Table 1. Historical summer commercial red king crab fishery economic performance, Norton Sound Section, eastern Bering Sea, 1977-2017. Bold type shows data that are used for the assessment model.

Year	Guideline Harvest Level (lb) [b]	Commercial Harvest (lb) [a, b] Open Access	CDQ	**Number Harvest**	Total Number (Open Access) Vessels	Permits	Landings	Total Pots Registered	Pulls	**ST CPUE CPUE**	**SD**	Season Length Days	Dates	**Mid-day from July 1**
										3.32	**0.67**			
1977	[c]	517.787		**195,877**	7	7	13		5,457			60	[c]	**0.049**
1978	3,000.000	2,091.961		**660,829**	8	8	54		10,817	**4.72**	**0.64**	60	6/07-8/15	**0.142**
1979	3,000.000	2,931.672		**970,962**	34	34	76		34,773	**2.89**	**0.63**	16	7/15-7/31	**0.088**
1980	1,000.000	1,186.596		**329,778**	9	9	50		11,199	**3.11**	**0.64**	16	7/15-7/31	**0.066**
1981	2,500.000	1,379.014		**376,313**	36	36	108		33,745	**0.87**	**0.62**	38	7/15-8/22	**0.096**
1982	500.000	228.921		**63,949**	11	11	33		11,230	**0.20**	**0.61**	23	8/09-9/01	**0.151**
1983	300.000	368.032		**132,205**	23	23	26	3,583	11,195	**0.90**	**0.64**	3.8	8/01-8/05	**0.096**
\1984	400.000	387.427		**139,759**	8	8	21	1,245	9,706	**1.61**	**0.64**	13.6	8/01-8/15	**0.110**
1985	450.000	427.011		**146,669**	6	6	72	1,116	13,209	**0.50**	**0.65**	21.7	8/01-8/23	**0.118**
1986	420.000	479.463		**162,438**	3	3		578	4,284	**1.79**	**0.69**	13	8/01-8/25	**0.153**
1987	400.000	327.121		**103,338**	9	9		1,430	10,258	**0.62**	**0.63**	11	8/01-8/12	**0.107**
1988	200.000	236.688		**76,148**	2	2		360	2,350	**2.39**	**0.84**	9.9	8/01-8/11	**0.110**
1989	200.000	246.487		**79,116**	10	10		2,555	5,149	**1.21**	**0.60**	3	8/01-8/04	**0.096**
1990	200.000	192.831		**59,132**	4	4		1,388	3,172	**1.09**	**0.67**	4	8/01-8/05	**0.099**
1991	340.000			**0**	No Summer Fishery									
1992	340.000	74.029		**24,902**	27	27		2,635	5,746	**0.17**	**0.59**	2	8/01-8/03	**0.093**
1993	340.000	335.790		**115,913**	14	20	208	560	7,063	**0.85**	**0.35**	52	7/01-8/28	**0.093**
1994	340.000	327.858		**108,824**	34	52	407	1,360	11,729	**0.75**	**0.34**	31	7/01-7/31	**0.044**
1995	340.000	322.676		**105,967**	48	81	665	1,900	18,782	**0.39**	**0.34**	67	7/01-9/05	**0.093**
1996	340.000	224.231		**74,752**	41	50	264	1,640	10,453	**0.48**	**0.35**	57	7/01-9/03	**0.101**
1997	80.000	92.988		**32,606**	13	15	100	520	2,982	**0.79**	**0.36**	44	7/01-8/13	**0.074**
1998	80.000	29.684	0.00	**10,661**	8	11	50	360	1,639	**0.74**	**0.37**	65	7/01-9/03	**0.110**
1999	80.000	23.553	0.00	**8,734**	10	9	53	360	1,630	**0.86**	**0.37**	66	7/01-9/04	**0.104**
2000	336.000	297.654	14.87	**111,728**	15	22	201	560	6,345	**1.17**	**0.34**	91	7/01- 9/29	**0.126**
2001	303.000	288.199	0	**98,321**	30	37	319	1,200	11,918	**0.60**	**0.34**	97	7/01- 9/09	**0.104**
2002	248.000	244.376	15.226	**86,666**	32	49	201	1,120	6,491	**1.16**	**0.34**	77	6/15-9/03	**0.060**
2003	253.000	253.284	13.923	**93,638**	25	43	236	960	8,494	**0.80**	**0.34**	68	6/15-8/24	**0.058**
2004	326.500	314.472	26.274	**120,289**	26	39	227	1,120	8,066	**1.20**	**0.34**	51	6/15-8/08	**0.033**
2005	370.000	370.744	30.06	**138,926**	31	42	255	1,320	8,867	**1.13**	**0.34**	73	6/15-8/27	**0.058**
2006	454.000	419.191	32.557	**150,358**	28	40	249	1,120	8,867	**1.23**	**0.34**	68	6/15-8/22	**0.052**
2007	315.000	289.264	23.611	**110,344**	38	30	251	1,200	9,118	**0.97**	**0.34**	52	6/15-8/17	**0.036**
2008	412.000	364.235	30.9	**143,337**	23	30	248	920	8,721	**1.25**	**0.34**	73	6/23-9/03	**0.079**
2009	375.000	369.462	28.125	**143,485**	22	27	359	920	11,934	**0.79**	**0.34**	98	6/15-9/20	**0.090**
2010	400.000	387.304	30	**149,822**	23	32	286	1,040	9,698	**1.14**	**0.34**	58	6/28-8/24	**0.074**
2011	358.000	373.990	26.851	**141,626**	24	25	173	1,040	6,808	**1.48**	**0.34**	33	6/28-7/30	**0.038**
2012	465.450	441.080	34.91	**161,113**	40	29	312	1,200	10,041	**1.22**	**0.34**	72	6/29-9/08	**0.093**
2013	495.600	373.278	18.585	**130,603**	37	33	460	1,420	15,058	**0.63**	**0.34**	74	7/3-9/14	**0.110**
2014	382.800	360.860	28.148	**129,657**	52	33	309	1,560	10,127	**1.06**	**0.34**	52	6/25-8/15	**0.052**
2015	394.600	371.520	29.595	**144,255**	42	36	251	1,480	8,356	**1.37**	**0.34**	26	6/29-7/24	**0.033**
2016	517.200	416.576	3,583	**138,997**	36	37	220	1,520	8,009	**1.20**	**0.34**	25	6/27-7/21	**0.025**
2017	496,800	411,736	0	**135,322**	36	36	270	1,640	9,401	**1.06**	**0.34**	30	6/26-7/25	**0.027**
2018	290,282	298,396	0	**89,613**	34	34	256	1,400	8,797	**0.62**	**0.34**	35	6/24-7/29	**0.038**

[a] Deadloss included in total. [b] Millions of pounds. [c] Information not available.

Table 2. Historical winter commercial and subsistence red king crab fisheries, Norton Sound Section, eastern Bering Sea, 1977-2016. Bold typed data are used for the assessment model.

		Commercial			Subsistence				
Model Year	Year[a]	# of Fishers	# of Crab Harvested	Winter[b]	Permits Issued	Permits Returned	Permits Fished	Total Crab Caught[c]	Total Crab Retained[d]
1978	1978	37	**9,625**	1977/78	290	206	149	**NA**	**12,506**
1979	1979	1[f]	**221**[f]	1978/79	48	43	38	**NA**	**224**
1980	1980	1[f]	**22**[f]	1979/80	22	14	9	**NA**	**213**
1981	1981	0	**0**	1980/81	51	39	23	**NA**	**360**
1982	1982	1[f]	**17**[f]	1981/82	101	76	54	**NA**	**1,288**
1983	1983	5	**549**	1982/83	172	106	85	**NA**	**10,432**
1984	1984	8	**856**	1983/84	222	183	143	**15,923**	**11,220**
1985	1985	9	**1,168**	1984/85	203	166	132	**10,757**	**8,377**
1986	1985/86	5	**2,168**	1985/86	136	133	107	**10,751**	**7,052**
1987	1986/87	7	**1,040**	1986/87	138	134	98	**7,406**	**5,772**
1988	1987/88	10	**425**	1987/88	71	58	40	**3,573**	**2,724**
1989	1988/89	5	**403**	1988/89	139	115	94	**7,945**	**6,126**
1990	1989/90	13	**3,626**	1989/90	136	118	107	**16,635**	**12,152**
1991	1990/91	11	**3,800**	1990/91	119	104	79	**9,295**	**7,366**
1992	1991/92	13	**7,478**	1991/92	158	105	105	**15,051**	**11,736**
1993	1992/93	8	**1,788**	1992/93	88	79	37	**1,193**	**1,097**
1994	1993/94	25	**5,753**	1993/94	118	95	71	**4,894**	**4,113**
1995	1994/95	42	**7,538**	1994/95	166	131	97	**7,777**	**5,426**
1996	1995/96	9	**1,778**	1995/96	84	44	35	**2,936**	**1,679**
1997	1996/97	2[f]	**83**[f]	1996/97	38	22	13	**1,617**	**745**
1998	1997/98	5	**984**	1997/98	94	73	64	**20,327**	**8,622**
1999	1998/99	5	**2,714**	1998/99	95	80	71	**10,651**	**7,533**
2000	1999/00	10	**3,045**	1999/00	98	64	52	**9,816**	**5,723**
2001	2000/01	3	**1,098**	2000/01	50	27	12	**366**	**256**
2002	2001/02	11	**2,591**	2001/02	114	61	45	**5,119**	**2,177**
2003	2002/03	13	**6,853**	2002/03	107	70	61	**9,052**	**4,140**
2004	2003/04	2[f]	**522**[f]	2003/04[g]	96	77	41	**1,775**	**1,181**
2005	2004/05	4	**2,091**	2004/05	170	98	58	**6,484**	**3,973**
2006	2005/06	1[f]	**75**[f]	2005/06	98	97	67	**2,083**	**1,239**
2007	2006/07	8	**3,313**	2006/07	129	127	116	**21,444**	**10,690**
2008	2007/08	9	**5,796**	2007/08	139	137	108	**18,621**	**9,485**
2009	2008/09	7	**4,951**	2008/09	105	105	70	**6,971**	**4,752**
2010	2009/10	10	**4,834**	2009/10	125	123	85	**9,004**	**7,044**
2011	2010/11	5	**3,365**	2010/11	148	148	95	**9,183**	**6,640**
2012	2011/12	35	**9,157**	2011/12	204	204	138	**11,341**	**7,311**
2013	2012/13	26	**22,639**	2012/13	149	148	104	**21,524**	**7,622**
2014	2013/14	21	**14,986**	2013/14	103	103	75	**5,421**	**3,252**
2015	2014/15	44	**41,062**	2014/15	155	153	107	**9,840**	**7,651**
2016	2015/16	25	**29,792**	2015/16	139	97	64	**6,468**	**5,340**
2017	2017	43	**26,008**	2017	163	163	109	**7,185**	**6,039**
2018	2018	28	**9,180**	2018	123	120	82	**5,767**	**4,424**

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 retained is the number of crab caught and kept.

f Confidentiality was waived by the fishers.

h Prior to 2005, permits were only given out of the Nome ADF&G office. Starting with the 2004-5 season, permits were given out in Elim, Golovin, Shaktoolik, and White Mountain.

Table 3. Summary of triennial trawl survey Norton Sound male red king crab abundance estimates (CL ≥ 64mm) . Trawl survey abundance estimate is based on 10×10 nm^2 grid, except for 2010 and 2017 (20×20 nm^2). Bold typed data are used for the assessment model.

				Survey coverage			Abundance ≥74 mm (1982-1991) ≥64 mm (1996- 2007)	
Year	Dates	Survey Agency	Survey method	Total surveyed stations	Stations w/ NSRKC	n mile^2 covered		CV
1976	9/02 – 9/25	NMFS	Trawl	103	62	10260	**4247.5**	**0.31**
1979	7/26 - 8/05	NMFS	Trawl	85	22	8421	**1417.2**	**0.20**
1980	7/04 - 7/14	ADFG	Pots				2092.3	N/A
1981	6/28 - 7/14	ADFG	Pots				2153.4	N/A
1982	7/06 - 7/20	ADFG	Pots				1140.5	N/A
1982	9/05 - 9/11	NMFS	Trawl	58	37	5721	**2791.7**	**0.29**
1985	7/01 - 7/14	ADFG	Pots				2320.4	0.083
1985	9/16 -10/01	NMFS	Trawl	78	49	7688	**2306.3**	**0.25**
1988	8/16 - 8/30	NMFS	Trawl	78	41	7721	**2263.4**	**0.29**
1991	8/22 - 8/30	NMFS	Trawl	52	38	5183	**3132.5**	**0.43**
1996	8/07 - 8/18	ADFG	Trawl	50	30	4938	**1283.0**	**0.25**
1999	7/28 - 8/07	ADFG	Trawl	52	31	5221	**2608.0**	**0.24**
2002	7/27 - 8/06	ADFG	Trawl	57	37	5621	**2056.0**	**0.36**
2006	7/25 - 8/08	ADFG	Trawl	114	45	10008	**3336.0**	**0.39**
2008	7/24 - 8/11	ADFG	Trawl	86	44	7330	**2894.2**	**0.31**
2010[a]	7/27 - 8/09	NMFS	Trawl	35	15	5841	**1980.1**	**0.44**
2011	7/18 - 8/15	ADFG	Trawl	65	34	6447	**3209.3**	**0.29**
2014	7/18 - 7/30	ADFG	Trawl	47	34	4700	**5934.6**	**0.47**
2017	7/28 - 8/08	ADFG	Trawl	60	41	6000	**1762.1**	**0.22**
2017	8/18 - 8/29	NMFS	Trawl	35	18	5841	**1035.8**	**0.40**
2018	7/22 - 7/29	ADFG	Trawl	60	34	6000	**1108.9**	**0.25**

Table 4. Summer commercial retained catch length-shell compositions.

		New Shell								Old Shell							
Year	Sample	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+
1977	1549	0	0	0	0.00	0.42	0.34	0.08	0.05	0	0	0	0.00	0.06	0.04	0.01	0.00
1978	389	0	0	0	0.01	0.19	0.47	0.26	0.04	0	0	0	0.00	0.01	0.01	0.01	0.00
1979	1660	0	0	0	0.03	0.23	0.38	0.26	0.07	0	0	0	0.00	0.03	0.00	0.00	0.01
1980	1068	0	0	0	0.00	0.10	0.31	0.37	0.18	0	0	0	0.00	0.00	0.01	0.02	0.01
1981	1784	0	0	0	0.00	0.07	0.15	0.28	0.23	0	0	0	0.00	0.00	0.05	0.12	0.09
1982	1093	0	0	0	0.04	0.19	0.16	0.22	0.29	0	0	0	0.00	0.01	0.02	0.03	0.03
1983	802	0	0	0	0.04	0.41	0.36	0.06	0.03	0	0	0	0.00	0.04	0.01	0.02	0.02
1984	963	0	0	0	0.10	0.42	0.28	0.06	0.01	0	0	0	0.01	0.07	0.05	0.01	0.00
1985	2691	0	0	0.00	0.06	0.31	0.37	0.15	0.02	0	0	0	0.00	0.03	0.03	0.01	0.00
1986	1138	0	0	0	0.03	0.36	0.39	0.12	0.02	0	0	0	0.00	0.02	0.04	0.02	0.00
1987	1985	0	0	0	0.02	0.18	0.29	0.27	0.11	0	0	0	0.00	0.03	0.06	0.03	0.01
1988	1522	0	0.00	0	0.02	0.20	0.30	0.18	0.04	0	0	0	0.01	0.06	0.10	0.07	0.02
1989	2595	0	0	0	0.01	0.16	0.32	0.17	0.05	0	0	0	0.00	0.06	0.12	0.09	0.02
1990	1289	0	0	0	0.01	0.14	0.35	0.26	0.07	0	0	0	0.00	0.04	0.07	0.05	0.01
1991																	
1992	2566	0	0	0	0.02	0.20	0.27	0.14	0.09	0	0	0	0.00	0.08	0.13	0.06	0.02
1993	17804	0	0	0	0.01	0.23	0.39	0.23	0.03	0	0	0	0.00	0.02	0.04	0.03	0.01
1994	404	0	0	0	0.02	0.09	0.08	0.07	0.02	0	0	0	0.02	0.19	0.25	0.20	0.05
1995	1167	0	0	0	0.04	0.26	0.29	0.15	0.05	0	0	0	0.01	0.05	0.07	0.06	0.01
1996	787	0	0	0	0.03	0.22	0.24	0.09	0.05	0	0	0	0.01	0.12	0.14	0.08	0.02
1997	1198	0	0	0	0.03	0.37	0.34	0.10	0.03	0	0	0	0.00	0.06	0.04	0.03	0.01
1998	1055	0	0	0	0.03	0.23	0.24	0.08	0.03	0	0	0	0.02	0.11	0.14	0.08	0.03
1999	562	0	0	0	0.06	0.29	0.24	0.18	0.09	0	0	0	0.00	0.02	0.05	0.04	0.00
2000	17213	0	0	0	0.02	0.30	0.39	0.11	0.02	0	0	0	0.00	0.05	0.07	0.04	0.01
2001	20030	0	0	0	0.02	0.22	0.37	0.21	0.07	0	0	0	0.00	0.02	0.05	0.02	0.01
2002	5219	0	0	0	0.04	0.23	0.28	0.25	0.07	0	0	0	0.00	0.03	0.04	0.03	0.01
2003	5226	0	0	0	0.02	0.37	0.32	0.12	0.03	0	0	0	0.00	0.02	0.05	0.05	0.01
2004	9606	0	0	0	0.01	0.38	0.39	0.11	0.03	0	0	0	0.00	0.03	0.03	0.01	0.01
2005	5360	0	0	0	0.00	0.25	0.47	0.16	0.02	0	0	0	0.00	0.02	0.05	0.02	0.01
2006	6707	0	0	0	0.00	0.18	0.35	0.17	0.02	0	0	0	0.00	0.05	0.14	0.07	0.01
2007	6125	0	0	0	0.01	0.36	0.34	0.14	0.03	0	0	0	0.00	0.02	0.06	0.03	0.01
2008	5766	0	0	0	0.00	0.35	0.35	0.06	0.01	0	0	0	0.00	0.09	0.09	0.04	0.01
2009	6026	0	0	0	0.01	0.34	0.33	0.11	0.02	0	0	0	0.00	0.08	0.08	0.02	0.01
2010	5902	0	0	0	0.01	0.39	0.36	0.10	0.01	0	0	0	0.00	0.05	0.05	0.02	0.00
2011	2552	0	0	0	0.00	0.32	0.40	0.12	0.02	0	0	0	0.00	0.06	0.06	0.02	0.00
2012	5056	0	0	0	0.00	0.24	0.46	0.18	0.02	0	0	0	0.00	0.03	0.04	0.02	0.00
2013	6072	0	0	0	0.00	0.24	0.37	0.24	0.06	0	0	0	0.00	0.01	0.04	0.02	0.00
2014	4682	0	0	0	0.01	0.28	0.24	0.18	0.07	0	0	0	0.00	0.04	0.09	0.07	0.02
2015	4173	0	0	0	0.01	0.48	0.28	0.10	0.03	0	0	0	0.00	0.02	0.03	0.03	0.01
2016	1543	0	0	0	0.00	0.25	0.47	0.16	0.03	0	0	0	0.00	0.02	0.02	0.03	0.01
2017	3412	0	0	0	0.00	0.18	0.39	0.21	0.03	0	0	0	0.01	0.03	0.12	0.05	0.01
2018	2609	0	0	0	0.00	0.11	0.32	0.32	0.08	0	0	0	0	0.01	0.08	0.08	0.02

Table 5. Winter commercial catch length-shell compositions.

		New Shell								Old Shell							
Year	Sample	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+
2015	576	0	0	0	0.07	0.50	024	0.06	0.01	0	0	0	0.01	0.04	0.03	0.03	0.01
2016	1016	0	0	0	0.03	0.45	0.31	0.03	0.00	0	0	0	0.01	0.09	0.04	0.02	0.01
2017	540	0	0	0	0.00	0.20	0.30	0.13	0.02	0	0	0	0.00	0.08	0.19	0.06	0.02
2018	401	0	0	0	0.00	0.11	0.25	0.27	0.05	0	0	0	0	0.04	0.16	0.10	0.02

Table 6. Summer Trawl Survey length-shell compositions.

			New Shell								Old Shell							
Year	Survey	Sample	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+
1976	NMFS	1326	0.01	0.02	0.10	0.19	0.34	0.18	0.02	0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.01	0.01
1979	NMFS	220	0.01	0.01	0.00	0.02	0.05	0.05	0.03	0.01	0.01	0.00	0.01	0.04	0.14	0.40	0.19	0.03
1982	NMFS	327	0.22	0.07	0.16	0.23	0.17	0.03	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.02	0.02	0.03
1985	NMFS	350	0.11	0.11	0.19	0.17	0.16	0.06	0.01	0.00	0.00	0.00	0.00	0.02	0.05	0.08	0.05	0.01
1988	NMFS	366	0.16	0.19	0.12	0.13	0.11	0.06	0.03	0.00	0.00	0.00	0.01	0.01	0.03	0.07	0.05	0.03
1991	NMFS	340	0.18	0.08	0.02	0.03	0.06	0.03	0.01	0.01	0.03	0.06	0.02	0.08	0.16	0.14	0.09	0.02
1996	ADFG	269	0.29	0.21	0.13	0.09	0.05	0.00	0.00	0.01	0.00	0.00	0.03	0.03	0.04	0.04	0.04	0.03
1999	ADFG	283	0.03	0.01	0.10	0.29	0.26	0.13	0.03	0.01	0.00	0.00	0.00	0.03	0.05	0.04	0.02	0.00
2002	ADFG	244	0.09	0.12	0.14	0.11	0.02	0.03	0.02	0.01	0.01	0.03	0.07	0.10	0.09	0.09	0.05	0.02
2006	ADFG	373	0.18	0.26	0.21	0.11	0.06	0.04	0.02	0.00	0.00	0.00	0.00	0.02	0.04	0.04	0.01	0.00
2008	ADFG	275	0.12	0.15	0.21	0.11	0.10	0.03	0.02	0.01	0.00	0.01	0.04	0.06	0.08	0.01	0.04	0.00
2010	NMFS	69	0.01	0.04	0.06	0.17	0.06	0.03	0.00	0.00	0.00	0.03	0.09	0.20	0.19	0.07	0.03	0.01
2011	ADFG	315	0.13	0.11	0.09	0.11	0.18	0.14	0.03	0.01	0.00	0.00	0.01	0.02	0.09	0.04	0.03	0.00
2014	ADFG	387	0.08	0.15	0.24	0.18	0.09	0.02	0.01	0.01	0.00	0.00	0.03	0.10	0.05	0.04	0.01	0.00
2017	ADFG	116	0.14	0.12	0.05	0.09	0.10	0.04	0.00	0.00	0.01	0.02	0.02	0.02	0.07	0.18	0.04	0.00
2017	NMFS	58	0.09	0.10	0.14	0.05	0.05	0.05	0.05	0.03	0.03	0.00	0.03	0.05	0.03	0.19	0.05	0.03
2018	ADFG	73	0.37	0.10	0.11	0.03	0.01	0.03	0.04	0.01	0	0.07	0.01	0.04	0.03	0.03	0.10	0.03

Table 7. Winter pot survey length-shell compositions.

			New Shell								Old Shell							
Year	CPUE	Sample	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+
1981/82	NA	719	0.00	0.10	0.23	0.21	0.07	0.02	0.02	0.00	0.00	0.05	0.11	0.11	0.04	0.02	0.02	0.00
1982/83	24.2	2583	0.03	0.08	0.28	0.28	0.21	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.01
1983/84	24.0	1677	0.01	0.16	0.26	0.23	0.15	0.06	0.01	0.00	0.00	0.00	0.00	0.02	0.06	0.03	0.01	0.01
1984/85	24.5	789	0.02	0.09	0.25	0.35	0.16	0.06	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.02	0.00	0.00
1985/86	19.2	594	0.04	0.12	0.17	0.24	0.19	0.08	0.01	0.00	0.00	0.00	0.00	0.01	0.06	0.04	0.01	0.00
1986/87	5.8	144	0.00	0.06	0.15	0.19	0.07	0.04	0.00	0.00	0.00	0.00	0.01	0.04	0.30	0.11	0.03	0.00
1987/88																		
1988/89	13.0	500	0.02	0.13	0.15	0.13	0.19	0.17	0.03	0.00	0.00	0.00	0.00	0.00	0.05	0.08	0.03	0.00
1989/90	21.0	2076	0.00	0.05	0.21	0.26	0.18	0.12	0.06	0.01	0.00	0.00	0.00	0.00	0.03	0.06	0.02	0.00
1990/91	22.9	1283	0.00	0.01	0.09	0.29	0.27	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.12	0.07	0.02
1992/93	5.5	181	0.00	0.01	0.03	0.06	0.13	0.12	0.03	0.00	0.00	0.00	0.00	0.02	0.19	0.27	0.10	0.05
1993/94																		
1994/95	6.2	858	0.01	0.06	0.08	0.10	0.26	0.23	0.07	0.01	0.00	0.00	0.00	0.00	0.03	0.07	0.06	0.02
1995/96	9.9	1580	0.06	0.14	0.20	0.19	0.11	0.07	0.03	0.00	0.00	0.00	0.00	0.01	0.06	0.07	0.03	0.01
1996/97	2.9	398	0.07	0.21	0.22	0.11	0.15	0.11	0.05	0.01	0.00	0.00	0.00	0.00	0.02	0.03	0.01	0.01
1997/98	10.9	881	0.00	0.14	0.41	0.27	0.05	0.02	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.02	0.02	0.01
1998/99	10.7	1307	0.00	0.02	0.12	0.36	0.36	0.08	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.01	0.00
1999/00	6.2	575	0.02	0.09	0.10	0.16	0.33	0.18	0.03	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.01	0.00
2000/01	3.1	44																
2001/02	13.0	828	0.05	0.29	0.26	0.17	0.06	0.06	0.04	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.00
2002/03	9.6	824	0.02	0.10	0.22	0.28	0.18	0.06	0.02	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.02	0.01
2003/04	3.7	296	0.00	0.02	0.16	0.26	0.32	0.14	0.01	0.00	0.00	0.00	0.01	0.02	0.02	0.01	0.02	0.01
2004/05	4.4	405	0.00	0.07	0.14	0.18	0.22	0.19	0.07	0.00	0.00	0.00	0.00	0.00	0.04	0.06	0.01	0.00
2005/06	6.0	512	0.00	0.14	0.23	0.21	0.16	0.05	0.02	0.00	0.00	0.01	0.01	0.02	0.04	0.07	0.03	0.01
2006/07	7.3	159	0.07	0.14	0.19	0.35	0.13	0.04	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.04	0.00	0.00
2007/08	25.0	3552	0.01	0.14	0.25	0.17	0.14	0.07	0.01	0.00	0.01	0.04	0.07	0.03	0.03	0.01	0.01	0.00
2008/09	21.9	525	0.00	0.07	0.13	0.35	0.20	0.08	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.00	0.00
2009/10	25.3	578	0.01	0.05	0.13	0.21	0.24	0.11	0.02	0.00	0.00	0.00	0.01	0.06	0.10	0.05	0.01	0.00
2010/11	22.1	596	0.02	0.08	0.13	0.20	0.17	0.13	0.05	0.00	0.00	0.00	0.01	0.03	0.11	0.05	0.01	0.00
2011/12	29.4	675	0.03	0.11	0.23	0.19	0.12	0.13	0.04	0.00	0.00	0.00	0.00	0.01	0.05	0.05	0.03	0.00

Table 8. Summer commercial1987-1994, 2012-2017 observer discards length-shell compositions.

		New Shell								Old Shell							
Year	Sample	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+
1987	1146	0.06	0.19	0.32	0.33	0.03	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.00
1988	722	0.01	0.04	0.15	0.48	0.14	0.00	0.00	0.00	0.00	0.01	0.03	0.10	0.04	0.00	0.00	0.00
1989	1000	0.07	0.19	0.24	0.22	0.03	0.00	0.00	0.00	0.02	0.03	0.07	0.11	0.03	0.00	0.00	0.00
1990	507	0.08	0.23	0.27	0.27	0.04	0.00	0.00	0.00	0.02	0.02	0.02	0.05	0.01	0.00	0.00	0.00
1992	580	0.11	0.17	0.30	0.29	0.03	0.00	0.00	0.00	0.01	0.02	0.02	0.04	0.01	0.00	0.00	0.00
1994	850	0.07	0.06	0.11	0.15	0.02	0.00	0.00	0.00	0.07	0.07	0.15	0.24	0.05	0.00	0.00	0.00
2012	939	0.21	0.11	0.19	0.32	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00
2013	2617	0.34	0.29	0.16	0.16	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1755	0.05	0.10	0.26	0.41	0.12	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.00	0.00
2015	824	0.01	0.08	0.18	0.44	0.23	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00
2016	426	0.04	0.05	0.17	0.50	0.17	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.00
2017	544	0.10	0.16	0.13	0.31	0.26	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
2018	532	0.10	0.17	0.36	0.30	0.02	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.00

Table 9. Summer commercial1 2012-2018 observer total catch length-shell compositions.

		New Shell								Old Shell							
Year	Sample	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+
2012	3055	0.10	0.05	0.08	0.15	0.15	0.17	0.06	0.01	0.00	0.00	0.00	0.03	0.08	0.09	0.03	0.00
2013	4762	0.19	0.16	0.09	0.10	0.16	0.16	0.09	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.00
2014	3506	0.02	0.05	0.13	0.22	0.22	0.12	0.08	0.03	0.00	0.00	0.00	0.02	0.03	0.03	0.02	0.01
2015	1671	0.01	0.04	0.09	0.23	0.37	0.14	0.05	0.01	0.00	0.00	0.00	0.01	0.02	0.02	0.01	0.00
2016	2114	0.01	0.01	0.03	0.12	0.29	0.36	0.08	0.02	0.00	0.00	0.00	0.01	0.03	0.03	0.02	0.00
2017	2748	0.02	0.03	0.03	0.06	0.19	0.33	0.18	0.02	0.00	0.00	0.00	0.00	0.02	0.07	0.03	0.01
2018	1628	0.03	0.06	0.12	0.11	0.09	0.17	0.18	0.04	0.00	0.00	0.01	0.01	0.15	0.07	0.08	0.02

Table 10. The number of tagged data released and recovered after 1 year (Y1) – 3 year (Y3) during 1980-1992 and 1993-2017 periods.

Release Length Class	Recap Length Class	1980-1992			1993-2018		
		Y1	Y2	Y3	Y1	Y2	Y3
64 – 73	64 – 73						
64 – 73	74 - 83	1					
64 – 73	84 - 93	1	1		3		
64 – 73	94 - 103		1			5	
64 – 73	104 – 113		1			4	11
64 – 73	114 – 123						11
64 – 73	124 – 133						
64 – 73	134+						
74 - 83	74 - 83						
74 - 83	84 - 93	3			21		
74 - 83	94 - 103	7			22	12	
74 - 83	104 – 113		13		4	94	19
74 - 83	114 – 123		1	2		5	46
74 - 83	124 – 133						6
74 - 83	134+						
84 - 93	84 - 93						
84 - 93	94 - 103	15	1		41	5	2
84 - 93	104 – 113	19	5	1	81	34	14
84 - 93	114 – 123		5	2	7	69	27
84 - 93	124 – 133				1	3	9
84 - 93	134+						6
94 - 103	94 - 103	4	1		7	2	
94 - 103	104 – 113	53	5	1	165	33	2
94 - 103	114 – 123	31	5	7	82	38	32
94 - 103	124 – 133	2	2	2		19	13
94 - 103	134+				1		
104 – 113	104 – 113	18			59	7	
104 – 113	114 – 123	38	15	3	109	64	9
104 – 113	124 – 133	7	8	4	15	18	18
104 – 113	134+						
114 – 123	114 – 123	17	2		72	9	
114 – 123	124 – 133	27	10	2	72	38	10
114 – 123	134+	5	1		19	6	3
124 – 133	124 – 133	15			41	9	1
124 – 133	134+	10	4	2	15	12	7
134+	134+	15	6	1	11	2	

Table 11. Summary of initial input parameter values and bounds for a length-based population model of Norton Sound red king crab. Parameters with "log_" indicate log scaled parameters.

Parameter	Parameter description	Lower	Upper
$\log\_q_{1,2}$	Commercial fishery catchability (1977-92, 1993-2017)	-20.5	20
$\log\_N_{76}$	Initial abundance	2.0	15.0
R_0	Mean Recruit	2.0	12.0
$\log\ \sigma_R^2$	Recruit standard deviation	-40.0	40.0
$a_{1\text{-}7}$	Intimal length proportion	0	10.0
r_1	Proportion of length class 1 for recruit	0	10.0
$\log\_\alpha$	Inverse logistic molting parameter	-5.0	-1.0
$\log\_\beta$	Inverse logistic molting parameter	1.0	5.5
$\log\_\phi_{st1}$	Logistic trawl selectivity parameter	-5.0	1.0
$\log\_\phi_{wa}$	Inverse logistic winter pot selectivity parameter	-5.0	1.0
$\log\_\phi_{wb}$	Inverse logistic winter pot selectivity parameter	0.0	6.0
$Sw_{1,2}$	Winter pot selectivity of length class 1,2	0.1	1.0
$\log\_\phi_1$	Logistic commercial catch selectivity parameter	-5.0	1.0
$\log\_\phi_2$	Logistic commercial catch selectivity parameter	0.0	6.0
log_acr	Logistic summer commercial retention selectivity parameter	-5.0	1.0
log_bcr	Logistic summer commercial retention selectivity parameter	0.0	6.0
log_awr	Logistic winter commercial retention selectivity parameter	-5.0	1.0
log_bwr	Logistic winter commercial retention selectivity parameter	0.0	6.0
w^2_t	Additional variance for standard CPUE	0.0	6.0
ms	Natural mortality multipliers	0.5	5.0
q	Survey q for NMFS trawl 1976-91	0.1	1.0
σ	Growth transition sigma	0.0	30.0
β_1	Growth transition mean	0.0	20.0
β_2	Growth transition increment	0.0	20.0

Table 12. Summary of parameter estimates and standard deviations of Norton Sound red king crab. (Model 18.2a)

name	Estimate	std.dev
$\log\_q_1$	-6.983	0.177
$\log\_q_2$	-6.791	0.124
$\log\_N_{76}$	9.050	0.130
R_0	6.430	0.082
$\log\_R_{76}$	0.006	0.420
$\log\_R_{77}$	-0.539	0.371
$\log\_R_{78}$	-0.712	0.355
$\log\_R_{79}$	0.402	0.319
$\log\_R_{80}$	0.516	0.289
$\log\_R_{81}$	0.425	0.266
$\log\_R_{82}$	0.398	0.319
$\log\_R_{83}$	0.575	0.281
$\log\_R_{84}$	0.183	0.300
$\log\_R_{85}$	0.365	0.325
$\log\_R_{86}$	0.094	0.340
$\log\_R_{87}$	0.218	0.269
$\log\_R_{88}$	0.025	0.305
$\log\_R_{89}$	-0.413	0.320
$\log\_R_{90}$	-0.319	0.272
$\log\_R_{91}$	-0.739	0.337
$\log\_R_{92}$	-0.510	0.309
$\log\_R_{93}$	-0.525	0.306
$\log\_R_{94}$	-0.310	0.261
$\log\_R_{95}$	-0.062	0.226
$\log\_R_{96}$	0.583	0.218
$\log\_R_{97}$	-0.046	0.300
$\log\_R_{98}$	-0.627	0.321
$\log\_R_{99}$	0.002	0.310
$\log\_R_{00}$	0.308	0.266
$\log\_R_{01}$	0.386	0.243
$\log\_R_{02}$	-0.020	0.316
$\log\_R_{03}$	-0.283	0.331
$\log\_R_{04}$	0.293	0.242
$\log\_R_{05}$	0.404	0.224
$\log\_R_{06}$	0.450	0.243
$\log\_R_{07}$	0.502	0.231
$\log\_R_{08}$	0.047	0.290

name	Estimate	std.dev
$\log\_R_{09}$	-0.422	0.292
$\log\_R_{10}$	0.011	0.246
$\log\_R_{11}$	0.305	0.279
$\log\_R_{12}$	0.934	0.183
$\log\_R_{13}$	-0.132	0.295
$\log\_R_{14}$	-0.650	0.312
$\log\_R_{15}$	-0.730	0.280
$\log\_R_{16}$	-0.428	0.242
$\log\_R_{17}$	0.036	0.285
a_1	1.545	4.574
a_2	2.347	4.264
a_3	3.801	4.074
a_4	4.077	4.059
a_5	4.318	4.050
a_6	3.553	4.079
a_7	2.115	4.341
r1	10.000	0.841
r2	9.677	0.865
log_a	-2.637	0.093
log_b	4.832	0.015
$\log\_\phi_{st1}$	-5.000	0.093
$\log\_\phi_{wa}$	-2.230	0.313
$\log\_\phi_{wb}$	4.798	0.033
Sw1	0.073	0.035
Sw2	0.489	0.127
$\log\_\phi_1$	-1.987	0.089
log_acr	-0.830	0.206
log_bcr	4.646	0.012
log_awr	-0.830	0.206
log_bwr	4.646	0.012
w^2_t	0.052	0.016
q	0.750	0.129
σ	3.935	0.214
β_1	12.080	0.768
β_2	7.714	0.183
ms78	3.238	0.270

Table 13. Estimated selectivity, mortality, molting probabilities, and proportions of legal crab by length class (mm CL) for Norton Sound male red king crab (Model 18.2a).

Length Class	Legal Proportion	Summer Com Retention	Winter Com Retention	Mean weight (lb)	Natural mortality (*M*)	Selectivity			
						Trawl	Winter Pot	Summer Fishery	Molting Probability
64 - 73	0.00	0.00	0.00	0.44	0.18	1.00	0.07	0.06	0.98
74 - 83	0.00	0.00	0.00	0.87	0.18	1.00	0.50	0.21	0.97
84 - 93	0.00	0.00	0.00	1.31	0.18	1.00	0.98	0.51	0.93
94 - 103	0.14	0.08	0.08	1.80	0.18	1.00	0.94	0.81	0.87
104 - 113	0.88	0.87	0.79	2.37	0.18	1.00	0.82	0.94	0.77
114 - 123	1.00	1.00	1.00	3.04	0.18	1.00	0.58	0.98	0.62
124 - 133	1.00	1.00	1.00	3.80	0.58	1.00	0.30	1.00	0.44
134+	1.00	1.00	1.00	4.60	0.58	1.00	0.11	1.00	0.28

Table 14. Estimated molting probability incorporated transition matrix (Model 18.2a).

Pre-molt Length Class	Post-molt Length Class							
	64-73	74-83	84-93	94-103	104-113	114-123	124-133	134+
64 - 73	0.02	0.11	0.78	0.09	0.00	0.00	0.00	0.00
74 - 83		0.03	0.25	0.69	0.03	0.00	0.00	0.00
84 - 93			0.07	0.44	0.48	0.01	0.00	0.00
94 - 103				0.15	0.59	0.27	0.00	0.00
104 - 113					0.29	0.61	0.10	0.00
114 - 123						0.50	0.47	0.03
124 - 133							0.73	0.27
134+								1.00

Table 15. Annual abundance estimates (million crab) and mature male biomass (Feb 01) (MMB, million lb) for Norton Sound red king crab estimated by a length-based analysis from 1976 to 2018.

	Abundance			Legal (≥ 104 mm)		MMB
Year	Recruits	Total (≥ 64 mm)	Mature (≥ 94 mm)	Abundance	Biomass	Biomass
1976	2.14	8.52	6.38	4.07	10.85	15.20
1977	0.94	7.49	6.56	5.25	15.09	17.63
1978	0.72	6.00	5.28	4.72	14.70	15.80
1979	0.53	4.18	3.64	3.30	10.84	11.51
1980	1.11	3.11	2.00	1.77	5.93	6.36
1981	1.55	3.07	1.52	1.16	3.87	4.53
1982	1.55	2.98	1.43	0.89	2.70	3.69
1983	1.49	3.24	1.76	1.16	3.37	4.49
1984	1.65	3.56	1.92	1.33	3.89	4.98
1985	1.39	3.45	2.07	1.45	4.27	5.44
1986	1.35	3.49	2.14	1.56	4.65	5.73
1987	1.20	3.28	2.08	1.55	4.68	5.68
1988	1.19	3.24	2.06	1.56	4.77	5.70
1989	1.09	3.09	2.01	1.54	4.76	5.64
1990	0.79	2.73	1.94	1.50	4.65	5.49
1991	0.71	2.49	1.78	1.43	4.48	5.15
1992	0.56	2.18	1.62	1.32	4.22	4.77
1993	0.56	1.98	1.42	1.18	3.80	4.26
1994	0.58	1.75	1.17	0.95	3.07	3.49
1995	0.67	1.68	1.01	0.78	2.50	2.92
1996	0.85	1.77	0.92	0.67	2.11	2.57
1997	1.45	2.43	0.98	0.68	2.06	2.63
1998	1.22	2.51	1.29	0.80	2.37	3.28
1999	0.71	2.33	1.62	1.12	3.23	4.18
2000	0.83	2.45	1.62	1.28	3.82	4.47
2001	1.20	2.65	1.46	1.14	3.54	4.14
2002	1.40	2.90	1.50	1.08	3.33	4.12
2003	1.14	2.81	1.67	1.15	3.47	4.43
2004	0.84	2.59	1.74	1.27	3.78	4.68
2005	1.12	2.74	1.63	1.26	3.83	4.52
2006	1.40	2.95	1.55	1.15	3.53	4.28
2007	1.52	3.16	1.64	1.13	3.42	4.37
2008	1.60	3.41	1.82	1.25	3.70	4.77
2009	1.25	3.22	1.97	1.36	4.02	5.15
2010	0.81	2.82	2.00	1.48	4.38	5.38
2011	0.88	2.68	1.80	1.43	4.34	5.05
2012	1.20	2.78	1.58	1.25	3.89	4.52
2013	2.06	3.59	1.53	1.10	3.40	4.20
2014	1.43	3.25	1.81	1.13	3.37	4.64
2015	0.70	2.76	2.06	1.44	4.14	5.32
2016	0.51	2.29	1.79	1.44	4.29	4.96
2017	0.58	2.02	1.43	1.21	3.77	4.20
2018	0.88	2.03	1.16	0.93	3.00	3.41

Table 16. Summary of catch and estimated discards (million lb) for Norton Sound red king crab. Assumed average crab weight is 2.0 lb for winter subsistence catch and 1.0 lb for Winter subsistence discards. Summer and winter commercial discards were estimated from the model.

Year	Summer Com	Winter Com	Winter Sub	Modeled Discards Summer	Discards Winter Sub	Modeled Discards Winter Com	Total	Catch/ MMB
1977	0.52	0.000	0.000	0.019	0.000	0.000	0.539	0.031
1978	2.09	0.024	0.025	0.035	0.008	0.001	2.183	0.138
1979	2.93	0.001	0.000	0.046	0.000	0.000	2.977	0.259
1980	1.19	0.000	0.000	0.023	0.000	0.000	1.213	0.191
1981	1.38	0.000	0.001	0.066	0.000	0.000	1.447	0.319
1982	0.23	0.000	0.003	0.019	0.001	0.000	0.253	0.069
1983	0.37	0.001	0.021	0.032	0.006	0.000	0.43	0.096
1984	0.39	0.002	0.022	0.029	0.005	0.000	0.448	0.090
1985	0.43	0.003	0.017	0.030	0.002	0.000	0.482	0.089
1986	0.48	0.005	0.014	0.027	0.004	0.001	0.531	0.093
1987	0.33	0.003	0.012	0.017	0.002	0.000	0.364	0.064
1988	0.24	0.001	0.005	0.011	0.001	0.000	0.258	0.045
1989	0.25	0.000	0.012	0.011	0.002	0.000	0.275	0.049
1990	0.19	0.010	0.024	0.008	0.004	0.001	0.237	0.043
1991	0	0.010	0.015	0	0.002	0.001	0.028	0.005
1992	0.07	0.021	0.023	0.003	0.003	0.001	0.121	0.025
1993	0.33	0.005	0.002	0.011	0.000	0.000	0.348	0.082
1994	0.32	0.017	0.008	0.012	0.001	0.001	0.359	0.103
1995	0.32	0.022	0.011	0.015	0.002	0.002	0.372	0.127
1996	0.22	0.005	0.003	0.014	0.001	0.001	0.244	0.095
1997	0.09	0.000	0.001	0.008	0.001	0.000	0.1	0.038
1998	0.03	0.002	0.017	0.003	0.012	0.001	0.065	0.020
1999	0.02	0.007	0.015	0.002	0.003	0.001	0.048	0.011
2000	0.3	0.008	0.011	0.013	0.004	0.001	0.337	0.075
2001	0.28	0.003	0.001	0.014	0.000	0.000	0.298	0.072
2002	0.25	0.007	0.004	0.017	0.003	0.001	0.282	0.068
2003	0.26	0.017	0.008	0.020	0.005	0.002	0.312	0.070
2004	0.34	0.001	0.002	0.020	0.001	0.000	0.364	0.078
2005	0.4	0.006	0.008	0.019	0.003	0.001	0.437	0.097
2006	0.45	0.000	0.002	0.027	0.001	0.000	0.48	0.112
2007	0.31	0.008	0.021	0.025	0.011	0.001	0.376	0.086
2008	0.39	0.015	0.019	0.032	0.009	0.002	0.467	0.098
2009	0.4	0.012	0.010	0.030	0.002	0.002	0.456	0.088
2010	0.42	0.012	0.014	0.024	0.002	0.001	0.473	0.088
2011	0.4	0.009	0.013	0.017	0.003	0.001	0.443	0.088
2012	0.47	0.025	0.015	0.022	0.004	0.002	0.538	0.119
2013	0.35	0.061	0.015	0.028	0.014	0.010	0.478	0.114
2014	0.39	0.035	0.007	0.039	0.002	0.008	0.481	0.104
2015	0.40	0.099	0.019	0.026	0.005	0.010	0.559	0.105
2016	0.42	0.080	0.011	0.015	0.001	0.005	0.532	0.107
2017	0.41	0.078	0.012	0.012	0.001	0.004	0.517	0.123
2018	0.30	0.029	0.008	0.011	0.002	0.002	0.352	0.103