

Fishery Management Report No. 06-58

**Trawl Survey of Shrimp and Forage Fish in Alaska's
Westward Region, 2005**

by

David R. Jackson

November 2006

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative Code	AAC	fork length	FL
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid-eye-to-fork	MEF
gram	g			mid-eye-to-tail-fork	METF
hectare	ha			standard length	SL
kilogram	kg	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	total length	TL
kilometer	km				
liter	L	at	@		
meter	m	compass directions:		Mathematics, statistics	
milliliter	mL	east	E	<i>all standard mathematical signs, symbols and abbreviations</i>	
millimeter	mm	north	N	alternate hypothesis	H _A
		south	S	base of natural logarithm	e
		west	W	catch per unit effort	CPUE
		copyright	©	coefficient of variation	CV
Weights and measures (English)		corporate suffixes:		common test statistics	(F, t, χ^2 , etc.)
cubic feet per second	ft ³ /s	Company	Co.	confidence interval	CI
foot	ft	Corporation	Corp.	correlation coefficient (multiple)	R
gallon	gal	Incorporated	Inc.	correlation coefficient (simple)	r
inch	in	Limited	Ltd.	covariance	cov
mile	mi	District of Columbia	D.C.	degree (angular)	°
nautical mile	nmi	et alii (and others)	et al.	degrees of freedom	df
ounce	oz	et cetera (and so forth)	etc.	expected value	E
pound	lb	exempli gratia	e.g.	greater than	>
quart	qt	(for example)		greater than or equal to	≥
yard	yd	Federal Information Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$. ¢	logarithm (base 10)	log
		months (tables and figures): first three letters	Jan., ..., Dec	logarithm (specify base)	log ₂ , etc.
		registered trademark	®	minute (angular)	'
		trademark	™	not significant	NS
		United States (adjective)	U.S.	null hypothesis	H ₀
		United States of America (noun)	USA	percent	%
		U.S.C.	United States Code	probability	P
		U.S. state	use two-letter abbreviations (e.g., AK, WA)	probability of a type I error (rejection of the null hypothesis when true)	α
				probability of a type II error (acceptance of the null hypothesis when false)	β
Physics and chemistry				second (angular)	"
all atomic symbols				standard deviation	SD
alternating current	AC			standard error	SE
ampere	A			variance	
calorie	cal			population	Var
direct current	DC			sample	var
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

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**TRAWL SURVEY OF SHRIMP AND FORAGE FISH IN ALASKA'S
WESTWARD REGION, 2005**

by

David R. Jackson,
Division of Commercial Fisheries, Kodiak

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1599

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*David R. Jackson,
Alaska Department of Fish and Game, Division of Commercial Fisheries,
211 Mission Road, Kodiak, Alaska 99615, USA*

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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 26 to October 30, 2005 in waters of the Westward Region's Kodiak 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 132 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 characteristics.

Catch composition in the 2005 survey was approximately 9% shrimp and 91% fish. 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 volume. Eulachon populations declined in 2005 after several years of unusually high abundance.

Population estimates for shrimp were generated using an area swept technique. No sections in any district produced shrimp population estimates 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 have remained relatively stable in recent surveys.

Key words: trawl survey, shrimp, forage fish, abundance, Westward Region, 2005

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) conducted a small-mesh bottom trawl survey for shrimp and forage fish from September 26 to October 30, 2005. 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 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). Little activity for trawl shrimp 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.

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 2005 small-mesh trawl survey was to provide stock abundance indices of shrimp in the historically productive sections of the Kodiak District and Pavlof Bay in the

South Peninsula District. 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 2005 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.

Bays to be surveyed were divided into strata based on historic shrimp population densities. Strata designations for each station are 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 stations with a station encompassing approximately 3.4 km². One station within each block was selected using a random number generator. 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. The entire haul was sampled for commercially important species 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 sampled differently (e.g., adult walleye pollock were

whole-haul sampled, while juvenile pollock were subsampled). In addition, giant wrymouth *Cryptacanthodes giganteus* and large pieces of debris were whole-haul sampled 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 taken from the initially selected table subsample to determine shrimp species composition. This shrimp-only subsample was weighed to the nearest gram.

All commercially important groundfish species were measured 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 from all hauls within each stratum and 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 2005 trawl survey were derived using an area-swept technique (Alverson and Pereyra 1969). Estimates from each stratum were totaled 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 are caught. Also, it was assumed that the total area considered contains the entire shrimp habitat within that selected station or strata and that all areas used in the expansion of population levels are 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). In instances where tow distance was different than 1.85 km, catch data was proportioned accordingly. Based on net performance data, it was assumed that the trawl swept a path 9.8-m wide, covering .0098 km² for every km 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 thirty-two stations were successfully sampled in waters around the Kodiak archipelago and south of the Alaska Peninsula during the 2005 survey (Figure 4). Survey haul parameters such as tow start and end position, date, depth, bottom temperature, and catch were collected for each haul. A performance value of 1 indicated a successful haul for sampling purposes (Appendix A).

Groundfish and various invertebrates accounted for the majority of the total catch by weight. Adult walleye pollock were 31.9% of the total weight, followed by flathead sole *Hippoglossoides elassodon* (16.8%), arrowtooth flounder *Atheresthes stomias* (12.9%), *Cyanea* sp. jellyfish (9.7%) and shrimp (9.5%); (Table 2). Within the 9.5% shrimp weight, 7.7% of the weight was northern pink shrimp, 0.9% sidestriped shrimp, and 0.8% humpy shrimp. Coonstriped and other non-commercial shrimp species comprised 0.1% of the survey catch weight. More than 21,000 length measurements were taken from 37 groundfish species and Pacific halibut (Table 3, Appendix B).

Forage fish were captured throughout the survey area totaling 1.8% of the survey catch by weight. Eulachon were the most abundant occurring in 58% of the trawl hauls and comprising 0.7% of the catch by weight. Pacific sandfish was next most abundant at 0.6% of the sample weight. Other forage fish species caught included Pacific herring, longsnout prickleback *Lumpenella longirostris*, rainbow smelt *Osmerus mordax*, and capelin *Mallotus villosus*.

SHRIMP ABUNDANCE AND DISTRIBUTION

Northern pink shrimp were found in 94% of the survey hauls averaging 19.6 kg/km towed. Sidestriped shrimp occurred in 46% of the hauls averaging 2.3 kg/km towed. Humpy shrimp were at only 11% of the sample sites, but a single haul in Wide Bay produced the largest catch of any shrimp at 236.7 kg of humpy shrimp per km towed.

Total shrimp density was highest also in Wide Bay where six hauls averaged 84.3kg/km towed (Table 4). Densities of all shrimp were similar in the Marmot Island Section and the Shelikof Strait, both averaging more than 60 kg of shrimp per km towed, about three times the entire survey average.. Lowest shrimp densities occurred in bays along the east side of Kodiak Island and in Pavlof Bay along the Alaska Peninsula. Northern pink shrimp were at the highest density in the Marmot Island Section and the Shelikof Strait, while the lowest densities were found in bays on the east side of Kodiak and Pavlof Bay on the Alaska Peninsula (Table 5, Figure 5).

Total shrimp abundance estimates followed a similar pattern, 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 1182 metric tons (mt). That was up from the previous year estimate of 809 mt. Inner Marmot Bay yielded an estimate of 445 mt in 2005.

A shrimp population estimate of 7,732 mt was generated for northern Shelikof Strait. This area is part of Kodiak's General Section and was not commercially utilized until after the fishery collapse. Fourteen exploratory tows produced this comparatively large estimate because they were spread over a large area.

Carapace lengths were recorded from 19,448 northern pink shrimp. The mean size for all northern pink shrimp measured onboard was 18.0 mm carapace length (CL); (Figure 6). Average size was largest in Chiniak Bay followed by Alitak and Puale Bays (Figure 7). Chiniak and Puale

Bays were characterized by lower than average shrimp densities and few small shrimp less than 15 mm CL. Alitak Bay had northern pink shrimp greater than 25 mm CL, which seldom occurred elsewhere. Wide Bay, Pavlof Bay and Uganik Bay all had smaller northern pink shrimp with an average size less than 17.3 mm CL.

Composite samples of northern pink shrimp collected by strata and section were examined in the laboratory for size and sex characteristics of the populations. 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. Few transitional stage shrimp were observed due to the timing of the survey. Most shrimp transitioning from male to female appear to have completed this change by the time of the survey with the exception of Shelikof Strait and Kukak Bay (Figures 8-11). About 30% of the females entering their first breeding season in those areas were still transitioning from the male stage. The ovigerous period was just beginning as egg-bearing females were prevalent in Alitak Bay, the last area surveyed. Most surveyed areas exhibited multiple modes of female shrimp indicating several age classes in the population. Chiniak Bay and Puale Bay have at least four age classes of northern pink shrimp present as multiple modes exist for both primiparous and multiparous females. Alitak Bay likely also has four age classes based on the bimodal male characteristics and the high proportion of shrimp greater than 25.0 mm CL. Age class strength in this case is masked by the onset of the ovigerous period. This contrasts with Kukak and Wide Bays where all of the females appear to be first-year spawners. Potential recruitment to the spawning biomass appeared most positive in Uganik Bay, Uyak Bay, Kiliuda Bay and the Twoheaded Island Section which all displayed strong modes of 15 mm CL male shrimp. Near-term recruitment to the spawning population appeared especially poor in Kukak Bay, Pavlof Bay and Puale Bay as the proportion of male shrimp was relatively low. Females in the Pavlof Bay and Wide Bay composite samples were characterized by having no individuals greater than 23.0 mm CL. An anomaly appeared in the Marmot Bay composite sample. The mode of female shrimp around 17.0 mm CL was unusual and didn't show in any of the other samples.

Humpy shrimp were found almost exclusively in Wide Bay during the 2005 survey with a few individuals scattered in other shallow hauls throughout the survey area (Figure 12). The population abundance was estimated to be 129 mt in 2005, an 82% increase from 71 mt in 2004. Mean carapace length of sampled shrimp during 2005 was 17.4 mm CL. The sexed composite sample showed only 15% of the females was multiparous (Figure 13).

Sidestriped shrimp were more widespread, occurring in 46% of the trawl hauls. Highest densities were found in Shelikof Strait and Alitak Bay (Figure 14). Nearly all samples in the survey coming from deeper than 80 fathoms had sidestriped shrimp present. The best catches occurred between 100 and 110 fathoms. The mean length of sidestriped shrimp measured during the survey cruise was 22.7 mm CL (Figure 15). Shrimp in Chiniak Bay and Kukak Bay had the largest mean size at 25.0 and 24.7 mm CL respectively (Figure 16). Stocks in those areas were characterized by having fewer small shrimp. The largest sidestriped shrimp in the survey came from Alitak Bay. It appeared that at least four age classes were present in the population with two distinct modes of males, especially in Shelikof Strait (Figures 17 and 18). The ovigerity period for sidestriped shrimp began earlier than for northern pink shrimp or humpy shrimp as the majority of females were carrying eggs during the survey. There were a number of transitional shrimp especially in Chiniak Bay and Kukak Bay that would likely bear eggs later in the fall. A biomass estimate of 1,265 mt was generated for sidestriped shrimp from all areas surveyed, however 1,019 mt of that came from

the Shelikof Strait (Table 6). This was due to the relatively large area considered shrimp habitat in the Shelikof estimate coupled with the relatively high shrimp density.

Smooth ocean pink shrimp, *Pandalas jordani*, were recorded in 2005 for the first time on the survey since 1983. Ocean pinks were present in seven Marmot Island hauls and one haul off Twoheaded Island (Figure 19). Mean CL was 18.7 mm from 242 sampled shrimp. The sexed composite sample had more females than males with a high proportion of primiparous females newly recruited to the spawning biomass (Figure 20).

FORAGE FISH DISTRIBUTION

Eulachon were the most abundant forage fish, present in 58% of the survey hauls averaging 1.7 kg per km towed from all sample hauls. The highest density and largest catch in a single haul came from Uyak Bay. Marmot Bay near Kodiak Island had the next highest average density (Figure 21). Pacific sandfish were the second most abundant of the forage fishes, but found in only 19% of the hauls. The catch occurred primarily in Wide Bay with a few individuals also captured in Puale Bay and Alitak Bay (Figure 22). Mean length of Pacific sandfish from the survey was 11.6 cm fork length with some individuals greater than 20 cm (Figure 23). Longsnout pricklebacks, as the next most abundant forage fish, occurred in 26% of the survey hauls. The highest density of longsnout pricklebacks was found in Alitak 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. Herring accounted for 0.30% of the total survey catch weight and occurred in 43% of the hauls. Uganik Bay on Kodiak 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 Deadman Bay. The warmest temperatures were found in bays along the Alaska Peninsula (Figure 26). The average survey bottom temperature was 7.6°C with a range from 4.0°C to 10.7°C.

DISCUSSION

Shrimp populations as a whole were similar in abundance during 2005 to the previous three years. The average density of northern pink shrimp was 19.6 kg per km towed, down from 24.3 kg per km towed in 2004 and 25.3 kg per km towed in 2003 (Figure 27). Conversely, the average sidestriped shrimp density was 2.3 kg per km towed in 2005 and higher than the average of 1.7 kg per km towed in 2004 (Figure 28). Also, humpy shrimp in Wide Bay had shown an 82% increase over 2004. Shrimp comprised only 9.4% of the total survey catch as compared to 21.5% in 2004 and 13.2% in 2003, because fish catches, especially flatfish and walleye pollock increased (Figure 29).

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 7). Except for the General Section, no sections will open to commercial shrimp fishing until a survey shows a recovery to the minimum acceptable levels. Sample hauls from Shelikof Strait generated the largest estimate of shrimp abundance for any area 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 7,732 mt population estimate. Sidedstriped 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 declined to 217 mt in 2005 from 365 mt in 2004 (Figure 30). The decline was not consistent among species as humpy shrimp populations increased over the previous year. Coonstriped and sidedstriped shrimp were still absent 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 2005 survey were largely warmer than optimum for pandalid shrimp production with only 13% 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). An example of this may be found in Wide Bay on the south side of the Alaska Peninsula. During the past four surveys this area had both the highest density of shrimp and the warmest ocean bottom temperatures. A large reduction in shrimp biomass occurred between 2001 and 2003, which coincided with an increase in the cod density. Pacific cod were caught at the rate of 5.39 kg per km towed in 2001, were virtually absent in 2002 and then increased to 15.8 kg per km towed in 2003. Along with a reduced shrimp population estimate in 2005, Pacific cod density was also down to 1.0 kg/km towed.

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. The catch of eulachon plummeted in 2005 compared to the previous three years. Eulachon were captured at the rate of 1.7 kg/km towed, similar to 2001, but considerably less than the intervening years (Figure 31). The average size of captured eulachon was also lower in 2005 with a higher proportion of small fish. A recruitment mode was observed primarily in Alitak Bay and Uyak Bay, but not other survey areas (Figure 32).

Walleye pollock has been the leading component by weight of small-mesh survey catches since the mid-1980s. Adult pollock during 2005 were encountered in 91% of the sample hauls. The greatest concentration was found on the east side of Kodiak Island in Ugak Bay and the Twoheaded Island Section (Figure 33). The capture rate for adult pollock in 2005 of 80.8 kg/km towed was the highest since 1995, but similar to 2002 and 2003 (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 Uyak Bay (Figure 35). Juvenile pollock were captured at the rate of 5.1 kg/km towed, which has been increasing over the past four years (Figure 36).

The small-mesh trawl survey in recent years has shown considerable increases in the number of spiny dogfish. Hauls from 2005 show that trend has extended with the highest capture rate on record, more than double the previous high (Figure 37). Rarely encountered prior to 1998, the small sharks occurred in 58% of the sample hauls and were more prevalent in the northern portions of the survey area. The highest catches appeared in Uyak Bay (Figure 38).

Jellyfish were found in 98% of the survey hauls averaging 30.3 kg per km towed. 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 84% of the catch. Other species captured included *Aequoria* sp., *Aurelia* sp. and *Chrysaora melanaster* (Figure 39).

Perhaps the greatest value of this survey is the continuation of the time series 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 2006. Commercial shrimp fishing sections in the Chignik and South Peninsula Districts will be the focus of that sampling effort.

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REFERENCES CITED

- Alaska Department of Fish and Game (ADF&G). 1982. Westward Region Shrimp Fishery Management Plan, Revision 1, April 1982. Unpublished manuscript Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K82-10, Kodiak.
- Alverson, D. L., and W. T. Pereyra. 1969. Demersal fish explorations in the northeastern Pacific Ocean-an evaluation of exploratory fishing methods and analytical approaches to stock size and yield forecasts. *Jour. Fish. Res. Board of Canada* 26: 1985-2001.
- Anderson, P. J. 2000. Pandalid shrimp as indicators of ecosystem regime shift. *J. Northw. Atl. Fish. Sci.*, Vol. 27: 1-10.
- Anderson, P. J., J. E. Blackburn, and B. A. Johnson. 1997a. Declines of forage fish species in the Gulf of Alaska, 1972-95, as indicators of regime shift. *In: Proceedings of the International Symposium on the Role of Forage Fishes in Marine Ecosystems*, November 13-16, 1996, Anchorage, Alaska. B.S. Baxer (ed.) 1997. University of Alaska. Alaska Sea Grant Rep., 97-01.
- Anderson, P. J., J. E. Blackburn, W. R. Bechtol, and J. F. Piatt. 1997b. Synthesis and analysis of Gulf of Alaska small-mesh trawl data, 1953 to 1996, and Gulf of Alaska forage fish ichthyoplankton analysis, 1972 to 1996. Appendix L *in: Duffy [ed.] EXXON Valdez Oil Spill restoration project annual report, APEX Project Alaska Predator Ecosystem Experiment in Prince William Sound and the Gulf of Alaska; Restoration project 96163LA-P, annual report.*
- Anderson, P. J., and J. F. Piatt. 1999. Community reorganization in the Gulf of Alaska following ocean climate regime shift. *Mar. Ecol. Prog. Ser.*, 189: 117-123.
- Butler, T. H. 1980. Shrimps of the Pacific coast of Canada. *Can. Bull. Fish. Aquat. Sci.* 202: 280pp.
- Gaffney, F. G. 1981. History of research and management of Alaskan shrimp. *In: Proceedings of the International Pandalid Shrimp Symposium*, February 13-15, 1979, Kodiak, Alaska. University of Alaska. Alaska Sea Grant Report 81-3.
- Jackson, D. R., and M. P. Ruccio. 2003. Kodiak, Chignik and South Peninsula shrimp fisheries and their management: A Report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K03-7, Kodiak
- Jackson, D. R. 2003. Project operational plan small-mesh bottom trawl survey of shrimp and forage fishes: Kodiak, Chignik, and South Peninsula Districts. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K03-47, Kodiak
- Jackson, P. B. 1979. Kodiak pandalid shrimp investigations. *Comp. Rept. 5-42-R. Comm. Fish. Res. and Devel. Act.* July 1, 1979-June 10, 1980. 42 pp.
- Jackson, P. B., L. J. Watson, and J. A. McCrary. 1983. The Westward Region shrimp fishery and shrimp research program, 1968-1981. Alaska Department of Fish and Game, Division of Commercial Fisheries, Informational Leaflet No. 216, Juneau.
- McCrary, J. A. 1971. Sternal spines as a characteristic for differentiating between females of some Pandalidae. *J. Fish. Res. Bd. Canada* 28: 99-100.
- Nunes, P. 1984. Reproductive and larval biology of Northern shrimp *Pandalus borealis* Kroyer, in relation to temperature. Ph.D. dissertation, Univ. of Alaska, Fairbanks, Alaska. 194p.
- Purcell, J. E. and M. V. Sturdevant. 2001. Prey selection and dietary overlap among zooplanktivorous jellyfish and juvenile fishes in Prince William Sound, Alaska. *Mar. Ecol. Prog. Ser.*, 210: 67-83.
- Shumway, S. E., H. C. Perkins, D.F. Schick, and A.P. Stickney. 1985. Synopsis of biological data on the pink shrimp, *Pandalus borealis* Krøyer, 1838. NOAA Technical Report NMFS 30, FAO Fisheries Synopsis No. 144. May 1985. 57pp.
- Watson, L. 1987. ADF&G shrimp research shrimp trawl survey manual. Unpublished manuscript. Alaska Department of Fish and Game, Division of Commercial Fisheries, Research Operational Plan, Revised January 1987.
- Worm, B. and R. A. Myers. 2003. Meta-analysis of cod-shrimp interactions reveals top-down control in oceanic food webs. *Ecology* 84(1): 162-173.

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 2005 Westward Region small-mesh trawl survey.

Rank	Common Name	Scientific Name	Percent of Catch by Weight	
1	Adult walleye pollock	<i>Theragra chalcogramma</i>	31.9	%
2	Flathead sole	<i>Hippoglossoides elassodon</i>	16.8	%
3	Arrowtooth flounder	<i>Atheresthes stomias</i>	12.9	%
4	Cyanea jellyfish	<i>Cyanea sp.</i>	9.7	%
5	Northern pink shrimp	<i>Pandalus borealis</i>	7.7	%
6	Spiny dogfish	<i>Squalus acanthias</i>	4.8	%
7	Juvenile walleye pollock	<i>Theragra chalcogramma</i>	2.0	%
8	Pacific cod	<i>Gadus macrocephalus</i>	1.8	%
9	Aurelia jellyfish	<i>Aurelia sp.</i>	1.1	%
10	Pacific halibut	<i>Hippoglossus stenolepis</i>	1.0	%
11	Sidestriped shrimp	<i>Pandalopsis dispar</i>	0.9	%
12	Humpy shrimp	<i>Pandalus goniurus</i>	0.8	%
13	Aequorea jellyfish	<i>Aequorea sp.</i>	0.8	%
14	Starry flounder	<i>Platichthys stellatus</i>	0.7	%
15	Big skate	<i>Raja binoculata</i>	0.7	%
16	Eulachon	<i>Thaleichthys pacificus</i>	0.7	%
17	Pacific Sandfish	<i>Trichodon trichodon</i>	0.6	%
18	Yellowfin sole	<i>Limanda aspera</i>	0.6	%
19	Northern rock sole	<i>Lepidopsetta polyxystra</i>	0.4	%
20	Sablefish	<i>Anoplopoma fimbria</i>	0.3	%
All other shrimp species				
	Common crangon	<i>Crangon communis</i>	0.06	%
	Smooth ocean pink	<i>Pandalus jordani</i>	0.05	%
	Coonstriped shrimp	<i>Pandalus hypsinotus</i>	0.01	%
	Glass shrimp	<i>Pasiphaea pacifica</i>	0.01	%
	Spot shrimp	<i>Pandalus platyceros</i>	<0.01	%
	Ridged crangon	<i>Crangon dalli</i>	<0.01	%
	Arctic argid	<i>Argis dentata</i>	<0.01	%
	Eualus sp.	<i>Eualus sp.</i>	<0.01	%
	Argis sp.	<i>Argis sp.</i>	<0.01	%
	Barbed eualid	<i>Eualus barbatus</i>	<0.01	%
All other forage fish species				
	Pacific herring	<i>Clupea pallas arengus</i>	0.30	%
	Longsnout prickleback	<i>Lumpenella longirostris</i>	0.20	%
	Capelin	<i>Mallotus villosus</i>	<0.01	%
	Rainbow smelt	<i>Osmerus mordax</i>	<0.01	%
	Slender eelblenny	<i>Lumpenus fabricii</i>	<0.01	%
All other animals		87 species	3.19	%

Table 3.-Fish measurements from the 2005 Westward Region small-mesh trawl survey.

Common Name	Number Measured	Mean Length (cm)	Estimated Number Caught	Estimated Total Catch (kg)
Alaska plaice	21	51.2	65	131.5
Aleutian skate	2	63.5	2	22.5
Arrowtooth flounder	2,652	32.6	13,991	7,690.0
Bering skate	19	26.4	19	28.3
Big skate	26	63.3	26	424.3
Black rockfish	7	50.1	7	16.0
Butter sole	1	29.0	2	0.8
Capelin	75	10.8	298	2.7
Dark dusky rockfish	3	41.3	3	3.8
Dover sole	39	35.8	187	135.9
English sole	6	34.2	12	5.1
Eulachon	1,017	15.9	18,832	400.3
Flathead sole	4,241	29.7	31,654	10,008.2
Light dusky rockfish	7	35.6	7	7.6
Lingcod	6	20.7	16	0.9
Longnose skate	19	48.5	19	124.0
Northern rockfish	4	30.0	12	3.9
Northern rock sole	142	33.8	442	237.7
Pacific cod	314	64.0	355	1,079.3
Pacific cod (juvenile)	47	14.8	235	6.3
Pacific halibut	137	62.1	137	574.5
Pacific herring	912	17.9	2,829	151.5
Pacific Ocean perch	18	25.9	28	9.6
Pacific sandfish	594	11.6	17,078	345.2
Pacific sleeper shark	1	207.0	1	75.0
Pacific tomcod	368	14.8	4,446	117.4
Rainbow smelt	14	12.9	81	1.6
Redbanded rockfish	10	31.8	10	6.9
Rex sole	174	30.9	667	186.0
Rougheye rockfish	131	37.5	139	158.5
Sablefish	256	39.1	282	197.5
Saffron cod	11	31.1	50	14.9
Sand sole	6	35.7	7	3.3
Silvergray rockfish	1	45.0	1	1.5
Southern rock sole	5	31.8	10	4.9
Spiny dogfish	684	75.0	1,113	2,845.5
Starry flounder	57	52.0	200	444.9
Walleye pollock	4,158	34.8	31,598	19,024.3
Walleye pollock (juvenile)	4,718	11.3	99,003	1,202.2
Yellowfin sole	248	32.9	735	332.9
	21,151			

Table 4.-Shrimp population estimates from the 2005 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	40	106.19	77.9	436
	3	1	17.9	1.48	-	9
Marmot Island	2	2	89.5	28.81	12.54	264
	3	4	70.9	52.48	18.81	381
	4	2	17.2	164.29	12.72	290
	5	4	57.2	171.50	7.98	247
Chiniak Bay	2	2	1.9	10.46	1.88	2
	3	4	9.5	20.51	3.68	20
	5	1	6.3	13.82	-	9
Ugak Bay	2	3	2.1	41.30	0.86	9
	3	3	0.2	54.23	0.07	1
Kiliuda Bay	2	2	1.2	13.69	0.42	2
	3	5	2.2	72.06	0.59	17
Twoheaded Island	2	8	3.8	131.30	1.9	51
	3	1	6.3	46.20	-	30
Alitak Bay	2	12	7.5	155.27	2.78	120
Uyak Bay	2	2	41.2	24.08	22.25	102
	3	6	37.3	58.14	3.22	223
	4	1	0.1	6.69	-	0
	5	1	2.4	2.81	-	1
Uganik Bay	2	1	0	2.33	-	0
	3	4	53.4	43.29	12.11	237
	4	1	35.4	5.21	-	19
	5	2	20.8	19.45	7.91	41
Kukak Bay	2	5	16.4	22.02	3.37	37
	3	2	1.7	21.23	1.46	4
Wide Bay	2	6	84.3	25.14	27.26	217
	3	1	0.0	3.16	-	0
Puale Bay	1	4	6.7	32.24	2.61	22
Shelikof Strait	1	14	62.8	1200.47	10.5	7732
Pavlof Bay	1	20	1.9	303.20	0.92	61

Table 5.-Northern pink shrimp population estimates from the 2005 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	39.1	106.19	23.33	426
	3	1	16.6	1.48	-	-
Marmot Island	2	2	87.3	28.81	13.18	258
	3	4	62.1	52.48	26.85	334
	4	2	17.1	164.29	12.79	289
	5	4	10	171.50	9.2	176
Chiniak Bay	2	2	1.9	10.46	1.88	2
	3	4	9.3	20.51	3.85	20
	5	1	4.5	13.82	-	6
Ugak Bay	2	3	2.1	41.30	0.87	9
	3	3	0.2	54.23	0.07	1
Kiliuda Bay	2	2	1.2	13.69	0.42	2
	3	5	2.2	72.06	0.61	16
Twoheaded Island	2	8	3.8	131.30	1.90	51
	3	1	6.2	46.20	-	29
Alitak Bay	2	12	3.4	155.27	1.53	55
Uyak Bay	2	2	39.1	24.08	24.36	96
	3	6	30.2	58.14	9.55	180
	4	1	0.1	6.69	-	-
	5	1	2.4	2.81	-	1
Uganik Bay	2	1	0	2.33	-	0
	3	4	49.1	43.29	16.51	218
	4	1	35.3	5.21	-	19
	5	2	20	19.45	9.74	40
Kukak Bay	2	5	14.0	22.02	5.23	32
	3	2	1.7	21.23	1.49	4
Wide Bay	2	6	33.6	25.14	11.44	87
	3	1	0	3.16	-	0
Puale Bay	1	4	6.7	32.24	2.62	22
Shelikof Strait	1	14	54.5	1200.47	13.31	6713
Pavlof Bay	1	20	1.9	303.20	0.93	60

Table 6.-Sidestriped shrimp population estimates from the 2005 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	0.8	106.19	0.46	9
	3	1	1.1	1.48	-	1
Marmot Island	2	2	2.1	28.81	1.76	6
	3	4	6.1	52.48	2.3	33
	4	2	0	164.29	0	0
	5	4	2.6	171.50	2.55	45
Chiniak Bay	2	2	0	10.46	0	0
	3	4	0.2	20.51	0.1	0
	5	1	1.8	13.82	-	3
Ugak Bay	2	3	0	41.30	0	0
	3	3	0	54.23	0	0
Kiliuda Bay	2	2	0	13.69	0	0
	3	5	0	72.06	0	0
Twoheaded Island	2	8	0	131.30	0	0
	3	1	0	46.20	0	0
Alitak Bay	2	12	4.1	155.27	2.81	65
Uyak Bay	2	2	2.0	24.08	1.48	5
	3	6	7.2	58.14	2.39	43
	4	1	0	6.69	0	0
	5	1	0	2.81	0	0
Uganik Bay	2	1	0	2.33	0	0
	3	4	4.4	43.29	1.66	19
	4	1	0.1	5.21	0	0
	5	2	0.8	19.45	0.62	2
Kukak Bay	2	5	2.4	22.02	1.00	5
	3	2	0	21.23	0	0
Wide Bay	2	6	0.1	25.14	0.03	0
	3	1	0	3.16	0	0
Puale Bay	1	4	0	32.24	0	0
Shelikof Strait	1	14	8.3	1200.47	1.63	1019
Pavlof Bay	1	20	0	303.20	0	0

Table 7.-Minimum acceptable biomass indices (MABI) and shrimp population estimates in metric tons from surveyed Westward Region fishing sections, 1995-2005.

District	Section	MABI ^a	Survey Year						
			2005	2004	2003	2002	2001	1998	1995
Kodiak	Inner Marmot Bay	1,652	661	498	423	604	1,089	247	567
	Marmot Island	11,615	978	809	1,407	1,315	1,703	230	ND
	Chiniak Bay	658	31	14	84	52	311	44	76
	Ugak Bay	1,815	10	ND	2	ND	46	0	ND
	Kiliuda Bay	2,405	19	ND	146	198	51	74	59
	Two Headed Island	3,312	81	ND	4	ND	66	65	59
	Alitak Bay	1,942	120	ND	130	ND	282	107	8
	Uyak Bay	1,447	326	ND	439	ND	306	163	174
	Uganik Bay	1,175	297	ND	403	ND	704	129	446
	Kukak Bay	none	41	ND	68	ND	187	44	10
	Wide Bay ^b	476	217	365	384	880	967	ND	36
	Puale Bay ^b	540	22	ND	40	ND	47	ND	ND
	Shelikof Strait ^c	none	7,732	1,362	8,527	ND	1,062	ND	ND
Alitak Flats	577	ND	ND	30	ND	ND	ND	ND	
Chignik	Kujulik Bay	1,715	ND	ND	ND	11	ND	ND	ND
	Chignik Bay	2,064	ND	580	ND	506	ND	ND	467
	Chiginagak Bay	314	ND	44	ND	ND	ND	ND	ND
	Nakalilok Bay	373	ND	40	ND	ND	ND	ND	ND
	Kuiukta Bay	862	ND	226	ND	167	ND	ND	164
	Mitrofanina Island	2,341	ND	3	ND	97	ND	ND	ND
	Ivanof Bay	2,586	ND	ND	ND	8	ND	ND	ND
South Peninsula	Stepovak Bay	10,526	ND	101	ND	370	ND	ND	ND
	Unga Strait	3,412	ND	272	ND	115	ND	ND	ND
	Beaver Bay	1,978	ND	1	ND	10	ND	ND	ND
	Pavlof Bay ^d	8,221	61	64	8	38	30	59	15
	Belkofski Bay	none	ND	ND	ND	1	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.

^d Pavlof Bay surveyed by NMFS in all years except 2002 and 2004.

ND means no data.

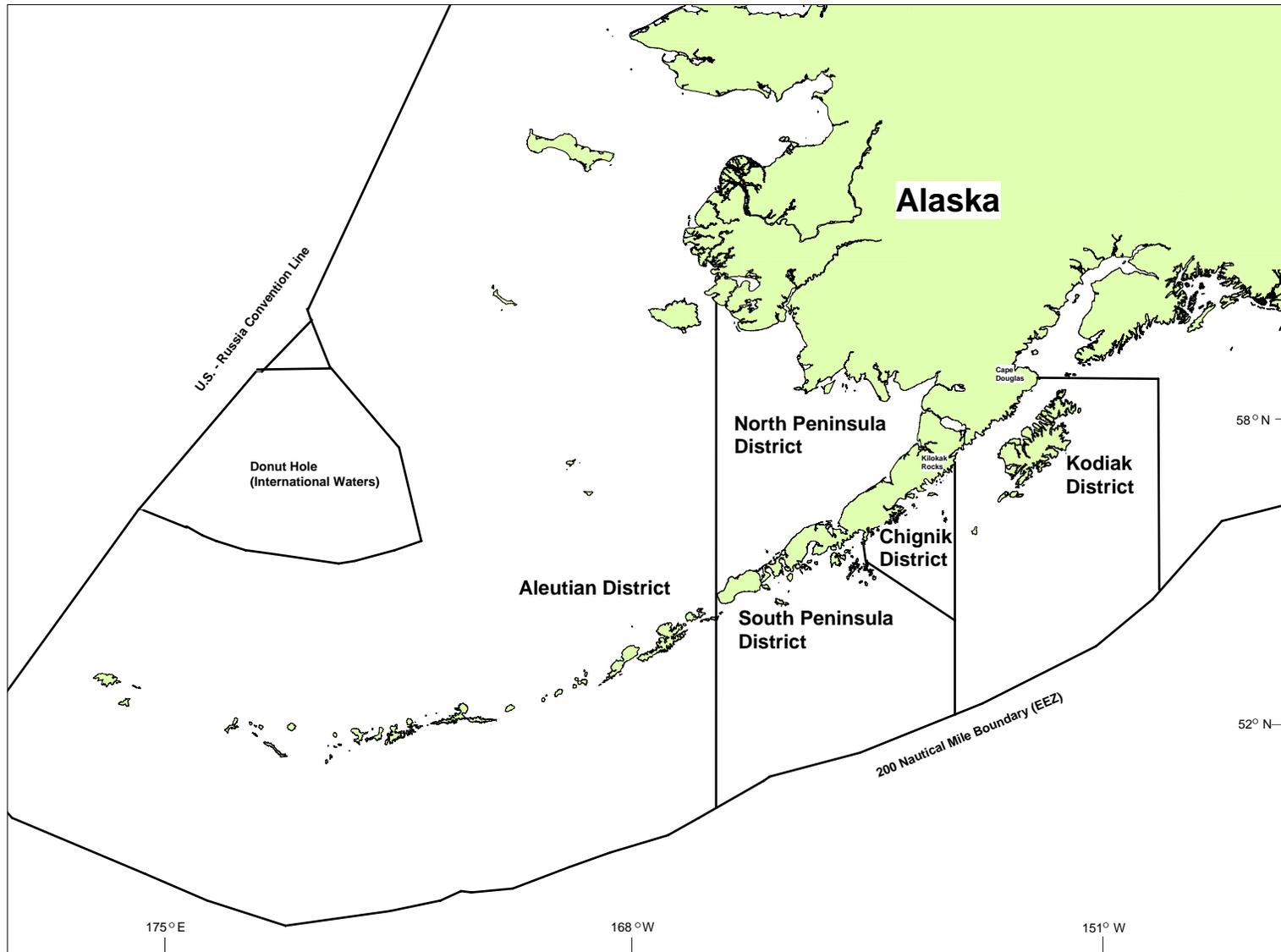


Figure 1.-Commercial shrimp fishing districts of Westward Registration Area J.

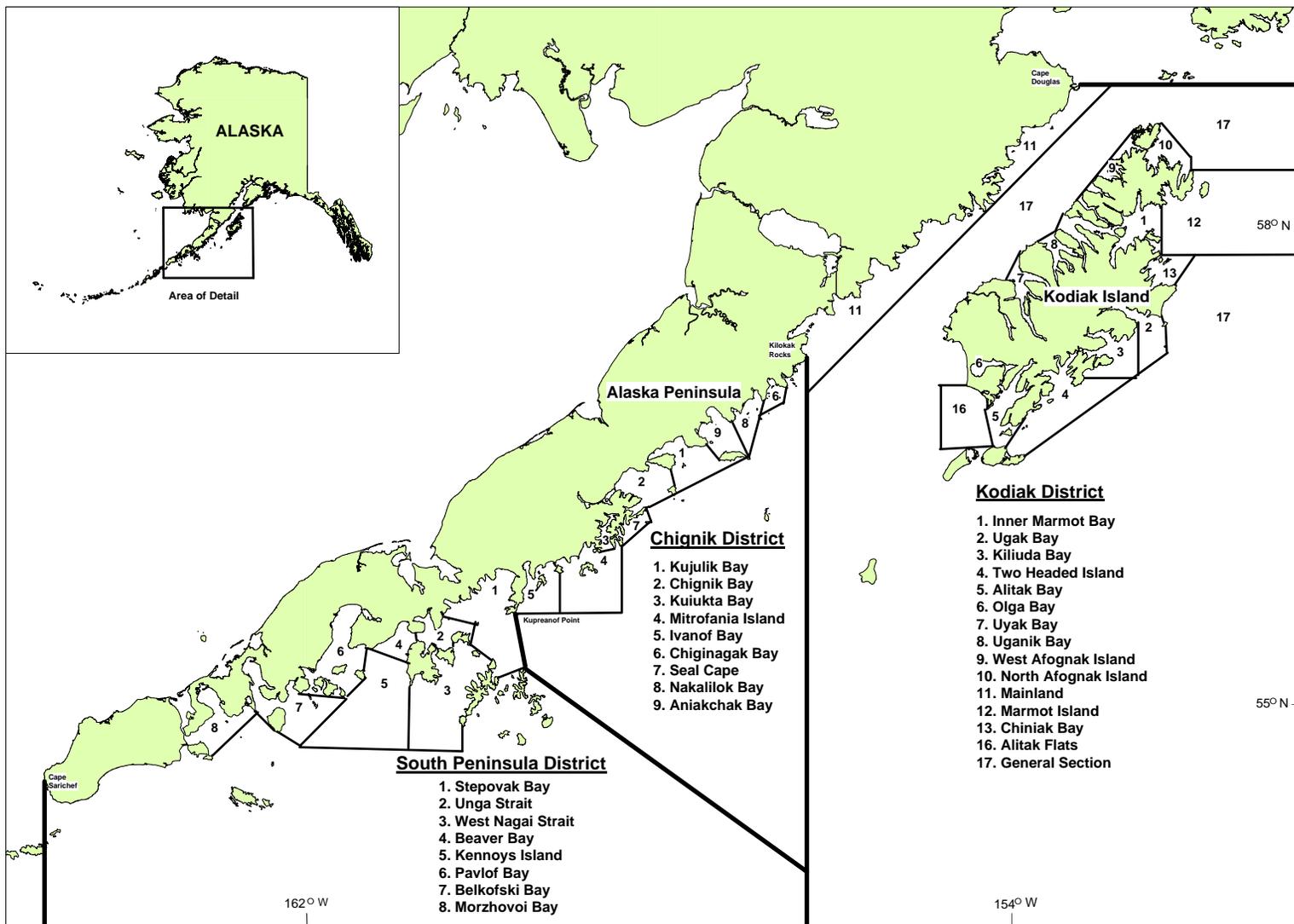


Figure 2.-Commercial shrimp fishing sections in the Kodiak, Chignik and South Peninsula Districts of Westward Area J.

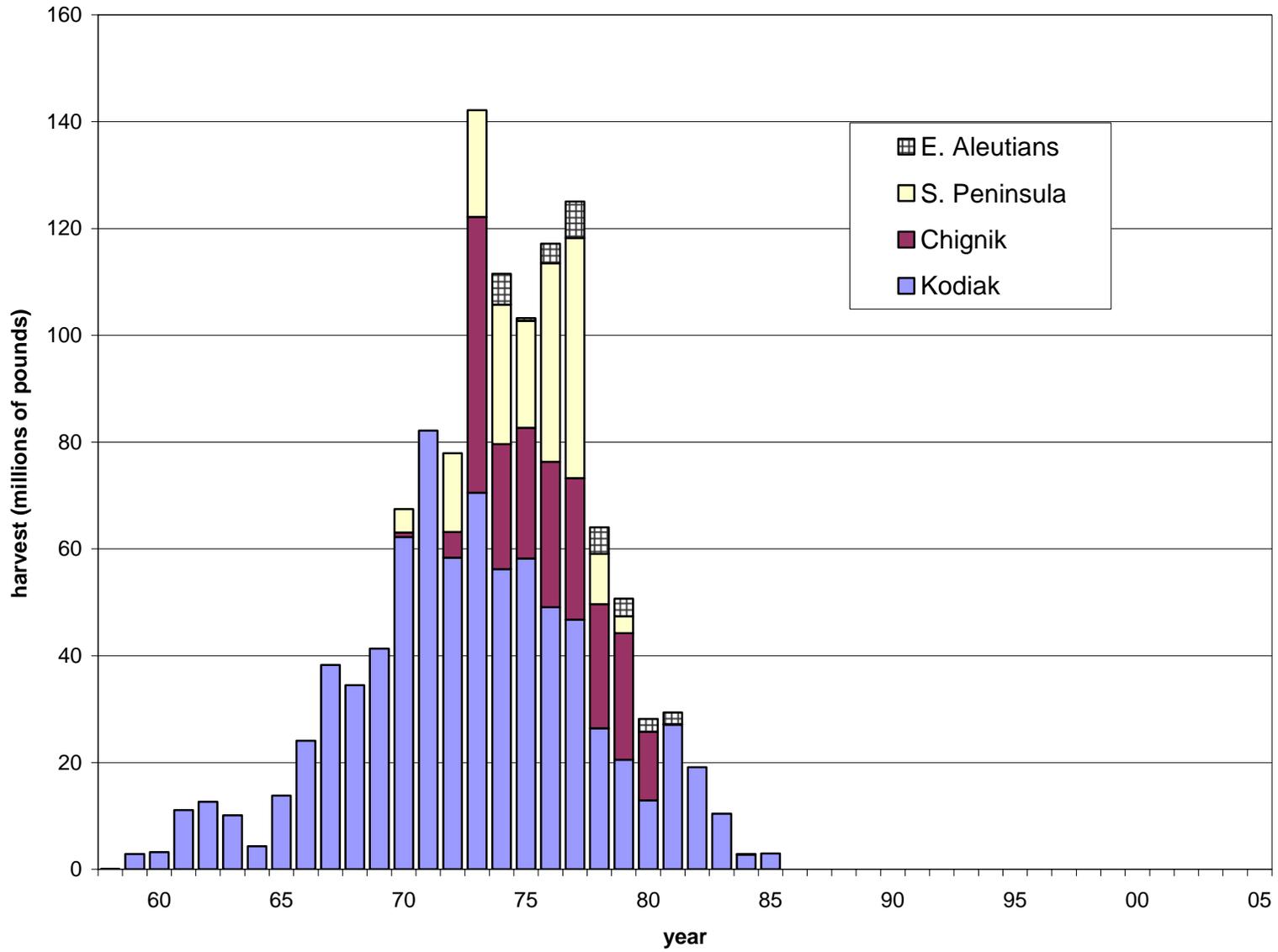


Figure 3.-Shrimp harvests from the Kodiak, Chignik, South Peninsula and Aleutian Districts, 1958-2005.

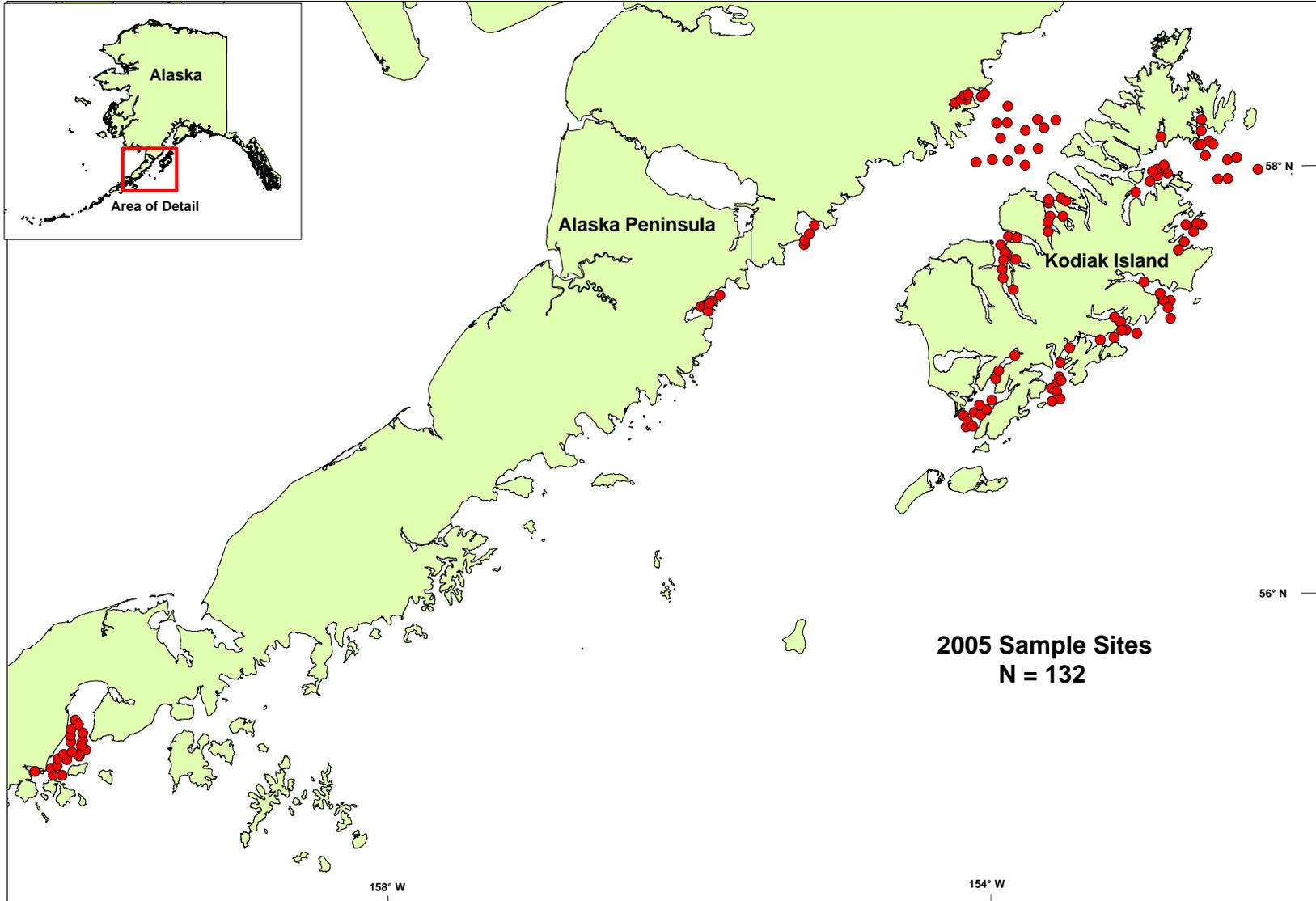


Figure 4.-Location of sample sites from the 2005 Westward Region small-mesh trawl survey.

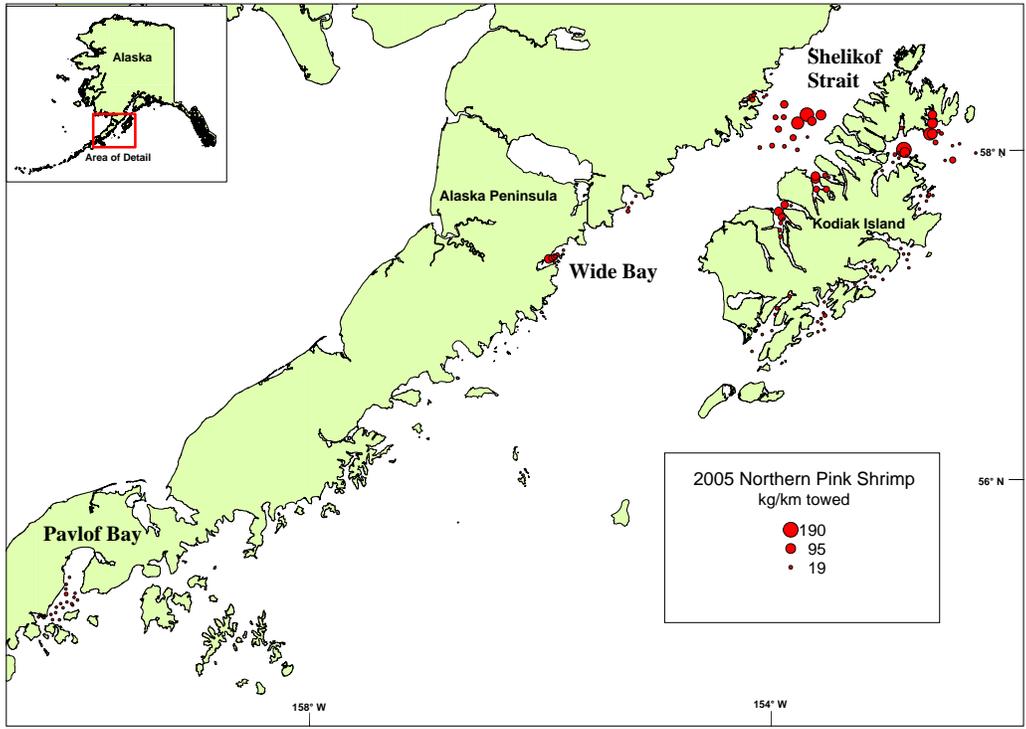


Figure 5.-Distribution and relative abundance of northern pink shrimp in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

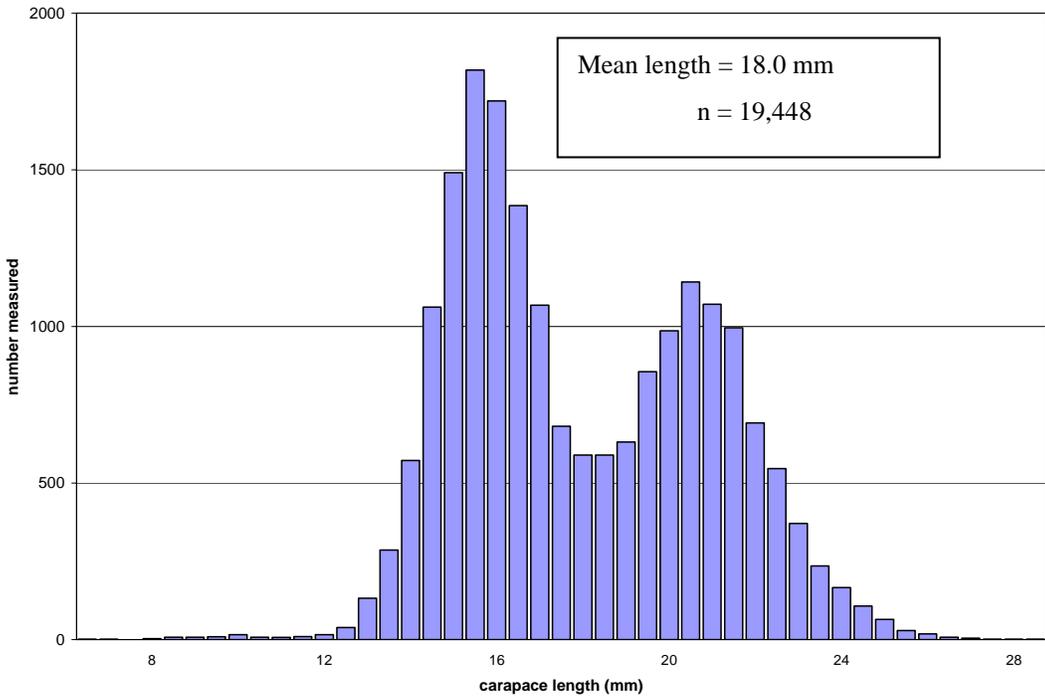


Figure 6.-Carapace lengths of northern pink shrimp from the 2005 Westward Region small-mesh trawl survey.

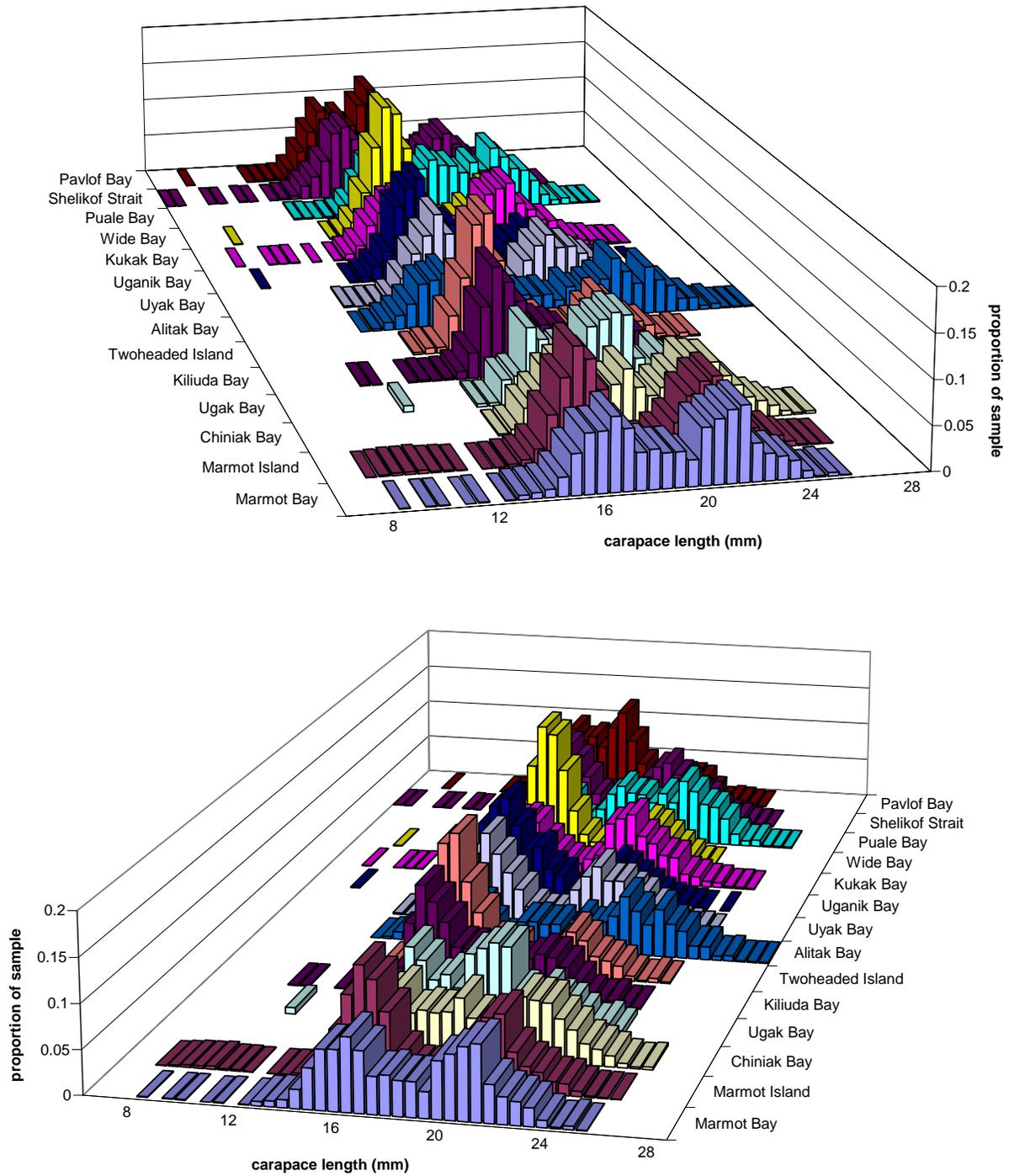


Figure 7.-Carapace lengths of northern pink shrimp by commercial fishing section from the 2005 Westward Region small-mesh trawl survey.

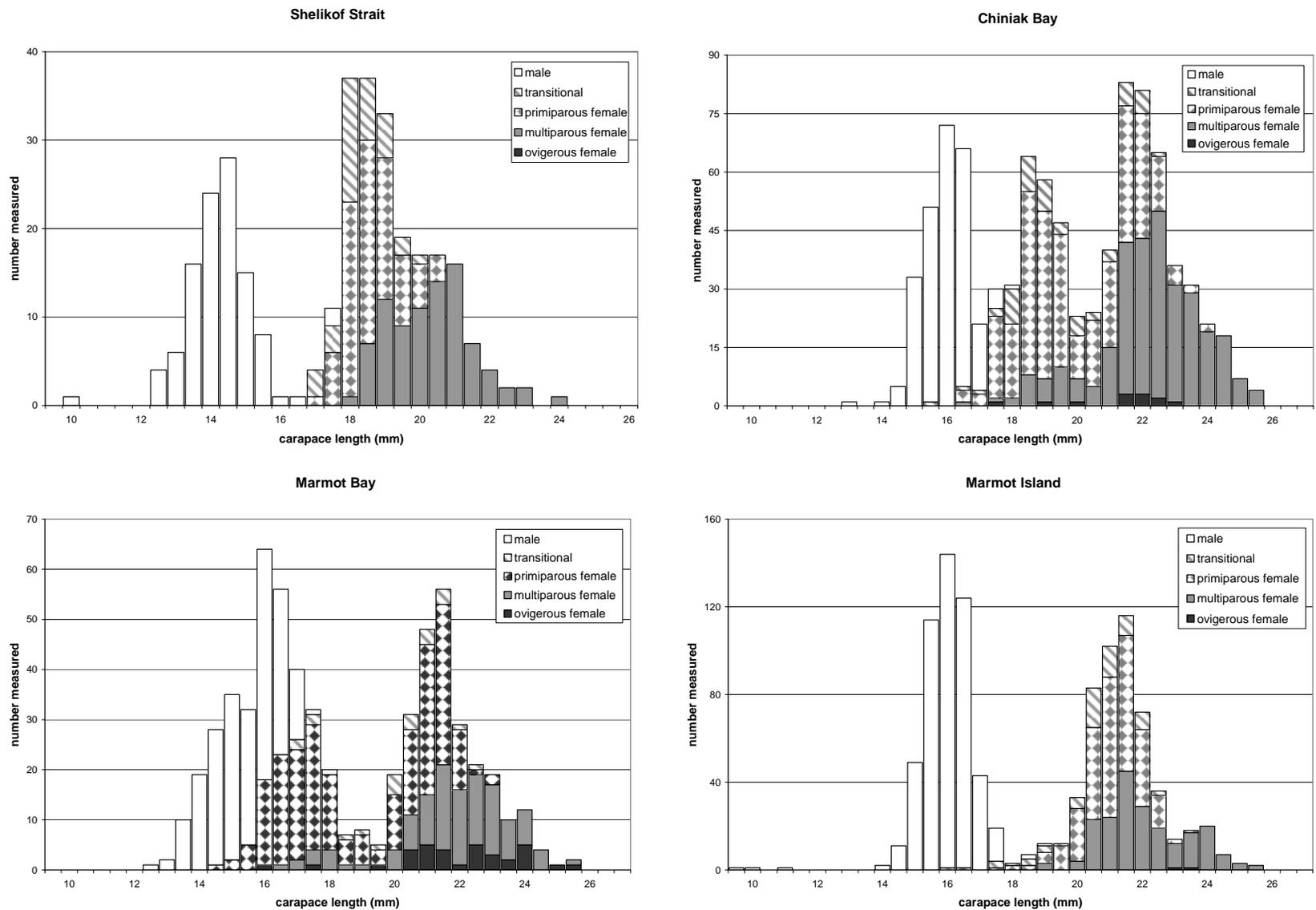


Figure 8.-Size composition by sex of northern pink shrimp from the 2005 Westward Region small-mesh trawl survey of Shelikof Strait and the Chiniak Bay, Marmot Bay and Marmot Island commercial shrimp fishing sections.

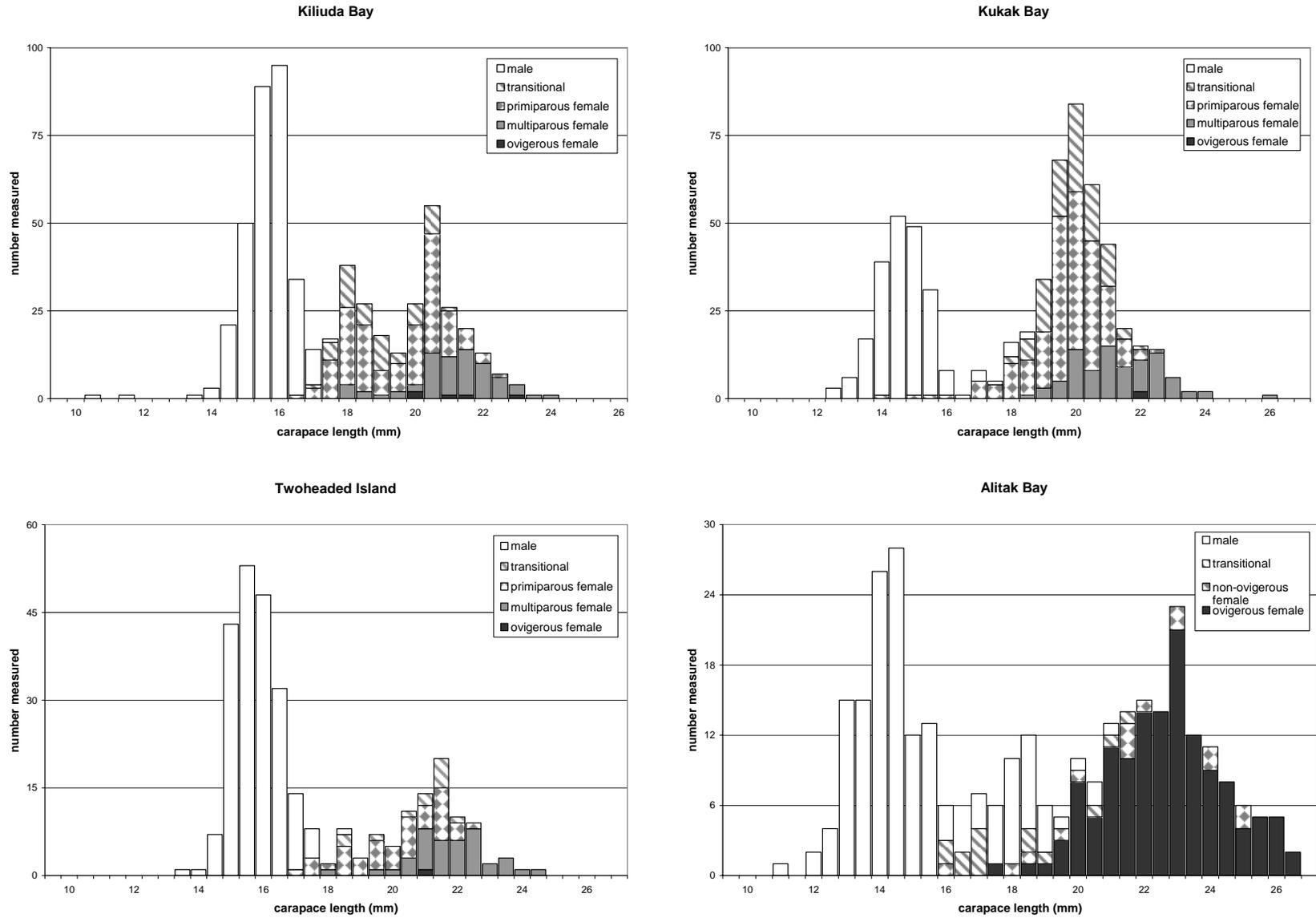


Figure 9.-Size composition by sex of northern pink shrimp from the 2005 Westward Region small-mesh trawl survey of Kiliuda Bay, Kukak Bay, Twoheaded Island and Alitak Bay commercial shrimp fishing sections.

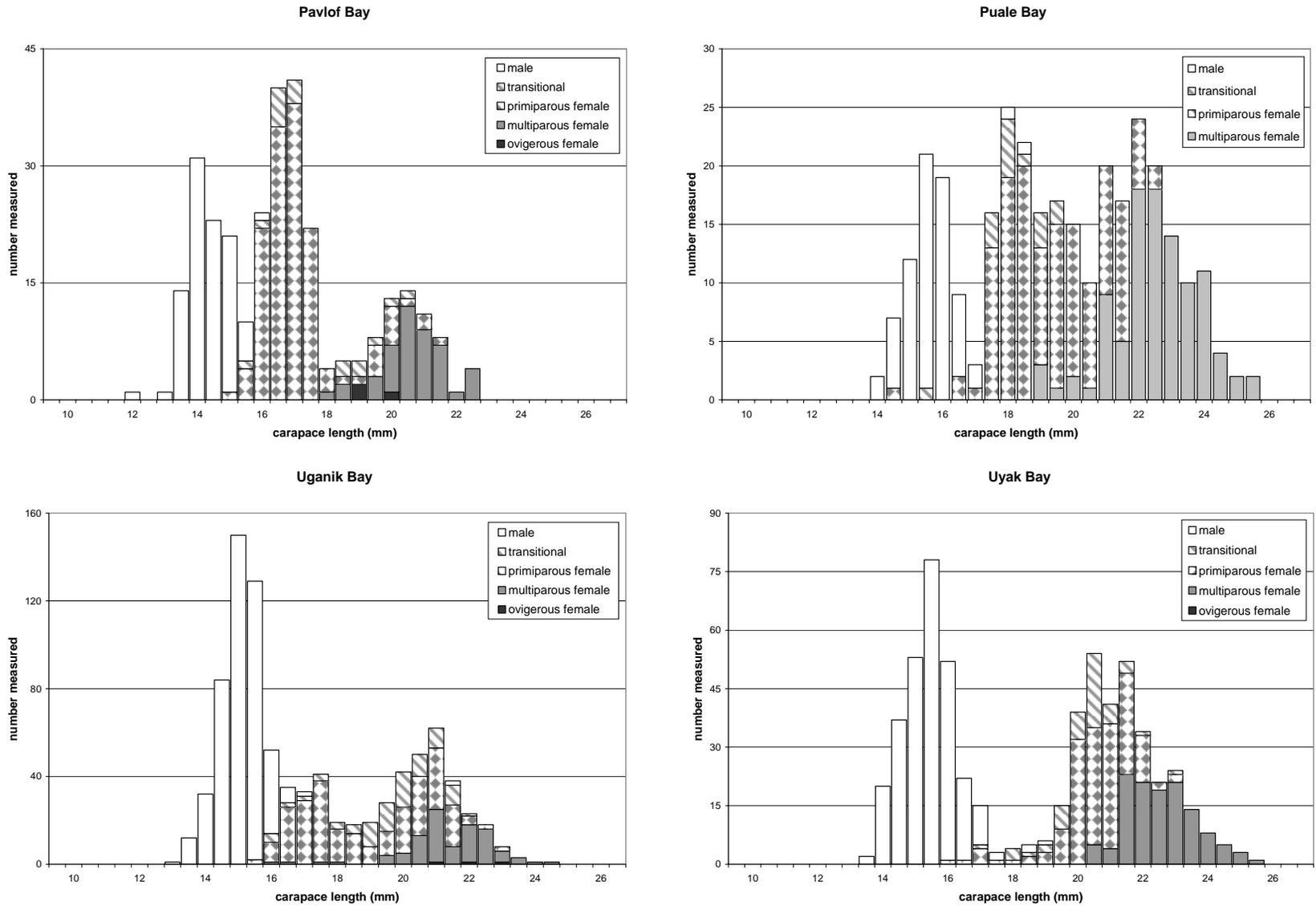


Figure 10.-Size composition by sex of northern pink shrimp from the 2005 Westward Region small-mesh trawl survey of the Pavlof Bay, Puale Bay, Uganik Bay and Uyak Bay commercial shrimp fishing sections.

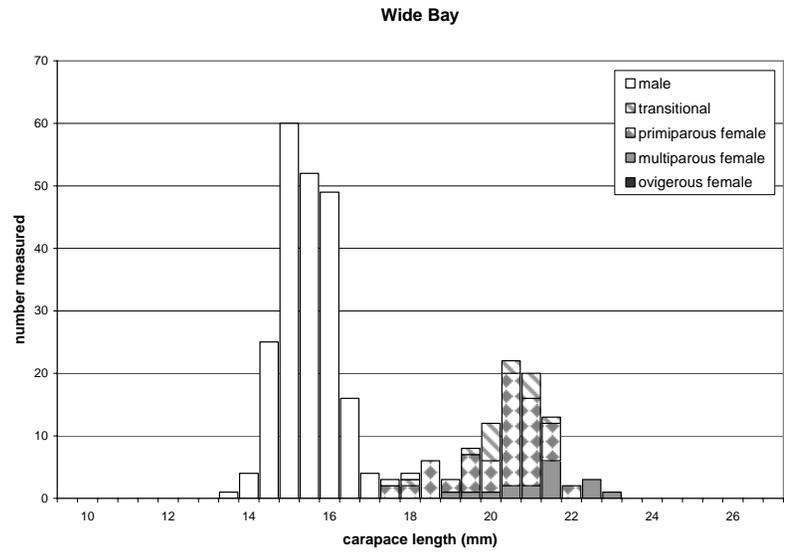


Figure 11.-Size composition by sex of northern pink shrimp from the 2005 Westward Region small-mesh trawl survey of the Wide Bay commercial fishing section.

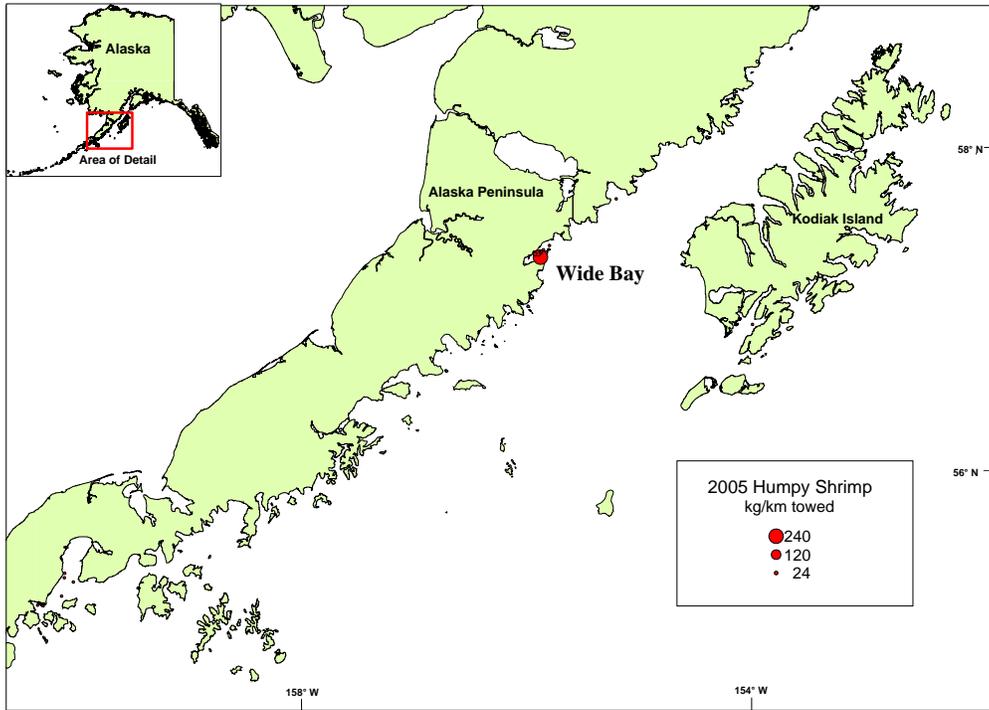


Figure 12.-Distribution and relative abundance of humpy shrimp in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

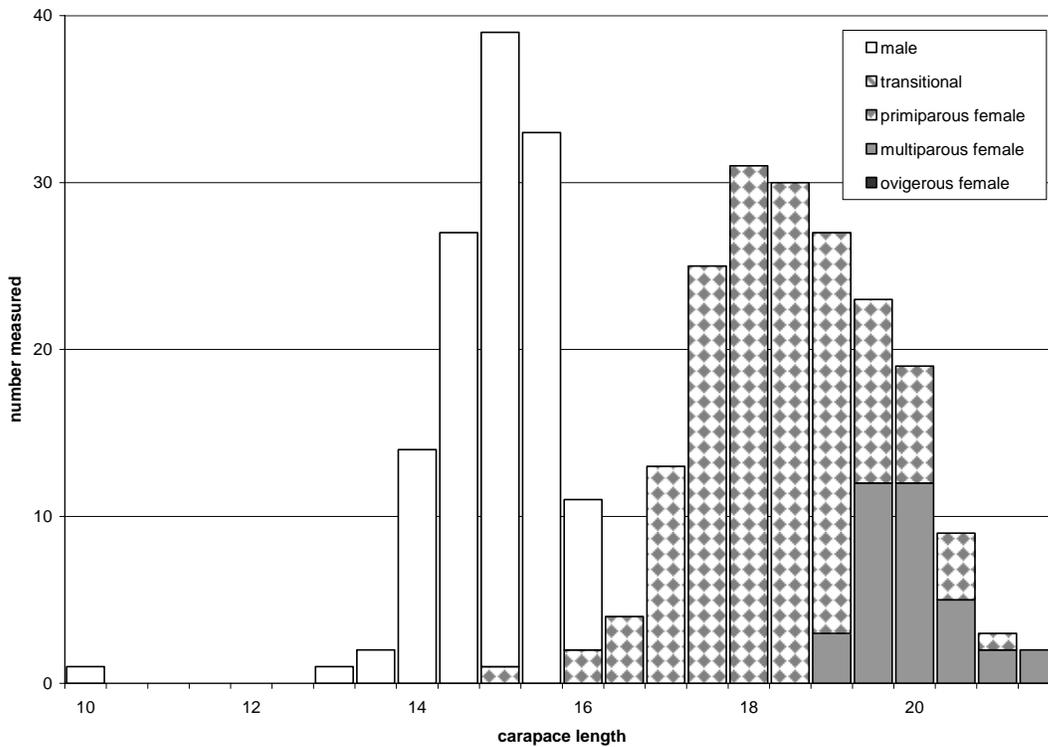


Figure 13.-Size composition by sex of Wide Bay humpy shrimp from the 2005 Westward Region small-mesh trawl survey.

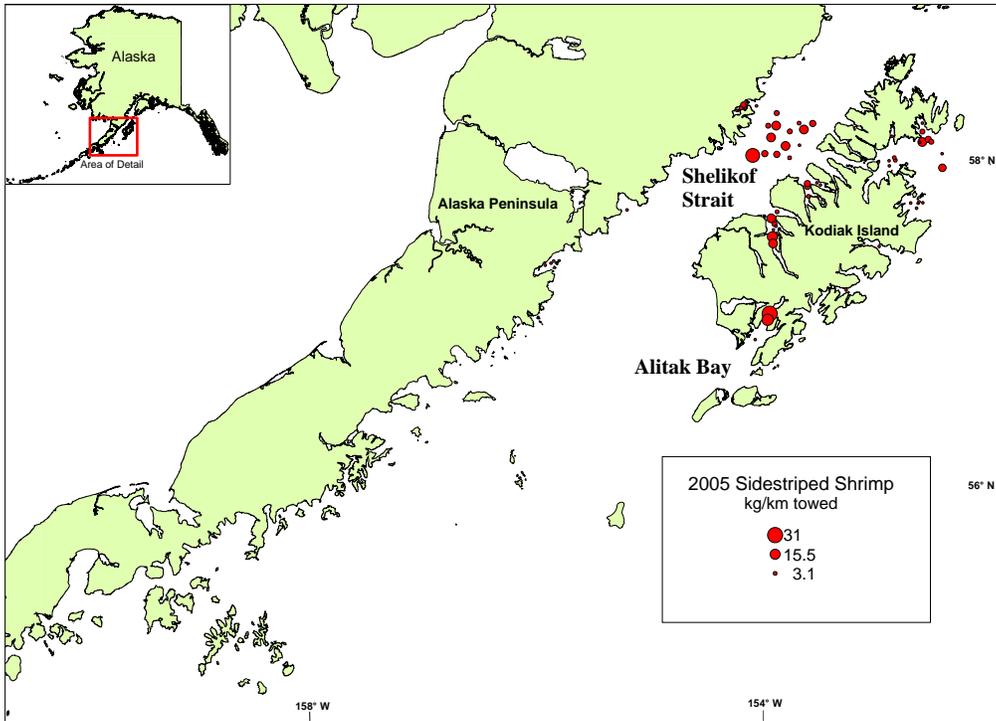


Figure 14.-Distribution and relative abundance of sidestriped shrimp in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

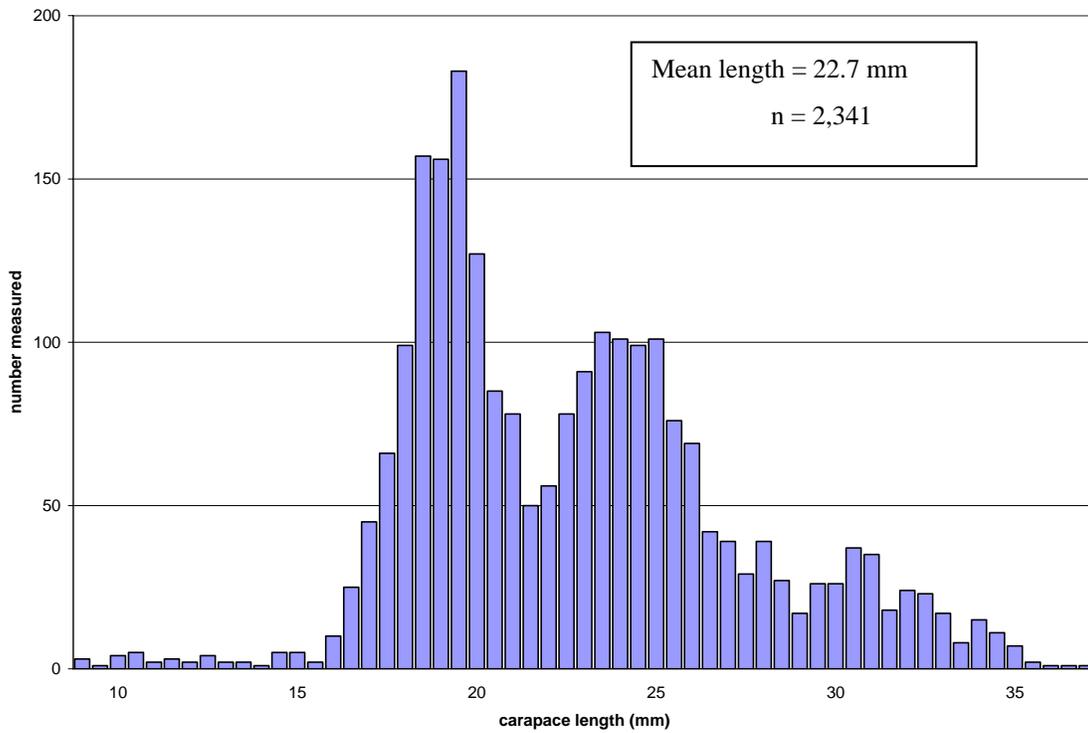


Figure 15.-Carapace lengths of sidestriped shrimp from the 2005 Westward Region small-mesh trawl survey.

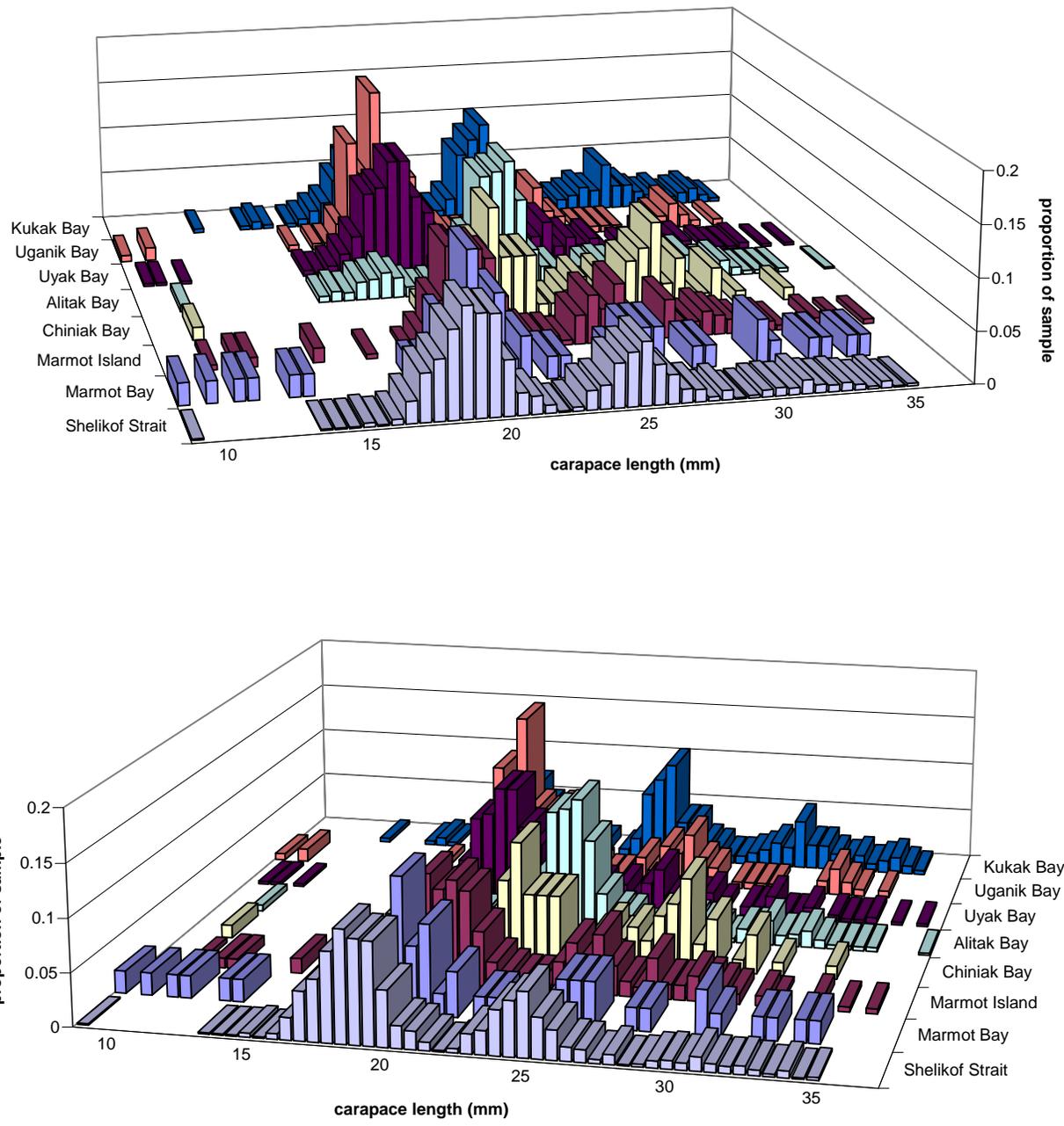


Figure 16.-Carapace lengths of sidestriped shrimp by commercial fishing section from the 2005 Westward Region small-mesh trawl survey.

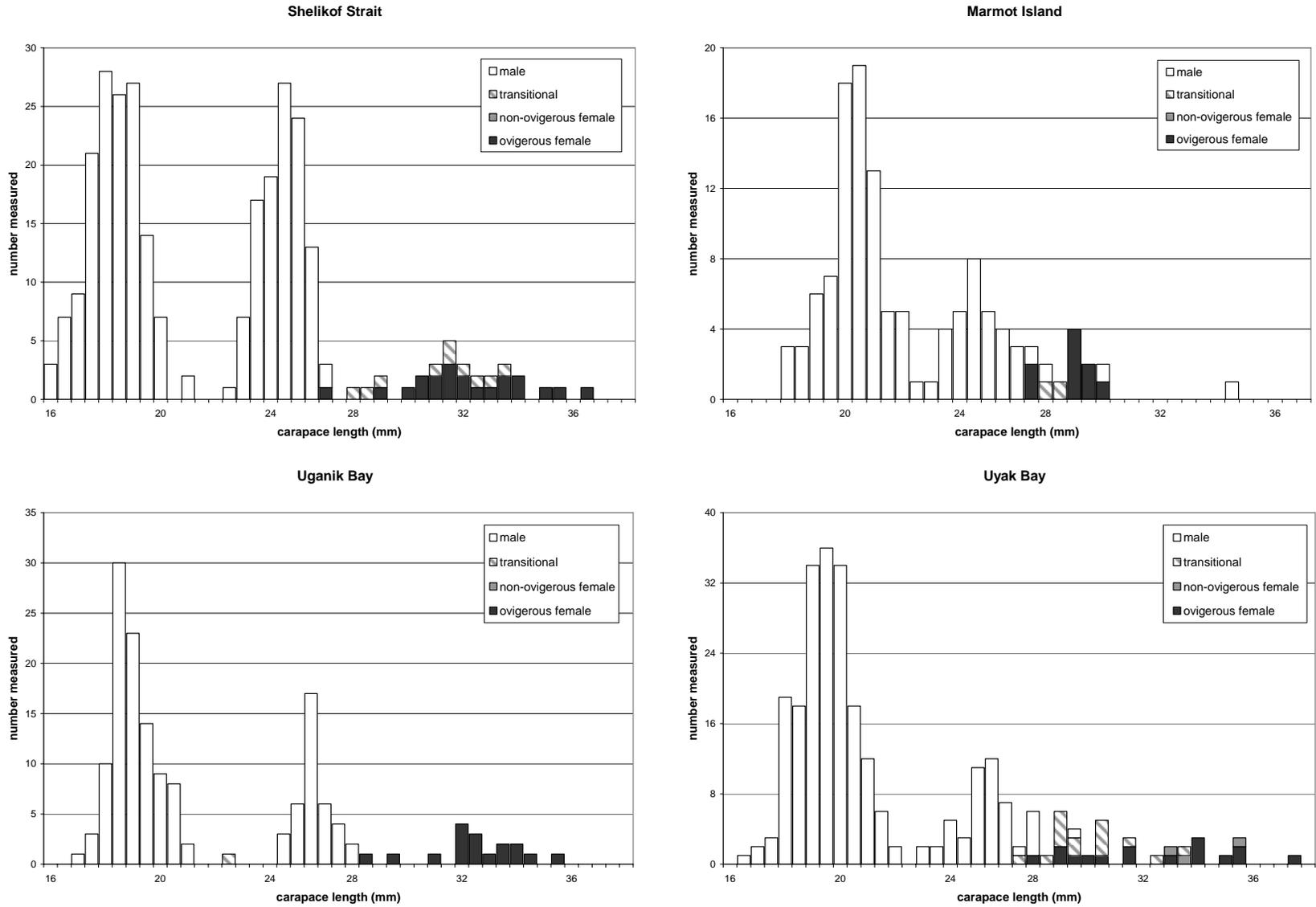


Figure 17.-Size composition by sex of sidestriped shrimp from the 2005 Westward Region small-mesh trawl survey of Shelikof Strait and the Marmot Island, Uganik Bay and Uyak Bay commercial shrimp fishing sections.

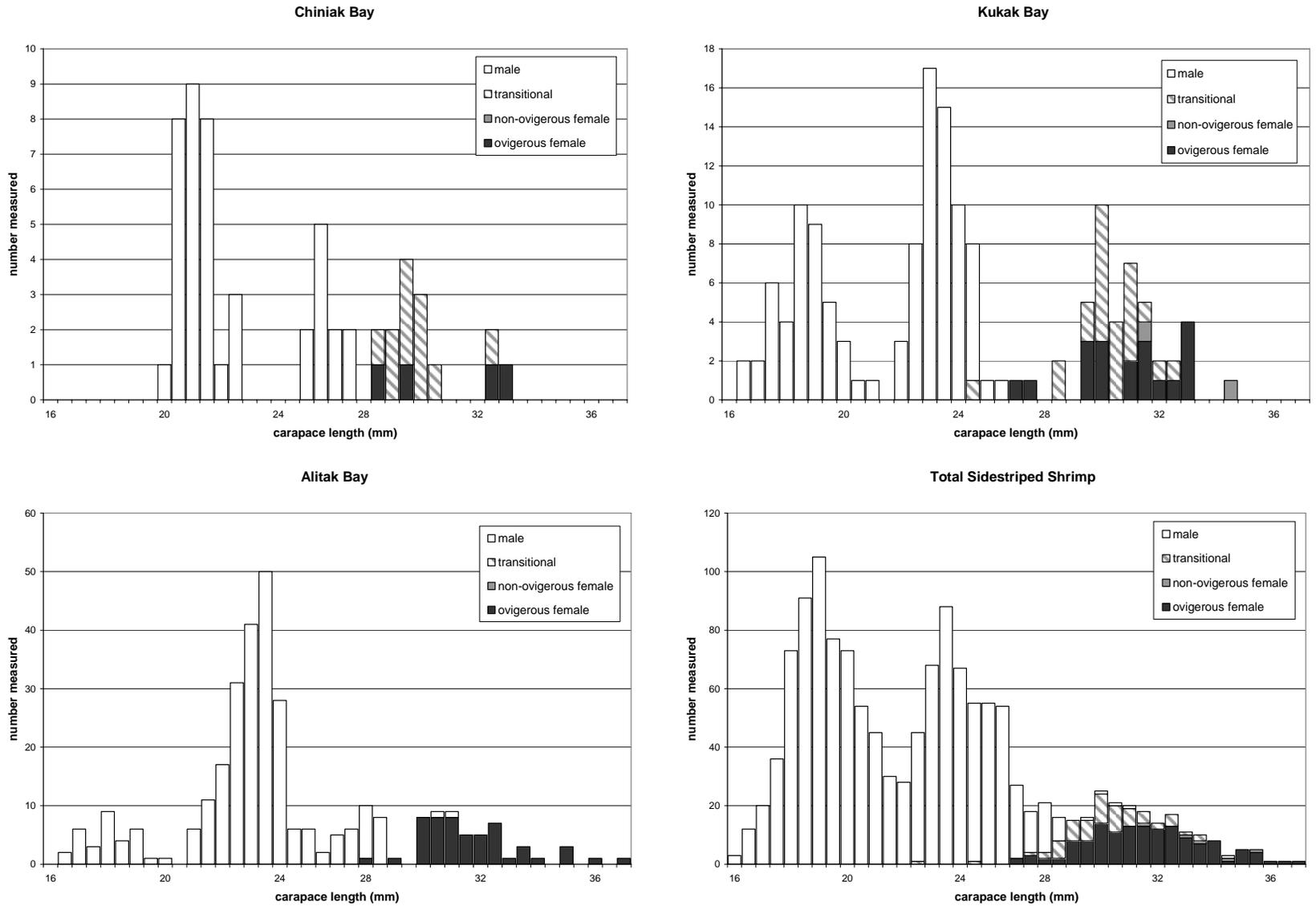


Figure 18.-Size composition by sex of sidestriped shrimp from the 2005 Westward Region small-mesh trawl survey of the Chiniak Bay, Kukak Bay, Alitak Bay commercial shrimp fishing sections and total from all sections.

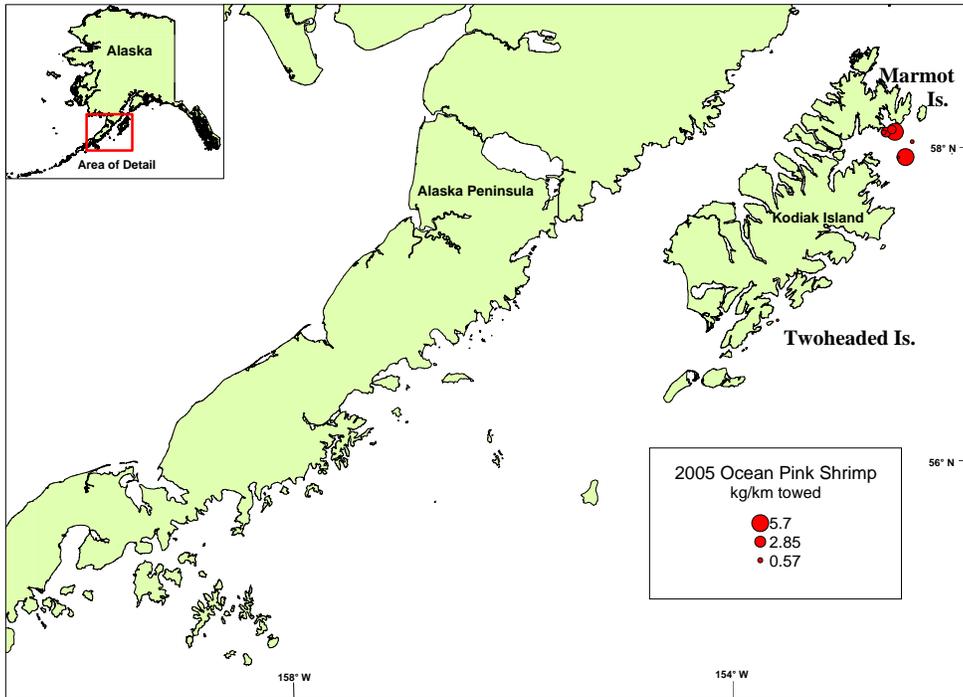


Figure 19.-Distribution and relative abundance of ocean pink shrimp in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

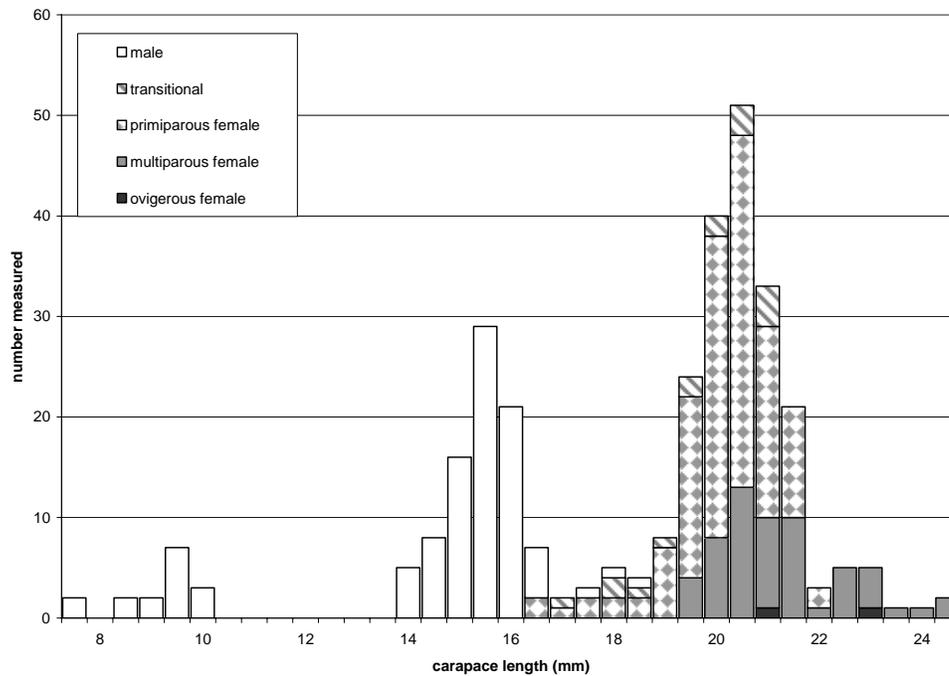


Figure 20.-Size composition by sex of ocean pink shrimp from the 2005 Westward Region small-mesh trawl survey.

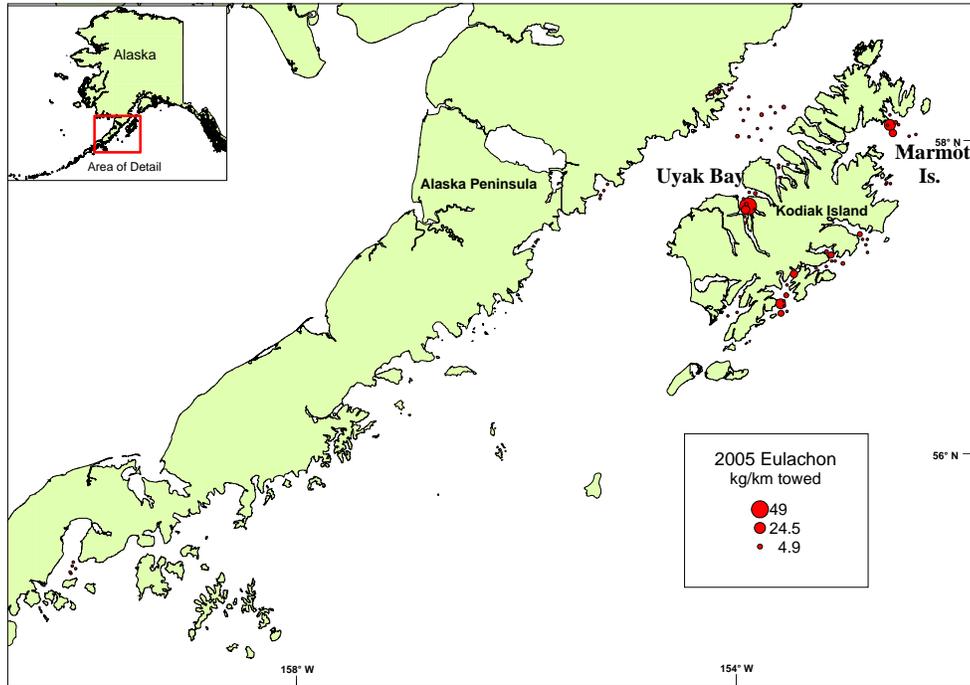


Figure 21.-Distribution and relative abundance of eulachon in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

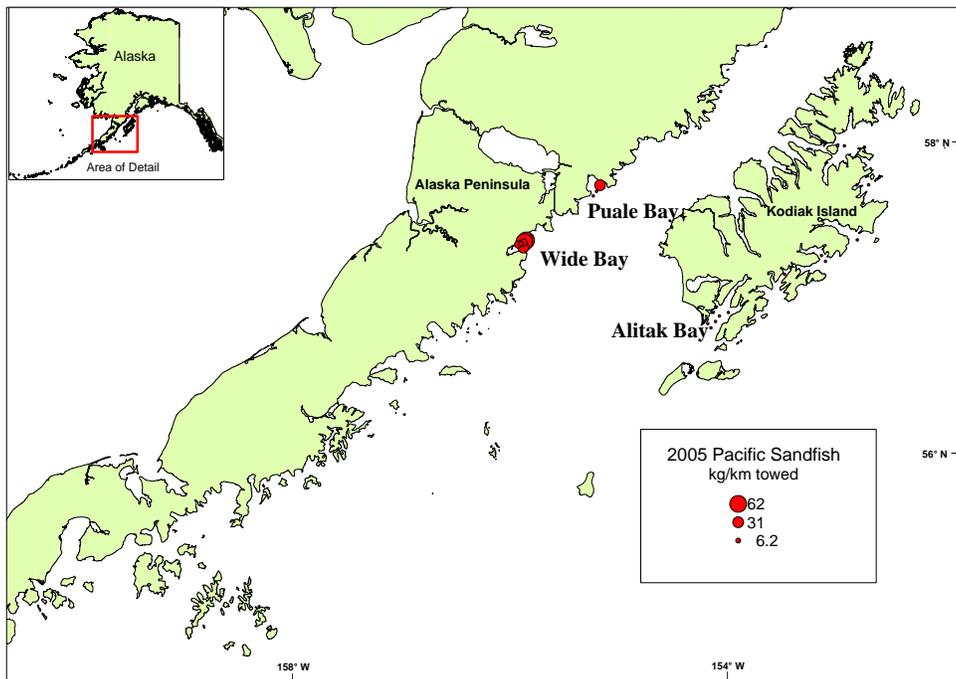


Figure 22.-Distribution and relative abundance of Pacific sandfish in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

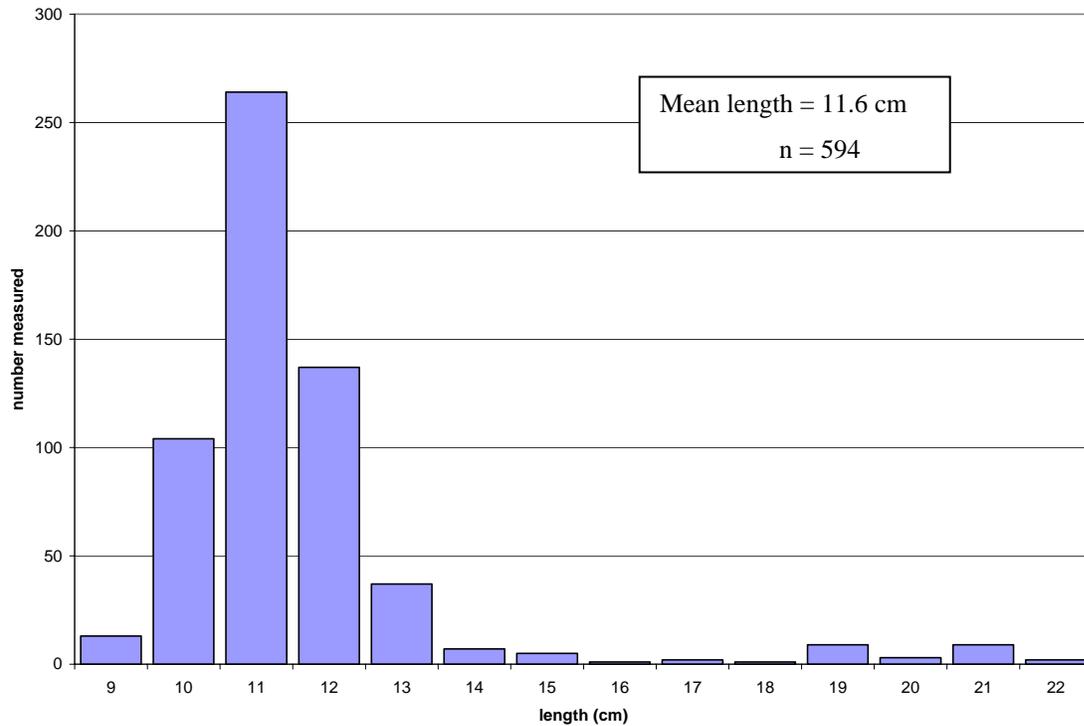


Figure 23.-Length of Pacific sandfish from the 2005 Westward Region small-mesh trawl survey.

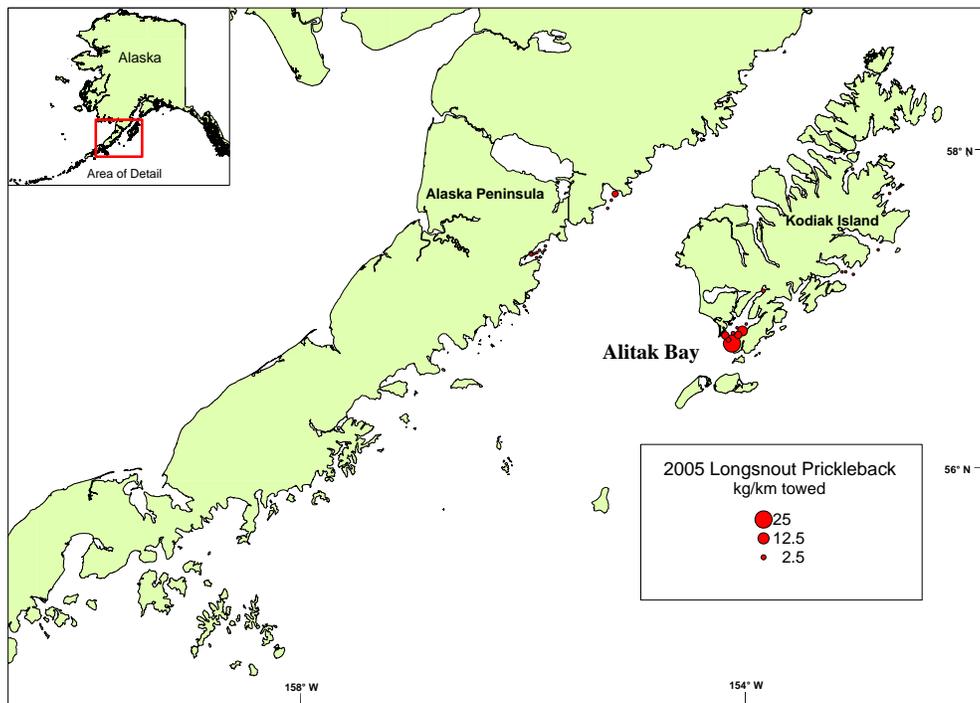


Figure 24.-Distribution and relative abundance of longsnout pricklebacks in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

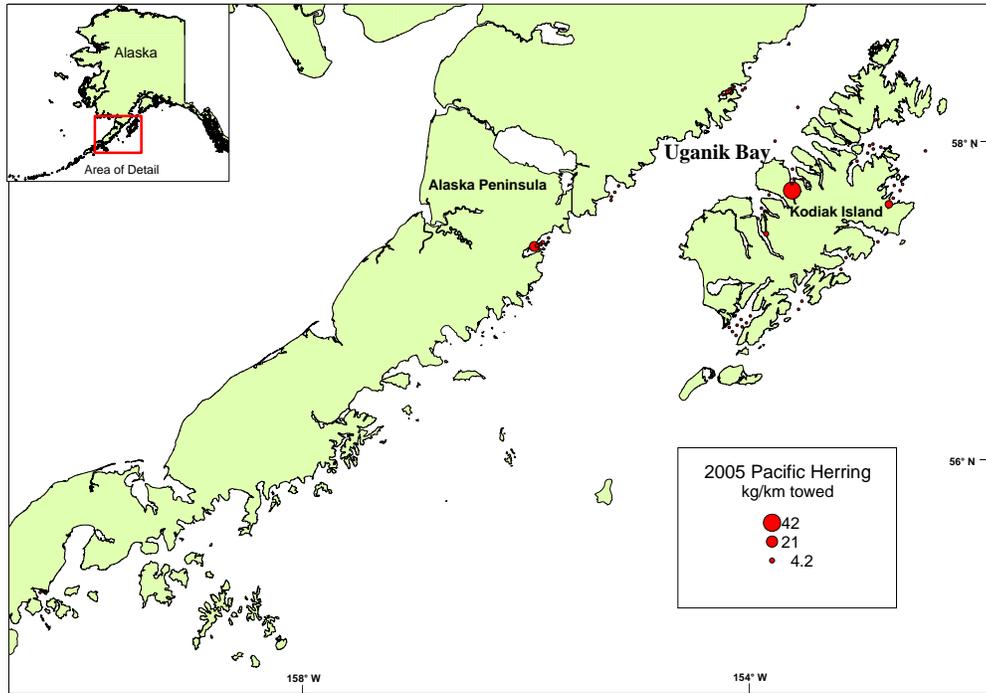


Figure 25.-Distribution and relative abundance of Pacific herring in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

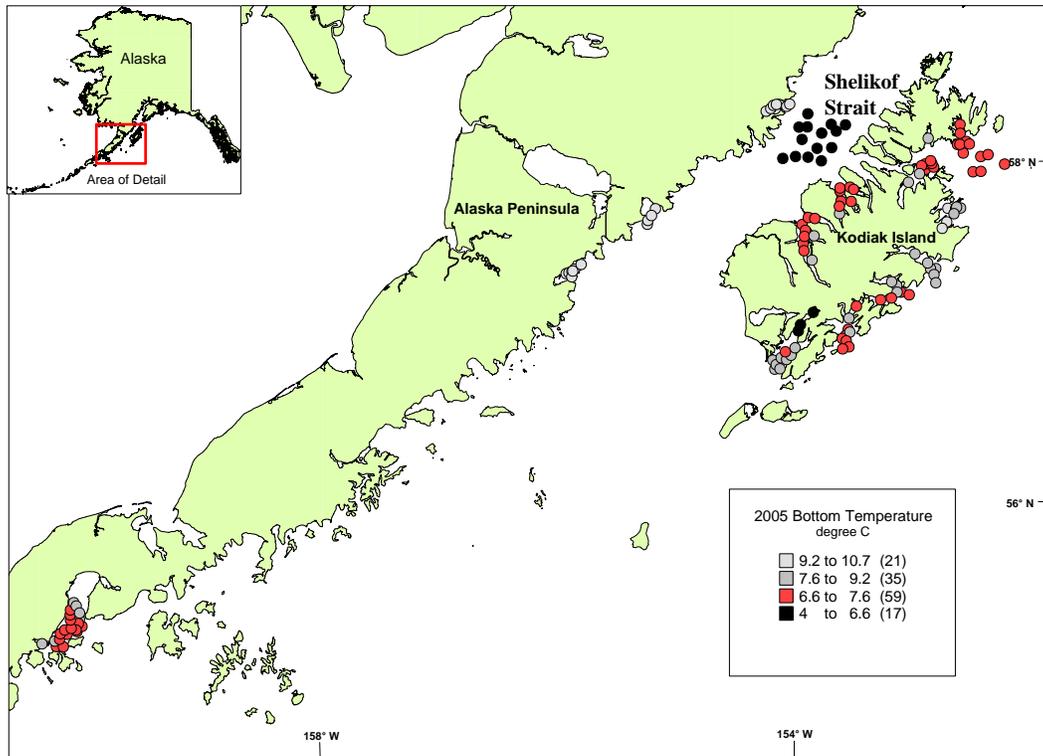


Figure 26.-Ocean bottom temperatures from the 2005 Westward Region small-mesh trawl survey.

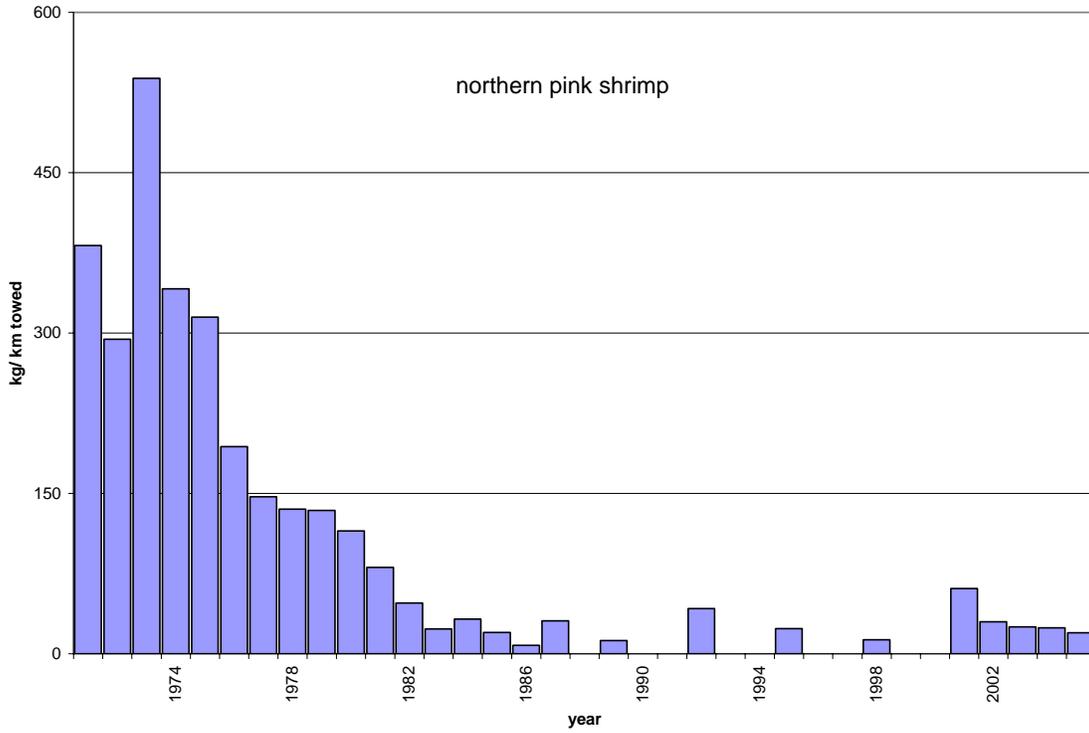


Figure 27.-Relative abundance of northern pink shrimp in kg/km towed from the Westward Region small-mesh trawl survey, 1971-2005.

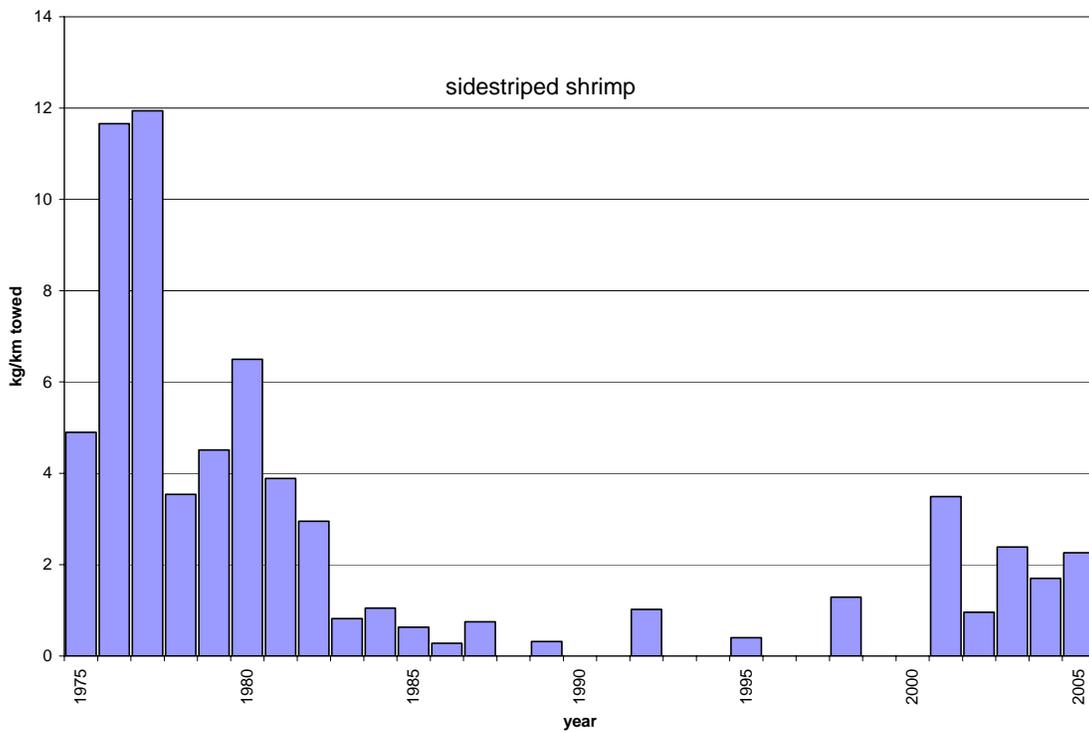


Figure 28.-Relative abundance of sidestriped shrimp in kg/km towed from the Westward Region small-mesh trawl survey, 1975-2005.

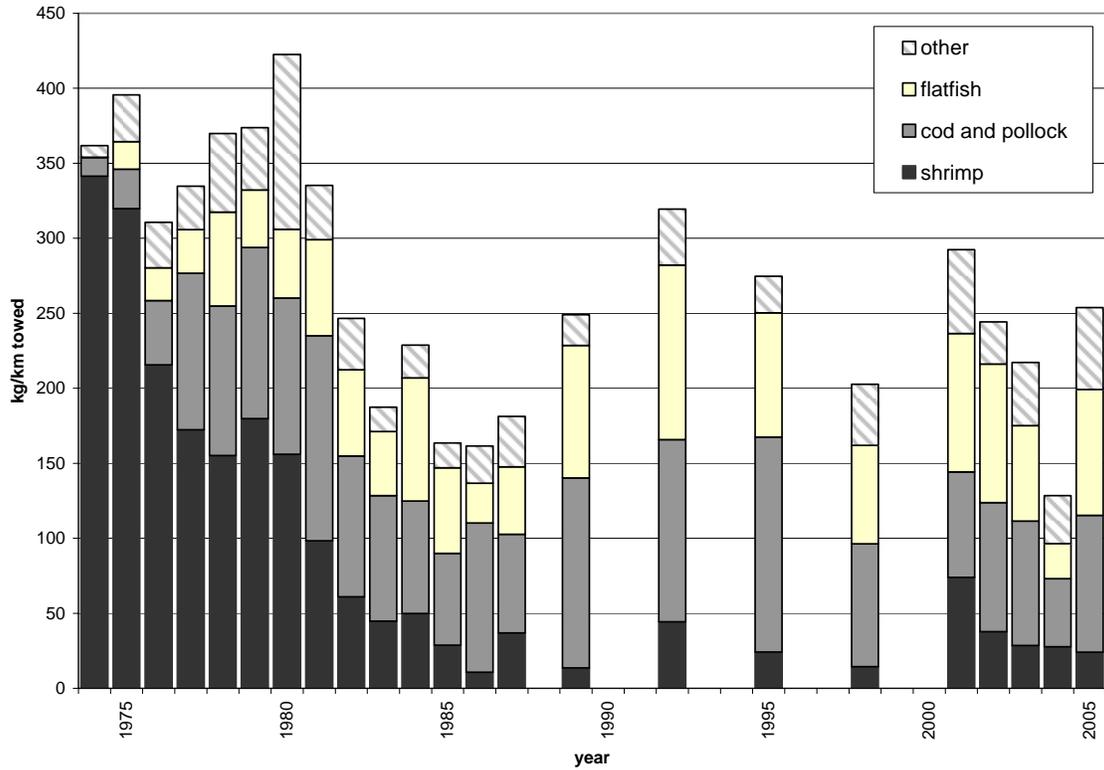


Figure 29.-Relative abundance of main species groups in kg/km towed from the Westward Region small-mesh trawl survey, 1971-2005.

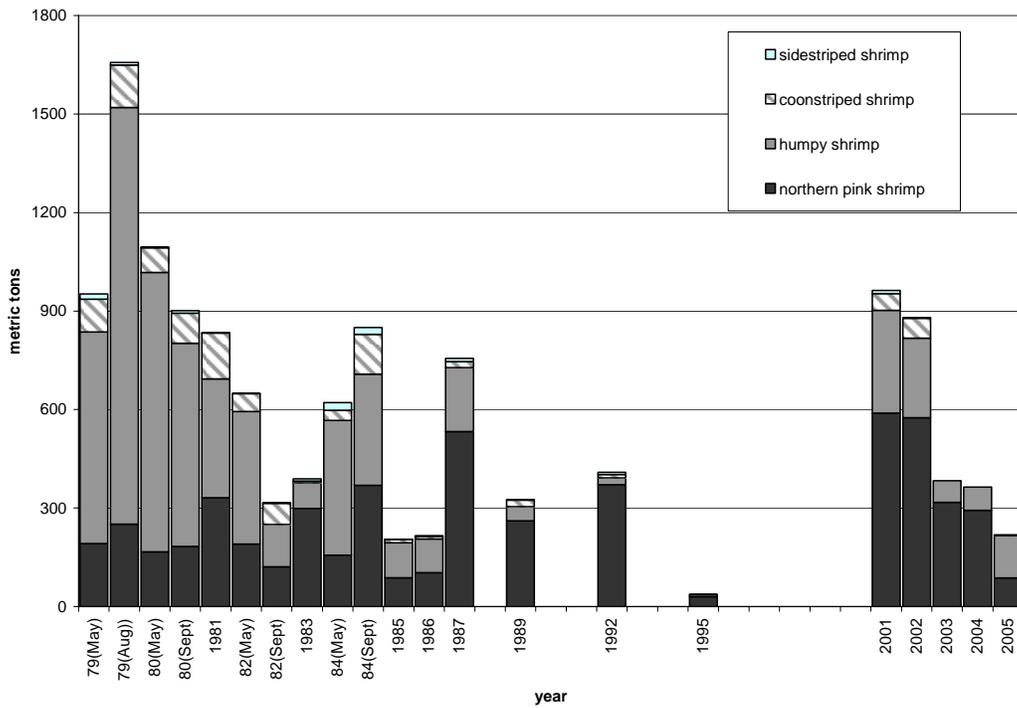


Figure 30.-Shrimp abundance estimates from Wide Bay, 1979-2005.

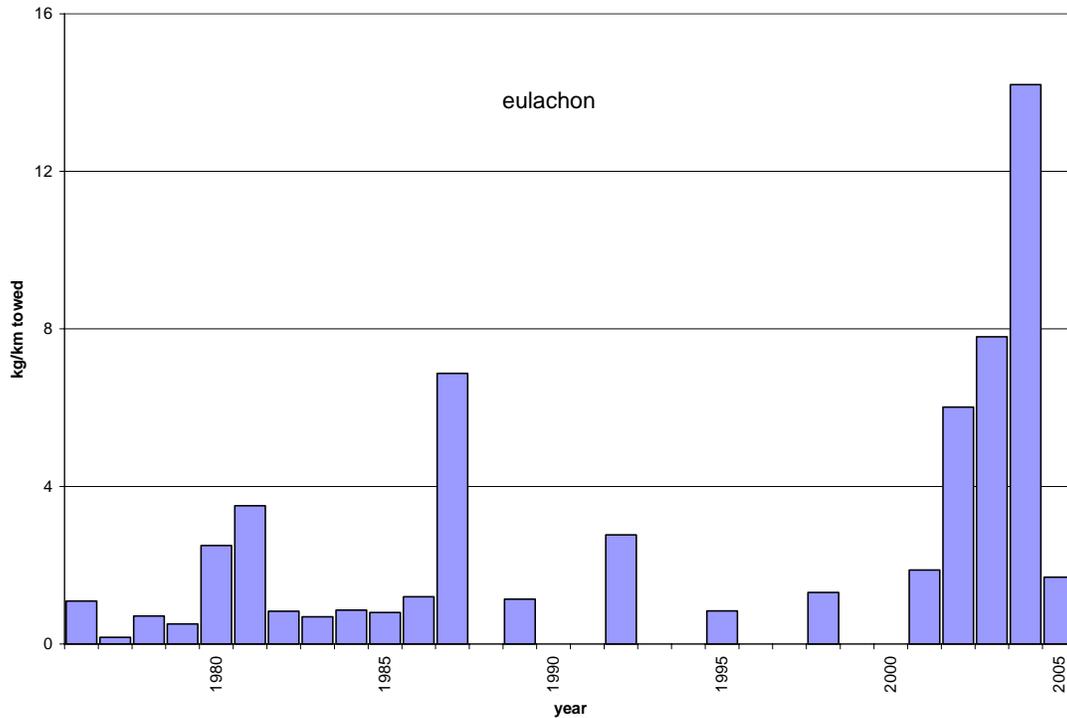


Figure 31.-Relative abundance of eulachon in kg/km towed from the Westward Region small-mesh trawl survey, 1976-2005.

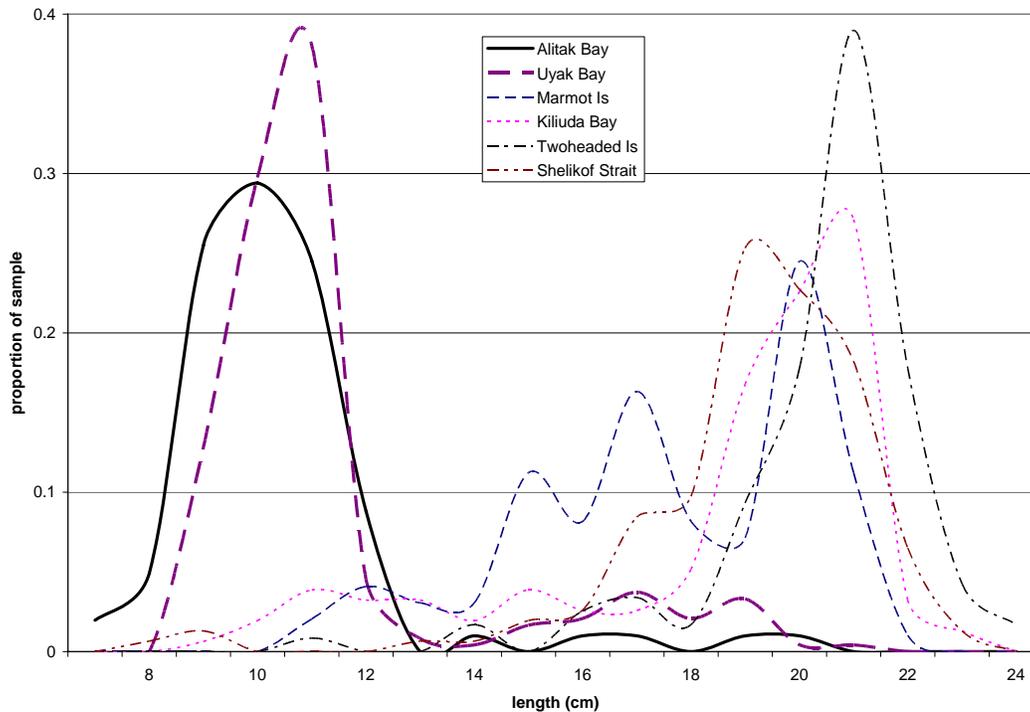


Figure 32.-Length of eulachon by survey area from the 2005 Westward Region small-mesh trawl survey.

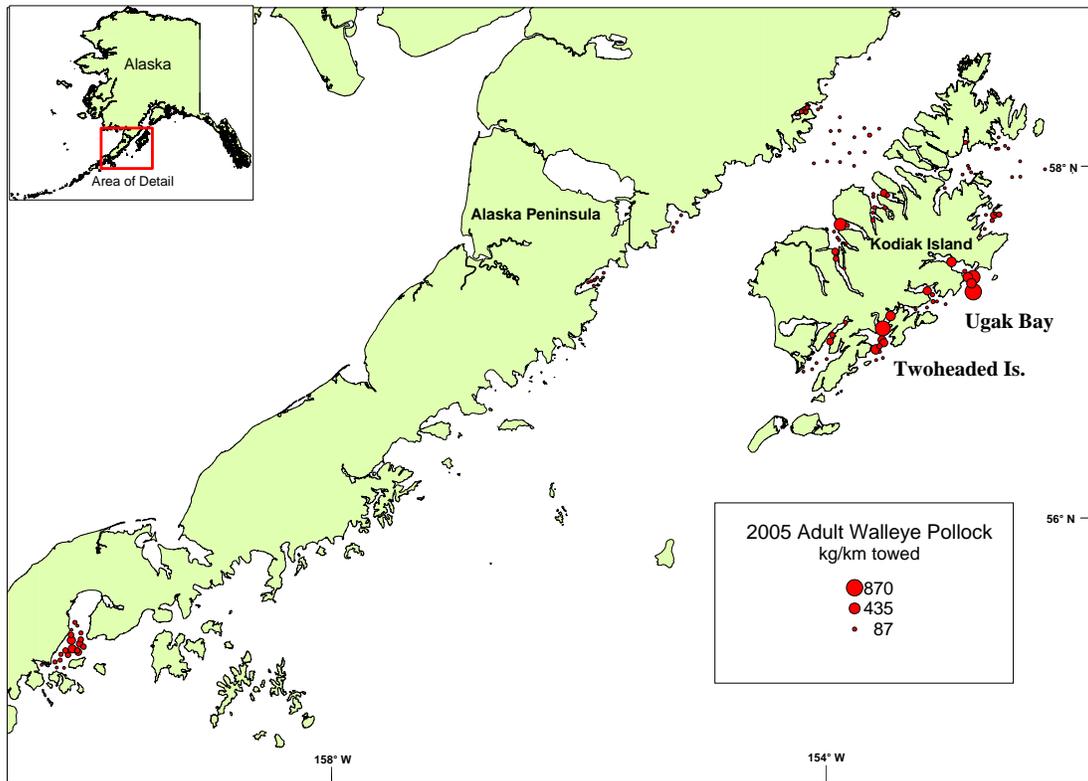


Figure 33.-Distribution and relative abundance of adult walleye pollock in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

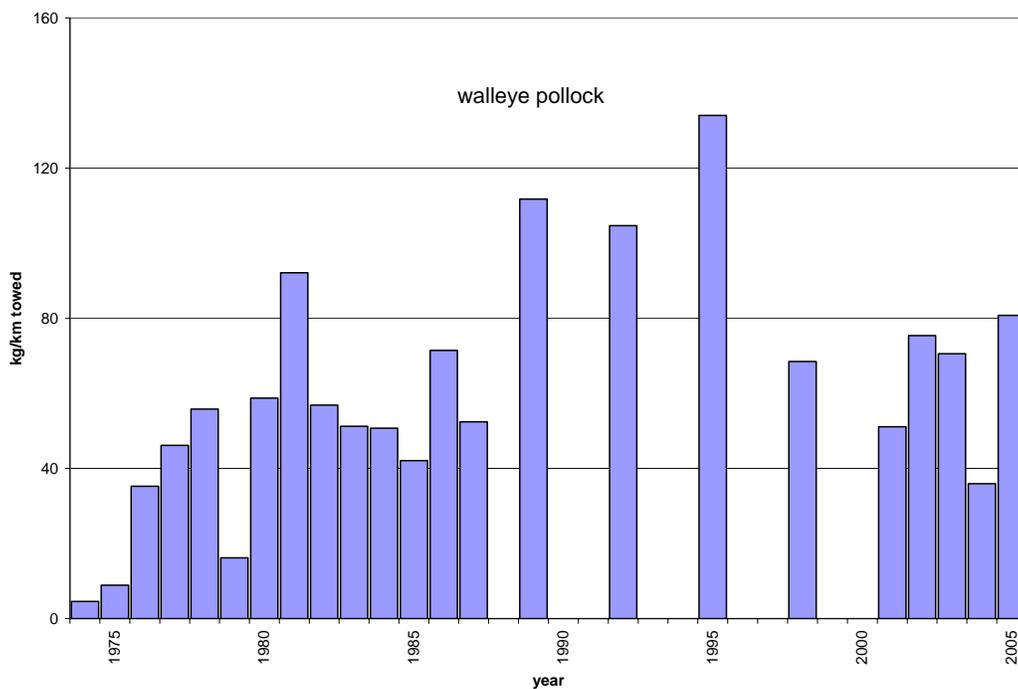


Figure 34.-Relative abundance of adult walleye pollock in kg/km towed from the Westward Region small-mesh trawl survey, 1974-2005.

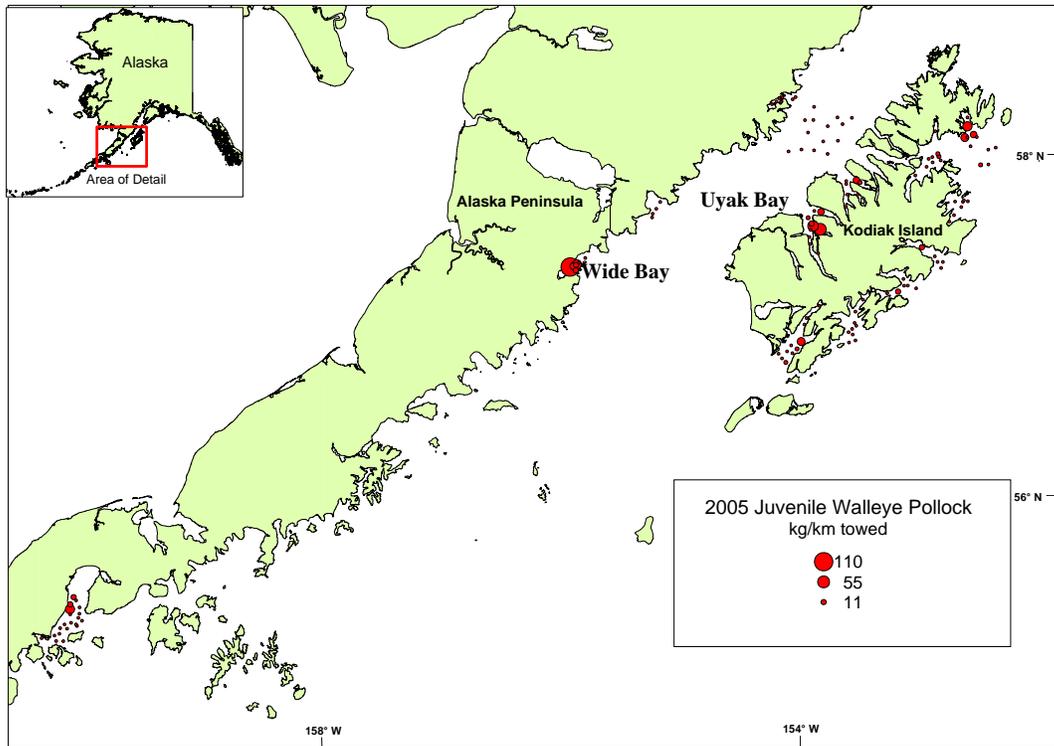


Figure 35.-Distribution and relative abundance of juvenile walleye pollock in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

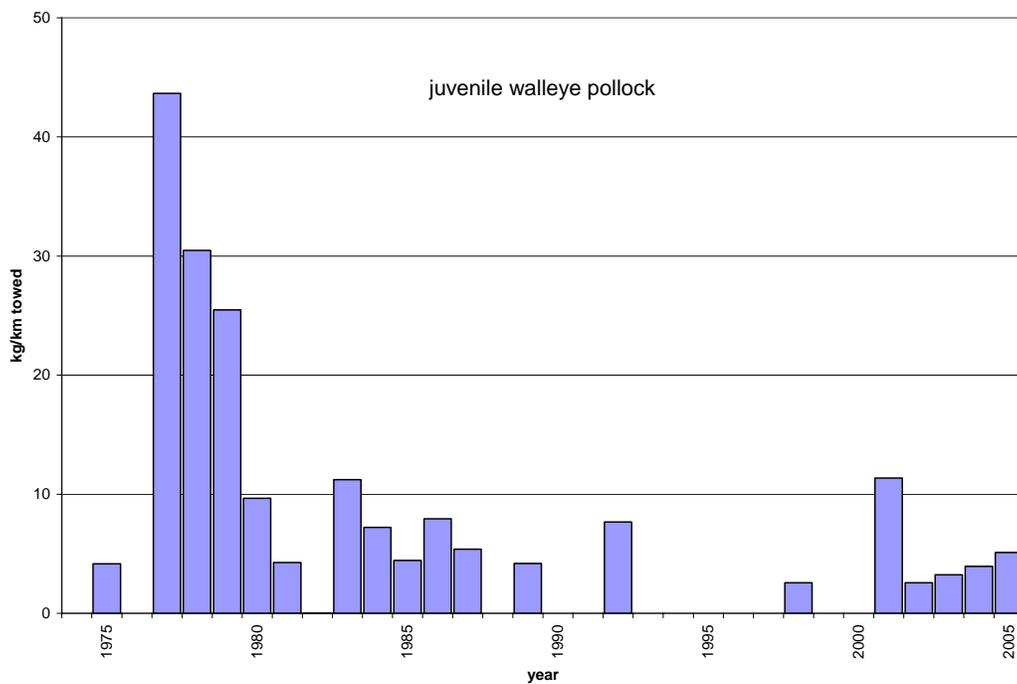


Figure 36.-Relative abundance of juvenile walleye pollock in kg/km towed from the Westward Region small-mesh trawl survey, 1974-2005

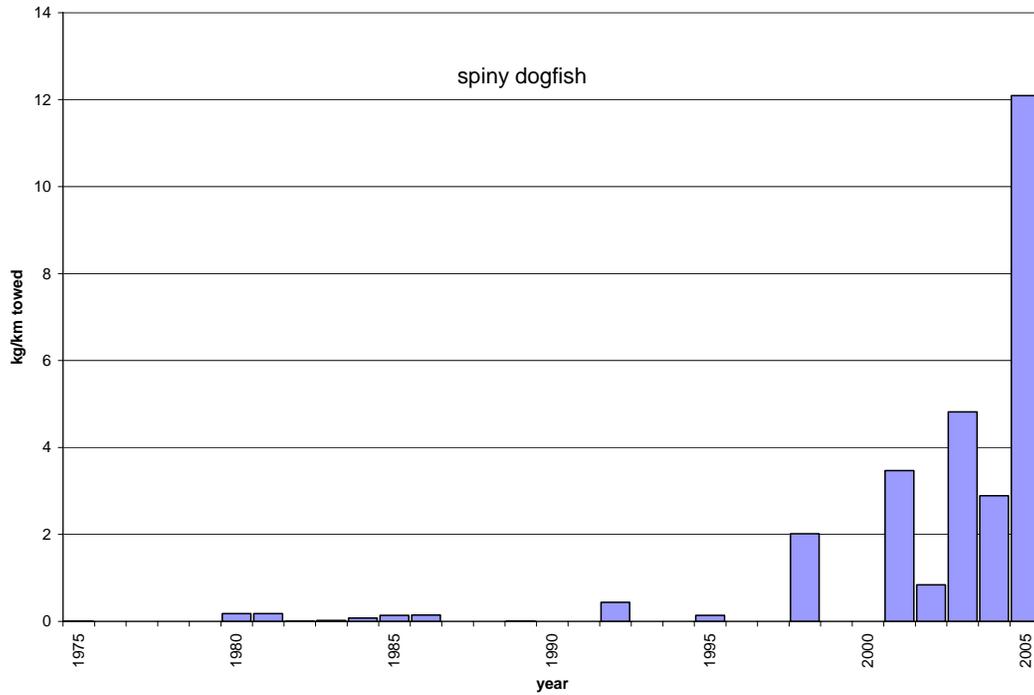


Figure 37.-Relative abundance of spiny dogfish in kg/km towed from the Westward Region small-mesh trawl survey, 1975-2005.

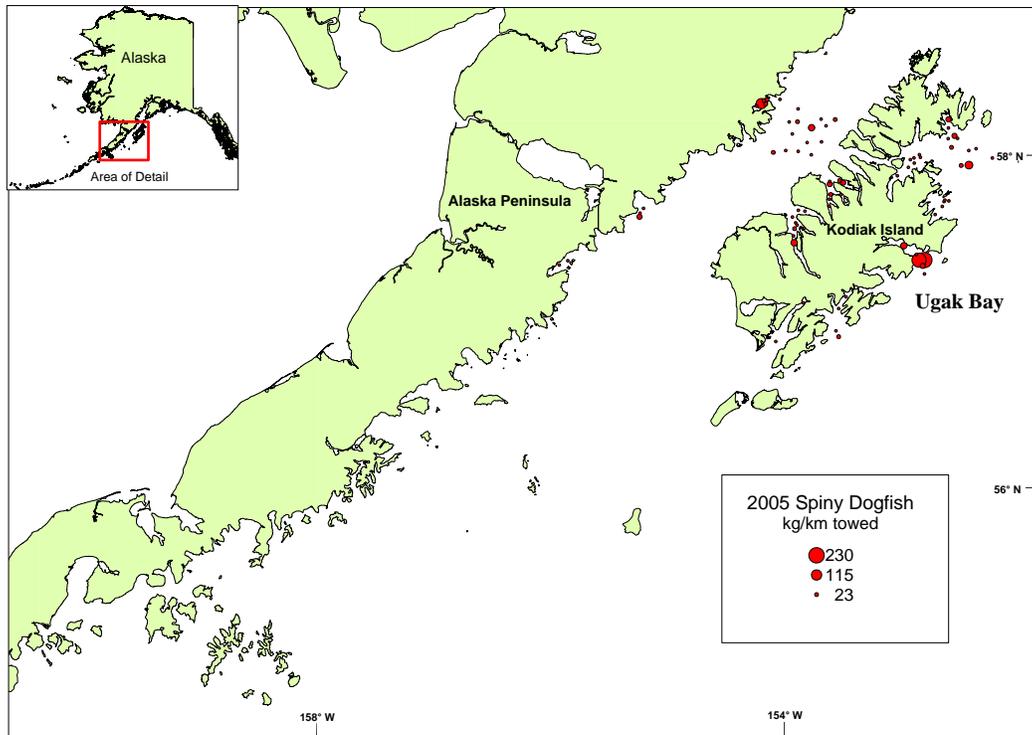


Figure 38.-Distribution and relative abundance of spiny dogfish in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

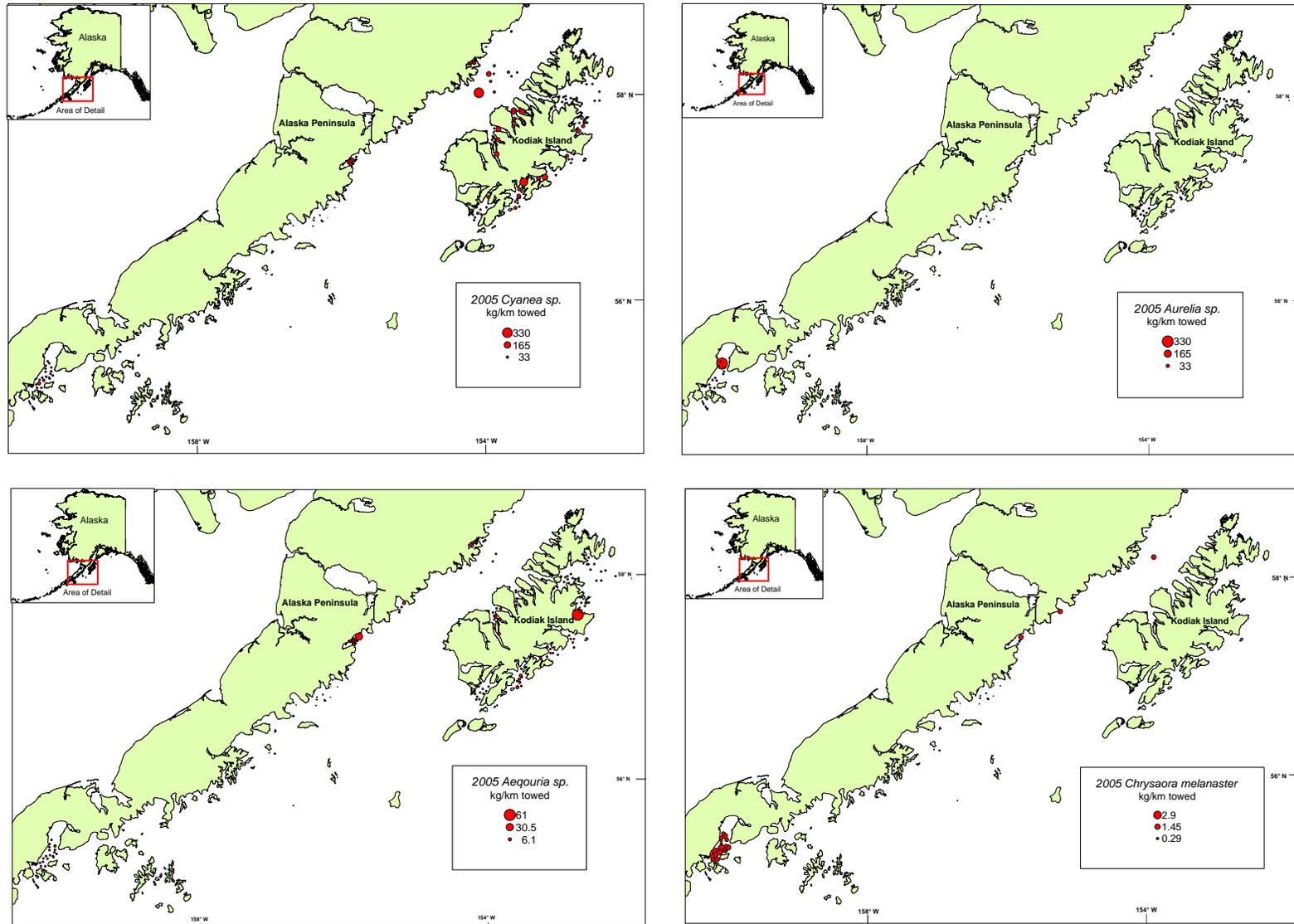


Figure 39.-Distribution and relative abundance of four jellyfish groups in kg/km towed from the 2005 Westward Region small-mesh trawl survey.

APPENDIX A. FISHING LOG AND CATCH DATA

Appendix A1.-Fishing log and catch data from the 2005 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	Kukak	Kukak	Kukak
Month/Day/Year	9/26/05	9/26/05	9/26/05	9/26/05	9/27/05	9/27/05	9/27/05	9/30/05	9/30/05	9/30/05
Station	807	810	814	811	802	801	808	823	821	824
Longitude Start	152°22.8	152°17.8	152°14.7	152°17.2	152°23.5	152°26.4	152°18.9	154°12.5	154°18.2	154°15.3
Latitude Start	57°43.7	57°43.6	57°43.8	57°44.1	57°39.0	57°36.7	57°41.8	58°18.1	58°17.3	58°18.2
Heading, Degrees	133	270	61	205	43	31	39	280	39	76
Average Depth (m)	91	146	164	146	91	45	142	87	54	109
Distance Fished (km)	1.9	1.9	1.9	1.7	1.9	1.9	1.9	1.7	1.9	1.9
Bottom Temperature (°C)	9.2	8.7	8.7	8.6	9.4	10.7	8.8	9.7	9.7	9.7
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	6.78	164.53	101.8	26.15	6.37	3.5	82.9	71.05	33.56	67.08
Pacific Cod	0	9.07	1.57	7.62	4	0	4.4	20.85	10.85	7.72
Pacific Sandfish	0.08	0	0	0	0	0.26	0	0	0.06	0
Eulachon	0	0.22	0.03	0.73	0	0	0	0.04	0.13	0.26
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	4	0.76	2.82	0	0	6.29	0	0	0.51
Herring	0.13	0	0	0.18	0.46	10.48	0.16	0.15	0.46	3.46
Sculpins	0.08	0	0	7.71	0.43	0	0	0	0	0
Other Forage Fish	0	0	0	0	0	0	1.7	0	0.06	0.12
Other Roundfish	0.81	0.01	0.16	0	1.19	1.04	0	0.72	0.65	0.65
TOTAL ROUNDFISH	7.88	177.82	104.31	45.21	12.45	15.28	95.45	92.81	45.78	79.79
Arrowtooth Flounder	46.02	41.95	13.22	9.17	15.17	0	9.62	60.89	12.7	5.07
Flathead Sole	51.83	85.74	125.73	33.86	43.34	0.52	74.7	33.98	19.7	37.44
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0.4	0	0.78	0	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pacific Halibut	3.44	0	0.37	0.78	1.35	0	2.02	12.71	0	0
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	1.45	0	0	0	3.25	0	0	0	0	0
Other Flatfish	30.92	0.76	0	0	19.61	0	0	0	1.68	0
TOTAL FLATFISH	134.08	128.45	140.1	43.81	82.73	0.52	86.34	107.58	34.08	42.51
Pink Shrimp	0.07	16.23	4.5	15.25	3.8	0.03	6.2	31.28	2.34	4.29
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	0.02	0.19	1.8	0.1	0	0	0.49	1.31	0.03	2.48
Other Shrimp	0.12	0.1	0.07	0.07	0.08	0.01	0.06	0.09	0.01	0.03
TOTAL SHRIMP	0.21	16.52	6.37	15.42	3.88	0.04	6.75	32.69	2.37	6.8
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	6.33	15.01	16.45	59.2	98.06	79.19	45.55	44.76	25.99	38.69
TOTAL INVERTS	6.33	15.01	16.45	59.2	98.06	79.19	45.55	44.76	25.99	38.69
Skates	0	0	0	0	0	0	0	20.84	0	0
Spiny Dogfish	0	8.64	2.21	2.55	6.45	0	6.72	18.21	8.23	120.65
Other	0	0.76	0	0	0	0	0	0.5	0.71	0.97
TOTAL CATCH	148.49	347.19	269.44	166.19	203.56	95.03	240.82	317.37	117.17	289.42

-continued-

Appendix A1.-Page 2 of 14.

Haul	11	12	13	14	15	16	17	18	19	20
Location	Kukak	Kukak	Kukak	Kukak	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof
Month/Day/Year	9/30/05	9/30/05	9/30/05	9/30/05	10/1/05	10/1/05	10/1/05	10/1/05	10/1/05	10/1/05
Station	825	826	829	833	199A	224A	223A	251B	281A	280A
Longitude Start	154°13.6	154°11.7	154°5.1	154°3.3	153°51.7	153°52.1	153°57.4	153°55.5	153°51.6	153°59.6
Latitude Start	58°19.3	58°19.7	58°19.0	58°19.7	58°16.4	58°11.8	58°11.8	58°7.5	58°1.4	58°1.6
Heading, Degrees	76	74	105	126	198	207	222	220	206	226
Average Depth (m)	100	109	84	82	210	201	217	201	197	201
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	9.8	9.2	9.5	5.3	5.4	5.2	5.3	5.3	5.3
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	56.46	79.2	18.25	13.04	46.57	19.09	28.03	38.96	21.77	51.69
Pacific Cod	5.29	5.24	0	1.48	0	0	0	3.75	0	0
Pacific Sandfish	0	0	0.08	0	0	0	0	0	0	0
Eulachon	0.24	0	0.05	0.05	0.51	0.3	0.11	0.28	1.45	2.83
Capelin	0	0.01	0	0	0	0	0	0	0	0
Rockfish	0	0.49	0	0.08	0	2.62	0	0	0	2.51
Herring	0.27	0.3	0.05	0.05	0	0	0	0	0	0
Sculpins	0	0.01	0	0.04	0.16	0.07	0.03	0.31	0.07	0.08
Other Forage Fish	0	0.08	0	0	0.13	0.6	0.11	0.28	0	0.25
Other Roundfish	0	2.21	0	0.05	1.04	1.89	0.05	0.01	0	0.09
TOTAL ROUNDFISH	62.26	87.54	18.44	14.8	48.4	24.58	28.33	43.59	23.28	57.45
Arrowtooth Flounder	26.97	13.48	0.78	20.96	68.32	53.06	22.98	74.89	19.6	13.67
Flathead Sole	77.03	56.22	4.83	32.19	3.56	6.02	3.1	4.13	9.01	6.5
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0	0	0	0.06	0.09	0.14	1.78	0.08
Dover Sole	0	0	0	0.86	0	0	0	0	0	0.5
Pacific Halibut	0	0	0.99	9.61	0	0	6.08	5.88	6.29	3.37
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	1.7	0	6.12	0	0	0	0	0	0
TOTAL FLATFISH	104.01	71.4	6.61	69.75	71.88	59.14	32.26	85.04	36.68	24.13
Pink Shrimp	17.58	16.22	0.17	3.15	57	32.53	29.33	37.67	18.62	28.6
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	6.02	1.97	0.01	0	5.27	12.51	5.55	10.97	6.83	6.82
Other Shrimp	0.13	0.13	0.02	0.18	0.7	0.8	0.16	0.37	0.47	0.93
TOTAL SHRIMP	23.73	18.32	0.2	3.33	62.98	45.84	35.04	49.01	25.91	36.35
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	24.14	15.69	0.41	0.5	40.36	20.54	101.61	23.68	33.61	2.92
TOTAL INVERTS	24.14	15.69	0.41	0.5	40.36	20.54	101.61	23.68	33.61	2.92
Skates	2.3	0	0	0	13.48	0	2.05	0	1.37	0.59
Spiny Dogfish	21.44	15.09	0	2.19	8.45	18.25	8.64	12.77	10.15	6.45
Other	0.24	2.54	0.24	0.14	0.13	0.12	1.03	0.28	0.2	0.08
TOTAL CATCH	238.12	210.58	25.89	90.71	245.68	168.47	249.46	214.36	131.21	127.97

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Haul	21	22	23	24	25	26	27	28	29	30
Location	Shelikof	Puale	Puale	Puale	Puale	Wide	Wide	Wide	Wide	Wide
Month/Day/Year	10/1/05	10/2/05	10/2/05	10/2/05	10/2/05	10/3/05	10/3/05	10/3/05	10/3/05	10/3/05
Station	279A	802	803	806	804	741	744	745	746	740
Longitude Start	154°7.7	155°33.7	155°33.3	155°28.6	155°31.1	156°25.4	156°23.5	156°21.6	156°19.8	156°21.8
Latitude Start	58°1.0	57°38.2	57°39.4	57°43.5	57°41.2	57°21.1	57°21.4	57°21.8	57°22.6	57°19.9
Heading, Degrees	232	5	71	226	194	56	40	56	178	38
Average Depth (m)	212	95	87	47	91	51	51	65	53	40
Distance Fished (km)	1.9	1.7	1.9	1.3	1.9	1.9	1.7	1.9	1.5	1.3
Bottom Temperature (°C)	5.2	10.1	10.1	10.4	10.1	10.2	10.5	10.4	10.2	10.1
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	43.91	50.41	23.68	8.87	18.9	108.45	20.51	13.79	2.09	10.98
Pacific Cod	0	48.39	5.86	3.12	11.77	1.25	3.02	0.22	0.81	0.77
Pacific Sandfish	0	0	0.11	27.98	0.1	13.76	8.46	15.63	61.45	31.15
Eulachon	0	0.64	0.84	0.13	0.05	0	0	0	0	0
Capelin	0	0	0	0	0	0	0	0.11	0	0
Rockfish	0	0.09	0	0	0	0	0	0	0	0
Herring	0	0.12	0.13	0.96	0.05	15.02	2.78	2.05	3.49	1.79
Sculpins	0	0	0	0	0	0.42	0.58	0	0	0
Other Forage Fish	0	0	0	0	0	0.42	0.24	0	0.12	0.51
Other Roundfish	0	0.64	0	4.97	0.15	4.6	3.33	1.19	0.7	1.67
TOTAL ROUNDFISH	43.91	100.29	30.62	46.03	31.02	143.91	38.92	32.98	68.66	46.86
Arrowtooth Flounder	78.95	9.12	9.67	4.65	12.23	0	0	0	0.23	0
Flathead Sole	0	37.76	9.16	4.54	14.96	8.34	1.27	0.43	0	1.79
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	0	2.25	5.99	0	2.21	0.96	0	0	0	0.17
Starry Flounder	0	14.48	10.78	0	0	0	0	0	0	0
Yellowfin Sole	0	1.82	0.84	2.85	0	5.21	1.62	0.54	0	2.04
Other Flatfish	0	3.65	0.28	0	0	0	0	0	0	2.04
TOTAL FLATFISH	78.95	69.07	36.71	12.03	29.4	14.51	2.9	0.97	0.23	6.04
Pink Shrimp	12.35	12.87	6.17	0.03	6.26	80.68	39.28	34.11	14.47	0.37
Humpy Shrimp	0	0	0	0	0.03	21.68	54.94	15.54	0.02	236.67
Coonstripe	0	0	0	0	0	3.02	0	0	0.23	0
Sidestripe	25.53	0	0	0	0.02	0.15	0	0.19	0.04	0
Other Shrimp	0.11	0.22	0.02	0	0.09	1.24	0.33	0.13	0	0.18
TOTAL SHRIMP	38	13.09	6.2	0.03	6.39	106.78	94.55	49.96	14.75	237.22
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	329.53	35.07	22.68	38.32	27.83	1.55	61.41	51.94	62.73	50.82
TOTAL INVERTS	329.53	35.07	22.68	38.32	27.83	1.55	61.41	51.94	62.73	50.82
Skates	3.48	15.56	0	0	0	0	0	0	0	0
Spiny Dogfish	17.47	39.3	13.01	0	8.48	2.43	0	0	4.79	0
Other	0	0	0.39	0	0.01	1.88	0.81	0.75	0.7	0
TOTAL CATCH	511.34	272.38	109.61	96.42	103.13	271.06	198.58	136.61	151.86	340.94

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Haul	31	32	33	34	35	36	37	38	39	40
Location	Wide	Wide	Pavlof							
Month/Day/Year	10/3/05	10/3/05	10/6/05	10/6/05	10/6/05	10/6/05	10/6/05	10/6/05	10/6/05	10/6/05
Station	743	747	313	305	304	279	262	245	263	280
Longitude Start	156°21.1	156°15.8	161°58.4	161°49.2	161°44.8	161°36.1	161°32.9	161°34.5	161°35.2	161°36.7
Latitude Start	57°21.9	57°24.2	55°12.9	55°11.9	55°11.8	55°17.1	55°18.9	55°21.3	55°19.9	55°17.6
Heading, Degrees	177	66	115	91	310	58	54	193	182	225
Average Depth (m)	64	54	73	91	118	106	113	96	96	98
Distance Fished (km)	1.7	0.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	10.5	10.1	8.1	7.2	7	6.9	7.4	7.8	7.5	7
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	33.63	1.08	16	16.92	37.69	180.6	137.45	135.24	158.49	138.58
Pacific Cod	1	0	2.87	2.1	20.88	0	0	1.08	0	3.94
Pacific Sandfish	58.92	0.81	0	0	0	0	0	0	0	0
Eulachon	0	0	0	0	0	0.28	0.7	0.12	0.12	0.09
Capelin	0.13	0	0	0	0.01	0	0	0	0	0
Rockfish	0	0	0	0	0.53	0.59	0	0	0	0
Herring	3.19	0.76	0.19	0	0	0	0	0	0	0
Sculpins	0	0	1.25	3.32	0	0	5.27	4.66	0	0
Other Forage Fish	0	0	0	0	0.2	0	0	0	0	0
Other Roundfish	1.96	0.49	0	1.75	0.13	0.67	3.29	1.03	0.95	0
TOTAL ROUNDFISH	98.83	3.13	20.31	24.1	59.44	182.15	146.71	142.13	159.56	142.61
Arrowtooth Flounder	0	0.05	0.26	7.19	16.38	10.09	44.94	17.92	10.61	10.08
Flathead Sole	0	0	15.81	23.57	49.46	19.34	65.65	8	38.63	17.03
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0	0.64	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pacific Halibut	0	0.49	0	3.57	19.34	0	0	3.33	4.31	0
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0.43	12.2	6.45	0	4.48	0	8	12.92	6.95
Other Flatfish	0	0.11	0.98	2.84	0.4	1.68	23	3.35	4.5	0
TOTAL FLATFISH	0	1.08	29.25	44.25	85.57	35.6	133.59	40.61	70.97	34.06
Pink Shrimp	17.97	0.03	0.63	0.75	1.26	0.89	5.22	0.4	0.48	0.18
Humpy Shrimp	13.28	0.02	0.05	0	0	0	0	0.02	0	0
Coonstripe	0.15	0	0	0	0	0	0	0	0	0
Sidestripe	0	0	0	0	0	0	0	0	0	0
Other Shrimp	0.03	0	0.02	0.03	0.13	0.01	0.13	0.14	0.17	0.01
TOTAL SHRIMP	31.42	0.05	0.69	0.78	1.39	0.9	5.35	0.56	0.65	0.19
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	110.48	33.42	17.33	10.15	9.51	3.18	7.55	16.25	4.79	12.04
TOTAL INVERTS	110.48	33.42	17.33	10.15	9.51	3.18	7.55	16.25	4.79	12.04
Skates	0	0	0	0	0	0	0	0	0	0
Spiny Dogfish	0	0	0	0	0	0	0	0	0	0
Other	3.44	0	0.98	0.64	0.13	0.09	0	0.24	0	0.09
TOTAL CATCH	244.18	37.69	68.57	79.91	156.05	221.92	293.2	199.78	235.96	188.99

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Haul	41	42	43	44	45	46	47	48	49	50
Location	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof	Pavlof
Month/Day/Year	10/7/05	10/7/05	10/7/05	10/7/05	10/7/05	10/7/05	10/7/05	10/7/05	10/8/05	10/8/05
Station	295	294	281	282	265	264	246	227	206	178
Longitude Start	161°50.3	161°47.2	161°42.3	161°46.7	161°43.9	161°39.8	161°40.3	161°40.5	161°40.3	161°38.1
Latitude Start	55°13.8	55°14.4	55°16.2	55°16.4	55°17.6	55°18.2	55°21.1	55°22.9	55°24.6	55°27.1
Heading, Degrees	4	58	58	44	54	91	3	18	10	40
Average Depth (m)	87	102	100	102	109	98	131	109	98	93
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)	7.7	7	7.1	7.1	7	7.2	7.3	7.3	7.4	8.1
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	64.54	61.35	108.19	81.17	121.16	236.27	271.06	140.21	51.55	110.6
Pacific Cod	5.94	4.05	2.08	3.73	1.05	0	38.12	9.23	1.78	2.7
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0
Eulachon	0	0	0	0	0	0	0	0	0	0
Capelin	0	0	0	0	0	0.03	0	0.06	0.01	0.09
Rockfish	0	0	0	0	0	0.16	0	0	0	0
Herring	0	0	0	0	0	0	0	0	0	0
Sculpins	0	0	0	0	0	0	1.28	0	0.09	0
Other Forage Fish	0	0	0	0	0	0	1.92	0	0	0
Other Roundfish	0	0	0	0	0.4	0.86	3.94	5.4	1.22	0
TOTAL ROUNDFISH	70.47	65.4	110.27	84.9	122.62	237.32	316.32	154.9	54.65	113.39
Arrowtooth Flounder	2.85	9.18	3.41	0	1.74	8.63	7.93	46.53	32.81	0.09
Flathead Sole	18.63	16.55	6.48	2.21	3.16	10.15	18.16	62.31	93.24	43.08
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	0	0	0	0	0	0	2.17	2.38	0	0
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	16.33	0.78	0	0	0	1.94	3.58	18.61	17.57	10.99
Other Flatfish	1.57	0.39	2.87	0	0.97	0	0	10.66	14.97	18.55
TOTAL FLATFISH	39.37	26.91	12.76	2.21	5.87	20.72	31.83	140.49	158.59	72.71
Pink Shrimp	0.13	0.44	0.3	0.65	0.42	0.16	16.97	8.95	0.63	0.32
Humpy Shrimp	0	0	0.01	0	0	0	0	0.06	0.01	0
Coonstripe	0	0	0	0	0	0	0	0	0	0.02
Sidestripe	0	0	0	0	0	0	0	0	0	0
Other Shrimp	0.02	0.04	0.01	0.02	0.03	0	0.16	0.19	0.05	0
TOTAL SHRIMP	0.14	0.48	0.32	0.67	0.44	0.16	17.13	9.2	0.69	0.34
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	3.94	45.82	27.3	24.21	8.15	8.42	4.26	3.14	5.74	25.23
TOTAL INVERTS	3.94	45.82	27.3	24.21	8.15	8.42	4.26	3.14	5.74	25.23
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	0.16	0	0.32	0.06	0.11	1.41	0.04	0.09	0
TOTAL CATCH	113.93	138.77	150.65	112.31	137.15	266.74	370.95	307.78	219.76	211.66

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Haul	51	52	53	54	55	56	57	58	59	60
Location	Pavlof	Pavlof	Uyak							
Month/Day/Year	10/8/05	10/8/05	10/10/05	10/10/05	10/10/05	10/10/05	10/10/05	10/10/05	10/10/05	10/11/05
Station	205	226	612	610	634	608	603	632	602	606
Longitude Start	161°36.6	161°34.5	153°55.4	153°53.3	153°47.8	153°52.3	153°54.6	153°49.0	153°54.2	153°53.9
Latitude Start	55°25.9	55°23.5	57°38.1	57°36.0	57°34.1	57°35.2	57°31.4	57°25.8	57°29.0	57°33.9
Heading, Degrees	167	347	350	316	318	303	181	170	335	352
Average Depth (m)	85	82	164	146	87	128	137	87	146	107
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)	8.4	8.3	7	7.2	7.7	7.2	7.3	7.6	7.3	7.2
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	46.85	73.16	20.67	23.72	85.89	45.01	210.23	13.82	140.82	1.02
Pacific Cod	0	6.83	6.29	0	2.24	0	4.29	0	0	0
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0
Eulachon	0	0	0.11	3.87	0.44	48.15	1.5	0	1.2	13.89
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	0	0.7	1.21	0	0	2.59	0	0	0.65
Herring	0	0	0	0	0.7	0.17	0.64	3.75	0	0
Sculpins	0	0	14.48	0	0	0.07	0.64	0	0	0
Other Forage Fish	0	0	0	0	0.44	0	0	0	0.15	0
Other Roundfish	0.11	0.13	0.27	0.24	0	0.59	0.86	1	3.35	0.32
TOTAL ROUNDFISH	46.96	80.13	42.52	29.04	89.72	93.98	220.76	18.57	145.52	15.88
Arrowtooth Flounder	0	1.64	133.28	142.79	0.44	20.19	42.39	1.05	38.72	5.62
Flathead Sole	5.11	14.12	99.79	230.4	42.39	48.81	76.21	11.95	58.3	16.36
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	1.11	4.6	0	0	0	0	0	0
Dover Sole	0	0	3.09	0	0	0	0	0	0	0
Pacific Halibut	0	0	1.62	0	26.64	3.67	0.67	0	5.87	0
Starry Flounder	0	5.78	0	0	39.06	0	0	0	0	0
Yellowfin Sole	0	3.35	0	0	0	0	0	0	0	0
Other Flatfish	0	2.98	0	0	0	0	0	0	0	0
TOTAL FLATFISH	5.11	27.88	238.89	377.79	108.53	72.67	119.27	13	102.89	21.98
Pink Shrimp	0	0	67.48	50.63	2.35	10.03	21.92	0.15	18.36	12.57
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0.09	0	0	0	0	0
Sidestripe	0	0	11.33	5.15	0	0.71	14.43	0	10.78	0.6
Other Shrimp	0.11	0.03	0.21	0.85	0.01	0.22	0.69	0.01	0.61	0.04
TOTAL SHRIMP	0.11	0.03	79.02	56.63	2.45	10.96	37.04	0.16	29.75	13.21
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	336.65	13.21	0.66	8.24	88.55	25.49	17.17	119.1	36.97	15.02
TOTAL INVERTS	336.65	13.21	0.66	8.24	88.55	25.49	17.17	119.1	36.97	15.02
Skates	0	0	0	0.54	0	0	2.72	0	0	0
Spiny Dogfish	0	0	7.26	9.15	1.35	10.18	6.94	0	48.84	23.73
Other	1.02	0.24	0.44	0.24	0.44	0	0	0.35	1.05	0.34
TOTAL CATCH	389.85	121.49	368.79	481.64	291.04	213.28	403.89	151.19	365.01	90.17

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Haul	61	62	63	64	65	66	67	68	69	70
Location	Uyak	Uyak	Uganik							
Month/Day/Year	10/11/05	10/11/05	10/11/05	10/11/05	10/12/05	10/12/05	10/12/05	10/12/05	10/12/05	10/12/05
Station	630	627	657	658	662	650	660	649	653	659
Longitude Start	153°47.3	153°51.5	153°25.0	153°22.7	153°24.2	153°30.7	153°31.6	153°31.7	153°31.4	153°31.3
Latitude Start	57°40.1	57°40.5	57°51.0	57°50.2	57°46.0	57°46.1	57°41.8	57°44.4	57°49.7	57°50.7
Heading, Degrees	321	282	298	306	320	20	167	3	180	184
Average Depth (m)	122	170	148	128	118	155	65	82	182	182
Distance Fished (km)	0.7	1.5	1.9	1.9	1.7	1.9	1.1	1.5	1.9	1.9
Bottom Temperature (°C)	7.4	7.3	6.7	6.6	6.7	6.7	7.8	7	6.9	6.9
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	86.36	494.65	179.66	76.88	62.99	70.81	68.55	32.27	25.04	21.25
Pacific Cod	0.88	12.93	7.99	0	0	2.97	14.04	0	6.8	2.21
Pacific Sandfish	0	0	0	0	0	0	0.2	0	0	0
Eulachon	2.59	2.13	0.33	0	0	0.35	0	0	0.19	0.31
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	2.29	0.19	0	3.54	0.46	0	0	0	1.35
Herring	1.55	0	0	0	0.06	0.35	41.16	0.81	0.16	0
Sculpins	0	0	0.16	16.63	0	0	0	0	0	0
Other Forage Fish	0	0	0	0	0.64	0	0	0	1.15	0.47
Other Roundfish	0	1.55	0.35	0	0.72	0.12	1.38	0	3.67	0.97
TOTAL ROUNDFISH	91.38	513.55	188.68	93.51	67.95	75.05	125.33	33.08	37.02	26.57
Arrowtooth Flounder	1.48	38.94	15.44	47.68	55.75	78.92	20.17	17.37	10.9	27.23
Flathead Sole	36.51	72.1	30.22	41.8	51.07	31.09	83.95	28.67	47.6	30.7
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	0.93	0	0	0	0	0	0	0	0	0
Pacific Halibut	0	0	0	3.33	7.64	0	0	0	0	2.88
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0	0	0	0	0	5.91	4.72	0	0
Other Flatfish	0	0	0	0	0	0	0	2.77	0	3.62
TOTAL FLATFISH	38.92	111.04	45.65	92.81	114.46	110.01	110.03	53.53	58.5	64.43
Pink Shrimp	6.6	55.32	29.73	10.24	35.34	46.41	0.01	0	71.19	68.88
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0.07	0	0	0	0	0	0.03	0	0	0
Sidestripe	0	2.97	1.44	0.19	0.06	3.04	0	0	6.13	7.42
Other Shrimp	0.04	0.73	0.03	0.05	0.57	0.29	0.02	0.01	0.49	0.36
TOTAL SHRIMP	6.71	59.02	31.2	10.49	35.97	49.74	0.06	0.01	77.8	76.66
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	103.96	15.46	43.11	134.72	42.99	40.76	56.44	25.53	69.39	131.47
TOTAL INVERTS	103.96	15.46	43.11	134.72	42.99	40.76	56.44	25.53	69.39	131.47
Skates	0	0	3.62	0.93	0	0.35	0	0	0	0
Spiny Dogfish	12.62	14.11	20.36	39.36	2.79	20.9	8.19	10.39	27.62	13.88
Other	0.19	0.91	0	0.21	0.43	0.17	1.43	0.3	0.19	0.16
TOTAL CATCH	253.78	714.09	332.61	372.03	264.58	296.98	301.48	122.84	270.52	313.17

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Haul	71	72	73	74	75	76	77	78	79	80
Location	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Marmot	Marmot	Marmot
Month/Day/Year	10/13/05	10/13/05	10/13/05	10/13/05	10/13/05	10/13/05	10/13/05	10/22/05	10/22/05	10/22/05
Station	282A	253B	252B	225A	226A	200D	201D	415	413	409
Longitude Start	153°43.2	153°36.6	153°45.9	153°43.0	153°33.7	153°36.9	153°27.8	152°36.9	152°37.1	152°39.5
Latitude Start	58°0.1	58°4.7	58°4.5	58°9.7	58°10.4	58°12.7	58°12.6	57°57.2	57°59.0	57°58.4
Heading, Degrees	48	38	20	33	36	28	38	271	32	207
Average Depth (m)	212	241	197	193	192	182	182	128	128	128
Distance Fished (km)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.3
Bottom Temperature (°C)	5.3	5.3	5.3	5.6	5.3	5.4	5.4	7.2	7.4	7.4
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	51.25	27.39	19.09	21.56	70.89	7.3	21.3	7.7	0.17	0.33
Pacific Cod	1.03	1.65	0	11.61	1.94	1.7	0	0	0	10.03
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0.11
Eulachon	0.8	0.16	1.56	3.08	1.28	1.58	3.67	0	0	0
Capelin	0	0	0	0	0	0	0	0.06	0.42	0.11
Rockfish	1.75	0.76	0.3	2.37	0.7	32.64	16.95	0.05	0	0
Herring	0.11	0	0	0	0	0	0.08	0.05	0.05	0.12
Sculpins	0	0	0.03	0.5	0.26	0	0	0.97	0	0.01
Other Forage Fish	0	0	0.1	0.24	0.23	1.18	0.56	0	0	0
Other Roundfish	2.13	5.9	0	0.24	0.02	2.95	0	3.48	0	0
TOTAL ROUNDFISH	57.07	35.85	21.07	39.6	75.33	47.35	42.57	12.32	0.64	10.7
Arrowtooth Flounder	37.51	106.92	34.64	59.71	20.32	68.25	55.86	36.43	14.86	33.62
Flathead Sole	0.02	0	22.82	22.51	14.01	140.24	18.76	68.62	20.18	41.97
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0.1	0.97	1.35	0.24	1.05	3.16	0.14	4.61	0.58	2.97
Dover Sole	0.7	0.97	0	0	0	0	0	0	0	0
Pacific Halibut	0	2.21	0	0.17	0.11	3.51	1.93	1.43	0	12.6
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	0	0	0	0	0	0	0
TOTAL FLATFISH	38.34	111.08	58.81	82.62	35.49	215.16	76.69	111.08	35.62	91.16
Pink Shrimp	21.8	2.2	41.48	141.64	70.38	168.99	101.06	6.05	1.15	14.32
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0.49
Sidestripe	3.19	1.66	12.56	5.3	10.95	2.65	6.09	0.47	0.04	0
Other Shrimp	0.19	0.1	1.01	1.14	0.18	0.95	1.65	0.75	0.01	0.13
TOTAL SHRIMP	25.18	3.96	55.05	148.08	81.51	172.59	108.79	7.27	1.2	14.94
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	4.83	13.91	30.97	1.43	11.92	24.54	6.72	13.21	12.65	3.58
TOTAL INVERTS	4.83	13.91	30.97	1.43	11.92	24.54	6.72	13.21	12.65	3.58
Skates	1.49	2.15	0	20.95	0	5.13	0	0	0	8.57
Spiny Dogfish	8.53	9.75	6.34	41.63	12.15	11.88	17.93	1.54	5.35	1.74
Other	0.1	0.42	0	0.47	0.12	7.69	0	0.36	0.17	1.21
TOTAL CATCH	135.53	177.11	172.25	334.77	216.52	484.34	252.7	145.79	55.62	131.9

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Haul	81	82	83	84	85	86	87	88	89	90
Location	Marmot	Marmot	Marmot	Marmot	Marmot	Marmot	Marmot Is	Marmot Is	Marmot Is	Marmot Is
Month/Day/Year	10/22/05	10/22/05	10/22/05	10/23/05	10/23/05	10/23/05	10/23/05	10/23/05	10/23/05	10/24/05
Station	435	407	402	433	423	429	99	10	39	490
Longitude Start	152°31.9	152°40.7	152°47.8	152°33.0	152°33.7	152°35.2	152°13.0	152°1.9	151°46.7	152°15.0
Latitude Start	57°57.9	57°55.7	57°52.7	57°59.2	58°0.2	58°8.0	58°2.8	58°1.6	57°59.0	58°12.7
Heading, Degrees	242	178	40	43	14	181	182	125	40	158
Average Depth (m)	124	106	82	181	190	113	137	157	128	122
Distance Fished (km)	1.9	1.7	1.9	1.9	1.9	1.9	1.7	1.9	1.9	1.5
Bottom Temperature (°C)	7.2	7.7	7.8	6.8	7	8	6.9	6.8	7.3	7.3
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	0.2	0.16	0.36	29.2	27.35	62.04	2.86	8.42	34.09	0.7
Pacific Cod	0.16	0	0	12.39	6.02	0	1.74	0	0	11.37
Pacific Sandfish	0	0	0	0	0	0	0	0	0	0
Eulachon	0	0	0	0	0	0	10.71	0.12	0	0
Capelin	0	0	0	0	0.03	0	0	0	0	0
Rockfish	0	0	0	0.54	1.62	0	1.23	0.51	1.43	0
Herring	0.19	0.03	0.46	0	0	0.32	0	0	0	0
Sculpins	0	8.9	0.07	0.14	0	0.11	0	0	0	0.02
Other Forage Fish	0	0	0	0.71	3.31	2.17	0.43	0	0	0
Other Roundfish	0.32	1.08	1.56	3.47	1.05	4.7	0.42	0.3	0	0.76
TOTAL ROUND FISH	0.87	10.17	2.45	46.46	39.38	69.35	17.39	9.35	35.52	12.85
Arrowtooth Flounder	65.87	59.97	32.88	93.45	107.67	8.81	49.99	50.77	25.5	149.09
Flathead Sole	17.56	74.97	41.48	76.78	83.46	175.36	101.84	10.96	6.9	344.15
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	14.37	0	0	5.56	2.44	0	7.28	2.42	5.41	0.93
Dover Sole	0	0	0	0	0	0	2	0	1.42	0
Pacific Halibut	0	0	2.02	6.35	9.42	0	0	0	8.51	8.39
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	8.65	0	0	0	0	0	0	0	0
TOTAL FLAT FISH	97.8	143.59	76.38	182.13	202.99	184.17	161.11	64.15	47.74	502.57
Pink Shrimp	4.91	0.38	0.37	92.97	181.48	16.63	30.6	1.18	0.07	72.67
Humpy Shrimp	0	0	0.01	0	0	0	0	0	0	0
Coonstripe	0	0	0.01	0	0	0	0	0	0	0
Sidestripe	0	0	0	2.04	3.45	1.12	0	0.01	0	0.18
Other Shrimp	0.09	0.43	0.05	0.43	0.79	0.33	0.1	0.01	0	0.18
TOTAL SHRIMP	5.01	0.81	0.43	95.44	185.73	18.08	30.71	1.2	0.07	73.03
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	7.55	18.62	6.07	0.14	1.07	10.68	4.15	0.63	1.22	0.27
TOTAL INVERTS	7.55	18.62	6.07	0.14	1.07	10.68	4.15	0.63	1.22	0.27
Skates	5.5	0	4.24	4.81	5.03	0	29.46	0	0	16.65
Spiny Dogfish	0	3.87	3.05	2.32	9.88	0	25.83	13.77	9.61	38.74
Other	0.98	0.82	0.79	1.85	1.39	0.11	0.14	0	1.42	0.47
TOTAL CATCH	117.71	177.89	93.41	333.15	445.46	282.4	268.78	89.09	95.57	644.57

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Haul	91	92	93	94	95	96	97	98	99	100
Location	Marmot Is	Marmot Is	Marmot Is	Marmot Is	Marmot Is	Marmot Is	Marmot Is	Marmot Is	Ugak	Ugak
Month/Day/Year	10/24/05	10/24/05	10/24/05	10/24/05	10/24/05	10/24/05	10/25/05	10/25/05	10/25/05	10/25/05
Station	493	499	470	478	522	18	109	13	124	122
Longitude Start	152°15.0	152°11.1	152°16.7	152°15.1	152°9.1	151°57.3	152°6.8	152°1.8	152°30.5	152°33.8
Latitude Start	58°9.6	58°6.8	58°5.8	58°5.8	58°6.0	58°2.3	57°56.3	57°56.5	57°22.8	57°22.8
Heading, Degrees	151	144	223	223	152	120	78	106	242	323
Average Depth (m)	149	182	155	159	219	137	155	199	82	95
Distance Fished (km)	1.9	1.9	1.7	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	7.1	6.8	7	6.8	6.8	6.8	6.8	6.7	8.5	8.5
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	32.27	20.21	43.65	43.82	6.53	0.18	28.38	32.63	672.67	349.38
Pacific Cod	7.26	8.1	20.22	10.47	0	5.72	0.33	0	9.83	3.1
Pacific Sandfish	0	0	0	0	0	0	0	0	0.24	0
Eulachon	0.12	2.74	2.25	23.46	2.39	0.18	0.18	0.94	0.73	1.17
Capelin	0	0	0.02	0	0	0	0	0	0	0
Rockfish	0	0.92	0	0.73	0	1.79	0	1.4	8.64	0
Herring	0	0	0	0	0	0	0	0.08	0	0.01
Sculpins	0.02	0	0.28	0	0	0	0	0	0	0
Other Forage Fish	0	0	0.28	0.55	0.48	0	0	0.63	0	0
Other Roundfish	0.26	8.61	0.89	3.36	1.43	1.7	8.42	1.07	4.3	0.35
TOTAL ROUNDFISH	39.94	40.58	67.59	82.39	10.82	9.58	37.32	36.76	696.42	354.01
Arrowtooth Flounder	26.5	189.47	56.71	96.19	78.15	210.7	20.41	121.9	72.22	22.99
Flathead Sole	82.09	376.89	143.31	152.57	177.31	6.01	11.46	14.28	48.31	26.7
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	4.91	0	2.25	6.36	0.02	0	0	0	0	0
Dover Sole	12.27	19.19	1.82	23.28	0	0	3.49	0	0	0
Pacific Halibut	0	4.77	0	0	2.32	1.35	2.02	0	2.64	8.66
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	0	0	0	0	0	0
TOTAL FLATFISH	125.78	590.32	204.09	282.4	257.79	218.06	37.38	136.17	123.17	58.35
Pink Shrimp	99.03	19.37	127.97	88.27	19.54	1.11	5.03	37.58	0.26	0.34
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	3.71	7.41	0.29	11.28	4.97	0	0	10.21	0	0
Other Shrimp	0.22	2	1.86	3.37	5.73	0.3	0.12	5.71	0.02	0.04
TOTAL SHRIMP	102.95	28.77	130.11	102.92	30.24	1.41	5.15	53.5	0.29	0.38
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	0.98	0.34	1.98	21	1.36	0.18	21.63	0.63	4.39	12.35
TOTAL INVERTS	0.98	0.34	1.98	21	1.36	0.18	21.63	0.63	4.39	12.35
Skates	0	0	6.03	7.6	18.69	33.63	0	14.03	57.41	0
Spiny Dogfish	1.89	28.48	0	7.82	14.09	11.07	22.65	69.84	220.81	190.57
Other	0.06	1.03	0.56	0.18	0.16	0.36	0.06	0.63	16.84	0.97
TOTAL CATCH	271.6	689.52	410.37	504.32	333.15	274.3	124.19	311.56	1119.33	616.63

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Haul	101	102	103	104	105	106	107	108	109	110
Location	Ugak	Ugak	Ugak	Ugak	Kiliuda	Kiliuda	Kiliuda	Kiliuda	Kiliuda	Kiliuda
Month/Day/Year	10/25/05	10/26/05	10/26/05	10/26/05	10/26/05	10/26/05	10/26/05	10/26/05	10/27/05	10/27/05
Station	119	112	129	138	166	162	157	158	153	148
Longitude Start	152°35.6	152°43.7	152°31.6	152°30.4	152°47.3	152°52.5	152°55.3	152°58.5	152°54.9	152°58.7
Latitude Start	57°24.8	57°27.9	57°20.7	57°17.9	57°13.7	57°14.7	57°16.9	57°18.2	57°14.6	57°12.6
Heading, Degrees	338	94	138	227	123	114	319	118	213	230
Average Depth (m)	96	91	95	102	137	109	91	87	107	118
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	8.5	7.8	7.7	6.9	7.5	7.9	8.1	7.6	6.9
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	76.92	327.28	315.17	866.55	29.08	6.65	80.82	235.1	90.14	31.55
Pacific Cod	8.56	2.29	11.74	5.02	5.35	13.75	0	9.1	0	0
Pacific Sandfish	0	0	0	0	0	0.02	0.04	0	0	0
Eulachon	4.56	0	2.05	0.43	3.77	1.71	8.48	3.15	1.48	1.07
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0.54	0.22	0	0	0.03	0.67	0	0	0	0
Herring	0	0	0	0	0	0	0.57	0	0	0.01
Sculpins	0	0	4.83	0	0	0	0.01	0	0	0
Other Forage Fish	0	0	0	0	0	0	0	0.01	0	0
Other Roundfish	0.28	0.22	2.79	0.16	0.28	0.44	0	0.89	0.43	0.16
TOTAL ROUNDFISH	90.86	330.01	336.58	872.17	38.5	23.24	89.91	248.24	92.05	32.79
Arrowtooth Flounder	29.34	28.91	1.32	0	2.21	2.7	11.84	45.1	14.96	18.68
Flathead Sole	48.43	54.84	22.09	38.98	20.91	30.75	20.32	31.81	18.44	104.14
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0	0	0	1.82	0	0	4.15	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pacific Halibut	34.22	0.32	5.32	0	0	0	0	0	5.69	0
Starry Flounder	0	0	0	0	0	0	5.82	0	0	0
Yellowfin Sole	0	4.55	0	0	0	0	0	0	0	0
Other Flatfish	0	0	0	0	6.73	4.83	0	0	5.33	0
TOTAL FLATFISH	111.99	88.62	28.73	38.98	29.85	40.1	37.99	76.91	48.57	122.82
Pink Shrimp	3.09	2.76	0.2	0.03	1.12	4.13	1.59	0.76	0.71	2.69
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	0	0.01	0	0	0	0	0	0	0	0
Other Shrimp	0.31	0.01	0.02	0.03	0.01	0.18	0.01	0.01	0.02	0.09
TOTAL SHRIMP	3.4	2.78	0.23	0.06	1.13	4.31	1.6	0.77	0.73	2.77
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	52.18	12.36	4	3.19	12.64	2.39	3.89	4.55	1.12	131.27
TOTAL INVERTS	52.18	12.36	4	3.19	12.64	2.39	3.89	4.55	1.12	131.27
Skates	0	20.35	0	0	0	0	0	0	0	0
Spiny Dogfish	9.69	54.87	35.04	3.81	0	0	0	0	0	0
Other	1.85	0.2	1.46	0.26	0.49	0.16	0.52	0.52	0.07	0.31
TOTAL CATCH	269.98	509.18	406.05	918.47	82.61	70.19	133.91	330.99	142.55	289.96

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Haul	111	112	113	114	115	116	117	118	119	120
Location	Kiliuda	Twoheaded								
Month/Day/Year	10/27/05	10/27/05	10/27/05	10/27/05	10/27/05	10/27/05	10/28/05	10/28/05	10/28/05	10/28/05
Station	143	203	206	213	221	215	223	227	235	238
Longitude Start	153°5.6	153°20.8	153°25.6	153°26.1	153°27.7	153°25.1	153°29.9	153°27.3	153°25.6	153°29.6
Latitude Start	57°12.0	57°9.8	57°5.6	57°1.8	56°59.7	57°0.8	56°58.6	56°57.8	56°55.7	56°55.0
Heading, Degrees	235	207	15	5	220	2	180	180	194	345
Average Depth (m)	120	109	118	124	126	115	129	137	137	128
Distance Fished (km)	1.9	1.9	1.7	0.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	7.2	7.5	7.8	7.5	7.2	8	7.3	7	7	7.1
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	55.68	309.5	719.21	251.75	104.41	261.82	307.36	21.19	5.14	16.68
Pacific Cod	3.46	0	0	41.04	0	14.42	6.53	0	0	1.4
Pacific Sandfish	0	0.09	0	0	0	0	0	0	0	0
Eulachon	2.3	11.87	0.43	6.26	0.2	0	20.23	0.21	0.07	8.99
Capelin	0	0.07	0.43	0	0	0	0	0	0	0
Rockfish	1.35	0	0	0.54	0	0	0.84	1.19	0	0.68
Herring	0	0	0	0	0	0.13	0	0.03	0	0
Sculpins	0	0	0	3.32	0	0	0	0	0	0
Other Forage Fish	0	0	0	0	0	0	0	0	0	0
Other Roundfish	1.24	0	0.18	0	2.08	1.27	0.24	0.11	1.51	0
TOTAL ROUNDFISH	64.03	321.54	720.24	302.91	106.69	277.64	335.2	22.72	6.72	27.76
Arrowtooth Flounder	63.74	97.52	34.5	15.45	35.75	7.29	44.69	102.49	38.34	13.83
Flathead Sole	95.48	57.81	29.18	7.63	13.46	17.69	25.16	7.45	6.32	4.92
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	6.14	0	0	0	4.52	0	1.58	4.93	2.27	0
Dover Sole	0	0	0	0	0	0	0	0	3.76	0
Pacific Halibut	0.62	0	0	0	0	0.76	0	1.35	5.69	0
Starry Flounder	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0	0	0	0	1.19	0	0	0	0
Other Flatfish	0	0	0	0	0	5.97	0	0	0	4.61
TOTAL FLATFISH	165.99	155.34	63.68	23.07	53.73	32.9	71.43	116.23	56.38	23.36
Pink Shrimp	2.44	0.53	0.26	1.17	3.75	16.12	5.05	0.62	0.91	6.22
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	0.01	0	0	0	0	0	0	0	0	0
Other Shrimp	0.02	0.1	0	0.1	0.1	0.14	0.1	0.03	0.01	0.08
TOTAL SHRIMP	2.46	0.63	0.26	1.27	3.85	16.25	5.14	0.65	0.93	6.3
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	67.48	231.15	49.05	81.05	26.58	11.13	7.96	23.5	20.07	49.41
TOTAL INVERTS	67.48	231.15	49.05	81.05	26.58	11.13	7.96	23.5	20.07	49.41
Skates	0	0	0	0	0	7.05	0	0	0	0
Spiny Dogfish	0	1.3	2.94	0	0	0	0	2.02	17.39	0
Other	0.26	1.17	2.56	0.98	0.29	0.6	0.35	0.1	0.57	0.08
TOTAL CATCH	300.22	711.12	838.73	409.29	191.14	345.57	420.09	165.23	102.05	106.91

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Haul	121	122	123	124	125	126	127	128	129	130
Location	Alitak	Alitak	Alitak	Alitak	Alitak	Alitak	Alitak	Alitak	Alitak	Alitak
Month/Day/Year	10/28/05	10/29/05	10/28/05	10/29/05	10/29/05	10/29/05	10/29/05	10/29/05	10/29/05	10/29/05
Station	326	317	319	320	308	304	303	294	298	289
Longitude Start	154°12.8	154°14.0	154°11.9	154°9.5	154°8.7	154°5.3	154°2.4	154°6.1	153°59.8	153°57.8
Latitude Start	56°47.9	56°51.1	56°49.5	56°48.1	56°51.9	56°51.3	56°52.8	56°54.0	56°55.3	57°1.2
Heading, Degrees	280	132	66	50	36	32	257	30	47	215
Average Depth (m)	32	45	40	49	53	64	58	82	69	159
Distance Fished (km)	1.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Bottom Temperature (°C)	8.3	8.4	8.1	7.8	7.9	7.8	7.9	7.1	8.1	4
Performance	1	1	1	1	1	1	1	1	1	1
	kg/km towed									
Pollock	0	0.73	0.24	8.82	4.76	1.27	8.92	41.12	39.03	204.11
Pacific Cod	12.93	1.94	1.84	0.05	0	9.99	3.67	10.58	0	1.03
Pacific Sandfish	0	0.51	0.01	0	0.59	0	0	0.19	2.8	0
Eulachon	0	0	0	0	0	0	0	2.28	0.77	0.11
Capelin	0	0	0	0	0	0	0	0	0	0
Rockfish	0	0	0	0	0	0	0	0	0	0.11
Herring	0	0.03	0.08	0.94	1.37	0.28	0.43	0.03	0.54	0
Sculpins	0	0	0	0.05	0	0	0	0	0	8.78
Other Forage Fish	0	0	0	0	0	0	0	0	0	9.33
Other Roundfish	0	5.43	3.83	30.12	2.01	6.89	10.34	0.79	12.19	4.4
TOTAL ROUNDFISH	12.93	8.64	6.01	39.98	8.72	18.43	23.36	54.98	55.33	227.88
Arrowtooth Flounder	0	0.73	0.62	1.72	0.74	1.15	0.22	3.59	7.44	11.09
Flathead Sole	0	4.64	1.75	3.44	3.59	13.05	10.01	22.28	34.39	19.65
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0.08	0	0	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pacific Halibut	0.21	1.03	0.31	0.38	0	2.11	0	0	0	3.13
Starry Flounder	195.66	0.81	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0.7	0.86	0.47	1.56	11.06	2.23	0	1.55	0
Other Flatfish	0.01	1.05	2.7	1.04	0	0.92	0	0.61	0	0
TOTAL FLATFISH	195.89	9.04	6.25	7.06	5.9	28.29	12.46	26.48	43.38	33.87
Pink Shrimp	0.02	0	0	0	0	0	0	5.84	0.37	8.22
Humpy Shrimp	0	0	0	0	0	0	0	0	0.01	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	0	0	0	0	0	0	0	0.03	0	18.08
Other Shrimp	0.05	0.01	0.02	0.04	0.05	0.01	0.01	0.1	0.01	0.6
TOTAL SHRIMP	0.07	0.01	0.02	0.04	0.06	0.01	0.01	5.97	0.39	26.9
Euphasiid	0	0	0	0	0	0	0	0	0	0
Other Inverts	4.78	3.25	2.04	2.34	30.51	6.55	2.72	9.03	20.98	40.19
TOTAL INVERTS	4.78	3.25	2.04	2.34	30.51	6.55	2.72	9.03	20.98	40.19
Skates	0	0	0	0	0	0	0	0	0	0
Spiny Dogfish	0	0	0	0	0	0	0	2.24	0	0
Other	0.98	0	0	1.88	1.25	0.72	0.33	3.36	0.87	0
TOTAL CATCH	214.63	20.94	14.32	51.3	46.44	54	38.88	102.05	120.95	328.83

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Haul	131	132
Location	Alitak	Alitak
Month/Day/Year	10/30/05	10/30/05
Station	281	285
Longitude Start	153°48.3	153°56.4
Latitude Start	57°7.6	57°3.4
Heading, Degrees	215	209
Average Depth (m)	118	162
Distance Fished (km)	1.9	1.9
Bottom Temperature (°C)	4.4	4
Performance	1	1
	<u>kg/km towed</u>	
Pollock	61.34	117.95
Pacific Cod	19.82	0.65
Pacific Sandfish	0	0
Eulachon	0	0
Capelin	0	0
Rockfish	0	0
Herring	0	0
Sculpins	0	13.05
Other Forage Fish	0.8	28.16
Other Roundfish	1.49	2.24
TOTAL ROUND FISH	83.44	162.04
Arrowtooth Flounder	23.69	14.08
Flathead Sole	151.97	19.06
Rock Sole	0	0
Rex Sole	0	0.17
Dover Sole	0	0
Pacific Halibut	16.26	10.15
Starry Flounder	0	8.41
Yellowfin Sole	6.07	0
Other Flatfish	0	0
TOTAL FLAT FISH	197.99	51.87
Pink Shrimp	12.81	13.37
Humpy Shrimp	0	0
Coonstripe	0.06	0
Sidestripe	0	30.13
Other Shrimp	0.17	0.45
TOTAL SHRIMP	13.05	43.95
Euphasiid	0	0
Other Inverts	16.82	12.36
TOTAL INVERTS	16.82	12.36
Skates	0	0
Spiny Dogfish	10.29	0
Other	0.23	1.37
TOTAL CATCH	321.81	271.6

APPENDIX B. FISH LENGTHS

Appendix B1.-Adult walleye pollock lengths from the 2005 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
13	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2
14	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
15	0	0	0	0	0	0	0	0	1	2	0	0	4	0	7
16	0	0	0	0	0	0	0	1	1	2	0	2	5	0	11
17	0	0	0	0	0	0	0	0	2	30	0	8	33	0	73
18	0	0	0	0	0	0	2	1	4	45	0	6	69	0	127
19	1	1	0	0	0	0	2	5	8	128	1	18	146	0	310
20	0	1	0	0	0	0	9	1	5	87	2	11	132	0	248
21	0	7	0	0	0	0	21	5	22	97	4	10	108	0	274
22	1	2	0	0	0	0	18	19	30	41	0	1	32	0	144
23	1	5	2	0	0	0	21	34	52	60	8	9	12	0	204
24	3	0	4	0	0	0	6	24	45	26	3	2	4	0	117
25	2	3	18	0	0	0	8	48	56	24	4	5	7	0	175
26	1	4	21	0	0	0	5	23	37	10	4	2	3	0	110
27	3	4	32	0	0	1	6	17	31	10	1	5	4	5	119
28	1	5	23	0	2	1	4	2	9	2	0	1	2	1	53
29	1	3	15	0	1	1	6	8	4	11	1	2	9	1	63
30	2	1	6	1	0	0	4	1	2	10	1	0	11	1	40
31	0	0	0	0	0	1	3	0	0	18	0	2	8	3	35
32	0	0	1	0	1	1	5	3	0	11	0	0	7	3	32
33	1	0	0	0	0	0	5	0	0	16	0	0	2	9	33
34	0	0	0	0	0	0	5	2	0	11	0	0	1	12	31
35	0	0	0	0	0	0	8	0	1	15	0	0	1	22	47
36	0	0	0	1	0	1	1	1	0	7	0	1	2	24	38
37	0	0	1	0	0	2	4	8	0	11	0	0	1	47	74
38	1	0	5	0	1	3	0	11	1	5	0	1	3	34	65
39	1	0	5	4	3	8	1	19	1	4	0	1	5	47	99
40	1	0	6	1	2	8	0	8	2	5	0	0	1	20	54
41	0	0	9	1	2	19	0	15	0	4	0	0	4	25	79
42	0	0	12	0	6	20	0	9	1	1	0	0	7	8	64
43	3	0	10	7	8	21	3	6	1	0	0	0	5	14	78
44	4	0	13	5	5	18	3	3	2	1	0	0	4	14	72
45	5	1	5	5	9	15	1	3	5	0	0	1	3	27	80

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length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
46	4	0	4	8	7	15	2	0	3	0	0	1	10	25	79
47	7	0	9	8	12	2	1	0	5	1	0	2	5	32	84
48	5	2	3	14	10	4	2	0	0	1	0	2	8	33	84
49	0	2	6	16	15	10	3	0	3	1	0	1	4	56	117
50	3	1	4	13	12	9	4	1	5	0	0	1	5	27	85
51	0	4	3	14	11	7	1	4	5	0	0	3	8	30	90
52	1	3	10	24	5	5	0	4	3	0	0	1	4	16	76
53	0	3	5	13	6	8	4	4	4	0	0	1	8	30	86
54	0	2	0	16	6	12	0	0	1	0	0	2	2	13	54
55	1	2	1	24	5	6	4	4	2	1	0	2	3	18	73
56	2	1	1	16	7	15	2	0	3	0	0	0	1	3	51
57	1	1	2	14	7	13	1	1	2	0	0	1	2	11	56
58	0	1	0	13	5	7	1	1	0	0	0	0	1	5	34
59	0	5	2	14	4	10	4	0	2	0	0	4	0	4	49
60	1	1	1	8	2	9	2	2	0	0	0	4	1	1	32
61	1	2	2	7	4	6	0	1	1	0	0	1	0	2	27
62	0	1	1	4	2	6	4	0	1	0	0	1	1	1	22
63	0	2	0	5	4	7	3	0	2	0	0	1	1	1	26
64	0	1	1	3	2	3	4	0	2	0	0	0	0	0	16
65	0	1	0	2	4	4	3	0	1	1	0	2	0	0	18
66	0	1	0	2	1	2	3	0	0	0	0	1	0	0	10
67	0	0	0	3	0	2	2	0	0	0	0	0	0	1	8
68	0	0	0	0	1	4	2	1	0	0	0	0	0	1	9
69	0	0	0	1	1	1	1	0	0	0	0	0	0	0	4
70	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
71	0	1	0	0	3	1	1	0	0	0	0	0	0	0	6
72	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
73	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1

Appendix B2.-Juvenile walleye pollock lengths from the 2005 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
7	0	0	0	0	0	0	0	0	0	2	0	0	5	0	7
8	4	0	1	0	0	0	0	8	8	11	0	2	66	1	101
9	8	19	4	0	0	0	7	56	83	56	2	8	221	2	466
10	22	68	15	0	1	4	27	141	110	103	29	55	219	39	833
11	55	213	37	5	22	21	74	201	94	97	112	60	102	161	1254
12	49	114	43	12	43	37	123	79	33	40	151	39	26	224	1013
13	38	30	31	18	35	21	112	42	5	11	85	8	1	200	637
14	10	9	30	23	9	10	66	6	0	1	29	1	2	54	250
15	11	3	14	28	2	7	37	0	0	1	3	0	0	6	112
16	4	1	6	12	2	2	9	0	0	0	0	0	0	1	37
17	1	0	0	5	1	0	1	0	0	0	0	0	0	0	8

Appendix B3.-Flathead sole lengths from the 2005 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
7	0	0	0	0	0	0	0	0	0	1	0	0	2	0	3
8	1	1	0	0	0	0	0	3	2	1	0	0	4	1	13
9	5	7	2	0	1	0	1	2	6	1	1	1	7	1	35
10	5	7	1	0	2	4	1	3	8	1	3	2	4	6	47
11	2	15	2	0	2	2	0	4	0	3	0	3	0	4	37
12	4	11	2	2	2	2	2	1	3	3	1	12	1	5	51
13	5	12	1	0	2	0	1	1	4	2	1	6	5	20	60
14	7	12	4	0	0	0	4	3	10	2	4	3	0	18	67
15	16	14	1	0	1	2	8	4	4	3	4	0	4	37	98
16	9	4	2	1	2	3	4	5	2	1	3	0	5	15	56
17	7	5	3	1	1	3	2	1	4	3	9	1	1	14	55
18	4	4	6	1	1	2	5	2	2	0	1	2	2	9	41
19	6	4	2	3	0	2	5	4	1	0	1	4	1	15	48
20	7	4	4	2	1	4	5	1	0	0	1	5	2	23	59
21	7	9	2	2	0	1	5	3	2	3	3	0	0	27	64
22	7	9	5	2	1	8	17	2	3	3	3	0	1	15	76
23	7	3	10	1	0	2	18	3	7	1	4	0	3	19	78
24	14	2	9	2	1	5	27	3	1	1	2	0	1	18	86
25	10	8	10	6	1	6	29	7	11	5	2	0	3	23	121
26	6	5	6	5	1	10	25	7	6	8	0	3	2	14	98
27	17	7	8	6	2	9	30	18	11	11	0	1	3	30	153
28	10	2	13	5	4	8	32	17	13	13	1	1	4	19	142
29	22	7	11	3	3	15	25	19	33	14	0	0	14	45	211
30	13	12	16	4	7	12	22	20	21	12	0	2	8	39	188
31	21	17	18	6	13	17	33	41	41	17	0	3	9	69	305
32	26	20	31	8	15	17	20	22	23	9	0	3	9	48	251
33	22	13	26	19	18	20	12	32	23	27	0	6	11	53	282
34	25	28	22	9	23	8	15	19	18	19	1	10	19	34	250
35	33	23	14	9	22	5	15	26	22	24	0	9	19	29	250
36	15	23	19	9	19	5	6	20	13	13	0	6	10	16	174
37	22	24	16	6	21	4	10	32	13	17	0	1	11	19	196
38	17	23	15	8	21	3	8	11	11	11	0	4	20	8	160
39	14	20	8	4	10	2	3	10	8	10	0	6	4	8	107
40	12	17	8	4	11	1	1	4	6	6	0	4	7	5	86
41	10	17	4	2	11	3	2	6	5	8	0	5	6	9	88
42	4	16	5	1	5	3	1	5	2	9	0	1	4	3	59
43	4	6	2	0	8	0	2	5	2	9	0	5	1	7	51
44	3	7	3	4	2	2	1	1	1	5	0	1	0	3	33
45	4	9	1	4	3	1	1	0	1	4	0	3	0	0	31
46	0	2	1	2	1	0	0	0	0	5	0	3	0	1	15
47	0	2	2	0	2	0	0	0	0	2	0	0	0	1	9
48	1	0	0	0	0	0	0	0	0	2	0	0	0	0	3
49	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
51	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
53	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Appendix B4.-Pacific cod lengths from the 2005 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
10	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
11	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
12	0	1	0	0	0	0	0	0	0	0	2	0	0	0	3
13	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4
14	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9
15	0	1	0	0	0	0	1	0	0	0	10	0	0	1	13
16	0	0	0	0	0	0	0	0	0	0	8	0	0	1	9
17	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4
18	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
20	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
25	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
29	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
30	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
31	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
32	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
34	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
36	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
37	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
39	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
41	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
43	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
44	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2
45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
46	0	0	0	0	0	0	1	0	0	1	1	0	0	0	3
48	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
49	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
50	0	0	0	0	1	0	2	0	0	0	0	0	0	3	6
51	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2
52	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
53	1	1	1	1	0	1	0	0	0	0	0	2	0	0	7
54	0	0	0	0	0	0	1	1	0	0	0	0	0	1	3
55	0	0	0	0	0	0	2	0	0	1	0	0	1	4	8
56	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
57	0	0	0	2	0	0	2	0	0	2	0	2	0	4	12
58	0	0	0	1	1	1	0	1	0	0	0	0	0	4	8
59	1	1	1	3	0	2	1	0	0	1	0	1	0	8	19
60	1	1	1	1	0	1	0	0	0	0	0	2	0	4	11
61	0	2	1	0	1	2	1	0	0	1	0	3	2	0	13

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length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
62	1	2	1	2	2	0	0	1	0	1	0	0	0	2	12
63	1	1	0	1	0	1	1	0	0	0	0	3	0	4	12
64	0	2	1	0	2	0	0	1	0	1	0	1	0	4	12
65	0	2	0	0	0	1	5	1	2	3	0	6	1	3	24
66	0	0	1	1	2	0	1	1	0	1	0	0	1	2	10
67	2	4	1	1	1	0	0	1	0	0	0	4	0	1	15
68	1	3	1	2	0	0	0	0	0	2	0	2	0	0	11
69	2	1	1	1	0	1	1	1	0	3	0	1	1	4	17
70	0	0	1	0	2	0	4	0	0	1	0	2	1	0	11
71	1	2	1	0	1	2	0	3	1	1	0	1	0	3	16
72	0	1	0	0	0	1	3	0	0	1	0	0	0	0	6
73	1	1	1	2	0	1	0	0	0	0	1	1	0	0	8
74	0	1	0	1	0	0	1	1	1	0	0	2	0	0	7
75	0	1	2	0	0	0	0	0	0	1	0	2	0	0	6
76	0	1	0	0	0	0	1	0	0	0	0	0	0	1	3
77	0	0	0	0	0	1	2	0	0	1	0	1	0	1	6
78	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
79	0	0	0	1	0	1	0	0	0	3	0	0	0	0	5
80	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
81	0	0	0	0	1	0	0	0	1	1	0	0	0	1	4
83	1	1	0	0	0	1	0	0	0	0	0	0	0	0	3
85	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2
86	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
87	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
88	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
91	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
95	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1

Appendix B5.-Arrowtooth flounder lengths from the 2005 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7	1	1	0	1	1	0	0	1	0	0	0	0	0	0	5
8	0	1	1	1	0	0	0	1	0	0	0	0	0	0	4
9	3	2	0	1	0	3	1	0	0	0	0	2	0	0	12
10	1	0	1	3	4	1	16	0	0	1	0	0	1	0	28
11	3	0	2	6	2	3	11	0	0	0	0	0	2	0	29
12	0	0	0	3	0	3	1	0	0	0	0	0	6	0	13
13	1	1	0	2	1	0	0	0	0	1	0	0	7	0	13
14	0	0	0	0	0	1	0	0	0	1	0	1	7	3	13
15	4	1	1	1	0	0	0	1	2	7	1	0	5	2	25
16	8	11	0	0	0	0	1	4	7	3	0	3	6	3	46
17	24	21	1	0	0	1	4	3	4	9	0	7	4	3	81
18	36	31	6	2	2	7	7	5	4	4	0	6	0	5	115
19	60	47	17	1	0	10	10	3	2	8	0	9	0	15	182
20	44	31	13	4	0	12	13	1	1	0	0	5	1	6	131
21	18	25	12	4	0	5	20	3	1	0	0	1	1	7	97
22	8	5	10	1	0	5	12	3	1	1	1	1	0	1	49
23	9	8	5	2	0	2	6	10	2	4	0	4	1	6	59
24	3	4	1	1	0	2	4	5	2	3	0	2	1	11	39
25	8	7	3	3	1	4	3	15	4	9	0	0	3	11	71
26	1	11	2	1	3	3	10	9	2	2	0	0	1	16	61
27	7	18	2	3	0	4	10	8	2	5	0	0	1	22	82
28	3	9	5	2	1	0	10	4	5	5	0	1	4	19	68
29	10	12	1	3	0	3	9	3	2	3	0	2	5	16	69
30	2	9	1	2	1	2	4	1	1	3	0	2	6	4	38
31	10	8	2	2	0	1	8	3	2	3	0	1	5	8	53
32	2	8	0	1	3	3	5	2	0	1	0	3	3	5	36
33	6	12	0	2	3	4	6	6	2	1	0	1	10	7	60
34	6	16	3	6	2	2	5	6	0	1	0	1	6	5	59
35	7	14	4	2	1	3	5	6	2	4	0	1	10	9	68
36	6	13	2	0	3	4	4	2	3	0	0	3	12	9	61
37	13	11	2	5	2	3	4	8	0	6	0	1	11	9	75
38	9	9	3	1	2	2	2	3	2	1	0	0	17	6	57
39	7	9	1	1	1	5	2	13	4	7	0	6	12	8	76
40	4	7	0	2	1	2	0	4	2	1	0	2	17	7	49
41	2	14	3	1	1	2	0	11	1	5	0	1	34	4	79
42	1	11	3	1	0	3	1	2	2	2	0	0	11	2	39
43	1	7	1	0	0	3	0	4	8	9	0	1	17	2	53
44	0	8	2	1	1	2	1	1	2	5	0	1	5	1	30
45	8	7	1	1	1	3	1	0	0	6	0	0	18	6	52

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length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
46	2	4	1	5	1	2	0	2	2	2	0	1	8	3	33
47	5	7	3	3	2	0	0	3	2	3	0	1	8	7	44
48	3	13	3	1	1	1	2	1	0	2	0	0	2	2	31
49	6	8	2	1	1	4	0	4	1	3	0	2	5	3	40
50	1	2	0	0	1	2	0	3	2	0	0	0	4	1	16
51	1	8	1	1	0	2	1	3	4	1	0	1	3	1	27
52	0	4	1	0	0	2	0	0	0	3	0	0	1	0	11
53	1	2	0	0	1	2	0	1	4	4	0	1	6	1	23
54	0	3	0	0	1	3	0	0	1	2	0	0	7	0	17
55	0	4	0	1	2	1	0	1	0	1	0	1	6	2	19
56	0	9	0	0	1	1	0	0	0	0	0	1	0	0	12
57	3	5	2	0	4	2	0	1	1	1	0	0	4	3	26
58	0	3	0	0	0	3	0	0	0	0	0	0	1	1	8
59	0	6	1	0	1	2	0	0	1	1	0	2	5	0	19
60	0	5	1	0	0	3	0	1	0	0	0	0	3	1	14
61	1	2	0	1	0	3	0	0	1	3	0	2	3	1	17
62	4	0	0	0	3	5	0	0	3	1	0	1	5	2	24
63	3	0	1	1	0	7	0	0	0	2	0	1	2	0	17
64	2	2	1	0	1	1	0	0	0	2	0	0	2	0	11
65	5	1	1	0	3	1	0	1	1	0	0	0	0	0	13
66	0	1	0	0	1	2	0	0	0	2	0	0	0	0	6
67	0	0	2	0	0	0	0	0	1	0	0	0	2	0	5
68	2	0	1	0	0	3	0	0	1	1	0	0	0	2	10
69	1	0	0	0	0	1	0	0	1	0	0	0	1	2	6
70	1	0	0	0	0	2	0	0	1	0	0	0	0	0	4
71	1	0	0	0	0	0	0	0	2	1	0	0	0	0	4
72	1	0	1	0	0	0	0	0	0	0	0	0	1	0	3
73	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
75	0	0	1	0	1	1	0	0	0	0	0	0	1	0	4
77	1	0	1	1	0	0	0	0	0	0	0	0	0	0	3
78	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
79	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
81	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1

Appendix B6.-Eulachon lengths from the 2005 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
7	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	5	0	0	0	0	0	1	2	8
9	0	0	0	1	1	0	26	31	1	0	0	1	2	1	64
10	0	0	0	0	3	0	30	72	0	0	0	0	0	2	107
11	0	2	1	0	6	1	25	92	3	0	0	3	0	2	135
12	0	4	0	2	5	0	9	11	2	1	0	1	0	1	36
13	0	3	0	4	5	0	0	2	1	1	0	2	1	0	19
14	0	3	2	3	3	2	1	1	0	0	0	11	1	0	27
15	0	11	1	2	6	0	0	4	0	2	0	17	3	2	48
16	0	8	0	0	4	3	1	5	0	1	0	0	4	2	28
17	0	16	1	1	4	4	1	9	1	3	0	2	13	4	59
18	0	8	0	0	8	2	0	5	0	0	0	1	15	1	40
19	0	7	0	2	26	11	1	8	2	6	0	1	39	1	104
20	0	24	0	15	35	21	1	1	0	3	0	3	35	0	138
21	0	11	0	13	42	46	0	1	1	2	0	2	28	0	146
22	0	1	2	2	5	21	0	0	0	0	0	0	10	0	41
23	0	0	1	1	2	5	0	0	0	1	0	0	2	0	12
24	0	0	1	0	0	2	0	0	0	0	0	0	0	0	3

Appendix B7.-Spiny dogfish lengths from the 2005 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
55	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
58	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
59	0	1	0	1	0	0	0	1	0	0	0	0	0	0	3
60	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2
61	0	0	0	1	0	1	0	1	2	0	0	0	2	0	7
62	0	1	0	0	0	0	0	0	2	0	0	2	0	0	5
63	0	2	0	4	0	0	0	2	2	0	0	1	2	0	13
64	0	0	0	3	0	0	0	0	2	1	0	0	0	0	6
65	0	5	0	9	0	1	0	5	3	0	0	0	7	0	30
66	0	1	0	5	0	0	0	0	2	0	0	0	3	0	11
67	0	7	1	6	0	3	0	7	4	0	0	2	4	0	34
68	0	1	0	4	0	0	0	1	2	0	1	0	0	0	9
69	0	14	0	6	0	2	1	10	6	2	1	1	11	0	54
70	0	5	2	4	0	0	0	1	3	2	0	1	2	0	20
71	0	16	2	8	0	0	0	11	11	2	0	4	2	0	56
72	1	4	1	6	0	2	0	0	0	0	0	0	1	0	15
73	0	15	1	5	0	2	0	9	9	2	0	3	11	0	57
74	0	2	2	1	0	0	0	0	2	3	0	4	5	0	19
75	3	15	3	8	0	2	0	5	6	1	1	3	14	0	61
76	1	7	0	1	0	0	0	2	2	4	0	1	2	0	20
77	1	13	0	5	0	0	1	3	2	4	0	1	13	0	43
78	0	5	0	2	0	0	0	3	1	4	0	0	2	0	17
79	2	10	0	3	0	0	0	1	5	1	0	0	3	0	25
80	0	2	0	1	0	0	0	1	0	0	0	2	6	0	12
81	1	5	0	1	0	0	1	2	5	5	0	2	4	0	26
82	0	4	0	0	0	0	0	0	1	0	0	0	3	0	8
83	0	10	0	4	0	0	0	4	3	2	0	1	7	0	31
84	0	0	0	2	0	0	0	2	0	3	1	1	0	0	9
85	1	3	0	2	0	1	1	1	1	5	0	0	4	0	19
86	0	1	1	0	0	1	0	0	2	1	0	0	1	0	7
87	2	4	2	0	0	0	0	3	3	2	0	0	4	0	20
88	0	0	0	0	0	0	1	0	1	0	0	1	0	0	3
89	2	1	2	2	0	0	0	3	4	2	0	2	0	0	18
90	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
91	0	0	0	1	0	1	1	0	2	2	0	0	1	0	8
92	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
93	0	0	0	0	0	0	0	1	1	2	0	1	0	0	5
94	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
95	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
96	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
97	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1

Appendix B8.-Pacific sandfish lengths from the 2005 Westward Region small-mesh trawl survey.

length (cm)	Marmot Bay	Marmot Island	Chiniak Bay	Ugak Bay	Kiliuda Bay	Twoheaded Is	Alitak Bay	Uyak Bay	Uganik Bay	Kukak Bay	Wide Bay	Puale Bay	Shelikof Strait	Pavlof Bay	Total
9	0	0	0	0	0	0	0	0	0	0	12	1	0	0	13
10	0	0	0	0	0	0	2	0	0	0	94	8	0	0	104
11	0	0	4	1	0	0	10	0	0	0	212	37	0	0	264
12	0	0	1	1	2	1	14	0	0	0	88	30	0	0	137
13	0	0	1	0	0	0	11	0	0	1	19	5	0	0	37
14	0	0	0	0	0	0	3	0	0	1	2	1	0	0	7
15	0	0	0	0	0	0	1	0	0	0	4	0	0	0	5
16	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
18	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
19	0	0	0	0	0	0	5	0	0	1	2	1	0	0	9
20	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
21	0	0	0	0	0	0	9	0	0	0	0	0	0	0	9
22	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2