

Norton Sound Winter Red King Crab Studies
1990

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Introduction

This winter king crab project began in February of 1982 with sampling procedures standardized in 1983. Sampling procedures and the results of past winter studies were documented by Schwarz and Lean (1982, 1983, 1984), Lean and Brannian (1986), Lean (1987), and Bue and Lean (1990). Renewed interest in the offshore gold dredging in the vicinity of popular subsistence crabbing areas, along with the incorporation of additional crab research projects, has increased the scope of the winter study.

In past years the study area was restricted to a narrow section of ice, oriented straight offshore from the Nome State office building and extending 1/2 to 2 miles out. In 1989, the area was expanded to 6 miles west of Nome in the vicinity of recent dredging and 6 miles east of Nome where there is very little subsistence crabbing effort. Shorefast and sea ice conditions are constantly changing and vary from one location to another. The entire 1988 season had been missed due to unstable ice beyond the 25 foot isobath. With the increased study area, not only are mining and subsistence issues addressed, the chance of a missed season as a result of poor ice conditions is reduced.

Objectives

The primary objective of the project since 1982 has been to monitor nearshore distribution and abundance of king crab during the months of highest local use. Secondary objectives included: testing of new tag types, tagging for growth and frequency of molting estimates, establishing a size distribution for estimating recruitment, monitoring rates of recapture in study pots, monitoring crab migration and determining the time of mating through examining female crab shell age and egg development. An additional objective for 1990 included the collection of newly settled king crab in order to document distribution during first benthic stages. Monitoring of the relationship between the distribution and abundance of crab, and dredging, increased as the study area expanded.

Methods

Study Area

During the 1983 study four permanent fishing stations were established at various depths so that the distribution of crab in nearshore waters could be evaluated (Figure 1). Station one was approximately one-half mile from shore and in water measuring 20 feet in depth from the working surface of the ice to the ocean floor. Stations two, three and four were approximately 0.75, 1.25 and 2 miles offshore in depths of 42, 50, and 60 feet respectively. Depths were checked using a weighted string before establishing a station. Proper location along the shore was determined by aligning the middle White Alice tower with the stack on top of the post office. Since 1983 attempts have been made to locate test spots as closely to these sites as possible so that results would be comparable.

Test sites were expanded and modified in 1989 and 1990 (Figure 2). In 1989 and 1990 only stations 2 and 3 were utilized due to the changed project design and

they were renamed Nome 2 and Nome 3 respectively. In 1989 three new test sites were established. Two stations were placed approximately 6 miles west of Nome, labeled West 1 and West 2, with water depths of 40 and 50 feet respectively. The location of station West 1 was at the intersection of three rays. One ray was line of sight along the major mountain ridge between Bowhead and Willow Creeks. Another was along the Anvil Mountain west ridge. The third ray was the alignment of a rock outcropping, near the Teller Road between Penny River and Sunset Creek, with the 1270 foot peak directly north. Station West 2 was located due south of West 1 along the third alignment. Another station was located approximately 6 miles east of Nome in alignment with the V.O.R. transmitter and the White Alice tower out to a depth of 39 feet. The site was labeled East 1. These stations, in addition to a new one (East 2) located east of town and approximately one half mile farther offshore from East 1 in 50 feet of water, were fished in 1990.

Test Fishing

Throughout the history of the project the same crab pot design has been used. The pots were purchased at "Arc 'n' Spark Welding, Inc." in Kodiak, Alaska. The shape of the pot is a truncated cone with a base diameter of 4 feet and top diameter of 24 inches, with a height of roughly 24 inches. The entrance is 16-18 inches in diameter located in the center of the top and there is a 6-8 inch plastic collar hanging from the entrance to keep crab from escaping.

Standardized baiting of pots was conducted so that differing catches between stations would not be attributed to the amount of bait used but rather to differences in the abundance of crab at each station. Two, one quart bait containers of chopped herring and a string of 10 saffron cod were put in each pot, each time they were sampled. Bait was thawed before use, although it occasionally became partially refrozen before it could be put into the pot. The herring used was commercial quality bait purchased from a floating processor during the summer commercial crab fishery. Some of the saffron cod were caught in the early fall and stored frozen until used.

A slip knot was tied in the line while lowering the pot so that when the pot was set the knot was about 6 feet below the surface. In this way it could be determined if the pot had been checked by unauthorized people. The slip knot had a second function which was to provide some slack in the line so that the pot would not be lifted off the bottom if the ice heaved. If the knot was found untied but the surface of the hole was frozen smooth, the ice had probably heaved. Robbed pots were noted and excluded from the CPUE calculations.

The following is a summary of the sampling procedure; detailed instructions on how the catch was processed are given in the operational plan. Pots were brought near the surface and suspended so that all the crab in the pot were covered with about a foot of water. Crab were removed individually, placed in a heated shed, measured, shell age was determined, egg development was noted on females, and up to 16 crab larger than 90 mm were tagged with hog ring tags and elastrator bands. Crab were then released through the same hole that the pot was suspended in. On the average, crab spent less than 10 seconds exposed to the outside air temperature, which ranged from -25 F to +35 F. When the eggs were not clearly in the eyed condition, samples were taken in order to assess egg development.

Uneyed eggs were also collected to analyze size and development in comparison to that of Bristol Bay.

Catch per unit effort (CPUE) was calculated in the form of catch per pot lift. CPUE was not standardized by accounting for differences in fishing time because the effectiveness of bait is thought to drop off rapidly with time. The rapid deterioration of the bait can be further accelerated due to consumption by captured crab or sand fleas. An attempt to standardize fishing methods and minimize the effect of fishing time has been made since 1983. Bait has been standardized so that variations between pots has been minimized and an effort was made to check the pots twice each week on non-adjacent days. Due to the difficulty of standardizing CPUE, catch per pot lift was considered a sufficiently good index of crab abundance for an abundance indexing program.

Results

Test Fishing

A total of 2076 male and 18 female red king crab were captured in 99 pot lifts from February 14 through April 26, 1990 (Table 1). The average pot lift caught 21.0 male and 0.2 female crab. The mean catch per pot lift by station was 25.3, 15.6, 21.5, 19.0, 18.6, and 27.2 for stations N2, N3, W1, W2, E1, and E2 respectively (Table 2). Station E2 had the highest mean male catch rate, followed by N2, while station N3 had the lowest catch rate. Station N2 had the highest female catch rate and W2 the lowest. Appendix Tables 1-6 present each station's daily catch. Hog ring tags were attached to 867 healthy newshell male crab over 90 mm carapace length.

Catch Sampling

A total of 2076 male crab were measured for carapace length and categorized by shell condition with 49.4% being sublegals and 50.6% legals (Table 3). The overall average carapace length was 104 mm. Of the 1051 legal male crab captured, 48.7% were recruits and 51.3% were post recruits. The average carapace length of legal crab was 115 mm. Of the 1025 sublegal male crab captured, 67.9% were pre-recruit ones and 32.1% were pre-recruit twos. The average sublegal carapace length was 92 mm.

Of the total catch, 16, 33, 25, and 26 percent were pre-recruit twos, pre-recruit ones, recruits, and post-recruits respectively. A total of 89% of the males captured were new shell. Sixty two percent (538) of the tagged crab were legal size and 38% (329) were sublegal.

A total of 0.9% of the total catch was female and those 18 were measured as to the percent fullness of egg clutch and egg stage (Table 4). Slightly more than half of the females had eyed eggs and the remainder uneyed (purple), while 61% of the specimens had a 90-100% clutch size. All females had eggs. The mean carapace length of females was 83 mm.

Juvenile Crab

No juvenile red king crab were captured in any of the three traps used. Dates and locations fished, as well as incidental catches, are shown in Table 5.

Tag Recoveries

A total of 3 crab tagged during the 1990 winter study were recaptured at ADF&G fishing stations. In each case, the recovery station was that one closest to the release station. Subsistence and commercial fishermen returned 16 tags from the 1990 winter study and 3 from the 1989 winter study (up to the time of this report).

Subsistence Monitoring

An aerial survey of the shorefast ice off the coast of Nome was flown on March 12 to document the amount of fishing effort on red king crab by local users (Appendix B). Approximately 100 pots and 83 handlines were estimated to be in use by observations of active fishing sites.

Discussion

The 1990 winter crab study had a higher than average catch rate of male red king crab. This year's catch rate exceeded the previous 3 years, but lagged behind the 3 years before that (Table 6). The catch rate of females was again low in this year's test sample. The 1990 winter catch of male crab had an average carapace length similar to that of the two previous winter studies (104mm as compared with 104 in 1987 and 105 in 1989). Prior to 1987 lengths had ranged from 94 to 99mm. Attempts to capture juveniles were unsuccessful in all three varieties of traps.

An examination of the winter test fish data from a succession of cohorts passing from one age class to the next, year by year, suggests little correlation between cohort size from one year to the next (Tables 7 and 8). An example of this is the cohort which was composed of prerecruit ones in 1989 and which were recruits in 1990. This cohort made up only 15% of the study catch in 1989 and was the smallest recorded percentage of prerecruit ones. The subsequent 1990 recruit population would have been expected to have made up a noticeably smaller than average percentage of the test catch. In actuality it made up 25% of the catch - well above the 1983 to 1989 average percentage of recruits. It seems likely that this lack of correlation is a result of the very narrow subsample that the winter test catch provides and that it is too limited and variable a sample to provide a reliable estimation of the sex and age structure of the king crab population in this area. The winter test fishery serves largely as an index of abundance of nearshore crab during the season of heaviest local commercial and subsistence use and is a valuable tool for this purpose and for the collection of other biological information useful in the management of this fishery.

The summer sampling also samples only a limited segment of the population. It takes place aboard commercial vessels restricted to areas further offshore than the winter subsistence use area and tries to target areas where the larger legal

males are found in greatest abundance and avoid areas with large concentrations of sublegal males and females. The larger post-recruits tend to be caught in disproportionately higher numbers than recruits during the summer commercial fishery, especially since the closure of the near shore waters to summer commercial fishing (Table 9). There appears to be no correlation between the percentages of recruit/postrecruit observed in the winter study compared with those observed in the following summer commercial season. Currently there is no reliable cost effective method for determining population sex and age structure.

Future Investigations

Attempts will be made in future studies to develop reliable capture methods to sample juvenile crab in the nearshore area. This will help expand our knowledge of this little studied, less mobile and probably more vulnerable age group. This is particularly important in light of additional offshore mining leases in the Norton Sound area. Tagging will continue in order to better monitor migration patterns and to examine molt growth rates. Winter abundance indexes will also continue in order to monitor the availability of king crab to the winter subsistence fishery.

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Table 1. Norton Sound winter king crab study, 1990. Daily catch totals for all stations combined (N2,N3,W1,W2,E1,E2).

Date	No. pots lifted	No. males captured	No. females captured	Avg male catch per pot lift	Cum males captured	Cum avg per pot
02/14	2	63	0	31.5	63	31.5
02/16	2	89	1	44.5	152	38.0
02/20	2	72	0	36.0	224	37.3
02/21	2	74	0	37.0	298	37.2
02/22	2	5	0	2.5	303	30.3
02/23	2	11	0	5.5	314	26.2
02/27	1	33	0	33.0	347	26.7
02/28	2	71	2	30.5	418	29.9
03/01	2	54	0	27.0	472	27.8
03/06	4	144	2	36.0	616	29.3
03/08	4	39	0	9.8	655	26.2
03/12	4	145	2	36.2	800	27.6
03/19	4	152	1	38.0	952	28.8
03/20	2	52	2	26.0	1004	28.8
03/22	6	90	0	15.0	1094	26.7
03/27	6	185	2	30.8	1279	27.2
03/29	6	54	2	9.0	1333	25.2
04/02	6	76	0	12.7	1409	23.9
04/05	4	76	2	19.0	1485	23.9
04/10	6	148	0	24.5	1633	23.6
04/12	6	53	0	8.7	1686	22.4
04/16	6	131	0	21.8	1817	22.4
04/19	6	79	0	13.2	1896	21.8
04/23	6	90	1	15.0	1986	21.3
04/26	6	90	1	15.0	2076	21.0
Total	99	2076	18	21.0	2076	21.0

Table 2. Comparison of Norton Sound winter king crab catches by station, 1990.

Station	No. pot lifts	No. males captured	Avg male catch per pot lift	No. females captured	Avg female catch per pot lift
N2	18	455	25.3	7	0.4
N3	18	281	15.6	3	0.2
W1	19	410	21.5	4	0.2
W2	20	381	19.0	0	0.0
E1	12	223	18.6	3	0.3
E2	12	326	27.2	1	0.1
Total	99	2076	21.0	18	0.2

Table 3. Norton Sound king crab study, 1990.
 Size frequency distribution of male crab captured
 at all fishing stations (N2,N3,W1,W2,E1,E2).

Carapace length (mm)	Number Measured			total	Carapace length (mm)	Number measured			total
	new	old	v. old			new	old	v. old	
prerecruit two or smaller					Legal males				
65-66	1	0	0	1	99-100	6	0	0	6
67-68	0	0	0	0	101-102	34	0	0	34
69-70	2	0	0	2	103-104	68	4	0	72
71-72	2	0	0	2	105-106	81	3	0	84
73-74	4	0	0	4	107-108	64	10	0	72
75-76	9	0	0	9	109-110	77	9	0	86
77-78	12	0	0	12	111-112	67	20	0	87
79-80	17	0	0	17	113-114	63	21	0	85
81-82	41	0	0	41	115-116	52	21	1	74
83-84	43	0	0	43					
85-86	52	0	0	52	Total	512	88	1	601
87-88	91	0	0	91	*old shell male crab between 100-115 mm are post recruits				
89	55	0	0	55					
Total 329 0 0 329					Legal males (post recruits)				
prerecruit one					117-118	47	28	1	76
90	42	0	0	42	119-120	48	23	1	72
91-92	112	0	0	112	121-122	56	23	1	81
93-94	113	0	0	113	123-124	37	12	1	49
95-96	118	0	0	118	125-126	35	9	1	45
97-98	119	0	0	119	127-128	31	12	2	45
99-100	115	0	0	115	129-130	17	7	1	25
101-102	50	0	0	50	131-132	11	5	0	16
103-104	19	0	0	19	133-134	11	0	1	12
105-106	4	0	0	4	135-136	9	2	0	11
107-108	3	0	0	3	137-138	7	2	0	9
109-110	1	0	0	1	139-140	4	1	0	5
					141-142	1	0	0	1
					143-144	2	0	0	3
					145-146	1	0	0	1
Total 696 0 0 696					Total 317 124 9 450				
Sublegal total 1025 0 0 1025					Legal total 829 212 10 1051				
					Grand total 1854 212 10 2076				

Table 4. Norton Sound winter king crab study, 1990.
Egg development and size of females.

Date	Station	Carapace length mm	Clutch size %	Comments
02/16	N3	78	90-100	uneyed eggs
02/28	N3	85	60-89	uneyed eggs
02/28	N2	78	60-89	uneyed eggs
03/06	N2	80	90-100	eyed eggs
03/06	W1	82	60-89	uneyed eggs
03/12	N2	79	90-100	eyed eggs
03/12	N2	85	60-89	uneyed eggs
03/19	E1	93	90-100	eyed eggs
03/20	N2	72	60-89	eyed eggs
03/20	N2	85	90-100	eyed eggs
03/27	W1	97	90-100	eyed eggs
03/27	N2	74	30-59	uneyed eggs
03/29	E1	81	90-100	eyed eggs
03/29	N3	70	90-100	eyed eggs
04/05	W1	92	90-100	eyed eggs
04/05	E1	84	60-89	uneyed eggs
04/23	E2	80	90-100	uneyed eggs
04/26	W1	99	90-100	eyed eggs

Table 5. Norton Sound winter king crab study, 1990.
Record of catches from juvenile king crab traps.

Date	Soak time (days)	Station	Gear	Catch/Comments
03/08	2	N3	astro-turf mat	empty-modified with holes
03/20	8	N3	astro-turf mat	many brittle stars (<1" dia.) few large sea stars 2 marine worms
03/22	2	N3	astro-turf mat	same as above
03/27	5	N3	minnow trap	1 coonstripe shrimp (3") (Pandalus hypsinotus)
03/29	2	N3	minnow trap	7 Pandalus(1 at 2"/rest 1-2)
04/02	4	N3	minnow trap	13 Pandalus(1-2 1/2"); 1 soft crab(Hapalogaster grebnitzkii)
04/10	8	N3	mono mesh	2 lyre crab (Hyas sp.); 2 sea stars; 1 sculpin
04/12	2	E2	astro-turf mat	0
04/12	2	N3	mono mesh	1 sculpin; 2 sea stars; 1 urchin
04/12	2	W2	minnow trap	7 Pandalus; 4 urchins; 1 soft crab, 1 Hyas, 1 hermit crab
04/16	4	E1	astro-turf mat	1 marine worm
04/16	4	W2	minnow trap	12 Pandalus; 1 Hyas; 1 soft crab
04/16	4	N3	mono mesh	10 sea stars
04/19	3	W2	minnow trap	15 Pandalus; 1 soft crab

Table 6. Norton Sound winter king crab study, 1990. Comparison of winter king crab catches by year, 1983-1990.

Year	No. pot lifts	No. Males captured	Av. Male catch per pot lift	No. females captured	Av. Female catch per pot lift
1982 ¹	60	246	4.1	10	0.2
1983	107	2586	24.0	236	2.0
1984	70	1677	24.0	78	1.1
1985	31	760	24.5	14	0.5
1986	31	594	19.2	74	2.4
1987	26	151	5.8	6	0.2
1988 ²	-	-	-	-	-
1989	42	548	13.1	9	0.2
1990	99	2076	21.0	18	0.2

¹ Fishing stations and baiting techniques were not standardized.

² No data collected for 1988 due to unstable ice conditions.

Table 7. Norton Sound winter king crab study, 1990.
 Comparison of percent pre-recruits, recruits,
 and post-recruits for the years 1983-1990.

Year	Sublegal pre-recruits			Legal post- recruits		
	twos (%)	ones (%)	total (%)	recruits (%)	recruits (%)	total (%)
1983	26	38	64	26	10	36
1984	35	31	66	19	16	35
1985	25	45	70	20	10	30
1986	26	35	61	22	17	39
1987	13	31	44	10	46	56
1988 ¹	-	-	-	-	-	-
1989	27	15	42	27	31	58
1990	16	33	49	25	26	51
Ave. % 1983-1989	25	33	58	21	22	42

¹ No data collected in winter 1988 due to unstable ice conditions.

Table 8. Norton Sound winter king crab study, 1990.
Cohort¹ as a percentage of the population
for the years 1983-1990.

Year	pre-recruits		recruits	post- recruits
	twos (%)	ones (%)		
1983	26	31	20	17
1984	35	45	22	46
1985	25	35	10	-
1986	26	31	-	31
1987	13	-	27	26
1988	-	15	25	-
1989	27	33	-	-
1990	16	-	-	-

¹ Cohort is presented based on the year at which the particular cohort occurred as prerecruit twos. Percentages listed for a cohort as post-recruits are not true percentages for that cohort because they include not only first year post-recruits but all post-recruits.

Table 9. Comparison of percent recruit and post-recruit king crab sampled from the summer commercial fishery and winter research, Norton Sound, 1983-1990.

Year	Winter Research		Summer Commercial	
	Recruits (%)	Post-recruits (%)	Recruits (%)	Post-recruits (%)
1983	73	27	55	45
1984	54	46	59	41
1985	68	32	45	55
1986	55	45	48	52
1987	20	80	22	78
1988 ¹	-	-	-	-
1989	47	53	25	75
1990	49	51	23	77-

¹ No data collected in winter 1988 due to unstable ice conditions.

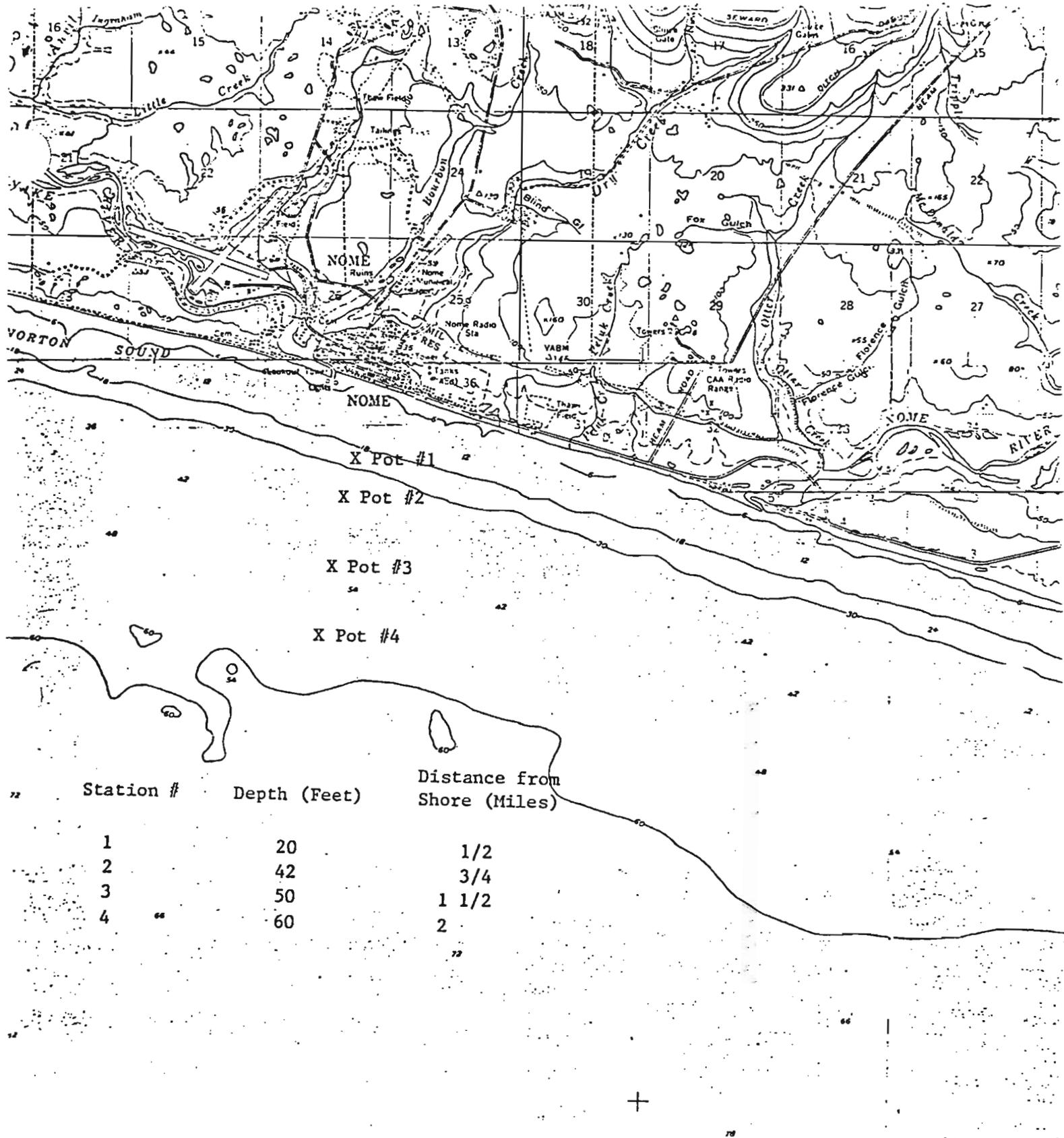


Figure 1. Winter king crab study area and pot locations, Norton Sound Section, 1983-1987.

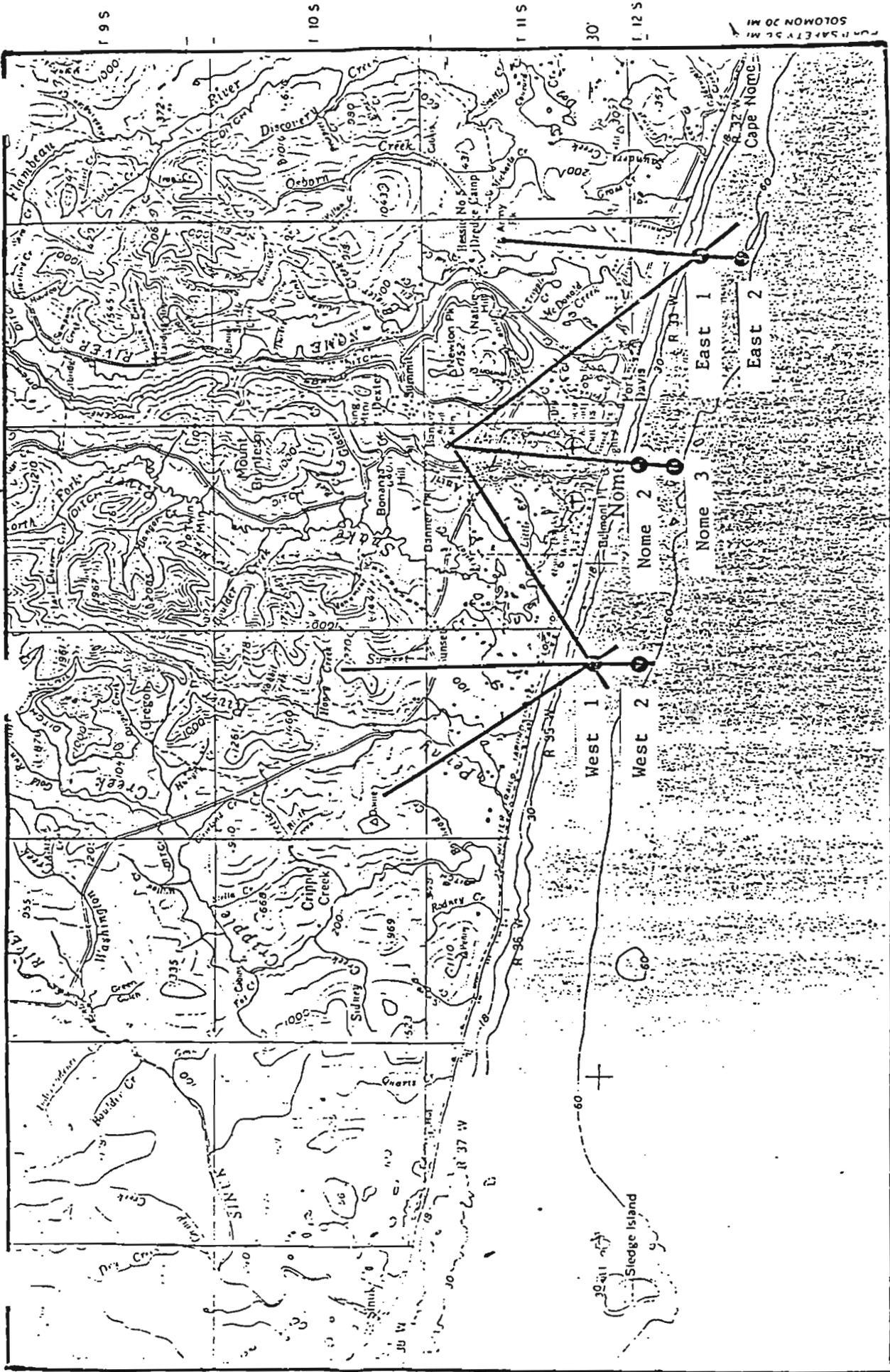


Figure 2. Winter king crab study area and pot locations, Norton Sound Section, 1990.

Appendix A

Table 1. Norton Sound winter king crab study, 1990.
Record of catches for fishing station N2.

Date	Soak time (days)	Daily No. males captured	Cum. No. males captured	Daily No. females captured	Cum. No. females captured
02/16	8	45	45	0	0
02/21	5	45	90	0	0
02/23	2	11	101	0	0
02/28	5	47	148	1	1
03/06	6	58	206	1	2
03/08	2	16	222	0	2
03/12	4	42	264	2	4
03/20	8	52	316	2	6
03/22	2	4	320	0	7
03/27	5	35	355	1	7
03/29	2	6	361	0	7
04/02	4	8	369	0	7
04/10	8	19	388	0	7
04/12	2	11	399	0	7
04/16	4	11	410	0	7
04/19	3	6	416	0	7
04/23	4	16	432	0	7
04/26	3	23	455	0	7
18 lifts	77	455	455	7	7

Average number of males per pot lift: 25.3

Average number of females per pot lift: 0.4

Appendix A

Table 2. Norton Sound winter king crab study, 1990.
Record of catches for fishing station N3.

Date	Soak time (days)	Daily No. males captured	Cum. No. males captured	Daily No. females captured	Cum. No. females captured
02/16	8	44	44	1	1
02/21	5	29	73	0	1
02/23	2	0	73	0	1
02/28	5	24	97	1	2
03/06	6	14	111	0	2
03/08	2	12	123	0	2
03/12	4	30	153	0	2
03/20	8	0	153	0	2
03/22	2	7	160	0	2
03/27	5	32	192	0	2
03/29	2	4	196	1	3
04/02	4	0	196	0	3
04/10	8	29	225	0	3
04/12	2	0	225	0	3
04/16	4	26	251	0	3
04/19	3	15	266	0	3
04/23	4	14	280	0	3
04/26	3	1	281	0	3
18 lift	77	281	281	3	3

Average number males per pot lift: 15.6

Average number of females per pot lift: 0.2

Appendix A

Table 3. Norton Sound winter king crab study, 1990.
Record of catches for fishing station W1.

Date	Soak time (days)	Daily No. males captured	Cum No. males captured	Daily No. females captured	Cum No. females captured
02/14	5	39	39	0	0
02/20	6	44	83	0	0
02/22	2	3	86	0	0
03/01	7	39	125	0	0
03/06	5	41	166	1	1
03/08	2	11	177	0	1
03/12	4	29	206	0	1
03/19	7	35	241	0	1
03/22	3	20	261	0	1
03/27	5	23	284	1	2
03/29	2	7	291	0	2
04/02	4	24	315	0	2
04/05	3	11	326	1	3
04/10	5	18	344	0	3
04/12	2	6	350	0	3
04/16	4	20	370	0	3
04/19	3	14	384	0	3
04/23	4	6	390	0	3
04/26	3	20	410	1	4
19 lifts	76	410	410	4	4

Average number of males per pot lift: 21.5

Average number of females per pot lift: 0.2

Appendix A

Table 4. Norton Sound winter king crab study, 1990.
Record of catches for fishing station W2.

Date	Soak time (days)	Daily No. males captured	Cum. No. males captured	Daily No. females captured	Cum. No. females captured
02/14	5	24	24	0	0
02/20	6	28	52	0	0
02/22	2	2	54	0	0
02/27	5	33	87	0	0
03/01	2	15	102	0	0
03/06	5	31	133	0	0
03/08	2	0	133	0	0
03/12	4	44	177	0	0
03/19	7	35	212	0	0
03/22	3	16	228	0	0
03/27	5	35	263	0	0
03/29	2	6	269	0	0
04/02	4	10	279	0	0
04/05	3	18	297	0	0
04/10	5	29	325	0	0
04/12	2	4	329	0	0
04/16	4	7	336	0	0
04/19	3	13	349	0	0
04/23	4	23	372	0	0
04/26	3	8	380	0	0
20 lifts	76	381	381	0	0

Average number of males per pot lift: 19.0

Average number of females per pot lift: 0.0

Appendix A

Table 5. Norton Sound winter king crab study, 1990.
Record of catches for fishing station E1.

Date	Soak time (days)	Daily No. males captured	Cum. No. males captured	Daily No. females captured	Cum. No. females captured
03/19	6	36	36	1	1
03/22	3	17	53	0	0
03/27	5	25	78	0	0
03/29	2	6	84	1	2
04/02	4	7	91	0	2
04/05	3	21	112	1	3
04/10	5	21	133	0	3
04/12	2	16	149	0	3
04/16	4	29	178	0	3
04/19	3	19	197	0	3
04/23	4	9	206	0	3
04/26	3	17	223	0	3
12 lifts	44	223	223	3	3

Average number of males per pot lift: 18.6

Average number of females per pot lift: 0.3

Appendix A

Table 6. Norton Sound winter king crab study, 1990.
Record of catches for fishing station E2.

Date	Soak time (days)	Daily No. males captured	Cum. No. males captured	Daily No. females captured	Cum. No. females captured
03/19	6	46	46	0	0
03/22	3	26	72	0	0
03/27	5	35	107	0	0
03/29	2	25	132	0	0
04/02	4	27	159	0	0
04/05	3	26	185	0	0
04/10	5	32	217	0	0
04/12	2	16	233	0	0
04/16	4	38	271	0	0
04/19	3	12	283	0	0
04/23	4	22	305	1	1
04/26	3	21	326	0	1
12 lifts	44	326	326	1	1

Average number of males per pot lift: 27.2
Average number of females per pot lift: 0.1

Appendix B

M E M O R A N D U M**S T A T E O F A L A S K A**
Department of Fish and Game

To: Charlie Lean
Area Biologist
Nome**Date:** March 15, 1990**Phone:****From:** Fred Bue
Asst. Area Bio.
Nome**Subject:** Crab aerial survey

On March 12, I made an aerial survey of the shore fast ice off the coast of Nome. The purpose of the survey was to document the amount of fishing effort on red king crab by local users.

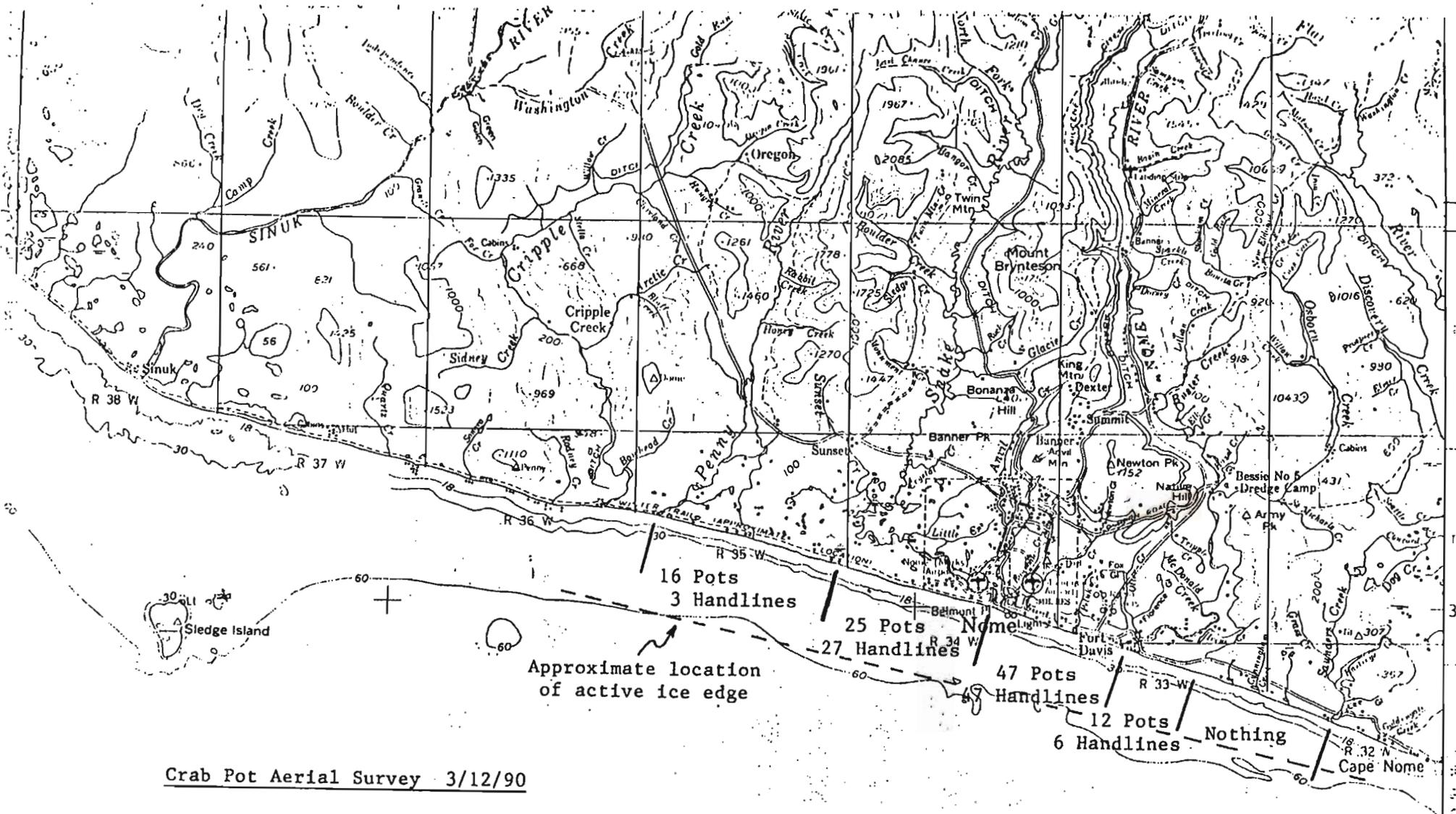
Attached is a map of the area surveyed. The area is divided in sections with total counts of pot and handline sites in each section.

The survey was flown immediately after a fair-weather weekend which was preceded by a fresh snowfall. Therefore, recent activity was obvious and only active fishing sites were counted. Four ADF&G test pots were included in the totals.

Using the known water of the ADF&G test pots as an indicator of depth at other fishing sites, the majority of the fishing activity was located within the 30 to 40 feet region. Few sites were observed beyond the 50 feet level. No active sites were noted between Farley's camp and Hastings Creek. Although areas to the west of Penny River and East of Hastings Creek were not surveyed, few snowmachine tracks were observed leading to those areas and would therefore indicate little fishing effort.

The shorefast ice edge formed nearly a straight line from approximately two miles off shore near Penny River in to one mile near Hastings Creek. Fragmented ice extended outward with very few small areas of open water.

cc: Gary Knuefer



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