



INVESTIGATIONS OF LIFE HISTORY AND FISHERY FOR TANNER CRAB  
(Chionoecetes bairdi) IN THE WESTWARD REGION, ALASKA, 1983

By:  
William A. Colgate

February 1985

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(*Chionoecetes bairdi*) IN THE WESTWARD REGION, ALASKA, 1983

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## ABSTRACT

The pilot trawl survey program to assess Tanner Crab, *Chionoecetes bairdi*, population in the Western Gulf of Alaska continued in 1983. Surveys were completed in the North Mainland fishing section of the Kodiak Management District, the Chignik Management District, and Pavlof Bay of the South Peninsula Management District. Some effort was directed to the question of sampling intensity with inconclusive results. Sampling effort was greater than on previous surveys. Valuable information was gained on prerecruit males in all areas surveyed. Declining recruitment can be expected in the North Mainland and Chignik areas in 1984, 1985, and 1986. Increasing recruitment can be expected in Pavlof Bay during the same period. Reproductive condition of females appears healthy in all trawl survey areas. Population indexing surveys using pots were conducted in the Kodiak and South Peninsula Management Districts in 1983. In Kodiak, some stocks of legal size crabs showed increases in relative abundance while other stocks experienced declines. District-wide the index of legal size crabs showed a slight increase (+ 7%). Kodiak female reproductive condition looked healthy in 1983. The pot survey in the South Peninsula Management District covered less than the normal area because of time constraints. In the area surveyed some stocks showed increases in legal crab abundance while other stocks showed declines over 1982. The district-wide increase of 16% was probably misleading since the offshore areas where recruitment has been poor in recent years was not surveyed. Female reproductive condition in the South Peninsula looked good in 1983. Size frequency information in the two districts shows a highly variable recruitment picture for the foreseeable future in the substocks surveyed. Continued studies on Black Mat Syndrome (*Trichomarix invadens*) show that the incidence of the disease declined in the Kodiak commercial catch in 1983 while increases were seen in some areas of the district in the pot survey samples. The disease seems to be more common in sublegal crabs than in legal size males and in oldshell individuals rather than in newshell crabs. This may be the result of a higher fishing mortality inflicted on the oldshell legal crab population (accumulated effect over several commercial seasons). Adult females show a higher incidence of this disease, a probable result of the terminal molt to maturity.

KEY WORDS: Tanner crab, *Chionoecetes bairdi*, trawl survey, population index, Western Gulf of Alaska, Black Mat Syndrome.

## EXPLANATION OF TERMS

### Newshe11 (NS)

- Hard exoskeletal animals. The dorsal side of the carapace is brownish-red. No apparent scratching on ventral side. Epifauna is absent or limited. Dactyli, pterygostomial and branchial spines sharp.

### Oldshell (OS)

- An apparent skipmolt. Carapace is hard and brownish. The thoracic sternum and ventral sides of the legs have obtained numerous scratches and abrasions. Dactyli, pterygostomial and branchial spines are worn. Epifauna may be present.

### Very Oldshell (OS)

- An obvious skipmolt. Carapace is hard, dark to blackish. Thoracic sternum and ventral side of legs with multiple scratches and abrasions. Underside of legs may be dark yellow-brown. Dactyli, pterygostomial and branchial spines heavily worn. Epifauna usually present, e.g. large barnacles.

### Molting

- All physiological events leading up to ecdysis, including ecdysis.

### Skip molt

- A crab which has not molted in more than 12 months.

### Crab Measurements

- All crab measurements, e.g.  $\leq 69$  mm, refer to carapace width (CW) unless otherwise noted.

### Size and Age Groups:

#### Prerecruit Fours

- Male Tanner crabs  $\leq 69$  mm in carapace width and 4 or more molts from attaining legal size. Note that this group includes prerecruit four, five, six and younger crabs, but are referred to as prerecruit fours herein.

#### Prerecruit Threes

- Male Tanner crabs 70-91 mm in carapace width and 3 molts from attaining legal size.

#### Prerecruit Twos

- Male Tanner crabs 92-114 mm in carapace width and 2 molts from attaining legal size.

#### Prerecruit Ones

- Male Tanner crabs 115-139 mm in carapace width and 1 molt from attaining legal size.

#### Recruit Legals

- Newshe11 male Tanner crabs 140-164 mm in carapace width, recruited to legal size in year of capture.

#### Postrecruit Legals

- Oldshell and very oldshell male Tanner crabs 140-164 mm and all males  $> 164$  mm in carapace width. Have been legal size at least one year.

#### Total Legals

- Male Tanner crabs  $> 139$  mm in carapace width.

## PILOT TRAWL SURVEY

### Introduction

One of the responsibilities of the Alaska Department of Fish and Game (ADF&G) is the assessment of red king crab (*Paralithodes camtschatica*) and Tanner crab (*Chionoecetes bairdi*) stocks in the Western Gulf of Alaska. Data obtained from the assessment program are used to estimate the annual abundance of legal male crabs and predict recruitment trends 2 to 4 years in advance of crabs attaining commercial size. These estimates and predictions are utilized by the ADF&G to establish annual harvest levels and harvesting strategies in order to obtain optimum yield under management policies enacted by the Alaska Board of Fisheries and the North Pacific Fishery Management Council (NPFMC).

In 1972 an experimental crab stock assessment program was begun which used special crab pots to simultaneously collect king and Tanner crabs. The experimental design called for sampling the crab stocks through one life cycle of crabs, roughly 8 to 10 years, so that the method could be adequately tested and evaluated. The tenth year of the crab pot index program was completed in August 1982. Some factors associated with using pots as a sampling tool for the Tanner crab have been identified: (1) Catchability of crabs is variable and dependent on crab size, attraction to a given bait, and ability to escape from a pot they have entered; (2) Determining the fishing power of a pot(s) or fraction of the population captured per unit time and area is a complex and difficult task for which current methodologies have produced variable results; and (3) Tanner crab behavioral traits are such that crabs one or more years away from entering the fishery do not appear to be captured by successive surveys in a manner reflecting their subsequent predicted abundance as recruits.

Whereas pots have historically been used to assess crab stocks in the Gulf of Alaska, trawls have successfully been used by the National Marine Fisheries Service (NMFS) to assess crab stocks in the Bering Sea (Reeves 1979). The need for better assessment data, particularly for prerecruit Tanner crab, has generated interest in the use of trawls as a management tool in the Western Gulf of Alaska. An experimental crab stock assessment program was devised whose overall objectives were as follows: (1) Test the feasibility of using trawls to assess the abundance of Tanner crab stocks in certain areas of the Western Gulf of Alaska where little or no stock assessment information is available; (2) Continue this feasibility study for several years to determine the reproducibility in terms of estimating legal male abundance and predicting recruitment trends; and (3) Evaluate the practicability and cost effectiveness of using trawls in place of current pot assessment surveys by simultaneously surveying certain key areas using both methods.

### Methods and Procedures

The NMFS has had some success in assessing crab stocks in the Bering Sea using trawls. In the hope of minimizing sampling problems we utilized gear similar to that used by NMFS (Otto et al. 1979). The net used was a 400 mesh eastern otter trawl with a 27.4 m headrope and a 21.3 m footrope. It was constructed of 36 thread 10.2 cm mesh in the wings, 60 thread 8.9 cm mesh in the intermediate, and a 96 thread 3.2 cm mesh codend liner. Headrope flotation was provided by eighteen

20.3 cm diameter floats. The bridle consisted of 45.7 m dandyines (18.3 m single, 27.4 m double). The doors measured 1.5 x 2.1 m, were of Astoria "V" type and weighed 340 kg apiece. This trawl has an effective net width (path swept) of about 12 m.

During the summer of 1983 trawl surveys were conducted in the North Mainland fishing section of the Kodiak Management District, the Chignik Management District, and the Pavlof Bay area of the South Peninsula District (Figure 1).

Each station consisted of one 30-minute tow (Appendix Table 1). Upon retrieval of the net the catch was weighed to the nearest kilogram using an electronic crane scale. The contents of the net were emptied onto the deck and all Tanner and king crabs were separated from the catch. The remainder of the catch was sampled by bottomfish research biologists. Among the numerous observations made on the catch, data was obtained on the number of species captured, their relative abundance and relative weights. Tanner crabs were separated by sex, weighed, counted, aged, and in most cases carapace width (CW) was measured (Figure 2). It should be noted that the weights for Tanner crab were obtained by weighing all individuals captured while the weights of many other captured species were obtained from randomly selected subsamples of the catch after removal of the Tanner crab and certain other species. Other pertinent data were collected on egg clutch size such as percentage fullness of the brood chamber and egg condition. The presence or absence of Black Mat Syndrome on the exoskeleton was noted. In 1983 tagging was not conducted on the trawl surveys.

The boat chartered for the 1983 trawl survey was the 27 m dragger F/V ROYAL BARON.

Upon returning to Kodiak the Tanner crab catch was standardized and is expressed as the number of crabs captured per 1.85 km (1 nm) towed. The data was stratified (by depth) and population estimates for various size and age groups of Tanner crab were generated using the standard area-swept technique (Colgate and Hicks 1982).

Using the resulting population estimates, predictions were made for the legal sized crabs that would be available for the subsequent commercial fishing season. These predictions assumed an annual natural mortality rate of 20% and a resource exploitation goal of 40%. Because of the high incidence of skip molting in male Tanner crabs  $\geq 115$  CW (i.e., prerecruit ones and older), predicting recruitment is tentative and somewhat complex. In order to take the skipmolting into account the following formula was used to predict recruitment into a future fishery.

$$\text{Recruitment Coefficient (RC)} = \frac{\text{Newshell } \sigma \text{ s } 140\text{-}164 \text{ mm}}{\text{Newshell } \sigma \text{ s } 140\text{-}164 \text{ mm} + \text{Oldshell } \sigma \text{ s } 115\text{-}139 \text{ mm}}$$

$$\text{Recruitment} = \text{RC} \times \text{A}$$

where RC = recruitment coefficient (from above)

A = population estimates of 115-139 mm males  
times 0.72 (or 1½ years survival with an  
annual natural mortality rate of 20%)

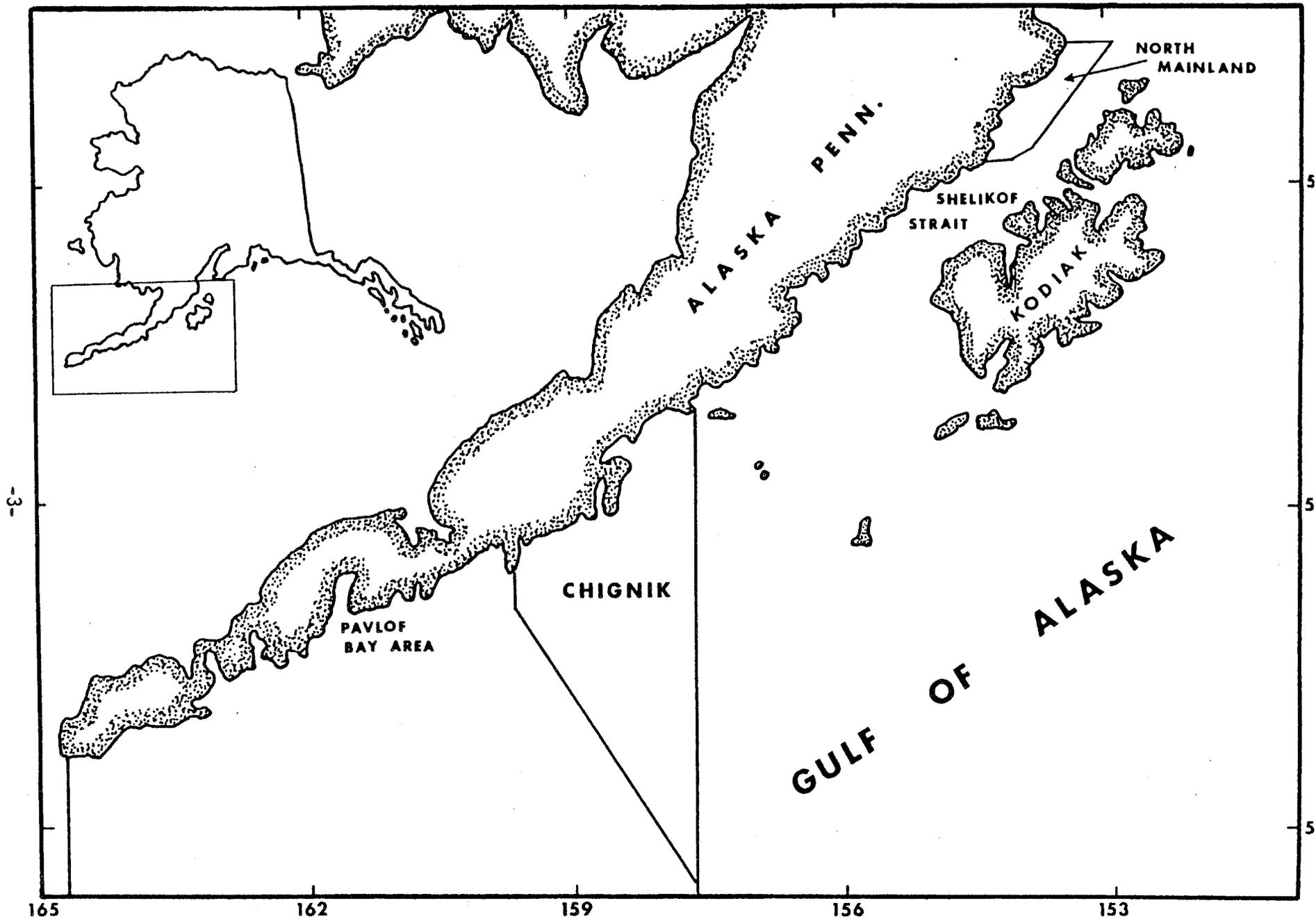


Figure 1. Areas of the western Gulf of Alaska in which ADF&G trawl surveys for crabs were completed during the summer of 1983.

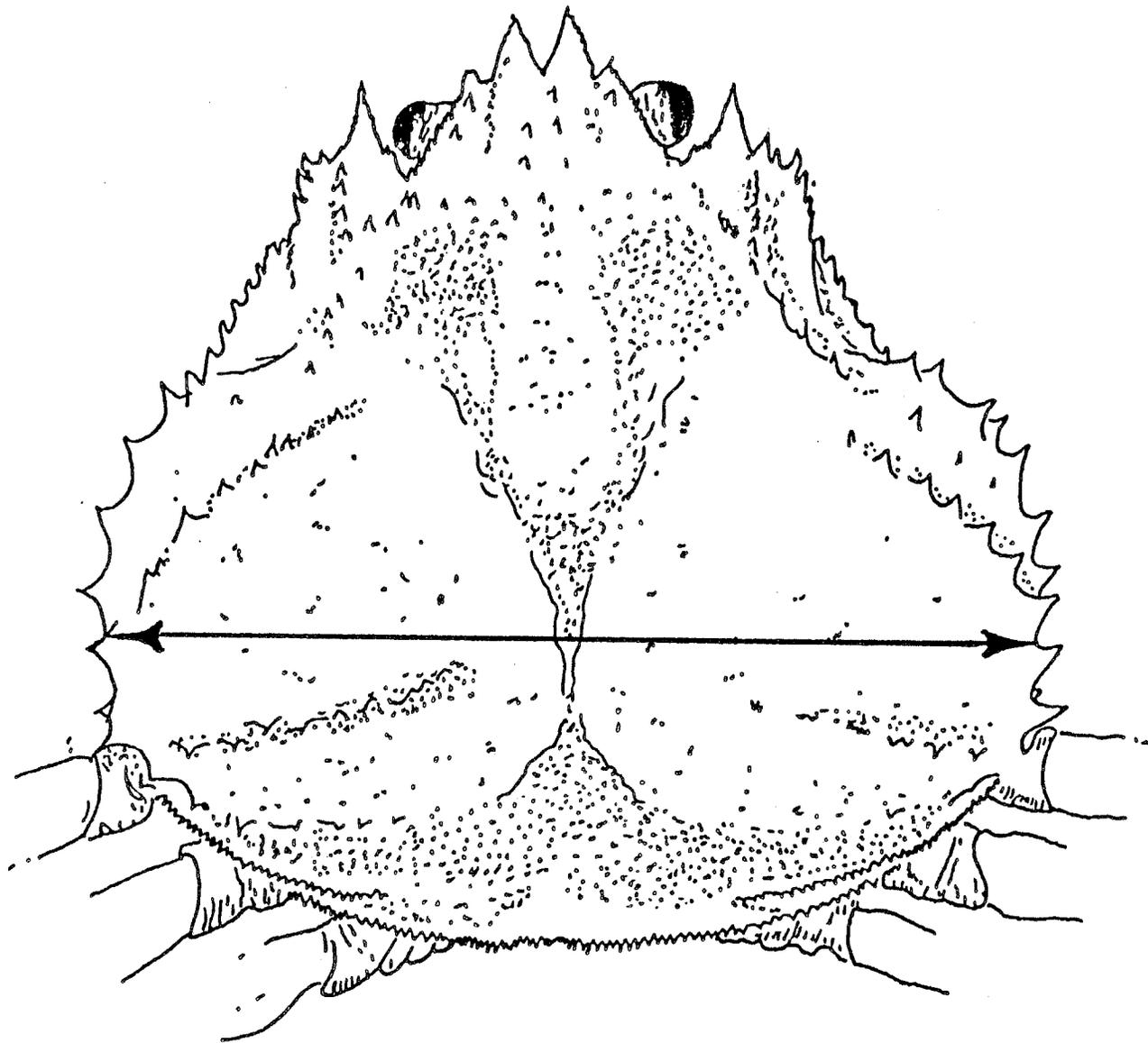


Figure 2. Tanner crab, *Chionoecetes bairdi*, measurement location for carapace width (CW).

## Results and Discussion

The following are results from the 1983 trawl survey in the North Mainland fishing section of the Kodiak Management District, the Chignik Management District, and the Pavlof Bay area of the South Peninsula Management District.

Kodiak Management District - North Mainland, 1983:

The North Mainland fishing section of the Kodiak Management District was the only area of this district surveyed in 1983.

It is comprised of all waters between 58°00' and 58°51' N. lat. west of a line from 58°51' N. lat., 152°45' W. long. to 58° N. lat., 154° W. long. The area has been stratified, by depth, into three strata, two of which are surveyed (Figure 3). Stratum II is the area from 36.5 m through 146.1 m on the west side of the North Mainland fishing section. Stratum III is the area from 146.2 m to the boundary of the fishing section (approximately the midline of northern Shelikof Strait). The survey area is 2334 km<sup>2</sup>.

Forty-one tows were successfully completed on the 1983 North Mainland survey (Figure 3). Of these, 36 tows were used to generate survey population estimates which is a sampling intensity of one tow per 64.8 km<sup>2</sup> of potential crab habitat.

Overall, 3,604 Tanner crabs were captured on the 1983 North Mainland trawl survey (Table 1). Of these 2,762 (76.6%) were male, while 842 (23.4%) were female. Each of the 41 tows produced some Tanner crab. Female catches varied from a low of 1 per 1.85 km in tow 31 to a high of 152 individuals in tow 39. Adult females were most concentrated in the area of tows 27 and 39 in the northern section of Stratum II (Figure 3). Male catches varied from a low of 6 in tow 17 to a high of 284 male crabs in tow 4. Most of the good catches (more than 100/1.85 km) of male Tanner crabs came from Stratum II while the offshore, deeper area of Stratum III tended to produce fewer crabs.

Looking at the male portion of the catch (Table 2) it is readily apparent that the majority of crabs captured on the North Mainland survey were prerecruit ones with 43.4% of the total (1,199 individuals). The percentage of the total male catch that were legal size was 19.7% which is the highest since we began surveying the area in 1980. Within the legal size crab group, the recruit crab portion accounted for 88.8% of the total legals captured. Thus the fishable population in the North Mainland fishing section is almost totally dependent on recruit class crabs to support its commercial fishery.

The shell age makeup of the male catch (Table 3) shows the preponderance of crabs were newshell individuals at the time of the North Mainland trawl survey. One interesting feature is the relatively high percentage of prerecruit two males that are oldshell individuals (skipmolts), 16.9%. This is almost twice as high as the level observed in 1982 when 9.1% of the prerecruit two crabs were oldshell. Skipmolting in the subadult Tanner crab population does not seem to be a common phenomenon. Since a portion of the prerecruit two crab group is sexually mature, it may be that we are observing an increase in skipmolting in that portion. However, it should be noted that skipmolting in the prerecruit one crab group has not shown a corresponding increase in the percentage of crabs that are oldshell. Essentially all of the males in this group should be mature. It will be interesting

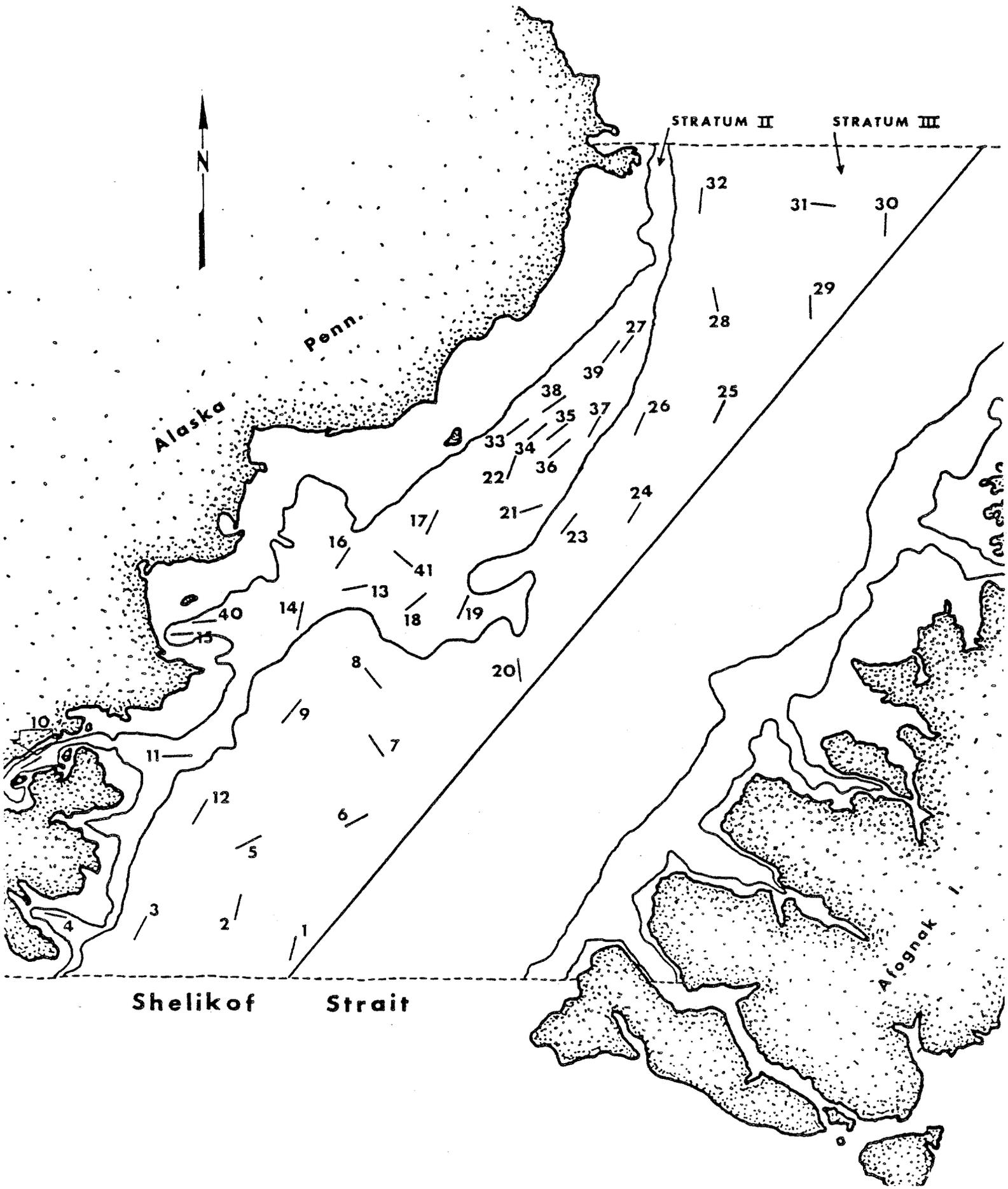


Figure 3. Tow locations in the North Mainland fishing section, 1983 Kodiak Management District trawl survey.

Table 1. Number of Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by sex, size, and age group<sup>1</sup> in the North Mainland fishing section, 1983 Kodiak Management District trawl survey.

Tow No.	Juv. ♀	Adult ♀	Total Females	Prerecruit Fours ♂	Prerecruit Threes ♂	Prerecruit Twos ♂	Prerecruit Ones ♂	Recruit Legals ♂	Postrecruit Legals ♂	Total Legals ♂	Total Males	Total Crab
1	3	1	4	6	1		2				9	13
2	6	0	6	14	3	3	1	1	1	2	23	29
3	1	2	3	3	2		8	10		10	23	26
4	1	2	3		2	21	206	51	4	55	284	287
5	1	10	11	1		1	10	8	3	11	23	34
6	1	2	3	1		1	10	10	3	13	25	28
7	0	2	2				10	4	1	5	15	17
8	0	8	8				5	2	2	4	9	17
9	2	52	54		1	16	42	33	3	36	95	149
10	29	2	31	24	50	44	76	24	4	28	222	253
11	3	15	18	9	6	5	16	79	4	83	119	137
12	3	25	28	1	15	21	43	16		16	96	124
13	19	3	22	14	6	6	4	5		5	35	57
14	8	8	16	4	4	3	27	3	1	4	42	58
15	22	1	23	17	21	3	7	8	4	12	60	83
16	3	0	3	2	4	1		1		1	8	11
17	3	1	4			1	4	1		1	6	10
18	1	15	16	1	1	13	30	2	1	3	48	64
19	0	10	10			11	40	9	4	13	64	74
20	0	3	3		1	1	3	4		4	9	12
21	2	12	14	2	1	2	28	7	1	8	41	55
22	2	2	4	2	7	15	59	11		11	94	98
23	14	6	20	14	1	11	13	5		5	44	64
24	9	13	22	5	1	4	11	7		7	28	50
25	6	13	19	8	36	12	10	2		2	68	87
26	5	5	10	14	4	5	2	1		1	26	36
27	12	121	133	7	4	34	82	15	3	18	145	278
28	36	35	71	57	72	37	10	5	1	6	182	253
29	6	2	8	7	2	6					15	23
30	4	2	6	3	2	9	29	23	2	25	68	74
31	0	1	1	1		6	37	28	5	33	77	78
32	3	21	24	1		10	23	2		2	34	58

-Continued-

Table 1. Number of Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by sex, size, and age group<sup>1</sup> in the North Mainland fishing section, 1983 Kodiak Management District trawl survey (continued).

Tow No.	Juv. ♀	Adult ♀	Total Females	Prerecruit Fours ♂	Prerecruit Threes ♂	Prerecruit Twos ♂	Prerecruit Ones ♂	Recruit Legals ♂	Postrecruit Legals ♂	Total Legals ♂	Total Males	Total Crab
1	3	1	4	6	1		2				9	13
2	6	0	6	14	3	3	1	1	1	2	23	29
3	1	2	3	3	2		8	10		10	23	26
4	1	2	3		2	21	206	51	4	55	284	287
5	1	10	11	1		1	10	8	3	11	23	34
6	1	2	3	1		1	10	10	3	13	25	28
7	0	2	2				10	4	1	5	15	17
8	0	8	8				5	2	2	4	9	17
9	2	52	54		1	16	42	33	3	36	95	149
10	29	2	31	24	50	44	76	24	4	28	222	253
11	3	15	18	9	6	5	16	79	4	83	119	137
12	3	25	28	1	15	21	43	16		16	96	124
13	19	3	22	14	6	6	4	5		5	35	57
14	8	8	16	4	4	3	27	3	1	4	42	58
15	22	1	23	17	21	3	7	8	4	12	60	83
16	3	0	3	2	4	1		1		1	8	11
17	3	1	4			1	4	1		1	6	10
18	1	15	16	1	1	13	30	2	1	3	48	64
19	0	10	10			11	40	9	4	13	64	74
20	0	3	3		1	1	3	4		4	9	12
21	2	12	14	2	1	2	28	7	1	8	41	55
22	2	2	4	2	7	15	59	11		11	94	98
23	14	6	20	14	1	11	13	5		5	44	64
24	9	13	22	5	1	4	11	7		7	28	50
25	6	13	19	8	36	12	10	2		2	68	87
26	5	5	10	14	4	5	2	1		1	26	36
27	12	121	133	7	4	34	82	15	3	18	145	278
28	36	35	71	57	72	37	10	5	1	6	182	253
29	6	2	8	7	2	6					15	23
30	4	2	6	3	2	9	29	23	2	25	68	74
31	0	1	1	1		6	37	28	5	33	77	78
32	3	21	24	1		10	23	2		2	34	58

-Continued-

Table 1. Number of Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by sex, size, and age group<sup>1</sup> in the North Mainland fishing section, 1983 Kodiak Management District trawl survey (continued).

Tow No.	Juv. ♀	Adult ♀	Total Females	Prerecruit Fours ♂	Prerecruit Threes ♂	Prerecruit Twos ♂	Prerecruit Ones ♂	Recruit Legals ♂	Postrecruit Legals ♂	Total Legals ♂	Total Males	Total Crab
33	2	6	8	2		1	24	20		20	47	55
34	4	6	10	3	1	1	44	21		21	70	80
35	8	1	9	4	2	2	46	11	1	12	66	75
36	14	7	21	8	32	90	101	7	1	8	239	260
37	8	8	16	12	2	30	45	6	2	8	97	113
38	3	3	6	4	1	4	12	13		13	34	40
39	9	143	152	2	5	23	59	11	3	14	103	255
40	5	4	9		1	3	8	12	4	16	28	37
41	6	5	11	8	9	3	12	6	3	9	41	52
Total	264	578	842	279	300	459	1,199	484	61	545	2,762	3,604

<sup>1</sup> See "Explanation of Terms" for description of size and age groups.

Table 2. Number of male Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by size, age group, and percent total male catch in the North Mainland fishing section, 1983 Kodiak Management District trawl survey.

Group <sup>1</sup>	Number	%	Percent of Legals
Prerecruit Fours	279	10.1	
Prerecruit Threes	300	10.9	
Prerecruit Twos	459	16.6	
Prerecruit Ones	1,199	43.4	
Recruit Legals	484	17.5	88.8
Postrecruit Legals	61	2.2	11.2
Total Legals	545	19.7	
Total Males	2,762	100.0	
Number of Tows		41	

<sup>1</sup> See "Explanation of Terms" for Tanner crab size and age distribution.

Table 3. Number and percent total male Tanner crabs, *Chionoecetes bairdi*, measured by size, age group, and exoskeletal age in the North Mainland fishing section, 1983 Kodiak Management District trawl survey.

Group <sup>1</sup>	NS		OS		VOS		Total
	No.	%	No.	%	No.	%	
Prerecruit Fours	252	99.6	1	0.4	0	-	253
Prerecruit Threes	271	98.9	3	1.1	0	-	274
Prerecruit Twos	357	81.7	74	16.9	6	1.4	437
Prerecruit Ones	970	83.5	188	16.2	4	0.3	1,162
Recruit Legals	472	100.0	NA	-	NA	-	472
Postrecruit Legals	24	40.7	34	57.6	1	1.7	59
Total Legals	496	93.4	34	6.4	1	0.2	531
Total Males	2,346	88.3	300	11.3	11	0.4	2,657

<sup>1</sup> NS - Newshell  
 OS - Oldshell  
 VOS - Very Oldshell

to see if the amount of skipmolting seen in the prerecruit two group continues to increase in 1984. One other possibility is that the incidence of prerecruit males with Black Mat Syndrome, which tripled in 1983 (from 2.1% in 1982 to 6.9% in 1983), may be responsible for the increase in the observed skipmolting.

One way of examining reproductive potential is by observing the relative egg clutch size of females. In the North Mainland fishing section (Table 4) females with full egg clutches (90-100% full) accounted for 57.1% of the total adult females captured in the 1983 survey. If females with partial egg clutches are included, 99.1% of the adult females had egg clutches. This is slightly higher than the 1982 survey on which 96.7% of the adults had egg clutches. Hence, in terms of relative egg clutch size at the time of the survey, the adult female Tanner crab population in the North Mainland fishing section is apparently in good condition, reproductively. Of the five barren adult females measured on the 1983 survey (Table 4), two were oldshell individuals and had active ovaries. One had old sperm in the spermathecae indicating that it had not been mated during the previous mating period and had not used the stored sperm to produce an egg clutch. The other barren oldshell individual had what appeared to be fresh sperm in the spermathecae and new mating marks indicating that she had mated recently. She look healthy in every respect save the absence of an egg clutch. The three very oldshell barren females had inactive ovaries and old sperm in the spermathecae. One of these crabs may have been barren because of the presence of Black Mat Syndrome, but the other two had no evidence of the disease and were probably barren due to senescence.

One reason to develop a trawl survey for Tanner crab population assessment was the desire to obtain information on sublegal sized crabs which would aid the Department in predicting future recruitment trends. The size frequency distribution of crabs captured on the 1983 North Mainland survey (Figure 4) indicates an interesting trend in future recruitment. There is apparently a relatively strong year class of prerecruit one (115-139 mm CW) crabs the bulk of which should molt in 1984 and be available for harvest during the 1985 commercial fishery. If a large portion of this cohort skip molts in 1984, it should then be available for harvest in 1986. At this point the recruitment picture beyond 1985 looks poor. The prerecruit two (92-114 mm CW) and prerecruit three (70-91 mm CW) year classes showed little strength on the 1983 North Mainland survey. It is not feasible to assess population trends beyond the prerecruit three year class since crabs smaller than 80 mm CW are not fully vulnerable to the trawl gear used on the survey. It should also be noted that size frequency data can be misleading if crab distribution is highly clumped by year class in which case survey design could be the determining factor in the apparent population structure observed.

Year class strength of adult female Tanner crabs (approximately 80 mm CW) is more difficult to assess from size frequency data (Figure 5) since the terminal molt to maturity causes a clumping of all adult year classes by shell age at a point when the crabs have just become fully vulnerable to the trawl. In general, the size frequency data suggests a decline in the female population from previous surveys in the North Mainland fishing section (Colgate and Hicks 1983). Hopefully, the decline is an artifact of survey design rather than an accurate reflection of the female population in the survey area. Sampling in 1984 may help us define the population strength more clearly.

Population estimates for female and various size and age groups of male Tanner crabs were calculated using the standard area swept technique (Table 5). In

Table 4. Number of female Tanner crabs, *Chionoecetes bairdi*, measured by shell age and percent fullness of egg clutch in the North Mainland fishing section, 1982 and 1983 Kodiak Management District trawl surveys.

1982																					
Class	Juvenile			Percent fullness of clutch																	
				0			1-24%			25-49%			50-74%			75-89%			90-100%		
Shell age	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO
Number	1053	18	0	2	7	54	0	4	17	1	2	16	81	12	14	452	18	23	118	1006	97
% Total (adults)				0.1	0.4	2.8	-	0.2	0.9	0.1	0.1	0.8	4.2	0.6	0.7	23.5	0.9	1.2	6.1	52.3	5.0
% by class				3.3			1.1			1.0			5.5			25.6			63.4		

1983																					
Class	Juvenile			Percent fullness of clutch																	
				0			1-24%			25-49%			50-74%			75-89%			90-100%		
Shell age	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO
Number	262	2	0	0	2	3	1	4	2	6	5	5	51	29	16	65	44	7	27	278	15
% Total (adults)				-	0.4	0.5	0.2	0.7	0.4	1.1	0.9	0.9	9.1	5.2	2.9	11.6	7.9	1.2	4.8	49.6	2.7
% by class				0.9			1.3			2.9			17.2			20.7			57.1		

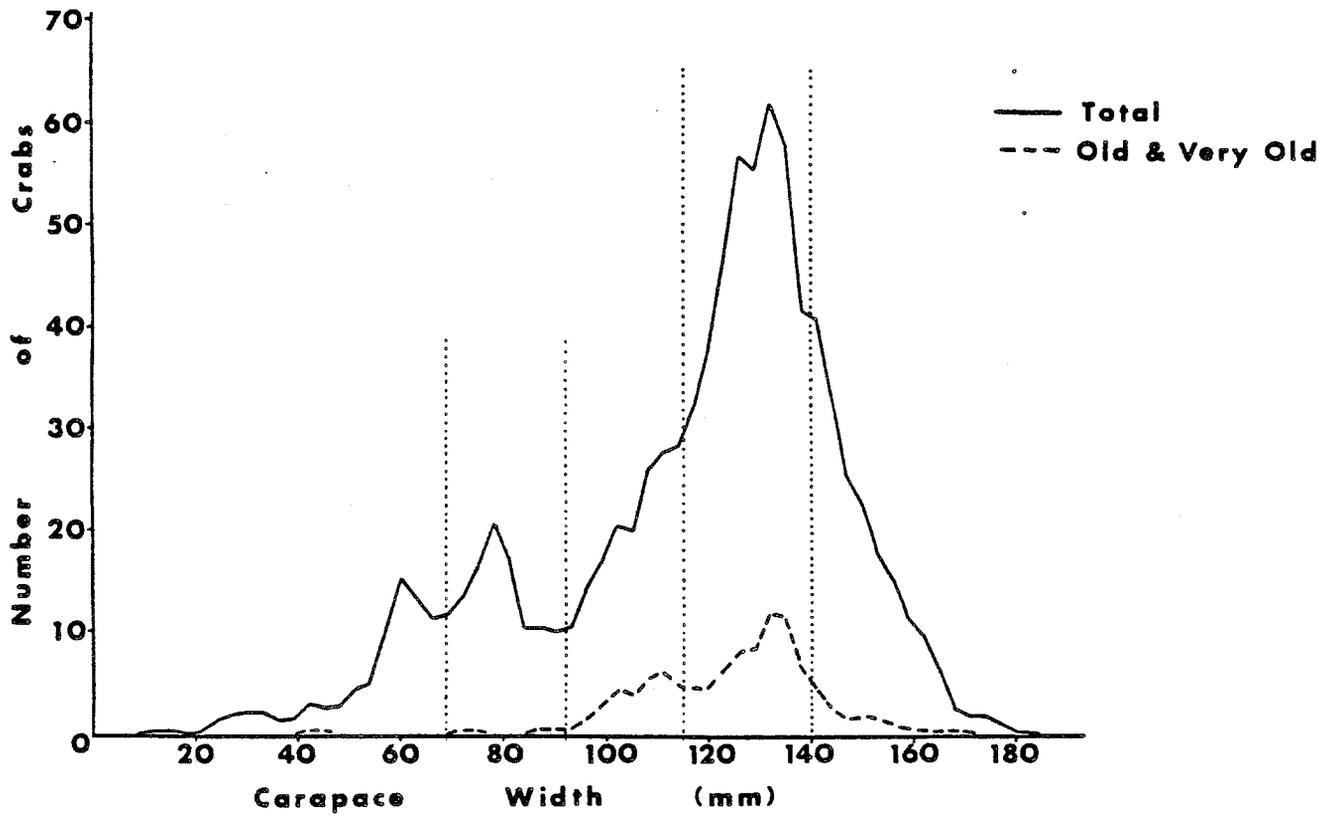


Figure 4. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from the North Mainland fishing section, 1983 Kodiak Management District trawl survey.

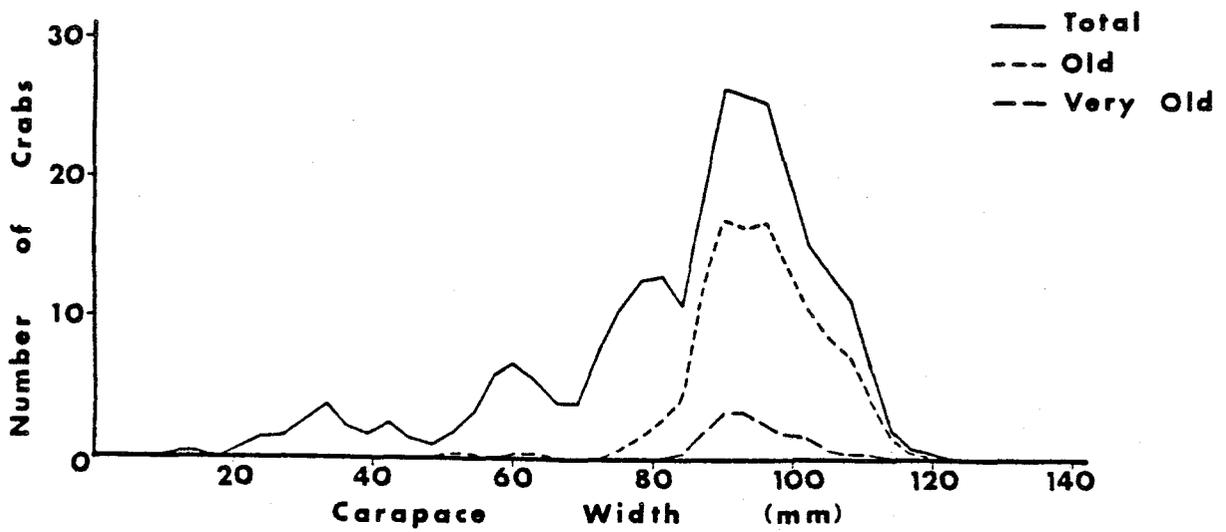


Figure 5. Carapace width frequency of female Tanner crabs, *Chionoecetes bairdi*, measured from the North Mainland fishing section, 1983 Kodiak Management District trawl survey.

Table 5. Population estimates for female and various size and age groups of male Tanner crabs, *Chionoecetes bairdi*, in the North Mainland fishing section, 1983 Kodiak Management District trawl survey.

Group	1983 Population Estimate $\pm$ percent error
♀ Juvenile	590,851 crabs $\pm$ 25.0%
♀ Adult	1,428,132 crabs $\pm$ 27.6%
♀ Total	2,019,706 crabs $\pm$ 22.4%
-----	
♂ Prerecruit Fours	681,402 crabs $\pm$ 32.4%
♂ Prerecruit Threes	724,299 crabs $\pm$ 42.4%
♂ Prerecruit Twos	941,062 crabs $\pm$ 19.6%
♂ Prerecruit Ones	2,386,288 crabs $\pm$ 18.3%
♂ Recruit Legals	1,097,312 crabs $\pm$ 20.3%
♂ Postrecruit Legals	142,696 crabs $\pm$ 18.8%
♂ Total Legals	1,240,415 crabs $\pm$ 19.4%
♂ Total	5,965,091 crabs $\pm$ 15.4%
-----	
Number of tows	41

general, the percentage errors around the population estimates are relatively low which is encouraging. The 1983 survey was the most intense survey conducted to date in the North Mainland fishing section. The survey indicated a total legal population of 1,240,415 crabs which should provide a 1984 commercial harvest of 1.24 million lb (562.5 mt) at an exploitation rate of 0.4 and an average crab weight of 2.5 lb (1.1 kg).

Recruitment predictions from the 1982 North Mainland survey were not confirmed by the 1983 survey results. Using a recruitment coefficient (RC) of 0.69 to account for skip molting in the prerecruit one crab group, the 1982 population estimate for recruit crabs at the start of the 1984 fishery was 3,376,102 crabs. The 1983 survey population estimate of recruit crabs at the start of the 1984 fishery (including a natural mortality of 0.1) was 987,581 crabs, roughly three and a half times lower than the population estimate of 1984 recruits from the 1982 survey. One tow (tow no. 13, Colgate and Hicks 1983) on the 1982 North Mainland survey accounted for approximately 30% of the prerecruit one and recruit population estimates. The contribution of this tow may have been in large part responsible for population estimates which were too high for those crab groups in 1982. One indication that this was the case was the 1983 fishery which did not corroborate the 1982 survey results. The fishery produced 838,624 crabs which was roughly 120,000 crabs short of the preseason forecast. The postseason Leslie population estimate in 1983 (Figure 6) indicated a legal size crab population of 1,739,196 crabs ( $r^2 = .741$ ) which was substantially below the survey population estimate of 2,392,762 crabs. It is interesting to note that if tow 13 (the "problem" tow mentioned above) is eliminated from the 1982 survey data, the population estimate of legal size crabs would have been 1,672,700 crabs at the start of the 1983 commercial fishing season. This estimate is much closer to the population indicated by the postseason Leslie estimate (1,739,196 crabs). The problems that we are seeing in our survey population estimates may be a matter of tow distribution in the survey area.

In an effort to distinguish differences in crab distribution within relatively small spatial areas, six tows were made at different depths within an 86 km<sup>2</sup> area (tows 33 through 38, Figure 3). Looking at those size and age groups which are fully vulnerable to the trawl gear (Figure 7) it seems as though depth was important when considering the catches of prerecruit two and prerecruit one male crabs, but relatively unimportant when considering the catches of legal size males and adult females. In the first instance catches of prerecruit one and two males at 73 fathoms (fm) or 133 m were at least twice as large as at the other tow depths. The number of points (6) in the study did not lend itself to statistical analysis so plots of the four crab group catches on the 1982 and 1983 North Mainland surveys were made by depth (Figures 8 and 9) to see whether or not the pattern seen in the six tow study in 1983 (Figure 7) prevailed over the entire survey area. In general, catches of prerecruit one crabs in 1982 and 1983 were highest from depths within the 40 to 80 m (73 to 146 m) range in the study area while catches from depths greater than 90 fm (165 m) were lower. With the exception of one catch of 136 crabs at 100 fm (183 m), results were similar for the prerecruit two size group. It should be noted that the highest catches of prerecruit ones in 1982 (679 crabs/1.85 km) and 1983 (206 crabs/1.85 km) were from 56 and 47 fm (102 and 88 m), respectively. The high catch in the six tow study area was 101 crabs at 73 fm (133 m). For prerecruit twos, the largest catch in 1982 was 191 crabs at 70 fm (128 m) and in 1983 the 90 crab catch from the 73 fm tow (133 m) in the six tow study area was the highest. It seems that the higher

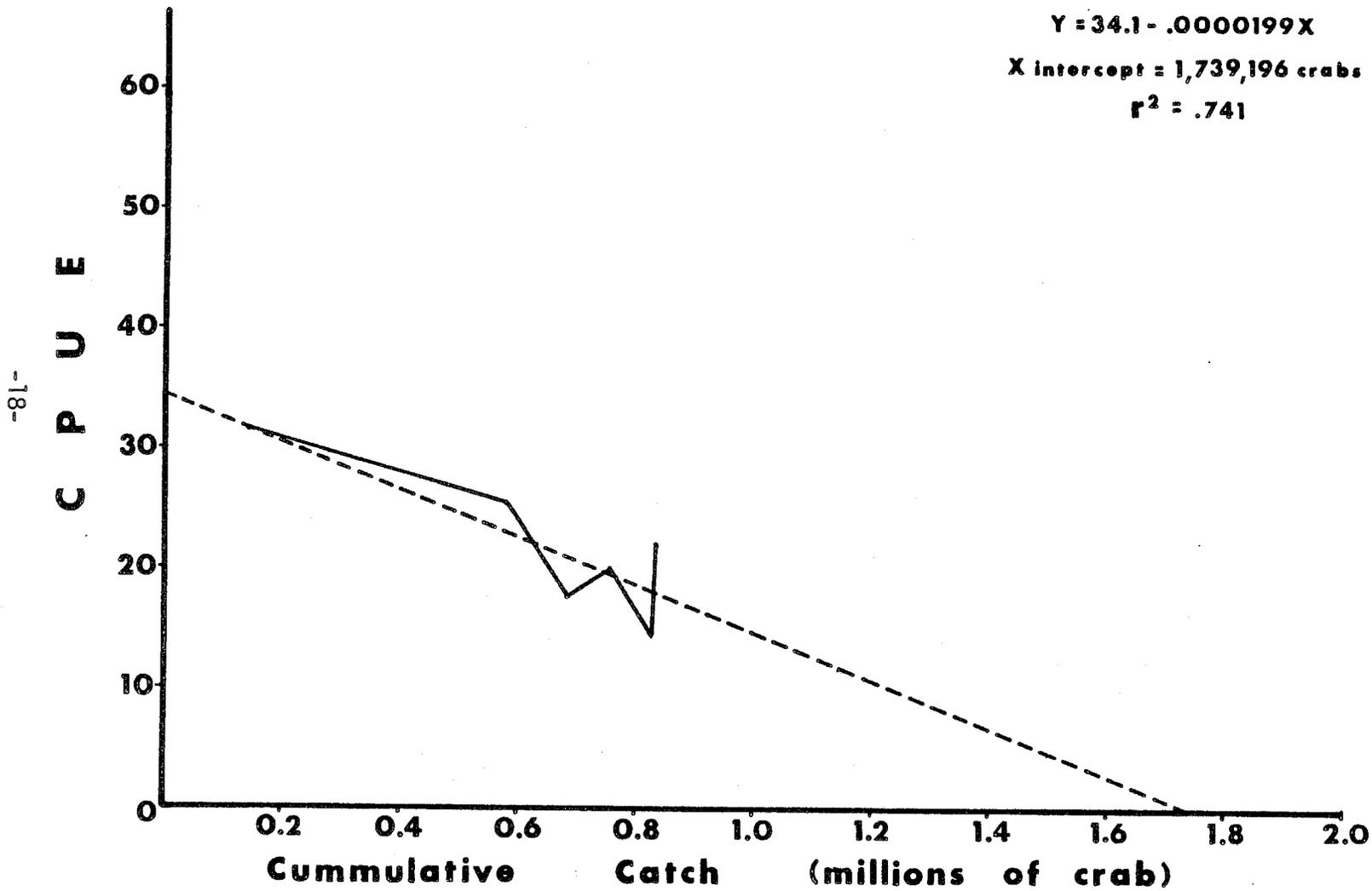


Figure 6. Leslie population estimate for legal size Tanner crabs, *Chionoecetes bairdi*, from 1983 North Mainland commercial catch data, Kodiak Management District.

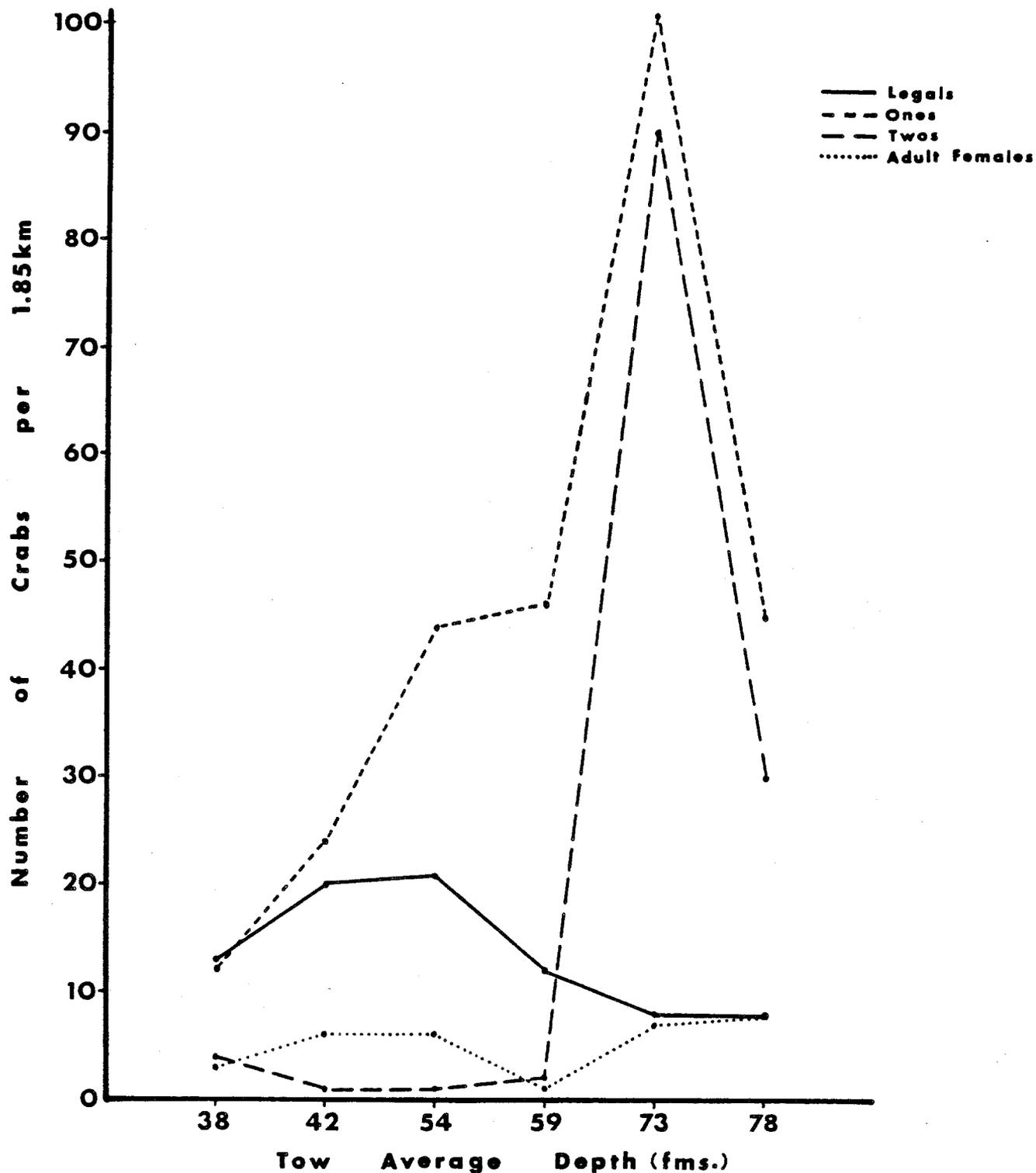


Figure 7. Catch of adult female and three size and age groups of male Tanner crab, *Chionoecetes bairdi*, in six closely spaced trawls of increasing tow depth in the North Mainland fishing section, 1983 Kodiak Management District trawl survey.

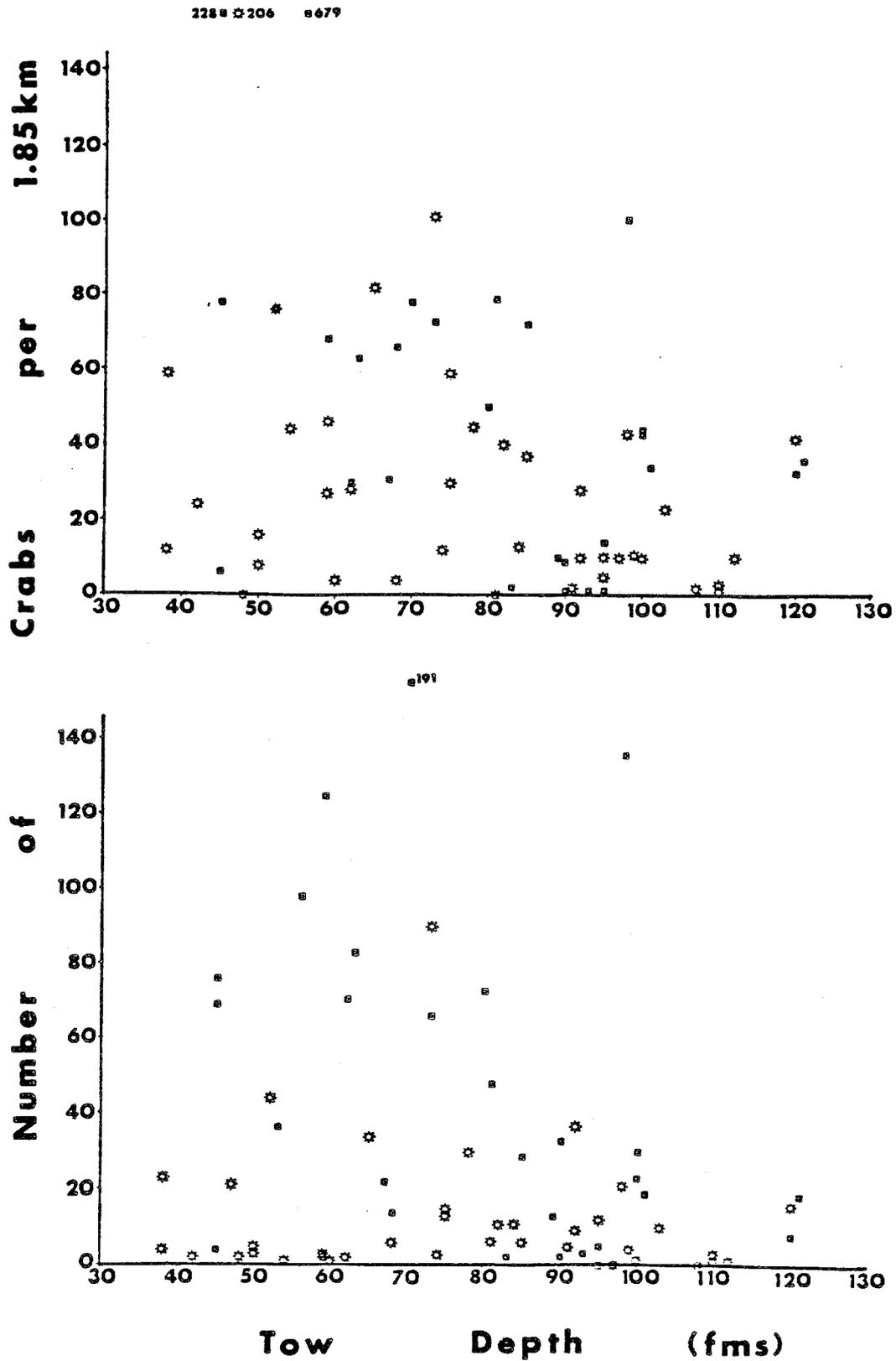


Figure 8. Catch by tow depth of prerecruit one (top) and two (bottom) male Tanner crabs, *Chionoecetes bairdi*, on the 1982 (■) and 1983 (\*) trawl surveys in the North Mainland fishing section, Kodiak Management District.

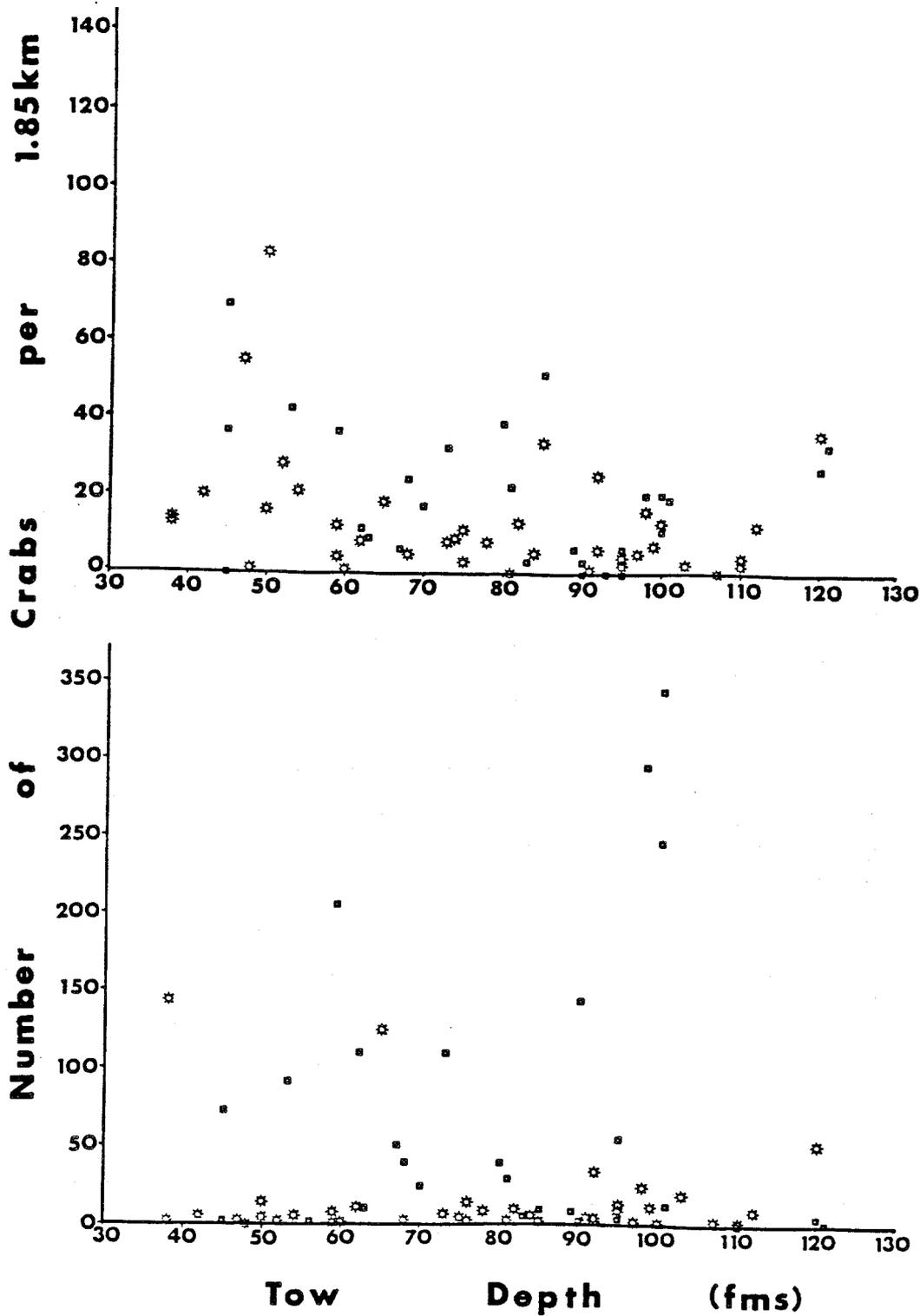


Figure 9. Catch by tow depth of legal male (top) and adult female (bottom) Tanner crabs, *Chionoecetes bairdi*, on the 1982 (■) and 1983 (\*) trawl surveys in the North Mainland fishing section, Kodiak Management District.

catches of crab in these two size groups tend to be encountered in the 40 to 80 fm (73 to 146 m) range, the variability in catches between tow depths in the study area (Figure 7) may be more attributable to discontinuities in habitat causing crab aggregations, than to specific differences in depth. The same can be said of the catches of legal size males and adult females (Figure 9). Poor catches of crabs were observed over the entire range of depths towed during the survey. While the high catches may tend to be observed more often within a certain depth range, they are not limited to depths within one 20 or 40 fm (37 to 73 m) depth range. This suggests that within the depth range of the North Mainland fishing section, depth, per se, is not a limiting factor for the distribution of crabs in the four groups examined.

Chignik Management District, 1983:

The 1983 trawl survey in the Chignik Management District marked the third year the Department has surveyed the area. Prior to 1981 no crab assessment work was done in the District.

In 1983 approximately 7,865 km<sup>2</sup> of potential crab habitat was surveyed (Figure 10) with an overall sampling intensity of one tow per 119.2 km<sup>2</sup>. The survey area was increased by 973 km<sup>2</sup> over the 1982 survey. The sampling intensity in 1982 was one tow per 114.9 km<sup>2</sup>.

Overall 2,848 Tanner crab were captured on the 1983 Chignik trawl survey (Table 6). Of these 1,625 (57.1%) were male while 1,223 (42.9%) were female. Only four of the 72 successfully completed tows produced no crab. Female catches varied from a low of zero crabs per 1.85 km for many of the tows to 419 individuals in tow 100 in Castle Bay. Adult females were most concentrated in Chignik Bay (tows 94-100) and in the west portion of the District offshore (tows 50-55). Male catches varied from a low of zero at five of the stations to a high of 280 individuals at tow 100 in Castle Bay. The highest catches of males occurred in the nearshore areas with Chignik, Kujulik, Kuiukta, and Ivanof Bays (Figure 10) along the area west of Mitrofanina Island (Figure 11) producing the largest catches.

Looking at the male portion of the catch (Table 7) it is apparent that the smaller crabs, prerecruit fours, comprised the largest portion of the total male catch, 34.9%. Prerecruit threes were the next most abundant group with 20.7% of the total. Prerecruit one and legal sized males each comprised less than 20% of the total, with 16.4% and 18.5%, respectively. Of the legal size portion of the catch, 73.3% were recruits while 26.7% were postrecruits.

The shell age makeup of the male catch (Table 8) shows the preponderance of crabs were newshell individuals at the time of the Chignik trawl survey. As one would expect, the subadult portion of the male population (much of the prerecruit two crabs and smaller) showed the least amount of skipmolting. Prerecruit one and postrecruit legals showed the highest amount of skipmolting with 45.5% and 53.2% of the crabs having skipped the previous molt, respectively. In 1982, only 29.5% of the prerecruit one crabs were oldshell so the amount of skipmolting almost doubled in the intervening year.

Looking at the relative egg clutch size of the female portion of the catch (Table 9) it seems as though the adult female population in the Chignik area was in healthy condition, reproductively, at the time of the 1983 survey. Seventy-eight

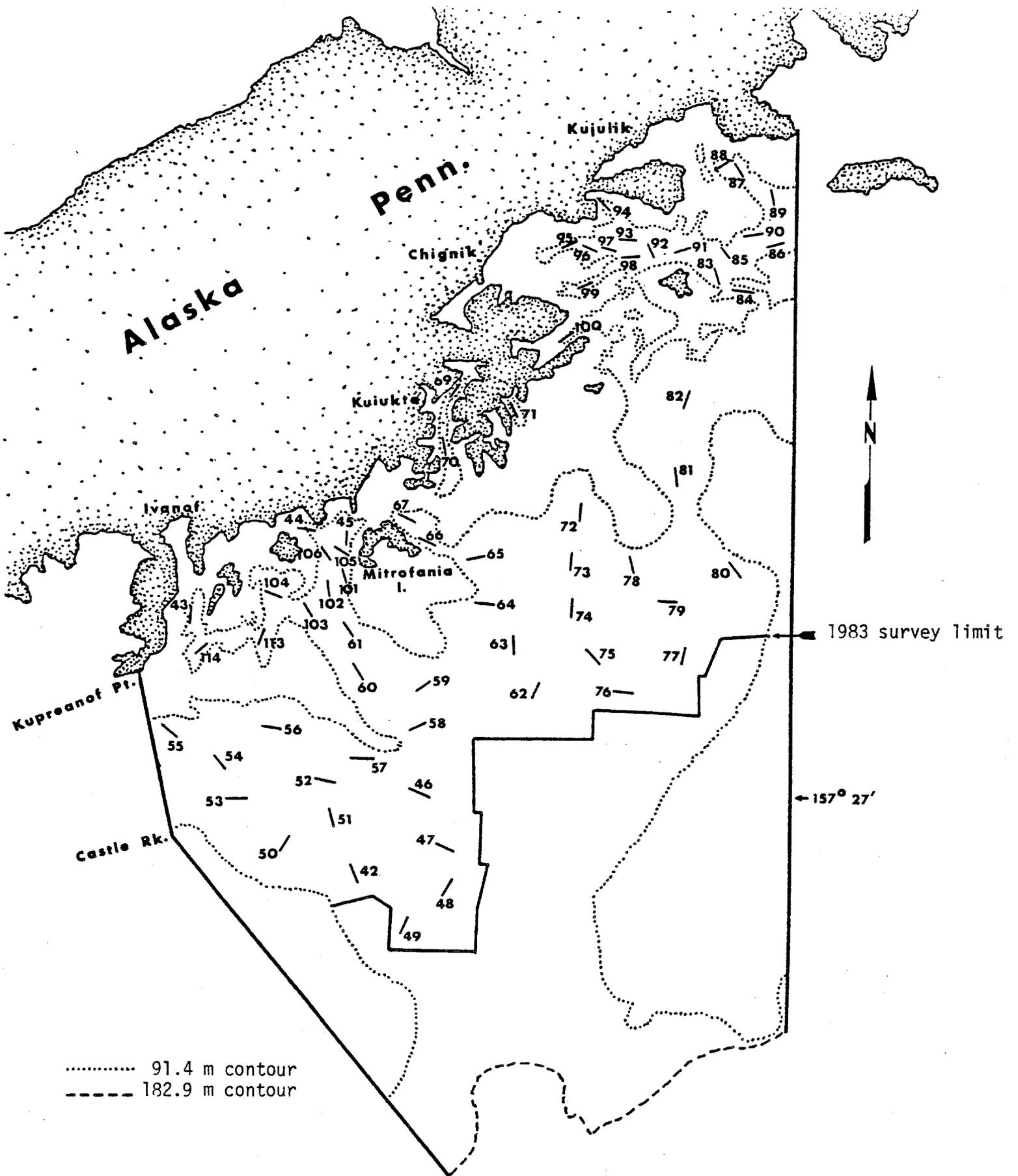


Figure 10. Area surveyed and tow locations, 1983 Chignik Management District trawl survey.

Table 6. Number of Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by sex, size, and age group, 1983 Chignik Management District trawl survey.

Tow No.	Juv. ♀	Adult ♀	Total Females	Prerecruit Fours ♂	Prerecruit Threes ♂	Prerecruit Twos ♂	Prerecruit Ones ♂	Recruit Legals ♂	Postrecruit Legals ♂	Total Legals ♂	Total Males	Total Crab
42		23	23	1		3	14		1	1	19	42
43	74		74	54	23	2		4	1	4	83	157
44	14		14	24	1						25	39
45	2	12	14	1	4		3	12	1	13	21	35
46	3	1	4	8	2		1				11	15
47	12		12	8	1						9	21
48	6	4	10	6			7				13	23
49		9	9	2			7				9	18
50	1	22	23	3		1	7				11	34
51	1	5	6	4	1		2				7	13
52		12	12			5	11				16	28
53	4	2	6	1			4	1		1	6	12
54	1	1	2	1	1		1				3	5
55	12	28	40	10	1	3	5				19	59
56	1	2	3	4			1		1	1	6	9
57												0
58	17	1	18	5	2						7	25
59	6		6	2		1	5		1	1	9	15
60					1	1					2	2
61	4		4	3		1	4				8	12
62				1							1	1
63		1	1	3	1				1	1	5	6
64				1							1	1
65				1		2					3	3
66				1							1	1
67	2	3	5	7	2	1	2	5		5	17	22
69	61		61	61	8	12	17	15	2	17	115	176
70	93		93	104	31	21	4	17	6	23	183	276
71	19		19	9				1	1	2	11	30
72	3	1	4		2	1	5	3	2	5	13	17
73												0
74	1	1	2				6	1	1	2	8	10
75		2	2									2
76							2		1	1	3	3
77							1		1	1	2	2

-Continued-

Table 6. Number of Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by sex, size, and age group, 1983 Chignik Management District trawl survey (continued).

Tow No.	Juv. ♀	Adult ♀	Total Females	Prerecruit Fours ♂	Prerecruit Threes ♂	Prerecruit Twos ♂	Prerecruit Ones ♂	Recruit Legals ♂	Postrecruit Legals ♂	Total Legals ♂	Total Males	Total Crab
78												0
79						1	1				2	2
80							1				1	1
81												0
82	1	1	2	4			4	4	1	5	13	15
83	2		2	2	1	1	1				5	7
84	1	7	8	2		2	7	1	3	4	15	23
85	6		6	6				1	1	2	8	14
86	2	2	4	4							4	8
87	17	11	28	17	1	2	6				26	54
88	7		7	5			1				6	13
89	1		1		8	7	40	39	15	54	109	110
90	2		2	2	1	1		1		1	5	7
91	1	1	2			1	1	8	8	16	18	20
92	3		3	1	1	1			1	1	4	7
93		1	1	1	1	4	5	7	7	14	25	26
94		27	27	1			2		1	1	4	31
95	14	10	24	7	10	10	9	9	1	10	46	70
96	4	22	26	2	5	19	8		1	1	35	61
97	1	4	5	1		5	8	5	3	8	22	27
98	1	5		1		3	8	4	2	6	18	24
99	10	2	12	13	1						14	26
100	359	60	419	84	164	24	6	1	1	2	280	699
101					1		1				2	2
102				2							2	2
103	4		4	5		1	2				8	12
104				4		1	1	1	1	2	8	8
105	4	11	15	2	11	6	5	5		5	29	44
106	13	10	23	5	29	5	4	7	2	9	51	74
107	4		4	7	2	1	4	5		5	19	23
108	15	3	18	10	7		5	12	2	14	34	52
109	13	1	14	9	1	1	5	6	1	7	23	37
110	11	8	19	10	4	1	2	12	1	13	30	49
111	29	6	35	21	7	3	11	14	4	18	60	95
112	9	15	24	8			2	16	2	18	28	52
113		1	1			1	6				7	8
114	13	1	14	7	1	1	2	3	3	6	17	31
Total	884	339	1,223	567	337	156	267	220	80	300	1,625	2,848

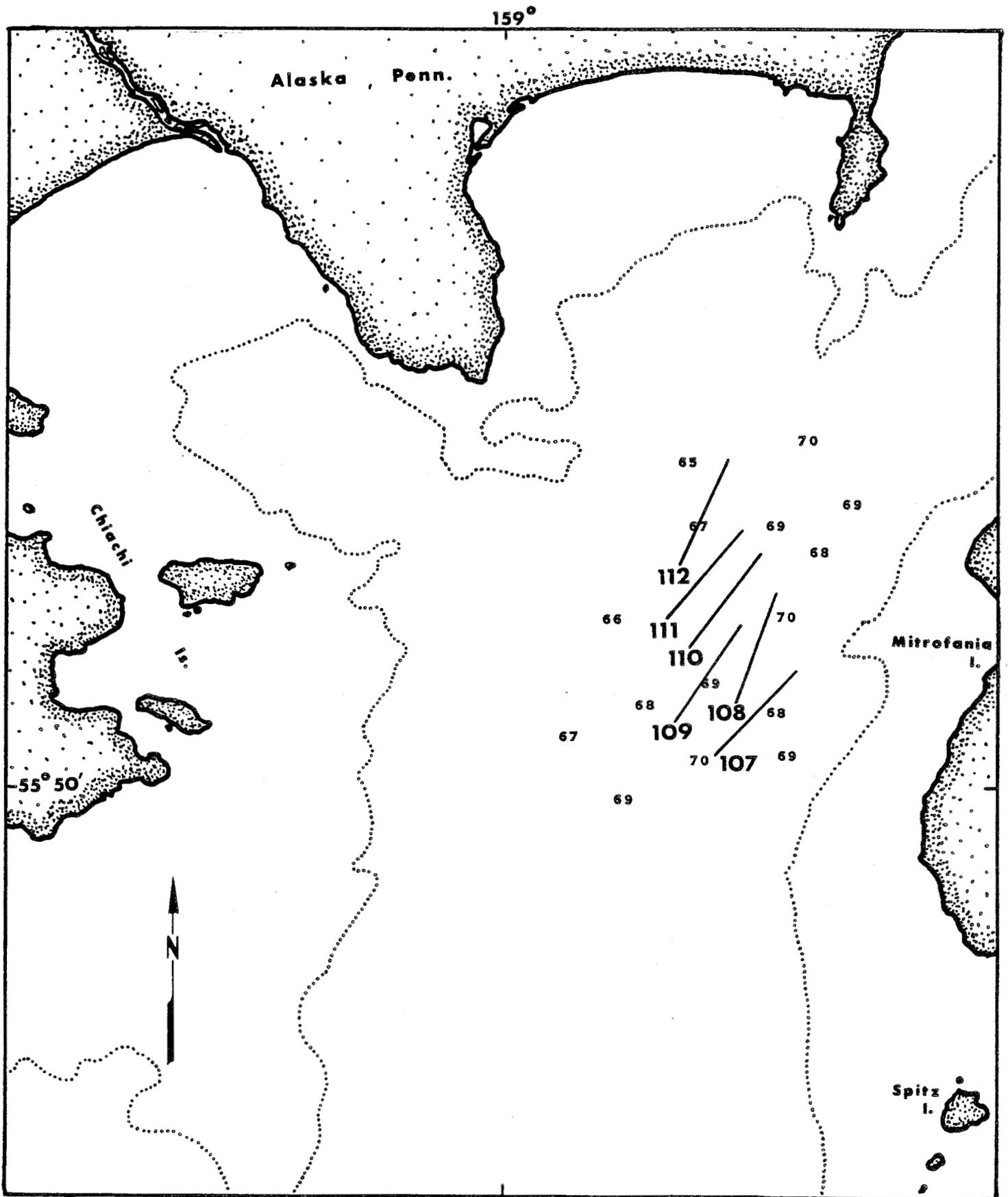


Figure 11. Tow locations in six tow study areas with all tows made at approximately the same depth, 1983 Chignik Management District trawl survey. Area depths varied from 65 to 70 fathoms.

Table 7. Number and percent total male Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by size-age group and exoskeletal age, 1983 Chignik Management District trawl survey.

Group	Number	%	Percent of Legals
Prerecruit Fours	567	34.9	
Prerecruit Threes	337	20.7	
Prerecruit Twos	156	9.6	
Prerecruit Ones	267	16.4	
Recruit Legals	220	13.5	73.3
Postrecruit Legals	80	4.9	16.7
Total Legals	300	18.5	
Total Males	1,625	100.0	
Number of Tows	72		

Table 8. Number and percent total male Tanner crabs, *Chionoecetes bairdi*, measured by size-age group and exoskeletal age, 1983 Chignik Management District trawl survey.

Group	NS		OS		VOS		Total
	No.	%	No.	%	No.	%	
Prerecruit Fours	560	100.0	0	-	0	-	560
Prerecruit Threes	321	99.7	1	0.3	0	-	322
Prerecruit Twos	136	88.3	14	9.1	4	2.6	154
Prerecruit Ones	145	54.5	115	43.2	6	2.3	266
Recruit Legals	225	100.0	NA	-	NA	-	225
Postrecruit Legals	37	46.8	42	53.2	0	-	79
Total Legals	262	86.2	42	13.8	0	-	304
Total Males	1,424	88.7	172	10.7	10	0.6	1,606

Table 9. Number of female Tanner crabs, *Chionoecetes bairdi*, measured by shell age and percent fullness of egg clutch in the Chignik Management District, 1982 and 1983 Chignik Management District trawl surveys.

		1982																				
Class	Shell age	Juvenile			Percent fullness of clutch																	
		N	O	VO	0			1-24%			25-49%			50-74%			75-89%			90-100%		
		N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO
Number		770	0	0	1	0	1	0	0	1	0	4	1	27	0	2	28	10	3	4	308	14
% Total (adults)					0.2	-	0.2	-	-	0.2	-	1.0	0.2	6.7	-	0.5	6.9	2.5	0.7	1.0	76.3	3.5
% by class					0.4			0.2			1.2			7.2			10.1			80.8		

-27-

		1983																				
Class	Shell age	Juvenile			Percent fullness of clutch																	
		N	O	VO	0			1-24%			25-49%			50-74%			75-89%			90-100%		
		N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO
Number		852	0	0	0	1	2	1	3	1	2	1	2	22	15	23	19	42	35	15	119	29
% Total (adults)					-	0.3	0.6	0.3	0.9	0.3	0.6	0.3	0.6	6.6	4.5	6.9	5.7	12.7	10.5	4.5	35.8	8.7
% by class					0.9			1.5			1.5			18.1			28.9			49.1		

percent of the adult females had brood chambers which were  $\geq 75\%$  full. It is interesting that 90.9% of the adult females in 1982 had clutches which were  $\geq 75\%$  full. Much of the difference can be attributed to a higher proportion of oldshell females in the 1982 catch (78.8%); oldshell females tend to have fuller egg clutches than newshell (i.e., primiparous) females. Of the three adult females that were barren in 1983, two had active ovaries but old sperm in their spermathecae while the very oldshell individual had inactive ovaries and old sperm in the spermathecae.

The size frequency distributions for male and female crabs measured on the 1983 Chignik trawl survey (Figures 12 and 13) show the absence of strong year classes of crabs for the foreseeable future. The male size frequency data, if an accurate reflection of year class strength in the population, indicates dismal commercial fishery prospects for the 1985, 1986, and 1987 commercial seasons at the very least. The female size frequency distribution also shows poor year class strength. We will need to closely monitor the reproductive condition of the female population in the next few years. With the low adult male population present in the area it is possible we might see an increase in adult female barrenness especially if a spatial separation of the two sexes occurs during the mating period.

Population estimates for female and various size and age groups of male Tanner crabs were calculated using the standard area swept technique (Table 10). In general the population estimates for the various crab groups seem low particularly in light of past survey estimates (Colgate and Hicks 1983). Percentage errors do not appear to be exorbitantly high. The population estimate of legal size crab in 1983 was only 575,079 individuals which is much lower than the population we expected to see according to the 1982 survey results. This is evident when one examines the recruitment prediction made from the population estimate of prerecruit ones observed in 1982 and the subsequent population estimate of recruits in 1983. Using a recruitment coefficient of 0.62 from the 1982 data the predicted recruitment of crabs expected on the 1983 survey (with 20% annual natural mortality) was 1,542,580 crabs  $\pm$  about 18%. The actual population of recruits from a comparable survey area in 1983 was 390,662 crabs  $\pm$  27%. This figure is almost four times lower than the predicted population estimate. Unfortunately, a preliminary analysis of fishery performance during the 1984 commercial season in the Chignik Management District tended to confirm the 1983 survey results. It is unlikely that there is a large population of legal size crabs in the District which was not encountered by the 1983 survey and subsequent commercial fishery. Since the 1983 survey results do not track well with the 1982 survey predictions we need to continue to better define the Tanner crab population distribution in the Chignik Management District.

In an effort to determine possible variation in crab abundance within a relatively small area of crab habitat at a particular depth, six closely spaced tows were taken within a 14 km<sup>2</sup> area at an average depth of about 70 fm or 128 m (Figure 11). Catch rates for those crab size groups which are highly vulnerable to the trawl showed (Figure 14) considerable variation among the catches of legal size and adult females, moderate variation among prerecruit one catches, and little variation among prerecruit two crab catches. A comparison of the sample variances from the respective crab group catches showed a higher variance between tows within the small study area than between tows taken at stations in the surrounding area (Figure 10, tows 44-45 and 101-106). It was thought that a more intense sampling

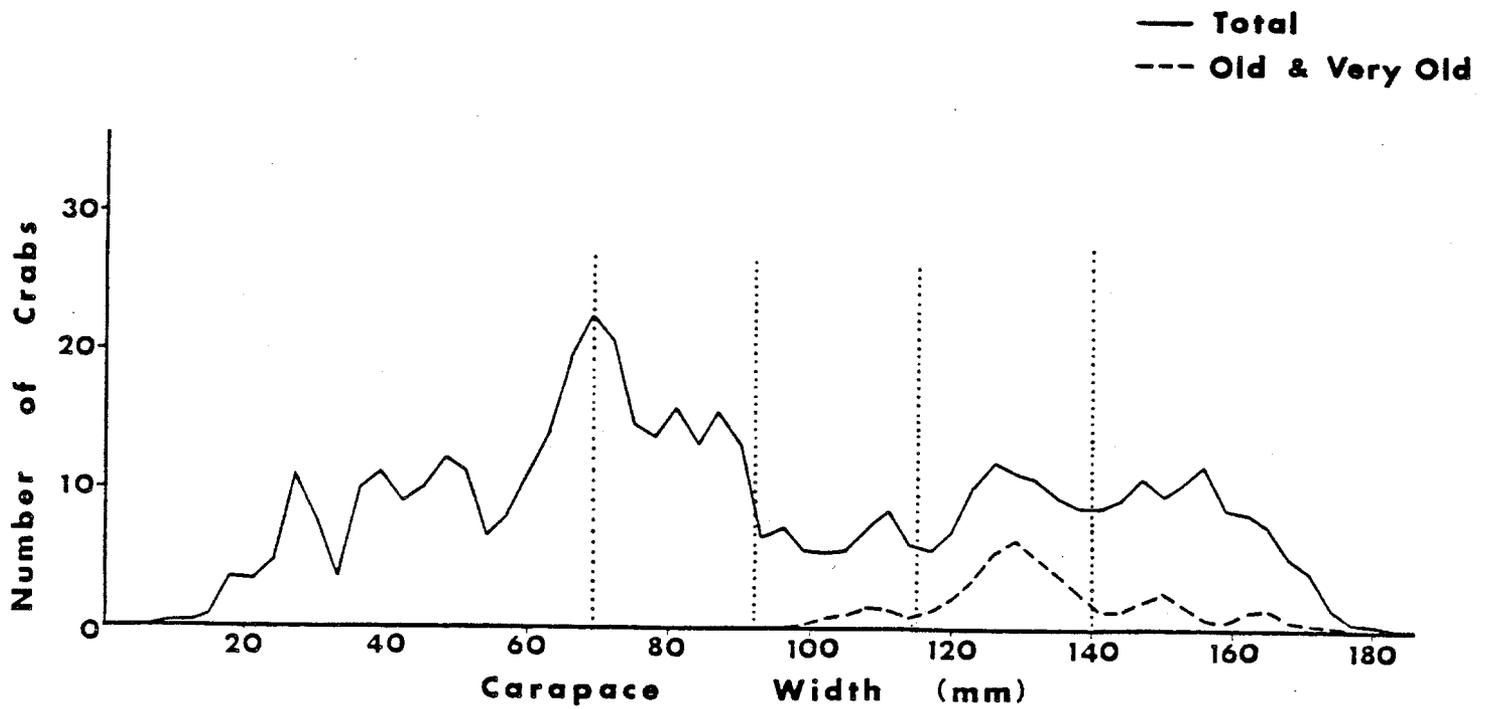


Figure 12. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured on the 1983 Chignik trawl survey, Chignik Management District. Dotted lines separate size groups (see Explanation of Terms).

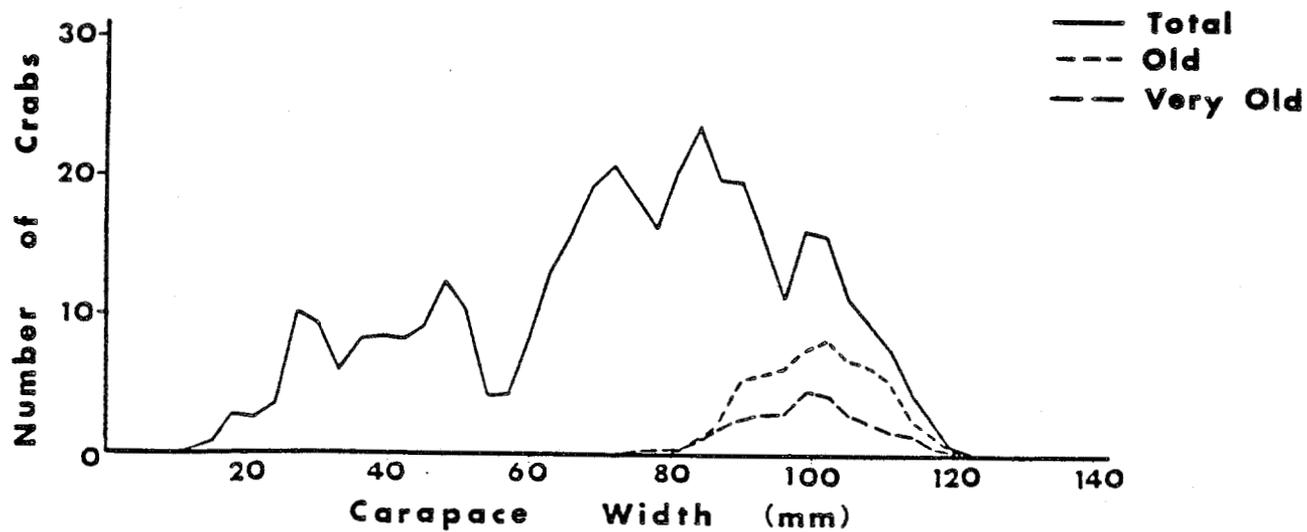


Figure 13. Carapace width frequency of female Tanner crabs, *Chionoecetes bairdi*, measured on the 1983 Chignik trawl survey, Chignik Management District.

Table 10. Population estimates for female and various size and age groups of male Tanner crabs, *Chionoecetes bairdi*, in the Chignik Management District, 1983 Chignik Management District trawl survey.

Group	1983	
	Population Estimate $\pm$ percent error	
♀ Juvenile	2,061,369 crabs $\pm$ 36.3%	
♀ Adult	1,390,849 crabs $\pm$ 27.9%	
♀ Total	3,455,005 crabs $\pm$ 27.1%	
-----		
♂ Prerecruit Fours	1,443,098 crabs $\pm$ 21.7%	
♂ Prerecruit Threes	697,689 crabs $\pm$ 46.7%	
♂ Prerecruit Twos	420,773 crabs $\pm$ 21.9%	
♂ Prerecruit Ones	1,073,876 crabs $\pm$ 18.2%	
♂ Recruit Legals	362,255 crabs $\pm$ 26.8%	
♂ Postrecruit Legals	203,768 crabs $\pm$ 21.6%	
♂ Total Legals	575,079 crabs $\pm$ 23.1%	
♂ Total	4,203,549 crabs $\pm$ 17.1%	
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Number of tows	66	

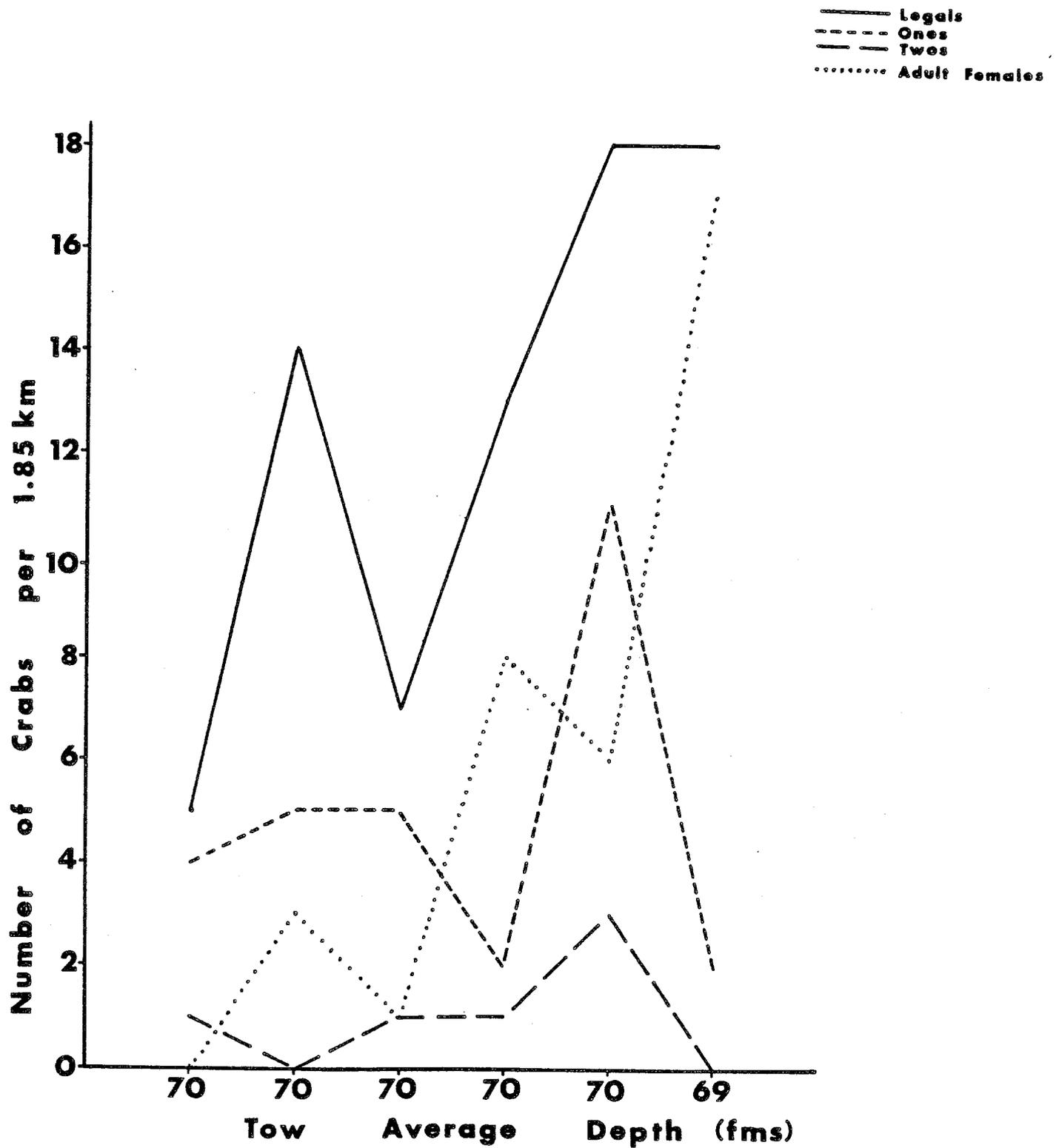


Figure 14. Catch of adult female and three size and age groups of male Tanner crabs, *Chionoecetes bairdi*, in six closely spaced tows at comparable depth in the Chignik Management District, 1983 Chignik Management District trawl survey.

scheme (the small study area) would provide a better estimate of the variance. However, the opposite occurred. In short, we did not do sufficient work in the area to properly address the questions of within-station variability. We hope to address this question again during the 1984 survey.

Leslie population estimates derived from the 1983 commercial fishing season for the Chignik Management District (Figure 15) suggested a lower total population of legal size crab than the 1982 survey population for the same crab group. The Leslie population estimate was 2,322,131 crabs while the 1982 survey estimate was 2,903,416 individuals  $\pm$  18.8%. The Leslie estimate was very close to the lower end of the 1982 survey population estimate when one accounts for the percentage error (2,358,219 crabs). Although the Leslie population estimate seems to confirm the results of the previous survey, some caution should be exercised in drawing such a conclusion. We had some indication during the 1983 commercial season that a substantial amount of undersize crabs were harvested. If this is the case, then the Leslie population estimate contains a portion of crabs that were sublegal in size and the estimate would be higher than the actual population by that proportionate amount. This would lead one to conclude that the 1982 survey population estimate of legal sized crabs was too high. In general, we have tended to assume that the survey estimate is on the low side since there are few areas which produce commercial quantities of Tanner crab that we are not able to survey because of the bottom topography. However, our estimates of initial base population size derived from the fishery do not seem to confirm that assumption. We need to further investigate our methods of analyzing the accuracy of our surveys. Our Leslie population estimate can be problematic in that we are not able to account for differences in gear type and fishing method, effects of weather on harvest rate and other factors which might skew the data.

#### South Peninsula Management District - Pavlof Bay Area, 1983:

The Pavlof Bay area was the only region of the South Peninsula Management District surveyed in 1983. It was the first trawl survey of crab stocks conducted by the Department in the area. The Pavlof Bay area is located on the Alaska Peninsula roughly between 161°40' and 162°00' W. long. and between 55°10' and 55° N. lat. (Figure 1). The area was not stratified by depth for the 1983 trawl survey. However, all tows were made in depths greater than 40 fm (73.2 m) due to the presence of large amounts of Dungeness crab gear at shallower depths. The area surveyed was 322 km<sup>2</sup>.

Fifteen tows were successfully completed on the 1983 Pavlof Bay trawl survey (Figure 16). Fourteen of the tows were used to generate crab population estimates which was a sampling intensity of one tow per 23 km<sup>2</sup> of potential crab habitat.

Overall, 4,394 Tanner crabs were captured on the 1983 Pavlof Bay trawl survey (Table 11). Of these, 2,605 (59.3%) were male while 1,789 (40.7%) were female. Each of the tows produced some Tanner crab. Female catches varied from a low of 2 per 1.85 km in tow 127 to a high of 371 in tow 116. Male catches varied from a low of 10 in tow 127 to a high of 577 km in tow 121.

Looking at the male portion of the catch (Table 12), each of the smaller size and age groups sampled were well represented in the catch with 24.4%, 23.3%, and 26.3% of the total being prerecruit fours, threes, and twos, respectively. The

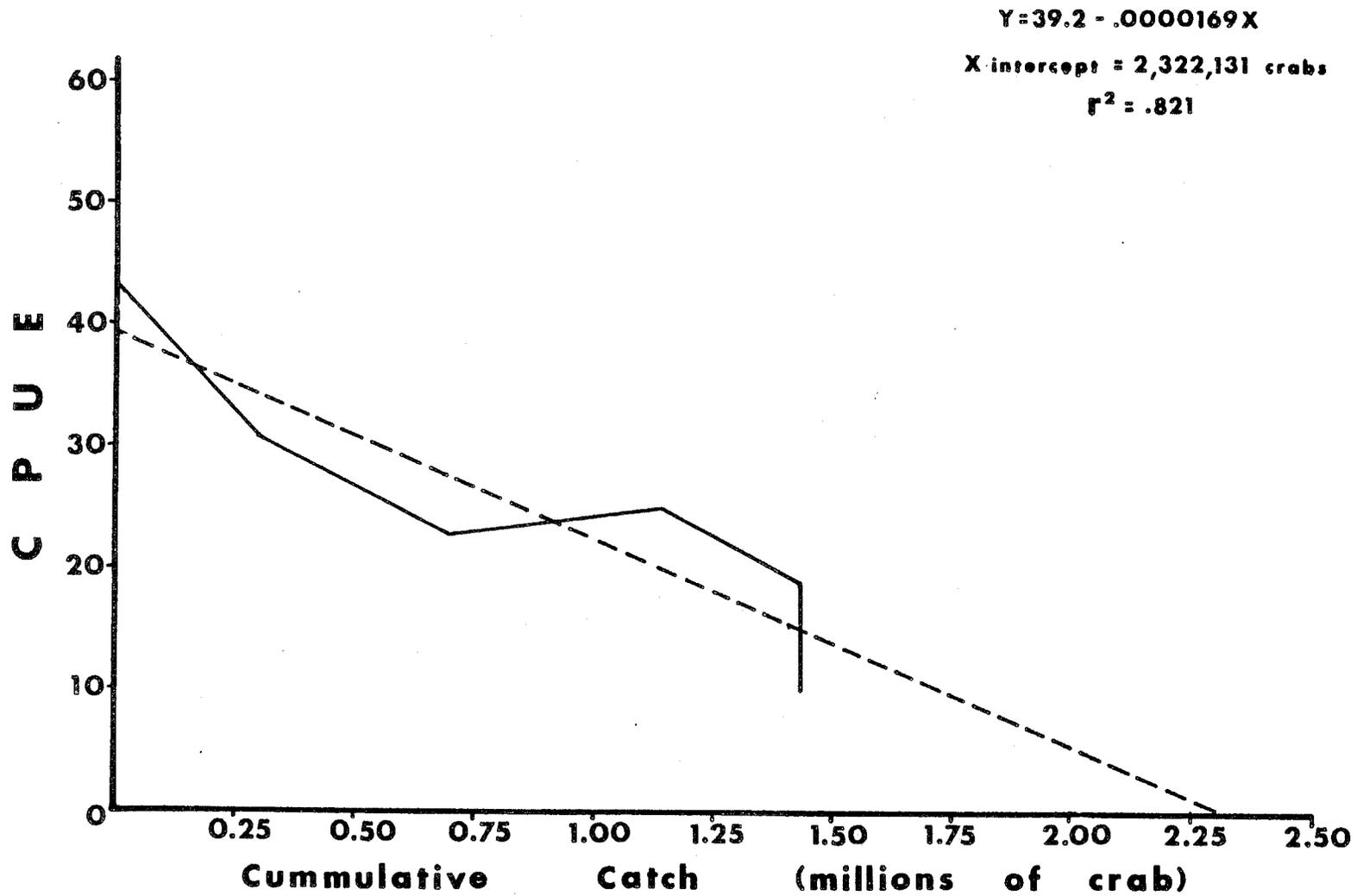


Figure 15. Leslie population estimate for legal size Tanner crabs, *Chionoecetes bairdi*, from 1983 Chignik commercial catch data, Chignik Management District.

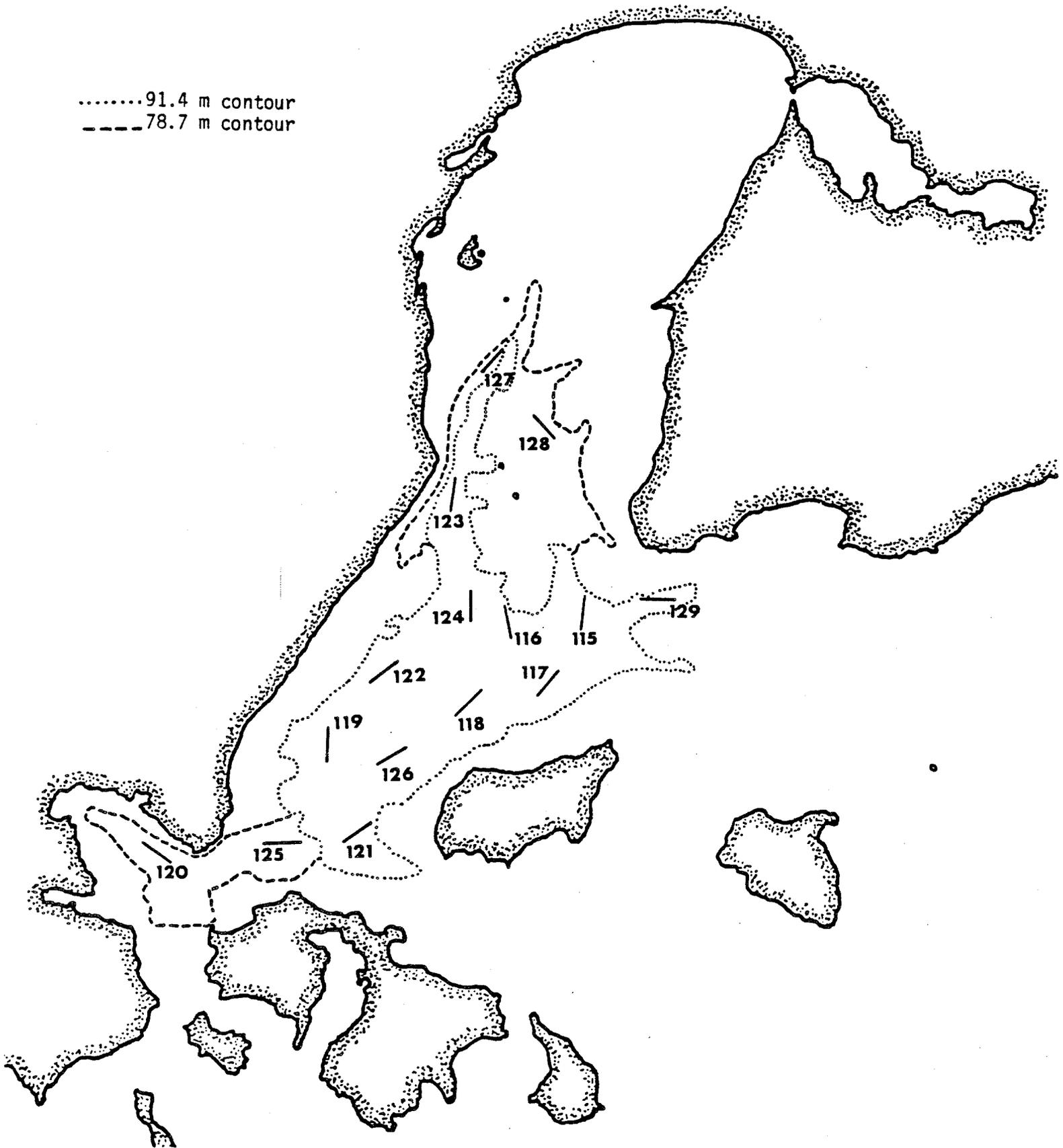


Figure 16. Tow locations in Pavlof Bay area, 1983 South Peninsula Management District trawl survey.

Table 11. Number of Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by sex, size, and age group, 1983 South Peninsula Management District trawl survey.

Tow No.	Juv. ♀	Adult ♀	Total Female	Prerecruit Fours ♂	Prerecruit Threes ♂	Prerecruit Twos ♂	Prerecruit Ones ♂	Recruit Legals ♂	Postrecruit Legals ♂	Total Legals ♂	Total Male	Total Crab
115	92	33	125	11	33	22	22	4	2	6	94	219
116	27	344	371	7	3	25	37	4	22	26	98	469
117	41	29	70	10	95	112	62	26	5	31	310	380
118	53		53	62	5		1	1		1	69	122
119	63	1	64	58	2	2	1	1		1	64	128
120	127	25	152	10	103	175	73	25	6	31	392	544
121	263	57	320	28	242	140	92	50	25	75	577	897
122	42	16	58	38	16	28	9	2		2	93	151
123	135	108	243	2	89	164	125	34	3	37	417	660
124	82	1	83	94	3	3	5	3	1	4	109	192
125	64	1	65	110	14	8	9	1	1	2	143	208
126	118		118	131			1				132	250
127	2		2	1		4	2	1	1	2	10	12
128	4	15	19	3		2	11	10	1	11	27	46
129	46		46	70							70	116
Totals	1,159	630	1,789	635	606	685	450	162	67	229	2,605	4,394

Table 12. Number of male Tanner crabs, *Chionoecetes bairdi*, captured per 1.85 km by size and age group and percent total male catch in the Pavlof Bay area, 1983 South Peninsula Management District trawl survey.

Group	Number	%	Percent of Legals
Prerecruit Fours	635	24.4	
Prerecruit Threes	606	23.3	
Prerecruit Twos	685	26.3	
Prerecruit Ones	450	17.3	
Recruit Legals	162	6.2	70.7
Postrecruit Legals	67	2.6	29.3
Total Legals	229	8.8	
Total Males	2,605	100.0	
Number of Tows		15	

percentage of the total male catch that was legal size was 8.8% (229 individuals) and within the legal size group 70.7% (162 crabs) were recruits. In terms of the shell age composition of the male catch (Table 13), the overwhelming majority of individuals had new shells (96.3%). It is noteworthy that of the 12 very oldshell individuals 10 were prerecruit one crabs which had failed to molt to legal size for 2 years. No skipmolting was observed in the prerecruit four and prerecruit three crab groups.

The relative egg clutch size of the female portion of the catch (Table 14) indicated that the population was in a reproductively healthy condition. Only one female (0.2%) was barren. She had active ovaries, but only old sperm in the spermathecae indicating that she had not mated after releasing her previous egg clutch. Of the 463 adult females measured from the Pavlof Bay area, 97.7% had egg clutches 50-100% full. It should be noted that the sample size (N=463) is not large and may not be indicative of the population as a whole.

The size frequency distribution of male and female Tanner crabs measured on the 1983 Pavlof Bay area trawl survey (Figure 17) shows a relatively strong year class of crabs centered around 90 mm CW at the time of the survey. Without skipmolting, the male portion of this crab group would be expected to molt to legal size in 1986 (for the 1987 commercial fishing season). In addition, if the size frequency is indicative of the actual structure of the population, recruitment should provide higher populations of legal size crabs over the next 2 years than was present during the 1983 survey. Hopefully, by increasing our sampling intensity the 1984 Pavlof Bay area survey will give us a more detailed picture of the Tanner crab population than was obtained in 1983.

Population estimates for the Pavlof Bay area (Table 15) seemed on the low side according to indications of the population size from the annual pot indexing survey which was conducted in the Pavlof Bay area about 3 weeks after the conclusion of the trawl survey. Percentage errors around the estimates were high which was a result of high variability between catches of legal size crab in each tow.

One of the reasons for surveying the Pavlof Bay area was to assess the population of red king crab and Tanner crab in an area conducive to both trawl and pot survey work. King crab catch data for sublegal and legal male and female red king crab are presented in this report (Table 16). Population estimates derived from the trawl survey did not compare well with those from the annual pot indexing survey. Part of the problem may have been due to the extreme variability in king crab catches of legal size individuals (43% of the captured legals were in one tow, No. 124, Table 16). Hopefully, we will be able to tell more about the red king crab population structure and distribution after completion of a more intensive survey in the bay in 1984. We plan to coordinate the pot and trawl work more closely than was possible in 1983. Surveying at the same time will eliminate problems of changes in king crab distribution over time.

Table 13. Number and percent total male Tanner crab, *Chionoecetes bairdi*, captured per 1.85 km by size and exoskeletal age in the Pavlof Bay area, 1983 South Peninsula Management District trawl survey.

Group	NS		OS		VOS		Total
	No.	%	No.	%	No.	%	
Prerecruit Fours	635	100.0	0	-	0	-	635
Prerecruit Threes	606	100.0	0	-	0	-	606
Prerecruit Twos	673	98.2	11	1.6	1	0.1	685
Prerecruit Ones	405	90.0	35	7.8	10	2.2	450
Recruit Legals	162	100.0	NA	-	NA	-	162
Postrecruit Legals	29	43.3	37	55.2	1	1.5	67
Total Legals	191	83.4	37	16.2	1	0.4	229
Total Males	2,510	96.3	83	3.2	12	0.5	2,605

Table 14. Number of female Tanner crabs, *Chionoecetes bairdi*, measured by shell age and percent fullness of egg clutch in the Pavlof Bay area, 1983 South Peninsula Management District trawl survey.

Class Shell age	1983																				
	Juvenile			Percent fullness of clutch																	
	N	O	VO	0			1-24%			25-49%			50-74%			75-89%			90-100%		
			N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	
Number	826	0	0	0	0	1	2	0	2	5	0	1	130	1	9	35	11	25	22	173	46
% Total (adults)				-	-	0.2	0.4	-	0.4	1.1	-	0.2	28.1	0.2	1.9	7.6	2.4	5.4	4.8	37.4	9.9
% by class				0.2			0.8			1.3			30.2			15.4			52.1		

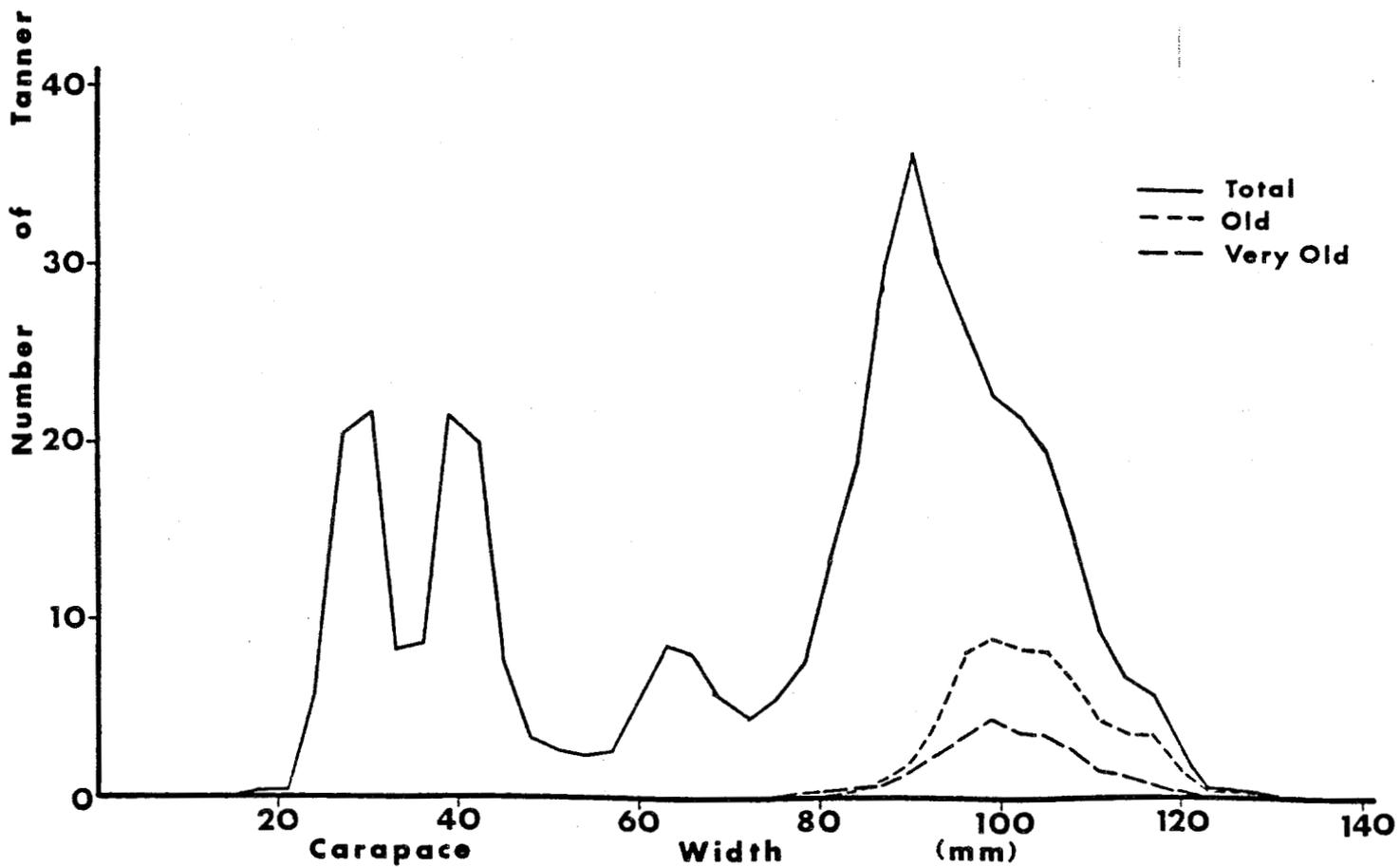
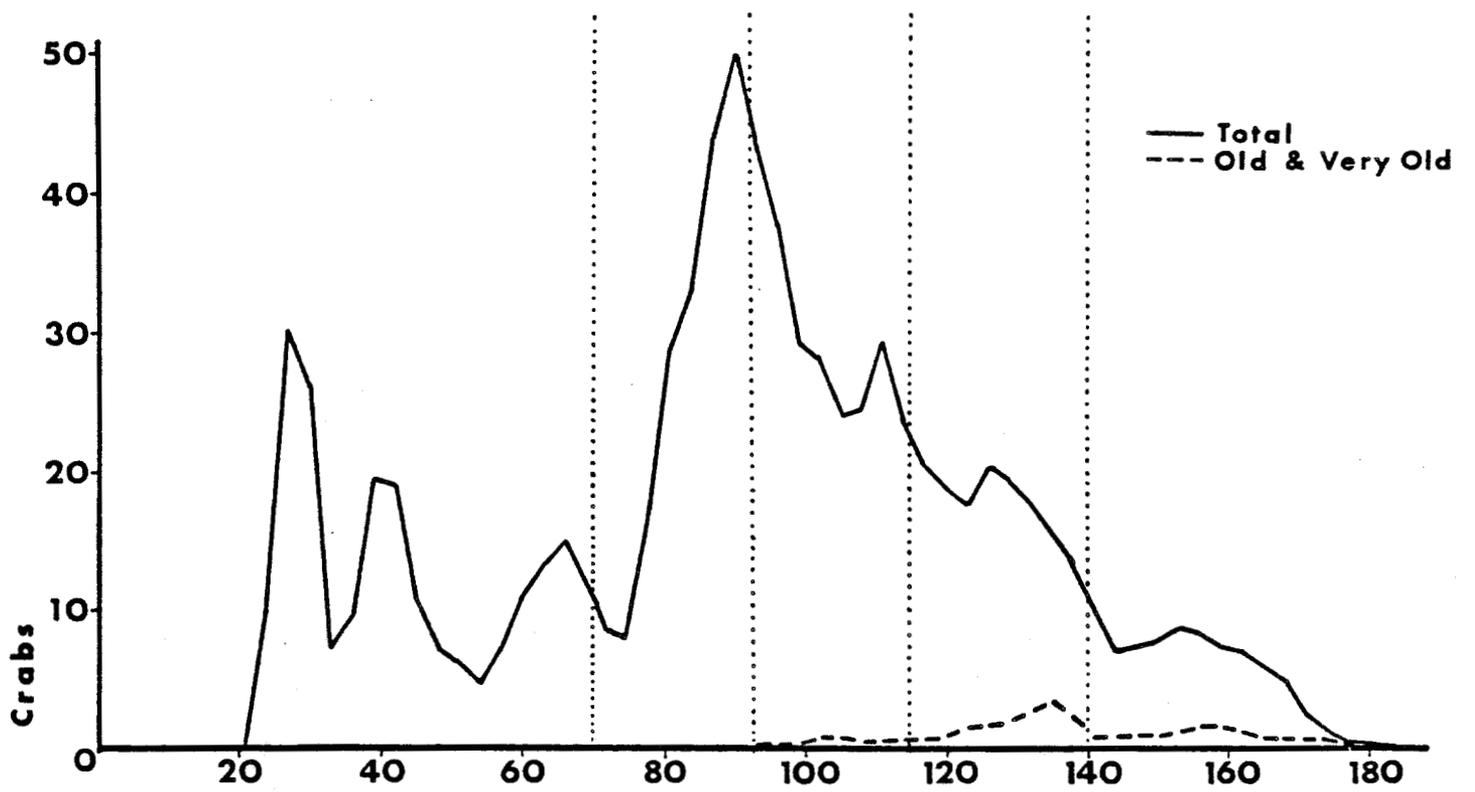


Figure 17. Carapace width frequency of male (top) and female (bottom) Tanner crabs, *Chionoecetes bairdi*, measured on the 1983 Pavlof Bay area trawl survey, South Peninsula Management District. Dotted lines separate size groups. (See "Explanation of Terms")

Table 15. Population estimates for female and various size and age groups of male Tanner crabs, *Chionoecetes bairdi*, in the Pavlof Bay area, 1983 South Peninsula Management District trawl survey.

Group	1983	
	Population Estimate $\pm$ percent error	
♀ Juvenile	1,103,406 crabs $\pm$ 22.1%	
♀ Adult	607,776 crabs $\pm$ 17.7%	
♀ Total	1,711,253 crabs $\pm$ 22.6%	
-----		
♂ Prerecruit Fours	565,823 crabs $\pm$ 31.6%	
♂ Prerecruit Threes	603,333 crabs $\pm$ 42.9%	
♂ Prerecruit Twos	695,185 crabs $\pm$ 40.0%	
♂ Prerecruit Ones	449,719 crabs $\pm$ 34.0%	
♂ Recruit Legals	162,585 crabs $\pm$ 36.6%	
♂ Postrecruit Legals	65,749 crabs $\pm$ 44.3%	
♂ Total Legals	228,320 crabs $\pm$ 35.0%	
♂ Total	2,542,422 crabs $\pm$ 26.6%	
-----		
Number of tows	14	

Table 16. Number of sublegal and legal size male and female red king crab captured per 1.85 km in the Pavlof Bay area, 1983 South Peninsula Management District trawl survey.

Tow No.	Sublegal red king crab	Legal red king crab	Female red king crab	Total red king crab
115		46		46
116		2		2
117				
118				
119				
120	3		97	100
121				
122	3	38		41
123	27	79		106
124	5	126	2	133
125				
126		4	1	5
127	5	1	537	543
128			132	132
129			1	1
<b>Total</b>	<b>43</b>	<b>296</b>	<b>770</b>	<b>1,109</b>

## POPULATION SURVEYS USING POTS

Tanner crab populations have been quantitatively surveyed using pots as an adjunct to the ADF&G's annual king crab population survey since 1973. The primary purpose of these surveys is to determine distribution and abundance of king and Tanner crab, particularly in historic commercial fishing areas.

### Methods and Procedures

One chartered fishing vessel and one State of Alaska research vessel was used to conduct the Westward Region population surveys during the summer of 1983 (Table 17). No Tanner crab surveys were conducted in the Eastern or Western Aleutians Management Districts during 1983. Station distribution was determined from a permanent sampling grid pattern in most cases. Targeted sampling areas were selected based on the historic distribution of the king crab resource and, to a lesser extent, the Tanner crab resource. Within the sampling areas regions of higher population levels received the greatest sampling effort.

The number of stations fished varied between bay and ocean areas. Generally, five ocean stations of 10 pots each were fished per day. Pots were spaced 0.40 km apart in an east-west direction. Ten or eleven bay stations were sampled daily.

Sampling gear consisted of 2.1 x 2.1 m crab pots weighing 318 kg and covered with 8.9 cm webbing. Two 1-liter perforated plastic jars were filled with chopped frozen herring, *Clupea harengus*, and placed inside each pot as bait.

Ideally, baited pots were set and allowed to fish for 24 hours. The average soak time over the last 10 years has been about 18 to 24 hours and the lower end of the average has become more typical as we have increased our daily fishing effort over the last few surveys. Individual pot identification, environmental conditions, depth and soak time were recorded for each pot.

Upon retrieval of each pot all organisms were sorted and species and number of individuals were noted. Crabs caught in each pot were separated by species, sex, and exoskeletal age. Subsampling was used in instances where the catch was large. Carapace width measurements were obtained for male and female Tanner crabs (Figure 2). Measurements were taken to the nearest millimeter using Vernier calipers. Exoskeletal age, egg clutch size (percentage fullness of the brood chamber), and egg condition were also recorded. A number of commercial sized Tanner crabs were tagged with a carapace dart tag and released while still on station. All crabs were released after the necessary data was collected.

Catch figures for individual pots were standardized to reflect a 24-hour fishing period (Table 18). These factors represent an approximation of a function derived from Kodiak king crab logbook data (Rothschild et al. 1970).

### Results and Discussion

The following are the results of the 1983 Tanner crab population indexing surveys in the Kodiak and South Peninsula Management Districts.

Table 17. Research fishing information and related catch data, 1983 Westward Region pot surveys.

District/ Date	Vessel	Keel length (ft)	Scientific Crew leader	Number ocean stations fished	Number of bay stations fished	Total pot Lifts	Depth range (fms)	No. male Tanner crab <i>C. bairdi</i> captured	No. female Tanner crab	
									<i>C. bairdi</i> Juv.	Adult
Kodiak (7/20-9/6)	Amber Dawn	97	F. Blau	163	167	2,091	7-134	29,087	77	4,090
South Peninsula (9/11-9/22)	Resolution	81	J. Hilsinger	11	66	309	17-77	3,757	52	726

Table 18. Soak factors used to standardize individual pot soak times.

<u>Days Pots Soaked</u>	<u>Soak Factor</u> <sup>1</sup>
0-----	0
1-----	1.00
2-----	1.50
3-----	2.00
4-----	2.33
5-----	2.67
6-----	3.00
7-----	3.25
8-----	3.50
9-----	3.75
>10-----	4.00

<sup>1</sup>The catch is divided by the soak factor to determine the catch in a standard 24-hour soak.

Example: If pot soaked 2 days and contained 12 crabs, the number of crabs captured in a standard 24-hour soak would be,

12 crabs ÷ 1.50 (soak factor  
from table) = 8 crabs in 24  
hours.

#### Kodiak Management District:

Of the 330 stations fished on the 1983 Kodiak pot survey, 163 were ocean stations while 167 were located in various bays around the island (Appendix Figures 1-8). A total of 2,091 pots was pulled during the survey which is 370 more than were pulled on the 1982 survey. Most of the increase was due to exploratory fishing for female red king crab in areas where we hoped to obtain more information on the reproductive condition of the red king crab population. Station by station location and catch information can be found in Appendix Table 2.

Male Tanner crab. The 1983 pot survey captured a total of 29,087 male Tanner crabs (Table 19). This was the highest total male catch of the last five surveys. Effort was higher in 1980 with 2,339 pots lifted compared to the 2,091 pots fished in 1983. However, the total male catch in 1980 was about 60% of the 1983 catch. The marked increase in the numbers of males captured on the survey was not limited to one or two size and age groups. It was observed in all size and age groups with the exception of the prerecruit fours which showed a decrease over the 1983 catch. The relative proportion of the prerecruit one and recruit crabs has changed little over the last three surveys. Prerecruit ones males made up 41.6%, 40.7%, and 43.0% of the catch in 1981, 1982, and 1983, respectively. Recruit legals accounted for 37.3%, 42.1%, and 37.8% of the catch in the same survey years.

Looking at the mean catch per pot of legal size crabs by substock and stock (Table 20 and Figure 18) shows a low of 0.4 legals/pot in substock 6 (Portlock Bank) and a high of 32.4 legals/pot in substock 17 (Twoheaded Island). Mean catch/pot of legal size crabs from the total survey area in 1983 was 12.4 crabs. Catches by stock varied from 4.0 crabs/pot in Stock A (Northeast) to 21.6 legals/pot in Stock B (Eastside).

It is more meaningful to examine the mean catch/pot of legal size crabs by stock from stations fished on both the 1982 and 1983 surveys in order to determine changes in relative abundance (Table 21). Two of the five stocks surveyed showed increases in abundance, with Stock B (Eastside) showing a 40% and Stock C (South-east) a 109% increase. Three of the stocks showed decreases in abundance with the largest decline in Stock D (Southwest) which was down 31% over the mean catch/pot in 1982. District wide, the percentage change in abundance between 1982 and 1983 was 7%, a very slight increase.

The ability to predict future recruitment to legal size or growth in smaller size groups is problematic with Tanner crab for two major reasons. First, using the pot method to assess the Tanner crab population seems to favor the capture of the larger sized, older portion of the Tanner crab population. Prerecruit crabs, especially those two or more molts (115 cm CW) away from legal size, are not captured in predictable numbers from survey to survey. Second, the phenomenon of skip molting is common in prerecruit one crabs. This hampers our ability to predict recruitment to legal size since the portion of the prerecruit one population molting to recruit size is variable from year to year.

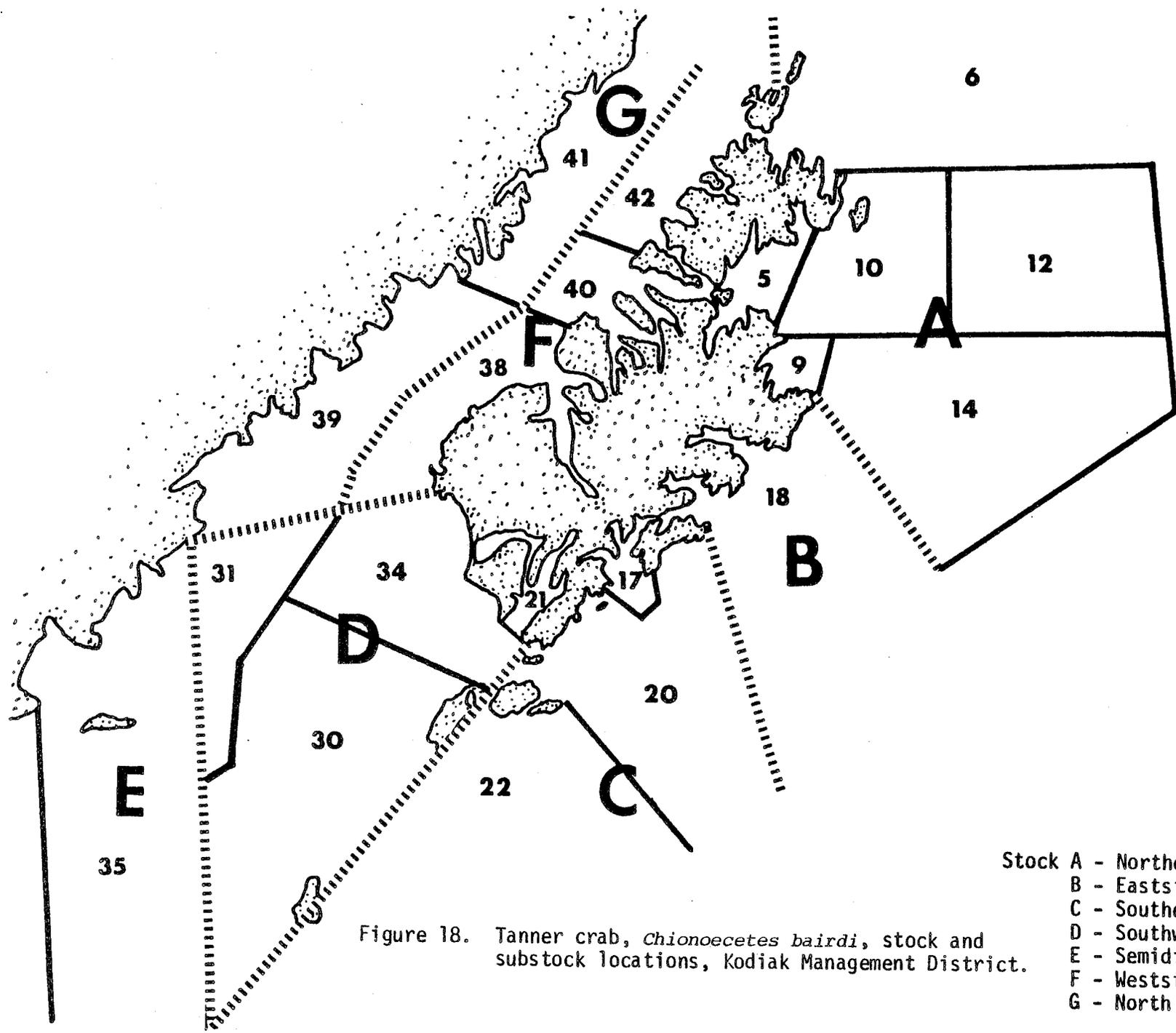
Size frequency data can hopefully give us an idea of the relative strength of the prerecruit one and legal size crab groups (Figures 19-23 and Figure 18). In the Northeast fishing section (Figure 19) low numbers of crabs were captured from the Stock A offshore substocks (6, 10/12, and 14) compared with the numbers encountered

Table 19. Number of male Tanner crabs, *Chionoecetes bairdi*, captured by size and age group and percentage of total male catch, 1979 - 1983 Kodiak Management District pot surveys.

Group	1979		1980		1981		1982		1983	
	No.	%								
Prerecruit Fours	5	0.0	26	0.2	11	0.1	6	0.0	1	0.0
Prerecruit Threes	70	0.5	179	1.5	83	0.8	82	0.4	254	0.9
Prerecruit Twos	813	6.2	1,317	11.4	947	9.1	1,735	8.3	2,984	10.3
Prerecruit Ones	4,782	36.2	4,814	41.6	4,316	41.6	8,546	40.7	12,496	43.0
Recruit Legals	2,409	18.2	2,390	20.6	3,873	37.3	8,850	42.1	10,982	37.8
Postrecruit Legals	5,115	38.7	2,848	24.6	1,146	11.0	1,802	8.6	2,370	8.1
<b>Total Legals</b>	<b>7,524</b>	<b>57.0</b>	<b>5,238</b>	<b>45.3</b>	<b>5,019</b>	<b>48.4</b>	<b>10,652</b>	<b>50.7</b>	<b>13,352</b>	<b>45.9</b>
<b>Total Males</b>	<b>13,193</b>		<b>11,572</b>		<b>10,376</b>		<b>21,021</b>		<b>29,087</b>	
Pot Lifts		1,709		2,339		1,793		1,721		2,091

Table 20. Mean catch/pot of legal male Tanner crabs, *Chionoecetes bairdi*, by substock and stock by year.

KODIAK POT SURVEYS													
Substock	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
6 Portlock	0.0	0.2	9.9	2.9	2.2	-	1.4	0.5	0.1	0.1	0.4		
5 Marmot Bay	8.0	10.4	11.6	10.9	6.9	-	2.9	4.4	3.6	9.8	6.2		
10/12 Marmot Gully	6.6	12.2	7.7	3.6	5.2	-	6.6	1.8	0.6	2.8	0.8		
9 Chiniak Bay	16.7	8.1	11.9	8.2	1.8	-	6.4	2.0	1.6	7.8	11.5		
14 Chiniak Gully	30.9	19.0	5.0	11.3	7.0	-	4.1	2.9	0.9	2.0	1.2		
STOCK A	12.4	10.0	9.2	7.4	4.6	-	4.3	2.3	1.4	4.5	4.0		
18 Ugak/Barnabas	13.1	24.8	10.0	4.4	6.3	-	6.7	2.8	3.8	15.3	21.6		
STOCK B	13.1	24.8	10.0	4.4	6.3	-	6.7	2.8	3.8	15.3	21.6		
17 Twoheaded Island	26.1	15.7	25.2	14.5	28.6	-	0.7	2.1	0.8	15.1	32.4		
20 Horse's Head	4.3	10.4	15.2	6.1	13.7	2.8	4.6	1.1	0.7	1.9	1.9		
22 S. Trinity Island	2.6	7.6	8.0	15.1	4.9	7.5	0.8	2.9	0.6	1.8	4.6		
STOCK C	11.0	11.2	16.1	11.9	15.7	5.2	2.0	2.0	0.7	6.3	13.0		
21 Alitak Bay	8.7	34.1	2.7	31.1	18.2	-	2.9	8.1	13.3	14.1	22.8		
30/34 Ikolik/Compass Rose	8.8	11.2	7.8	6.4	9.5	4.6	2.0	2.1	3.2	6.0	2.8		
STOCK D	8.8	22.6	5.2	18.8	13.8	4.6	2.4	5.1	8.2	10.0	12.8		
40 Kupreanof/Uganik	1.0	3.3	14.1	12.7	7.1	-	3.1	3.2	8.7	14.1	10.6		
42 West Afognak	-	-	-	33.4	-	-	8.9	-	-	-	-		
STOCK F	1.0	3.3	14.1	23.1	7.1	-	6.0	3.2	8.7	14.1	10.6		
ALL SUBSTOCKS	9.3	14.4	10.9	13.1	9.5	4.9	4.3	3.1	4.6	10.0	12.4		

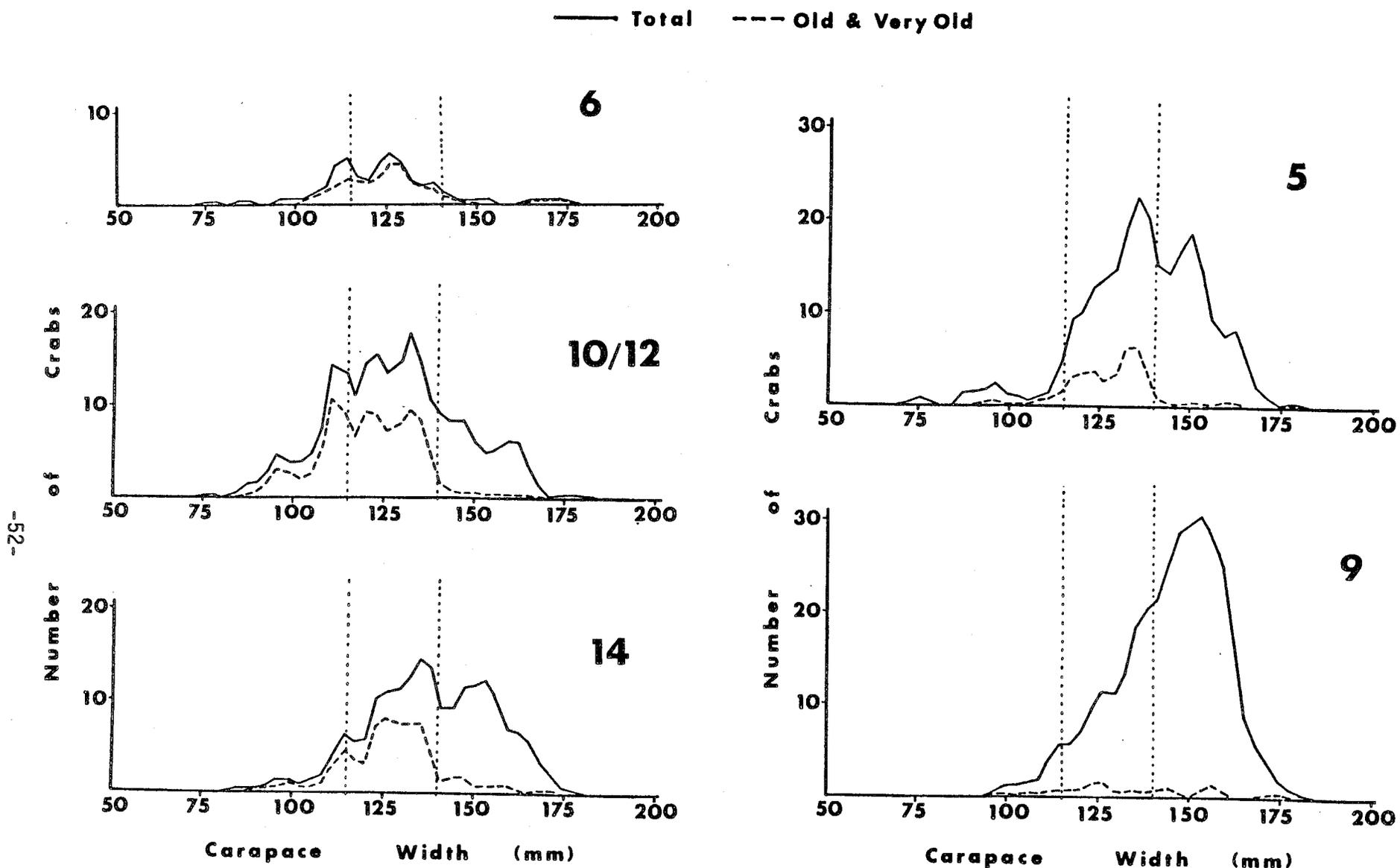


- Stock A - Northeast
- B - Eastside
- C - Southeast
- D - Southwest
- E - Semidi Islands
- F - Westside
- G - North Mainland

Figure 18. Tanner crab, *Chionoecetes bairdi*, stock and substock locations, Kodiak Management District.

Table 21. Mean catch/pot of legal male Tanner crabs, *Chionoecetes bairdi*, by stock from stations fished on both the 1982 and 1983 Kodiak Management District pot surveys.

Stock	1982	1983	Percent Change
A - Northeast	4.5	3.4	- 24
B - Eastside	18.7	26.2	+ 40
C - Southeast	3.4	7.1	+109
D - Southwest	7.7	5.3	- 31
F - Westwide	14.9	14.0	- 6
Kodiak Total	6.9	7.4	+ 7



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Figure 19. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from five substocks (5, 6, 9, 10/12 and 14) of Stock A of the Kodiak Management District, 1983 Kodiak Management District pot survey. See Figure 18 for substock locations. Dotted lines separate legal and pre-recruit one crabs from rest of catch.

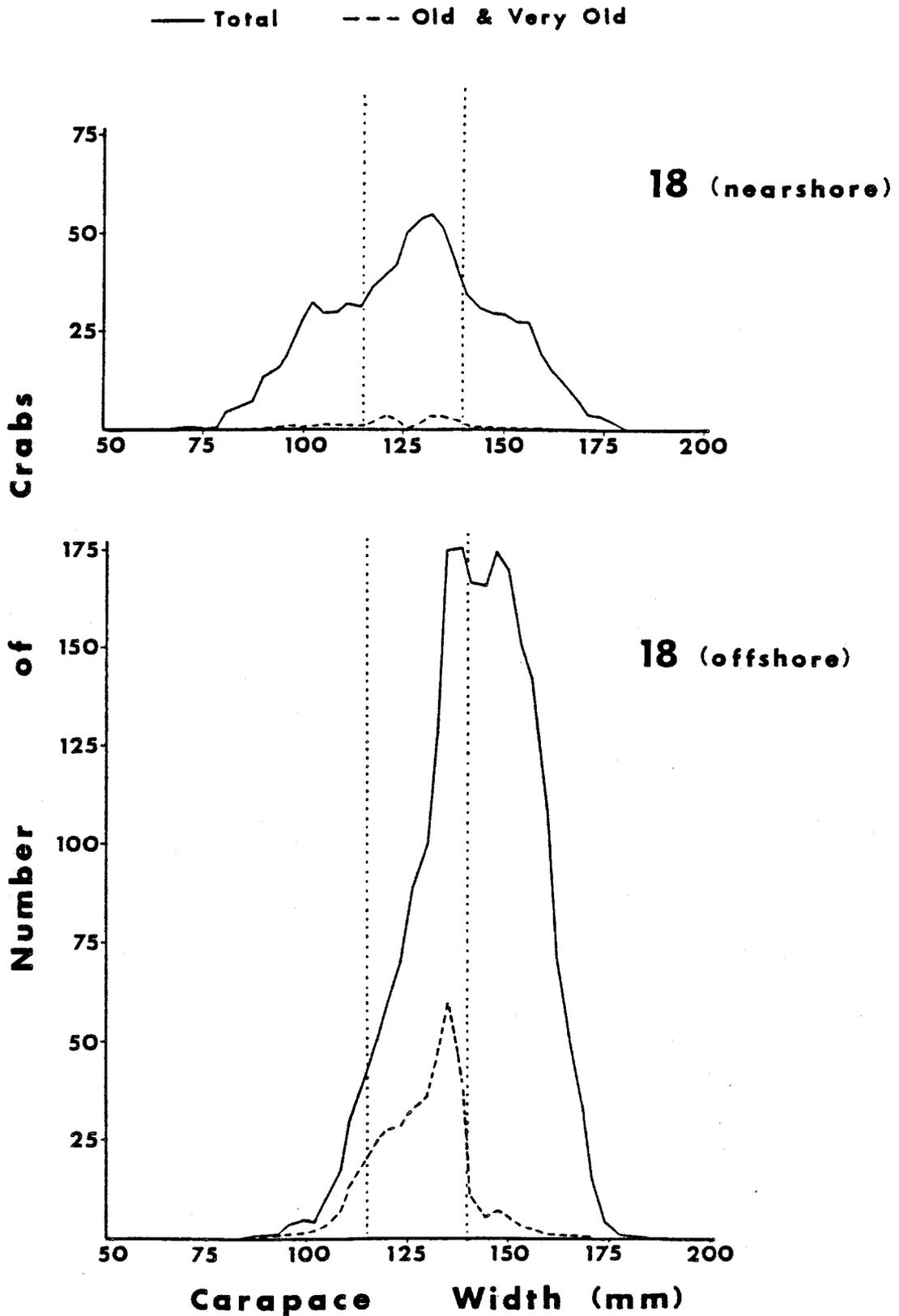


Figure 20. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from Stock B (substock 18) of the Kodiak Management District, 1983 Kodiak Management District pot survey. See Figure 18 for substock locations. Dotted lines separate legal and prerecruit one crabs from rest of catch.

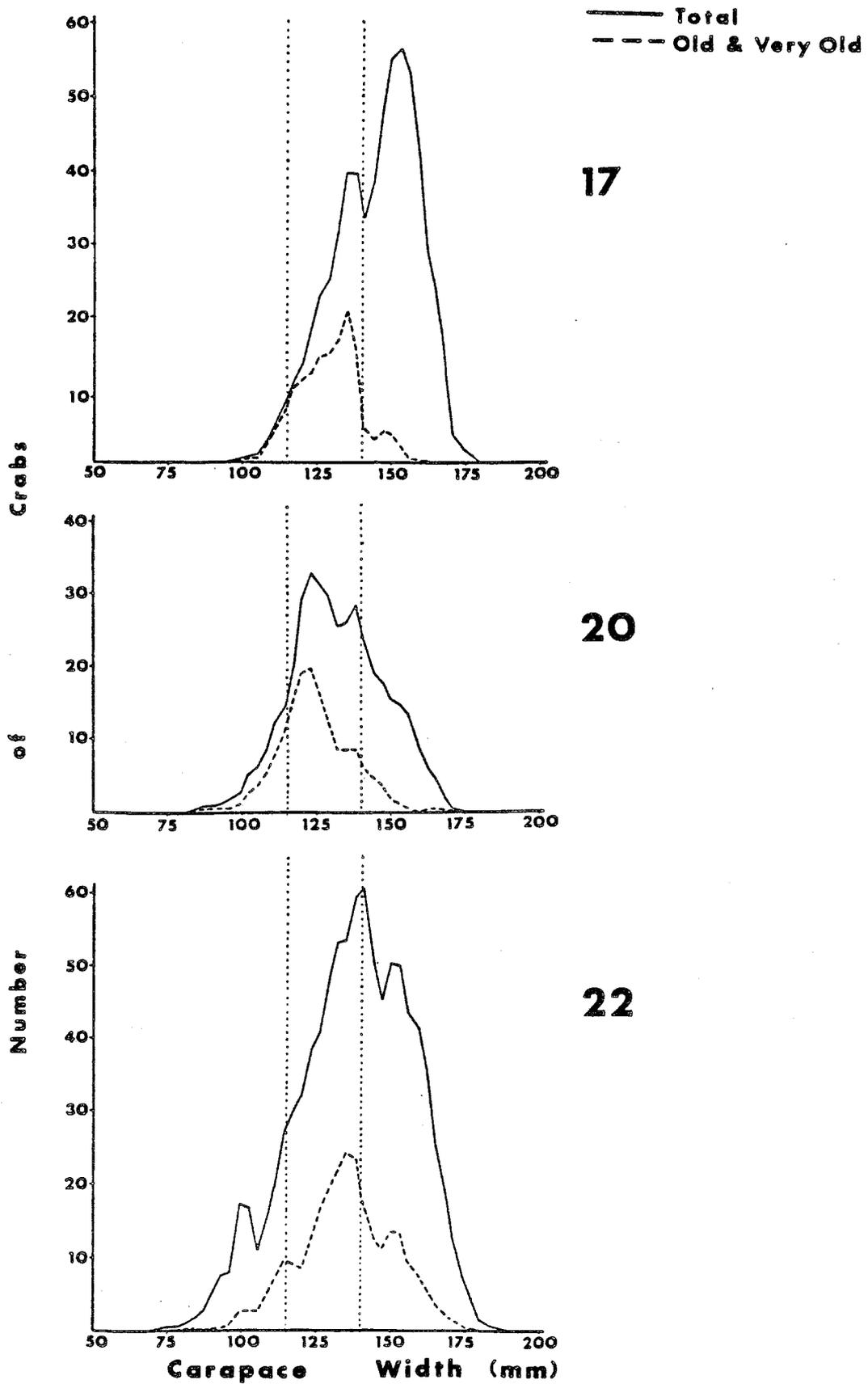


Figure 21. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from substocks 17, 20, and 22 of Stock C of the Kodiak Management District, 1983 Kodiak Management District pot survey. See Figure 18 for substock location. Dotted lines separate legal and prerecruit one crabs from rest of catch.

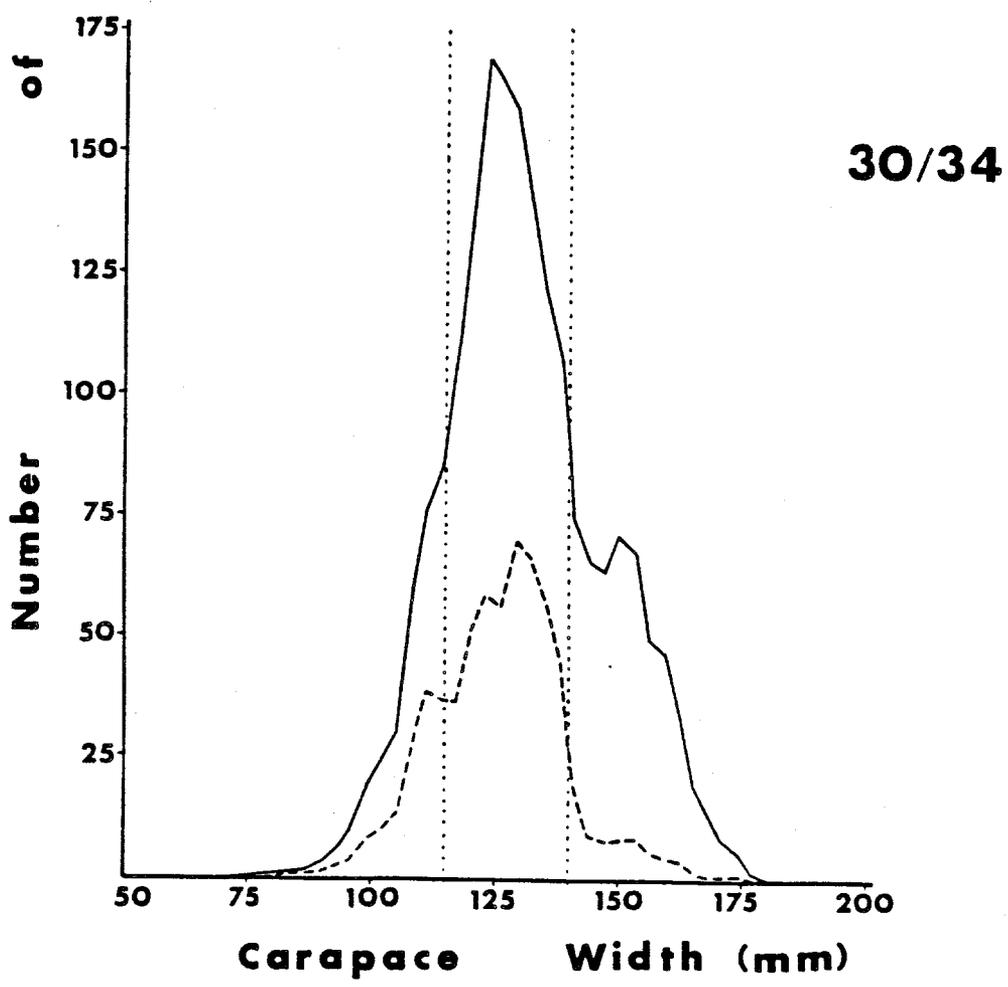
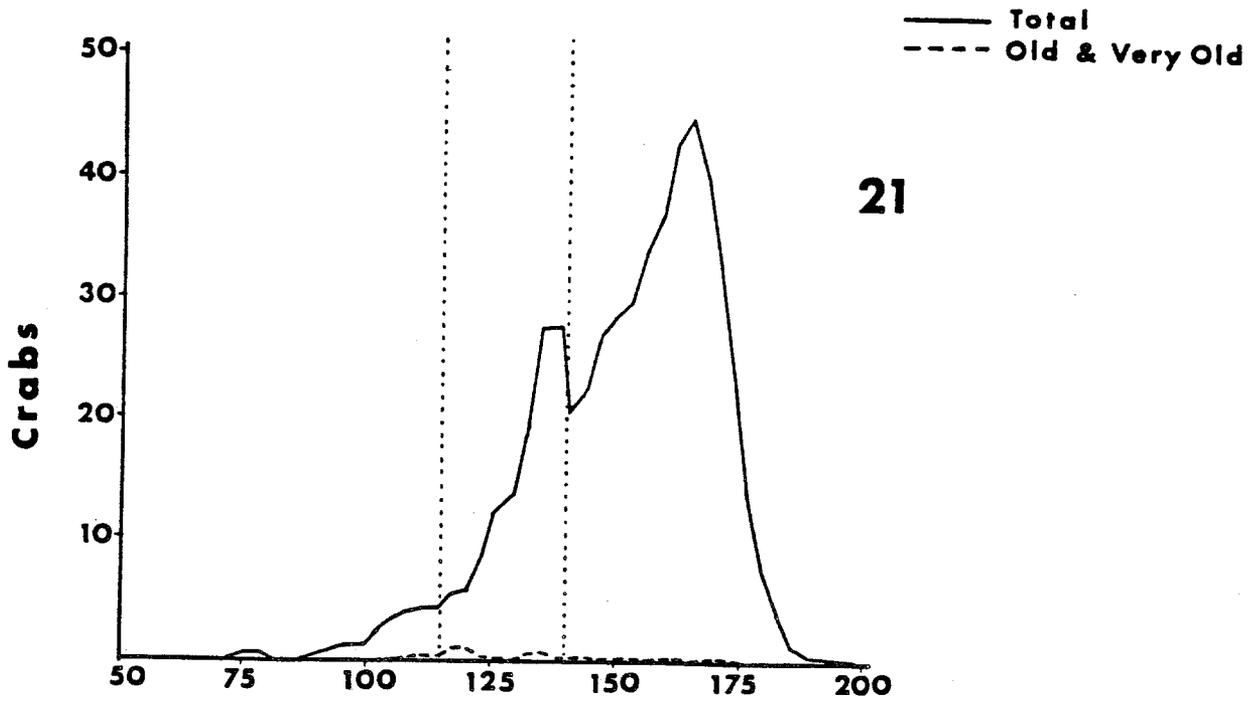


Figure 22. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, from substocks 21 and 30/34 of Stock D of the Kodiak Management District, 1983 Kodiak Management District pot survey. See Figure 18 from substock locations. Dotted lines separate legal and pre-recruit one crabs from rest of catch.

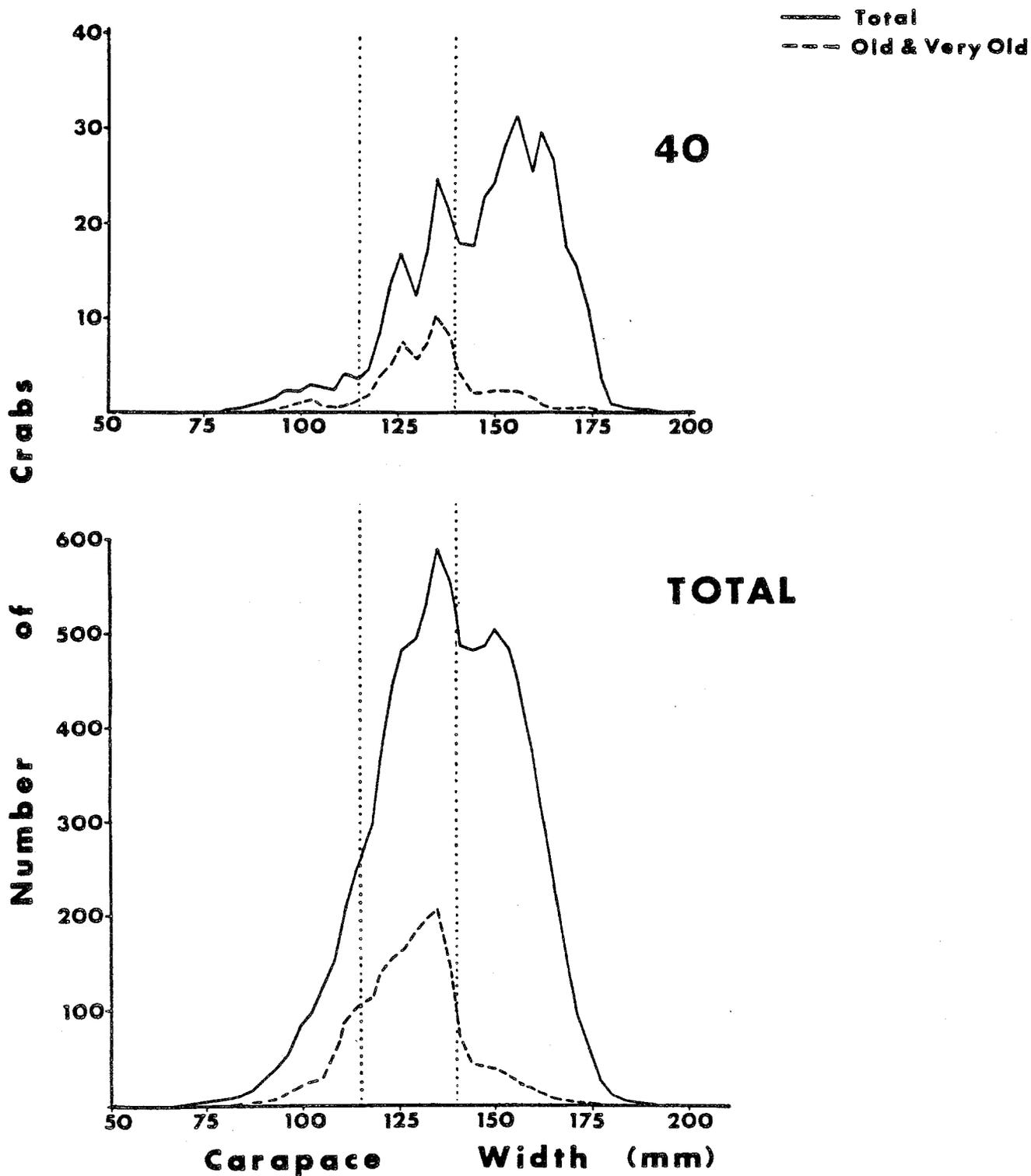


Figure 23. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from substock 40 of Stock F and the total survey catch of the Kodiak Management District, 1983 Kodiak Management District pot survey. See Figure 18 for substock locations. Dotted lines separate legal and prerecruit one crabs from rest of catch.

in the two nearshore substocks (5 and 9). Also, the offshore substocks seem to have a much higher proportion of old and very oldshell crabs compared with the nearshore substocks. If the size frequency distribution of the prerecruit ones and legal size crabs accurately reflects the abundance of these groups in the population, then the legal crab abundance of substocks 5 and 10/12 may increase a bit in 1984. Recruitment to legal size in 1984 may be poor in substock 9 compared with the recruit group seen in 1983. In Stock B (Figure 20) an analysis was made between the nearshore (Kiliuda and Ugak Bays to roughly 4.8 km offshore) and offshore stock components (beyond 4.8 km). The proportion of crabs that were skipmolts on the 1983 survey was higher in the offshore area than in the nearshore population as was the case with Stock A. The legal size population was very strong in the offshore area and it would seem that recruitment in 1984 may be substantial, but lower than in 1983. In Stock C (Figure 12), the nearshore substock (17) had good recruitment in 1983 as did one of the offshore substocks (22). However, the substantial number of legal and prerecruit one sized crabs observed in substock 22 were captured mainly in four of the 30 stations fished on the 1983 survey. According to the 1983 survey data it looks as though recruitment in 1984 should be strong compared with 1983 in substocks 20 and 22, while it should be down in substock 17. Substocks 21 and 30/34 of Stock D (Figure 22) differed from each other in population structure. A strong recruit class was present in substock 21 in 1983, however, the recruitment picture for 1984 looks poor at this time. Substocks 30 and 34 in the offshore area had poor recruitment in 1983, however, it looks as though a strong year class of prerecruit one crabs is available to molt to legal size in 1984 if skipmolting is not high (which it tends to be in this area). Recruitment in substock 40 of Stock F (Figure 23) appears to be declining according to the size frequency information from the 1983 survey. We should expect a poor fishery in this substock in 1985.

When the size frequency data from the Kodiak Management District are viewed as a whole (Figure 23) it appears as though recruitment in 1984 may be slightly higher than was the case in 1983. However, we have some indications that the efficiency of the pot survey may have changed the last year or so. If the catch rate of the pots on the survey is somewhat dependent on the density of the king crab population, "relative abundance" figures for legal Tanner crabs, which we rely on for harvest forecasts, may be positively skewed because of decreased competition from king crab. One piece of evidence for this is the fact that the total harvest during the 1983 commercial fishery did not measure up to that predicted by the previous survey despite high effort. The harvest was 20% short of the prediction despite the fact that we attempted to be conservative in our forecast.

Female Tanner Crab. The total number of female Tanner crabs measured on the 1983 Kodiak Management District pot survey was 4,167. Juvenile females numbered 77 individuals which was 1.8% of the female catch.

Observations on egg clutch size (Table 22) showed females with full (90-100%) egg clutches comprised 62.0% of the total adult female catch during the 1983 Kodiak Management District pot survey. If those crabs with nearly full (75-89%) clutches were added in, 81.8% of the adult females measured had full or nearly full egg clutches. Barren females made up 1.1% of the adult females measured on the 1983 pot survey, the lowest percentage barrenness of the last five survey years (6.7%, 8.5%, 3.4%, 1.8%, and 1.1%, respectively, for 1979-1983). Of the 47 barren females captured, 43.8% had active ovaries while 56.2% had inactive ovaries. With the exception of one individual, which had new sperm in the

Table 22. Number of female Tanner crabs, *Chionoecetes bairdi*, measured by shell age and percentage fullness of egg clutch, 1983 Kodiak Management District pot survey.

Class Shell age	1983																				
	Juvenile			Percent fullness of clutch																	
	N	O	VO	0			1-24%			25-49%			50-74%			75-89%			90-100%		
N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	
<u>Number</u>																					
-Nearshore	42	1	0	0	4	3	4	14	6	14	15	8	44	86	5	39	101	8	67	584	21
-Offshore	24	9	1	1	19	20	5	29	17	27	38	13	93	239	38	90	550	24	245	1540	79
-Total	66	10	1	1	23	23	9	43	23	41	53	21	137	325	43	129	651	32	312	2124	100
<u>% Total (adults)</u>																					
-Nearshore				-	0.4	0.3	0.4	1.4	0.6	1.4	1.5	0.8	4.3	8.4	0.5	3.8	9.9	0.8	6.5	57.1	2.1
-Offshore				0.03	0.6	0.7	0.2	0.9	0.6	0.9	1.2	0.4	3.0	7.8	1.2	2.9	17.9	0.8	8.0	50.2	2.6
-Total				0.02	0.6	0.6	0.2	1.1	0.6	1.0	1.3	0.5	3.3	7.9	1.1	3.2	15.9	0.8	7.6	51.9	2.4
<u>% by Class</u>																					
-Nearshore					0.7			2.3				3.6			13.2			14.5			65.7
-Offshore					1.3			1.7				2.5			12.1			21.6			60.8
-Total					1.1			1.8				2.8			12.3			19.8			62.0

spermathecae, all of the barren females had either no sperm or old sperm in their spermatheca, indicating that none had mated during the 1983 mating period. It is interesting that while the numbers were small, almost two times the amount of barrenness was observed offshore (1.3% of the adults) compared with the near-shore females (0.7% of the adults) captured on the survey. It would seem that the female population in the survey area was in a healthy reproductive state at the time of the survey.

#### South Peninsula Management District:

Of the 77 stations fished on the 1983 South Peninsula pot survey 11 were ocean stations while 66 were located in the bay and nearshore environs of the District (Appendix Figures 9-12). A total of 307 pots was pulled during the survey which is slightly less than half the 1982 survey effort. The lower survey effort was due to the late starting date and the necessity of completing the important areas in time for the Department to analyze the data and decide whether or not a commercial king crab season could be justified. The lateness of the survey was the result of vessel breakdown. Station by station location and catch information can be found in Appendix Table 3.

Male Tanner Crab. The standardized catch of male Tanner crabs captured on the 1983 pot survey totaled 3,674 crabs (Table 23). This catch was high considering the effort expended on the three previous surveys (less than half the number of pots fished on the 1980-1982 surveys). Comparing the size and age composition of the 1983 survey with previous surveys may be erroneous since very little of the offshore environment was sampled in 1983. In 1983, 39.7% of the males captured were legal size while 60.3% were sublegal size crabs. The prerecruit one size group was the largest group in the catch with 1,826 individuals (49.7% of the male catch). This apparently sizable group of crabs should provide good recruitment in 1984 (available to the 1985 commercial fishery).

Looking at the mean catch/pot of legal size Tanner crabs from stations fished on both the 1982 and 1983 pot surveys (Table 24 and Figure 24) it would seem that changes in abundance varied considerably between the substocks fished on the last two surveys. The Deer Island and Pavlof Bay area substocks showed increases of 39% and 47%, respectively, while the other substocks seem to have declined in legal crab abundance. It should be noted that the Mountain Point substock decrease of 46% may not be representative of that substock as a whole since only one station was fished from this offshore area in 1982 and 1983. The overall 16% increase in the abundance of legal size crabs in the South Peninsula Management District must be regarded with caution for two reasons. First, the offshore areas which have generally been plagued with poor recruitment the past few years were not surveyed in 1983. Inclusion of those areas could lower the District-wide relative abundance of legal size crabs substantially. Second, if capturing Tanner crab with pots is affected by the size of the king crab population, the results of the South Peninsula pot survey may be skewed toward showing a higher abundance of legal size Tanner crabs than would be seen under "normal" survey conditions. While the king crab population is currently very low in the South Peninsula Management District, it was of a moderate to moderately low size over the 1972-82 ADF&G survey years.

Size frequency data (Figures 25-28 and Figure 24), if an accurate reflection of the population structure and strength of the captured size groups, indicates

Table 23. Number of male Tanner crabs, *Chionoecetes bairdi*, captured by size and age group and percent of total male catch, 1980 - 1983 South Peninsula Management District pot surveys.

Group	1980		1981		1982		1983	
	No.	%	No.	%	No.	%	No.	%
Prerecruit Fours	5	0.2	2	0.04	2	0.1	3	0.1
Prerecruit Threes	63	2.2	13	0.3	7	0.3	49	1.3
Prerecruit Twos	229	8.0	193	3.9	166	6.0	337	18.5
Prerecruit Ones	1,300	45.6	1,360	27.4	1,178	42.8	1,826	49.7
Recruit Legals	310	10.9	1,963	39.5	666	24.2	658	17.9
Postrecruit Legals	944	33.2	1,435	28.9	732	26.6	801	21.8
Total Legals	1,284	44.0	3,398	68.4	1,398	50.8	1,459	39.7
Total Males	2,851	100.0	4,965	100.0	2,751	100.0	3,674	100.0
Pot Lifts	700		750		630		307	

Table 24. Number and mean catch/pot of legal Tanner crabs, *Chionoecetes bairdi*, by substock from stations fished on both the 1982 and 1983 South Peninsula Management District pot surveys.

School	# Legals		# Pots		Mean Legals/Pot		% Change
	1982	1983	1982	1983	1982	1983	
Ikatan/Morzhovoi	216	162	56	57	3.80	2.84	- 25
Deer Island	127	183	51	53	2.49	3.45	+ 39
Pavlof Bay	491	721	84	84	5.85	8.58	+ 47
Beaver/Balboa	171	157	55	55	3.11	2.85	- 8
Mountain Point	74	40	10	10	7.40	4.00	- 46
South Peninsula Total	1,076	1,263	256	259	4.20	4.88	+ 16

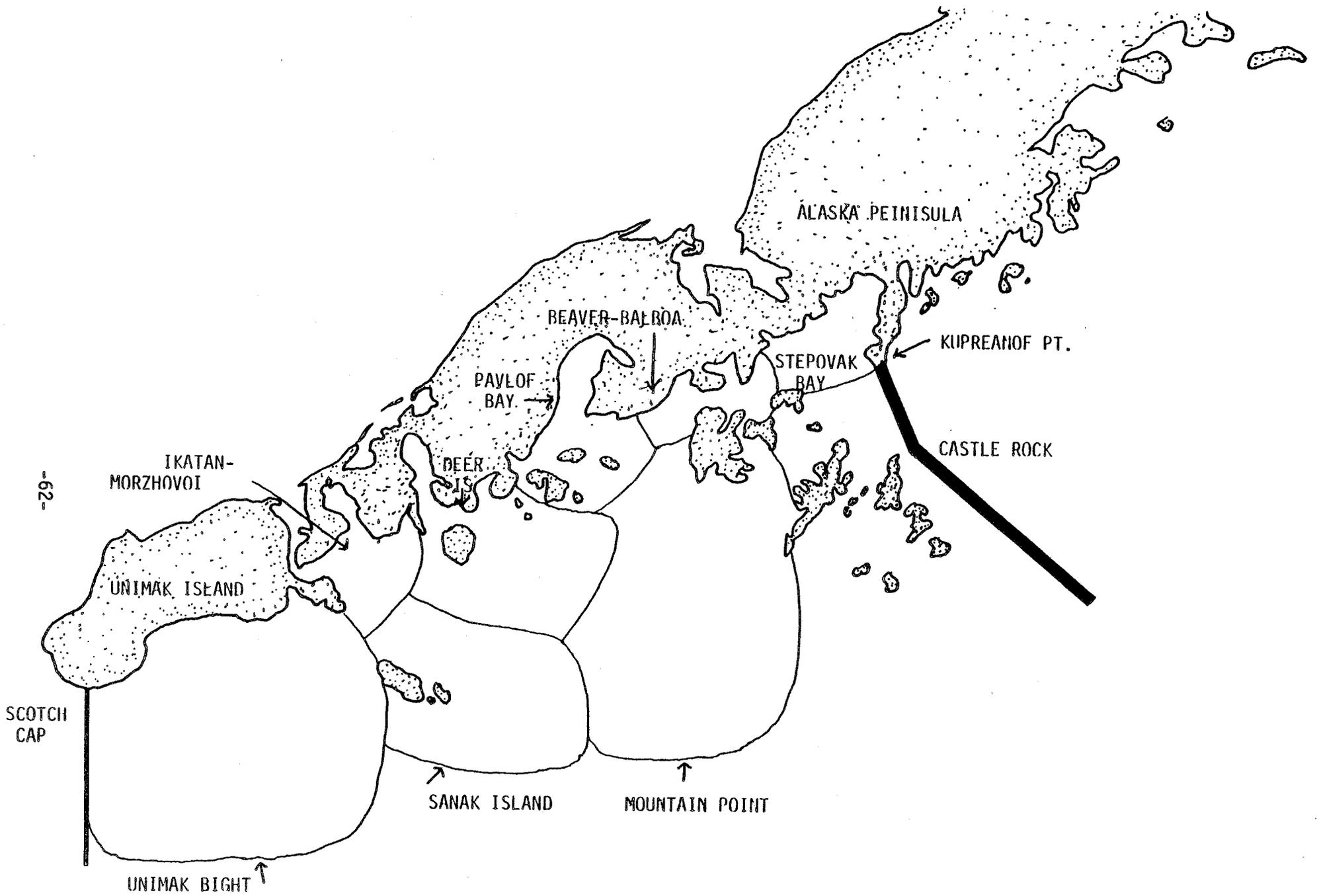


Figure 24. Tanner crab, *Chionoecetes bairdi*, substock locations for the South Peninsula Management District.

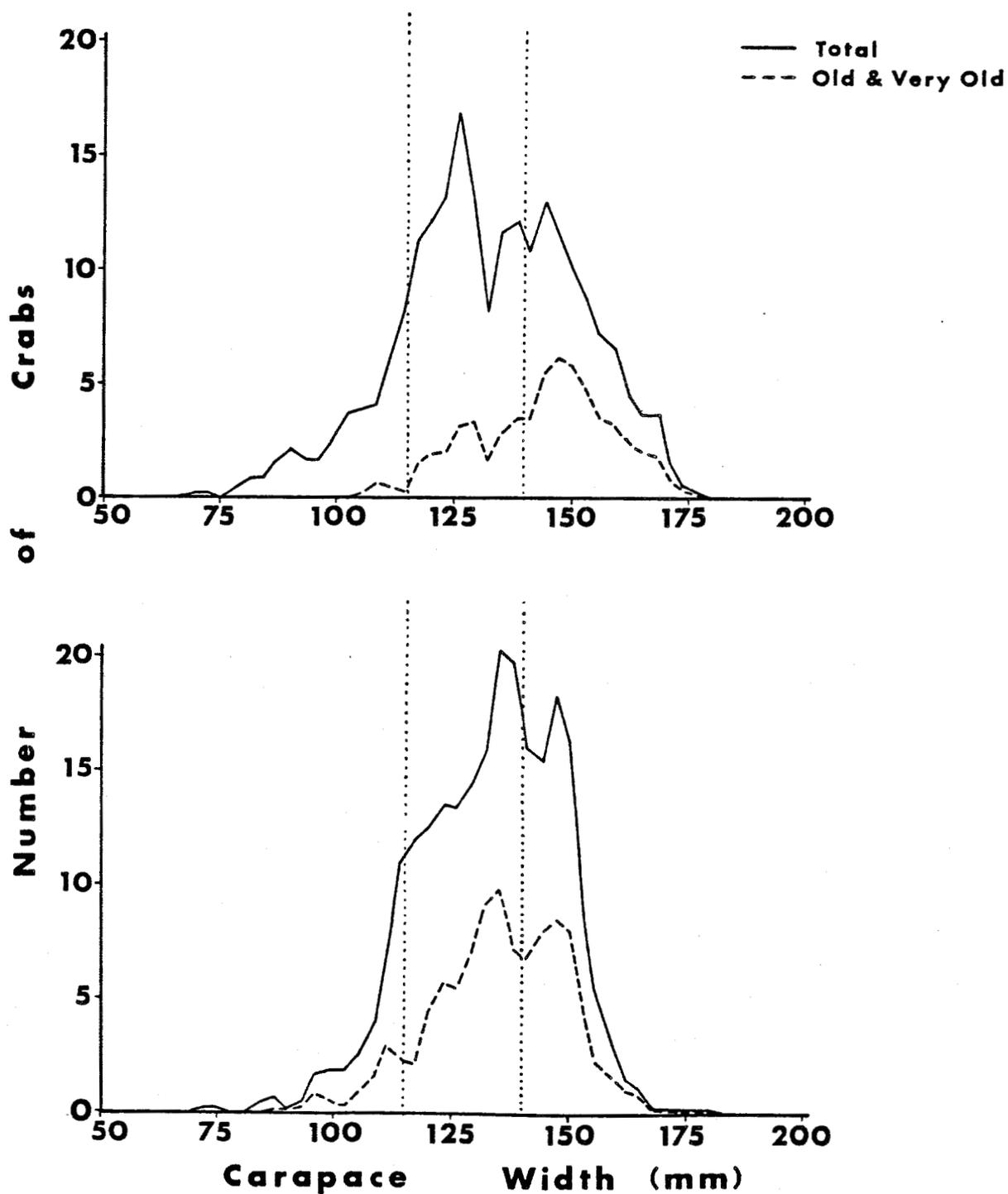


Figure 25. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from the Ikatan/Morzhovoi Bay area (top) and Deer Island area (bottom) substocks of the South Peninsula stock, 1983 South Peninsula Management District pot survey. Dotted lines separate legal and prerecruit one crabs from rest of catch.

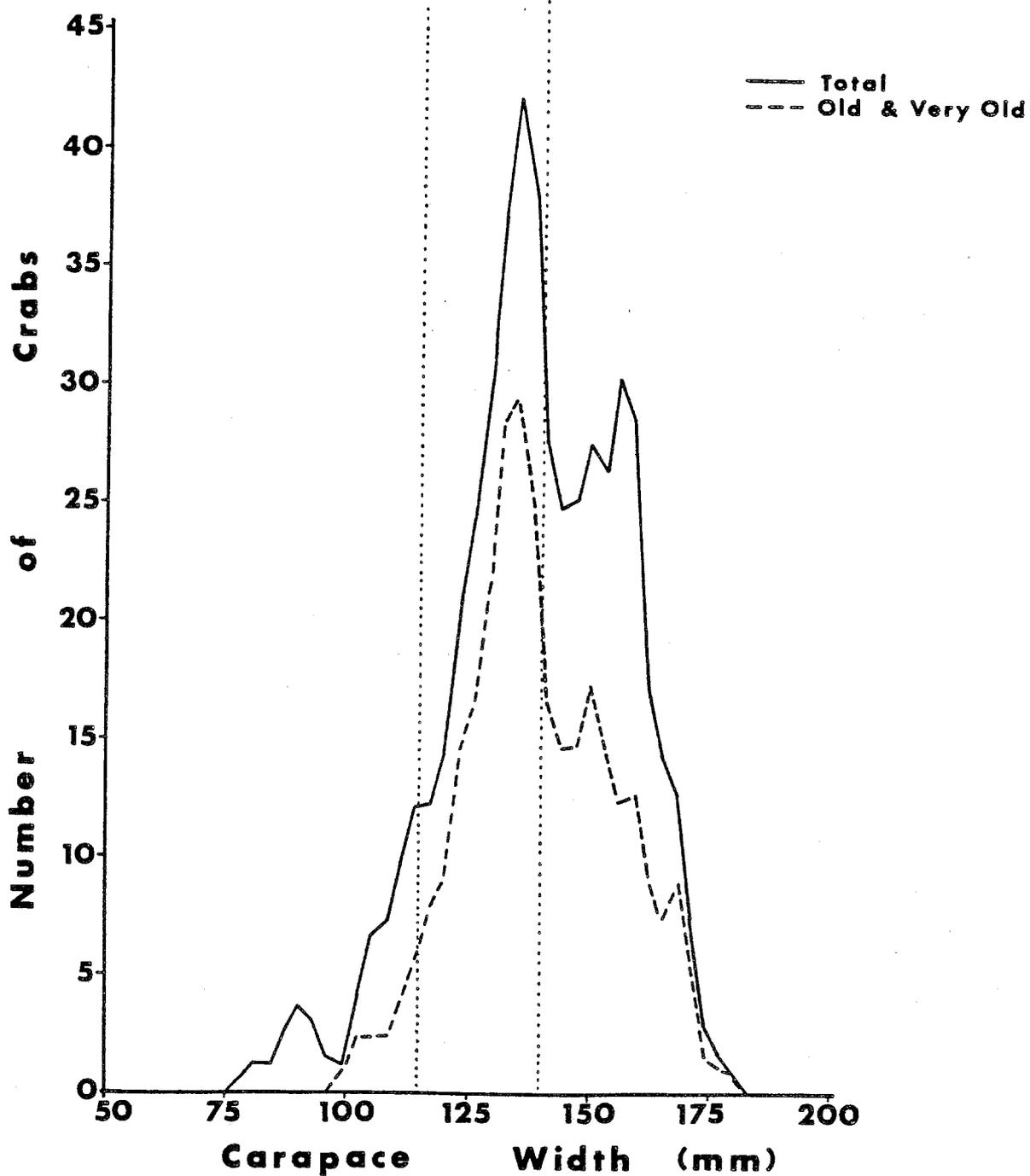


Figure 26. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from the Pavlof Bay area substocks of the South Peninsula stocks, 1983 South Peninsula Management District pot survey. Dotted lines separate legal and prerecruit one crabs from rest of catch.

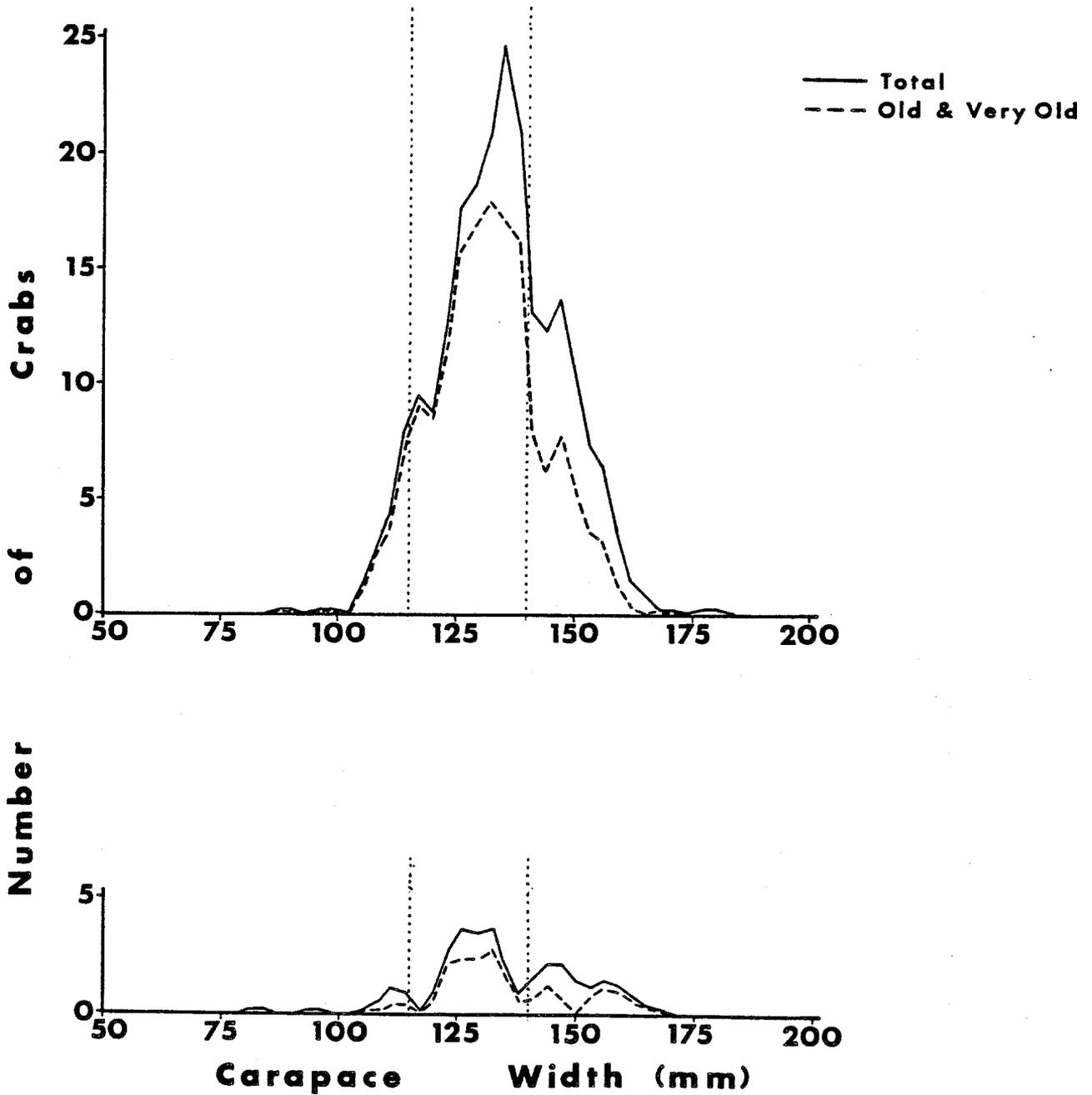


Figure 27. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from the Beaver/Balboa Bay area (top) and Mountain Point area (bottom) substocks of the South Peninsula stock, 1983 South Peninsula Management District pot survey. Dotted lines separate legal and prerecruit one crabs from rest of stock.

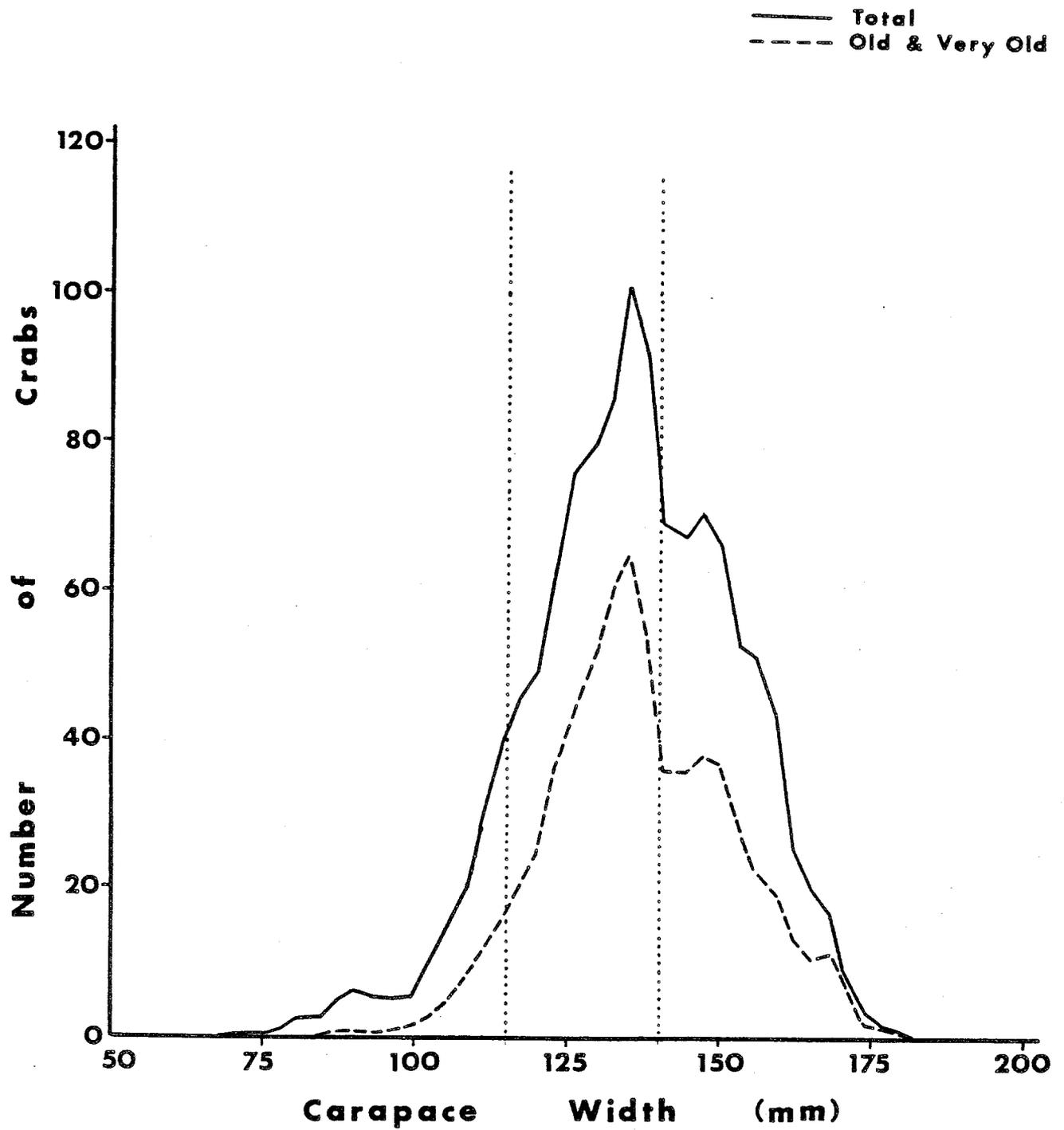


Figure 28. Carapace width frequency of male Tanner crabs, *Chionoecetes bairdi*, measured from the South Peninsula stocks, 1983 South Peninsula Management District pot survey. Dotted lines separate legal and prerecruit one crabs from rest of catch.

variable recruitment trends for some of the substocks surveyed on the 1983 South Peninsula survey. Skipmolt in the South Peninsula crab stocks seems to be considerably more common than is the case in the Kodiak area which tends to make recruitment predictions even more difficult. In the Ikatan/Morzhovoi Bay and Deer Island areas of the South Peninsula (Figure 25) there is a fairly abundant class of prerecruit one crabs; however, a large number of these crabs are newshells of which an unknown portion may be skipmolt in 1984. The picture in the other substocks (Figures 26 and 27) may be more amenable to interpretation. If the skipmolt portion of the populations in the Pavlof Bay (Figure 26), Beaver/Balboa and Mountain Point (Figure 27) areas molts to legal size in 1984, then recruitment for the 1985 commercial fishery should be just as strong in those areas as it was for the 1984 commercial season. (Note: preliminary figures from the 1984 commercial season tend to indicate that the 1983 survey index of legal size crabs was too high.) If a portion of the newshell prerecruit one population also molts to legal size in 1984, recruitment should be stronger than that observed in 1983. The total survey size frequency distribution (Figure 28) shows a group of prerecruit one skipmolt crab that could provide recruitment to the 1984 legal population as least equal to that observed in 1983 (i.e., most of the newshell portion 139 mm CW, Figure 28).

Female Tanner Crab. The total number of female Tanner crabs measured on the 1983 South Peninsula Management District pot survey was 778. This was the largest number of females measured of the last four surveys despite the fact that effort in 1983 was considerably less than that on the three previous surveys. Juvenile females numbered 52 individuals which was 6.7% of the total females measured on the 1983 survey.

Observations on egg clutch size (Table 25) showed females with full (90-100%) egg clutches comprised 71.6% of the total adult female catch during the 1983 South Peninsula Management District pot survey. If those crabs with nearly full (75-89%) clutches are added in (another 19.1%), then 90.7% of the adult females had full or nearly full egg clutches. Barren females made up 1.4% of the adult females, the lowest percent barrenness observed in the last four survey years. Most of the barren females had inactive ovaries when examined. The reproductive condition of the female Tanner crab population in the 1983 South Peninsula Management District survey areas appeared healthy at the time of the survey.

#### ABUNDANCE AND DISTRIBUTION OF BLACK MAT SYNDROME

Black Mat Syndrome (BMS), an invasive fungal disease caused by the ascomycete, *Trichomarix invadens*, seems to be limited to the crab genus, *Chionoecetes*. The disease has been found to invade not only the carapace but most of the internal organs of the host (Sparks and Hibbitts 1979; Sparks 1982). In an effort to determine the distribution and incidence of BMS in the western Gulf of Alaska, the ADF&G has expanded a sampling program initiated in the Kodiak area in 1980. In 1983 over 55,000 Tanner crabs (48,633 male and 6,884 female) were examined for the presence of the disease.

Table 25. Number of female Tanner crabs, *Chionoecetes bairdi*, measured by shell age and percent fullness of egg clutch, 1983 South Peninsula Management District pot survey.

Class	1983																				
	Juvenile			Percent fullness of clutch																	
	Shell age			0		1-24%			25-49%			50-74%			75-89%			90-100%			
N		O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO	N	O	VO
Number	51	1	0	0	0	10	0	0	17	0	0	1	4	3	32	25	40	74	20	68	432
% Total (adults)				-	-	1.4	-	-	2.3	-	-	0.1	0.6	0.7	4.4	3.4	5.5	10.2	2.8	9.4	59.5
% by class					1.4			2.3			0.1		5.4		19.1			71.6			

## Materials and Methods

Three collection methods have been used to sample Tanner crabs in the Westward Region for the presence of BMS.

Initially random samples were collected from commercial catches delivered to the Kodiak processing plants. Dockside samples were selected from the Kodiak, Chignik, and South Peninsula Management Districts. All commercial samples were pot caught legal sized male crabs.

Additionally crab specimens have been examined for BMS on the ADF&G annual king and Tanner crab population index surveys in the Kodiak and South Peninsula areas. Crabs from these surveys were obtained by fishing 2.1 x 2.1 m commercial style pots at predetermined stations.

The final source of data for the BMS study was the Tanner crab trawl surveys. Crabs were captured in bottom tows made with a 400 mesh eastern otter trawl which was towed for 30 minutes at each station fished. The northern Shelikof Strait area of Kodiak, the Chignik Management District, and the Pavlof Bay area of the South Peninsula Management District were surveyed in 1983. The trawl survey samples most segments of the crab population whereas the pot survey and commercial catches primarily sample adult size crabs. The smallest crabs captured on the pot surveys were about 60 mm (carapace width) compared to 9 mm in the trawl samples.

Tanner crabs were noted as having BMS if the black tarlike nodules of *Trichomarix invadens* were observed visually on the external surface of the crab. No judgment was made as to the extent of the infection.

## Results and Discussion

Looking at the samples from the commercial fishery and the trawl and pot surveys (Table 26 and Figure 18) it would seem that overall the incidence of BMS declined or showed little change in the areas surveyed in 1982 and 1983. The exception occurred in the trawl survey where the total percentage BMS was 1.7% in 1982 and 3.0% in 1983. The highest incidence among the areas surveyed in 1983 was observed in the Kodiak District pot survey with 5.0%. Most of the other districts sampled showed less than 2% incidence by all sampling methods. No BMS was encountered in the South Peninsula Management District in 1983 in either the trawl or pot surveys.

The 1983 commercial catch samples from the Kodiak Management District (Table 26) showed the Outer Marmot Gully substock 12, to have the highest incidence of crabs having BMS (30.9%). It should be noted that the sample size was small from this substock with only 152 males observed. Areas showing the least amount of the disease (< 1%) among legal sized crabs were the Portlock, Twoheaded, Ugak/Barnabas, Alitak Bay, South Mainland, Kupreanof/Uganik, and North Mainland areas. Most of the samples from these areas were from the nearshore environs where the incidence of BMS is generally low.

The only Kodiak Management District area surveyed by trawl in 1983, the North Mainland substocks (Table 26), showed 3.0% BMS compared with 1.9% in the same area in 1982, a slight change.

Table 26. Percent occurrence of Black Mat Syndrome by district and substock for the 1982-1983 male Tanner crab, *Chionoecetes bairdi*, sampling efforts in the Western Gulf of Alaska.

Kodiak Mgmt. Dist Substock No. <sup>1</sup>		1982 Comm. Catch No.	% BMS	1983 Comm. Catch No.	% BMS	1982 Trawl Survey No.	% BMS	1983 Trawl Survey No.	% BMS	1982 Pot Survey No.	% BMS	1983 Pot Survey No.	% BMS
Marmot Bay	5	451	2.2	319	5.6	-	-	-	-	1,049	0.4	524	4.4
Portlock	6	100	0	158	0	-	-	-	-	91	60.4	86	62.8
Chiniak Bay	9	176	0	298	2.3	-	-	-	-	798	0.5	1,009	0.3
Marmot Gully	10	457	4.8	1,080	5.6	-	-	-	-	1,340	15.6	479	25.7
O. Marmot Gully	12	51	2.0	152	30.9	-	-	-	-	100	22.0	10	70.0
Chiniak Gully	14	101	8.9	258	4.3	-	-	-	-	584	9.8	388	12.6
Twoheaded	17	50	0	2,060	0.4	-	-	-	-	1,415	0.3	1,622	0.2
Ugak/Barnabas	18	600	1.3	3,490	0.7	-	-	-	-	4,944	0.5	7,008	0.9
Horse's Head	20	101	6.9	748	1.3	-	-	-	-	986	1.7	856	6.9
Alitak Bay	21	-	-	2,683	0.3	-	-	-	-	1,005	0.1	1,194	0
S. Trinity Is.	22	106	4.7	533	4.5	-	-	-	-	757	14.8	2,062	10.5
Compass Rose	30	688	12.4	2,725	4.6	-	-	-	-	5,404	12.8	3,787	7.7
Ikolik/Alitak	34	518	2.1	1,956	1.1	-	-	-	-	1,248	4.0	335	27.5
Semidi Is.	35	214	5.6	974	3.0	-	-	-	-	-	-	-	-
Uyak Bay	38	199	6.0	150	2.7	618	1.0	-	-	-	-	-	-
S. Mainland	39	250	1.2	50	0	-	-	-	-	-	-	-	-
Kupreanof/Uganik	40	836	4.4	710	0	601	0	-	-	1,302	0.6	1,207	3.4
N. Mainland	41	766	2.6	1,518	1.0	5,746	1.9	2,657	3.0	-	-	-	-
W. Afognak	42	79	1.3	154	1.3	-	-	-	-	-	-	-	-
<b>KODIAK TOTAL</b>		<b>5,743</b>	<b>4.0</b>	<b>20,016</b>	<b>2.1</b>	<b>6,965</b>	<b>1.7</b>	<b>2,657</b>	<b>3.0</b>	<b>21,022</b>	<b>6.0</b>	<b>20,567</b>	<b>5.0</b>
<b>CHIGNIK MGMT. DIST. TOTAL</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3,079</b>	<b>1.6</b>	<b>1,606</b>	<b>1.1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>SOUTH PENINSULA MGMT. DIST. Pavlof Bay Substock</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2,605</b>	<b>0</b>	<b>789</b>	<b>4.1</b>	<b>1,511</b>	<b>0</b>
<b>Other Substocks</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,963</b>	<b>1.5</b>	<b>2,163</b>	<b>0</b>
<b>SOUTH PENINSULA TOTAL</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2,605</b>	<b>0</b>	<b>2,752</b>	<b>2.2</b>	<b>3,674</b>	<b>0</b>

<sup>1</sup> See Figure 18 for Kodiak substock locations.

Sampling during the pot surveys in the Kodiak area produced variable results in some of the substocks compared with results from the commercial fishery (Table 26). Incidence of BMS in the Portlock, Marmot Gully, Outer Marmot Gully, Chiniak Gully, Horse's Head, S. Trinity Islands, Compass Rose, and Ikolik/Alitak substocks appeared considerably higher than in the commercial samples from the same area. In two of the substocks, Portlock and Outer Marmot Gully, the higher incidence of the disease may have been primarily the result of small sample sizes from limited areas of the substocks. In most of the substocks, however, the higher incidence of BMS observed in the pot survey samples was due to a relatively high proportion of the prerecruit one and two crabs having the disease. Prerecruit ones are not well represented in the commercial crab samples and prerecruit two crabs are not present at all.

Examining the 1983 pot and trawl survey male catch by size group and shell age shows some interesting results (Table 27, 28, and 29). Black Mat Syndrome was more prevalent in the sublegal than in the legal size groups by both sampling methods. In the North Mainland area of the Kodiak Management District which was surveyed by trawl, prerecruit two and four crabs had the highest incidence of BMS (Table 27). In the Chignik area in 1983 the prerecruit ones and twos showed the highest incidence with 5.3% and 2.0% of the males captured having the disease, respectively (Table 28). Among males captured on the 1983 Kodiak pot survey the incidence of BMS was highest in the prerecruit two and three size groups with 14.2% and 15.8%, respectively (Table 29). Legal size crabs exhibited an incidence of 1.5%.

In terms of shell age, the disease is more common among oldshell individuals than newshell crabs and most common among very oldshell crabs. In the total male catch on the 1983 North Mainland trawl survey (Table 27), BMS was observed in 1.9% of the newshell, 10.7% of the oldshell, and 27.3% of the very oldshell crabs captured. In Chignik, where the disease is apparently less common, BMS was observed in 0.1% of the newshell, 8.7% of the oldshell, and 10.0% of the very oldshell males captured (Table 28). The Kodiak pot survey (Table 29) showed an incidence of 1.0%, 16.9%, and 68.0% in the newshell, oldshell, and very oldshell males captured, respectively.

Looking at the female portion of the catch on the Kodiak trawl and pot surveys (Tables 30, 31, and 32) it would seem that BMS is more common among females than males. Overall incidence was 5.6% on the North Mainland trawl survey (Table 30) compared with 3.0% of the males from that area. In Chignik (Table 31) the difference is slight with 1.2% of the females captured having the disease while 1.1% of the males had the disease in the summer of 1983. The pot survey in Kodiak (Table 32) produced 35.8% infected female crabs compared with only 5.0% of the males captured. The main reason for the higher incidence among females may be due to the terminal molt females undergo upon reaching adulthood. This tends to result in a greater portion of the female population being oldshell and very oldshell than in the male population (Tables 27, 28, and 29). This is particularly evident on the pot survey (Table 32) where far fewer juvenile (i.e., small) females are captured than by the trawl method of fishing. Since virtually all of the juvenile females are newshell and the disease seems to be less prevalent among newshells, the incidence of the disease may appear higher from the pot survey which captures far fewer juvenile females than the trawl method of fishing. Of course, other factors may be responsible for the apparent high incidence of BMS in females from the pot survey. For instance, more offshore areas where the

Table 27. Number of male Tanner crabs, *Chionoecetes bairdi*, captured by size and age group by exoskeletal age and percent occurrence of Black Mat Syndrome in North Mainland substock, 1983 Kodiak Management District trawl survey.

Group	Number of crabs				Number with Black Mat				Percent with Black Mat			
	NS	OS	VOS	Total	NS	OS	VOS	Total	NS	OS	VOS	Total
Prerecruit Fours	252	1		253	20	1		21	7.9	100.0		8.3
Prerecruit Threes	271	3		274	7	3		10	2.6	100.0		3.6
Prerecruit Twos	357	74	6	437	10	19	1	30	2.8	25.7	16.7	6.9
Prerecruit Ones	970	188	4	1,162	7	9	1	17	0.7	4.8	25.0	1.5
Recruit Legals	472	-	-	472	1	-	-	1	0.2	-	-	0.2
Postrecruit Legals	24	34	1	59			1	1	0.0	0.0	100.0	1.7
Total Legals	496	34	1	531	1		1	2	0.2	0.0	100.0	0.4
Total Males	2,346	300	11	2,675	45	32	3	80	1.9	10.7	27.3	3.0
% of Total	88.3	11.3	0.4	100.0	56.2	40.0	3.8	100.0				

Table 28. Number of male Tanner crabs, *Chionoecetes bairdi*, captured by size and age group by exoskeletal age and percent occurrence of Black Mat Syndrome, 1983 Chignik Management District trawl survey.

Group	Number of crabs				Number with Black Mat				Percent with Black Mat			
	NS	OS	VOS	Total	NS	OS	VOS	Total	NS	OS	VOS	Total
Prerecruit Fours	560			560					0.0			0.0
Prerecruit Threes	321	1		322					0.0	0.0		0.0
Prerecruit Twos	136	14	4	154	1	2		3	0.7	14.3	0.0	2.0
Prerecruit Ones	145	115	6	266		13	1	14	0.0	11.3	16.7	5.3
Recruit Legals	225	-	-	225	1	-	-	1	0.4	-	-	0.4
Postrecruit Legals	37	42		79					0.0	0.0		0.0
Total Legals	262	42		304	1			1	0.4	0.0		0.3
Total Males	1,424	172	10	1,606	2	15	1	18	0.1	8.7	10.0	1.1
% of Total	88.7	10.7	0.6	100.0	11.1	83.3	5.6	100.0				

Table 29. Number of male Tanner crabs, *Chionoecetes bairdi*, captured by size and age group by exoskeletal age and percent occurrence of Black Mat Syndrome, 1983 Kodiak Management District pot survey.

Group	Number of crabs				Number with Black Mat				Percent with Black Mat			
	NS	OS	VOS	Total	NS	OS	VOS	Total	NS	OS	VOS	Total
Prerecruit Fours	1			1				0	0.0			0.0
Prerecruit Threes	127	14	5	146	11	7	5	23	8.7	50.0	100.0	15.8
Prerecruit Twos	1,205	644	80	1,929	38	177	58	273	3.2	27.5	72.5	14.2
Prerecruit Ones	5,699	2,803	183	8,685	60	411	117	588	1.1	14.7	63.9	6.8
Recruit Legals	8,171	-	-	8,171	42	-	-	42	0.5	-	-	0.5
Postrecruit Legals	1,083	539	13	1,635	7	81	12	100	0.6	15.0	92.3	6.1
Total Legals	9,254	539	13	9,806	50	81	12	143	0.5	15.0	92.3	1.5
Total Males	16,286	4,000	281	20,567	159	676	191	1,026	1.0	16.9	68.0	5.0
% of Total	79.2	19.4	1.4	100.0	15.5	65.9	18.6	100.0				

Table 30. Number of female Tanner crabs, *Chionoecetes bairdi*, measured by exoskeletal age and percent occurrence of Black Mat Syndrome in the North Mainland substock, 1983 Kodiak Management District trawl survey.

Group	Number of crabs				Number with Black Mat				Percent with Black Mat			
	NS	OS	VOS	Total	NS	OS	VOS	Total	NS	OS	VOS	Total
Juveniles	263	2		265	8	2		10	3.0	100.0		3.8
Adults	151	354	47	552	6	18	12	36	4.0	5.1	25.5	6.5
Total	414	356	47	817	14	20	12	46	3.4	5.6	25.5	5.6
% of Total	50.7	43.6	5.7	100.0	30.4	43.5	26.1	100.0				

Table 31. Number of female Tanner crabs, *Chionoecetes bairdi*, measured by exoskeletal age and percent occurrence of Black Mat Syndrome, 1983 Chignik Management District trawl survey.

Group	Number of crabs				Number with Black Mat				Percent with Black Mat			
	NS	OS	VOS	Total	NS	OS	VOS	Total	NS	OS	VOS	Total
Juveniles	790			790					0.0			0.0
Adults	57	183	92	332		9	4	13	0.0	4.9	4.3	3.9
Total	847	183	92	1,122		9	4	13	0.0	4.9	4.3	1.2
% of Total	75.5	16.3	8.2	100.0	0.0	69.2	30.8	100.0				

Table 32. Number of female Tanner crabs, *Chionoecetes bairdi*, measured by exoskeletal age and percent occurrence of Black Mat Syndrome, 1983 Kodiak Management District pot survey.

Group	Number of crabs				Number with Black Mat				Percent with Black Mat			
	NS	OS	VOS	Total	NS	OS	VOS	Total	NS	OS	VOS	Total
Juveniles	66	9	1	76	1	7	1	9	1.5	77.8	100.0	11.8
Adults	629	3,220	242	4,091	35	1,258	189	1,482	5.6	39.1	78.1	36.2
Total	695	3,229	243	4,167	36	1,265	190	1,491	5.2	39.2	78.2	35.8
% of Total	16.7	77.5	5.8	100.0	2.4	84.8	12.7	100.0				

disease is more prevalent may be fished on the pot survey producing a higher proportion of infected females than might occur in the nearshore environment. Another possibility is that the specific areas surveyed on the trawl surveys have a lower incidence of BMS, per se, than is the case in the areas surveyed on the Kodiak pot survey.

While the incidence of Black Mat Syndrome did not seem high enough to be a cause for concern in 1983, it is important to note that Tanner crab populations are not at high levels at present and there is some evidence (from other disease studies) that the disease may be at low levels when crab populations are low and spread more rapidly in the population as the population size increases. We need to continue our monitoring program during fluctuations in the Tanner crab population in order to better define the dynamics of this host/parasite relationship. We also need to further analyze the data we have so that we can gain a better understanding of BMS in the western Gulf of Alaska.

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APPENDICES

Appendix Table 1. Travel record 1983 Westward Region trawl surveys.

Trawl Number	Mo/Day/Yr.	Starting Position Loran C. <sup>1</sup>		Compass Heading	Time Towed Min.	Denth-fms Avg.	Seas Ft.	Swell Ft.	Comments
<u>North Mainland (Kodiak Management District)</u>									
1	07/27/83	322805	436773	010	30	107	2-4	0-2	
2	07/27/83	322800	437854	000	30	110	2-4	0-2	Loran questionable
3	07/27/83	322959	437838	000	30	159	2-4	2-4	
4	07/28/83	323067	438433	074	30	47	0-2	0-2	
5	07/28/83	322595	437463	350	30	112	0-2	0-2	
6	07/28/83	322374	436928	345	30	100	2-4	0-2	
7	07/28/83	322126	436914	335	30	97	0-2	0-2	
8	07/28/83	321986	437061	340	30	95	0-2	0-2	
9	07/28/83	322098	437497	240	30	120	0-2	2-4	
10	07/29/83	322700	438899	030	15	52	0-2	0-2	Hung up-door in mud
11	07/29/83	322471	438110	030	30	50	2-4	0-2	
12	07/29/83	322466	437862	225	30	98	2-4	2-4	
13	07/29/83	321662	437450	180	30	68	4-6	4-6	
14	07/29/83	321855	437685	180	30	59	2-4	2-4	
15	07/30/83	322098	438297	225	30	42	2-4	2-4	Empty Oil drum
16	07/30/83	321707	437599	220	30	48	2-4	2-4	
17	07/30/83	321505	437385	220	30	60	0-2	2-4	
18	07/30/83	321686	437214	045	30	75	2-4	2-4	
19	07/30/83	321657	436875	045	30	82	2-4	2-4	
20	07/30/83	321714	436442	000	30	110	2-4	2-4	
21	07/31/83	321176	437100	180	30	62	2-4	0-2	
22	07/31/83	321288	436933	000	30	75	0-2	2-4	
23	07/31/83	321290	436651	010	30	84	2-4	2-4	
24	07/31/83	321209	436396	000	30	99	0-2	2-4	
25	07/31/83	320802	436402	000	30	95	0-2	2-4	
26	07/31/83	320917	436674	180	30	91	0-2	2-4	
27	08/01/83	320839	436887	000	30	65	0-2	0-2	
28	08/01/83	320522	436533	000	30	92	2-4	2-4	
29	08/01/83	320413	436182	020	30	81	2-4	2-4	
30	08/01/83	320075	436160	000	30	92	2-4	2-4	
31	08/01/83	320023	436425	320	30	85	0-2	2-4	

-Continued-

Appendix Table 1. Travel record 1983 Westward Region trawl surveys (continued).

Trawl Number	Mo/Day/Yr.	Starting Position		Compass Heading	Time Towed Min.	Depth-fms Avg.	Seas Ft.	Swell Ft.	Comments
		Loran C <sup>1</sup>							
32	08/01/83	320186	436964	180	30	103	2-4	4-6	
33	08/02/83	321057	437148	225	30	42	2-4	4-6	
34	08/02/83	321170	437127	025	30	54	2-4	2-4	
35	08/02/83	321065	437023	200	30	59	2-4	2-4	
36	08/02/83	321164	436974	045	30	73	2-4	4-6	
37	08/02/83	321085	436862	030	30	78	2-4	4-6	
38	08/02/83	320983	437073	045	30	38	2-4	2-4	
39	08/02/83	320750	436952	200	30	38	2-4	4-6	
40	08/03/83	322036	438261	045	30	50	2-4	2-4	
41	08/03/83	321580	437302	150	30	74	2-4	4-6	
<u>Chignik (Chignik Management District)</u>									
42	08/07/83	336318	457515	330	30	111	2-4	4-6	
43	08/07/83	335747	458845	350	30	56	2-4	4-6	
44	08/08/83	334832	457235	270	30	56	6-8	8-10	
45	08/09/83	334813	456963	135	30	70	2-4	2-4	
46	08/09/83	335508	456151	110	30	94	4-6	4-6	
47	08/09/83	335657	456008	090	30	107	4-6	6-8	
48	08/09/83	335771	456068	180	30	110	6-8	8-10	
49	08/09/83	336120	456687	180	30	111	6-8	4-6	
50	08/10/83	336453	458054	020	30	111	2-4	2-4	
51	08/10/83	336118	457383	010	30	105	2-4	2-4	
52	08/10/83	335988	457401	295	30	95	2-4	2-4	
53	08/10/83	336301	458253	270	30	90	0-2	2-4	
54	08/10/83	336296	458540	315	30	83	0-2	2-4	
55	08/10/83	336360	459226	270	30	90	0-2	2-4	
56	08/11/83	335959	458122	060	30	67	0-2	2-4	
57	08/11/83	335755	457204	080	30	73	2-4	2-4	
58	08/11/83	335448	456583	032	30	75	2-4	4-6	
59	08/11/83	335153	456171	045	30	85	2-4	4-6	
60	08/11/83	335243	456808	300	30	83	4-6	4-6	
61	08/11/83	335206	457049	300	30	81	4-6	2-4	
62	08/12/83	334636	454813	120	30	76	2-4	4-6	
63	08/12/83	334593	454892	315	30	75	2-4	2-4	

-Continued-

Appendix Table 1. Travel record 1983 Westward Region trawl surveys (continued).

Trawl Number	Mo/Day/Yr.	Starting Position		Compass Heading	Time Towed Min.	Depth-fms	Seas Ft.	Swell Ft.	Comments
		Loran C.				Avg.			
64	08/12/83	334538	455201	300	30	72	2-4	2-4	
65	08/12/83	334237	455107	235	30	60	2-4	4-6	
66	08/12/83	334343	455659	270	30	58	2-4	2-4	
67	08/12/83	334357	456122	110	30	86	0-2	2-4	Hung up
68	08/13/83	333919	455433	310	-	95	2-4	4-6	Hung up-abandoned
69	08/13/83	333907	455440	300	30	93	2-4	4-6	
70	08/13/83	333555	455283	200	30	85	0-2	0-2	
71	08/13/83	333306	454573	160	25	44	0-2	0-2	
72	08/14/83	333587	453897	180	30	93	0-2	2-4	
73	08/14/83	333777	453829	180	30	42	0-2	2-4	
74	08/14/83	334030	454101	180	30	65	2-4	4-6	
75	08/14/83	334210	454001	135	30	70	2-4	4-6	
76	08/14/83	334285	453835	060	30	72	2-4	4-6	
77	08/14/83	334000	452960	000	30	74	4-6	4-6	
78	08/15/83	333656	453250	090	22	45	8-10	10-12	
79	08/15/83	333735	453005	060	30	65	4-6	6-8	
80	08/15/83	333208	452008	000	30	70	4-6	6-8	
81	08/15/83	333033	452229	300	15	49	4-6	4-6	Hung up
82	08/15/83	332669	452351	060	30	102	4-6	4-6	
83	08/16/83	321924	451790	130	25	105	0-2	2-4	
84	08/16/83	331874	451380	270	30	110	0-2	2-4	
85	08/16/83	331817	451705	125	30	101	0-2	2-4	
86	08/16/83	331533	450880	240	30	98	0-2	2-4	
87	08/16/83	331363	451348	270	30	57	0-2	2-4	
88	08/16/83	331361	451544	222	30	49	0-2	2-4	
89	08/17/83	331325	451030	115	30	80	2-4	2-4	
90	08/17/83	331540	451048	270	30	105	2-4	4-6	
91	08/17/83	332010	452283	055	30	150	0-2	2-4	
92	08/17/83	332100	452655	315	25	112	0-2	2-4	
93	08/17/83	332142	452943	240	30	99	0-2	2-4	
94	08/18/83	332020	453346	111	30	50	0-2	0-2	
95	08/18/83	332375	453760	090	30	80	0-2	0-2	
96	08/18/83	332346	453621	060	30	88	0-2	0-2	
97	08/18/83	332300	453407	110	30	98	0-2	0-2	
98	08/18/83	332255	452954	265	30	103	0-2	2-4	

-Continued-

Appendix Table 1. Travel record 1983 Westward Region trawl survey (continued).

Trawl Number	Mo/Day/Yr.	Starting Position Loran C.!		Compass Heading	Time Towed Min.	Depth-fms Avg.	Seas Ft.	Swell Ft.	Comments
99	08/18/83	332455	453355	045	30	65	0-2	0-2	
100	08/20/83	332802	453718	020	25	56	0-2	0-2	Lots of mud
101	08/21/83	335096	457019	315	30	77	0-2	0-2	
102	08/21/83	335146	457138	170	30	80	0-2	2-4	
103	08/21/83	335261	457373	340	30	79	0-2	0-2	
104	08/21/83	335358	457906	070	30	57	0-2	0-2	
105	08/21/83	334934	456931	270	30	72	0-2	0-2	
106	08/21/83	334950	457105	000	30	72	0-2	0-2	
107	08/22/83	334741	456849	180	30	70	0-2	0-2	
108	08/22/83	334835	456951	000	30	70	0-2	0-2	
109	08/22/83	334738	456855	170	30	70	0-2	0-2	
110	08/22/83	334834	456962	000	30	70	0-2	0-2	
111	08/22/83	334741	456860	180	30	70	0-2	2-4	
112	08/22/83	334777	456927	002	30	69	0-2	0-2	
113	08/23/83	335605	458111	010	30	55	0-2	0-2	
114	08/23/83	335907	458844	000	30	60	0-2	0-2	

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Pavlof Bay (South Peninsula Management District)

115	08/24/83	339603	467192	195	30	57	0-2	0-2	
116	08/24/83	339706	467428	135	30	53	0-2	2-4	
117	08/24/83	339690	467247	225	30	57	2-4	0-2	
118	08/24/83	339820	467517	200	30	56	0-2	0-2	
119	08/24/83	340103	468112	180	30	56	0-2	0-2	
120	08/25/83	340468	468759	090	30	43	0-2	0-2	
121	08/25/83	340208	468063	045	30	59	0-2	0-2	
122	08/25/83	340033	468018	000	30	59	0-2	0-2	
123	08/25/83	339674	467678	150	30	61	0-2	0-2	
124	08/25/83	339740	467569	170	30	57	0-2	0-2	
125	08/26/83	340316	468318	075	30	51	0-2	0-2	
126	08/26/83	340122	467976	009	30	61	0-2	0-2	
127	08/26/83	339425	467466	210	30	43	0-2	0-2	
128	08/26/83	339489	467266	315	30	47	0-2	0-2	
129	08/26/83	339553	467028	045	30	76	2-4	2-4	

!Loran readings were frequently erroneous in bays and inshore areas as well as periods when the transmitter station was having problems of an unspecified nature. Tow locations as depicted on the various figures in this report were plotted by radar and should be considered most accurate.

Appendix Table 2. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 Kodiak Management District pot survey. Totals may not agree with those in Table 19 due to a less refined standardization of catch data here.

STATION	DATE	POTS	LORAN LOCATION MIDDLE POT		DEPTH RANGE	TANNER CRAB				KING CRAB		
						SUBLEGAL PRE-ONES	MALES ONES	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE
40	9/02	3	11279.0	31450.9	20- 59	0	5	24	0	0	0	0
40S	9/02	3	11262.4	31439.7	45- 65	9	45	183	1	0	1	0
41	9/02	3	11351.0	31499.0	44- 55	0	0	0	0	0	0	0
42	9/02	3	11345.0	31491.2	23-113	7	30	21	5	2	0	0
43	9/05	3	11352.2	31491.2	27- 70	0	0	0	0	0	0	0
44	9/05	3	11349.9	31407.2	24- 39	2	11	11	3	0	0	0
45	9/02	3	11333.9	31491.6	46- 66	0	0	0	0	0	0	0
48	9/05	2	11340.5	31402.4	48- 67	0	0	0	0	0	0	0
49	9/05	3	11332.7	31474.4	40- 50	3	2	0	5	0	0	0
50	9/05	3	11333.7	31470.4	35- 53	0	0	0	0	0	0	0
52	9/02	3	11317.5	31477.1	64-123	0	2	10	0	0	0	0
53	9/05	2	11312.9	31457.9	20- 21	0	0	0	0	0	0	0
54	9/05	2	11314.2	31452.8	17- 52	2	0	0	2	0	0	0
55	9/05	3	11313.9	31447.0	29- 31	0	0	0	0	0	0	0
57	9/02	3	11296.1	31463.4	36- 00	3	27	143	22	0	0	0
58	9/02	3	11295.0	31459.2	40- 03	6	107	261	217	0	0	0
58S	9/02	3	11206.9	31452.0	31- 73	5	45	100	120	14	26	0
59	9/02	3	11274.6	31442.4	35- 51	0	0	0	0	0	0	2
60	9/02	3	11256.4	31429.7	22- 35	0	0	0	2	0	0	0
60	8/31	3	11352.5	31431.4	65- 71	0	0	0	0	0	0	0
69	8/31	3	11324.4	31426.9	30- 53	0	0	0	3	0	0	0
70	8/31	2	11327.0	31423.6	66- 68	4	73	27	30	0	0	0
71	9/01	3	11302.0	31419.0	67- 72	0	3	1	0	0	0	0
72	9/01	3	11304.6	31415.6	57- 62	0	0	2	0	0	0	0
73	8/31	3	11307.1	31411.6	36- 53	0	1	0	0	0	0	0
74	9/01	3	11279.1	31412.6	36- 63	0	6	6	0	0	0	0
75	9/01	3	11282.1	31400.1	44- 40	0	2	0	0	0	0	0
76	9/01	3	11250.2	31405.0	13- 20	0	0	0	0	0	0	0
77	9/01	3	11259.9	31401.6	29- 33	4	150	120	60	56	72	32
78	9/01	3	11237.0	31399.9	9- 12	1	5	23	37	0	1	0
79	9/01	3	11216.7	31390.4	15- 29	0	4	9	0	115	7	287
80	9/01	3	11196.3	31380.3	10- 20	1	17	10	0	1	0	5
87	9/06	3	11205.3	31336.0	10- 30	0	0	0	3	0	0	0
89	9/06	3	11230.0	31320.3	111-131	0	28	97	0	0	0	0
90	9/06	3	11179.2	31327.6	16- 25	0	0	0	0	1	0	0
91	9/06	3	11106.3	31322.9	34- 53	6	70	137	1	0	0	0
92	9/06	3	11194.7	31317.3	73- 78	11	99	199	0	0	6	16
93	9/06	3	11207.6	31312.9	20- 65	1	1	0	0	0	0	0
94	9/06	3	11155.6	31310.4	7- 9	0	0	0	0	0	0	0
95	9/06	3	11160.4	31309.6	40- 66	1	13	88	0	0	0	0
98	9/06	3	11140.2	31303.4	14- 41	55	151	36	41	0	0	1
98S	9/06	3	11126.6	31301.1	30- 35	54	106	160	92	0	0	3
100	9/06	3	11113.2	31296.2	0- 10	0	0	4	1	0	0	0
109	8/17	3	32554.4	43450.0	64- 70	2	56	91	0	0	0	0
110	8/17	3	32549.6	43430.7	20- 51	0	0	0	0	0	0	0
110C	8/17	1	32536.2	43411.0	15- 15	0	0	0	0	0	0	0
110N	8/17	3	32542.5	43424.4	21- 23	1	1	3	0	0	0	22
111	8/17	3	32570.0	43495.0	40- 46	11	58	162	7	0	0	0

-Continued-

Appendix Table 2. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 Kodiak Management District pot survey. Totals may not agree with those in Table 19 due to a less refined standardization of catch data here (continued).

STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB				KING CRAB		
			MIDDLE	POT		SUBLEGAL PRE-ONES	MALES ONES	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE
111N	8/17	3	32573.8	43513.7	37- 43	15	35	29	18	0	6	170
112	8/17	3	32565.7	43475.0	64- 66	1	28	100	0	0	0	0
113	8/17	3	32559.4	43451.6	36- 57	0	2	24	0	0	1	339
113N	8/17	3	32551.4	43430.2	13- 18	0	0	0	0	0	0	2
114	8/17	3	32576.5	43489.7	70- 71	1	20	88	12	0	0	5
115	8/17	3	32572.2	43473.3	60- 73	1	14	104	0	0	1	0
118	8/17	3	32507.5	43505.1	31- 50	0	0	0	0	0	0	0
118S	8/17	3	32595.0	43516.9	52- 57	4	43	52	3	0	14	1
119	8/17	3	32503.0	43485.8	73- 75	10	98	131	59	0	1	0
120	8/17	3	32577.1	43464.3	33- 69	5	69	56	10	0	0	38
121	8/06	3	32573.0	43597.4	67- 69	2	46	72	1	1	28	0
122	8/06	3	32585.7	43626.2	90- 97	0	43	102	1	1	20	1
123	8/06	3	32600.0	43652.0	74- 89	1	24	91	1	0	0	0
124	8/06	3	32612.8	43666.7	67- 93	4	30	74	1	21	0	21
125	8/06	3	32626.1	43683.6	62- 68	7	89	179	1	0	1	1
126	8/06	3	32641.0	43719.1	22- 25	0	0	0	0	0	0	0
127	8/06	3	32635.8	43695.9	46- 63	9	40	250	0	9	7	1
128	8/06	3	32632.0	43681.3	22- 40	4	26	30	0	0	0	0
128E	8/06	3	32622.2	43640.7	16- 31	0	0	0	0	0	0	0
129	8/06	3	32645.2	43713.4	44- 48	19	73	222	1	6	4	0
130	8/06	3	32643.5	43693.2	35- 41	0	0	0	0	0	0	0
131	8/05	3	32664.0	43754.4	32- 35	5	5	96	3	5	6	0
132	8/05	3	32657.5	43729.9	34- 37	2	6	42	3	120	18	8
133	8/05	3	32651.0	43707.6	36- 37	0	0	9	0	2	2	0
134	8/05	3	32681.5	43787.8	20- 27	0	0	0	0	0	0	0
135	8/05	3	32674.7	43745.1	31- 34	0	15	113	3	39	0	44
136	8/05	3	32669.4	43745.7	30- 34	0	0	19	6	110	3	292
137	8/05	3	32684.1	43784.2	14- 20	0	0	0	0	0	0	0
138	8/05	3	32679.9	43760.7	23- 23	0	0	2	2	11	0	108
139	8/05	3	32691.6	43777.4	21- 24	0	0	0	0	16	0	82
143	8/31	3	11411.0	31436.2	119-126	0	7	0	0	0	0	0
144	8/31	3	11380.3	31434.5	110-112	1	69	114	16	0	0	0
145	8/31	3	11387.6	31430.0	68-107	0	0	0	0	0	0	0
146	8/31	3	11358.1	31427.0	102-106	0	2	5	0	0	0	0
149	8/31	3	11331.9	31417.6	82- 85	23	57	29	10	0	0	0
150	8/18	3	32457.0	43304.4	26- 30	15	57	36	0	0	0	1
151	8/18	3	32451.7	43280.5	44- 51	33	68	22	4	0	0	1
152	8/18	3	32446.4	43257.1	18- 45	0	1	1	0	0	0	288
153	8/18	3	32441.0	43233.5	34- 63	0	8	43	0	0	0	144
154	8/18	3	32446.9	43225.3	43- 52	0	10	25	0	14	8	280
155	8/18	3	32454.0	43220.1	61- 64	7	221	250	0	0	0	32
156	8/18	3	32470.2	43258.4	59- 69	2	54	21	0	0	0	0
159	8/18	3	32454.5	43194.6	73- 74	10	114	129	80	3	7	221
160	8/18	3	32475.7	43280.1	65- 67	6	260	55	0	0	2	2
161	8/31	3	11336.5	31413.5	26- 51	0	0	0	0	0	0	0
183E	8/21	3	31240.0	11005.1	52- 53	95	115	45	13	0	0	0
184	8/21	1	11004.7	31241.9	20- 20	0	0	0	0	0	0	0
192	9/03	3	11282.4	31468.0	100-122	10	36	35	196	0	0	0

-Continued-

Appendix Table 2. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 Kodiak Management District pot survey. Totals may not agree with those in Table 19 due to a less refined standardization of catch data here (continued).

STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB		KING CRAB				
			MIDDLE	POT		SUBLEGAL PRE-ONFS	LEGAL MALES ONFS	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE
192N	9/04	3	11205.3	31468.6	23- 31	0	0	0	0	0	0	0
194	9/03	3	11260.0	31460.6	42- 09	3	12	2	5	0	0	0
194S	9/04	3	11263.3	31459.2	25- 35	0	0	1	1	0	0	0
195	9/03	3	11265.0	31456.2	73- 97	2	0	17	2	0	0	0
196	9/03	3	11263.6	31452.0	40- 61	1	66	11	147	0	0	0
196N	9/04	3	11266.4	31454.3	23- 42	1	2	0	1	0	0	0
198	9/03	3	11249.6	31440.2	62-100	2	9	15	46	0	0	0
198S	9/04	3	11248.4	31448.1	20- 44	0	0	0	0	0	0	0
199N	9/04	3	11252.4	31445.4	25- 32	0	0	0	0	0	0	0
200	9/03	3	11243.1	31435.0	27- 60	0	5	26	0	0	0	34
200N	9/04	3	11251.6	31442.1	10- 30	1	0	5	1	0	0	0
200S	9/04	3	11231.1	31425.6	25- 39	0	0	0	0	3	0	196
200W	9/04	3	11236.9	31431.7	27- 30	1	0	0	0	0	0	0
202	9/03	3	11232.4	31436.4	93- 94	3	2	64	13	0	0	0
202S	9/04	3	11229.1	31432.0	20- 43	0	0	0	0	0	0	0
204G	9/03	3	11215.5	31426.2	35- 72	2	18	76	0	0	0	0
206	9/03	3	11211.0	31420.3	56- 61	0	11	75	5	0	0	0
206S	9/04	3	11207.9	31416.4	19- 36	1	0	0	0	0	0	0
208N	9/04	3	11208.5	31422.1	27- 44	3	22	6	237	0	0	0
209	9/03	3	11195.9	31407.0	36- 60	3	10	25	7	0	3	0
209E	9/04	3	11121.3	31400.1	26- 36	0	0	0	0	0	0	0
211	9/03	3	11109.4	31409.0	30- 41	1	43	90	9	2	46	92
211S	9/03	3			10- 35	0	0	0	0	0	0	33
200	8/16	3	32625.7	43567.6	19- 23	0	0	0	0	0	0	0
201	8/16	3	32620.0	43545.0	43- 44	0	0	0	0	0	0	0
202	8/16	3	32649.2	43626.9	7- 14	0	0	0	0	0	0	0
203	8/16	2	32644.2	43610.1	24- 20	0	0	0	0	0	0	0
203S	8/16	3	32646.7	43609.6	36- 37	0	0	0	0	0	0	0
204	8/16	3	32637.3	43503.9	32- 37	0	0	0	0	0	0	0
205	8/16	3	32660.3	43645.0	17- 27	0	0	0	0	0	0	0
206	8/16	3	32662.3	43627.1	10- 16	0	0	0	0	0	0	0
206N	8/16	3	32661.9	43639.2	19- 25	1	3	1	0	1	0	30
206S	8/16	1	32660.0	43639.6	27- 27	0	0	0	0	0	0	0
207	8/16	3	32654.0	43603.4	21- 32	0	0	0	171	0	0	0
207N	8/16	3	32656.7	43619.6	36- 37	6	51	21	0	0	0	10
208	8/15	2	326 .	436 .	10- 16	0	0	0	0	0	0	0
209	8/15	3	32677.6	43650.0	24- 30	0	0	0	0	0	0	0
290	8/15	3	32671.3	43635.1	67- 73	0	0	0	0	0	0	0
291	8/15	3	32609.0	43691.2	14- 19	0	0	0	0	0	0	0
292	8/15	3	32684.2	43671.1	31- 37	0	0	0	0	0	0	0
293	8/15	3	32713.6	43752.0	9- 19	0	0	0	0	0	0	0
294	8/15	3	32707.4	43732.1	0- 11	0	0	0	0	0	0	0
295	8/15	3	32701.5	43709.0	10- 21	0	0	0	0	0	0	0
296	8/15	3	32710.9	43740.4	11- 14	0	0	0	0	0	0	0
297	8/15	3	32713.3	43727.6	19- 20	0	0	0	0	0	0	0
298	8/15	3	32724.5	43743.9	15- 16	0	0	0	0	0	0	0
299	8/15	3	32710.0	43724.2	10- 20	0	0	0	0	0	0	0
300	8/15	3	32713.4	43702.6	26- 29	0	0	0	0	0	0	0

-Continued-

Appendix Table 2. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 Kodiak Management District pot survey. Totals may not agree with those in Table 19 due to a less refined standardization of catch data here (continued).

STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB				KING CRAB		
			MIDDLE	POT		SUBLEGAL PRE-ONES	MALES ONES	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE
357	8/29	10	11928.1	31485.1	81-84	14	60	9	72	6	8	3
365	8/29	10	11899.0	31481.2	51-62	9	24	2	0	0	2	27
372	8/29	10	11809.0	31482.1	85-93	0	0	0	0	0	0	0
380	8/29	10	11836.4	31447.9	60-63	3	3	3	2	0	0	0
387	8/29	10	11843.5	31417.8	39-70	2	0	0	1	0	1	0
408	8/28	10	11715.5	31380.0	71-77	0	0	0	0	0	0	0
422	8/30	10	11507.5	31399.8	58-72	39	134	39	338	0	0	0
423	8/28	10	11582.5	31371.7	69-74	9	17	2	53	0	2	2
424	8/28	10	11653.4	31347.6	53-61	0	0	0	0	0	0	0
430	8/30	10	11449.3	31395.8	71-92	3	1	3	7	0	0	0
431	8/28	10	11514.0	31368.9	63-78	15	61	21	102	0	2	0
432	8/28	10	11585.8	31344.2	41-52	5	3	2	12	0	0	0
437	8/30	10	11389.3	31391.6	69-98	0	13	60	3	0	0	0
438	8/30	10	11448.2	31368.8	72-90	11	61	25	100	1	6	17
439	8/27	10	11518.0	31340.9	39-50	14	14	0	29	0	1	121
445	8/30	10	11380.9	31364.7	101-115	12	42	22	34	0	0	0
446	8/27	10	11451.0	31337.4	37-42	4	8	15	13	0	0	11
452	8/27	10	11381.4	31334.5	35-50	2	6	2	6	0	0	0
453	8/27	10	11455.5	31304.8	70-86	0	0	0	0	0	0	0
458	8/27	10	11384.5	31301.1	25-29	0	0	0	0	0	0	0
463	8/25	10	11265.0	31324.2	59-112	0	0	5	1	0	0	0
464	8/26	10	11306.7	31303.6	31-61	1	4	1	1	1	2	307
465	8/26	10	11378.2	31277.3	26-28	0	0	0	1	0	0	0
469	8/25	10	11258.0	31298.8	47-67	3	24	77	0	0	0	11
470	8/26	10	11317.9	31273.2	26-32	0	0	0	0	0	0	0
475	8/25	10	11192.6	31295.9	52-72	1	10	7	1	0	0	0
476	8/25	10	11261.4	31270.8	34-66	2	23	20	0	0	0	0
477	8/26	10	11336.5	31251.6	32-34	0	0	0	0	0	0	0
481	8/25	10	11179.8	31263.6	46-53	7	21	4	1	0	0	0
482	8/26	10	11281.5	31240.6	37-55	1	0	0	0	0	0	0
486	8/24	10	11210.8	31238.6	70-88	13	108	121	84	0	2	31
487	8/24	10	11299.1	31212.0	40-57	0	0	0	0	0	0	0
491	8/24	10	11135.0	31238.1	30-39	0	3	0	7	0	0	0
492	8/24	10	11234.2	31209.2	78-92	5	74	46	19	2	5	495
497	8/24	10	11162.5	31208.6	40-42	0	0	0	0	0	0	0
498	8/23	10	11262.1	31179.3	72-88	2	5	2	4	0	1	0
503	8/23	10	11289.9	31149.2	85-95	2	2	0	6	0	6	23
506	8/21	10	10999.7	31230.1	42-56	220	317	150	441	0	0	2
510	8/23	10	11325.2	31117.6	47-71	0	0	0	1	0	1	3
515	8/23	10	11265.8	31116.8	54-74	0	0	0	1	0	0	0
516	8/22	10	11359.2	31086.1	45-51	0	0	0	0	0	0	0
517	8/21	10	10998.7	31207.3	50-59	34	313	212	316	0	3	438
518	8/21	10	11037.2	31168.9	42-43	0	0	0	0	0	0	0
521	8/23	10	11299.6	31087.5	74-84	0	0	0	1	0	0	0
523	8/21	10	11016.3	31167.8	41-45	21	134	143	17	0	0	1
526	8/22	10	11246.9	31088.6	48-70	0	0	0	4	0	0	0
527	8/19	10	32465.2	43207.9	36-86	27	324	502	30	0	11	50
528	8/19	10	32438.0	43124.6	49-62	47	400	447	37	0	2	141

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Appendix Table 2. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 Kodiak Management District pot survey. Totals may not agree with those in Table 19 due to a less refined standardization of catch data here (continued).

STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB				KING CRAB		
			MIDDLE	FOT		SUBLEGAL PRE-ONES	MALES ONES	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE
529	0/20	10	11037.2	31141.3	43- 44	0	11	12	0	0	0	2
532	0/19	10	32465.6	43183.0	80- 92	7	385	889	206	0	17	0
533	0/20	10	32436.3	43103.0	39- 82	13	315	349	460	0	11	289
534	0/10	10	32412.6	43060.4	42- 44	0	4	2	4	0	0	0
536	0/19	10	32485.4	43237.2	38- 75	0	0	0	0	0	0	0
537	0/19	10	32457.8	43147.5	53- 74	34	210	183	118	0	0	5
538	0/10	9	32439.6	43101.3	39- 55	0	0	0	0	0	0	2
542	0/20	10	32461.4	43133.8	55- 80	38	311	307	777	0	0	6
546	0/20	10	32488.2	43185.1	74- 87	9	253	444	19	0	0	0
547	0/10	10	32464.8	43132.9	41- 50	2	0	0	3	0	0	0
551	0/10	10	32490.1	43177.7	72- 85	1	4	37	1	0	0	0
554	0/10	10	32512.2	43217.8	82- 90	29	82	252	7	0	0	0
582	0/11	10	32595.0	43549.0	62- 81	11	311	539	35	0	2	0
586	0/11	10	32594.2	43451.2	92-107	1	14	0	3	0	0	0
588	0/14	10	32651.0	43618.0	34- 41	20	215	33	3	0	3	17
592	0/14	10	32647.8	43573.3	49- 83	0	0	0	0	0	0	0
593	0/11	10	32621.9	43481.0	40- 76	0	0	0	6	0	0	0
596	0/14	10	32677.0	43629.9	36- 53	0	0	0	0	0	0	0
597	0/12	10	32647.8	43535.8	50- 83	1	3	27	2	0	0	0
598	0/11	10	32616.4	43430.5	78- 82	4	87	38	49	0	0	0
600	0/14	10	32704.6	43697.0	28- 36	0	0	0	0	0	1	94
601	0/13	10	32673.9	43591.8	44- 87	0	1	0	1	0	0	0
602	0/12	10	32646.5	43500.5	80- 88	8	71	16	76	0	0	0
606	0/14	10	32703.0	43651.4	37- 55	0	38	109	1	0	1	8
607	0/12	10	32569.6	43546.2	56- 79	0	17	48	0	0	0	0
608	0/11	10	32643.1	43465.3	55- 77	30	83	3	34	0	0	0
610	0/13	10	32692.0	43593.8	71- 88	17	153	86	110	2	6	5
611	0/12	10	32670.2	43525.0	49- 52	2	0	0	3	0	0	0
616	0/13	10	32725.8	43679.0	29- 50	0	0	0	0	0	0	0
617	0/12	10	32697.0	43581.3	45- 52	23	39	6	49	0	1	0
622	7/20	10	32815.4	43939.3	12- 15	0	0	0	0	0	0	0
623	7/20	10	32782.6	43841.4	15- 25	0	0	0	0	0	0	1
625	0/13	10	32725.0	43643.6	44- 47	0	0	0	0	0	0	0
630	7/20	10	32809.8	43902.8	17- 20	0	0	0	0	1	0	9
632	0/13	10	32751.0	43702.0	45- 50	0	0	0	0	0	0	0
636	7/21	8	32836.2	43960.8	25- 30	0	0	1	0	0	0	0
637	7/20	10	32808.0	43862.8	47- 48	9	123	481	1	0	0	9
642	7/21	10	32865.2	44015.9	28- 35	0	0	0	0	0	0	0
643	7/21	10	32833.0	43918.5	48- 52	82	676	568	174	6	3	38
644	7/20	10	32804.4	43818.9	69- 70	1	0	0	0	0	0	0
649	7/22	10	32892.6	44086.1	22- 26	0	0	0	0	0	0	0
650	7/21	10	32861.2	43978.9	47- 51	0	0	0	0	0	1	0
651	7/21	10	32831.8	43881.6	70- 72	14	103	218	180	0	0	1
655	7/22	10	32888.3	44037.0	52- 53	0	0	0	0	0	0	0
661	7/22	10	32916.2	44097.7	53- 58	1	1	0	0	10	16	14
667	7/22	10	32941.3	44157.3	29- 46	0	0	0	0	0	3	0
673	7/23	8	32969.6	44216.0	24- 34	0	0	0	0	0	0	1
674	7/22	10	32935.1	44104.4	85- 92	43	48	20	167	0	0	0

Appendix Table 2. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 Kodiak Management District pot survey. Totals may not agree with those in Table 19 due to a less refined standardization of catch data here (continued).

STATION	DATE	POTS	DRAN LOCATION		DEPTH RANGE	TANNER		CRAB		KING CRAB		
			MIDDLE	POT		SUBLEGAL PRE-ONES	MALES ONES	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE
579	7/23	10	32996.7	44272.4	24-33	0	0	0	0	1	0	13
580	7/23	10	32969.1	44177.0	73-91	41	70	30	114	49	10	0
682	7/25	10	33025.1	44321.6	26-31	0	0	0	0	0	0	0
687	7/23	10	32990.9	44227.0	43-67	0	1	0	2	529	00	204
691	7/25	10	330	443	9-18	0	0	0	0	0	0	0
692	7/24	10	33020.7	44204.4	29-40	3	7	11	17	124	33	387
695	7/24	10	33047.3	44345.5	30-36	0	0	0	0	0	0	0
696	7/23	10	33018.2	44251.4	64-74	0	0	0	0	0	0	0
697	7/25	10	33073.5	44397.1	18-26	0	0	0	0	0	0	0
698	7/24	10	33046.1	44308.0	61-67	79	55	23	05	238	102	213
699	7/25	10	33112.0	44400.0	27-39	0	0	0	0	0	0	0
700	7/24	10	33072.2	44366.2	37-63	9	32	14	3	36	17	7
702	7/25	10	33120.2	44400.9	54-66	0	0	0	0	0	0	0
703	7/24	10	33098.5	44421.4	69-70	0	5	3	1	1,312	129	1,777
730	7/26	10	33090.1	44546.5	38-40	4	17	0	65	0	0	0
733	7/26	10	33061.6	44486.6	26-34	52	120	22	27	0	0	0
736	7/26	10	33066.9	44536.0	38-44	3	13	6	41	0	0	0
737	7/26	10	33032.1	44424.1	23-20	6	7	2	5	0	0	0
740	7/26	10	33005.1	44365.1	20-25	0	0	0	0	0	0	0
742	7/28	10	33043.5	44526.6	40-115	0	34	59	1	0	3	0
743	7/27	10	33010.0	44412.1	30-31	0	13	2	10	0	0	11
746	7/28	10	33046.0	44565.0	126-134	7	26	55	42	0	0	0
747	7/28	9	33015.3	44464.1	37-38	10	23	17	19	0	0	0
748	7/27	10	32983.3	44357.9	25-29	1	5	5	0	0	0	5
751	7/28	9	33018.6	44515.3	96-120	4	74	97	0	7	11	0
752	7/27	10	32985.4	44401.7	34-37	29	110	21	37	0	1	20
753	7/27	10	32949.8	44202.7	19-25	0	0	0	4	0	0	0
756	7/28	10	32988.6	44454.1	40-62	9	64	32	0	0	0	0
757	7/27	10	32957.5	44345.4	30-34	7	20	4	52	0	0	0
759	7/29	10	32994.0	44507.3	109-121	3	35	63	0	0	0	0
760	7/29	10	32962.0	44393.3	38-40	26	109	19	66	4	2	24
764	7/29	10	32964.6	44441.0	56-89	44	200	49	160	3	3	0
765	7/29	10	32933.7	44334.4	33-36	14	30	10	22	1	1	4
773	7/29	10	32970.6	44497.6	123-131	3	68	183	13	0	0	0
774	7/30	10	32937.6	44382.7	43-52	8	48	16	51	10	6	70
775	7/30	10	32904.3	44260.5	24-27	0	2	0	5	0	0	0
783	7/30	10	32907.6	44318.7	33-41	24	160	34	63	0	0	0
791	7/30	10	32911.2	44374.7	94-113	0	171	261	3	0	4	4
792	7/31	10	32879.9	44257.3	30-35	57	239	8	329	0	0	2
800	7/30	10	32801.9	44312.0	64-101	16	359	130	7	13	4	134
801	7/31	10	32850.4	44197.2	27-33	0	0	0	2	0	0	0
810	7/31	10	32852.0	44244.0	48-62	227	1,320	25	0	0	2	2
820	7/31	10	32824.0	44190.0	42-49	0	0	0	0	0	0	0
823N	8/04	10	32721.4	43834.9	26-43	0	3	29	0	435	112	2,284
829	7/31	10	32820.0	44246.4	110-126	5	66	189	4	0	1	0
830	8/01	10	32794.9	44126.6	37-42	0	0	0	0	0	0	0
831	8/03	10	32766.2	44001.6	14-16	0	0	0	0	0	0	0
832	8/04	10	32734.3	43897.1	15-34	0	0	0	1	0	0	3

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Appendix Table 2. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 Kodiak Management District pot survey. Totals may not agree with those in Table 19 due to a less refined standardization of catch data here (continued).

STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB				KING CRAB		
			MIDDLE	POT		SUBLEGAL PRE-ONES	LEGAL MALES	MALES ONES	LEGAL FEMALES	SUBLEGAL	LEGAL	FEMALE
838	8/01	10	32796.0	44175.6	72-97	5	83	07	5	34	25	131
839	8/01	10	32767.4	44064.5	27-35	0	0	0	0	0	0	0
840	8/04	10	32730.2	43949.2	17-23	0	0	0	0	0	0	0
841	8/04	10	32708.7	43837.0	27-33	0	0	13	22	367	79	2,568
847	8/01	10	32768.8	44112.2	44-52	0	1	3	0	3	3	145
848	8/03	10	32741.1	44002.2	22-24	0	0	0	0	0	0	0
849	8/04	10	32711.5	43889.3	28-38	1	1	8	0	729	111	1,167
854	8/01	10	32770.2	44166.6	111-128	2	45	43	29	22	48	1
855	8/02	10	32742.8	44060.4	35-41	0	0	0	0	0	0	0
856	8/03	9	32711.4	43940.0	14-21	0	0	0	0	0	0	0
861	8/02	10	32739.2	44104.2	61-100	4	0	9	0	79	69	237
862	8/03	9	32713.4	43993.1	27-30	0	0	0	0	0	0	0
863	8/03	10	32683.7	43881.6	10-15	0	0	2	0	0	0	0
868	8/02	10	32714.9	44046.3	43-54	5	0	1	0	3	5	0
873	8/02	10	32712.9	44091.4	95-120	4	24	54	8	0	0	0
879	8/02	10	32685.4	44044.6	65-104	8	8	0	4	0	0	0
1106	8/22	10	11189.2	31064.6	59-73	0	0	0	0	0	0	0
1109	8/22	10	11241.5	31056.4	67-72	0	0	0	0	0	0	0
1110	8/22	10	11335.6	31049.8	55-80	0	0	0	2	0	0	0
2049	9/05	2	11339.3	31475.8	20-47	48	33	2	14	0	0	0
2050	9/05	2	11315.7	31462.6	15-33	0	0	0	4	0	0	0
2053	9/05	2	11300.6	31449.2	18-33	1	2	0	0	0	0	0
2054	9/05	2	11323.6	31461.5	15-56	0	0	0	0	0	0	0
2058	9/02	2	11284.6	31448.4	21-47	0	1	24	0	0	0	0
2059	9/02	2	11263.4	31433.7	25-37	0	0	0	0	0	0	0
2060	9/02	2	11245.0	31421.5	15-15	0	0	0	0	0	0	0
2072	9/01	2	11296.0	31408.1	55-57	0	0	0	0	0	0	0
2073	8/31	2	.	.	13-15	0	0	0	0	0	0	0
2076	9/01	2	11246.2	31403.8	14-15	0	0	0	0	0	0	0
2077	9/01	2	11250.3	31396.8	13-14	5	35	14	76	0	0	1
2078	9/01	2	11225.3	31393.4	24-31	0	20	13	0	84	13	547
2079	9/01	2	11206.6	31386.1	17-23	0	37	26	0	0	0	93
2080	9/01	2	11186.1	31372.9	18-20	0	0	1	0	0	0	0
2125	8/06	2	32631.9	43696.4	18-35	0	1	0	0	1	0	0
2126	8/06	2	32646.8	43731.6	13-17	0	0	0	0	0	0	0
2136	8/05	2	32667.7	43729.1	35-35	1	3	21	0	13	5	3
2138	8/05	1	32682.3	43747.9	11-11	0	0	0	0	0	0	0
2139	8/05	2	32692.7	43761.3	13-17	0	0	2	0	0	0	0
2147	8/31	2	11350.9	31416.8	10-35	0	0	0	0	0	0	0
2161	8/31	2	.	.	10-12	0	0	0	0	0	0	0
3150	8/18	3	32494.6	43329.9	52-59	0	0	0	0	0	0	0
3150S	8/18	2	32502.1	43343.5	24-40	5	112	44	3	3	0	24
3151	8/18	3	32482.5	43303.4	50-66	4	100	14	0	0	3	20

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STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB				KING CRAB		
			MIDDLE	POT		SUBLEGAL PRE-ONES	LEGAL MALES	MALES ONES	LEGAL FEMALES	SUBLEGAL	LEGAL	FEMALE
GRAND TOTAL		2,091				2,380	12,970	13,564	7,417	4,698	1,309	15,130

Appendix Table 3. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 South Peninsula Management District pot survey. Totals may not agree with those in Table 23 due to a less refined standardization of catch data here.

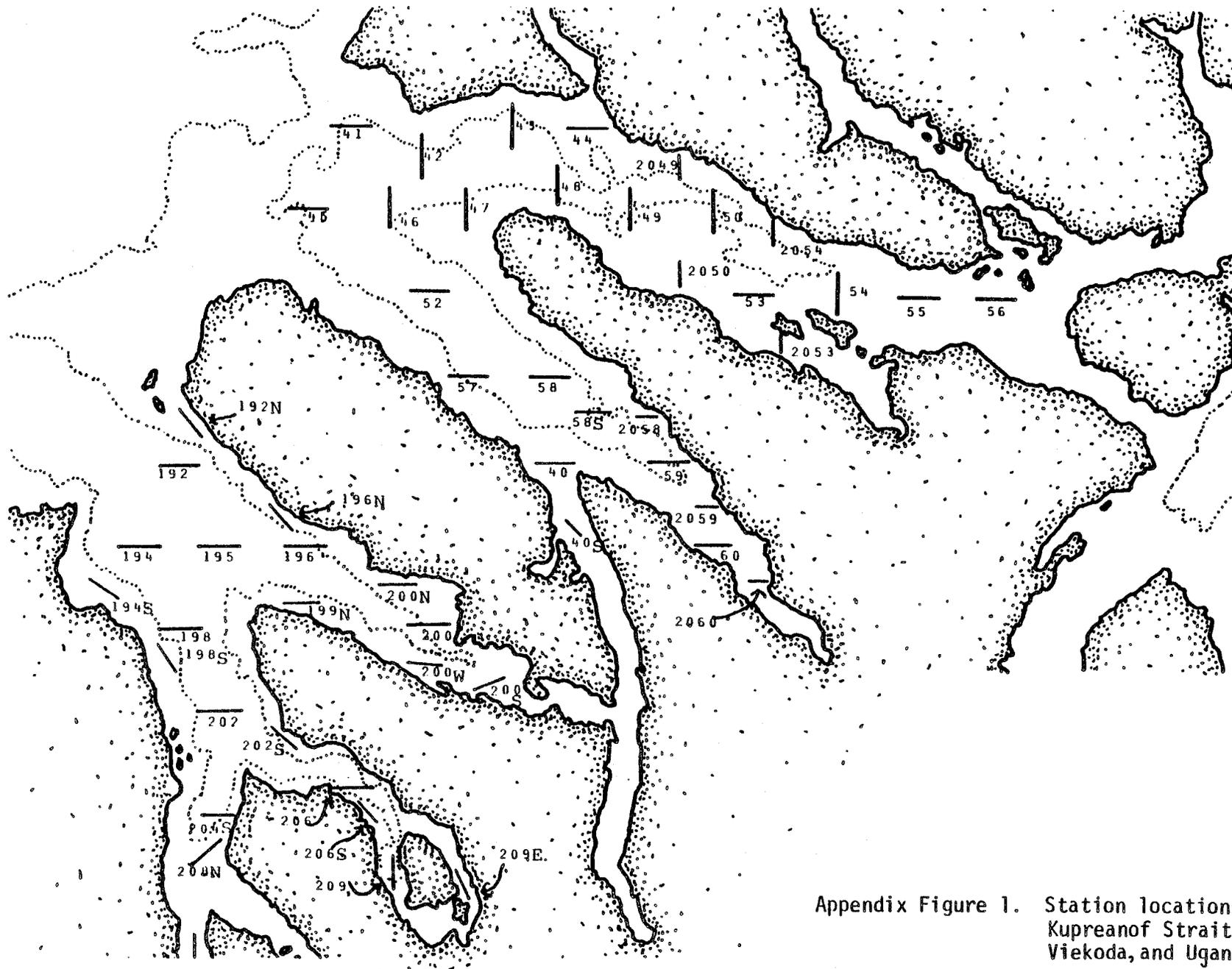
STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB				KING CRAB			
			MIDDLE	POT		SUBLEGAL PRE-ONES	MALES ONES	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE	
21	9/11	3	34308.6	47346.6	47- 51	1	0	0	0	0	0	0	0
24	9/11	3	34299.4	47324.5	43- 44	0	0	0	0	0	0	0	0
25	9/11	3	34290.2	47315.4	48- 48	6	47	25	1	0	0	0	0
26	9/11	3	34292.5	47306.7	35- 41	0	0	0	0	0	0	0	0
27	9/11	3	34283.0	47298.0	45- 46	14	18	12	5	7	4	0	0
29	9/11	3	34275.9	47280.7	41- 43	1	7	12	0	0	0	0	0
29	9/11	3	34273.7	47287.7	48- 50	25	43	48	151	0	1	0	0
39	9/12	3	18433.2	34254.1	25- 32	0	0	0	0	0	0	0	0
41	9/12	3	18428.6	34251.0	40- 40	0	1	0	0	3	4	6	6
42	9/12	3	18434.6	34245.7	41- 42	0	0	0	0	0	1	7	7
43	9/12	3	18423.9	34247.7	45- 48	2	0	0	0	23	12	62	62
45	9/12	3	18430.3	34242.8	44- 46	0	4	5	0	67	81	297	297
47	9/12	3	18426.5	34239.6	35- 49	1	24	8	0	5	4	111	111
48	9/12	3	18420.4	34247.4	55- 61	2	13	21	3	10	29	72	72
68	9/14	3	18453.8	34159.8	17- 29	0	0	0	0	0	0	0	0
71	9/14	3	18448.6	34161.8	28- 30	2	3	1	1	0	0	0	0
80	9/14	3	18451.7	34142.1	42- 60	4	32	2	0	0	0	0	0
83	9/14	3	18452.6	34134.2	38- 47	0	0	0	0	0	0	0	0
84	9/15	3	18470.6	34100.6	20- 43	3	8	2	2	5	3	107	107
85	9/15	3	18476.2	34089.3	37- 39	0	12	3	0	0	3	300	300
86	9/15	3	18464.7	34105.1	23- 43	3	1	0	0	21	13	95	95
87	9/15	3	18470.9	34095.5	39- 44	1	14	2	0	11	14	67	67
88	9/15	3	18460.5	34104.8	47- 49	1	3	4	3	0	0	1	1
89	9/15	3	18465.8	34100.7	23- 24	0	0	0	0	0	0	0	0
90	9/15	3	18466.7	34094.6	18- 31	0	0	0	0	0	0	0	0
101	9/16	3	18499.1	34025.0	40- 45	1	0	1	0	0	0	0	0
103	9/16	3	18495.0	34024.6	48- 51	0	0	1	0	0	0	0	0
104	9/16	3	18499.7	34019.6	50- 51	0	0	0	0	0	0	0	0
107	9/16	3	18496.4	34015.7	50- 65	2	28	88	15	0	0	0	0
108	9/16	3	18500.7	34010.7	60- 62	0	4	29	0	0	0	0	0
144	9/16	3	18503.6	34018.1	45- 46	1	0	3	1	4	3	477	477
145	9/16	3	18504.6	34011.0	50- 53	1	3	1	1	0	1	1	1
146	9/19	3	18512.0	33991.1	57- 60	0	0	5	0	0	3	0	0
147	9/19	3	18516.1	33981.6	62- 65	1	9	46	2	0	2	0	0
148	9/19	3	18512.7	33982.5	52- 54	0	1	3	0	0	0	0	0
149	9/19	3	18517.3	33976.3	53- 60	0	0	1	0	0	0	0	0
150	9/17	3	18521.6	33976.0	37- 47	13	29	7	0	1	2	7	7
153	9/17	3	18533.6	33954.2	40- 56	18	20	29	24	4	10	461	461
154	9/17	3	18522.8	33967.0	35- 58	0	0	0	0	1	24	0	0
156	9/17	3	18539.0	33942.6	40- 52	11	18	21	4	0	0	1,400	1,400
157	9/17	3	18527.4	33962.3	40- 55	21	55	89	8	0	1	0	0
159	9/17	3	18543.8	33931.0	32- 40	1	4	3	0	1	0	496	496
160	9/17	3	18534.4	33945.8	41- 45	6	15	41	46	0	1	76	76
164	9/17	3	18540.1	33933.4	26- 40	1	9	4	18	0	0	0	0
165	9/17	3	18530.8	33948.3	39- 44	5	28	49	20	0	3	162	162
172	9/17	3	18540.8	33927.1	24- 34	0	0	1	0	0	0	0	0
183	9/21	3	18535.2	33868.7	45- 51	5	50	9	208	0	0	0	0
184	9/21	3	18530.0	33862.2	51- 55	14	143	24	198	0	0	0	0

-Continued-

Appendix Table 3. Fishing information, standardized Tanner crab, *Chionoecetes bairdi*, and king crab, *Paralithodes camtschatica*, catch by research station, 1983 South Peninsula Management District pot survey. Totals may not agree with those in Table 23 due to a less refined standardization of catch data here (continued).

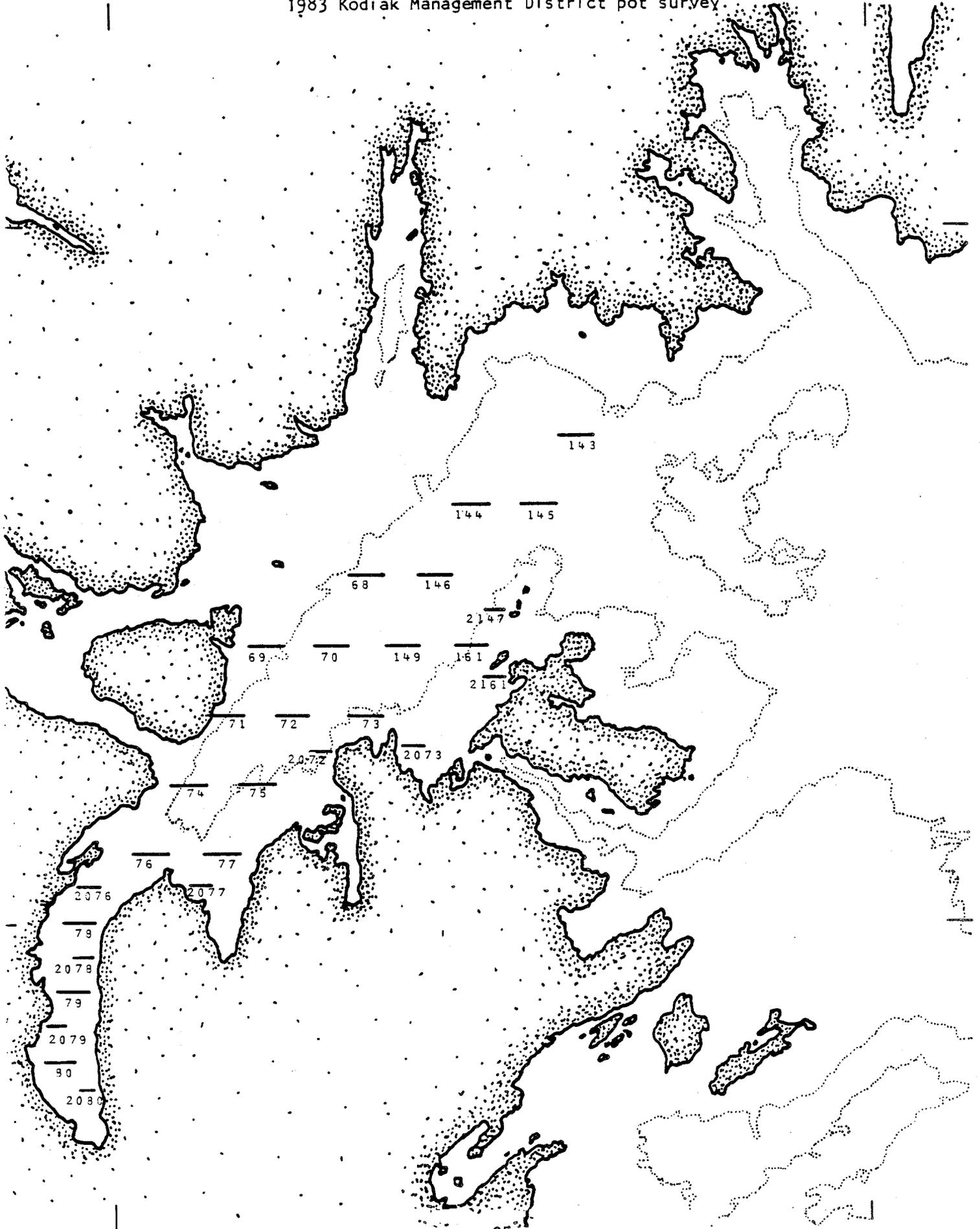
STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB				KING CRAB		
			MIDDLE	POT		SUBLEGAL PRE-ONES	MALES ONES	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE
187	9/21	3	18541.1	33855.7	62-62	39	70	11	37	0	1	0
189	9/21	3	18549.6	33839.7	41-44	2	15	52	0	0	0	0
190	9/21	3	18542.2	33840.7	63-68	0	0	0	0	0	0	0
192	9/21	3	18545.0	33845.8	60-75	0	0	0	0	0	0	0
193	9/21	3	18550.9	33833.5	34-38	0	0	0	0	0	0	0
194	9/21	3	18547.1	33844.4	54-57	1	30	32	0	3	3	5
196	9/21	3	18546.0	33834.8	45-48	0	0	0	0	0	0	0
198	9/21	3	18546.9	33830.1	39-40	0	0	0	0	0	0	0
204	9/22	3	33787.6	46368.0	23-26	0	0	0	0	0	0	0
205	9/22	3	33785.8	46350.4	62-67	1	1	4	0	0	0	0
206	9/22	3	33782.2	46352.2	44-48	0	0	0	0	0	0	0
207	9/22	3	33772.8	46347.3	52-53	0	0	0	0	0	0	0
209	9/22	3	33777.2	46350.4	53-57	0	0	1	0	1	2	25
210	9/22	3	33786.4	46334.4	59-69	0	0	0	1	0	0	0
213	9/22	3	33779.5	46333.3	73-75	0	0	7	0	0	0	0
221	9/22	3	33779.6	46317.2	71-72	0	25	32	17	0	0	0
225	9/22	3	33772.3	46314.9	53-57	0	1	0	0	0	0	0
230	9/22	3	33766.7	46299.5	65-75	0	0	0	0	0	0	0
487	9/11	11	34280.6	47307.3	20-51	10	56	58	46	3	3	2
496	9/12	10	18416.8	34251.7	42-73	58	99	42	5	0	4	0
547	9/15	10	18457.6	34111.5	20-49	0	17	10	0	0	0	0
548	9/14	10	18450.0	34112.0	40-62	43	206	159	70	35	38	34
549	9/14	10	18443.8	34123.3	32-52	21	98	78	76	0	0	0
577	9/16	10	18507.1	33997.3	52-55	0	0	1	0	0	1	0
586	9/19	10	18519.0	33961.6	45-67	2	4	25	0	0	2	0
587	9/19	10	18517.4	33966.2	51-59	11	31	66	11	1	2	0
599	9/20	10	18517.5	33926.9	40-49	45	414	237	454	0	1	2
622	9/20	10	18515.0	33914.4	41-45	7	65	17	329	0	0	0
623	9/20	10	18507.5	33919.4	53-77	8	50	40	26	11	41	17

STATION	DATE	POTS	LORAN LOCATION		DEPTH RANGE	TANNER CRAB				KING CRAB		
			MIDDLE	POT		SUBLEGAL PRE-ONES	MALES ONES	LEGAL MALES	FEMALES	SUBLEGAL	LEGAL	FEMALE
GRAND TOTAL		309				414	1,836	1,472	1,783	217	317	4,290

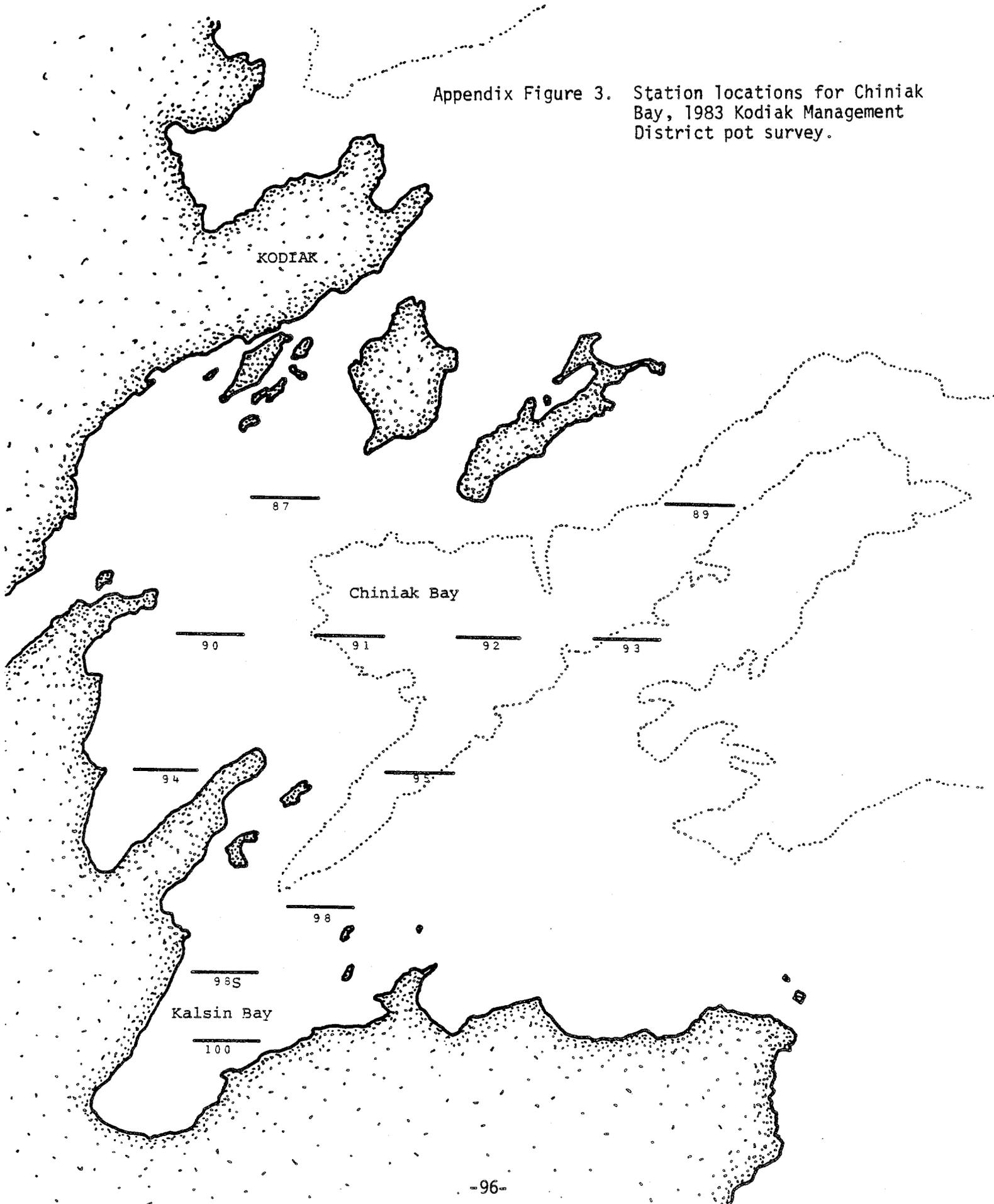


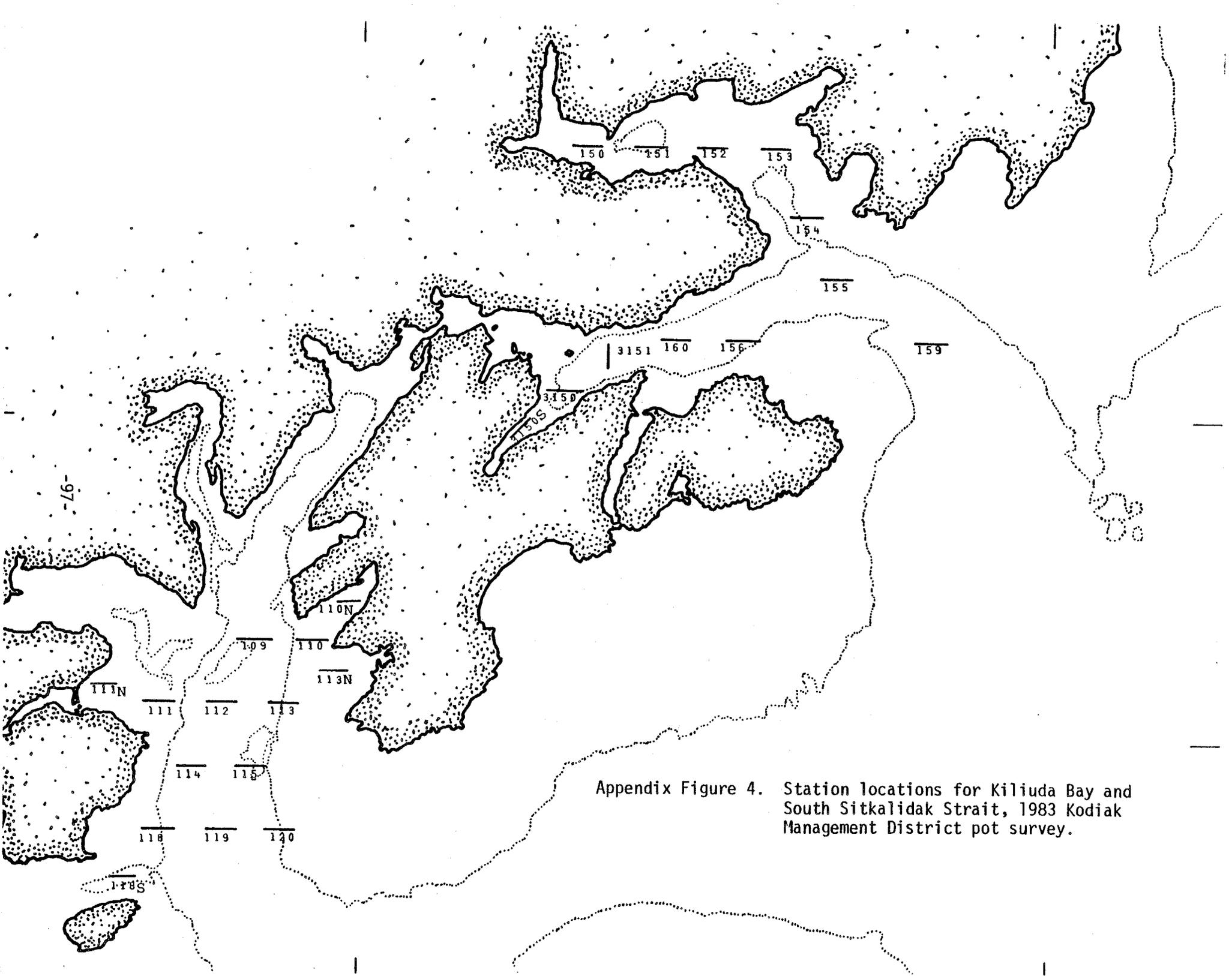
Appendix Figure 1. Station locations for Kupreanof Strait, Viekada, and Uganik Bays.

Appendix Figure 2. Station locations for Marmot Bay area, 1983 Kodiak Management District pot survey.



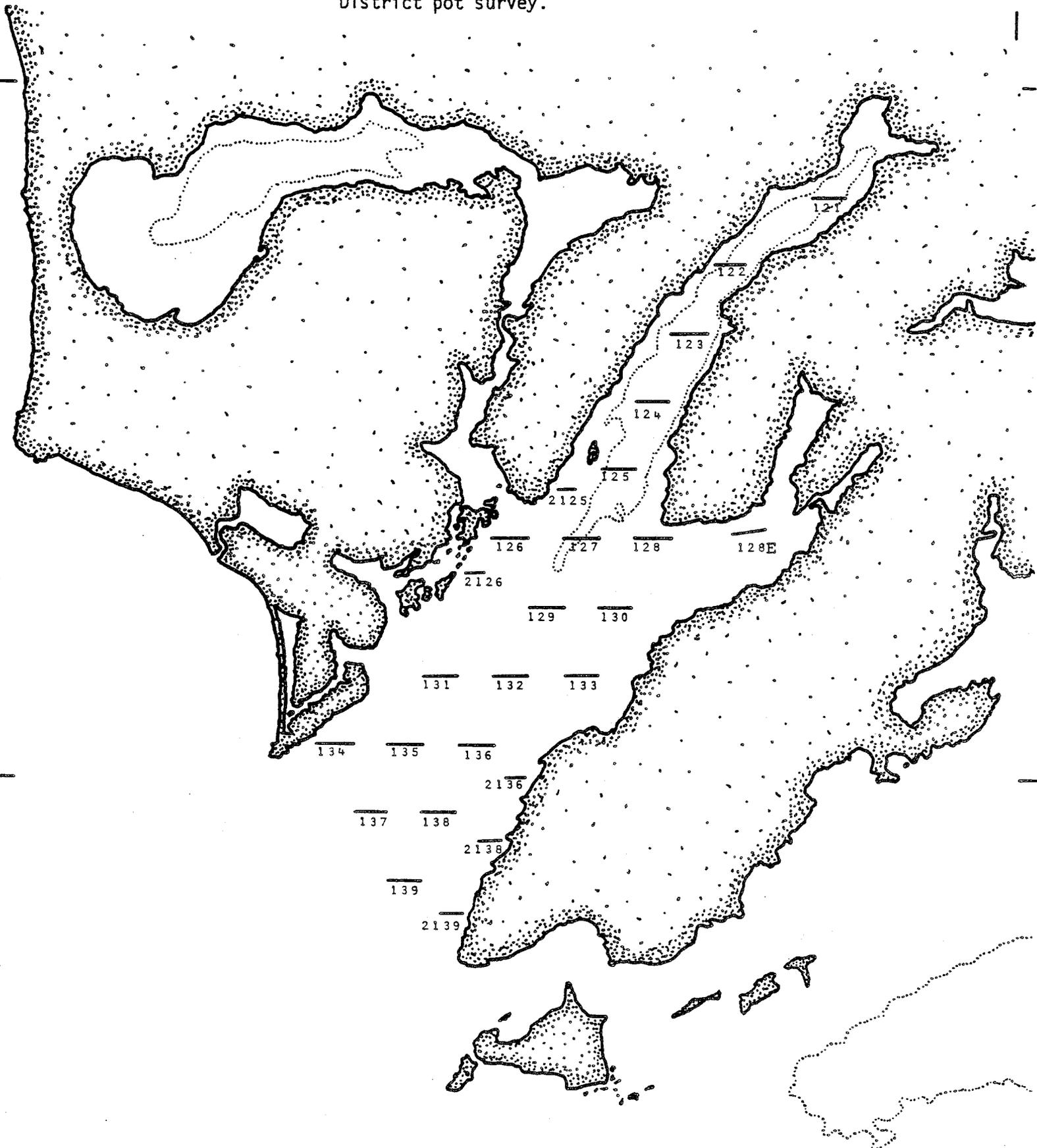
Appendix Figure 3. Station locations for Chiniak Bay, 1983 Kodiak Management District pot survey.





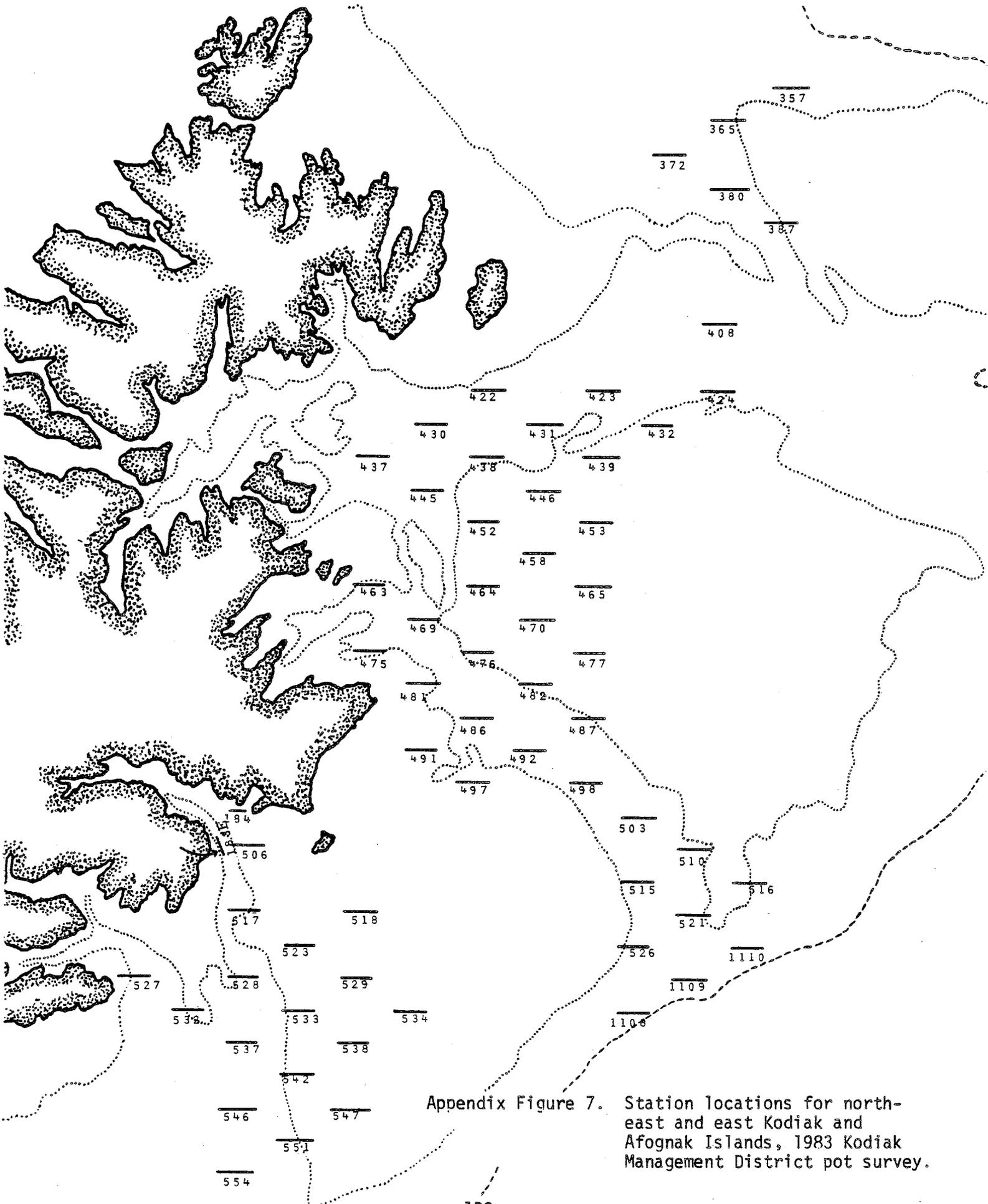
Appendix Figure 4. Station locations for Kiliuda Bay and South Sitkalidak Strait, 1983 Kodiak Management District pot survey.

Appendix Figure 5. Station locations for Alitak Bay, 1983 Kodiak Management District pot survey.

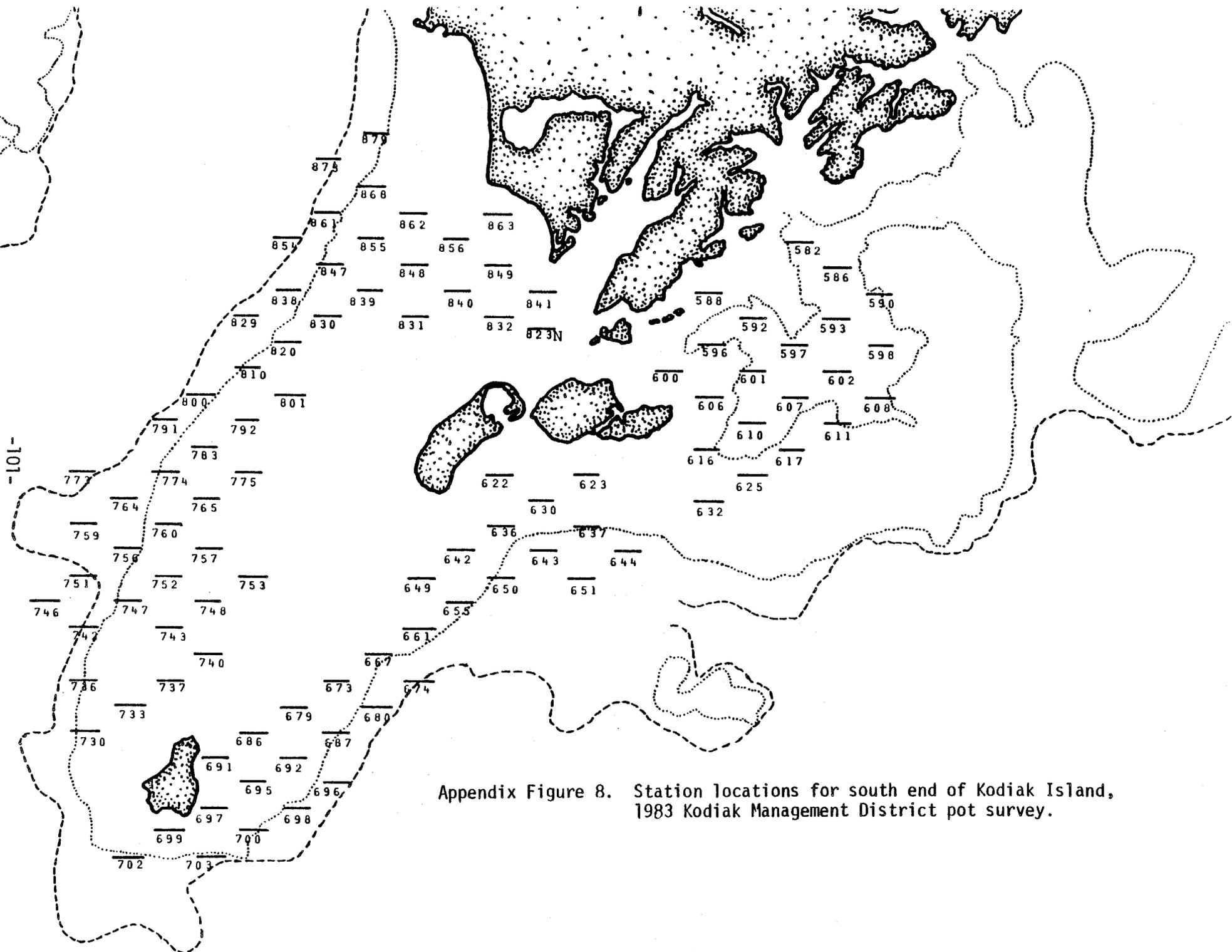


Appendix Figure 6. Station locations for Geese Islands-Kaguyak Bay area, 1983 Kodiak Management District pot survey.

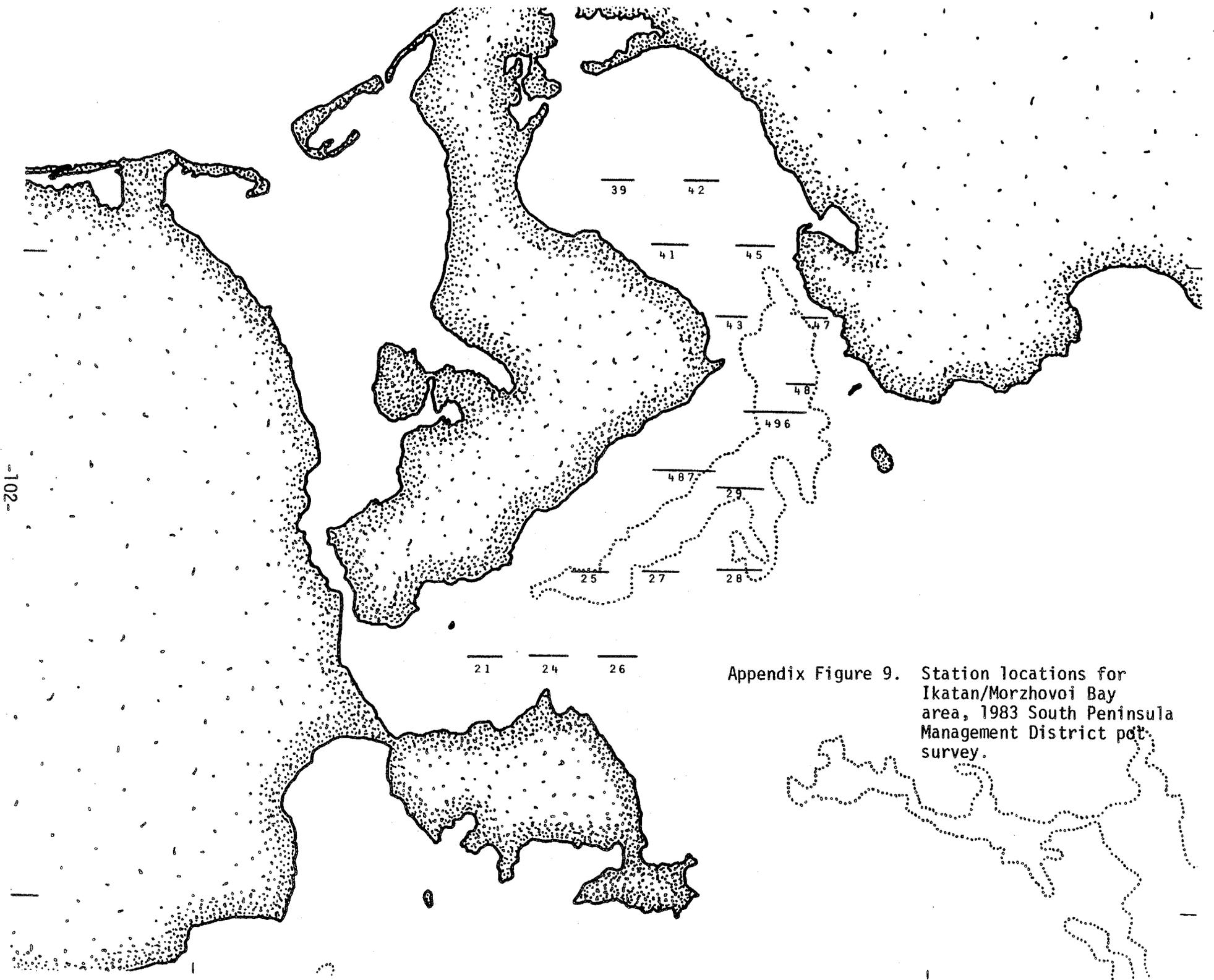




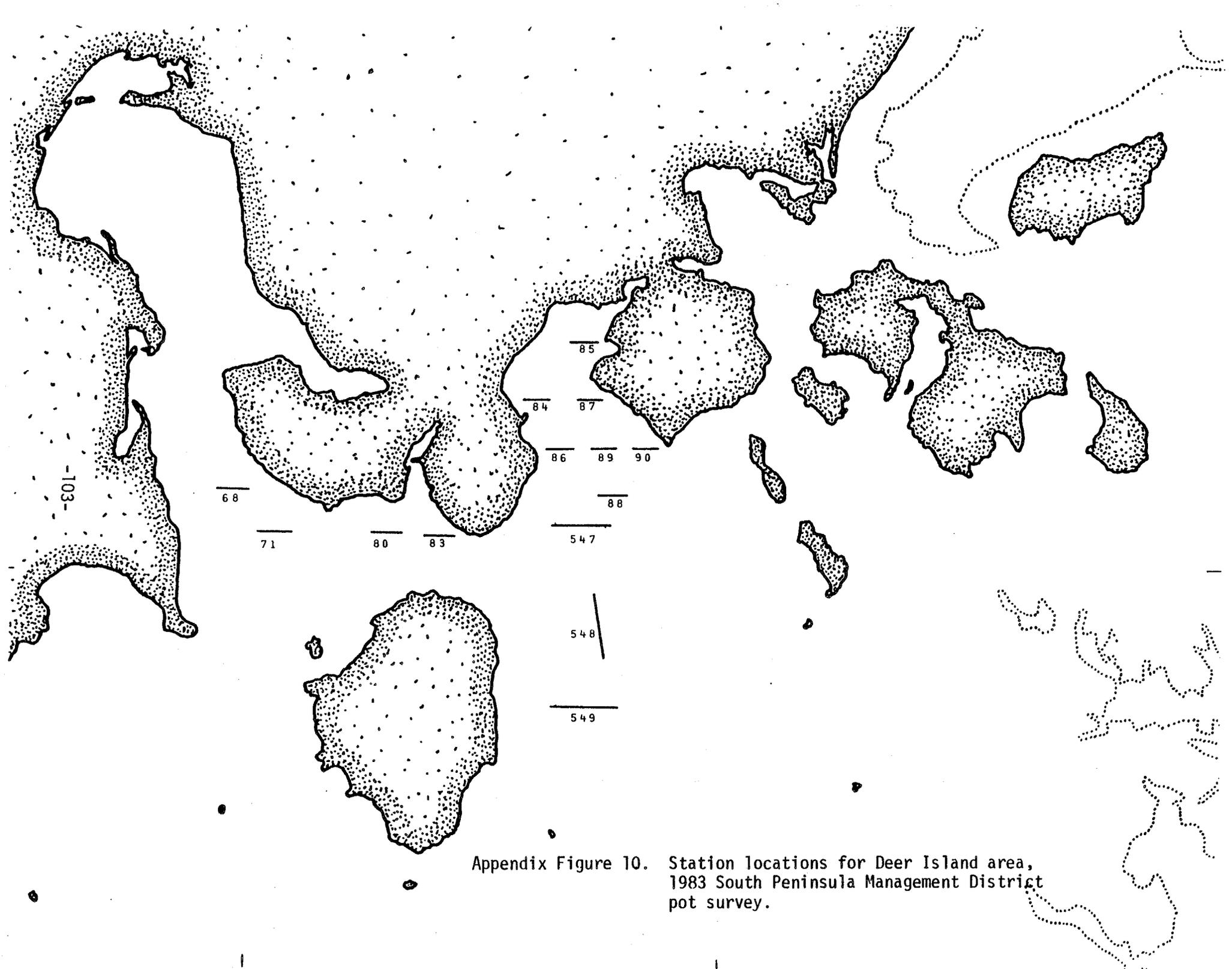
Appendix Figure 7. Station locations for north-east and east Kodiak and Afognak Islands, 1983 Kodiak Management District pot survey.



Appendix Figure 8. Station locations for south end of Kodiak Island, 1983 Kodiak Management District pot survey.

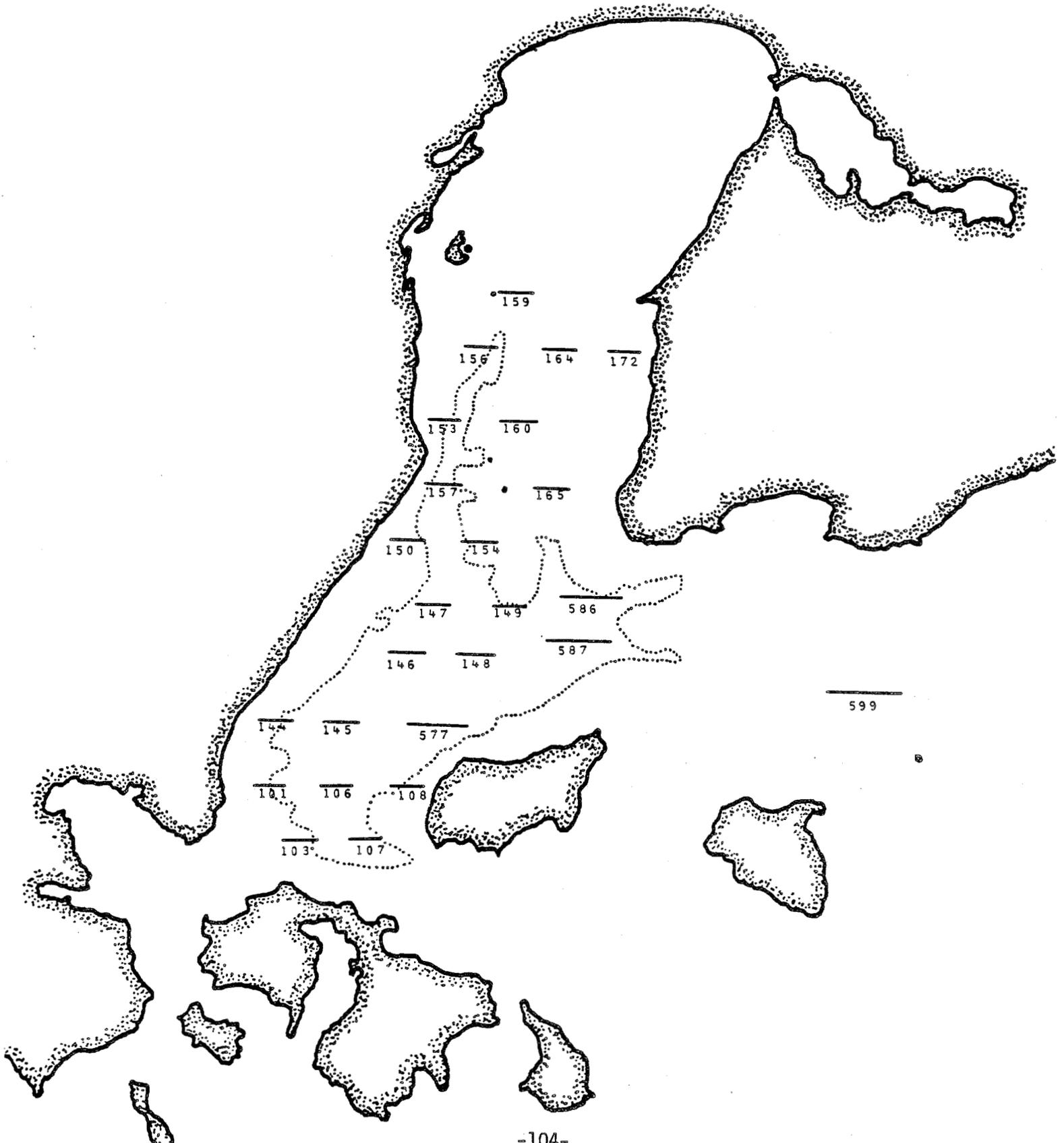


Appendix Figure 9. Station locations for Ikatan/Morzhovoi Bay area, 1983 South Peninsula Management District pot survey.

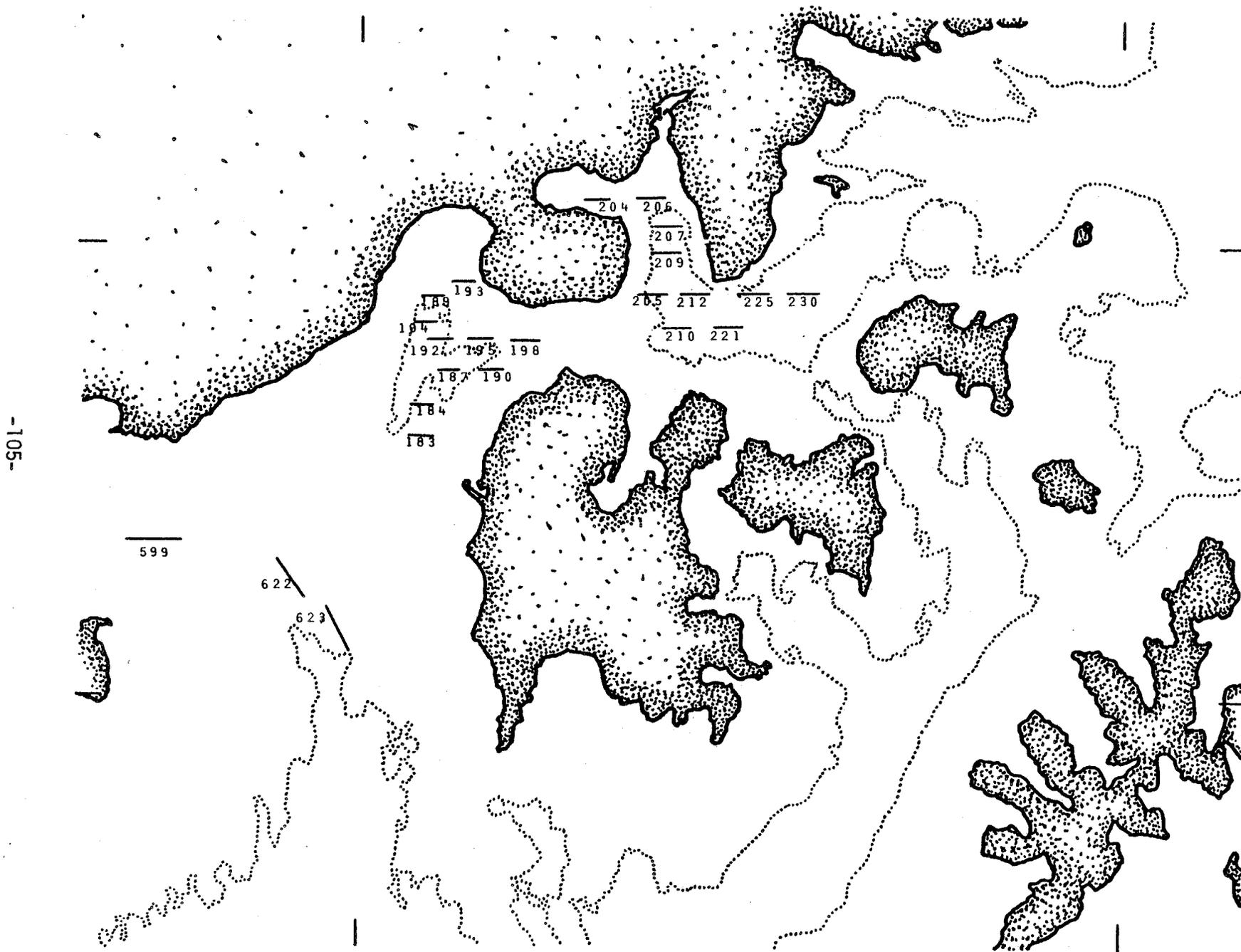


Appendix Figure 10. Station locations for Deer Island area, 1983 South Peninsula Management District pot survey.

Appendix Figure 11. Station locations for Pavlof Bay area, 1983 South Peninsula Management District pot survey.



Appendix Figure 12. Station locations for Beaver/Balboa Bay area, 1983 South Peninsula Management District pot survey.



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