TRAWL SURVEY OF SHRIMP AND FORAGE FISH ABUNDANCE IN THE KODIAK DISTRICT, 2001

By

Michael P. Ruccio

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ABSTRACT

The Alaska Department of Fish and Game (ADF&G) conducted a small-mesh-net bottom trawl survey for shrimp and forage fish from September 17 to October 16, 2001 in waters of the Kodiak District. The purpose of the survey was to assess relative shrimp biomass within the district and compare the results to established thresholds for commercial fishery openings. Secondary objectives included generating relative abundance indices for forage fish, obtaining species composition data, length frequencies from commercially important groundfish and shrimp, and tagging Pacific cod *Gadus macrocephalus* as part of a mark-recapture study.

A standard, high opening shrimp research trawl net with 3.1 cm stretch mesh throughout the mouth, body, and codend was used to complete 96 tows. Stations were selected in established strata using a random number generator with tows conducted for a standard distance of 1.85 km. The entire catch or each tow was weighed and sorted and commercially important groundfish, shrimp, and forage fish were sampled for species identification and in some cases length and weight data. Population estimates were generated using an area swept technique.

Only two sections in the Kodiak District were above the department's established minimum acceptable biomass indices (MABIs) used as a threshold for opening commercial shrimp fishing. Sections above threshold were the Wide and Inner Marmot Bay. However, these sections are largely located within non-pelagic trawl closure areas that include shrimp and beam trawl net closures. Sufficient area where non-pelagic trawls are permitted does not exist within these two sections to allow a commercial fishery to occur. All other surveyed sections remain below MABI levels required for consideration of commercial fishing opening. Most sections remain well below historic population levels and exhibited only minor changes from the survey conducted in 1998. Therefore, only the General Section that has no MABI threshold will open for shrimp trawling in 2002/03.

Catch composition in the 2001 survey was approximately 26.0% shrimp and 74.0% fish. In the survey conducted in 1998, catch composition was 8.0% shrimp and 92.0% fish. In both surveys, the primary shrimp species captured was the northern or pink shrimp *Pandalis 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 district with Pacific sandfish *Trichodon trichodon* and eulachon *Thaleichthys pacificus* as the most frequent occurrences in the survey catches.

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) conducted a small-mesh-net bottom trawl survey for shrimp and forage fish from September 17 to October 16, 2001. The survey focused on historically productive shrimp areas in inshore waters around Kodiak Island, Shelikof Strait, and bays along the south side of the Alaska Peninsula. The area surveyed included the Kodiak District for shrimp management listed in section 5 of the Alaska Administrative Code (5 AAC 31.505). The survey was a platform of opportunity for assessing forage fish distribution and abundance.

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 stock assessment trawl survey program began in 1970. Information on previous shrimp trawl assessment surveys and the commercial fishery logbook program is available in the ADF&G Regional Information Report series.

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. Table 1 contains information on the historic commercial trawl shrimp effort and harvest from the Kodiak District from 1958 to 2001 (Ruccio et al. 2002). Commercial shrimp harvest peaked in the 1971 season at over 82 million pounds. Commercial effort peaked in the 1974/75 commercial fishery when 75 vessels participated. As stocks declined and commercial fishing effort decreased, the level of research conducted by ADF&G also decreased. Over time, the department was subject to greater budgetary constraints and shrimp staff positions were reduced or re-tasked. The last full-time shrimp biologist position was eliminated in 1987. Trawl assessment surveys of shrimp stocks were first reduced from spring and fall surveys to a single fall survey in 1986. Further reductions resulted in the shrimp survey being conducted biennially beginning in 1987 and triennially beginning in 1989. The scope of areas being covered by the shrimp surveys has also declined since the early 1980s as a function of budget constraints.

In 1998, the North Pacific Fishery Management Council (NPFMC) and in 1999 the Alaska Board of Fisheries (BOF) adopted prohibitions on directed take of forage fish in the North Pacific and Bering Sea. In their actions, both state and federal regulations capped bycatch of forage fish at very conservative levels. 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 many commercially important groundfish species and marine mammals. ADF&G has not previously conducted forage fish research per se, but has provided catch data from small-mesh surveys to other agencies and researchers. Information on forage fish from previous surveys has been integrated into several publications (Anderson et al. 1997a, Anderson et al. 1997b, Piatt 1999).

OBJECTIVES

The objective of the 2001 shrimp and forage fish survey was to assess the relative stock abundance of shrimp in the Kodiak District. These indices of abundance will be used for comparison to established MABIs to see if sufficient population levels exist for commercial fishery openings.

Secondary objectives of the 2001 survey were:

- Generate relative abundance estimates of forage fish species from the areas trawled.
- Determine species composition of the catch by haul and area.
- Obtain length frequency distributions for commercially important shrimp and fish species.
- Obtain composition samples of shrimp for each strata surveyed; analyze each sample for sex and length frequency.
- Floy-tag[1] Pacific cod *Gadus macrocephalus* captured during the survey as part of an ongoing mark-recapture project to study migration and growth patterns of that species.
- Compare relative abundance of shrimp to recent and historic survey data to make inferences about population trends.

METHODS

Trawl Descriptions and Procedures

The 27.4 m ADF&G research vessel *Resolution* was used to trawl areas of known historic shrimp habitat and areas of historic commercial exploitation. An 18.6 m trawl with a three bridle high opening was used. This net was initially developed by the National Marine Fisheries Service (NMFS) and had been 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 a 17.0 m tickler chain suspended by 29.0 cm dropper chains. The trawl was attached to Astoria semi-vee trawl doors with three 18.2 m dandylines 1.8 cm in diameter. The Astoria semi-vee trawl doors weighed 340.0 kg each and measured 1.7 m by 2.7 m. Net 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 cod end. 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 4.0 m (Watson 1987).

Bays to be surveyed were divided into strata based on known historic shrimp population areas. In some smaller bays, this division was not necessary. Within the stratum or bay, each survey area was divided into blocks of four stations. 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

[1] Use of trade names does not constitute an endorsement by ADF&G.

towed at a speed of 3.7 km/hour and for a distance of 1.85 km. Several stations were not trawled for the full 1.85 km due to untrawlable bottom types. Total distance towed was recorded by Differential Global Position System (DGPS) readings.

Total catch was weighed to the nearest two kilogram increments by lifting the cod end with a crane scale. The entire haul was sampled for commercially important species including: sablefish *Anoplopoma fimbria*, Pacific cod, Walleye pollock, Pacific halibut *Hippoglossus stenolepis*, all rockfish species *Sebastes* and *Sebastolobus*, lingcod *Ophidion 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 *Culpea pallasi*. In many 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 m^2 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 cod end. The splitting net was then lifted up though 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 speciated, enumerated, and weighed to the nearest kilogram. A second 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 each trawl station where sufficient shrimp were available, 300 shrimp (typically pink shrimp) were measured to the nearest 0.5 mm. All pandalid shrimp were measured from the right eye socket to the midpoint on the posterior margin of the carapace.

A composite sample of shrimp was opportunistically collected from either the whole-haul or table sample from each stratum, depending on the amount of shrimp captured in the tow. This sample was preserved in ethyl alcohol to be sexed in the laboratory after the completion of the at-sea portion of the survey. The primary pandalid shrimp in the strata composition samples were speciated, measured, weighed, and sexed using techniques described in Butler (1980).

Shrimp Population Estimation

Shrimp population estimates for each stratum from the 2001 trawl survey were derived using an area swept technique described in Alverson and Pereyra (1969). The estimates were then totaled to provide an abundance index for each section. Based on net performance data, it is assumed that the trawl swept a path 9.8 m wide and the total area swept by the trawl in a 1 km tow was 1/102 km^2. All tows were recorded in nautical miles and converted to kilometers (nautical miles X 1.853 = kilometers towed). In instances where tow distance was either less than or greater than l.85 km was towed, catch data was proportioned accordingly. The catch of shrimp per tow was then converted into a density estimate consisting of the kg of shrimp per km^2 (kg shrimp caught

per km multiplied by 102). The density was then multiplied by the total area (km^2) being considered within a stratum to generate the population index:

Population index = kg of shrimp per km towed X 0.0098 km (area swept) X station or stratum (km^2)

Some assumptions are undertaken in using the area swept technique. First, it is assumed that all the shrimp within the trawl path are caught. Secondly, it is assumed that total area in km^2 contains all the shrimp within that selected station or strata. As these assumptions may not always be the case, the generated population estimate is a relative and not absolute index. In addition, estimates are for all species of shrimp captured in survey trawls and not just those fished commercially. Spot shrimp or 'prawns' *P. platyceros* and coonstriped shrimp *P. hypsinotus,* are commonly found in steep, rocky substrate and are not well sampled by trawl gear. Therefore, their population densities are not well estimated using this technique.

RESULTS

General Results

Ninety-six trawls were conducted around the Kodiak archipelago, in Shelikof Strait, and in waters adjacent to the Alaska Peninsula during the 2001 survey (Figure 1). The abundance of shrimp per km towed from the stations trawled in the 2001 shrimp survey is shown in Figure 2. Pink shrimp was the most abundant shrimp species in all areas surveyed. Appendix A contains survey haul parameters such as tow start and end position, date, depth, bottom temperature, and catch. Relative population estimates generated from the 2001 and other recent surveys and the MABI threshold level for commercial fishery openings are contained in Table 2. All surveyed areas remain below the established thresholds for commercial shrimp fishery openings except Wide and Inner Marmot bays. Table 3 contains the pink shrimp catch in kg/km towed for surveys from 1975 to 2001. Forage fish were captured throughout the survey area. The highest densities were found in Wide and Marmot Bays (Figure 3).

Catch Composition

Overall, shrimp comprised 26.0% of the aggregate catches in the 2001 small-mesh survey (Figure 4). Within the shrimp catch, species composition was as follows: 21.1% pink shrimp, 2.7% humpy shrimp *P. goniurus*, 1.2% sidestriped shrimp, 0.4% coonstripe shrimp, 0.6% of miscellaneous pandalid and non-pandalid shrimp. Forage fish comprised 2.0% of the total catch by weight. Pacific sandfish *Trichodon trichodon* comprised 1.2%, eulachon *Thaleichthys pacificus* was 0.6%, while other forage fish species were 0.2% of the total catch by weight. Groundfish, Pacific halibut, and miscellaneous invertebrates comprised 74.0% of the total catch by weight. Walleye pollock comprised 21.6% of the total weight, followed by flathead sole (16.1%), arrowtooth flounder (13.1%), unidentified jellyfish (10.8%), and Pacific cod (2.6%). Table 4 contains the top twenty species captured by weight as well as the percent of occurrence by weight of all the shrimp and forage fish captured during the 2001 survey. Appendix B contains the top twenty species captured by weight for each survey area.

Length Frequency

During the survey, 26,517 unsexed pink shrimp carapace lengths were measured. Mean carapace length was 17.8 mm with two prominent modes in the data (Figure 5). The unsexed pink shrimp length frequency distributions by survey area are shown in Figure 6.

Post survey analysis of strata samples resulted in 8,751 sexed carapace length measurements taken on three species of shrimp: pink, humpy, and sidestriped. For all strata samples, prominent modes occurred for male pink shrimps with a greater distribution of sizes seen for nonovigerous female pink shrimps (Figures 7-11). Few transitional pink shrimp were observed in the 2001 survey. A small number were noted in Spiridon Bay (Figure 10) with minimal occurrence elsewhere. Ovigerous female pink shrimp were only noted in large numbers in Alitak Bay (Figure 9). In most strata samples, insufficient numbers of other pandalid shrimp were captured to include in the composition measurements. The exceptions were relatively high occurrence of humpy shrimp in Wide Bay and sidestriped shrimp in Kukak Bay (Figure 11).

Twenty-nine groundfish species were measured for a total of 13,400 length frequency measurements. The number of animals measured and their mean lengths are contained in Table 5. This table also contains the estimated number and total weight of the measured groundfish and forage fish captured during the 2001 survey.

Tagged Pacific Cod

During the 2001 small-mesh survey, 158 Pacific cod were tagged and released with an orange spaghetti-type Floy-tag in the first dorsal fin.

Bottom Temperatures

Bottom temperature readings were taken for each tow during the 2001 small-mesh survey. Mean bottom temperature was 8.0°C with a range from 4.6°C to 11.2°C. The linear relationship of decreasing temperature and increasing depth is shown in Figure 12. The coldest water temperatures (4.6°C and 4.7°C) occurred in Deadman Bay, a deep fjord within Alitak Bay on Kodiak Island's south end.

DISCUSSION

Shrimp populations in the Kodiak District remain below Minimum Acceptable Biomass Index levels except for the Wide and Inner Marmot Bay Sections (Table 2). Sections below established MABI do not meet the criteria for a commercial fishery opening and will remain closed. Stocks below the MABI level are considered severely depressed (ADF&G 1982).

No commercial trawl fishery will open in Wide Bay, as it is completely encompassed by non-pelagic trawl closure areas adopted by the BOF in 1999 (Figure 13). Inner Marmot Bay has a

very small portion of waters open to non-pelagic trawl use, however the amount of area is not of sufficient size to support a commercial fishery. The non-pelagic closure extends to all on-bottom trawl net types, including shrimp nets and beam trawls. Furthermore, Wide Bay is within the Mainland Section in Registration Area J and closed under the provisions of 5 AAC 31.590 Westward Area Shrimp Fisheries Management Plan. This plan, implemented by the BOF, requires a comprehensive fourteen-point plan to be addressed by the department within the regular BOF cycle to reopen the Mainland Section. As other bays within the Mainland Section remain below established MABIs, ADF&G will not address the provisions of the management plan at this time. The General Section for shrimp management, that has no established MABI, will continue to open with the regulatory season established from June 15 through February 28.

The overall percentage of shrimp species seen in the 2001 survey was comparable to levels seen in the 1983 surveys (Table 3 and Figure 4). The increase in the 2001 survey was largely driven by strong shrimp catches in Inner Marmot and Wide Bays (Figure 2), the only two areas above established MABIs. Other surveyed areas showed minor increases or slight decreases in relative populations from the last survey conducted in 1998. Catches along the eastside and south end of Kodiak Island were primarily composed of fish species and showed little change from previous surveys. Individual section catch composition information is contained in Appendix B.

Unlike the 1998 survey, strong shrimp abundance was not correlated to temperature and depth (Ruccio 1999). The largest relative shrimp populations found in Wide Bay, were among the most shallow and warmest bottom temperatures (10.9-11.0°C) recorded in the 2001 survey (Figure 14). Conversely, Deadman Bay is among the deepest and coldest locations towed (4.4-4.6°C) and showed only minor population increases. Deadman Bay located at the head of Alitak Bay remains far below historic abundance levels (Table 2). These situations are somewhat perplexing given the relatively narrow band of pink shrimp thermal requirements for optimal reproduction, egg, and larval survival documented by Nunes (1984) who found temperatures of 3-6°C to be ideal for survival in laboratory studies. Shumway *et al.* (1985) reported the most common range for large pink shrimp populations to be between 0°C and 5°C. Pink shrimp have comprised the largest component of the historic shrimp abundance in the Kodiak District. Only three tows on the 2001 survey fell within this range; the majority of the temperature recordings were between 5°C and 9°C (Figure 12). It should be noted, however, that these temperature readings represent one data point during the year. Bottom temperatures can be expected to have a highly variable range from month to month and year to year from a variety of oceanographic and atmospheric influences.

A well documented ecological shift from dominant shellfish to dominant groundfish populations in concurrence to a warming of the waters of the Northern Gulf of Alaska has occurred, beginning in the late 1970s. This change has been associated with the Pacific Decadal Oscillation (PDO)(Anderson et al. 1997b, Anderson 2000). This long-lived pattern of climate variability has resulted in long term periods of cold and warm ocean temperatures. Several authors have indicated that shrimp and forage fish populations were strongly impacted by the warming period that occurred post 1977 (Anderson and Piatt 1999, Anderson 2000, Anderson et al. 1997a). To illustrate the sea surface temperature variability over time, researchers at the University of Washington have derived a standardized index encompassing several oceanographic and atmospheric inputs. This index, called the PDO index, is the leading principal component of North Pacific monthly sea-surface temperature (SST) variability. The PDO index clearly illustrates the ‘cool regime’ of the North Pacific Ocean that occurred from 1947 to 1976 (Figure

15) [2]. The marked warming that began in 1977 persisted until approximately 1988. Since that time, PDO index values have oscillated between positive (warm) values and negative (cool) values (Francis et al.1998, Mantua et al. 1997). The past five years have been predominantly cool years according to the index.

It is probable that the recent increase in shrimp populations seen in the ADF&G trawl survey are directly correlated to colder temperatures indicated in the PDO index from 1998 to the present. Recovery of shrimp stocks to large, stable populations will likely require a continued shift to a colder ocean regime. Anderson (2000) suggests that pandalid populations are susceptible to rapid population declines with the onset of warm ocean temperatures but populations do not recover as quickly when colder conditions begin to prevail. Additionally, shrimp have been previously discussed as important prey in many gadid and other groundfish species diets (Albers and Anderson 1985, Yang and Nelson 2000). The level of predation working in concert with a slow response to colder oceanographic conditions may explain the continued depressed condition of Kodiak shrimp stocks in most sections.

The next scheduled shrimp survey for the Westward Region is 2002 and will target areas primarily in the Chignik and South Peninsula management areas. Marmot, Chiniak, and Kiliuda Bays within the Kodiak District will also be surveyed.

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Table 1. Historic commercial trawl shrimp catch and effort for the Kodiak District of Westward Registration Area J, 1958-2001.

Calendar Year	Fishing Year	Vessels	Landings	Harvest (Pounds)	Price per lb. ($)
1958		NA	NA	31,886	0.04
1959		NA	NA	2,861,900	0.04
1960		11	94	3,197,985	0.04
1961		12	203	11,083,500	0.04
1962		11	204	12,654,027	0.04
1963		NA	NA	10,118,472	0.04
1964		6	NA	4,339,114	0.04
1965		11	320	13,823,061	0.04
1966		17	551	24,097,141	0.05
1967		23	NA	38,267,856	0.05
1968		16	NA	34,468,713	0.04
1969		26	935	41,353,461	0.06
1970		18	1,024	62,181,204	0.04
1971		49	1,746	82,153,724	0.04
1972		63	1,398	58,352,319	0.04
1973		50	1,283	70,511,477	0.06
	1973/74	63	1,029	56,203,992	0.08
	1974/75	75	1,100	58,235,982	0.08
	1975/76	58	884	49,086,591	0.08
	1976/77	62	762	46,712,083	0.10
	1977/78	58	653	26,409,366	0.13
	1978/79	50	328	20,506,021	0.17
	1979/80	37	242	12,863,536	0.23
	1980/81	67	462	27,101,218	0.29
	1981/82	55	298	19,112,367	0.27
	1982/83	40	224	10,391,207	0.27
	1983/84	14	63	2,779,030	0.35
	1984/85	13	59	2,942,922	0.33
	1985/86	5	26	1,145,980	0.20
	1986/87		Confidential [a]		
	1987/88		Confidential [a]		
	1988/89	0	0	0	0
	1989/90	0	0	0	0

-Continued-

Table 1 . (page 2 of 2)

Calendar Year	Fishing Year	Vessels	Landings	Harvest in Pounds	Price
	1990/91	0	0	0	0
	1991/92	0	0	0	0
	1992/93	0	0	0	0
	1993/94	3	3	1,704	NA
	1994/95	0	0	0	0
	1995/96	0	0	0	0
	1996/97		Confidential [a]		
	1997/98	4	7	11,905	$0.22
	1998 to 2001 [b]	4	16	24,309	NA
Averages[c]		33	556	25,917,820	$0.12

[a]Catch confidential when less than three vessels participated.

[b]Harvest combined to protect vessel confidentiality.

[c]Average calculated from years 1960-1985.

Table 2. Relative population estimates and minimum acceptable biomass indices (MABI) in millions of pounds of pandalid shrimp by section and survey year, 1989-2001.

		Survey Year				
SECTION	MABI	2001	1998	1995	1992	1989
Inner Marmot Bay	3.64	**4.36**	0.48	1.14	1.10	0.32
Marmot Island	25.60	1.39	0.49	Not surveyed	Not surveyed	0.98
Chiniak Bay	1.45	0.63	0.10	0.18	0.38	0.22
Ugak Bay	4.00	0.09	Not surveyed	Not surveyed	Not surveyed	0.19
Kiliuda Bay	5.30	0.12	0.16	0.12	0.31	0.55
Twoheaded Island	7.30	0.12	0.14	0.12	1.11	0.00
Alitak Bay	4.28	0.51	0.25	0.02	0.18	0.00
Uyak Bay	3.19	0.76	0.34	0.43	0.15	0.17
Uganik Bay	2.59	1.57	0.28	1.07	0.47	0.45
Kukak Bay [a]	NA	0.41	0.10	0.03	Not surveyed	0.08
Wide Bay [a]	1.05	**2.00**	Not surveyed	0.07	0.91	0.72
Puale Bay[a]	1.19	0.11	Not surveyed	Not surveyed	Not surveyed	<0.01
Shelikof Strait [b]	NA	0.05	Not surveyed	Not surveyed	Not surveyed	Not surveyed

[a] Kukak, Wide, and Puale Bays are part of the Mainland Section; MABIs are established for each bay.

[b] Shelikof Strait is part of the General Section that has no established MABI.

NA = not available, no established MABI for survey area.

Bold indicates population estimate above established MABI.

Table 3. Historic pink shrimp *Pandalus borealis* catches (kg/km towed) from Westward Region shrimp trawl surveys. Stratum not sampled are indicated by 'N/A'.

		Month and Year of Survey										
Area	Stratum	9/2001	9/1998	9/1995	9/1992	8/1989	9/1987	10/1986	10/1984	9/1983	9/1982	7/1975
Marmot Bay (Area 102)												
	Stratum 2	121	7	64	33	11	1	28	29	21	22	264
	Stratum 3	127	14	35	67	9	226	35	115	285	605	117
Chiniak Bay (inshore, Area 104)												
	Stratum 2	34	3	28	66	34	18	7	11	N/A	N/A	N/A
	Stratum 3	81	4	9	33	20	0	25	27	N/A	N/A	N/A
	Stratum 4	N/A	0	N/A	0	0	0	0	0	N/A	N/A	N/A
	Stratum 5	17	5	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kiliuda Bay (Area 107)												
	Stratum 2	9	0	2	5	0	N/A	6	0	2	1	946
	Stratum 3	4	3	6	15	23	N/A	7	1	1	0	324
	Stratum 4	N/A	N/A	N/A	10	0	N/A	3	N/A	0	N/A	69
Twoheaded Gully (Area 108)												
	Stratum 2	3	10	4	31	0	N/A	15	6	0	5	612
Alitak Bay (Area 109)												
	Stratum 2	11	3	0	4	0	4	4	73	81	76	316

-Continued-

Table 3. (page 2 of 2)

		Month and Year of Survey										
Area	Stratum	9/2001	9/98	9/95	9/92	8/89	9/87	10/86	10/84	9/83	9/82	7/75
Uyak Bay (Area 110)												
	Stratum 2	34	2	25	0	16	N/A	N/A	N/A	7	12	18
	Stratum 3	21	9	14	0	8	N/A	N/A	N/A	3	13	169
	Stratum 4	N/A	N/A	0	0	35	N/A	N/A	N/A	0	0	N/A
	Stratum 5	N/A	N/A	N/A	0	0	N/A	N/A	N/A	0	0	N/A
Uganik Bay (Area 112)												
	Stratum 2	0	0	N/A	0	0	0	N/A	N/A	0	N/A	684
	Stratum 3	54	7	62	31	24	11	N/A	N/A	13	33	55
	Stratum 4	73	1	6	0	0	0	N/A	N/A	0	0	N/A
	Stratum 5	52	9	37	18	29	0	N/A	N/A	45	42	N/A
Kukak Bay (Area 114)												
	Stratum 2	23	10	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wide Bay (Area 119)												
	Stratum 2	149	N/A	12	120	83	151	33	118	101	37	N/A
Chignik Bay (Area 207)												
	Stratum 2	N/A	N/A	33	52	15	25	N/A	23	33	29	375
	Stratum 3	N/A	N/A	0	29	7	29	N/A	2	28	24	180
Kuiukta Bay (Area 220)												
	Stratum 1	N/A	N/A	24	45	11	30	25	N/A	N/A	N/A	258

Table 4. Relative abundance by weight of the top 20 species, percentage of shrimp, and percentage of forage fish occurrence in the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Walleye pollock [a]	*Theragra chalcogramma*	21.6%
2	**Pink shrimp**	*Pandalus borealis*	21.1%
3	Flathead Sole	*Hippoglossus elassodon*	16.1%
4	Arrowtooth flounder	*Atheresthes stomias*	13.1%
5	Jellyfish unidentified	Class Scyphozoa	10.8%
6	**Humpy shrimp**	*Pandalus goniurus*	2.7%
7	Pacific cod	*Gadus macrocehpalus*	2.6%
8	**Sidestriped shrimp**	*Pandalopis dispar*	1.2%
9	Spiny dogfish	*Squalus acanthias*	1.2%
10	**Pacific sandfish**	*Trichodon trichodon*	1.2%
11	Plain sculpin	*Myoxocephalus jaok*	0.8%
12	Big skate	*Raja binoculata*	0.7%
13	**Eulachon**	*Thaleichthys pacificus*	0.6%
14	Pacific halibut	*Hippoglossus stenolepis*	0.6%
15	Starry flounder	*Platichthys stellatus*	0.6%
16	Yellowfin Sole	*Pleuronectes aspera*	0.6%
17	Northern rock sole	*Lepidopsetta sp.*	0.5%
18	**Coonstripe shrimp**	*Pandalus hypsinotus*	0.4%
19	Longnose skate	*Raja rhina*	0.4%
20	Rex sole	*Glyptocephalus zachirus*	0.2%
All other shrimp species	Crangon shrimp unidenified	*Genus Crangon*	0.200%
	Hippolytid shrimp	Family Hippolytidae	0.100%
	Glass shrimp	*Pasiphaea pacifica*	0.080%
	Spot shrimp	*Pandalus platyceros*	0.020%
	Argid shrimp unidentified	*Genus Argis*	0.100%
	Spiny lebbid	*Lebbus groenlandicus*	0.010%
	Short-scaled eualid	*Eualus suckleyi*	0.005%
	Barbed eualid	*Eualus barbatus*	0.004%
	Heptacarpus shrimp unident.	*Genus Heptacarpus*	0.003%
	Sculptured shrimp	*Sclerocrangon boreas*	<0.001%
All other forage fish species	Prickleback unidentified	*Genus Stichaeidae*	0.10%
	Pacific herring	*Clupea pallasi*	0.10%
	Capelin	*Mallotus villosus*	0.04%
	Threespine stickleback	*Gasterosteus aculeatus*	0.01%
	Pacific sand lance	*Ammodytes hexapterus*	<0.01%
	All other animals [b]		2.2%
			100.0%

[a] Adult and juvenile walleye pollock and Pacific cod combined.

[b] Sixty three different species composed the group of other animals.

Table 5. Number measured and mean lengths of commerically important groundfish and forage fish from the 2001 small-mesh trawl survey.

Common name	Number Measured	Estimated Number Caught	Mean Length (cm)	Estimated Total Catch in Kilograms
Groundfish				
Alaska plaice	10	31	52.2	51.8
Arrowtooth flounder	1,556	7,201	35.8	5,122.3
Big skate	19	19	62.8	261.9
Black rockfish	2	2	12.0	0.3
Butter sole	2	2	37.0	1.1
Dover sole	11	58	38.1	31.4
English sole	3	11	39.0	6.2
Flathead sole	3,320	21,954	29.8	6,264.6
Juvenile Pacific cod	31	80	14.2	4.0
Juvenile walleye pollock	3,079	93,951	14.2	1,529.7
Light dusky rockfish	60	60	43.3	76.0
Longnose skate	21	21	55.6	164.7
Northern rockfish	8	8	20.9	1.7
Northern rock sole	111	262	37.0	178.6
Pacific cod *(untagged)*	126	127	61.5	360.5
Pacific cod *(tagged and released)*	234	234	63.5	655.8
Pacific halibut	59	59	60.2	240.0
Pacific herring	392	904	17.9	46.9
Pacific ocean perch	1	1	39.0	0.8
Redbanded rockfish	4	4	23.0	0.8
Rex sole	131	454	28.7	92.8
Rougheye rockfish	54	54	34.6	40.3
Sablefish	75	75	44.3	82.6
Skate unidentified	7	7	33.9	14.5
Sand sole	1	3	10.0	0.9
Spiny dogfish	144	148	79.2	466.6
Starry flounder	32	91	54.7	226.0
Walleye pollock	3,800	13,151	37.9	6,879.5
Yellowfin sole	107	532	35.6	220.8
Forage Fish				
Capelin	NA	743	NA	13.8
Eulachon	NA	4,295	NA	253.2
Pacific sandfish	NA	NA	NA	458.4
Pacific sand lance	NA	1	NA	>0.1
Pricklebacks	NA	596	NA	75.8
Threespine stickleback	NA	127	NA	5.3

NA= Not available

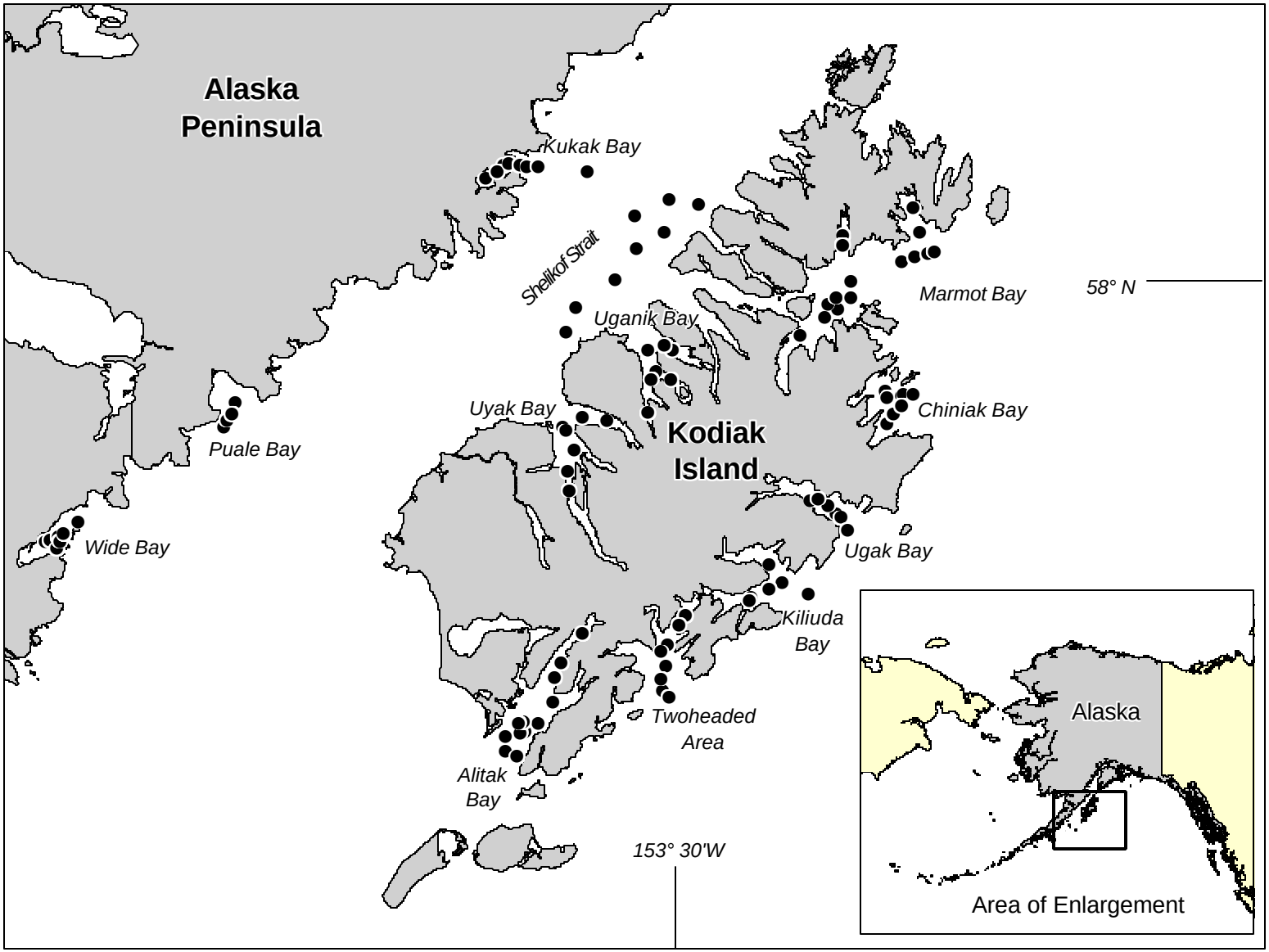

Figure 1. Location of small-mesh trawl sample sites in the 2001 Kodiak District survey.

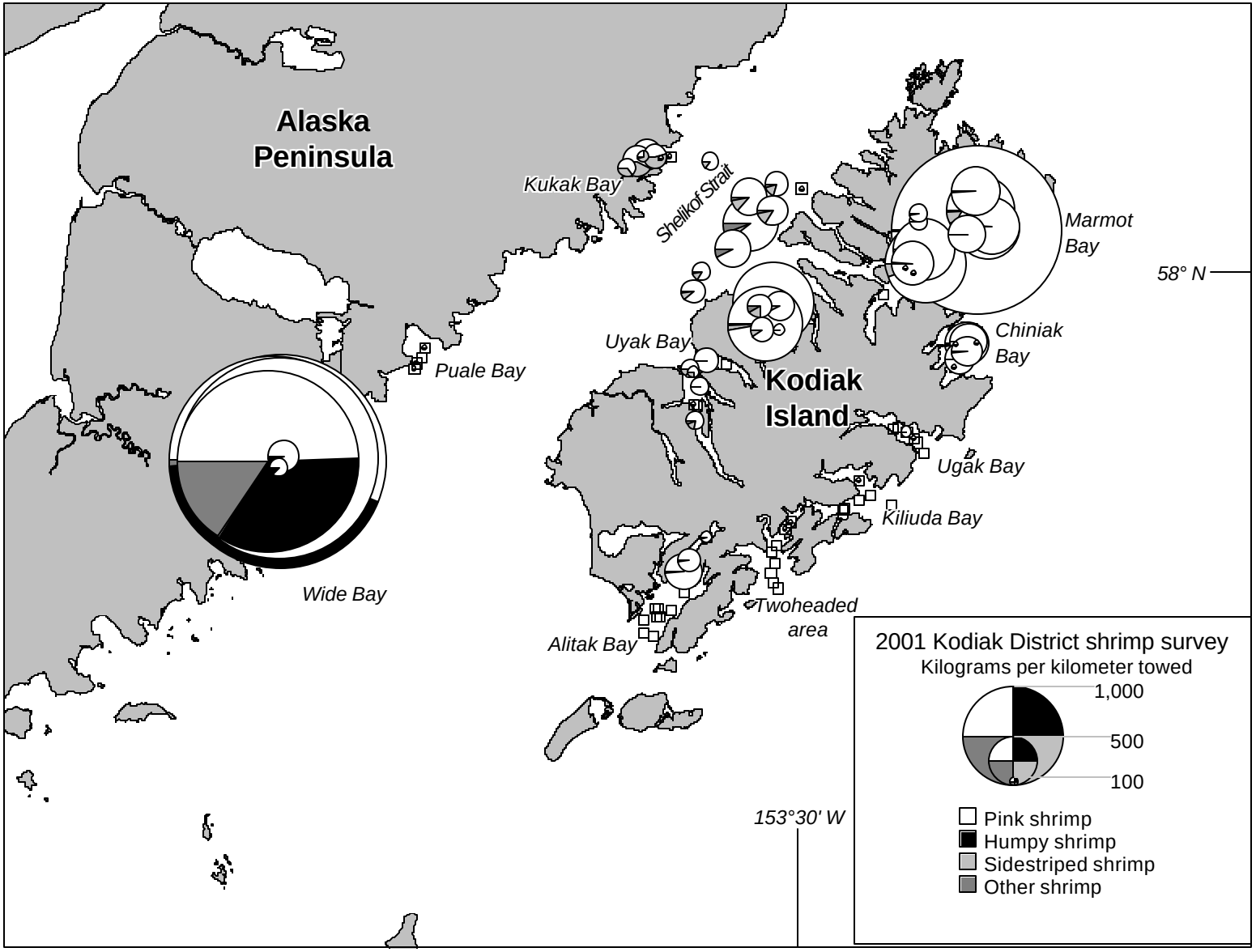

Figure 2. Kilograms of shrimp per kilometer towed by species from the 2001 Kodiak District small-mesh trawl survey.

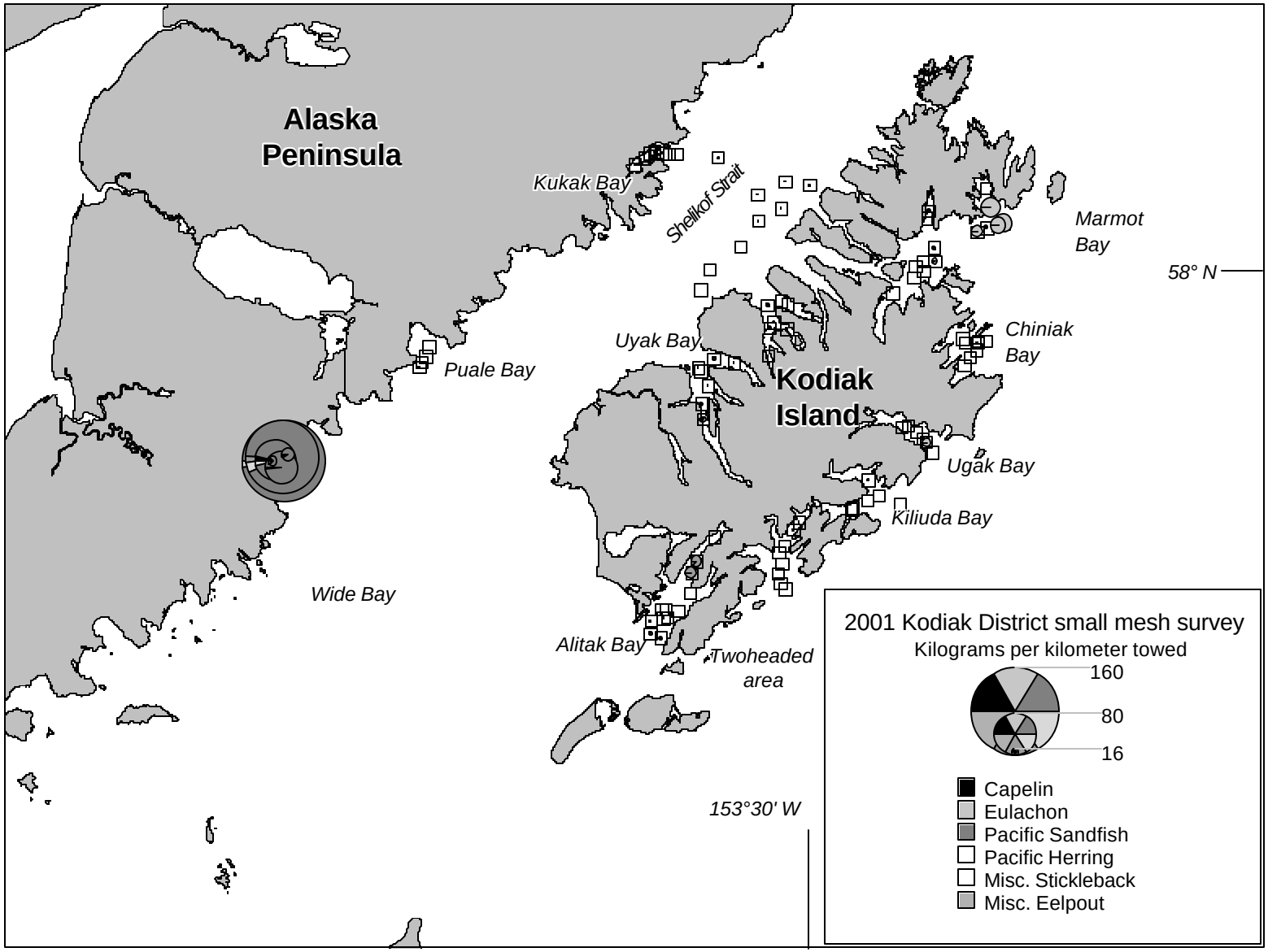

Figure 3. Kilograms of forage fish per kilometer towed by species from the 2001 Kodiak District small-mesh trawl survey.

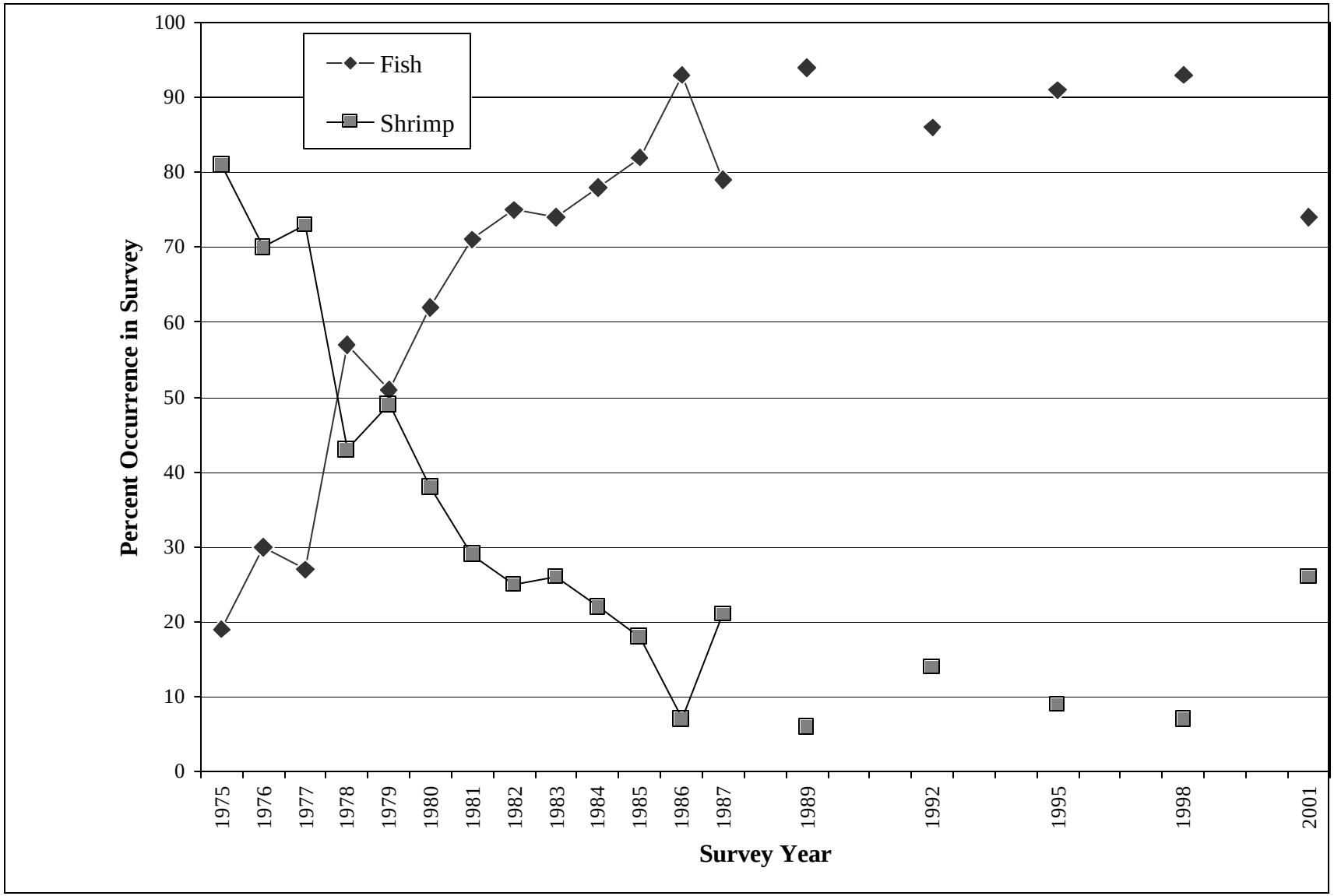

Figure 4. Catch composition from shrimp trawl surveys conducted in the Westward Region, 1975 to 2001.

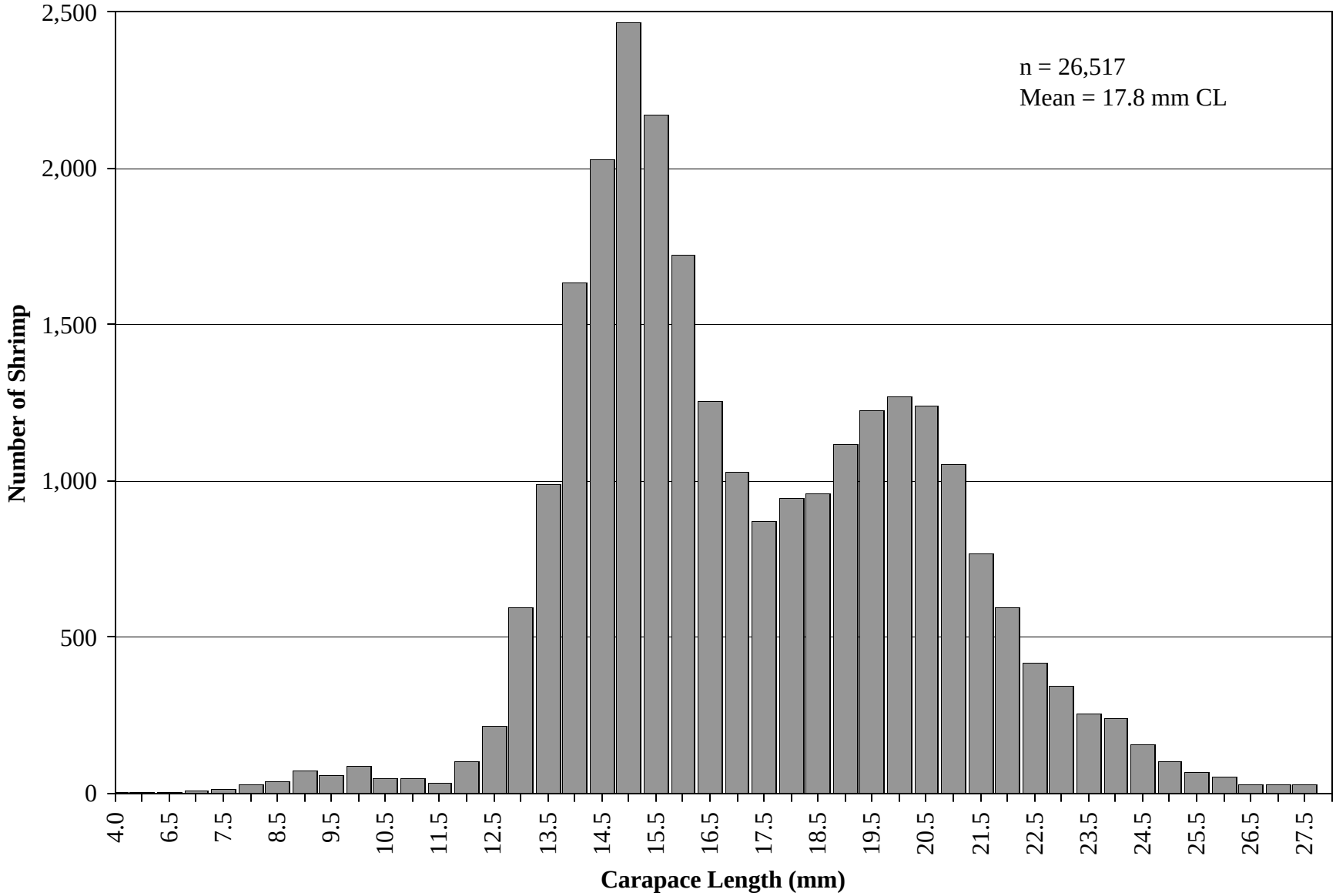

Figure 5. Unsexed shrimp carapace length frequencies from the 2001 Kodiak District small-mesh trawl survey.

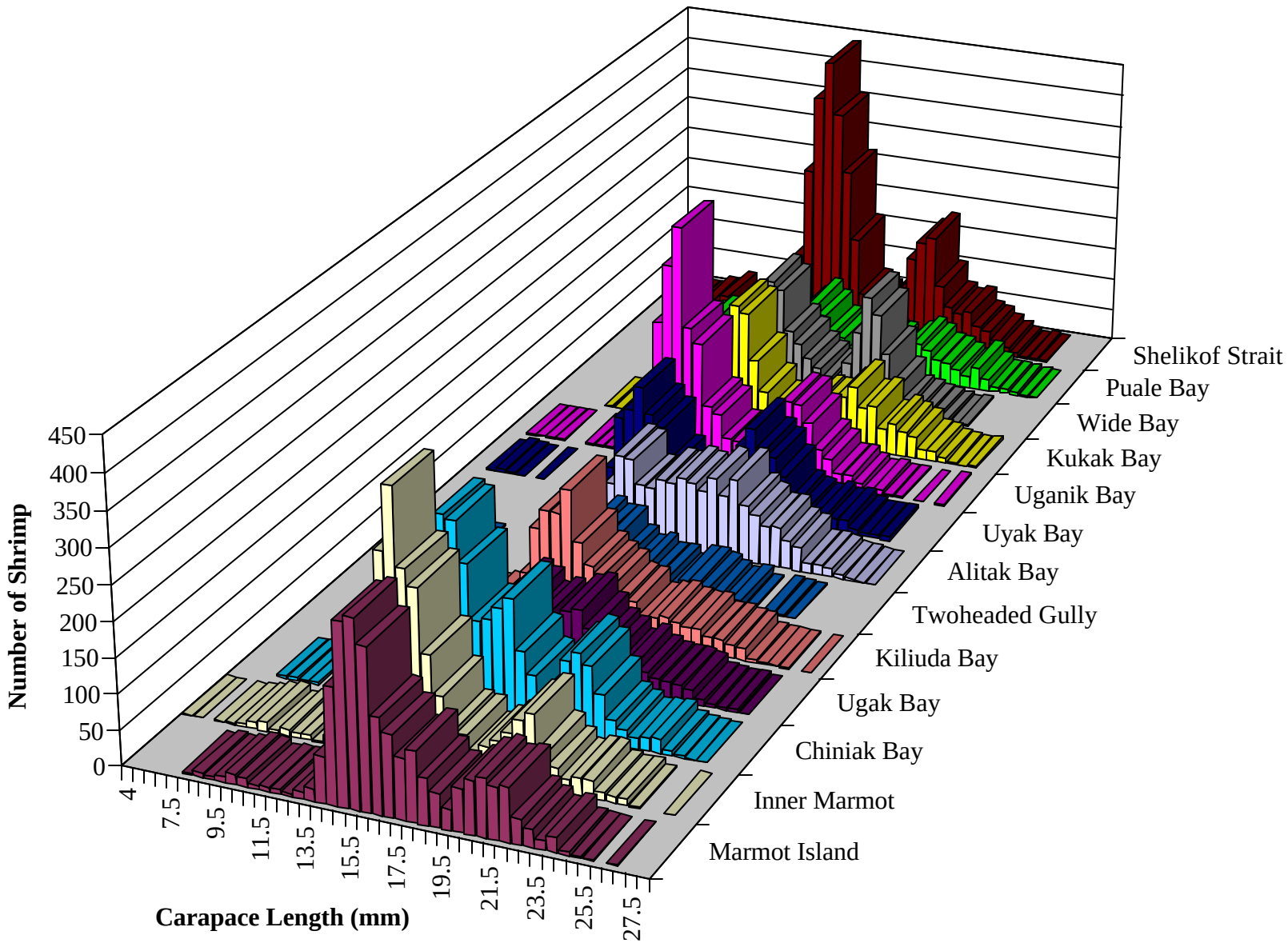

Figure 6. Unsexed shrimp carapace lengths by survey area from the 2001 Kodiak District small-mesh trawl survey.

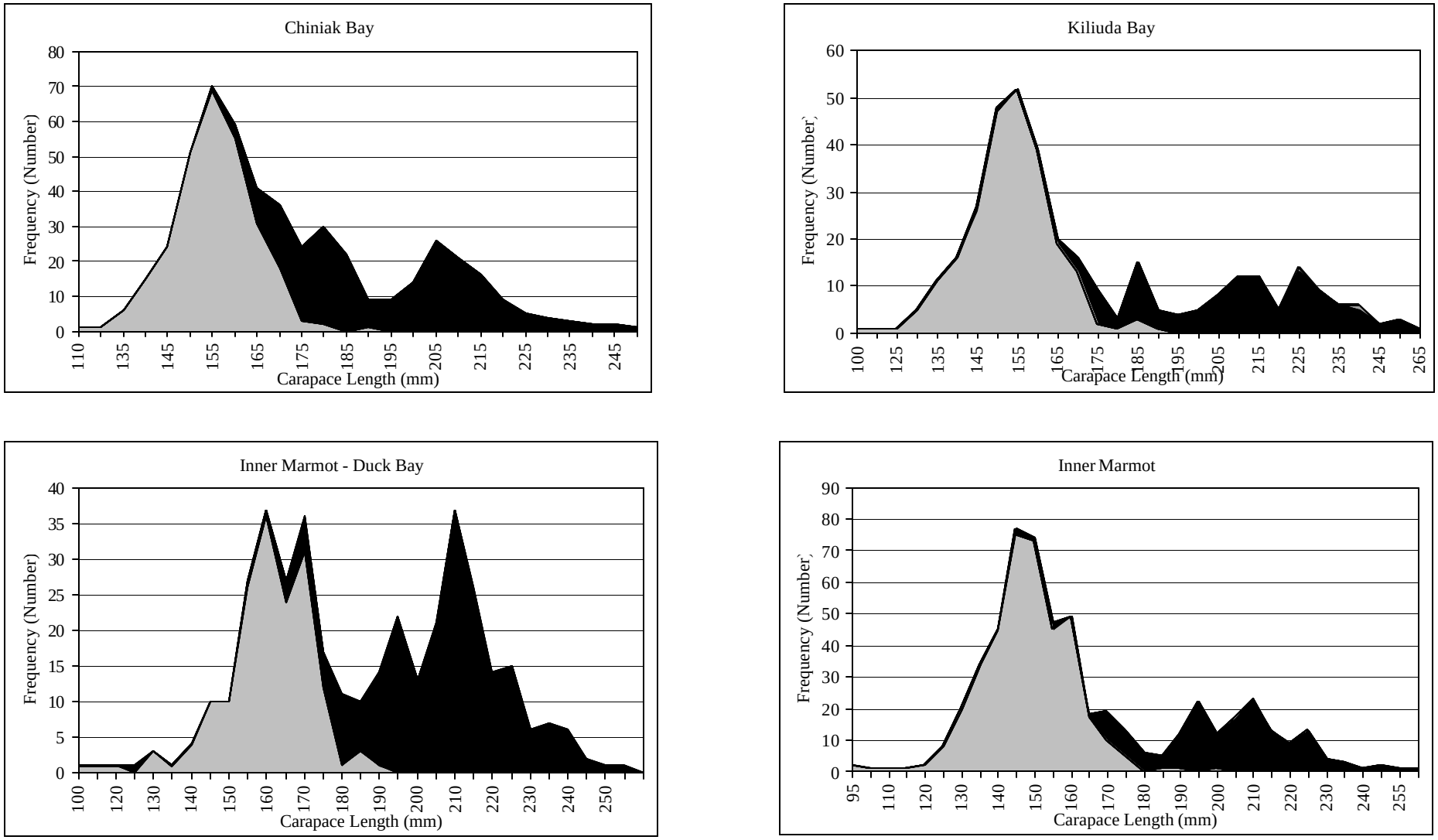

Figure 7. Pink shrimp sex composition by carapace length in the Chiniak Bay, Kiliuda Bay, Duck Bay, and Inner Marmot Bay strata, 2001.

LEGEND = Males = Transitionals = Females = Ovigerous Females

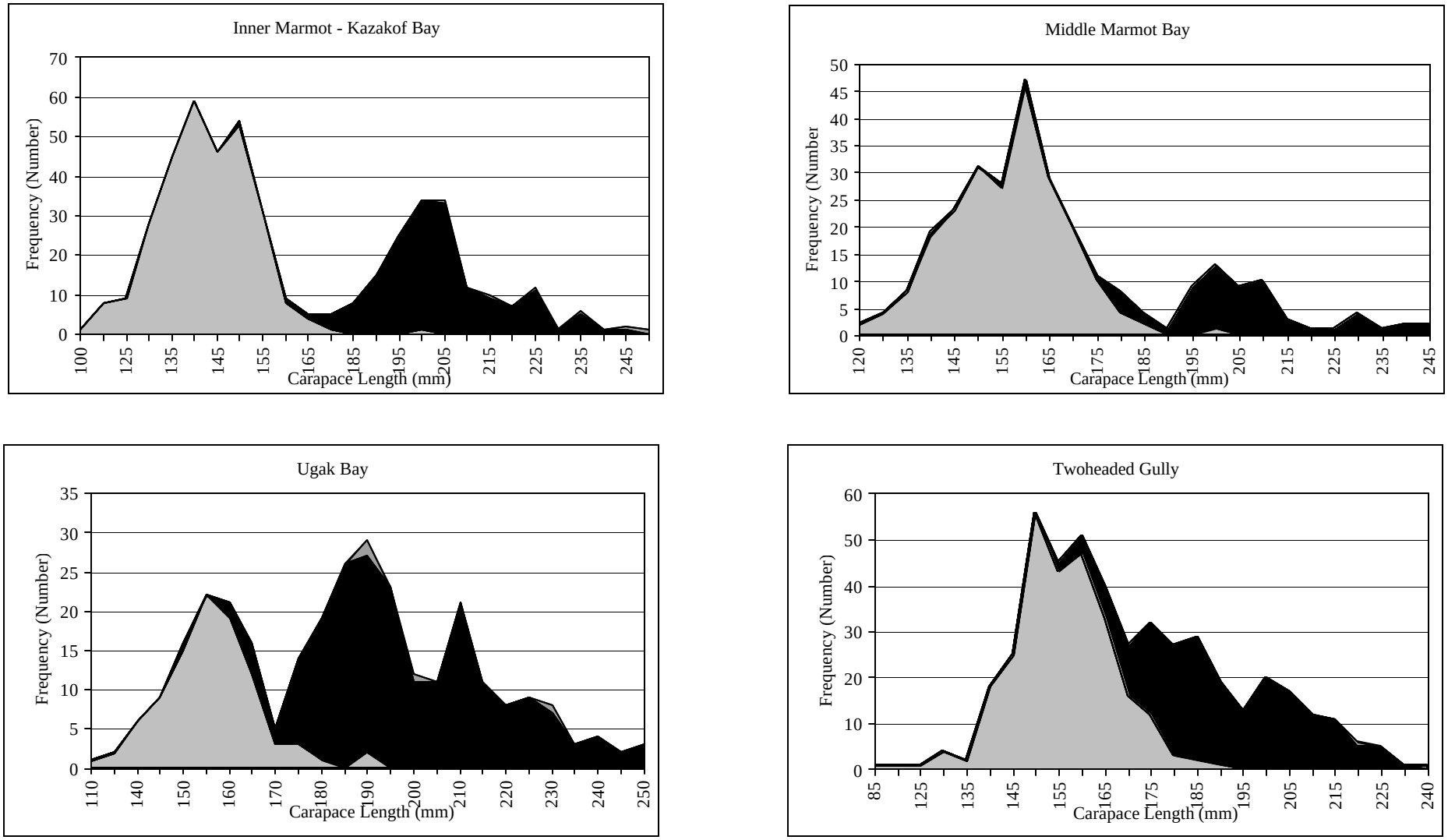

Figure 8. Pink shrimp sex composition by carapace length in the Kazakof Bay, Middle Marmot Bay, Ugak Bay, and Twoheaded Gully strata, 2001.

LEGEND = Males = Transitionals = Females = Ovigerous Females

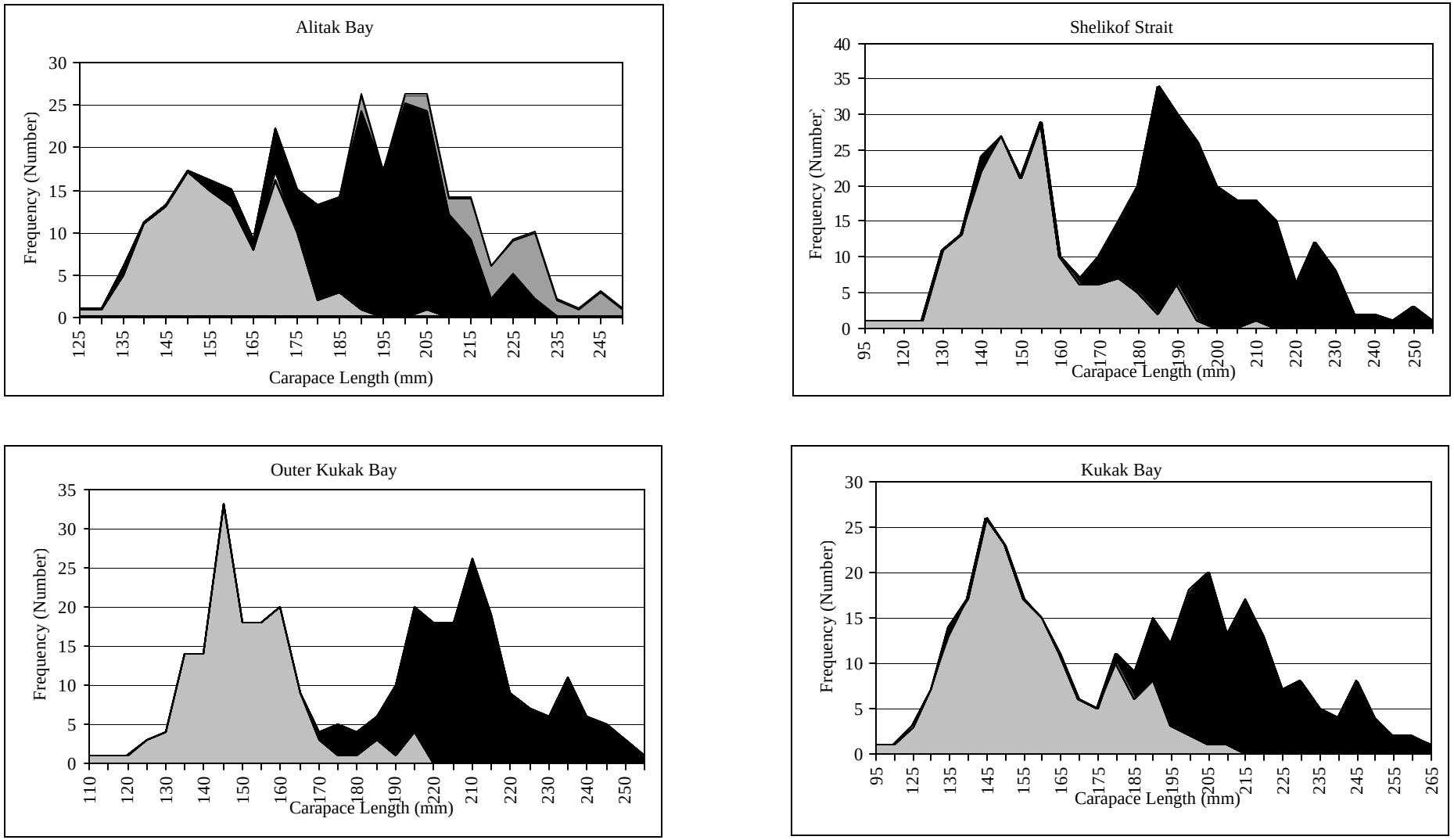

Figure 9. Pink shrimp sex composition by carapace length in the Alitak Bay, Shelikof Strait, Outer Kukak Bay, and Kukak Bay strata, 2001.

LEGEND = Males = Transitionals = Females = Ovigerous Females

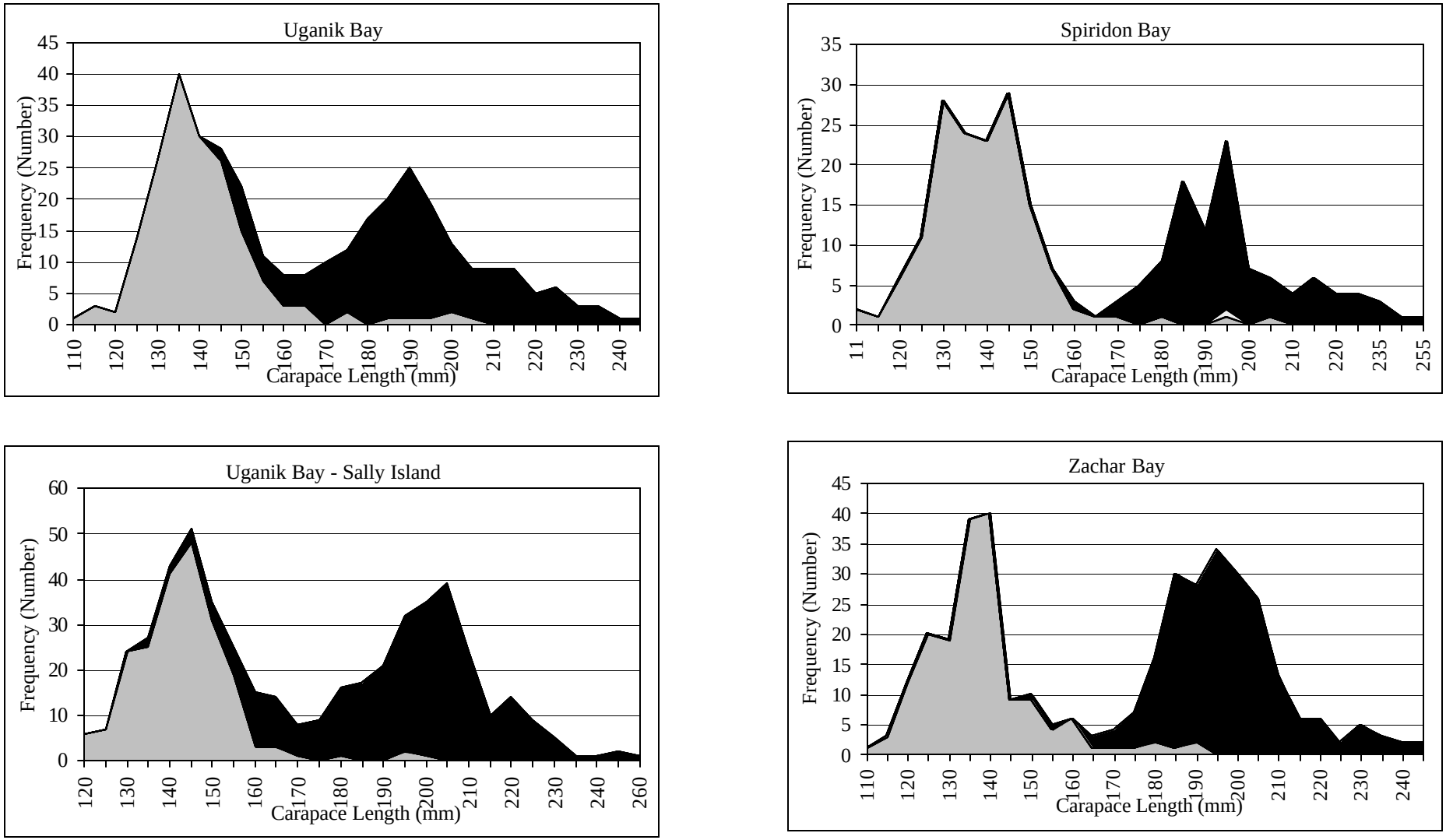

Figure 10. Pink shrimp sex composition by carapace length in the Uganik Bay, Spiridon Bay, Sally Island, and Zachar Bay strata, 2001.

LEGEND = Males = Transitionals = Females = Ovigerous Females

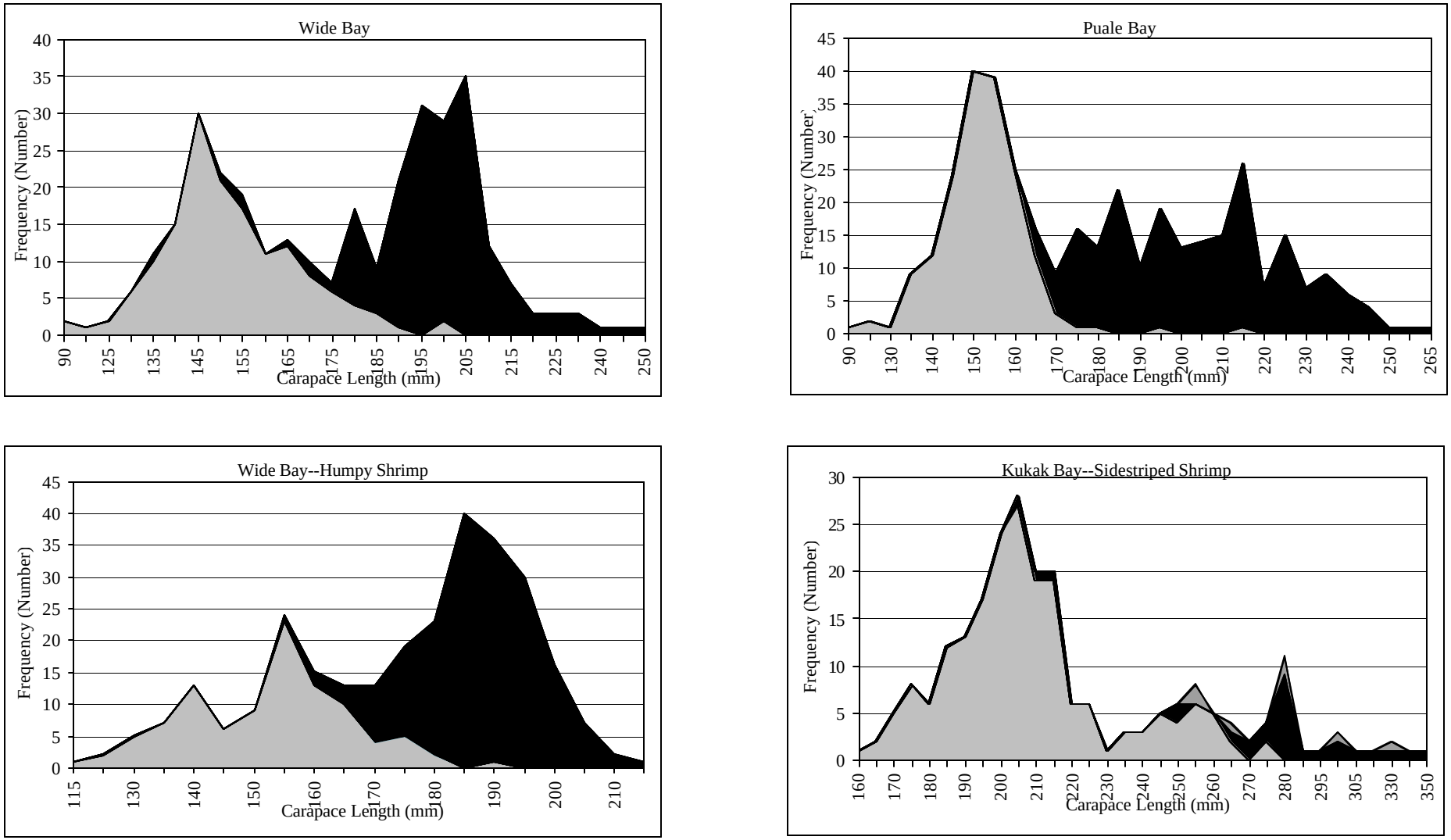

Figure 11. Pink shrimp sex composition by carapace length in Wide and Puale Bays strata, humpy shrimp sex composition in Wide Bay strata, and sidestriped shrimp sex composition in Kukak Bay strata, 2001.

LEGEND = Males = Transitionals = Females = Ovigerous Females

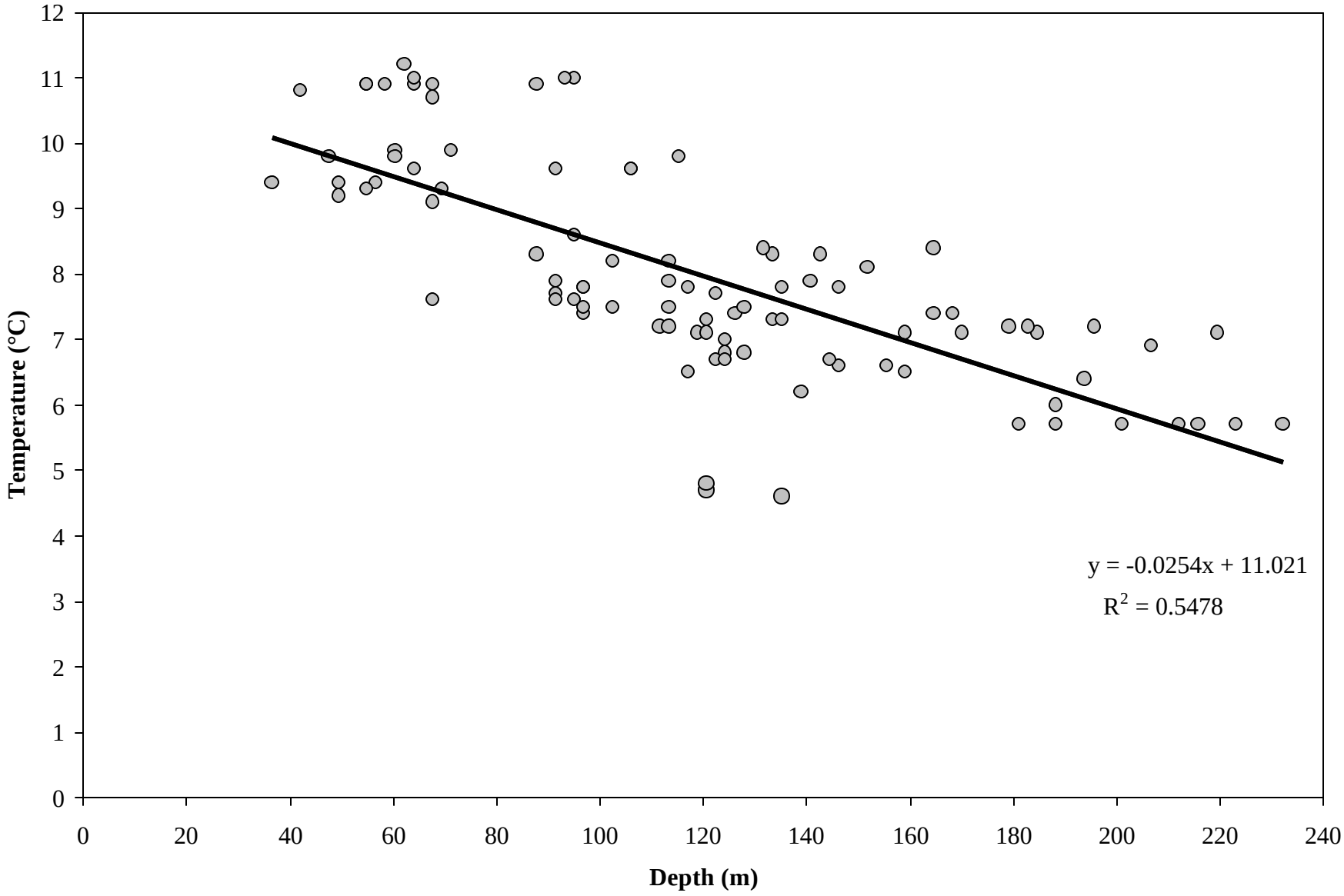

Figure 12. Depth and bottom temperature relationship from trawled locations in the 2001 small-mesh survey.

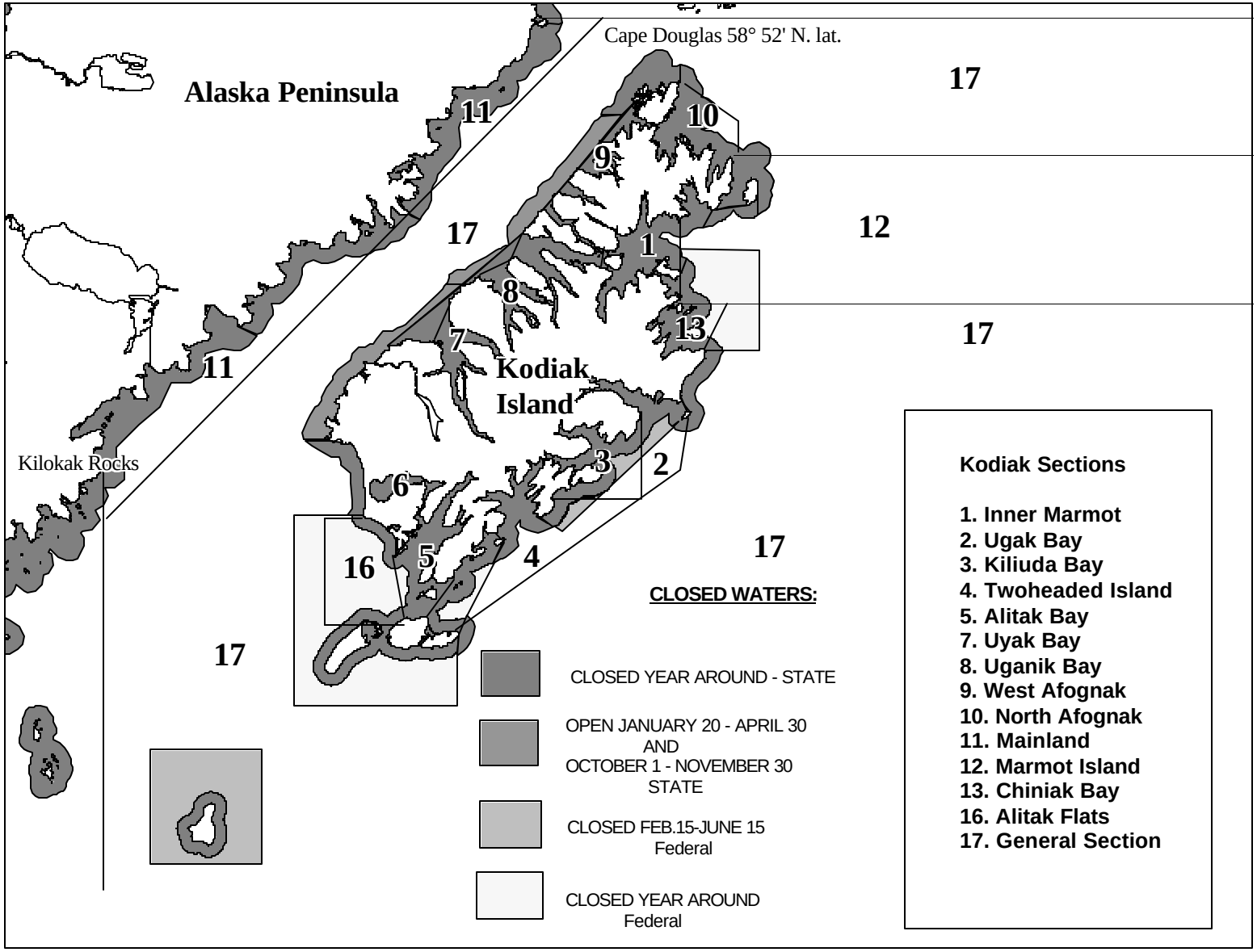

Figure 13. Kodiak Sections for shrimp management and non-pelagic and beam trawl closures, 2001.

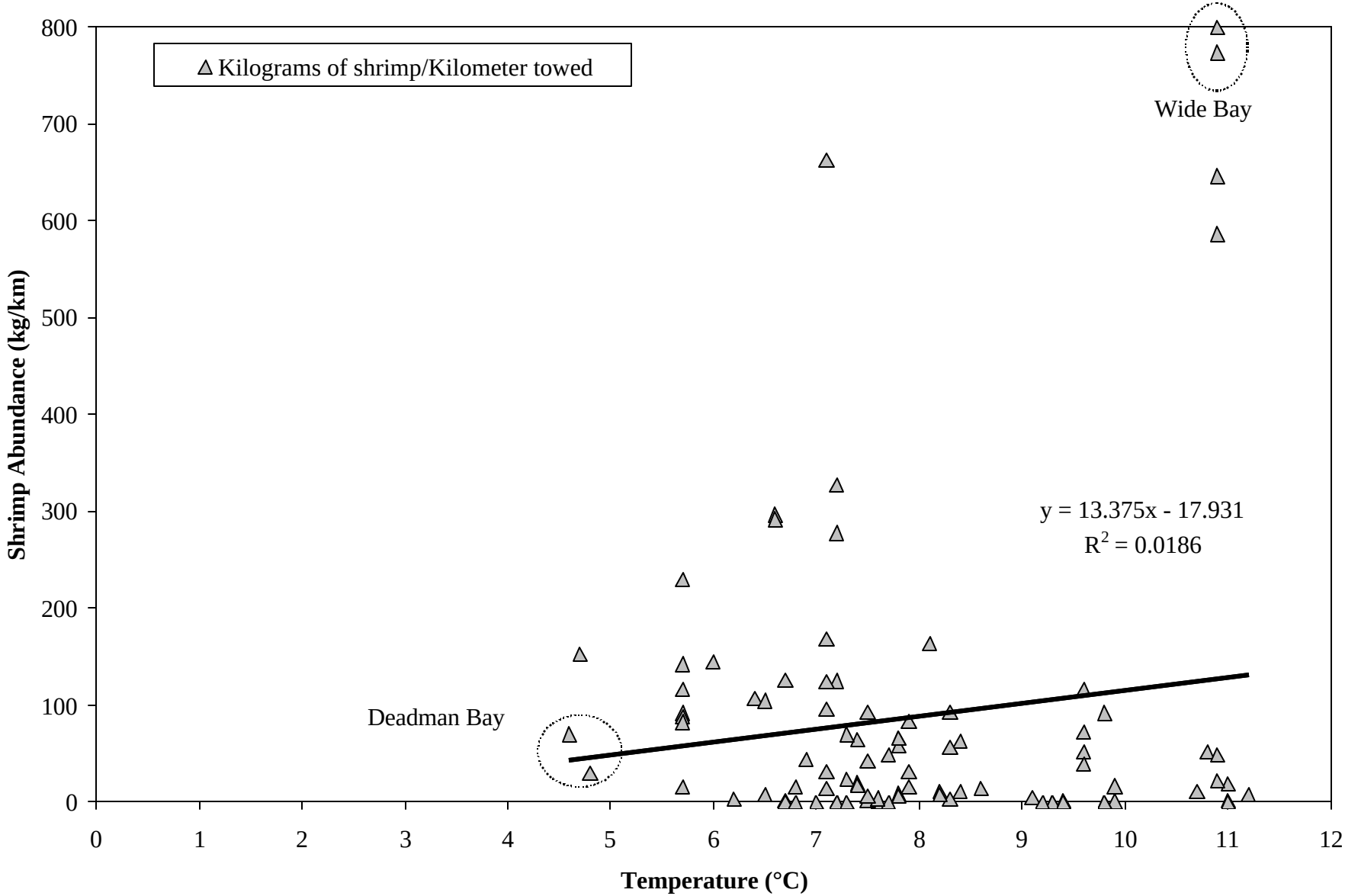

Figure 14. Shrimp abundance by bottom temperature at trawl depth from the 2001 small-mesh survey.

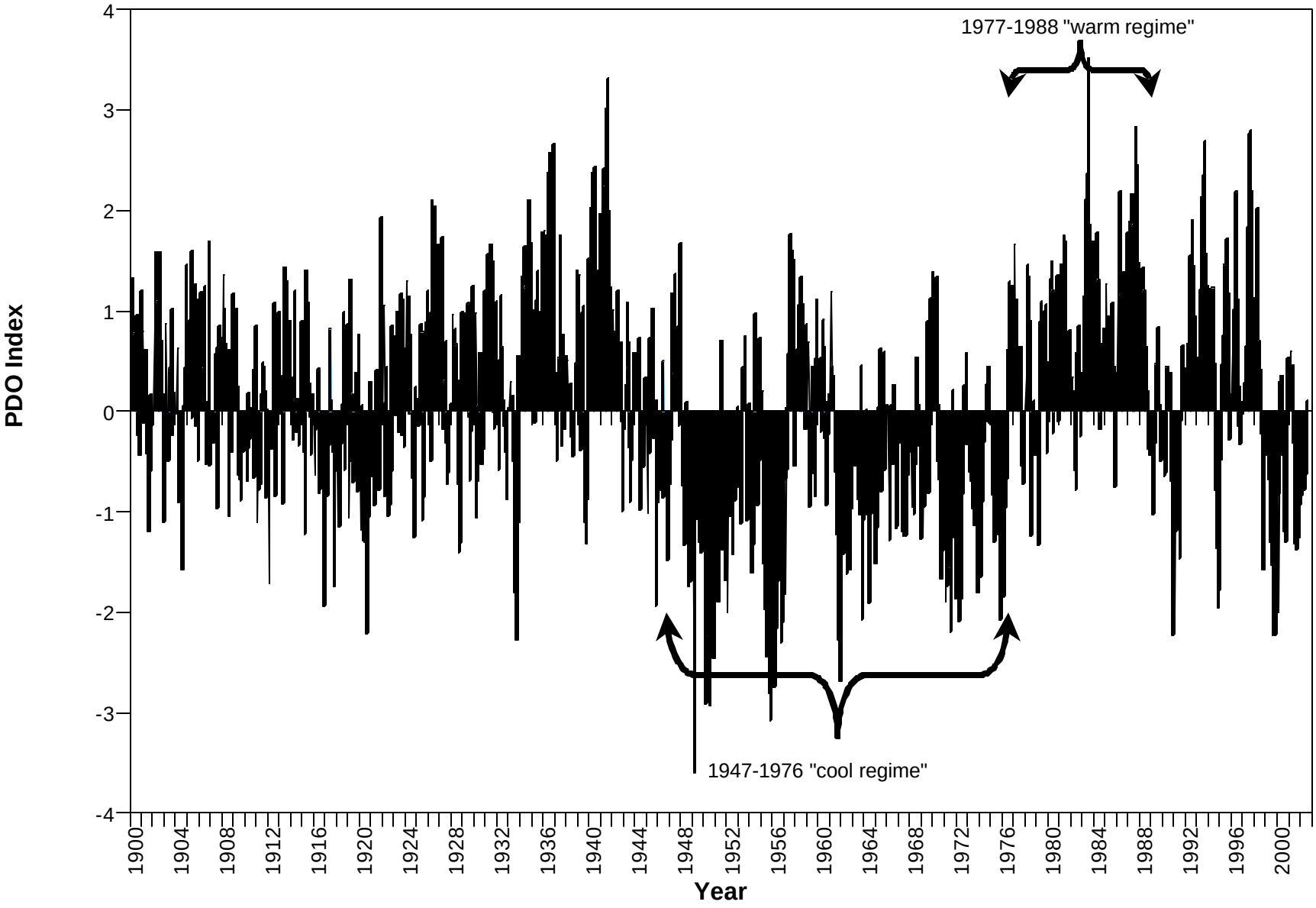

Figure 15. Pacific Decadal Oscillation (PDO) index for the North Pacific Ocean, 1900 though July, 2002.
Source: Reprinted with permission from http://tao.atmos.washington.edu/pdo/

APPENDIX

Appendix A. Fishing log and catch data from the 2001 small-mesh trawl survey of the Kodiak District.

Haul	1	2	3	4	5	6	7	8	9	10
Location	Chiniak	Chiniak	Chiniak	Chiniak	Chiniak	Chiniak	Chiniak	Chiniak	Uganik B	Uganik B
Month/Day/Year	9/17/2001	9/17/2001	9/17/2001	9/17/2001	9/17/2001	9/18/2001	9/18/2001	9/18/2001	9/19/2001	9/19/2001
Longitude Start	152 23.0	152 22.3	152 18.1	152 22.6	152 20.6	152 17.5	152 14.8	152 18.1	153 31.5	153 29.3
Latitude Start	57 44.4	57 43.5	57 43.6	57 39.2	57 40.8	57 43.9	57 43.9	57 42.2	57 50.7	57 47.4
Heading, Degrees	197	132	272	40	37	109	50	230	352	147
Average Depth (m)	69	102	152	95	133	132	165	143	194	146
Distance Fished (km)	1.5	0.9	1.7	1.9	1.3	0.7	0.9	0.9	1.9	1.9
Bottom Temperature	9.3	8.2	8.1	8.6	8.3	8.4	8.4	8.3	6.4	6.6
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	0.7	92.3	3.5	16	14.5	24	12.8	13.3	32.6	62.3
Pacific Cod	0	8.9	2.5	0	3.3	3.2	17.4	0	1.5	1.2
Rockfish	0	0	0.7	0	0.5	0	0	2.6	0	0.3
Sablefish	0	0	0.4	0	0	0	0	0	1.1	1.4
Herring	0	0.5	0	0	0	0	0	0	0.6	0
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	0.1	2.1	14.3	3.3	3	0.5	0	17	1.1	0.7
Other Roundfish	0.3	1.9	2	0.5	1.8	0.1	0.5	1.5	4	2.2
TOTAL ROUNDFISH	1.2	105.8	23.3	19.9	23.2	27.8	30.7	34.5	40.9	68.2
Arrowtooth Flndr	1.8	95	63.4	9.9	20.9	41.7	137.2	28	40.1	34.6
Flathead Sole	8.6	58	112.9	51.4	100.4	85.7	267.4	217.1	59.7	164.8
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0.2	3.9	0	0	0	0.9	12	0	0	0
Dover Sole	0	0.3	0	1.7	0	0	0	0	0	0
Pac Halibut	0	0	0	0	0	0.7	0	0	6.3	0
Starry Flndr	3.4	0	0	24.7	0	0	0	0	0	0
Yellowfin Sole	7.4	0	0	0	0	0	0	0	0	0
Other Flatfish	22.6	47.3	9.8	3.4	6.4	77.2	0	0	0	0
TOTAL FLATFISH	44	204.6	186.1	91.1	127.7	206.1	416.6	245.1	106.2	199.4
Skates	0	5.2	0.3	0	0	0	13.2	0	0.4	0
Spiny Dogfish	0	0	0	0	0	0	0	0	0	0
Other Elasmobrh	0	0	0	0	0	0	0	0	0	0
Tanner Crab	0	0	0	0	0	0	0	0	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0	0	0	0
Pink Shrimp	0	21.9	106.7	7.1	101.4	211.7	15.2	121.3	43.4	155.5
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0.1	0	0.2	0	0	0	0	0	0
Sidestripe	0	0	1.1	0	0	0	6.8	0.8	9.2	3.2
Other Shrimp	0	0.1	1	0.1	0.3	1.3	1.4	1	5.2	1.6
Scallop	0	0	0	0	0	0	0	0	0	0
Other Inverts	17.6	3.8	0	48.7	4.7	14.7	0.3	20.6	4.9	9.9
TOTAL INVERTS	17.6	25.9	108.8	56.2	106.4	227.7	23.8	143.7	62.7	170.2
Other	0.9	1.9	1.9	0.2	0.4	0	1.6	0	0.3	1.8
TOTAL CATCH	63.7	343.4	320.4	167.4	257.6	461.7	486	423.3	210.6	439.5

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Appendix A. (page 2 of 10)

Haul	11	12	13	14	15	16	17	18	19	20
Location	Uganik B	Uganik B	Uganik B	Uganik B	Uganik B	Uyak Bay	Uyak Bay	Uyak Bay	Uyak Bay	Uyak Bay
Month/Day/Year	9/20/01	9/20/01	9/20/01	9/20/01	9/20/01	9/21/01	9/21/01	9/21/01	9/21/01	9/21/01
Longitude Start	153 31.3	153 30.6	153 24.6	153 24.4	153 26.7	153 54.2	153 54.7	153 52.5	153 55.9	153 55.0
Latitude Start	57 41.0	57 46.3	57 46.2	57 50.8	57 51.5	57 29.0	57 32.0	57 35.4	57 38.8	57 38.2
Heading, Degrees	340	14	314	296	295	339	176	326	177	346
Average Depth (m)	68	159	124	144	155	146	141	123	168	165
Distance Fished (km)	1.9	1.9	0.7	1.9	1.7	1.7	1.7	1.3	1.9	0.9
Bottom Temperature	7.6	6.5	6.8	6.7	6.6	7.8	7.9	7.7	7.4	7.4
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	109.2	137	142.6	102.5	41.3	20.6	14.7	32	30.4	21.3
Pacific Cod	0.9	1.8	0	0	0	7.3	0	0.2	0	0
Rockfish	0	0	0	0	0.1	0	0.2	0.1	0	0
Sablefish	0.3	0.3	0	0.3	0.9	2.5	3.4	1.2	1.5	0
Herring	1.5	0.1	0.5	0	0	0.4	0.1	0.3	0	0
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	0.2	0.7	0	0.1	0	0.5	0.8	0	0	1.3
Other Roundfish	1.5	4.5	4.1	1.1	0.4	9.6	6.1	1.8	1.5	1
TOTAL ROUNDFISH	113.7	144.3	147.1	103.9	42.6	40.9	25.3	35.6	33.5	23.6
Arrowtooth Flndr	6.6	14.4	22.8	16	31.8	112.1	86.4	12.7	15.3	32.7
Flathead Sole	177	104.4	29.8	77.6	48.2	139	133.5	34.9	22.1	71.7
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0	0	0	11.2	2.5	0.4	1.4	0.8
Dover Sole	0	0	2.3	0	0	0	0	0	4.6	0
Pac Halibut	0	0	0	0.6	0	0	0.4	0	0	0
Starry Flndr	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	12	0	0	0	0	0	0	0	0	0
Other Flatfish	10.8	0	0	0	0	0	0	0	0	0
TOTAL FLATFISH	206.3	118.8	54.8	94.3	80	262.4	222.7	48	43.4	105.2
Skates	0	5.3	0	0	0	8	17.7	8.5	0	0
Spiny Dogfish	0	0	0	0	0	1.6	0	5.3	0	0
Other Elasmobrh	0	0	0	0	0	0	0	0	0	0
Tanner Crab	0	0	0	0	0	0	0	0	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0	0	0	0
Pink Shrimp	0.3	50.8	51	63	182.3	30.3	15.2	53.2	29.3	30.2
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	4.5	0	4.8	12.4	5.5	3.7	0.2	4.9	11.4
Other Shrimp	0.1	1.2	0.4	0.2	0	3.2	1.7	0.9	0.7	0.8
Scallop	0	0	0	0	0	0	0	0	0	0
Other Inverts	73.1	12.1	78.8	6	29.4	21.7	12.5	12.4	1.6	20.9
TOTAL INVERTS	73.5	68.5	130.1	73.9	224.1	60.7	33.1	66.6	36.5	63.4
Other	0.7	0	0	0	0	5.6	0	0	0	0
TOTAL CATCH	394.2	336.9	332.1	272.1	346.8	379.2	298.8	164	113.4	192.2

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Appendix A. (page 3 of 10)

Haul	21	22	23	24	25	26	27	28	29	30
Location	Uyak Bay	Uyak Bay	Puale By	Puale By	Puale By	Puale By	Wide Bay	Wide Bay	Wide Bay	Wide Bay
Month/Day/Year	9/21/01	9/21/01	9/22/01	9/22/01	9/22/01	9/22/01	9/23/01	9/23/01	9/23/01	9/23/01
Longitude Start	153 43.4	153 50.3	155 33.7	155 32.7	155 30.1	155 31.2	156 25.1	156 23.6	156 21.7	156 21.5
Latitude Start	57 39.8	57 40.4	57 38.9	57 39.9	57 42.8	57 40.9	57 21.1	57 21.3	57 20.0	57 21.8
Heading, Degrees	270	90	208	214	235	180	63	60	55	50
Average Depth (m)	97	135	95	88	62	93	59	55	42	64
Distance Fished (km)	1.9	1.1	1.1	1.9	0.9	0.9	1.7	1.9	1.3	1.9
Bottom Temperature	7.8	7.8	11	10.9	11.2	11	10.9	10.9	10.8	10.9
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	48.4	17.9	28.1	20.6	1.9	32	61.2	97.6	5.4	227.9
Pacific Cod	7.7	0	27.1	13	5.2	27.4	8.4	7.3	0.6	7.3
Rockfish	0	0	0	0	0	0	0	0	0	0
Sablefish	0	0	0.8	0	3	0	1	0.7	0.7	1.4
Herring	0.3	0.3	0	0.1	0.6	0	0.4	1.6	0.9	3.7
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	3.6	0.4	2.4	0	0	0	85.4	47.8	6	21.4
Other Roundfish	2.4	7.3	2.4	1	1.2	2.4	10.3	42.6	50.5	69.4
TOTAL ROUNDFISH	62.5	25.9	60.9	34.7	12.1	61.8	166.7	197.6	64.1	331.2
Arrowtooth Flndr	3.1	24.7	5.1	3.2	2.5	2.1	0	0	0	0
Flathead Sole	45.8	96	32.2	3.4	8.1	37	28.6	18	7.5	28.2
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0.5	0	0	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pac Halibut	0	0	0	3	4	0	2.8	0	2.6	1.7
Starry Flndr	0	0	12.4	24.8	0	48.1	0	0	5.4	0
Yellowfin Sole	0	0	0	0	0.5	0	18.9	22.3	22.8	14.7
Other Flatfish	0	0	0	0	1.2	0.8	0	0	0	3.4
TOTAL FLATFISH	48.8	121.2	49.7	34.4	16.3	88	50.3	40.3	38.3	47.9
Skates	0	50.1	6.9	0	0	56.3	0	0	11.3	0
Spiny Dogfish	1.2	0	11.5	4.8	0	14.7	4.9	7.1	0	9.4
Other Elasmobrh	0	0	0	0	0	0	0	0	0	0
Tanner Crab	0	0	0	0	0	0	1.6	0	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0.7	0	0	0	0	0	0	0	0	0
Pink Shrimp	4.5	96.5	27	11.3	15.2	3.7	212.6	177.1	49.1	355.9
Humpy Shrimp	0	0	0.1	0	0.1	0	148.9	250.6	6.8	41.9
Coonstripe	0	0	0	0	0	0	46.8	3	0.6	12.5
Sidestripe	0	0.3	0.1	0	0.1	0.1	2.5	0	0	4.2
Other Shrimp	0.2	1.6	1.6	0.6	1	0.3	20	1.3	0.4	3.4
Scallop	0	0	0	0	0	0	0	0	0	0
Other Inverts	35.4	16.6	2.1	4.7	6	15	26.3	0.1	7.8	6.8
TOTAL INVERTS	40.7	114.9	30.9	16.5	22.4	19	458.7	432.1	64.7	424.7
Other	0	1.1	0.3	0.3	0.2	0	165.4	0	0.6	0
TOTAL CATCH	153.3	313.2	160.2	90.7	50.9	239.7	845.9	677.1	179	813.2

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Haul	31	32	33	34	35	36	37	38	39	40
Location	Wide Bay	Wide Bay	Wide Bay	Kukak B	Kukak B	Kukak B	Kukak B	Kukak B	Kukak B	Kukak B
Month/Day/Year	9/23/01	9/23/01	9/23/01	9/25/01	9/25/01	9/25/01	9/25/01	9/25/01	9/25/01	9/25/01
Longitude Start	156 20.9	156 19.7	156 15.8	154 18.2	154 14.8	154 12.8	154 11.4	154 8.3	154 6.1	154 3.2
Latitude Start	57 21.2	57 22.3	57 24.2	58 17.3	58 18.4	58 19.4	58 19.7	58 19.4	58 19.2	58 19.3
Heading, Degrees	7	10	80	35	62	73	77	296	104	79
Average Depth (m)	55	68	64	64	115	106	106	91	68	71
Distance Fished (km)	1.3	0.7	0.7	1.5	1.5	1.3	1.7	1.5	1.1	0.9
Bottom Temperature	10.9	10.9	11	9.6	9.8	9.6	9.6	9.6	10.7	9.9
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	30.2	95.9	9.9	43.1	62.7	26.1	56.4	87.9	13	13.7
Pacific Cod	3.8	9.5	0	15.9	5.2	4.9	6.1	6.6	0	0
Rockfish	0	0	0	0	0	0	0.4	0.1	0.5	0
Sablefish	0.2	0	0	0	0	0	0	0.5	0.4	0.8
Herring	2.7	2.4	1.3	0.1	0.1	0	1	0	2.3	0.2
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	11.2	8.3	0.8	0.2	0	0	0	0	0	0
Other Roundfish	113.5	36.8	1.3	3.2	1.3	1.2	12.4	2.2	1.4	0.8
TOTAL ROUNDFISH	161.7	152.9	13.3	62.5	69.3	32.2	76.3	97.3	17.7	15.4
Arrowtooth Flndr	0	0	0	3.8	1	5.9	7.7	21	0.3	0.3
Flathead Sole	5.6	2.8	0.8	18.2	34.2	9.3	54.7	22.7	10.3	4
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	0.5	0.5	0	0	0	0	0.4	0.3
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pac Halibut	0	0	0	9.8	0.8	11.3	0	1.6	0	0
Starry Flndr	0	0	0	41.7	0	0	0	0	0	0
Yellowfin Sole	10.2	0	0.6	2.1	0	0	0	0	0	0
Other Flatfish	0	0	0.1	0	0	0	0	0	0	0
TOTAL FLATFISH	15.8	2.8	2.1	76.2	36	26.4	62.5	45.3	11	4.6
Skates	0	0	0	11.1	7.1	0	11.3	8.7	0	0
Spiny Dogfish	0	4.7	0	0	9.3	23.4	23.6	12.8	0	3
Other Elasmobrh	0	0	0	0	0	0	0	0	0	0
Tanner Crab	0	0	0	0	0	0.2	0	0	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0	0	0	0
Pink Shrimp	362.7	155.6	0.6	28.1	44.4	11	58.9	28.9	13.8	31.2
Humpy Shrimp	198.4	3.3	0.1	0	0	0	0	0.2	0.1	0
Coonstripe	51	1.3	0	0	0	0	0	0	0.1	0
Sidestripe	17	3.3	0	15.4	32.6	29.7	17.8	32.1	1.6	1
Other Shrimp	17	0.6	0.1	0.3	0.8	2.1	0.8	0.2	0.3	3.3
Scallop	0	0	0.5	0	0	0	0	0	0	0
Other Inverts	12.6	0	7.8	17.5	82.9	53.9	17.8	2.7	3.7	35.5
TOTAL INVERTS	658.7	164	9.2	61.3	160.7	96.9	95.3	64.1	19.5	71
Other	0	7.6	3.5	0.9	1.2	0	1	0	0.2	0
TOTAL CATCH	836.2	332.1	28.1	211.9	283.5	179	270	228.1	48.5	94

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Haul	41	42	43	44	45	46	47	48	49	50
Location	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Shelikof	Marmot B
Month/Day/Year	9/25/01	9/26/01	9/26/01	9/26/01	9/26/01	9/26/01	9/26/01	9/27/01	9/27/01	10/9/01
Longitude Start	153 48.9	153 16.8	153 25.4	153 35.0	153 26.8	153 34.8	153 40.9	153 55.0	153 51.9	152 40.3
Latitude Start	58 18.5	58 13.3	58 14.0	58 11.6	58 9.0	58 6.5	58 1.7	57 53.6	57 57.5	57 55.8
Heading, Degrees	205	215	211	215	212	214	217	44	48	180
Average Depth (m)	207	188	181	188	216	232	223	212	201	102
Distance Fished (km)	1.3	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.3
Bottom Temperature	6.9	5.7	5.7	6	5.7	5.7	5.7	5.7	5.7	7.5
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	17	11.9	12.9	6.9	23.8	18	43	14.2	15.1	7.3
Pacific Cod	0	8	0	1.9	0	0	0	0.8	0	0
Rockfish	0	0.2	1.2	3	0.4	0.7	0	0	37.2	0
Sablefish	0	0	0.5	1.3	0	6	1.3	2.4	2.1	0
Herring	0	0	0	0	0	0	0	0	0	0
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	0.5	0.1	0.7	0	0	16.7	0.7	1	2.6	0
Other Roundfish	5.3	2.2	2.8	3.1	3.7	2.8	1.7	1.5	0.5	0.3
TOTAL ROUNDFISH	22.9	22.3	18.1	16.3	27.9	44.2	46.7	20	57.5	7.5
Arrowtooth Flndr	5.9	26.5	44.7	39.9	63.9	34.7	31.8	97.8	14.4	17.5
Flathead Sole	2.9	0.5	11.6	12	10.4	12.2	0	0	3.7	59.7
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0.3	2.1	0.7	0.5	1.3	1	0	0	0.4	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pac Halibut	0.1	0	0	0	4.4	0.6	0.1	2	16.1	0
Starry Flndr	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	9.1	29.1	57	52.4	80.1	48.5	31.8	99.8	34.6	77.2
Skates	0	0	1.1	6.4	0	1.4	0	12.5	0	0
Spiny Dogfish	0	2.5	3.6	1.9	3.5	9.3	4.5	8.2	1.9	0
Other Elasmobrh	0	0	0	0	0	0	0	0	0	0
Tanner Crab	0	0	0	0	0	0	0	0	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0	0	0	0
Pink Shrimp	42	5.9	39.9	67.2	52.5	111.1	70.9	41.4	36	2.4
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	5.8	2.3	6.8	8.5	8.2	6.4	0	5.3	7.1	0
Other Shrimp	0.5	0.3	2.9	2.3	2.1	6.8	6	0.9	1.3	0.2
Scallop	0	0	0	0	0	0	0	0	0	0
Other Inverts	26.2	3.1	7.4	16.7	15	5.6	39.9	0.1	14.9	54.7
TOTAL INVERTS	74.4	11.6	57	94.7	77.8	129.8	116.7	47.8	59.3	57.2
Other	0	0	0.4	0	0.7	0	0	0.8	0	0
TOTAL CATCH	106.4	65.6	137.1	171.7	190.1	233.3	199.8	189	153.3	141.9

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Haul	51	52	53	54	55	56	57	58	59	60
Location	Marmot I	Marmot I	Marmot I	Marmot I	Marmot I	Marmot I	Marmot I	Marmot I	Marmot B	Marmot B
Month/Day/Year	10/9/01	10/9/01	10/9/01	10/9/01	10/9/01	10/10/01	10/10/01	10/11/01	10/11/01	10/11/01
Longitude Start	152 47.6	152 36.9	152 39.7	152 37.1	152 33.1	152 35.1	152 35.3	152 32.8	152 18.0	152 14.6
Latitude Start	57 53.0	57 57.1	57 58.0	57 59.0	58 1.5	58 8.5	58 7.1	57 59.0	58 4.5	58 5.3
Heading, Degrees	40	270	0	20	211	180	180	35	225	37
Average Depth (m)	91	133	126	135	196	113	117	179	185	170
Distance Fished (km)	0.9	1.7	0.9	0.7	0.9	1.9	1.5	1.9	1.3	1.9
Bottom Temperature	7.7	7.3	7.4	7.3	7.2	7.9	7.8	7.2	7.1	7.1
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	2.6	16.5	37.1	101.2	42.6	54.4	20	17.1	18.5	16
Pacific Cod	0	4.9	5.8	4.4	0	0	0	2.3	3.3	1
Rockfish	0	2.5	0.2	0	1.3	0	0	0.8	0.1	2.2
Sablefish	0.8	0	1.7	0	11.9	0.8	0	0	0	0.5
Herring	0	0	0	0	0	0	0	0	0	0
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	0	0	0.5	0	2.4	1.3	0.4	0.1	0	0
Other Roundfish	0.2	0	0.1	0	13.2	6.8	1.3	24.8	18.6	14.7
TOTAL ROUNDFISH	3.6	23.9	45.4	105.6	71.3	63.3	21.7	45.1	40.5	34.4
Arrowtooth Flndr	35.6	2.8	46.4	25.2	153.3	21.7	10.4	25.7	49	22.4
Flathead Sole	32.4	0.8	34.2	44.3	100.3	135.9	122.2	40.5	30.2	52.5
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0	2	0	3.1	0	0	3.8	0	1.1
Dover Sole	1.3	0	0	0	0	0	0	0	0	0
Pac Halibut	0	0	7.9	0	0	6.1	0	0	0	0
Starry Flndr	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	1.6	0	0	0	0	0	0	0	0	0
Other Flatfish	0	0	9.9	0	0	0	0	0	0	0
TOTAL FLATFISH	71	3.5	100.4	69.6	256.7	163.7	132.6	70	79.1	76
Skates	0	0	0	0	12.8	0	0	9	11.6	1.7
Spiny Dogfish	6.2	1.4	8.9	3	17.4	0	1.7	10.1	12	17.1
Other Elasmobrh	0	0	0	0	0	0	0	0	0	0
Tanner Crab	0	0	0.5	0	0	0	0	0	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0	0	0	0
Pink Shrimp	0.6	14.9	38.7	233.8	260.7	42.6	54.4	167.1	104.7	357.4
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	0.6	0	0.3	8.9	2.2	1.1	9.2	0.1	0.4
Other Shrimp	0	0	0.5	2	0.7	0.2	0.3	0.6	0.6	0.3
Scallop	0	0	0	0	0	0	0	0	0	0
Other Inverts	9.2	0.3	0.9	22	12.6	8.9	14.9	1.8	7.6	13.8
TOTAL INVERTS	9.9	15.8	40.6	258.1	282.9	53.8	70.7	178.8	113	371.8
Other	0.6	0	5.5	1.1	0.4	0	0	0.1	0	0.2
TOTAL CATCH	91.1	44.7	200.9	437.4	641.5	280.8	226.8	313.2	256.1	501.1

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Haul	61	62	63	64	65	66	67	68	69	70
Location	Marmot B	Marmot B	Marmot B	Marmot B	Ugak Bay	Ugak Bay	Ugak Bay	Ugak Bay	Ugak Bay	Ugak Bay
Month/Day/Year	10/11/01	10/11/01	10/11/01	10/11/01	10/12/01	10/12/01	10/13/01	10/13/01	10/13/01	10/13/01
Longitude Start	152 10.7	152 8.9	152 13.1	152 14.9	152 37.2	152 39.5	152 44.5	152 42.4	152 35.8	152 33.8
Latitude Start	58 5.7	58 6.1	58 9.1	58 12.7	57 25.5	57 26.7	57 27.5	57 27.8	57 24.8	57 22.8
Heading, Degrees	307	157	321	154	125	126	130	134	154	157
Average Depth (m)	159	219	183	128	97	97	88	91	95	97
Distance Fished (km)	0.9	1.5	1.9	0.9	1.5	1.9	0.9	1.3	1.3	1.3
Bottom Temperature	7.1	7.1	7.2	7.5	7.4	7.5	8.3	7.6	7.6	7.8
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	17.6	4.8	42.3	2.3	128.6	105.7	37.6	145.8	144.5	128.9
Pacific Cod	1.8	3.7	110.4	1.4	84.9	36.5	1.6	24.4	17.7	49.6
Rockfish	0	0.7	2.4	0	0.7	0	0	0	0	0
Sablefish	2.4	2.2	0	0	0	0	0	0	0	0
Herring	0	0	0	0	0	0	0	0.4	0	0
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	5.6	0	0	1.1	0	0	0	0	0	0
Other Roundfish	33.7	28.4	24.7	0.2	5	0.4	1.4	2.7	13.3	1.1
TOTAL ROUNDFISH	61	39.7	179.9	5.1	219.1	142.6	40.6	173.2	175.4	179.7
Arrowtooth Flndr	34.9	21.5	201	53.5	28	19.7	1.9	0	39.1	17.4
Flathead Sole	107.5	128.8	105.6	32.9	38.8	13.7	11.2	8.7	7.5	78.2
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	0.1	0	0	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pac Halibut	0	0	0	0	0	0	0	11.9	0	0
Starry Flndr	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0	0	0	0	0	0	0	0	4.1
Other Flatfish	0	0	0	0	0	4.4	0	0	0	0
TOTAL FLATFISH	142.5	150.4	306.7	86.4	66.7	37.8	13.2	20.6	46.6	99.8
Skates	11.7	0	4.5	6.2	0	0	0	0	0	9.8
Spiny Dogfish	7	20.8	21.2	12.2	0	2.4	0	0	0	0
Other Elasmobrh	0	0	0	0	0	0	0	0	0	0
Tanner Crab	0	0	0.1	0	0	0	0	0	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0	0	0	0
Pink Shrimp	267.7	141.3	140.2	197.9	14.3	23	7.6	3.8	4	6.2
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	0.5	0.3	8	0	0	0	0	0	0	0
Other Shrimp	0.5	0.3	1.7	1.5	0.1	0	0	0	0.1	0.6
Scallop	0	0	0	0	0	0	0	0	0	0
Other Inverts	46.8	10.1	21.4	23.7	230.7	109.3	158.9	293	241.3	20.2
TOTAL INVERTS	315.6	152.1	171.4	223.1	245.2	132.3	166.5	296.8	245.4	27
Other	0	0.2	0	1.8	10.3	0.3	0	0	0	0
TOTAL CATCH	537.8	363.1	683.6	334.8	541.3	315.3	220.3	490.6	467.4	316.3

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Haul	71	72	73	74	75	76	77	78	79	80
Location	Kiliuda	Kiliuda	Kiliuda	Kiliuda	Kiliuda	Kiliuda	2HeadGly	2HeadGly	2HeadGly	2HeadGly
Month/Day/Year	10/13/01	10/13/01	10/13/01	10/13/01	10/14/01	10/14/01	10/14/01	10/14/01	10/14/01	10/14/01
Longitude Start	152 45.2	152 52.6	152 56.3	152 56.5	153 1.6	153 2.2	153 20.4	153 22.5	153 25.6	153 27.6
Latitude Start	57 12.9	57 14.7	57 17.6	57 13.8	57 12.4	57 12.0	57 9.6	57 8.2	57 5.1	57 4.0
Heading, Degrees	300	115	149	253	53	270	209	214	19	165
Average Depth (m)	139	113	91	113	117	123	119	121	112	113
Distance Fished (km)	1.3	1.3	1.7	0.9	1.3	1.9	1.9	1.3	1.3	1.3
Bottom Temperature	6.2	8.2	7.9	7.5	6.5	6.7	7.1	7.1	7.2	7.2
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	8	53.8	50.8	84	130.2	2.9	153.9	484.3	104	94.5
Pacific Cod	14.2	16.2	9.1	6.3	11.8	3.6	0	2.5	0	3.2
Rockfish	0	0	0	0	0	0	0	0	12.1	0
Sablefish	0	0	0	0	0	0	0	0	0.6	0
Herring	0	0	0	0	0	0	0.2	0	0	0
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	7.2	0	0	0	0	0	0	0	0	0
Other Roundfish	0	0	1.5	1.4	0.5	0.5	2.4	4.4	0.1	3
TOTAL ROUNDFISH	29.4	70	61.4	91.8	142.5	7	156.5	491.1	116.9	100.7
Arrowtooth Flndr	61.3	77.9	28.1	21.9	277.1	122.9	44.9	140.8	417.4	75.6
Flathead Sole	4	38.2	36.6	66.7	13.6	20.8	23.5	106.8	147.7	33
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0	5	0	1	0.2	0	0	0	4.1	2.2
Dover Sole	0	1.4	0	0	0	1.8	0	0	8.8	0
Pac Halibut	0	0	0	0	0	0	3.3	0	0.5	0
Starry Flndr	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	3.1	0	2.4	0	0	0	0	0	0	4.3
Other Flatfish	0	0	0	0	0	0	0	0	0	0
TOTAL FLATFISH	68.5	122.6	67.1	89.5	290.9	145.5	71.7	247.6	578.4	115.1
Skates	0	9.6	0	0	26.4	0	0	0	0	0
Spiny Dogfish	0	0	0	0	0	1.9	1	0	0	0
Other Elasmobrh	0	0	26.4	0	0	0	0	0	0	0
Tanner Crab	0.1	0	0.1	0	0	0.2	0.1	0.1	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0	0	0	0
Pink Shrimp	3.9	8.8	9.8	12.3	8	0.6	16.5	15.7	0	0.1
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	0	0	0	0	0	0	0	0
Other Shrimp	0.2	0.1	0.2	0.3	0	0	0.3	0.1	0	0
Scallop	0	0	0	0	0	0	0	0	0	0
Other Inverts	10.4	6	11.3	0	222.6	114.5	62.1	126.3	116.1	9.1
TOTAL INVERTS	14.4	14.9	21.5	12.6	230.6	115.4	79	142.2	116.1	9.3
Other	0.3	0.4	0	0.5	0.6	0	0.8	1.5	4.7	0.2
TOTAL CATCH	112.6	217.5	176.4	194.4	691.1	270	308.9	882.4	816.1	225.2

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Appendix A. (page 9 of 10)

Haul	81	82	83	84	85	86	87	88	89	90
Location	2HeadGly	2HeadGly	2HeadGly	2HeadGly	Alitak B	Alitak B	Alitak B	Alitak B	Alitak B	Alitak B
Month/Day/Year	10/14/01	10/14/01	10/15/01	10/15/01	10/15/01	10/15/01	10/15/01	10/16/01	10/16/01	10/16/01
Longitude Start	153 26.3	153 27.0	153 27.7	153 25.3	153 58.2	153 56.3	153 50.2	153 58.5	154 2.9	154 6.8
Latitude Start	57 1.8	56 58.0	56 59.8	56 57.0	57 0.0	57 2.2	57 6.8	56 56.1	56 52.9	56 51.6
Heading, Degrees	207	0	198	180	30	20	62	220	235	232
Average Depth (m)	121	124	128	124	121	135	121	60	57	55
Distance Fished (km)	1.3	0.9	1.3	1.3	1.9	1.5	1.3	1.3	1.3	0.9
Bottom Temperature	7.3	6.7	6.8	7	4.7	4.6	4.8	9.9	9.4	9.3
Performance	1	1	1	1	1	1	1	1	1	1
				----------KILOGRAMS PER KILOMETER----------						
Pollock	783.9	18.1	87.2	5.2	178.2	190.3	268.7	16	33.6	7.7
Pacific Cod	3.3	23.1	0	6.5	8.6	3	1.7	1.2	8.1	0.1
Rockfish	0	0	0	0	0.2	0	0	0.2	0	0
Sablefish	0	0	0	0	0	0	0	0	0.5	0
Herring	0	0	0	0	0	0	0.2	0	0	0
Salmon	0	0	0	0	0	0	0	0	0	0
Sculpins	0	0	0.2	0	0	0.1	0	4.2	2.1	0
Other Roundfish	0	0.2	0	0	13.5	14.4	0	0.5	0.7	2
TOTAL ROUNDFISH	787.2	41.5	87.4	11.7	200.6	207.8	270.5	22.2	45	9.7
Arrowtooth Flndr	187.4	29.1	15.9	0.9	19.7	20	7.8	0.2	1.6	0
Flathead Sole	135.4	15.6	7.1	6.7	29.9	37.5	42.8	2.9	8.9	4
Rock Sole	0	0	0	0	0	0	0	0	0	0
Rex Sole	0.4	3.8	2.1	0	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0	0	0	0	0
Pac Halibut	2.6	0	0	0	9.5	8.8	0	5.7	0.3	0
Starry Flndr	0	0	0	0	0	0	0	0	0	0
Yellowfin Sole	0	0	0	0	0	0	0	0	5.2	0
Other Flatfish	0	0	4	0	4	0	0	0	7.4	1.3
TOTAL FLATFISH	325.8	48.5	29.1	7.7	63	66.3	50.6	8.8	23.4	5.3
Skates	0	0	0	0	0	0	0	0	0	0
Spiny Dogfish	4.4	0	0	0	0	0	0	0	0	0
Other Elasmobrh	0	0	0	0	0	0	0	0	0	0
Tanner Crab	0	0	0	0	2.2	0	0	0	0	0
Red King Crab	0	0	0	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0	0	0	0
Pink Shrimp	0.1	0.7	0.2	0.1	80.8	57	31.3	0.4	1.3	0.6
Humpy Shrimp	0	0	0	0	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0	0	0	0	0
Sidestripe	0	0	0	0	0	0	0	0	0	0
Other Shrimp	0	0	0	0	1.7	2	1.7	0	0.1	0.1
Scallop	0	0	0	0	0	0	0	0	0	0
Other Inverts	9.8	38.8	46.9	13.7	13.5	22.7	8.5	40.6	30.4	7.8
TOTAL INVERTS	9.9	39.5	47	13.8	98.2	81.7	41.4	41	31.8	8.5
Other	0.5	0	0	0	0	0.6	9.2	0	0	0.3
TOTAL CATCH	1127.7	129.6	163.5	33.2	361.8	356.4	371.8	72	100.3	23.9

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Haul	91	92	93	94	95	96
Location	Alitak B	Alitak B	Alitak B	Alitak B	Alitak B	Alitak B
Month/Day/Year	10/16/01	10/16/01	10/16/01	10/16/01	10/16/01	10/16/01
Longitude Start	154 8.0	154 7.3	154 8.5	154 12.5	154 12.6	154 9.0
Latitude Start	56 51.5	56 53.1	56 53.0	56 50.9	56 48.5	56 47.7
Heading, Degrees	221	30	240	236	50	37
Average Depth (m)	49	68	60	48	37	49
Distance Fished (km)	1.1	1.9	1.3	1.1	1.1	1.3
Bottom Temperature	9.4	9.1	9.8	9.8	9.4	9.2
Performance	1	1	1	1	1	1
			----------KILOGRAMS PER KILOMETER----------			
Pollock	2.2	8.2	3.8	0.3	2.5	8.3
Pacific Cod	0	5.4	0	4.3	0	4
Rockfish	0	0	0	0	0	0
Sablefish	0	0	0	0	0	0
Herring	0	0	0.6	5.5	7.9	0.1
Salmon	0	0	0	0	0	0
Sculpins	0	0	0	0	0	0.1
Other Roundfish	9.8	1.3	1.2	0.7	19	10.5
TOTAL ROUNDFISH	12	14.9	5.5	10.8	29.4	22.9
Arrowtooth Flndr	0.3	10.1	0.5	0	0	2
Flathead Sole	4.9	14.4	0.2	2.2	0	5.6
Rock Sole	0	0	0	0	0	0
Rex Sole	0	0	0	0	0	0
Dover Sole	0	0	0	0	0	0
Pac Halibut	0	25.5	0	0	0	0
Starry Flndr	0	0	0	0	0	1.8
Yellowfin Sole	0.4	1.1	0	0	0	8.6
Other Flatfish	0	1.5	0	0	0.8	0.6
TOTAL FLATFISH	5.6	52.6	0.7	2.2	0.8	18.5
Skates	0	0	0	0	0	0
Spiny Dogfish	0	0	0	0	0	0
Other Elasmobrh	0	0	0	0	0	0
Tanner Crab	0	0	0.2	0.1	0	0
Red King Crab	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0
Pink Shrimp	0.4	2.4	0.4	0	0	0.2
Humpy Shrimp	0	0	0	0	0	0
Coonstripe	0	0	0	0	0	0
Sidestripe	0	0	0	0	0	0
Other Shrimp	0.1	0.1	0	0.1	0.1	0.2
Scallop	0	0	0	0	0	0
Other Inverts	4.1	11.8	10.7	6.1	18.2	4.7
TOTAL INVERTS	4.6	14.3	11.2	6.3	18.3	5.1
Other	0.4	0.2	0.2	0	0.1	1.4
TOTAL CATCH	22.6	82.1	17.6	19.4	48.6	47.8

Appendix B.1. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Chiniak Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Flathead sole	*Hippoglossus elassodon*	35.9%
2	**Pink shrimp**	*Pandalus borealis*	22.6%
3	Arrowtooth Flounder	*Atheresthes stomias*	15.4%
4	Walleye pollock	*Theragra chalcogramma*	6.6%
5	Northern rock sole	*Lepidopsetta sp.*	6.0%
6	Jellyfish unidentified	Class Scyphozoa	5.5%
7	Starry flounder	*Platichthys stellatus*	1.8%
8	Great sculpin	*Myoxocephalus polyacanthocephalus*	1.6%
9	Pacific cod	*Gadus macrocephalus*	1.3%
10	Rex sole	*Glyptocephalus zachirus*	0.6%
11	Longnose skate	*Raja rhina*	0.4%
12	Yellowfin sole	*Pleuronectes aspera*	0.4%
13	**Sidestriped shrimp**	*Pandalopsis dispar*	0.3%
14	Big skate	*Raja binoculata*	0.2%
15	Plain sculpin	*Myoxocephalus jaok*	0.2%
16	Rougheye rockfish	*Sebastes aleutianus*	0.2%
17	Dover sole	*Microstomus pacificus*	0.1%
18	Shortfin eelpout	*Lycodes brevipes*	0.1%
19	Eulachon	*Thaleichthys pacificus*	0.1%
20	**Crangon shrimp unidentified**	*Genus Crangon*	0.1%
All other shrimp species	Hippolytid shrimp	Family Hippolytidae	0.04%
	Argid shrimp unidentified	*Genus Argis*	0.04%
	Coonstripe shrimp	*Pandalus hypsinotus*	0.02%
All other forage fish species	Threespine stickleback	*Gasterosteus aculeatus*	0.03%
	Pacific sandfish	*Trichogon trichodon*	0.02%
	Pacific herring	*Clupea pallasi*	0.02%
	Capelin	*Mallotus villosus*	0.01%
	All other animals [a]		0.4%
			100.0%

[a] Twenty one different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.2. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Inner Marmot Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	**Pink shrimp**	*Pandalus borealis*	42.0%
2	Flathead sole	*Hippoglossus elassodon*	18.0%
3	Arrowtooth flounder	*Atheresthes stomias*	15.1%
4	Jellyfish unidentified	Class Scyphozoa	5.5%
5	Pacific cod	*Gadus macrocephalus*	5.4%
6	Walleye pollock	*Theragra chalcogramma*	4.1%
7	Spiny dogfish	*Squalus acanthais*	3.3%
8	**Eulachon**	*Thaleichthys pacificus*	3.3%
9	Longnose skate	*Raja rhina*	0.8%
10	**Sidestriped shrimp**	*Pandalopis dispar*	0.4%
11	Snailfish Unidentified	Family Liparidae	0.4%
12	Rougheye rockfish	*Sebastes aleutianus*	0.2%
13	Monster snailfish	*Careproctus phasma*	0.2%
14	Sablefish	*Anoplopoma fimbria*	0.2%
15	Big skate	*Raja binoculata*	0.1%
16	Giant wrymouth	*Cryptacanthodes giganteus*	0.1%
17	Bigmouth sculpin	*Hemitripterus bolini*	0.1%
18	Crangon shrimp unidenified	*Pleuronectes aspera*	0.1%
19	Armhook squid	*Berryteuthis magister*	0.1%
20	Skate unidentified	*Bathyraja sp.*	0.1%
All other shrimp species	Hippolytid shrimp	Family Hippolytidae	0.04%
	Argid shrimp unidentified	*Genus Argis*	<0.01%
All other forage fish species	Prickleback unidentified	*Genus Stichaeidae*	0.02%
	Capelin	*Mallotus villosus*	0.01%
	All other animals [a]		0.2%
			100.0%

[a] Nine different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.3. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Marmot Island (offshore) from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	**Pink shrimp**	*Pandalus borealis*	35.1%
2	Flathead Sole	*Hippoglossus elassodon*	25.9%
3	Arrowtooth Flounder	*Atheresthes stomias*	12.8%
4	Walleye pollock	*Theragra chalcogramma*	12.7%
5	Jellyfish unidentified	Class Scyphozoa	2.8%
6	Spiny dogfish	*Squalus acanthias*	2.1%
7	Smooth lumpsucker	*Aptocyclus ventricosus*	1.4%
8	**Sidestriped shrimp**	*Pandalopsis dispar*	1.2%
9	Eulachon	*Thaleichthys pacificus*	0.8%
10	Pacific cod	*Gadus macrocephalus*	0.8%
11	Pacific halibut	*Hippoglossus stenolepis*	0.7%
12	Big skate	*Raja binoculata*	0.6%
13	Sablefish	*Anoplopoma fimbria*	0.6%
14	Rex sole	*Glyptocephalus zachirus*	0.4%
15	Longnose skate	*Raja rhina*	0.4%
16	**Prickleback unidentified**	*Genus Stichaeidae*	0.3%
17	Alaska plaice	*Pleuronectes quadrituberculatus*	0.2%
18	Spinyhead sculpin	*Dasycottus setiger*	0.2%
19	Rougheye rockfish	*Sebastes aleutianus*	0.2%
20	Armhook squid	*Berryteuthis magister*	0.2%
All other shrimp species	Crangon shrimp unidenified	*Genus Crangon*	0.10%
	Argid shrimp unidentified	*Genus Argis*	0.05%
	Hippolytid shrimp	Family Hippolytidae	0.02%
	Coonstripe shrimp	*Pandalus hypsinotus*	<0.01%
All other forage fish species	Capelin	*Mallotus villosus*	0.04%
	All other animals [a]		0.6%
			100.0%

[a] Fourteen different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.4. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Ugak Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Jellyfish unidentified	Class Scyphozoa	43.6%
2	Walleye pollock	*Theragra chalcogramma*	29.9%
3	Pacific cod	*Gadus macrocephalus*	9.7%
4	Flathead sole	*Hippoglossus elassodon*	6.7%
5	Arrowtooth flounder	*Atheresthes stomias*	4.7%
6	**Pink shrimp**	*Pandalis borealis*	2.8%
7	**Eulachon**	*Thaleichthys pacificus*	0.9%
8	Pacific halibut	*Hippoglossus stenolepis*	0.5%
9	Longnose skate	*Raja rhina*	0.4%
10	Alaska plaice	*Pleuronectes quadrituberculatus*	0.3%
11	Yellowfin sole	*Pleuronectes aspera*	0.2%
12	Spiny dogfish	*Squalus acanthias*	0.1%
13	Bivalve unidentified	Pelecypoda unidentified	0.1%
14	Sea cucumber unidentified	*Molpodia sp.*	0.1%
15	Sea anemone unidentified	*Order Actiniaria*	<0.1%
16	Shortfin eelpout	*Lycodes brevipes*	<0.1%
17	**Prickleback unidentified**	*Genus Stichaeidae*	<0.1%
18	Rougheye rockfish	*Sebastes aleutianus*	<0.1%
19	**Pacific sandfish**	*Trichodon trichodon*	<0.1%
20	**Pacific herring**	*Clupea pallasi*	<0.1%
All other shrimp species	Crangon shrimp unidenified	*Genus Crangon*	0.02%
	Hippolytid shrimp	Family Hippolytidae	0.01%
	Argid shrimp unidentified	*Genus Argis*	0.01%
All other forage fish species	None captured in this bay.		
	All other animals [a]		<0.1%
			100.0%

[a] Four different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.5. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Kiliuda Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Arrowtooth flounder	*Atheresthes stomias*	36.4%
2	Jellyfish unidentified	Class Scyphozoa	23.3%
3	Walleye pollock	*Theragra chalcogramma*	18.2%
4	Flathead sole	*Hippoglossoides elassodon*	10.2%
5	Pacific cod	Gadus macrocephalus	3.6%
6	**Pink shrimp**	*Pandalis borealis*	2.4%
7	Pacific sleeper shark	*Somniosus pacificus*	1.9%
8	Big skate	*Raja binoculata*	1.5%
9	Great sculpin	*Myoxocephalus polyacanthocephalus*	0.4%
10	Longnose skate	*Raja rhina*	0.4%
11	Yellowfin sole	*Pleuronectes aspera*	0.4%
12	Rex sole	*Glyptocephalus zachirus*	0.3%
13	Dover sole	*Microstomus pacificus*	0.2%
14	**Eulachon**	*Thaleichthys pacificus*	0.2%
15	Twenty arm sea star	*Pycnopodia helianthoides*	0.2%
16	Skate unidentified	*Bathyraja sp.*	0.2%
17	Spiny dogfish	*Squalus acanthias*	0.2%
18	**Crangon shrimp unidenified**	*Genus Crangon*	<0.01%
19	Tanner crab	*Chionoecetes bairdi*	<0.01%
20	**Prickleback unidentified**	*Genus Stichaeidae*	<0.01%
All other shrimp species	Argid shrimp unidentified	*Genus Argis*	0.01%
	Hippolytid shrimp	Family Hippolytidae	0.08%
	Spot Shrimp	*Pandalus platyceros*	<0.01%
	Barbed eualid	*Eualus barbatus*	<0.01%
	Sidestriped shrimp	*Pandalopsis dispar*	
All other forage fish species	None captured in this bay.		0.00%
	All other animals [a]		0.1%
			100.0%

[a] Five different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.6. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Twoheaded Gully from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Walleye pollock	*Theragra chalcogramma*	47.5%
2	Arrowtooth flounder	*Atheresthes stomias*	24.5%
3	Flathead Sole	*Hippoglossus elassodon*	12.8%
4	Jellyfish unidentified	Class Scyphozoa	11.4%
5	**Pink shrimp**	*Pandalus borealis*	1.1%
6	Pacific cod	*Gadus macrocephalus*	0.9%
7	Rougheye rockfish	*Sebastes aleutianus*	0.3%
8	Rex sole	*Glyptocephalus zachirus*	0.3%
9	Dover sole	*Microstomus pacificus*	0.2%
10	Twenty arm sea star	*Pycnopodia helianthoides*	0.2%
11	Pacific halibut	*Hippoglossus stenolepis*	0.2%
12	**Eulachon**	*Thaleichthys pacificus*	0.2%
13	Spiny dogfish	*Squalus acanthias*	0.2%
14	Yellowfin sole	*Pleuronectes asper*	0.1%
15	Northern rock sole	*Lepidopsetta sp.*	0.1%
16	Smooth lumpsucker	*Aptocyclus ventricosus*	<0.01%
17	Sablefish	*Anoplopoma fimbria*	<0.01%
18	Prowfish	*Zaprora silenus*	<0.01%
19	Shortfin eelpout	*Lycodes brevipes*	<0.01%
20	**Crangon shrimp unidenified**	*Genus Crangon*	<0.01%
All other shrimp species	Argid shrimp unidentified	*Genus Argis*	<0.01%
	Hippolytid shrimp	Family Hippolytidae	<0.01%
All other forage fish species	Pacific herring	*Clupea pallasi*	<0.01%
	Capelin	*Mallotus villosus*	<0.01%
	All other animals [a]		0.2%
			100.0%

[a] Six different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.7. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Alitak Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Walleye pollock	*Theragra chalcogramma*	47.5%
2	**Pink shrimp**	*Pandalus borealis*	12.6%
3	Jellyfish unidentified	Class Scyphozoa	10.7%
4	Flathead sole	*Hippoglossoides elassodon*	10.1%
5	Arrowtooth flounder	*Atheresthes stomias*	4.4%
6	Pacific halibut	*Hippoglossus stenolepis*	3.8%
7	Pacific cod	*Gadus macrocephalus*	2.4%
8	**Prickleback unidentified**	*Genus Stichaeidae*	1.8%
9	Pacific tomcod	*Microgadus proximus*	1.4%
10	Alaska plaice	*Pleuronectes quadrituberculatus*	0.9%
11	Yellowfin sole	*Pleuronectes aspera*	0.9%
12	**Pacific herring**	*Clupea pallasi*	0.7%
13	**Pacific sandfish**	*Trichodon trichodon*	0.7%
14	**Crangon shrimp unidenified**	*Genus Crangon*	0.3%
15	Plain sculpin	*Myoxocephalus jaok*	0.2%
16	Tanner crab	*Chionoecetes bairdi*	0.2%
17	Great sculpin	*Myoxocephalus polyacanthocephalus*	0.2%
18	Wattled eelpout	*Lycodes palearis*	0.1%
19	Starry flounder	*Platichthys stellatus*	0.1%
20	**Capelin**	*Mallotus villosus*	0.1%
All other shrimp species	Hippolytid shrimp	Family Hippolytidae	<0.01%
	Coonstripe shrimp	*Pandalus hypsinotus*	<0.01%
	Humpy shrimp	*Pandalus goniurus*	<0.01%
	Spot Shrimp	*Pandalus platyceros*	<0.01%
	Sidestriped shrimp	*Pandalopsis dispar*	<0.01%
All other forage fish species	Eulachon	*Thaleichthys pacificus*	0.70%
	All other animals [a]		<0.01%
			100.0%

[a] Eighteen different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.8. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Uyak Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Flathead sole	*Hippoglossus elassodon*	33.9%
2	Arrowtooth Flounder	*Atheresthes stomias*	18.7%
3	**Pink shrimp**	*Pandalus borealis*	14.6%
4	Walleye pollock	*Theragra chalcogramma*	12.2%
5	Jellyfish unidentified	Class Scyphozoa	6.7%
6	Big skate	*Raja binoculata*	2.8%
7	Longnose skate	*Raja rhina*	1.8%
8	**Sidestriped shrimp**	*Pandalopis dispar*	1.5%
9	Rex sole	*Glyptocephalus zachirus*	1.2%
10	**Pacific cod**	*Gadus macrocehpalus*	1.1%
11	Octopus	*Octopus dofleini*	0.9%
12	Sablefish	*Anoplopoma fimbria*	0.6%
13	Crangon shrimp unidenified	*Genus Crangon*	0.5%
14	Spiny dogfish	*Squalus acanthias*	0.5%
15	Shortfin eelpout	*Lycodes brevipes*	0.5%
16	Wattled eelpout	*Lycodes palearis*	0.5%
17	Eulachon	*Thaleichthys pacificus*	0.4%
18	**Dover sole**	*Microstomus pacificus*	0.4%
19	Longsnout prickleback	*Lumpenella longirostris*	0.3%
20	Great sculpin	*Myoxocepahlus polyacanthocepha*	0.3%
All other shrimp species	Argid shrimp unidentified	*Genus Argis*	0.03%
	Hippolytid shrimp	Family Hippolytidae	0.02%
	Barbed eualid	*Eualus barbatus*	<0.01%
All other forage fish species	Capelin	*Mallotus villosus*	0.11%
	Pacific herring	*Clupea pallasi*	0.09%
	All other animals [a]		0.5%
			100.0%

[a] Fifteen different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.9. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Uganik Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Flathead sole	*Hippoglossus elassodon*	30.5%
2	Walleye pollock	*Theragra chalcogramma*	25.7%
3	**Pink shrimp**	*Pandalus borealis*	23.7%
4	Jellyfish unidentified	Class Scyphozoa	7.6%
5	Arrowtooth flounder	*Atheresthes stomias*	7.1%
6	**Sidestriped shrimp**	*Pandalopis dispar*	1.6%
7	Yellowfin sole	*Plueronectes asper*	0.6%
8	Alaska plaice	*Plueronectes quadrituberculatus*	0.4%
9	**Crangon shrimp unidenified**	*Genus Crangon*	0.4%
10	**Longsnout prickleback**	*Lumpenella longirostris*	0.4%
11	Pacific halibut	*Hippoglossus stenolepis*	0.3%
12	Pacific cod	*Gadus macrocephalus*	0.3%
13	Longnose skate	*Raja rhina*	0.3%
14	Sablefish	*Anoplopoma fimbria*	0.2%
15	Sea anemone unidentified	*Order Actiniaria*	0.2%
16	Shortfin eelpout	*Lycodes brevipes*	0.1%
17	**Pacific herring**	*Culpea pallasi*	0.1%
18	Spinyhead sculpin	*Dayscottus setiger*	0.1%
19	Wattled eelpout	*Lycodes palearis*	0.1%
20	**Eulachon**	*Thaleichthys pacificus*	0.1%
All other shrimp species	Hippolytid shrimp	Family Hippolytidae	0.03%
	Coonstripe shrimp	*Pandalus hypsinotus*	0.02%
All other forage fish species	Prickleback unidentified	*Genus Stichaeidae*	<0.01%
	Capelin	*Mallotus villosus*	<0.01%
	All other animals [a]		0.2%
			100.0%

[a] Thirteen different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.10. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence from Shelikof Strait in the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	**Pink shrimp**	*Pandalus borealis*	32.2%
2	Arrowtooth flounder	*Atheresthes stomias*	25.3%
3	Walleye Pollock	*Theragra chalcogramma*	11.2%
4	Jellyfish unidentified	Class Scyphozoa	8.1%
5	Flathead sole	*Hippoglossoides elassodon*	3.7%
6	**Sidestriped shrimp**	*Pandalopsis dispar*	3.4%
7	Light dusky rockfish	*Sebastes ciliatus*	2.8%
8	Spiny dogfish	*Squalus acanthias*	2.5%
9	Pacific halibut	*Hippoglossus stenolepis*	1.7%
10	**Glass shrimp**	*Pasiphaea pacifica*	1.2%
11	Bigmouth sculpin	*Hemitripterus bolini*	1.2%
12	**Eulachon**	*Thaleichthys pacificus*	1.1%
13	Sablefish	*Anoplopoma fimbria*	1.0%
14	Longnose skate	*Raja rhina*	0.8%
15	Pacific cod	*Gadus macrocephalus*	0.8%
16	Big skate	*Raja binoculata*	0.5%
17	Rex sole	*Glyptocephalus zachirus*	0.4%
18	**Crangon shrimp unidenified**	*Genus Crangon*	0.3%
19	Armhook squid	*Berryteuthis magister*	0.2%
20	Skate unidentified	*Bathyraja sp.*	0.2%
All other shrimp species	Barbed eualid	*Eualus barbatus*	0.06%
	Heptacarpus shrimp unident.	*Genus Heptacarpus*	0.05%
	Hippolytid shrimp	Family Hippolytidae	0.01%
	Short-scaled eualid	*Eualus suckleyi*	<0.01%
All other forage fish species	Prickleback unidentified	*Genus Stichaeidae*	0.09%
	Capelin	*Mallotus villosus*	0.04%
	All other animals [a]		1.3%
			100.0%

[a] Fourteen different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.11. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Kukak Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Walleye pollock	*Theragra chalcogramma*	23.4%
2	**Pink shrimp**	*Pandalus borealis*	16.2%
3	Jellyfish unidentified	Class Scyphozoa	15.0%
4	Flathead sole	*Hippoglossus elassodon*	12.2%
5	**Sidestriped shrimp**	*Pandalopis dispar*	10.0%
6	Spiny dogfish	*Squalus acanthias*	5.6%
7	Starry flounder	*Platichthys stellatus*	3.3%
8	Arrowtooth flounder	*Atheresthes stomias*	3.1%
9	Pacific cod	*Gadus macrocephalus*	3.0%
10	Big skate	*Raja binoculata*	2.4%
11	Pacific halibut	*Hippoglossus stenolepis*	1.7%
12	Snailfish unidentified	Family Liparidae	1.0%
13	Longnose skate	*Raja rhina*	0.7%
14	**Eulachon**	*Thaleichthys pacificus*	0.5%
15	**Crangon shrimp unidenified**	*Genus Crangon*	0.4%
16	**Pacific herring**	*Platichthys stellatus*	0.2%
17	**Sea anemone unident.**	Order Actiniaria	0.2%
18	Yellowfin sole	*Pleuronectes aspera*	0.2%
19	Sablefish	*Anoplopoma fimbria*	0.1%
20	**Pacific sandfish**	*Trichodon trichodon*	0.1%
All other shrimp species	Hippolytid shrimp	Family Hippolytidae	0.05%
	Argid shrimp unidentified	*Genus Argis*	0.02%
	Humpy shrimp	*Pandalis goniurus*	0.02%
	Coonstripe shrimp	*Pandalus hypsinotus*	<0.01%
	Spot shrimp	*Pandalus platyceros*	<0.01%
All other forage fish species	Capelin	*Mallotus villosus*	0.09%
	Pacific sand lance	*Ammodytes hexapterus*	<0.01%
	All other animals [a]		0.4%
			100.0%

[a] Twelve different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.12. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Puale Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	Starry flounder	*Platichthys stellatus*	17.0%
2	Walleye pollock	*Theragra chalcogramma*	16.4%
3	Pacific cod	*Gadus macrocehpalus*	13.7%
4	Flathead sole	*Hippoglossus elassodon*	13.7%
5	**Pink shrimp**	Pandalus borealis	11.1%
6	Big skate	*Raja binoculata*	9.7%
7	Spiny dogfish	*Squalus acanthias*	5.8%
8	Jellyfish unidentified	Class Scyphozoa	4.9%
9	Arrowtooth flounder	*Atheresthes stomias*	2.6%
10	Pacific halibut	*Hippoglossus stenolepis*	1.5%
11	Sablefish	*Anoplopoma fimbria*	0.6%
12	**Crangon shrimp unidenified**	*Genus Crangon*	0.6%
13	Wattled eelpout	*Lycodes palearis*	0.4%
14	**Pacific sandfish**	*Trichodon trichodon*	0.4%
15	Pacific tomcod	*Microgadus proximus*	0.3%
16	Yellow Irish lord	*Hemilepidotus jordani*	0.2%
17	Butter sole	*Isopsetta isolepis*	0.2%
18	Ribbed sculpin	*Triglops pingeli*	0.2%
19	**Pacific herring**	*Clupea pallasi*	0.1%
20	**Eulachon**	*Thaleichthys pacificus*	0.1%
All other shrimp species	Argid shrimp unidentified	*Genus Argis*	0.04%
	Humpy shrimp	*Pandalus goniurus*	0.03%
	Sidestriped shrimp	*Pandalopsis dispar*	0.03%
	Hippolytid Shrimp	Family Hippolytidae	0.03%
All other forage fish species	Prickleback unidentified	*Genus Stichaeidae*	<0.01%
	All other animals [a]		0.4%
			100.0%

[a] Seven different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

Appendix B.13. Relative abundance by weight of the top 20 species, percentage of shrimp and forage fish occurrence in Wide Bay from the 2001 small-mesh trawl survey.

Rank	Common name	Species Name	Percent of catch by weight
1	**Pink shrimp**	*Pandalus borealis*	36.4%
2	**Humpy shrimp**	*Pandalus goniurus*	19.4%
3	Walleye pollock	*Theragra chalcogramma*	15.2%
4	**Pacific sandfish**	*Trichodon trichodon*	8.0%
5	Plain sculpin	*Myoxocephalus jaok*	5.4%
6	**Coonstripe shrimp**	*Pandalus hypsinotus*	3.2%
7	Flathead sole	*Hippoglossus elassodon*	2.8%
8	Yellowfin sole	*Pleuronectes aspera*	2.6%
9	Jellyfish unidentified	Class Scyphozoa	1.2%
10	Pacific cod	*Gadus macrocephalus*	1.0%
11	Spiny dogfish	*Squalus acanthias*	0.8%
12	**Hippolytid shrimp**	Family Hippolytidae	0.8%
13	**Sidestriped shrimp**	*Pandalopsis dispar*	0.7%
14	**Pacific herring**	*Platichthys stellatus*	0.3%
15	Pacific tomcod	*Microgadus proximus*	0.3%
16	Big skate	*Raja binoculata*	0.3%
17	Pacific halibut	*Hippoglossus stenolepis*	0.2%
18	**Crangon shrimp unidenified**	*Genus Crangon*	0.2%
19	Green sea urchin	*Strongylocentrotus droebachiensis*	0.2%
20	Purple-orange sea star	*Asterias amurensis*	0.1%
All other shrimp species	Spot shrimp	*Pandalus platyceros*	0.13%
	Spiny lebbeid	*Lebbeus groenlandicus*	0.08%
	Short-scaled eualid	*Eualus suckleyi*	0.08%
	Argid shrimp unidentified	*Genus Argis*	0.00%
	Sculptured shrimp	*Sclerocrangon boreas*	<0.01%
All other forage fish species	Capelin	*Mallotus villosus*	0.10%
	Prickleback unidentified	*Genus Stichaeidae*	<0.01%
	All other animals [a]		0.8%
			100.0%

[a] Twenty different species composed the group of other animals.
Note- Adult and juvenile Walleye pollock and Pacific cod combined.

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