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Alaska Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
7600 Sand Point Way NE
Seattle, WA 98115

www.afsc.noaa.gov

U.S. DEPARTMENT OF COMMERCE
Penny. S. Pritzker, Secretary
National Oceanic and Atmospheric Administration
Kathryn D. Sullivan, Under Secretary and Administrator
National Marine Fisheries Service
Eileen Sobeck, Assistant Administrator for Fisheries

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PREFACE

This data report presents data from the 2011 Gulf of Alaska groundfish survey conducted by the Alaska Fisheries Science Center of the National Marine Fisheries Service (NMFS). It contains detailed descriptions of the survey planning and operation, 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, list 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 seventh biennial groundfish assessment survey of the Gulf of Alaska during the summer of 2011. These surveys extend 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 700 m in the Gulf of Alaska from Islands of Four Mountains (170° W long.) and continued eastward approximately 2,800 km across the Gulf of Alaska to Dixon Entrance (133° 25' W long.). The survey was conducted aboard two chartered commercial trawlers, the FV *Ocean Explorer* and the FV *Sea Storm*. Trawl haul samples were successfully collected at 670 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 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.

More than 150 fish and 360 invertebrate species were captured in survey tows. The species highest in total catch abundance (by weight) over the entire survey area were arrowtooth flounder (*Atheresthes stomias*), Pacific ocean perch (*Sebastes alutus*), Pacific cod (*Gadus macrocephalus*), and Pacific halibut (*Hippoglossus stenolepis*). Survey results are presented including 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 seventh biennial bottom trawl survey of groundfish and invertebrate resources of the Gulf of Alaska (GOA) was conducted during the summer of 2011 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. The biennial regimen extends the series begun in 1984, previously conducted every 3 years between 1984 and 1999, which has provided time series of distribution, abundance, and biological characteristics of GOA groundfish resources for the purpose of stock assessment and management.

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In this report, we document the operations and results of the 2011 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 for use in stock assessments. Only the 2011 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 ≤ 700 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 included:

- Tissue collections from sleeper sharks (*Somniosus pacificus*) and spiny dogfish (*Squalus suckleyi*) for ageing purposes.
- A study on the production of antifreeze in the proteins of starry flounder (*Platichthys stellatus*);
- Collections of five predatory fish species in juvenile stage to better understand recruitment strategies;
- Coral collection for genetic analysis;

- Marine mammal prey species collection for the AFSC's National Marine Mammal Laboratory reference collection;
- Short-tailed albatross *(Diomedea albatrus*) observations.

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 2011 GOA survey included the portion of the continental shelf from the Islands of Four Mountains east approximately 2,800 km to Dixon Entrance and from nearshore waters (minimum depth approximately 15 m) to a depth of 700 m.

The total 2011 survey area was 308,415 km² (Table 1). Survey depths usually extend out to 1,000 m, making the usual survey area about 320,000 km², but during 2011, the 700-1000 m depth stratum could not be sampled because there were only two vessels participating in the survey rather than the usual three, and a vessel with additional wire capacity for sampling deeper water was not available. The continental shelf shallower than 200 m made up 81% of the survey area, and the width of the shelf varies from approximately 20 km (11 nautical miles (nmi)) off of the Islands of Four Mountains to approximately 220 km (120 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 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 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. The survey assessed only that portion of the slope between 200 and 700 m, which represented 18% of the total survey area. About 32% (97,995 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% (64,932 km²) and 20% (63,291 km²), respectively, while the Yakutat INPFC survey area makes up about 18% (55,310 km²). The Southeastern INPFC survey area is the smallest portion, about 9% of the total survey area (26,832 km²).

Vessels

Since the inception of the Gulf of Alaska bottom trawl survey series in 1984, commercial trawlers with crew have been chartered to conduct the survey operations under the supervision and guidance of RACE Groundfish Assessment Program staff. In most years, three vessels have been chartered for the survey. During the 2011 survey only two were used due to budget and charter complications. The two vessels extended their survey duration to compensate for the lack

of the third vessel, but neither of the two vessels had the capacity to trawl in the 700 – 1000 m stratum. Since these surveys generate quantitative data for a time series to describe trends in 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 2011, only 727 stations were allocated for a survey that typically targets 820 stations in all depth strata.

The two U.S. commercial fishing vessels which were chartered to conduct the 2011 GOA bottom trawl survey were the FV *Ocean Explorer* and the FV *Sea Storm.* Both vessels are house-forward stern trawlers with hydraulic net reels and paired constant tension hydraulic trawl winches containing between 1,280 and 1,460 m of 2.54 cm diameter steel cable. Both 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 *Ocean Explorer* is 47.2 m LOA with a 1,800 HP main engine. Each vessel is 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 Scanmar® 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).

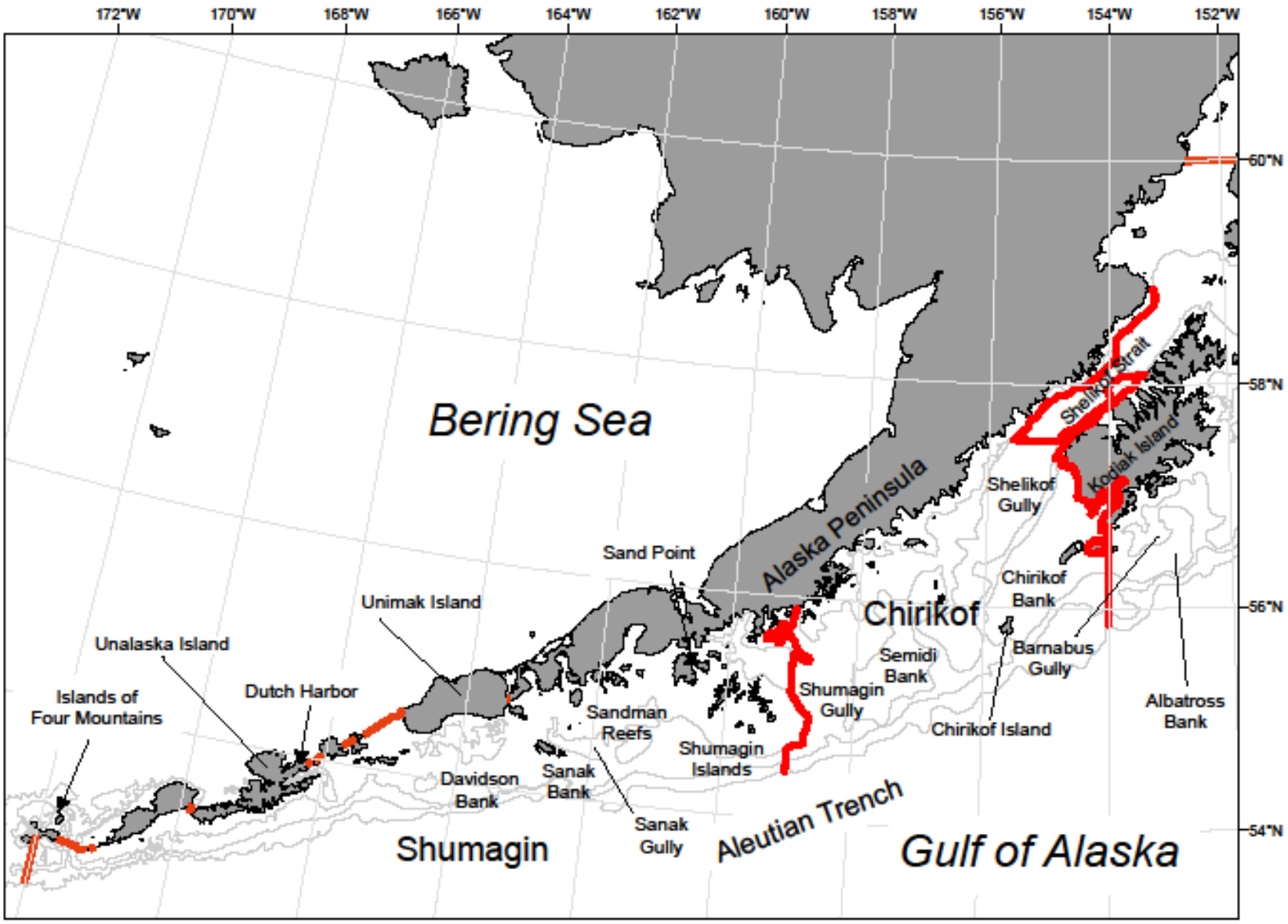

Figure 1. -- Bathymetric and geographic features of the survey area for the 2011 Gulf of Alaska biennial groundfish survey.

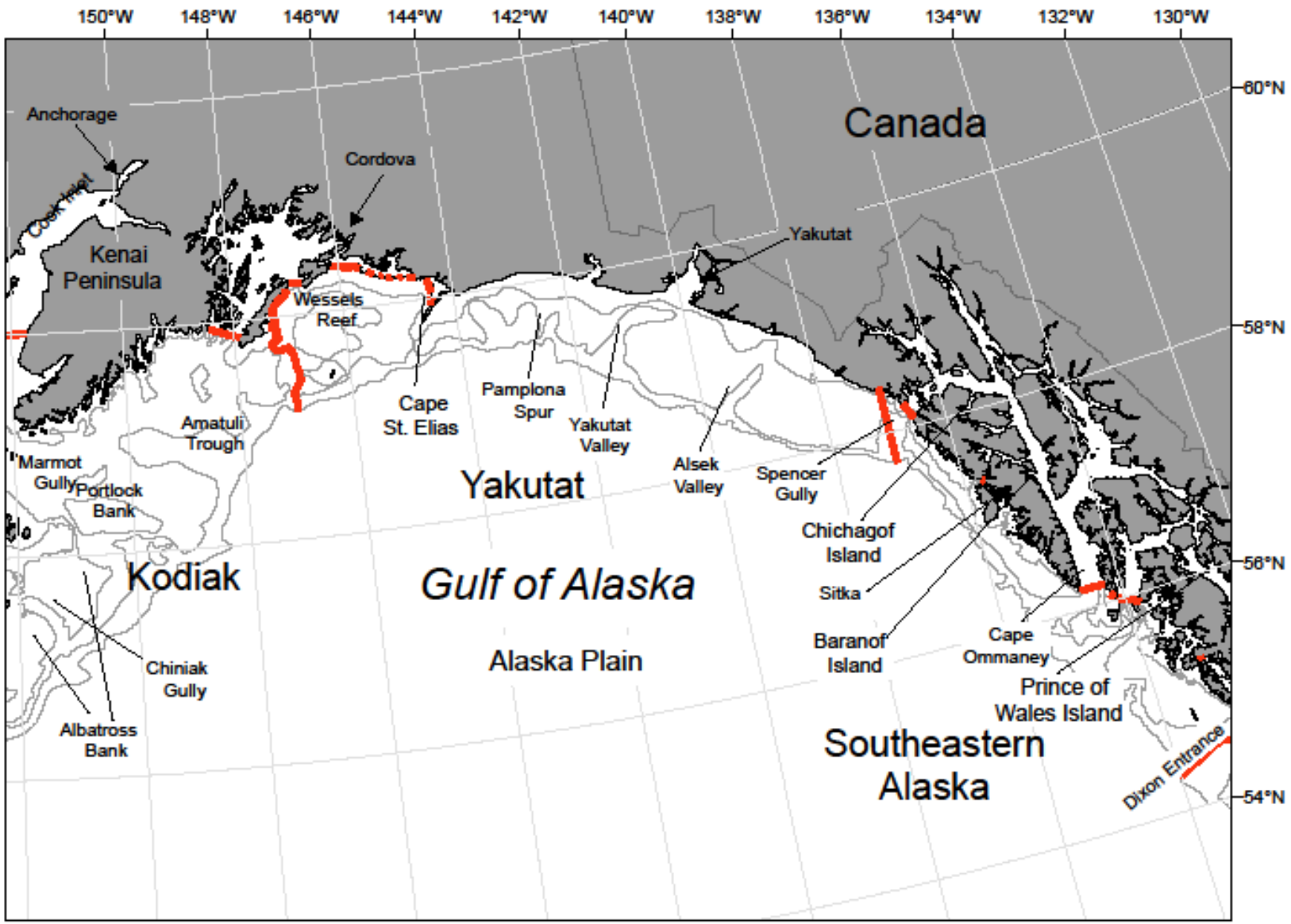

Figure 1. -- Continued.

Survey Design

The 2011 biennial survey was designed based upon stratified random sampling consistent with previous GOA surveys (Britt and Martin 2000, Martin and Clausen 1995, Stark and Clausen 1995, Munro and Hoff 1995). The survey area was divided into 54 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, variances, and stratum areas from the 1990-2009 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 the 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 numbers were rounded to whole numbers and represented the number of stations allocated to each stratum with the 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 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 (less than 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.

We allocated 727 stations among the 54 strata. Geographic center points of the assigned station polygon were considered to define the location of the station. Vessels were assigned

stations and 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 skipper, no trawlable grounds could be found within 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 Scanmar net mensuration equipment. Scanmar net spread data were generally not collected for tows over extremely rough bottom so as not to risk

losing the instruments. 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.

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 in like manner by successively filling the sorting table from the codend, sorting, and weighing until the entire catch had been processed. Alternatively, the total weight of the catch was determined using 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, the predominant species were discarded and the non-dominant species were retained, which were sorted and weighed with those from the table. Total weight estimates for the predominant 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. Pacific halibut were measured and discarded as promptly as possible and their weights were estimated from the length data.

Additional biological information was recorded from individuals of 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 from randomly-selected samples of walleye pollock (See Appendix Table B-1 for scientific names of fish species), samples stratified by haul, sex, and size of rockfish species, and samples stratified by area, sex, and size of other target species. 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 *Ocean explorer* while stomach content scans were performed aboard the FV *Sea*

Storm. Ancillary data and specimens were collected for several other research projects as described previously.

Abundance, Size 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 Scanmar units between on-bottom and off-bottom positions. Net spreads for tows for with insufficient Scanmar 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 errors 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 size 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 fish: flatfish, roundfish, and rockfish. 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 used to monitor population trends and status. Gear deployment is

standardized and intentionally not modified over time to ensure scientific consistency and statistical continuity of the time series necessary to reliably monitor the status of fish stocks and forecast trends.

RESULTS

A total of 727 stations were originally assigned, 704 tows were attempted, but only 670 tows (95%) were successfully completed and included in the biomass and size composition analyses (Table 1). The reason why there were substantially more stations allocated than attempted was that the original cruise plan called for a third vessel. Due to complications relating to budget and contracts the third vessel was not employed and the original stations had to be allocated between two vessels instead of three. Headrope depth and temperature measurements were successfully collected for 700 attempted tows (99%). Bottom temperatures ranged from 0.0° to 13.2° C. Sea surface temperatures ranged from 0.0° to 16.0° C. Average net spread for successfully completed tows ranged from 12.7 to 19.5 m. Average net heights ranged from 2.5 to 9.0 m.

Table 1. -- Number of stations allocated, attempted, and successfully completed, and sampling density for the 2011 Gulf of Alaska biennial (INPFC) 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)	Stations/ 1000 m^2
Shumagin	1 - 100	114	107	105	41,289	2.54
	101 - 200	37	37	37	14,677	2.52
	201 - 300	11	11	11	2,788	3.95
	301 - 500	8	8	7	2,531	2.77
	501 - 700	4	3	3	2,006	1.50
	All depths	**174**	**166**	**163**	**63,291**	**2.58**
Chirikof	1 - 100	72	70	68	26,035	2.61
	101 - 200	60	57	56	23,849	2.35
	201 - 300	22	20	20	11,546	1.73
	301 - 500	7	6	6	1,604	3.74
	501 - 700	5	5	5	1,953	2.56
	All depths	**166**	**158**	**155**	**64,987**	**2.28**
Kodiak	1 - 100	99	88	87	38,516	2.26
	101 - 200	106	111	107	43,332	2.47
	201 - 300	26	24	24	11,490	2.09
	301 - 500	9	6	6	2,912	2.06
	501 - 700	4	4	4	1,745	2.29
	All depths	**244**	**233**	**228**	**97,995**	**2.25**
Yakutat	1 - 100	15	14	14	16,661	0.84
	101 - 200	38	33	33	29,382	1.12
	201 - 300	15	13	13	5,170	2.51
	301 - 500	7	6	6	2,628	2.28
	501 - 700	3	2	2	1,469	1.36
	All depths	**78**	**68**	**68**	**55,310**	**1.23**
Southeastern	1 - 100	11	9	8	6,546	1.22
	101 - 200	23	23	22	11,084	1.98
	201 - 300	17	15	15	5,052	2.97
	301 - 500	11	9	8	3,117	2.57
	501 - 700	3	3	3	1,033	2.90
	All depths	**65**	**59**	**56**	**26,832**	**2.09**
All areas	1 - 100	311	288	282	129,047	2.19
	101 - 200	264	261	255	122,324	2.08
	201 - 300	91	83	83	36,046	2.30
	301 - 500	42	35	33	12,792	2.58
	501 - 700	19	17	17	8,206	2.07
	All depths	**727**	**684**	**670**	**308,415**	**2.17**

Catch Results by Area

At least 154 fish species from 35 families were captured during the 2011 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. Pacific ocean perch, Walleye pollock, Pacific cod, and Pacific halibut were also very important components of the Gulf-wide species composition.

In the Shumagin INPFC area, walleye pollock had the greatest CPUE of any species, and were only slightly more abundant than arrowtooth flounder. In the Chirikof and Kodiak INPFC areas, arrowtooth flounder dominated all other species in terms of CPUE by a two-fold margin. Pacific ocean perch seconded arrowtooth flounder in abundance in Kodiak,Yakutat and Southeasten INPFC areas.

Table 2. -- Mean CPUE (kg/ha) for the 20 most abundant groundfish in each International North Pacific Fisheries Commission statistical area during the 2011 biennial Gulf of Alaska bottom trawl survey.

Shumagin area	CPUE	**Chirikof area**	CPUE	**Kodiak area**	CPUE
walleye pollock	36.4	arrowtooth flounder	66.0	arrowtooth flounder	76.1
arrowtooth flounder	35.7	Pacific cod	31.0	Pacific ocean perch	34.8
Pacific cod	25.8	Pacific ocean perch	30.4	walleye pollock	24.5
Pacific ocean perch	15.7	walleye pollock	25.4	Pacific halibut	17.0
Pacific halibut	15.1	giant grenadier	19.3	Pacific cod	12.1
Atka mackerel	13.9	northern rockfish	14.1	flathead sole	7.9
giant grenadier	12.7	Pacific halibut	11.4	giant grenadier	7.0
flathead sole	12.0	flathead sole	7.8	dusky rockfish	6.4
southern rock sole	8.1	sablefish	5.3	sablefish	5.1
northern rockfish	7.4	rex sole	5.2	southern rock sole	4.1
northern rock sole	7.1	Pacific sleeper shark	4.1	northern rockfish	3.5
yellowfin sole	4.1	shortraker rockfish	3.6	eulachon	3.2
black rockfish	2.3	southern rock sole	3.4	rex sole	3.0
rex sole	2.0	silvergray rockfish	3.1	Dover sole	2.4
dusky rockfish	1.7	eulachon	2.7	yellowfin sole	1.8
yellow Irish lord	1.4	northern rock sole	2.0	rougheye rockfish	1.7
sablefish	1.1	shortspine thornyhead	1.9	longnose skate	1.7
butter sole	1.1	Dover sole	1.8	spiny dogfish	1.6
big skate	1.0	big skate	1.7	shortspine thornyhead	1.6
shortspine thornyhead	0.9	Atka mackerel	1.3	northern rock sole	1.5
Number of hauls	163	Number of hauls	155	Number of hauls	228

Yakutat area	CPUE	**Southeastern area**	CPUE	**All areas**	CPUE
arrowtooth flounder	31.4	arrowtooth flounder	64.4	arrowtooth flounder	56.7
Pacific ocean perch	12.4	Pacific ocean perch	27.1	Pacific ocean perch	25.2
big skate	7.0	silvergray rockfish	26.9	walleye pollock	23.0
sablefish	6.7	spotted ratfish	15.4	Pacific cod	16.2
walleye pollock	6.5	walleye pollock	13.4	Pacific halibut	12.1
Pacific halibut	4.7	canary rockfish	11.3	giant grenadier	9.5
Dover sole	4.5	redstripe rockfish	6.6	flathead sole	7.6
spiny dogfish	4.2	Dover sole	6.1	northern rockfish	5.6
flathead sole	4.1	shortspine thornyhead	5.1	sablefish	4.4
shortraker rockfish	4.1	Pacific cod	4.0	southern rock sole	3.9
eulachon	3.8	rex sole	3.9	silvergray rockfish	3.2
starry flounder	3.5	Pacific halibut	3.6	Atka mackerel	3.2
giant grenadier	3.2	flathead sole	3.2	rex sole	3.1
shortspine thornyhead	2.8	sablefish	3.1	dusky rockfish	2.7
lingcod	2.0	yellowtail rockfish	3.0	Dover sole	2.5
English sole	1.5	shortraker rockfish	2.7	northern rock sole	2.4
rex sole	1.5	southern rock sole	2.3	eulachon	2.3
Pacific cod	1.2	rougheye rockfish	1.7	big skate	2.2
longnose skate	1.2	lingcod	1.5	shortraker rockfish	2.1
sharpchin rockfish	1.0	Pacific hake	1.2	shortspine thornyhead	2.0
Number of hauls	68	Number of hauls	56	Number of hauls	670

Catch Results by Species

For each commercially-important and other dominant groundfish species, the following information is presented:

1. A brief synopsis of the data collected.
2. A table presenting the number of hauls, the number of hauls with catch, mean CPUE, estimated biomass with 95% confidence intervals, and mean weight of that species by INPFC area and depth.
3. A figure showing the distribution and relative abundance of that species.
4. A figure showing the estimated size composition of the population for that species.
5. CPUE and biomass estimates (with 95% confidence intervals) by stratum for that species.

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

Names used are those established by general usage in the scientific community, using the following published resources: Names of Fishes (Nelson et al., 2004), 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 most recent Integrated Taxonomic Information System (ITIS) database (http://www.itis.gov). Names used in this document may differ on the basis of the most recent research.

Arrowtooth flounder (*Atheresthes stomias*)

Arrowtooth flounder was the most abundant species caught in the 2011 survey (Table 2). Arrowtooth flounder were caught throughout the survey area at all depths less than 700 m, occurring in 92% of tows at all surveyed depths, including 99% of the tows between 101 and 500 m. Mean weight was highest in the two deepest strata (301-500 m and 501-700 m; Table 3). The highest densities generally occurred on the broad continental shelf in the Kodiak and eastern Chirikof INPFC areas, especially around the Shumagin Islands and in the area northeast of Kodiak Island (Fig. 2, Table 4). Mean densities were uniformly low on the continental slope at depths greater than 500 m and essentially zero at depths greater than 700 m. Fish less than 30 cm FL were very rare at depths greater than 300 m in all areas (Fig. 3). A distinct length mode around 40-45 cm for males occurred at depths between 201 and 700 m in all INPFC areas, although this mode was somewhat less pronounced in the 201 and 300 m stratum in the Chirikof and Yakutat INPFC areas (Fig.3). In addition, a length mode for females around 55 cm occurred in the 301-700 m stratum in all INPFC areas except the Shumagins, as well as in the less than 100 m stratum in the Kodiak INPFC area and the 201-300 m stratum in the Yakutat INPFC area (Fig. 3).

Table 3. -- Number of survey hauls, number of hauls with arrowtooth flounder, mean CPUE, biomass, and mean weight, based on the 2011 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	105	98	38.50	158,957	94,579	223,335	0.714
	101 - 200	37	37	41.73	61,246	29,858	92,634	0.584
	201 - 300	11	11	10.13	2,825	1,160	4,490	0.686
	301 - 500	7	7	9.06	2,293	1,298	3,288	0.934
	501 - 700	3	1	1.80	362	0	1,513	0.932
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	154	35.66	225,683	156,257	295,109	0.675
Chirikof	1 - 100	68	54	28.93	75,325	29,479	121,170	0.779
	101 - 200	56	56	133.72	318,911	74,277	563,545	0.878
	201 - 300	20	20	27.93	32,243	13,620	50,866	0.766
	301 - 500	6	6	12.03	1,929	131	3,727	1.059
	501 - 700	5	4	4.17	815	0	1,950	1.220
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	140	66.05	429,222	180,400	678,044	0.851
Kodiak	1 - 100	87	72	64.07	246,778	77,284	416,271	1.112
	101 - 200	107	106	99.87	432,736	288,623	576,848	0.811
	201 - 300	24	24	53.53	61,511	36,285	86,738	0.818
	301 - 500	6	5	12.67	3,688	5	7,371	1.157
	501 - 700	4	3	6.52	1,137	0	3,900	1.137
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	210	76.11	745,850	525,270	966,429	0.893
Yakutat	1 - 100	14	12	19.52	32,516	127	64,906	0.853
	101 - 200	33	32	42.83	125,841	22,380	229,302	0.628
	201 - 300	13	12	23.71	12,260	4,488	20,032	0.988
	301 - 500	6	6	10.78	2,833	1,110	4,556	1.190
	501 - 700	2	2	1.50	220	0	943	1.621
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	64	31.40	173,671	67,177	280,164	0.685
Southeastern	1 - 100	8	4	10.11	6,621	0	21,064	0.779
	101 - 200	22	21	140.76	156,021	35,771	276,271	0.707
	201 - 300	15	15	10.10	5,101	2,215	7,988	0.694
	301 - 500	8	8	16.23	5,059	2,882	7,236	1.109
	501 - 700	3	1	1.07	111	0	462	1.009
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	49	64.44	172,913	52,656	293,171	0.717
All areas	1 - 100	282	240	40.31	520,197	332,822	707,572	0.885
	101 - 200	255	252	89.50	1,094,754	779,857	1,409,652	0.769
	201 - 300	83	82	31.61	113,941	86,567	141,314	0.807
	301 - 500	33	32	12.35	15,802	11,283	20,321	1.097
	501 - 700	17	11	3.22	2,645	0	5,331	1.149
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	617	56.66	1,747,339	1,383,962	2,110,715	0.806

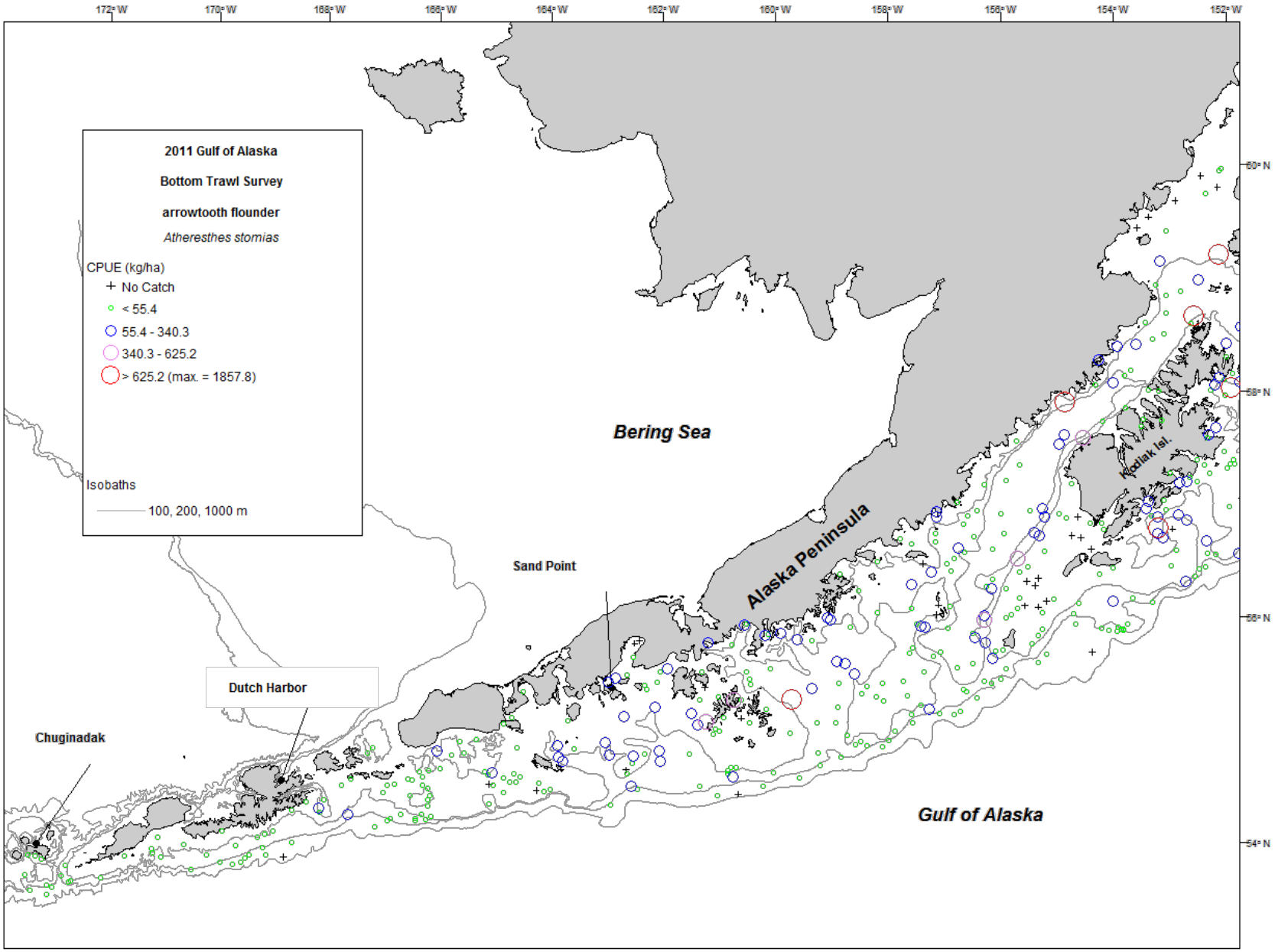

Figure 2 -- Distribution and relative abundance of arrowtooth flounder from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

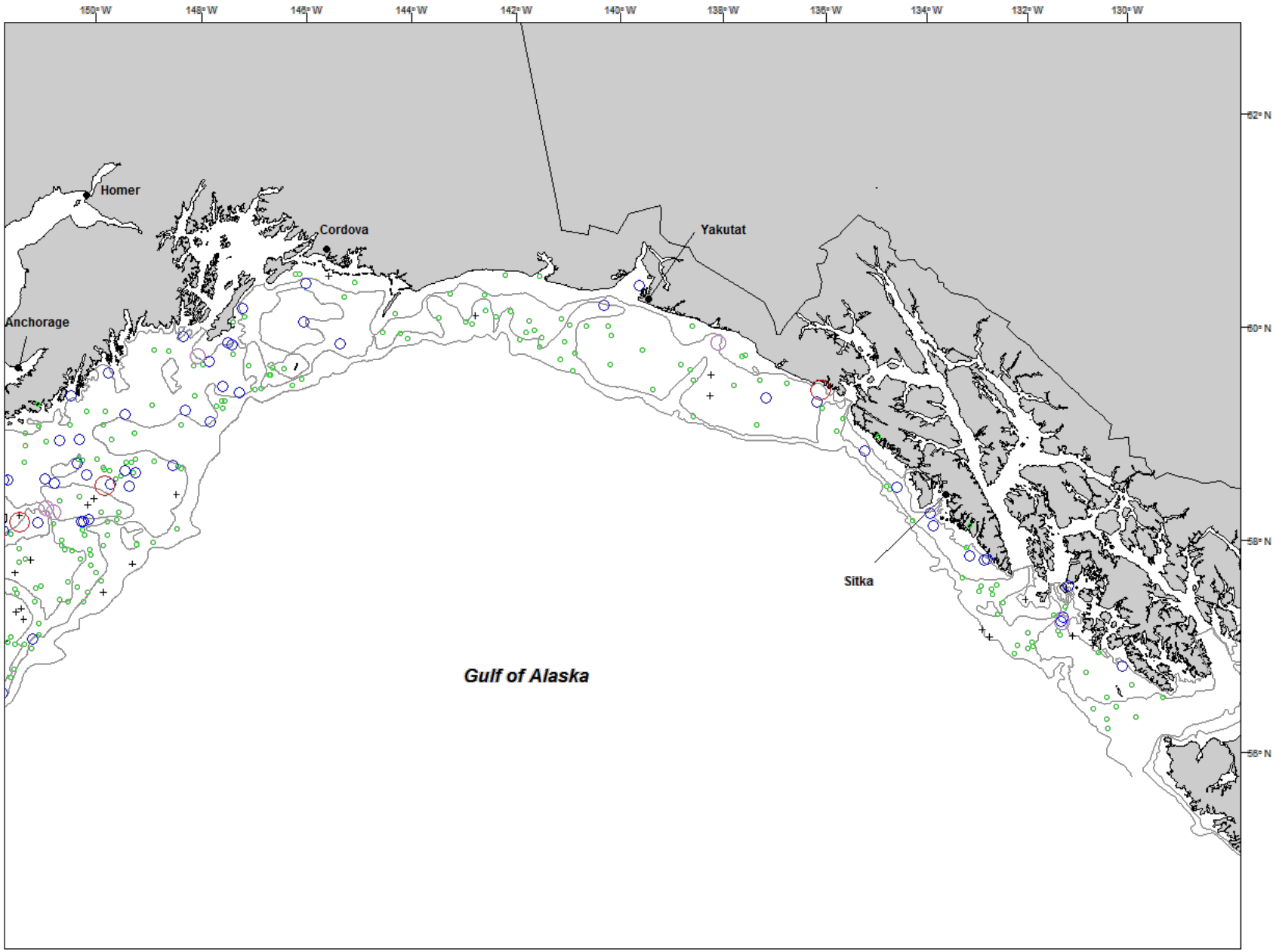

Figure 2 – Continued.

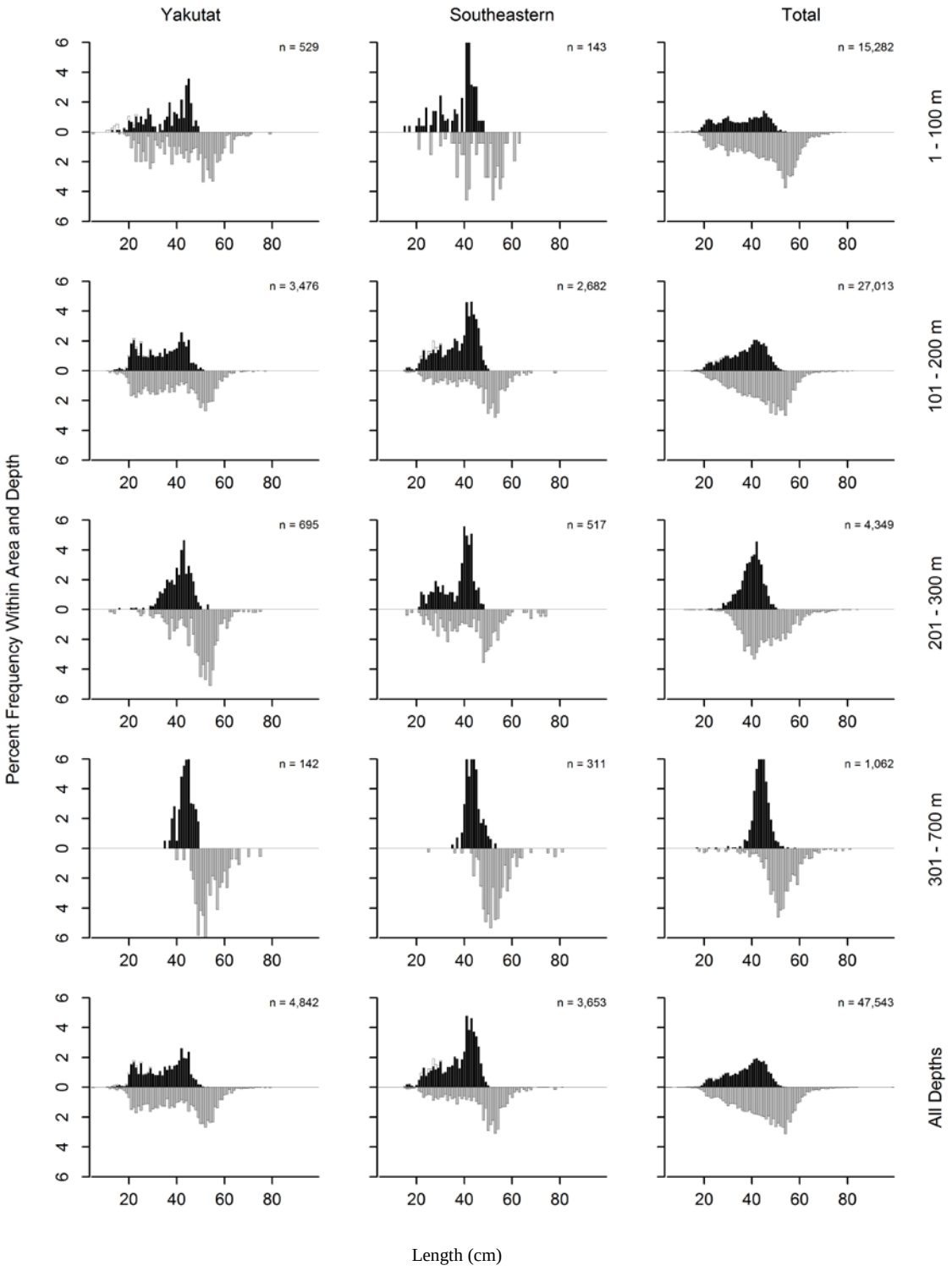

Figure 3. -- Continued (arrowtooth flounder).

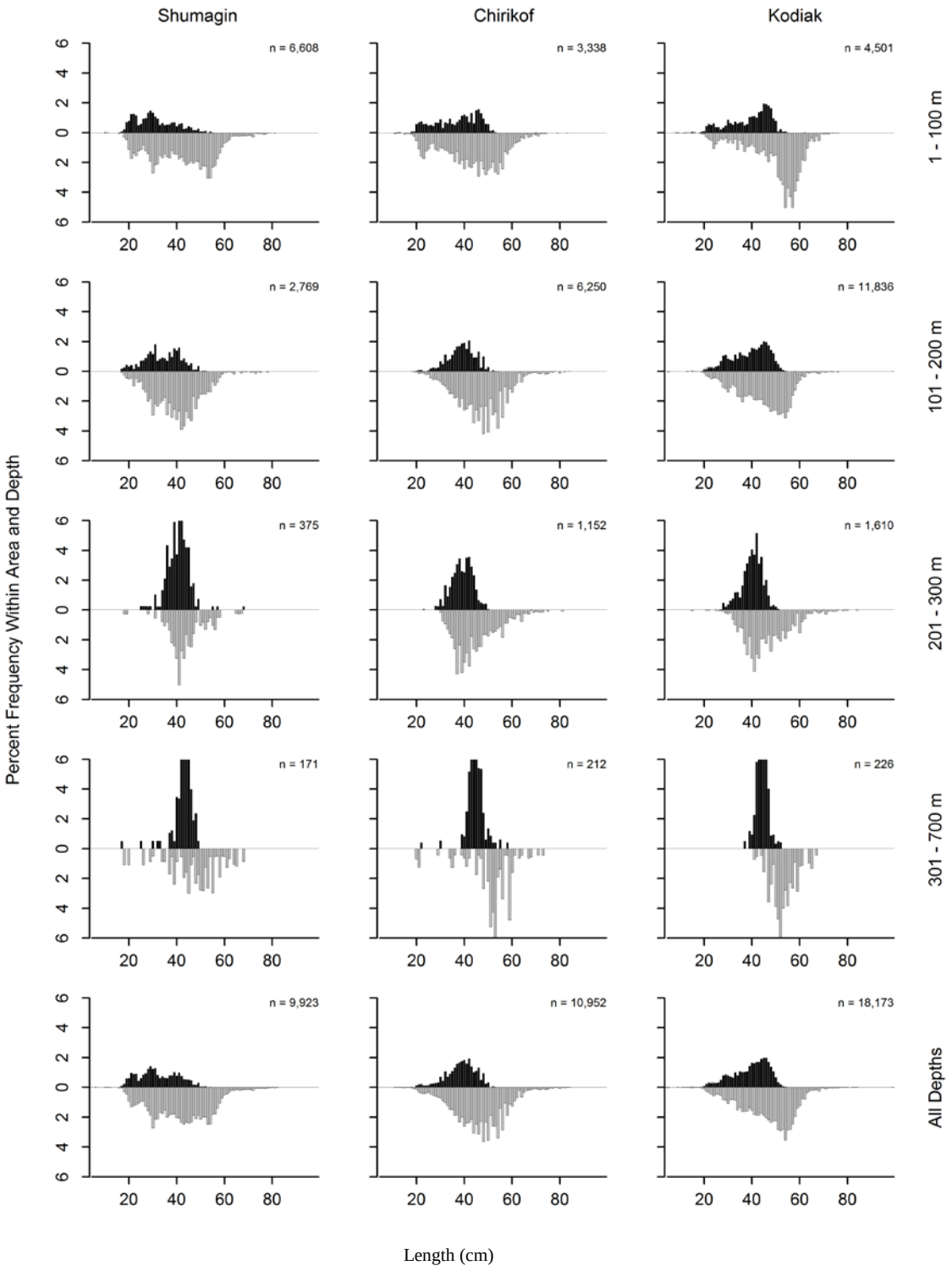

Figure 3. -- Size composition of arrowtooth flounder from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

Table 4. -- Catch per unit of effort by stratum for arrowtooth flounder sorted by descending CPUE for the 2011 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	8	8	247.30	103,777	0	222,458
Chirikof	101 - 200	East Shumagin Gully	14	14	174.89	194,197	0	413,035
Kodiak	101 - 200	Albatross Gullies	29	29	170.88	135,199	55,040	215,358
Kodiak	1 - 100	Kenai Peninsula	6	6	158.11	83,165	0	204,619
Chirikof	101 - 200	Shelikof Edge	26	26	148.46	114,828	1,175	228,481
Kodiak	101 - 200	Barren Islands	18	18	130.86	143,689	31,645	255,734
Kodiak	201 - 300	Upper Shelikof Gully	3	3	125.34	40,210	7,466	72,955
Shumagin	101 - 200	Sanak Gully	6	6	94.74	40,220	8,286	72,154
Kodiak	101 - 200	Portlock Flats	25	25	89.60	65,730	24,875	106,586
Kodiak	1 - 100	Lower Cook Inlet	12	7	84.47	83,514	0	219,391
Southeastern	101 - 200	Prince of Wales Shelf	14	13	75.85	52,244	0	106,225
Kodiak	1 - 100	Albatross Shallows	25	24	74.89	43,182	21,927	64,438
Shumagin	1 - 100	Shumagin Bank	31	28	66.80	82,822	24,010	141,634
Yakutat	101 - 200	Yakutat Flats	9	9	62.26	56,232	0	159,298
Kodiak	101 - 200	Kenai Flats	17	17	56.62	68,378	39,839	96,917
Yakutat	101 - 200	Middleton Shelf	9	9	51.79	38,046	16,747	59,345
Shumagin	1 - 100	Lower Alaska Peninsula	19	17	50.24	34,547	11,491	57,602
Chirikof	1 - 100	Upper Alaska Peninsula	18	16	43.84	34,814	14,580	55,048
Kodiak	101 - 200	Kodiak Outer Shelf	18	17	39.28	19,740	3,959	35,521
Yakutat	201 - 300	Yakutat Gullies	7	7	34.77	10,578	2,638	18,519
Chirikof	1 - 100	Chirikof Bank	34	24	30.97	33,427	0	75,066
Chirikof	201 - 300	Lower Shelikof Gully	14	14	30.38	30,437	11,753	49,121
Yakutat	101 - 200	Fairweather Shelf	7	6	28.78	22,240	1,667	42,813
Kodiak	201 - 300	Kodiak Slope	6	6	27.78	4,508	0	12,303
Yakutat	1 - 100	Middleton Shallows	6	5	25.25	16,956	0	50,008
Kodiak	201 - 300	Kenai Gullies	15	15	25.22	16,793	8,354	25,233
Shumagin	101 - 200	Shumagin Outer Shelf	27	27	21.97	17,916	6,734	29,099
Kodiak	1 - 100	Albatross Banks	38	29	21.14	32,569	0	75,864
Shumagin	1 - 100	Davidson Bank	39	37	20.24	27,684	16,286	39,082
Kodiak	1 - 100	Northern Kodiak Shallows	6	6	19.77	4,349	0	9,256
Chirikof	101 - 200	Chirikof Outer Shelf	16	16	19.73	9,886	4,133	15,638
Southeastern	301 - 500	Southeastern Deep Gullies	7	7	18.43	4,320	2,068	6,573
Yakutat	101 - 200	Yakataga Shelf	8	8	17.67	9,324	5,412	13,235
Shumagin	1 - 100	Fox Islands	16	16	16.69	13,904	6,262	21,546
Yakutat	1 - 100	Yakutat Shallows	8	7	15.64	15,560	0	33,208
Yakutat	301 - 500	Yakutat Slope	3	3	14.07	2,140	0	4,337
Shumagin	101 - 200	West Shumagin Gully	4	4	13.65	3,110	0	6,894
Kodiak	301 - 500	Kodiak Slope	6	5	12.67	3,688	0	7,558
Chirikof	301 - 500	Chirikof Slope	6	6	12.03	1,929	40	3,818
Chirikof	201 - 300	Chirikof Slope	6	6	11.82	1,806	0	3,726
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	11	10.40	4,082	1,232	6,933
Shumagin	201 - 300	Shumagin Slope	11	11	10.13	2,825	1,140	4,511
Southeastern	1 - 100	Southeastern Shallows	8	4	10.11	6,621	0	21,433
Chirikof	1 - 100	Semidi Bank	16	14	9.70	7,083	1,509	12,657
Southeastern	301 - 500	Southeastern Slope	1	1	9.56	739		
Shumagin	301 - 500	Shumagin Slope	7	7	9.06	2,293	1,263	3,322
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	9.06	1,019	100	1,938
Yakutat	201 - 300	Yakutat Slope	6	5	7.91	1,682	347	3,016
Kodiak	501 - 700	Kodiak Slope	4	3	6.52	1,137	0	4,304
Yakutat	301 - 500	Yakutat Gullies	3	3	6.26	693	0	2,211
Chirikof	501 - 700	Chirikof Slope	5	4	4.17	815	0	2,041
Shumagin	501 - 700	Shumagin Slope	3	1	1.80	362	0	1,919
Yakutat	501 - 700	Yakutat Slope	2	2	1.50	220	0	2,355
Southeastern	501 - 700	Southeastern Slope	3	1	1.07	111	0	586

Pacific halibut (*Hippoglossus stenolepis*)

Pacific halibut was the fifth most abundant species caught in the 2011 survey with the fourth highest mean CPUE in the Kodiak INPFC area (Table 2). Pacific halibut were particularly abundant at depths less than 100 m where they were caught in approximately 97% of the tows and 74% of the estimated halibut biomass was found at these depths (Table 5). The highest CPUEs were found at this depth range in the three western INPFC areas. The Yakutat and Southeastern INPFC areas had much lower overall abundance; however the greatest concentration came from the 100 – 200 m depth range (Table 5). The frequency of occurrence of Pacific halibut in tows decreased from west to east, ranging from about 92% of the tows in the Shumagin INPFC area to 51% of the tows in the Southeastern INPFC area (Table 6). The highest densities were recorded in the lower Cook Inlet, on Albatross Banks northeast of Kodiak Island, around the Kenai Peninsula, and in the Northern Kodiak Shallows (Fig. 4, Table 6). A pronounced length mode around 55 cm was noted in the two shallowest depth zones of the Shumagin and Chirikof INPFC areas, and around 65 cm in the Kodiak INPFC area (Fig. 5).

Table 5. -- Number of survey hauls, number of hauls with Pacific halibut, mean CPUE, biomass, and mean weight, based on the 2011 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	105	105	20.13	83,118	57,662	108,574	1.885
	101 - 200	37	33	7.54	11,062	7,927	14,198	2.328
	201 - 300	11	8	3.01	839	223	1,456	2.268
	301 - 500	7	4	1.33	336	0	762	2.669
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	150	15.07	95,355	69,709	121,001	1.933
Chirikof	1 - 100	68	68	20.38	53,049	45,428	60,670	2.134
	101 - 200	56	48	7.98	19,037	11,838	26,235	4.235
	201 - 300	20	9	1.59	1,840	480	3,199	5.302
	301 - 500	6	2	1.12	179	0	505	5.339
	501 - 700	5	1	0.32	62	0	220	3.566
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	128	11.41	74,166	63,735	84,597	2.493
Kodiak	1 - 100	87	85	33.82	130,250	46,034	214,466	3.256
	101 - 200	107	89	7.32	31,726	24,094	39,357	5.038
	201 - 300	24	14	3.85	4,421	1,415	7,427	7.750
	301 - 500	6	1	0.57	166	0	574	8.839
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	189	17	166,564	81,903	251,224	3.552
Yakutat	1 - 100	14	12	4.11	6,847	3,119	10,575	3.505
	101 - 200	33	18	5.93	17,433	1,918	32,948	3.168
	201 - 300	13	6	3.13	1,617	0	3,576	6.284
	301 - 500	6	2	1.06	279	0	733	7.382
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	38	4.73	26,175	10,356	41,994	3.377
Southeastern	1 - 100	8	5	1.59	1,037	239	1,836	2.979
	101 - 200	22	17	7.43	8,236	3,790	12,681	3.938
	201 - 300	15	6	0.73	371	39	703	4.476
	301 - 500	8	1	0.11	35	0	119	2.505
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	29	3.61	9,679	5,205	14,154	3.816
All areas	1 - 100	282	275	21.26	274,302	186,532	362,072	2.465
	101 - 200	255	205	7.15	87,493	68,499	106,487	3.781
	201 - 300	83	43	2.52	9,087	5,506	12,669	5.584
	301 - 500	33	10	0.78	995	332	1,658	4.327
	501 - 700	17	1	0.07	62	0	220	3.566
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	534	12.06	371,939	282,550	461,329	2.729

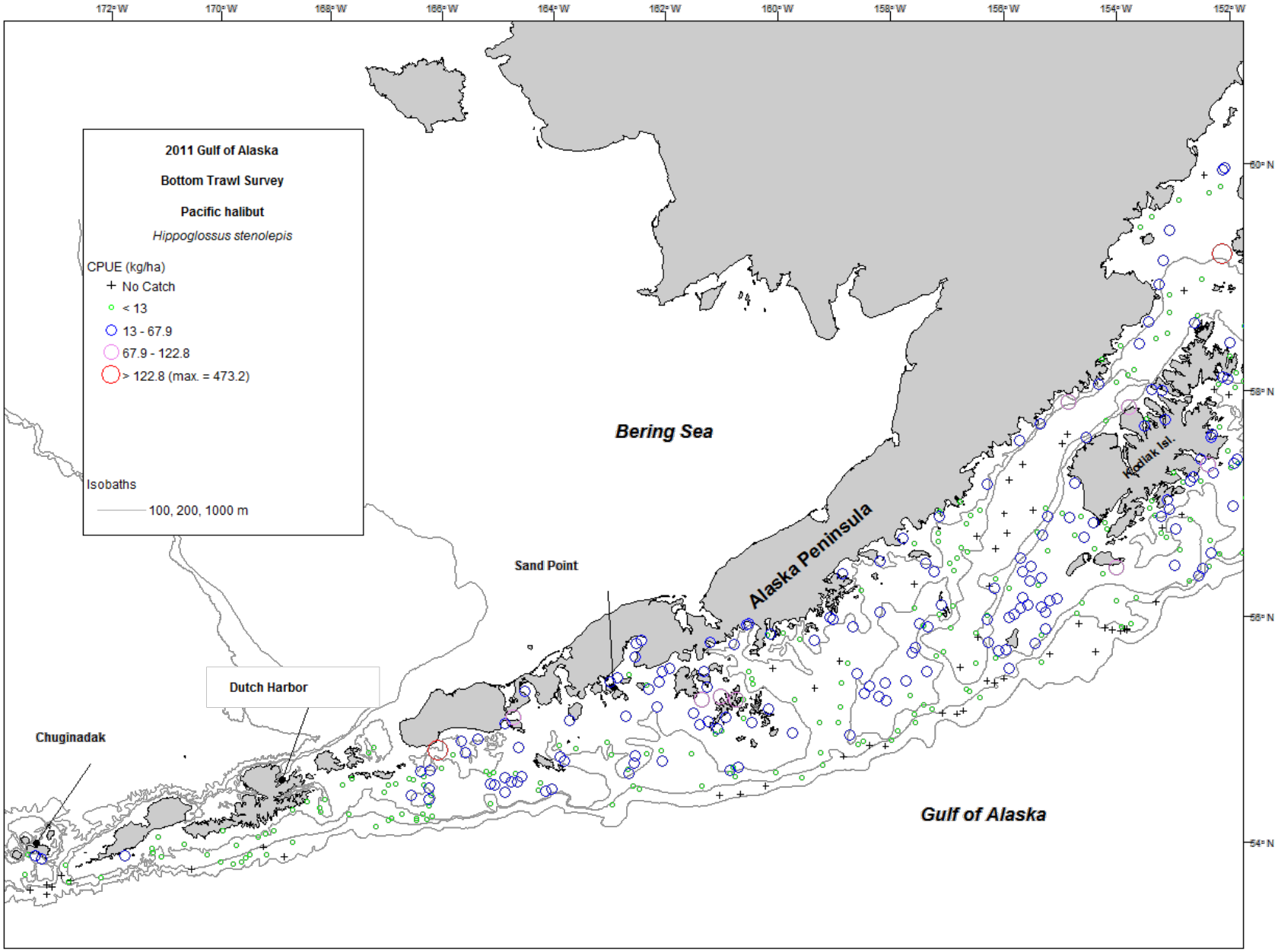

Figure 4. -- Distribution and relative abundance of Pacific halibut from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

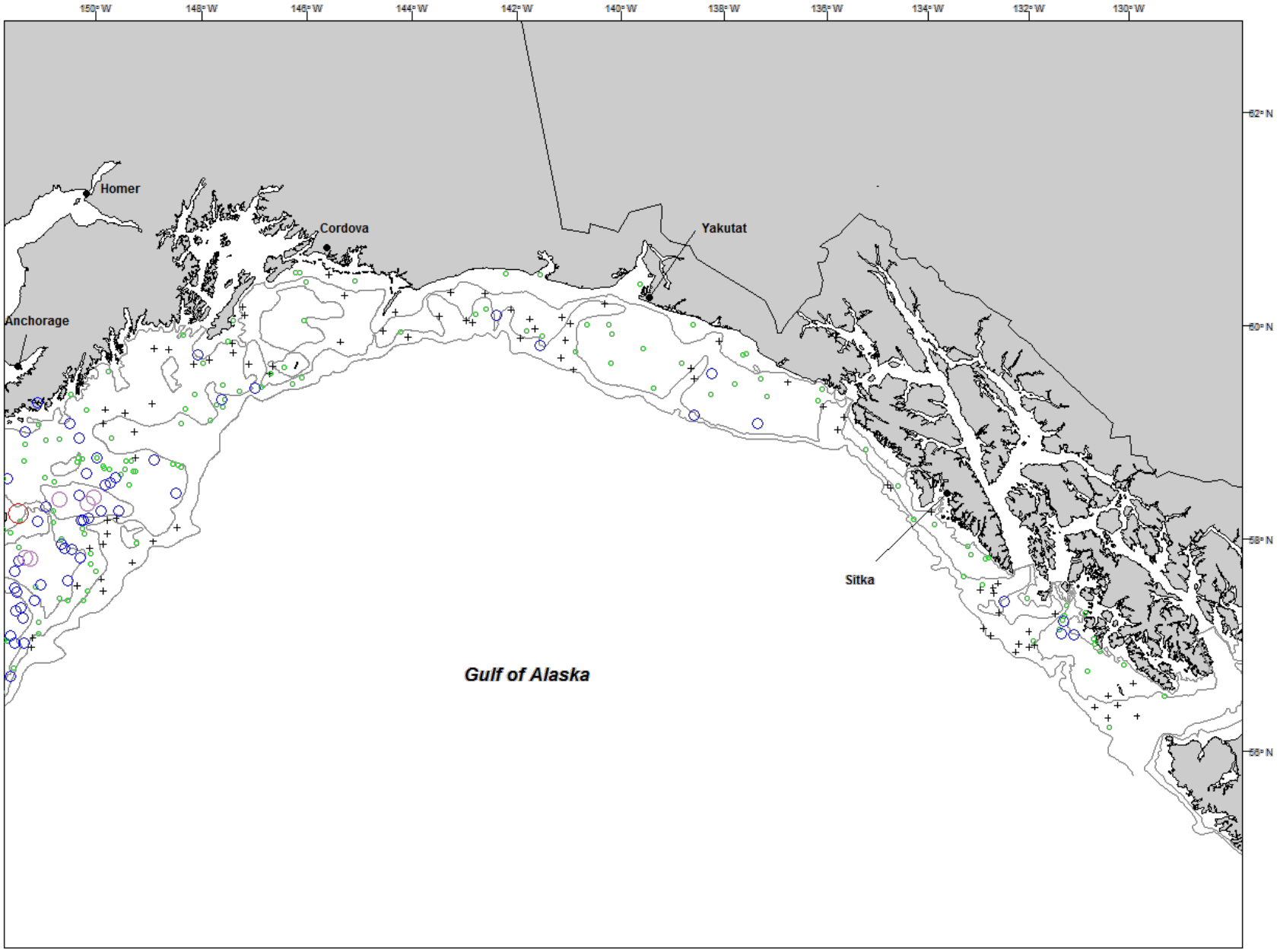

Figure 4. -- Continued.

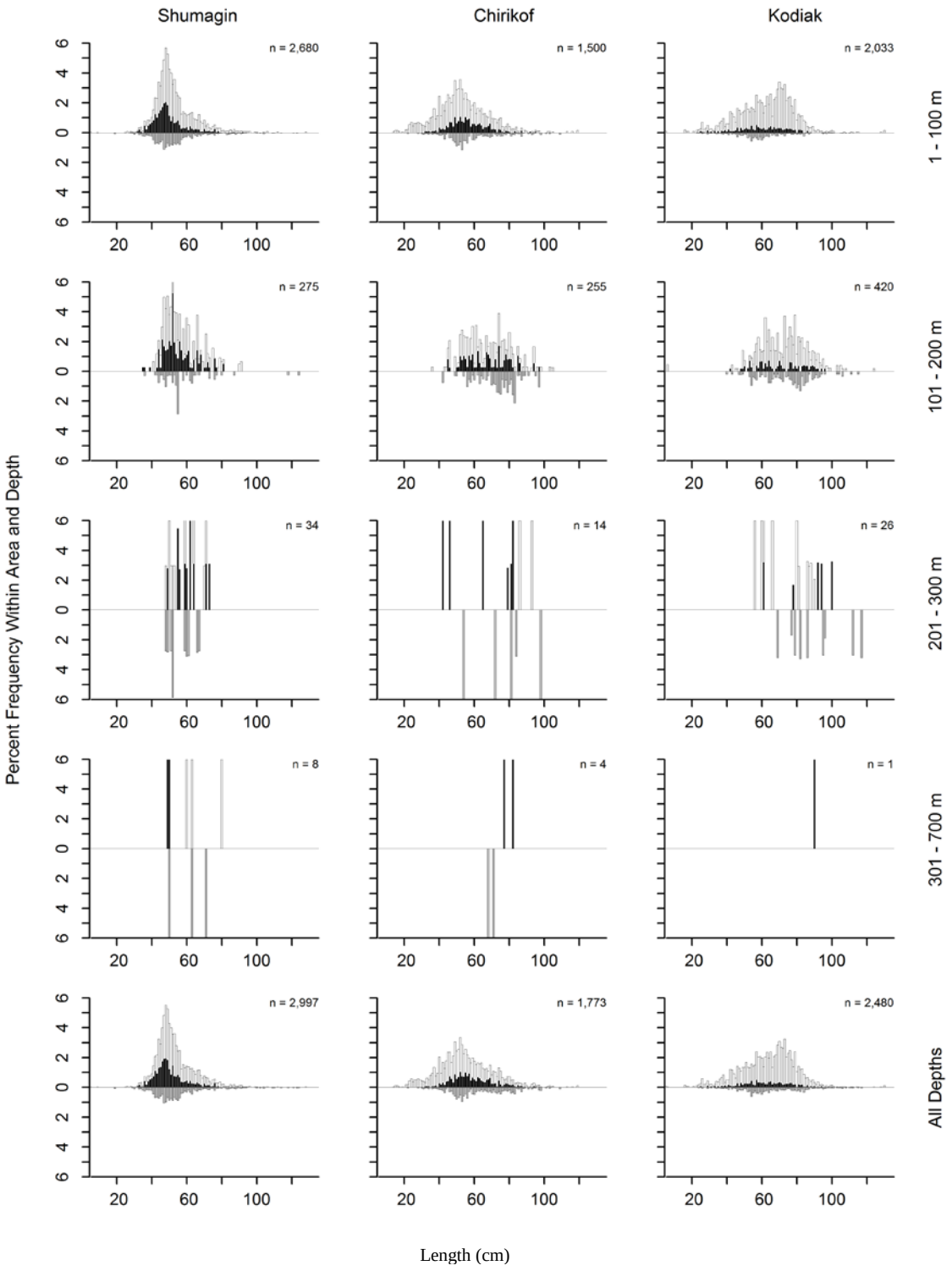

Figure 5. -- Size composition of Pacific halibut from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

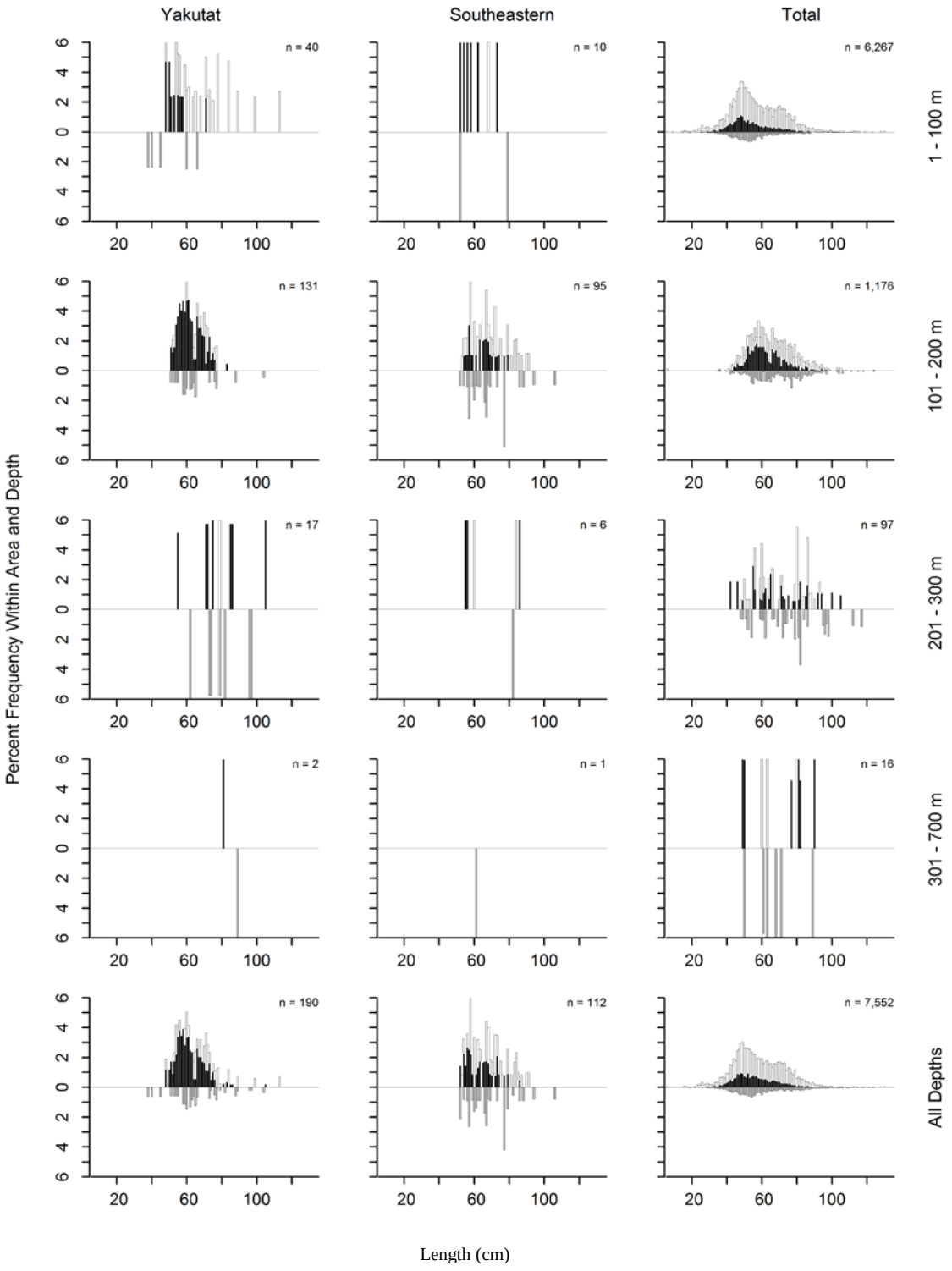

Figure 5. – Continued (Pacific halibut).

Table 6. -- Catch per unit of effort by stratum for Pacific halibut sorted by descending CPUE for the 2011 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	Lower Cook Inlet	12	11	53.71	53,099	0	136,671
Kodiak	1 - 100	Albatross Banks	38	38	32.51	50,073	35,861	64,284
Kodiak	1 - 100	Northern Kodiak Shallows	6	6	31.13	6,848	0	15,447
Kodiak	1 - 100	Albatross Shallows	25	24	25.83	14,895	6,351	23,438
Shumagin	1 - 100	Davidson Bank	39	39	23.76	32,509	9,280	55,737
Shumagin	1 - 100	Lower Alaska Peninsula	19	19	23.52	16,172	10,634	21,710
Shumagin	1 - 100	Shumagin Bank	31	31	23.43	29,054	19,612	38,496
Chirikof	1 - 100	Semidi Bank	16	16	21.15	15,440	10,513	20,367
Chirikof	1 - 100	Chirikof Bank	34	34	20.97	22,636	17,903	27,368
Chirikof	1 - 100	Upper Alaska Peninsula	18	18	18.86	14,974	10,858	19,089
Yakutat	101 - 200	Fairweather Shelf	7	6	14.56	11,249	0	26,793
Chirikof	101 - 200	Shelikof Edge	26	24	11.38	8,803	3,385	14,220
Kodiak	101 - 200	Kodiak Outer Shelf	18	18	11.21	5,632	1,978	9,287
Shumagin	101 - 200	Sanak Gully	6	6	11.00	4,670	2,161	7,179
Kodiak	101 - 200	Portlock Flats	25	24	10.33	7,579	4,946	10,212
Kodiak	1 - 100	Kenai Peninsula	6	6	10.14	5,336	2,033	8,639
Kodiak	101 - 200	Albatross Gullies	29	22	10.03	7,936	3,713	12,159
Southeastern	101 - 200	Prince of Wales Shelf	14	10	8.77	6,041	1,661	10,420
Kodiak	101 - 200	Barren Islands	18	17	7.79	8,548	4,283	12,813
Shumagin	101 - 200	Shumagin Outer Shelf	27	24	7.13	5,810	3,498	8,122
Yakutat	201 - 300	Yakutat Slope	6	4	6.90	1,468	0	3,508
Chirikof	101 - 200	East Shumagin Gully	14	11	6.54	7,259	2,479	12,039
Shumagin	1 - 100	Fox Islands	16	16	6.46	5,383	3,336	7,430
Chirikof	101 - 200	Chirikof Outer Shelf	16	13	5.94	2,975	1,554	4,396
Yakutat	101 - 200	Yakataga Shelf	8	3	5.49	2,895	0	7,706
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	7	5.23	2,195	1,033	3,357
Yakutat	1 - 100	Middleton Shallows	6	5	4.93	3,307	345	6,269
Kodiak	201 - 300	Kenai Gullies	15	10	4.82	3,212	1,046	5,379
Yakutat	1 - 100	Yakutat Shallows	8	7	3.56	3,540	500	6,580
Yakutat	101 - 200	Yakutat Flats	9	7	3.49	3,152	1,133	5,171
Shumagin	201 - 300	Shumagin Slope	11	8	3.01	839	215	1,464
Kodiak	201 - 300	Upper Shelikof Gully	3	1	2.75	882	0	4,679
Shumagin	101 - 200	West Shumagin Gully	4	3	2.56	583	0	1,338
Kodiak	201 - 300	Kodiak Slope	6	3	2.01	327	0	703
Yakutat	301 - 500	Yakutat Slope	3	2	1.83	279	0	893
Kodiak	101 - 200	Kenai Flats	17	8	1.68	2,031	0	4,444
Chirikof	201 - 300	Lower Shelikof Gully	14	6	1.60	1,606	269	2,942
Southeastern	1 - 100	Southeastern Shallows	8	5	1.59	1,037	219	1,856
Chirikof	201 - 300	Chirikof Slope	6	3	1.53	234	0	590
Shumagin	301 - 500	Shumagin Slope	7	4	1.33	336	0	777
Chirikof	301 - 500	Chirikof Slope	6	2	1.12	179	0	521
Southeastern	201 - 300	Baranof-Chichagof Slope	4	2	1.02	114	0	390
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	4	0.65	256	0	539
Kodiak	301 - 500	Kodiak Slope	6	1	0.57	166	0	594
Yakutat	201 - 300	Yakutat Gullies	7	2	0.49	149	0	410
Chirikof	501 - 700	Chirikof Slope	5	1	0.32	62	0	233
Yakutat	101 - 200	Middleton Shelf	9	2	0.19	137	0	349
Southeastern	301 - 500	Southeastern Deep Gullies	7	1	0.15	35	0	122

Flathead sole *(Hippoglossoides elassodon)*

Flathead sole was the seventh most abundant species caught in the 2011 survey (Table 2). The population was primarily concentrated in bays around Kodiak Island and along the Alaska Peninsula, with 95% of the estimated biomass in waters less than 200 m deep and the remainder at depths between 201 and 300 m (Fig. 6, Tables 7 and 8). The mean CPUE was highest in the Northern Kodiak and Albatross Shallows as well as in the Lower Alaska Peninsula (Table 8). Only about 13% of the estimated biomass was found in the Yakutat and Southeastern INPFC areas even though those areas account for 27% of the total survey area (Tables 1 and 7). The mean weight of flathead sole did not exhibit a consistent pattern with depth among the individual INPFC areas the mean weight was lowest in the southeastern area (Table 7). A relatively prominent length mode around 30-32 cm for males occurred in the shallowest depth zone in the Shumagin, Chirikof, and Kodiak INPFC areas as well as in the 101-200 m depth zone in the Shumagin and Chirikof INPFC areas. Another mode for males at approximately 35 cm occurred in the 101-200 m depth zone in the Kodiak INPFC area as well as in the 201-300 m depth zones in the Shumagin, Chirikof, and Kodiak INPFC areas (Fig 7). There was no prominent length mode consistent across depth zones and INPFC areas for females.

Table 7. -- Number of survey hauls, number of hauls with flathead sole, mean CPUE, biomass, and mean weight, based on the 2011 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	105	87	15.27	63,066	40,282	85,850	0.306
	101 - 200	37	23	8.77	12,866	4,408	21,324	0.298
	201 - 300	11	5	0.42	117	0	296	0.456
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	115	12.02	76,049	51,789	100,309	0.305
Chirikof	1 - 100	68	34	7.3	19,017	9,308	28,725	0.390
	101 - 200	56	42	9.94	23,718	13,778	33,657	0.309
	201 - 300	20	14	6.85	7,914	687	15,142	0.392
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	90	7.79	50,649	35,415	65,882	0.348
Kodiak	1 - 100	87	47	12.45	47,952	21,359	74,545	0.290
	101 - 200	107	73	6.08	26,350	19,208	33,491	0.341
	201 - 300	24	16	3.03	3,477	0	10,139	0.370
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	136	7.94	77,779	50,206	105,352	0.308
Yakutat	1 - 100	14	9	6.82	11,356	0	24,137	0.404
	101 - 200	33	16	3.65	10,727	0	22,783	0.480
	201 - 300	13	4	1.11	573	0	1,205	0.293
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	29	4.1	22,656	6,194	39,118	0.432
Southeastern	1 - 100	8	2	12.9	8,445	0	25,381	0.159
	101 - 200	22	5	0.05	58	0	158	0.210
	201 - 300	15	2	0.01	4	0	10	0.157
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	9	3.17	8,506	0	25,443	0.160
All areas	1 - 100	282	179	11.61	149,836	109,724	189,947	0.299
	101 - 200	255	159	6.03	73,718	55,393	92,042	0.335
	201 - 300	83	41	3.35	12,086	3,695	20,477	0.380
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	379	7.64	235,639	190,981	280,296	0.313

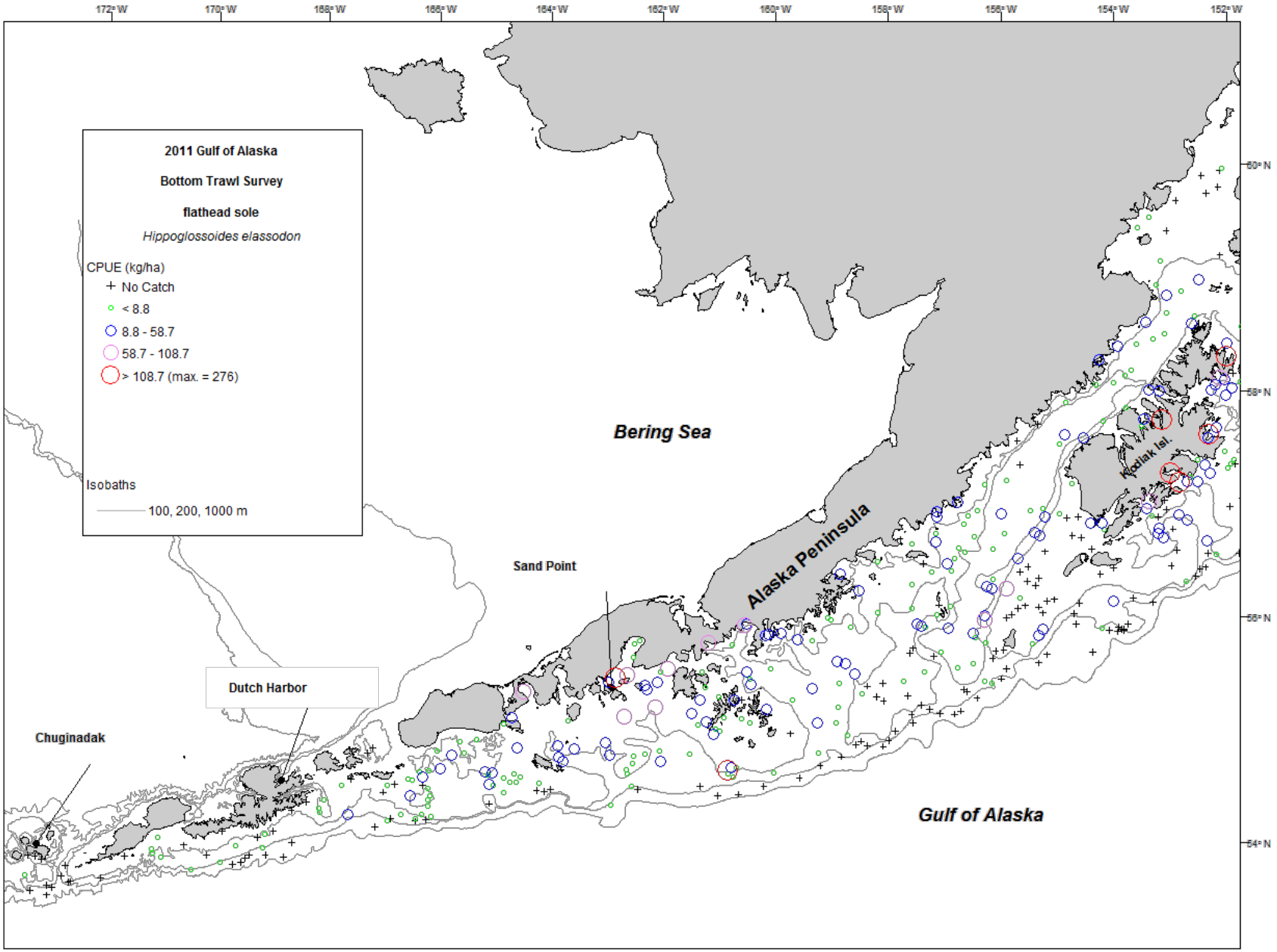

Figure 6. -- Distribution and relative abundance of flathead sole from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

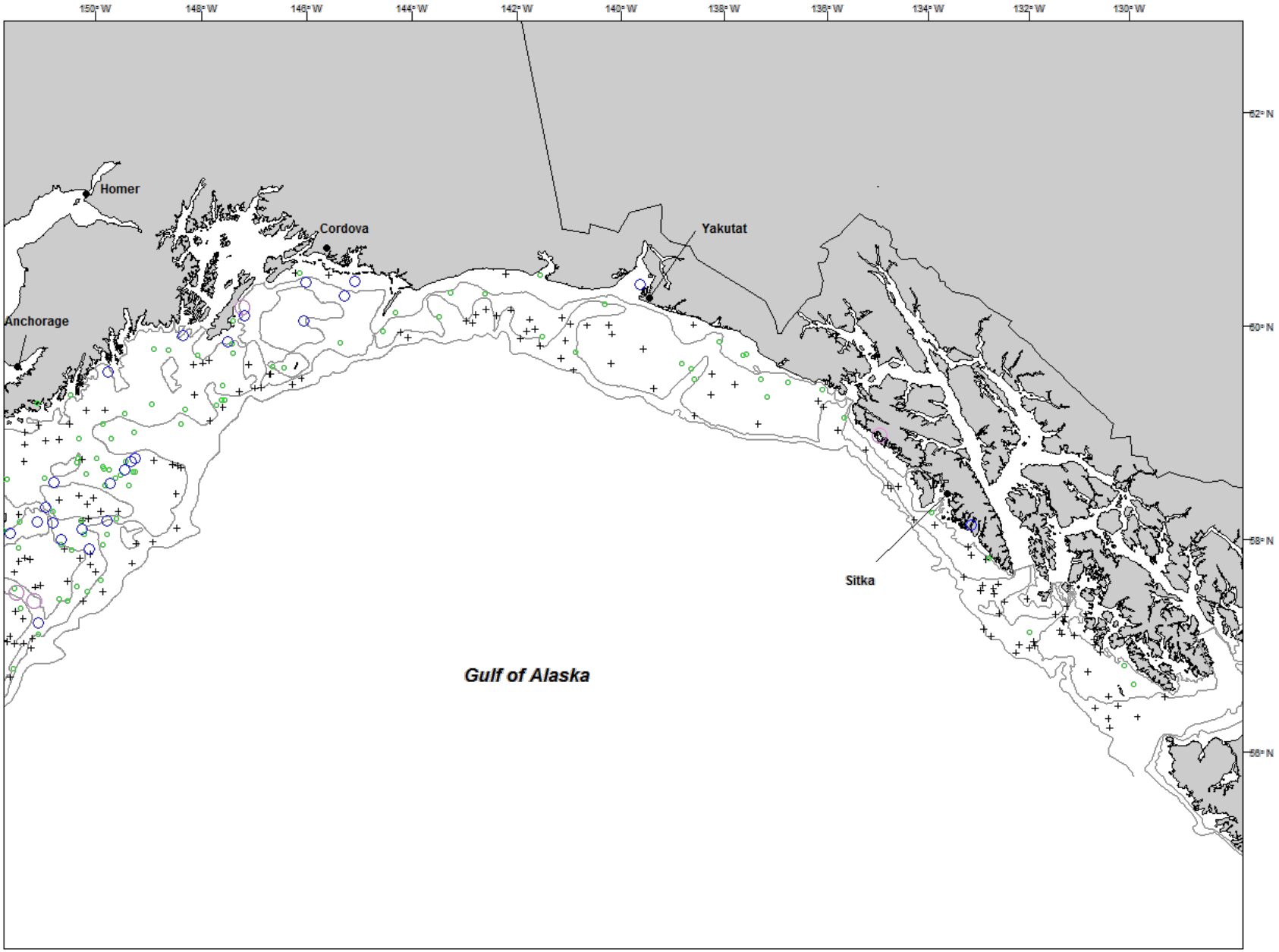

Figure 6. -- Continued.

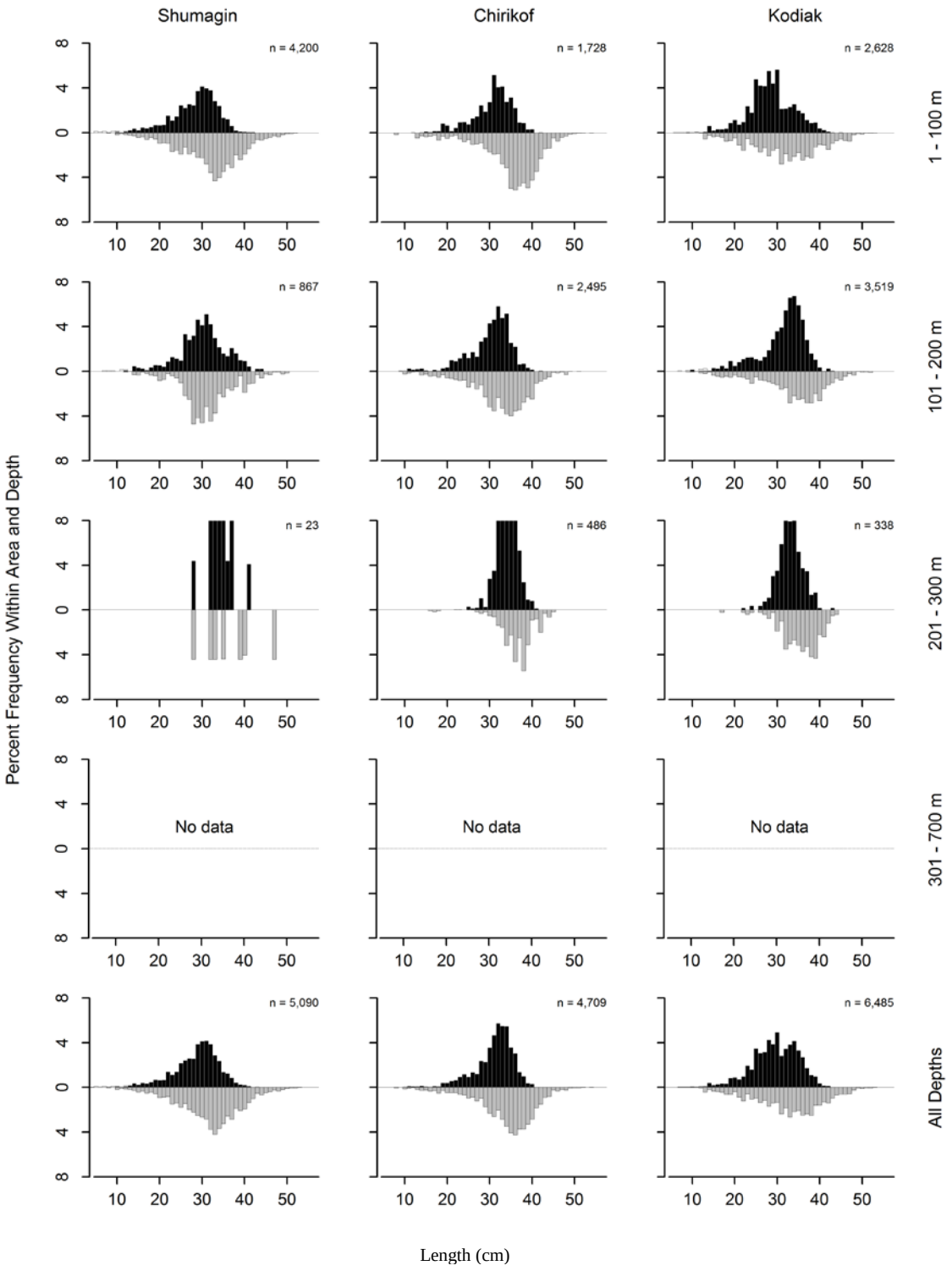

Figure 7. -- Size composition of flathead sole from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

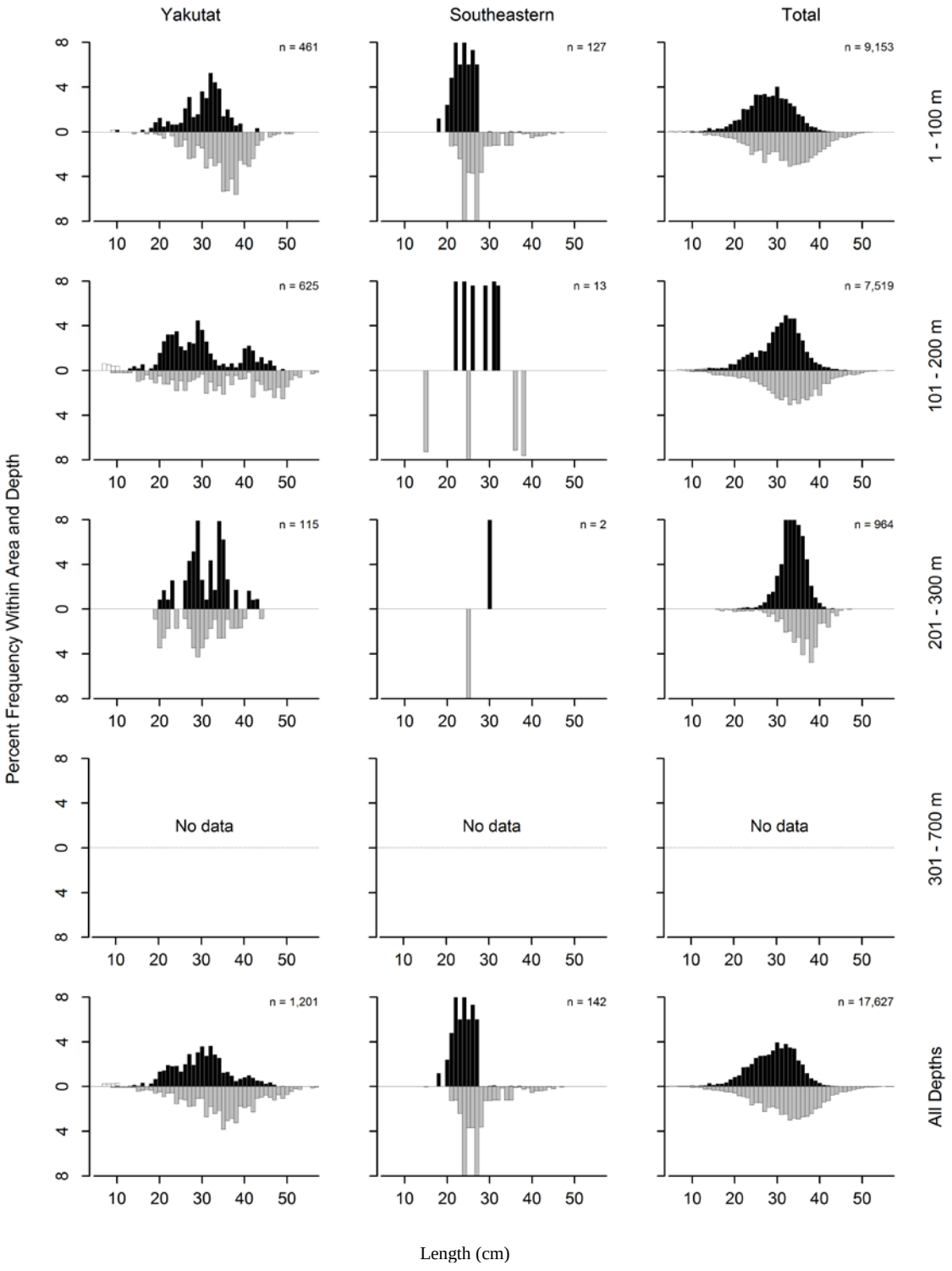

Figure 7. -- Continued (flathead sole).

Table 8. -- Catch per unit of effort by stratum for flathead sole sorted by descending CPUE for the 2011 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	6	6	54.97	12,092	0	37,130
Kodiak	1 - 100	Albatross Shallows	25	20	49.24	28,390	13,720	43,060
Shumagin	1 - 100	Lower Alaska Peninsula	19	19	48.25	33,178	12,100	54,256
Kodiak	101 - 200	Albatross Gullies	29	24	18.12	14,334	8,499	20,168
Shumagin	101 - 200	Sanak Gully	6	6	17.27	7,331	1,279	13,384
Shumagin	1 - 100	Shumagin Bank	31	29	17.11	21,217	11,680	30,754
Yakutat	101 - 200	Middleton Shelf	9	7	14.14	10,387	0	22,669
Chirikof	1 - 100	Upper Alaska Peninsula	18	14	13.55	10,762	3,443	18,080
Chirikof	101 - 200	East Shumagin Gully	14	14	13.41	14,887	6,444	23,330
Southeastern	1 - 100	Southeastern Shallows	8	2	12.90	8,445	0	25,815
Yakutat	1 - 100	Middleton Shallows	6	4	11.44	7,684	0	21,205
Chirikof	101 - 200	Shelikof Edge	26	24	10.80	8,355	2,936	13,773
Kodiak	1 - 100	Kenai Peninsula	6	5	10.16	5,342	0	16,593
Chirikof	201 - 300	Lower Shelikof Gully	14	13	7.88	7,898	620	15,176
Kodiak	201 - 300	Upper Shelikof Gully	3	3	7.10	2,278	0	11,098
Shumagin	101 - 200	West Shumagin Gully	4	4	7.00	1,595	413	2,777
Shumagin	1 - 100	Davidson Bank	39	33	6.16	8,434	4,042	12,825
Chirikof	1 - 100	Chirikof Bank	34	12	5.46	5,890	758	11,023
Shumagin	101 - 200	Shumagin Outer Shelf	27	13	4.83	3,940	0	10,854
Kodiak	101 - 200	Barren Islands	18	14	4.52	4,958	2,241	7,675
Kodiak	101 - 200	Portlock Flats	25	19	4.36	3,200	1,872	4,527
Yakutat	1 - 100	Yakutat Shallows	8	5	3.69	3,672	0	9,093
Chirikof	1 - 100	Semidi Bank	16	8	3.24	2,365	0	6,999
Kodiak	101 - 200	Kenai Flats	17	10	2.77	3,348	12	6,683
Yakutat	201 - 300	Yakutat Gullies	7	4	1.88	573	0	1,226
Kodiak	201 - 300	Kenai Gullies	15	11	1.59	1,061	177	1,946
Kodiak	1 - 100	Lower Cook Inlet	12	5	1.02	1,011	0	2,459
Kodiak	101 - 200	Kodiak Outer Shelf	18	6	1.02	510	0	1,127
Chirikof	101 - 200	Chirikof Outer Shelf	16	4	0.95	476	0	1,395
Kodiak	201 - 300	Kodiak Slope	6	2	0.85	137	0	427
Kodiak	1 - 100	Albatross Banks	38	11	0.73	1,119	75	2,163
Shumagin	201 - 300	Shumagin Slope	11	5	0.42	117	0	298
Shumagin	1 - 100	Fox Islands	16	6	0.28	237	37	437
Yakutat	101 - 200	Fairweather Shelf	7	3	0.28	218	0	656
Yakutat	101 - 200	Yakataga Shelf	8	3	0.14	74	0	183
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	3	0.13	55	0	158
Chirikof	201 - 300	Chirikof Slope	6	1	0.11	17	0	59
Yakutat	101 - 200	Yakutat Flats	9	3	0.05	49	0	149
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	0.02	2	0	10
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	1	<0.01	2	0	5
Southeastern	101 - 200	Prince of Wales Shelf	14	2	<0.01	2	0	7

Southern rock sole *(Lepidopsetta bilineata)*

Southern rock sole was the tenth most abundant species caught in the 2011 survey (Table 2). The population was primarily confined to water depths less than 100 m in the Shumagin, Chirikof, and Kodiak INPFC areas, with the highest concentrations in nearshore waters and the tops of banks between Kodiak Island and the Shumagin Islands (Tables 9 and 10 and Fig. 8). Ninety-two percent of the southern rock sole biomass occurred in these areas (Table 9) even though they make up only 34% of the total survey area (Table 1). The CPUEs ranged from zero to very small throughout the Yakutat and Southeastern areas except for one location in the Southeastern Shallows south of Sitka, where relatively high abundance was found (Table 10). A relatively prominent length mode around 30 cm for males occurred in the shallowest depth zone of the Kodiak INPFC area and at 40-45 cm for females in the shallowest depth zone in the Shumagin, Chirikof, and Kodiak INPFC areas (Fig. 9).

Table 9. -- Number of survey hauls, number of hauls with southern rock sole, mean CPUE, biomass, and mean weight, based on the 2011 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	105	87	12.22	50,445	37,873	63,017	0.673
	101 - 200	37	16	0.59	859	244	1,474	0.857
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	1	0.06	15	0	51	0.993
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	104	8.11	51,319	38,733	63,905	0.676
Chirikof	1 - 100	68	51	8.44	21,968	15,535	28,401	0.863
	101 - 200	56	10	0.09	203	75	331	0.833
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	1	0.09	14	0	49	1.307
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	62	3.41	22,185	15,751	28,619	0.863
Kodiak	1 - 100	87	60	9.97	38,386	25,024	51,747	0.672
	101 - 200	107	18	0.37	1,585	506	2,664	0.888
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	78	4.08	39,971	26,567	53,375	0.678
Yakutat	1 - 100	14	3	0.35	589	0	1,787	0.454
	101 - 200	33	2	0.07	219	0	674	0.723
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	5	0.15	808	0	2,033	0.505
Southeastern	1 - 100	8	6	8.94	5,854	0	13,900	0.502
	101 - 200	22	4	0.39	437	0	956	0.546
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	10	2.34	6,290	0	14,355	0.505
All areas	1 - 100	282	207	9.09	117,241	96,856	137,626	0.688
	101 - 200	255	50	0.27	3,303	1,921	4,684	0.799
	201 - 300	83	0	---	---	---	---	---
	301 - 500	33	2	0.02	30	0	75	1.124
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	259	3.91	120,573	100,143	141,003	0.690

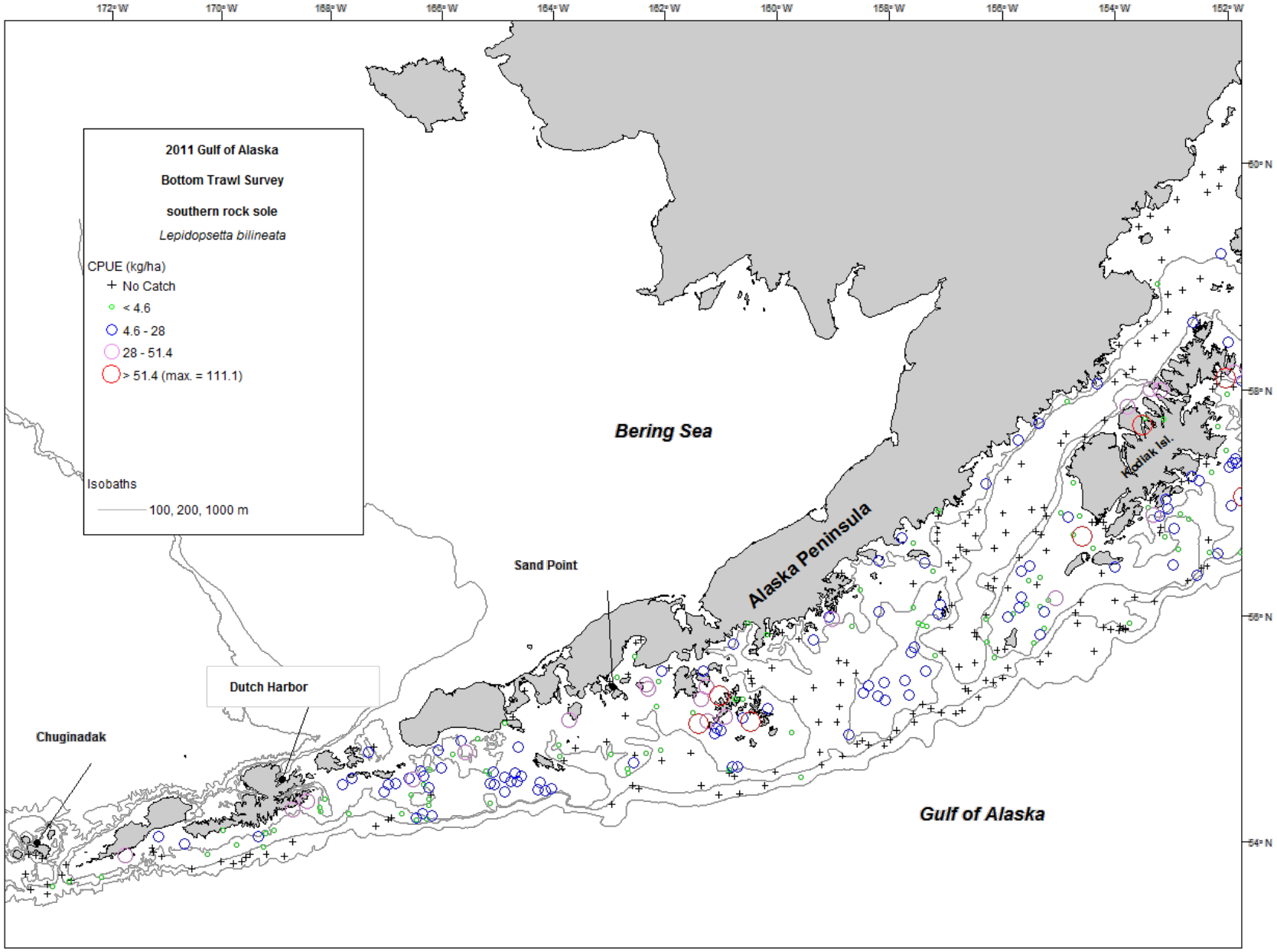

Figure 8. -- Distribution and relative abundance of southern rock sole from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

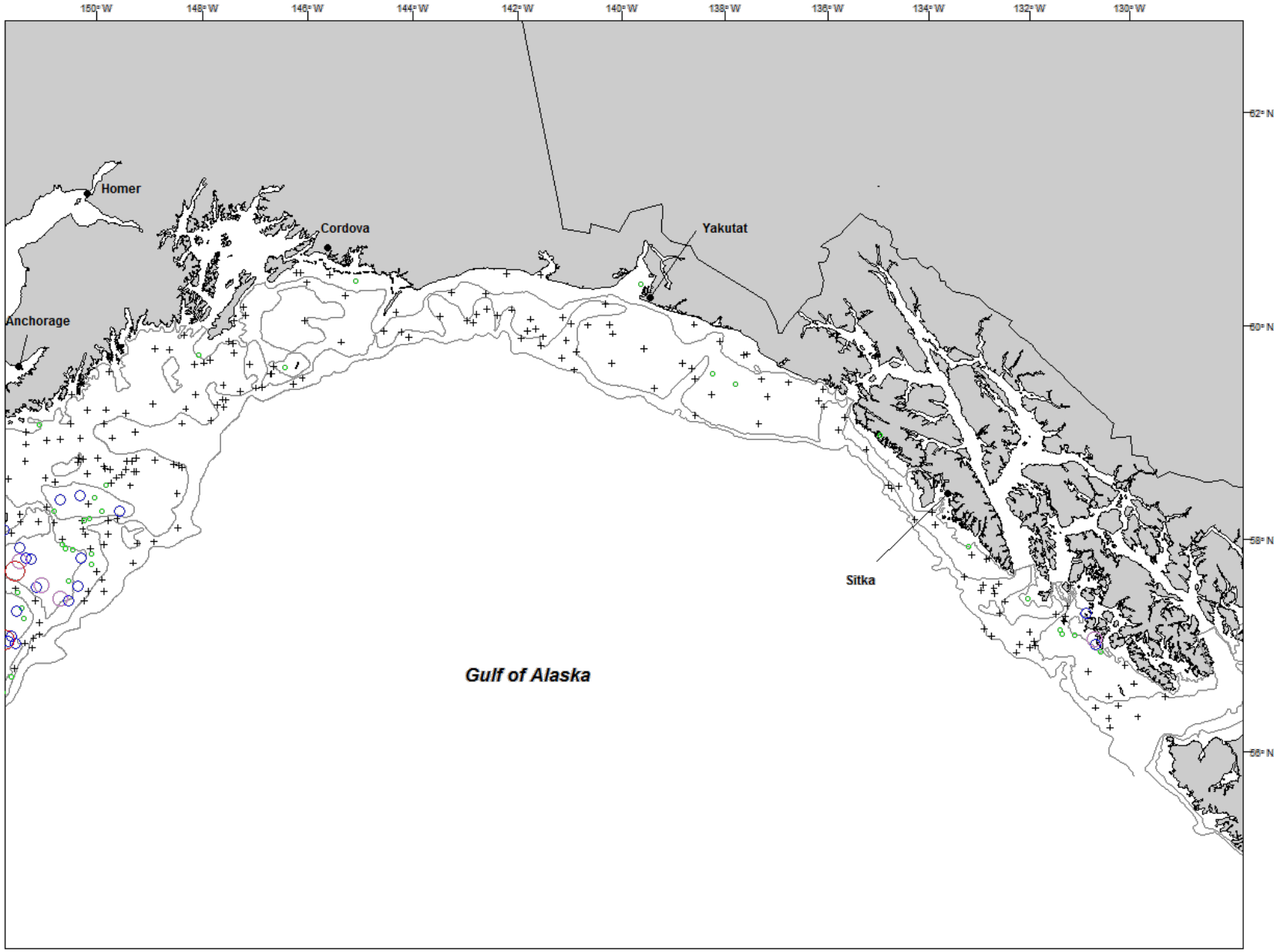

Figure 8. -- Continued.

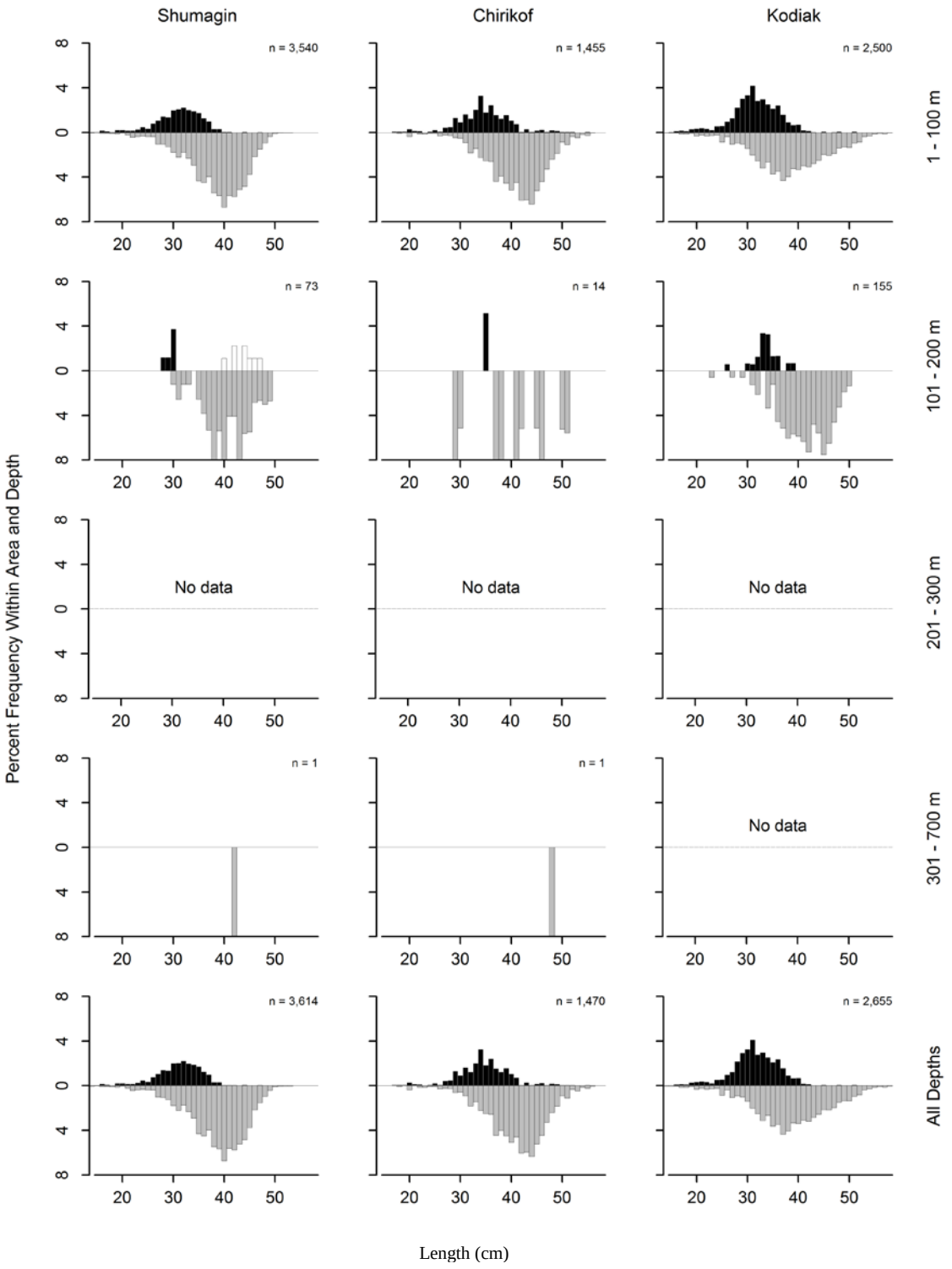

Figure 9. -- Size composition of southern rock sole from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

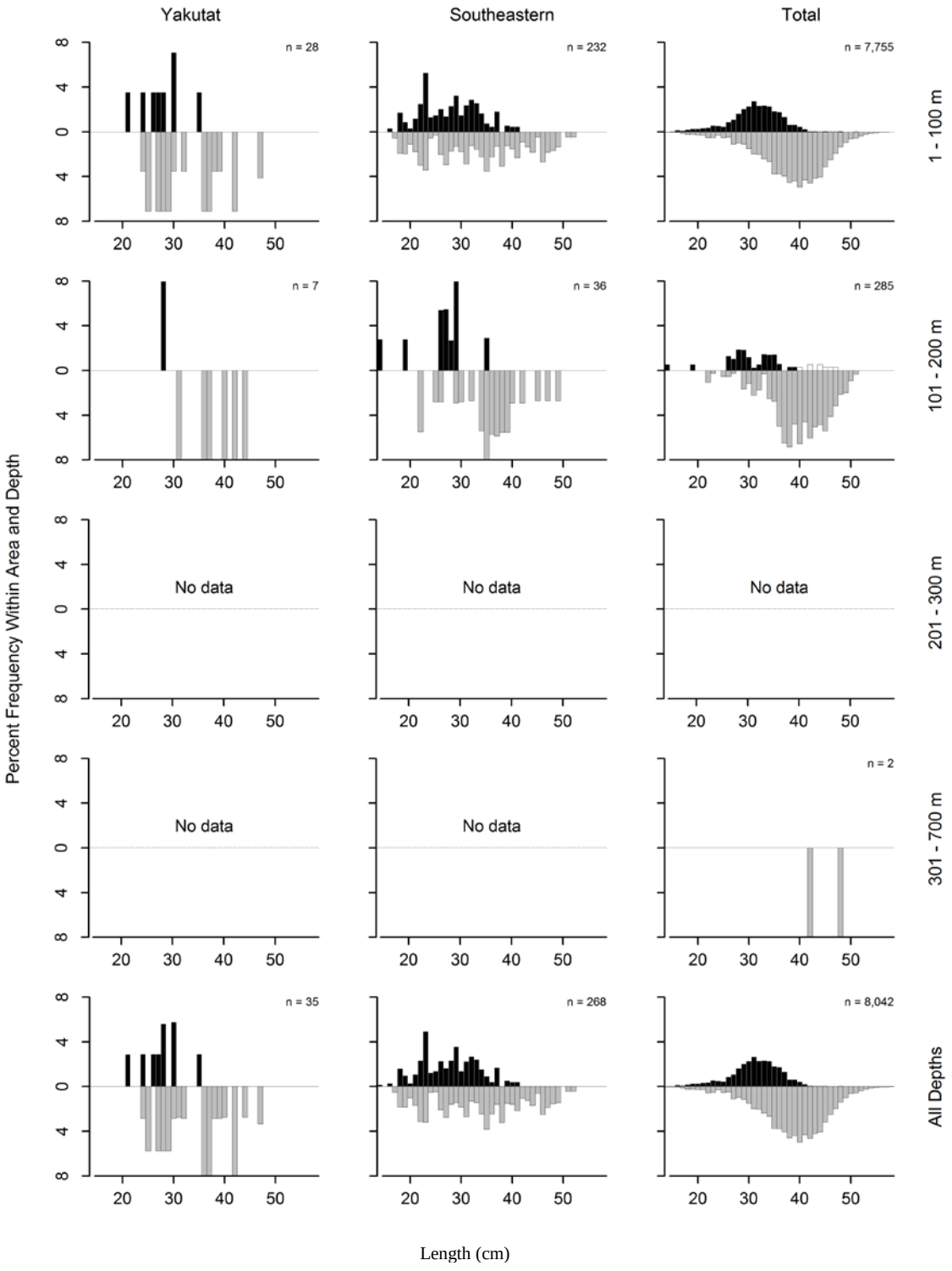

Figure 9. -- Continued (southern rock sole).

Table 10. -- Catch per unit of effort by stratum for southern rock sole sorted by descending CPUE for the 2011 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	6	6	35.39	7,784	53	15,515
Shumagin	1 - 100	Shumagin Bank	31	27	16.59	20,566	10,789	30,343
Kodiak	1 - 100	Albatross Banks	38	37	14.28	21,996	11,967	32,025
Shumagin	1 - 100	Fox Islands	16	14	13.26	11,046	4,309	17,783
Shumagin	1 - 100	Davidson Bank	39	38	11.37	15,554	11,490	19,618
Kodiak	1 - 100	Albatross Shallows	25	13	10.90	6,284	814	11,754
Chirikof	1 - 100	Semidi Bank	16	16	10.71	7,818	5,208	10,428
Southeastern	1 - 100	Southeastern Shallows	8	6	8.94	5,854	0	14,105
Chirikof	1 - 100	Upper Alaska Peninsula	18	12	8.66	6,874	3,095	10,653
Chirikof	1 - 100	Chirikof Bank	34	23	6.74	7,276	2,427	12,125
Shumagin	1 - 100	Lower Alaska Peninsula	19	8	4.77	3,279	0	6,689
Kodiak	101 - 200	Kodiak Outer Shelf	18	7	2.39	1,203	173	2,234
Kodiak	1 - 100	Lower Cook Inlet	12	2	1.88	1,863	0	5,920
Shumagin	101 - 200	Shumagin Outer Shelf	27	13	0.93	761	150	1,371
Kodiak	1 - 100	Kenai Peninsula	6	2	0.87	459	0	1,383
Yakutat	1 - 100	Middleton Shallows	6	2	0.75	505	0	1,789
Southeastern	101 - 200	Prince of Wales Shelf	14	4	0.63	437	0	959
Kodiak	101 - 200	Albatross Gullies	29	10	0.44	346	0	743
Yakutat	101 - 200	Fairweather Shelf	7	2	0.28	219	0	689
Shumagin	101 - 200	Sanak Gully	6	3	0.23	99	0	223
Chirikof	101 - 200	Shelikof Edge	26	7	0.18	139	37	240
Chirikof	301 - 500	Chirikof Slope	6	1	0.09	14	0	51
Yakutat	1 - 100	Yakutat Shallows	8	1	0.08	84	0	282
Shumagin	301 - 500	Shumagin Slope	7	1	0.06	15	0	53
Chirikof	101 - 200	East Shumagin Gully	14	3	0.06	64	0	147
Kodiak	101 - 200	Portlock Flats	25	1	0.05	36	0	112

Northern Rock Sole (*Lepidopsetta polyxystra*)

The northern rock sole were the sixteenth most commonly caught species (Table 2) and were primarily distributed in the western and central Gulf of Alaska (i.e., the Shumagin, Chirikof, and Kodiak INPFC areas) and were rare east of 150ºW (Fig. 10). They generally occurred in waters shallower than 100 m where approximately 97% of their total estimated biomass was found (Table 11). Approximately 59% of their biomass was concentrated in the shallowest depth zone (1-100 m) of the Shumagin INPFC area (Table 11), which makes up less than 13% of the total survey area (Table 1). They were frequently encountered, occurring in 91% of all trawls in this area and depth stratum. Northern rock sole were not collected from the Yakutat INPFC area and the highest CPUEs were recorded from the Lower Alaska Peninsula , Northern Kodiak Shallows, and Shumagin Bank strata in 1-100 m of water (Table 12). Females were longer than males in the Shumagin, Chirikof, and Kodiak INPFC areas where the length mode for females was around 40 cm and for males was around 30 cm (Fig. 11).

Table 11. -- Number of survey hauls, number of hauls with northern rock sole, mean CPUE, biomass, and mean weight, based on the 2011 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	105	96	10.48	43,285	21,119	65,452	0.436
	101 - 200	37	18	1.17	1,714	455	2,973	0.474
	201 - 300	11	2	0.23	63	0	170	0.542
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	116	7.12	45,063	22,862	67,264	0.437
Chirikof	1 - 100	68	50	5.08	13,224	6,354	20,094	0.705
	101 - 200	56	4	0.03	83	0	182	0.623
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	54	2.05	13,307	6,436	20,177	0.705
Kodiak	1 - 100	87	48	3.73	14,381	4,863	23,900	0.559
	101 - 200	107	2	0.01	29	0	71	0.559
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	50	1.47	14,410	4,892	23,929	0.559
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
Southeastern	1 - 100	8	1	0.15	96	0	317	0.300
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	1	0.04	96	0	317	0.300
All areas	1 - 100	282	195	5.5	70,986	46,163	95,809	0.493
	101 - 200	255	24	0.15	1,826	565	3,087	0.480
	201 - 300	83	2	0.02	63	0	170	0.542
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	221	2.36	72,875	48,022	97,728	0.492

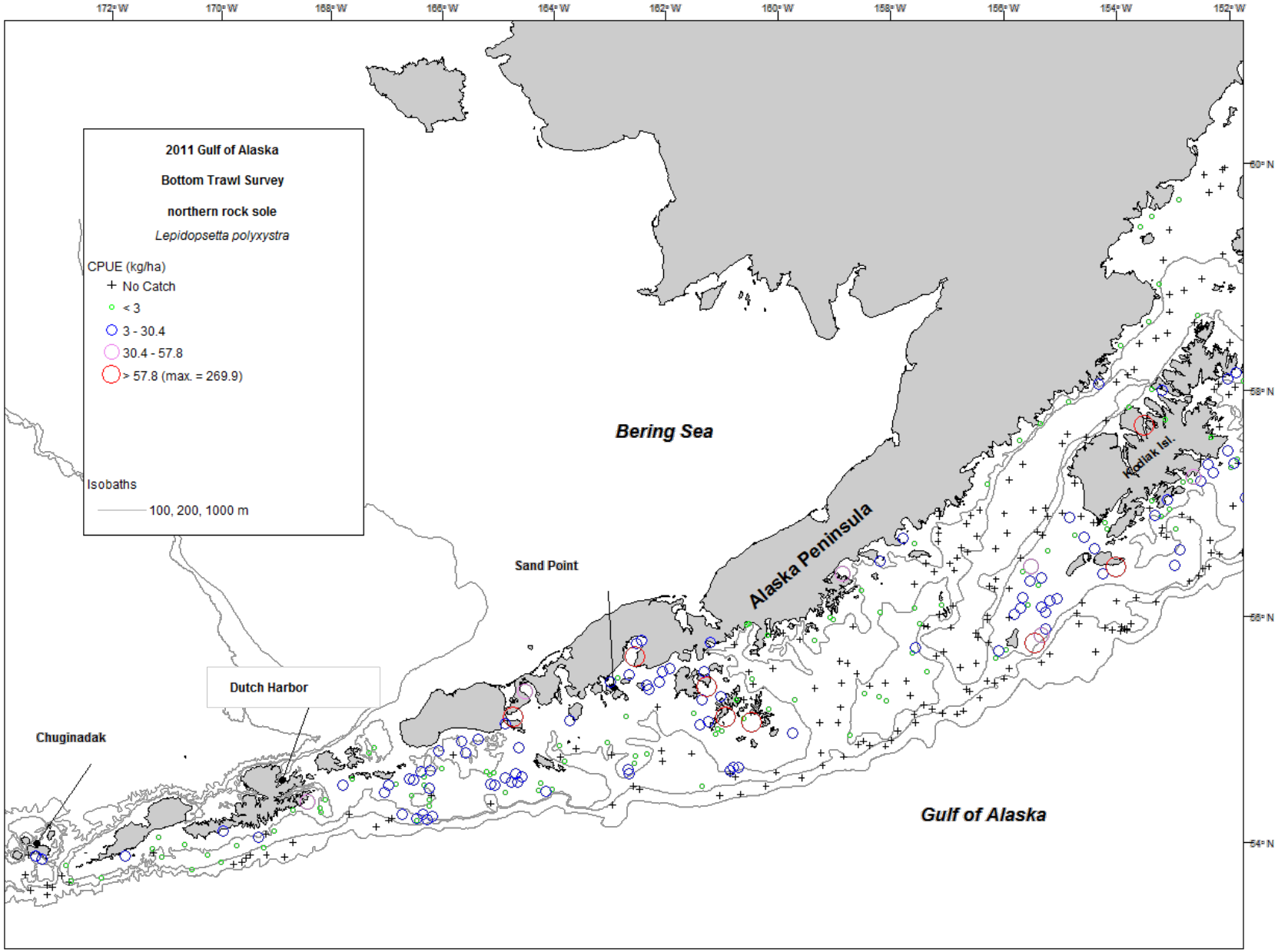

Figure 10. -- Distribution and relative abundance of northern rock sole from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

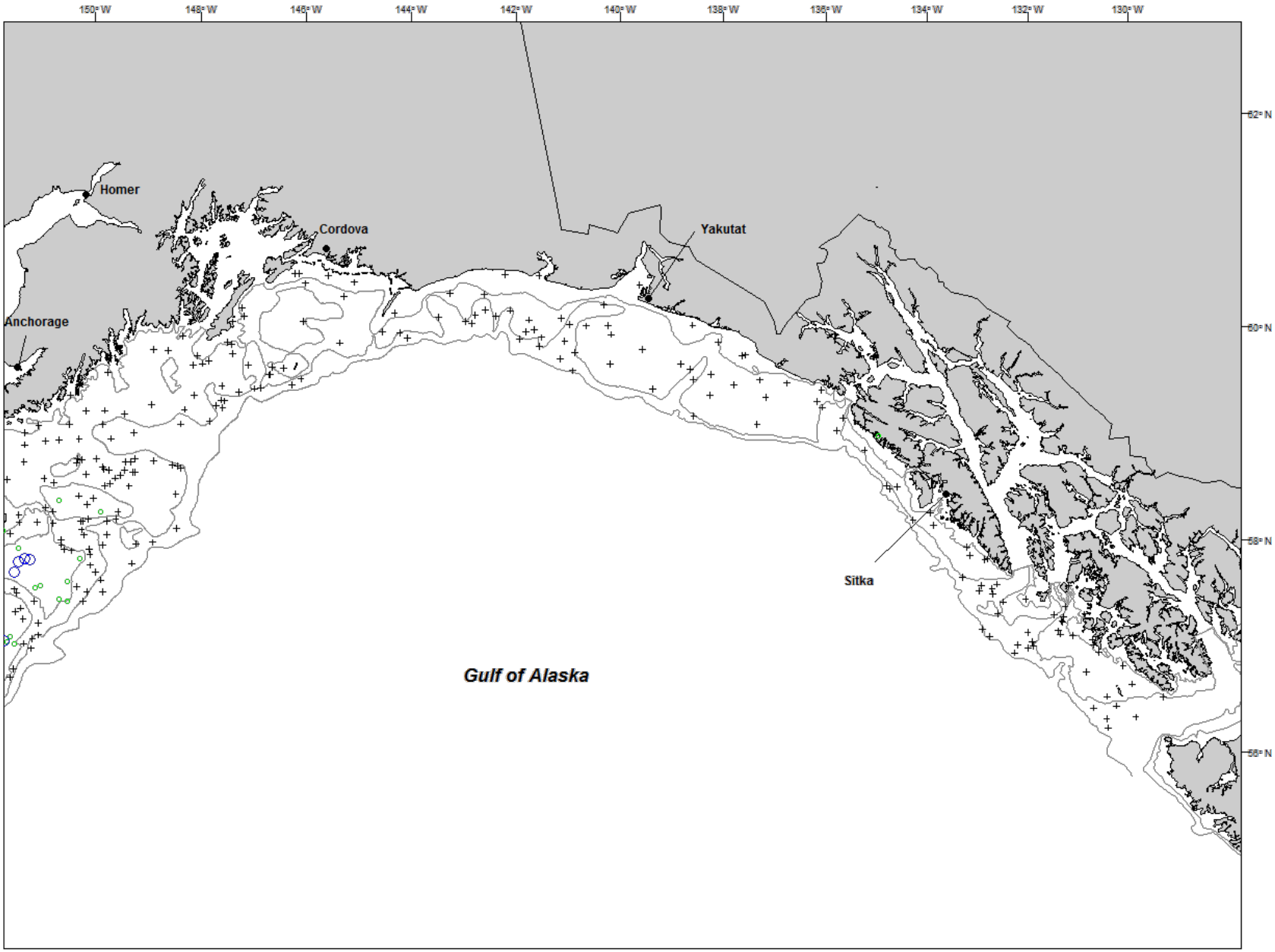

Figure 10. -- Continued.

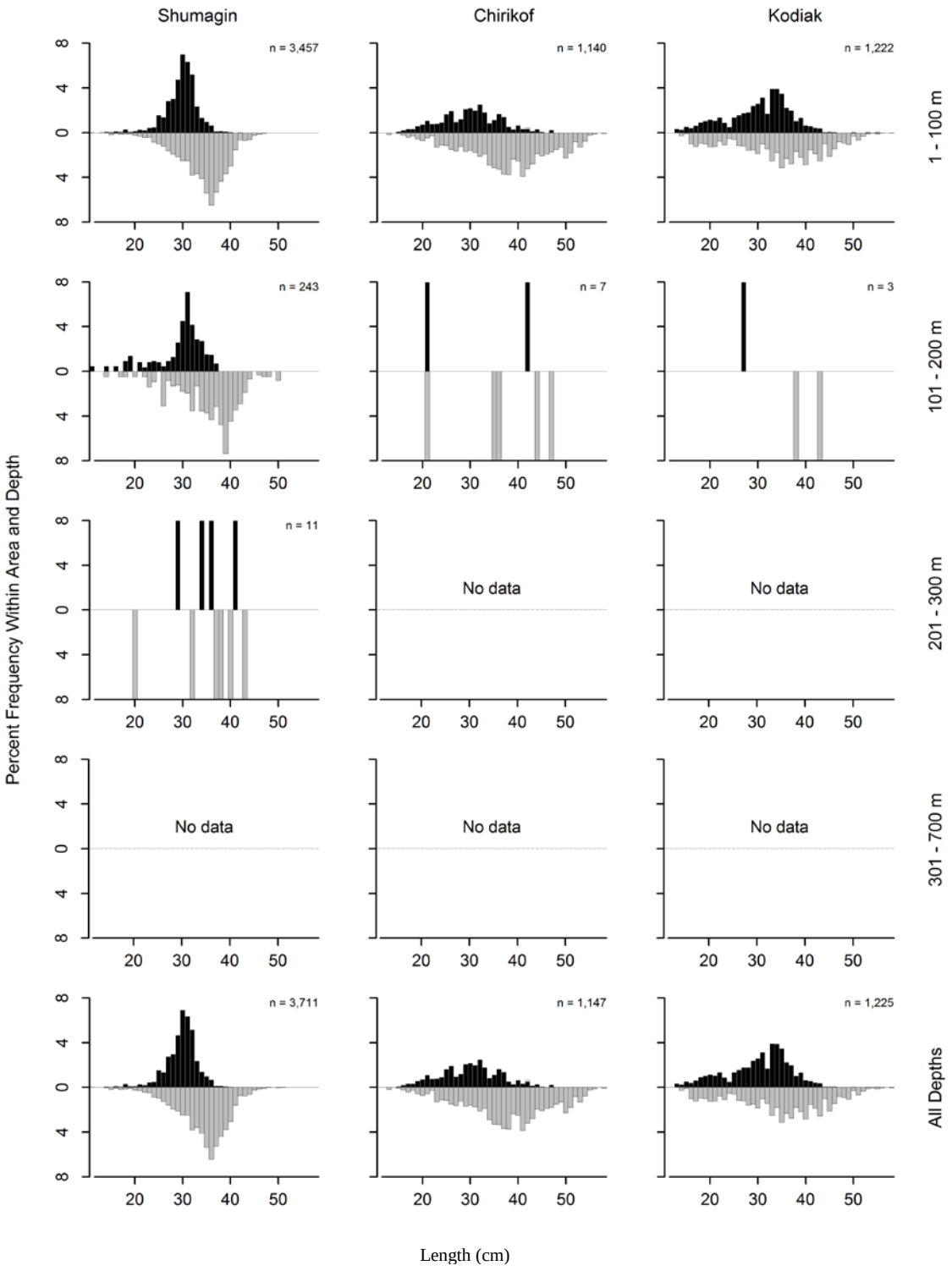

Figure 11. -- Size composition of northern rock sole from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

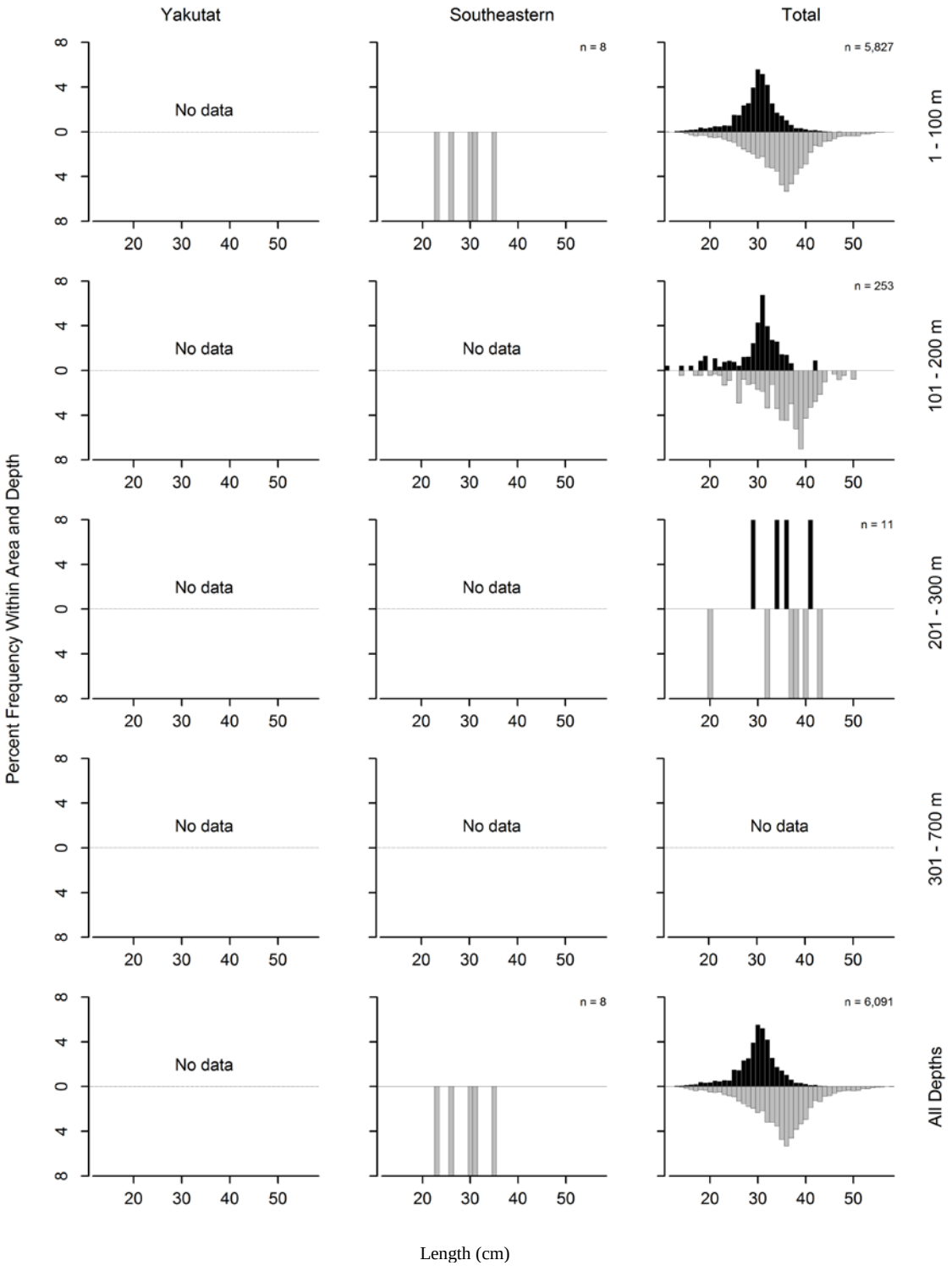

Figure 11. -- Continued (northern rock sole).

Table 12. -- Catch per unit of effort by stratum for northern rock sole sorted by descending CPUE for the 2011 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	25.60	17,605	0	37,999
Kodiak	1 - 100	Northern Kodiak Shallows	6	5	11.56	2,542	0	8,239
Shumagin	1 - 100	Shumagin Bank	31	28	10.69	13,256	4,349	22,162
Chirikof	1 - 100	Chirikof Bank	34	26	8.53	9,201	3,474	14,928
Kodiak	1 - 100	Albatross Banks	38	25	5.74	8,834	810	16,858
Shumagin	1 - 100	Davidson Bank	39	36	5.65	7,726	5,237	10,215
Shumagin	1 - 100	Fox Islands	16	16	5.64	4,699	0	9,725
Kodiak	1 - 100	Albatross Shallows	25	14	4.98	2,869	80	5,658
Chirikof	1 - 100	Upper Alaska Peninsula	18	13	4.38	3,477	0	7,488
Shumagin	101 - 200	Shumagin Outer Shelf	27	16	2.05	1,669	409	2,928
Chirikof	1 - 100	Semidi Bank	16	11	0.75	546	0	1,131
Shumagin	201 - 300	Shumagin Slope	11	2	0.23	63	0	171
Southeastern	1 - 100	Southeastern Shallows	8	1	0.15	96	0	322
Kodiak	1 - 100	Lower Cook Inlet	12	4	0.14	137	0	291
Shumagin	101 - 200	Sanak Gully	6	1	0.08	32	0	116
Shumagin	101 - 200	West Shumagin Gully	4	1	0.06	13	0	55
Chirikof	101 - 200	Shelikof Edge	26	2	0.05	41	0	122
Chirikof	101 - 200	East Shumagin Gully	14	2	0.04	42	0	104
Kodiak	101 - 200	Kodiak Outer Shelf	18	1	0.03	14	0	43
Kodiak	101 - 200	Barren Islands	18	1	0.01	15	0	47

Rex sole (*Glyptocephalus zachirus*)

The rex sole was the thirteenth most abundant species caught in the 2011 survey (Table 2). The rex sole population was widely distributed throughout the survey area, occurring in 51 of the 54 strata (Fig. 12 and Tables 13-14). Although large catches of rex sole were rare, rex sole were present in approximately 86% of the tows between 101 and 500 m (Table 13). The mean weight of rex sole was substantially greater in the three westernmost INPFC areas than in the Yakutat and Southeastern INPFC areas. This trend was supported by the length frequency data which showed a much higher fraction of large fish (greater than 40 cm FL) of both sexes occurring in the Shumagin, Chirikof, and Kodiak INPFC areas than in the Yakutat and Southeastern INPFC areas. A relatively distinct length mode around 32 cm FL occurred in the depth zones deeper than 100 m for both males and females in the Southeastern INPFC area (Fig. 13).

Table 13. -- Number of survey hauls, number of hauls with rex sole, mean CPUE, biomass, and mean weight, based on the 2011 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	105	39	0.95	3,934	928	6,940	0.499
	101 - 200	37	30	4.09	5,998	3,335	8,661	0.423
	201 - 300	11	10	8.76	2,442	1,338	3,546	0.491
	301 - 500	7	7	2.33	590	294	885	0.549
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	86	2.05	12,964	8,875	17,052	0.461
Chirikof	1 - 100	68	18	0.71	1,853	0	3,958	0.420
	101 - 200	56	51	7.51	17,911	11,326	24,497	0.417
	201 - 300	20	20	11.93	13,773	5,419	22,127	0.465
	301 - 500	6	5	0.68	108	4	213	0.218
	501 - 700	5	1	0.3	59	0	212	0.471
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	95	5.19	33,705	23,171	44,238	0.434
Kodiak	1 - 100	87	18	0.72	2,761	374	5,148	0.282
	101 - 200	107	85	4.93	21,347	13,873	28,821	0.423
	201 - 300	24	24	4.33	4,976	2,718	7,233	0.266
	301 - 500	6	6	2.12	618	14	1,221	0.285
	501 - 700	4	2	0.48	84	0	305	0.244
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	135	3.04	29,785	21,723	37,847	0.365
Yakutat	1 - 100	14	11	1.71	2,851	1,182	4,519	0.215
	101 - 200	33	24	0.83	2,435	1,146	3,723	0.194
	201 - 300	13	13	4.27	2,207	226	4,187	0.190
	301 - 500	6	5	2.32	610	144	1,076	0.179
	501 - 700	2	1	1.32	194	0	1,027	0.230
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	54	1.5	8,296	5,572	11,019	0.199
Southeastern	1 - 100	8	4	0.87	570	0	1,521	0.131
	101 - 200	22	18	4.97	5,507	1,993	9,021	0.215
	201 - 300	15	15	3.51	1,774	515	3,032	0.193
	301 - 500	8	8	7.75	2,417	1,094	3,740	0.256
	501 - 700	3	1	1.13	117	0	490	0.299
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	46	3.87	10,385	6,510	14,260	0.212
All areas	1 - 100	282	90	0.93	11,969	7,446	16,492	0.301
	101 - 200	255	208	4.35	53,199	42,464	63,933	0.365
	201 - 300	83	82	6.98	25,171	16,233	34,109	0.340
	301 - 500	33	31	3.39	4,342	2,940	5,745	0.262
	501 - 700	17	5	0.55	454	0	1,140	0.266
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	416	3.08	95,134	80,560	109,708	0.342

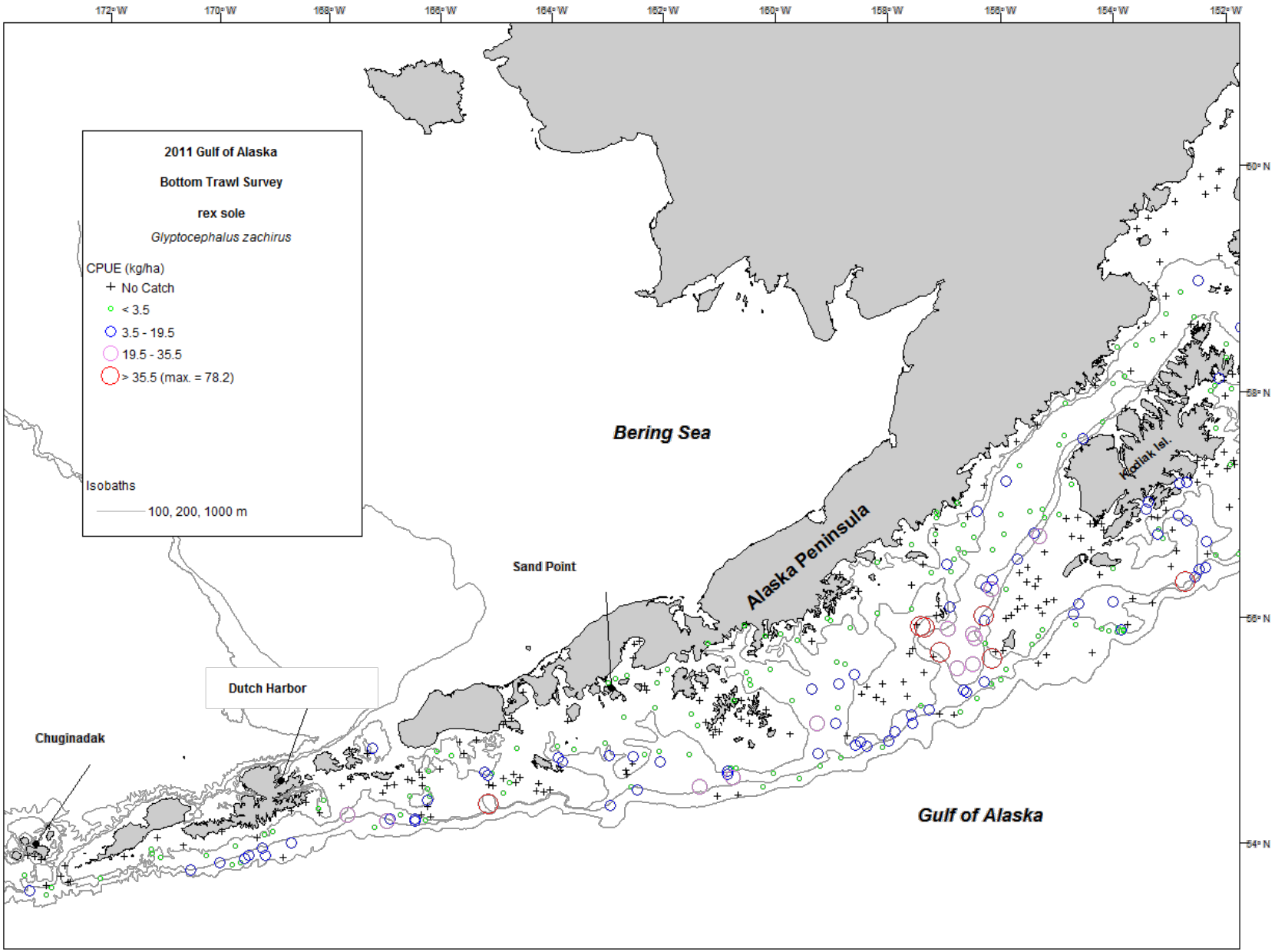

Figure 12. -- Distribution and relative abundance of rex sole from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

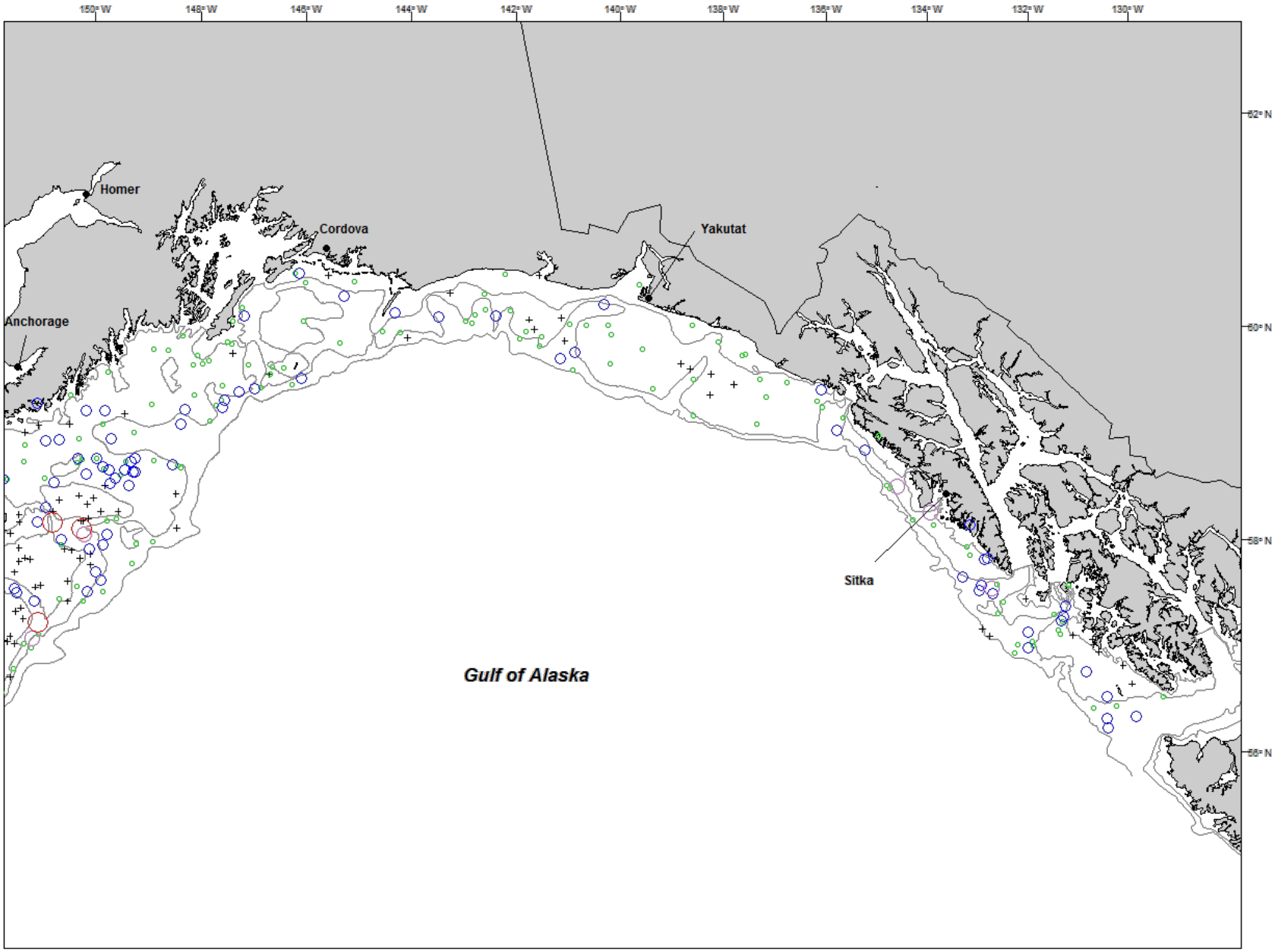

Figure 12. -- Continued.

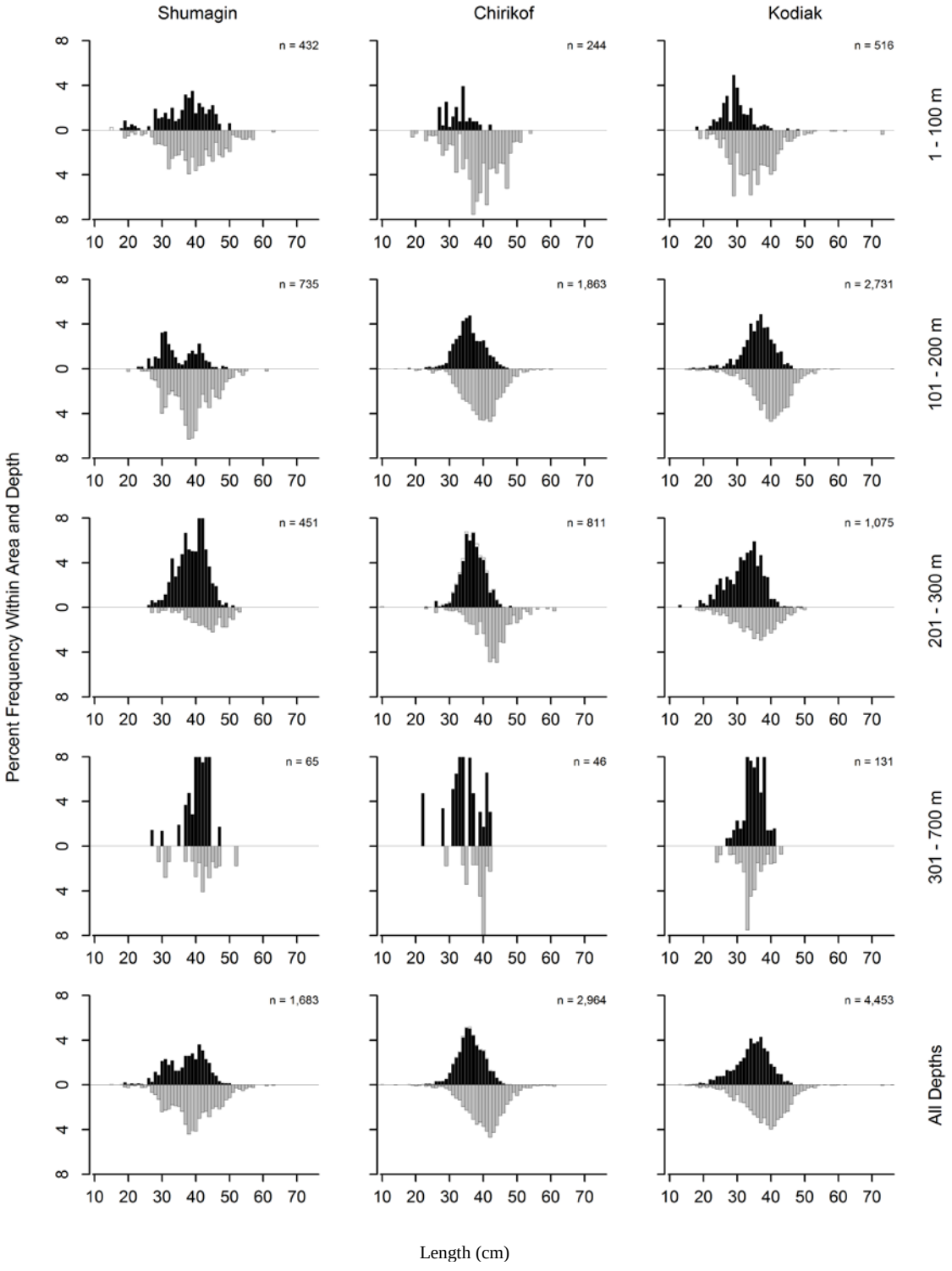

Figure 13. -- Size composition of rex sole from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

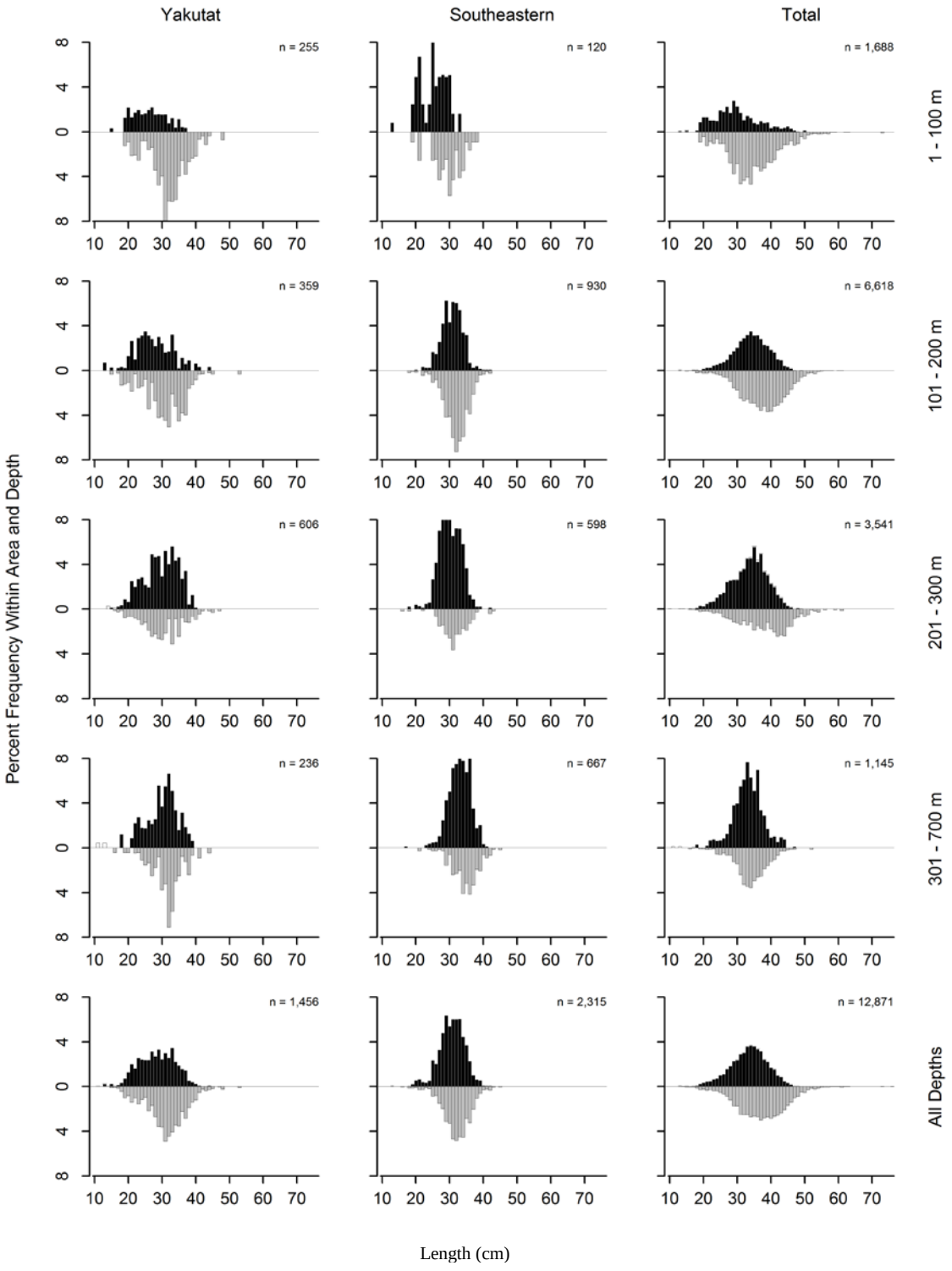

Figure 13. -- Continued (rex sole).

Table 14. -- Catch per unit of effort by stratum for rex sole sorted by descending CPUE for the 2011 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	201 - 300	Lower Shelikof Gully	14	14	13.32	13,341	4,942	21,741
Chirikof	101 - 200	Shelikof Edge	26	23	11.21	8,669	3,709	13,629
Southeastern	301 - 500	Southeastern Deep Gullies	7	7	10.19	2,390	1,021	3,758
Kodiak	101 - 200	Albatross Gullies	29	21	10.03	7,938	2,783	13,094
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	8	9.58	4,021	429	7,613
Kodiak	201 - 300	Kodiak Slope	6	6	9.37	1,521	0	3,080
Shumagin	201 - 300	Shumagin Slope	11	10	8.76	2,442	1,324	3,559
Kodiak	101 - 200	Kodiak Outer Shelf	18	12	8.42	4,232	0	9,125
Chirikof	101 - 200	Chirikof Outer Shelf	16	16	6.75	3,382	2,162	4,602
Yakutat	201 - 300	Yakutat Gullies	7	7	6.44	1,959	0	3,996
Kodiak	101 - 200	Portlock Flats	25	24	6.29	4,616	3,039	6,194
Shumagin	101 - 200	Sanak Gully	6	6	5.31	2,255	731	3,778
Chirikof	101 - 200	East Shumagin Gully	14	12	5.28	5,860	1,490	10,230
Kodiak	201 - 300	Kenai Gullies	15	15	5.06	3,367	1,483	5,250
Shumagin	101 - 200	Shumagin Outer Shelf	27	20	4.48	3,650	1,263	6,036
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	11	4.17	1,638	385	2,891
Chirikof	201 - 300	Chirikof Slope	6	6	2.83	432	0	984
Kodiak	1 - 100	Albatross Shallows	25	9	2.76	1,594	274	2,914
Kodiak	101 - 200	Barren Islands	18	14	2.45	2,693	508	4,879
Shumagin	301 - 500	Shumagin Slope	7	7	2.33	590	283	896
Yakutat	301 - 500	Yakutat Gullies	3	2	2.33	258	0	906
Yakutat	301 - 500	Yakutat Slope	3	3	2.32	352	0	854
Kodiak	1 - 100	Kenai Peninsula	6	5	2.16	1,136	0	3,229
Southeastern	101 - 200	Prince of Wales Shelf	14	10	2.16	1,486	422	2,550
Kodiak	301 - 500	Kodiak Slope	6	6	2.12	618	0	1,252
Yakutat	1 - 100	Yakutat Shallows	8	6	2.08	2,066	639	3,492
Shumagin	1 - 100	Davidson Bank	39	14	1.76	2,402	0	5,209
Yakutat	101 - 200	Middleton Shelf	9	8	1.67	1,227	75	2,380
Kodiak	101 - 200	Kenai Flats	17	14	1.55	1,867	236	3,499
Chirikof	1 - 100	Chirikof Bank	34	8	1.44	1,549	0	3,641
Yakutat	501 - 700	Yakutat Slope	2	1	1.32	194	0	2,654
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	1.20	136	0	463
Yakutat	1 - 100	Middleton Shallows	6	5	1.17	785	0	2,026
Yakutat	201 - 300	Yakutat Slope	6	6	1.16	248	14	481
Southeastern	501 - 700	Southeastern Slope	3	1	1.13	117	0	621
Yakutat	101 - 200	Yakataga Shelf	8	4	0.91	481	0	1,151
Southeastern	1 - 100	Southeastern Shallows	8	4	0.87	570	0	1,546
Shumagin	1 - 100	Fox Islands	16	4	0.79	661	0	1,605
Chirikof	301 - 500	Chirikof Slope	6	5	0.68	108	0	218
Shumagin	1 - 100	Shumagin Bank	31	13	0.66	815	90	1,540
Yakutat	101 - 200	Yakutat Flats	9	7	0.58	527	89	965
Kodiak	501 - 700	Kodiak Slope	4	2	0.48	84	0	337
Shumagin	101 - 200	West Shumagin Gully	4	4	0.41	94	0	236
Chirikof	1 - 100	Upper Alaska Peninsula	18	8	0.36	286	45	527
Southeastern	301 - 500	Southeastern Slope	1	1	0.35	27		
Chirikof	501 - 700	Chirikof Slope	5	1	0.30	59	0	224
Kodiak	201 - 300	Upper Shelikof Gully	3	3	0.28	88	0	425
Yakutat	101 - 200	Fairweather Shelf	7	5	0.26	200	0	444
Shumagin	1 - 100	Lower Alaska Peninsula	19	8	0.08	56	19	93
Chirikof	1 - 100	Semidi Bank	16	2	0.02	18	0	46
Kodiak	1 - 100	Albatross Banks	38	4	0.02	32	0	64

Dover sole (*Microstomus pacificus*)

Dover sole were ranked fifteenth overall by CPUE in the 2011 Gulf of Alaska survey (Table 2). They were collected from all sampled depth ranges (Table 15) and were distributed throughout the survey area (Fig. 14). They were caught in relatively modest numbers in 51 of the 59 survey strata (Table 16). Although large catches of Dover sole were rare, they were present in approximately 81% of the trawls at depths greater than 200 m. The highest mean CPUEs were generally recorded southwest of Kodiak Island and in the central part of the Gulf of Alaska between the Kenai Peninsula and Yakutat. The mean weight of Dover sole generally decreased from west to east. Although the smallest fish were in the shallowest depth zone, there was not a consistent trend of increasing fish size at deeper depths (Fig. 15, Table 15). Males were considerably more abundant in the survey area, especially at water depths between 301 and 700 m where they were predominant (Fig. 15).

Table 15. -- Number of survey hauls, number of hauls with Dover sole, mean CPUE, biomass, and mean weight, based on the 2011 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	105	8	0.06	235	0	470	0.526
	101 - 200	37	7	0.1	146	30	262	0.558
	201 - 300	11	1	0.03	8	0	27	0.758
	301 - 500	7	1	0.53	134	0	449	0.914
	501 - 700	3	2	1.55	311	0	954	0.893
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	19	0.13	833	253	1,413	0.687
Chirikof	1 - 100	68	8	0.24	620	0	1,463	0.939
	101 - 200	56	37	1.13	2,702	1,475	3,929	0.853
	201 - 300	20	14	5.94	6,863	0	14,088	1.085
	301 - 500	6	6	4.43	711	156	1,266	0.957
	501 - 700	5	5	3.64	711	0	1,456	0.815
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	70	1.79	11,606	4,220	18,992	0.986
Kodiak	1 - 100	87	19	0.31	1,190	226	2,154	0.638
	101 - 200	107	80	2.73	11,826	7,995	15,657	0.976
	201 - 300	24	21	7.2	8,268	5,230	11,306	0.885
	301 - 500	6	6	6.41	1,867	131	3,604	0.694
	501 - 700	4	4	4.53	791	656	925	0.926
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	130	2.44	23,942	18,919	28,964	0.891
Yakutat	1 - 100	14	7	1.36	2,269	0	6,511	0.474
	101 - 200	33	21	2.11	6,195	1,366	11,023	0.948
	201 - 300	13	13	17.01	8,793	5,143	12,443	0.841
	301 - 500	6	6	27.73	7,286	382	14,190	0.858
	501 - 700	2	2	0.92	135	0	563	0.990
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	49	4.46	24,678	16,018	33,338	0.811
Southeastern	1 - 100	8	2	0.17	108	0	325	0.559
	101 - 200	22	13	3.49	3,870	0	11,645	0.785
	201 - 300	15	15	4.57	2,309	814	3,803	0.501
	301 - 500	8	8	30.21	9,418	3,066	15,770	0.748
	501 - 700	3	3	7.43	767	0	2,390	0.958
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	41	6.14	16,473	6,889	26,056	0.712
All areas	1 - 100	282	44	0.34	4,422	41	8,803	0.556
	101 - 200	255	158	2.02	24,739	15,589	33,888	0.916
	201 - 300	83	64	7.28	26,241	17,612	34,870	0.853
	301 - 500	33	27	15.18	19,416	11,271	27,561	0.787
	501 - 700	17	16	3.31	2,714	1,310	4,118	0.901
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	309	2.51	77,531	62,580	92,482	0.830

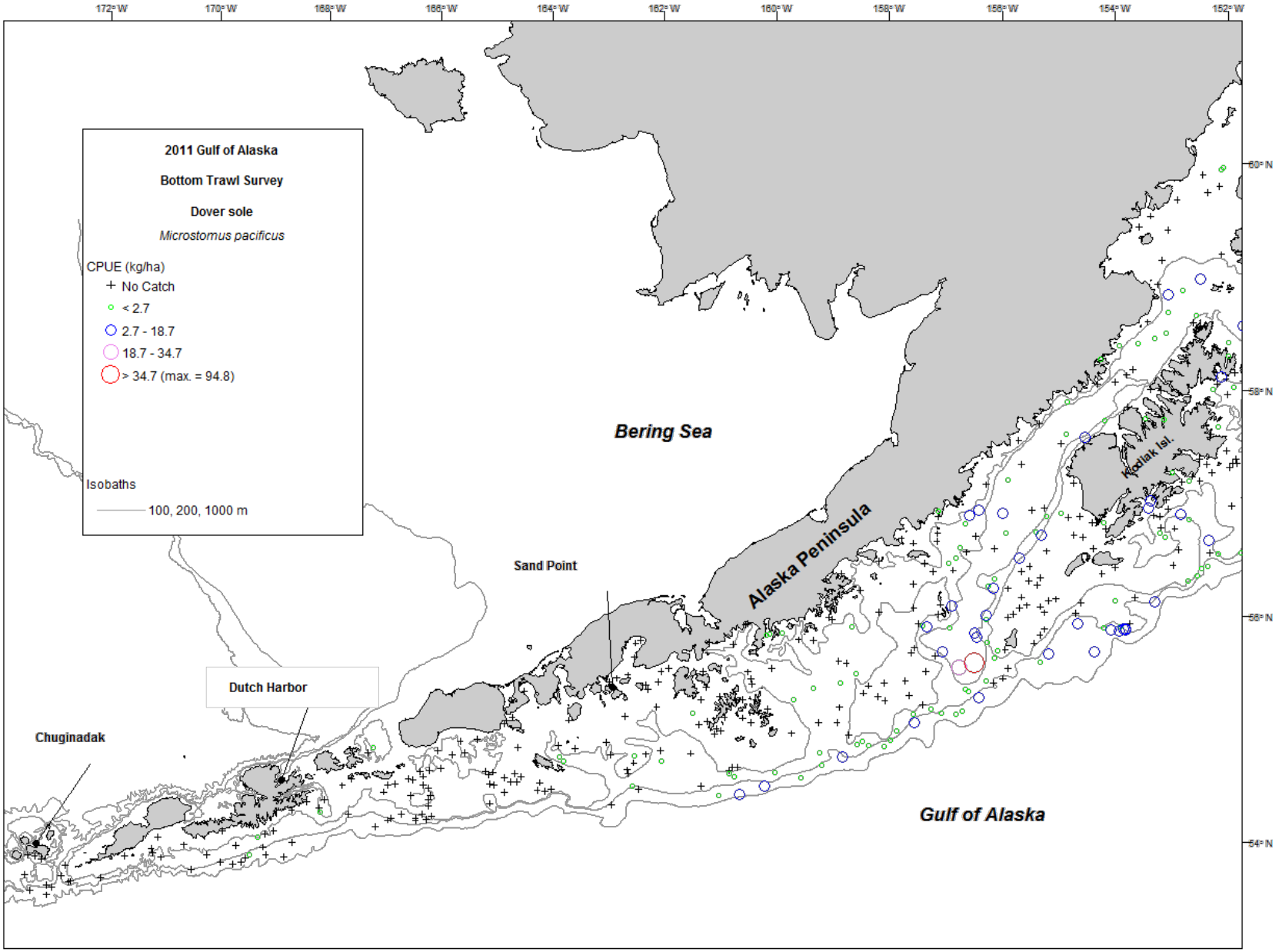

Figure 14. -- Distribution and relative abundance of Dover sole from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

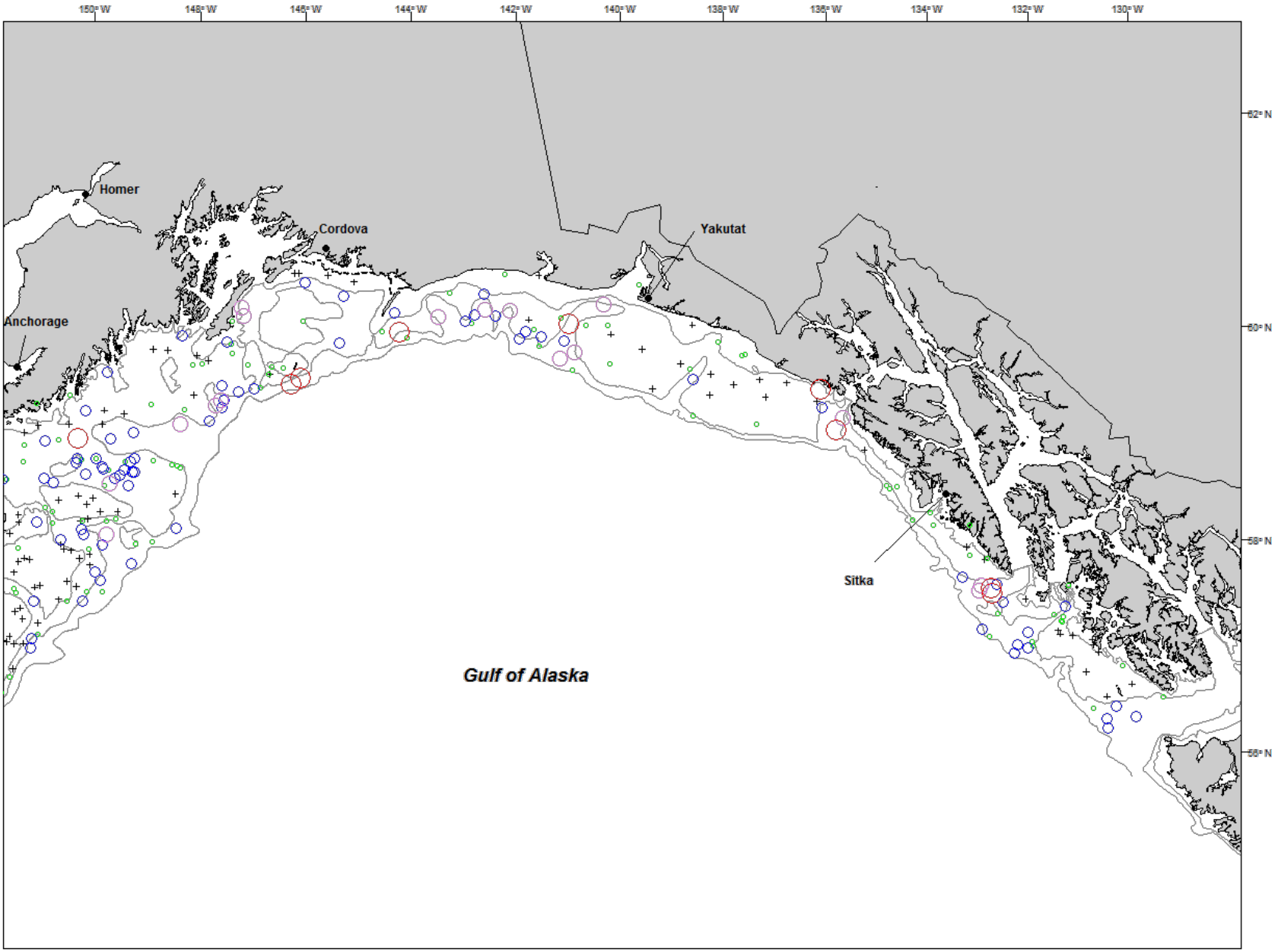

Figure 14. -- Continued.

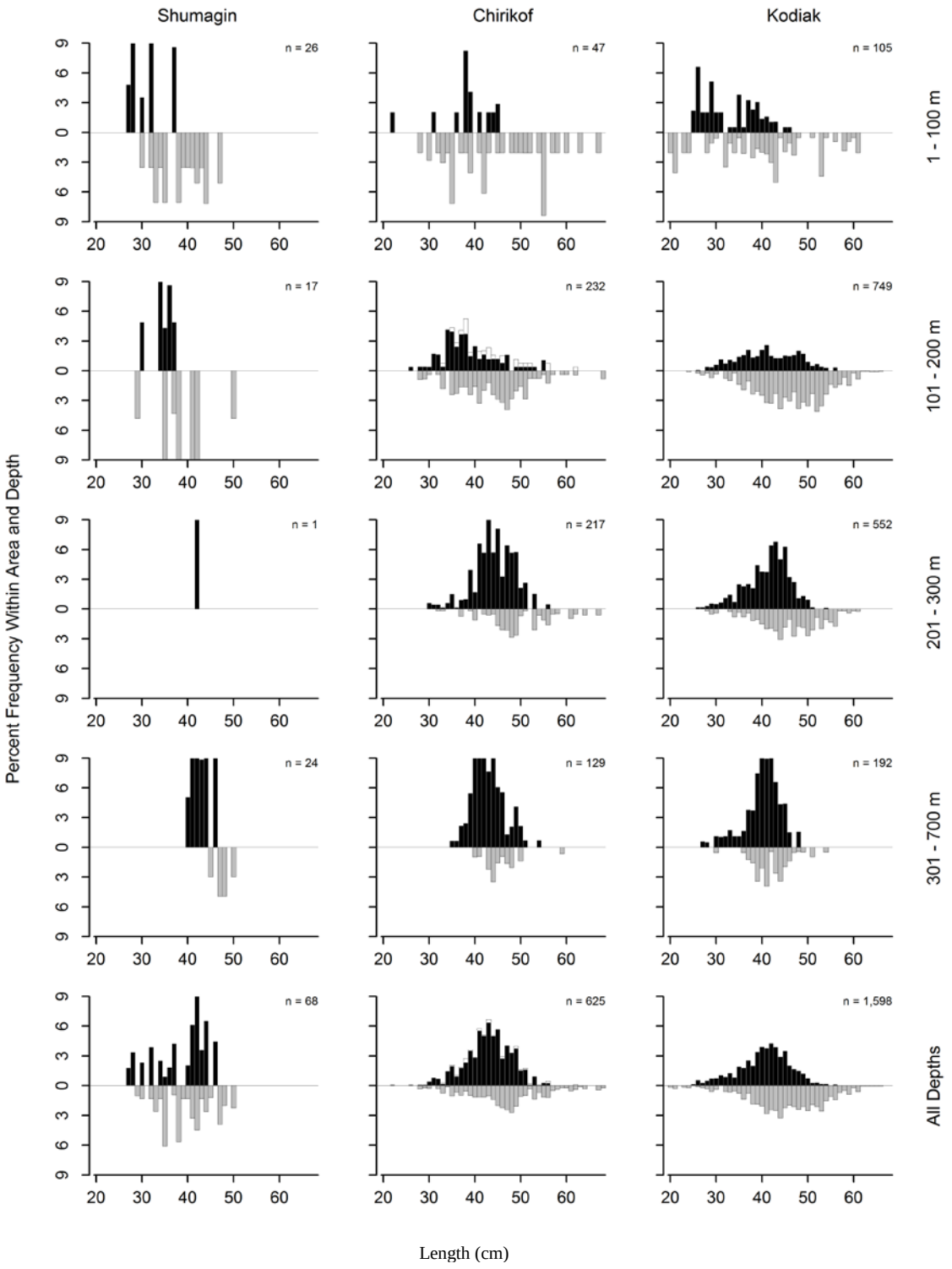

Figure 15. -- Size composition of Dover sole from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

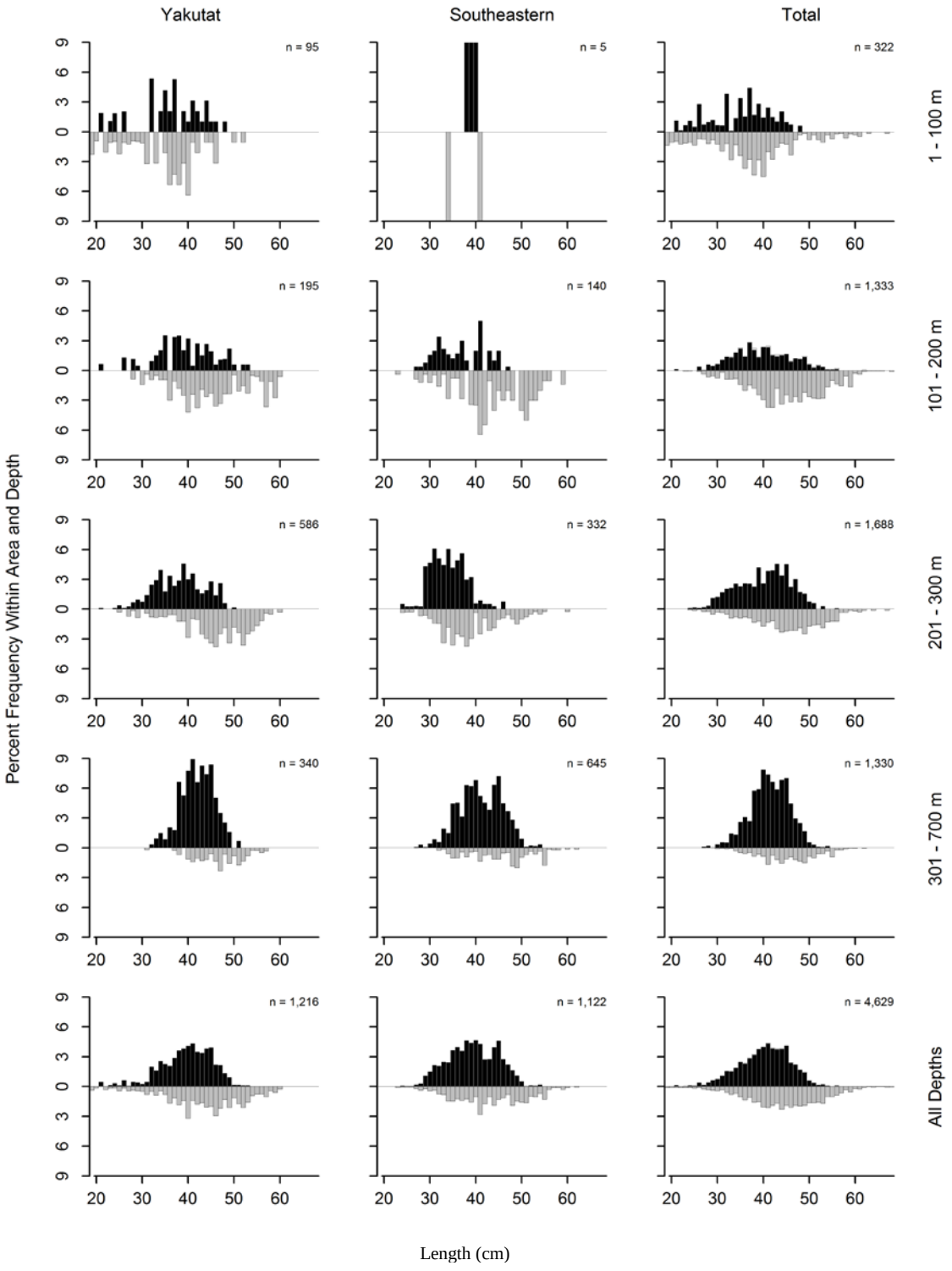

Figure 15. -- Continued (Dover sole).

Table 16. --Catch per unit of effort by stratum for Dover sole sorted by descending CPUE for the 2011 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	7	7	39.80	9,330	2,758	15,902
Yakutat	301 - 500	Yakutat Slope	3	3	31.68	4,817	0	14,668
Yakutat	301 - 500	Yakutat Gullies	3	3	22.30	2,470	0	6,651
Yakutat	201 - 300	Yakutat Gullies	7	7	21.32	6,487	3,980	8,995
Kodiak	201 - 300	Kenai Gullies	15	14	11.13	7,412	4,428	10,396
Yakutat	201 - 300	Yakutat Slope	6	6	10.84	2,306	0	5,761
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	6	8.31	3,487	0	11,441
Kodiak	101 - 200	Portlock Flats	25	25	7.46	5,475	2,198	8,752
Southeastern	501 - 700	Southeastern Slope	3	3	7.43	767	0	2,962
Chirikof	201 - 300	Lower Shelikof Gully	14	9	6.52	6,531	0	13,801
Yakutat	101 - 200	Middleton Shelf	9	8	6.49	4,767	0	9,601
Kodiak	301 - 500	Kodiak Slope	6	6	6.41	1,867	43	3,692
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	6.11	687	0	2,400
Kodiak	201 - 300	Kodiak Slope	6	6	4.91	797	9	1,585
Kodiak	501 - 700	Kodiak Slope	4	4	4.53	791	637	944
Chirikof	301 - 500	Chirikof Slope	6	6	4.43	711	128	1,294
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	11	4.13	1,622	620	2,623
Chirikof	501 - 700	Chirikof Slope	5	5	3.64	711	0	1,516
Chirikof	101 - 200	Shelikof Edge	26	21	2.73	2,108	910	3,307
Kodiak	101 - 200	Albatross Gullies	29	19	2.44	1,930	782	3,078
Yakutat	1 - 100	Yakutat Shallows	8	5	2.21	2,195	0	6,544
Chirikof	201 - 300	Chirikof Slope	6	5	2.17	332	15	650
Yakutat	101 - 200	Yakataga Shelf	8	7	2.14	1,129	259	1,999
Kodiak	101 - 200	Kenai Flats	17	10	1.71	2,063	551	3,575
Shumagin	501 - 700	Shumagin Slope	3	2	1.55	311	0	1,181
Kodiak	101 - 200	Barren Islands	18	15	1.54	1,689	885	2,493
Kodiak	101 - 200	Kodiak Outer Shelf	18	11	1.33	669	0	1,353
Southeastern	301 - 500	Southeastern Slope	1	1	1.13	88		
Kodiak	1 - 100	Kenai Peninsula	6	4	0.92	485	0	1,349
Yakutat	501 - 700	Yakutat Slope	2	2	0.92	135	0	1,400
Kodiak	1 - 100	Albatross Shallows	25	9	0.85	489	22	955
Chirikof	101 - 200	Chirikof Outer Shelf	16	11	0.68	341	117	565
Kodiak	1 - 100	Northern Kodiak Shallows	6	2	0.57	125	0	342
Southeastern	101 - 200	Prince of Wales Shelf	14	7	0.56	383	0	906
Chirikof	1 - 100	Chirikof Bank	34	5	0.53	574	0	1,415
Shumagin	301 - 500	Shumagin Slope	7	1	0.53	134	0	460
Yakutat	101 - 200	Yakutat Flats	9	5	0.32	287	0	662
Chirikof	101 - 200	East Shumagin Gully	14	5	0.23	253	22	483
Shumagin	1 - 100	Lower Alaska Peninsula	19	3	0.19	130	0	335
Kodiak	201 - 300	Upper Shelikof Gully	3	1	0.18	59	0	312
Southeastern	1 - 100	Southeastern Shallows	8	2	0.17	108	0	331
Shumagin	101 - 200	Shumagin Outer Shelf	27	4	0.12	97	0	203
Shumagin	101 - 200	Sanak Gully	6	3	0.12	49	0	110
Yakutat	1 - 100	Middleton Shallows	6	2	0.11	74	0	199
Shumagin	1 - 100	Fox Islands	16	3	0.08	66	0	187
Chirikof	1 - 100	Upper Alaska Peninsula	18	3	0.06	46	0	108
Kodiak	1 - 100	Albatross Banks	38	2	0.05	83	0	206
Shumagin	1 - 100	Shumagin Bank	31	2	0.03	39	0	97
Shumagin	201 - 300	Shumagin Slope	11	1	0.03	8	0	27
Yakutat	101 - 200	Fairweather Shelf	7	1	0.02	12	0	41
Kodiak	1 - 100	Lower Cook Inlet	12	2	0.01	9	0	23

Yellowfin sole (*Limanda aspera*)

Yellowfin sole were locally abundant in bays around Kodiak Island and the Alaska Peninsula near the Shumagin Islands, but were not widely distributed in the survey area. They were the twelfth and fifteenth most abundant species in the Shumagin Islands and Kodiak regions respectively, but not common elsewhere (Table 2). Yellowfin sole were only caught in nearshore strata, all 41 hauls containing this species were in the shallowest depth zone (Fig. 16; Tables 17 and 18). The highest mean CPUEs were noted in the Lower Alaska Peninsula, the Northern Kodiak Shallows and on the Albatross Shallows (Table 18). These three strata accounted for approximately 92% of the survey area's biomass estimate despite accounting for less than 5% of the survey area (Table 18, Appendix Table A-1).

Table 17. -- Number of survey hauls, number of hauls with yellowfin sole, mean CPUE, biomass, and mean weight, based on the 2011 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	105	22	6.31	26,057	5,027	47,086	0.467
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	22	4.12	26,057	5,027	47,086	0.467
Chirikof	1 - 100	68	7	0.83	2,161	142	4,180	0.425
	101 - 200	56	0	---	---	---	---	---
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	7	0.33	2,161	142	4,180	0.425
Kodiak	1 - 100	87	11	4.67	17,978	0	36,651	0.448
	101 - 200	107	0	---	---	---	---	---
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	11	1.83	17,978	0	36,651	0.448
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
Southeastern	1 - 100	8	1	0.58	380	0	1,257	0.244
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	1	0.14	380	0	1,257	0.244
All areas	1 - 100	282	41	3.61	46,576	18,750	74,402	0.454
	101 - 200	255	0	---	---	---	---	---
	201 - 300	83	0	---	---	---	---	---
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	41	1.51	46,576	18,750	74,402	0.454

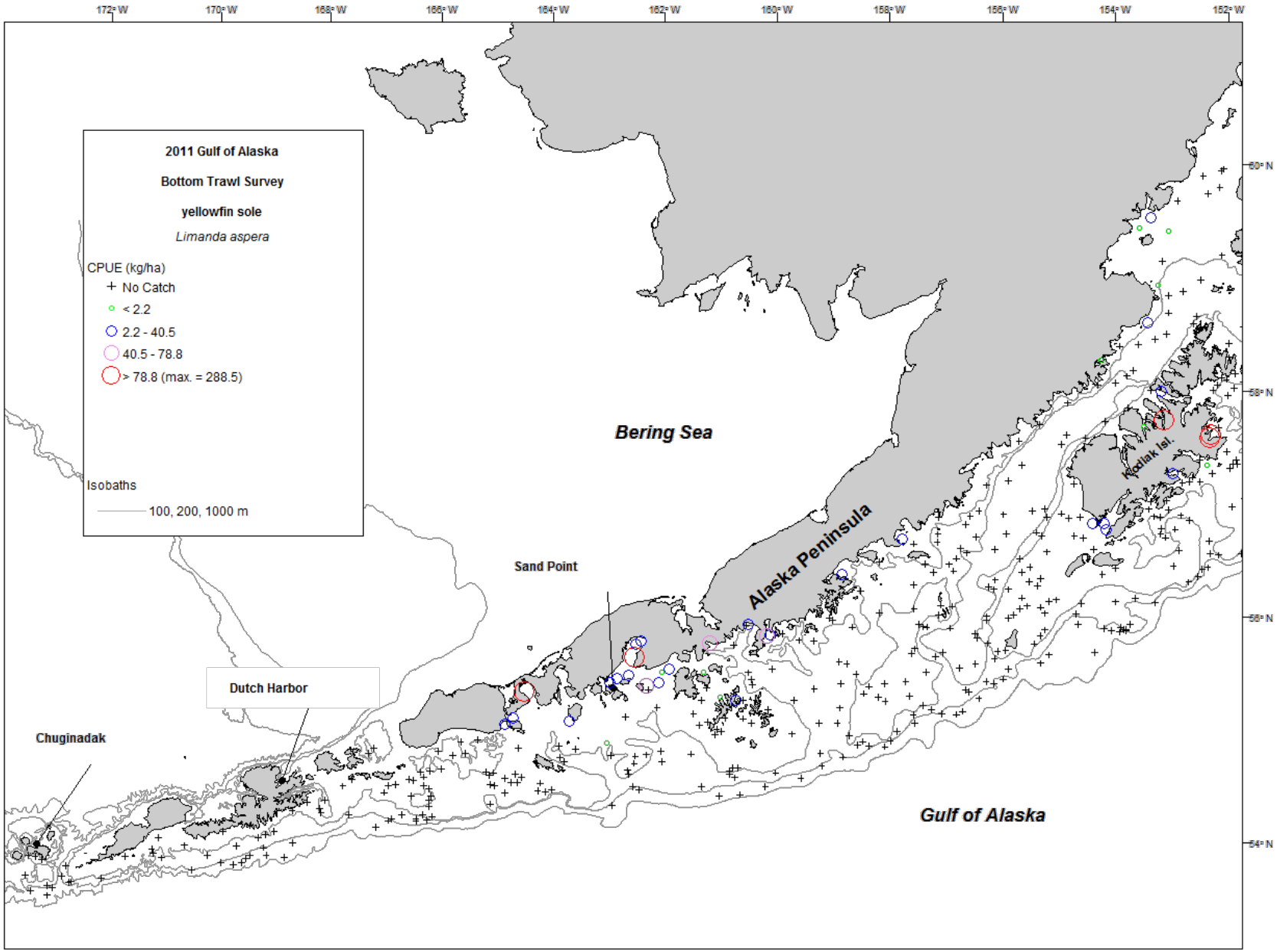

Figure 16. -- Distribution and relative abundance of yellowfin sole from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

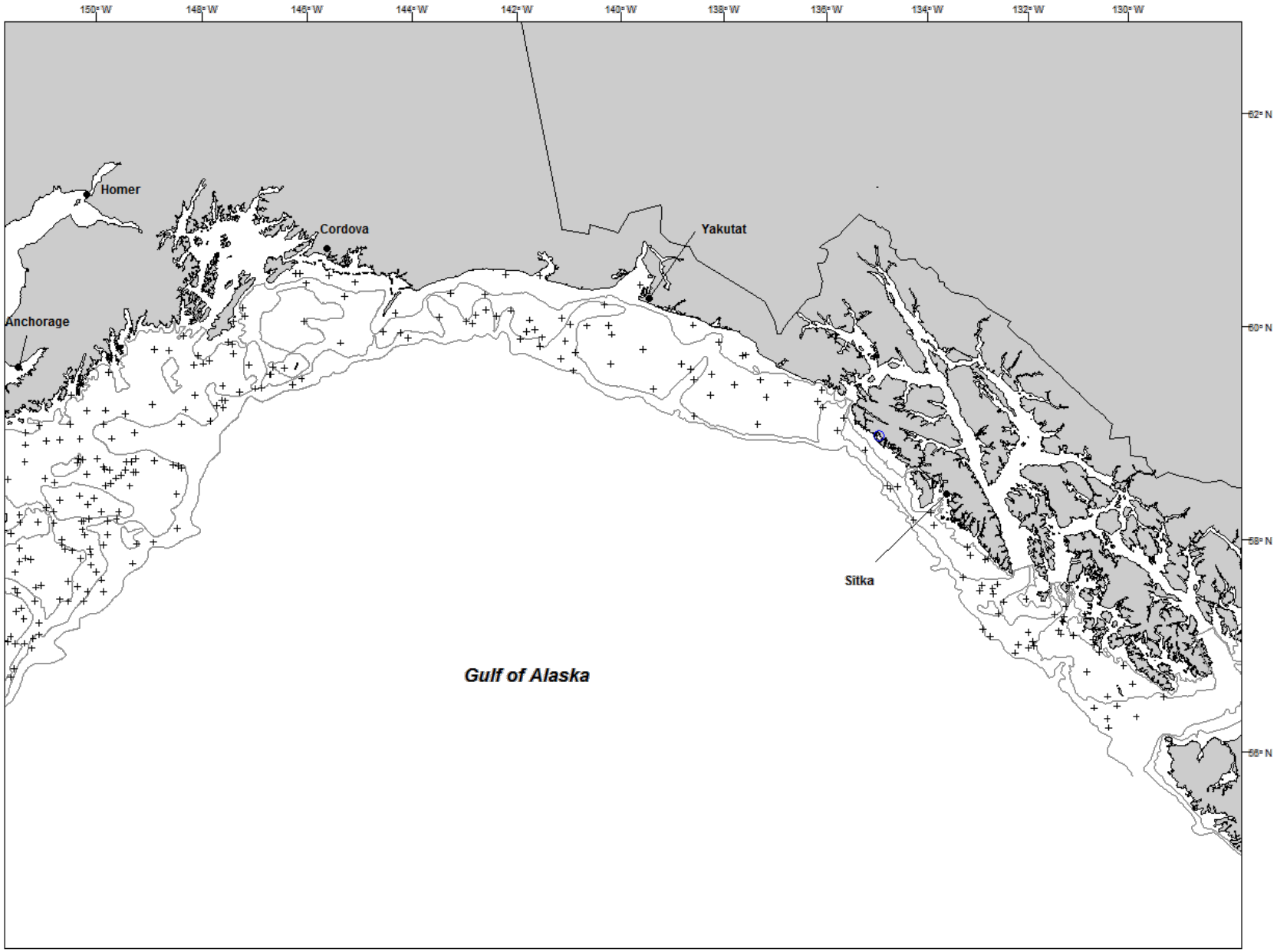

Figure 16. -- Continued.

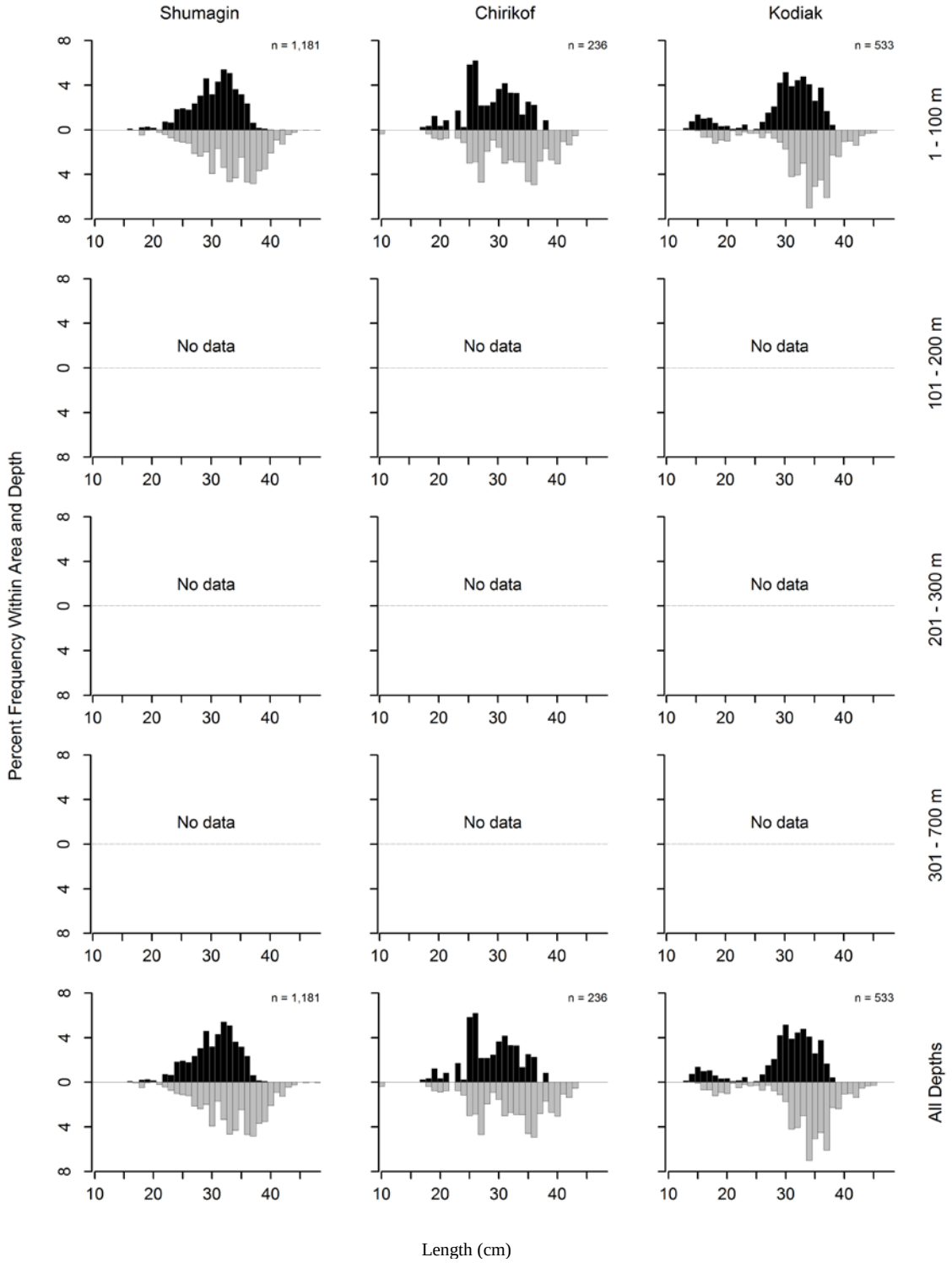

Figure 17. -- Size composition of yellowfin sole from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

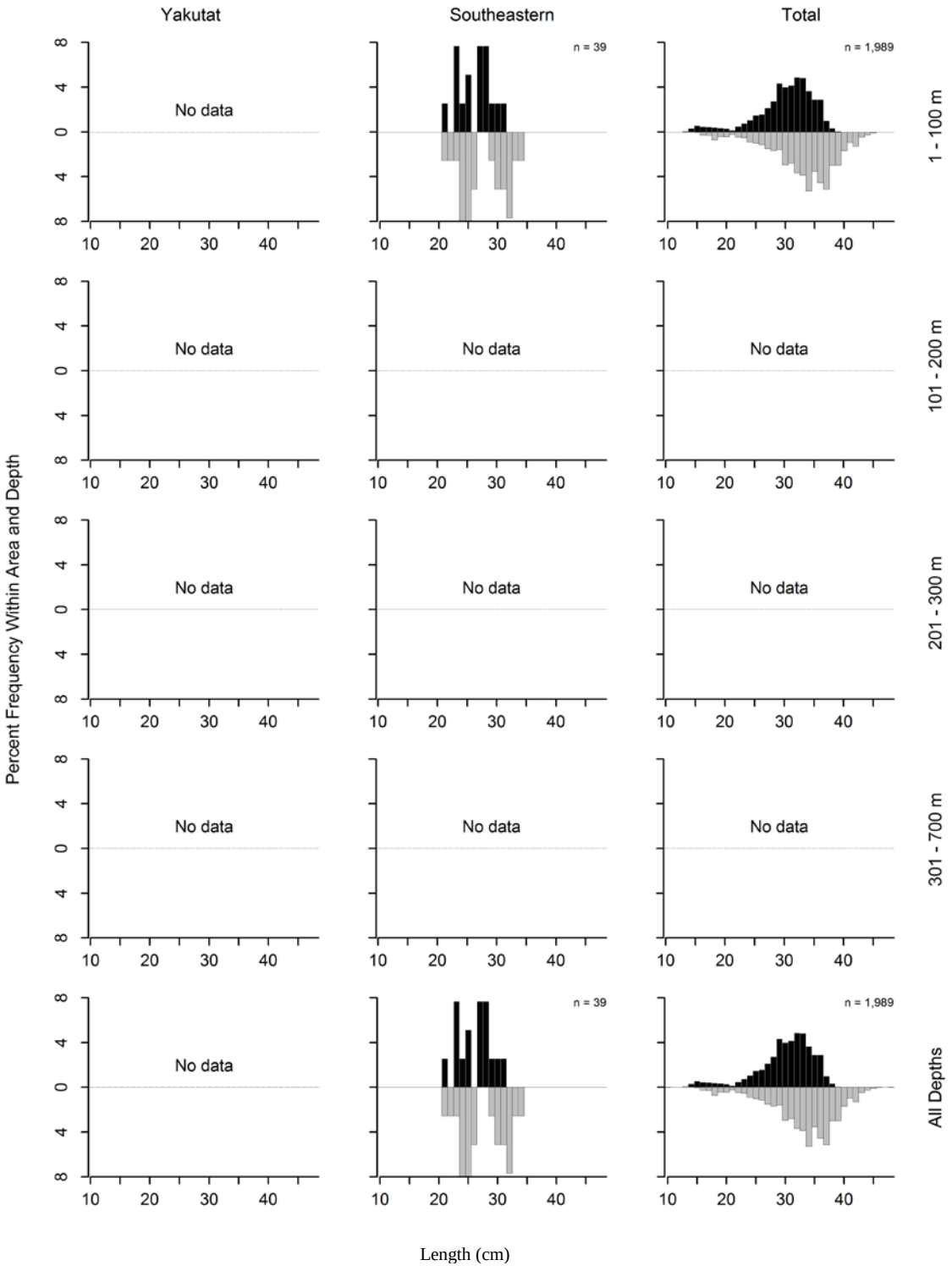

Figure 17. -- Continued (yellowfin sole).

Table 18. --Catch per unit of effort by stratum for yellowfin sole sorted by descending CPUE for the 2011 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	36.73	25,256	4,175	46,337
Kodiak	1 - 100	Northern Kodiak Shallows	6	3	23.63	5,197	0	14,636
Kodiak	1 - 100	Albatross Shallows	25	4	21.24	12,245	0	29,525
Chirikof	1 - 100	Upper Alaska Peninsula	18	4	1.73	1,373	0	3,225
Chirikof	1 - 100	Chirikof Bank	34	3	0.73	788	0	1,695
Southeastern	1 - 100	Southeastern Shallows	8	1	0.58	380	0	1,280
Kodiak	1 - 100	Lower Cook Inlet	12	4	0.54	536	11	1,061
Shumagin	1 - 100	Davidson Bank	39	1	0.35	482	0	1,466
Shumagin	1 - 100	Shumagin Bank	31	5	0.26	319	0	737

Other Flatfishes

Alaska plaice (*Pleuronectes quadrituberculatus*)

Alaska plaice were very uncommon in the survey appearing in only 34 of 670 tows. Except for one tow with specimens in the 100 – 200 m depth stratum, all occurrences were in shallower water. Approximately 92% of the estimated biomass of Alaska plaice in the survey area came from just two strata-- the Upper Alaska Peninsula in the Chirikof INPFC area and the Lower Alaska Peninsula stratum in the Shumagin INPFC area (Table 20). Together these two strata make up just 5 % of the entire survey area and approximately 11% of the survey area in the shallow depth range (Appendix Table A-1). No Alaska plaice were caught in the Yakutat or Southeastern INPFC areas (Table 19).

Starry flounder (*Platichthys stellatus*)

Catches of starry flounder were almost exclusively confined to water depths less than 100 m in all INPFC areas (Table 21). The highest densities were recorded in Middleton Shallows and in the Yakutat Shallows strata both of which are in the Yakutat INPFC area (Table 22).

English sole (*Parophrys vetulus*)

Although English sole were found in all five of the INPFC area in waters between 1 and 300 m, 78% of the estimated biomass came from just two of the INPFC areas, the Kodiak and Yakutat areas in water less than 100 m (Table 23). Approximately 67% of the estimated biomass of English sole in the survey area came from three strata (Northern Kodiak Shallows,

Middleton Shallows, and Yakutat Shallows) (Table 24). Combined, these three strata represent just 6 % of the entire survey area (Appendix Table A-1). Mean weight generally increased with depth.

Butter sole (*Isopsetta isolepis*)

Butter sole were encountered in all five of the INPFC areas although in the Southeastern INPFC area they were only encountered in one tow. They were almost exclusively found in water less than 100 m deep (Table 25). This species was relatively well distributed throughout the four western INPFC areas appearing in 16 strata. Six of these strata produced 82% of the estimated biomass. (Table 26).

Table 19. -- Number of survey hauls, number of hauls with Alaska plaice, mean CPUE, biomass, and mean weight, based on the 2011 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	105	19	1.28	5,271	2,312	8,230	1.465
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	19	0.83	5,271	2,312	8,230	1.465
Chirikof	1 - 100	68	6	2.55	6,635	0	15,807	1.616
	101 - 200	56	0	---	---	---	---	---
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	6	1.02	6,635	0	15,807	1.616
Kodiak	1 - 100	87	8	0.08	327	0	755	1.124
	101 - 200	107	1	0.01	33	0	102	1.333
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	9	0.04	359	0	790	1.140
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	0	---	---	---	---	---
All areas	1 - 100	282	33	0.95	12,233	2,677	21,789	1.530
	101 - 200	255	1	<0.01	33	0	102	1.333
	201 - 300	83	0	---	---	---	---	---
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	34	0.40	12,266	2,710	21,822	1.529

Table 20. -- Catch per unit of effort by stratum for Alaska plaice sorted by descending CPUE for the 2011 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	Upper Alaska Peninsula	18	3	7.96	6,321	0	15,513
Shumagin	1 - 100	Lower Alaska Peninsula	19	14	7.30	5,022	2,053	7,991
Kodiak	1 - 100	Northern Kodiak Shallows	6	3	0.37	82	0	207
Chirikof	1 - 100	Chirikof Bank	34	3	0.29	314	0	884
Kodiak	1 - 100	Lower Cook Inlet	12	3	0.20	196	0	609
Shumagin	1 - 100	Shumagin Bank	31	3	0.13	162	0	376
Kodiak	1 - 100	Albatross Shallows	25	2	0.09	49	0	120
Shumagin	1 - 100	Davidson Bank	39	2	0.06	87	0	214
Kodiak	101 - 200	Barren Islands	18	1	0.03	33	0	102

Table 21. -- Number of survey hauls, number of hauls with starry flounder, mean CPUE, biomass, and mean weight, based on the 2011 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	105	15	1.37	5,670	1,020	10,321	1.707
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	15	0.9	5,670	1,020	10,321	1.707
Chirikof	1 - 100	68	10	2.26	5,881	0	14,694	2.662
	101 - 200	56	0	---	---	---	---	---
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	10	0.9	5,881	0	14,694	2.662
Kodiak	1 - 100	87	17	2.27	8,751	607	16,895	2.123
	101 - 200	107	1	0.02	71	0	219	5.398
	201 - 300	24	1	0.06	70	0	294	1.558
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	19	0.91	8,893	746	17,040	2.127
Yakutat	1 - 100	14	7	11.53	19,218	0	39,476	1.892
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	7	3.47	19,218	0	39,476	1.892
Southeastern	1 - 100	8	1	0.15	96	0	318	2.410
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	1	0.04	96	0	318	2.410
All areas	1 - 100	282	50	3.07	39,616	16,038	63,194	1.996
	101 - 200	255	1	0.01	71	0	219	5.398
	201 - 300	83	1	0.02	70	0	294	1.558
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	52	1.29	39,757	16,178	63,336	1.997

Table 22. --Catch per unit of effort by stratum for starry flounder sorted by descending CPUE for the 2011 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	Middleton Shallows	6	4	12.48	8,382	0	18,474
Yakutat	1 - 100	Yakutat Shallows	8	3	10.89	10,835	0	30,233
Kodiak	1 - 100	Lower Cook Inlet	12	6	6.50	6,424	0	14,269
Chirikof	1 - 100	Chirikof Bank	34	6	4.52	4,882	0	13,554
Kodiak	1 - 100	Northern Kodiak Shallows	6	3	4.34	954	0	3,193
Shumagin	1 - 100	Lower Alaska Peninsula	19	9	3.69	2,537	224	4,849
Shumagin	1 - 100	Shumagin Bank	31	4	1.80	2,228	0	6,060
Kodiak	1 - 100	Albatross Shallows	25	5	1.59	918	0	2,535
Chirikof	1 - 100	Upper Alaska Peninsula	18	4	1.26	999	0	2,621
Shumagin	1 - 100	Davidson Bank	39	1	0.53	728	0	2,216
Kodiak	1 - 100	Albatross Banks	38	3	0.30	456	0	1,222
Kodiak	201 - 300	Upper Shelikof Gully	3	1	0.22	70	0	372
Shumagin	1 - 100	Fox Islands	16	1	0.21	177	0	556
Southeastern	1 - 100	Southeastern Shallows	8	1	0.15	96	0	324
Kodiak	101 - 200	Portlock Flats	25	1	0.10	71	0	219

Table 23. -- Number of survey hauls, number of hauls with English sole, mean CPUE, biomass, and mean weight, based on the 2011 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	105	8	0.23	941	0	2,655	1.206
	101 - 200	37	1	0.01	20	0	62	0.831
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	9	0.15	961	0	2,676	1.195
Chirikof	1 - 100	68	3	0.21	549	0	1,558	0.890
	101 - 200	56	1	0.01	34	0	104	1.355
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	4	0.09	583	0	1,595	0.909
Kodiak	1 - 100	87	10	1.31	5,052	0	10,447	0.754
	101 - 200	107	6	0.07	297	0	680	0.571
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	16	0.55	5,349	0	10,759	0.741
Yakutat	1 - 100	14	10	4.83	8,042	677	15,407	0.537
	101 - 200	33	4	0.04	103	0	226	0.572
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	14	1.47	8,145	779	15,511	0.537
Southeastern	1 - 100	8	4	1.08	707	0	2,002	0.514
	101 - 200	22	8	0.73	810	0	2,000	0.589
	201 - 300	15	2	0.33	165	0	502	0.762
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	14	0.63	1,682	0	3,378	0.567
All areas	1 - 100	282	35	1.18	15,291	6,057	24,524	0.625
	101 - 200	255	20	0.1	1,265	42	2,487	0.595
	201 - 300	83	2	0.05	165	0	502	0.762
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	57	0.54	16,720	7,396	26,044	0.624

Table 24. --Catch per unit of effort by stratum for English sole sorted by descending CPUE for the 2011 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	6	4	14.65	3,223	0	9,165
Yakutat	1 - 100	Middleton Shallows	6	4	6.78	4,553	0	12,266
Yakutat	1 - 100	Yakutat Shallows	8	6	3.51	3,490	0	6,994
Kodiak	1 - 100	Kenai Peninsula	6	2	1.56	821	0	2,845
Kodiak	1 - 100	Albatross Shallows	25	3	1.42	820	0	2,002
Southeastern	101 - 200	Prince of Wales Shelf	14	5	1.11	764	0	1,961
Southeastern	1 - 100	Southeastern Shallows	8	4	1.08	707	0	2,036
Chirikof	1 - 100	Upper Alaska Peninsula	18	2	0.68	539	0	1,552
Shumagin	1 - 100	Shumagin Bank	31	1	0.68	839	0	2,551
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	2	0.42	165	0	506
Kodiak	1 - 100	Lower Cook Inlet	12	1	0.19	189	0	603
Kodiak	101 - 200	Barren Islands	18	3	0.17	190	0	528
Yakutat	101 - 200	Middleton Shelf	9	3	0.12	90	0	215
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	3	0.11	46	0	103
Kodiak	101 - 200	Kenai Flats	17	1	0.08	97	0	303
Shumagin	1 - 100	Davidson Bank	39	5	0.05	62	1	123
Chirikof	101 - 200	Shelikof Edge	26	1	0.04	34	0	105
Shumagin	1 - 100	Fox Islands	16	1	0.03	24	0	74
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.03	20	0	62
Shumagin	1 - 100	Lower Alaska Peninsula	19	1	0.02	17	0	52
Yakutat	101 - 200	Yakutat Flats	9	1	0.01	13	0	43
Chirikof	1 - 100	Chirikof Bank	34	1	0.01	10	0	30
Kodiak	101 - 200	Portlock Flats	25	1	0.01	5	0	15
Kodiak	101 - 200	Albatross Gullies	29	1	0.01	6	0	17

Table 25. -- Number of survey hauls, number of hauls with butter sole, mean CPUE, biomass, and mean weight, based on the 2011 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	105	19	1.62	6,687	0	14,711	0.502
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	19	1.06	6,687	0	14,711	0.502
Chirikof	1 - 100	68	14	0.97	2,517	344	4,691	0.316
	101 - 200	56	2	0.2	467	0	1,387	0.292
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	16	0.46	2,984	654	5,314	0.312
Kodiak	1 - 100	87	26	1.18	4,544	1,410	7,677	0.256
	101 - 200	107	1	---	13	0	40	0.377
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	27	0.47	4,557	1,423	7,691	0.256
Yakutat	1 - 100	14	6	3.24	5,405	114	10,696	0.228
	101 - 200	33	2	0.02	58	0	151	0.231
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	8	0.99	5,462	170	10,754	0.228
Southeastern	1 - 100	8	1	0.01	4	0	13	0.110
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	1	<0.01	4	0	13	0.110
All areas	1 - 100	282	66	1.48	19,157	9,230	29,084	0.305
	101 - 200	255	5	0.04	538	0	1,460	0.286
	201 - 300	83	0	---	---	---	---	---
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	71	0.64	19,695	9,726	29,663	0.304

Table 26. --Catch per unit of effort by stratum for butter sole sorted by descending CPUE for the 2011 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	Middleton Shallows	6	4	7.27	4,878	0	10,561
Shumagin	1 - 100	Davidson Bank	39	4	2.81	3,844	0	11,638
Kodiak	1 - 100	Albatross Shallows	25	12	2.66	1,534	0	3,501
Kodiak	1 - 100	Lower Cook Inlet	12	8	2.53	2,503	110	4,895
Shumagin	1 - 100	Lower Alaska Peninsula	19	8	2.22	1,524	0	3,327
Chirikof	1 - 100	Chirikof Bank	34	12	1.81	1,948	74	3,822
Shumagin	1 - 100	Shumagin Bank	31	6	0.74	913	0	2,011
Chirikof	1 - 100	Upper Alaska Peninsula	18	2	0.72	569	0	1,754
Chirikof	101 - 200	Shelikof Edge	26	2	0.60	467	0	1,389
Yakutat	1 - 100	Yakutat Shallows	8	2	0.53	526	0	1,343
Kodiak	1 - 100	Northern Kodiak Shallows	6	2	0.49	108	0	361
Shumagin	1 - 100	Fox Islands	16	1	0.49	407	0	1,273
Kodiak	1 - 100	Albatross Banks	38	4	0.26	399	0	1,065
Yakutat	101 - 200	Middleton Shelf	9	1	0.05	40	0	131
Yakutat	101 - 200	Yakutat Flats	9	1	0.02	18	0	60
Kodiak	101 - 200	Albatross Gullies	29	1	0.02	13	0	40
Southeastern	1 - 100	Southeastern Shallows	8	1	0.01	4	0	13

Walleye Pollock (*Theragra chalcogramma*)

Walleye pollock was the third most abundant species caught in the 2011 survey (Table 2). Pollock were caught throughout the survey area (Fig. 18) in 50 of the 59 survey strata and at all depths less than 700 m (Tables 27 and 28). They were most abundant at depths less than 200 m, where 92% of the estimated total biomass occurred. They were caught in approximately 77% of the trawls less than 300 m deep, including 90% of the trawls in depths between 201 and 300 m. The highest CPUEs were recorded in shallow strata (1-100 m) in the Shumagin, Chirikof, and Kodiak INPFC areas; the highest CPUE (63.25 kg/ha) was recorded from the Lower Alaska Peninsula stratum in the Shumagin INPFC area (Table 28). Mean weight increased with depth to 500 m in three of the five INPFC areas (Shumagin, Yakutat, Southeastern) but mean weight decreased between 201 - 300 m in the Chirikof and Kodiak areas (Table 27). Young-of-the-year pollock with a length mode centered around 15 cm occurred at depths less than 200 m in the Shumagin, Chirikof, and Kodiak INPFC areas as well as at depths between 201 and 300 m in the Chirikof and Kodiak areas (Fig. 19). Juveniles of approximately 20 cm occurred in the Yakutat and Southeastern INPFC areas in depths less than 200 m.

Table 27. -- Number of survey hauls, number of hauls with walleye pollock, mean CPUE, biomass, and mean weight, based on the 2011 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	105	81	44.53	183,866	58,446	309,286	1.138
	101 - 200	37	32	30.33	44,513	12,359	76,666	0.979
	201 - 300	11	9	7.82	2,179	0	4,456	1.192
	301 - 500	7	1	0.13	32	0	108	1.690
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	123	36.43	230,589	101,282	359,897	1.104
Chirikof	1 - 100	68	39	33.22	86,484	671	172,296	0.879
	101 - 200	56	47	26.06	62,159	12,215	112,103	0.954
	201 - 300	20	18	14.37	16,587	1,654	31,520	0.235
	301 - 500	6	1	0.29	47	0	161	1.131
	501 - 700	5	2	0.24	47	0	129	0.958
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	107	25.44	165,323	66,946	263,700	0.705
Kodiak	1 - 100	87	54	32.19	123,968	39,303	208,633	0.419
	101 - 200	107	86	23.28	100,867	29,202	172,532	0.928
	201 - 300	24	21	11.6	13,330	746	25,914	0.209
	301 - 500	6	4	5.79	1,686	0	5,285	1.029
	501 - 700	4	1	1.9	331	0	1,248	0.909
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	166	24.51	240,181	130,136	350,226	0.511
Yakutat	1 - 100	14	12	4.76	7,923	1,681	14,166	0.320
	101 - 200	33	29	7.34	21,562	4,394	38,729	0.259
	201 - 300	13	13	12.47	6,445	0	13,944	0.638
	301 - 500	6	1	0.1	25	0	105	0.910
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	55	6.5	35,955	17,027	54,882	0.304
Southeastern	1 - 100	8	6	20.86	13,652	0	33,202	0.186
	101 - 200	22	18	8.22	9,109	2,888	15,329	0.300
	201 - 300	15	14	25.53	12,900	0	30,605	0.840
	301 - 500	8	3	1.23	383	0	886	0.894
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	41	13.43	36,044	9,754	62,334	0.302
All areas	1 - 100	282	192	32.23	415,893	244,043	587,743	0.636
	101 - 200	255	212	19.47	238,209	145,844	330,575	0.716
	201 - 300	83	75	14.27	51,441	25,573	77,308	0.318
	301 - 500	33	10	1.7	2,172	0	5,812	1.009
	501 - 700	17	3	0.46	377	0	1,299	0.914
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	492	22.96	708,092	512,665	903,520	0.615

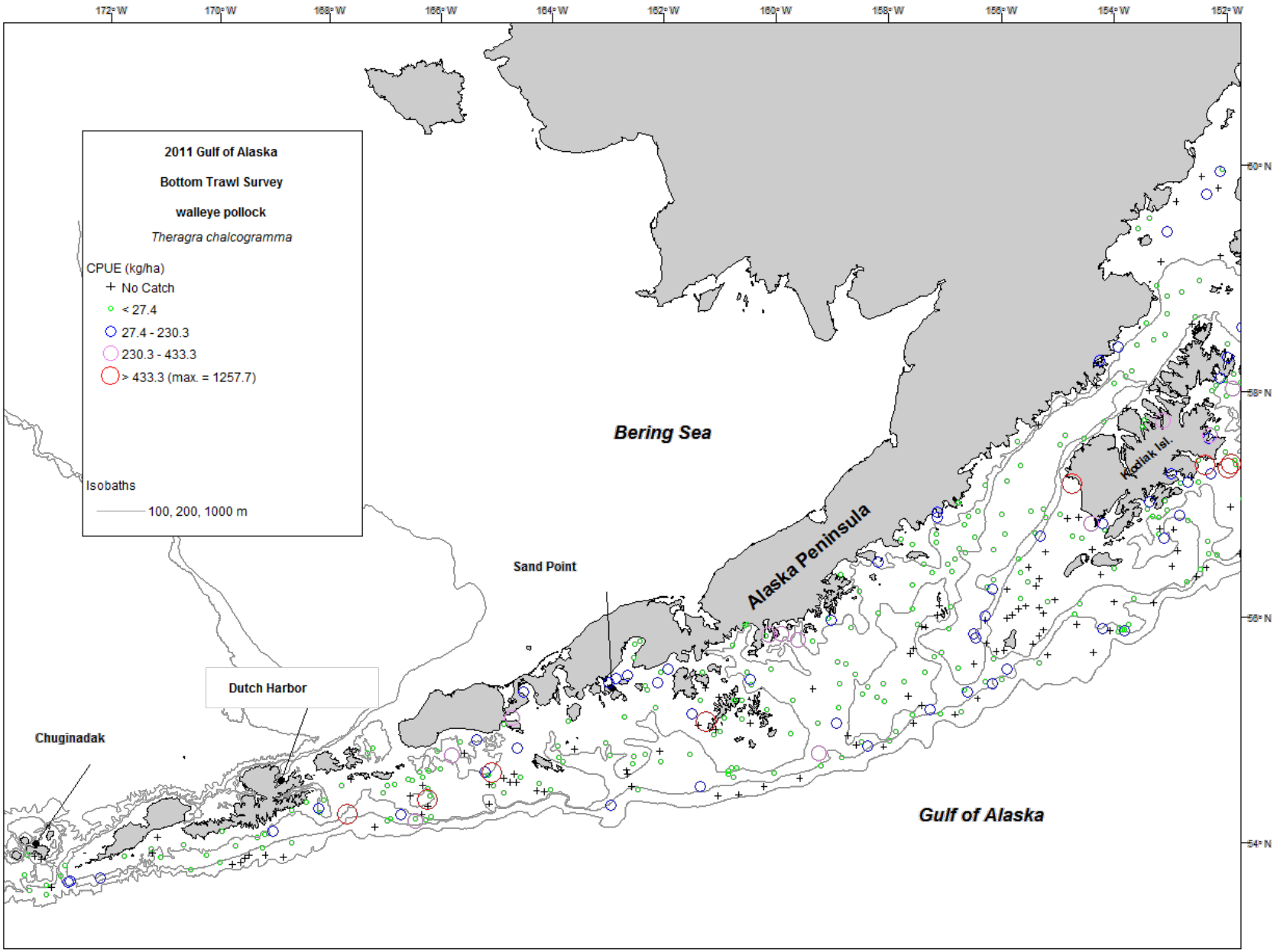

Figure 18. -- Distribution and relative abundance of walleye pollock from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

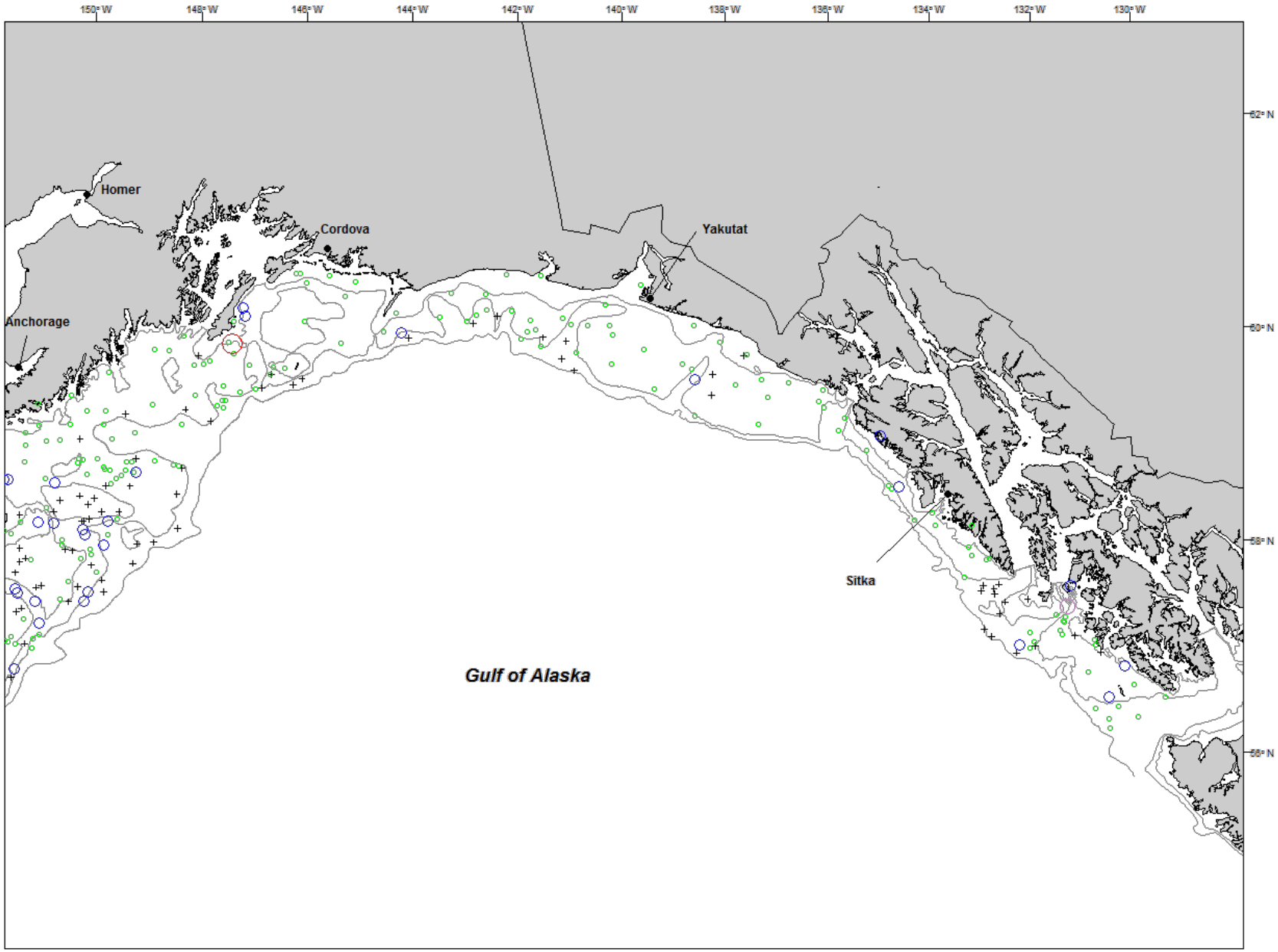

Figure 18. -- Continued.

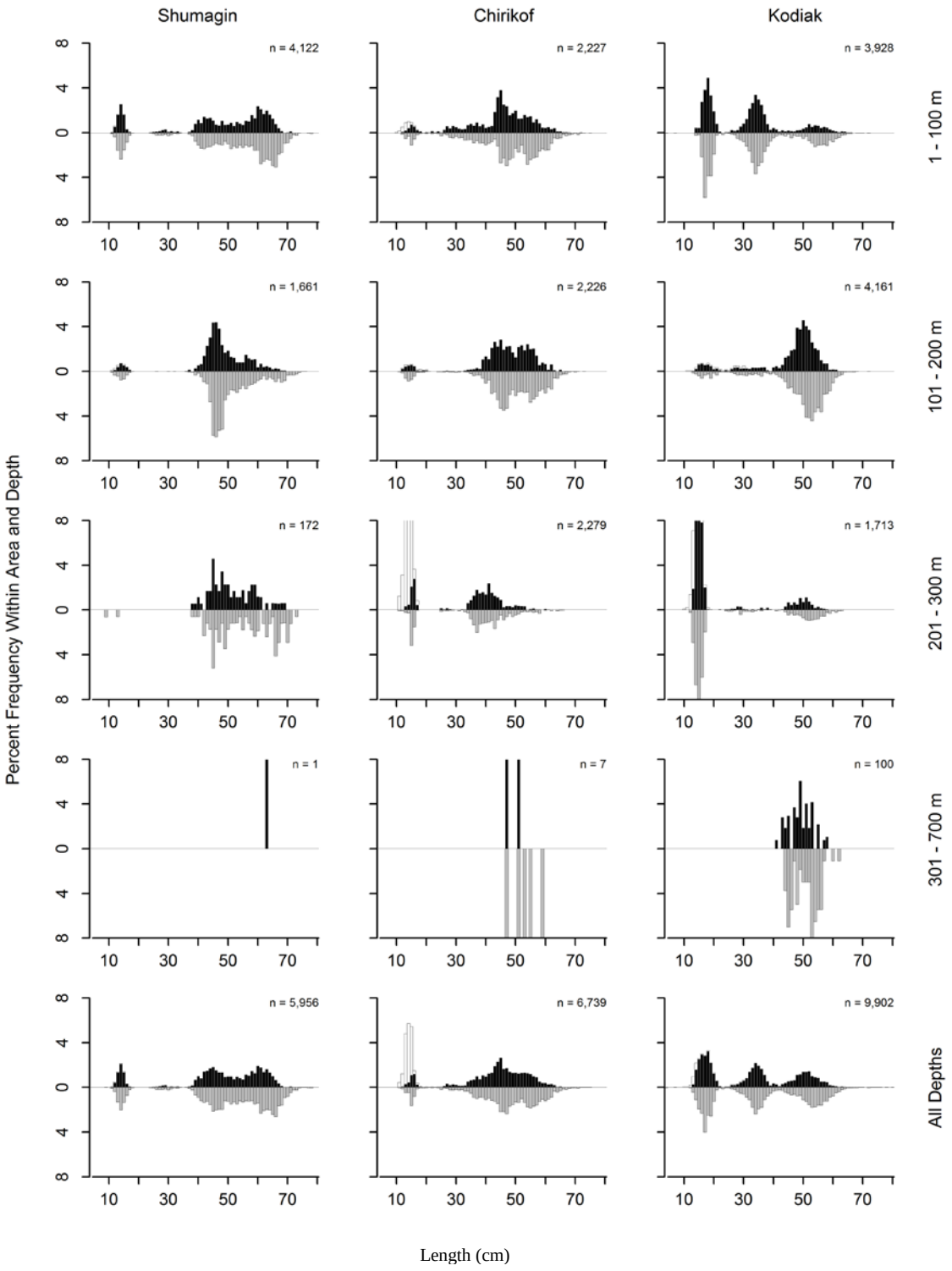

Figure 19. -- Size composition of walleye pollock from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

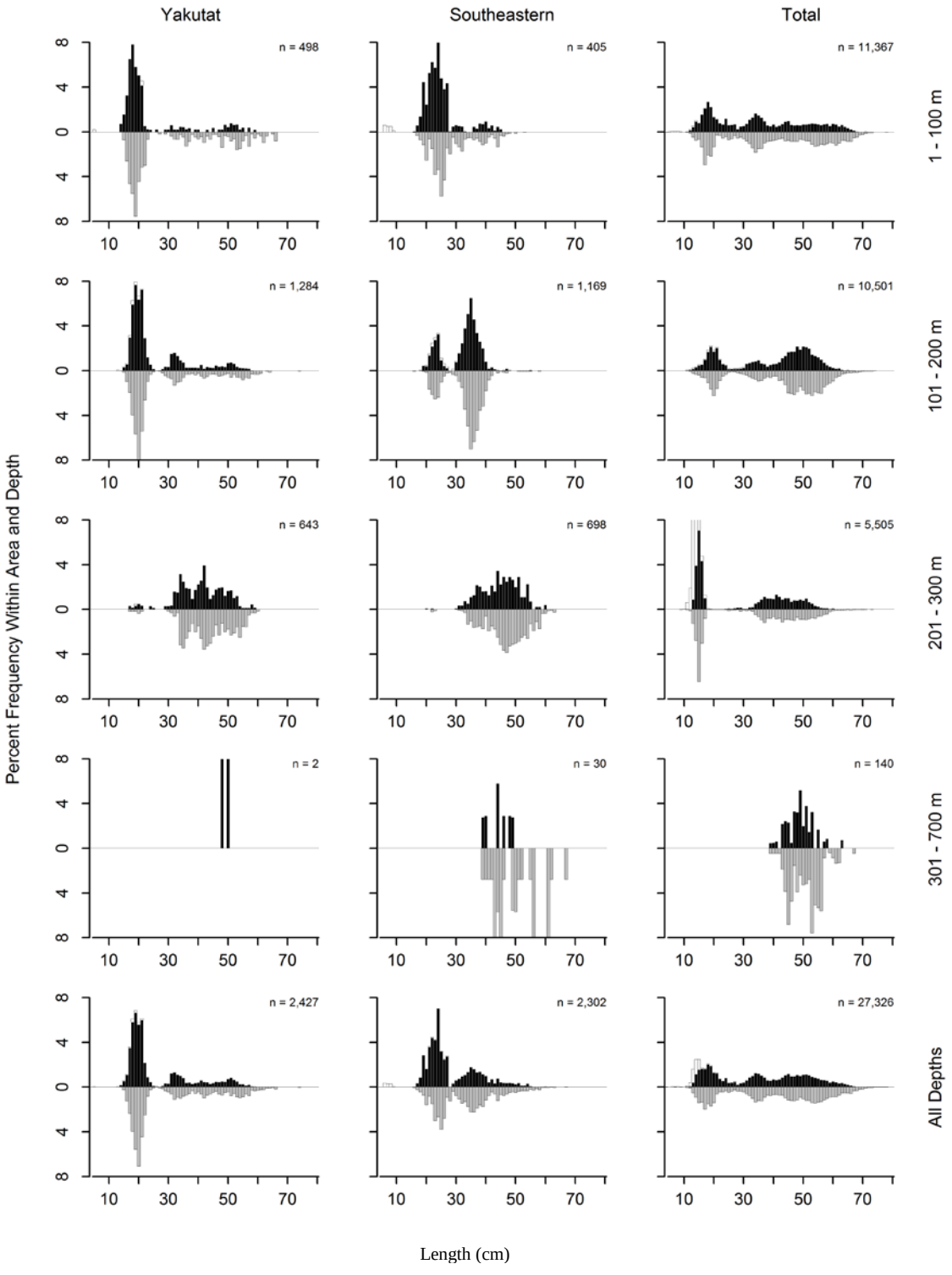

Figure 19. -- Continued (walleye pollock).

Table 28. -- Catch per unit of effort by stratum for walleye pollock sorted by descending CPUE for the 2011 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	63.25	43,491	10,543	76,440
Kodiak	1 - 100	Northern Kodiak Shallows	6	3	58.01	12,759	0	43,601
Shumagin	1 - 100	Davidson Bank	39	26	55.74	76,262	0	156,936
Kodiak	1 - 100	Albatross Shallows	25	22	53.65	30,933	3,195	58,671
Chirikof	1 - 100	Chirikof Bank	34	13	52.41	56,563	0	139,545
Chirikof	101 - 200	Chirikof Outer Shelf	16	13	51.29	25,700	1,512	49,888
Kodiak	101 - 200	Albatross Gullies	29	23	49.45	39,126	12,850	65,402
Shumagin	101 - 200	Shumagin Outer Shelf	27	23	49.32	40,212	8,273	72,151
Shumagin	1 - 100	Shumagin Bank	31	23	46.45	57,587	0	151,643
Kodiak	1 - 100	Albatross Banks	38	17	39.36	60,633	0	136,373
Chirikof	1 - 100	Upper Alaska Peninsula	18	16	36.92	29,317	6,762	51,872
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	10	29.55	11,603	0	29,472
Kodiak	101 - 200	Kenai Flats	17	15	26.81	32,381	0	97,465
Chirikof	101 - 200	East Shumagin Gully	14	13	25.48	28,288	0	72,269
Kodiak	101 - 200	Kodiak Outer Shelf	18	10	23.69	11,905	0	26,057
Southeastern	1 - 100	Southeastern Shallows	8	6	20.86	13,652	0	33,702
Yakutat	201 - 300	Yakutat Slope	6	6	20.82	4,429	0	12,442
Chirikof	201 - 300	Chirikof Slope	6	5	20.78	3,175	0	9,981
Yakutat	101 - 200	Middleton Shelf	9	8	17.26	12,678	0	29,771
Kodiak	1 - 100	Lower Cook Inlet	12	7	17.18	16,983	1,080	32,887
Shumagin	101 - 200	West Shumagin Gully	4	4	16.91	3,852	0	11,053
Kodiak	201 - 300	Kodiak Slope	6	4	14.04	2,278	0	4,988
Chirikof	201 - 300	Lower Shelikof Gully	14	13	13.39	13,412	0	27,320
Kodiak	201 - 300	Kenai Gullies	15	14	12.30	8,191	0	20,617
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	11.52	1,297	0	3,285
Chirikof	101 - 200	Shelikof Edge	26	21	10.56	8,171	1,157	15,184
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	8	9.62	4,035	0	8,419
Kodiak	101 - 200	Barren Islands	18	18	9.60	10,543	4,244	16,841
Kodiak	101 - 200	Portlock Flats	25	20	9.42	6,913	0	13,889
Kodiak	201 - 300	Upper Shelikof Gully	3	3	8.92	2,860	0	6,104
Shumagin	1 - 100	Fox Islands	16	14	7.83	6,526	2,179	10,873
Shumagin	201 - 300	Shumagin Slope	11	9	7.82	2,179	0	4,484
Southeastern	101 - 200	Prince of Wales Shelf	14	10	7.37	5,074	4	10,143
Yakutat	201 - 300	Yakutat Gullies	7	7	6.63	2,016	0	4,780
Yakutat	101 - 200	Fairweather Shelf	7	6	6.21	4,800	0	9,918
Kodiak	301 - 500	Kodiak Slope	6	4	5.79	1,686	0	5,468
Kodiak	1 - 100	Kenai Peninsula	6	5	5.06	2,659	0	6,730
Yakutat	1 - 100	Middleton Shallows	6	6	4.93	3,308	1,374	5,243
Yakutat	1 - 100	Yakutat Shallows	8	6	4.64	4,615	0	10,895
Yakutat	101 - 200	Yakutat Flats	9	9	4.15	3,747	0	8,264
Kodiak	501 - 700	Kodiak Slope	4	1	1.90	331	0	1,383
Southeastern	301 - 500	Southeastern Slope	1	1	1.33	103		
Southeastern	301 - 500	Southeastern Deep Gullies	7	2	1.19	280	0	800
Shumagin	101 - 200	Sanak Gully	6	5	1.06	448	0	972
Chirikof	1 - 100	Semidi Bank	16	10	0.83	604	0	1,727
Yakutat	101 - 200	Yakataga Shelf	8	6	0.64	337	77	597
Chirikof	301 - 500	Chirikof Slope	6	1	0.29	47	0	167
Chirikof	501 - 700	Chirikof Slope	5	2	0.24	47	0	136
Yakutat	301 - 500	Yakutat Gullies	3	1	0.23	25	0	133
Shumagin	301 - 500	Shumagin Slope	7	1	0.13	32	0	110

Pacific cod (*Gadus macrocephalus*)

Pacific cod was the fourth most abundant species caught in the 2011 survey in all areas combined and second most abundant in the Chirikof area (Table 2). Cod were caught in all INPFC areas in waters less than 300 m deep (Table 29). Catch per unit effort (CPUE) was highest in the 0 -100 m depth range in all area except the Southeastern INPFC area where it was more abundant in the 100 – 200 m depth range (Table 29). In all areas abundance dropped off significantly in depths greater than 200 m (Table 29). Approximately 81% of the survey-wide biomass was estimated to be shallower than 100 m. Cod occurred in about 88% of the tows in the 1 – 100 m depth range. (Table 29). While the distribution range of this species was wide, it occurred in 39 of the 54 depth strata, the catches with higher abundance were in the western portion of the survey area (Table 30, Fig. 20). Ninety-six percent of the total Pacific cod biomass was estimated to be in the central and western Gulf of Alaska with very low densities in the Yakutat and Southeastern INPFC areas (Table 29). The highest densities were recorded in the Semidi and Chirikof Bank areas in the Chirikof INPFC area (Table 30). Mean weight generally increased with depth. A very distinct length mode occurred at about 40 cm in the Shumagin INPFC area (Fig. 21). This mode was less distinct but closer to 50 - 60 cm in the Chirkiof and Kodiak INPFC areas (Fig. 21).

Table 29. -- Number of survey hauls, number of hauls with Pacific cod, mean CPUE, biomass, and mean weight, based on the 2011 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	105	100	35.38	146,090	75,291	216,889	1.259
	101 - 200	37	33	10.93	16,041	4,632	27,450	1.524
	201 - 300	11	6	5.16	1,440	0	2,909	1.930
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	139	25.84	163,571	92,022	235,120	1.285
Chirikof	1 - 100	68	61	68.06	177,192	68,392	285,992	1.332
	101 - 200	56	45	9.74	23,239	14,424	32,054	2.001
	201 - 300	20	10	1.11	1,278	505	2,050	2.795
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	116	31.04	201,708	92,549	310,867	1.390
Kodiak	1 - 100	87	72	20.54	79,128	33,966	124,289	1.772
	101 - 200	107	84	8.67	37,575	24,009	51,141	1.812
	201 - 300	24	7	1.56	1,791	81	3,501	2.180
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	163	12.09	118,493	71,580	165,406	1.790
Yakutat	1 - 100	14	11	2.9	4,827	2,104	7,549	2.892
	101 - 200	33	7	0.51	1,495	0	3,759	2.669
	201 - 300	13	1	0.17	89	0	307	1.897
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	19	1.16	6,411	3,041	9,780	2.816
Southeastern	1 - 100	8	5	3.15	2,063	0	4,550	1.693
	101 - 200	22	18	6.89	7,635	4,010	11,261	1.404
	201 - 300	15	9	2.16	1,094	239	1,948	2.029
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	32	4.02	10,792	6,520	15,065	1.500
All areas	1 - 100	282	249	31.72	409,299	274,413	544,186	1.380
	101 - 200	255	187	7.03	85,985	66,697	105,273	1.759
	201 - 300	83	33	1.58	5,691	3,280	8,103	2.180
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	469	16.24	500,975	364,696	637,254	1.439

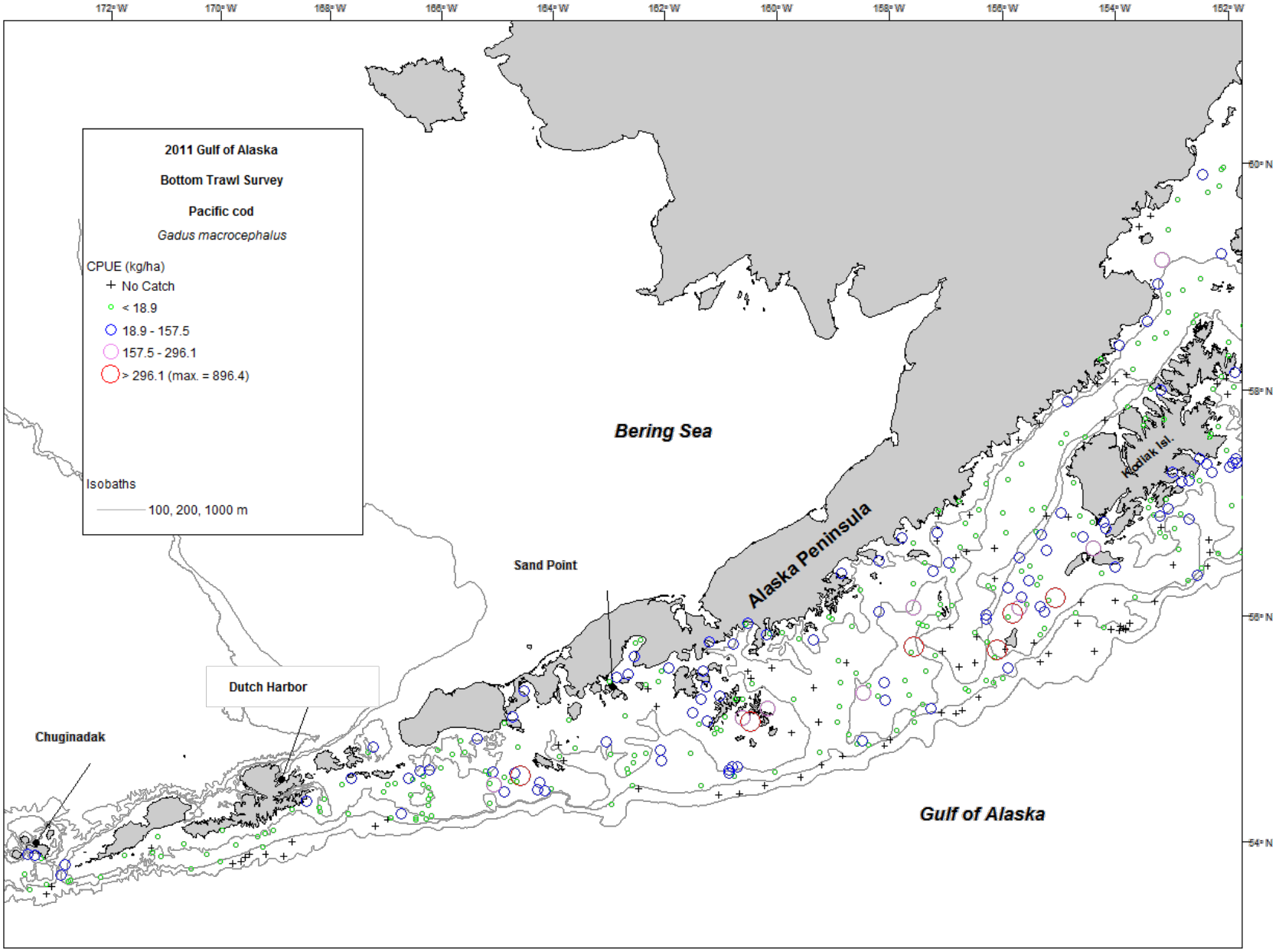

Figure 20. -- Distribution and relative abundance of Pacific cod from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

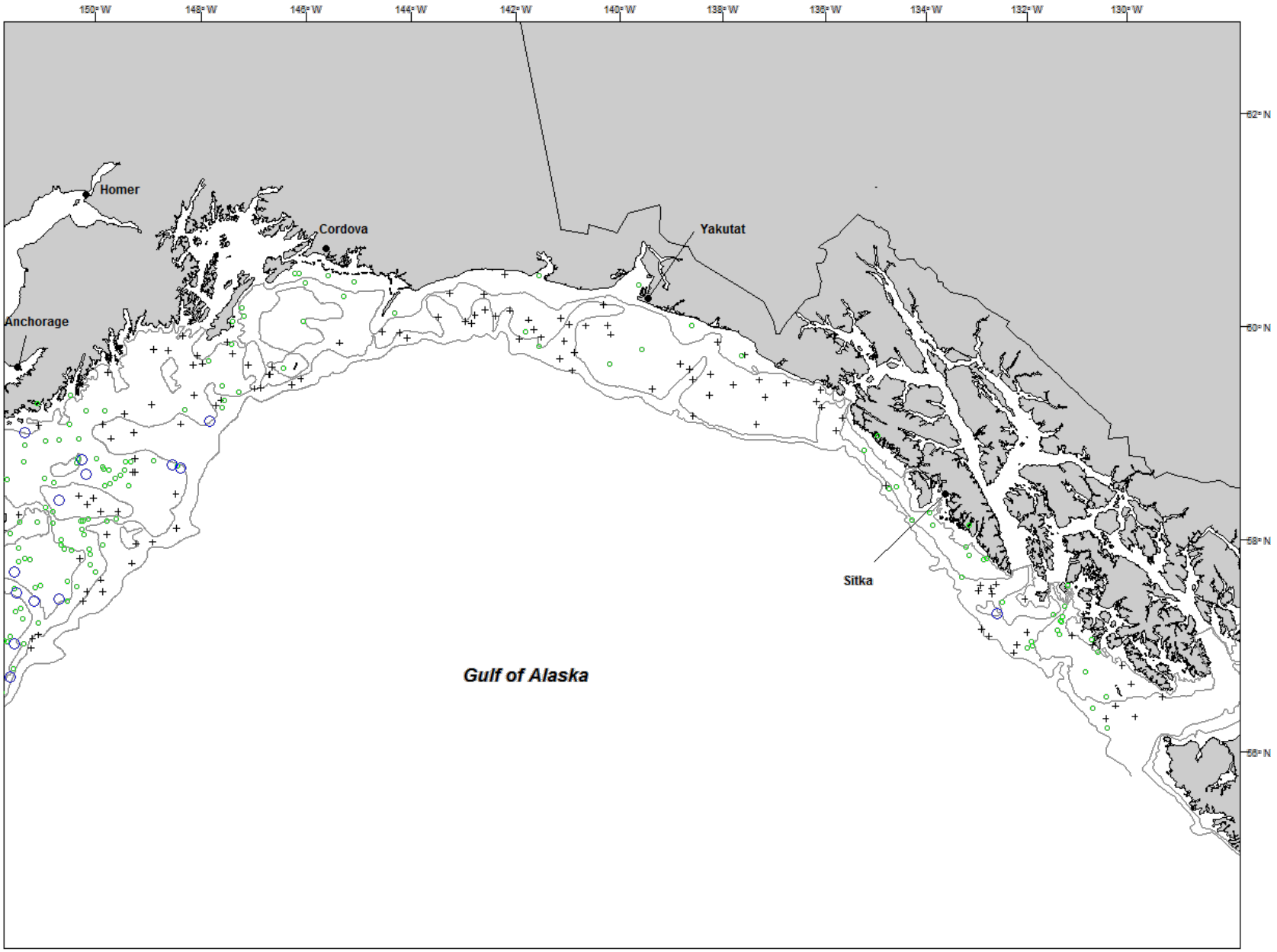

Figure 20. -- Continued.

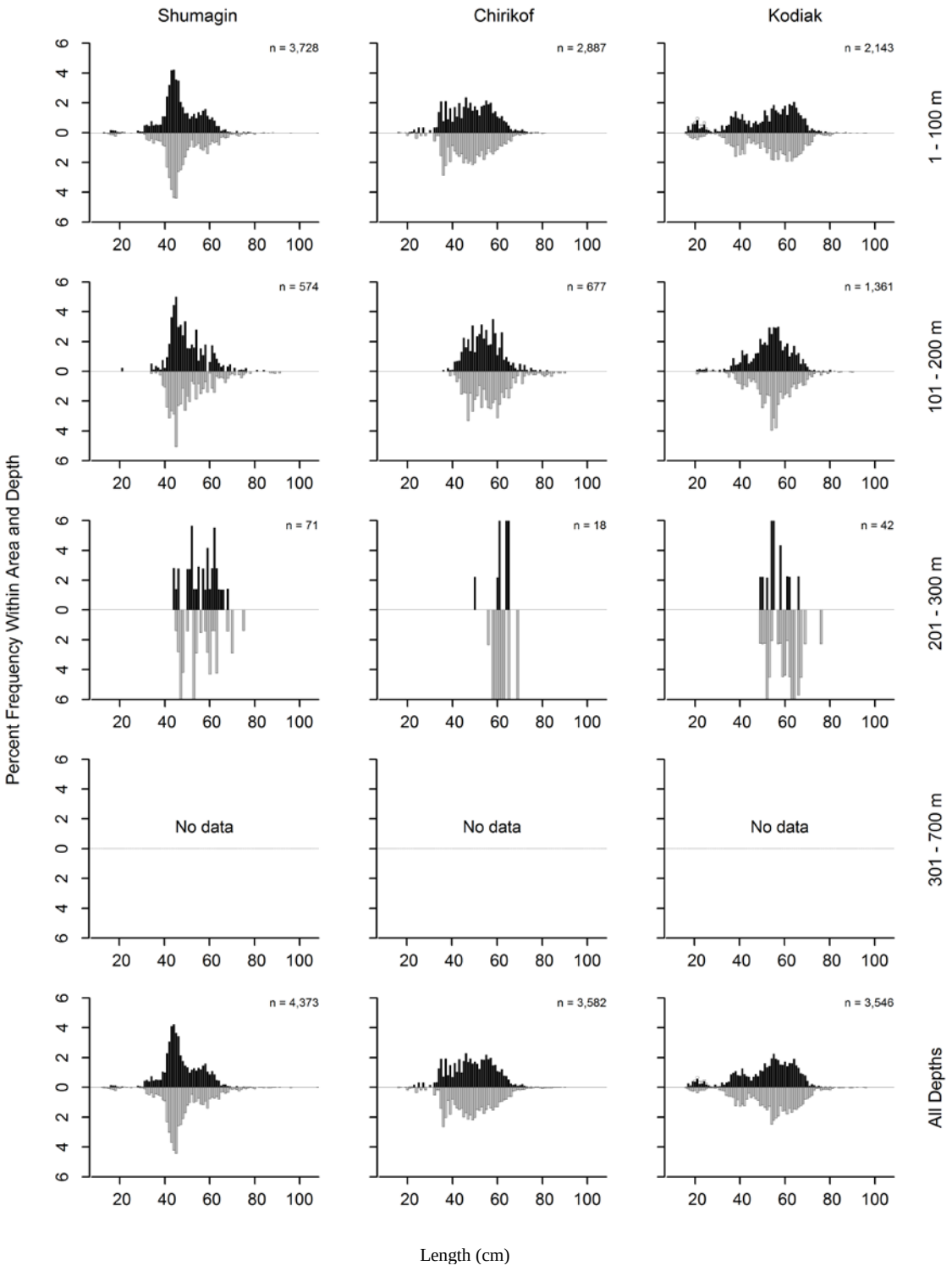

Figure 21. -- Size composition of Pacific cod from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

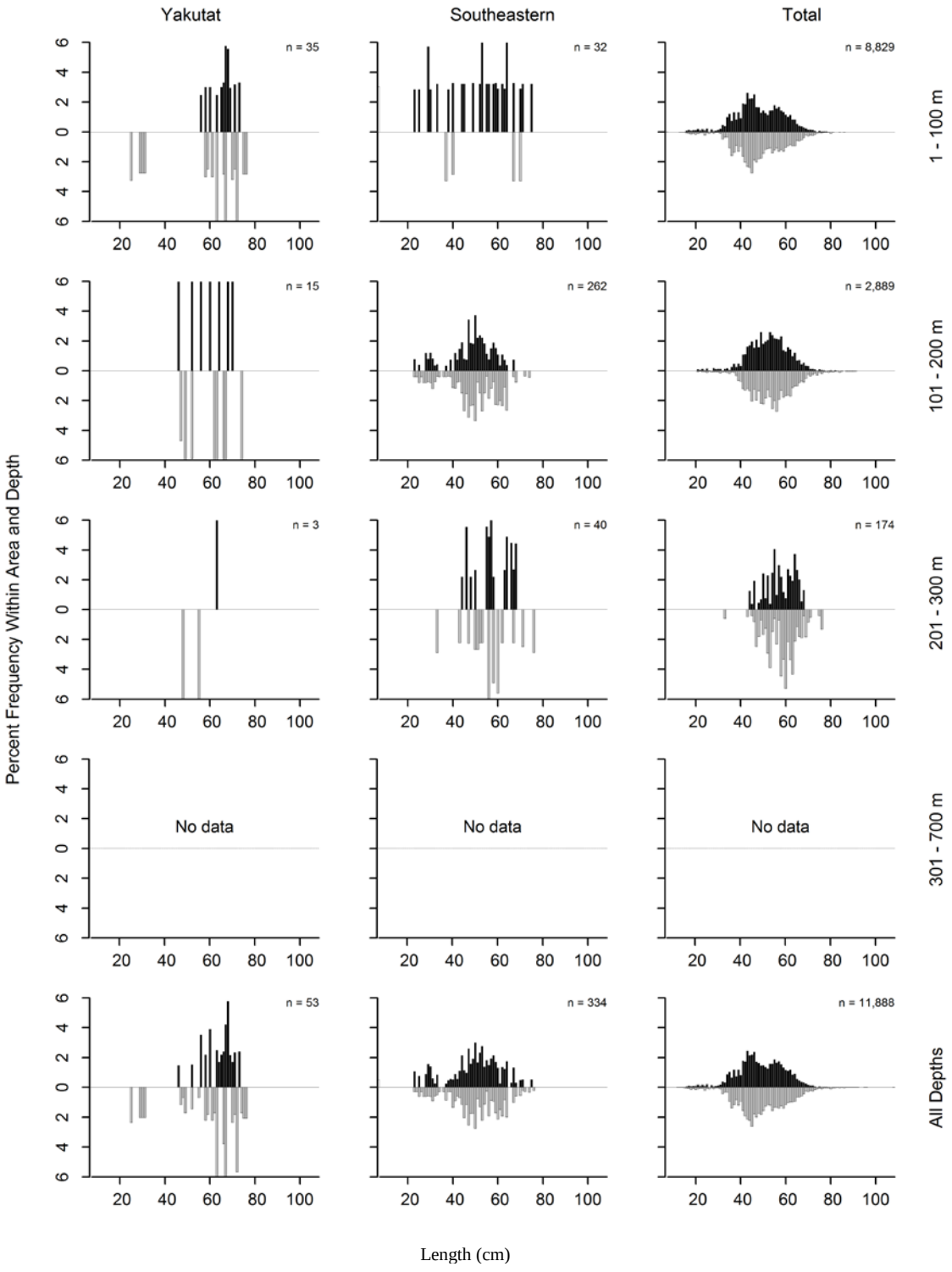

Figure 21. – Continued (Pacific cod).

Table 30. --Catch per unit of effort by stratum for Pacific cod sorted by descending CPUE for the 2011 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	16	100.13	73,115	0	161,579
Chirikof	1 - 100	Chirikof Bank	34	31	82.02	88,515	21,629	155,401
Shumagin	1 - 100	Shumagin Bank	31	27	46.52	57,684	3,154	112,214
Shumagin	1 - 100	Davidson Bank	39	39	38.78	53,054	7,662	98,445
Kodiak	1 - 100	Lower Cook Inlet	12	10	33.88	33,495	0	75,533
Shumagin	1 - 100	Lower Alaska Peninsula	19	19	31.41	21,596	11,987	31,204
Kodiak	1 - 100	Albatross Banks	38	31	19.89	30,639	12,421	48,856
Chirikof	1 - 100	Upper Alaska Peninsula	18	14	19.60	15,562	1,779	29,346
Kodiak	1 - 100	Northern Kodiak Shallows	6	6	17.30	3,805	0	9,397
Shumagin	101 - 200	Sanak Gully	6	5	16.90	7,175	0	18,623
Shumagin	1 - 100	Fox Islands	16	15	16.51	13,756	3,103	24,409
Kodiak	1 - 100	Albatross Shallows	25	22	15.62	9,007	5,142	12,872
Kodiak	101 - 200	Portlock Flats	25	22	15.49	11,366	2,853	19,879
Chirikof	101 - 200	Shelikof Edge	26	20	14.44	11,171	3,590	18,752
Kodiak	101 - 200	Barren Islands	18	17	10.86	11,920	2,744	21,097
Shumagin	101 - 200	Shumagin Outer Shelf	27	27	10.79	8,801	3,604	13,999
Kodiak	101 - 200	Kodiak Outer Shelf	18	13	10.16	5,105	1,390	8,820
Kodiak	101 - 200	Albatross Gullies	29	25	8.65	6,843	3,064	10,623
Southeastern	101 - 200	Prince of Wales Shelf	14	11	8.32	5,731	2,430	9,032
Chirikof	101 - 200	Chirikof Outer Shelf	16	14	8.20	4,107	1,491	6,723
Chirikof	101 - 200	East Shumagin Gully	14	11	7.17	7,961	3,871	12,051
Shumagin	201 - 300	Shumagin Slope	11	6	5.16	1,440	0	2,927
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	7	4.54	1,905	10	3,800
Yakutat	1 - 100	Middleton Shallows	6	6	4.46	2,995	449	5,540
Kodiak	1 - 100	Kenai Peninsula	6	3	4.15	2,182	0	4,959
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	4.12	463	0	1,440
Southeastern	1 - 100	Southeastern Shallows	8	5	3.15	2,063	0	4,614
Kodiak	201 - 300	Kenai Gullies	15	5	2.33	1,554	0	3,255
Kodiak	101 - 200	Kenai Flats	17	7	1.94	2,341	0	5,107
Yakutat	1 - 100	Yakutat Shallows	8	5	1.84	1,832	0	3,710
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	6	1.61	631	55	1,206
Yakutat	101 - 200	Middleton Shelf	9	4	1.58	1,160	0	3,456
Chirikof	201 - 300	Lower Shelikof Gully	14	7	1.19	1,196	423	1,970
Kodiak	201 - 300	Upper Shelikof Gully	3	2	0.74	237	0	864
Chirikof	201 - 300	Chirikof Slope	6	3	0.53	81	0	182
Yakutat	201 - 300	Yakutat Slope	6	1	0.42	89	0	319
Yakutat	101 - 200	Yakutat Flats	9	2	0.34	304	0	771
Shumagin	101 - 200	West Shumagin Gully	4	1	0.29	65	0	273
Yakutat	101 - 200	Yakataga Shelf	8	1	0.06	31	0	103

Atka mackerel *(Pleurogrammus monopterygius)*

Atka mackerel were uncommon, ranking the twelfth most abundant species caught in the 2011 survey (Table 2). Approximately 90% of the estimated Atka mackerel biomass occupied the Shumagin NPFMC area (Table 31) where local abundance was relatively high at Davidson Bank and Shumagin Bank (Table 32). Atka mackerel were not caught east of Homer, Alaska (Fig. 22, Table 32). Almost the entire biomass was confined to depths less than 200 m, with about 90% in waters less than 100 m. Atka mackerel were caught in about 25% of tows at depths less than 200 m in the Shumagin INPFC area (Table 31). Most of the fish captured were longer than 40 cm (Fig. 23).

Table 31. -- Number of survey hauls, number of hauls with Atka mackerel, mean CPUE, biomass, and mean weight, based on the 2011 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	105	26	21.09	87,073	0	194,607	1.434
	101 - 200	37	10	0.53	771	176	1,367	1.073
	201 - 300	11	3	0.16	43	0	105	0.819
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	39	13.89	87,888	0	195,424	1.429
Chirikof	1 - 100	68	9	0.16	421	65	776	1.192
	101 - 200	56	21	3.05	7,284	0	19,373	1.309
	201 - 300	20	7	0.84	972	0	2,032	1.304
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	37	1.33	8,676	0	20,790	1.302
Kodiak	1 - 100	87	1	0.01	20	0	62	2.180
	101 - 200	107	7	0.15	634	0	1,447	1.332
	201 - 300	24	1	0.01	16	0	55	1.481
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	9	0.07	670	0	1,485	1.351
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	0	---	---	---	---	---
All areas	1 - 100	282	36	6.78	87,514	0	195,049	1.433
	101 - 200	255	38	0.71	8,689	0	20,820	1.285
	201 - 300	83	11	0.29	1,031	0	2,094	1.275
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	85	3.15	97,234	0	205,419	1.416

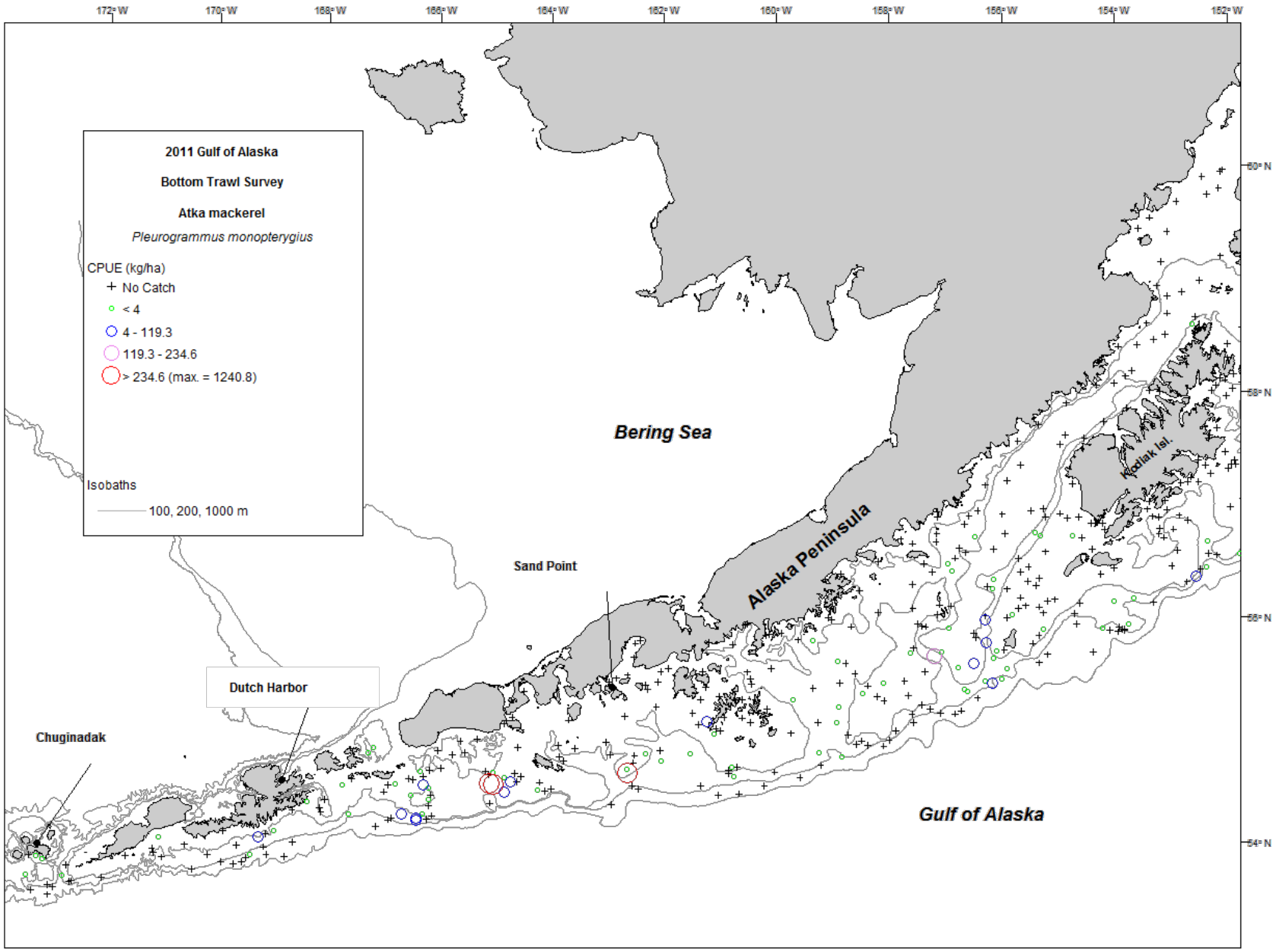

Figure 22. -- Distribution and relative abundance of Atka mackerel from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

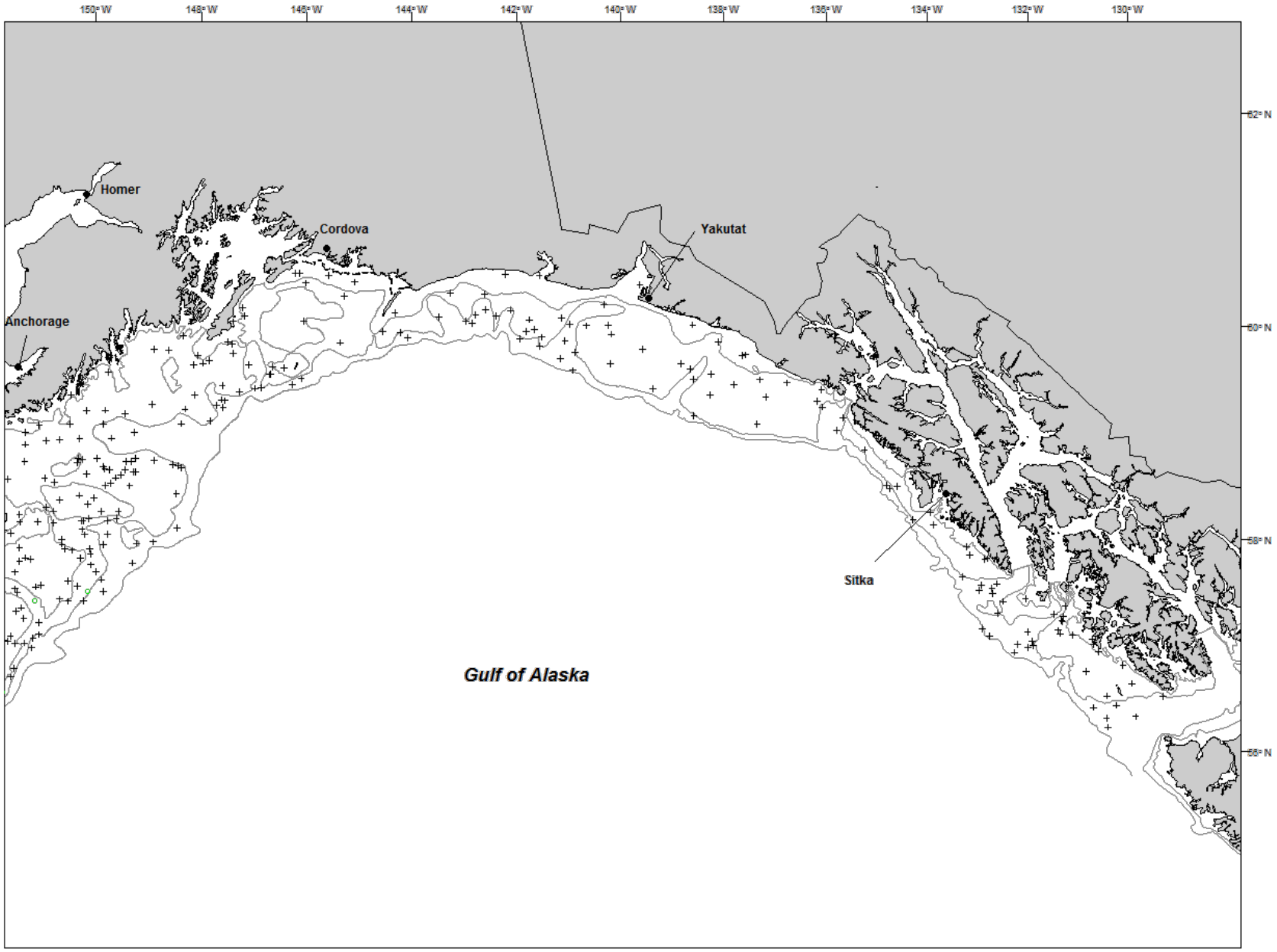

Figure 22. -- Continued.

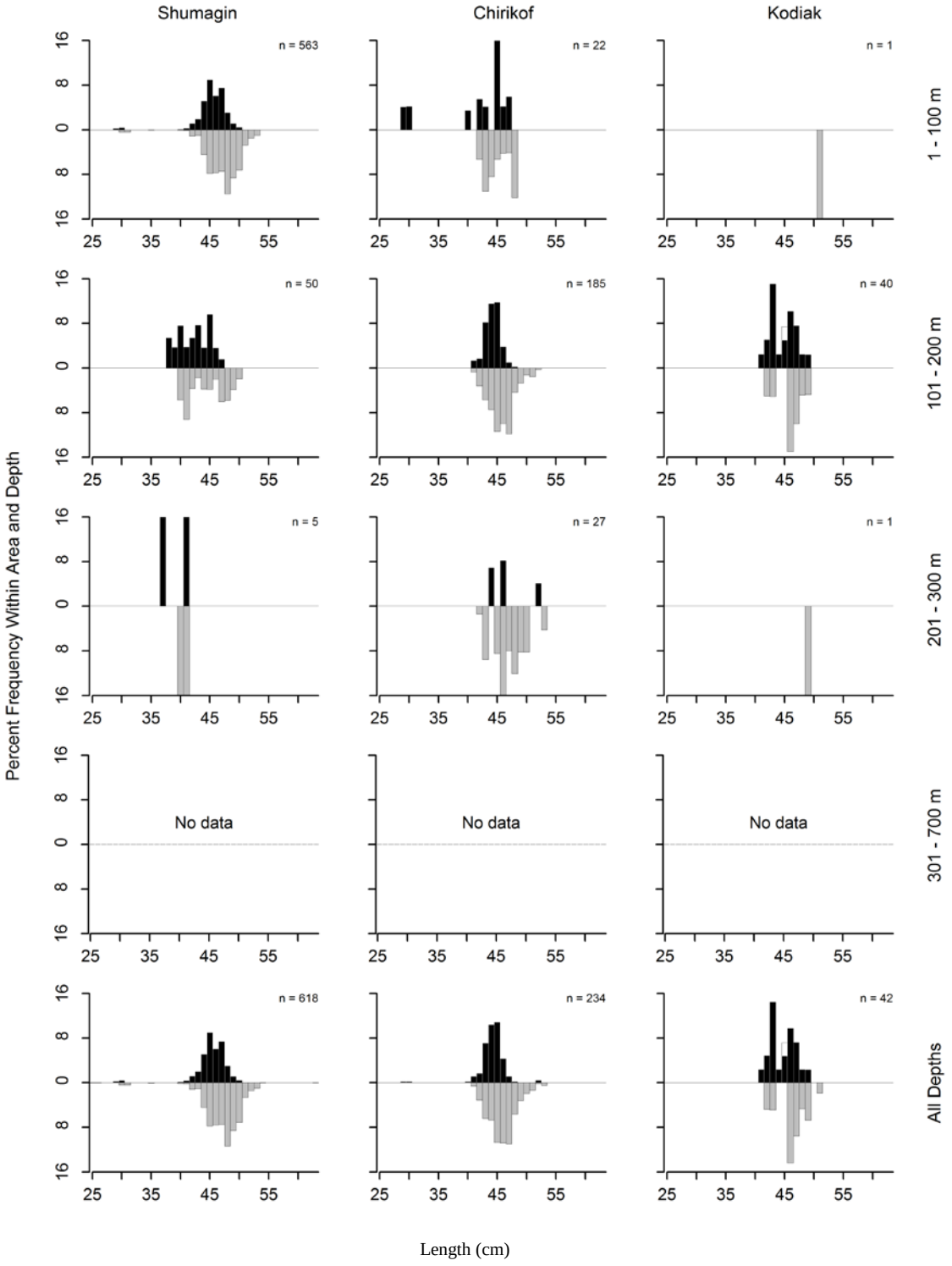

Figure 23. -- Size composition of Atka mackerel from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

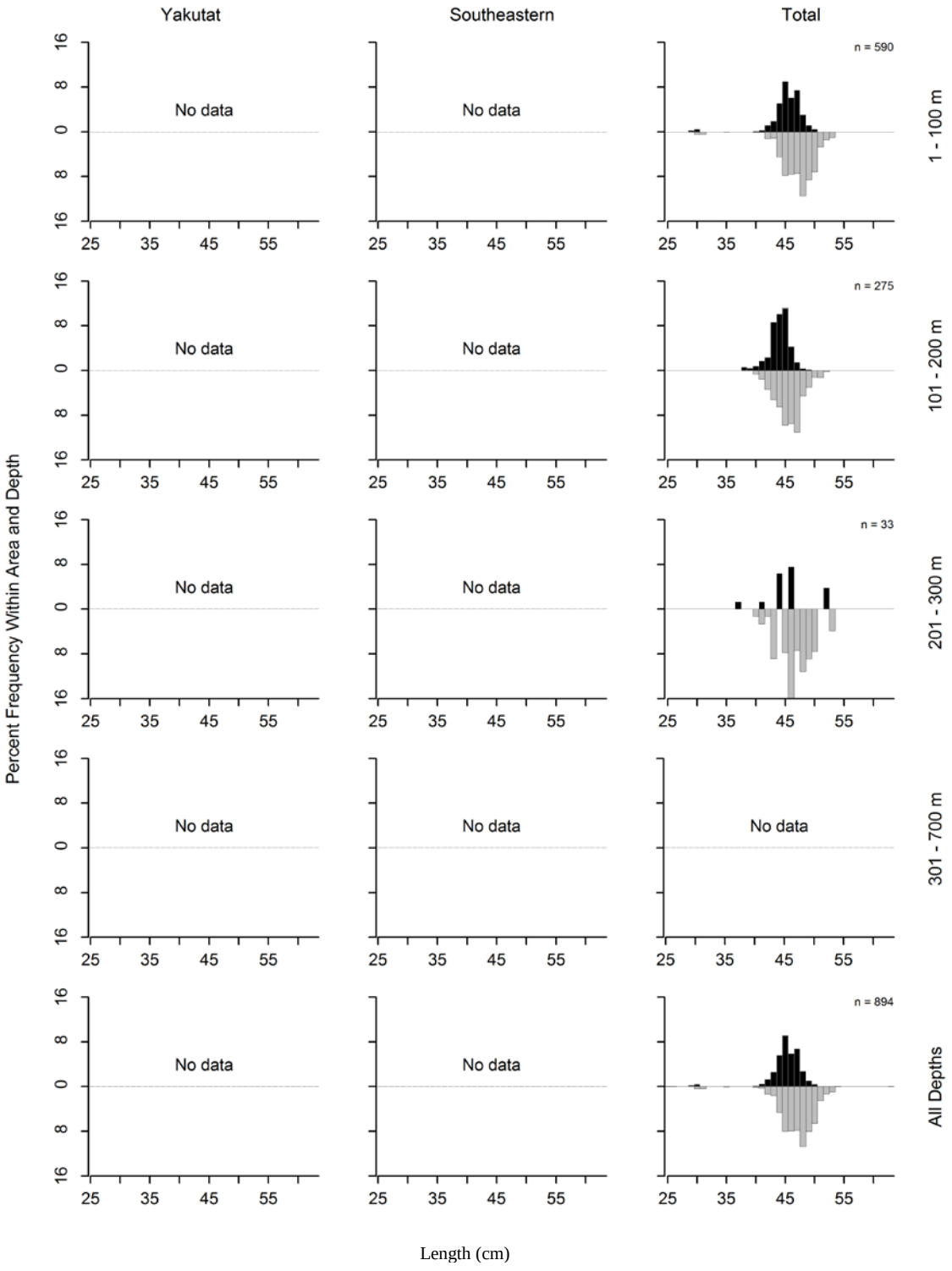

Figure 23. -- Continued (Atka mackerel).

Table 32. --Catch per unit of effort by stratum for Atka mackerel sorted by descending CPUE for the 2011 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	39	14	40.26	55,079	0	145,090
Shumagin	1 - 100	Shumagin Bank	31	6	25.20	31,246	0	94,109
Chirikof	101 - 200	Shelikof Edge	26	10	8.58	6,633	0	18,739
Kodiak	101 - 200	Kodiak Outer Shelf	18	5	1.15	577	0	1,393
Chirikof	201 - 300	Lower Shelikof Gully	14	4	0.92	921	0	1,988
Shumagin	1 - 100	Fox Islands	16	6	0.90	748	4	1,493
Chirikof	101 - 200	Chirikof Outer Shelf	16	7	0.80	403	58	748
Shumagin	101 - 200	Shumagin Outer Shelf	27	8	0.80	652	77	1,227
Chirikof	201 - 300	Chirikof Slope	6	3	0.33	51	0	115
Shumagin	101 - 200	Sanak Gully	6	2	0.28	120	0	332
Chirikof	1 - 100	Chirikof Bank	34	5	0.23	246	0	533
Chirikof	101 - 200	East Shumagin Gully	14	4	0.22	248	0	512
Chirikof	1 - 100	Semidi Bank	16	3	0.19	138	0	352
Shumagin	201 - 300	Shumagin Slope	11	3	0.16	43	0	106
Kodiak	201 - 300	Kodiak Slope	6	1	0.10	16	0	57
Kodiak	101 - 200	Albatross Gullies	29	2	0.07	57	0	139
Chirikof	1 - 100	Upper Alaska Peninsula	18	1	0.05	36	0	112
Kodiak	1 - 100	Albatross Shallows	25	1	0.04	20	0	62

Sablefish *(Anoplopoma fimbria)*

Sablefish was the ninth most abundant species caught in the 2011 survey (Table 2). They were most abundant in the Chirikof, Kodiak and Yakutat areas (Table 33), and were caught in 46 of the 59 survey strata and at all sampled depths sampled (Fig. 24; Tables 33 and 34). Sablefish occurred in 91% of tows in waters deeper than 200 m, including all tows deeper than 500 m, and 86% of the estimated biomass was recorded at depths deeper than 200 m. Catch per Unit Effort was consistently higher in the slope and gully strata of all INPFC areas (Table 34). Mean weight consistently increased with depth in all areas except for the Shumagin INPFC area (Table 33). A relatively distinct length mode for males occurred around 65-70 cm FL at depths deeper than 300 m in the Chirikof, Kodiak, and Yakutat INPFC areas (Fig. 25). No corresponding length mode occurred for females. Small fish (less than 50 cm FL) were almost exclusively confined to depths less than 200 m in all INPFC areas (Fig. 25).

Table 33. -- Number of survey hauls, number of hauls with sablefish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	3	0.02	62	0	156	0.730
	101 - 200	37	1	0.01	21	0	64	1.401
	201 - 300	11	6	1.61	449	79	818	1.349
	301 - 500	7	6	4.64	1,175	270	2,081	1.410
	501 - 700	3	3	27.55	5,526	0	18,475	3.298
	701 - 1000	0	0		---	---	---	---
	All depths	163	19	1.14	7,234	0	20,251	2.459
Chirikof	1 - 100	68	0		---	---	---	---
	101 - 200	56	17	0.61	1,450	459	2,441	1.508
	201 - 300	20	18	11.26	13,003	5,656	20,350	2.079
	301 - 500	6	6	40.69	6,526	2,647	10,405	2.651
	501 - 700	5	5	67.92	13,267	3,706	22,828	2.995
	701 - 1000	0	0		---	---	---	---
	All depths	155	46	5.27	34,247	23,149	45,344	2.427
Kodiak	1 - 100	87	5	0.07	254	0	721	1.696
	101 - 200	107	51	3.08	13,362	4,959	21,765	1.886
	201 - 300	24	24	6.67	7,666	4,759	10,573	1.918
	301 - 500	6	6	35.32	10,284	0	21,655	2.894
	501 - 700	4	4	103.89	18,128	7,369	28,886	3.052
	701 - 1000	0	0		---	---	---	---
	All depths	228	90	5.07	49,694	34,636	64,752	2.398
Yakutat	1 - 100	14	4	0.15	257	0	546	0.389
	101 - 200	33	18	0.94	2,751	912	4,590	0.924
	201 - 300	13	12	5.57	2,879	729	5,030	1.735
	301 - 500	6	6	70.23	18,456	0	62,242	3.006
	501 - 700	2	2	84.95	12,481	0	40,828	3.154
	701 - 1000	0	0		---	---	---	---
	All depths	68	42	6.66	36,824	0	76,182	2.392
Southeastern	1 - 100	8	3	0.15	96	0	213	0.416
	101 - 200	22	6	0.37	412	0	871	1.222
	201 - 300	15	12	2.77	1,399	395	2,402	2.044
	301 - 500	8	8	12.16	3,789	1,302	6,276	2.430
	501 - 700	3	3	26.39	2,728	533	4,923	2.326
	701 - 1000	0	0		---	---	---	---
	All depths	56	32	3.14	8,423	5,550	11,295	2.115
All areas	1 - 100	282	15	0.05	669	164	1,175	0.594
	101 - 200	255	93	1.47	17,996	9,342	26,650	1.582
	201 - 300	83	72	7.05	25,396	17,321	33,470	1.964
	301 - 500	33	32	31.45	40,230	2,557	77,903	2.765
	501 - 700	17	17	63.52	52,129	29,782	74,476	3.035
	701 - 1000	0	0		---	---	---	---
	All depths	670	229	4.42	136,420	98,353	174,488	2.387

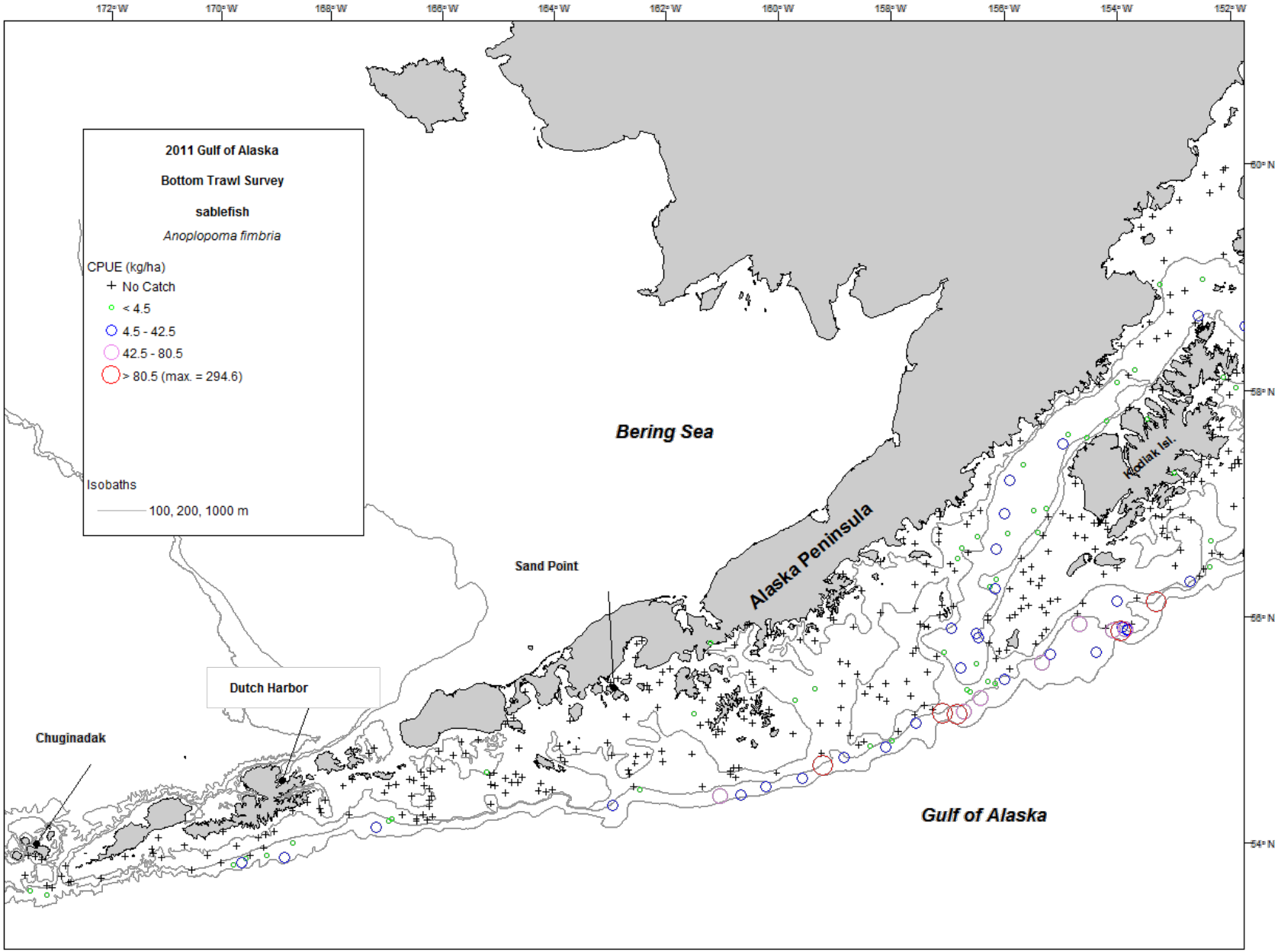

Figure 24. -- Distribution and relative abundance of Sablefish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

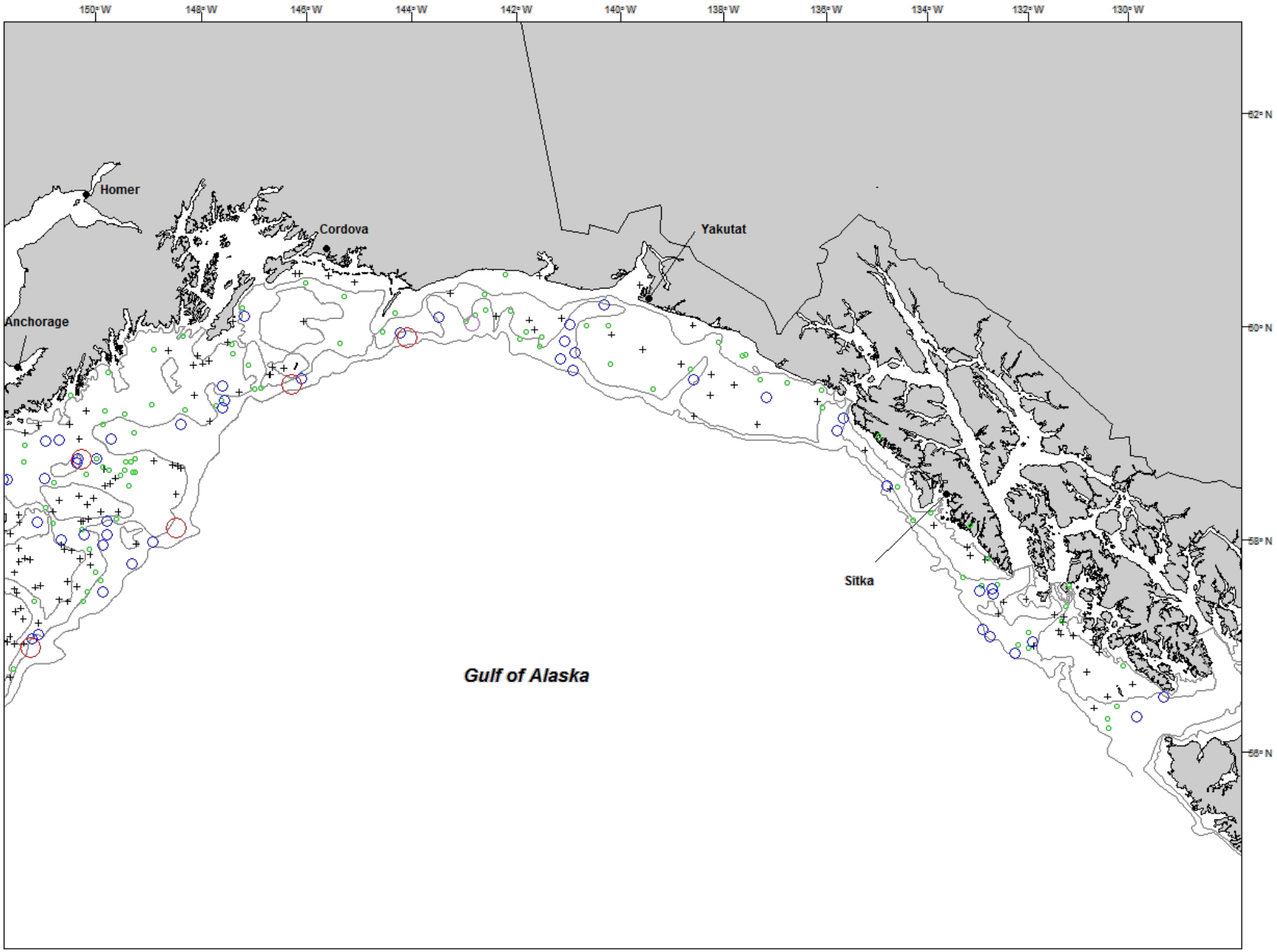

Figure 24. -- Continued.

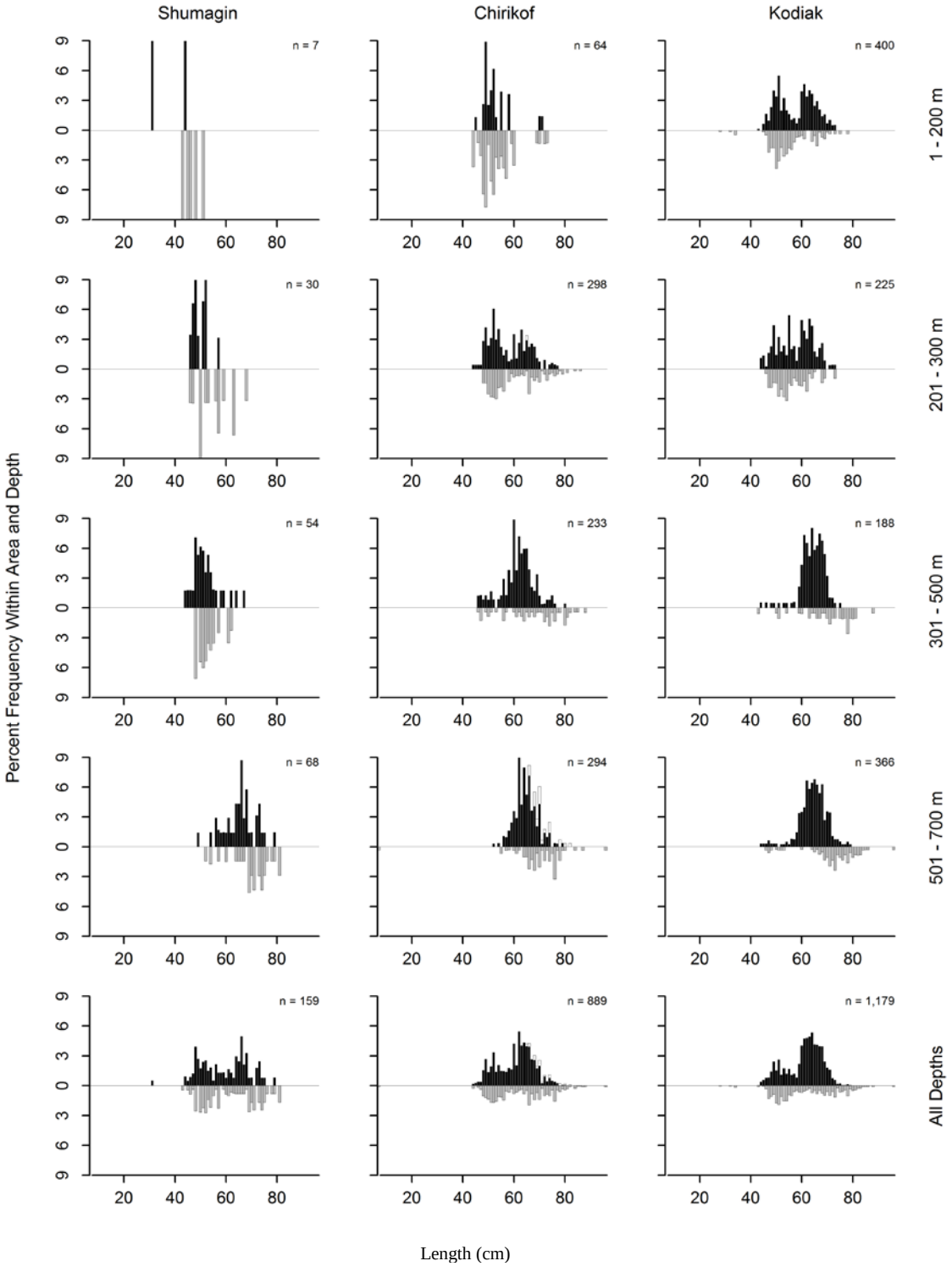

Figure 25. -- Size composition of sablefish from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

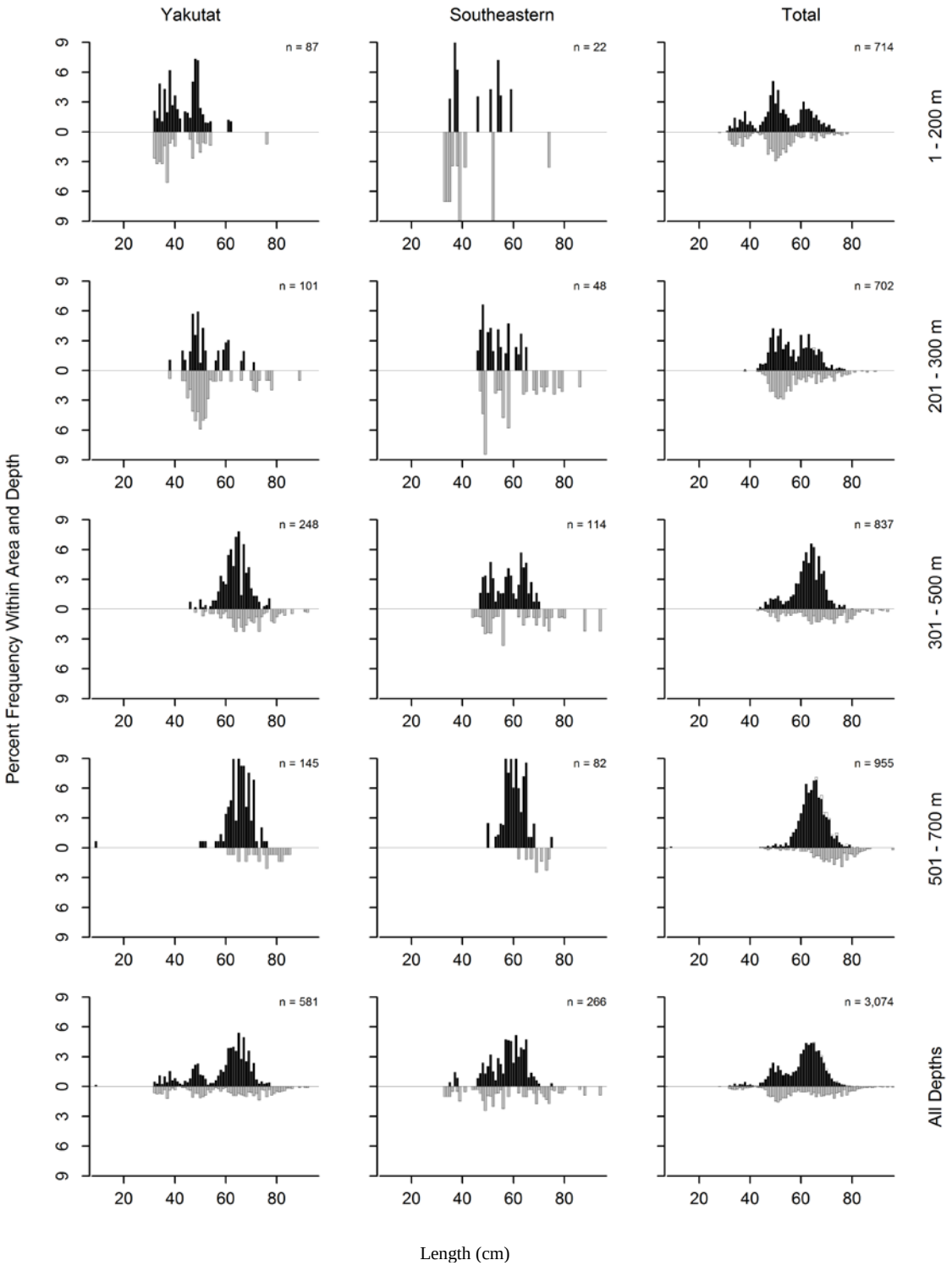

Figure 25. -- Continued (sablefish).

Table 34. --Catch per unit of effort by stratum for sablefish sorted by descending CPUE for the 2011 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	3	3	114.84	17,462	0	76,648
Kodiak	501 - 700	Kodiak Slope	4	4	103.89	18,128	5,795	30,460
Yakutat	501 - 700	Yakutat Slope	2	2	84.95	12,481	0	96,187
Chirikof	501 - 700	Chirikof Slope	5	5	67.92	13,267	2,944	23,590
Chirikof	301 - 500	Chirikof Slope	6	6	40.69	6,526	2,450	10,602
Kodiak	301 - 500	Kodiak Slope	6	6	35.32	10,284	0	22,231
Shumagin	501 - 700	Shumagin Slope	3	3	27.55	5,526	0	23,036
Southeastern	501 - 700	Southeastern Slope	3	3	26.39	2,728	0	5,696
Chirikof	201 - 300	Chirikof Slope	6	5	26.34	4,026	0	10,295
Southeastern	301 - 500	Southeastern Deep Gullies	7	7	12.57	2,947	374	5,520
Southeastern	301 - 500	Southeastern Slope	1	1	10.90	842		
Yakutat	301 - 500	Yakutat Gullies	3	3	8.98	994	0	2,710
Chirikof	201 - 300	Lower Shelikof Gully	14	13	8.96	8,977	3,712	14,242
Kodiak	201 - 300	Kenai Gullies	15	15	8.10	5,395	2,906	7,884
Yakutat	201 - 300	Yakutat Gullies	7	7	7.75	2,357	170	4,544
Kodiak	201 - 300	Kodiak Slope	6	6	7.60	1,233	0	2,855
Kodiak	101 - 200	Barren Islands	18	10	5.92	6,496	353	12,639
Kodiak	101 - 200	Portlock Flats	25	16	5.16	3,784	0	9,610
Shumagin	301 - 500	Shumagin Slope	7	6	4.64	1,175	239	2,112
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	3.29	370	0	898
Kodiak	201 - 300	Upper Shelikof Gully	3	3	3.24	1,038	0	2,886
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	9	2.62	1,029	72	1,986
Yakutat	201 - 300	Yakutat Slope	6	5	2.46	523	92	953
Kodiak	101 - 200	Albatross Gullies	29	12	1.84	1,456	419	2,494
Shumagin	201 - 300	Shumagin Slope	11	6	1.61	449	75	823
Yakutat	101 - 200	Yakutat Flats	9	6	1.15	1,034	185	1,883
Chirikof	101 - 200	Chirikof Outer Shelf	16	6	1.13	567	0	1,285
Kodiak	101 - 200	Kenai Flats	17	10	1.11	1,334	437	2,231
Yakutat	101 - 200	Middleton Shelf	9	6	1.05	772	0	1,690
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	4	0.94	395	0	865
Yakutat	101 - 200	Fairweather Shelf	7	3	0.89	689	0	2,274
Chirikof	101 - 200	Shelikof Edge	26	9	0.67	520	12	1,029
Kodiak	101 - 200	Kodiak Outer Shelf	18	3	0.58	291	0	789
Yakutat	101 - 200	Yakataga Shelf	8	3	0.49	256	0	721
Kodiak	1 - 100	Kenai Peninsula	6	1	0.35	186	0	665
Chirikof	101 - 200	East Shumagin Gully	14	2	0.33	363	0	897
Yakutat	1 - 100	Yakutat Shallows	8	4	0.26	257	0	553
Southeastern	1 - 100	Southeastern Shallows	8	3	0.15	96	0	216
Kodiak	1 - 100	Northern Kodiak Shallows	6	1	0.09	19	0	68
Kodiak	1 - 100	Albatross Shallows	25	2	0.07	38	0	108
Shumagin	1 - 100	Davidson Bank	39	1	0.03	44	0	133
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.03	21	0	64
Southeastern	101 - 200	Prince of Wales Shelf	14	2	0.03	17	0	42
Shumagin	1 - 100	Shumagin Bank	31	1	0.01	15	0	46
Kodiak	1 - 100	Lower Cook Inlet	12	1	0.01	11	0	36
Shumagin	1 - 100	Lower Alaska Peninsula	19	1	0.01	4	0	11

Giant grenadier (*Albatrossia pectoralis*)

Giant grenadier was the sixth most abundant species caught in the 2011 survey (Table 2). They were caught throughout the survey area but were most abundant in the western portion, and almost exclusively occurred in slope strata at depths exceeding 300 m (Fig. 26; Tables 35 and 36). Approximately 70% of the biomass was found in the Shumagin and Chirikof INPFC areas. Giant grenadier occurred in 76% of tows in waters deeper than 300 m and all of the tows deeper than 500 m (Table 35). Mean CPUEs were highest in the Chirikof, Shumagin and Kodiak slope strata, exceeding 100 kg/ha (Table 36). Mean weight decreased with depth to 700 m as the smaller males made up a larger fraction of the total population at deeper depths (Fig. 27, Table 35). A relatively distinct length mode occurred around 25-30 cm (snout to anal fin insertion) at all depths and INPFC areas (except for Southeastern) for females, whereas males exhibited no discernible length mode. The sex ratio of the giant grenadiers in the survey area was dominated by females (Fig. 27).

Table 35. -- Number of survey hauls, number of hauls with giant grenadier, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	1	0.03	51	0	155	3.957
	201 - 300	11	3	8.3	2,314	0	6,964	3.152
	301 - 500	7	7	90.94	23,018	2,428	43,609	2.859
	501 - 700	3	3	273.42	54,837	0	135,679	2.456
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	14	12.67	80,220	5,435	155,004	2.578
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	0	---	---	---	---	---
	201 - 300	20	2	2.59	2,993	0	9,918	3.067
	301 - 500	6	6	569.12	91,285	0	207,310	2.874
	501 - 700	5	5	158.9	31,037	814	61,259	2.257
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	13	19.28	125,315	9,589	241,041	2.696
Kodiak	1 - 100	87	0	---	---	---	---	---
	101 - 200	107	0	---	---	---	---	---
	201 - 300	24	2	0.11	129	0	336	3.628
	301 - 500	6	5	121.42	35,354	10,720	59,988	2.764
	501 - 700	4	4	187.74	32,758	24,606	40,909	2.633
	701 - 1000	0	0		---	---	---	---
	All depths	228	11	6.96	68,241	42,579	93,902	2.701
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	2	3.84	1,010	0	3,876	3.497
	501 - 700	2	2	114.63	16,841	0	33,801	2.573
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	4	3.23	17,851	454	35,248	2.612
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	1	0.92	288	0	968	2.569
	501 - 700	3	3	2.21	229	0	511	1.462
	701 - 1000	0	0		---	---	---	---
	All depths	56	4	0.19	516	0	1,211	1.924
All areas	1 - 100	282	0	---	---	---	---	---
	101 - 200	255	1	<0.01	51	0	155	3.957
	201 - 300	83	7	1.51	5,436	0	12,925	3.114
	301 - 500	33	21	118.01	150,955	39,535	262,374	2.848
	501 - 700	17	17	165.36	135,701	56,801	214,601	2.458
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	46	9.47	292,142	167,986	416,299	2.656

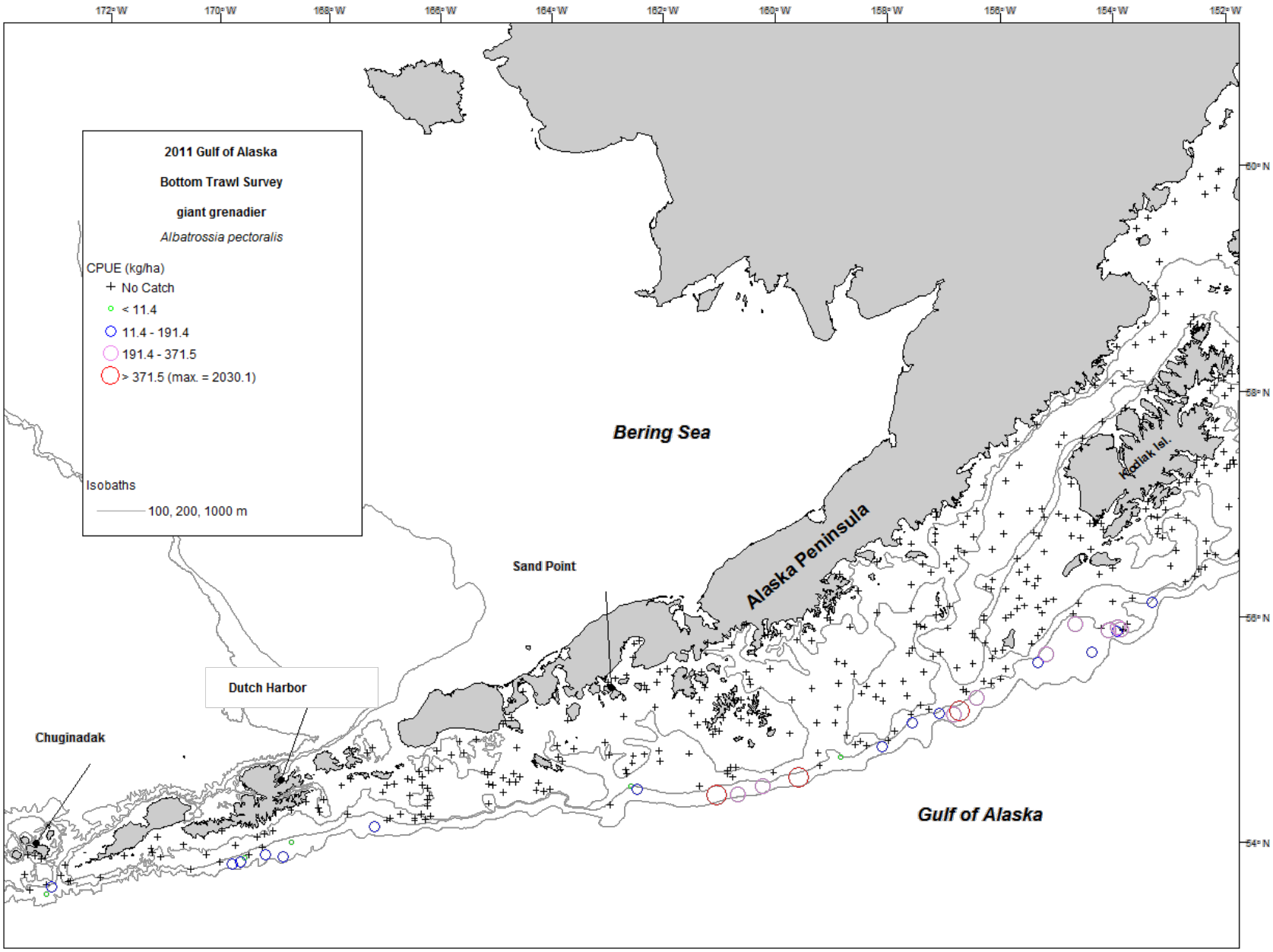

Figure 26. -- Distribution and relative abundance of giant grenadier from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

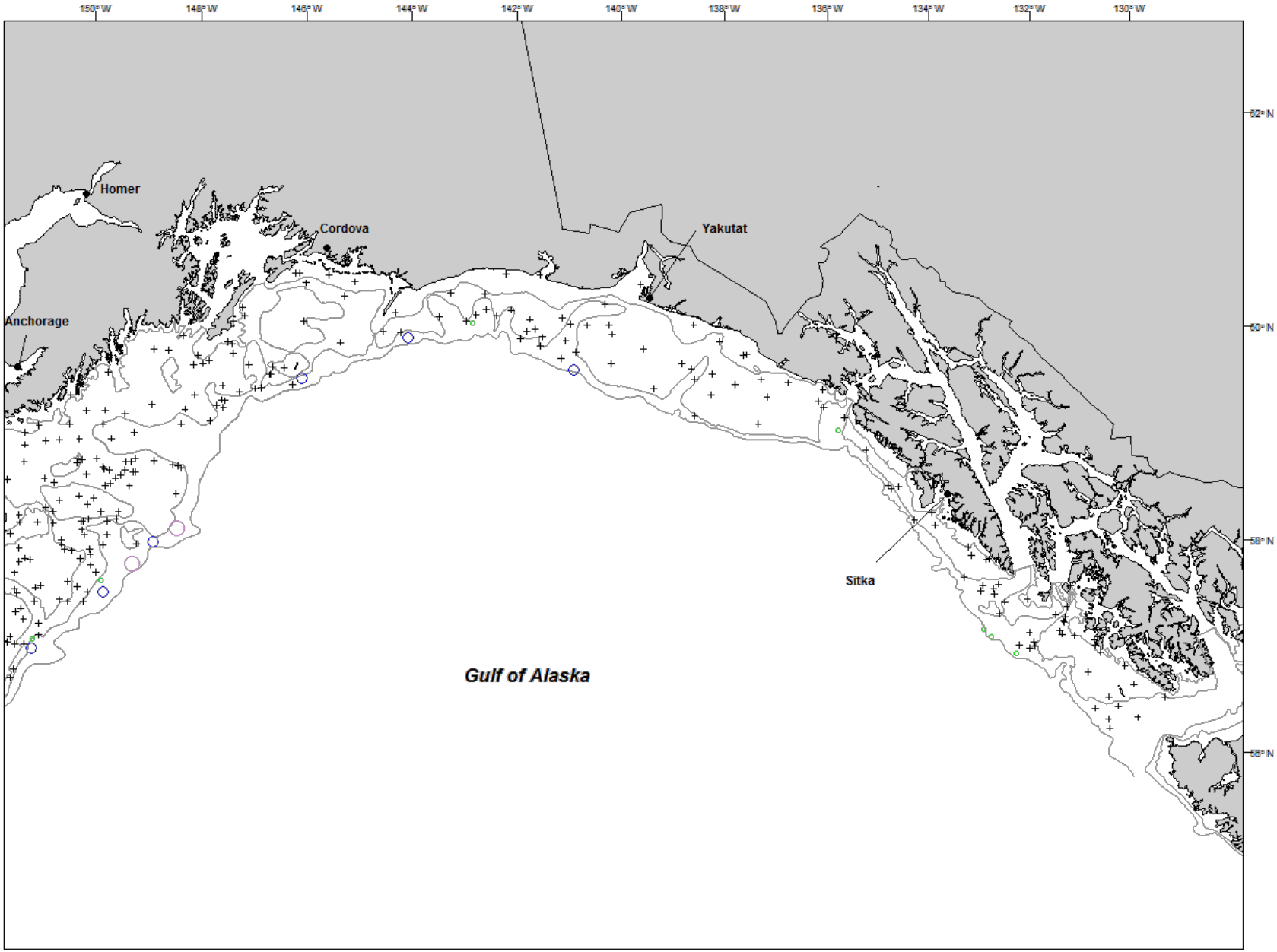

Figure 26. -- Continued.

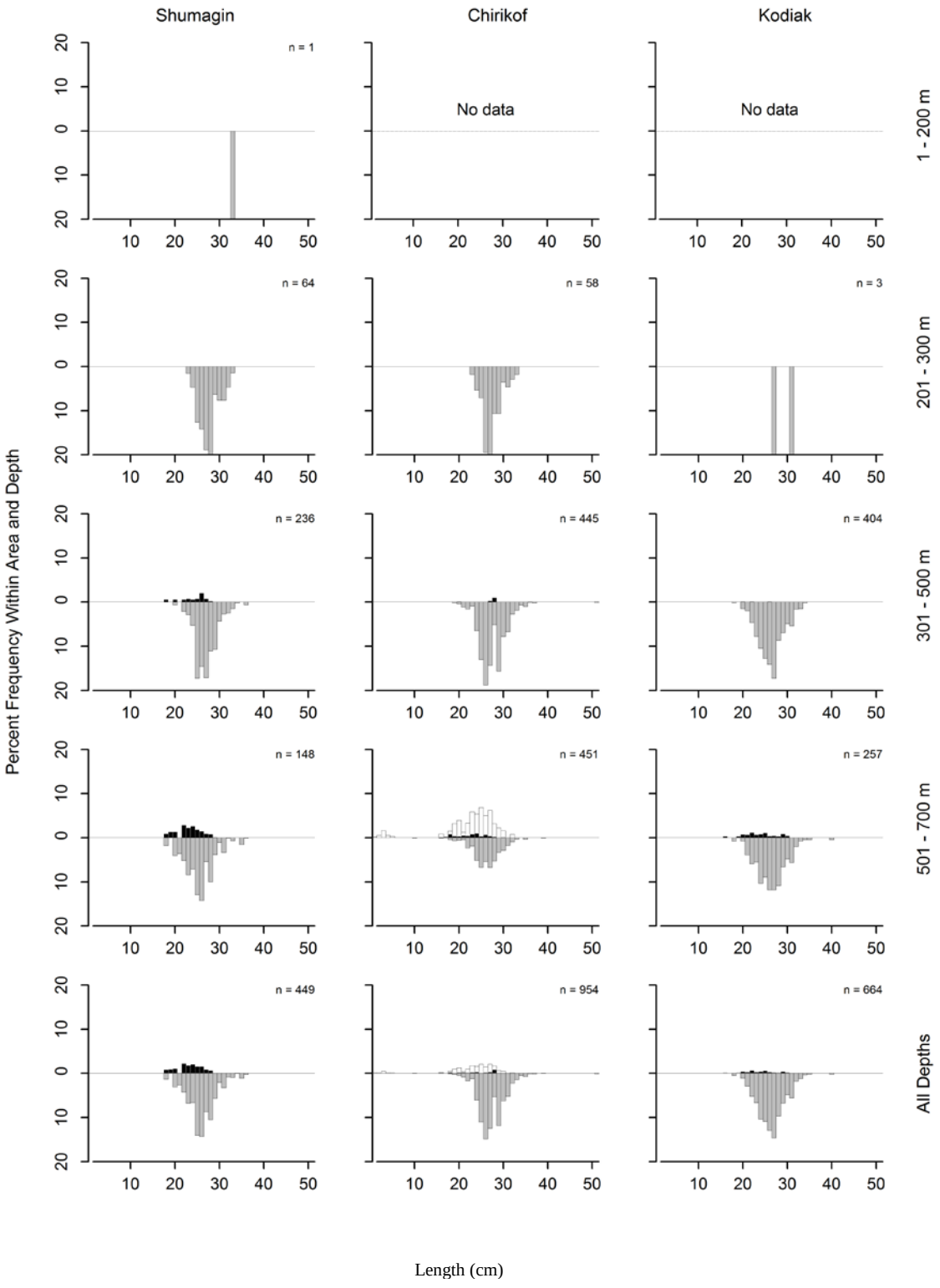

Figure 27. -- Size composition of giant grenadier from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

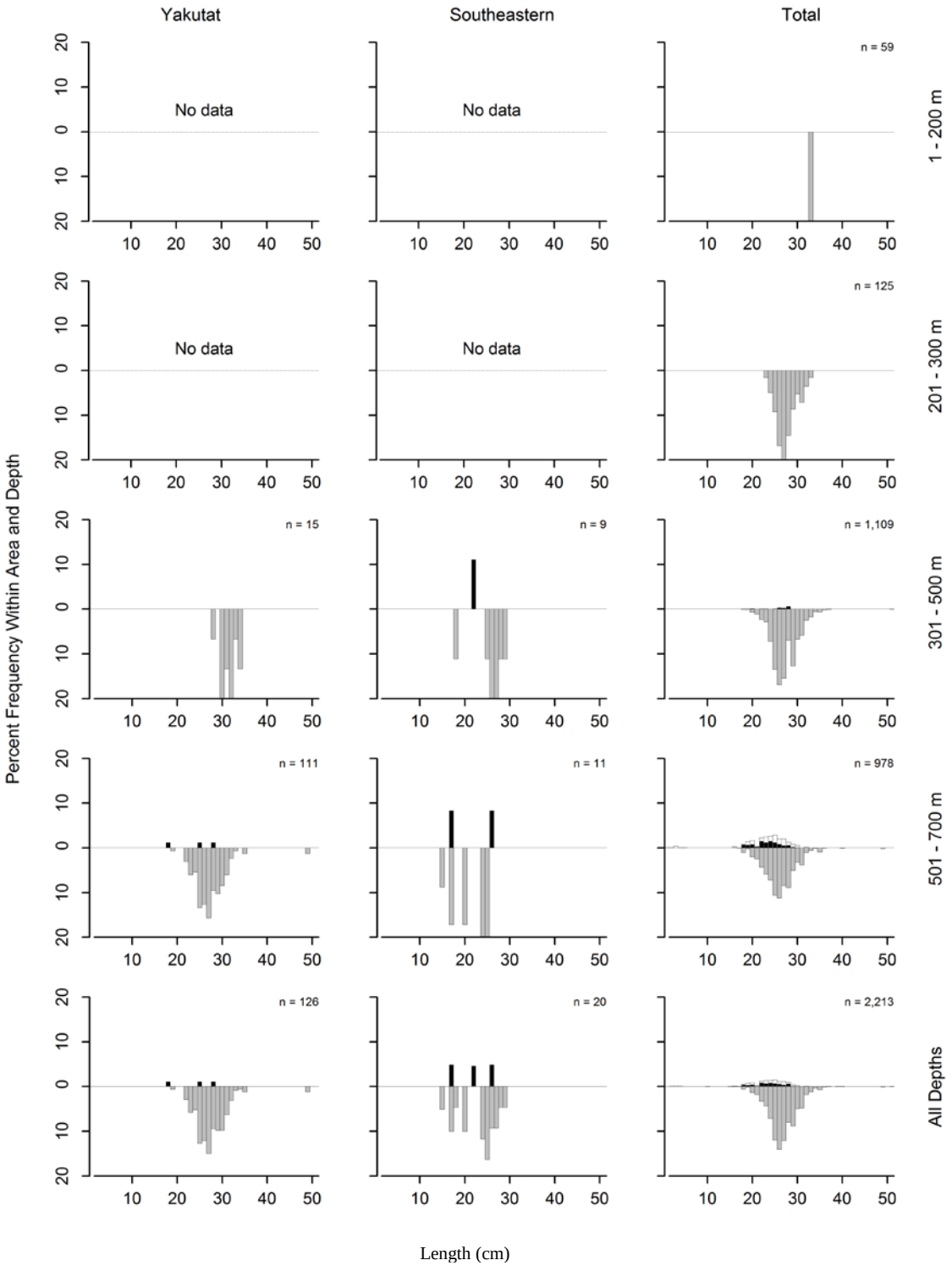

Figure 27. -- Continued (giant grenadier).

Table 36. -- Catch per unit of effort by stratum for giant grenadier sorted by descending CPUE for the 2011 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	569.12	91,285	0	213,190
Shumagin	501 - 700	Shumagin Slope	3	3	273.42	54,837	0	164,159
Kodiak	501 - 700	Kodiak Slope	4	4	187.74	32,758	23,414	42,101
Chirikof	501 - 700	Chirikof Slope	5	5	158.90	31,037	0	63,669
Kodiak	301 - 500	Kodiak Slope	6	5	121.42	35,354	9,472	61,237
Yakutat	501 - 700	Yakutat Slope	2	2	114.63	16,841	0	66,920
Shumagin	301 - 500	Shumagin Slope	7	7	90.94	23,018	1,714	44,323
Chirikof	201 - 300	Chirikof Slope	6	2	19.59	2,993	0	10,269
Shumagin	201 - 300	Shumagin Slope	11	3	8.30	2,314	0	7,021
Yakutat	301 - 500	Yakutat Slope	3	2	6.64	1,010	0	4,885
Southeastern	501 - 700	Southeastern Slope	3	3	2.21	229	0	611
Southeastern	301 - 500	Southeastern Deep Gullies	7	1	1.23	288	0	992
Kodiak	201 - 300	Kodiak Slope	6	2	0.79	129	0	347
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.06	51	0	155

Pacific Ocean Perch *(Sebastes alutus)*

Pacific ocean perch was the second most abundant species caught in the 2011 survey, and was the most abundant and widely distributed rockfish species encountered during the survey (Table 2). The CPUEs were the highest in the 201-300 m depth range in the Shumagin and Southeastern INPFC areas, but they were also high in the 101-200 m depth range in the Chirikof, Kodiak, and Yakutat INPFC areas (Table 37). The Kodiak and Chirikof INPFC areas had the greatest estimated biomass (Fig. 37), accounting for 69% of the total biomass. Pacific ocean perch were caught throughout the survey area, in 46 of the 59 survey strata at all depths to 700 m, with the highest concentrations on the Shumagin slope and Chirikof Outer shelf and slope (Fig. 28, Table 38). Approximately 96% of the population biomass was estimated in the 101-300 m depth range and over 98% in the 101-500 m range. Mean weight generally increased with depth to 500 m (Table 37). The proportion of fish smaller than 30 cm was extremely small at depths greater than 200 m in the Shumagin, Chirikof, and Kodiak INPFC areas and at depths greater than 300 m in the Yakutat and Southeastern INPFC areas (Fig. 29). At most depths, the medial size ranged between 35 and 40 cm for both sexes (Fig. 29).

Table 37. -- Number of survey hauls, number of hauls with Pacific ocean perch, mean CPUE, biomass, and mean weight, based on the 2011 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	105	13	0.22	893	0	2,018	0.262
	101 - 200	37	21	9.49	13,924	0	37,607	0.607
	201 - 300	11	11	291.25	81,199	0	228,741	0.624
	301 - 500	7	6	13.29	3,365	0	8,299	0.627
	501 - 700	3	1	0.13	26	0	107	0.525
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	52	15.71	99,406	0	246,404	0.614
Chirikof	1 - 100	68	11	0.22	577	0	1,201	0.166
	101 - 200	56	34	67.62	161,281	0	352,179	0.659
	201 - 300	20	13	30.68	35,427	0	93,244	0.670
	301 - 500	6	3	0.45	72	0	205	0.607
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	61	30.37	197,357	268	394,445	0.656
Kodiak	1 - 100	87	9	3.21	12,345	0	36,992	0.564
	101 - 200	107	77	63.88	276,790	165,127	388,453	0.673
	201 - 300	24	19	41.55	47,742	5,326	90,158	0.655
	301 - 500	6	5	13.63	3,969	0	12,641	0.616
	501 - 700	4	1	0.2	35	0	133	0.740
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	111	34.79	340,881	219,694	462,068	0.665
Yakutat	1 - 100	14	1	<0.01	1	0	3	0.016
	101 - 200	33	25	15.74	46,247	0	98,696	0.195
	201 - 300	13	13	38.46	19,887	2,663	37,111	0.464
	301 - 500	6	6	8.14	2,138	0	7,833	0.733
	501 - 700	2	1	0.46	67	0	354	0.615
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	46	12.36	68,339	13,049	123,629	0.242
Southeastern	1 - 100	8	1	0.01	8	0	26	0.012
	101 - 200	22	11	5.85	6,486	0	16,414	0.353
	201 - 300	15	14	118.96	60,104	18,385	101,822	0.639
	301 - 500	8	6	19.51	6,081	1,524	10,638	0.797
	501 - 700	3	1	0.08	8	0	35	0.536
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	33	27.09	72,687	30,891	114,483	0.603
All areas	1 - 100	282	35	1.07	13,824	0	38,504	0.469
	101 - 200	255	168	41.26	504,727	280,374	729,080	0.540
	201 - 300	83	70	67.79	244,358	86,243	402,473	0.622
	301 - 500	33	26	12.21	15,625	4,987	26,262	0.695
	501 - 700	17	4	0.17	136	0	358	0.616
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	303	25.25	778,670	507,658	1,049,682	0.565

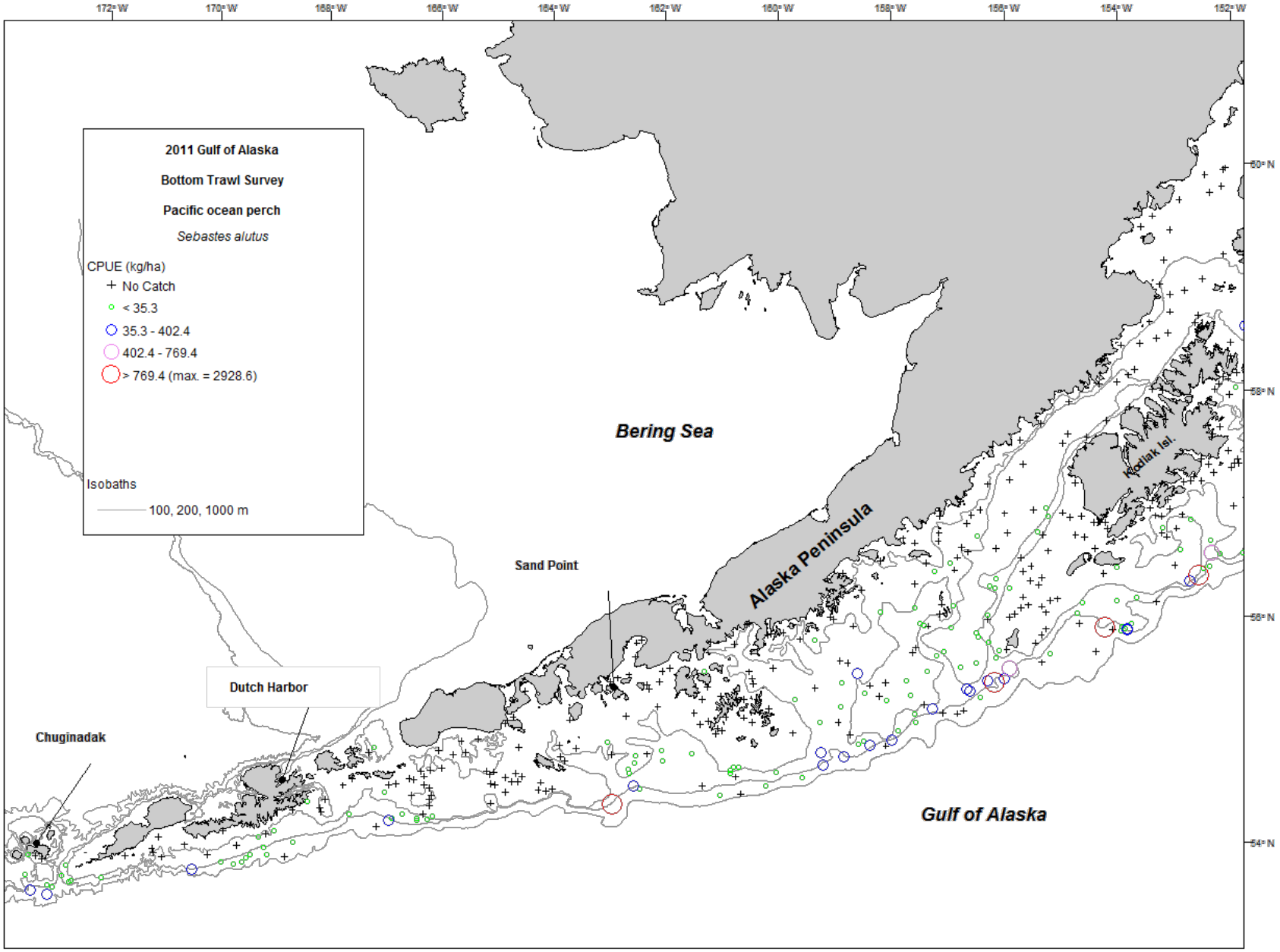

Figure 28. -- Distribution and relative abundance of Pacific Ocean perch from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

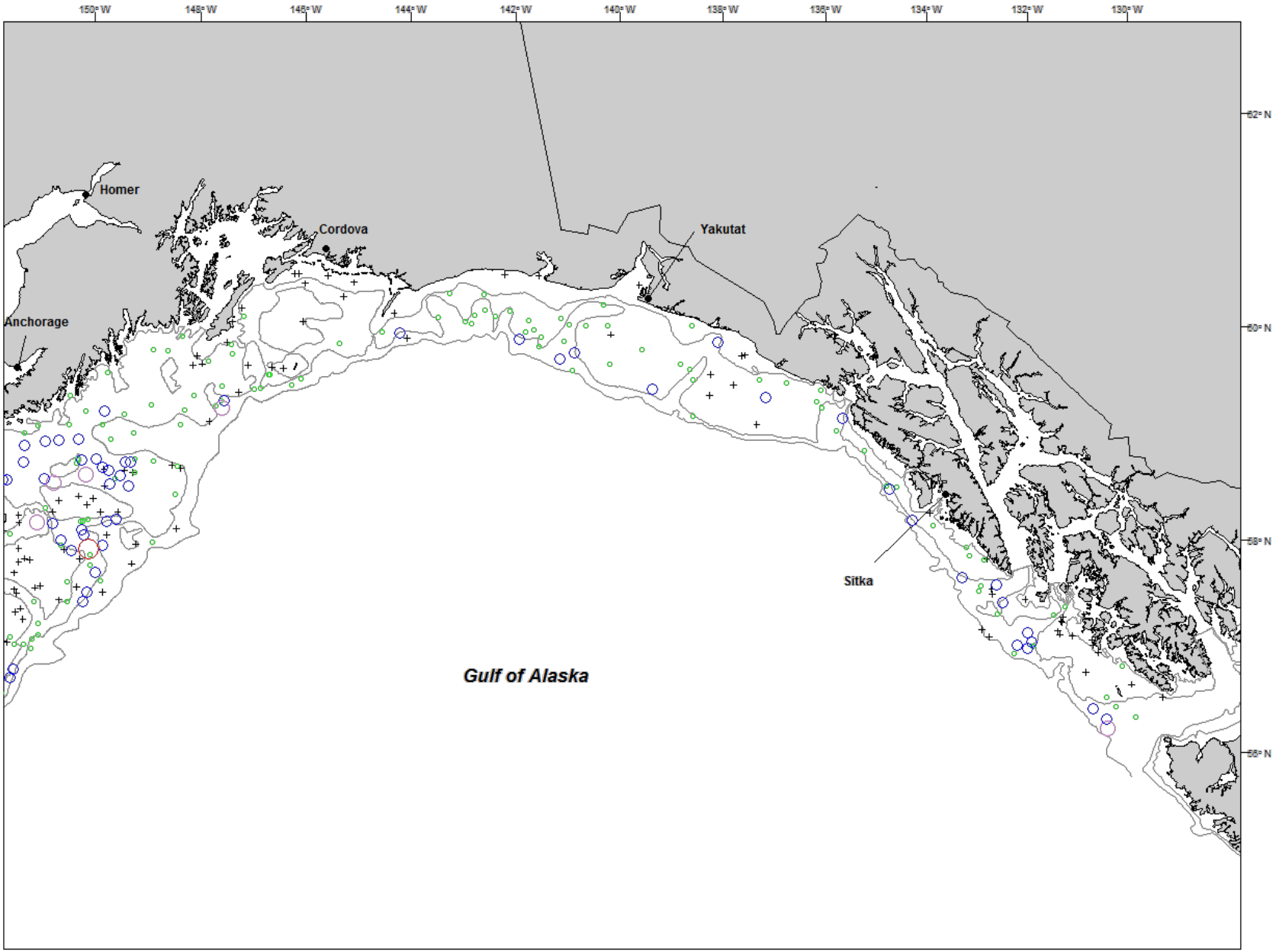

Figure 28. -- Continued.

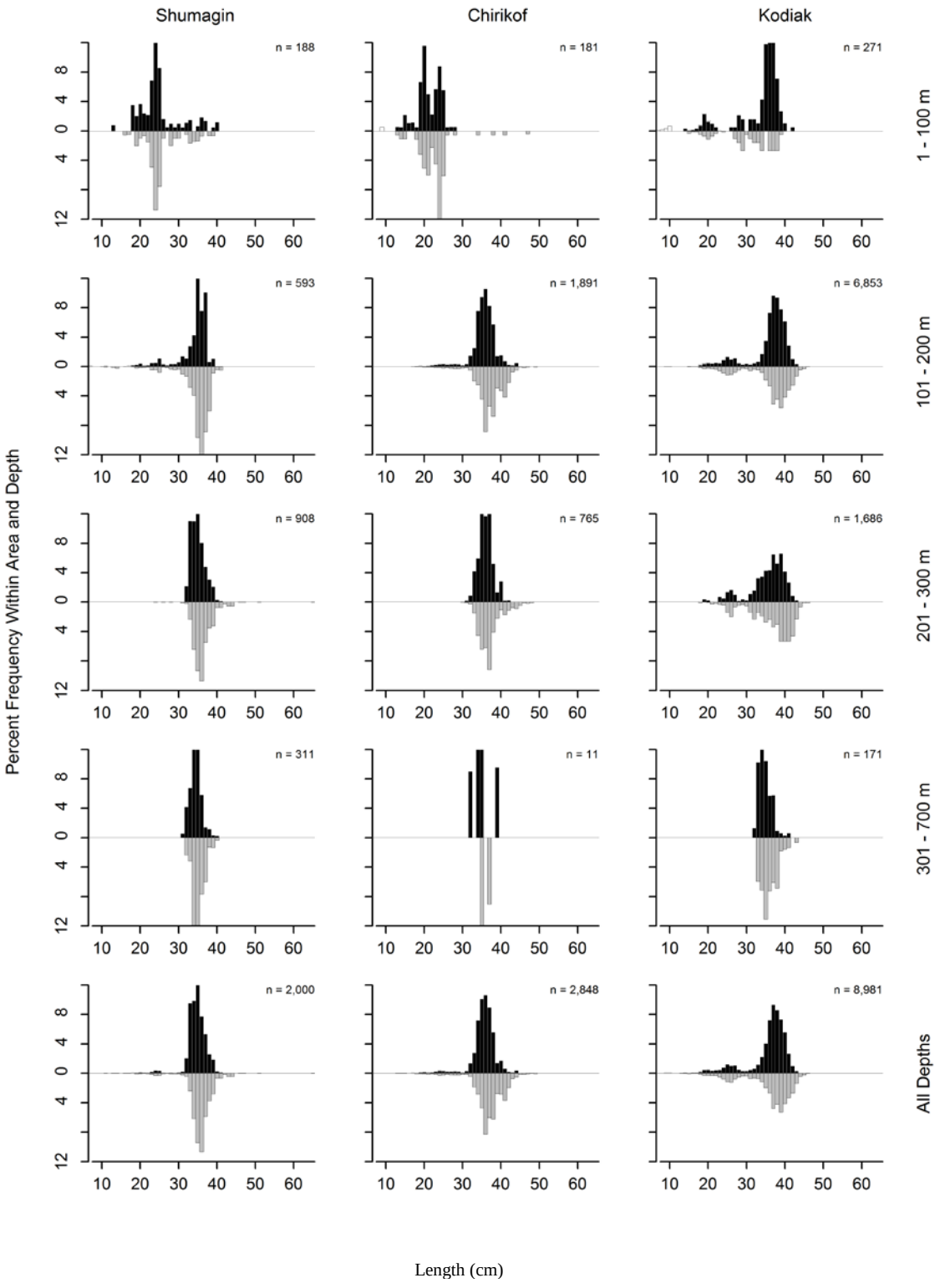

Figure 29. -- Size composition of Pacific ocean perch from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

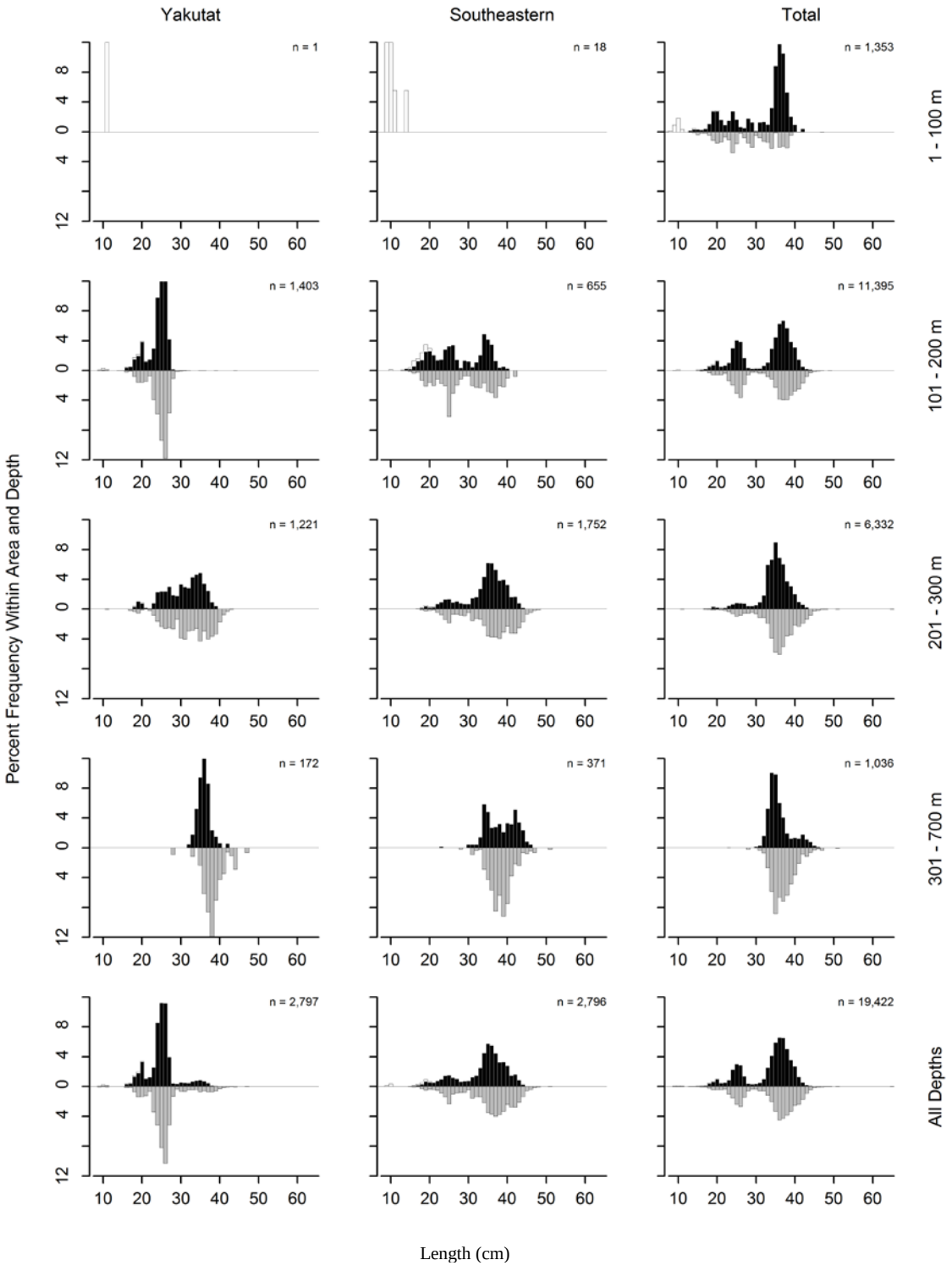

Figure 29. -- Continued (Pacific ocean perch).

Table 38. -- Catch per unit of effort by stratum for Pacific ocean perch sorted by descending CPUE for the 2011 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	201 - 300	Shumagin Slope	11	11	291.25	81,199	0	230,551
Chirikof	101 - 200	Chirikof Outer Shelf	16	15	286.56	143,585	0	336,477
Chirikof	201 - 300	Chirikof Slope	6	6	221.79	33,896	0	94,604
Kodiak	101 - 200	Kodiak Outer Shelf	18	15	140.97	70,848	9,866	131,831
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	10	129.77	50,962	8,967	92,957
Kodiak	101 - 200	Albatross Gullies	29	20	116.31	92,021	7,512	176,530
Kodiak	101 - 200	Portlock Flats	25	19	101.45	74,426	32,036	116,817
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	81.24	9,142	2,786	15,498
Kodiak	201 - 300	Kenai Gullies	15	13	61.50	40,954	0	83,069
Yakutat	201 - 300	Yakutat Slope	6	6	59.01	12,553	0	30,099
Kodiak	201 - 300	Kodiak Slope	6	6	41.83	6,788	0	15,197
Yakutat	101 - 200	Yakutat Flats	9	8	34.29	30,970	0	81,994
Southeastern	301 - 500	Southeastern Slope	1	1	33.07	2,555		
Kodiak	101 - 200	Barren Islands	18	8	28.10	30,859	5,573	56,146
Yakutat	201 - 300	Yakutat Gullies	7	7	24.10	7,333	0	16,704
Yakutat	301 - 500	Yakutat Gullies	3	3	17.82	1,973	0	9,666
Shumagin	101 - 200	Shumagin Outer Shelf	27	18	17.00	13,861	0	37,590
Chirikof	101 - 200	East Shumagin Gully	14	6	15.40	17,096	0	53,148
Southeastern	301 - 500	Southeastern Deep Gullies	7	5	15.04	3,526	0	8,241
Kodiak	301 - 500	Kodiak Slope	6	5	13.63	3,969	0	13,081
Shumagin	301 - 500	Shumagin Slope	7	6	13.29	3,365	0	8,470
Yakutat	101 - 200	Fairweather Shelf	7	4	13.26	10,243	0	32,683
Yakutat	101 - 200	Yakataga Shelf	8	8	8.90	4,696	0	10,329
Kodiak	1 - 100	Albatross Banks	38	7	7.91	12,178	0	36,823
Southeastern	101 - 200	Prince of Wales Shelf	14	5	7.59	5,229	0	15,121
Kodiak	101 - 200	Kenai Flats	17	15	7.15	8,635	795	16,474
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	6	3.00	1,257	0	3,278
Chirikof	201 - 300	Lower Shelikof Gully	14	7	1.53	1,532	0	3,334
Yakutat	301 - 500	Yakutat Slope	3	3	1.09	166	0	494
Chirikof	101 - 200	Shelikof Edge	26	13	0.78	600	39	1,162
Chirikof	1 - 100	Semidi Bank	16	8	0.76	553	0	1,179
Shumagin	1 - 100	Shumagin Bank	31	8	0.55	684	0	1,773
Yakutat	101 - 200	Middleton Shelf	9	5	0.46	338	0	750
Yakutat	501 - 700	Yakutat Slope	2	1	0.46	67	0	916
Chirikof	301 - 500	Chirikof Slope	6	3	0.45	72	0	211
Kodiak	1 - 100	Kenai Peninsula	6	2	0.32	168	0	524
Shumagin	1 - 100	Fox Islands	16	4	0.24	200	0	497
Kodiak	501 - 700	Kodiak Slope	4	1	0.20	35	0	147
Shumagin	101 - 200	Sanak Gully	6	3	0.15	63	0	147
Shumagin	501 - 700	Shumagin Slope	3	1	0.13	26	0	135
Southeastern	501 - 700	Southeastern Slope	3	1	0.08	8	0	44
Chirikof	1 - 100	Chirikof Bank	34	2	0.02	22	0	58
Southeastern	1 - 100	Southeastern Shallows	8	1	0.01	8	0	26
Shumagin	1 - 100	Davidson Bank	39	1	0.01	9	0	28
Chirikof	1 - 100	Upper Alaska Peninsula	18	1	<0.01	2	0	7
Yakutat	1 - 100	Yakutat Shallows	8	1	<0.01	1	0	3

Northern rockfish (*Sebastes polyspinis*)

Northern rockfish was the second most abundant rockfish species and the eighth most abundant species caught in the 2011 survey (Table 2). They were found primarily in the western portion of the survey area with about 80% of the estimated biomass in the Shumagin and Chirikof INPFC areas and almost all of the remainder in the Kodiak INPFC area (Fig. 30, Table 39). They were almost exclusively found in waters shallower than 200 m (Table 39). The highest CPUEs of northern rockfish occurred in the Semidi Bank and the Kodiak Outer shelf strata (Table 40). The length distribution of northern rockfish caught during the survey was confined to a relatively narrow range between approximately 30 and 45 cm in all areas and depth ranges with a mode around 40 cm for males and between 40 and 45 cm for females, in the two westernmost INPFC areas (Fig. 31).

Table 39. -- Number of survey hauls, number of hauls with northern rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	11	6.71	27,723	0	80,679	1.115
	101 - 200	37	14	13.06	19,165	0	49,695	1.135
	201 - 300	11	6	0.7	195	18	372	0.701
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	31	7.44	47,082	0	107,507	1.120
Chirikof	1 - 100	68	5	19.78	51,510	0	138,283	1.137
	101 - 200	56	14	16.82	40,121	0	117,337	1.139
	201 - 300	20	3	0.12	144	0	389	0.777
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	22	14.12	91,774	0	203,844	1.137
Kodiak	1 - 100	87	2	1.49	5,755	0	17,491	1.051
	101 - 200	107	27	6.67	28,911	0	80,656	0.989
	201 - 300	24	5	0.08	91	0	185	0.600
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	34	3.55	34,757	0	86,553	0.997
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	1	0.01	16	0	53	0.501
	201 - 300	13	1	0.02	12	0	40	0.740
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	2	<0.01	28	0	73	0.579
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	0	---	---	---	---	---
All areas	1 - 100	282	18	6.59	84,988	0	184,626	1.123
	101 - 200	255	56	7.21	88,213	0	185,452	1.084
	201 - 300	83	15	0.12	441	162	720	0.700
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	89	5.63	173,642	37,998	309,286	1.101

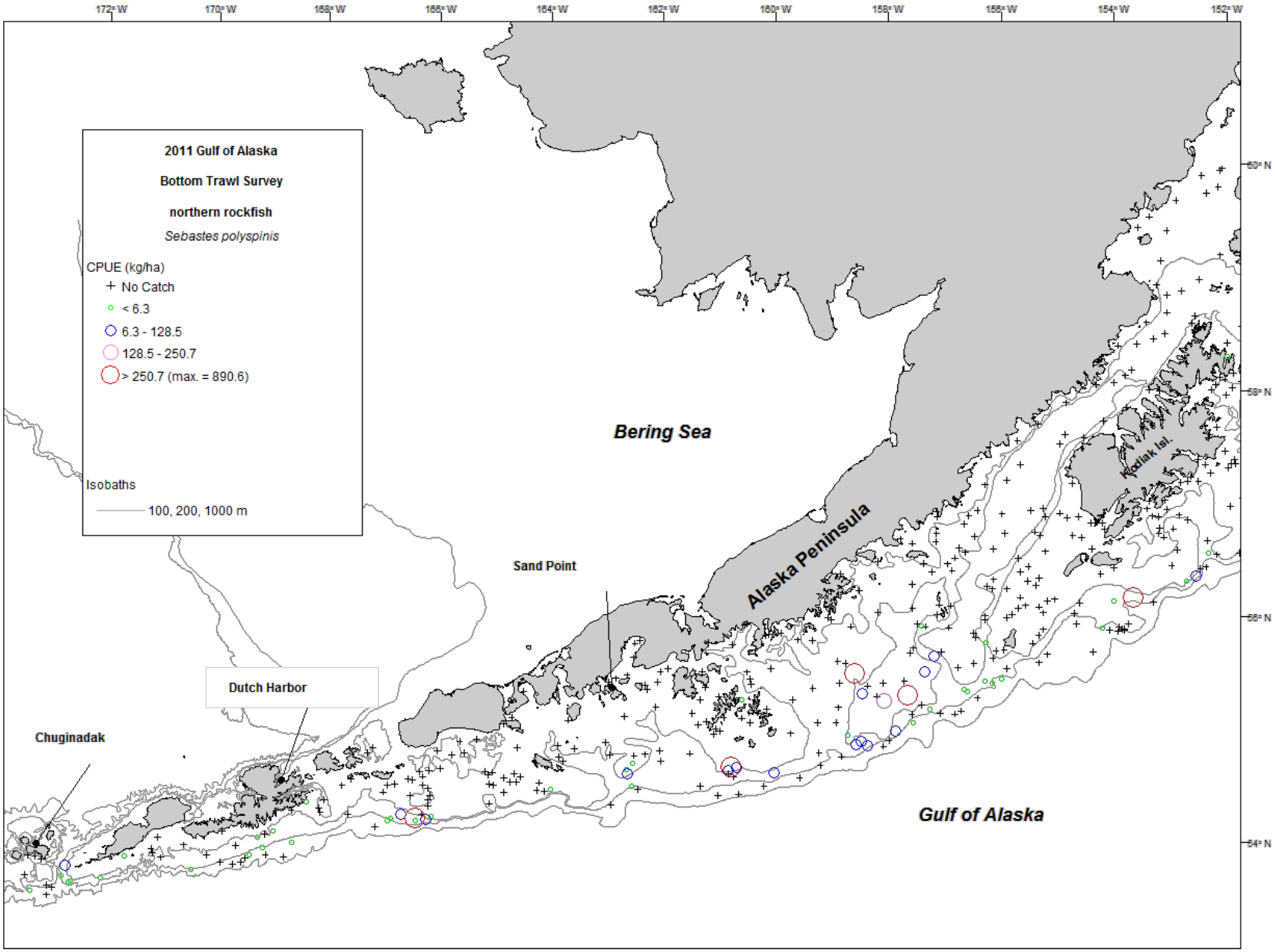

Figure 30. -- Distribution and relative abundance of northern rockfish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

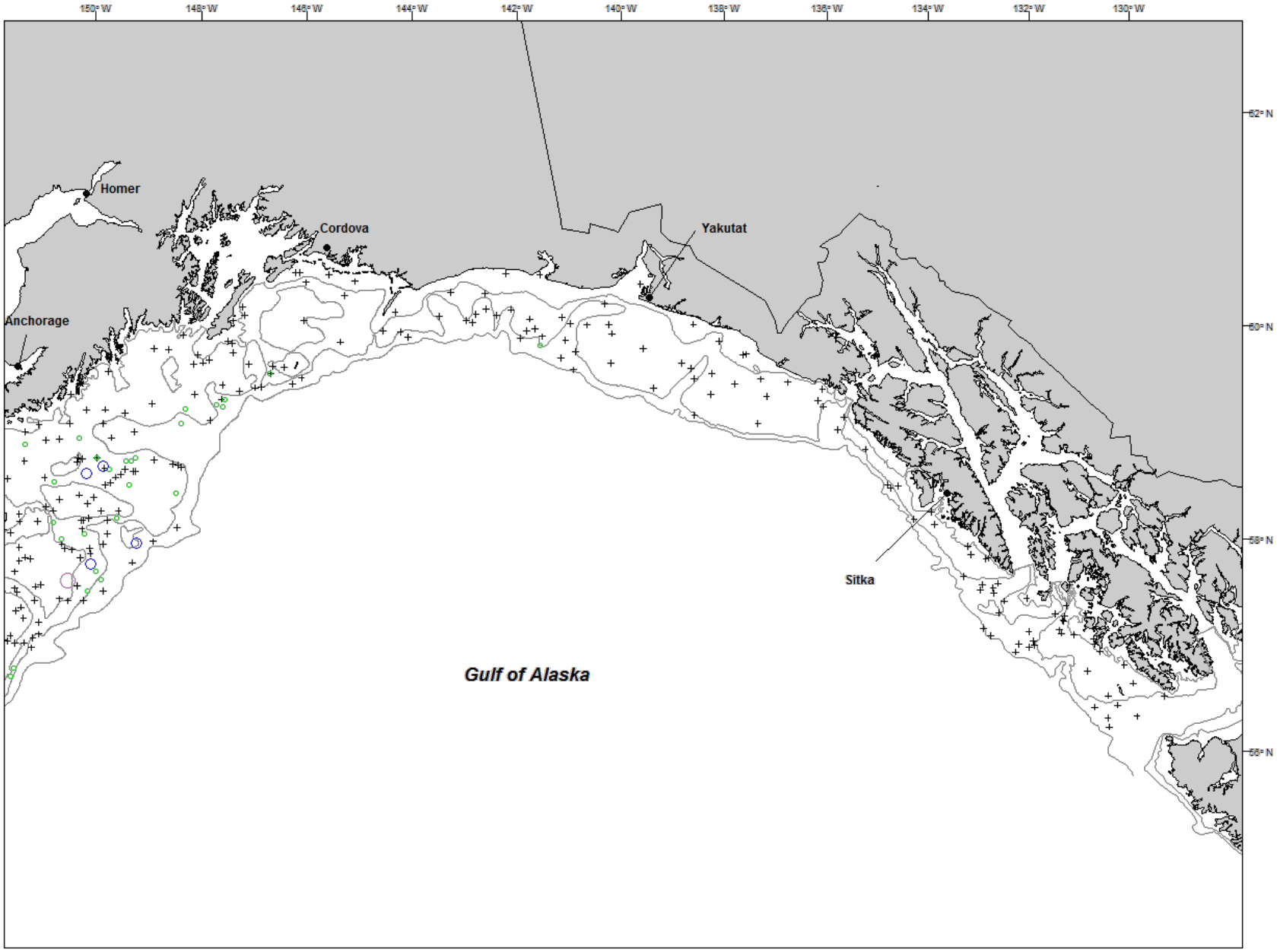

Figure 30. -- Continued.

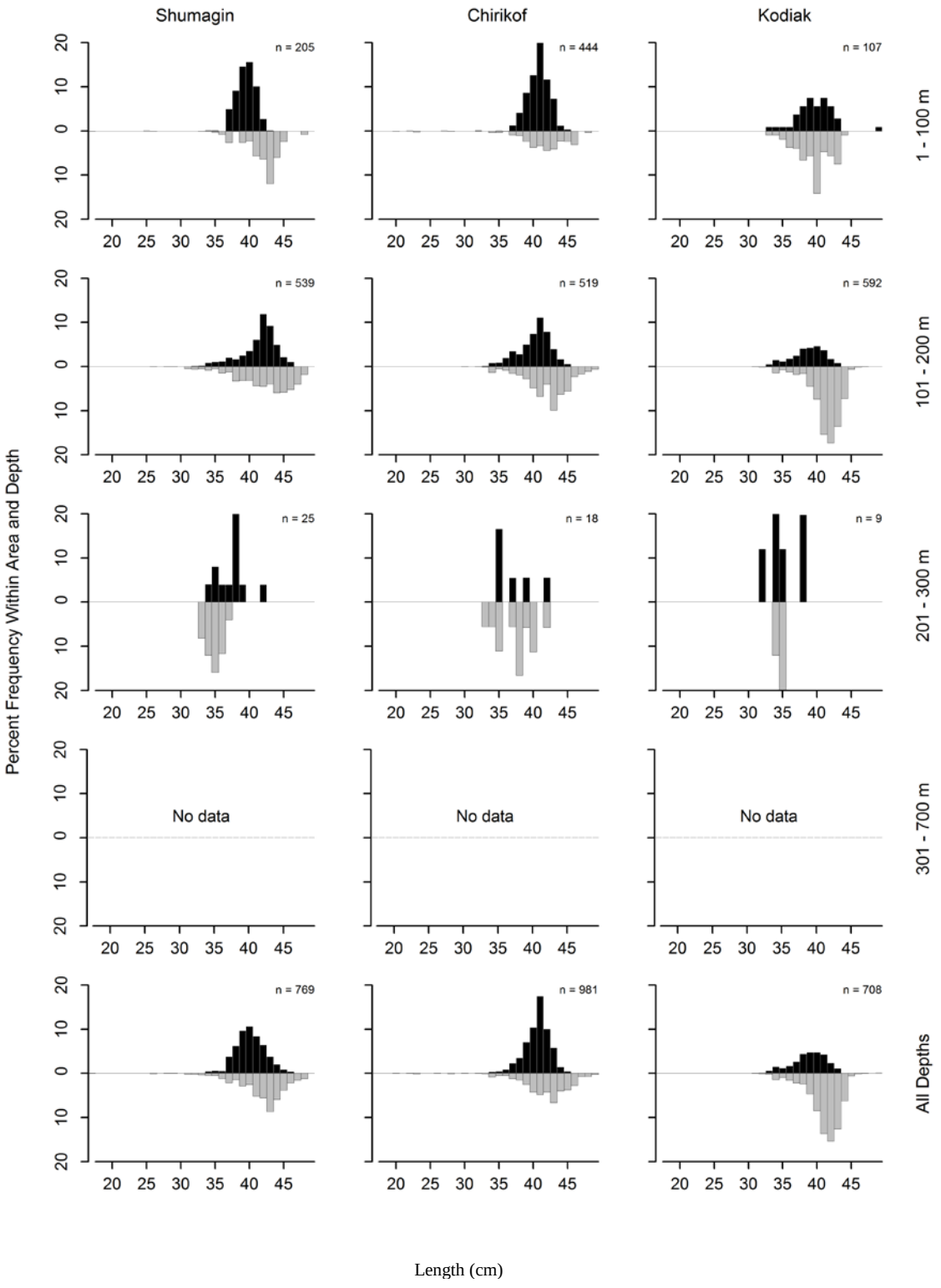

Figure 31. -- Size composition of northern rockfish from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

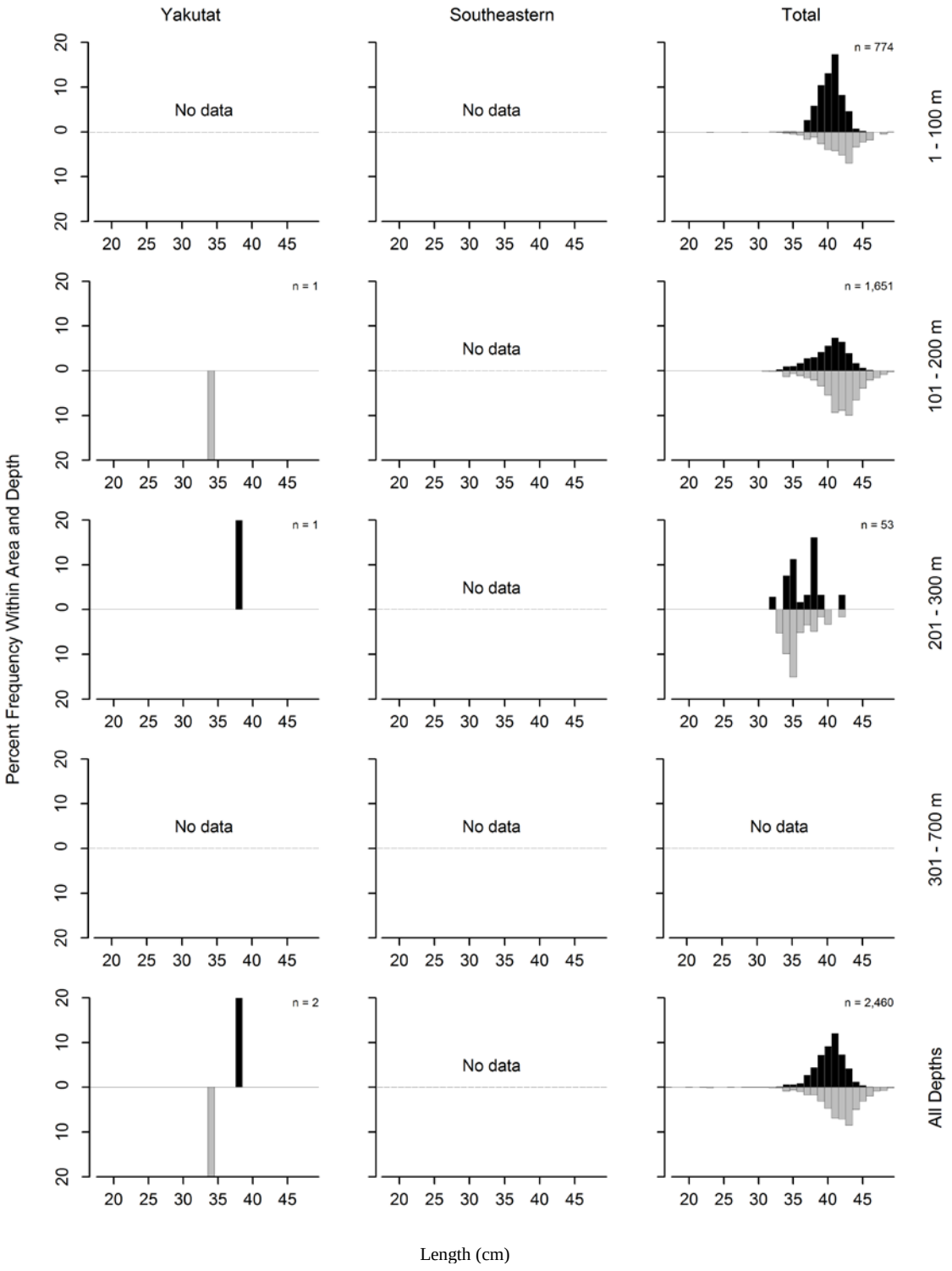

Figure 31. -- Continued (northern rockfish).

Table 40. --Catch per unit of effort by stratum for northern rockfish sorted by descending CPUE for the 2011 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	5	70.54	51,510	0	138,733
Kodiak	101 - 200	Kodiak Outer Shelf	18	9	54.61	27,447	0	79,401
Chirikof	101 - 200	East Shumagin Gully	14	1	32.36	35,937	0	113,561
Shumagin	101 - 200	Shumagin Outer Shelf	27	14	23.50	19,165	0	49,754
Shumagin	1 - 100	Shumagin Bank	31	6	22.22	27,554	0	80,510
Chirikof	101 - 200	Chirikof Outer Shelf	16	10	7.65	3,831	0	8,253
Kodiak	1 - 100	Albatross Banks	38	1	3.73	5,747	0	17,483
Kodiak	101 - 200	Portlock Flats	25	10	1.20	880	31	1,729
Chirikof	201 - 300	Chirikof Slope	6	3	0.94	144	0	402
Shumagin	201 - 300	Shumagin Slope	11	6	0.70	195	16	374
Chirikof	101 - 200	Shelikof Edge	26	3	0.46	353	0	978
Kodiak	101 - 200	Albatross Gullies	29	6	0.45	358	0	965
Kodiak	101 - 200	Kenai Flats	17	1	0.17	199	0	622
Shumagin	1 - 100	Fox Islands	16	3	0.14	120	0	278
Kodiak	201 - 300	Kenai Gullies	15	4	0.11	74	0	162
Kodiak	201 - 300	Kodiak Slope	6	1	0.11	17	0	61
Yakutat	201 - 300	Yakutat Slope	6	1	0.05	12	0	41
Shumagin	1 - 100	Davidson Bank	39	2	0.04	49	0	131
Kodiak	101 - 200	Barren Islands	18	1	0.03	27	0	84
Yakutat	101 - 200	Middleton Shelf	9	1	0.02	16	0	54
Kodiak	1 - 100	Albatross Shallows	25	1	0.01	8	0	26

Rougheye rockfish *(Sebastes aleutianus)*

Rougheye rockfish were caught throughout the survey area primarily on the upper continental slope and in the deeper gullies in the 101-500 m depth range, where approximately 90% of its biomass was estimated (Fig. 32; Tables 41 and 42). The highest CPUEs were generally recorded in the 301-500 m range (Table 41) where rougheye rockfish were caught in approximately 58% of the tows. Fish size generally increased with depth to 700 m (Fig. 33, Table 41). The only relatively distinct length mode occurred at around 30 cm for both males and females in the 201-300 m depth range in the Yakutat INPFC area.

Table 41. -- Number of survey hauls, number of hauls with rougheye rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	1	0.03	126	0	392	2.689
	101 - 200	37	1	0.01	12	0	35	0.907
	201 - 300	11	1	0.24	66	0	210	1.137
	301 - 500	7	2	0.52	132	0	335	1.610
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	5	0.05	335	0	680	1.681
Chirikof	1 - 100	68	2	0.03	68	0	178	0.729
	101 - 200	56	12	0.24	580	0	1,173	0.784
	201 - 300	20	14	2.85	3,292	683	5,900	1.353
	301 - 500	6	5	2.85	457	0	1,236	1.424
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	33	0.68	4,397	1,666	7,127	1.226
Kodiak	1 - 100	87	9	0.34	1,295	0	2,807	0.728
	101 - 200	107	21	1.43	6,201	1,366	11,035	0.613
	201 - 300	24	19	4.94	5,676	1,421	9,931	0.871
	301 - 500	6	4	11.88	3,458	0	10,651	1.518
	501 - 700	4	2	0.51	90	0	258	1.952
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	55	1.71	16,720	7,903	25,536	0.807
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	15	0.33	965	282	1,648	0.171
	201 - 300	13	7	2.08	1,078	0	2,170	0.416
	301 - 500	6	4	1.7	447	0	953	1.216
	501 - 700	2	2	0.71	104	60	147	1.901
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	28	0.47	2,593	1,386	3,801	0.300
Southeastern	1 - 100	8	2	1.51	991	0	3,222	0.439
	101 - 200	22	4	0.23	260	0	607	0.449
	201 - 300	15	2	1.75	882	0	2,382	2.089
	301 - 500	8	8	7.75	2,415	1,704	3,126	1.688
	501 - 700	3	2	0.72	74	0	213	1.717
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	18	1.72	4,622	1,868	7,376	0.976
All areas	1 - 100	282	14	0.19	2,480	0	5,071	0.594
	101 - 200	255	53	0.66	8,017	3,114	12,920	0.469
	201 - 300	83	43	3.05	10,993	5,879	16,107	0.915
	301 - 500	33	23	5.4	6,909	0	14,194	1.542
	501 - 700	17	6	0.33	267	83	452	1.862
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	139	0.93	28,666	19,144	38,189	0.756

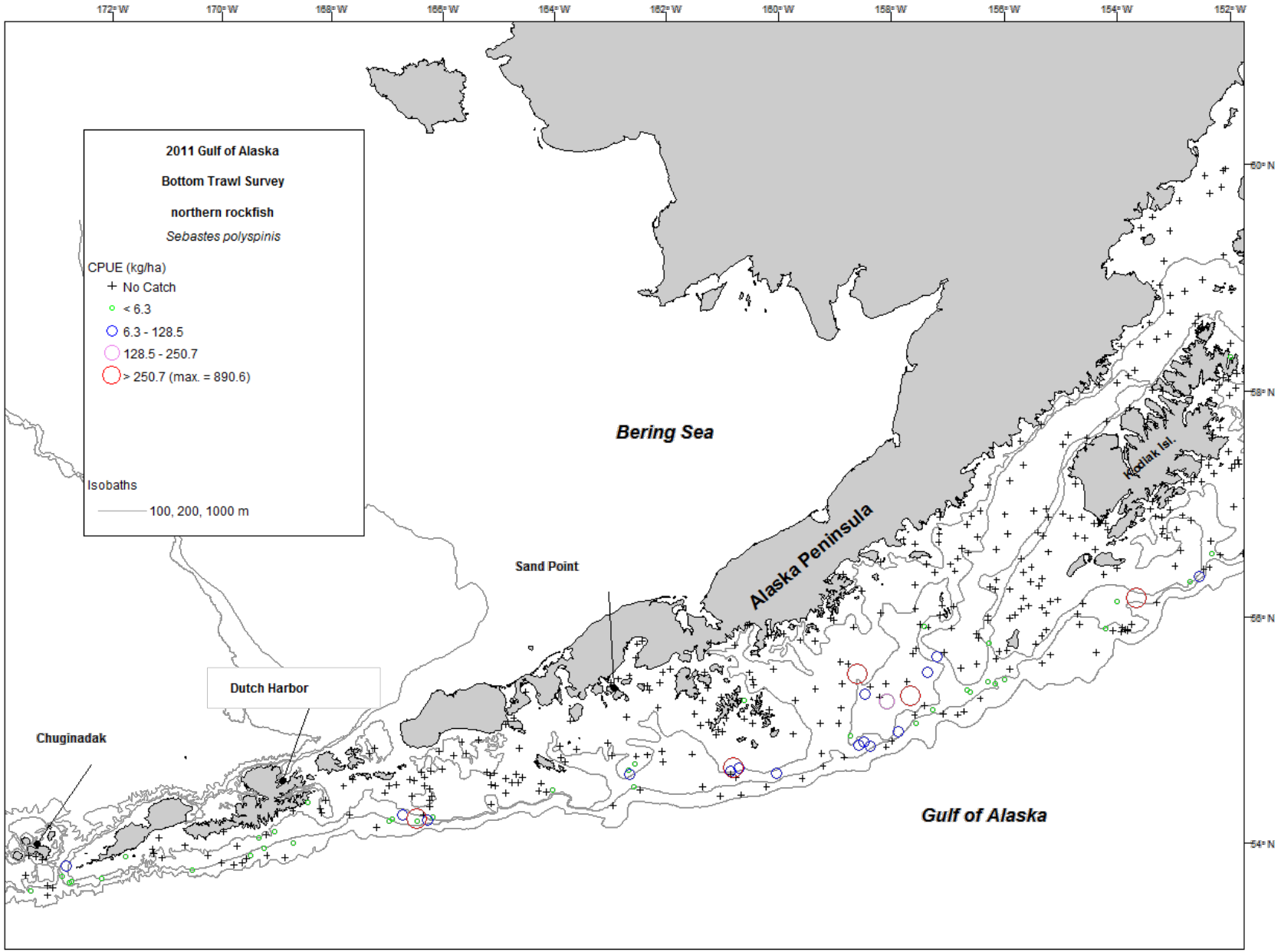

Figure 32. -- Distribution and relative abundance of rougheye rockfish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

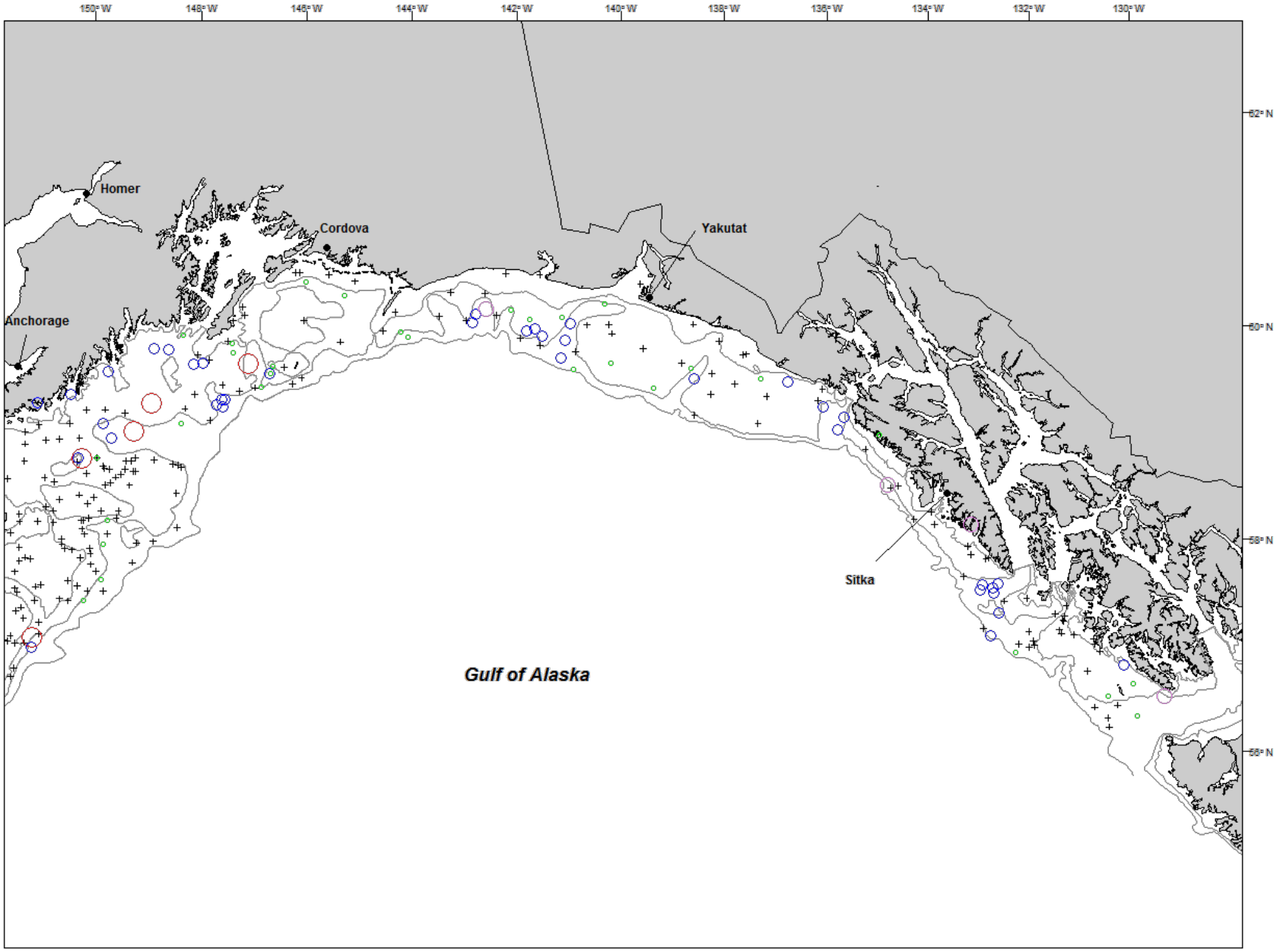

Figure 32. -- Continued.

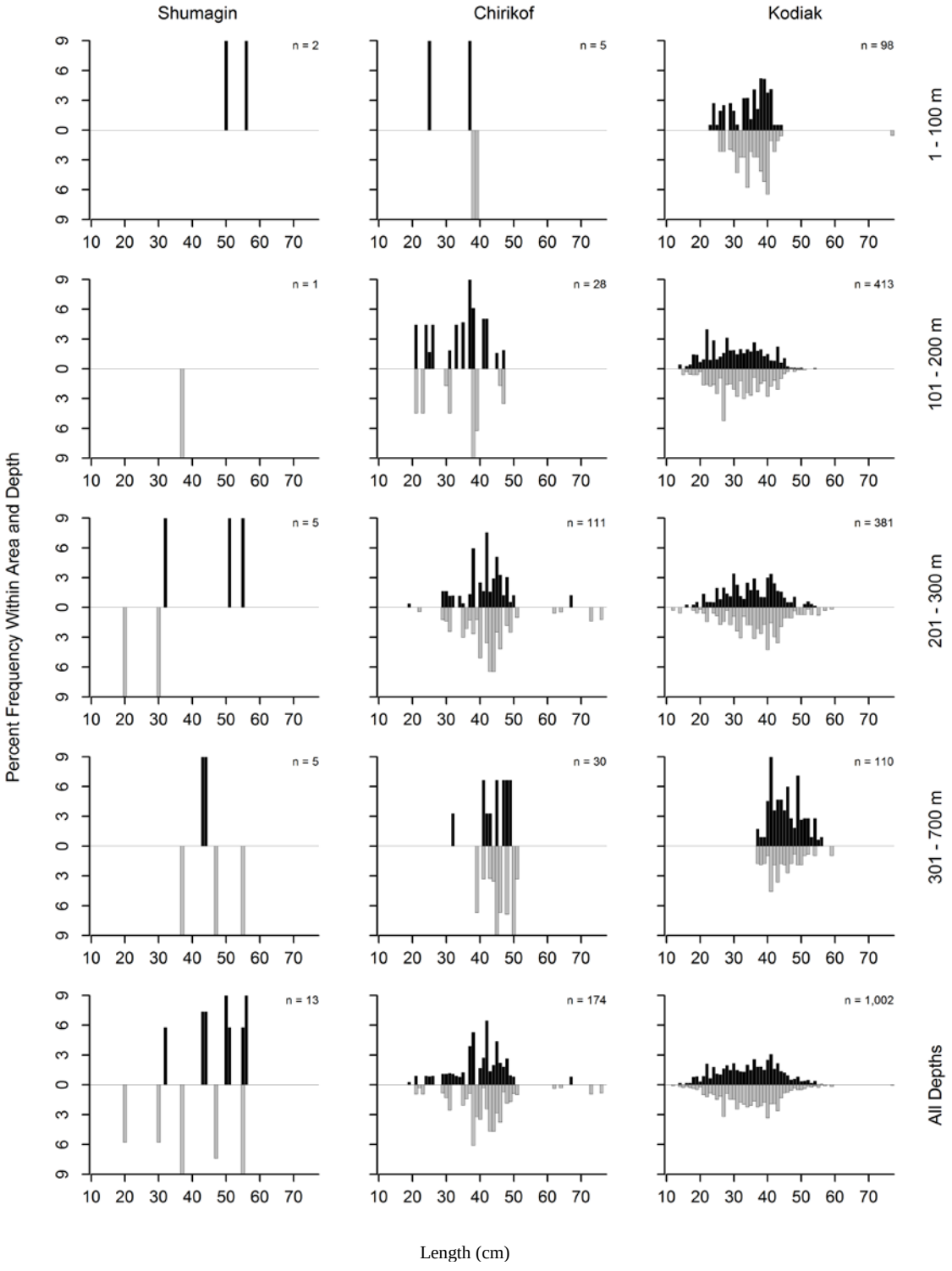

Figure 33. -- Size composition of rougheye rockfish from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

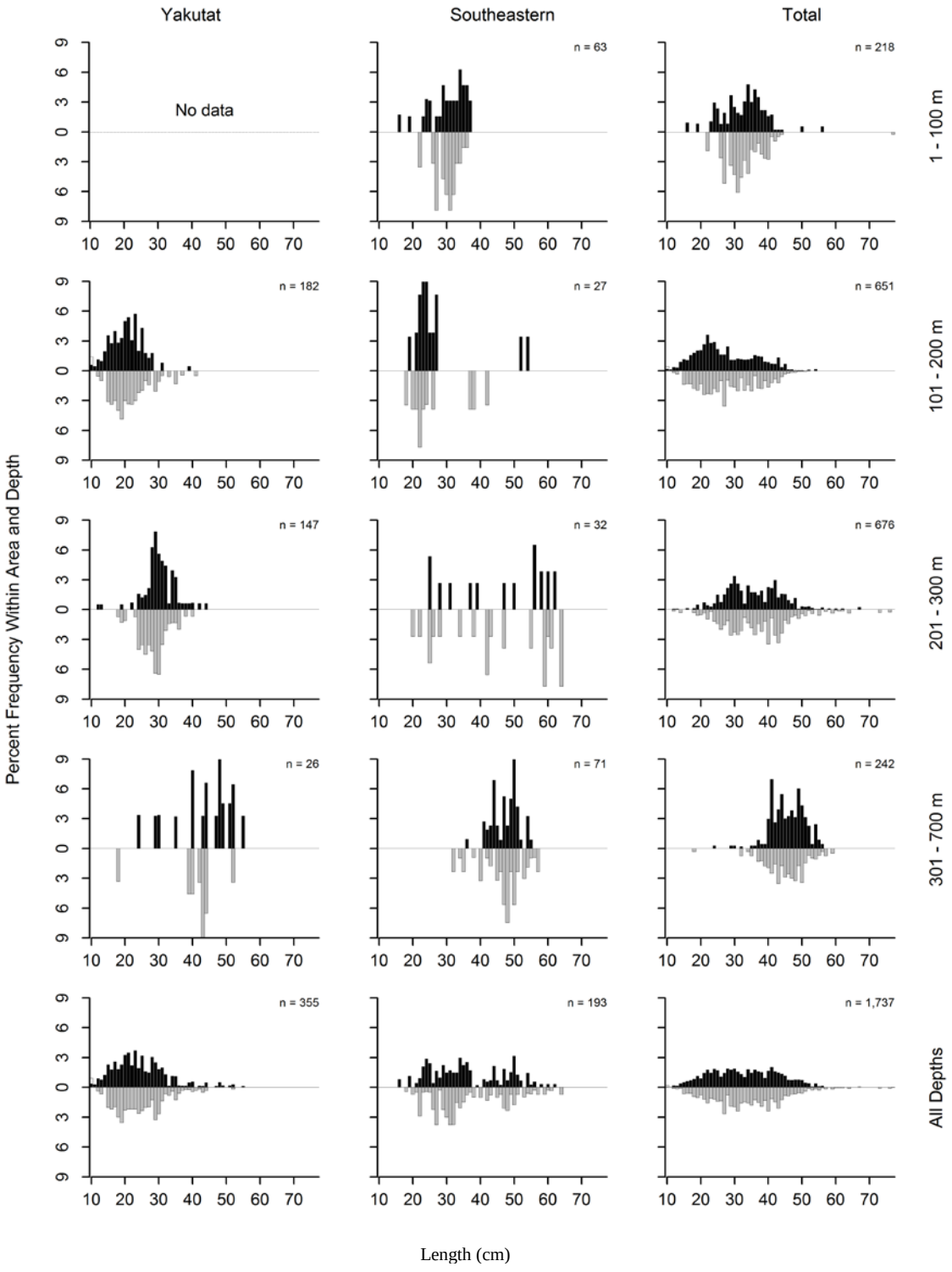

Figure 33. -- Continued (rougheye rockfish).

Table 42. -- Catch per unit of effort by stratum for rougheye rockfish sorted by descending CPUE for the 2011 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	1	1	17.86	1,380		
Kodiak	301 - 500	Kodiak Slope	6	4	11.88	3,458	0	11,016
Kodiak	201 - 300	Kodiak Slope	6	5	11.26	1,826	0	5,299
Kodiak	201 - 300	Kenai Gullies	15	12	5.60	3,728	493	6,962
Chirikof	201 - 300	Chirikof Slope	6	5	4.92	752	0	1,658
Southeastern	301 - 500	Southeastern Deep Gullies	7	7	4.42	1,035	299	1,771
Yakutat	201 - 300	Yakutat Gullies	7	5	3.31	1,008	0	2,132
Kodiak	101 - 200	Kenai Flats	17	9	3.02	3,642	0	7,627
Chirikof	301 - 500	Chirikof Slope	6	5	2.85	457	0	1,276
Yakutat	301 - 500	Yakutat Gullies	3	3	2.64	293	125	460
Chirikof	201 - 300	Lower Shelikof Gully	14	9	2.54	2,539	26	5,053
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	2.09	235	0	983
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	1	1.65	647	0	2,089
Kodiak	101 - 200	Albatross Gullies	29	6	1.53	1,214	0	3,069
Southeastern	1 - 100	Southeastern Shallows	8	2	1.51	991	0	3,279
Kodiak	101 - 200	Portlock Flats	25	2	1.44	1,052	0	3,166
Kodiak	1 - 100	Kenai Peninsula	6	2	1.30	683	0	1,882
Yakutat	101 - 200	Yakataga Shelf	8	5	1.09	574	0	1,169
Kodiak	1 - 100	Albatross Shallows	25	6	1.03	593	0	1,610
Yakutat	301 - 500	Yakutat Slope	3	1	1.01	154	0	818
Southeastern	501 - 700	Southeastern Slope	3	2	0.72	74	0	262
Yakutat	501 - 700	Yakutat Slope	2	2	0.71	104	0	232
Shumagin	301 - 500	Shumagin Slope	7	2	0.52	132	0	342
Kodiak	501 - 700	Kodiak Slope	4	2	0.51	90	0	283
Chirikof	101 - 200	East Shumagin Gully	14	3	0.39	431	0	1,020
Kodiak	201 - 300	Upper Shelikof Gully	3	2	0.38	122	0	406
Southeastern	101 - 200	Prince of Wales Shelf	14	4	0.38	260	0	610
Yakutat	201 - 300	Yakutat Slope	6	2	0.33	70	0	190
Kodiak	101 - 200	Barren Islands	18	4	0.27	292	0	671
Yakutat	101 - 200	Fairweather Shelf	7	2	0.25	192	0	623
Yakutat	101 - 200	Middleton Shelf	9	5	0.24	176	0	427
Shumagin	201 - 300	Shumagin Slope	11	1	0.24	66	0	212
Chirikof	101 - 200	Shelikof Edge	26	8	0.16	127	39	215
Shumagin	1 - 100	Fox Islands	16	1	0.15	126	0	393
Chirikof	1 - 100	Upper Alaska Peninsula	18	2	0.09	68	0	179
Kodiak	1 - 100	Northern Kodiak Shallows	6	1	0.08	18	0	66
Chirikof	101 - 200	Chirikof Outer Shelf	16	1	0.04	22	0	69
Yakutat	101 - 200	Yakutat Flats	9	3	0.03	24	0	56
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.01	12	0	36

Blackspotted rockfish (*Sebastes melanostictus*)

Although blackspotted rockfish were found throughout the survey area, the highest concentrations were found in the Shumagin, Chirikof and Kodiak INPFC areas, mostly along the slope in 300 -500 m of water (Table 43). These areas contained 65 % of the estimated biomass (Table 43, Fig. 34) even though they only made up about 2% of the survey area (Table 1). Of the five strata with the highest CPUEs only one, the Chirikof Slope was in the 200 – 300 m depth range (Table 44). Mean weight increased with depth (Table 43). Length data for this species showed a strong mode at about 45 cm for both males and females in depths between 300 – 700 m in the three western INPFC areas (Fig. 35).

Table 43. -- Number of survey hauls, number of hauls with blackspotted rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	1	0.03	105	0	326	1.493
	101 - 200	37	8	0.45	664	0	1,487	0.818
	201 - 300	11	4	0.95	266	0	698	0.555
	301 - 500	7	6	7.65	1,936	0	5,101	1.426
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	19	0.47	2,970	0	6,100	1.093
Chirikof	1 - 100	68	1	0.03	86	0	268	0.723
	101 - 200	56	4	0.04	105	0	231	1.199
	201 - 300	20	6	2.03	2,349	0	6,100	1.134
	301 - 500	6	4	29.58	4,744	0	15,531	1.416
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	15	1.12	7,284	0	18,325	1.294
Kodiak	1 - 100	87	3	0.06	249	0	648	0.701
	101 - 200	107	8	0.07	304	0	656	0.626
	201 - 300	24	9	0.19	221	0	485	0.928
	301 - 500	6	2	11.58	3,371	0	8,677	1.281
	501 - 700	4	1	0.21	37	0	140	1.176
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	23	0.43	4,182	0	9,349	1.117
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	1	0.01	23	0	76	0.150
	201 - 300	13	0		---	---	---	---
	301 - 500	6	4	1.04	274	0	787	1.338
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	5	0.05	297	0	696	0.825
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	1	0.02	10	0	33	0.719
	301 - 500	8	4	1.81	565	421	710	1.018
	501 - 700	3	3	1.35	140	0	286	1.606
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	8	0.27	715	543	887	1.089
All areas	1 - 100	282	5	0.03	440	0	890	0.808
	101 - 200	255	21	0.09	1,097	253	1,941	0.712
	201 - 300	83	20	0.79	2,847	0	6,512	1.015
	301 - 500	33	20	8.51	10,889	32	21,746	1.344
	501 - 700	17	4	0.22	177	37	317	1.491
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	70	0.50	15,449	4,218	26,680	1.179

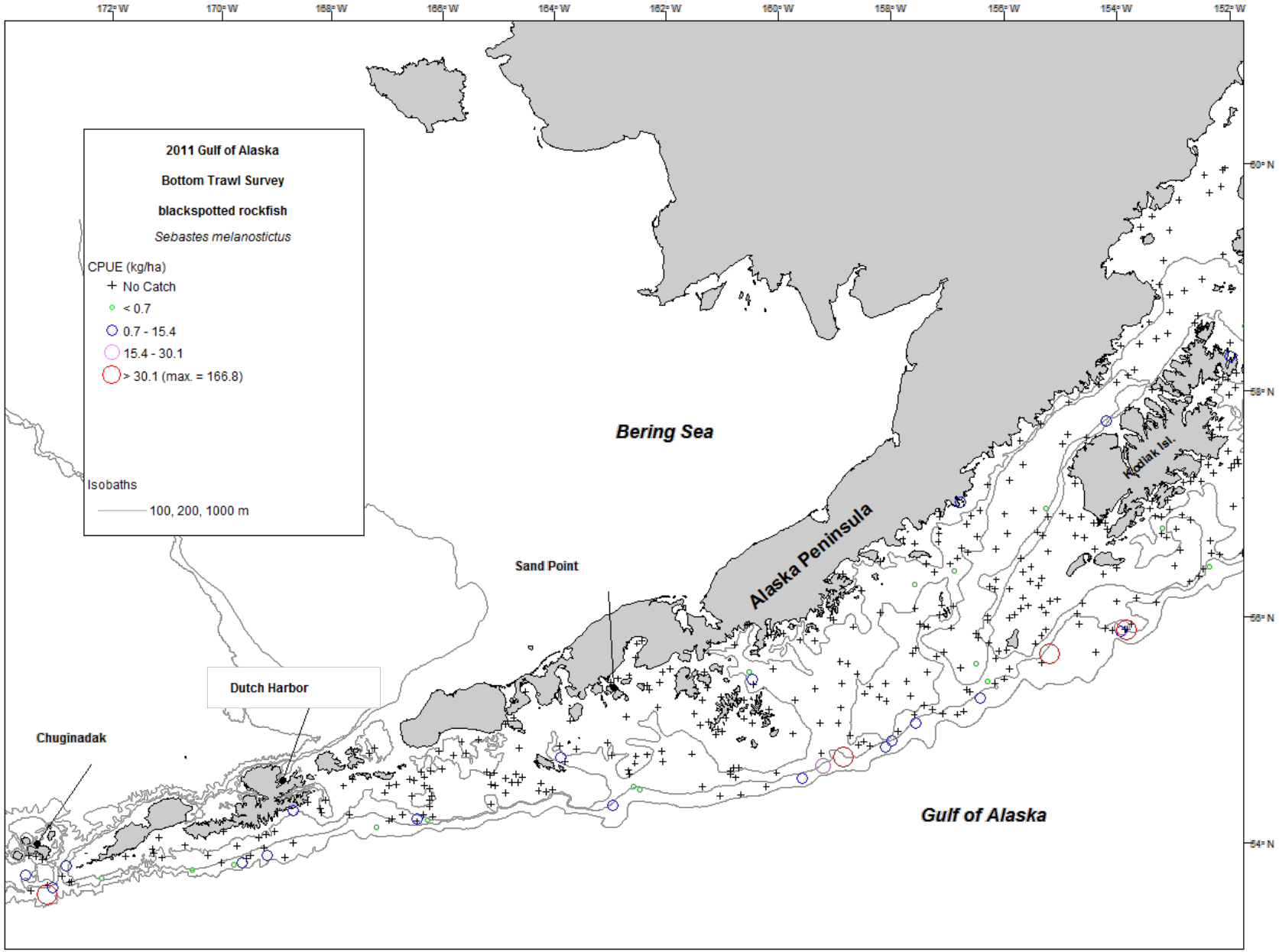

Figure 34. -- Distribution and relative abundance of blackspotted rockfish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

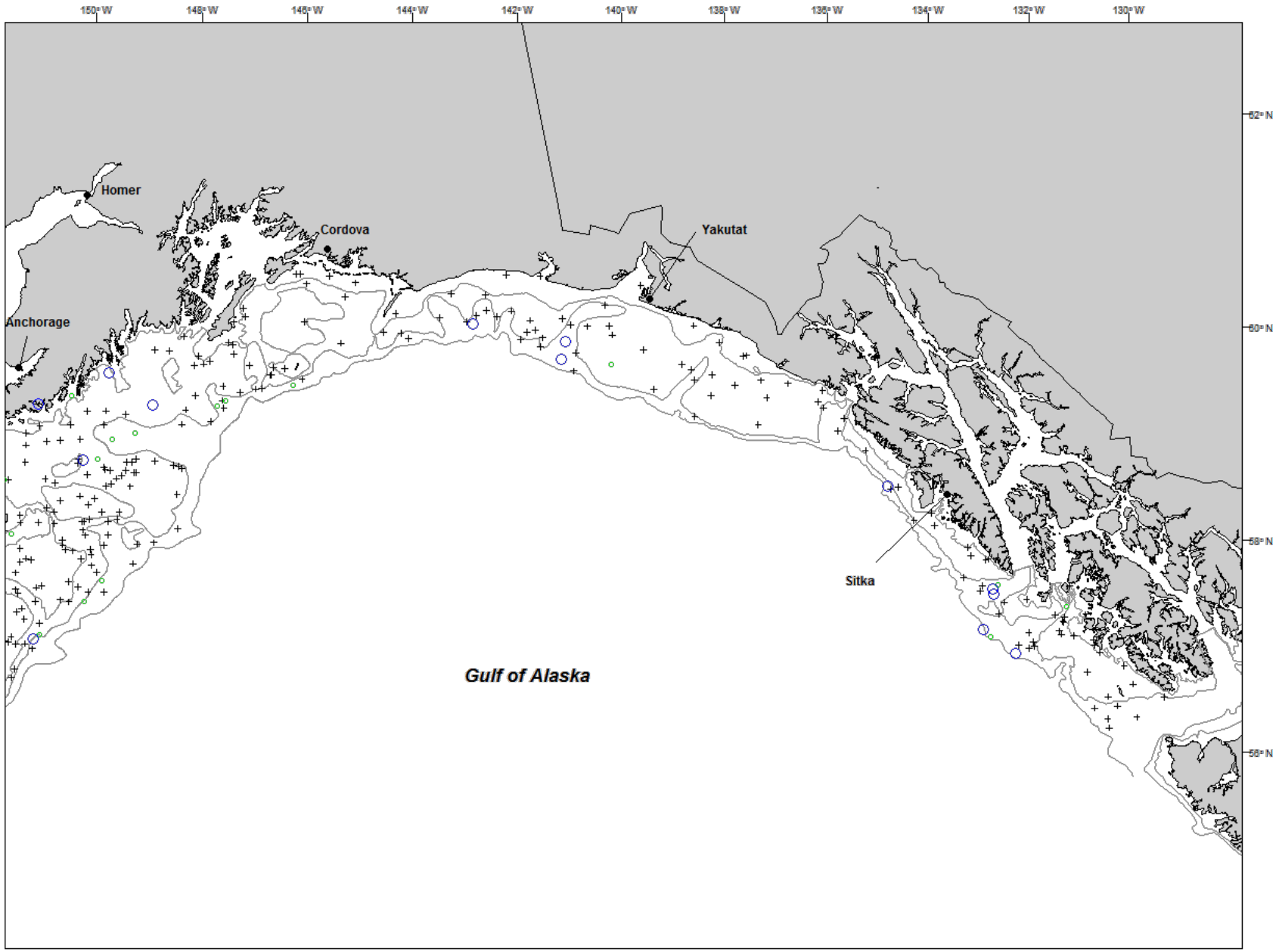

Figure 34. -- Continued.

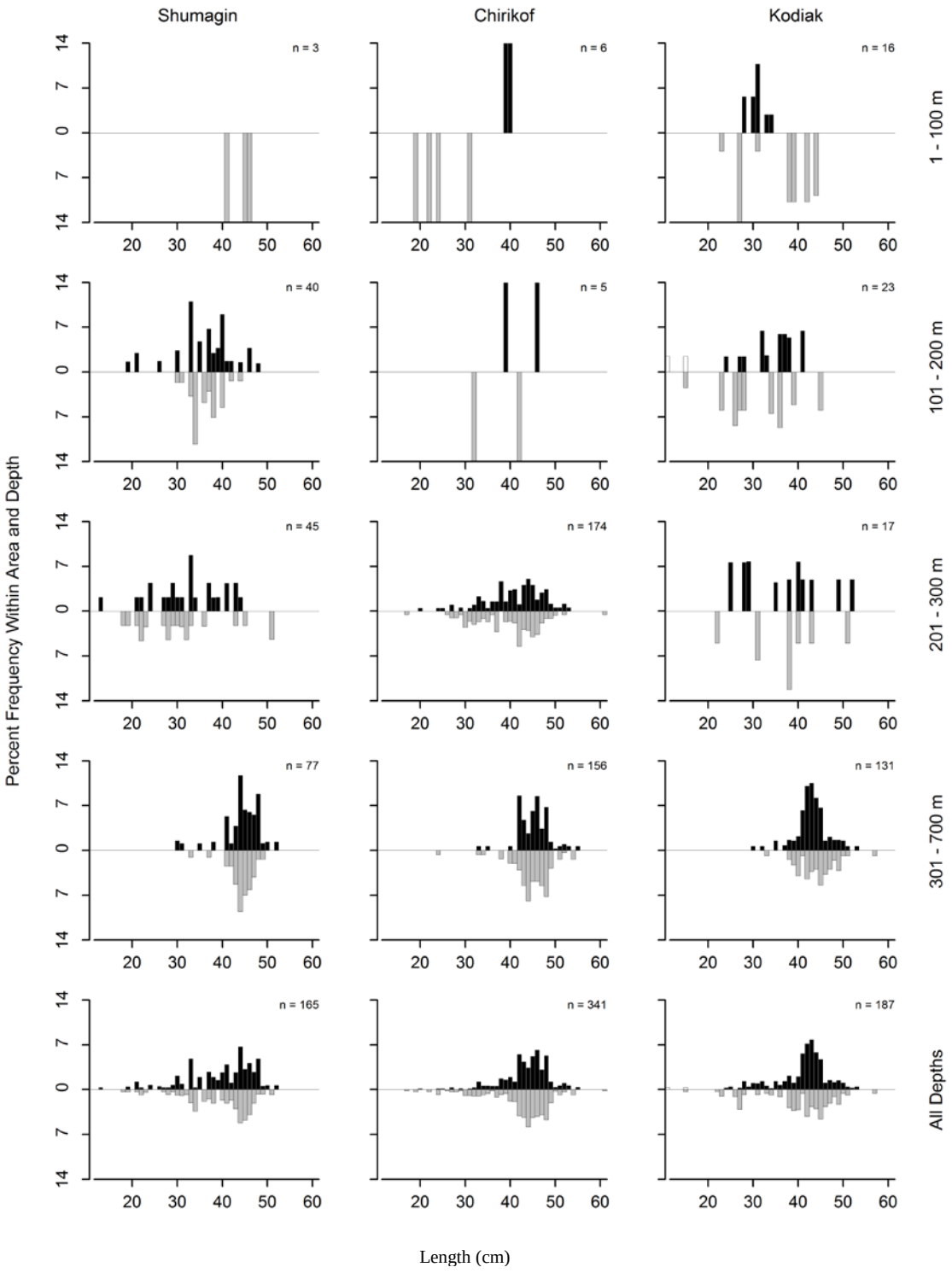

Figure 35. -- Size composition of blackspotted rockfish from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

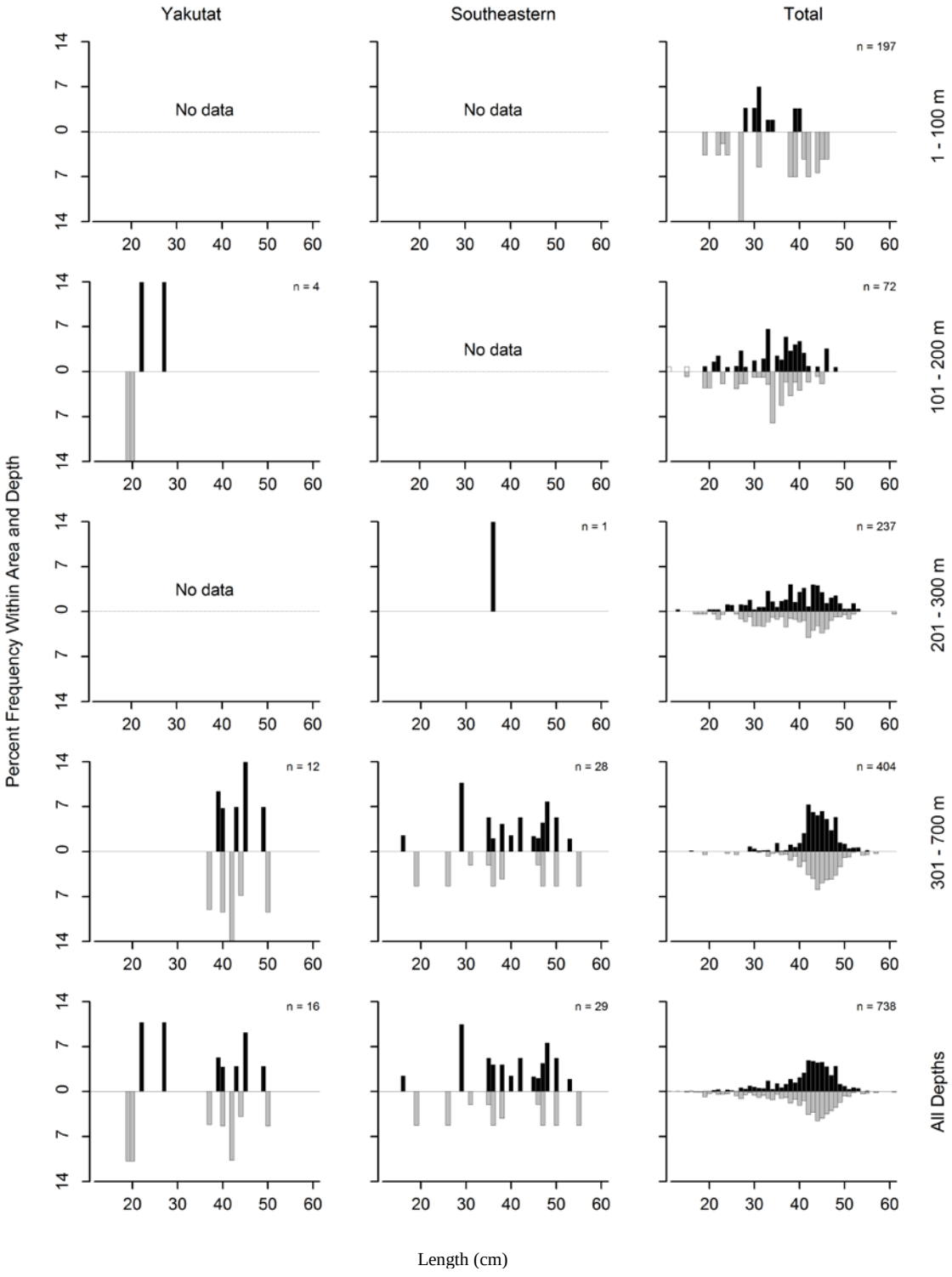

Figure 35. -- Continued (blackspotted rockfish).

Table 44. --Catch per unit of effort by stratum for blackspotted rockfish sorted by descending CPUE for the 2011 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	4	29.58	4,744	0	16,078
Chirikof	201 - 300	Chirikof Slope	6	4	15.05	2,300	0	6,239
Kodiak	301 - 500	Kodiak Slope	6	2	11.58	3,371	0	8,946
Shumagin	301 - 500	Shumagin Slope	7	6	7.65	1,936	0	5,210
Southeastern	301 - 500	Southeastern Slope	1	1	5.90	456		
Southeastern	501 - 700	Southeastern Slope	3	3	1.35	140	0	337
Yakutat	301 - 500	Yakutat Slope	3	2	1.16	176	0	836
Kodiak	201 - 300	Kodiak Slope	6	5	0.96	156	0	458
Shumagin	201 - 300	Shumagin Slope	11	4	0.95	266	0	703
Yakutat	301 - 500	Yakutat Gullies	3	2	0.88	98	0	313
Shumagin	101 - 200	Sanak Gully	6	1	0.75	319	0	1,138
Southeastern	301 - 500	Southeastern Deep Gullies	7	3	0.47	109	0	259
Shumagin	101 - 200	West Shumagin Gully	4	2	0.45	103	0	373
Kodiak	1 - 100	Kenai Peninsula	6	2	0.40	212	0	621
Shumagin	101 - 200	Shumagin Outer Shelf	27	5	0.30	242	0	559
Kodiak	501 - 700	Kodiak Slope	4	1	0.21	37	0	156
Kodiak	101 - 200	Kenai Flats	17	2	0.19	223	0	569
Shumagin	1 - 100	Fox Islands	16	1	0.13	105	0	327
Chirikof	1 - 100	Upper Alaska Peninsula	18	1	0.11	86	0	268
Kodiak	201 - 300	Kenai Gullies	15	4	0.10	65	0	131
Chirikof	101 - 200	Shelikof Edge	26	2	0.07	50	0	142
Kodiak	1 - 100	Albatross Shallows	25	1	0.06	37	0	114
Kodiak	101 - 200	Portlock Flats	25	3	0.06	42	0	95
Chirikof	201 - 300	Lower Shelikof Gully	14	2	0.05	50	0	123
Chirikof	101 - 200	East Shumagin Gully	14	1	0.04	40	0	125
Chirikof	101 - 200	Chirikof Outer Shelf	16	1	0.03	15	0	47
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	1	0.03	10	0	34
Yakutat	101 - 200	Yakutat Flats	9	1	0.03	23	0	77
Kodiak	101 - 200	Barren Islands	18	1	0.02	24	0	74
Kodiak	101 - 200	Albatross Gullies	29	2	0.02	16	0	43

Dusky rockfish *(Sebastes variabilis)*

Dusky rockfish was the fourth most abundant rockfish species and the 14th most abundant species caught in the 2011 survey area (Table 2). Dusky rockfish were found throughout the survey area but were most concentrated between Kodiak Island and Prince William Sound, exclusively in water depths less than 300 m. Over 86% of its estimated biomass was in the 101 to 200 m depth range and 75% of the biomass was in the Kodiak INPFC area (Fig. 36, Table 45). The highest CPUEs were recorded on the Portlock Flats and Kenai Flats (Table 46), which combined, accounted for almost 64% of the estimated biomass even though these two strata constitute just 6% of the survey area (Appendix Table A-1). Most fish measured between 35- 50 cm FL and there was no general trend in fish size with depth although fish smaller than about 40 cm FL were primarily confined to depths less than 100 m (Fig. 37).

Table 45. -- Number of survey hauls, number of hauls with dusky rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	6	0.06	261	0	681	0.784
	101 - 200	37	7	6.76	9,915	0	28,725	1.514
	201 - 300	11	5	1.07	298	0	749	1.478
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	18	1.65	10,473	0	29,293	1.479
Chirikof	1 - 100	68	1	0.11	283	0	883	1.359
	101 - 200	56	8	1.91	4,560	0	13,576	1.224
	201 - 300	20	7	0.28	327	54	599	1.359
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	16	0.8	5,169	0	14,210	1.239
Kodiak	1 - 100	87	3	1.97	7,590	0	22,794	1.242
	101 - 200	107	32	12.66	54,853	0	127,132	1.522
	201 - 300	24	5	0.39	450	0	1,116	1.706
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	40	6.42	62,893	0	136,589	1.483
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	7	0.83	2,452	0	5,265	1.479
	201 - 300	13	2	3.19	1,651	0	5,591	1.427
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	9	0.74	4,103	0	8,522	1.457
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	2	0.04	42	0	102	0.988
	201 - 300	15	2	1.44	727	0	2,272	1.369
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	4	0.29	768	0	2,315	1.341
All areas	1 - 100	282	10	0.63	8,133	0	23,354	1.222
	101 - 200	255	56	5.87	71,821	0	146,914	1.496
	201 - 300	83	21	0.96	3,452	0	7,341	1.442
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	87	2.7	83,407	7,072	159,742	1.462

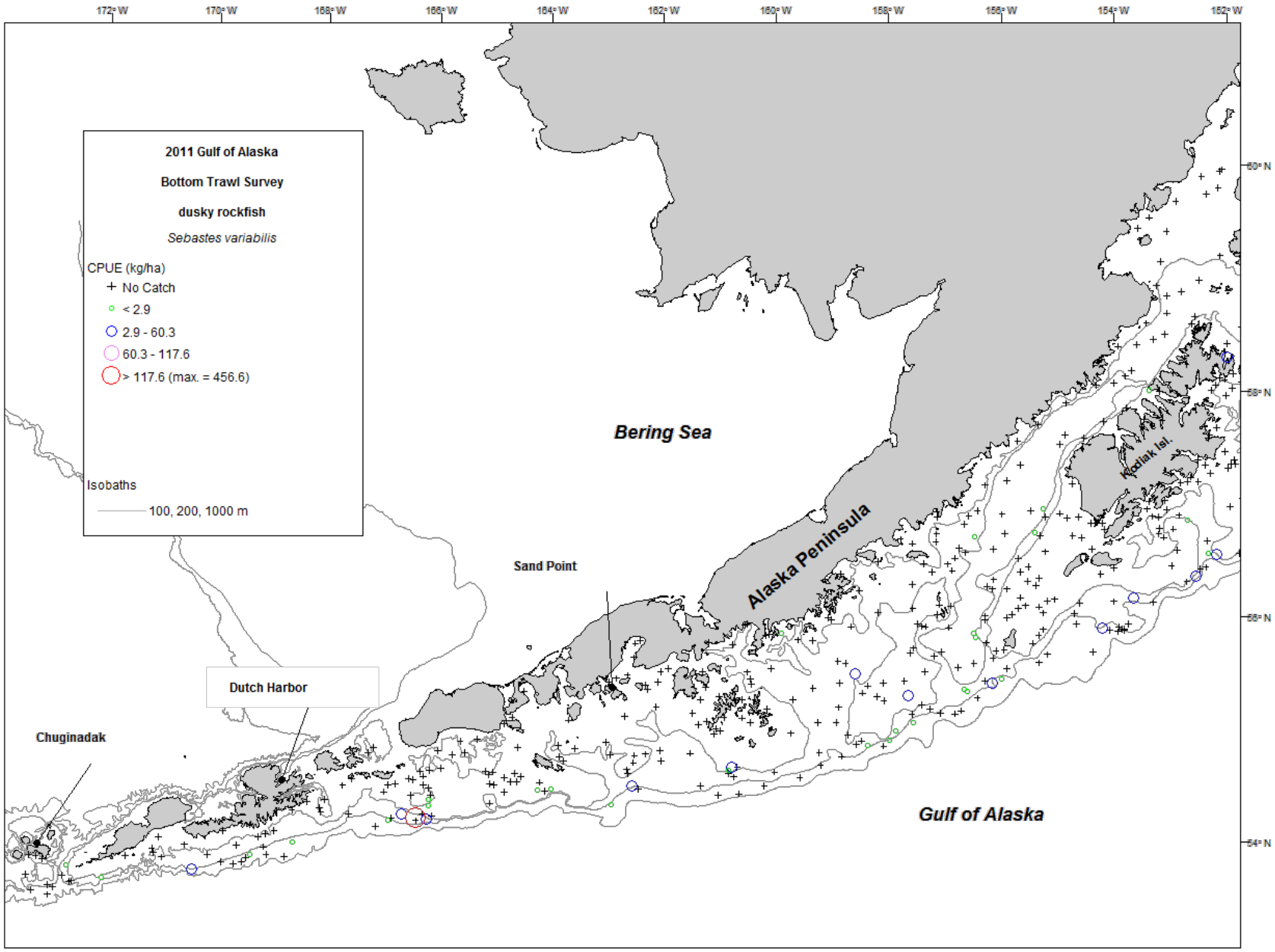

Figure 36. -- Distribution and relative abundance of dusky rockfish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

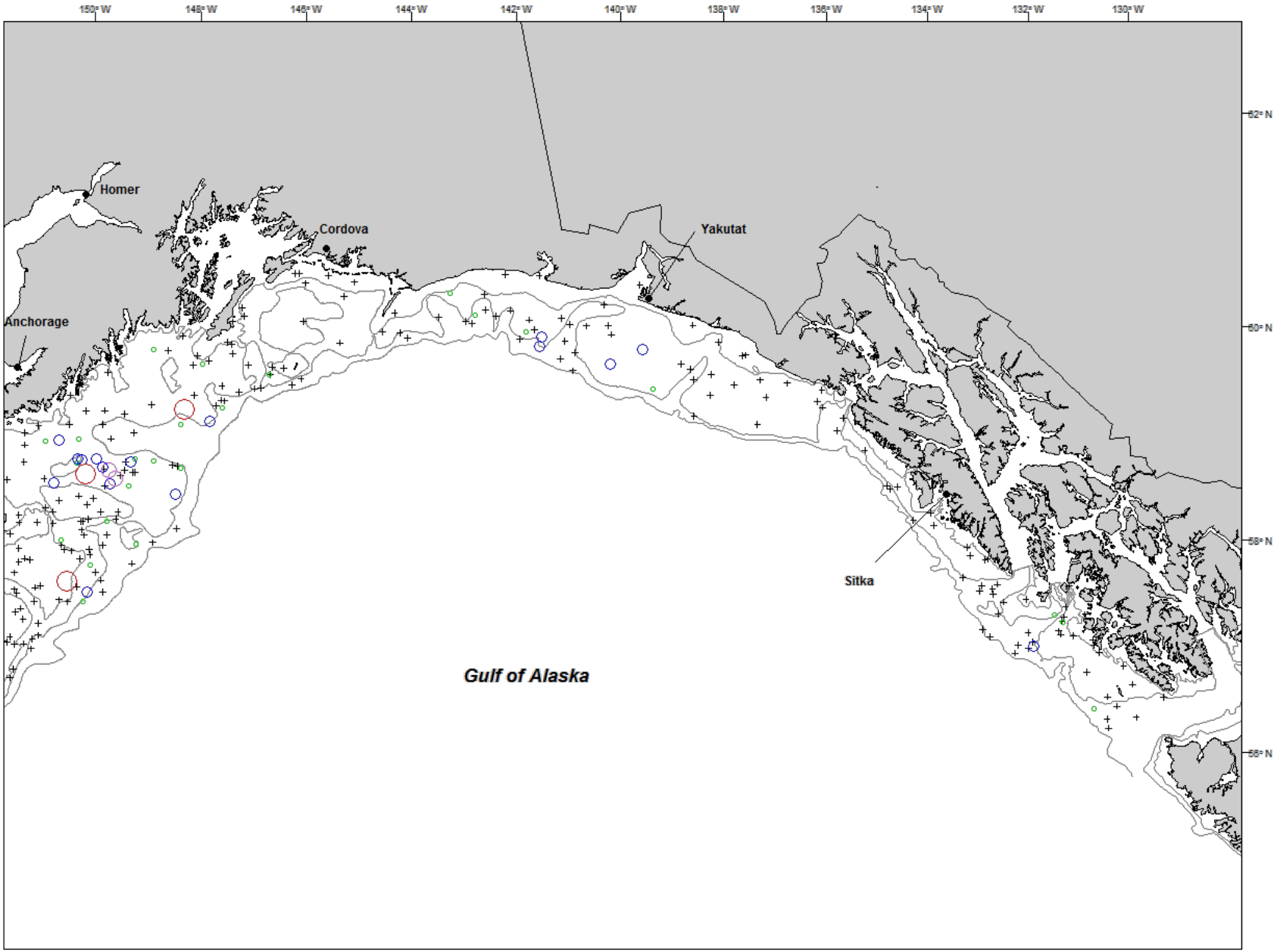

Figure 36. -- Continued.

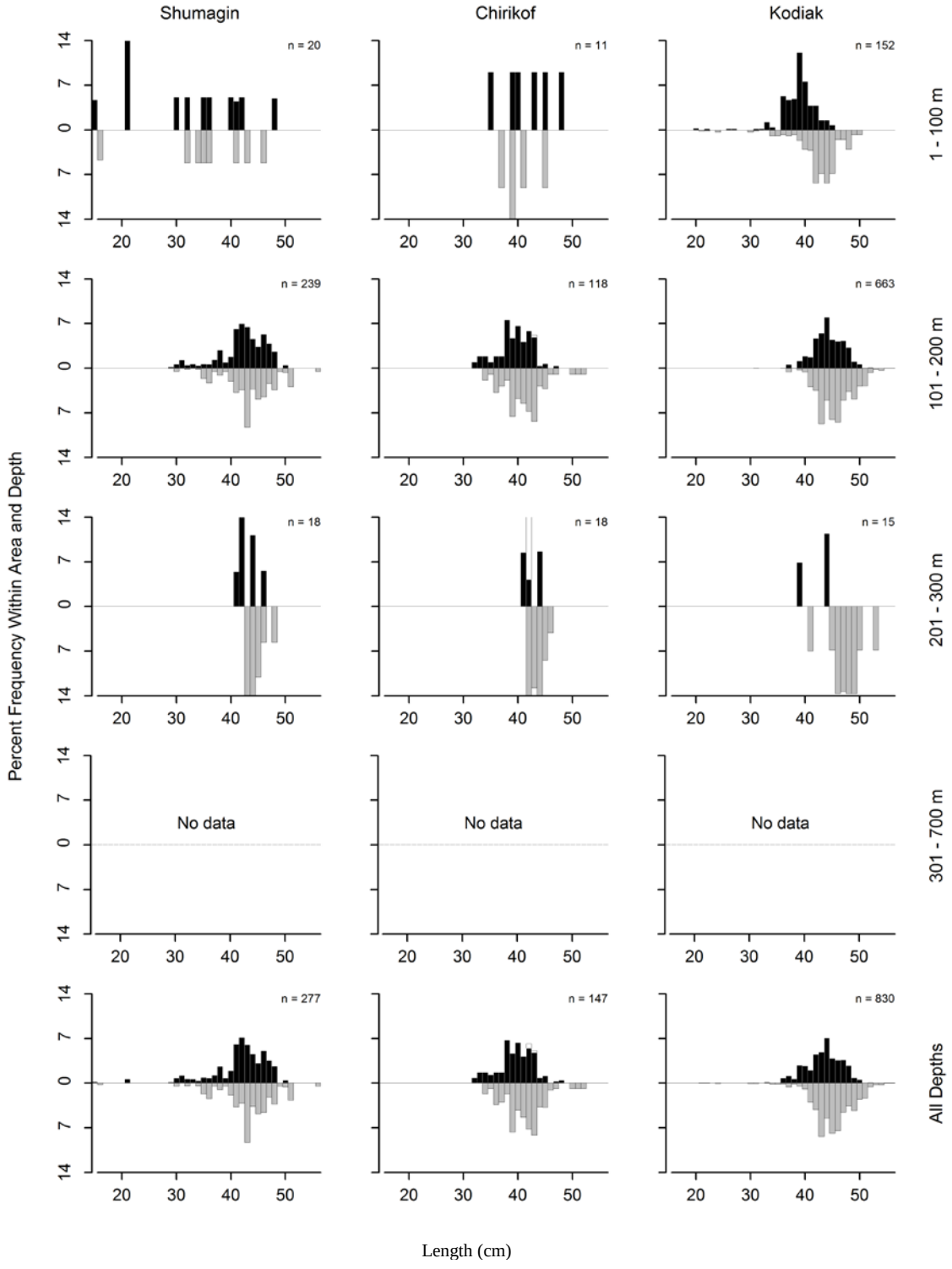

Figure 37. -- Size composition of dusky rockfish from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

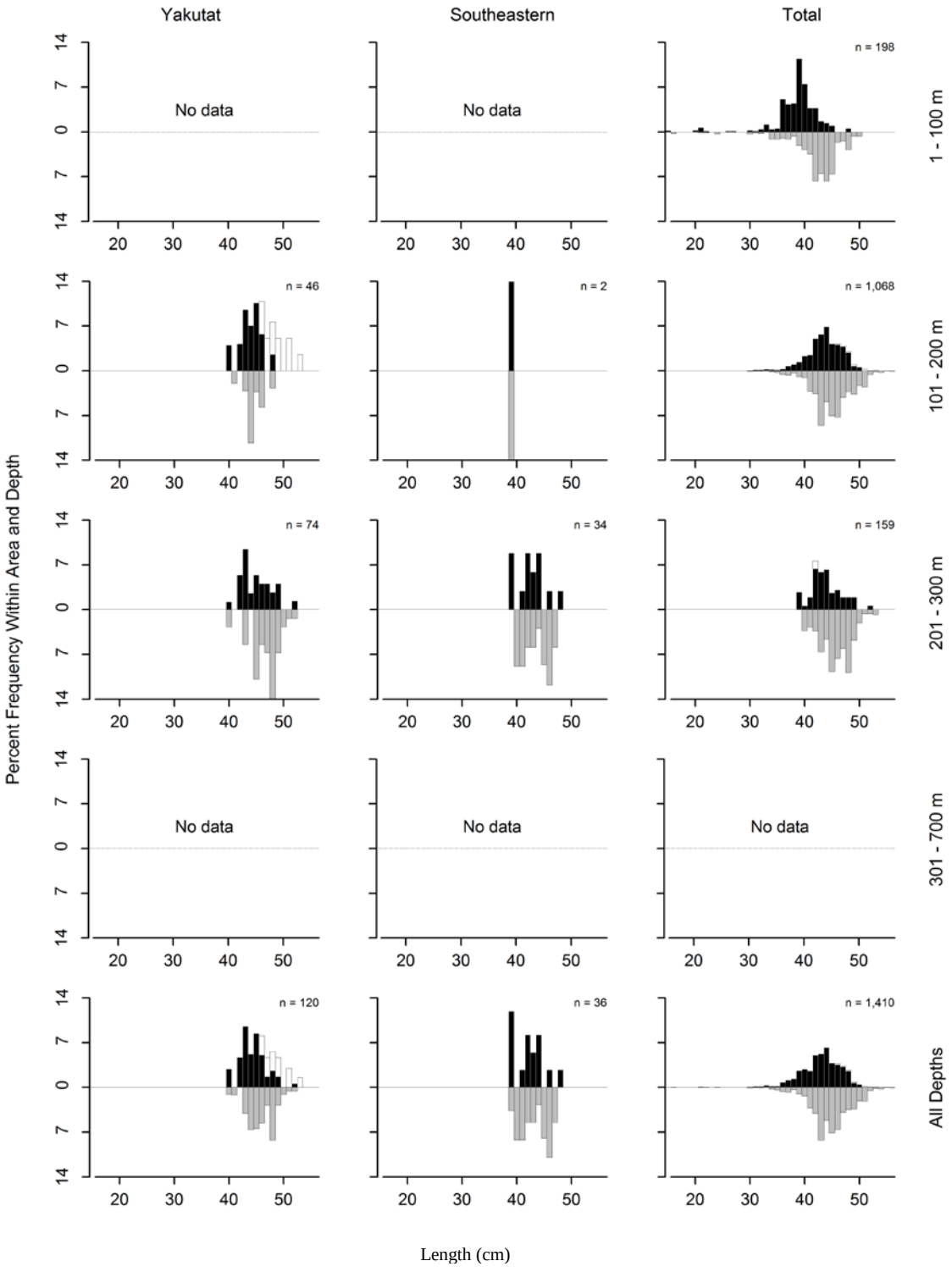

Figure 37. -- Continued (dusky rockfish).

Table 46. --Catch per unit of effort by stratum for dusky rockfish sorted by descending CPUE for the 2011 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	Portlock Flats	25	16	28.80	21,125	0	48,863
Kodiak	101 - 200	Kenai Flats	17	3	26.41	31,896	0	99,320
Shumagin	101 - 200	Shumagin Outer Shelf	27	7	12.16	9,915	0	28,762
Yakutat	201 - 300	Yakutat Slope	6	2	7.76	1,651	0	5,791
Kodiak	1 - 100	Albatross Banks	38	1	4.83	7,444	0	22,646
Chirikof	101 - 200	East Shumagin Gully	14	1	3.78	4,200	0	13,270
Kodiak	101 - 200	Kodiak Outer Shelf	18	8	3.09	1,551	134	2,968
Yakutat	101 - 200	Yakutat Flats	9	3	2.00	1,806	0	4,526
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	2	1.85	727	0	2,291
Chirikof	201 - 300	Chirikof Slope	6	4	1.37	209	0	502
Yakutat	101 - 200	Yakataga Shelf	8	3	1.15	607	0	1,670
Shumagin	201 - 300	Shumagin Slope	11	5	1.07	298	0	755
Chirikof	101 - 200	Chirikof Outer Shelf	16	5	0.66	329	0	701
Kodiak	201 - 300	Kenai Gullies	15	4	0.65	433	0	1,102
Chirikof	1 - 100	Semidi Bank	16	1	0.39	283	0	886
Kodiak	1 - 100	Albatross Shallows	25	1	0.23	132	0	403
Shumagin	1 - 100	Shumagin Bank	31	1	0.16	203	0	617
Kodiak	101 - 200	Albatross Gullies	29	4	0.15	119	0	275
Kodiak	101 - 200	Barren Islands	18	1	0.15	162	0	503
Chirikof	201 - 300	Lower Shelikof Gully	14	3	0.12	117	0	252
Kodiak	201 - 300	Kodiak Slope	6	1	0.11	17	0	62
Kodiak	1 - 100	Northern Kodiak Shallows	6	1	0.06	14	0	50
Southeastern	101 - 200	Prince of Wales Shelf	14	2	0.06	42	0	103
Yakutat	101 - 200	Middleton Shelf	9	1	0.05	38	0	127
Shumagin	1 - 100	Davidson Bank	39	4	0.04	57	0	131
Chirikof	101 - 200	Shelikof Edge	26	2	0.04	31	0	76
Shumagin	1 - 100	Lower Alaska Peninsula	19	1	<0.01	1	0	2

Dark rockfish (*Sebastes ciliatus*)

Dark rockfish were rarely caught during the survey (Table 47), occurring in 8 of 670 tows (1%). All fish were caught in the Shumagin (n = 2), Chirikof (n = 4) and Kodiak (n = 2) INPFC areas in water shallower than 300 m (Fig. 38; Tables 47 and 48). This species occurred in only 6 of the 54 strata (Table 48). The estimated biomass for the entire area was 145 t. No length frequency data are presented since catch numbers were too small.

Table 47. -- Number of survey hauls, number of hauls with dark rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	1	0.01	14	0	41	1.013
	201 - 300	11	1	0.06	18	0	57	1.709
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	2	0.01	31	0	77	1.317
Chirikof	1 - 100	68	3	0.01	33	0	74	0.437
	101 - 200	56	0	---	---	---	---	---
	201 - 300	20	1	0.01	15	0	50	1.392
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	4	0.01	48	0	99	0.553
Kodiak	1 - 100	87	1	0.01	29	0	88	0.646
	101 - 200	107	1	0.01	37	0	114	1.400
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	2	0.01	65	0	161	0.925
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	0	---	---	---	---	---
All areas	1 - 100	282	4	<0.01	62	0	132	0.514
	101 - 200	255	2	<0.01	50	0	132	1.269
	201 - 300	83	2	0.01	32	0	81	1.550
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	8	<0.01	145	29	260	0.799

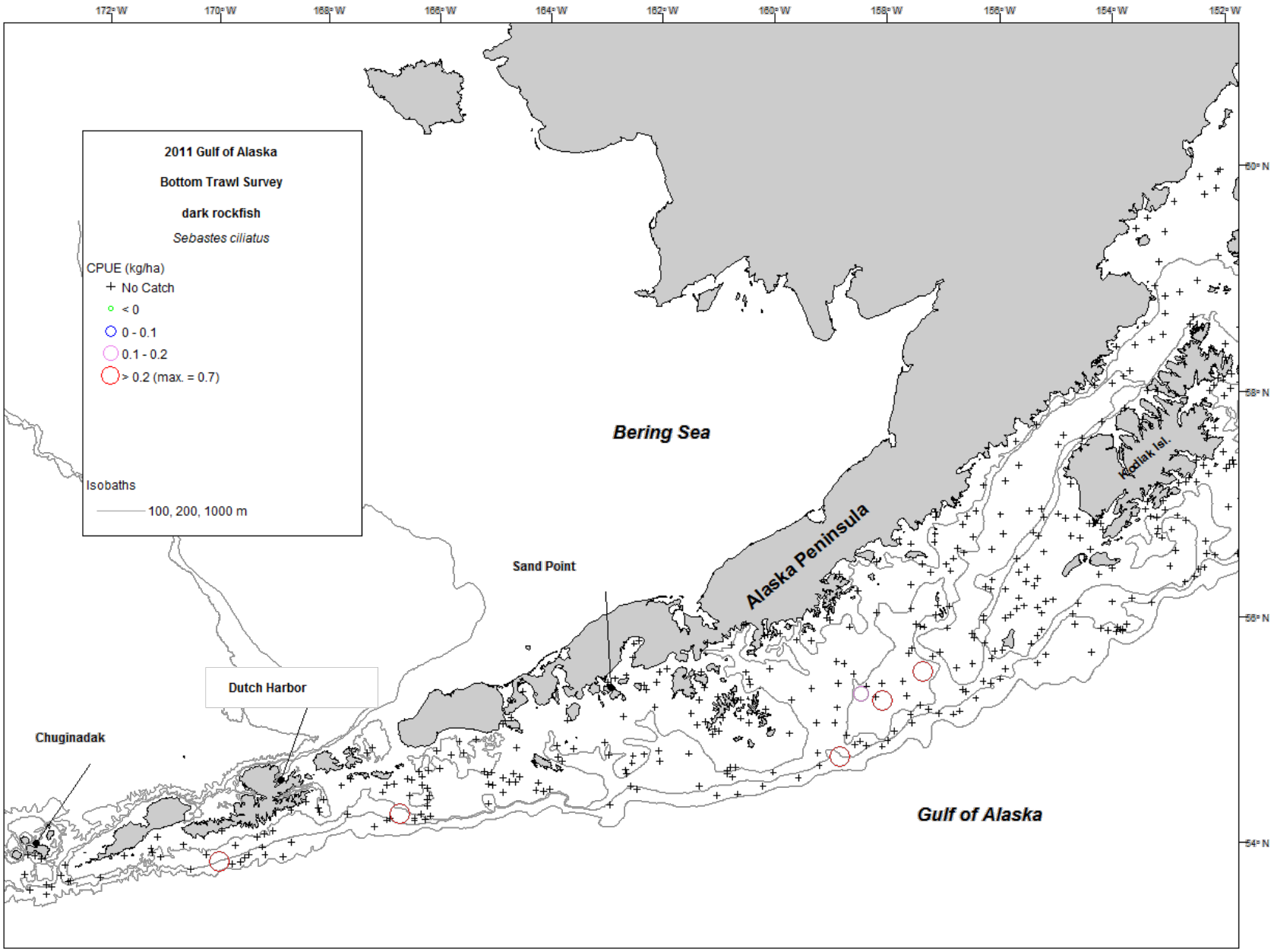

Figure 38. -- Distribution and relative abundance of dark rockfish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

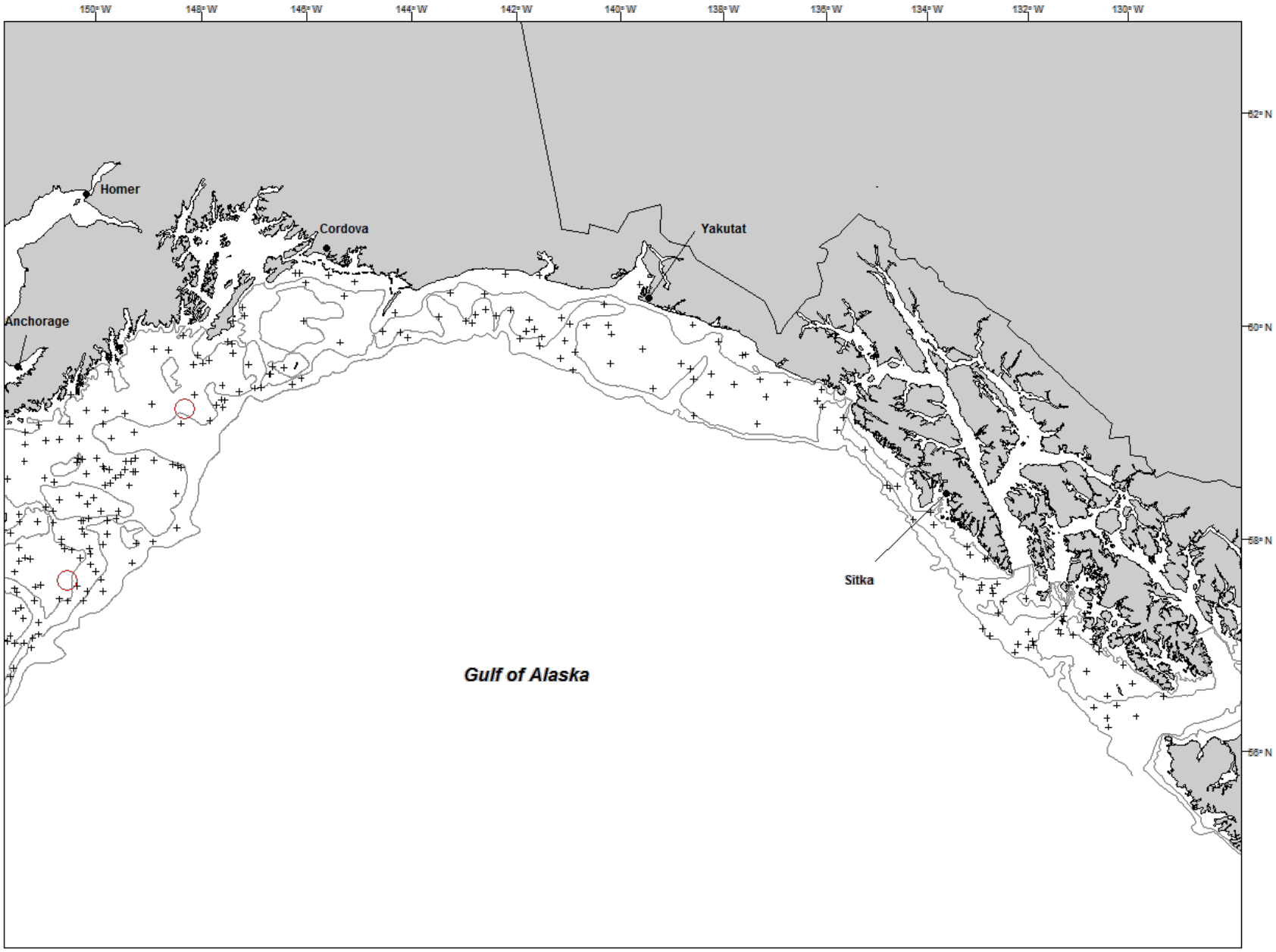

Figure 38. -- Continued.

Table 48. -- Catch per unit of effort by stratum for dark rockfish sorted by descending CPUE for the 2011 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	201 - 300	Chirikof Slope	6	1	0.10	15	0	52
Shumagin	201 - 300	Shumagin Slope	11	1	0.06	18	0	57
Chirikof	1 - 100	Semidi Bank	16	3	0.05	33	0	74
Kodiak	101 - 200	Kenai Flats	17	1	0.03	37	0	114
Kodiak	1 - 100	Albatross Banks	38	1	0.02	29	0	88
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.02	14	0	41

Sharpchin rockfish (*Sebastes zacentrus*)

Sharpchin rockfish were encountered in only 32 out of the 670 survey tows (4.8%). They were caught in only two tows west of Kodiak Island (Table 49, Fig. 39). Over 93% of the estimated biomass occurred in the Yakutat and Southeastern INPFC areas (Table 49). The highest CPUEs by far were recorded in the Yakutat slope stratum, which accounted for approximately 63 % of the total biomass estimate even though these only make up only about 0.7 % of the survey area (Table 50, Appendix Table A-1). Sharpchin rockfish were confined to depths between 101 and 300 m with 86% of the estimated biomass being caught between 200 and 300 m (Table 49). Length frequency data from fish in this depth range showed females with distinct mode around 28 – 30 cm while males were somewhat smaller with a mode at about 25 cm (Fig. 40).

Table 49. -- Number of survey hauls, number of hauls with sharpchin rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	0	---	---	---	---	---
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	1	0.07	161	0	501	0.466
	201 - 300	20	1	0.01	15	0	51	0.365
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	2	0.03	176	0	517	0.455
Kodiak	1 - 100	87	0	---	---	---	---	---
	101 - 200	107	4	0.08	355	0	823	0.409
	201 - 300	24	1	0.01	8	0	25	0.430
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	5	0.04	363	0	831	0.410
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	4	0.13	396	0	961	0.108
	201 - 300	13	4	9.8	5,065	0	17,117	0.313
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	8	0.99	5,461	0	17,529	0.275
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	5	0.21	235	0	527	0.128
	201 - 300	15	12	3.58	1,808	0	4,010	0.259
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	17	0.76	2,042	0	4,243	0.232
All areas	1 - 100	282	0	---	---	---	---	---
	101 - 200	255	14	0.09	1,146	307	1,985	0.170
	201 - 300	83	18	1.91	6,895	0	18,782	0.297
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	32	0.26	8,041	0	19,965	0.269

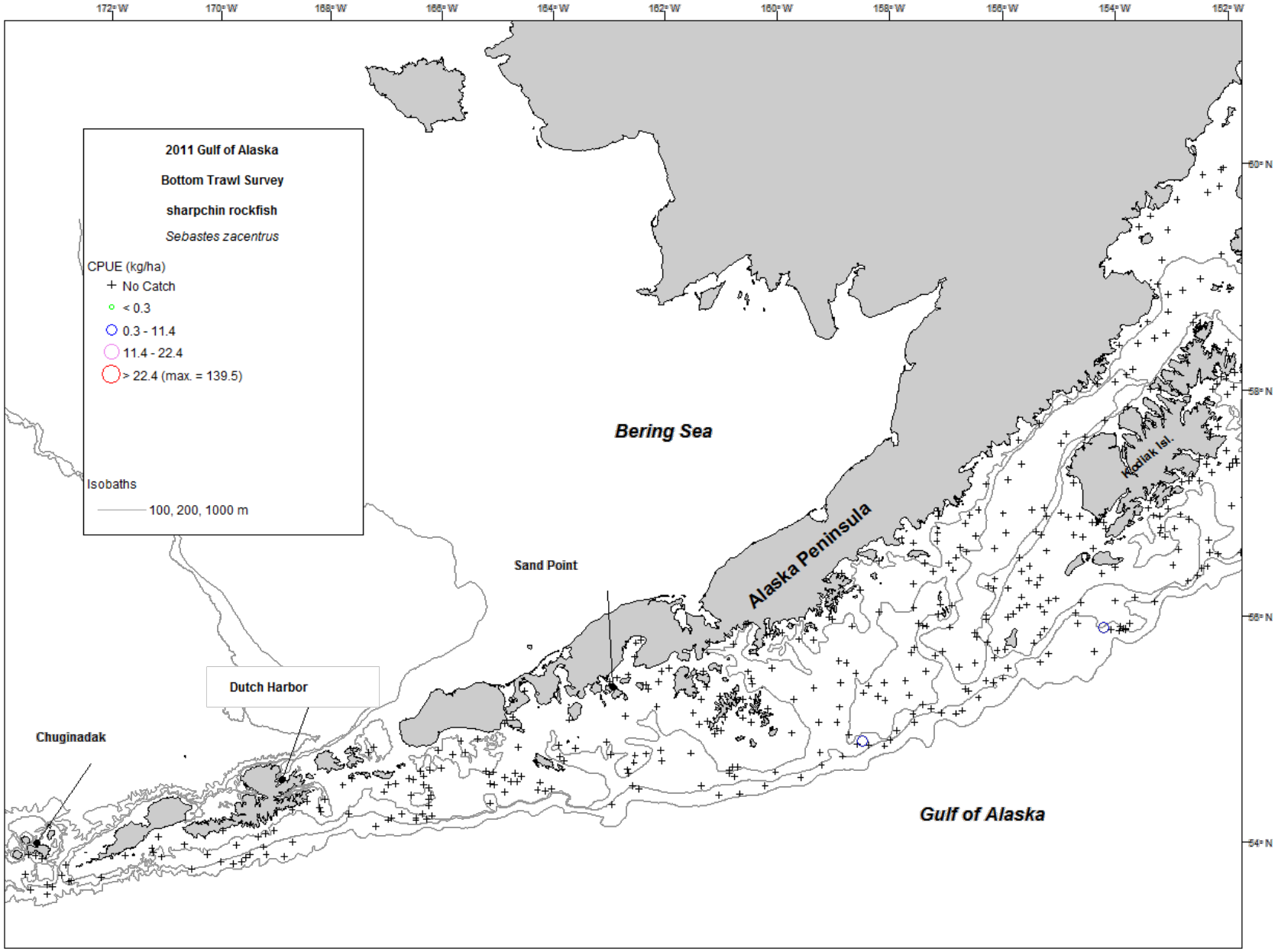

Figure 39. -- Distribution and relative abundance of sharpchin rockfish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

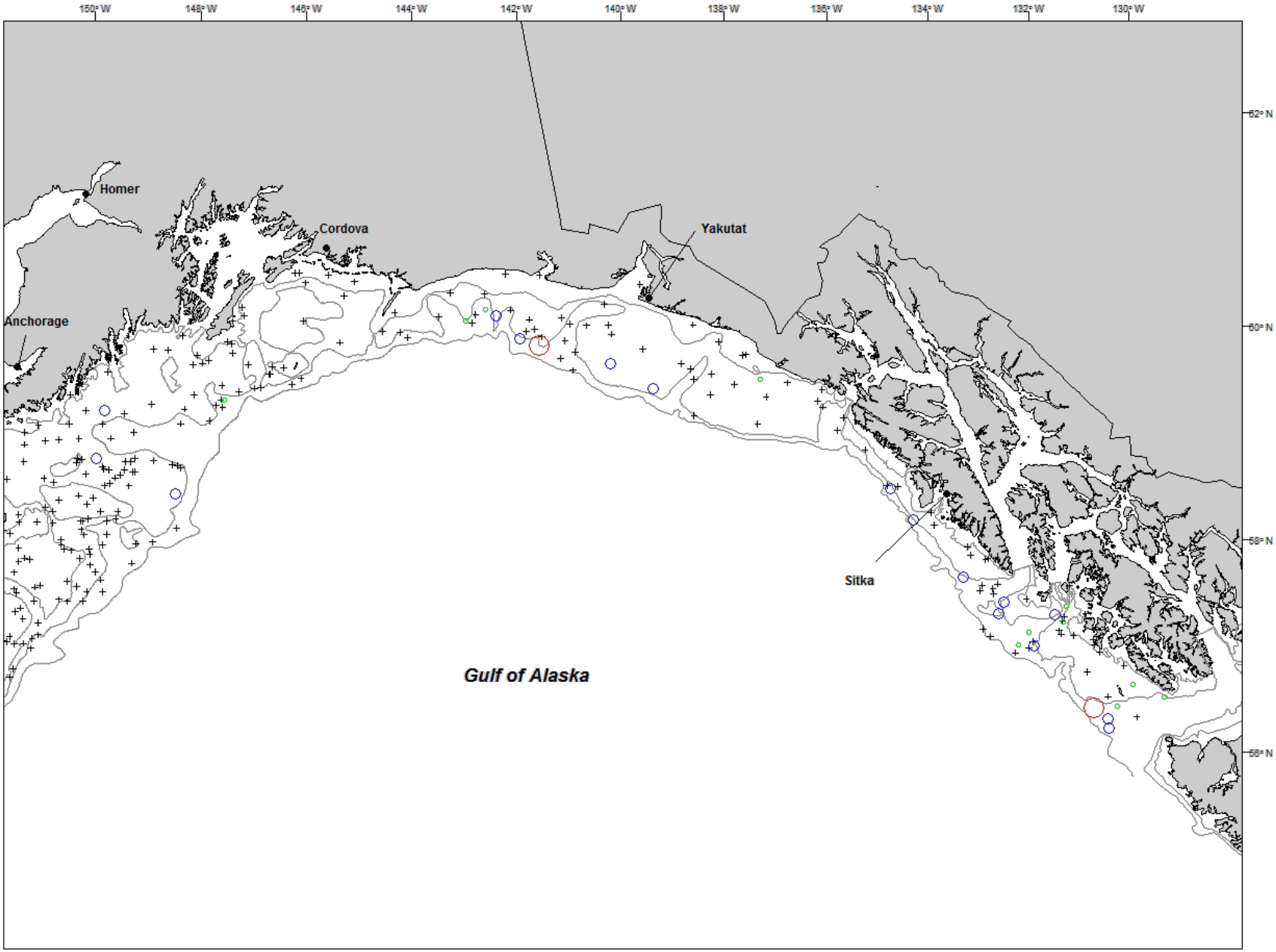

Figure 39. -- Continued.

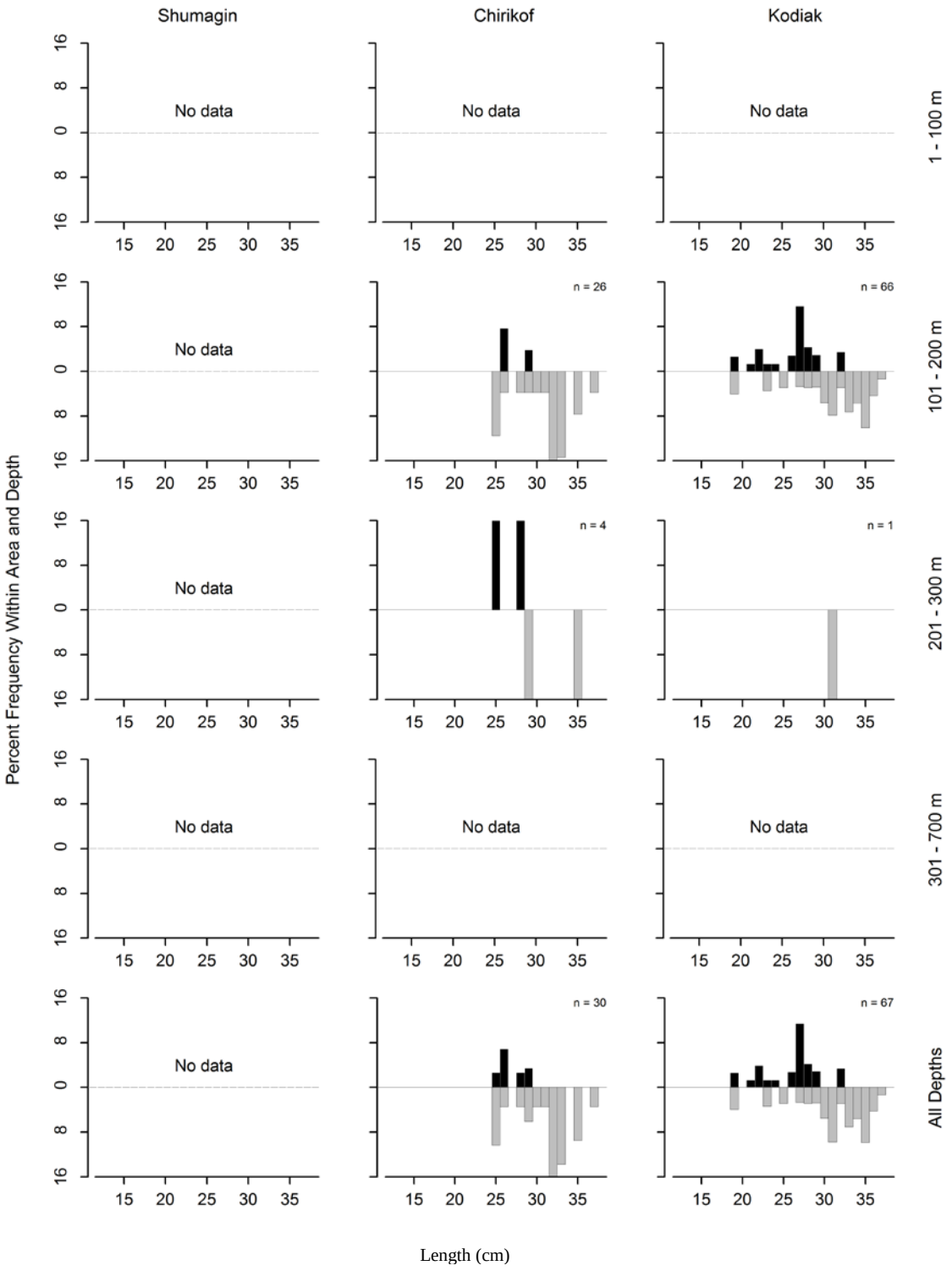

Figure 40. -- Size composition of sharpchin rockfish from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

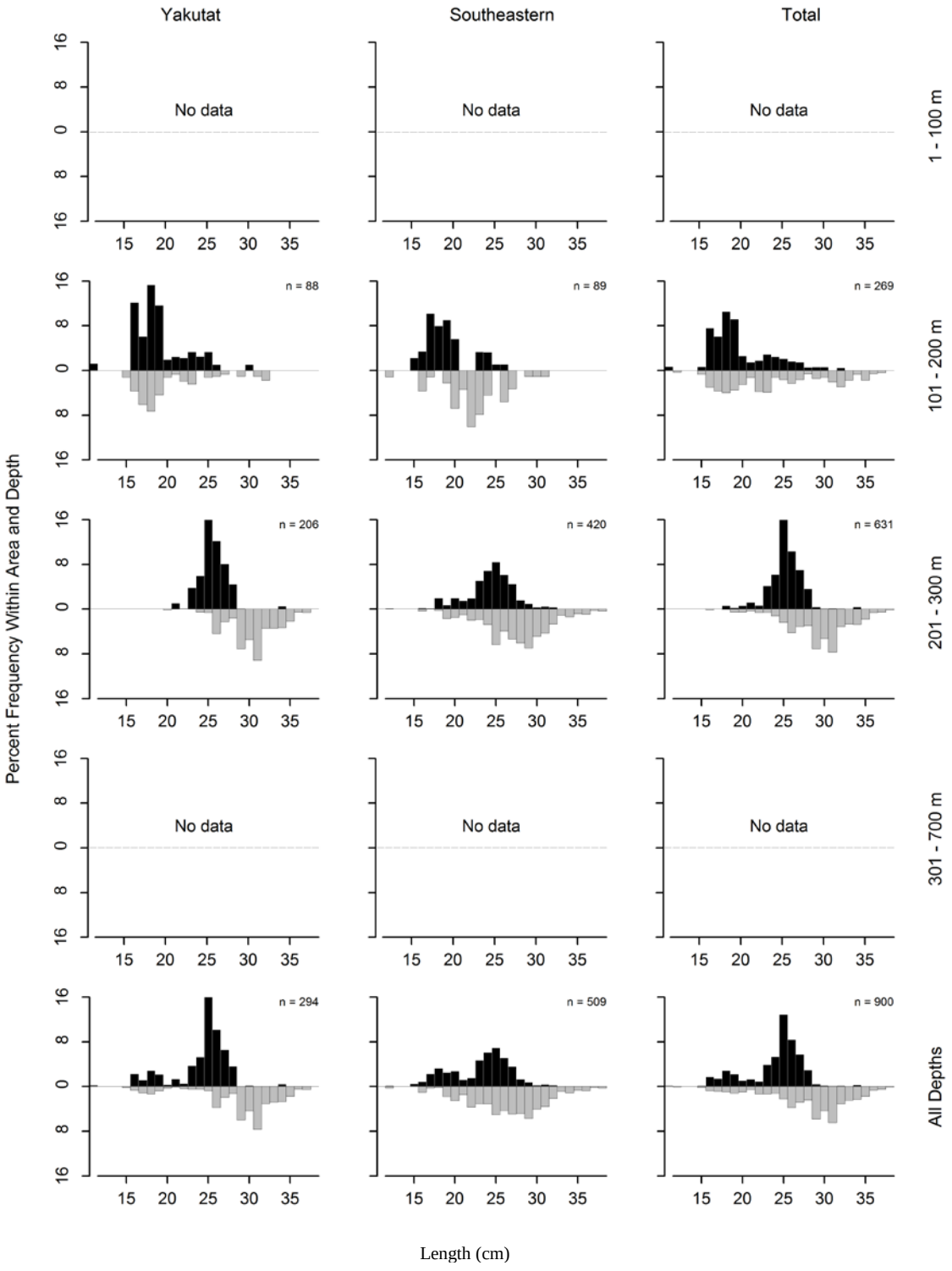

Figure 40. -- Continued (sharpchin rockfish).

Table 50. -- Catch per unit of effort by stratum for sharpchin rockfish sorted by descending CPUE for the 2011 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	6	3	23.78	5,058	0	17,721
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	9	3.74	1,470	0	3,626
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	3.00	338	0	1,151
Kodiak	101 - 200	Portlock Flats	25	2	0.40	292	0	756
Yakutat	101 - 200	Yakutat Flats	9	2	0.38	345	0	911
Southeastern	101 - 200	Prince of Wales Shelf	14	5	0.34	235	0	529
Chirikof	101 - 200	Chirikof Outer Shelf	16	1	0.32	161	0	503
Chirikof	201 - 300	Chirikof Slope	6	1	0.10	15	0	53
Yakutat	101 - 200	Yakataga Shelf	8	1	0.09	46	0	155
Kodiak	101 - 200	Kodiak Outer Shelf	18	1	0.06	28	0	88
Kodiak	101 - 200	Kenai Flats	17	1	0.03	35	0	108
Yakutat	201 - 300	Yakutat Gullies	7	1	0.02	7	0	24
Kodiak	201 - 300	Kenai Gullies	15	1	0.01	8	0	25
Yakutat	101 - 200	Fairweather Shelf	7	1	0.01	6	0	19

Shortraker Rockfish (*Sebastes borealis*)

Shortraker rockfish were the fifth most abundant rockfish species in 2011 and nineteenth most abundant fish overall (Table 2). They occurred throughout the survey area, although almost exclusively (98% of estimated total biomass) on the continental slope and gullies in depths from 200 to 700 m (Fig. 41, Table 51). The highest CPUEs were consistently recorded from the 301-500 m depth stratum where shortraker rockfish made up around 53% of the estimated total biomass and were common, occurring in approximately 67% of the trawls from this stratum (Table 51). Shortraker rockfish were more common in the central and eastern Gulf of Alaska than in the western Gulf of Alaska (Fig. 41). Approximately 85% of their estimated biomass was from the Chirikof, Kodiak, and Yakutat INPFC areas (Table 51). The highest shortraker rockfish CPUEs were recorded in the Chirikof, Yakutat, and Southeastern Slope strata (Table 52). Mean weight was highest in the Southeastern INPFC area and length generally increased from west to east (Fig. 42, Table 51).

Table 51. -- Number of survey hauls, number of hauls with shortraker rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	1	0.05	78	0	239	3.062
	201 - 300	11	2	1.79	500	0	1,286	5.477
	301 - 500	7	5	7.45	1,886	0	5,432	2.101
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	8	0.39	2,464	0	6,023	2.429
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	0	---	---	---	---	---
	201 - 300	20	6	17	19,632	0	60,482	5.505
	301 - 500	6	5	23.38	3,750	0	9,198	2.435
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	11	3.6	23,382	0	64,593	4.579
Kodiak	1 - 100	87	1	0.04	155	0	533	4.050
	101 - 200	107	4	0.24	1,042	0	2,376	5.644
	201 - 300	24	9	3.64	4,180	0	8,886	3.567
	301 - 500	6	4	12.83	3,736	0	8,666	2.910
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	18	0.93	9,113	2,803	15,422	3.402
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	3	9.36	4,840	0	13,537	4.929
	301 - 500	6	5	67.44	17,721	0	56,924	3.789
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	8	4.08	22,561	0	55,618	3.987
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	3	23.47	7,316	5,187	9,444	7.038
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	3	2.73	7,316	5,187	9,444	7.038
All areas	1 - 100	282	1	0.01	155	0	533	4.050
	101 - 200	255	5	0.09	1,121	0	2,465	5.330
	201 - 300	83	20	8.09	29,152	0	68,902	5.016
	301 - 500	33	22	26.9	34,408	0	69,944	3.646
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	48	2.10	64,835	18,028	111,643	4.184

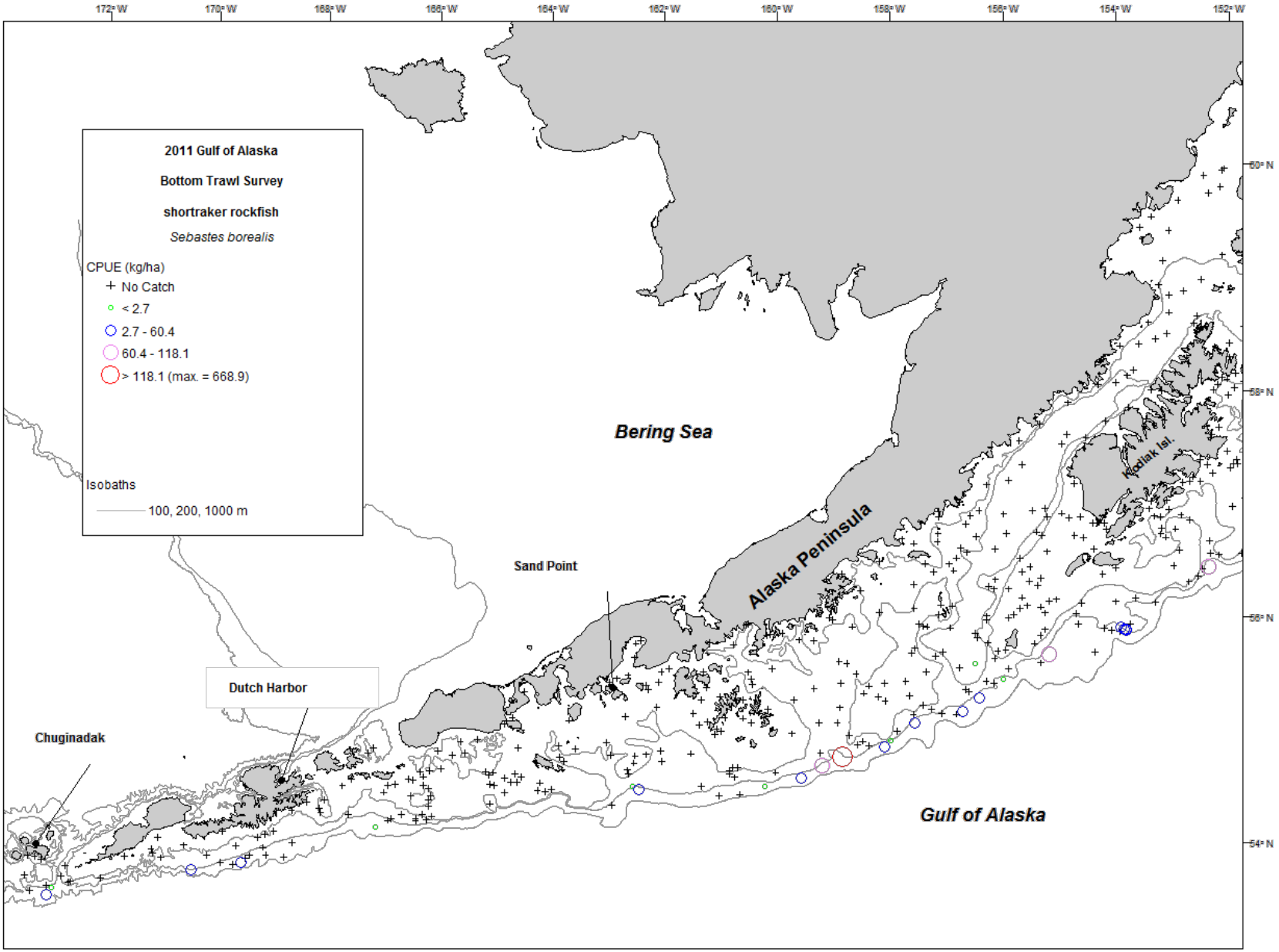

Figure 41. -- Distribution and relative abundance of shortraker rockfish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

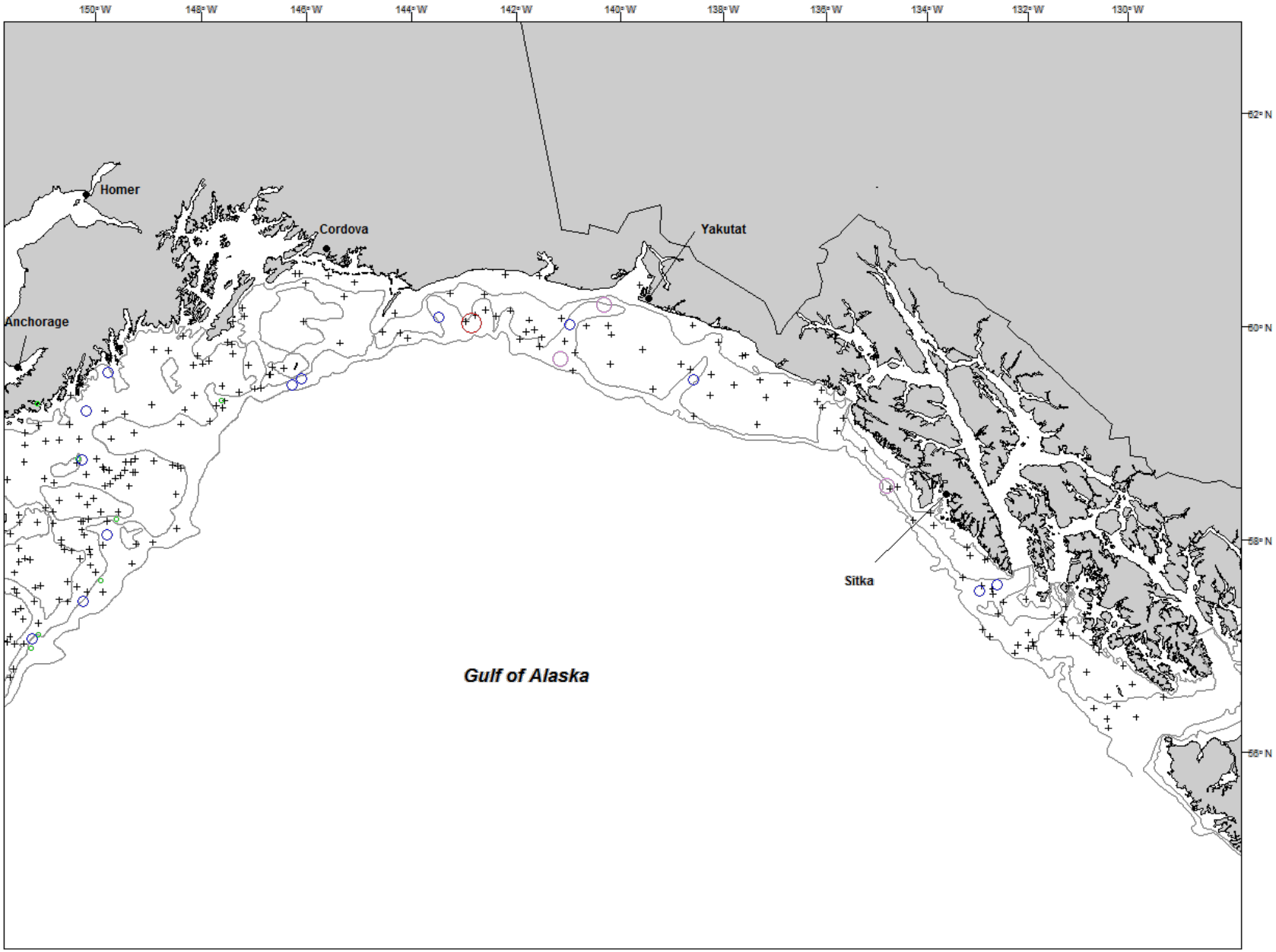

Figure 41. -- Continued.

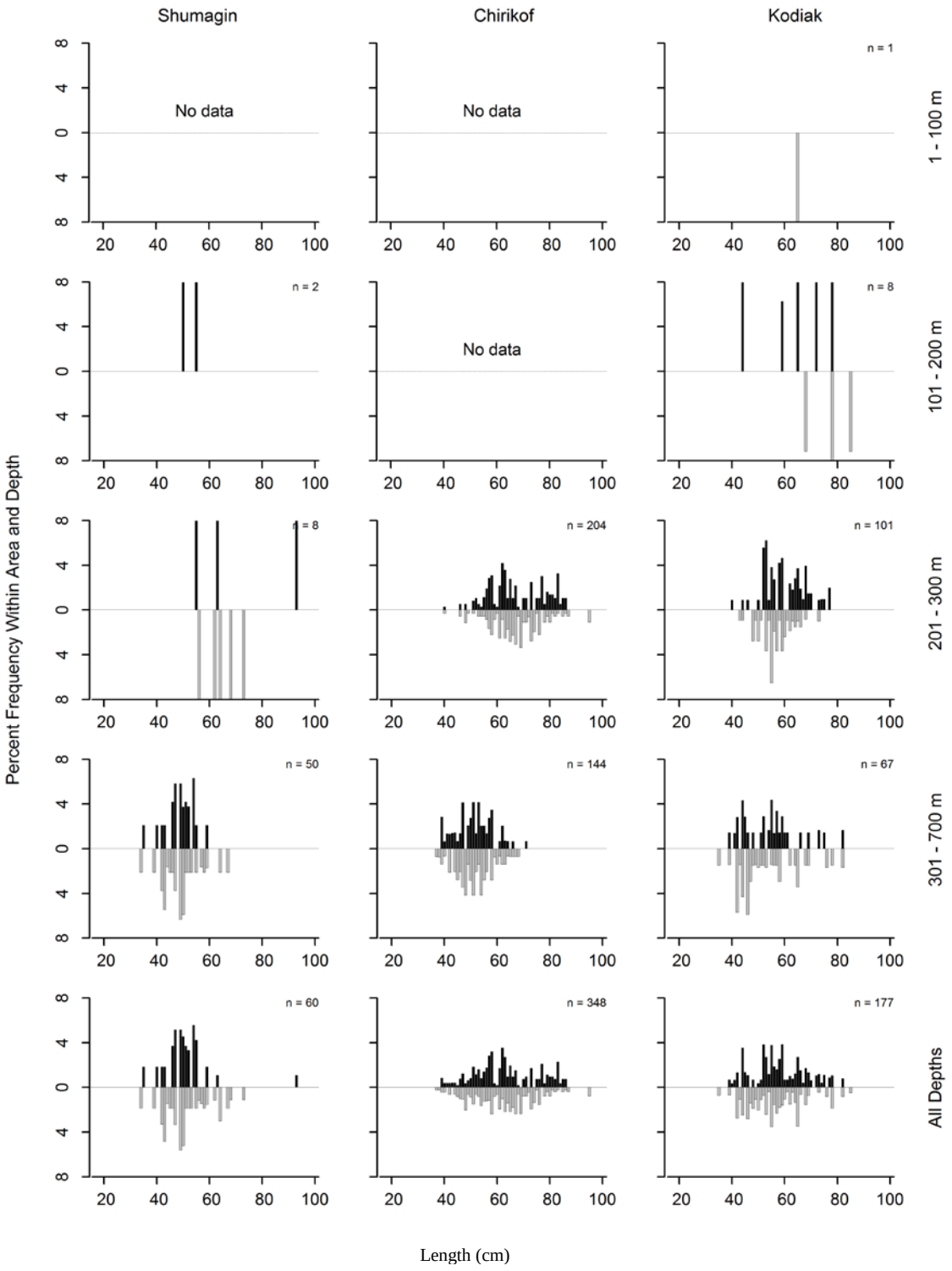

Figure 42. -- Size composition of shortraker rockfish from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

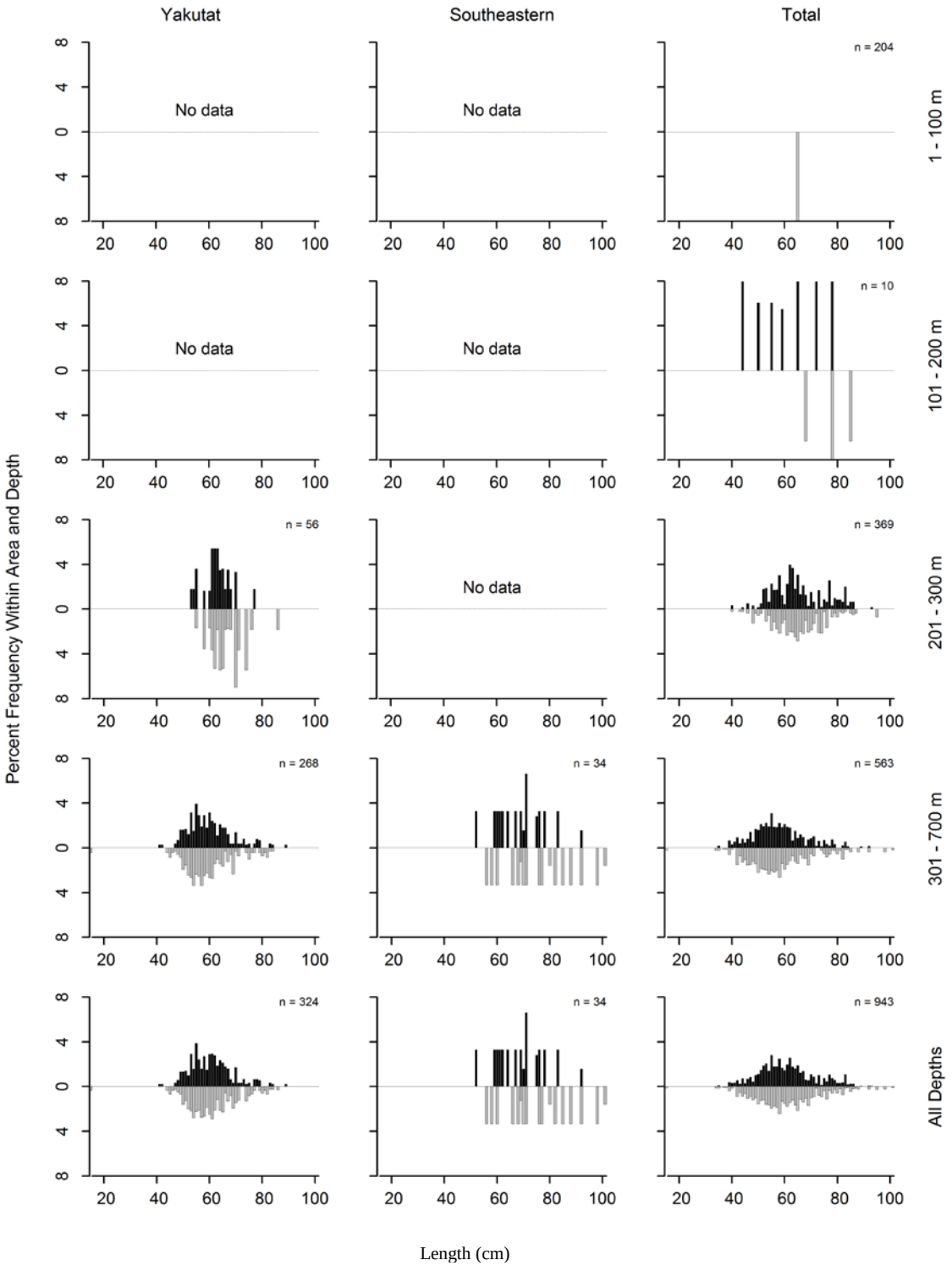

Figure 42. -- Continued (shortraker rockfish).

Table 52. --Catch per unit of effort by stratum for shortraker rockfish sorted by descending CPUE for the 2011 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	201 - 300	Chirikof Slope	6	5	127.44	19,478	0	62,395
Yakutat	301 - 500	Yakutat Slope	3	3	83.56	12,706	0	63,736
Southeastern	301 - 500	Southeastern Slope	1	1	80.74	6,238		
Yakutat	301 - 500	Yakutat Gullies	3	2	45.30	5,015	0	19,384
Chirikof	301 - 500	Chirikof Slope	6	5	23.38	3,750	0	9,474
Kodiak	201 - 300	Kodiak Slope	6	6	20.81	3,376	0	8,752
Yakutat	201 - 300	Yakutat Gullies	7	3	15.91	4,840	0	13,839
Kodiak	301 - 500	Kodiak Slope	6	4	12.83	3,736	0	8,916
Shumagin	301 - 500	Shumagin Slope	7	5	7.45	1,886	0	5,554
Southeastern	301 - 500	Southeastern Deep Gullies	7	2	4.60	1,078	0	3,280
Shumagin	201 - 300	Shumagin Slope	11	2	1.79	500	0	1,296
Kodiak	201 - 300	Kenai Gullies	15	3	1.21	803	0	2,230
Kodiak	101 - 200	Kenai Flats	17	2	0.67	806	0	2,083
Kodiak	1 - 100	Kenai Peninsula	6	1	0.29	155	0	553
Kodiak	101 - 200	Portlock Flats	25	1	0.27	198	0	606
Chirikof	201 - 300	Lower Shelikof Gully	14	1	0.16	155	0	490
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.10	78	0	239
Kodiak	101 - 200	Albatross Gullies	29	1	0.05	38	0	117

Shortspine Thornyhead (*Sebastolobus alascanus*)

Shortspine thornyhead was the sixth most abundant rockfish species caught in the 2011 survey and 20th most abundant species overall (Table 2). Shortspine thornyhead were found throughout the survey area at all depths sampled but the majority of their total biomass (approximately 91%) was estimated from waters deeper than 200 m (Fig. 43, Table 53). The highest CPUEs were recorded from strata on the continental slope and in the deeper gullies (Table 54). Shortspine thornyhead length distributions were similar in nearly all areas at all depths with both males and females exhibiting length modes around 25 cm FL; males in the Southeastern INPFC area were slightly longer with a length mode around 30 cm FL in 501-700 m depths (Fig. 44).

Table 53. -- Number of survey hauls, number of hauls with shortspine thornyhead, mean CPUE, biomass, and mean weight, based on the 2011 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	105	2	<0.01	17	0	48	0.293
	101 - 200	37	7	0.14	202	0	507	0.338
	201 - 300	11	10	3.88	1,082	425	1,739	0.271
	301 - 500	7	7	8.87	2,245	1,128	3,362	0.310
	501 - 700	3	3	11.33	2,272	0	7,073	0.227
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	29	0.92	5,818	1,332	10,303	0.265
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	3	0.26	621	0	1,689	0.329
	201 - 300	20	10	2.28	2,631	717	4,545	0.293
	301 - 500	6	6	37.98	6,091	2,851	9,331	0.320
	501 - 700	5	5	15.11	2,950	1,183	4,718	0.291
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	24	1.89	12,293	8,601	15,985	0.307
Kodiak	1 - 100	87	0	---	---	---	---	---
	101 - 200	107	13	0.58	2,516	640	4,392	0.252
	201 - 300	24	18	5.75	6,608	3,942	9,274	0.266
	301 - 500	6	6	9.29	2,706	1,737	3,675	0.169
	501 - 700	4	4	22.55	3,934	2,226	5,643	0.253
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	41	1.61	15,764	12,288	19,240	0.237
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	16	0.5	1,464	574	2,354	0.183
	201 - 300	13	13	10.72	5,543	2,330	8,756	0.244
	301 - 500	6	6	21.17	5,563	1,288	9,838	0.244
	501 - 700	2	2	20.81	3,057	2,393	3,720	0.269
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	37	2.83	15,627	11,138	20,116	0.241
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	5	0.54	597	0	1,833	0.289
	201 - 300	15	15	9.12	4,609	2,913	6,305	0.178
	301 - 500	8	8	23.08	7,194	5,416	8,973	0.226
	501 - 700	3	3	12.36	1,278	0	3,771	0.397
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	31	5.1	13,678	10,724	16,632	0.217
All areas	1 - 100	282	2	---	17	0	48	0.293
	101 - 200	255	44	0.44	5,400	2,889	7,910	0.240
	201 - 300	83	66	5.68	20,473	15,912	25,034	0.237
	301 - 500	33	33	18.61	23,800	18,936	28,663	0.245
	501 - 700	17	17	16.44	13,491	8,501	18,480	0.268
	701 - 1000	0	0		---	---	---	---
	All depths	670	162	2.05	63,180	55,313	71,046	0.246

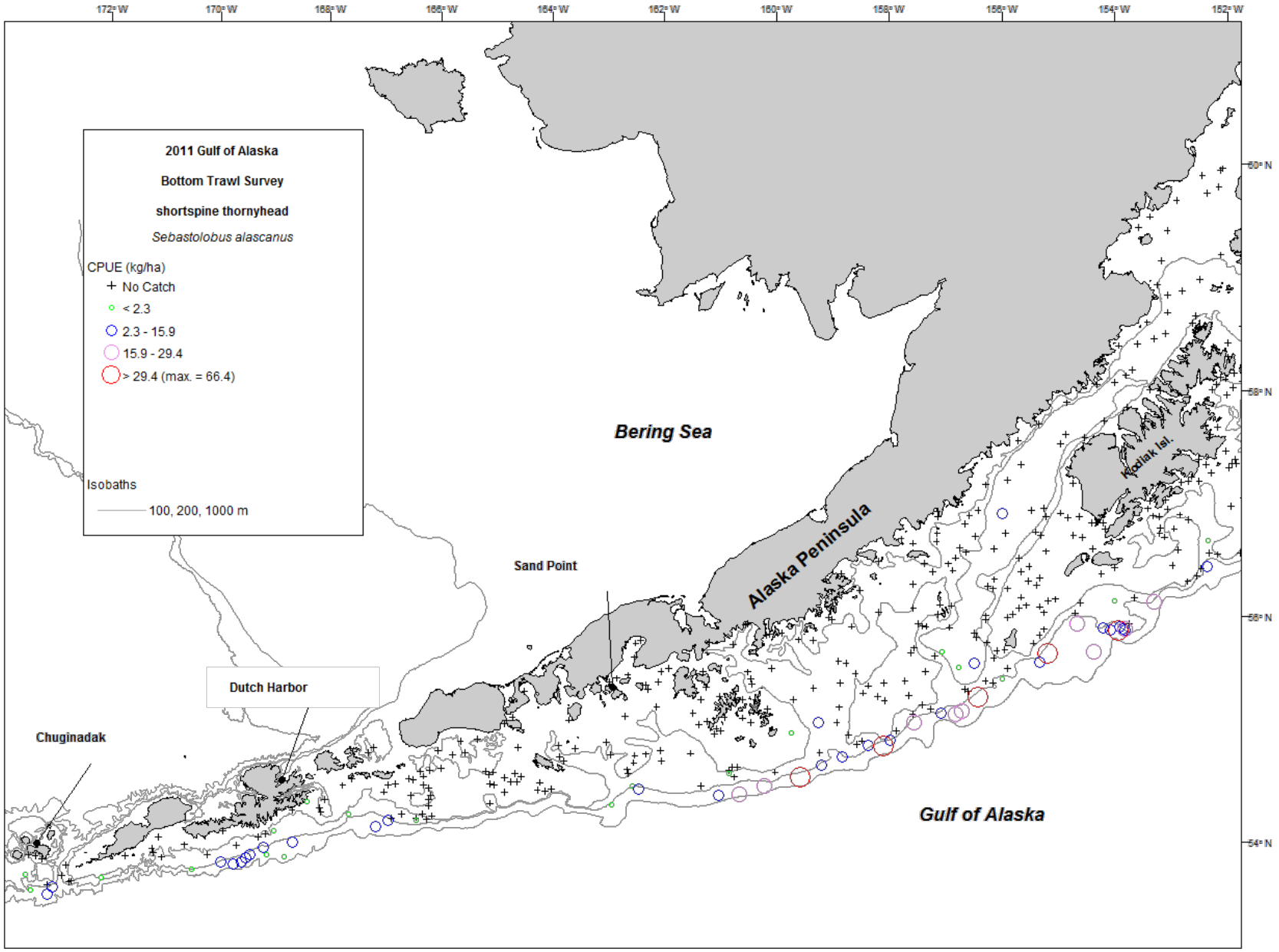

Figure 43. -- Distribution and relative abundance of shortspine thornyhead rockfish from the 2011 Gulf of Alaska bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than the mean CPUE, between the mean CPUE and two standard deviations above mean, between two and four standard deviations above the mean, and greater than four standard deviations above the mean.

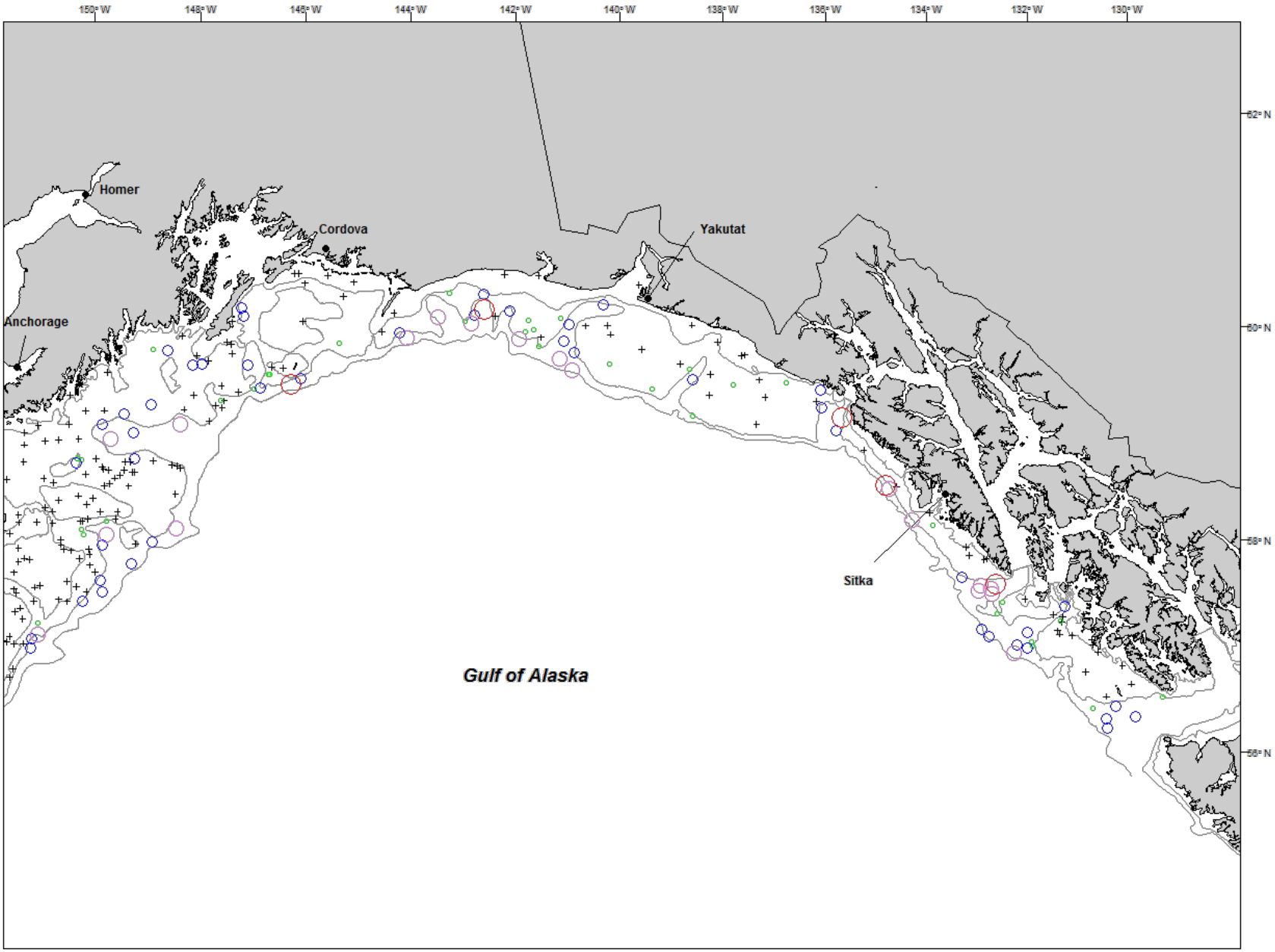

Figure 43. -- Continued.

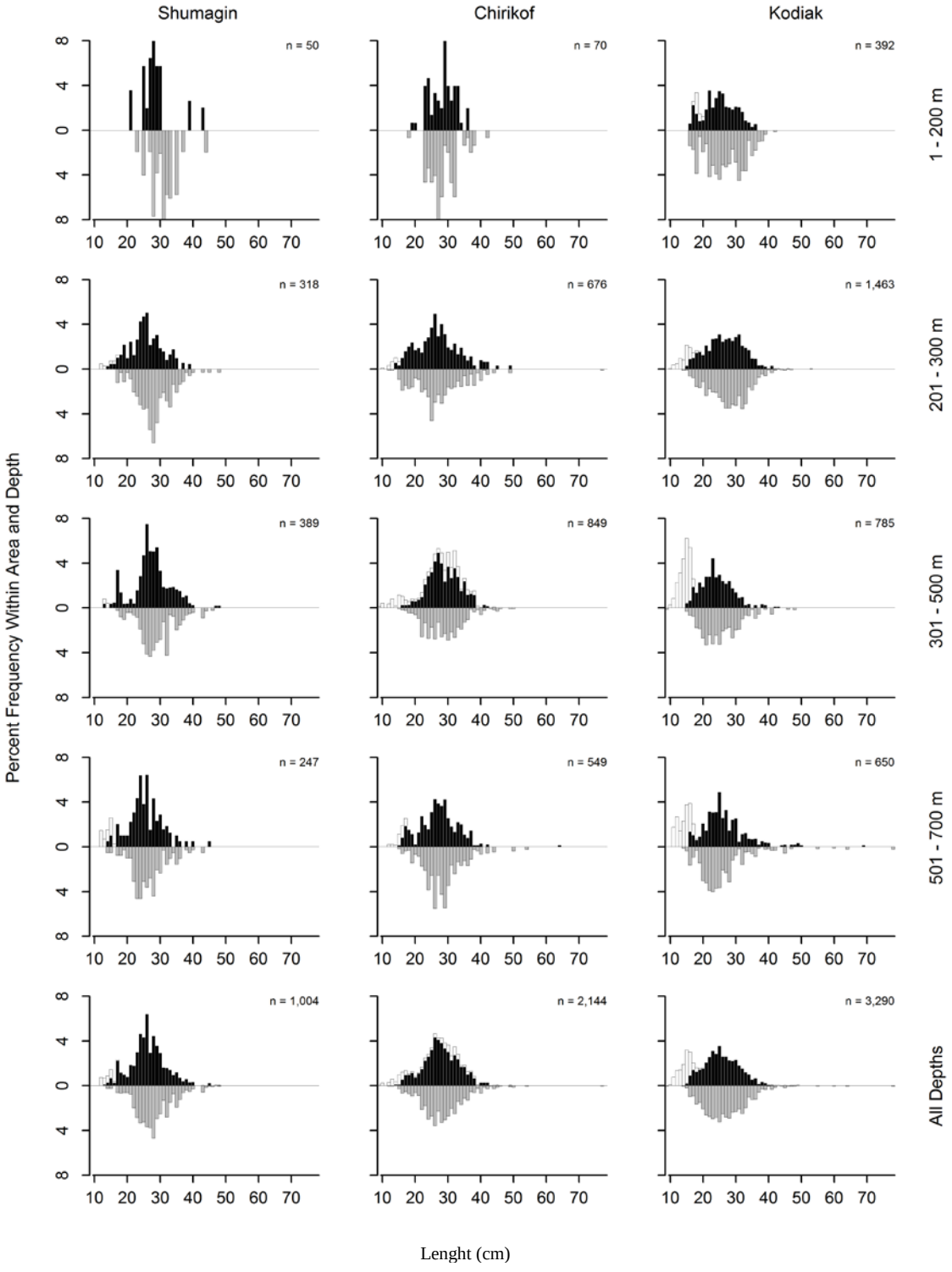

Figure 44. -- Size composition of shortspine thornyhead from the 2011 Gulf of Alaska bottom trawl survey by International North Pacific Fisheries Commission statistical areas and depth intervals. Males are shown in black, females in gray and unsexed fish in white.

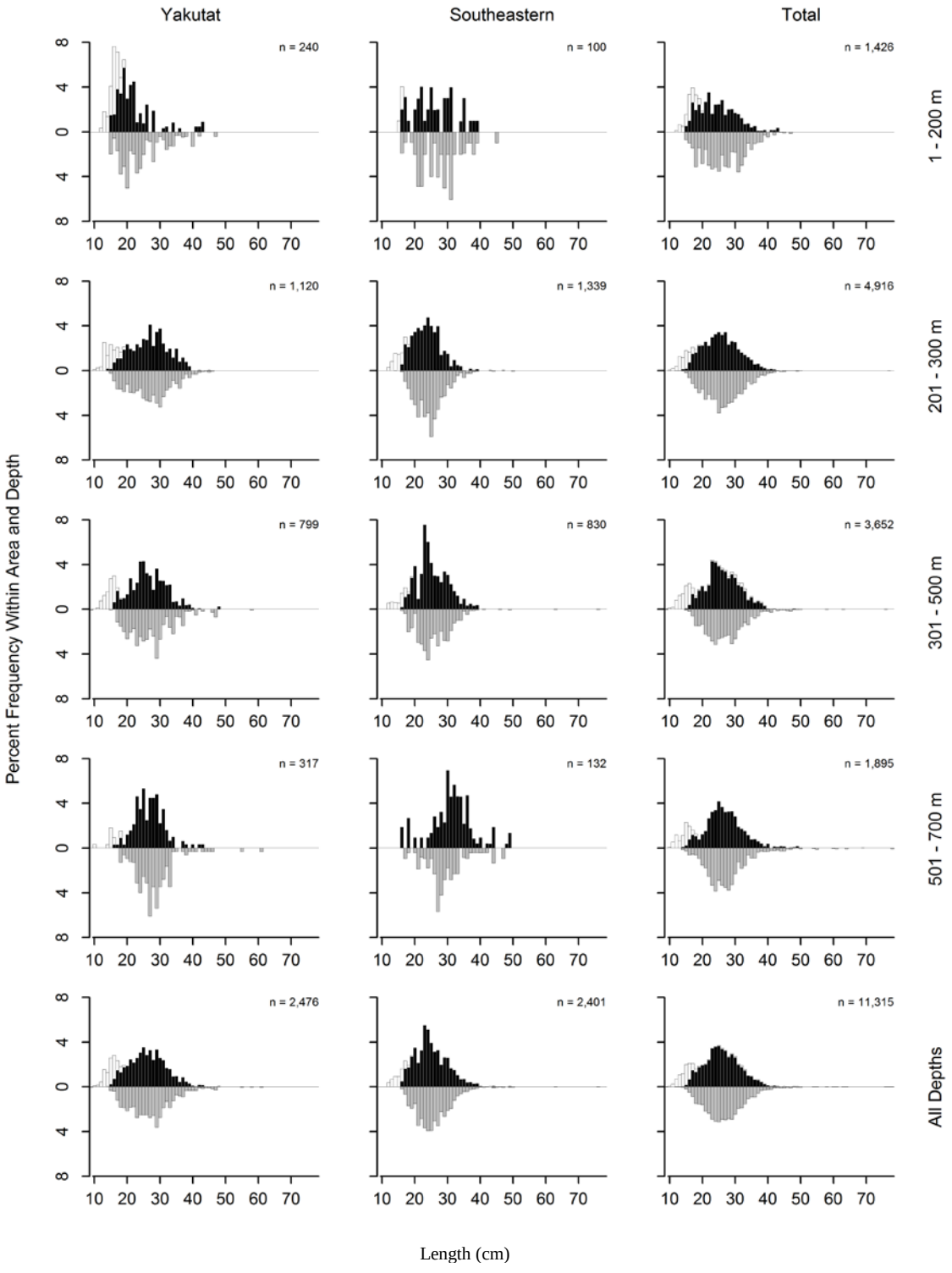

Figure 44. -- Continued (shortspine thornyhead).

Table 54. -- Catch per unit of effort by stratum for shortspine thornyhead sorted by descending CPUE for the 2011 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	37.98	6,091	2,687	9,495
Southeastern	301 - 500	Southeastern Slope	1	1	36.82	2,845		
Yakutat	301 - 500	Yakutat Slope	3	3	26.54	4,035	0	10,131
Kodiak	501 - 700	Kodiak Slope	4	4	22.55	3,934	1,976	5,893
Yakutat	501 - 700	Yakutat Slope	2	2	20.81	3,057	1,098	5,015
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	19.31	2,173	619	3,727
Southeastern	301 - 500	Southeastern Deep Gullies	7	7	18.55	4,349	2,509	6,189
Chirikof	501 - 700	Chirikof Slope	5	5	15.11	2,950	1,042	4,859
Yakutat	301 - 500	Yakutat Gullies	3	3	13.80	1,528	0	4,127
Yakutat	201 - 300	Yakutat Gullies	7	7	13.44	4,088	979	7,198
Southeastern	501 - 700	Southeastern Slope	3	3	12.36	1,278	0	4,650
Kodiak	201 - 300	Kodiak Slope	6	6	11.46	1,860	1,015	2,705
Shumagin	501 - 700	Shumagin Slope	3	3	11.33	2,272	0	8,764
Kodiak	301 - 500	Kodiak Slope	6	6	9.29	2,706	1,688	3,724
Shumagin	301 - 500	Shumagin Slope	7	7	8.87	2,245	1,089	3,400
Chirikof	201 - 300	Chirikof Slope	6	6	8.50	1,299	424	2,174
Kodiak	201 - 300	Kenai Gullies	15	12	7.13	4,748	2,159	7,337
Yakutat	201 - 300	Yakutat Slope	6	6	6.84	1,455	0	3,086
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	11	6.20	2,436	1,050	3,822
Shumagin	201 - 300	Shumagin Slope	11	10	3.88	1,082	417	1,747
Kodiak	101 - 200	Kenai Flats	17	6	1.76	2,129	337	3,920
Chirikof	201 - 300	Lower Shelikof Gully	14	4	1.33	1,332	0	3,114
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	2	1.28	537	0	1,802
Yakutat	101 - 200	Middleton Shelf	9	5	0.92	675	34	1,316
Yakutat	101 - 200	Yakataga Shelf	8	6	0.88	465	0	1,093
Chirikof	101 - 200	East Shumagin Gully	14	1	0.44	489	0	1,544
Kodiak	101 - 200	Portlock Flats	25	2	0.39	287	0	872
Chirikof	101 - 200	Chirikof Outer Shelf	16	2	0.26	132	0	341
Shumagin	101 - 200	Shumagin Outer Shelf	27	7	0.25	202	0	508
Yakutat	101 - 200	Fairweather Shelf	7	2	0.25	191	0	627
Yakutat	101 - 200	Yakutat Flats	9	3	0.15	133	0	336
Kodiak	101 - 200	Albatross Gullies	29	4	0.12	97	0	211
Southeastern	101 - 200	Prince of Wales Shelf	14	3	0.09	60	0	136
Shumagin	1 - 100	Shumagin Bank	31	1	0.01	15	0	45
Kodiak	101 - 200	Kodiak Outer Shelf	18	1	0.01	3	0	9
Shumagin	1 - 100	Fox Islands	16	1	<0.01	2	0	7

Other Rockfishes

Redstripe rockfish (*Sebastes proriger*)

Redstripe rockfish were rarely encountered outside the Southeastern INPFC area and were never encountered west of Kodiak Island (Table 55). While all fish were caught in depth strata ranging between 1 and 300 m, over 97% of estimated biomass came from the 200-300 m depth stratum. Most fish were caught in the Prince of Wales Slope/Gullies (Table 56), which ranges from 200 -300 m in depth even though this stratum represents only about 1% of the entire survey area (Appendix Table A-1). Mean weight increased with depth (Table 55).

Silvergray rockfish (*Sebastes brevispinis*)

Silvergray rockfish were found in all except the Shumagin INPFC area (Table 57) and was the third most abundant rockfish and the eleventh most abundant species (Table 2). The largest concentrations were found in the Chirikof area in the 100 – 200 m depth range and in the Southeastern area in water 100 -300 m deep (Table 57). The highest mean CPUEs were recorded in the Prince of Wales Shelf and Prince of Wales Slope/Gully and the East Shumagin Gully (which is actually in the Chirikof INPFC area) strata (Table 58). Together, these three strata accounted for over 91 % of the estimated biomass even though they represent only about 7% of the total survey area (Table 58, Appendix Table A-1). No fish were caught deeper than 300 m (Table 57).

Harlequin rockfish (*Sebastes variegatus*)

Harlequin rockfish were infrequently caught in modest numbers throughout the survey area, they were primarily found in the 101 to 200 m depth range, which accounted for approximately 96 % of its total biomass estimate (Table 59). The highest mean CPUEs were recorded in Shumagin Outer Shelf stratum (Table 60), which accounted for approximately 59% of the estimated biomass but only represents less than 3% of the total survey area (Appendix Table A-1).

Redbanded rockfish (*Sebastes babcocki*)

Redbanded rockfish were caught in all five of the INFPC areas but were most abundant in the eastern area (Table 61). This species was always caught in depths less than 500 m. Approximately 56% of the total estimated biomass was in the Southeastern INPFC area, with the highest mean CPUEs recorded in the 201 to 500 m depth range. The strata with the highest CPUEs included the Prince of Wales Slope/Gullies, the Southeastern Slope, The Baranof-Chichagof Slope and the Baranof-Chichagof Shelf strata (Table 62). Combined these strata contained 51 % of the estimated biomass even though they represent only about 3% of the total survey area. (Appendix Table A-1).

Yelloweye rockfish (*Sebastes ruberrimus*)

Yelloweye rockfish were caught very infrequently and in very low numbers throughout the survey area (Tables 63 and 64). Most (69%) yelloweye rockfish were caught between 100 and 200 m and the remainder were caught in the 1 -100 m depth range (Table 63). One tow off the Kenai Peninsula which represented the highest mean CPUE (Table 64) and accounted for almost 31 % of the entire estimated biomass.

Rosethorn rockfish (*Sebastes helvomaculatus*)

Rosethorn rockfish were caught only in the Yakutat and Southeastern INPFC areas (Table 65). Mean CPUEs were modest in all strata where rosethorn rockfish were caught, with the highest values recorded in the Prince of Wales Slope/Gullies, Yakutat Gullies, and Southeast Slope strata (Table 66). Rosethorn rockfish were captured almost exclusively in the 101 to 300 m depth range (Table 65), which accounted for more than 95% of its estimated biomass.

Table 55. -- Number of survey hauls, number of hauls with redstripe rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	0	---	---	---	---	---
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	0	---	---	---	---	---
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	0	---	---	---	---	---
Kodiak	1 - 100	87	1	0.12	466	0	1,606	0.203
	101 - 200	107	1	0.01	33	0	103	0.384
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	2	0.05	499	0	1,642	0.210
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	4	0.98	506	0	1,591	0.669
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	4	0.09	506	0	1,591	0.669
Southeastern	1 - 100	8	1	0.01	5	0	17	0.019
	101 - 200	22	2	0.03	32	0	79	0.230
	201 - 300	15	7	35.04	17,703	0	53,533	0.451
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	10	6.61	17,740	0	53,570	0.447
All areas	1 - 100	282	2	0.04	471	0	1,611	0.183
	101 - 200	255	3	0.01	65	0	146	0.289
	201 - 300	83	11	5.05	18,208	0	54,052	0.455
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	16	0.61	18,745	0	54,603	0.438

Table 56. --Catch per unit of effort by stratum for redstripe rockfish sorted by descending CPUE for the 2011 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	Prince of Wales Slope/Gullies	11	4	44.98	17,663	0	53,932
Yakutat	201 - 300	Yakutat Slope	6	4	2.38	506	0	1,646
Kodiak	1 - 100	Kenai Peninsula	6	1	0.89	466	0	1,664
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	0.36	40	0	102
Kodiak	101 - 200	Kodiak Outer Shelf	18	1	0.07	33	0	103
Southeastern	101 - 200	Prince of Wales Shelf	14	2	0.05	32	0	79
Southeastern	1 - 100	Southeastern Shallows	8	1	0.01	5	0	17

Table 57. -- Number of survey hauls, number of hauls with silvergray rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	0	---	---	---	---	---
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	4	8.47	20,204	0	63,403	1.313
	201 - 300	20	1	0.01	13	0	46	1.304
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	5	3.11	20,218	0	63,417	1.313
Kodiak	1 - 100	87	1	0.01	46	0	157	0.417
	101 - 200	107	5	0.89	3,846	0	11,649	1.339
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	6	0.4	3,892	0	11,696	1.305
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	5	0.45	1,315	0	3,236	1.919
	201 - 300	13	2	4.96	2,564	0	8,646	1.558
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	7	0.7	3,879	0	9,456	1.664
Southeastern	1 - 100	8	2	0.06	37	0	99	0.491
	101 - 200	22	9	57.29	63,505	5,354	121,656	1.629
	201 - 300	15	13	16.86	8,520	0	20,659	1.521
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	24	26.85	72,061	12,719	131,403	1.614
All areas	1 - 100	282	3	0.01	82	0	199	0.447
	101 - 200	255	23	7.27	88,870	19,269	158,471	1.534
	201 - 300	83	16	3.08	11,097	0	24,164	1.529
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	42	3.24	100,049	29,458	170,641	1.530

Table 58. -- Catch per unit of effort by stratum for silvergray rockfish sorted by descending CPUE for the 2011 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	Prince of Wales Shelf	14	8	91.57	63,073	4,523	121,623
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	10	20.93	8,219	0	20,495
Chirikof	101 - 200	East Shumagin Gully	14	1	18.14	20,139	0	63,640
Yakutat	201 - 300	Yakutat Slope	6	2	12.05	2,564	0	8,954
Kodiak	101 - 200	Kenai Flats	17	1	3.06	3,697	0	11,535
Southeastern	201 - 300	Baranof-Chichagof Slope	4	3	2.67	301	0	1,076
Yakutat	101 - 200	Yakutat Flats	9	2	1.20	1,086	0	3,035
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	1	1.03	432	0	1,453
Yakutat	101 - 200	Fairweather Shelf	7	1	0.21	163	0	562
Kodiak	101 - 200	Portlock Flats	25	1	0.11	79	0	241
Yakutat	101 - 200	Yakataga Shelf	8	1	0.09	48	0	160
Kodiak	1 - 100	Kenai Peninsula	6	1	0.09	46	0	163
Chirikof	201 - 300	Chirikof Slope	6	1	0.09	13	0	47
Kodiak	101 - 200	Albatross Gullies	29	2	0.08	62	0	158
Chirikof	101 - 200	Shelikof Edge	26	2	0.06	46	0	113
Southeastern	1 - 100	Southeastern Shallows	8	2	0.06	37	0	101
Chirikof	101 - 200	Chirikof Outer Shelf	16	1	0.04	19	0	60
Yakutat	101 - 200	Middleton Shelf	9	1	0.03	19	0	61
Kodiak	101 - 200	Kodiak Outer Shelf	18	1	0.02	9	0	27

Table 59. -- Number of survey hauls, number of hauls with harlequin rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	1	<0.01	4	0	11	0.210
	101 - 200	37	2	1.51	2,215	0	6,743	0.673
	201 - 300	11	2	0.07	19	0	54	0.428
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	5	0.35	2,238	0	6,766	0.668
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	6	0.36	856	0	2,025	0.530
	201 - 300	20	1	0.02	19	0	65	0.463
	301 - 500	6	1	0.03	5	0	17	0.450
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	8	0.14	880	0	2,049	0.528
Kodiak	1 - 100	87	1	---	5	0	16	0.062
	101 - 200	107	9	0.05	198	0	422	0.196
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	10	0.02	202	0	427	0.187
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	3	0.1	305	0	769	0.221
	201 - 300	13	2	0.18	95	0	297	0.205
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	5	0.07	400	0	892	0.217
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	4	0.03	15	0	32	0.164
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	4	0.01	15	0	32	0.164
All areas	1 - 100	282	2	<0.01	8	0	20	0.090
	101 - 200	255	20	0.29	3,574	0	8,245	0.490
	201 - 300	83	9	0.04	148	0	352	0.231
	301 - 500	33	1	<0.01	5	0	17	0.450
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	32	0.12	3,735	0	8,409	0.465

Table 60. -- Catch per unit of effort by stratum for harlequin rockfish sorted by descending CPUE for the 2011 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	101 - 200	Shumagin Outer Shelf	27	2	2.72	2,215	0	6,751
Chirikof	101 - 200	Chirikof Outer Shelf	16	5	0.92	461	0	1,304
Yakutat	101 - 200	Yakataga Shelf	8	3	0.58	305	0	781
Yakutat	201 - 300	Yakutat Slope	6	2	0.45	95	0	307
Chirikof	101 - 200	East Shumagin Gully	14	1	0.36	395	0	1,247
Kodiak	101 - 200	Kodiak Outer Shelf	18	2	0.18	90	0	276
Chirikof	201 - 300	Chirikof Slope	6	1	0.12	19	0	67
Kodiak	101 - 200	Portlock Flats	25	4	0.11	82	0	216
Shumagin	201 - 300	Shumagin Slope	11	2	0.07	19	0	54
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	3	0.04	14	0	31
Chirikof	301 - 500	Chirikof Slope	6	1	0.03	5	0	17
Kodiak	101 - 200	Kenai Flats	17	3	0.02	27	0	60
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	0.01	1	0	5
Kodiak	1 - 100	Kenai Peninsula	6	1	0.01	5	0	16
Shumagin	1 - 100	Shumagin Bank	31	1	0.00	4	0	11

Table 61. -- Number of survey hauls, number of hauls with redbanded rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	1	0.04	12	0	39	1.081
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	1	<0.01	12	0	39	1.081
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	3	0.03	71	0	153	1.105
	201 - 300	20	4	0.17	199	0	462	1.425
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	7	0.04	270	0	544	1.324
Kodiak	1 - 100	87	1	<0.01	8	0	27	0.490
	101 - 200	107	9	0.18	788	0	1,597	1.407
	201 - 300	24	10	0.21	239	0	560	0.794
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	20	0.11	1,034	178	1,890	1.180
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	5	0.22	641	0	1,693	0.725
	201 - 300	13	9	0.44	229	22	436	0.513
	301 - 500	6	1	0.02	6	0	23	0.401
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	15	0.16	876	0	1,949	0.651
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	4	0.82	914	0	2,844	1.522
	201 - 300	15	13	3.01	1,520	539	2,502	0.901
	301 - 500	8	4	1.33	415	101	729	0.678
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	21	1.06	2,850	742	4,957	0.983
All areas	1 - 100	282	1	<0.01	8	0	27	0.490
	101 - 200	255	21	0.2	2,414	253	4,574	1.145
	201 - 300	83	37	0.61	2,199	1,178	3,220	0.851
	301 - 500	33	5	0.33	421	107	735	0.672
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	64	0.16	5,042	2,655	7,428	0.945

Table 62. -- Catch per unit of effort by stratum for redbanded rockfish sorted by descending CPUE for the 2011 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	Prince of Wales Slope/Gullies	11	9	3.14	1,233	262	2,203
Southeastern	301 - 500	Southeastern Slope	1	1	2.98	230		
Southeastern	201 - 300	Baranof-Chichagof Slope	4	4	2.56	288	0	590
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	1	1.99	834	0	2,807
Southeastern	301 - 500	Southeastern Deep Gullies	7	3	0.79	185	0	510
Yakutat	101 - 200	Yakutat Flats	9	2	0.65	588	0	1,656
Chirikof	201 - 300	Chirikof Slope	6	3	0.61	93	0	252
Yakutat	201 - 300	Yakutat Slope	6	6	0.54	116	0	268
Kodiak	101 - 200	Portlock Flats	25	4	0.51	371	0	935
Kodiak	101 - 200	Albatross Gullies	29	2	0.45	356	0	951
Yakutat	201 - 300	Yakutat Gullies	7	3	0.37	114	0	293
Kodiak	201 - 300	Kenai Gullies	15	7	0.32	213	0	535
Kodiak	201 - 300	Kodiak Slope	6	3	0.16	26	0	59
Chirikof	101 - 200	Chirikof Outer Shelf	16	3	0.14	71	0	154
Southeastern	101 - 200	Prince of Wales Shelf	14	3	0.12	80	0	232
Chirikof	201 - 300	Lower Shelikof Gully	14	1	0.11	106	0	335
Yakutat	101 - 200	Yakataga Shelf	8	2	0.09	45	0	136
Yakutat	301 - 500	Yakutat Gullies	3	1	0.05	6	0	30
Shumagin	201 - 300	Shumagin Slope	11	1	0.04	12	0	39
Kodiak	1 - 100	Northern Kodiak Shallows	6	1	0.04	8	0	28
Kodiak	101 - 200	Kenai Flats	17	2	0.03	33	0	87
Kodiak	101 - 200	Barren Islands	18	1	0.03	28	0	87
Yakutat	101 - 200	Fairweather Shelf	7	1	0.01	8	0	29

Table 63. -- Number of survey hauls, number of hauls with yelloweye rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	1	0.12	174	0	529	4.077
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	1	0.03	174	0	529	4.077
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	3	0.08	200	0	502	3.282
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	3	0.03	200	0	502	3.282
Kodiak	1 - 100	87	1	0.22	847	0	2,919	4.650
	101 - 200	107	7	0.3	1,298	0	2,748	3.982
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	8	0.22	2,145	0	4,428	4.222
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	3	0.22	240	0	523	3.780
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	3	0.09	240	0	523	3.780
All areas	1 - 100	282	1	0.07	847	0	2,919	4.650
	101 - 200	255	14	0.16	1,911	377	3,445	3.878
	201 - 300	83	0	---	---	---	---	---
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	15	0.09	2,758	418	5,098	4.086

Table 64. -- Catch per unit of effort by stratum for yelloweye rockfish sorted by descending CPUE for the 2011 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	6	1	1.61	847	0	3,024
Kodiak	101 - 200	Kenai Flats	17	3	0.84	1,016	0	2,439
Kodiak	101 - 200	Kodiak Outer Shelf	18	2	0.29	143	0	373
Southeastern	101 - 200	Prince of Wales Shelf	14	2	0.25	171	0	423
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.21	174	0	530
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	1	0.17	69	0	232
Chirikof	101 - 200	East Shumagin Gully	14	1	0.12	134	0	424
Kodiak	101 - 200	Portlock Flats	25	1	0.10	70	0	216
Kodiak	101 - 200	Albatross Gullies	29	1	0.09	69	0	211
Chirikof	101 - 200	Chirikof Outer Shelf	16	1	0.07	35	0	109
Chirikof	101 - 200	Shelikof Edge	26	1	0.04	31	0	94

Table 65. -- Number of survey hauls, number of hauls with rosethorn rockfish, mean CPUE, biomass, and mean weight, based on the 2011 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	105	0	---	---	---	---	---
	101 - 200	37	0	---	---	---	---	---
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	0	---	---	---	---	---
Chirikof	1 - 100	68	0	---	---	---	---	---
	101 - 200	56	0	---	---	---	---	---
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	0	---	---	---	---	---
Kodiak	1 - 100	87	0	---	---	---	---	---
	101 - 200	107	0	---	---	---	---	---
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	0	---	---	---	---	---
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	1	0.07	193	0	630	0.288
	201 - 300	13	1	0.01	7	0	25	0.153
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	2	0.04	200	0	637	0.279
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	2	0.01	8	0	23	0.194
	201 - 300	15	5	0.95	481	0	997	0.207
	301 - 500	8	1	0.08	27	27	27	0.391
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	8	0.19	516	0	1,032	0.212
All areas	1 - 100	282	0	---	---	---	---	---
	101 - 200	255	3	0.02	201	0	639	0.282
	201 - 300	83	6	0.14	488	0	1,004	0.206
	301 - 500	33	1	0.02	27	27	27	0.391
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	10	0.02	716	60	1,373	0.228

Table 66. -- Catch per unit of effort by stratum for rosethorn rockfish sorted by descending CPUE for the 2011 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	Prince of Wales Slope/Gullies	11	4	1.21	475	0	998
Southeastern	301 - 500	Southeastern Slope	1	1	0.34	27		
Yakutat	101 - 200	Yakutat Flats	9	1	0.21	193	0	639
Southeastern	201 - 300	Baranof-Chichagof Slope	4	1	0.05	6	0	23
Yakutat	201 - 300	Yakutat Slope	6	1	0.03	7	0	26
Southeastern	101 - 200	Prince of Wales Shelf	14	1	0.01	7	0	21
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	1	<0.01	2	0	6

Alaska skate *(Bathyraja parmifera)*

Alaska skate were caught infrequently (in only 8 of the 59 survey strata) and in modest numbers in the three westernmost INPFC areas (Tables 67 and 68). Catches of Alaska skate were confined to the less than 200 m depth range (Table 67).

Aleutian skate (*Bathyraja aleutica*)

Aleutian skate were caught in 11% of all survey hauls and were most commonly found in the Chirikof and Kodiak INPFC areas (Table 69) and were not encountered in the Southeastern INPFC area. They were encountered in all depth strata shallower than 700 m (Table 69) although 98% of the estimated biomass occurred in depths shallower than 300 m. The highest mean CPUE was recorded in the Upper Shelikof Gully stratum where they occurred in every tow (Table 70). Mean fish weight generally decreased with depth (Table 69).

Bering skate (*Bathyraja interrupta*)

Bering skate were caught throughout the survey area but the greatest biomass occurred in the Chirikof and Kodiak areas (Table 71). Approximately 81% of the total biomass was estimated from depths shallower than 200 m. The highest Bering skate CPUE was recorded near the Barren Islands in the Kodiak INPFC area (Table 72). They were caught in all depths in 2011 but the highest CPUEs were recorded in depths less than 300 m. The deepest Bering skate catches were from 501-700 m in the Chirikof and Southeastern Slope INPFC areas (Table 71).

Big skate (*Raja binoculata*)

Big skate were caught in modest numbers in approximately 12% of all survey hauls and in all five of the INPFC areas (Table 73). The highest CPUEs were recorded in some of the 1-100 m strata (Table 74) and approximately 90% of their biomass was estimated from the 1-100 m stratum. Most of the remaining biomass was found in waters between 101 and 200 m depth. Mean weight was greatest in the two shallowest strata (Table 73).

Longnose skate (*Raja rhina*)

Longnose skate were caught in approximately 22% of all survey hauls and in all five of the INPFC areas (Table 75). Approximately 49% of their estimated biomass was located in the Kodiak INPFC area. Longnose skate occurred in all depths surveyed, but greater than 50% of their total biomass was estimated from the 101-200 m stratum (Table 75). The highest CPUEs were recorded in the Upper Shelikof Gully (201-300 m), Kenai Peninsula (1-100 m), and Yakutat Gullies (301-500 m) strata (Table 76).

Table 67. -- Number of survey hauls, number of hauls with Alaska skate, mean CPUE, biomass, and mean weight, based on the 2011 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	105	2	0.07	275	0	735	4.456
	101 - 200	37	1	0.04	59	0	179	4.583
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	3	0.05	333	0	806	4.478
Chirikof	1 - 100	68	1	0.03	83	0	252	6.339
	101 - 200	56	1	0.03	79	0	242	6.271
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	2	0.02	162	0	393	6.305
Kodiak	1 - 100	87	3	0.06	227	0	494	6.537
	101 - 200	107	2	0.07	320	0	781	6.049
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	5	0.06	547	14	1,079	6.242
Yakutat	1 - 100	14	0	---	---	---	---	---
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	0	---	---	---	---	---
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	0	---	---	---	---	---
All areas	1 - 100	282	6	0.05	584	33	1,136	5.341
	101 - 200	255	4	0.04	457	0	957	5.845
	201 - 300	83	0	---	---	---	---	---
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	10	0.03	1,042	313	1,770	5.551

Table 68. -- Catch per unit of effort by stratum for Alaska skate sorted by descending CPUE for the 2011 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	6	1	0.38	83	0	298
Kodiak	101 - 200	Barren Islands	18	2	0.29	320	0	783
Shumagin	1 - 100	Fox Islands	16	1	0.25	210	0	659
Kodiak	1 - 100	Albatross Shallows	25	2	0.25	143	0	350
Chirikof	101 - 200	Shelikof Edge	26	1	0.10	79	0	242
Chirikof	1 - 100	Chirikof Bank	34	1	0.08	83	0	252
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.07	59	0	179
Shumagin	1 - 100	Davidson Bank	39	1	0.05	64	0	195

Table 69. -- Number of survey hauls, number of hauls with Aleutian skate, mean CPUE, biomass, and mean weight, based on the 2011 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	105	5	0.15	636	46	1,226	7.039
	101 - 200	37	2	0.14	207	0	562	8.484
	201 - 300	11	1	0.11	30	0	94	2.752
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	8	0.14	873	185	1,561	6.954
Chirikof	1 - 100	68	6	0.72	1,881	66	3,696	11.722
	101 - 200	56	12	0.91	2,177	579	3,774	8.453
	201 - 300	20	5	1.18	1,366	36	2,695	7.650
	301 - 500	6	2	0.75	120	0	393	5.530
	501 - 700	5	2	0.71	139	0	364	3.305
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	27	0.87	5,682	3,013	8,350	8.606
Kodiak	1 - 100	87	11	0.86	3,295	1,130	5,460	10.109
	101 - 200	107	11	0.56	2,427	740	4,114	9.892
	201 - 300	24	8	1.72	1,980	1,238	2,723	6.216
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	2	0.14	25	0	70	0.701
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	32	0.79	7,727	4,951	10,503	8.354
Yakutat	1 - 100	14	2	0.37	624	0	1,573	6.719
	101 - 200	33	4	0.35	1,020	0	2,137	8.718
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	1	0.07	20	0	82	0.509
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	7	0.3	1,663	276	3,051	6.698
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	0	---	---	---	---	---
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	0	---	---	---	---	---
All areas	1 - 100	282	24	0.5	6,436	3,489	9,382	9.611
	101 - 200	255	29	0.48	5,831	3,323	8,338	9.050
	201 - 300	83	14	0.94	3,375	1,870	4,881	6.647
	301 - 500	33	3	0.11	139	0	408	2.317
	501 - 700	17	4	0.2	164	0	393	2.121
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	74	0.52	15,945	11,868	20,022	8.139

Table 70. --Catch per unit of effort by stratum for Aleutian skate sorted by descending CPUE for the 2011 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	3	3	4.71	1,510	1,239	1,781
Chirikof	1 - 100	Upper Alaska Peninsula	18	3	1.82	1,446	0	3,202
Kodiak	101 - 200	Albatross Gullies	29	7	1.80	1,423	291	2,555
Kodiak	1 - 100	Kenai Peninsula	6	2	1.79	940	0	2,564
Chirikof	201 - 300	Lower Shelikof Gully	14	5	1.36	1,366	27	2,704
Chirikof	101 - 200	Chirikof Outer Shelf	16	3	1.35	676	0	1,507
Kodiak	1 - 100	Albatross Banks	38	7	1.21	1,863	295	3,432
Chirikof	101 - 200	East Shumagin Gully	14	3	0.93	1,034	0	2,336
Yakutat	101 - 200	Middleton Shelf	9	2	0.93	681	0	1,733
Kodiak	101 - 200	Barren Islands	18	2	0.78	858	0	2,128
Chirikof	301 - 500	Chirikof Slope	6	2	0.75	120	0	407
Kodiak	1 - 100	Northern Kodiak Shallows	6	1	0.74	164	0	584
Chirikof	501 - 700	Chirikof Slope	5	2	0.71	139	0	382
Yakutat	101 - 200	Yakataga Shelf	8	2	0.64	339	0	865
Kodiak	201 - 300	Kodiak Slope	6	2	0.64	104	0	363
Chirikof	101 - 200	Shelikof Edge	26	6	0.60	466	0	962
Kodiak	1 - 100	Albatross Shallows	25	1	0.57	328	0	1,006
Kodiak	201 - 300	Kenai Gullies	15	3	0.55	367	0	1,077
Yakutat	1 - 100	Middleton Shallows	6	1	0.50	335	0	1,195
Shumagin	1 - 100	Shumagin Bank	31	3	0.37	463	0	1,003
Yakutat	1 - 100	Yakutat Shallows	8	1	0.29	289	0	974
Kodiak	101 - 200	Kodiak Outer Shelf	18	2	0.29	146	0	361
Chirikof	1 - 100	Chirikof Bank	34	2	0.27	289	0	753
Shumagin	101 - 200	Shumagin Outer Shelf	27	2	0.25	207	0	563
Chirikof	1 - 100	Semidi Bank	16	1	0.20	146	0	457
Kodiak	501 - 700	Kodiak Slope	4	2	0.14	25	0	77
Yakutat	301 - 500	Yakutat Slope	3	1	0.13	20	0	104
Shumagin	201 - 300	Shumagin Slope	11	1	0.11	30	0	95
Shumagin	1 - 100	Fox Islands	16	1	0.10	84	0	263
Shumagin	1 - 100	Davidson Bank	39	1	0.07	90	0	274

Table 71. -- Number of survey hauls, number of hauls with Bering skate, mean CPUE, biomass, and mean weight, based on the 2011 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	105	3	0.04	146	0	327	2.647
	101 - 200	37	2	0.06	91	0	259	2.176
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	5	0.04	237	7	467	2.443
Chirikof	1 - 100	68	7	0.1	253	61	444	2.318
	101 - 200	56	10	0.21	510	109	910	1.726
	201 - 300	20	8	0.4	462	116	808	1.976
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	1	0.02	3	0	12	0.217
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	26	0.19	1,228	684	1,771	1.878
Kodiak	1 - 100	87	10	0.23	889	132	1,646	2.337
	101 - 200	107	22	0.26	1,138	583	1,692	1.930
	201 - 300	24	3	0.15	175	0	491	2.101
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	35	0.22	2,202	1,252	3,152	2.090
Yakutat	1 - 100	14	2	0.06	102	0	266	1.020
	101 - 200	33	0	---	---	---	---	---
	201 - 300	13	1	0.06	30	0	102	1.841
	301 - 500	6	1	0.09	24	0	100	1.673
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	4	0.03	156	0	340	1.195
Southeastern	1 - 100	8	0	---	---	---	---	---
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	1	<0.01	<1	0	1	0.026
	301 - 500	8	1	0.09	27	0	91	0.825
	501 - 700	3	1	0.07	8	0	32	0.492
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	3	0.01	35	0	100	0.550
All areas	1 - 100	282	22	0.11	1,389	579	2,199	2.156
	101 - 200	255	34	0.14	1,738	1,056	2,420	1.876
	201 - 300	83	13	0.19	668	248	1,087	1.913
	301 - 500	33	2	0.04	51	0	131	1.082
	501 - 700	17	2	0.01	11	0	33	0.354
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	73	0.13	3,857	2,744	4,970	1.930

Table 72. --Catch per unit of effort by stratum for Bering skate sorted by descending CPUE for the 2011 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	Barren Islands	18	8	0.68	741	224	1,258
Chirikof	201 - 300	Lower Shelikof Gully	14	6	0.44	443	95	790
Kodiak	1 - 100	Lower Cook Inlet	12	2	0.41	400	0	1,006
Kodiak	1 - 100	Kenai Peninsula	6	1	0.40	210	0	751
Chirikof	101 - 200	Shelikof Edge	26	6	0.34	261	0	527
Kodiak	201 - 300	Upper Shelikof Gully	3	1	0.32	103	0	544
Kodiak	101 - 200	Albatross Gullies	29	8	0.23	183	62	304
Yakutat	301 - 500	Yakutat Gullies	3	1	0.22	24	0	127
Kodiak	1 - 100	Albatross Shallows	25	4	0.21	123	0	247
Chirikof	101 - 200	East Shumagin Gully	14	2	0.17	192	0	490
Kodiak	1 - 100	Northern Kodiak Shallows	6	1	0.17	37	0	133
Shumagin	101 - 200	Sanak Gully	6	1	0.16	67	0	238
Chirikof	201 - 300	Chirikof Slope	6	2	0.13	20	0	53
Southeastern	301 - 500	Southeastern Deep Gullies	7	1	0.12	27	0	93
Chirikof	1 - 100	Semidi Bank	16	2	0.11	84	0	207
Chirikof	101 - 200	Chirikof Outer Shelf	16	2	0.11	56	0	138
Chirikof	1 - 100	Chirikof Bank	34	4	0.11	120	1	239
Kodiak	201 - 300	Kenai Gullies	15	2	0.11	73	0	179
Yakutat	1 - 100	Middleton Shallows	6	1	0.10	66	0	237
Yakutat	201 - 300	Yakutat Gullies	7	1	0.10	30	0	104
Kodiak	101 - 200	Kodiak Outer Shelf	18	2	0.10	48	0	117
Shumagin	1 - 100	Fox Islands	16	1	0.09	71	0	224
Kodiak	101 - 200	Kenai Flats	17	2	0.09	103	0	255
Kodiak	101 - 200	Portlock Flats	25	2	0.09	63	0	156
Kodiak	1 - 100	Albatross Banks	38	2	0.08	119	0	288
Southeastern	501 - 700	Southeastern Slope	3	1	0.07	8	0	41
Chirikof	1 - 100	Upper Alaska Peninsula	18	1	0.06	49	0	154
Yakutat	1 - 100	Yakutat Shallows	8	1	0.04	36	0	119
Shumagin	1 - 100	Shumagin Bank	31	1	0.03	40	0	122
Shumagin	101 - 200	Shumagin Outer Shelf	27	1	0.03	25	0	76
Shumagin	1 - 100	Davidson Bank	39	1	0.03	34	0	104
Chirikof	501 - 700	Chirikof Slope	5	1	0.02	3	0	13
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	1	<0.01	0	0	1

Table 73. -- Number of survey hauls, number of hauls with big skate, mean CPUE, biomass, and mean weight, based on the 2011 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	105	11	1.25	5,178	1,548	8,808	19.961
	101 - 200	37	3	0.73	1,073	0	2,336	12.274
	201 - 300	11	0	---	---	---	---	---
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	14	0.99	6,251	2,412	10,090	18.024
Chirikof	1 - 100	68	20	4.13	10,748	5,157	16,338	17.451
	101 - 200	56	1	0.13	303	0	954	8.819
	201 - 300	20	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	21	1.7	11,051	5,427	16,675	16.995
Kodiak	1 - 100	87	22	2.36	9,084	4,195	13,973	12.282
	101 - 200	107	7	0.38	1,626	0	3,390	14.116
	201 - 300	24	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	29	1.09	10,710	5,579	15,841	12.529
Yakutat	1 - 100	14	7	21.01	35,001	0	90,243	8.097
	101 - 200	33	5	1.22	3,596	132	7,059	18.190
	201 - 300	13	0	---	---	---	---	---
	301 - 500	6	0	---	---	---	---	---
	501 - 700	2	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	12	6.98	38,597	0	93,962	8.539
Southeastern	1 - 100	8	2	1.82	1,188	0	3,664	7.093
	101 - 200	22	0	---	---	---	---	---
	201 - 300	15	1	0.17	85	0	271	2.929
	301 - 500	8	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	3	0.47	1,273	0	3,756	6.480
All areas	1 - 100	282	62	4.74	61,199	5,136	117,263	10.024
	101 - 200	255	16	0.54	6,598	2,560	10,637	15.180
	201 - 300	83	1	0.02	85	0	271	2.929
	301 - 500	33	0	---	---	---	---	---
	501 - 700	17	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	79	2.20	67,883	11,642	124,123	10.334

Table 74. --Catch per unit of effort by stratum for big skate sorted by descending CPUE for the 2011 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	8	3	25.22	25,082	0	81,157
Yakutat	1 - 100	Middleton Shallows	6	4	14.77	9,920	0	24,960
Chirikof	1 - 100	Upper Alaska Peninsula	18	8	6.06	4,808	864	8,752
Chirikof	1 - 100	Chirikof Bank	34	11	5.39	5,814	1,658	9,970
Kodiak	1 - 100	Albatross Shallows	25	10	4.86	2,800	182	5,417
Kodiak	1 - 100	Albatross Banks	38	5	2.44	3,764	125	7,403
Shumagin	1 - 100	Shumagin Bank	31	5	2.36	2,928	0	5,947
Kodiak	1 - 100	Northern Kodiak Shallows	6	1	2.35	517	0	1,844
Yakutat	101 - 200	Yakutat Flats	9	2	2.09	1,886	0	4,811
Yakutat	101 - 200	Middleton Shelf	9	2	1.93	1,420	0	3,700
Kodiak	1 - 100	Lower Cook Inlet	12	4	1.83	1,813	0	3,762
Southeastern	1 - 100	Southeastern Shallows	8	2	1.82	1,188	0	3,727
Shumagin	1 - 100	Lower Alaska Peninsula	19	3	1.56	1,072	0	2,430
Shumagin	101 - 200	Shumagin Outer Shelf	27	2	0.97	792	0	1,925
Shumagin	1 - 100	Fox Islands	16	1	0.87	721	0	2,257
Kodiak	101 - 200	Albatross Gullies	29	5	0.77	606	44	1,168
Kodiak	101 - 200	Barren Islands	18	1	0.70	769	0	2,391
Shumagin	101 - 200	Sanak Gully	6	1	0.66	281	0	1,004
Yakutat	101 - 200	Fairweather Shelf	7	1	0.37	289	0	997
Kodiak	1 - 100	Kenai Peninsula	6	2	0.36	191	0	523
Shumagin	1 - 100	Davidson Bank	39	2	0.34	458	0	1,110
Chirikof	101 - 200	East Shumagin Gully	14	1	0.27	303	0	958
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	1	0.22	85	0	274
Kodiak	101 - 200	Kenai Flats	17	1	0.21	252	0	785
Chirikof	1 - 100	Semidi Bank	16	1	0.17	125	0	393

Table 75. -- Number of survey hauls, number of hauls with longnose skate, mean CPUE, biomass, and mean weight, based on the 2011 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	105	2	0.10	412	0	1,005	10.641
	101 - 200	37	3	0.22	318	0	762	5.215
	201 - 300	11	2	0.75	210	0	610	6.495
	301 - 500	7	0	---	---	---	---	---
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	163	7	0.15	941	126	1,755	7.118
Chirikof	1 - 100	68	10	0.73	1,902	655	3,149	10.159
	101 - 200	56	15	1.23	2,925	1,036	4,813	7.553
	201 - 300	20	7	1.80	2,080	394	3,766	5.703
	301 - 500	6	1	0.27	43	0	148	4.092
	501 - 700	5	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	155	33	1.07	6,950	4,227	9,672	7.318
Kodiak	1 - 100	87	16	1.23	4,748	861	8,635	9.464
	101 - 200	107	41	2.01	8,693	5,569	11,818	7.875
	201 - 300	24	9	2.80	3,218	0	9,864	10.161
	301 - 500	6	0	---	---	---	---	---
	501 - 700	4	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	228	66	1.70	16,659	10,193	23,125	8.666
Yakutat	1 - 100	14	2	0.64	1,065	0	2,868	7.314
	101 - 200	33	16	1.44	4,241	1,905	6,578	5.962
	201 - 300	13	2	1.29	665	0	2,108	8.954
	301 - 500	6	3	1.90	498	0	1,243	6.687
	501 - 700	2	1	1.07	157	0	833	5.781
	701 - 1000	0	0	---	---	---	---	---
	All depths	68	24	1.20	6,626	3,477	9,776	6.415
Southeastern	1 - 100	8	3	1.54	1,008	0	2,542	4.669
	101 - 200	22	7	0.98	1,084	75	2,093	5.227
	201 - 300	15	2	0.55	278	0	720	6.392
	301 - 500	8	4	1.18	366	0	767	6.336
	501 - 700	3	0	---	---	---	---	---
	701 - 1000	0	0	---	---	---	---	---
	All depths	56	16	1.02	2,736	868	4,604	5.217
All areas	1 - 100	282	33	0.71	9,134	4,755	13,512	8.388
	101 - 200	255	82	1.41	17,262	12,929	21,594	6.986
	201 - 300	83	22	1.79	6,451	751	12,151	7.758
	301 - 500	33	8	0.71	908	183	1,632	6.354
	501 - 700	17	1	0.19	157	0	833	5.781
	701 - 1000	0	0	---	---	---	---	---
	All depths	670	146	1.10	33,911	26,175	41,647	7.434

Table 76. --Catch per unit of effort by stratum for longnose skate sorted by descending CPUE for the 2011 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	3	1	6.36	2,040	0	10,819
Kodiak	1 - 100	Kenai Peninsula	6	3	4.49	2,364	0	6,376
Yakutat	301 - 500	Yakutat Gullies	3	2	3.98	441	0	1,569
Kodiak	1 - 100	Northern Kodiak Shallows	6	4	3.43	755	103	1,406
Kodiak	101 - 200	Kenai Flats	17	9	2.61	3,152	822	5,482
Kodiak	101 - 200	Portlock Flats	25	12	2.46	1,803	788	2,819
Kodiak	101 - 200	Barren Islands	18	9	2.28	2,502	678	4,326
Yakutat	201 - 300	Yakutat Gullies	7	2	2.19	665	0	2,158
Chirikof	201 - 300	Lower Shelikof Gully	14	7	2.08	2,080	383	3,778
Yakutat	101 - 200	Fairweather Shelf	7	3	1.98	1,531	0	3,333
Kodiak	201 - 300	Kenai Gullies	15	8	1.77	1,178	216	2,140
Yakutat	101 - 200	Middleton Shelf	9	6	1.67	1,225	248	2,201
Southeastern	301 - 500	Southeastern Deep Gullies	7	4	1.56	366	0	781
Southeastern	1 - 100	Southeastern Shallows	8	3	1.54	1,008	0	2,581
Kodiak	101 - 200	Albatross Gullies	29	9	1.40	1,105	354	1,856
Chirikof	101 - 200	Chirikof Outer Shelf	16	4	1.38	692	0	1,528
Chirikof	101 - 200	Shelikof Edge	26	7	1.37	1,056	133	1,979
Kodiak	1 - 100	Albatross Shallows	25	5	1.15	665	79	1,251
Yakutat	101 - 200	Yakutat Flats	9	3	1.14	1,030	0	2,637
Yakutat	1 - 100	Middleton Shallows	6	1	1.11	743	0	2,653
Southeastern	101 - 200	Baranof-Chichagof Shelf	8	2	1.08	455	0	1,240
Yakutat	501 - 700	Yakutat Slope	2	1	1.07	157	0	2,152
Chirikof	101 - 200	East Shumagin Gully	14	4	1.06	1,176	0	2,641
Chirikof	1 - 100	Upper Alaska Peninsula	18	4	1.03	818	0	1,751
Southeastern	101 - 200	Prince of Wales Shelf	14	5	0.91	629	0	1,397
Yakutat	101 - 200	Yakataga Shelf	8	4	0.86	456	0	968
Chirikof	1 - 100	Semidi Bank	16	3	0.80	583	0	1,264
Shumagin	201 - 300	Shumagin Slope	11	2	0.75	210	0	615
Southeastern	201 - 300	Prince of Wales Slope/Gullies	11	2	0.71	278	0	725
Kodiak	1 - 100	Albatross Banks	38	4	0.63	964	0	2,007
Chirikof	1 - 100	Chirikof Bank	34	3	0.46	501	0	1,089
Shumagin	101 - 200	Shumagin Outer Shelf	27	3	0.39	318	0	762
Yakutat	301 - 500	Yakutat Slope	3	1	0.38	57	0	303
Yakutat	1 - 100	Yakutat Shallows	8	1	0.32	322	0	1,083
Chirikof	301 - 500	Chirikof Slope	6	1	0.27	43	0	154
Kodiak	101 - 200	Kodiak Outer Shelf	18	2	0.26	131	0	330
Shumagin	1 - 100	Fox Islands	16	1	0.22	179	0	561
Shumagin	1 - 100	Shumagin Bank	31	1	0.19	233	0	708

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APPENDIX A

Stratum Specifications and Locations

Appendix Table A-1 presents the survey stratum definitions for the 2011 Gulf of Alaska biennial bottom trawl survey including depth range, stratum name, and stratum area in square nautical miles and square kilometers. Appendix Table A-2 presents the summary stratum 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 2011 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**

Appendix Table A-1. - Continued.

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**
1 – 700		**Grand Total**	**89,930**	**308,416**

Appendix Table A-2. -- Summary codes used for the 2011 Gulf of Alaska biennial bottom trawl survey including depth range, International North Pacific Fisheries Commission statistical areas, their square areas, 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	

Appendix Table A-2. - Continued.

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

Appendix Table B-1. -- Fish species encountered and identified during the 2011 Aleutian Islands bottom trawl survey.

FAMILY	SPECIES_NAME	COMMON_NAME
Petromyzontidae	*Lampetra tridentata*	Pacific lamprey
Chimaeridae	*Hydrolagus colliei*	spotted ratfish
Lamnidae	*Lamna ditropis*	salmon shark
	Squalus acanthias	spiny dogfish
Squalidae	*Somniosus pacificus*	Pacific sleeper shark
	Raja binoculata	big skate
	Bathyraja interrupta	Bering skate
	Raja rhina	longnose skate
	Bathyraja taranetzi	mud skate
	Bathyraja parmifera	Alaska skate
Rajidae	*Bathyraja aleutica*	Aleutian skate
	Bathyraja maculata	whiteblotched skate
	Bathyraja mariposa	butterfly skate
Clupeidae	*Clupea pallasi*	Pacific herring
	Bathylagus pacificus	Pacific blacksmelt
Bathylagidae	*Bathylagus* sp.	blacksmelt unident.
Bathylagidae	*Bathylagus milleri*	robust blacksmelt
	Leuroglossus schmidti	northern smoothtongue
	Bathylagus ochotensis	popeye blacksmelt
Searsiidae	*Sagamichthys abei*	shining tubeshoulder
Osmeridae	*Osmeridae*	smelt unident.
	Thaleichthys pacificus	eulachon
Osmeridae	*Hypomesus pretiosus*	surf smelt
	Mallotus villosus	capelin
	Spirinchus thaleichthys	longfin smelt
	Oncorhynchus tshawytscha	chinook salmon
	Oncorhynchus kisutch	coho salmon
Salmonidae	*Oncorhynchus gorbuscha*	pink salmon
	Oncorhynchus keta	chum salmon
	Oncorhynchus nerka	sockeye salmon
	Salvelinus malma	Dolly Varden
Melanostomiidae	*Tactostoma macropus*	longfin dragonfish
Chauliodontidae	*Chauliodontinae*	viperfish unident.
Chauliodontidae	*Chauliodus macouni*	Pacific viperfish
Scopelarchidae	*Benthalbella dentata*	northern pearleye
Myctophidae	*Myctophidae*	lanternfish unident.
Myctophidae	*Stenobrachius* sp.	
	Stenobrachius leucopsarus	northern lampfish
Myctophidae	*Diaphus theta*	California headlightfish
	Nannobrachium regale	pinpoint lampfish
	Lampanyctus jordani	brokenline lampfish
Macrouridae	*Coryphaenoides* sp.	
	Coryphaenoides acrolepis	Pacific grenadier
Macrouridae	*Albatrossia pectoralis*	giant grenadier
	Coryphaenoides cinereus	popeye grenadier

FAMILY	SPECIES_NAME	COMMON_NAME
Moridae	*Antimora microlepis*	Pacific flatnose
Merluccidae	*Merluccius productus*	Pacific hake
	Microgadus proximus	Pacific tomcod
Gadidae	*Gadus macrocephalus*	Pacific cod
	Theragra chalcogramma	walleye pollock
	Poromitra curilensis	crested bigscale
Melamphaeidae	*Melamphaes lugubris*	highsnout bigscale
	Sebastolobus alascanus	shortspine thornyhead
	Sebastolobus altivelis	longspine thornyhead
Scorpaenidae	*Sebastes* sp.	rockfish unident.
Scorpaenidae	*Sebastes aleutianus*	rougheye rockfish
	Sebastes melanostictus	blackspotted rockfish
	Sebastes alutus	Pacific ocean perch
	Sebastes brevispinis	silvergray rockfish
	Sebastes ciliatus	dark rockfish
	Sebastes variabilis	dusky rockfish
	Sebastes crameri	darkblotched 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 pinniger	canary rockfish
	Sebastes polyspinis	northern rockfish
	Sebastes proriger	redstripe rockfish
	Sebastes ruberrimus	yelloweye rockfish
	Sebastes babcocki	redbanded rockfish
	Sebastes variegatus	harlequin rockfish
	Sebastes wilsoni	pygmy rockfish
	Sebastes zacentrus	sharpchin rockfish
	Sebastes borealis	shortraker rockfish
	Sebastes reedi	yellowmouth rockfish
Anoplopomatidae	*Anoplopoma fimbria*	sablefish
	Ophiodon elongatus	lingcod
	Pleurogrammus monopterygius	Atka mackerel
	Hexagrammos stelleri	whitespotted greenling
Hexagrammidae	*Hexagrammos decagrammus*	kelp greenling
Cottidae	*Cottidae*	sculpin unident.
	Icelinus borealis	northern sculpin
	Icelinus tenuis	spotfin sculpin
	Gymnocanthus galeatus	armorhead sculpin
Cottidae	*Malacocottus* sp.	
	Malacocottus zonurus	darkfin sculpin
	Hemilepidotus zapus	longfin Irish lord
	Hemilepidotus hemilepidotus	red Irish lord
	Hemilepidotus jordani	yellow Irish lord
	Triglops forficata	scissortail sculpin
	Triglops scepticus	spectacled sculpin

FAMILY	SPECIES_NAME	COMMON_NAME
	Triglops pingeli	ribbed sculpin
	Triglops macellus	roughspine sculpin
	Myoxocephalus polyacanthocephalus	great sculpin
	Myoxocephalus jaok	plain sculpin
	Leptocottus armatus	Pacific staghorn sculpin
Cottidae	*Dasycottus setiger*	spinyhead sculpin
	Psychrolutes paradoxus	tadpole sculpin
	Nautichthys oculofasciatus	sailfin sculpin
	Rhamphocottus richardsoni	grunt sculpin
	Hemitripterus bolini	bigmouth sculpin
Agonidae	*Leptagonus* sp.	
	Leptagonus frenatus	sawback poacher
Agonidae	*Bathyagonus sp.*	starsnout poacher unident.
	Bathyagonus nigripinnis	blackfin poacher
	Podothecus accipenserinus	sturgeon poacher
Agonidae	*Aspidophoroides bartoni*	Aleutian alligatorfish
	Hypsagonus quadricornis	fourhorn poacher
Cyclopteridae	*Aptocyclus ventricosus*	smooth lumpsucker
	Lethotremus muticus	docked snailfish
	Eumicrotremus birulai	round lumpsucker
	Eumicrotremus orbis	Pacific spiny lumpsucker
Cyclopteridae	*Eumicrotremus* sp.	spiny lumpsuckers
	Eumicrotremus phrynoides	toad lumpsucker
Cyclopteridae	*Liparidae*	snailfish unident.
	Liparis gibbus	variegated snailfish
	Crystallichthys cyclospilus	blotched snailfish
Cyclopteridae	*Careproctus* sp.	
	Careproctus melanurus	blacktail snailfish
	Careproctus gilberti	smalldisk snailfish
	Careproctus rastrinus	salmon snailfish
	Paraliparis dactylosus	red snailfish
	Paraliparis cephalus	swellhead snailfish
Cyclopteridae	*Paraliparis* sp.	
Cyclopteridae	*Allocareproctus* sp.	
Bathymasteridae	*Bathymaster caeruleofasciatus*	Alaskan ronquil
	Bathymaster signatus	searcher
Zoarcidae	*Zoarcidae*	eelpout unident.
Zoarcidae	*Bothrocara pusillum*	Alaska eelpout
	Lycodes cortezianus	bigfin eelpout
	Lycodapus mandibularis	pallid eelpout
	Lycodes palearis	wattled eelpout
	Lycodes concolor	ebony eelpout
	Lycodes brevipes	shortfin eelpout
	Lycodes beringi	Bering eelpout
	Lycodes pacificus	blackbelly eelpout
	Lumpenus maculatus	daubed shanny
	Lumpenus fabricii	slender eelblenny
	Lumpenus sagitta	snake prickleback
Stichaeidae	*Lumpenella longirostris*	longsnout prickleback

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

Appendix Table B-2. -- Invertebrate species encountered and identified during the 2011 Aleutian Islands bottom trawl survey.

PHYLUM	SPECIES_NAME	COMMON_NAME
PHYLUM	SPECIES_NAME	COMMON_NAME
Porifera	*Porifera*	sponge unident.
Porifera	*Suberites* sp.	
	Suberites domuncula	hermit sponge
Porifera	*Aphrocallistes vastus*	clay pipe sponge
	Mycale loveni	tree sponge
	Mycale adhaerens	smooth scallop sponge
Porifera	*Coelosphaeridae*	ginseng sponge
	Geodia mesotriaena	
Porifera	*Acanthascus* sp.	
	Halichondria panicea	barrel sponge
	Leucandra heathi	spiny vase sponge
Porifera	*Rhabdocalyptus* sp.	cloud sponge
	Mycale bellabellensis	lampshade sponge
	Phakellia cribrosa	funnel sponge
	Phakellia dalli	cat-o-nine-tails sponge
	Myxilla lacunosa	sulfur sponge
	Myxilla brunnea	soft brown sponge
	Phakellia beringensis	hat sponge
	Plicatellopsis amphispicula	firm finger sponge
Porifera	*Histodermella* sp. A	spud sponge
	Leucosolenia blanca	yellow leafy sponge
Porifera	*Tethya* sp.	ball sponge
Porifera	*Polymastia* sp.	
	Halichondria sitiens	black papilliate sponge
	Halichondria cf. sitiens	yellow green papillate sponge
Porifera	*Polymastia* sp. B	orange nipple ball sponge
Porifera	*Stylissa* sp.	drumstick sponge
	Neoesperiopsis infundibula	rough China hat sponge
	Neoesperiopsis digitata	
Porifera	*Inflatella* sp. 1	
Porifera	*Stelletta* sp.	stone sponge
	Mycalecarmia lobata	cotton ball sponge
	Polymastia fluegeli	Flugel's nippled spong
	Polymastia robusta	long nippled sponge
	Weberella bursa	pale mammilated sponge
Porifera	*Polymastia* sp. A	prolific nipple sponge
Porifera	*Vulcanella* sp. 1	fuzzy cratered sponge
Porifera	*Vulcanella* sp.	
	Scypha ciliata	hairy urn sponge
	Plakina tanaga	white convoluted sponge
Porifera	*Latrunculia* sp. A	green papillate sponge
Porifera	*Latrunculia* sp. B	smooth green sponge
Porifera	*Axinella* sp.	firm gray sponge
	Isodictya palmata	prickly pear sponge
Porifera	*Hexactinellida*	glass sponge unident.

PHYLUM	SPECIES_NAME	COMMON_NAME
Porifera	*Staurocalyptus* sp.	
	Geodinella robusta	calcareous finger sponge
	Regadrella okinoseana	lacy basket sponge
	Craniella spinosa	furry ball sponge
	Tetilla sp.	
Cnidaria	*Bonneviella* sp. A	champagne flute hydroid
Cnidaria	*Aglaophenia* sp.	
Cnidaria	*Abietinaria* sp.	
Cnidaria	*Abietinaria greenei*	bushy white hydroid
Cnidaria	*Abietinaria* sp. A	white tangled hydroid
Cnidaria	*Scyphozoa*	jellyfish unident.
	Periphylla periphylla	
	Chrysaora melanaster	
	Phacellophora camtschatica	egg yolk jelly
Cnidaria	*Aequorea* sp.	
Cnidaria	*Atolla* sp.	
	Aurelia labiata	
	Aurelia aurita	
	Chrysaora fuscescens	sea nettle
Cnidaria	*Cyanea* sp.	
	Cyanea capillata	lion's mane
Cnidaria	*Alcyonium* sp. A	pink orange mushroom coral
Cnidaria	*Gersemia* sp.	sea raspberry
Cnidaria	*Anthomastus* sp.	
Cnidaria	*Anthomastus* sp. A	red anthomastus
Cnidaria	*Primnoa* sp.	
	Primnoa pacifica	
	Primnoa willeyi	red tree coral
	Paragorgia arborea	Kamchatka coral
	Alaskagorgia aleutiana	
Cnidaria	*Pennatulacea*	sea pen or sea whip unident.
Cnidaria	*Virgularia* sp.	smoothstem seawhip
Cnidaria	*Virgulariidae*	sea whip unident.
Cnidaria	*Stylatula* sp.	slender seawhips
Cnidaria	*Protoptilum* sp.	
	Halipteris willemoesi	
	Ptilosarcus gurneyi	orange sea pen
Cnidaria	*Actiniaria*	sea anemone unident.
	Actinauge verrilli	reticulate anemone
	Paractinostola faeculenta	rough purple sea anemone
Cnidaria	*Metridium* sp.	
	Metridium farcimen	gigantic anemone
	Stomphia didemon	cowardly anemone
Cnidaria	*Stomphia* sp.	
	Urticina crassicornis	mottled anemone
	Urticina columbiana	
	Bathyphelia australis	hot dog sea anemone
	Oractis diomedeae	grape anemone
Cnidaria	*Oractis* sp.	

PHYLUM	SPECIES_NAME	COMMON_NAME
Cnidaria	*Actiniidae*	actinid sea anemones unident.
	Cribrinopsis fernaldi	chevron-tentacled anemone
	Liponema brevicornis	tentacle-shedding anemone
Cnidaria	*Actinostolidae*	
Cnidaria	*Actinistola* sp. A	
Cnidaria	*Caryophyllia* sp.	
	Caryophyllia alaskensis	Alaska cup coral
Cnidaria	*Stylasteridae*	stylasterid corals
Cnidaria	*Stylaster* sp.	
	Stylaster campylecus	
Cnidaria	*Stylaster* sp. A	undulate hydrocoral
Cnidaria	*Plumarella* sp.	
Cnidaria	*Isidella* sp.	articulated bamboo coral
Cnidaria	*Thouarella* sp.	
Cnidaria	*Fanellia* sp.	
	Fanellia compressa	
	Fanellia fraseri	
	Muriceides nigra	
Cnidaria	*Amphilaphis* sp.	
Cnidaria	*Amphilaphis* sp. 2	
Cnidaria	*Muriceides* sp. cf. *cylindrica*	
Cnidaria	*Plumarella* sp. 2	
Ctenophora	*Ctenophora*	comb jelly unident.
Ctenophora	*Beroe* sp.	
Annelida	*Polychaeta*	polychaete worm unident.
	Eunice valens	
Annelida	*Aphroditidae*	sea mouse unident.
Annelida	*Aphrodita* sp.	
Annelida	*Aphrodita negligens*	
	Halosydna brevisetosa	
	Euphrosine multibranchiata	
Annelida	*Polynoidae*	scale worm unident.
Annelida	*Eunoe* sp.	
	Eunoe nodosa	giant scale worm
	Eunoe depressa	depressed scale worm
Annelida	*Serpulidae*	serpulid worm
	Serpula columbiana	
Annelida	*Serpula* sp.	
	Notostomum cyclostomum	striped sea leech
Sipuncula	*Sipuncula*	peanut worm unid.
Rhynchocoela	*Nemertea*	nemertean worm unident.
Rhynchocoela	*Emplectonema* sp.	
Arthropoda	*Amphipoda*	amphipod unident.
Arthropoda	*Isopoda*	isopod unident.
	Rocinella angusta	
Arthropoda	*Thoracica*	barnacle unident.
Arthropoda	*Balanus* sp.	
	Balanus evermanni	giant barnacle
Arthropoda	*Pandalus* sp.	

PHYLUM	SPECIES_NAME	COMMON_NAME
	Pandalus danae	dock shrimp
	Pandalus jordani	ocean shrimp
	Pandalus eous	Alaskan pink
	Pandalus tridens	yellowleg pandalid
	Pandalus platyceros	spot shrimp
	Pandalus goniurus	humpy shrimp
	Pandalus hypsinotus	coonstripe shrimp
	Pandalopsis dispar	sidestripe shrimp
	Eualus biunguis	deepsea eualid
	Eualus suckleyi	shortscale eualid
	Lebbeus groenlandicus	spiny lebbeid
Arthropoda	*Crangon* sp.	
	Crangon communis	twospine crangon
	Crangon dalli	ridged crangon
	Crangon septemspinosa	sevenspine bay shrimp
Arthropoda	*Argis* sp.	
	Argis dentata	Arctic argid
	Sclerocrangon boreas	sculptured shrimp
	Argis levior	Nelson's argid
	Argis ovifer	split-eye argid
	Pasiphaea pacifica	Pacific glass shrimp
	Notostomus japonicus	spinyridge shrimp
	Cancer branneri	
	Cancer magister	Dungeness crab
	Cancer oregonensis	Oregon rock crab
	Pinnixa occidentalis	pea crab
Arthropoda	*Majidae*	spider crabs unident.
	Oregonia gracilis	graceful decorator crab
	Chorilia longipes	Longhorned decorator crab
	Chionoecetes tanneri	grooved Tanner crab
	Chionoecetes bairdi	Tanner crab
	Hyas lyratus	Pacific lyre crab
	Telmessus cheiragonus	helmet crab
Arthropoda	*Paguridae*	hermit crab unident.
Arthropoda	*Pagurus* sp.	
	Pagurus brandti	sponge hermit
	Pagurus aleuticus	Aleutian hermit
	Labidochirus splendescens	splendid hermit
	Pagurus confragosus	knobbyhand hermit
	Pagurus cornutus	
	Pagurus kennerlyi	bluespine hermit
	Pagurus trigonocheirus	fuzzy hermit crab
	Pagurus beringanus	Bering hermit
	Pagurus ochotensis	Alaskan hermit
	Elassochirus tenuimanus	widehand hermit crab
	Pagurus capillatus	hairy hermit crab
	Elassochirus cavimanus	purple hermit
	Elassochirus gilli	Pacific red hermit
	Lopholithodes foraminatus	box crab

PHYLUM	SPECIES_NAME	COMMON_NAME
	Lopholithodes mandtii	
Arthropoda	*Acantholithodes* sp.	
Arthropoda	*Acantholithodes hispidus*	fuzzy crab
	Lithodes aequispinus	golden king crab
	Hapalogaster grebnitzkii	
	Rhinolithodes wosnessenskii	rhinoceros crab
	Paralithodes camtschaticus	red king crab
	Placetron wosnessenskii	scaled crab
	Pugettia gracilis	graceful kelp crab
	Munida quadrispina	pinchbug
Arthropoda	*Pycnogonida*	sea spider unident.
Arthropoda	*Pycnogonum* sp.	
Mollusca	*Neomenia* sp.	
Mollusca	*Polyplacophora*	chiton unident.
	Cryptochiton stelleri	giant Pacific chiton
Mollusca	*Lepidozona* sp.	
Mollusca	*Nudibranchia*	nudibranch unident.
	Tochuina tetraquetra	giant orange tochui
Mollusca	*Dendronotus* sp.	
Mollusca	*Tritonia* sp.	
	Tritonia festiva	festive Tritonia
	Tritonia diomedea	rosy tritonia
Mollusca	*Chlamylla* sp.	
	Anisodoris nobilis	Pacific sea lemon
	Anisodoris lentiginosa	mottled pale sea-lemon
Mollusca	*Archidoris* sp.	Archidoris nudibranch
	Archidoris odhneri	white night doris
Mollusca	*Diaulula* sp. A	
	Cranopsis major	great puncturella
	Diadora aspera	
Mollusca	*Gastropoda*	snail unident.
Mollusca	*Cryptonatica* sp.	
Mollusca	*Natica* sp.	
	Cryptonatica	Aleutian moonsnail
	Cryptonatica	rusty moonsnail
	Nucella lamellosa	frilled dogwinkle
	Euspira lewisii	
Mollusca	*Lamellaria* sp.	
Mollusca	*Colus* sp.	
	Colus halli	shrew whelk
	Japelion aleutica	
Mollusca	*Japelion* sp. A	
Mollusca	*Pyrulofusus* sp.	
	Pyrulofusus dexius	
Mollusca	*Volutopsius* sp.	
	Pyrulofusus deformis	warped whelk
	Pyrulofusus harpa	left-hand whelk
Mollusca	*Beringius* sp.	
	Beringius kennicottii	

PHYLUM	SPECIES_NAME	COMMON_NAME
	Beringius beringii	
Mollusca	*Beringius* sp. B	two-channeled Beringius
Mollusca	*Neptunea* sp.	
	Neptunea amianta	white neptune
	Neptunea pribiloffensis	Pribilof whelk
	Neptunea lyrata	lyre whelk
	Neptunea ventricosa	fat whelk
Mollusca	*Neptunea* sp. E	
Mollusca	*Plicifusus* sp.	
Mollusca	*Aforia circinata*	keeled aforia
	Fusitriton oregonensis	Oregon triton
	Bathybembix bairdii	
	Cidarina cidaris	
Mollusca	*Buccinum* sp.	
	Buccinum oedematum	swollen whelk
	Buccinum plectrum	sinuous whelk
	Buccinum scalariforme	ladder whelk
Mollusca	*Arctomelon* sp.	
	Arctomelon stearnsii	Alaska volute
	Arctomelon tamikoae	
Mollusca	*Arctomelon* sp. cf. *stearnsii*	
	Olivella beatica	beatic dwarf olive
Mollusca	*Velutina* sp.	
Mollusca	*Bivalvia*	bivalve unident.
	Modiolus modiolus	northern horsemussel
Mollusca	*Mytilus* sp.	
Mollusca	*Chlamys* sp.	
	Chlamys rubida	reddish scallop
	Patinopecten caurinus	weathervane scallop
	Panopea abrupta	Pacific geoduck
Mollusca	*Yoldia* sp.	
	Yoldia thraciaeformis	broad yoldia
	Yoldia hyperborea	northern yoldia
	Nuculana pernula	northern nutclam
	Limopsis akutanica	Akutan limops
	Musculus discors	discordant mussel
Mollusca	*Astarte* sp.	
	Astarte arctica	
	Cyclocardia ovata	
Mollusca	*Clinocardium sp.*	
	Clinocardium nuttallii	Nuttall cockle
	Clinocardium ciliatum	hairy cockle
	Clinocardium californiense	California cockle
	Serripes groenlandicus	Greenland cockle
	Serripes notabilis	oblique smoothcockle
Mollusca	*Mya* sp.	
	Lucinoma annulatum	ringed lucine
	Pododesmus macrochisma	Alaska falsejingle
Mollusca	*Octopodidae*	octopus unident.

PHYLUM	SPECIES_NAME	COMMON_NAME
	Benthoctopus leioderma	smoothskin octopus
	Opisthoteuthis californiana	flapjack devilfish
	Octopus dofleini	giant octopus
Mollusca	*Benthoctopus* sp.	
	Vampyroteuthis infernalis	vampire squid
Mollusca	*Decapodiformes*	squid unident.
	Rossia pacifica	eastern Pacific bobtail
	Loligo opalescens	California market squid
Mollusca	*Gonatus* sp.	
	Berryteuthis magister	magistrate armhook squid
Mollusca	*Gonatopsis* sp.	
	Gonatopsis borealis	boreopacific armhook squid
	Moroteuthis robusta	robust clubhook squid
	Chiroteuthis calyx	
	Octopoteuthis deletron	
	Histioteuthis dofleini	
Bryozoa	*Bryozoa*	bryozoan unident.
	Flustra serrulata	leafy bryozoan
	Flustrellidra corniculata	
Bryozoa	*Alcyonidium pedunculatum*	
Bryozoa	*Alcyonidium* sp. A	medusa bryozoan
Bryozoa	*Alcyonidium* sp.	
	Myriozoum subgracile	
	Porella compressa	flattened bryozoan
	Rhamphostomella costata	ribbed bryozoan
	Hippodiplosia insculpta	
Bryozoa	*Microporina* sp.	
Bryozoa	*Dendrobeania* sp.	
Brachiopoda	*Brachiopoda*	lampshell unident.
	Terebratalia transversa	common brachiopod
Brachiopoda	*Frieleia halli*	
	Terebratulina unguicula	snakeshead brachiopod
	Laqueus californianus	California lamp shell
Echinodermata	*Asteroidea*	sea star unident.
Echinodermata	*Evasterias* sp.	
	Evasterias troschelii	mottled sea star
	Evasterias echinosoma	giant sea star
	Orthasterias koehleri	redbanded sea star
	Leptasterias hylodes	Aleutian sea star
	Pycnopodia helianthoides	sunflower sea star
	Stylasterias forreri	long-rayed star
	Tarsaster alaskanus	
	Lethasterias nanimensis	blackspined sea star
Echinodermata	*Lethasterias* sp.	
	Pedicellaster magister	majestic sea star
Echinodermata	*Pisaster* sp.	
	Poraniopsis inflata	thorny sea star
Echinodermata	*Henricia* sp.	
	Henricia sanguinolenta	sanguine sea star

PHYLUM	SPECIES_NAME	COMMON_NAME
	Henricia aspera	ridged blood star
	Henricia leviuscula	blood sea star
	Henricia longispina	
	Henricia spiculifera	spiny Henricia
	Odontohenricia fisheri	
Echinodermata	*Odontohenricia* sp.	
Echinodermata	*Odontohenricia* sp. B	
	Leptasterias katharinae	
	Leptasterias arctica	
Echinodermata	*Leptasterias* sp.	
	Gephyreaster swifti	Swift's sea star
Echinodermata	*Pseudarchaster* sp.	
	Pseudarchaster alascensis	
Echinodermata	*Hippasteria* sp.	
	Hippasteria californica	
	Hippasteria spinosa	spiny red sea star
	Pseudarchaster parelii	scarlet sea star
Echinodermata	*Mediaster* sp.	
	Mediaster tenellus	
	Mediaster aequalis	vermilion sea star
Echinodermata	*Ceramaster* sp.	
	Ceramaster japonicus	red bat star
	Ceramaster patagonicus	orange bat sea star
	Ceramaster clarki	
	Ceramaster stellatus	
	Luidia foliolata	sand sea star
Echinodermata	*Solaster* sp.	
	Solaster endeca	northern sun sea star
	Solaster dawsoni	morning sun sea star
	Solaster stimpsoni	striped sun sea star
Echinodermata	*Solaster* sp. A	
Echinodermata	*Solaster* sp. E	Kessler sun star
Echinodermata	*Solaster* sp. F	Fisher sun star
Echinodermata	*Solaster* sp. G	ocher sun star
Echinodermata	*Crossaster* sp.	
	Crossaster borealis	grooved sea star
	Crossaster papposus	rose sea star
	Heterozonias alternatus	cannonball sun star
Echinodermata	*Lophaster* sp.	
	Lophaster vexator	crested star
Echinodermata	*Pteraster* sp.	
	Pteraster tesselatus	
	Pteraster jordani	
	Pteraster militaris	wrinkled star
	Pteraster marssipus	
	Pteraster obscurus	obscure sea star
	Diplopteraster multipes	pincushion sea star
	Asterias amurensis	purple-orange sea star
	Ctenodiscus crispatus	common mud star

PHYLUM	SPECIES_NAME	COMMON_NAME
	Leptychaster pacificus	
	Leptychaster arcticus	North Pacific sea star
Echinodermata	*Dipsacaster* sp.	
	Dipsacaster borealis	northern sea star
Echinodermata	*Cheiraster* sp. A	Aleutian fragile sea star
	Cheiraster dawsoni	fragile sea star
	Nearchaster variabilis	
	Strongylocentrotus droebachiensis	green sea urchin
Echinodermata	*Strongylocentrotus* sp.	
	Strongylocentrotus pallidus	white sea urchin
Echinodermata	*Allocentrotus fragilis*	orange-pink sea urchin
	Brisaster latifrons	heart urchin
	Echinarachnius parma	parma sand dollar
Echinodermata	*Florometra* sp.	
	Florometra inexpectata	
	Florometra asperrima	common northern feather star
Echinodermata	*Ophiuroidea*	brittlestarfish unident.
	Gorgonocephalus eucnemis	basketstar
Echinodermata	*Gorgonocephalus* sp.	
Echinodermata	*Asteronyx* sp.	
	Asteronyx loveni	serpent sea star
Echinodermata	*Astrochele* sp. A	
Echinodermata	*Astrochele* sp.	
	Ophiura sarsi	notched brittlestar
	Amphiophiura superba	
	Stegophiura ponderosa	
	Ophiacantha cataleimmoida	
Echinodermata	*Ophiopholis* sp.	
	Ophiopholis longispina	
	Ophiopholis aculeata	ubiquitous brittle star
Echinodermata	*Ophiolebes* sp.	
Echinodermata	*Holothuroidea*	sea cucumber unident.
	Parastichopus leukothele	giant orange cucumber
	Parastichopus californicus	California sea cucumber
	Pseudostichopus mollis	sandy sea cucumber
Echinodermata	*Molpadia* sp.	
	Molpadia intermedia	sweet sea potato
	Pentamera lissoplaca	crescent sea cucumber
Echinodermata	*Bathyplotes* sp.	
Echinodermata	*Cucumaria* sp.	
	Cucumaria fallax	sea football
	Cucumaria frondosa	
Echinodermata	*Psolus* sp.	
Echinodermata	*Psolus* sp. A	
	Psolus squamatus	whitescaled sea cucumber
Echinodermata	*Synallactes* sp. A	
Echinodermata	*Synallactes* sp.	
	Synallactes challengeri	

PHYLUM	SPECIES_NAME	COMMON_NAME
Chordata	*Ascidiacea*	tunicate unident.
Chordata	*Ascidian n.* sp. A	cow-eye tunicate
Chordata	*Thaliacea*	salp unident.
	Thetys vagina	common salp
Chordata	*Styela* sp.	
	Styela rustica	sea potato
	Halocynthia igaboja	
	Halocynthia aurantium	sea peach
	Cnemidocarpa finmarkiensis	broad base tunicate
Chordata	*Distaplia* sp.	
	Distaplia occidentalis	
	Distaplia smithi	
	Aplidium californicum	
Chordata	*Amaroucium soldatovi*	
Chordata	*Aplidium* sp. A	sea glob
	Aplidium new species a	orange aplidium
	Ascidia paratropa	glassy tunicate
	Halocynthia hispidus	hairy tunicate
	Polyclinum planum	
	Molgula grifithsii	sea grape

APPENDIX C

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

Species	Sex	a	b	n
Arrowtooth flounder	Male	4.316E-06	3.104	357
	Female	3.178E-06	3.164	546
	Both	3.191E-06	3.161	906
Atka mackerel	Male	1.998E-06	3.324	108
	Female	2.008E-05	2.926	137
	Both	1.528E-05	2.979	245
Blackspotted rockfish	Male	6.086E-06	3.153	142
	Female	6.698E-06	3.139	120
	Both	6.393E-06	3.146	262
Pacific cod	Male	5.284E-06	3.104	395
	Female	3.999E-06	3.150	435
	Both	5.284E-06	3.104	830
Dover sole	Male	5.003E-06	3.110	218
	Female	4.123E-06	3.145	255
	Both	4.228E-06	3.140	473
Dusky rockfish	Male	1.155E-05	3.063	392
	Female	7.792E-06	3.127	458
	Both	9.618E-06	3.092	850
Flathead sole	Male	1.383E-06	3.317	279
	Female	1.238E-06	3.338	376
	Both	1.275E-06	3.332	674
Giant grenadier	Male	7.205E-04	2.699	62
	Female	1.427E-03	2.576	113
	Both	1.124E-03	2.618	175
Northern rockfish	Male	2.113E-05	2.945	372
	Female	1.333E-05	3.024	487
	Both	2.113E-05	2.945	859
Northern rock sole	Male	4.182E-06	3.170	171
	Female	3.129E-06	3.225	240
	Both	3.472E-06	3.205	411
Walleye pollock	Male	4.391E-06	3.086	711
	Female	5.119E-06	3.058	945
	Both	4.208E-06	3.093	1674
Pacific ocean perch	Male	1.028E-05	3.048	1184
	Female	1.324E-05	3.002	1187
	Both	1.103E-05	3.035	2376
Rex sole	Male	6.266E-07	3.398	231
	Female	4.639E-07	3.454	292
	Both	5.002E-07	3.439	523
Rougheye rockfish	Male	1.033E-05	3.074	280
	Female	1.266E-05	3.041	267
	Both	1.140E-05	3.058	547
Sablefish	Male	6.643E-06	3.053	240
	Female	3.197E-06	3.169	196
	Both	4.654E-06	3.110	436
Sharpchin rockfish	Male	1.151E-05	3.035	53
	Female	4.405E-06	3.210	87
	Both	6.009E-06	3.155	140
Shortraker rockfish	Male	1.270E-05	3.040	217
	Female	9.940E-06	3.084	212
	Both	1.140E-05	3.060	429
Southern rock sole	Male	7.665E-06	3.067	143
	Female	4.516E-06	3.167	240
	Both	4.670E-06	3.159	383
Shortspine thornyhead	Male	3.302E-06	3.225	171
	Female	2.753E-06	3.257	194
	Both	2.857E-06	3.250	381

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