

2A00-21

**A BOTTOM TRAWL SURVEY FOR CRABS  
IN THE SOUTHERN, KAMISHAK BAY, AND BARREN ISLANDS  
DISTRICTS OF THE COOK INLET MANAGEMENT AREA  
8-12 JUNE AND 26 JUNE - 1 JULY 1997**

by  
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## ABSTRACT

During 8-12 June and 26 June - 1 July 1997, the Alaska Department of Fish and Game conducted bottom trawl surveys to assess Tanner (*Chionoecetes bairdi*) and red king (*Paralithodes camtschaticus*) crabs in the Southern, Kamishak, and Barren Islands Districts of the Cook Inlet Management Area. The surveys were conducted with the state research vessel *Pandalus*, overall length 20.1 m (66 ft), making 1-nautical mile tows with a 400 mesh Eastern otter trawl.

The 23 successful tows in the Southern District yielded a population estimate of 1.0 million male Tanner crab vulnerable to the trawl survey gear. Legal males comprised only 15% of the population estimate. The Southern District was also estimated to contain 450,311 female Tanner crab, with mature female crab comprising 64% of the surveyed population. The 1997 Southern District survey also yielded 10 male king crab, but no female king crab were caught. Fifteen male and 90 female Dungeness crab were caught. Other species caught during the Southern District survey included walleye pollock (3,858 lb), Pacific cod (1,575 lb), Pacific halibut (1,467 lb), rockfish (204 lb), weathervane scallop (19 lb), and sablefish (4 lb).

The 19 successful tows in the Kamishak and Barren Islands Districts yielded a population estimate of 2.9 million male Tanner crab, with legal male crab comprising only 14% of the population vulnerable to the trawl survey gear. The 1997 survey also produced an estimated population abundance of 307,257 female Tanner crab, with mature female crab comprising 26% of the surveyed population. A total of 63 male and 71 female red king crab were caught in the Kamishak and Barren Islands Districts survey. Other species caught during the 1997 survey included Pacific cod (2,806 lb), Pacific halibut (1,469 lb), walleye pollock (390 lb), weathervane scallops (373 lb), sablefish (12 lb), and rockfish (11 lb).

The legal segments of both Tanner and red king crabs in the Southern District and the Kamishak and Barren Islands Districts continue to be insufficient to support commercial fisheries. In addition, estimated abundance of prerecruit males, although highly variable over time, remains at a low level with little evidence of stock rebuilding at this time.

## INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) has been conducting bottom trawl surveys for red king (*Paralithodes camtschaticus*) and Tanner (*Chionoecetes bairdi*) crabs in the Cook Inlet Management Area since 1990 (Kimker 1996; Bechtol 1998). Data from these surveys are used to generate crab population estimates, monitor trends in stock abundance, and set quotas for the commercial fisheries (Bechtol and Trowbridge 1999).

The trawl surveys superseded the crab pot surveys that were used by ADF&G prior to 1991 to assess crab stocks (Kimker 1991a, 1991b). The pot survey data established an index of abundance that was correlated with commercial catch information. The shortcomings of the pot surveys, such as soak variation, dependence on the commercial fishery, and the relative nature of the indices themselves, induced the Department to use a trawl survey to eliminate the influence of these variables and allow direct stock enumeration. Trawl surveys conducted by the National Marine Fisheries Service (NMFS) in the Bering Sea by ADF&G in the Westward Region have historically proven satisfactory in determining stock conditions and fisheries management strategies for king and Tanner crabs.

Many species of groundfish are captured during the trawl surveys. Enumerating the groundfish catch was inconsistent for the first few years of surveys due to personnel limits. Beginning in 1993 the regional groundfish biologist regularly participated in the trawl survey and provided a vehicle for collection and analysis of groundfish data that will be documented in other reports.

### *Objectives*

The 1997 survey goals were:

1. Determine the abundance of Tanner and red king crab stocks in the Southern, Kamishak and Barren Islands Districts of the Cook Inlet Management Area.
2. Document the size and shell age of all Tanner, king and Dungeness (*Cancer magister*) crabs captured. Determine egg condition of all female crabs.
3. Document relative catch rates and abundance of key groundfish species including Pacific Cod (*Gadus macrocephalus*), walleye pollock (*Theragra chalcogramma*), sablefish (*Anoplopoma fimbria*), and all rockfish species (*Sebastes* spp.).
4. Document the abundance, size, sex, maturity, and age of these key groundfish species. These data are will be reported in a separate data report.

## METHODS

### *Study Area and Survey Stations*

Survey area selection was based on historical pot indices, commercial catch information, and previous survey catch history. The two general survey areas included (Figure 1): (1) in the Southern District, that portion of Kachemak Bay extending west to 152° W. longitude, and (2) in the Kamishak and Barren Islands Districts, often referred to as Kamishak Bay and including waters of Kamishak Bay extending east to 152° 40' W. longitude.

Initially, Southern District survey stations were 2.5 nautical mile squares (6.25 nmi<sup>2</sup>) and Kamishak Bay stations were 5.0 nautical miles squares (25.0 nmi<sup>2</sup>; Kimker 1991a). However, individual station size and shape varied somewhat due to irregular coastline and depth. Depths shallower than 18 m (10 fathoms) were subsequently precluded from the survey and analysis to reduce potential gear loss problems and to better represent Tanner and king crab habitat. Southern District stations were further delineated into strata deeper and shallower than 92 m (50 fathoms). Individual stations were also re-evaluated with respect to results of previous surveys and commercial fisheries, occasionally resulting in an increase or decrease in the size allocated to a given survey station.

The trawl path was selected within the station grid by the vessel skipper wherever it appeared that a good tow could be made. The initial goal for tow length was 1.0 nautical miles (nmi), which required approximately 30 minutes of towing at 2.5 kts. All tows were made during daylight hours. Because irregular bottom or bottom hang-ups occasionally reduced the duration of a given tow, data analysis was restricted to those tow lengths  $\geq 0.5$  nmi. Data from shorter tows were discarded and the tows repeated if time allowed.

### *Vessel and Gear*

The state research vessel *Pandalus*, overall length 20.1 m (66 ft), was used for the survey. A 400 mesh Eastern otter trawl with a 21.3 m (70 ft) headrope and a 29.0 m (95 ft) footrope fished with 363 kg (800 lb), 1.5 m x 2.1 m, Nor'Eastern Astoria V trawl doors. The net opening was estimated to be 2.7 m (9 ft) high and 12.2 m (40 ft) wide. The trawl mesh was 1.6 cm (4 inch) in the wings and body, 1.4 cm (3½ inch) in the intermediate and cod end, and 0.5 cm (1¼ inch) in the cod end liner. Bottom temperature was recorded with a time specific temperature logger attached to the trawl headrope. This temperature logger was typically attached once daily on a tow where the likelihood of gear loss or a bottom hang-up was thought to be minor.

### *Catch Sampling*

Successful tows were brought aboard and weighed. All Tanner, king, and Dungeness crabs were weighed and measured by sex and species. Carapace sizes were measured as widths for Tanner and Dungeness crabs and lengths for king crabs. Shell age was recorded as soft, new, old, or very old for all crab (Table 1; Kimker 1991*a*). Soft-shell and new-shell crabs are believed to have molted after the most recent winter. In contrast, old shells and very old shells are believed to have been retained for one or more years, thereby having avoided molting for at least one year. Female crabs were also assessed for egg condition and clutch size. All target groundfish were weighed by species and sampled for weight, length, sex, maturity, and age. These size, age and maturity data will be described in a separate report. Weathervane scallops were measured at sea for shell height, age, sex, and gonad maturity.

### *Data Analysis*

For each district and target species, the population abundance  $N_i$  and population biomass  $B_i$  were estimated from the following area swept equations:

$$N_i = 151.9 \times \sum_{i=1}^n \left( A_i \times \frac{C_i}{l_i} \right)$$
$$B_i = 151.9 \times \sum_{i=1}^n \left( A_i \times \frac{C_i}{l_i} \right)$$

where

151.9 = a factor to convert the catch per nautical mile towed to catch per square nautical miles

= 6,076 feet per nautical mile/40 feet (fishing width of the net)

$A_i$  = the surface area of station  $i$  in square nautical miles

$C_i$  = the tow catch in area  $i$  measures as either number or weight of animals

$l_i$  = the distance towed in area  $i$  in nautical mile

Because only survey stations that were sampled with a successful tow were included in the aggregated estimate, these are minimum population estimates. Population numbers were not estimated for king crab because of the low abundance and patchy distribution of this species.

Crab growth rates often vary by area across the geographic distribution of a given species but tend to be consistent within a given management area. Crab carapace widths were classified into estimated “age” categories based on previous observations of the Cook Inlet crab resources. For analysis purposes, soft-shell and new-shell crabs were pooled into a single “new” category whereas old-shell and very old-shell crabs were pooled into a single “old” category (Table 1; Kimker 1991*a*). Mean carapace sizes were calculated by weighting size frequency distributions in a survey

station by the surface area of the survey station.

## RESULTS

### *Southern District*

A total of 23 successful tows, ranging in depth from 13-91 fathoms (15-93 m), were made in the Southern District during 26 June to 1 July 1997 (Figure 2; Appendix A). Aggregate catch from all tows was 44,018 lb; total catch of all non-target species and debris was 34,938 lb. After being standardized to catch per nautical mile, target species comprised 9,101 lb of the Southern District catches (Table 2). Mean catch among the 23 tows was 395.7 lb/nmi. Target invertebrate catches totaled 1,664 lb of Tanner crab, 8 lb of king crab, 120 lb of Dungeness crab, and 19 lb of weathervane scallops. Pacific halibut catches totaled 1,467 lb and target groundfish species totaled 5,823 lb, comprised of 1,575 lb of Pacific cod, 204 lb of rockfish, 3,858 lb of walleye pollock, and 4 lb of sablefish.

### Tanner Crab

A total, standardized for tow distance, of 1,408 male Tanner crab was caught in the Southern District (Table 4). Sublegal crab (<140 mm) comprised 86% of the catch. Prerecruit-1 and -2 crab comprised a total of 58% of all the males caught. Legal male catch was only 14% of all size classes combined. New recruits comprised just 13% (176 crab) of the legal male population; only one postrecruit male (>165 mm) was caught. The Southern District population estimate was 1,035,946 male Tanner crab vulnerable to the trawl survey gear (Tables 5 and 6). Legal males were estimated to total 154,163 Tanner crab, or 15% of the surveyed population (Figures 4 and 5). Carapace widths ranged from 24-163 mm (0.9-6.4 inch; Table 7). Mean male carapace width, weighted by population abundance within stations, was 109.2 mm (4.3 inch); mean width of legal males was 147 mm (5.8 inch).

A total, standardized for tow distance, of 657 female Tanner crab was caught in the Southern District survey (Table 8). The Southern District was estimated to contain 450,311 female Tanner crab vulnerable to the trawl survey gear (Tables 9 and 10). Mature females were estimated to total 287,443 Tanner crab, or 64% of the surveyed population. Juvenile crab comprised 38% (n=251) of the catch. Nearly 90% of the total female catch and 67% of the adult females had new shells (Figure 6). Only 3 of the mature females were barren and 75% of the mature females had full clutches. Eggs in all clutches were uneyed. Female carapace width ranged from 16 to 124 mm (0.6-4.9 inch; Table 11). Mean carapace width, weighted by population estimates within stations, was 89.2 mm (3.5 inch) and mean width of all mature females was 100.8 mm (4.0 inch).

## King Crab

The 1997 Southern District survey yielded a total of 10 male king crab from three stations (Tables 12 and 13). Four males had new shells. A single juvenile with a 106-mm (4.1-inch) carapace length was caught adjacent to the Homer Spit (Table 12; Figure 2). The nine mature king crab caught in Kachemak Bay were comprised as follows: one new-shell recruit, one old-shell recruit, three new-shell postrecruits, and four old-shell postrecruits. Carapace length among all samples ranged from 106-185 mm (4.2-7.3 inch), with a mean size of 163.2 mm (6.4 inch; Table 7). Due to the small number of king crab captured, a population estimate was not calculated for the Southern District. No female king crab were caught in the Southern District (Tables 14 and 15).

## Dungeness Crab

Only 15 male Dungeness crab were captured (Table 16 and 17). Male carapace widths ranged from 109-177 mm (4.3-7.0 inch) with a weighted mean of 153.2 mm (6.0 inch; Table 7). Four legal males were caught, comprising 27% of all male Dungeness captures. Three of the legal males had new shells. Seven old-shell prerecruit-1 and one old-shell prerecruit-2 crabs were caught. Two soft-shell males, both new recruits, were caught.

The Southern District survey caught 90 female Dungeness crab (Tables 18 and 19). The Southern District population estimate was 59,768 female Dungeness crab vulnerable to the trawl survey gear. Based on the observed carapace widths, all female Dungeness were assumed to be mature, although only one was egg-bearing. Carapace widths ranged from 119-167 mm (4.7-6.6 inch), with a weighted mean of 141.4 mm (5.6 inch; Table 11).

## Weathervane Scallop

A total of 31 weathervane scallops were caught among eight tows in the Southern District survey (Table 2; Figure 2), with the largest catches observed at stations 4 (5 lb) and 3 (4 lb). Shell heights ranged from 75-186 mm (3.0-7.3 inch) and mean height was 120.4 mm (4.8 inch; Figure 7). Scallop ages ranged from 2-15 years, with a mean age of 4.9 years (Figure 7).

## Groundfish and Halibut

Pacific halibut were caught by every tow in the Southern District; mean halibut catch was 63.8 lb/nmi (Table 2). Catch biomass of halibut was greatest in station 17 (Figure 2), which yielded a catch rate of 486 lb/nmi. Estimated population biomass was 1.4 million lb of Pacific halibut in the surveyed area. Walleye pollock yielded the greatest catches among all target species caught in the 1997 Southern District trawl survey. Pollock catch totaled 3,858 lb among all tows, with a mean catch rate of 167.7 lb/nmi. Catch rates ranged from 0-818 lb/nmi with the greatest catch rate of 818 lb/nmi from station 12 (Figure 2). In general, few pollock were caught in the

outermost stations of the district. Estimated population biomass was 3.2 million lb of walleye pollock in the surveyed area. Pacific cod were caught in all stations except one. Catches of Pacific cod ranged from 0-512 lb/nmi, with a mean catch rate of 76.4 lb/nmi among tows. The largest catch rates occurred in stations 16 (222 lb/nmi), 19 (164 lb/nmi), and 22 (512 lb/nmi) along the outer portion of the survey area (Figure 2). Estimated population biomass was 1.4 million lb of Pacific cod in the surveyed area. Standardized rockfish catches totaled 204 lb, comprised of 2 lb of yelloweye, 46 lb of rougheye, 9 lb of redbanded, 145 of dusky, and 2 lb of redstripe rockfishes (Table 2). Mean rockfish catch was 8.9 lb/nmi, with catch rates ranging from 0-58lb/nmi. Only 4 lb of sablefish were caught: 3 lb/nmi in station 11 and 1 lb/nmi in station 12.

### *Kamishak and Barren Islands Districts*

A total of 19 successful tows were made in the Kamishak and Barren Islands Districts during 8-12 June 1997 (Appendix B; Table 3; Figure 3). Station 64 was abandoned after several tow attempts failed. Aggregate catch from all tows was 23,890 lb; total catch of all non-target species and debris was 17,559 lb. After being standardized to catch per nautical mile, target species comprised 6,497 lb of the catches (Table 3). Mean catch among the 19 tows was 395.7 lb/nmi. Target invertebrate catches totaled 955 lb of Tanner crab, 480 lb of king crab, 373 lb of weathervane scallops, and no Dungeness crab. Pacific halibut catches totaled 1,469 lb and target groundfish species totaled 3,219lb, comprised of 2,806 lb of Pacific cod, 390 lb of walleye pollock, 12 lb of sablefish, and 11 lb of dusky rockfish.

#### Tanner Crab

A total, standardized for tow distance, of 758 male Tanner crab was caught in the Kamishak and Barren Islands Districts (Table 20). Sublegal crab (<140 mm) comprised 86% of the catch. Prerecruit-1 and -2 crabs comprised a total of 69% (n=509) of all males caught. The legal male catch was only 14% of all age classes combined. New recruits comprised just 4% (n=27) of the legal male catch; two postrecruit males were caught. The population estimate for the Kamishak and Barren Islands Districts was 2,926,177 male Tanner crab vulnerable to the trawl survey gear (Tables 6 and 21; Figures 8 and 9). Estimated population abundance of legal males was 396,763 Tanner crab, or 14% of the surveyed male population. Carapace widths ranged from 19-174 mm (0.7-6.9 inch; Table 7). Mean male carapace width, weighted by population abundance within stations, was 112.9 mm (4.4 inch); mean width of legal males was 146.6 mm (5.8 inch).

A total of 80 female Tanner crab was caught in the Kamishak and Barren Islands Districts survey (Table 22). Juveniles comprised 75% (n=60) of the catch (Figure 6). New-shell crabs represented only 10% (n=2) of the mature females. Only 1 of the mature females was barren and 70% of the mature females had full clutches. Eggs in all clutches were uneyed. Female carapace width ranged from 14 to 103 mm (0.6-4.1 inch; Table 11). The mean carapace width, weighted by station area, was 54.8 mm (2.2 inch) and the mean width of all mature females was 91.3 mm (3.6 inch).

Estimated population abundance for the districts was 307,257 female Tanner crab vulnerable by the trawl survey gear (Tables 9 and 23). Mature females comprised 26% of the surveyed population, or 79,353 crab.

### King Crab

The 1997 survey of the Kamishak and Barren Islands Districts yielded a total of 63 male red king crab from eight stations (Tables 12 and 13). Fourteen males were of legal size ( $\geq 145$  mm; 5.7 inch), eight new-shell recruits, four old-shell recruits, and two old-shell postrecruits. The bulk of the survey catch was prerecruit-2 ( $n=19$ ) and prerecruit-1 ( $n=25$ ) crab. All prerecruit crab had new shells. Carapace lengths (Table 7) among all samples ranged from 102-176 mm (4.0-6.9 inch) with a mean size, weighted by station area, of 131.4 mm (5.2 inch). Legal male carapace lengths averaged 156 mm (6.1 inch) in length.

After catch rate standardization for tow length, the 1997 survey caught 71 female red king crab from four stations in the Kamishak and Barren Islands Districts (Tables 14 and 15). Only four females had old shells. Ninety percent ( $n=64$ ) of the females were mature and only six of the mature females were barren. Carapace length of female king crab ranged 82-135 mm (3.2-5.3 inch; Table 11) and mean length was 115.5 mm (4.5 inch). Mean length of mature females was 117.4 mm (4.6 inch).

### Weathervane Scallop

A total of 407 weathervane scallops, with a weight of 373 lb, was caught among seven tows in the Kamishak and Barren Islands Districts survey. The largest component of the catch biomass occurred at stations 37 (240 lb) and 44 (72 lb), both located east of Augustine Island (Figure 3). Shell heights ( $n=407$ ) ranged from 73-196 mm (2.9-7.7 inch) and mean height was 150.0 mm (5.9 inch; Figure 10). Scallop ages ( $n=207$ ) exhibited a bimodal distribution with a range of 2-22 years and a mean age of 9.1 years (Figure 10).

### Groundfish and Halibut

Pacific halibut were caught in all except one tow in the Kamishak and Barren Islands Districts; mean halibut catch was 77.3 lb/nmi (Table 3). Catch biomass of halibut was greatest in station 51 (Figure 3), which yielded a catch rate of 242 lb/nmi. Estimated population biomass was 5.8 million lb of Pacific halibut in the surveyed area. Pacific cod were caught in all stations and yielded the greatest catches among all target species caught in the 1997. Catch of Pacific cod totaled 2,806 lb among all stations, with a mean catch rate of 147.7 lb/nmi among tows. Walleye pollock catch totaled 390 lb among all tows, with a mean catch rate of 20.5 lb/nmi. Much of the survey catch was attributed to a catch of 148 lb of walleye pollock at station 51 (Figure 3). Estimated population biomass was 1.3 million lb of walleye pollock in the surveyed area.

Standardized rockfish catches totaled 11 lb, comprised entirely of dusky rockfishes (Table 3). Only 12 lb of sablefish was caught, all at station 57 (Figure 3).

### *Bottom Temperature*

Benthic water temperature along the ocean floor was sampled with the temperature logger at only one station in the Southern District in 1997. The temperature was 6.6°C at a mean depth of 49 fathoms during the tow of station 10 on 27 June 1997 (Figure 2; Appendix C). In the Kamishak and Barren Islands Districts, benthic water temperature was recorded at stations 37, 61, and 68. However, that electronically recorded data was subsequently lost to an equipment failure.

## **DISCUSSION**

### *Tanner Crab*

The legal segment of Tanner crab in both the Southern District and the Kamishak and Barren Islands Districts continued to be insufficient to support a commercial fishery. Limited commercial fisheries occurred most recently in the Southern District from 1991 through 1994 (Kimker 1996; Bechtol and Trowbridge 1999). Trawl surveys in this district documented a decline in the Tanner crab stock from >2.5 million males in the early 1990s to a low of <0.9 million in 1994, followed by only a modest recovery in recent years (Table 6; Bechtol 1998; Bechtol and Trowbridge 1999). Estimated abundance of both total males and legal males in 1997 was the second lowest in the history of the trawl survey. In addition, the 1997 abundance of legal males remained substantially below even the harvest abundance from the late 1960s to the late 1980s (Figure 11). This trend was most apparent for postrecruit Tanner crab, none of which were caught in the Southern District for the second consecutive year. Estimated abundance of prerecruit males, although highly variable over time, has generally declined since the early 1990s and there is little evidence of stock rebuilding.

In the Kamishak and Barren Islands Districts, the commercial Tanner crab fisheries remained closed following the 1991 season (Kimker 1996; Bechtol and Trowbridge 1999). Although the 398,000 legal crab estimated to be in the Kamishak and Barren Islands Districts was the third greatest in the history of the trawl survey, over 73% of these crab had old shells and were not new recruits (Table 6). Few postrecruit crab have been captured in the history of the trawl surveys, and old-shell recruits have outnumbered new-shell recruits, and old-shell prerecruit-1 crab have outnumbered new prerecruit-1 crab, in 7 of 8 surveys years (86%). There is little evidence of stock rebuilding at this time (Figure 11).

The sequence of years where new-shell crab outnumbered old-shell crab may be attributed to a strong cohort moving through the population. Old-shell crab are thought to have skipped at least one molt. These “skip-molt” crab may suffer greater mortality than their molting cohorts due to factors such as an inability to replace lost appendages or to shed parasites that are attached to old shells. Many old-shell cohorts, and particularly very old-shell crab, observed in the field appear to have lower vigor than new-shell crab. Although shell aging is highly subjective, particularly in the Southern District inside of the Homer Spit, there is considerable discussion about the existence of a terminal molt wherein crab reach a reproductive size and fail to molt to a larger size. Paul and Paul (1990) showed that Tanner crab are biologically capable of reproducing at substantially smaller size than legal recruitment. Under situations of high recruit mortality, such as from intensive fishing pressure, there may be a genetic advantage to reproducing at a size smaller than legal recruitment. The failure of the prerecruit crab to recruit to legal size, despite the lack of a commercial fishery, is somewhat disturbing and may indicate genetic selection for a terminal molt. Although crab achieving a terminal molt at something less than the size of legal recruitment may suffer increased natural mortality, the ability to skip molt may also increase relative genetic fitness by virtue of successful reproduction at a size less than full fishing mortality.

Some of the annual variation in cohort abundance may be explained by gear selectivity. For example, trawl survey selectivity increases with cohort age due to factors including trawl mesh size and the size- and sex-specific habitat distributions of the crab cohorts. Estimated abundance of prerecruit-4 male crab remains particularly suspect because prerecruit-4 abundance should exceed the subsequent prerecruit-3 abundance in order to accommodate natural mortality (Table 6; Figures 5 and 9).

Another indicator of stock status is the percentage of mature and egg-bearing females. In 1997 the percentage of mature females bearing eggs remained high in all survey areas (Tables 8 and 22). Although some barren females with very old shells were found, this is a normal condition for senescent females that are approaching the end of their natural life cycle. The 56.3% mature females that were observed in the 1997 Southern District survey exceeded the historical average (Table 10). However, estimated abundance of both mature and juvenile female crabs in 1997 was at the lowest in the history of the trawl survey. In contrast, the 25.8% mature females observed in the Kamishak and Barren Islands Districts, although an increase from the 1996 survey average, was well below the historical average. In 1997, estimated abundance of mature females was the lowest, and abundance of juvenile females the second lowest, in the trawl survey history.

Historical pot and trawl survey data exhibit a positive bias toward male Tanner crab (Tables 6 and 10; Kimker 1996). This bias likely resulted from two factors: (1) an emphasis on stations that historically yielded the best catches of male Tanner crab in previous surveys and commercial fisheries; and (2) when bad weather caused a loss in survey fishing time, stations that have not shown significant male catches are eliminated from the survey.

### *King Crab*

Compared to historical commercial catch data, which only summarize data of legal males, survey results in 1997 indicated the overall population level of red king crab remains severely depressed in both the Southern, Kamishak, and Barren Islands Districts (Table 13; Bechtol 1998). For example, the mean commercial catch prior to the final 1984 closure was 3.44 million lb (Bechtol and Trowbridge 1999). Assuming an average weight of 6.5 lb per crab, the 1984 catch represented 0.5 million legal males. In contrast, king crab catches during the 1997 trawl survey were considered too low to generate a meaningful estimate of population abundance. The 63 male king crab and 71 female king crab caught in 1997 were both records for the Kamishak and Barren Islands Districts trawl survey and both continue a trend in increased catches since 1993. However, more pronounced increases will be needed to confirm stock rebuilding.

### *Dungeness Crab*

The Southern District trawl surveys recognized a group of Dungeness males as they moved through the successive years beginning in 1990 (Table 17; Bechtol 1998). Trawl data indicated a large reduction of these males by 1994. The presence of a strong cohort was also observed in the 1995 and 1996 trawl survey, as the catch of both total males and legal males increased. However, the catch of male Dungeness in the 1997 trawl survey was the lowest on record. Although the trawl survey was not designed to assess the Dungeness crab stock, trends in the trawl survey data seem to agree with the results of the Southern District Dungeness pot survey (Trowbridge et al. 2000).

### *Weathervane Scallop*

The bottom trawl survey has typically caught weathervane scallops at a variety of locations throughout the Cook Inlet Management Area (Tables 2 and 3). In the Kamishak Bay area, trawl survey data, in conjunction with commercial fishery harvest reports, was used to identify preliminary survey stations for an ADF&G dredge survey for weathervane scallops (Bechtol 2000). Although not likely to become the primary assessment tool, trawls survey data may find utility as an index to “tune” an age-structured model for weathervane scallops in Kamishak Bay.

### *Groundfish and Halibut*

Catches of groundfish and halibut have been inconsistently recorded from the historical trawl surveys of the Cook Inlet Management Area. However, it is apparent that Pacific cod, walleye pollock, and Pacific halibut are the predominant vertebrate species caught in the trawl survey (Tables 2 and 3). A more comprehensive review of historical field data forms may reveal

additional quantitative information that can be used to document trends in abundance and biomass for some species. It is also recommended that future sampling methods be modified to subsample the entire trawl catch instead of sampling only target species. In addition to providing a broader assessment of ecosystem health, increased subsampling will provide some data to monitor changes in a greater variety of species, including some species for which future fisheries may develop.

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Table 1. Carapace widths (mm) used to determine crab size classes in Cook Inlet.

Class	Prerecruit				Recruit	Postrecruit
	Pre-4	Pre-3	Pre-2	Pre-1		
<b>Tanner Crab</b>						
Width	<70	70-91	92-114	115-139	140-165	>165
<b>King Crab</b>						
Width	<91	92-108	109-126	127-144	145-163	>163
<b>Dungeness Crab</b>						
Width	<89	90-114	115-139	140-164	165-189	>189

Table 2. Catch biomass of target species per nautical mile tow in a bottom trawl survey of the Southern District, Cook Inlet, 1997.

Survey Station	Dungeness Crab	Tanner Crab	King Crab	Weathervane Scallop	Pacific Cod	Walleye Pollock	Rockfish	Sablefish	Pacific Halibut	Total
	<b>Round Weight (lb/nmi)</b>									
1	1	84	0	0	100	126	0	0	12	323
2	4	11	8	2	50	94	0	0	20	189
3	2	44	0	4	12	98	0	0	8	168
4	14	60	0	5	18	84	2	0	20	203
5	3	47	0	0	2	22	0	0	80	154
6	40	46	0	0	24	154	2	0	10	276
7	46	92	0	2	2	302	0	0	2	446
8	0	276	0	0	52	8	7	0	42	385
9	0	166	0	0	98	156	7	0	30	457
10	0	174	0	1	46	462	6	0	22	711
11	0	186	0	0	96	324	36	3	6	651
12	0	222	0	2	12	818	0	1	34	1,089
13	0	68	0	0	54	324	30	0	56	532
14	0	4	0	2	102	276	8	0	8	400
15	0	96	0	1	2	522	0	0	5	626
16	0	0	0	0	222	0	3	0	136	361
17	0	0	0	0	1	0	0	0	486	487
18	0	0	0	0	0	8	41	0	30	79
19	0	0	0	0	164	0	58	0	77	299
20	0	0	0	0	50	0	0	0	100	150
21	6	0	0	0	94	0	0	0	131	231
22	0	0	0	0	512	0	4	0	76	592
71	4	88	0	0	44	80	0	0	76	292
<b>Total</b>	<b>120</b>	<b>1,664</b>	<b>8</b>	<b>19</b>	<b>1,757</b>	<b>3,858</b>	<b>204</b>	<b>4</b>	<b>1,467</b>	<b>9,101</b>
<b>Mean</b>	<b>5.2</b>	<b>72.3</b>	<b>0.3</b>	<b>0.8</b>	<b>76.4</b>	<b>8.9</b>	<b>167.7</b>	<b>0.2</b>	<b>63.8</b>	<b>395.7</b>

Table 3. Catch biomass of target species per nautical mile tow in a bottom trawl survey of the Kamishak and Barren Islands Districts, Cook Inlet, 1997.

Survey Station	Dungeness Crab	Tanner Crab	King Crab	Weathervane Scallop	Pacific Cod	Walleye Pollock	Rockfish	Sablefish	Pacific Halibut	Total
<b>Round Weight (lb/nmi)</b>										
27	0	4.3	0	0	92	12	0	0	37	145
32	0	118	0	8	190	16	0	0	87	419
33	0	68.5	4	18	204	4	0	0	8	307
37	0	62	182	240	72	0	0	0	164	720
38	0	5	6	0	40	0	0	0	68	119
41	0	10	4	0	8	0.25	0	0	23	45
44	0	70	38	72	194	0	0	0	110	484
45	0	0	204	0	22	6	1	0	144	377
471	0	108	2	0	496	0	0	0	60	666
472	0	24	40	0	196	72	0	0	0	332
50	0	66	0	26	240	0	10	0	126	468
51	0	260	0	8	68	148	0	0	242	726
53	0	30	0	1	126	0	0	0	44	201
54	0	2	0	0	4	0	0	0	82	88
57	0	50	0	0	182	10	0	12	43	297
58	0	14.5	0	0	546	46	0	0	138	745
61	0	32	0	0	44	64	0	0	18	158
67	0	14	0	0	74	6	0	0	65	159
68	0	17	0	0	8	6	0	0	10	41
Total	0	955	480	373	2,806	390	11	12	1,469	6,497
Mean	0.0	50.3	25.3	19.6	147.7	20.5	0.6	0.6	77.3	341.9

Table 4. Catch of male Tanner crab by shell age and size per nautical mile towed during a trawl survey of the Southern District, Cook Inlet, 1997.

Station	Sublegal Males						Legal Males				Total Legal	Total Males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
1	10	18	42	0	20	0	13	0	0	0	13	103
2	4	4	8	0	1	1	1	0	0	0	1	19
3	22	7	22	2	7	3	3	0	0	0	3	66
4	48	15	38	4	4	6	1	0	0	0	1	116
5	0	1	13	0	17	0	8	0	0	0	8	39
6	36	11	18	0	8	3	1	2	0	0	3	79
7	29	29	55	0	21	1	3	0	0	0	3	138
8	31	17	57	0	58	3	12	2	0	0	14	180
9	9	10	21	2	24	6	5	3	0	0	8	80
10	8	7	36	0	66	0	13	0	0	0	13	130
11	10	7	21	1	49	6	21	4	0	0	25	119
12	3	15	14	0	61	4	49	1	0	0	50	147
13	0	0	1	0	9	4	17	1	0	0	18	32
14	0	0	1	1	0	2	0	0	0	0	0	4
15	0	0	0	0	17	14	21	2	0	0	23	54
71	20	24	29	0	20	0	8	0	0	0	8	101
<b>Southern District Total</b>												
Total	230	165	376	10	382	53	176	15	0	0	191	1,407
Percent	16%	12%	27%	1%	27%	4%	13%	1%	0%	0%	14%	100%

Carapace widths (mm) used for Tanner crab size classes.

Class	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post Recruit
mm	<70	70-91	92-114	115-139	140-165	>165

Table 5. Population estimate by shell age and size for male Tanner crab in the Southern District, Cook Inlet, 1997.

Station	Sublegal Males						Legal Males				Total Legal	Total Males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
1	7,565	13,616	31,771	0	15,129	0	9,834	0	0	0	9,834	77,916
2	1,774	1,774	3,548	0	444	444	444	0	0	0	444	8,427
3	18,447	5,869	18,447	1,677	5,869	2,515	2,515	0	0	0	2,515	55,340
4	22,457	7,018	17,778	1,871	1,871	2,807	468	0	0	0	468	54,271
5	0	902	11,730	0	15,339	0	7,218	0	0	0	7,218	35,189
6	27,342	8,355	13,671	0	6,076	2,279	760	1,519	0	0	2,279	60,001
7	17,312	17,312	32,833	0	12,536	597	1,791	0	0	0	1,791	82,381
8	16,811	9,219	30,910	0	31,452	1,627	6,507	1,085	0	0	7,592	97,611
9	6,275	6,972	14,642	1,394	16,733	4,183	3,486	2,092	0	0	5,578	55,778
10	10,354	9,059	46,591	0	85,416	0	16,824	0	0	0	16,824	168,244
11	7,033	4,923	14,769	703	34,462	4,220	14,769	2,813	0	0	17,582	83,692
12	2,848	14,241	13,291	0	57,912	3,798	46,519	949	0	0	47,469	139,558
13	0	0	949	0	8,544	3,798	16,139	949	0	0	17,089	30,380
14	0	0	1,009	1,009	0	2,017	0	0	0	0	0	4,034
15	0	0	0	0	9,503	7,826	11,739	1,118	0	0	12,857	30,186
71	10,390	12,468	15,065	0	10,390	0	4,156	0	0	0	4,156	52,469
<b>Southern District Total</b>												
Total	148,607	111,729	267,005	6,655	311,678	36,110	143,170	10,525	0	0	153,695	1,035,478
Percent	14%	11%	26%	1%	30%	3%	14%	1%	0%	0%	15%	100%

Carapace widths (mm) used for Tanner crab size classes.

Class	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post Recruit
mm	<70	70-91	92-114	115-139	140-165	>165

Table 6. Historical population estimates by carapace length and age for male Tanner crab caught in trawl surveys of the Cook Inlet Management Area, 1990-1997.

<b>Southern District</b>												
Year	Sublegal Males						Legal Males				Total legal	Total males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
1990	453,024	682,569	541,891	9,492	403,015	37,055	137,235	163,961	12,081	53,504	366,781	2,493,827
1991	316,529	295,026	826,589	35,265	790,463	117,838	279,543	187,509	45,587	24,084	536,723	2,918,433
1992	306,159	134,137	438,453	34,688	683,607	205,970	740,136	138,101	49,547	26,155	953,939	2,756,953
1993	599,873	89,299	120,343	12,548	215,292	109,962	280,719	185,496	41,158	16,946	524,319	1,671,636
1994	258,118	169,986	114,102	8,572	95,260	58,967	65,675	94,138	6,726	20,633	187,172	892,177
1995	372,035	356,327	449,225	17,330	386,004	37,399	157,383	62,421	6,049	9,466	235,319	1,853,639
1996	189,773	42,712	312,708	121,332	368,250	156,423	48,546	45,116	0	0	93,662	1,284,860
1997	148,607	111,729	267,005	6,655	311,678	36,110	143,170	10,525	0	0	153,695	1,035,478

**Kamishak and Barren Islands Districts**

Year	Sublegal Males						Legal Males				Total legal	Total males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
1990	1,831,889	332,005	535,114	429,654	257,792	2,085,775	105,461	488,244	0	0	593,705	6,065,934
1991	230,638	155,084	286,310	91,460	357,887	1,053,779	39,765	330,052	0	0	369,817	2,544,975
1992	251,834	552,348	360,846	233,671	166,434	1,236,465	19,629	193,576	0	3,968	217,173	3,018,771
1993	298,382	151,385	523,487	211,521	137,821	530,615	23,387	87,287	0	0	110,674	1,963,885
1994	200,254	852,801	1,168,971	431,525	916,511	673,005	51,582	126,964	0	3,968	182,514	4,425,581
1995	47,256	422,861	841,368	502,175	733,399	875,308	171,912	71,418	0	0	243,330	3,665,697
1996	681,961	162,180	297,593	366,916	730,491	1,561,542	88,162	315,768	0	3,967	407,897	4,208,580
1997	519,036	23,800	15,594	342,027	202,073	1,388,968	107,126	282,795	0	7,935	397,856	2,889,354

Carapace widths (mm) used for Tanner crab size classes in Cook Inlet.

Class	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post Recruit
mm	<70	71-90	91-114	115-139	140-165	>165

Table 7. Maximum, minimum, and mean carapace width of male Tanner, king, and Dungeness crabs caught in trawl surveys of Cook Inlet, 1997.

<b>Southern District</b>									
Station	<u>Tanner Crab</u>			<u>King Crab</u>			<u>Dungeness Crab</u>		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Crab Carapace Width (mm)									
1	38	158	106.7						
2	32	141	91.6	165	165	165.0	109	163	141.8
3	30	149	92.0				157	177	167.0
4	28	148	83.4	154	178	166.0			
5	85	154	124.2				166	166	166.0
6	39	147	88.9	106	185	162.1			
7	24	143	91.1				135	170	153.9
8	46	154	106.6						
9	25	150	107.4						
10	42	160	111.1						
11	37	162	116.3						
12	35	159	119.3						
13	110	163	139.1						
14	92	122	106.5						
15	116	160	137.8						
71	38	159	102.2						
Weighted District Means			105.6			162.9			155.1

<b>Kamishak and Barrens Islands Districts</b>									
Station	<u>Tanner Crab</u>			<u>King Crab</u>			<u>Dungeness Crab</u>		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Crab Carapace Width (mm)									
27	98	143	115.5						
32	47	152	117.1						
33	100	148	129.4	140	140	140.0			
37	96	155	126.2	102	153	119.8			
38	106	143	129.3	133	133	133.0			
41	97	132	122.6	123	123	123.0			
44	108	159	131.1	136	160	143.5			
45				113	176	143.6			
471	34	136	98.6	112	112	112.0			
472	61	149	118.3	138	141	139.5			
50	111	158	133.8						
51	102	174	134.1						
53	54	156	117.0						
54	131	131	131.0						
57	25	149	117.6						
58	48	140	124.1						
61	34	158	126.3						
67	24	140	64.5						
68	19	143	65.8						
Weighted District Means			115.0			132.5			

Table 8. Catch per nautical mile towed of female Tanner crab by carapace age and clutch fullness in a trawl survey of the Southern District, Cook Inlet, 1997.

Station	Juveniles	Full Clutches			Partial Clutches			Barren			Total mature			Total Females
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	
1	14	1	0	0	1	0	0	0	0	0	2	0	0	16
2	4	0	0	0	0	0	0	0	0	0	0	0	0	4
3	10	0	0	0	0	0	0	0	0	0	0	0	0	10
4	33	4	0	0	0	0	0	0	0	0	4	0	0	37
5	2	0	0	0	0	0	0	0	0	0	0	0	0	2
6	26	1	0	0	0	0	0	0	0	0	1	0	0	27
7	27	0	0	0	0	0	0	0	0	0	0	0	0	27
8	34	89	0	12	28	1	8	0	0	2	117	1	22	174
9	9	52	43	46	10	1	3	0	0	1	62	44	50	165
10	8	16	0	0	21	0	0	0	0	0	37	0	0	45
11	28	7	4	5	21	0	1	0	0	0	28	4	6	66
12	7	11	0	0	4	0	0	0	0	0	15	0	0	22
13	5	0	6	1	0	0	0	0	0	0	0	6	1	12
71	44	5	0	0	1	0	0	0	0	0	6	0	0	50
<b><u>Southern District Total</u></b>														
Abund.	251	186	53	64	86	2	12	0	0	3	272	55	79	657
Percent	38%	28%	8%	10%	13%	0%	2%	0%	0%	<1%	41%	8%	12%	100%

Table 9. Population estimate by carapace condition and clutch fullness for female Tanner crab in the Southern District, Cook Inlet, 1997.

Station	Juveniles	Full Clutches			Partial Clutches			Barren			Total mature			Total Females
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	
1	10,590	756	0	0	1	0	0	0	0	0	757	0	0	11,348
2	1,774	0	0	0	0	0	0	0	0	0	0	0	0	1,774
3	8,385	0	0	0	0	0	0	0	0	0	0	0	0	8,385
4	15,439	1,871	0	0	0	0	0	0	0	0	1,871	0	0	17,311
5	1,805	0	0	0	0	0	0	0	0	0	0	0	0	1,805
6	19,747	760	0	0	0	0	0	0	0	0	760	0	0	20,507
7	16,118	0	0	0	0	0	0	0	0	0	0	0	0	16,118
8	18,438	48,263	0	6,507	28	1	8	0	0	1,085	48,291	1	7,600	74,330
9	6,275	36,255	29,981	32,072	10	1	3	0	0	697	36,265	29,982	32,772	105,294
10	10,354	20,707	0	0	21	0	0	0	0	0	20,728	0	0	31,082
11	19,692	4,923	2,813	3,516	21	0	1	0	0	0	4,944	2,813	3,517	30,967
12	6,646	10,443	0	0	4	0	0	0	0	0	10,447	0	0	17,093
13	4,747	0	5,696	949	0	0	0	0	0	0	0	5,696	949	11,393
71	22,858	2,597	0	0	1	0	0	0	0	0	2,598	0	0	25,456
<b><u>Southern District Total</u></b>														
Abund.	162,867	126,577	38,490	43,045	86	2	12	0	0	1,782	126,663	38,492	44,839	372,861
Percent	44%	34%	10%	12%	0%	0%	0%	0%	0%	0%	34%	10%	12%	100%

Table 10. Historical population estimates for female Tanner crab caught in Cook Inlet bottom trawl surveys, 1990-1997.

Year	<b>Southern District</b>			
	Juvenile	Mature	Total	% Mature
	Estimated Abundance			
1990	919,907	393,506	1,313,413	30.0%
1991	519,521	914,322	1,433,843	63.8%
1992	350,782	533,748	884,530	60.3%
1993	573,958	600,634	1,174,592	51.1%
1994	515,136	373,041	888,177	42.0%
1995	609,577	676,352	1,285,929	52.6%
1996	223,189	451,068	674,257	66.9%
1997	162,867	209,994	372,861	56.3%
			Average	51.7%

Year	<b>Kamishak and Barren Islands Districts</b>			
	Juvenile	Mature	Total	% Mature
	Estimated Abundance			
1990	2,140,458	499,961	2,640,419	18.9%
1991	326,075	87,484	413,559	21.2%
1992	453,343	217,801	671,144	32.5%
1993	389,426	826,705	1,216,131	68.0%
1994	490,030	944,491	1,434,521	65.8%
1995	195,451	479,970	675,421	71.1%
1996	637,737	150,670	788,407	19.1%
1997	227,905	79,352	307,257	25.8%
			Average	40.3%

Table 11. Maximum, minimum, and mean carapace width of female Tanner, king, and Dungeness crabs caught in trawl surveys of Cook Inlet, 1997.

<b>Southern District</b>									
Station	<u>Tanner Crab</u>			<u>King Crab</u>			<u>Dungeness Crab</u>		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Crab Carapace Width (mm)									
1	34	111	69.6				147	147	147.0
2	48	84	68.5						
3	16	91	63.2						
4	30	107	59.6				132	167	144.3
5	32	48	40.0				131	143	136.5
6	39	105	59.2				130	151	140.6
7	42	94	73.2				119	154	138.3
8	44	120	94.7						
9	35	124	93.9						
10	41	116	95.0						
11	42	113	86.5						
12	73	107	92.5						
13	34	117	81.2						
21							146	163	153.0
71	45	105	72.5				149	153	150.7
Weighted District Means			86.7						141.1

<b>Kamishak and Barrens Islands Districts</b>									
Station	<u>Tanner Crab</u>			<u>King Crab</u>			<u>Dungeness Crab</u>		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Crab Carapace Width (mm)									
27	30	30	30.0						
32	43	98	74.4						
33	84	84	84.0						
37	87	103	93.0	82	128	113.4			
38	94	94	94.0	122	122	122.0			
45				110	135	118.5			
471	56	68	60.2						
472	60	60	60.0	119	119	119.0			
51	90	91	90.5						
53	82	95	90.3						
57	37	37	37.0						
58	92	92	92.0						
61	14	14	14.0						
67	32	89	43.0						
68	24	56	38.4						
Weighted District Means			54.8			115.5			

Table 12. Station catch per nautical mile by carapace length and age of male king crab caught in trawl surveys of the Cook Inlet Management Area, 1997.

<b>Southern District</b>												
Station <sup>a</sup>	Sublegal Males						Legal Males				Total legal	Total males
	Pre-4	Pre-3	Pre-2 (new)	(old)	Pre-1 (new)	(old)	Recruit (new)	(old)	Postrecruit (new)	(old)		
2	0	0	0	0	0	0	0	0	1	0	1	1
4	0	0	0	0	0	0	1	1	0	0	2	2
6	0	1	0	0	0	0	0	0	2	4	6	7
<b>Southern District Total</b>												
Abund.	0	1	0	0	0	0	1	1	3	4	9	10
Percent	0%	10%	0%	0%	0%	0%	10%	10%	30%	40%	90%	100%
<b>Kamishak and Barren Islands Districts</b>												
Station <sup>a</sup>	Sublegal Males						Legal Males				Total legal	Total males
	Pre-4	Pre-3	Pre-2 (new)	(old)	Pre-1 (new)	(old)	Recruit (new)	(old)	Postrecruit (new)	(old)		
33	0	0	0	0	1	0	0	0	0	0	0	1
37	0	5	15	0	2	0	0	2	0	0	2	24
38	0	0	0	0	1	0	0	0	0	0	0	1
41	0	0	1	0	0	0	0	0	0	0	0	1
44	0	0	0	0	4	0	1	1	0	0	2	6
45	0	0	2	0	11	0	7	1	0	2	10	23
471	0	0	1	0	0	0	0	0	0	0	0	1
472	0	0	0	0	6	0	0	0	0	0	0	6
<b>Kamishak and Barren District Total</b>												
Abund.	0	5	19	0	25	0	8	4	0	2	14	63
Percent	0%	8%	30%	0%	40%	0%	13%	6%	0%	3%	22%	100%

Carapace lengths (mm) used for king crab size classes in Cook Inlet.

Class	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post Recruit
mm	<91	91-108	109-126	127-144	145-163	>163

<sup>a</sup> - Stations not listed had no catch of male king crab.

Table 13. Historical catch per nautical mile by carapace length and age for male king crab caught in trawl surveys of the Cook Inlet Management Area, 1990-1997.

<b>Southern District</b>												
Year	Sublegal Males						Legal Males				Total legal	Total males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
1990	0	1	0	0	0	0	0	0	1	2	3	4
1991	0	0	0	0	1	0	18	3	69	14	104	105
1992	0	2	2	0	0	0	1	1	11	31	44	48
1993	0	2	5	0	0	0	1	0	5	2	8	15
1994	4	0	0	0	0	0	0	0	1	6	7	11
1995	0	0	0	0	0	0	0	0	1	2	3	3
1996	0	1	0	0	0	0	0	1	1	2	4	5
1997	0	1	0	0	0	0	1	1	3	4	9	10

<b>Kamishak and Barren Islands Districts</b>												
Year	Sublegal Males						Legal Males				Total legal	Total males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
1990	1	0	0	0	1	0	2	0	1	1	4	6
1991	0	0	0	0	0	0	0	1	2	4	7	7
1992	0	2	1	0	1	0	2	2	8	10	22	26
1993	1	0	0	0	0	0	0	0	1	0	1	2
1994	0	0	0	0	0	0	0	0	1	2	3	3
1995	1	2	0	0	0	0	1	0	1	1	3	6
1996	0	12	14	0	3	0	0	1	1	0	2	31
1997	0	5	19	0	25	0	8	4	0	2	14	63

Carapace lengths (mm) used for king crab size classes in Cook Inlet.

Class	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post Recruit
mm	<91	91-108	109-126	127-144	145-163	>163

Table 14. Station catch per nautical mile by maturity and clutch size for female king crab in trawl surveys of Cook Inlet, 1997.

<b>Southern District Catches</b>														
Station <sup>a</sup>	Juveniles	Full Clutches			Partial Clutches			Barren			Total Mature			Total Females
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	
No Catch														
<b>Southern District Total</b>														
Abund.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

<b>Kamishak and Barren Islands Districts Catches</b>														
Station <sup>a</sup>	Juveniles	Full Clutches			Partial Clutches			Barren			Total Mature			Total Females
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	
37	5	1	0	0	28	0	0	6	0	0	35	0	0	40
38	0	0	0	0	1	0	0	0	0	0	1	0	0	1
45	2	1	0	0	19	4	0	0	0	0	20	4	0	26
472	0	0	0	0	4	0	0	0	0	0	4	0	0	4
<b>Kamishak and Barren District Total</b>														
Abund.	7	2	0	0	52	4	0	6	0	0	60	4	0	71
Percent	10%	3%	0%	0%	73%	6%	0%	8%	0%	0%	84%	6%	0%	100%

<sup>a</sup> - Stations not listed had no catch of female king crab.

Table 15. Historical catch per nautical mile of female king crab in trawl surveys of Cook Inlet, 1990-1997.

Year	Southern District Catches													Total Females	
	Juveniles	Full Clutches			Partial Clutches			Barren			Total Mature				
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old		
1990	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1991	0	0	0	0	8	0	0	0	0	0	8	0	0	8	
1992	1	19	0	0	59	0	0	2	0	0	80	0	0	81	
1993	3	3	0	0	14	1	0	0	0	0	17	1	0	21	
1994	6	2	0	0	2	0	0	0	0	0	4	0	0	10	
1995	0	0	0	0	1	0	0	0	0	0	1	0	0	1	
1996	0	0	0	0	0	0	0	1	0	1	1	0	1	2	
1997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Year	Kamishak and Barren Islands Districts Catches													Total Females
	Juveniles	Full Clutches			Partial Clutches			Barren			Total Mature			
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	
1990	0	3	0	0	1	0	0	0	0	0	4	0	0	4
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	1	0	0	0	2	0	0	1	0	0	3	0	0	4
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	4	0	0	0	0	0	0	0	0	0	0	0	0	4
1996	2	0	0	0	7	0	0	0	0	0	7	0	0	9
1997	7	2	0	0	52	4	0	6	0	0	60	4	0	71

Table 16. Station catch per nautical mile by carapace width and age for male Dungeness crab in a trawl survey of the Southern District, Cook Inlet, 1997.

Station	Sublegal Males						Legal Males				Total Legal	Total Males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
2	0	1	1	0	1	1	0	0	0	0	4	4
3	0	0	0	0	0	1	1	0	0	0	2	2
5	0	0	0	0	0	0	1	0	0	0	1	1
7	0	0	0	1	0	5	1	1	0	0	8	8
<b>Southern District Total</b>												
Total	0	1	1	1	1	7	3	1	0	0	4	15
Percent	0%	7%	7%	7%	7%	47%	20%	7%	0%	0%	27%	100%

Carapace widths (mm) used for Dungeness crab size classes.

Class	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post Recruit
mm	<89	90-114	115-139	140-164	165-189	>189

Table 17. Historical catch per nautical mile by carapace length and age for male Dungeness crab caught in trawl surveys of the Southern District, Cook Inlet, 1990-1997.

<b>Southern District</b>												
Year	Sublegal Males						Legal Males				Total legal	Total males
	Pre-4	Pre-3	Pre-2 (new)	(old)	Pre-1 (new)	(old)	Recruit (new)	(old)	Postrecruit (new)	(old)		
1990	1	17	189	5	91	7	6	1	0	0	7	317
1991	0	1	15	2	158	12	45	1	0	0	46	234
1992	0	0	19	2	93	31	54	10	1	1	66	211
1993	0	0	0	3	50	7	67	9	0	0	76	136
1994	0	0	2	0	7	3	13	12	0	0	25	37
1995	0	2	97	1	46	3	5	5	0	0	10	159
1996	0	0	3	16	43	56	1	1	28	28	58	176
1997	0	1	1	1	1	7	3	1	0	0	4	15

Carapace widths (mm) used for Dungeness crab size classes.

Class mm	Pre-4 <89	Pre-3 90-114	Pre-2 115-139	Pre-1 140-164	Recruit 165-189	Post Recruit >189
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Table 18. Station catch per nautical mile by carapace age and clutch fullness for female Dungeness crab in a trawl survey of the Southern District, Cook Inlet, 1997.

Station	Juveniles	Full Clutches			Partial Clutches			Barren			Total mature			Total Females
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	
1	0	0	0	0	0	0	0	1	0	0	1	0	0	1
4	0	0	0	0	0	0	0	3	6	2	3	6	2	11
5	0	1	0	0	0	0	0	3	0	0	4	0	0	4
6	0	0	0	0	0	0	0	0	28	0	0	28	0	28
7	0	0	0	0	0	0	0	5	32	1	5	32	1	38
21	0	0	0	0	0	0	0	0	4	1	0	4	1	5
71	0	0	0	0	0	0	0	0	0	3	0	0	3	3
<b><u>Southern District Total</u></b>														
Abund.	0	1	0	0	0	0	0	12	70	7	13	70	7	90
Percent	0%	1%	0%	0%	0%	0%	0%	13%	78%	8%	14%	78%	8%	100%

Table 19. Historical catches of female Dungeness crab in trawl surveys of the Southern District, Cook Inlet, 1990-1997.

Year	Southern District Catches													
	Juvenile s	Full Clutches			Partial Clutches			Barren			Total Mature			Total Females
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	
1990	NA <sup>a/</sup>	0	8	0	0	0	0	2	13	0	2	21	0	23
1991	0	37	7	0	8	2	0	408	14	0	453	23	0	476
1992	0	0	1	0	0	0	0	397	78	0	397	79	0	476
1993	7	0	0	0	0	0	0	377	150	0	377	150	0	534
1994	0	0	0	0	0	0	0	43	69	2	43	69	2	114
1995	0	8	1	1	0	0	0	105	10	0	113	11	1	125
1996	0	0	0	0	0	0	0	96	167	107	96	167	107	370
1997	0	1	0	0	0	0	0	12	70	7	13	70	7	90

<sup>a/</sup> - Juveniles were not distinguished in the 1990 survey.

Table 20. Catch abundance by carapace size and age per mile towed of male Tanner crab during a trawl survey of the Kamishak and Barren Islands Districts, Cook Inlet, 1997.

Station	Sublegal Males						Legal Males				Total Legal	Total Males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
27	0	0	0	2	0	1	0	1	0	0	1	4
32	2	1	0	22	0	59	0	5	0	0	5	89
33	0	0	0	2	0	39	0	4	0	0	4	45
37	0	0	1	10	2	21	1	7	0	0	8	42
38	0	0	0	1	0	1	0	1	0	0	1	3
41	0	0	0	1	0	6	0	0	0	0	0	7
44	0	0	0	3	2	29	0	7	0	0	7	41
471	62	2	1	37	1	48	0	0	0	0	0	151
472	2	2	0	2	0	8	0	4	0	0	4	18
50	0	0	1	0	20	4	14	2	0	0	16	41
51	0	0	1	6	13	89	8	30	0	2	40	149
53	4	0	0	1	7	11	1	0	0	0	1	24
54	0	0	0	0	1	0	0	0	0	0	0	1
57	3	0	0	2	0	24	0	4	0	0	4	33
58	1	0	0	0	3	6	0	2	0	0	2	12
61	2	0	0	1	2	8	3	4	0	0	7	20
67	27	2	0	0	0	5	0	1	0	0	1	35
68	34	1	0	1	0	4	0	3	0	0	3	43
<b><u>Kamishak and Barren Islands Districts Total</u></b>												
Total	137	8	4	91	51	363	27	75	0	2	104	758
Percent	18%	1%	1%	12%	7%	48%	4%	10%	0%	0%	14%	100%
Carapace widths (mm) used for Tanner crab size classes.												
Class	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post Recruit						
mm	<70	70-91	92-114	115-139	140-165	>165						

Table 21. Population estimate of male Tanner crab in the Kamishak and Barren Islands Districts, Cook Inlet, 1997.

Station	Sublegal Males						Legal Males				Total Legal	Total Males
	Pre-4	Pre-3	Pre-2		Pre-1		Recruit		Postrecruit			
			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
27	0	0	0	7,935	0	3,968	0	3,968	0	0	3,968	15,871
32	7,935	3,968	0	87,288	0	234,090	0	19,838	0	0	19,838	353,119
33	0	0	0	7,935	0	154,737	0	15,871	0	0	15,871	178,543
37	0	0	3,968	39,676	7,935	83,320	3,968	27,773	0	0	31,741	166,640
38	0	0	0	3,968	0	3,968	0	3,968	0	0	3,968	11,903
41	0	0	0	2,558	0	15,348	0	0	0	0	0	17,906
44	0	0	0	11,903	7,935	115,061	0	27,773	0	0	27,773	162,673
471	228,853	7,382	3,691	136,573	3,691	177,176	0	0	0	0	0	557,367
472	547	547	0	547	0	2,187	0	1,094	0	0	1,094	4,922
50	0	0	3,968	0	79,353	15,871	55,547	7,935	0	0	63,482	162,673
51	0	0	3,968	23,806	51,579	353,119	31,741	119,029	0	7,935	158,705	591,177
53	15,871	0	0	3,968	27,773	43,644	3,968	0	0	0	3,968	95,223
54	0	0	0	0	3,968	0	0	0	0	0	0	3,968
57	11,903	0	0	7,935	0	95,223	0	15,871	0	0	15,871	130,932
58	3,968	0	0	0	11,903	23,806	0	7,935	0	0	7,935	47,612
61	7,935	0	0	3,968	7,935	31,741	11,903	15,871	0	0	27,773	79,353
67	107,126	7,935	0	0	0	19,838	0	3,968	0	0	3,968	138,867
68	134,899	3,968	0	3,968	0	15,871	0	11,903	0	0	11,903	170,608
<b><u>Kamishak and Barren Islands Districts Total</u></b>												
Total	519,036	23,800	15,594	342,027	202,073	1,388,968	107,126	282,795	0	7,935	397,856	2,889,354
Percent	18%	1%	1%	12%	7%	48%	4%	10%	0%	0%	14%	100%

Carapace widths (mm) used for Tanner crab size classes.

Class	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post Recruit
mm	<70	70-91	92-114	115-139	140-165	>165

Table 22. Catch per nautical mile by carapace age and clutch fullness for female Tanner crab in a trawl survey of the Kamishak and Barren Islands Districts, Cook Inlet, 1997.

Station	Juveniles	Full Clutches			Partial Clutches			Barren			Total mature			Total Females	
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old		
27	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
32	3	0	0	2	0	0	2	0	0	0	0	0	0	4	7
33	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1
37	0	0	1	5	0	0	0	0	0	0	0	1	5	6	6
38	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1
471	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
472	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
51	0	0	0	1	0	0	1	0	0	0	0	0	0	2	2
53	0	2	0	1	0	0	0	0	0	0	2	0	1	3	3
57	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
58	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1
61	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
67	21	0	1	1	0	0	0	0	0	0	0	1	1	23	23
68	21	0	0	0	0	0	0	0	0	0	0	0	0	21	21

**Kamishak and Barren Islands Districts Total**

Abund.	60	2	2	10	0	0	5	0	0	1	2	2	16	80
Percent	75%	3%	3%	13%	0%	0%	6%	0%	0%	1%	3%	3%	20%	100%

Table 23. Population estimate by carapace condition and clutch fullness of female Tanner crab in the Kamishak and Barren Islands Districts, Cook Inlet, 1997.

Station	Juveniles	Full Clutches			Partial Clutches			Barren			Total mature			Total Females
		New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	
27	3,968	0	0	0	0	0	0	0	0	0	0	0	0	3,968
32	11,903	0	0	7,935	0	0	7,935	0	0	0	0	0	15,871	27,773
33	0	0	0	0	0	0	0	0	0	3,968	0	0	3,968	3,968
37	0	0	3,968	19,838	0	0	0	0	0	0	0	3,968	23,806	23,806
38	0	0	0	0	0	0	3,968	0	0	0	0	0	3,968	3,968
471	36,912	0	0	0	0	0	0	0	0	0	0	0	0	36,912
472	547	0	0	0	0	0	0	0	0	0	0	0	0	547
51	0	0	0	3,968	0	0	3,968	0	0	0	0	0	7,935	7,935
53	0	7,935	0	3,968	0	0	0	0	0	0	7,935	0	11,903	11,903
57	3,968	0	0	0	0	0	0	0	0	0	0	0	0	3,968
58	0	0	0	0	0	0	3,968	0	0	0	0	0	3,968	3,968
61	3,968	0	0	0	0	0	0	0	0	0	0	0	0	3,968
67	83,320	0	3,968	3,968	0	0	0	0	0	0	0	3,968	7,935	91,255
68	83,320	0	0	0	0	0	0	0	0	0	0	0	0	83,320

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**Kamishak and Barren Islands Districts Total**

Abund.	227,905	7,935	7,935	39,676	0	0	19,838	0	0	3,968	7,935	7,935	79,353	307,257
Percent	74%	3%	3%	13%	0%	0%	6%	0%	0%	1%	3%	3%	26%	100%

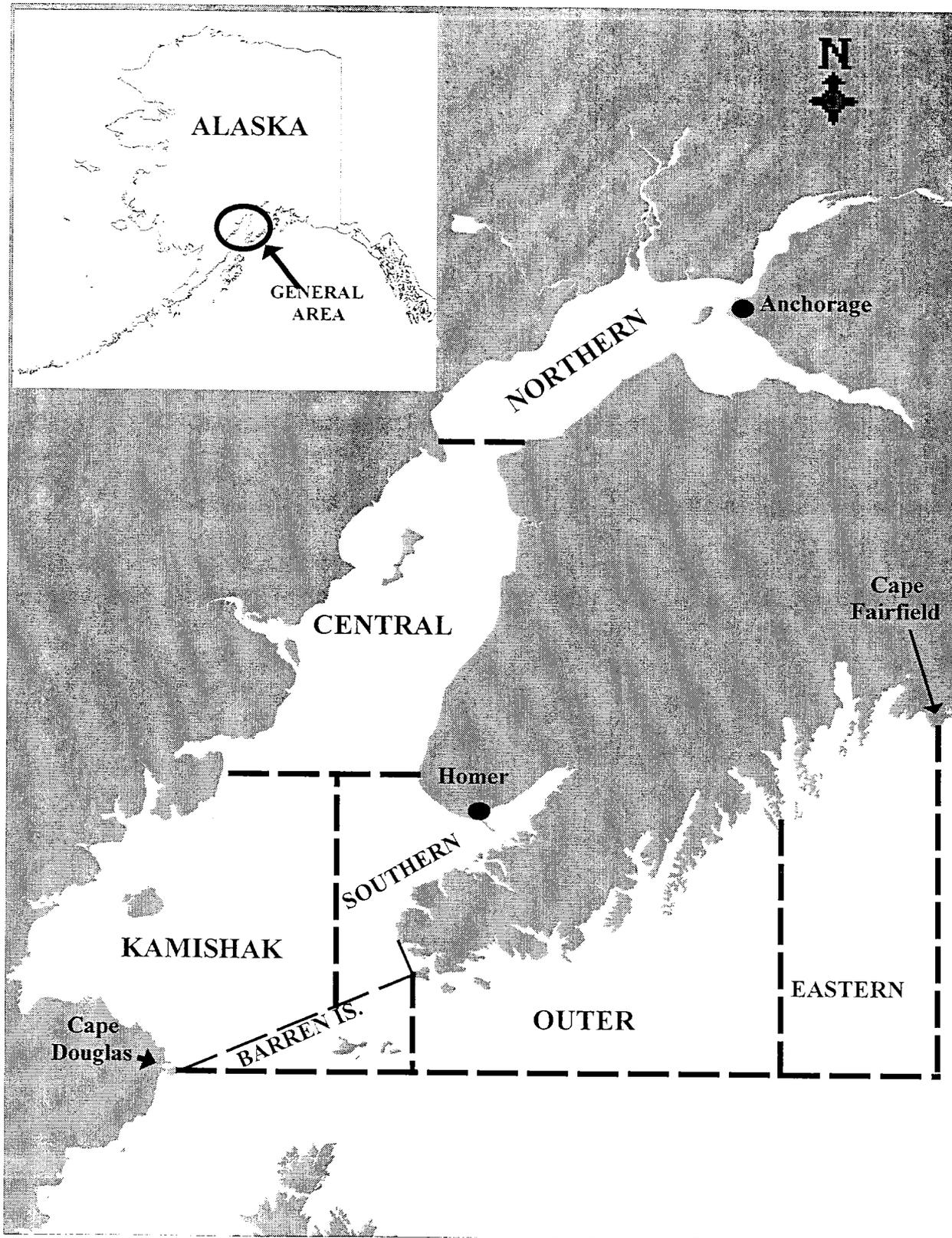


Figure 1. Crab management districts in the Cook Inlet Management Area.

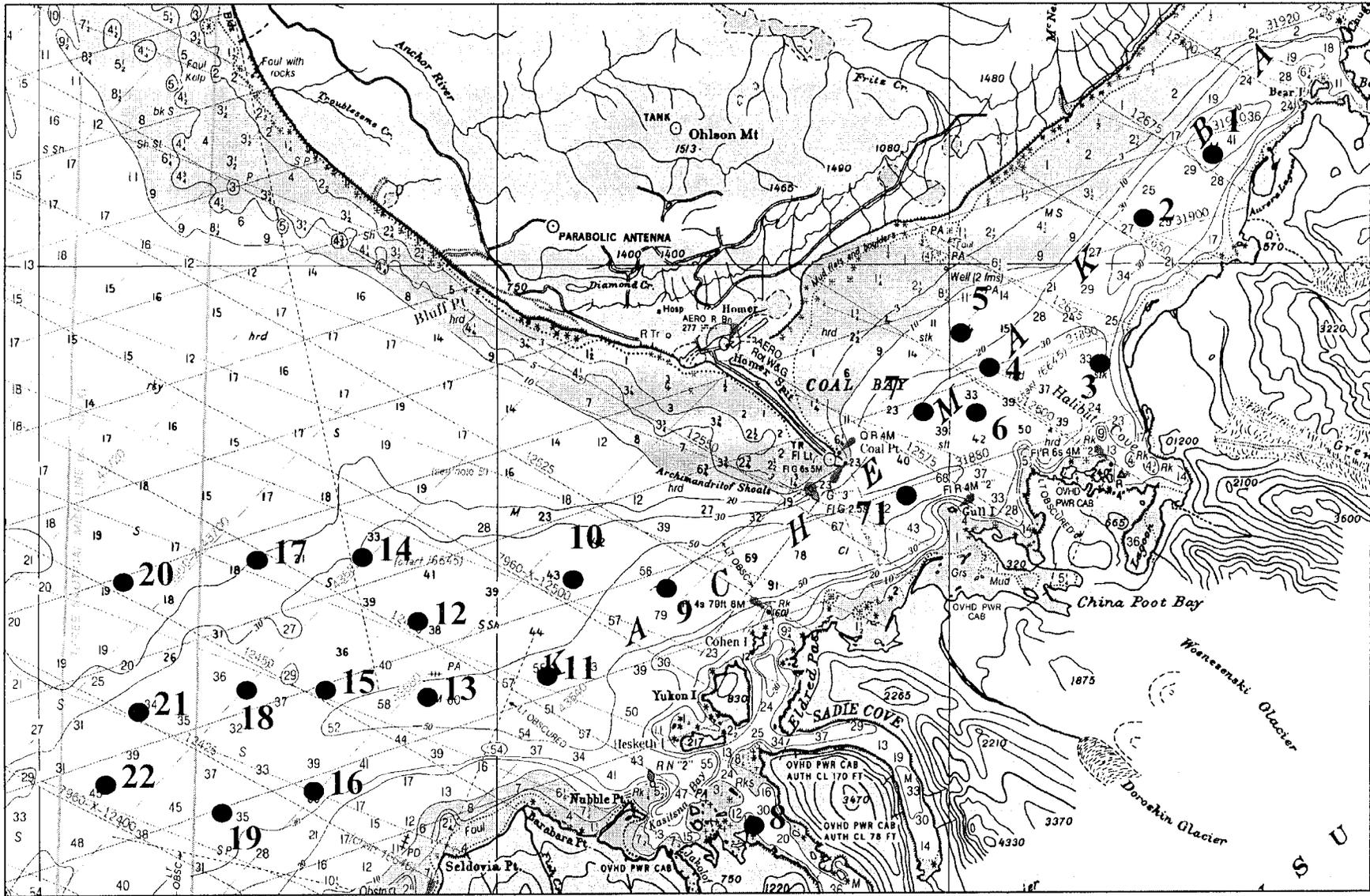


Figure 2. Survey stations in a bottom trawl survey of the Southern District, Cook Inlet, during 26 June – 1 July 1997.

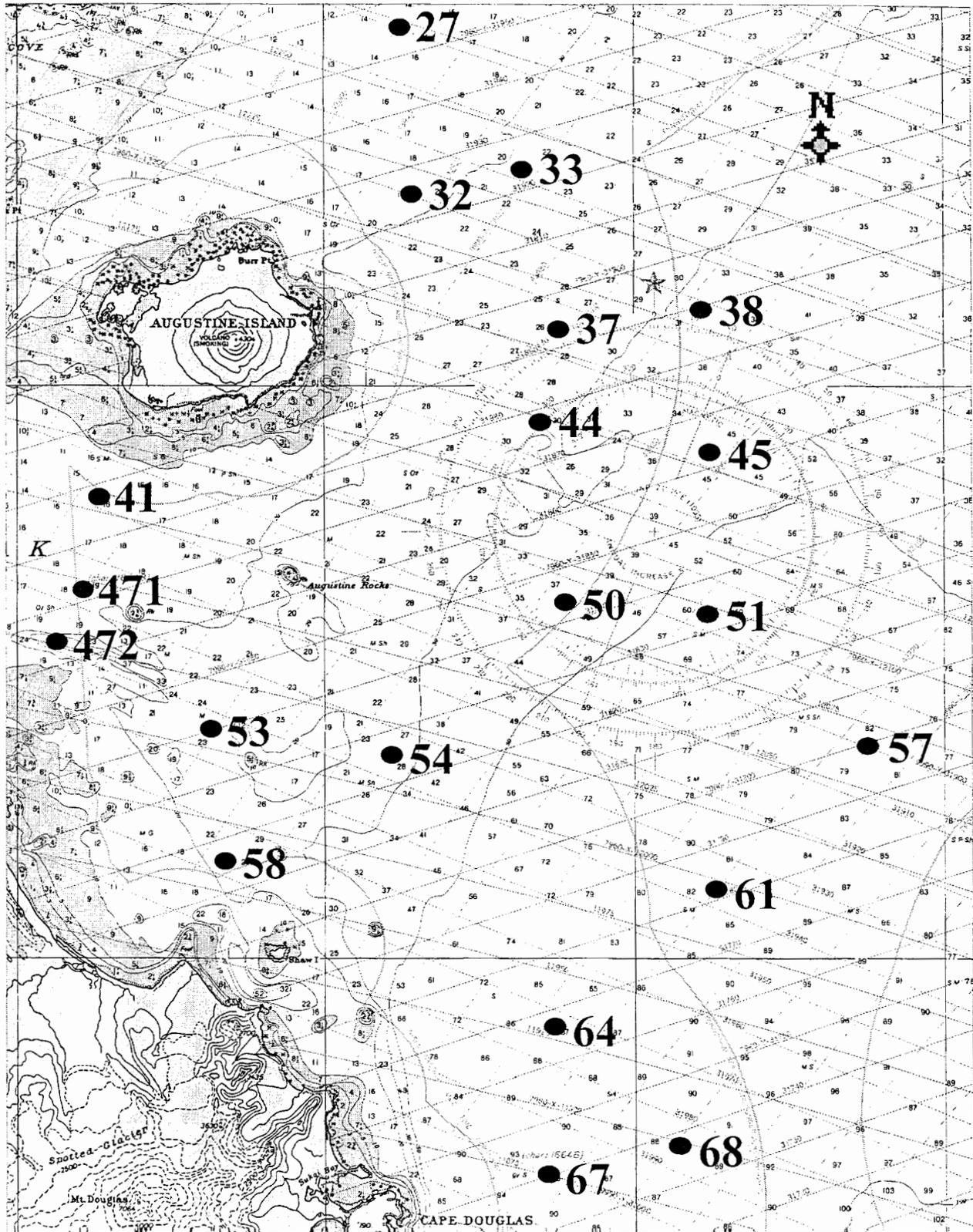


Figure 3. Survey stations in a bottom trawl survey of the Kamishak and Barren Islands District, Cook Inlet, during 8-12 June 1997.

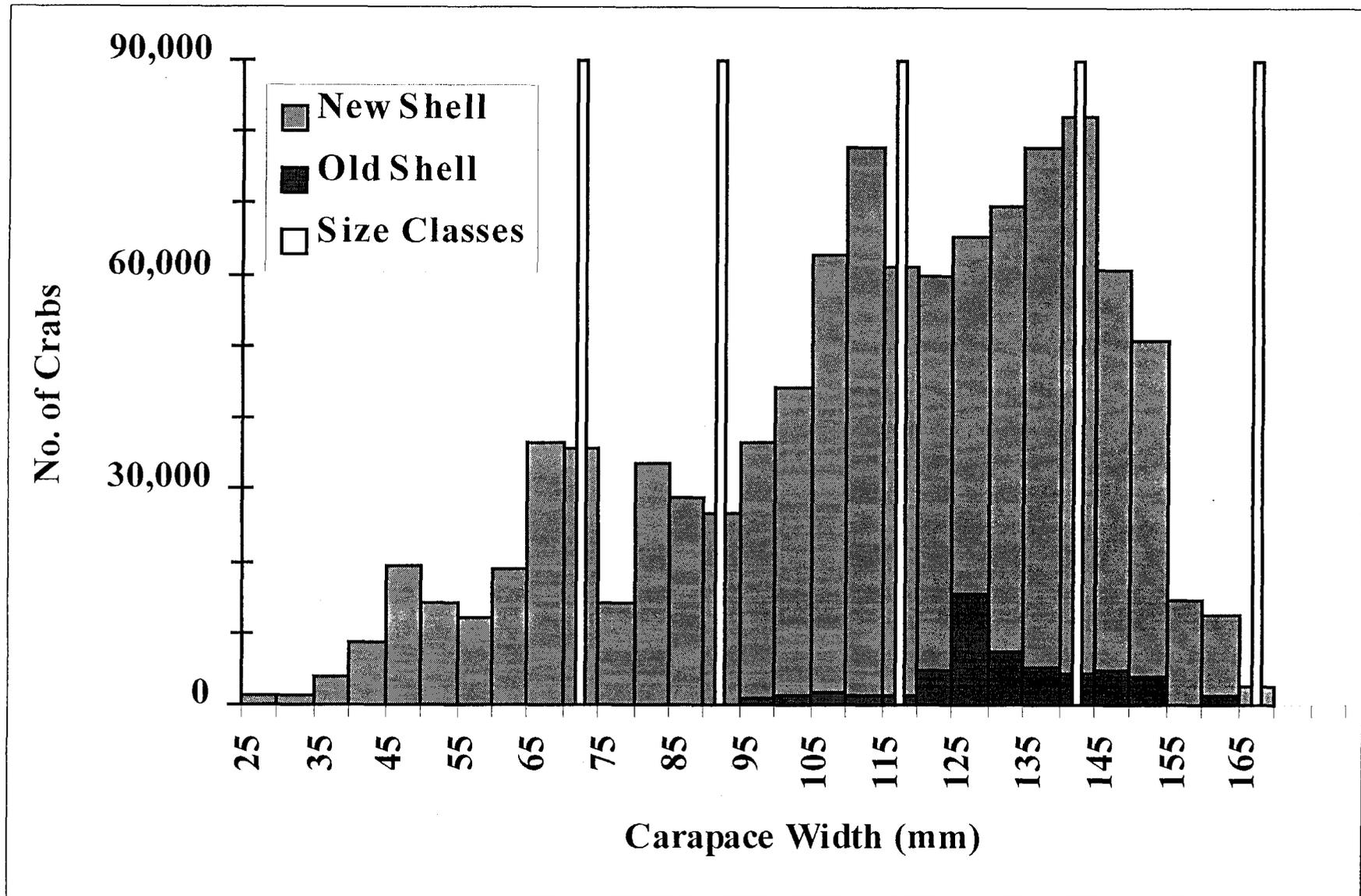


Figure 4. Shell size and maturity composition of the male Tanner crab population in the Cook Inlet Southern District, 1997.

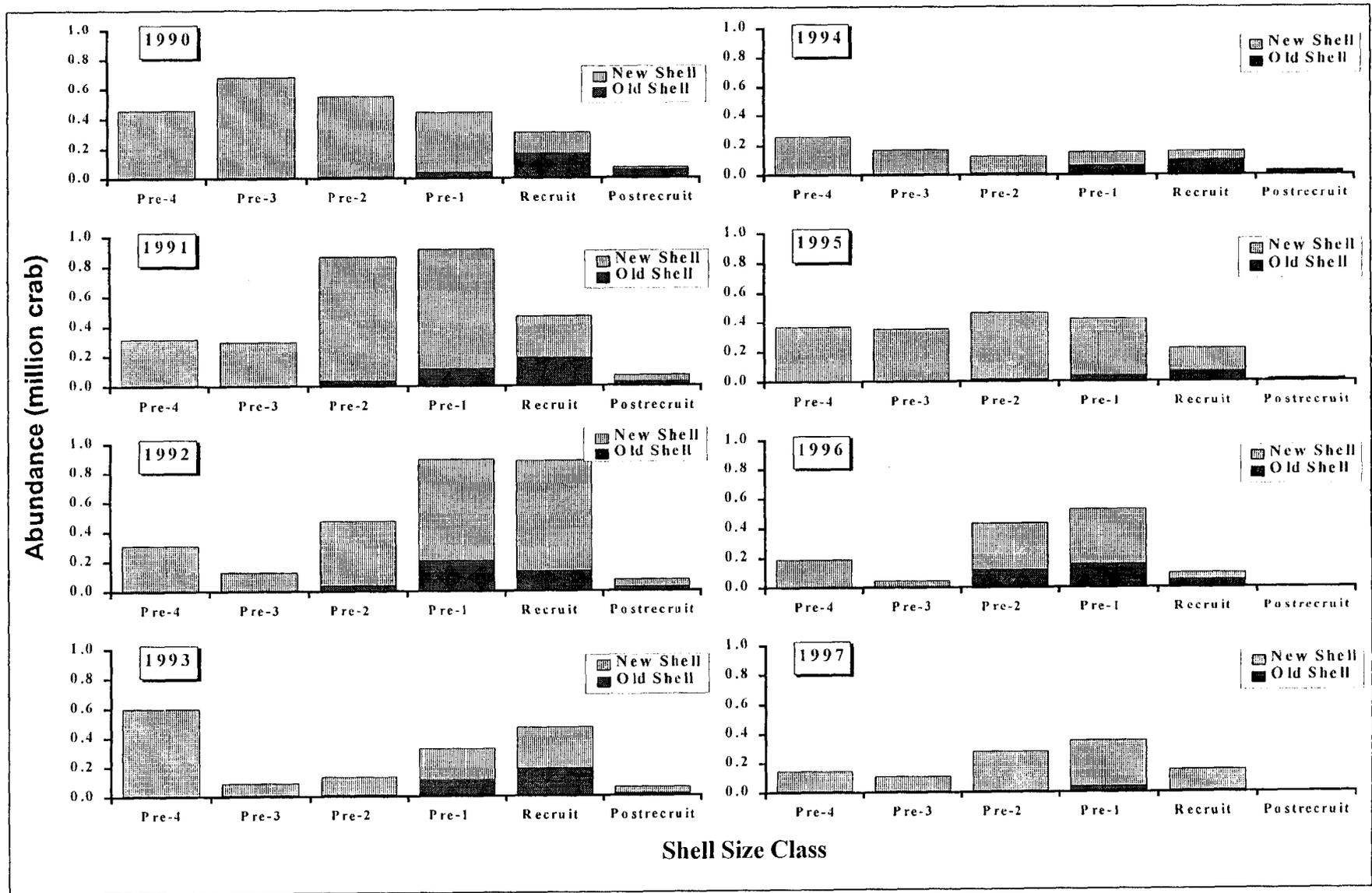


Figure 5. Estimated population abundance, by shell size and age composition, of male Tanner crab in the Southern District, 1990-1997.

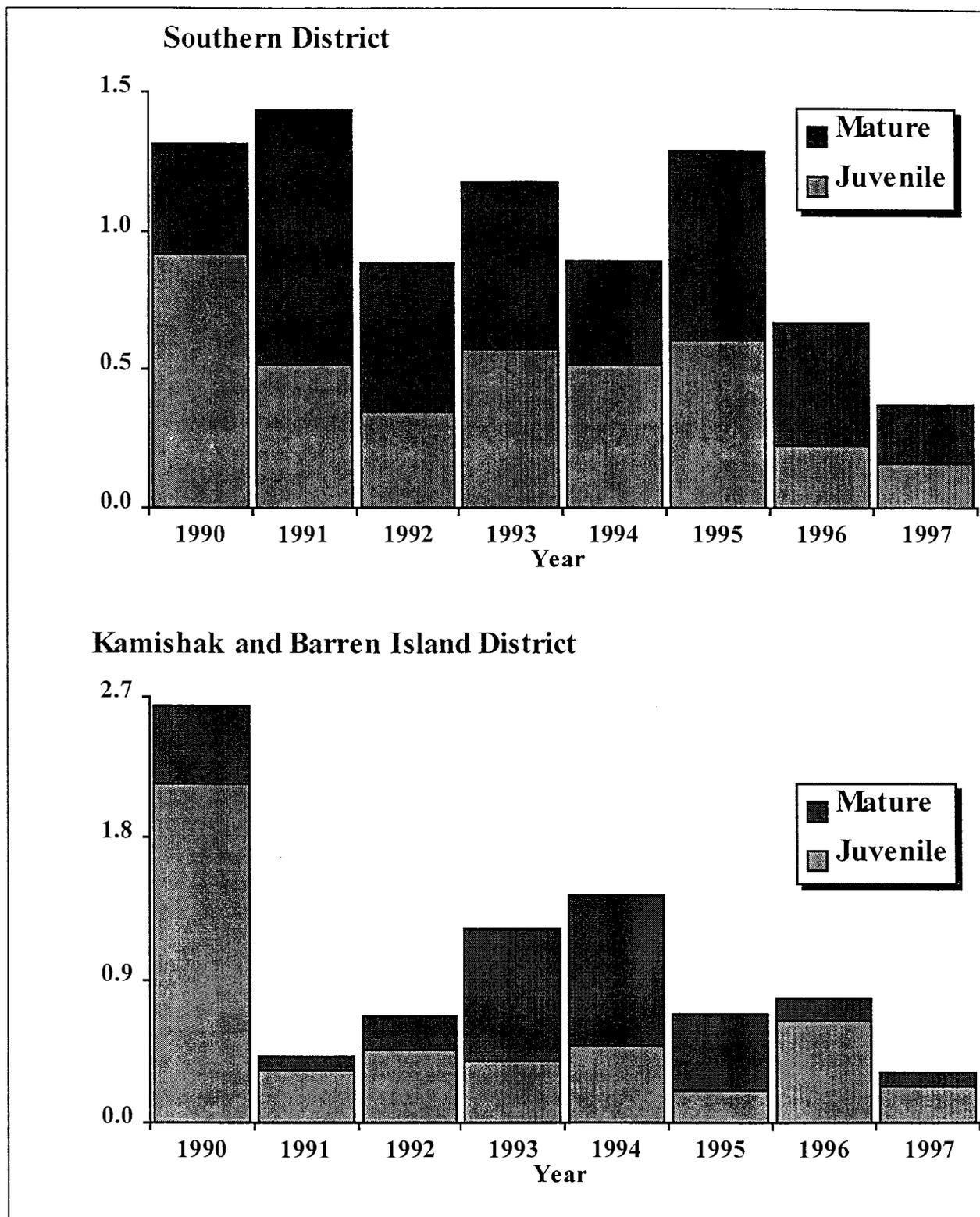


Figure 6. Abundance and maturity of female Tanner crab in the Southern District and the Kamishak and Barren Islands Districts, 1990-1997.

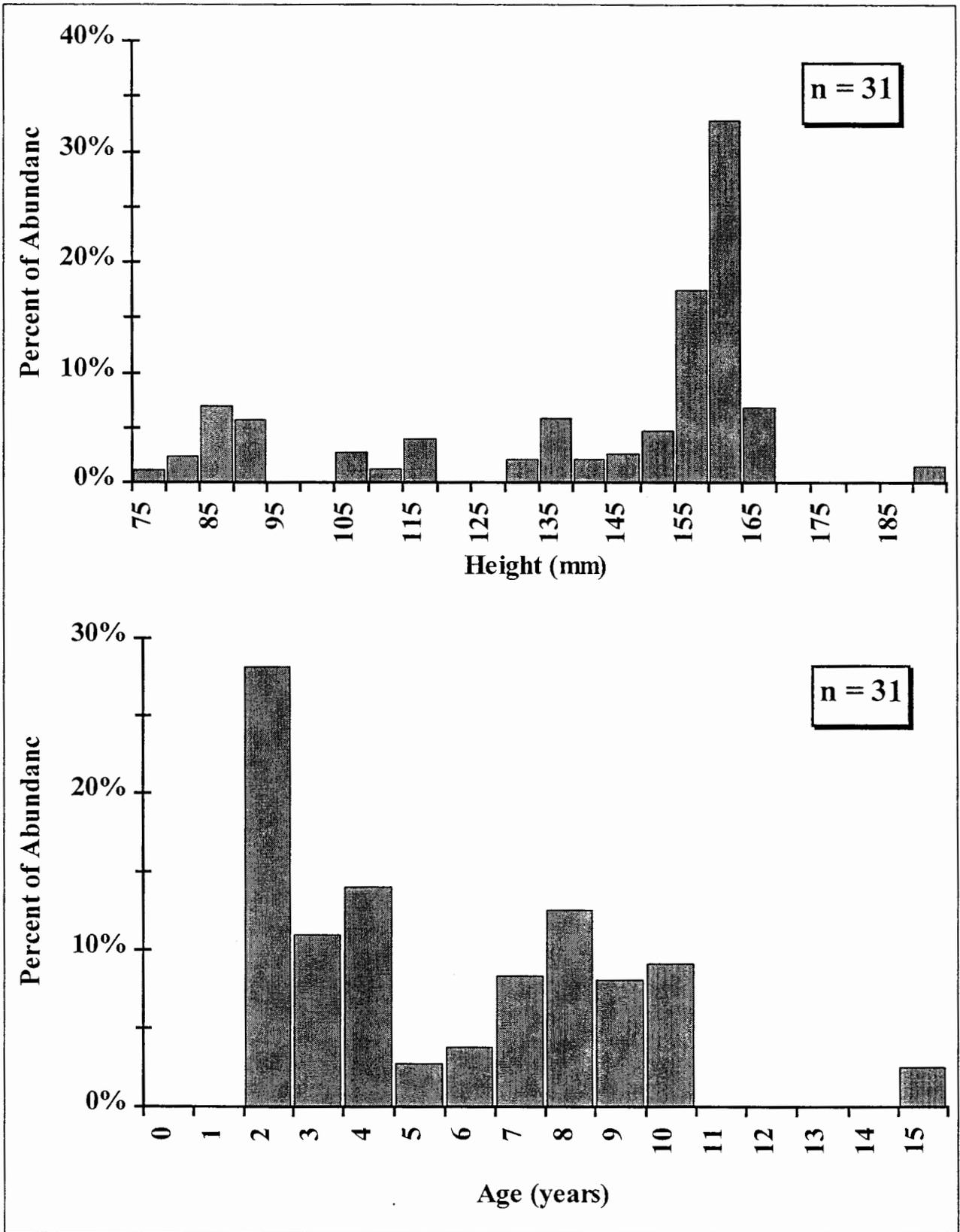


Figure 7. Shell height and age of weathervane scallops in the Southern District, 1997.

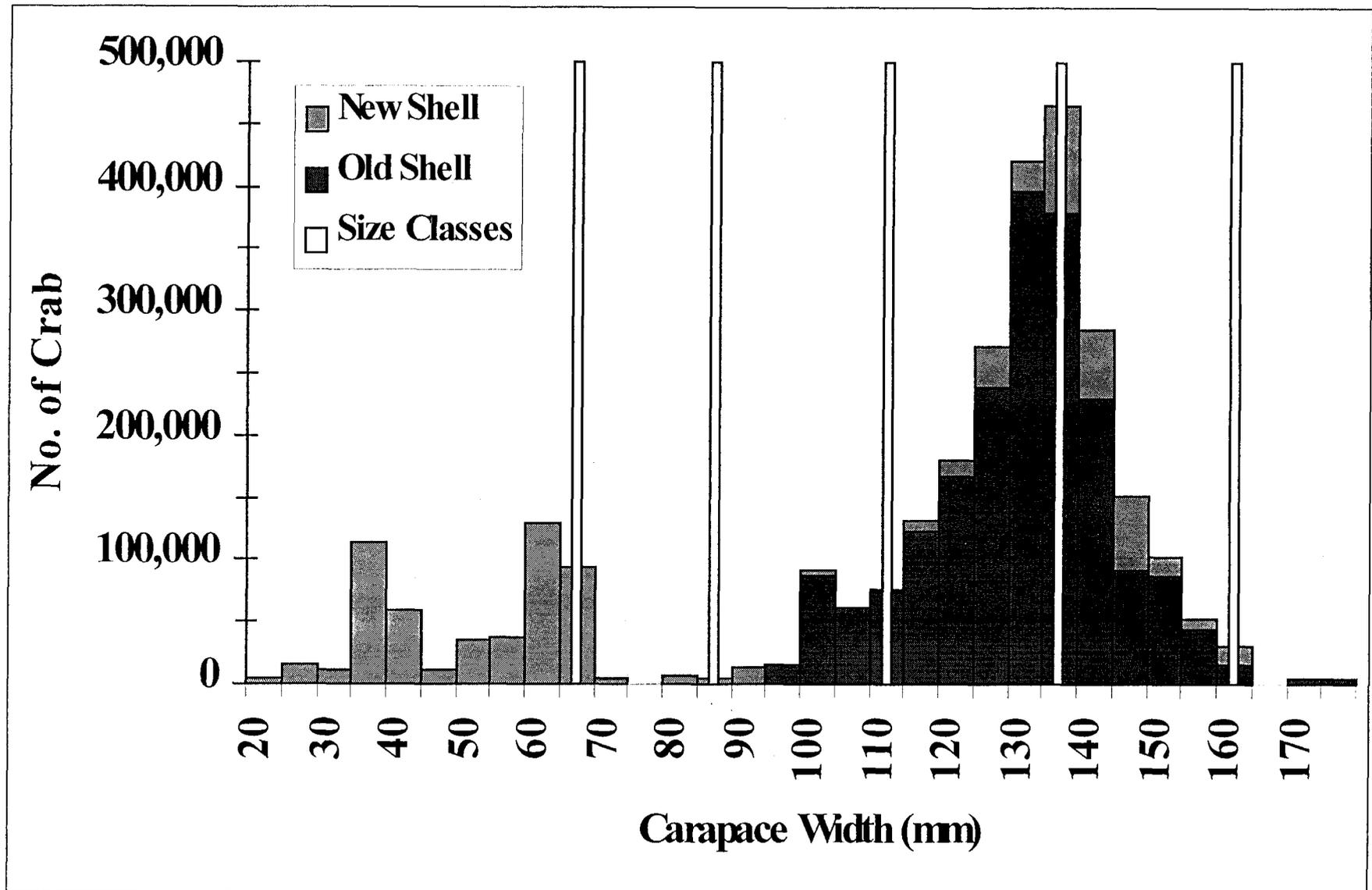


Figure 8. Shell size and maturity composition of male Tanner crab in the Kamishak and Barren Islands Districts, Cook Inlet, June 1997.

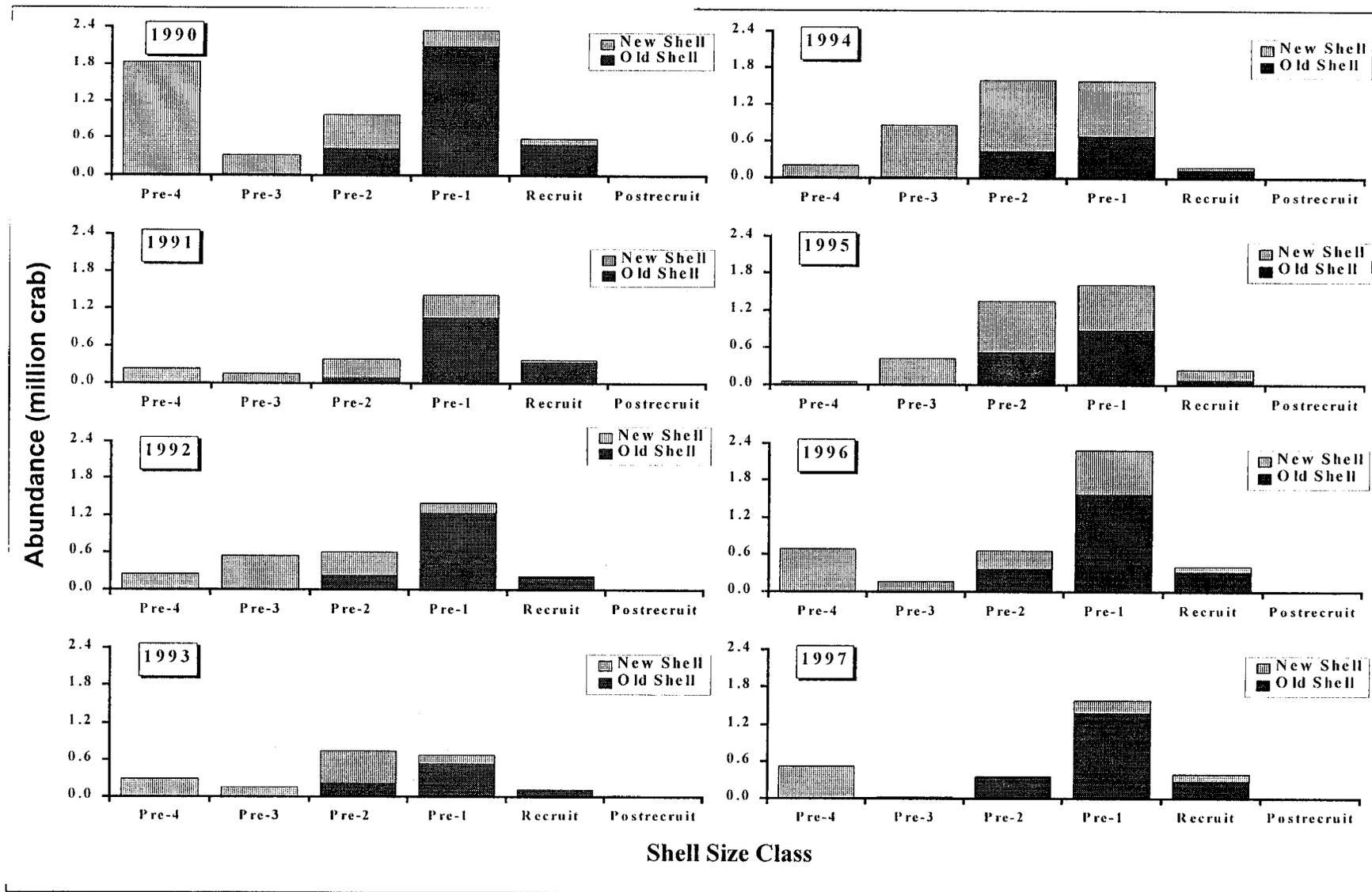


Figure 9. Estimated population abundance, by shell size and age composition, of male Tanner crab in the Kamishak and Barren Islands Districts, 1990-1997.

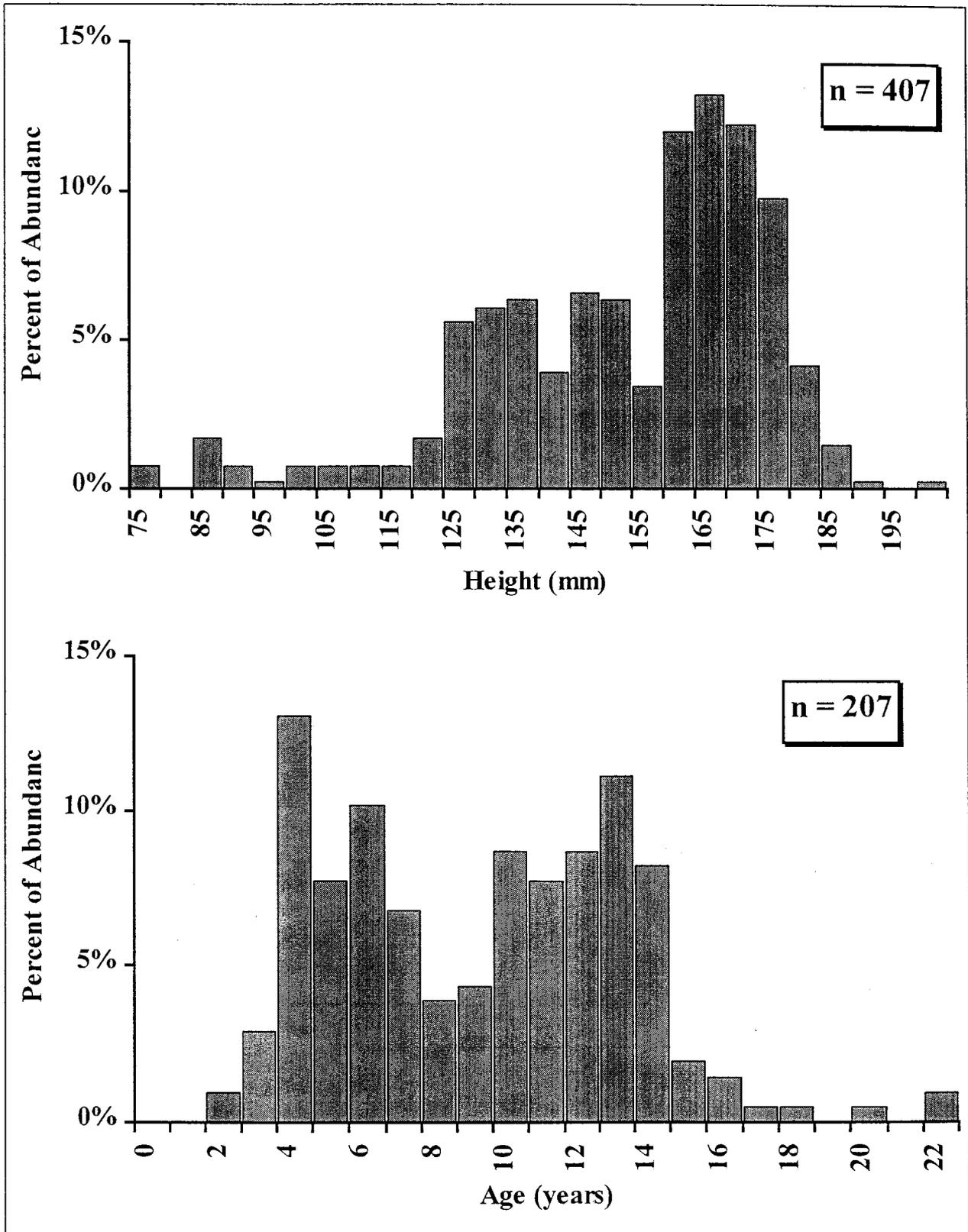


Figure 10. Shell height and age of weathervane scallops in the Kamishak and Barren Islands Districts, 1997.

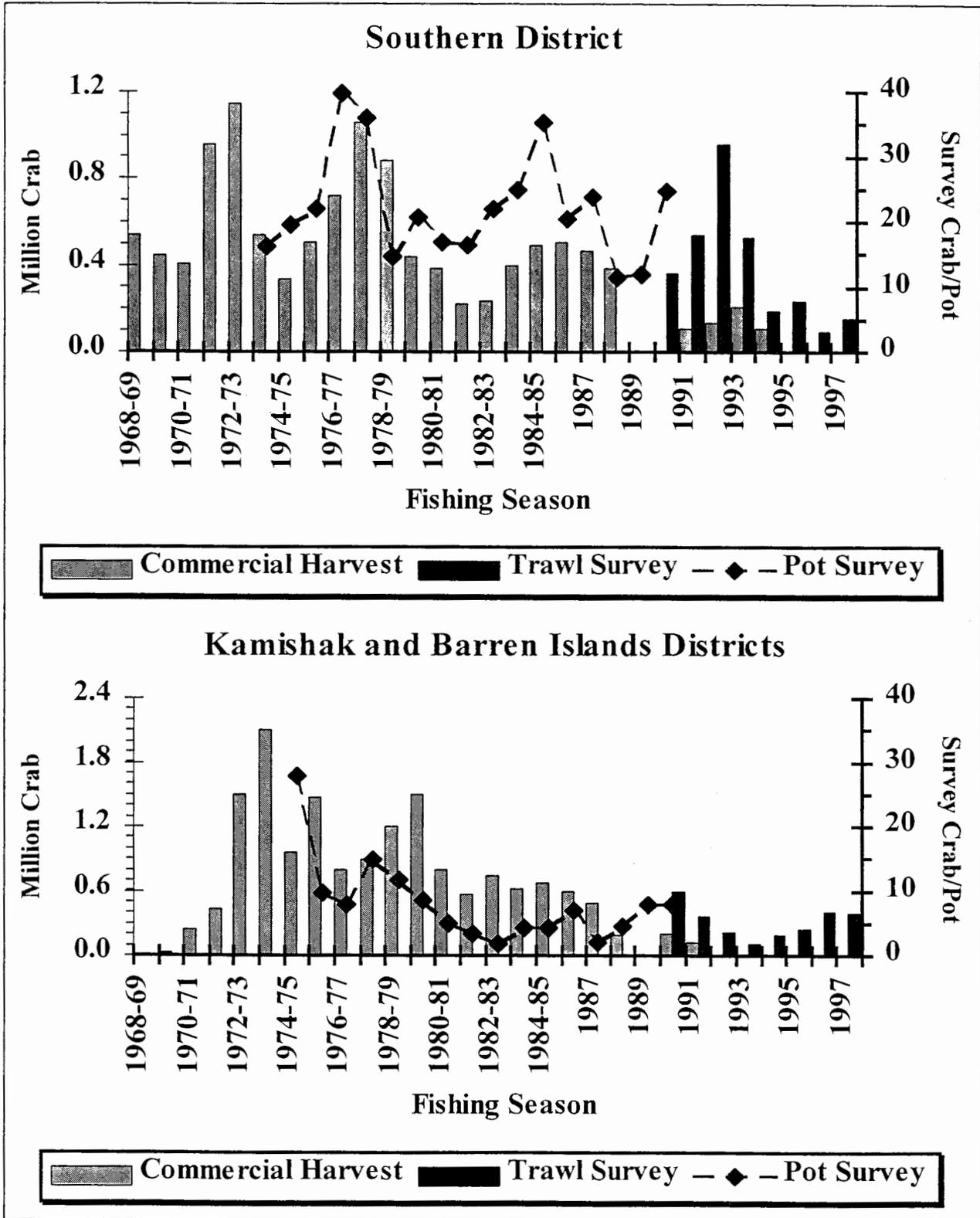


Figure 11. Historical fishery harvests and pot and bottom trawl survey catches of legal male Tanner crab in the Southern, Kamishak, and Barren Island Districts, 1968-1997.

Appendix A. Fishing log and catch (lb) in the Cook Inlet Southern District trawl survey, 26 June - 1 July 1997.

Station	Area (nmi <sup>2</sup> )	Date	<u>Tow Start Location</u>		Course (deg.)	Duration (minutes)	Distance (nmi)	Scope (fathom)	<u>Depth (fathom)</u>		Catch (lb)
			Latitude	Longitude					Min.	Max.	
1	4.98	26-Jun	59° 41.78'	151° 09.13'	030	0:28	1.0	100	27	37	1,316
2	2.92	26-Jun	59° 40.59'	151° 12.31'	050	0:29	1.0	75	25	25	858
3	5.52	28-Jun	59° 37.64'	151° 15.63'	030	0:27	1.0	125	34	38	532
4	3.08	28-Jun	59° 37.72'	151° 19.21'	050	0:30	1.0	100	32	33	1,138
5	5.94	26-Jun	59° 38.35'	151° 20.37'	035	0:27	1.0	50	13	14	2,298
6	5.00	28-Jun	59° 36.80'	151° 19.85'	045	0:28	1.0	125	40	40	1,350
7	3.93	1-Jul	59° 37.43'	151° 20.47'	195	0:27	1.0	100	31	34	1,404
8	3.57	28-Jun	59° 23.54'	151° 29.71'	070	0:29	1.0	275	90	91	3,996
9	4.59	28-Jun	59° 33.26'	151° 33.44'	040	0:29	1.0	200	64	66	1,482
10	8.52	27-Jun	59° 33.57'	151° 37.66'	050	0:28	1.0	150	48	49	1,096
11	4.63	27-Jun	59° 31.53'	151° 38.85'	060	0:30	1.0	175	55	57	1,872
12	6.25	27-Jun	59° 32.81'	151° 44.52'	060	0:27	1.0	125	38	43	1,860
13	6.25	27-Jun	59° 31.28'	151° 44.09'	070	0:29	1.0	175	56	58	1,840
14	6.64	29-Jun	59° 34.43'	151° 45.01'	200	0:26	1.0	100	34	37	3,608
15	3.68	27-Jun	59° 31.66'	151° 46.62'	210	0:27	1.0	125	39	40	3,208
16	3.26	30-Jun	59° 29.26'	151° 49.08'	050	0:28	1.0	125	37	39	1,294
17		30-Jun	59° 34.37'	151° 49.75'	200	0:10	0.3	60	20	21	Hung Up
17	8.94	29-Jun	59° 34.44'	151° 49.71'	200	0:26	1.0	50	21	23	4,372
18	6.25	30-Jun	59° 31.61'	151° 50.34'	205	0:20	1.0	100	35	37	1,014
19	6.25	30-Jun	59° 29.37'	151° 51.38'	190	0:25	1.0	190	38	42	1,238
20	6.25	29-Jun	59° 33.94'	151° 55.50'	200	0:28	1.0	50	20	21	2,652
21	6.25	29-Jun	59° 31.23'	151° 54.66'	210	0:22	1.0	100	34	38	2,520
22	6.25	30-Jun	59° 29.86'	151° 56.32'	215	0:30	1.0	125	42	46	1,832
71	3.42	28-Jun	59° 35.18'	151° 22.94'	030	0:28	1.0	200	53	77	1,238
Total							23.0		13	91	44,018

Appendix B. Fishing log and aggregate catch (lb) in the Cook Inlet Kamishak District trawl survey, 8-12 June 1997.

Station	Area (nmi <sup>2</sup> )	Date	<u>Tow Start Location</u>		Course (deg.)	Duration (minutes)	Distance (nmi)	Scope (fathom)	<u>Depth (fathom)</u>		Catch (lb)
			Latitude	Longitude					Min.	Max.	
27	26.1	12-Jun	59° 31.87'	153° 14.47'	290	0:29	1.0	50	13	14	1,684
32	26.1	12-Jun	59° 26.92'	153° 15.30'	108	0:30	1.0	50	18	19	710
33	26.1	12-Jun	59° 27.75'	153° 08.17'	100	0:28	1.0	60	20	22	672
37	26.1	12-Jun	59° 22.10'	153° 05.97'	075	0:27	1.0	75	26	27	1,596
38	26.1	12-Jun	59° 22.36'	152° 56.61'	025	0:29	1.0	100	30	33	346
41	16.8	11-Jun	59° 16.46'	153° 35.58'	105	0:25	1.0	50	17	17	384
44	26.1	11-Jun	59° 18.58'	153° 07.14'	052	0:30	1.0	100	29	29	1,762
45	26.1	11-Jun	59° 17.57'	152° 56.21'	050	0:28	1.0	125	40	45	1,342
471	24.3	11-Jun	59° 13.41'	153° 36.45'	150	0:28	1.0	50	18	19	1,276
472	1.8	11-Jun	59° 11.23'	153° 38.02'	100	0:14	0.5	125	45	48	4,070
50	26.1	10-Jun	59° 12.24'	153° 05.44'	037	0:28	1.0	125	38	38	1,922
51	26.1	10-Jun	59° 12.54'	152° 56.15'	115	0:30	1.0	175	59	68	2,668
53	26.1	10-Jun	59° 07.60'	153° 27.06'	295	0:30	1.0	75	23	24	678
54	26.1	10-Jun	59° 06.56'	153° 17.05'	015	0:14	0.5	75	24	25	Hung Up
54	26.1	10-Jun	59° 06.87'	153° 16.55'	020	0:27	1.0	75	24	26	210
57	26.1	8-Jun	59° 07.18'	152° 44.17'	285	0:25	1.0	225	78	81	1,098
58	26.1	10-Jun	59° 03.05'	153° 26.06'	310	0:28	1.0	75	23	23	1,172
61	26.1	8-Jun	59° 02.88'	152° 54.11'	185	0:28	1.0	250	82	84	430
64	26.1	9-Jun	58° 57.97'	153° 05.55'	120	0:13	0.4	250	86	87	Hung Up
67	26.1	9-Jun	58° 52.37'	153° 04.90'	280	0:29	1.0	275	89	92	1,154
68	26.1	9-Jun	58° 53.73'	152° 56.19'	240	0:30	1.0	250	88	89	716
Total							19.4		13	92	23,890

Stations 471 and 472 are components of an area that in aggregate previously totaled to station 47.

Appendix C. Data logger temperature recordings from Cook Inlet crab trawl surveys, 1992-1997.

Southern District				Kamishak and Barren Islands Districts			
Date	Station	Depth (fm)	Temp (°C)	Date	Station	Depth (fm)	Temp (°C)
7/15/92	4	32	7.5	7/10/92	61	82	6.7
7/16/92	7	37	7.5	7/11/92	67	90	6.3
7/17/92	10	47	7.8	7/12/92	53	24	<u>9.3</u>
7/18/92	11	55	<u>7.9</u>				Average = 7.4
			Average = 7.7				
7/6/93	5	16	6.9	6/28/93	53	22	8.2
7/7/93	7	34	6.7	6/29/93	31	12	10.2
7/8/93	8	67	6.6	6/30/93	67	92	5.5
7/12/94	7	39	7.1	7/1/93	54	23	8.8
7/13/94	18	36	8.4	7/2/93	44	26	<u>8.0</u>
7/14/94	15	41	<u>7.6</u>				Average = 8.1
			Average = 7.2				
6/27/94	3	30	6.3	6/14/94	67	89	5.9
6/28/94	5	22	6.4	6/15/94	38	29	6.8
6/29/94	8	81	6.0	6/16/94	47	18	7.4
6/30/94	11	54	6.5	6/17/94	51	55	<u>7.1</u>
7/5/94	13	57	6.5				Average = 6.8
7/6/94	18	35	<u>7.4</u>				
			Average = 6.5				
7/5/95	5	16	6.3	6/19/95	34	27	7.9
7/6/95	2	28	5.7	6/20/95	44	30	7.4
7/7/95	10	49	6.4	6/21/95	67	94	7.1
7/8/95	71	66	6.3	6/22/95	47	19	5.9
7/9/95	8	92	6.0	6/23/95	41	16	7.2
7/10/95	15	39	<u>7.4</u>	6/24/95	23	16	<u>7.1</u>
			Average = 6.4				Average = 7.1
8/19/96	10	46	9.2	6/20/96	68	91	5.5
8/20/96	18	35	<u>9.7</u>	6/21/96	58	23	7.6
			Average = 9.5	6/22/96	41	17	8.3
				6/23/96	37	27	<u>7.6</u>
							Average = 7.3
6/27/97	10	49	6.6	6/8/97	61	84	ND
				6/9/97	68	89	ND
				6/12/97	37	27	ND

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