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Alaska Department of Fish and Game
Division of Commercial Fisheries
PO Box 3-2000
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April 1988

Red King Crab 1986 Survey, Kodiak, Alaska

by

S. Forrest Blau

State of Alaska

Steve Cowper, Governor

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ABSTRACT

Alaska Department of Fish and Game conducted a red king crab (*Paralithodes camtschatica*) survey during the summer of 1986 within Statistical Area K, Kodiak, Alaska. The primary purpose of the survey was to find out if the population level of king crab was large enough under the Kodiak Red King Crab Management Plan to have a commercial fishery for the scheduled 1986/87 season.

King crab pots, modified with smaller webbing than used in the commercial fishery were the basic sampling gear. Pots were placed in stations arranged systematically in various strata. In 38 days of fishing 1,087 crab pots were lifted. Only 1,929 red king crab were caught, 1.8/pot, the lowest in the 16 year history of these annual surveys. No commercial red king crab fishery in Area K for the 1986/87 season was allowed since the female threshold values for each district were well below the minimum levels required. The Area K point estimate of the number of legal-sized crabs was 350,000, weighing 1,298.5 tonnes (2,863,000 lb), the lowest population estimate ever calculated for the area. Recruitment of small king crabs was very low, making this the ninth consecutive year of below-average recruitment of small crab.

In July, 34 stations were fished twice in the Southeast District. The regular stations consisted of three pots and were fished prior to the resurvey stations which consisted of 10 pots. The catch of male and female king crabs were compared by various size categories and were found to be statistically the same for each survey.

KEY WORDS: red king crab (*Paralithodes camtschatica*), 1986 Kodiak survey, thresholds values, population estimate, fishery closure

INTRODUCTION

Surveys designed primarily to catch red king crabs (*Paralithodes camtschatica*) around the Kodiak Archipelago have occurred each summer for 16 years from 1971-86. Numerous reports have documented the survey findings over this time period. Overviews for the surveys, prior to 1986, are contained in: Powell 1974; Powell, Kaiser and Peterson 1974; Blau 1985a; and Peterson et al. 1986. Procedures and results of the 1986 survey are partially described in Alaska Department of Fish and Game's (ADF&G) king crab report to industry (ADF&G 1986). The purpose of this report is to more fully document the 1986 Kodiak survey; especially regarding the detailed information collected on red king crabs. Hereafter, the term king crab refers only to red king crab, unless noted otherwise.

ADF&G chartered the 31-m long F/V ARCTIC LADY from 1 July through 19 August 1986 for its annual king crab survey in Statistical Area K, Kodiak, Alaska. The survey was conducted in four of the five Kodiak king crab districts: Northeast, Southeast, Southwest, and Shelikof (Figure 1). Objectives of the survey, were to: (1) estimate the mean catch per pot and standard errors, by district, for the following king crab groups: females; juveniles and adults; males; prerecruits (fours, threes, twos, ones) recruits, and postrecruits (see Appendix A for explanation of king crab terms); (2) estimate the number and biomass (in pounds) of legal male king crabs for each district in accordance with the current Kodiak Management Area Red King Crab Management Plan (Appendix B); (3) estimate the abundance of Tanner crabs (*Chionoecetes bairdi*) for each Tanner crab district surveyed and compare the results with those from the 1985 king crab survey; (4) estimate female king crab fecundity by developing a relationship between egg numbers, length of female, and observed clutch size estimates; and (5) collect and report on other survey data (i.e. female crabs' relative egg clutch sizes, occurrence of black mat syndrome on Tanner crab, incidentally caught species, etc.). No Tanner crab data is presented in this report but it may be summarized in a future ADF&G report.

MATERIALS AND METHODS

Survey personnel aboard the F/V ARCTIC LADY included seven to eight people; a skipper and three to four vessel crewmen plus ADF&G's biological crewleader and two technicians. Commercial sized crab pots were set and pulled daily at various stations except during the mid-charter break. The following description of gear used comes from Blau 1986. Each crab pot measured 213 x 213 x 76 cm, weighing 295 kg and had a pair of tunnel eye openings of 20 x 91 cm. Pots were covered with 9 cm stretch-mesh webbing rather than the 24 cm stretch-mesh normally used in the commercial fishery. This smaller mesh enabled retention of smaller crabs. Pots were baited with chopped frozen herring contained in two 0.95 liter perforated bait jars.

Stations are research fishing locations, each assigned a unique number, and fixed latitude and longitude readings. Pots were set within stations, which generally were laid out in an east-west fashion. Stations were arranged in a systematic checkerboard grid pattern. The station pattern used for the open

ocean areas has been in existence since 1973; with the exception of two areas fished in 1986 where stations were placed in a denser pattern. The most recent station patterns for the bays and straits have been in existence since 1981 or earlier. Bay stations generally are closer together (denser) in both a north-south and east-west manner than the standard ocean stations (Blau 1986: Peterson et al. 1986). For the 1986 survey both standard ocean and bay stations consisted of three pots. Pots were spaced 0.6 km (1/3 mi) in bay stations and 0.5 km (1/4 mi) apart in ocean stations. ADF&G provided the vessel skipper a list detailing the latitude and longitude (in hundredths of degrees) where each pot was to be placed. Electronics utilizing the LORAN-C system enabled the vessel skipper to place the pots within each open ocean station at their respective latitude and longitude readings. In bays the skipper placed pots by using radar in conjunction with standard bay station charts on which desired pot locations were marked.

During the Kodiak crab population surveys from 1982-85, each ocean station was sampled with 10 pots. A statistical analysis of king crab catch within stations, by ADF&G personnel prior to the 1986 survey, revealed that three pots would be the minimum number required to sample a station yielding a similar result to what would be expected if 10 pots were fished. Hence, the decision was made to sample the open ocean stations, on the 1986 survey, with three pots. Crab fishermen and processors were skeptical of this new approach and requested that ADF&G conduct a resurvey in the Southeast District using the previous year's standard of 10 pots per ocean station. ADF&G agreed to industry's request and conducted the resurvey of this district by utilizing funds from ADF&G's Test Fish Fund. Pots were placed 0.5 km apart for both the regular survey and resurvey open ocean stations, therefore the station length was longer on the resurvey stations. Pots were pulled on the resurvey from 11 thru 14 and 16 thru 18 July 1986. All appendices, figures and tables in this report include all the survey data, both the regular and resurvey data, except Table 4, where they are segregated.

Based on ADF&G's analysis of king crab abundance from the 1980-85 Kodiak crab surveys, a series of strata were established. Stations were selected systematically within these strata. In eight bays and straits all standard (nonancillary) stations were selected to be fished. For strata in the open ocean areas the station pattern was either less, the same, or more dense than previous years. Appendix C lists by district, the strata, strata area and stations fished during the 1986 survey. The spatial distribution of stations and strata are shown on charts (Appendices D.1 thru D.9).

The catch in each pot was sorted into crabs, other invertebrates, and fish. Crabs were placed on a measuring-sorting table where they were separated by species, sex and shell-age. Carapace lengths of king crabs and carapace widths (inside the spines) of Tanner crabs were measured with Vernier calipers to the nearest millimeter. Carapace widths of male crabs were checked with go-no-go gauges to see if the crabs were of sublegal or legal size. These gauges were set at the minimum legal size for each species, 177.8 mm (7 in) and 134.8 mm (5 1/2 in) wide for king and Tanner crabs, respectively. Black mat syndrome (*Trichomaris invadens*) was recorded when present on Tanner crab. Adult female crabs of both species were examined for egg clutch size, stage of egg development, and clutch condition. No subsampling of the catch from pots occurred, since relatively few crabs were captured.

Six different forms were used to record the data collected on the survey (Appendix E). The crab data form was used to record the required data for each crab (Appendix E.1). Crab and incidental species deck log form, served as both a checklist for crabs captured as well as recording the fork lengths and condition of Pacific halibut (*Hippoglossus stenolepis*) and the variety of other incidental species caught. This form was designed for both three- and 10-pot stations (Appendices E.2 and E.3). Pilot house log forms required the time, depth, and location where pots were set, either in three- or 10-pot stations (Appendices E.4 and E.5). A daily station summary form required the number of stations, pots, crabs, and fish caught each day be recorded on it and whether or not the data had been called in, via radio, to the ADF&G Kodiak office (Appendix E.6).

Population estimates for Kodiak's legal male red king crabs within Area K were estimated using Kruse's (1986) modification of Collie and Sissenwine's (1983) procedure. In brief, the procedure calculates an estimate of the overall catchability coefficient which scales the relative abundance indexes from the 1973-82 annual surveys to the commercial catches in each respective year. The index of relative abundance for each year is then corrected for error, and divided by the estimate of the catchability coefficient to estimate absolute abundance.

RESULTS

In 38 days of fishing 1,087 crab pots were lifted, an average of 28.6 potlifts per day (Table 1). Sixty-nine percent of the research fishing effort was located in the open ocean areas while the remaining 31% was in bays. On the regular survey the most pots were fished in the Northeast District, 250 (10 nmi^2/pot), and the least in the Shelikof District, 91 (2 nmi^2/pot). If the resurvey effort is included to the rest of the regular survey then the Southeast District had the most overall pots fished in it, 507 or 47% of the pots fished on the entire survey (Table 1). Depth range of the pots fished on the survey was 13-245 m. The depth range fished in both the bays and open ocean areas was similar, and the mean depth fished in both areas was the same at 87 m. Pots soaked for an average of 17.8 hours in the bay stations and 19.0 hours in the ocean stations; an overall mean of 19.0 hours for all pots soaked (Table 1). By district, the overall mean soak times were the greatest in the Northeast District since 15 pots were soaked for five days at ocean stations during the mid-charter break. Conversely, the overall mean soak time was least in the Southwest District due to the closer than average spacing of ocean stations, particularly those located in stratum D (Appendix D.7). Soak times ranged from 13 - 124 hours with the mode in the 16-hour period (Table 2 and Figure 2). Ninety-nine percent of the pots were lifted with a soak period of <25 hours. These pots had a mean soak time of 17.5 hours. Of these pots, 80% were soaked between 15-18.999 hours (Table 2 and Figure 2). When the 15 pots soaked $\geq$112 hours during the mid-charter break are included, the overall survey mean pot soak time rises to 19.0 hours.

Only 1,929 king crabs were caught, 1.8 per pot, (Table 1) which is the lowest catch in the 16 year history of ADF&G's annual Kodiak crab surveys (Blau 1986; Peterson et al. 1986). Seventy-five percent of these crabs were females. Of the males captured, 74% were legal size (Table 1). Other than the

adult female category in the Northeast and Southwest districts, no king crab category in any district did the average catch of king crabs exceed one crab per pot. Catch per pot of adult females by district was only one fifth to one tenth of the minimum threshold values required to have a commercial fishery during the 1986/87 season (Table 3). Catches of both juvenile females and prerecruit males was extremely low, making this the ninth consecutive year of below average recruitment of prerecruit-four male crabs (Blau 1985b and 1986). A detailed list of king crab caught by station and district is given in Appendix F.

Within the Kodiak Management Area, population estimates of legal-sized king crabs, based on results of the regular survey, range from 300,000-423,000 animals with 350,000 being the point estimate (95% CI). The mean weight of all legal-sized king crabs captured on the survey was 3.71 kg (8.18 lb). The estimated weight of the legal population, using the point estimate of 3.71 kg/crab is 1,298.5 mt (2,863,000 lb). This is the lowest population estimate ever for king crab within the Kodiak Management Area (ADF&G 1986). Since none of the district adult female thresholds were met, no district estimates of legal population size were generated.

Thirty-four stations were fished in a replicate manner on both the regular survey and resurvey in the Southeast District. The regular survey fished three-pot stations between 4-8 July (102 potlifts) whereas on the resurvey four nine-pot and 31 10-pot stations were fished (336 potlifts) between 11-14 and 16-18 July (Table 4). Identical stations were fished on the resurvey as on the regular survey but they were fished eight to 11 days later (Appendix F.1). The length of the resurvey stations were longer because of more pots being fished than on the regular survey, even though the pot spacing remained the same on both surveys. The operational plan stated that the soak-times for pots will be as constant as possible between these replicate surveys. This goal was met in that the minimum-maximum soak-time range, mean, and standard deviations of soak-times for both surveys were similar (Table 4). Within each king crab category, the catch of crabs was not statistically different between the two surveys ($P < 0.05$) (Table 4).

Length frequencies and exoskeletal classifications of female and male king crabs caught on the 1986 survey are listed by district and all districts combined in Appendices G.1 thru G.5. This information is summed raw data, unweighted by strata. When all data is combined the female length frequency mode is at 135-136 mm CL and the male mode is at 163-164 mm CL (Figure 3 and Appendix G.5). All female exoskeletons were classified as new shell; and only one juvenile female was caught (Appendix G.5). Of the 486 male king crabs caught, 80% had exoskeletons classified as new shell, 14% as old shell, and 6% as very old shell (Figure 4 and Appendix G.5). New shell male crabs ranged in size from the smallest to the largest males captured. Also new shell males occurred exclusively at carapace lengths $\leq$137-138 mm CL and $\geq$183-184 mm CL (Figure 4 and Appendix G.5). Old shell and very old shell crabs occurred only between 139-140 mm CL and 181-182 mm CL (Figure 4 and Appendix G.5). Modes for old shell males occurred at 163-164 mm CL and 165-166 mm CL for very old shells (Figure 4 and Appendix G.5).

Of the 1,442 adult females captured on the survey the percent catch by district follows: Southwest 45%, Northeast 35%, Southeast 19%, and Shelikof 2% (Tables 1 and 5). When the estimated clutch sizes of females are grouped

in the same manner as has been done in the past (Blau 1985b; Schmidt and Blau 1986) the overall survey results are: 5% of the females were barren; 3% had clutches of 1-29%; 3% had clutches from 30-59%; 28% had clutches from 60-89%; and 61% had clutches estimated to be 90-100% full (Table 5 and Figure 5). The proportion of clutch sizes by district were similar to the overall survey distribution of clutch size groups with the exception of the Shelikof District whose clutch sizes were the poorest of the districts (Table 5). Ninety-one percent of the females had carapace lengths from 120 thru 149 mm. In addition, the mean carapace length of females progressively increased as the percent clutch size groups decreased (Table 6 and Figure 6).

Two stages of egg development and five categories of clutch condition were recorded for adult females (Appendix E.1). There were 1,369 (95%) adult females which were observed to have clutches of eyed eggs, two females had clutches of uneyed eggs (0.1%) and 71 (5%) had no data recorded in this category. Of the adult female clutches, 1,240 (86%) were observed to contain no obvious dead eggs; 116 (8%) contained dead eggs which made up <20% of the clutch; 16 (1%) had dead eggs which comprised >20% of the clutch; 30 (2%) were barren with clean pleopodal setae; 39 (3%) were barren but had their pleopodal setae covered with empty egg cases; and one (<0.1%) female's clutch condition was not recorded.

Ninety-four percent (N=65) of all barren females came from the Northeast and Shelikof districts where they made up 10% and 59% of the females caught in each respective district (Table 5). Fifty-seven percent of all barren females had empty egg cases. Seventy-one percent (N=37) of the barren females in the Northeast District came from Kiliuda Bay and all of the Shelikof District barren females (N=13) were caught in Uganik Bay. Thirty-eight percent and 93% of the barren females in Kiliuda and Uganik Bays, respectively, had pleopodal setae covered only with empty egg cases. Both of these areas are known to have had infestations of the nemertean egg-predator, *Carcinonemertes* sp. These nermerteans are believed to be the cause of barreness in females whose pleopodal setae are covered with empty egg cases only 3 to 5 months after egg extrusion (Blau 1986).

The sex ratio of all adult females to adult males caught on the 1986 survey was 2.97. For this ratio adult males are defined as all males of prerecruit-three size and larger (Table 1). This is the highest survey sex ratio recorded in 16 years (Blau 1985b,1986). In 1985 the ratio was 2.10. The sex ratio for the Southwest District was 2.17. Sex ratios are not given for the other districts since sample size was too small. Under experimental conditions adult male king crabs of various sizes and shell-ages can mate successfully (producing fertilized clutches of $\geq$75%) with four to nine females (Powell, Jones, and Hurd 1974).

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TABLES AND FIGURES

Table 1. Effort and the actual catch of red king crab on the 1986 king crab survey, Statistical Area K, Kodiak, Alaska.

King Crab District	No. Days Pots Set & Lifted	No. Pots Lifted			Depth Range of Pots & Mean Depth Fished (m)					Mean Pot Soak (Hrs.)			Females		Males: Prerecruits				Males: Legals		Total Crab
		Bay	Ocean	Total	Bay	$\bar{x}$	Ocean	$\bar{x}$	Total $\bar{x}$	Bay	Ocean	Total	Juv.	Adult	4's	3's	2's	1's	Re-cruits	Postre-cruits	
Northeast	12	139	111	250	13-201	84	55-216	107	95	17.4	30.7	23.3	1	503	1	1	24	68	41	11	650
CPUE													<0.1	2.0	<0.1	<0.1	0.1	0.3	0.2	<0.1	2.6
Southeast																					
Reg. Survey[a]	7-1/2	54	117	171	16-132	89	27-154	84	86	20.0	17.4	18.2	0	9	0	0	0	0	0	6	15
CPUE													0	<0.2	0	0	0	0	0	0.1	0.3
Resurvey	6-1/2	0	336	336	-	-	31-164	86	86	-	18.3	18.3	0	264	0	0	0	0	1	22	287
CPUE													0	0.8	0	0	0	0	<0.1	0.1	0.9
S.E. TOTAL	14	54	453	507	16-132	89	27-164	86	86	20.0	18.1	18.3	0	273	0	0	0	0	1	28	302
CPUE													0	0.5	0	0	0	0	<0.1	0.1	0.6
Southwest	9	57	182	239	15-176	75	16-245	80	78	17.2	16.5	16.7	0	644	0	2	3	15	90	187	941
CPUE													0	2.7	0	<0.1	<0.1	0.1	0.4	0.8	3.9
Shelikof	3	91	-	91	16-210	98	-	-	98	17.5	0	17.5	0	22	0	2	5	3	2	2	36
CPUE													0	0.2	0	<0.1	0.1	<0.1	<0.1	<0.1	0.4
GRAND TOTALS	38	341	746	1,087	13-210	87	16-245	87	87	17.8	19.6	19.0	1	1,442	1	5	32	86	134	228	1,929
CPUE													<0.1	1.3	<0.1	<0.1	<0.1	0.1	0.1	0.2	1.8

[a]Regular survey stations consisted of 3 pots/station and 10 pots/station were fished on the resurvey in the Southwest District. There were 23 stations (69 pots) fished on the regular survey which were not fished on the resurvey (i.e. stations 101-115, 118-120, 1636, 1637, 3636, 4636 and 4637) hence the CPUE numbers presented above for the regular and resurveys in the Southeast District are not comparable.

Table 2. Soak-time frequency of crab pots fished, by hour intervals, during the 1986 Kodiak king crab survey, in Statistical Area K, Kodiak, Alaska.

No. Hours Pots Soaked			No. Pots
13.0	-	13.999	3
14.0	-	14.999	18
15.0	-	15.999	151
16.0	-	16.999	327
17.0	-	17.999	211
18.0	-	18.999	170
19.0	-	19.999	63
20.0	-	20.999	68
21.0	-	21.999	34
22.0	-	22.999	12
23.0	-	23.999	9
24.0	-	24.999	6
112.0	-	112.999	3
123.0	-	123.999	5
124.0	-	124.999	7
Total			1,087

Table 3. Red king crab catch per unit of effort and associated standard error by district from the 1986 king crab survey in Statistical Area K, Kodiak, Alaska[a].

Crab Category	Northeast		Southeast[b]		Southwest		Shelikof		Total	
	CPUE	SE	CPUE	SE	CPUE	SE	CPUE	SE	CPUE	SE
Females										
Juveniles	<0.01	<0.01	0	0	0	0	0	0	<0.01	<0.01
Adults	0.40	0.34	0.34	0.59	0.76	0.31	0.33	0.30	0.17	
Adult Threshold[c]	3.30	-	3.30	-	7.10	-	1.50	-	-	-
Males										
Prerecruit-Fours	<0.01	<0.01	0	0	0	0	0	0	<0.01	<0.01
Prerecruit-Threes	<0.01	<0.01	0	0	<0.01	<0.01	0.02	0.02	<0.01	<0.01
Prerecruit-Twos	0.02	0.03	0	0	<0.01	<0.01	0.07	0.06	0.01	0.01
Prerecruit-Ones	0.07	0.08	0	0	0.01	<0.01	0.04	0.04	0.03	0.03
Recruits	0.04	0.05	0	0	0.01	<0.01	0.04	0.04	0.05	0.03
Postrecruits	0.01	0.01	0.03	0.03	0.21	0.09	0.03	0.03	0.08	0.03
Total Legals	0.05	0.06	0.03	0.03	0.31	0.14	0.06	0.05	0.12	0.05

[a]Numbers are rounded to the second decimal place. Data from "Westward Region King Crab Survey Results for 1986" report (ADF&G 1986); therein the above numbers are shown to the fourth decimal place.
[b]Data includes resurvey catch and effort.
[c]Threshold values below which no commercial fishing is allowed have been established for Kodiak adult female red king in the "Kodiak Management Area Red King Crab Management Plan" (Appendix B).

Table 4. Comparison of red king crab catches from the regular survey and resurvey in the Southeast District from the 1986 king crab survey in Statisical Area K, Kodiak, Alaska[a].

	Regular Survey	Resurvey
No. Stations	34	34
No. Potlifts	102	336
Min. Soak-Time (hr)	15.58	15.55
Max. Soak-Time (hr)	22.20	24.47
Mean Soak-Time (hr)	16.98	18.28
Soak Time Stan. Dev.	1.65	1.70

King Crab Category	Regular Survey No. Crab	CPUE	Resurvey No. Crab	CPUE
Females				
Juveniles	0	0	0	0
Adults	2	0.02	264	0.78
Males				
Prerecruit-Fours	0	0	0	0
Prerecruit-Threes	0	0	0	0
Prerecruit-Twos	0	0	0	0
Prerecruit-Ones	0	0	0	0
Recruits	0	0	1	<0.01
Postrecruits	6	0.06	22	0.07
Total Legals	6	0.06	23	0.07

[a]Stations fished in a replicate manner on both the regular survey and resurvey included the following: 580, 585, 588, 593, 596, 600, 601, 603, 606, 610, 611, 617, 623, 625, 636, 637, 643, 649, 651, 661, 662, 666, 667, 673, 679, 680, 687, 692, 695, 696, 698, 700, and 703.

Table 5. Proportion of adult female red king crabs within relative egg clutch size groups by district as observed on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska[a].

King Crab Districts	Percent and Number of Adult Females in Egg Clutch Groups										Total No. Females
	Barren		1-29%		30-59%		60-89%		90-100%		
Northeast	10%	(52)	5%	(26)	3%	(15)	33%	(166)	48%	(244)	503
Regular Sur.	11%	(1)	22%	(2)	11%	(1)	44%	(4)	11%	(1)	9
Resurvey	0%	(0)	<1%	(1)	1%	(3)	25%	(66)	74%	(194)	264
Southeast	<1%	(1)	1%	(3)	1%	(4)	26%	(70)	72%	(195)	273
Southwest	<1%	(3)	2%	(16)	3%	(20)	25%	(164)	68%	(441)	644
Shelikof	59%	(13)	5%	(1)	5%	(1)	18%	(4)	14%	(3)	22
Totals	5%	(69)	3%	(46)	3%	(40)	28%	(404)	61%	(883)	1,442

[a]Data presented is raw data only and does not include any weighting by strata (i.e. different fishing intensities).

Table 6. Comparison between adult female red king crabs' carapace lengths and clutch size groups from the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

Carapace Length (mm) Groups	Clutch Size Groups					
	Barren	1-29%	30-59%	60-89%	90-100%	Total
	Number of Crabs					
90 - 99	0	0	0	0	1	1
100 - 109	2	0	0	1	0	3
110 - 119	2	2	0	6	14	24
120 - 129	7	4	9	61	101	182
130 - 139	8	18	16	188	441	671
140 - 149	30	16	10	115	293	464
150 - 159	17	6	2	23	31	79
160 - 169	3	0	3	10	2	18
Totals	69	46	40	404	883	1,442
Mean Carapace Length (mm)	143.65	140.15	138.73	138.50	138.09	

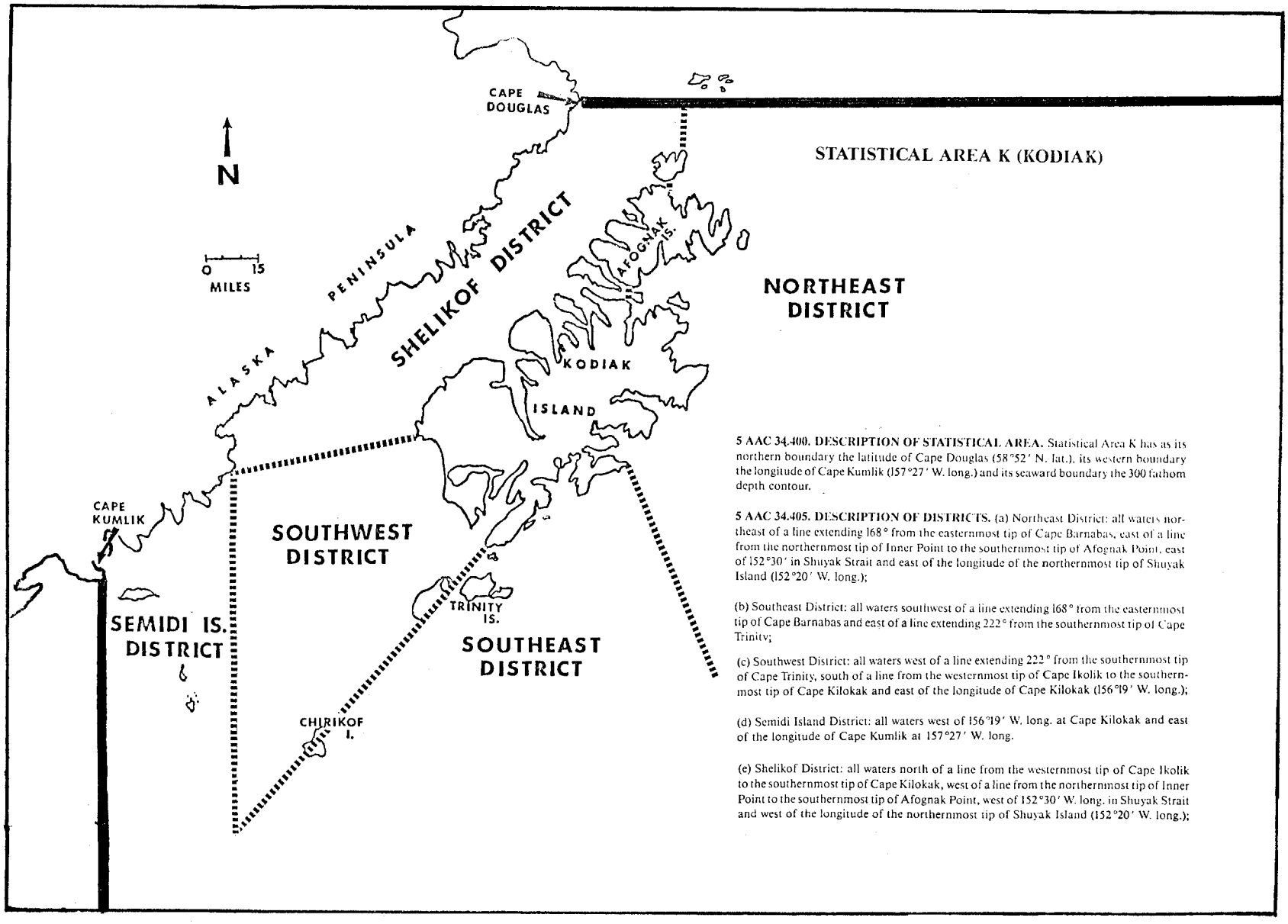


Figure 1. The five commercial king crab fishing districts in Statistical Area K, Kodiak, Alaska.

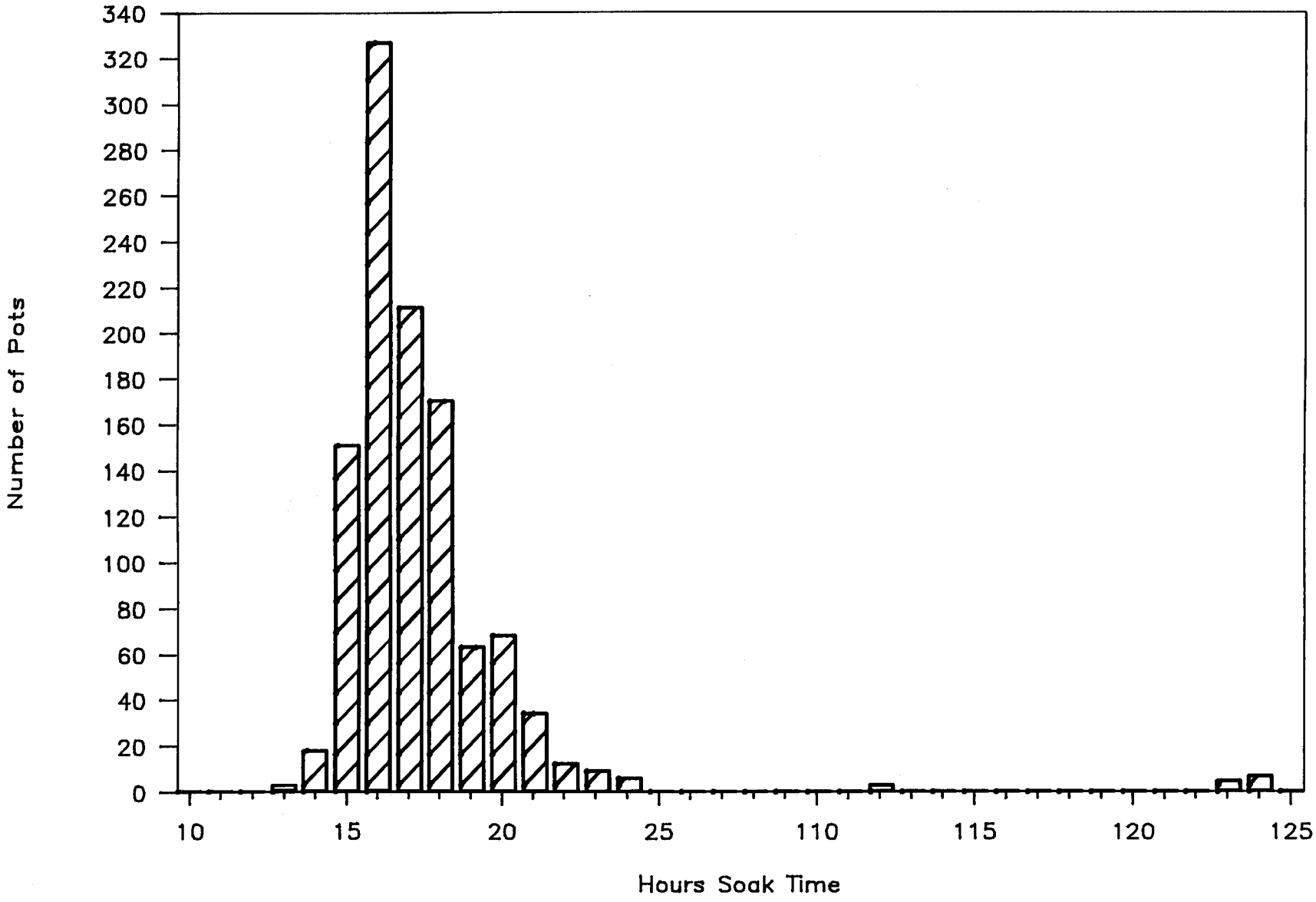


Figure 2. Soak-time frequency of crab pots fished, by hour intervals, during the 1986 king crab survey, Statistical Area K, Kodiak, Alaska.

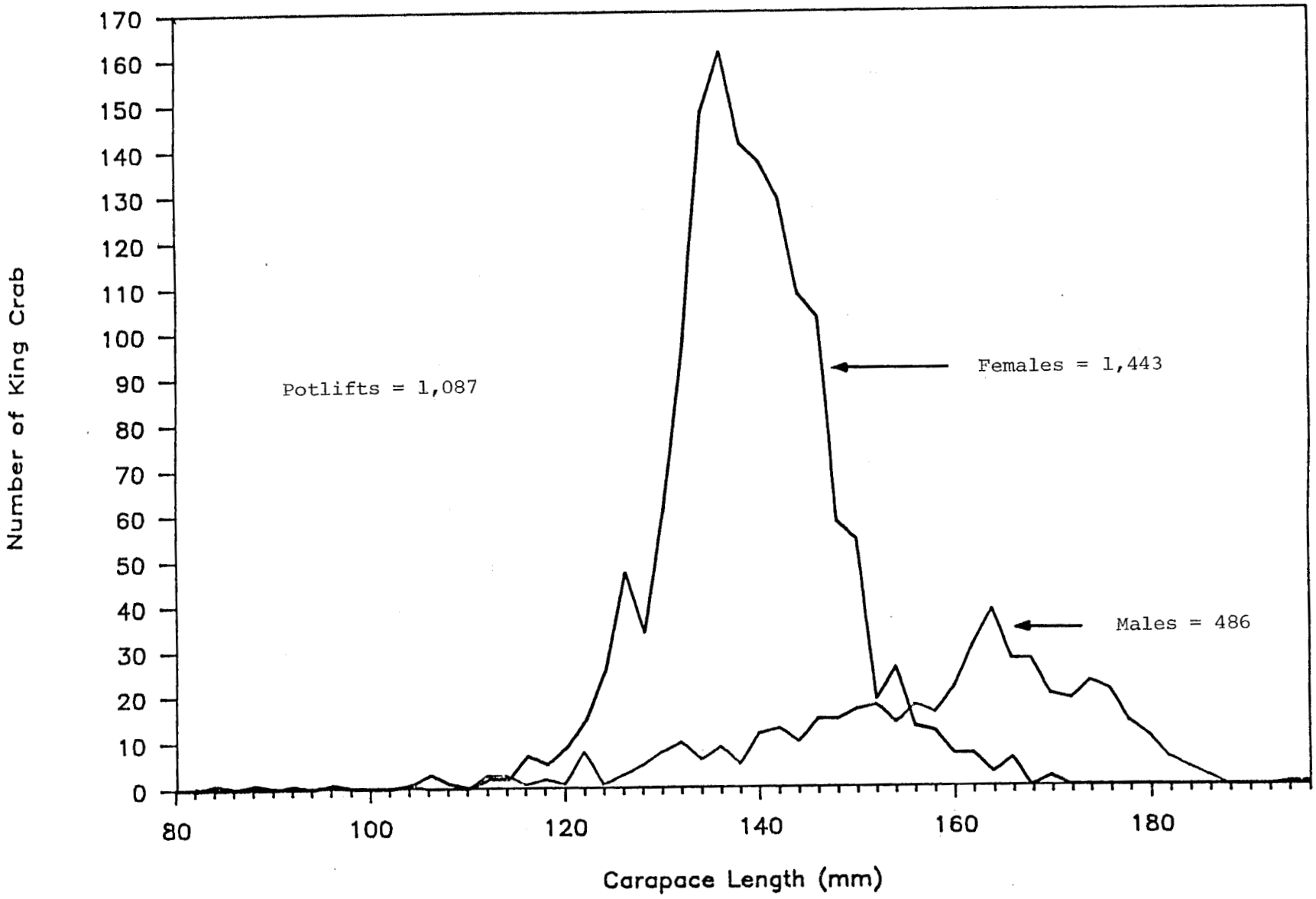


Figure 3. Length frequencies of red king crabs caught on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

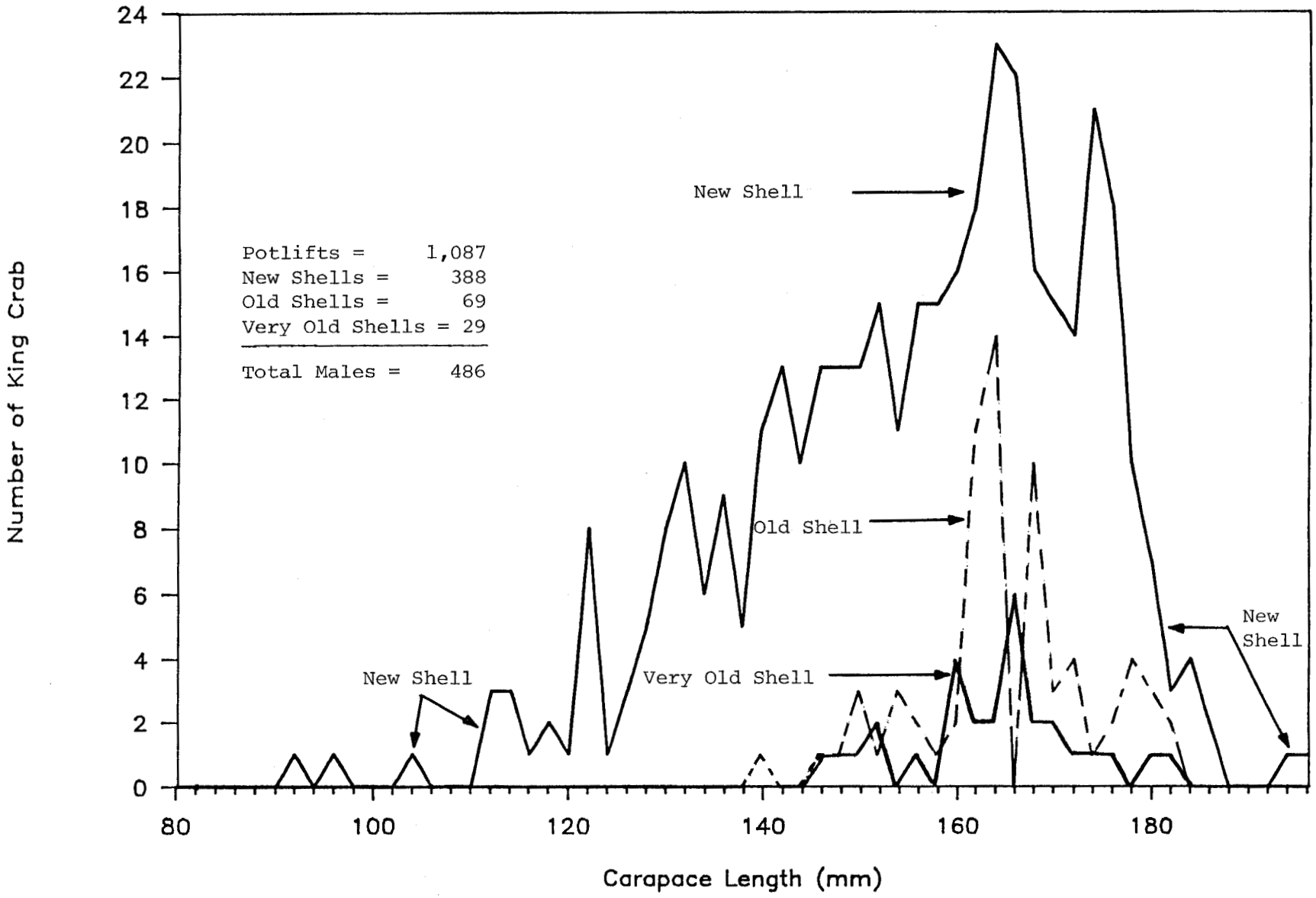


Figure 4. Length frequencies by exoskeletal ages of male red king crabs caught on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

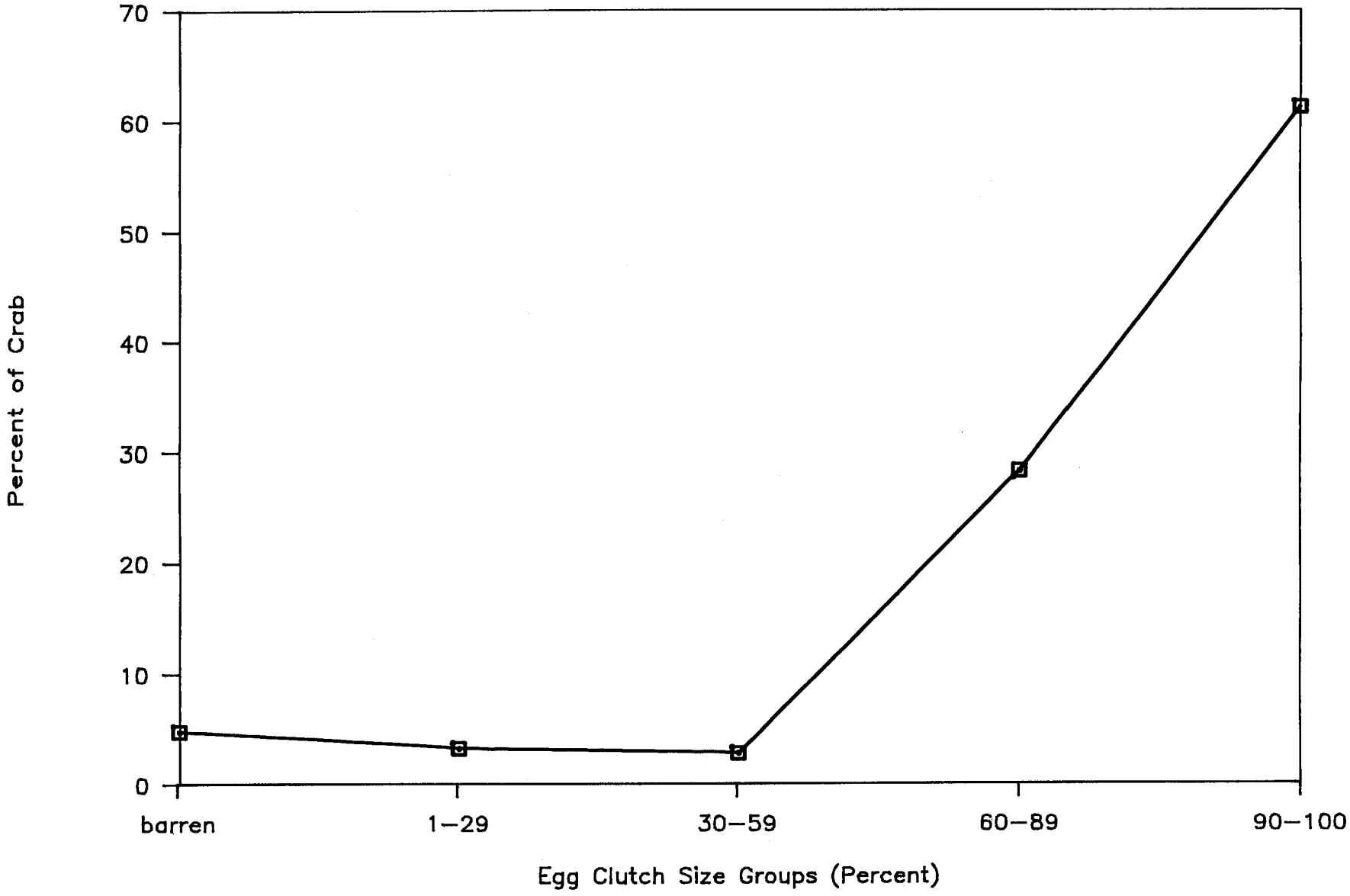


Figure 5. Percent contribution by clutch size groups for all adult female red king crabs caught on the 1986 king crab survey, Statistical Area K, Kodiak, Alaska.

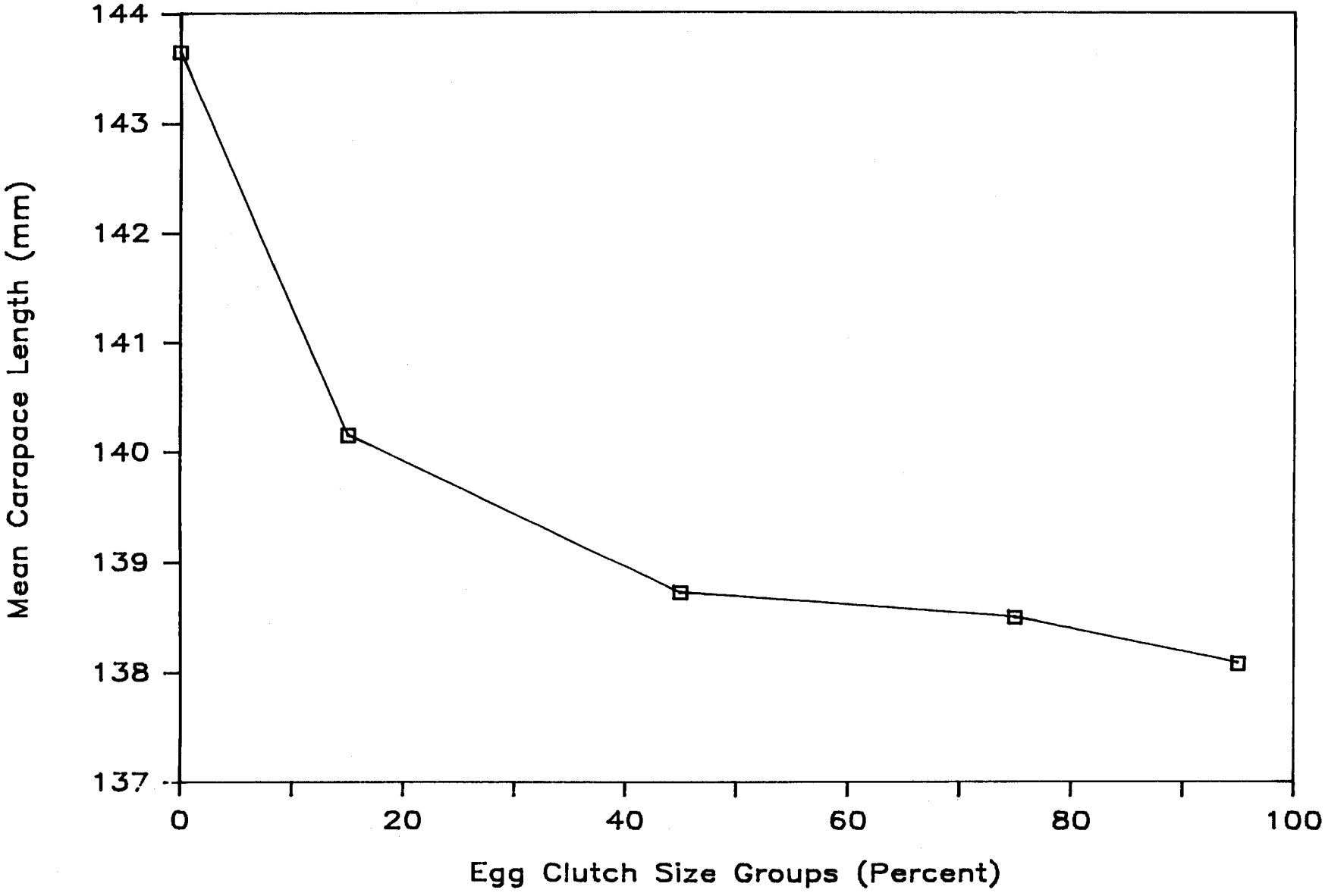


Figure 6. Relationship between mean carapace length at the mid-points of five clutch size groups for all adult female red king crabs caught on the 1986 king crab survey, Statistical Area K, Kodiak, Alaska.

APPENDICES

Appendix A.1. Definition of terms for red king crabs within Statistical Area K, Kodiak, Alaska.

Carapace - Shell (exoskeletal) shield covering the back of a crab.

Carapace Length (CL) - Straight-line distance across the carapace from the posterior margin of the right eye orbit to the medial-posterior margin of the carapace.

Legal Size - Male crabs ≥178 mm (7 in) in carapace width, including the spines, as measured as the straight line distance across the carapace at a right angle to a line midway between the eyes to the midpoint of the posterior portion of the carapace.

Sublegal Size - All male crabs <178 mm (7 in) in carapace width, including the spines (see definition of legal crab above).

Juvenile Females - Nonovigerous (nonembryo bearing) females with carapace lengths ≤115 mm.

Adult Females - All ovigerous (embryo bearing) females and all females with carapace lengths ≥116 mm.

New shell Crabs (Exuviants) - Crabs which retain their exoskeltons for a year or less (0 - 12 months) and typically have whitish ventral surfaces with relatively few scratches or abrasions.

Old shell Crabs (Anexuviants) - Crabs which have not molted for 13 - 24 months; ventral surface yellowish with a number of dark stained scratches (generally rare for females).

Very Old shell Crabs (Anexuviants) - Crabs which have not molted for 25 - 36+ months; ventral surface dark from the combined appearance of yellowish exoskeleton and several years of accumulated scratches (very rare for females).

Prerecruit-Fours (4's) - Males <95 mm CL, estimated to be four or more years from legal size.

Prerecruit-Threes (3's) - Males 95 - 112 mm CL estimated to be three years from legal size.

Prerecruit-Twos (2's) - Males 113 - 130 mm CL estimated to be two years from legal size.

-Continued-

Prerecruit-Ones (1's) - Males ≥131 mm CL but less than legal width.

Recruits - New shell males which have carapace widths ≥178 mm (7 in) but whose carapace lengths are ≤164 mm. These crab are subject to being caught in a commercial fishery for the first time.

Postrecruits - All males ≥165 mm CL and all old shell and very old shell legal sized crab ≤164 mm CL. These crab have been exposed to a commercial fishery for one or more years.

Appendix B.1. Kodiak Management Area red king crab management plan as of 5/15/86.

The management plan for the 1986 Kodiak red king crab season is outlined in this report. The procedures outlined in this document are designed to inform reviewers of the steps management plans on taking during this upcoming season to meet current management objectives. These objectives are as follows:

1. Maintain maximum reproductive potential of the stocks when the population of female animals is depressed.

2. When reproductive needs are met, conduct the harvest to meet the policies developed by the Board of Fisheries as outlined in 5AAC 34.080 and the Policy on King Crab Resource Management. These policies state that the objective of management is to maintain stable yields, even if some losses on maximum physical yield occur.

To meet these objectives, thresholds of relative abundance indices of female animals for each of the Kodiak area stocks have been developed. Thresholds are defined as abundance level indicators of depressed populations of commercial fish species that below which, no season will occur. No action related to the conduct of a commercial fishery should occur which causes these abundance levels to decline. These thresholds are developed for the Kodiak Districts by examination of the relationship of historic fertilized female abundance in a given year to abundances of male animals of a size class from predominantly the parent year of the females. For each stock within the Kodiak area, this threshold has been equated to the mean number fertilized females per pot within that stock as established by pre-season survey. These abundance levels for each fishing district which approximates the stocks for which they are calculated is as follows:

DISTRICT	Fertilized Females/Pot	
Northeast District	3.3	(1.93 Million)*
Southeast District	3.3	(.72 Million)
Southwest District	7.1	(2.28 Million)
Shelikof District	1.5	(.19 Million)

* Approximate total numbers estimated=the catch per pot data reflected in the survey.

-Continued-

If the survey reveals the female abundance indices are below these values, the district will be closed to fishing for that season for that District. This is to insure that handling mortality on the females remains insignificant and accidental overharvest of male animals during the season does not have major risks to the reproductive potential of the stock. (In the unlikely event that a large surplus of males, beyond that which is necessary for reproduction is indicated by the survey, even if the females are below threshold, the data will be reexamined to determine if a season is warranted under these unusual conditions). If the survey indicates abundances of females are above this value but that the population of reproductive crab is depressed, surplus male crab above the minimum legal size limit will be estimated and a quota of pounds of legal male animals will be established for that district. Surplus male crab will be estimated by using sex ratio and size structure information from studies of mating crab in the Kodiak area (Powell, Jones, & Hurd, 1974;Powell, Rothschild, and Buss, 1974). Legal male crab (greater than 7 inches in carapace width) not required for mating will be considered surplus.

If this number is of sufficient magnitude to have a controlled harvest, the season will progress as scheduled. The minimum harvest will depend on the size of the expected fleet participating in the fishery. The season will be closed upon reaching this harvest guideline.

If the population of reproductive animals is at an average or peak abundance, the harvest strategy table from 5AAC 34.080 will be used to determine a quota of legal males to be harvested for each district.

This management plan will be updated with new analysis and survey results annually and will be subject to review by the local Advisory Committee and the Board of Fisheries.

References

Powell, G. C, B. J. Rothschild, and J. Buss. 1974. A Study of King Crab (Paralithodes camtshatica, Tilesius) Brood Stocks, Kodiak Island, Alaska, 1963-1971. Unpublished Manuscript. 30 pp.

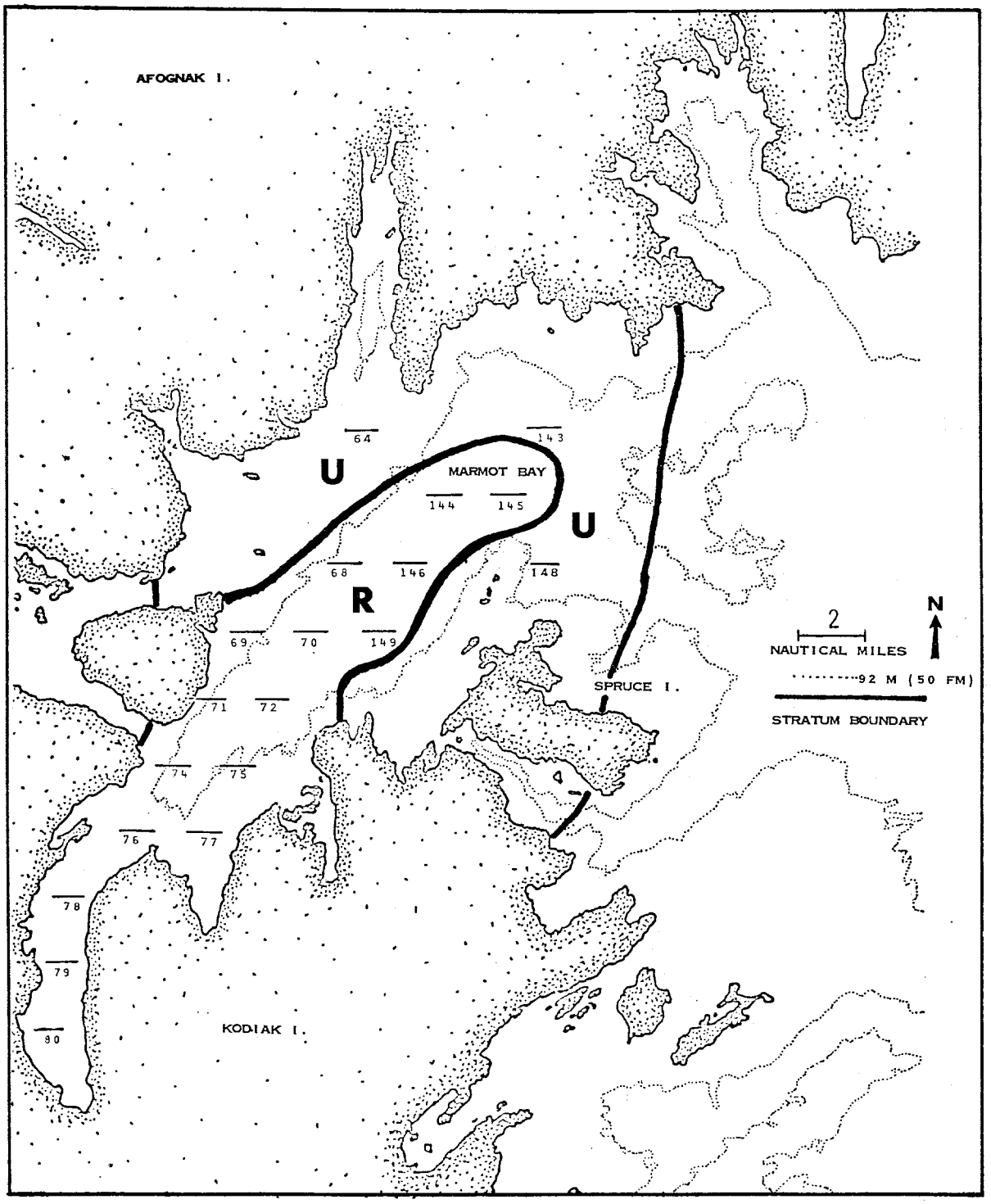
Powell, G. C., K.E. James, and C. L. Hurd. 1974 Ability of male king crab, Paralithodes camtschatica, to mate repeatedly, Kodiak, Alaska, 1973. Natl. Mar. Fish. Service. Fish Bull. 72 (1): 171-179.

Appendix C.1. Stations fished by strata within districts on the 1986 king crab survey, Statisitcal Area K, Kodiak, Alaska.

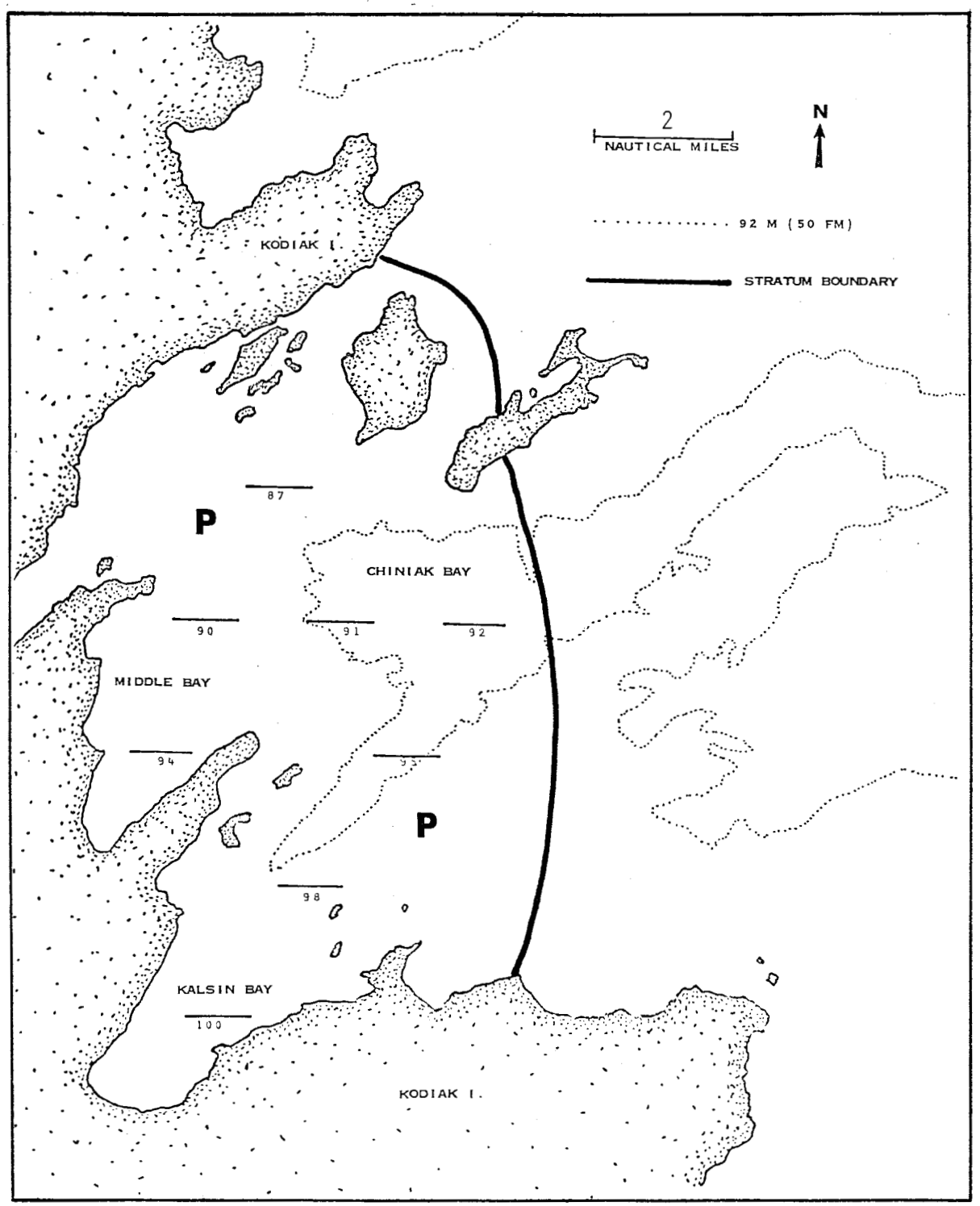
King Crab District	Stratum Code	Stratum Area (nmi^2)	Stations Fished by Stratum
Northeast	N	151	517, 528, 532, 533, 536
"	O	93	150, 151, 152, 153, 154, 155, 156, 157, 158,159, 160
"	P	61	87, 90, 91, 92, 94, 95, 98, 100
"	Q	63	173, 174, 175, 176, 177, 178, 179, 182, 184, 187, 506
"	R	80	68, 69, 70, 71, 72, 74, 75, 76, 77, 78, 79, 80, 144, 145, 146, 149
"	S	405	432, 438, 439, 446, 452, 464, 469, 486, 492, 498, 503, 510, 521
"	T	1,616	347, 349, 365, 379, 394, 407, 422, 424, 437, 453, 407, 422, 424, 437, 453, 470, 470, 475, 487, 491, 513, 523, 542
"	U	121	64, 143, 148
		2,590	
Southeast	H	394	661, 667, 673, 679, 680, 692, 695, 696, 698, 700, 703
"	I	117	636, 637, 643, 1636, 1637, 3636, 4636, 4637
"	J	210	588, 596, 600, 606, 610, 617
"	K	56	109, 110, 111, 112, 113, 114, 115, 118, 119, 120
"	L	47	101, 102, 103, 104, 105, 106, 107, 108
"	M	1,356	580, 585, 593, 601, 603, 611, 623, 625, 638, 649, 651, 662, 666
		2,180	
Southwest	B	455	743, 747, 748, 751, 752, 756, 757, 759, 760, 764, 765, 774, 775, 783, 792, 800
"	C	170	820, 830, 838, 847, 854, 861
"	D	199	823, 832, 840, 841, 849, 856, 1823, 1840, 1841, 1849, 1856, 2832, 2849, 2856, 4832, 4840, 4841, 4849, 4856, 4863, 6832, 6840, 6856, 7832, 8840

-continued-

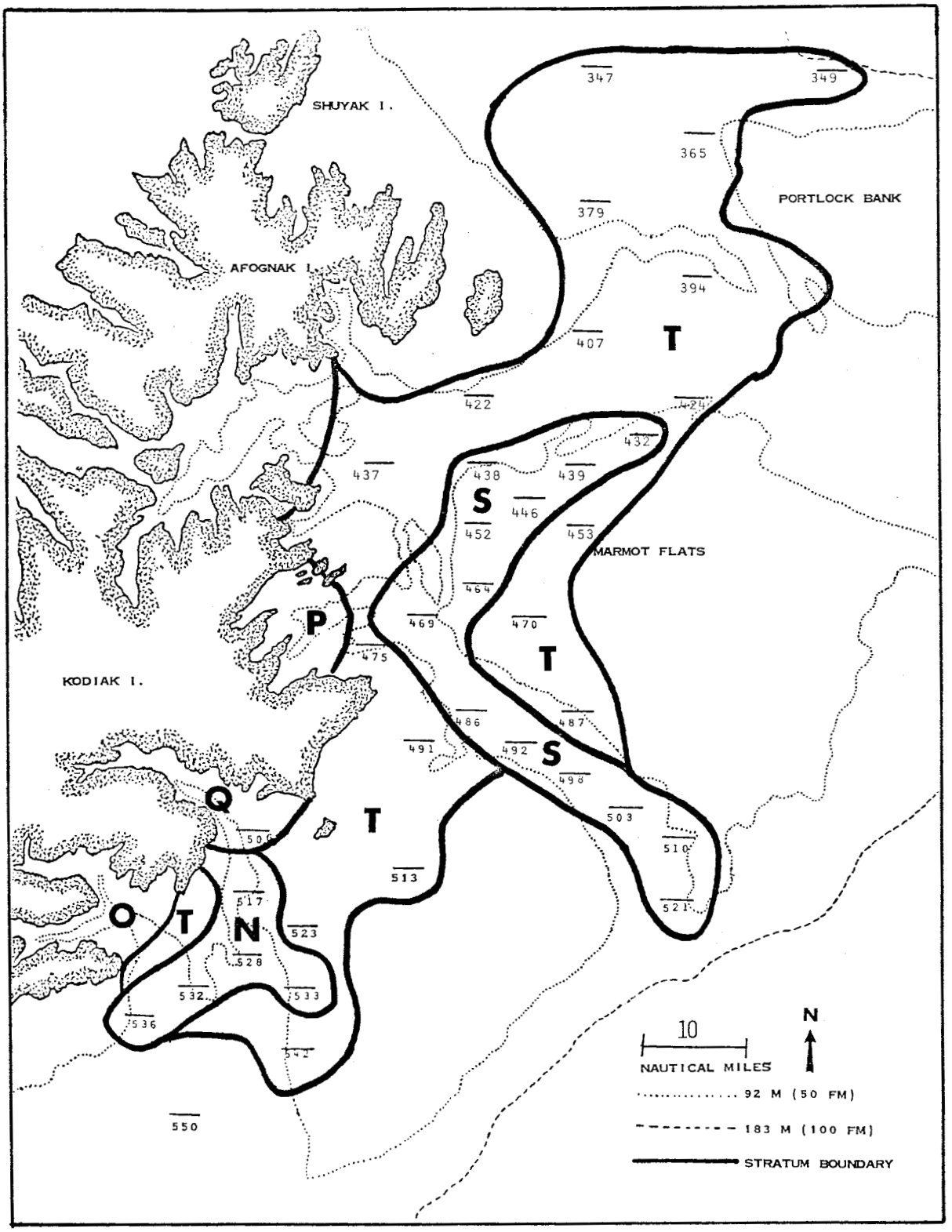
King Crab District	Stratum Code	Stratum Area (nmi^2)	Stations Fished by Stratum
Southwest (cont.)			
	E	110	121, 122, 123, 124, 125, 126, 127, 128, 129, 130
"	F	48	131, 132, 133, 134, 135, 136, 137, 138, 139
"	G	1,032	733, 738, 740, 755, 782, 801, 819, 821, 855, 867, 869, 879
		2,014	
Shelikof	V	76	41, 42, 45, 44, 45, 46, 47, 48, 49, 50, 53, 54, 55, 56
"	W	42	51, 52, 57, 58, 59, 60
"	X	74	192, 194, 195, 196, 200, 202, 204, 206, 209, 211
		192	
TOTALS	23	6,976	251 Stations (115 bay and 136 ocean)



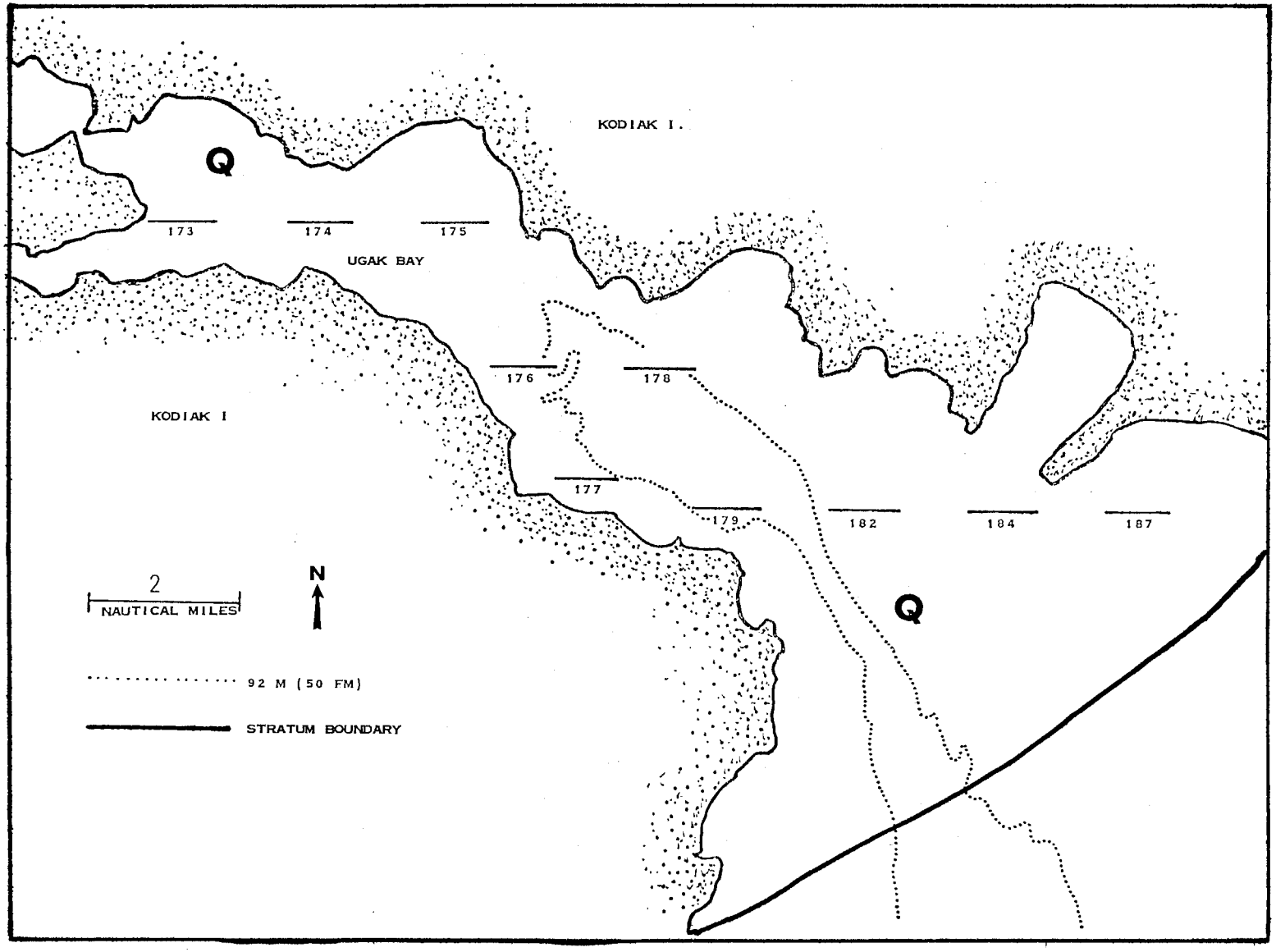
Appendix D.1. Locations of stations fished in Marmot Bay (Northeast District) on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska. (Bold letters are strata designations.)



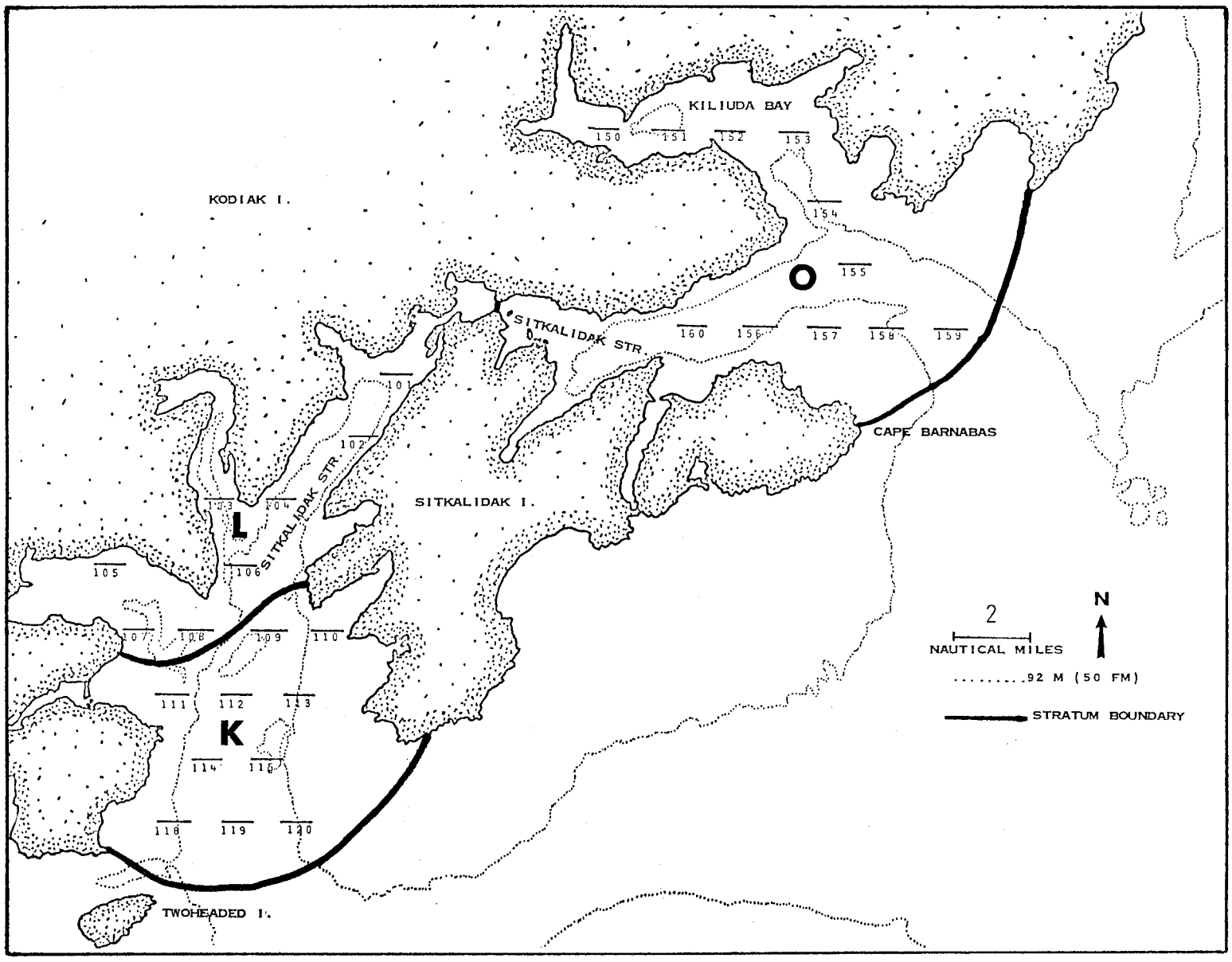
Appendix D.2. Locations of stations fished in Chiniak Bay (Northeast District) on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska. (Bold letters are the stratum's designation.)



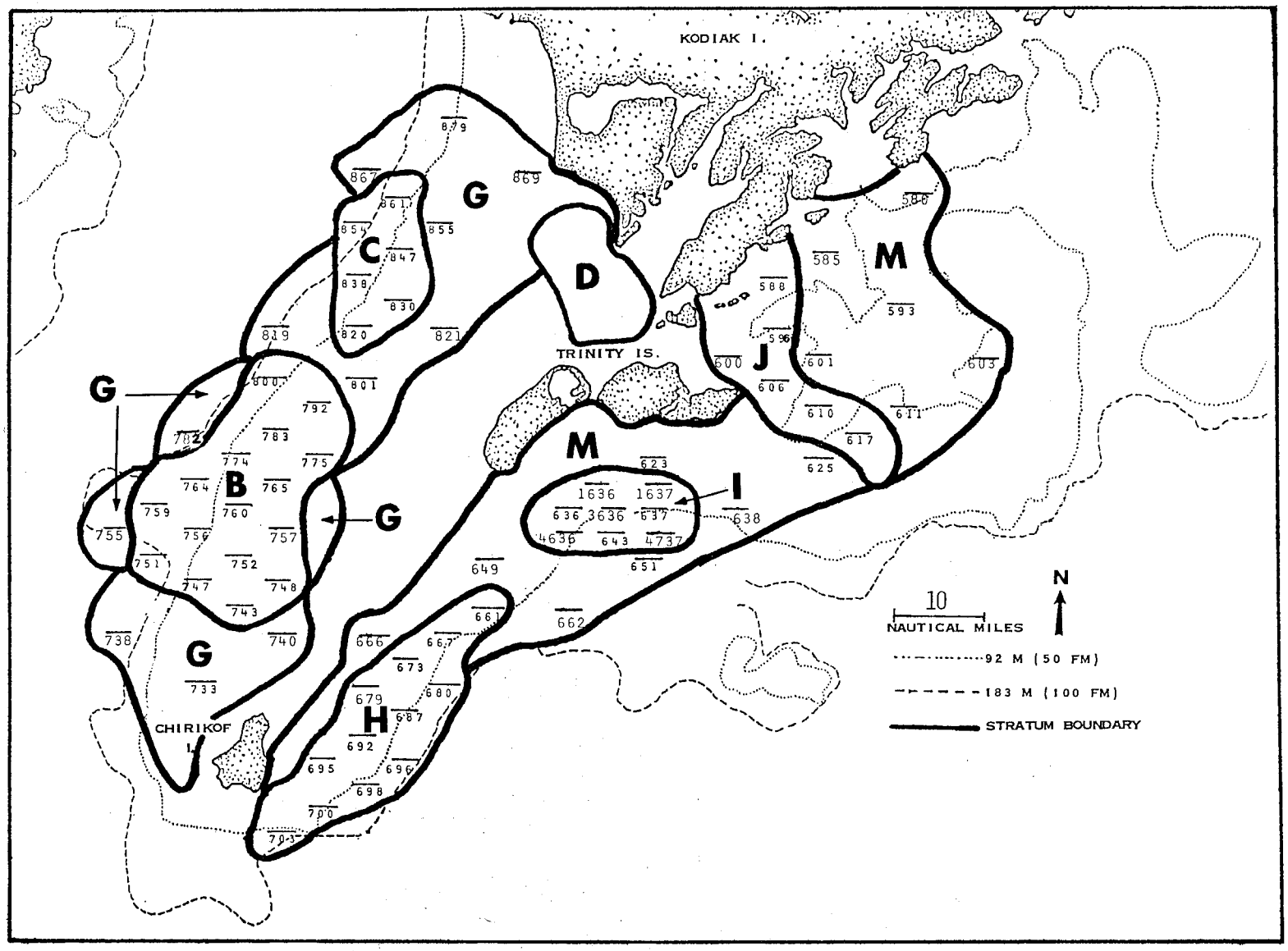
Appendix D.3. Locations of stations fished in the open ocean areas of the Northeast District on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska. (Bold letters are strata designations.)



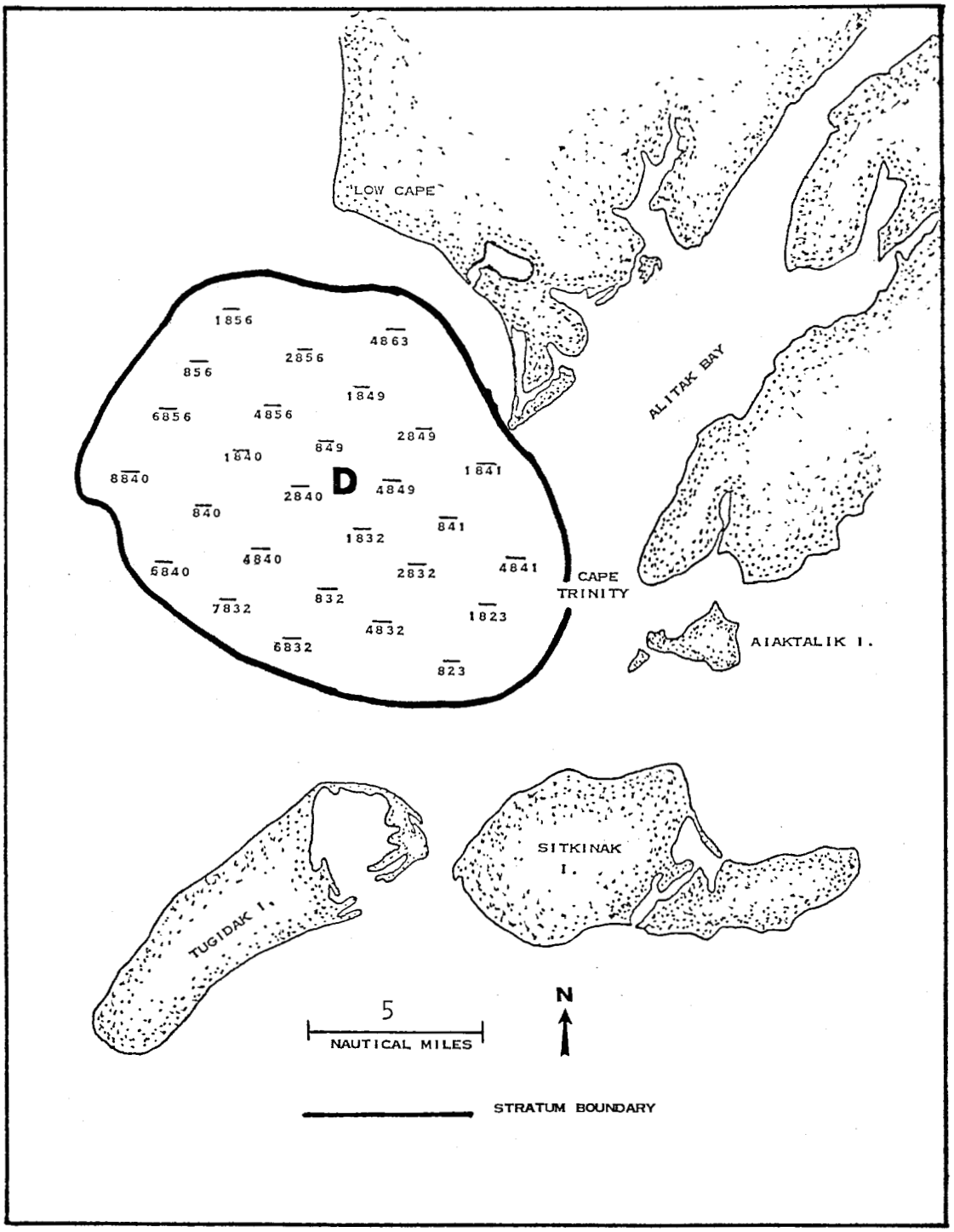
Appendix D.4. Locations of stations fished in Ugak Bay (Northeast District) on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska. (Bold letters are the stratum's designation.)



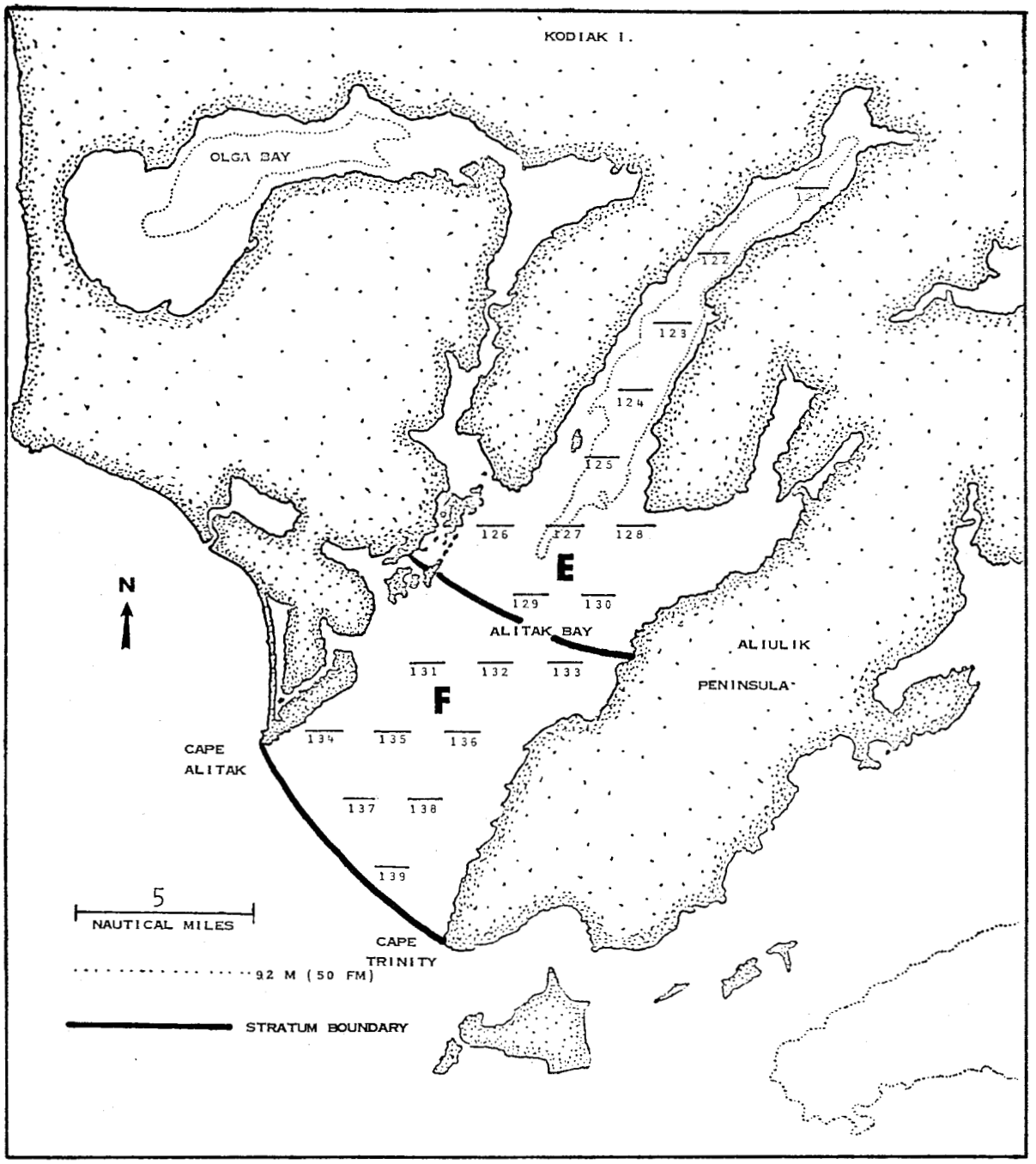
Appendix D.5. Locations of stations fished in Kiliuda Bay (Northeast District) and Sitkalidak Strait (Southeast District) on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska. (Bold letters are strata designations.)



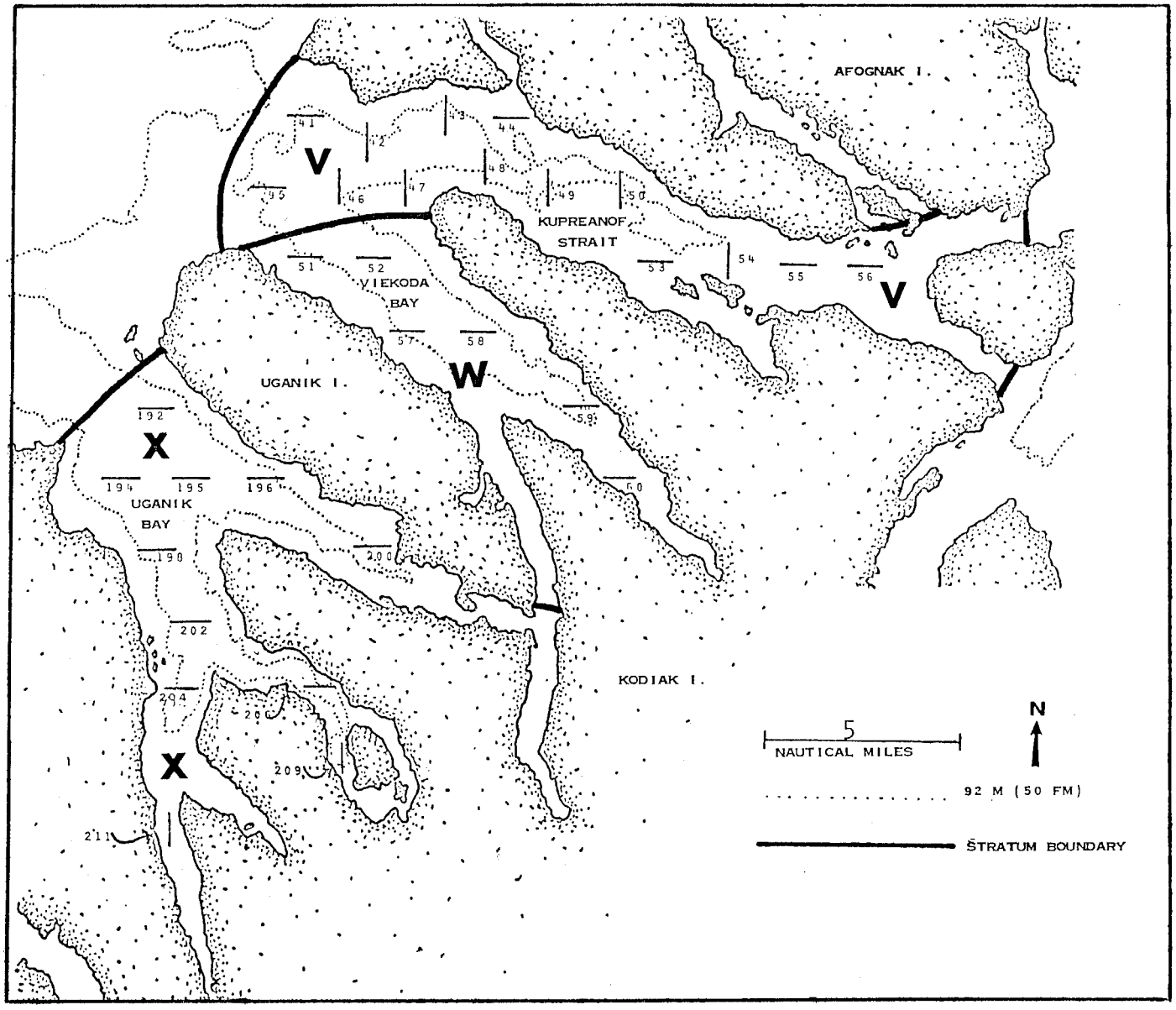
Appendix D.6. Locations of open ocean stations fished in the Southeast and Southwest districts on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska. (Bold letters are strata designations.)



Appendix D.7. Locations of stations fished on Alitak Flats, in stratum D in the Southwest District, on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.



Appendix D.8. Locations of stations fished in Alitak Bay (Southwest District) on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska. (Bold letters are strata designations.)



Appendix D-9. Locations of stations fished in Kupreanof Strait, Viekoda, and Uganik bays (Shelikof District) on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska. (Bold letters are strata designations.)

CRAB DATA FORM

SPECIES _____

SEX _____

VESSEL

DATE + +

STATION NUMBER

POT ORDER

BUOY NUMBER

TRAWL HAUL NUMBER

SAMPLING FACTOR /

PAGE ___

OF ___

	SPECIES	SEX	CARAPACE LENGTH (MM)	LEGAL Y=YES	CARAPACE WIDTH (MM)	SHELL CONDITION	BLACK MAT Y = PRESENT	EGGS: % CLUTCH FULLNESS	EGGS: DEVELOPMENT	EGGS: CLUTCH CONDITION	COMMENTS
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

CODED INSTRUCTIONS

SPECIES
1-L. aequispina
2-P. camtschatica
3-P. platypus
6-C. bairdi
7-C. opilio
9-C. magister

SEX
1-male
2-female

SHELL CONDITION
0-soft
1-new
2-old
3-very old

EGG DEVELOPMENT
1-uneyed eggs
2-eyed eggs

CLUTCH CONDITION
1-dead eggs not apparent
2-dead eggs <20%
3-dead eggs >20%
4-barren with clean "silky" setae
5-barren with "matted" setae, empty egg cases

-note observations of nemertean worms under comments

Appendix E.1. Crab data form used on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

LOCATION _____

VESSEL

DATE ☐☐ - ☐☐ - ☐☐

CRAB AND INCIDENTAL SPECIES DECK LOG

MEASURER _____

RECORDER _____

STATION	BUOY NO.	POT ORDER	KING ♂	KING ♀	TANNER ♂	TANNER ♀	HALIBUT LENGTHS (CM)	NO. HALIBUT	NO. P. COD	NO. SCULPIN	NO. STARFISH	NO. SNAILS	OTHER SPECIES
		1											
		2											
		3											
		1											
		2											
		3											
		1											
		2											
		3											

NOTES: 1) Indicate presence by sex of king and Tanner crab - Y=yes, N=no. Record biological data on crab data form.
2) Record an A (alive, D (dead), or S (skeleton) for each halibut captured.

Appendix E-2. Crab and incidental species deck log form used for three pot stations on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

LOCATION _____ CRAB AND INCIDENTAL MEASURER _____

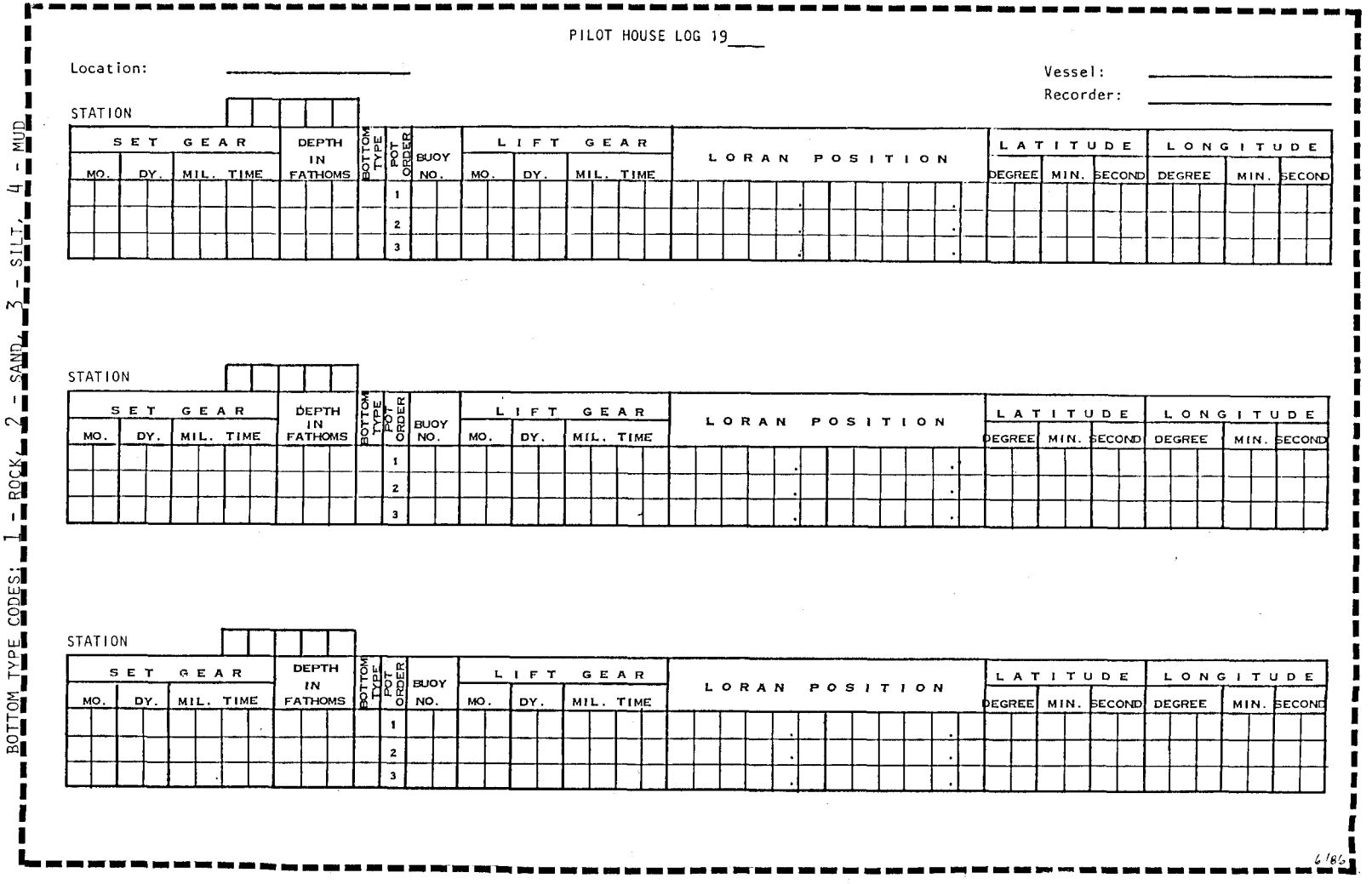
VESSEL SPECIES DECK LOG RECORDER _____

DATE ☐ + + ☐

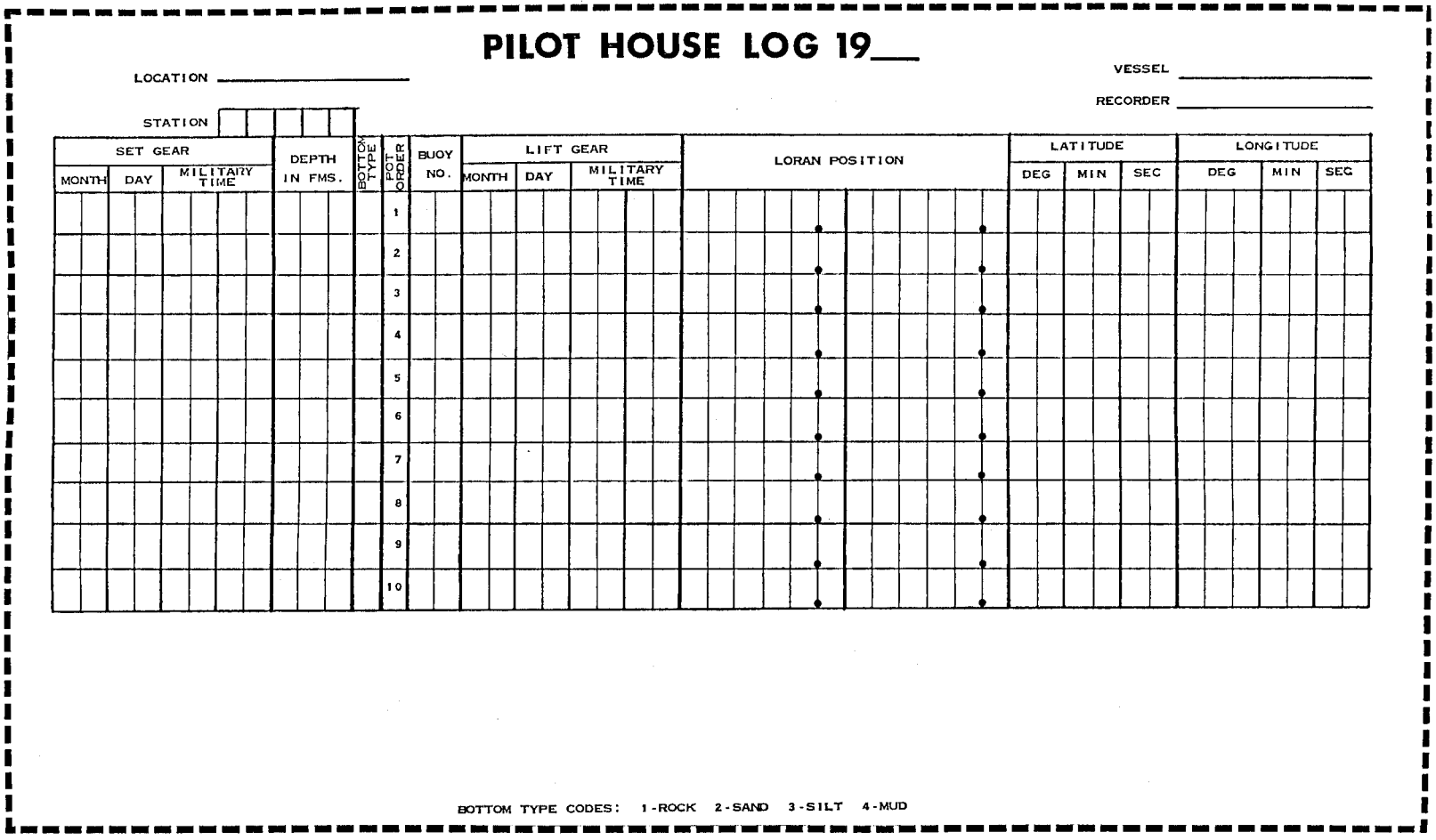
STATION	BUOY NO.	POT ORDER	KING ♂	KING ♀	TANNER ♂	TANNER ♀	HALIBUT LENGTHS (CM)	NO. HALIBUT	NO. P. COD	NO. SCULPINS	NO. STARFISH	NO. SNAILS	OTHER SPECIES
		1											
		2											
		3											
		4											
		5											
		6											
		7											
		8											
		9											
		10											

NOTES: 1) Indicate presence by sex of king and Tanner crab - Y=yes, N=no. Record biological data on crab data form.
2) Record an A (alive), D (dead) or S (skeleton) for each halibut captured.

Appendix E.3. Crab and incidental species deck log form used for 10 pot stations on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.



Appendix E.4. Pilot house log form used for three pot stations on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.



Appendix E.5. Pilot house log form used for 10 pot stations on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

DAILY STATION SUMMARY 198__

LOCATION _____ RECORDER _____

VESSEL _____ PAGE _____

STATION	SET GEAR		LIFT GEAR		NO. POT LIFTS	MALE KINGS		FEMALE KINGS		MALE TANNERS		FEMALE TANNERS		NO. HALI-BUT	NO. COD-FISH	CALL-IN
	MO.	DAY	MO.	DAY		LEGAL	SUBLEG.	MATURE	JUV.	LEGAL	SUBLEG.	MAT.	JUV.			

Appendix E.6. Daily station summary form used on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

Appendix F.1. Catch by station of red king crabs on the 1986 king crab survey, Statistical Area K, Kodiak, Alaska.

Stratum	Station	Latitude Deg Min	Longitude Deg Min	Depth Meters Min Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Legals Ones	Males Legals Recruits	Males Legals Postrecruits
Northeast District															
N	517	57 16.79	152 30.76	77- 80	08-05-86	3	15.8	0	0	0	0	0	0	0	0
N	528	57 11.00	152 30.77	92-104	08-05-86	3	15.5	0	0	0	0	0	0	0	0
N	532	57 8.20	152 39.27	104-141	08-03-86	3	124.7	0	0	0	0	0	0	0	0
N	533	57 8.20	152 20.93	73- 75	08-05-86	3	15.7	0	0	0	0	0	0	0	0
N	536	57 5.20	152 48.67	128-137	08-03-86	3	124.4	0	0	0	0	0	0	0	0
O	150	57 18.26	153 6.38	53- 60	08-04-86	3	15.2	0	0	0	0	0	0	0	0
O	151	57 18.40	153 2.69	84- 93	08-04-86	3	15.4	0	0	0	0	0	0	0	0
O	152	57 18.40	152 58.92	33- 82	08-04-86	3	15.7	0	23	0	0	0	0	0	0
O	153	57 18.40	152 55.50	60- 84	08-04-86	3	16.0	0	10	0	0	0	0	0	0
O	154	57 16.37	152 53.51	79- 93	08-04-86	3	16.3	0	36	0	0	0	0	0	0
O	155	57 14.36	152 51.56	110-117	08-04-86	3	16.6	0	1	0	0	0	0	0	0
O	156	57 12.44	152 57.18	84-123	08-04-86	3	16.8	0	0	0	0	0	0	0	0
O	157	57 12.44	152 53.59	31- 66	08-04-86	3	16.9	0	0	0	0	0	0	0	0
O	158	57 12.44	152 49.96	44- 81	08-04-86	3	17.1	0	0	0	0	0	0	0	0
O	159	57 12.44	152 46.28	130-137	08-04-86	3	17.4	0	0	0	0	0	0	0	0
O	160	57 12.44	153 0.70	115-119	08-04-86	3	16.5	0	0	0	0	0	0	0	0
P	87	57 45.00	152 22.60	26- 59	08-18-86	3	18.5	0	0	0	0	0	0	0	0
P	90	57 43.00	152 24.48	27- 40	08-18-86	3	18.9	0	0	0	0	0	0	0	0
P	91	57 43.00	152 20.78	93-123	08-18-86	3	18.2	0	132	0	0	1	0	0	0
P	92	57 43.00	152 16.91	137-141	08-18-86	3	17.5	1	0	1	1	20	64	41	9
P	94	57 41.00	152 25.63	16- 20	08-18-86	3	17.3	0	0	0	0	0	0	0	0
P	95	57 41.00	152 18.81	53-134	08-18-86	3	17.2	0	0	0	0	0	0	0	0
P	98	57 39.00	152 22.00	31- 84	08-18-86	2	17.3	0	0	0	0	0	0	0	0

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Appendix F.1. (p 2 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Legals Ones	Males Legals Recruits	Males Legals Postrecruits
P	100	57	37.00	152	23.92	13	38	08-18-86	3	17.3	0	0	0	0	0	0	0	0
Q	173	57	29.00	152	51.68	75	75	08-06-86	2	15.8	0	0	0	0	0	0	0	0
Q	174	57	29.00	152	48.08	49	88	08-06-86	3	15.9	0	1	0	0	0	0	0	0
Q	175	57	29.00	152	44.38	26	38	08-06-86	3	16.2	0	0	0	0	0	0	0	0
Q	176	57	27.10	152	42.58	84	90	08-06-86	3	16.4	0	0	0	0	0	0	0	0
Q	177	57	25.40	152	40.58	26	90	08-06-86	3	16.6	0	22	0	0	0	0	0	0
Q	178	57	27.10	152	38.68	95	97	08-06-86	3	16.7	0	0	0	0	0	0	0	0
Q	179	57	25.00	152	36.88	99	99	08-06-86	3	16.9	0	0	0	0	0	0	0	0
Q	182	57	25.00	152	33.89	86	97	08-06-86	2	17.0	0	0	0	0	0	0	0	0
Q	184	57	24.95	152	29.58	31	35	08-06-86	3	17.1	0	0	0	0	0	0	0	0
Q	187	57	25.00	152	25.88	22	31	08-06-86	3	17.2	0	0	0	0	0	0	0	0
Q	506	57	22.50	152	30.77	86	90	08-05-86	3	15.9	0	3	0	0	0	0	0	0
R	68	58	0.05	152	35.93	113	126	08-17-86	3	18.0	0	0	0	0	0	0	0	0
R	69	57	58.04	152	41.23	33	95	08-16-86	3	20.1	0	0	0	0	0	0	0	0
R	70	57	58.04	152	37.94	132	139	08-16-86	3	19.4	0	0	0	0	0	0	0	0
R	71	57	56.05	152	43.35	88	126	08-16-86	2	18.8	0	0	0	0	0	0	0	0
R	72	57	56.05	152	39.88	101	112	08-16-86	3	18.9	0	0	0	0	0	0	0	0
R	74	57	54.05	152	45.53	66	128	08-16-86	3	18.4	0	0	0	0	0	0	0	0
R	75	57	54.05	152	41.68	59	84	08-16-86	3	18.6	0	0	0	0	0	0	0	0
R	76	57	52.05	152	47.45	26	49	08-16-86	3	18.2	0	0	0	0	0	0	0	0
R	77	57	52.05	152	43.70	46	60	08-16-86	3	18.3	0	0	0	0	0	0	0	0
R	78	57	50.05	152	51.02	13	20	08-16-86	3	18.1	0	0	0	0	0	0	0	0
R	79	57	48.05	152	51.61	37	46	08-16-86	3	18.0	0	147	0	0	3	4	0	2
R	80	57	46.05	152	52.33	22	35	08-16-86	3	17.9	0	128	0	0	0	0	0	0
R	144	58	2.05	152	30.53	198	199	08-17-86	3	18.1	0	0	0	0	0	0	0	0
R	145	58	2.05	152	26.72	81	198	08-17-86	3	17.9	0	0	0	0	0	0	0	0

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Appendix F.1. (p 3 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Legals Ones	Males Legals Recruits	Males Legals Postrecruits
R	146	58	0.05	152	32.35	187	201	08-17-86	3	17.3	0	0	0	0	0	0	0	0
R	149	57	58.04	152	34.15	148	161	08-16-86	3	18.8	0	4	0	0	0	0	0	0
S	432	58	1.57	151	21.95	84	90	08-09-86	3	16.1	0	0	0	0	0	0	0	0
S	438	57	58.52	151	50.13	143	157	08-09-86	3	15.5	0	0	0	0	0	0	0	0
S	439	57	58.52	151	31.76	71	81	08-09-86	3	15.9	0	0	0	0	0	0	0	0
S	446	57	55.52	151	41.32	75	77	08-09-86	3	15.8	0	0	0	0	0	0	0	0
S	452	57	52.50	151	50.50	62	68	08-09-86	3	15.4	0	0	0	0	0	0	0	0
S	464	57	46.40	151	50.87	55	57	08-08-86	3	23.8	0	0	0	0	0	0	0	0
S	469	57	43.50	152	0.88	104	121	08-08-86	3	20.2	0	0	0	0	0	0	0	0
S	486	57	34.49	151	51.61	161	163	08-07-86	3	16.0	0	0	0	0	0	0	0	0
S	492	57	31.49	151	42.28	161	168	08-07-86	3	16.1	0	0	0	0	0	0	0	0
S	498	57	28.50	151	33.42	135	150	08-07-86	3	16.0	0	0	0	0	0	0	0	0
S	503	57	25.50	151	24.16	170	176	08-07-86	3	15.8	0	0	0	0	0	0	0	0
S	510	57	22.50	151	15.09	86	88	08-07-86	3	15.6	0	0	0	0	0	0	0	0
S	521	57	16.79	151	15.43	130	143	08-07-86	3	15.3	0	0	0	0	0	0	0	0
T	347	58	34.30	151	29.76	163	165	08-10-86	3	16.1	0	0	0	0	0	0	0	0
T	349	58	34.30	150	51.26	168	168	08-10-86	3	16.4	0	0	0	0	0	0	0	0
T	365	58	28.30	151	10.99	97	101	08-10-86	3	16.1	0	0	0	0	0	0	0	0
T	379	58	22.28	151	30.41	146	148	08-10-86	3	16.0	0	0	0	0	0	0	0	0
T	394	58	16.79	151	11.72	110	117	08-10-86	3	16.0	0	0	0	0	0	0	0	0
T	407	58	10.30	151	31.09	113	137	08-11-86	3	15.1	0	0	0	0	0	0	0	0
T	422	58	4.49	151	49.76	121	124	08-11-86	3	14.9	0	0	0	0	0	0	0	0
T	424	58	4.49	151	12.44	108	110	08-09-86	3	16.1	0	0	0	0	0	0	0	0
T	437	57	58.52	152	9.36	168	174	08-11-86	3	14.9	0	0	0	0	0	0	0	0
T	453	57	52.50	151	32.09	55	62	08-09-86	3	16.1	0	0	0	0	0	0	0	0
T	470	57	43.50	151	41.80	55	59	08-08-86	3	23.5	0	0	0	0	0	0	0	0

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Appendix F.1. (p 4 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Prerecruits Ones	Males Legals Recruits	Males Legals Postrecruits
T	475	57	40.52	152	9.76	60	97	08-08-86	3	18.5	0	0	0	0	0	0	0	0
T	487	57	34.49	151	33.09	66	66	08-07-86	3	16.3	0	0	0	0	0	0	0	0
T	491	57	31.49	152	1.42	59	66	08-07-86	3	15.8	0	0	0	0	0	0	0	0
T	513	57	19.50	152	1.97	71	71	08-03-86	3	112.5	0	0	0	0	0	0	0	0
T	523	57	14.00	152	20.85	75	77	08-05-86	3	15.9	0	0	0	0	0	0	0	0
T	542	57	2.20	152	21.00	115	130	08-03-86	3	123.4	0	0	0	0	0	0	0	0
T	550	56	56.20	152	39.27	148	150	08-03-86	3	123.9	0	0	0	0	0	0	0	0
U	64	58	4.00	152	35.15	27	53	08-17-86	2	17.7	0	0	0	0	0	0	0	0
U	143	58	4.00	152	24.83	203	216	08-17-86	3	18.5	0	0	0	0	0	0	0	0
U	148	58	0.05	152	24.92	81	150	08-17-86	3	16.2	0	0	0	0	0	0	0	0
Totals									250		0	507	1	1	24	68	41	11
Southeast District																		
H	661	56	8.20	154	45.23	95	97	07-05-86	3	16.2	0	0	0	0	0	0	0	0
H	661	56	8.20	154	43.43	88	101	07-13-86	10	17.8	0	0	0	0	0	0	0	0
H	667	56	5.20	154	54.14	71	81	07-05-86	3	16.1	0	0	0	0	0	0	0	0
H	667	56	5.20	154	52.35	59	95	07-13-86	10	17.1	0	0	0	0	0	0	0	0
H	673	56	2.20	155	3.23	55	57	07-05-86	3	17.5	0	0	0	0	0	0	0	0
H	673	56	2.20	155	1.44	44	62	07-13-86	10	16.5	0	0	0	0	0	0	0	0
H	679	55	59.20	155	11.78	42	46	07-05-86	3	16.4	0	0	0	0	0	0	0	0
H	679	55	59.20	155	9.99	42	53	07-12-86	10	18.0	0	0	0	0	0	0	0	0
H	680	55	59.20	154	53.97	148	154	07-05-86	3	16.3	0	0	0	0	0	0	0	0

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Appendix F.1. (p 5 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Legals Ones	Males Legals Recruits	Males Legals Postrecruits
H	680	55	59.20	154	52.19	139	165	07-12-86	10	17.6	0	0	0	0	0	0	0	0
H	687	55	56.17	155	3.01	92	102	07-05-86	3	16.1	0	0	0	0	0	0	0	0
H	687	55	56.17	155	1.22	75	121	07-12-86	10	16.9	0	0	0	0	0	0	0	0
H	692	55	53.20	155	11.44	49	60	07-04-86	3	16.9	0	0	0	0	0	0	0	0
H	692	55	53.20	155	9.65	51	75	07-12-86	10	16.3	0	0	0	0	0	0	0	0
H	695	55	50.20	155	19.69	62	68	07-04-86	3	16.9	0	0	0	0	0	0	0	0
H	695	55	50.20	155	17.91	51	68	07-11-86	10	19.6	0	0	0	0	0	0	0	0
H	696	55	50.20	155	2.78	121	126	07-04-86	3	16.7	0	0	0	0	0	0	0	0
H	696	55	50.20	155	0.99	115	143	07-11-86	10	16.4	0	0	0	0	0	0	0	0
H	698	55	47.20	155	11.15	112	113	07-04-86	3	16.6	0	0	0	0	0	0	0	0
H	698	55	47.20	155	9.37	102	117	07-11-86	10	17.3	0	0	0	0	0	0	0	0
H	700	55	44.10	155	19.37	102	113	07-04-86	3	16.3	0	0	0	0	0	0	0	0
H	700	55	44.10	155	17.60	77	121	07-11-86	10	18.0	0	0	0	0	0	0	0	0
H	703	55	41.20	155	28.48	115	123	07-04-86	3	16.2	0	0	0	0	0	0	0	0
H	703	55	41.20	155	26.70	104	126	07-11-86	10	18.6	0	0	0	0	0	0	0	0
I	636	56	20.20	154	28.07	48	49	07-06-86	3	15.9	0	0	0	0	0	0	0	0
I	636	56	20.20	154	26.27	46	51	07-15-86	9	18.7	0	0	0	0	0	0	0	1
I	637	56	20.20	154	10.17	79	81	07-06-86	3	16.2	0	0	0	0	0	0	0	0
I	637	56	20.20	154	8.82	77	81	07-15-86	9	24.1	0	0	0	0	0	0	0	0
I	643	56	17.20	154	18.92	93	95	07-06-86	3	15.9	0	0	0	0	0	0	0	2
I	643	56	17.20	154	17.12	93	95	07-15-86	9	17.8	0	1	0	0	0	0	0	3
I	1636	56	23.20	154	23.25	27	27	07-15-86	3	20.6	0	0	0	0	0	0	0	0
I	1637	56	23.20	154	9.77	57	59	07-15-86	3	20.8	0	0	0	0	0	0	0	0
I	3636	56	20.20	154	19.13	60	66	07-15-86	3	20.3	0	0	0	0	0	0	0	0
I	4636	56	17.21	154	27.78	75	79	07-15-86	3	19.1	0	0	0	0	0	0	0	0
I	4637	56	17.20	154	9.63	95	97	07-15-86	3	20.7	0	0	0	0	0	0	0	0

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Appendix F.1. (p 6 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Prerecruits Ones	Males Legals Recruits	Males Legals Postrecruits
J	588	56	47.20	153	43.27	73	75	07-08-86	3	22.0	0	0	0	0	0	0	0	0
J	588	56	47.20	153	41.44	46	77	07-18-86	10	19.7	0	0	0	0	0	0	0	0
J	596	56	41.20	153	43.17	128	135	07-07-86	3	17.6	0	0	0	0	0	0	0	0
J	596	56	41.20	153	41.35	119	132	07-18-86	10	19.2	0	0	0	0	0	0	0	0
J	600	56	38.20	153	52.05	77	81	07-07-86	3	17.4	0	0	0	0	0	0	0	0
J	600	56	38.20	153	50.23	55	70	07-18-86	10	17.9	0	0	0	0	0	0	0	0
J	606	56	35.15	153	43.07	79	97	07-07-86	3	17.2	0	0	0	0	0	0	0	4
J	606	56	35.15	153	41.26	68	99	07-17-86	10	18.8	0	264	0	0	0	0	1	18
J	610	56	32.09	153	34.07	130	135	07-07-86	3	16.3	0	0	0	0	0	0	0	0
J	610	56	32.09	153	32.26	104	150	07-16-86	10	16.9	0	0	0	0	0	0	0	0
J	617	56	29.20	153	25.27	88	93	07-07-86	3	16.3	0	0	0	0	0	0	0	0
J	617	56	29.20	153	23.46	88	101	07-16-86	10	21.1	0	0	0	0	0	0	0	0
K	109	57	3.10	153	25.51	115	132	07-10-86	3	18.4	0	0	0	0	0	0	0	0
K	110	57	3.10	153	21.94	38	102	07-10-86	3	18.5	0	2	0	0	0	0	0	0
K	111	57	1.06	153	30.98	71	81	07-09-86	3	21.3	0	0	0	0	0	0	0	0
K	112	57	1.06	153	27.29	117	119	07-09-86	3	21.5	0	0	0	0	0	0	0	0
K	113	57	1.06	153	23.62	59	102	07-09-86	3	21.6	0	5	0	0	0	0	0	0
K	114	56	59.09	153	29.08	126	128	07-09-86	3	21.1	0	0	0	0	0	0	0	0
K	115	56	59.06	153	25.43	68	102	07-09-86	3	21.2	0	0	0	0	0	0	0	0
K	118	56	57.15	153	30.85	49	130	07-09-86	3	20.4	0	0	0	0	0	0	0	0
K	119	56	57.15	153	27.34	135	137	07-09-86	3	20.8	0	0	0	0	0	0	0	0
K	120	56	57.15	153	23.89	57	99	07-09-86	3	20.9	0	0	0	0	0	0	0	0
L	101	57	10.90	153	18.16	27	57	07-10-86	3	19.3	0	0	0	0	0	0	0	0
L	102	57	8.96	153	19.98	121	123	07-10-86	3	19.1	0	0	0	0	0	0	0	0
L	103	57	7.10	153	28.38	26	106	07-10-86	3	18.8	0	0	0	0	0	0	0	0
L	104	57	7.00	153	24.68	97	121	07-10-86	3	18.9	0	0	0	0	0	0	0	0

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Appendix F.1. (p 7 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Prerecruits Ones	Males Legals Recruits	Males Legals Postrecruits
L	105	57	5.10	153	34.48	16	42	07-09-86	3	20.9	0	0	0	0	0	0	0	0
L	106	57	5.03	153	26.99	108	117	07-10-86	3	18.7	0	0	0	0	0	0	0	0
L	107	57	3.10	153	32.78	35	106	07-09-86	3	20.8	0	0	0	0	0	0	0	0
L	108	57	3.10	153	29.08	73	95	07-10-86	3	18.2	0	0	0	0	0	0	0	0
M	580	56	56.20	153	16.26	42	64	07-08-86	3	22.2	0	0	0	0	0	0	0	0
M	580	56	56.20	153	14.43	33	70	07-18-86	10	20.9	0	0	0	0	0	0	0	0
M	585	56	50.20	153	34.37	73	77	07-08-86	3	22.0	0	0	0	0	0	0	0	0
M	585	56	50.20	153	32.54	59	77	07-18-86	10	20.4	0	0	0	0	0	0	0	0
M	593	56	44.20	153	16.07	130	139	07-07-86	3	17.0	0	0	0	0	0	0	0	0
M	593	56	44.20	153	14.24	117	141	07-17-86	10	17.6	0	0	0	0	0	0	0	0
M	601	56	38.20	153	34.35	88	139	07-07-86	3	17.0	0	0	0	0	0	0	0	0
M	601	56	38.20	153	32.53	77	163	07-17-86	10	18.2	0	0	0	0	0	0	0	0
M	603	56	38.20	152	58.07	77	81	07-07-86	3	16.8	0	0	0	0	0	0	0	0
M	603	56	38.20	152	56.25	73	113	07-17-86	10	16.8	0	0	0	0	0	0	0	0
M	611	56	32.09	153	15.87	90	93	07-07-86	3	16.6	0	0	0	0	0	0	0	0
M	611	56	32.09	153	14.06	90	97	07-17-86	9	16.2	0	0	0	0	0	0	0	0
M	623	56	26.21	154	10.28	31	37	07-06-86	3	16.2	0	1	0	0	0	0	0	0
M	623	56	26.20	154	8.46	35	49	07-16-86	10	16.4	0	0	0	0	0	0	0	0
M	625	56	26.20	153	33.97	84	84	07-07-86	3	16.1	0	0	0	0	0	0	0	0
M	625	56	26.20	153	31.16	81	84	07-16-86	10	20.4	0	0	0	0	0	0	0	0
M	638	56	20.20	153	51.89	92	93	07-06-86	3	16.4	0	0	0	0	0	0	0	0
M	638	56	20.20	153	50.09	88	92	07-16-86	10	17.3	0	0	0	0	0	0	0	0
M	649	56	14.20	154	45.47	40	44	07-05-86	3	16.4	0	0	0	0	0	0	0	0
M	649	56	14.20	154	43.67	40	49	07-13-86	10	18.5	0	0	0	0	0	0	0	0
M	651	56	14.20	154	10.07	130	132	07-06-86	3	16.1	0	0	0	0	0	0	0	0
M	651	56	14.20	154	8.27	126	132	07-14-86	10	16.4	0	0	0	0	0	0	0	0

-Continued-

Stratum	Station	Latitude Deg Min	Longitude Deg Min	Depth Meters Min Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Prerecruits Ones	Males Legals Recruits	Males Legals Postrecruits
M	662	56 8.20	154 27.77	93- 93	07-06-86	3	15.8	0	0	0	0	0	0	0	0
M	662	56 8.20	154 25.98	92-121	07-14-86	10	19.5	0	0	0	0	0	0	0	0
M	666	56 5.20	155 11.99	31- 33	07-05-86	3	15.7	0	0	0	0	0	0	0	0
M	666	56 5.20	155 10.20	31- 38	07-12-86	10	18.9	0	0	0	0	0	0	0	0
			Totals			507		0	273	0	0	0	0	1	28
Southwest District															
B	743	56 8.20	155 38.87	55- 55	07-20-86	3	17.0	0	0	0	0	0	0	0	0
B	747	56 11.20	155 47.41	68- 68	07-20-86	3	16.8	0	0	0	0	0	0	0	0
B	748	56 11.20	155 30.17	51- 51	07-21-86	3	15.5	0	0	0	0	0	0	0	0
B	751	56 14.20	155 56.91	199-209	07-20-86	3	16.7	0	0	0	0	0	0	0	0
B	752	56 14.20	155 39.22	66- 66	07-21-86	3	15.8	0	0	0	0	0	0	0	0
B	756	56 17.20	155 47.85	73- 81	07-21-86	3	15.9	0	0	0	0	0	0	0	0
B	757	56 17.20	155 30.51	53- 57	07-21-86	3	16.9	0	0	0	0	0	0	0	0
B	759	56 20.20	155 57.34	209-214	07-21-86	3	16.1	0	0	0	0	0	0	0	0
B	760	56 20.20	155 39.63	71- 71	07-21-86	3	16.6	0	0	0	0	0	0	0	0
B	764	56 23.20	155 48.27	126-146	07-21-86	3	16.4	0	0	0	0	0	0	0	0
B	765	56 23.20	155 30.77	59- 62	07-21-86	3	16.9	0	0	0	0	0	0	0	0
B	774	56 26.20	155 40.01	81- 86	07-21-86	3	16.6	0	0	0	0	0	0	0	0
B	775	56 26.20	155 21.62	49- 53	07-22-86	3	13.3	0	0	0	0	0	0	0	0
B	783	56 29.20	155 31.19	71- 73	07-22-86	3	15.2	0	0	0	0	0	0	0	0
B	792	56 32.20	155 21.95	64- 66	07-22-86	3	14.6	0	0	0	0	0	0	0	0

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Appendix F.1. (p 9 of 13)

Stratum	Station	Latitude Deg Min	Longitude Deg Min	Depth Meters Min Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Legals Ones	Males Legals Recruits	Males Legals Postrecruits
B	800	56 35.20	155 31.53	156-170	07-22-86	3	14.8	0	0	0	0	0	0	0	0
C	820	56 41.20	155 13.77	77- 81	07-22-86	3	15.6	0	0	0	0	0	0	0	0
C	830	56 44.20	155 4.77	71- 75	07-23-86	3	15.9	0	0	0	0	0	0	0	0
C	838	56 47.20	155 13.95	165-176	07-23-86	3	15.9	0	0	0	0	0	0	0	0
C	847	56 50.20	155 5.07	84- 90	07-23-86	3	16.0	0	0	0	0	0	0	0	0
C	854	56 53.20	155 14.67	225-229	07-23-86	2	16.1	0	0	0	0	0	0	0	0
C	861	56 56.20	155 5.31	161-168	07-23-86	3	16.5	0	0	0	0	0	0	0	0
D	823	56 41.20	154 19.52	24- 26	07-26-86	3	16.9	0	0	0	0	0	0	0	0
D	832	56 44.20	154 28.67	62- 64	07-25-86	3	18.2	0	0	0	0	0	0	0	0
D	840	56 47.20	154 37.86	38- 40	07-24-86	3	16.4	0	0	0	0	0	0	0	0
D	841	56 47.20	154 19.67	51- 51	07-26-86	3	16.6	0	3	0	0	0	0	0	1
D	849	56 50.20	154 28.82	68- 68	07-25-86	3	17.5	0	3	0	0	1	1	11	38
D	856	56 53.20	154 38.05	31- 35	07-24-86	3	15.8	0	0	0	0	0	0	0	0
D	1823	56 43.45	154 17.34	64- 70	07-26-86	3	17.2	0	101	0	0	0	1	36	47
D	1832	56 46.45	154 26.49	60- 60	07-25-86	3	18.4	0	50	0	0	0	1	5	13
D	1840	56 49.45	154 35.64	38- 42	07-24-86	3	16.5	0	0	0	0	0	0	0	0
D	1841	56 49.45	154 17.49	16- 31	07-25-86	3	19.4	0	0	0	0	0	0	0	0
D	1849	56 52.45	154 26.58	40- 55	07-25-86	3	17.4	0	0	0	0	0	0	0	0
D	1856	56 55.45	154 35.87	31- 33	07-24-86	3	15.7	0	0	0	0	0	0	0	0
D	2832	56 44.95	154 21.85	60- 60	07-26-86	3	16.7	0	171	0	1	1	1	1	3
D	2840	56 47.95	154 31.05	57- 60	07-25-86	3	17.7	0	1	0	0	0	0	0	2
D	2849	56 50.95	154 22.13	59- 59	07-25-86	3	18.8	0	79	0	0	0	0	0	3
D	2856	56 53.95	154 31.19	22- 24	07-24-86	3	16.7	0	0	0	0	0	0	0	0
D	4832	56 42.70	154 24.03	20- 22	07-26-86	3	17.0	0	62	0	0	0	0	0	1
D	4840	56 45.70	154 33.30	38- 53	07-25-86	3	17.8	0	0	0	0	0	0	0	0
D	4841	56 45.70	154 15.16	44- 46	07-26-86	3	17.4	0	1	0	0	0	0	0	0

-Continued-

Appendix F.1. (p 10 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Prerecruits Ones	Males Legals Recruits	Males Legals Postrecruits
D	4849	56	48.70	154	24.31	60	64	07-25-86	3	18.4	0	25	0	0	0	0	2	7
D	4856	56	51.70	154	33.42	24	26	07-24-86	3	16.6	0	0	0	0	0	0	0	0
G	4863	56	54.70	154	24.33	15	16	07-25-86	3	17.3	0	0	0	0	0	0	0	0
D	6832	56	41.95	154	30.85	22	22	07-25-86	3	18.1	0	0	0	0	0	0	0	0
D	6840	56	44.95	154	40.09	31	31	07-24-86	3	16.3	0	0	0	0	0	0	0	0
D	6856	56	50.95	154	40.23	48	49	07-24-86	3	15.9	0	0	0	0	0	0	0	0
D	7832	56	43.45	154	35.54	26	26	07-25-86	3	17.9	0	0	0	0	0	0	0	0
D	8840	56	48.70	154	42.41	38	40	07-24-86	3	16.0	0	0	0	0	0	0	0	0
E	121	57	6.85	153	48.96	123	126	07-28-86	3	16.5	0	0	0	0	0	0	0	0
E	122	57	4.90	153	54.18	95	176	07-28-86	3	16.6	0	0	0	0	0	0	0	0
E	123	57	2.90	153	56.29	148	157	07-28-86	3	16.9	0	0	0	0	0	0	0	0
E	124	57	0.95	153	58.13	115	159	07-28-86	3	17.1	0	0	0	0	0	0	0	0
E	125	56	58.94	153	59.98	123	137	07-28-86	3	17.3	0	0	0	0	0	0	0	0
E	126	56	56.95	154	5.48	24	53	07-28-86	3	17.9	0	0	0	0	0	0	0	0
E	127	56	56.95	154	1.69	26	113	07-28-86	3	17.8	0	0	0	0	0	0	0	1
E	128	56	56.95	153	58.18	15	62	07-28-86	3	17.5	0	0	0	0	0	0	0	0
E	129	56	55.00	154	3.93	75	84	07-27-86	3	17.9	0	0	0	0	0	0	1	3
E	130	56	55.00	153	59.98	60	64	07-28-86	3	17.4	0	1	0	0	0	0	0	0
F	131	56	53.00	154	9.14	59	60	07-27-86	3	17.9	0	0	0	0	0	5	6	20
F	132	56	53.00	154	6.14	55	66	07-27-86	3	17.7	0	0	0	0	0	0	1	0
F	133	56	53.00	154	1.86	57	62	07-27-86	3	17.5	0	0	0	0	0	0	0	3
F	134	56	51.00	154	14.38	31	48	07-27-86	3	16.9	0	0	0	0	0	0	0	0
F	135	56	51.00	154	10.96	49	53	07-27-86	3	17.1	0	3	0	1	1	3	20	34
F	136	56	51.00	154	7.29	51	70	07-27-86	3	17.3	0	0	0	0	0	2	3	9
F	137	56	49.03	154	12.80	26	31	07-27-86	3	16.8	0	0	0	0	0	0	0	0
F	138	56	49.05	154	9.09	33	37	07-27-86	3	16.7	0	0	0	0	0	0	0	0

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Appendix F.1. (p 11 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Legals Ones	Males Legals Recruits	Males Legals Postrecruits
F	139	56	47.02	154	10.90	51	62	07-27-86	3	16.5	0	144	0	0	0	1	4	2
G	733	55	59.20	155	46.53	49	55	07-20-86	3	16.2	0	0	0	0	0	0	0	0
G	738	56	5.20	156	5.08	232	234	07-20-86	3	16.1	0	0	0	0	0	0	0	0
G	740	56	5.20	155	29.98	38	40	07-20-86	3	16.5	0	0	0	0	0	0	0	0
G	755	56	17.20	156	5.87	242	245	07-20-86	3	16.3	0	0	0	0	0	0	0	0
G	782	56	29.20	155	48.77	214	220	07-21-86	3	16.8	0	0	0	0	0	0	0	0
G	801	56	35.20	155	13.39	53	55	07-22-86	3	16.2	0	0	0	0	0	0	0	0
G	819	56	41.20	155	31.87	231	232	07-22-86	3	15.1	0	0	0	0	0	0	0	0
G	821	56	41.20	154	55.19	35	37	07-23-86	3	16.0	0	0	0	0	0	0	0	0
G	855	56	53.20	154	55.54	57	62	07-23-86	3	16.5	0	0	0	0	0	0	0	0
G	867	56	59.20	155	14.46	240	245	07-23-86	3	16.3	0	0	0	0	0	0	0	0
G	869	56	59.20	154	38.21	31	33	07-24-86	3	15.7	0	0	0	0	0	0	0	0
G	879	57	5.20	154	55.89	123	137	07-24-86	3	15.5	0	0	0	0	0	0	0	0
					Totals				239		0	644	0	2	3	15	90	187
Shelikof District																		
V	41	58	2.05	153	24.17	82	99	08-14-86	3	17.2	0	0	0	0	0	0	0	0
V	42	58	0.96	153	21.11	37	210	08-14-86	3	16.2	0	0	0	0	0	0	0	0
V	43	58	1.71	153	17.29	81	146	08-14-86	3	16.2	0	0	0	0	0	0	0	0
V	44	58	2.05	153	13.04	33	51	08-15-86	3	16.7	0	0	0	0	0	0	0	0
V	45	58	0.05	153	26.03	84	119	08-14-86	3	16.0	0	0	0	0	0	0	0	0
V	46	57	59.71	153	22.91	84	163	08-14-86	3	16.3	0	0	0	0	0	0	0	0

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Appendix F.1. (p 12 of 13)

Stratum	Station	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	Depth Meters Min	Depth Meters Max	Date Pots Lifted	No. Pots	Mean Soak Hours	--Females- Juv	Females- Adult	Males Prerecruits Fours	Prerecruits Threes	Prerecruits Twos	Prerecruits Ones	Legals Recruits	Legals Postrecruits
V	47	57	59.71	153	19.43	40	97	08-14-86	3	15.8	0	0	0	0	0	0	0	0
V	48	58	0.43	153	15.04	59	137	08-15-86	3	16.6	0	0	0	0	0	0	0	0
V	49	57	59.71	153	11.66	73	82	08-15-86	3	16.8	0	0	0	0	0	0	0	0
V	50	57	59.71	153	8.30	49	99	08-15-86	3	16.9	0	0	0	0	0	0	0	0
V	53	57	58.04	153	5.14	33	70	08-15-86	3	17.1	0	0	0	0	0	0	0	0
V	54	57	58.04	153	2.06	73	90	08-15-86	2	17.3	0	0	0	0	0	0	0	0
V	55	57	58.04	152	57.84	53	57	08-15-86	3	17.5	0	0	0	0	0	0	0	0
V	56	57	58.04	152	54.23	29	33	08-15-86	3	17.7	0	0	0	0	0	0	0	0
W	51	57	58.04	153	24.17	16	179	08-14-86	3	15.6	0	0	0	0	0	0	0	0
W	52	57	58.04	153	20.39	154	168	08-14-86	3	14.9	0	0	0	0	0	0	0	0
W	57	57	56.05	153	18.55	73	148	08-14-86	3	15.3	0	0	0	0	0	0	0	0
W	58	57	56.05	153	14.83	113	137	08-14-86	3	15.2	0	0	0	0	0	0	0	0
W	59	57	54.05	153	9.47	55	95	08-14-86	3	14.9	0	7	0	1	3	2	0	0
W	60	57	52.05	153	7.39	40	66	08-14-86	3	15.1	0	0	0	0	0	0	0	0
X	192	57	54.00	153	31.37	135	174	08-13-86	3	19.7	0	0	0	0	0	0	0	0
X	194	57	52.05	153	33.17	73	168	08-13-86	3	21.8	0	0	0	0	0	0	0	0
X	195	57	52.05	153	29.47	161	183	08-13-86	3	22.1	0	0	0	0	0	0	0	0
X	196	57	52.05	153	25.67	102	156	08-13-86	3	22.4	0	0	0	0	0	0	0	0
X	198	57	50.00	153	31.27	106	183	08-13-86	3	19.0	0	0	0	0	0	0	0	0
X	200	57	50.00	153	20.70	66	113	08-13-86	2	21.4	0	12	0	0	1	1	1	1
X	202	57	48.00	153	29.47	145	165	08-13-86	3	18.9	0	0	0	0	0	0	0	0
X	204	57	45.90	153	30.64	71	150	08-13-86	3	18.8	0	0	0	0	0	0	0	0

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Stratum	Station	Latitude Deg Min	Longitude Deg Min	Depth Meters Min Max	Date Pots Lifted	No. Pots	Mean Soak Hours	Females Juv	Females Adult	Males Prerecruits Fours	Males Prerecruits Threes	Males Prerecruits Twos	Males Legals Ones	Males Legals Recruits	Males Legals Postrecruits
X	206	57 45.90	153 23.14	73-110	08-13-86	3	18.5	0	0	0	0	0	0	0	0
X	209	57 43.77	153 22.50	93-104	08-13-86	3	18.3	0	3	0	1	1	0	1	1
X	211	57 41.87	153 31.70	59- 68	08-13-86	3	18.6	0	0	0	0	0	0	0	0
			Totals			91		0	22	0	2	5	3	2	2
			Survey Grand Totals			1,087		1	1,442	1	5	32	86	134	228

Note: Latitude and longitude readings given in Appendix F are from ADF&G's list calculated in the office and given to the skipper as a guide where to set the stations. The skippers did not record where they set the pots, since they used this list as a guide. Therefore the actual latitude and longitude readings of where the pots were fished probably varied slightly from the readings reported above.

Appendix G.1. Length frequency of red king crabs by shell age captured in the Northeast District on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

Carapace Length (mm)	Females			Males			
	All Juv	New Shell Adult	Total	New Shell	Old Shell	Very Old Shell	Total
83 - 84	0	0	0	0	0	0	0
85 - 86	0	0	0	0	0	0	0
87 - 88	1	0	1	0	0	0	0
89 - 90	0	0	0	0	0	0	0
91 - 92	0	0	0	1	0	0	1
93 - 94	0	0	0	0	0	0	0
95 - 96	0	0	0	0	0	0	0
97 - 98	0	0	0	0	0	0	0
99 -100	0	0	0	0	0	0	0
101 -102	0	0	0	0	0	0	0
103 -104	0	0	0	0	0	0	0
105 -106	0	0	0	0	0	0	0
107 -108	0	1	1	0	0	0	0
109 -110	0	0	0	0	0	0	0
111 -112	0	0	0	1	0	0	1
113 -114	0	0	0	3	0	0	3
115 -116	0	2	2	1	0	0	1
117 -118	0	3	3	1	0	0	1
119 -120	0	2	2	0	0	0	0
121 -122	0	6	6	6	0	0	6
123 -124	0	8	8	1	0	0	1
125 -126	0	15	15	2	0	0	2
127 -128	0	6	6	4	0	0	4
129 -130	0	16	16	6	0	0	6
131 -132	0	22	22	9	0	0	9
133 -134	0	25	25	6	0	0	6
135 -136	0	49	49	8	0	0	8
137 -138	0	34	34	4	0	0	4
139 -140	0	43	43	10	0	0	10
141 -142	0	49	49	11	0	0	11
143 -144	0	37	37	7	0	0	7
145 -146	0	58	58	7	0	1	8
147 -148	0	25	25	10	0	0	10
149 -150	0	29	29	8	0	0	8
151 -152	0	14	14	10	0	0	10
153 -154	0	21	21	4	0	0	4

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Appendix G.1. (p 2 of 2)

Carapace Length (mm)	Females			Males			
	All New Shell			New Shell	Old Shell	Very Old Shell	Total
	Juv	Adult	Total				
155 -156	0	7	7	5	0	0	5
157 -158	0	9	9	1	0	0	1
159 -160	0	5	5	4	0	0	4
161 -162	0	7	7	2	0	1	3
163 -164	0	3	3	2	0	0	2
165 -166	0	5	5	1	0	0	1
167 -168	0	0	0	3	1	0	4
169 -170	0	2	2	0	0	0	0
171 -172	0	0	0	1	0	0	1
173 -174	0	0	0	2	0	0	2
175 -176	0	0	0	2	0	0	2
Totals	1	503	504	143	1	2	146

Appendix G.2. Length frequency of red king crabs by shell age captured in the Southeast District on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

Carapace Length (mm)	Females			Males			
	All Juv	New Shell Adult	Total	New Shell	Old Shell	Very Old Shell	Total
95 - 96	0	1	1	0	0	0	0
97 - 98	0	0	0	0	0	0	0
99 -100	0	0	0	0	0	0	0
101 -102	0	0	0	0	0	0	0
103 -104	0	0	0	0	0	0	0
105 -106	0	0	0	0	0	0	0
107 -108	0	0	0	0	0	0	0
109 -110	0	0	0	0	0	0	0
111 -112	0	0	0	0	0	0	0
113 -114	0	0	0	0	0	0	0
115 -116	0	0	0	0	0	0	0
117 -118	0	0	0	0	0	0	0
119 -120	0	0	0	0	0	0	0
121 -122	0	0	0	0	0	0	0
123 -124	0	0	0	0	0	0	0
125 -126	0	2	2	0	0	0	0
127 -128	0	4	4	0	0	0	0
129 -130	0	3	3	0	0	0	0
131 -132	0	21	21	0	0	0	0
133 -134	0	39	39	0	0	0	0
135 -136	0	36	36	0	0	0	0
137 -138	0	41	41	0	0	0	0
139 -140	0	36	36	0	0	0	0
141 -142	0	23	23	0	0	0	0
143 -144	0	27	27	0	0	0	0
145 -146	0	13	13	0	0	0	0
147 -148	0	8	8	0	0	0	0
149 -150	0	11	11	1	1	0	2
151 -152	0	3	3	0	0	0	0
153 -154	0	0	0	0	0	0	0
155 -156	0	3	3	0	0	0	0
157 -158	0	1	1	0	0	0	0
159 -160	0	1	1	0	0	0	0
161 -162	0	0	0	0	5	0	5
163 -164	0	0	0	0	3	0	3
165 -166	0	0	0	0	0	1	1

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Appendix G.2. (p 2 of 2)

Carapace Length (mm)	Females			Males			
	All Juv	New Shell Adult	Total	New Shell	Old Shell	Very Old Shell	Total
167 -168	0	0	0	1	1	0	2
169 -170	0	0	0	1	1	0	2
171 -172	0	0	0	0	1	0	1
173 -174	0	0	0	0	1	1	2
175 -176	0	0	0	0	2	1	3
177 -178	0	0	0	1	4	0	5
179 -180	0	0	0	0	1	0	1
181 -182	0	0	0	0	0	0	0
183 -184	0	0	0	0	0	0	0
185 -186	0	0	0	0	0	0	0
187 -188	0	0	0	0	0	0	0
189 -190	0	0	0	0	0	0	0
191 -192	0	0	0	0	0	0	0
193 -194	0	0	0	1	0	0	1
195 -196	0	0	0	1	0	0	1
Totals	0	273	273	6	20	3	29

Appendix G.3. Length frequency of red king crabs by shell age captured in the Southwest District on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

Carapace Length (mm)	Females			Males			
	All New Shell			New Shell	Old Shell	Very Old Shell	Total
	Juv	Adult	Total				
95 - 96	0	0	0	1	0	0	1
97 - 98	0	0	0	0	0	0	0
99 -100	0	0	0	0	0	0	0
101 -102	0	0	0	0	0	0	0
103 -104	0	0	0	1	0	0	1
105 -106	0	1	1	0	0	0	0
107 -108	0	0	0	0	0	0	0
109 -110	0	0	0	0	0	0	0
111 -112	0	0	0	0	0	0	0
113 -114	0	0	0	0	0	0	0
115 -116	0	5	5	0	0	0	0
117 -118	0	2	2	0	0	0	0
119 -120	0	7	7	0	0	0	0
121 -122	0	9	9	1	0	0	1
123 -124	0	17	17	0	0	0	0
125 -126	0	30	30	1	0	0	1
127 -128	0	24	24	0	0	0	0
129 -130	0	42	42	1	0	0	1
131 -132	0	54	54	1	0	0	1
133 -134	0	83	83	0	0	0	0
135 -136	0	76	76	0	0	0	0
137 -138	0	66	66	1	0	0	1
139 -140	0	55	55	0	1	0	1
141 -142	0	55	55	2	0	0	2
143 -144	0	42	42	2	0	0	2
145 -146	0	32	32	6	1	0	7
147 -148	0	21	21	3	1	1	5
149 -150	0	13	13	4	2	1	7
151 -152	0	1	1	5	1	2	8
153 -154	0	4	4	6	3	0	9
155 -156	0	3	3	9	2	1	12
157 -158	0	1	1	14	1	0	15
159 -160	0	1	1	12	2	4	18
161 -162	0	0	0	16	6	1	23
163 -164	0	0	0	21	11	2	34
165 -166	0	0	0	21	0	5	26

-Continued-

Appendix G.3. (p 2 of 2)

Carapace Length (mm)	Females			Males			
	All New Shell			New Shell	Old Shell	Very Old Shell	Total
	Juv	Adult	Total				
167 -168	0	0	0	12	8	2	22
169 -170	0	0	0	13	2	2	17
171 -172	0	0	0	13	3	1	17
175 -176	0	0	0	16	0	0	16
177 -178	0	0	0	9	0	0	9
179 -180	0	0	0	6	2	1	9
181 -182	0	0	0	3	2	1	6
183 -184	0	0	0	4	0	0	4
185 -186	0	0	0	2	0	0	2
187 -188	0	0	0	0	0	0	0
189 -190	0	0	0	0	0	0	0
191 -192	0	0	0	0	0	0	0
193 -194	0	0	0	0	0	0	0
195 -196	0	0	0	0	0	0	0
Totals	0	644	644	225	48	24	297

Appendix G.4. Length frequency of red king crabs by shell age captured in the Shelikof District on the 1986 king crab survey in Statistical Area K, Kodiak, Alaska.

Carapace Length (mm)	Females			Males			
	All Juv	New Shell Adult	Total	New Shell	Old Shell	Very Old Shell	Total
105 -106	0	1	1	0	0	0	0
107 -108	0	0	0	0	0	0	0
109 -110	0	0	0	0	0	0	0
111 -112	0	1	1	2	0	0	2
113 -114	0	2	2	0	0	0	0
115 -116	0	0	0	0	0	0	0
117 -118	0	0	0	1	0	0	1
119 -120	0	0	0	1	0	0	1
121 -122	0	0	0	1	0	0	1
123 -124	0	1	1	0	0	0	0
125 -126	0	0	0	0	0	0	0
127 -128	0	0	0	1	0	0	1
129 -130	0	0	0	1	0	0	1
131 -132	0	0	0	0	0	0	0
133 -134	0	1	1	0	0	0	0
135 -136	0	0	0	1	0	0	1
137 -138	0	0	0	0	0	0	0
139 -140	0	3	3	1	0	0	1
141 -142	0	2	2	0	0	0	0
143 -144	0	2	2	1	0	0	1
145 -146	0	0	0	0	0	0	0
147 -148	0	4	4	0	0	0	0
149 -150	0	1	1	0	0	0	0
151 -152	0	1	1	0	0	0	0
153 -154	0	1	1	1	0	0	1
155 -156	0	0	0	1	0	0	1
157 -158	0	1	1	0	0	0	0
159 -160	0	0	0	0	0	0	0
161 -162	0	0	0	0	0	0	0
163 -164	0	0	0	0	0	0	0
165 -166	0	1	1	0	0	0	0
167 -168	0	0	0	0	0	0	0
169 -170	0	0	0	1	0	0	1
171 -172	0	0	0	0	0	0	0
173 -174	0	0	0	0	0	0	0
175 -176	0	0	0	0	0	0	0

-Continued-

Appendix G.4. (p 2 of 2)

Carapace Length (mm)	Females			Males			
	All Juv	New Shell Adult	Total	New Shell	Old Shell	Very Old Shell	Total
177 -178	0	0	0	0	0	0	0
179 -180	0	0	0	1	0	0	1
181 -182	0	0	0	0	0	0	0
183 -184	0	0	0	0	0	0	0
185 -186	0	0	0	0	0	0	0
187 -188	0	0	0	0	0	0	0
189 -190	0	0	0	0	0	0	0
191 -192	0	0	0	0	0	0	0
193 -194	0	0	0	0	0	0	0
195 -196	0	0	0	0	0	0	0
Totals	0	22	22	14	0	0	14

Appendix G.5. Length frequency of all red king crabs by shell age captured on the 1986 king crab survey,in Statistical Area K, Kodiak, Alaska.

Carapace Length (mm)	Females			Males			
	All	New Shell		New	Old	Very	
	Juv	Adult	Total	Shell	Shell	Old Shell	Total
83 - 84	0	0	0	0	0	0	0
85 - 86	0	0	0	0	0	0	0
87 - 88	1	0	1	0	0	0	0
89 - 90	0	0	0	0	0	0	0
91 - 92	0	0	0	1	0	0	1
93 - 94	0	0	0	0	0	0	0
95 - 96	0	1	1	1	0	0	1
97 - 98	0	0	0	0	0	0	0
99 -100	0	0	0	0	0	0	0
101 -102	0	0	0	0	0	0	0
103 -104	0	0	0	1	0	0	1
105 -106	0	2	2	0	0	0	0
107 -108	0	1	1	0	0	0	0
109 -110	0	0	0	0	0	0	0
111 -112	0	1	1	3	0	0	3
113 -114	0	2	2	3	0	0	3
115 -116	0	7	7	1	0	0	1
117 -118	0	5	5	2	0	0	2
119 -120	0	9	9	1	0	0	1
121 -122	0	15	15	8	0	0	8
123 -124	0	26	26	1	0	0	1
125 -126	0	47	47	3	0	0	3
127 -128	0	34	34	5	0	0	5
129 -130	0	61	61	8	0	0	8
131 -132	0	97	97	10	0	0	10
133 -134	0	148	148	6	0	0	6
135 -136	0	161	161	9	0	0	9
137 -138	0	141	141	5	0	0	5
139 -140	0	137	137	11	1	0	12
141 -142	0	129	129	13	0	0	13
143 -144	0	108	108	10	0	0	10
145 -146	0	103	103	13	1	1	15
147 -148	0	58	58	13	1	1	15
149 -150	0	54	54	13	3	1	17
151 -152	0	19	19	15	1	2	18
153 -154	0	26	26	11	3	0	14
155 -156	0	13	13	15	2	1	18

-Continued-

Appendix G.5. (p 2 of 2)

Carapace Length (mm)	Females			Males			
	All Juv	New Shell Adult	Total	New Shell	Old Shell	Very Old Shell	Total
157 -158	0	12	12	15	1	0	16
159 -160	0	7	7	16	2	4	22
161 -162	0	7	7	18	11	2	31
163 -164	0	3	3	23	14	2	39
165 -166	0	6	6	22	0	6	28
167 -168	0	0	0	16	10	2	28
169 -170	0	2	2	15	3	2	20
171 -172	0	0	0	14	4	1	19
173 -174	0	0	0	21	1	1	23
175 -176	0	0	0	18	2	1	21
177 -178	0	0	0	10	4	0	14
179 -180	0	0	0	7	3	1	11
181 -182	0	0	0	3	2	1	6
183 -184	0	0	0	4	0	0	4
185 -186	0	0	0	2	0	0	2
187 -188	0	0	0	0	0	0	0
189 -190	0	0	0	0	0	0	0
191 -192	0	0	0	0	0	0	0
193 -194	0	0	0	1	0	0	1
195 -196	0	0	0	1	0	0	1
Totals	1	1,442	1,443	388	69	29	486

Appendix H.1. Data collected on the 1986 Kodiak king crab survey and stored on microcomputer diskettes at the Alaska Department of Fish and Game office, Kodiak, Alaska.

Data Items

Station Number
Pot Order
Latitude
Longitude
Depth Pots Fished (m)
Bottom Type Pots Set On (rock, sand, silt, mud)

Date Each Pot Set
Month
Day
Military Time

Date Each Pot Lifted
Month
Day
Military Time

Male Red King Crabs
Sublegal or Legal
Carapace Length (mm)
Shell Age (new shell, old shell, very old shell)

Female Red King Crabs
Carapace Length (mm)
Shell Age (new shell, old shell, very old shell)
Percent Clutch Fullness
Egg Development (uneyed, eyed)
Clutch Condition (dead eggs apparent, dead eggs <20%, dead eggs >20%, with clean "silky" setae, barren with "matted" setae - empty egg cases)
Tag Number

Male Tanner Crabs
Sublegal or Legal
Carapace Width (mm)
Shell Age (new shell, old shell, very old shell)
Black Mat Syndrome (present or absent)

-Continued-

Data Items

Female Tanner Crabs
Juvenile or Adult
Carapace Width (mm)
Shell Age (new shell, old shell, very old shell)
Black Mat Syndrome (present or absent)
Percent Clutch Fullness
Egg Development (uneyed, eyed)

Clutch Condition (dead eggs apparent, dead eggs <20%, dead eggs >20%, barrren with clean "silky" setae, barren with "matted" setae - empty egg cases)
Pacific Halibut Fork Length (cm)
Halibut Condition (alive, dead, dead-skeleton)
Number of Pacific Cod

MISCELLANEOUS SPECIES (Number and species recorded)

Fish
Sculpins (includes primarily Irish lords Hemilepidotus spp. and great and plain sculpins Myoxocephalus spp.)
Sablefish (Anoplopoma fimbria)
Rockfish (Sebates spp.)
Walleye Pollock (Therga chalcogramma)
Arrowtooth Flounder (Artheresthes stomias)
Flathead Sole (Hipploglossoides elassodon)
Sand Sole (Psttichtys melanostictus)
Lemon Sole (Pleuronectes quadritubercularus)
Greenling (Hexagrammus spp.)
Lingcod (Ophiodon elongatus)
Founder (not identified to species)
Spiny Dogfish (Squalus acanthias)
Skate (not identified to species)

Crabs
Brown or Golden King Crab (Lithodes aequispina) data recorded on crab form, Appendix D.1.

-Continued-

Data Items

Red King Crab and Tanner Crab (crabs which are outside of pot hanging onto the web when the pot is brought to the surface are termed "riders" are not recorded as part of the measured catch)
Dungeness Crab (Cancer magister) (sex and carapace width mm)

Cancer Crab (Cancer sp.)
Hermit Crabs (Pagurus spp.)

Echinoderms
Seastars (not identified to species, but the majority of them are the sun flower star, Pycnopodia helianthodies)
Sandollars (not identified to species)
Sea Urchins (not identified to species)

Molluscs
Octopus (Octopus dofleini)
Snails (not identified to species, but Frusitrition oregonensis is the most common)
Scallops (not identified to species)
Rock Jingle (Pododesmus macroschisma)

Jellyfish (not identified to species)

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