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Results of the Acoustic-Trawl Survey of Walleye Pollock (*Gadus chalcogrammus*) in the Gulf of Alaska, June-August 2013 (DY2013-07)

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Results of the Acoustic-Trawl Survey of Walleye Pollock (*Gadus chalcogrammus*) in the Gulf of Alaska, June-August 2013 (DY2013-07)

by

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ABSTRACT

Scientists from the Midwater Assessment and Conservation Engineering (MACE) Program of the Alaska Fisheries Science Center's (AFSC) Resource Assessment and Conservation Engineering (RACE) Division conducted an acoustic-trawl (AT) stock assessment survey of portions of the Gulf of Alaska (GOA) continental shelf to estimate the distribution and abundance of walleye pollock (*Gadus chalcogrammus*) during summer of 2013. Similar MACE surveys were conducted in the GOA during summers 2003, 2005, and 2011. The 2013 survey covered the entire shelf from the Islands of Four Mountains to Yakutat Bay including many associated bays and troughs. Greater numbers of age-1 walleye pollock were seen throughout the survey area in 2013 compared to previous surveys, particularly in the Shumagin Islands area, Shelikof Strait, Barnabas Trough, and on the continental shelf between Kodiak Island and Prince William Sound. The biomass estimate for the entire survey area was 884,049 metric tons (t). Most walleye pollock were located in Shelikof Strait (48% of entire survey biomass). Large quantities of pollock were also detected on the continental shelf (31% of entire survey biomass), with approximately half located in the North Pacific Fishery Management Council's (NPFMC) management area 630. Backscatter was attributed to other species where possible. Biomass estimates were calculated for Pacific ocean perch (*Sebastes alutus*, 243,536 t) and capelin (*Mallotus villosus*, 493,106 t). A relative abundance distribution was estimated for euphausiids (primarily consisting of *Thysanoessa inermis*, but also including *T. spinifera*, *T. ruschii*, and *Euphausia pacifica*).

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INTRODUCTION

Scientists from the Midwater Assessment and Conservation Engineering (MACE) Program of the Alaska Fisheries Science Center's (AFSC) Resource Assessment and Conservation Engineering (RACE) Division routinely conduct acoustic-trawl (AT) stock assessment surveys to estimate the distribution and abundance of walleye pollock (*Gadus chalcogrammus*) in Alaska waters. Surveys are conducted annually in the Gulf of Alaska (GOA) during late winter and early spring to assess pre-spawning aggregations, but have infrequently been conducted in this region during the summer. Limited summer survey efforts consist of multi-year studies in Chiniak and Barnabas Troughs east of Kodiak Island to explore species spatial distribution relative to environmental conditions (Hollowed et al. 2007, Logerwell et al. 2007) and the effect of commercial fishing on walleye pollock abundance (Walline et al. 2012, Wilson et al. 2003). Expanded shelf wide AT surveys have been carried out in the GOA in summer 2003, 2005, and 2011. However, these surveys were limited in their scope, and were concluded short of original plans due to budgetary restrictions in 2003, and ship mechanical issues in 2005 and 2011. The AFSC leadership decided that the AT summer survey should return to the Bering Sea for four consecutive years beginning in 2007. Thus, summer GOA surveys were not conducted between 2005 and 2011. The MACE Program was able to maintain the originally-proposed biennial cycle of odd years in the GOA and consequently resumed the GOA summer shelf survey in 2013. This survey included several areas covered in all prior summer surveys (Shelikof Strait, Barnabas Trough, Chiniak Trough) and also had the most extensive coverage of the continental shelf and associated bays and troughs since 2003. This report presents the distribution and abundance of walleye pollock, Pacific ocean perch (POP; *Sebastes alutus*), capelin (*Mallotus villosus*), and euphausiids (primarily consisting of *Thysanoessa inermis*, but also including *T. spinifera*, *T. ruschii*, and *Euphausia pacifica*) based on the summer AT survey conducted between June and August 2013. Acoustic system calibration and physical oceanographic results are also presented.

METHODS

The survey (cruise DY2013-07) was conducted between 8 June and 9 August on the Gulf of Alaska shelf from 50-1,000 m depth extending from the Islands of Four Mountains to Yakutat Bay. For this report the area referred to as the "shelf" includes transects that are roughly perpendicular to the continental shelf depth contours and extend in a general north-south direction from inshore bottom depths of ≥50 m to upper continental slope bottom depths of >1,000 m. Smaller surveys were conducted in several bays and around islands including: Sanak Trough, Morzhovoi Bay, Pavlof Bay, the Shumagin Islands area (including Renshaw Point, Unga Strait, and West Nagai Strait), Mitrofania Island, Nakchamik Island, Shelikof Strait, Alitak Bay, Barnabas Trough, Chiniak Trough, Marmot Bay, Prince William Sound, Kayak Island Trough, and Yakutat Trough. Survey itineraries and scientific personnel are listed in Appendices I and II. All activities were conducted aboard the NOAA ship *Oscar Dyson*, a 64-m stern trawler equipped for fisheries and oceanographic research. The survey followed established AT survey methods as specified in NOAA protocols for fisheries acoustics surveys and related sampling[1].

Acoustic Equipment, Calibration, and Data Collection

Acoustic measurements were collected with a Simrad EK60 scientific echo sounding system (Simrad 2008, Bodholt and Solli 1992). System electronics were housed inside the vessel in a permanent laboratory space dedicated to acoustics. Five split-beam transducers (18-, 38-, 70-, 120-, and 200-kHz) were mounted on the bottom of the vessel's retractable centerboard, which extended 9 m below the water surface. A Simrad ME70 multibeam sonar (Simrad 2007, Trenkel et al. 2008) was mounted on the hull 10 m forward of the centerboard at a depth of 6 m below the water surface. Multibeam data were collected only during nighttime operations using the Simrad ME70 in a 31-beam configuration (Weber et al. 2013). The ME70 sampling rate was

[1] National Marine Fisheries Service (NMFS) 2013. NOAA protocols for fisheries acoustics surveys and related sampling (Alaska Fisheries Science Center), 23 p. Prepared by Midwater Assessment and Conservation Engineering Program, Alaska Fish. Sci. Center, Natl. Mar. Fish. Serv., NOAA. Available online: http://www.afsc.noaa.gov/RACE/midwater/AFSC%20AT%20Survey%20Protocols_Feb%202013.pdf

synchronized with that of the EK60 to eliminate interference between the two instruments, resulting in an effective sampling interval of 1.35 seconds during these nighttime mini-surveys.

Standard sphere acoustic system calibrations were conducted to measure acoustic system performance. During calibrations, the ship was anchored at the bow and stern. A tungsten carbide sphere (38.1 mm diameter) suspended below the centerboard-mounted transducers was used to calibrate the 38-, 70-, 120-, and 200-kHz systems. The tungsten carbide sphere was replaced with a 64 mm diameter copper sphere for the calibration of the 18-kHz system. After each sphere was centered on the acoustic axis, split-beam target-strength and acoustic measurements were collected to estimate transducer gains following methods of Foote et al. (1987). Transducer beam characteristics were modeled by moving each sphere through a grid of angular coordinates and collecting target-strength data using the ER60's calibration utility (Simrad 2008). Acoustic system gain and beam pattern parameters measured during the June and August calibrations were used to provide a final parameter set for data analysis.

Acoustic data were logged at the five split-beam frequencies using ER60 software (v. 2.2.1). Acoustic telegram data were also logged with Myriax EchoLog 500 (v. 4.70.1.14256) software as a backup. Results presented in this report are based on 38-kHz acoustic raw data using a post-processing S_v threshold of –70 decibels (dB re $1m^{-1}$). Acoustic measurements were collected at 0.5 ms pulse length and a ping interval of 1 second from 16 m below the surface to within 0.5 m of the sounder-detected bottom or a maximum of 1,000 m in deep water. Data were analyzed using Myriax Echoview post-processing software (Version 5.3.36.22078).

Trawl Gear and Oceanographic Equipment

Midwater and near-bottom acoustic backscatter was sampled using an Aleutian Wing 30/26 Trawl (AWT). This trawl was constructed with full-mesh nylon wings, and polyethylene mesh in the codend and aft section of the body. The headrope and footrope each measured 81.7 m (268 ft). Mesh sizes tapered from 325.1 cm (128 in) in the forward section of the net to 8.9 cm (3.5 in) in the codend, which was fitted with a single 12 mm (0.5 in) codend liner. On or near-bottom backscatter, and some midwater backscatter, was also sampled with a poly Nor'eastern (PNE)

bottom trawl, which is a 4-panel high-opening trawl equipped with roller gear and constructed with stretch mesh sizes that range from 13 cm (5 in) in the forward portion of the net to 8.9 cm (3.5 in) in the codend. The PNE codend was fitted with either a 12 mm (0.5 in) codend liner (10 hauls between haul numbers 1-22, 169-203) or a 32 mm (1.25 in) codend liner (12 hauls between haul numbers 23-168; total of 12 PNE hauls). The PNE hauls with the larger mesh liner were only used for length keys in Pavlof Bay and outer Alitak Bay. Both the AWT and PNE were fished with 5 m^2 Fishbuster trawl doors each weighing 1,089 kg. Average trawling speed was approximately 1.7 m/sec (3.3 knots).

Vertical net openings and depths were monitored with either a Simrad FS70 third-wire netsonde, or a Furuno (CN-24) acoustic-link netsonde attached to the headrope. The vertical net opening for the AWT during fishing ranged from 14.0 to 27.9 m (46 to 92 ft) and averaged 21.8 m (72 ft). The PNE vertical mouth opening during fishing ranged from 5.0 to 8.0 m (16 to 26 ft) and averaged 6.8 m (22 ft). Detailed trawl gear specifications are described in Guttormsen et al. (2010).

A small mesh pocket net was sewn into the bottom panel of the AWT trawl approximately 26 m forward of the codend. Pocket net catch data were recorded independently from the catch in the codend. These data are being used in ongoing work to estimate the trawl selectivity of the AWT and to gauge escapement of juvenile pollock and other small fishes (Williams et al. 2011). Pocket net data were not used to adjust trawl codend catches or other estimates reported here. The AWT trawl also included a Cam-Trawl stereo imager (Williams et al. 2010) attached to the starboard panel forward of the codend. The Cam-Trawl was used to capture stereo images for species identification and length measurement of individual fish as they pass through the net toward the codend. Images are viewed and annotated using procedures described in Williams et al. (2010).

A Methot trawl (Methot 1986) was used to target midwater aggregations of macro-zooplankton, age-0 walleye pollock, and other larval fishes. The Methot trawl has a rigid square frame measuring 2.3 m on each side, which formed the mouth of the net. Mesh sizes were 2 by 3 mm in the body of the net and 1 mm in the codend. A 1.8 m dihedral depressor was used to generate

additional downward force. A calibrated General Oceanics flowmeter was attached to the mouth of the Methot trawl; the number of flowmeter revolutions, area of the net mouth opening, and the total time the net was in the water was used to determine the volume of water filtered during hauling. The trawl was attached to a single cable fed through a stern-mounted A-frame. Real-time trawl depths were monitored using a Simrad ITI acoustic link temperature-depth sensor attached to the bottom of the Methot frame. Average trawling speed for the Methot net was approximately 1.2 m/sec (2.3 knots).

On several occasions when verification by trawling was not possible (i.e., rough bottom topography), a stereo-video drop camera designed to observe near-bottom fish and benthic habitat was used to examine the composition of acoustic targets ('survey cam' in Table 5). The camera was lowered to the target depth while the ship was on station drifting slowly (~0.5 knots) over the area of interest for approximately 10 minutes. After the camera was recovered, images were analyzed to determine relative abundance of the taxa.

Physical oceanographic data collected during the cruise included temperature profiles obtained with a Sea-Bird Electronics temperature-depth probe (SBE-39) attached to the AWT and PNE trawl headrope and the bottom of the Methot frame, and conductivity-temperature-depth (CTD) observations collected with a Sea-Bird CTD (SBE 9-11plus) system at calibration sites, at predetermined stations, and at nightly opportunistic sites. Sea surface temperature data were also measured using the ship's Furuno T-2000 sea surface temperature system located mid-ship, approximately 1.4 m below the surface. These and other environmental data were recorded using the ship's Scientific Computing Systems (SCS). Surface water temperatures were averaged over each 1 nautical mile (nmi) along the cruise track.

Survey Design

The survey design consisted of a series of parallel line transects, except in areas where it was necessary to reorient tracklines to maintain a perpendicular alignment to the isobaths and work around landmasses. In Deadman Bay within Alitak Bay, and in Izhut Bay, zig-zag transects were used because of the narrowness of the bays. A random start position was generated for the first

transect in all areas. Acoustic and trawl data used in abundance estimation were collected during daylight hours (generally between 05:30 and 23:00 local time during the survey). Nighttime activities included collection of additional physical oceanographic data, and work with other specialized sampling devices (e.g., Simrad ME70 multibeam/EK60 sonar mini-grids for characterizing bottom type and rockfish abundance together with associated drop camera deployments).

Trawl hauls were conducted to classify observed backscatter by species and size composition and to collect specimens of walleye pollock. Walleye pollock were sampled to determine sex, fork length (FL), body weight, age, gonad maturity, and pre-spawner ovary weights. Walleye pollock (except age-0 fish) and fishes other than capelin were measured to the nearest 1-mm fork length (FL) using an electronic measuring board (Towler and Williams 2010). Capelin and age-0 walleye pollock were measured to the nearest millimeter standard length (SL). When large numbers of juveniles mixed with adults were encountered in a haul, the predominant size groups were subsampled separately (e.g., age-1 vs. adults). For each trawl haul, sex and length measurements were collected for up to 500 randomly sampled individuals, and up to an additional 60 individuals were sampled for body weight, maturity, and age. Maturity was determined by visual inspection and was categorized as immature, developing, pre-spawning, spawning, or post-spawning[2]. An electronic motion-compensating scale (Marel M60) was used to weigh individual fish to the nearest 2 g. For age determinations, walleye pollock otoliths were collected and stored in a 50% glycerin/thymol-water solution. The otoliths were then processed by scientists in the AFSC's Age and Growth Program to determine individual fish ages following the survey. Trawl station and biological measurements were electronically recorded in the Catch Logger for Acoustic Midwater Surveys (CLAMS) database.

The catch from a Methot trawl haul was transferred to a large bucket. Large organisms such as jellyfish and small fishes were removed, identified, weighed, and measured for length. The remainder of the catch was placed on a 1-mm mesh screen and weighed. A subsample of the zooplankton mixture was then weighed and sorted into broad taxonomic groups, while a second

[2] ADP Codebook. 2013. RACE Division, AFSC, NMFS, NOAA; 7600 Sand Point Way NE, Seattle, WA 98115. Available online: http://www.afsc.noaa.gov/RACE/groundfish/adp_codebook.pdf.

subsample was weighed and preserved in a 10% buffered formalin solution for more detailed enumeration at the Polish Sorting Center in Szczecin, Poland.

Data Analysis

The bottom depth was estimated as the mean of echo sounder-detected bottom depths based on the five frequencies (Jones et al. 2011). Acoustic backscatter was recorded between depths of 16 m below the surface to 0.5 m above the bottom (except where the bottom exceeded the 1,000 m lower limit of data collection). Acoustic data were binned at 0.5 nmi horizontal by 10-m vertical resolution. Acoustic backscatter was assigned to species based primarily on trawl catch composition. If trawl verification of backscatter species composition was not possible, we assigned backscatter based on Cam-Trawl or drop camera images, multi-frequency response (De Robertis et al. 2010), school morphology (e.g., rockfish tend to group together to form "haystacks" near the seafloor), or experience from previous summer and winter cruises in the area (e.g., POP are assumed more adept at avoiding the trawl than pollock over the shelf break).

Walleye pollock length compositions were combined from trawl hauls into regional length strata based on geographic proximity, similarity of length composition, and backscatter characteristics. Mean fish weight-at-length for each length interval (nearest 1.0 cm) was estimated from the trawl information when six or more walleye pollock were measured for that length interval; otherwise, weight-at-length was estimated using a linear regression of the natural logs of all length-weight data (De Robertis and Williams 2008).

Walleye pollock abundance was estimated by dividing the acoustic measurements of area backscattering coefficient by the mean backscattering cross section of pollock (MacLennan et al. 2002) using an acoustic target strength (TS) to length relationship of $TS = 20 \log_{10}(FL)-66$ (Traynor 1996). Numbers and biomass for each regional length stratum were estimated as in Honkalehto et al. (2008). Total abundance was estimated by summing the stratum estimates. Biomass estimates were also calculated for capelin and POP from select areas based on similar methodologies using a TS to length relationship for capelin of $TS = 20 \log_{10}(FL)-70.3$

(Guttormsen and Wilson 2009) and the generic physoclist fish TS to length relationship for POP of TS = 20 $\log_{10}$(FL)-67.5 (Foote 1987).

Relative errors for the acoustic-based estimates were derived using a one-dimensional (1-D) geostatistical method (Petitgas 1993, Williamson and Traynor 1996, Walline 2007). "Relative estimation error" is defined as the ratio of the square root of the estimation variance to the product of the biomass estimate (kg) and the transect spacing for each survey area (nmi):

$$Relative\ estimation\ error = \frac{\sqrt{variance}}{biomass * transect\ spacing}$$

Relative estimation error for the entire survey (among *n* survey areas with different transect spacings) was computed by summing the estimation variance for each area *j* and then dividing by the sum of the products of the biomass and transect spacing for each area, assuming independence among estimation errors for each survey area (Rivoirard et al. 2000):

$$Relative\ estimation\ error_{survey} = \frac{\sqrt{\sum_{j=1}^{n} variance_j}}{\sum_{j=1}^{n} biomass_j * transect\ spacing_j}$$

For regions containing several different transect spacings, the estimation variance is summed for each unique transect spacing area.

Geostatistical methods were used for computation of estimation error because they account for the observed spatial structure in the fish distribution. These errors quantify only transect sampling variability of the acoustic data (Rivoirard et al. 2000). Other sources of error (e.g., target strength, trawl sampling) were not evaluated.

Euphausiid backscatter was isolated by comparing the relative frequency response at 18-, 38-, 120-, and 200-kHz, following the techniques of Ressler et al. (2012). These techniques have been applied successfully in the eastern Bering Sea and are, at this stage, still experimental in the

GOA pending further validation work to be conducted in conjunction with the survey results reported here. Euphausiid backscatter at 120-kHz was identified using custom built programs in both Echoveiw (Myriax Software, Hobart, Tasmania, Australia) and Matlab (Mathworks, Natick, Massachusetts, USA). Methot trawl catches were used to confirm the presence of euphausiids in the water column and help to ground-truth the multi-frequency acoustic analyses.

RESULTS and DISCUSSION

Acoustic System Calibration

An acoustic system calibration was conducted at the beginning of the survey and another at the end of survey (Table 1). The 38-kHz transducer showed no significant differences in gain parameters or beam pattern characteristics between calibrations, confirming that the acoustic system was stable throughout the cruise. Acoustic system settings for data collection were based on results from the 8 June calibration. Final results were scaled with a linearized average of the 8 June and 7 August integration gains. A total of 35.8% of the total backscatter for the entire GOA survey was classified as pollock.

Walleye Pollock Weight, Length, and Age

Weight at length data were collected from 2,599 walleye pollock during the GOA survey (Table 2). Weight at length was observed to be similar throughout the surveyed areas, and so fish from all areas were grouped into one weight at length key. Walleye pollock weight at length during the 2013 GOA survey was similar to prior summer surveys (Fig. 1).

Otoliths were collected from a total of 2,160 walleye pollock (Table 2), of which 1,501 were aged. Length at age data varied somewhat between areas. Notably, age-1 fish in Barnabas and Chiniak Troughs were slightly larger than those found in other areas, and fish older than 5 years old in Pavlof Bay were among the largest-at-age encountered during the 2013 survey (Tables 3 and 4). However, because the overall contribution from these anomalous areas was relatively small all areas were combined into a single length at age key. Mean length at age in 2013 was

similar to those in 2011 with a slight increase at older ages in 2013 (Fig. 2). Mean weight at age was also similar up to age-11 where older fish were heavier in 2013 compared to 2011 (Fig. 3). In 2003 fish age-4 to 7 were slightly lighter compared to recent years (Table 4; Fig. 3). Interestingly the 4-7 year old age classes in 2003 equate to the 12-15 year old age classes in 2011 (Figs. 2 and 3), reflecting that their slightly smaller lengths and weights have carried throughout their lives.

Water Temperatures

Surface water temperatures across the GOA shelf ranged from 5.1° to 17.2° C (average 10.6° C) generally increasing from west to east (Fig. 4). However, inferences about surface temperatures are confounded by the broad time span of the survey. Sampling of the shelf was spread over two months and generally progressed from west to east. During this time water temperatures throughout the region were increasing to summer highs. Surface temperatures on the shelf in areas where fishing occurred averaged 12.1°C and decreased to approximately 5.3°C at 105 m depth, the mean depth where backscatter was observed on the shelf (Fig. 5).

Average surface temperatures in the bays and island regions that were surveyed likewise increased from west to east with survey timing, but roughly fell into three groups. Sanak Trough, Morzhovoi Bay, Pavlof Bay, Mitrofania Island, and Nakchamik Island had average surface temperatures between 6.3° and 7.3°C, while the Shumagins Islands area was slightly warmer at 8.3°C (Fig. 5). Temperatures at depths where fishing took place in these areas averaged approximately 4.5°C. Shelikof Strait, Alitak Bay/Deadman Bay, Barnabas Trough, Chiniak Trough, and Marmot Bay had warmer surface temperatures, averaging between 9.2° and 11.2°C, and temperatures at depth where fishing activity occurred averaged approximately 5.5°C, except for in Shelikof Strait and Deadman Bay where temperatures at depth where fishing occurred averaged 4.5°C and 3.7°C respectively (Fig. 5). Prince William Sound, Kayak Island Trough, and Yakutat Trough had the warmest surface temperatures averaging approximately 14°C at fishing locations while the temperature at depth where fishing occurred averaged approximately 5.3°C (Fig. 5). The warmest sea surface temperature recorded during the survey (18.1°C) was in

Prince William Sound. Temperatures near the seafloor were collected at 46 locations where CTD casts were made and averaged 5.1°C at the average bottom depth of 156 m (Fig. 4).

GOA Shelf and Slope from the Islands of Four Mountains to Yakutat Trough

The GOA shelf from the Islands of Four Mountains to the Yakutat Trough (Figs. 6-8) was surveyed between 9 June and 5 Aug. The survey covered the shelf and associated shelf break between approximately the 50 and 1,000 m depth contours. Acoustic backscatter was measured along 3,093 km (1,671 nmi) of trackline along 38 transects spaced 46.3 km (25 nmi) apart. The total area surveyed on the shelf encompassed 140,441 km^2 (40,946 nmi^2).

Biological data and specimens were collected along the GOA shelf from 29 AWT hauls and 16 PNE hauls, two of which were fished in midwater (Tables 5-7; Figs. 6-8). Pacific ocean perch was the most abundant species by weight (55.2%) in the midwater trawls, although 97% of the POP caught in midwater were from two hauls (Table 6; hauls 156, 160). Walleye pollock was the second most abundant species by weight (43.4%) captured in the midwater trawls. Walleye pollock was the most abundant species captured by number (68.4%) in the midwater hauls and POP was the second most abundant species by number (22.7%).

Walleye pollock was the most abundant species by weight in the demersal hauls (43.8%) and the second most abundant species by number (31.1%; Table 7). Pacific ocean perch was the second most abundant species caught by weight in demersal hauls on the shelf (42.8%) but was the most abundant species caught by number (51.0%). Sixty-three percent of the POP caught in demersal hauls were from a single haul (haul 99).

Two major length groups of walleye pollock were observed on the GOA shelf. One ranged from 13 to 22 cm FL with a mode of 18 cm FL, representing age-1 fish (Tables 8 and 9; Fig. 9). The other ranged from 35 to 70 cm FL with a mode of 54 cm FL. Walleye pollock on the shelf ranged in age from 1 to 18 years old with age-1 fish most abundant by number and age-6 fish most abundant by biomass (Tables 10 and 11).

Walleye pollock distribution was patchy across the shelf portion of the survey (Figs. 10-12). The areas of greatest walleye pollock density along the broadly spaced shelf transects were south of Unimak Pass, between Mitrofania and Nakchamik Islands, south of the Trinity Islands, and south of the Kenai Peninsula in dense aggregations spread across the Portlock Bank area. Age-1 fish were found south of the Kenai Peninsula and Prince William Sound (Figs. 10-12). Both age-1 and older pollock were located on average approximately 105 m below the ocean surface with age-1 fish an average of 44 m off bottom and older fish an average of 27 m off bottom in waters averaging approximately 140 m deep (Fig. 13).

Pollock densities on the shelf were generally lower than in bays and troughs, but when these densities are expanded over the large area of the shelf and slope, the total is substantial. The total walleye pollock biomass estimate for the GOA shelf was 269,131 metric tons (t) (Table 12), approximately 31% of the total pollock survey biomass. Approximately 56 % of the walleye pollock biomass on the shelf was detected in the North Pacific Fishery Management Council (NPFMC) management area 630, and approximately 15% came from each of three management areas (NPFMC areas 610, 620, 640; Table 12). The relative estimation error of the biomass based on the 1-D geostatistical analysis was 14.8%. Prior summer GOA shelf surveys did not encompass the same geographic areas covered in 2013 (Fig. 14) so direct comparisons of biomass and number totals between years are not possible (Table 12).

Sanak Trough

Sanak Trough (Fig. 6) was surveyed on 15 June along 91.7 km (49.5 nmi) of trackline along five transects spaced 7.4 km (4 nmi) apart encompassing an area of 679 km^2 (198 nmi^2). Bottom depths ranged from 53 to 170 m.

One midwater AWT was conducted in Sanak Trough (Tables 2, 5, and 13; Fig. 6). The catch in the AWT was dominated by walleye pollock with only two other species caught. Walleye pollock ranged in length from 13 to 73 cm FL with a major mode at 44 cm FL (Tables 8 and 9; Fig. 9). Age classes between 1 and 15 were represented with age-3 fish most abundant by number and biomass (Tables 10 and 11).

The backscatter attributed to walleye pollock in Sanak Trough was patchy and scattered throughout the area (Fig. 10) at an average depth of approximately 112 m and 14 m off the bottom (Fig. 13). The biomass estimate for Sanak Trough was 927 t (Table 12), roughly equivalent to what was seen in 2011. The relative estimation error of the biomass based on the 1-D geostatistical analysis was 22.9%.

Morzhovoi and Pavlof Bays

Morzhovoi Bay and Pavlof Bay (Fig. 6) were surveyed on 15 and 16 June respectively. Acoustic backscatter in Morzhovoi Bay was measured along 88.9 km (48 nmi) of trackline encompassing an area of 329 km^2 (96 nmi^2), and in Pavlof Bay along 84.3 km (45.5 nmi) of trackline encompassing an area of 312 km^2 (91 nmi^2; Fig. 3). Transects in both bays (12 in Morzhovoi and 11 in Pavlov) were spaced 3.7 km (2 nmi) apart and bottom depths ranged from 40-140 m.

Biological data and specimens were collected in Morzhovoi Bay from two AWT midwater hauls (Tables 2, 5, and 14; Fig. 6). Walleye pollock was the most abundant species caught in the AWT hauls, contributing 98.4% by weight and 99.5% by number (Table 14). Walleye pollock from Morzhovoi Bay were made up of two length groups, one ranging from 12 to 16 cm with a mode of 14 cm, and the other from 49 to 80 cm and a mode of 59 cm (Tables 8 and 9; Fig. 9). The age-1 pollock (12-16 cm) accounted for 47% of the total number and 1% of the biomass in Morzhovoi Bay (Table 10 and 11). No age-2 and very few age-3 pollock were captured in the two tows.

Backscatter in Morzhovoi Bay attributed to walleye pollock was diffuse and fairly evenly scattered throughout the bay with one larger school located at the mouth of the bay (Fig. 10). Pollock were detected at an average depth of approximately 70 m and 13 m off the bottom (Fig. 13). The biomass estimate for Morzhovoi Bay was 5,758 t, approximately 30% greater than what was seen in Morzhovoi Bay in 2011 (Table 12). The relative estimation error of the biomass based on the 1-D geostatistical analysis was 19.6%.

One midwater AWT and one PNE trawl were conducted in Pavlof Bay (Tables 2, 5, 15 and 16; Fig. 6). The catch in the AWT was dominated by walleye pollock with only two other species caught (Table 15). Pacific cod (*Gadus macrocephalus*) was the most abundant species caught by weight in the PNE (39.5%; Table 16) followed by walleye pollock (22.8%). By number, flathead sole (*Hippoglossoides elassodon*) was the dominant species caught (45.7%) in the PNE followed by yellowfin sole (*Limanda aspera*; 15.3%). Walleye pollock made up only 9% of the PNE catch in Pavlof Bay by number. Walleye pollock lengths in Pavlof Bay were predominantly in the range of 10 to 16 cm FL, with fewer fish in the 21 to 76 cm FL range (Tables 8 and 9; Fig. 9). Age-1 pollock accounted for 98% by number and 38% by biomass of the Pavlov totals (Tables 10 and 11).

Acoustic backscatter attributed to walleye pollock in Pavlof Bay was observed throughout the survey area with a large school of age-1 fish located near the mouth of the bay (Fig. 10). Backscatter attributed to pollock was located at an average depth of approximately 90 m and 10 m off the bottom (Fig. 13). The biomass estimate for Pavlof Bay was 2,150 t, slightly lower than in 2011 (Table 12). The relative estimation error of the biomass based on the 1-D geostatistical analysis was 17.8%.

Shumagin Islands

The West Nagai Strait, Unga Strait, Renshaw Point, and Shumagin Trough areas in the Shumagin Islands (Fig. 6) were surveyed from 19 to 23 June. The outer trough survey area was extended out to the shelf break, farther than in previous years. Acoustic backscatter was measured along 517.6 km (279.5 nmi) of trackline from 29 transects encompassing an area of 6,385.5 km^2 (1861.7 nmi^2). Transects were spaced 4.6 km (2.5 nmi) apart in West Nagai Strait, and Unga Strait, 7.4 km (4.0 nmi) apart east of Renshaw Point, 13.9 km (7.5 nmi) apart in the outer Shumagin Trough, and 20.3 km (11.0 nmi) apart on the outer shelf area. Bottom depths did not exceed 240 m along any transect, and transects generally did not extend into waters less than about 45 m depth.

Biological data and specimens were collected in the Shumagin Islands in six midwater AWT hauls (Tables 2, 5, and 17; Fig. 6). Two additional experimental AWT hauls were conducted in the Shumagin Islands area to test a new version of the Cam-Trawl system with an open codend resulting in no catch retention. Walleye pollock was the most abundant species caught in AWT hauls by weight (71.0%) and number (97.4%). A single salmon shark (*Lamna ditropis*) captured off Renshaw Point near Karpa Island accounted for the second most abundant weight (26.5%) in the catch in the Shumagin Islands (Table 17). Walleye pollock lengths ranged from 10 to 70 cm FL with the majority of fish in the 10 to 16 cm FL range (Tables 8 and 9; Fig. 9). These age-1 pollock accounted for 99% of the number and 90% of the biomass for the Shumagins total (Tables 10 and 11).

Walleye pollock were most abundant in the Unga Strait area and in the Shumagin Trough (Fig. 10). Average depth of walleye pollock backscatter was 125 m and 28 m off the bottom (Fig. 13). The biomass estimate of 33,605 t was approximately 4.5 times higher than any previous summer acoustic survey estimate (Table 12). The relative estimation error of the biomass based on the 1-D geostatistical analysis was 13.8%.

Mitrofania and Nakchamik Islands

Surveys near Mitrofania and Nakchamik Islands (Fig. 7) were conducted from 22 through 25 June. Acoustic backscatter in the vicinity of Mitrofania Island was measured along 120 km (65 nmi) of trackline from seven transects spaced 6.5 km (3.5 nmi) apart encompassing an area of 780 km^2 (227.5 nmi^2). Near Nakchamik Island, acoustic backscatter was measured along 89 km (48 nmi) of trackline from nine transects spaced 5.6 km (3.0 nmi) apart encompassing an area of 494 km^2 (144 nmi^2). Bottom depths ranged from 62 to 172 m near Mitrofania Island and from 54 to 274 m near Nakchamik Island.

Biological data and specimens were collected from three midwater AWT hauls in the Mitrofania area and one midwater AWT haul near Nakchamik (Tables 2, 5, 18, and 19; Fig. 7). Walleye pollock was the most abundant species caught, contributing 95.1% and 100% by weight, and 99.3% and 100% by number, in the two areas respectively (Tables 18 and 19). Chum salmon was

the second most abundant species by weight (2.9%) in the hauls near Mitrofania, and capelin was the second most abundant species by number (0.5%).

In Mitrofania, all walleye pollock from trawls used for length keys were between 11 and 18 cm FL with a mode at 14 cm (Tables 8 and 9; Fig. 9), representing age-1 fish. Conversely, in Nakchamik, all pollock captured were between 44 and 64 cm with a mode at 54 cm (Tables 8 and 9; Fig. 9) and pollock estimates ranged in age from age-3 to 18 with age-6 fish most abundant (Tables 10 and 11).

Several transects were added to the Mitrofania area survey extending the survey area farther to the south and onto the shelf compared to 2011. Walleye pollock backscatter densities were highest on transects due west of Mitrofania Island and on the southern extended transects (Fig. 11). The average depth of backscatter near Mitrofania Island was located approximately 114 m below the surface and within 18 m of the seafloor (Fig. 13). The biomass estimate in Mitrofania was 2,459 t (Table 12), approximately 40% less than in 2011 even though roughly twice as much area was covered in the current survey. The relative estimation error of the biomass based on the 1-D geostatistical analysis was 24.3%.

Backscatter attributed to walleye pollock in Nakchamik was distributed throughout the region at approximately 138 m depth and 28 m off the bottom (Fig. 13). The biomass estimate was 8,861 t (Table 12), approximately five times the amount seen in 2011 which covered the same area. The relative estimation error of the biomass based on the 1-D geostatistical analysis was 12.8%.

Shelikof Strait

The Shelikof Strait sea valley (Fig. 7) was surveyed from 1 to 7 July. Acoustic backscatter was measured along 17 transects spaced at 27.8 km (15 nmi) along 1,070 km (577.5 nmi) of trackline encompassing an area of 29,711 km^2 (8,662.4 nmi^2). Bottom depths did not exceed 310 m along any transect in the strait, and transects generally did not extend into waters of less than 50 m depth.

Biological data and specimens were collected in Shelikof Strait from 13 AWT trawls (Tables 2, 5, and 20; Fig. 7). Walleye pollock was the most abundant species, making up 99.4% by weight and 98.9% by number of the total catch (Table 20). Eulachon (*Thaleichthys pacificus*) were the second most abundant species caught but made up less than 1% of the weight and number in the catch. Walleye pollock in Shelikof Strait ranged in length from 12 to 65 cm FL with major modes at 15, 39, and 51 cm (Tables 8 and 9; Fig. 9). Ages of walleye pollock from Shelikof Strait ranged from 1 to 14 years old, with age-1 fish most abundant by number and age-3 fish most abundant by biomass (Tables 10 and 11).

The highest walleye pollock densities were found in the northern part of Shelikof Strait between Afognak Island and the Alaska Peninsula, and in the middle of the survey area between the western end of Kodiak Island and the Alaska Peninsula (Fig. 11). Unlike the winter survey, the majority of the biomass in the northern half of the Strait was age-1 walleye pollock. Age-1 pollock were also present in the middle of the survey area west of Kodiak Island, along with larger fish in the 35 to 45 cm FL range. In the southern hauls conducted near Chirikof Island, fish in the 40 to 65 cm FL range were dominant. Backscatter attributed to age-1 walleye pollock was generally located shallower in the water column (average depth 125 m and 90 m above the seafloor) than the larger fish (average depth 200 m and 20 m above the seafloor).

The biomass estimate for Shelikof Strait was 423,031 t (Table 12), which accounted for approximately 48% of the entire GOA summer survey pollock biomass estimate, and almost 3 times the biomass estimate of any previous summer survey in Shelikof Strait. Approximately 25% of the biomass and 89% by number detected in Shelikof Strait were age-1 walleye pollock (Tables 10 and 11). The relative estimation error of the biomass based on the 1-D geostatistical analysis was 5.6%. An estimated 4.2 billion 1-year-old walleye pollock indicates that the 2012 year class may be strong compared with recent years – i.e., 0.2 billion in 2003, 1.2 billion in 2005 (based on fish length $\leq$ 20 cm FL, no age data available), and 1.5 billion in 2011.

Alitak/Deadman Bay

Alitak Bay (Fig. 7) was surveyed on 9 and 10 July along 7 transects spaced 5.6 km (3.0 nmi) apart in the outer part of the bay and using a zig-zag pattern in the narrow inner Deadman Bay area. Acoustic backscatter was measured along 109 km (59 nmi) of trackline encompassing an area of 532 km^2 (155 nmi^2). Bottom depths ranged from 24 to 178 m.

Biological data and specimens were collected in the outer part of Alitak Bay from two PNE hauls fished near bottom (Tables 2, 5, and 21; Fig. 7). Walleye pollock made up 94.1% by weight and 66.9% by number from the two PNE trawls (Table 21). Pacific herring (*Clupea pallasi*) was the second most abundant species caught by weight (4.7%) and number (25.1%). The walleye pollock caught at the outer part of Alitak Bay where primarily between 45 and 70 cm FL (Tables 8 and 9; Fig. 9) and were located approximately 150 m deep and 27 m off the seafloor (Fig. 13).

In Deadman Bay, within Alitak Bay, dense echosign found on average 100 m deep and 130 m off the seafloor (Fig. 13) was sampled with one AWT haul conducted near the middle of the bay (Tables 2, 5, and 22; Fig. 7). Walleye pollock dominated the catch by weight (86.6%) and number (89.1%; Table 22) and ranged in length from 25 to 35 cm FL (Tables 8 and 9; Fig. 9). Ages of walleye pollock from Alitak and Deadman Bay combined ranged from 2 to 18 years old, with age-2 fish most abundant by number and age-7 fish most abundant by biomass (Tables 10 and 11).

The biomass estimate for the Alitak/Deadman Bay area was 15,149 t (Table 12), more than 1.5 times greater than the 2003 survey and almost six times greater than the 2011 survey. Even though the aggregation in Deadman Bay was very dense, the overall Alitak/Deadman Bay biomass estimate was less than 2% of the entire summer survey biomass because of the small geographic area contained within the bay. The relative estimation error of the biomass based on the 1-D geostatistical analysis was 25.6%.

Barnabas Trough

Barnabas Trough (Fig. 7) was surveyed from 11 to 14 July. Acoustic backscatter was measured along 15 transects spaced 5.6 km (3 nmi) apart encompassing 555.6 km (300 nmi) (3,087 km^2; 900 nmi^2) (Fig. 7). Depths in Barnabas Trough ranged from 33 to 185 m.

Biological data and specimens were collected from 10 AWT hauls in Barnabas Trough (Tables 2, 5, and 23; Fig. 7). Walleye pollock was the dominant species caught, contributing 97.0% by weight and 98% of the catch by number (Table 23). Chum salmon (*Oncorhynchus keta*) was the second most abundant species caught by weight (1.1%), and capelin was the second most abundant species by number caught (1.0%) in Barnabas Trough.

Barnabas Trough was dominated by a bimodal size range, one from 16 to 24 cm FL, and another from 35 to 70 cm FL with modes at 20 cm and 54 cm FL (Tables 8 and 9; Fig. 9). Fish ranged in age from 1 to 18 years old with age-1 fish most abundant by number and biomass (Tables 10 and 11).

Large aggregations of adult walleye pollock were detected in Barnabas Trough (Fig. 11) on average approximately 115 m deep and 20 m off the bottom (Fig. 13). Age-1 pollock were detected on average approximately 95 m deep and 35 m off the bottom. The biomass estimate for Barnabas Trough was 62,818 t (Table 12), approximately 7% of the entire GOA summer survey biomass estimate, and twice the amount seen in 2011 which covered approximately the same area. The relative estimation error of the biomass based on the 1-D geostatistical analysis was 6.0%.

Chiniak Trough

Chiniak Trough (Fig. 7) was surveyed between 14 and 18 July. Acoustic backscatter was measured along 17 transects spaced 5.6 km (3 nmi) apart covering 340.8 km (184 nmi) (1,893 km^2; 552 nmi^2) of trackline. Depths ranged from 48 to 235 m in Chiniak Trough.

Biological data and specimens were collected from eight AWT hauls in Chiniak Trough (Tables 2, 5, and 24; Fig. 7). Walleye pollock was the dominant species caught, contributing 97.0% by weight and 62.5% by number to the catch (Table 24). Capelin was the second most abundant species caught making up 33.7% of the catch by number and 0.9% by weight of the catch in Chiniak Trough (Table 24).

Chiniak Trough was dominated by a bimodal size range, one from 16 to 24 cm FL, and another from 35 to 66 cm FL with modes at 18 cm and 55 cm FL (Tables 8 and 9; Fig. 9). Fish ranged in age from 1 to 18 years old with age-1 fish most abundant by number and age-6 fish most abundant by biomass in Chiniak Trough (Tables 10 and 11).

Large aggregations of adult walleye pollock were detected in Chiniak Trough (Fig. 11) on average approximately 115 m deep and 20 m off the bottom (Fig. 13). Age-1 pollock were detected on average approximately 95 m deep and 35 m off the bottom. The biomass estimate for Chiniak Trough was 24,470 t (Table 12), approximately 3% of the entire GOA summer survey biomass estimate but 40% less than the 2011 estimate which covered roughly the same area. The relative estimation error of the biomass based on the 1-D geostatistical analysis was 6.9%.

Marmot and Izhut Bays

Surveys in Marmot and Izhut Bays (Fig. 7) were conducted 16-17 July. Acoustic backscatter in Marmot Bay was measured along 179.6 km (97 nmi) of trackline along 15 transects spaced 2.8 km (1.5 nmi) apart in the inner bay, 4.6 km (2.5 nmi) apart in Spruce Gully, and 7.4 km (4.0 nmi) apart in the outer bay, encompassing a total area of 1,094 km^2 (319 nmi^2). Izhut Bay was surveyed along 12.0 km (6.5 nmi) of zig-zag transects encompassing an area of 32.6 km^2 (9.5 nmi^2). Bottom depths ranged from about 67 to 304 m in Marmot Bay and from 74 to 185 m in Izhut bay.

Biological data and specimens were collected from four AWT hauls in Marmot Bay and one AWT haul in Izhut Bay (Tables 2, 5, 25, and 26; Fig. 7). Walleye pollock was the most abundant species caught by weight and number in the AWT hauls in both Marmot (91.5% and 96.6%

respectively) and Izhut Bay (88.4% and 77.4% respectively; Tables 25 and 26). Chum salmon was the second most abundant species caught by weight (3.9%) in Marmot Bay and Capelin were the second most abundant by number (2.2%; Table 25). Eulachon were the second most abundant species caught in Izhut Bay making up 9.6% by weight and 19.7% by number of the catch (Table 26).

Walleye pollock ranged in length from 15 to 70 cm FL in both Marmot and Izhut Bays with modes in Marmot Bay at 17 cm, 36 cm, and 60 cm FL, while Izhut only had major modes at 16 and 35 cm (Tables 8 and 9; Fig. 9). The vast majority of the fish larger than 20 cm in Marmot Bay were caught in the deep haul conducted in Spruce Gully. Walleye pollock from Marmot Bay ranged in age primarily from 1 to 14 years old, and in Izhut Bay primarily from age-1 to -3, with age-1 fish most abundant by number and biomass in both areas (Tables 10 and 11).

Adult walleye pollock were detected throughout Marmot Bay (Fig. 11) at an average depth of 143 m and 20 m off the sea floor (Fig. 13). Age-1 pollock in Marmot Bay were on average 90 m deep and 70 m off the bottom. Fish in Izhut Bay were on average 100 m deep and 34 m off the bottom. The biomass estimate for Marmot Bay was 8,210 t (Table 12). The relative estimation error of the biomass based on the 1-D geostatistical analysis was 7.4%. The biomass estimate for Izhut Bay was 803 t. No estimation error was calculated for the zig-zag transect conducted in Izhut Bay.

Prince William Sound and Trough South of Montague Island

Prince William Sound and the trough that extends south of Montague Island (Fig. 8) were surveyed from 29 July to 1 Aug. along 404 km (218 nmi) of trackline from 16 transects spaced at 14.8 km (8 nmi) encompassing an area of 5,982 km^2 (1,744 nmi^2). Bottom depths ranged from 65 to 750 m.

Biological collections were made within Prince William Sound (PWS) with one AWT haul, and in the trough south of Montague Island with two AWT hauls and one PNE trawl (Tables 2, 5, 27 and 28; Fig. 8). In the AWT hauls, *Berryteuthis magister* squid was the most abundant species

caught, making up 90.3% and 60.8% of the catch by weight and number, respectively (Table 27). However, all of the squid were captured in the haul conducted within Prince William Sound proper and composed 92% of that haul's catch. Walleye pollock made up 7% of the catch within the sound. Of the two AWT hauls on the outer shelf walleye pollock made up 91% of the catch by weight. Walleye pollock also dominated the midwater PNE haul (78.4% by weight) conducted south of Montague Island (Table 28). Most of the walleye pollock caught in the AWT haul conducted in PWS were adults ranging in length from 45 to 65 cm FL (Tables 8 and 9; Fig. 9). Age-1 fish ranging in length from 15 to 20 cm FL were caught in the two AWT hauls south of Montague Island. A mix of age-1 fish and larger adults were caught in the PNE haul. Ages for both the sound and outer shelf ranged up to 14 years old but age-1 fish dominated in both number and biomass (Tables 10 and 11).

Backscatter in Prince William Sound was very sparse (Fig. 12), with most fish located in the trough south of Montague Island and consisting of age-1 fish. Most of the adult backscatter was located at an average depth of 270 m approximately 70 m above the seafloor, while the age-1 pollock backscatter was located at an average of 130 m depth and 55 m above the bottom (Fig. 13). The biomass estimate for Prince William Sound is 16,062 t, only 5,970 t of which was within the sound proper (Table 12). The relative estimation error based on the 1-D geostatistical analysis of the acoustic backscattering in 2013 was 8.7%.

Kayak Island and Yakutat Troughs

The trough east of Kayak Island (Fig. 8) was surveyed 3-4 Aug. along 85 km (46 nmi) of trackline from three transects spaced 22.2 km (12.0 nmi) apart encompassing an area of 947 km^2 (276 nmi^2). Bottom depths ranged from 95 to 438 m. Yakutat Trough was surveyed 5-7 Aug. along 168.5 km (91 nmi) of trackline from six transects spaced 22.2 km (12.0 nmi) apart encompassing an area of 1,883 km^2 (549 nmi^2). Bottom depths in Yakutat Trough ranged from 106 to 355 m.

In the Kayak Island Trough, biological collections were conducted with one AWT trawl (Tables 2, 5, and 29; Fig. 8). Dusky rockfish (*Sebastes variabilis*) and POP were the most abundant

species caught by weight, making up 61.4% and 25.4%, respectively (Table 29). Walleye pollock composed only 11.3% of the catch weight, and 18.3% of the catch by number, in the Kayak Island Trough. Two length groups of pollock were caught in the AWT haul in Kayak Island Trough, one ranging from 13 to 22 cm FL with a mode at 18 cm FL, and another from 35 to 70 cm FL with a mode at 54 cm FL (Tables 8 and 9; Fig. 9).

In the Yakutat Trough, biological collections were conducted with four AWT and one PNE trawls (Tables 2, 5, 30, and 31; Fig. 8). Pacific ocean perch was the most abundant species caught by weight in both haul types, making up 83.3% and 90.5% of the catch in the two gear types, respectively (Tables 30 and 31). Walleye pollock was the second most abundant by weight (14.8%) and first by number (62.4%) in the midwater hauls. Dusky Rockfish were the second most abundant by both weight (8.9%) and number (2.3%) in the PNE haul. No pollock were captured in the PNE haul in Yakutat Trough. Most of the walleye pollock caught in the AWT hauls were age-1 fish ranging in length from 14 to 22 cm FL (Fig. 9). A few larger fish were also caught in Yakutat Trough ranging in length from 28 to 69 cm FL with a mode of 54 cm FL. Ages of fish in both Kayak Trough and Yakutat Trough ranged primarily from age-1 to -10 with age-1 fish dominant in both number and biomass (Table 10 and 11).

Backscatter was relatively light and diffuse in the Kayak Island and Yakutat Troughs. The densest backscatter attributed to pollock in the Yakutat Trough was detected along the transects near the mouth of Yakutat Bay (Fig. 12), with fish located on average 195 m from the surface and 25 m off the bottom (Fig. 13). The biomass estimate for Kayak Island Trough is 5,174 t (Table 12). The relative estimation error based on the 1-D geostatistical analysis of the acoustic backscattering was 14.5%.The biomass estimate for Yakutat Trough is 5,441 t (Table 12). The relative estimation error based on the 1-D geostatistical analysis of the acoustic backscattering was 12.9%.

Walleye Pollock Biomass by Management Area

The survey areas outlined above do not necessarily follow the boundaries of the NPFMC management areas. Some areas, such as the expansive shelf survey, the outer transects of the

Shumagins Island survey, Mitrofania, Shelikof Strait, and the Prince William Sound survey, extend across multiple management areas. Because walleye pollock are managed based on these management areas, we have also summarized the survey results based on these units. Table 32 presents the biomass of pollock within each management area, along with the geographic survey area from which they were derived, for fish less than or equal to 23 cm FL (age-1) and fish greater than 23 cm FL (age-2+). The total walleye pollock biomass for the entire GOA summer acoustic-trawl survey was 884,049 t and spanned six different management areas. The relative estimation error of the biomass based on the 1-D geostatistical analysis was 7.6%. The area with the largest amount of age-2+ fish was NPFMC area 620, which contained 45% of the total biomass from the survey and 53% of the biomass of fish age-2+. The area with the largest amount of age-1 fish was area 630, which contained 41% of the entire survey biomass and 58% of the age-1 biomass from the survey. The Shelikof Strait geographic area contained the largest amount of both age-1 and older fish of all the geographic areas within the survey. Overall age-1 fish made up 24% of the total biomass of the summer GOA survey.

Other Acoustic Backscatter

The GOA survey was designed to assess pollock first and other species second so areas where pollock were unlikely to occur yet other species were likely to occur were not thoroughly surveyed. Thus, the following distributions and biomass estimates for species other than pollock are not comprehensive and likely underestimates.

Pacific ocean perch/Rockfishes

Backscatter identified as Pacific ocean perch was distributed across the GOA shelf predominantly near the shelf break with large aggregations found near the Islands of Four Mountains, between Sanak Island and the Shumagin Islands, the Portlock Bank area, and the mouth of Yakutat Trough (Figs. 15 and 16). Trawl hauls in these areas confirmed the backscatter as POP. Lengths from 970 POP were collected from a total of 22 hauls on the shelf and one in Chiniak Trough (Table 2). The POP ranged in length from 28 to 47 cm FL (average 37.5 cm FL) in all but three of the hauls (hauls 8, 30, and 160). Lengths of POP in the other three hauls extended down to 21 cm FL with modes at 25 and 38 cm FL (Fig. 17). A total of 1.5% of the

backscatter from the entire GOA survey was designated as POP, and amounted to a biomass of 243,536 t. The relative estimation error of the POP biomass based on the 1-D geostatistical analysis was 16.7%.

Approximately 1.7% of the entire GOA backscatter was designated as undifferentiated "rockfishes", and an additional 4.3% was designated as unknown "fishes". This backscatter typically extended from the seafloor to approximately 10 to 20 m off the seafloor and was localized and patchy on the shelf. Classification was based on: 1) pairwise frequency differences using data collected at all five frequencies where a relatively "flat" pair-wise frequency response curve was indicative of swim-bladdered fishes (De Robertis et al. 2010); 2) backscatter morphology ("haystacks" on the bottom); and 3) concurrent survey camera drops and trawl catches containing fish species other than pollock, POP, or capelin, which appeared close to the seafloor. Additional rockfishes captured during trawl and camera operations on the shelf included dusky (*Sebastes ciliates*), northern (*S. polyspinis*), harlequin (*S. variegatus*), redbanded (*S. babcocki*), sharpchin (*S. zacentrus*), tiger (*S. nigrocinctus*), and shortspine thornyhead (*Sebastolobus alascanus*) rockfishes; these were generally observed far less frequently than POP. No biomass estimates were calculated for any of these other rockfish species. Some of this additional backscatter likely also contains POP that could not be definitively separated from other species.

Capelin

Large aggregations of capelin were encountered in Barnabas and Chiniak Troughs and on Portlock Bank east of Kodiak Island where backscatter clasification was confirmed with trawl verification (Fig. 18). A large aggregation was also detected between the Barren Islands and the Kenai Peninsula. However, no fishing was conducted on this aggregation so classification of backscatter in the Barren Islands vicinity is based on trawls conducted in schools to the south on Portlock Bank that displayed a similar mutifrequency response and school morphology.

Capelin lengths from 3,119 fish in 55 hauls (Table 2) ranged from 5 to 18 cm standard length (SL; average 10.9 cm SL) throughout the survey area (Fig. 19). The trawl meshes forward of the codend were covered with juvenile capelin as the net was hauled aboard in several areas of high

capelin concentration. The juvenile capelin were shaken from the net and sampled separately from the codend. These juvenile capelin as well as the capelin retained in the pocket net averaged 8.3 cm SL. The number of juveniles retained in the codend was often less than those collected from the trawl meshes or in the pocket net.

A total of 12.6% of backscatter for the entire GOA survey was designated as capelin. This resulted in an estimated total capelin biomass for the GOA summer survey of 493,106 t. The relative estimation error of the capelin biomass based on the 1-D geostatistical analysis was 20.4%. Approximately 45 % of the total capelin backscatter was located between the Barren Islands and Kenai Peninsula. If the amount of suspected capelin backscatter (i.e., not verified with a trawl haul) is not included, then the capelin abundance would be reduced to 272,188 t.

Eulachon

Eulachon lack swimbladders so they do not produce a strong acoustic return compared to similarly sized swimbladdered fishes (Gauthier and Horne 2004). Therefore, they are generally often only detected in our surveys when they are caught in trawls. No eulachon biomass estimate was produced for this survey. Relatively few eulachon were caught in trawls in the 2013 summer GOA survey compared to past surveys. Eulachon were caught primarily in Shelikof Strait and on the shelf from Portlock Bank through Yakutat Trough. Eulachon ranged in length from 10 to 22 cm FL with a mode of 14 cm.

Undifferentiated Surface Mix

A layer of undifferentiated non-pollock surface backscatter was prevalent throughout much of the summer GOA survey and was particularly abundant throughout the Shumagins Islands and Mitrofania areas (Fig. 20). This backscatter ranged from the surface to over 60 m deep and composed 40% of the total backscatter seen throughout the entire survey. The layer was characterized by greatest backscattering at 18 or 38 kHz. This was different than the multi-frequency response for capelin, rockfish, pollock, or euphausiids, but was similar to two types of undifferentiated surface backscatter that have been described in the Bering Sea (Woillez et al. 2012). Sampling by AWT, survey camera drops, and Methot hauls in this layer did not

definitively identify the source. We suspect this scattering is from a mixture of small plankton with gas enclosures.

Methot Hauls and Euphausiid Abundance

A total of 11 Methot hauls were conducted over the course of the 2 month survey (Table 3, Figs. 6-8). Eight hauls were on the shelf, two were in Barnabas Trough, and one was in the outer shelf portion of Prince William Sound. The Methot was fished at an average depth of 110 m below the surface and 20 m above the bottom. Catch composition (Table 33) by weight consisted primarily of euphausiids (76.3%) and jellyfish (11.4%).

Euphausiids (primarily consisting of *Thysanoessa inermis*, but also including *T. spinifera, T. ruschii*, and *Euphausia pacifica*) were found throughout the survey area with a patchy distribution (Fig. 21). Transects were surveyed during daylight hours, when euphausiids aggregate lower in the water column. Therefore, the majority of euphausiid backscatter was observed below 50 m depth in the water column, with the highest concentrations observed between 50 and 80 m depth. Though the distribution was patchy across the GOA shelf, several "hot spots" of euphausiid relative abundance were identified. Areas of highest relative mean abundance were Barnabus Trough and Sanak Trough, which both had mean backscatter values roughly twice that of other surveyed bays and troughs. Other hot spots included the shelf west of Sanak Island, the Shumagin Islands, Mitrofania Island, Nakchamik Island, Portlock Bank, Kayak Island Trough, and Yakutat Trough.

Special Projects

Data collections in support of ongoing work that addresses rockfish assessment in untrawlable habitat on the GOA shelf were conducted during DY2013-07 (contact: Chris.Wilson@noaa.gov, 206-526-4163). Activities included surveying closely-spaced parallel transects within 34 GOA bottom trawl survey grids which defined areas of untrawlable or trawlable bottom type. Data were collected from synchronized ME-70 multibeam and EK60 echosounders with accompanying drop video camera deployments (n = 67) to record bottom type and assess abundance of rockfishes. Operations were conducted during nighttime hours and sampling

operations for each grid cell took approximately 3 hours depending on the number of camera deployments at each site (2-3 each).

Ovaries from walleye pollock at various maturity stages were collected throughout the survey and preserved in formalin for maturity development analysis (contact: Sandi.Neidetcher@noaa.gov, 206-526-4521). Whenever age-0 pollock were captured, a sample was frozen at -20°C for age and growth analysis (contact: Annette.Dougherty@noaa.gov, 206-526-6523). Tissue samples from several different fish species were collected for radio isotope analysis (contact: sam.c.wainright@uscga.edu, 860-444-8653). Results for all special projects are to be reported elsewhere.

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TABLES AND FIGURES

Table 1. -- Simrad ER60 38 kHz acoustic system description and settings used during the summer 2013 acoustic-trawl surveys of walleye pollock in the Gulf of Alaska, results from standard sphere acoustic system calibrations conducted in association with the surveys, and final analysis parameters.

		system settings	8 June Captain's Bay Unalaska	7 Aug. Sea Otter Bay Yakutat	Final Analysis Parameters
Echosounder		Simrad ER60	--	--	Simrad ER60
Transducer		ES38B	--	--	ES38B
Frequency (kHz)		38	--	--	38
Transducer depth (m)		9.15	--	--	9.15
Pulse length (ms)		0.512	--	--	0.512
Transmitted power (W)		2000	--	--	2000
Angle sensitivity	Along	22.76	--	--	22.76
	Athwart	21.37	--	--	21.37
2-way beam angle (dB)		-20.74	--	--	-20.74
Gain (dB)		22.24	22.24	22.04	22.14
s_A correction (dB)		-0.68	-0.68	-0.51	-0.59
Integration gain (dB)		21.56	21.56	21.52	21.54
3 dB beamwidth	Along	6.74	6.74	6.71	6.73
	Athwart	7.20	7.20	7.16	7.18
Angle offset	Along	-0.06	-0.06	-0.06	-0.06
	Athwart	-0.07	-0.07	-0.05	-0.06
Post-processing sv threshold (dB)		-70	--	--	--
Measured standard sphere TS (dB)		--	-41.97	-42.60	--
Sphere range from transducer (m)		--	22.55	19.17	--
Absorption coefficient (dB/m)		0.0100	0.0100	0.0094	--
Sound velocity (m/s)		1476.0	1464.9	1478.4	--
Water temp at transducer (ºC)		--	5.4	9.8	--

Note: Gain and beam pattern terms are defined in the Operator Manual for Simrad ER60 Scientific echosounder application, which is available from Simrad Strandpromenaden 50, Box 111, N-3191 Horten, Norway.

Table 2. -- Number of biological samples and measurements collected during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf and associated areas.

Haul	Walleye pollock					Capelin[#]	Eulachon	POP	Other rockfish*	Pacific herring	jellyfish
no.	Lengths	Weights	Maturity	Otoliths	Ovaries	lengths	lengths	length/weight	lengths	length/weight	lengths
1	5							64			
8	253	37	37	37	9			2/2			
13	311	50	50	49	5						
25	308	97	90	97	9						
26	338	37	37	37							
27	138	43	32	37	5	3					
28	75	75	74	57	9						
29	91	13		5		21					
30	13	13	13	13				76/29			
31	3	3	3					110/29			
33	7								25		
38	257	35	30	30		16					
39	93	10		10		22					
40	80	19	8	8		6	48				
42	87	10		10		9					
43	86	9				35					
44						2					
45	89	12	1				1				
46	18	18	18	18							
47	65	17	17	17		2	23				
48	104	10				103					
51	9	9	8	8		1					
52	282	89	89	89							
56	262	61	53	61			50				
59	110	70	61	70	9						
60	73	25	15	25							
61	341	55	50	55							
64	248	70	60	70		14	50				
65	502	59	54	59		75	50				
69	340	72	49	59	5						
70	81	43	43	43							
72	366	52	42	52			52				
73	476	45	40	45		53					
74	389	40	40	40							
77	370	41	41	41							

Table 2. -- Cont.

Haul	Walleye pollock					Capelin	Eulachon	POP	Other rockfish*	Pacific herring	jellyfish
no.	Lengths	Weights	Maturity	Otoliths	Ovaries	lengths	lengths	length/weight	lengths	length/weight	lengths
81	130	39	39	39							
82	392	52	45	40	5		69				
85	8										
86	412	25	25	25							
90	308	25	25	25		4	1			49/20	
91	419	25	25	25						50	
92	408	26	26	26	2						
95	2					115					
97	314	41	41	41							
99								92/42	18		
100	200	39	39	39		8					
101	305	30	30	30							
102	76	7	7	7		12					
103	143										
105											57
106	4					100					
107	59	10	10	10		57					
108	64	11	10	11		11					
109	431	40	39	40		82					
111	124	26	24	26		40					
112		16									
115	20					86					11
116	239	31	31	31							
117	521	41	41	41							
118	381	49	48	40		3	8	43			
119	25					152					21
120	354										
121	20					83					
122	110	27	4			49	21				28
123	451	32	32	32		66	53				
124	130	33	33	20		63	50				
129	89	10				13					
130	275	53				115					
131	3	3				145					12
132	56	4				54					

Table 2. -- Cont.

Haul	Walleye pollock					Capelin	Eulachon	POP	Other rockfish*	Pacific herring	jellyfish
no.	Lengths	Weights	Maturity	Otoliths	Ovaries	lengths	lengths	length/weight	lengths	length/weight	lengths
137	81					228					
138	414	23	23	22	5	20					
139	316	20	20	20				9			
142	30					187					16
143	5					83					3
144	5							1			
145	17	17						21			
146	10	10	10	10				31			
149	3										20
150								3	83		
151	317	21	21	21							
152	69	18	12	14	4	2					
155	99	41	11	16		1					
156	32	23				2		58			
160	13	13	12	12				87/28			
162											5
163	72	31				18	63	2			
164	103	15	15	15	1	102					
165	86	16	2	16		140					
166											12
167	55	16	16	16		56					4
168	111	70	62	65	4		81				
172	96	10		10		151					1
173											13
174	55	15	5			106					
177						234					
178	78	14	6	14				1		1	
179	6										
180	48	11				89					
184	214	43	37	43		10				40	
185	58	13	3	3		12				73	
188	208	35	35	35		5		9/9	1		
189	95	2	2	2		21					
190	148	40	40	40				72	92		
192	1	1				2	2				

Table 2. -- Cont.

Haul	Walleye pollock					Capelin	Eulachon	POP	Other rockfish*	Pacific herring	jellyfish
no.	Lengths	Weights	Maturity	Otoliths	Ovaries	lengths	lengths	length/weight	lengths	length/weight	lengths
193	41										
196	43	33	33	33				71			
197								84	5		
198	24	12					18	56/24			8
199	2	2						66/20			
202	132	23	23	23		30	90	5		4/4	
203	118	77	40	40			36	7	3		
Total	15,948	2,599	2,057	2,160	72	3,119	766	970/183	227	217/24	211

* Other rockfish species include northern (haul 33 & 99), redbanded, sharpchin, and shortraker (Haul 99), harlequin (Haul 150), dusky (Haul 150, 188, 190 & 197), and rougheye (Haul 203) rockfishes.

[#]Includes lengths from fish caught in the pocket net and/or shaken from the intermediate net meshes.

Table 3. -- Average walleye pollock length (cm) at age (and sample size) for each area of the Gulf of Alaska shelf for three summer acoustic-trawl surveys. Ages were not determined from the 2005 summer GOA survey. Shading indicates values more than one standard deviation from the average.

		Age															
Survey	**n**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**18**
2013																	
Alitak	51		31.5	32.1	50.0	53.3	54.0	59.7	57.5	61.6	62.5	74.0					
Barnabas	97	20.3	36.0	42.0	47.3	50.9	54.8	55.5	58.0	56.7	58.0	62.0	56.0				
Chiniak	62	21.0			52.0	51.5	54.7	55.7	56.7	53.7	56.0	58.0	60.0				
GOA shelf	352	17.8	31.0	40.4	46.2	51.9	54.3	55.4	56.5	59.0	58.0	61.0			61.0		
Izhut	13		36.3	42.0													
Marmot	16		34.1	38.0		53.0			60.3								
Morzhovoi	72	14.2				55.0		59.1	61.1	62.3	62.1	66.5	66.3	65.5	67.0	70.5	64.0
Nakchamik	60			44.0	50.0	53.3	54.3	54.1	57.8	64.0							
Pavlof	62	15.0	30.0	31.9			63.0	62.0	67.7	67.3	66.8	66.4	70.0	72.5	66.0		
PWS	55	17.8	29.1	42.0	46.4	52.0	54.6	58.6	57.7	55.0							
Sanak	97	14.3	31.4	43.0	44.6	55.0		53.8								73.0	
Shelikof	401	15.1	28.3	38.1	43.0	51.7	53.4	55.1	55.1	57.0							
Shumagins	58	13.5	34.6	45.5			56.6	59.7	60.0						68.0		
Kayak	40			42.7	47.1	49.6	53.0			57.0							
Yakutat	63		36.0	43.8	49.8	50.5	56.6	58.0	54.0				60.0				
average		**16.8**	**30.7**	**39.4**	**46.5**	**52.0**	**54.5**	**56.7**	**58.6**	**59.7**	**61.8**	**65.4**	**65.3**	**67.8**	**65.3**	**71.3**	**64.0**
2011																	
Alitak	86	19.0	30.1	37.6	48.2	54.5	58.1	59.5	60.5	59.0	70.0						
Barnabas	79			42.0	47.7	54.7	58.5	58.0		73.0							
Chiniak	112			37.0	47.9	53.0	53.8	57.7	67.0								
GOA shelf	334		32.0	38.6	44.9	49.8	53.3	55.0	50.7	63.3	61.5	63.0	62.1	60.3	61.0		
Mitrofania	52			39.1	45.4	50.3	56.0	53.0									
Morzhovoi	29		29.0		42.0	51.7	66.0	63.8	73.0	68.5	65.0	64.0	64.3	62.0		62.0	
Nakchamik	67		30.2	35.8	40.0	56.0	59.0										
Shelikof	328	16.1	27.0	37.6	45.2	50.0	53.8	55.4	54.4		56.5	58.0					
average		**16.1**	**28.1**	**37.4**	**45.6**	**51.6**	**54.9**	**57.2**	**57.1**	**65.3**	**62.0**	**63.1**	**62.6**	**61.1**	**61.0**	**62.0**	
2003																	
Alitak	79	16.3	29.4	39.2	42.6	44.8	50.5	54.5		54.5							
Barnabas	130		33.4	39.4	41.6	43.2											
Chiniak	75	17.3	34.2	38.7	44.4	47.0	55.0	60.7	60.0	64.0	63.0		64.0				
GOA shelf	566	17.3	30.2	37.1	38.7	46.1	52.5	55.2	55.3	54.7	59.0	60.0					
Marmot	84	18.6	34.2	37.8	44.0	52.7	55.0	63.0	64.6	64.2	65.5	63.0					
Nakchamik	28		28.8	34.5	38.0	43.0											
PWS	81	18.0	32.0	37.7	41.7	49.3	53.0	56.0									
Shelikof	269	16.7	26.8	33.1	35.1	40.6	47.0	49.8	51.0								
Shumagins	43	15.7	31.0	36.2	41.6	48.0	58.0	54.5	60.0								
average		**17.0**	**29.3**	**37.4**	**38.7**	**45.2**	**52.2**	**55.1**	**59.0**	**59.1**	**62.8**	**61.0**	**64.0**				
Overall average		**16.7**	**29.7**	**38.2**	**42.1**	**50.3**	**54.4**	**56.5**	**58.5**	**60.3**	**62.1**	**63.8**	**63.9**	**64.0**	**64.7**	**69.0**	**64.0**

Table 4. -- Average walleye pollock weight (g) by age for each area of the Gulf of Alaska shelf for three summer acoustic-trawl surveys. Ages were not determined from the 2005 summer GOA survey. Shading indicates values more than one standard deviation from the average.

		Age															
Survey	**n**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**18**
2013																	
Alitak	51		0.24	0.24	1.08	1.33	1.27	1.68	1.53	1.83	1.93	2.82					
Barnabas	97	0.06	0.40	0.60	0.97	1.16	1.36	1.34	1.58	1.53	1.70	2.28	1.53				
Chiniak	62	0.07			1.04	1.06	1.28	1.37	1.44	1.27	1.26	1.56	1.90				
GOA shelf	352	0.04	0.24	0.56	0.80	1.16	1.30	1.34	1.37	1.77	1.67	1.76			1.40		
Izhut	13		0.38	0.53													
Marmot	16		0.31	0.40		1.19			1.71								
Morzhovoi	72	0.02				1.42		1.56	1.82	1.73	1.74	2.06	2.04	2.02	2.10	2.56	1.54
Nakchamik	60			0.83	1.24	1.32	1.39	1.39	1.53	1.68							
Pavlof	62	0.03	0.21	0.27			2.13	1.88	2.58	2.40	2.33	2.22	2.54	2.58	2.22		
PWS	55	0.04	0.19	0.64	0.78	1.17	1.36	1.57	1.54	1.24							
Sanak	97	0.02	0.25	0.66	0.74	1.11		1.26								2.21	
Shelikof	401	0.02	0.17	0.45	0.66	1.12	1.18	1.25	1.22	1.27							
Shumagins	58	0.02	0.35	0.79			1.55	1.73	1.73						2.13		
Kayak	40			0.64	0.88	0.94	1.10			1.48							
Yakutat	63		0.37	0.66	0.98	0.97	1.42	1.40	1.06				1.50				
average		**0.04**	**0.23**	**0.51**	**0.83**	**1.16**	**1.32**	**1.43**	**1.60**	**1.67**	**1.83**	**2.14**	**2.06**	**2.21**	**1.82**	**2.44**	**1.54**
2011																	
Alitak	86	0.05	0.25	0.46	0.95	1.19	1.44	1.65	1.50	1.63	1.90						
Barnabas	79			0.62	0.94	1.28	1.61	1.47		2.09							
Chiniak	112			0.45	0.91	1.18	1.25	1.53	1.86								
GOA shelf	334		0.27	0.49	0.75	0.99	1.17	1.29	0.99	1.53	1.75	1.78	1.62	1.61	1.48		
Mitrofania	52			0.52	0.78	1.05	1.37	1.31									
Morzhovoi	29		0.18		0.57	1.03	1.81	1.83	2.49	2.10	1.83	1.44	1.64	1.53		1.54	
Nakchamik	67		0.20	0.37	0.54	1.07	1.16										
Shelikof	328	0.03	0.15	0.44	0.79	1.06	1.28	1.34	1.25		1.53	1.65					
average		**0.03**	**0.18**	**0.44**	**0.80**	**1.10**	**1.31**	**1.46**	**1.38**	**1.75**	**1.74**	**1.66**	**1.63**	**1.57**	**1.48**	**1.54**	
2003																	
Alitak	79	0.03	0.22	0.53	0.67	0.73	0.94	1.16		1.34							
Barnabas	130		0.30	0.50	0.60	0.67											
Chiniak	75	0.04	0.32	0.45	0.71	0.84	1.39	1.67	1.57	1.84	1.81		1.70				
GOA shelf	566	0.04	0.24	0.42	0.47	0.82	1.14	1.22	1.21	1.18	1.27	1.58					
Marmot	84	0.05	0.31	0.42	0.70	1.15	1.47	1.99	2.28	2.22	2.10	2.50					
Nakchamik	28		0.20	0.31	0.40	0.56											
PWS	81	0.04	0.28	0.45	0.60	1.01	1.08	1.23									
Shelikof	269	0.04	0.16	0.28	0.34	0.51	0.74	0.80	0.77								
Shumagins	43	0.03	0.23	0.37	0.54	0.82	1.24	1.17	1.20								
average		**0.04**	**0.21**	**0.43**	**0.48**	**0.77**	**1.10**	**1.21**	**1.58**	**1.64**	**1.76**	**1.89**	**1.70**				
Overall average		**0.04**	**0.22**	**0.46**	**0.64**	**1.04**	**1.30**	**1.40**	**1.58**	**1.67**	**1.79**	**1.87**	**1.82**	**1.84**	**1.77**	**2.22**	**1.54**

Table 5. -- Trawl stations and catch data summary from the summer 2013 Gulf of Alaska shelf walleye pollock acoustic trawl survey aboard the NOAA ship *Oscar Dyson*.

Haul	area	Gear[a]	Date	Time	Duration	Start position		Depth (m)		Temp. (°C)		Walleye pollock		Other
no.		type	(GMT)	(GMT)	(minutes)	Lat. (N)	Long. (W)	footrope	bottom	headrope	surface[b]	(kg)	number	(kg)
1	Shelf	PNE	9-Jun	23:42	15	52 28.04	169 55.45	-	222	-	5.8	4.4	5	397.5
-	Shelf	ME70 cam	10-Jun	8:31	11	52 39.17	169 17.00							
-	Shelf	ME70 cam	10-Jun	9:42	10	52 37.60	169 14.65							
2	Shelf	Methot	10-Jun	20:44	15	53 3.94	168 7.01	99	108	4.9	6.7	-	-	0.4
3	Shelf	survey cam	10-Jun	23:04	13	52 56.75	168 1.50							
4	Shelf	survey cam	11-Jun	4:31	12	53 12.27	167 28.05							
5	Shelf	ME70 cam	11-Jun	9:27	10	53 17.51	166 48.51							
6	Shelf	ME70 cam	11-Jun	10:13	10	53 17.67	166 45.96							
7	Shelf	ME70 cam	11-Jun	11:56	11	53 18.82	166 47.16							
8	Shelf	PNE	11-Jun	16:52	15	53 17.91	166 46.58	119	124	4.8	7.2	649.2	456	34.1
9	Shelf	survey cam	11-Jun	23:51	13	53 34.11	166 13.34							
10	Shelf	survey cam	12-Jun	5:39	34	53 44.64	165 35.01							
11	Shelf	ME70 cam	12-Jun	10:06	10	53 43.31	165 42.66							
12	Shelf	ME70 cam	12-Jun	10:56	10	53 41.80	165 41.31							
13	Shelf	PNE	12-Jun	18:32	13	53 45.26	164 50.09	133	134	4.9	6.8	1,970.6	1,468	14.4
14	Shelf	Methot	13-Jun	2:58	15	54 8.10	164 20.89	79	85	4.4	7.1	-	-	3.4
15	Shelf	survey cam	13-Jun	6:09	-	53 51.48	164 7.97							
16	Shelf	survey cam	13-Jun	9:41	7	53 51.40	164 7.83							
17	Shelf	PNE	13-Jun	16:45	10	53 53.99	163 23.40	228	269	5.1	7	-	-	-
18	Shelf	survey cam	13-Jun	22:21	16	54 35.33	163 56.65							
19	Shelf	AWT*	14-Jun	9:20	2	53 59.28	162 49.99	159	704	5	7.2	-	-	-
20	Shelf	ME70 cam	14-Jun	12:28	10	54 5.19	162 50.31							
21	Shelf	ME70 cam	14-Jun	13:15	10	54 4.40	162 47.69							
22	Shelf	PNE	14-Jun	20:03	15	54 10.32	162 2.78	82	83	4.8	6.8	-	-	57.8
23	Shelf	survey cam	14-Jun	21:41	11	54 12.85	162 4.92							
24	Shelf	Methot	15-Jun	0:39	15	54 25.23	162 14.69	139	141	4.5	7.2	-	-	1.9
25	Sanak	AWT	15-Jun	8:59	25	54 44.25	162 38.63	100	128	4.4	6.3	233.6	354	3.6
26	Morzhovoi	AWT	15-Jun	17:21	30	54 49.59	163 8.67	86	93	4.7	6.3	723.9	450	8.5
27	Morzhovoi	AWT	16-Jun	1:16	24	54 53.31	162 59.34	77	93	4.5	7.2	173.2	1,419	6.0
28	Pavlof	PNE	16-Jun	20:05	15	55 27.23	161 38.03	95	96	4.1	7.2	107.0	75	361.9
29	Pavlof	AWT	16-Jun	23:48	6	55 18.03	161 33.05	96	103	4.3	7.6	59.1	3,067	3.4
30	Shelf	PNE	17-Jun	16:35	17	54 24.11	161 27.20	82	85	4.9	7.1	16.7	13	450.9
31	Shelf	AWT	17-Jun	19:47	44	54 16.11	161 20.07	248	330	5.1	7	3.6	3	314.5
32	Shelf	survey cam	18-Jun	11:11	10	54 43.71	160 55.22							
33	Shelf	PNE	18-Jun	20:13	16	54 31.15	159 57.91	103	105	4.8	7.7	-	-	45.7
34	Shelf	survey cam	19-Jun	2:21	10	54 35.44	159 14.21							
35	Shumagins	survey cam	19-Jun	9:51	10	55 4.54	160 37.36							

Table 5. -- Cont.

Haul	area	Gear[a]	Date	Time	Duration	Start position		Depth (m)		Temp. (°C)		Walleye pollock		Other
no.		type	(GMT)	(GMT)	(minutes)	Lat. (N)	Long. (W)	footrope	bottom	headrope	surface[b]	(kg)	number	(kg)
36	Shumagins	ME70 cam	19-Jun	11:51	10	55 3.03	160 33.86							
37	Shumagins	ME70 cam	19-Jun	13:03	12	55 2.00	160 36.47							
38	Shumagins	AWT	19-Jun	16:53	38	55 3.83	160 26.59	111	143	4.6	8.1	184.8	6,750	8.3
39	Shumagins	AWT	19-Jun	21:59	11	55 10.43	160 15.68	147	179	4.5	7.9	115.9	5,615	0.5
40	Shumagins	AWT	20-Jun	1:53	21	55 12.31	160 12.32	178	221	4.3	7.7	142.8	6,514	8.9
41	Shumagins	AWT*	20-Jun	10:52	15	55 31.41	160 17.77	163	198	3.9	8.6	-	-	-
42	Shumagins	AWT	20-Jun	18:40	5	55 33.74	160 4.47	156	170	3.7	8.2	60.8	3,496	140.6
43	Shumagins	AWT	21-Jun	0:45	12	55 30.30	159 42.22	83	165	4.7	8.6	68.8	4,006	1.7
44	Shumagins	AWT*	21-Jun	11:46	15	55 8.82	158 20.02	141	156	4.3	8.6	-	-	-
45	Shumagins	AWT	22-Jun	2:18	25	55 16.40	159 10.31	137	197	4.4	8.3	15.5	785	0.1
46	Mitrofania	AWT	23-Jun	3:00	57	55 42.26	158 51.50	43	97	6.3	7.3	23.4	18	15.4
47	Mitrofania	AWT	23-Jun	8:29	20	55 38.70	158 50.84	65	162	5.9	7.3	27.2	208	0.7
48	Mitrofania	AWT	23-Jun	17:09	8	55 31.49	158 46.88	140	154	4.6	7.5	285.9	18,585	1.1
49	Shelf	ME70 cam	24-Jun	11:15	11	55 48.61	158 11.83							
50	Shelf	ME70 cam	24-Jun	12:05	10	55 50.42	158 12.64							
51	Shelf	PNE	24-Jun	17:13	15	55 52.57	158 26.40	119	122	4.6	6.8	10.1	9	14.7
52	Nakchamik	AWT	25-Jun	3:37	54	56 23.85	157 48.26	132	236	4.7	7.2	386.9	282	-
53	Nakchamik	survey cam	25-Jun	10:51	10	56 18.39	157 46.02							
54	Nakchamik	PNE*	25-Jun	12:55	15	56 23.81	157 36.24	135	200	4.6	7.3	-	-	-
55	Shelikof	survey cam*	1-Jul	1:45	3	58 29.66	151 58.66							
56	Shelikof	AWT	1-Jul	6:13	10	58 47.19	152 41.67	116	197	5.5	10.1	342.1	11665	8.1
57	Shelikof	ME70 cam	1-Jul	12:51	11	58 43.61	152 45.26							
58	Shelikof	ME70 cam	1-Jul	13:57	11	58 44.65	152 43.00							
59	Shelikof	AWT	1-Jul	20:23	10	58 40.95	153 11.56	106	159	5.4	9.4	42.5	1188	5.2
60	Shelikof	AWT	2-Jul	2:20	2	58 22.10	153 14.00	77	185	5.3	11.4	1,133.0	46910	-
61	Shelikof	AWT	2-Jul	4:35	10	58 21.94	153 13.62	155	189	4.1	11.5	393.7	13590	0.7
62	Shelikof	ME70 cam	2-Jul	10:25	13	58 16.30	153 59.80							
63	Shelikof	ME70 cam	2-Jul	12:01	12	58 16.21	153 57.17							
64	Shelikof	AWT	2-Jul	19:02	11	58 3.65	153 59.20	173	203	4.4	11.1	841.5	31968	6.5
65	Shelikof	AWT	3-Jul	3:09	4	57 41.37	154 35.07	184	214	4.4	10.5	698.2	15153	9.1
66	Shelikof	ME70 cam	3-Jul	8:37	13	57 38.61	154 51.80							
67	Shelikof	ME70 cam	3-Jul	9:39	13	57 40.09	154 53.08							
68	Shelikof	ME70 cam	3-Jul	11:30	12	57 39.23	154 54.19							
69	Shelikof	AWT	3-Jul	20:21	27	57 16.67	155 2.73	175	219	4.3	10.1	1,683.0	4091	-
70	Shelikof	AWT	4-Jul	8:40	31	56 59.81	154 58.01	85	91	4.7	9.5	98.7	81	3.6
71	Shelikof	ME70 cam	4-Jul	12:22	12	56 58.91	154 48.16							
72	Shelikof	AWT	4-Jul	17:10	15	56 49.17	155 18.35	171	218	4.6	10.2	2,487.6	19476	12.4
73	Shelikof	AWT	4-Jul	22:13	31	57 0.61	156 4.14	198	220	4.4	9.3	1,207.0	10614	16.1

Table 5. -- Cont.

Haul	area	Gear[a]	Date	Time	Duration	Start position		Depth (m)		Temp. (°C)		Walleye pollock		Other
no.		type	(GMT)	(GMT)	(minutes)	Lat. (N)	Long. (W)	footrope	bottom	headrope	surface[b]	(kg)	number	(kg)
74	Shelikof	AWT	5-Jul	7:33	8	56 37.01	155 34.49	122	204	4.9	9.2	1,356.5	3,119	3.5
75	Shelikof	ME70 cam	5-Jul	11:01	10	56 36.77	155 33.92							
76	Shelikof	ME70 cam	5-Jul	12:25	16	56 36.40	155 31.68							
77	Shelikof	AWT	6-Jul	0:29	10	56 12.06	155 56.60	152	176	4.7	9.4	1,085.6	1,032	5.4
78	Shelikof	ME70 cam	6-Jul	10:00	10	55 44.01	157 2.91							
79	Shelikof	ME70 cam	6-Jul	10:44	10	55 45.20	157 0.67							
80	Shelikof	ME70 cam	6-Jul	12:41	15	55 44.18	156 57.03							
81	Shelikof	AWT	6-Jul	23:45	35	55 22.48	155 58.21	210	229	4.9	8.4	145.0	130	2.8
82	Shelf	AWT	7-Jul	10:28	21	56 5.16	157 45.81	147	168	4.3	8	1,137.8	836	2.8
83	Shelf	ME70 cam	8-Jul	9:47	15	56 3.70	154 42.93							
84	Shelf	ME70 cam	8-Jul	10:42	11	56 2.18	154 41.97							
85	Shelf	AWT	8-Jul	15:18	16	56 5.69	154 48.08	64	116	8.3	8.9	10.4	8	10.7
86	Shelf	AWT	9-Jul	1:39	34	56 9.21	154 1.23	120	162	5.3	9.6	757.5	1,437	4.9
87	Alitak	ME70 cam	9-Jul	11:04	7	56 45.39	154 19.47							
88	Alitak	ME70 cam	9-Jul	11:38	11	56 44.47	154 16.98							
89	Alitak	ME70 cam	9-Jul	13:11	8	56 46.23	154 18.57							
90	Alitak	PNE	9-Jul	17:42	6	56 44.15	154 18.09	69	74	7.2	9.5	611.1	472	82.9
91	Alitak	AWT	10-Jul	3:26	29	57 2.13	153 57.13	87	161	5.1	12.6	464.8	1,985	71.9
92	Alitak	PNE	10-Jul	6:01	17	56 55.04	154 5.21	84	86	3.7	11.6	849.5	479	8.5
93	Shelf	ME70 cam	10-Jul	12:52	11	56 39.37	153 37.64							
94	Shelf	ME70 cam	10-Jul	13:40	10	56 39.23	153 39.85							
95	Shelf	AWT	10-Jul	16:24	14	56 41.74	153 43.26	72	131	6.3	9.6	-	-	0.2
96	Shelf	survey cam	11-Jul	1:53	13	56 33.78	152 44.77							
97	Barnabas	AWT	11-Jul	6:48	38	56 38.35	152 34.22	121	137	5.1	10.2	375.3	314	12.5
98	Shelf	ME70 cam	11-Jul	12:18	12	56 34.56	152 7.98							
99	Shelf	PNE	11-Jul	16:12	14	56 33.23	151 59.67	196	196	5.1	9.7	-	-	1,795.0
100	Barnabas	AWT	11-Jul	23:08	22	56 50.17	152 12.11	94	102	5.4	10.1	270.6	200	36.7
101	Barnabas	AWT	12-Jul	3:07	12	56 50.12	152 25.51	125	170	5.3	10.1	420.1	305	6.8
102	Barnabas	AWT	12-Jul	7:09	17	56 52.55	152 29.39	63	169	6.4	11.1	611.0	9,613	10.9
103	Barnabas	AWT	12-Jul	10:02	11	56 56.43	152 29.81	143	167	5.3	10.8	316.9	3,951	3.1
104	Barnabas	ME70 cam[#]	12-Jul	-	-									
105	Barnabas	Methot	12-Jul	16:53	21	56 53.73	152 36.81	135	149	5.3	11	-	-	15.1
106	Barnabas	AWT	12-Jul	20:40	9	56 53.85	152 54.29	70	79	6.3	11	-	1	6.1
107	Barnabas	AWT	13-Jul	2:22	4	57 0.26	152 39.36	130	156	5.2	11.6	134.9	2,120	3.4
108	Barnabas	AWT	13-Jul	7:44	19	57 2.45	152 44.50	81	159	5.9	11.7	280.1	5,192	4.1
109	Barnabas	AWT	13-Jul	10:22	12	57 3.85	152 47.95	150	165	5.7	11.4	964.9	2,815	13.1
110	Barnabas	survey cam	13-Jul	12:44	15	57 2.33	152 45.08							
111	Barnabas	AWT	13-Jul	20:19	2	57 8.36	152 28.61	122	148	5.9	10.6	300.7	5,332	1.3
112	Barnabas	Methot	14-Jul	5:55	15	57 23.33	152 32.27	77	84	7.1	10	-	-	7.7
113	Shelf	ME70 cam	14-Jul	12:37	13	57 23.20	152 3.34							

Table 5. -- Cont.

Haul no.	area	Gear[a] type	Date (GMT)	Time (GMT)	Duration (minutes)	Start position Lat. (N)	Start position Long. (W)	Depth (m) footrope	Depth (m) bottom	Temp. (°C) headrope	Temp. (°C) surface[b]	Walleye pollock (kg)	Walleye pollock number	Other (kg)
114	Shelf	ME70 cam	14-Jul	13:26	10	57 21.96	152 5.86							
115	Shelf	AWT	14-Jul	16:33	20	57 8.90	151 45.61	71	82	7.2	10.1	-	-	8.6
116	Chiniak	AWT	15-Jul	3:29	16	57 25.85	151 21.33	78	176	6.4	11.9	304.0	239	4.5
117	Chiniak	AWT	15-Jul	7:44	7	57 26.54	151 20.82	136	172	5.9	11.3	603.9	972	5.0
118	Chiniak	AWT	15-Jul	10:27	28	57 29.81	151 33.50	139	156	5.9	11.8	1,285.8	1,073	46.3
119	Chiniak	AWT	15-Jul	16:56	6	57 29.44	151 46.33	55	81	6.9	10.2	35.1	25	7.2
120	Chiniak	AWT	15-Jul	23:05	17	57 38.62	151 45.84	88	107	7.5	10.3	1,891.5	1,398	16.5
121	Chiniak	AWT	16-Jul	2:22	20	57 37.65	151 55.00	76	185	6.8	10.1	23.3	20	21.3
122	Marmot	AWT	16-Jul	18:05	33	58 1.91	152 29.48	130	195	6.6	10.4	613.8	16,784	15.5
123	Marmot	AWT	16-Jul	22:19	41	57 59.82	152 20.22	193	271	5.3	11.2	573.3	848	71.5
124	Izhuit	AWT	17-Jul	3:51	17	58 11.63	152 15.80	91	175	7.5	14.2	134.6	3,269	17.7
125	Marmot	ME70 cam	17-Jul	10:06	11	57 52.63	152 5.61							
126	Marmot	ME70 cam	17-Jul	10:58	10	57 54.00	152 3.09							
127	Marmot	ME70 cam	17-Jul	12:58	12	57 56.45	152 0.80							
128	Marmot	ME70 cam	17-Jul	13:49	12	57 55.29	151 59.73							
129	Marmot	AWT	17-Jul	16:06	16	58 1.45	151 55.58	110	175	5.6	11.6	77.8	1,517	16.7
130	Marmot	AWT	17-Jul	22:17	12	58 2.16	151 47.24	126	152	5.9	12.3	712.9	15,982	79.2
131	Chiniak	AWT	18-Jul	2:59	11	57 40.38	151 58.06	87	204	6.8	11.1	4.5	3	22.9
132	Chiniak	AWT	18-Jul	5:17	2	57 41.55	151 57.97	115	156	6.3	11.2	239.7	4,862	12.7
133	Shelf	ME70 cam	23-Jul	9:24	10	57 36.23	150 36.68							
134	Shelf	ME70 cam	23-Jul	10:04	10	57 37.95	150 34.21							
135	Shelf	ME70 cam	23-Jul	11:18	10	57 39.90	150 34.00							
136	Shelf	ME70 cam	23-Jul	13:24	10	57 35.44	150 26.51							
137	Shelf	AWT	23-Jul	16:28	10	57 47.03	150 36.82	78	90	6	11.6	-	-	11.2
138	Shelf	AWT	23-Jul	20:50	17	58 5.65	151 14.07	89	130	6.5	11.7	802.1	664	15.6
139	Shelf	AWT	24-Jul	8:13	30	58 37.47	151 7.67	147	186	5.4	11.4	382.3	1,346	42.1
140	Shelf	ME70 cam	24-Jul	11:50	10	58 32.10	150 48.67							
141	Shelf	ME70 cam	24-Jul	12:51	10	58 33.11	150 49.91							
142	Shelf	AWT	24-Jul	16:04	10	58 24.41	150 42.19	63	74	8	11.4	-	-	18.5
143	Shelf	PNE	24-Jul	19:55	12	58 16.04	150 28.65	70	70	9.7	10.1	-	-	84.8
144	Shelf	AWT	24-Jul	23:18	3	58 9.44	150 12.69	159	160	5.3	13.1	0.2	1	4.1
145	Shelf	PNE	25-Jul	1:12	19	58 8.75	150 11.31	201	211	5.2	13.6	20.4	17	95.8
146	Shelf	AWT	25-Jul	5:55	40	57 49.87	149 36.93	255	280	5.1	13	13.4	10	46.4
147	Shelf	ME70 cam	25-Jul	9:51	10	57 56.44	149 34.43							
148	Shelf	ME70 cam	25-Jul	10:50	10	57 55.38	149 35.83							
149	Shelf	Methot	25-Jul	15:49	30	58 5.06	148 56.69	89	98	5.4	13.3	-	-	2.4
150	Shelf	PNE	25-Jul	17:53	16	58 4.74	148 57.19	97	97	5.4	12.9	-	-	124.3
151	Shelf	AWT	25-Jul	21:55	15	58 17.55	149 21.33	135	151	5.3	14.5	6,000.0	5,320	-
152	Shelf	AWT	26-Jul	6:43	7	59 9.35	151 1.87	68	103	7.9	13.6	654.6	13,885	0.2
153	Shelf	ME70 cam	26-Jul	11:00	10	59 12.04	150 25.33							

Table 5. -- Cont.

Haul	area	Gear[a]	Date	Time	Duration	Start position		Depth (m)		Temp. (°C)		Walleye pollock		Other
no.		type	(GMT)	(GMT)	(minutes)	Lat. (N)	Long. (W)	footrope	bottom	headrope	surface[b]	(kg)	number	(kg)
154	Shelf	ME70 groundtruth	26-Jul	11:40	10	59 10.68	150 26.69							
155	Shelf	AWT	26-Jul	15:46	3	59 15.33	150 5.75	132	192	5.7	14.9	142.0	3,536	5.7
156	Shelf	AWT	27-Jul	4:49	< 1	58 47.77	149 42.25	183	225	5.4	15.2	295.7	298	9,704.3
157	Shelf	ME70 groundtruth	27-Jul	10:19	11	58 44.45	149 22.00							
158	Shelf	ME70 groundtruth	27-Jul	11:01	10	58 43.44	149 20.50							
159	Shelf	ME70 groundtruth	27-Jul	11:50	13	58 42.89	149 24.46							
160	Shelf	AWT	27-Jul	21:03	2	58 48.83	148 6.73	257	618	5.2	14.2	48.0	40	4,151.9
161	Shelf	Methot	28-Jul	1:03	24	59 3.58	148 34.10	108	230	5.6	16.2	-	-	0.1
162	Shelf	Methot	28-Jul	6:15	31	59 28.91	149 20.77	78	142	6.2	15.7	-	-	3.9
163	Shelf	AWT	28-Jul	8:31	16	59 22.87	149 10.33	165	191	5.4	16.1	45.1	806	42.2
164	Shelf	AWT	28-Jul	16:28	23	59 40.07	148 34.38	148	200	5.4	14.6	137.0	3,573	41.6
165	Shelf	AWT	28-Jul	21:45	17	59 14.89	147 47.54	168	194	5.5	14.5	15.7	430	2.4
166	Shelf	AWT	29-Jul	1:22	31	59 6.31	147 33.80	234	501	4.8	15.6	-	-	13.2
167	PWS	AWT	30-Jul	16:53	48	60 36.48	147 8.08	217	226	5.4	17.5	71.8	55	907.5
168	PWS	PNE	31-Jul	3:42	14	60 7.52	147 7.36	215	217	5.4	16.2	63.2	217	17.4
169	PWS	ME70 cam	31-Jul	10:09	11	59 50.39	147 8.57							
170	PWS	ME70 cam	31-Jul	10:53	11	59 49.18	147 5.75							
171	PWS	ME70 cam	31-Jul	12:04	10	59 49.41	147 2.05							
172	PWS	AWT	31-Jul	14:45	14	59 52.16	147 11.19	97	174	6.2	15.7	34.4	969	7.3
173	PWS	Methot	31-Jul	23:49	25	59 35.99	146 53.45	132	145	5.6	14.3	-	-	3.6
174	PWS	AWT	1-Aug	4:09	10	59 28.07	147 0.49	132	216	5.7	13.1	189.9	4,986	9.6
175	PWS	ME70 cam	1-Aug	7:33	10	59 28.40	147 9.18							
176	PWS	ME70 cam	1-Aug	9:31	11	59 35.44	147 0.35							
177	Shelf	AWT	1-Aug	16:10	8	59 40.29	146 36.15	54	89	6.3	15	-	-	30.3
178	Shelf	AWT	1-Aug	21:20	12	59 17.21	146 27.71	153	232	5.9	15.1	178.4	4,784	2.3
179	Shelf	AWT	2-Aug	2:36	30	59 32.19	145 41.71	245	314	4.9	15.8	-	-	1.7
180	Shelf	AWT	2-Aug	6:24	8	59 48.27	145 48.91	71	110	5.7	15.8	83.6	2,615	1.4
181	Shelf	ME70 cam	2-Aug	8:55	10	59 42.98	145 56.03							
182	Shelf	ME70 cam	2-Aug	9:38	11	59 44.29	145 57.36							
183	Shelf	PNE[#]	2-Aug	16:56	-	60 4.20	145 54.77							
184	Shelf	AWT	2-Aug	20:12	12	60 12.96	145 59.02	79	112	5.7	16.5	283.4	5,653	17.2
185	Shelf	AWT	3-Aug	2:35	20	59 47.47	144 59.73	115	174	5.7	15.9	281.1	7,146	8.8
186	Shelf	ME70 cam	3-Aug	8:00	10	59 36.16	144 28.86							
187	Shelf	ME70 cam	3-Aug	8:59	10	59 34.68	144 28.13							
188	Shelf	AWT	3-Aug	16:12	13	59 38.23	144 6.24	195	264	5.8	15.1	158.5	208	11.1
189	Shelf	PNE	3-Aug	20:28	7	59 50.09	144 9.32	64	76	5.9	14.2	0.8	2	6.9
190	Kayak Island	AWT	4-Aug	15:40	23	59 34.31	143 26.07	248	298	5.4	14.6	117.1	148	917.9
191	Shelf	Methot	4-Aug	20:21	24	59 46.37	142 43.57	182	197	5.8	14	-	-	15.3
192	Shelf	PNE	4-Aug	23:42	24	59 56.26	142 30.61	93	99	5.9	14.5	0.9	1	251.2
193	Shelf	Methot	5-Aug	4:15	31	59 42.76	141 49.36	94	98	6	12.4	-	-	1.7

Table 5. -- Cont.

Haul	area	Gear[a]	Date	Time	Duration	Start position		Depth (m)		Temp. (°C)		Walleye pollock		Other
no.		type	(GMT)	(GMT)	(minutes)	Lat. (N)	Long. (W)	footrope	bottom	headrope	surface[b]	(kg)	number	(kg)
194	Shelf	ME70 cam	5-Aug	8:26	10	59 28.22	142 8.31							
195	Shelf	ME70 cam	5-Aug	9:05	11	59 29.26	142 9.45							
196	Shelf	PNE	5-Aug	17:04	5	59 23.75	142 12.31	251	251	5.2	14.9	38.9	43	180.9
197	Yakutat	PNE	5-Aug	20:26	4	59 14.10	141 40.16	207	207	5.6	15.8	-	-	105.1
198	Yakutat	AWT	5-Aug	22:51	21	59 11.32	141 32.52	269	323	5.3	15.8	10.6	12	286.6
199	Yakutat	AWT	6-Aug	5:37	1	59 18.24	141 29.93	224	335	5.7	16.6	9.8	5	2,485.2
200	Yakutat	ME70 cam	6-Aug	10:34	10	59 23.04	141 40.82							
201	Yakutat	ME70 cam	6-Aug	11:37	10	59 19.19	141 39.47							
202	Yakutat	AWT	6-Aug	21:59	30	59 36.88	140 39.29	183	207	5.9	11.6	199.7	4,234	37.0
203	Yakutat	AWT	7-Aug	5:01	8	59 26.79	140 15.33	219	238	5.7	14.7	270.5	4,705	24.2

[a]AWT = Aleutian wing trawl, PNE = Poly nor'eastern bottom trawl, Methot = Methot trawl, survey cam = camera drop for species id, ME70 cam = camera drop on un/trawlable areas to verify bottom type determined using ME70.

[b]shipboard sensor at 1.4 m depth.

* Experimental gear trawl.

[#] Gear malfunction, haul aborted

Table 6. -- Summary of catch by species in 29 Aleutian wing trawls and 2 Poly Nor'eartern trawls conducted in midwater during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg.	Percent	Nos.	Percent
Pacific ocean perch [a]	*Sebastes alutus*	14,557.9	55.2	18,149	22.7
walleye pollock	*Gadus chalcogrammus*	11,437.3	43.4	54,756	68.4
eulachon	*Thaleichthys pacificus*	57.3	0.2	2,316	2.9
chinook salmon	*Oncorhynchus tshawytscha*	47.8	0.2	24	<0.1
capelin	*Mallotus villosus*	33.0	0.1	3,283	4.1
sponge unident.	Porifera phylum	32.6	0.1	2	<0.1
coho salmon	*Oncorhynchus kisutch*	32.4	0.1	12	<0.1
hydromedusa jelly unident.	*Aequorea* sp.	25.4	0.1	324	0.4
giant grenadier	*Albatrossia pectoralis*	16.8	0.1	6	<0.1
Pacific herring	*Clupea pallasi*	14.4	0.1	285	0.4
Pacific cod	*Gadus macrocephalus*	13.6	0.1	8	<0.1
northern sea nettle	*Chrysaora melanaster*	12.5	<0.1	28	<0.1
Pacific halibut	*Hippoglossus stenolepis*	12.2	<0.1	2	<0.1
magistrate armhook squid	*Berryteuthis magister*	11.8	<0.1	158	0.2
jellyfish unident.	Scyphozoa class	9.2	<0.1	50	0.1
chum salmon	*Oncorhynchus keta*	6.8	<0.1	4	<0.1
lions mane jelly	*Cyanea* sp.	6.5	<0.1	59	0.1
arrowtooth flounder	*Atheresthes stomias*	6.1	<0.1	13	<0.1
red king crab	*Paralithodes camtschaticus*	4.1	<0.1	2	<0.1
Pacific sandfish	*Trichodon trichodon*	4.0	<0.1	61	0.1
sockeye salmon	*Oncorhynchus nerka*	2.8	<0.1	1	<0.1
spiny dogfish	*Squalus acanthias*	1.9	<0.1	1	<0.1
light dusky rockfish	*Sebastes variabilis*	1.6	<0.1	1	<0.1
squid unident.	cephalopoda class	1.2	<0.1	76	0.1
golden king crab	*Lithodes aequispina*	1.2	<0.1	1	<0.1
shrimp unident.	decapoda order	1.1	<0.1	337	0.4
fried egg jelly	*Phacellophora camtchatica*	0.9	<0.1	1	<0.1
smooth lumpsucker	*Aptocyclus ventricosus*	0.8	<0.1	1	<0.1
hydroid unident.	Hydrozoa class	0.2	<0.1	30	<0.1
lanternfish unident.	Myctophidae family	0.2	<0.1	38	<0.1
moon jelly unident.	*Aurelia* sp.	0.1	<0.1	6	<0.1
prowfish	*Zaprora silenus*	0.1	<0.1	3	<0.1
sculpin unident.	Cottidae family	0.1	<0.1	3	<0.1
fish larvae unident.	actinopteryii subclass	0.0	<0.1	3	<0.1
isopod unident.	Isopoda order	0.0	<0.1	2	<0.1
		26,353.9		80,046	

[a] 97% of POP caught in hauls 156 and 160.

Table 7. -- Summary of catch by species in 14 Poly Nor'eartern bottom trawls conducted during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg.	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	2,774.3	43.8	2,234	31.1
Pacific ocean perch [a]	*Sebastes alutus*	2,712.6	42.8	3,661	51.0
salmon shark	*Lamna ditropis*	200.0	3.2	2	<0.1
sponge unident.	Porifera phylum	107.1	1.7	154	2.1
shortraker rockfish	*Sebastes borealis*	66.8	1.1	8	0.1
arrowtooth flounder	*Atheresthes stomias*	54.0	0.9	112	1.6
spiny dogfish	*Squalus acanthias*	51.1	0.8	16	0.2
Pacific cod	*Gadus macrocephalus*	46.5	0.7	18	0.3
lingcod	*Ophiodon elongatus*	46.3	0.7	5	0.1
sea anemone unident.	Actinostolidae family	45.3	0.7	208	2.9
Pacific halibut	*Hippoglossus stenolepis*	42.0	0.7	9	0.1
light dusky rockfish	*Sebastes ciliatus*	26.4	0.4	24	0.3
northern rockfish	*Sebastes polyspinis*	22.9	0.4	36	0.5
southern rock sole	*Lepidopsetta bilineata*	15.2	0.2	9	0.1
harlequin rockfish	*Sebastes variegatus*	15.1	0.2	105	1.5
prowfish	*Zaprora silenus*	15.1	0.2	4	0.1
Atka mackerel	*Pleurogrammus monopterygius*	8.0	0.1	5	0.1
flathead sole	*Hippoglossoides elassodon*	6.8	0.1	20	0.3
red king crab	*Paralithodes camtschaticus*	6.7	0.1	3	<0.1
redbanded rockfish	*Sebastes babcocki*	6.3	0.1	5	0.1
sharpchin rockfish	*Sebastes zacentrus*	5.6	0.1	11	0.2
yelloweye rockfish	*Sebastes ruberrimus*	5.5	0.1	2	<0.1
sea pen or sea whip unident.	Pennatulacea order	5.4	0.1	54	0.8
chinook salmon	*Oncorhynchus tshawytscha*	5.0	0.1	1	<0.1
kelp greenling	*Hexagrammos decagrammus*	3.9	0.1	7	0.1
lion's mane jelly	*Cyanea capillata*	3.5	0.1	12	0.2
eulachon	*Thaleichthys pacificus*	3.3	0.1	83	1.2
Irish lord	*Hemilepidotus* sp.	3.1	<0.1	4	0.1
sea urchin unident.	Echinacea suborder	3.0	<0.1	95	1.3
Sakhalin sole	*Limanda sakhalinensis*	3.0	<0.1	4	0.1
yellowfin sole	*Limanda aspera*	2.6	<0.1	7	0.1
chum salmon	*Oncorhynchus keta*	2.6	<0.1	2	<0.1
rex sole	*Glyptocephalus zachirus*	2.3	<0.1	3	<0.1
sockeye salmon	*Oncorhynchus nerka*	2.0	<0.1	1	<0.1
sea anemone unident.	Actiniaria order	2.0	<0.1	25	0.3
jellyfish unident.	Scyphozoa class	1.8	<0.1	6	0.1
hermit crab unident.	Paguridae family	1.7	<0.1	52	0.7
hydromedusa jelly unident.	*Aequorea* sp.	1.5	<0.1	5	0.1
tiger rockfish	*Sebastes nigrocinctus*	1.3	<0.1	1	<0.1
golden king crab	*Lithodes aequispina*	1.2	<0.1	1	<0.1
magistrate armhook squid	*Berryteuthis magister*	0.9	<0.1	1	<0.1
northern sea nettle	*Chrysaora melanaster*	1.0	<0.1	5	0.1
butter sole	*Isopsetta isolepis*	0.9	<0.1	1	<0.1

Table 7. -- continued

Common name	Scientific name	Weight kg.	Weight Percent	Number Nos.	Number Percent
lions mane jelly	*Cyanea* sp.	0.8	<0.1	4	0.1
northern rock sole	*Lepidopsetta polyxystra*	0.8	<0.1	2	<0.1
smooth lumpsucker	*Aptocyclus ventricosus*	0.7	<0.1	1	<0.1
shortspine thornyhead	*Sebastolobus alascanus*	0.5	<0.1	1	<0.1
sidestripe shrimp	*Pandalopsis dispar*	0.5	<0.1	32	0.4
Tanner crab	*Chionoecetes bairdi*	0.5	<0.1	5	0.1
blackspotted rockfish	*Sebastes melanostictus*	0.5	<0.1	2	<0.1
starfish unident.	Asteroidea class	0.4	<0.1	9	0.1
basketstar	*Gorgonocephalus eucnemis*	0.4	<0.1	6	0.1
sea cucumber unident.	Holothuroidea class	0.4	<0.1	3	<0.1
soft coral unident.	Alcyonacea order	0.4	<0.1	6	0.1
capelin	*Mallotus villosus*	0.2	<0.1	32	0.4
northern ronquil	*Ronquilus jordani*	0.2	<0.1	1	<0.1
whelk unident.	Buccinidae family	0.2	<0.1	6	0.1
Amphilaphis sp.	*Amphilaphis* sp.	0.2	<0.1	15	0.2
Pacific sandfish	*Trichodon trichodon*	0.1	<0.1	2	<0.1
sea star unident.	*Pteraster* sp.	0.1	<0.1	1	<0.1
sea asnail unident.	*Liparis* sp.	0.1	<0.1	1	<0.1
barnacle unident.	Thoracica order	0.1	<0.1	4	0.1
sculpin unident.	Cottidae family	0.1	<0.1	4	0.1
heart urchin unident.	Spatangoida order	0.1	<0.1	1	<0.1
unsorted shab	unsorted shab	0.1	<0.1		-
nudibranch unident.	Nudibranchia arder	0.1	<0.1	2	<0.1
sea mouse unident.	Aphroditidae family	0.0	<0.1	2	<0.1
fuzzy crab	*Acantholithodes hispidus*	0.0	<0.1	1	<0.1
pandalid shrimp unident.	Pandalidae family	0.0	<0.1	5	0.1
shrimp unident.	decapoda order	0.0	<0.1	3	<0.1
mollusk unident.	Mollusca phylum	0.0	<0.1	1	<0.1
spiny lumpsuckers	*Eumicrotremus* sp.	0.0	<0.1	1	<0.1
common mud star	*Ctenodiscus crispatus*	0.0	<0.1	1	<0.1
scallop unident.	Pectinidae family	0.0	<0.1	1	<0.1
spider crab	*Loxorhynchus crispatus*	0.0	<0.1	1	<0.1
polychaete worm unident.	Polychaeta class	0.0	<0.1	2	<0.1
Total		6,338.8		7,179	

[a] 63% of POP caught in haul 99.

Table 8. -- Number-at-length estimates (millions) by area from acoustic-trawl surveys of walleye pollock during the 2013 summer GOA survey.

Length	Shelf	Sanak	Morzhovoi	Pavlof	Shumagins	Mitrofania	Nakchamik	Shelikof	Alitak/ Deadman	Chiniak	Barnabas	Marmot	Izhut	PWS	Kayak	Yakutat	Total
10	-	-	-	0.07	3.54	-	-	-	-	-	-	-	-	-	-	-	3.60
11	-	-	-	0.50	26.11	2.55	-	-	-	-	-	-	-	-	-	-	29.16
12	-	-	0.15	6.01	231.89	28.01	-	6.53	-	-	-	-	-	-	-	-	272.59
13	0.11	0.01	0.85	16.56	643.70	40.75	-	437.92	-	-	-	-	-	-	<0.01	<0.01	1,139.91
14	4.63	0.03	1.15	14.85	517.88	42.02	-	1,015.78	-	-	-	-	-	-	0.02	0.40	1,596.76
15	43.72	0.03	0.70	5.24	192.61	12.73	-	1,264.79	-	-	-	2.11	4.79	9.05	0.16	3.76	1,539.70
16	152.57	0.01	0.20	0.84	21.60	5.09	-	889.65	-	0.09	2.75	16.17	6.64	27.58	0.56	13.07	1,136.80
17	310.21	-	-	-	-	-	-	394.86	-	0.88	7.41	26.68	4.06	77.71	1.11	26.69	849.60
18	323.22	-	-	-	-	1.27	-	74.93	-	1.82	24.53	20.33	2.58	57.17	1.16	27.81	534.81
19	198.07	-	-	-	-	-	-	65.01	-	1.42	58.91	9.57	0.74	19.53	0.71	17.04	371.00
20	91.11	-	-	-	-	-	-	0.09	-	1.26	64.53	3.05	-	-	0.34	7.78	168.17
21	29.81	-	-	0.09	4.56	-	-	0.58	-	1.12	63.89	1.03	-	1.93	0.11	2.56	105.69
22	8.24	-	-	-	-	-	-	0.05	-	0.62	25.77	0.41	-	-	0.03	0.71	35.83
23	-	-	-	-	-	-	-	1.09	-	0.23	9.72	0.00	-	-	-	-	11.04
24	-	-	-	-	-	-	-	1.20	-	0.06	2.39	-	-	-	-	-	3.65
25	-	-	-	-	-	-	-	3.19	0.02	-	-	-	-	-	-	-	3.21
26	0.04	-	-	0.01	-	-	-	9.60	0.06	-	-	-	-	-	<0.01	<0.01	9.72
27	-	<0.01	-	0.02	-	-	-	9.65	0.17	-	-	-	-	-	-	-	9.85
28	0.17	<0.01	-	0.05	-	-	-	10.61	0.23	-	-	0.03	-	0.02	<0.01	0.01	11.13
29	0.42	0.01	-	0.05	-	-	-	5.49	0.30	-	-	0.02	-	-	<0.01	0.04	6.32
30	0.43	0.01	-	0.07	-	-	-	7.31	1.07	-	-	0.03	-	-	<0.01	0.04	8.97
31	0.34	0.03	-	0.04	-	-	-	4.28	1.91	-	-	0.18	-	-	<0.01	0.03	6.80
32	0.35	0.01	-	0.05	0.05	-	-	5.56	2.35	-	-	0.27	0.03	-	<0.01	0.03	8.70
33	0.33	0.05	-	0.04	-	-	-	7.27	1.69	-	-	0.50	0.05	-	<0.01	0.03	9.96
34	0.22	0.04	-	0.02	0.10	-	-	6.84	0.78	-	-	0.43	0.05	-	<0.01	0.02	8.50
35	0.45	0.02	-	0.01	-	-	-	14.69	0.23	0.02	0.04	0.54	0.10	-	0.01	0.02	16.13
36	0.81	0.01	-	<0.01	0.05	-	-	23.57	0.04	0.02	0.05	0.56	0.05	-	0.02	0.02	25.19
37	1.49	-	-	0.01	0.05	-	-	38.68	0.02	0.01	0.07	0.47	0.05	0.02	0.03	0.02	40.92
38	3.81	-	-	-	-	-	-	58.52	0.01	0.01	0.04	0.27	0.05	-	0.08	0.03	62.83
39	4.65	0.01	-	-	-	-	-	64.73	-	-	0.06	0.15	0.02	-	0.10	0.03	69.76
40	7.19	0.03	-	0.01	-	-	-	48.72	0.02	-	0.02	0.10	-	-	0.16	0.04	56.29
41	7.09	0.04	-	-	-	-	-	33.97	0.02	-	0.03	0.05	0.02	-	0.16	0.05	41.43
42	5.95	0.11	-	-	-	-	-	22.97	0.03	0.01	0.08	<0.01	0.01	0.02	0.13	0.05	29.35
43	6.36	0.17	-	<0.01	0.05	-	-	10.47	-	0.04	0.10	-	-	-	0.14	0.05	17.38

Table 8.--Continued.

Length	Shelf	Sanak	Morzhovoi	Pavlof	Shumagins	Mitrofania	Nakchamik	Shelikof	Alitak/ Deadman	Chiniak	Barnabas	Marmot	Izhut	PWS	Kayak	Yakutat	Total
44	6.46	0.21	-	0.01	-	-	0.02	4.44	-	0.06	0.07	-	-	-	0.14	0.05	11.48
45	8.04	0.17	-	-	-	-	-	1.17	0.03	0.07	0.13	0.04	-	0.23	0.18	0.06	10.13
46	5.73	0.10	-	0.01	-	-	-	2.78	0.04	0.15	0.14	0.01	-	0.12	0.13	0.05	9.27
47	6.22	0.05	-	-	-	-	0.07	5.03	0.08	0.18	0.36	0.02	-	0.12	0.14	0.04	12.30
48	8.77	0.02	-	<0.01	0.05	-	0.10	7.01	0.13	0.27	0.62	-	-	0.12	0.20	0.05	17.34
49	8.50	0.01	0.01	<0.01	0.05	-	0.20	6.54	0.28	0.39	0.68	0.01	-	0.02	0.19	0.05	16.93
50	9.01	0.02	-	-	-	-	0.49	15.48	0.26	0.55	1.20	0.01	-	-	0.20	0.05	27.28
51	9.35	0.02	0.04	<0.01	0.05	-	0.44	18.60	0.26	1.18	1.69	0.04	-	0.23	0.21	0.05	32.16
52	13.37	0.03	0.04	<0.01	0.05	-	0.86	17.42	0.50	1.49	2.81	0.07	-	0.12	0.30	0.07	37.13
53	13.12	<0.01	0.15	-	-	-	0.86	14.50	0.40	1.67	3.71	0.09	0.01	0.47	0.30	0.07	35.34
54	18.19	0.01	0.08	<0.01	0.05	-	0.93	9.40	0.59	2.19	3.96	0.10	-	0.47	0.41	0.13	36.49
55	15.52	0.01	0.16	<0.01	0.15	-	0.76	8.10	0.59	2.21	3.05	0.19	0.01	1.05	0.35	0.09	32.25
56	10.63	0.02	0.25	-	-	-	0.73	5.69	0.65	2.13	3.50	0.15	-	0.82	0.24	0.06	24.87
57	11.00	0.03	0.34	0.01	0.15	-	0.44	6.12	0.62	1.80	2.82	0.25	-	0.47	0.25	0.06	24.36
58	6.94	<0.01	0.39	<0.01	0.24	-	0.27	2.49	0.61	1.18	2.28	0.12	0.01	0.72	0.16	0.04	15.45
59	5.09	0.01	0.46	0.01	0.52	-	0.32	4.08	0.40	1.00	1.92	0.33	-	0.70	0.12	0.03	14.99
60	4.13	0.01	0.26	<0.01	0.15	-	0.17	2.12	0.45	0.66	1.66	0.32	-	0.12	0.09	0.02	10.16
61	3.54	<0.01	0.23	<0.01	0.10	-	0.05	0.23	0.47	0.43	1.17	0.25	0.01	0.35	0.08	0.02	6.93
62	1.71	-	0.15	0.02	0.19	-	0.15	0.70	0.48	0.22	0.62	0.26	-	0.23	0.04	0.01	4.79
63	0.70	<0.01	0.22	0.04	-	-	-	0.38	0.35	0.07	0.55	0.10	-	0.12	0.02	0.01	2.54
64	0.44	-	0.15	0.07	0.05	-	0.05	0.23	0.29	0.11	0.53	0.04	-	-	0.01	<0.01	1.98
65	0.56	-	0.13	0.04	0.05	-	-	0.15	0.21	0.05	0.36	0.06	-	-	0.01	<0.01	1.63
66	0.15	-	0.08	0.06	-	-	-	-	0.25	0.02	0.37	0.03	-	-	<0.01	<0.01	0.96
67	0.34	-	0.11	0.07	-	-	-	-	0.15	-	0.07	0.01	-	-	0.01	<0.01	0.76
68	0.09	-	0.05	0.01	0.05	-	-	-	0.07	-	0.12	-	-	-	<0.01	<0.01	0.40
69	0.05	-	0.02	0.05	0.05	-	-	-	0.09	-	0.10	0.01	-	-	<0.01	<0.01	0.38
70	-	-	0.03	0.03	0.05	-	-	-	0.06	-	0.04	-	0.01		-	-	0.22
71	-	-	0.04	0.06	-	-	-	-	0.03	-	-	-	-	-	-	-	0.13
72	-	-	0.02	0.02	-	-	-	-	0.01	-	-	-	-	-	-	-	0.06
73	-	<0.01	-	0.01	-	-	-	-	0.01	-	-	-	-	-	-	-	0.03
74	-	-	<0.01	-	-	-	-	-	0.04	-	-	-	-	-	-	-	0.04
75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
76	-	-	<0.01	0.01	-	-	-	-	0.01	-	-	-	-	-	-	-	0.00
77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Total	1,369.44	1.35	6.45	45.09	1,644.17	132.43	6.89	4,671.27	17.39	25.67	294.95	85.46	19.27	199.48	8.83	101.37	8,629.53

Table 9. -- Biomass-at-length estimates (thousands of metric tons) by area from acoustic-trawl surveys of walleye pollock during the 2013 GOA survey.

Length	Shelf	Sanak	Morzhovoi	Pavlof	Shumagins	Mitrofania	Nakchamik	Shelikof	Alitak/ Deadman	Chiniak	Barnabas	Marmot	Izhut	PWS	Kayak	Yakutat	Total
10	-	-	-	0.5	24.9	-	-	-	-	-	-	-	-	-	-	-	25.3
11	-	-	-	4.7	246.1	24.0	-	-	-	-	-	-	-	-	-	-	274.8
12	-	-	2.1	84.1	3,246.4	392.2	-	91.4	-	-	-	-	-	-	-	-	3,816.2
13	1.8	0.2	14.1	273.8	10,640.7	673.6	-	7,239.1	-	-	-	-	-	-	<0.1	<0.1	18,843.3
14	95.7	0.6	23.8	306.9	10,702.9	868.5	-	20,992.8	-	-	-	-	-	-	0.4	8.2	32,999.7
15	1,020.9	0.6	16.4	122.3	4,497.0	297.3	-	29,530.2	-	-	-	49.2	111.9	211.3	3.7	87.7	35,948.5
16	4,530.8	0.2	5.9	24.8	641.4	151.3	-	26,419.9	-	2.6	81.6	480.1	197.1	819.0	16.7	388.2	33,759.6
17	10,765.0	-	-	-	-	-	-	13,702.5	-	30.5	257.3	925.8	140.7	2,696.6	38.6	926.4	29,483.4
18	13,243.3	-	-	-	-	52.2	-	3,069.9	-	74.6	1,004.9	832.8	105.8	2,342.3	47.5	1,139.7	21,912.9
19	9,573.2	-	-	-	-	-	-	3,142.0	-	68.7	2,847.5	462.4	35.6	944.1	34.4	823.8	17,931.8
20	5,010.9	-	-	-	-	-	-	5.0	-	69.5	3,549.3	167.9	-	-	18.7	428.0	9,249.3
21	1,946.4	-	-	5.7	297.8	-	-	38.1	-	73.3	4,171.2	67.5	-	125.9	7.1	167.2	6,900.2
22	620.8	-	-	-	-	-	-	4.0	-	46.9	1,941.0	30.6	-	-	2.2	53.4	2,698.9
23	-	-	-	-	-	-	-	98.6	-	20.6	876.6	0.2	-	-	-	-	996.0
24	-	-	-	-	-	-	-	114.9	-	5.5	229.6	-	-	-	-	-	350.0
25	-	-	-	-	-	-	-	345.4	2.3	-	-	-	-	-	-	-	347.7
26	5.4	-	-	1.6	-	-	-	1,245.2	8.2	-	-	-	-	-	<0.1	0.5	1,260.8
27	-	0.6	-	3.4	-	-	-	1,359.5	23.9	-	-	-	-	-	-	-	1,387.4
28	26.5	0.7	-	7.6	-	-	-	1,666.2	36.6	-	-	4.5	-	3.0	0.1	2.3	1,747.4
29	77.3	1.6	-	9.0	-	-	-	1,020.3	55.1	-	-	3.1	-	-	0.3	6.7	1,173.4
30	85.7	2.6	-	14.5	-	-	-	1,461.3	213.7	-	-	6.7	-	-	0.3	7.4	1,792.1
31	77.5	6.0	-	8.2	-	-	-	961.9	428.7	-	-	40.7	-	-	0.3	6.7	1,529.8
32	87.7	3.3	-	12.3	12.6	-	-	1,390.7	587.8	-	-	66.8	7.4	-	0.3	7.5	2,176.5
33	93.7	14.9	-	10.2	-	-	-	2,042.9	476.2	-	-	140.1	14.9	-	0.3	8.1	2,801.3
34	67.2	10.8	-	5.5	30.8	-	-	2,085.8	238.9	-	-	131.0	16.2	-	0.2	5.8	2,592.1
35	154.2	6.1	-	4.2	-	-	-	5,074.2	80.4	5.3	15.5	187.4	34.6	-	2.0	7.1	5,571.0
36	309.4	5.0	-	0.4	19.2	-	-	8,953.9	16.1	5.8	17.1	212.3	17.9	-	5.9	6.4	9,569.4
37	612.0	-	-	5.4	20.8	-	-	15,900.9	8.7	2.1	27.7	193.5	21.8	8.0	12.9	7.4	16,821.1
38	1,676.1	-	-	-	-	-	-	25,755.0	6.1	2.2	19.8	117.9	23.3	-	37.2	12.7	27,650.3
39	2,222.5	4.2	-	-	-	-	-	30,938.9	-	-	27.4	70.8	11.3	-	49.6	16.0	33,340.7
40	3,713.2	13.7	-	6.2	-	-	-	25,173.4	10.9	-	11.6	50.6	-	-	84.3	20.5	29,084.6
41	4,007.7	22.5	-	-	-	-	-	19,211.3	12.0	-	17.6	28.4	10.0	-	89.1	30.4	23,428.9
42	3,566.5	63.5	-	-	-	-	-	13,773.5	18.8	3.1	50.2	1.5	3.5	11.6	78.7	29.3	17,600.1
43	4,095.3	110.9	-	0.6	32.5	-	-	6,746.0	-	24.4	64.7	-	-	-	90.4	33.6	11,198.4

Table 9.-- Continued.

Length	Shelf	Sanak	Morzhovoi	Pavlof	Shumagins	Mitrofania	Nakchamik	Shelikof	Alitak/ Deadman	Chiniak	Barnabas	Marmot	Izhut	PWS	Kayak	Yakutat	Total
44	4,555.1	149.3	-	8.5	-	-	17.2	3,126.2	-	43.0	51.9	-	-	-	100.9	36.0	8,088.1
45	6,117.0	130.9	-	-	-	-	-	890.2	21.0	55.8	98.2	32.6	-	177.5	137.0	42.1	7,702.4
46	4,451.4	78.8	-	9.4	-	-	-	2,161.6	29.6	118.0	109.6	11.1	-	90.7	97.1	41.4	7,198.7
47	5,180.8	40.4	-	-	-	-	61.0	4,184.1	66.3	147.6	299.7	13.9	-	97.2	116.2	34.9	10,242.1
48	7,908.4	15.9	-	0.9	45.5	-	88.1	6,322.3	121.6	241.6	557.2	-	-	105.2	178.5	48.7	15,633.8
49	8,293.1	12.9	9.3	0.9	47.6	-	190.8	6,384.3	276.9	380.7	658.9	14.0	-	18.9	187.5	49.3	16,525.2
50	9,112.3	17.9	-	-	-	-	494.4	15,659.5	265.8	558.2	1,215.8	14.5	-	-	206.2	53.8	27,598.3
51	10,297.5	19.4	42.1	1.0	53.6	-	484.4	20,480.6	285.7	1,297.4	1,859.2	39.5	-	257.1	233.7	58.0	35,409.2
52	15,441.6	30.6	46.7	1.1	56.2	-	987.6	20,114.3	579.2	1,717.8	3,245.5	82.5	-	134.8	350.7	85.4	42,874.0
53	15,834.6	5.3	184.4	-	-	-	1,032.4	17,502.3	484.8	2,018.5	4,475.6	103.5	7.1	563.5	361.0	82.0	42,655.2
54	23,138.7	11.2	97.2	1.2	62.0	-	1,181.6	11,955.9	748.9	2,786.1	5,042.8	133.5	-	594.1	517.3	162.6	46,433.1
55	21,125.0	12.0	220.9	3.8	198.9	-	1,031.0	11,030.1	801.7	3,007.7	4,157.5	262.7	8.0	1,429.6	479.0	120.3	43,888.4
56	14,623.6	30.4	337.8	-	-	-	1,008.8	7,826.7	896.4	2,926.5	4,819.2	206.5	-	1,124.2	331.4	84.0	34,215.6
57	15,969.7	38.4	491.8	21.6	212.2	-	638.8	8,889.8	896.4	2,612.0	4,099.7	363.5	-	677.9	361.3	94.4	35,367.6
58	10,409.1	6.6	579.1	7.0	365.4	-	403.3	3,737.8	916.8	1,776.9	3,418.4	175.2	8.8	1,079.7	235.9	59.9	23,180.0
59	8,062.2	14.0	732.3	15.7	817.8	-	503.2	6,463.2	633.0	1,591.3	3,040.1	528.5	-	1,109.2	183.8	41.8	23,736.0
60	6,937.8	14.8	433.4	4.7	245.7	-	287.6	3,561.3	753.9	1,111.0	2,797.2	532.9	-	196.2	157.4	39.3	17,073.2
61	6,046.8	7.5	394.1	3.2	166.2	-	83.4	395.9	806.6	735.1	1,987.8	418.6	10.1	597.4	137.8	31.3	11,821.9
62	3,084.5	-	270.3	28.5	351.1	-	264.2	1,254.3	870.6	401.8	1,122.6	468.0	-	420.6	70.3	16.0	8,622.9
63	1,358.9	8.6	420.4	70.5	-	-	-	739.1	675.5	138.2	1,070.7	194.4	-	226.7	30.1	10.9	4,943.9
64	929.4	-	320.0	154.4	106.1	-	102.7	487.5	599.4	239.5	1,114.6	90.1	-	-	21.2	4.8	4,169.6
65	1,169.6	-	276.6	77.5	101.5	-	-	309.1	441.5	97.2	760.1	124.0	-	-	26.7	6.1	3,389.7
66	325.6	-	177.3	133.2	-	-	-	-	544.1	33.6	825.9	63.0	-	-	7.4	1.7	2,111.8
67	739.3	-	231.5	157.8	-	-	-	-	318.0	-	146.5	31.1	-	-	16.9	3.8	1,644.8
68	201.9	-	106.7	29.4	109.9	-	-	-	164.9	-	278.7	-	-	-	4.6	1.0	897.1
69	130.1	-	44.4	117.3	116.0	-	-	-	223.7	-	228.6	34.0	-	-	3.0	0.7	897.8
70	-	-	78.9	70.3	136.4	-	-	-	175.4	-	125.6	-	16.5	-	-	-	603.1
71	-	-	110.2	164.6	-	-	-	-	85.3	-	-	-	-	-	-	-	360.1
72	-	-	65.2	73.8	-	-	-	-	31.9	-	-	-	-	-	-	-	170.9
73	-	14.1	-	38.5	-	-	-	-	33.3	-	-	-	-	-	-	-	85.8
74	-	-	7.6	-	-	-	-	-	138.7	-	-	-	-	-	-	-	146.3
75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
76	-	-	8.2	43.6	-	-	-	-	37.6	-	-	-	-	-	-	-	89.4
77	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	
78	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	
79	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	
80	-	-	9.6	-	-	-	-	-	-	-		-	-	-	-	-	9.6
Total	269,130.7	927.0	5,758.0	2,150.3	33,605.2	2,459.0	8,860.6	423,030.6	15,148.8	24,470.3	62,818.0	8,209.6	802.6	16,062.5	5,174.2	5,441.2	884,048.5

Table 10. -- Number-at-age estimates (millions) by area from acoustic-trawl surveys of walleye pollock during the 2013 summer GOA survey.

Age	Shelf	Sanak	Morzhovoi	Pavlof	Shumagins	Mitrofania	Nakchamik	Shelikof	Alitak/ Deadman	Chiniak	Barnabas	Marmot	Izhut	PWS	Kayak	Yakutat	Total
1	1,161.69	0.07	3.05	44.15	1,641.89	132.43	-	4,151.36	-	7.41	256.16	79.34	18.80	192.96	4.20	99.83	7,793.36
2	2.58	0.10	-	0.27	0.10	-	-	76.67	5.51	0.10	3.77	1.17	0.13	0.02	0.02	0.16	90.59
3	51.69	0.75	<0.01	0.13	0.21	-	0.09	304.37	3.56	0.38	0.91	2.44	0.30	0.28	1.13	0.46	366.70
4	21.87	0.19	0.02	0.01	0.06	-	0.39	30.68	0.38	0.86	1.59	0.08	0.01	0.26	0.49	0.15	57.03
5	29.42	0.08	0.20	<0.01	0.12	-	1.33	29.90	0.91	2.88	5.31	0.17	<0.01	0.77	0.66	0.18	71.95
6	43.80	0.07	0.71	0.02	0.44	-	2.17	38.16	2.01	5.57	9.95	0.61	0.01	1.74	0.99	0.26	106.50
7	34.26	0.04	1.06	0.08	0.66	-	1.77	25.76	2.29	4.90	9.27	0.82	0.01	1.99	0.78	0.20	83.88
8	15.94	0.02	0.68	0.12	0.37	-	0.76	9.98	1.31	2.38	4.75	0.46	0.01	0.94	0.36	0.09	38.16
9	4.31	0.01	0.23	0.06	0.10	-	0.22	2.86	0.46	0.63	1.39	0.14	<0.01	0.27	0.10	0.03	10.82
10	1.74	<0.01	0.15	0.05	0.08	-	0.08	0.84	0.28	0.28	0.71	0.08	<0.01	0.14	0.04	0.01	4.49
11	0.70	<0.01	0.12	0.06	0.04	-	0.02	0.22	0.24	0.10	0.42	0.05	<0.01	0.03	0.02	<0.01	2.01
12	0.83	<0.01	0.11	0.06	0.05	-	0.03	0.31	0.17	0.11	0.35	0.05	<0.01	0.04	0.02	<0.01	2.13
13	0.18	<0.01	0.04	0.03	0.03	-	<0.01	0.02	0.09	0.02	0.13	0.01	<0.01	0.01	0.00	<0.01	0.58
14	0.36	<0.01	0.05	0.02	0.04	-	0.02	0.14	0.12	0.04	0.20	0.04	-	0.02	0.01	<0.01	1.05
15	0.03	<0.01	0.01	0.02	-	-	-	-	0.04	-	0.01	<0.01	-	-	<0.01	<0.01	0.11
16	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
17	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
18	0.03	-	0.01	<0.01	<0.01	-	<0.01	0.01	0.02	0.01	0.03	<0.01	-	-	<0.01	<0.01	0.11
Total	1,369.44	1.35	6.45	45.09	1,644.17	132.43	6.89	4,671.27	17.39	25.67	294.95	85.46	19.27	199.48	8.83	101.37	8,629.53

Table 11. -- Biomass-at-age estimates (thousands of metric tons) by area from acoustic-trawl surveys of walleye pollock during the 2013 summer GOA survey.

Age	Shelf	Sanak	Morzhovoi	Pavlof	Shumagins	Mitrofania	Nakchamik	Shelikof	Alitak/ Deadman	Chiniak	Barnabas	Marmot	Izhut	PWS	Kayak	Yakutat	Total
1	46.81	<0.01	0.06	0.82	30.30	2.46	-	104.34	-	0.38	14.61	3.02	0.59	7.14	0.17	4.02	214.7
2	0.75	0.03	-	0.05	0.03	-	-	18.29	1.30	0.01	0.36	0.35	0.04	<0.01	0.01	0.04	21.3
3	31.70	0.47	<0.01	0.05	0.09	-	0.07	146.04	1.01	0.29	0.62	0.93	0.12	0.21	0.70	0.26	182.6
4	19.13	0.14	0.02	0.01	0.06	-	0.41	22.84	0.37	0.88	1.62	0.06	0.00	0.23	0.43	0.13	46.3
5	32.99	0.07	0.27	<0.01	0.15	-	1.58	33.04	1.09	3.49	6.39	0.22	<0.01	0.96	0.75	0.20	81.2
6	55.38	0.08	1.07	0.04	0.65	-	2.78	45.69	2.77	7.35	13.22	0.90	0.01	2.40	1.25	0.33	133.9
7	46.76	0.06	1.72	0.17	1.06	-	2.39	32.96	3.58	6.82	13.29	1.32	0.02	2.92	1.06	0.27	114.4
8	22.84	0.03	1.18	0.28	0.63	-	1.05	13.47	2.18	3.42	7.15	0.76	0.01	1.41	0.52	0.13	55.1
9	6.21	0.01	0.43	0.14	0.16	-	0.31	3.85	0.82	0.91	2.18	0.24	<0.01	0.41	0.14	0.04	15.9
10	2.74	<0.01	0.28	0.11	0.14	-	0.13	1.30	0.53	0.43	1.21	0.15	<0.01	0.22	0.06	0.02	7.3
11	1.27	<0.01	0.26	0.12	0.08	-	0.04	0.38	0.52	0.17	0.81	0.09	<0.01	0.05	0.03	0.01	3.8
12	1.43	<0.01	0.25	0.14	0.11	-	0.05	0.50	0.36	0.18	0.63	0.09	0.01	0.06	0.03	0.01	3.8
13	0.35	<0.01	0.08	0.09	0.07	-	0.01	0.04	0.21	0.04	0.27	0.03	<0.01	0.02	0.01	<0.01	1.2
14	0.66	<0.01	0.11	0.05	0.08	-	0.03	0.24	0.24	0.08	0.39	0.07	-	0.03	0.02	<0.01	2.0
15	0.06	0.01	0.02	0.05	-	-	-	-	0.13	-	0.01	<0.01	-	-	<0.01	<0.01	0.3
16	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
17	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
18	0.06	-	0.02	0.01	0.01	-	0.01	0.03	0.04	0.01	0.07	0.01	-	-	<0.01	<0.01	0.3
Total	269.13	0.93	5.76	2.15	33.61	2.46	8.86	423.03	15.15	24.47	62.82	8.21	0.80	16.06	5.17	5.44	884.0

Table 12. -- Pollock number (millions), biomass (thousands of metric tons), and relative estimation error by area for the summer 2003, 2005, 2011, and 2013 Gulf of Alaska acoustic trawl surveys.

	2003			2005			2011			2013		
Area	Number	Biomass	est. error	Number	Biomass	est. error	Number	Biomass	est. error	Number	Biomass	est. error
Shumagin[a] Shelf	not surveyed			68.7	61.2		72.1	68.1		38.2	41.1	
Chirikof[b] Shelf	7.6	3.9	0.21	35.5	31.3	0.11	104.6	98.8	0.09	39.8	42.8	0.15
Kodiak[c] Shelf	484.7	53.1		24.5	21.9		37.7	35.6		820.2	150.7	
Eastern[d] Shelf	not surveyed			not surveyed			not surveyed			471.2	34.6	
Sanak Trough	not surveyed			not surveyed			1.1	1.0	0.11	1.3	0.9	0.23
Morzhovoi Bay	not surveyed			not surveyed			2.5	4.4	0.07	6.5	5.8	0.20
Pavlof Bay	not surveyed			not surveyed			5.1	2.9	0.08	45.1	2.2	0.18
Shumagin Islands	15.8	7.4	0.16	not surveyed			4.6	4.2	0.09	1,644.2	33.6	0.14
Mitrofania Island	<0.1	<0.1	[e]	not surveyed			4.3	4.0	0.13	132.4	2.5	0.24
Nakchamik Island	13.0	4.1	0.13	not surveyed			4.3	1.7	0.06	6.9	8.9	0.13
Shelikof Strait	693.8	151.3	0.09	1,291.2	81.6	[e]	1,624.8	156.9	0.06	4,671.3	423.0	0.06
Alitak/Deadman Bay	14.6	9.2	0.15	not surveyed			5.3	2.6	[e]	17.4	15.1	0.26
Chiniak Trough	29.0	14.0	0.11	9.1	12.6	0.12	35.6	38.4	0.07	25.7	24.5	0.07
Barnabas Trough	65.4	30.4	0.11	12.9	15.1	0.14	29.5	33.8	0.10	294.9	62.8	0.06
Marmot/Izhut Bay	17.2	8.3	0.18	not surveyed			not surveyed			104.7	9.0	0.07
Amatuli Trench	78.7	23.1	[e]	not surveyed			not surveyed			included with shelf area		
Kenai Peninsula Bays	17.7	1.5	[e]	not surveyed			not surveyed			not surveyed		
Prince William Sound	29.9	14.7	0.14	not surveyed			not surveyed			199.5	16.1	0.09
Kayak Island Trough	not surveyed			not surveyed			not surveyed			8.8	5.2	0.15
Yakutat trough	not surveyed			not surveyed			not surveyed			101.4	5.4	0.13
Total	1,467.4	320.9		1,442.0	223.9		1,982.6	453.0		8,629.5	884.0	0.08

[a] Shumagin NPFMC area 610 - 159°-170°W
[b] Chirikof NPFMC area 620 - 154°-159°W
[c] Kodiak NPFMC area 630 - 147°-154°W
[d] Eastern NPFMC area 640 - 140°-147°W
[e] survey design not appropriate for variance estimation

Table 13. -- Summary of catch by species in the Aleutian wing trawl conducted in midwater in Sanak Trough during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	233.6	98.5	354	98.6
Pacific cod	*Gadus macrocephalus*	2.5	1.1	2	0.6
flathead sole	*Hippoglossoides elassodon*	1.1	0.5	3	0.8
Total		237.2		359	

Table 14. -- Summary of catch by species in two Aleutian wing trawls conducted in midwater in Morzhovoi Bay during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	897.0	98.4	1,869	99.5
smooth lumpsucker	*Aptocyclus ventricosus*	9.7	1.1	3	0.2
Pacific cod	*Gadus macrocephalus*	2.8	0.3	2	0.1
arrowtooth flounder	*Atheresthes stomias*	1.7	0.2	1	0.1
sturgeon poacher	*Podothecus acipenserinus*	0.1	<0.1	1	0.1
capelin	*Mallotus villosus*	0.1	<0.1	3	0.2
Total		911.4		1,879	

Table 15. -- Summary of catch by species in the Aleutian wing trawl conducted in midwater in Pavlof Bay during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	59.1	94.5	3,067	99.3
arrowtooth flounder	*Atheresthes stomias*	2.1	3.3	1	<0.1
capelin	*Mallotus villosus*	1.3	2.1	21	0.7
Total		62.6		3,089	

Table 16. -- Summary of catch by species in the Poly Nor'eastern bottom trawl conducted in Pavlof Bay during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
Pacific cod	*Gadus macrocephalus*	185.3	39.5	76	9.1
walleye pollock	*Gadus chalcogrammus*	107.0	22.8	75	9.0
flathead sole	*Hippoglossoides elassodon*	68.6	14.6	380	45.7
yellowfin sole	*Limanda aspera*	55.2	11.8	127	15.3
Pacific halibut	*Hippoglossus stenolepis*	11.4	2.4	4	0.5
Tanner crab	*Chionoecetes bairdi*	10.0	2.1	70	8.4
great sculpin	*Myoxocephalus polyacanthocephalus*	8.5	1.8	10	1.2
red king crab	*Paralithodes camtschaticus*	6.0	1.3	1	0.1
Alaska plaice	*Pleuronectes quadrituberculatus*	4.6	1.0	2	0.2
eelpout unident.	Zoarcidae family	3.0	0.6	17	2.0
king crab unident.	*Lithodes* sp.	2.2	0.5	1	0.1
sea anemone unident.	Actinostolidae family	2.2	0.5	6	0.7
northern sculpin	*Icelinus borealis*	1.8	0.4	5	0.6
sponge unident.	Porifera phylum	1.6	0.3	6	0.7
hermit crab unident.	Paguridae family	1.1	0.2	18	2.2
arrowtooth flounder	*Atheresthes stomias*	0.5	0.1	5	0.6
shrimp unident.	decapoda order	0.2	<0.1	28	3.4
		468.8		831	

Table 17. -- Summary of catch by species in six Aleutian wing trawls conducted in midwater in the Shumagins Islands area during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	588.8	71.0	27,166	97.4
salmon shark	*Lamna ditropis*	220.0	26.5	1	0.0
capelin	*Mallotus villosus*	10.3	1.2	628	2.3
smooth lumpsucker	*Aptocyclus ventricosus*	3.9	0.5	2	<0.1
Pacific halibut	*Hippoglossus stenolepis*	2.8	0.3	1	<0.1
eulachon	*Thaleichthys pacificus*	1.2	0.1	49	0.2
arrowtooth flounder	*Atheresthes stomias*	0.9	0.1	1	<0.1
magistrate armhook squid	*Berryteuthis magister*	0.6	0.1	23	0.1
squid unident.	cephalopoda class	0.3	<0.1	14	0.1
Total		828.7		27,885	

Table 18. -- Summary of catch by species in three Aleutian wing trawls conducted in midwater near Mitrofania Island during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	336.6	95.1	18,811	99.3
chum salmon	*Oncorhynchus keta*	10.3	2.9	4	<0.1
chinook salmon	*Oncorhynchus tshawytscha*	5.1	1.4	1	<0.1
capelin	*Mallotus villosus*	1.1	0.3	104	0.5
eulachon	*Thaleichthys pacificus*	0.5	0.2	23	0.1
jellyfish unident.	Scyphozoa class	0.2	0.1	5	<0.1
		353.9		18,948	

Table 19. -- Summary of catch by species in the Aleutian wing trawl conducted in midwater near Nakchamik Island during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	386.9	100	282	100
Total		386.9		282	

Table 20. -- Summary of catch by species in 13 Aleutian wing trawls conducted in midwater in Shelikof Strait during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	11,514.1	99.4	159,017	98.9
eulachon	*Thaleichthys pacificus*	29.1	0.3	1,156	0.7
magistrate armhook squid	*Berryteuthis magister*	11.6	0.1	11	<0.1
jellyfish unident.	Scyphozoa class	10.4	0.1	115	0.1
chum salmon	*Oncorhynchus keta*	5.0	<0.1	2	<0.1
Pacific ocean perch	*Sebastes alutus*	4.7	<0.1	6	<0.1
capelin	*Mallotus villosus*	4.5	<0.1	331	0.2
squid unident.	cephalopoda class	2.7	<0.1	74	<0.1
arrowtooth flounder	*Atheresthes stomias*	2.7	<0.1	3	<0.1
Atka mackerel	*Pleurogrammus monopterygius*	1.9	<0.1	1	<0.1
lions mane jelly	*Cyanea* sp.	0.5	<0.1	11	<0.1
isopod unident.	Isopoda order	<0.1	<0.1	11	<0.1
Total		11,587.3		160,738	

Table 21. -- Summary of catch by species in the two Poly Nor'eastern bottom trawls conducted in Alitak Bay during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	1460.63	94.1	951	66.9
Pacific herring	*Clupea pallasi*	73.224	4.7	357	25.1
jellyfish unident.	Scyphozoa class	11.233	0.7	104	7.3
Pacific cod	*Gadus macrocephalus*	6.34	0.4	2	0.1
smooth lumpsucker	*Aptocyclus ventricosus*	0.44	<0.1	1	0.1
eulachon	*Thaleichthys pacificus*	0.064	<0.1	1	0.1
capelin	*Mallotus villosus*	0.062	<0.1	4	0.3
salmon unident.	*Oncorhynchus* sp.	<0.1	<0.1	1	0.1
Total		1552.023		1421	

Table 22. -- Summary of catch by species in the Aleutian wing trawl conducted in midwater in Deadman Bay during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	464.84	86.6	1985	89.1
Pacific herring	*Clupea pallasi*	40.41	7.5	197	8.8
smooth lumpsucker	*Aptocyclus ventricosus*	27.62	5.1	14	0.6
jellyfish unident.	Scyphozoa class	3.9	0.7	33	1.5
Total		536.77		2229	

Table 23. -- Summary of catch by species in 10 Aleutian wing trawls conducted in midwater in Barnabas Trough during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	3,674.7	97.4	29,846	98.0
chum salmon	*Oncorhynchus keta*	42.4	1.1	20	0.1
jellyfish unident.	Scyphozoa class	31.1	0.8	185	0.6
arrowtooth flounder	*Atheresthes stomias*	6.4	0.2	4	<0.1
chinook salmon	*Oncorhynchus tshawytscha*	6.0	0.2	3	<0.1
smooth lumpsucker	*Aptocyclus ventricosus*	3.4	0.1	2	<0.1
capelin	*Mallotus villosus*	3.4	0.1	295	1.0
Pacific cod	*Gadus macrocephalus*	2.4	0.1	1	<0.1
Pacific herring	*Clupea pallasi*	1.0	<0.1	4	<0.1
Pacific ocean perch	*Sebastes alutus*	0.8	<0.1	1	<0.1
northern sea nettle	*Chrysaora melanaster*	0.3	<0.1	9	<0.1
flathead sole	*Hippoglossoides elassodon*	0.3	<0.1	2	<0.1
shrimp unident.	decapoda order	0.2	<0.1	66	0.2
lions mane jelly	*Cyanea* sp.	0.2	<0.1	4	<0.1
spiny lumpsuckers	*Eumicrotremus* sp.	0.1	<0.1	1	<0.1
hydroid unident.	hydrozoa class	<0.1	<0.1	1	<0.1
		3,772.7		30,444	

Table 24. -- Summary of catch by species in eight Aleutian wing trawls conducted in midwater in Chiniak Trough during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	4,387.9	97.0	8,593	62.5
capelin	*Mallotus villosus*	39.0	0.9	4,636	33.7
Pacific ocean perch	*Sebastes alutus*	33.7	0.7	43	0.3
chum salmon	*Oncorhynchus keta*	29.0	0.6	11	0.1
jellyfish unident.	Scyphozoa class	27.0	0.6	178	1.3
Pacific herring	*Clupea pallasi*	4.8	0.1	22	0.2
salps unident.	Thaliacea class	1.2	<0.1	220	1.6
smooth lumpsucker	*Aptocyclus ventricosus*	1.1	<0.1	1	<0.1
flathead sole	*Hippoglossoides elassodon*	0.5	<0.1	1	<0.1
eulachon	*Thaleichthys pacificus*	0.2	<0.1	8	0.1
hydroid unident.	hydrozoa class	0.1	<0.1	18	0.1
squid unident.	cephalopoda class	<0.1	<0.1	7	0.1
Total		4,524.3		13,738	

Table 25. -- Summary of catch by species in four Aleutian wing trawls conducted in midwater in Marmot Bay during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	1,977.8	91.5	35,131	96.6
chum salmon	*Oncorhynchus keta*	84.9	3.9	29	0.1
smooth lumpsucker	*Aptocyclus ventricosus*	61.1	2.8	31	0.1
jellyfish unident.	Scyphozoa class	18.2	0.8	89	0.2
eulachon	*Thaleichthys pacificus*	8.2	0.4	307	0.8
capelin	*Mallotus villosus*	7.3	0.3	785	2.2
Pacific cod	*Gadus macrocephalus*	2.6	0.1	2	<0.1
squid unident.	cephalopoda class	0.5	<0.1	8	<0.1
Pacific herring	*Clupea pallasi*	0.3	<0.1	1	<0.1
Total		2,160.8		36,383	

Table 26. -- Summary of catch by species in the Aleutian wing trawl conducted in midwater in Izhut Bay during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	134.6	88.4	3,269	77.4
eulachon	*Thaleichthys pacificus*	14.6	9.6	831	19.7
capelin	*Mallotus villosus*	1.3	0.8	106	2.5
jellyfish unident.	Scyphozoa class	1.2	0.8	11	0.3
Pacific sandfish	*Trichodon trichodon*	0.6	0.4	5	0.1
squid unident.	cephalopoda class	<0.1	<0.1	1	<0.1
Total		152.2		4,223	

Table 27. -- Summary of catch by species in three Aleutian wing trawls conducted in midwater in Prince William Sound and the trough south of Montague Island during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
magistrate armhook squid[a]	*Berryteuthis magister*	902.8	90.3	10,465	60.8
walleye pollock	*Gadus chalcogrammus*	75.4	7.5	6,010	34.9
capelin	*Mallotus villosus*	9.1	0.9	697	4.1
chinook salmon	*Oncorhynchus tshawytscha*	4.4	0.4	5	<0.1
Aurelia sp.	*Aurelia* sp.	3.2	0.3	4	<0.1
sockeye salmon	*Oncorhynchus nerka*	2.7	0.3	1	<0.1
chrysaora jellyfish	*Chrysaora* sp.	1.5	0.2	2	<0.1
squid unident.	cephalopoda class	0.6	0.1	14	0.1
lions mane jelly	*Cyanea* sp.	0.2	<0.1	1	<0.1
Pacific herring	*Clupea pallasi*	0.1	<0.1	1	<0.1
Aequorea sp.	*Aequorea* sp.	0.1	<0.1	3	<0.1
Total		999.9		17,203	

[a] all squid captured in haul 167

Table 28. -- Summary of catch by species in the Poly Nor'eastern bottom trawl conducted in midwater in the trough south of Montague Island during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
walleye pollock	*Gadus chalcogrammus*	63.2	78.4	217	60.3
arrowtooth flounder	*Atheresthes stomias*	4.3	5.3	2	0.6
lion's mane jellyfish	*Cyanea capillata*	3.5	4.4	12	3.3
eulachon	*Thaleichthys pacificus*	3.2	4.0	81	22.5
sockeye salmon	*Oncorhynchus nerka*	2.0	2.5	1	0.3
flathead sole	*Hippoglossoides elassodon*	1.6	2.0	1	0.3
hydromedusa jelly unident.	*Aequorea* sp.	1.5	1.9	5	1.4
smooth lumpsucker	*Aptocyclus ventricosus*	0.7	0.8	1	0.3
sidestripe shrimp	*Pandalopsis dispar*	0.5	0.7	32	8.9
sea mouse unident.	Aphroditidae family	<0.1	<0.1	2	0.6
pandalid shrimp unident.	Pandalidae family	<0.1	<0.1	5	1.4
common mud star	*Ctenodiscus crispatus*	<0.1	<0.1	1	0.3
Total		80.6		360	

Table 29. -- Summary of catch by species in the Aleutian wing trawl conducted in midwater in Kayak Island Trough during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
light dusky rockfish	*Sebastes ciliatus*	635.6	61.4	323	39.9
Pacific ocean perch	*Sebastes alutus*	263.0	25.4	324	40.0
walleye pollock	*Gadus chalcogrammus*	117.1	11.3	148	18.3
widow rockfish	*Sebastes entomelas*	6.4	0.6	4	0.5
chum salmon	*Oncorhynchus keta*	4.2	0.4	1	0.1
northern sea nettle	*Chrysaora melanaster*	4.0	0.4	6	0.7
chinook salmon	*Oncorhynchus tshawytscha*	3.9	0.4	1	0.1
magistrate armhook squid	*Berryteuthis magister*	0.8	0.1	2	0.2
prowfish	*Zaprora silenus*	0.0	0.0	1	0.1
		1,035.0		810	

Table 30. -- Summary of catch by species in the four Aleutian wing trawls conducted in midwater in Yakutat Trough during the summer 2013 walleye pollock acoustic- trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
Pacific ocean perch	*Sebastes alutus*	2,770.0	83.3	3,584	24.9
walleye pollock	*Gadus chalcogrammus*	490.6	14.8	8,968	62.4
eulachon	*Thaleichthys pacificus*	29.6	0.9	969	6.7
northern sea nettle	*Chrysaora melanaster*	15.3	0.5	17	0.1
squid unident.	cephalopoda class	8.1	0.2	735	5.1
chum salmon	*Oncorhynchus keta*	4.3	0.1	1	0.0
rougheye rockfish	*Sebastes aleutianus*	3.2	0.1	3	0.0
arrowtooth flounder	*Atheresthes stomias*	0.8	0.0	1	0.0
chinook salmon	*Oncorhynchus tshawytscha*	0.8	0.0	2	0.0
capelin	*Mallotus villosus*	0.5	0.0	62	0.4
Pacific herring	*Clupea pallasi*	0.2	0.0	4	0.0
lanternfish unident.	Myctophidae family	0.1	0.0	21	0.1
sablefish	*Anoplopoma fimbria*	0.0	0.0	1	0.0
jellyfish unident.	Scyphozoa class	0.0	0.0	4	0.0
prowfish	*Zaprora silenus*	0.0	0.0	1	0.0
shrimp unident.	decapoda order	0.0	0.0	1	0.0
isopod unident.	Isopoda order	0.0	0.0	2	0.0
		3,323.5		14,376	

Table 31. -- Summary of catch by species in the Poly Nor'eastern bottom trawl conducted in Yakutat Trough during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
Pacific ocean perch	*Sebastes alutus*	95.1	90.5	213	96.8
light dusky rockfish	*Sebastes ciliatus*	9.3	8.9	5	2.3
northern sea nettle	*Chrysaora melanaster*	0.7	0.7	2	0.9
Total		105.1		220	

Table 32. -- Pollock biomass (metric tons) by NPFMC management area for walleye pollock less than or equal to 23 cm FL (age-1) and walleye pollock greater than 23cm FL (age-2+) for the 2013 summer Gulf of Alaska acoustic-trawl survey.

Management area	Geographic area	Total biomass	Age-1 biomass	Age-2+ biomass
610	Shelf	41,054.72	12.80	41,041.92
	Sanak Trough	927.02	1.59	925.44
	Morzhovoi Bay	5,758.04	62.24	5,695.80
	Pavlof Bay	2,150.28	822.87	1,327.41
	Shumagin Islands	30,706.60	27,684.00	3,022.60
	Mitrofania	222.33	248.78	-
Total		80,818.99	28,832.28	52,013.17
620	Shelf	37,308.20	11.63	37,296.57
	Shumagin Islands	2,898.57	2,613.25	285.32
	Mitrofania	2,236.69	2,236.69	-
	Nakchamik	8,860.62	-	8,860.62
	Shelikof Strait	326,716.85	33,640.79	293,076.06
	Alitak	15,148.81	-	15,148.81
Total		393,169.74	38,502.36	354,667.38
630	Shelf	156,215.27	28,441.61	127,773.66
	Shelikof Strait	96,313.75	70,692.75	25,621.00
	Barnabas Trough	62,817.95	14,729.35	48,088.60
	Chiniak Trough	24,470.27	386.60	24,083.67
	Marmot Bay	8,209.64	3,016.58	5,193.06
	Izhut Bay	802.63	591.15	211.48
	PWS shelf	7,898.82	5,612.60	2,286.22
Total		356,728.33	123,470.64	233,257.69
640	Shelf	34,552.45	18,342.66	16,209.79
	PWS shelf	2,193.68	1,526.69	666.99
	Kayak Island	5,174.16	169.27	5,004.89
	Yakutat Trough	5,230.71	3,826.02	1,404.69
Total	Total	47,151.00	23,864.64	23,286.36
649	PWS	5,969.96	-	5,969.96
Total		5,969.96	-	5,969.96
650	Yakutat Trough	210.46	196.58	13.88
Total		210.46	196.58	13.88
Survey Total		884,048.49	212,842.42	666,003.65

Table 33. -- Summary of catch by species in 11 Methot trawls conducted during the summer 2013 walleye pollock acoustic-trawl survey of the Gulf of Alaska shelf.

		Weight		Number	
Common name	Scientific name	kg	Percent	Nos.	Percent
euphausiid unident.	Euphausiacea order	42.3	76.3	563,001	97.6
jellyfish unident.	Scyphozoa class	6.3	11.4	776	0.1
hydromedusa jelly unident.	*Aequorea* sp.	3.9	7.1	125	<0.1
northern sea nettle	*Chrysaora melanaster*	1.4	2.5	15	<0.1
lions mane jelly	*Cyanea* sp.	0.8	1.4	13	<0.1
salps unident.	salpida order	0.4	0.8	3,766	0.7
amphipod unident.	amphipoda order	0.2	0.3	8,055	1.4
walleye pollock age 0	*Gadus chalcogrammus*	0.1	0.1	97	<0.1
brittlestarfish unident.	Ophiuroidea class	0.0	0.1	15	<0.1
hydroid unident.	hydrozoa class	0.0	<0.1	9	<0.1
flatfish larvae	Pleuronectiformes order	0.0	<0.1	33	<0.1
copepod unident.	Copepoda class	0.0	<0.1	777	0.1
mud star unident.	*Ctenodiscus* sp.	0.0	<0.1	1	<0.1
octopus unident.	*Octopus* sp.	0.0	<0.1	1	<0.1
pandalid shrimp unident.	Pandalidae family	0.0	<0.1	3	<0.1
fish larvae unident.	actinopteryii subclass	0.0	<0.1	1	<0.1
lanternfish unident.	Myctophidae family	0.0	<0.1	3	<0.1
shrimp unident.	decapoda order	0.0	<0.1	1	<0.1
Pacific cod	*Gadus macrocephalus*	0.0	<0.1	1	<0.1
		55.4		576,693	

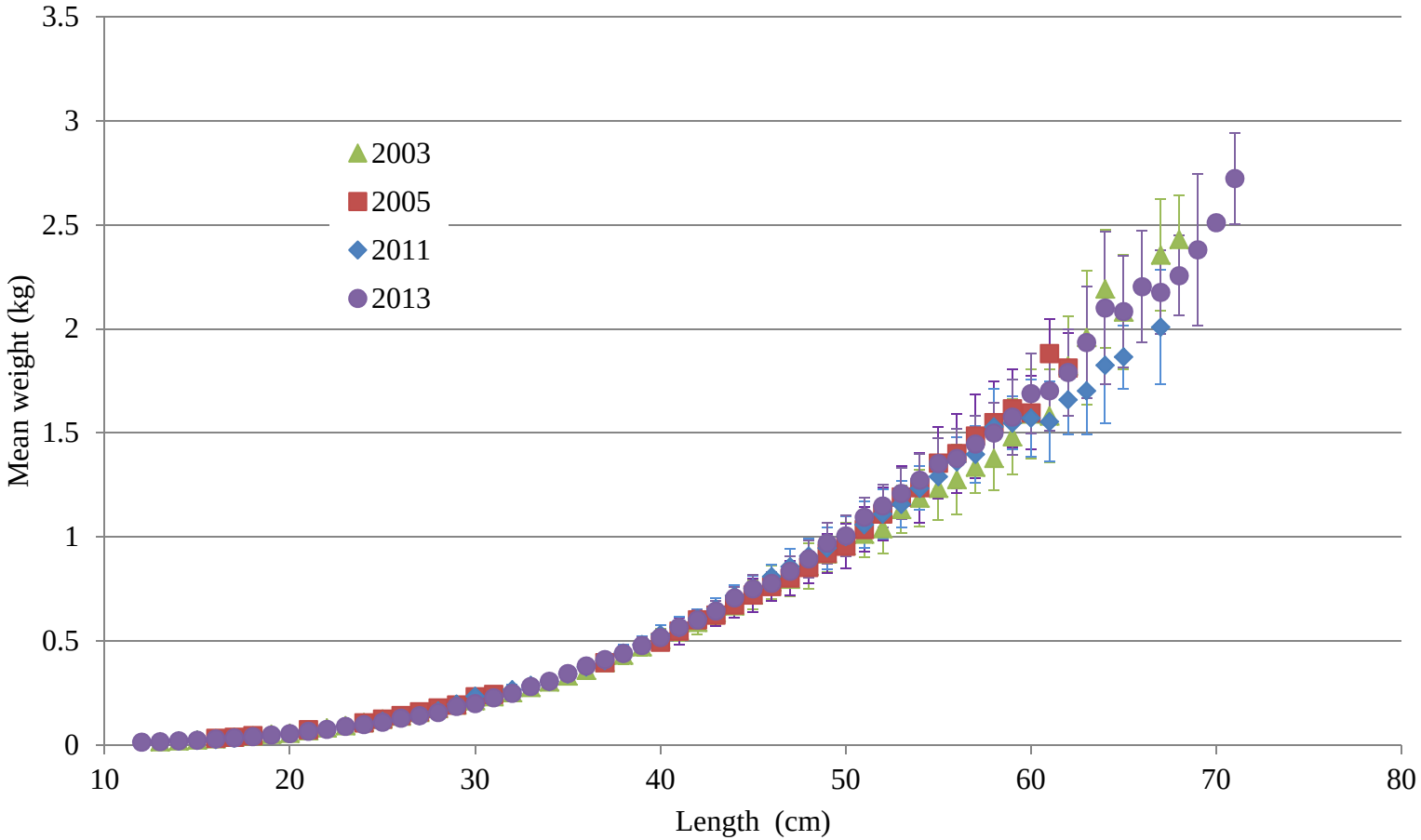

Figure 1. -- Mean weight (kg), and standard deviation, at length (cm) for all areas combined during GOA surveys conducted in 2003, 2005, 2011, and 2013. Only length classes containing at least six fish were plotted for each year.

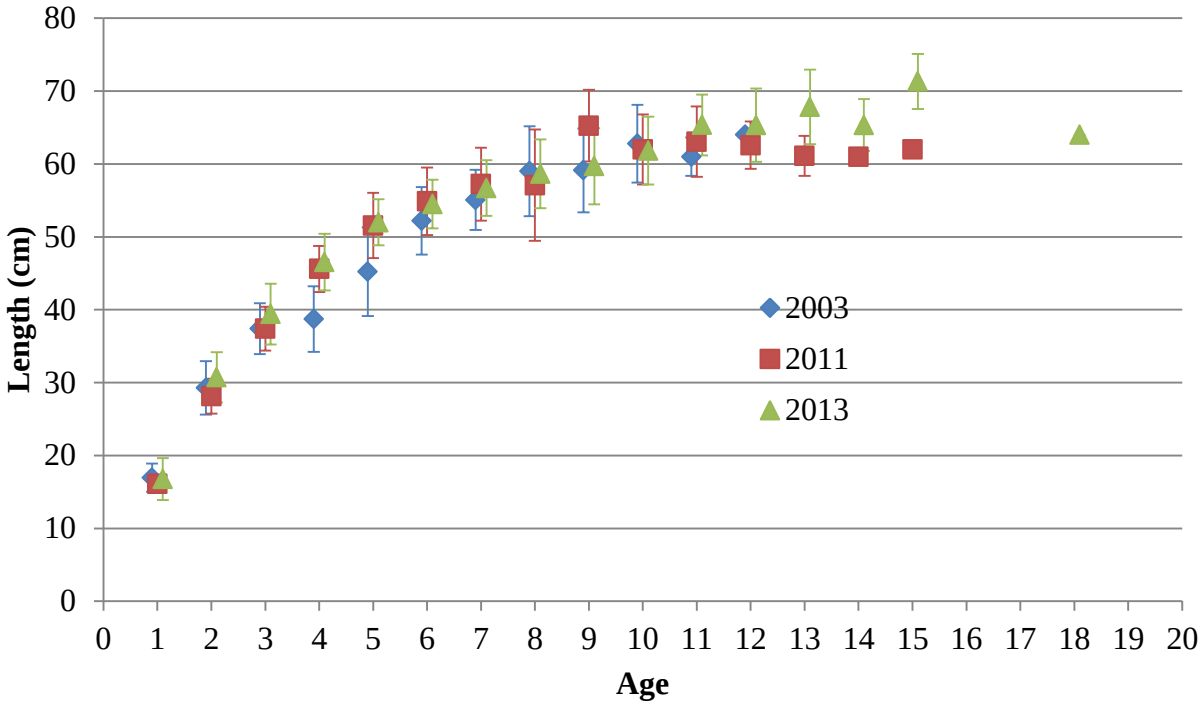

Figure 2. -- Average length (cm) at age (bars indicate 1 standard deviation) for walleye pollock from summer acoustic-trawl surveys in the Gulf of Alaska in 2003, 20011, and 2013.

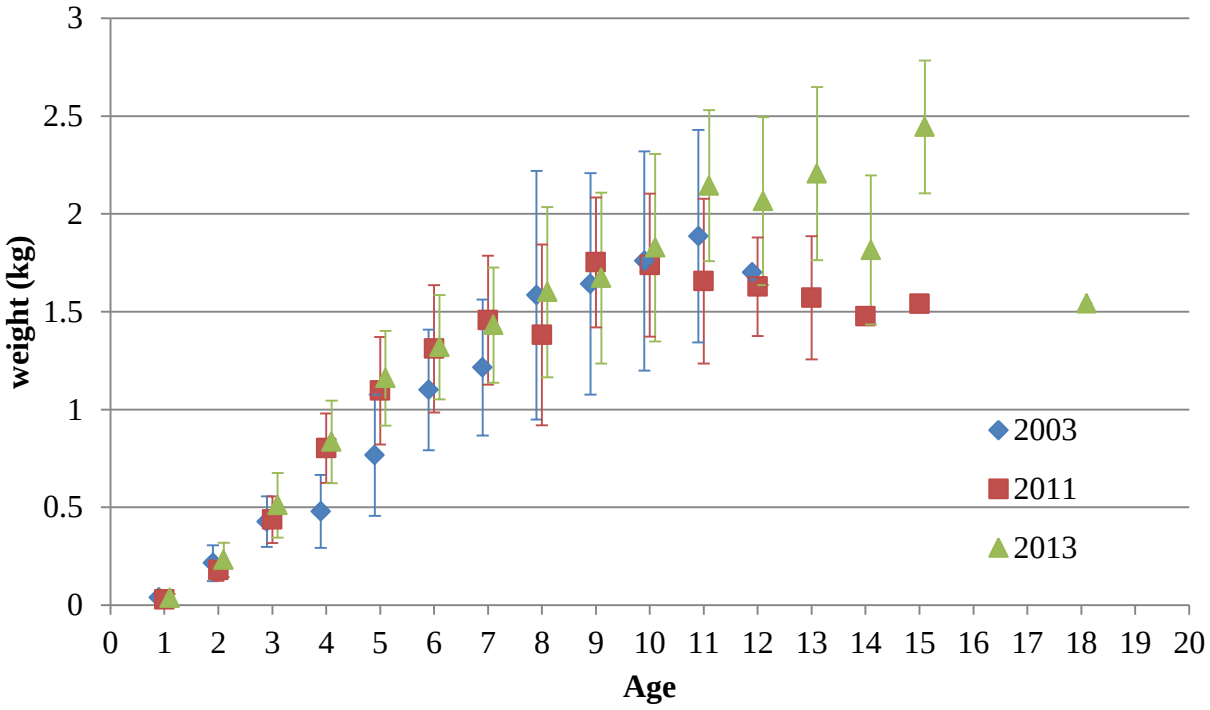

Figure 3. -- Average weight (kg) at age (bars indicate 1 standard deviation) for walleye pollock from summer acoustic-trawl surveys in the Gulf of Alaska in 2003, 20011, and 2013.

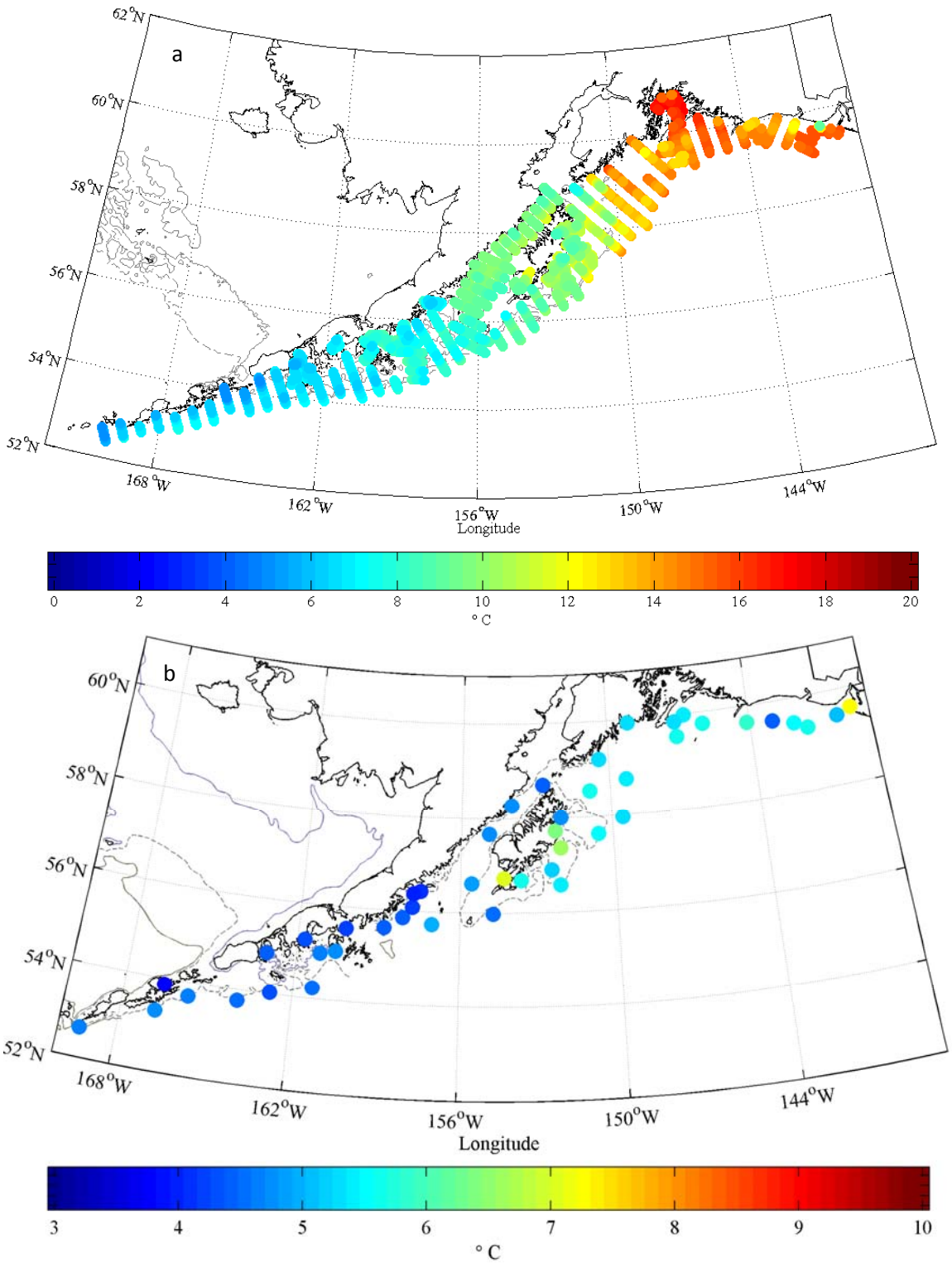

Figure 4. -- Temperature (°C) a) measured at the sea surface using shipboard surface temperature sensors along survey transects averaged at 1 nautical mile resolution, and b) near the seafloor using conductivity-temperature-depth profilers (CTDs) during the summer 2013 acoustic-trawl survey of the GOA shelf.

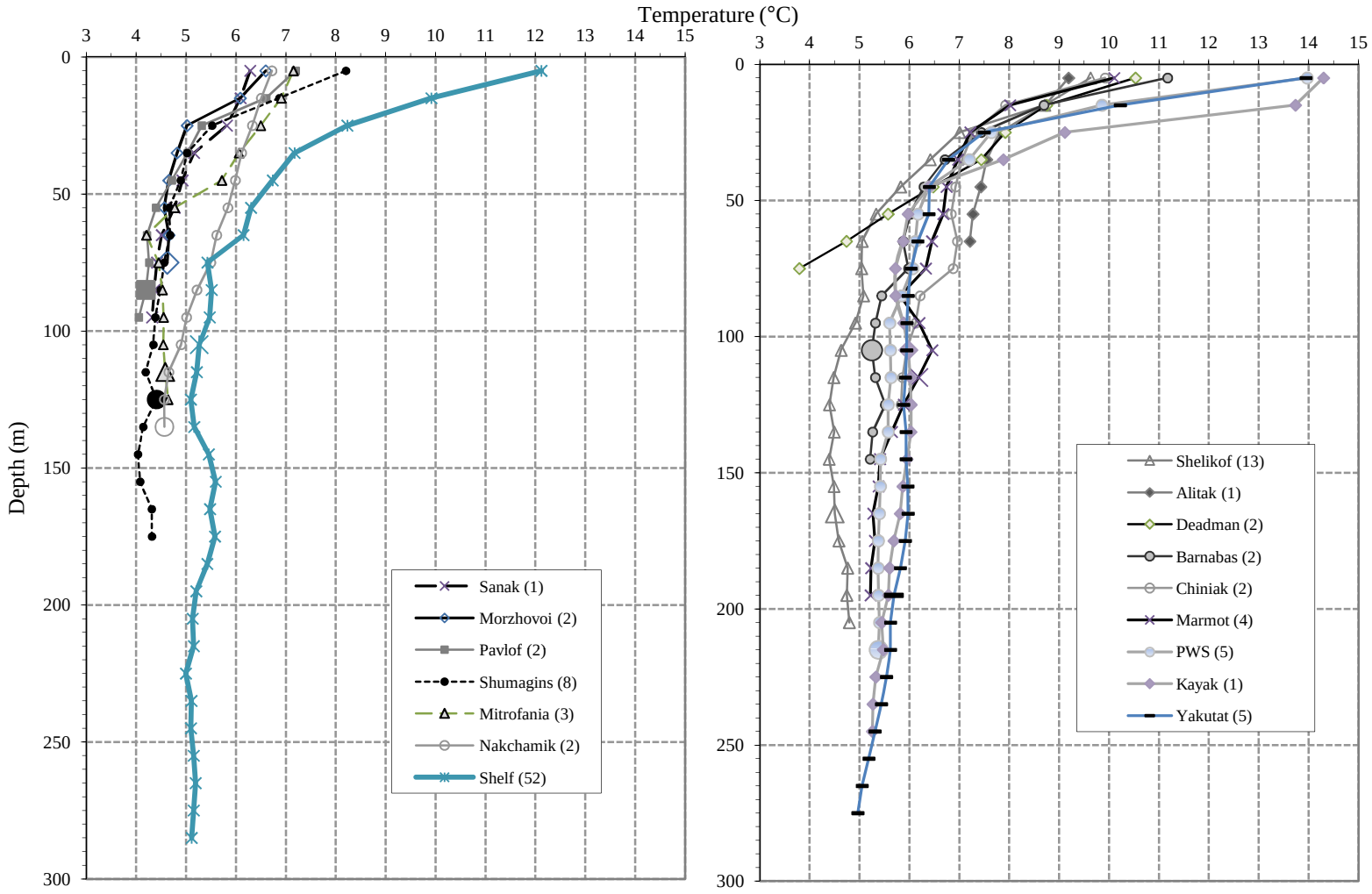

Figure 5. -- Average temperature (C) at depth (m) at fishing locations, and number of hauls sampled, by area surveyed during the summer 2013 acoustic trawl survey of the Gulf of Alaska. Profiles from areas surveyed during Leg 1 are shown in the left panel, while those areas surveyed during Legs 2-3 are shown in the right. The Shelf area, which includes hauls from Legs 1-3, is shown in the left panel. The largest symbol for each profile represents the mean depth of pollock biomass in that area.

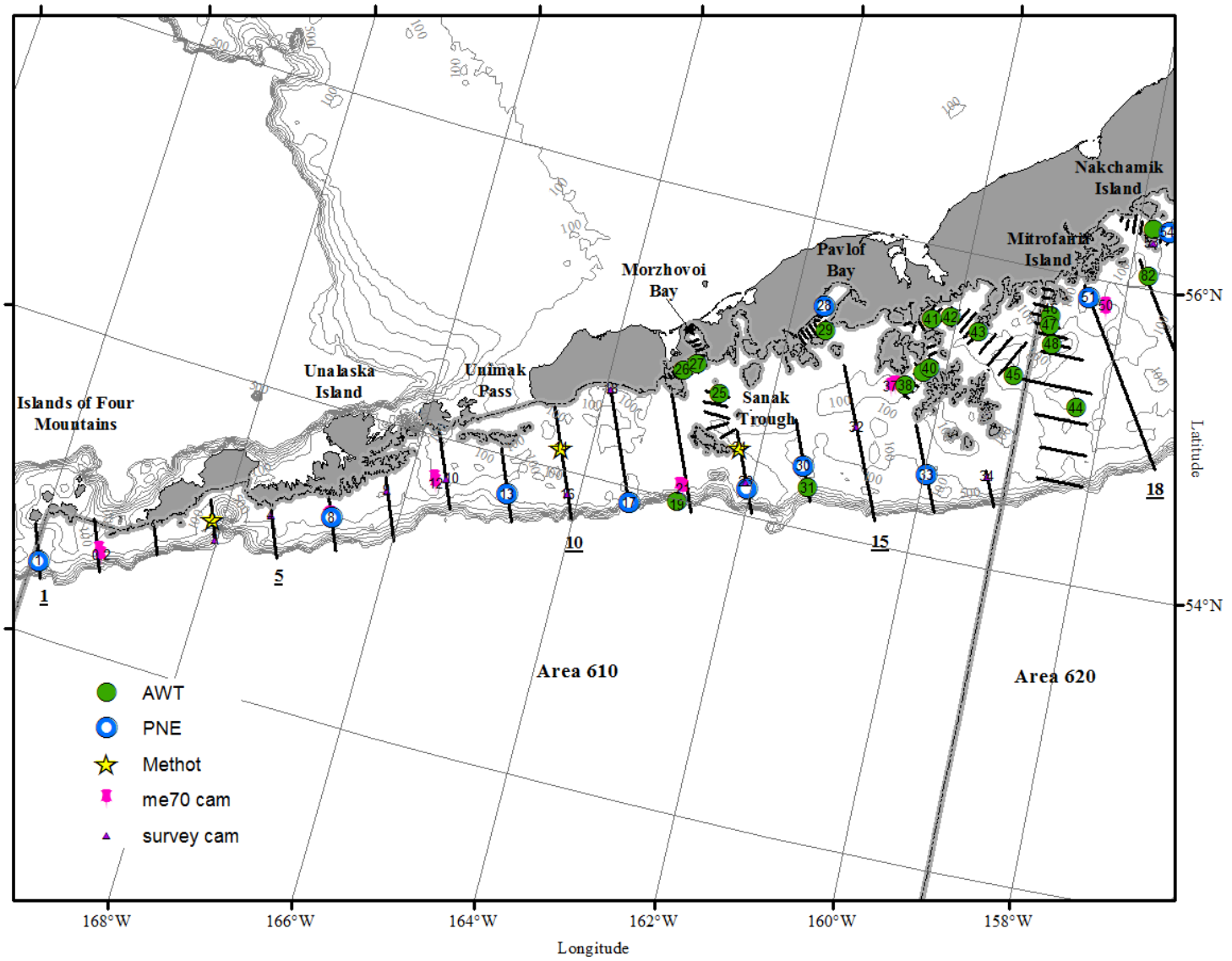

Figure 6. -- Transect lines and locations of Aleutian-wing trawl (AWT), poly-Nor'eastern trawl (PNE), Methot hauls, and ME70 and survey camera drops from the summer 2013 acoustic-trawl survey of walleye pollock in the western Gulf of Alaska from the Islands of Four Mountains to the Shumagin Islands. Transect numbers are underlined and haul numbers are on top of haul symbols. Boundary between NPFMC areas 610 and 620 is displayed.

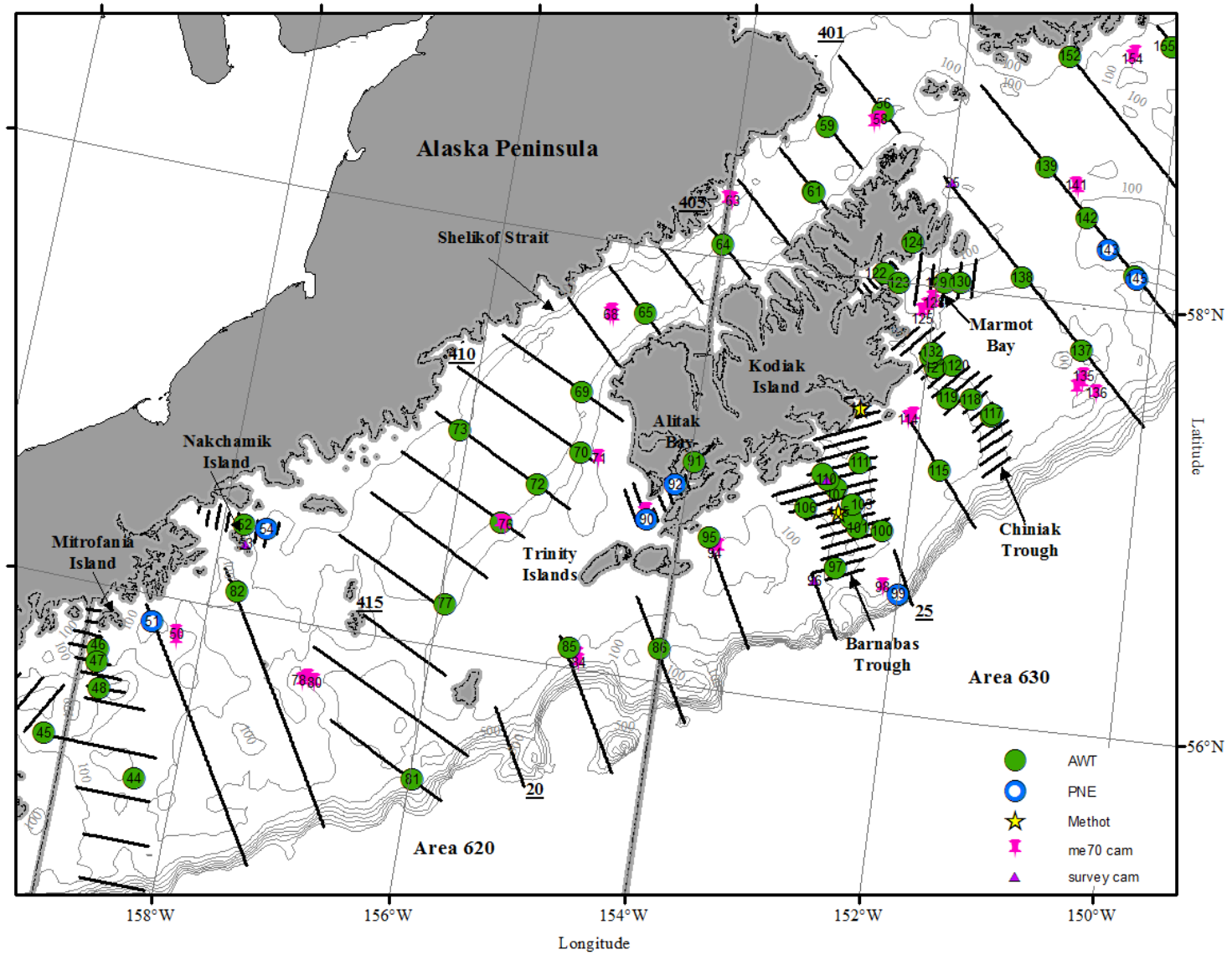

Figure 7. -- Transect lines and locations of Aleutian-wing trawl (AWT), poly-Nor'eastern trawl (PNE), Methot hauls, and ME70 and survey camera drops from the summer 2013 acoustic-trawl survey of walleye pollock in the central Gulf of Alaska from the Shumagin Islands to eastern Kodiak Island. Transect numbers are underlined and haul numbers are on top of haul symbols. Boundary between NPFMC areas 620 and 630 is displayed.

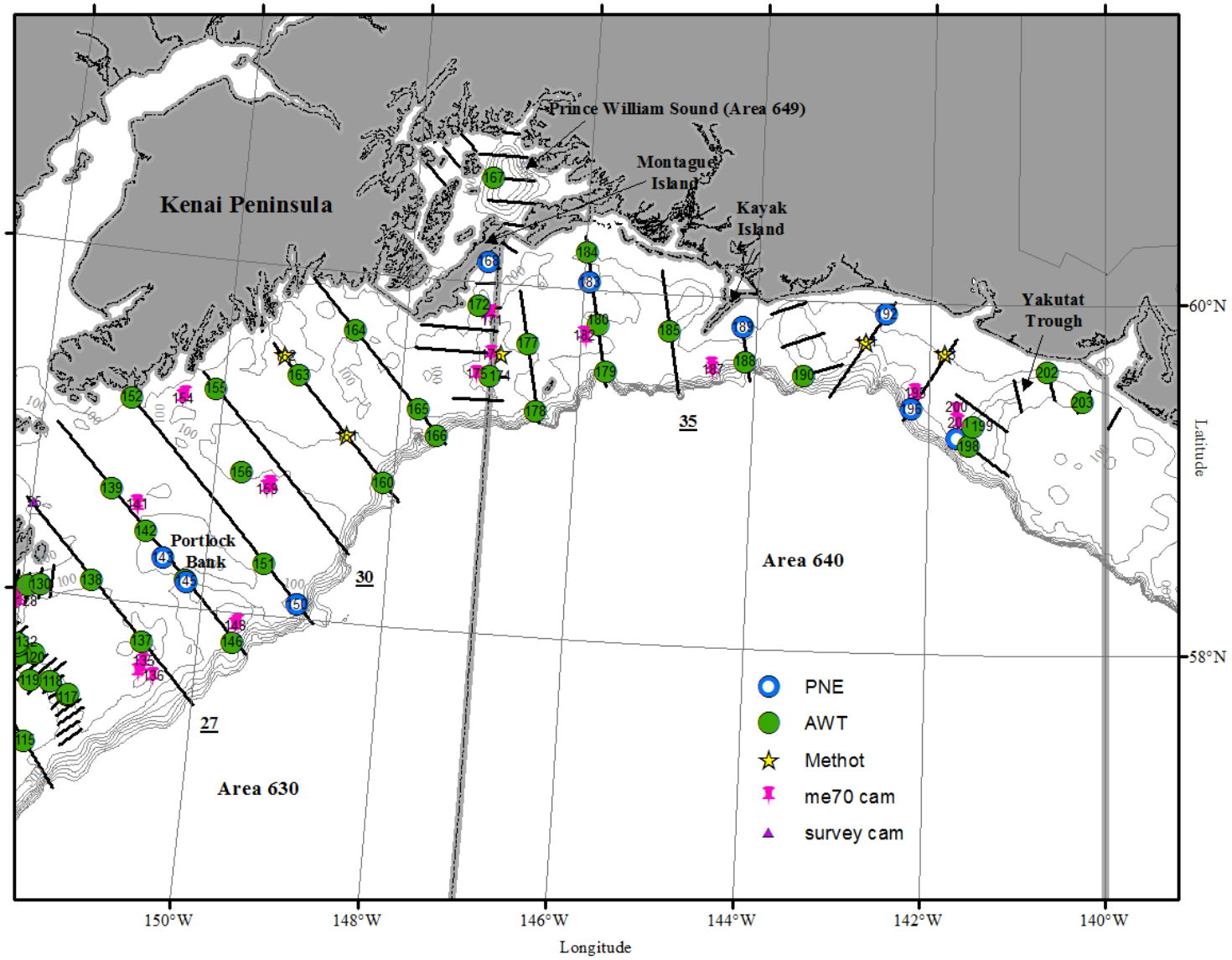

Figure 8. -- Transect lines and locations of Aleutian-wing trawl (AWT), poly-Nor'eastern trawl (PNE), Methot hauls, and ME70 and survey camera drops from the summer 2013 acoustic-trawl survey of walleye pollock in the eastern Gulf of Alaska from eastern Kodiak Island to Yakutat Trough. Transect numbers are underlined and haul numbers are on top of haul symbols. Boundaries between NPFMC areas 630, 640, and 649 are displayed.

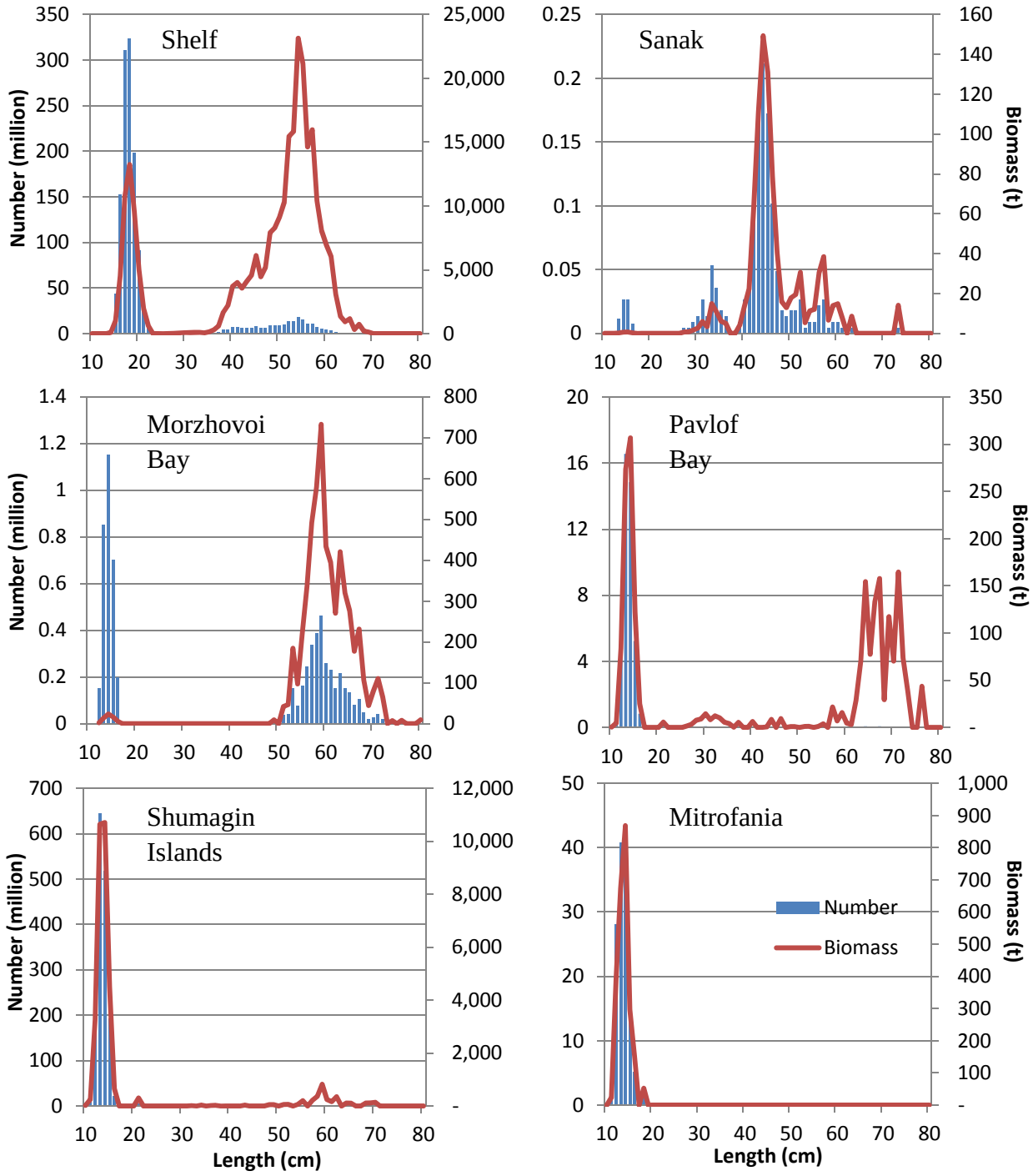

Figure 9. -- Walleye pollock numbers in millions (blue bars and primary y-axis) and biomass in metric tons (red line and secondary y-axis) at length (cm) for each of the major survey areas in the 2013 summer GOA acoustic-trawl survey.

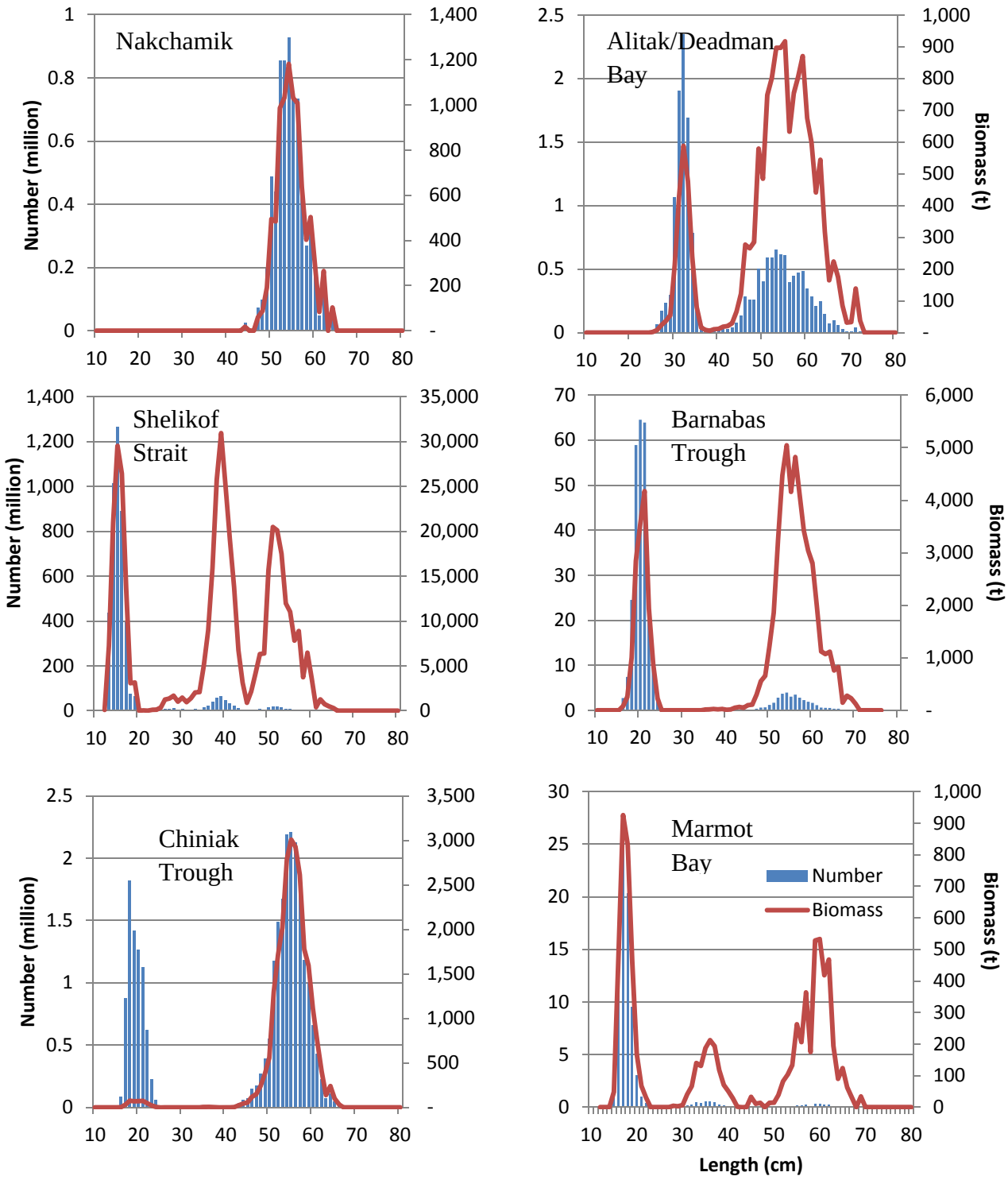

Figure 9. -- Continued.

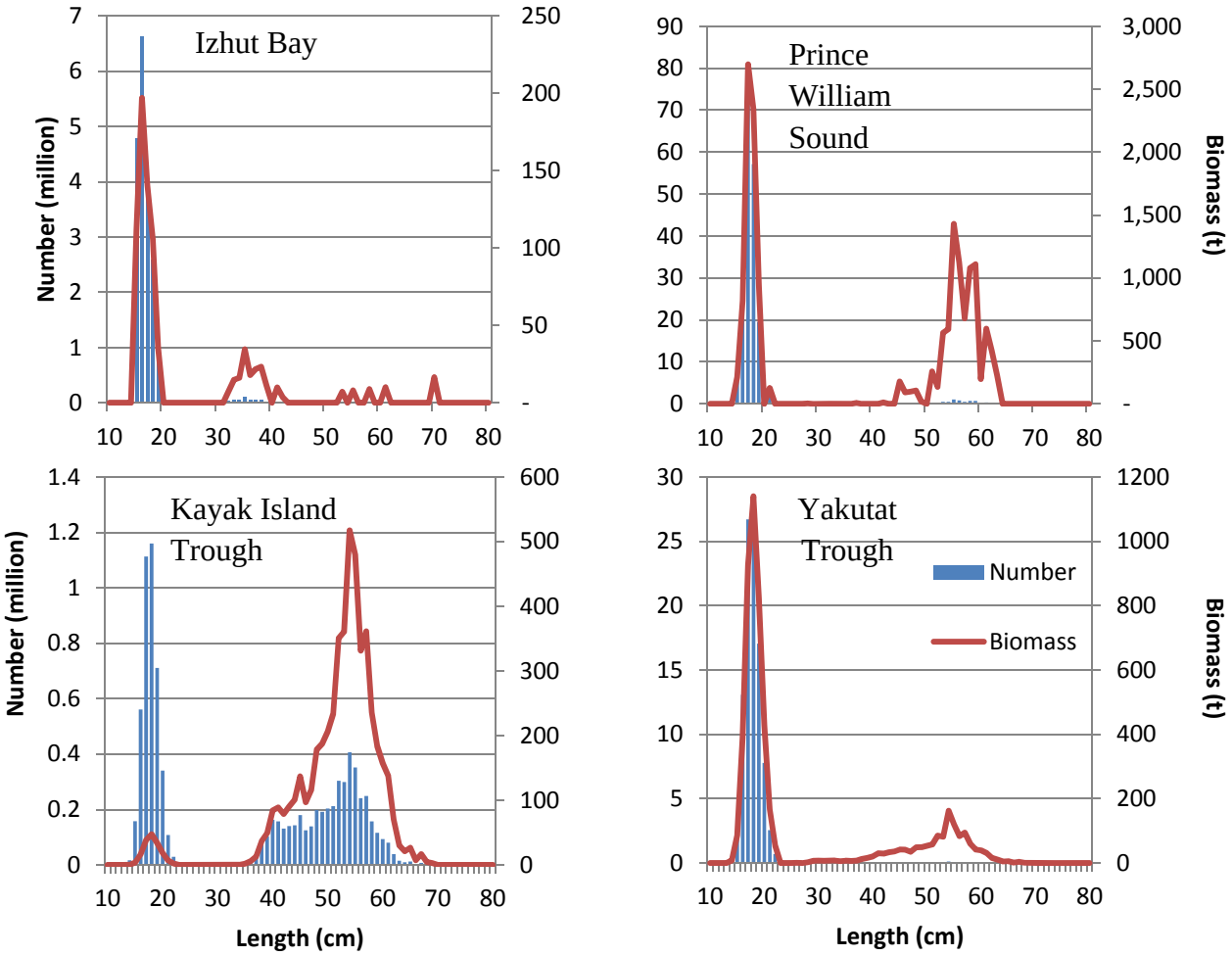

Figure 9. -- Continued.

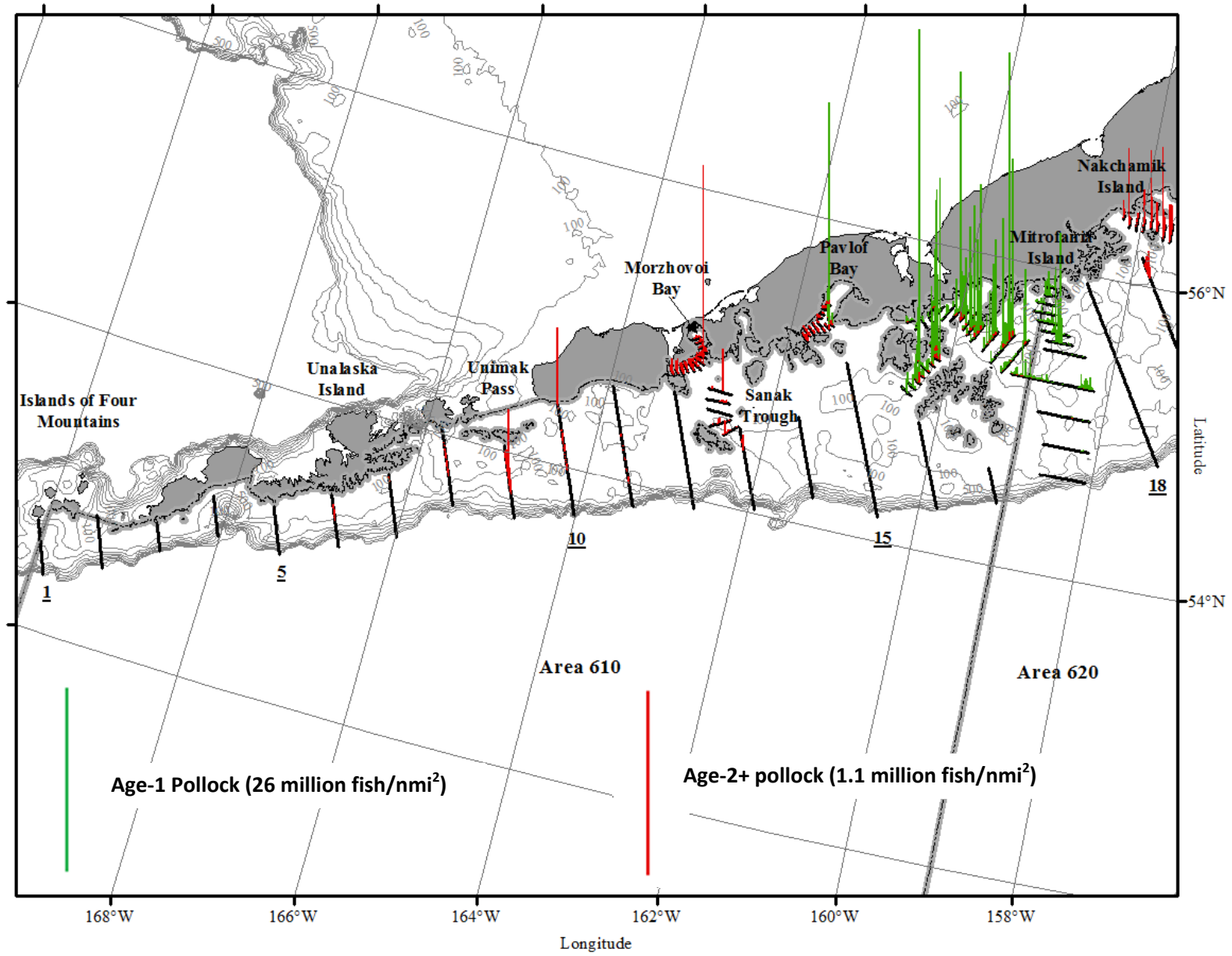

Figure 10. -- Density of age-1 walleye pollock (green vertical lines) and age-2+ walleye pollock (red vertical lines) along tracklines surveyed during the summer 2013 acoustic-trawl survey in the western GOA. Note difference in vertical bar scale for age-1 and age-2+ pollock densities. Transect numbers are underlined. Boundary between NPFMC areas 610 and 620 is displayed.

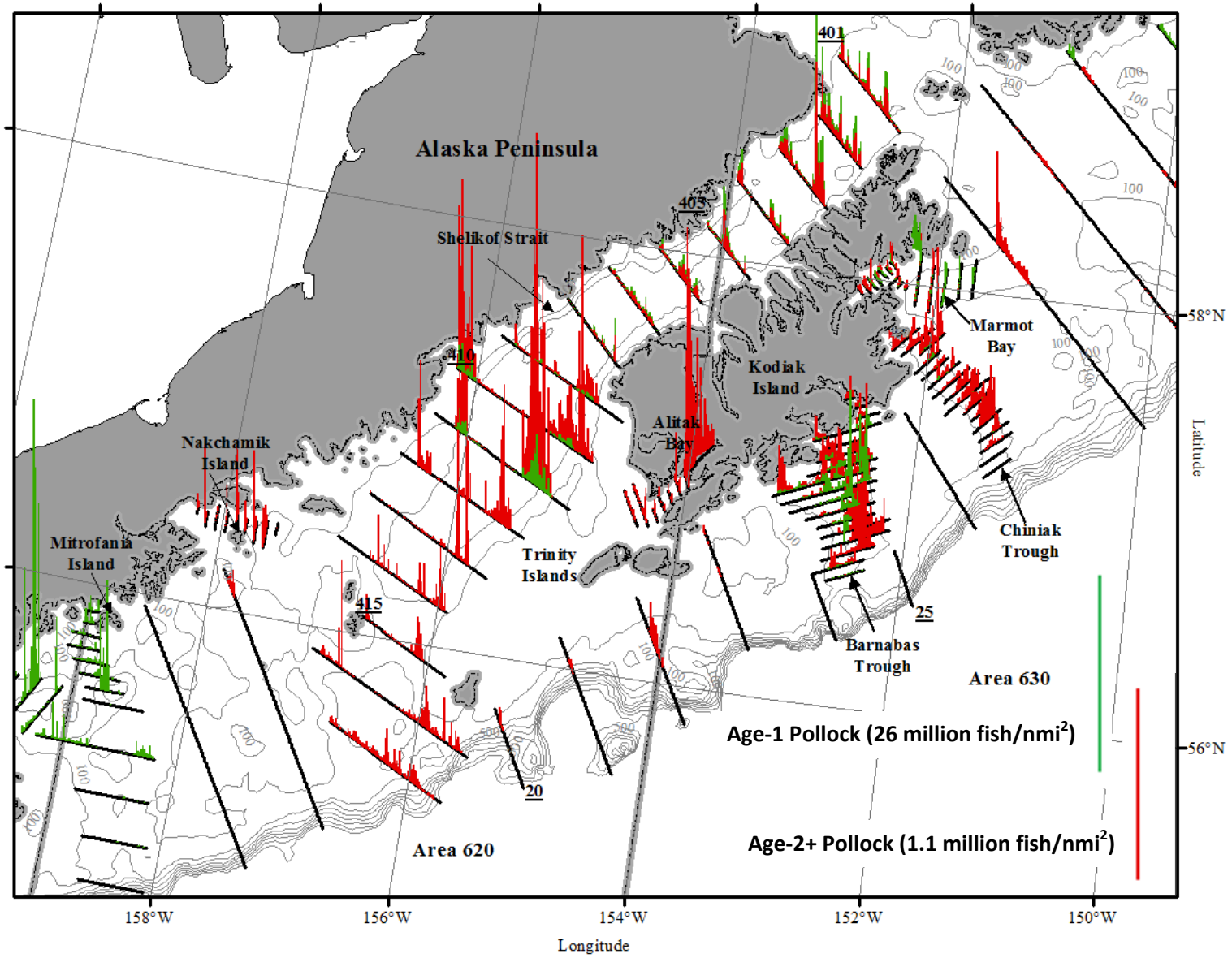

Figure 11. -- Density of age-1 walleye pollock (green vertical lines) and age-2+ walleye pollock (red vertical lines) along tracklines surveyed during the summer 2013 acoustic-trawl survey in the central GOA. Note difference in vertical bar scale for age-1 and age-2+ pollock densities. Transect numbers are underlined. Boundary between NPFMC areas 620 and 630 is displayed.

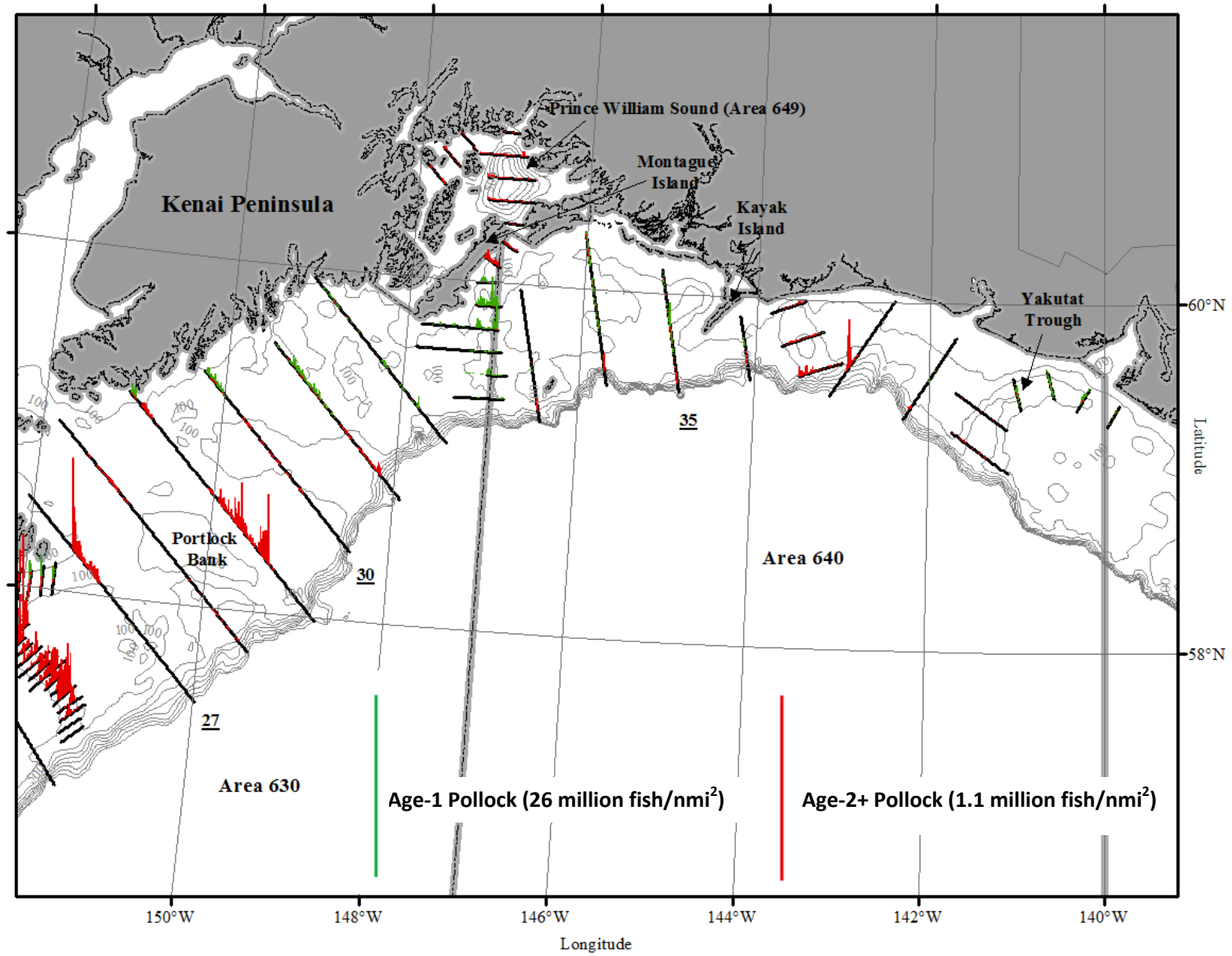

Figure 12. -- Density of age-1 walleye pollock (green vertical lines) and age-2+ walleye pollock (red vertical lines) along tracklines surveyed during the summer 2013 acoustic-trawl survey in the eastern GOA. Note difference in vertical bar scale for age-1 and age-2+ pollock densities. Transect numbers are underlined. Boundaries between NPFMC areas 630, 640, and 649 are displayed.

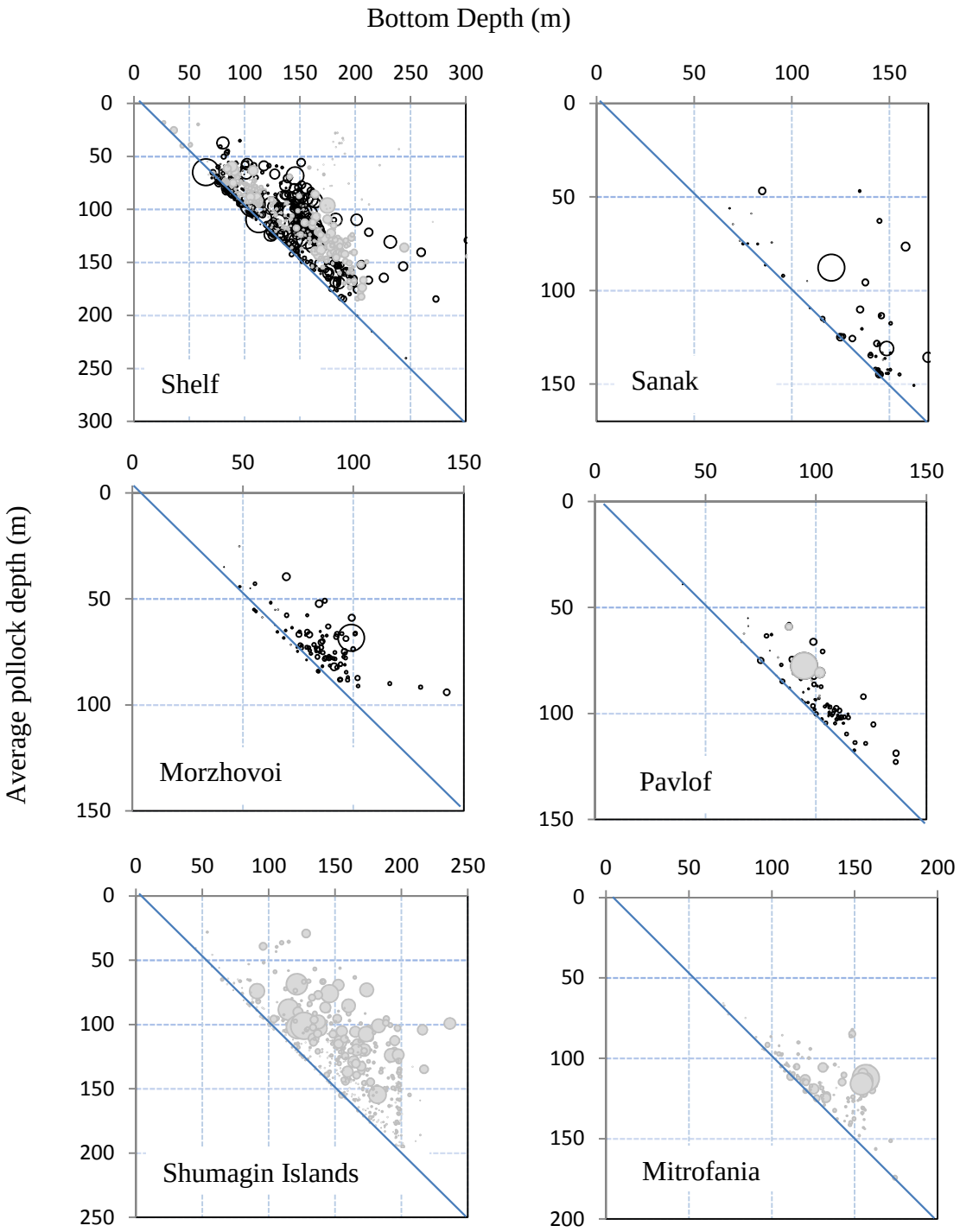

Figure 13. -- Mean pollock depth (weighted by biomass) versus bottom depth (m) for each 0.5 nmi of trackline from the summer 2013 GOA acoustic-trawl survey. Bubble size is scaled to the maximum biomass for each plot for age-1 pollock (grey circles) and pollock greater than age-1 (open circles).

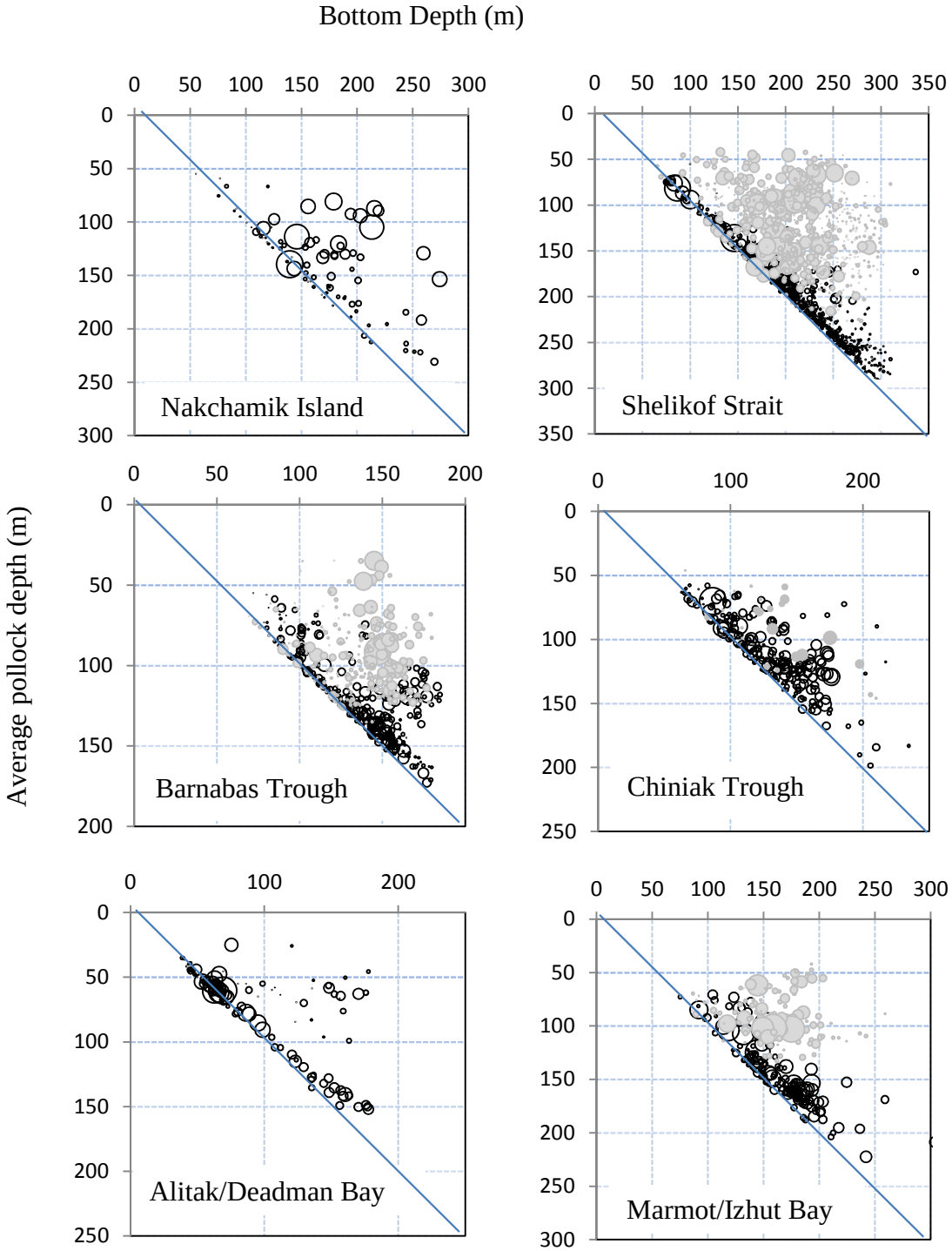

Figure 13. -- Continued.

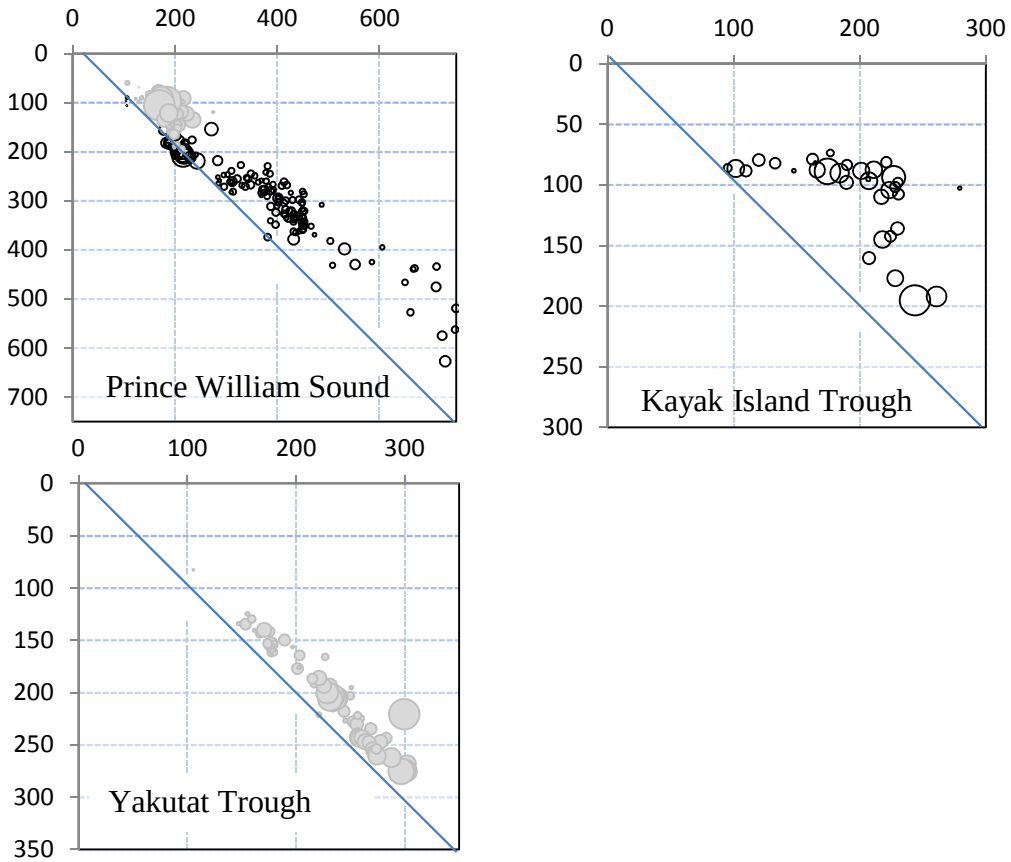

Figure 13. -- Continued.

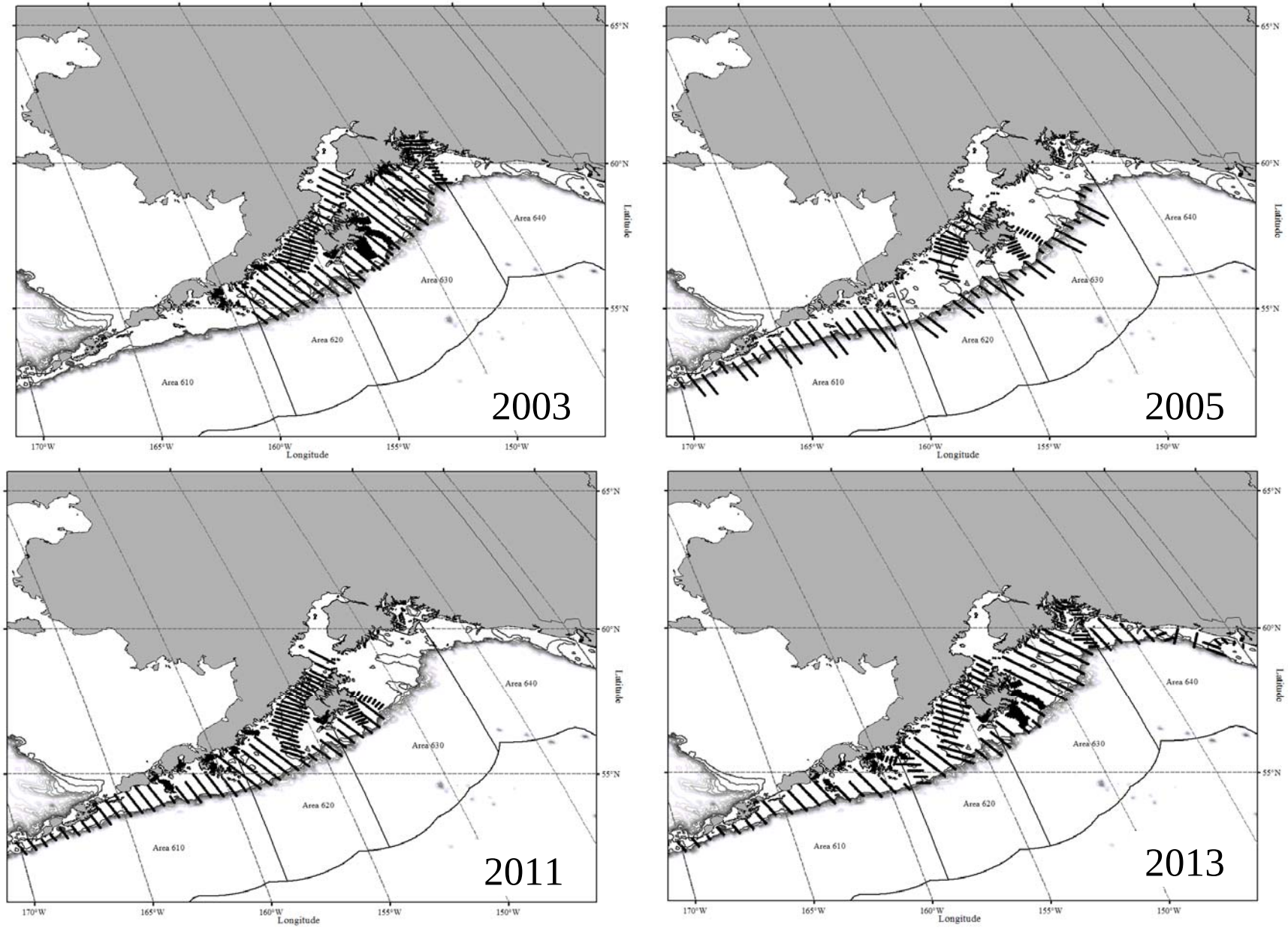

Figure 14.--Extent of the MACE summer GOA surveys conducted in 2003, 2005, 2011 and 2013.

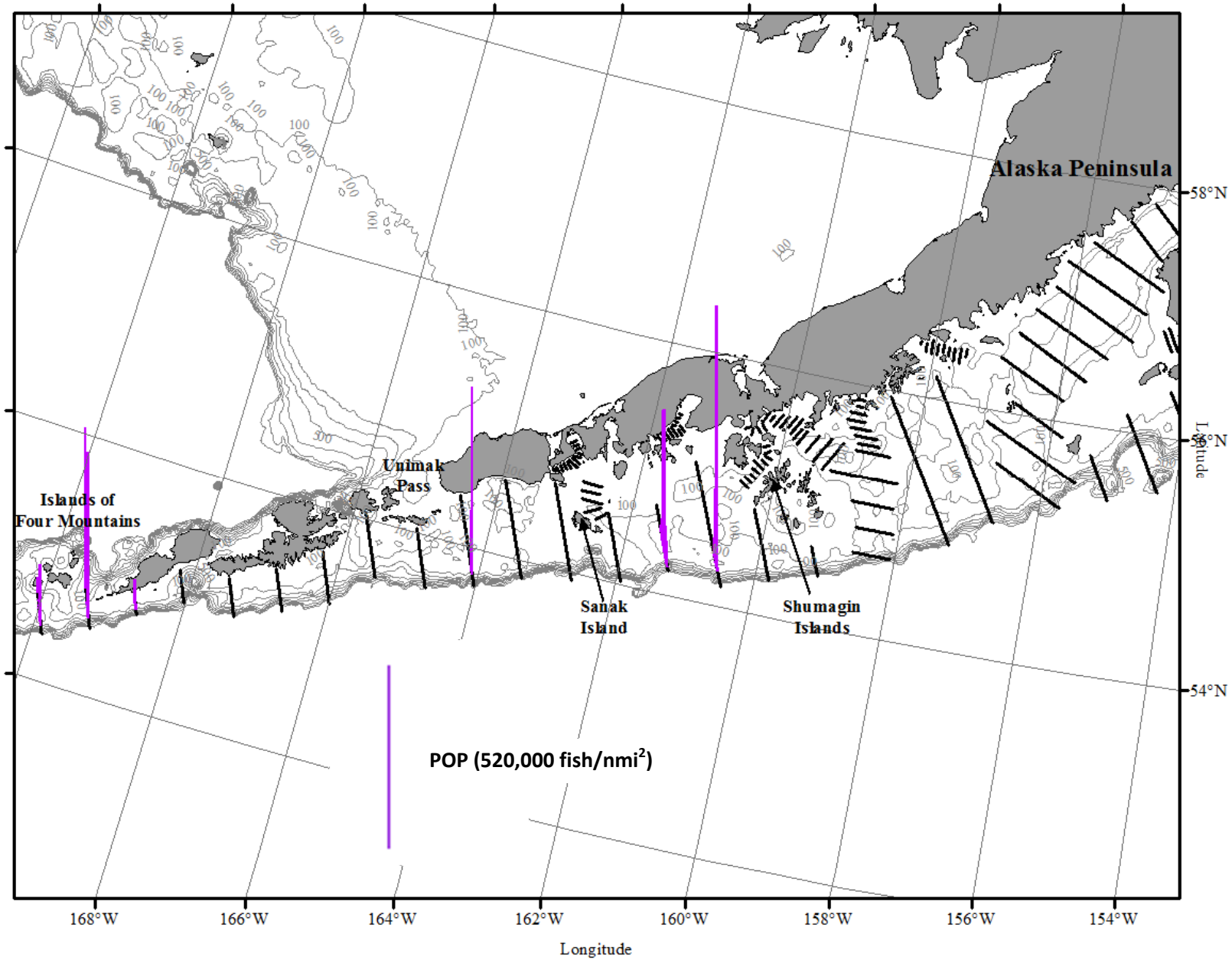

Figure 15. -- Distribution and density (fish/nmi^2) of Pacific ocean perch along the western tracklines surveyed during the summer 2013 acoustic-trawl survey of the GOA.

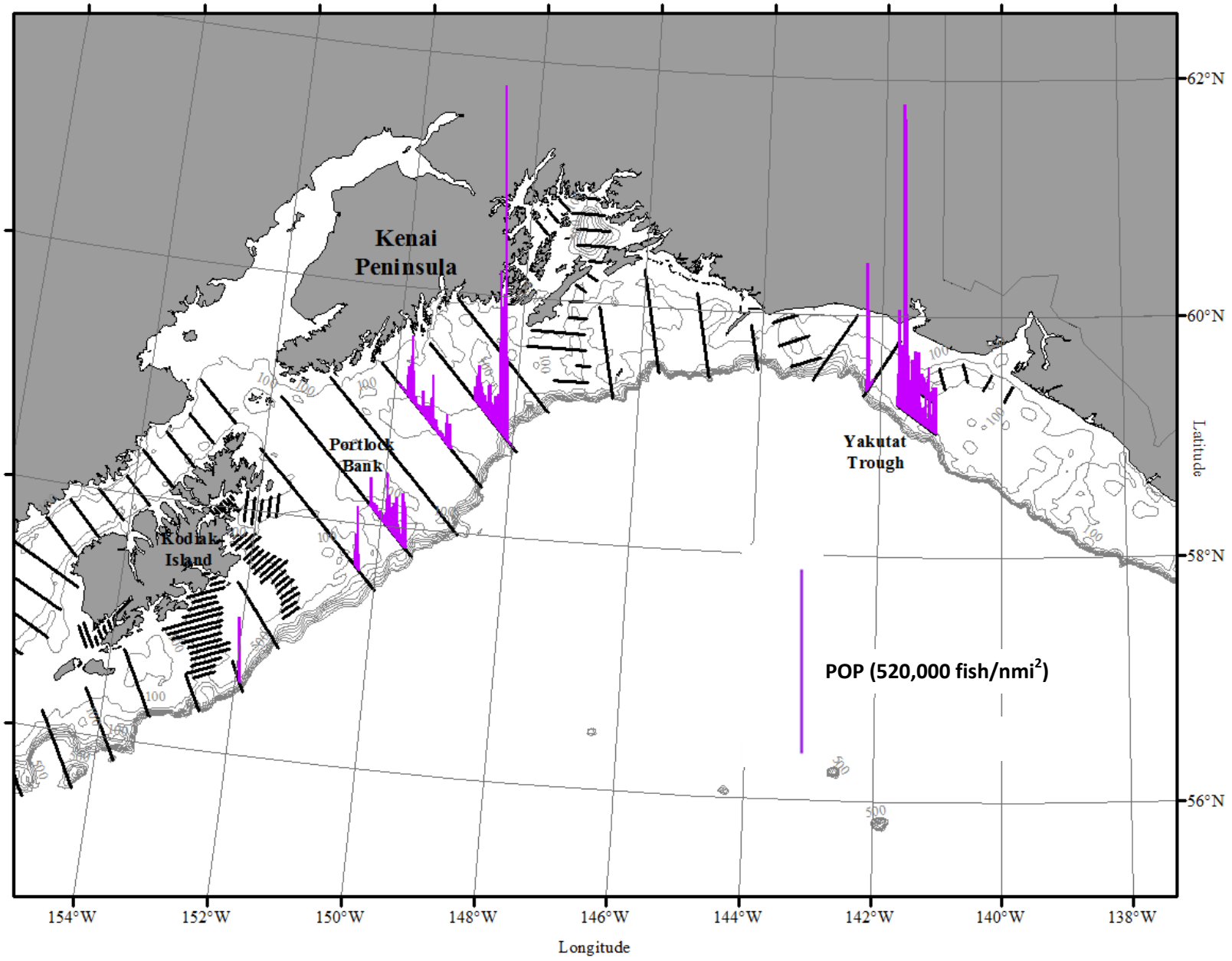

Figure 16. -- Distribution and density (fish/nmi^2) of Pacific ocean perch along the eastern tracklines surveyed during the summer 2013 acoustic-trawl survey of the GOA.

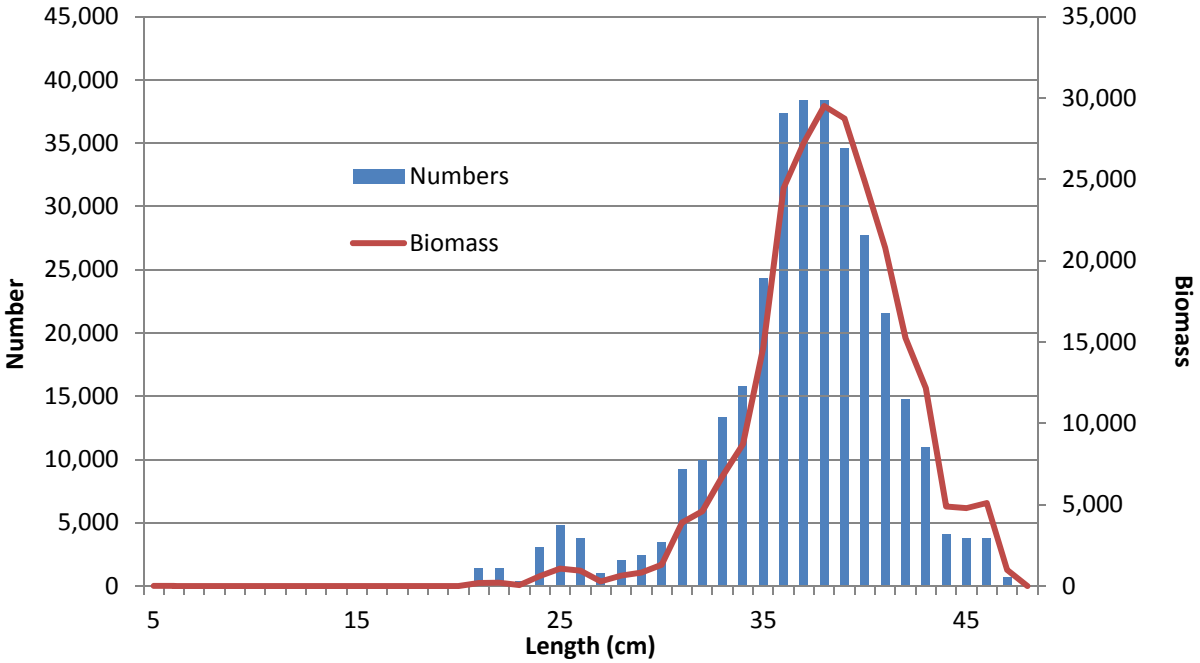

Figure 17. -- Pacific ocean perch numbers (blue bars and primary y-axis) and biomass in metric tons (red line and secondary y-axis) at length (cm) for the entire survey area in the 2013 summer GOA acoustic-trawl survey.

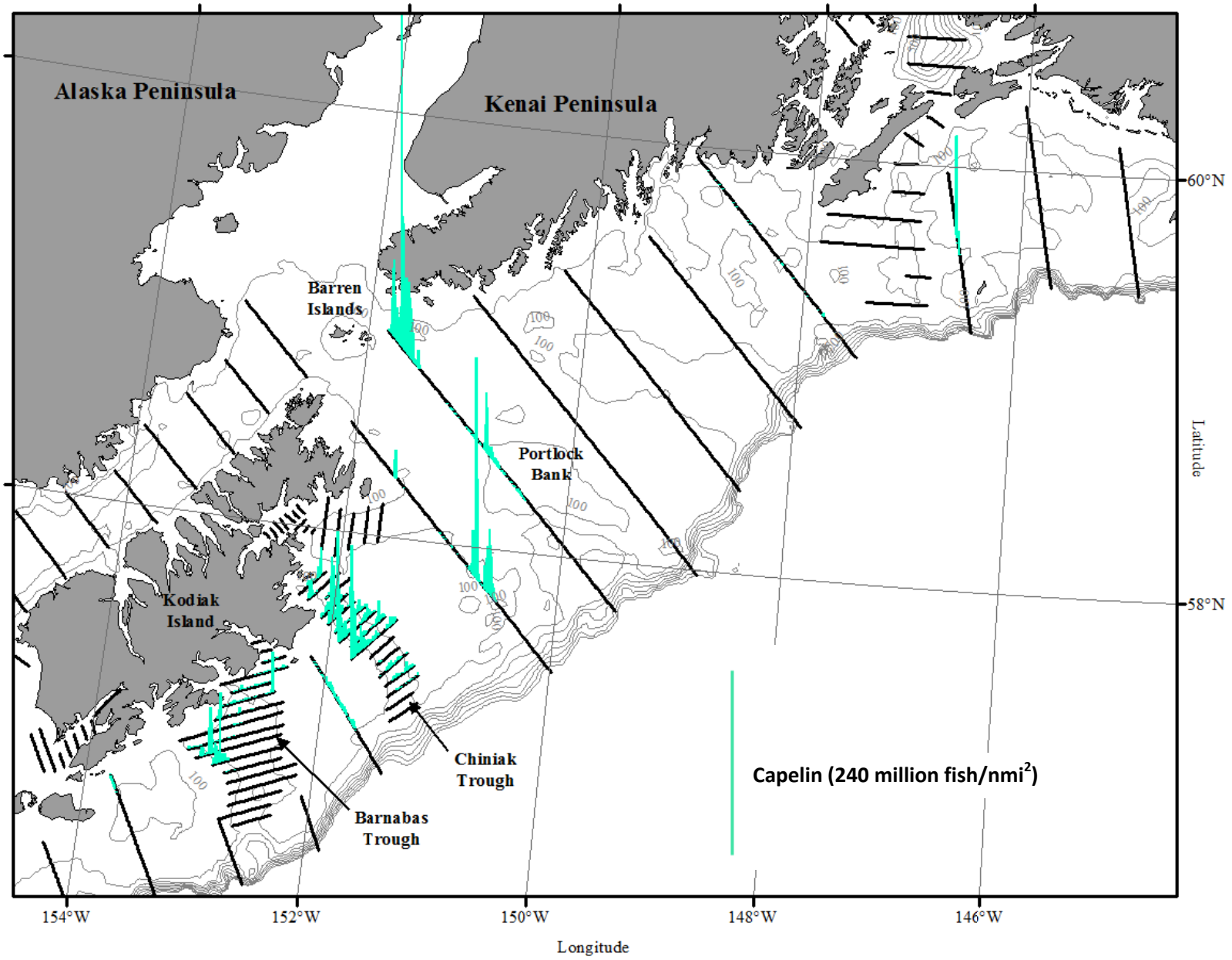

Figure 18. -- Distribution and density (fish/nmi^2) of capelin along tracklines surveyed during the summer 2013 acoustic-trawl survey of the GOA.

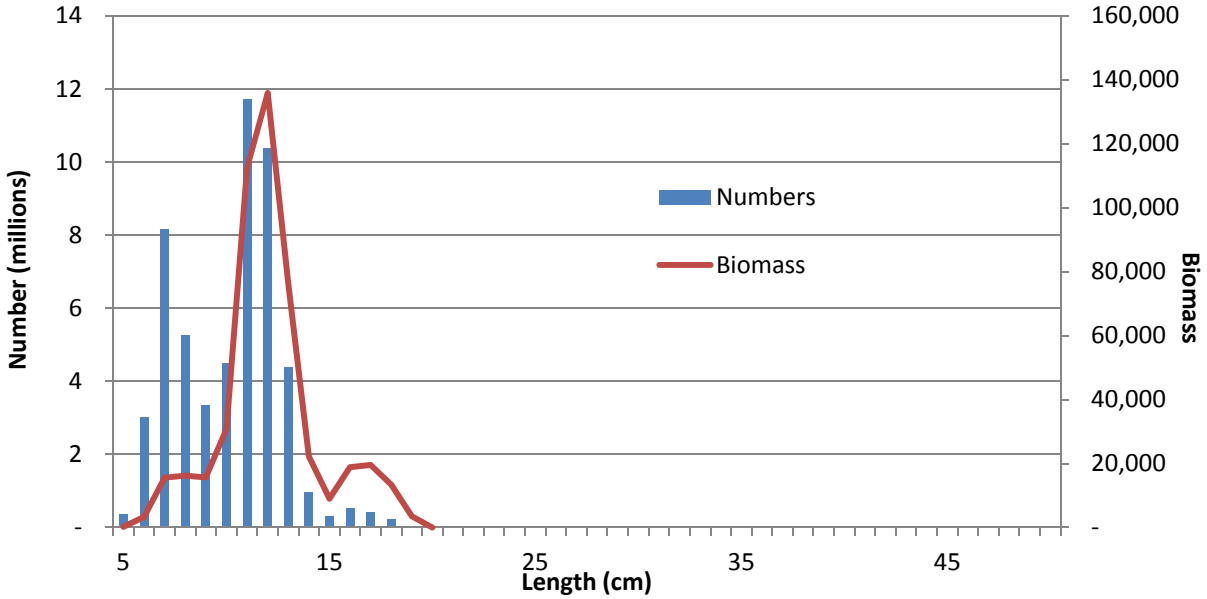

Figure 19. -- Capelin numbers in millions (blue bars and primary y-axis) and biomass in metric tons (red line and secondary y-axis) at length (cm) for the entire survey area in the 2013 summer GOA acoustic-trawl survey.

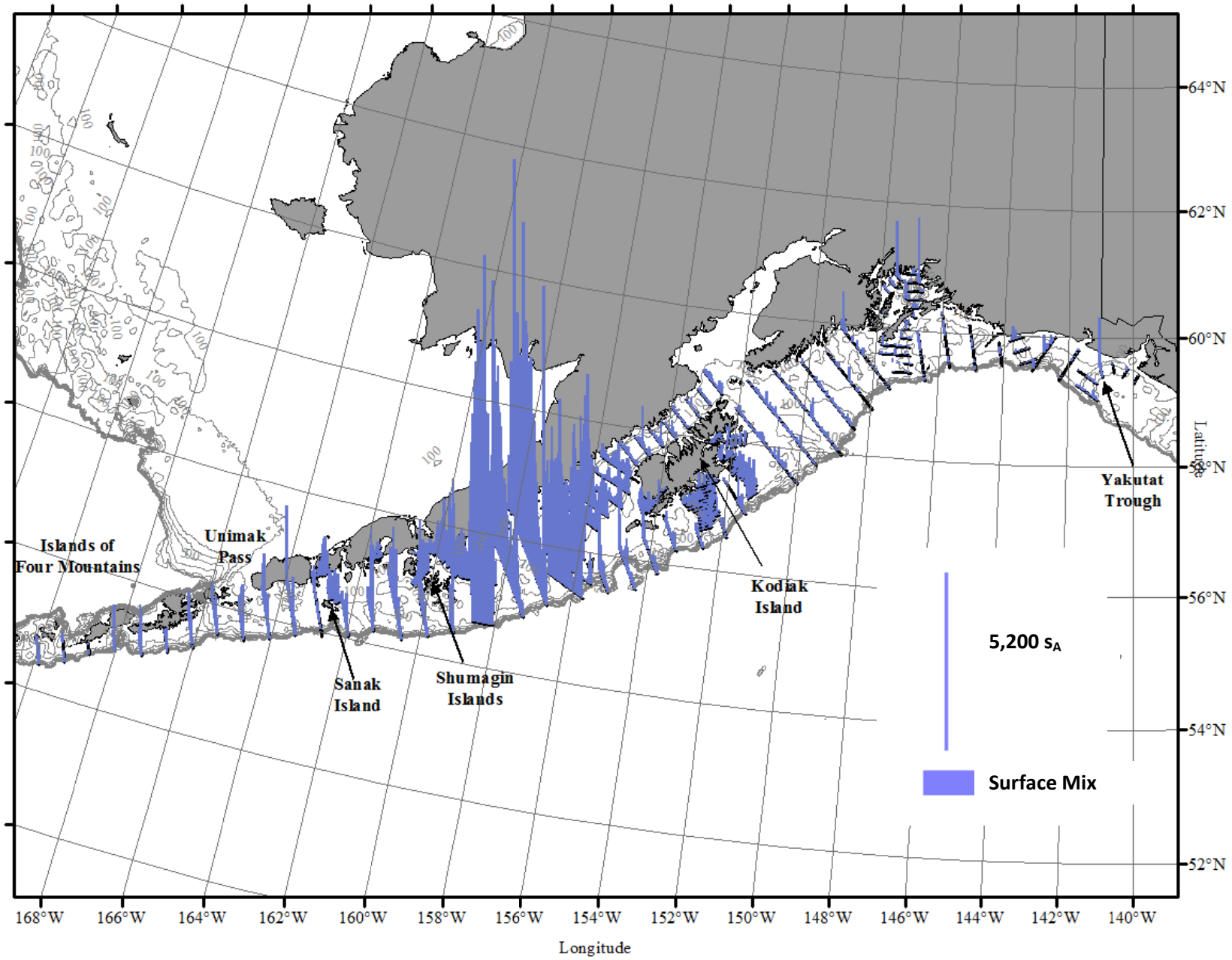

Figure 20. -- Distribution and strength of backscatter (s_A) attributed to undifferentiated surface mix along tracklines surveyed during the summer 2013 acoustic-trawl survey of the GOA.

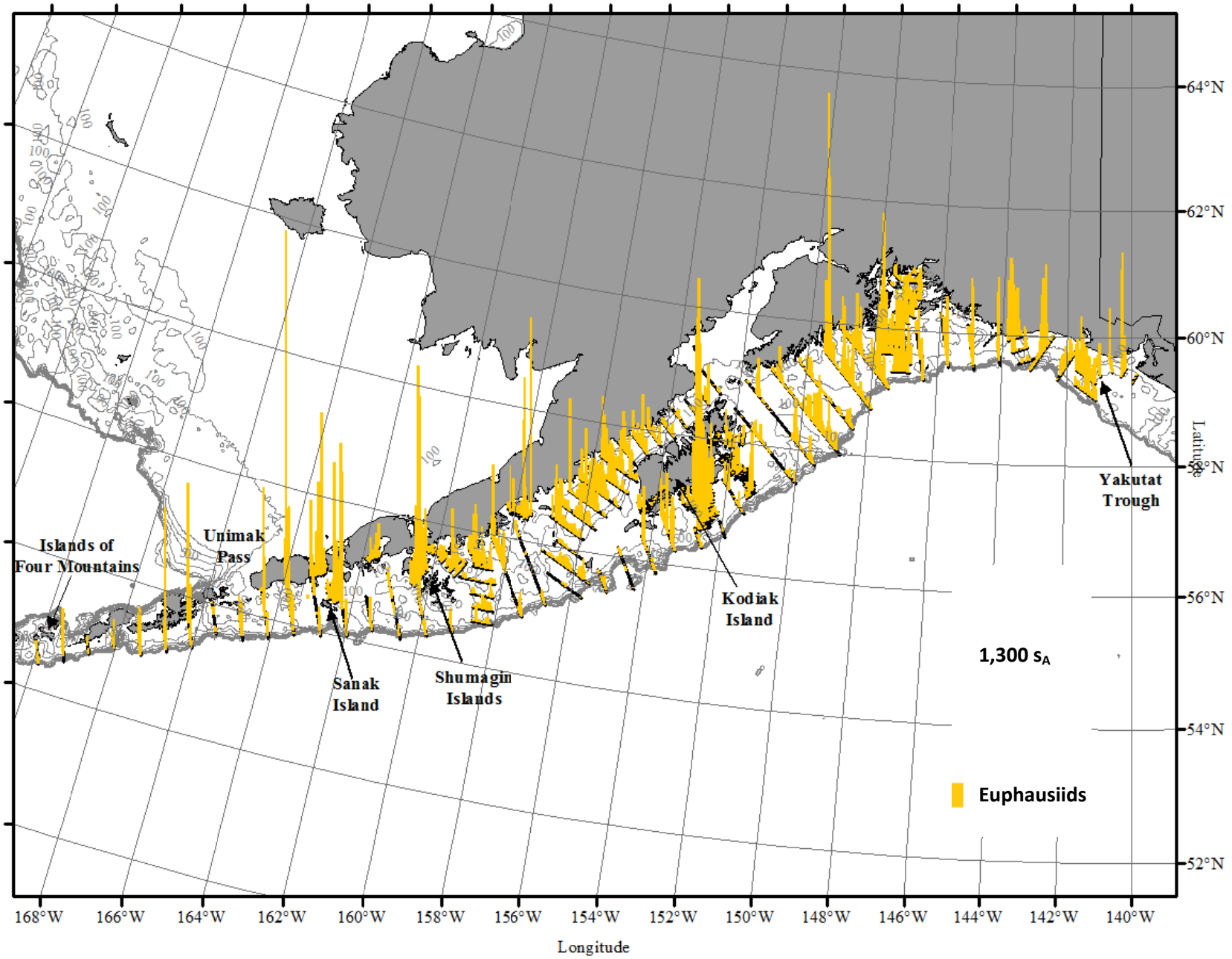

Figure 21. -- Distribution and strength of backscatter (s_A) at 120-kHz attributed to euphausiids along tracklines surveyed during the summer 2013 acoustic-trawl survey of the GOA.

APPENDIX I. ITINERARY

Leg I

8 June	Acoustic sphere calibration in Captain's Bay, Dutch Harbor, AK
9 June	Depart Dutch Harbor, AK, Transit to survey start area
9 - 15 June	Acoustic-trawl survey of the GOA shelf (Transects 1-13)
15 June	Acoustic-trawl survey of Sanak Trough (Transects 151-155)
15 June	Acoustic-trawl survey of Morzhovoi Bay (Transects 101-112)
16 June	Acoustic-trawl survey of Pavlof Bay (Transects 201-211)
17 - 19 June	Acoustic-trawl survey of the GOA shelf (Transects 14-17)
19 - 23 June	Acoustic-trawl survey of Shumagins Islands area (Transects 251-283)
22 - 23 June	Acoustic-trawl survey of Mitrofania area (Transects 301-307)
24 June	Acoustic-trawl survey of the GOA shelf (Transect 18)
24 - 25 June	Acoustic-trawl survey of Nakchamik area (Transects 351-359)
25 June	Transit to Kodiak, AK
26 June - 30 June	In port Kodiak, AK

Leg II

30 June	Transit to survey resume point
1 - 7 July	Acoustic-trawl survey of Shelikof Strait (Transects 401-417)
7 - 9 July	Acoustic-trawl survey of the GOA shelf (Transects 19-22)
9 - 10 July	Acoustic-trawl survey of Alitak bay (Transects 552-559)
10 - 11 July	Acoustic-trawl survey of the GOA shelf (Transects 23-25)
11 -14 July	Acoustic-trawl survey of Barnabas Trough (Transects 499-515)
14 July	Acoustic-trawl survey of the GOA shelf (Transect 26)
14 - 16 July	Acoustic-trawl survey of Chiniak Trough (Transects 451-466)
16 - 17 July	Acoustic-trawl survey of Marmot Bay (Transects 601-615)
17 July	Acoustic-trawl survey of Izhut Bay (Transect 651)
18 July	Acoustic-trawl survey of Chiniak Trough (Transect 467)
18 July	Transit to Kodiak, AK
18 July - 22 July	In port Kodiak, AK

Leg III

22 July	Transit to survey resume point
23 - 29 July	Acoustic-trawl survey of the GOA shelf (Transects 27-32)
29 July - 1 Aug.	Acoustic-trawl survey of Prince William Sound (Transects 702-716)
1 - 3 Aug.	Acoustic-trawl survey of the GOA shelf (Transects 33-36)
3 - 4 Aug.	Acoustic-trawl survey of the Kayak Island Trough (Transects 37-41)
4 - 5 Aug.	Acoustic-trawl survey of the GOA shelf (Transects 42-43)
5 - 7 Aug.	Acoustic-trawl survey of the Yakutat Trough (Transects 44-54)
7 Aug.	Acoustic sphere calibration in Sea Otter Bay, Yakutat, AK
8 - 9 Aug.	Transit to Kodiak, AK
9 Aug.	In Kodiak, AK. End of survey

APPENDIX II. SCIENTIFIC PERSONNEL

Leg I (8 - 26 June)

Name	Position	Organization
Patrick Ressler	Chief Scientist	AFSC
Kresimir Williams	Fishery biologist	AFSC
Rick Towler	Computer Spec.	AFSC
Taina Honkalehto	Fishery Biologist	AFSC
Abigail McCarthy	Fishery Biologist	AFSC
Charles Anderson	Database Manager	NGDC
Michael Gallagher	Oceanographer	NOAA
Marla Crouch	Teacher at Sea	NOAA

Leg II (30 June - 18 July)

Name	Position	Organization
Neal Williamson	Chief Scientist	AFSC
Paul Walline	Fishery Biologist	AFSC
Scott Furnish	Computer Spec.	AFSC
Denise McKelvey	Fishery Biologist	AFSC
William Floering	Fishery Biologist	AFSC
Tyler Lueck	Undergraduate student intern	Lawrence U.
Amy Ell	Teacher at Sea	NOAA
Sam Wainright	Professor	USCG Academy

Leg III (22 July - 9 August)

Name	Position	Organization
Patrick Ressler	Chief Scientist	AFSC
Paul Walline	Fishery Biologist	AFSC
Scott Furnish	Computer Spec.	AFSC
Abigail McCarthy	Fishery Biologist	AFSC
Darin Jones	Fishery Biologist	AFSC
Kirsten Simonsen	Fishery Biologist	AFSC
Jodi Pirtle	Fishery Biologist	AFSC
Julia Harvey	Teacher at Sea	NOAA
Melissa George	Teacher at Sea	NOAA

AFSC – Alaska Fisheries Science Center, Seattle, WA
NOAA – National Oceanic and Atmospheric Administration
NGDC – National Geophysical Data Center
Lawrence U. – Lawrence University, Appleton, WI
USCG – United States Coast Guard