A BOTTOM TRAWL SURVEY OF CRABS AND GROUNDFISH IN THE SOUTHERN, KAMISHAK AND BARREN ISLANDS DISTRICTS OF THE COOK INLET MANAGEMENT AREA, JULY 6-17 , 1990

by
Al Kimker
Area Shellfish Biologist

Regional Information Report [1] No. 2H90-13

Alaska Department of Fish and Game
Division of Commercial Fisheries Central Region
333 Raspberry Road
Anchorage, AK 99518-1599

February 1991

[1] Contribution 90-13 from the Homer area office. The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

INTRODUCTION

The Department has been conducting pot surveys for red king (Paralithodes camtschaticus) and Tanner (Chionoecetes bairdi) crabs in the Cook Inlet Management Area since 1975. These surveys have served as indices of crab abundance. The indices in turn were utilized to determine relative stock condition as well as set preseason harvest guidelines for the commercial and personal use fisheries. The shortcomings of the pot surveys, such as soak variation and the relative nature of the indices themselves, induced the Department to employ a survey method that would provide for direct stock enumeration. Beginning in 1990, the Department incorporated a trawl survey, along with the existing pot survey, to assess the king and Tanner crab stocks in Cook Inlet.

Historically trawl surveys have been operated by both the National Marine Fisheries Service (NMFS) in the Bering Sea and the Department of Fish and Game in the Westward Region. Data from these surveys have proved satisfactory in determining stock conditions and resultant fisheries management strategies for king and Tanner crabs.

OBJECTIVES

1. Determine abundance of Tanner and red king crab stocks in the Southern, Kamishak and Barren Islands Districts of the Cook Inlet Management Area (Figure 1).

2. Document the size and shell age of all Tanner, king and Dungeness (Cancer magister) crabs captured. Determine egg condition of all female crabs caught.

3. Record species composition and length frequency of the following fish target species: halibut (Hippoglossus stenolepis), blackcod (Anoplopoma fimbria), Pacific cod (Gadus macrocephalus), pollock (Theragra chalcogramma) and selected rockfish (Sebastes spp.).

4. Document the incidental catch of all other species at least to family name.

METHODS

Trawl and Area Description

The state research vessel Pandalus, overall length 66 feet, was utilized to conduct the survey. A 400 mesh eastern trawl was fished with 800 pound, 5'x 7', Nor'Eastern Astoria V trawl doors. Headrope and footrope lengths were 70 and 95 feet, respectively. The estimated fishing height and width were 9 and 40 feet, respectively. The trawl had 4.0 inch mesh in the wings and body, 3.5 inch in the intermediate and cod end and a 1.25 inch cod end liner.

Selection of the general survey areas was based on historical pot index and commercial catch information. Geographic areas that had very limited probability of crab catch were not selected. The two general locations chosen were: 1) that portion of the Southern District from upper Kachemak Bay extending west to 152 degrees W. longitude, and 2) the Kamishak and Barren Islands Districts (referred to as Kamishak District) as far east as 152 degrees 40 minutes W. longitude (Figure 2).

Sampling Methods

Actual station sizes were based on those dimensions utilized in the Westward Region. Bay stations (Southern District) were 2.5 nautical miles square (6.25 sq. m.) (Figure 3) and ocean stations (Kamishak and Barren Islands) were 5.0 nautical miles square (25.0 sq. m.) (Figure 4). Station size and shape varied somewhat based on irregular coastline and depth. Depths shallower than 10 fathoms were precluded from station selection.

Individual tows were 1.0 nautical miles. Irregular bottom occasionally caused tows of reduced lengths ranging from 0.5 to 1.0 nautical miles. Tow speeds averaged 2.50 nautical miles per hour with a range of 2.15 to 2.85 nmph. The tow path was randomly selected within the station grid by the vessel skipper wherever it appeared that a good tow could be made. All tows were made during daylight hours.

Successful tows were brought aboard and weighed unless the catches were too heavy. All king, Tanner and Dungeness crabs were weighed and measured. Width measurements were used for Tanner and Dungeness crabs while length was utilized for king crabs. Shell age and egg condition information was recorded.

Halibut, Pacific cod, pollock, blackcod, rockfish and skates were sampled to varying degrees depending on the amount caught. All halibut and skates were measured only. Weights for halibut and skate were determined using a NMFS length/weight conversion table. Depending on the number and size of fish in the catch, a minimum of two baskets of pollock and three baskets of Pacific cod were measured. All pollock and Pacific cod were weighed. Catches of blackcod and rockfish were small enough to permit weight and measurement of all the respective species.

A one basket sample was taken from the remainder of the catch after the aforementioned species were sorted out. Common invertebrate and fish species such as most of the flatfish were weighed by species. Other marine life including algae and exotic animal species were weighed as a group separately from miscellaneous debris such as rocks, coal and sticks.

Data Analysis

Abundance estimates for king and Tanner crabs were generated using the following area swept equation:

$T = 151.9\ (A)\ (C)$ where 151.9 is a factor to convert catch per nautical mile towed to catch per square nautical mile.

T = the estimated total number for each species.
A = the area of the station in square nautical miles.
C = the average catch per tow in number of crabs.

A coefficient of variation (CV) was derived for the population estimate by dividing the standard error of the population estimate (Se) by the population estimate itself.

RESULTS

General

A total of 47 good tows were made from July 6 through July 17, 1990. One station had to be retowed due to a net hangup. The numbers of stations fished in the Southern and Kamishak/Barren Islands Districts were 19 and 28, respectively (Appendices A and B).

Two of the 47 good tows were not brought aboard because they contained very large catches of non-target species. Bringing these

catches aboard would have required extensive working time that was not available. Weights of the two tows were estimated. Species composition was judged for the dominant classifications only. No crabs were visible in these tows.

Southern District

Crab catches in the Southern District were 3,123, 797 and 33 pounds for Tanner, Dungeness and king crabs, respectively. Pollock was the dominant target fish species with a total catch of 3,096 pounds. Pacific cod poundage was 1,111, while total halibut catch was 621 pounds (Table 1.) The majority of the pollock caught were between 400 and 500 mm in length (Figure 5). Both small and medium size Pacific cod were captured (Figure 6). Halibut were small with the bulk of the 93 animals between 400 and 700 mm in length (Figure 7). The mean lengths of pollock, pacific cod and halibut were 413, 472 and 577 mm, respectively.

The total male Tanner crab catch was 2,892 animals. The majority were sublegals (<140 mm). True prerecruit ones, twos and threes comprised 16, 22 and 27 percent, respectively, of all the males caught. True prerecruits and recruits are new shells in the respective size classes. The legal male catch was 15 percent (425) of all age classes combined. True recruits constituted 37 percent of the legal male catch (Table 2 and Figure 8). A total of 1,522 female Tanner crabs were caught. Of these, 1,066 were juveniles and the remaining 456 were adults. One hundred forty seven (32%) of the adult females were newly mature (Table 3 and Figure 9).

Six king crabs, four males and two females, were captured in three different stations (Tables 4 and 5). Dungeness crabs numbered 317 and 660 for males and females, respectively. The majority (92%) of the male Dungeness were prerecruit ones and twos (Tables 6 and 7).

Flathead sole (Hippoglossoides elassodon), sculpins (unidentified) and arrowtooth flounder (Atheresthes stomias) were the dominant non-target fish species caught in the Southern District (Table 8). Non-target species catch by station is shown in Appendix C. The tows at stations 19 and 20 were too large to bring aboard. The catch at station 19 was dominated by starfish (unidentified), urchins (unidentified) and clam shells. The majority of the catch at station 20 was starfish, sand dollars (unidentified), sea cucumbers (Cucumaria sp.), butter sole, (Isopsetta isolepis) pacific cod and small halibut.

Kamishak and Barren Islands Districts

Crab catches in the Kamishak and Barren Islands Districts were 1,583, 17 and 49 pounds for Tanner, Dungeness and king crabs, respectively. The dominant target fish species was pollock with a catch of 5,860 pounds. Pacific cod and halibut catches were 2,470 and 1,689 pounds, respectively. Skate catch was also relatively large at 2,463 pounds (Table 9.) Two distinct size groups of pollock were caught: small fish around 150 mm and larger ones extending from 400 to 600 mm (Figure 10). Pacific cod were a variety of sizes ranging from 150 to 750 mm (Figure 11). Halibut were most numerous at the small end of the size frequency, diminishing in numbers as the size increased (Figure 12). The mean lengths of pollock, pacific cod and halibut were 397, 452 and 535 mm, respectively.

A total of 1,553 male Tanner crabs were caught. Sublegals in the prerecruit one size class dominated the catch with 39 percent (610) of the males caught. The majority (88%) of these prerecruit ones were skip molts. Skip molts are old and very old shelled crabs. Legal male crabs comprised 10 percent of the catch. Skip molts made up the major portion (82%) of the legals (Table 10 and Figure 13). A total of 676 female Tanner crabs were caught. Of these, 548 were juveniles and 128 were adults. Sixty (47%) of the adult

females were newly mature; however, 55 of the 60 were caught at a single station (Table 11 and Figure 14).

A total of 10 king crabs, six males and four females, were caught from five different stations (Tables 12 and 13). Fourteen Dungeness crabs were captured, seven males and seven females. All the Dungeness were adults and none of the females were bearing eggs. Arrowtooth flounder and butter sole were the dominant non-target fish species caught in the Kamishak District (Table 8). Non-target species catch by station is shown on Appendix D.

Tanner Crab Population Estimates

The extremely small catches of male and female king crabs, six in the Southern District and ten in the Kamishak/Barren Islands Districts, did not lend itself to calculating a population estimate based on any confidence.

Tanner crab population estimates of catchable males and females were 2,493,827 and 1,313,413 crabs, respectively, for the Southern District. Estimates for the Kamishak and Barren Islands District were 6,065,934 males and 2,640,419 females. The estimate of legal male Tanner crab numbers were 366,780 and 593,705 for the Southern and Kamishak/Barren Islands Districts, respectively (Table 14). True recruits composed 37 percent of the legal male stock in the Southern District, and 18 percent in the Kamishak and Barren Islands Districts.

DISCUSSION

The objectives of the 1990 crab and groundfish trawl survey were generally met. Catches of king crabs were so poor, that enumeration, except in a qualitative sense, could not be made. Given both the aggregating nature of king crabs and the results of

recent pot surveys, it is quite possible that the trawl survey either missed the small aggregations, or the crabs moved out of the survey area. Recent pot surveys indicate a substantial number of king crabs in June and a subsequent sharp reduction by late July.

The Tanner crab stock in the Southern District has been depressed for a number of years. The commercial fishery was closed during 1989 and 1990 due to low adult and legal stock abundance. The 1990 trawl survey showed continued poor recruitment into the legal segment of the stock, but identified larger numbers of true prerecruit ones, twos and threes (Table 2 and Figure 8). The population estimate of true prerecruit ones indicates that over 400 thousand males may potentially recruit into the legal segment of the stock in 1991 (Table 14). If natural mortality is low and the majority of these animals recruited, the resulting legal stock in 1991 would be a substantial increase over 1990.

Similar to the Southern District, the stock in the Kamishak and Barren Islands Districts has been depressed. Numbers of true prerecruit ones, twos and threes are less in Kamishak and Barren Islands than in the Southern District. The most important difference between the two areas, however, is the prevalent skip-molting in the prerecruit one and two size classes in Kamishak and Barren Islands. Forty five percent (110) of the prerecruit twos and 89 percent (534) of the prerecruit ones were skip molts in Kamishak and the Barren Islands (Table 10 and Figure 13). This compares to two percent of the prerecruit twos (11) and eight percent (43) of the prerecruit ones in the Southern District (Table 2 and Figure 8). Dockside interview information, collected from commercial fishermen, indicates that significant numbers of skip molt sublegals are caught in the Kamishak District fishery. Comparison of Department pot survey data with subsequent commercial fishing data indicates that once these animals skip molt, they probably will not molt again; that is, large numbers of

skipmolt prerecruit ones identified in the department survey do not materialize as recruits in the commercial fishery.

Since the Tanner crab data were used to set the guideline harvest ranges for the 1991 commercial Tanner crab season in both the Southern and Kamishak/Barren Islands Districts, postseason catch totals and fishery performance data should yield a gross estimate of accuracy of the trawl survey. If guideline harvests are not achieved, or if catch per unit of effort is very low, the trawl survey may have overestimated legal stock abundance. On the other hand, if relative catches per unit of effort begin high and remain there through the fishery closure, the trawl survey may have underestimated stock abundance.

Regarding other target species, particularly groundfish, successive years of survey data will be required to ascertain the reliability of the trawl survey as either a relative or specific estimate of groundfish abundance.

EEO STATEMENT

The Alaska Department of Fish and Game operates all of its public programs and activities free from discrimination on the basis of race, religion, color, national origin, age, sex or handicap. Because the department receives federal funding, any person who believes he or she has been discriminated against should write to:

O.E.O.
U.S. Department of Interior
Washington, DC 20240

Table 1. Target species catch in pounds by station, Southern District, 1990 Cook Inlet trawl survey.

Station No.	Tanner	Dung.	King	Halibut	Pac. cod	Pollock	Rock-fish sp.	Black cod	Skate sp.	Misc. invert., fish&debris	Total catch
1	271	28	0	8	26	26	3	0	0	655	1017
2	237	72	11	17	8	8	0	0	0	641	994
3	217	68	0	0	0	0	0	0	0	673	958
4	492	177	0	136	6	11	1	0	0	1049	1872
5	65	294	0	6	2	0	0	0	0	1209	1576
6	1019	40	12	71	18	30	1	0	0	1309	2500
8	167	0	10	0	58	20	1	0	182	164	602
9	206	0	0	63	30	53	38	0	15	727	1132
10	128	0	0	0	11	164	16	0	14	427	760
11	135	3	0	15	88	179	1	6	70	779	1276
12	2	0	0	23	120	1648	0	0	151	1238	3182
13	102	0	0	43	18	44	2	0	0	331	540
14	12	0	0	0	137	329	6	0	0	562	1046
15	68	10	0	5	43	549	6	0	0	1139	1820
17	1	5	0	12	21	0	0	0	7	1926	1972
18	1	45	0	34	26	35	0	0	0	785	926
19	0	0	0	0	0	0	0	0	0	5000	5000
20	0	0	0	0	0	0	0	0	0	10000	10000
21	0	55	0	188	499	0	0	0	41	5543	6326
Southern District totals											
19	3123	797	33	621	1111	3096	75	6	480	34157	43499

Table 2. Numbers of male Tanner crabs by station, size and age class, Southern District, 1990 Cook Inlet trawl survey.

	Sublegal males						Legal males					
			92-114		115-139		140-165		>165			
Station	<70	70-91	(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)	Total legal	Total males
1	96	220	75	0	36	2	14	1	3	0	18	447
2	21	88	62	0	37	6	16	5	1	0	22	236
3	21	148	74	0	37	2	11	1	0	0	12	294
4	18	84	162	3	105	2	41	20	3	2	66	440
5	113	14	8	2	3	3	5	0	5	0	10	153
6	19	27	88	1	123	13	27	137	1	50	215	486
8	90	33	57	2	31	4	7	9	0	3	19	238
9	30	112	25	1	13	3	5	11	0	3	19	203
10	98	37	4	2	3	0	0	0	0	0	0	144
11	3	7	25	0	33	0	28	0	1	0	29	97
12	8	0	1	0	0	0	0	0	0	0	0	9
13	2	15	37	0	32	1	3	1	0	0	4	91
14	5	2	0	0	0	1	0	0	0	0	0	8
15	0	3	8	0	14	6	2	5	0	4	11	42
17	0	1	2	0	0	0	0	0	0	0	0	3
18	1	0	0	0	0	0	0	0	0	0	0	1
District Total	525	791	628	11	467	43	159	190	14	62	425	2892

Stations not listed had no male Tanner crab catch
Prerecruit three = 70 - 91 mm
Prerecruit two = 92 - 114 mm
Prerecruit one = 115 - 139 mm
Recruit = 140 - 165 mm

Table 3. Numbers of female Tanner crabs by station, Southern District, 1990 Cook Inlet trawl survey.

		Mature												
		Full clutches			Partial clutches			Barren			Total mature			Total
Station	Juveniles	New	Old	VO	New	Old	VO	New	Old	VO	New	Old	VO	females
1	174	3	0	0	0	0	0	0	0	0	3	0	0	177
2	130	15	0	0	0	0	0	0	0	0	15	0	0	145
3	121	5	0	0	0	0	2	0	0	0	5	0	2	128
4	77	15	11	9	3	0	4	0	0	6	18	11	19	125
5	104	1	1	4	0	0	1	0	0	0	1	1	5	111
6	41	12	29	127	0	1	51	0	1	29	12	31	207	291
8	114	2	3	1	0	0	1	0	0	1	2	3	3	122
9	131	62	10	0	0	0	0	1	0	0	63	10	0	204
10	125	8	0	0	0	0	0	0	0	0	8	0	0	133
11	9	5	0	0	0	0	0	0	0	0	5	0	0	14
12	20	1	0	0	0	0	0	0	0	0	1	0	0	21
13	11	13	3	0	0	0	0	0	0	0	13	3	0	27
14	5	1	0	6	0	0	1	0	0	7	1	0	14	20
15	2	0	0	0	0	0	0	0	0	0	0	0	0	2
17	1	0	0	0	0	0	0	0	0	0	0	0	0	1
18	1	0	0	0	0	0	0	0	0	0	0	0	0	1
District Total	1066	143	57	147	3	1	60	1	1	43	147	59	250	1522

Stations not listed had no female Tanner crab catch

Table 4. Numbers of male king crabs, by station, size and age class, Southern District, 1990 Cook Inlet trawl survey.

Station	<91	91-108	Sublegal males 109-126 (new)	Sublegal males 109-126 (old)	Sublegal males 127-144 (new)	Sublegal males 127-144 (old)	Legal males 145-163 (new)	Legal males 145-163 (old)	Legal males >163 (new)	Legal males >163 (old)	Total legal	Total males
2	0	1	0	0	0	0	0	0	1	0	1	2
6	0	0	0	0	0	0	0	0	0	1	1	1
8	0	0	0	0	0	0	0	0	0	1	1	1
District total	0	1	0	0	0	0	0	0	1	2	3	4

Stations not listed had no male king crab catch

Table 5. Numbers of female king crabs by station, Southern District, 1990 Cook Inlet trawl survey.

Station	Juveniles	Mature												Total females
		Full clutches			Partial clutches			Barren			Total mature			
		New	Old	VO	New	Old	VO	New	Old	VO	New	Old	VO	
2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
District total	2	0	0	0	0	0	0	0	0	0	0	0	0	2

Stations not listed had no female king crab catch

Table 6. Numbers of male Dungeness crabs by station, size and age class, Southern District, 1990 Cook Inlet trawl survey.

	Sublegal males						Legal males					
	<89	90-114	115-139		140-164		165-189		>189		Total	Total
Station			(new)	(old)	(new)	(old)	(new)	(old)	(new)	(old)	legal	males
1	0	0	0	1	0	0	0	0	0	0	0	1
2	0	9	23	0	9	1	0	0	0	0	0	42
3	0	5	38	0	16	2	0	0	0	0	0	61
4	0	1	65	0	22	0	1	0	0	0	1	89
5	1	2	54	4	39	3	3	0	0	0	3	106
6	0	0	8	0	4	0	0	0	0	0	0	12
11	0	0	1	0	1	0	0	0	0	0	0	2
15	0	0	0	0	0	0	2	0	0	0	2	2
21	0	0	0	0	0	1	0	1	0	0	1	2
District total	1	17	189	5	91	7	6	1	0	0	7	317

Stations not listed had no male Dungeness crab catch
Prerecruit two = 115 - 139 mm
Prerecruit one = 140 - 164 mm

Table 7. Numbers of female Dungeness crabs by station, Southern District, 1990 Cook Inlet trawl survey.

Station	Full clutches			Partial Clutches			No. Eggs Present[1]			Shellage			Total females
	New	Old	VO	New	Old	VO	New	Old	VO	New	Old	VO	
1	0	8	0	0	0	0	2	13	0	2	21	0	23
2	2	4	0	0	0	0	52	4	0	54	8	0	62
3	0	3	0	1	0	0	21	1	1	22	4	1	27
4	0	1	0	0	3	1	143	1	1	143	5	1	149
5	0	2	0	0	1	0	255	3	1	255	6	1	262
6	0	1	0	0	3	2	27	0	4	27	4	4	35
11	0	0	0	0	0	0	1	0	0	1	0	0	1
15	0	0	0	0	0	0	9	0	0	9	0	0	9
17	0	0	0	0	0	0	6	0	0	6	0	0	6
18	0	0	0	0	0	0	41	0	0	41	0	0	41
21	0	0	0	0	0	0	36	9	0	36	9	0	45
District total	2	19	0	1	7	3	593	31	4	596	57	7	660

Stations not listed had no female Dungeness crab catch

[1] Juveniles not distinguished.

Table 8. Catch composition by weight in pounds of non-target species, 1990 Cook Inlet trawl survey.

Common name	District		Total
	Kamishak	Southern	
Alaska plaice	3.11	5.92	9.03
arrowtooth flounder	522.27	108.47	630.74
butter sole	313.98	95.03	409.01
Calif. sea cucumber	0.33	0.00	0.33
crab unident.	0.42	0.00	0.42
cucumaria sp.	0.00	23.56	23.56
debris	232.62	242.43	475.05
Dover sole	55.22	95.70	150.92
eelpout unident.	2.58	6.51	9.09
English sole	0.62	51.28	51.89
eulachon	0.99	0.00	0.99
fish unident.	6.49	1.75	8.25
flathead sole	59.33	216.62	275.95
greenling unident.	0.88	0.00	0.88
invertebrate unident.	271.56	95.37	366.93
Pacific cod	10.67	0.00	10.67
Pacific herring	0.02	0.00	0.02
poacher unident.	1.27	0.88	2.15
pollock	0.86	0.00	0.86
rex sole	5.78	63.15	68.93
rock sole	75.02	24.45	99.47
and dollar unident.	0.00	2.54	2.54
sculpin unident.	14.46	114.04	128.50
sea urchin unident.	34.82	0.00	34.82
searcher	1.50	0.00	1.50
shrimp unident.	0.00	0.37	0.37
smelt unident.	3.22	0.17	3.39
starry flounder	6.41	7.47	13.88
tomcod	0.98	2.62	3.60
weathervane scallop	29.19	1.49	30.68
yellowfin sole	135.87	8.63	144.50
Totals	1,790.47	1,168.45	2,958.92

Specie table weights were determined by summing station subsample specie weights.

Table 9. Target species catch in pounds by station, Kamishak District, 1990 Cook Inlet trawl survey.

Station No.	Tanner	Dung.	King	Halibut	Pac. cod	Pollock	Rock-fish sp.	Black cod	Skate sp.	Misc. invert., fish&debris	Total catch
27	6	1	0	12	0	0	0	0	13	684	716
28	5	0	10	16	29	0	0	0	104	742	906
29	0	0	0	115	43	30	0	0	0	202	390
32	60	0	0	32	82	0	0	0	8	830	1012
33	14	0	0	10	73	18	0	0	9	758	882
37	1	0	0	31	13	0	0	0	272	1001	1318
38	1	16	0	198	0	251	0	0	176	340	982
39	0	0	0	99	11	0	0	0	0	390	500
41	0	0	0	66	0	0	0	0	142	898	1106
44	63	0	28	36	0	0	0	0	50	1293	1470
45	8	0	0	161	294	0	0	0	0	99	562
46	5	0	0	91	7	0	0	0	99	808	1010
47	9	0	0	3	1	0	0	0	123	820	956
48	7	0	0	49	38	8	0	0	170	472	744
50	16	0	0	18	0	0	0	0	7	629	670
51	438	0	11	136	385	0	0	0	29	2161	3160
52	266	0	0	0	55	715	0	0	136	990	2162
53	59	0	0	39	75	140	0	0	192	581	1086
55	2	0	0	126	140	2	0	18	87	915	1290
56	90	0	0	40	85	2294	0	0	61	964	3534
57	72	0	0	0	187	50	0	0	172	1089	1570
58	276	0	0	71	222	1222	0	0	163	924	2878
60	95	0	0	140	249	676	0	0	25	1377	2562
61	13	0	0	0	60	286	0	0	45	264	668
64	10	0	0	0	0	0	0	0	0	1490	1500
65	26	0	0	105	162	105	16	0	125	1229	1768
67	21	0	0	0	204	53	3	0	152	1273	1706
68	20	0	0	95	55	10	23	0	103	760	1066
Kamishak District totals											
28	1583	17	49	1689	2470	5860	42	18	2463	23983	38174

Table 10. Numbers of male Tanner crabs by station, size and age class, Kamishak District, 1990 Cook Inlet trawl survey.

Station	Sublegal males						Legal males					
	<70	70-91	92-114 (new)	92-114 (old)	115-139 (new)	115-139 (old)	140-165 (new)	140-165 (old)	>165 (new)	>165 (old)	Total legal	Total males
27	4	0	1	3	0	2	0	0	0	0	0	10
28	5	0	1	1	0	3	0	0	0	0	0	10
29	1	0	0	0	0	0	0	0	0	0	0	1
32	29	3	2	33	2	18	0	0	0	0	0	87
33	0	0	0	0	0	1	0	0	0	0	0	1
37	0	0	0	1	0	6	0	1	0	0	1	8
38	0	0	0	0	0	1	0	0	0	0	0	1
39	1	0	0	0	0	0	0	0	0	0	0	1
44	0	0	1	7	4	31	0	3	0	0	3	46
45	1	0	0	2	0	4	0	0	0	0	0	7
46	0	0	0	0	0	2	0	1	0	0	1	3
47	7	1	0	0	0	0	0	0	0	0	0	8
48	7	0	0	2	0	5	0	0	0	0	0	14
50	0	0	0	0	0	3	0	4	0	0	4	7
51	1	0	0	19	12	154	4	64	0	0	68	254
52	0	0	2	5	12	109	4	28	0	0	32	160
53	7	0	1	8	4	26	2	2	0	0	4	50
55	7	0	0	0	0	2	0	0	0	0	0	9
56	5	0	0	5	2	36	4	10	0	0	14	62
57	9	1	0	8	1	24	2	2	0	0	4	47
58	166	78	121	2	25	22	8	1	0	0	9	423
60	25	2	7	9	3	44	0	6	0	0	6	96
61	20	0	0	0	0	8	0	0	0	0	0	28
64	14	0	0	0	0	4	1	0	0	0	1	19
65	13	0	1	2	0	12	2	0	0	0	2	30
67	51	0	0	2	0	9	0	2	0	0	2	64
68	96	0	0	1	1	8	0	1	0	0	1	107
District Total	469	85	137	110	66	534	27	125	0	0	152	1553

Stations not listed had no male Tanner crab catch
Prerecruit three = 70 - 91 mm
Prerecruit two = 92 - 114 mm
Prerecruit one = 115 - 139 mm

Table 1. Numbers of female Tanner crabs by station, Kamishak District, 1990 Cook Inlet trawl survey.

Station	Juveniles	Mature												Total females
		Full clutches			Partial clutches			Barren			Total mature			
		New	Old	VO	New	Old	VO	New	Old	VO	New	Old	VO	
27	5	0	0	0	0	0	0	0	0	0	0	0	0	5
28	3	0	0	0	0	0	0	0	0	0	0	0	0	3
29	1	0	0	0	0	0	0	0	0	0	0	0	0	1
32	17	1	0	0	0	0	1	0	0	2	1	0	3	21
37	0	0	1	3	0	0	0	0	0	0	0	1	3	4
47	7	0	0	0	0	0	0	0	0	0	0	0	0	7
48	7	0	0	0	0	0	0	0	0	0	0	0	0	7
50	1	0	0	1	0	0	0	0	0	0	0	0	1	2
51	1	0	0	1	0	0	0	0	0	0	0	0	1	2
52	1	0	0	4	0	0	0	0	0	0	0	0	4	5
53	5	1	0	0	0	0	0	0	0	0	1	0	0	6
55	7	0	0	0	0	0	0	0	0	0	0	0	0	7
56	5	0	0	0	0	0	0	0	0	0	0	0	0	5
57	6	1	2	21	0	0	15	0	0	0	1	2	36	45
58	212	51	1	7	2	0	0	2	0	0	55	1	7	275
60	18	2	3	0	0	0	1	0	0	0	2	3	1	24
61	29	0	0	2	0	0	1	0	0	0	0	0	3	32
64	18	0	0	0	0	0	0	0	0	0	0	0	0	18
65	24	0	0	0	0	0	0	0	0	0	0	0	0	24
67	60	0	0	0	0	0	0	0	0	2	0	0	2	62
68	121	0	0	0	0	0	0	0	0	0	0	0	0	121
District total	548	56	7	39	2	0	18	2	0	4	60	7	61	676

Stations not listed had no female Tanner crab catch

Table 12. Numbers of male king crabs by station, size and age class, Kamishak District, 1990 Cook Inlet trawl survey.

Station	<90	91-108	Sublegal males 109-126 (new)	Sublegal males 109-126 (old)	Sublegal males 127-144 (new)	Sublegal males 127-144 (old)	Legal males 145-163 (new)	Legal males 145-163 (old)	Legal males >163 (new)	Legal males >163 (old)	Total legal	Total males
27	1	0	0	0	0	0	0	0	0	0	0	1
44	0	0	0	0	0	0	1	0	1	1	3	3
51	0	0	0	0	0	0	1	0	0	0	1	1
58	0	0	0	0	1	0	0	0	0	0	0	1
District total	1	0	0	0	1	0	2	0	1	1	4	6

Stations not listed had no male king crab catch

Table 13. Numbers of female king crabs by station, size and age class, Kamishak District, 1990 Cook Inlet trawl survey.

Station	Juveniles	Mature												Total females
		Full clutches			Partial clutches			Barren			Total mature			
		New	Old	VO	New	Old	VO	New	Old	VO	New	Old	VO	
28	0	2	0	0	1	0	0	0	0	0	3	0	0	3
51	0	1	0	0	0	0	0	0	0	0	1	0	0	1
District total	0	3	0	0	1	0	0	0	0	0	4	0	0	4

Stations not listed had no female king crab catch

Table 14. Tanner crab population estimates in numbers by sex, size and age class, 1990 Cook Inlet trawl survey.

	Southern District		Kamishak District	
	Pop. Est.[a]	CV[b]	Pop. Est.	CV
MALES				
Sublegal				
<70 mm	453,024	33	1,831,889	40
70-91 mm	682,569	34	332,005	92
91-114 mm				
new[c]	541,891	30	535,114	88
o & vo	9,492	38	429,654	34
115-139				
new	403,015	33	257,792	44
o & vo	37,055	33	2,085,775	34
Legal				
140-164				
new	137,235	33	105,461	38
o & vo	163,961	72	488,244	55
166				
ew	12,081	44	0	0
o & vo	53,504	80	0	0
Total legals	366,780	51	593,705	48
Total males	2,493,827	25	6,065,934	31
FEMALES				
Juveniles	919,907	25	2,140,458	44
Adults	393,506	55	499,961	56
Total females	1,313,413	25	2,640,419	43

[a] Data not adjusted to reflect tows of less than 1 nautical mile.

[b] CV = coefficient of variation expressed as a percent.

[c] shellage: new - new shell, o & vo - old & very old shell.

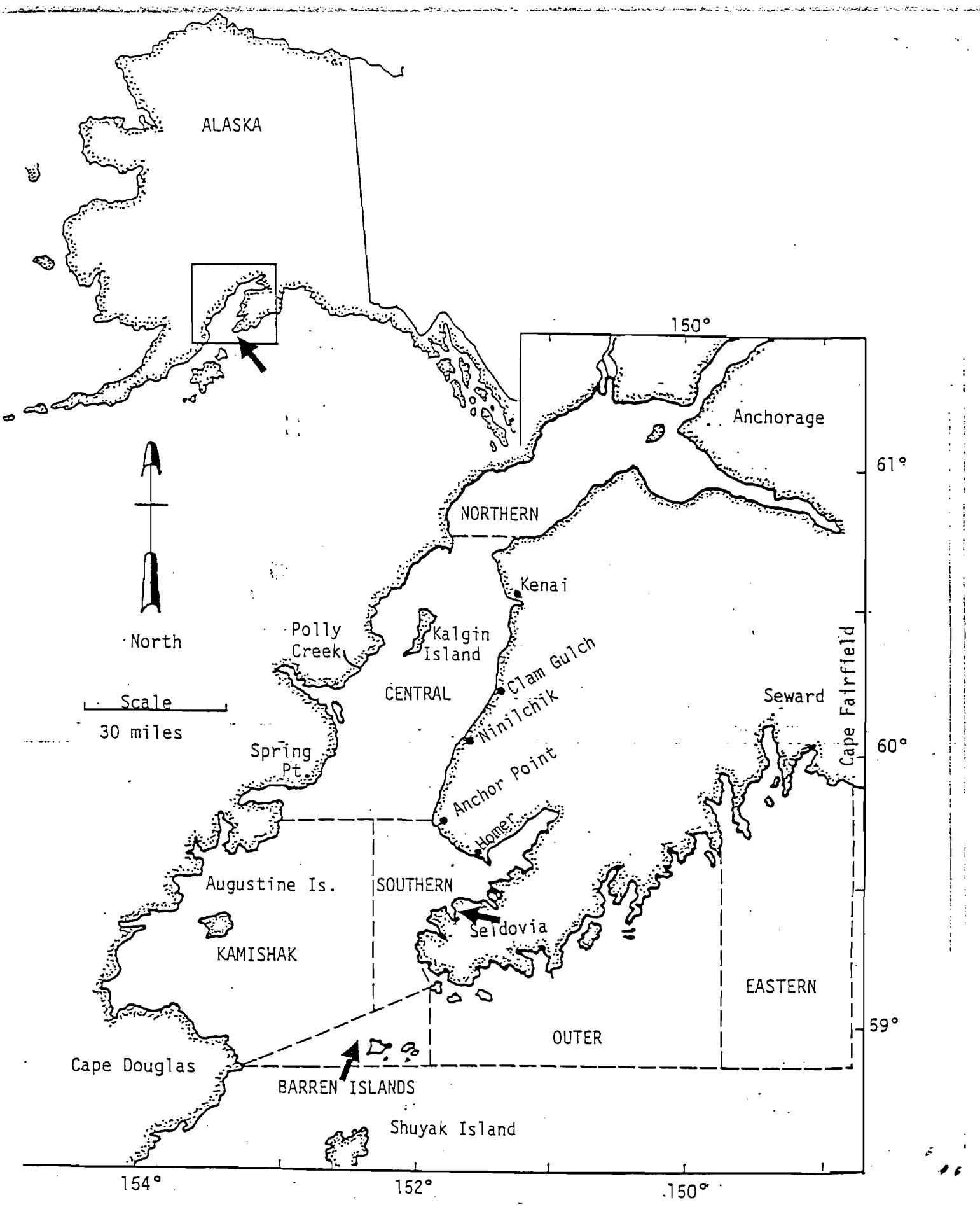

Figure 1. Cook Inlet district location chart.

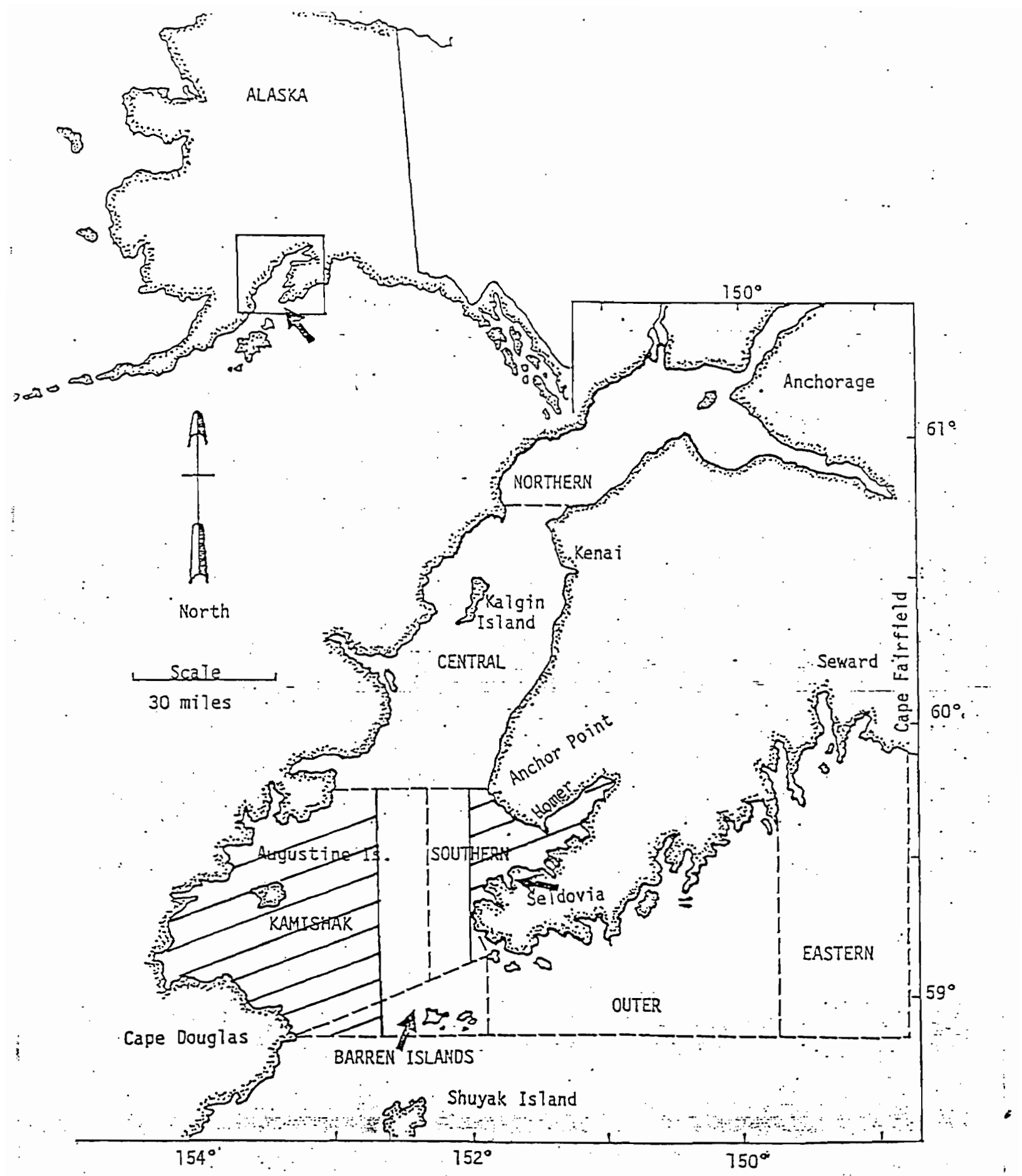

Figure 2. Cook Inlet trawl survey locations.

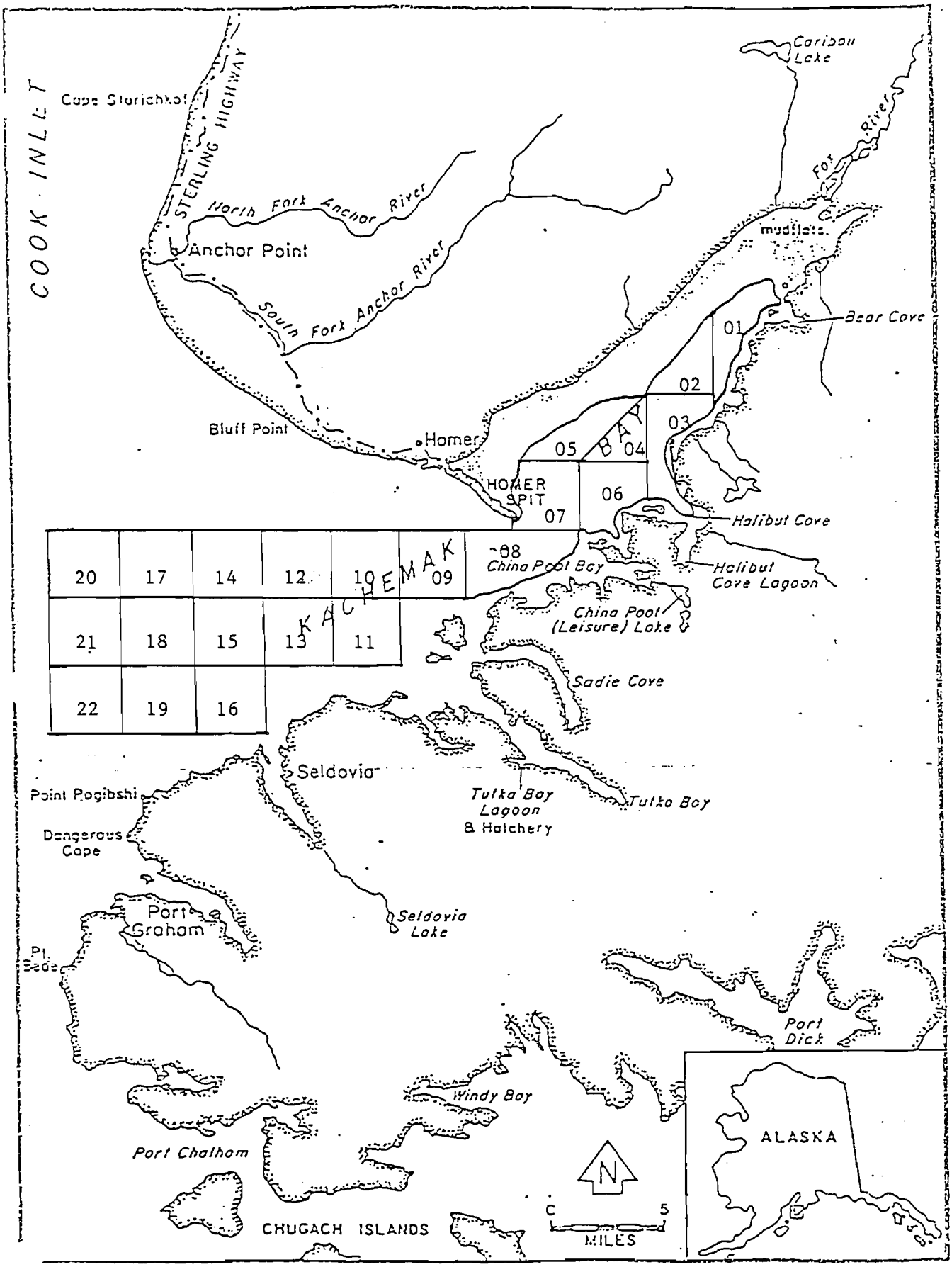

Figure 3. Southern District crab trawl survey stations.

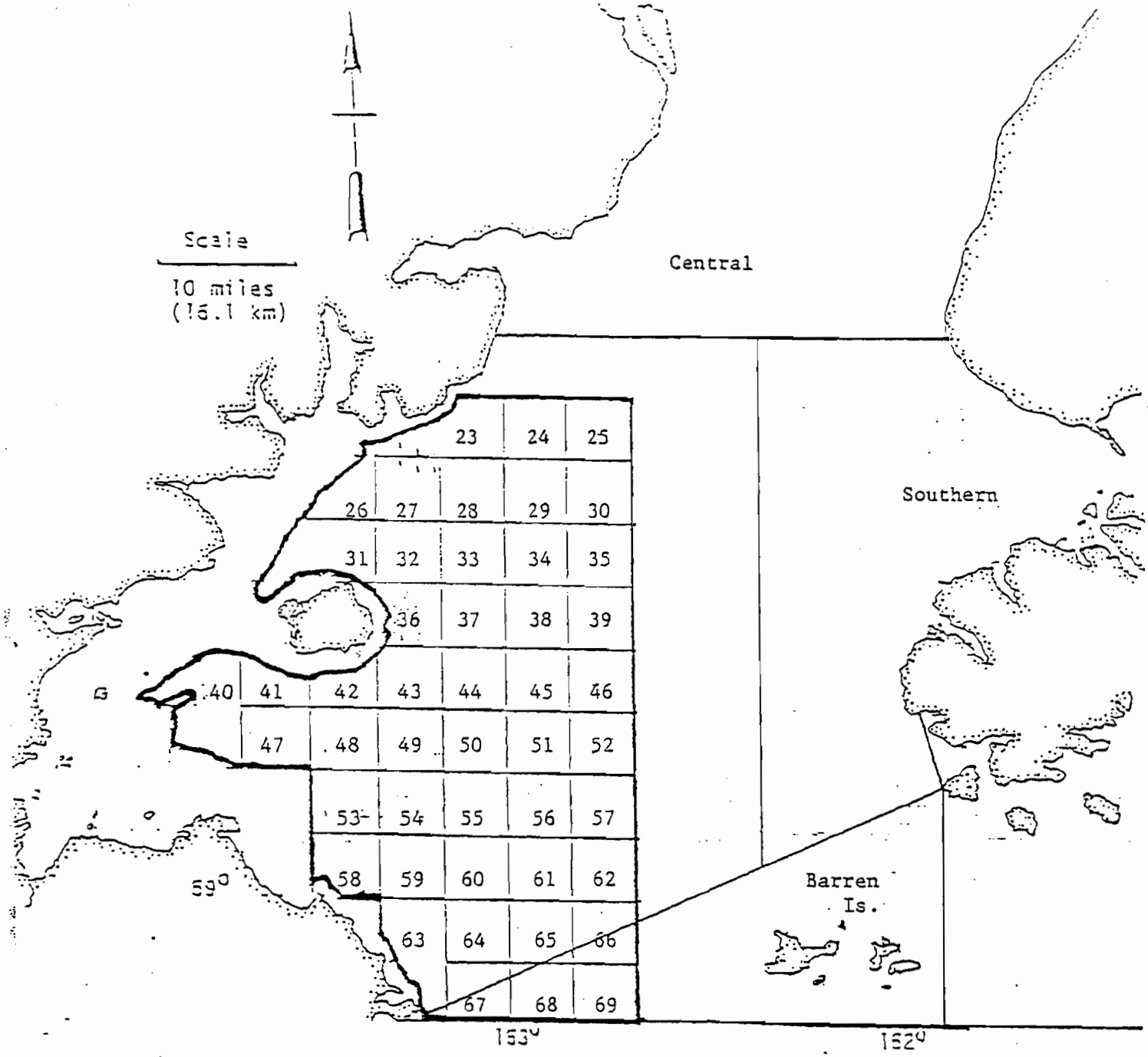

Figure 4. Kamishak and Barren Islands Districts crab trawl survey stations.

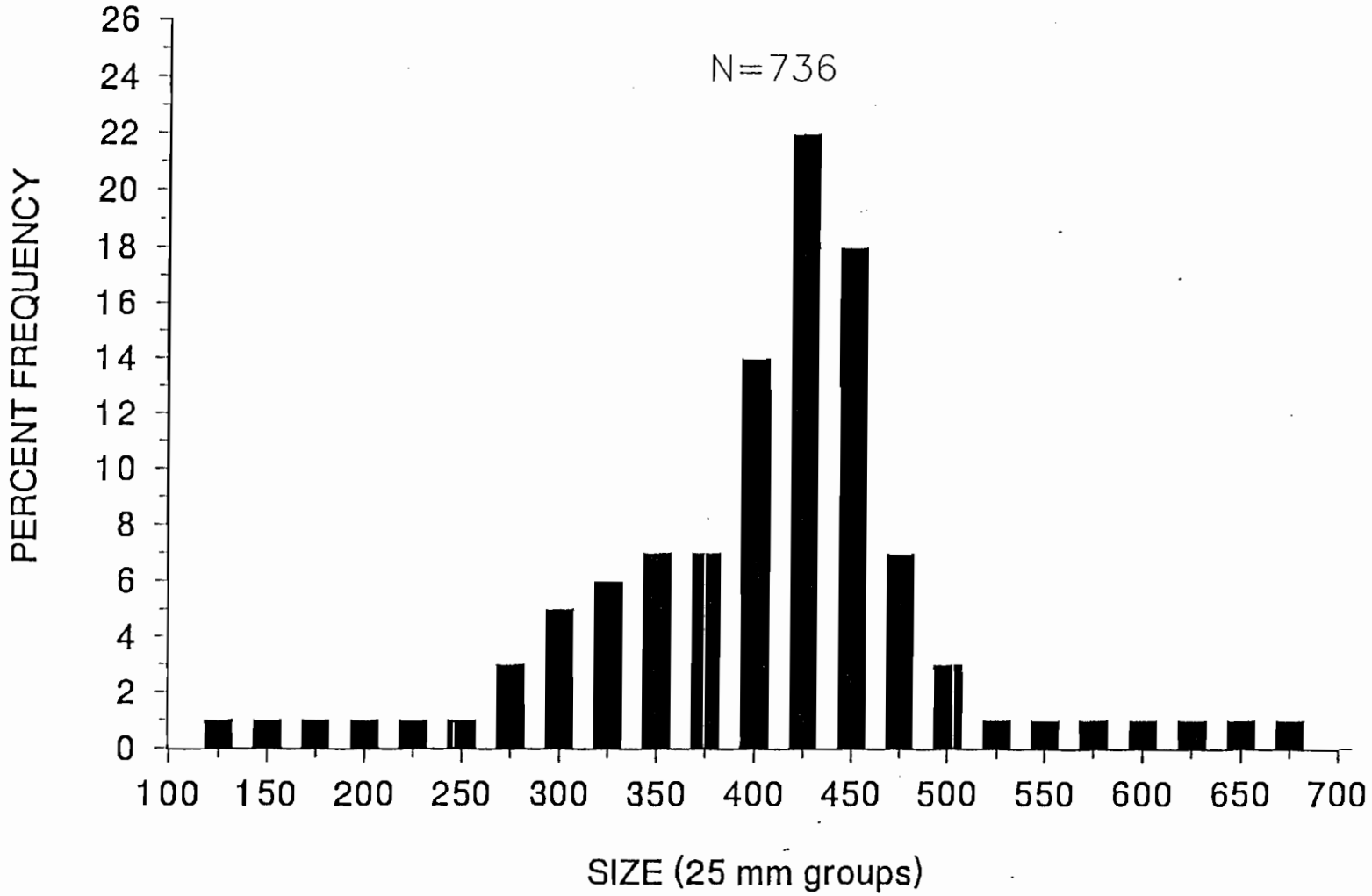

Figure 5. Pollock size frequency, Southern District, 1990 Cook Inlet trawl survey.

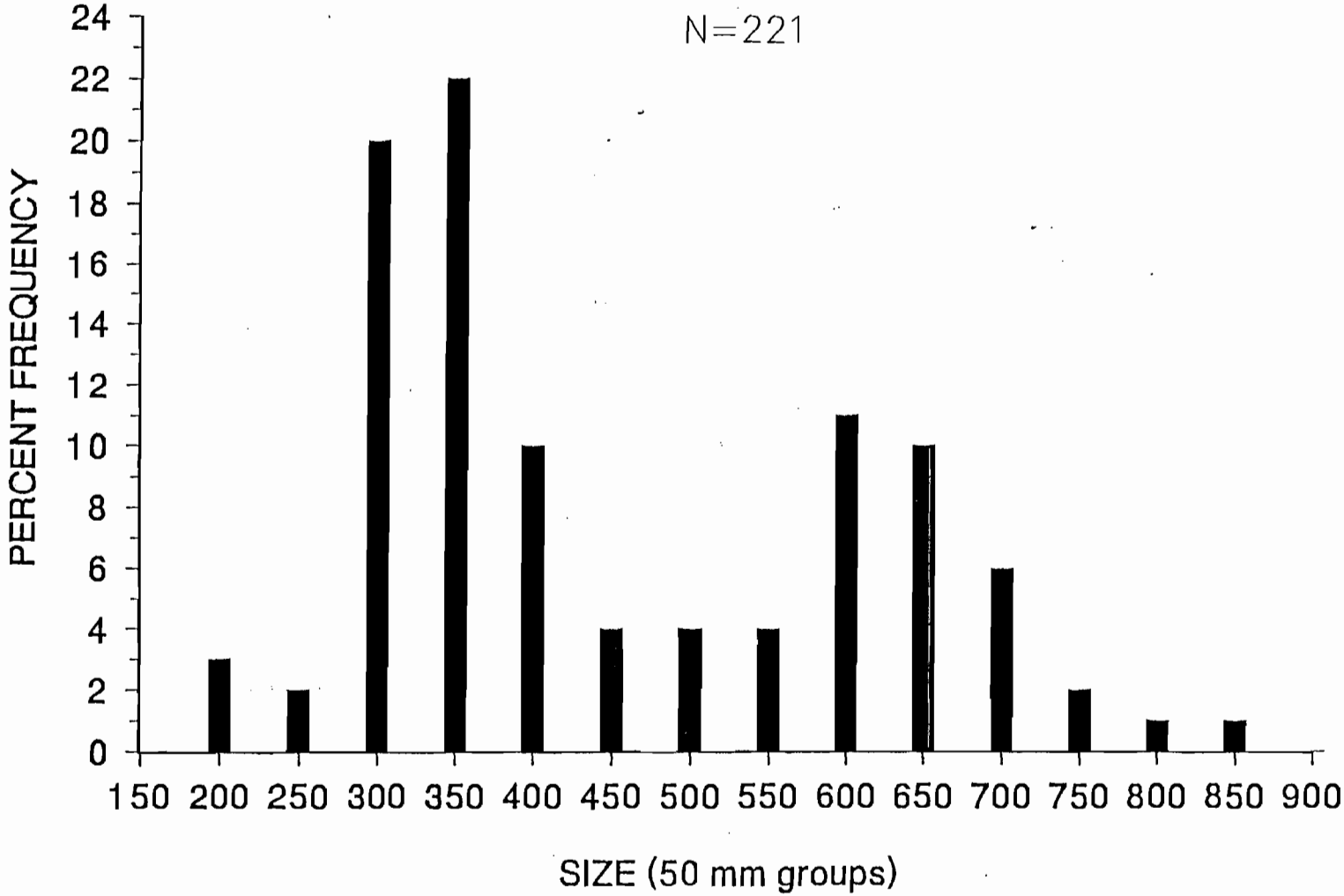

Figure 6. Pacific cod size frequency, Southern District, 1990 Cook Inlet trawl survey.

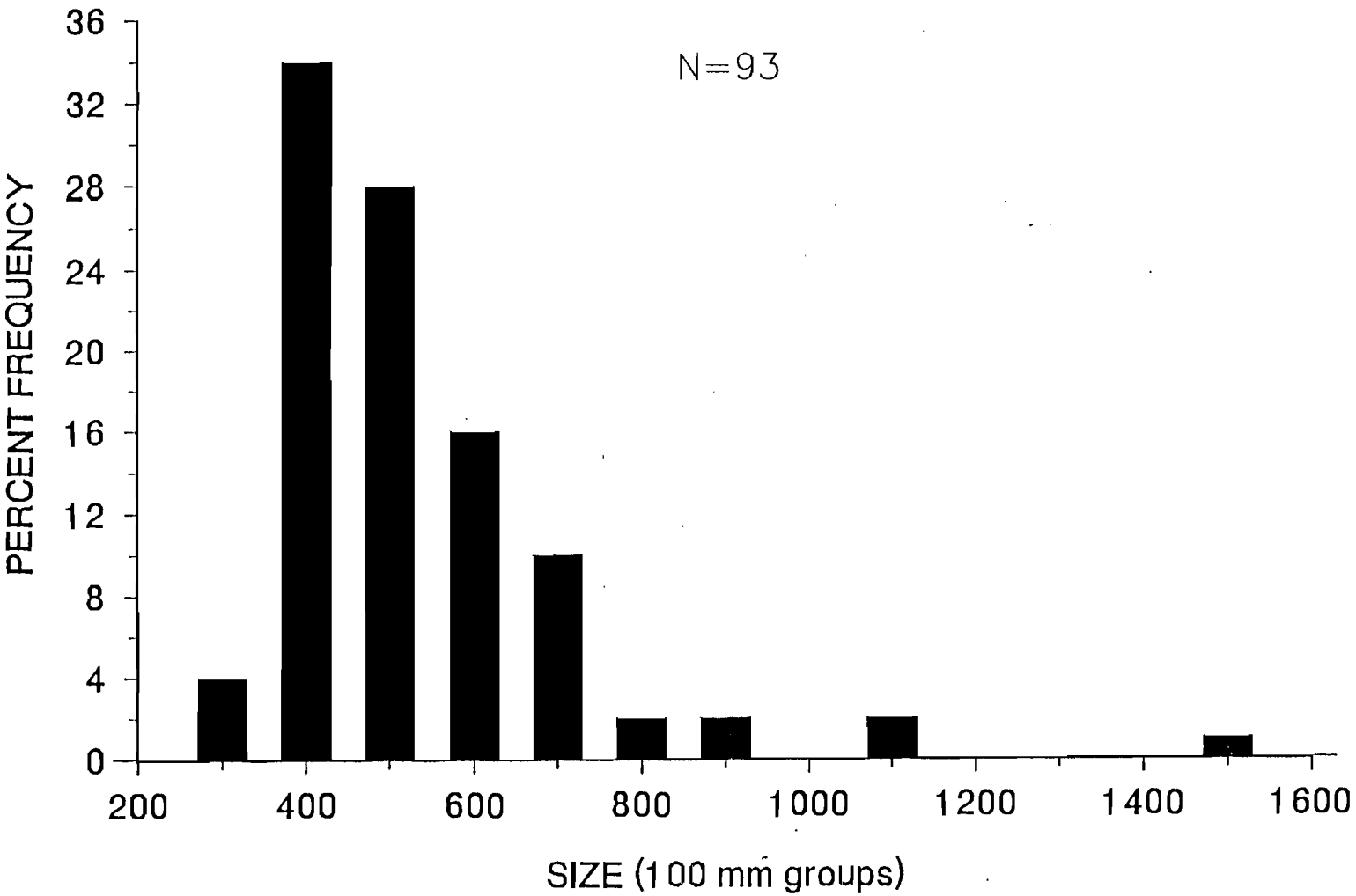

Table 7. Halibut size frequency, Southern District, 1990 Cook Inlet trawl survey.

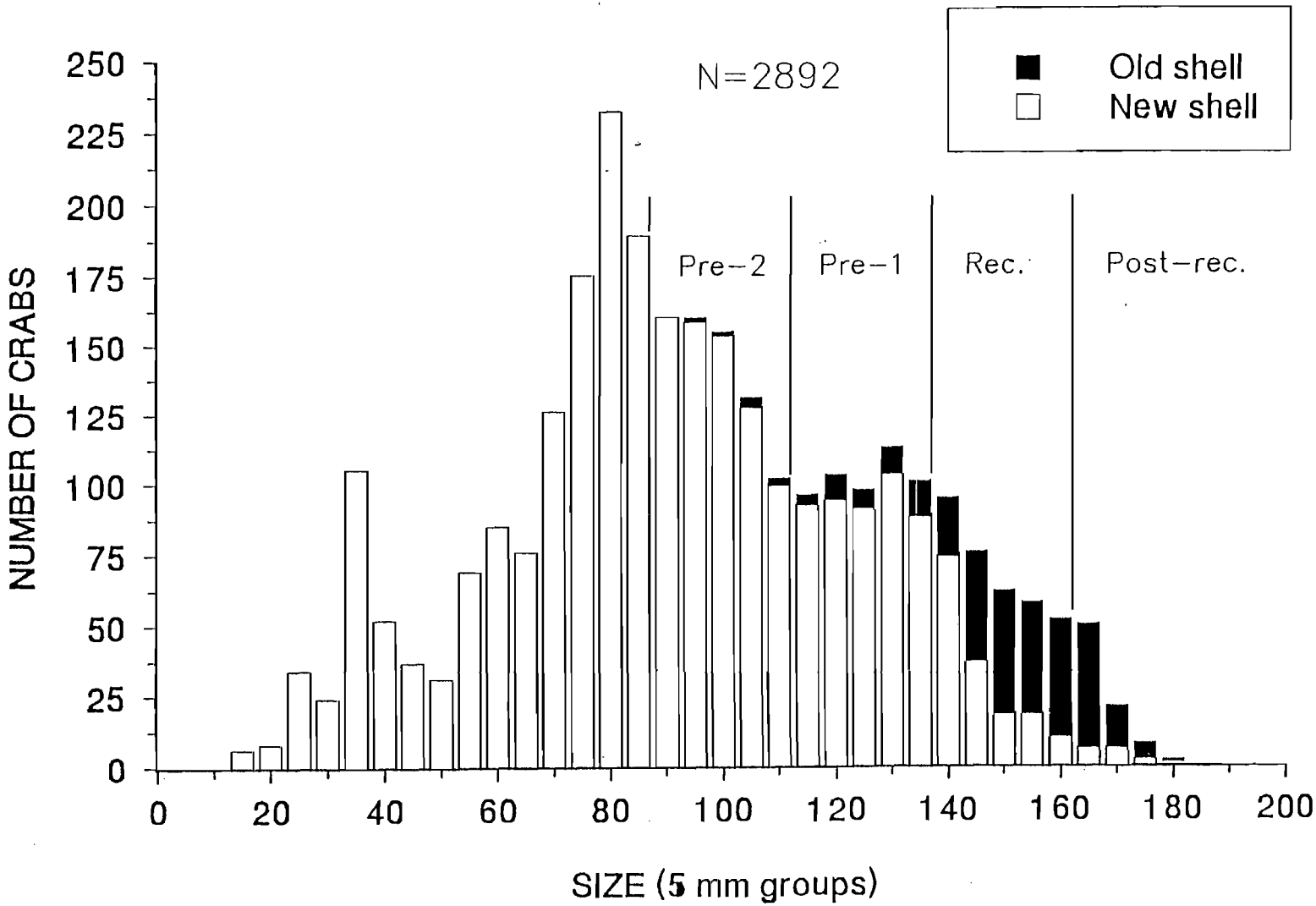

Figure 8. Male Tanner crab size frequency, Southern District, 1990 Cook Inlet trawl survey.

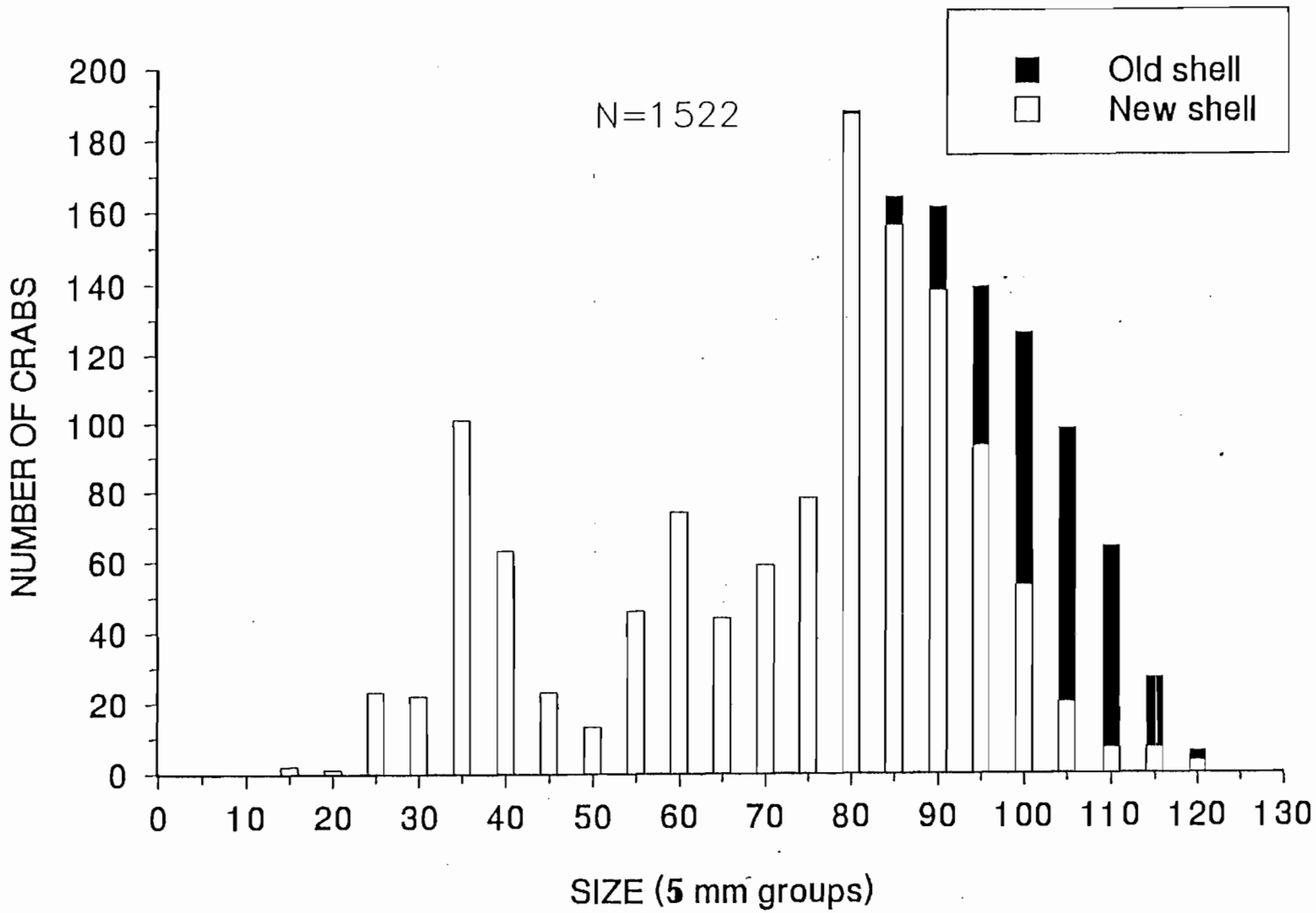

Figure 9. Female Tanner crab size frequency, Southern District, 1990 Cook Inlet trawl survey.

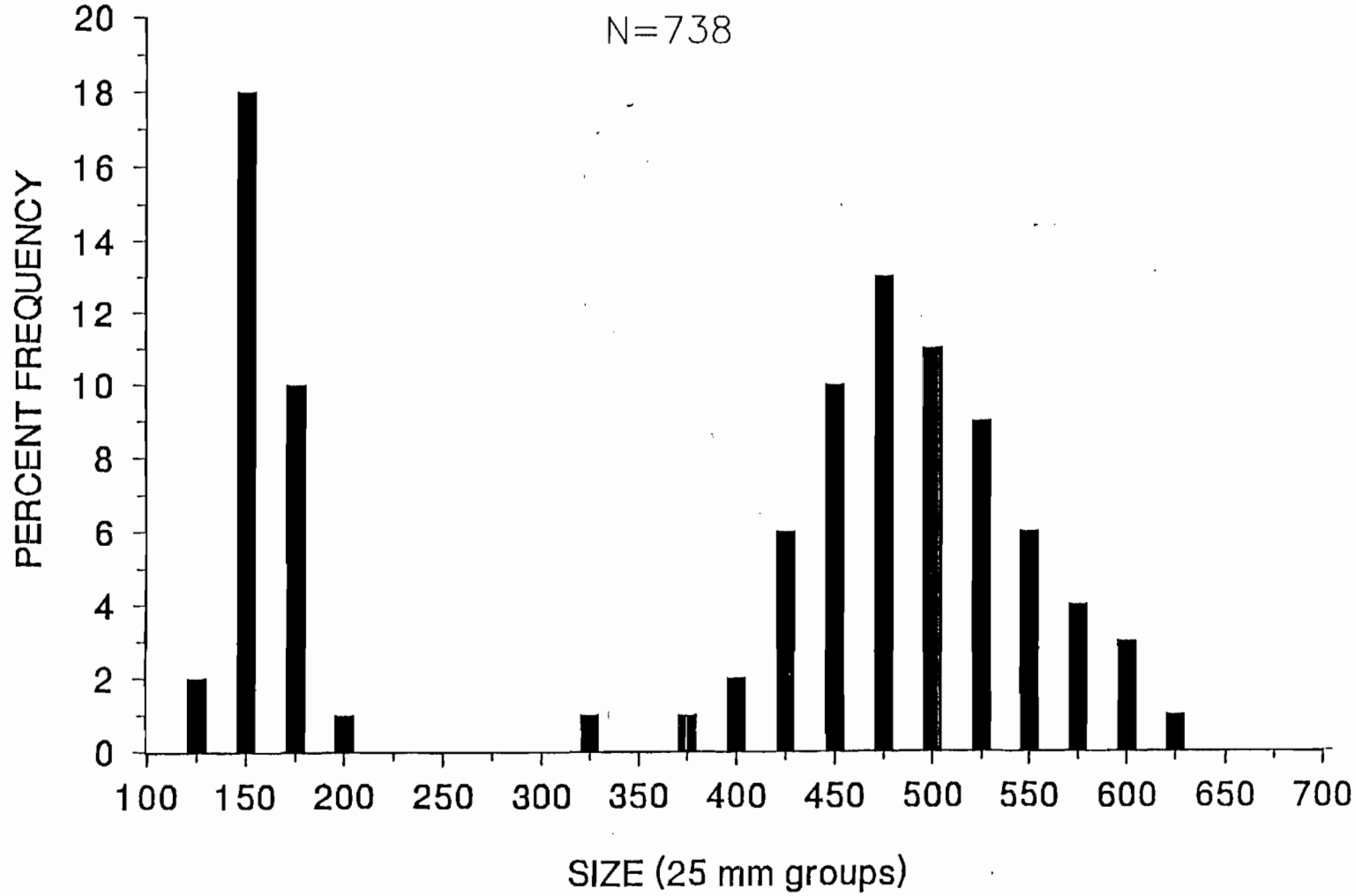

Figure 10. Pollock size frequency, Kamishak District, 1990 Cook Inlet trawl survey.

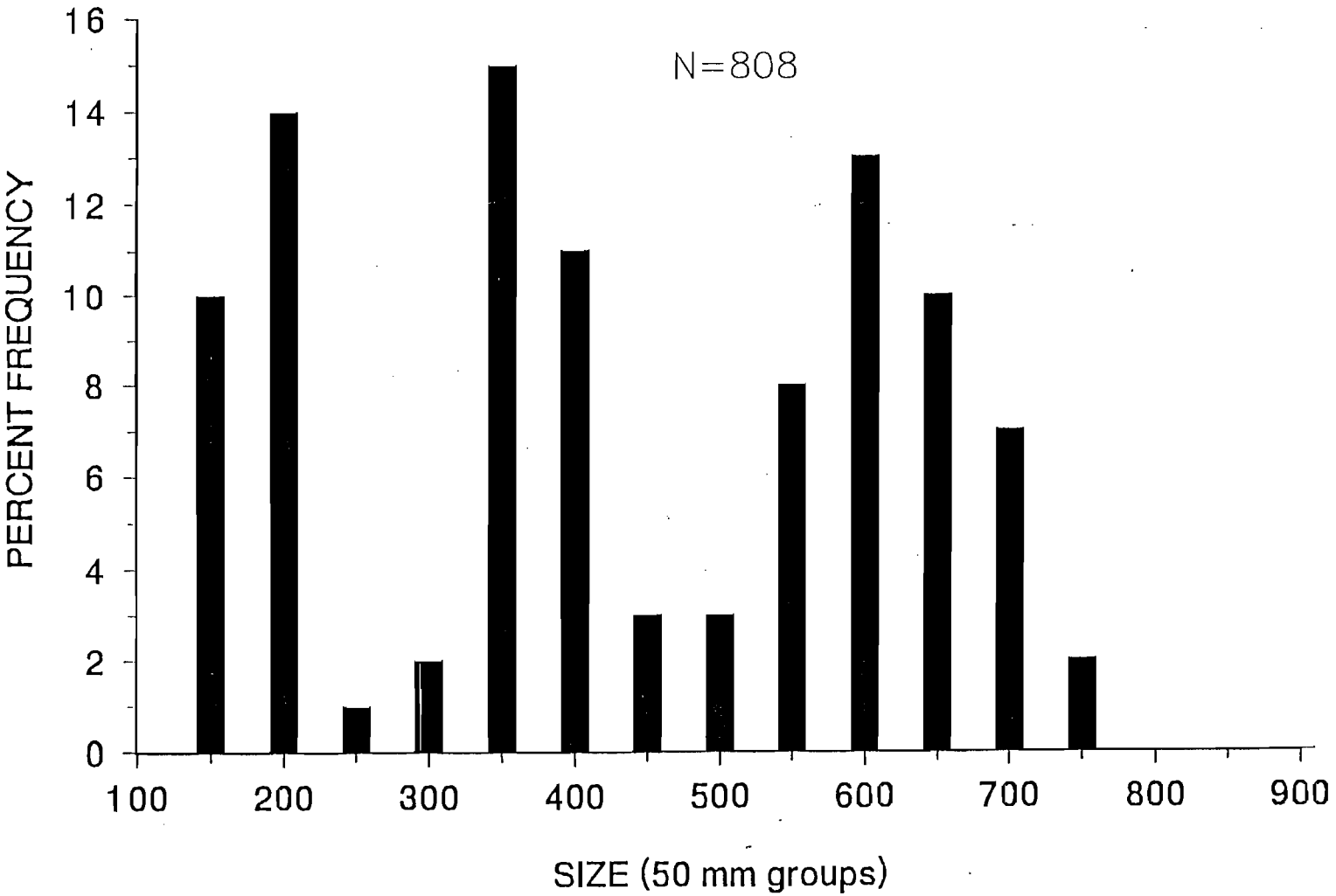

Figure 11. Pacific cod size frequency, Kamishak District, 1990 Cook Inlet trawl trawl survey.

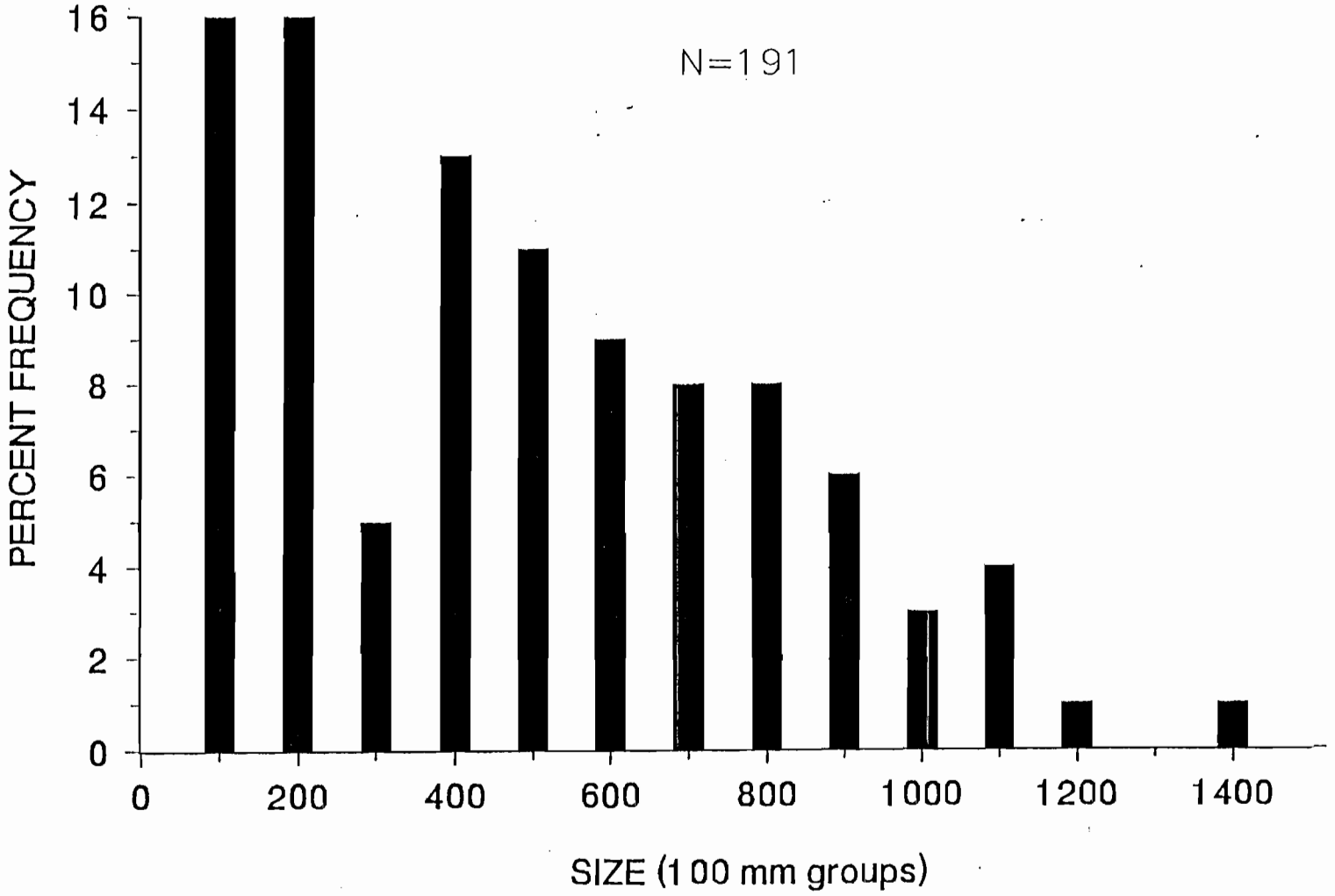

Figure 12. Halibut size frequency, Kamishak District, 1990 Cook Inlet trawl survey.

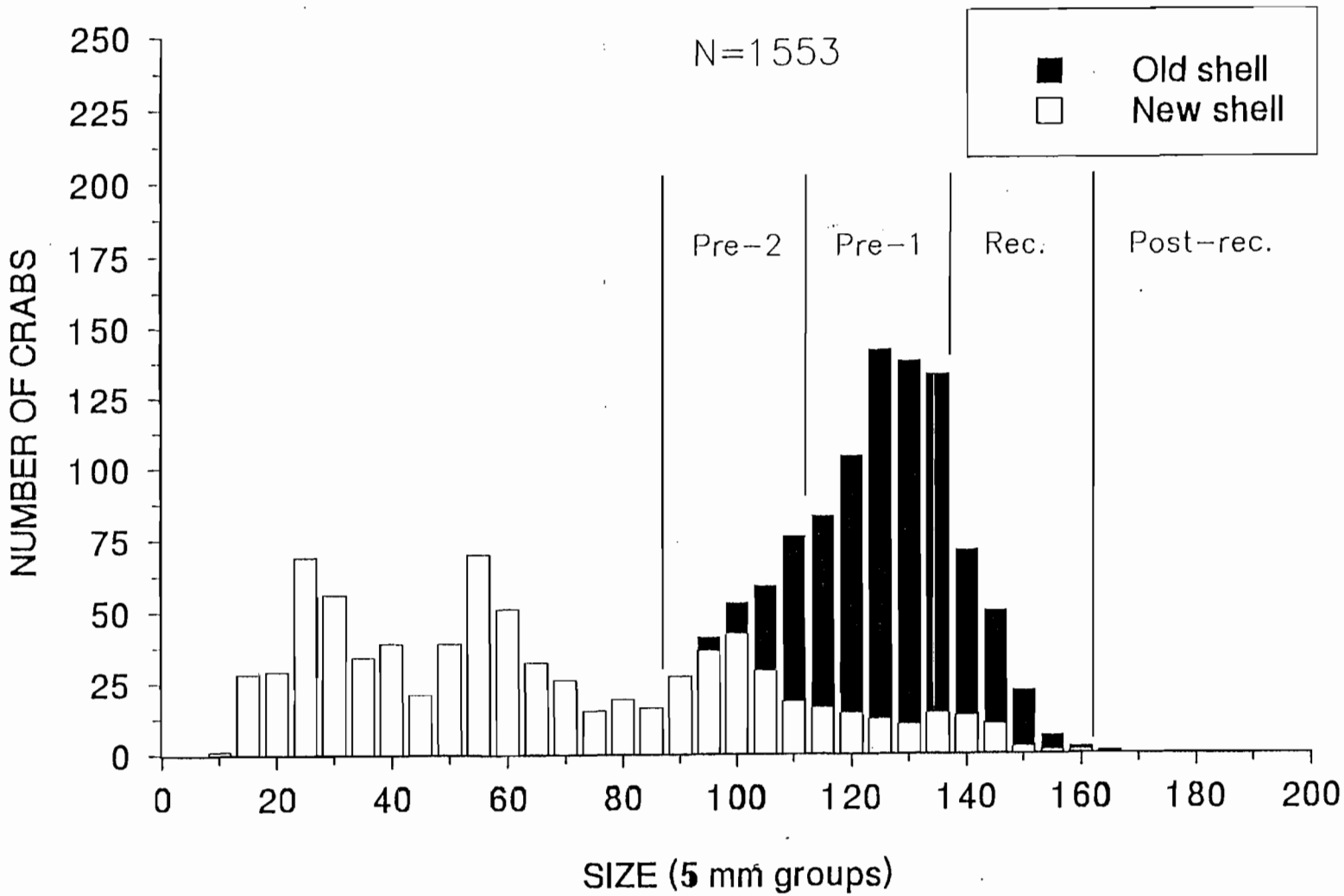

Figure 13. Male Tanner crab size frequency, Kamishak District, 1990 Cook Inlet trawl survey.

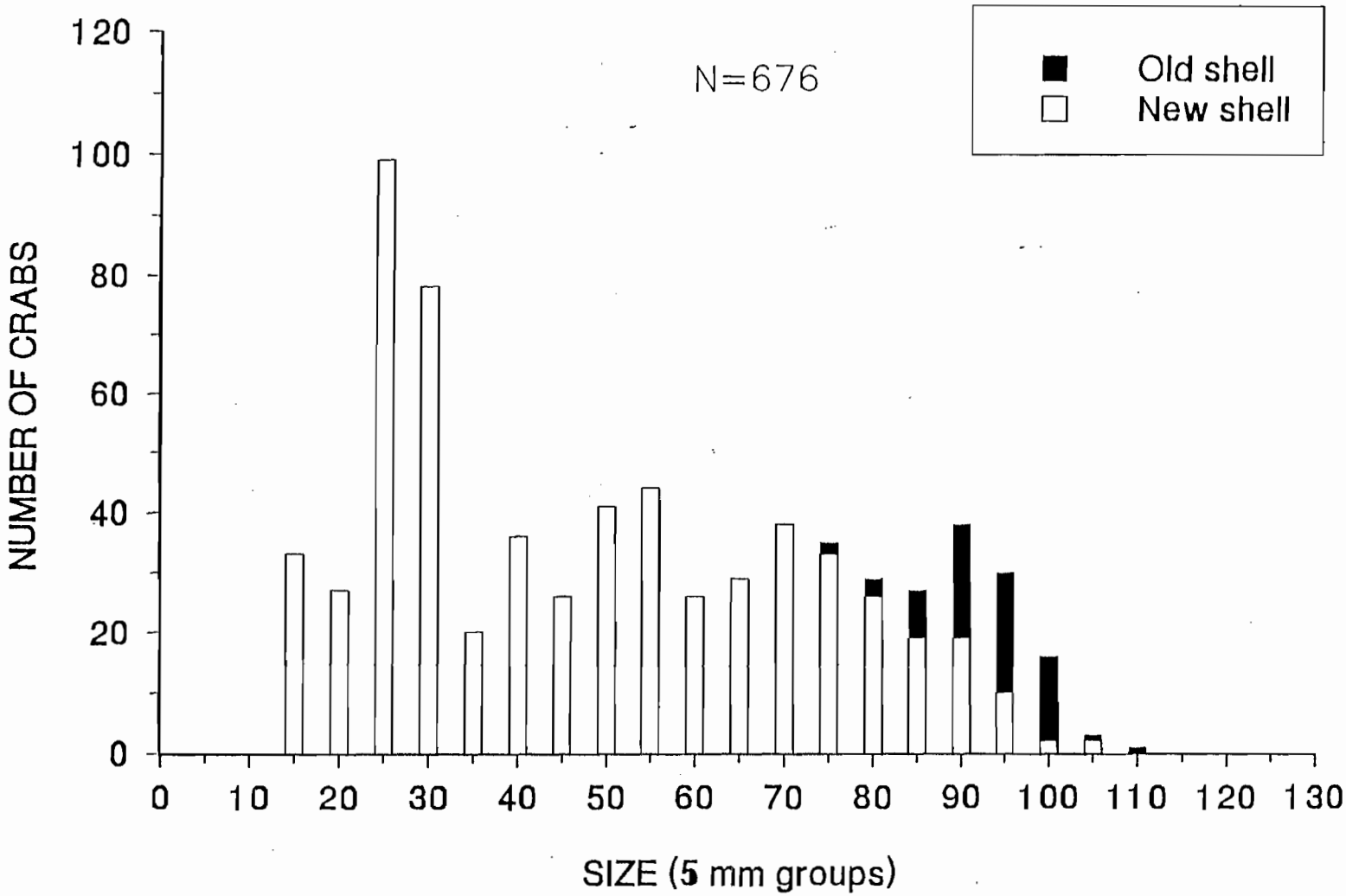

Figure 14. Female Tanner crab size frequency, Kamishak District, 1990 Cook Inlet trawl survey.

Appendix A. Fishing log and catch (lbs.) by station in the Southern District, 1990 Cook Inlet trawl survey.

Station	Area (sqnm)	Date	Latitude (start)	Longitude (start)	Heading (degrees)	Time (min)	Length (nm)	Depth (min)	Depth (max)	Catch (lbs)
1	6.93	07/09/90	59 42.47	151 08.13	35	23	1.00	34	36	1017
2	3.41	07/09/90	59 41.15	151 11.14	190	21	1.00	26	27	994
3	6.25	07/09/90	59 38.36	151 13.34	180	27	1.00	34	38	958
4	2.87	07/11/90	59 37.99	151 17.94	40	24	1.00	32	32	1872
5	4.15	07/09/90	59 38.29	151 21.09	40	26	1.00	14	14	1576
6	5.53	07/11/90	59 36.77	151 19.07	35	23	1.00	38	38	2500
8	7.88	07/08/90	59 34.63	151 28.95	65	23	0.80	51	54	602
9	5.91	07/06/90	59 33.77	151 33.43	45	27	1.00	55	57	1132
10	5.91	07/06/90	59 34.00	151 36.34	215	27	1.00	43	46	760
11	5.91	07/10/90	59 31.20	151 38.90	65	23	1.00	58	60	1276
12	5.91	07/06/90	59 34.31	151 41.79	215	24	1.00	45	46	3182
13	5.91	07/08/90	59 31.38	151 43.70	70	14	0.50	56	57	540
14	5.91	07/06/90	59 34.02	151 46.15	195	16	0.60	40	42	1046
15	5.91	07/10/90	59 30.84	151 48.02	35	24	1.00	45	46	1820
17	5.91	07/08/90	59 34.65	151 51.41	210	27	1.00	17	17	1972
18	5.91	07/10/90	59 31.92	151 53.45	185	23	1.00	33	35	926
19	5.91	07/10/90	59 28.96	151 51.41	212	25	1.00	34	42	5000
20	5.91	07/08/90	59 33.88	151 59.18	170	27	1.00	22	22	10000
21	5.91	07/08/90	59 31.95	151 55.90	200	28	1.00	24	28	6326

Number of stations: 19
Total area (sqnm): 107.94
Total catch (lbs): 43499

Appendix B. Fishing log and catch (lbs.) by station in the Kamishak District, 1990 Cook Inlet trawl survey.

Station	Area (sqnm)	Date	Latitude (start)	Longitude (start)	Heading (degrees)	Time (min)	Length (nm)	Depth (min)	Depth (max)	Catch (lbs)
27	26.12	07/17/90	59 32.95	153 15.46	90	23	1.00	13	14	716
28	26.12	07/17/90	59 33.00	153 05.71	115	22	1.00	18	20	906
29	26.12	07/17/90	59 30.25	152 53.75	245	22	1.00	23	24	390
32	26.12	07/17/90	59 27.60	153 15.81	45	23	1.00	17	17	1012
33	26.12	07/16/90	59 22.44	153 05.07	40	21	0.89	22	22	882
37	26.12	07/16/90	59 27.50	153 05.38	40	25	1.00	26	26	1318
38	26.12	07/15/90	59 22.88	152 53.72	250	23	1.00	32	36	982
39	26.12	07/15/90	59 22.29	152 44.66	205	13	0.50	39	39	500
41	16.84	07/15/90	59 16.25	153 28.77	220	25	1.00	17	17	1106
44	26.12	07/16/90	59 18.03	153 07.07	40	23	1.00	29	30	1470
45	26.12	07/16/90	59 17.73	152 56.63	35	18	0.69	38	41	562
46	26.12	07/15/90	59 17.04	152 47.54	195	22	1.00	51	54	1010
47	25.41	07/16/90	59 13.17	153 35.59	55	23	1.00	19	19	956
48	26.12	07/15/90	59 11.89	153 25.13	75	23	1.00	21	22	744
50	26.12	07/16/90	59 12.73	153 05.07	90	24	1.00	39	40	670
51	26.12	07/15/90	59 12.27	152 54.72	315	24	1.00	56	65	3160
52	26.12	07/12/90	59 12.47	153 47.15	40	14	0.50	66	67	2162
53	26.12	07/15/90	59 09.31	153 25.54	85	22	1.00	24	24	1086
55	26.12	07/15/90	59 07.80	153 06.26	85	23	1.00	57	63	1290
56	26.12	07/15/90	59 07.11	152 54.25	300	25	1.00	76	78	3534
57	26.12	07/12/90	59 07.69	152 46.25	45	23	1.00	80	82	1570
58	24.74	07/13/90	59 04.28	153 25.79	90	21	1.00	26	29	2878
60	26.12	07/13/90	59 03.06	153 05.78	115	22	1.00	73	76	2562
61	26.12	07/12/90	59 03.17	152 54.97	50	14	0.50	82	82	668
64	26.12	07/13/90	58 56.79	153 05.38	60	14	0.50	89	89	1500
65	26.12	07/13/90	58 58.00	152 55.22	125	23	1.00	90	91	1768
67	26.12	07/13/90	58 53.22	153 03.43	225	23	1.00	88	91	1706
68	26.12	07/13/90	58 53.36	152 55.95	20	23	1.00	89	89	1066

Number of stations: 28
Total area (sqnm): 719.99
Total catch (lbs): 38174

Appendix C. Catch composition by weight of non-target species by station, Southern District, 1990 Cook Inlet trawl survey.

Station number: 1

Species	Weight (lbs.)
debris	10.42
flathead sole	5.82
butter sole	1.03
invertebrate unident	1.14
arrowtooth flounder	1.27
Total sub-sample weight =	19.709 pounds

Station number: 2

Species	Weight (lbs.)
flathead sole	6.04
yellowfin sole	4.14
sculpin unident	41.99
arrowtooth flounder	0.24
shrimp inident	0.37
debris	10.00
smelt unident	0.08
Total sub-sample weight =	62.890 pounds

Station number: 3

Species	Weight (lbs.)
sculpin unident	11.64
yellowfin sole	1.63
Alaska plaice	3.92
arrowtooth flounder	0.41
flathead sole	8.70
debris	75.99
invertebrate unident	3.48
Total sub-sample weight =	105.805 pounds

Station number: 4

Species	Weight (lbs.)
rock sole	2.46
flathead sole	13.99
arrowtooth flounder	13.99
debris	26.00

invertebrate unident	0.30
sculpin unident	18.00
Total sub-sample weight =	74.777 pounds

Station number: 5

Species	Weight (lbs.)
debris	33.99
English sole	0.33
yellowfin sole	1.85
rock sole	0.97
flathead sole	5.04
invertebrate unident	6.23
sculpin unident	16.00
Total sub-sample weight =	64.440 pounds

Station number: 6

Species	Weight (lbs.)
flathead sole	51.99
arrowtooth flounder	2.57
invertebrate unident	5.37
debris	6.00
sculpin unident	6.00
Total sub-sample weight =	71.960 pounds

Station number: 8

Species	Weight (lbs.)
Dover sole	5.09
arrowtooth flounder	8.00
flathead sole	19.81
invertebrate unident	2.97
rex sole	1.32
sculpin unident	0.68
eelpout unident	0.55
debris	30.00
Total sub-sample weight =	68.446 pounds

Station number: 9

Species	Weight (lbs.)
arrowtooth flounder	4.56

eelpout unident	2.50
invertebrate unident	1.31
debris	11.99
flathead sole	30.00
Dover sole	0.87
rex sole	1.69
sculpin unident	1.42
smelt unident	0.07
Total sub-sample weight =	54.444 pounds

Station number: 10

Species	Weight (lbs.)
Alaska plaice	1.99
sculpin unident	0.31
eelpout unident	2.79
weathervane scallop	1.48
invertebrate unident	2.43
debris	8.99
rex sole	3.49
yellowfin sole	1.00
flathead sole	26.99
Dover sole	2.67
arrowtooth flounder	8.99
Total sub-sample weight =	61.215 pounds

Station number: 11

Species	Weight (lbs.)
invertebrate unident	5.20
Dover sole	27.86
rex sole	7.47
arrowtooth flounder	23.99
flathead sole	10.00
debris	3.21
Total sub-sample weight =	77.760 pounds

Station number: 12

Species	Weight (lbs.)
flathead sole	13.40
Dover sole	39.04
English sole	3.10
sculpin unident	3.28
invertebrate unident	1.75
fish unident	1.75

arrowtooth flounder	8.35
rex sole	2.46
Total sub-sample weight =	73.170 pounds

Station number: 13

Species	Weight (lbs.)
arrowtooth flounder	5.53
English sole	1.32
flathead sole	4.45
rex sole	25.35
poacher unident	0.06
invertebrate unident	18.84
debris	8.33
Dover sole	14.10
Total sub-sample weight =	78.020 pounds

Station number: 14

Species	Weight (lbs.)
English sole	40.00
rex sole	4.51
Dover sole	4.18
sculpin unident	2.64
tomcod	0.99
arrowtooth flounder	4.54
flathead sole	4.89
eelpout unident	0.66
starry flounder	6.00
debris	9.81
Total sub-sample weight =	78.262 pounds

Station number: 15

Species	Weight (lbs.)
butter sole	23.99
arrowtooth flounder	11.99
sculpin unident	0.70
invertebrate unident	2.40
flathead sole	15.43
Dover sole	1.85
rex sole	16.82
Total sub-sample weight =	73.212 pounds

Appendix C. Continued.

Station number: 17

Species	Weight (lbs.)
invertebrate unident	13.99
debris	1.12
poacher unident	0.17
sculpin unident	2.32
starry flounder	1.46
butter sole	33.99
arrowtooth flounder	2.53
English sole	3.69
sand dollar unident	2.53
cucumaria sp.	4.36
Total sub-sample weight =	66.219 pounds

Station number: 18

Species	Weight (lbs.)
English sole	2.82
butter sole	35.99
debris	1.23
arrowtooth flounder	11.41
tomcod	1.63
invertebrate unident	8.50
poacher unident	0.63
sculpin unident	8.04
Total sub-sample weight =	70.302 pounds

Station number: 19

Species	Weight (lbs.)
sea urchin unident	0.00
debris	0.00
starfish unident	0.00
Total sub-sample weight =	0.000 pounds

Station number: 20

Species	Weight (lbs.)
Pacific halibut	0.00
Pacific cod	0.00
starfish unident	0.00
sand dollar unident	0.00
butter sole	0.00
cucumaria sp.	0.00

Total sub-sample weight = 0.000 pounds

Station number: 21

Species	Weight (lbs.)
cucumaria sp.	0.00
debris	5.26
invertebrate unident	21.37
Pacific halibut	0.00
rock sole	21.00
butter sole	0.00
Pacific cod	0.00
sculpin unident	0.95
starfish unident	0.00
sand dollar unident	0.00
cucumaria sp.	19.19

Total sub-sample weight = 67.802 pounds

Note - Station weights taken from 1 basket sub-sample after target species have been sorted from catch.

Appendix D. Catch composition by weight of non-target species by station, Kamishak District, 1990 Cook Inlet trawl survey.

Station number: 27

Species	Weight (lbs.)
debris	23.00
butter sole	0.88
poacher unident	0.30
Pacific cod	1.10
pollock	0.30
arrowtooth flounder	0.37
flathead sole	0.44
yellowfin sole	17.63
rock sole	1.43
sculpin unident	0.48
greenling unident	0.88
invertebrate unident	23.00
Total sub-sample weight =	69.854 pounds

Station number: 28

Species	Weight (lbs.)
rock sole	5.84
arrowtooth flounder	2.02
flathead sole	2.38
yellowfin sole	14.10
invertebrate unident	15.00
debris	15.00
poacher unident	0.15
sculpin unident	0.99
butter sole	8.75
Total sub-sample weight =	64.259 pounds

Station number: 29

Species	Weight (lbs.)
butter sole	4.85
arrowtooth flounder	1.41
rock sole	3.70
invertebrate unident	0.63
debris	48.00
smelt unident	0.61
sea urchin unident	2.82
tomcod	0.19

Total sub-sample weight = 62.242 pounds

Station number: 32

Species	Weight (lbs.)
debris	20.00
pollock	0.17
invertebrate unident	20.00
butter sole	3.06
Pacific cod	0.81
flathead sole	3.96
yellowfin sole	10.49
fish unident	1.89
arrowtooth flounder	0.13

Total sub-sample weight = 60.547 pounds

Station number: 33

Species	Weight (lbs.)
weathervane scallop	10.80
invertebrate unident	14.85
Alaska plaice	1.41
tomcod	0.26
yellowfin sole	7.27
butter sole	30.00
arrowtooth flounder	2.49
flathead sole	0.08

Total sub-sample weight = 67.191 pounds

Station number: 37

Species	Weight (lbs.)
crab unident	0.41
weathervane scallop	3.08
sculpin unident	0.22
tomcod	0.18
arrowtooth flounder	0.68
flathead sole	1.16
yellowfin sole	7.01
rock sole	0.37
butter sole	6.96
poacher unident	0.06

Total sub-sample weight = 20.183 pounds

Appendix D. Continued.

Station number: 38

Species	Weight (lbs.)
flathead sole	1.38
butter sole	33.99
poacher unident	0.19
invertebrate unident	1.62
debris	1.62
arrowtooth flounder	24.58
Total sub-sample weight =	63.408 pounds

Station number: 39

Species	Weight (lbs.)
invertebrate unident	4.25
sculpin unident	7.34
poacher unident	0.04
arrowtooth flounder	5.99
rock sole	13.99
butter sole	43.99
Total sub-sample weight =	75.635 pounds

Station number: 41

Species	Weight (lbs.)
yellowfin sole	11.83
pollock	0.37
debris	0.06
flathead sole	0.13
Pacific cod	6.23
starry flounder	2.68
rock sole	6.54
butter sole	2.71
arrowtooth flounder	1.23
fish unident	4.21
Total sub-sample weight =	36.045 pounds

Station number: 44

Species	Weight (lbs.)
butter sole	38.00
rock sole	2.64
flathead sole	1.03
Pacific cod	1.52
weathervane scallop	5.07

invertebrate unident	0.38
yellowfin sole	9.14
rex sole	0.94
fish unident	0.38
arrowtooth flounder	16.53
Total sub-sample weight =	75.677 pounds

Station number: 45

Species	Weight (lbs.)
weathervane scallop	8.48
invertebrate unident	12.43
arrowtooth flounder	3.68
sculpin unident	2.46
butter sole	18.58
rock sole	26.89
Total sub-sample weight =	72.553 pounds

Station number: 46

Species	Weight (lbs.)
debris	0.66
invertebrate unident	0.66
arrowtooth flounder	13.31
rock sole	2.07
butter sole	61.99
Total sub-sample weight =	78.710 pounds

Station number: 47

Species	Weight (lbs.)
starry flounder	3.72
flathead sole	3.76
Dover sole	0.04
yellowfin sole	22.31
arrowtooth flounder	1.10
debris	13.99
Alaska plaice	1.69
poacher unident	0.02
invertebrate unident	13.99
butter sole	0.22
Total sub-sample weight =	60.891 pounds

Appendix D. Continued.

Station number: 48

Species	Weight (lbs.)
rock sole	1.91
butter sole	0.99
poacher unident	0.44
yellowfin sole	18.73
debris	11.00
arrowtooth flounder	4.98
flathead sole	2.40
searcher	0.22
Pacific herring	0.02
sculpin unident	0.11
smelt unident	0.44
invertebrate unident	11.00
Total sub-sample weight =	52.271 pounds

Station number: 50

Species	Weight (lbs.)
debris	4.94
English sole	0.61
Dover sole	0.33
rex sole	1.34
rock sole	7.82
butter sole	28.00
Pacific cod	0.99
invertebrate unident	4.94
arrowtooth flounder	30.00
Total sub-sample weight =	79.010 pounds

Station number: 51

Species	Weight (lbs.)
rex sole	0.44
butter sole	18.14
arrowtooth flounder	43.99
Dover sole	11.94
Total sub-sample weight =	74.533 pounds

Station number: 52

Species	Weight (lbs.)
Dover sole	6.98
butter sole	8.28

invertebrate unident	6.59
flathead sole	1.19
arrowtooth flounder	60.00
Total sub-sample weight =	83.060 pounds

Station number: 53

Species	Weight (lbs.)
flathead sole	12.12
arrowtooth flounder	6.83
butter sole	4.51
poacher unident	0.03
tomcod	0.33
yellowfin sole	16.31
eelpout unident	0.48
weathervane scallop	1.49
invertebrate unident	11.99
debris	11.99
smelt unident	1.05
Total sub-sample weight =	67.198 pounds

Station number: 55

Species	Weight (lbs.)
arrowtooth flounder	38.00
Dover sole	4.73
flathead sole	2.64
rock sole	1.76
sculpin unident	1.16
invertebrate unident	11.00
debris	11.00
rex sole	1.10
Total sub-sample weight =	71.422 pounds

Station number: 56

Species	Weight (lbs.)
arrowtooth flounder	64.88
invertebrate unident	8.64
Dover sole	3.74
Total sub-sample weight =	77.271 pounds

Table D. Continued.

Station number: 57

Species	Weight (lbs.)
arrowtooth flounder	21.99
debris	9.03
rex sole	0.63
sea urchin unident	21.99
invertebrate unident	9.03
Dover sole	2.33
Total sub-sample weight =	65.053 pounds

Station number: 58

Species	Weight (lbs.)
eelpout unident	0.70
invertebrate unident	18.00
debris	18.00
yellowfin sole	0.99
flathead sole	7.23
arrowtooth flounder	16.00
Total sub-sample weight =	60.930 pounds

Station number: 60

Species	Weight (lbs.)
invertebrate unident	30.00
arrowtooth flounder	16.00
Dover sole	9.61
debris	16.00
searcher	1.27
Calif. sea cucumber	0.33
rex sole	0.44
Total sub-sample weight =	73.664 pounds

Station number: 61

Species	Weight (lbs.)
arrowtooth flounder	26.00
rex sole	0.85
sculpin unident	1.67
invertebrate unident	6.45
Dover sole	10.00

Total sub-sample weight = 44.995 pounds

Station number: 64

Species	Weight (lbs.)
debris	0.00
Pacific cod	0.00
pollock	0.00
invertebrate unident	0.00
Dover sole	0.00
arrowtooth flounder	0.00

Total sub-sample weight = 0.000 pounds

Station number: 65

Species	Weight (lbs.)
Dover sole	3.85
flathead sole	5.95
arrowtooth flounder	60.00
invertebrate unident	6.28
debris	6.28
eulachon	0.99
eelpout unident	1.21

Total sub-sample weight = 84.581 pounds

Station number: 67

Species	Weight (lbs.)
invertebrate unident	18.73
debris	21.99
Dover sole	1.60
sea urchin unident	10.00
arrowtooth flounder	16.00
flathead sole	6.17

Total sub-sample weight = 74.522 pounds

Station number: 68

Species	Weight (lbs.)
arrowtooth flounder	43.99
flathead sole	7.23
smelt unident	1.10
eelpout unident	0.17

Appendix D. Continued.

weathervane scallop	0.24
invertebrate unident	21.99
Total sub-sample weight =	74.751 pounds

Note - Station weights taken from 1 basket sub-sample after target species have been sorted from catch.