

Norton Sound Winter Red King Crab Studies, 1999

by

Elisabeth L. Brennan

Regional Information Report¹ No. 3A99-25

Alaska Department of Fish & Game
Commercial Fisheries Division, AYK Region
333 Raspberry Road
Anchorage, Alaska 99518-1599

June 1999

¹ The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports.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

OFFICE OF EQUAL OPPORTUNITY (OEO) STATEMENT

The Alaska Department of Fish and Game conducts all programs and activities free from discrimination on the basis of sex, color, race, religion, national origin, age, marital status, pregnancy, parenthood or disability. For information on alternative formats available for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-4120, (TDD)1-800-478-3648, or (fax) 907-586-6596. Any person who believes s/he has been discriminated against should write to: ADF&G, PO Box 25526, Juneau, AK 99802-5526; or O.E.O., U.S. Department of Interior, Washington, DC 20240.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	ii
LIST OF FIGURES.....	iii
LIST OF APPENDICES	iv
INTRODUCTION.....	1
METHODS	2
RESULTS	2
DISCUSSION	3
ACKNOWLEDGEMENTS	4
LITERATURE CITED	5

LIST OF TABLES

<u>Tables</u>	<u>Page</u>
1. Location of test fishing stations for the winter red king crab pot survey, Norton Sound, 1999	7
2. Number of pot lifts and catch, by station, for all stations in the winter red king crab pot survey, Norton Sound, 1999	8
3. Daily catch of red king crab for all stations in the winter pot survey, Norton Sound, 1999	9
4. Summary of male red king crab data from the winter pot survey, Norton Sound, 1999	10
5. Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1999	11
6. Length frequencies by shell age of all legal male red king crab captured in the winter pot survey, Norton Sound, 1999	12
7. Length frequencies by shell age of all sublegal male red king crab captured in the winter pot survey, Norton Sound, 1999	13
8. Length frequencies and percent ovigerity of all female red king crab captured in the winter pot survey, Norton Sound, 1999	14
9. Subsistence and commercial king crab permits issued for winter fishing, Norton Sound, 1978 - 1999.....	15
10. Total catch of red king crab during the winter pot surveys, Norton Sound, 1983 - 1999	16
11. Percent prerecruits, recruits, and postrecruits in the catch of red king crab during the winter pot surveys, 1983 - 1999, and the summer pot survey, 1995, Norton Sound	17
12. Average length frequencies of legal male and female red king crab captured during the winter pot surveys in the Nome area, Norton Sound, 1983 - 1999	18
13. Recruit and postrecruit red king crab as a percentage of the legal catch sampled during the winter pot surveys and summer commercial fisheries in the Nome area, Norton Sound, 1983 - 1999	19
14. Red king crab tag information recovered during the 1999 Norton Sound winter commercial and subsistence red king crab harvest	20

LIST OF FIGURES

<u>Figures</u>	<u>Page</u>
1. Area location map and CPUE for the red king crab winter pot survey, Norton Sound, 1999	21
2. Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1999	22
3. Annual catch per unit effort (CPUE) for male red king crab in the winter pot survey, Norton Sound, 1983 - 1999	23
4. Comparison of the length frequency distribution of all male red king crab captured during the winter and summer pot and trawl surveys, Norton Sound, 1995 - 1999	24

LIST OF APPENDICES

<u>Appendix</u>	<u>Page</u>
A. Record of catches for fishing stations in the 1999 Norton Sound winter red king crab study	27

INTRODUCTION

Red king crab, *Paralithodes camtschatica*, support both commercial and subsistence harvests in the Norton Sound area. The greatest area of effort is concentrated in the vicinity of Nome. Commercial fisheries occur during the winter and summer months, with the majority of the commercial catch occurring in the summer. Subsistence fisheries occur primarily in winter months and sporadically in summer months. The king crab population is concentrated closer to shore from December through April, and shore fast ice allows subsistence fishers easy access. A winter king crab test-fishing project began in February of 1982 in an attempt to monitor the nearshore distribution, abundance, life history and collect biological data of red king crab. 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 (1989), Knuepfer and Gebhard (1990), Brennan and Anderson (1993), Brennan (1993), Brennan and LaFlamme (1995), Rob (1996), Rob and Fair (1997), and Brennan (1998).

Shorefast and sea ice conditions constantly change. From 1982 until 1987, test fishing stations were restricted to a single transect of shorefast ice extending ½ 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 due to poor ice condition and budget constraints. In 1992 and 1994, test fishing was not funded. In 1996 test fishing was expanded 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. Pots were established in more shallow water than in the past, and due to unstable ice, no pots were fished in the vicinity of Bluff. In 1998, traditional ice stations were fished.

Objectives for the 1999 winter field season were:

1. Monitor the catch of sublegal and legal male red king crab and the shell age of each age class to evaluate recruitment into legal population prior to the summer fishery.
2. Monitor the catch and distribution of red king crab accessible to winter users in the Nome area.
3. Monitor intensity and distribution of the winter fishing effort in the Nome area.
4. Tag all male new shell red king crab with carapace length \leq 100mm, as part of ongoing studies to estimate the growth of tagged crab recaptured in summer and winter fisheries.
5. Monitor the size and number of female red king crab captured and estimate egg development and clutch size.
6. Monitor other life history and biological data such as disease, parasitism, and the incidence of competing species.

METHODS

Eight test fishing stations were established in an area spanning from 7 miles west of Nome to 5 miles east of Nome (Table 1, Figure 1). All stations were located as close as possible to historical sites. Each station was located in water ranging from 40 feet to 51 feet deep and from approximately ½ mile to 1 ½ miles 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 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 "took", 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 tethered line at the surface of the ice. Each hole was covered with Styrofoam and plywood to reduce refreezing of the hole. All holes were marked per regulation. The GPS was used to record all station locations. New this season, all pots were covered with 1.5 inch seine web in an effort to standardize the gear since crab size is the primary focus of the winter study.

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 so that all crab in the pot remained immersed in water. Crab were removed one at a time and legal and biological measurements were made to the nearest millimeter. Shell age was determined. Egg development on female crab was noted. New shell and old shell crab with a carapace length of 100mm or less were tagged with hog rings with spaghetti tags. Any prior injuries on all tagged crab caught were noted. All crab were released into the same hole that the pot was suspended in. Catch per unit effort (CPUE) was calculated as the catch per pot lift.

RESULTS

Stations were deployed beginning on February 8, 1999. Ice conditions in the Nome area were fair to poor in regard to traveling offshore. Pot locations, distances from Nome, and distance offshore were computed and recorded using the GPS (Table 1).

A total of 1,308 male and 15 female red king crab were captured and sampled at 8 stations between February 12 and April 20, 1999. A total of 122 pot lifts were made for an overall CPUE of 10.7 male and 0.1 female red king crab (Table 2). The CPUE for all crab captured at each station is presented in Table 2 and Figure 1. Daily catch information is presented in Table 3. Record of each station fished is found in Appendix Table A. A total of 459 male crab were tagged. Other species captured include Arctic Lyre crab *Hyas coarctatus*, Soft crab *Hapalogaster grebnitzkii*, Flatbottom sea star *Asterias*, sea urchins of the genus *Strongylocentrotus*, *Pandalus* (sp.) shrimp, unidentified sculpins and jellyfish.

² Use of vendor name does not imply endorsement.

Carapace length measurements and shell age were taken from 1,308 male crab. Of the total male crab caught, 650 or 49.7% were prerecruit, 510 or 39.0% were recruit, and 148 or 11.3% postrecruit (Table 4). Prerecruit threes (carapace length <76mm) were 0.7 % of the total male crab catch. Prerecruit twos (carapace length 76 to 89 mm) were 6.5% of the total male crab catch. Prerecruit ones (carapace length >89 mm) were 42.4% of the total male crab catch (Table 5, Table 11). The average length of all male king crab captured was 103 mm (Table 5). The length distribution of all male crab captured during the winter pot study ranged from 58 mm to 136 mm (Table 5, Figure 2).

Legal male crab were 50.3 % of the total male crab catch. The average carapace length of the legal crab caught was 110 mm (Table 6). Legal new shell male crab had an average carapace length of 110 mm and were 91.9 % of the legal crab catch. Legal old shell male crab had an average carapace length of 115 mm and were 8.1 % of the legal crab catch. Recruit crab (legal new shell male crab with carapace length \leq 115 mm) made up 77.5 % of the legal male catch and postrecruit crab (legal new shell male crab with carapace length \geq 116 mm and all legal old shell males) made up 22.5 % (Table 6).

Sublegal male crab were 49.7% of the total male crab catch (Table 4). The mean carapace length of the sublegal male crab caught was 96 mm. New shell sublegal male crab had a mean carapace length of 98 mm and were 98.6 % of the sublegal male catch. Old shell sublegal male crab had a mean carapace length of 100 mm and was 1.4 % of the sublegal male catch (Table 7).

A total of 15 female crab were caught, 4 juvenile (carapace length < 72mm, no eggs) and 11 adults. The average carapace length was 52 mm for juvenile female crab, and 79 mm for adult female crab (Table 8). No adult female crab had full egg clutches and 11 adults had high egg clutches. One female adult crab was observed with yellow/brown eggs with eyes during the winter pot study. All other female crab with eggs clutches were observed with purple or dark brown eggs.

DISCUSSION

The red king crab winter pot survey has been conducted in the Nome area during fourteen of the seventeen 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 the residents of Nome during the winter subsistence and commercial fisheries. This information is used as an indicator of population health which has implications for the larger scale summer commercial fishery.

During 1999 the sea ice was stable in the historic study area throughout the season. The active ice edge was approximately 2 miles offshore in most areas. Weather conditions were only severe enough to prevent travel a few times throughout the season. Travel from shore to pots on the sea ice was fair. Large pressure ridges occurred in some areas making travel difficult at times. As the season progressed and snow fall increased, these areas became easier to travel through. Travel conditions along the beach line were good all season.

Subsistence fishing effort was concentrated in front of Nome within five miles east and west. The subsistence effort of 97 permits was slightly below the average number of permits issued since 1977 (124), but greater than the previous three winter seasons (Table 9). This increase was due to the good condition of sea ice and greater abundance of crab nearshore.

Commercial fishing effort extended about 20 miles west of town and east toward Cape Nome. Eight fishers registered for the 1999 winter commercial fishery. This compares to the previous three year average of 6 fishers (Table 9). Ice conditions were stable throughout the season. As of April 27, commercial fishers harvested 2,384 crab. The harvest was slightly above the average number of crab harvested since 1977.

The 1999 winter pot survey had a catch of 1,308 male king crab compared to an average of 1,038 male crab in the winter surveys 1983 through 1998 (Table 10). Male CPUE (10.7 crab/pot) was below the average of 14.6 crab per pot for the winter surveys since 1983 (Table 10, Figure 3). The total number of female crab caught (15) was below the average of 44 female crab since 1983.

The 1999 sublegal catch proportion (50 % of the total male catch) was just below the average (52 %) (Table 11). Prerecruit threes and twos combined made up just 7 %. This is well below the average of 23% prerecruit threes and twos since 1983. Prerecruit ones made up 42 % of all male crab sampled. This was well above the 1983-1998 average of 29 %. The legal crab catch proportion of 50 % was the highest since 1995. This compares to the average of 48 % for the years 1983 to 1998. Recruit crab made up 39% of all male crab captured. This is the highest recruitment seen in the pot survey since it was begun in 1983. Postrecruit crab made up only 11 % of all male crab captured, which was the fourth lowest postrecruit catch. Subsistence and commercial fishers in the Nome area also reported this trend of increasing recruit age crab.

The composition of the male catch of red king crab in the 1999 pot survey changed dramatically from the 1998 survey (Table 11, Table 13). Only 18% of the 1998 male catch were legal compared to 50 % in 1999. In 1998, 82% of the total catch were sublegal male, compared to 50 % in 1999. The average length of legal male crab in 1998 was 113 mm compared to 110 mm in 1999. Comparisons of the length frequency distribution of all male red king crab captured during the winter and summer pot and trawl surveys between 1995 and 1999 are presented in Figure 4. Crab that were prerecruit ones in 1998 molted and became the large recruit proportion observed during the 1999 study.

A total of 18 tagged crab captured during the 1999 winter fishery were returned by subsistence and commercial fishers to the Nome ADF&G office (Table 14). The returned crab had been tagged during the 1995, 1996, 1997 and 1998 and 1999 winter pot surveys. Seven of the 9 returned crab tagged between 1995 and 1998 were used to calculate an average growth per molt of 12.3 mm.

ACKNOWLEDGEMENTS

Paul Thompson was the project technician. Peter Rob created the winter crab database and provided technical assistance. Lowell Fair and Fred Bue assisted in setting pots at the beginning of the project.

LITERATURE CITED

- Brennan, E.L. 1993. Norton Sound winter red king crab studies, 1993. Regional Information Report No. 3A93-13. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Anchorage.
- Brennan, E.L. 1998. Norton Sound winter red king crab studies, 1998. Regional Information Report No. 3A98-25. Alaska Department of Fish and Game, Commercial Fisheries Division, Anchorage.
- Brennan, E.L. and R. Anderson 1993. Norton Sound winter red king crab studies, 1991. Regional Information Report No. 3A93-12. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Anchorage.
- Brennan, E.L. and T. R. LaFlamme. 1995. Norton Sound winter red king crab studies, 1995. Regional Information Report No. 3A95-20. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Anchorage.
- Bue, F.J. and C.F. Lean 1990. Norton Sound winter red king crab studies, 1989. Regional Information Report No. 3N90-05. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Nome.
- Knuepfer, G.R. and J.G. Gebhard, 1990. Norton Sound winter red king crab studies, 1990. Regional Information Report NO. 3N90-19. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Nome.
- Lean C.F. 1987. Catch rates, size composition and growth of red king crab taken in Norton Sound near Nome during the winter of 1987. AYK Region Shellfish Report #12. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Nome.
- Lean C.F. and L. Brannian 1987. Catch rates, size composition and growth of red king crab taken in Norton Sound near Nome during the winters of 1985 and 1986. AYK Region Shellfish Report #11. Alaska Department of Fish and Game, Division of Commercial Fisheries, Nome.
- Rob, P. J. 1996. Norton Sound Winter Red King Crab Studies, 1996. Regional Information Report No. 3A96-22. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Anchorage.
- Rob, P. J. and L.F. Fair. 1997. Norton Sound Winter Red King Crab Studies, 1997. Regional Information Report No. 3A97-25. Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, Anchorage.
- Schwarz, L. and C.F. Lean, 1982. Nearshore winter king crab study, Norton Sound, February through May, 1982. AYK Region Shellfish Report #10. Alaska Department of Fish and Game, Division of Commercial Fisheries, Nome.

LITERATURE CITED (continued)

_____. 1983. Nearshore winter king crab study, Norton Sound, January through April, 1983. AYK Region Shellfish Report #6. Alaska Department of Fish and Game, Division of Commercial Fisheries, Nome.

_____. 1984. Nearshore winter king crab study, Norton Sound, January through April, 1984. AYK Region Shellfish Report #8. Alaska Department of Fish and Game, Division of Commercial Fisheries, Nome.

Table 1. Location of test fishing stations for the winter red king crab pot survey, Norton Sound, 1999.

Pot	Location from Town	Longitude	Latitude	Depth (ft)	Historical Station
Nome 2	0.88 miles South	N 64°29' 05"	W 165°24' 33"	43 ft	yes
Nome 3	1.17 miles South	N 64°28' 51"	W 165°24' 48"	49 ft	yes
West 3	2.48 miles West	N 64°29' 21"	W 165°28' 52"	45 ft	yes
West 4	2.71 miles West	N 64°29' 00"	W 165°29' 07"	50 ft	yes
West 1	6.72 miles West	N 64°30' 41"	W 165°37' 22"	40 ft	yes
West 2	6.76 miles West	N 64°30' 17"	W 165°37' 33"	51 ft	yes
East 1	4.97 miles East	N 64°27' 52"	W 165°15' 01"	40 ft	yes
East 2	5.06 miles East	N 64°27' 27"	W 165°15' 22"	48 ft	yes

Table 2. Number of pot lifts and catch, by station, for all stations in the winter red king crab pot survey, Norton Sound, 1999.

Station	Dates Fished	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	2/8 - 4/19	17	83	4.9	1	0.1
Nome 3	2/8 - 4/19	17	114	6.7	2	0.1
West 1	2/18 - 4/20	14	228	16.3	1	0.1
West 2	2/18 - 4/20	14	141	10.1	1	0.1
West 3	2/12 - 4/20	15	235	15.7	0	0.0
West 4	2/12 - 4/20	15	270	18.0	7	0.5
East 1	2/17 - 4/19	15	186	12.4	2	0.1
East 2	2/17 - 4/19	15	51	3.4	1	0.1
Total		122	1,308	10.7	15	0.1

Table 3. Daily catch of red king crab for all stations in the winter pot survey, Norton Sound, 1999.

Date	Stations	# of Pots Lifted	# of	Male CPUE	Cumulative # of Males Captured	# of Females Captured
			Males Captured			
12-Feb	Nome2, Nome3	2	22	11.0	22	0
16-Feb	Nome2, Nome3, West 3, West 4	4	71	17.8	93	1
19-Feb	Nome2, Nome3, West 3, West 4	4	40	10.0	133	1
22-Feb	Nome2, Nome3, West1, West2, West 3, West 4, East1, East2,	8	124	15.5	257	0
25-Feb	East1, East2, Nome2, Nome3	4	16	4.0	273	0
26-Feb	West1, West2, West3, West4	4	75	18.8	348	1
1-Mar	East1, East2, Nome2, Nome3	4	47	11.8	395	0
2-Mar	West1, West2, West3, West4	4	102	25.5	497	0
4-Mar	East1, East2, Nome2, Nome3	4	29	7.3	526	1
5-Mar	West1, West2, West3, West4	4	79	19.8	605	0
9-Mar	East1, East2, Nome2, Nome3	4	13	3.3	618	0
10-Mar	West1, West2	2	22	11.0	640	0
11-Mar	East1, East2, West3, West4	4	67	16.8	707	1
12-Mar	West1, West2, Nome2, Nome3	4	25	6.3	732	0
15-Mar	West1, West2, West3, West4	4	57	14.3	789	0
16-Mar	East1, East2, Nome2, Nome3	4	39	9.8	828	0
18-Mar	West1, West2, West3, West4	4	80	20.0	908	0
22-Mar	East1, East2, Nome2, Nome3	4	73	18.3	981	0
23-Mar	West1, West2, West3, West4	4	76	19.0	1057	0
25-Mar	East1, East2, Nome2, Nome3	4	24	6.0	1081	1
26-Mar	West1, West2, West3, West4	4	33	8.3	1114	0
30-Mar	East1, East2, Nome2, Nome3	4	10	2.5	1124	0
31-Mar	West1, West2, West3, West4	4	23	5.8	1147	3
1-Apr	East1, East2, Nome2, Nome3	4	7	1.8	1154	0
5-Apr	Nome2, Nome3, West3, West4	4	5	1.3	1159	1
6-Apr	East 1, East 2	2	7	3.5	1166	0
7-Apr	West1, West2	2	22	11.0	1188	1
8-Apr	East1, East2, Nome2, Nome3	4	23	5.8	1211	0
14-Apr	West1, West2, West3, West4	4	2	0.5	1213	0
16-Apr	East 1, East 2	2	32	16.0	1245	2
19-Apr	East1, East2, Nome2, Nome3	4	36	9.0	1281	1
20-Apr	West1, West2, West3, West4	4	27	6.8	1308	1
		122	1308	10.7		15

Table 4. Summary of male red king crab data from the winter pot survey, Norton Sound, 1999.

	Number	Percent	Mean Length (mm)
Sublegal Male Crab			96
New Shell	641	49.0%	
Old Shell	9	0.7%	
Legal Male Crab			110
New Shell	605	46.3%	
Old Shell	53	4.1%	
Totals	1308	100%	
Prerecruit Males	650	49.7%	
Recruit Males	510	39.0%	
Postrecruit Males	148	11.3%	
Total	1308	100.0%	

Prerecruits are sublegale crab with a carapace length < 115 mm.

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

Postrecruit crab are legal crab with a carapace length \geq 116 mm.

Table 5. Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1999.

Carapace Length (mm)	Prerecruits		Recruits		Postrecruits		Totals	%
	Number	Percent	Number	Percent	Number	Percent		
58	1	0.1%					1	0.1%
59	0	0.0%					0	0.0%
60	0	0.0%					0	0.0%
61	0	0.0%					0	0.0%
62	0	0.0%					0	0.0%
63	0	0.0%					0	0.0%
64	0	0.0%					0	0.0%
65	0	0.0%					0	0.0%
66	0	0.0%					0	0.0%
67	1	0.1%					1	0.1%
68	1	0.1%					1	0.1%
69	2	0.2%					2	0.2%
70	1	0.1%					1	0.1%
71	0	0.0%					0	0.0%
72	1	0.1%					1	0.1%
73	0	0.0%					0	0.0%
74	0	0.0%					0	0.0%
75	3	0.2%					3	0.2%
76	1	0.1%					1	0.1%
77	3	0.2%					3	0.2%
78	1	0.1%					1	0.1%
79	1	0.1%					1	0.1%
80	1	0.1%					1	0.1%
81	4	0.3%					4	0.3%
82	4	0.3%					4	0.3%
83	7	0.5%					7	0.5%
84	6	0.5%					6	0.5%
85	6	0.5%					6	0.5%
86	10	0.8%					10	0.8%
87	13	1.0%					13	1.0%
88	17	1.3%					17	1.3%
89	11	0.8%					11	0.8%
90	15	1.1%					15	1.1%
91	14	1.1%					14	1.1%
92	25	1.9%					25	1.9%
93	35	2.7%					35	2.7%
94	35	2.7%					35	2.7%
95	24	1.8%					24	1.8%
96	30	2.3%					30	2.3%
97	52	4.0%					52	4.0%
98	45	3.4%					45	3.4%
99	57	4.4%					57	4.4%
100	47	3.6%	0	0.0%			47	3.6%
101	50	3.8%	4	0.3%			54	4.1%
102	61	4.7%	4	0.3%	1	0.1%	66	5.0%
103	45	3.4%	19	1.5%	3	0.2%	67	5.1%
104	15	1.1%	47	3.6%	3	0.2%	65	5.0%
105	5	0.4%	50	3.8%	3	0.2%	58	4.4%
106	0	0.0%	52	4.0%	0	0.0%	52	4.0%
107	0	0.0%	67	5.1%	1	0.1%	68	5.2%
108	0	0.0%	46	3.5%	1	0.1%	47	3.6%
109	0	0.0%	55	4.2%	3	0.2%	58	4.4%
110	0	0.0%	50	3.8%	3	0.2%	53	4.1%
111			28	2.1%	3	0.2%	31	2.4%
112			31	2.4%	9	0.7%	40	3.1%
113			23	1.8%	3	0.2%	26	2.0%
114			17	1.3%	1	0.1%	18	1.4%
115			17	1.3%	2	0.2%	19	1.5%
116					21	1.6%	21	1.6%
117					16	1.2%	16	1.2%
118					9	0.7%	9	0.7%
119					12	0.9%	12	0.9%
120					8	0.6%	8	0.6%
Totals	650	49.7%	510	39.0%	(continued)			

Postrecruits (continued)				
Carapace Length (mm)	Number	Percent	Totals	%
121	5	0.4%	5	0.4%
122	8	0.6%	8	0.6%
123	2	0.2%	2	0.2%
124	3	0.2%	3	0.2%
125	3	0.2%	3	0.2%
126	5	0.4%	5	0.4%
127	5	0.4%	5	0.4%
128	2	0.2%	2	0.2%
129	1	0.1%	1	0.1%
130	1	0.1%	1	0.1%
131	3	0.2%	3	0.2%
132	1	0.1%	1	0.1%
133	1	0.1%	1	0.1%
134	2	0.2%	2	0.2%
135	2	0.2%	2	0.2%
136	2	0.2%	2	0.2%
137	0	0.0%	0	0.0%
138	0	0.0%	0	0.0%
139	0	0.0%	0	0.0%
140	0	0.0%	0	0.0%
141	0	0.0%	0	0.0%
142	0	0.0%	0	0.0%
143	0	0.0%	0	0.0%
144	0	0.0%	0	0.0%
145	0	0.0%	0	0.0%
146	0	0.0%	0	0.0%
147	0	0.0%	0	0.0%
148	0	0.0%	0	0.0%
149	0	0.0%	0	0.0%
150	0	0.0%	0	0.0%
151	0	0.0%	0	0.0%
152	0	0.0%	0	0.0%
153	0	0.0%	0	0.0%
154	0	0.0%	0	0.0%
155	0	0.0%	0	0.0%
156	0	0.0%	0	0.0%
157	0	0.0%	0	0.0%
158	0	0.0%	0	0.0%
159	0	0.0%	0	0.0%
160	0	0.0%	0	0.0%
Totals	148	11.3%	1,308	100.0%

Number of Prerecruit threes (< 76mm)	9	0.7%
Number of Prerecruit twos (76 to 89 mm)	85	6.5%
Number of prerecruit ones (> 89mm)	555	42.4%
		49.6%

Average Length of all male crab captured = 103 mm

Table 6. Length frequencies by shell age of all legal male red king crab captured in the winter pot survey, Norton Sound, 1999.

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	4	0.6%	0	0.0%	4	0.6%
102	4	0.6%	1	0.2%	5	0.8%
103	19	2.9%	3	0.5%	22	3.3%
104	47	7.1%	3	0.5%	50	7.6%
105	50	7.6%	3	0.5%	53	8.1%
106	52	7.9%	0	0.0%	52	7.9%
107	67	10.2%	1	0.2%	68	10.3%
108	46	7.0%	1	0.2%	47	7.1%
109	55	8.4%	3	0.5%	58	8.8%
110	50	7.6%	3	0.5%	53	8.1%
111	28	4.3%	3	0.5%	31	4.7%
112	31	4.7%	9	1.4%	40	6.1%
113	23	3.5%	3	0.5%	26	4.0%
114	17	2.6%	1	0.2%	18	2.7%
115	17	2.6%	2	0.3%	19	2.9%
116	20	3.0%	1	0.2%	21	3.2%
117	14	2.1%	2	0.3%	16	2.4%
118	9	1.4%	0	0.0%	9	1.4%
119	11	1.7%	1	0.2%	12	1.8%
120	7	1.1%	1	0.2%	8	1.2%
121	4	0.6%	1	0.2%	5	0.8%
122	8	1.2%	0	0.0%	8	1.2%
123	2	0.3%	0	0.0%	2	0.3%
124	3	0.5%	0	0.0%	3	0.5%
125	3	0.5%	0	0.0%	3	0.5%
126	3	0.5%	2	0.3%	5	0.8%
127	4	0.6%	1	0.2%	5	0.8%
128	1	0.2%	1	0.2%	2	0.3%
129	0	0.0%	1	0.2%	1	0.2%
130	1	0.2%	0	0.0%	1	0.2%
131	2	0.3%	1	0.2%	3	0.5%
132	0	0.0%	1	0.2%	1	0.2%
133	0	0.0%	1	0.2%	1	0.2%
134	1	0.2%	1	0.2%	2	0.3%
135	1	0.2%	1	0.2%	2	0.3%
136	1	0.2%	1	0.2%	2	0.3%
137	0	0.0%	0	0.0%	0	0.0%
138	0	0.0%	0	0.0%	0	0.0%
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%	0	0.0%	0	0.0%
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	605	91.9%	53	8.1%	658	100.0%
Average Lengths	110		115		110	
		Total Recruits=	510	77.5%		
		Total Postrecruits=	148	22.5%		

Table 7. Length frequencies by shell age of all sublegal male red king crab captured in the winter pot survey, Norton Sound, 1999.

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)	%	Total Sublegal Males	%
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	0			0.0%	0			0.0%	0	0.0%
65	0			0.0%	0			0.0%	0	0.0%
66	0			0.0%	0			0.0%	0	0.0%
67	1			0.2%	0			0.0%	1	0.2%
68	1			0.2%	0			0.0%	1	0.2%
69	2			0.3%	0			0.0%	2	0.3%
70	1			0.2%	0			0.0%	1	0.2%
71	0			0.0%	0			0.0%	0	0.0%
72	1			0.2%	0			0.0%	1	0.2%
73	0			0.0%	0			0.0%	0	0.0%
74	0			0.0%	0			0.0%	0	0.0%
75	3			0.5%	0			0.0%	3	0.5%
76		1		0.2%		0		0.0%	1	0.2%
77		3		0.5%		0		0.0%	3	0.5%
78		1		0.2%		0		0.0%	1	0.2%
79		1		0.2%		0		0.0%	1	0.2%
80		1		0.2%		0		0.0%	1	0.2%
81		4		0.6%		0		0.0%	4	0.6%
82		4		0.6%		0		0.0%	4	0.6%
83		7		1.1%		0		0.0%	7	1.1%
84		6		0.9%		0		0.0%	6	0.9%
85		6		0.9%		0		0.0%	6	0.9%
86		10		1.5%		0		0.0%	10	1.5%
87		13		2.0%		0		0.0%	13	2.0%
88		17		2.6%		0		0.0%	17	2.6%
89		11		1.7%		0		0.0%	11	1.7%
90			15	2.3%			0	0.0%	15	2.3%
91			14	2.2%			0	0.0%	14	2.2%
92			25	3.9%			0	0.0%	25	3.9%
93			35	5.4%			0	0.0%	35	5.4%
94			34	5.2%			1	0.2%	35	5.4%
95			24	3.7%			0	0.0%	24	3.7%
96			30	4.6%			0	0.0%	30	4.6%
97			49	7.6%			3	0.5%	52	8.0%
98			45	6.9%			0	0.0%	45	6.9%
99			57	8.8%			0	0.0%	57	8.8%
100			47	7.2%			0	0.0%	47	7.2%
101			50	7.7%			0	0.0%	50	7.7%
102			60	9.2%			1	0.2%	61	9.4%
103			41	6.3%			4	0.6%	45	6.9%
104			15	2.3%			0	0.0%	15	2.3%
105			5	0.8%			0	0.0%	5	0.8%
106			0	0.0%			0	0.0%	0	0.0%
107			0	0.0%			0	0.0%	0	0.0%
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	9	85	546	98.6%	0	0	9	1.4%	649	100.0%
Average Lengths (mm)	71	85	98		0	0	100		96	
Average Length of all sublegal new shell males =				96 mm	Average length of all sublegal old shell males =				100 mm	

Table 8. Length frequencies and percent ovigerity of all female red king crab captured in the winter pot survey, Norton Sound, 1999.

Carapace Length (mm)	Percent Ovigerity					Juvenile	Total
	Full 90 - 100%	High 60 - 89%	Medium 30 - 59%	Low 1 - 29%	None 0%		
30	0	0	0	0	0	1	1
31	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0
42	0	0	0	0	0	1	1
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	0	0	0	0	1	1
67	0	0	0	0	0	0	0
68	0	0	0	0	0	0	0
69	0	0	0	0	0	1	1
70	0	1	0	0	0	0	1
71	0	1	0	0	0	0	1
72	0	0	0	0	0	0	0
73	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0
75	0	1	0	0	0	0	1
76	0	0	0	0	0	0	0
77	0	2	0	0	0	0	2
78	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0
80	0	2	0	0	0	0	2
81	0	1	0	0	0	0	1
82	0	0	0	0	0	0	0
83	0	1	0	0	0	0	1
84	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0
86	0	2	0	0	0	0	2
87	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0
	0	11	0	0	0	4	15

Total number of juvenile females (<72mm) = 4
 Average length of juvenile females (<72mm) = 52 mm
 Average length of adult females (>=72mm) = 79 mm
 Average length of all females = 72 mm

Table 9. Subsistence and commercial king crab permits issued for winter fishing, Norton Sound, 1978 - 1999.

Winter	<u>Subsistence Fishery</u>			<u>Commercial Fishery^a</u>		
	Number of Permits Issued	Number of Crab Harvested	Average Harvest/Fisher	Number of Registered Fishermen	Number of Crab Harvested	Average Harvest/Fisher
1977-1978	290	12,506	84	37	9,625	260
1978-1979	48	224	6	1	221	221
1979-1980	22	213	24	1	22	22
1980-1981	51	360	16	0	0	0
1981-1982	101	1,288	24	1	17	17
1982-1983	172	10,432	123	5	549	110
1983-1984	222	11,220	78	8	856	107
1984-1985	203	8,377	63	9	1,168	130
1985-1986	136	7,052	66	5	2,168	434
1986-1987	138	5,772	59	7	1,040	149
1987-1988	71	2,724	68	10	425	43
1988-1989	139	6,126	65	5	403	81
1989-1990	136	12,152	114	13	3,626	279
1990-1991	119	7,366	93	11	3,800	345
1991-1992	158	11,736	112	13	7,478	575
1992-1993	88	1,097	30	8	1,788	224
1993-1994	118	4,113	58	25	5,753	230
1994-1995	166	5,426	56	42	7,538	179
1995-1996	85	1,679	48	9	1,778	198
1996-1997	38	745	71	3	83	28
1997-1998	93	8,622	135	5	984	197
1998-1999 ^b	97	^c	^c	8	2,384	298
Average 1977-1998	124			10	2,349	182

^a Before 1985 the winter commercial fishery was open from 1 January through 30 April. After March 1985, the winter commercial fishery was/is open by regulation from 15 November through 15 May.

^b Preliminary inseason information.

^c Information not yet available, will be listed in later reports.

Table 10. Total catch of red king crab during the winter pot surveys, Norton Sound, 1983 - 1999.

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
Average of surveys 1983- 1998	77	1,038	14.6	44	0.6

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

^b The project was not funded.

Table 11. Percent prerecruits, recruits and postrecruits in the catch of red king crab during the winter pot surveys, 1983 - 1999, and the summer pot survey, 1995, Norton Sound.

Year	<u>Sublegal Prerecruits</u>				<u>Legal</u>			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%
Averages 1983 - 1998	Average of threes and twos combined =	23.0%	29.1%	52.1%	20.4%	27.5%	47.9%	

Year	<u>Sublegal Prerecruits</u>				<u>Legal</u>			Total
	Threes ^a	Twos ^c	Ones ^d	Subtotal	Recruits	Postrecruits	Subtotal	
Summer 1995	8.6%	12.4%	16.9%	37.9%	20.0%	42.1%	62.1%	100%

^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 in the Nome area, Norton Sound, 1983 - 1999.

Year	Average Length (mm)	
	Legal Male Crab	Female Crab
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

^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.

Table 13. Recruit and postrecruit red king crab as a percentage of the legal catch sampled during the winter pot surveys and summer commercial fisheries in the Nome area, Norton Sound, 1983 - 1999.

Year	<u>Winter Study</u>		<u>Summer Commercial</u>	
	Recruits	Postrecruits	Recruits	Postrecruits
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	a	a	25%	75%
1989	47%	53%	23%	77%
1990	49%	51%	21%	79%
1991	52%	48%	b	b
1992	c	c	28%	72%
1993	20%	80%	31%	69%
1994	c	c	14%	86%
1995	42%	58%	36%	64%
1996	28%	72%	30%	70%
1997	40%	60%	49%	51%
1998	48%	52%	32%	68%
1999	78%	22%		

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

^b No data collected in the summer of 1991 due to closed fishery.

^c No data collected due to lack of funding.

Table 14. Fishing crab tag information recovered during the 1999 Norton Sound commercial and subsistence red king crab harvest.

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 ^a	Skip Molts	Average Growth per Molt (mm)
NZ2821	1/10/99	656403	no info		2/28/97	N2	98				
NZ2927	2/22/99	656403	123	new	3/28/97	N3	92	31	2	0	15.5
NX3014	2/24/99	656403	138	old	3/9/95	W1	128	10	1	3	10.0
NZ3193	3/4/99	656403	97	new	3/2/98	N3	81	16	1	0	16.0
NZ3343	3/5/99	656403	99	old	3/23/98	W3	99	0	0	1	0.0
NZ3124	3/6/99	656403	106	new	2/27/98	W3	92	14	1	0	14.0
NZ3163	3/9/99	656403	99	new	3/2/98	W3	85	14	1	0	14.0
NZ3676	3/12/99	656403	95	new	2/22/99	W4	96	-1			
NX3882	3/17/99	636403	120	old	4/10/96	B2	93	27	2	1	13.5
NX3601	3/23/99	656403	87	new	2/12/99	N2	87	0			
NZ3590	3/23/99	656403	97	new	2/12/99	W4	92	5			
NZ3126	3/26/99	656403	106	new	2/27/98	W3	91	15	1	0	15.0
NZ3697	3/29/99	656403	97	new	2/19/99	W4	97	0			
NZ3916	4/4/99	656403	100	new	3/22/99	E1	99	1			
NZ3721	4/7/99	656403	94	new	4/1/99	N2	93	1			
NZ3963	4/13/99	656403	95	new	3/23/99	W4	95	0			
NZ4013	4/13/99	656403	no info		4/8/99	N3	99				
NZ3919	4/19/99	656403	98	new	3/30/99	N3	99	-1			
NZ4054	4/24/99	656403	99	new	4/20/99	W1	99	0			
										Average Growth	12.3

^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=4.78 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.

N2=0.85 miles south of Nome.

N3=1.34 miles south of Nome.

W1=6.83 miles west of Nome

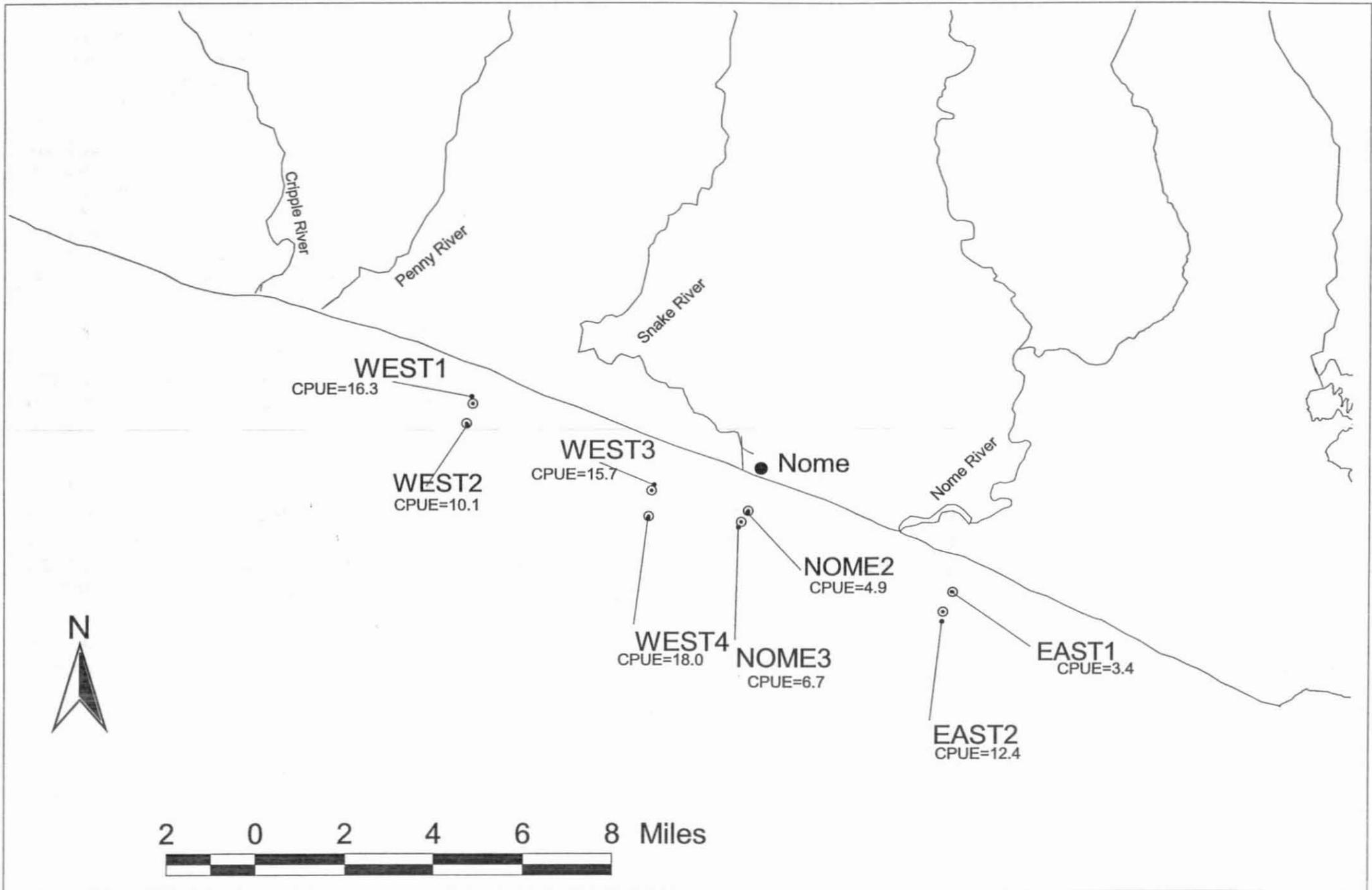
W2=6.78 miles west of Nome

W3=2.8 miles west of Nome

W4=2.8 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, 1999.



Norton Sound King Crab Winter 1999

February 8 - April 20, 1999

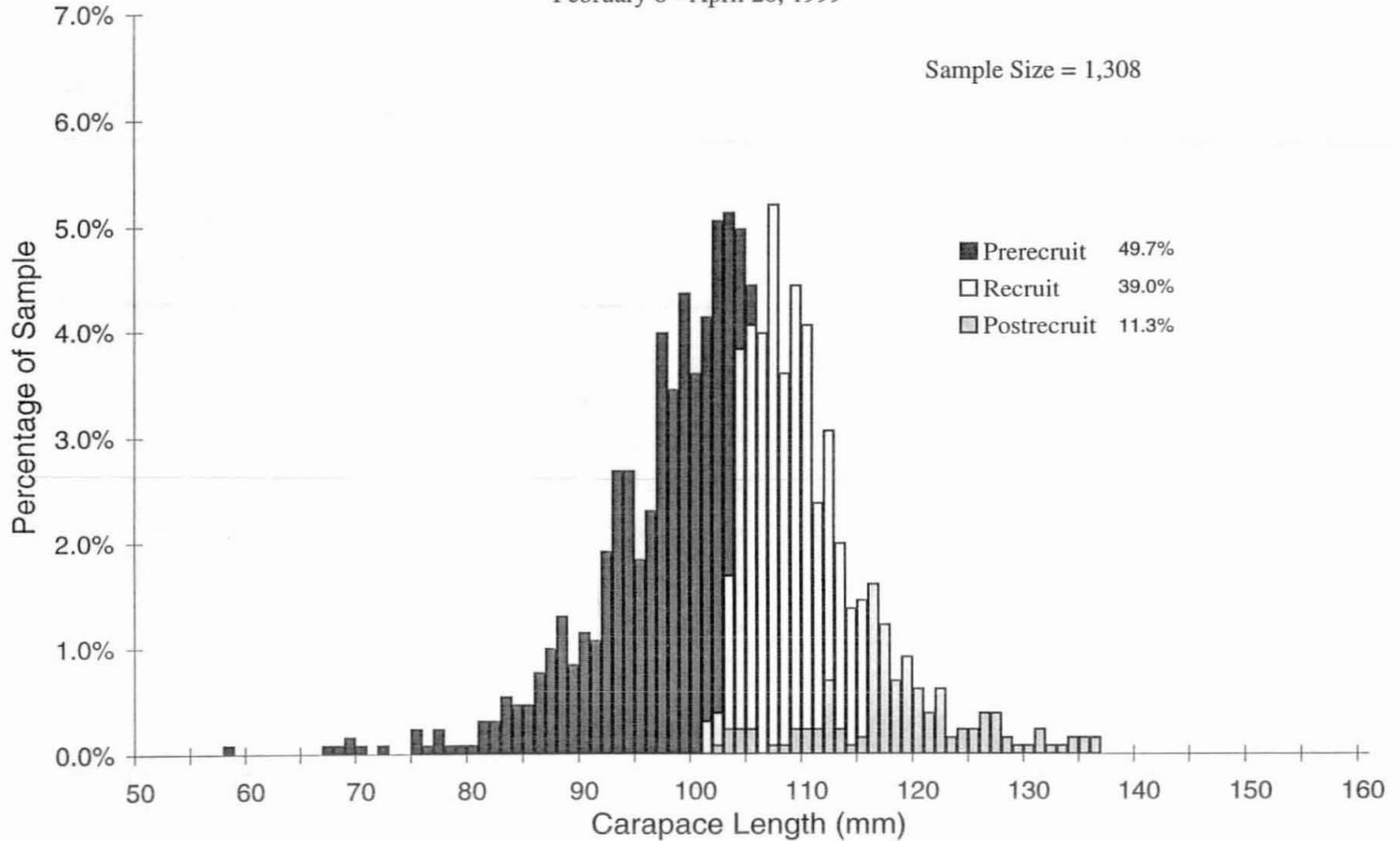


Figure 2. Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1999.

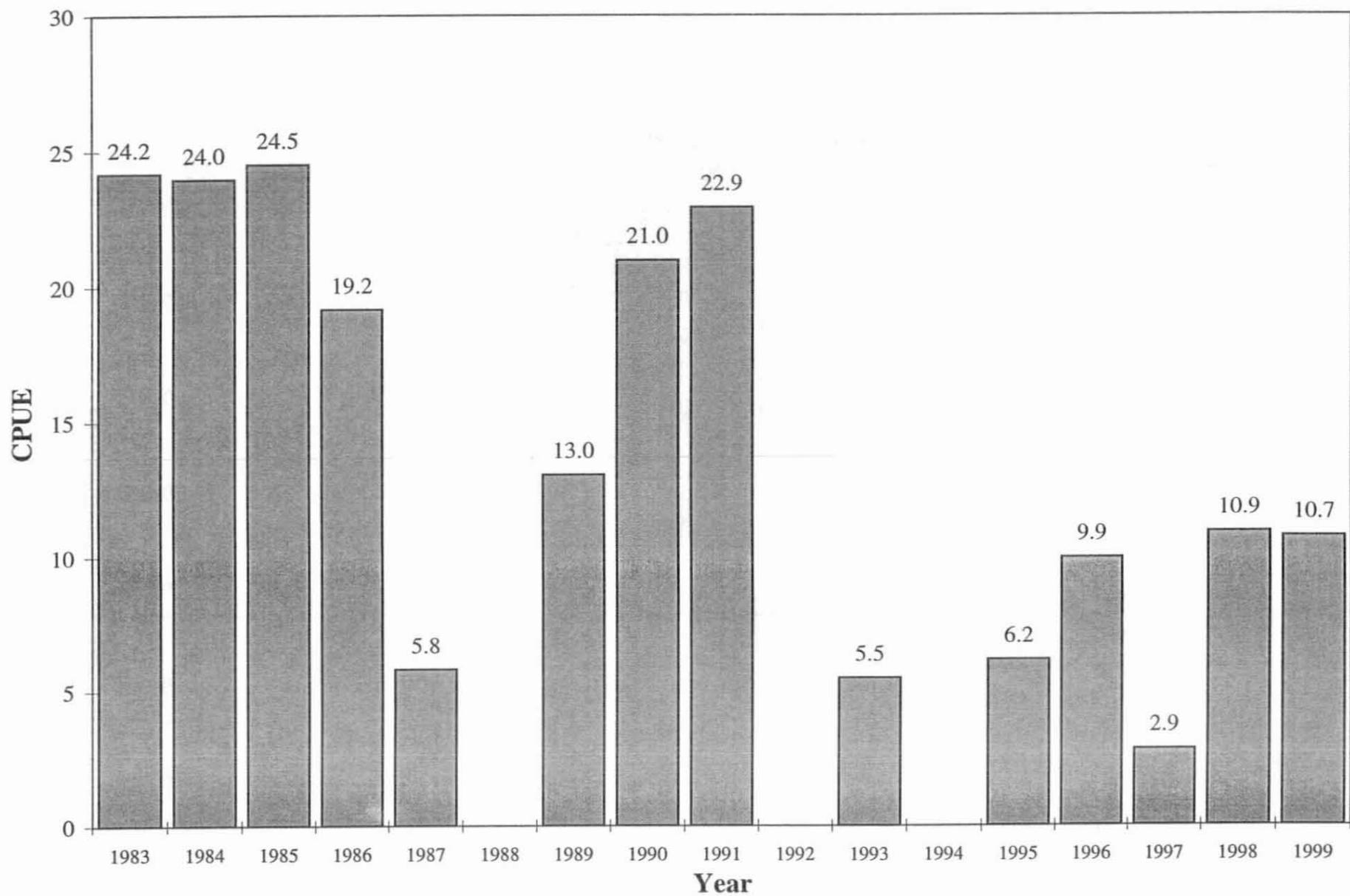
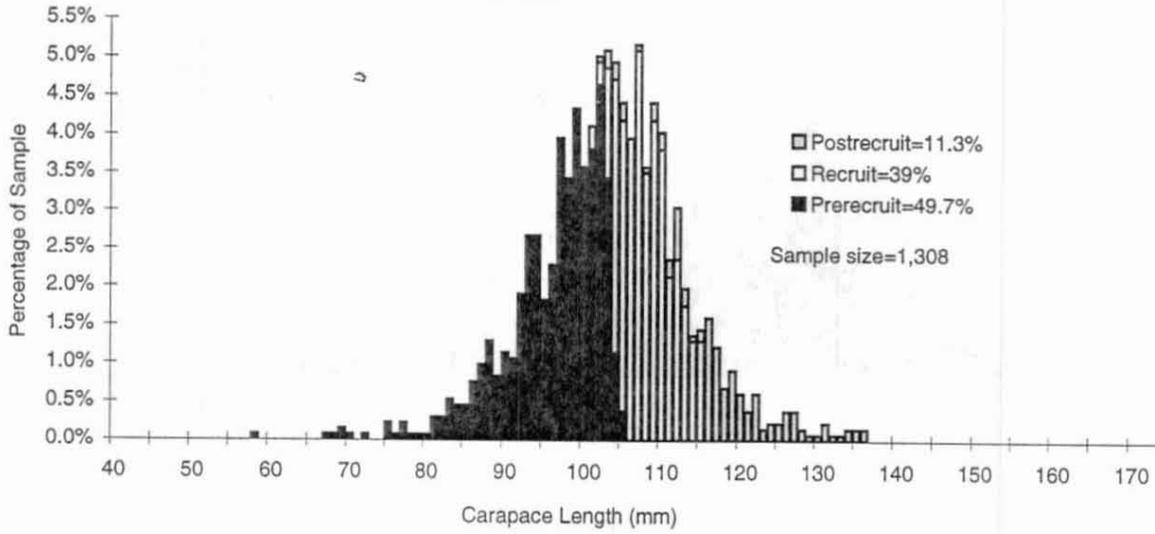


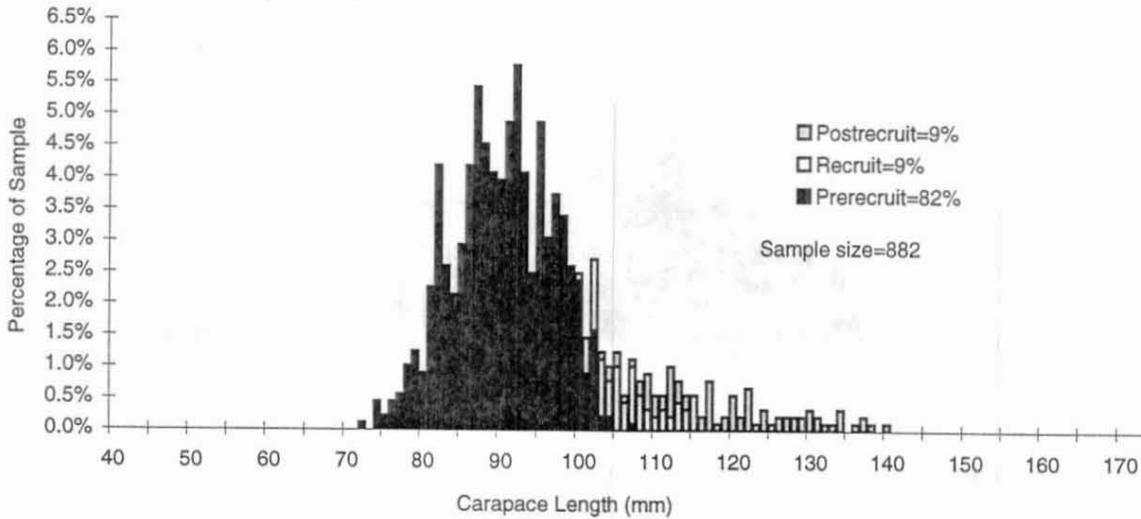
Figure 3. Annual catch per unit effort (CPUE) for male red king crab in the winter pot survey, Norton Sound, 1983 - 1999. There were no winter pot surveys in 1988, 1992 and 1994.

Figure 4. Comparison of the length frequency distribution of all male red king crab captured during the winter and summer pot and trawl surveys, Norton Sound, 1995 - 1999.

Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1999.



Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1998.



Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1997.

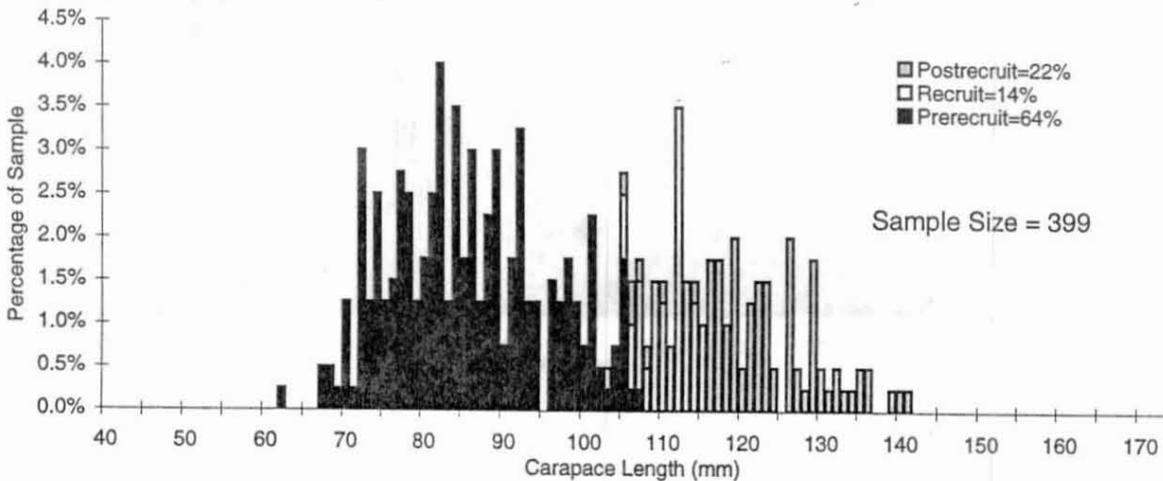
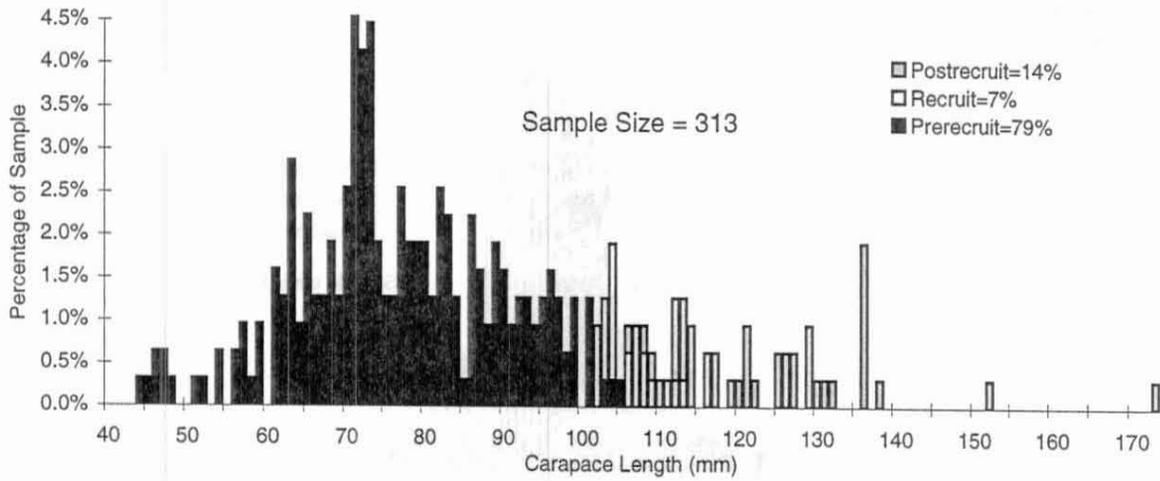
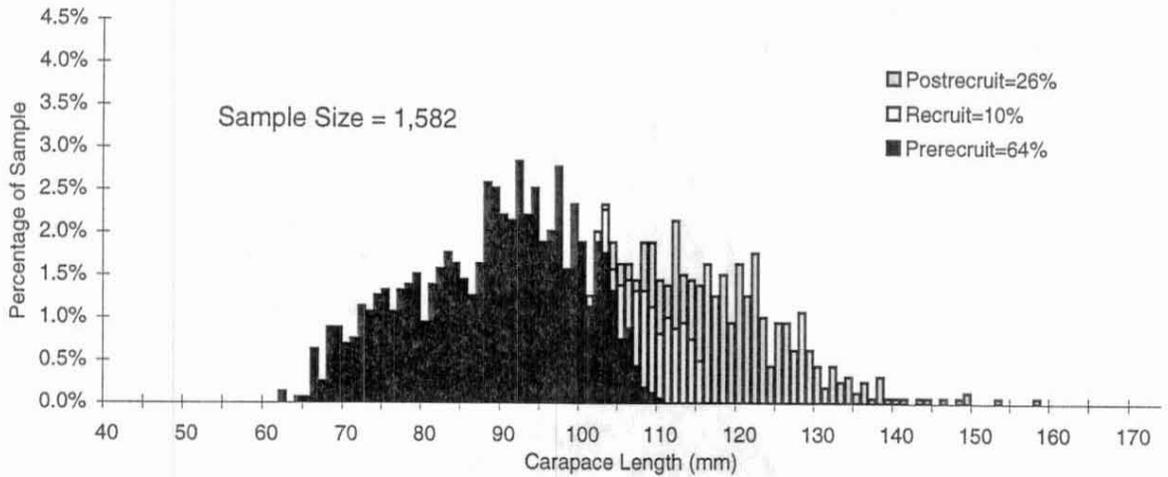


Figure 4. (Page 2 Of 3)

Length frequency distribution of all male red king crab captured during the summer trawl survey, Norton Sound, 1996.



Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1996.



Length frequency distribution of all male red king crab captured during the summer pot survey, Norton Sound, 1995.

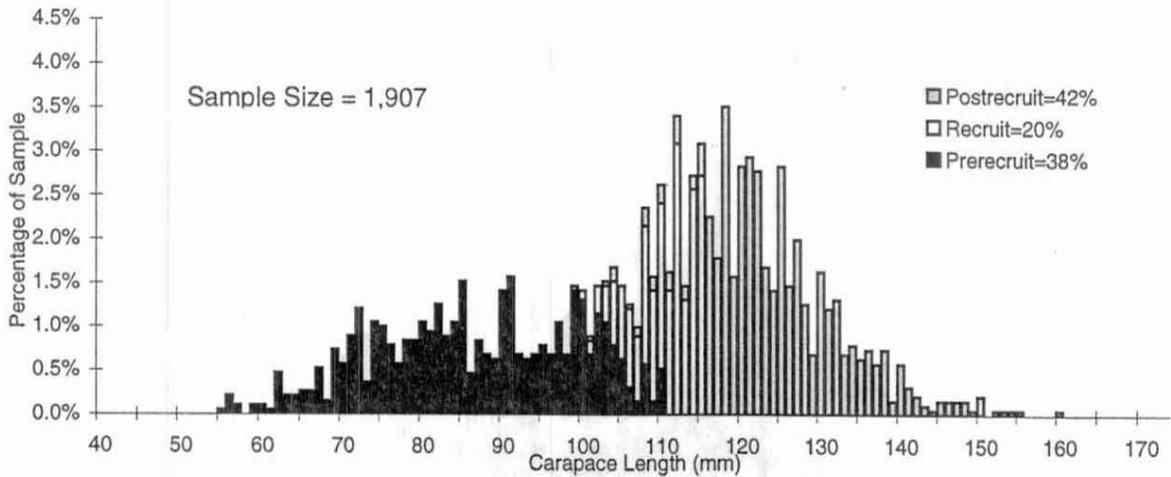
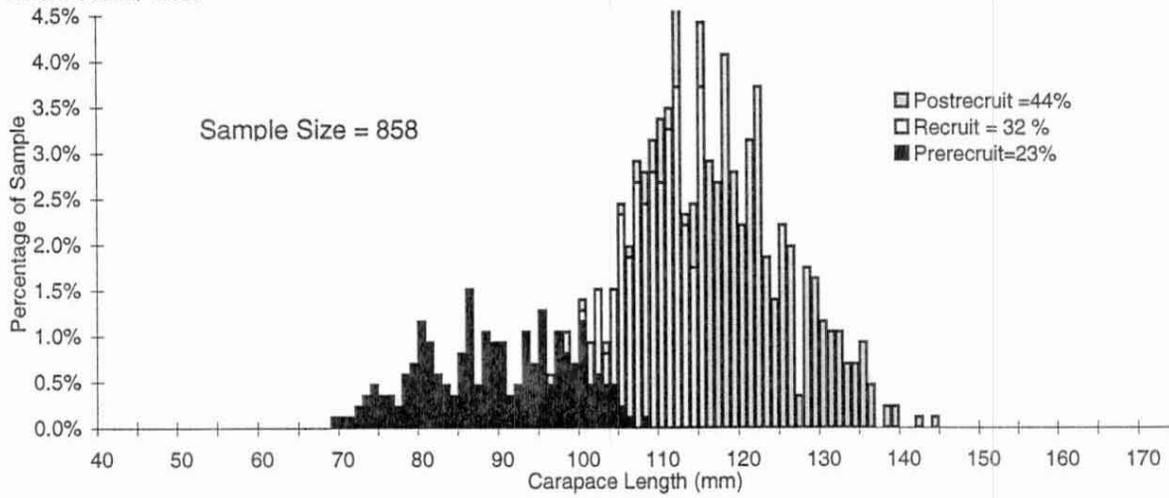


Figure 4. (Page 3 of 3).

Length frequency distribution of all male red king crab captured during the winter pot survey, Norton Sound, 1995.



Appendix Table A. Record of catches for fishing stations in the 1999 Norton Sound winter red king crab study.

(page 1 of 4)

Station E1

Date	Soak Time (days)	Daily No. of males captured	Cumulative No. of males captured	Daily No. of females captured	Cumulative No. of females captured
22-Feb	5	18	18	0	0
25-Feb	3	10	28	0	0
1-Mar	4	10	38	0	0
4-Mar	3	18	56	0	0
9-Mar	5	9	65	0	0
11-Mar	2	1	66	0	0
16-Mar	5	21	87	0	0
22-Mar	6	38	125	0	0
25-Mar	3	15	140	1	1
30-Mar	5	0	140	0	1
1-Apr	2	0	140	0	1
6-Apr	5	7	147	0	1
8-Apr	2	7	154	0	1
16-Apr	8	32	186	1	2
19-Apr	3	0	186	0	2
Avg. male catch per pot lift =		12.4			

Station E2

Date	Soak Time (days)	Daily No. of males captured	Cumulative No. of males captured	Daily No. of females captured	Cumulative No. of females captured
22-Feb	5	21	21	0	0
25-Feb	3	6	27	0	0
1-Mar	4	0	27	0	0
4-Mar	3	2	29	0	0
9-Mar	5	1	30	0	0
11-Mar	2	1	31	0	0
16-Mar	5	0	31	0	0
22-Mar	6	18	49	0	0
25-Mar	3	0	49	0	0
30-Mar	5	0	49	0	0
1-Apr	2	0	49	0	0
6-Apr	5	0	49	0	0
8-Apr	2	2	51	0	0
16-Apr	8	0	51	1	1
19-Apr	3	0	51	0	1
Avg. male catch per pot lift =		3.4			

Appendix Table A. Record of catches for fishing stations in the 1999 Norton Sound winter red king crab study.

(page 2 of 4)

Station N2

Date	Soak Time (days)	Daily No. of males captured	Cumulative No. of males captured	Daily No. of females captured	Cumulative No. of females captured
12-Feb	4	22	22	0	0
16-Feb	4	6	28	0	0
19-Feb	3	3	31	0	0
22-Feb	3	2	33	0	0
25-Feb	3	0	33	0	0
1-Mar	4	37	70	0	0
4-Mar	3	9	79	1	1
9-Mar	5	3	82	0	1
12-Mar	3	1	83	0	1
16-Mar	4	0	83	0	1
22-Mar	6	0	83	0	1
25-Mar	3	0	83	0	1
30-Mar	5	0	83	0	1
1-Apr	2	0	83	0	1
5-Apr	4	0	83	0	1
8-Apr	3	0	83	0	1
19-Apr	11	0	83	0	1
Avg. male catch per pot lift =		4.9			

Station N3

Date	Soak Time (days)	Daily No. of males captured	Cumulative No. of males captured	Daily No. of females captured	Cumulative No. of females captured
12-Feb	4	0	0	0	0
16-Feb	4	0	0	0	0
19-Feb	3	0	0	0	0
22-Feb	3	0	0	0	0
25-Feb	3	0	0	0	0
1-Mar	4	0	0	0	0
4-Mar	3	0	0	0	0
9-Mar	5	0	0	0	0
12-Mar	3	0	0	0	0
16-Mar	4	18	18	0	0
22-Mar	6	17	35	0	0
25-Mar	3	8	43	0	0
30-Mar	5	10	53	0	0
1-Apr	2	7	60	0	0
5-Apr	4	4	64	1	1
8-Apr	3	14	78	0	1
19-Apr	11	36	114	1	2
Avg. male catch per pot lift =		6.7			

Appendix Table A. Record of catches for fishing stations in the 1999 Norton Sound winter red king crab study.
(page 3 of 4)

Station W1

Date	Soak Time (days)	Daily No. of males captured	Cumulative No. of males captured	Daily No. of females captured	Cumulative No. of females captured
22-Feb	4	15	15	0	0
26-Feb	4	24	39	0	0
2-Mar	4	22	61	0	0
5-Mar	3	1	62	0	0
10-Mar	5	6	68	0	0
12-Mar	2	4	72	0	0
15-Mar	3	22	94	0	0
18-Mar	3	21	115	0	0
23-Mar	5	32	147	0	0
26-Mar	3	33	180	0	0
31-Mar	5	0	180	0	0
7-Apr	7	22	202	1	1
13-Apr	6	0	202	0	1
20-Apr	7	26	228	0	1
Avg. male catch per pot lift =		16.3			

Station W2

Date	Soak Time (days)	Daily No. of males captured	Cumulative No. of males captured	Daily No. of females captured	Cumulative No. of females captured
22-Feb	4	24	24	0	0
26-Feb	4	26	50	0	0
2-Mar	4	17	67	0	0
5-Mar	3	28	95	0	0
10-Mar	5	16	111	0	0
12-Mar	2	20	131	0	0
15-Mar	3	1	132	0	0
18-Mar	3	0	132	0	0
23-Mar	5	6	138	0	0
26-Mar	3	0	138	0	0
31-Mar	5	1	139	1	1
7-Apr	7	0	139	0	1
13-Apr	6	2	141	0	1
20-Apr	7	0	141	0	1
Avg. male catch per pot lift =		10.1			

Appendix Table A. Record of catches for fishing stations in the 1999 Norton Sound winter red king crab study.
(page 4 of 4)

Station W3

Date	Soak Time (days)	Daily No. of males captured	Cumulative No. of males captured	Daily No. of females captured	Cumulative No. of females captured
16-Feb	4	31	31	0	0
19-Feb	3	29	60	0	0
22-Feb	3	19	79	0	0
26-Feb	4	5	84	0	0
2-Mar	4	29	113	0	0
5-Mar	3	27	140	0	0
11-Mar	6	27	167	0	0
15-Mar	4	32	199	0	0
18-Mar	3	26	225	0	0
23-Mar	5	7	232	0	0
26-Mar	3	1	233	0	0
31-Mar	5	1	234	0	0
5-Apr	5	0	234	0	0
13-Apr	8	0	234	0	0
20-Apr	7	1	235	0	0
Avg. male catch per pot lift =		15.7			

Station W4

Date	Soak Time (days)	Daily No. of males captured	Cumulative No. of males captured	Daily No. of females captured	Cumulative No. of females captured
16-Feb	4	34	34	1	1
19-Feb	3	8	42	1	2
22-Feb	3	25	67	0	2
26-Feb	4	20	87	1	3
2-Mar	4	34	121	0	3
5-Mar	3	23	144	0	3
11-Mar	6	38	182	1	4
15-Mar	4	2	184	0	4
18-Mar	3	33	217	0	4
23-Mar	5	31	248	0	4
26-Mar	3	0	248	0	4
31-Mar	5	21	269	2	6
5-Apr	5	1	270	0	6
13-Apr	8	0	270	0	6
20-Apr	7	0	270	1	7
Avg. male catch per pot lift =		18.0			