

Fishery Management Report No. 07-13

**Trawl Survey of Shrimp and Forage Fish in Alaska's
Westward Region, 2006**

by

David R. Jackson

April 2007

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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ABSTRACT

The Alaska Department of Fish and Game (ADF&G) conducted a small-mesh bottom trawl survey for shrimp and forage fish from September 25 to October 24, 2006 in waters of the Westward Region's Kodiak, Chignik and South Peninsula commercial shrimp fishing districts. The primary purpose of the survey was to measure pandalid shrimp biomass within the region. Results were compared with established pandalid shrimp threshold biomass levels to determine appropriate fishery management. Secondary objectives included obtaining species composition data and length frequencies from commercially important groundfish and shrimp and generating density estimates for forage fish.

A standard, high-opening, shrimp research trawl net with 3.1-cm stretch mesh throughout the mouth, body, and codend was used to complete 105 tows. Stations were selected in established strata using a random number generator with tows conducted in a station for a standard distance of 1.85 km. The entire catch of each tow was weighed and sorted by species with a subsample examined to determine catch proportions of small animals. Commercially important groundfish, shrimp, and forage fish were sampled for species identification and size frequency.

Catch composition in the 2006 survey was approximately 12% shrimp and 88% fish and other invertebrates. The primary shrimp species captured was the northern pink shrimp *Pandalus borealis*. Walleye pollock *Theragra chalcogramma*, flathead sole *Hippoglossus elassodon*, and arrowtooth flounder *Atheresthes stomias* comprised the majority of fish catches. Forage fish were found throughout the survey area with eulachon *Thaleichthys pacificus* and Pacific sandfish *Trichodon trichodon* occurring in greatest abundance.

Population estimates for shrimp were generated using an area swept technique. No section in any district produced a shrimp population estimate above the department's established minimum acceptable biomass index (MABI), the criteria used as a threshold for opening commercial shrimp fishing. Most sections remain well below historic population levels, but 2006 estimates were generally higher than recent surveys.

Key words: trawl survey, shrimp, forage fish, abundance, Westward Region, 2006

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) conducted a small-mesh bottom trawl survey for shrimp and forage fish from September 25 to October 24, 2006. The survey focused on historically productive shrimp grounds in nearshore waters around Kodiak Island, Shelikof Strait, and bays along the south side of the Alaska Peninsula located in the Kodiak, Chignik and South Peninsula shrimp management districts of Westward Registration Area J (Figure 1). Districts are listed in Title 5 of the Alaska Administrative Code (5 AAC) Chapter 31 and have been further divided into sections for fishery management purposes (Figure 2).

Shrimp have been commercially harvested around Kodiak Island since 1958 and along the south side of the Alaska Peninsula since 1968. Total landings averaged more than 50 million pounds per year during the 1960s and 1970s, which was primarily taken with trawl gear (Figure 3). Pot gear accounted for less than 1% of the harvest. Little shrimp trawling activity has occurred since 1982 as stock abundance and fisheries declined sharply with changing oceanographic conditions (Anderson 2000). Harvests have averaged less than 10,000 pounds per year since 1986 (Jackson and Ruccio 2003). The pink or northern pink shrimp *Pandalus borealis* comprised more than 85% of the catch in the heyday of the fishery, but humpy shrimp *P. goniurus*, coonstriped shrimp *P. hypsinotus*, and sidestriped shrimp *Pandalopsis dispar* all made significant contributions to the harvest (Gaffney 1981). Other shrimps taken incidentally include several species from the families Crangonidae and Hippolytidae. Spot shrimp *P. platyceros* and coonstriped shrimp have occasionally been the target of minor pot fisheries.

ADF&G began research on pandalid shrimp in 1968 with a commercial fishery logbook program. The objectives of this program were to establish baseline data on relative stock abundance and to define basic life history parameters for the primary species involved in the commercial fisheries (Jackson et al. 1983). The trawl survey stock assessment program began in 1970 to provide directly comparable stock abundance indices and monitor recruitment, growth, and the effects of fishing on the population age structure. Successive indices for a given stock were shown to track fluctuations in relative abundance over time (Jackson 1979). A management strategy developed in 1979 utilized survey results as the primary data source for harvest level determination (ADF&G 1982). Harvest levels were based on proportions of abundance index thresholds. The management goal was to achieve maximum harvests without affecting reproductive potential. The strategy was based on trends in stock abundance relative to a representative biomass index (RBI). This level was defined as the mean abundance estimate obtained after initial exploitation, but prior to the abundance decline. It was thought that recovery to this level could reasonably be expected. Based on the RBI, a second level called the minimum acceptable biomass index (MABI) was established at 40% of the RBI level. Stocks for which abundance levels were less than the prescribed MABI were considered severely depressed and no fishing was allowed. The management plan approved by the Alaska Board of Fisheries (BOF) in 1982 detailed RBI and MABI levels for 26 shrimp fishing sections (Table 1). Although never formally adopted into regulation by the BOF, the specified population threshold levels are still utilized as criteria for opening and closing fisheries.

ADF&G conducted spring and fall stock assessment surveys for shrimp during the years when shrimp abundance was high and commercial fishing effort was at its greatest level. As stocks declined and commercial fishing effort decreased, the level of research conducted by ADF&G also decreased. Trawl assessment surveys of shrimp stocks were first reduced from spring and fall surveys to a single fall survey in 1986. Further funding reductions resulted in a biennial shrimp survey beginning in 1987 and a triennial survey from 1989 to 2001. The scope of areas covered by the shrimp surveys has also declined since the early 1980s as a function of budget constraints. Funding from National Marine Fisheries Service (NMFS) to extend their Pavlof Bay small-mesh trawl data series and monitor long-term changes of the species community structure in the Gulf of Alaska (GOA) was the basis for an additional survey in 2002. The survey series continued annually from 2003-2005 when ADF&G partially funded the program from commercial fishing license sales, while NMFS provided support with a nearshore marine research project grant. Survey effort in 2006 continued through cooperative ADF&G and NMFS funding.

Forage fish populations have come under increased scrutiny by federal and state regulatory bodies. In 1998, the North Pacific Fishery Management Council and in 1999 the BOF, adopted prohibitions on the directed take of forage fish in the North Pacific and Bering Sea. Both groups recognized the importance of forage fish in the transfer of energy from primary to secondary producers in the marine ecosystem as well as being important food for marine mammals and many commercial groundfish species. ADF&G has not conducted forage fish research per se, but catch data from prior shrimp or small-mesh trawl surveys has provided important information on forage fish populations to other agencies and researchers. Changing species composition documented from the long term, regular assessment program has given insight on the effects of changing oceanographic conditions (Anderson et al. 1997a and 1997b; Anderson and Piatt 1999).

OBJECTIVES

The primary goal of the 2006 small-mesh trawl survey was to provide stock abundance indices of shrimp in the historically productive sections of the Kodiak, Chignik and South Peninsula Districts. The primary objective was a comparison of current population estimates with established MABIs to determine the potential for commercial fishery openings.

Secondary objectives of the 2006 survey were to:

- Determine species composition of the catch by haul and survey area.
- Obtain length frequency distributions for commercially important shrimp and fish species.
- Obtain composite samples of predominate shrimp species for each stratum surveyed and analyze each sample for sex and length frequency.
- Compare relative abundance of shrimp to recent and historic survey data to make inferences about population trends.
- Generate density estimates for forage fish species from the areas trawled.

METHODS

TRAWL DESCRIPTION AND SURVEY PROCEDURES

The 27.4 m ADF&G research vessel *Resolution* was used to trawl areas of historic commercial exploitation and other areas of known shrimp habitat. The small-mesh high opening trawl with three bridles was initially developed by NMFS and adopted as the standard for shrimp trawl research by NMFS, ADF&G, and Canadian researchers in British Columbia. (Watson 1987). This net has an 18.6 m footrope with an 8.0 mm chain suspended by 29 cm dropper chains. The net also has a 17.0 m tickler chain. Astoria semi-vee trawl doors weighing 340 kg each and measuring 1.7 m x 2.7 m were attached with three 18.2 m dandyines (1.8 cm in diameter) to hold the net open. Flotation was achieved by using twenty-nine 16.6 cm floats. The net was constructed with 3.1 cm stretch mesh through the mouth, body, and codend. Electronic net measurement systems and scuba observations have shown this net opens to an average width of 9.8 m and to a height of 4 m.

Sections to be surveyed for shrimp were selected by the project leader based on commercial fishing and survey history, budget considerations and logistics. Some commercial fishing sections have been sampled yearly, while others have had intermittent scrutiny. Selected sections were divided into strata based on historic shrimp population densities. Strata designations for each station have not changed since the mid 1970s and were contained in the project operational plan (Jackson, 2003). In some smaller bays, this division was not utilized. Within the stratum or bay, each survey area was divided into blocks of four geographically close stations with a station encompassing approximately 3.4 km². One station within each block was selected for sampling using a random number generator. The goal was to spread available survey effort throughout the bay or stratum. If the station was determined to be untrawlable, the closest adjacent station within the four-station block with trawlable bottom was selected. The trawl net was towed at a speed of 3.7 km/h and for a distance of 1.85 km. Several stations were not trawled for the full 1.85 km due to untrawlable ocean bottom. Total distance towed was recorded by Differential Global Position System (DGPS) readings.

Total catch from each trawl haul was weighed to the nearest one-kilogram increment by lifting the codend with a crane scale. All commercially important species within each haul were weighed including: sablefish *Anoplopoma fimbria*, Pacific cod *Gadus macrocephalus*, walleye pollock *Theragra chalcogramma*, Pacific halibut *Hippoglossus stenolepis*, all rockfish species *Sebastes* and *Sebastolobus*, lingcod *Ophiodon elongatus*, giant Pacific octopus *Octopus dofleini*, all salmon species *Oncorhynchus* sp., all sharks in the families Lamnidae and Squalidae, all skates in the family Rajidae, Dungeness crabs *Cancer magister*, king crabs *Paralithodes* sp. and *Lithodes* sp., Tanner crabs *Chionoecetes* sp., and Pacific herring *Clupea pallasii*. In some instances, adult and juvenile animals were weight sampled differently (e.g., adult walleye pollock were whole-haul weight sampled, while juvenile pollock were subsampled for weight). In addition, giant wrymouth *Cryptacanthodes giganteus* and large pieces of debris were whole-haul sampled for weight because these items were not likely to be taken in a subsample split.

A 1.5 m² splitting net with a 3.1-cm mesh liner was used to obtain a subsample of the total catch. The splitting net was tied into the sorting bin before the haul was dumped from the codend. The splitting net was then lifted up through the catch by hydraulic crane and the subsample moved to a sorting table for further assessment (i.e., table subsample). The entire table subsample and animals that were whole-haul sampled were then identified to species, enumerated, and weighed to the nearest kilogram. A 2 kg subsample of shrimp (i.e., shrimp-only subsample) was randomly taken from the initially selected table subsample to determine shrimp species composition. This shrimp-only subsample was weighed to the nearest gram.

Measurements were taken from all commercially important groundfish species to obtain size frequency distributions. Fish species were measured from snout tip to fork or mid point of the caudal fin. From the shrimp subsample, 200 of the predominant shrimp species (typically pink shrimp) were measured from the right eye socket to the midpoint on the posterior margin of the carapace to the nearest 0.5-mm.

A composite sample of shrimp was collected according to protocol detailed in the project operational plan from all hauls within each stratum. This sample contained shrimp in relative proportion to the volume of shrimp in each haul from a particular stratum and was frozen at sea. The primary pandalid shrimp in the strata composition samples were sampled in the laboratory and identified to species, measured, weighed, and sexed using techniques described in Butler (1980). Female northern pink shrimp were also classified as primiparous (first spawning season) or multiparous (multiple spawning seasons) based on sternal spine characteristics (McCrary 1971).

SHRIMP POPULATION ESTIMATION

Shrimp population estimates for each stratum from the 2006 trawl survey were derived using an area-swept technique (Alverson and Pereyra 1969). Estimates from each stratum were summed to provide an abundance index for each section. Some assumptions were undertaken in using the area swept technique. It was assumed that all the shrimp within the trawl path were caught. Also, it was assumed that the total area considered contained the entire shrimp habitat within that selected station or strata and that all areas used in the expansion of population levels were shrimp habitat. As these assumptions may not always be the case, the generated population estimates are a relative and not an absolute index. In addition, estimates are for all species of shrimp captured in survey trawls and not just for those fished commercially. Spot shrimp or 'prawns' and

coonstriped shrimp are commonly found in steep, rocky substrate, which is not suitable for trawling. Therefore, their population densities are poorly estimated using this technique.

All tows were recorded in nautical miles and converted to kilometers (nautical miles x 1.852 = kilometers towed). To account for tows of unequal length catch data was converted to weight per km towed. Based on net performance data, it was assumed that the trawl swept a path 9.8-m wide, covering .0098 km² for every kilometer towed. The catch of shrimp per one kilometer of tow length was converted into a kg per km² density estimate by multiplying by a factor of 102, or the number of net widths in a square kilometer. The shrimp density was averaged for all sampled stations within the survey area and stratum. The average density was then multiplied by the total area (km²) within a stratum that was considered shrimp habitat to generate the population index:

$$\text{Population index for each stratum} = \text{average shrimp kg/km towed} \times 102 \times \text{area considered (km}^2\text{)}$$

RESULTS

One hundred and five stations were successfully sampled in waters around the Kodiak Archipelago and south of the Alaska Peninsula during the 2006 survey (Figure 4). Survey haul parameters such as tow start and end position, date, depth, bottom temperature, and catch were collected for each haul (Appendix A). A performance value of 0 indicated a successful haul for sampling purposes.

Catch from the entire survey totaled 52,595 kg averaging 501 kg per haul. Groundfish and various invertebrates accounted for the majority of the total catch by weight. Adult walleye pollock were 35.3% of the total weight, followed by flathead sole *Hippoglossoides elassodon* (18.0%), arrowtooth flounder *Atheresthes stomias* (13.5%) and shrimp (12.0%); (Table 2). Of the total survey shrimp weight, 11.0% was northern pink shrimp and 0.7% sidestriped shrimp. Other shrimp species comprised nearly 0.3% of the survey catch weight. More than 17,000 length measurements were taken from 35 groundfish species and Pacific halibut (Table 3, Appendix B).

Forage fish were captured throughout the survey area totaling 4.0% of the survey catch by weight. Eulachon were the most abundant occurring in 62% of the trawl hauls and comprising 3.3% of the catch by weight. Pacific sandfish was next most abundant at 0.5% of the sample weight. Other forage fish species caught included Pacific herring, longsnout prickleback *Lumpenella longirostris*, snake prickleback *Lumpenus sagitta*, rainbow smelt *Osmerus mordax*, capelin *Mallotus villosus* and deepsea smelt Family Bathylagidae.

SHRIMP DISTRIBUTION AND ABUNDANCE

Northern pink shrimp were found in 96% of the survey hauls averaging 30.0 kg/km towed. Sidestriped shrimp occurred in 53% of the hauls averaging 2.0 kg/km towed. Ocean pink shrimp were found in 29% of the hauls averaging 0.25 kg/km towed. Humpy shrimp occurred at only 10% of the sample sites.

Total shrimp density was highest in two Marmot Island strata where two hauls averaged 180 kg/km towed and four hauls averaged 120 kg/km towed (Table 4). Shrimp density was also well above the average in Stepovak Bay at 97 kg/km towed. The lowest shrimp densities were found in Morzhovoi and Pavlof Bays along the Alaska Peninsula and Chiniak Bay on Kodiak Island.

Total shrimp abundance estimates for a stratum for all species followed a similar pattern to density estimates for tows, but varied somewhat because of habitat considerations. Results from stations on fishing grounds that had been traditionally utilized in the Marmot Island Section of

the Kodiak District produced the largest estimated shrimp population at 1,631 metric tons (mt). Stepovak Bay had the second largest population estimated at 1,095 mt.

A shrimp population estimate of 1,065 mt was generated for the area surveyed in northern Shelikof Strait. This area is part of Kodiak's General Section and was not commercially utilized until after the fishery collapse. The results of eleven exploratory tows were used to produce this comparatively large estimate because they were spread over a large sample area.

Northern pink shrimp comprised the majority of the shrimp catch with Marmot Island and Stepovak Bay sections having the highest northern pink shrimp densities, while Morzhovoi and Pavlof Bays sections had the lowest (Table 5, Figure 5). Carapace lengths were recorded from 17,664 northern pink shrimp. The mean size measured onboard the survey was 18.1 mm carapace length (CL), (Figure 6). Average size was largest in Chiniak Bay followed by Kuiukta Bay and Marmot Island sections (Figure 7). Although Chiniak shrimp were larger than average, that area had one of the lowest population densities. That contrasts with Kuiukta and Marmot Bays which also had larger than average shrimp but above average population densities. Average size of northern pink shrimp was smallest in Unga Strait and Kujulik Bay.

Composite samples of northern pink shrimp collected by strata and section were examined in the laboratory for size and sex characteristics of the populations (Figures 8-10). In addition, non-ovigerous females were examined for the presence of sternal spines as an indicator of the first breeding season for an individual. Sternal spines have been shown to be absent in northern pink shrimp after the first molt into breeding dress, which is a special female characteristic enlarging the space beneath the abdomen for egg incubation. This character can be used to determine the survival of shrimp entering their second breeding season. The ovigerous period was just beginning as egg-bearing females were not yet prevalent in the samples. The exception was Wide Bay where nearly half of the brood stock was already ovigerous. Wide Bay also had the highest bottom temperature which was likely related to the advanced breeding season.

Most areas exhibited a high proportion of males in the population indicating strong recruitment. Areas with below average recruitment as indicated by numbers of males were Chiniak, Kuiukta, Pavlof and Morzhovoi Bays. The majority of sampled northern pink shrimp were classified as transitional or primiparous female. Both of these groups are individuals newly recruited to the female population and will be carrying eggs this winter season for the first time. The number of multiparous females in most samples is relatively low. Natural mortality is apparently high as few shrimp are surviving to their second breeding season. In Pavlof Bay and Wide Bay there were no shrimp greater than 23 mm CL. Chignik Bay appeared to have at least 4 age classes of shrimp present as distinct modes in the population structure. This contrasts with Kujulik Bay, a neighboring area, where larger shrimp are relatively rare.

Sidestriped shrimp were widespread, occurring in 53% of the trawl hauls. Nearly all hauls occurring in deeper than 150 m contained sidestripes. Some hauls as shallow as 58 m also had specimens. Highest densities were found in the Marmot Island and Chignik Bay Sections (Table 6, Figure 11). The mean length of sidestriped shrimp measured during the survey cruise was 21.6 mm CL (Figure 12). A distinct size mode was centered at 21 mm CL. The prevalence of this size class was noticeable in all sampled areas, except Shelikof Strait (Figure 13). Marmot Bay and Shelikof Strait samples had the most sign of the smallest shrimp. Marmot Island Section had the largest average size at 23.4 mm CL, while Chignik Bay Section had the smallest at 20.2 mm CL.

Composite samples of sidestriped shrimp also were examined in the laboratory for size and sex characteristics (Figures 14 and 15). The Shelikof Strait sample was the only one that showed a significant number of individuals in the second male year as males, common for sidestriped shrimp. It appears a lower rate of natural mortality may be occurring there. Shelikof Strait and Marmot Island have the greatest proportion of female shrimp.

Humpy shrimp were found almost exclusively in Wide Bay during the 2006 survey with a few individuals in other shallow hauls scattered throughout the survey area (Figure 16). The sexed composite sample showed the population as almost entirely one year old males with only 7% female (Figure 17).

Ocean pink shrimp, *Pandalas jordani*, otherwise known as smooth pink shrimp were recorded in 2006 for the second time on the survey since 1983. Ocean pinks were present in Marmot Island, Marmot Bay, and Shelikof Strait survey areas (Table 7, Figure 18). Mean CL was 17.6 mm from 1,008 sampled shrimp (Figure 19). The sexed composite sample had more transitional and female shrimp than males with a high proportion of the population newly recruited to the spawning biomass (Figure 20).

FORAGE FISH DISTRIBUTION

Eulachon were the most abundant forage fish, present in 62% of the survey hauls averaging 9.1 kg per km towed from all sample hauls. The highest density and largest catch in a single haul came from Unga Strait. The Marmot Island Section near Kodiak had the next highest average density (Figure 21). Pacific sandfish were the second most abundant of the forage fishes averaging 1.45 kg/km towed, but were found in only 14% of the hauls. The Pacific sandfish catch occurred primarily in Wide Bay with a few individuals also captured in other shallow tows (Figure 22). Mean length of Pacific sandfish from the survey was 13.0 cm fork length with some individuals greater than 20 cm (Figure 23). Longsnout pricklebacks, as the next most abundant forage fish, occurred in 21% of the survey hauls averaging 0.26 kg/km towed. The highest density of longsnout pricklebacks was found in Chignik Bay and Marmot Bay (Figure 24). Pacific herring are not considered a forage fish under the Forage Fish Management Plan (5 AAC 39.212); however, they are an important food source for many species of birds, animals and fish. Many ecosystem analysts consider herring a forage fish. Herring accounted for 0.11% of the total survey catch weight and occurred in 15% of the hauls. Kazakof Bay on Afognak Island had the highest catch (Figure 25).

BOTTOM TEMPERATURES

Water temperature was recorded on each tow during the survey using a thermograph attached to the headrope of the trawl. The coolest near-bottom ocean temperatures were found in Shelikof Strait and Unga Strait. The warmest temperatures were found in bays along the Alaska Peninsula (Figure 26). The average survey bottom temperature was 7.3°C with a range from 5.6°C to 9.9°C.

DISCUSSION

Shrimp populations as a whole increased in abundance during 2006 from the previous three years. The average density of northern pink shrimp was 30.0 kg/km towed, up from 19.6 kg/km towed in 2005 and 24.3 kg per km towed in 2004 (Figure 27). Conversely, the average sidestriped shrimp density was 2.0 kg/km towed in 2006, slightly lower than the average of 2.3

kg/km towed in 2005 (Figure 28). Humpy shrimp in Wide Bay had a large decline falling from 237 kg/km towed in 2005 to 3 kg/km towed in 2006. Shrimp comprised about 12% of the total catch on the survey. This was slightly higher than 2005, but lower than 2004 when shrimp comprised 22% of the catch (Figure 29). Fish populations also generally increased in 2006 over the previous year.

The primary objective of the survey was to compare current shrimp population estimates with established MABIs to determine if commercial harvest could be allowed. All historically fished stocks surveyed were below their MABI and are considered severely depressed (Table 8). Except for the General Section, no sections will open to commercial shrimp fishing until a survey shows a recovery to the minimum acceptable levels. Inner Marmot Bay and Chignik Bay Sections produced population estimates closest to the minimum acceptable levels for a commercial fishery. Those estimates were about 44% of the MABI.

Inner Marmot Bay, Marmot Island, Kujulik Bay, Chignik Bay, Stepovak Bay and Unga Strait population estimates were all higher than the prior survey of the area. Population estimates from Chiniak Bay, Kuiu Bay and Pavlof Bay were low and largely unchanged from the prior survey.

Sample hauls from Shelikof Strait generated a relatively large estimate of shrimp abundance when compared to other areas surveyed. As part of the Kodiak District General Section, Shelikof Strait is currently open to commercial shrimp fishing from June 15 to February 28 without a MABI specified. Commercial fishing activity has been minimal and the harvest miniscule compared to the 1,065 mt population estimate. Sidestriped shrimp density in the Shelikof Strait was higher than elsewhere in the survey area increasing the potential for future fishery development in Shelikof Strait.

Wide Bay, part of the Mainland Section, had produced an estimate above the MABI required for a fishery in 2001 and 2002, but fell below MABI in 2003 and stayed below the threshold with the current estimate. The total shrimp biomass in Wide Bay declined to 168 mt in 2006 from 217 mt in 2005 and 365 in 2004 (Figure 30). The decline was not consistent among species as northern pink shrimp populations increased over the previous year, but humpy shrimp declined radically. Either natural mortality or migration was a large factor as the density fell from 237 kg/km towed to 3 kg/km towed. Coonstriped and sidestriped shrimp were still at very low densities after virtually disappearing in 2003.

A well documented ecological shift from dominant shellfish to dominant groundfish populations occurred with a warming of Gulf of Alaska waters beginning in the late 1970s. Temperatures in recent years have continued warmer. Temperatures of 3°C to 6°C were found ideal for larval shrimp development in the laboratory (Nunes 1984). Large pink shrimp populations are most commonly found in waters between 0°C and 5°C (Shumway et al. 1985). Ocean bottom temperatures recorded on the 2006 survey were largely warmer than optimum for pandalid shrimp production with only 19% of the hauls exhibiting ocean bottom temperatures of 6°C or lower.

Unfavorable ocean temperatures may not be the most limiting element for shrimp production. Another factor constricting shrimp population growth is the effect of predation in the current environment. Analysis of cod-shrimp interactions in the Atlantic Ocean revealed top-down control in oceanic food webs. Shrimp biomass was strongly inversely related to cod biomass, but

not to ocean temperature (Worm and Myers 2003). Significant numbers of small shrimp may be cropped off annually by predators.

Of the forage fishes, eulachon were caught most frequently and in greatest abundance on the survey. They are an important prey item for marine mammals as well as other fish species, however little is known of the eulachon population structure in Alaska. Eulachon are anadromous and spawn in rivers that drain into the Gulf of Alaska and Bering Sea. Eulachon were captured in 2006 at the rate of 9.1 kg/km towed (Figure 31). This is about four times the rate observed in 2005, but similar to the prior three years. Capelin is another osmerid forage fish that has previously been more abundant in the Gulf of Alaska. Although both species are part of the same family, capelin and eulachon have reacted differently to the changing ocean environment. Capelin populations have noticeably diminished over the past 20 years, while eulachon populations have apparently flourished (Figure 32).

Walleye pollock has been the leading component by weight of small-mesh survey catches since the mid-1980s. Adult pollock during 2006 were encountered in 99% of the sample hauls. The greatest concentration was found in Pavlof Bay on the Alaska Peninsula (Figure 33). The capture rate for adult pollock in 2006 of 96.3 kg/km towed was the highest since 1995 and similar to 1989 and 1992 (Figure 34). Juvenile walleye pollock defined as age-0 fish were captured in 97% of survey hauls with the greatest abundance in Wide Bay and Pavlof Bay (Figure 35). Juvenile pollock density averaging 1.0 kg/km towed is the lowest rate recorded in the history of the survey (Figure 36).

Jellyfish were found in 88% of the survey hauls averaging 8.9 kg per km towed, a decline from 30.3 kg/km towed in 2005. These gelatinous zooplankton can occur in dense aggregations and consume high numbers of commercially important fish and crustacean larvae (Purcell and Sturdevant, 2001). *Cyanea* sp. was the leading component of this group at about 87% of the catch. Other varieties captured included *Aequoria* sp., *Aurelia* sp. and comb jellies, phylum Ctenophora (Figure 37). The lower volume of jellyfish found in 2006 was consistent among species. One, *Chrysaura melanaster*, was notably absent after being observed in previous surveys.

The small-mesh trawl survey has shown considerable increases in the abundance of spiny dogfish in recent years. Hauls from 2006 show that trend has continued with the second highest capture rate on record (Figure 38). Rarely encountered prior to 1998, the small sharks occurred in 54% of the 2006 sample hauls. The highest catches occurred in Marmot Bay and Chignik Bay (Figure 39).

A shrimp species that has become increasingly common in recent years is the ocean pink shrimp. Abundant off the coast of British Columbia and western US, there were only a few scattered records in the small-mesh trawl survey database prior to 2005. There were no records since 1983 until a few individuals were found in composite samples from the 2004 survey. During 2005, ocean pink shrimp were found in 8 sample tows with the abundance estimated at 41 mt. The estimate increased to 118 mt in 2006 (Figure 40). Distribution had increased as well with ocean pink shrimp found in 30 sample hauls from three fishing sections (Figure 41).

Perhaps the greatest value of this survey is the continuation of the time series database for small-mesh trawl samples. Marine fishery management is moving away from a single species approach based on static oceanographic conditions that do not, in reality, exist. It is now recognized that effective and sustainable use of resources requires a better understanding of ecosystem processes

and how they are affected by changing environmental and human influences. Foremost in research priorities must be the continuation of systematic studies of the marine ecosystem if the effects of those influences are to be examined. The small-mesh trawl survey series has documented species composition of shrimp and fish in the Gulf of Alaska for over 30 years and will continue to provide important clues for researchers trying to understand the ecology of the North Pacific Ocean.

The next small-mesh trawl survey in the Westward Region is scheduled for September-October 2007. Commercial shrimp fishing sections in the Kodiak and South Peninsula Districts will be the focus of that sampling effort.

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TABLES AND FIGURES

Table 1.-Shrimp biomass indices from the Westward Region Shrimp Fishery Management Plan, 1982.

District	Section	RBI ^a	MABI ^b
Kodiak	Kiliuda Bay	5,989	2,405
	Twoheaded Island	8,258	3,312
	Ugak Bay	4,537	1,815
	Alitak Bay		
	Northern Pink	2,405	962
	All species	4,855	1,962
	Alitak Flats	3,176	1,270
	Marmot Island	28,993	11,615
	Inner Marmot Bay	4,128	1,652
	Chiniak Bay	1,637	658
	Uganik Bay	2,931	1,175
	Uyak Bay	3,621	1,447
	Wide Bay ^c	1,184	476
	Puale Bay ^c	1,352	540
Chignik	Chignik Bay	5,159	2,064
	Kujulik Bay	4,288	1,715
	Mitrofanina Island	5,853	2,341
	Ivanof Bay	6,466	2,586
	Chiginagak Bay	780	313
	Aniakchak Bay	3,267	1,307
	Nakalilok Bay	926	372
	Kuiukta Bay	2,160	862
South Peninsula	Stepovak Bay	26,302	10,526
	Unga Strait	8,530	3,412
	West Nagai	7,473	2,976
	Beaver Bay	4,946	1,978
	Pavlof Bay	20,554	8,221
	Morzhovoi Bay	12,160	4,864

^a Representative Biomass Index (metric tons)

^b Minimum Acceptable Biomass Index (metric tons)

^c Bay contained within Mainland Section

Table 2.-Percent of catch by weight of the top 20 species, percentage of shrimp, and percentage of forage fish occurrence in the 2006 Westward Region small-mesh trawl survey.

Rank	Common Name	Scientific Name	Percent of Catch by Weight
1	Adult walleye pollock	<i>Theragra chalcogramma</i>	35.3 %
2	Flathead sole	<i>Hippoglossoides elassodon</i>	18.0 %
3	Arrowtooth flounder	<i>Atheresthes stomias</i>	13.5 %
4	Northern pink shrimp	<i>Pandalus borealis</i>	11.0 %
5	Eulachon	<i>Thaleichthys pacificus</i>	3.3 %
6	Cyanea jellyfish	<i>Cyanea sp.</i>	2.8 %
7	Pacific cod	<i>Gadus macrocephalus</i>	2.2 %
8	Spiny dogfish	<i>Squalus acanthias</i>	2.1 %
9	Pacific halibut	<i>Hippoglossus stenolepis</i>	1.9 %
10	Yellowfin sole	<i>Limanda aspera</i>	1.1 %
11	Pacific sleeper shark	<i>Somniosus pacificus</i>	1.0 %
12	Sidestriped shrimp	<i>Pandalopsis dispar</i>	0.7 %
13	Northern rock sole	<i>Lepidopsetta polyxystra</i>	0.7 %
14	Pacific Sandfish	<i>Trichodon trichodon</i>	0.5 %
15	Rex sole	<i>Glyptocephalus zachirus</i>	0.5 %
16	Big skate	<i>Raja binoculata</i>	0.5 %
17	Rougheye rockfish	<i>Sebastes aleutianus</i>	0.5 %
18	Juvenile walleye pollock	<i>Theragra chalcogramma</i>	0.3 %
19	Starry flounder	<i>Platichthys stellatus</i>	0.3 %
20	Dover sole	<i>Microstomus pacificus</i>	0.3 %
All other shrimp species			
	Ocean pink	<i>Pandalus jordani</i>	0.09 %
	Common crangon	<i>Crangon communis</i>	0.07 %
	Coonstripe	<i>Pandalus hypsinotus</i>	0.03 %
	Humpy	<i>Pandalus goniurus</i>	0.03 %
	Arctic argid	<i>Argis dentata</i>	0.01 %
	Glass shrimp	<i>Pasiphaea pacifica</i>	<0.01 %
	Eualus sp.	<i>Eualus sp.</i>	<0.01 %
	Barbed eualid	<i>Eualus barbatus</i>	<0.01 %
	Spot	<i>Pandalus platyceros</i>	<0.01 %
	Argis sp.	<i>Argis sp.</i>	<0.01 %
	Ridged crangon	<i>Crangon dalli</i>	<0.01 %
	Yellowleg pandalid	<i>Pandalus tridens</i>	<0.01 %
	Sculptered shrimp	<i>Sclerocrangon boreas</i>	<0.01 %
All other forage fish species			
	Pacific herring	<i>Clupea harengus</i>	0.11 %
	Longsnout prickleback	<i>Lumpenella longirostris</i>	0.10 %
	Capelin	<i>Mallotus villosus</i>	<0.01 %
	Rainbow smelt	<i>Osmerus mordax</i>	<0.01 %
	Deepsea smelt	Family Bathylagidae	<0.01 %
	Snake prickleback	<i>Lumpenus sagitta</i>	<0.01 %
All other animals		73 species	2.93 %

Table 3.-Fish measurements from the 2006 Westward Region small-mesh trawl survey.

Common Name	Number Measured	Mean Length (cm)	Estimated Number Caught	Estimated Total Catch (kg)
Alaska plaice	20	48.1	96	148.7
Alaska skate	2	40.5	2	7.9
Aleutian skate	1	52.0	1	6.1
Arrowtooth flounder	2,447	33.2	11,768	7,097.3
Bering skate	10	30.2	10	18.2
Big skate	15	67.7	15	261.3
Butter sole	1	40.0	3	1.6
Capelin	5	11.2	20	0.2
Deepsea smelt	2	8.5	8	0.0
Dover sole	46	37.2	249	171.3
English sole	5	34.0	14	5.3
Eulachon	2,136	16.7	54,919	1,751.3
Flathead sole	4,209	28.8	31,002	9,464.5
Light dusky rockfish	7	40.0	18	22.7
Lingcod	4	18.0	13	0.6
Longnose skate	22	53.2	22	148.9
Northern rockfish	2	29.0	2	0.7
Northern rock sole	163	34.6	651	370.7
Pacific cod	331	63.5	346	1,172.0
Pacific cod (juvenile)	55	11.5	224	2.8
Pacific halibut	192	68.2	192	1,024.2
Pacific herring	350	18.9	497	56.9
Pacific Ocean perch	15	27.1	31	12.7
Pacific sandfish	422	13.0	6,134	278.4
Pacific sleeper shark	5	210.0	5	507.6
Pacific tomcod	79	21.5	260	22.7
Rainbow smelt	1	20.0	5	0.3
Redbanded rockfish	3	28.7	3	1.6
Rex sole	259	26.0	1,370	263.7
Rougheye rockfish	118	35.2	246	246.1
Sablefish	96	41.5	102	77.5
Saffron cod	8	30.1	42	9.0
Southern rock sole	1	44.0	4	3.2
Spiny dogfish	292	77.5	353	1,089.8
Starry flounder	25	50.7	84	182.5
Walleye pollock	3,509	33.2	37,637	18,555.5
Walleye pollock (juvenile)	2,269	10.2	24,307	183.5
Yellowfin sole	285	32.9	1,260	555.1
	<u>17,412</u>			

Table 4.-Shrimp population estimates from the 2006 Westward Region small-mesh trawl survey.

Survey Area	Stratum	No. Tows	Average Kg/Km	Total Sq. Km	Std. Error	Pop. Estimate (MT)
Inner Marmot Bay	2	8	65.2	106.19	11.94	710
	3	2	6.8	5.08	3.47	4
Marmot Island	2	2	180.8	28.81	21.12	534
	3	4	120.0	52.48	24.24	646
	4	2	11.5	164.29	7.96	194
	5	4	14.6	171.50	4.73	257
Chiniak Bay	2	2	2.1	10.46	2.1	2
	3	2	5.2	20.51	3.78	11
	4	1	0.1	7.03	-	0
	5	2	14.5	13.82	6.7	21
Wide Bay	2	6	65.3	25.14	11.18	168
	3	1	0.0	3.16	-	0
Shelikof Strait	1	11	11.0	943.22	2.92	1065
Stepovak Bay	3	3	97.4	109.76	11.74	1095
Unga Strait	1	6	50.5	182.47	28.37	944
Pavlof Bay	1	20	0.3	303.20	0.16	10
Chignik Bay	2	8	75.1	115.59	9.85	891
	3	3	5.4	36.01	2.66	20
Kujulik Bay	2	2	5.2	14.75	2.55	8
	3	4	20.3	64.83	3.88	135
Kuiukta Bay	1	4	32.2	54.54	3.45	180
Morzhovoi Bay	2	7	2.7	264.51	0.45	18
	3	1	0.1	157.88	-	1

Table 5.-Northern pink shrimp population estimates from the 2006 Westward Region small-mesh trawl survey.

Survey Area	Stratum	No. Tows	Average Kg/Km	Total Sq. Km	Std. Error	Pop. Estimate (MT)
Inner Marmot Bay	2	8	61.0	106.19	14.64	664
	3	2	5.7	5.08	0.04	3
Marmot Island	2	2	178.5	28.81	32.48	527
	3	4	110.1	52.48	11.23	592
	4	2	6.6	164.29	2.06	112
	5	4	6.0	171.50	3.03	106
Chiniak Bay	2	2	2.1	10.46	2.10	2
	3	2	4.7	20.51	4.33	10
	4	1	0	7.03	-	0
	5	2	11.4	13.82	4.95	16
Wide Bay	2	6	61.2	25.14	15.05	158
	3	1	0	3.16	-	0
Shelikof Strait	1	11	9.7	943.22	3.29	935
Stepovak Bay	3	3	93.0	109.76	23.23	1047
Unga Strait	1	6	48.8	182.47	28.90	912
Pavlof Bay	1	20	0.3	303.20	0.16	10
Chignik Bay	2	8	69.1	115.59	14.34	819
	3	3	5.4	36.01	2.66	20
Kujulik Bay	2	2	5.1	14.75	2.75	8
	3	4	20.3	64.83	3.88	135
Kuiukta Bay	1	4	30.1	54.54	5.14	169
Morzhovoi Bay	2	7	0.6	264.51	0.45	17
	3	1	0.1	157.88	-	1

Table 6.-Sidestriped shrimp population estimates from the 2006 Westward Region small-mesh trawl survey.

Survey Area	Stratum	No. Tows	Average Kg/Km	Total Sq. Km	Std. Error	Pop. Estimate (MT)
Inner Marmot Bay	2	8	3.6	106.19	1.64	40
	3	2	1.1	5.08	0.50	1
Marmot Island	2	2	1.9	28.81	1.18	6
	3	4	8.9	52.48	4.20	48
	4	2	2.6	164.29	2.56	44
	5	4	6.0	171.50	3.43	105
Chiniak Bay	2	2	0	10.46	0	0
	3	2	0.4	20.51	0.44	1
	4	1	0	7.03	-	0
	5	2	3.1	13.82	1.15	4
Wide Bay	2	6	1.4	25.14	0.67	4
	3	1	0	3.16	-	0
Shelikof Strait	1	11	1.1	943.22	0.58	108
Stepovak Bay	3	3	4.4	109.76	1.72	49
Unga Strait	1	6	1.7	182.47	1.65	32
Pavlof Bay	1	20	0	303.20	0	0
Chignik Bay	2	8	6.0	115.59	3.16	71
	3	3	0	36.01	0	0
Kujulik Bay	2	2	0	14.75	0.01	0
	3	4		64.83	0	0
Kuiukta Bay	1	4	2.1	54.54	1.73	11
Morzhovoi Bay	2	7	0	264.51	0	0
	3	1	0	157.88	0	0

Table 7.-Ocean pink shrimp population estimates from the 2006 Westward Region small-mesh trawl survey.

Survey Area	Stratum	No. Tows	Average Kg/Km	Total Sq. Km	Std. Error	Pop. Estimate (MT)
Inner Marmot Bay	2	8	0.6	106.19	0.16	6
	3	2	0	5.08	0	0
Marmot Island	2	2	1.7	28.81	0.31	1
	3	4	4.0	52.48	0.25	5
	4	2	9.4	164.29	1.58	39
	5	4	10.7	171.50	1.34	46
Chiniak Bay	2	2	0	10.46	0	0
	3	2	0	20.51	0	0
	4	1	0	7.03	0	0
	5	2	0	13.82	0	0
Wide Bay	2	6	0	25.14	0	0
	3	1	0	3.16	0	0
Shelikof Strait	1	11	0.9	943.22	0.08	21
Stepovak Bay	3	3	0	109.76	0	0
Unga Strait	1	6	0	182.47	0	0
Pavlof Bay	1	20	0	303.20	0	0
Chignik Bay	2	8	0	115.59	0	0
	3	3	0	36.01	0	0
Kujulik Bay	2	2	0	14.75	0	0
	3	4	0	64.83	0	0
Kuiukta Bay	1	4	0	54.54	0	0
Morzhovoi Bay	2	7	0	264.51	0	0
	3	1	0	157.88	0	0

Table 8.-Minimum acceptable biomass indices (MABI) and shrimp population estimates in metric tons from surveyed Westward Region fishing sections, 1995-2006.

District	Section	MABI ^a	Survey Year							
			2006	2005	2004	2003	2002	2001	1998	1995
Kodiak	Inner Marmot Bay	1,652	714	445	498	423	604	1,089	247	567
	Marmot Island	11,615	1,631	1,182	809	1,407	1,315	1,703	230	ND
	Chiniak Bay	658	34	31	14	84	52	311	44	76
	Ugak Bay	1,815	ND	10	ND	2	ND	46	0	ND
	Kiliuda Bay	2,405	ND	19	ND	146	198	51	74	59
	Two Headed Island	3,312	ND	81	ND	4	ND	66	65	59
	Alitak Bay	1,942	ND	120	ND	130	ND	282	107	8
	Uyak Bay	1,447	ND	326	ND	439	ND	306	163	174
	Uganik Bay	1,175	ND	297	ND	403	ND	704	129	446
	Kukak Bay	none	ND	41	ND	68	ND	187	44	10
	Wide Bay ^b	476	168	217	365	384	880	967	ND	36
	Puale Bay ^b	540	ND	22	ND	40	ND	47	ND	ND
Shelikof Strait ^c	none	1,065	7,732	1,362	8,527	ND	1,062	ND	ND	
Alitak Flats	577	ND	ND	ND	30	ND	ND	ND	ND	
Chignik	Kujulik Bay	1,715	143	ND	ND	ND	11	ND	ND	ND
	Chignik Bay	2,064	911	ND	580	ND	506	ND	ND	467
	Chiginagak Bay	314	ND	ND	44	ND	ND	ND	ND	ND
	Nakalilok Bay	373	ND	ND	40	ND	ND	ND	ND	ND
	Kuiukta Bay	862	180	ND	226	ND	167	ND	ND	164
	Mitrofanina Island	2,341	ND	ND	3	ND	97	ND	ND	ND
	Ivanof Bay	2,586	ND	ND	ND	ND	8	ND	ND	ND
South Peninsula	Stepovak Bay	10,526	1,095	ND	101	ND	370	ND	ND	ND
	Unga Strait	3,412	944	ND	272	ND	115	ND	ND	ND
	Beaver Bay	1,978	ND	ND	1	ND	10	ND	ND	ND
	Pavlof Bay	8,221	10	61	64	8	38	30	59	15
	Morzhovoi Bay	none	19	ND	ND	ND	ND	ND	ND	ND

^a Minimum acceptable biomass index

^b Wide and Puale Bays are part of the Mainland Section, but have individual MABIs established.

^c Shelikof Strait is part of the General Section; Area considered for the biomass estimate is not consistent between survey years.

ND means no data.

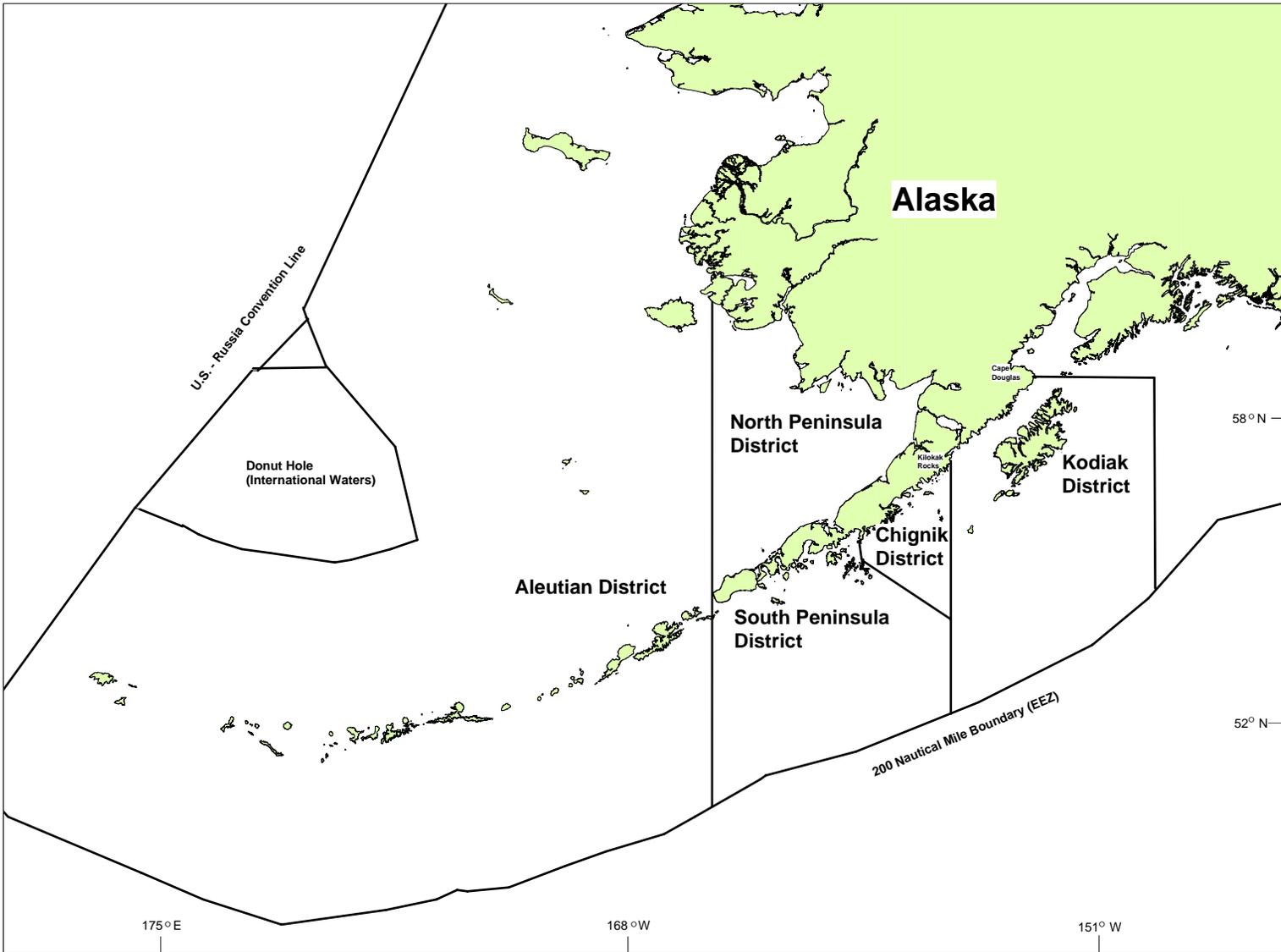


Figure 1.-Commercial shrimp fishing districts of Westward Registration Area J.

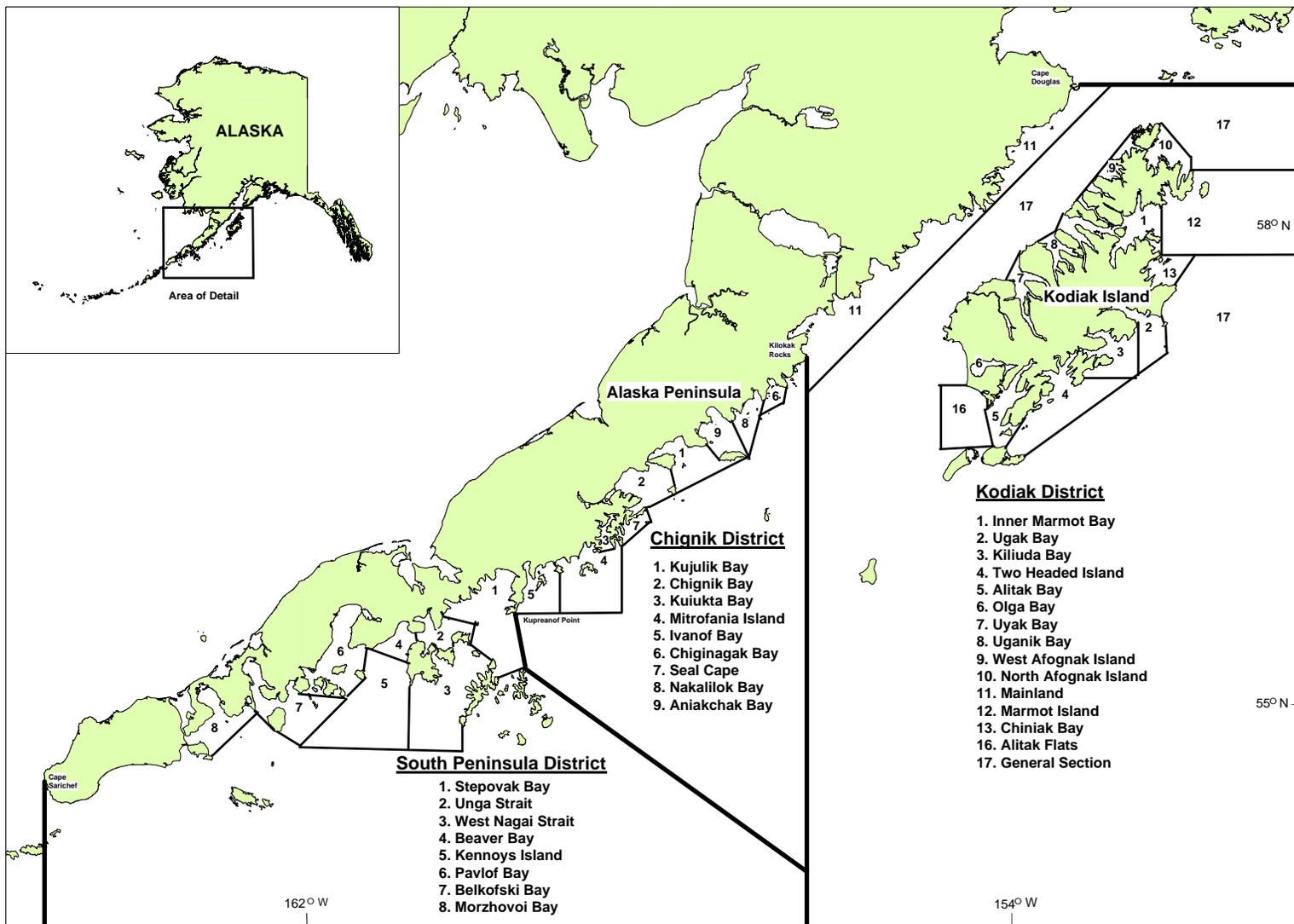


Figure 2.-Commercial shrimp fishing sections in the Kodiak, Chignik and South Peninsula Districts of Westward Area J.

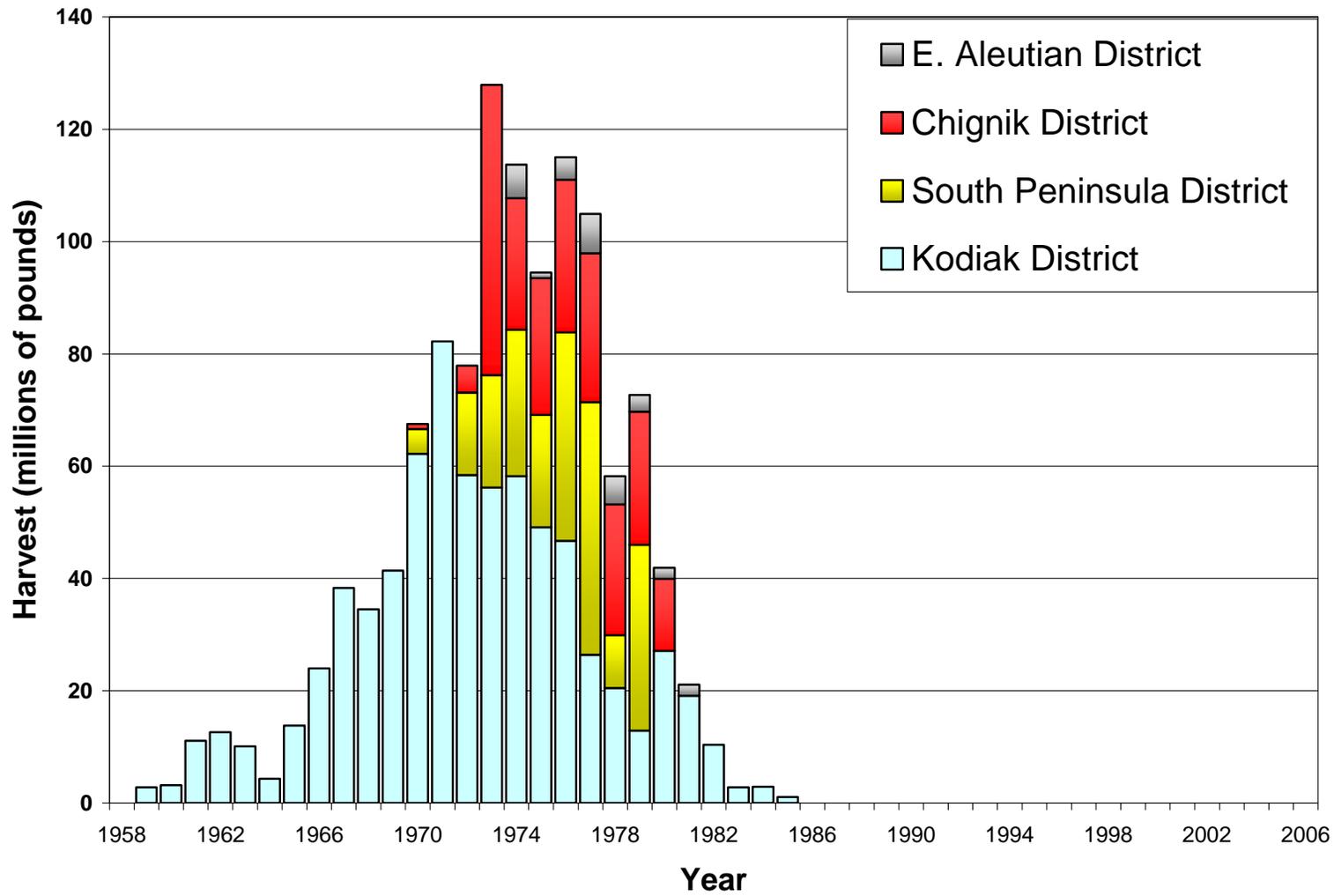


Figure 3.-Shrimp harvests from the Kodiak, Chignik, South Peninsula and Eastern Aleutian Districts, 1958-2006.

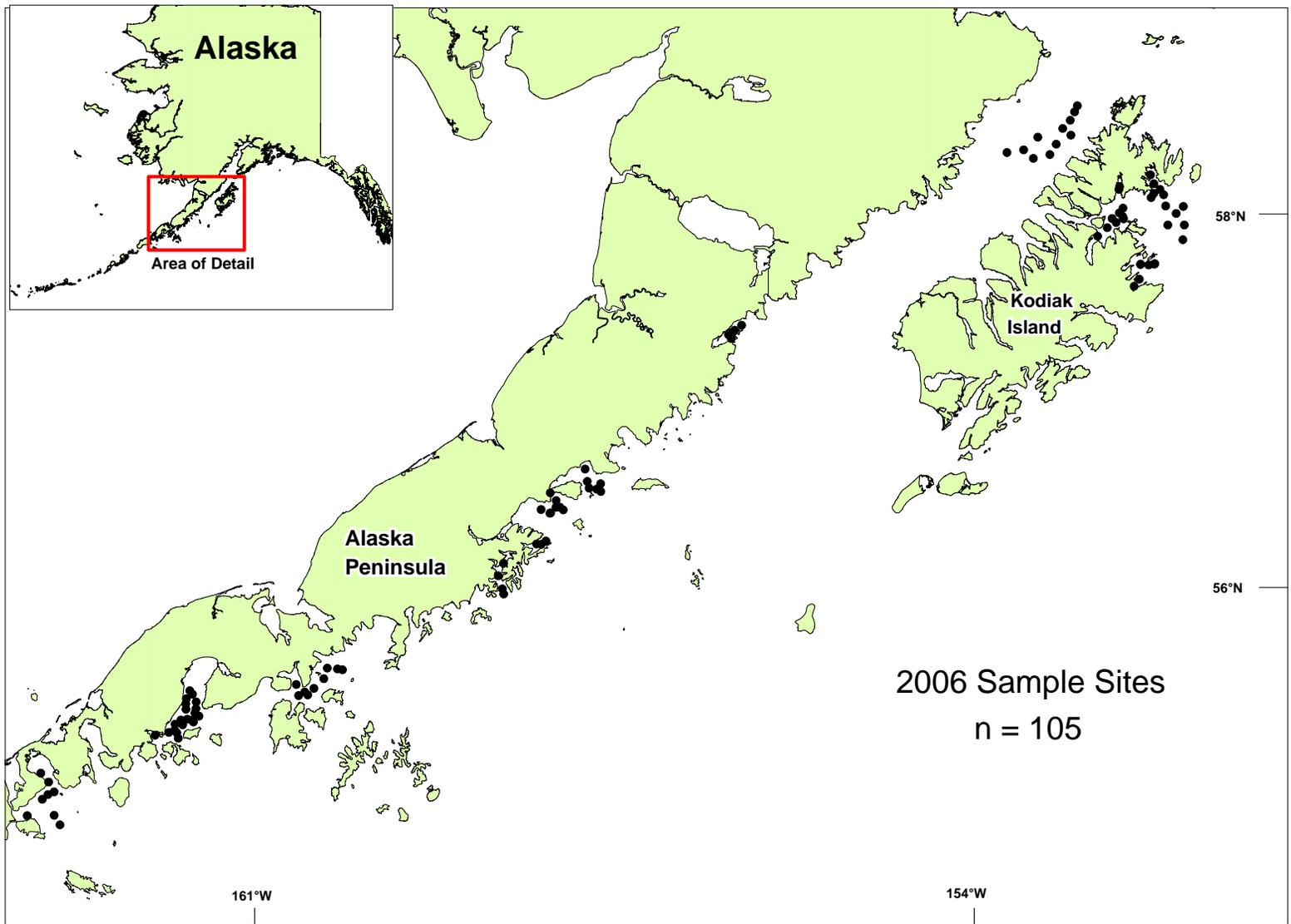


Figure 4.-Location of sample sites from the 2006 Westward Region small-mesh trawl survey.

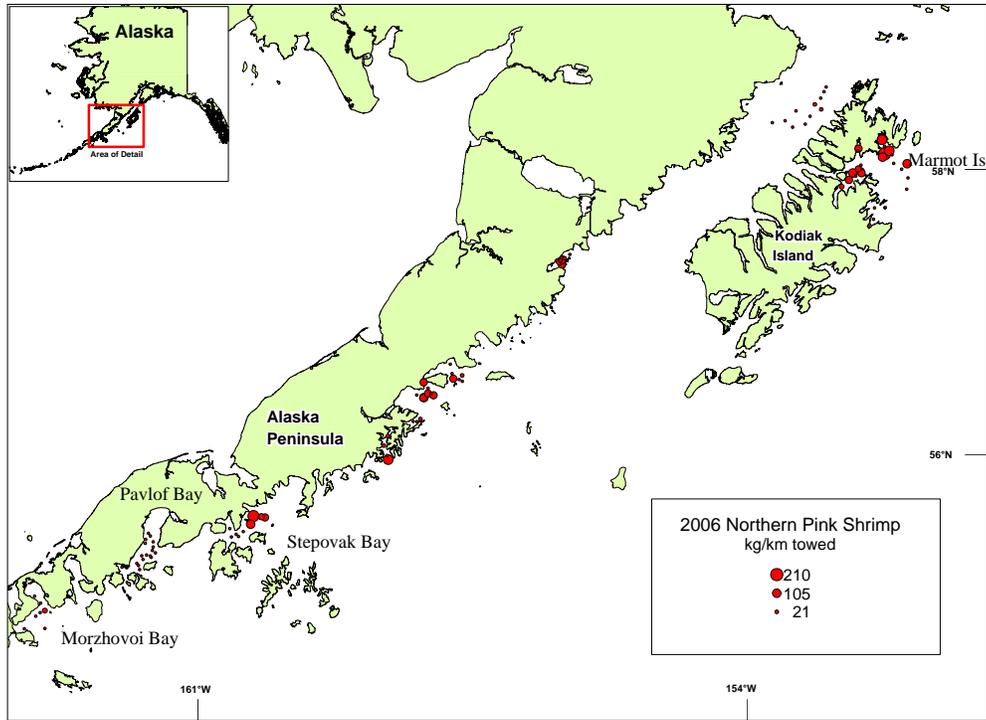


Figure 5.-Distribution and relative abundance of northern pink shrimp in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

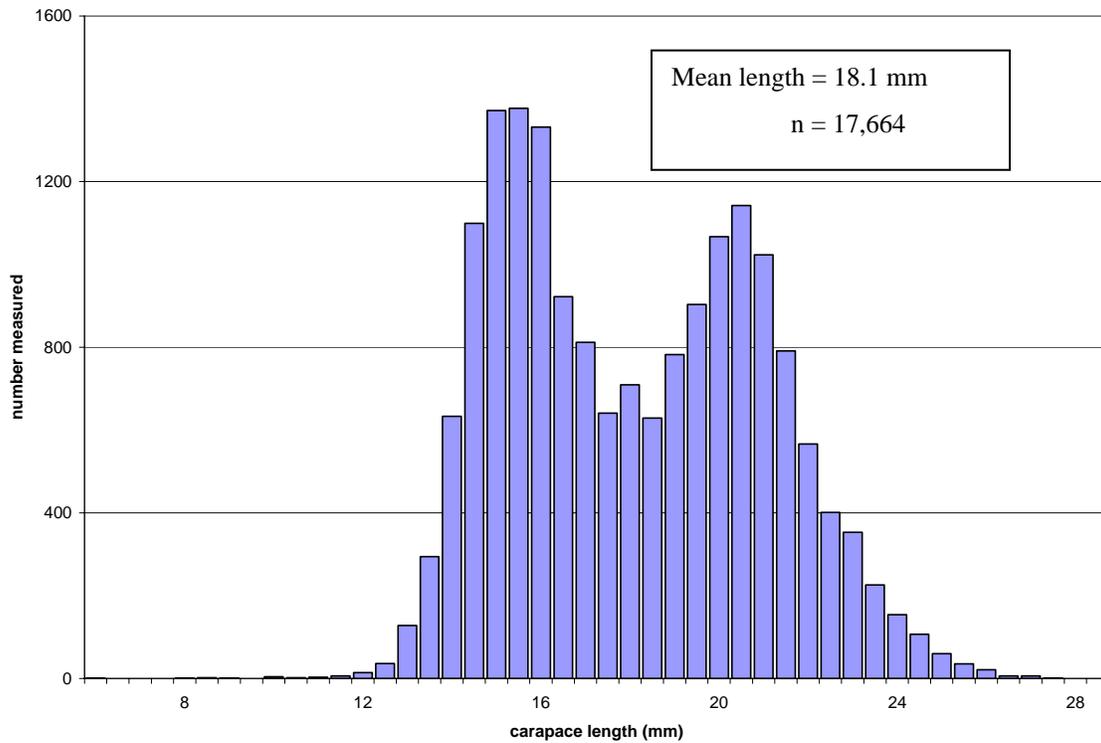


Figure 6.-Carapace lengths of northern pink shrimp from the 2006 Westward Region small-mesh trawl survey.

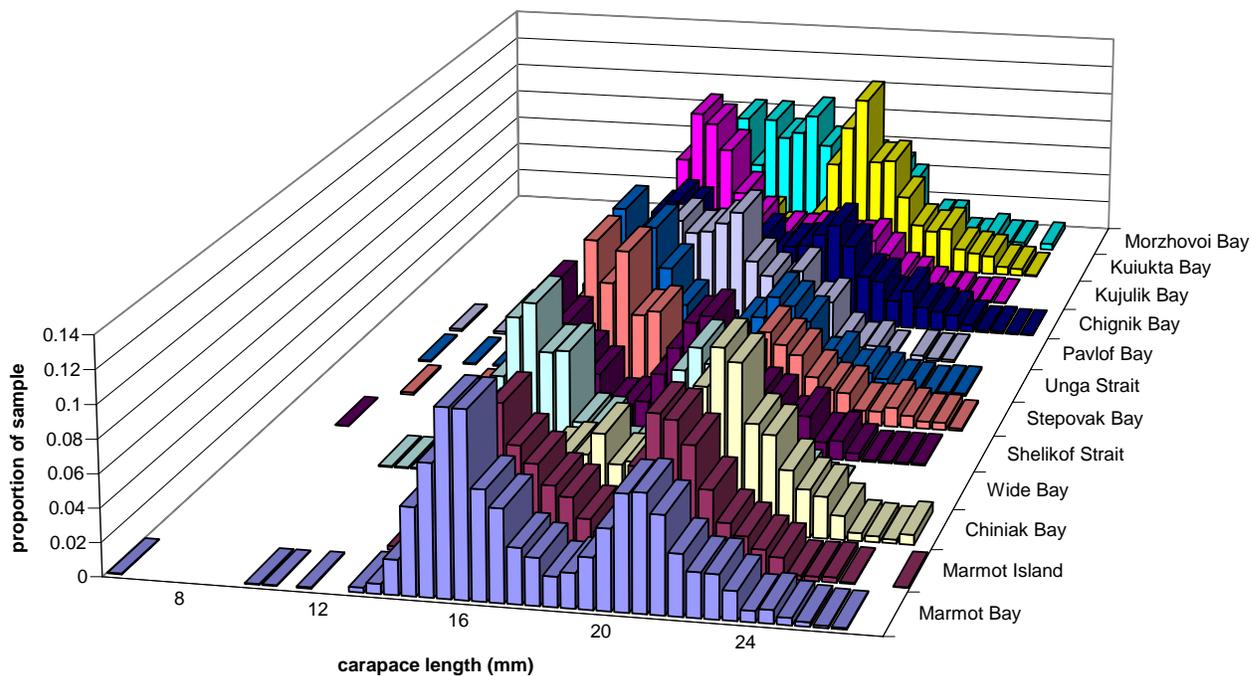
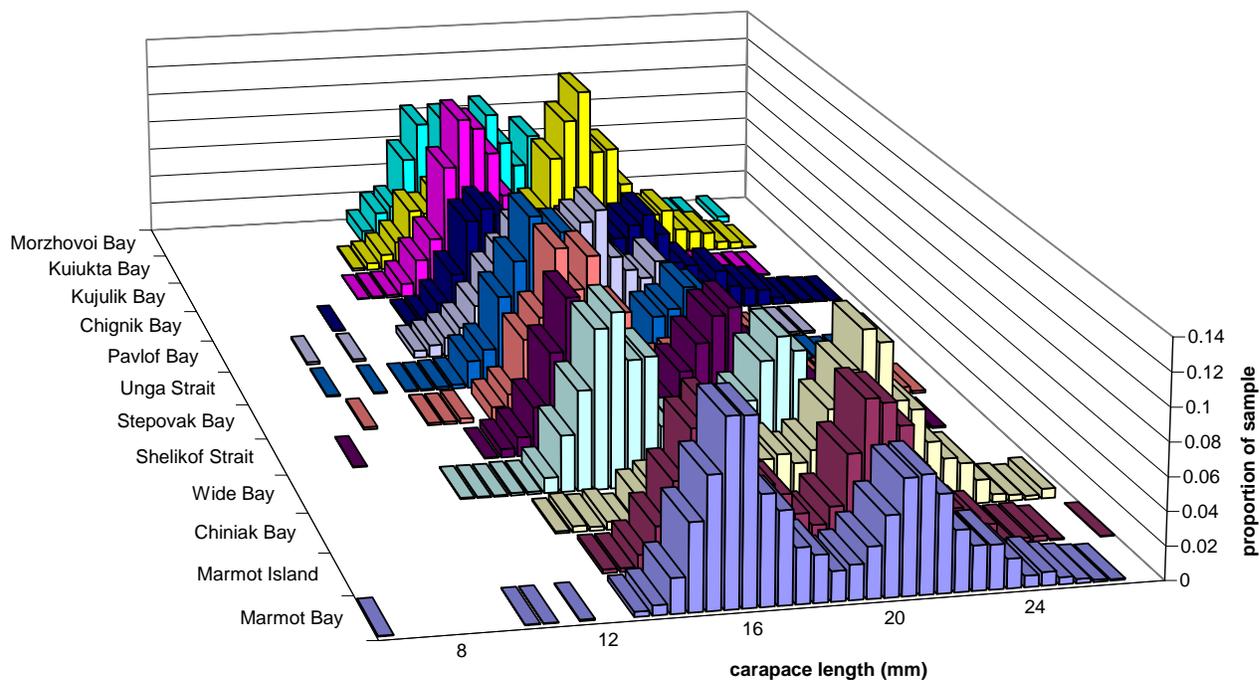


Figure 7.-Carapace lengths of northern pink shrimp by commercial fishing section from the 2006 Westward Region small-mesh trawl survey.

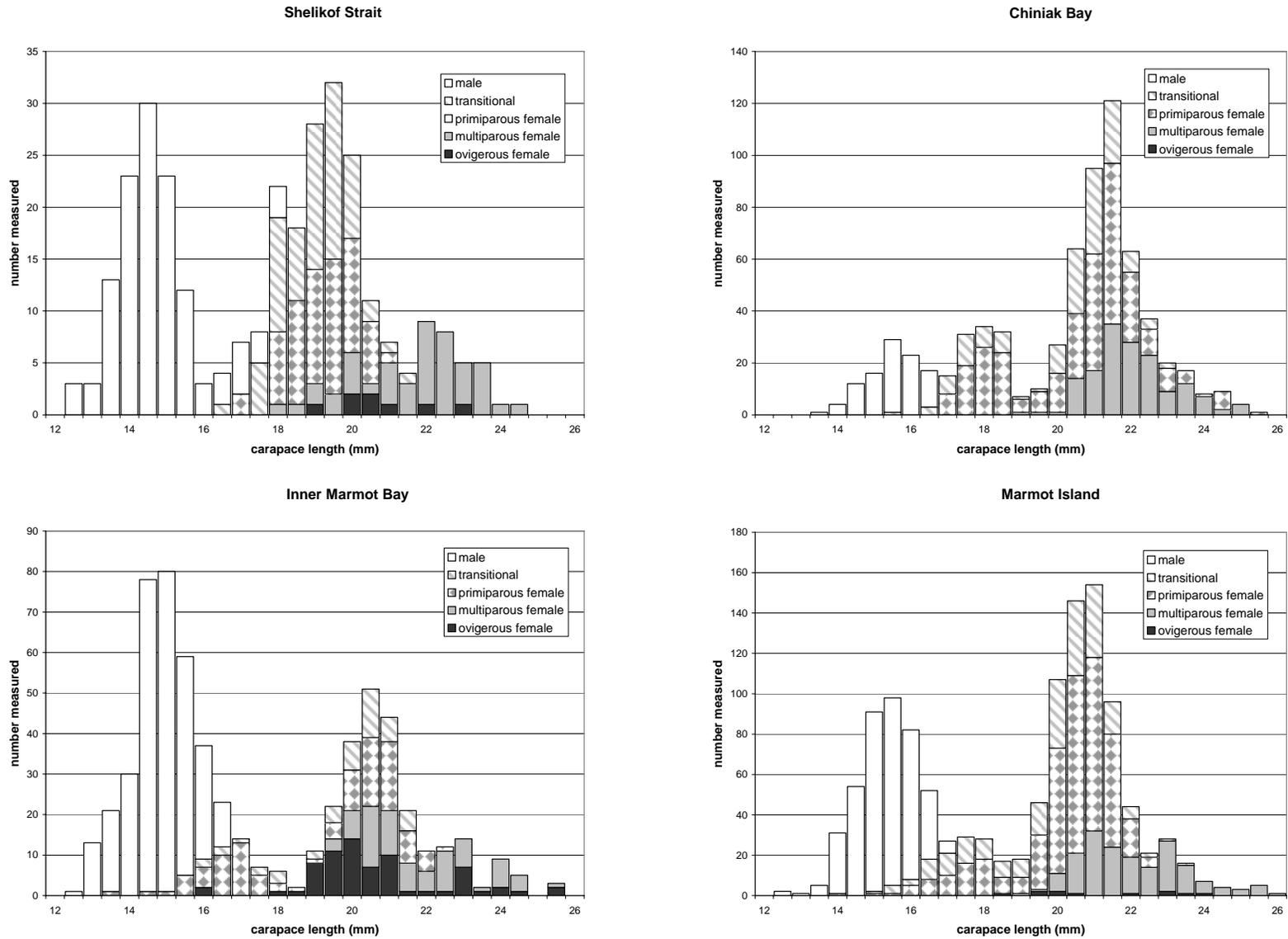


Figure 8.-Size composition by sex of northern pink shrimp from the 2006 Westward Region small-mesh trawl survey of Shelikof Strait and the Chiniak Bay, Inner Marmot Bay and Marmot Island commercial shrimp fishing sections.

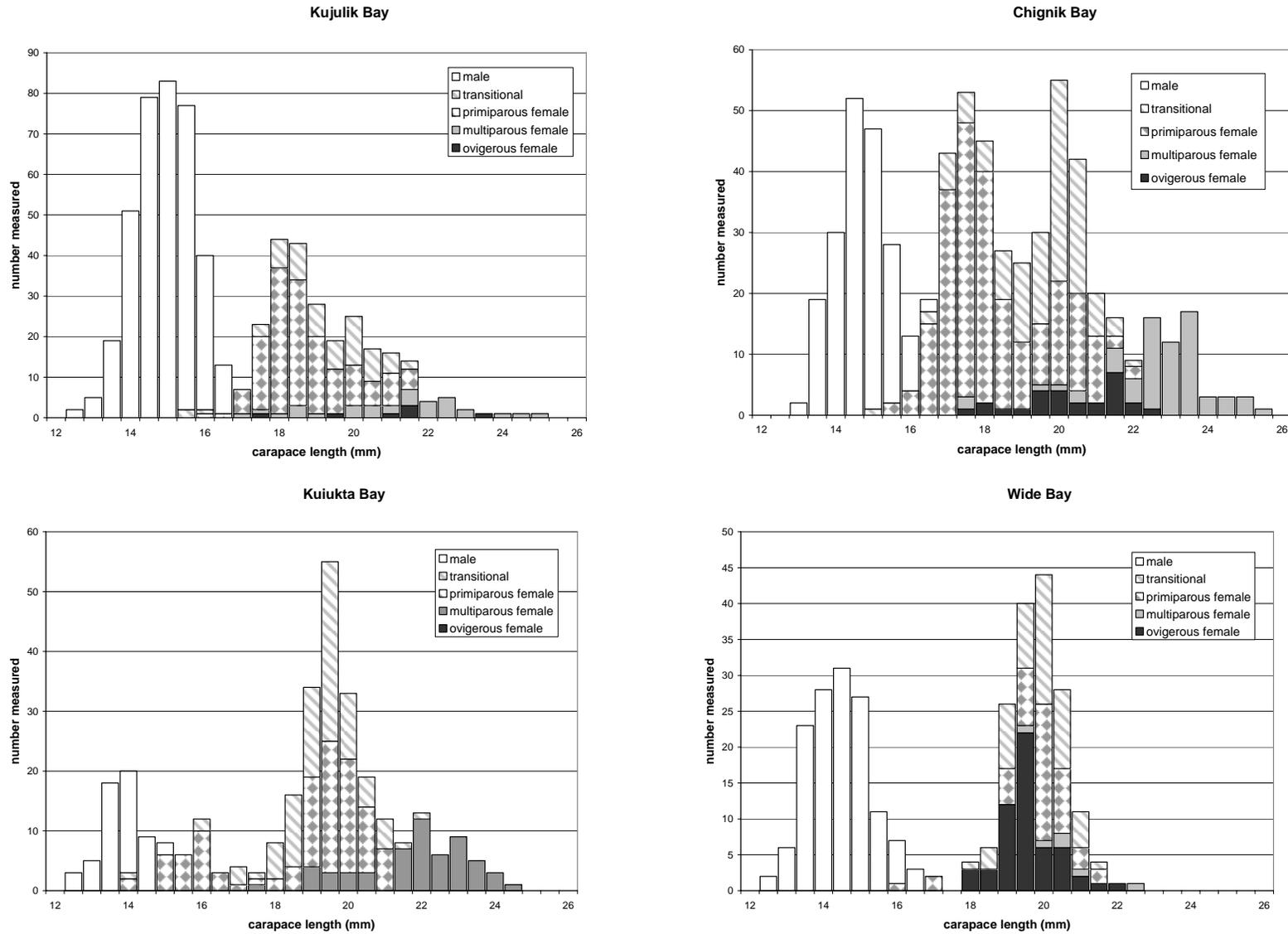


Figure 9.—Size composition by sex of northern pink shrimp from the 2006 Westward Region small-mesh trawl survey of the Kujulik Bay, Chignik Bay, Kuiuhta Bay and Wide Bay commercial shrimp fishing sections.

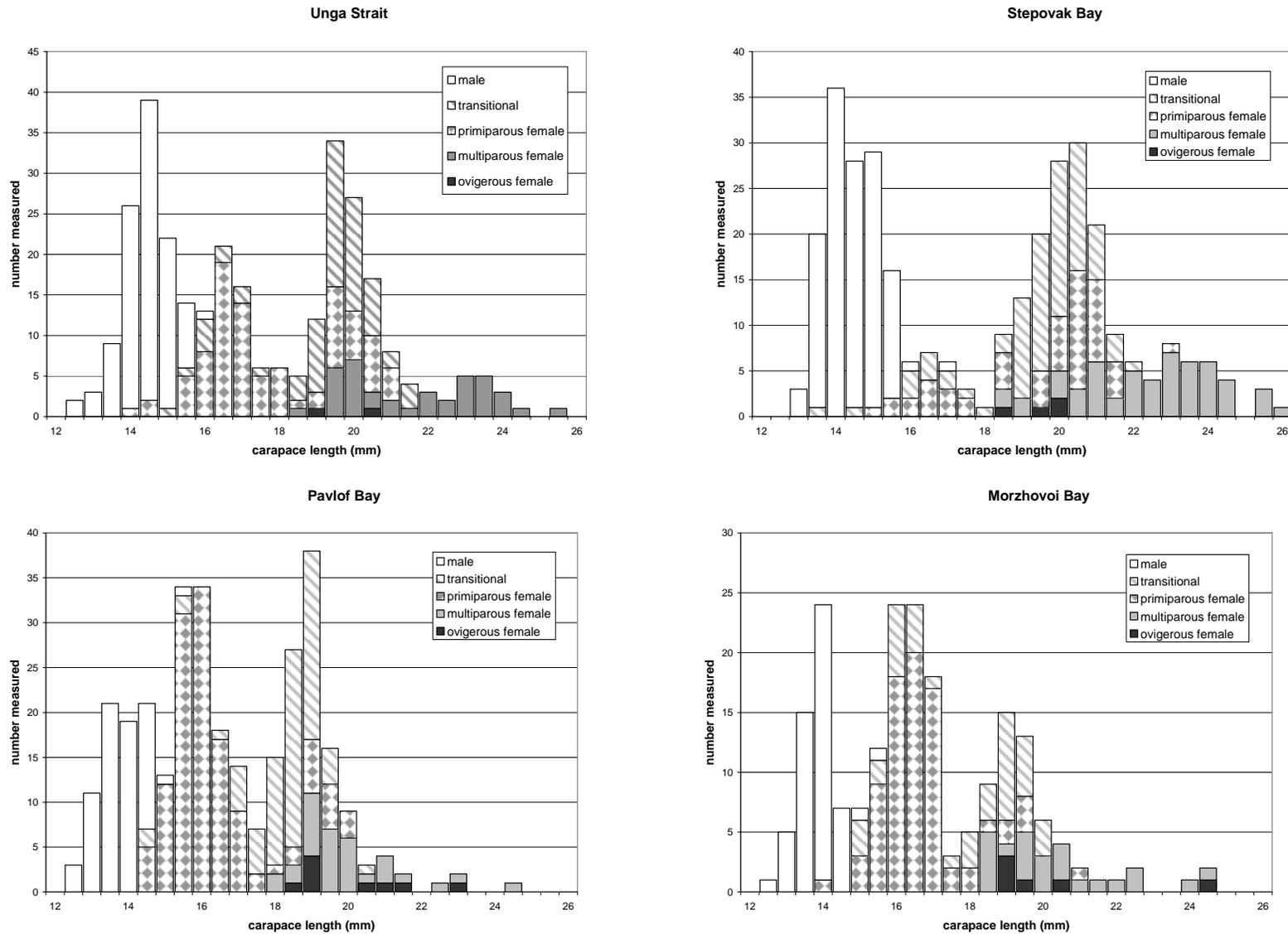


Figure 10.-Size composition by sex of northern pink shrimp from the 2006 Westward Region small-mesh trawl survey of the Unga Strait, Stepovak Bay, Pavlof Bay and Morzhovoi Bay commercial shrimp fishing sections.

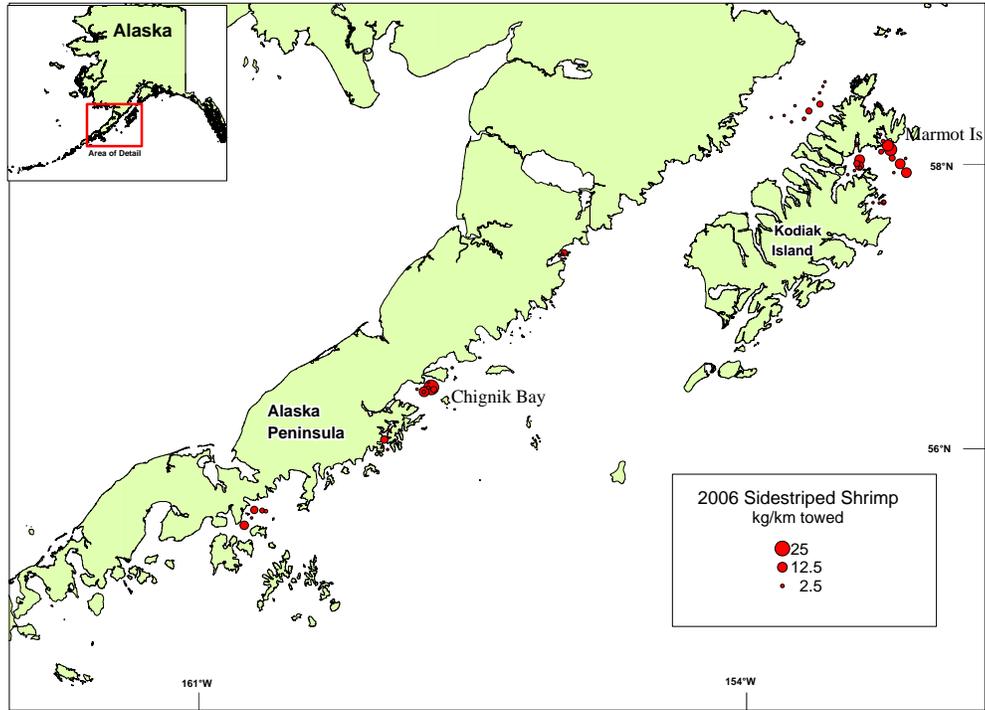


Figure 11.-Distribution and relative abundance of sidestriped shrimp in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

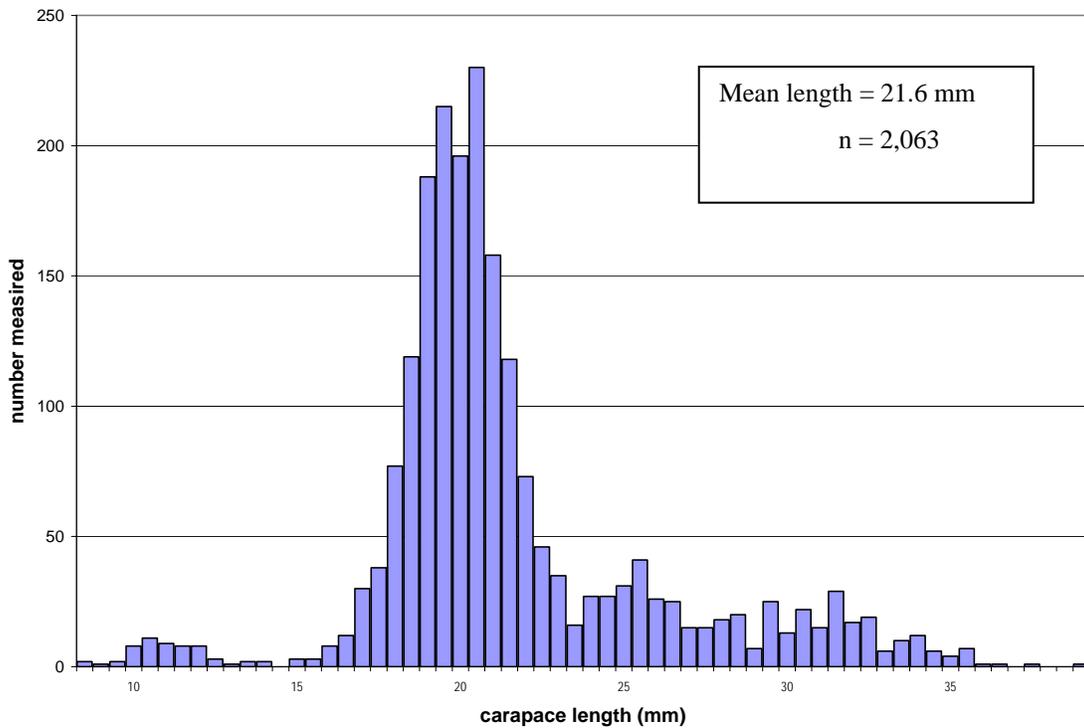


Figure 12.-Carapace lengths of sidestriped shrimp from the 2006 Westward Region small-mesh trawl survey.

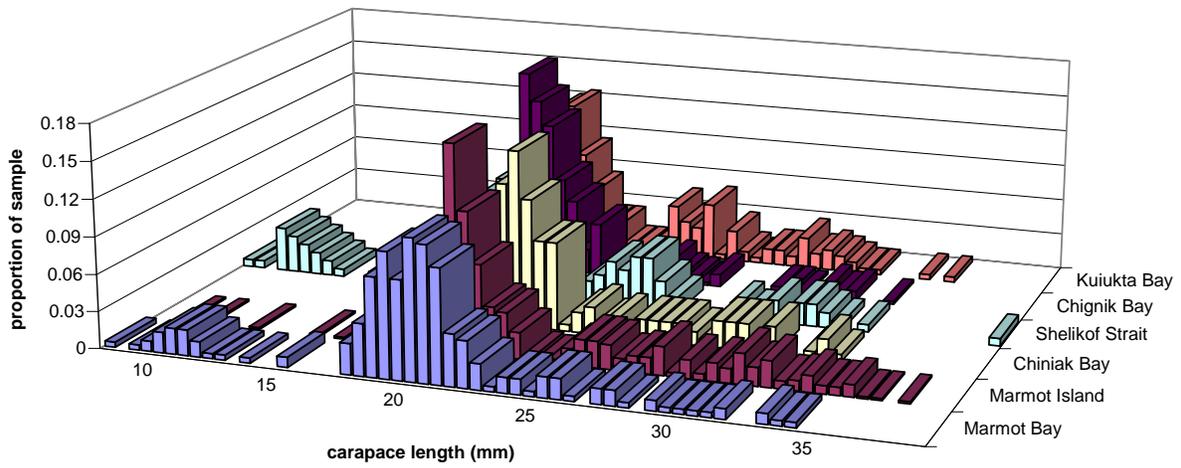
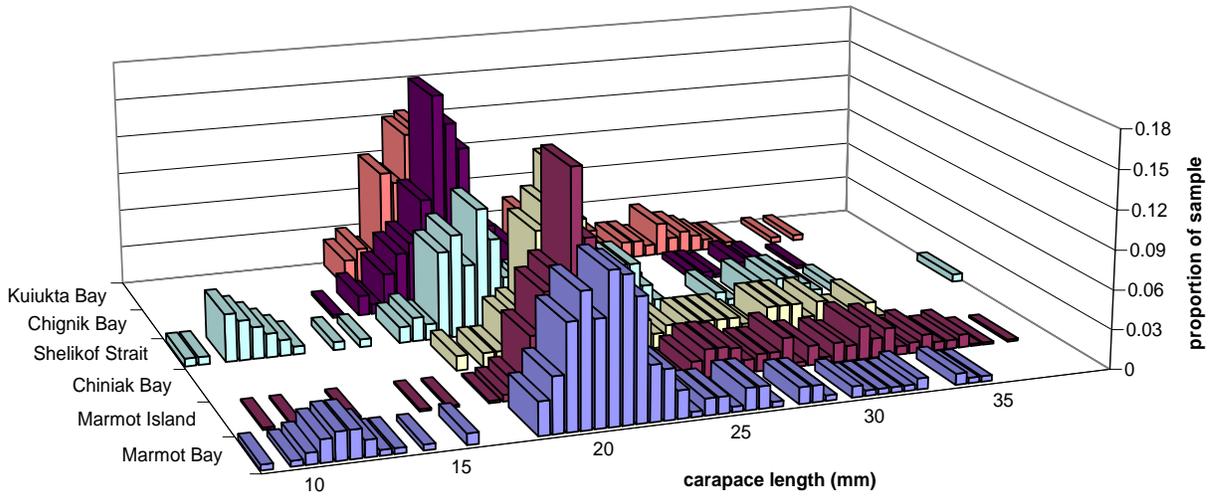


Figure 13.-Carapace lengths of sidestriped shrimp by commercial fishing section from the 2006 Westward Region small-mesh trawl survey.

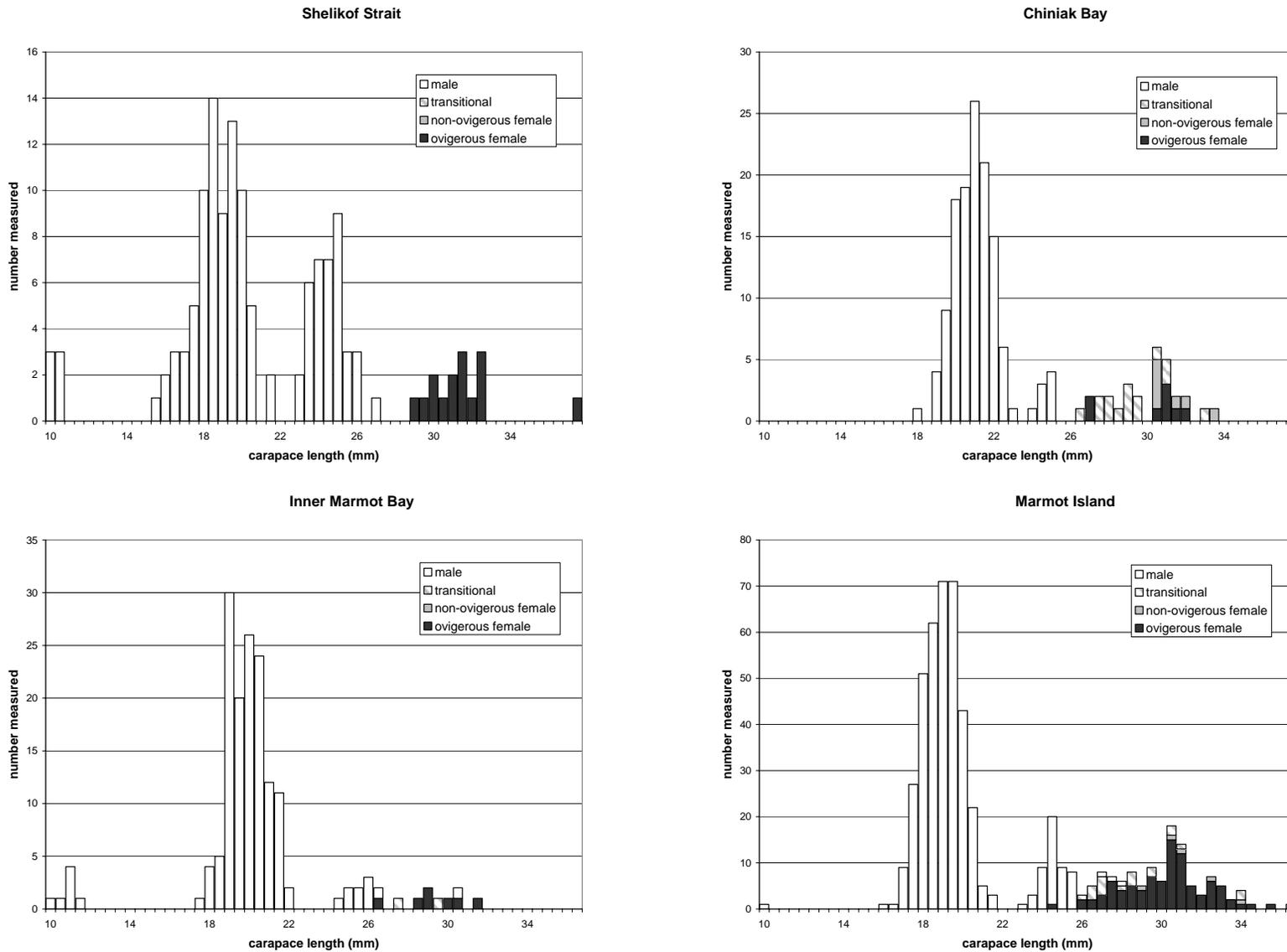


Figure 14.-Size composition by sex of sidestriped shrimp from the 2006 Westward Region small-mesh trawl survey of Shelikof Strait and the Chiniak Bay, Inner Marmot Bay and Marmot Island commercial shrimp fishing sections.

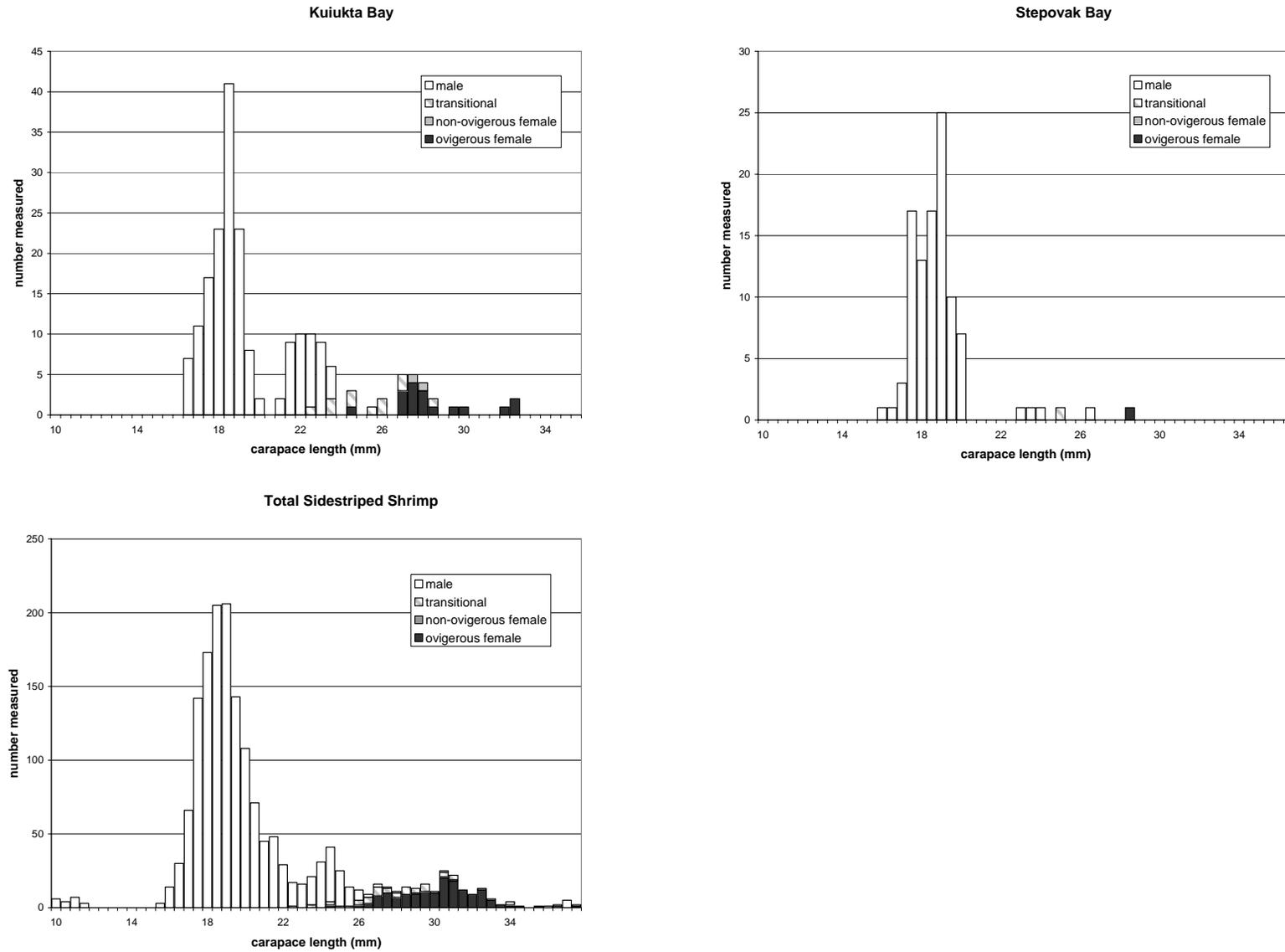


Figure 15.-Size composition by sex of sidestriped shrimp from the 2006 Westward Region small-mesh trawl survey of the Kuiukta Bay and Stepovak Bay commercial shrimp fishing sections and total from all sections.

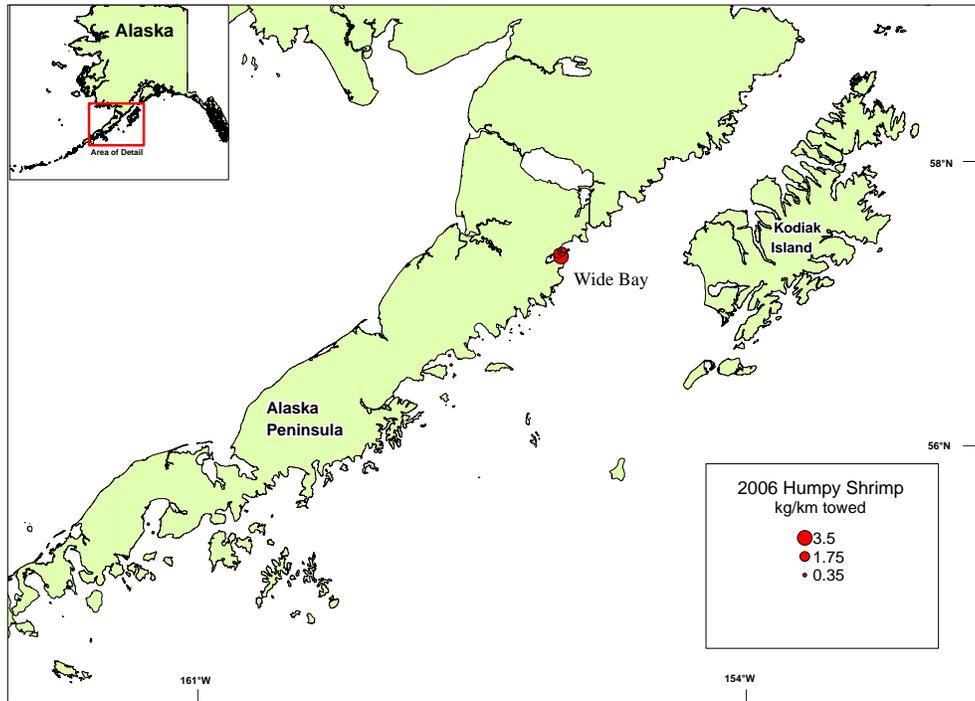


Figure 16.-Distribution and relative abundance of humpy shrimp in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

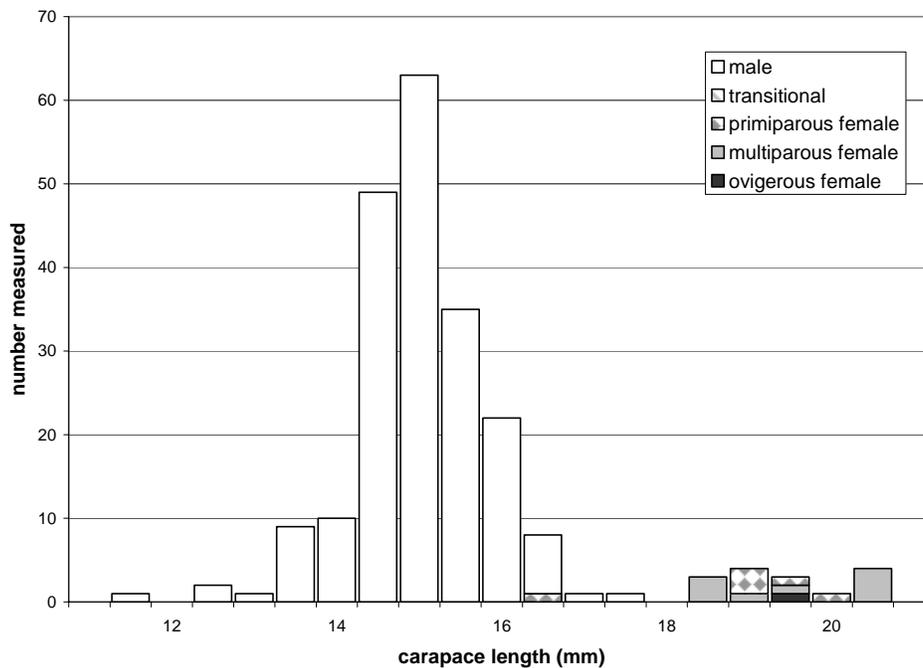


Figure 17.-Size composition by sex of Wide Bay humpy shrimp from the 2006 Westward Region small-mesh trawl survey.

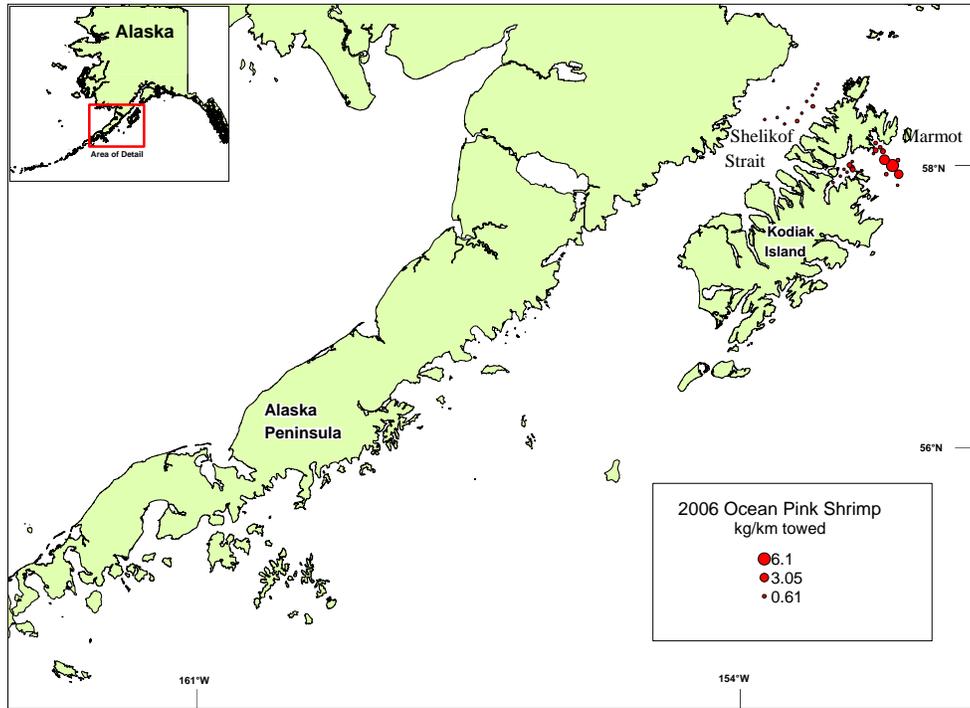


Figure 18.-Distribution and relative abundance of ocean pink shrimp in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

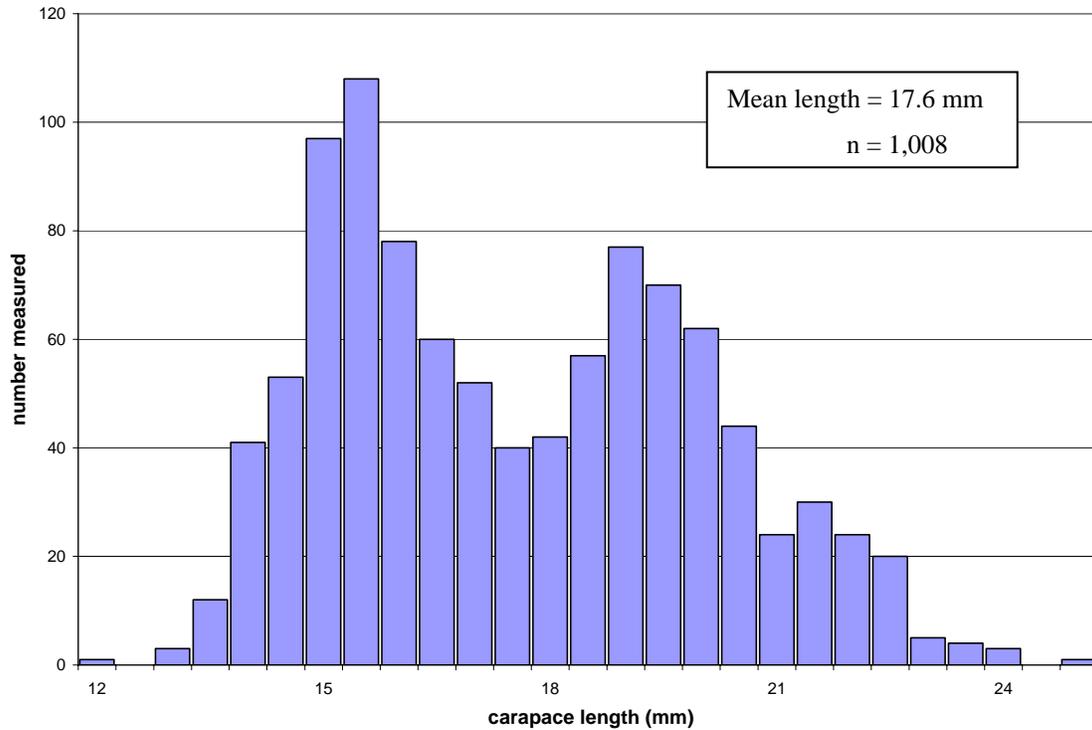


Figure 19.-Carapace lengths of ocean pink shrimp from the 2006 Westward Region small-mesh trawl survey.

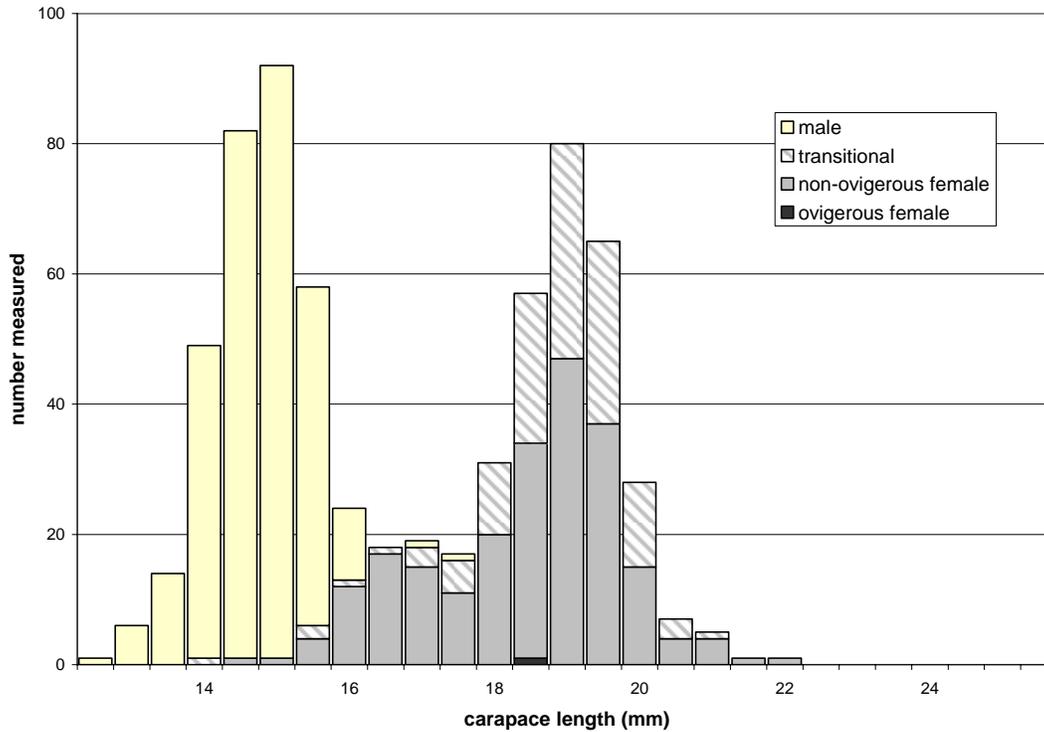


Figure 20.-Size composition by sex of ocean pink shrimp from the 2006 Westward Region small-mesh trawl survey.

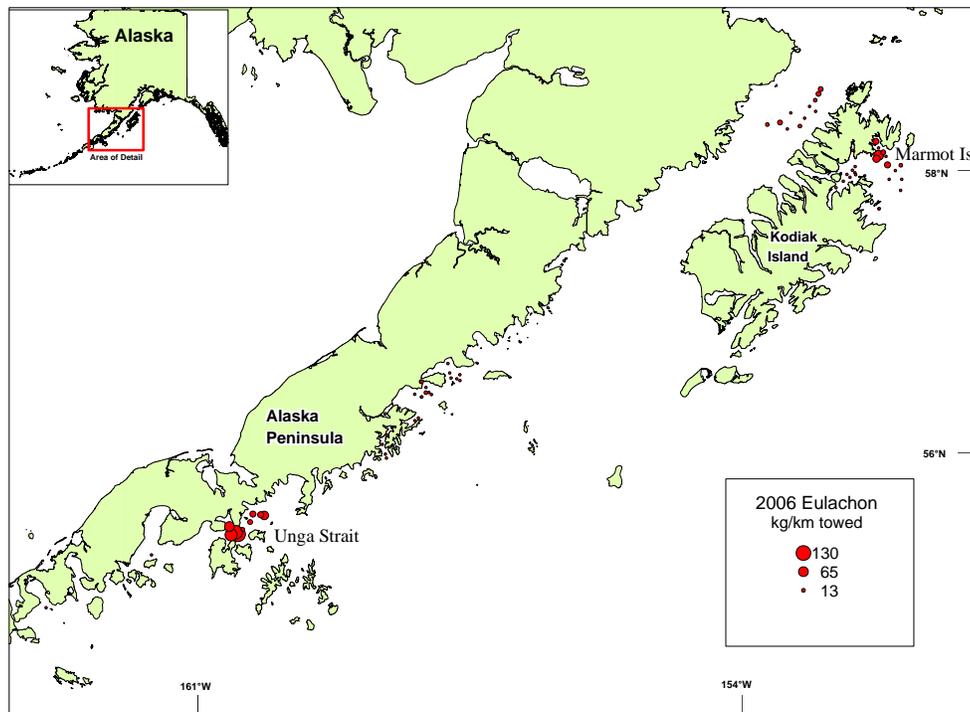


Figure 21.-Distribution and relative abundance of eulachon in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

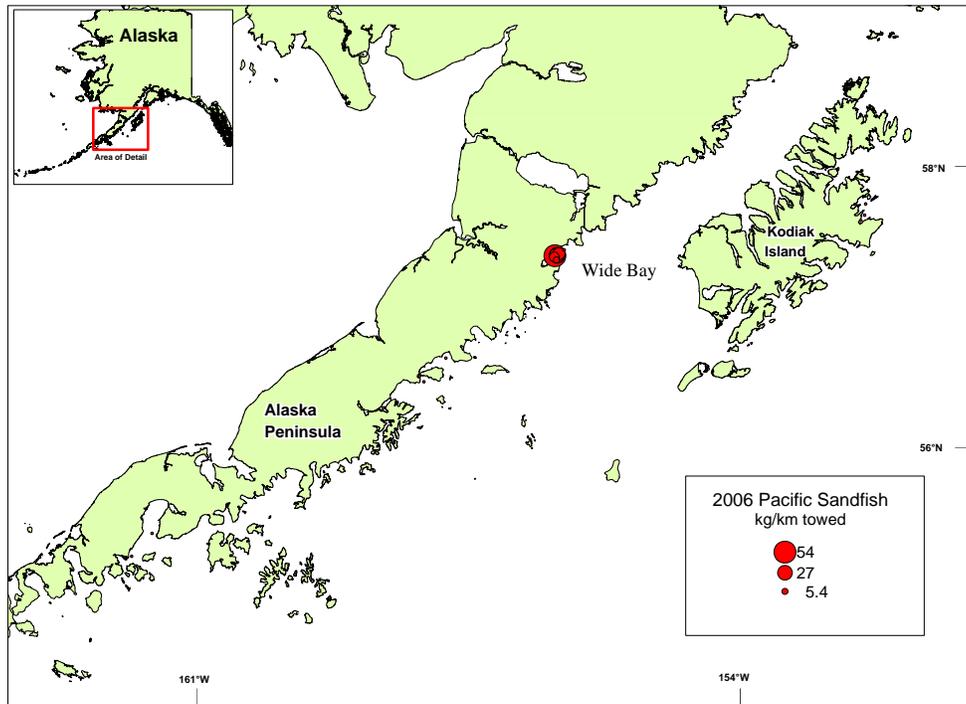


Figure 22.-Distribution and relative abundance of Pacific sandfish in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

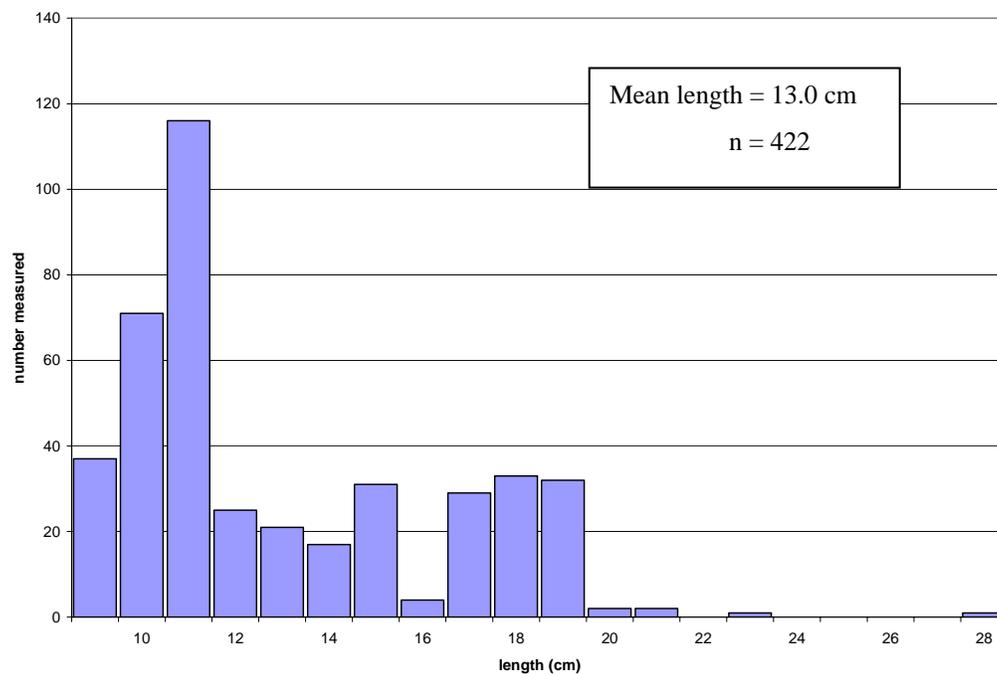


Figure 23.-Length of Pacific sandfish from the 2006 Westward Region small-mesh trawl survey.

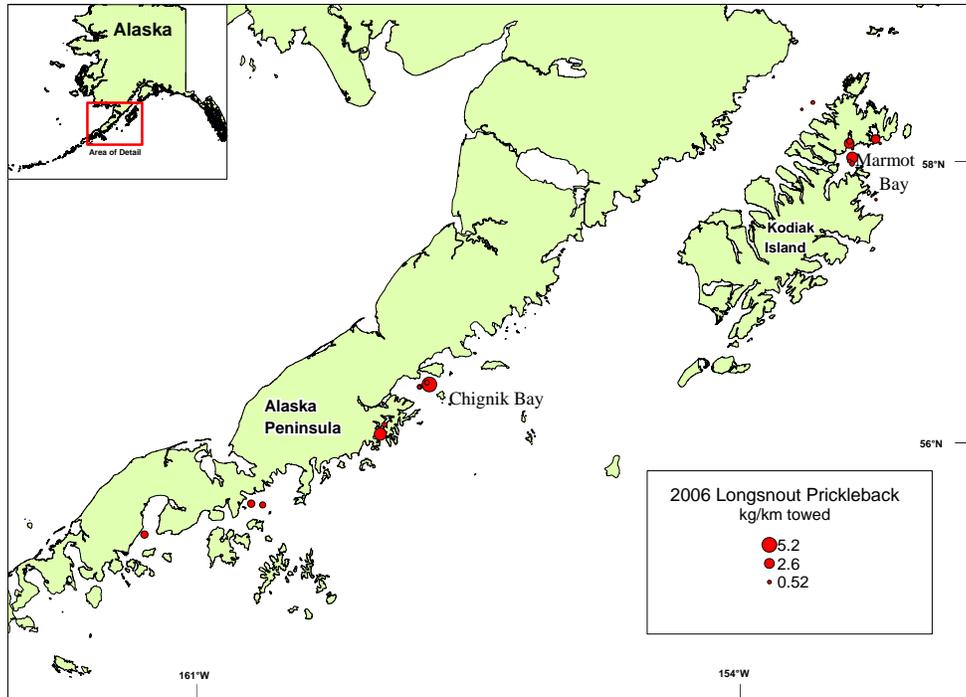


Figure 24.-Distribution and relative abundance of longsnout pricklebacks in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

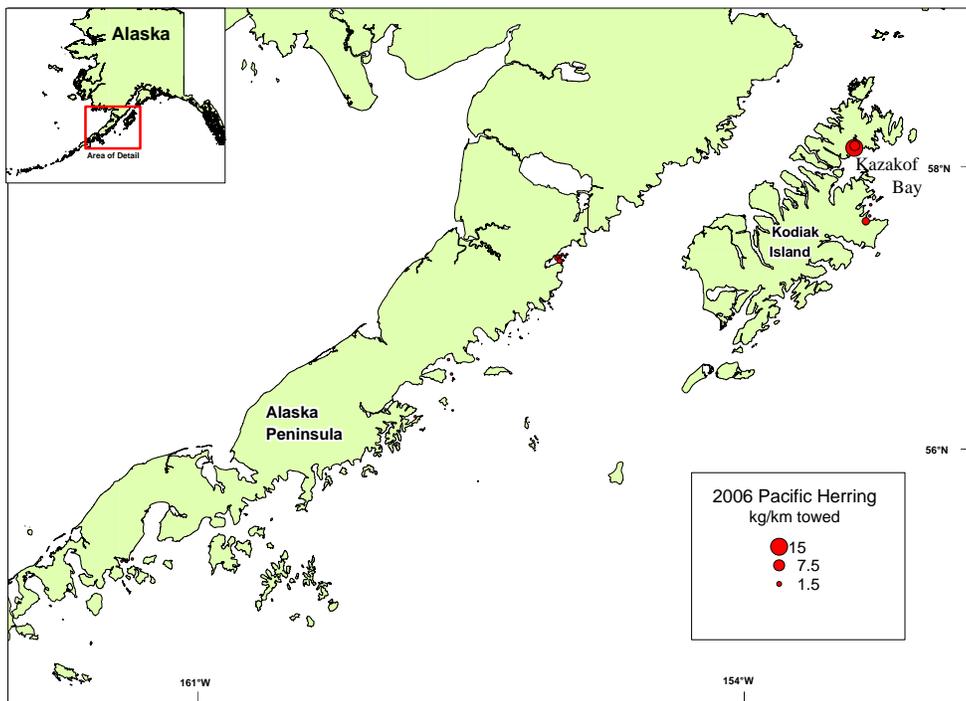


Figure 25.-Distribution and relative abundance of Pacific herring in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

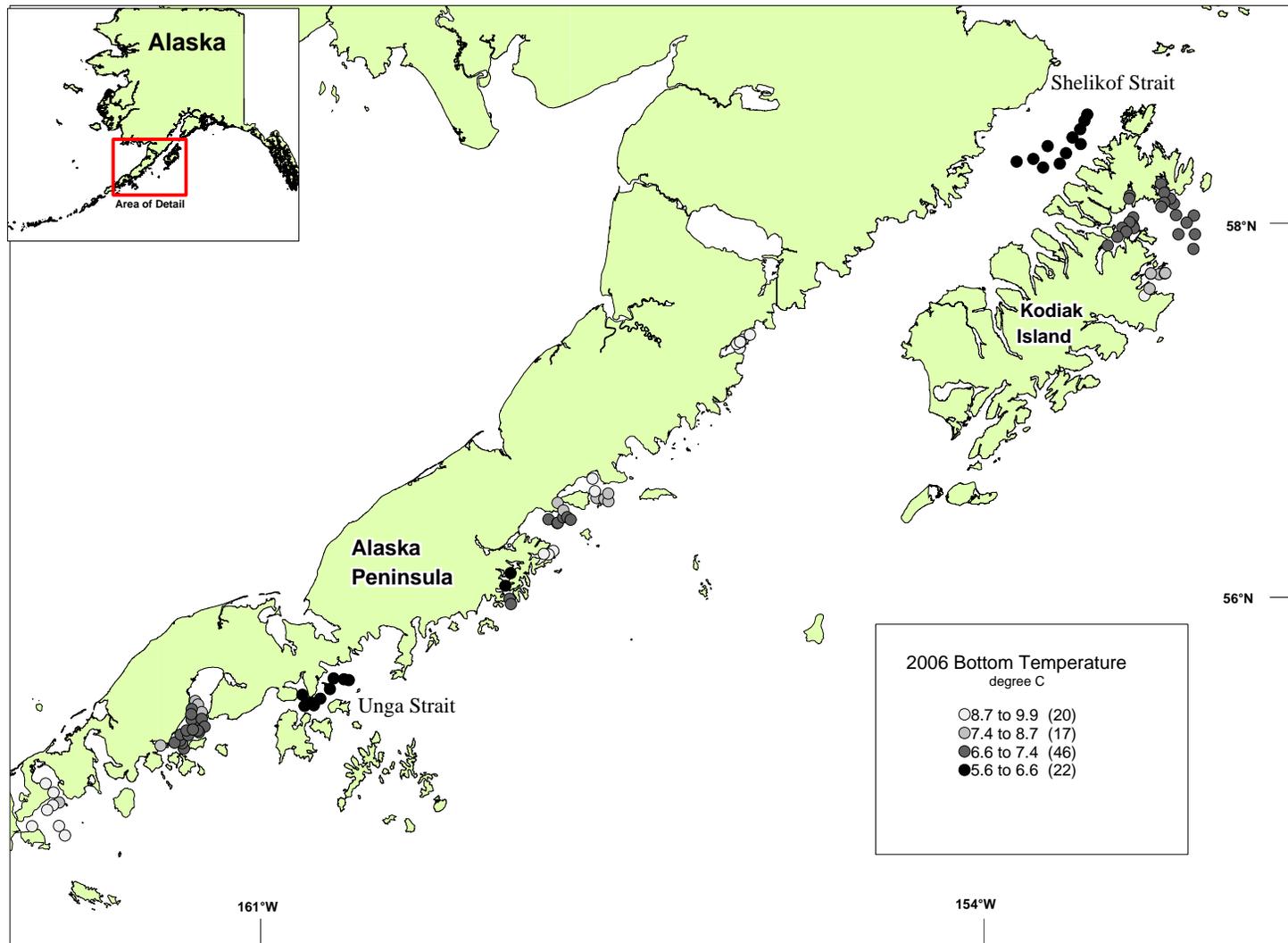


Figure 26.-Ocean bottom temperatures from the 2006 Westward Region small-mesh trawl survey.

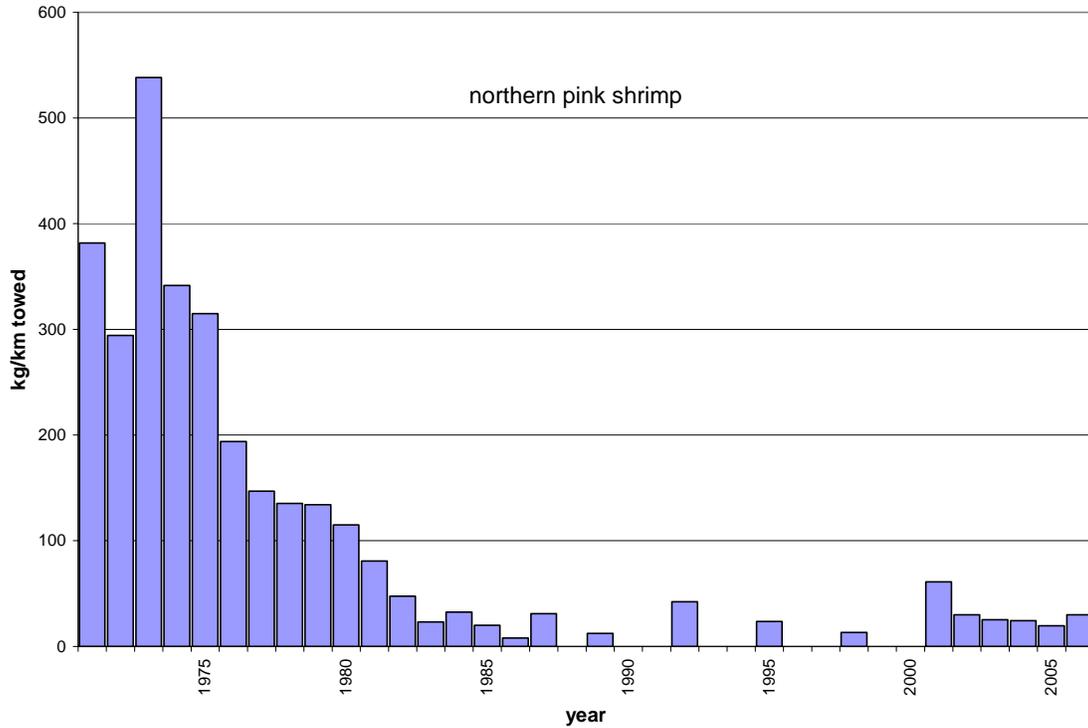


Figure 27.-Relative abundance of northern pink shrimp in kg/km towed from the Westward Region small-mesh trawl survey, 1971-2006.

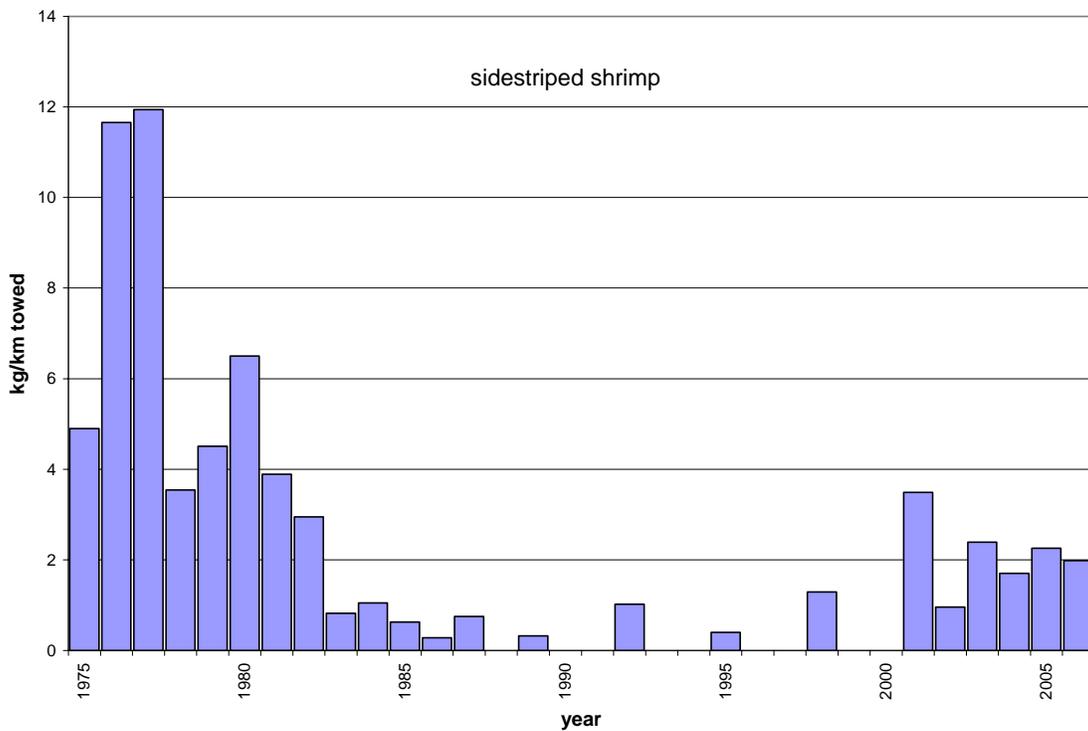


Figure 28.-Relative abundance of sidestriped shrimp in kg/km towed from the Westward Region small-mesh trawl survey, 1975-2006.

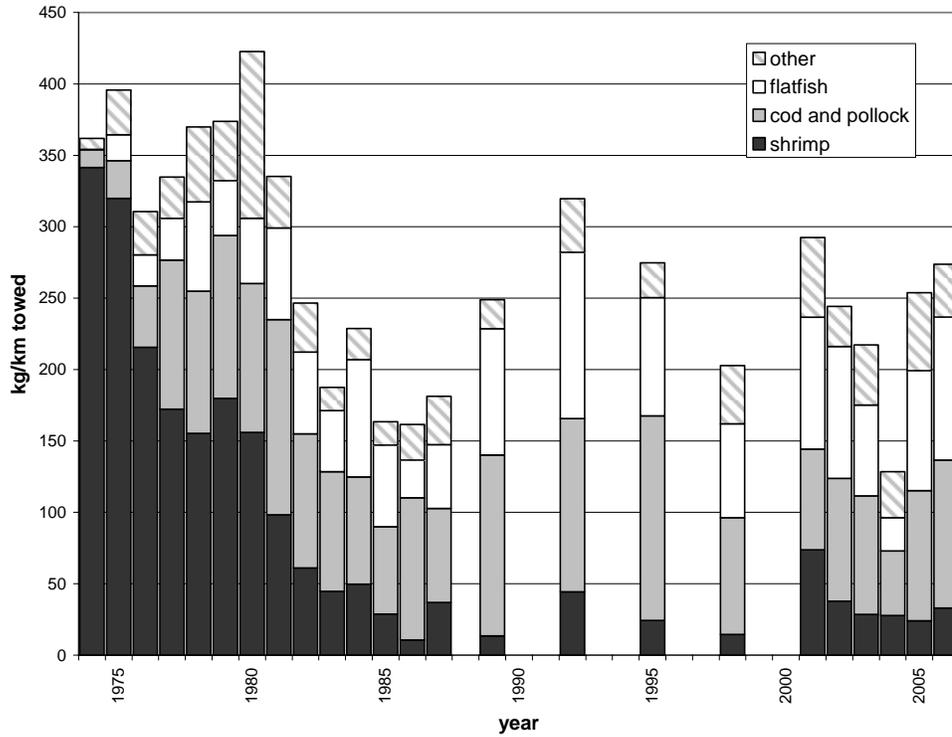


Figure 29.-Relative abundance of main species groups in kg/km towed from the Westward Region small-mesh trawl survey, 1974-2006.

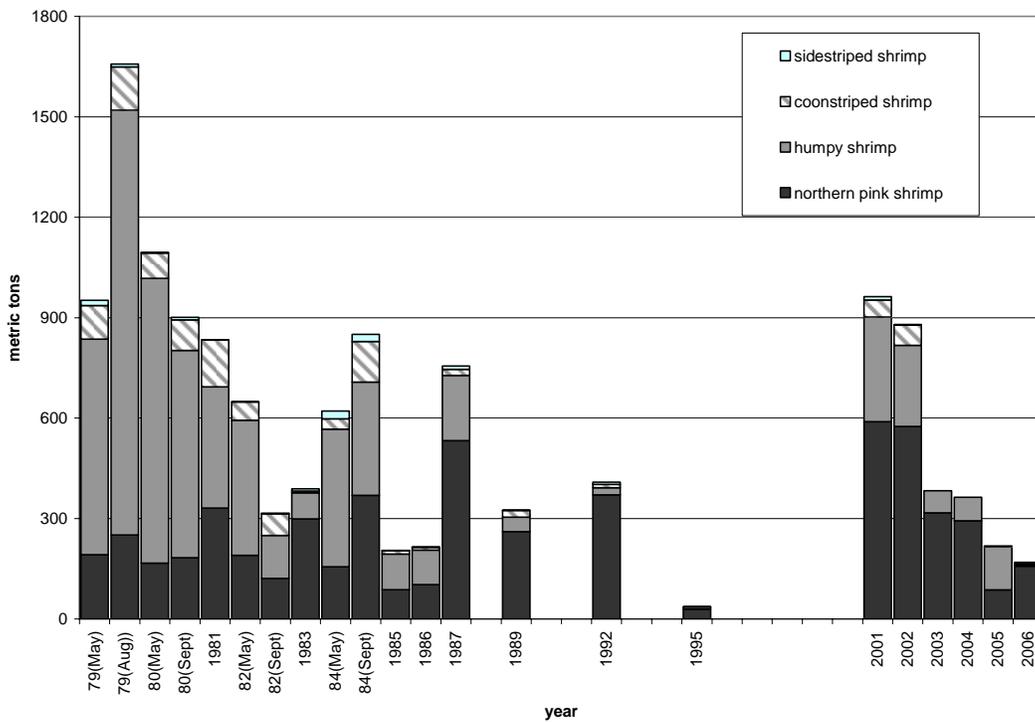


Figure 30.-Shrimp abundance estimates from Wide Bay, 1979-2006.

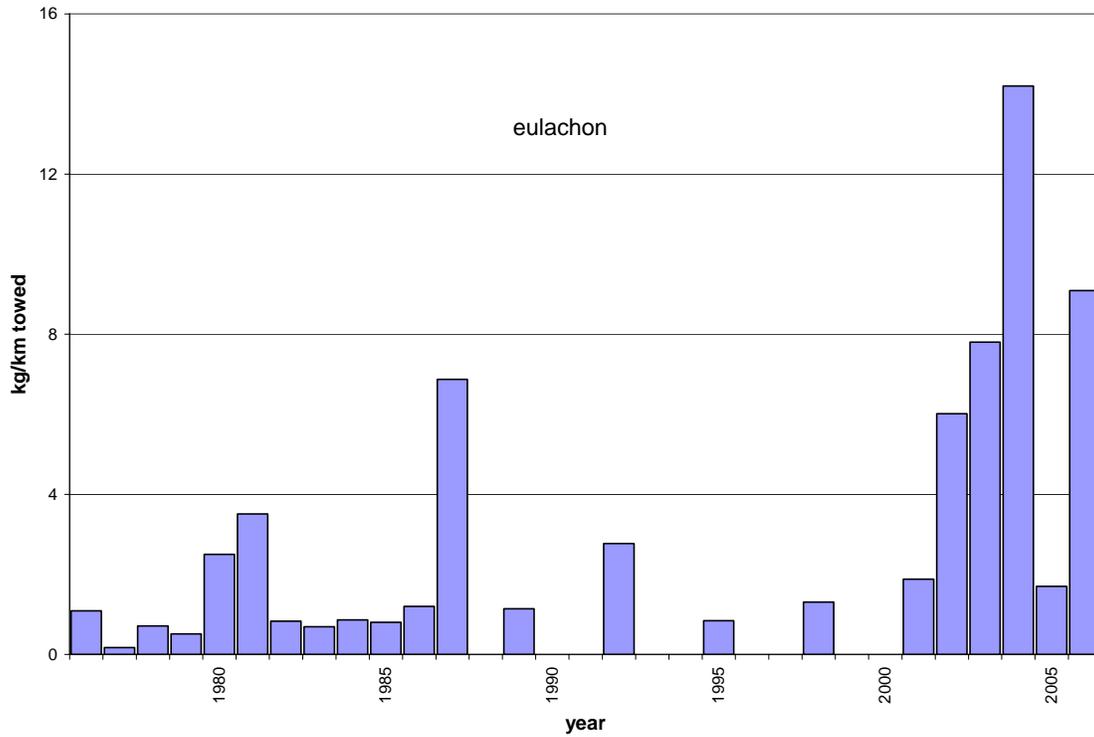


Figure 31.-Relative abundance of eulachon in kg/km towed from the Westward Region small-mesh trawl survey, 1976-2006.

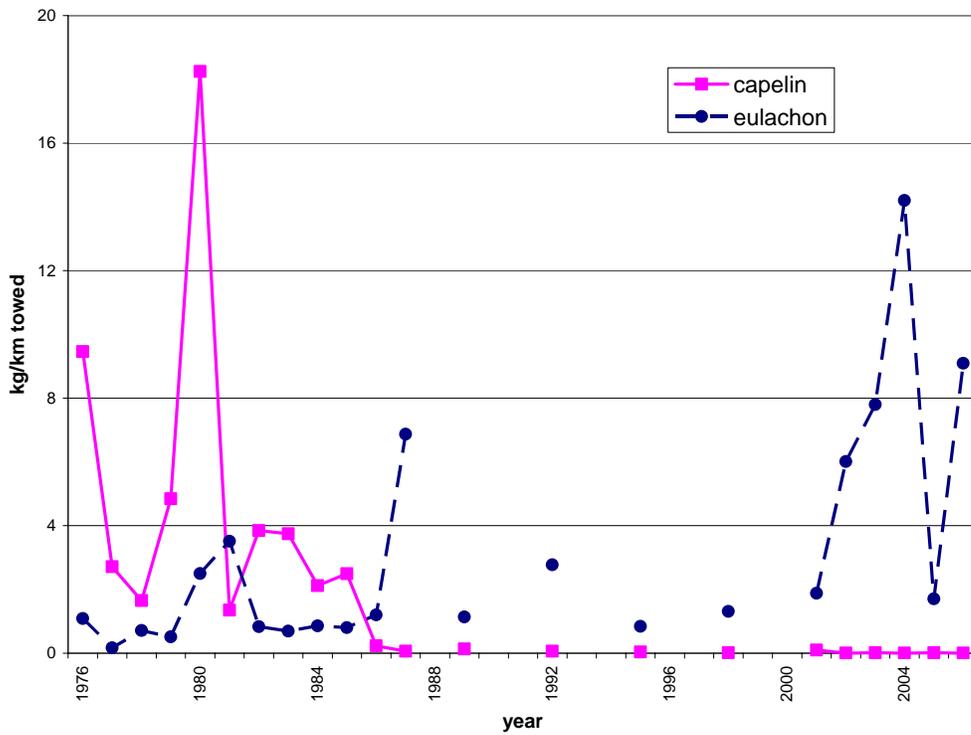


Figure 32.-Relative abundance of capelin and eulachon in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

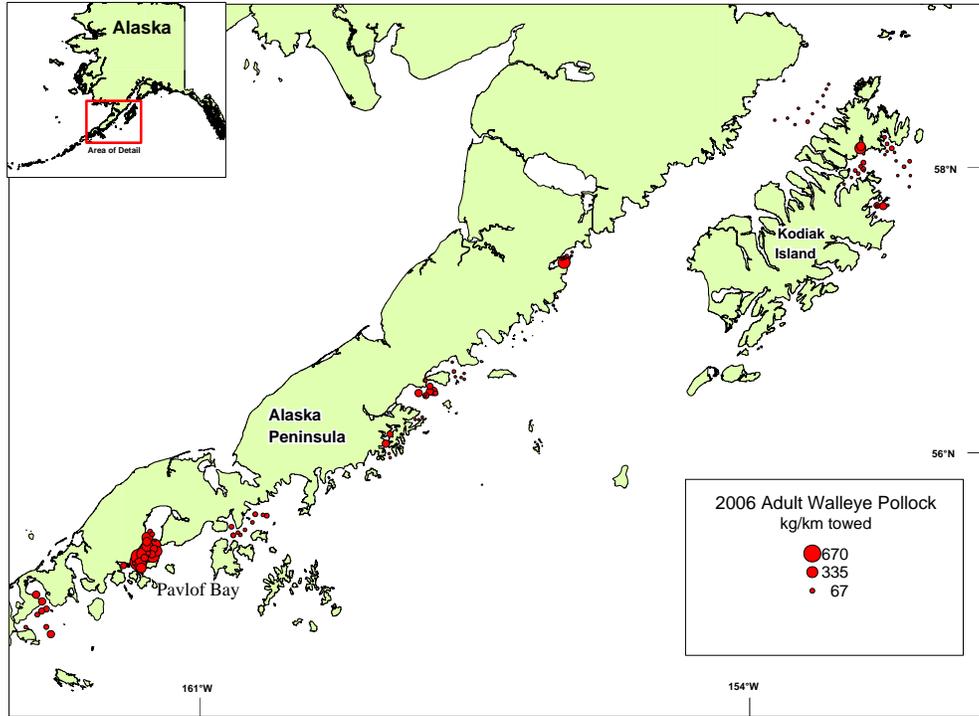


Figure 33.-Distribution and relative abundance of adult walleye pollock in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

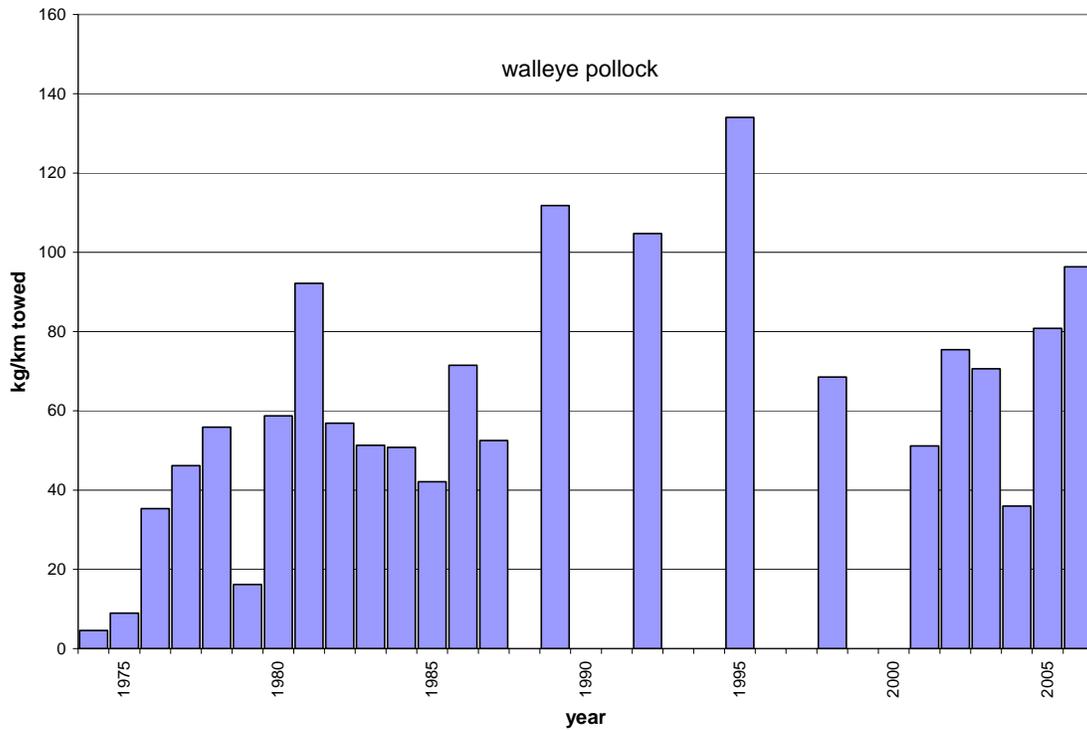


Figure 34.-Relative abundance of adult walleye pollock in kg/km towed from the Westward Region small-mesh trawl survey, 1974-2006.

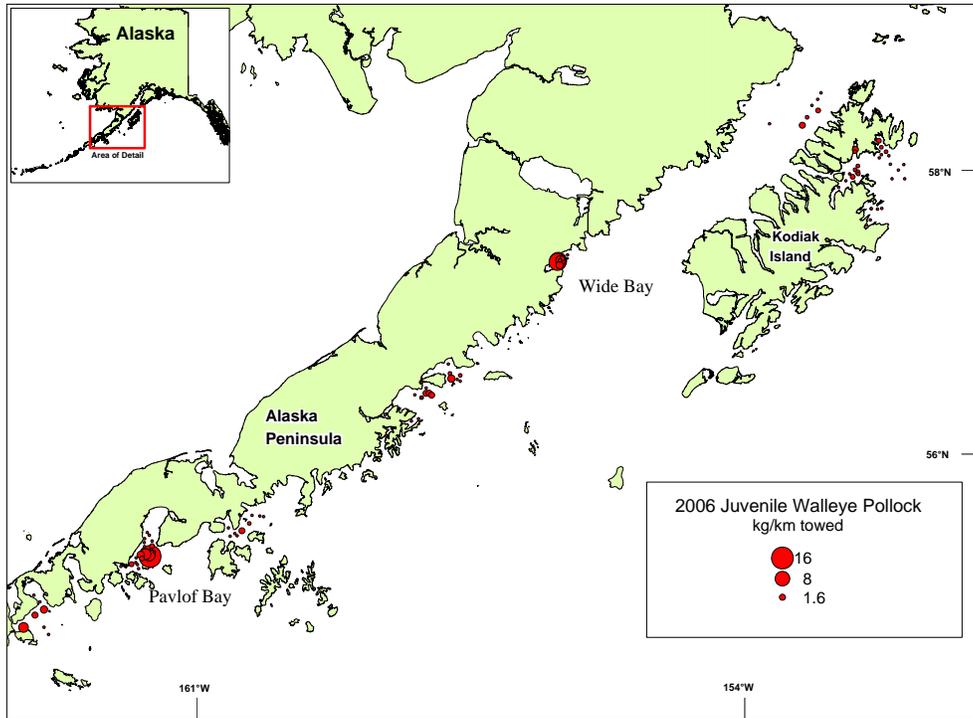


Figure 35.-Distribution and relative abundance of juvenile walleye pollock in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

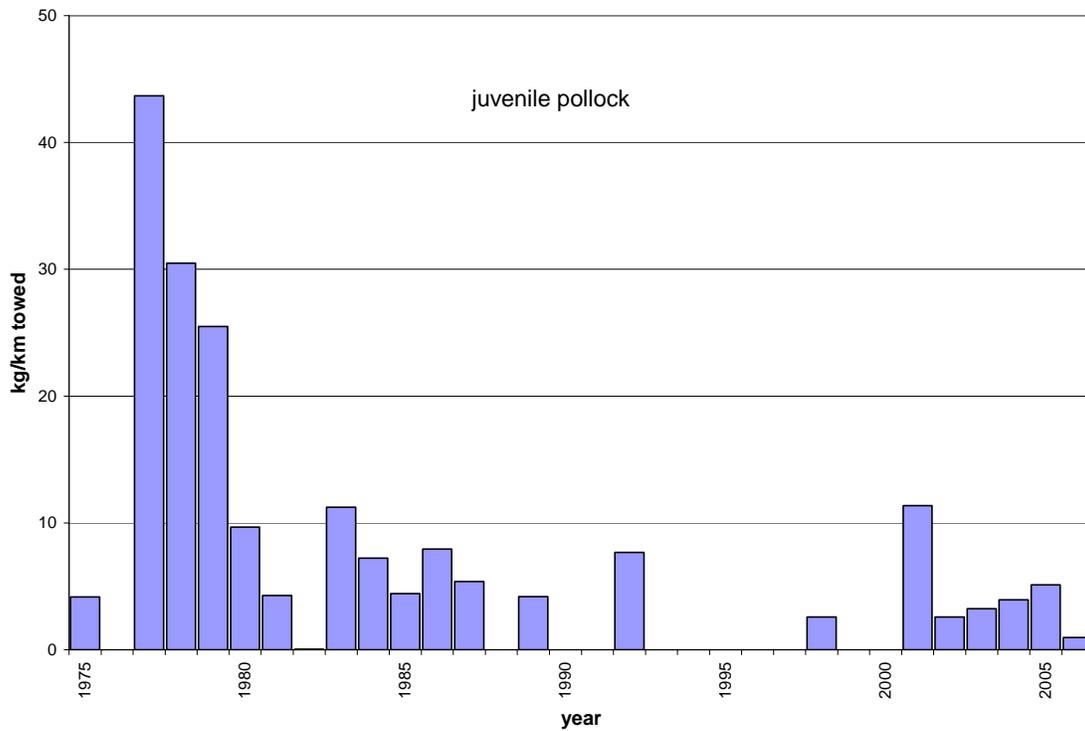


Figure 36.-Relative abundance of juvenile walleye pollock in kg/km towed from the Westward Region small-mesh trawl survey, 1975-2006

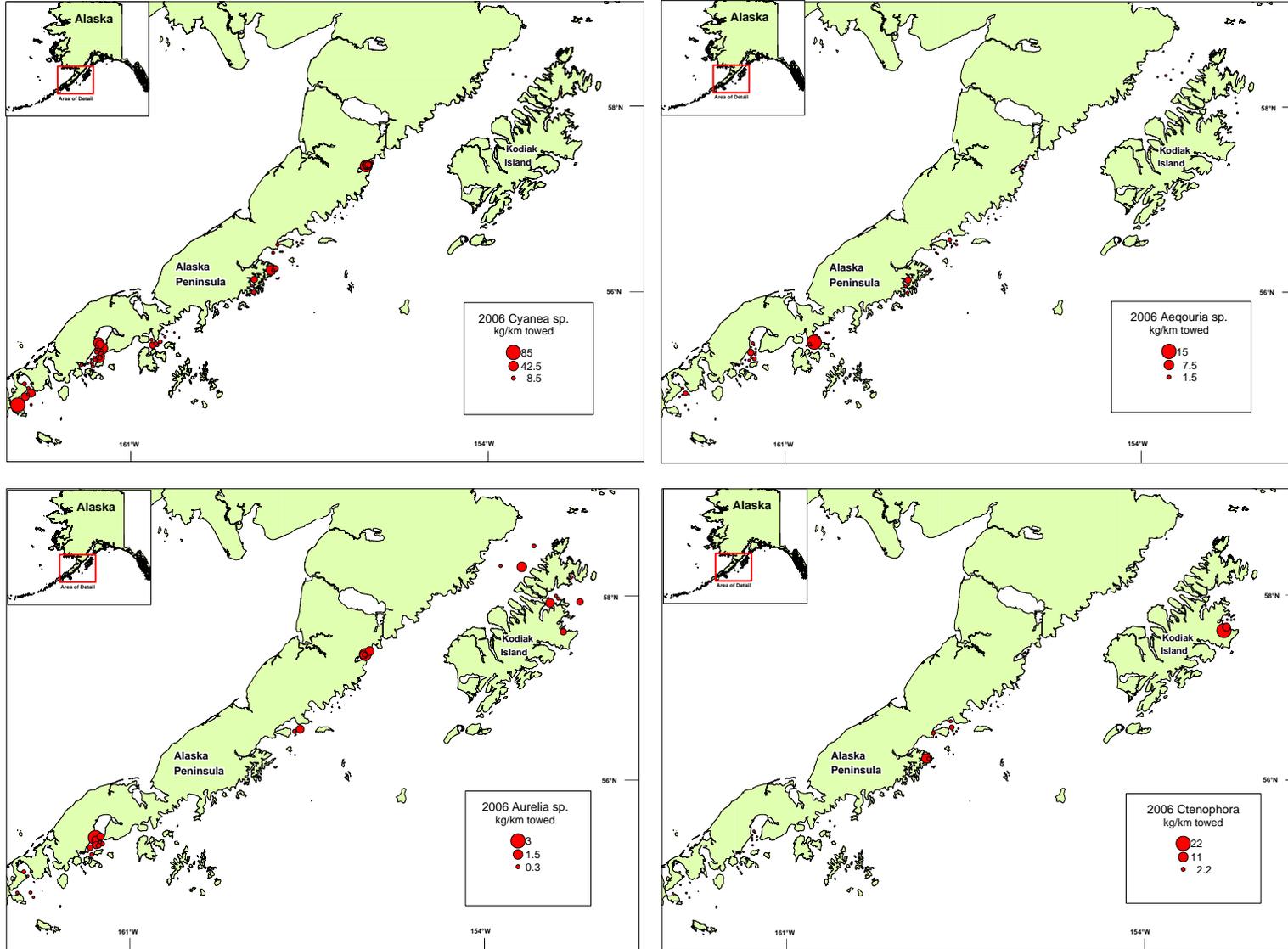


Figure 37.-Distribution and relative abundance of four jellyfish groups in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

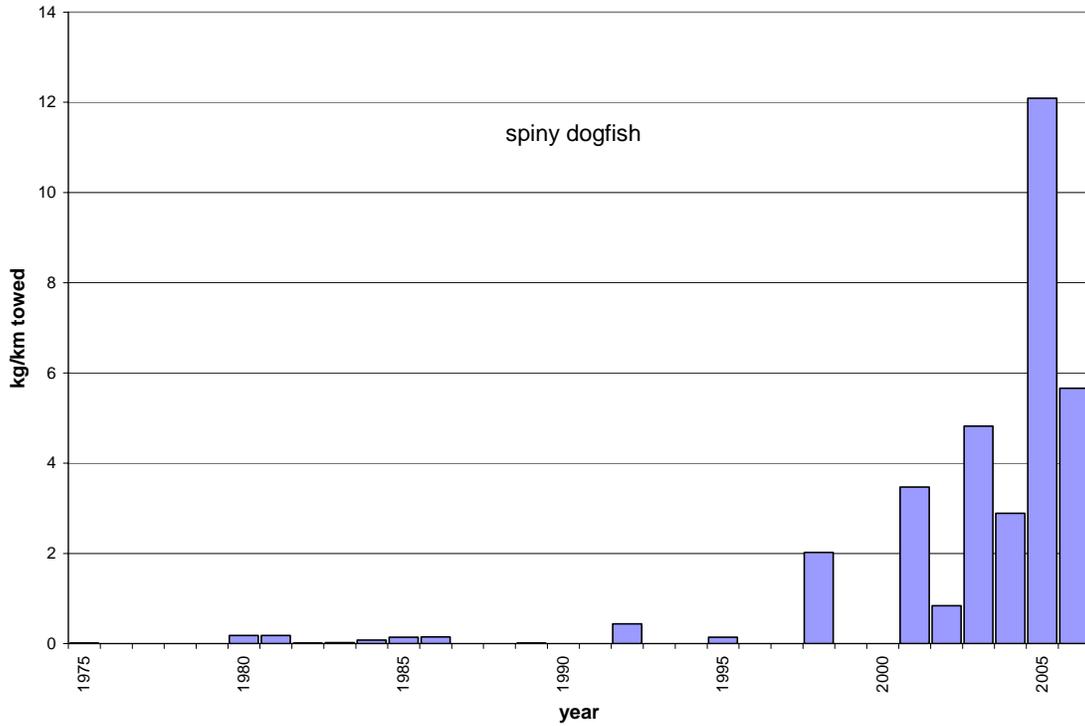


Figure 38.-Relative abundance of spiny dogfish in kg/km towed from the Westward Region small-mesh trawl survey, 1975-2006.

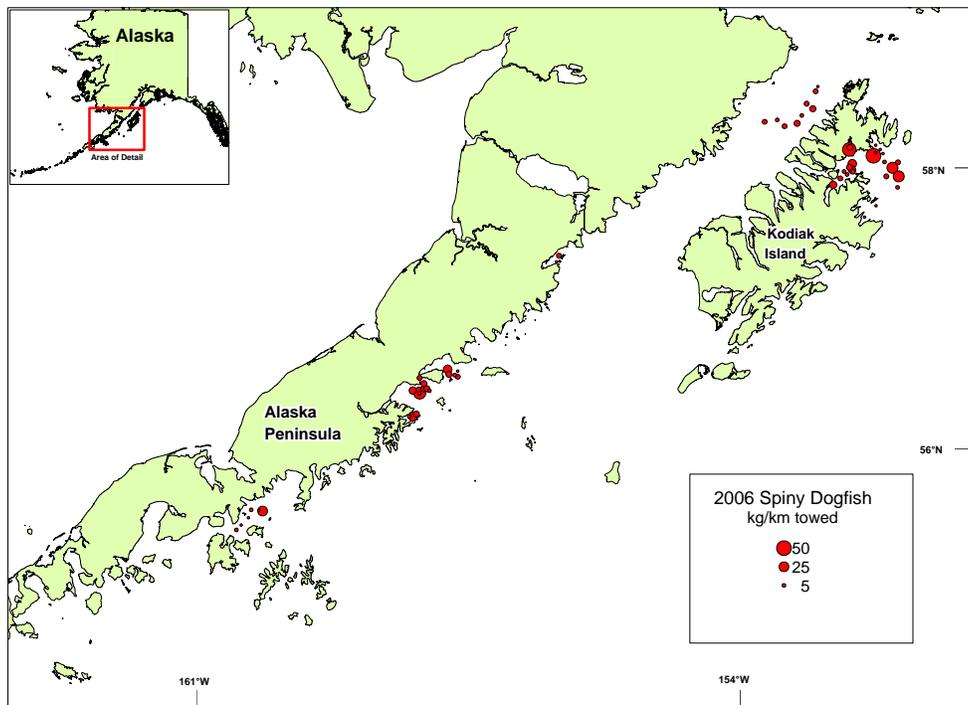


Figure 39.-Distribution and relative abundance of spiny dogfish in kg/km towed from the 2006 Westward Region small-mesh trawl survey.

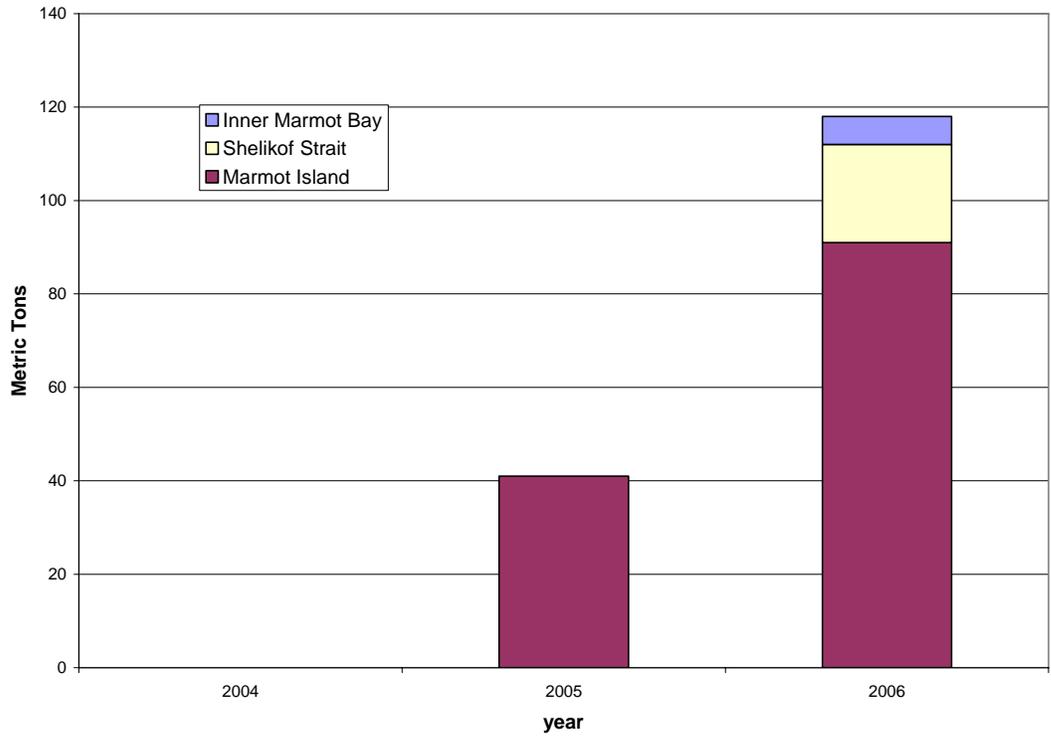


Figure 40.-Westward Region ocean pink shrimp abundance estimates, 2004-2006.

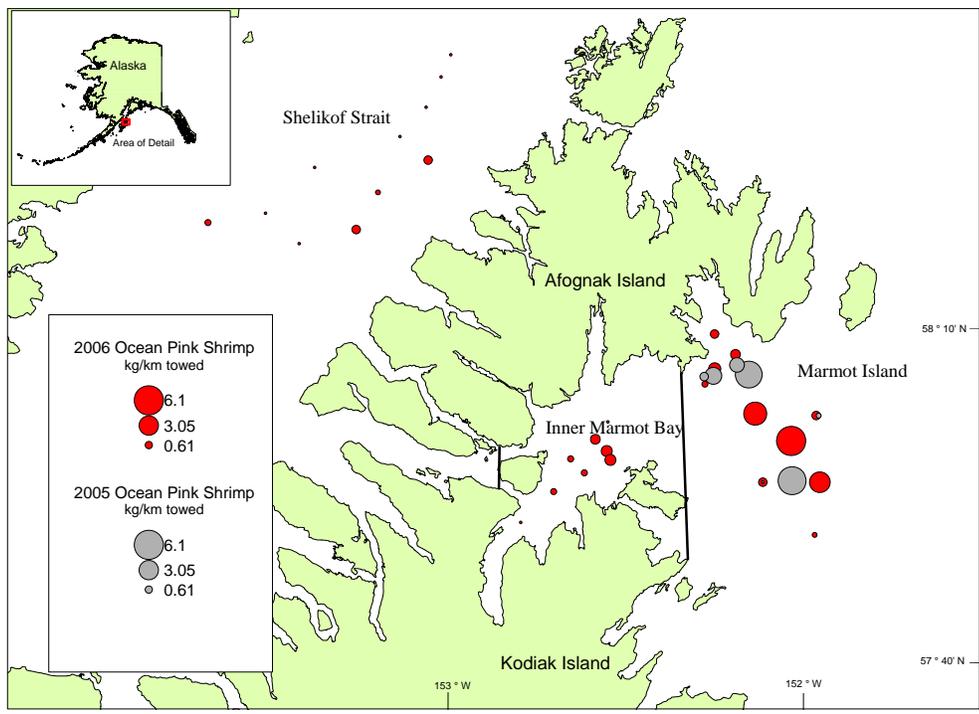


Figure 41.-Distribution and relative abundance of ocean pink shrimp in kg/km towed from the 2005 and 2006 Westward Region small-mesh trawl surveys.

APPENDIX A. FISHING LOG AND CATCH DATA

Appendix A1.-Fishing log and catch data from the 2006 Westward Region small-mesh trawl survey.

Haul	1	2	3	4	5	6	7	8	9	10
Location	Chiniak	Chiniak	Chiniak	Chiniak	Chiniak	Chiniak	Chiniak	Kuiuhta	Kuiuhta	Kuiuhta
Date	9/25/06	9/25/06	9/25/06	9/25/06	9/25/06	9/26/06	9/26/06	9/30/06	9/30/06	9/30/06
Station	804	810	814	801	802	806	816	1082	1061	1970
Longitude Start	152°22.7'	152°17.9'	152°14.6'	152°26.4'	152°23.4'	152°22.7'	152°14.4'	158°35.5'	158°38.0'	158°34.9'
Latitude Start	57°43.7'	57°43.5'	57°43.8'	57°36.7'	57°39.0'	57°43.8'	57°43.9'	55°59.8'	56°3.9'	56°8.0'
Heading, Degrees	127	268	68	45	39	94	77	335	183	224
Average Depth (m)	91	146	179	40	91	113	179	149	162	149
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	8.1	7.6	7.5	8.9	7.9	8	7.6	6.6	5.6	6.2
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	9.38	155.77	30.41	0.08	25.82	97.66	28.08	8.65	170.06	104.94
Pacific Cod	1.05	12.77	4.13	0	0	7.38	0	0	12.8	3.13
Pacific Sandfish	0	0	0	0.48	0.08	0.1	0	0	0	0
Eulachon	0	0	0.67	0	0	0	0.23	7.36	1.59	2.11
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	5.02	0.46	0	0	0	1.05	1.05	0	0.78
Herring	0.03	0	0	3.19	0.08	0	0	0	0	0
Sculpins	0	6.91	5.71	2.54	0.38	2.24	0	0	0	12.1
Other Forage Fish	0	0	0.17	0.21	0	0	0	0	3.53	0.88
Other Roundfish	0.76	0.16	2.88	0.4	1.4	1.96	0.65	1.21	3.53	0
TOTAL ROUND FISH	11.22	180.63	44.42	6.89	27.77	109.34	30.02	18.27	191.5	123.95
Arrowtooth Flounder	105.67	97.22	270.4	0.62	34.95	84.82	157.48	35.01	51.16	125.08
Flathead Sole	95.02	180.19	164.15	38.94	175.48	22.74	139.93	39.88	56.63	134.72
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0.3	4.85	7.39	0	0.28	2.27	17.08	1.99	1.23	3.68
Dover Sole	0	6.89	16.78	0	0.66	1.05	1.4	0	0	0
Pacific Halibut	14	2.88	15.71	1.08	0	0.76	20.92	0	0	6.29
Starry Flounder	0	0	0	10.21	13.51	4.55	0	0	0	5.61
Yellowfin Sole	12.96	0	0	74.72	5.67	1.4	0	0	0	0
Other Flatfish	46.21	38.2	0	1.17	13.88	9.44	0	0	0	0
TOTAL FLAT FISH	274.16	330.23	474.43	126.73	244.43	127.03	336.81	76.88	109.02	275.39
Northern Pink Shrimp	0	9.05	16.31	0.01	4.22	0.38	6.4	30.31	19.76	44.11
Humpy Shrimp	0	0	0	0	0.01	0	0	0	0	0
Coonstripe Shrimp	0	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0.02	0.88	4.27	0.01	0	0	1.97	0.88	7.23	0.12
Other Shrimp	0.07	0.53	0.85	0	0.03	0	0.04	0.14	0.06	0.15
TOTAL SHRIMP	0.09	10.45	21.42	0.02	4.25	0.38	8.41	31.33	27.04	44.38
Squid	0	0	0	0	0	0	0	0.3	0.04	0.01
Jellyfish	0.6	0.23	0.07	22.69	10.11	0.38	0.05	13.33	5.5	25.48
Other Inverts	12.4	7.82	26.02	2.54	0	3.85	0.02	0	0.04	0.28
TOTAL INVERTS	13	8.05	26.08	25.23	10.11	4.23	0.07	13.63	5.59	25.77
Skates	10.57	9.76	14.79	7.42	0	12.21	0	3.41	0	0
Spiny Dogfish	0	0	2.13	0	3.02	0	0	0	0	1.57
Other	2.51	4.07	4.2	1.1	0.38	4.9	3.74	0.1	0	0.88
TOTAL CATCH	311.56	543.2	587.47	167.39	289.96	258.1	379.05	143.63	333.15	471.92

-continued-

Appendix A1.-Page 2 of 11.

Haul	11	12	13	14	15	16	17	18	19	20
Location	Morzhovoi	Morzhovoi	Morzhovoi	Morzhovoi	Morzhovoi	Morzhovoi	Morzhovoi	Morzhovoi	Pavlof	Pavlof
Date	10/2/06	10/2/06	10/2/06	10/2/06	10/2/06	10/3/06	10/3/06	10/3/06	10/4/06	10/4/06
Station	3008	3003	3007	3011	3014	3021	3020	3032	313	304
Longitude Start	162°57.4'	163°5.2'	163°0.6'	163°1.0'	163°4.3'	163°13.1'	162°57.4'	162°54.0'	161°58.4'	161°44.9'
Latitude Start	54°54.7'	55°0.7'	54°57.8'	54°53.8'	54°52.3'	54°47.1'	54°47.2'	54°44.1'	55°12.9'	55°11.9'
Heading, Degrees	355	122	160	221	214	54	158	114	117	309
Average Depth (m)	128	76	91	91	91	78	87	106	73	117
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	8.6	9	8.7	9.1	8.8	9	9	8.8	8.5	7
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	132.75	164.85	170.25	115.7	78.46	48.99	84.45	154.67	122.59	247.39
Pacific Cod	0	0	6.91	3.23	3.54	0	0	2.46	0.65	5.89
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0
Eulachon	0.38	0	0	0	0	0	0	0	0	0
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0.49	0	0	0	0	0.27	0	0	0	0
Herring	0	0	0	0	0	0	0	0	0.22	0
Sculpins	0.19	0	0	0	0	0.02	0	0	0	0
Other Forage Fish	0	0	0	0	0	0	0	0	0	0
Other Roundfish	1.19	0.6	0.43	0	0.32	0	0	0.38	0	0
TOTAL ROUND FISH	135	165.45	177.6	118.93	82.32	49.28	84.45	157.51	123.46	253.28
Arrowtooth Flounder	65.8	2.82	15.72	13.06	7.37	2.09	4.68	4.77	0.09	41.85
Flathead Sole	108.51	3.84	49.24	37.36	84.91	32.4	16.93	11.45	32.06	56.71
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0	0.65	0	0	0	0	0	0.62
Dover Sole	0.58	0	0	0	0	0	0	0	0	0
Pacific Halibut	17.45	0	0	0	0	5.8	10.27	0	0	13.72
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	3.84	8.35	0	5.79	1.59	0.43	0	20.23	2.97
Other Flatfish	8.08	0	0	9.31	0	2.45	0.6	2.78	2.68	0.87
TOTAL FLAT FISH	200.41	10.49	73.3	60.37	98.08	44.32	32.9	19	55.06	116.73
Northern Pink Shrimp	3.27	0.07	0.29	0.04	0.74	0.08	0	0.06	0.01	0.51
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe Shrimp	0	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0	0	0	0	0	0	0	0	0	0
Other Shrimp	0.11	0.02	0.08	0	0	0.01	0.01	0	0	0.1
TOTAL SHRIMP	3.38	0.09	0.38	0.04	0.74	0.09	0.01	0.06	0.01	0.61
Squid	0.96	0	0	0	0	0	0	0	0	0
Jellyfish	31.55	11.51	6.93	3.75	31.47	85	3.93	0.17	6.14	7.68
Other Inverts	0.11	0.45	0.83	0.9	0	0.42	0.03	0.02	0	0
TOTAL INVERTS	32.62	11.96	7.76	4.65	31.47	85.42	3.96	0.2	6.14	7.68
Skates	0	0	0	0	0	0	0	0	0	0
Spiny Dogfish	0	0	0	0	0	0	0	0	0	0
Other	1.15	0.45	0.14	0.13	0.13	1.23	1.79	0.35	0	0.74
TOTAL CATCH	372.57	188.44	259.18	215.44	234.34	180.35	123.11	177.11	184.66	379.05

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Haul	21	22	23	24	25	26	27	28	29	30
Location	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof
Date	10/4/06	10/4/06	10/4/06	10/4/06	10/4/06	10/4/06	10/5/06	10/5/06	10/5/06	10/5/06
Station	293	294	295	282	281	265	178	205	226	246
Longitude Start	161°45.8'	161°47.0'	161°50.3'	161°46.7'	161°42.3'	161°43.3'	161°38.1'	161°36.6'	161°34.5'	161°40.4'
Latitude Start	55°13.6'	55°14.5'	55°13.8'	55°16.4'	55°16.2'	55°17.7'	55°27.1'	55°26.0'	55°23.5'	55°21.2'
Heading, Degrees	62	72	8	54	56	20	30	167	346	354
Average Depth (m)	118	106	87	102	98	106	93	85	80	128
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	6.8	6.8	7.3	6.9	6.8	6.8	7.5	7.9	8.1	6.9
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	381.56	660.88	59.82	581.32	163.05	447.01	91.21	67.25	17.6	296.08
Pacific Cod	4.32	5.26	3.02	5.13	4.54	6.97	3.27	7.13	0.97	18.39
Pacific Sandfish	0	0	0.16	0	0	0	0	0	0.02	0
Eulachon	0	0	0	0	0	0	0	0	0	0
Capelin	0	0	0.01	0	0	0.06	0	0	0	0
Rockfish	2.11	0	0	0	0	0.65	0	0	0	0.16
Herring	0	0	0.11	0	0	0	0	0	0	0
Sculpins	0	0	5.97	0	11.16	0	0	0	11.17	0
Other Forage Fish	0	0	0	0	0	0	0	0	0	1.6
Other Roundfish	1.93	0	0.12	0	0	0	0	1.97	0.65	0.76
TOTAL ROUND FISH	389.92	666.14	69.21	586.45	178.75	454.68	94.47	76.35	30.41	316.98
Arrowtooth Flounder	42.92	35.93	9.91	11.49	18.35	38.28	1.79	3.56	0	46.42
Flathead Sole	65.15	15.65	43.12	11.49	21	12.84	25.4	24.37	4.67	63.1
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0.23	0	0.55	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pacific Halibut	7.37	0	0	0.97	12.08	1.97	7.45	45.92	0	4.08
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0	5.97	2.15	7.96	2.8	33.57	5.53	5.43	9.28
Other Flatfish	5.41	0.81	1.89	2.01	2.59	0.49	45.52	42.49	3.37	0
TOTAL FLAT FISH	120.86	52.39	61.13	28.11	62.53	56.38	113.73	121.86	13.47	122.88
Northern Pink Shrimp	0.12	0	0	0.06	0.02	0.17	0.09	0.02	0	3.11
Humpy Shrimp	0	0	0	0	0	0	0.02	0	0.01	0
Coonstripe Shrimp	0	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0	0	0	0	0	0	0	0	0	0
Other Shrimp	0.04	0	0.01	0.01	0.09	0.01	0	0.02	0.03	0.16
TOTAL SHRIMP	0.16	0	0.01	0.07	0.11	0.18	0.11	0.04	0.03	3.27
Squid	0.08	0	0	0	0	0	0.3	0	0.01	0
Jellyfish	6.77	2.85	2.91	1.79	9.73	2.8	46.81	30.03	61.75	13.95
Other Inverts	0.19	0	0	0.03	0.05	0	0.22	0	0.08	1.16
TOTAL INVERTS	7.04	2.85	2.91	1.82	9.78	2.8	47.33	30.03	61.84	15.11
Skates	0	0	0	0	0	0	0	0	0	0
Spiny Dogfish	0	0	0	0	0	0	0	0	0	0
Other	0.39	0	0.12	0.18	0.44	0	0.3	0.66	0.08	0.73
TOTAL CATCH	518.36	721.38	133.37	616.63	251.62	514.04	255.94	228.94	105.83	458.96

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Haul	31	32	33	34	35	36	37	38	39	40
Location	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Unga	Unga
Date	10/5/06	10/5/06	10/5/06	10/5/06	10/6/06	10/6/06	10/6/06	10/6/06	10/6/06	10/7/06
Station	206	227	245	262	279	263	280	264	152	199
Longitude Start	161°40.2'	161°40.5'	161°34.5'	161°32.8'	161°36.0'	161°35.1'	161°36.7'	161°39.6'	160°35.9'	160°29.2'
Latitude Start	55°24.6'	55°22.9'	55°21.4'	55°18.9'	55°17.1'	55°19.9'	55°17.7'	55°18.0'	55°29.1'	55°25.8'
Heading, Degrees	23	16	183	60	61	173	226	77	170	69
Average Depth (m)	98	111	95	124	95	93	96	98	118	124
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	7.2	7	6.9	6.9	6.8	6.9	6.9	6.9	6.3	5.8
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	284.63	187.49	385.78	228.29	489.89	155.72	150.56	92.21	65.39	58.18
Pacific Cod	1.4	1.84	0.86	14.39	20.41	11.53	7.34	9.5	18.12	1
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0
Eulachon	0	0	0	0	0.09	0	0	0	70.5	125.36
Capelin	0	0	0	0	0	0	0	0.02	0	0
Rockfish	0	0	0	0	0.97	0.24	0	0	0	0
Herring	0	0	0	0	0	0	0	0	0	0
Sculpins	0	0	0	1.27	0	0	0	0	0	0
Other Forage Fish	0	0	0	0	0	0	0	0	0	0
Other Roundfish	4.62	1.86	0.54	1.08	0	0	0.43	0	0	0
TOTAL ROUND FISH	290.65	191.19	387.19	245.03	511.36	167.49	158.34	101.73	154	184.54
Arrowtooth Flounder	13.35	52.18	21.25	50.4	58.7	21.71	16.03	5.38	37.63	57.82
Flathead Sole	47.41	24.14	19.25	79.97	58.05	18.37	13.5	18.56	23.67	19.45
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0	0	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pacific Halibut	2.11	2.02	0	8.92	0.54	1.09	0	0	0	0
Starry Flounder	0	0	0	32.27	0	0	0	0	0	0
Yellowfin Sole	3.34	0.69	4.9	6.52	8.33	5.7	0	3.39	0	0
Other Flatfish	0.97	1.15	9.99	4.77	7.19	5.7	0	0	1.53	4.32
TOTAL FLAT FISH	67.18	80.17	55.4	182.84	132.81	52.57	29.52	27.32	62.83	81.59
Northern Pink Shrimp	0.13	0.51	0.01	1.28	0.24	0.06	0.03	0.02	2.91	2.57
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe Shrimp	0	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0	0	0	0	0	0	0	0	0	0
Other Shrimp	0.03	0.01	0.03	0.2	0.02	0.04	0	0.01	0	0.08
TOTAL SHRIMP	0.16	0.53	0.04	1.48	0.26	0.11	0.03	0.03	2.91	2.65
Squid	0.14	0	0	0	0	0	0	0.01	0	0
Jellyfish	7.54	6.38	13.64	6.36	30.09	13.46	12.86	8.36	5.62	8.65
Other Inverts	0.28	0	0.01	0.32	1.32	0.08	0	0.15	0	0.01
TOTAL INVERTS	7.95	6.38	13.64	6.68	31.41	13.54	12.86	8.52	5.62	8.65
Skates	0	0	0	9.81	0	0	0	0	0	0
Spiny Dogfish	0	0	0	0	0	0	0	0	0	4.43
Other	0.14	0.34	0	0.16	0.19	0.1	0.11	0.07	0.34	0
TOTAL CATCH	366.09	278.62	456.26	446	676.03	233.8	200.86	137.69	225.7	281.86

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Haul	41	42	43	44	45	46	47	48	49	50
Location	Unga	Unga	Unga	Unga	Stepovak	Stepovak	Stepovak	Kuiukta	Chignik	Chignik
Date	10/7/06	10/7/06	10/7/06	10/7/06	10/7/06	10/7/06	10/7/06	10/8/06	10/8/06	10/8/06
Station	174	201	151	131	92	90	109	1090	1909	1907
Longitude Start	160°31.0'	160°34.6'	160°25.6'	160°19.9'	160°17.8'	160°11.8'	160°9.0'	158°34.7'	158°10.1'	158°12.8'
Latitude Start	55°26.7'	55°25.6'	55°27.9'	55°31.0'	55°34.4'	55°34.1'	55°33.8'	55°58.1'	56°15.1'	56°14.0'
Heading, Degrees	301	61	45	38	130	91	86	337	74	65
Average Depth (m)	142	129	179	171	190	181	177	118	124	95
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	5.7	6	5.7	5.8	5.9	5.9	5.8	7.3	9.3	9.7
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	38.97	71.2	40.02	55.89	76.09	54.29	69.29	3.04	8.75	22.49
Pacific Cod	6.13	1.48	44.34	0	0	0	0	0	0	2.43
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0
Eulachon	107.73	99.71	10.99	16.87	30.22	25.81	55.59	6.07	0.85	0.29
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	0	0	0	0	5.35	0.86	0.11	0.49	0
Herring	0	0	0	0	0	0	0	0	0	0.13
Sculpins	0	0	0	0	0.6	0	0.83	0.12	6.87	7.25
Other Forage Fish	0	0	0	0	1.43	0	1.1	0	0	0
Other Roundfish	0	0.49	1.31	2.5	0	1.74	0.04	0	0.76	1.4
TOTAL ROUND FISH	152.83	172.88	96.66	75.27	108.34	87.18	127.71	9.34	17.71	34
Arrowtooth Flounder	34.27	48.81	32.62	78.96	83.73	69.27	102.51	27.2	13.3	28.06
Flathead Sole	38.51	8.72	55.6	70.53	63.79	51.48	92.28	23.37	29.54	44.1
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0.52	2.35	1.05	4.66	0.4	4.09	5.77	0	0.37
Dover Sole	0	0	0	0	0	0	0	1.27	0	0
Pacific Halibut	9.27	4.6	4.44	4.24	16.62	38.22	15.79	0	2.43	7.66
Starry Flounder	0	0	0	0	0	0	0	0	3	13.11
Yellowfin Sole	0	0	0	0	0	0	0	0	0	2.27
Other Flatfish	0.57	0	0	0	0	0	0	0	0	0
TOTAL FLAT FISH	82.62	62.66	95.02	154.79	168.8	159.37	214.67	57.61	48.28	95.57
Northern Pink Shrimp	12.46	2.4	103.94	168.36	60.56	80.42	138.02	26.37	10.63	3.25
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe Shrimp	0	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0	0	9.96	0.22	7.56	3.82	1.68	0	0	0
Other Shrimp	1.18	0.02	0.78	1.87	2	0.54	0.45	0.15	0.13	0.49
TOTAL SHRIMP	13.64	2.41	114.68	170.45	70.11	84.78	140.14	26.53	10.76	3.74
Squid	0.34	0.13	1.91	2.9	0.84	0.13	0.16	0	0.02	0
Jellyfish	10.09	20.83	25.11	4.09	0.96	0.13	2.21	2.55	17.89	8.57
Other Inverts	3.86	0.01	0.02	0	0	0	0.16	0.02	0.46	0.01
TOTAL INVERTS	14.29	20.97	27.03	6.99	1.79	0.27	2.53	2.58	18.36	8.59
Skates	0	0	0	1.28	0	0	3.31	0	0	0
Spiny Dogfish	0	0	2.35	2.27	5.59	1.57	22.99	0	11.66	19.87
Other	0.11	0.26	0.11	0.4	0.12	1.07	0	0.06	0.13	0.22
TOTAL CATCH	263.5	259.18	335.85	411.45	354.75	334.23	586.93	96.11	106.91	161.99

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Haul	51	52	53	54	55	56	57	58	59	60
Location	Chignik	Chignik	Chignik	Chignik	Chignik	Chignik	Chignik	Chignik	Chignik	Kujulik
Date	10/9/06	10/10/06	10/10/06	10/11/06	10/11/06	10/11/06	10/11/06	10/11/06	10/11/06	10/11/06
Station	1901	1924	1912	1921	1929	1941	1937	1931	1917	1944
Longitude Start	158°15.6'	158°12.9'	158°7.8'	158°7.4'	158°4.3'	158°7.6'	158°4.2'	158°1.9'	157°60.0'	157°44.9'
Latitude Start	56°14.1'	56°25.2'	56°24.0'	56°24.1'	56°25.8'	56°30.5'	56°28.1'	56°25.9'	56°25.1'	56°32.0'
Heading, Degrees	202	86	127	53	225	126	176	134	93	78
Average Depth (m)	74	146	160	173	162	87	142	186	192	91
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	9.8	7.2	7	6.9	7.1	8.6	7.4	7	7	8.3
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	25.48	167.84	29.55	115.12	169.98	54.64	109.32	205.67	89.17	13.83
Pacific Cod	0	24.27	0	0	0	3.56	0	0	1.89	4.7
Pacific Sandfish	0	0	0	0	0	0.02	0.01	0	0	0
Eulachon	0	1.15	3.49	0.92	10.84	14.5	3.82	0.47	1.33	1.47
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	0	2.16	5.7	1.08	0	0	0.73	1.03	0
Herring	0	0	0	0	0	0	0	0	0	0.05
Sculpins	0	0.82	0.44	6.61	0	0	0	0.47	0.27	0.04
Other Forage Fish	0	0	0.58	0.77	0	0	0	0.79	5.11	0
Other Roundfish	2.18	0.33	0.43	13.99	0	0.4	0.62	0	0	0.13
TOTAL ROUND FISH	27.66	194.41	36.65	143.1	181.9	73.13	113.78	208.13	98.8	20.22
Arrowtooth Flounder	0.29	55.78	138.72	94.68	60.04	11.22	45.24	50.67	33.7	3.02
Flathead Sole	23.7	56.28	57.2	70.55	29.09	13.38	34.23	52.87	41.08	1.04
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	2.63	2.91	7.22	0.29	0.77	0	5.04	0.01	0
Dover Sole	0	2.79	0	0.31	0	0	0	0	0	0
Pacific Halibut	12.79	20.15	0	4.7	0	11.13	3.32	8.44	0	0
Starry Flounder	1.3	0	0	0	0	4.46	0	0	0	1.77
Yellowfin Sole	7.96	0	0	0	0	5.23	0	0	0	0
Other Flatfish	0	0	0	0	0	0.84	0	0	0	0
TOTAL FLAT FISH	46.04	137.62	198.83	177.45	89.41	47.02	82.78	117.02	74.79	5.83
Northern Pink Shrimp	2.17	90.03	108.18	84.48	78.47	4.01	6	95.74	86.27	12.56
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe Shrimp	0	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0	0.3	1.72	13.61	1.85	0	0.01	24.98	5.53	0
Other Shrimp	0	0.9	0.43	0.12	0.39	0.01	0.13	0.28	0.59	0.1
TOTAL SHRIMP	2.17	91.23	110.33	98.21	80.71	4.01	6.14	121.01	92.39	12.66
Squid	0	0	0.73	0.15	1	0	0.02	0.79	1.33	0.01
Jellyfish	52.7	5.41	0	0	2	7.18	0.1	0.94	0.19	1.51
Other Inverts	0	0	0.01	0	0	0	0	0	0.01	0
TOTAL INVERTS	52.7	5.41	0.74	0.15	2.99	7.18	0.12	1.73	1.52	1.52
Skates	0	0	13.54	0	0	0	0	0	0	0
Spiny Dogfish	3.59	14.85	4.91	37.35	12.01	8.37	9.29	12.15	5.72	12.63
Other	0.12	0	0	0	0.14	0.14	0.09	0	0	0.04
TOTAL CATCH	132.29	460.58	365.01	456.26	367.17	139.85	212.2	460.04	273.22	52.92

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Haul	61	62	63	64	65	66	67	68	69	70
Location	Kujulik	Kujulik	Kujulik	Kujulik	Kujulik	Wide	Wide	Wide	Wide	Wide
Date	10/12/06	10/12/06	10/12/06	10/12/06	10/12/06	10/13/06	10/13/06	10/13/06	10/13/06	10/13/06
Station	1963	1960	1946	1947	1955	746	740	744	742	743
Longitude Start	157°47.2'	157°45.9'	157°40.4'	157°38.0'	157°38.1'	156°19.8'	156°21.8'	156°22.9'	156°23.4'	156°21.0'
Latitude Start	56°38.2'	56°34.2'	56°31.7'	56°31.0'	56°33.4'	57°22.6'	57°19.9'	57°21.7'	57°21.2'	57°21.9'
Heading, Degrees	155	174	126	118	161	186	32	41	65	188
Average Depth (m)	51	100	95	106	107	58	45	58	60	62
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	9.7	9.3	8.3	8.1	8	9.8	9.9	9.8	9.8	9.9
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	14	52.58	8.91	4.1	4.3	35.53	396.59	18.73	15.98	8.89
Pacific Cod	0.01	17.87	2.05	0.13	4.81	2.56	0.75	9.04	0.03	0.11
Pacific Sandfish	0.54	0	0	0	0	19.24	5.87	53.55	11.87	31.27
Eulachon	0.54	0.73	6.51	3.69	2.36	0	0	0	0	0
Capelin	0.01	0	0	0	0	0	0	0	0	0
Rockfish	0	0	0	0	0	0.19	0	0	0	0
Herring	0.16	0	0	0	0	0.54	1.7	0.94	2.35	0.49
Sculpins	0	10.34	0.07	1.02	0.08	1.75	13.41	19.21	2.11	5.93
Other Forage Fish	0.02	0	0	0	0	0	0	0	0.01	0
Other Roundfish	6.92	2.61	0.04	0	0.13	2.23	2.01	0.05	0.76	3.95
TOTAL ROUND FISH	22.21	84.13	17.57	8.95	11.68	62.03	420.32	101.53	33.12	50.64
Arrowtooth Flounder	8.23	5.31	11.66	16.4	7.76	1.59	0	0	0.12	0.3
Flathead Sole	24.89	40.98	12.08	30.54	12.14	9.54	6.98	5.01	2.94	1.93
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0.08	0.43	0	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pacific Halibut	0	1.43	0	2.42	4.81	0.87	1.78	0	0.52	3.69
Starry Flounder	1.38	7.35	0	0	0	0	0	0	0	0
Yellowfin Sole	12.81	0	0	0	0	8.43	2.79	6.53	4.11	3.71
Other Flatfish	0	0	0.39	0	0	0.32	0.84	0	0	0
TOTAL FLAT FISH	47.31	55.15	24.55	49.35	24.71	20.74	12.39	11.54	7.69	9.62
Northern Pink Shrimp	2.34	7.84	17.56	19.98	30.92	84.07	30.29	76.18	92.11	83.58
Humpy Shrimp	0.08	0.11	0	0	0	0.47	3.44	0.27	1.63	1.22
Coonstripe Shrimp	0	0	0	0	0	0.47	1.2	4.16	1.67	1.75
Sidestriped Shrimp	0	0.02	0	0	0	4.51	0.01	1.27	1.24	1.27
Other Shrimp	0.09	0.28	0.37	0.72	0.15	0.16	0.11	0.15	0.04	0.37
TOTAL SHRIMP	2.52	8.25	17.93	20.7	31.07	89.66	35.05	82.03	96.7	88.2
Squid	0	0.03	0.04	0	0.02	0	0	0	0	0
Jellyfish	1.58	4.9	0.81	2.77	2.08	0.56	2.79	37.28	63.83	22.56
Other Inverts	0.16	0.02	0.01	0	0	0.28	0.59	0.35	0.14	0
TOTAL INVERTS	1.74	4.95	0.86	2.77	2.09	0.84	3.38	37.63	63.97	22.56
Skates	0	0	0	0	0	0	0	0	0	0
Spiny Dogfish	0	20.06	3.83	8.1	2.05	6.05	2.89	0	0	0
Other	0.2	0.24	0.04	0.31	0.21	24.24	1.68	1.61	0.47	0.15
TOTAL CATCH	73.97	172.79	64.79	90.17	71.81	203.56	475.7	234.34	201.94	171.17

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Haul	71	72	73	74	75	76	77	78	79	80
Location	Wide	Wide	Marmot Is							
Date	10/13/06	10/14/06	10/19/06	10/19/06	10/19/06	10/20/06	10/20/06	10/20/06	10/20/06	10/20/06
Station	745	747	108	106	511	489	497	18	4	21
Longitude Start	156°21.5'	156°15.8'	152°6.7'	152°8.0'	152°9.2'	152°16.9'	152°11.4'	151°57.7'	152°1.9'	151°57.1'
Latitude Start	57°21.9'	57°24.2'	57°56.3'	58°2.5'	58°6.0'	58°12.4'	58°7.8'	58°2.3'	58°0.0'	57°56.3'
Heading, Degrees	56	72	90	183	163	136	152	130	246	204
Average Depth (m)	65	58	160	153	210	131	186	146	164	186
Distance Fished (km)	1.9	0.9	1.9	1.9	1.9	0.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	9.8	9.7	6.7	6.6	6.7	6.8	6.8	6.7	6.7	6.7
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	43.03	4.59	12.95	25.36	4.69	35.77	76.61	44.28	34.01	5.09
Pacific Cod	8.94	1.46	0	0.06	0	11.61	5.32	9.69	61.61	3.48
Pacific Sandfish	26.28	1.62	0	0	0	0	0	0	0	0
Eulachon	0	0	0.62	23.43	5.39	26.01	19.99	10.21	2.34	3.18
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	0	0.03	0.4	5.8	0	1.94	0	105.22	1.43
Herring	0.65	0	0	0	0	0	0	0	0	0
Sculpins	0	4.59	0	0.11	0	0	0.02	0	16.65	0
Other Forage Fish	0	0	0	0	0	0	0.2	0	0	0
Other Roundfish	0.54	0.05	1.94	0	26.51	1.02	0.4	0.43	2.48	1.8
TOTAL ROUND FISH	79.43	12.31	15.54	49.36	42.39	74.4	104.48	64.61	222.31	14.98
Arrowtooth Flounder	0	0.43	19.23	17.3	30.46	16.46	12.87	99.05	36.12	120.8
Flathead Sole	0.09	0.43	11.14	51.26	136.61	142.86	212.62	23.73	25.38	10.75
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0.05	1.07	0	13.41	0	0	0	0
Dover Sole	0	0	0.62	0	0	4.88	29.89	3.86	0	0
Pacific Halibut	0	0.8	0	0.27	0	0	14.62	6.5	7.87	0
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	1.34	2.16	0	0	0	0	0	0	0	0
Other Flatfish	0	4.32	0	0	0	0	0	0	0	0
TOTAL FLAT FISH	1.43	8.14	31.03	69.9	167.08	177.61	270	133.14	69.37	131.55
Northern Pink Shrimp	0.93	0	4.57	8.68	137.72	135.23	107.73	1.66	14.34	6.75
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe Shrimp	0	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0.01	0	0.03	5.14	16.88	0.33	15.22	0.11	11.52	12.34
Other Shrimp	0.01	0.02	0.74	3.91	1.93	0.19	1.37	0.78	6.3	3.46
TOTAL SHRIMP	0.96	0.02	5.33	17.73	156.53	135.75	124.32	2.55	32.16	22.56
Squid	0	0	0	0	0	0.41	0	0	0	0
Jellyfish	35.81	5.72	0.9	0.11	0.23	0.41	0	0	0	0
Other Inverts	0	0.82	0	0	0	0	0.01	0.22	1.75	0
TOTAL INVERTS	35.81	6.54	0.9	0.11	0.23	0.81	0.01	0.22	1.75	0
Skates	0	11.38	0	2.45	5.18	0	5.97	0	32.08	10.63
Spiny Dogfish	0	0	8.53	5.59	2.78	0	1.84	8.97	32.15	31.26
Other	0.62	39.74	0.76	0.11	0	0.2	0.4	0.55	1.85	0.15
TOTAL CATCH	118.25	78.14	62.1	145.25	374.19	388.77	507.02	210.04	391.67	211.12

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Haul	81	82	83	84	85	86	87	88	89	90
Location	Marmot Is	Marmot Is	Marmot Is	Marmot Is	Marmot	Marmot	Marmot	Marmot	Marmot	Marmot
Date	10/20/06	10/21/06	10/21/06	10/21/06	10/21/06	10/21/06	10/21/06	10/21/06	10/22/06	10/22/06
Station	15	493	477	471	428	429	422	433	434	418
Longitude Start	151°58.0'	152°14.9'	152°14.9'	152°16.5'	152°34.9'	152°35.3'	152°33.0'	152°33.2'	152°32.6'	152°35.1'
Latitude Start	57°51.6'	58°9.6'	58°6.5'	58°5.1'	58°8.7'	58°7.8'	58°1.7'	57°59.1'	57°58.3'	58°0.2'
Heading, Degrees	10	155	228	218	192	175	199	50	46	175
Average Depth (m)	117	166	149	175	109	115	181	177	155	153
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	6.9	6.8	6.8	6.8	7.2	7.2	6.8	6.7	6.8	6.8
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	1.03	37.5	0.58	32.26	208.97	319.92	61.04	87.99	24.39	39.41
Pacific Cod	0	23.43	12.15	17.66	18.36	0	3.43	19.76	11.69	19.57
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0
Eulachon	0.22	5.13	70.25	35.68	0.96	0	2.48	3.95	3.73	2.17
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	1.57	0	0	0.13	0	1.13	0	0.03	0
Herring	0	0	0	0	5.51	14.59	0	0	0	0
Sculpins	0	0.21	0	0	0	0	1.31	0	0	0.72
Other Forage Fish	0	1.79	0	0	0.96	2.53	3.06	0.9	0	0.54
Other Roundfish	0	2.03	0	0	4.68	1.58	0.44	0.54	4.9	0.24
TOTAL ROUND FISH	1.24	71.65	82.98	85.6	239.56	338.62	72.88	113.14	44.74	62.66
Arrowtooth Flounder	12.01	30.14	72.82	31.02	11.09	4.28	48.22	114.74	49.53	39.05
Flathead Sole	4.64	186.4	175.52	116.18	90.81	75.07	36.27	65.18	70.56	102.32
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0.16	20.31	7.7	16.44	0	0	0.87	0.01	1.24	2.35
Dover Sole	0	5.36	1.17	0	0	0	0	0	0	0
Pacific Halibut	0	0	5.66	2.02	12.74	0.44	6.66	0	4.12	1.22
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0	0	0	0	0	0	0	0	0
Other Flatfish	0	0.22	0	0	0	0	0	0	0	0
TOTAL FLAT FISH	16.82	242.43	262.87	165.66	114.64	79.78	92.03	179.94	125.44	144.93
Northern Pink Shrimp	1.41	200.19	112.06	82.88	5.76	5.68	84.29	91.55	65.72	117.94
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe Shrimp	0	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0	2.69	0	3.52	0.58	1.57	12.05	9.11	2.28	4.75
Other Shrimp	0.32	0.93	1.37	0.46	0.02	0.04	0.39	1.7	1.31	1.32
TOTAL SHRIMP	1.73	203.8	113.44	86.86	6.36	7.29	96.73	102.35	69.31	124.01
Squid	0	0	0	0	0	0	0.02	0	0	0
Jellyfish	0	0	0	0	2.91	2.62	0	0	0.25	0.18
Other Inverts	0.01	0	0	0	0	0	0	0	0	0.02
TOTAL INVERTS	0.01	0	0	0	2.91	2.62	0.02	0	0.25	0.2
Skates	0	15.29	5.5	0	0	0	0	3.97	0	1.27
Spiny Dogfish	4.7	1.16	2.81	49.95	12.15	42.68	17.9	14.93	7.48	10.34
Other	0	0.22	0	0.16	0.19	0.39	0.15	0.36	0.62	0
TOTAL CATCH	24.49	534.56	467.6	388.23	375.81	471.38	279.7	414.69	247.84	343.41

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Haul	91	92	93	94	95	96	97	98	99	100
Location	Marmot	Marmot	Marmot	Marmot	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof
Date	10/22/06	10/22/06	10/22/06	10/22/06	10/23/06	10/23/06	10/23/06	10/23/06	10/23/06	10/24/06
Station	409	415	404	402	175D	175A	174C	148A	149C	150A
Longitude Start	152°39.3'	152°37.0'	152°42.2'	152°47.8'	153°25.3'	153°31.0'	153°40.8'	153°22.7'	153°12.0'	153°3.4'
Latitude Start	57°58.4'	57°57.2'	57°55.5'	57°52.7'	58°17.7'	58°20.4'	58°19.6'	58°24.5'	58°22.2'	58°25.1'
Heading, Degrees	211	273	28	57	323	306	226	95	34	28
Average Depth (m)	122	128	131	87	173	166	177	173	188	192
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	6.8	6.8	6.9	7	5.6	5.6	5.6	5.8	5.6	5.6
Performance	0	0	0	0	0	0	0	0	0	0
	kg/km towed									
Pollock	36.73	38.21	29.14	7.07	10.15	17.47	2.61	3.44	17.08	17.73
Pacific Cod	11.5	7.88	18.44	2.48	0	0.49	35.67	0.73	0	0
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0
Eulachon	2.33	6.24	0.19	0.08	2.72	20.4	9.95	7.02	2.17	2.16
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0.89	0	2.16	0	0	0.27	0	0	0	0
Herring	0	0	0	0	0	0	0	0	0	0
Sculpins	0.91	0	0	1.19	0.25	0	0.07	0	0.01	0
Other Forage Fish	0	0	0	0	0	0.14	0	0	0.33	0.58
Other Roundfish	0.34	2.19	0.3	0.91	0	0.02	0	0.35	0.02	1.88
TOTAL ROUND FISH	52.71	54.53	50.23	11.73	13.12	38.78	48.29	11.53	19.61	22.35
Arrowtooth Flounder	25.13	68.06	9.34	61.11	23.15	11.3	9.89	14.46	28.49	52.62
Flathead Sole	71.71	92.11	120.54	24.3	27.36	27.3	2.27	8.31	22.66	44.98
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	3	0	0.96	0	0.37	0.01	0.27	0.5	0	0.29
Dover Sole	0	0	0	0.87	4.83	5.28	0	0	0	0.14
Pacific Halibut	8.62	40.34	6.95	7.5	2.21	6.44	0.29	0	0.17	0.1
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0	0	0	0	0	0	0	0	0
Other Flatfish	0	0	0	4.67	0	0	0	0	0	0
TOTAL FLAT FISH	108.45	200.51	137.78	98.45	57.92	50.34	12.72	23.27	51.32	98.13
Northern Pink Shrimp	12.11	81.98	34.08	0.11	2.76	1.85	10.37	2.99	28.89	30.33
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe Shrimp	0.09	0	0	0	0	0	0	0	0	0
Sidestriped Shrimp	0	0.47	0.43	0	0.06	0.02	0.09	0.19	5.05	4.52
Other Shrimp	0.58	0.52	2.41	0.04	0.32	0.22	0.89	0.21	1.22	1.48
TOTAL SHRIMP	12.79	82.97	36.93	0.16	3.14	2.08	11.36	3.39	35.16	36.33
Squid	0	0	0	0	0.12	0.09	0	0	0.58	0.06
Jellyfish	0.33	0	1.34	0.66	0.12	1.47	0.33	0.07	0.75	0.14
Other Inverts	8.41	0.12	0.87	0.64	0.25	0	0.03	0	0.18	0.03
TOTAL INVERTS	8.74	0.12	2.21	1.3	0.5	1.56	0.37	0.07	1.52	0.24
Skates	7.38	0	25.44	0	0	10.57	0	0	2.28	8.43
Spiny Dogfish	3.43	5.45	8.29	12.99	6.18	5.29	8.13	0	4.59	11.99
Other	23.57	0.91	1.53	1.19	0.12	0.44	0.13	0.07	0	0.72
TOTAL CATCH	217.06	344.49	262.42	125.81	80.99	109.07	80.99	166.85	114.47	178.19

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Haul	101	102	103	104	105
Location	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof
Date	10/24/06	10/24/06	10/24/06	10/24/06	10/24/06
Station	121D	122A	920	93B	176D
Longitude Start	153°8.2'	153°3.8'	153°1.3'	152°59.6'	153°15.7'
Latitude Start	58°27.2'	58°29.9'	58°32.6'	58°34.6'	58°18.9'
Heading, Degrees	350	49	298	52	210
Average Depth (m)	170	160	164	155	184
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	5.6	5.9	6	6	5.6
Performance	0	0	0	0	0
	kg/km towed				
Pollock	15.82	4.49	0.67	0.24	42.95
Pacific Cod	0	0	0	0	0
Pacific Sandfish	0	0	0	0	0
Eulachon	6.76	14.66	22.21	19.77	12
Capelin	0	0	0	0	0
Rockfish	0	0.76	0.03	0	0.46
Herring	0	0	0	0	0
Sculpins	0	0	0	0	0
Other Forage Fish	0	0	0	0	0.02
Other Roundfish	0.94	0	0	0	0
TOTAL ROUND FISH	23.52	19.9	22.91	20.01	55.44
Arrowtooth Flounder	18.23	5.02	1.04	0.78	19.27
Flathead Sole	56.62	12.83	12.93	1.51	24.23
Rock Sole	0	0	0	0	0
Rex Sole	0	0	0	0	0.33
Dover Sole	2.17	1.39	1.63	1.12	0
Pacific Halibut	14.47	0	5.34	0	15.39
Starry Flounder	0	0	0	0	0
Yellowfin Sole	0	0	0	0	0
Other Flatfish	0	0	0	0	0
TOTAL FLATFISH	91.49	19.24	20.93	3.41	59.22
Northern Pink Shrimp	7.54	1.03	0.93	3.33	16.38
Humpy Shrimp	0	0	0	0	0
Coonstripe Shrimp	0	0	0	0	0
Sidestriped Shrimp	0.06	0.02	0.02	0.02	2.25
Other Shrimp	0.65	0.24	0.17	0.09	1.64
TOTAL SHRIMP	8.26	1.3	1.12	3.44	20.26
Squid	0	0	0	0	0.33
Jellyfish	0.72	0.45	1.41	0.11	9.26
Other Inverts	0.01	0.05	0.15	0.05	0.12
TOTAL INVERTS	0.73	0.5	1.57	0.16	9.7
Skates	10.57	0	0	0	0
Spiny Dogfish	6.88	0	7.4	1.51	9.8
Other	0	0.1	0.07	0.1	0
TOTAL CATCH	141.47	41.04	54	28.62	154.43

APPENDIX B. FISH LENGTHS

Appendix B1.-Adult walleye pollock lengths from the 2006 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhoi Bay	Total
12	0	0	0	0	0	0	0	0	1	0	0	0	1
14	0	0	0	0	0	0	0	1	0	0	0	0	1
15	0	0	0	2	0	1	0	0	0	0	0	0	3
16	0	0	0	3	4	1	6	0	0	0	0	0	14
17	1	4	0	8	18	8	19	4	2	3	5	0	72
18	6	10	0	19	45	19	17	9	21	8	13	0	167
19	20	25	1	15	61	7	17	20	77	11	4	0	258
20	30	43	3	20	46	7	7	13	94	14	5	0	282
21	38	39	10	22	17	6	15	21	84	20	2	3	277
22	19	31	6	26	6	0	15	39	48	17	5	6	218
23	18	10	9	51	0	5	11	63	18	14	0	12	211
24	15	4	3	55	0	2	7	56	11	10	0	19	182
25	3	2	5	37	3	1	5	66	7	4	0	19	152
26	4	5	6	24	1	0	0	51	1	1	0	8	101
27	1	1	2	12	8	1	1	27	0	2	0	4	59
28	2	0	0	4	4	0	2	16	0	2	1	1	32
29	1	0	1	2	7	0	0	10	0	2	0	0	23
30	0	0	0	1	2	0	0	3	0	1	0	0	7
31	2	0	2	2	2	2	1	1	0	0	1	1	14
32	6	0	1	0	1	2	0	1	0	0	1	0	12
33	14	0	4	0	1	1	0	0	0	0	0	0	20
34	15	0	5	0	0	0	0	0	0	0	3	0	23
35	29	4	7	0	0	0	1	0	0	0	2	0	43
36	17	3	8	0	1	1	0	0	1	1	2	1	35
37	11	5	6	0	0	1	0	3	4	0	2	0	32
38	14	4	10	0	0	0	1	0	4	1	1	0	35
39	6	3	4	0	0	0	1	5	2	1	2	2	26
40	5	4	2	0	2	0	0	6	1	0	2	0	22
41	3	4	6	0	0	0	1	17	5	0	1	0	37
42	4	2	3	0	0	0	0	14	7	0	2	0	32
43	3	2	5	0	1	0	0	13	5	0	4	0	33
44	2	1	5	0	1	0	4	28	2	0	4	0	47
45	4	0	0	0	0	0	1	27	5	0	1	1	39

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Appendix B1.-Page 2 of 2.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
46	3	0	1	0	0	1	1	23	6	0	5	0	40
47	3	0	4	0	2	0	1	22	5	0	0	1	38
48	1	0	1	0	1	0	1	27	0	1	1	4	37
49	3	0	3	0	1	1	2	39	3	1	0	4	57
50	1	1	2	0	2	2	5	29	5	0	1	14	62
51	4	0	4	0	2	2	4	27	7	1	1	11	63
52	4	1	8	0	5	1	3	35	7	0	2	21	87
53	2	0	7	0	1	0	4	35	8	1	2	24	84
54	0	0	5	0	0	1	9	27	10	1	3	18	74
55	2	1	2	0	1	5	6	35	7	0	3	20	82
56	0	2	4	0	1	5	4	15	6	3	2	20	62
57	0	1	8	0	0	2	5	19	10	2	1	15	63
58	1	1	2	1	3	4	5	11	10	3	3	6	50
59	1	2	2	0	0	3	4	4	13	4	2	4	39
60	3	2	2	0	1	3	3	6	8	0	1	4	33
61	3	1	3	1	1	5	4	1	4	1	5	4	33
62	0	3	1	0	0	3	1	6	2	6	1	1	24
63	2	5	2	0	1	0	1	2	1	1	0	1	16
64	0	0	0	0	1	0	1	3	1	1	0	1	8
65	4	4	1	0	1	0	1	2	1	0	0	0	14
66	2	1	2	0	0	0	0	0	2	1	0	0	8
67	3	2	2	0	0	0	0	1	0	0	0	0	8
68	0	2	2	0	0	0	0	0	0	0	1	0	5
69	1	0	1	0	0	0	1	0	0	0	0	0	3
70	1	1	0	0	0	0	0	0	1	0	0	0	3
71	0	2	0	0	0	0	0	0	0	1	0	0	3
73	0	0	1	0	0	0	0	0	0	0	0	0	1
75	0	2	0	0	0	0	0	0	0	0	0	0	2

Appendix B2.-Juvenile walleye pollock lengths from the 2006 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
6	0	0	0	0	0	1	8	0	0	0	0	0	9
7	0	0	0	0	0	9	41	0	0	0	0	0	50
8	0	0	1	5	8	12	38	25	3	1	0	2	95
9	14	28	5	51	58	18	41	149	36	25	0	38	463
10	63	61	14	138	76	4	29	158	94	64	0	77	778
11	70	55	14	93	39	2	8	121	66	81	0	69	618
12	25	17	6	23	10	1	0	40	21	35	1	23	202
13	8	0	0	3	1	0	0	6	2	18	0	4	42
14	2	0	0	0	0	0	0	1	0	1	0	3	7
15	1	0	0	0	0	0	0	0	0	0	0	0	1
16	0	0	0	0	0	0	0	1	0	0	0	0	1
17	0	0	0	0	0	0	0	1	0	0	0	0	1

Appendix B3.-Flathead sole lengths from the 2006 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
6	0	0	0	0	0	0	0	0	1	0	0	0	1
7	1	1	0	0	0	0	1	0	2	0	0	0	5
8	8	2	1	1	0	3	2	0	2	3	0	0	22
9	3	4	4	6	2	0	2	2	1	4	3	0	31
10	2	7	1	4	4	0	3	3	1	6	0	0	31
11	1	3	1	9	11	2	1	1	4	4	3	0	40
12	3	2	2	3	5	12	1	0	7	2	3	0	40
13	7	1	2	1	10	9	1	8	13	10	4	0	66
14	6	6	0	2	12	11	5	7	9	18	2	1	79
15	22	7	1	6	13	3	5	11	8	8	4	1	89
16	10	4	1	7	2	11	10	5	6	12	5	6	79
17	12	3	1	11	11	13	5	21	4	18	2	10	111
18	14	6	1	17	3	5	5	28	13	15	1	7	115
19	10	5	4	19	12	5	7	42	5	16	6	2	133
20	12	7	3	21	6	3	5	32	4	9	2	9	113
21	8	4	8	18	6	1	0	28	3	7	2	2	87
22	9	5	7	11	3	0	1	13	8	7	3	0	67
23	10	7	4	19	3	0	4	26	8	4	5	4	94
24	8	4	4	8	7	0	2	17	12	8	5	4	79
25	16	3	7	5	4	0	3	32	31	9	7	2	119
26	18	5	8	2	3	0	1	36	11	9	8	7	108
27	18	7	5	0	5	0	3	36	20	10	4	11	119
28	14	12	11	1	6	2	4	26	14	8	5	4	107
29	23	10	14	1	16	3	7	32	15	14	8	9	152
30	23	11	14	0	11	3	10	44	17	6	14	9	162
31	12	10	14	0	18	2	12	43	16	12	13	14	166
32	16	20	22	1	21	6	17	46	14	14	22	18	217
33	26	24	21	0	27	4	16	55	23	14	21	15	246
34	13	23	19	0	17	4	15	32	31	6	19	17	196
35	27	32	22	0	37	10	8	36	25	5	13	22	237
36	35	35	17	0	20	11	13	28	41	6	12	11	229
37	21	33	21	0	22	7	9	25	31	8	15	11	203
38	20	38	9	0	17	5	7	16	28	5	10	15	170
39	16	30	7	0	14	5	4	11	15	3	10	8	123
40	19	21	6	0	14	2	2	10	15	6	4	11	110
41	18	21	6	0	2	2	7	10	8	3	4	15	96
42	10	12	4	0	2	0	1	5	5	2	2	13	56
43	7	11	6	0	7	0	0	2	9	3	0	8	53
44	5	7	0	0	0	0	0	3	3	1	0	5	24
45	1	10	2	0	0	0	0	0	1	0	0	3	17
46	1	1	1	0	0	0	0	3	0	1	0	0	7
47	0	0	0	0	0	0	0	0	0	1	0	1	2
48	0	4	2	0	0	0	0	0	0	0	0	0	6
49	0	0	0	0	0	0	0	1	0	0	0	0	1
50	0	0	0	0	0	0	0	1	0	0	0	0	1

Appendix B4.-Pacific cod lengths from the 2006 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
9	0	0	0	3	0	0	0	0	0	0	0	0	3
10	0	0	0	11	0	0	0	0	0	0	0	0	11
11	0	0	0	18	0	0	0	0	0	0	0	0	18
12	0	0	1	8	0	0	0	0	0	0	0	0	9
13	0	0	0	8	0	0	0	0	0	1	0	0	9
14	0	0	0	2	0	0	0	0	0	0	0	0	2
15	0	1	0	2	0	0	0	0	0	0	0	0	3
28	0	0	0	0	0	0	0	0	0	1	0	0	1
29	0	0	0	1	0	0	0	1	0	0	0	0	2
31	0	0	0	1	0	0	0	1	0	0	0	0	2
35	0	0	0	1	0	0	0	0	0	0	0	0	1
37	1	0	0	0	0	0	1	0	0	0	0	0	2
38	1	0	0	0	0	0	0	0	0	0	0	0	1
39	0	0	0	1	0	0	0	0	0	0	0	0	1
40	0	0	0	0	0	0	0	0	0	1	0	0	1
43	1	0	0	0	1	0	0	0	0	0	0	1	3
45	0	0	0	0	0	0	0	1	0	0	0	1	2
46	0	0	0	0	0	0	0	1	0	0	0	0	1
47	0	0	0	0	0	0	0	1	0	0	0	0	1
48	1	0	0	0	1	0	0	3	0	0	0	1	6
49	0	0	0	1	0	0	0	3	0	0	0	0	4
50	2	2	0	0	0	0	0	0	0	1	0	0	5
51	0	0	0	0	0	0	0	2	0	0	0	1	3
52	3	2	0	0	0	0	0	3	0	0	0	0	8
53	2	1	1	0	0	0	3	2	0	0	0	0	9
54	0	1	0	0	0	0	1	1	0	0	0	0	3
55	0	2	1	0	0	0	0	6	0	0	0	0	9
56	0	1	0	0	0	0	0	4	0	0	0	1	6
57	1	2	0	0	0	0	0	5	1	1	2	0	12
58	4	1	0	0	0	0	0	1	0	0	0	1	7
59	0	2	0	0	0	0	1	2	2	0	1	0	8
60	2	1	0	1	0	0	0	1	3	1	0	0	9

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Appendix B4.-Page 2 of 2.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
61	1	5	2	0	0	0	1	2	1	0	0	1	13
62	4	0	1	0	0	0	5	2	0	1	0	0	13
63	5	2	1	0	0	0	5	2	2	1	0	0	18
64	2	5	0	0	0	0	2	1	0	0	0	0	10
65	2	4	1	0	1	0	2	3	1	0	0	0	14
66	1	3	0	0	0	0	2	7	1	1	1	0	16
67	3	7	0	1	0	0	3	4	0	0	2	0	20
68	0	1	0	1	1	0	2	3	0	0	0	0	8
69	1	7	0	1	1	0	2	2	0	1	1	0	16
70	3	0	1	0	1	0	0	4	3	1	0	0	13
71	6	4	2	1	2	0	4	1	0	0	1	0	21
72	1	0	3	0	0	0	2	0	0	1	1	0	8
73	2	5	0	1	1	0	1	2	0	2	0	1	15
74	2	2	0	0	0	0	0	0	0	1	0	0	5
75	0	2	0	0	0	0	1	1	0	1	0	0	5
76	1	2	0	0	0	0	0	1	0	1	0	0	5
77	2	2	0	1	0	0	1	0	0	0	0	0	6
78	0	2	0	0	0	0	0	1	1	0	0	1	5
79	0	1	0	1	0	0	0	0	0	0	0	1	3
80	2	0	0	0	0	0	0	0	0	0	0	0	2
81	1	0	0	0	0	0	0	2	0	0	0	0	3
87	0	0	0	0	0	0	0	1	0	0	0	0	1
91	1	0	0	0	0	0	0	2	0	0	0	0	3
93	0	0	0	0	0	0	0	1	0	0	0	0	1

Appendix B5.-Arrowtooth flounder lengths from the 2006 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
7	2	0	0	0	1	0	0	0	0	0	0	0	3
8	2	0	0	0	0	0	0	0	0	0	0	0	2
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	0	0	0	1	0	3	1	0	0	4	0	0	9
11	2	0	0	0	0	16	0	0	0	0	0	0	18
12	0	2	0	0	0	14	2	0	3	0	1	0	22
13	0	8	0	0	0	11	4	1	7	3	1	0	35
14	0	8	2	0	0	4	1	1	9	6	2	0	33
15	1	14	0	0	1	5	1	1	6	7	1	1	38
16	5	14	3	2	0	1	1	3	16	20	0	0	65
17	3	7	8	2	2	0	1	1	16	30	0	2	72
18	9	3	12	0	2	0	0	1	10	36	0	0	73
19	7	5	26	1	2	1	1	2	2	41	0	0	88
20	9	1	10	2	4	0	0	2	2	15	0	0	45
21	11	4	9	0	2	0	1	0	2	15	0	0	44
22	11	4	6	1	5	2	1	2	3	5	1	1	42
23	13	4	5	3	3	5	1	4	4	4	1	1	48
24	10	10	6	0	5	1	3	10	5	2	2	3	57
25	6	14	7	2	5	4	10	13	24	5	6	2	98
26	16	13	8	0	2	2	1	12	13	4	0	3	74
27	15	17	4	0	2	2	2	29	26	22	3	2	124
28	13	13	5	0	4	0	2	19	16	10	8	3	93
29	15	16	6	0	2	0	3	13	17	7	6	2	87
30	10	3	3	0	5	0	0	11	8	8	4	5	57
31	7	7	2	0	3	0	1	4	7	5	4	5	45
32	4	8	4	0	6	0	1	3	7	0	3	4	40
33	5	8	4	0	2	1	1	13	9	2	3	5	53
34	5	6	0	0	1	1	0	12	6	2	2	2	37
35	3	12	3	0	4	2	3	11	4	3	4	3	52
36	3	8	4	0	4	1	0	9	8	1	8	1	47
37	6	5	3	0	3	2	1	6	13	0	4	3	46
38	4	10	1	0	4	4	2	2	12	1	4	2	46
39	3	14	0	0	4	3	8	6	5	0	3	5	51
40	8	10	3	0	3	3	2	7	12	1	9	1	59
41	11	11	2	1	5	10	10	7	9	2	10	0	78
42	3	9	0	0	2	5	4	5	9	1	10	2	50
43	2	6	2	0	1	6	6	6	9	1	6	1	46
44	0	6	3	0	5	2	4	6	10	1	8	2	47
45	10	12	2	0	3	5	5	12	5	0	2	2	58

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length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
46	5	2	3	0	3	4	4	3	7	1	2	0	34
47	9	9	2	0	5	3	5	9	7	2	4	2	57
48	3	3	3	0	5	3	3	3	6	2	1	1	33
49	7	7	5	0	1	0	6	3	8	1	7	0	45
50	8	5	3	0	3	0	3	5	9	2	2	1	41
51	4	6	3	0	2	5	3	3	9	1	4	1	41
52	3	1	4	0	0	1	1	1	1	0	1	1	14
53	1	7	3	0	1	0	2	0	1	0	0	0	15
54	1	0	1	0	1	0	0	0	0	2	1	2	8
55	2	2	0	0	2	0	0	0	1	0	2	0	9
56	0	3	0	0	2	1	2	0	0	0	1	1	10
57	1	5	1	0	1	1	2	2	1	0	0	0	14
58	1	4	1	0	0	0	2	2	1	0	1	0	12
59	2	1	4	0	1	1	1	1	2	0	2	1	16
60	2	0	2	0	0	1	1	0	0	0	0	0	6
61	0	1	6	0	2	0	1	0	0	1	0	0	11
62	1	2	4	0	0	1	0	2	1	0	0	0	11
63	3	1	3	0	2	0	2	1	1	0	0	0	13
64	2	0	5	0	0	0	0	0	2	0	1	0	10
65	2	2	4	0	3	1	1	1	2	0	0	0	16
66	3	0	0	0	0	0	0	0	0	0	0	0	3
67	1	0	3	0	0	0	2	5	0	0	0	0	11
68	0	0	1	0	1	1	0	1	0	1	0	0	5
69	0	0	2	0	0	0	0	1	1	0	1	0	5
70	0	0	1	0	0	0	1	0	0	0	0	0	2
71	1	0	0	0	0	0	0	0	0	0	0	0	1
72	1	0	0	0	0	1	1	0	1	0	0	0	4
73	2	0	0	0	0	0	0	1	0	0	0	1	4
74	0	0	1	0	0	0	1	2	2	0	0	0	6
75	0	0	0	0	0	1	0	0	0	0	0	0	1
76	0	1	0	0	0	1	0	0	0	0	0	0	2
77	0	0	0	0	0	0	1	0	0	0	0	0	1
79	0	0	0	0	0	0	0	0	1	0	0	0	1
80	0	0	0	0	0	0	0	0	1	0	0	0	1
82	0	0	1	0	0	0	0	0	0	0	0	0	1

Appendix B6.-Eulachon lengths from the 2006 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
7	0	0	0	0	0	0	0	0	0	0	1	0	1
8	0	0	0	0	0	0	0	0	0	0	7	0	7
9	0	0	0	0	0	0	0	0	0	2	29	0	31
10	0	1	0	0	1	0	0	0	0	1	13	0	16
11	0	1	0	0	2	1	3	0	1	3	7	0	18
12	0	0	0	0	14	4	10	0	3	4	9	0	44
13	0	5	0	0	12	6	27	0	30	30	35	0	145
14	0	16	0	0	5	8	30	0	39	24	24	0	146
15	4	64	0	0	15	13	40	1	35	40	19	0	231
16	11	63	0	0	36	23	41	0	19	31	6	2	232
17	28	71	1	0	80	51	52	0	34	41	12	0	370
18	24	37	1	0	115	35	49	0	14	17	9	0	301
19	43	78	0	0	168	18	36	0	10	11	8	0	372
20	25	49	1	0	76	0	0	0	3	3	0	0	157
21	10	27	2	0	17	0	0	0	2	4	0	0	62
22	0	2	0	0	0	0	0	0	0	0	0	0	2
32	1	0	0	0	0	0	0	0	0	0	0	0	1

Appendix B7.-Spiny dogfish lengths from the 2006 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
56	0	0	0	0	0	0	0	0	1	0	0	0	1
58	0	0	0	0	1	0	0	0	0	0	0	0	1
60	1	0	0	0	0	0	0	0	0	0	0	0	1
61	0	1	0	0	0	0	0	0	0	0	0	0	1
62	0	0	0	0	1	0	0	0	0	0	0	0	1
63	0	1	0	0	1	0	0	0	0	0	0	0	2
64	0	1	0	0	0	0	0	0	0	0	0	0	1
65	1	1	0	0	2	0	0	0	0	0	0	0	4
66	1	0	0	0	0	0	0	0	0	0	0	0	1
67	0	2	1	0	4	0	0	0	1	0	0	0	8
68	0	1	0	0	2	0	0	0	0	0	0	0	3
69	2	3	1	0	0	0	0	0	0	1	0	0	7
70	4	2	1	0	2	0	0	0	2	0	0	0	11
71	3	6	0	0	2	0	1	0	6	1	0	0	19
72	5	4	0	0	0	0	0	0	1	0	0	0	10
73	7	4	0	0	5	0	2	0	5	2	0	0	25
74	3	5	0	0	0	1	0	0	4	0	0	0	13
75	8	4	0	0	3	0	0	0	8	2	1	0	26
76	4	0	0	0	3	1	0	0	2	0	0	0	10
77	4	3	0	0	0	0	0	0	6	2	0	0	15
78	4	1	0	0	1	0	0	0	2	1	0	0	9
79	7	4	0	0	2	1	0	0	3	1	0	0	18
80	0	5	1	1	1	0	0	0	1	0	0	0	9
81	5	4	0	0	4	0	0	0	4	3	0	0	20
82	4	2	0	1	0	1	0	0	1	0	0	0	9
83	1	2	0	1	0	0	0	0	4	1	0	0	9
84	1	1	0	0	1	0	0	0	1	0	0	0	4
85	3	3	0	0	0	0	0	0	2	1	0	0	9
86	2	1	0	0	0	0	0	0	1	1	0	0	5
87	1	1	0	0	1	0	1	0	0	2	0	0	6
88	2	0	0	0	1	0	0	0	2	1	0	0	6
89	7	0	0	0	0	0	0	0	1	3	0	0	11
90	0	1	0	0	1	1	1	0	0	0	0	0	4
91	0	0	0	0	0	1	0	0	2	1	0	0	4
92	0	0	0	0	0	0	0	0	1	0	0	0	1
93	0	0	0	1	0	0	0	0	1	0	0	0	2
94	0	0	0	0	1	0	0	0	0	0	0	0	1
95	0	0	0	0	0	0	0	0	1	1	0	0	2
98	0	0	0	0	1	0	0	0	1	0	0	0	2
99	0	1	0	0	0	0	0	0	0	0	0	0	1

Appendix B8.-Pacific sandfish lengths from the 2006 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Wide Bay	Shelikof Strait	Stepovak Bay	Unga Strait	Pavlof Bay	Chignik Bay	Kujulik Bay	Kuiukta Bay	Morzhovoi Bay	Total
9	0	0	1	33	0	0	0	0	1	2	0	0	37
10	0	0	6	64	0	0	0	0	0	1	0	0	71
11	0	0	17	95	0	0	0	1	1	2	0	0	116
12	0	0	2	23	0	0	0	0	0	0	0	0	25
13	0	0	0	20	0	0	0	1	0	0	0	0	21
14	0	0	1	16	0	0	0	0	0	0	0	0	17
15	0	0	1	29	0	0	0	0	0	1	0	0	31
16	0	0	0	4	0	0	0	0	0	0	0	0	4
17	0	0	1	28	0	0	0	0	0	0	0	0	29
18	0	0	0	32	0	0	0	0	0	1	0	0	33
19	0	0	0	30	0	0	0	0	0	2	0	0	32
20	0	0	0	1	0	0	0	0	0	1	0	0	2
21	0	0	0	2	0	0	0	0	0	0	0	0	2
23	0	0	0	1	0	0	0	0	0	0	0	0	1
28	0	0	0	0	0	0	0	1	0	0	0	0	1