

Norton Sound Summer Commercial Red King Crab Fishery  
Project Report, 1998

By

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## INTRODUCTION

The Norton Sound Section of the Northern Bering Sea District consists of all waters in statistical area Q that are north of the latitude of Cape Romanzof, east of 168 west longitude, and south of the latitude of Cape Prince of Wales (Figures 1 and 2). A large vessel summer commercial red king crab (*Paralithodes camtschatica*) fishery existed in the Norton Sound Section from 1977 through 1992. No summer commercial fishery occurred in 1991 due to a lack of staff necessary to manage the fishery. The budget had been cut the previous winter. In 1992 the large vessel summer commercial fishery resumed. Regulation changes adopted during the March 1993 Board of Fisheries meeting changed the character of the fishing fleet to that of a small boat fleet. A superexclusive designation went into effect for the Norton Sound commercial crab fishery June 27, 1994. A vessel registered for the Norton Sound crab fishery may not be used to take king crab in any other registration area during that registration year. A vessel moratorium was put into place prior to the 1996 season with the intention to create a license limitation in the near future.

The National Marine Fisheries Service (NMFS) conducted a trawl survey to examine the abundance of Norton Sound red king crab in late August 1991 (Appendix Table 5). The results of that survey as compared to the 6 previous trawl surveys show a gradual trend of increasing abundance since the low recorded in 1982. The 1991 survey estimated the total biomass of legal king crab (red king crab with carapace  $\geq 4.75$  inches) to be 3.4 million pounds present in the open commercial fishing area. The 1991 survey was the last survey conducted by the NMFS. The Alaska Department of Fish and Game (ADF&G) conducted a trawl survey to examine the abundance of Norton Sound red king crab from August 7 - 18, 1996. The estimated abundance of legal male was 534,446 red king crab with a biomass of approximately 1.6 million pounds (Appendix Table 5). This population estimate showed a 40% decline in the legal biomass of king crab since 1991. The results from the 1996 trawl survey prompted the fishery managers to reduce the harvest rate in the commercial fishery to five percent of the legal biomass and set the guideline harvest at 80,000 pounds. This is a significant reduction from the previous exploitation rate and guideline harvest. One ADF&G fishery biologist was stationed in Nome to monitor the fishery and sample legal crab delivered to buyers in Nome.

### Objectives and Tasks

The objectives for the 1998 summer king crab project were to:

1. Monitor commercial harvest of red king crab on a daily basis.
2. Inform processors and fishermen of:
  - a. Fishery regulations.
  - b. Fish buying and reporting requirements.
  - c. Management strategies.

3. Assist in public relations and inform the public of the status of the commercial fishery.
4. Compile the catch data necessary to generate the data tables used for inseason management.
5. Measure and determine carapace length, age, and sex of sampled crab in the commercial harvest.
6. Determine the percentage of recruits in the commercial harvest sample (new shell legal crab with carapace length less than or equal to 115 mm).
7. Measure and record shell length and age of recaptured tagged king crab.
8. Draft a project report which includes text, tables, and figures that summarizes the fishery and is incorporated into the report to the Alaska Board of Fisheries.

## METHODS

The methods used during the 1998 commercial crab season for catch monitoring and reporting, sampling crab, skipper interviews, and collecting information from tagged crab are presented in the ADF&G Norton Sound King Crab Operational Plan.

Catch reporting logs were kept by buyers and by skippers of catcher vessels for each delivery. Buyer verbal reports were to be relayed daily by 9:00 a.m. to the ADF&G office in Nome. Fish tickets were due in to the ADF&G office on Friday of each week throughout the duration of the fishery. Reports from fishermen and catcher/seller fish tickets were required every Monday for the duration of the fishery. Compliance with reporting requirements was generally good.

## RESULTS

### Harvest Summary

The 1998 summer commercial red king crab fishery opened at 12 noon, July 1 in the Norton Sound Section. The first fishers registered July 7, and the first delivery was not made until July 16. The fishery was closed by regulation at 12 noon, September 3. A total of 11 fishing vessels and 13 fishers were registered for the summer commercial crab season. Ten fishers were registered as catcher/sellers. No large vessels participated in

the 1998 summer season. No floating crab processors or catcher/processors operated in Norton Sound during the 1998 summer fishery, therefore no independent observers were placed on board commercial vessels. There was one company set up to purchase and process crab in Nome. A group of fishers acted as catcher/sellers and coordinated flying live crab to a buyer in Anchorage.

The total commercial catch was 10,661 crab (Table 1). A total of 29,684 pounds were harvested. This includes approximately 2,059 pounds of deadloss and 1,985 pounds of crab given away or kept for personal use. Eight vessels made 50 deliveries, and 11 permit holders fished. Average weight for commercially caught crab was 2.78 lb/crab. A total of 360 pots were registered and 1,639 pot pulls were recorded during the fishery. The average price/pound was \$1.47. The fishery value was approximately \$41,000. This does not include deadloss and crab given away or kept for personal use. Daily catch statistics can be found in Table 1 and Figure 3.

Fish ticket reports document that 6 statistical areas were fished (Table 2, Figure 6). Statistical area 636401 had the highest catch with 10,771 pounds taken or approximately 36.3% of the entire harvest. The second highest catch came from statistical area 626401 which was 8,065 lbs or 27.2% of the harvest. The overall CPUE for the 1998 fishery was 6.5 crab/pot (Table 1). Statistical area 626401 had the greatest CPUE with 9.6 crab/pot (Table 2).

Included in the totals were fourteen landings made by 8 fishermen registered as catcher sellers. The Lower Yukon crab fleet lost their live crab market in Anchorage on the day they pulled their pots for a final time. Fishers tried to sell most of their crab locally and also gave away crab to organizations in Nome. They brought approximately 600 crab back out to sea in an attempt to release them. These crab have been included in the total pounds of deadloss because it is unknown if they survived.

### **Legal Male King Crab**

Carapace length measurements and shell age were collected from 1,055 male red king crab throughout the duration of the 1998 summer fishery. This was done by sampling the commercial harvest as boats delivered their catch. Carapace age was classified as new (11 months old) or old (at least 23 months old) (Table 3, Figure 4). Overall mean carapace length of the legal male red king crab sampled was 116.9 mm (Table 3). Male crab with new shell carapaces made up 61.1% of the total legal male king crab sampled, and old shell crab made up 38.9% of the sample (Table 3, Figure 4). Recruit crab made up 31.8% of all legal male crab sampled (Table 3). Postrecruit crab made up 68.2% of the legal crab sampled.

## Tagged Crab

Three male crab with tags were returned to the ADF&G office during the 1998 commercial fishery (Table 4). Information from 2 of these returned crab was useful. The crab with tag number NX3182 was tagged March 16, 1995 and grew 27 mm. The crab with tag number NX3940 was tagged April 1, 1996 and grew 30 mm. The average growth per molt was 14.3 mm.

## SUMMARY

There has been a change in the character of the summer commercial fishery toward a small boat fleet since 1993 due to regulation changes affecting pot limits, opening dates and a regulation making Norton Sound a superexclusive registration area. The quality and quantity of data collected since the 1993 summer crab fishery has differed greatly from previous years due to the nature of the small vessel fishery. No floating processor or catcher processor has taken part in the fishery since 1993, therefore no independent observers have been placed onboard commercial vessels. An ADF&G sampler has been stationed in Nome, and samples the commercial catch at the dock as it is delivered to buyers. The smaller catcher vessels take longer to make the runs to check pots, and have to be more cautious of weather. During the past three seasons, some vessels have based their operations out of the village of Golovin. This was due to its close proximity to more productive statistical areas. There has been a shift in the fishery effort and harvest eastward and closer to shore since 1992. This is due in part to the change in character of the fishery to that of a small vessel fishery, a relaxation of the closure line in 1993, 1994 and 1995, and a diminished number of legal crab in the western statistical areas. Comparisons of the annual summer commercial harvest of crab by statistical area can be found in Appendix Table 1.

Beginning in 1996 and continuing through the 1998 summer commercial crab fishery, a new approach for rewarding the return of tagged crab was used. Baseball caps picturing a king crab and the words "Norton Sound" and "Tag Reward" were used to encourage commercial fishermen to report and return tagged crab to the ADF&G office. This replaced the former \$3.00 reward. Reporting of tag information has greatly improved.

The 1998 season had the lowest number of vessels and fishermen participating since regulations changed the character of the summer season in 1993. The ex-vessel value of the 1998 fishery is estimated at \$41,003 (Appendix Tables 2 and 3) and is the lowest value in the history of the fishery. All these factors were most likely due to the decrease in the quota from 340,000 lbs to 80,000 lbs of red king crab and the vessel moratorium on new entrants greater than 32 feet. This also may be due to the low price offered for crab during the 1998 season. Catcher sellers were able to sell crab for a higher price than the single buyer in Nome was paying. The 1998 summer crab fishery had the second lowest mean carapace length in the past 7 years. Essentially, fewer large older crab were

harvested or available to be harvested. The low harvest was also due in part to lack of fishing effort. Most crab fishers were not aggressive in deploying their pots or moving pots according to crab movements. The only buyer in Nome ceased operations August 20 due to buying commitments in other parts of the state. Poor weather during the later part of August kept fishing vessels in port for 14 days. The majority of vessels pulled their pots on August 24 and 25 and sold crab locally. One vessel fished until the regulation closure. One registered vessel broke down during the season and was unable to retrieve its pots at the end of the season. These pots were retrieved ten days late and the catch was released. The fisher estimated 5 pots were lost.

Table 1. Daily catch (using fish ticket data) for the commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, July 1 - September 3, 1998. <sup>a,b</sup>

Date	Permits	Landings	Number of Crab	Lbs of Crab Harvested	Cumulative Total (lbs)	No. of Pots Pulled	Average Weight	CPUE
16-Jul	2	2	441	1,162	1,162	80	2.63	5.5
17-Jul	1	1	222	577	1,739	40	2.60	5.6
18-Jul	5	5	736	2,074	3,813	119	2.82	6.2
19-Jul	0	0	0	0	3,813	0	0.00	0.0
20-Jul	4	4	729	2,016	5,829	152	2.77	4.8
21-Jul	0	0	0	0	5,829	0	0.00	0.0
22-Jul	3	3	578	1,521	7,350	116	2.63	5.0
23-Jul	2	2	477	1,345	8,695	80	2.82	6.0
24-Jul	2	2	281	739	8,695	65	4.79	4.3
25-Jul				0	9,434			
26-Jul				0	9,434			
27-Jul	4	4	905	2,593	12,027	145	2.87	6.2
28-Jul				0	12,027			
29-Jul				0	12,027			
30-Jul				0	12,027			
31-Jul	2	2	543	1,606	13,633	73	2.96	7.4
1-Aug	2	2	530	1,535	15,168	64	2.90	8.3
2-Aug				0	15,168			
3-Aug	1	0	75	216	15,384	24	2.88	3.1
4-Aug				0	15,384			
5-Aug	4	4	1,362	3,826	19,210	126	2.81	10.8
6-Aug	2	2	170	368	19,578	60	2.16	2.8
7-Aug				0	19,578			
8-Aug				0	19,578			
9-Aug	2	2	265	711	20,289	69	2.68	3.8
10-Aug	3	3	720	1,966	22,255	92	2.73	7.8
11-Aug	1	1	70	212	22,467	35	3.03	2.0
12-Aug				0	22,467			
13-Aug				0	22,467			
14-Aug				0	22,467			
15-Aug				0	22,467			
16-Aug				0	22,467			
17-Aug				0	22,467			
18-Aug				0	22,467			
19-Aug				0	22,467			
20-Aug				0	22,467			
21-Aug				0	22,467			
22-Aug				0	22,467			
23-Aug				0	22,467			
24-Aug				0	22,467			
25-Aug				0	22,467			
26-Aug	4	5	1,616	4,362	26,829	146	2.70	11.1
27-Aug	2	2	563	1,711	28,540	73	3.04	7.7
28-Aug				0	28,540			
29-Aug	1	2	333	1,009	29,549	40	3.03	8.3
30-Aug				0	29,549			
31-Aug				0	29,549			
1-Sep				0	29,549			
2-Sep				0	29,549			
3-Sep	1	2	45	135	29,684	40	3.00	1.1
Totals:	11	50	10,661	29,684		1,639	2.78	6.5

<sup>a</sup> First Delivery was not made until July 16, 1998.

<sup>b</sup> Includes 787 crab not sold due to deadloss.

Table 2. Red king crab summer commercial harvest (from fish ticket reports) by statistical area for Norton Sound Section, Eastern Bering Sea, July 1 - September 3, 1998.

Statistical Area	Number	Pounds	Pots Pulled	CPUE	Average Weight (Lbs.)	Percent of Pots Pulled in Stat. Area (%)	Percent Harvest in Stat. Area (%)
626401	2,825	8,065	293	9.6	2.85	17.9	27.2
636330	928	2,449	182	5.1	2.64	11.1	8.3
636401	3,799	10,771	452	8.4	2.84	27.6	36.3
646401	1,164	3,194	263	4.4	2.74	16.0	10.8
656330	1,562	4,078	370	4.2	2.61	22.6	13.7
656401	383	1,127	79	4.8	2.94	4.8	3.8
Total:	10,661	29,684	1,639	6.5	2.78		

Table 3. Carapace length measurement summary of sampled legal male red king crab captured during the commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, July 1 - September 3, 1998.

Carapace Length (mm)	New shell			Old shell			Total		
	No.	Ave Length Calc.	%	No.	Ave Length Calc.	%	No.	Ave Length Calc.	%
95	1	0.1	0.1%	0	0.0	0.0%	1	0.1	0.1%
96	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
97	1	0.2	0.1%	1	0.2	0.1%	2	0.2	0.2%
98	2	0.3	0.2%	1	0.2	0.1%	3	0.3	0.3%
99	3	0.5	0.3%	1	0.2	0.1%	4	0.4	0.4%
100	0	0.0	0.0%	4	1.0	0.4%	4	0.4	0.4%
101	8	1.3	0.8%	1	0.2	0.1%	9	0.9	0.9%
102	10	1.6	0.9%	9	2.2	0.9%	19	1.8	1.8%
103	5	0.8	0.5%	6	1.5	0.6%	11	1.1	1.0%
104	13	2.1	1.2%	7	1.8	0.7%	20	2.0	1.9%
105	14	2.3	1.3%	15	3.8	1.4%	29	2.9	2.7%
106	11	1.8	1.0%	10	2.6	0.9%	21	2.1	2.0%
107	26	4.3	2.5%	6	1.6	0.6%	32	3.2	3.0%
108	17	2.8	1.6%	15	4.0	1.4%	32	3.3	3.0%
109	23	3.9	2.2%	17	4.5	1.6%	40	4.1	3.8%
110	31	5.3	2.9%	12	3.2	1.1%	43	4.5	4.1%
111	30	5.2	2.8%	12	3.2	1.1%	42	4.4	4.0%
112	37	6.4	3.5%	17	4.6	1.6%	54	5.7	5.1%
113	44	7.7	4.2%	7	1.9	0.7%	51	5.5	4.8%
114	29	5.1	2.7%	17	4.7	1.6%	46	5.0	4.4%
115	31	5.5	2.9%	22	6.2	2.1%	53	5.8	5.0%
116	22	4.0	2.1%	21	5.9	2.0%	43	4.7	4.1%
117	38	6.9	3.6%	18	5.1	1.7%	56	6.2	5.3%
118	25	4.6	2.4%	7	2.0	0.7%	32	3.6	3.0%
119	24	4.4	2.3%	14	4.1	1.3%	38	4.3	3.6%
120	31	5.8	2.9%	19	5.6	1.8%	50	5.7	4.7%
121	26	4.9	2.5%	11	3.2	1.0%	37	4.2	3.5%
122	21	4.0	2.0%	9	2.7	0.9%	30	3.5	2.8%
123	9	1.7	0.9%	13	3.9	1.2%	22	2.6	2.1%
124	17	3.3	1.6%	8	2.4	0.8%	25	2.9	2.4%
125	13	2.5	1.2%	13	4.0	1.2%	26	3.1	2.5%
126	13	2.5	1.2%	9	2.8	0.9%	22	2.6	2.1%
127	6	1.2	0.6%	14	4.3	1.3%	20	2.4	1.9%
128	7	1.4	0.7%	4	1.2	0.4%	11	1.3	1.0%
129	11	2.2	1.0%	13	4.1	1.2%	24	2.9	2.3%
130	4	0.8	0.4%	8	2.5	0.8%	12	1.5	1.1%
131	3	0.6	0.3%	6	1.9	0.6%	9	1.1	0.9%
132	10	2.0	0.9%	6	1.9	0.6%	16	2.0	1.5%
133	1	0.2	0.1%	5	1.6	0.5%	6	0.8	0.6%
134	4	0.8	0.4%	4	1.3	0.4%	8	1.0	0.8%
135	2	0.4	0.2%	1	0.3	0.1%	3	0.4	0.3%
136	3	0.6	0.3%	8	2.7	0.8%	11	1.4	1.0%
137	4	0.8	0.4%	2	0.7	0.2%	6	0.8	0.6%
138	3	0.6	0.3%	0	0.0	0.0%	3	0.4	0.3%
139	3	0.6	0.3%	5	1.7	0.5%	8	1.1	0.8%
140	3	0.7	0.3%	2	0.7	0.2%	5	0.7	0.5%
141	2	0.4	0.2%	3	1.0	0.3%	5	0.7	0.5%
142	2	0.4	0.2%	1	0.3	0.1%	3	0.4	0.3%
143	2	0.4	0.2%	3	1.0	0.3%	5	0.7	0.5%
144	0	0.0	0.0%	3	1.1	0.3%	3	0.4	0.3%
145	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
146	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
147	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
148	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
149	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
150	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%

Total No.	645	61.1%	410	38.9%	1,055	100.0%
Mean		116.1		118.1		116.9

Total legal 1,055

Total Recruits 336  
Percent 31.8%

Total Post Recruits 719  
Percent 68.2%

Table 4. Red king crab tag information recovered during the Norton Sound commercial red king crab harvest, July 1 - September 3, 1998.

Tag Number	Capture Date	Stat. Area of Capture	Carapace Length (mm)	Shell Age	Tagging Date	Tagging Location <sup>b</sup>	Carapace Length (mm)	Shell Age	Growth (mm)	No. of Molts <sup>a</sup>	Skip Molts	Average Growth per Molt (mm)
NX3182	6/15/98	656403	111	old	3/16/95	W6	84	N	27	2	1	13.5
NX1410	unknown				7/14/85		123	N				
NX3940	7/27/98	636330	111	old	4/1/96	W5	81	N	30	2	0	15.0
												14.3

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

<sup>b</sup> B1= Bluff area, 45 miles east of Nome.  
 B4=Bluff area, 50 miles east of Nome.  
 E3=7.9 miles east of Nome.  
 E4=9.5 miles east of Nome.  
 N3=1.34 miles south of Nome.  
 W4=2.8 miles west of Nome.  
 W5=11.49 miles west of Nome.

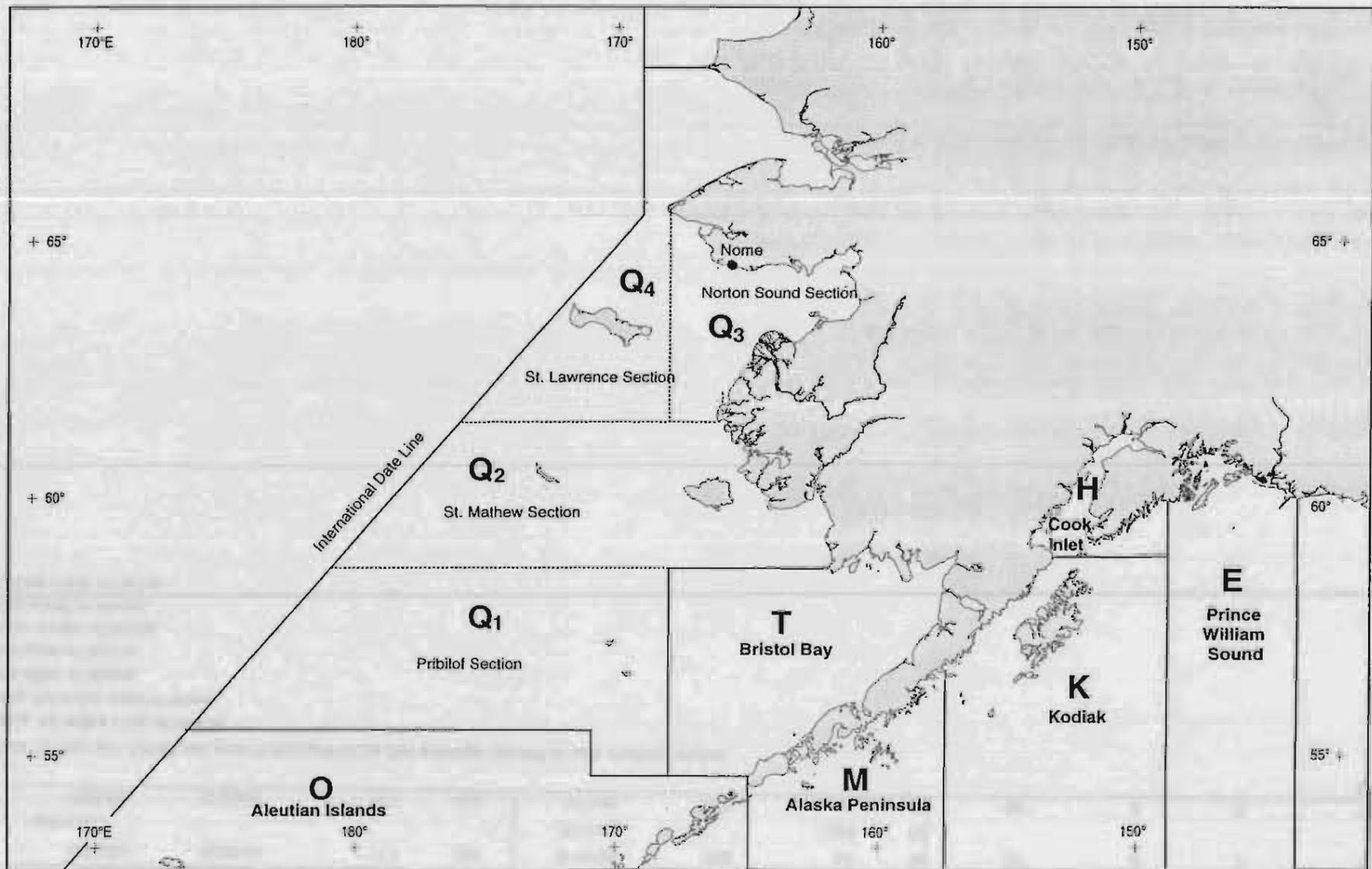


Figure 1. King crab fishing districts and sections of Statistical Areas E – Q.

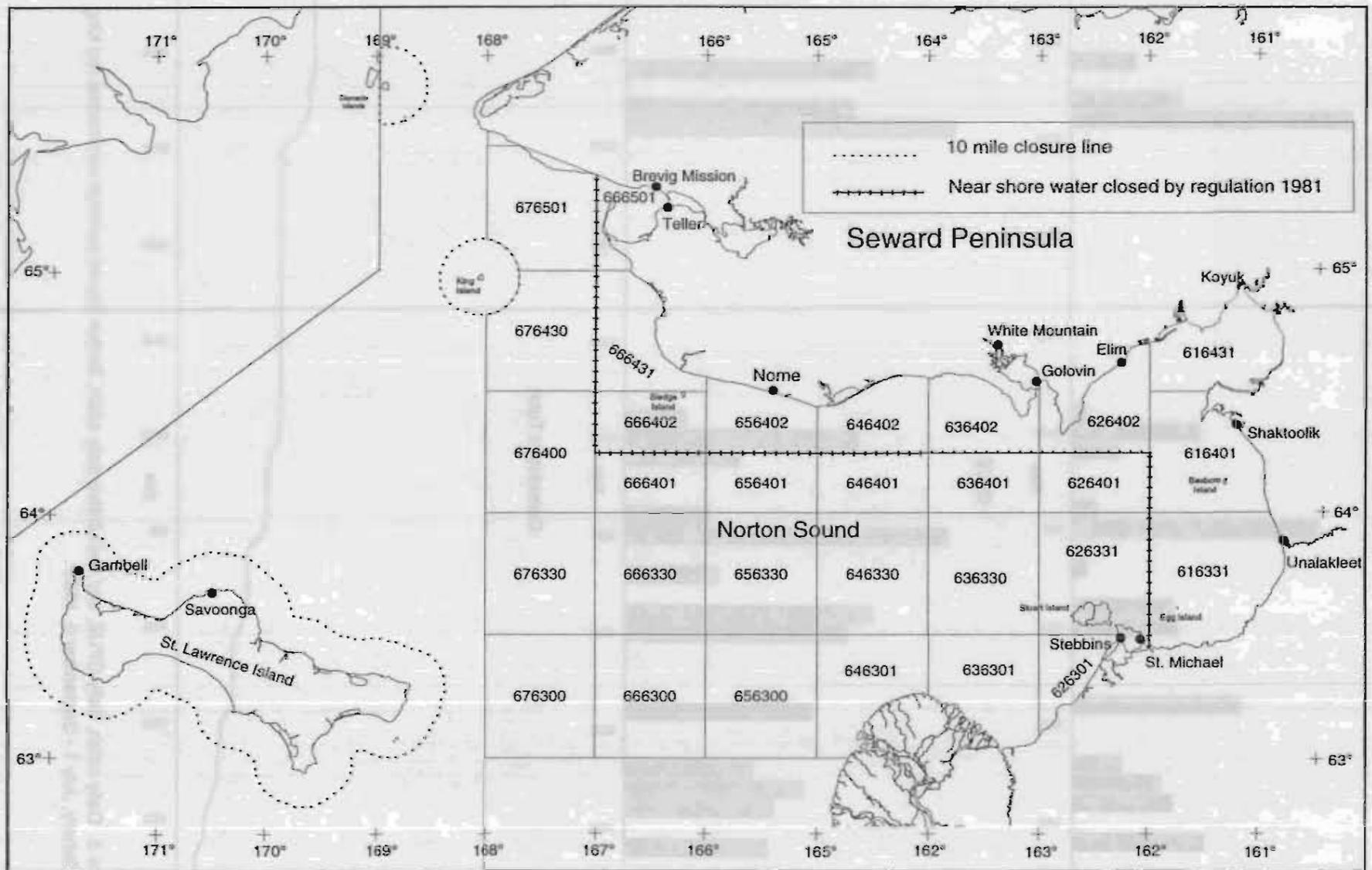


Figure 2. Norton Sound red king crab statistical areas.

# 1998 Norton Sound Red King Crab

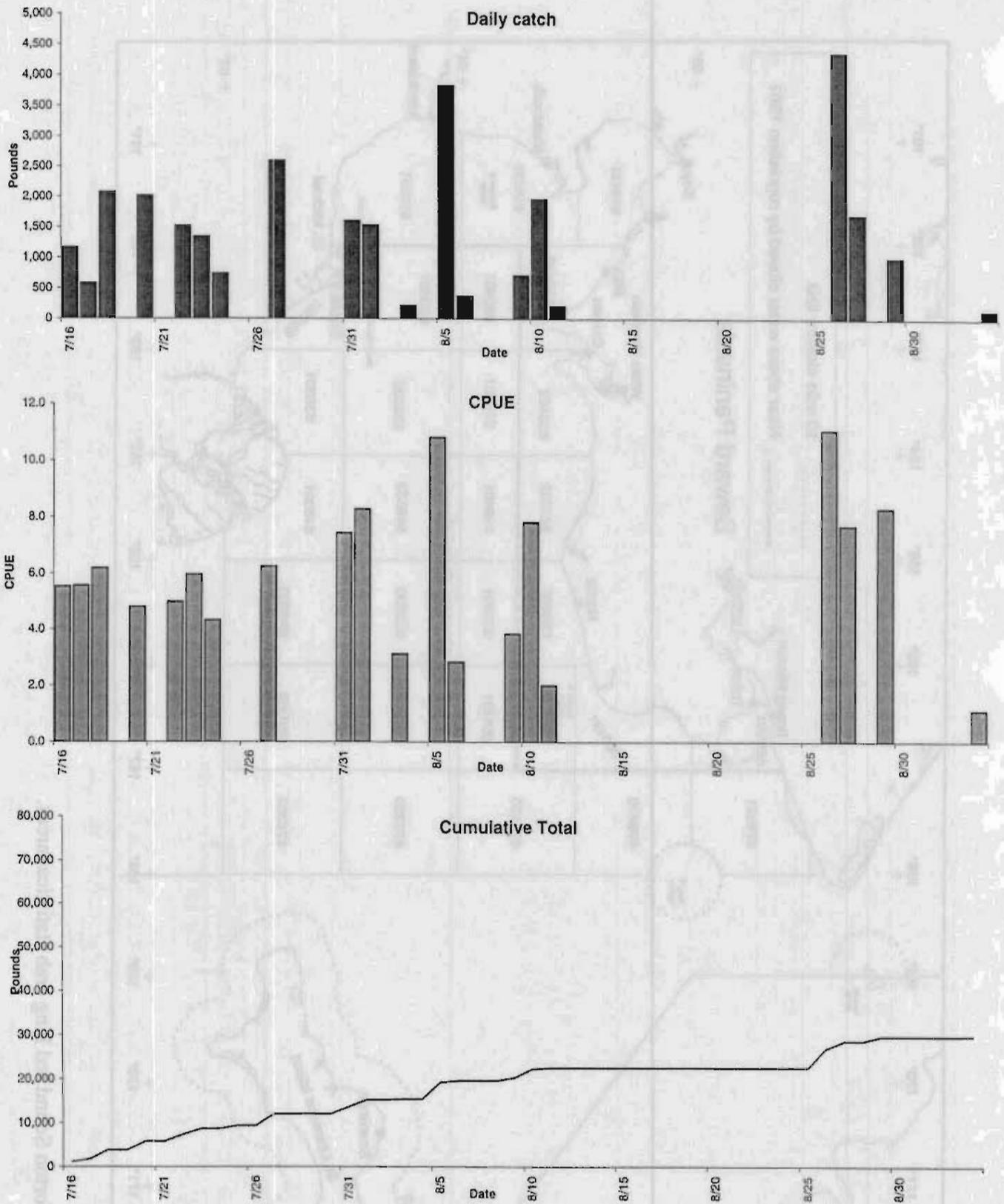


Figure 3. Daily catch, daily CPUE, and cumulative daily catch, Norton Sound summer commercial red king crab fishery, July 1 - September 3, 1998 .

# Legal Male Red King Crab

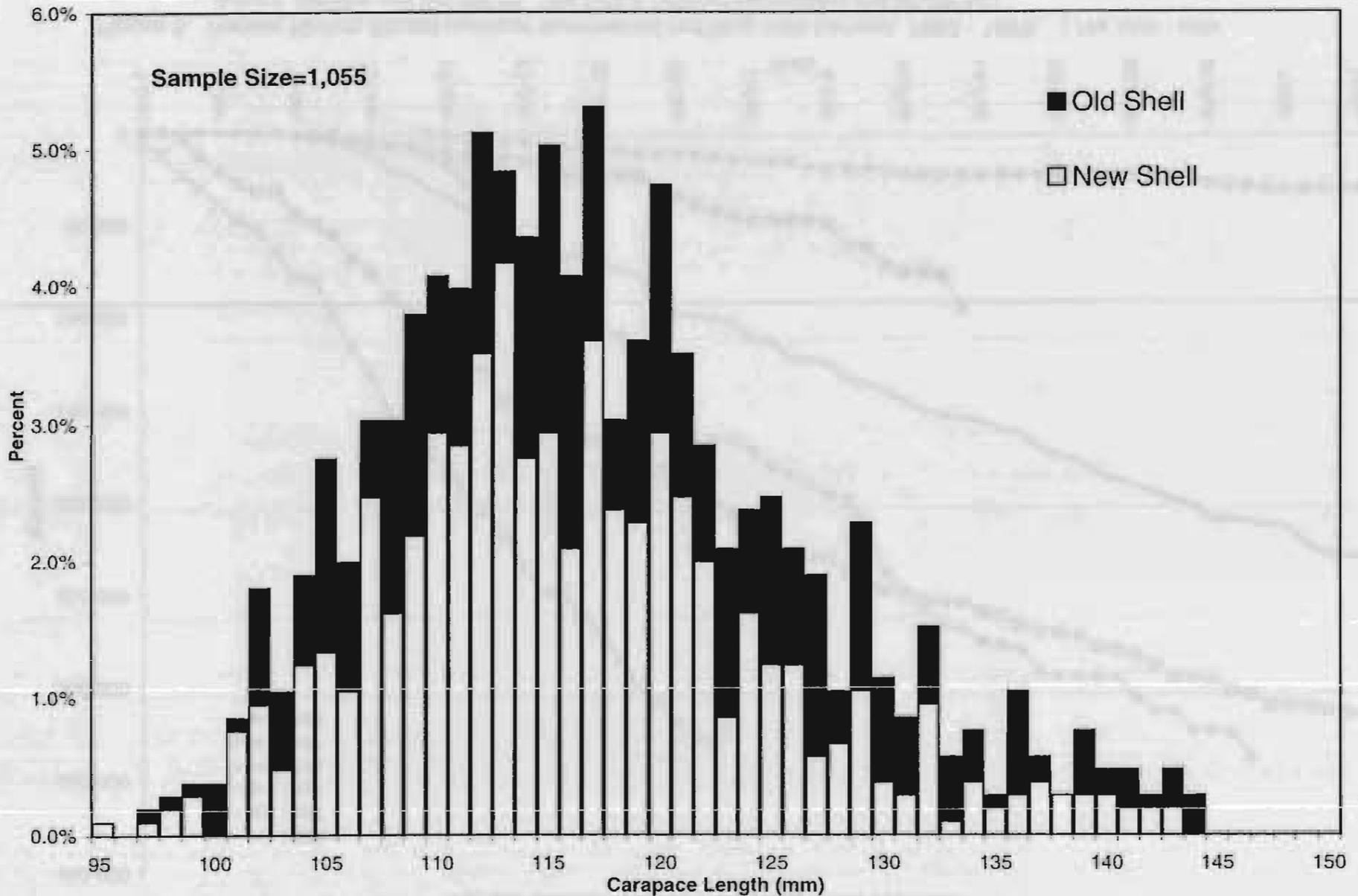


Figure 4. Length frequency distribution of new and old carapace age condition of legal male red king crab, Norton Sound summer commercial king crab fishery, July 1 - September 3, 1998.

### Recent Norton Sound Red King Crab Harvest

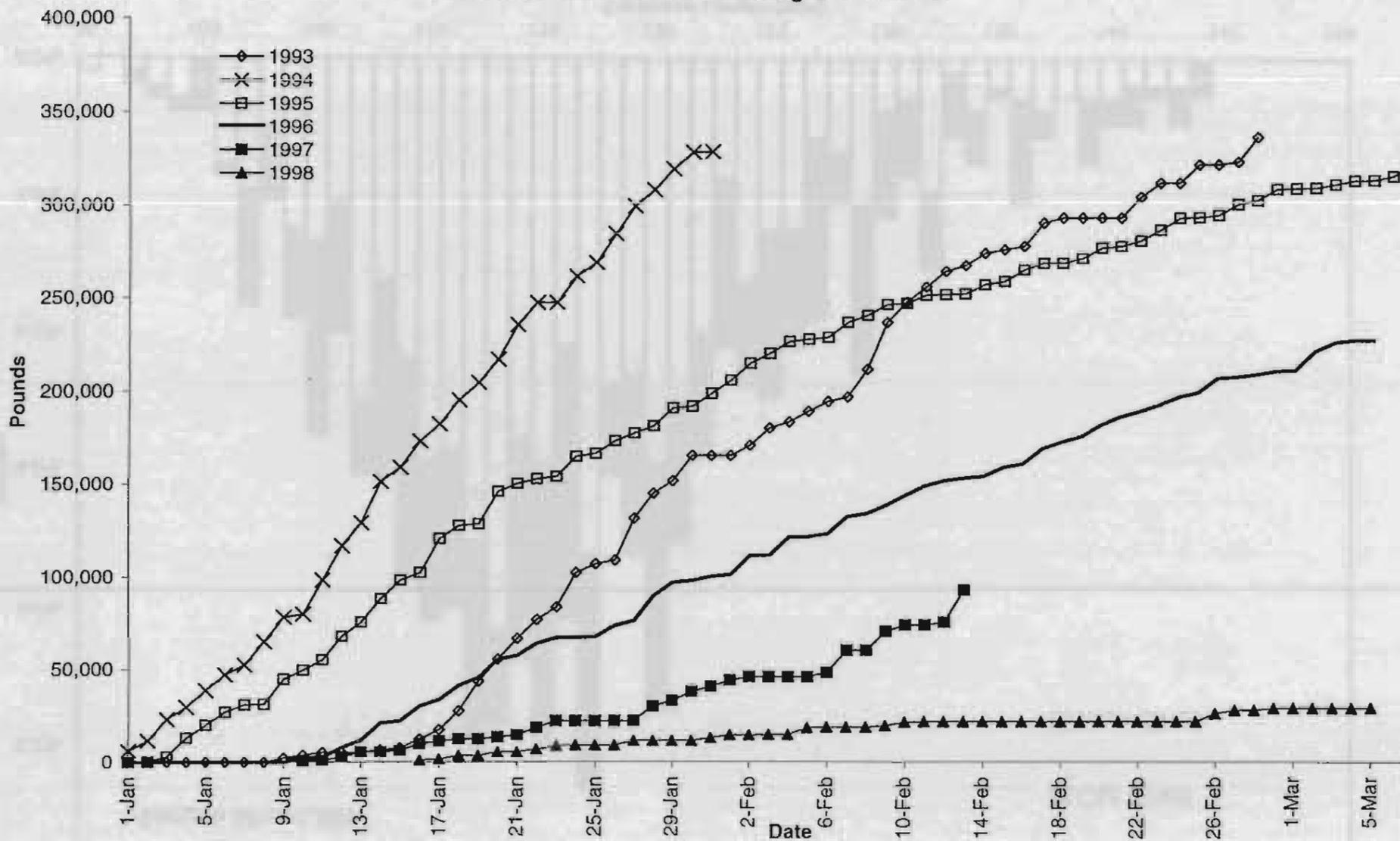


Figure 5. Recent Norton Sound summer commercial red king crab harvest, 1993 - 1998. (The 1993 - 1996 harvest guideline was 340,000 lbs. The 1997 & 1998 harvest guideline was 80,000 lbs.)

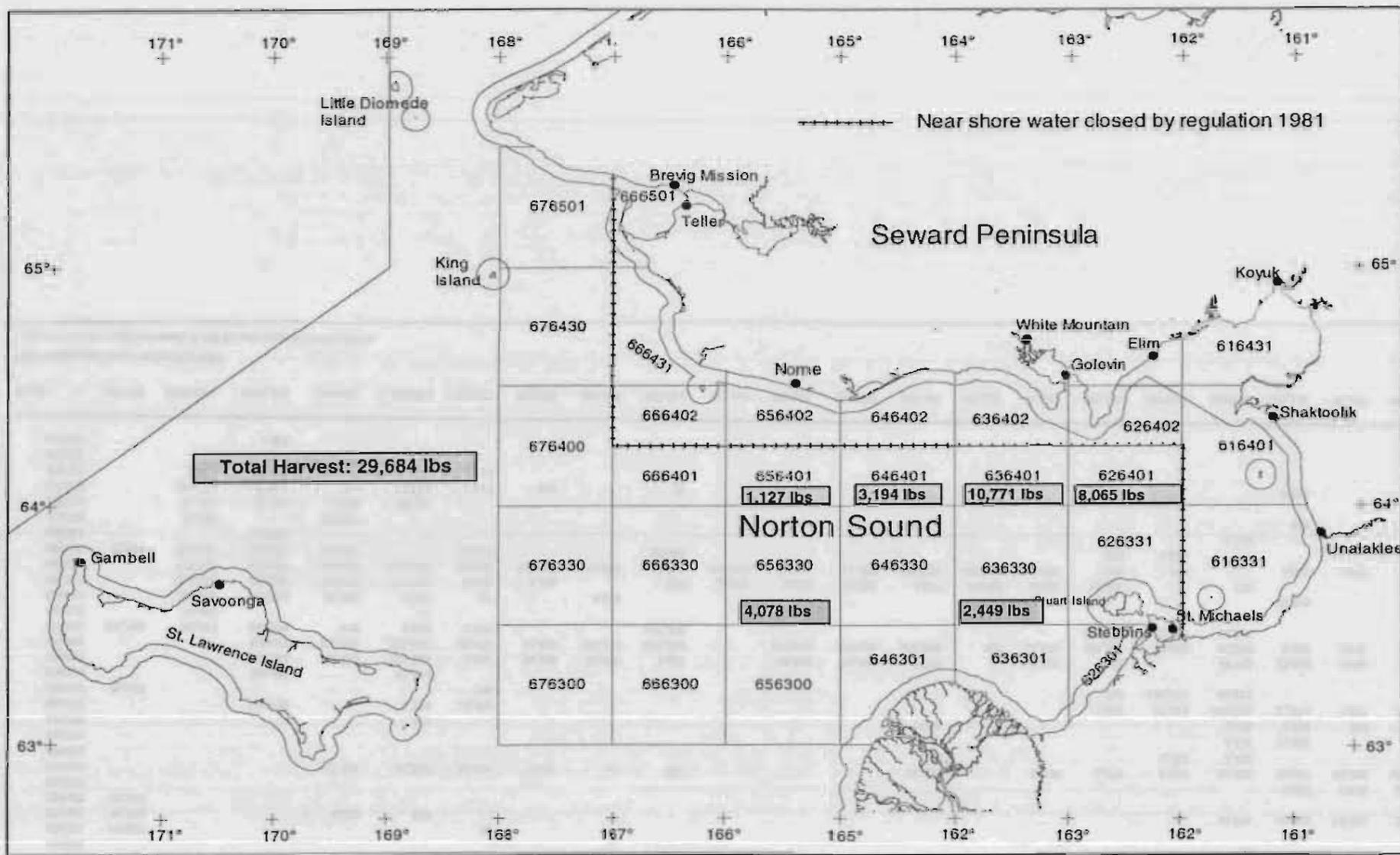


Figure 6. 1998 Norton Sound summer commercial red king crab harvest by statistical area.

Appendix Table 1. Historic commercial harvest of red king crab from Norton Sound Section, Eastern Bering Sea, by statistical areas, 1977-1998 (catch in pounds). \*

Statistical Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1992	1993	1994	1995	1996 <sup>b</sup>	1997	1998	Totals					
616331	7,893																48					7,941					
616401																		35					35				
626331	40,020					22													61				40,103				
626401	31,572			4,830	399														18,971	45,045	18,066	8,065	126,948				
626402	38,995																						38,995				
636330																											
636401				12,398	61,823	32,246	5,880	41	891				22,030		1,159	1,373	8,087	24,329	4,560	3,838	2,449	30,847					
636402																	1,754	3,466	70,677	59,206	10,771		310,911				
646301																			4,628	13,888			18,516				
646330					4,716								5,212						1,693	2,894	314		14,029				
646401					1,319	17,532											1,963	37,222	105,045	22,834	1,052	3,194	346,133				
646402	80,969					748										730	143,511	66,821					292,779				
656300			161,099		15,174																		176,873				
656330			323,518	72,735	395,662	3,983	24,246	83,479	7,632			79,006	36,129	1,757						265	19,745	15,446	4,661	4,078	1,077,156		
656401			138,011	121,147	253,387	60,480	11,422	183,119	246,200			194,408	165,644	100,956		171	53,119	105,341	29,566	32,289	9,985	4,035	1,127	1,710,407			
656402	306,302	90,187	288,869	918	3,098	2,832											193,079	106,053	44,000						1,167,701		
666230		55,490			77																				55,567		
666300		162,795	60,816	84,874	9,167	95		4,534																	347,800		
666330		353,016	505,050	367,446	141,513	8,990	1,192		389	70,615	2,963	13,020	1,275	27,185	4,305	31,758			730						1,529,447		
666401		179,212	486,947	205,400	381,510	79,580	325,045	116,254	5,341	408,848	50,744	21,895	115,257	162,263	10,632	746	396			3,081	1,816				2,554,887		
666402	12,036	515,778	534,938	183,581		17,585			32,992								535	1,221								1,298,666	
666431			146,029																							147,153	
676300		13,238		126,231																1,124							140,015
676330		51,304	81,798	6,762	18,734																546						158,598
676400		667,130	33,856	274	92,026	1,315	247		32					3,212												807,867	
676430		3,811	12,309		373	3,513			1,171																		21,177
676501					36																						36
686530			1,860																								1,860
Totals	517,787	2,091,961	2,931,672	1,186,596	1,379,014	228,921	368,032	387,427	427,011	479,463	327,121	236,688	246,487	192,831	74,029	335,790	327,858	322,676	224,231	92,988	29,684					12,378,583	

\* No commercial fishery occurred in 1991.

<sup>b</sup> Does not include approximately 2,490 lbs not reported on fish tickets.

Appendix Table 2. Historic summer commercial red king crab annual harvest, Norton Sound Section, Eastern Bering Sea, 1977 - 1998.

Year	Number of Vessels	Number of Permits	Number of Landings	Number of Crab	Harvest (lbs) <sup>a,b</sup>	Number of Pot Lifts	CPUE	Percent Old Shell	Average Weight (lbs)	Avg. Legal Mean Length (mm)
1977	7	7	13	195,877	0.52	5,457	36	d	2.7	113.4
1978	8	8	54	660,829	2.09	10,817	64	d	3.0	118.9
1979	34	34	76	970,962	2.93	34,773	28	d	3.0	119.8
1980	9	9	50	329,778	1.19	11,199	29	d	3.6	125.8
1981	36	36	108	376,313	1.38	33,745	11	d	3.7	128.5
1982	11	11	33	63,949	0.23	11,230	6	d	3.6	125.4
1983	23	23	26	132,205	0.37	11,195	12	d	2.8	115.2
1984	8	8	21	139,759	0.39	9,706	14	d	2.8	112.5
1985	6	6	72	146,669	0.43	13,209	11	d	2.9	115.8
1986	3	3	d	162,438	0.48	4,284	38	d	2.9	115.9
1987	9	9	d	103,338	0.33	10,258	10	13	3.2	121.7
1988	2	2	d	76,148	0.24	2,350	32	26	3.1	119.0
1989	10	10	d	79,116	0.25	5,149	15	29	3.1	119.8
1990	4	4	d	59,132	0.19	3,172	19	17	3.1	121.1
1991 <sup>c</sup>										
1992	27	27	d	24,902	0.07	5,746	4	29	3.0	119.7
1993	14	20	208	115,913	0.33	7,063	16	10	2.9	119.1
1994	34	52	407	108,824	0.32	11,729	9	71	3.0	118.8
1995	48	81	665	105,967	0.32	18,782	5.6	21	3.0	118.2
1996	41	50	264	74,752	0.22	10,453	7.1	36	3.0	117.1
1997	13	15	100	32,606	0.09	2,982	10.9	14	2.8	115.7
1998	8	11	50	10,661	0.03	1,639	6.5	39	2.8	116.9

<sup>a</sup> Deadloss included in total.

<sup>b</sup> Millions of pounds.

<sup>c</sup> No summer commercial fishery.

<sup>d</sup> Information not available.

Appendix Table 3. Historic summer commercial red king crab fishery economic performance, Eastern Norton Sound Section, Bering Sea, 1977 - 1998.

Year	Guideline Harvest Level (lbs) <sup>b</sup>	Legal Male Pop. Est.(lbs) <sup>b</sup>	Commercial Harvest (lbs) <sup>a,b</sup>	Number of			Number of Pots		Exvessel Price/lb	Fishery Value (millions \$)	Season Length	
				Vessels	Permits	Landings	Registered	Pulls			Days	Dates
1977	<sup>d</sup>	10.0	0.52	7	7	13	<sup>d</sup>	5,457	0.75	0.229	60	<sup>d</sup>
1978	3.00	11.0	2.09	8	8	54	<sup>d</sup>	10,817	0.95	1.897	60	6/7-8/15
1979	3.00	5.4	2.93	34	34	76	<sup>d</sup>	34,773	0.75	1.878	16	7/15-7/31
1980	1.00	6.6	1.19	9	9	50	<sup>d</sup>	11,199	0.75	0.890	16	7/15-7/31
1981	2.50	4.7	1.38	36	36	108	<sup>d</sup>	33,745	0.85	1.172	38	7/15-8/22
1982	0.50	1.3	0.23	11	11	33	<sup>d</sup>	11,230	2.00	0.405	23	8/9-9/1
1983	0.30	2.1	0.37	23	23	26	3,583	11,195	1.50	0.537	3.8	8/1-8/5
1984	0.40	2.7	0.39	8	8	21	1,245	9,706	1.02	0.395	13.6	8/1-8/15
1985	0.45	2.4	0.43	6	6	72	1,116	13,209	1.00	0.427	21.7	8/1-8/23
1986	0.42	2.8	0.48	3	3	<sup>d</sup>	578	4,284	1.25	0.600	13	8/1-8/25 <sup>a</sup>
1987	0.40	2.2	0.33	9	9	<sup>d</sup>	1,430	10,258	1.50	0.491	11	8/1-8/12
1988	0.20	3.2	0.24	2	2	<sup>d</sup>	360	2,350	<sup>d</sup>	<sup>d</sup>	9.9	8/1-8/11
1989	0.20	3.2	0.25	10	10	<sup>d</sup>	2,555	5,149	3.00	0.739	3	8/1-8/4
1990	0.20	3.2	0.19	4	4	<sup>d</sup>	1,388	3,172	<sup>d</sup>	<sup>d</sup>	4	8/1-8/5
1991 <sup>c</sup>	0.34	3.4										
1992	0.34	3.4	0.07	27	27	<sup>d</sup>	2,635	5,746	1.75	0.130	2	8/1-8/3
1993	0.34	3.4	0.33	14	20	208	560	7,063	1.28	0.430	52	7/1-8/28 <sup>f</sup>
1994	0.34	3.4	0.32	34	52	407	1,360	11,729	2.02	0.646	31	7/1-7/31
1995	0.34	3.4	0.32	48	81	665	1,900	18,782	2.87	0.926	67	7/1-9/5
1996	0.34	3.4	0.22	41	50	264	1,640	10,453	2.29	0.519	57	7/1-9/3 <sup>g</sup>
1997	0.08	1.6	0.09	13	15	100	520	2,982	1.98	0.184	44	7/1-8/13 <sup>h</sup>
1998	0.08	1.6	0.03	8	11	50	360	1,639	1.47	0.041	65	7/1-9/3 <sup>i</sup>

<sup>a</sup> Deadloss included in total.

<sup>b</sup> Millions of pounds.

<sup>c</sup> No summer commercial fishery.

<sup>d</sup> Information not available.

<sup>e</sup> Fishing actually began 8/12.

<sup>f</sup> Fishing actually began 7/8.

<sup>g</sup> Fishing began 7/9 due to fishermen's strike.

<sup>h</sup> First delivery was made 7/10.

<sup>i</sup> First delivery was made 7/16.

Appendix Table 4. A comparison of the proportion of recruit and postrecruit king crab sampled from summer commercial harvest, Norton Sound Section, Eastern Bering Sea, 1983 - 1998.

Year	Summer Commercial	
	Recruits (%)	Postrecruits (%)
1983	55	45
1984	59	41
1985	45	55
1986	48	52
1987	22	78
1988	25	75
1989	23	77
1990	21	79
1991 <sup>a</sup>		
1992	28	72
1993	31	69
1994	14	86
1995	36	64
1996	30	70
1997	49	51
1998	32	68

<sup>a</sup> No data collected in summer 1991 due to closed fishery.

Appendix Table 5. The results of the population assessment surveys conducted for red king crab in Norton Sound since 1976.

Year	Date	Research Agency	Gear	Population Abundance Estimates		
				Pre-2 Males <sup>b</sup>	Pre-1 Males <sup>b</sup>	Legal Males <sup>a</sup>
1976	9/2 - 9/5, 9/16 - 10/7	NMFS	Trawl	321,781	838,570	1,447,459
1979 <sup>c</sup>	7/26 - 8/5	NMFS	Trawl			684,662
1980 <sup>d</sup>	7/4 - 7/14	ADF&G	Pots			1,900,000
1981	6/28 - 7/14	ADF&G	Pots			1,285,195
1982	7/6 - 7/20	ADF&G	Pots			353,273
1982	9/5 - 9/11	NMFS	Trawl	295,497	819,309	610,174
1985	7/1 - 7/14	ADF&G	Pots			907,579
1985	9/16 - 10/1	NMFS	Trawl	463,022	739,968	966,566
1988	8/16 - 8/30	NMFS	Trawl	561,945	513,087	909,948
1991	8/22 - 8/30	NMFS	Trawl	287,389	347,155	1,181,496
1996	9/7 - 9/18	ADF&G	Trawl	449,505	354,071	534,446

<sup>a</sup> Legal male red king crab were defined as at least 105 mm in carapace length for the 1996 ADF&G trawl survey and all NMFS trawl surveys except the 1979 survey which defined legal males as at least 100 mm in carapace length. ADF&G pot surveys defined legal males as at least 121 mm in carapace width.

<sup>b</sup> Pre-2 males were defined as 76-89 mm in carapace length and pre-1 males were defined as 90-104 mm in carapace length.

<sup>c</sup> Population estimates are valid for the date of the survey (i.e., either before or after the summer commercial fishery).

<sup>d</sup> The 1980 pot survey estimate has been revised from the original estimate of 13.4 million pounds which was thought inaccurate due to an under-reporting of recovered tagged crab.

<sup>e</sup> Pre-2 male and pre-1 male data is unavailable for the 1979 NMFS trawl survey.