A BOTTOM TRAWL SURVEY FOR CRABS AND GROUNDFISH IN THE PRINCE WILLIAM SOUND MANAGEMENT AREA, 16-26 AUGUST 1997

by

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ABSTRACT

During 16-26 August 1997, the Alaska Department of Fish and Game (ADF&G) conducted a bottom trawl survey to assess red king, Tanner, and Dungeness crabs and groundfish n the Prince William Sound Management Area (PWS). Survey effort was allocated as follows: 27 tows in the Port Fidalgo and Orca Bay, 12 tows in North Montague, and 14 tows in Southwest PWS. Tows in the Port Fidalgo, Orca Bay, and the North Montague encompassed traditional trawl; survey stations, whereas tows in the Southwest area represented experimental stations selected through a random survey design. The 39 tows in the Port Fidalgo, Orca Bay, and North Montague areas yielded a population estimate of 364,639 male Tanner crab. This was a 20% decline from the 1995 survey estimate and a 79% decline from the male population estimate in 1991. An estimated 221,204 male Tanner crab were present in the Southwest area. Legal-sized male Tanner crab were not found in the Southwest area and <3% of the estimate male population in other survey areas. Thus, the abundance of legal male Tanner crab is insufficient to support a harvest. The population abundance of juvenile female Tanner crab increased 4% in 1997 relative to the 1995 survey estimate. However, the mature female population and the overall female population continued to decline relative to female population estimates in the early 1990s. No Dungeness or red king crabs were caught in the 1997 survey; overall abundance of legal males for these species remained insufficient to support a commercial fishery. One golden king crab was caught in the North Montague area and 17 golden king crab were caught in the Southwest area. Because the trawl survey assessed only the shallower portion of the depth range inhabited by golden king crab, these catches are viewed as an index of abundance. Groundfish sampling during the trawl survey focused on commercially important species. The largest component of the identified groundfish catch biomass in all survey areas was walleye pollock (16.0%), followed by rockfishes (3.1%), Pacific halibut (3.0%), sablefish (2.3%), Pacific cod (1.5%), and sharks (0.8%). Other identified species included lingcod, weathervane scallops, octopus, and squid.

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) has been conducting bottom trawl surveys for Tanner crab (*Chionoecetes bairdi*) in the Prince William Sound Management Area (PWS) since 1991 (Figure 1; Kimker and Trowbridge 1992). Data from these surveys are used to generate Tanner crab population estimates. Many other species of shellfish and groundfish are incidentally captured during crab trawl surveys. Trawl survey data is used to monitor trends in stock abundance of other crab and groundfish species. More detailed analyses of groundfish will be presented on an ad hoc basis in other reports (Bechtol 1998).

In 1991, trawl surveys superseded crab pot surveys as ADF&G's preferred method for Tanner crab assessment in PWS (Trowbridge 1992). Pot surveys provided an index of abundance that was viewed relative to commercial catch data. Problems in interpreting pot survey results, such as effects of soak time, the need for commercial fishery data, and the inability of generating abundance estimates, led ADF&G to develop trawl surveys as an assessment tool. Trawl surveys conducted by the National Marine Fisheries Service (NMFS) in the Bering Sea and by ADF&G in the Westward Region have provided reliable information to assess stocks and develop fisheries management strategies for Tanner crabs.

The objectives of the 1997 survey were:

1. Estimate the abundance of Tanner crab stocks in PWS.

2. Document the size and shell age of all Tanner, red king (*Paralithodes camtschatica*), golden king (*Lithodes aequispina*), and Dungeness (*Cancer magister*) crabs captured.

3. Determine the clutch fullness and egg condition of all female crabs captured.

4. Document the weight and abundance of other commercially important species caught during the survey.

METHODS

Study Area and Survey Stations

Survey area selection for trawl surveys was based on historical pot survey and crab tagging studies data and commercial catch information. The three general trawl survey areas were (Figure 1):
(1) Port Fidalgo and Orca Bay, encompassing the Northern and Hinchinbrook Districts of eastern PWS and including Port Fidalgo, Orca Bay, and Hinchinbrook Entrance;
(2) North Montague, including from Smith Island to Green Island; and
(3) Southwest, defined herein as waters of internal PWS south of 60° 30' N latitude, 147° 00' W

longitude, and comprising a significant portion of the Western District.

Traditional survey stations include the Port Fidalgo and Orca Bay and North Montague areas. Historically, survey stations were 2.5 nautical mile squares (6.25 nmi^2). More recently, individual stations in the Port Fidalgo and Orca Bay and North Montague areas were reevaluated with respect to results of previous surveys and commercial fisheries. This resulted in an increase or decrease in the size of some survey stations (Trowbridge 1992). Depths shallower than 92 m (50 fathoms) were subsequently omitted from surveys and analyses of these areas to reduce gear damage or loss and to better represent Tanner and king crab habitat in PWS. Individual station size and shape were also modified to accommodate irregular depth contours. The 1997 trawl survey sampled all historical trawl survey stations from these areas.

In the Southwest area, stations were treated as unmodified 2.5 nautical mile squares. Potential stations were identified by placing 2.5 nautical mile squares on a NOAA nautical chart. Survey stations were selected using a random number generator and excluding stations that on the nautical chart appeared lack of sufficient trawlable habitat due to habitat relief or habitat depth.

The trawl path within a station grid was selected by the vessel skipper to provide a 1.0 nautical mile tow with a low probability of gear loss or damage. Each tow required approximately 25 minutes of towing at a speed of 2.5 nautical miles per hour. All tows were made during daylight hours. Data analysis was restricted to tows ≥0.5 nautical miles in length. Data from tows shorter than 0.5 nautical miles were discarded, and these tows were repeated if time allowed.

Vessel and Gear

The state research vessel *Pandalus*, overall length 20.1 m (66 ft), was used for surveys. A 400 mesh eastern trawl with a 21.3 m (70 ft) headrope, a 29.0 m (95 ft) footrope, and 363 kg (800 lb), 1.5 m x 2.1 m, Nor'Eastern Astoria V trawl doors was used. The net opening was estimated to be 2.7 m (9 ft) high and 12.2 m (40 ft) wide. Trawl stretched 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.

Catch Sampling

Contents from successful tows were brought aboard and weighed. Target species caught during the 1997 trawl survey of PWS are shown in Appendix A. Non-crab species of significant commercial importance were sorted, weighted according to species group, and either counted or measured for length and sex. Other species sampled in this manner included Pacific cod, walleye pollock, rockfish, sharks, sablefish, Pacific halibut, and majestic squid. Weathervane scallop were measured for shell height. All Tanner and king crabs were sorted by sex and species and then weighed. Carapace widths were measured for Tanner crab and carapace lengths were measured for king crab. Shell age was recorded as soft, new, old, or very old for all crab (Kimker and Trowbridge 1992). Soft and new shells were believed to have molted after the most

recent winter. In contrast, old and very old shells are believed to have not molted for one or more years. Females were assessed for maturity, egg condition, and clutch size. Determination of female maturity was based on carapace size and the firmness of the connection between the abdomen and the thorax.

Data Analysis

For each area and target species group, the catch in either abundance or biomass, was converted to catch per 1.0 nautical mile by dividing by the distance towed. The catch weight of non-target species and nonbiological material, such as rocks, was pooled into a debris category. The population (P_i), measured in either abundance or biomass, was estimated from the following area swept equation (Gunderson 1993):

$$P_i = 151.9x \sum_{i=1}^{n} \left(A_i \, x \, \frac{C_i}{l_i} \right) ,$$

where

151.9 = a factor, obtained by dividing 6,076 feet per nautical mile by the 40-foot width of the net, used to convert the catch per nautical mile towed to animals per square nautical mile;
A_i = surface area of station i in square nautical miles;
C_i = catch of a species, either in abundance or weight, in the sample tow of area i;
l_i = distance towed, in nautical miles, in area i .

Only historically productive areas were sampled; and only sampled stations were included in the aggregated estimate. Population estimates were, therefore, considered to be conservatively biased for Tanner crab (i.e. the actual population was probably underestimated). However, those crab outside of the surveyed areas are thought to comprise a minor component of the total crab population. Population estimates were not calculated for king crab due to 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 studies of PWS crab resources. Legal and sublegal crab refers to crab carapace widths that are at least and less than, respectively, the regulatory minimum size for harvest. The minimum size is 135 mm (5.3 inches) for Tanner crab and 178 mm (7 inches) for red and golden king crabs. For this report, soft and new shells were pooled into a single "new" category whereas "old" and "very old" shells were pooled into a single "old" category (Table 1; Kimker and Trowbridge 1992). Mean carapace sizes were calculated by weighting size frequency distributions from each survey station by the surface area of that survey station.

RESULTS

Survey Effort and Aggregate Catch

A total of 53 successful tows were made in PWS during 16-26 August 1997 (Appendix B; Table 2; Figure 2). All tows except for two were 1.0 nautical miles in length: tow 97328 was 0.9 nautical mile and tow 97348 was 0.6 nautical mile. The aggregate catch from all tows was 60,743 lb, which included 345 lb of Tanner crab and 86 lb of golden king crab. No Dungeness crab or red king crabs were caught during the survey. Seventy-two percent of the catch, 43,599 lb, was debris. Walleye pollock comprised the largest component of the groundfish catch and accounted for 9,694 lb, or 16% of the total catch. Rockfish totaled 1,864 lb, or 3% of the aggregate catch and comprised the second largest component of the catch. Pacific halibut totaled 1,818 lb, also 3% of the aggregate catch, and was the third largest catch component among all stations. Other species documented in the catch were sablefish (1,408 lb), Pacific cod (930 lb), sharks (514 lb), squid (440 lb), lingcod (30 lb), weathervane scallop (11 lb), and octopus (5 lb).

Port Fidalgo and Orca Bay

A total of 27 successful tows were made in Port Fidalgo and Orca Bay during 16-20 August 1997 (Appendix B; Tables 2 and 3). Total catch was 30,286 lb and mean catch among tows was 1,122 lb. Seventy-five percent of the catch was debris. Tanner crab catch among tows totaled 154 lb, or <1% of the catch, with a mean catch rate of 5.7 lb/nm towed. Walleye pollock comprised the largest component of the groundfish catch and accounted for 4,186 lb, or 14% of the total catch. Pacific halibut totaled 928 lb, or 3% of the aggregate catch and comprised the second largest component of the catch. Rockfish totaled 873 lb, also 3% of the aggregate catch, and were the third largest component of the catch among tows. Other species documented in the catch were sablefish (539 lb), sharks (342 lb), Pacific cod (338 lb), squid (129 lb), weathervane scallop (8 lb), and octopus (3 lb).

Tanner Crab

A total of 208 male Tanner crab was caught in Port Fidalgo and Orca Bay (Table 4). Sublegal Tanner crab comprised 88% of the total male catch; 29% of all sublegal crab and 28% of all males were caught in station 1. Legal-size male crabs were only caught in six stations. Male carapace widths ranged from 26-156 mm (1.0-6.1 inch; Table 5); mean male width was 79.7 mm (3.1 inch). Legal male crab comprised 6% (n=12 crab) of the male catch and had an average width of 141.7 mm (5.6 inch). Only two new recruit males were caught and no postrecruit males were caught. The population estimate for Port Fidalgo and Orca Bay was 181,890 male Tanner crab vulnerable to trawl survey gear (Table 6; Figure 3). Over 29% of the male population occurred in station 1. Estimated abundance of legal male Tanner crab was103,674, or 6% of the total male population.

The Port Fidalgo and Orca Bay tows caught 165 female Tanner crab (Table 7). Juveniles comprised 73% (n=121 crab) of the catch. New shells were observed on 36% of the adult females and 83% of all females. Only one mature female was barren and 81% of the mature females had full clutches. Carapace widths of female Tanner crab in Port Fidalgo and Orca Bay ranged from 24-102 mm (0.9-4.0 inch; Table 8; Figure 7). Mean female carapace width was 61.4 mm (2.4 inch), and mature females had a mean width of 86.9 mm (3.4 inch). Port Fidalgo and Orca Bay were estimated to contain 141,773 female Tanner crab vulnerable to the survey gear (Table 9; Figure 4). Mature females comprised 27% of the total estimated female population, or 36,427 crab.

Groundfish

Pacific cod comprised 1.1% of the trawl catches from Port Fidalgo and Orca Bay and produced a mean catch rate 12.5 lb/nm towed (Table 2). Pacific cod length ranged from 404-824 mm, and the most abundant size class was 635-644 mm (Table 10; Figure 5). Mean length was 638.7 mm and mean weight was 6.0 lb (Table 10).

Rockfish species comprised 2.9% of the trawl catch from Port Fidalgo and Orca Bay and produced a mean catch rate of 32.3 lb/nm towed (Table 2). Rougheye rockfish was the most abundant species caught (Table 10). Fish length ranged from 102-756 mm, and exhibited a multi-modal size distribution with the most abundant sizes were in the 285-304 mm size range (Figure 6). Mean length was 338.3 mm and mean weight was 1.5 lb (Table 10). Only one shortspine thornyhead was caught and measured 119 mm in length. Only one yelloweye rockfish was caught and measured 516 mm in length. Only one dusky rockfish was caught and measured 368 mm in length. Two silvergray rockfish were caught and measured 466 and 501 mm. One sharpchin rockfish was caught and measured 292 mm.

Walleye pollock comprised 13.8% of the trawl catch from Port Fidalgo and Orca Bay and produced a mean catch rate 155.0 lb/nm towed (Table 2). Pollock length ranged from 162-730 mm, and the most abundant sizes were in the 495-564 mm mode (Figure 7). Mean length was 514.1 mm and mean weight was 2.8 lb (Table 10).

Sablefish comprised 1.8% of the trawl catches from Port Fidalgo and Orca Bay and produced a mean catch rate 20.0 lb/nm towed (Table 2). Sablefish length ranged from 360-656 mm, and mean length was 497.1 mm (Table 10). The most abundant sizes were in the 465-524 mm mode (Figure 8).

A total of 342 sharks (1.1% of the total trawl catch weight) was caught in Port Fidalgo and Orca Bay and produced a mean catch rate 12.7 lb/nm towed (Table 2). One salmon shark, measuring 2,190 mm, was caught. The remaining shark catch was 17 spiny dogfish, totaling 88 lb for a mean catch rate of 5.2 lb/nm towed (Table 10). Spiny dogfish length ranged from 720-980 mm, and mean length was 849.4 mm (Figure 9).

Weathervane scallop

A total of 25 weathervane scallops was caught in Port Fidalgo and Orca Bay and produced a mean catch rate 0.3 lb/nm towed (Table 2). Shell height ranged from 54-177 mm (Figure 10); and mean height was 102.9 mm.

North Montague

Twelve successful tows were made in the North Montague area during 21 and 22 August 1997 (Appendix C; Tables 2 and 11). Aggregate catch from all tows was 11,476 lb, which included 77 lb of Tanner crab, 2 lb of golden king crab, 45 lb of squid, 3 lb of weathervane scallop, 2 lb of octopus, and 8,528 lb of debris. Pacific halibut comprised 232 lb, or 2% of the aggregate catch. Twenty-three percent, or 2,590 lb, of the aggregate catch was comprised of Pacific cod, walleye pollock, rockfish, and sablefish.

Tanner Crab

A total of 613 male Tanner crab were caught in the North Montague area (Table 12). Male carapace widths ranged from 28-130 mm (1.1-5.1 inch; Table 5). Mean male carapace width was 62.1 mm (2.4 inch). No legal-size Tanner crab were caught in the North Montague area and prerecruit-1 and –2 crab comprised only 14%, of the male catch. The North Montague area was estimated to contain 182,748 male Tanner crab vulnerable to trawl survey gear (Tables 13; Figure 10).

The North Montague tows caught 180 female Tanner crab (Table 14). Juveniles comprised 66% (n=118) of the female catch. New shells comprised 87% of the mature females. Only one mature female was barren and 65% of the mature females had full clutches. Female carapace widths ranged from 23-99 mm (0.9-3.9 inch; Table 8; Figure 11). Mean carapace width was 58.9 mm (2.3 inch). The North Montague area contained an estimated 177,553 female Tanner crab vulnerable to the survey gear (Tables 15). Mature females totaled 57,588 crab, or 32% of the estimated female population.

King Crab

No male king crab were caught in the 1997 survey of the North Montague area. One female golden king crab, measuring 113 mm (4.4 inch) and weighing 2 lb, was caught in station 112 (Tables 8 and 11).

Groundfish

Mean catch rate of Pacific cod in the North Montague was 10.5 lb/nm towed (Tables 2 and 11).

Pacific cod length ranged from 254-766 mm, and the most abundant size class was 725-734 mm (Table 10; Figure 5). Mean length was 608.1 mm and mean weight was 8.4 lb.

Rockfish in aggregate comprised 3.9% of the North Montague trawl catch and produced a mean catch rate of 36.8 lb/nm towed (Tables 2 and 11). Rougheye rockfish was the most abundant species caught and exhibited a multi-modal size distribution. Fish length ranged from 88-677 mm, but the most abundant sizes were in the 285-334 mm size range (Figure 6). Mean length was 370.7 mm and mean weight was 2.1 lb (Table 10). One silvergray rockfish was caught and measured 447 mm in length.

Walleye pollock comprised 16.1% of the trawl catch from the North Montague area and produced a mean catch rate 153.8 lb/nm towed (Tables 2 and 11). Pollock length ranged from 282-754 mm, and the most abundant fish were in the 495-594 mm size range (Figure 7). Mean length was 513.9 mm and mean weight was 2.6 lb (Table 10).

Sablefish comprised 1.4% of the trawl catches from the North Montague area and produced a mean catch rate 13.3 lb/nm towed (Tables 2 and 11). Sablefish length ranged from 276-724 mm and the most abundant fish occurred in the 495-544 mm size range (Figure 8). Mean length was 519.3 mm and mean weight was 2.9 lb (Table 10).

Two spiny dogfish were caught, totaling 0.1% of the trawl catch from the North Montague area and produced a mean catch rate 1.2 lb/nm towed (Table 2). Spiny dogfish lengths were 908 and 1,001 mm (Table 10; Figure 9).

Weathervane scallop

A total of 10 weathervane scallops was caught in North Montague area and produced a mean catch rate 0.3 lb/nm towed (Table 2). Shell height ranged from 67-130 mm (Figure 10); and mean height was 101.9 mm.

Southwest Area

Fourteen successful tows were made in the Southwest area during 23-26 August 1997 (Appendix D; Tables 2 and 16). Aggregate catch from all tows was 19,928 lb, which included 116 lb of Tanner crab, 84 lb of golden king crab, 267 lb of squid, and 12,810 lb of debris. Pacific halibut comprised 3.4%, or 674 lb, of the aggregate catch. Pacific cod, walleye pollock, rockfish, sablefish, sharks, and lingcod comprised 30%, or 5,977 lb, of the aggregate catch.

Tanner Crab

Southwest area tows caught 233 male Tanner crab (Table 17). Male carapace width ranged from 27-132 mm (1.1-5.2 inch; Table 5). Mean male carapace width was 75.9 mm (3.0 inch). No legal-size Tanner crab were caught in the Southwest area and prerecruit-1 and –2 crab comprised only 29% of the male catch. The Southwest area was estimated to contain 221,204 male Tanner crab vulnerable to trawl survey gear (Tables 18; Figure 12).

Southwest area tows caught 185 female Tanner crab (Table 19). Juveniles comprised 65% (n=121) of the female catch. New shells comprised 53% of the mature females. Four mature females were barren and 55% of the mature females had full clutches. Female carapace width ranged from 30-99 mm (1.2-3.9 inch; Table 8; Figure 13). Mean carapace width was 56.3 mm (2.2 inch). The Southwest area contained an estimated 175,168 female Tanner crab vulnerable to the survey gear (Tables 20). Mature females totaled 60,760 crab, or 35% of the estimated female population.

King Crab

Sixteen male golden king crab were caught in the 1997 survey of the Southwest area (Table 21). Male carapace widths ranged from 111-171 mm (4.4-6.8 inch; Table 5). Mean male carapace width was 150.3 mm (5.9 inch). Legal-size golden king crab comprised 88% of the male crab catch in the Southwest area and prerecruit-1 and –2 crab comprised the remaining 12% of the male catch. Two female golden king crab were caught and measured 96 and 129 mm (3.8 and 5.1 inch; Table 8). A population estimate was not calculated for golden king crab because the sample size was relatively small and only a small portion of the habitat for this species was surveyed.

Groundfish

Pacific cod comprised 3.1% of the trawl catch from the Southwest area and produced a mean catch rate 44.2 lb/nm towed (Tables 2 and 16). Pacific cod length ranged from 218-792 mm, and exhibited a multi-modal size distribution with the most abundant size class being 595-614 mm (Figure 5). Mean length was 593.7 mm and mean weight was 6.5 lb (Table 10).

Rockfish species comprised 2.8% of the trawl catch from the Southwest area and produced a mean catch rate of 39.8 lb/nm towed (Tables 2 and 16). Rougheye rockfish was the most abundant species caught and exhibited a multi-modal size distribution. Rougheye rockfish length ranged from 117-781 mm, but the most abundant lengths were in the 285-304 mm size range (Figure 6). Mean length was 390.2 mm and mean weight was 2.4 lb (Table 10). Other rockfishes caught included three shortraker rockfish, measuring 818, 888, and 934 mm; one redbanded rockfish measuring 324 mm; one redstripe rockfish measuring 372 mm; and one sharpchin rockfish measuring 390 mm.

Walleye pollock comprised 18.7% of the trawl catch from the Southwest area and produced a mean catch rate 266.4 lb/nm towed (Tables 2 and 16). Pollock length ranged from 98-752 mm, and fish were most abundance in the 465-544 mm size range (Figure 7). Mean length was 510.0

mm and mean weight was 2.7 lb (Table 10).

Sablefish comprised 4.4% of the trawl catch from the Southwest area and produced a mean catch rate 62.9 lb/nm towed (Tables 2 and 16). Sablefish length ranged from 95-769 mm, and sablefish were most abundant in the 515-544 mm size range (Figure 8). Mean length was 572.3 mm and mean weight was 4.0 lb (Table 10).

Southwest area tows yielded 26 spiny dogfish (0.8% of the total catch) with a mean catch rate 11.5 lb/nm towed (Tables 2 and 16). Spiny dogfish length ranged from 680-959 mm (Figure 9). Mean length was 648.5 mm and mean weight was 6.1 lb (Table 10).

One lingcod was caught in the Southwest area and weighed 30 lb (Tables 10 and 16); no length data was obtained.

Bottom Temperature

Bottom water temperature was measured with a data logger during one trawl tow of the PWS survey. On tow 99332 at station 109, the water temperature was 5.4°C at a depth of 104 fathoms.

DISCUSSION

Tanner Crab

Estimated abundance of legal-size Tanner crab in Prince William Sound continues to be insufficient to support a commercial fishery. Commercial fisheries occurred in the PWS Management Area from 1968 through 1988 (Table 2; Berceli et al. 1999). ADF&G has assessed Tanner crab in the management area since 1977 (Table 22). Pot surveys were conducted from 1977 through 1991 and documented a decline in mean catch rates of male Tanner crab from 93.0 crab/pot in 1977 to 13.0 crab/pot in 1991. Although survey effort changed somewhat during this period, the continued decline was believed to represent a decline in relative abundance. Trawl surveys have been conducted in the management area since 1991. Mean catch of male Tanner crab declined from 104.9 crab/tow in 1991 to 19.5 crab/tow in 1997 (Table 22). Trawl surveys also allowed the Tanner crab population to be estimated through an area-swept approach (Gunderson 1993). The estimated population of legal male Tanner crab in the Port Fidalgo, Orca Bay, and North Montague areas declined from 105,045 to 10,674 from 1991 to 1997 (Table 23). Male Tanner crab in aggregate declined from 1.7 million to 364,638 during the time period.

Pot surveys also indicated a general decline in catch rates of female Tanner crab during 1977 to 1991 (Table 22; Berceli et al. 1999). Trawl surveys estimates suggested the population of female

Tanner crab in the Port Fidalgo, Orca Bay, and North Montague areas continued to decline from 1991 to 1997 (Table 23). Juvenile Tanner crab declined from 1.1 million crab in 1991 to 225,311 crab in 1997, and the population of mature female Tanner crab has declined from a peak of 808,266 crab in 1992 to 94,015 crab in 1997.

Only 12 of the 620 male Tanner crab caught among all areas in the 1997 survey were of legal size, and in the Port Fidalgo and Orca Bay and North Montague areas, the largest component of male crab in the prerecruit-1 size class had old shells (Figure 3). Old shell crab are thought to have skipped at least one molt. These "skip-molt" crab may suffer greater natural mortality than their molting cohorts due to their inability to replace lost appendages and to shed parasites or diseases associated with old shells. Many old shell crab, particularly those with very old shells, often appear to be less vigorous than new shell crab. Although shell aging is somewhat subjective, there may be a terminal molt when crab reach reproductive size and fail to molt to a larger size. Paul and Paul (1990) showed that Tanner crab are capable of reproducing at a size substantially smaller than legal recruitment. If historical fishing removed a large proportion of legal size males, selective pressures may favor crab which reproduce before they attain legal size. The prevalence of skip-molt crab and the failure of prerecruit crabs to attain legal size despite the closure of commercial fisheries for many years may indicate this phenomena has occurred.

Because reproductively-effective females are important to maintaining the viability of a population, another indicator of stock status is the percentage of mature and egg-bearing females. In 1997, mature females comprised only 26% of the Port Fidalgo and Orca Bay populations, 32% of the Northwest populations, 35% of the Southwest populations (Tables 9 and 15). The occurrence of some barren females with very old shells is not considered unusual and is consistent with senescent females approaching the end of their natural life cycle. Although few barren females were found, the continued decline in mature females relative to historical surveys remains a concern (Table 22). Although the observed abundance of juvenile females increased in 1997 relative to the 1995 survey, a sustained increase in recruitment to mature females will be required for this population to rebuild.

Historical pot and trawl survey data exhibit a positive bias for encountering male Tanner crab (Table 22). This bias likely resulted from two factors: 1) survey emphasized areas that historically yielded the best catches of male Tanners in past surveys and commercial fisheries; and 2) survey station areas were modified to focus on the primary Tanner crab habitat. Although minor aggregations of Tanner crab may occur outside of the areas surveyed in this study, it is unlikely that these other aggregations comprise a significant component of the PWS Tanner crab population. Given the drastic decline in Tanner crab within traditional survey areas, it is also important to protect available aggregations throughout PWS to serve as broodstock when environmental conditions are favorable for reproductive success.

King Crab

Although ADF&G has not conducted assessment programs targeting king crabs in recent years,

trawl survey results provide an index of population abundance. Despite the wide geographical coverage of the 1997 trawl survey, no red king crab were caught, suggesting this population remains severely depressed. The capture of a single golden king crab in the traditional survey stations of the Port Fidalgo and Orca Bay and North Montague areas is consistent with the low incidence of this species in historical surveys (Table 22). The capture of 18 golden king crab in the Southwest area was also consistent with the known distributions within PWS. Although trawl gear may not be the most effective assessment tool for golden king crab in PWS, the abundance of this species observed at this time do not appear to be sufficient to sustain commercial harvests. It is suggested that other assessment tools, such as a pot survey, be implemented at a time that king crab abundance indices indicate that the population may have rebuilt.

Groundfish

Both within and among survey areas, pollock comprised the largest component of commercially important species. Population estimates were not calculated for groundfish species captured during the 1997 bottom trawl survey of PWS. Survey stations were selected primarily with a focus on assessing Tanner crab in areas of historical Tanner crag aggregations. Commercial fishery data, as well as data from other surveys, indicates that groundfish populations that are commercially important in PWS, in general, have a much wider distribution than the areas encompassed by the 1997 bottom trawl survey. However, the 1997 survey data is useful for population analysis through extrapolation to other areas of PWS. For example, such an approach was used to determine the biomass of pollock that are present in PWS during the summer (Bechtol 1998). Thus, bottom trawl survey data will not only provide an index of stock status, but, in some cases, can be used to develop population estimates.

The bottom trawl survey was been conducted annually in PWS from 1991 to 1995, at which time a biennial survey schedule was assumed. This survey continues to provide the primary assessment tool for Tanner crab as well as a variety of groundfish species and it will be important to maintain this survey platform into the future.

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Table 1. Carapace widths used to determine crab size classes in the Prince William Sound Management Area.

Class	Prerecruit				Recruit	Postrecruit
	Pre-4	Pre-3	Pre-2	Pre-1		
	Tanner Crab					
Width (mm)	<72	72-92	93-112	113-134	135-157	>157
	King Crab					
Width (mm)	<91	92-108	109-126	127-144	145-163	>163
	Dungeness Crab					
Width (mm)	<89	90-114	115-139	140-164	165-189	>189

Sizes based on Kimker and Trowbridge (1992).

Table 2. Target species catch weight per nautical mile trawl tow in the Port Fidalgo and Orca Bay, North Montague, and Southwest areas, Prince William Sound, August 1997.

Survey Station	Tanner Crab	King Crab	Pacific Cod	Rockfish	Pacific Halibut	Walleye Pollock	Sablefish	Sharks	Weathervane Lingcod	Scallop	Octopus	Squid	Debris	Total
	Round Weight (lb)													
Total of Port Fidalgo and Orca Bay Stations (n=27)														
Weight	154	0	338	873	928	4,186	539	342	0	8	3	129	22,787	30,286
Percent	0.5%	0.0%	1.1%	2.9%	3.1%	13.8%	1.8%	1.1%	0.0%	0.0%	0.0%	0.4%	75.2%	100.0%
Lb/Tow	5.7	0.0	12.5	32.3	34.4	155.0	20.0	12.7	0.0	0.3	0.1	4.8	844.0	1,121.7
Total of North Montague Stations (n=12)														
Weight	77	2	126	442	232	1,846	160	14	0	3	2	45	8,528	11,476
Percent	0.7%	0.0%	1.1%	3.9%	2.0%	16.1%	1.4%	0.1%	0.0%	0.0%	0.0%	0.4%	74.3%	100.0%
Lb/Tow	6.4	0.2	10.5	36.8	19.3	153.8	13.3	1.2	0.0	0.3	0.2	3.8	710.6	956.3
Total of Southwest Stations (n=14)														
Weight	116	84	619	557	674	3,729	881	161	30	0	0	267	12,810	19,928
Percent	0.6%	0.4%	3.1%	2.8%	3.4%	18.7%	4.4%	0.8%	0.2%	0.0%	0.0%	1.3%	64.3%	100.0%
Lb/Tow	8.3	6.0	44.2	39.8	48.1	266.4	62.9	11.5	2.1	0.0	0.0	19.1	915.0	1,423.5
Total among all Survey Stations (n=53)														
Weight	345	86	930	1,864	1,818	9,694	1,408	514	30	11	5	440	43,599	60,743
Percent	0.6%	0.1%	1.5%	3.1%	3.0%	16.0%	2.3%	0.8%	0.0%	0.0%	0.0%	0.7%	71.8%	100.0%

Table 3. Target species catch weight per nautical mile trawl tow in Port Fidalgo and Orca Bay, Prince William Sound, August 1997.

Survey Station	Tanner Crab	King Crab	Pacific Cod	Rockfish	Pacific Halibut	Walleye Pollock	Sablefish	Sharks	Weathervane Lingcod	Scallop	Octopus	Squid	Debris	Total
	Round Weight (lb)													
1	10	0	0	28	0	0	0	0	0	0	0	0	358	396
2	12	0	4	250	0	360	74	0	0	0	0	38	1,100	1,838
4	2	0	0	0	34	64	78	6	0	0	0	6	392	582
5	1	0	0	50	0	50	16	254	0	0	0	0	973	1,344
6	2	0	0	14	0	2	42	4	0	1	0	0	440	505
7	1	0	0	56	0	6	16	4	0	0	0	0	609	692
8	0.5	0	6	3	25	40	20	8	0	0	0	0	520	622
9	1	0	14	12	0	48	16	6	0	0	0	0	1,043	1,140
10	0	0	10	4	26	54	10	0	0	0	0	0	752	856
11	3	0	4	40	42	162	1	6	0	1	0	0	575	834
12	4	0	2	0	12	16	12	14	0	2	0	0	609	671
13	0.5	0	0	15.5	6	222	18	0	0	0	0	24	1,386	1,672
14	5	0	48	12	165	322	2	0	0	1	0	0	1,625	2,180
15	1	0	0	6	40	154	6	0	0	0	0	0	789	996
16	3	0	24	22	77	56	8	0	0	0	0	0	1,220	1,410
17	0	0	50	0	8	36	20	10	0	0	0	0	458	582
18	3	0	28	106	13	548	14	0	0	0	0	0	1,672	2,384
19	5	0	12	8	39	22	10	0	0	2	0	0	506	604
20	0	0	20	32	52	564	14	4	0	0	2	0	996	1,684
21	13	0	0	46	132	230	22	6	0	0	0	0	1,401	1,850
22	6	0	8	16	85	134	44	12	0	0	0	2	853	1,160
23	4	0	0	44	0	154	12	4	0	0	0	18	320	556
24	16	0	40	10	28	130	70	4	0	0	0	30	1,336	1,664
25	10	0	14	38	58	254	6	0	0	0	1	10	569	960
26	7	0	6	6	38	274	0	0	0	1	0	0.5	644	976
27	6	0	34	36	28	142	0	0	0	0	0	0	780	1,026
28	38	0	14	18	20	142	8	0	0	0	0	0	862	1,102
	Totals Among Port Fidalgo and Orca Bay Stations													
Weight	154	0	338	873	928	4,186	539	342	0	8	3	129	22,787	30,286
Percent	0.5%	0.0%	1.1%	2.9%	3.1%	13.8%	1.8%	1.1%	0.0%	0.0%	0.0%	0.4%	75.2%	100.0%

Table 4. Catch abundance of male Tanner crab by shell age and size per nautical mile trawl tow in Port Fidalgo and Orca Bay, Prince William Sound, August 1997.

Survey Station	Sublegal Males						Legal Males				Total Legal	Total Males
	Prerecruit		Prerecruit-2		Prerecruit-1		Recruit		Postrecruit			
	4	3	(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
1	52	2	3	0	0	0	0	1	0	0	1	58
2	0	0	0	1	1	2	1	3	0	0	4	8
4	1	0	0	0	0	1	0	0	0	0	0	2
5	1	0	0	1	0	0	0	0	0	0	0	2
6	1	0	0	0	0	1	0	0	0	0	0	2
7	1	0	0	0	0	0	0	0	0	0	0	1
8	1	0	0	0	0	0	0	0	0	0	0	1
9	0	0	0	1	0	0	0	0	0	0	0	1
11	0	0	0	0	0	1	0	0	0	0	0	1
12	7	0	0	0	0	1	0	0	0	0	0	8
13	1	0	0	0	0	0	0	0	0	0	0	1
14	3	0	0	0	2	2	0	0	0	0	0	7
15	1	0	0	1	0	0	0	0	0	0	0	2
16	1	1	0	0	0	0	0	0	0	0	0	2
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	1	0	0	0	0	0	0	1
19	3	0	0	1	0	1	0	0	0	0	0	5
20	0	0	0	0	0	0	0	0	0	0	0	0
21	1	3	6	3	0	0	0	1	0	0	1	14
22	2	0	2	0	1	0	0	0	0	0	0	5
23	0	1	1	0	1	0	0	1	0	0	1	4
24	9	6	2	0	1	0	0	0	0	0	0	18
25	4	5	2	0	0	3	0	0	0	0	0	14
26	6	0	1	1	1	0	0	1	0	0	1	10
27	10	1	1	1	0	0	0	0	0	0	0	13
28	3	3	4	2	2	10	1	3	0	0	4	28
						Area Total						
Total	108	22	22	12	10	22	2	10	0	0	12	208
Percent	52%	11%	11%	6%	5%	11%	1%	5%	0%	0%	6%	100%

Table 5. Maximum, minimum, and mean carapace size of male Tanner and golden king crabs caught in a trawl survey of Prince William Sound, 1997.

Port Fidalgo and Orca Bay

	Tanner Crab Carapace Width (mm)		
Station	Min.	Max.	Mean
1	26	136	57.8
2	109	147	128.8
4	55	115	85.0
5	50	105	77.5
6	39	117	78.0
7	32	32	32.0
8	41	41	41.0
9	108	108	108.0
11	124	124	124.0
12	33	119	53.7
13	62	62	62.0
14	31	130	92.1
15	58	110	84.0
16	61	87	74.0
18	118	118	118.0
19	49	118	77.0
21	59	143	99.5
22	49	126	85.8
23	84	140	113.0
24	46	122	77.3
25	47	131	85.7
26	29	155	77.9
27	34	106	59.6
28	43	156	110.7
Mean			79.7

North Montague

	Tanner Crab Carapace Width (mm)		
Station	Min.	Max.	Mean
101	31	95	57.4
102	31	122	73.5
103	31	130	57.3
104	35	124	66.4
105	28	63	45.5
106	32	104	56.6
107	42	110	66.3
108	30	109	65.1
109	41	107	77.8
110	75	126	94.3
111	42	104	67.0
112	60	105	88.6
Weighted Mean			62.1

Southwest Area

	Tanner Crab Carapace Width (mm)		
Station	Min.	Max.	Mean
U15	42	109	72.1
V15	33	109	71.8
V14	57	132	94.1
W14	38	124	92.3
AC12	41	122	75.0
AD12	27	120	68.9
AD13	33	77	53.9
AF11	64	64	64.0
AH09	57	57	57.0
AB10	42	95	60.6
AA10	36	85	52.0
AA09	42	69	59.0
AB09	29	76	55.1
Mean			75.9

	King Crab Carapace Length (mm)		
Station	Min.	Max.	Mean
AC12	151	161	156.0
AA10	111	111	111.0
AA09	136	165	150.8
AB09	128	172	154.5
Weighted Mean			150.7

Note: Stations and species combinations not listed produced no catch.

Table 6. Estimated population abundance of male Tanner crab by shell age and size class in Port Fidalgo and Orca Bay, Prince William Sound, August 1997.

Survey Station	Sublegal Males						Legal Males				Total Legal	Total Males
	Prerecruit		Prerecruit-2		Prerecruit-1		Recruit		Postrecruit			
	4	3	(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)		
1	47,314	1,820	2,730	0	0	0	0	0	0	910	910	52,773
2	0	0	0	898	898	1,795	0	0	898	2,693	3,591	7,182
4	904	0	0	0	0	904	0	0	0	0	0	1,808
5	1,130	0	0	1,130	0	0	0	0	0	0	0	2,260
6	931	0	0	0	0	931	0	0	0	0	0	1,862
7	931	0	0	0	0	0	0	0	0	0	0	931
8	430	0	0	0	0	0	0	0	0	0	0	430
9	0	0	0	931	0	0	0	0	0	0	0	931
11	0	0	0	0	0	972	0	0	0	0	0	972
12	9,538	0	0	0	0	1,363	0	0	0	0	0	10,900
13	412	0	0	0	0	0	0	0	0	0	0	412
14	3,185	0	0	0	2,124	2,124	0	0	0	0	0	7,432
15	1,010	0	0	1,010	0	0	0	0	0	0	0	2,020
16	805	805	0	0	0	0	0	0	0	0	0	1,610
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	1,019	0	0	0	0	0	0	1,019
19	2,283	0	0	761	0	761	0	0	0	0	0	3,805
20	0	0	0	0	0	0	0	0	0	0	0	0
21	728	2,183	4,366	2,183	0	0	0	0	0	728	728	10,186
22	1,552	0	1,552	0	776	0	0	0	0	0	0	3,881
23	0	1,062	1,062	0	1,062	0	0	0	0	1,062	1,062	4,247
24	6,644	4,429	1,476	0	738	0	0	0	0	0	0	13,288
25	3,239	4,048	1,619	0	0	2,429	0	0	0	0	0	11,335
26	5,231	0	872	872	872	0	0	0	0	872	872	8,719
27	7,154	715	715	715	0	0	0	0	0	0	0	9,301
28	2,634	2,634	3,512	1,756	1,756	8,780	0	0	878	2,634	3,512	24,583
Area Total												
Total	96,055	17,696	17,904	10,256	9,245	20,058	0	0	1,776	8,898	10,674	181,890
Percent	53%	10%	10%	6%	5%	11%	0%	0%	1%	5%	6%	100%

Table 7. Abundance of female Tanner crab by carapace age and clutch fullness caught per nautical mile towed in a trawl survey of Port Fidalgo and Orca Bay, Prince William Sound, August 1997.

Port Fidalgo and Orca Bay

		Full Clutches			Partial Clutches			Barren			Total mature			
Station	Juveniles	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	Total Females
1	37	0	0	0	0	0	0	0	0	0	0	0	0	37
2	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5	1	0	0	0	1	0	0	0	0	0	1	0	0	2
6	0	0	0	0	0	0	0	0	0	0	1	1	0	2
7	5	0	0	0	0	0	0	0	0	0	0	0	0	5
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	4	0	0	0	0	0	0	0	0	0	0	0	0	4
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1	0	0	1	0	0	0	0	0	1	0	0	1	2
12	6	0	0	0	0	0	1	0	0	0	0	1	1	8
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1	0	0	0	0	0	0	0	0	0	1	0	0	2
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	2	0	0	0	0	0	0	0	0	0	0	0	0	2
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	5	0	0	0	0	0	0	0	0	0	0	0	0	5
19	2	0	0	0	0	0	0	0	0	0	0	0	0	2
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	2	0	0	0	0	0	1	0	0	0	0	0	2	4
22	2	0	0	0	1	0	0	0	0	0	1	0	0	3
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	14	1	0	0	2	0	1	1	0	0	5	1	10	30
25	4	0	0	0	3	0	0	0	0	0	3	5	2	14
26	8	0	0	0	0	0	0	0	0	0	0	0	0	8
27	22	0	0	0	1	0	0	0	0	0	3	0	0	25
28	3	0	1	0	0	0	0	0	1	0	1	3	1	8
Port Fidalgo and Orca Bay Total														
Abund.	121	7	10	13	8	0	3	1	1	1	16	11	17	165
Percent	73.3%	4.2%	6.1%	7.9%	4.8%	0.0%	1.8%	0.6%	0.6%	0.6%	9.7%	6.7%	10.3%	100.0%

Table 8. Maximum, minimum, and mean carapace width of female Tanner, king, and Dungeness crabs caught in trawl surveys of Cook Inlet, 1996.

Port Fidalgo and Orca Bay

	Tanner Crab Carapace Width (mm)		
Station	Min.	Max.	Mean
1	34	84	51.6
2	62	62	62.0
4	54	54	54.0
5	43	77	60.0
6	75	95	85.0
7	44	65	50.6
9	33	57	44.8
11	51	94	72.5
12	45	96	58.3
14	24	100	62.0
16	41	57	49.0
18	55	65	61.4
19	42	59	50.5
21	44	94	73.0
22	49	88	63.0
24	43	100	73.8
25	55	97	74.9
26	43	68	52.4
27	32	102	59.4
28	39	98	73.1
Weighted Mean			61.4

North Montague

	Tanner Crab Carapace Width (mm)		
Station	Min.	Max.	Mean
101	43	98	67.8
102	31	84	52.6
103	37	95	66.3
104	23	54	37.3
105	31	99	63.9
106	24	51	36.0
107	43	99	67.7
108	34	80	50.8
109	45	48	46.5
110	92	92	92.0
111	40	70	50.4
112	85	85	85.0
Weighted Mean			58.9

North Montague

	Golden King Crab Length (mm)		
Station	Min.	Max.	Mean
112	113	113	113.0

Southwest Area

	Tanner Crab Carapace Width (mm)		
Station	Min.	Max.	Mean
U15	43	98	67.8
V15	43	95	70.2
V14	55	99	78.0
W14	55	87	73.3
AC12	30	94	55.9
AD12	45	45	45.0
AD13	37	73	52.2
AF11	36	36	36.0
AG10	40	47	43.5
AH09	43	47	45.0
AB10	45	74	59.9
AA10	33	73	51.2
AA09	47	76	57.3
AB09	37	90	53.1
Weighted Mean			56.3

	Golden King Crab Length (mm)		
Station	Min.	Max.	Mean
AA09	96	129	112.5

Note: Stations and species combinations not listed produced no catch.

Table 9. Estimated population abundance by carapace condition and clutch fullness for female Tanner crab in Port Fidalgo and Orca Bay, Prince William Sound, 1997.

		Port Fidalgo and Orca Bay												
		Full Clutches			Partial Clutches			Barren			Total mature			
Station	Juveniles	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	Total Females
1	33,666	0	0	0	0	0	0	0	0	0	0	0	0	33,666
2	898	0	0	0	0	0	0	0	0	0	0	0	0	898
4	904	0	0	0	0	0	0	0	0	0	0	0	0	904
5	1,130	0	0	0	0	0	0	0	0	0	1,130	0	0	2,260
6	0	931	931	0	931	931	0	0	0	0	931	931	0	1,862
7	4,656	0	0	0	0	0	0	0	0	0	0	0	0	4,656
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	3,725	0	0	0	0	0	0	0	0	0	0	0	0	3,725
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	972	0	0	0	0	0	0	0	0	972	0	0	972	1,944
12	8,175	0	1,363	0	0	1,363	0	0	0	0	0	1,363	1,363	10,900
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1,062	1,062	0	0	1,062	0	0	0	0	0	1,062	0	0	2,124
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	1,610	0	0	0	0	0	0	0	0	0	0	0	0	1,610
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	5,096	0	0	0	0	0	0	0	0	0	0	0	0	5,096
19	1,522	0	0	0	0	0	0	0	0	0	0	0	0	1,522
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	1,455	0	0	728	0	0	728	0	0	0	0	0	1,455	2,910
22	1,552	0	0	0	0	0	0	0	0	0	776	0	0	2,329
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	10,335	1,476	738	6,644	1,476	738	6,644	738	0	0	3,691	738	7,382	22,147
25	3,239	0	4,048	1,619	0	4,048	1,619	0	0	0	2,429	4,048	1,619	11,335
26	6,975	0	0	0	0	0	0	0	0	0	0	0	0	6,975
27	15,740	1,431	0	0	1,431	0	0	0	0	0	2,146	0	0	17,886
28	2,634	878	1,756	878	878	1,756	878	0	878	0	878	2,634	878	7,024
		Port Fidalgo and Orca Bay Total												
Abund.	105,346	5,778	8,836	9,869	5,778	8,836	9,869	738	878	972	13,044	9,714	13,669	141,773
Percent	74.3%	4.1%	6.2%	7.0%	4.1%	6.2%	7.0%	0.5%	0.6%	0.7%	9.2%	6.9%	9.6%	100.0%

Table 10. Catch weight, abundance, and mean size of commercially important groundfish and Pacific halibut caught during a bottom trawl survey of Prince William Sound, August 1997.

	Weight (lb)	Abundance (# of fish)	Avg Wt lb/fish	Length (mm) Minimum	Maximum	Mean
Orca Bay and Port Fidalgo						
Pacific cod	338	56	6.0	404	824	638.7
Shortspine Thornyhead	0.5	1	0.5	119	119	119.0
Yelloweye Rockfish	4	1	4.0	516	516	516.0
Rougheye Rockfish	861	578	1.5	102	756	338.3
Dusky Rockfish	1	1	1.0	368	368	368.0
Silvergray Rockfish	4	2	2.0	466	501	483.5
Sharpchin Rockfish	1	1	1.0	292	292	292.0
Halibut	928	136	6.8			
Walleye Pollock	4,186	1,519	2.8	162	730	514.1
Salmon Shark	254	1	254.0	2190	2190	2190.0
Spiny Dogfish	88	17	5.2	720	980	849.4
Sablefish	539	232	2.3	360	656	497.1
North Montague						
Pacific cod	126	15	8.4	254	766	608.1
Rougheye Rockfish	440	213	2.1	88	677	370.7
Silvergray Rockfish	2	1	2.0	447	447	447.0
Halibut	232	15	15.5			
Walleye Pollock	1,862	730	2.6	282	754	513.9
Spiny Dogfish	14	2	7.0	908	1001	954.5
Sablefish	144	49	2.9	276	724	519.3
Southwest Area						
Pacific cod	484	75	6.5	218	792	593.7
Lingcod	30	1	30.0			
Rougheye Rockfish	473	200	2.4	117	781	390.2
Shortraker Rockfish	72	3	24.0	818	934	880.0
Redstriped Rockfish	2	1	2.0	324	324	324.0
Sharpchin Rockfish	2	1	2.0	372	372	372.0
Halibut	658	29	22.7	390	390	390.0
Walleye Pollock	3,646	1,362	2.7	98	752	510.0
Spiny Dogfish	158	26	6.1	680	959	648.5
Sablefish	725	180	4.0	95	769	572.3

Table 11. Target species catch weight per nautical mile tow in the North Montague area, Prince William Sound, August 1997.

Survey Station	Tanner Crab	King Crab	Pacific Cod	Rockfish	Pacific Halibut	Walleye Pollock	Sablefish	Sharks	Lingcod	Weathervane Scallop	Octopus	Squid	Debris	Total
						Round Weight (lb)								
101	6	0	6	34	76	320	0	0	0	0	0	16	420	878
102	8	0	48	36	16	0	4	0	0	0	0	6	386	504
103	2.5	0	4	90	0	36	12	0	0	0	0	0	494	638
104	24	0	0	86	8	622	6	0	0	0.5	0	0	1,820	2,566
105	1	0	8	52	56	470	0	0	0	1	2	0	1,994	2,584
106	2.5	0	0	8	0	18	0	8	0	0	0	0	170	206
107	10	0	28	86	0	26	4	0	0	0.5	0	0	576	730
108	11	0	4	8	0	4	12	0	0	1	0	0	472	512
109	3	0	0	8	22	36	18	0	0	0	0	0	587	674
110	4.5	0	22	10	26	46	16	0	0	0	0	1	491	616
111	2	0	0	16	8	16	22	6	0	0	0	0	634	704
112	2	2	6	8	20	252	66	0	0	0	0	22	486	864
						Totals Among North Montague Stations								
Weight	77	2	126	442	232	1,846	160	14	0	3	2	45	8,528	11,476
Percent	0.7%	0.0%	1.1%	3.9%	2.0%	16.1%	1.4%	0.1%	0.0%	0.0%	0.0%	0.4%	74.3%	100.0%

Table 12. Catch abundance of male Tanner crab by shell age and size per nautical mile trawl tow in the North Montague area, Prince William Sound, August 1997.

Survey Station	Sublegal Males: Prerecruit 4	Sublegal Males: Prerecruit 3	Sublegal Males: Prerecruit-2 (new)	Sublegal Males: Prerecruit-2 (old)	Sublegal Males: Prerecruit-1 (new)	Sublegal Males: Prerecruit-1 (old)	Legal Males: Recruit (new)	Legal Males: Recruit (old)	Legal Males: Postrecruit (new)	Legal Males: Postrecruit (old)	Total Legal	Total Males
North Montague												
101	16	4	1	1	0	0	0	0	0	0	0	22
102	9	2	3	0	1	0	0	0	0	0	0	15
103	7	0	0	0	0	1	0	0	0	0	0	8
104	31	13	2	0	0	1	0	0	0	0	0	47
105	2	0	0	0	0	0	0	0	0	0	0	2
106	7	0	1	0	0	0	0	0	0	0	0	8
107	11	4	2	0	0	0	0	0	0	0	0	17
108	28	11	1	4	0	0	0	0	0	0	0	44
109	2	0	2	0	0	0	0	0	0	0	0	4
110	0	2	0	0	0	1	0	0	0	0	0	3
111	2	1	0	1	0	0	0	0	0	0	0	4
112	1	1	3	0	0	0	0	0	0	0	0	5
Total Among North Montague Stations												
Total	116	38	15	6	1	3	0	0	0	0	0	179
Percent	65%	21%	8%	3%	1%	2%	0%	0%	0%	0%	0%	100%

Table 13. Estimated population abundance of male Tanner crab by shell age and size class in the North Montague area, Prince William Sound, August 1997.

Survey Station	Sublegal Males: Prerecruit 4	Prerecruit 3	Prerecruit-2 (new)	Prerecruit-2 (old)	Prerecruit-1 (new)	Prerecruit-1 (old)	Legal Males: Recruit (new)	Recruit (old)	Postrecruit (new)	Postrecruit (old)	Total Legal	Total Males
North Montague												
101	14,898	3,725	931	931	0	0	0	0	0	0	0	20,485
102	8,244	1,832	2,748	0	916	0	0	0	0	0	0	13,739
103	6,518	0	0	0	0	931	0	0	0	0	0	7,449
104	28,866	12,105	1,862	0	0	931	0	0	0	0	0	43,764
105	1,686	0	0	0	0	0	0	0	0	0	0	1,686
106	6,518	0	931	0	0	0	0	0	0	0	0	7,449
107	10,243	3,725	1,862	0	0	0	0	0	0	0	0	15,829
108	36,713	13,768	1,530	4,589	0	0	0	0	0	0	0	56,600
109	1,862	0	1,862	0	0	0	0	0	0	0	0	3,725
110	0	1,862	0	0	0	931	0	0	0	0	0	2,793
111	2,339	1,170	0	1,170	0	0	0	0	0	0	0	4,679
112	910	910	2,730	0	0	0	0	0	0	0	0	4,549
Total Among North Montague Stations												
Total	118,797	39,095	14,456	6,690	916	2,793	0	0	0	0	0	182,748
Percent	65%	21%	8%	4%	1%	2%	0%	0%	0%	0%	0%	100%

Table 14. Abundance of female Tanner crab by carapace age and clutch fullness caught per nautical mile towed in a trawl survey of the North Montague area, Prince William Sound, August 1997.

		North Montague												
		Full Clutches			Partial Clutches			Barren			Total mature			
Station	Juveniles	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	Total Females
101	17	3	0	0	2	0	0	0	0	0	5	0	0	22
102	7	5	0	1	1	0	1	0	0	0	6	0	2	15
103	3	0	0	0	0	0	0	0	0	0	0	0	0	3
104	35	21	0	0	10	0	0	0	0	0	31	0	0	66
105	5	0	0	0	0	0	0	0	0	0	0	0	0	5
106	2	0	0	0	0	0	0	0	0	0	0	0	0	2
107	15	3	3	1	5	0	0	0	0	0	8	3	1	27
108	26	0	0	0	0	0	0	0	0	0	0	0	0	26
109	3	3	0	0	1	0	0	0	0	0	4	0	0	7
110	0	0	0	0	0	0	0	0	0	1	0	0	1	1
111	5	0	0	0	0	0	0	0	0	0	0	0	0	5
112	0	0	0	0	0	0	1	0	0	0	0	0	1	1
		North Montague Total												
Abund.	118	35	3	2	19	0	2	0	0	1	54	3	5	180
Percent	65.5%	19.5%	1.7%	1.1%	10.6%	0.0%	1.1%	0.0%	0.0%	0.6%	30.0%	1.7%	2.8%	100.0%

Table 15. Estimated population abundance of female Tanner crab by carapace age and clutch fullness in the North Montague area, Prince William Sound, August 1997.

		North Montague												
		Full Clutches			Partial Clutches			Barren			Total mature			
Station	Juveniles	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	Total Females
101	15,829	2,793	0	0	1,862	0	0	0	0	0	4,656	0	0	20,485
102	6,412	4,580	0	916	916	0	916	0	0	0	5,496	0	1,832	13,739
103	2,793	0	0	0	0	0	0	0	0	0	0	0	0	2,793
104	32,590	19,554	0	0	9,311	0	0	0	0	0	28,866	0	0	61,456
105	4,215	0	0	0	0	0	0	0	0	0	0	0	0	4,215
106	1,862	0	0	0	0	0	0	0	0	0	0	0	0	1,862
107	13,967	2,793	2,793	931	4,656	0	0	0	0	0	7,449	2,793	931	25,141
108	33,654	0	0	0	0	0	0	0	0	0	0	0	0	33,654
109	2,793	2,793	0	0	931	0	0	0	0	0	3,725	0	0	6,518
110	0	0	0	0	0	0	0	0	0	931	0	0	931	931
111	5,848	0	0	0	0	0	0	0	0	0	0	0	0	5,848
112	0	0	0	0	0	0	910	0	0	0	0	0	910	910
		North Montague Total												
Abund.	119,965	32,514	2,793	1,847	17,677	0	1,826	0	0	931	50,191	2,793	4,604	177,553
Percent	67.6%	18.3%	1.6%	1.0%	10.0%	0.0%	1.0%	0.0%	0.0%	0.5%	28.3%	1.6%	2.6%	100.0%

Table 16. Target species catch weight per nautical mile trawl tow in the Southwest area, Prince William Sound, August 1997.

Survey Station	Tanner Crab	King Crab	Pacific Cod	Rockfish	Pacific Halibut	Walleye Pollock	Sablefish	Sharks	Weathervane Lingcod	Scallop	Octopus	Squid	Debris	Total
	Round Weight (lb)													
U15	10	0	0	36	0	10	2	0	0	0	0	0	486	544
V15	12	0	0	42	0	24	6	0	0	0	0	0	776	860
V14	28	0	10	34	12	46	18	0	0	0	0	0	1,044	1,192
W14	40	0	0	26	0	40	4	4	0	0	0	0	1,146	1,260
AC12	8	16	36	8	103	129	53	0	0	0	0	48	418	819
AD12	1	0	20	60	34	218	122	6	0	0	0	62	857	1,380
AD13	1	0	34	242	169	74	76	6	0	0	0	6	1,066	1,674
AF11	1	0	34	12	152	48	158	108	0	0	0	4	1,767	2,284
AG10	1	0	337	20	40	207	392	7	0	0	0	3	1,236	2,243
AH09	1	0	138	0	102	2,747	24	30	30	0	0	0	2,520	5,592
AB10	3	0	0	0	14	86	6	0	0	0	0	30	345	484
AA10	6	2	0	0	24	24	8	0	0	0	0	34	426	524
AA09	1	34	10	73	24	60	4	0	0	0	0	32	536	774
AB09	3	32	0	4	0	16	8	0	0	0	0	48	187	298
	Totals Among Southwest Stations													
Weight	116	84	619	557	674	3,729	881	161	30	0	0	267	12,810	19,928
Percent	0.6%	0.4%	3.1%	2.8%	3.4%	18.7%	4.4%	0.8%	0.2%	0.0%	0.0%	1.3%	64.3%	100.0%

Table 17. Catch abundance of male Tanner crab by shell age and size per nautical mile trawl tow in Southwest area, Prince William Sound, August 1997.

Survey Station	Sublegal Males: Prerecruit 4	Sublegal Males: Prerecruit 3	Sublegal Males: Prerecruit-2 (new)	Sublegal Males: Prerecruit-2 (old)	Sublegal Males: Prerecruit-1 (new)	Sublegal Males: Prerecruit-1 (old)	Legal Males: Recruit (new)	Legal Males: Recruit (old)	Legal Males: Postrecruit (new)	Legal Males: Postrecruit (old)	Total Legal	Total Males
Southwester Area												
U15	10	8	1	1	0	0	0	0	0	0	0	20
V15	11	10	6	0	0	0	0	0	0	0	0	27
V14	4	12	12	1	6	2	0	0	0	0	0	37
W14	7	21	16	9	8	1	0	0	0	0	0	62
AC12	2	0	0	0	1	0	0	0	0	0	0	3
AD12	7	3	1	0	2	0	0	0	0	0	0	13
AD13	25	2	0	0	0	0	0	0	0	0	0	27
AF11	1	0	0	0	0	0	0	0	0	0	0	1
AH09	1	0	0	0	0	0	0	0	0	0	0	1
AB10	19	0	1	0	0	0	0	0	0	0	0	20
AA10	9	1	0	0	0	0	0	0	0	0	0	10
AA09	3	0	0	0	0	0	0	0	0	0	0	3
AB09	7	2	0	0	0	0	0	0	0	0	0	9
Southwest Area Total												
Total	106	59	37	11	17	3	0	0	0	0	0	233
Percent	45%	25%	16%	5%	7%	1%	0%	0%	0%	0%	0%	100%

Table 18. Estimated population abundance of male Tanner crab by shell age and size class in Southwest area, Prince William Sound, August 1997.

Survey Station	Sublegal Males: Prerecruit 4	Prerecruit 3	Prerecruit-2 (new)	Prerecruit-2 (old)	Prerecruit-1 (new)	Prerecruit-1 (old)	Legal Males: Recruit (new)	Recruit (old)	Postrecruit (new)	Postrecruit (old)	Total Legal	Total Males
Southwest Area												
U15	9,494	7,595	949	949	0	0	0	0	0	0	0	18,988
V15	10,443	9,494	5,696	0	0	0	0	0	0	0	0	25,633
V14	3,798	11,393	11,393	949	5,696	1,899	0	0	0	0	0	35,127
W14	6,646	19,937	15,190	8,544	7,595	949	0	0	0	0	0	58,861
AC12	1,899	0	0	0	949	0	0	0	0	0	0	2,848
AD12	6,646	2,848	949	0	1,899	0	0	0	0	0	0	12,342
AD13	23,734	1,899	0	0	0	0	0	0	0	0	0	25,633
AF11	949	0	0	0	0	0	0	0	0	0	0	949
AH09	949	0	0	0	0	0	0	0	0	0	0	949
AB10	18,038	0	949	0	0	0	0	0	0	0	0	18,988
AA10	8,544	949	0	0	0	0	0	0	0	0	0	9,494
AA09	2,848	0	0	0	0	0	0	0	0	0	0	2,848
AB09	6,646	1,899	0	0	0	0	0	0	0	0	0	8,544
Area Total												
Total	100,634	56,013	35,127	10,443	16,139	2,848	0	0	0	0	0	221,204
Percent	45%	25%	16%	5%	7%	1%	0%	0%	0%	0%	0%	100%

Table 19. Abundance of female Tanner crab by carapace age and clutch fullness caught per nautical mile towed in a trawl survey of the Southwest area, Prince William Sound, August 1997.

Southwest Area

		Full Clutches			Partial Clutches			Barren			Total mature			
Station	Juveniles	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	Total Females
U15	11	1	0	2	0	0	2	0	0	2	1	0	6	18
V15	12	1	2	0	2	1	1	1	0	0	4	3	1	20
V14	4	3	6	0	7	0	0	0	0	1	10	6	1	21
W14	8	2	8	1	2	0	0	0	0	0	4	8	1	21
AC12	18	0	3	0	6	0	0	0	0	0	6	3	0	27
AD12	1	0	0	0	0	0	0	0	0	0	0	0	0	1
AD13	18	0	0	0	2	0	0	0	0	0	2	0	0	20
AF11	1	0	0	0	0	0	0	0	0	0	0	0	0	1
AG10	4	0	0	0	0	0	0	0	0	0	0	0	0	4
AH09	2	0	0	0	0	0	0	0	0	0	0	0	0	2
AB10	6	1	0	0	0	0	0	0	0	0	1	0	0	7
AA10	23	1	0	0	0	0	0	0	0	0	1	0	0	24
AA09	2	1	0	0	0	0	0	0	0	0	1	0	0	3
AB09	11	2	1	0	2	0	0	0	0	0	4	1	0	16
Southwest Total														
Abund.	121	12	20	3	21	1	3	1	0	3	34	21	9	185
Percent	65.3%	6.5%	10.8%	1.6%	11.4%	0.5%	1.6%	0.5%	0.0%	1.6%	18.4%	11.4%	4.9%	100.0%

Table 20. Estimated population abundance of female Tanner crab by carapace age and clutch fullness in the Southwest area, Prince William Sound, August 1997.

Southwest Area														
		Full Clutches			Partial Clutches			Barren			Total mature			
Station	Juveniles	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	Total Females
U15	10,443	949	0	1,899	0	0	1,899	0	0	1,899	949	0	5,696	17,089
V15	11,393	949	1,899	0	1,899	949	949	949	0	0	3,797	2,848	949	18,988
V14	3,798	2,848	5,696	0	6,646	0	0	0	0	949	9,494	5,696	949	19,937
W14	7,595	1,899	7,595	949	1,899	0	0	0	0	0	3,798	7,595	949	19,937
AC12	17,089	0	2,848	0	5,696	0	0	0	0	0	5,696	2,848	0	25,633
AD12	949	0	0	0	0	0	0	0	0	0	0	0	0	949
AD13	17,089	0	0	0	1,899	0	0	0	0	0	1,899	0	0	18,988
AF11	949	0	0	0	0	0	0	0	0	0	0	0	0	949
AG10	3,331	0	0	0	0	0	0	0	0	0	0	0	0	3,331
AH09	1,899	0	0	0	0	0	0	0	0	0	0	0	0	1,899
AB10	5,696	949	0	0	0	0	0	0	0	0	949	0	0	6,646
AA10	21,836	949	0	0	0	0	0	0	0	0	949	0	0	22,785
AA09	1,899	949	0	0	0	0	0	0	0	0	949	0	0	2,848
AB09	10,443	1,899	949	0	1,899	0	0	0	0	0	3,798	949	0	15,190
Southwest Total														
Abund.	114,408	11,392	18,988	2,848	19,937	949	2,848	949	0	2,848	32,278	19,937	8,544	175,168
Percent	65.3%	6.5%	10.8%	1.6%	11.4%	0.5%	1.6%	0.5%	0.0%	1.6%	18.4%	11.4%	4.9%	100.0%

Table 21. Station catch per nautical mile by carapace length and shell age of king crab caught in trawl surveys of Prince William Sound, 1997.

Male Golden King Crab

	Southwest Area											
	Sublegal Males						Legal Males					
			Pre-2		Pre-1		Recruit		Postrecruit		Total	Total
Station[a]	Pre-4	Pre-3	(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)	legal	males
AC12	0	0	0	0	0	0	0	3	0	0	3	3
AA10	0	0	1	0	0	0	0	0	0	0	0	1
AA09	0	0	0	0	0	0	6	0	0	0	6	6
AB09	0	0	0	0	1	0	4	1	0	0	5	6
	Southwest Area Total											
Abund.	0	0	1	0	1	0	10	4	0	0	14	16
Percent	0%	0%	6%	0%	6%	0%	63%	25%	0%	0%	88%	100%

Female Golden King Crab

		Full Clutches			Partial Clutches			Barren			Total Mature			
Station[a]	Juveniles	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	New	Old	Very Old	Total Females
	North Montague													
112	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Southwest Area													
AA09	0	1	0	0	0	0	0	0	0	1	1	0	0	1

[a] - Stations and areas not listed had no king crab catch.

Table 22. Tanner and king crab catch rates by pot and trawl surveys of traditional survey stations in the Port Fidalgo, Orca Bay, and North Montague areas of Prince William Sound, 1977-1997.

		Pot Survey Catch Abundance				
Year	Number Of Pots	Female Tanner Crab	Male Tanner Crab	Total Tanner Crab (both sexes)	Mean Tanner Crab Per Pot	King Crab (both sexes)
1977	51	1,972	2,773	4,745	93.0	30
1978	146	1,099	6,376	7,475	51.2	193
1979	237	3,210	16,831	20,041	84.6	161
1980	240	2,092	11,012	13,104	54.6	103
1981	216	1,064	8,114	9,178	42.5	36
1982	224	849	4,734	5,583	24.9	30
1983	180	573	3,225	3,798	21.1	3
1984	178	610	3,440	4,050	22.8	18
1985	163	212	2,191	2,403	14.7	15
1986	168	570	2,473	3,043	18.1	18
1987	138	1,010	2,336	3,346	24.2	1
1988	119	750	1,195	1,945	16.3	2
1989	114	459	1,640	2,099	18.4	5
1990	109	255	1,336	1,591	14.6	5
1991	81	331	724	1,055	13.0	23

		Trawl Survey Catch Abundance				
Year	Number Of Tows	Female Tanner Crab	Male Tanner Crab	Total Tanner Crab (both sexes)	Mean Tanner Crab Per Tow	King Crab (both sexes)
1991	35	1,786	1,884	3,670	104.9	0
1992	38	1,514	1,783	3,297	86.8	2
1993	38	761	1,254	2,015	53.0	2
1994	38	905	1,098	2,003	52.7	2
1995	33	358	534	892	27.0	0
1996		Biennial survey schedule initiated				
1997	37	341	380	721	19.5	1

Table 23. Tanner crab population abundance estimates based on bottom trawl survey catches in the Port Fidalgo, Orca Bay, and North Montague areas, Prince William Sound, 1991-1997.

Male Tanner Crab

Carapace Width (mm)	Shell Age	Survey Year 1991	1992	1993	1994	1995	1996	1997
<73	New	620,890	522,363	406,364	581,695	249,368		214,852
73-92	New	537,060	287,565	95,881	70,772	31,681	N O	56,791
93-112	New	215,572	367,261	98,978	34,103	16,820		32,360
" "	Old	40,529	90,965	92,826	85,066	46,709	S U	16,946
113-134	New	70,933	135,806	108,525	18,154	4,797	R	10,161
" "	Old	145,542	9,474	134,404	155,455	79,397	V E	22,851
135-157	New	20,280	53,397	54,420	4,015	0	Y	0
" "	Old	81,057	843	51,453	46,562	24,864		0
>157	New	935	1,600	0	0	0		1,776
" "	Old	2,773	0	2,751	627	0		8,898
Legal Males		105,045	55,840	108,624	51,204	24,864		10,674
Total Males		1,735,571	1,469,274	1,045,602	996,449	453,636		364,638

Female Tanner Crab

Maturity	Survey Year 1991	1992	1993	1994	1995	1996	1997
Juveniles Females	1,128,480	613,447	403,803	609,771	216,771		225,311
Mature Females	516,811	808,266	296,547	211,894	106,640		94,015
Total Females	1,645,291	1,421,713	700,350	821,665	323,411		319,326

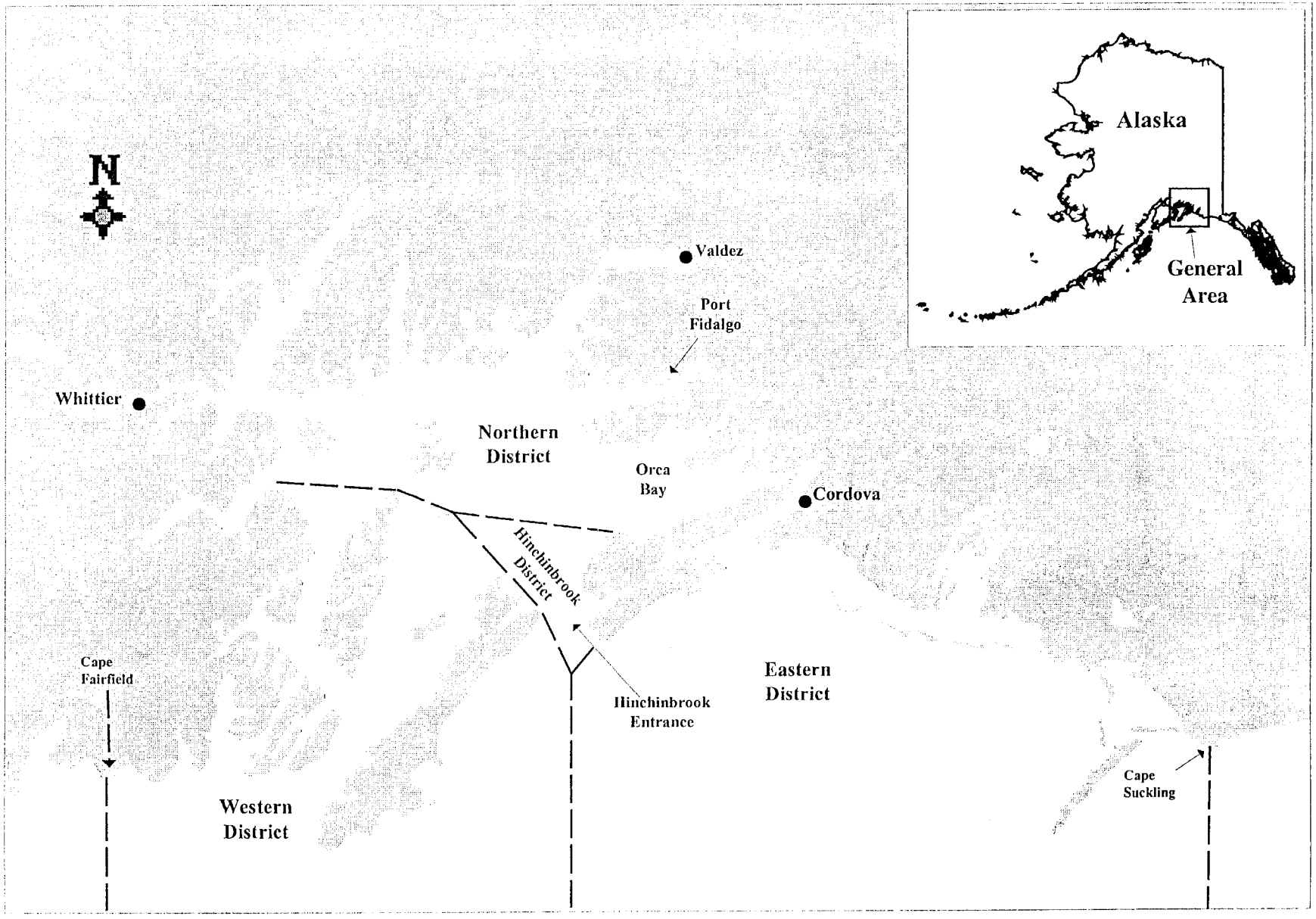

Figure 1. Crab management districts in the Prince William Sound Management area.

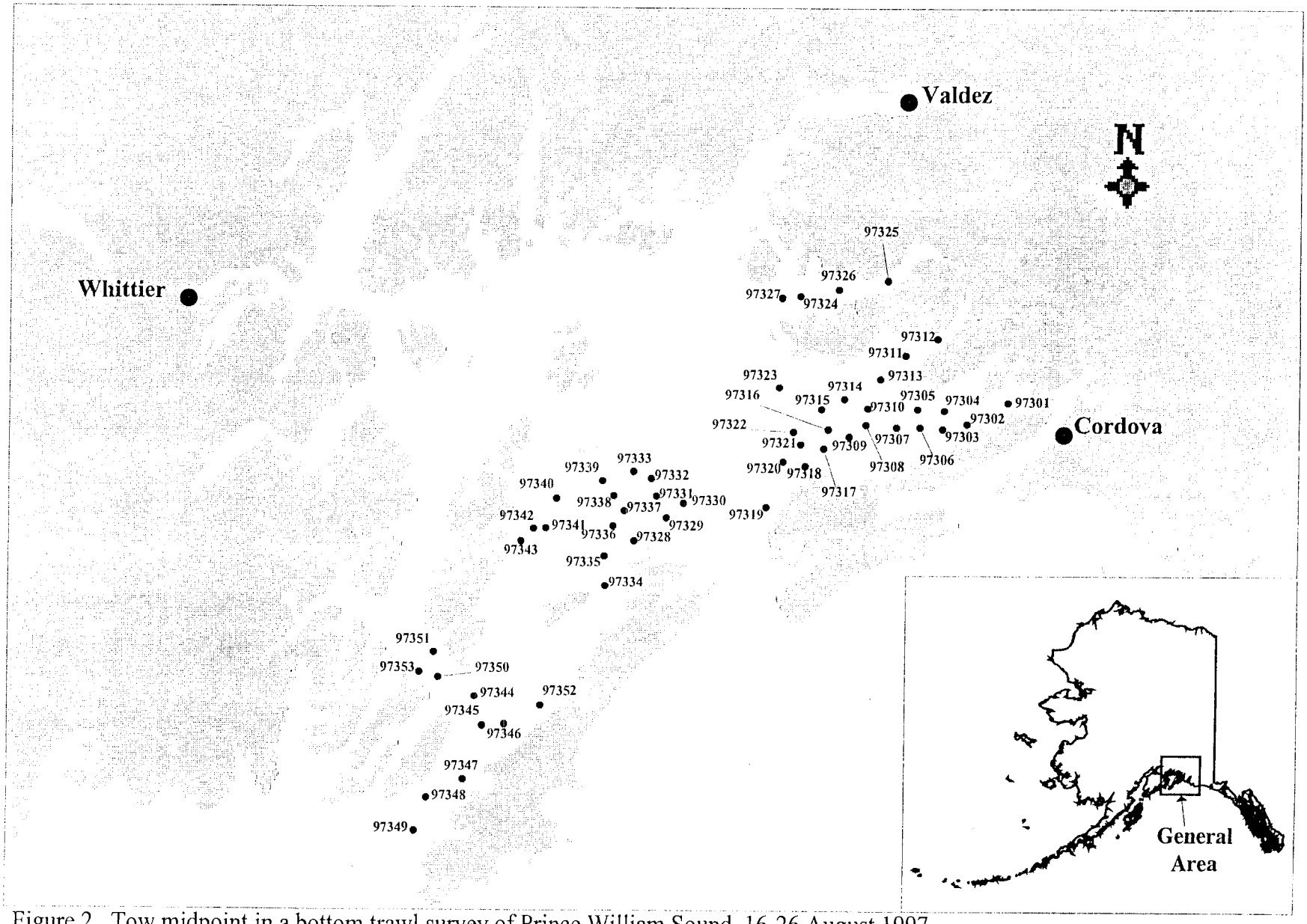

Figure 2. Tow midpoint in a bottom trawl survey of Prince William Sound, 16-26 August 1997.

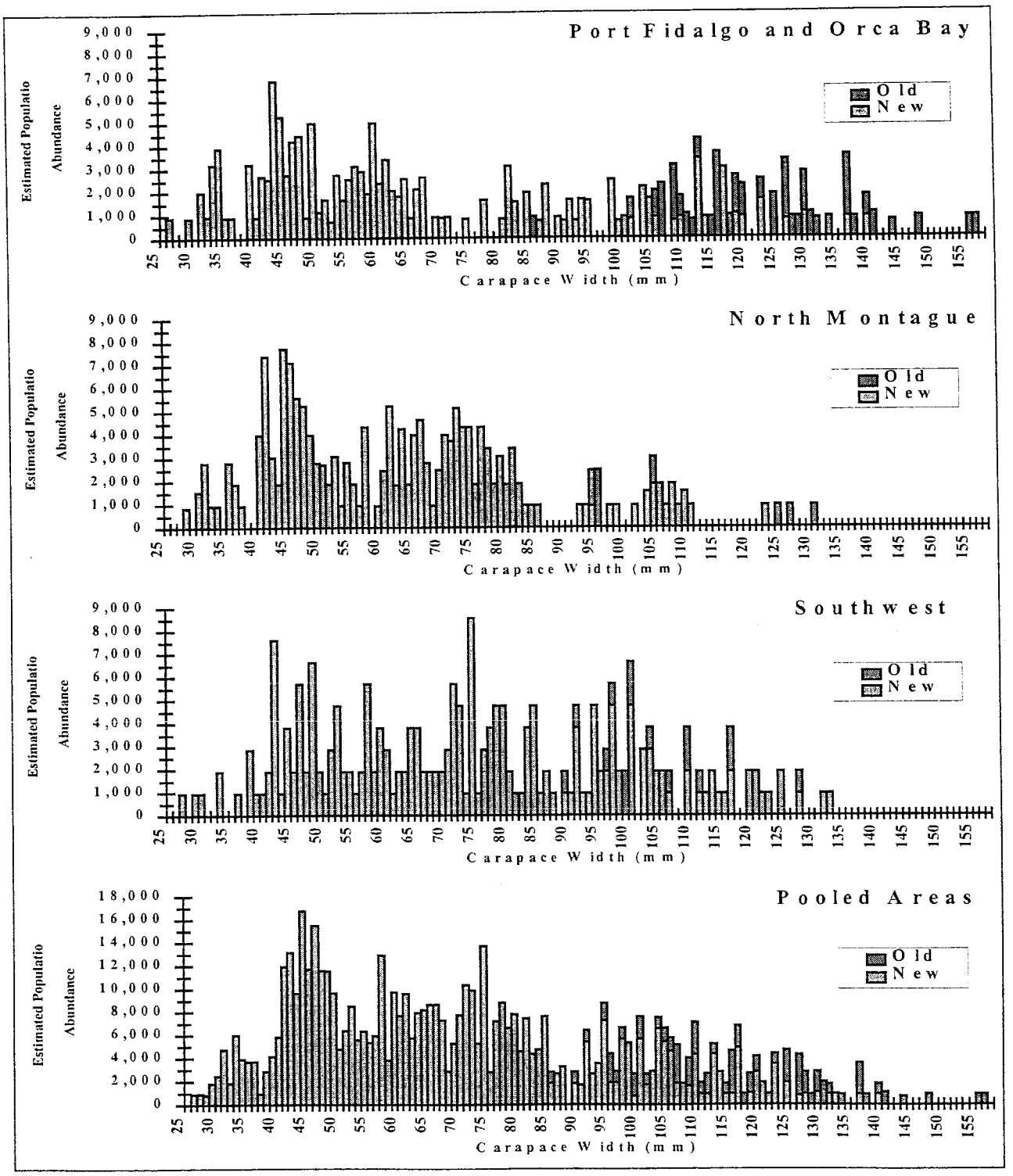

Figure 3. Estimated population abundance of male Tanner crab in trawl survey stations of the Port Fidalgo and Orca Bay, North Montague, and Southwest areas of Prince William Sound, August 1997.

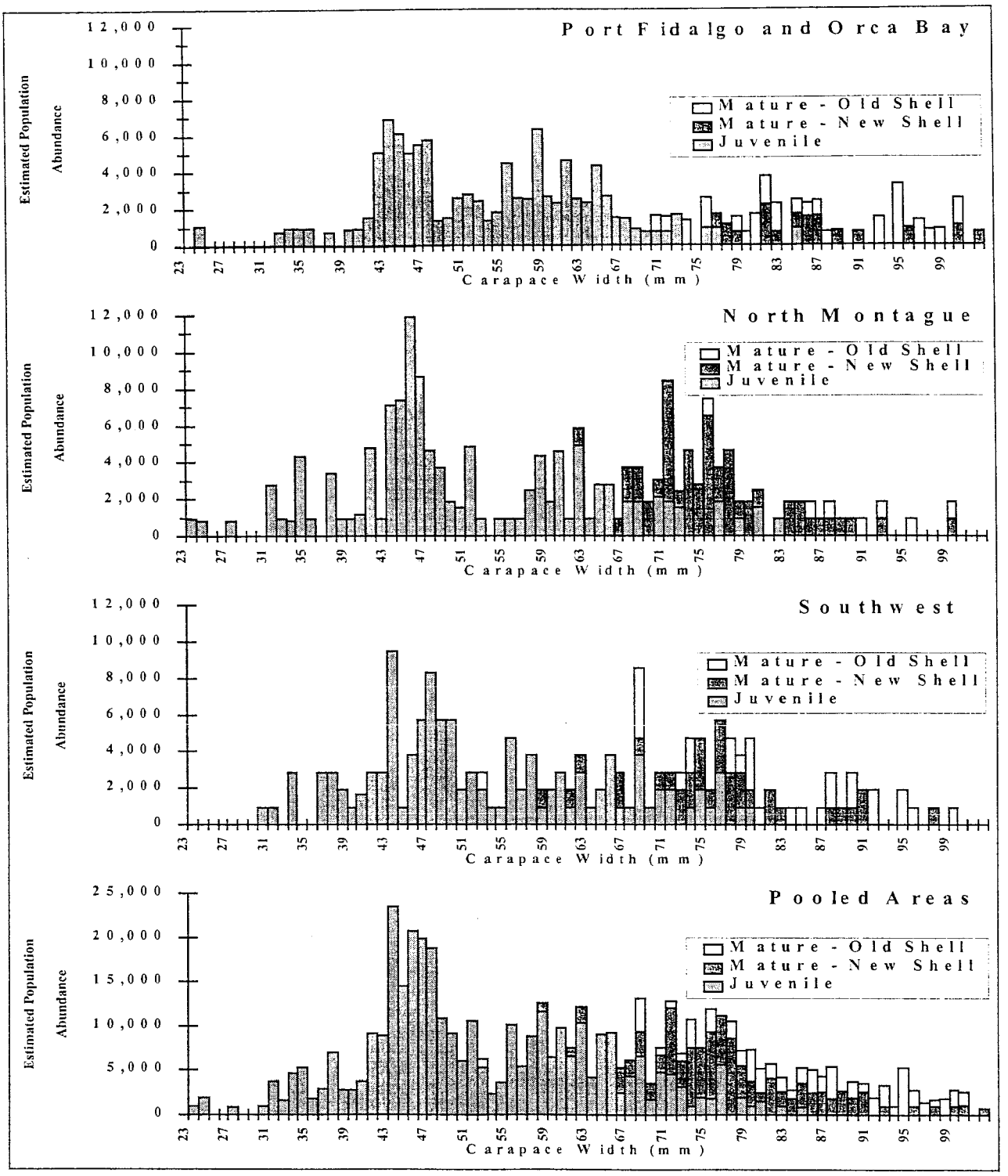

Figure 4. Estimated population abundance of female Tanner crab in trawl survey stations of the Port Fidalgo and Orca Bay, North Montague, and Southwest areas of Prince William Sound, August 1997.

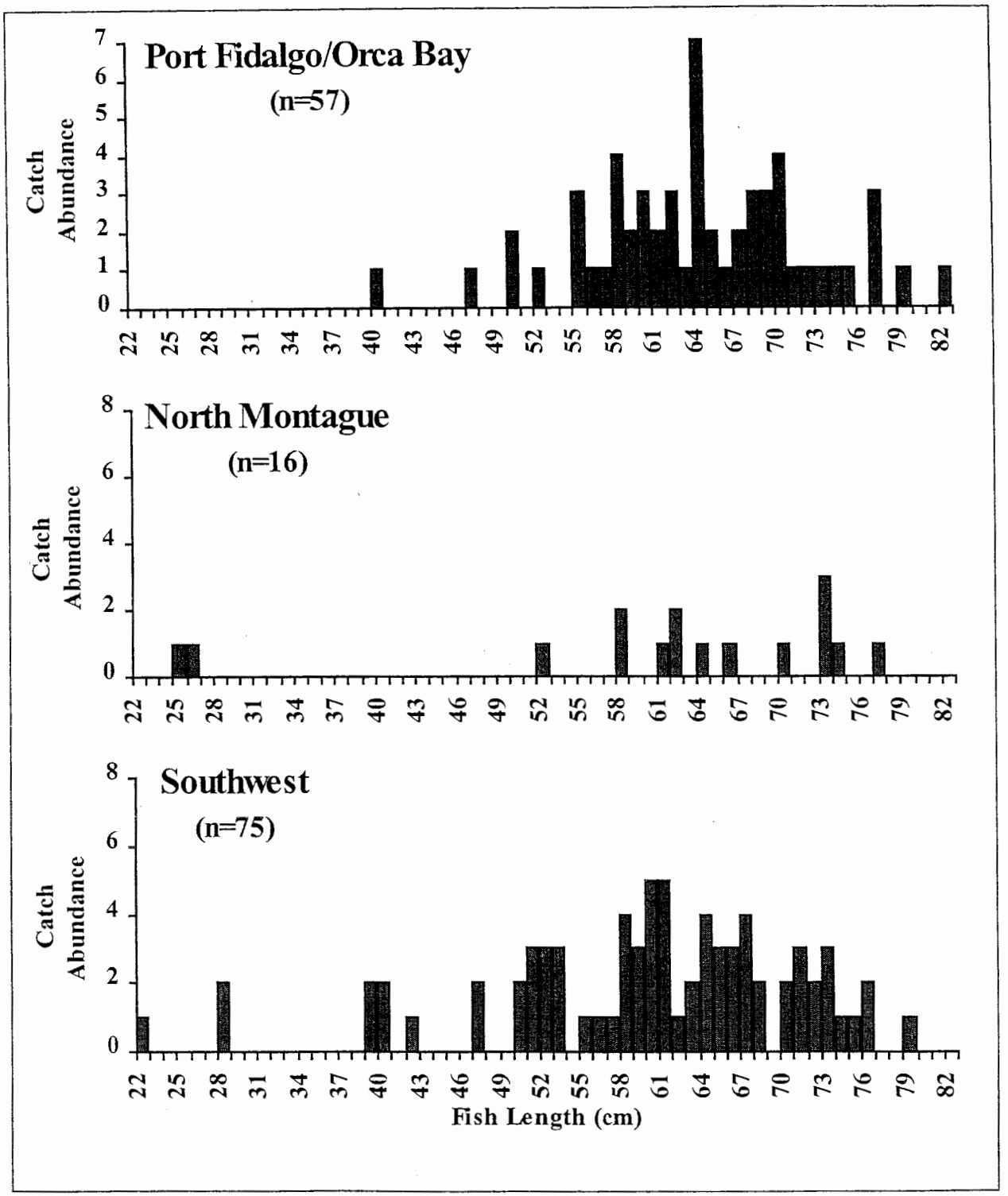

Figure 5. Size composition of Pacific cod caught in a bottom trawl survey of Prince William Sound, August 1997.

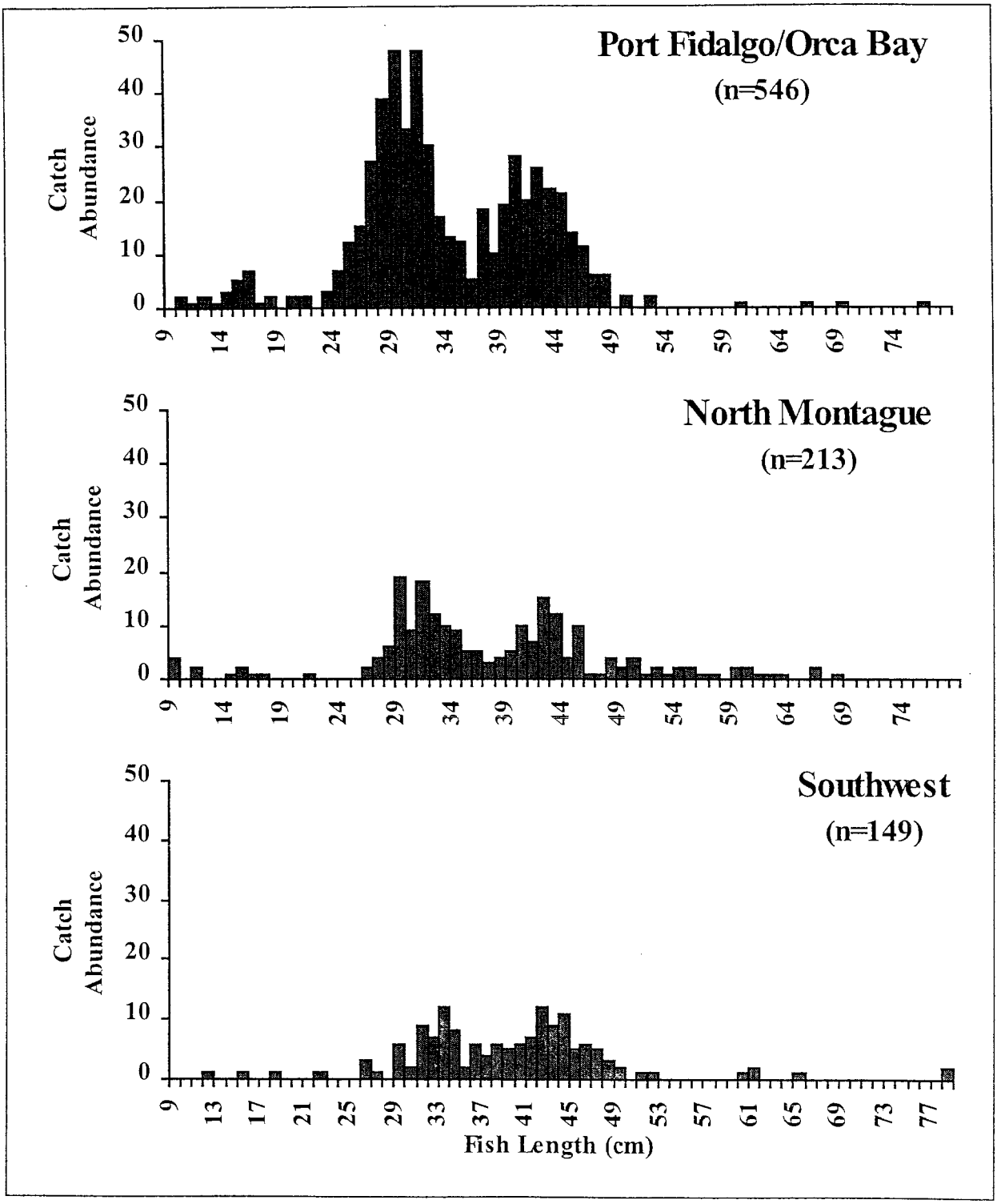

Figure 6. Size composition of rougheye rockfish caught in a bottom trawl survey of Prince William Sound, August 1997.

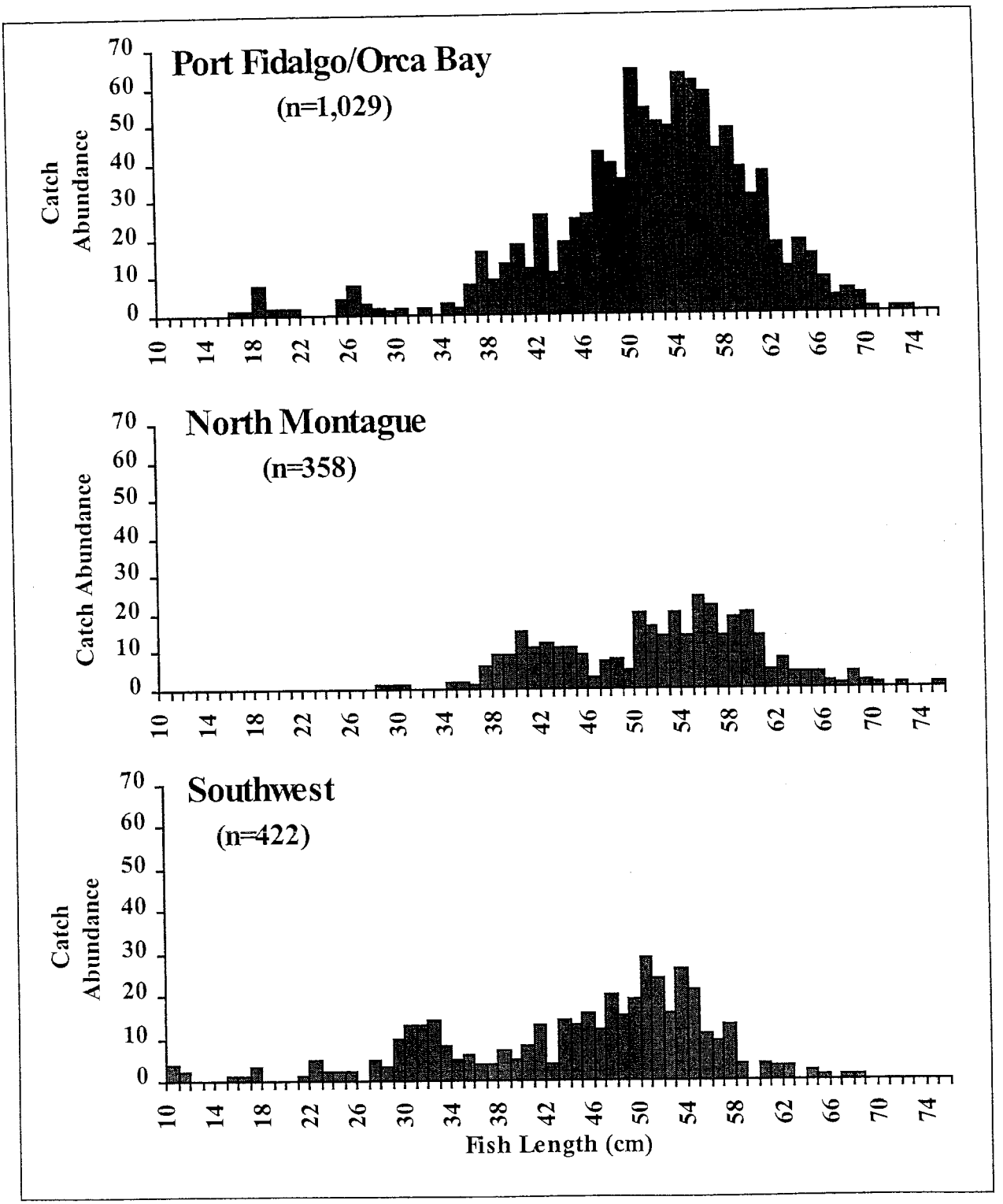

Figure 7. Size composition of walleye pollock caught in a bottom trawl survey of Prince William Sound, August 1997.

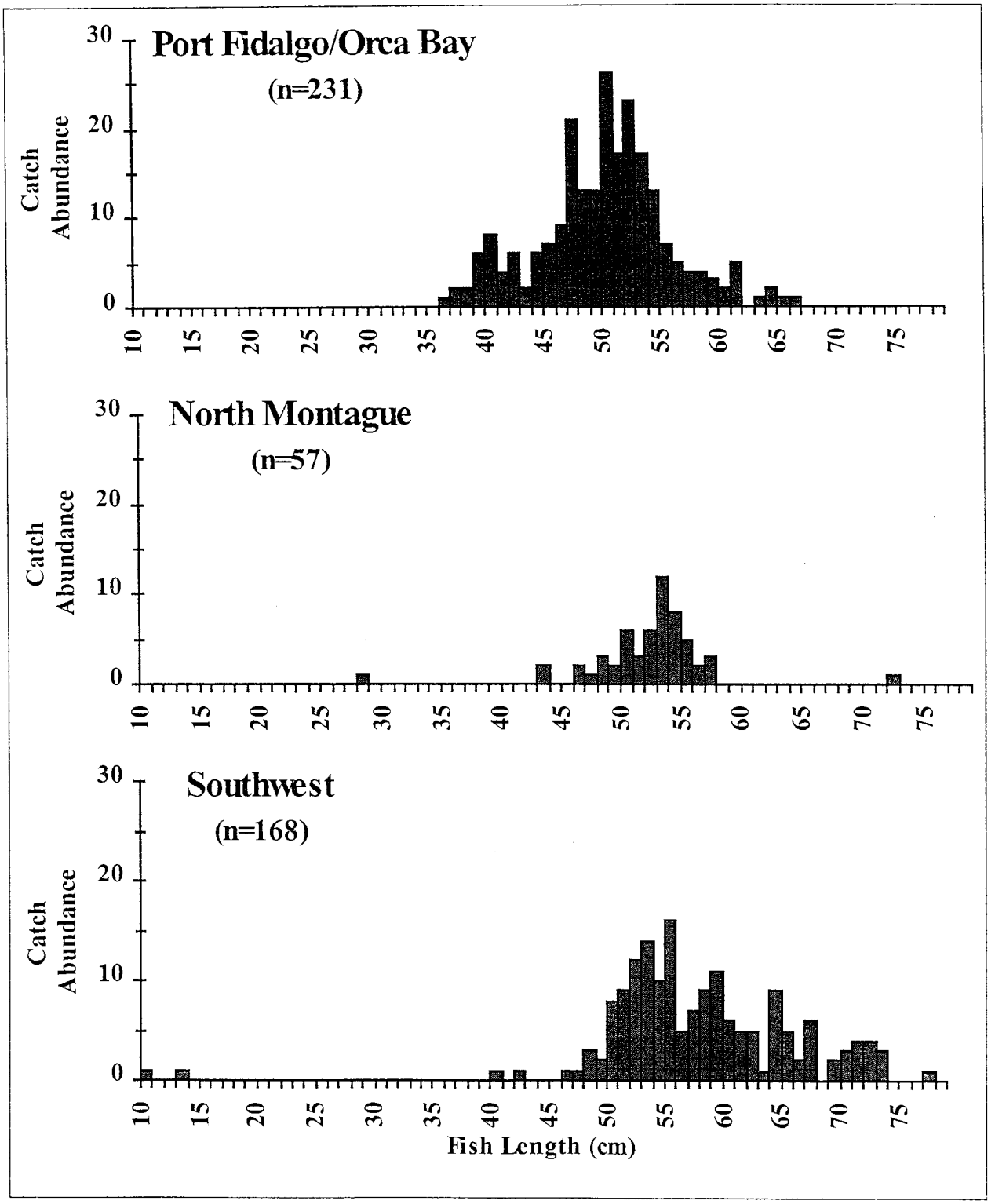

Figure 8. Size composition of sablefish caught in a bottom trawl survey of Prince William Sound, August 1997.

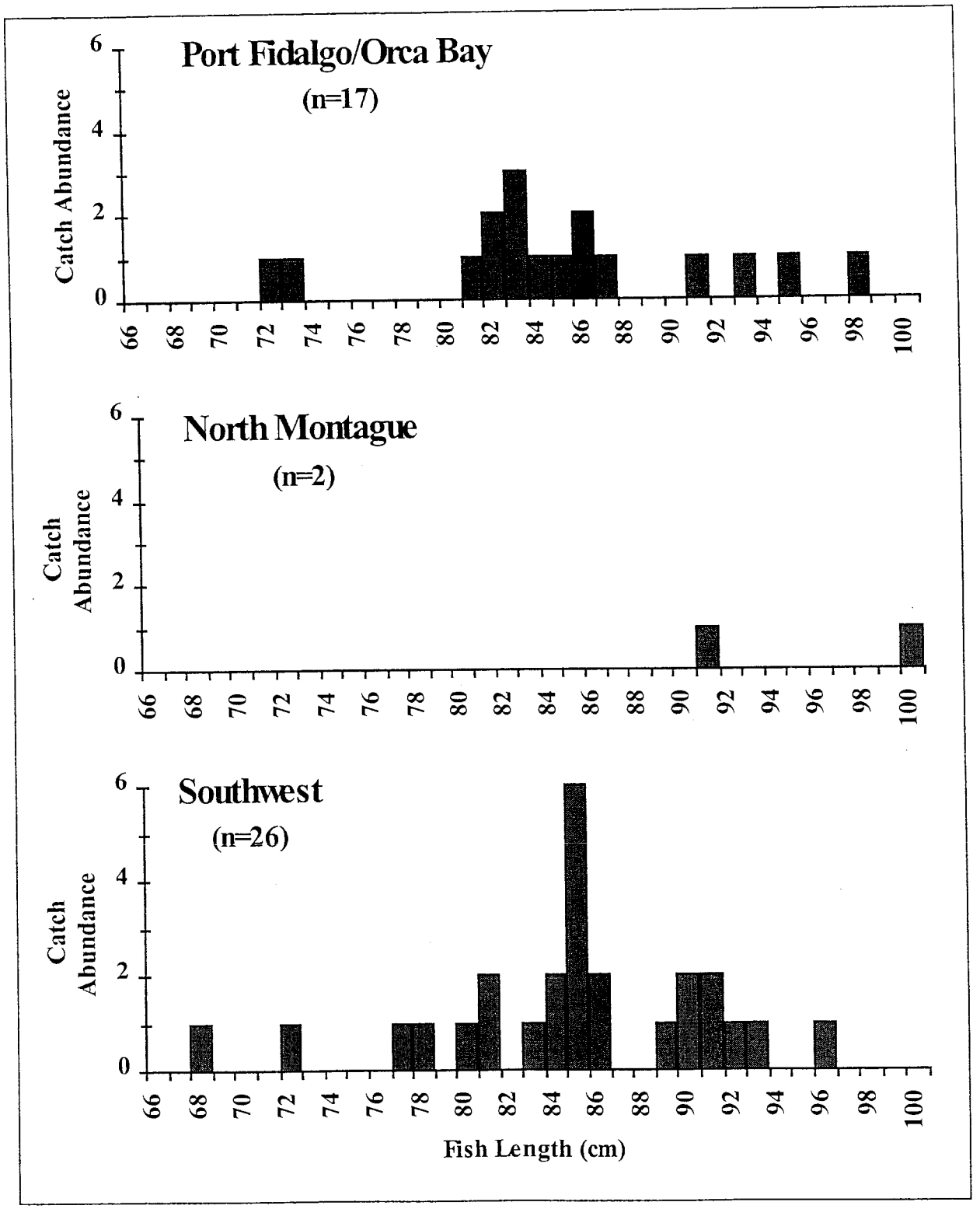

Figure 9. Size composition of spiny dogfish caught in a bottom trawl survey of Prince William Sound, August 1997.

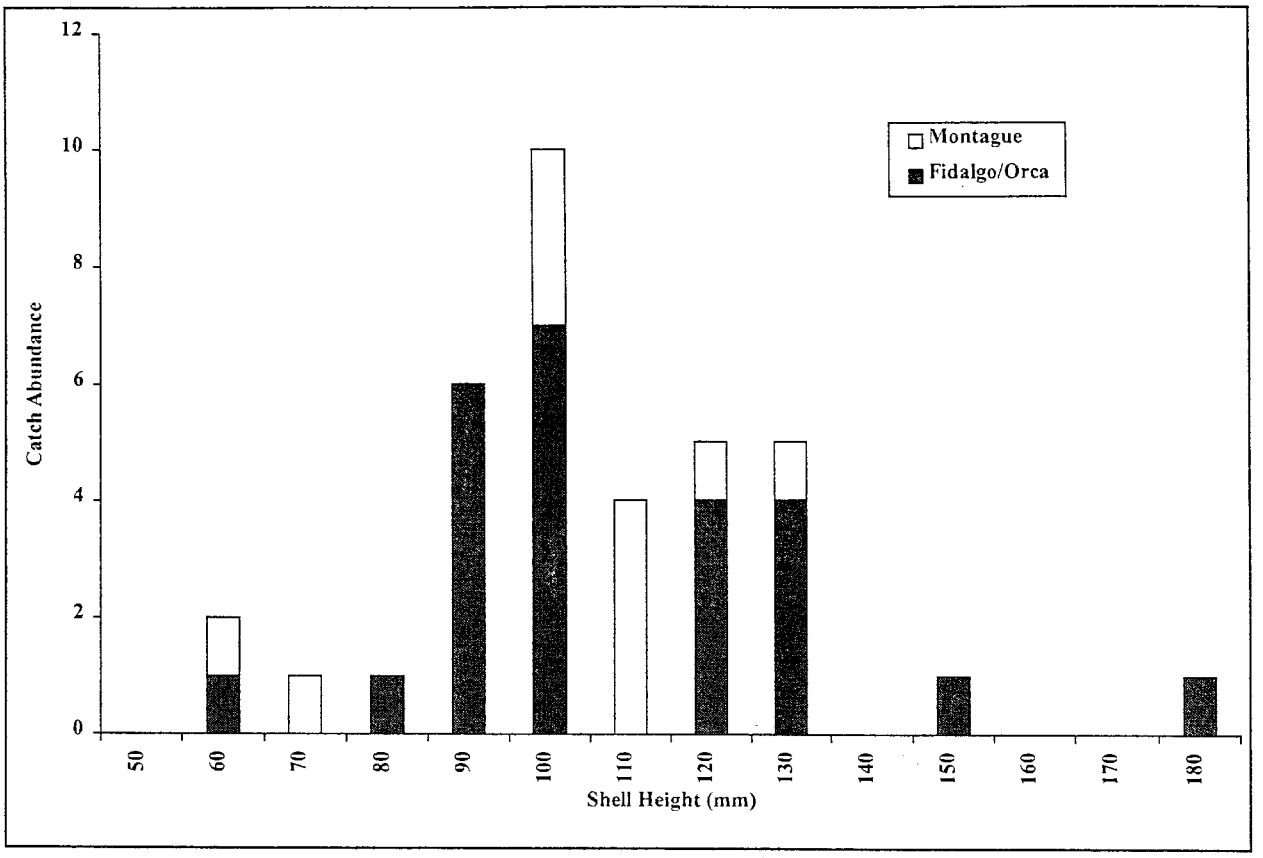

Figure 10. Size composition of weathervane scallop caught in a bottom trawl survey of Prince William Sound, August 1997.

Appendix A. Tow description for a bottom trawl survey of Prince William Sound, August 1997.

Towid	Date	Survey Station Square Id.	Survey Station Hist. Id.	Survey Station Area (nm^2)	Tow Start Location Latitude (°N)	Tow Start Location Longitude (°W)	Tow End Location Latitude (°N)	Tow End Location Longitude (°W)	Tow Duration (minutes)	Tow Length (nm)	TowDepth (fm) Minimum	TowDepth (fm) Maximum	Net Catch Weight (lb)
Port Fidalgo, Orca Bay, and Hinchinbrook Entrance													
97301	8/16/97	Q33	24	4.86	60°36.19'	145°53.80'	60°36.56'	145°55.75'	:24	1.0	99	100	1,664
97302	8/16/97	R32	23	6.99	60°33.94'	145°04.07'	60°34.44'	145°02.33'	:23	1.0	94	108	556
97303	8/16/97	R31	22	5.11	60°33.51'	146°09.18'	60°33.82'	146°07.08'	:26	1.0	82	82	1,160
97304	8/16/97	Q31	21	4.79	60°35.37'	146°06.81'	60°35.71'	146°08.92'	:26	1.0	60	76	1,850
97305	8/17/97	Q30	18	6.71	60°35.78'	146°12.26'	60°35.61'	146°14.35'	:27	1.0	71	75	2,384
97306	8/17/97	R30	20	5.55	60°33.67'	146°13.81'	60°34.01'	146°11.82'	:24	1.0	75	76	1,684
97307	8/17/97	R29	19	5.01	60°33.87'	146°18.71'	60°33.81'	146°16.63'	:26	1.0	65	70	604
97308	8/17/97	R28	17	4.64	60°33.90'	146°24.88'	60°34.26'	146°23.08'	:23	1.0	68	68	582
97309	8/17/97	R27	12	8.97	60°33.17'	146°26.45'	60°32.64'	146°28.28'	:27	1.0	65	66	671
97310	8/17/97	Q28	16	5.3	60°35.74'	146°24.63'	60°35.78'	146°22.56'	:26	1.0	63	65	1,410
97311	8/18/97	O29	14	6.99	60°40.91'	146°16.80'	60°41.43'	146°15.00'	:26	1.0	73	74	2,180
97312	8/18/97	N31	13	2.71	60°42.58'	146°10.31'	60°43.12'	146°08.35'	:27	1.0	98	103	1,672
97313	8/18/97	P28	15	6.65	60°39.12'	146°20.19'	60°38.44'	146°21.78'	:25	1.0	70	70	996
97314	8/18/97	Q27	11	6.4	60°36.87'	146°29.40'	60°36.55'	146°27.39'	:24	1.0	55	64	834
97315	8/18/97	Q26	5	7.44	60°36.03'	146°32.37'	60°35.28'	146°33.79'	:25	1.0	70	70	1,344
97316	8/18/97	R26	9	6.13	60°33.42'	146°32.64'	60°33.77'	146°30.71'	:24	1.0	73	74	1,140
97317	8/18/97	S26	10	6.28	60°31.59'	146°33.61'	60°31.82'	146°31.56'	:26	1.0	64	64	856
97318	8/19/97	T25	8	2.83	60°30.04'	146°35.27'	60°29.84'	146°37.31'	:27	1.0	68	80	622
97319	8/19/97	U24	4	5.95	60°25.32'	146°44.27'	60°26.36'	146°44.21'	:26	1.0	116	119	582
97320	8/19/97	S24	2	5.91	60°29.88'	146°40.46'	60°30.87'	146°41.15'	:25	1.0	101	104	1,838
97321	8/19/97	S25	7	6.13	60°31.98'	146°38.24'	60°32.29'	146°36.29'	:25	1.0	66	69	692
97322	8/19/97	R25	6	6.13	60°33.24'	146°39.75'	60°33.49'	146°37.69'	:25	1.0	57	57	505
97323	8/19/97	P24	1	5.99	60°37.37'	146°41.57'	60°38.41'	146°41.93'	:32	1.0	66	70	396
97324	8/20/97	M25	27	4.71	60°46.87'	146°38.48'	60°47.26'	146°36.50'	:25	1.0	91	95	1,026
97325	8/20/97	L28	25	5.33	60°48.48'	146°20.56'	60°48.69'	146°18.56'	:25	1.0	107	110	960
97326	8/20/97	M26	26	5.74	60°47.68'	146°28.63'	60°47.73'	146°30.71'	:24	1.0	107	107	976
97327	8/20/97	M24	28	5.78	60°47.25'	146°40.31'	60°46.54'	146°42.18'	:25	1.0	81	90	1,102

Appendix A. (p. 2 of 2)

Towid	Date	Survey Station Square Id.	Hist. Id.	Area (nm^2)	Tow Start Location Latitude (°N)	Longitude (°W)	Tow End Location Latitude (°N)	Longitude (°W)	Tow Duration (minutes)	Tow Length (nm)	TowDepth (fm) Minimum	Maximum	Net Catch Weight (lb)
						North Montague							
97328	8/21/97	V18	108	8.56	60°22.76'	147°10.80'	60°22.09'	147°11.98'	:21	0.9	55	57	462
97329	8/21/97	V20	111	7.7	60°24.63'	147°05.77'	60°24.87'	147°03.79'	:25	1.0	86	90	704
97330	8/21/97	U20	112	5.99	60°26.66'	147°01.93'	60°25.83'	147°00.66'	:27	1.0	115	127	864
97331	8/21/97	U19	110	6.13	60°26.67'	147°05.92'	60°27.24'	147°07.76'	:23	1.0	101	107	616
97332	8/21/97	T19	109	6.13	60°28.29'	147°07.30'	60°29.16'	147°08.55'	:26	1.0	104	104	674
97333	8/21/97	T18	106	6.13	60°29.38'	147°12.57'	60°29.43'	147°10.53'	:25	1.0	98	101	206
97334	8/22/97	X17	105	5.55	60°17.34'	147°17.50'	60°18.33'	147°16.93'	:27	1.0	63	74	2,584
97335	8/22/97	W17	104	6.13	60°20.53'	147°18.20'	60°21.23'	147°16.65'	:27	1.0	78	79	2,566
97336	8/22/97	V17	103	6.13	60°23.47'	147°16.26'	60°24.46'	147°15.24'	:28	1.0	60	70	638
97337	8/22/97	U18	107	6.13	60°25.25'	147°14.38'	60°25.69'	147°12.47'	:31	1.0	90	96	730
97338	8/22/97	U17	102	6.03	60°26.54'	147°16.15'	60°27.41'	147°15.07'	:27	1.0	114	131	504
97339	8/22/97	T17	101	6.13	60°28.31'	147°18.91'	60°28.66'	147°16.98'	:26	1.0	101	106	878
						Southwest Area							
97340	8/23/97	U15	NA	6.25	60°27.19'	147°27.09'	60°26.18'	147°27.66'	:26	1.0	85	85	544
97341	8/23/97	V15	NA	6.25	60°24.19'	147°29.23'	60°23.24'	147°29.89'	:25	1.0	83	87	860
97342	8/23/97	V14	NA	6.25	60°24.16'	147°31.68'	60°23.19'	147°32.43'	:25	1.0	90	94	1,192
97343	8/24/97	W14	NA	6.25	60°22.78'	147°33.99'	60°21.91'	147°35.20'	:26	1.0	106	106	1,260
97344	8/24/97	AC12	NA	6.25	60°07.30'	147°43.70'	60°06.30'	147°44.18'	:24	1.0	135	153	819
97345	8/24/97	AD12	NA	6.25	60°04.32'	147°42.19'	60°03.30'	147°42.43'	:25	1.0	126	134	1,380
97346	8/24/97	AD13	NA	6.25	60°04.28'	147°36.79'	60°03.65'	147°38.60'	:27	1.0	74	80	1,674
97347	8/25/97	AF11	NA	6.25	59°58.04'	147°46.92'	59°58.77'	147°45.49'	:25	1.0	110	114	2,284
97348	8/25/97	AG10	NA	6.25	59°56.36'	147°54.16'	59°56.68'	147°53.21'	:14	0.6	101	109	1,346
97349	8/25/97	AH09	NA	6.25	59°53.57'	147°55.36'	59°52.88'	147°56.95'	:25	1.0	73	74	5,592
97350	8/25/97	AB10	NA	6.25	60°09.14'	147°51.99'	60°08.26'	147°50.91'	:25	1.0	155	168	484
97351	8/26/97	AA10	NA	6.25	60°10.68'	147°51.68'	60°11.67'	147°53.08'	:28	1.0	212	218	524
97352	8/26/97	AA09	NA	6.25	60°00.45'	147°02.38'	60°11.32'	147°58.25'	:26	1.0	189	228	774
97353	8/26/97	AB09	NA	6.25	60°08.81'	147°54.69'	60°09.65'	147°56.00'	:24	1.0	160	174	298

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