratum for capelin sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Yakutat	1 - 100	Yakutat Shallows	10	8	0.06	59	0	154
Yakutat	1 - 100	Middleton Shallows	9	7	0.03	17	0	43
Shumagin	101 - 200	Sanak Gully	5	1	0.01	5	0	18
Chirikof	1 - 100	Chirikof Bank	26	5	0.01	9	0	25
Shumagin	1 - 100	Lower Alaska Peninsula	19	8	0.01	6	0	12
Kodiak	1 - 100	Kenai Peninsula	9	5	0.01	4	0	9
Kodiak	1 - 100	Northern Kodiak Shallows	9	5	0.01	2	0	4
Chirikof	101 - 200	East Shumagin Gully	20	5	0.01	8	0	17
Yakutat	101 - 200	Fairweather Shelf	9	2	0.01	4	0	12
Kodiak	1 - 100	Albatross Shallows	20	6	0.01	3	0	7
Kodiak	101 - 200	Albatross Gullies	29	2	0.01	4	0	12
Yakutat	101 - 200	Yakutat Flats	8	2	< 0.01	3	0	9
Chirikof	1 - 100	Upper Alaska Peninsula	17	2	< 0.01	2	0	7
Yakutat	101 - 200	Yakataga Shelf	8	2	< 0.01	1	0	5
Kodiak	101 - 200	Kenai Flats	15	4	< 0.01	4	0	9
Chirikof	101 - 200	Shelikof Edge	34	9	< 0.01	1	0	3
Kodiak	1 - 100	Lower Cook Inlet	15	3	< 0.01	2	0	4
Yakutat	101 - 200	Middleton Shelf	6	3	< 0.01	1	0	3
Kodiak	201 - 300	Kenai Gullies	16	4	< 0.01	2	0	3
Shumagin	101 - 200	West Shumagin Gully	4	1	< 0.01	1	0	2
Kodiak	101 - 200	Barren Islands	18	4	< 0.01	1	0	2
Kodiak	1 - 100	Albatross Banks	33	3	< 0.01	1	0	2
Kodiak	201 - 300	Upper Shelikof Gully	4	1	< 0.01	0	0	1
Shumagin	1 - 100	Fox Islands	13	1	< 0.01	1	0	2
Shumagin	1 - 100	Davidson Bank	44	8	< 0.01	1	0	2
Shumagin	101 - 200	Shumagin Outer Shelf	41	1	< 0.01	0	0	1
Shumagin	201 - 300	Shumagin Slope	21	1	< 0.01	0	0	0
Chirikof	201 - 300	Lower Shelikof Gully	11	1	< 0.01	0	0	0
Shumagin	1 - 100	Shumagin Bank	31	3	< 0.01	1	0	1
Kodiak	101 - 200	Portlock Flats	33	2	< 0.01	0	0	0

Table 79. -- Number of survey hauls, number of hauls with eulachon, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	8	1.11	1,627	0	3,828	0.031
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	16	0.25	1,640	0	3,841	0.031
Chirikof	1 - 100	59	11	0.26	671	0	1,989	0.040
	101 - 200	86	35	5.36	12,783	2,826	22,740	0.031
	201 - 300	21	11	4.80	5,538	2,865	8,210	0.038
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	57	2.79	18,992	8,659	29,324	0.033
Kodiak	1 - 100	86	24	1.07	4,119	0	8,851	0.038
	101 - 200	127	37	9.73	42,151	7,402	76,899	0.031
	201 - 300	28	20	23.11	26,555	0	53,756	0.032
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	81	7.18	72,824	31,317	114,330	0.032
Yakutat	1 - 100	19	10	3.18	5,303	0	14,833	0.033
	101 - 200	31	28	2.80	8,239	4,983	11,495	0.026
	201 - 300	18	14	1.36	702	293	1,112	0.032
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	55	2.49	14,249	4,482	24,015	0.028
Southeastern	1 - 100	9	0	---	---	---	---	---
	101 - 200	27	3	0.28	314	0	895	0.100
	201 - 300	18	0	---	---	---	---	---
	301 - 500	8	2	0.98	306	0	1,145	0.032
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	10	0.28	775	0	1,660	0.046
All areas	1 - 100	280	54	0.78	10,124	0	20,759	0.035
	101 - 200	321	111	5.32	65,114	28,809	101,420	0.030
	201 - 300	106	49	9.14	32,930	5,562	60,298	0.033
	301 - 500	37	5	0.24	311	0	1,149	0.032
	501 - 700	16	0	---	---	---	---	---
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	219	3.39	108,479	64,965	151,993	0.031

Table 80. -- Catch per unit of effort by stratum for eulachon sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Kodiak	201 - 300	Upper Shelikof Gully	4	4	49.68	15,937	0	47,663
Kodiak	101 - 200	Barren Islands	18	9	27.99	30,736	0	64,693
Kodiak	201 - 300	Kenai Gullies	16	16	15.94	10,618	144	21,091
Chirikof	101 - 200	Shelikof Edge	34	26	13.71	10,601	730	20,473
Yakutat	1 - 100	Middleton Shallows	9	6	7.66	5,143	0	14,856
Shumagin	101 - 200	West Shumagin Gully	4	4	7.01	1,597	0	4,119
Kodiak	101 - 200	Portlock Flats	33	7	5.65	4,143	0	11,354
Kodiak	1 - 100	Albatross Shallows	20	7	5.62	3,238	0	7,927
Chirikof	201 - 300	Lower Shelikof Gully	11	9	5.53	5,538	2,832	8,243
Yakutat	101 - 200	Middleton Shelf	6	6	4.14	3,043	358	5,729
Kodiak	101 - 200	Kenai Flats	15	12	4.12	4,971	1,889	8,054
Yakutat	101 - 200	Fairweather Shelf	9	9	4.04	3,121	928	5,313
Yakutat	101 - 200	Yakataga Shelf	8	8	3.46	1,825	546	3,105
Kodiak	101 - 200	Albatross Gullies	29	7	2.80	2,211	0	5,181
Yakutat	201 - 300	Yakutat Gullies	9	9	2.06	626	225	1,027
Chirikof	101 - 200	East Shumagin Gully	20	9	1.97	2,182	193	4,171
Kodiak	1 - 100	Kenai Peninsula	9	6	1.32	696	0	1,669
Southeastern	301 - 500	Southeastern Deep Gullies	4	2	1.31	306	0	1,268
Chirikof	1 - 100	Upper Alaska Peninsula	17	5	0.80	637	0	1,960
Southeastern	101 - 200	Prince of Wales Shelf	16	3	0.46	314	0	898
Yakutat	201 - 300	Yakutat Slope	9	5	0.36	77	0	228
Kodiak	1 - 100	Northern Kodiak Shallows	9	3	0.29	63	0	181
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	2	0.28	109	0	344
Yakutat	101 - 200	Yakutat Flats	8	5	0.28	250	0	559
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	0.23	26	0	107
Kodiak	101 - 200	Kodiak Outer Shelf	32	2	0.18	89	0	268
Yakutat	1 - 100	Yakutat Shallows	10	4	0.16	159	0	410
Kodiak	1 - 100	Lower Cook Inlet	15	8	0.12	122	0	292
Shumagin	101 - 200	Sanak Gully	5	2	0.07	28	0	77
Chirikof	1 - 100	Semidi Bank	16	2	0.04	32	0	97
Southeastern	1 - 100	Southeastern Shallows	9	2	0.03	20	0	53
Yakutat	301 - 500	Yakutat Gullies	2	2	0.03	3	0	28
Shumagin	1 - 100	Shumagin Bank	31	7	0.01	12	0	27
Yakutat	301 - 500	Yakutat Slope	7	1	0.01	1	0	4
Chirikof	201 - 300	Chirikof Slope	10	2	< 0.01	0	0	1
Shumagin	101 - 200	Shumagin Outer Shelf	41	2	< 0.01	2	0	5
Shumagin	201 - 300	Shumagin Slope	21	1	< 0.01	0	0	1
Chirikof	1 - 100	Chirikof Bank	26	4	< 0.01	1	0	3

Table 81. -- Number of survey hauls, number of hauls with Pacific hake, mean CPUE, biomass, and mean weight, based on the 2015 Gulf of Alaska biennial bottom trawl survey, by International North Pacific Fisheries Commission statistical areas and depth intervals.

INPFC area	Depth (m)	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Lower 95% biomass CI (t)	Upper 95% biomass CI (t)	Mean weight (kg)
Shumagin	1 - 100	107	0	---	---	---	---	---
	101 - 200	50	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	2	0	---	---	---	---	---
	All depths	189	0	---	---	---	---	---
Chirikof	1 - 100	59	0	---	---	---	---	---
	101 - 200	86	0	---	---	---	---	---
	201 - 300	21	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	3	0	---	---	---	---	---
	All depths	179	0	---	---	---	---	---
Kodiak	1 - 100	86	0	---	---	---	---	---
	101 - 200	127	0	---	---	---	---	---
	201 - 300	28	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	4	0	---	---	---	---	---
	All depths	256	0	---	---	---	---	---
Yakutat	1 - 100	19	0	---	---	---	---	---
	101 - 200	31	0	---	---	---	---	---
	201 - 300	18	1	0.03	17	0	54	1.369
	301 - 500	9	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	1	0	---	---	---	---	---
	All depths	80	1	<0.01	17	0	54	1.369
Southeastern	1 - 100	9	2	27.91	18,273	0	48,189	1.091
	101 - 200	27	1	0.02	21	0	66	1.153
	201 - 300	18	2	0.21	105	0	261	1.591
	301 - 500	8	5	2.70	841	0	2,072	1.520
	501 - 700	4	1	0.06	6	0	24	0.631
	701 - 1000	2	0	---	---	---	---	---
	All depths	68	11	6.86	19,246	0	49,179	1.106
All areas	1 - 100	280	2	1.42	18,273	0	48,189	1.091
	101 - 200	321	1	<0.01	21	0	66	1.153
	201 - 300	106	3	0.03	122	0	280	1.556
	301 - 500	37	5	0.66	841	0	2,072	1.520
	501 - 700	16	1	0.01	6	0	24	0.631
	701 - 1000	12	0	---	---	---	---	---
	All depths	772	12	0.60	19,263	0	49,196	1.107

Table 82. -- Catch per unit of effort by stratum for Pacific hake sorted by descending CPUE for the 2015 Gulf of Alaska bottom trawl survey.

INPFC area	Depth range	Stratum name	Number of hauls	Hauls with catch	CPUE (kg/ha)	Biomass (t)	Lower CI biomass	Upper CI biomass
Southeastern	1 - 100	Southeastern Shallows	9	2	27.91	18,273	0	48,771
Southeastern	301 - 500	Southeastern Slope	4	2	3.24	250	0	750
Southeastern	301 - 500	Southeastern Deep Gullies	4	3	2.52	590	0	1,910
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	0.45	51	0	213
Southeastern	201 - 300	Prince of Wales Slope/Gullies	14	1	0.14	54	0	171
Southeastern	501 - 700	Southeastern Slope	4	1	0.06	6	0	27
Yakutat	201 - 300	Yakutat Gullies	9	1	0.06	17	0	55
Southeastern	101 - 200	Prince of Wales Shelf	16	1	0.03	21	0	66

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APPENDIX A

Strata Specifications and Locations

Appendix Table A-1 presents the survey strata definitions for the 2015 Gulf of Alaska biennial bottom trawl survey including depth range, stratum name, and the area in square nautical miles and square kilometers. Appendix Table A-2 presents the summary strata code definitions. Appendix Figures A-1 through A-5 are charts showing the locations and extent of the strata as defined.

Appendix Table A-1. -- Survey strata used for the 2015 Gulf of Alaska biennial survey including depth, stratum code, name and area in square nautical miles (nmi^2) and square kilometers (km^2).

Depth range (m)	Stratum code	Stratum name	Area (nmi^2)	Area (km^2)
1 - 100	10	Fox Islands	2,430	8,333
	11	Davidson Bank	3,989	13,681
	12	Lower Alaska Peninsula	2,005	6,876
	13	Shumagin Bank	3,615	12,399
	20	Upper Alaska Peninsula	2,315	7,941
	21	Semidi Bank	2,129	7,302
	22	Chirikof Bank	3,147	10,792
	30	Albatross Shallows	1,681	5,766
	31	Albatross Banks	4,491	15,403
	32	Lower Cook Inlet	2,883	9,887
	33	Kenai Peninsula	1,534	5,260
	35	Northern Kodiak Shallows	641	2,200
	40	Yakutat Shallows	2,900	9,947
	41	Middleton Shallows	1,958	6,714
	50	Southeastern Shallows	1,909	6,546
	991	**Subtotal**	**37,628**	**129,047**
101 - 200	110	Sanak Gully	1,238	4,245
	111	Shumagin Outer Shelf	2,377	8,154
	112	West Shumagin Gully	664	2,278
	120	East Shumagin Gully	3,238	11,104
	121	Shelikof Edge	2,255	7,735
	122	Chirikof Outer Shelf	1,461	5,011
	130	Albatross Gullies	2,307	7,912
	131	Portlock Flats	2,139	7,336
	132	Barren Islands	3,202	10,981
	133	Kenai Flats	3,521	12,077
	134	Kodiak Outer Shelf	1,465	5,026
	140	Middleton Shelf	2,142	7,346
	141	Yakataga Shelf	1,539	5,277
	142	Yakutat Flats	2,634	9,032
	143	Fairweather Shelf	2,253	7,728
	150	Baranof-Chichagof Shelf	1,224	4,196
	151	Prince of Wales Shelf	2,008	6,888
	992	**Subtotal**	**35,668**	**122,324**

Depth range (m)	Stratum code	Stratum name	Area (nmi^2)	Area (km^2)
201 - 300	210	Shumagin Slope	813	2,788
	220	Lower Shelikof Gully	2,921	10,018
	221	Chirikof Slope	446	1,528
	230	Kenai Gullies	1,942	6,659
	231	Kodiak Slope	473	1,623
	232	Upper Shelikof Gully	935	3,208
	240	Yakutat Gullies	887	3,043
	241	Yakutat Slope	620	2,127
	250	Baranof-Chichagof Slope	328	1,125
	251	Prince of Wales Slope/Gullies	1,145	3,927
	993	**Subtotal**	**10,511**	**36,047**
301 - 500	310	Shumagin Slope	738	2,531
	320	Chirikof Slope	468	1,604
	330	Kodiak Slope	849	2,912
	340	Yakutat Gullies	323	1,107
	341	Yakutat Slope	443	1,521
	350	Southeastern Deep Gullies	684	2,344
	351	Southeastern Slope	225	773
	994	**Subtotal**	**3,730**	**12,792**
501 - 700	410	Shumagin Slope	585	2,006
	420	Chirikof Slope	570	1,953
	430	Kodiak Slope	509	1,745
	440	Yakutat Slope	428	1,469
	450	Southeastern Slope	301	1,033
	995	**Subtotal**	**2,393**	**8,206**
701 – 1,000	510	Shumagin Slope	565	1,937
	520	Chirikof Slope	894	3,066
	530	Kodiak Slope	1,019	3,494
	540	Yakutat Slope	550	1,887
	550	Southeastern Slope	352	1,206
	996	**Subtotal**	**3,380**	**11,590**
1 – 1,000	**999**	**Grand Total**	**93,309**	**320,006**

Appendix Table A-2. -- Summary codes used for the 2015 Gulf of Alaska biennial bottom trawl survey including depth range, International North Pacific Fisheries Commission statistical areas and square area, and strata included in the summary area.

Summary code number	Depth range (m)	INPFC area	Area (nmi^2)	Area (km^2)	Strata included
911	1 - 100	**Shumagin**	12,039	41,289	10 -13
912	101 - 200		4,280	14,677	110 - 112
913	201 - 300		813	2,788	210
914	301 - 500		738	2,531	310
915	501 - 700		585	2,006	410
916	701 – 1,000		565	1,937	510
919	1 -1,000		19,020	65,228	
921	1 - 100	**Chirikof**	7,591	26,035	20-22
922	101 - 200		6,954	23,850	120-122
923	201 - 300		3,350	11,490	230, 231
924	301 - 500		468	1,604	320
925	501 - 700		570	1,953	420
926	701 – 1,000		894	3,066	520
929	1 -1,000		19,827	67,998	
931	1 - 100	**Kodiak**	11,230	38,516	30 - 33, 35
932	101 - 200		12,634	43,332	130 - 134
933	201 - 300		3,350	11,490	230 - 232
934	301 - 500		849	2,912	330
935	501 - 700		509	1,745	430
936	701 – 1,000		1,019	3,494	530
939	1 -1,000		29,591	101,489	

Summary code number	Depth range (m)	INPFC area	Area (nmi^2)	Area (km^2)	Strata included
941	1- 100	**Yakutat**	4,858	16,661	240, 241
942	101 - 200		8,568	29,383	140 – 143
943	201 - 300		1,507	5,170	240, 241
944	301 - 500		766	2,628	340, 341
945	501 - 700		428	1,469	440
946	701 – 1,000		550	1,887	540
949	1 -1,000		16,677	57,198	
951	1 - 100	**Southeastern**	1,909	6,546	50
952	101 - 200		3,232	11,084	150, 151
953	201 - 300		1,473	5,052	250, 251
954	301 - 500		909	3,117	350, 351
955	501 - 700		301	1,033	450
956	701 – 1,000		352	1,206	550
959	1 -1,000		8,176	28,039	
999	1 – 1,000	**All Areas**	93,309	320,006	

APPENDIX B

Fish and Invertebrate Taxa Encountered

Appendix Tables B-1 and B-2 list fish and invertebrate taxa encountered and identified during the 2015 Gulf of Alaska biennial bottom trawl survey. Most common and scientific names are from Robins et al. (1991). Order of listings and common names used are for convenience and do not imply adherence to a particular phylogenetic system.

Appendix Table B-1. – Fish species encountered during the 2015 Gulf of Alaska bottom trawl survey.

Family	Species Name	Common Name
Petromyzontidae	Petromyzontidae	lamprey unid.
	Lampetra tridentata	Pacific lamprey
Chimaeridae	*Hydrolagus colliei*	spotted ratfish
Lamnidae	*Lamna ditropis*	salmon shark
Squalidae	*Somniosus pacificus*	Pacific sleeper shark
	Squalus acanthias	spiny dogfish
Rajidae	*Bathyraja* sp.	
	Bathyraja aleutica	Aleutian skate
	Bathyraja interrupta	Bering skate
	Bathyraja lindbergi	Commander skate
	Bathyraja maculata	whiteblotched skate
	Bathyraja mariposa	butterfly skate
	Bathyraja parmifera	Alaska skate
	Bathyraja taranetzi	mud skate
	Bathyraja trachura	roughtail skate
	Raja binoculata	big skate
	Raja rhina	longnose skate
Clupeidae	*Clupea pallasi*	Pacific herring
Bathylagidae	*Bathylagidae*	deepsea smelt unid.
	Bathylagus sp.	blacksmelt unid.
	Bathylagus milleri	robust blacksmelt
	Leuroglossus schmidti	northern smoothtongue
Alepocephalidae	*Rouleina attrita*	softskin slickhead
Opisthoproctidae	*Macropinna microstoma*	barreleye
	Thaleichthys pacificus	eulachon
Osmeridae	*Mallotus villosus*	capelin
	Spirinchus thaleichthys	longfin smelt
Salmonidae	Salmonidae	salmon and trouts unid.
	Oncorhynchus sp.	salmon unid.
	Oncorhynchus gorbuscha	pink salmon
	Oncorhynchus keta	chum salmon
	Oncorhynchus kisutch	coho salmon
	Oncorhynchus tshawytscha	chinook salmon
	Salvelinus malma	Dolly Varden
Melanostomiidae	*Tactostoma macropus*	longfin dragonfish
Chauliodontidae	*Chauliodontinae*	viperfish unid.

	Chauliodus macouni	Pacific viperfish
Scopelarchidae	*Benthalbella* sp.	
	Benthalbella dentata	northern pearleye
Notosudidae	*Scopelosaurus harryi*	scaly paperbone
Myctophidae	Myctophidae	lanternfish unid.
	Stenobrachius sp.	
	Diaphus theta	California headlightfish
	Lampanyctus sp.	
	Lampanyctus jordani	brokenline lampfish
	Nannobrachium regale	pinpoint lampfish
	Protomyctophum thompsoni	northern flashlightfish
	Stenobrachius leucopsarus	northern lampfish
	Stenobrachius nannochir	garnet lampfish
Macrouridae	*Albatrossia pectoralis*	giant grenadier
	Coryphaenoides acrolepis	Pacific grenadier
	Coryphaenoides cinereus	popeye grenadier
Moridae	*Antimora microlepis*	Pacific flatnose
Merluccidae	*Merluccius productus*	Pacific hake
Gadidae	*Eleginus gracilis*	saffron cod
	Gadus chalcogrammus	walleye pollock
	Gadus macrocephalus	Pacific cod
	Microgadus proximus	Pacific tomcod
Oneirodidae	Oneirodidae	dreamer unid.
	Oneirodes sp.	
Melamphaeidae	*Melamphaes lugubris*	highsnout bigscale
	Poromitra cristiceps	
	Poromitra curilensis	crested bigscale
Scorpaenidae	*Sebastes* sp.	rockfish unid.
	Sebastes aleutianus	rougheye rockfish
	Sebastes alutus	Pacific ocean perch
	Sebastes babcocki	redbanded rockfish
	Sebastes borealis	shortraker rockfish
	Sebastes brevispinis	silvergray rockfish
	Sebastes ciliatus	dark rockfish
	Sebastes crameri	darkblotched rockfish
	Sebastes diploproa	splitnose rockfish
	Sebastes elongatus	greenstriped rockfish
	Sebastes entomelas	widow rockfish
	Sebastes flavidus	yellowtail rockfish
	Sebastes helvomaculatus	rosethorn rockfish
	Sebastes maliger	quillback rockfish
	Sebastes melanops	black rockfish
	Sebastes melanostictus	blackspotted rockfish

	Sebastes nigrocinctus	tiger rockfish
	Sebastes paucispinis	bocaccio
	Sebastes pinniger	canary rockfish
	Sebastes polyspinis	northern rockfish
	Sebastes proriger	redstripe rockfish
	Sebastes reedi	yellowmouth rockfish
	Sebastes ruberrimus	yelloweye rockfish
	Sebastes variabilis	dusky rockfish
	Sebastes variegatus	harlequin rockfish
	Sebastes wilsoni	pygmy rockfish
	Sebastes zacentrus	sharpchin rockfish
	Sebastolobus alascanus	shortspine thornyhead
	Sebastolobus altivelis	longspine thornyhead
Anoplopomatidae	*Anoplopoma fimbria*	sablefish
Hexagrammidae	*Hexagrammos decagrammus*	kelp greenling
	Hexagrammos lagocephalus	rock greenling
	Hexagrammos stelleri	whitespotted greenling
	Ophiodon elongatus	lingcod
	Pleurogrammus monopterygius	Atka mackerel
Cottidae	*Dasycottus setiger*	spinyhead sculpin
	Gymnocanthus galeatus	armorhead sculpin
	Gymnocanthus pistilliger	threaded sculpin
	Hemilepidotus hemilepidotus	red Irish lord
	Hemilepidotus jordani	yellow Irish lord
	Hemilepidotus zapus	longfin Irish lord
	Hemitripterus bolini	bigmouth sculpin
	Icelus spiniger	thorny sculpin
	Leptocottus armatus	Pacific staghorn sculpin
	Malacocottus zonurus	darkfin sculpin
	Myoxocephalus jaok	plain sculpin
	Myoxocephalus polyacanthocephalus	great sculpin
	Psychrolutes sp.	
	Psychrolutes paradoxus	tadpole sculpin
	Radulinus asprellus	slim sculpin
	Rhamphocottus richardsoni	grunt sculpin
	Triglops forficata	scissortail sculpin
	Triglops macellus	roughspine sculpin
	Triglops metopias	highbrow sculpin
	Triglops pingeli	ribbed sculpin
	Triglops scepticus	spectacled sculpin
Agonidae	Agonidae	poacher unid.
	Bathyagonus alascanus	gray starsnout
	Bathyagonus nigripinnis	blackfin poacher

	Bathyagonus pentacanthus	bigeye poacher
	Leptagonus frenatus	sawback poacher
	Podothecus accipenserinus	sturgeon poacher
Cyclopteridae	*Allocareproctus unangas*	goldeneye snailfish
	Aptocyclus ventricosus	smooth lumpsucker
	Careproctus sp.	
	Careproctus colletti	Alaska snailfish
	Careproctus cypselurus	blackfin snailfish
	Careproctus furcellus	emarginate snailfish
	Careproctus gilberti	smalldisk snailfish
	Careproctus melanurus	blacktail snailfish
	Careproctus rastrinus	salmon snailfish
	Crystallichthys cyclospilus	blotched snailfish
	Elassodiscus caudatus	humpback snailfish
	Elassodiscus tremebundus	blacklip snailfish
	Eumicrotremus sp.	spiny lumpsuckers
	Eumicrotremus orbis	Pacific spiny lumpsucker
	Eumicrotremus phrynoides	toad lumpsucker
	Lethotremus muticus	docked snailfish
	Liparidae	snailfish unid.
	Paraliparis sp.	
	Paraliparis dactylosus	red snailfish
Bramidae	*Brama japonica*	Pacific pomfret
Bathymasteridae	*Bathymaster caeruleofasciatus*	Alaskan ronquil
	Bathymaster signatus	searcher
Zoarcidae	*Bothrocara brunneum*	twoline eelpout
	Bothrocara pusillum	Alaska eelpout
	Bothrocara zestum	western eelpout
	Lycenchelys camchatica	Kamchatka eelpout
	Lycenchelys crotalinus	snakehead eelpout
	Lycodes sp.	
	Lycodes beringi	Bering eelpout
	Lycodes brevipes	shortfin eelpout
	Lycodes cortezianus	bigfin eelpout
	Lycodes pacificus	blackbelly eelpout
	Lycodes palearis	wattled eelpout
	Lycodapus sp.	
Stichaeidae	*Chirolophis decoratus*	decorated warbonnet
	Lumpenella longirostris	longsnout prickleback
	Lumpenus sp.	
	Lumpenus maculatus	daubed shanny
	Lumpenus sagitta	snake prickleback
	Poroclinus rothrocki	whitebarred prickleback

Pholididae	*Pholis laeta*	crescent gunnel
Cryptacanthodidae	*Cryptacanthodes giganteus*	giant wrymouth
Anarhichadidae	*Anarhichas orientalis*	Bering wolffish
	Anarrhichthys ocellatus	wolf-eel
Zaproridae	*Zaprora silenus*	prowfish
Trichodontidae	*Trichodon trichodon*	Pacific sandfish
Ammodytidae	*Ammodytes* sp.	sand lance unid.
	Ammodytes hexapterus	Arctic sand lance
Icosteidae	*Icosteus aenigmaticus*	ragfish
Bothidae	*Citharichthys sordidus*	Pacific sanddab
Pleuronectidae	*Atheresthes evermanni*	Kamchatka flounder
	Atheresthes stomias	arrowtooth flounder
	Embassichthys bathybius	deepsea sole
	Eopsetta jordani	petrale sole
	Glyptocephalus zachirus	rex sole
	Hippoglossoides elassodon	flathead sole
	Hippoglossus stenolepis	Pacific halibut
	Isopsetta isolepis	butter sole
	Lepidopsetta sp.	rock sole unid.
	Lepidopsetta bilineata	southern rock sole
	Lepidopsetta polyxystra	northern rock sole
	Limanda aspera	yellowfin sole
	Lyopsetta exilis	slender sole
	Microstomus pacificus	Dover sole
	Parophrys vetulus	English sole
	Platichthys stellatus	starry flounder
	Pleuronectes quadrituberculatus	Alaska plaice
	Pleuronichthys decurrens	curlfin sole
	Psettichthys melanostictus	sand sole

Appendix Table B-2. – Invertebrates encountered during the 2015 Gulf of Alaska bottom trawl survey

Phylum	Species Name	Species Code	Common Name
Porifera	*Porifera*	91000	sponge unid.
	Suberites sp.	91015	
	Suberites sp. A	91017	wax sponge
	Suberites domuncula	91020	hermit sponge
	Aphrocallistes vastus	91030	clay pipe sponge
	Heterochone calyx	91035	goblet sponge
	Mycale sp.	91039	
	Mycale loveni	91040	tree sponge
	Mycale adhaerens	91042	smooth scallop sponge
	Halichondria oblonga	91045	ginseng sponge
	Acanthascus sp.	91048	
	Halichondria sp.	91049	
	Halichondria panicea	91050	barrel sponge
	Rhabdocalyptus sp.	91053	cloud sponge
	Mycale bellabellensis	91054	lampshade sponge
	Stelodoryx oxeata	91057	scapula sponge
	Semisuberites cribrosa	91059	cat-o-nine-tails sponge
	Myxilla brunnea	91062	soft brown sponge
	Echinoclathria beringensis	91063	hat sponge
	Axinella blanca	91064	firm finger sponge
	Histodermella kagigunensis	91066	spud sponge
	Tedania kagalaskai	91067	club sponge
	Monanchora pulchra	91068	yellow leafy sponge
	Hyalonema sp.	91070	fiberoptic sponge
	Polymastia sp.	91074	
	Polymastia pacifica	91075	
	Halichondria sitiens	91079	black papillate sponge
	Mycale carlilei	91086	trumpet sponge
	Leucandra tuba	91087	
	Neoesperiopsis rigida	91088	soft finger sponge
	Cladocroce attu	91089	rough hat sponge
	Esperiopsis flagrum	91092	cheesestick sponge
	Leucandra sp.	91097	
	Geodia starki	91100	pita sponge
	Stelletta sp.	91105	stone sponge
	Polymastia fluegeli	91110	Flugel's nippled sponge

	Weberella bursa	91112	pale mammilated sponge
	Polymastia sp. A	91113	prolific nipple sponge
	Tentorium semisuberites	91125	two nipple sponge
	Craniella villosa	91127	
	Plakina tanaga	91215	white convoluted sponge
	Latrunculia oparinae	91226	green papillate sponge
	Hymeniacidon assimilis	91228	
	Axinella sp.	91230	firm gray sponge
	Echinoclathria sp. A	91238	fuzzy tree sponge
	Echinoclathria sp.	91239	
	Halichondria oblonga	91241	
	Asbestopluma sp. A	91251	fuzzy sponge
	Cornulum clathriata	91255	lattice sponge
	Monanchora alaskensis	91261	
	Hexactinellida	91700	glass sponge unid.
	Geodinella lendenfeldi	91705	calcareous finger sponge
	Aulosaccus schulzei	91710	vase sponge
	Regadrella okinoseana	91725	lacy basket sponge
	Craniella sp.	99987	puffball sponges
	Craniella arb	99988	
Cnidaria	*Hydrozoa*	40010	
	Hydroidolina	40011	hydroid unid.
	Bonneviella sp. A	40012	champagne flute hydroid
	Aglaophenia sp.	40028	
	Abietinaria sp.	40034	
	Abietinaria greenei	40035	bushy white hydroid
	Abietinaria sp. A	40036	white tangled hydroid
	Sertulariidae	40049	Sertulariid hydroid
	Neoturris breviconis	40061	blob-top jelly
	Scyphozoa	40500	jellyfish unid.
	Periphylla periphylla	40503	helmet jelly
	Chrysaora melanaster	40504	
	Phacellophora camtschatica	40505	egg yolk jelly
	Aequorea sp.	40506	
	Bolinopsis sp.	40507	
	Atolla sp.	40510	
	Aurelia sp.	40511	
	Aurelia labiata	40512	

Chrysaora fuscescens	40515	sea nettle
Aurelia limbata	40520	brown rimmed jelly
Cyanea capillata	40561	lion's mane
Anthozoa	41000	
Alcyonium sp.	41102	
Anthomastus sp.	41300	
Anthomastus sp. A	41331	red anthomastus
Primnoa sp.	41520	
Primnoa pacifica	41521	
Bathypathes patula	41541	
Swiftia pacifica	41571	
Paragorgia arborea	41582	Kamchatka coral
Calcigorgia spiculifera	41701	
Clavularia incrustans	41752	encrusting coral
Pennatulacea	42000	sea pen or sea whip unid.
Virgulariidae	42003	sea whip unid.
Halipteris sp.	42008	
Halipteris sp. A	42009	maroon sea whip
Halipteris willemoesi	42012	
Ombellula sp.	42015	
Ptilosarcus gurneyi	42017	orange sea pen
Actiniaria	43000	sea anemone unid.
Actinauge verrilli	43001	reticulate anemone
Actinostola faeculenta	43002	rough purple sea anemone
Actinoscyphia sp.	43003	
Metridium sp.	43010	
Metridium farcimen	43021	gigantic anemone
Stomphia sp.	43030	
Stomphia coccinea	43032	swimming anemone
Urticina sp.	43040	
Urticina crassicornis	43042	mottled anemone
Urticina columbiana	43044	crusty red anemone
Zoanthidae sp. A	43045	hot dog zoanthid
Oceanactis diomedeae	43050	grape anemone
Cribrinopsis fernaldi	43082	chevron-tentacled anemone
Liponema brevicorne	43090	tentacle-shedding anemone
Actinostolidae	43100	
Actinostola sp.	43110	

	Actinostola sp. A	43111	
	Zoanthus sp.	43225	
	Stylaster sp.	44030	
	Cyclohelia lamellata	44040	
	Plumarella superba	44075	
	Errinopora sp. B	44077	pale-edged hydrocoral
	Plumarella sp.	44083	
	Isidella sp.	44085	articulated bamboo coral
	Thouarella sp.	44087	
	Keratoisis sp.	44088	nodal bamboo coral unid.
	Fanellia sp.	44089	
	Fanellia compressa	44090	
	Muriceides nigra	44092	
	Muriceides sp.	44093	
Ctenophora	*Ctenophora*	45000	comb jelly unid.
	Beroe sp.	45005	
Platyhelminthes	*Platyhelminthes*	92000	flatworm unid.
Rhynchocoela	*Nemertea*	92500	nemertean worm unid.
Annelida	*Polychaeta*	50000	polychaete worm unid.
	Eunice valens	50005	
	Chaetopterus sp.	50013	
	Aphroditidae	50160	sea mouse unid.
	Aphrodita sp.	50161	
	Aphrodita negligens	50192	
	Euphrosine multibranchiata	50205	
	Cheilonereis cyclurus	54030	
	Eunoe sp.	56310	
	Eunoe nodosa	56311	giant scale worm
	Gattyana ciliata	56321	
	Serpulidae	57409	serpulid worm
	Serpula columbiana	57411	
	Serpula sp.	57412	
	Notostomum cyclostomum	59111	striped sea leech
	Notostomobdella sp.	59120	
Sipuncula	*Sipuncula*	94000	peanut worm unid.
	Phascolosomatidae	94011	
Mollusca	*Neomenia* sp.	70060	
	Neomenia cf. *yamamoti*	70062	
	Polyplacophora	70100	chiton unid.

Cryptochiton stelleri	70108	giant Pacific chiton
Amicula vestita	70115	
Placiphorella pacifica	70122	
Leptochiton sp.	70124	
Nudibranchia	71010	nudibranch unid.
Tochuina tetraquetra	71012	giant orange tochui
Tritonia sp.	71025	
Tritonia festiva	71026	festive Tritonia
Tritonia diomedea	71030	rosy tritonia
Armina californica	71080	California armina
Cadlina modesta	71105	
Anisodoris nobilis	71230	Pacific sea lemon
Anisodoris lentiginosa	71235	mottled pale sea-lemon
Dorididae	71250	dorid nudibranch unid.
Archidoris sp.	71259	Archidoris nudibranch
Archidoris odhneri	71260	white night doris
Diaulula sp. A	71269	
Cranopsis major	71350	great puncturella
Gastropoda	71500	snail unid.
Gastropteron pacifica	71503	
Bulbus fragilis	71515	fragile moonsnail
Cryptonatica sp.	71524	
Cryptonatica aleutica	71535	Aleutian moonsnail
Cryptonatica russa	71537	rusty moonsnail
Nucella lamellosa	71542	frilled dogwinkle
Euspira pallida	71580	pale moonsnail
Colus sp.	71710	
Colus jordani	71719	
Colus halli	71731	shrew whelk
Japelion aleutica	71740	
Japelion sp.	71741	
Japelion sp. A	71742	
Pyrulofusus sp.	71747	
Pyrulofusus dexius	71749	
Volutopsius sp.	71750	
Pyrulofusus deformis	71753	warped whelk
Pyrulofusus harpa	71755	left-hand whelk
Pyrulofusus melonis	71761	
Volutopsius simplex	71762	simple whelk
Beringius sp.	71769	
Beringius kennicottii	71770	

Beringius beringii	71772	
Beringius rotundus	71787	rotund whelk
Beringius sp. I	71789	
Neptunea sp.	71800	
Neptunea amianta	71810	white neptune
Neptunea pribiloffensis	71820	Pribilof whelk
Neptunea lyrata	71870	lyre whelk
Neptunea sp. E	71885	
Neptunea sp. B	71888	
Plicifusus sp.	71890	
Plicifusus kroyeri	71891	
Scabrotrophon sp.	72399	
Boreotrophon stuarti	72407	winged trophon
Fusitriton oregonensis	72500	Oregon triton
Bathybembix bairdii	72520	
Cidarina cidaris	72525	
Buccinum sp.	72740	
Buccinum oedematum	72747	swollen whelk
Buccinum viridum	72749	turban whelk
Buccinum plectrum	72751	sinuous whelk
Buccinum scalariforme	72752	ladder whelk
Buccinum ciliatum	72757	
Buccinum rondinum	72786	eroded whelk
Arctomelon sp.	72789	
Arctomelon stearnsii	72790	Alaska volute
Bivalvia	74000	bivalve unid.
Modiolus modiolus	74060	northern horsemussel
Mytilus edulis	74080	blue mussel
Chlamys sp.	74104	
Chlamys rubida	74106	reddish scallop
Patinopecten caurinus	74120	weathervane scallop
Panopea abrupta	74301	Pacific geoduck
Yoldia sp.	74414	
Yoldia seminuda	74416	crisscrossed yoldia
Yoldia hyperborea	74420	northern yoldia
Nuculana pernula	74436	northern nutclam
Limopsis akutanica	74481	Akutan limops
Empleconia vaginata	74482	vaginated limops
Glycymeris septentrionalis	74485	
Limatula sp. A	74572	
Astarte sp.	74640	

	Clinocardium sp.	74980	
	Clinocardium ciliatum	74983	hairy cockle
	Clinocardium californiense	74985	California cockle
	Clinocardium blandum	74986	low-rib cockle
	Humilaria kennerleyi	75025	Kennerleys venus
	Protothaca staminea	75030	Pacific littleneck
	Mactromeris sp.	75110	
	Tellina sp.	75201	
	Macoma sp.	75240	
	Siliqua patula	75266	Pacific razor
	Serripes groenlandicus	75285	Greenland cockle
	Serripes notabilis	75287	oblique smoothcockle
	Bankia setacea	75382	feathery shipworm
	Halicardia perplicata	75570	
	Pododesmus macrochisma	75600	Alaska falsejingle
	Octopodidae	78010	octopus unid.
	Benthoctopus leioderma	78012	smoothskin octopus
	Octopus sp.	78020	
	Japetella diaphana	78022	
	Opisthoteuthis californiana	78030	flapjack devilfish
	Enteroctopus dofleini	78403	giant octopus
	Benthoctopus oregonensis	78455	
	Decapodiformes	79000	squid unid.
	Rossia pacifica	79020	eastern Pacific bobtail
	Doryteuthis opalescens	79120	California market squid
	Gonatidae	79199	
	Gonatus sp.	79200	
	Gonatus onyx	79201	clawed armhook squid
	Berryteuthis magister	79210	magistrate armhook squid
	Gonatopsis sp.	79250	
	Gonatopsis borealis	79252	boreopacific armhook squid
	Moroteuthis robusta	79302	robust clubhook squid
	Galiteuthis phyllura	79340	
	Chiroteuthis calyx	79404	
	Belonella borealis	79443	
	Octopoteuthis deletron	79504	
Arthropoda	*Isopoda*	62000	isopod unid.
	Rocinella angusta	62025	
	Thysanoessa sp.	63501	

Neognathophausia gigas	64011	giant red mysid
Neognathophausia ingens	64012	red mysid
Thoracica	65100	barnacle unid.
Balanus sp.	65201	
Balanus evermanni	65203	giant barnacle
Balanus nubilus	65206	
Pandalus sp.	66020	
Pandalus danae	66025	dock shrimp
Pandalus jordani	66030	ocean shrimp
Pandalus eous	66031	Alaskan pink shrimp
Pandalus tridens	66033	yellowleg pandalid
Pandalus platyceros	66040	spot shrimp
Pandalus hypsinotus	66050	coonstripe shrimp
Pandalus stenolepis	66055	roughpatch shrimp
Pandalopsis dispar	66120	sidestripe shrimp
Eualus barbatus	66171	barbed eualid
Eualus macrophthalmus	66180	bigeye eualid
Eualus biunguis	66190	deepsea eualid
Lebbeus groenlandicus	66203	spiny lebbeid
Crangon sp.	66502	
Crangon communis	66515	twospine crangon
Crangon franciscorum	66517	California bay shrimp
Crangon dalli	66530	ridged crangon
Metacrangon variabilis	66535	deepsea spinyhead
Crangon septemspinosa	66548	sevenspine bay shrimp
Argis sp.	66570	
Argis alaskensis	66575	common argid
Argis dentata	66580	Arctic argid
Sclerocrangon boreas	66601	sculptured shrimp
Argis lar	66611	kuro argid
Argis levior	66613	Nelson's argid
Pasiphaea pacifica	66770	Pacific glass shrimp
Pasiphaea tarda	66772	crimson pasiphaeid
Notostomus japonicus	66815	spinyridge shrimp
Cancer branneri	68011	furrowed rock crab
Cancer magister	68020	Dungeness crab
Cancer oregonensis	68040	Oregon rock crab
Oregonia bifurca	68502	
Oregonia gracilis	68510	graceful decorator crab
Chorilia longipes	68520	longhorned decorator crab

	Chionoecetes sp.	68541	Tanner crab unid.
	Chionoecetes tanneri	68550	grooved Tanner crab
	Chionoecetes bairdi	68560	Tanner crab
	Hyas coarctatus	68577	circumboreal toad crab
	Hyas lyratus	68578	Pacific lyre crab
	Telmessus cheiragonus	68781	helmet crab
	Paguridae	69010	hermit crab unid.
	Pagurus sp.	69035	
	Pagurus brandti	69042	sponge hermit
	Pagurus aleuticus	69060	Aleutian hermit
	Labidochirus splendescens	69061	splendid hermit
	Pagurus confragosus	69070	knobbyhand hermit
	Pagurus cornutus	69080	hornyhand hermit
	Pagurus kennerlyi	69085	bluespine hermit
	Pagurus trigonocheirus	69086	fuzzy hermit crab
	Pagurus beringanus	69087	Bering hermit
	Pagurus ochotensis	69090	Alaskan hermit
	Pagurus rathbuni	69095	longfinger hermit
	Pagurus tanneri	69100	longhand hermit
	Elassochirus tenuimanus	69110	widehand hermit crab
	Pagurus capillatus	69120	hairy hermit crab
	Elassochirus cavimanus	69121	purple hermit
	Elassochirus gilli	69122	Pacific red hermit
	Elassochirus sp.	69123	
	Lopholithodes foraminatus	69270	box crab
	Acantholithodes hispidus	69285	fuzzy crab
	Lithodes couesi	69300	scarlet king crab
	Lithodes aequispinus	69310	golden king crab
	Rhinolithodes wosnessenskii	69317	rhinoceros crab
	Phyllolithodes papillosus	69318	flatspine triangle crab
	Paralithodes camtschaticus	69322	red king crab
	Paralomis sp.	69330	
	Placetron wosnessenskii	69336	scaled crab
	Pugettia producta	69532	
	Munida quadrispina	69556	pinchbug
Brachiopoda	*Brachiopoda*	97000	lampshell unid.
	Terebratalia transversa	97110	common brachiopod
	Frieleia halli	97111	
	Terebratulina unguicula	97115	snakeshead brachiopod
	Laqueus californianus	97116	California lamp shell
Bryozoa	*Bryozoa*	95000	bryozoan unid.

	Myriapora orientalis	95006	
	Phidolopora pacifica	95015	lattice-work bryozoan
	Flustrellidra corniculata	95035	
	Alcyonidium pedunculatum	95036	
	Alcyonidium sp. A	95037	medusa bryozoan
	Myriapora subgracilis	95040	
	Porella compressa	95050	flattened bryozoan
	Rhamphostomella costata	95070	ribbed bryozoan
	Hippoporina insculpta	95071	
	Celleporina ventricosa	95080	coral bryozoan
	Microporina sp.	95102	
	Dendrobeania sp.	95105	
Echinodermata	*Asteroidea*	80000	sea star unid.
	Evasterias sp.	80010	
	Evasterias retifera	80012	
	Evasterias echinosoma	80020	giant sea star
	Orthasterias koehleri	80106	redbanded sea star
	Leptasterias hylodes	80112	Aleutian sea star
	Leptasterias coei	80115	
	Leptasterias truculenta	80116	giant Aleutian six-rayed star
	Rathbunaster californicus	80120	
	Pycnopodia helianthoides	80160	sunflower sea star
	Stylasterias forreri	80170	long-rayed star
	Ampheraster marianus	80182	
	Lethasterias nanimensis	80200	blackspined sea star
	Pedicellaster magister	80230	majestic sea star
	Pisaster brevispinus	80311	giant pink star
	Pisaster ochraceus	80312	purple star
	Poraniopsis inflata	80520	thorny sea star
	Henricia sp.	80540	
	Henricia aspera	80543	ridged blood star
	Henricia leviuscula	80544	blood sea star
	Henricia asthenactis	80547	
	Henricia spiculifera	80549	spiny Henricia
	Odontohenricia fisheri	80550	
	Odontohenricia sp.	80551	
	Odontohenricia sp. A	80552	
	Odontohenricia sp. C	80554	
	Leptasterias katharinae	80591	
	Leptasterias sp.	80595	

Gephyreaster swifti	80602	Swift's sea star
Pseudarchaster sp.	80610	
Pseudarchaster alascensis	80620	
Hippasteria sp.	80630	
Hippasteria sp. A	80633	
Hippasteria californica	80640	
Hippasteria spinosa	80650	spiny red sea star
Pseudarchaster parelii	80660	scarlet sea star
Cryptopeltaster lepidonotus	80670	
Mediaster sp.	80690	
Mediaster tenellus	80691	
Mediaster aequalis	80710	vermilion sea star
Ceramaster sp.	80728	
Ceramaster japonicus	80729	red bat star
Ceramaster patagonicus	80730	orange bat sea star
Luidia foliolata	80810	sand sea star
Dermasterias imbricata	80910	leather sea star
Solaster sp.	81060	
Solaster endeca	81061	northern sun sea star
Solaster hypothrissus	81062	
Solaster dawsoni	81064	morning sun sea star
Solaster stimpsoni	81065	striped sun sea star
Solaster sp. A	81067	
Solaster sp. F	81071	Fisher sun star
Crossaster sp.	81090	
Crossaster borealis	81092	grooved sea star
Crossaster sp. B	81094	pink rose star
Crossaster papposus	81095	rose sea star
Heterozonias alternatus	81100	cannonball sun star
Lophaster sp.	81120	
Lophaster sp. A	81121	
Lophaster vexator	81125	crested star
Lophaster furcilliger	81130	crested sea star
Pteraster sp.	81310	
Pteraster sp. A	81313	
Pteraster tesselatus	81315	
Pteraster jordani	81316	
Pteraster militaris	81320	wrinkled star
Pteraster marssipus	81321	
Pteraster obscurus	81355	obscure sea star
Diplopteraster multipes	81360	pincushion sea star

Diplopteraster sp.	81361	
Asterias amurensis	81742	purple-orange sea star
Ctenodiscus crispatus	81780	common mud star
Leptychaster sp.	81820	
Leptychaster anomalus	81829	
Leptychaster arcticus	81835	North Pacific sea star
Dipsacaster sp.	81850	
Dipsacaster borealis	81870	northern sea star
Dipsacaster eximus	81875	
Cheiraster sp. A	81909	Aleutian fragile sea star
Cheiraster dawsoni	81910	fragile sea star
Nearchaster variabilis	81912	
Nearchaster sp.	81919	
Nearchaster aciculosus	81920	
Nearchaster pedicellaris	81921	
Strongylocentrotus droebachiensis	82510	green sea urchin
Strongylocentrotus sp.	82511	
Strongylocentrotus polyacanthus	82522	
Strongylocentrotus purpuratus	82525	purple sea urchin
Allocentrotus fragilis	82530	orange-pink sea urchin
Brisaster sp.	82660	
Brisaster latifrons	82675	heart urchin
Brisaster owstoni	82676	
Echinarachnius parma	82740	parma sand dollar
Dendraster excentricus	82741	
Florometra sp.	82760	
Florometra asperrima	82771	common northern feather star
Ophiuroidea	83000	brittlestar unid.
Ophiuridae	83010	
Gorgonocephalus eucnemis	83020	basketstar
Gorgonocephalus sp.	83022	
Asteronyx loveni	83070	serpent sea star
Asteronyx longifissa	83075	
Astrochele sp.	83090	
Ophiura sarsi	83320	notched brittlestar
Stegophiura ponderosa	83340	
Ophiacantha normani	83341	
Ophiacantha sp.	83342	
Ophiacantha cataleimmoida	83345	
Ophiopholis sp.	83360	

	Ophiopholis longispina	83390	
	Ophiopholis aculeata	83400	ubiquitous brittle star
	Ophiomusium jolliensis	83407	
	Ophiosphalma sp. cf. *jolliensis*	83408	
	Ophiolebes sp.	83411	
	Ophiolebes sp. F	83421	
	Holothuroidea	85000	sea cucumber unid.
	Parastichopus californicus	85020	California sea cucumber
	Pseudostichopus mollis	85070	sandy sea cucumber
	Molpadia intermedia	85120	sweet sea potato
	Bathyplotes sp.	85180	
	Cucumaria fallax	85201	sea football
	Cucumaria frondosa	85202	
	Psolus sp.	85210	
	Psolus squamatus	85220	whitescaled sea cucumber
	Psolus japonicus	85222	
	Synallactes sp.	85289	
	Synallactes challengeri	85290	
Chordata	*Ascidiacea*	98000	tunicate unid.
	Ascidian n. sp. A	98001	cow-eye tunicate
	Thaliacea	98070	salp unid.
	Styela rustica	98082	sea potato
	Halocynthia sp.	98200	sea peach unid.
	Halocynthia igaboja	98204	
	Halocynthia aurantium	98205	sea peach
	Cnemidocarpa finmarkiensis	98206	broad base tunicate
	Pyura haustor	98207	wrinkled tunicate
	Distaplia sp.	98210	
	Distaplia occidentalis	98212	
	Distaplia smithi	98213	
	Aplidium californicum	98219	
	Amaroucium soldatovi	98303	
	Aplidium sp. A	98310	sea glob
	Ascidia paratropa	98322	glassy tunicate
	Chelyosoma productum	98331	
	Polyclinum planum	98340	
	Molgula griffithsii	99902	sea grape

APPENDIX C

Appendix Table C-1. -- Length-weight parameters (a and b) for species where individual length and weight data were collected during the 2015 survey. The number of individuals measured and weighed (n) is also provided.

Species	Sex	a	b	n
Arrowtooth flounder	Male	5.331E-06	3.070	331
	Female	3.049E-06	3.174	499
	Both	3.289E-06	3.159	831
Atka mackerel	Male	7.169E-06	3.104	176
	Female	4.540E-05	2.778	241
	Both	3.410E-05	2.833	417
Blackspotted rockfish	Male	5.347E-06	3.181	302
	Female	6.677E-06	3.143	294
	Both	5.979E-06	3.162	596
Pacific cod	Male	4.468E-06	3.128	373
	Female	4.604E-06	3.124	402
	Both	4.536E-06	3.126	775
Dover sole	Male	1.431E-06	3.317	322
	Female	2.828E-06	3.208	419
	Both	2.331E-06	3.235	741
Dusky rockfish	Male	1.528E-05	3.013	424
	Female	2.111E-05	2.959	526
	Both	1.839E-05	2.982	950
Flathead sole	Male	1.519E-06	3.300	312
	Female	1.273E-06	3.334	381
	Both	1.289E-06	3.331	693
Giant grenadier	Male	--	--	--
	Female	--	--	--
	Both	3.450E-03	2.408	22
Northern rockfish	Male	7.849E-05	2.718	283
	Female	8.012E-05	2.714	345
	Both	8.164E-05	2.711	628
Northern rock sole	Male	3.720E-06	3.195	199
	Female	3.166E-06	3.225	259
	Both	3.319E-06	3.216	458
Walleye pollock	Male	6.904E-06	3.007	495
	Female	1.029E-05	2.938	674
	Both	8.826E-06	2.965	1169
Pacific ocean perch	Male	1.029E-05	3.045	581
	Female	1.248E-05	3.010	562
	Both	1.151E-05	3.024	1143
Rex sole	Male	8.277E-07	3.346	102
	Female	7.596E-07	3.366	132
	Both	7.196E-07	3.373	234
Rougheye rockfish	Male	6.704E-06	3.146	226
	Female	5.443E-06	3.184	231
	Both	6.053E-06	3.165	457
Sablefish	Male	1.866E-06	3.258	492
	Female	2.320E-06	3.219	524
	Both	2.146E-06	3.233	1076
Harlequin rockfish	Male	5.549E-06	3.152	97
	Female	2.882E-06	3.267	134
	Both	3.793E-06	3.219	231
Shortraker rockfish	Male	8.362E-06	3.107	166
	Female	6.371E-06	3.155	189
	Both	7.398E-06	3.130	355
Southern rock sole	Male	4.363E-06	3.169	151
	Female	4.376E-06	3.169	248
	Both	4.356E-06	3.170	399
Shortspine thornyhead	Male	4.686E-06	3.157	328
	Female	3.040E-06	3.235	332
	Both	3.060E-06	3.233	717

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