

Norton Sound Winter Red King Crab Studies, 2003

By

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and

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ABSTRACT

Biological data was collected for a winter king crab test-fishing project, begun in February of 1982 to monitor the nearshore distribution, abundance, and life history of the red king crab population in the Nome area. Monitoring was done by catching, measuring, and tagging king crabs through established stations in the sea ice offshore of Nome. Staff also monitored the winter subsistence and commercial fisheries to evaluate crab abundance available to local users. Project data were incorporated into a length-based population model developed to predict population estimates for the red king crab biomass in Norton Sound. A total of 826 male and 22 female red king crabs were captured and sampled at nine stations between February 12 and April 14, 2003. A total of 86 pot lifts were made for an overall CPUE of 9.6 male and 0.3 female red king crabs. Carapace length measurements and shell age were taken from 826 male crabs. Of the total male crabs caught, 542 or 65.6% were prerecruit, 167 or 20.2% were recruit, and 117 or 14.2% postrecruit. The composition of the male catch of red king crabs in the 2003 pot survey changed from the 2002 survey. Analysis of the 2003 winter data indicated recruitment more than doubled from the 2002 survey and a trend of increased legal crab abundance was evidenced.

INTRODUCTION

Red king crab *Paralithodes camtschatica* support both commercial and subsistence harvests in the Norton Sound area. The greatest area of effort for both fisheries is concentrated in the vicinity of Nome. Commercial fisheries occur during the winter and summer months, most of the commercial catch occurs in the summer. Subsistence fisheries occur primarily in winter months and sporadically in summer months. The king crab population is concentrated near the shore from December through April, when shorefast ice allows subsistence fishers easy access. A winter king crab test-fishing project began in February of 1982. Sampling procedures were standardized in 1983. Results of prior studies were reported by Schwarz and Lean (1982, 1983, 1984), Lean and Brannian (1987), Lean (1987), Bue and Lean (1990), Knuepfer and Gebhard (1990), Brennan and Anderson (1993), Brennan (1993, 1998, 1999, 2000), Brennan and Karpovich (2002), Brennan and LaFlamme (1995), Rob (1996), and Rob and Fair (1997).

Shorefast and sea ice conditions constantly change during the winter months. From 1982 until 1987, test fishing stations were restricted to a single transect of shorefast ice extending $\frac{1}{2}$ to 2 miles directly offshore from the Nome Post Office. Poor ice conditions precluded any test fishing in 1988. During the 1989 and 1990 seasons, the study area was expanded 6 miles to the west of Nome, in the vicinity of gold dredging activity, and 6 miles to the east of Nome, where less subsistence activity occurs. Test fishing effort was reduced in 1991 and 1993 because of poor ice condition and budget constraints. In 1992 and 1994, test fishing was not funded. Test fishing was expanded in 1996 to the vicinity of Bluff, 50 miles east of Nome. In 1997, the active ice edge was closer to shore, and sea ice conditions were quite rough because of pressure ridges. Pots were established in more shallow water than in the past, and unstable ice prevented fishing with pots in the vicinity of Bluff. In 1998, 1999, and 2000 traditional ice stations were fished. In 2001, sea ice around Nome was extremely unstable. Pots deployed in traditional areas were lost when shore ice broke off at the beginning of the project. Three pots were deployed from the ice that remained close to shore but few crab were captured in these pots. In 2002, traditional ice stations were fished once again and ice was stable throughout most of the winter.

The purpose of this study is to collect biological data during the winter months for monitoring the nearshore distribution, abundance, and life history of the red king crab population. This collection is done by catching, measuring, and tagging king crab through established stations in the sea ice offshore of Nome. The winter subsistence and commercial fisheries are monitored to evaluate the abundance available to local users. Winter project data are incorporated into a length-based population model (Zheng et al. 1998) developed to predict population estimates for the red king crab biomass in Norton Sound. This model improves management of the red king crab fisheries by providing an annual estimate used to determine the guideline harvest level (GHL). Before development of the length-based model, the triennial Norton Sound king crab survey was the only means of determining the crab biomass.

Objectives for the 2003 winter field season:

1. Enumerate the catch of sublegal and legal male red king crabs; determine the shell age of each age class to evaluate recruitment into legal population before the summer fishery.
2. Enumerate and describe the subsistence and commercial king crab catch accessible to winter users in the Nome area.
3. Monitor the intensity and distribution of winter fishing effort in the Nome area.
4. Tag all male new shell red king crabs with carapace length $\leq 100\text{mm}$, as part of ongoing studies to estimate growth and movement of tagged crabs recaptured in summer and winter fisheries.
5. Measure and record the size and number of female red king crabs captured and estimate egg development and clutch size.
6. Monitor other life history and biological data such as disease, parasitism, and incidence of competing species.
7. Describe relative distribution of crabs within the winter 2003 study area using catch per unit effort information.

METHODS

Nine test fishing stations were established in an area spanning from approximately seven miles west of Nome to five miles east of Nome (Table 1, Figure 1) beginning February 12, 2003. All stations but one were located as close as possible to historical sites. Each station was located in water ranging from 30 feet to 50 feet deep and from approximately $\frac{1}{2}$ mile to 1 mile offshore. Travel to and from stations was by snowmachines towing sleds to carry supplies and equipment.

Station locations were established by locating the approximate historical site with a Garmin GPS (Global Positioning System) 45². A test hole was drilled using a gasoline-powered auger and water depth was checked using a weighted string. When the appropriate water depth was found, a square hole about five feet long on each side was cut in the ice using ice augers. Other tools used include ice chisels or "tuks", axes, shovels, ice picks and long poles. Conical, four-foot diameter "Japanese style" king crab pots were baited with chopped herring in two one-quart bait containers and one string of 10 whole saffron cod. Each pot was deployed and attached to a line tethered at the ice surface. Each hole was covered with Styrofoam and plywood to reduce refreezing of the hole. All holes were marked per regulation (5AAC 34.925). GPS was used to record all station locations.

²Use of vendor name does not imply endorsement.

Once pots were deployed, each pot was checked and rebaited twice per week, (weather permitting). When pots were checked, they were brought to the surface and suspended to keep all crab in the pot immersed in water. Crab were removed one at a time and legal and biological measurements were made to the nearest millimeter. A legal red king crab is a male crab with a shell width greater than or equal to 4¼ inches, approximately 121 mm, across (legal measurement). Biological measurement is the measurement taken from the posterior margin of the right eye orbit of the carapace to the center of the posterior carapace margin. The relationship between legal measurements and biological measurements is good and suggests minimally legal crabs, as defined by the legal measurement, would theoretically have a biological measurement of 104mm in carapace length. Shell age was determined as new or old shell by observing features such as scarring on the ventral surface, dullness on the dactyl tips and attached barnacle sizes. Egg development and clutch size of female crabs was noted. New shell and old shell male crabs with a carapace length of 100mm or less were tagged with hog rings with spaghetti tags to estimate growth rates of these mainly sub-legal crabs. Any prior injuries on all tagged crabs caught were noted. Also noted were general observations on the condition of the crabs. All crabs were released into the same hole in which the pot was suspended.

Casual conversation with commercial and subsistence fishers was solicited to get their impressions of the season, any general observations they had as to where the crabs were, and how abundant they appeared. Subsistence permits were given out to fishers for recording their catches. Commercial fishers must report and turn in fish tickets to the Nome ADF&G office weekly. In this way the commercial harvest was tracked inseason.

Catch per unit effort (CPUE) was calculated as the catch of crabs per pot lift. The relative distribution of crabs within the study area was plotted on a map, using catch per unit effort statistics. CPUE is used to compare the relative abundance between seasons and areas fished.

Stations were deployed beginning on February 12, 2003. Ice conditions in the Nome area were fair for traveling offshore. Pot locations, distances from Nome, and distance offshore were computed and recorded using the GPS (Table 1).

RESULTS

A total of 826 male and 22 female red king crabs were captured and sampled at nine stations between February 12 and April 14, 2003. A total of 86 pot lifts were made for an overall CPUE of 9.6 male and 0.3 female red king crabs (Table 2). The CPUE for all crabs captured at each station is presented in Table 2 and Figure 2. Daily catch information is presented in Table 3. A total of 464 male crabs were tagged. Other species captured include Arctic Lyre crabs *Hyas coarctatus*, Soft crabs *Hapalogaster grebnitzkii*, flatbottom sea stars *Asterias*, sea urchins of the genus *Strongylocentrotus*, shrimps *Pandalus* (sp.), Saffron Cod *Eleginus gracilis*, unidentified sculpins and jellyfish.

Carapace length measurements and shell age were taken from 826 male crabs. Of the total male crabs caught, 542 or 65.6% were prerecruit, 167 or 20.2% were recruit, and 117 or 14.2% postrecruit (Table 4). Prerecruit threes (sublegal crabs with carapace length <76mm) comprised 4.2 % of the total male crab catch. Prerecruit twos (sublegal crabs with carapace length 76 to 89 mm) accounted for 19.7% of the total male crab catch. Prerecruit ones (sublegal crabs with carapace length >89 mm) comprised 41.6% of the total male crab catch (Table 5). The average length of all male king crabs captured was 99 mm (Table 5). The length distribution of all male crabs captured during the winter pot study ranged from 59 mm to 150 mm (Table 5, Figure 3).

Legal male crabs accounted for 34.4% of the total male crab catch (Table 4). The average carapace length of the legal crabs caught was 114 mm (Table 6). Legal new shell male crabs had an average carapace length of 113 mm. Legal old shell male crabs had an average carapace length of 120 mm. Recruit crabs (legal, new shell male crabs with carapace length ≤ 115 mm) made up 58.8% of the legal male catch and postrecruit crabs (legal new shell male crab with carapace length ≥ 116 mm and all legal old shell males) made up 41.2% (Table 6). Sublegal new shell male crabs made up 94.8% of the sublegal crab catch (Table 4). The average carapace length of all sublegal male crabs caught was 91mm (Table 7).

A total of 22 female crabs were caught, 2 juveniles (carapace length < 72mm, no eggs) and 20 adults. The average carapace length was 67 mm for juvenile female crabs, and 74 mm for adult female crabs (Table 8). Eleven adult female crabs had egg clutches 90-100% full, eight adults had egg clutches 90 - 100% full, and one adult female crab had no egg clutch. All egg clutches had purple or dark brown eggs. This coloring indicates eggs had been extruded and fertilized within the last 4 months.

Subsistence fishing effort was concentrated in front of Nome within five miles east and west. Subsistence effort of 107 permits was just below the average number of permits issued since 1977 (120), and greater than all but one of previous seven winter seasons (Table 9). This increase was primarily because of good sea ice condition. A regulation was put into place in 1999 to ensure winter subsistence crab fishers use of the prime fishing area. Commercial winter crab fishers are now excluded from a section of sea ice lying between the mouth of the Nome River and Dredge #6 west of Nome, and extending due south. Only subsistence and personal use fishers are allowed to operate in this area, but not confined to the area. Subsistence crab permits indicate 4,140 crabs (16,827 pounds) were harvested.

Commercial fishing effort extended about 20 miles west of town and east toward Cape Nome. Fifteen fishers registered for the winter fishery and thirteen fishers made deliveries in the 2003 winter commercial fishery. This season had the largest effort since 1995 (Table 9). Ice conditions were stable throughout the season. Fish ticket results show commercial fishers harvested 6,853 crabs. The harvest was significantly above the average since 1977.

Appendix A lists individual stations and catches by date. Stations East 1 and West 3 had the highest crab catches of all stations (11.9 and 11.8 crabs per pot lift). Station Nome 2 had the poorest CPUE of all stations (3.8 crabs per pot lift). This station was discontinued March 4, and Station West 7 was discontinued March 10, 2003 because of poor catch rate. One captured crab had the microsporidian infestation causing "cottage cheese disease".

DISCUSSION

Red king crab winter pot surveys have been conducted in the Nome area during 18 of the past 21 years since sampling procedures were standardized in 1983. The winter survey has provided opportunities to collect and interpret valuable information on the crab population immediately available to residents of Nome during the winter subsistence and commercial fisheries. Winter project data are incorporated into a length-based population model developed to predict biomass for the red king crab population in Norton Sound. The model is especially useful in years no summer trawl survey is estimated. This model improves upon the trawl estimate because it incorporates all sources of data, and uses historical abundance trends based on length.

Sea ice was stable in the historical study area throughout the 2003 season. One station was deployed in an area outside of the traditional study area. Weather conditions were only severe enough to prevent travel a few times throughout the season. No large pressure ridges made travel difficult as in some years. Travel conditions along the beach line were good all season.

The 2003 winter pot survey had a catch of 826 male king crabs compared to an average of 956 male crabs in the winter surveys 1983 through 2002 (Table 5 and 10). Male CPUE (9.6 crabs/pot) was slightly below the 2002 study and below the average CPUE for the winter surveys since 1983 (Table 10, Figure 3). The total number of female crabs caught, 22, was below the average of 39 female crabs. Subsistence and commercial fishers indicated a good abundance of crabs throughout the winter fishing season.

Composition of male red king crabs caught in the 2003 pot survey changed from the 2002 survey. The 2003 sublegal catch proportion was 65.6% of the total male catch, and was well above the average of 51.8% (Table 11). Prerecruit threes and twos combined made up 23.5%. This percent is well below the prerecruit threes and prerecruit two crabs seen in 2002. Prerecruit ones made up 41.6% of all male crab sampled. This number was greater than the 1983-2002 average of 28.4% and well above the prerecruit one crabs observed in the 2002 study. Prerecruit one crabs will molt into the legal biomass beginning in the fall of 2003. The prerecruit segment of the crabs captured during the winter study indicates at least two years of good recruitment beginning in 2004.

The legal crab catch proportion of 34.4% is greater than observed in 2002 (Table 11). This number compares to the average of 48.2% for the years 1983 to 2002. Recruit crabs made up 20.2% of all male crabs captured and more than doubled from the 2002 study. The high percentage of sublegal one crabs observed in 2002 molted and became recruit crabs seen in 2003. Postrecruit crabs made up 14.2% of all male crabs captured, slightly greater than seen in the 2002 study. Subsistence and commercial fishers in the Nome area also reported this trend of high numbers of prerecruit crabs and more legal crabs than the previous winter. Legal crabs captured during the 2003 winter survey had the average length of 113mm (Table 12), which was less than the average length in 2002.

Winter subsistence and commercial crab fishers turned in twenty-six tags during the 2003 winter season (Table 13). Fifteen of the tags returned were initially deployed during the 2003 project and provided no growth information. One tag was returned without the carapace attached, therefore no growth information was obtained. Ten tags were returned with shells attached that provided information on the growth of the crabs. Average growth per molt was 14.2 mm. All tags but one were deployed in 2002 and crabs had undergone one molt. One tag was deployed in 1999 and the crab appeared to molt two times and skip molt twice.

The Norton Sound red king crab length based population model developed by Zheng, et al. (1998) incorporates trawl surveys, winter and summer pot studies, and summer and winter fisheries data from 1976 to present. Using these data, the model can be used to project estimates in years when there is no trawl survey, allowing abundance based management of the Norton Sound red king crab fisheries. The length frequency data from the winter crab project were incorporated into the computer model to predict the Norton Sound 2003 summer crab biomass. The expected legal male crab abundance is 3.16 million pounds, therefore the 2003 summer commercial crab fishery will be managed for a guideline harvest goal of 253,000 pounds. This goal equates to an 8% exploitation rate in accordance with the harvest strategy set by the Alaska Board of Fisheries. The 2003 winter data indicates a trend of increasing legal crab abundance compared to the 2002 winter season and healthier recruitment in the near future.

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Table 1. Location of test fishing stations for the winter red king crab pot survey, Norton Sound, 2003.

Station	Longitude (degrees)	Latitude (degrees)	Depth (ft)	Historical Station
Nome 2	64 48883	165 40871	30	yes
Nome 3	64 48297	165 41587	45	yes
West 1	64 51418	165 63865	38	yes
West 2	64 50866	165 64537	51	yes
West 3	64 49602	165 47422	33	yes
West 4	64 48878	165 48226	40	yes
West 7	64 50738	165 56297	35	no
East 1	64 46186	165 24350	41	yes
East 2	64 45698	165 24377	50	yes

Table 2. Number of pot lifts and catch, by station, for all stations in the winter red king crab pot survey, Norton Sound, 2003.

Station	Number of Pot Lifts	Number of Male Red King Crab Caught	CPUE for Male Red King Crab	Number of Female Red King Crab Caught	CPUE for Female Red King Crab
Nome 2	6	23	3.8	0	0.0
Nome 3	11	111	10.1	2	0.2
East 1	9	107	11.9	1	0.1
East 2	8	87	10.9	3	0.4
West 1	13	137	10.5	8	0.6
West 2	5	26	5.2	0	0.0
West 3	15	177	11.8	6	0.4
West 4	12	104	8.7	1	0.1
West 7	7	54	7.7	1	0.1
Total	86	826	9.6	22	0.3

Table 3. Daily catch of red king crab for all stations in the winter pot survey, Norton Sound, 2003.

Date Checked	Stations	Number of			Male CPUE	Female CPUE
		Pots Lifted	Males	Females		
14-Feb	N2, W3	2	20	0	10.0	0.0
18-Feb	N2, W1, W3, W7	4	84	1	21.0	0.3
20-Feb	N2, W1, W3, W7	4	44	1	11.0	0.3
24-Feb	N2, W1, W3, W4, W7	5	50	3	10.0	0.6
27-Feb	W1, W3, W7	3	21	0	7.0	0.0
28-Feb	N2, W4	2	10	0	5.0	0.0
4-Mar	W1, W7	2	5	0	2.5	0.0
5-Mar	N2, W3, W4	3	18	0	6.0	0.0
7-Mar	W1, W3, W4, W7, N3	5	35	1	7.0	0.2
10-Mar	E1, W1, W3, W4, W7, N3	6	75	2	12.5	0.3
13-Mar	N3, W3	2	44	2	22.0	1.0
17-Mar	E1, E2, N3, W4	4	96	0	24.0	0.0
18-Mar	W3, W1	2	3	1	1.5	0.5
20-Mar	E1, E2, N3, W4	4	34	0	8.5	0.0
21-Mar	W1, W2, W3	3	20	2	6.7	0.7
24-Mar	E1, E2, N3, W1, W2, W3, W4	7	39	2	5.6	0.3
27-Mar	E1, E2, N3, W4	4	32	1	8.0	0.3
2-Apr	W1, W3	2	22	1	11.0	0.5
3-Apr	E1, E2, N3	3	48	3	16.0	1.0
4-Apr	W2, W4	2	1	0	0.5	0.0
7-Apr	E1, E2, N3, W3, W4	5	39	1	7.8	0.2
8-Apr	W1, W2	2	28	0	14.0	0.0
10-Apr	E1, E2, N3, W3, W4	5	11	0	2.2	0.0
11-Apr	W1, W2	2	17	1	8.5	0.5
14-Apr	E1, E2, N3	3	30	0	10.0	0.0
		86	826	22	9.6	0.3

Table 4. Summary of male red king crab data from the winter pot survey, Norton Sound, 2003.

	Number	Percent	Mean Length (mm)
Sublegal Male Crab			91
New Shell	514	62.2%	
Old Shell	28	3.4%	
Legal Male Crab			114
New Shell	219	26.5%	
Old Shell	65	7.9%	
Totals	826	100%	
Prerecruit Males	542	65.6%	
Recruit Males	167	20.2%	
Postrecruit Males	117	14.2%	
Total	826	100.0%	

Prerecruits are sublegal crab with a carapace length ≤ 115 mm.

Recruit crab are new shell, legal crab with a carapace length ≤ 115 mm.

Postrecruit crab are legal crab with a carapace length ≥ 116 mm.

Table 5. Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 2003.

Carapace Length (mm)	Pre-recruit		Recruit		Eutrecruit		Totals	%	Postrecruit (continued)				
	Number	Percent	Number	Percent	Number	Percent			Length (mm)	Number	Percent	Totals	%
55	0	0.0%											
56	0	0.0%											
57	0	0.0%											
58	0	0.0%					0	0.0%					
59	1	0.1%					1	0.1%					
60	0	0.0%					0	0.0%	121	4	0.5%	4	0.5%
61	0	0.0%					6	0.0%	122	2	0.2%	2	0.2%
62	0	0.0%					0	0.0%	123	3	0.4%	3	0.4%
63	0	0.0%					0	0.0%	124	3	0.4%	3	0.4%
64	2	0.2%					2	0.2%	125	1	0.1%	1	0.1%
65	0	0.0%					0	0.0%	126	3	0.4%	3	0.4%
66	3	0.4%					3	0.4%	127	8	1.0%	8	1.0%
67	2	0.2%					2	0.2%	128	6	0.7%	6	0.7%
68	1	0.1%					1	0.1%	129	5	0.6%	5	0.6%
69	1	0.1%					1	0.1%	130	4	0.5%	4	0.5%
70	2	0.2%					2	0.2%	131	0	0.0%	0	0.0%
71	2	0.2%					2	0.2%	132	4	0.5%	4	0.5%
72	6	0.7%					6	0.7%	133	1	0.1%	1	0.1%
73	2	0.2%					2	0.2%	134	2	0.2%	2	0.2%
74	8	1.0%					8	1.0%	135	1	0.1%	1	0.1%
75	5	0.6%					5	0.6%	136	2	0.2%	2	0.2%
76	6	0.7%					6	0.7%	137	2	0.2%	2	0.2%
77	10	1.2%					10	1.2%	138	0	0.0%	0	0.0%
78	5	0.6%					5	0.6%	139	0	0.0%	0	0.0%
79	9	1.1%					9	1.1%	140	0	0.0%	0	0.0%
80	12	1.5%					12	1.5%	141	0	0.0%	0	0.0%
81	13	1.6%					13	1.6%	142	0	0.0%	0	0.0%
82	10	1.2%					10	1.2%	143	0	0.0%	0	0.0%
83	7	0.8%					7	0.8%	144	0	0.0%	0	0.0%
84	8	1.0%					8	1.0%	145	0	0.0%	0	0.0%
85	15	1.8%					15	1.8%	146	0	0.0%	0	0.0%
86	15	1.8%					15	1.8%	147	0	0.0%	0	0.0%
87	26	3.1%					26	3.1%	148	0	0.0%	0	0.0%
88	15	1.8%					15	1.8%	149	0	0.0%	0	0.0%
89	12	1.5%					12	1.5%	150	1	0.1%	1	0.1%
90	28	3.4%					28	3.4%	151	0	0.0%	0	0.0%
91	23	2.8%					23	2.8%	152	0	0.0%	0	0.0%
92	22	2.7%					22	2.7%	153	0	0.0%	0	0.0%
93	21	2.5%					21	2.5%	154	0	0.0%	0	0.0%
94	26	3.1%					26	3.1%	155	0	0.0%	0	0.0%
95	29	3.5%	0	0.0%			29	3.5%	156	0	0.0%	0	0.0%
96	23	2.8%	0	0.0%			23	2.8%	157	0	0.0%	0	0.0%
97	32	3.9%	0	0.0%			32	3.9%	158	0	0.0%	0	0.0%
98	32	3.9%	1	0.1%			33	4.0%	159	0	0.0%	0	0.0%
99	23	2.8%	0	0.0%			23	2.8%	160	0	0.0%	0	0.0%
100	19	2.3%	0	0.0%	0	0.0%	19	2.3%	Totals	117	14.2%	826	100.0%
101	30	3.6%	0	0.0%	1	0.1%	31	3.8%					
102	19	2.3%	2	0.2%	0	0.0%	21	2.5%					
103	15	1.8%	7	0.8%	0	0.0%	22	2.7%					
104	2	0.2%	11	1.3%	3	0.4%	16	1.9%					
105	0	0.0%	21	2.5%	1	0.1%	22	2.7%					
106	0	0.0%	24	2.9%	2	0.2%	26	3.1%					
107	0	0.0%	14	1.7%	3	0.4%	17	2.1%					
108	0	0.0%	18	2.2%	1	0.1%	19	2.3%					
109	0	0.0%	11	1.3%	1	0.1%	12	1.5%					
110	0	0.0%	14	1.7%	2	0.2%	16	1.9%					
111	0	0.0%	12	1.5%	4	0.5%	16	1.9%					
112	0	0.0%	11	1.3%	3	0.4%	14	1.7%					
113	0	0.0%	7	0.8%	1	0.1%	8	1.0%					
114			5	0.6%	4	0.5%	9	1.1%					
115			9	1.1%	3	0.4%	12	1.5%					
116			0	0.0%	7	0.8%	7	0.8%					
117			0	0.0%	11	1.3%	11	1.3%					
118			0	0.0%	6	0.7%	6	0.7%					
119			0	0.0%	3	0.4%	3	0.4%					
120					9	1.1%	9	1.1%					
Totals	542	65.6%	167	20.2%									

(continued)

Number of Pre-recruit threes (< 76mm)	35	4.2%
Number of Pre-recruit twos (76 to 89 mm)	163	19.7%
Number of pre-recruit ones (> 89mm)	344	41.6%
		65.6%

Average Length of all male crab captured = 99 mm

Table 6. Length frequencies by shell age of all legal male red king crab captured in the winter pot survey, Norton Sound, 2003

Carapace Length (mm)	Legal New Shell Males		Legal Old Shell Males		Total Legal Males	
	Number	Percent	Number	Percent	Number	Percent
100	0	0.0%	0	0.0%	0	0.0%
101	0	0.0%	0	0.0%	0	0.0%
102	0	0.0%	1	0.4%	1	0.4%
103	2	0.7%	0	0.0%	2	0.7%
104	7	2.5%	0	0.0%	7	2.5%
105	11	3.9%	3	1.1%	14	4.9%
106	21	7.4%	1	0.4%	22	7.7%
107	24	8.5%	2	0.7%	26	9.2%
108	14	4.9%	3	1.1%	17	6.0%
109	18	6.3%	1	0.4%	19	6.7%
110	11	3.9%	1	0.4%	12	4.2%
111	14	4.9%	2	0.7%	16	5.6%
112	12	4.2%	4	1.4%	16	5.6%
113	11	3.9%	3	1.1%	14	4.9%
114	7	2.5%	1	0.4%	8	2.8%
115	5	1.8%	4	1.4%	9	3.2%
116	9	3.2%	3	1.1%	12	4.2%
117	2	0.7%	5	1.8%	7	2.5%
118	8	2.8%	3	1.1%	11	3.9%
119	5	1.8%	1	0.4%	6	2.1%
120	2	0.7%	1	0.4%	3	1.1%
121	7	2.5%	2	0.7%	9	3.2%
122	3	1.1%	1	0.4%	4	1.4%
123	1	0.4%	1	0.4%	2	0.7%
124	3	1.1%	0	0.0%	3	1.1%
125	1	0.4%	2	0.7%	3	1.1%
126	1	0.4%	0	0.0%	1	0.4%
127	2	0.7%	1	0.4%	3	1.1%
128	5	1.8%	3	1.1%	8	2.8%
129	3	1.1%	3	1.1%	6	2.1%
130	3	1.1%	2	0.7%	5	1.8%
131	1	0.4%	3	1.1%	4	1.4%
132	0	0.0%	0	0.0%	0	0.0%
133	1	0.4%	3	1.1%	4	1.4%
134	1	0.4%	0	0.0%	1	0.4%
135	1	0.4%	1	0.4%	2	0.7%
136	1	0.4%	0	0.0%	1	0.4%
137	1	0.4%	1	0.4%	2	0.7%
138	0	0.0%	2	0.7%	2	0.7%
139	0	0.0%	0	0.0%	0	0.0%
140	0	0.0%	0	0.0%	0	0.0%
141	0	0.0%	0	0.0%	0	0.0%
142	0	0.0%	0	0.0%	0	0.0%
143	0	0.0%	0	0.0%	0	0.0%
144	0	0.0%	0	0.0%	0	0.0%
145	0	0.0%	0	0.0%	0	0.0%
146	0	0.0%	0	0.0%	0	0.0%
147	0	0.0%	0	0.0%	0	0.0%
148	0	0.0%	0	0.0%	0	0.0%
149	0	0.0%	0	0.0%	0	0.0%
150	0	0.0%	0	0.0%	0	0.0%
151	0	0.0%	1	0.4%	1	0.4%
152	0	0.0%	0	0.0%	0	0.0%
153	0	0.0%	0	0.0%	0	0.0%
154	0	0.0%	0	0.0%	0	0.0%
155	0	0.0%	0	0.0%	0	0.0%
156	0	0.0%	0	0.0%	0	0.0%
157	0	0.0%	0	0.0%	0	0.0%
158	0	0.0%	0	0.0%	0	0.0%
159	0	0.0%	0	0.0%	0	0.0%
160	0	0.0%	0	0.0%	0	0.0%
Totals	218	76.8%	65	22.9%	284	100.0%
Average Lengths	113		120		114	
	Total Recruits=		167	58.8%		
	Total Postrecruits=		117	41.2%		

Table 7. Length frequencies by shell age of all sublegal male red king crab captured in the winter pot survey, Norton Sound, 2003.

Carapace Length (mm)	Sublegal New Shell Males				Sublegal Old Shell Males				Total Sublegal Males	
	Threes (<76 mm)	Twos (76 to 89 mm)	Ones (>89 mm)	%	Threes (<76 mm)	Twos (76 to 89 mm)	Ones (>89 mm)	%		%
51	0			0.0%	0			0.0%	0	0.0%
52	0			0.0%	0			0.0%	0	0.0%
53	0			0.0%	0			0.0%	0	0.0%
54	0			0.0%	0			0.0%	0	0.0%
55	0			0.0%	0			0.0%	0	0.0%
56	0			0.0%	0			0.0%	0	0.0%
57	0			0.0%	0			0.0%	0	0.0%
58	0			0.0%	0			0.0%	0	0.0%
59	1			0.2%	0			0.0%	1	0.2%
60	0			0.0%	0			0.0%	0	0.0%
61	0			0.0%	0			0.0%	0	0.0%
62	0			0.0%	0			0.0%	0	0.0%
63	0			0.0%	0			0.0%	0	0.0%
64	2			0.4%	0			0.0%	2	0.4%
65	0			0.0%	0			0.0%	0	0.0%
66	3			0.6%	0			0.0%	3	0.6%
67	2			0.4%	0			0.0%	2	0.4%
68	1			0.2%	0			0.0%	1	0.2%
69	1			0.2%	0			0.0%	1	0.2%
70	1			0.2%	1			0.2%	2	0.4%
71	2			0.4%	0			0.0%	2	0.4%
72	6			1.1%	0			0.0%	6	1.1%
73	2			0.4%	0			0.0%	2	0.4%
74	7			1.3%	1			0.2%	8	1.5%
75	5			0.9%	0			0.0%	5	0.9%
76		6		1.1%		0		0.0%	6	1.1%
77		9		1.7%		1		0.2%	10	1.8%
78		5		0.9%		0		0.0%	5	0.9%
79		8		1.5%		1		0.2%	9	1.7%
80		12		2.2%		0		0.0%	12	2.2%
81		12		2.2%		0		0.0%	12	2.2%
82		9		1.7%		1		0.2%	10	1.8%
83		7		1.3%		0		0.0%	7	1.3%
84		8		1.5%		0		0.0%	8	1.5%
85		14		2.6%		1		0.2%	15	2.8%
86		15		2.8%		0		0.0%	15	2.8%
87		25		4.6%		1		0.2%	26	4.8%
88		15		2.8%		0		0.0%	15	2.8%
89		12		2.2%		0		0.0%	12	2.2%
90			28	5.2%			0	0.0%	28	5.2%
91			23	4.2%			0	0.0%	23	4.2%
92			21	3.9%			1	0.2%	22	4.1%
93			19	3.5%			2	0.4%	21	3.9%
94			24	4.4%			2	0.4%	26	4.8%
95			29	5.4%			0	0.0%	29	5.4%
96			22	4.1%			1	0.2%	23	4.2%
97			28	5.2%			4	0.7%	32	5.9%
98			31	5.7%			1	0.2%	32	5.9%
99			22	4.1%			1	0.2%	23	4.2%
100			15	2.8%			4	0.7%	19	3.5%
101			28	5.2%			2	0.4%	30	5.5%
102			18	3.3%			1	0.2%	19	3.5%
103			14	2.6%			1	0.2%	15	2.8%
104			2	0.4%			0	0.0%	2	0.4%
105			0	0.0%			0	0.0%	0	0.0%
106			8	1.5%			0	0.0%	8	1.5%
107			8	1.5%			0	0.0%	8	1.5%
108			0	0.0%			0	0.0%	0	0.0%
109			0	0.0%			0	0.0%	0	0.0%
110			0	0.0%			0	0.0%	0	0.0%
Totals	33	157	324	94.8%	2	6	20	5.2%	342	100.0%

Average Length (mm)

91

Average Length of all sublegal new shell males =

91 mm

Average Length of all sublegal old shell males =

92 mm

Table 8. Length frequencies and percent ovigerity of all female red king crab captured in the winter pot survey, Norton Sound, 2003.

Carapace Length (mm)	Percent Ovigerity					Juvenile	Total
	Adult						
	Full 90 - 100%	High 60 - 89%	Medium 30 - 59%	Low 1 - 29%	None 0%		
40	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0
66	0	1	0	0	0	1	2
67	0	0	0	0	0	1	1
68	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0
70	2	1	0	0	0	0	3
71	0	0	0	0	0	0	0
72	1	0	0	0	0	0	1
73	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0
75	0	2	0	0	0	0	2
76	2	0	0	0	1	0	3
77	0	1	0	0	0	0	1
78	0	0	0	0	0	0	0
79	2	0	0	0	0	0	2
80	1	0	0	0	0	0	1
81	0	0	0	0	0	0	0
82	2	1	0	0	0	0	3
83	1	0	0	0	0	0	1
84	0	0	0	0	0	0	0
85	0	1	0	0	0	0	1
86	0	0	0	0	0	0	0
87	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0
89	0	1	0	0	0	0	1
90	0	0	0	0	0	0	0
	11	8	0	0	1	2	22

Total number of juvenile females (<72mm) = 2
 Average length of juvenile females (<72mm) = 67 mm
 Average length of adult females (≥72mm) = 74 mm
 Average length of all females = 76 mm

Table 9. Winter commercial and subsistence red king crab harvests, Norton Sound, Eastern Bering Sea, 1978 - 2003.

Year ^a	Commercial		Subsistence						
	Fishers	# Crab Harvested	Winter ^b	Permits Issued	Permits Returned	Permits Fished	Total Crab Caught ^c	Total Crab Harvested ^d	Average/ permit fished
1978	37	9,625	1977-78	290	206	149	^c	12,506	84
1979	1	221	1978-79	48	43	38	^c	224	6
1980	1	22	1979-80	22	14	9	^c	213	24
1981	0	0	1980-81	51	39	23	^c	360	16
1982	1	17	1981-82	101	76	54	^c	1,288	24
1983	5	549	1982-83	172	106	85	^c	10,432	123
1984	8	856	1983-84	222	183	143	15,923	11,220	78
1985	9	1,168	1984-85	203	166	132	10,757	8,377	63
1986	5	2,168	1985-86	136	133	107	10,751	7,052	66
1987	7	1,040	1986-87	138	134	98	7,406	5,772	59
1988	10	425	1987-88	71	58	40	3,573	2,724	68
1989	5	403	1988-89	139	115	94	7,945	6,126	65
1990	13	3,626	1989-90	136	118	107	16,635	12,152	114
1991	11	3,800	1990-91	119	104	79	9,295	7,366	93
1992	13	7,478	1991-92	158	105	105	15,051	11,736	112
1993	8	1,788	1992-93	88	79	37	1,193	1,097	30
1994	25	5,753	1993-94	118	95	71	4,894	4,113	58
1995	42	7,538	1994-95	167	71	57	5,918	4,059	71
1996	9	1,778	1995-96	84	44	35	2,936	1,679	48
1997	2	83	1996-97	38	22	13	1,617	745	57
1998	5	984	1997-98	94	73	64	20,327	8,622	135
1999	5	2,714	1998-99	95	80	71	10,651	7,533	106
2000	10	3,045	1999-2000	98	64	52	9,816	5,723	107
2001	3	1,098	2000-2001	50	27	12	366	256	21
2002	11	2,591	2001-2002	114	61	45	5,119	2,177	48
2003	13	6,853	2002-2003	107	70	61	9,052	4,140	68
Avg 1978-2000	10	2,351	Avg 1984-2000	120	91	72	8,614	5,908	74

^a Prior to 1985 the winter commercial fishery occurred from January 1 - April 30; As of March 1985, fishing may occur from November 15 - May 15.

^b The winter subsistence fishery occurs during months of two calendar years (as early as December, through May).

^c The number of crab actually caught; some may have been returned.

^d The number of crab harvested is the number of crab caught and kept.

Table 10. Total catch of red king crab during the winter pot surveys, Norton Sound, 1983 - 2003.

Year	# of Pot Lifts	# of Males Captured	Male CPUE	# of Females Captured	Female CPUE
1983	107	2,586	24.2	236	2.2
1984	70	1,677	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 ^a					
1989	42	548	13.0	9	0.2
1990	99	2,076	21.0	18	0.2
1991	56	1,283	22.9	8	0.1
1992 ^b					
1993	33	181	5.5	1	0.0
1994 ^b					
1995	126	776	6.2	10	0.1
1996	159	1,582	9.9	26	0.2
1997	140	399	2.9	60	0.4
1998	84	882	10.9	38	0.5
1999	122	1,308	10.7	15	0.1
2000	93	575	6.2	22	0.2
2001 ^c	14	44	3.1	1	0.1
2002	64	832	13.0	46	0.7
2003	86	826	9.6	22	0.3
Average 1983-2001	76	956	13.1	39	0.5

^a No data collected in 1988 because of unstable ice conditions.

^b The project was not funded.

^c Unstable ice conditions.

Table 11. Percent prerecruits, recruits, and postrecruits in the catch of red king crab during the winter pot surveys, 1983 - 2003, Norton Sound.

Year	Sublegal Prerecruits				Legal			Total
	Threes ^{ab}	Twos ^{bc}	Ones ^d	Subtotal	Recruits	Postrecruits	Subtotal	
1983		26.2%	38.0%	64.2%	26.1%	9.6%	35.7%	100%
1984		34.7%	31.0%	65.6%	18.6%	15.8%	34.4%	100%
1985		24.7%	45.1%	69.8%	20.4%	9.8%	30.2%	100%
1986		25.7%	35.0%	60.7%	21.7%	17.7%	39.3%	100%
1987		12.5%	31.3%	43.8%	10.4%	45.8%	56.3%	100%
1988 ^e								
1989		26.8%	15.4%	42.2%	27.3%	30.5%	57.8%	100%
1990		15.9%	33.5%	49.4%	24.7%	26.0%	50.6%	100%
1991	0.2%	4.8%	30.6%	35.6%	33.5%	30.9%	64.4%	100%
1992 ^f								
1993	0.0%	3.3%	8.8%	12.2%	17.1%	70.7%	87.9%	100%
1994 ^f								
1995 ^g	2.1%	9.8%	11.4%	23.3%	32.3%	44.4%	76.7%	100%
1996	9.2%	22.1%	33.1%	64.3%	10.1%	25.5%	35.7%	100%
1997	11.0%	32.3%	20.8%	64.2%	14.3%	21.6%	35.8%	100%
1998	0.8%	36.6%	44.3%	81.7%	8.7%	9.5%	18.3%	100%
1999	0.7%	6.5%	42.4%	49.6%	39.0%	11.3%	50.3%	100%
2000	3.1%	13.2%	20.3%	36.5%	38.6%	24.9%	63.5%	100%
2001	4.5%	18.2%	15.9%	38.6%	13.6%	47.7%	61.3%	100%
2002	10.7%	43.1%	25.5%	79.3%	9.0%	11.8%	20.8%	100%
2003	4.2%	19.7%	41.6%	65.6%	20.2%	14.2%	34.4%	100%
Averages 1983 2002	Average of threes and twos combined	23.5%	28.4%	51.8%	21.5%	26.7%	48.2%	

^a Prerecruit threes are all sublegal males with carapace length < 76 mm.

^b Prior to 1991 carapace lengths were consolidated in pairs so that prerecruit threes and twos cannot be accurately separated.

^c Prerecruit twos are all sublegal males with carapace length from 76 through 89 mm.

^d Prerecruit ones are all sublegal males with carapace length > 89 mm.

^e No data collected due to unstable ice conditions during the winter of 1988.

^f No data collected due to lack of funds.

^g Includes catch from 12 testfishing stations and from one commercial fisherman catch on 5 April.

Table 12. Average length frequencies of legal male and female red king crab captured during the winter pot surveys, Norton Sound, 1983 - 2003.

Year	Average Carapace Length (mm)	
	Legal Male	Female
1983	c	c
1984	c	c
1985	c	79
1986	c	70
1987	c	71
1988	a	
1989	c	79
1990	115	83
1991	114	75
1992	b	
1993	118	93 ^d
1994	b	
1995	117	77
1996	117	71
1997	118	74
1998	113	76
1999	110	72
2000	113	72
2001	106	75 ^d
2002	117	77
2003	113	76

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^a No data collected in 1988 due to unstable ice conditions.

^b No data collected in 1992 and 1994 due to a lack of funds.

^c Information not available.

^d Only one female crab captured during 1993 and 2001.

Table 13. Red king crab tag information recovered during the 2003 Norton Sound winter commercial and subsistence red king crab fisheries.

Tag Number	Capture Date	Stat. Area of Capture	Carapace Length (mm)	Shell Age	Tagging Date	Tagging Location ^b	Carapace Length (mm)	Growth (mm) ^c	No. of Molts ^d	Skip Molts	Average Growth per Molt (mm)
NZ00085	2-Mar-03	656430	95	new	29-Mar-02	E5	79	16	1	0	16.0
NZ00112	26-Feb-03	656403	96	new	3-Apr-02	E2	82	14	1	0	14.0
NZ00114	7-Apr-03	656403	90	new	3-Apr-02	E5	75	15	1	0	15.0
NZ00151	27-Feb-03	656430	94	new	3-Apr-02	W5	80	14	1	0	14.0
NZ00185	13-Mar-03	656403	104	new	5-Apr-02	E5	91	13	1	0	13.0
NZ00288	8-Apr-03	656403	93	new	14-Feb-03	N2	92	1			
NZ00306	16-Apr-03	656403	99	new	18-Feb-03	W3	98	1			
NZ00309	17-Mar-03	656430	93	new	18-Feb-03	W7	93	0			
NZ00321	16-Apr-03	656403	94	new	20-Feb-03	W3	95	-1			
NZ00326	2-Apr-03	656430	x		18-Feb-03	W3	80				
NZ00331	3-Apr-03	656430	x		18-Feb-03	W7	91				
NZ00368	8-Apr-03	656430	98	new	24-Feb-03	W4	98	0			
NZ00373	15-Mar-03	656430	82	new	24-Feb-03	W3	82	0			
NZ00389	16-Apr-03	656430	x		24-Feb-03	W1	94				
NZ00397	15-Apr-03	656430	x		24-Feb-03	W4	89				
NZ00407	31-Mar-03	656430	x		5-Mar-03	W4	96				
NZ00412	10-Apr-03	656403	x		7-Mar-03	N3	77				
NZ00434	16-Apr-03	656430	x		5-Mar-03	W5	80				
NZ00443	18-Apr-03	656430	x		7-Mar-03	W3	85				
NZ00519	18-Apr-03	656430	x		24-Mar-03	W1	97				
NZ03772	21-Mar-03	656430	121	old	26-Feb-99	W2	97	24	2	2	12.0
NZ04610	16-Apr-03	656430	x		19-Feb-02	E1	81				
NZ04620	13-Mar-03	656430	102	new	19-Feb-02	E1	87	15	1	0	15.0
NZ04658	20-Feb-03	656430	99	new	25-Feb-02	E1	86	13	1	0	13.0
NZ04692	20-Mar-03	656430	109	new	26-Feb-02	N3	95	14	1	0	14.0
NZ04986	7-Mar-03	656430	106	new	19-Mar-02	E4	91	15	1	0	15.0
Average Growth											14.2

x = missing data/no information provided

^a Crab growth of 12 mm (+/- 5mm) per year is thought to be the average growth in one molting period.

^b B1= Bluff area, 45 miles east of Nome.

B4=Bluff area, 50 miles east of Nome.

E1=5 miles east of Nome

E2=5.2 miles east of Nome

E3=7.9 miles east of Nome.

E4=9.5 miles east of Nome.

E5=5 miles east of Nome

N2=0.85 miles south of Nome.

N3=1.34 miles south of Nome.

W1=7 miles west of Nome

W2=7 miles west of Nome

W3=2.8 miles west of Nome

W4=2.8 miles west of Nome.

W5=4 miles west of Nome

W7=7 miles west of Nome

^c Growth of + or - 5 mm are considered errors in measurement.

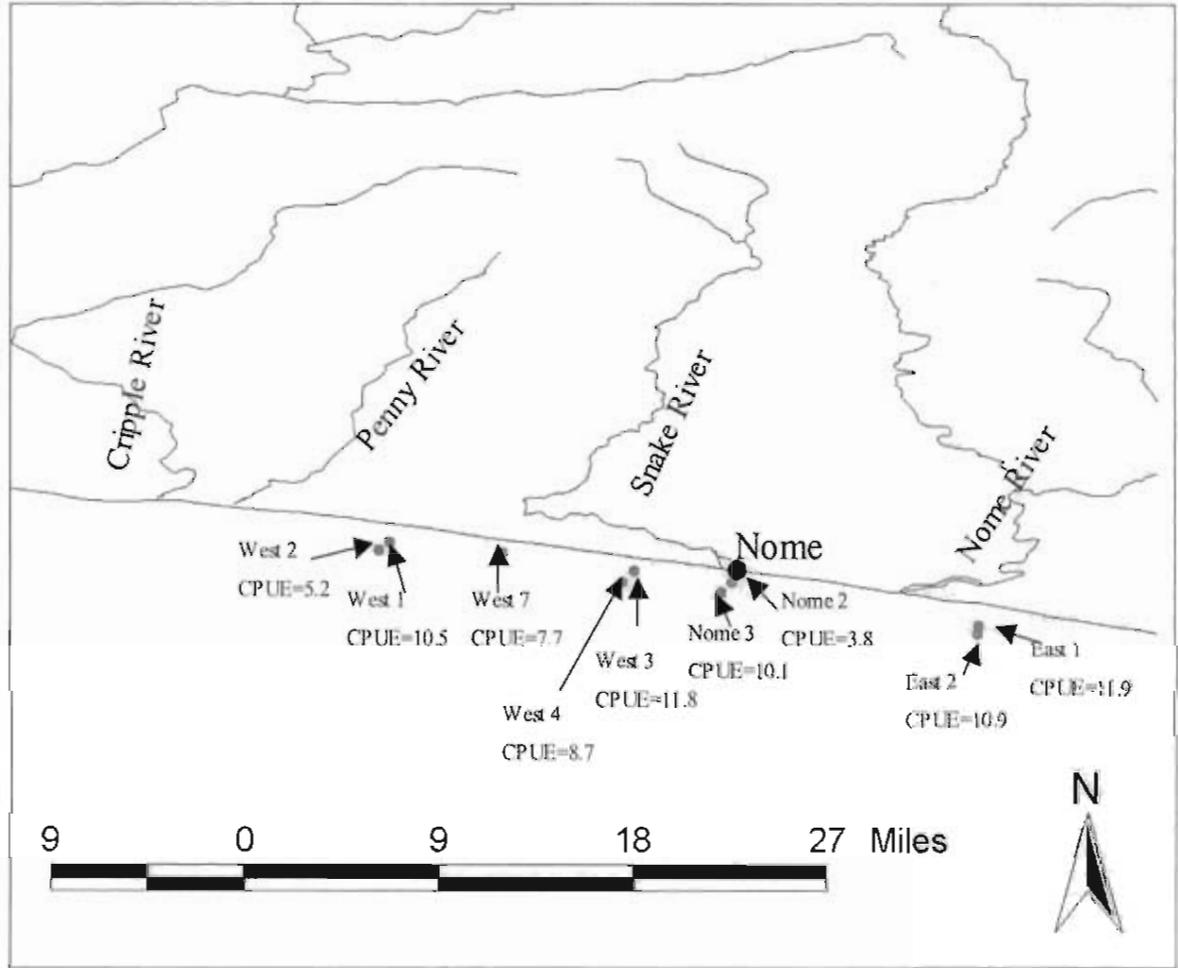


Figure 1. Area location map and CPUE for the red king crab winter pot survey, Norton Sound, 2003.

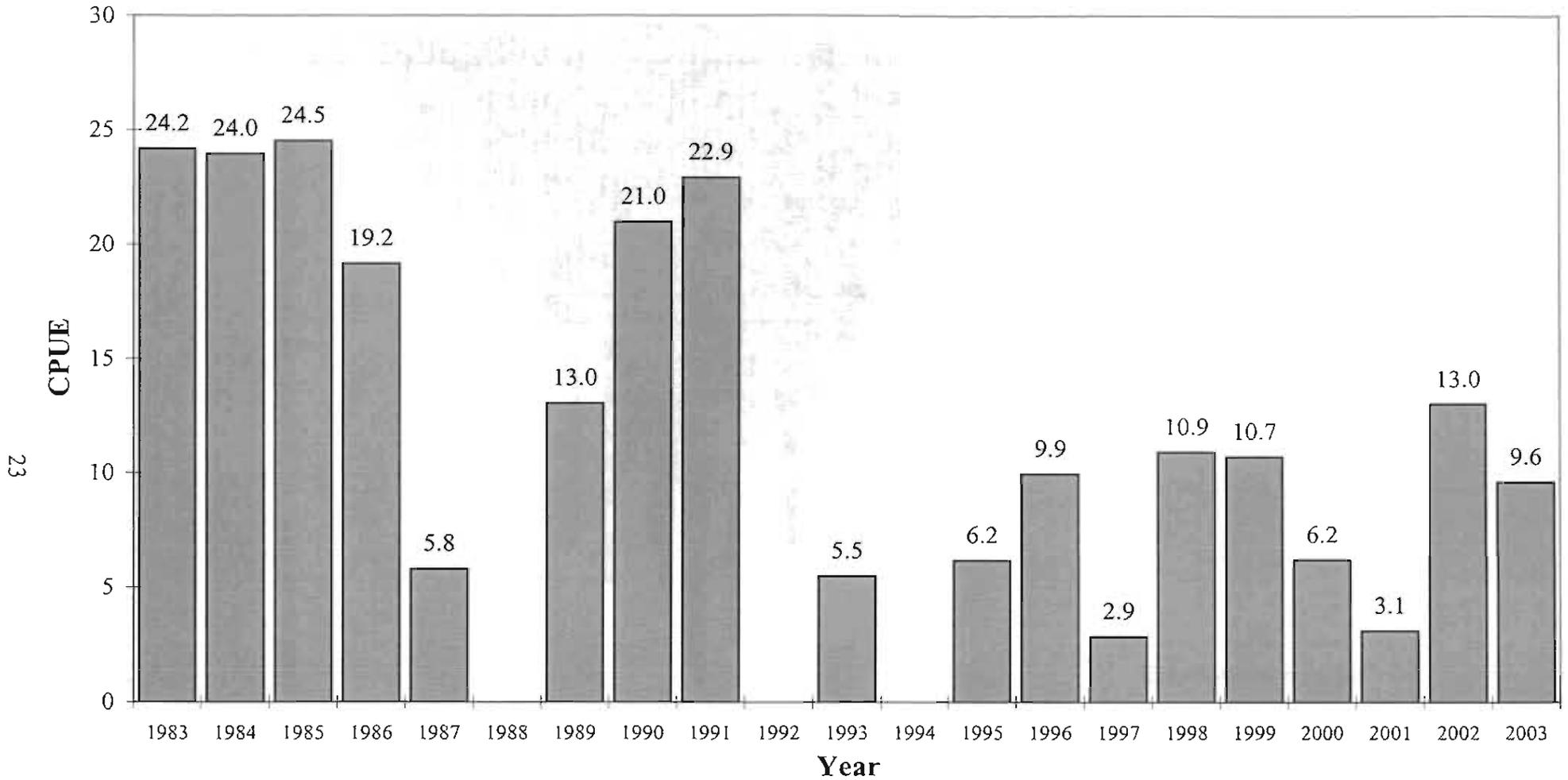


Figure 2. Annual catch per unit effort (CPUE) for male red king crab in the winter pot survey, Norton Sound, 1983 - 2003. There were no winter pot surveys in 1988, 1992 and 1994.

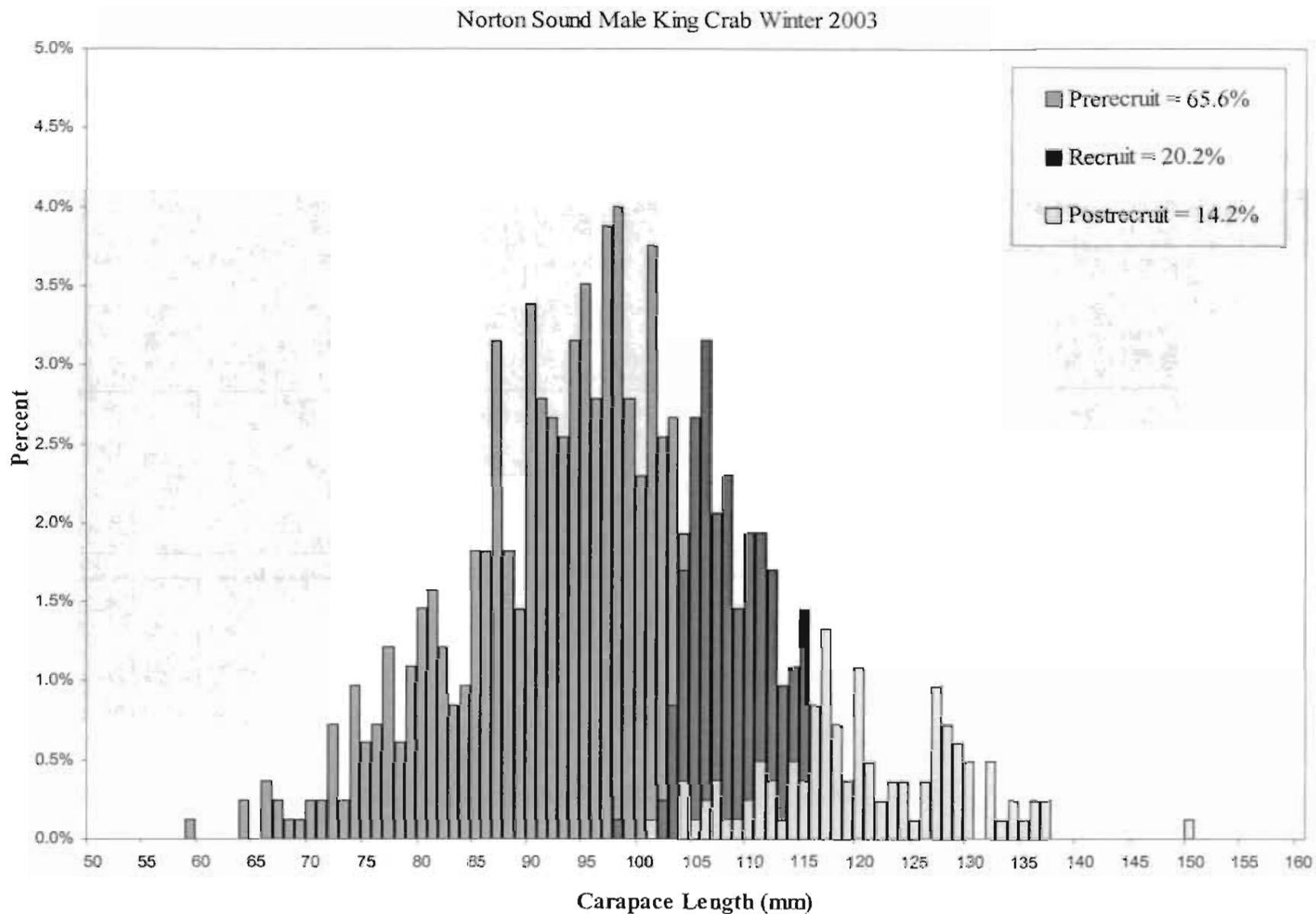


Figure 3. Length frequency distribution of all male red king crab with carapace length >50 mm captured during winter pot survey, Norton Sound, 2003.

Appendix A. Catch by station for the 2003 winter crab project. (page 1 of 3)

Station E1

2003		Daily count	Cumulative	Daily count	Cumulative
Date	Soak time (days)	of males captured	count of males captured	of females captured	count of females captured
10-Mar	4	18	18	0	0
17-Mar	7	19	37	0	0
20-Mar	3	22	59	0	0
24-Mar	4	4	63	0	0
27-Mar	3	13	76	0	0
3-Apr	7	6	82	1	1
7-Apr	4	12	94	0	1
10-Apr	3	0	94	0	1
14-Apr	4	13	107	0	1

Avg. male catch per pot lift = 11.9

Station E2

2003		Daily count	Cumulative	Daily count	Cumulative
Date	Soak time (days)	of males captured	count of males captured	of females captured	count of females captured
17-Mar	5	19	19	0	0
20-Mar	3	7	26	0	0
24-Mar	4	2	28	1	1
27-Mar	3	14	42	1	2
3-Apr	7	22	64	1	3
7-Apr	4	5	69	0	3
10-Apr	3	5	74	0	3
14-Apr	4	13	87	0	3

Avg. male catch per pot lift = 10.9

Station N2

2003		Daily count	Cumulative	Daily count	Cumulative
Date	Soak time (days)	of males captured	count of males captured	of females captured	count of females captured
14-Feb	2	12	12	0	0
18-Feb	4	8	20	0	0
20-Feb	2	0	20	0	0
24-Feb	4	1	21	0	0
28-Feb	4	0	21	0	0
4-Mar	4	2	23	0	0

Avg. male catch per pot lift = 3.8

Appendix A. Catch by station for the 2003 winter crab project. (page 2 of 3)

Station N3

2003 Date	Soak time (days)	Daily count of males captured	Cumulative count of males captured	Daily count of females captured	Cumulative count of females captured
7-Mar	3	14	14	0	0
10-Mar	3	19	33	0	0
13-Mar	3	28	61	0	0
17-Mar	4	8	69	0	0
20-Mar	3	5	74	0	0
24-Mar	4	3	77	1	1
27-Mar	3	5	82	0	1
3-Apr	7	19	101	1	2
7-Apr	4	3	104	0	2
10-Apr	3	3	107	0	2
14-Apr	4	4	111	0	2

Avg. male catch per pot lift = 11.1

Station W1

2003 Date	Soak time (days)	Daily count of males captured	Cumulative count of males captured	Daily count of females captured	Cumulative count of females captured
18-Feb	4	6	6	0	0
20-Feb	2	16	22	0	0
24-Feb	4	18	40	1	1
27-Feb	3	0	40	0	1
4-Mar	5	5	45	0	1
7-Mar	3	6	51	1	2
10-Mar	3	12	63	2	4
18-Mar	8	0	63	1	5
21-Mar	3	18	81	1	6
24-Mar	3	18	99	0	6
2-Apr	9	12	111	1	7
8-Apr	6	16	127	0	7
11-Apr	3	10	137	1	8

Avg. male catch per pot lift = 10.5

Station W2

2003 Date	Soak time (days)	Daily count of males captured	Cumulative count of males captured	Daily count of females captured	Cumulative count of females captured
21-Mar	3	0	0	0	0
24-Mar	3	6	6	0	0
4-Apr	11	1	7	0	0
8-Apr	4	12	19	0	0
11-Apr	3	7	26	0	0

Avg. male catch per pot lift = 5.2

Appendix A. Catch by station for the 2003 winter crab project. (page 3 of 3)

Station W3

2003		Daily count	Cumulative	Daily count	Cumulative
Date	Soak time (days)	of males captured	count of males captured	of females captured	count of females captured
14-Feb	2	8	8	0	0
18-Feb	4	26	34	0	0
20-Feb	2	18	52	1	1
24-Feb	4	20	72	1	2
27-Feb	3	21	93	0	2
5-Mar	6	8	101	0	2
7-Mar	2	6	107	0	2
10-Mar	3	12	119	0	2
13-Mar	3	16	135	2	4
18-Mar	5	3	138	0	4
21-Mar	3	2	140	1	5
24-Mar	3	6	146	0	5
2-Apr	9	10	156	0	5
7-Apr	5	20	176	1	6
10-Apr	3	1	177	0	6

Avg. male catch per pot lift = 11.8

Station W4

2003		Daily count	Cumulative	Daily count	Cumulative
Date	Soak time (days)	of males captured	count of males captured	of females captured	count of females captured
24-Feb	3	11	11	1	1
28-Feb	4	10	21	0	1
5-Mar	5	8	29	0	1
7-Mar	2	9	38	0	1
10-Mar	3	14	52	0	1
17-Mar	7	50	102	0	1
20-Mar	3	0	102	0	1
24-Mar	4	0	102	0	1
27-Mar	3	0	102	0	1
4-Apr	8	0	102	0	1
7-Apr	3	0	102	0	1
10-Apr	3	2	104	0	1

Avg. male catch per pot lift = 8.7

Station W7

2003		Daily count	Cumulative	Daily count	Cumulative
Date	Soak time (days)	of males captured	count of males captured	of females captured	count of females captured
18-Feb	4	44	44	1	1
20-Feb	2	10	54	0	1
24-Feb	4	0	54	0	1
27-Feb	3	0	54	0	1
4-Mar	5	0	54	0	1
7-Mar	3	0	54	0	1
10-Mar	3	0	54	0	1

Avg. male catch per pot lift = 7.7